Ingersoll-Rand

Utility Equipment

C8.3 CUMMINS ENGINE OPERATION & MAINTENANCE MANUAL FOR:

HP675WCU

XP825WCU
HP750WCU
XP750WCU

CODE: D

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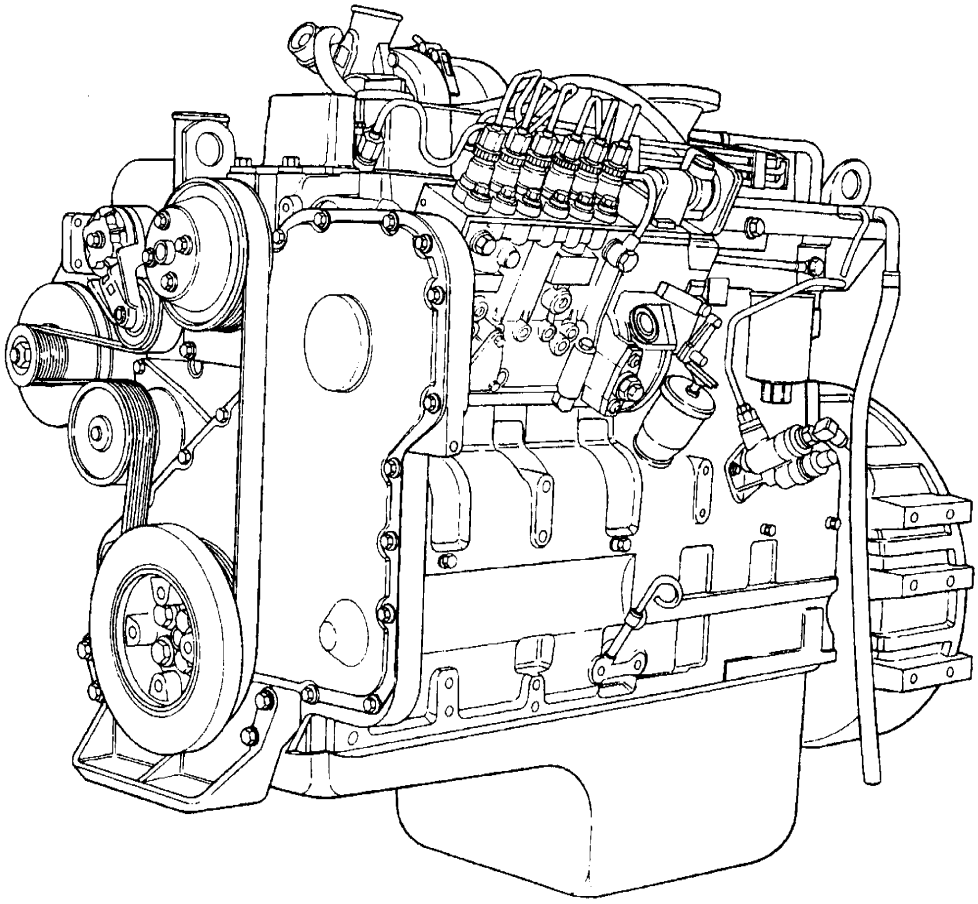
Operation and Maintenance Manual
Industrial C8.3 Series Engine



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Foreword

This manual contains information for the correct operation and maintenance of your Cummins engine. It also includes important safety information, engine and systems specifications, troubleshooting guidelines, and listings of Cummins Authorized Repair Locations and component manufacturers.

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. These parts can be identified by the following trademarks:

NOTE: 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

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.

Part Name	Part Number	Part 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 Filter		
• Fuel		
• Fuel-Water Separator		
• Coolant		
• Remote Gas		
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		

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Section i - Introduction

Section Contents

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To the Owner and Operator

General Information

Preventive maintenance is the easiest and least expensive type of maintenance. Follow the maintenance schedule recommendations outlined in Maintenance Guidelines (Section 2).

Keep records of regularly scheduled maintenance.

Use the correct fuel, lubricating oil, and coolant in your engine as specified in Maintenance Specifications (Section V).

Cummins Inc. uses the latest technology and the highest quality components to produce its engines. Cummins Inc. recommends using genuine Cummins new parts and ReCon® exchange parts.

Personnel at Cummins Authorized Repair Locations have been trained to provide expert service and parts support. If you have a problem that can **not** be resolved by a Cummins Authorized Repair Location, follow the steps outlined in the Service Assistance (Section S).

Product coverage, warranty limitations and owner responsibilities are available in Warranty (Section W).

⚠ CAUTION ⚠

Disconnect both the positive (+) and negative (-) battery cables from the battery before welding on the vehicle. Attach the welder ground cable no more than 0.61 meters [2 feet] from the part being welded. Do not connect the ground cable of the welder to the ECM cooling plate or ECM. Welding on the engine or engine mounted components is not recommended.

About the Manual

General Information

This manual contains information needed to correctly operate and maintain your engine as recommended by Cummins Inc. For additional service literature and ordering locations, refer to Service Literature (Section L).

This manual does not cover vehicle, vessel, or equipment maintenance procedures. Consult the original vehicle, vessel, or equipment manufacturer for specific maintenance recommendations.

Both metric and U.S. customary values are listed in this manual. The metric value is listed first, followed by the U.S. customary in brackets.

Numerous illustrations and symbols are used to aid in understanding the meaning of the text. Refer to Symbols in this section for a complete listing of symbols and their definitions.

Each section of the manual is preceded by a Section Contents to aid in locating information.

How to Use the Manual

General Information

This manual is organized according to intervals at which maintenance on your engine is to be performed. A maintenance schedule, that states the required intervals and maintenance checks, is located in Maintenance Guidelines (Section 2). Locate the interval at which you are performing maintenance; then follow the steps given in that section for all the procedures to be performed.

Keep a record of all the checks and inspections made. A maintenance record form is located in Maintenance Guidelines (Section 2).

Engine troubleshooting procedures for your engine are located in Troubleshooting Symptoms (Section TS).

Specifications for your engine are located in Maintenance Specifications (Section V).

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.**

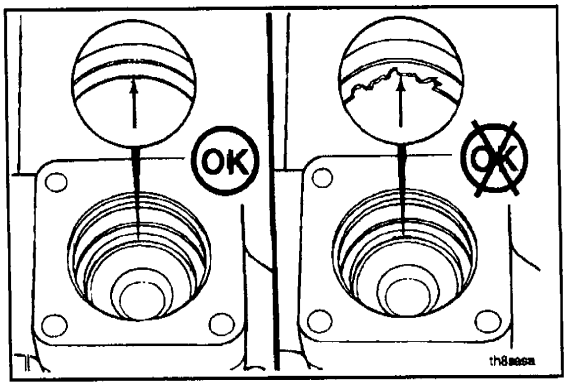
Refer to another location in this manual or another publication for additional information.

The component weighs 23 kg [50 lbs] or more. To reduce the possibility of personal injury, use a hoist or get assistance to lift the component. 17800009

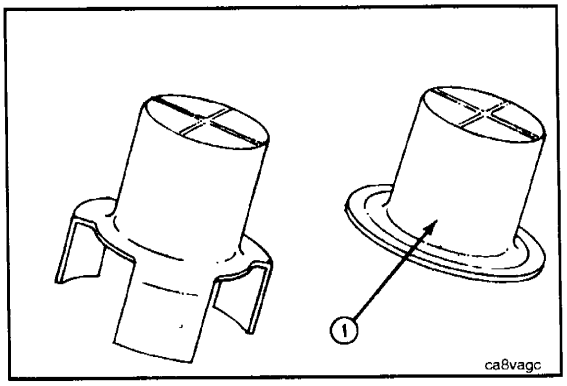
Illustrations

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

⚠ WARNING ⚠

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, 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.
- 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.
- Liquified petroleum gas is heavier than air and can accumulate near the floor, in sumps, and low-lying areas.
- Natural gas is lighter than air and can accumulate under hood and awnings.
- To reduce the possibility of suffocation and frostbite, wear protective clothing and ONLY disconnect natural gas and liquified petroleum gas lines in a well ventilated area.
- Coolant is toxic. If **not** reused, dispose of in accordance with local environmental regulations.

General Repair Instructions

General Information

This engine incorporates the latest technology at the time it was manufactured; yet, it is designed to be repaired using normal repair practices performed to quality standards.

- **Cummins Inc. does not recommend or authorize any modifications or repairs to engines or components except for those detailed in Cummins Service Information. In particular, unauthorized repair to safety-related components can cause personal injury or death. Below is a partial listing of components classified as safety-related:**

Air Compressor
Air Controls
Air Shutoff Assemblies
Balance Weights
Cooling Fan
Fan Hub Assembly
Fan Mounting Bracket(s)
Fan Mounting Capscrews
Fan Hub Spindle
Flywheel
Flywheel Crankshaft Adapter
Flywheel Mounting Capscrews
Fuel Shutoff Assemblies
Fuel Supply Tubes
Lifting Brackets
Throttle Controls
Turbocharger Compressor Casing
Turbocharger Oil Drain Line(s)
Turbocharger Oil Supply Line(s)
Turbocharger Turbine Casing
Vibration Damper Mounting Capscrews

- **Follow all safety instructions noted in the procedures**
  - — Follow the manufacturer's recommendations for cleaning solvents and other substances used during the repair of the engine. Some solvents and used engine oil have been identified by government agencies as toxic or carcinogenic. Avoid excessive breathing, ingestion and contact with such substances. **Always** use good safety practices with tools and equipment.
- **Provide a clean environment and follow the cleaning instructions specified in the procedures**
  - — The engine and its components **must** be kept clean during any repair. Contamination of the engine or components will cause premature wear.
- **Perform the inspections specified in the procedures**
- **Replace all components or assemblies which are damaged or worn beyond the specifications**
- **Use genuine Cummins new or ReCon® service parts and assemblies**
  - — The assembly instructions have been written to use again as many components and assemblies as possible. When it is necessary to replace a component or assembly, the procedure is based on the use of new Cummins or Cummins ReCon® components. All of the repair services described in this manual are available from all Cummins Distributors and most Dealer locations.
- **Follow the specified disassembly and assembly procedures to reduce the possibility of damage to the components**

Complete rebuild instructions are available in the shop manual which can be ordered or purchased from a Cummins Authorized Repair Location. Refer to Section L — Service Literature for ordering instructions.

Welding on a Vehicle with an Electronic Controlled Fuel System

△ CAUTION △

Disconnect both the positive (+) and negative (-) battery cables from the battery before welding on the vehicle. Attach the welder ground cable no more than 0.61 meters [2 feet] from the part being welded. Do not connect the ground cable of the welder to the ECM cooling plate or ECM. Welding on the engine or engine mounted components is not recommended or damage to the engine or components can result.

General Cleaning Instructions

Solvent and Acid Cleaning

Several solvent and acid-type cleaners can be used to clean the engine parts. Experience has shown that the best results can be obtained using a cleaner that can be heated to 90 to 95 degrees Celsius [180 to 200 degrees Fahrenheit]. A cleaning tank that provides a constant mixing and filtering of the cleaning solution will give the best results. **Cummins**

Inc. does not recommend any specific cleaners. Always follow the cleaner manufacturer's instructions.

Remove all the gasket material, o-rings, and the deposits of sludge, carbon, etc., with a wire brush or scraper before putting the parts in a cleaning tank. Be careful **not** to damage any gasket surfaces. When possible, steam clean the parts before putting them in the cleaning tank.

⚠ WARNING ⚠

Acid is extremely dangerous and can cause personal injury and damage the machinery. Always provide a tank of strong soda water as a neutralizing agent. Wear goggles and protective clothing to reduce the possibility of serious personal injury.

Rinse all of the parts in hot water after cleaning. Dry completely with compressed air. Blow the rinse water from all of the capscrew holes and the oil drillings.

If the parts are **not** to be used immediately after cleaning, dip them in a suitable rustproofing compound. The rustproofing compound **must** be removed from the parts before installation on the engine.

Steam Cleaning

Steam cleaning can be used to remove all types of dirt that can contaminate the cleaning tank. It is a good way to clean the oil drillings.

⚠ WARNING ⚠

When using a steam cleaner, wear safety glasses or a face shield, as well as protective clothing. Hot steam can cause serious personal injury.

Do **not** steam clean the following parts:

1. Electrical Components
2. Wiring
3. Injectors
4. Fuel Pump
5. Belts and Hoses
6. Bearings
7. Electronic Control Module (ECM)
8. ECM Connectors

Glass or Plastic Bead Cleaning

Glass or plastic bead cleaning can be used on many engine components to remove carbon deposits. The cleaning process is controlled by the size of the glass or plastic beads, the operating pressure, and the cleaning time.

△ CAUTION △

Do not use glass or plastic bead cleaning on aluminum piston skirts. Do not use glass bead cleaning on aluminum ring grooves. Small particles of glass or plastic will embed in the aluminum and result in premature wear. Valves, turbocharger shafts, etc., can also be damaged. Follow the cleaning directions listed in the procedures.

NOTE: Plastic bead blasting media, Part No. 3822735, can be used to clean aluminum ring grooves. Do **not** use any bead blasting media on pin bores or aluminum skirts.

Follow the equipment manufacturer's cleaning instructions. The following guidelines can be used to adapt to manufacturer's instructions:

1. Bead size:
   a. Use U.S. size No. 16-20 for piston cleaning with plastic bead media, Part No. 3822735.
   b. Use U.S. size No. 70 for piston domes with glass media.
   c. Use U.S. size No. 60 for general purpose cleaning with glass media.
2. Operating Pressure:
   a. Glass: Use 620 kPa [90 psi] for general purpose cleaning.
   b. Plastic: Use 270 kPa [40 psi] for piston cleaning.
3. Steam clean or wash the parts with solvent to remove all of the foreign material and glass or plastic beads after cleaning. Rinse with hot water. Dry with compressed air.
4. Do **not** contaminate the wash tanks with glass or plastic beads.

Acronyms and Abbreviations

General Information

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

API	American Petroleum Institute
ASTM	American Society of Testing and Materials
°C	Celsius
CARB	California Air Resources Board
C.I.D.	Cubic Inch Displacement
CNG	Compressed Natural Gas
CPL	Control Parts List
cSt	Centistokes
ECM	Electronic Control Module
EGR	Exhaust Gas Recirculation
EPA	Environmental Protection Agency
°F	Fahrenheit
FMI	Failure Mode Indentifier
GVW	Gross Vehicle Weight
LPG	Liquified Petroleum Gas
Hg	Mercury
hp	Horsepower
H_2O	Water
ICM	Ignition Control Module
km/l	Kilometers per Liter
kPa	Kilopascal
LNG	Liquid Natural Gas
LTA	Low Temperature Aftercooling
MPa	Megapascal
mph	Miles Per Hour
mpq	Miles Per Quart
N•m	Newton-meter
NG	Natural Gas
OEM	Original Equipment Manufacturer
PID	Parameter Identification Descriptions
ppm	Parts Per Million
psi	Pounds Per Square Inch
PTO	Power Takeoff
rpm	Revolutions Per Minute
SAE	Society of Automotive Engineers
SCA	Supplemental Coolant Additive
STC	Step Timing Control
SID	Subsystem Identification Descriptions
VS	Variable Speed
VSS	Vehicle Speed Sensor

NOTES

Section E - Engine and System Identification

Section Contents

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Engine Identification

Engine Dataplate

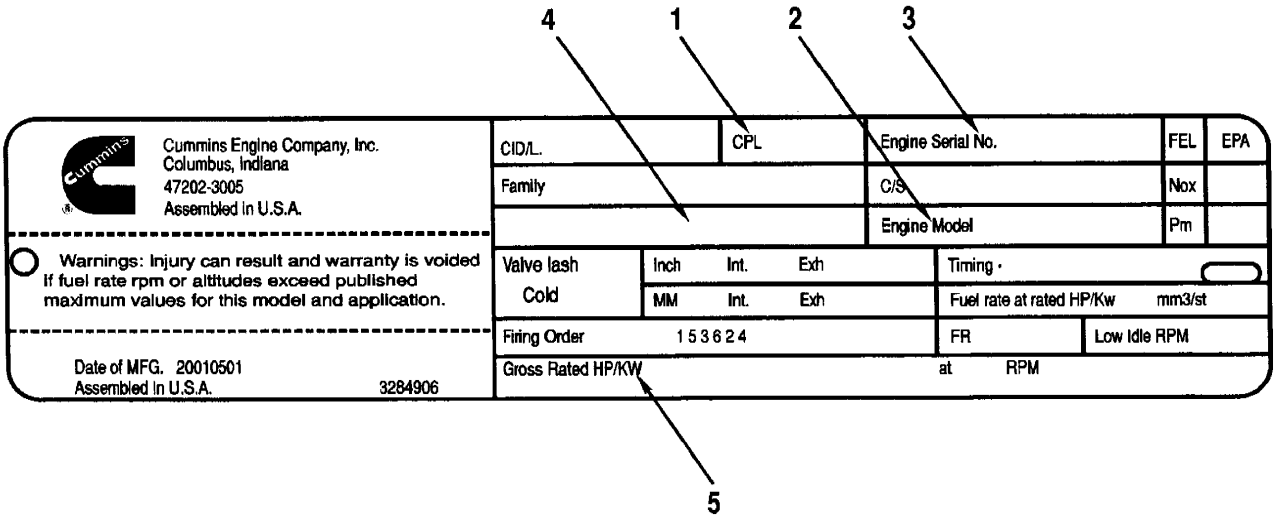
Industrial Applications

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 Inc.

The 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.

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



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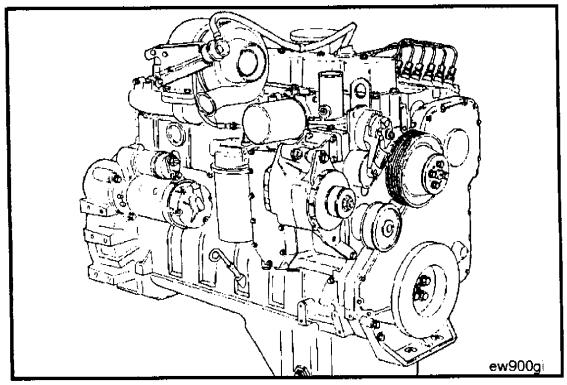


Cummins Engine Nomenclature

Industrial Applications

The following example shows a model name of an engine for industrial applications:

Example: 6CTAA8.3

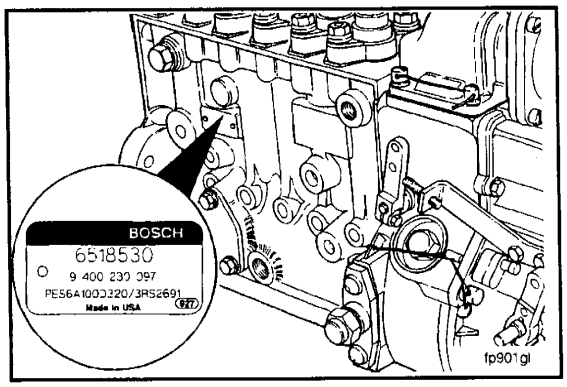
8.3 = displacement in liters

AA = charge air aftercooled

T = turbocharged

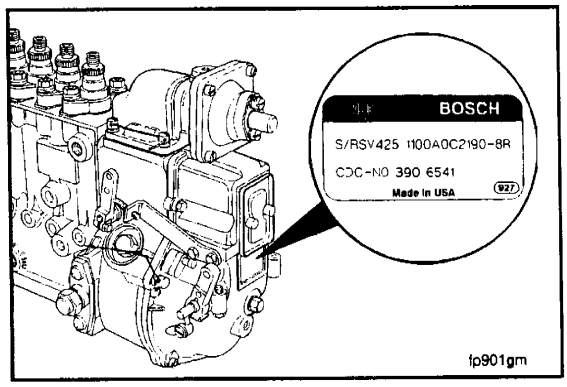
C = engine series

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.



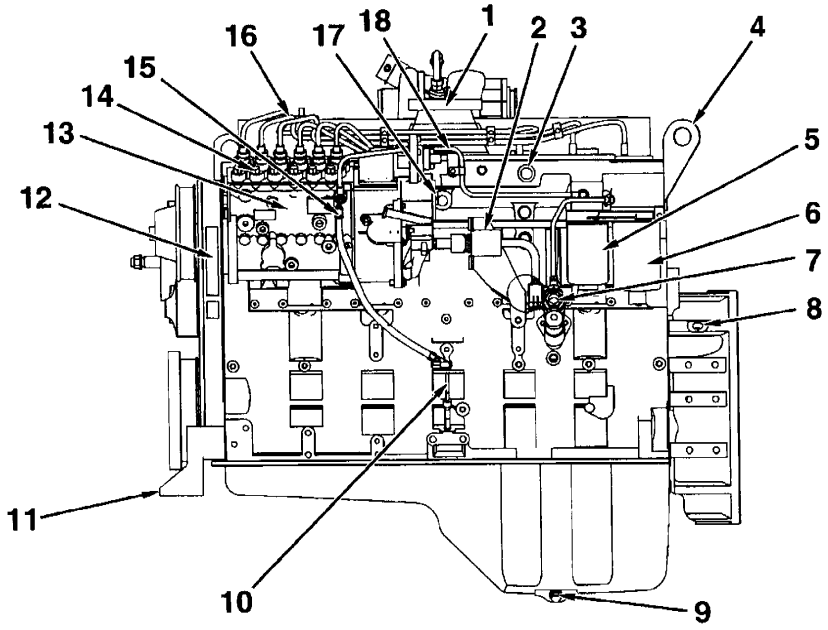
The Cummins part number for the fuel pump-governor combination is located on the governor dataplate.

Engine Diagrams

Engine Views

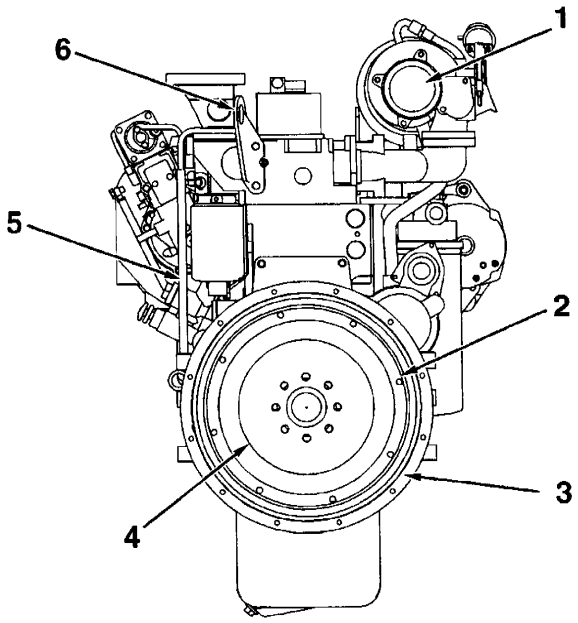
The following drawings illustrate the major components. You **must** be familiar with each component to conduct the maintenance and service procedures discussed in this manual.

NOTE: The drawings in this section reflect a standard configuration. Your engine will possibly be equipped with optional accessories such as port- or starboard-side dipsticks. Location of optional items can be different from those shown.



Fuel Pump Side View

1. Engine air inlet
2. Shutoff solenoid
3. M22 x 1.5 (air)
4. Rear lifting bracket
5. Fuel filter
6. Fuel/water separator
7. Fuel transfer pump
8. 3/4 x 16-inch UNF tap for magnetic pickup
9. Lubricating oil pan drain plug
10. Lubricating oil dipstick
11. Front engine mounting bracket
12. Engine dataplate
13. Fuel injection pump
14. Delivery valve
15. Fuel drain line
16. High-pressure fuel lines
17. 1/2-inch NPTF (air)
18. Intake air heater.



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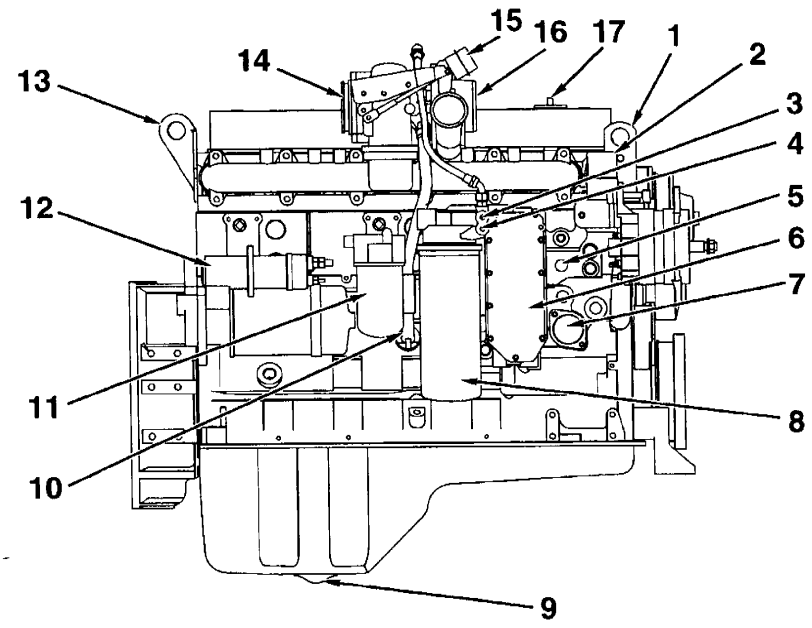
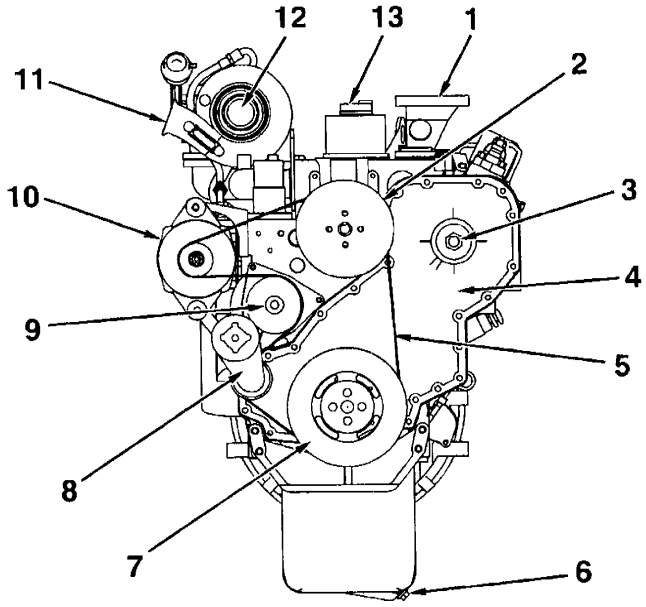
Rear View

1. Turbocharger exhaust outlet
2. Flexplate mounting holes
3. Flywheel housing
4. Flywheel
5. Crankcase breather tube
6. Rear engine lifting bracket.



Exhaust Side View

1. Front engine lifting bracket
2. Water/coolant outlet connection
3. Lubricating oil pressure (after filter)
4. Lubricating oil pressure (before filter)
5. Coolant heater port
6. Lubricating oil cooler
7. Water/coolant inlet
8. Lubricating oil filter
9. Lubricating oil pan drain plug
10. Turbocharger oil drain
11. Coolant filter
12. Starting motor
13. Rear engine lifting bracket
14. Turbocharger exhaust outlet
15. Turbocharger wastegate actuator
16. Turbocharger air outlet
17. Engine oil fill.



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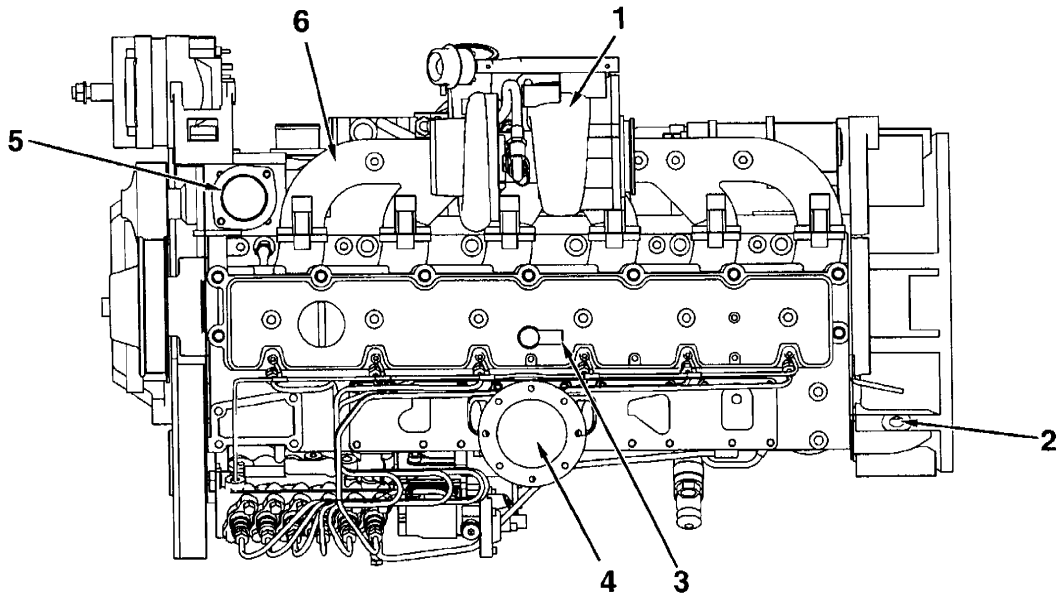
Front View

1. Engine air inlet
2. Fan pulley
3. Fuel pump drive cover
4. Front gear cover
5. Drive belt
6. Lubricating oil pan drain plug
7. Vibration damper
8. Fan belt tensioner
9. Water pump
10. Alternator
11. Turbocharger air outlet
12. Turbocharger air inlet
13. Engine oil fill.



Top View

1. Turbocharger
2. 3/4 x 16-inch UNF tap for magnetic pickup
3. Crankcase breather
4. Engine air inlet
5. Thermostat
6. Exhaust manifold.

NOTES

Section 1 - Operating Instructions

Section Contents

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Operating Instructions - Overview

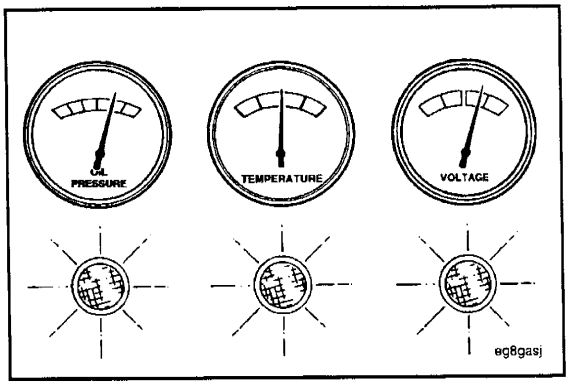
General Information

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

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

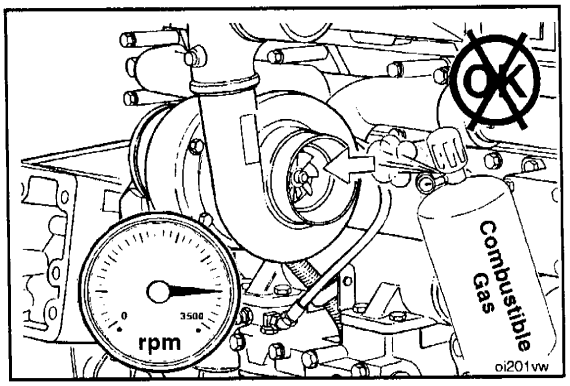
The **new** Cummins engine associated with this manual does **not** require a "break-in" procedure. This section of the manual provides all of the necessary information required for proper engine operation.

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

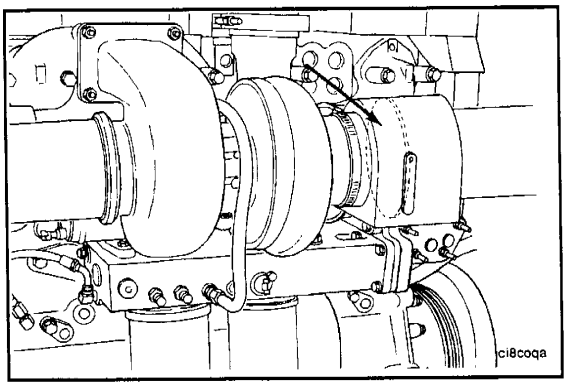


⚠ WARNING ⚠

DO NOT OPERATE A DIESEL ENGINE WHERE THERE ARE OR CAN BE COMBUSTIBLE VAPORS. The vapors can be sucked through the air intake system and cause engine acceleration and overspeeding 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 overspeeding where an engine, due to its application, due to a fuel spill or gas leak. Remember, Cummins 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 YOUR CUMMINS AUTHORIZED REPAIR LOCATION FOR FURTHER INFORMATION.

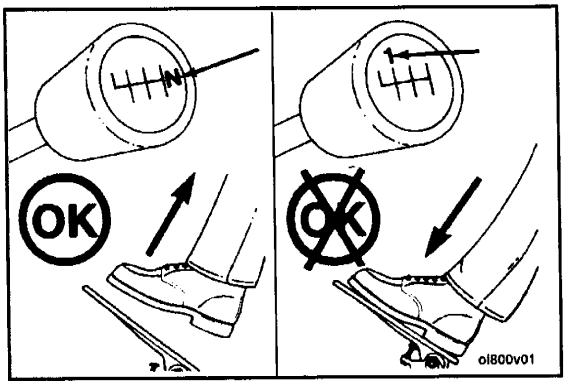


Cummins recommends the installation of an air intake shutoff device or a similar safety device to minimize the risk of overspeeding where an engine, due to the vehicle, vessel or equipment being operated in a combustible environment, such as due to a fuel spill or gas leak.



⚠ CAUTION ⚠

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



Normal Starting Procedure

General Information

⚠ WARNING ⚠

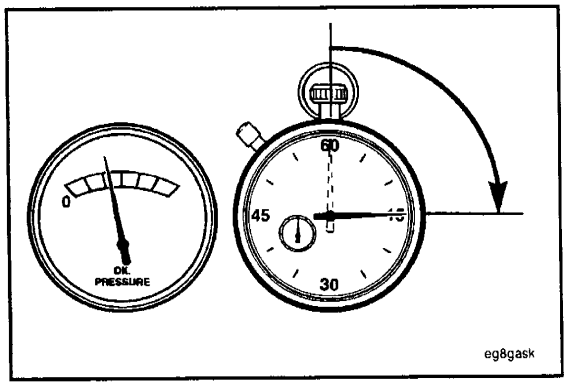
Do not depress the accelerator pedal or move the accelerator lever from the idle position while cranking the engine. This can result in engine overspeed and severe damage to the engine.

⚠ CAUTION ⚠

To prevent 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].

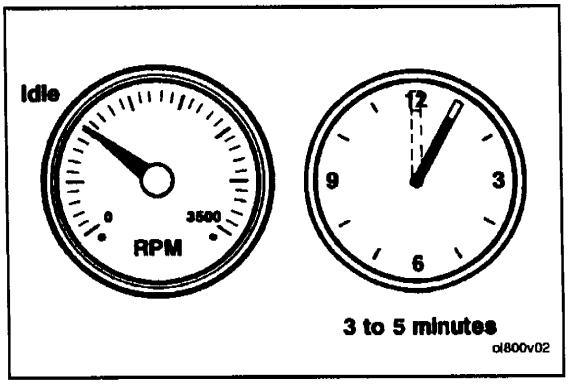
- Disengage the driven unit, or if equipped, put the transmission in neutral.
- With the accelerator pedal or lever in the idle position, turn the key switch to the ON position, and wait for the WAIT-TO-START lamp to go out; then, turn the key to the START position.
- If the engine does **not** start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



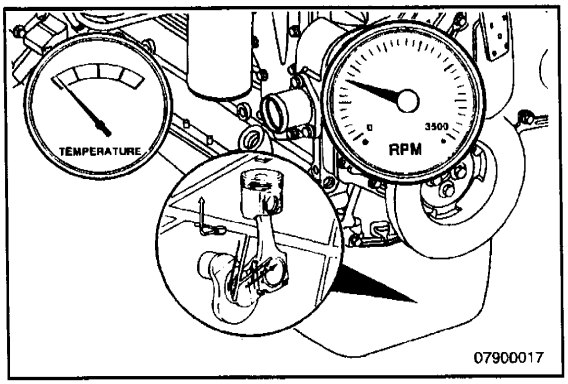
⚠ CAUTION ⚠

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.



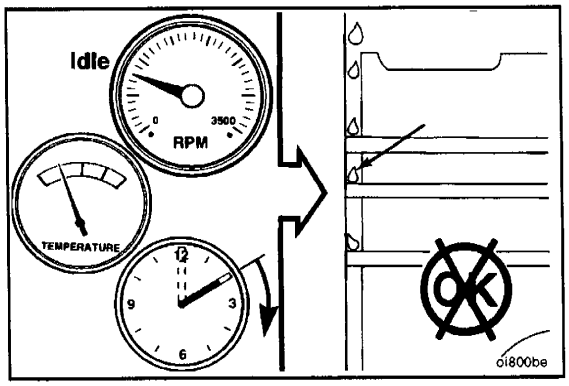
After starting a cold engine, increase the engine speed (rpm) slowly to provide adequate lubrication to the bearings and to allow the oil pressure to stabilize.



△ CAUTION △

Do not operate engine at low idle for long periods with engine coolant temperature below the minimum specification in Maintenance Specifications (Section V). 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 avoid personal injury, always ventilate the compartment before servicing the batteries. To avoid arcing, remove the negative (-) battery cable first and attach the negative (-) battery cable last.

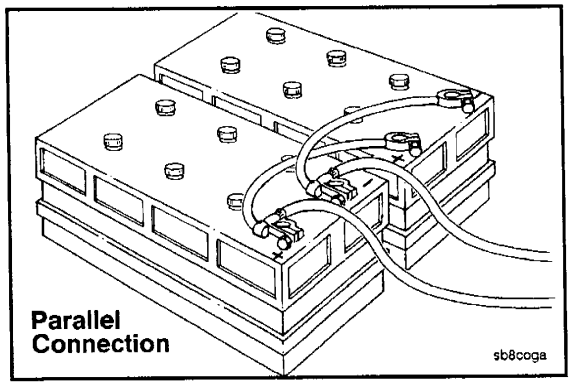
⚠ CAUTION ⚠

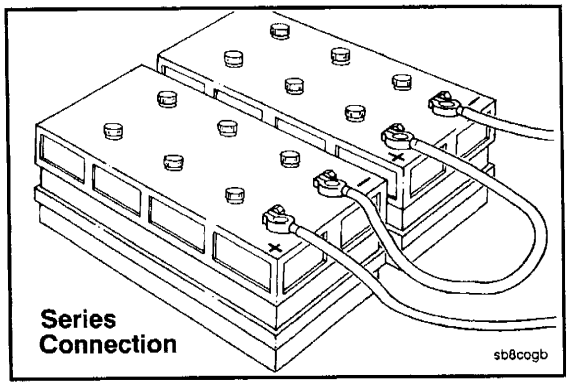
When using jumper cables to start the engine, make sure to connect the cables in parallel: Positive (+) to positive (+) and negative (-) to negative (-). When using an external electrical source to start the engine, turn the disconnect switch to the OFF position. Remove the key before attaching the jumper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

⚠ CAUTION ⚠

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

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





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

Cold Weather Starting

General Information

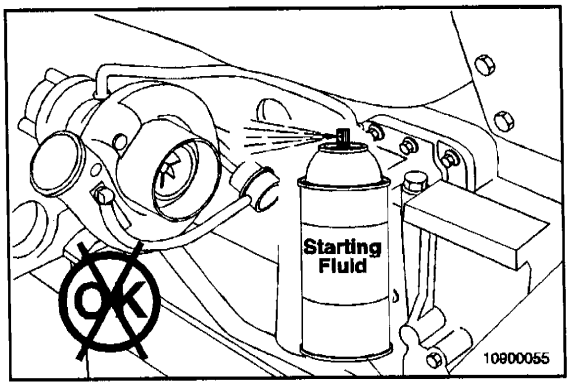
Follow the Normal Starting Procedures in this section. In cold weather, the Wait-To-Start lamp will stay on longer.

Using Starting Aids

⚠ WARNING ⚠

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

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



Starting Procedure After Extended Shutdown or Oil Change

General Information

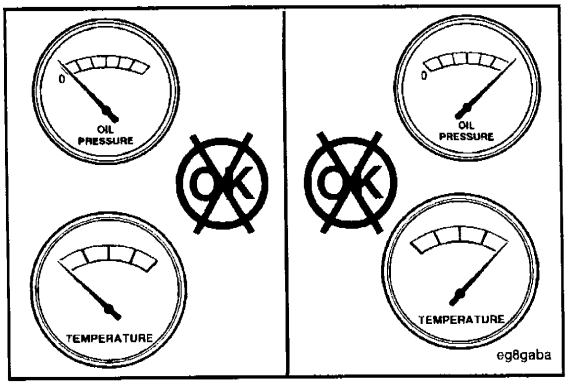
Follow the Normal Starting Procedure in this section. The engine will not start until the minimum cranking oil pressure is detected by the ECM. It can take more cranking time to start the engine after an extended shut down or oil change.

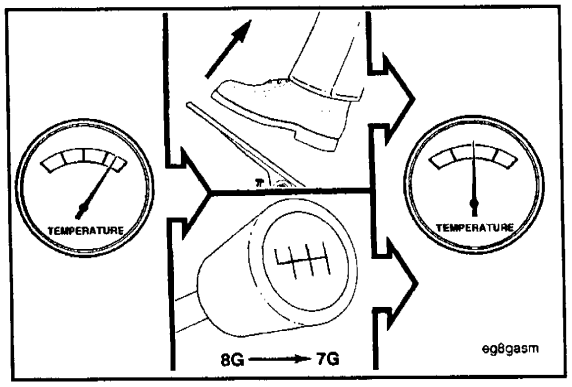
Operating the Engine

Normal

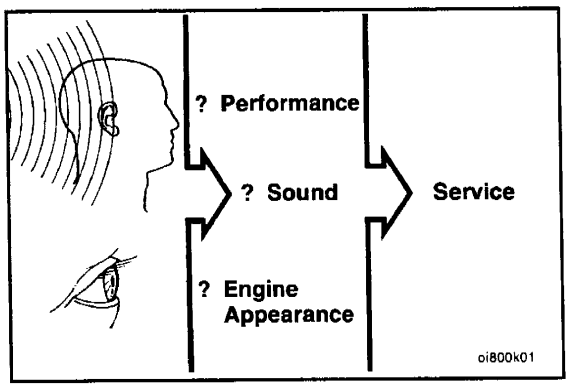
If equipped, monitor the oil pressure and coolant temperature gauges frequently. Refer to Lubricating Oil System specifications and Cooling System specifications, in Maintenance Specifications (Section V) for recommended operating pressures and temperatures. Shut off the engine if any pressure or temperature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

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





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



Most failures give an early warning. Look and listen for changes in performance, sound, or engine appearance that can indicate service or engine repair is needed. Some changes to look for are:

- Engine misfires
- Vibration
- Unusual engine noises
- Sudden changes in engine operating temperatures or pressures
- Excessive smoke
- Loss of power
- An increase in oil consumption
- An increase in fuel consumption
- Fuel, oil, or coolant leaks.

Cold Weather

It is possible to operate diesel engines in extremely cold environments if they are properly prepared and maintained. Satisfactory performance of a diesel engine in low ambient temperature conditions requires modification of the engine, surrounding equipment, operating practices and maintenance procedures.

The correct engine coolant lubricating oil and fuels **must** be used for the cold weather range in which the engine is being operated. Below are the recommendations for these critical engine fluids:

Ambient Temperature

0 to -32°C [32 to -25°F]

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

Refer to Maintenance Specifications (Section V) Lubricating Oil recommendations for the correct specifications.

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

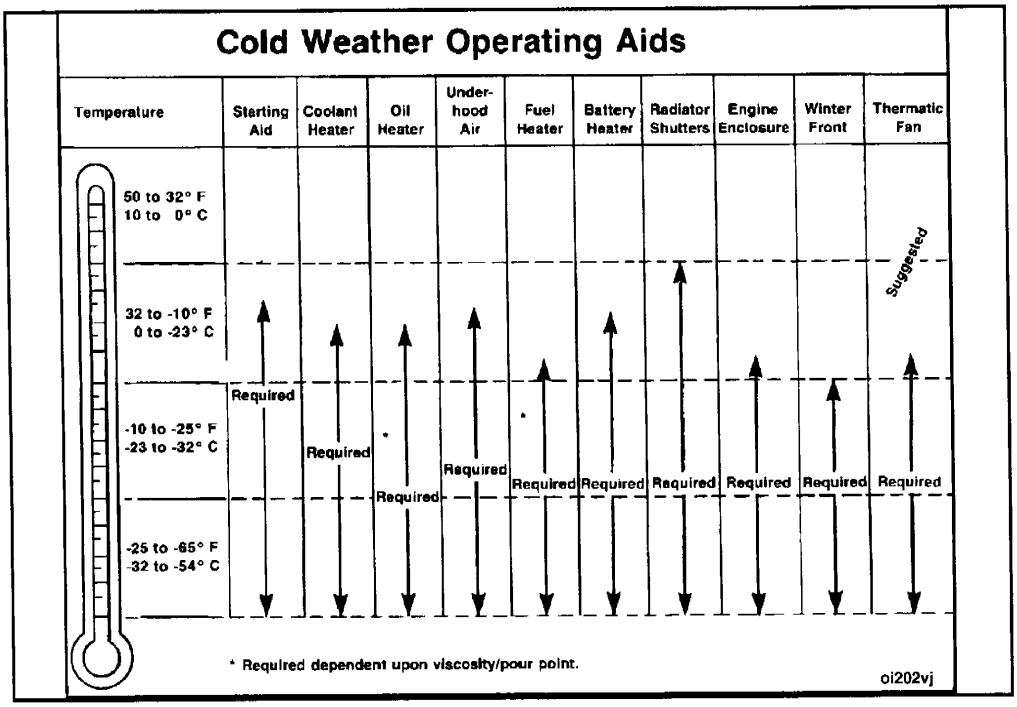
-32 to -54°C [-25 to -65°F]

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

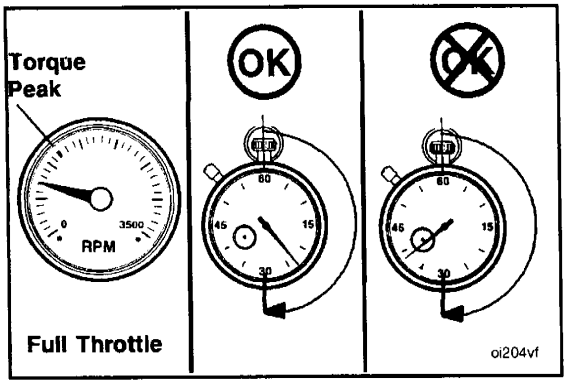
Refer to Maintenance Specifications (Section V) Lubricating Oil recommendations for the correct specifications.

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

The following cold weather operating aids are required for cold weather situations:



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

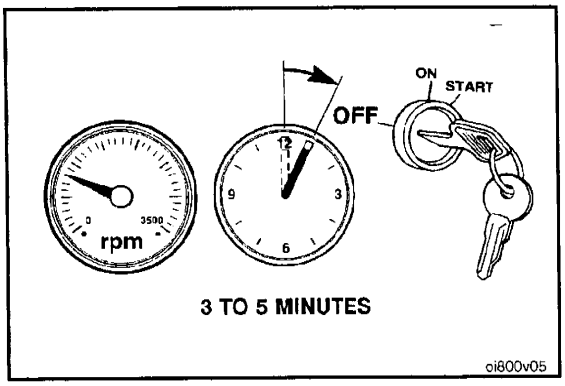
⚠ CAUTION ⚠

Do not operate the engine at full throttle operation 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).



Engine Shutdown

General Information

Allow the engine to idle 3 to 5 minutes before shutting it off after a full-load operation. This allows adequate cooldown of pistons, cylinders, bearings, and turbocharger components.

Turn the ignition keyswitch to the OFF position. If the engine does not shut down, refer to Troubleshooting Symptom (Section TS).

Section 2 - Maintenance Guidelines

Section Contents

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Maintenance Guidelines - Overview

General Information

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

If the engine 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 engine is operated in a dusty environment or if frequent stops are made. 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 engine is equipped with a component or accessory not manufactured by Cummins Inc., refer to the component manufacturer's maintenance recommendations.

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

Tool Requirements

General Information

The maintenance schedules **must** be used for routine and periodic maintenance. Perform each function at the indicated time interval. The intervals stated are for normal operating conditions. Service the unit more frequently under severe conditions. Neglecting maintenance can result in failures or permanent damage to the engine. If the engine is operating in ambient temperatures consistently below -18°C [0°F] or above 38°C [100°F], perform maintenance at shorter intervals.

Sockets		Wrenches	Other Tools
1/2-Inch Drive	**3/8-Inch Drive**		
19 mm	14 mm	28 mm	Ratchets, 1/2- and 3/8-inch drive
17 mm	13 mm	19 mm	Socket extensions, 1/2- and 3/8-inch long and short
15 mm	10 mm	18 mm	Socket universal joint, 3/8-inch drive
	8 mm	17 mm	Adapter, 1/2-inch female-to-3/8-inch male socket
	7/16 deep socket	15 mm	Torque wrench, 1/2-inch drive, 100 ft-lb capacity
	3/8 inch	14 mm	Breaker bar, 1/2-inch drive
	5/16 inch	13 mm	Plastic hammer
		10 mm	5/16-inch allen hex key
		8 mm	Spray can of silicone lubricant
		7/8 inch	Flat blade screwdriver
		11/16 inch	Brass rod, 4.76-mm (3/16-in) diameter
		9/16 inch	DCA4 test kit, Fleetguard® Part Number CC-2602J
		1/2 inch	Engine barring gear, Part Number 3377371
		7/16 inch	Filter wrenches (75- to 80-, 90- to 95-, and 118- to 131-mm)
		3/8 inch	
		1/4 inch	

Maintenance Schedule

General Information

For your convenience, listed below are the section numbers that contain specific instructions for performing the maintenance checks listed in the maintenance schedule.

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

Daily or Refueling - Maintenance Check[4] ..... Section 3

- Air Intake Piping - Inspect
- Air Tanks and Reservoirs - Drain
- Cooling Fan - Check/Correct
- Crankcase Breather Tube - Inspect
- Drive Belts - Check/Correct
- Engine Coolant Level - Check/Correct
- Engine Lubricating Oil Level - Check/Correct
- Fuel-Water Separator - Drain

Every 10,000 km [6000 mi], 250 Hours, or 3 Months - Maintenance Check[1, 4] ..... Section 4
- Air Compressor Mounting Hardware - Check/Correct
- Air Cleaner Restriction - Check/Correct
- Charge Air Cooler - Check/Correct
- Charge Air Piping - Check/Correct
- Lubricating Oil and Filters - Change

Every 19,000 km [12,000 mi], 500 Hours, or 6 Months - Maintenance Check[2, 3, 4] ..... Section 5
- Coolant Filters - Replace
- Supplemental Coolant Additives (SCA) and Antifreeze - Check
- Fuel Filter (Spin-On Type) - Replace

Every 38,000 km [24,000 mi], 1000 Hours, or 12 Months - Maintenance Check[4] ..... Section 6
- Fan Belt Tensioner - Check/Correct
- Overhead Set - Adjust

Every 77,000 km [48,000 mi], 2000 Hours, or 2 Years - Maintenance Check[2, 3, 4] ..... Section 7
- Air Compressor Discharge Lines - Check/Correct
- Cooling System - Drain, Flush, and Fill
- Vibration Damper, Rubber - Check

Notes:

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 19,000 km [12,000 mi], 500 hours or 6 months, whichever occurs first. The operator **must** use a heavy-duty year-round antifreeze that meets the chemical composition of GM6038M. The antifreeze change interval is 2 years or 77,000 km [48,000 mi], whichever occurs first. 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, air conditioner compressor, and fan clutch. Refer to Section M for addresses and telephone numbers.

Maximum 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?

- 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
- Genset/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

(Continued)

Table 1, Oil Drain Intervals

Vehicle/Equipment	Kilometers	Miles	Hours	Months
Paver/crane/backhoe	N/A	N/A	250	3
Dozer/scraper/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
Genset/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

Maintenance Record Form

Maintenance Data

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

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

A	B	C	D	E	F

(Continued)

A	B	C	D	E	F

Section 3 - Maintenance Procedures at Daily Interval

Section Contents

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Daily Maintenance Procedures - Overview

General Information

Preventative maintenance begins with day-to-day awareness of the engine and its system. Before starting the engine, check the oil and coolant levels. Look for:

- Leaks
- Loose or damaged parts
- Worn or damaged belts
- Any change in engine appearance.
- Odor of fuel

Engine Operation Report

The engine **must** be maintained in top mechanical condition if the operator is to get optimum satisfaction from its use. The maintenance department needs daily running reports from the operator to make necessary adjustments in the time allocated. The daily running report also helps to make provisions for more extensive maintenance work as the reports indicate the necessity.

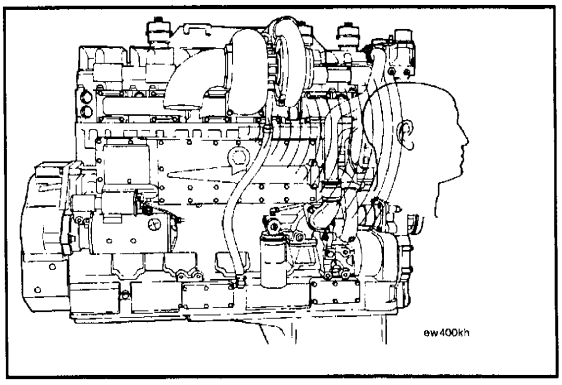
Comparison and intelligent interpretation of the daily report, along with a practical follow-up action, will eliminate most failures and emergency repairs.

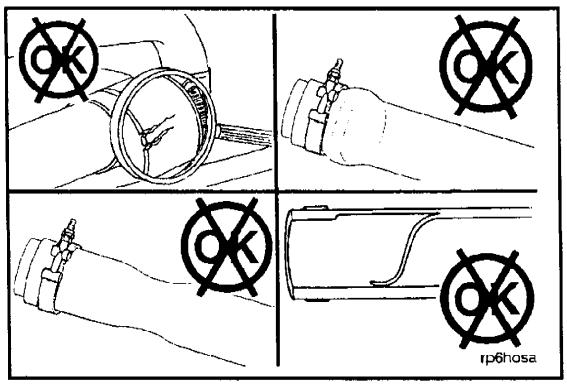
Report to the maintenance department any of the following conditions:

- Low lubricating oil pressure
- Low power
- Power increases or engine surge
- Erratic or no accelerator control or response
- Any warning lights flashing or staying on
- Abnormal water or oil temperature
- Unusual engine noise
- Excessive smoke
- Excessive use of coolant, fuel, or lubricating oil
- Any fuel, coolant, or lubricating oil leaks
- Loose or damaged parts
- Worn or damaged belts

Unusual Engine Noise

During daily maintenance checks, listen for any unusual engine noise that can indicate that service is required.





Air Intake Piping

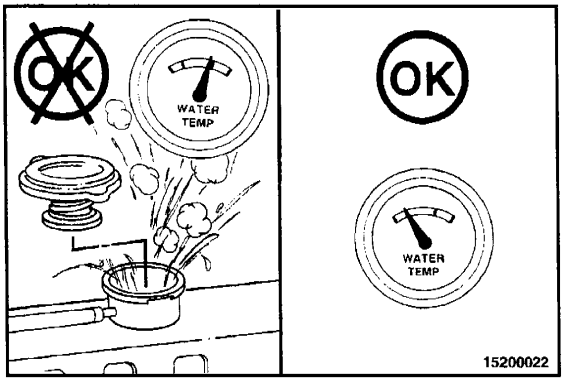
Maintenance Check

Visually inspect the intake piping daily for wear points and damage to piping, loose clamps, or punctures that can damage the engine.

Replace damaged pipes, and tighten loose clamps, as necessary, to prevent the air system from leaking.

Torque Value: 8 N•m [72 in-lb]

Check for corrosion under the clamps and hoses of the intake system piping. Corrosion can allow corrosive products and dirt to enter the intake system. Disassemble and clean, as required.



Coolant Level

Maintenance Check

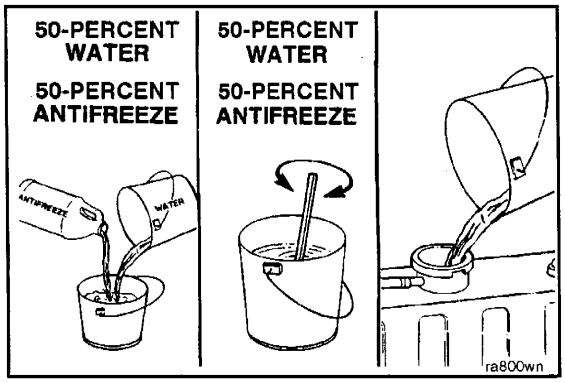
⚠ WARNING ⚠

Do not remove a pressure cap from a hot engine. Wait until the coolant temperature is below 50°C [120°F] before removing the pressure cap. Heated coolant spray or steam can cause personal injury.

△ CAUTION △

Never use a sealing additive to stop leaks in the cooling system. This can result in cooling system plugging and inadequate coolant flow, causing the engine to overheat.

The coolant level **must** be checked daily.



△ CAUTION △

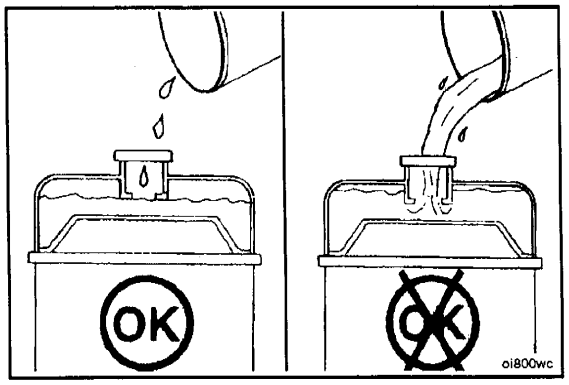
Do not add cold coolant to a hot engine. Engine castings can be damaged. Allow the engine to cool to below 50°C [120°F] before adding coolant.

Make up coolant added to the engine **must** be mixed with the correct proportions of antifreeze, supplemental coolant additive, and water to avoid engine damage.

Coolant recommendations and specification details on correct mixing of coolant can be found in Maintenance Specifications (Section V).

Fill the cooling system with coolant to the bottom of the fill neck in the radiator fill or expansion tank.

NOTE: Some radiators have two fill necks, both of which **must** be filled when the cooling system is drained.

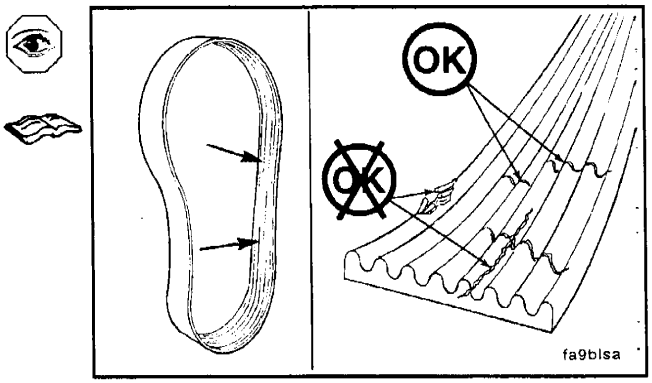


Drive Belts

Maintenance Check

Poly-Vee Belt

Inspect the belts daily. Check the belt for intersecting cracks. Traverse (across the belt width) cracks are acceptable. Longitudinal (direction of belt length) cracks that intersect with transverse cracks are **not** acceptable. Replace the belt if it is frayed or has pieces of material missing. Refer to Section A for belt adjustment and replacement procedures.

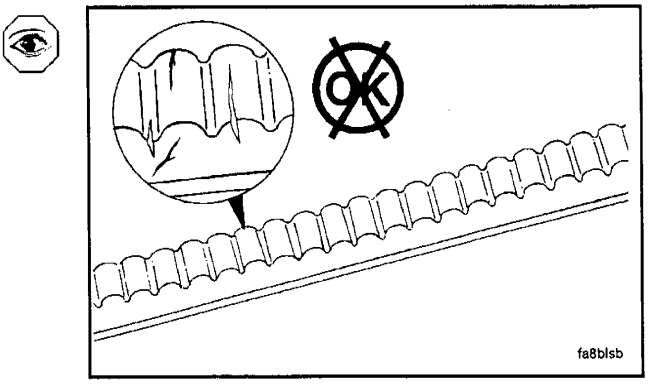


Belt damage can be caused by:

- Incorrect tension
- Incorrect size or length
- Pulley misalignment
- Incorrect installation
- Severe operating environment
- Oil or grease on the side of belts.

Cogged Belt

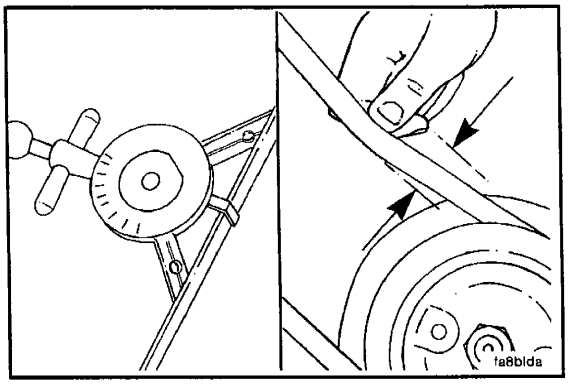
Inspect the belts daily. Replace the belts if they are cracked, frayed, or have chunks of material missing. Small cracks are acceptable.



