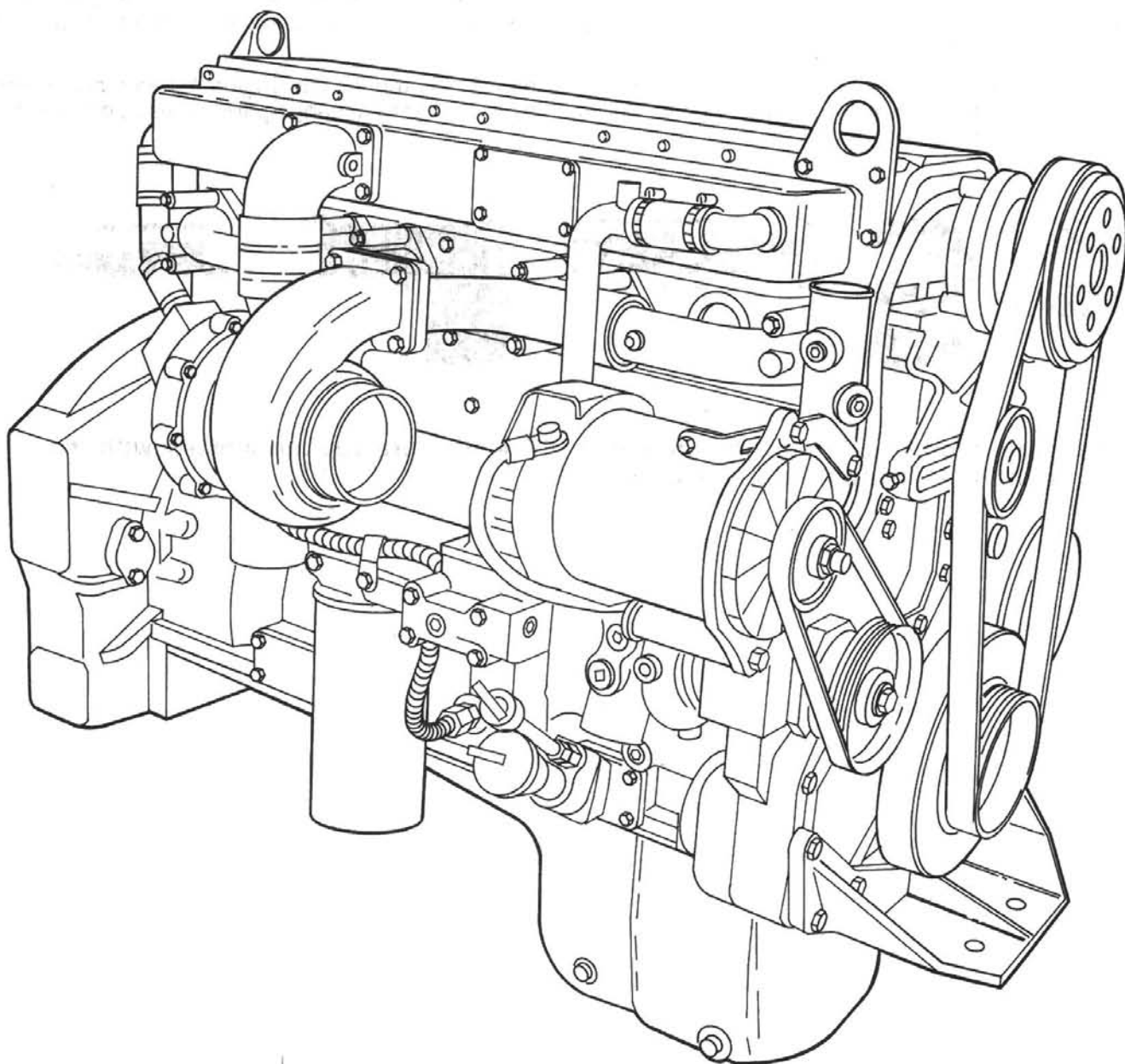




Operation and Maintenance Manual L10 Series Engines Industrial Models



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 this section.

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 Engine Company, 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.

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

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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.

Engine Model	_____
Engine Serial Number	_____
Engine CPL	_____
Fuel Pump Part Number	_____
Filter Part Numbers:	
• Air Cleaner Element	_____
• Lubricating Oil	_____
• Fuel	_____
• Fuel Water Separator	_____
Belt Part Numbers	_____

Section i - Introduction

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To The Owner and Operator

Preventative 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, oil and coolant in your engine as specified in Engine Specifications (Section V).