Adjust the belts that have a glazed or shiny surface, which indicates belt slippage. Correctly installed and tensioned belts will show even pulley and belt wear. Refer to Section A for belt adjustment and replacement procedures.

Belt damage can be caused by:

- Incorrect tension
- Incorrect size or length
- Pulley misalignment
- Incorrect installation
- Severe operating environment
- Oil or grease on the belts

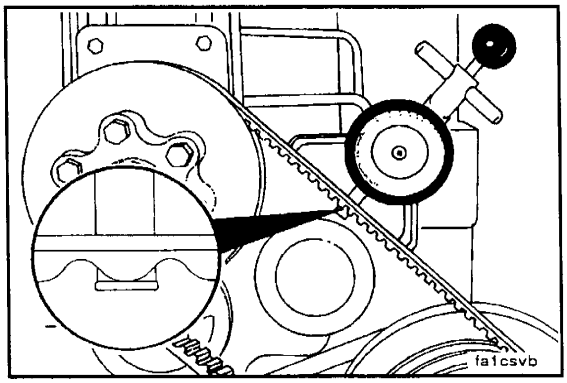


Measure the belt tension in the center span of the pulleys.

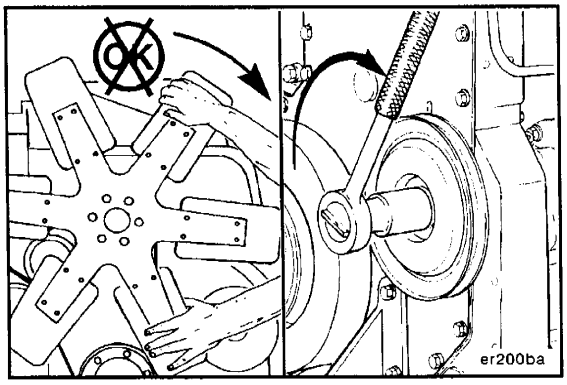
Refer to the Belt Tension Chart in Section V for the correct gauge and tension value for the belt width used.

An alternate method (deflection method) can be used to check belt tension by applying 110 N [25 lbf] force between the pulleys on v-belts. If the deflection is more than one belt thickness per foot of pulley center distance, the belt tension **must** be adjusted.

Refer to Section A for adjustment procedures.



For cogged belts, **make sure** that the belt tension gauge is positioned so that the center tensioning leg is placed directly over the high point (hump) of a cog. Other positioning will result in incorrect measurement.

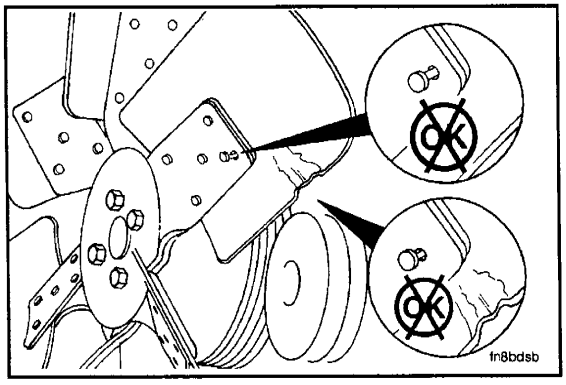


Fan, Cooling

Inspect for Reuse

⚠ WARNING ⚠

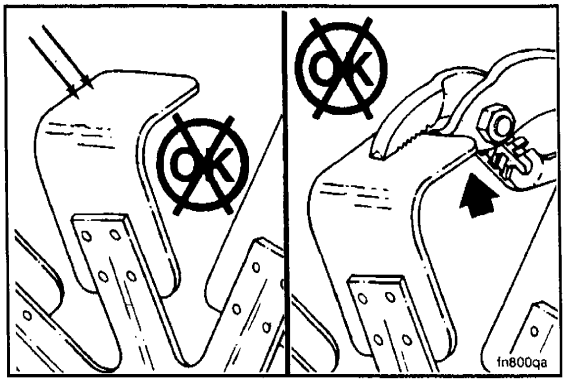
Do not rotate the engine by pulling or prying on the fan. The fan blade(s) can be damaged and cause the fan to fail and cause personal injury or property damage. Use the accessory drive shaft to rotate the crankshaft.



A visual inspection of the cooling fan is required daily. Check for cracks, loose rivets, and bent or loose blades. Check the fan to make sure it is securely mounted. Tighten the capscrews, if necessary.

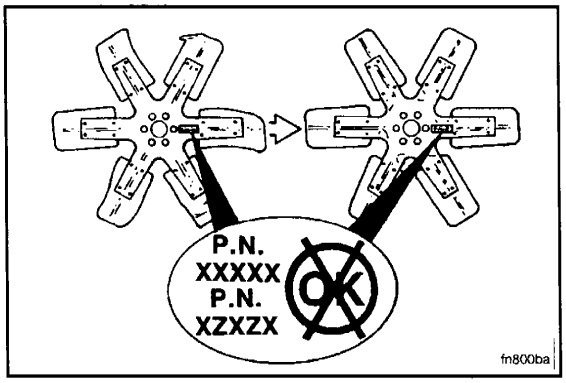
⚠ WARNING ⚠

Do not straighten a bent fan blade or continue to use a damaged fan. A bent or damaged fan blade can fail during operation and cause personal injury or property damage.



Replace original equipment fan that is damaged with a fan of the identical part number. Cummins Engine Company, Inc. **must** approve any other fan changes to be covered under warranty.

Refer vehicle or equipment manufacturers specifications for capscrew torque.



Fuel-Water Separator

Drain

⚠ WARNING ⚠

Drain the water-fuel separator into a container and dispose of in accordance with local environmental regulations.

Cummins Inc. requires a fuel-water separator or fuel filter be installed in the fuel supply system.

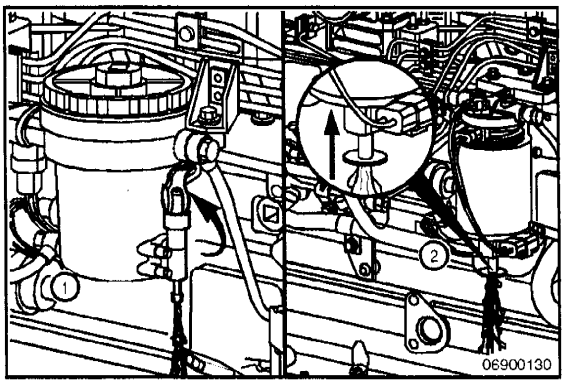
Drain the water and sediment from the separator daily.

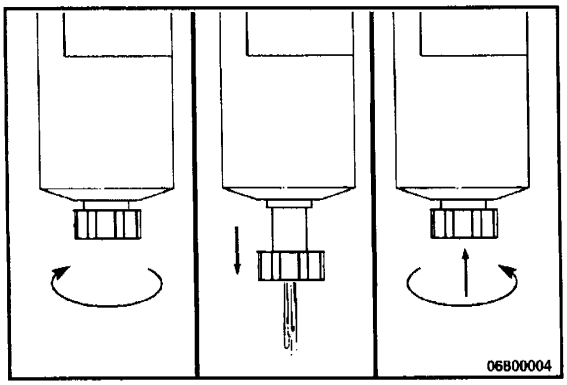
Canister Type

Shut off the engine.

Pull up on the drain valve lever until fluid drains out of the drain tube. Drain the filter sump until clear fuel is visible.

Push up on the drain valve until fluid drains out of the drain tube.





Spin-on Type

Shut off the engine.

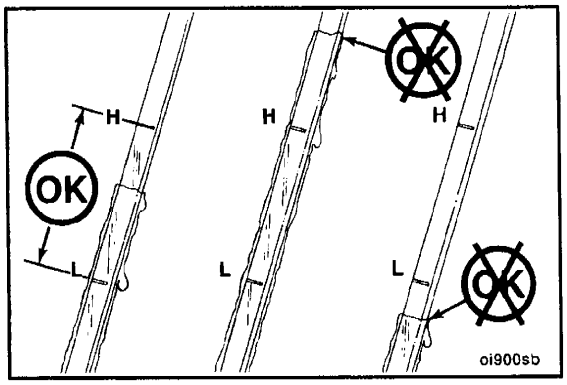
Use your hand to open the drain valve. Turn the valve **counterclockwise** approximately 3 1/2 turns until the valve drops down 25.4mm [1 in] and draining occurs.

Drain the filter sump until clear fuel is visible.

⚠ CAUTION ⚠

When closing the drain valve, do not overtighten the valve. Overtightening can damage the threads.

To close the valve, lift the valve and turn **clockwise** until it is hand-tight.



Lubricating Oil Level

Maintenance Check

⚠ CAUTION ⚠

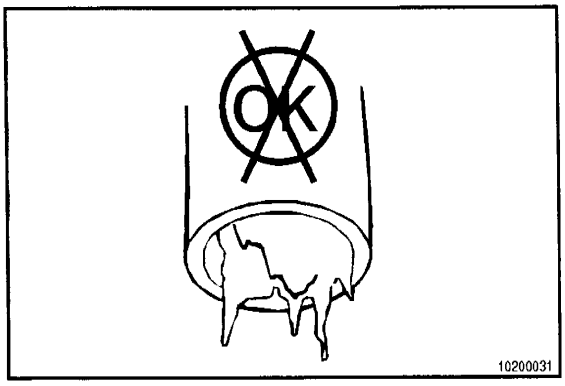
Never operate the engine with oil level below the L (low) mark or above the H (high) mark. Poor engine performance or engine damage can occur.

The engine **must** be level when checking the oil level to make sure the measurement is correct.

Shut off the engine for an accurate reading.

Wait at least 15 minutes after shutting off the engine to check the oil level. This allows time for the oil to drain into the oil pan.

For additional lubricating oil recommendations and oil pan capacity information, refer to Maintenance Specifications (Section V).



Crankcase Breather Tube

Maintenance Check

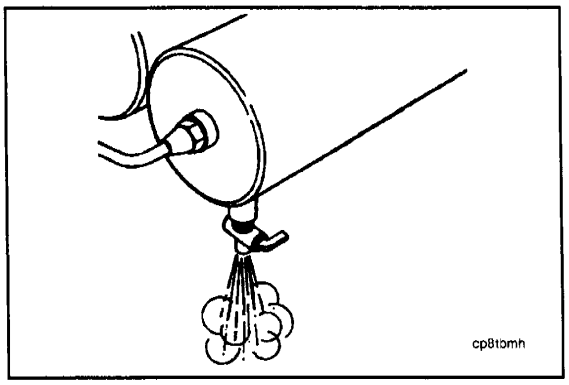
Inspect the breather tube for sludge, debris, or ice in the tube.

Inspect the tube more frequently in icy conditions.

Air Tanks and Reservoirs

Drain

If automatic purging or spitter valves are used, confirm the valves are operating correctly. If a manual drain valve is used on the wet tank, open the draincock on the wet tank to drain any moisture accumulated in the air system. If oil is present, the air compressor system **must** be checked. Contact your Cummins Authorized Repair Location.



NOTES

Maintenance Procedures at 10,000 Kilometers [6000 Miles], 250 Hours, or 3 Months

Section Contents

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Maintenance Procedures - Overview

General Information

All maintenance checks and inspections listed in previous maintenance intervals **must** also be performed at this time, in addition to those listed under this maintenance interval.

Air Compressor

Maintenance Check

NOTE: Depending on application, all engines will possibly **not** be equipped with an air compressor.

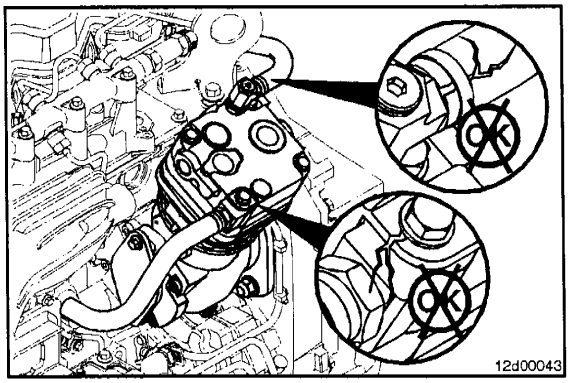
Inspect compressor housing for cracks and damage.

Inspect hydraulic pump couplings for cracks, wear, or damage (if equipped).

Inspect air plumbing for splits or cracks.

Inspect the air compressor mounting nuts, including support bracket, for loose or damaged hardware.

Operate the engine and check for correct compressor operation and air, oil, and coolant leaks.



Torque Value:

Mounting 18 mm	77 N•m	[57 ft-lb]

Torque Value:

Bracket 10 mm	45 N•m	[33 ft-lb]

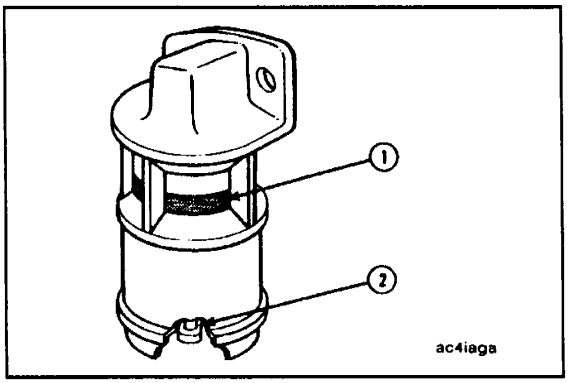
Air Cleaner Restriction

Maintenance Check

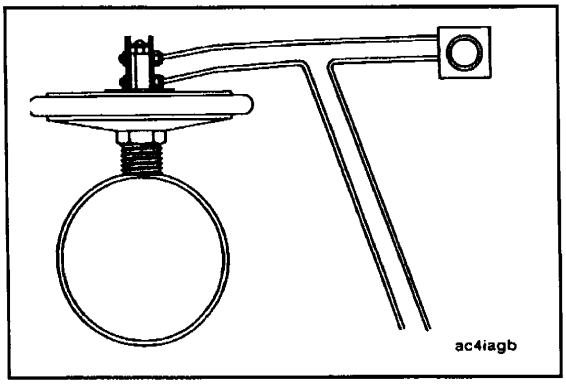
Mechanical Indicator

NOTE: Do **not** remove the felt washer from the indicator. The felt washer absorbs moisture.

A mechanical restriction indicator is available to indicate excessive air restriction through a dry-type air cleaner. This instrument can be mounted in the air cleaner outlet or on the instrument panel. The red flag (1) in the window gradually rises as the cartridge loads with dirt. After changing or replacing the cartridge, reset the indicator by pushing the reset button.

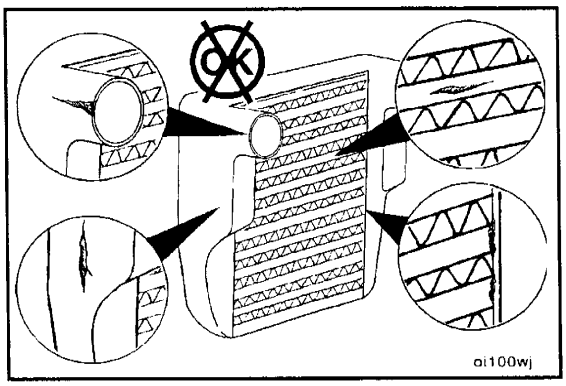


Restriction or vacuum indicators need to be installed as close as possible to the turbocharger air inlet in order to obtain a true indication of restrictions.



Vacuum Indicator

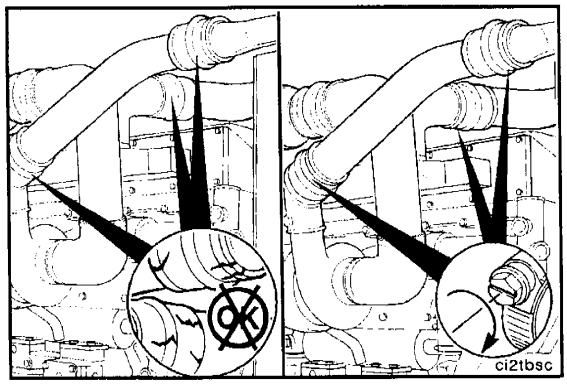
Vacuum switches actuate a warning light on the instrument panel when the air restriction becomes excessive.



Charge-Air Cooler

Maintenance Check

Inspect the charge-air cooler (CAC) for dirt and debris blocking the fins. Check for cracks, holes, or other damage. If damage is found, refer to the vehicle, vessel, or equipment manufacturer.



Charge-Air Piping

Maintenance Check

Inspect the charge-air piping and hoses for leaks, holes, cracks, or loose connections. Tighten the hose clamps if necessary. Refer to the vehicle or equipment manufacturer's specifications for the correct torque value.

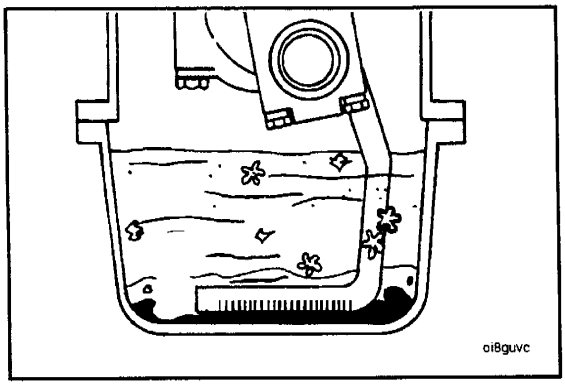
Lubricating Oil and Filters

Drain

⚠ WARNING ⚠

Some state and federal agencies have determined that used engine oil can be carcinogenic and cause reproductive toxicity. Avoid inhalation of vapors, ingestion, and prolonged contact with used engine oil. If not reused, dispose of in accordance with local environmental regulations.

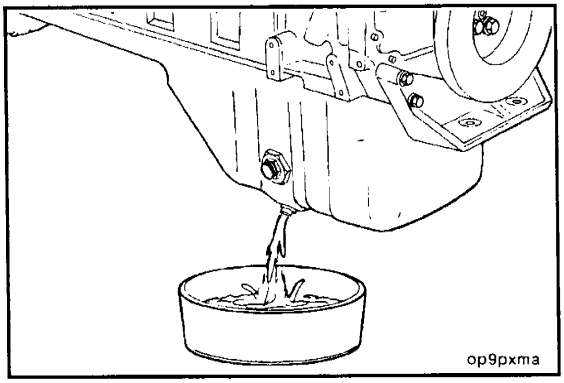
PROTECT THE ENVIRONMENT: Handling and disposal of used lubricating engine oil is subject to federal, state, and local laws and regulations. Use authorized waste disposal facilities, including civic amenity sites and garages providing authorized facilities for receipt of used lubricating oil. If in doubt, contact your state and local environmental authorities or the Environmental Protection Agency for guidance as to proper handling and disposal of used lubricating engine oil.



NOTE: If the engine is in service, under no circumstances can the lubricating oil drain interval extend beyond the intervals given in the charts.

Change the lubricating oil and filters to remove the contaminants suspended in the lubricating oil.

NOTE: Drain the lubricating oil **only** when it is hot and the contaminants are in suspension.

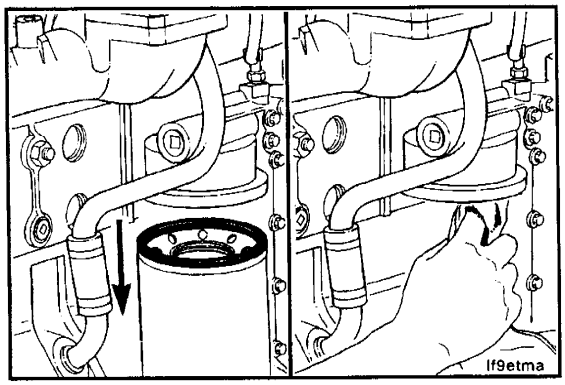


⚠ WARNING ⚠

To avoid personal injury, avoid direct contact of hot oil with your skin.

NOTE: Use a container that can hold at least 25 liters [26 qt] of lubricating oil.

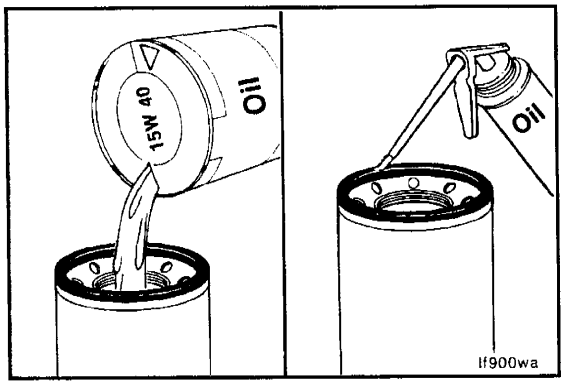
Operate the engine until the water temperature reaches 60°C [140°F]. Shut the engine off. Remove the lubricating oil drain plug.



Remove

Clean the area around the lubricating oil filter head. Remove the filter. Clean the gasket surface of the filter head.

NOTE: The o-ring can stick on the filter head. Make sure it is removed.



Install

NOTE: Fill the filters with clean lubricating oil before installation.

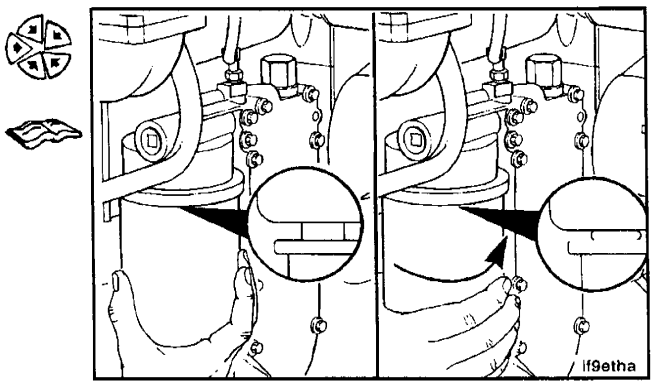
NOTE: The LF3000 lubricating oil filter has two gaskets. Lubricate both gaskets.

Apply a light film of oil to the gasket sealing surface before installing the filters.

⚠ CAUTION ⚠

Mechanical overtightening can distort the threads or damage the lubricating oil filter element seal.

Install the lubricating oil filter as specified by the filter manufacturer.



Check and clean the lubricating oil drain plug threads and sealing surface.

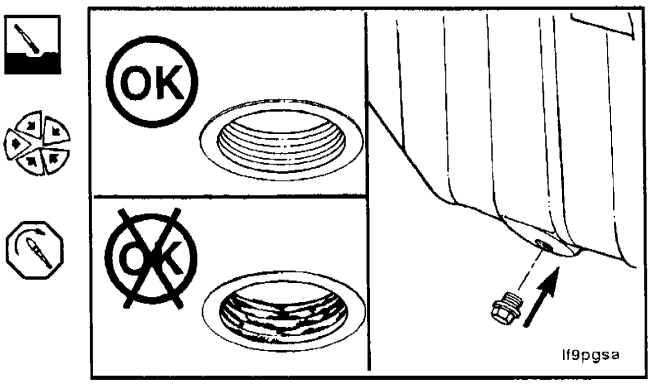
Install the lubricating oil pan drain plug.

Torque Value:

For steel stamp oil pans	80 N•m	[59 ft-lb]

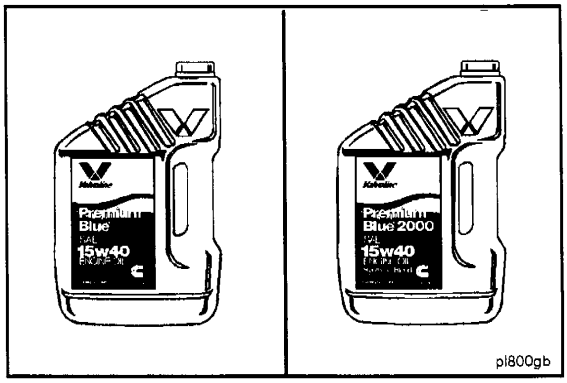
Torque Value:

For aluminum oil pans	60 N•m	[44 ft-lb]



Fill

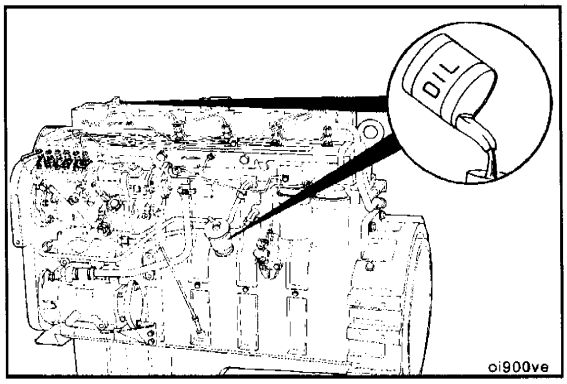
NOTE: Use a high-quality 15W-40 multiviscosity lubricating oil, such as Cummins Premium Blue®, or equivalent, in Cummins engines. Choose the correct oil for your operating climate as outlined in Section V.

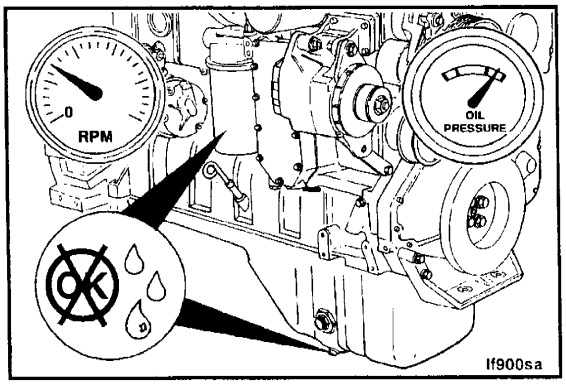


Fill the engine with clean lubricating oil to the proper level.

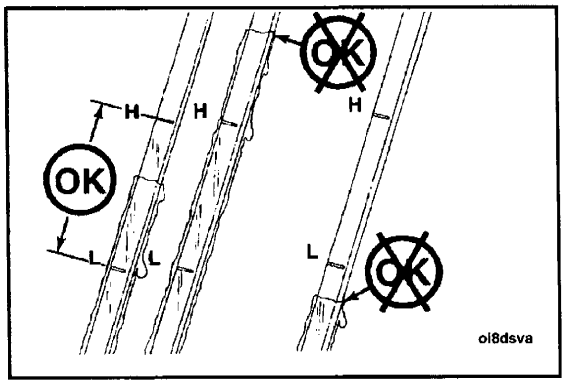
System Capacity:

23.8 liters [25.1 qt]





Operate the engine at low idle to inspect for leaks at the lubricating oil filter and the drain plug.



Stop the engine. Wait approximately 15 minutes to let the lubricating oil drain from the upper parts of the engine. Check the level again.

Add oil as necessary to bring the oil level to the H (high) mark on the dipstick.

Maintenance Procedures at 19,000 Kilometers [12,000 Miles], 500 Hours, or 6 Months

Section Contents

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Maintenance Procedures - Overview

General Information

All maintenance checks and inspections listed in previous maintenance intervals **must** also be performed at this time, in addition to those listed under this maintenance interval.

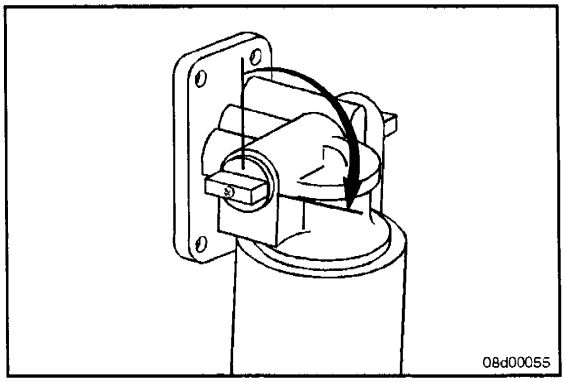
Coolant Filter

Remove

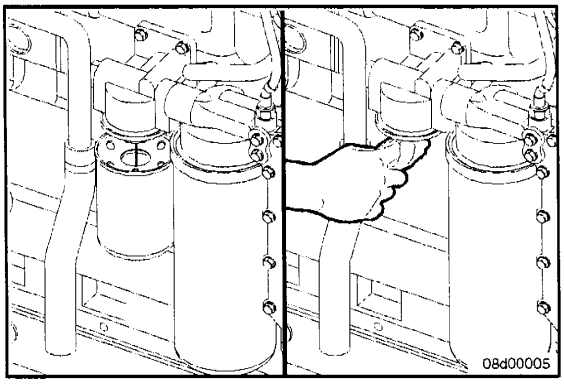
⚠ WARNING ⚠

Wait until the coolant temperature is below 50°C [122°F] before removing the pressure cap. Remove the coolant system pressure cap and close the shutoff valve before removing the coolant filter. Failure to do so can result in personal injury from heated coolant spray.

Turn the shutoff valve to the OFF position by rotating the knob from vertical to horizontal in the direction shown.

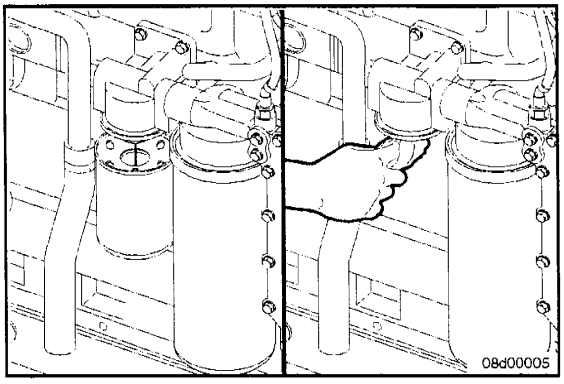


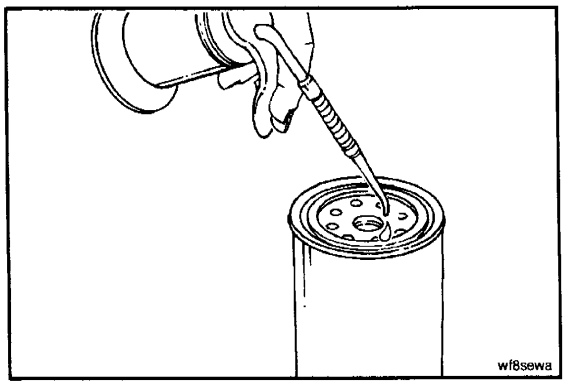
Remove and discard the coolant filter.



Clean

Clean the gasket surface.





Install

⚠ CAUTION ⚠

Do not allow oil to get into the filter. Oil will damage the DCA.

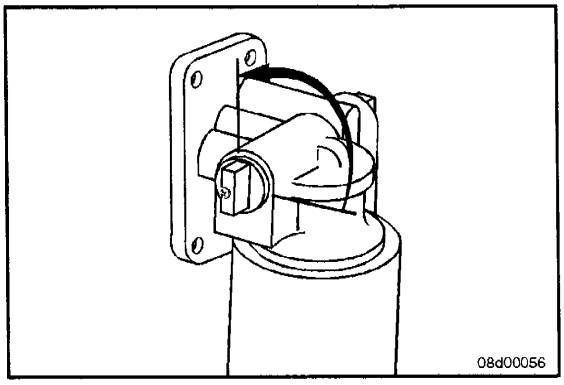
⚠ CAUTION ⚠

Mechanical overtightening can distort the threads or damage the filter head.

Apply a thin film of lubricating oil to the gasket sealing surface before installing the new coolant filter.

Install the coolant filter on the filter head. Tighten the filter until the gasket contacts the filter head surface.

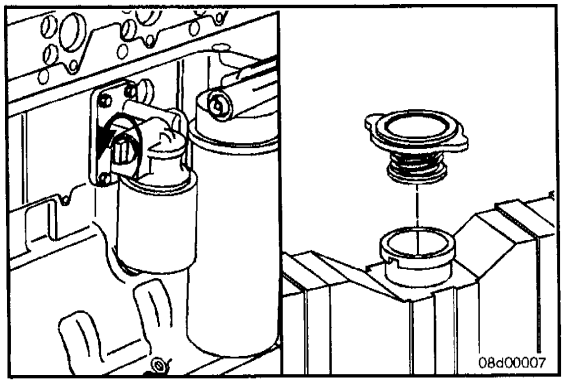
Tighten the coolant filter an additional 1/2 to 3/4 of a turn, or as specified by the filter manufacturer.



⚠ CAUTION ⚠

The valve must be in the ON position to prevent engine damage.

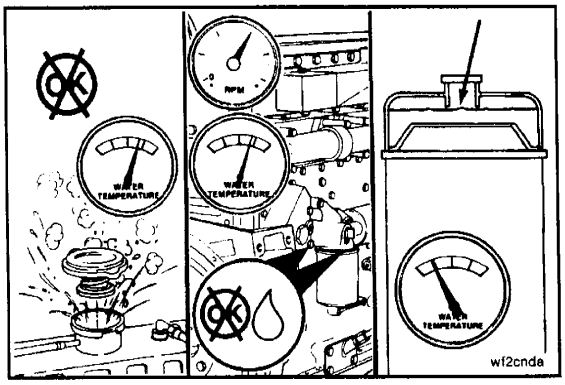
Turn the shutoff to the ON position by rotating the knob from horizontal to vertical in the direction shown.



Install the coolant system pressure cap.

Operate the engine and check for coolant leaks.

After the air has been purged from the system, check the coolant level again.



Supplemental Coolant Additive (SCA) and Antifreeze Concentration

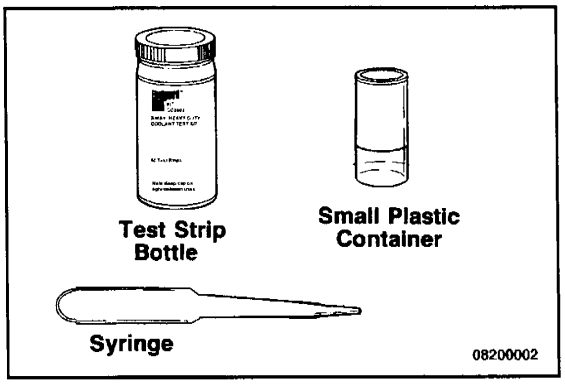
Maintenance Check

Supplemental Coolant Additive (SCA)

Check the SCA concentration level:

- At least twice a year
- At every subsequent oil drain interval if the concentration is above 3 units
- Whenever coolant is added to the cooling system between filter changes.

Use Fleetguard® coolant test kit, Part No. CC2602, to check the SCA concentration level. Instructions are included with the test kit. Refer to Coolant Recommendations and Specifications in Maintenance Specifications (Section V) for the correct SCA and antifreeze level.



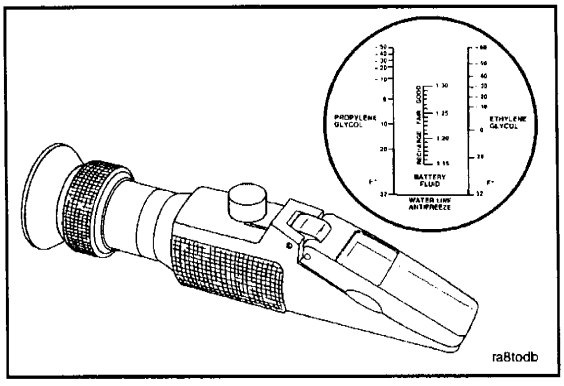
Antifreeze

△ CAUTION △

Overconcentration of antifreeze or use of high-silicate antifreeze can damage the engine.

Check the antifreeze concentration. Use a mixture of 50-percent water and 50-percent ethylene glycol or propylene glycol-based antifreeze to protect the engine to -32°C [-26°F] year-around.

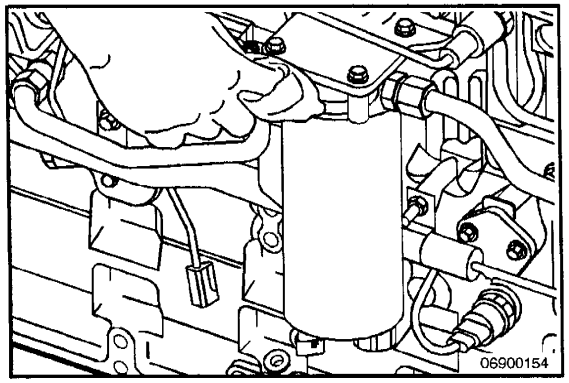
The Fleetguard® refractometer, Part Number C2800, provides a reliable, easy-to-read, and accurate measurement of freezing point protection and glycol (antifreeze) concentration.



Antifreeze is essential in every climate.

Antifreeze broadens the operating temperature range by lowering the coolant freezing point and by raising its boiling point.

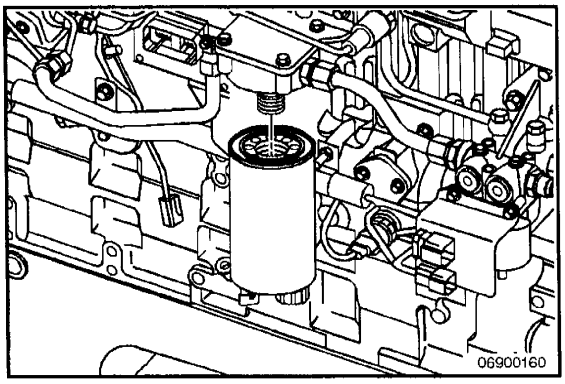
The corrosion inhibitors also protect the cooling system components from corrosion and prolong component life.



Fuel Filter (Spin-On Type)

Clean

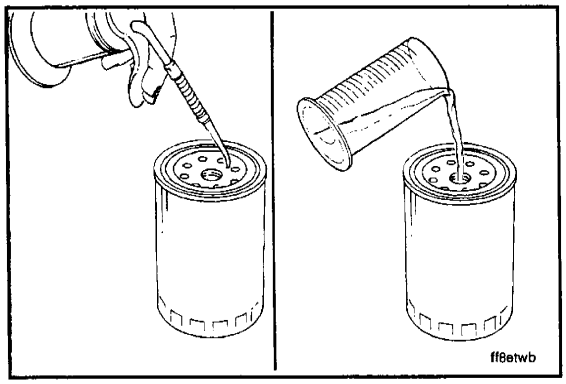
Clean the area around the fuel filter head.



Remove

75- to 80-mm and 90- to 95-mm Wrenches

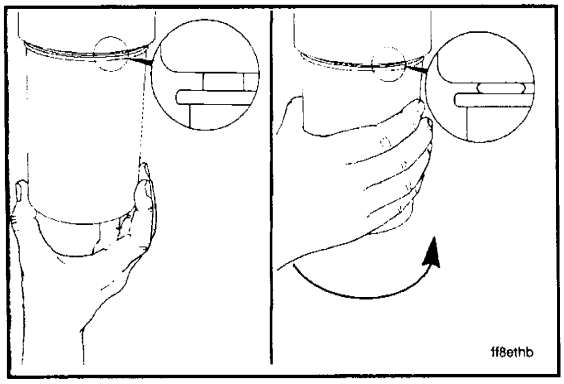
Remove the fuel filter. Clean the gasket surface of the fuel filter head.



Install

Replace the o-ring.

Fill the new fuel filter(s) with clean fuel, and lubricate the o-ring seal with clean lubricating engine oil.



⚠ CAUTION ⚠

To reduce the possibility of fuel leaks, make sure the fuel filter is installed tightly but not too tightly. Mechanical overtightening will damage the fuel filter.

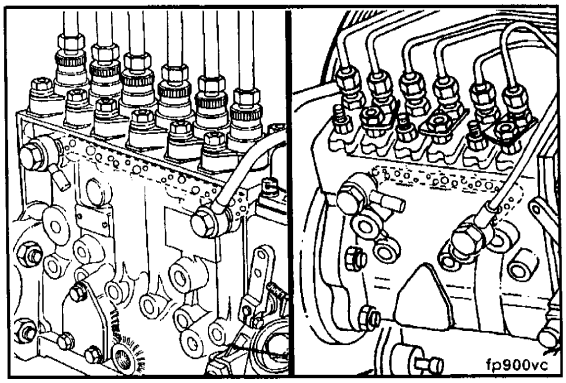
Install the fuel filter as specified by the filter manufacturer.

Prime

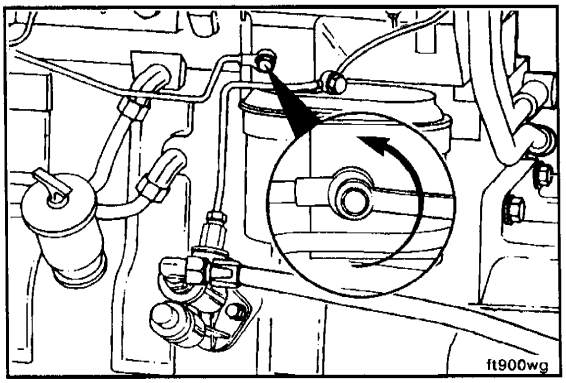
Controlled venting is provided at the injection pump through the fuel drain manifold. Small amounts of air introduced by changing the fuel filters or fuel injection pump supply line will be vented automatically if the fuel filter is changed in accordance with the instructions.

NOTE: Manual bleeding is required if:

- The fuel filter is **not** filled prior to installation
- Fuel injection pump is replaced
- High-pressure fuel line connections are loosened or fuel lines replaced
- Initial engine start up or start up after an extended period of no engine operation occurs
- Vehicle fuel tank has been run until empty.



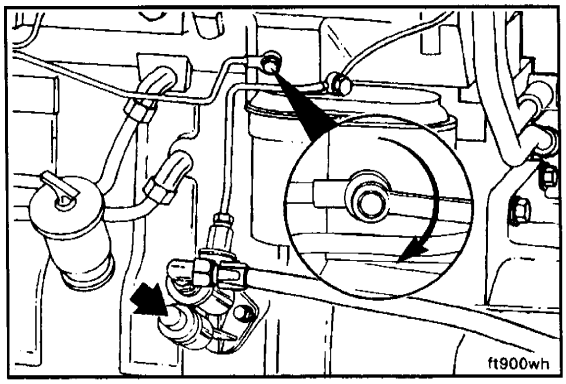
Open the bleed screw.

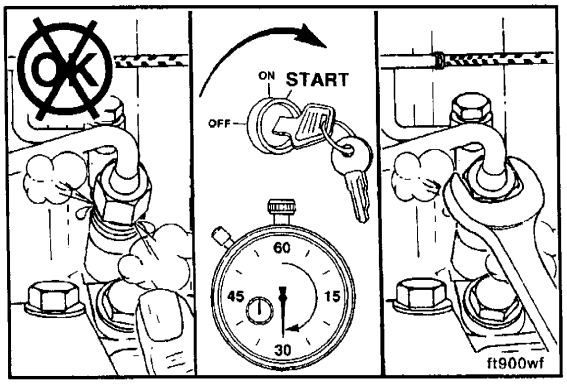


Operate the plunger on the fuel transfer pump until the fuel flowing from the fitting is free of air.

Tighten the bleed screw.

Torque Value: 9 N•m [80 in-lb]



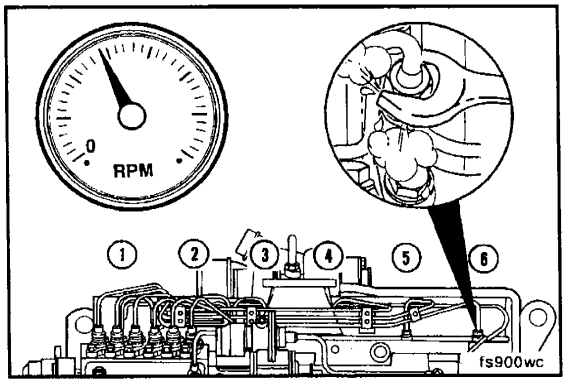


⚠ WARNING ⚠

The pressure of the fuel in the line is sufficient to penetrate the skin and cause serious personal injury. Wear gloves and protective clothing.

17-mm (PES.A, PES.MW) and 19-mm (PES.P) Wrenches

Loosen the fittings at the injectors, and crank the engine to allow entrapped air to vent from the lines. Tighten the fittings.



⚠ WARNING ⚠

It is necessary to put the engine in the run position. Because the engine could start, be sure to follow all the safety precautions. Use the normal engine starting procedure.

Start the engine and vent one line at a time until the engine runs smoothly.

NOTE: Do **not** engage the starter for more than 30 seconds each time when it is used to vent the system: Wait 2 minutes between engagements.

Maintenance Procedures at 38,000 Kilometers [24,000 Miles], 1000 Hours, or 1 Year

Section Contents

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Maintenance Procedures - Overview

General Information

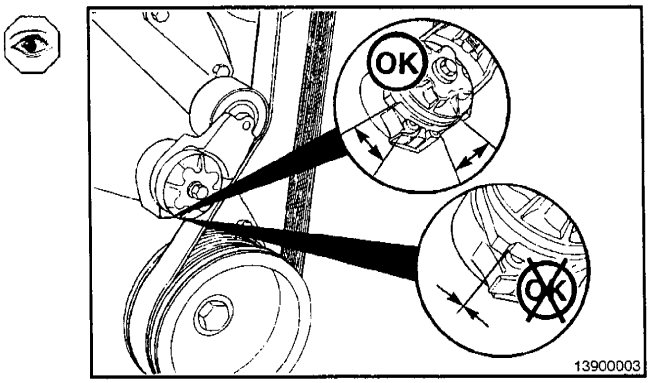
All maintenance checks and inspections listed in previous maintenance intervals **must** also be performed at this time, in addition to those listed under this maintenance interval.

Cooling Fan Belt Tensioner

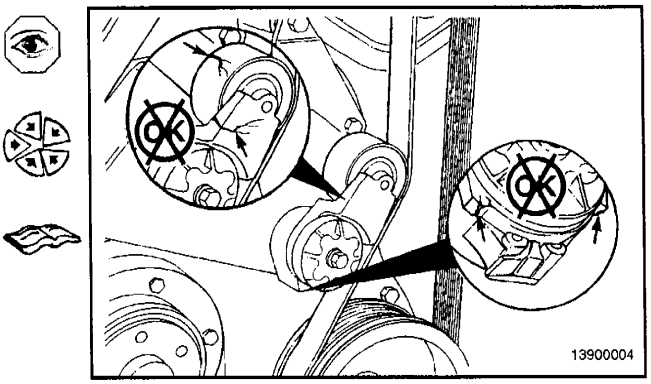
Maintenance Check

Every 48,000 km [30,000 mi], 1000 hours, or 1 year, whichever occurs first, inspect the automatic belt tensioner.

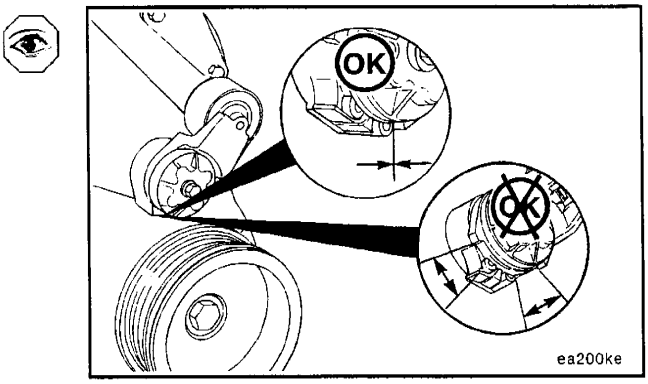
With the engine turned off, check that neither the top nor bottom tensioner arm stop is touching the cast boss on the tensioner body. If either of the stops is touching a boss, the alternator belt **must** be replaced. Check to make sure the correct belt part number is being used if either condition exists.

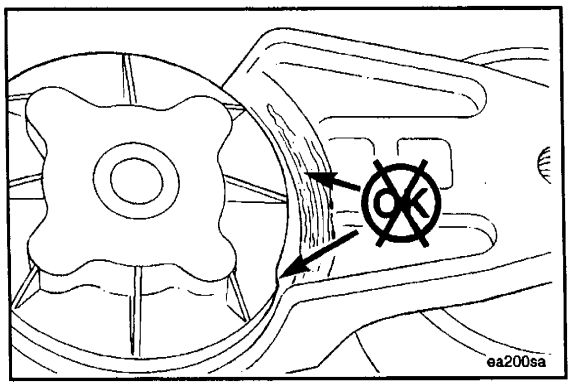


Check the tensioner pulley and body for cracks. If any cracks are noticed, the tensioner **must** be replaced. Refer to a Cummins Authorized Repair Facility. Check the tensioner for dirt buildup. If this condition exists, the tensioner **must** be removed and steam-cleaned.

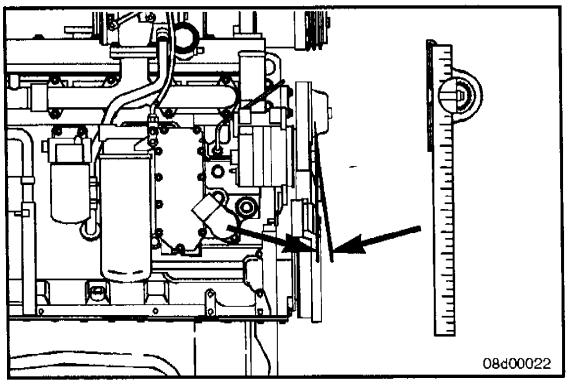


Check that the bottom tensioner arm stop is in contact with the bottom tensioner arm stop boss on the tensioner body. If these two are **not** touching, the tensioner **must** be replaced.





Inspect the tensioner for evidence of the pivoting tensioner arm contacting the stationary circular base. If there is evidence of these two areas touching, the pivot tube bushing has failed and the tensioner **must** be replaced.

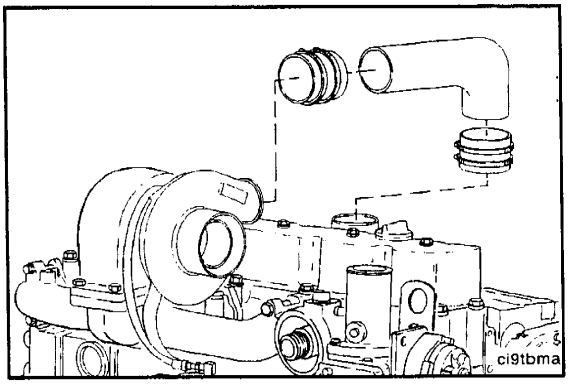


A worn tensioner that has play in it or a belt that "walks" off its pulley possibly indicates pulley misalignment.

NOTE: Maximum pulley misalignment is 3 degrees.

This measurement can be taken with a straightedge and an inclinometer.

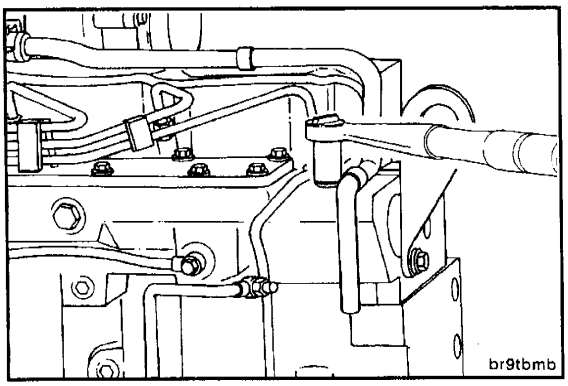
Install the belt.



Overhead Set

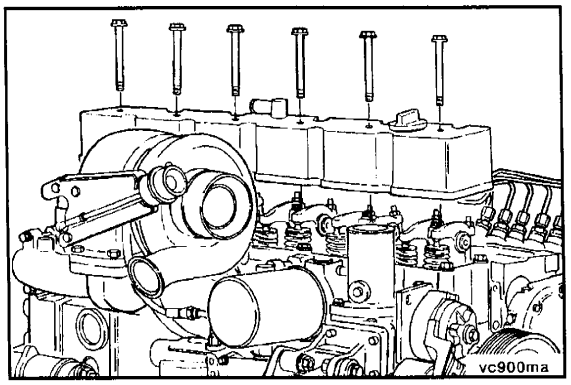
Adjust

Remove the air crossover tube from the engine if equipped.



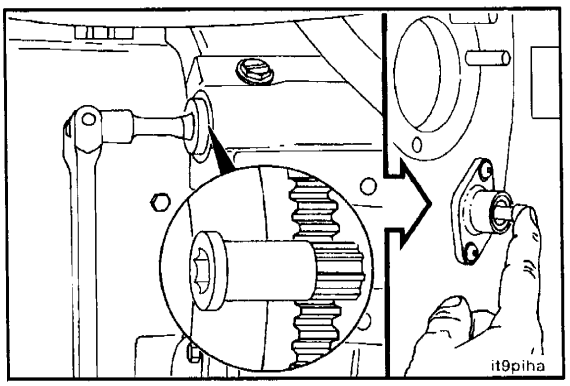
Disconnect the support clamps, hose clamp, and wastegate sensing line. Remove the crankcase vent tube and any other parts that would prevent removal of the valve cover.

Remove valve cover.

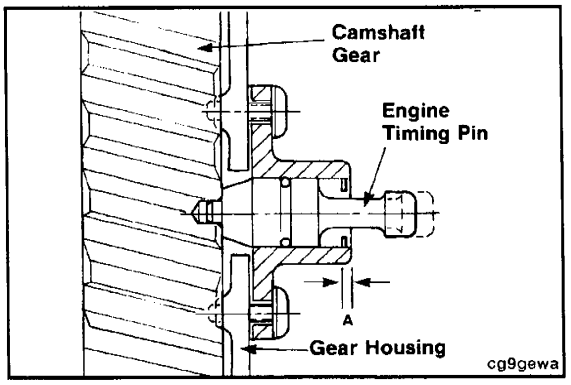


Locate top dead center for cylinder No. 1 by rotating the crankshaft slowly while pressing on the engine timing pin.

The barring gear inserts into the flywheel housing and engages the flywheel ring gear. The engine can then be rotated by hand using a 1/2-inch ratchet or breaker bar.

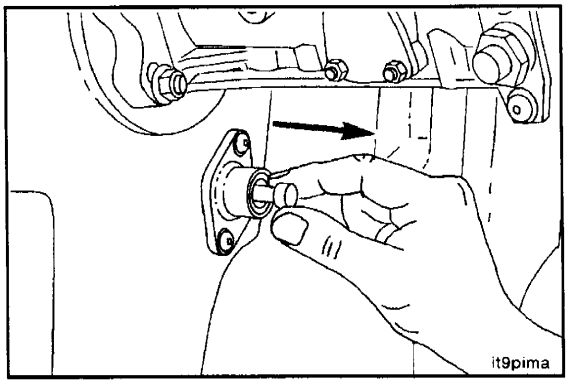


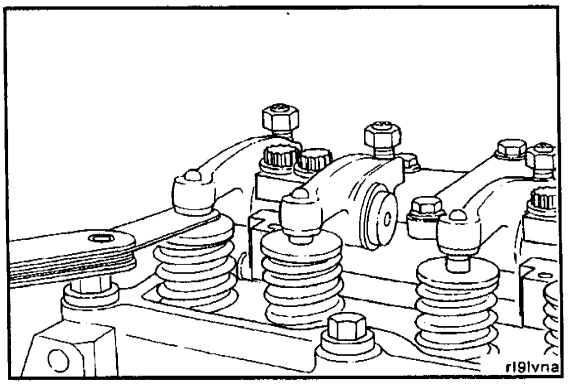
When the engine timing pin engages the hole in the camshaft gear, cylinder No. 1 is at top dead center on the compression stroke.



⚠ CAUTION ⚠

Be sure to disengage the engine timing pin after locating top dead center to prevent damage to the engine timing pin.



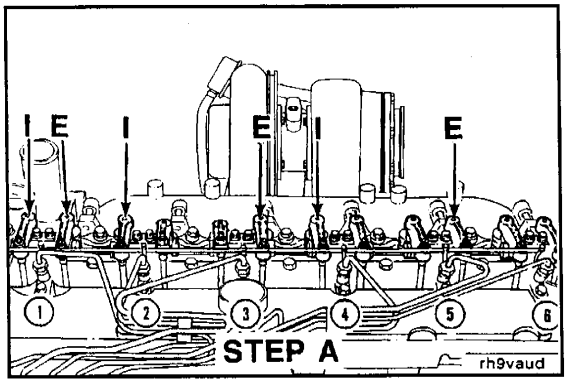


Intake clearance: 0.30 mm [0.012 in].

Exhaust clearance: 0.61 mm [0.024 in].

Check/set valves with engine cold - below 60°C [140°F].

NOTE: The clearance is correct when some resistance is "felt" when the feeler gauge is slipped between the valve stem and the rocker lever.

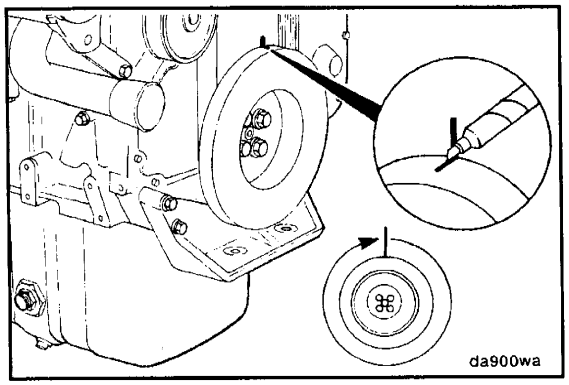


Locate top dead center for cylinder No. 1.

Check/adjust the valves indicated for STEP A (I = intake; E = exhaust).

After tightening the rocker lever locknut, check the valve clearance to make sure the valve clearance has **not** changed.

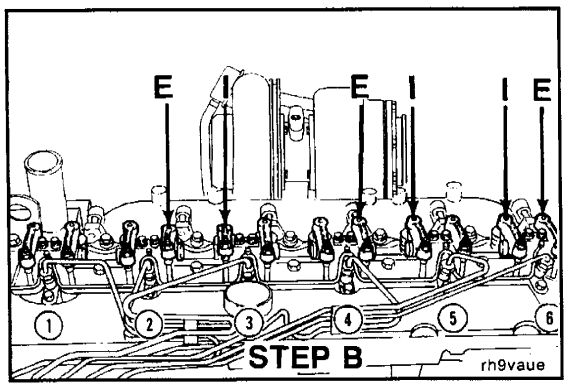
Torque Value: 24 N•m [212 in-lb]



△ CAUTION △

Be sure the engine timing pin is disengaged to prevent damage to the engine timing pin.

Mark vibration damper and rotate the crankshaft 360 degrees.



Set the valves indicated for STEP B.

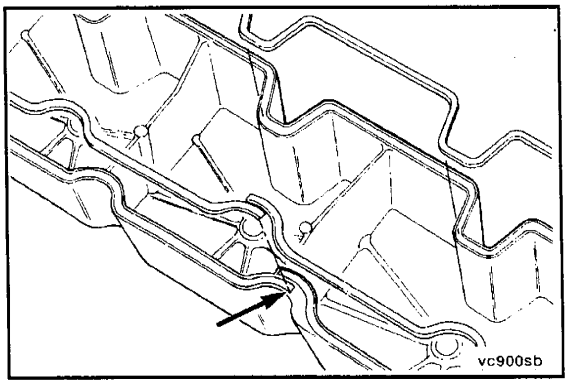
After tightening the rocker lever locknut, check the valve clearance to make sure the valve clearance has **not** changed.

Torque Value: 24 N•m [212 in-lb]

NOTE: If the seal is **not** damaged, it can be used again. If the seal is damaged, install a new seal.

Install the rubber seal into the groove in the valve cover. Start the installation at the overlap area shown in the illustration. Do **not** stretch the rubber seal.

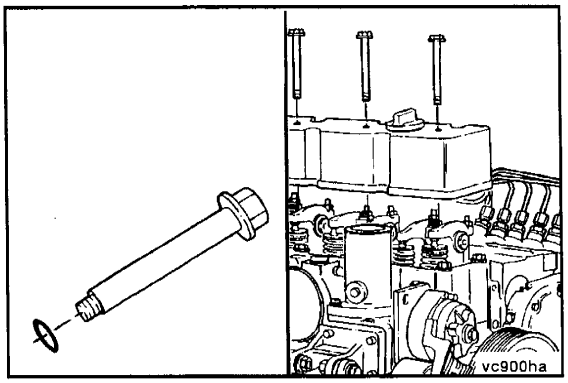
If the seal has more overlap than shown in the illustration, trim the length to provide the correct overlap.



Install new sealing o-rings on the capscrews.

Install the valve cover and wastegate sensing tube.

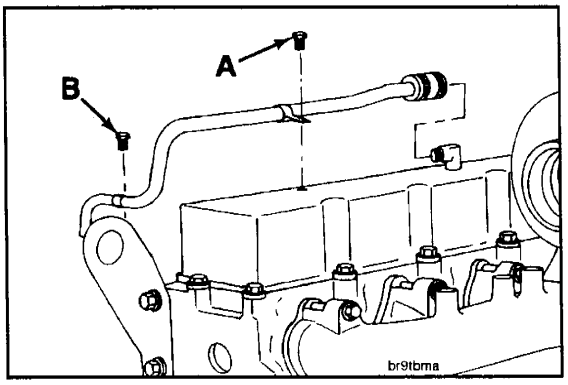
Torque Value: 24 N•m [212 in-lb]



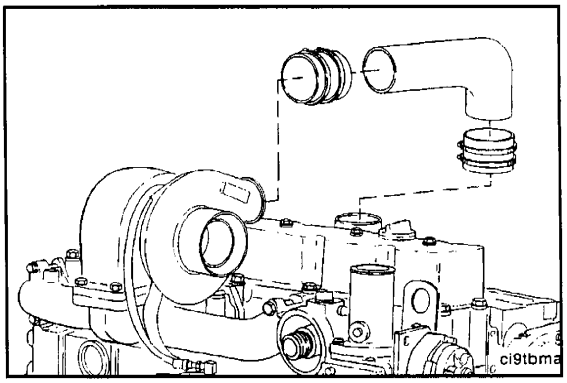
Install the crankcase vent tube, and secure with the support clamps and hose clamp.