Cummins Engine Company, Inc. uses the latest technology and the highest quality components to produce its engines. Cummins recommends using only genuine Cummins 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 **cannot** be resolved by a Cummins Authorized Repair Location, follow the steps outlined in the Service Assistance (Section S).

About the Manual

This manual contains information needed to correctly operate and maintain your engine as recommended by Cummins Engine Company, Inc. Additional service literature can be ordered from your local Cummins distributor.

This manual does **not** cover vehicle or equipment maintenance procedures. Consult the vehicle 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 page i-3 for a complete listing of symbols and their definitions.

Each section is preceded by a "Section Contents" to aid in locating information quickly.

How to Use the Manual

This manual is organized according to intervals at which maintenance on your engine is to be performed. A table which gives required intervals and checks to be made is located in 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. In addition, the procedures completed under previous maintenance intervals **must** also be performed.

Keep a record of all the checks and inspections made. A record form for recording date or hours at which maintenance checks were performed is located in Section 2.

Refer to Section T for a guide to troubleshooting your engine. Follow the directions given on page 2 to locate and correct engine problems.

Refer to Section V for specifications recommended by Cummins Engine Company, Inc., for your engine. Specifications and torque values for each engine system are given in that section.

Symbols

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



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



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



Indicates a **REMOVAL** or **DISASSEMBLY** step.



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



INSPECTION is required.



CLEAN the part or assembly.



PERFORM a mechanical or time **MEASUREMENT**.



LUBRICATE the part or assembly.



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



TIGHTEN to a specific torque.



PERFORM an electrical **MEASUREMENT**.



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



The component weighs 23 kg [50 lb] or more. To avoid personal injury, use a hoist or get assistance to lift the component.

Simbolos

Los símbolos siguientes son usados en este manual para clarificar el proceso de las instrucciones. Cuando aparece uno de estos símbolos, su significado se especifica en la parte inferior.



ADVERTENCIA - Serios daños personales o daño a la propiedad puede resultar si las instrucciones de Advertencia **no** se consideran.



PRECAUCION - Daños menores pueden resultar, o de piezas del conjunto o el motor puede averiarse si las instrucciones de Precaución **no** se siguen.



Indica un paso de **REMOCION** o **DESMONTAJE**.



Indica un paso de **INSTALACION** o **MONTAJE**.



Se requiere **INSPECCION**.



LIMPIESE la pieza o el montaje.



EJECUTESE una **MEDICION** mecánica o del tiempo.



LUBRIQUESE la pieza o el montaje.



Indica que se dará una **LLAVE DE TUERCAS** o el **TAMAÑO DE HERRAMIENTA**.



APRIETESE hasta un par torsor específico.



EJECUTESE una **MEDICION** eléctrica.



Para información adicional refiérase a otro emplazamiento de este manual o a otra publicación anterior.



El componente pesa 23 kg [50 lb] o mas. Para evitar dano corporal empleen una cabria u obtengan ayuda para elevar el componente.

Symbole

In diesem Handbuch werden die folgenden Symbole verwendet, die wesentliche Funktionen hervorheben. Die Symbole haben folgende Bedeutung:



WARNUNG - Wird die Warnung **nicht** beachtet, dann besteht erhöhte Unfall- und Beschädigungsgefahr.



VORSICHT - Werden die Vorsichtsmassnahmen **nicht** beachtet, dann besteht Unfall- und Beschädigungsgefahr.



AUSBAU bzw. **ZERLEGEN**.



EINBAU bzw. **ZUSAMMENBAU**.



INSPEKTION erforderlich.



Teil oder Baugruppe **REINIGEN**.



DIMENSION - oder **ZEITMESSUNG**.



Teil oder Baugruppe **ÖLEN**.



WERKZEUGGRÖSSE wird angegeben.



ANZUG auf vorgeschriebenes Drehmoment erforderlich.



Elektrische **MESSUNG DURCHFÜHREN**.



Weitere Informationen an anderer Stelle bzw. in anderen Handbüchern.



Das teil weigt 23 kg [50 lb] oder mehr. Zur vermeidung von koerperverletzung winde benutzen oder hilfe beim heben des teils in anspruch nehmen.

Symboles

Les symboles suivants sont utilisés dans ce manuel pour aider à communiquer le but des instructions. Quand l'un de ces symboles apparaît, il évoque le sens défini ci-dessous:



AVERTISSEMENT - De graves lésions corporelles ou des dommages matériels considérables peuvent survenir si les instructions données sous les rubriques "Avertissement" **ne sont pas** suivies.



ATTENTION - De petites lésions corporelles peuvent survenir, ou bien une pièce, un ensemble ou le moteur peuvent être endommagés si les instructions données sous les rubriques "Attention" **ne sont pas** suivies.



Indique une opération de **DEPOSE**.



Indique une opération de **MONTAGE**.



L'INSPECTION est nécessaire.



NETTOYER la pièce ou l'ensemble.



EFFECTUER une **MESURE** mécanique ou de temps.



GRAISSER la pièce ou l'ensemble.



Indique qu'une **DIMENSION DE CLE** ou **D'OUTIL** sera donnée.



SERRER à un couple spécifique.



EFFECTUER une **MESURE** électrique.



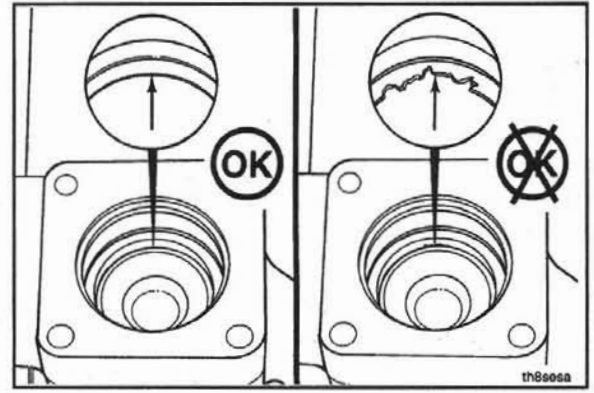
Se reporter à un autre endroit dans ce manuel ou à une autre publication pour obtenir des informations plus complètes.



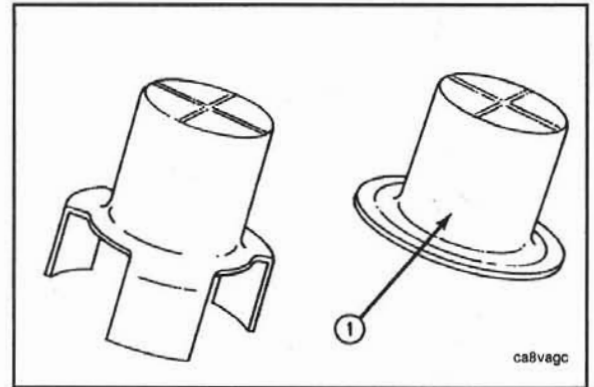
Le composant pèse 23 kg [50 lb] ou davantage. Pour éviter toute blessure, employer un appareil de levage ou demander de l'aide pour le soulever.

Illustrations

The illustrations used in the "Repair Sections" of this manual are intended to give an example of a problem, and to show what to look for and where the problem can be found. Some of the illustrations are "generic" and might **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 illustration can differ from your application, but the procedure given will be the same.



General Safety Instructions

Important Safety Notice



Improper practices or carelessness can cause burns, cuts, mutilation, asphyxiation or other bodily 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.

- Make sure the work area surrounding the product 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 you slowly loosen the filler cap and relieve the pressure from the cooling system.
- Do **not** work on anything that is supported **ONLY** by lifting jacks or a hoist. **Always** use blocks or proper stands to support the product before performing any service work.
- Relieve all pressure in the air, oil, and the 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 prevent 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 capture and recycling refrigerant.
- To avoid 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 contains alkali. Do **not** get the substance in your 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 avoid 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 them 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.