Torque Value:

A =	24 N•m [212 in-lb].
B =	43 N•m [32 in-lb].



Install the air crossover tube and any other parts previously removed to gain access to the valve cover.



NOTES

Maintenance Procedures at 77,000 Kilometers [48,000 Miles], 2000 Hours, or 2 Years

Section Contents

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Maintenance Procedures - Overview

General Information

All maintenance checks and inspections listed in previous maintenance intervals **must** also be performed at this time, in addition to those listed under this maintenance interval.

Air Compressor Discharge Lines

General Information

All air compressors have a small amount of lubricating oil carryover that lubricates the piston rings and moving parts. When this lubricating oil is exposed to normal air compressor operating temperatures over time, the lubricating oil will form varnish or carbon deposits. If the following maintenance check are not performed, the air compressor piston rings will wear and not seal correctly.

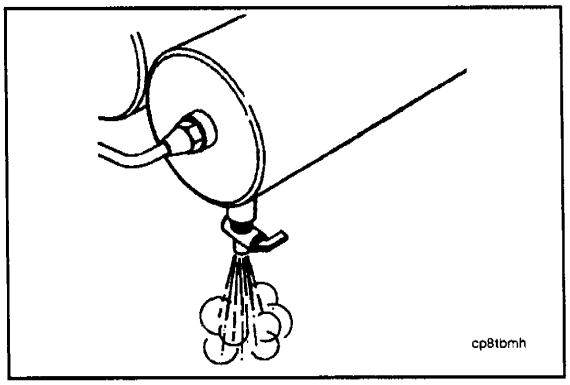
Maintenance Check

⚠ WARNING ⚠

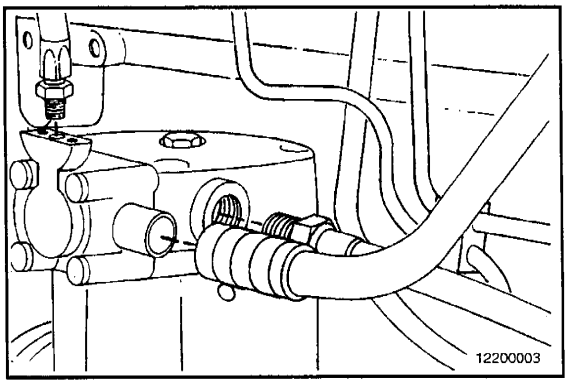
Wear appropriate eye and face protection when using compressed air. Flying debris and dirt can cause personal injury.

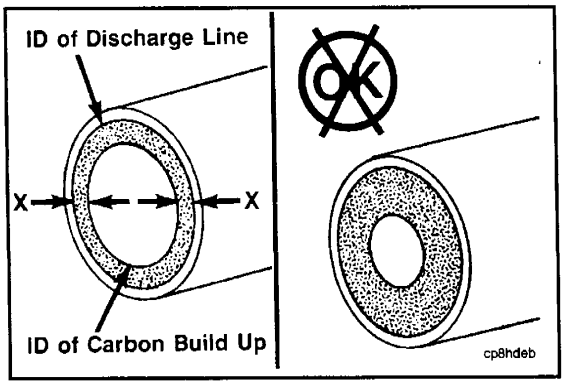
Shut off the engine.

Open the drain valve on the wet tank to release the system air pressure.

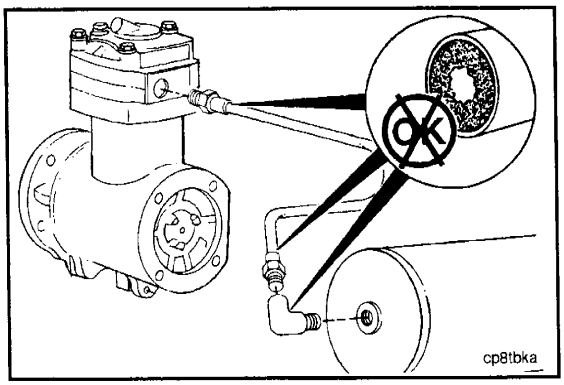


Remove the air compressor discharge line from the air compressor. Location of the air compressor discharge line can be found in Flow Diagram, Compressed Air System in System Diagrams (Section D).

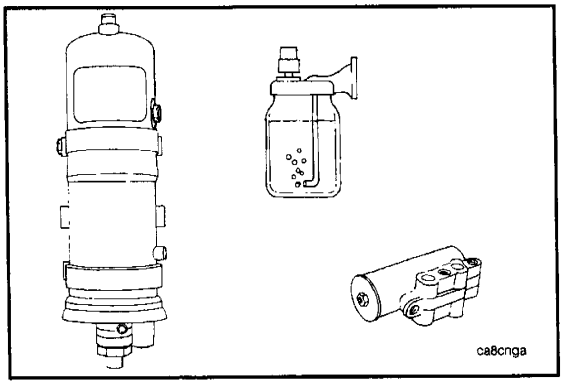




Measure the total carbon deposit thickness inside the air discharge line as shown. If the total carbon deposit (X + X) exceeds 2 mm [1/16 in], clean and inspect the cylinder head, the valve assembly, and the discharge line. Replace if necessary. Contact the Cummins Authorized Repair Location for procedures.



If the total carbon deposit exceeds specifications, continue checking the air discharge line connections up to the first tank until total carbon deposit is less than 2 mm [1/16 in]. Clean or replace any lines or connections that exceed this specification.



Inspect any air driers, splitter valves, pressure relief valves, and alcohol injectors for carbon deposits or malfunctioning parts. Inspect for air leaks. Maintain and repair the parts according to the manufacturer's specifications.

Cooling System

Drain

⚠ WARNING ⚠

Do not remove the pressure cap from a hot engine. Wait until the coolant temperature is below 50°C [120°F] before removing the pressure cap. Heated coolant spray or steam can cause personal injury.

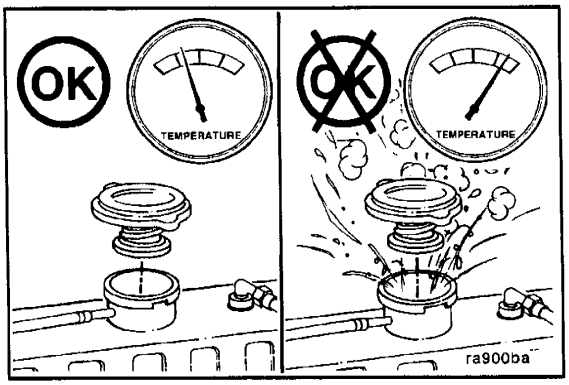
⚠ WARNING ⚠

Coolant is toxic. Keep away from children and pets. If not reused, dispose of in accordance with local environmental regulations.

⚠ CAUTION ⚠

Protect the environment: Handling and disposing of used antifreeze is subject to federal, state, and local regulations. Use authorized waste disposal facilities, including civic amenity sites and garages providing authorized facilities for the receipt of used antifreeze. If in doubt, contact local authorities of the Environmental Protection Agency (EPA) for guidance as to proper handling of used antifreeze.

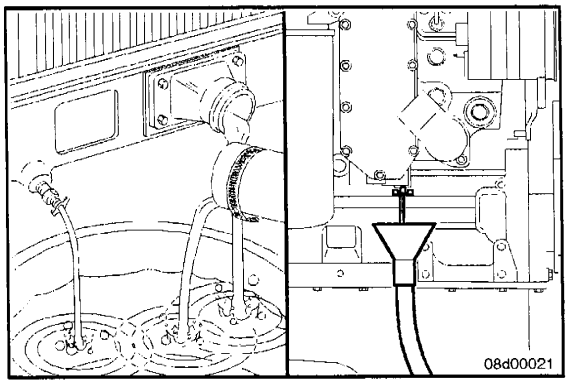
- Avoid excessive contact, and wash thoroughly after contact.
- Keep out of reach of children.



⚠ WARNING ⚠

Coolant is toxic. Keep away from children and pets. If not reused, dispose of in accordance with local environmental regulations.

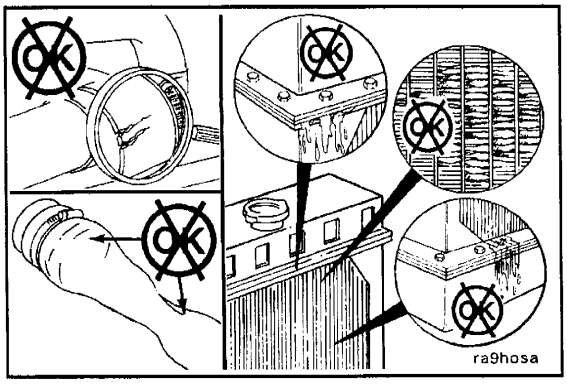
Drain the cooling system by opening the drain valve on the radiator and removing the plug in the bottom of the water inlet hose. A drain pan with a capacity of 19 liters [5 gal] will be adequate for most applications.

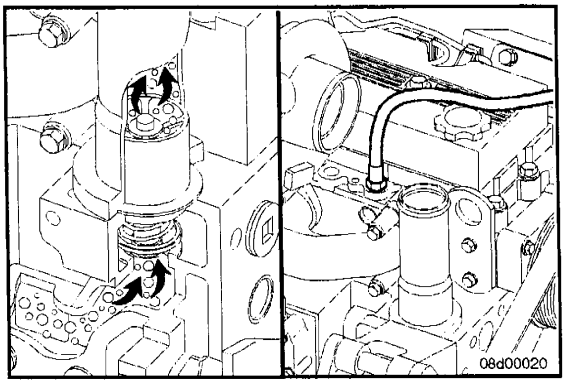


Check for damaged hoses and loose or damaged hose clamps. Replace as required.

Check the radiator for leaks, damage, and buildup of dirt.

Clean and replace as required.



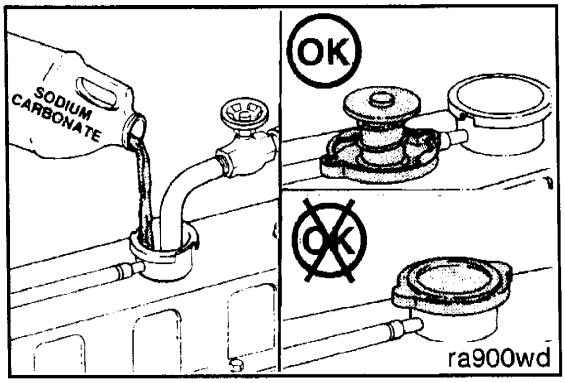


Flush

⚠ CAUTION ⚠

The system must be filled properly to prevent air locks. During filling, air must be purged from the engine coolant passages. Be sure to open the petcock on the aftercooler for aftercooled engines. Wait 2 to 3 minutes to allow air to be vented; then add mixture to bring the level to the top.

NOTE: Adequate venting is provided for a fill rate of 19 liters [5 gal] per minute.

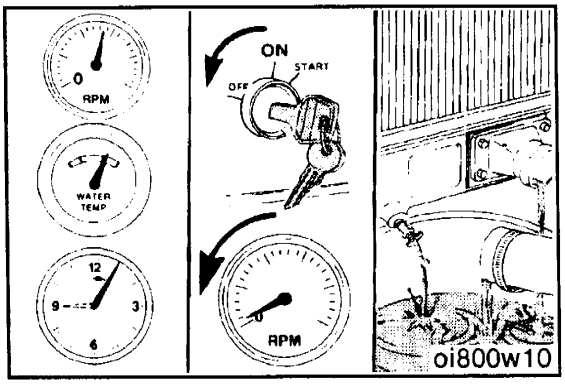


⚠ CAUTION ⚠

Do not install the radiator cap. The engine is to be operated without the cap for this process.

Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).

NOTE: Use 0.5 kg [1 lb] of sodium carbonate for every 23 liters [6 gal] of water.

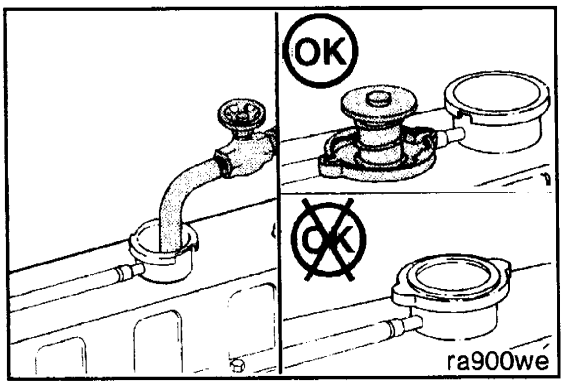


⚠ WARNING ⚠

Coolant is toxic. If not reused, dispose of in accordance with local environmental regulations.

Operate the engine for 5 minutes with the coolant temperature above 80°C [176°F].

Shut the engine off, and drain the cooling system.



Fill the cooling system with high-quality water.

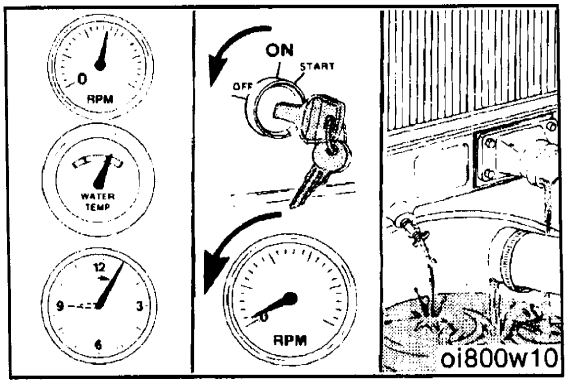
NOTE: Be sure to vent the engine and aftercooler for complete filling.

NOTE: Do **not** install the radiator cap or the new coolant filter.

Operate the engine for 5 minutes with the coolant temperature above 80°C [176°F].

Shut the engine off, and drain the cooling system.

NOTE: If the water being drained is still dirty, the system **must** be flushed again until the water is clean.



Fill

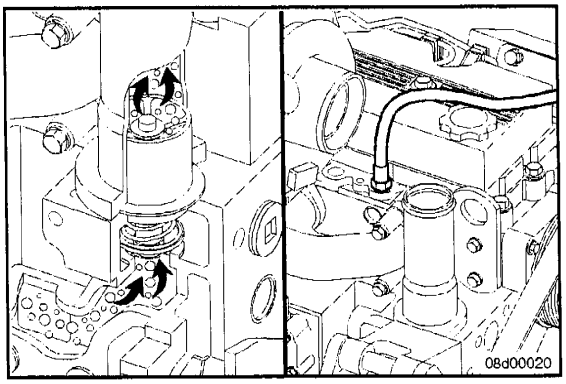
⚠ CAUTION ⚠

The system must be filled properly to prevent air locks. During filling, air must be purged from the engine coolant passages. Be sure to open the petcock on the aftercooler for aftercooled engines. Wait 2 to 3 minutes to allow air to be vented; then add mixture to bring the level to the top.

The system is designed to use a specific quantity of coolant. If the coolant level is low, the engine will run hot.

If frequent addition of coolant is necessary, the engine or system has a leak. Find and repair the leak.

The system has a designed fill rate of 19 liters [5 gal] per minute.

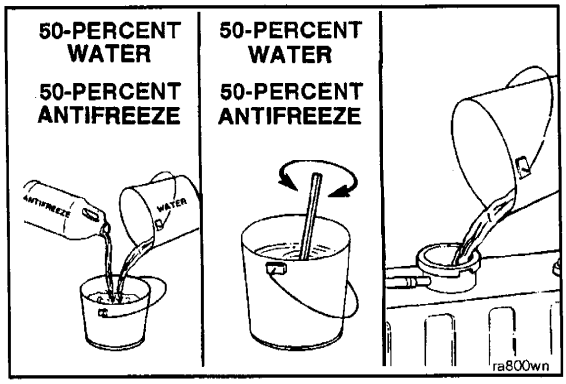


⚠ CAUTION ⚠

Never use water alone for coolant. This can result in damage from corrosion.

Use a mixture of 50-percent water and 50-percent ethylene glycol or propylene glycol antifreeze to fill the cooling system.

Coolant Capacity (Engine Only)			
	liters		U.S.gal
QSC8.3	10.9	MAX	11.5

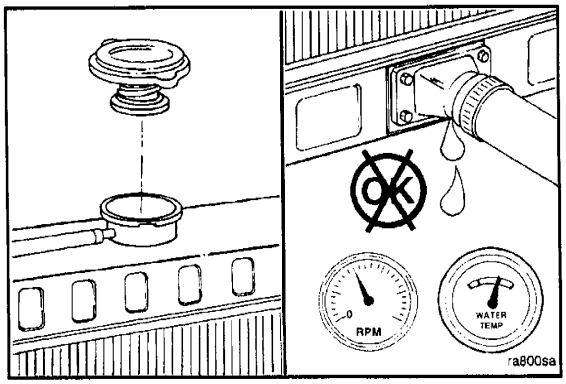


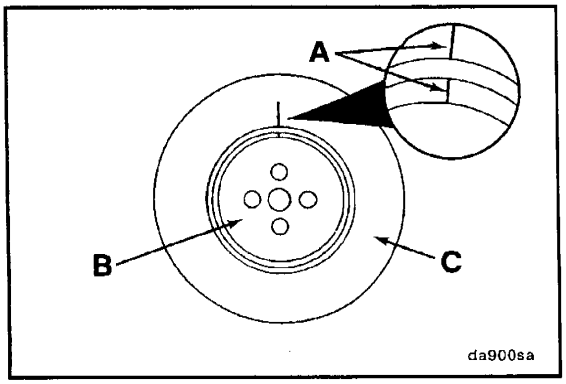
⚠ WARNING ⚠

Before removing the pressure cap, wait until the coolant temperature is below 50°C [120°F]. Failure to do so can cause personal injury from heated coolant spray.

Install the pressure cap. Operate the engine until the coolant reaches a temperature of 80°C [180°F], and check for coolant leaks.

Check the coolant level again to make sure the system is full of coolant or that the coolant level has risen to the hot level in the recovery bottle on the system, if so equipped.

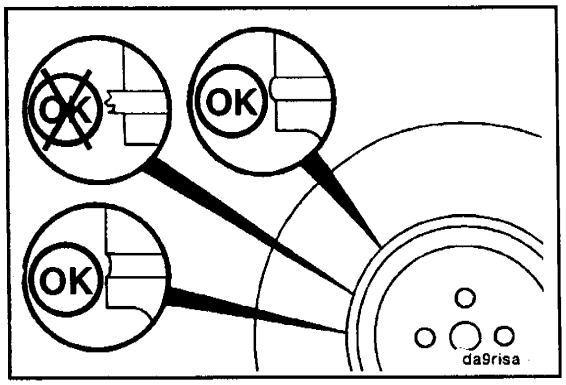




Vibration Damper, Rubber

Inspect

Check the index lines (A) in the vibration damper hub (B) and the inertia member (C). If the lines are more than 1.59 mm [1/16 in] out of alignment, replace the vibration damper.



Inspect the rubber member for deterioration. If pieces of rubber are missing or if the elastic member is more than 3.18 mm [1/8 in] below the metal surface, replace the damper.

Look for forward movement on the damper ring on the hub. Replace the vibration damper if any movement is detected.

For vibration damper location, refer to Engine Diagrams in Engine Identification (Section E).

Section A - Adjustment, Repair, and Replacement

Section Contents

Page

Alternator

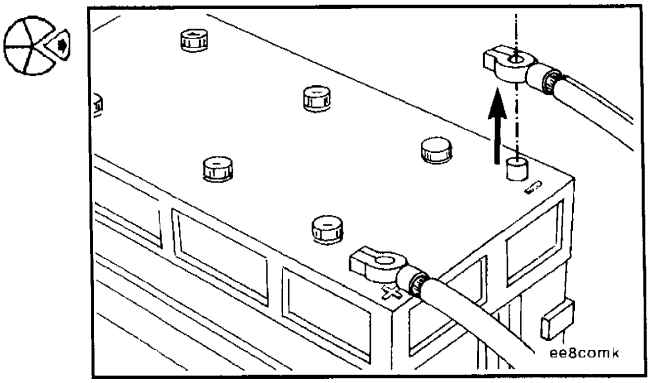
Preparatory Steps

⚠ WARNING ⚠

Always connect the ground or negative (-) cable last to avoid arcing that can ignite explosive battery gases.

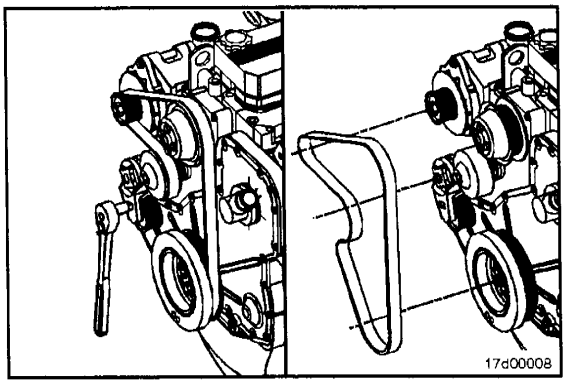
Disconnect the ground cable from the battery terminal.

Remove and tag all wires.



Remove the drive belt from the alternator pulley.

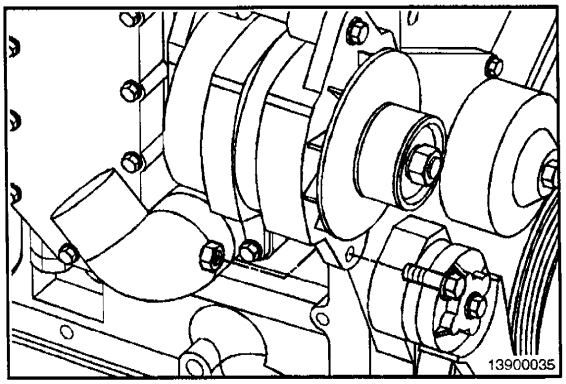
Refer to the Troubleshooting and Repair Manual, ISC Engine, Bulletin No. 3666245.



Remove

13 mm

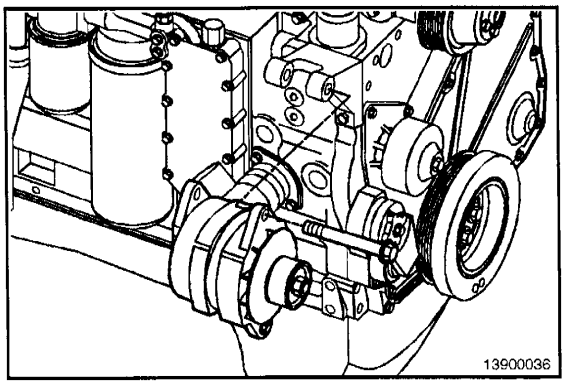
Remove the alternator link capscrew.

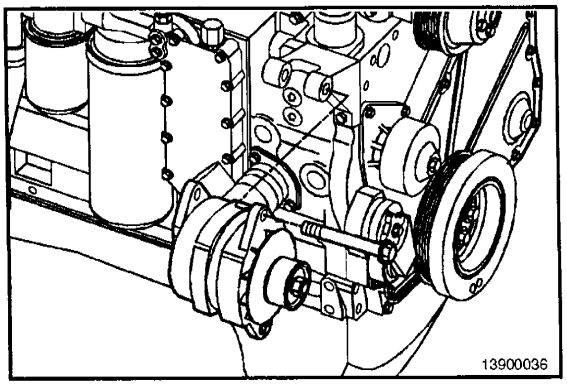


16 mm

Remove the alternator mounting capscrew.

Remove the alternator.



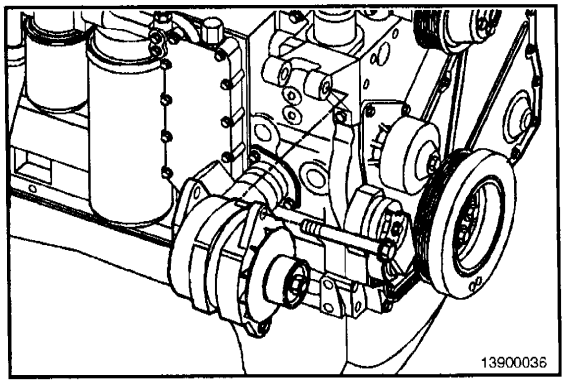


Install

To install the alternator, the alternator mounting components **must** be tightened in the following sequence:

1. Alternator-to-alternator bracket capscrew
2. Lower brace-to-alternator capscrew
3. Lower alternator brace-to-water pump capscrew
4. Water inlet-to-block capscrews.

NOTE: The wrench size and torque value is determined by the make and model of the alternator. Refer to the Troubleshooting and Repair Manual, ISC Engine, Bulletin No. 3666245.



To install the alternator, the alternator mounting components **must** be tightened in the following sequence:

1. Alternator-to-alternator bracket capscrew

Torque Value: 43 N•m [32 ft-lb]

2. Lower brace-to-alternator capscrew

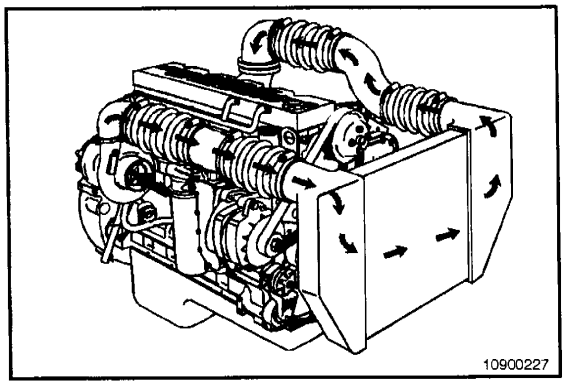
Torque Value: 24 N•m [18 ft-lb]

3. Lower alternator brace-to-water pump capscrew

Torque Value: 24 N•m [18 ft-lb]

4. Water inlet-to-block capscrews.

Torque Value: 24 N•m [18 ft-lb]

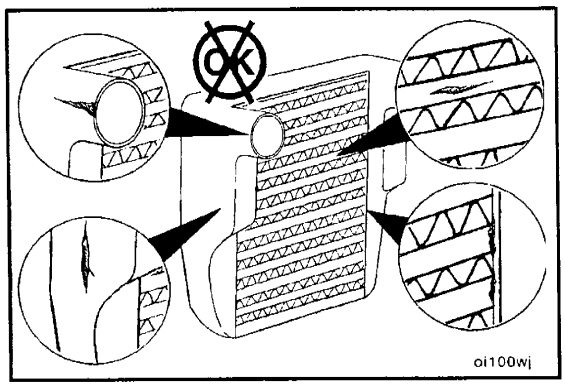


Charge-Air Cooler

General Information

The long-term integrity of the charge air cooler system is the responsibility of the vehicle and component manufacturers; however, the following can be checked by any Cummins Authorized Repair Facility.

NOTE: If the engine experiences a turbocharger failure or any other occasion where oil or debris is put into the charge air cooler, the charge air cooler **must** be cleaned.



Initial Check

Inspect the charge air cooler for cracks, holes, and damage.

Inspect the tubes, fins, and welds for tears, breaks, or other damage. If any damage causes the charge air cooler to fail the air leak check, the charge air cooler **must** be replaced.

Inspect the charge air cooler plumbing for cracks and damage.

Remove

⚠ WARNING ⚠

Coolant is toxic. Keep away from children and pets. If not reused, dispose of in accordance with local environmental regulations.

⚠ WARNING ⚠

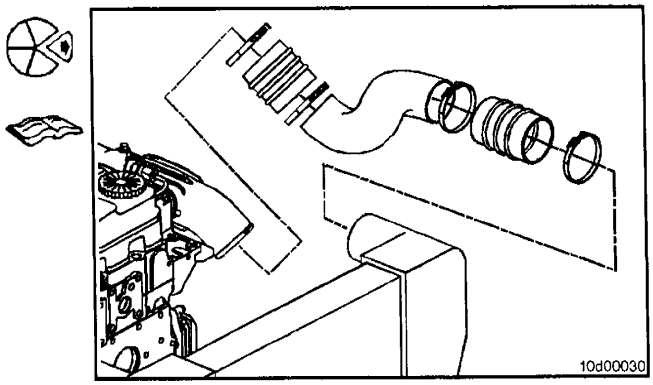
Wear appropriate eye and face protection when using compressed air. Flying debris and dirt can cause personal injury.

Use compressed air to clean debris from the outside of the charge air cooler.

Drain the coolant. Refer to Section 7.

Remove the charge air cooler plumbing.

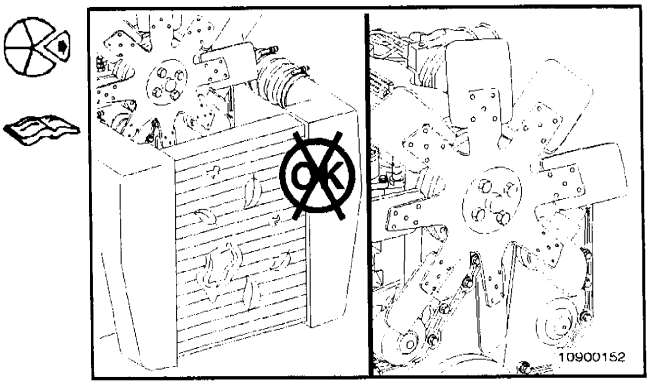
Remove the charge air cooler. Refer to the OEM service manual.



Clean

NOTE: If the engine experiences a turbocharger failure or any other occasion where oil or debris is put into the charge air cooler, the charge air cooler **must** be cleaned.

Remove the charge air cooler piping and charge air cooler from the vehicle. Refer to the original equipment manufacturer's instructions.



⚠ WARNING ⚠

When using solvents, acids, or alkaline materials for cleaning, follow the manufacturer's recommendations for use. Wear goggles and protective clothing to reduce the possibility of personal injury.

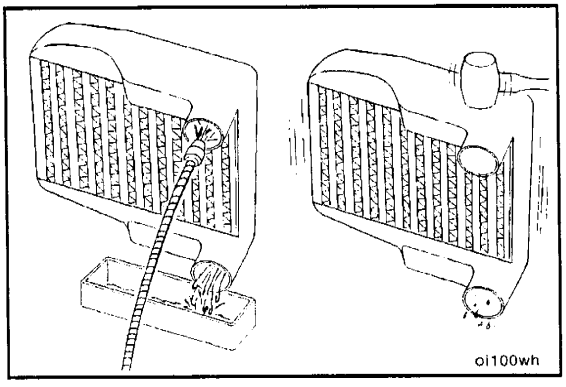
⚠ CAUTION ⚠

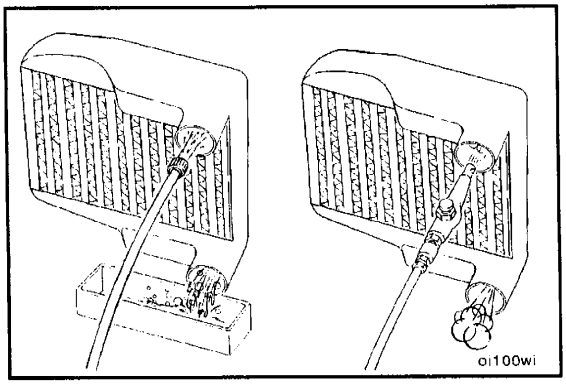
Do not use caustic cleaners to clean the charge air cooler. Damage to the charge air cooler will result.

Flush the charge air cooler internally with solvent in the opposite direction of normal airflow. Shake the charge air cooler and lightly tap on the end tanks with a rubber mallet to dislodge trapped debris. Continue flushing until all debris or oil is removed (i.e., the water runs clear).

NOTE: Make sure that the tubes are in the vertical direction when flushing.

If the debris can **not** be totally removed from the charge air cooler, the charge air cooler **must** be replaced.





⚠ WARNING ⚠

Wear appropriate eye and face protection when using compressed air. Flying debris and dirt can cause personal injury.

⚠ WARNING ⚠

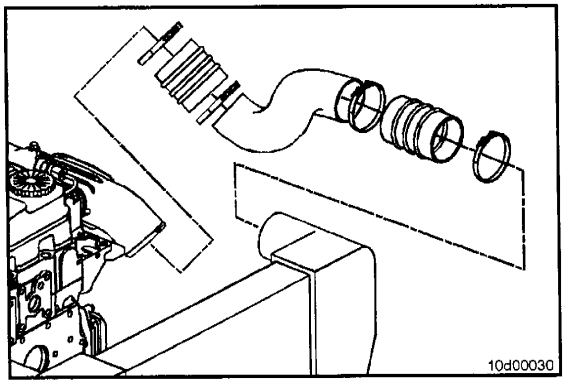
When using solvents, acids, or alkaline materials for cleaning, follow the manufacturer's recommendations for use. Wear goggles and protective clothing to reduce the possibility of personal injury.

△ CAUTION △

The charge air cooler must be rinsed, dried, and cleaned of solvent, oil, and debris, or engine damage will result.

After the charge air cooler has been thoroughly cleaned of all oil and debris with solvent, wash the charge air cooler internally with hot, soapy water to remove the remaining solvent. Rinse thoroughly with clean water.

Blow compressed air through the inside of the charge air cooler in the opposite direction of normal airflow until the charge air cooler is dry internally.

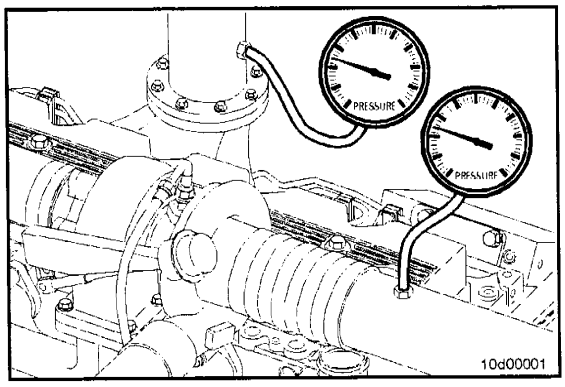


Install

Install the charge air cooler.

Install the charge air cooler plumbing.

Refer to the OEM service manual for instructions.



Pressure Test

Pressure Gauge, Part Number ST-1273

Install the pressure gauge, Part Number ST-1273, to the fitting in the turbocharger outlet.

Install another pressure gauge, Part Number ST-1273, in the intake manifold.

Operate the engine at rated rpm and load. Record the readings on the two gauges.

If the differential pressure is greater than 21 kPa [3 psi], check the charge air cooler for plugging. Clean or replace if necessary.

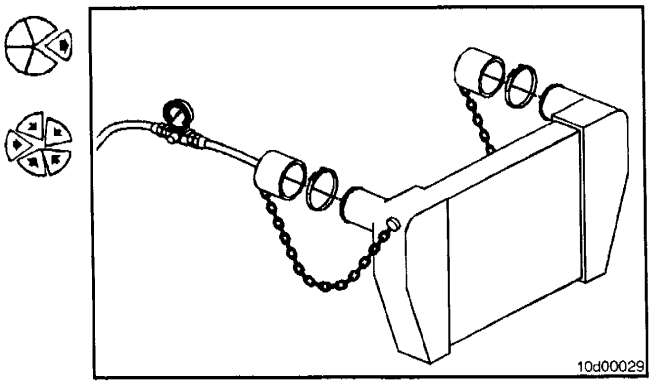
Leak Test

⚠ WARNING ⚠

To reduce the possibility of injury if either plug blows off during the test, secure safety chains on the test plugs to any convenient capscrew on the radiator assembly. This test must not be performed without securely fastened safety chains.

To check the charge air cooler for cracked tubes or header, remove the inlet and outlet hoses from the cooler. The charge air cooler does **not** have to be removed from the chassis.

Install a plug or cap over the outlet side of the cooler. Install a pressure gauge and a regulated shop air supply line with a shutoff valve to the inlet side of the cooler.

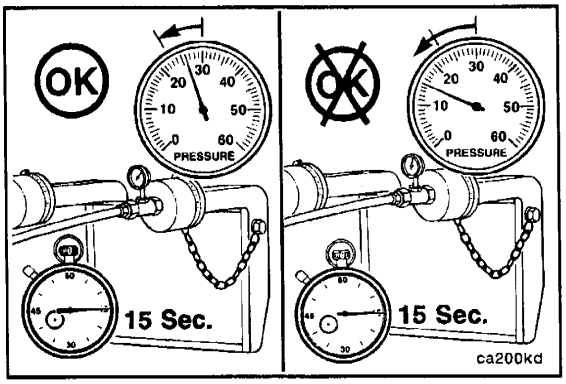


Apply air pressure to the cooler until the pressure gauge reads a steady 207 kPa [30 psi] of air pressure.

Shut off the airflow to the cooler and start a stopwatch at the same time. Record the leakage at 15 seconds.

If the pressure drop is 48 kPa [7 psi] or less in 15 seconds, the cooler is operational.

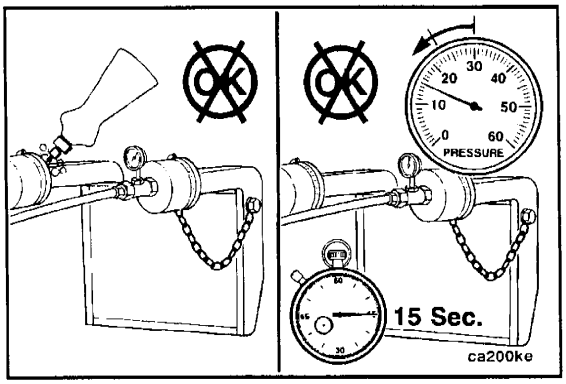
If the pressure drop is greater than 48 kPa [7 psi] in 15 seconds, check all connections again.



Determine if the pressure drop is caused by a leaky charge air cooler or a leaky connection. Spray soapy water on all hose connections, and watch for bubbles to appear at the location of the leak.

If the pressure drop is caused by a leaky connection, repair the connection and repeat the test. If the leak is within the charge air cooler, repeat the test to verify the accuracy of the pressure drop measurement. Similar pressure drop readings **must** be obtained in at least three consecutive tests before the reading can be considered accurate.

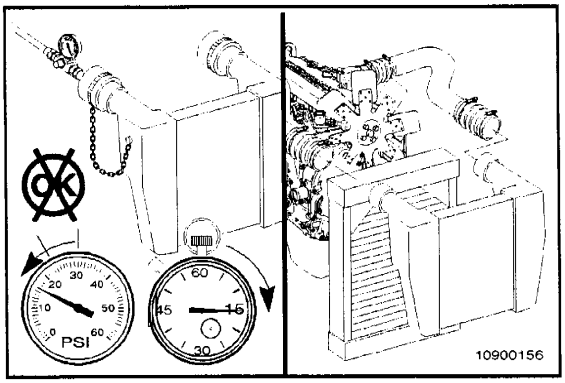
NOTE: If a charge air cooler leaks more than 48 kPa [7 psi] in 15 seconds, it will appear as a major leak in a leak tank.

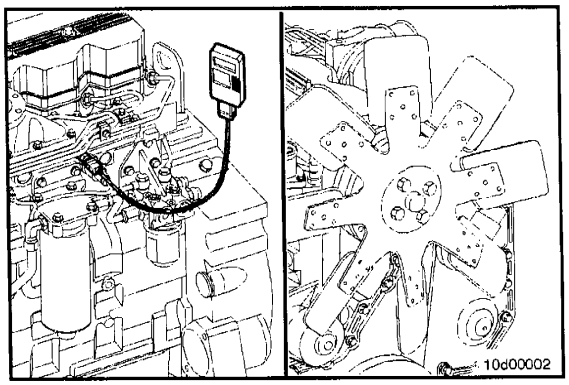


If the pressure drop is greater than 48 kPa [7 psi] in 15 seconds, the charge air cooler **must** be replaced.

Refer to the equipment manufacturer's service manual for replacement instructions.

NOTE: Charge air coolers are **not** designed to be 100-percent leak free. If the pressure drop is less than 48 kPa [7 psi] in 15 seconds, then the charge air cooler does **not** need to be replaced.



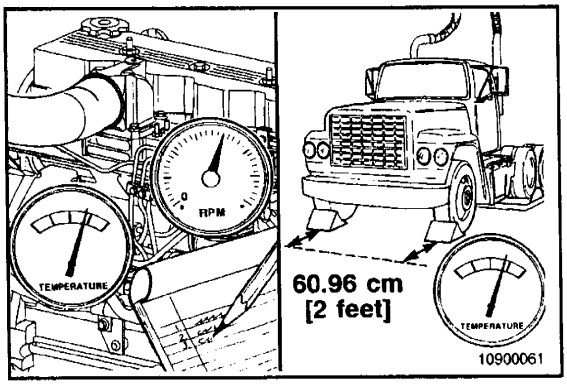


Temperature Differential Test

Install a temperature gauge in the intake manifold.

Lock the fan drive in the ON mode to prevent erratic test results. This can be done by installing a jumper across the temperature switch or supplying shop air to the fan. Refer to the fan drive manufacturer for lockup procedure.

NOTE: Some trucks have a manual switch that will lock the fan on.

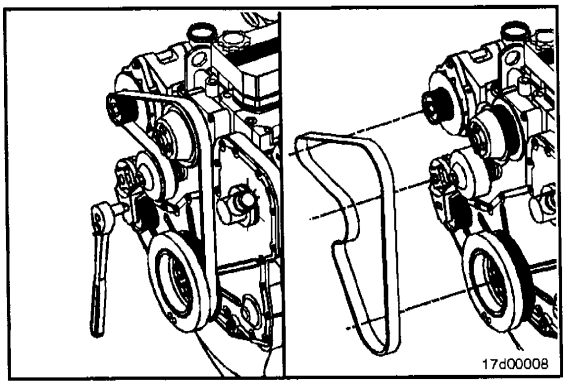


Operate the engine at rated rpm and load. Record the intake manifold temperature.

Measure the ambient temperature at least 2 feet in front of the vehicle.

The maximum temperature differential **must not** be greater than 25°C [45°F].

If the temperature differential is greater than 25°C [45°F], check the charge air cooler for dirt and debris on the fins, and clean as necessary. If the problem still exists, check the cooler for internal contamination or plugging.



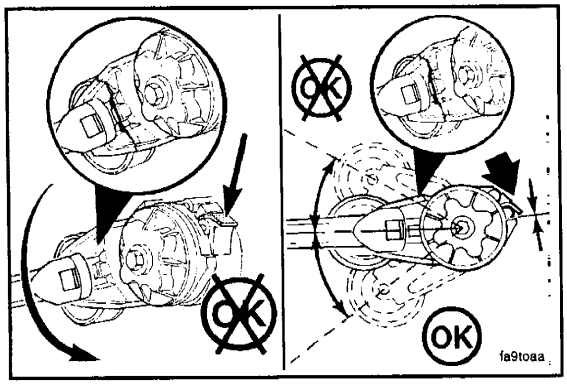
Drive Belt, Cooling Fan

Remove

3/8-Inch Square Drive

Lift the tensioner to remove the drive belt.

NOTE: The belt tensioner winds in the direction that the spring tang is bent over the tensioner body. To loosen the tension on the belt, rotate the tensioner to wind the spring tighter.



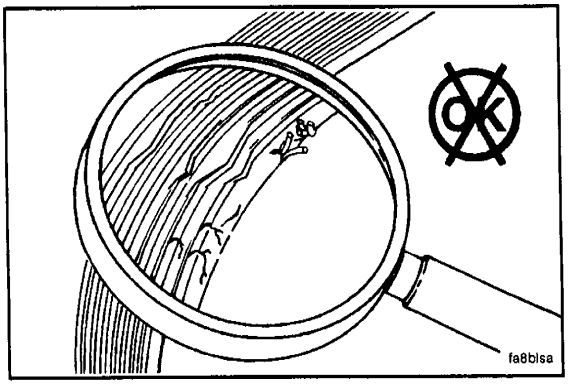
⚠ CAUTION ⚠

Applying excessive force in the opposite direction of wind-up or after the tensioner has been wound up to the positive stop can cause the tensioner arm to break.

Inspect for Reuse

Inspect the drive belt for:

- Cracks
- Glazing
- Tears or cuts
- Hardening
- Excessive wear.



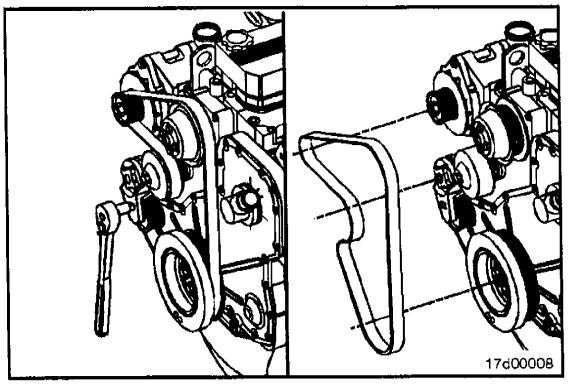
Install

△ CAUTION △

The belt tensioner is spring-loaded and must be pivoted away from the drive belt. Pivoting in the wrong direction can result in damage to the belt tensioner.

3/8-Inch Square Drive

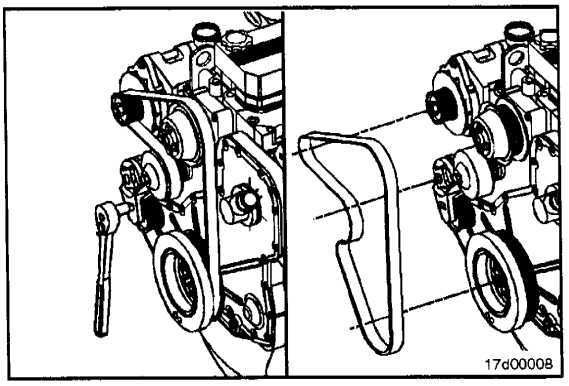
Lift the tensioner to install the drive belt.



Cooling Fan Belt Tensioner

Preparatory Steps

Remove the drive belt.



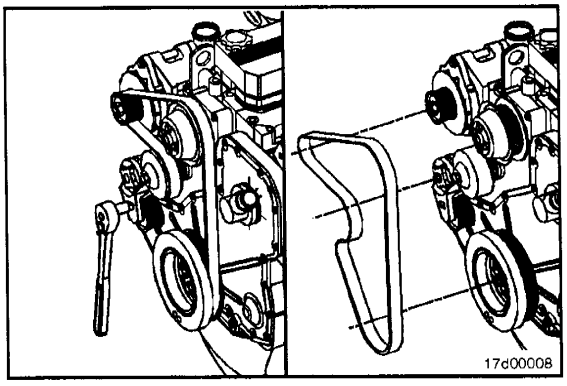
Remove

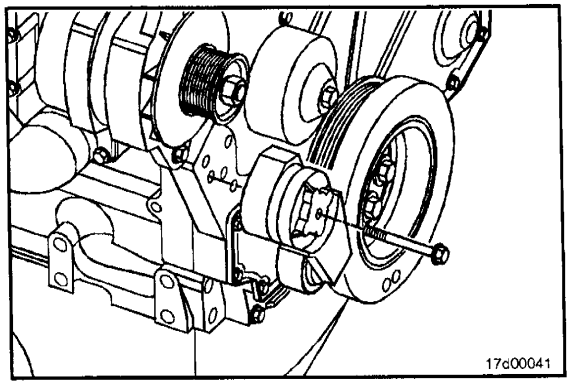
△ CAUTION △

The belt tensioner is spring loaded and must be pivoted away from the drive belt. Pivoting in the wrong direction can damage the belt tensioner.

3/8-Inch Square Drive

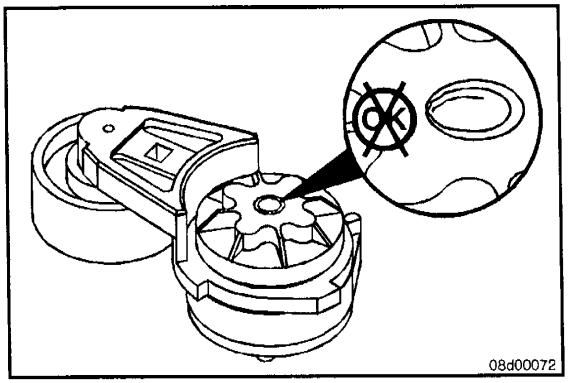
Lift the belt tensioner to relieve tension in the belt, and remove the belt.





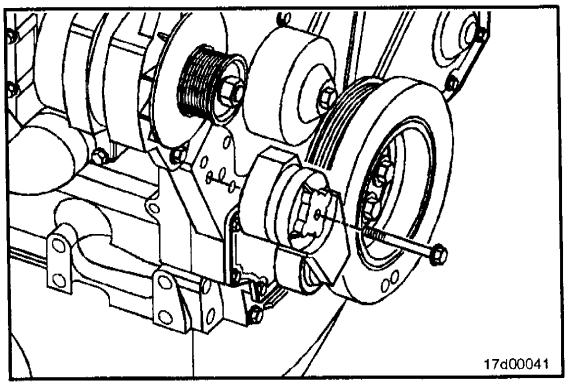
15 mm

Remove the capscrew and belt tensioner from the bracket.



Inspect for Reuse

Inspect the tensioner bushing between the arm and the spring case.

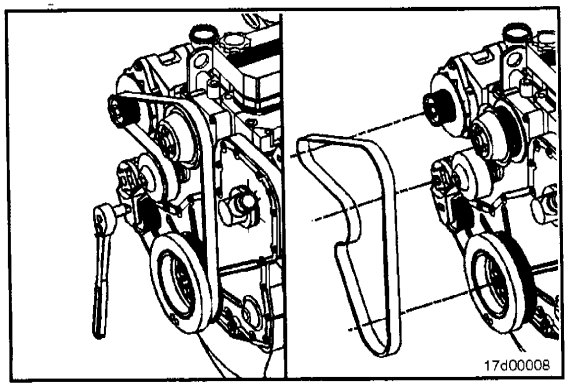


Install

15 mm

Install the belt tensioner and capscrews.

Torque Value: 43 N•m [32 ft-lb]



3/8-Inch Square Drive

Lift and hold the tensioner. Install the drive belt, and release the tensioner.

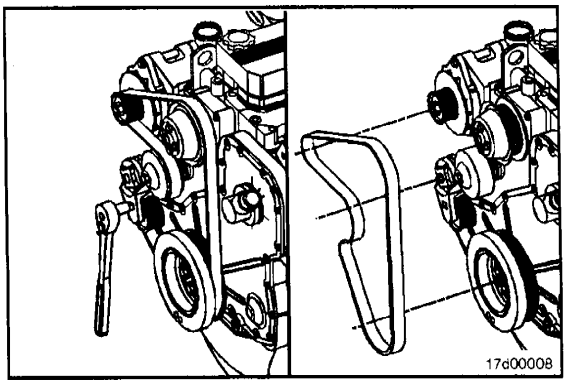
Service Tip: If difficulty is experienced installing the drive belt or if the belt seems too short, position the belt over the grooved pulleys first; then, while holding the tensioner up, slide the belt over the water pump pulley.

Fan Spacer and Pulley

Preparatory Steps

Remove the drive belt.

Loosen the capscrews before removing the belt, and tighten the capscrews after the belt is installed.



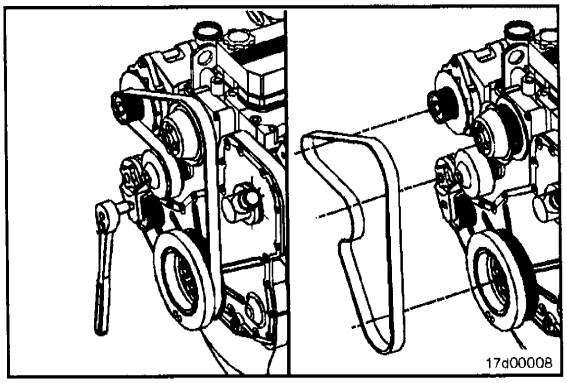
Remove

⚠ CAUTION ⚠

The belt tensioner is spring-loaded and must be pivoted away from the drive belt. Pivoting in the wrong direction can result in damage to the belt tensioner.

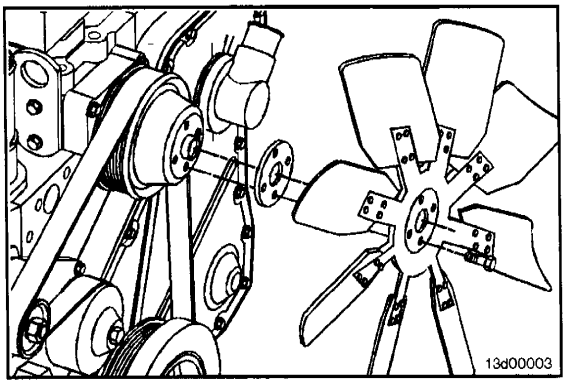
3/8-Inch Square Drive

Lift the tensioner to relieve tension in the belt. Remove the belt.



Remove the fan capscrews, fan, and spacer.

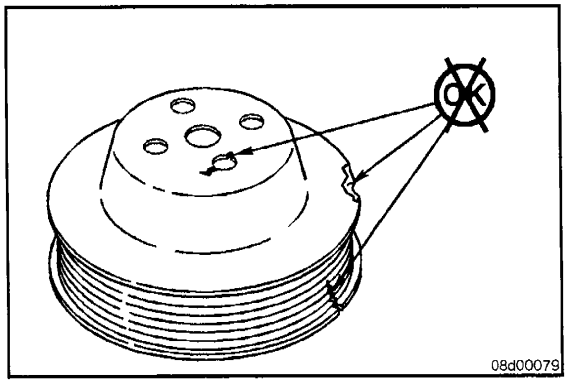
Remove the fan pulley.

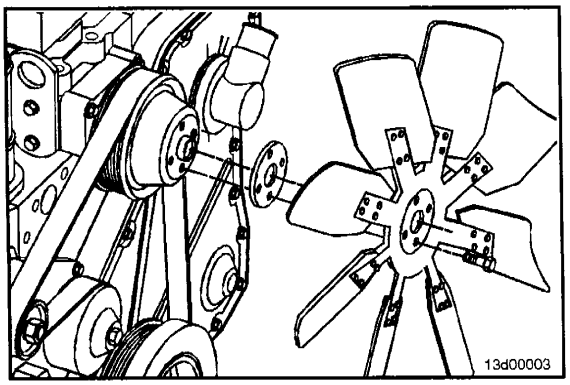


Inspect for Reuse

Inspect the fan pulley for cracks near bolt holes.

Check for cracks, loose rivets, and bent or loose blades.





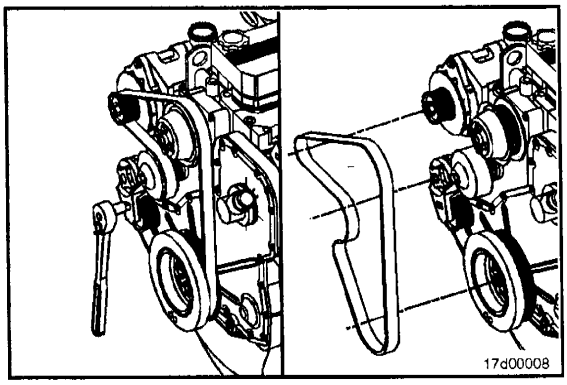
Install

13 mm

Install the fan pulley.

Install the spacer, fan, and fan capscrews.

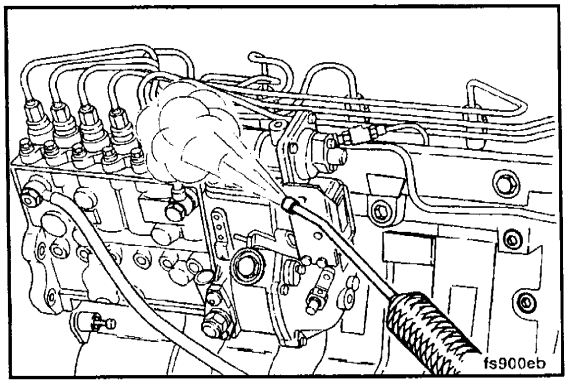
Torque Value: 24 N•m [212 in-lb]



3/8-Inch Square Drive

Lift the tensioner, and install the belt.

Service Tip: If difficulty is experienced installing the drive belt or if the belt seems too short, position the belt over the grooved pulleys first; then, while holding the tensioner up, slide the belt over the water pump pulley.



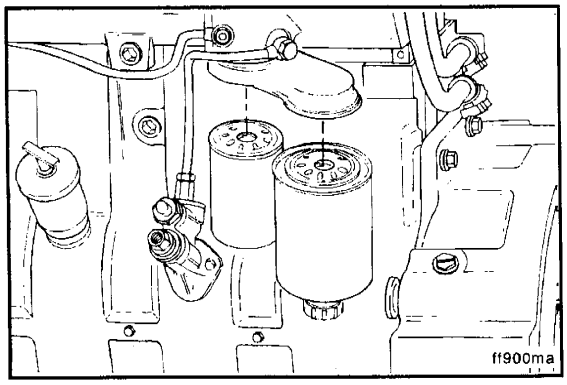
Fuel Filter Adapter

Preparatory Steps

Bosch®

Clean debris.

Remove fuel filters.



Remove

Bosch®

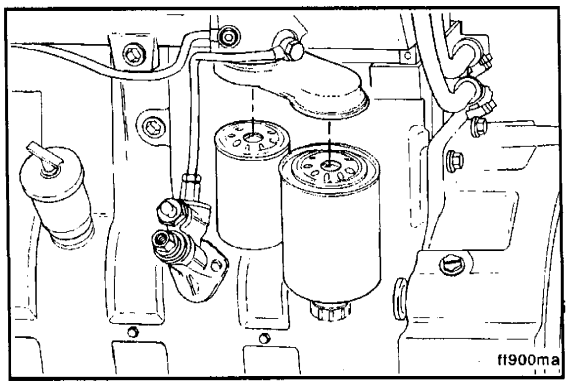
Remove the retaining nut, fuel filter head adapter, and sealing washers.

Install

Bosch®

Install in the reverse order of removal.

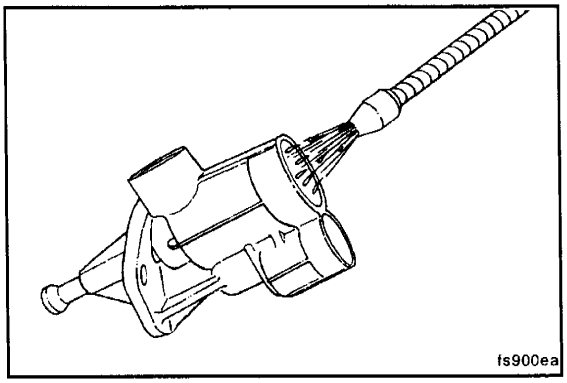
Torque Value: 32 N•m [24 ft-lb]



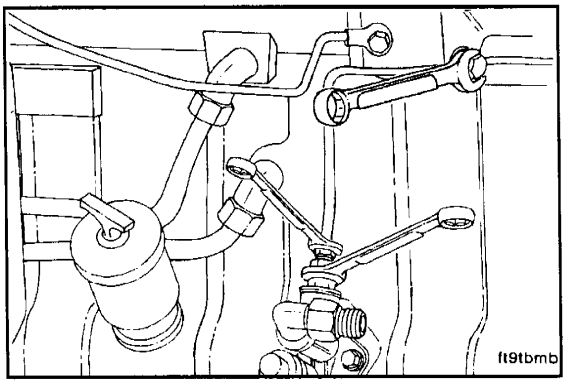
Fuel Lift Pump

Preparatory Steps

Clean all debris from the fuel lift pump.



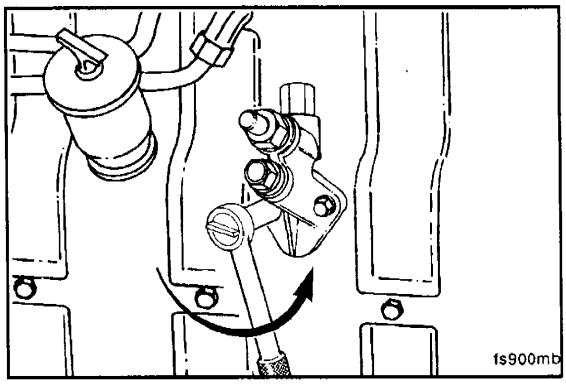
Disconnect the fuel supply lines.

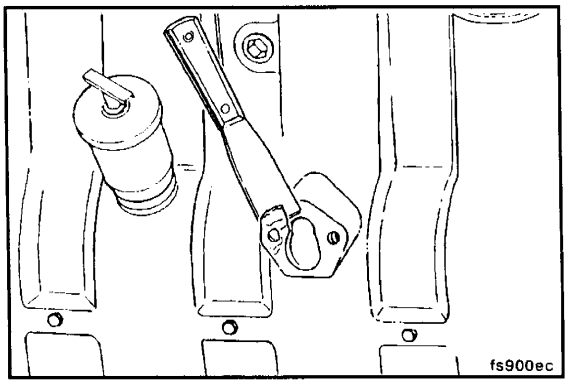


Remove

Remove the two fuel lift pump mounting capscrews.