Definition of Terms

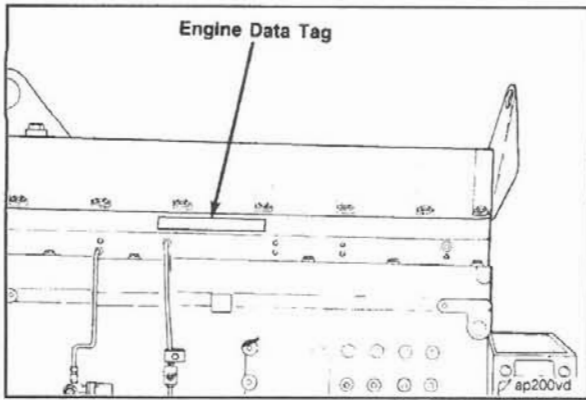
AFC	Air Fuel Control		
API	American Petroleum Institute	in-lb	Inch Pound
ASA	Air Signal Attenuator	kg	Kilograms
ASTM	American Society of Testing and Materials	km	Kilometers
C	Celsius	km/l	Kilometers per Liter
CARB	California Air Resources Board	kPa	Kilopascal
C.I.D.	Cubic Inch Displacement	l	Liter
cm	Centimeter	m	Meter
CPL	Control Parts List	mm	Millimeter
cSt	Centistokes	MPa	Megapascal
DCA	Diesel Coolant Additive	MPH	Miles Per Hour
E.C.S.	Emission Control System	MPQ	Miles Per Quart
EPA	Environmental Protection Agency	N•m	Newton-meter
F	Fahrenheit	OEM	Original Equipment Manufacturer
ft-lb	Foot Pound	ppm	Parts Per Million
GVW	Gross Vehicle Weight	psi	Pounds Per Square Inch
Hg	Mercury	PTO	Power Takeoff
HP	Horsepower	RPM	Revolutions Per Minute
H₂O	Water	S.A.E.	Society of Automotive Engineers
		VS	Variable Speed

Section E - Engine and Component Identification

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Engine Identification



Engine Dataplate

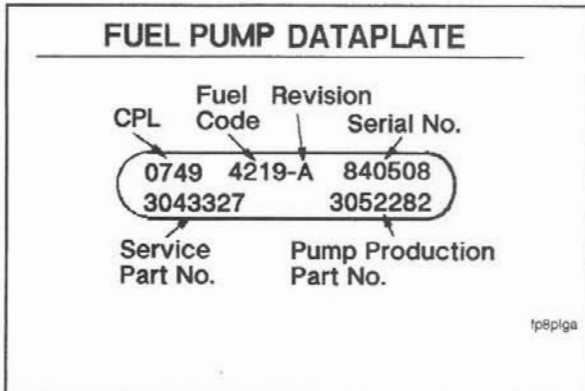
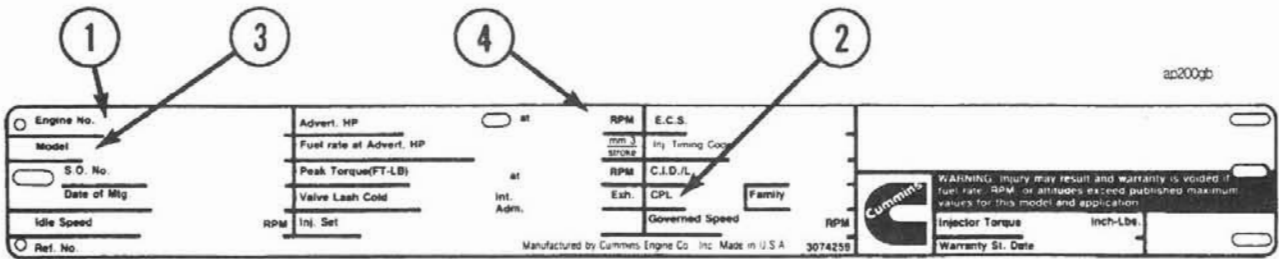
The engine dataplate shows specific information about your engine. The engine serial number and Control Parts List (CPL) provide information for ordering parts and service needs.

NOTE: The engine dataplate **must not** be changed unless approved by Cummins Engine Company, Inc.

The dataplate is located on the fuel pump side of the engine on the side of the rocker housing.

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

1. Engine Serial Number (ESN)
2. CPL
3. Model
4. Horsepower and RPM Rating



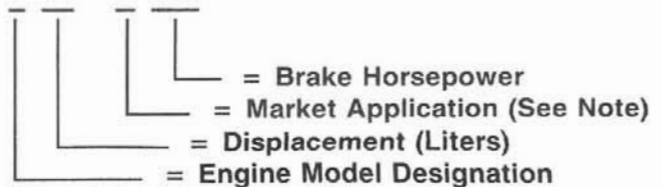
Fuel Pump Dataplate

The fuel pump dataplate is located on the top of the fuel pump. It provides information for fuel pump calibration.

Cummins Engine Nomenclature

The Cummins engine nomenclature provides the following engine data:

L 10 - C 240



- NOTE:** A = Agriculture
C = Construction
G = Generator Drive

General Specifications

Metric [U.S. Customary]

General Engine Data

Horsepower (Refer to the engine dataplate)

Engine speed @ Maximum Output:

- Standard Rating (RPM) 2100

Bore and Stroke 125 mm [4.921 in] X 136 mm [5.354 in]

Displacement 10 liters [611 C.I.D.]