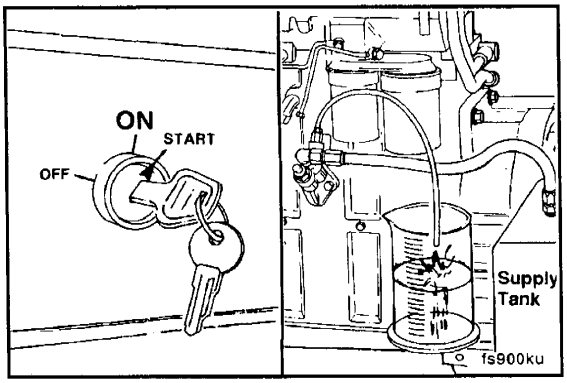
Remove the fuel lift pump.





Clean

Clean the fuel transfer pump mounting surface on the cylinder block.



Install

⚠ CAUTION ⚠

Failure to tighten the fuel transfer pump mounting capscrews alternately can result in broken lift pump flanges.

Install a new fuel transfer pump gasket.

Alternately tighten the mounting bolts.

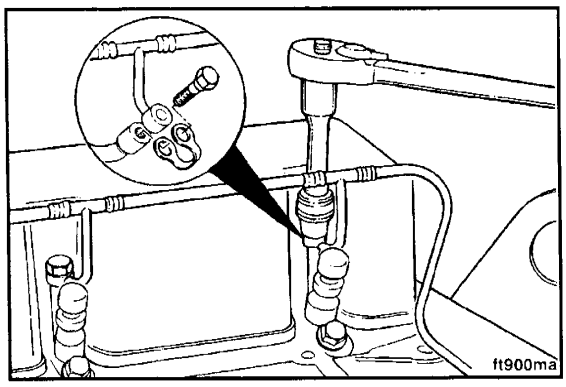
Torque Value: 24 N•m [212 in-lb]

Connect the fuel lines.

Fuel Manifold (Drain)

Preparatory Steps

Clean all debris from around the fuel drain manifold.



Remove

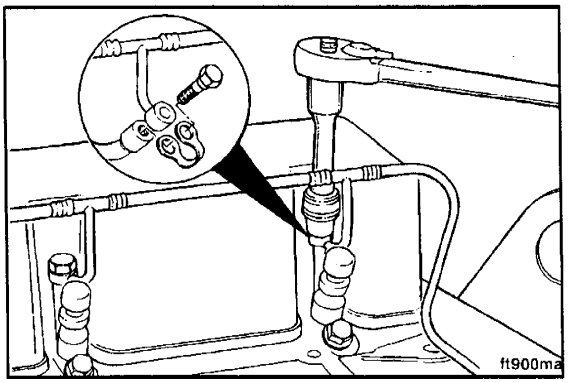
Remove the banjo capscrews from the injectors and fuel filter head.

Install

Install the fuel drain manifold in the reverse order of removal.

Torque Value:

Filter Head Banjo	15 N•m [133 in-lb]
Injector Banjo	9 N•m [80 in-lb].



Fuel Shutoff Valve

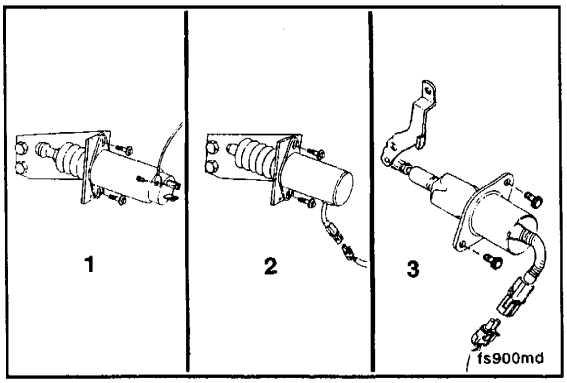
Preparatory Steps

Label and disconnect the wiring.

Remove

Remove the two mounting capscrews, and remove the solenoid from the bracket.

1. Synchro-start
2. Trombetta
3. Direct link.



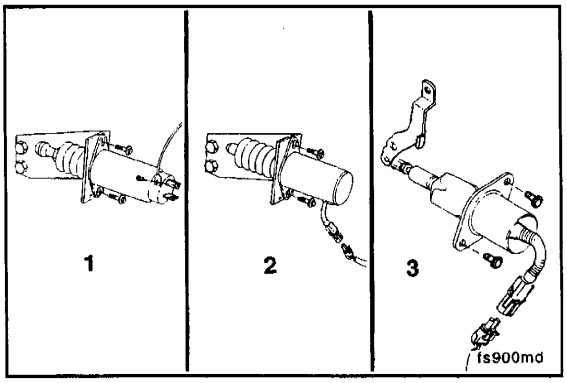
Install

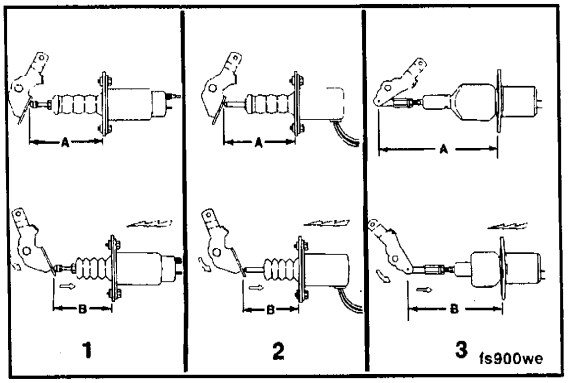
NOTE: Make sure the acorn nut is tightened to be snugly on the fuel shutoff solenoid shaft (Synchro-start **only**).

Install the new fuel shutoff solenoid to the bracket, and connect the wires. Make sure the wiring harness one the Trombetta solenoid is installed in the six-o'clock position.

Torque Value: 10 N•m [89 in-lb]

1. Synchro-start
2. Trombetta
3. Direct link.

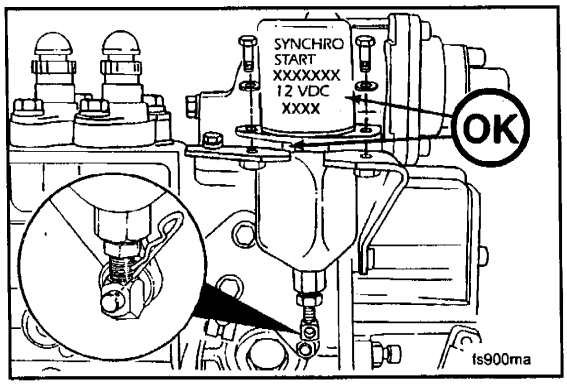




Activate the switch and check the plunger travel.

	Synchro-start	Trombetta	Direct link
A =	86.8 mm [3.4 in]	91.4 mm [3.6 in]	
B =	60.2 mm [2.4 in]	63.5 mm [2.5 in]	117.1 mm [4.61 in]

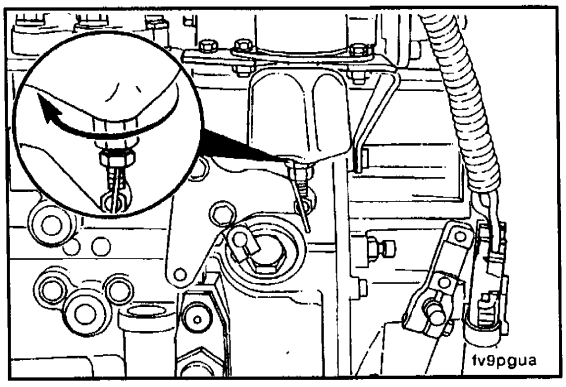
The plunger **must** be retracted when the fuel shutoff solenoid is activated to the RUN position B. The fuel shutoff solenoid **must** operate without binding.



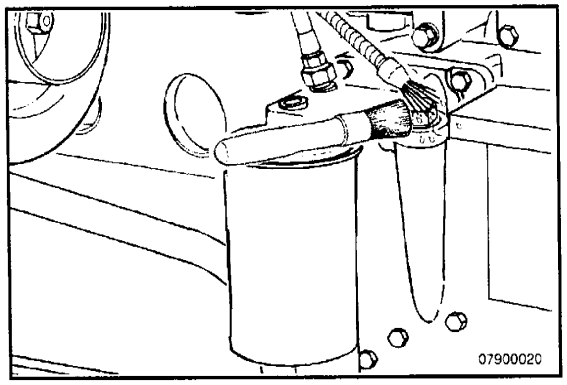
Remove the hitch pin clip, the mounting capscrews, and the fuel shutoff solenoid.

Install the new solenoid in reverse order of removal, and connect the wires.

Torque Value: 10 N•m [89 in-lb]



Adjust the solenoid linkage as necessary so that the plunger is magnetically held in with the shutoff lever in the absolute full-run position. Turn the large hex nut on the end of the plunger to make adjustments, and secure in place with a locknut.



Lubricating Oil Pressure Regulator (Main Rifle)

Preparatory Steps

⚠ WARNING ⚠

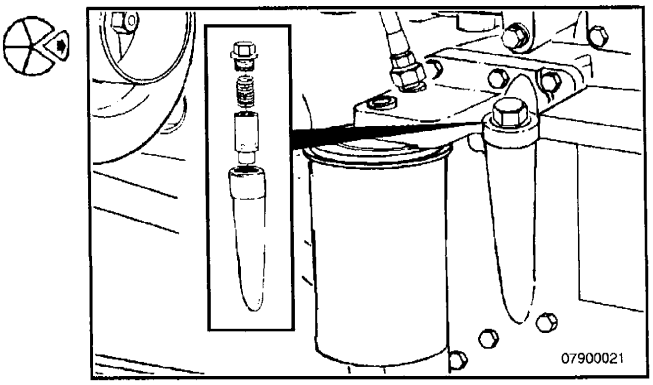
When using solvents, acids, or alkaline materials for cleaning, follow the manufacturer's recommendations for use. Wear goggles and protective clothing to avoid personal injury.

Clean the area around the pressure regulator plug with solvent to prevent debris from falling into the plunger bore when the plug is removed.

Remove

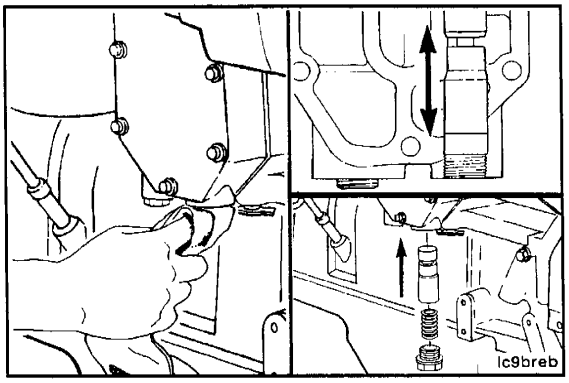
Remove the threaded plug, spring, and plunger.

Service Tip: The plunger normally can be removed by inserting one finger into the plunger bore until snug, and pulling up. If the plunger can **not** be removed in this manner, the plunger is probably stuck and will require removal of the housing for plunger removal and cleaning.



Clean

Clean and inspect the bore and regulator valve before assembly.

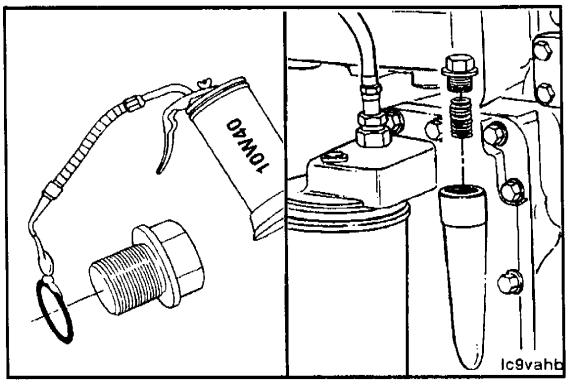


Install

NOTE: The valve **must** move freely in the bore.

Install the regulator, spring, and plug.

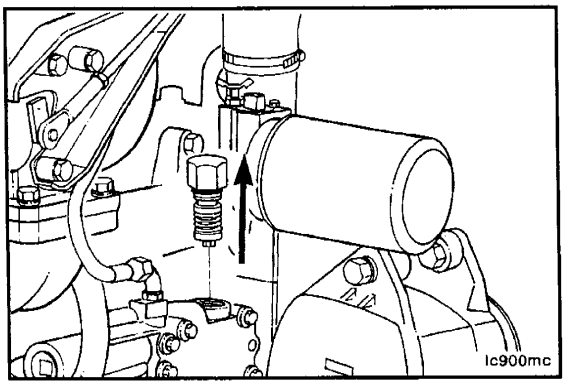
Torque Value: 80 N•m [59 ft-lb]



Lubricating Oil Thermostat

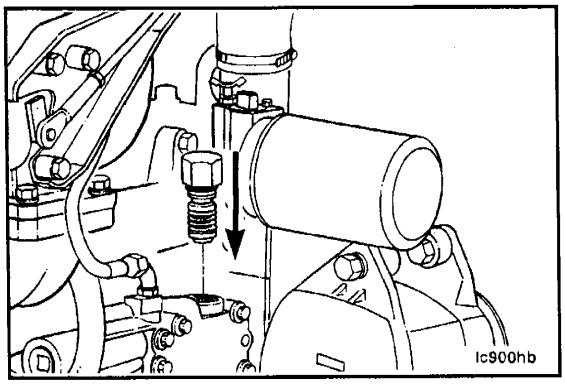
Preparatory Steps

Clean debris from oil thermostat.



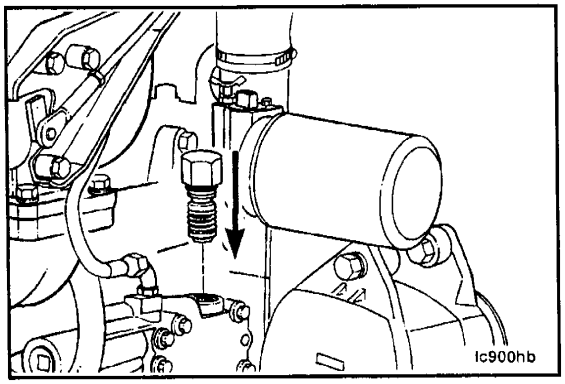
Remove

Remove the lubricating oil thermostat.



Clean

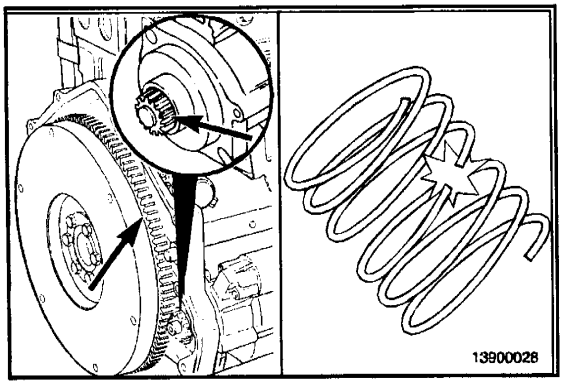
Clean and inspect the lubricating oil thermostat bore before assembly.



Install

Install and tighten the oil cooler bypass valve.

Torque Value: 50 N•m [37 ft-lb]



Starting Motor

Initial Check

If the starter solenoid is making a sound but the engine is **not** rotating, remove the starter motor and check for broken ring gear teeth or a broken starter motor spring.

Remove

⚠ WARNING ⚠

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

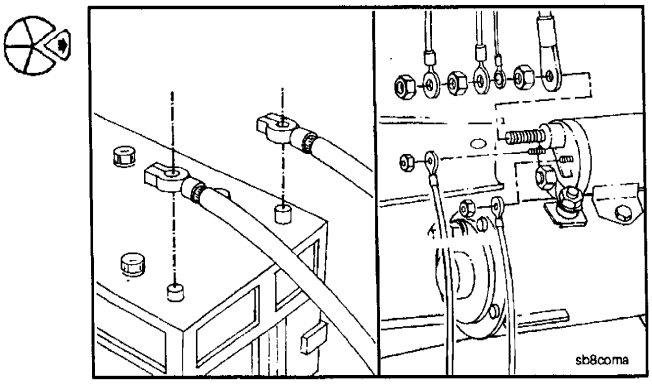
⚠ WARNING ⚠

Acid is extremely dangerous and can damage the machinery and can also cause serious burns. Always provide a tank of strong soda water as a neutralizing agent when servicing the batteries. Wear goggles and protective clothing to reduce the possibility of serious personal injury.

Remove the electrical connections from the batteries, negative (-) cable first.

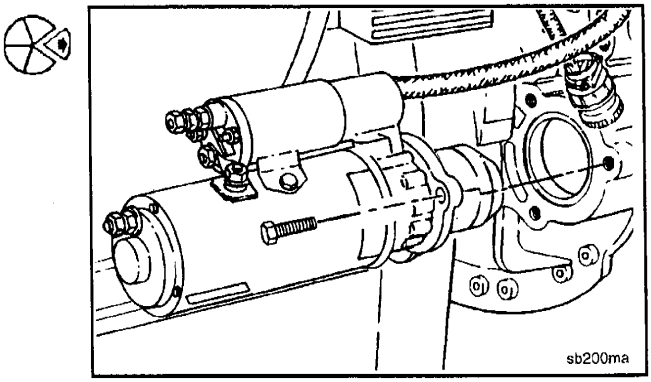
Remove the electrical connections from the starter motor.

Identify each wire with a tag indicating location on starter motor.



Remove the capscrews from the flywheel housing.

Remove the starter motor.

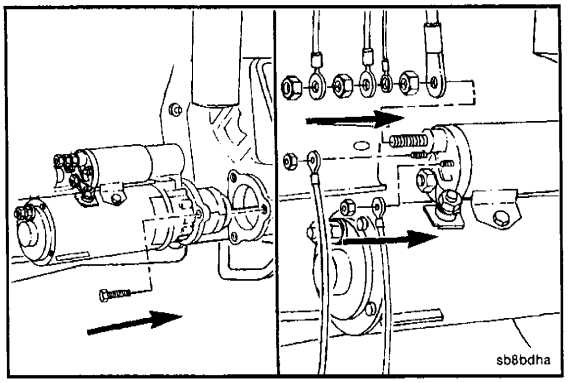


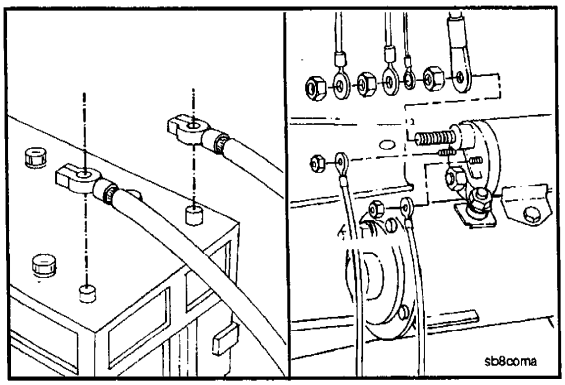
Install

Install the starter motor.

Install and tighten the mounting capscrews.

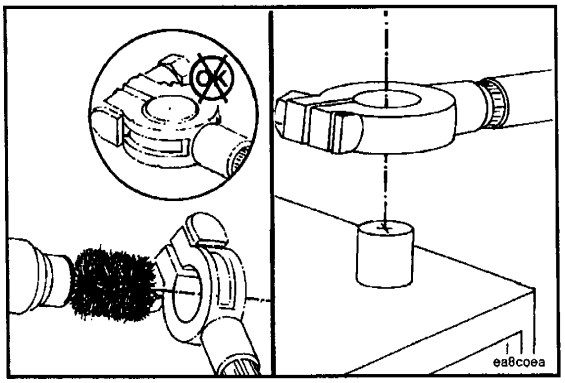
Torque Value: 43 N•m [32 ft-lb]





NOTE: Use the location tags to help identify where each wire connection goes.

Install the starter motor electrical connections.



⚠ WARNING ⚠

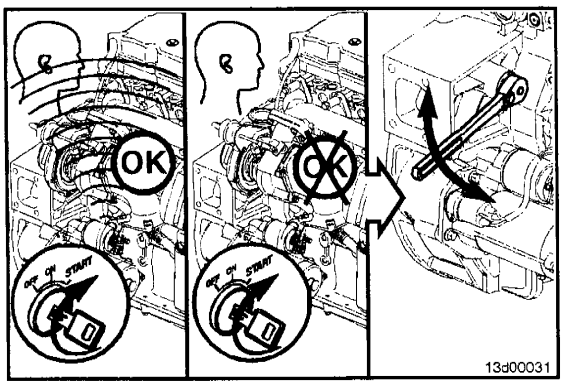
Batteries can emit explosive gases. To reduce the possibility of personal injury, always ventilate the compartment before servicing the batteries. To avoid arcing, remove the negative (-) battery cable first and attach the negative (-) battery cable last.

⚠ WARNING ⚠

Acid is extremely dangerous and can damage the machinery and can also cause serious burns. Always provide a tank of strong soda water as a neutralizing agent when servicing the batteries. Wear goggles and protective clothing to reduce the possibility of serious personal injury.

Clean the inside of the battery terminal with a brush before connecting to battery.

Install battery cables, connecting the negative (-) cable last.



Rotation Check

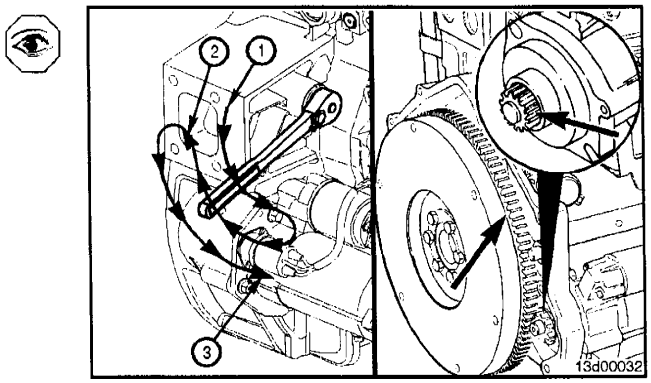
If the starter motor solenoid makes a sound, turn the keyswitch to the OFF position, and attempt to bar the crankshaft in both directions.

Bar the engine using the barring tool, Part Number 3824591.

Bar the crankshaft as follows:

1. Direction of engine rotation
2. Direction opposite engine rotation
3. Direction of engine rotation.

If the crankshaft will bar over, attempt to start the engine. If the starter motor cranks the engine, check the starter motor pinion gear and flywheel ring gear for damage.



Air in Fuel

General Information

⚠ WARNING ⚠

Fuel is flammable. Keep all cigarettes, flames, pilot lights, arcing equipment, and switches out of the work area and areas sharing ventilation to reduce the possibility of severe personal injury or death when working on the fuel system.

⚠ WARNING ⚠

Do not vent the fuel system on a hot engine; this can cause fuel to spill onto a hot exhaust manifold, which can cause a fire.

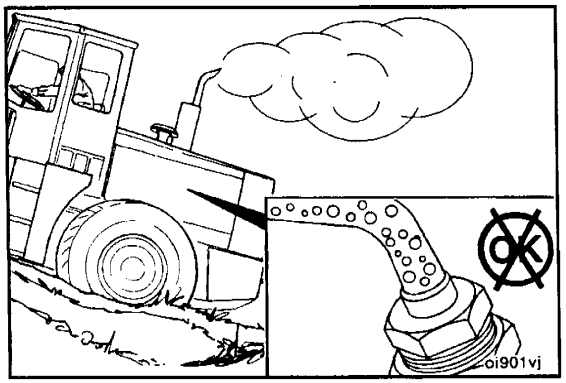
The low-pressure fuel system for Cummins diesel installed in the vehicle consists of the fuel tank, lines between tank and engine, transfer pump and lines, and fuel filter and lines. Air or bubbles at the injection pump can cause no or erratic engine operation and/or subsequent malfunction of the fuel injection pump. Air can be introduced by leaks in the fuel system prior to the transfer pump since fuel pressure is a vacuum. Bubbles can result from any number of restrictions in the system:

- Plugged fuel filter
- Crimped fuel line
- Stopped-up tank module
- Inoperative transfer pump.

If sufficient fuel reaches the injection pump from the low-pressure system, then solutions to engine operational problems are elsewhere. The following steps will aid in evaluating low-pressure fuel system performance in absence of fault codes.

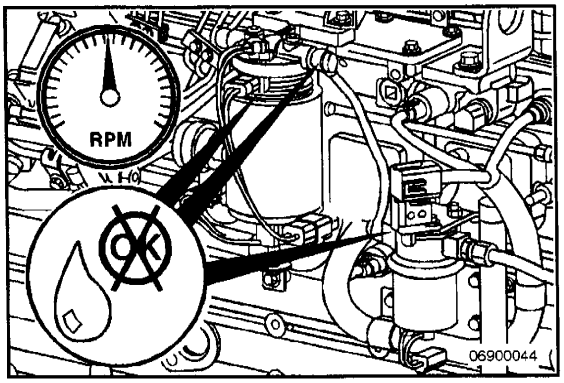
NOTE: For cold-start/performance problems, perform the following steps:

- Leave vehicle outside in cold environment for at least 12 hours.
- Perform outlined test.
- If the system fails to meet test criteria, replace the fuel lift pump.

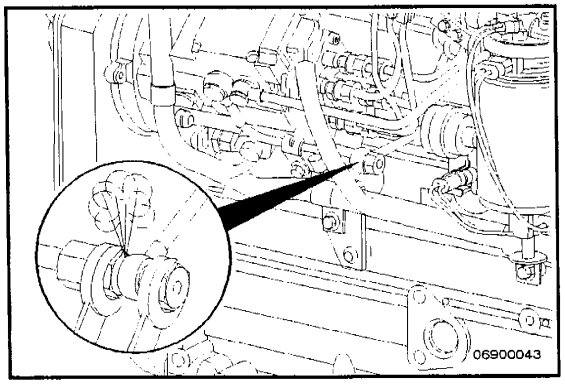


Test

A replacement of fuel supply lines, fuel filters, fuel injection pump, high-pressure fuel lines, and injectors will let air enter the fuel system. Air in the system will make the engine hard to start, run rough, misfire, produce low power, and can cause excessive smoke and a fuel knock.



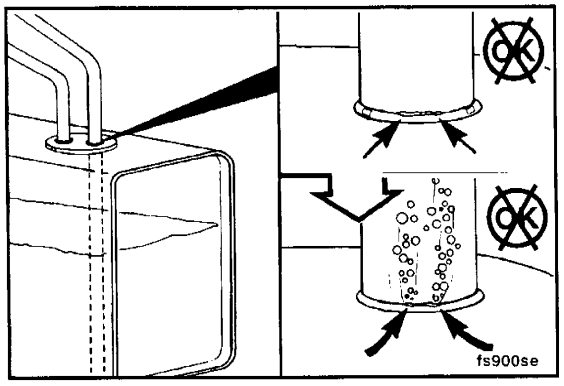
Since the fuel lift pump provides positive pressure through the fuel filter and supply line to the fuel injection pump, loose connections or defective seals can show as a fuel leak, **not** as an air leak.



NOTE: If an excessive amount of air has entered into the system, the system will need to be vented.

Loosen the return banjo fitting on the fuel lift pump. Run the fuel lift pump until all the air has been vented. When all the air has been vented, retighten the fitting.

NOTE: To run the fuel pump for 25 seconds, crank the engine for a split second, and leave the key in the ON position.



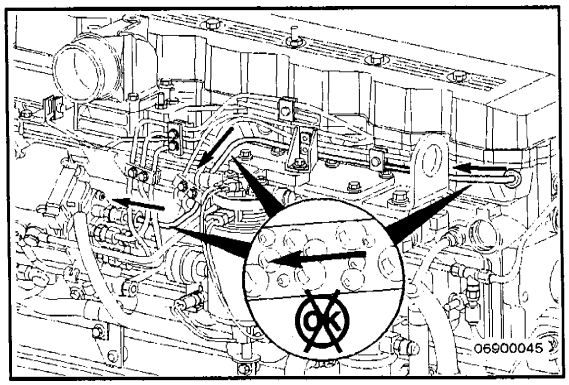
If air continues to bubble out of the system for several minutes, then an air leak is present.

An often overlooked source from which air can enter the fuel system is between the inlet of the fuel transfer pump and the suction tube in the tank. Fuel tanks that have the outlet fitting at the top will have a suction tube that extends to the bottom of the tank. Cracks or pin holes in the weld that join the tube to the fitting can let air enter the fuel system.

Also, check to make sure all the fittings from the fuel supply line on the tank to the inlet of the fuel transfer pump are tight.

Use a sight glass at the fuel lift pump inlet to check for air in the fuel supply lines.

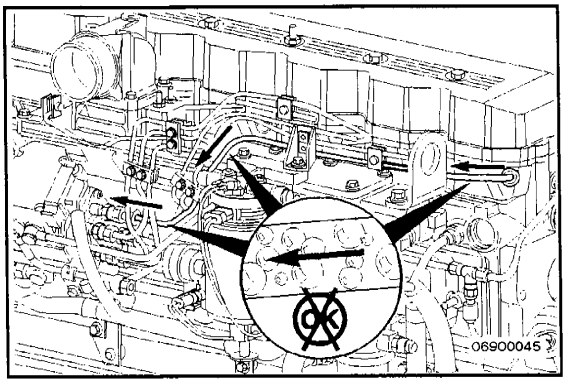
Since the fuel pump provides a positive pressure through the fuel filter and supply line to the fuel injection pump, loose connections or defective seals should show as a fuel leak, **not** as an air leak.



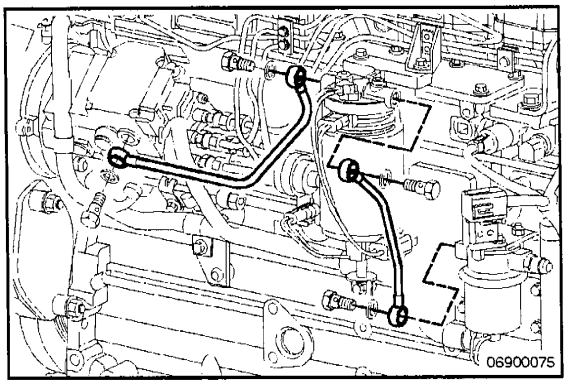
A stuck-open injector can also blow combustion gas back into the pump and cause air to be present in the overflow. If the engine seems to be misfiring or running rough, break all the injector supply lines loose at the pump end. Crank the engine, and observe the lines. If combustion gas seems to be blowing back through the line, the injector is stuck open. Remove the injector. Take the vehicle to an Authorized Cummis Repair Facility/Dealer Location for testing.

Torque Value: 24 N•m [212 in-lb]

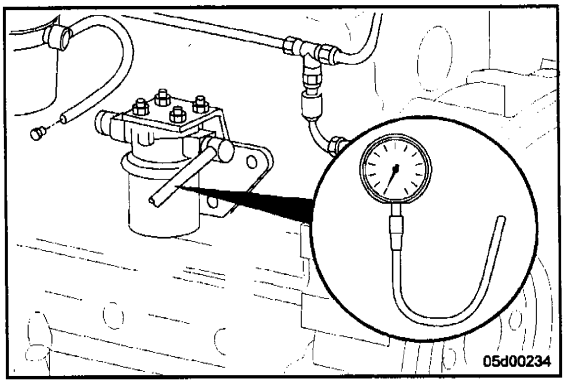
NOTE: Use two wrenches when loosening the lines at the fuel pump: One to hold the delivery valve and one to loosen the fuel line.

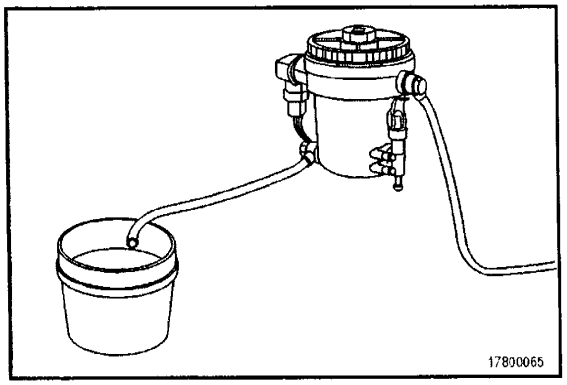


Disconnect the fuel line from the outlet of the fuel filter.

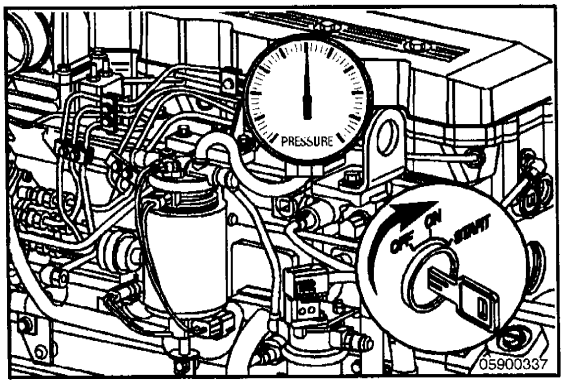


Attach a preferably clear hose to the outlet of the fuel filter. (Do **not** use pressure test fitting.) Place a pressure gauge on the inlet side of the fuel filter and a vacuum gauge on the inlet side to the transfer pump.





Insert a hose into an empty 3.8-liter [1-gal] container.

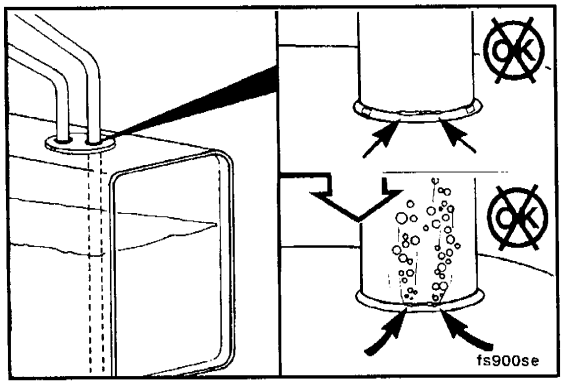


Operate the fuel lift pump by bumping the starter. (The lift pump should run for 25 to 30 seconds.) Check for bubbles in fuel.

Record filter inlet pressure and transfer pump inlet restriction.

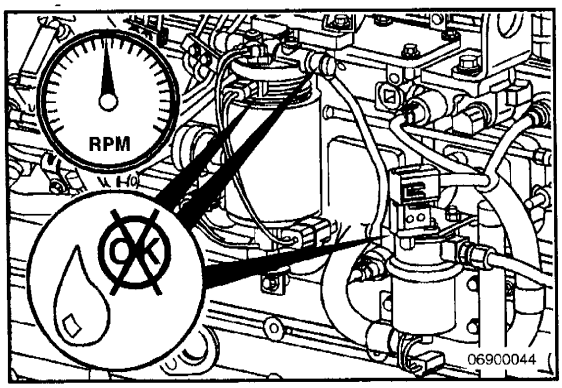
If filter inlet pressure is greater than 34.8 kPa [5 psi], the filter element **must** be replaced. Repeat test.

If inlet restriction is greater than 152.4 mm Hg [6 in Hg] or 155.1 mm Hg [3 psi], then excessive restriction exists between fuel in the tank and the transfer pump, which **must** be repaired (e.g., fuel line or tank module). Repeat test.



If bubbles are present, check for air leaks in the fuel supply circuit.

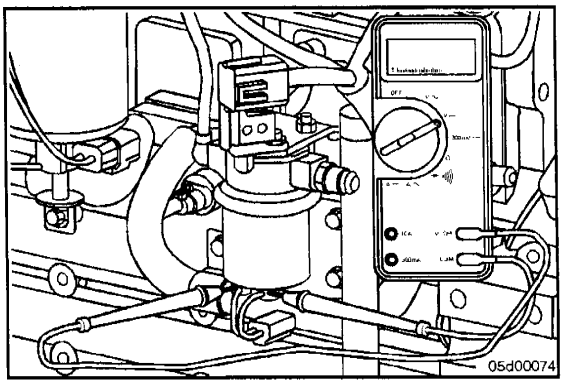
Measure the amount of fuel in the container. If more than 1.33 liters [45 fl oz] are collected and the fuel is bubble-free, then it is unlikely the low-pressure fuel system is the cause of engine operational problems.



Reconnect the lift pump that is retaining the fuel filter pressure connections. Running engine at high idle, the filter inlet pressure should be greater than 42.3 kPa [6 psi]; otherwise, there is a fuel lift pump malfunction.

If the fuel transfer pump does **not** run, check electrical circuits, and verify voltage is present at lift pump connector.

NOTE: When an engine is **not** running, with key on, the lift pump will run less than 2 seconds (varies with ECM calibration); with starter bump, about 25 to 30 seconds. If voltage is present, replace fuel transfer pump. Resistance measurement across the transfer pump terminals can be made for confirmation of pump malfunction. Resistance greater than 200 ohms or less than 0.2 ohm does confirm an electrical fault when voltage is present but the fuel pump is **not** running.



NOTES

Section D - System Diagrams

Section Contents

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System Diagrams - Overview

General Information

The following drawings show the flow through the engine systems. Although the parts can be different for various applications and installations, the flow remains the same. The systems shown are

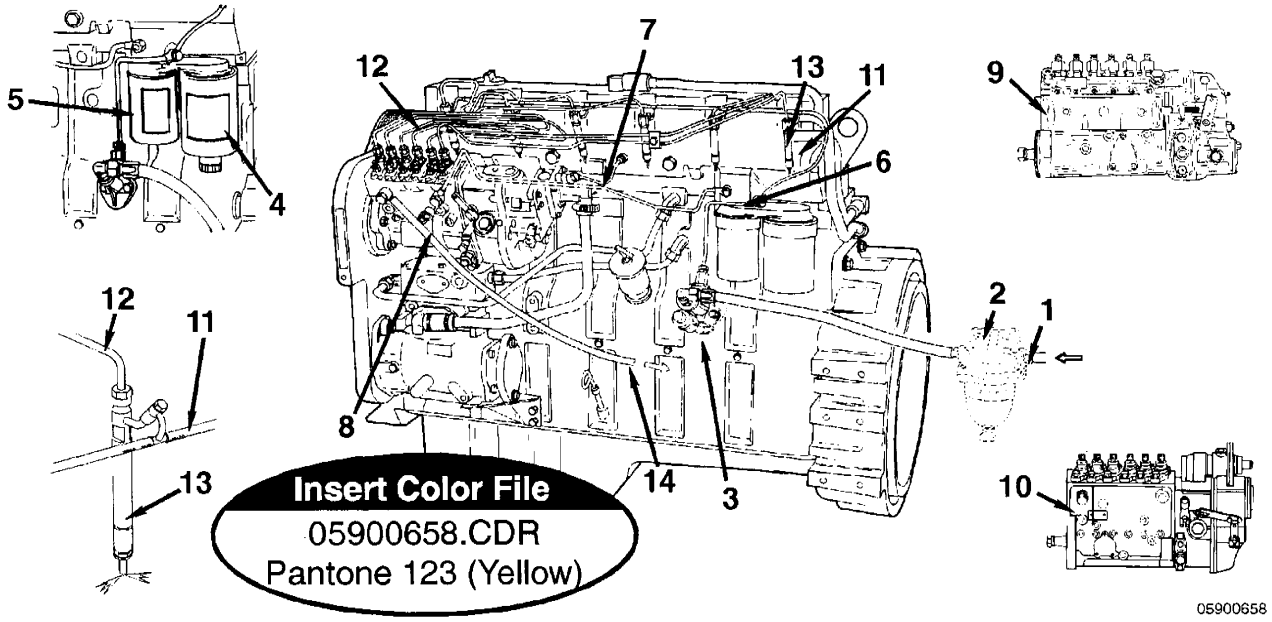
- Fuel system
- Lubricating oil system
- Coolant system
- Intake air system
- Exhaust system
- Compressed air system.

Knowledge of the engine systems can help in troubleshooting, servicing, and general maintenance of the engine.

Flow Diagram, Fuel System

General Information

General Information

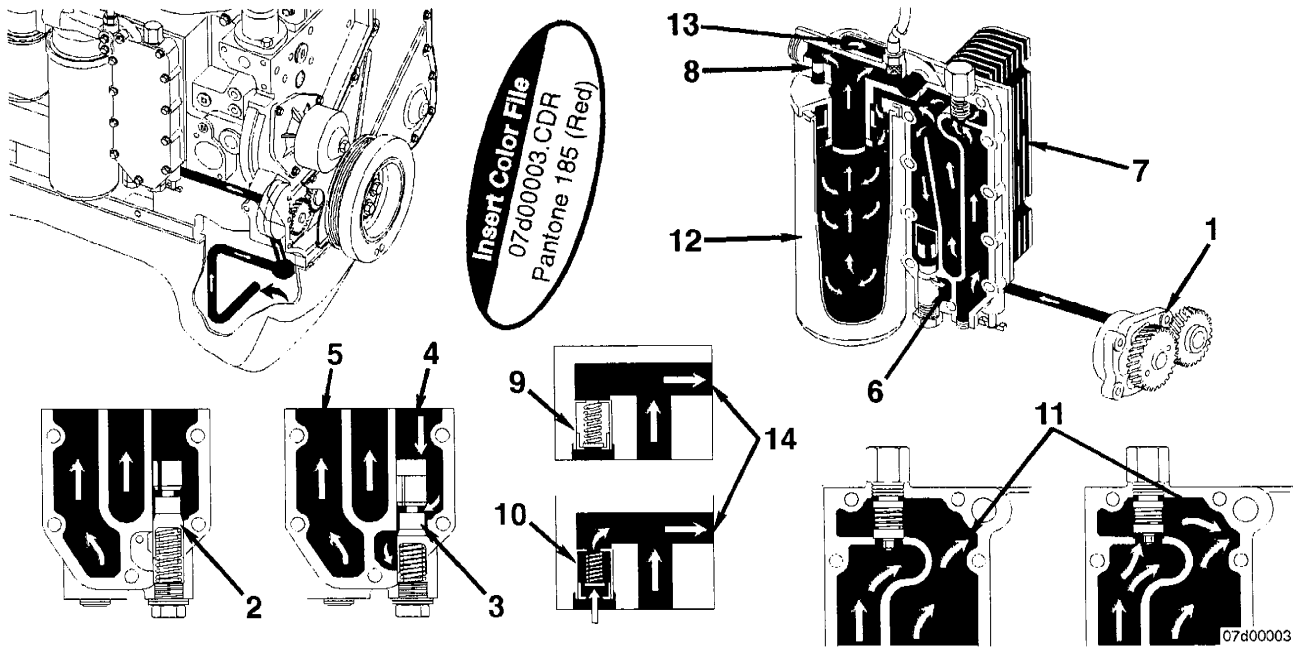


1. Fuel from supply tank
2. Prefilter or screen
3. Fuel transfer pump
4. Fuel/water separator
5. Fuel filter
6. Low-pressure supply line
7. Turbocharger boost control line
8. Bosch® PES.MW injection pump
9. Bosch® PES.A injection pump
10. Bosch® PES.P injection pump
11. Fuel drain manifold
12. High-pressure fuel lines
13. Hole-type injectors
14. Fuel return to supply tank.

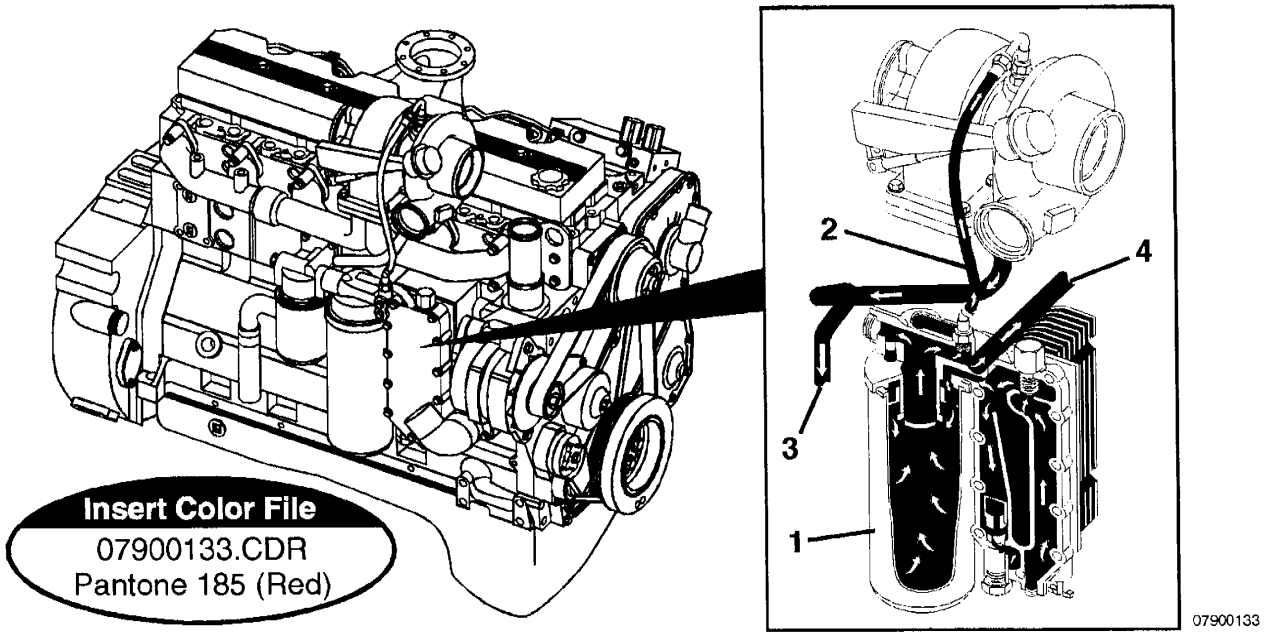
Flow Diagram, Lubricating Oil System

General Information

General Information

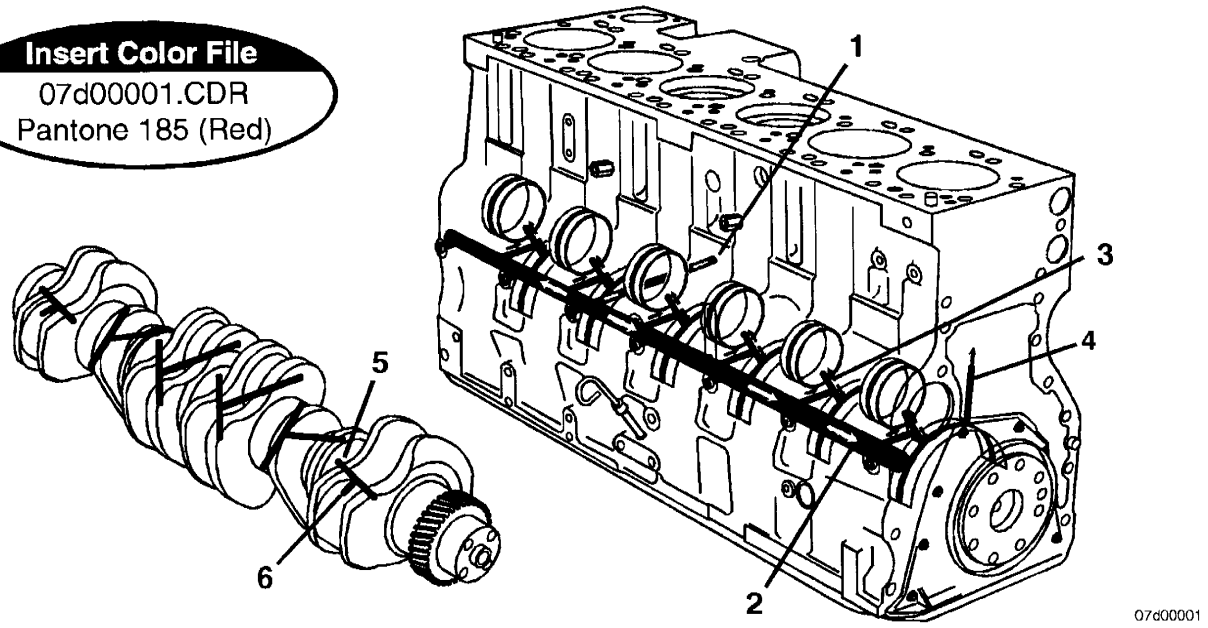


1. Gerotor lubricating oil pump
2. Pressure regulating valve closed
3. Pressure regulating valve open
4. From lubricating oil pump
5. To lubricating oil cooler
6. To lubricating oil pump oil pan
7. Lubricating oil cooler
8. Filter bypass valve
9. Filter bypass valve closed
10. Filter bypass valve open
11. To lubricating oil filter
12. Full-flow lubricating oil filter
13. From lubricating oil filter
14. Main lubricating oil rifle.

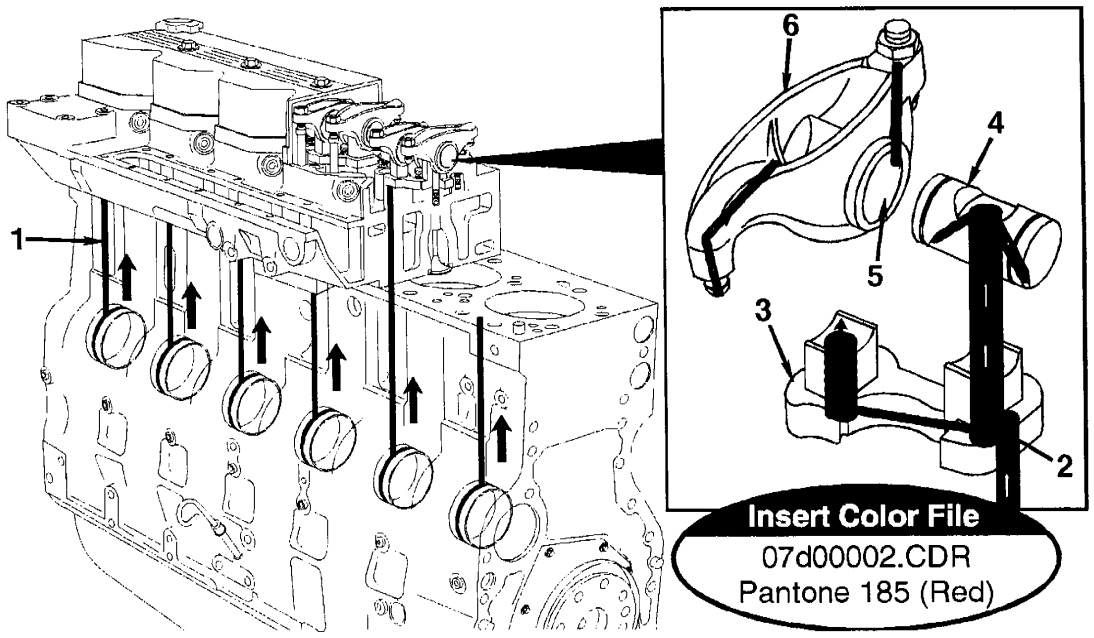


1. Lubrication oil filter
2. Turbocharger lubricating oil supply
3. Turbocharger lubricating oil drain
4. To main lubricating oil rifle.

Insert Color File
07d00001.CDR
Pantone 185 (Red)



1. From lubricating oil cooler
2. Main lubricating oil rifle
3. To camshaft
4. To piston cooling nozzle
5. From main lubricating oil rifle
6. To connecting rod bearing.



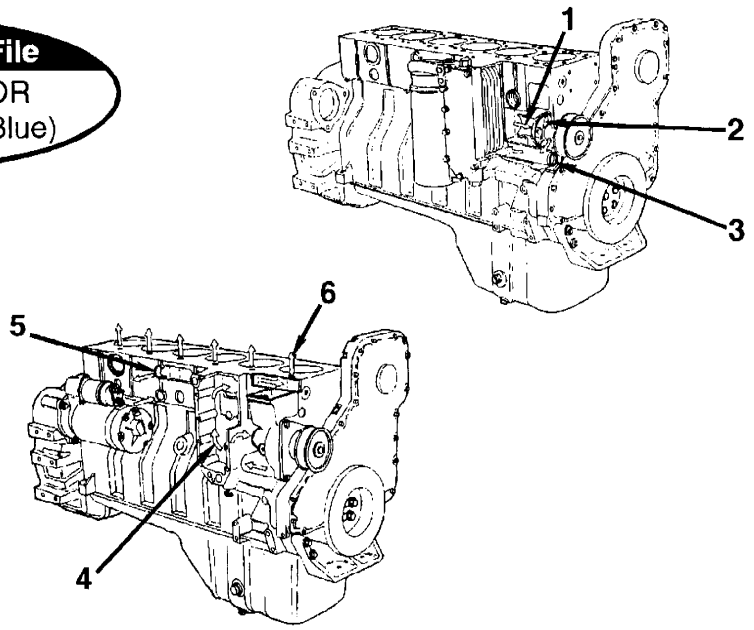
1. From cam bushings
2. Transfer slot
3. Rocker lever support
4. Rocker lever shaft
5. Rocker lever bore
6. Rocker lever.

Flow Diagram, Cooling System

General Information

General Information

Insert Color File
08900201.CDR
Pantone 299 (Blue)

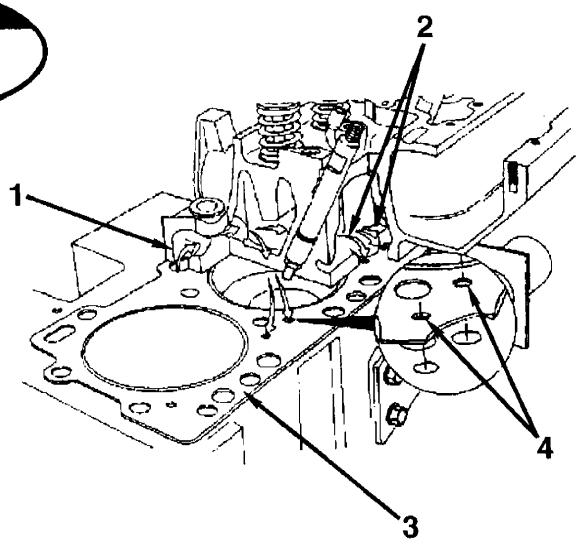


08900201

Cylinder Block

1. Coolant inlet
2. Water pump impeller
3. Coolant flow to oil cooler
4. Coolant flow past oil cooler
5. Upper coolant manifold
6. Coolant flow to cylinder head.

Insert Color File
08900203.CDR
Pantone 299 (Blue)

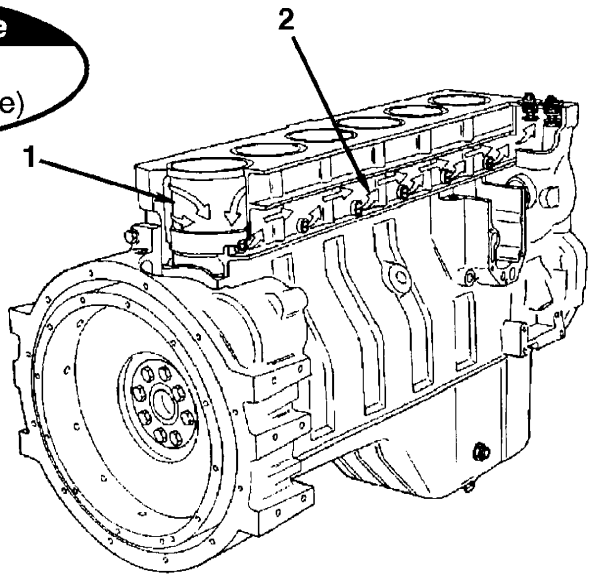


08900203

Cylinder Head

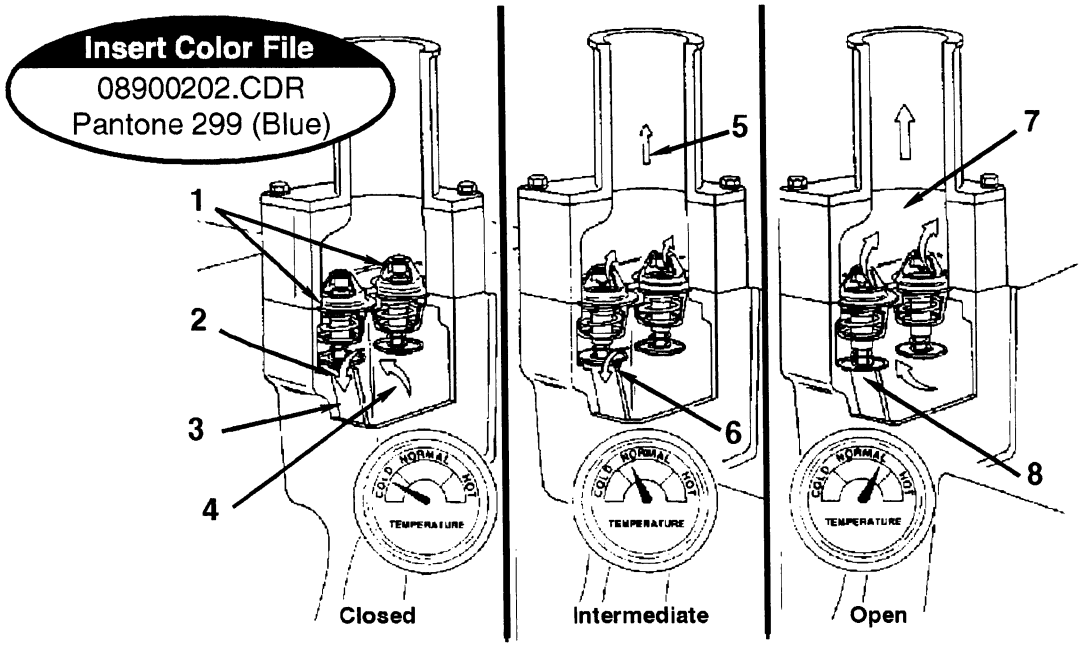
1. Flow from upper coolant manifold
2. Flow to liner cavity
3. Cylinder head gasket
4. Coolant flow orifice.

Insert Color File
08900200.CDR
Pantone 299 (Blue)



08900200

1. Flow past cylinder liners
2. Lower coolant manifold.

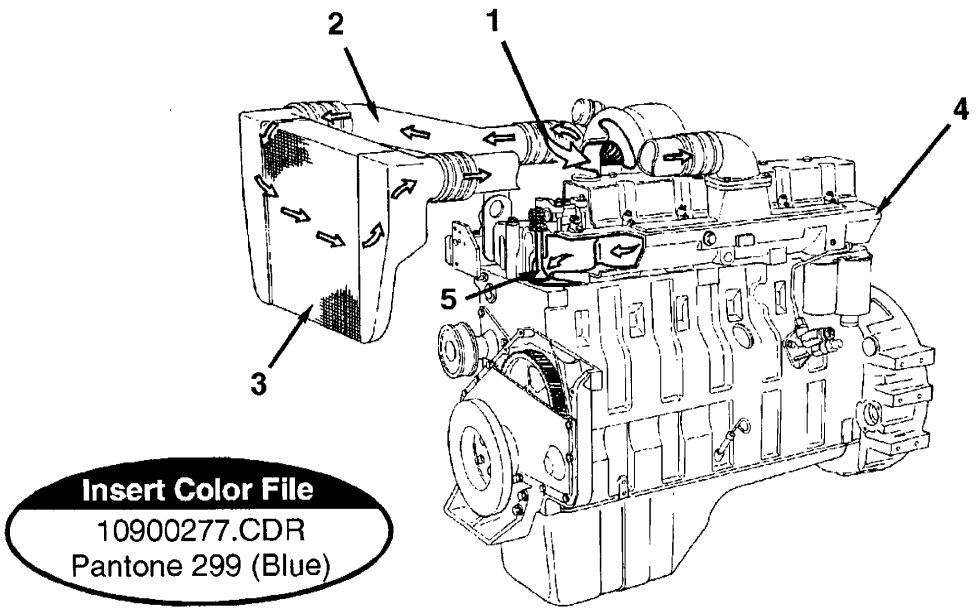


Thermostat

1. Thermostats
2. Flow to water pump inlet
3. Bypass passage open
4. Flow from lower coolant manifold
5. Partial coolant flow to radiator
6. Restricted flow to bypass
7. Flow to radiator
8. Bypass closed.

Flow Diagram, Air Intake System

General Information



Insert Color File
10900277.CDR
Pantone 299 (Blue)

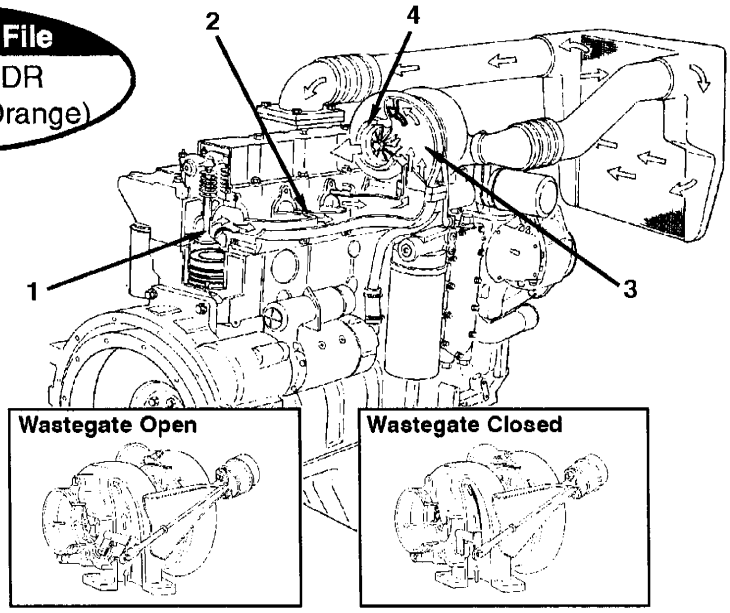
10900277

1. Intake air inlet to turbocharger
2. Turbocharger air to charge air cooler
3. Charge air cooler
4. Intake manifold - integral part of cylinder head
5. Intake valve.

Flow Diagram, Exhaust System

General Information

Insert Color File
11900058.CDR
Pantone 165 (Orange)



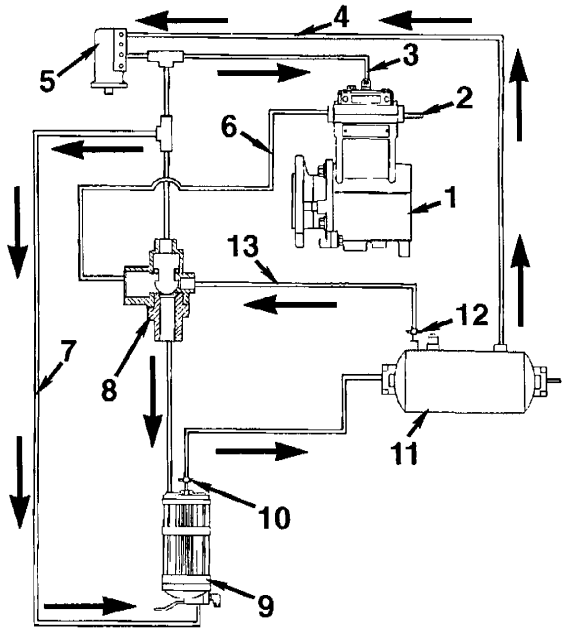
11900058

1. Exhaust valve
2. Exhaust manifold - pulse-type
3. Dual entry to turbocharger
4. Turbocharger exhaust outlet.

Flow Diagram, Compressed Air System

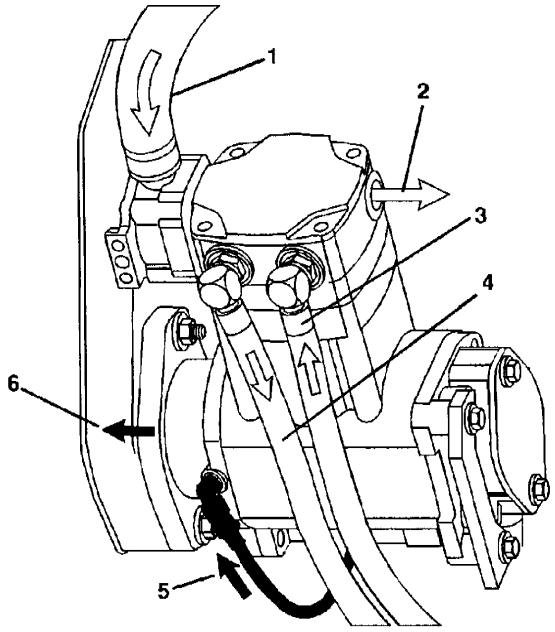
General Information

General Information

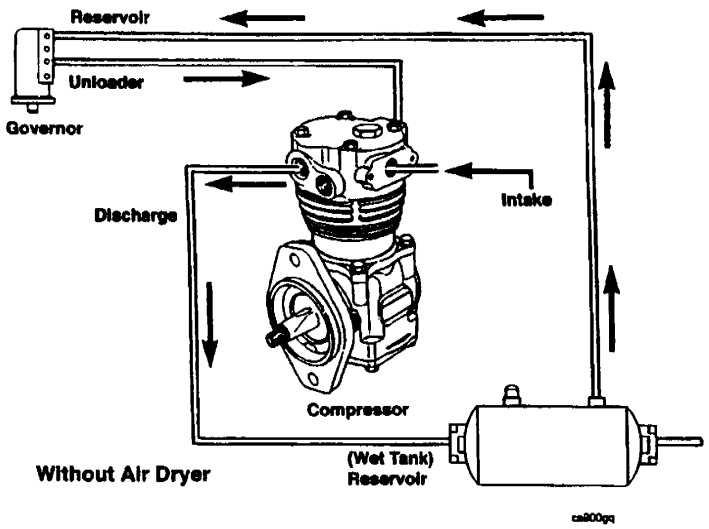


12900074

1. Compressor
2. Compressor intake
3. E-type unloader
4. Reservoir line
5. Governor
6. Discharge line
7. Splitter valve line
8. Economy valve line
9. Air drainer
10. Check valve (built into dryer)
11. Reservoir (wet tank)
12. Check valve
13. Secondary pressure line.



1. Air in
2. Air out
3. Coolant out
4. Coolant in
5. Lubricating oil in
6. Lubricating oil out.


Reservoir
Unloader
Governor
Discharge
Intake
Compressor
(Wet Tank)
Reservoir
Without Air Dryer

NOTES

Section L - Service Literature

Section Contents

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Additional Service Literature

General Information

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

Bulletin Number	Title of Publication
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

Service Literature Ordering Location

Contact Information

Region	Ordering Location
United States and Canada	Cummins Distributors or Credit Cards at 1-800-646-5609 or Order online at www.powerstore.cummins.com
U.K., Europe, Mid-East, Africa, and Eastern European Countries	Cummins Engine Co., Ltd. Royal Oak Way South Daventry Northants, NN11 5NU, England
South and Central America (excluding Brazil and Mexico)	Cummins Americas, Inc. 16085 N.W. 52nd Avenue Hialeah, FL 33104
Brazil and Mexico	Cummins Inc. International Parts Order Dept., MC 40931 Box 3005 Columbus, IN 47202-3005
Far East (excluding Australia and New Zealand)	Cummins Diesel Sales Corp. Literature Center 8 Tanjong Penjuru Jurong Industrial Estate Singapore
Australia and New Zealand	Cummins Diesel Australia Maroondah Highway, P.O.B. 139 Ringwood 3134 Victoria, Australia

Section M - Component Manufacturers

Section Contents

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Component Manufacturers' Addresses

General Information

NOTE: The following list contains addresses and telephone numbers of suppliers of accessories used on Cummins engines. Suppliers can be contacted directly for any specifications **not** covered in this manual.

Air Compressors

Bendix Heavy Vehicles Systems
Div. of Allied Automotive
901 Cleveland Street
Elyria, OH 44036
Telephone: (216) 329-9000

Holset Engineering Co., Inc.
1320 Kemper Meadow Drive
Suite 500
Cincinnati, OH 45240
Telephone: (513) 825-9600

Midland-Grau
Heavy Duty Systems
Heavy Duty Group Headquarters
10930 N. Pamona Avenue
Kansas City, MO 64153
Telephone: (816) 891-2470

Air Cylinders

Bendix Ltd.
Douglas Road
Kingswood
Bristol
England
Telephone: 0117-671881

Catching Engineering
1733 North 25th Avenue
Melrose Park, IL 60160
Telephone: (708) 344-2334

TEC - Hackett Inc.
8909 Rawles Avenue
Indianapolis, IN 46219
Telephone: (317) 895-3670

Air Heaters

Fleetguard, Inc.
1200 Fleetguard Road
Cookeville, TN 38502
Telephone: (615) 526-9551

Kim Hotstart Co.
P.O. Box 11245
Spokane, WA 99211-0245
Telephone: (509) 534-6171

Air Starting Motors

Ingersoll Rand
Chorley New Road
Horwich
Bolton
Lancashire
England
BL6 6JN
Telephone: 01204-65544

Ingersoll-Rand Engine
Starting Systems
888 Industrial Drive
Elmhurst, IL 60126
Telephone: (708) 530-3875

StartMaster
Air Starting Systems
A Division of Sycon Corporation
9595 Cheney Avenue
P. O. Box 491
Marion, OH 43302
Telephone: (614) 382-5771

Alternators

Robert Bosch Ltd.
P.O. Box 98
Broadwater Park
North Orbital Road
Denham
Uxbridge
Middlesex UD9 5HG
England
Telephone: (0)1895-838383

Prestolite Electrics
Cleveland Road
Leyland
PR5 1XB
England
Telephone: (0)1772-421663

C. E. Niehoff & Co.
2021 Lee Street
Evanston, IL 60202
Telephone: (708) 866-6030

Delco-Remy America
2401 Columbus Avenue
P.O. Box 2439
Anderson, IN 46018
Telephone: (317) 646-3528

Leece-Neville Corp.
400 Main Street
Arcade, NY 14009
Telephone: (716) 492-1700

Auxiliary Brakes

The Jacobs Manufacturing Company
Vehicle Equipment Division
22 East Dudley Town Road
Bloomfield, CT 06002
Telephone: (203) 243-1441

Belts

T.B.A. Belting Ltd.
P.O. Box 77
Wigan
Lancashire
WN2 4XQ
England
Telephone: (0)1942-259221

Dayco Mfg.
Belt Technical Center
1955 Enterprize
Rochester Hills, MI 48309
Telephone: (810) 853-8300

Gates Rubber Company
900 S. Broadway
Denver, CO 80217

Goodyear Tire and
Rubber Company
Industrial Products Div.
2601 Fortune Circle East
Indianapolis, IN 46241
Telephone: (317) 898-4170

Catalytic Converters

Donaldson Company, Inc.
1400 West 94th Street
P.O. Box 1299
Minneapolis, MN 55440
Telephone: (612) 887-3835

Nelson Division
Exhaust and Filtration Systems
1801 U.S. Highway 51 P.O. Box 428
Stoughton, WI 53589
Telephone: (608) 873-4200

Walker Manufacturing
3901 Willis Road
P.O. Box 157
Grass Lake, MI 49240
Telephone: (517) 522-5500

Coolant Level Switches

Robertshaw Controls Company
P.O. Box 400
Knoxville, TN 37901
Telephone: (216) 885–1773

Clutches

Twin Disc International S.A.
Chaussee de Namur
Nivelles
Belguim
Telephone: 067-224941

Twin Disc Incorporated
1328 Racine Street
Racine, WI 53403
Telephone: (414) 634-1981

Coolant Heaters

Fleetguard, Inc.
1200 Fleetguard Road
Cookeville, TN 38502
Telephone: (615) 526-9551

Drive Plates

Detroit Diesel Allison
Division of General Motors
Corporation
P.O. Box 894
Indianapolis, IN 46206-0894
Telephone: (317) 242-5000

Electric Starting Motors

Prestolite Electrics
Cleveland Road
Leyland
PR5 1XB
England
Telephone: 01772-421663

Delco-Remy America
2401 Columbus Avenue
P.O. Box 2439
Anderson, IN 46018
Telephone: (317) 646-3528

Leece-Neville Corp.
400 Main Street
Arcade, NY 14009
Telephone: (716) 492-1700

Nippondenso Inc.
2477 Denso Drive
P.O. Box 5133
Southfield, MI 48086
Telephone: (313) 350-7500

Electronic Switches

Cutler-Hammer Products
Eaton Corporation
4201 N. 27th Street
Milwaukee, WI 53216
Telephone: (414) 449-6600

Engine Protection Controls

Flight Systems Headquarters
Hempt Road
P.O. Box 25
Mechanicsburg, PA 17055
Telephone: (717) 697-0333

The Nason Company
2810 Blue Ridge Blvd.
West Union, SC 29696
Telephone: (803) 638-9521

Teddington Industrial
Equipment
Windmill Road
Sunbury on Thames
Middlesex
TW16 7HF
England
Telephone: (0)9327-85500

Fan Clutches

Kysor Cooling Systems N.A.
6040 West 62nd Street
Indianapolis, IN 46278
Telephone: (317) 328-3330

Holset Engineering Co. Ltd.
ST Andrews Road
Huddersfield, West Yorkshire
England HD1 6RA
Telephone: (0)1484-22244

Horton Industries, Inc.
P.O. Box 9455
Minneapolis, MN 55440
Telephone: (612) 378-6410

Rockford Clutch Company
1200 Windsor Road
P.O. Box 2908
Rockford, IL 61132-2908
Telephone: (815) 633-7460

Fans

Truflo Ltd.
Westwood Road
Birmingham
B6 7JF
England
Telephone: (0)121-3283041

Hayes-Albion Corporation
Jackson Manufacturing Plant
1999 Wildwood Avenue
Jackson, MI 49202
Telephone: (517) 782-9421

Engineered Cooling Systems, Inc.
201 W. Carmel Drive
Carmel, IN 46032
Telephone: (317) 846-3438

Brookside Corporation
P.O. Box 30
McCordsville, IN 46055
Telephone: (317) 335-2014

TCF Aerovent Company
9100 Purdue Rd., Suite 101
Indianapolis, IN 46268-1190
Telephone: (317) 872-0030

Kysor-Cadillac
1100 Wright Street
Cadillac, MI 49601
Telephone: (616) 775-4681

Schwitzer
6040 West 62nd Street
P.O. Box 80-B
Indianapolis, IN 46206
Telephone: (317) 328-3010

Fault Lamps

Cutler-Hammer Products
Eaton Corporation
4201 N. 27th Street
Milwaukee, WI 53216
Telephone: (414) 449-6600

Filters

Fleetguard International Corp.
Cavalry Hill Industrial Park
Weedon
Northampton NN7 4TD
England
Telephone: 01327-341313

Fleetguard, Inc.
1200 Fleetguard Road
Cookeville, TN 38502
Telephone: 1-800-22-Filters
(1-800-223-4583)

Flexplates

Corrugated Packing and
Sheet Metal
Hamsterley
Newcastle Upon Tyne
England
Telephone: (0)1207-560-505

Allison Transmission
Division of General Motors
Corporation
P.O. Box 894
Indianapolis, IN 46206-0894
Telephone: (317) 242-5000

Midwest Mfg. Co.
29500 Southfield Road, Suite 122
Southfield, MI 48076
Telephone: (313) 642-5355

Wohlert Corporation
708 East Grand River Avenue
P.O. Box 20217
Lansing, MI 48901
Telephone: (517) 485-3750

Fuel Coolers

Hayden, Inc.
1531 Pomona Road
P.O. Box 848
Corona, CA 91718-0848
Telephone: (909) 736-2665

Fuel Pumps

Robert Bosch Corp.
Automotive Group
2800 South 25th Ave.
Broadview, IL 60153

Fuel Warmers

Fleetguard, Inc.
1200 Fleetguard Road
Cookeville, TN 38502
Telephone: (615) 526-9551

Gauges

Grasslin U.K. Ltd.
Vale Rise
Tonbridge
Kent
TN9 1TB
England
Telephone: (0)1732-359888

Datcon Instruments
P.O. Box 128
East Petersburg, PA 17520
Telephone: (717) 569-5713

Rochester Gauges, Inc.
11616 Harry Hines Blvd.
P.O. Box 29242
Dallas, TX 75229
Telephone: (214) 241-2161

Governors

Woodward Governor Co.
P.O. Box 1519
Fort Collins, CO 80522
Telephone: (303) 482-5811
(800) 523-2831

Barber Colman Co.
1354 Clifford Avenue
Loves Park, IL 61132
Telephone: (815) 637-3000

United Technologies
Diesel Systems
1000 Jorie Blvd.
Suite 111
Oak Brook, IL 69521
Telephone: (312) 325-2020

Heat Sleeves

Bentley Harris Manufacturing Co.
100 Bentley Harris Way
Gordonville, TN 38563
Telephone: (313) 348-5779

Hydraulic and Power Steering Pumps

Honeywell Control Systems Ltd.
Honeywell House
Arlington Business Place
Bracknell
Berks RG12 1EB
Telephone: (0)1344-656000

Sperry Vickers
P.O. Box 302
Troy, MI 48084
Telephone: (313) 280-3000

Z.F.
P.O. Box 1340
Grafvonsoden Strasse
5-9 D7070
Schwaebisch Gmuend
Germany
Telephone: 7070-7171-31510

In-Line Connectors

Pioneer-Standard Electronics, Inc.
5440 Neiman Parkway
Solon, OH 44139
Telephone: (216) 349–1300

Deutsch
Industrial Products Division
37140 Industrial Avenue
Hemet, CA 92343
Telephone: (714) 929–1200

Oil Heaters

Fleetguard, Inc.
1200 Fleetguard Road
Cookeville, TN 38502
Telephone: (615) 526-9551

Kim Hotstart Co.
P.O. Box 11245
Spokane, WA 99211-0245
Telephone: (509) 534-6171

Prelubrication Systems

RPM Industries, Inc.
Suite 109
55 Hickory Street
Washington, PA 15301
Telephone: (412) 228–5130

Radiators

JB Radiator Specialties, Inc.
P.O. Box 292087
Sacramento, CA 95829–2087
Telephone: (916) 381–4791

The G&O Manufacturing Company
100 Gando Drive
P.O. Box 1204
New Haven, CT 06505–1204
Telephone: (203) 562–5121

Young Radiator Company
2825 Four Mile Road
Racine, WI 53404
Telephone: (910) 271–2397

L and M Radiator, Inc.
1414 East 37th Street
Hibbing, MN 55746
Telephone: (218) 263–8993

Throttle Assemblies

Williams Controls, Inc.
14100 SW 72nd Avenue
Portland, OR 97224
Telephone: (503) 684–8600

Torque Converters

Twin Disc International S.A.
Chaussee de Namur
Nivelles
Belgium
Telephone: 067-224941

Twin Disc Incorporated
1328 Racine Street
Racine, WI 53403-1758
Telephone: (414) 634-1981

Rockford Powertrain, Inc.
Off-Highway Systems
1200 Windsor Road
P.O. Box 2908
Rockford, IL 61132-2908
Telephone: (815) 633-7460

Modine Mfg. Co.
1500 DeKoven Avenue
Racine, WI 53401
Telephone: (414) 636-1640

NOTES

Section S - Service Assistance

Section Contents

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Routine Service and Parts

General Information

Personnel at Cummins Authorized Repair Locations can assist you with the correct operation and service of your engine. Cummins has a worldwide service network of more than 5,000 Distributors and Dealers who have been trained to provide sound advice, expert service, and complete parts support. Check the telephone directory yellow pages or refer to the directory in this section for the nearest Cummins Authorized Repair Location.

Emergency and Technical Service

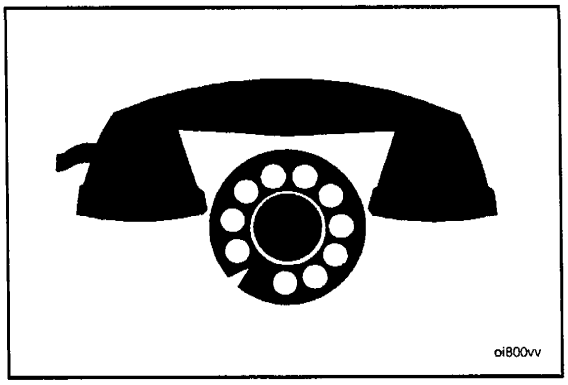
General Information

The Cummins Customer Assistance Center provides a 24-hour, toll free telephone number to aid in technical and emergency service when a Cummins Authorized Repair Location can **not** be reached or is unable to resolve an issue with a Cummins product.

If additional assistance is required, call Toll-Free:

1-800-DIESELS
(1-800-343-7357)

- Includes all 50 states, Bermuda, Puerto Rico, Virgin Islands, and the Bahamas.
- Outside of North America contact your Regional Office. Telephone numbers and addresses are listed in the International Directory.



Problem Solving

General Information

Normally, any problem that arises with the sale, service, or repair of your engine can be handled by a Cummins Authorized Repair Location in your area. Refer to the telephone directory yellow pages for the one nearest you. If the problem has **not** been handled satisfactorily, follow the steps outlined below:

1. If the disagreement is with a Dealer, talk to the Cummins Distributor with whom he has his service agreement.
2. If the disagreement is with a Distributor, call the nearest Cummins Division or Regional Office; however, most problems are solved below the Division or Regional office level. Telephone numbers and addresses are listed in this section. Before calling, write down the following information:
   a. Engine model and serial number
   b. Type and make of equipment
   c. Total kilometers [miles] or hours of operation
   d. Warranty start date
   e. Nature of problem
   f. Summary of the current problem arranged in the order of occurrence
   g. Name and location of the Cummins Distributor or Dealer
3. If a problem can **not** be resolved satisfactorily through your Cummins Authorized Repair Location or Division Office, write to:

Cummins Customer Assistance Center - 41403, Cummins Inc., Box 3005, Columbus, IN 47202-3005

Division and Regional Offices

Locations

NOTE: The following list contains offices in U.S., Canada, Australia, New Zealand, and Puerto Rico.

United States

Southern Division Office
Cummins Engine Company, Inc.
425 Franklin Road S.W.
Suite 500
Marietta, GA 30067
Telephone: (770) 423-1108
FAX: (770) 499-8240

Plains Regional Office
Cummins Engine Company, Inc.
1901 Central Drive
Suite 356
Bedford, TX 76021
Telephone: (817) 267-3172
FAX: N/A

Canada

Canadian Division Office
Cummins Diesel of Canada, Ltd.
5575 North Service Road
Burlington, Ontario L726M1
Telephone: (905) 331-5944
FAX: (905) 331-0276

Western Canada Regional Office
Cummins Diesel of Canada, Ltd.
18452 - 96th Avenue
Surrey, B.C. V3T 4W2
Telephone: (604) 882-5727
FAX: (604) 882-9110

Eastern Canada Regional Office
Cummins Diesel of Canada Ltd.
7200 Trans Canada Hwy.
Pt. Cuaire, Quebec H9R 1C0
Telephone: (514) 695-2402
FAX: (514) 695-8917

Central Canada Regional Office
Cummins Diesel of Canada Ltd.
4887 – 35th Street SE
Calgary, Alberta T2B 3C6
FAX: (403) 569-9974

Australia Regional Office

Cummins Engine Company Pty. Ltd.
2 Caribbean Drive
Scoresby, Victoria 3179
Australia
Telephone: (61-3) 9765-3222
FAX: (61-3) 9763-0079

NOTE: This office also serves New Zealand.

Cummins Americas Regional Office

Cummins Latin America
3088 N. Commerce Parkway
MPC #14, Building A
Miramar, FL 33025
Telephone: (305) 621-1300

NOTE: This office serves Puerto Rico and South America excluding Brazil.

Distributors and Branches

United States

Alabama

Birmingham Distributor
Cummins Alabama, Inc.
2200 Pinson Highway
P.O. Box 1147
Birmingham, AL 35201
Telephone: (205) 841-0421
FAX: (205) 849–5926

Mobile Branch
Cummins Alabama, Inc.
1924 N. Beltline Hwy.
Mobile, AL 36601–1598
Telephone: (334) 456-2236
FAX: (334) 452–6419

Mobile Onan/Marine Branch
Cummins Alabama, Inc.
3422 Georgia Pacific Avenue
Mobile, AL 36617
Telephone: (334) 452-6426
FAX: (334) 473-6657

Montgomery Branch
Cummins Alabama, Inc.
2325 West Fairview Avenue
Montgomery, AL 36108
Telephone: (205) 263-2594
FAX: (205) 263–2594

Alaska

Anchorage - (Branch of Seattle)
Cummins Northwest, Inc.
2618 Commercial Drive
Anchorage, AK 99501-3095
Telephone: (907) 279-7594
FAX: (907) 276-6340

Arizona

Phoenix Distributor and Branch
Cummins Southwest, Inc.
2239 N. Black Canyon Hgwy
Phoenix, AZ 85009
Telephone: (602) 252-8021
FAX: (602) 253–6725

Tucson Branch
Cummins Southwest, Inc.
1912 West Prince Road
Tucson, AZ 85705
Telephone: (520) 887-7440
FAX: (520) 887–4173

Arkansas

Little Rock - (Branch of Memphis)
Cummins Mid-South, Inc.
6600 Interstate 30
Little Rock, AR 72209
Telephone:
Sales: (501) 569-5600
Service: (501) 569–5656
Parts: (501) 569–5613
FAX: (501) 565–2199

California

San Leandro Distributor
Cummins West, Inc.
14775 Wicks Blvd.
San Leandro, CA 94577–6779
Telephone: (510) 351-6101
FAX: (510) 352–3925

Arcata Branch
Cummins West, Inc.
4801 West End Road
Arcata, CA 95521
Telephone: (707) 822–7392
FAX: (707) 822–7585

Bakersfield Branch
Cummins West, Inc.
4601 East Brundage Lane
Bakersfield, CA 93307
Telephone: (805) 325-9404
FAX: (805) 861–8719

Fresno Branch
Cummins West, Inc.
2740 Church Avenue
Fresno, CA 93706
Telephone: (209) 495–4745
FAX: (209) 486–7402

Redding Branch
Cummins West, Inc.
20247 Charlanne Drive
Redding, CA 96001
Telephone: (916) 222–4070
FAX: (916) 224–4075

Stockton Branch
Cummins West, Inc.
41 West Yokuts Avenue
Suite 131
Stockton, CA 95207
Telephone: (209) 473–0386
FAX: (209) 478–2454

West Sacramento Branch
Cummins West, Inc.
2661 Evergreen Avenue
West Sacramento, CA 95691
Telephone: (916) 371-0630
FAX: (916) 371–2849

Los Angeles Distributor
Cummins Cal Pacific Inc.
1939 Deere Avenue (Irvine)
Irvine, CA 92606
Telephone: (949) 253–6000
FAX: (949) 253–6080

Montebello Branch
Cummins Cal Pacific Inc.
1105 South Greenwood Avenue
Montebello, CA 90640
Telephone: (323) 728–8111
FAX: (323) 889–7422

Bloomington Branch
Cummins Cal Pacific Inc.
3061 S. Riverside Avenue
Bloomington, CA 92377
Telephone: (909) 877-0433
FAX: (909) 877-3787

San Diego Branch
Cummins Cal Pacific Inc.
310 N. Johnson Avenue
El Cajon, CA 92020
Telephone: (619) 593-3093
FAX: (619) 593–0600

Ventura Branch
Cummins Cal-Pacific Inc.
3958 Transport St.
Ventura, CA 93003
Telephone: (805) 644–7281
FAX: (805) 644–7284

Colorado

Denver Distributor
Cummins Rocky Mountain, Inc.
5100 East 58th Avenue
Commerce City, CO 80022
Telephone: (303) 287-0201
FAX: (303) 288–7080

Denver Onan/Industrial Branch
Cummins Rocky Mountain, Inc.
5100 East 58th Ave.
Commerce City, CO 80022
Telephone: (303) 286-7697
FAX: (303) 287–4837

Durango Branch
Cummins Rocky Mountain, Inc.
13595 County Road 213
Durango, CO 81301
Telephone: (970) 259–7470
FAX: (970) 259–7482

Grand Junction Branch
Cummins Rocky Mountain, Inc.
2380 U.S. Highway 6 & 50
P.O. Box 339
Grand Junction, CO 81501
Telephone: (303) 242-5776
FAX: (303) 243–5495

Connecticut

Rocky Hill - (Branch of Bronx)
Cummins Metropower, Inc.
914 Cromwell Ave.
Rocky Hill, CT 06067
Telephone: (860) 529–7474
FAX: (860) 529–7524

Florida

Tampa Distributor
Cummins Southeastern Power, Inc.
Corporate Office
5421 N. 59th Street
Tampa, FL 33610
Telephone: (813) 621-7202
FAX: (813) 621–8250

Ft. Myers Branch
Cummins Southeastern Power, Inc.
2671 Edison Avenue
Ft. Myers, FL 33902
Telephone: (941) 337–1211
FAX: (941) 337-5374

Jacksonville Branch
Cummins Southeastern Power, Inc.
755 Pickettville Rd.
Jacksonville, FL 32220
Telephone: (904) 378-1902
FAX: (904) 378–1904

Hialeah (Miami) Branch
Cummins Southeastern Power, Inc.
9900 N.W. 77th Avenue
Hialeah Gardens, FL 33016
Telephone: (305) 821-4200
FAX: (305) 557-2992

Ocala Branch
Cummins Southeastern Power
321 Southwest 52nd Ave.
Ocala, FL 34474–1892
Telephone: (352) 861–1122
FAX: (352) 861–1130

Orlando Branch
Cummins Southeastern Power, Inc.
4020 North
Orange Blossom Trail
Orlando, FL 32810
Telephone: (407) 298-2080
FAX: (407) 290-8727

Tampa Branch
Cummins Southeastern Power, Inc.
5912 E. Hillsborough Avenue
Tampa, FL 33610
Telephone: (813) 626-1101
FAX: (813) 628–4183

Georgia

Atlanta Distributor
Cummins South, Inc.
5125 Georgia Highway 85
College Park, GA 30349
Telephone: (404) 763-0151
FAX: (404) 766–2132

Albany Branch
Cummins South, Inc.
1915 W. Oakridge Drive
Albany, GA 31707–4938
Telephone: (912) 888-6210
FAX: (912) 883–1670

Atlanta Branch
Cummins South, Inc.
100 University Avenue, S.W.
Atlanta, GA 30315-2202
Telephone: (404) 527-7800
FAX: (404) 527–7832

Augusta Branch
Cummins South, Inc.
1255 New Savannah Road
Augusta, GA 30901-3891
Telephone: (706) 722-8825
FAX: (706) 722–7553

Savannah Branch
Cummins South, Inc.
8 Interchange Court
Savannah, GA 31401–1627
Telephone: (912) 232-5565
FAX: (912) 232–5145

Hawaii

Kapolei Distributor
Cummins Hawaii Diesel Power, Inc.
91–230 Kalaeloa Blvd.
Kapolei, HI 96707
Telephone: (808) 682–8110
FAX: (808) 682–8477

Idaho

Boise - (Branch of Salt Lake City)
Cummins Intermountain, Inc.
2851 Federal Way City
Boise, ID 83705
Telephone: (208) 336-5000
FAX: (208) 338-5436

Pocatello - (Branch of Salt Lake City)
Cummins Intermountain, Inc.
14299 Highway 30 West
Pocatello, ID 83201
Telephone: (208) 234-1661
FAX: (208) 234–1662

Illinois

Chicago Distributor
Cummins Northern Illinois, Inc.
7145 Santa Fe Drive
Hodgkins, IL 60525
Telephone: (708) 579-9222
FAX: (708) 352-7547

Bloomington-Normal – (Branch of Indianapolis)
Cummins Mid-States Power, Inc.
(at U.S. 51 N and I-55)
414 W. Northtown Road
Bloomington-Normal, IL 61761
Telephone: (309) 452-4454
FAX: (309) 452–1642

Onan Branch
Cummins/Onan Northern Illinois
8745 W. 82nd Place
Justin, IL 60458
Telephone: (708) 563–7070
FAX: (708) 563–7095

Harrisburg (Branch of St. Louis)
Cummins Gateway, Inc.
Highway 45 North
Harrisburg, IL 62946
Telephone: (618) 273-4138
FAX: (618) 273–4531

Rock Island - (Branch of Omaha)
Cummins Great Plains Diesel, Inc.
7820 - 42nd Street West
Rock Island, IL 61204
Telephone: (309) 787-4300
FAX: (309) 787–4397

Onan Branch
Cummins Gateway, Inc.
#1 Extra Mile Drive
Collinsville, IL 62234
Telephone: (618) 345–0123
FAX: (314) 531–6604

Indiana

Indianapolis Distributor
Cummins Mid-States Power, Inc.
P.O. Box 42917
3762 West Morris Street
Indianapolis, IN 46242-0917
Telephone: (317) 243-7979
FAX: (317) 240–1925

Evansville - (Branch of Louisville)
Cummins Cumberland, Inc.
7901 Highway 41 North
Evansville, IN 47711
Telephone: (812) 867-4400
FAX: (812) 421–3282

Ft. Wayne Branch
Cummins Mid-States Power, Inc.
3415 Coliseum Blvd. West
(At Jct. I-69 & 30/33)
Ft. Wayne, IN 46808
Telephone: (219) 482-3691
FAX: (219) 484–8930

Gary - (Branch of Chicago)
Cummins Northern Illinois, Inc.
1440 Texas Street
Gary, IN 46402
Telephone: (219) 885-5591
FAX: (219) 883-4817

Indianapolis Branch
Cummins Mid-States Power, Inc.
P. O. Box 42917
3621 West Morris Street
Indianapolis, IN 46242-0917
Telephone: (317) 244-7251
FAX: (317) 240–1215

Onan Branch
Mid-States Power, Inc.
4301 W. Morris Street
P.O. Box 42917
Indianapolis, IN 46240–0917
Telephone: (317) 240–1967
FAX: (317) 240–1975

Iowa

Cedar Rapids - (Branch of Omaha)
Cummins Great Plains Diesel, Inc.
625 - 33rd Avenue SW
Cedar Rapids, IA 52406
Telephone: (319) 366-7537 (24 hours)
FAX: (319) 366–7562

Des Moines - (Branch of Omaha)
Cummins Great Plains Diesel, Inc.
1680 N.E. 51st Avenue
P.O. Box B
Des Moines, IA 50313
Telephone: (515) 262-9591
Parts: (515) 262-9744
FAX: (515) 262–0626

Des Moines - (Branch of Omaha)
Midwestern Power Products
Division of Cummins Great Plains Diesel, Inc.
5194 N.E. 17th Street
Des Moines, IA 50313
Telephone: (515) 264-1650
FAX: (515) 264-1651

Kansas

Colby - (Branch of Kansas City, Missouri)
Cummins Mid-America, LLC.
1880 South Range
Colby, KS 67701
Telephone: (785) 462-3945
FAX: (785) 462-3970

Garden City - (Branch of Kansas City, Missouri)
Cummins Mid-America, Inc.
1285 Acraway
Garden City, KS 67846
Telephone: (316) 275-2277
FAX: (316) 275–2533

Wichita - (Branch of Kansas City, Missouri)
Cummins Mid-America, Inc.
5101 North Broadway
Wichita, KS 67201
Telephone: (316) 838-0875
FAX: (316) 838–0704

Kentucky

Louisville Distributor
Cummins Cumberland, Inc.
(Corporate Office)
2301 Nelsonville Parkway
Louisville, KY 40223
Telephone: (502) 254-3363
FAX: (502) 254–9272

Hazard Branch
Cummins Cumberland, Inc.
Highway 15 South
P.O. Box 510
Hazard, KY 41701
Telephone: (606) 436-5718
FAX: (606) 436–5038

Louisville Branch
Cummins Cumberland, Inc.
9820 Bluegrass Parkway
Louisville, KY 40299
Telephone: (502) 491-4263
FAX: (502) 499–0896

Louisiana

Morgan City - (Branch of Memphis)
Cummins Mid-South, Inc.
Hwy. 90 East
P.O. Box 1229
Amelia, LA 70340
Telephone: (504) 631-0576
FAX: (504) 631–0081

New Orleans - (Branch of Memphis)
Cummins Mid-South, Inc.
110 E. Airline Highway
Kenner, LA 70062
Telephone: (504) 468-3535
FAX: (504) 465–3408

Maine

Bangor (Branch of Boston)
Cummins Northeast, Inc.
221 Hammond Street
Bangor, ME 04401
Telephone: (207) 941-1061
FAX: (207) 945–3170

Scarborough - (Branch of Boston)
Cummins Northeast, Inc.
10 Gibson Road
Scarborough, ME 04074
Telephone: (207) 883-8155
FAX: (207) 883–5526

Maryland

Baltimore Distributor
Cummins Power Systems, Inc.
1907 Parkwood Drive
MD 21061
Telephone: (410) 590–8700
FAX: (410) 590–8723

Massachusetts

Boston Distributor
Cummins Northeast, Inc.
100 Allied Drive
Dedham, MA 02026
Telephone: (781) 329-1750
FAX: (781) 329–4428

Springfield Branch
Cummins Northeast, Inc.
177 Rocus Street
Springfield, MA 01104
Telephone: (413) 737-2659
FAX: (413) 731–1082

Mexico

Tijuana - (Branch of Los Angeles)
Distribuidora Cummins De Baja
Blvd. 3ra. Oeste No. 17523
Fracc. Industrial
Garita de Otay C.P. 22400
Tijuana, Baja California
Mexico
Telephone: 011–52–66–238433
FAX: 011–52–66–238649

Michigan

Detroit (Novi) Distributor
Cummins Michigan, Inc.
41216 Vincenti Court
Novi, MI 48375
Telephone: (248) 478-9700
FAX: (248) 478-1570

Blissfield, Michigan
Diesel Fuel Systems, Inc.
Subsidiary of Cummins Michigan Inc.
211 N. Jipson Street
Blissfield, MI 49228
Telephone: (517) 486-4324
FAX: (517) 486-3614

Dearborn Branch
Cummins Michigan, Inc.
3760 Wyoming Avenue
Dearborn, MI 48120
Telephone: (313) 843-6200
FAX: (313) 843-6070

Grand Rapids Branch
Cummins Michigan, Inc.
3715 Clay Avenue, S.W.
Grand Rapids, MI 49508
Telephone: (616) 538-2250
FAX: (616) 538-3830

Grand Rapids Branch
Standby Power, Inc.
7580 Expressway Drive S.W.
Grand Rapids, MI 49548
Telephone: (616) 281-2211
FAX: (616) 281-3177

Iron Mountain - (Branch of De Pere)
Cummins Great Lakes, Inc.
1901 Stevenson Avenue
Iron Mountain, MI 49801
Telephone: (906) 774-2424
(800) 236-2424
FAX: (906) 774-1190

Novi Branch
Cummins Michigan, Inc.
25100 Novi Road
Novi, MI 48375
Telephone: (248) 380-4300
FAX: (248) 380-0910

Power Products (Branch of Detroit)
Cummins Michigan, Inc.
41326 Vincenti Ct.
Novi, MI 48375
Telephone: (248) 426-9300
FAX: (248) 473-8560

Saginaw Branch
Cummins Michigan, Inc.
722 N. Outer Drive
Saginaw, MI 48605
Telephone: (517) 752-5200
FAX: (517) 752-4194

Standby Power - (Branch of Detroit)
Cummins Michigan, Inc.
12130 Dixie
Redford, MI 48239
Telephone: (313) 538-0200
FAX: (313) 538-3966

Minnesota

St. Paul Distributor
Cummins North Central, Inc.
3030 Centre Pointe Drive
Suite 500
Roseville, MN 55113
Telephone: (651) 636-1000
FAX: (651) 638-2442

Duluth Branch
Cummins Diesel Sales, Inc.
3115 Truck Center Drive
Duluth, MN 55806–1786
Telephone: (218) 628-3641
FAX: (218) 628–0488

St. Paul Branch
Cummins North Central, Inc.
2690 Cleveland Ave. North
St. Paul, MN 55113
Telephone: (651) 636-1000
FAX: (651) 638-2497

Mississippi

Jackson - (Branch of Memphis)
Cummins Mid-South, Inc.
325 New Highway 49 South
Jackson, MS 39288-4224
Telephone:
Admin.: (601) 932-7016
Parts: (601) 932-2720
Service: (601) 939-1800
FAX: (601) 932–7399

Missouri

Kansas City Distributor and Branch
Cummins Mid-America, Inc.
8201 NE Parvin Road
Kansas City, MO 64161
Telephone: (816) 414–8200
FAX: (816) 414–8299

Joplin Branch
Cummins Mid-America, Inc.
3507 East 20th Street
Joplin, MO 64801
Telephone: (417) 623-1661
FAX: (417) 623–1817

Springfield Branch
Cummins Mid-America, Inc.
3637 East Kearney
Springfield, MO 65803
Telephone: (417) 862-0777
FAX: (417) 862-4429

St. Louis Distributor
Cummins Gateway, Inc.
7210 Hall Street
St. Louis, MO 63147
Telephone: (314) 389-5400
FAX: (314) 389–9671

Columbia Branch
Cummins Gateway, Inc.
5221 Highway 763 North
Columbia, MO 65202
Telephone: (314) 449-3711
FAX: (314) 449–3712

Sikeston Branch
Cummins Gateway, Inc.
101 Keystone Drive
Sikeston, MO 63801
Telephone: (314) 472-0303
FAX: (314) 472–0306

Industrial Power Branch
Cummins Gateway, Inc.
3256 E. Outer Road
Scott City, MO 63788
Telephone: (573) 335-9399
FAX: (573) 335-7062

Montana

Billings - (Branch of Denver)
Cummins Rocky Mountain, Inc.
5151 Midland Road
Billings, MT 59101
Telephone: (406) 245-4194
FAX: (406) 245–7923

Great Falls - (Branch of Denver)
Cummins Rocky Mountain, Inc.
415 Vaughn Road
Great Falls, MT 59404
Telephone: (406) 452-8561
FAX: (406) 452–9911

Missoula - (Branch of Seattle)
Cummins Northwest, Inc.
4950 North Reserve Street
Missoula, MT 59802-1498
Telephone: (406) 728-1300
FAX: (406) 728-8523

Nebraska

Omaha Distributor and Branch
Cummins Great Plains Diesel, Inc.
5515 Center Street
P.O. Box 6068
Omaha, NE 68106
Telephone: (402) 551-7678 (24 Hours)
FAX: (402) 551–1952

Kearney Branch
Cummins Great Plains Diesel, Inc.
515 Central Avenue
Kearney, NE 68847
Telephone: (308) 234-1994
FAX: (308) 234–5776

Nevada

Elko - (Branch of Salt Lake City)
Cummins Intermountain, Inc.
5370 East Idaho Street
Elko, NV 89801
Telephone: (775) 738-6405
FAX: (775) 738–1719

Las Vegas - (Branch of Salt Lake City)
Cummins Intermountain, Inc.
2750 Losee Road
North Las Vegas, NV 89030
Telephone: (702) 399-2339
FAX: (702) 399–7457

Sparks - (Branch of Salt Lake City)
Cummins Intermountain, Inc.
150 Glendale Avenue
Sparks, NV 89431
Telephone: (775) 331-4983
FAX: (775) 331–7429

New Jersey

Newark - (Branch of Bronx)
Cummins Metropower, Inc.
41-85 Doremus Ave.
Newark, NJ 07105
Telephone: (973) 491–0100
FAX: (973) 578–8873

New Mexico

Albuquerque - (Branch of Phoenix)
Cummins Southwest, Inc.
1921 Broadway N.E.
Albuquerque, NM 87102
Telephone: (505) 247-2441
FAX: (505) 842–0436

Farmington - (Branch of Phoenix)
Cummins Southwest, Inc.
1101 North Troy King Road
Farmington, NM 87401
Telephone: (505) 327-7331
FAX: (505) 326–2948

New York

Bronx Distributor
Cummins Metropower, Inc.
890 Zerega Avenue
Bronx, NY 10473
Telephone: (718) 892-2400
FAX: (718) 892–0055

Albany - (Branch of Boston)
Cummins Northeast, Inc.
101 Railroad Avenue
Albany, NY 12205
Telephone: (518) 459-1710
FAX: (518) 459–7815

Buffalo - (Branch of Boston)
Cummins Northeast, Inc.
480 Lawrence Bell Dr.
Williamsville, NY 14221-7090
Telephone: (716) 631-3211
FAX: (716) 626–0799

Syracuse - (Branch of Boston)
Cummins Northeast, Inc.
29 Eastern Avenue
Syracuse, NY 13211
Telephone: (315) 437-2751
FAX: (315) 437-8141

North Carolina

Charlotte Distributor
Cummins Atlantic, Inc.
11101 Nations Ford Road (28273)
P.O. Box 240729
Charlotte, NC 28224-0729
Telephone: (704) 588-1240
FAX: (704) 587-4870

Charlotte Branch
Cummins Atlantic, Inc.
3700 North Interstate 85
Charlotte, NC 28206
Telephone: (704) 596-7690
FAX: (704) 596–3038

Greensboro Branch
Cummins Atlantic, Inc.
513 Preddy Boulevard (27406)
P.O. Box 22066
Greensboro, NC 27420-2066
Telephone: (336) 275-4531
FAX: (336) 275–8304

Wilson Branch
Cummins Atlantic, Inc.
1514 Cargill Avenue (27893)
P.O. Box 1177
Wilson, NC 27894-1117
Telephone: (252) 237-9111
FAX: (252) 237–9132

North Dakota

Fargo - (Branch of St. Paul)
Cummins North Central, Inc.
3801 - 34th Ave. SW
Fargo, ND 58104
Telephone: (701) 282-2466
FAX: (701) 277–5399

Grand Forks - (Branch of St. Paul)
Cummins North Central, Inc.
4728 Gateway Drive
Grand Forks, ND 58201
Telephone: (701) 775-8197
FAX: (701) 775–4833

Minot - (Branch of St. Paul)
Cummins North Central, Inc.
1501 - 20th Avenue, S.E.
Minot, ND 58702
Telephone: (701) 852-3585
FAX: (701) 852–3588

Ohio

Columbus Distributor and Branch
Cummins Interstate Power, Inc.
4000 Lyman Drive
Hilliard (Columbus), OH 43026
Telephone: (614) 771-1000
FAX: (614) 771–0769

Columbus Distributor
Cummins Interstate Power, Inc.
2297 Southwest Bldv., Suite K
Grove City, OH 43123
Telephone: (614) 771-1000
FAX: (614) 527-2576

Cincinnati Branch
Cummins Interstate Power, Inc.
10470 Evendale Drive
Cincinnati, OH 45241
Telephone: (513) 563-6670
FAX: (513) 563–0594

Cleveland Branch
Cummins Interstate Power, Inc.
7585 Northfield Road
Cleveland, OH 44146
Telephone: (440) 439-6800
FAX: (440) 439–7390

Strasburg Branch
Cummins Interstate Power, Inc.
777 South Wooster Avenue
Strasburg, OH 44680
Telephone: (216) 878-5511
FAX: (216) 878–7666

Toledo Branch
Cummins Interstate Power, Inc.
801 Illinois Avenue
Maumee
(Toledo), OH 43537
Telephone: (419) 893-8711
FAX: (419) 893–5362

Youngstown Branch
Cummins Interstate Power, Inc.
7145 Masury Road
Hubbard
(Youngstown), OH 44425
Telephone: (216) 534-1935
FAX: (216) 534–5606

Oklahoma

Oklahoma City - (Branch of Arlington)
Cummins Southern Plains, Inc.
5800 West Reno
Oklahoma City, OK 73127
Telephone: (405) 946-4481 (24 hours)
FAX: (405) 946–3336

Tulsa - (Branch of Arlington)
Cummins Southern Plains, Inc.
16525 East Skelly Drive
Tulsa, OK 74116
Telephone: (918) 234–3240
FAX: (918) 234–2342

Oregon

Bend - (Branch of Seattle)
Cummins Northwest, Inc.
3500 N. Highway 97 (97701-5729)
P.O. Box 309
Bend, OR 97709-0309
Telephone: (541) 389-1900
FAX: (541) 389–1909

Coburg/Eugene - (Branch of Seattle)
Cummins Northwest, Inc.
91201 Industrial Parkway
Coburg, OR 97401
(Mailing Address)
P.O. Box 10877
Eugene, OR 97440-2887
Telephone: (541) 687-0000
FAX: (541) 687–1977

Medford - (Branch of Seattle)
Cummins Northwest, Inc.
4045 Crater Lake Highway
Medford, OR 97504-9796
Telephone: (541) 779-0151
FAX: (541) 772–2395

Pendleton - (Branch of Seattle)
Cummins Northwest, Inc.
223 S.W. 23rd Street
Pendleton, OR 97801-1810
Telephone: (541) 276-2561
FAX: (541) 276-2564

Portland - (Branch of Seattle)
Cummins Northwest, Inc.
4711 N. Basin Avenue
P. O. Box 2710 (97208-2710)
Portland, OR 97217-3557
Telephone: (503) 289-0900
FAX: (503) 286-5938

Pennsylvania

Philadelphia Distributor
Cummins Power Systems, Inc.
2727 Ford Road
Bristol, PA 19007
Telephone: (215) 785-6005 and
(609) 563–0005
FAX: (215) 785-4085

Bristol Branch
Cummins Power Systems, Inc.
2727 Ford Road
Bristol, PA 19007
Telephone: (215) 785-6005 and
(609) 563–0005
FAX: (215) 785–4728

Pittsburgh Branch
Cummins Power Systems, Inc.
3 Alpha Drive
Pittsburgh, PA 15238–2901
Telephone: (412) 820–8300
FAX: (412) 820–8308

Harrisburg Branch
Cummins Power Systems, Inc.
4499 Lewis Road
Harrisburg, PA 17111-2541
Telephone: (717) 564-1344
FAX: (717) 558-8217

Puerto Rico

Puerto Nuevo - (Branch of Tampa)
Cummins Diesel Power, Inc.
#31 Calle "C"
El Matadero
Puerto Nuevo, Puerto Rico 00920
Telephone: (787) 793–0300
FAX: (787) 793–1072

South Carolina

Charleston - (Branch of Charlotte)
Cummins Atlantic, Inc.
3028 West Montague Avenue
Charleston, SC 29418–5593
Telephone: (843) 554-5112
FAX: (843) 745–0745

Charleston - (Branch of Charlotte)
Cummins Atlantic Inc.
231 Farmington Road
Charleston, SC 29483
Telephone: (843) 851-9819
FAX: (843) 875–4338

Columbia - (Branch of Charlotte)
Cummins Atlantic, Inc.
1233 Bluff Road (29201)
P.O. Box 13543
Columbia, SC 29201–3543
Telephone: (803) 799-2410
FAX: (803) 779–3427

South Dakota

Sioux Falls - (Branch of Omaha)
Cummins Great Plains Diesel, Inc.
701 East 54th Street North
Sioux Falls, SD 57104
Telephone: (605) 336-1715
FAX: (605) 336–1748

Tennessee

Memphis Distributor & Distribution Center
Cummins Mid-South, Inc.
666 Riverside Drive
Memphis, TN 38703
Telephone: (901) 577-0666
FAX: (901) 522–8758

Chattanooga - (Branch of Atlanta)
Cummins South, Inc.
1509 East 26th Street
Chattanooga, TN 37407-1095
Telephone: (615) 629-1447
FAX: (615) 629–1494

Knoxville - (Branch of Louisville)
Cummins Cumberland, Inc.
1211 Ault Road
Knoxville, TN 37914
Telephone: (423) 523-0446
FAX: (423) 523-0343

Memphis Branch
Cummins Mid-South, Inc.
1784 E. Brooks Road
Memphis, TN 38116
Telephone:
Sales/Admin.: (901) 345-7424
Parts: (901) 345-1784
Service: (901) 345-6185
FAX: (901) 346–4735

Nashville - (Branch of Louisville)
Cummins Cumberland, Inc.
706 Spence Lane
Nashville, TN 37217
Telephone: (615) 366-4341
FAX: (615) 366–5693

Texas

Arlington Distributor
Cummins Southern Plains, Inc.
600 N Watson Road
Arlington, TX 76004-3027
Telephone: (817) 640-6801
FAX: (817) 640-6852

Amarillo Branch
Cummins Southern Plains, Inc.
5224 Interstate 40 -
Expressway East
P.O. Box 31570
Amarillo, TX 79120-1570
Telephone: (806) 373-3793 (24 hours)
FAX: (806) 372–8547

Dallas Branch
Cummins Southern Plains, Inc.
3707 Irving Boulevard
Dallas, TX 75247
Telephone: (214) 631-6400 (24 hours)
FAX: (214) 631–2322

El Paso - (Branch of Phoenix)
Cummins Southwest, Inc.
14333 Gateway West
El Paso, TX 79927
Telephone: (915) 852-4200
FAX: (915) 852-3295

Fort Worth Branch
Cummins Southern Plains, Inc.
3250 North Freeway
Fort Worth, TX 76111
Telephone: (817) 624-2107 (24 hours)
FAX: (817) 624–3296

Houston Branch
Cummins Southern Plains, Inc.
4750 Homestead Road
P.O. Box 1367
Houston, TX 77251-1367
Telephone: (713) 675-7421 (24 hours)
FAX: (713) 675–1515

Mesquite Branch
Cummins Southern Plains, Inc.
2615 Big Town Blvd.
Mesquite, TX 75150
Telephone: (214) 321-5555 (24 hours)
FAX: (214) 328–2732

Odessa Branch
Cummins Southern Plains, Inc.
1210 South Grandview
P.O. Box 633
Odessa, TX 79760-0633
Telephone: (915) 332-9121 (24 hours)
FAX: (915) 333–4655

San Antonio Branch
Cummins Southern Plains, Inc.
6226 Pan Am Expressway North
P.O. Box 18385
San Antonio, TX 78218–0385
Telephone: (512) 655-5420 (24 hours)
FAX: (512) 655–3865

Houston Onan Branch
Southern Plains Power
A Division of Cummins Southern Plains
1155 West Loop North
Houston, TX 77055
Telephone: (713) 956-0020
FAX: (713) 956-0266

Utah

Salt Lake City Distributor
Cummins Intermountain, Inc.
1030 South 300 West
Salt Lake City, UT 84101
Telephone: (801) 355-6500
FAX: (801) 524–1351

Vernal Branch
Cummins Intermountain, Inc.
1435 East 335 South
Vernal, UT 84078
Telephone: (435) 789-5732
FAX: (435) 789-2853

Virginia

Cloverdale - (Branch of Charlotte)
Cummins Atlantic, Inc.
263 Simmons Drive
Cloverdale, VA 24077
Telephone: (540) 966-3169
FAX: (540) 966-3749

Richmond - (Branch of Charlotte)
Cummins Atlantic, Inc.
3900 Deepwater Terminal Road
Richmond, VA 23234
Telephone: (804) 232-7891
FAX: (804) 232-7428

Tidewater - (Branch of Charlotte)
Cummins Atlantic, Inc.
Atlantic Power Generation
3729 Holland Blvd.
Chesapeake, VA 23323
Telephone: (757) 485-4848
FAX: (757) 485-5085

Washington

Seattle Distributor
Cummins Northwest, Inc.
811 S.W. Grady Way (98055-2944)
P.O. Box 9811
Renton, WA 98057–9811
Telephone: (425) 235-3400
FAX: (425) 235–8202

Chehalis Branch
Cummins Northwest, Inc.
926 N.W. Maryland
Chehalis, WA 98532-0339
Telephone: (360) 748-8841
FAX: (360) 748–8843

Spokane Branch
Cummins Northwest, Inc.
11134 W. Westbow Blvd.
Spokane, WA 99204
Telephone: (509) 455–4411
FAX: (509) 624–4681

Tacoma Branch
Cummins Northwest, Inc.
3701 Pacific Highway East
Tacoma, WA 98424-1135
Telephone: (253) 922-2191
FAX: (253) 922–2379

Yakima Branch
Cummins Northwest, Inc.
1905 East Central Avenue (98901-3609)
P.O. Box 9129
Yakima, WA 98909-0129
Telephone: (509) 248-9033
FAX: (509) 248–9035

West Virginia

Charleston - (Branch of Louisville)
Cummins Cumberland, Inc.
3100 MacCorkle Ave. SW
P.O. Box 8456
South Charleston, WV 25303
Telephone: (304) 744-6373
FAX: (304) 744-8605

Fairmont - (Branch of Louisville)
Cummins Cumberland, Inc.
South Fairmount Exit, I-79
145 Middletown Road
Fairmont, WV 26554
Telephone: (304) 367-0196
FAX: (304) 367–1077

Wisconsin

DePere Distributor
Cummins Great Lakes, Inc.
Corporate Office
875 Lawrence Drive
P.O. Box 5070
DePere, WI 54115–5070
Telephone: (920) 337-1991
FAX: (920) 337-9746

Chippewa Falls Branch
Cummins Great Lakes, Inc.
2030 St. Highway 53
Chippewa Falls, WI 54729
Telephone: (715) 720-0680
FAX: (715) 720–0685

DePere Branch
Cummins Great Lakes, Inc.
939 Lawrence Drive
P. O. Box 5070
DePere, WI 54115–5070
Telephone: (920) 336-9631
(800) 236–1191
FAX: (920) 336–8984

Milwaukee Branch
Cummins Great Lakes, Inc.
9401 South 13th Street
P.O. Box D
Oak Creek, WI 53154
Telephone: (414) 768-7400
(800) 472-8283
FAX: (414) 768-9441

Wausau Branch
Cummins Great Lakes, Inc.
4703 Rib Mountain Drive
Wausau, WI 54401
Telephone: (715) 359-6888
(800) 236-3744
FAX: (715) 359-3744

Wyoming

Gillette - (Branch of Denver)
Cummins Rocky Mountain, Inc.
2700 Hwy. 14 & 16 North
P.O. Box 1207 (82717)
Gillette, WY 82716
Telephone: (307) 682-9611
FAX: (307) 682–8242

Rock Springs - (Branch of Salt Lake City)
Cummins Intermountain, Inc.
2000 Foothill Blvd.
P.O. Box 1634
Rock Springs, WY 82901
Telephone: (307) 362-5168
FAX: (307) 362–5171

Canada

Alberta

Edmonton Distributor and Branch
Cummins Alberta
11751 - 181 Street
Edmonton, AB T5S 2K5
Telephone: (780) 455-2151
FAX: (780) 454-9512

Calgary Branch
Cummins Alberta
4887 - 35th Street S.E.
Calgary, Alberta T2B 3H6, Canada
Telephone: (403) 569-1122
FAX: (403) 569-0027

Grande Prairie
Cummins Alberta - Grande Praire
RR2, Site 9, Box 22
Sexsmith, AB CN T0H 3C0
Telephone: (780) 568-3359
FAX: (780) 568-2263

Hinton Branch
Cummins Alberta
135 Veats Avenue
Hinton, Alberta T7V 1S8, Canada
Telephone: (780) 865-5111
FAX: (780) 865-5714

Lethbridge Branch
Cummins Alberta
240 - 24th Street North
Lethbridge, Alberta T1H 3T8, Canada
Telephone: (403) 329-6144
FAX: (403) 320-5383

British Columbia

Vancouver Distributor
Cummins British Columbia
18452 - 96th Avenue
Surrey, B.C., Canada
V4N 3P8
Telephone: (604) 882-5000
FAX: (604) 882-5080

Kamloops Branch
Cummins British Columbia
976 Laval Crescent
Kamloops, B.C. Canada V2C 5P5
Telephone: (250) 828-2388
FAX: (250) 828-6713

Prince George Branch
Cummins British Columbia
102- 3851- 18th Avenue
Prince George, B.C. V2N 1B1
Telephone: (250) 564-9111
FAX: (250) 564-5853

Sparwood Branch
Cummins British Columbia
731 Douglas Fir Road
Sparwood, B.C. VOB 2GO, Canada
Telephone: (250) 425-0522
FAX: (250) 425–0323

Tumbler Ridge Branch
Cummins British Columbia
Industrial Site, Box 226
Tumbler Ridge, B.C.
Canada VOC 2WO
Telephone: (250) 242-4217
FAX: (250) 242–4906

Manitoba

Winnipeg Distributor
Cummins Mid-Canada Ltd.
489 Oak Point Road
P.O. Box 1860
Winnipeg, MB R3C 3R1, Canada
Telephone: (204) 632-5470
FAX: (204) 697–0267

New Brunswick

Fredericton - (Branch of Montreal)
Cummins Eastern Canada, Inc.
R.R.#1 Doak Road
P.O. Box 1178, Station 'A'
Fredericton,
New Brunswick E3B 4X2, Canada
Telephone: (506) 451-1929
FAX: (506) 451-1921

Newfoundland

St. John's - (Branch of Montreal)
Cummins Eastern Canada, Inc.
122 Clyde Avenue
Donovans Industrial Park
Mount Pearl, Newfoundland A1N 2C2
Canada
Telephone: (709) 747-0176
FAX: (709) 747–2283

Wabush - (Branch of Montreal)
Cummins Eastern Canada, Inc.
Wabush Industrial Park
Wabush, Newfoundland A0R 1B0
Telephone: (709) 282-3626
FAX: (709) 282–3108

Nova Scotia

Halifax - (Branch of Montreal)
Cummins Eastern Canada, Inc.
50 Simmonds Drive
Dartmouth, Nova Scotia B3B 1R3
Telephone: (902) 468-7938
FAX: (902) 468–5177
Parts: (902) 468–6560

Ontario

Toronto Distributor
Cummins Ontario, Inc.
7175 Pacific Circle
Mississauga, ON L5T 2A5
Telephone: (905) 795–0050
FAX: (905) 795–0021

Kenora - (Branch of Winnipeg)
Cummins Mid-Canada Ltd.
Highway 17 East
P.O. Box 8
Kenora, Ontario P9N 3X1
Telephone: (807) 548–1941
FAX: (807) 548–8302

Ottawa Branch
Cummins Ontario Inc.
3189 Swansea Crescent
Ottawa, Ontario K1G 3W5,
Telephone: (613) 736-1146
FAX: (613) 736-1202

Thunder Bay Branch
Cummins Ontario Inc.
1400 W. Walsh Street
Thunder Bay
Ontario P7E 4X4
Telephone: (807) 577-7561
FAX: (807) 577–1727

Whitby Branch
Cummins Ontario Inc.
1311 Hopkins Street
Whitby, Ontario L1N 2C2, Canada
Telephone: (905) 668-6886
FAX: (905) 668-1375

Quebec

Montreal Distributor
Cummins Eastern Canada, Inc.
7200 Trans Canada Highway
Pointe Claire, Quebec H9R 1C2,
Telephone: (514) 695-8410
FAX: (514) 695–8917

Montreal Branch
Cummins Eastern Canada, Inc.
7200 Trans Canada Highway
Pointe Claire, Quebec H9R 1C2,
Canada
Telephone: (514) 695-8410
Sales: (514) 695-4555
Parts: (514) 694-5880
FAX: (514) 695–8917

Dorval Onan Branch
Cummins, Eastern Canada, Inc.
580 Lepihe
Dorval, Quebec H9H 1G2
Telephone: (514) 631-5000
FAX: (514) 631-0104

Quebec City Branch
Cummins Diesel
Branch of Cummins Americas, Inc.
2575 Dalton Street
Ste. Foy, Quebec G1P 3S7
Telephone: (418) 653-6411
FAX: (418) 653-5844