Compression Ratio: 16.3:1

Firing Order 1-5-3-6-2-4

Engine Weight (with Standard Accessories):

- Dry Weight 884.5 kg [1950 lb]
- Wet Weight 929.8 kg [2050 lb]

Crankshaft Rotation - (viewed from the front of the engine).....Clockwise

Fuel System

For performance and fuel rate values, refer to the engine data sheet, or the fuel pump code for the particular model involved.

Maximum Allowable Restriction to Pump:

- With **Clean** Filter 102 mm Hg [4 in Hg]
- With **Dirty** Filter 204 mm Hg [8 in Hg]

Maximum Allowable Return Line Restriction 63 mm Hg [2.5 in Hg]

Maximum Allowable Return Line Restriction with Check Valves and/or Overhead Tanks . 165 mm Hg [6.5 in Hg]

Lubricating Oil System

Oil Pressure - Low Idle (Minimum Allowable) 70 kPa [10 psi]

- At 1200 RPM or Torque Peak (Minimum Allowable) 207 kPa [30 psi]

Oil Capacity of Standard Engine:

- Combination Filter 2.6 liters [0.7 U.S. gal]
- Oil Pan (High-Low) 34 to 30.3 liters [9 to 8 U.S. gal]

Total System Capacity including filters 38 liters [10 U.S. gal]

Cooling System

Coolant Capacity (Engine Only) 11 liters [12 U.S. qts]

Standard Modulating Thermostat Range 82 to 93°C [180 to 200°F]

Minimum Recommended Pressure Cap 50 kPa [7 psi]

Minimum Recommended Operating Temperature 70°C [158°F]

Maximum Allowable Operating Temperature 100°C [212°F]

Exhaust System

- Exhaust Pipe Size (Normally Acceptable Inside Diameter) 102 mm [4 in]
 Maximum Exhaust Pipe Restriction
- H₂O 1016 mm [40 in]
 - Hg 75 mm [3 in]

Air Intake System

- Maximum Allowable Intake Restriction with Clean Air Filter Element:
- Heavy Duty Dry Type Cleaner 25.4 cm H₂O [10 in. H₂O]
- Maximum Allowable Intake Restriction with Dirty Air Filter Element 64 cm H₂O [25 in. H₂O]

Electrical System

Minimum Recommended Battery Capacity

System Voltage	Ambient Temperatures			
		-18°C [0°F]		0°C [32°F]
	Cold Cranking Amperes	Reserve Capacity * Amperes	Cold Cranking Amperes	Reserve Capacity* Amperes
12 Volt	1800	640	1280	480
24 Volt **	900	320	640	240

* The number of plates within a given battery size determines reserve capacity. Reserve capacity determines the length of time which sustained cranking can occur.