Val D'Or Branch
Cummins, Eastern Canada, Inc.
1025 Rue Del
Val D'Or, Quebec 59P 4P6
Telephone: (819) 825-0993
FAX: (819) 825-8488

Saskatchewan

Lloydminster - (Branch of Winnipeg)
Cummins Mid-Canada Ltd.
4005 52nd
Lloydminster, SK S9V 0Y9
Telephone: (305) 825–2062
FAX: (305) 825–6702

Regina - (Branch of Winnipeg)
Cummins Mid-Canada Ltd.
110 Kress Street
P.O. Box 98
Regina, SK S4P 2Z5
Telephone: (306) 721-9710
FAX: (306) 721–2962

Saskatoon - (Branch of Winnipeg)
Cummins Mid-Canada, Ltd.
3001 Faithful Avenue
P.O. Box 7679
Saskatoon, SK S7K 4R4, Canada
Telephone: (306) 933-4022
FAX: (306) 242–1722

Australia

Branches:

Gepps Cross
Cummins Engine Company, Pty. Ltd.
P.O. Box 108
Blair Athol, 5084
South Australia, Australia
Location:
45-49 Cavan Road
Gepps Cross, 5094
Telephone: (61-8) 8262-5211

Dosra
Cummins Engine Company, Pty. Ltd.
P.O. Box 124
Darra, 4076
Queensland, Australia
Location:
33 Kimberley Street
Darra, 4076, Australia
Telephone: (61-7) 3375-3277

Bunbury
Cummins Engine Company, Pty. Ltd.
P.O. Box 1751
Bunbury, WA 6230
Australia
Location:
11 Dryanda Court
Picton, WA 6230
Telephone: (61-8) 9725-6777
FAX: (61-8) 9725-6444

Cairns
Cummins Engine Company, Pty. Ltd.
P.O. Box 7189
Cairns Mail Centre, 4870
Queensland, Australia
Location:
Liberty Street
Cairns, 4870
Telephone: (61-7) 935-2999

Campbellfield
Cummins Engine Company, Pty. Ltd.
Private Bag 9
Campbellfield, 3061
Victoria, Australia
Location:
1788-1800 Hume Highway
Campbellfield, 3061
Telephone: (613) 9357-9200

Dandenong
Cummins Engine Company, Pty. Ltd.
Lot 7 Greens Road
Dandenong, 3175
Victoria, Australia
Telephone: (613) 9706-8088

Darwin
Cummins Engine Company, Pty. Ltd.
P.O. Box 37587
Winnellie, 0821
Northern Territory, Australia
Location:
Lot 1758 Graffin Crescent
Winnellie, 0821
Telephone: (61-8) 8947-0766

Devonport
Cummins Engine Company, Pty. Ltd.
P.O. Box 72E
Tasmania, Australia
Location:
2 Matthews Way
Devonport, 7310
Telephone: (61-3) 6424-8800

Emerald
Cummins Engine Company, Pty. Ltd.
P.O. Box 668
Emerald, 4720
Queensland, Australia
Location:
Capricorn Highway
Emerald, 4720
Telephone: (61-7) 4982-4022

Grafton
Cummins Engine Company, Pty. Ltd.
P.O. Box 18
South Grafton, 2461
New South Wales, Australia
Location:
18-20 Induna Street
South Grafton, 2461
Telephone: (61-2) 6642-3655

Hexham
Cummins Engine Company, Pty. Ltd.
21 Galleghan Street
Hexham
New South Wales, Australia
Telephone: (61-2) 4964-8466
FAX: (61-2) 4964-8616

Kalgoorlie
Cummins Engine Company, Pty. Ltd.
P.O. Box 706
Kalgoorlie, 6430
Western Australia, Australia
Location:
16 Atbara Street
Kalgoorlie, 6430
Telephone: (61-8) 9021-2588

Karratha
Cummins Engine Company, Pty. Ltd.
P.O. Box 377
Karratha, WA 6714
Australia
Location:
1490 Lambert Road
Karratha, WA 6714
Australia
Telephone: (61-8) 9144-4646
FAX: (61-8) 9143-1507

Laverton
Cummins Engine Company, Pty. Ltd.
Locked Bag 1
Laverton, Victoria 3028
Australia
Location:
195 Boundary Road
Laverton North, Victoria 3028
Australia
Telephone: (61-3) 9360-0800
FAX: (61-3) 9360-0438

Leeton
Cummins Engine Company, Pty. Ltd.
P.O. Box 775
Leeton, NSW 2705
Australia
Location:
29 Brady Way
Leeton, NSW 2705
Australia
Telephone: (61-2) 6953-3077
FAX: (61–2) 6953-3109

Mackay
Cummins Engine Company, Pty. Ltd.
P.O. Box 842
Mackay, 4740
Queensland, Australia
Location:
4 Presto Avenue
Mackay, 4746
Telephone: (61-7) 4955-1222

Mount Gambier
Cummins Engine Company, Pty. Ltd.
P.O. Box 2219
Mount Gambier, 5290
South Australia, Australia
Location:
2 Avey Road
Mount Gambier, 5290
Telephone: (61-87) 25-6422

Penrith
Cummins Engine Company, Pty. Ltd.
P.O. Box 132
Cambridge Park, 2747
New South Wales, Australia
Location:
7 Andrews Road
Penrith, 2750
Telephone: (61-2) 4729-1313

Queanbeyan
Cummins Engine Company, Pty. Ltd.
P.O. Box 527
Queanbeyan, 2620
New South Wales, Australia
Location:
15-27 Bayldon Road
Queanbeyan, 2620
Telephone: (61-2) 6297-3433
FAX: (61-2) 6297-6709

Regency Park
Cummins Engine Company, Pty. Ltd.
P.O. Box 2147
Regency Park, SA 5942
Australia
Location:
11 Manton Street
Hindmarsh, SA 5942
Australia
Telephone: (61-8) 8346-3832
FAX: (61-8) 8340-2045

Swan Hill
Cummins Engine Company, Pty. Ltd.
P.O. Box 1264
Swan Hill, 3585
Victoria, Australia
Location:
5 McAllister Road
Swan Hill, 3585
Telephone: (61-3) 5032-1511

Tamworth
Cummins Engine Company, Pty. Ltd.
P.O. Box 677
Tamworth, 2320
New South Wales, Australia
Location:
Lot 65 Gunnedah Road
Tamworth, 2340
Telephone: (61-2) 6765-5455

Townsville
Cummins Engine Company, Pty. Ltd.
P.O. Box 7339
Garbutt Business Centre, QLD4814
Australia
Location:
704-710 Ingham Road
Townsville, QLD 4814
Telephone: (61-7) 4774-7733
FAX: (61-7) 4774-7640

Welshpool
Cummins Engine Company, Pty. Ltd.
P. O. Box 52
Welshpool, 6986
Western Australia, Australia
Location:
50 Kewdale Road
Welshpool, 6106
Telephone: (61-8) 9458-5911

Wetherill Park
Cummins Engine Company, Pty. Ltd.
Private Bag 150
Wetherill Park, NSW 2164
Australia
Location:
492-494 Victoria Street
Wetherill Park, NSW 2164
Australia
Telephone: (61-2) 9616-5300
FAX: (61-2) 9616-5399

Wodonga
Cummins Engine Company, Pty. Ltd.
P.O. Box 174
Wodonga, 3690
Victoria, Australia
Location:
9-11 McKoy Street
Wodonga, 3690
Telephone: (61-2) 6024-3655

New Zealand

Auckland

Cummins Engine Company, Pty. Ltd.
Private Bag 92804
Penrose, Auckland, New Zealand
Location:
440 Church Street
Penrose
Telephone: (64-9) 579-0085

Branches:

Auckland

Cummins Engine Company, Pty. Ltd.
Private Bag 92804
Penrose, Auckland, New Zealand
Location:
440 Church Street
Penrose
Telephone: (64-9) 579-0085

Christchurch

Cummins Engine Company, Pty. Ltd.
P.O. Box 16-149
Hornby, Christchurch, New Zealand
Location:
35 Parkhouse Road
Sockburn, Christchurch
Telephone: (64-3) 348-8170

Dunedin

Cummins Engine Company, Pty. Ltd.
P.O. Box 2333
South Dunedin, New Zealand
Location:
8 Devon Street
Dunedin
Telephone: (643) 477-8818

Palmerston North

Cummins Engine Company, Pty. Ltd.
P.O. Box 9024
Palmerston North, New Zealand
Location:
852-860 Tremaine Avenue
Telephone: (64-6) 356-2209

Rotorua

Cummins Engine Company, Pty. Ltd.
P.O. Box 934
Rotorua, New Zealand
Location:
328 Te Ngae Road
Rotorua
Telephone: (647) 345-6699

Regional Offices - International

Locations

European Regional Office - Mechelen

Cummins Diesel N.V.
Blarenberglaan 4
Industriepark Noord 2
2800 Mechelen
Brussels
Telephone: (32-15) 89000

Countries Covered:

- Austria
- Belgium
- Czech Republic
- Denmark
- Finland
- Greece
- Hungary
- Iceland
- Israel
- Luxembourg
- Netherlands
- Norway
- Portugal
- Slovakia
- Spain
- Sweden
- Switzerland

Cumbrasa Regional Office - Brazil

Cummins Brasil S.A.
Rua Jati, 266
07180-900 Guarulhos
Sao Paulo, Brazil

Mailing Address:
P.O. Box 13
07180-900 Guarulhos
Sao Paulo, Brazil
Telephone: (55-11) 945-9811

Country Covered: Brazil

Beijing Regional Office - China

Cummins Corporation
China World Tower, Suite 917
China World Trade Center
No. 1 Jian Guo Men Wai
Beijing 100004
People's Republic of China
Telephone: (86-1) 6505-1658
Fax: (88-10) 6505-4211

Countries Covered:

- China
- Mongolia

Bogota Regional Office - Columbia

Cummins Engine Co. de Colombia S.A.
Carrera 11A No. 90-15 Of. 601/602
Bogota, D.E., Colombia
Telephone: (57-1) 610-4849

Mailing Address:
Apartado Aereo 90988
Bogota D.E., Colombia

Countries Covered:

- Argentina
- Bolivia
- Chile
- Colombia
- Ecuador
- Paraguay
- Peru
- Uruguay

Gross-Gerau Regional Office - Germany

Cummins Diesel Deutschland GmbH
Odenwaldstr. 23
D-4521 Gross-Gerau
Germany
Telephone: (49-6152) 174-0

Countries Covered:

- Albania
- Bulgaria
- Latvia
- Germany
- Luxembourg
- Slovenia
- Macedonia
- Poland
- Romania
- Lithuania
- Estonia
- Croatia
- Bosnia

Hong Kong Regional Office - Hong Kong

Cummins Engine H.K. Ltd.
Unison Industrial Centre
15th Floor, Units C & D
27-31 Au Pui Wan Street
P. O. Box 840 Shatin
Fo Tan, Shatin, N.T.
Hong Kong
Telephone: (852) 2606-5678
Fax: (852) 2691-1641, 2687-3552

Country Covered: Hong Kong, Macau

Pune Kirloskar Regional Office - India

Kirloskar Cummins Limited
Kothrud
Pune - 411 029, India
Telephone: (91-212) 33-0240, 33-5435, 33-1105

Countries Covered:

- Bhutan
- India
- Nepal

Milan Regional Office - Italy

Cummins Diesel Italia S.P.A.
Piazza Locatelli 8
Zona Industriale
20098 San Giuliano Milanese
Milan, Italy
Telephone: (+39-02) 98-83-111

Country Covered: Italy

North Asia Regional Office - Japan

Cummins Diesel Sales Corporation
1-12-10 Shintomi
Chuo-ku, Tokyo 104
Japan
Telephone: (81-3) 3555-3131/2/3/4/5

Country Covered: Japan

Seoul Regional Office - Korea

Cummins Korea Ltd.
5th Floor, Hye Sung Building
35-26 Sam Sung Dong, Kang Nam Ku
Seoul, South Korea
Telephone: (82-2) 516-0431/2/3, 517-3370/1

Country Covered: South Korea

Cummsa Regional Office - Mexico

Cummins, S.A. de C.V.
Arquimedes No. 209
Col. Polanco
11560 Mexico, D.F.
Mexico
Telephone: (52-5) 254-3822/3783/3622

Mailing/Shipping Address:
Gonzalez de Castilla Inc.
P.O. Box 1391
4605 Modern Lane
Modern Industrial Park
Laredo, TX 78040
Telephone: (512) 722-5207

Country Covered: Mexico

Moscow Regional Office - Russia

Cummins Engine Co., Inc.
Park Place
Office E708
Leninsky Prospect 113
Russia 117198
Telephone: (7-502) 256-5122 or 256-5123

Countries Covered:

Armenia	
Azerbaijan	Moldova
Belarus	Russia
Tajikistan	
Georgia	Turkmenistan
Kyrgyzstan	Ukranie
Kazakhstar	Uzbekistan

South And East Asia Area Office - Singapore

Cummins Diesel Sales Corporation
8 Tanjong Penjuru
Jurong Industrial Estate
Singapore 2260
Telephone: (65) 265-0155

Countries Covered:

Bangladesh	Malaysia
Brunei	Mongolia
Burma/Mynamar	Philippines
Cambodia	Singapore
	Sri Lanka
Indonesia	Thailand
Laos	Vietnam

Taipei Regional Office - Taiwan

Cummins Corporation - Taiwan
12th Floor, No. 149
Min-Sheng E. Road
Section 2
Taipei, Taiwan
R.O.C. 104
Telephone: (886-2) 2503-8441

Country Covered: Taiwan

Middle East Regional Office

Cummins Diesel FZE
Units ZF 5 & 6, Jebel Ali Free Zone
Dubai
United Arab Emirates
Telephone: (971) 4 883-8998
Fax: (971) 4 883-8997
E-mail: cdfze@emirates.net.ae)

Countries Covered:

MIDEAST

Afghanistan	Jordan	Saudi Arabia
Bahrain	Kuwait	Sudan
Cyprus	Lebanon	Syria
Djibouti	Oman	U.A.E.
Egypt	Pakistan	United Kingdom
Iraq	Qatar	Yemen
Iran	Turkey	

North/West/East and Central Africa Regional Office - Daventry (U.K.)

Cummins Engine Company Ltd.
Royal Oak Way South
Daventry, Northants NN11 5NU
England
Telephone: (44-1327) 886000

Countries Covered:

NORTH/WEST/EAST AND CENTRAL AFRICA

Benin (from Togo)	Gabon	Mauritania
Burkina-Paso	Gambia	Morocco
Burundi		
Cameroon	Ghana	Niger
Cape Verde	Guinea	Nigeria
Central African Republic	Guinea-Bissau	Sao Tome & Principe
	Ivory Coast	
Chad	Liberia	Senegal
Congo (D.R.)		Seychelles
Congo (P.R.)		
	Libya	Siera Leone
Djibouti		Somalia
Equatorial Guinea	Mali	Togo
	Malta	Tunisia
		Uganda

Latin America Regional Office - Miramar (U.S.A.)

Cummins Americas, Inc.
Miramar Park of Commerce
3450 Executive Way
Miramar, FL 33025
Telephone: (305) 431-5511

Countries Covered:

- Argentina
- Bolivia
- Chile
- Colombia
- Costa Rica
- Dominican Republic
- El Salvador
- Eucador
- Guatemala
- Honduras
- Nicaragua
- Panama
- Paraguay
- Peru
- Uruguay
- Venezuela

Caracas Regional Office - Venezuela

Cummins Engine Company
Oficina de Delegado
Torre La Primera, Oficina 5-D
Av. Francisco de Miranda
Chacao, Caracas 1060

Mailing Address:
Cummins Engine Company M-227
c/o Jet Cargo International
P.O. Box 020010
Miami, FL 33102-0010 U.S.A.
Telephone: (58-2) 32-0563, 32-718

Counties Covered:

- Costa Rica
- Dominican Republic
- El Salvador
- Guatemala
- Honduras
- Nicaragua
- Panama
- Venezuela

Southern Africa Regional Office

Cummins Diesel South Africa (Pty) Ltd
13 Eastern Service Road
Kelvin View 2054
South Africa
Telephone: (00 27 11) 321 8700 (from U.K.)
Fax: (00 27 11 444 1899)

Mailing Address:
Wendywood 2144
Gauteng
South Africa

Countries Covered:

- Angola
- Botswana
- Comoros Island
- Lesotho
- Madagascar
- Malawi
- Mauritius
- Mozambique
- Nambia
- Swaziland
- South Africa
- ST. Helena
- Tanzania
- Zambia
- Zimbabwe

Distributors - International

Locations

ABU DHABI
- See United Arab Emirates

AFGHANISTAN
- See Middle East Regional Office

ALBANIA
- See Germany Regional Office - Gross-Gerau

ALGERIA
- See Cummins Diesel S.A. - Lyon

AMERICAN SAMOA
- See South Pacific Regional Office

ANDORRA
- See European Regional Office - Mechelen

ANGOLA

Luanda
Hull Blyth (Angola) Ltd
Casa Inglesa
Rua Major Kahangulo, 134/140
Luanda
Republic of Angola
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310026
Fax: (244-2) 335602

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Distribuidora Cummins, S.A.
(DICUMAR)
Av. Del Libertador 602 Piso 5
Buenos Aires, Argentina
Telephone: (54-1)814-1895/1395/1393

ARUBA, ISLAND OF
- See Netherlands Antilles

AUSTRIA

Neudoerfl
Cummins Diesel Motorenvertriebsges
m.b.H. Trenner & Co.
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A-7201 Neudoerfl
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BALEARIC ISLANDS

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Cummins Ventas y Servicio, S.A.
Torrelaguna, 56
28027 Madrid, Spain
Telephone: (34-91) 367-2000
376-2404

BANGLADESH

Dhaka
Equipment & Engineering Co., Ltd.
G.P.O. Box 2339
Dhaka 1000, Bangladesh
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56, Dilkusha Commercial Area
2nd Floor/Eastern Block
Telephone: (880-2) 234357, 234060

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Cummins Southeastern Power, Inc.
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Cummins Distributor
Belgium S.A.
623/629 Chaussee de Haecht
B-1030 Brussels, Belgium
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(32-2) 216-81-10

BELIZE

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Cummins Southeastern Power, Inc.
5421 N. 59th Street
Tampa, FL 33610
Telephone: (813) 621-7202

BENIN
- See Togo

BERMUDA

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Cummins Metropower, Inc.
890 Zerega Avenue
Bronx, NY 10473
Telephone: (718) 892-2400

BHUTAN

Pune (Office in India)
Cummins Diesel Sales &
Service (India) Ltd.
35A/1/2, Erandawana
Pune - 411 038, India
(State of Maharashtra) India
Telephone: (91-212) 331234/331554/
331635/330066/
330166/330356/
31703

BOLIVIA

La Paz
Machinery & Auto Service
Casilla 4042
La Paz, Bolivia
Location:
Av. 20 de Octubre Esq.
Rosendo Gutierrez
Telephone: (591-2) 379650, 366394

BONAIRE, ISLAND OF
- See Netherlands Antilles

BOTSWANA
- See Southern Africa Regional Office - Kelvin

BRAZIL

Ananindeua
Marcos Marcelino & Companhia
Ltda.
Rodovia BR-316, Km 9
67020-010 Ananindeua, Para,
Brazil
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31950-640 Olhos D'Agua Norte
Belo Horizonte, MG
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Mato Grosso Ltda.
Rodovia BR 163 Km 01
79060-000 Campo Grande
Mato Grosso do Sul, Brazil
Telephone: (55-67) 787-1166

Curitiba
Distribuidora Cummins Parana S.A.
Rua Brasilio Itibere, 2195
80230 Curitiba, Parana
Brazil
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Fortaleza
Distribuidora Cummins Diesel
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Av. da Abolicao, 3882,
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Goianian
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Av. Caiapo 777 - Setor Sta. Genoveva
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Distribuidora Cummins
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Estrada da Ponta Negra, 6080 - Sao Jorge
69037 Manaus, Amazonas,
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Meridional S.A.
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Distribuidora Cummins
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Rua Sariema, 138-Olaria
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de Motores Cummins
Rua Martin Burchard, 291 - Bras
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Sao Paulo, Brazil
Telephone: (55-11) 270-2311

BRITISH VIRGIN ISLANDS
- See Puerto Rico

BRUNEI
- See Malaysia

BURKINA - FASO
- See North/West/East and Central Africa Regional
Office - Daventry

BULGARIA
-See Germany Regional Office - Gross-Gerau

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Contact: Scott &
English (M) Sdn Bhd
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West Malaysia
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16 Jalan Chan Sow Lin
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West Malaysia
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Bia, S.A.
Rameistraat, 123
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CAMBODIA
- See South & East Asia Regional Office
- Singapore

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CAPE VERDE
- See ECV Portugal

CENTRAL AFRICAN REPUBLIC
- See North/West Africa Regional Office
- Daventry

CEYLON
- See Sri Lanka

CHAD
- See North/West/East and Central Africa Regional Office - Daventry

CHILE

Santiago
Distribuidora Cummins Diesel
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Casilla Postal 1230
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697-3566/7/8,
697-2709

CHINA, PEOPLE'S REPUBLIC

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Fax: (86-10) 67882285

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People's Republic of China
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Fax: (86-871) 5632210

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Xinjiang, People's Republic of China
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Fax: (86-991) 3849232

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Fax: (86-21) 64033111

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Wuhan, 430030
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Fax: (86-27) 83330180 ext. 812

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Guangzhou, 510065
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Fax: (86-20) 83313135

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Shenzhen Chongfa Cummins Engine Co., Ltd.
Unit D2-F2.6
Tian An Che Gong Miao Industrial Estate
Shen Nan Rd.,
Shenzhen, 518040
People's Republic of China
Telephone: (86-755) 3415479
Fax: (86-755) 3415480

COLOMBIA

Barranquilla
Cummins de Colombia S.A.
Apartado Aereo 5347
Barranquilla, Colombia
Location: Calle 30, No. 19 - 21
Telephone: (57-58) 40-02-06/40-13-46

Bogota
Cummins Colombiana Ltda.
Apartado Aereo No. 7431
Bogota, D.E. Colombia
Location:
Av. Americas X Carrera
42C No. 19-45
Telephone: (57-1) 244-5688/5882

Bucaramanga
Cummins API, Ltda.
Apartado Aereo 352
Bucaramanga, Colombia
Location:
Autopista a Giron, Km 7
Telephone: (57-76) 468060

Cali
Distribuidora Cummins del Valle, Ltda.
Apartado Aereo No. 6398
Cali, Colombia
Location:
Av. 3a. # 39-35 - Vipasa
Telephone: (57-3) 65-4343

Medellin
Equipos Tecnicos Ltda.
Apartado Aereo No. 2046
Medellin, Colombia
Location: Carrera 52 No. 10-184
Telephone: (57-4) 255-4200

Pereira
Equipos Tecnicos Ltda. C.Q.R.
Apartado Aereo No. 1240
Pereira, Colombia
Location: Carrera 8a. No. 45-39
Telephone: (57-63) 366341

COMOROS
- See Southern Africa Regional Office - Kelvin

CONGO, PEOPLE'S REPUBLIC

Brussels (Office in Belgium)
Bia, S.A.
Rameistraat, 123
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Overijse, Belgium
Telephone: (32-2) 6892811

CORSICA
- See France

COSTA RICA

San Jose
Servicios Unidos, S.A.
P.O. Box 559
San Jose, Costa Rica
Location:
100 metros al este de
Excelsior Antiguo
Curridabat, San Jose
Telephone Office: (506) 53-93-93
Telephone Service Shop:
(506) 26-00-76

CUBA

Miami (Office in U.S.A.)
Cummins Southeastern Power, Inc.
9900 N.W. 77 Court
Hialeah Gardens, FL 33016
Telephone: (305) 821-4200

CYPRUS

Nicosia
Alexander Dimitriou & Sons Ltd.
P.O. Box 21932
Nicosia, Cyprus
CY-1515
Location:
4 Salamis Avenue
Telephone: (357-2) 349450

CZECH REPUBLIC
- See Austrian Distributor

DENMARK

Glostrup
Cummins Diesel Salg & Service A/S
Hovedvejen 233B
Osted
DK-4000 Roskilde
Denmark
Telephone: (45-46) 423 552

DJIBOUTI
- See North/West/East and Central Africa

DOMINICA

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DOMINICAN REPUBLIC

Santo Domingo
Argico C. Por A.
P.O. Box 292-2 Feria
Santo Domingo
Dominican Republic, ZP-6
Location:
Calle Jose A. Soler
No. 3, ESQ.
Avenida Lope de Vega
Telephone: (809) 562-6281

DUBAI
- See United Arab Emirates

ECUADOR

Guayaquil
Motores Cummins (MOTCUM) S.A.
P.O. Box 1062
Guayaquil, Ecuador
Location:
Avenida Carlos Julio
Arosemena Km. 4
Telephone: (593-4) 203995/201177

Quito
Rectificadora Botar S.A.
P.O. Box 17-01-3344
Quito, Ecuador
Location:
Av. 10 de Agosto No. 5980
Telephone: (593-2) 465-176/177/
178/195/197

EGYPT

Cairo
ADAT
P.O. Box 1572
Cairo, Egypt
Sales and Service Location:
25, Pyramid Road
Giza, Cairo, Egypt
Telephone: (20-2) 385-4001/2/4/5/6/8/9

EL SALVADOR

San Salvador
Salvador Machinery
Company, S.A. de C.V.
P.O. Box 125
San Salvador, El Salvador
Location:
Blvd. Ejercito Nacional
Telephone: (503) 711022, 228388

ENGLAND
- See United Kingdom

EQUATORIAL GUINEA
- See North/West/East and Central Africa Regional Office - Daventry

ESTONIA
- See Gross Gerau Regional Office - Germany

FAROE ISLANDS

Wellingborough (Office in United Kingdom)
Cummins Diesel
Rutherford Drive
Park Farm South
Wellingborough
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England
Telephone: (44-1933) 334200

FERNANDO PO

- See Spain

FIJI

- See Cummins Diesel Sales & Service New Zealand Ltd.

FINLAND

Helsinki
Machinery OY
P.O. Box 560
FIN 01741 Varta Finland
Telephone: Int: (358-9) 8955 2215

FRANCE

Lyon
Cummins Diesel S.A.
Sales Corporation
39, rue Ampere Z.I.
69680 Chassieu, France
Telephone: (33) 72-22-92-72
Parts and Service Telephone:
(33) 72-22-92-69

GABON

- See North/West/East and Central Africa Regional Office - Daventry

GAMBIA

- See Matforce Senegal

GEORGIA

- See Moscow Regional Office - Moscow

GERMANY

Gross-Gerau
Cummins Diesel Deutschland GmbH
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D-6080 Gross-Gerau,
Germany
Location: Odenwaldstr. 23
Telephone: (49-6152) 174-0

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Accra
J&D Diesels and Systems
P.O. Box c2381
Cantonments
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Athens-Lamia
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GREENLAND

- See Denmark

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Maquinaria y Equipos, S.A.
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GUINEA BISSAU

- See North/West/East and Central Africa Regional Office - Daventry

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HOLLAND

- See Netherlands

HONDURAS

Tegucigalpa
Comercial Laeisz
Honduras, S.A.
P.O. Box 1022
Tegucigalpa, D.C., Honduras
Location:
Zona La Burrera,
Blvd. Toncontin
Frente a Gasolinera Esso.
Telephone: (504) 333570/335615

HONG KONG

Kowloon
Cummins Engine H. K. Ltd.
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27-31 Au Pui Wan Street
Fo Tan, Shatin, Hong Kong
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331635, 330066,
330166, 330356,
331703

Bombay
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Bombay 400001, India
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Calcutta
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Service (I) Ltd.
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Circular Road
Calcutta 700 019 (West Bengal), India
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Jakarta Selatan 12330, Indonesia
Location:
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Telephone: (62-21) 736-1978/736-3302

IRAN

- See Middle East Regional Office - United Arab Emirates

IRAQ

- See Middle East Regional Office or United Arab Emirates

IRELAND

Wellingborough (Office in England)
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Denington Estate
Wellingborough
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ISRAEL

Tel Aviv
Israel Engines &
Trailers Co. Ltd.
Levinson Brothers Engineers
P. O. Box 390
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IVORY COAST

- See Cote d' Ivoire

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JORDAN

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Amman, Jordan
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KENYA

Nairobi
Werrot & Company Limited
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Nairobi, Kenya
Location:
Lusaka Road
Telephone: (254-150) 20316

KOREA, SOUTH

Seoul
Hwa Chang Trading Co., Ltd.
Central P.O. Box No. 216
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KUWAIT

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General Transportation &
Equipment Co.
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Shuwaikh Behind
Canada Dry Factory
Telephone: (965) 4833380/1/2

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LAOS

- See South and East Asia Regional Office - Singapore

LATVIA

- See Moscow Regional Office - Moscow

LEBANON

Beirut
S.E.T.I. Charles Keller
S.A.L.
B.P. 16-6726
Beirut, Lebanon
Location:
Corniche du Fleuve
Telephone: (961-1) 425040/41

LESOTHO

- See South Africa

LIBYA

- See North/West Africa Regional Office - Daventry

LIECHTENSTEIN

- See Switzerland

LUXEMBOURG

Gross-Gerau (Office in Germany)
Cummins Diesel Deutschland GmbH
P.O. Box 11 34
Odenwaldstrasse 23
D-6080 Gross-Gerau, Germany
Telephone: (49-6152) 174-0

MACAU

- See Hong Kong

MADAGASCAR

- See East and Southern Africa Regional Office - Harare

MADEIRA ISLANDS

- See Portugal

MALAYSIA

Kuala Lumpur
Cummins Diesel Sales & Service
Div. of Scott & English
(M) Sdn. Bhd.
P.O. Box 10324
50710 Kuala Lumpur, West Malaysia
Location:
16 Jalan Chan Sow Lin
55200 Kuala Lumpur
Telephone: (60-3) 2211033

MALI
- See Senegal (Matforce)

MALTA

Valletta
Plant & Equipment Ltd.
Regency House
254, Republic Street
Valletta, Malta
Telephone: (356) 23-26-20, 23-33-43, 23-16-23, 24-75-17

MARTINIQUE

Miami (Office in U.S.A.)
Cummins Southeastern Power, Inc.
9900 N.W. 77 Court
Hialeah Gardens, FL 33016
Telephone: (305) 821-4200

MEXICO

Guadalajara
Cummins Del Occidente, S.A.
Lazaro Cardenas No. 2950
Fracc. Alamo Industrial
45560 Guadalajara, Jal. Mexico
Telephone: (52-3) 670-93-06, 670-53-38, 670-63-61, 670-62-33

Monterrey
Tecnica Automotriz, S.A.
Av. Alfonso Royes
No. 3637 Nte.
Monterrey, Nuevo Leon, Mexico
Telephone: (52-83) 51-41-51, 51-46-56

Merida
Cummins Del Sureste, S.A. de C.V.
Av. Aviacion Civil No. 647
Esquina Calle 100
Col. Sambula
97259 Merida, Yucatan, Mexico
Telephone: (52-99) 24-11-55, 24-00-15

Puebla
Cummins de Oriente, S.A. de C.V.
Av. Reforma No. 2112,
Puebla, Pue. Mexico
Telephone: (52-22) 48-76-74, 48-76-75

Queretaro
Distribuidor Cummins Del Centro, S.A. de C.V.
Blvd. Bernardo Quintana No. 518
Col. Arboledas
C.P. 76140 Queretaro, Qro., Mexico
Telephone: (52-42) 12-41-90, 12-58-90, 12-62-94, 14-04-16, 14-08-81, 14-15-91

Tlalnepantla
Distribuidor Cummins
Metropolitana, S.A. DE C.V.
Sor Juana Ines de la Cruz No. 555
54000 Tlalnepantla, Edo. de Mexico, Mexico
Telephone: (52-5) 327-38-00, 390-64-37, 390-12-27

MOROCCO

Casablanca
Soberma (Groupe Auto Hall)
Société Soberma
Chamin Ain Borja
Quartier Beausite
Ain Sebaâ
Casablanca, Morocco
Telephone: (212-22) 66 66 40-43
Fax: (212-22) 66 66 45-46

MOZAMBIQUE
- See Southern Africa Regional Office - Kelvin

NAMIBIA (Southwest Africa)

Walvis Bay
Namib Diesel
P.O. Box 2449, Walvis Bay, Namibia
Location:
210, 2nd Street
Walvis Bay, Namibia
Telephone: 064-203971

NEPAL

Pune (Office in India)
Cummins Diesel Sales & Service (India) Ltd.
35A/1/2, Erandawana
Pune, - 411 038, (State of Maharashtra) India
Telephone: (91-212) 331234, 331554, 331635, 330066, 330166, 330356, 331703

NETHERLANDS

Dordrecht
Cummins Diesel Sales & Service, B.C.
Galvanistraat 35
3316 GH Dordrecht
Netherlands
Telephone: (31-78) 618-12-00

NETHERLANDS ANTILLES

Miami (Office in U.S.A.)
Cummins Southeastern Power, Inc.
9900 N.W. 77 Court
Hialeah Gardens, FL 33016
Telephone: (305) 821-4200

NEW CALEDONIA
- See South Pacific Regional Office - Melbourne

NEW GUINEA
- See Papua New Guinea

NICARAGUA

Managua
F. Alf. Pellas & Cia.
Apartado Postal No. 46
Managua, Nicaragua
Location:
6a. Calle
30 y 31 Avs. N.O., Zona 5
Telephone: (505-2) 660616

NIGERIA

Lagos
SCOA TRAC
P.M.B. 21108
Ikeja, Lagos
Nigeria
Location:
Apapa-Oshodi Expressway
Isolo Industrial Estate,
Isolo
Telephone: (234-1) 45-21-539/45-21-803

Paris (Office in France)
SCOA INTER
Immeuble Marie-Joseph
Rue du Maréchal de Lattre de Tassigny
78990 Elancourt
France
Telephone: (33-1) 30-68-82-68

NORTHERN IRELAND
- See United Kingdom

NORWAY

Oslo
Cummins Diesel Salg & Service A/S
Hestehagen 3
Postboks 151
N-1441 DR0BAK
Norway
Telephone: (47) 64 90 70 80

OMAN

Ruwi
Universal Engineering Services L.L.C.
P.O. Box 2688
Ruwi
Sultanate of Oman
Telephone: (968) 590830, 591304

PAKISTAN

Karachi
Diesel Power Systems
2 Bangalore Town
Main Shahrah-e-Faisal
Karachi 75350
Pakistan
Telephone: (92) 21-453 9603/4/5

PANAMA

Panama City
Grupo Tiesa, S.A.
Apartado Postal #55-0549
Partillo, Panama
Telephone: (507) 67-3866

PAPUA NEW GUINEA

Sydney (Office in Australia)
Cummins Diesel Sales & Service
P.O. Box 150
Cabramatta, 2166
New South Wales, Australia

PARAGUAY

Asuncion
Automotores y Maquinaria, S.R.L.
Yegros y Fulgencio R. Moreno
P.O. Box 1160
Asuncion, Paraguay
Telephone: (595-21) 493111, 493115

PERU

Lima
Comercial Diesel del Peru S.A.
P.O. Box 14-0234
Lima, Peru
Location:
Ave. V.R. Haya de la Torre 2648
Lima 3, Peru
Telephone: (51-14) 74-3173/4374/3144/2281

PHILIPPINES

EDSA
Power Systems, Inc. EDSA
P.O. Box 3241
Manila
Philippines 1501
Location:
79E. Delos Santos Ave.
Mandaluyong, Metro Manila
Telephone: (63-2) 791769, 791771, 5311945, 5315448, 5311934, 5312531, 53414513

POLAND
Polremaco
30-709 Krakow
Ul. Stoczniowcow 3
Poland
Telephone: (48-12) 6561917

PORTUGAL

Lisbon
Electro Central Vulcanizadora, Lda.
P.O. Box 3077
1302 Lisbon, Portugal
Location:
Rua Conselheiro Martins de Carvalho
Lote 1480
1400 Lisboa (Restelo)
Telephone: (351-2) 303 4800

QATAR

Doha
Jaidah Motors & Trading Co.
P.O. Box 150
Doha, Qatar (Arabian Gulf)
Telephone: (974) 442-6161

REUNION
- See Lyon Regional Office - Lyon

RIO DE ORO
- See Spain

ROMANIA
- See Germany Regional Office - Gross-Gerau

RUSSIA
- See Moscow Regional Office - Moscow

RWANDA

Brussels (Office in Belgium)
Bia, S.A.
Rameistraat, 123
B-3090 - Overijse, Belgium
Telephone: (32-2) 6892811

ST. LUCIA

Miami (Office in U.S.A.)
Cummins Southeastern Power, Inc.
9900 N.W. 77 Court
Hialeah Gardens, FL 33016
Telephone: (305) 821-4200

ST. VINCENT

Miami (Office in U.S.A.)
Cummins Southeastern Power, Inc.
9900 N.W. 77 Court
Hialeah Gardens, FL 33016
Telephone: (305) 821-4200

SAN MARINO
- See Italy

SAO TOME AND PRINCIPE
- See North/West/East and Central Africa Regional Office - Daventry

SAUDI ARABIA

Al-Khobar
GCC Olayan
P.O. Box 356
Al-Khobar 31952
Saudi Arabia
Telephone: (966-3) 882-0888

SCOTLAND
- See United Kingdom

SENEGAL

Dakar
Matforce
B.P. 397
Dakar, Senegal
Location:
10 Avenue Faidherbe
Telephone: (221-8) 399500
Fax: (221-8) 399531/399550

Equipements et Services (Mining Only)
BP 15372-Fann
Dakar
Senegal
Contacts: Mr. Jean Smets
Tel: (221-8) 60 77 76 & 24 73 62
Fax: (221-8) 60 95 98

SEYCHELLES
- See North/West/East & Central Regional Office - Daventry

SIERRA LEONE
- See North/West/East and Central Africa Regional Office - Daventry

SINGAPORE

Singapore
Applied Diesel Sales & Service Pte Ltd
8 Tanjong Penjuru
Jurong Industrial Estate
Singapore 2260
Telephone: (65) 261-3555

SLOVAKIA
- See European Regional Office - Gross-Gerau

SOLOMON ISLANDS
- See South Pacific Regional Office - Melbourne

SOMALIA
- See East and Southern Africa Regional Office - Harare

SOUTH AFRICA

Johannesburg
Cummins Diesel South Africa Pty. Ltd.
Private Bag X7
Wendywood 2144
South Africa
Location:
13 Eastern Service Road
Kelvin View 2054
Telephone: (27-11) 321 8700

SOUTHWEST AFRICA

- See Namibia

SPAIN

Madrid

Cummins Ventas y
Servicio S.A.
Torrelaguna, 56
28027 Madrid, Spain
Telephone: (34-91) 367-2000/3672404

SPANISH GUINEA

- See Spain

SRI LANKA

Colombo

Trade Promoters Ltd
P.O. Box 321
69, Walukarama Road
Colombo 3
Sri Lanka
Telephone: (94-1) 573927, 574651,
575005

SUDAN

- See Middle East Regional Office - United Arab Emirates

SURINAM

Miami (Office in U.S.A.)

Cummins Southeastern Power, Inc.
9900 N.W. 77 Court
Hialeah Gardens, FL 33016
Telephone: (305) 821-4200

SWAZILAND

- See South Africa

SWEDEN

Stockholm

SMA Maskin AB
Aggelundavagen 7
S-17562 Jarfalla
Sweden
Telephone: (46-8) 56-222-500

SWITZERLAND

Regensdorf

Robert Aebi S.A.
Riedhofstrasse 100
8105 Regensdorf
Switzerland
Telephone: (41-1) 842-5111

SYRIA

Damascus

Puzant Yacoubian & Sons
P.O. Box 3617
Damascus, Syria
Location:
Abou Baker El Saddik Street
Kafar Sousse Square
Telephone: (963-11) 212-8600

TAHITI, ISLAND OF

- See French Polynesia

TAIWAN

Taipei (JV)

Cummins Power Service & Parts Corp.
No. 115, Wu Ko 1st Rd.,
Wu Ku, Industrial District
Taipei, Taiwan, R.O.C.
Telephone: (886-2) 2290-0331
Fax: (886-2) 2290-0393

TANZANIA

- See South African Regional Office - Kelvin

THAILAND

Bangkok

Diethelm & Company Ltd.
1696 New Petchburi Road
Bangkok 10310, Thailand
Telephone: (66-2) 254-4900

TOGO (and BENIN)

Lome

Togomat
B.P. 1641
Lome, Togo
Location:
Zone Industrielle CNPPME
Telephone: (228) 27-23-95

TONGA, ISLAND OF

- See South Pacific Regional Office - Melbourne

TRINIDAD and TOBAGO

Miami (Office in U.S.A.)

Cummins Southeastern Power Inc.
9900 N.W. 77 Court
Hialeah Gardens, FL 33016
Telephone: (305) 821-4200

TURKEY

Istanbul

Hamamcioglu Muesseseleri
Okul Cad. No. 9
81474 Orhanli - Tuzia
Istanbul, Turkey
Telephone: (90) 216-394-3210

UKRAINE

- See Moscow Regional Office - Moscow

UNITED ARAB EMIRATES

Dhabi

Cummins Diesel FZE
P.O. Box 17636
Units ZF516, Jebel Ali Free Zone
Dhabi,
United Arab Emirates
Telephone: (971) 4-883-8998

UNITED KINGDOM

Wellingborough

Cummins Diesel
Rutherford Drive
Park Farm South
Wellingborough
Northants NN8 2QH, England
Telephone: (44-1933) 334200

URUGUAY

Montevideo

Santaro S.A.
P.O. Box 379
Montevideo
Uruguay
Location:
Avenida Millan No. 2441
Telephone:(598-2) 293908

VATICAN CITY

- See Italy

VENEZUELA

Caracas

Sudimat
Apartado Postal 1322
Carmelitas
Caracas 1010
Venezuela
Location:
Final Avenida San Martin
Urb. la Quebradita
Caracas 1061
Telephone: (58-2) 442-6161/2647

VIETNAM

Hanoi

Diethelm & Co. Ltd. Engineering
Room No. 1, 2nd Floor
8 Trang Thi Street
Hanoi, Vietnam
Telephone: (84-4) 260-332, 244-394

Ho Chi Minh City

Diethelm & Co. Ltd. Engineering
3rd Floor, IBC Building
1 Me Linh Square
District 1
Ho Chi Minh City, Vietnam
Telephone: (84-8) 294-102, 294-103

WESTERN SAMOA

- See South Pacific Regional Office - Melbourne

YEMEN

Sana'a

Zubieri Trading Co.
P.O. Box 535
Sana'a, Yemen Arab Republic
Telephone: (967) 1-223943/224051

YUGOSLAVIA

Cummins Dizel Motori Doo
Prodaja I Servis
Autoput 22
11080 Zemun
Beograd
F.R. Yugoslavia
Telephone: (381-11) 314 9071

ZAMBIA

Ndola

Cummins Diesel Services (Zambia) Ltd.
P.O. Box 71501
Ndola, Zambia
Telephone: (260-2) 610729

ZIMBABWE

Harare

Cummins Zimbabwe (Pvt) Ltd.
P.O. Box ST363
Southerton
Harare, Zimbabwe
Location:
72 Birmingham Road
Southerton, Harare
Telephones: (263-4) 621871/2/3/4/5

Section TS - Troubleshooting Symptoms

Section Contents

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Troubleshooting Procedures and Techniques

General Information

This guide describes some typical engine operating problems, their causes, and some acceptable corrections to those problems. Unless noted otherwise, the problems listed are those which an operator can diagnose and repair.

⚠ WARNING ⚠

Performing troubleshooting procedures NOT outlined in this section can result in equipment damage or personal injury or death. Troubleshooting must be performed by trained, experienced technicians. Consult a Cummins Authorized Repair Location for diagnosis and repair beyond that which is outlined, and for symptoms not listed in this section. Before beginning any troubleshooting, refer to General Safety Instructions in Section i of this manual.

Follow the suggestions below for troubleshooting:

- Study the complaint thoroughly before acting
- Refer to the engine system diagrams
- Do the easiest and most logical things first
- Find and correct the cause of the complaint

Troubleshooting Symptoms Charts

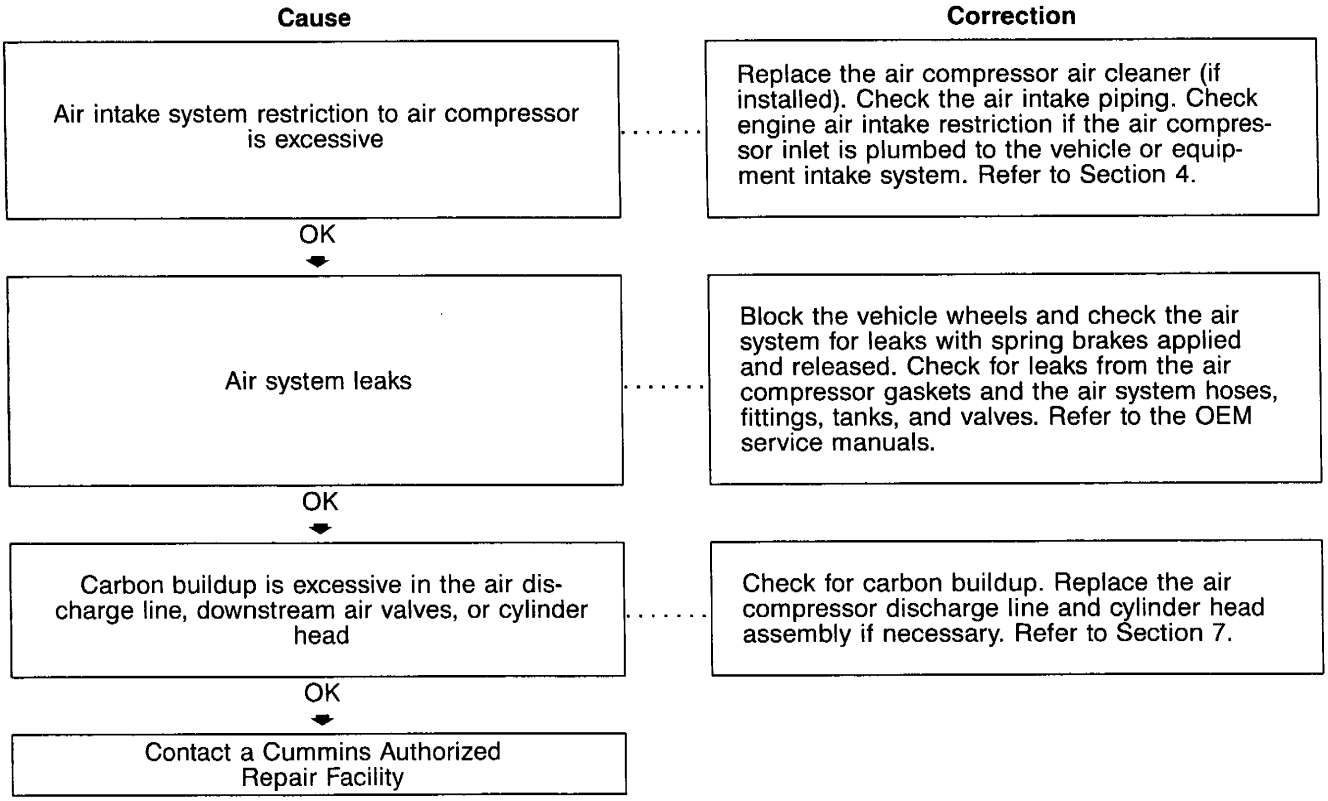
General Information

Use the charts on the following pages of this section to aid in diagnosing specific engine symptoms. Read each row of blocks from top to bottom. Follow through the chart to identify the corrective action.

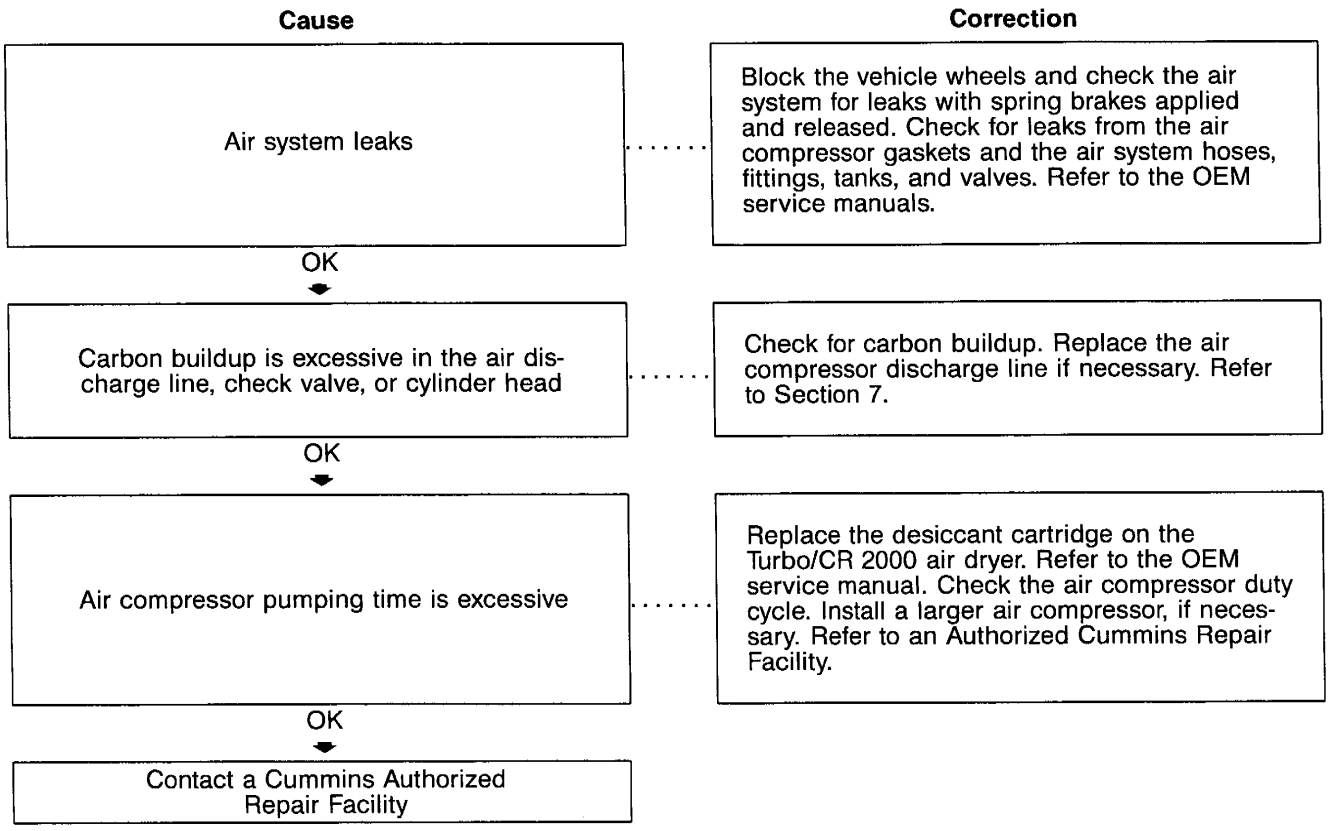
⚠ WARNING ⚠

Troubleshooting presents the risk of equipment damage, personal injury or death. Troubleshooting must be performed by trained, experienced technicians.

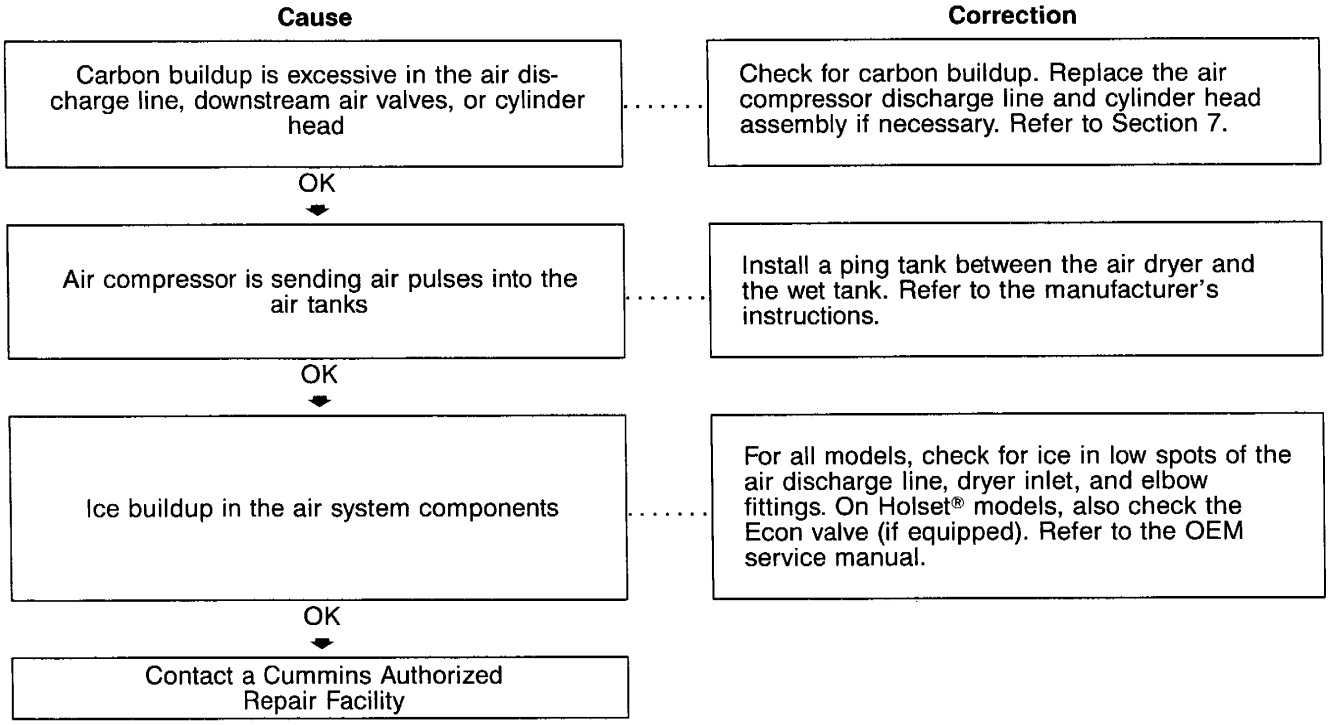
Air Compressor Air Pressure Rises Slowly



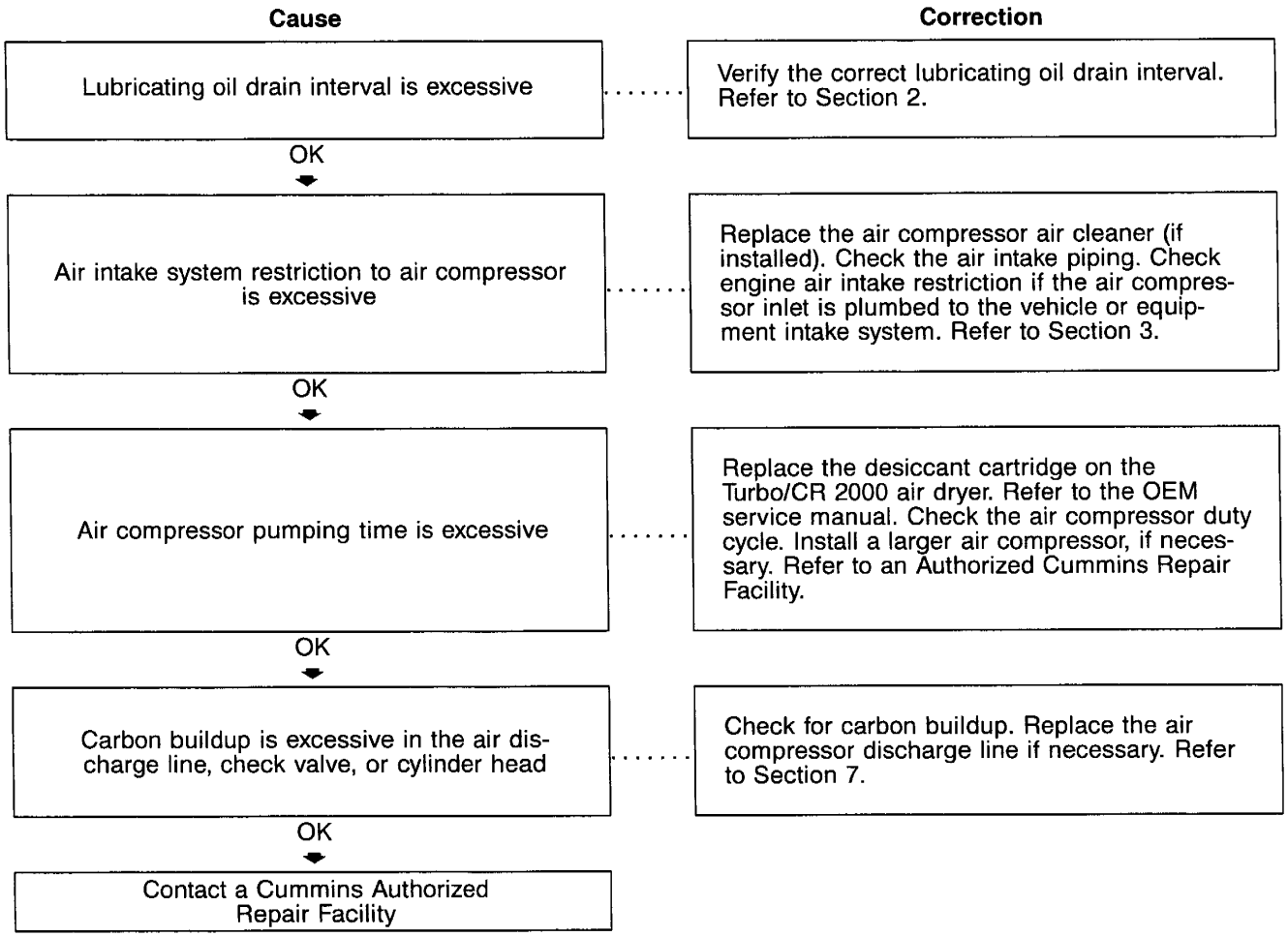
Air Compressor Cycles Frequently



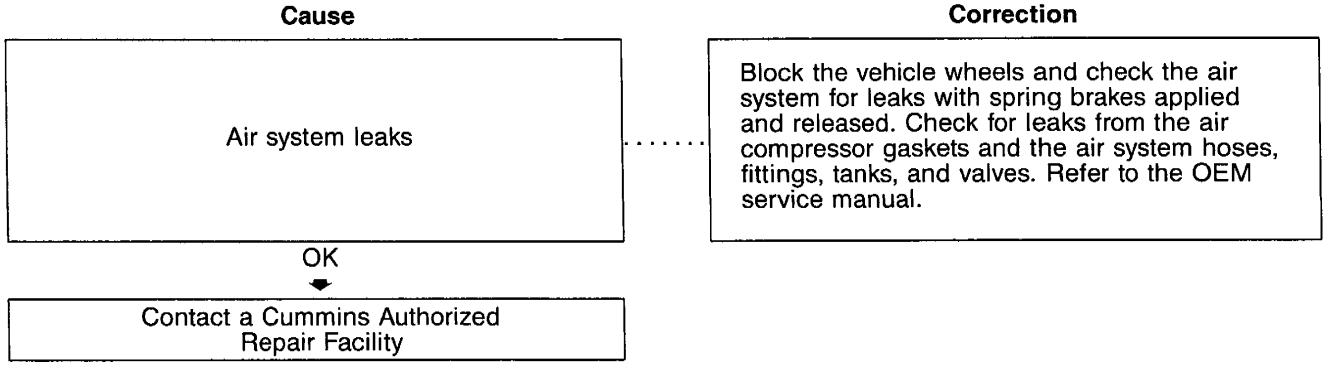
Air Compressor Noise is Excessive



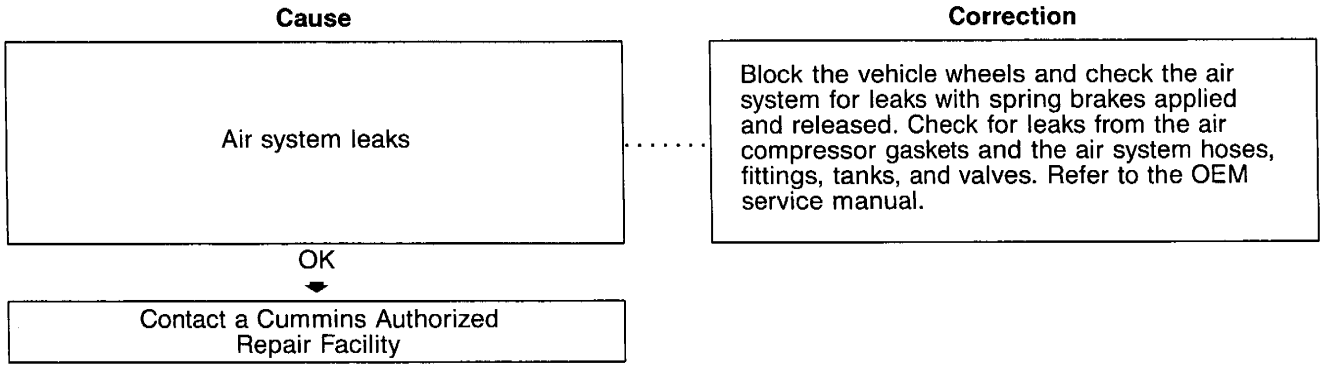
Air Compressor Pumping Excess Lubricating Oil into the Air System



Air Compressor Will Not Maintain Adequate Air Pressure (Not Pumping Continuously)



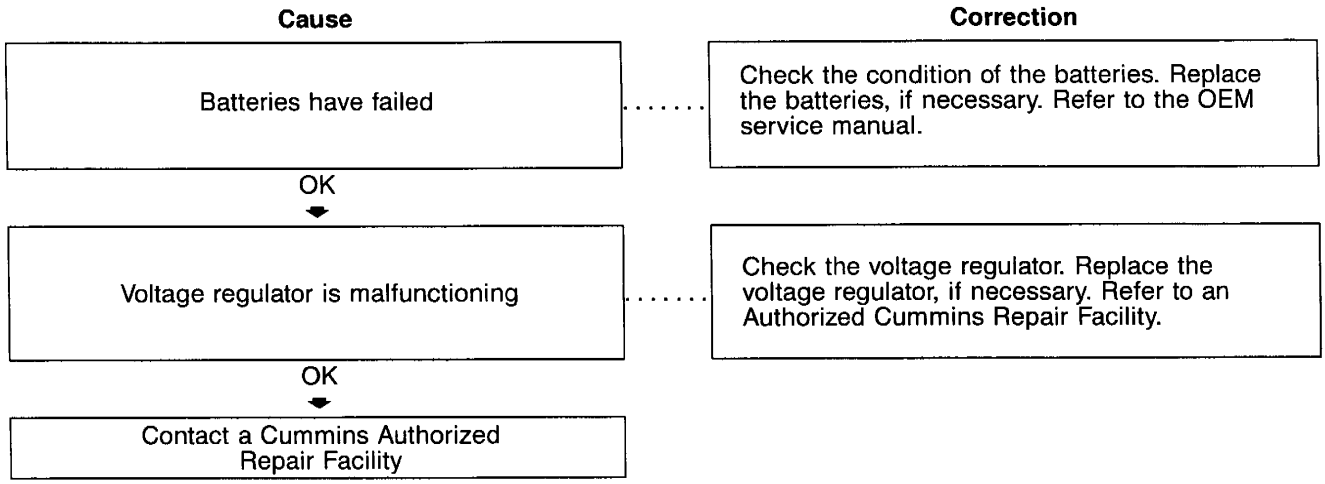
Air Compressor Will Not Stop Pumping



Alternator Not Charging or Insufficient Charging

Cause	Correction
Alternator pulley is loose on the shaft	Tighten the pulley. Refer to OEM service manual.
OK ↓	
Batteries have malfunctioned	Check the condition of the batteries. Replace the batteries, if necessary. Refer to OEM service manual.
OK ↓	
Battery cables or connections are loose, broken, or corroded (excessive resistance)	Check the battery cables and connections.
OK ↓	
Alternator is overloaded, or alternator capacity is below specification	Install an alternator with a higher capacity. Refer to the OEM service manual.
OK ↓	
Alternator or voltage regulator is malfunctioning	Test the alternator output. Replace the alternator or voltage regulator if necessary. Refer to the OEM service manual.
OK ↓	
Battery temperature is above specification	Position the batteries away from heat sources. Refer to the OEM service manual.
OK ↓	
Electrical system is "open" (blown fuses, broken wires, or loose connections)	Check the fuses, wires, and connections. Refer to the OEM service manual and the manufacturer's wiring diagram.
OK ↓	
Vehicle gauge is malfunctioning	Check the vehicle gauge. Refer to the OEM service manual.
OK ↓	
Contact a Cummins Authorized Repair Facility	

Alternator Overcharging



Coolant Contamination

Cause	Correction
Coolant is rusty and has debris	Drain and flush the cooling system. Fill with correct mixture of antifreeze and water. Refer to Section 7.
OK ↓	
Transmission oil cooler or torque converter cooler is leaking	Check the transmission oil cooler and torque converter cooler for coolant leaks. Refer to the OEM service manual.
OK ↓	
Lubricating oil cooler is leaking	Check the lubricating oil cooler for coolant leaks and cracks. Refer to Section 7.
OK ↓	
Cylinder head gasket is leaking	Check the cylinder head gasket. Refer to the OEM service manual.
OK ↓	
Contact a Cummins Authorized Repair Facility	

Coolant Loss – External

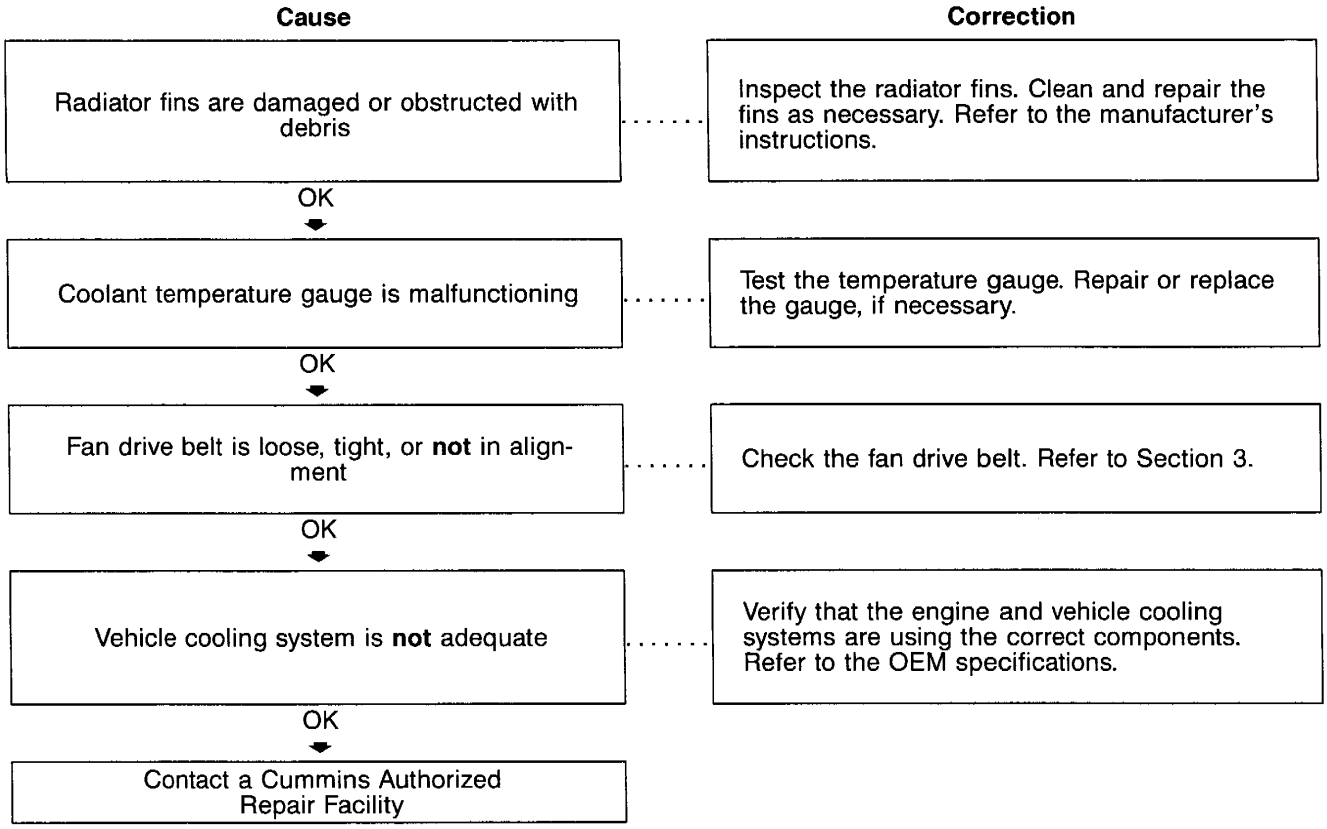
Cause	Correction
Coolant level is below specification	Inspect the engine and cooling system for external coolant leaks. Repair if necessary. Add coolant. Refer to the OEM service manual.
OK ↓	
External coolant leak	Inspect the engine for coolant leaking from hoses, draincocks, water manifold, jumper tubes, expansion and pipe plugs, fittings, radiator core, air compressor and cylinder head gaskets, lubricating oil cooler, water pump seal, cylinder block, and OEM-mounted components that have coolant flow.
OK ↓	
Radiator cap is **not** correct, is malfunctioning, or has low-pressure rating	Check the radiator pressure cap. Refer to the OEM service manual.
OK ↓	
Cooling system hose is collapsed, restricted, or leaking	Inspect the hoses. Refer to Section 7.
OK ↓	
Coolant fill line is restricted or obstructed	Check the coolant fill line for restrictions or obstructions. Refer to Section 7.
OK ↓	
Coolant is rusty and has debris	Drain and flush the cooling system. Fill with correct mixture of antifreeze and water. Refer to Section 7.
OK ↓	
Engine is overheating	Refer to the Coolant Temperature Above Normal symptom tree.
OK ↓	
Contact a Cummins Authorized Repair Facility	

Coolant Temperature Above Normal – Gradual Overheat

Cause	Correction
Charge air cooler fins, radiator fins, or air conditioner condenser fins are damaged or obstructed with debris	Inspect the charge air cooler, air conditioner condenser, and radiator fins. Clean, if necessary. Refer to Section 4 and the OEM service manual.
OK ⬇	
Cold weather radiator cover or winterfront is closed	Open the cold weather radiator cover or the winterfront. Maintain a minimum of 784 cm^2 [122 in^2], or approximately 28 x 28 cm [11 x 11 in], of opening at all times. Refer to Section 1.
OK ⬇	
Coolant level is below specification	Inspect the engine and cooling system for external coolant leaks. Repair if necessary. Add coolant. Refer to Section 7.
OK ⬇	
Fan shroud is damaged or missing, or the air recirculation baffles are damaged or missing	Inspect the shroud and the recirculation baffles. Repair, replace, or install, if necessary. Refer to the OEM service manual.
OK ⬇	
Lubricating oil is contaminated with coolant or fuel	Contact a Cummins Authorized Repair Facility.
OK ⬇	
Cooling system hose is collapsed, restricted, or leaking	Inspect the hoses. Refer to Section 7.
OK ⬇	
Coolant mixture of antifreeze and water is **not** correct	Verify the concentration of antifreeze in the coolant. Add antifreeze or water to correct the concentration. Refer to Section 5 and Section V.
OK ⬇	
Lubricating oil level is above or below specification	Check the oil level. Add or drain oil, if necessary. Refer to Section 3. Check the dipstick calibration.
OK ⬇	

(Continued)

Coolant Temperature Above Normal – Gradual Overheat (Continued)



Coolant Temperature is Above Normal – Sudden Overheat

Cause	Correction
Coolant level is below specification	Inspect the engine and cooling system for external coolant leaks. Repair if necessary. Add coolant. Refer to Section 3.
OK ↓	
Air in the cooling system	Inspect and vent the cooling system. Refer to Section 1.
OK ↓	
Fan drive belt is broken	Check the fan drive belt. Replace the belt, if necessary. Refer to Section A.
OK ↓	
Radiator cap is **not** correct, is malfunctioning, or has low-pressure rating	Check the radiator pressure cap. Refer to the OEM service manual.
OK ↓	
Cooling system hose is collapsed, restricted, or leaking	Inspect the hoses. Refer to Section 7.
OK ↓	
Coolant temperature gauge is malfunctioning	Test the temperature gauge. Repair or replace the gauge, if necessary.
OK ↓	
Charge air cooler fins, radiator fins, or air conditioner condenser fins are damaged or obstructed with debris	Inspect the charge air cooler, air conditioner condenser, and radiator fins. Clean, if necessary. Refer to Section 4 and the OEM service manual.
OK ↓	
Cold weather radiator cover or winterfront is closed	Open the cold weather radiator cover or the winterfront. Maintain a minimum of 784 cm^2 [122 in^2], or approximately 28 x 28 cm [11 x 11 in], of opening at all times. Refer to Section 1.
OK ↓	
Contact a Cummins Authorized Repair Facility	

Coolant Temperature is Below Normal

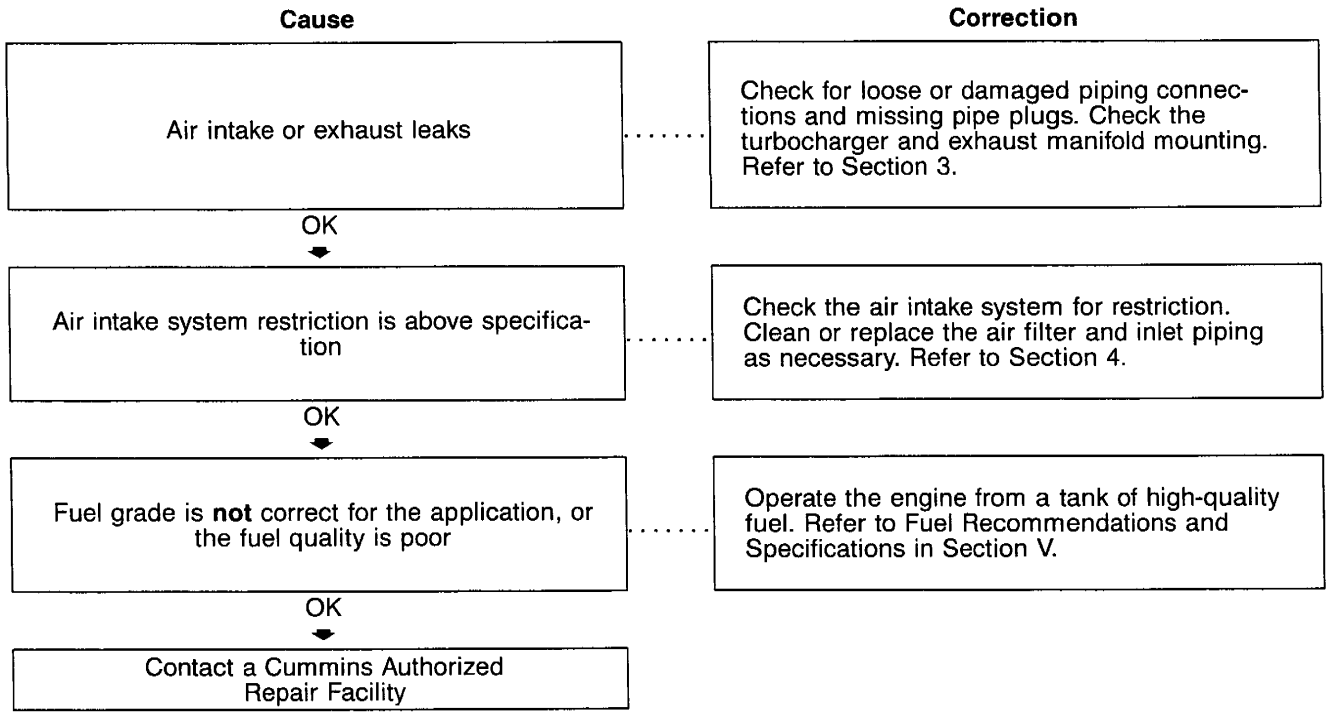
Cause	Correction
Coolant temperature gauge or sensor is malfunctioning	Test the gauge and the sensor. Repair or replace, if necessary. Refer to OEM service manual.
OK ↓	
Engine is operating at low ambient temperature	Check the winterfront, shutters, and under-the-hood air. Use under-the-hood intake air in cold weather. Refer to Cold Weather Operation, Bulletin 3387266, and Section 1.
OK ↓	
Fan drive or fan controls are malfunctioning	Check the fan drive and controls. Refer to the OEM service manual.
OK ↓	
Coolant temperature gauge is malfunctioning	Test the temperature gauge. Repair or replace the gauge, if necessary.
OK ↓	
Thermostat is **not** correct or is malfunctioning	Check the thermostat for the correct part number and for correct operation. Contact a Cummins Authorized Repair Facility.
OK ↓	
Contact a Cummins Authorized Repair Facility	

Engine Acceleration or Response Poor

Cause	Correction
Operator technique is **not** correct	Refer to Section 1, Operating Instructions.
OK ↓	
Fuel level is low in the tank	Fill the supply tank. Refer to the OEM service manual.
OK ↓	
Vehicle parasitics are excessive	Check the vehicle brakes for dragging, transmission malfunction, cooling fan operation cycle time, and engine-driven units. Refer to the OEM service manual.
OK ↓	
Clutch is malfunctioning or is **not** correct	Compare the drivetrain specifications to Cummins recommendations. Check the clutch for correct operation. Refer to the OEM service manual.
OK ↓	
Drivetrain is **not** correctly matched to the engine	Check for correct gearing and drivetrain components. Refer to the OEM vehicle specifications.
OK ↓	
Fuel leak	Check the fuel lines, fuel connections, and fuel filters for leaks. Check the fuel lines to the supply tanks. Refer to the OEM service manual.
OK ↓	
Intake manifold air temperature is above specification	Refer to the Intake Manifold Air Temperature Above Specification symptom tree.
OK ↓	
Fuel supply line or passage restriction between the fuel pump and the injectors	Check the fuel supply line or passage for sharp bends or restriction.
OK ↓	
Charge air cooler is restricted or leaking	Inspect the charge air cooler for air restrictions or leaks. Refer to Section 4.
OK ↓	

(Continued)

Engine Acceleration or Response Poor (Continued)

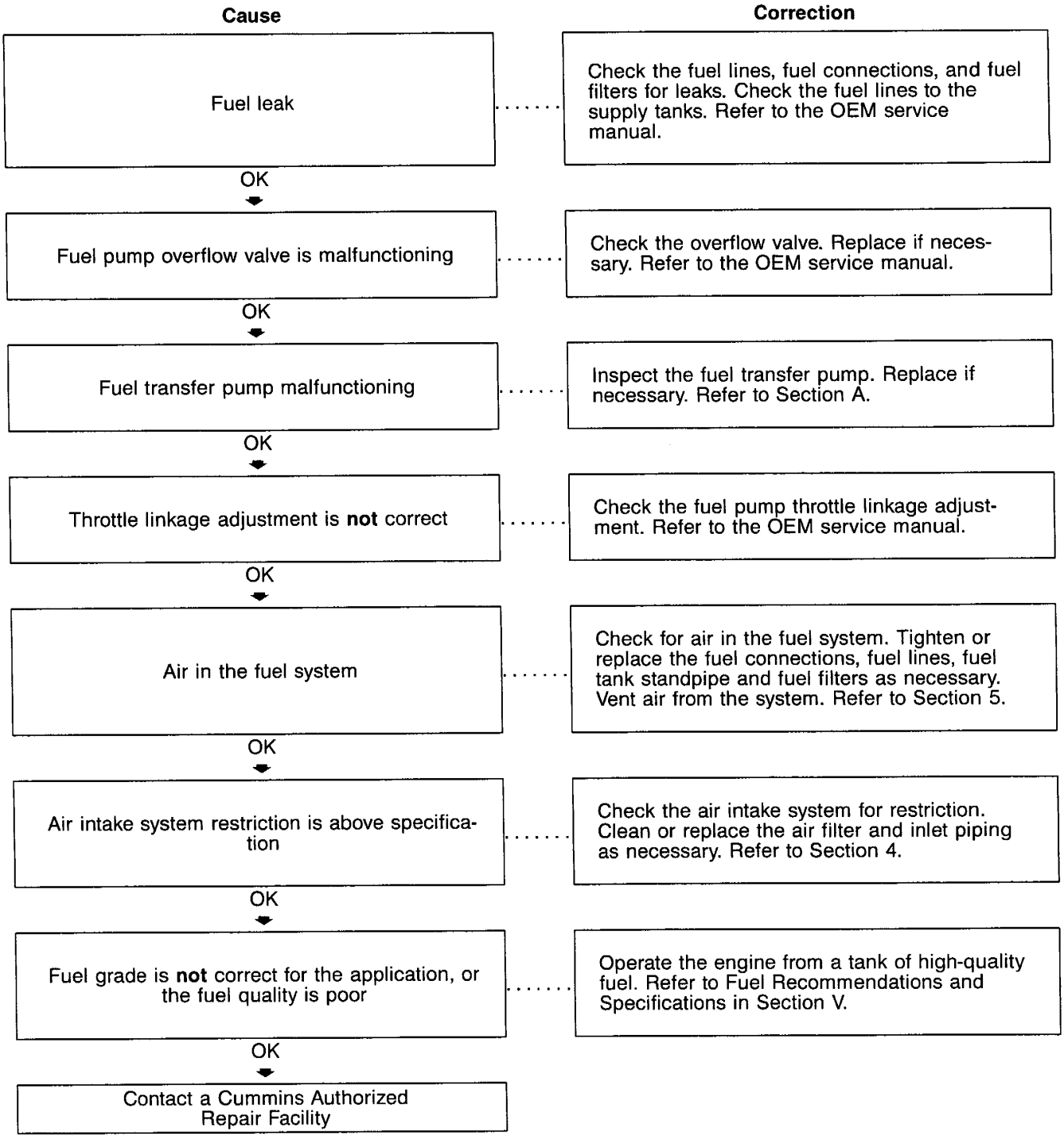


Engine Difficult to Start or Will Not Start (Exhaust Smoke)

Cause	Correction
Starting procedure is **not** correct	Verify the correct starting procedure. Refer to Section 1.
OK ↓	
Fuel level is low in the tank	Fill the supply tank. Refer to the OEM service manual.
OK ↓	
Starting aid, if necessary for cold weather, is malfunctioning	Check for correct operation of the cold weather starting aid. Refer to Cold Weather Starting Aids in Section 1. Refer to the manufacturer's instructions.
OK ↓	
Engine block heater is malfunctioning (if equipped)	Check the electrical sources and wiring to the cylinder block heater. Replace the block heater, if necessary. Refer to the OEM service manual.
OK ↓	
Fuel heater is malfunctioning (if equipped)	Check the fuel heater and replace, if necessary. Refer to the manufacturer's instructions.
OK ↓	
Battery voltage is low	Check the batteries and the unswitched battery supply circuit. Refer to the OEM service manual.
OK ↓	
Keyswitch circuit is malfunctioning	Check the vehicle keyswitch circuit. Refer to the OEM service manual.
OK ↓	
Engine cranking speed is too slow	If the cranking speed is slower than 150 rpm, refer to the Engine Will Not Crank or Cranks Slowly symptom tree.
OK ↓	
Vehicle parasitics are excessive	Check the vehicle brakes for dragging, transmission malfunction, cooling fan operation cycle time, and engine-driven units. Refer to the OEM service manual.
OK ↓	

(Continued)

Engine Difficult to Start or Will Not Start (Exhaust Smoke) (Continued)

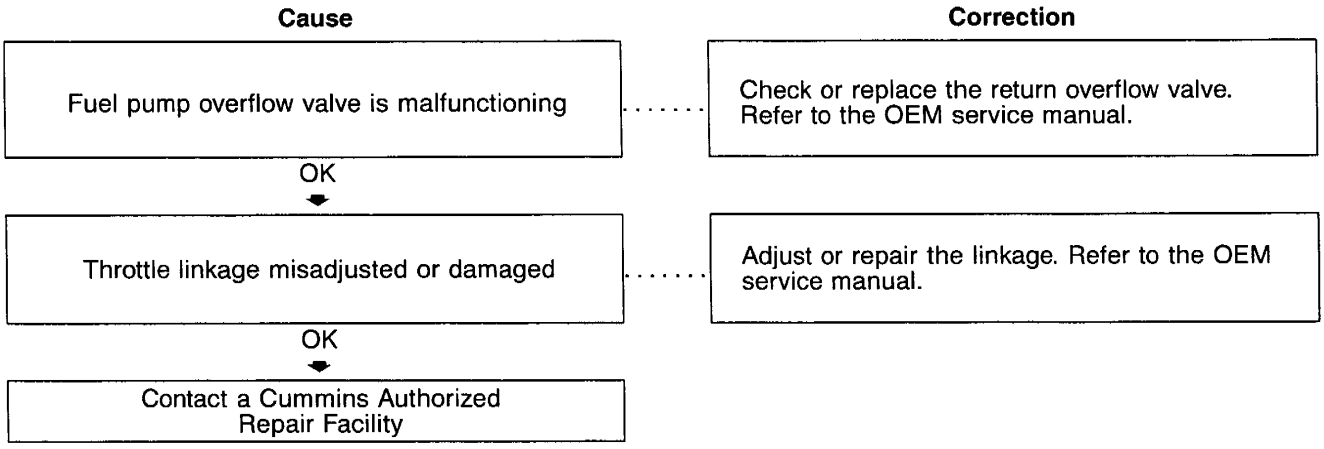


Engine Difficult to Start or Will Not Start (No Exhaust Smoke)

Cause	Correction
Starting procedure is **not** correct	Verify the correct starting procedure. Refer to Section 1.
OK ↓	
Fuel level is low in the tank	Fill the supply tank. Refer to the OEM service manual.
OK ↓	
Fuel shutoff valve is malfunctioning	Check for loose wires and verify that the fuel shutoff valve is functioning. Check to be sure manual shutoff lever is in the run position. Refer to the OEM service manual.
OK ↓	
OEM engine protection system is malfunctioning	Isolate the OEM engine protection system. Follow the OEM service manuals to check for a malfunction.
OK ↓	
Battery voltage is low	Check the batteries and the unswitched battery supply circuit. Refer to the OEM service manual.
OK ↓	
Keyswitch circuit is malfunctioning	Check the vehicle keyswitch circuit. Refer to the OEM service manual.
OK ↓	
Air in the fuel system	Check for air in the fuel system. Tighten or replace the fuel connections, fuel lines, fuel tank standpipe and fuel filters as necessary. Vent air from the system. Refer to Section 5.
OK ↓	
Fuel transfer pump malfunctioning	Inspect the fuel transfer pump. Replace if necessary. Refer to Section A.
OK ↓	
Fuel drain backup	Verify the fuel return line is plumbed to the bottom of the fuel tank.
OK ↓	

(Continued)

Engine Difficult to Start or Will Not Start (No Exhaust Smoke) (Continued)

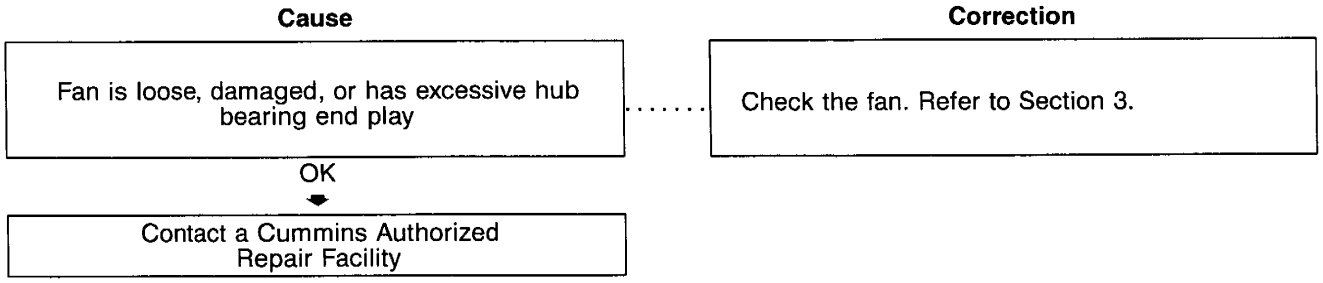


Engine Noise Excessive

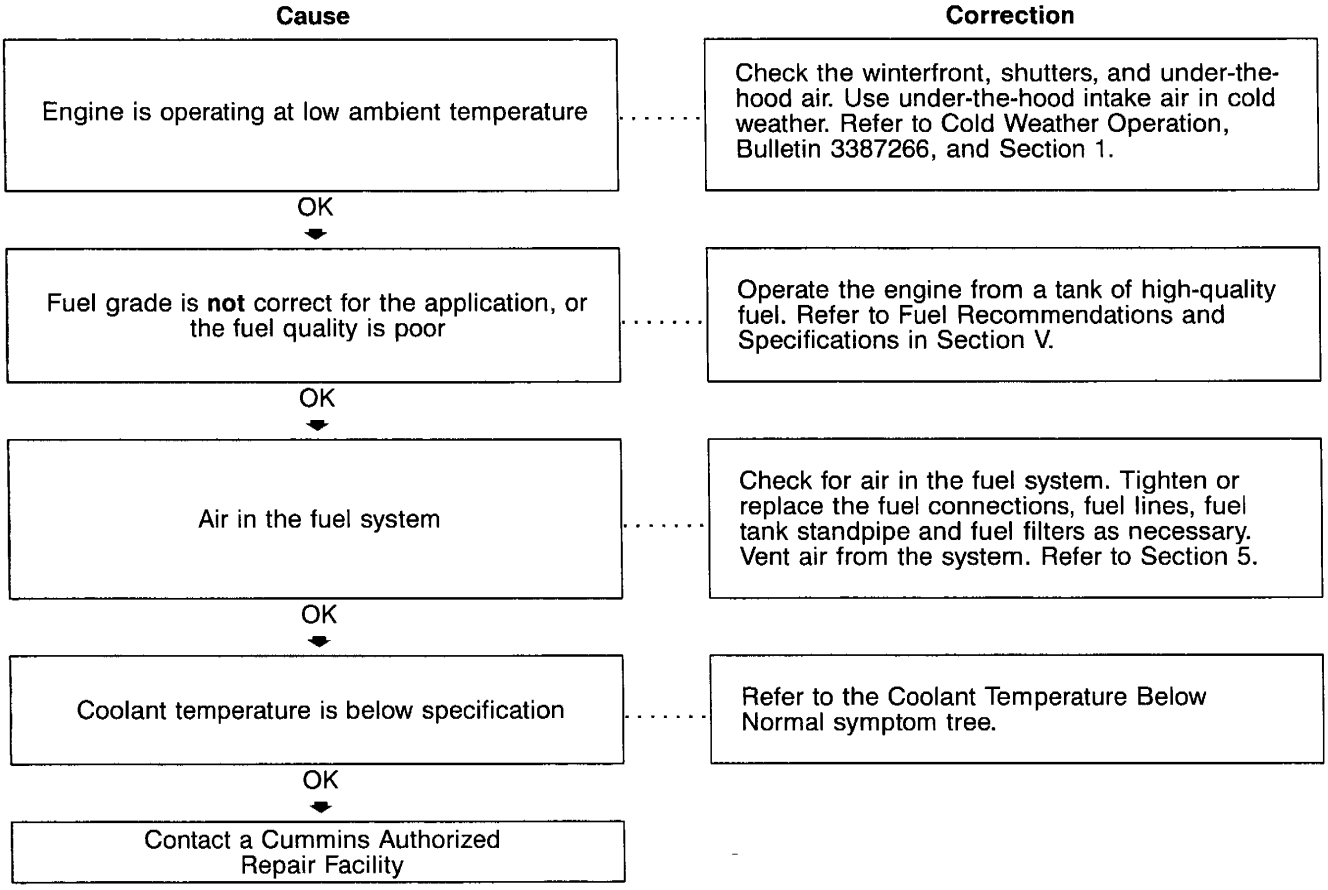
Cause	Correction
Fan drive belt is loose, tight, or **not** in alignment	Check the fan drive belt. Refer to Section 3.
OK ↓	
Lubricating oil is thin or diluted	Refer to the Lubricating Oil Specifications in Section V.
OK ↓	
Vibration damper is damaged	Inspect the vibration damper. Refer to Section 7.
OK ↓	
Air intake or exhaust leaks	Check for loose or damaged piping connections and missing pipe plugs. Check the turbocharger and exhaust manifold mounting. Refer to Section 3.
OK ↓	
Air intake or exhaust piping is contacting the chassis or cab	Inspect the air piping, chassis, and cab for contact points. Refer to the OEM service manual.
OK ↓	
Air intake system restriction is above specification	Check the air intake system for restriction. Clean or replace the air filter and inlet piping as necessary. Refer to Section 4.
OK ↓	
Coolant temperature is above specification	Refer to the Coolant Temperature is Above Normal - Sudden Overheat or the Coolant Temperature is Above Normal - Gradual Overheat symptom tree.
OK ↓	
Engine mounts are worn, damaged, or **not** correct	Check the engine mounts. Refer to the OEM service manual.
OK ↓	
Fan clutch, hydraulic pump, or freon compressor noise is excessive	Isolate each component, and check for noise. Refer to the OEM service manual.
OK ↓	

(Continued)

Engine Noise Excessive (Continued)



Engine Noise Excessive — Combustion Knocks



Engine Power Output Low

Cause	Correction
Fuel level is low in the tank	Fill the supply tank. Refer to the OEM service manual.
OK ↓	
Engine is operating above recommended altitude	Engine power decreases above recommended altitude. Refer to the Engine Data Sheet for specifications.
OK ↓	
Throttle linkage adjustment is **not** correct	Check the fuel pump throttle linkage adjustment. Refer to the OEM service manual.
OK ↓	
Fuel shutoff lever (mechanical) partially engaged	Check or replace shutoff lever in run position.
OK ↓	
Intake and exhaust system restricted	Check the intake and exhaust systems for restrictions. Inspect the intake air filter and replace as necessary.
OK ↓	
Air intake system restriction is above specification	Check the air intake system for restriction. Clean or replace the air filter and inlet piping as necessary. Refer to Section 4.
OK ↓	
Air intake or exhaust leaks	Check for loose or damaged piping connections and missing pipe plugs. Check the turbocharger and exhaust manifold mounting. Refer to Section 3.
OK ↓	
Air leak between the turbocharger and the intake manifold	Check for leaks in the air crossover tube, charge air cooler connections, hoses, or through holes in the manifold cover and repair or replace if necessary. Refer to the OEM service manual.
OK ↓	

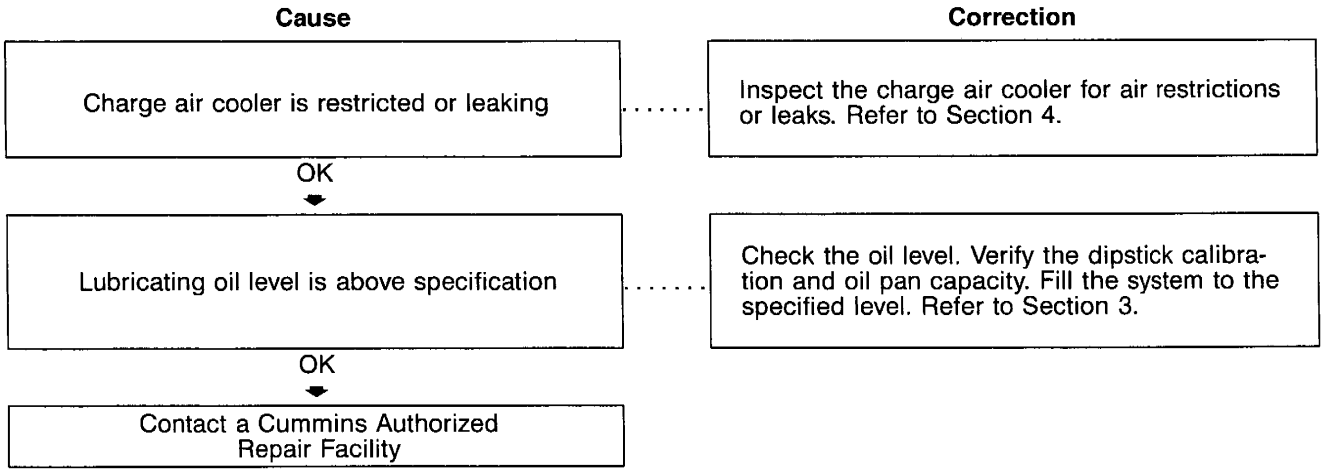
(Continued)

Engine Power Output Low (Continued)

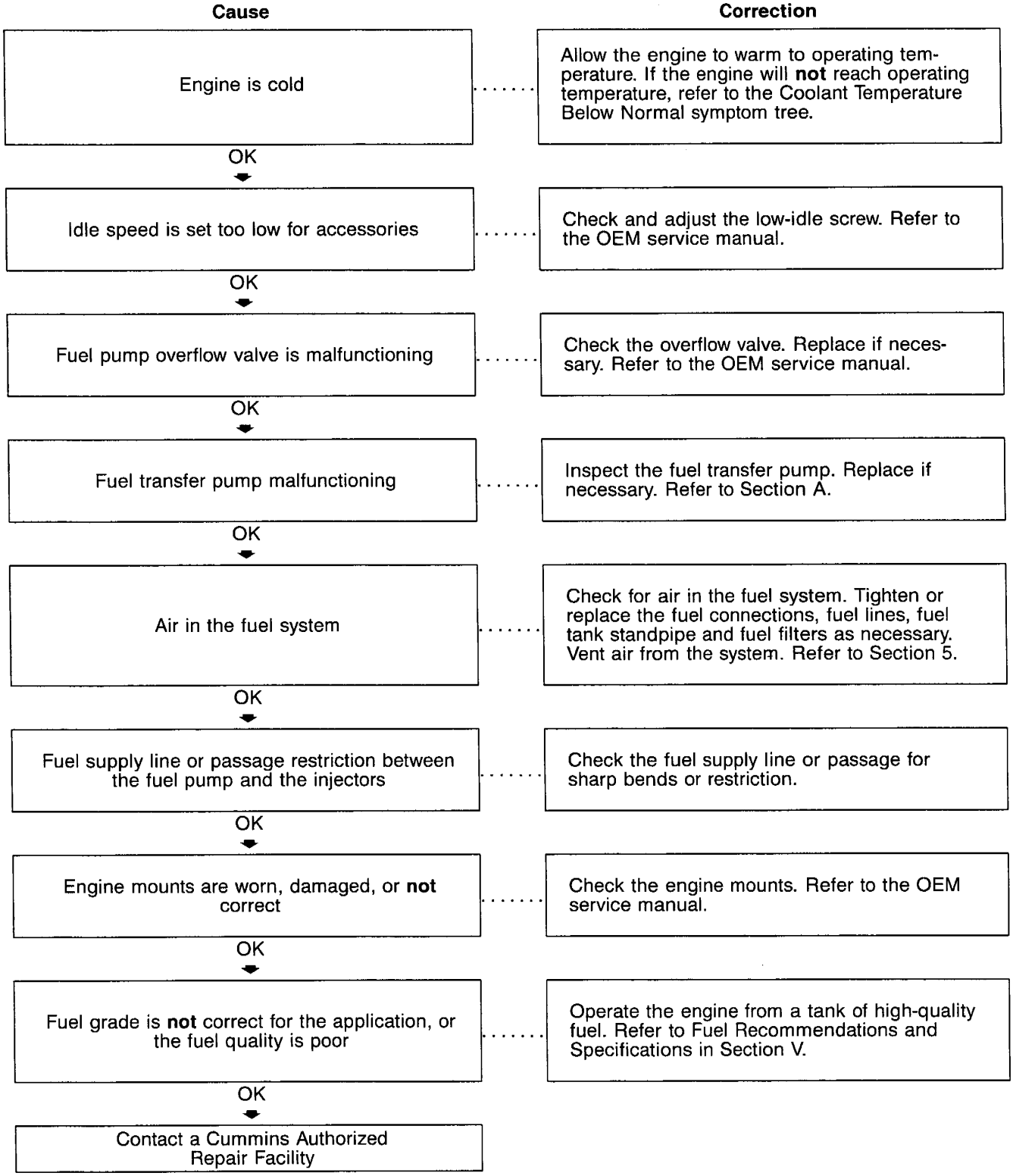
Cause	Correction
Fuel leak	Check the fuel lines, fuel connections, and fuel filters for leaks. Check the fuel lines to the supply tanks. Refer to the OEM service manual.
OK ↓	
Fuel quality is poor	Operate the engine from a temporary tank of number 2 diesel fuel. Refer to the OEM service manual.
OK ↓	
Fuel supply is **not** adequate	Check the flow through the filter to locate the source of the restriction. Refer to the OEM service manual.
OK ↓	
Fuel return restriction excessive	Inspect the fuel return lines for restrictions. Refer to the OEM service manual.
OK ↓	
Fuel pump overflow valve is malfunctioning	Check the overflow valve. Replace if necessary. Refer to the OEM service manual.
OK ↓	
Fuel lift pump is malfunctioning	Check the fuel lift pump for correct operation. Check the pump output pressure. Replace the fuel lift pump if necessary. Refer to Section A.
OK ↓	
Air in the fuel system	Check for air in the fuel system. Tighten or replace the fuel connections, fuel lines, fuel tank standpipe and fuel filters as necessary. Vent air from the system. Refer to Section 5.
OK ↓	
Vehicle parasitics are excessive	Check the vehicle brakes for dragging, transmission malfunction, cooling fan operation cycle time, and engine-driven units. Refer to the OEM service manual.
OK ↓	

(Continued)

Engine Power Output Low (Continued)



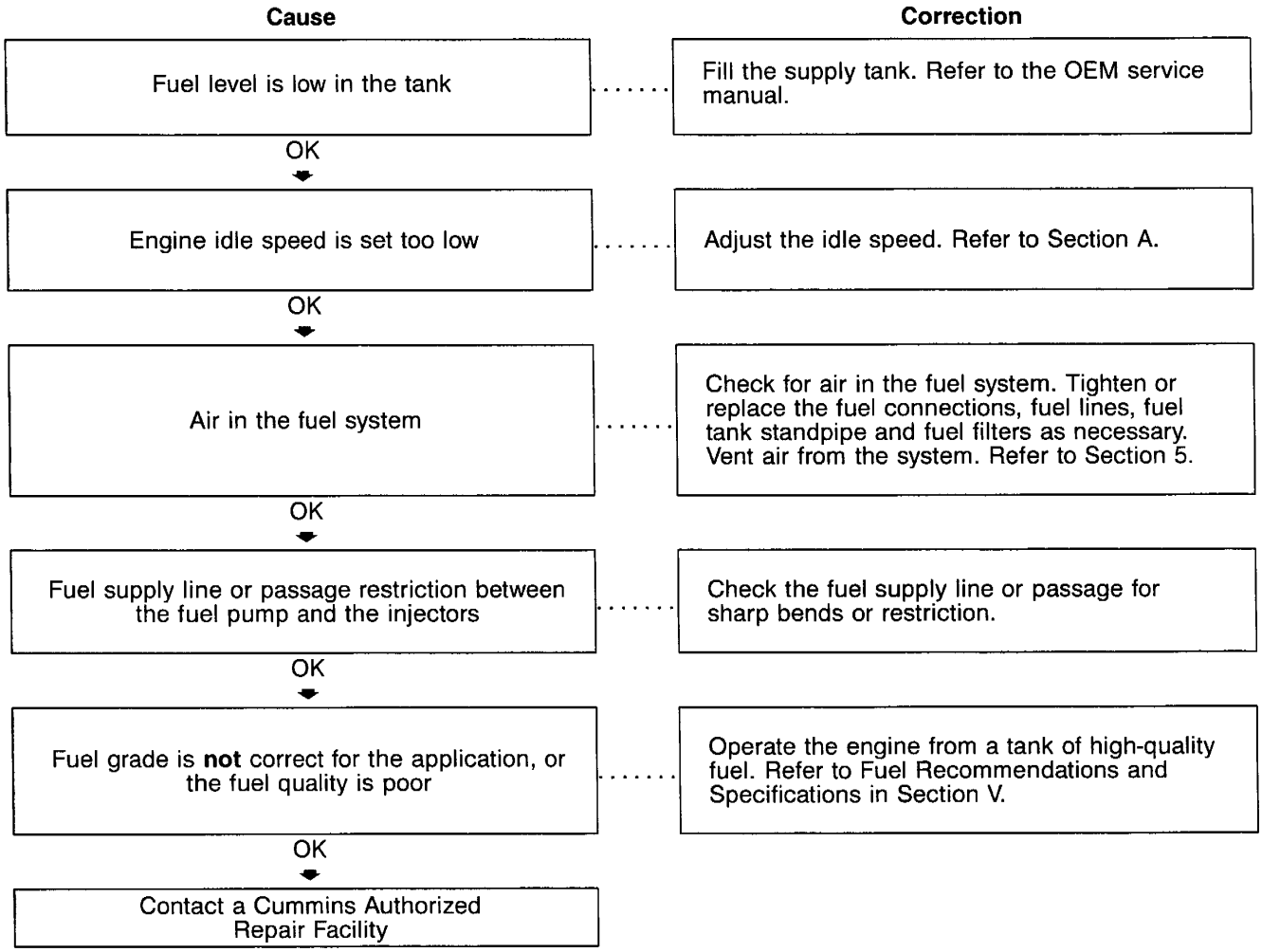
Engine Runs Rough at Idle



Engine Runs Rough or Misfires

Cause	Correction
Engine is cold	Allow the engine to warm to operating temperature. If the engine will **not** reach operating temperature, refer to the Coolant Temperature Below Normal symptom tree.
OK ↓	
Air in the fuel system	Check for air in the fuel system. Tighten or replace the fuel connections, fuel lines, fuel tank standpipe and fuel filters as necessary. Vent air from the system. Refer to Section 5.
OK ↓	
Fuel supply line or passage restriction between the fuel pump and the injectors	Check the fuel supply line or passage for sharp bends or restriction.
OK ↓	
Fuel grade is **not** correct for the application, or the fuel quality is poor	Operate the engine from a tank of high-quality fuel. Refer to Fuel Recommendations and Specifications in Section V.
OK ↓	
Fuel leak	Check the fuel lines, fuel connections, and fuel filters for leaks. Refer to the OEM service manual.
OK ↓	
Fuel pump overflow valve is malfunctioning	Check the overflow valve. Replace if necessary. Refer to the OEM service manual.
OK ↓	
Fuel lift pump is malfunctioning	Check the fuel lift pump for correct operation. Check the pump output pressure. Replace the fuel lift pump if necessary. Refer to Section A.
OK ↓	
Engine mounts are worn, damaged, or **not** correct	Check the engine mounts. Refer to the OEM service manual.
OK ↓	
Contact a Cummins Authorized Repair Facility	

Engine Speed Surges at Low or High Idle



Engine Speed Surges Under Load or in Operating Range

Cause	Correction
Fuel level is low in the tank	Fill the supply tank. Refer to the OEM service manual.
OK ↓	
Air in the fuel system	Check for air in the fuel system. Tighten or replace the fuel connections, fuel lines, fuel tank standpipe and fuel filters as necessary. Vent air from the system. Refer to Section 5.
OK ↓	
Idling with excessive load	Use the PTO feature for loaded conditions at low engine speeds. Refer to Section 1.
OK ↓	
Vehicle parasitics are excessive	Check the vehicle brakes for dragging, transmission malfunction, cooling fan operation cycle time, and engine-driven units. Refer to the OEM service manual.
OK ↓	
Clutch is malfunctioning or is **not** correct	Compare the drivetrain specifications to Cummins recommendations. Check the clutch for correct operation. Refer to the OEM service manual.
OK ↓	
Fuel grade is **not** correct for the application, or the fuel quality is poor	Operate the engine from a tank of high-quality fuel. Refer to Fuel Recommendations and Specifications in Section V.
OK ↓	
Contact a Cummins Authorized Repair Facility	

Engine Starts But Will Not Keep Running

Cause	Correction
Fuel level is low in the tank	Fill the supply tank. Refer to the OEM service manual.
OK	
Idle speed is set too low for accessories	Check and adjust the low-idle screw. Refer to Section A.
OK	
Engine-driven units are engaged	Disengage engine-driven units.
OK	
Fuel shutoff lever (mechanical) partially engaged	Check for correct solenoid operation. Refer to the OEM service manual.
OK	
Air in the fuel system	Check for air in the fuel system. Tighten or replace the fuel connections, fuel lines, fuel tank standpipe and fuel filters as necessary. Vent air from the system. Refer to Section 5.
OK	
Fuel filter or fuel suction line is restricted	Replace the fuel filter. Refer to the OEM service manual.
OK	
Fuel supply line or passage restriction between the fuel pump and the injectors	Check the fuel supply line or passage for sharp bends or restriction.
OK	
Fuel grade is **not** correct for the application, or the fuel quality is poor	Operate the engine from a tank of high-quality fuel. Refer to Fuel Recommendations and Specifications in Section V.
OK	
Contact a Cummins Authorized Repair Facility	

Engine Vibration Excessive

Cause	Correction
Engine **not** running smoothly	Refer to the Engine Runs Rough or Misfires symptom tree.
OK ↓	
Belt-driven accessories are malfunctioning	Check the fan hub, alternator, freon compressor, and hydraulic pump for interference. Isolate belt-driven accessories, and check for vibration. Refer to Section 3 and Section 4.
OK ↓	
Air compressor pumping time is excessive	Refer to the Air Compressor Cycles Frequently symptom tree.
OK ↓	
Engine mounts are worn, damaged, or **not** correct	Check the engine mounts. Refer to the OEM service manual.
OK ↓	
Fan is loose, damaged, or has excessive hub bearing end play	Check the fan. Refer to Section 3.
OK ↓	
Engine is misfiring	Refer to the Engine Runs Rough or Misfires symptom tree.
OK ↓	
Vibration damper is damaged	Inspect the vibration damper. Refer to Section 7.
OK ↓	
Alternator bearing worn or damaged	Clean and replace the alternator. Refer to the OEM service manual.
OK ↓	
Contact a Cummins Authorized Repair Facility	

Engine Will Not Crank or Cranks Slowly (Air Starter)

Cause	Correction
Air pressure is low in the air tanks	Increase air pressure with an external air source. Refer to the OEM service manual.
OK	
Engine-driven units are engaged	Disengage engine-driven units.
OK	
Lubricating oil level is above specification	Check the oil level. Verify the dipstick calibration and oil pan capacity. Fill the system to the specified level. Refer to Section 3.
OK	
Lubricating oil does **not** meet specifications for operating conditions	Change the oil and filters. Refer to Section 4. Use the oil recommended in Section V.
OK	
Electrical system is "open" (blown fuses, broken wires, or loose connections)	Check the fuses, wires, and connections. Refer to the OEM service manual and manufacturer's wiring diagram.
OK	
Battery charge is low	Check battery. If the battery is low, check the alternator for proper charging. Charge the battery, and replace if necessary. Refer to the OEM service manual.
OK	
Keyswitch circuit is malfunctioning	Check the vehicle keyswitch circuit. Refer to the OEM service manual.
OK	
Starter solenoid is **not** receiving voltage	Check the battery supply to the starter solenoid. Refer to the OEM service manual.
OK	

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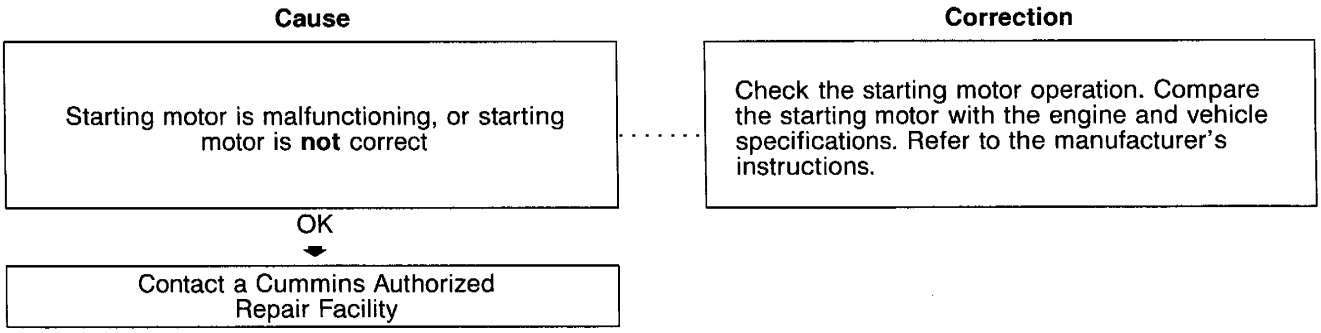
Engine Will Not Crank or Cranks Slowly (Air Starter) (Continued)



Engine Will Not Crank or Cranks Slowly (Electric Starter)

Cause	Correction
Batteries are cold	Check the battery heater. Refer to the manufacturer's instructions.
OK ↓	
Battery cables or connections are loose, broken, or corroded (excessive resistance)	Check the battery cables and connections.
OK ↓	
Electrical system is "open" (blown fuses, broken wires, or loose connections)	Check the fuses, wires, and connections. Refer to the OEM service manual and manufacturer's wiring diagram.
OK ↓	
Battery charge is low	Check battery. If the battery is low, check the alternator for proper charging. Charge the battery, and replace if necessary. Refer to the OEM service manual.
OK ↓	
Keyswitch circuit is malfunctioning	Check the vehicle keyswitch circuit. Refer to the OEM service manual.
OK ↓	
Starter solenoid is **not** receiving voltage	Check the battery supply to the starter solenoid. Refer to the OEM service manual.
OK ↓	
Engine-driven units are engaged	Disengage engine-driven units.
OK ↓	
Lubricating oil level is above specification	Check the oil level. Verify the dipstick calibration and oil pan capacity. Fill the system to the specified level. Refer to Section 3.
OK ↓	

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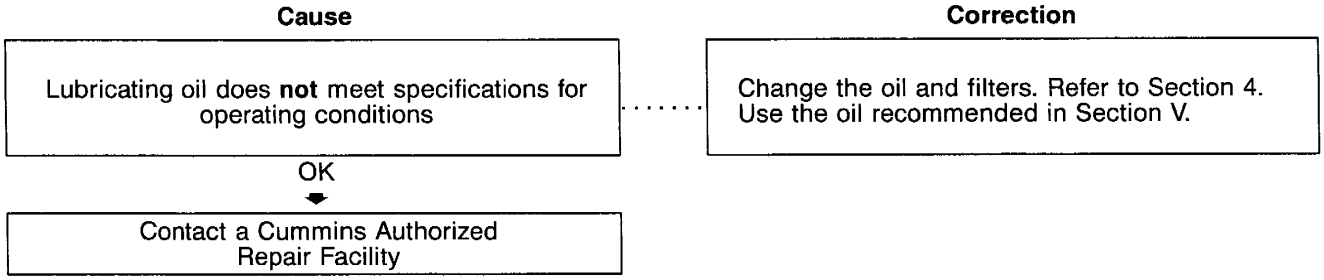
Engine Will Not Crank or Cranks Slowly (Electric Starter) (Continued)



Engine Will Not Reach Rated Speed (RPM)

Cause	Correction
Vehicle speed is too low for adequate cooling with high engine load	Reduce the engine load. Increase the engine (fan) rpm by downshifting.
OK ↓	
Throttle linkage adjustment is **not** correct	Check throttle linkage adjustment. Refer to the OEM service manual.
OK ↓	
Tachometer is **not** calibrated or is malfunctioning	Compare the tachometer reading with a handheld tachometer or an electronic service tool reading. Calibrate or replace the tachometer as necessary. Refer to the OEM service manual.
OK ↓	
Air-fuel tube leaking, wastegate diaphragm ruptured, or wastegate plumbing damaged	Tighten the fittings, repair plumbing, replace wastegate diaphragm. Refer to the OEM service manual or an Authorized Cummins Repair Facility.
OK ↓	
Charge air cooler restricted (if equipped)	Inspect the air cooler for internal and external restrictions. Replace the restricted cooler if necessary. Refer to the OEM service manual.
OK ↓	
Fuel supply is **not** adequate	Check the flow through the filter to locate the source of the restriction. Refer to the OEM service manual.
OK ↓	
Fuel shutoff lever (mechanical) partially engaged	Make sure fuel shutoff lever is in the RUN position. Replace if necessary. Refer to the OEM service manual.
OK ↓	
Exhaust back pressure too high	Measure and correct if above specification. Refer to an Authorized Cummins Repair Facility.
OK ↓	

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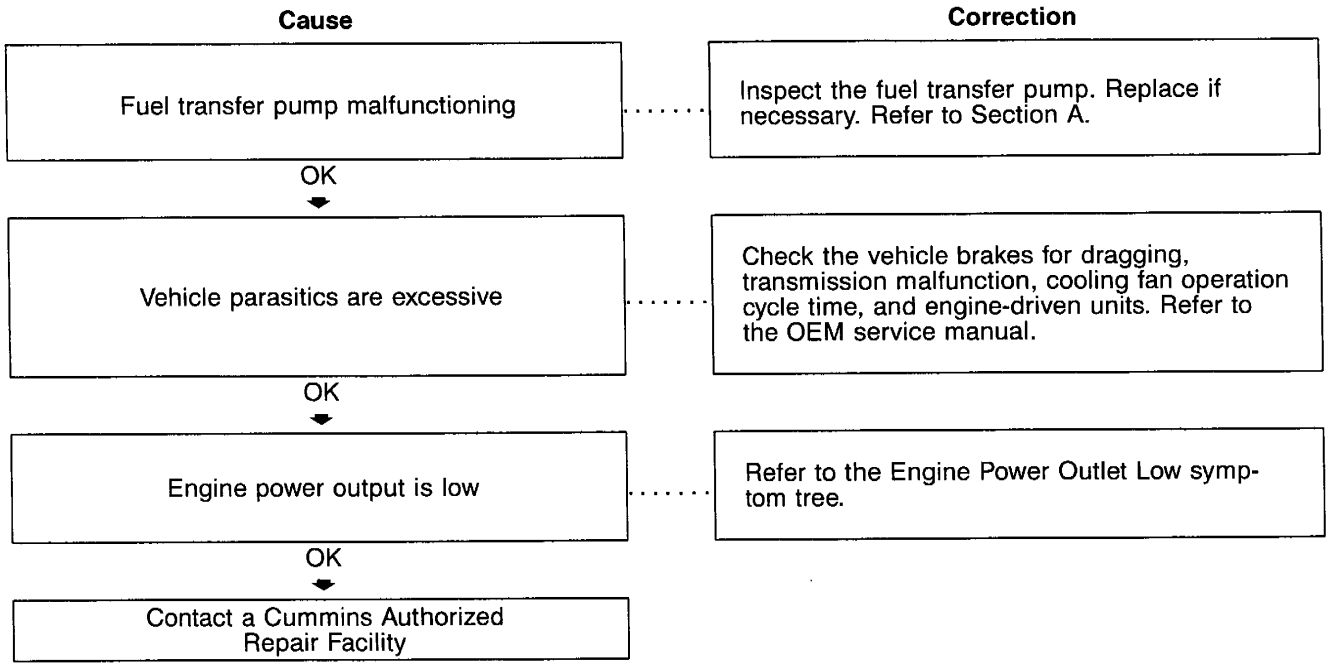
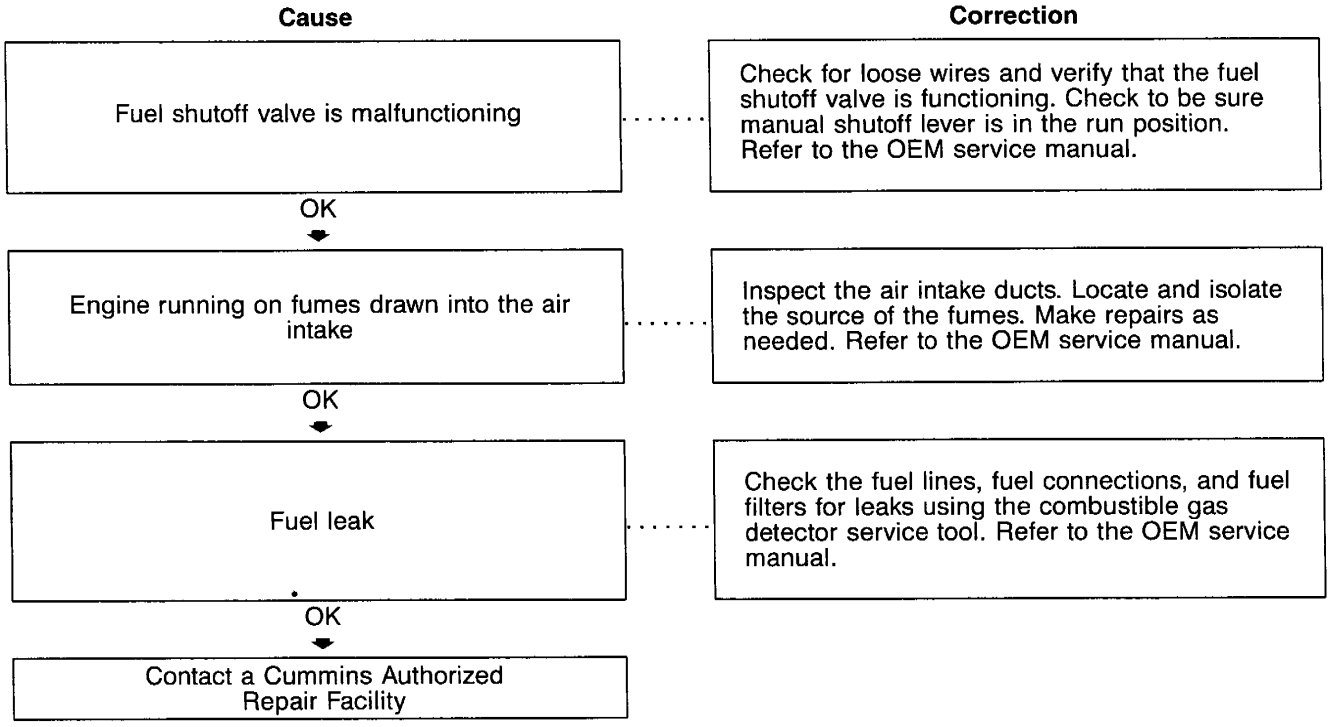
Engine Will Not Reach Rated Speed (RPM) (Continued)