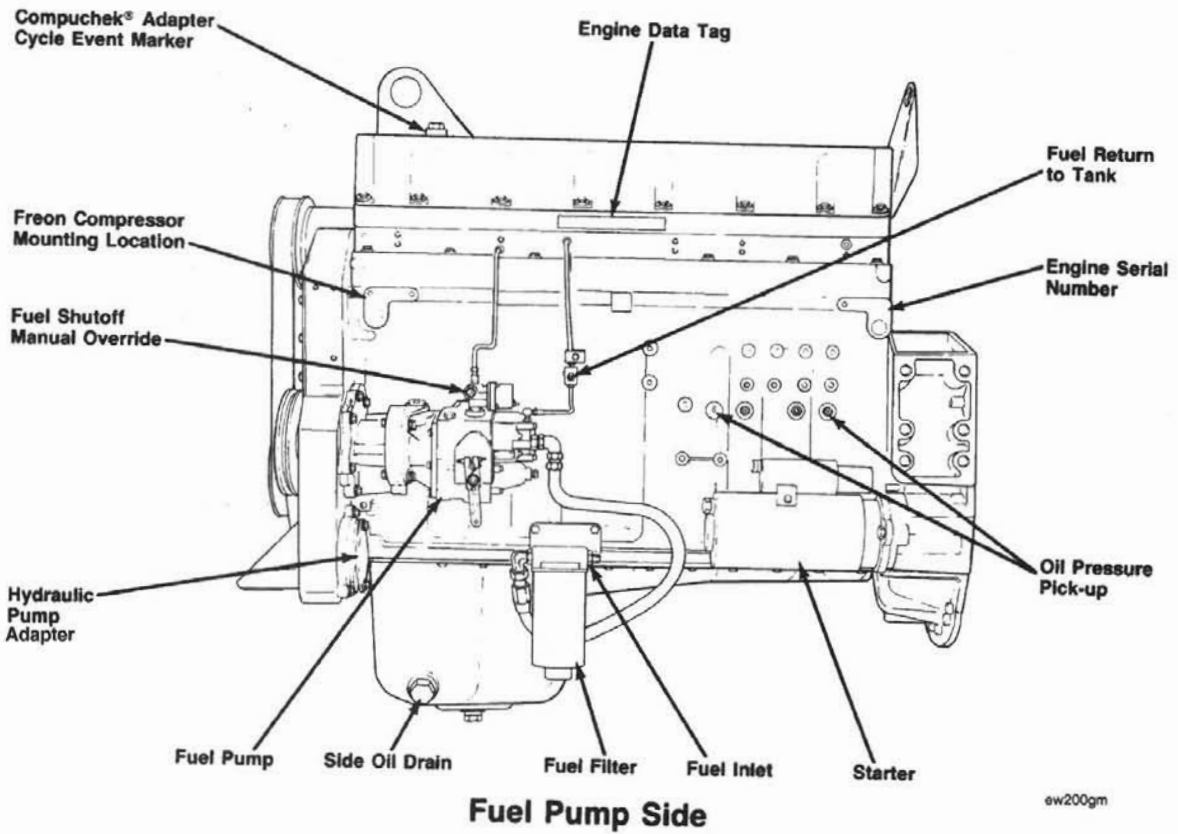
** CCA ratings are based on two, 12 volt batteries in series.

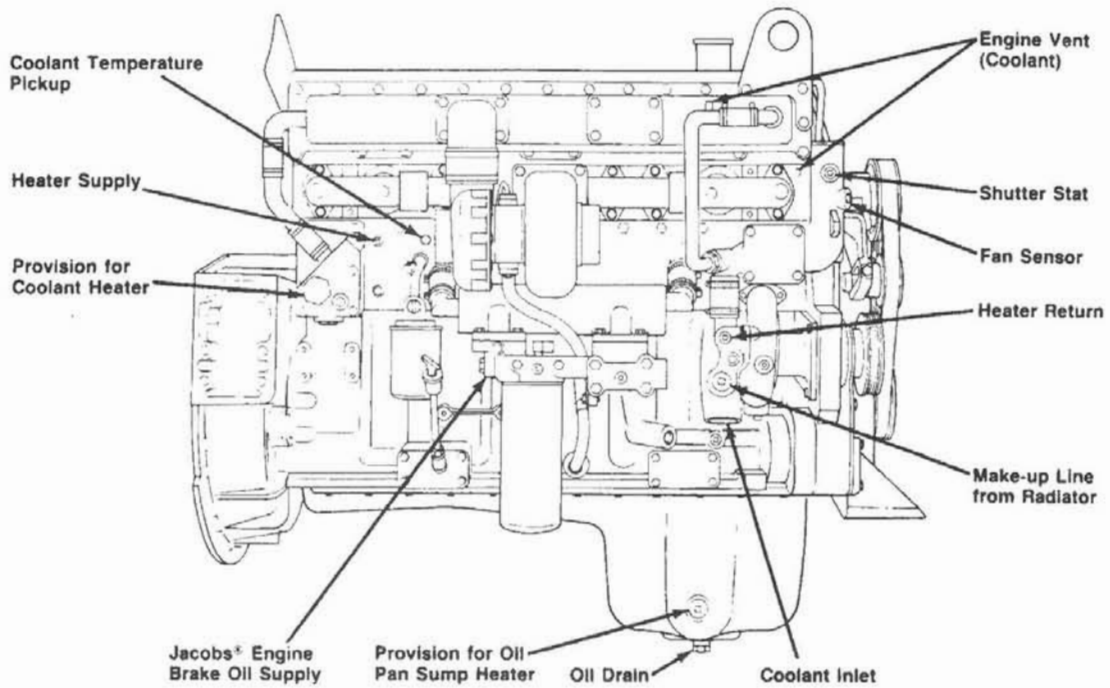
Batteries (Specific Gravity)

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

External Engine Components

The illustrations which follow show the locations of the major external engine components, the filters, and other service and maintenance points. Some external components will be at different locations for different engine models.





Exhaust Side

ew200g04

Section 1 - Operating Instructions

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