Engine Will Not Shut Off



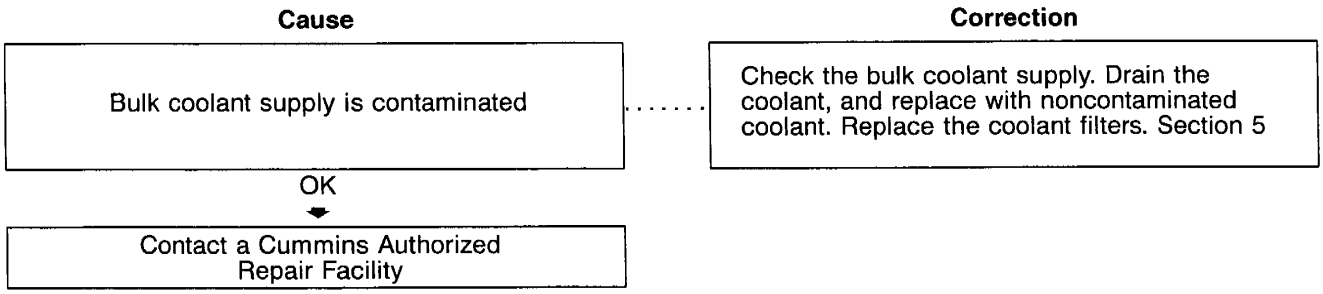
Exhaust Smoke Excessive Under Load

Cause	Correction
Engine is being lugged down	Use lower gear.
OK ↓	
Air in the fuel system	Check for air in the fuel system. Tighten or replace the fuel connections, fuel lines, fuel tank standpipe and fuel filters as necessary. Vent air from the system. Refer to Section 5.
OK ↓	
Air filter is restricted	Check the air filter for restrictions. Refer to Section 4.
OK ↓	
Intake or exhaust leak	Check intake and exhaust systems for loose or damaged piping connections and/or missing pipe plugs. Check turbocharger and exhaust manifold mounting. Refer to the OEM service manual.
OK ↓	
Turbocharger is malfunctioning	Monitor the turbocharger boost pressure with an electronic service tool. Refer to the OEM service manual or an Authorized Cummins Repair Facility.
OK ↓	
Engine is cold	Allow the engine to warm to operating temperature. If the engine will **not** reach operating temperature, refer to the Coolant Temperature Below Normal symptom tree.
OK ↓	
Air-fuel (AFC) control is leaking or obstructed	Check the AFC for leaks. Repair any leaks found, if necessary. Check and clean AFC tubing and fittings for obstructions. Refer to the OEM service manual or an Authorized Cummins Repair Facility.
OK ↓	
Contact a Cummins Authorized Repair Facility	

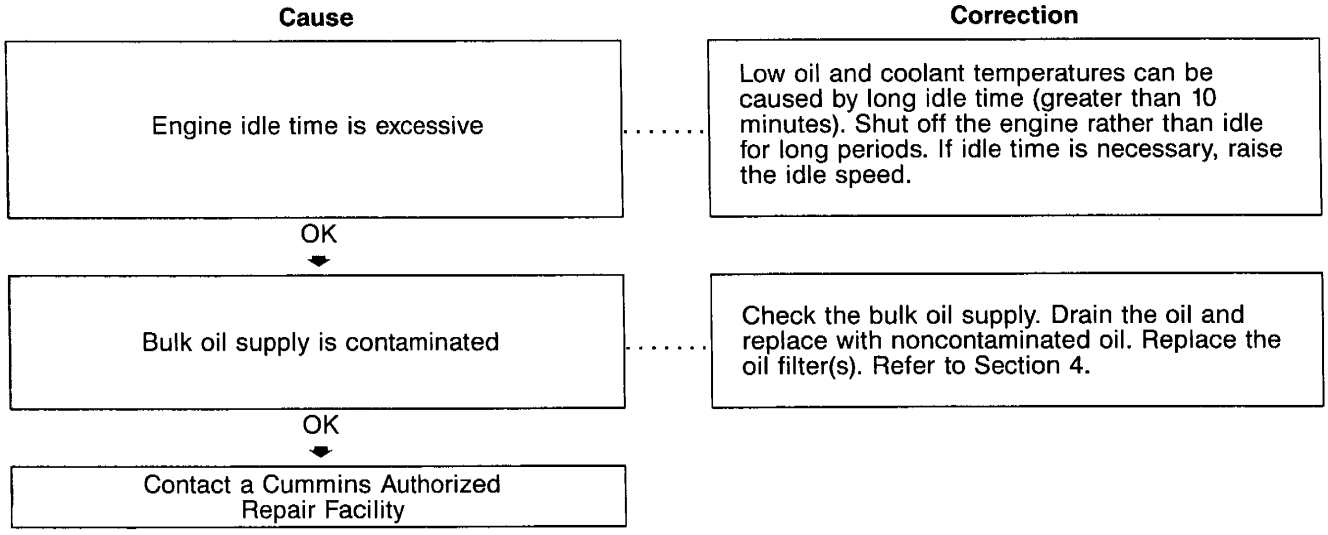
Fuel Consumption Excessive

Cause	Correction
Operator technique is **not** correct	Refer to Section 1, Operating Instructions.
OK ↓	
Fuel leak	Check the fuel lines, fuel connections, and fuel filters for leaks. Check the fuel lines to the supply tanks. Refer to the OEM service manual.
OK ↓	
Hubometer or odometer is miscalibrated	Check the hubometer and odometer calibrations. Calibrate or replace the hubometer or odometer, if necessary. Calculate fuel consumption with new mileage figures.
OK ↓	
Air intake or exhaust leaks	Check for loose or damaged piping connections and missing pipe plugs. Check the turbocharger and exhaust manifold mounting. Refer to Section 3.
OK ↓	
Air intake system restriction is above specification	Check the air intake system for restriction. Clean or replace the air filter and inlet piping as necessary. Refer to Section 4.
OK ↓	
Equipment and environmental factors are affecting fuel consumption	Consider ambient temperatures, wind, tire size, axle alignment, routes, and use of aerodynamic aids when evaluating fuel consumption.
OK ↓	
Lubricating oil level is above specification	Check the oil level. Verify the dipstick calibration and oil pan capacity. Fill the system to the specified level. Refer to Section V.
OK ↓	
Contact a Cummins Authorized Repair Facility	

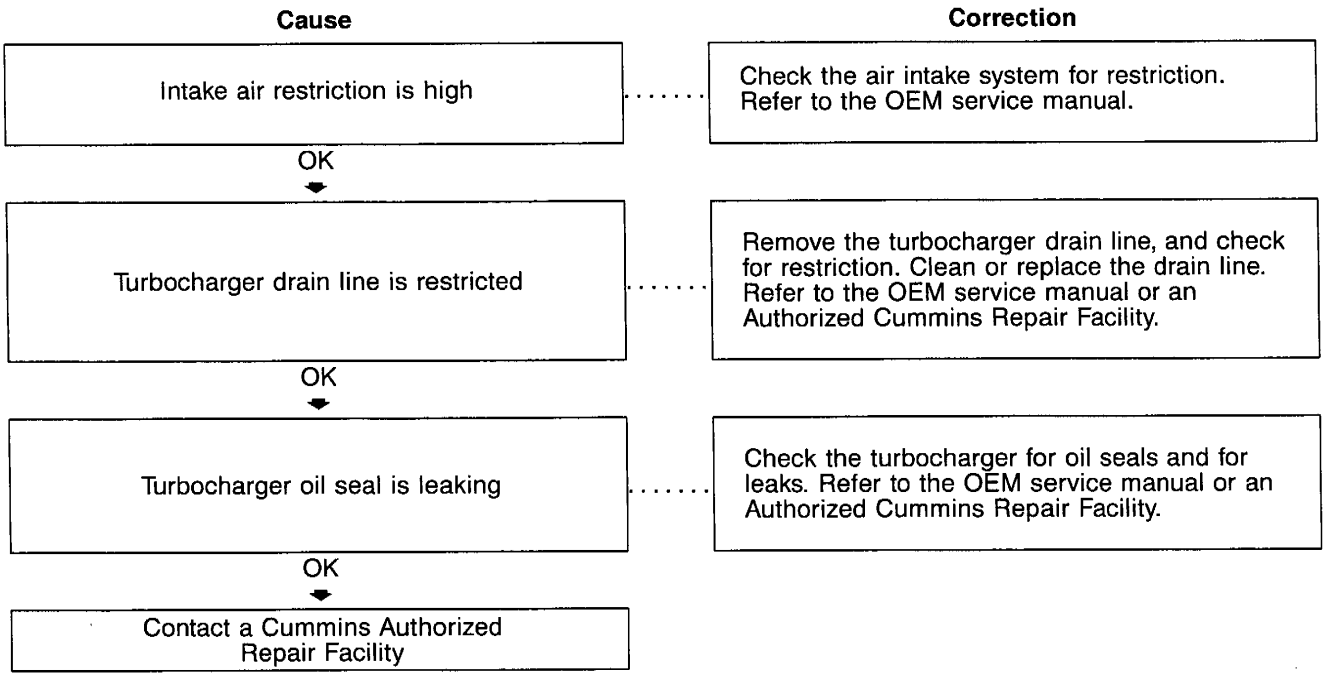
Fuel in Coolant



Fuel in the Lubricating Oil



Fuel or Lubricating Oil Leaking From Exhaust Manifold



Intake Manifold Air Temperature Above Specification

Cause	Correction
Charge air cooler fins, radiator fins, or air conditioner condenser fins are damaged or obstructed with debris	Inspect the charge air cooler, air conditioner condenser, and radiator fins. Clean, if necessary. Refer to Section 4 and the OEM service manual.
OK ↓	
Cold weather radiator cover or winterfront is closed	Open the cold weather radiator cover or the winterfront. Maintain a minimum of 784 cm^2 [122 in^2], or approximately 28 x 28 cm [11 x 11 in], of opening at all times. Refer to Section 1.
OK ↓	
Fan drive belt or water pump belt is broken	Check the fan drive belt and water pump belt. Replace the belts if necessary. Refer to Section A.
OK ↓	
Fan shroud is damaged or missing, or the air recirculation baffles are damaged or missing	Inspect the shroud and the recirculation baffles. Repair, replace, or install, if necessary. Refer to the OEM service manual.
OK ↓	
Radiator shutters are **not** opening completely or the shutterstat setting is wrong	Inspect the radiator shutters. Repair or replace if necessary. Refer to the manufacturer's instructions. Check the shutterstat setting. Refer to the OEM service manual.
OK ↓	
Vehicle speed is too low for adequate cooling with high engine load	Reduce the engine load. Increase the engine (fan) rpm by downshifting.
OK ↓	
Vehicle cooling system is **not** adequate	Verify that the engine and vehicle cooling systems are using the correct components. Refer to the OEM vehicle specifications.
OK ↓	
Intake manifold temperature gauge is malfunctioning, if equipped	Test the temperature gauge. Refer to the OEM service manual.
OK ↓	

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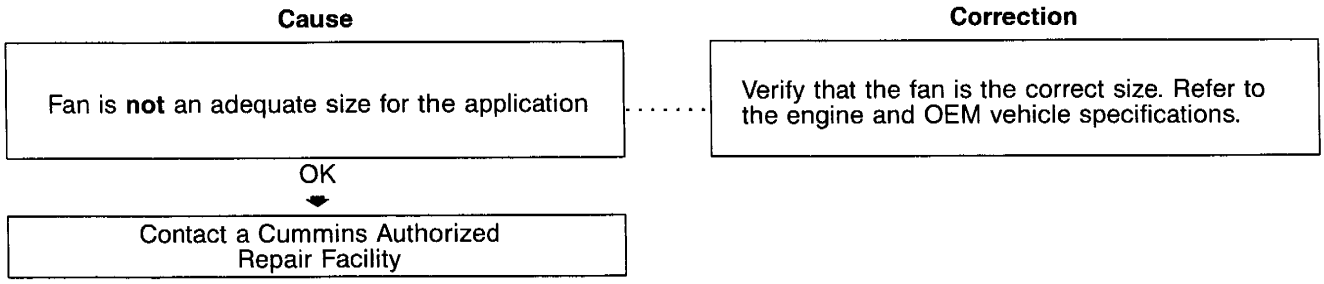
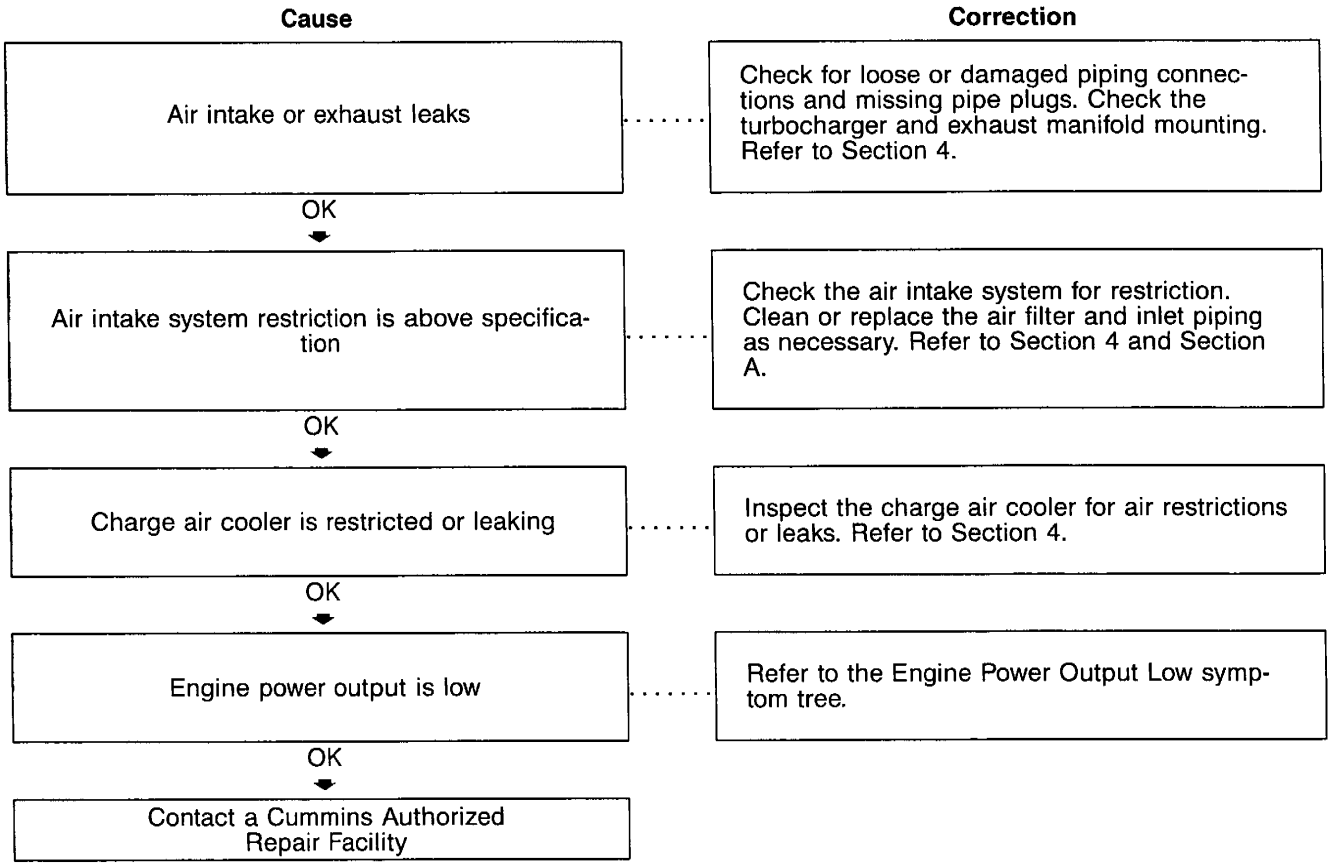
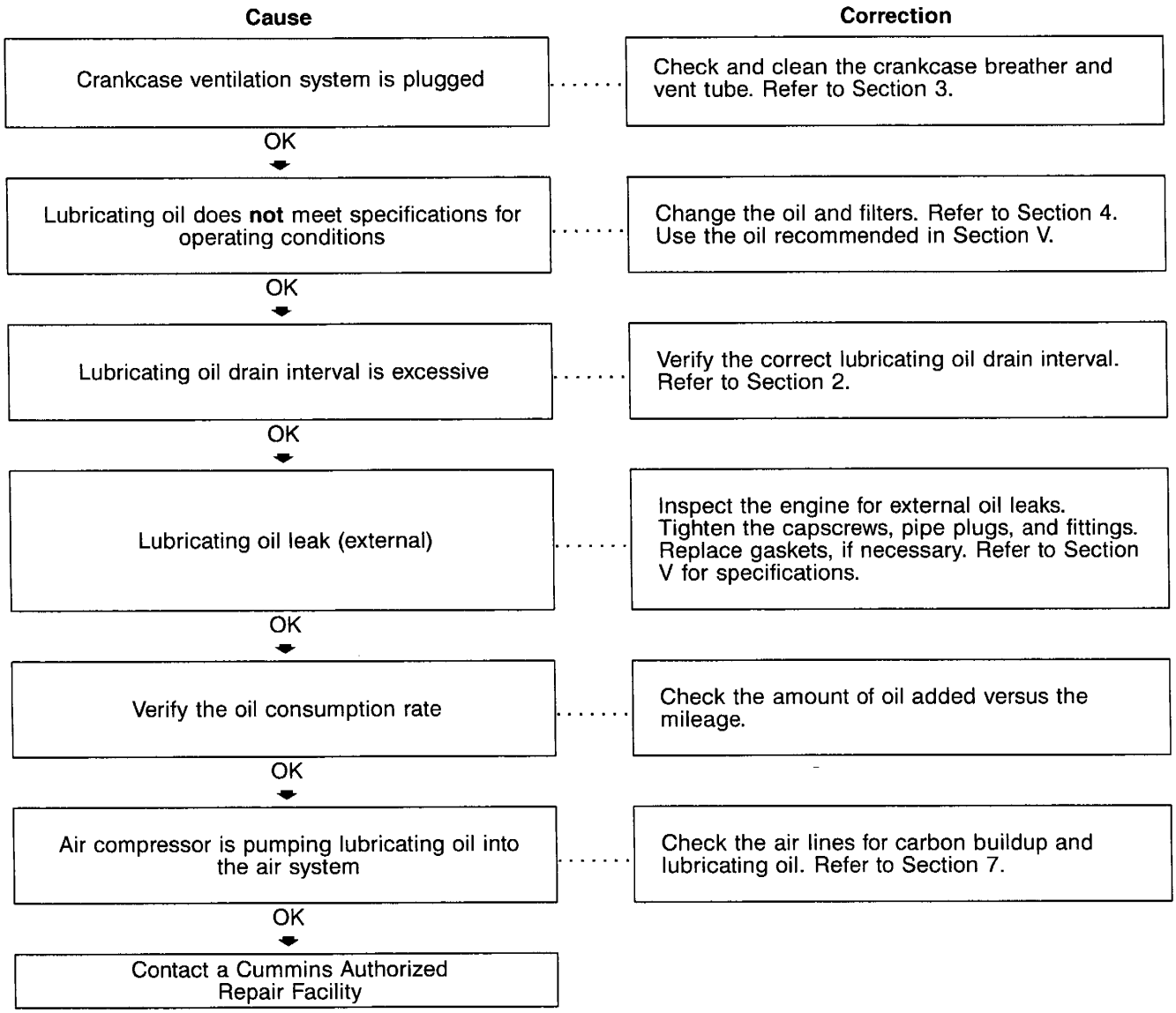
Intake Manifold Air Temperature Above Specification (Continued)



Intake Manifold Pressure (Boost) is Below Normal



Lubricating Oil Consumption Excessive



Lubricating Oil Contaminated

Cause	Correction
Lubricating oil sludge is excessive	Change the oil and filters. Refer to the Lubricating Oil Sludge in the Crankcase Excessive symptom tree.
OK ↓	
Lubricating oil is contaminated with coolant or fuel	Change the oil and filters. Refer to Section 4. Use the oil recommended in Section V.
OK ↓	
Fuel lift pump is malfunctioning	Check the fuel lift pump for correct operation. Check the pump output pressure. Replace the fuel lift pump if necessary. Refer to Section A.
OK ↓	
Bulk oil supply is contaminated	Check the bulk oil supply. Drain the oil and replace with noncontaminated oil. Replace the oil filter(s). Refer to Section 4.
OK ↓	
Contact a Cummins Authorized Repair Facility	

Lubricating Oil Loss

Cause	Correction
Lubricating oil leak (external)	Inspect the engine for external oil leaks. Tighten the capscrews, pipe plugs, and fittings. Replace gaskets, if necessary. Refer to the OEM service manual.
OK ↓	
Lubricating oil level is below specification	Check the oil level. Verify the dipstick calibration and the oil pan capacity. Fill the system to the specified level. Refer to Section 3.
OK ↓	
Lubricating oil does **not** meet specifications for operating conditions	Change the oil and filters. Refer to Section 4. Use the oil recommended in Section V.
OK ↓	
Lubricating oil cooler is leaking	Check the lubricating oil cooler for coolant leaks and cracks. Refer to the OEM service manual or an Authorized Cummins Repair Facility.
OK ↓	
Air compressor is pumping lubricating oil into the air system	Check the air lines for carbon buildup and lubricating oil. Refer to the OEM service manual or an Authorized Cummins Repair Facility.
OK ↓	
Blowby excessive	Check for excessive blowby. Refer to the OEM service manual or an Authorized Cummins Repair Facility.
OK ↓	
Turbocharger oil seal is leaking	Check the turbocharger for oil seals and for leaks. Refer to the OEM service manual or an Authorized Cummins Repair Facility.
OK ↓	
Contact a Cummins Authorized Repair Facility	

Lubricating Oil Pressure High

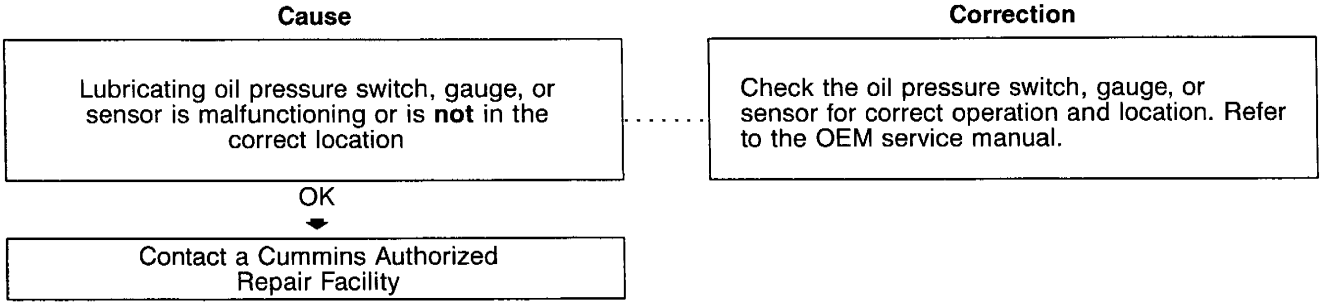
Cause	Correction
Engine is cold	Allow the engine to warm to operating temperature. If the engine will **not** reach operating temperature, refer to the Coolant Temperature Below Normal symptom tree.
OK ↓	
Coolant temperature is below specification	Refer to the Coolant Temperature Below Normal symptom tree.
OK ↓	
Lubricating oil does **not** meet specifications for operating conditions	Change the oil and filters. Refer to Section 4. Use the oil recommended in Section V.
OK ↓	
Lubricating oil pressure switch, gauge, or sensor is malfunctioning or is **not** in the correct location	Check the oil pressure switch, gauge, or sensor for correct operation and location. Refer to the OEM service manual.
OK ↓	
Contact a Cummins Authorized Repair Facility	

Lubricating Oil Pressure Low

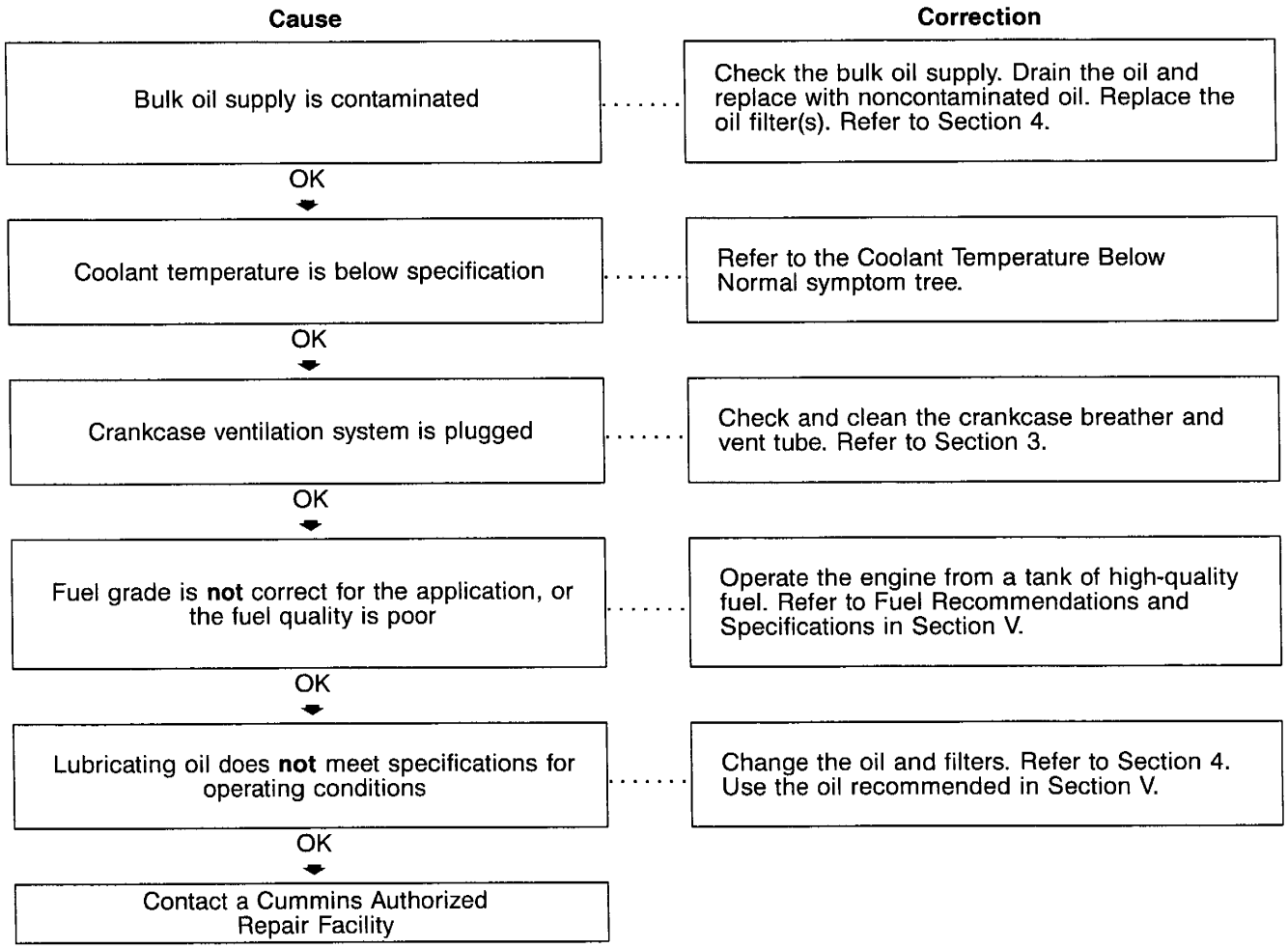
Cause	Correction
Engine angularity during operation exceeds specification	Refer to the Engine Data Sheet.
OK ↓	
Lubricating oil does **not** meet specifications for operating conditions	Change the oil and filters. Refer to Section 4. Use the oil recommended in Section V.
OK ↓	
Lubricating oil is diluted with water	Check for a missing dipstick, rain caps, or oil fill caps. Change the oil. Refer to the OEM service manual.
OK ↓	
Lubricating oil viscosity **not** correct	Make sure the correct lubricating oil is being used. Refer to Section 4.
OK ↓	
Lubricating oil filter is plugged	Change the oil and filter. Refer to Section 4. Verify the oil change interval is correct. Refer to Section 2.
OK ↓	
Lubricating oil is contaminated with coolant or fuel	Change the oil and filters. Refer to the Lubricating Oil Contaminated symptom tree.
OK ↓	
Lubricating oil leak (external)	Inspect the engine for external oil leaks. Tighten the capscrews, pipe plugs, and fittings. Replace gaskets, if necessary. Refer to Section V for specifications.
OK ↓	
Lubricating oil level is above or below specification	Check the oil level. Add or drain oil, if necessary. Refer to Section 3. Check the dipstick calibration.
OK ↓	

(Continued)

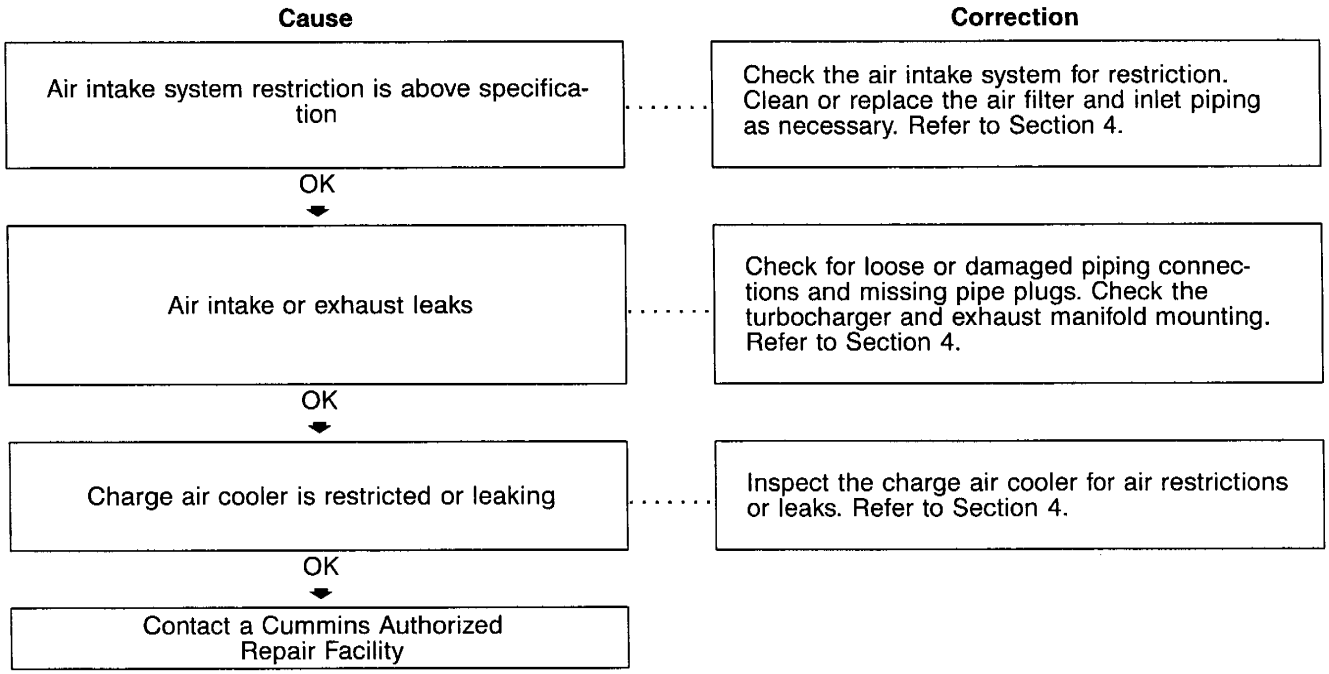
Lubricating Oil Pressure Low (Continued)



Lubricating Oil Sludge in the Crankcase Excessive



Smoke, Black — Excessive



Smoke, White — Excessive

Cause	Correction
Starting procedure is **not** correct	Verify the correct starting procedure. Refer to Section 1.
OK ↓	
Engine is cold	Allow the engine to warm to operating temperature. If the engine will **not** reach operating temperature, refer to the Coolant Temperature Below Normal symptom tree.
OK ↓	
Engine is operating at low ambient temperature	Check the winterfront, shutters, and under-the-hood air. Use under-the-hood intake air in cold weather. Refer to Cold Weather Operation, Bulletin 3387266, and Section 1.
OK ↓	
Starting aid is malfunctioning	Check for correct operation of cold-starting aid. Refer to Cold Weather Starting Aids in Section 1. Refer to the manufacturer's instructions.
OK ↓	
Coolant temperature is below specification	Refer to the Coolant Temperature is Below Normal symptom tree.
OK ↓	
Fuel grade is **not** correct for the application, or the fuel quality is poor	Operate the engine from a tank of high-quality fuel. Refer to Fuel Recommendations and Specifications in Section V.
OK ↓	
Air intake or exhaust leaks	Check for loose or damaged piping connections and missing pipe plugs. Check the turbocharger and exhaust manifold mounting. Refer to Section 3.
OK ↓	
Air intake system restriction is above specification	Check the air intake system for restriction. Clean or replace the air filter and inlet piping as necessary. Refer to Section 4.
OK ↓	

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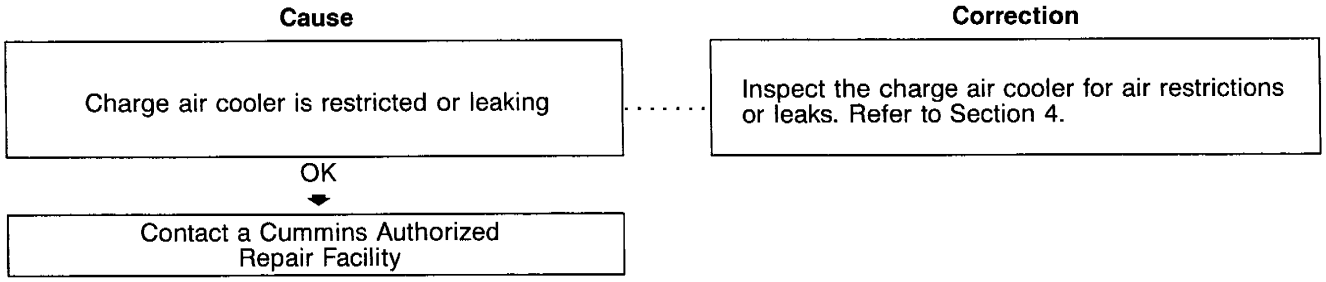
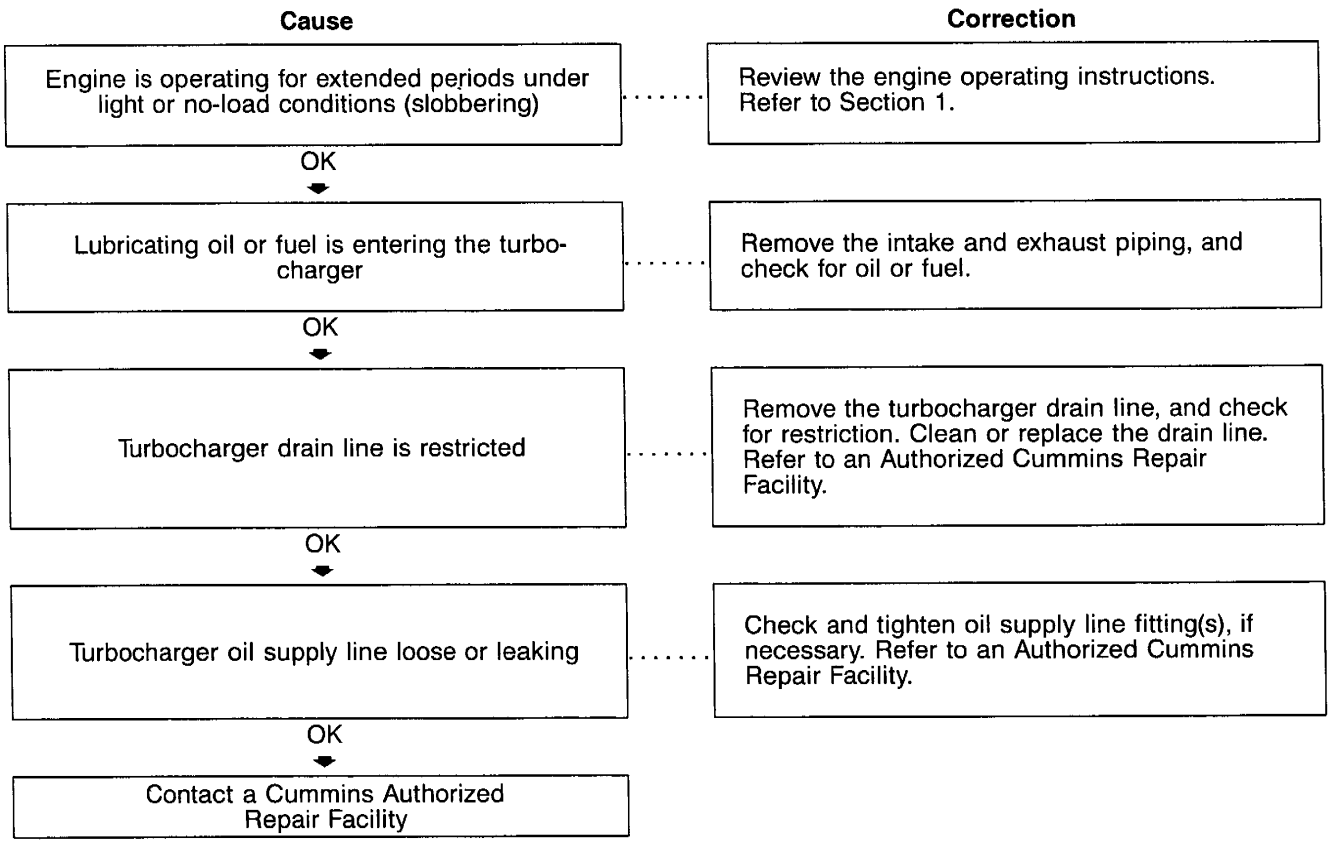
Smoke, White — Excessive (Continued)



Turbocharger Leaks Engine Oil or Fuel



NOTES

Section V - Maintenance Specifications

Section Contents

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General Engine

Specifications

General Engine Data

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]

Firing Order 1-5-3-6-2-4

Valve Clearances:
- Intake ..... 0.30 mm [0.012 in]
- Exhaust ..... 0.61 mm [0.024 in]

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

Compression Ratio:
- Naturally Aspirated 16.4:1
- Turbocharged 17.3:1
- Turbocharged/Aftercooled 16.5:1
- Charge Air Cooled 18.0:1

Fuel System

Specifications

Maximum Fuel Filter Pressure Drop across Filters ..... 34 kPa [5 psi]

Maximum Inlet Restriction to Fuel Transfer Pump ..... 100 mm Hg [4 in Hg]

Maximum Allowable Return Line Restriction ..... 518 mm Hg [20.4 in Hg]

Lubricating Oil System

Specifications

Oil Pressure:
- At Low Idle (minimum allowable) ..... 69 kPa [10 psig]
- At Rated Speed (minimum allowable) ..... 207 kPa [30 psig]

Regulated Pressure ..... 517 kPa [75 psi]

Oil Capacity of Standard Engine:
- Standard Oil Pan
  - Pan **Only** ..... 18.9 liters [20 qt]

Total System Capacity ..... 19.9 liters [21 qt]

Standard Oil Pan with Cylinder Block Stiffener Plate
- Pan **Only** ..... 19.9 liters [21 qt]

Oil Pan Low to High:
- 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]

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

Oil Pressure
- At Idle Speed - Minimum ..... 69 kPa [10 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]

Maximum Operational Angularity of Oil Pan (see Engine Mounting)
- Front Down ..... 45 degrees
- Front Up ..... 35 degrees
- Side to Side ..... 45 degrees

Cooling System

Specifications

Coolant Capacity (engine **only**) ..... 10.9 liters [11.5 qt]

Standard Modulating Thermostat - Range ..... 84 to 91°C [184 to 195°F]

Maximum Allowable Operating Temperature ..... 100°C [212°F]

Minimum Recommended Operating Temperature ..... 70°C [158°F]

Minimum Recommended Pressure Cap ..... 50 kPa [7 psi]

Air Intake System

Specifications

Maximum Intake Restriction (clean air filter element) ..... 254 mm H_2O [10.0 in H_2O]

Maximum Intake Restriction (dirty air filter element) ..... 635 mm H_2O [25.0 in H_2O]

Exhaust System

Specifications

Maximum Exhaust Back Pressure ..... 76 mm Hg [3 in Hg]

Electrical System

Specifications

Recommended Battery Capacity

System Voltage	Ambient Temperature			
	-18°C [0°F]		-29°C [-20°F]	
	Cold Cranking Amperes	Reserve Capacity (Minutes) (1)	Cold Cranking Amperes	Reserve Capacity (Minutes) (1)
12 VDC	1250	360	1875	360
24 VDC (2)	625	180	900	180

1. The number of plates within a given battery size determines reserve capacity. Reserve capacity is the length of time for which a battery at 27°C [80°F] can supply 25 amperes at 10.5 volts or greater.

2. CCA ratings are based on two 12-VDC batteries in series.

Batteries (Specific Gravity)

Specific Gravity at 27°C [80°F]	State of Charge
1.260 to 1.280	100%
1.230 to 1.250	75%
1.200 to 1.220	50%
1.170 to 1.190	25%
1.110 to 1.130	Discharged

Cummins/Fleetguard® 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 Engine Company, Inc. recommends the use of ASTM No. 2D fuel. The use of No. 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 No. 2D and No. 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.

Acceptable Substitute Fuels - Cummins C8.3 Fuel System

No. 1D Diesel(1)(2)	No. 2D Diesel	No. 1K Kerosene	Jet-A	Jet-A1	JP-5	JP-8	Jet-B	JP-4	CITE
OK	OK	OK	OK	OK	OK	OK	**NOT** OK	**NOT** OK	**NOT** OK

1. Any adjustment to compensate for reduced performance with a fuel system using alternate fuel is **not** warrantable.
2. Winter blend fuels, such as those found at commercial fuel dispensing outlets, are combinations of No. 1D and No. 2D diesel fuel and are acceptable.

Additional information for fuel recommendations and specifications can be found in Fuel for Cummins Engines, Bulletin No. 3379001. See the ordering information in the back of this manual.

Lubricating Oil Recommendations and Specifications

New Engine Break-in Oils

△ CAUTION △

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.

⚠ CAUTION ⚠

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 E.M.A. Lubricating Oils Data Book for Heavy-Duty Automotive and Industrial Engines. The data book can be ordered from the Engine Manufacturers Association, One Illinois Center, 111 East Wacker Drive, Chicago, IL U.S.A. 60601. The telephone number is (312) 644-6610.

Arctic Operation Engine Oil

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.

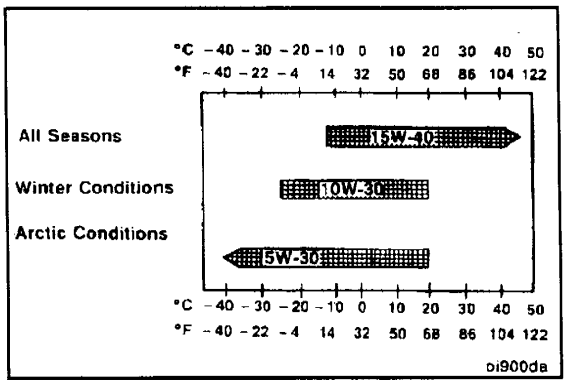
Cummins Engine Company, Inc. recommends the use of a high-quality SAE 15W-40 multiviscosity heavy-duty engine oil, such as Cummins Premium Blue®, that meets the requirements of Cummins Engineering Specification CES20071 or CES20076, or the American Petroleum Institute (API) performance classification 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 No. 3810340, or a Cummins Authorized Repair Facility.

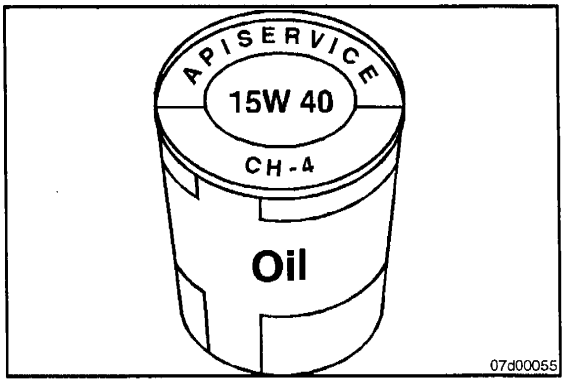
The use of low-viscosity oils, such as 10W or 10W-30, can be used to aid in starting the engine and in providing sufficient oil flow at ambient temperatures below -5°C [23°F]. However, continuous use of low-viscosity oils can decrease engine life due to wear. Refer to the accompanying chart.



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.

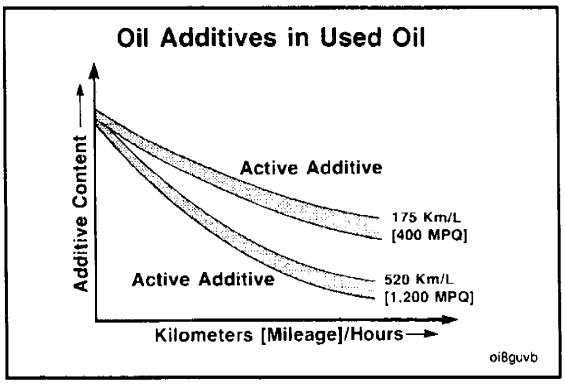
The center section identifies the SAE oil viscosity grade.



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.

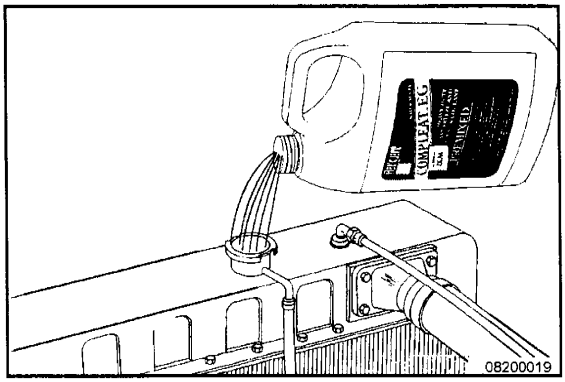
Refer to the Oil Drain Interval Chart in this section to determine which oil drain interval to use for an application.



Coolant Recommendations and Specifications

Fully Formulated Coolant/Antifreeze

Cummins Engine Company, 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.



Water Quality	
Calcium Magnesium (Hardness)	Maximum 170 ppm as ($CaCO_3$ + $MgCO_3$)
Chloride	40 ppm as(Cl)
Sulfur	100 ppm as (SO_4)

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⚠ 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.

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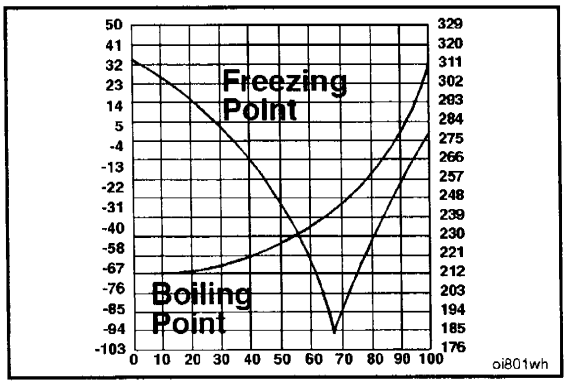
Cummins Engine Company, Inc. recommends using Fleetguard™ Compleat. It is available in both glycol forms (ethylene and propylene) and complies with TMC standards.



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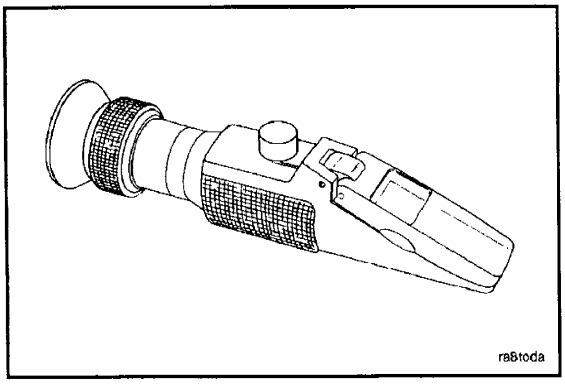
Fully formulated antifreeze **must** be mixed with high-quality water at a 50/50 ratio (40- to 60-percent working range). A 50/50 mixture of antifreeze and water has a -36°C [-33°F] freezing point and a 110°C [230°F] boiling point, which is adequate for North America. The actual lowest freezing point 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.



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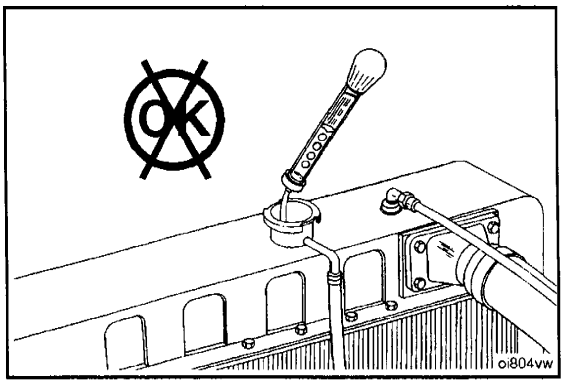
A refractometer **must** be used to measure the freezing point of the coolant accurately.

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



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 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 Additives (SCA)

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

DCA4

DCA4 is the recommended SCA for all Cummins 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 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		

(Continued)

Fleetguard® Part No.	Cummins Part No.	DCA4 Units
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		
Total Cooling System Capacity	**Initial Charge (B)**	**10,000 km [6000 mi], 250 Hours, or 3 Months**
30 to 57 liters [8 to 15 gal]	WF-2074	WF-2070

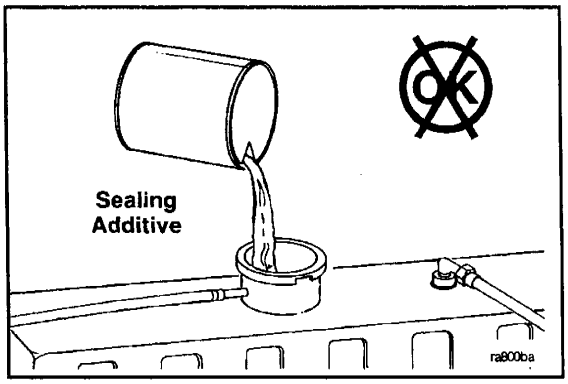
Notes:

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.

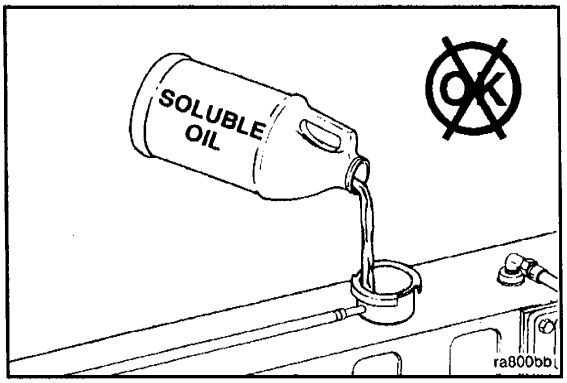
D. Check the coolant additive concentration regularly. Check the cooling system using Fleetguard® DCA4 **only** with DCA4 coolant test kit, Part No.CC-2626.



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.

Drive Belt Tension

Tension Chart

SAE Belt Size	Belt Tension Gauge Part No.		Belt Tension New		Belt Tension Range Used*	
	Click-type	Burroughs	N	lbf	N	lbf
0.380 in	3822524		620	140	270 to 490	60 to 110
0.440 in	3822524		620	140	270 to 490	60 to 110
1/2 in	3822524	ST-1138	620	140	270 to 490	60 to 110
11/16 in	3822524	ST-1138	620	140	270 to 490	60 to 110
3/4 in	3822524	ST-1138	620	140	270 to 490	60 to 110
7/8 in	3822524	ST-1138	620	140	270 to 490	60 to 110
4 rib	3822524	ST-1138	620	140	270 to 490	60 to 110
5 rib	3822524	ST-1138	670	150	270 to 530	60 to 120
6 rib	3822525	ST-1293	710	160	290 to 580	65 to 130
8 rib	3822525	ST-1293	890	200	360 to 710	80 to 160
10 rib	3822525	3823138	1110	250	440 to 890	100 to 200
12 rib	3822525	3823138	1330	300	530 to 1070	120 to 240
12 rib K section	3822525	3823138	1330	300	890 to 1070	200 to 240

NOTE: This chart does not apply to automatic belt tensioners.

* A belt is considered used if it has been in service for ten minutes or longer.

* If used belt tension is less than the minimum value, tighten the belt to the maximum used belt value.

Engine Component Torque Values

Torque Table

Component	Wrench Size	Torque Value		
		N•m	ft-lb	in-lb
Aftercooler mounting	10 mm	24	18	
Aftercooler water hose clamp	8 mm	5		44
Alternator link (Delco 10-15 SI)	13 mm	24	18	
Alternator link (Delco 20-27 SI)	3/4 in	43	32	
Alternator mtg. bolt 10-15 SI	15 mm	43	32	
Alternator mtg. 27 SI	18 mm	77	57	
Alternator support (upper)	10 mm	24	18	
Belt tensioner flat bracket	Allen 5 mm	24	18	
Belt tensioner mounting	15 mm	43	32	
Crankshaft damper and pulley	15 mm	137	101	
Crossover clamp	5/16 in	5		44
Tee bolt type clamp	11 mm	8		71
Exhaust outlet pipe, v-band clamp	7/16 in	8		71
Fan bracket mounting	10 mm	24	18	
Fan pulley	10 mm	24	18	
Fan pulley	13 mm	43	32	
Fuel filter	75 to 85 mm	Install as specified by filter manufacturer.		
Fuel filter adapter nut	24 mm	32	24	
Lubricating oil filter	75 to 85 mm	3/4 of a turn after contact		
Lubricating oil cooler assembly	10 mm	24	18	
Lubricating oil pan drain plug	17 mm	80	59	

(Continued)

Component	Wrench Size	Torque Value		
		N•m	ft-lb	in-lb
Lubricating oil pan heater plug	27 mm	80	59	
Lubricating oil pressure regulator plug	19 mm	80	59	
Starter mounting	10 mm	43	32	
Thermostat housing	10 mm	24	18	
Water inlet connection	15 mm	43	32	
Water pump mounting	13 mm	24	18	
Rocker lever (valve) cover	15 mm	12		106
Water-in-fuel (WIF) sensor	19 mm	Hand-tighten		

Sealants

General Information

Use either the sealants listed below or sealants containing equivalent properties.

Item Description	Sealing Method
1. Pipe plugs	Precoated Teflon™ or pipe sealer
2. Gaskets	No sealant required
3. Cups plugs	Loctite 277 or Cummins sealant, Part Number 3375068
4. O-rings	Lubriplate™ 105
5. Rear camshaft expansion plug	Loctite 277 or Cummins sealant, Part Number 3375068
6. Fuel pump studs	Loctite 242
7. Turbocharger drain (in block)	Loctite 277 or Cummins sealant, Part Number 3375068
8. Dipstick tube (in block)	Loctite 277 or Cummins sealant, Part Number 3375068
9. Wet flywheel housing to block	Three-Bond™ sealant, Part Number 3823494
10. Rear seal (in rear cover)	No sealant required
11. Timing pin housing capscrews	No sealant required
12. Side oil fill	Loctite 277 or Cummins sealant, Part Number 3375068
13. Oil pan at gear housing joint	Three-Bond™ sealant, Part Number 3823494

Capscrew Markings and Torque Values

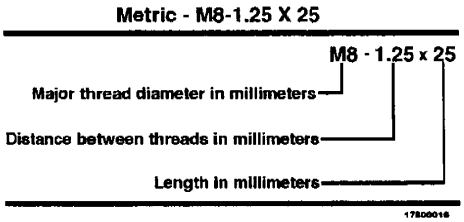
General Information

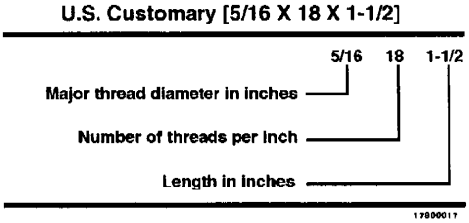
△ CAUTION △

When replacing capscrews, always use a capscrew of the same measurement and strength as the capscrew being replaced. Using the wrong capscrews can result in engine damage.

Metric capscrews and nuts are identified by the grade number stamped on the head of the capscrew or on the surface of the nuts. U.S. Customary capscrews are identified by radial lines stamped on the head of the capscrew.

The following examples indicate how capscrews are identified:

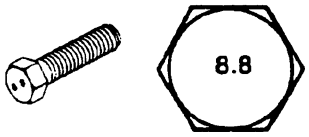
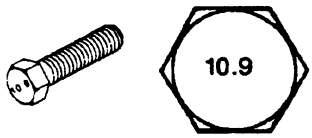
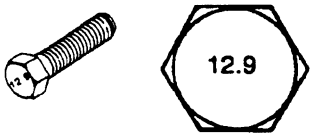




NOTES:

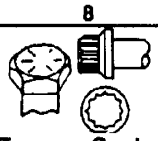
1. **Always** use the torque values listed in the following tables when specific torque values are **not** available.
2. Do **not** use the torque values in place of those specified in other sections of this manual.
3. The torque values in the table are based on the use of lubricated threads.
4. When the ft-lb value is less than 10, convert the ft-lb value to in-lb to obtain a better torque with an in-lb torque wrench. Example: 6 ft-lb equals 72 in-lb.

Capscrew Markings and Torque Values - Metric

Commercial Steel Class	8.8	10.9	12.9
Capscrew Head Markings			

Body Size	Torque				Torque				Torque			
Diameter	Cast Iron		Aluminum		Cast Iron		Aluminum		Cast Iron		Aluminum	
mm	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb
6	9	5	7	4	13	10	7	4	14	9	7	4
7	14	9	11	7	18	14	11	7	23	18	11	7
8	23	17	18	14	33	25	18	14	40	29	18	14
10	45	33	30	25	65	50	30	25	70	50	30	25
12	80	60	55	40	115	85	55	40	125	95	55	40
14	125	90	90	65	180	133	90	65	195	145	90	65
16	195	140	140	100	280	200	140	100	290	210	140	100
18	280	200	180	135	390	285	180	135	400	290	180	135
20	400	290	—	—	550	400	—	—	—	—	—	—

Capscrew Markings and Torque Values - U.S. Customary

SAE Grade Number	5	8
Capscrew Head Markings These are all SAE Grade 5 (3 line)		
		

Capscrew Body Size	Capscrew Torque - Grade 5 Capscrew				Capscrew Torque - Grade 8 Capscrew			
	Cast Iron		Aluminum		Cast Iron		Aluminum	
	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb
1/4 - 20	9	7	8	6	15	11	8	6
1/4 - 28	12	9	9	7	18	13	9	7
5/16 - 18	20	15	16	12	30	22	16	12
5/16 - 24	23	17	19	14	33	24	19	14
3/8 - 16	40	30	25	20	55	40	25	20
3/8 - 24	40	30	35	25	60	45	35	25
7/16 - 14	60	45	45	35	90	65	45	35
7/16 - 20	65	50	55	40	95	70	55	40
1/2 - 13	95	70	75	55	130	95	75	55
1/2 - 20	100	75	80	60	150	110	80	60
9/16 - 12	135	100	110	80	190	140	110	80
9/16 - 18	150	110	115	85	210	155	115	85
5/8 - 11	180	135	150	110	255	190	150	110
5/8 - 18	210	155	160	120	290	215	160	120
3/4 - 10	325	240	255	190	460	340	255	190
3/4 - 16	365	270	285	210	515	380	285	210
7/8 - 9	490	360	380	280	745	550	380	280
7/8 - 14	530	390	420	310	825	610	420	310
1 - 8	720	530	570	420	1100	820	570	420
1 - 14	800	590	650	480	1200	890	650	480

NOTES

Section W - Warranty

Section Contents

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Off-Highway Engines United States and Canada

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.

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 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's 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. Locations in the United States and Canada are listed in the Cummins Off Highway Authorized Dealer Directory.

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

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 or fuel or by water, dirt or other contaminants in the fuel or oil.

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.

Except for power units and fire pumps, 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.

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* 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, 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, 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

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 fuel or by water, dirt or other contaminants in the fuel.

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.

* 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 B3.3 engines.

Off-Highway Engines International

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.

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 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.

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's 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 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. Locations are listed in the Cummins International Sales and Service Directory.

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

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 or fuel or by water, dirt or other contaminants in the fuel or oil.

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.

Starters, alternators, power steering pumps and non-Cummins air compressors supplied by Cummins on B or C Series Engines that are not supplied as part of a package unit are covered for six months* from the date of delivery of the Engine to the first user, or the date the Engine is first leased, rented or loaned, or from when the Engine has been operated for 50 hours, whichever occurs first.

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.

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 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 B3.3 engines.

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 B5.9, QSB, QSC, QS9 and C8.3 emission control parts:

Fuel Pump
- Static Timing
- Delivery Valve
- Injection Control Valve Module

Injectors
- Calibration
- Needle
- Nozzle
- Spring

Turbocharger
- Compressor Wheel
- Turbine Wheel
- Turbine Oil Seal
- Wastegate Valve

Intake Manifold
- Charge Air Cooler
- Aftercooler

Exhaust Manifold

Oxidation Catalyst

Electronic Control System
- Control Module
- Boost Pressure Sensor
- Coolant Temperature Sensor
- Fuel Pressure Sensor

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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