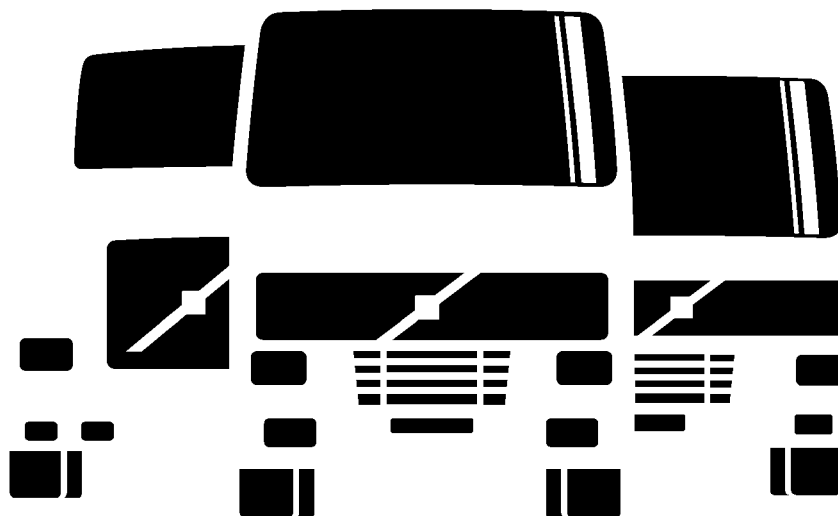


Service Manual Trucks

Group 177-501

Preventive Maintenance
Annual Service
VN, VHD



Foreword

The descriptions and service procedures contained in this manual are based on designs and methods studies carried out up to January 2002.

The products are under continuous development. Vehicles and components produced after the above date may therefore have different specifications and repair methods. When this is believed to have a significant bearing on this manual, supplementary service bulletins will be issued to cover the changes.

The new edition of this manual will update the changes.

In service procedures where the title incorporates an operation number, this is a reference to an S.R.T. (Standard Repair Time).

Service procedures which do not include an operation number in the title are for general information and no reference is made to an S.R.T.

The following levels of observations, cautions and warnings are used in this Service Documentation:

Note: Indicates a procedure, practice, or condition that must be followed in order to have the vehicle or component function in the manner intended.

Caution: Indicates an unsafe practice where damage to the product could occur.

Warning: Indicates an unsafe practice where personal injury or severe damage to the product could occur.

Danger: Indicates an unsafe practice where serious personal injury or death could occur.

Volvo Trucks North America, Inc.
Greensboro, NC USA

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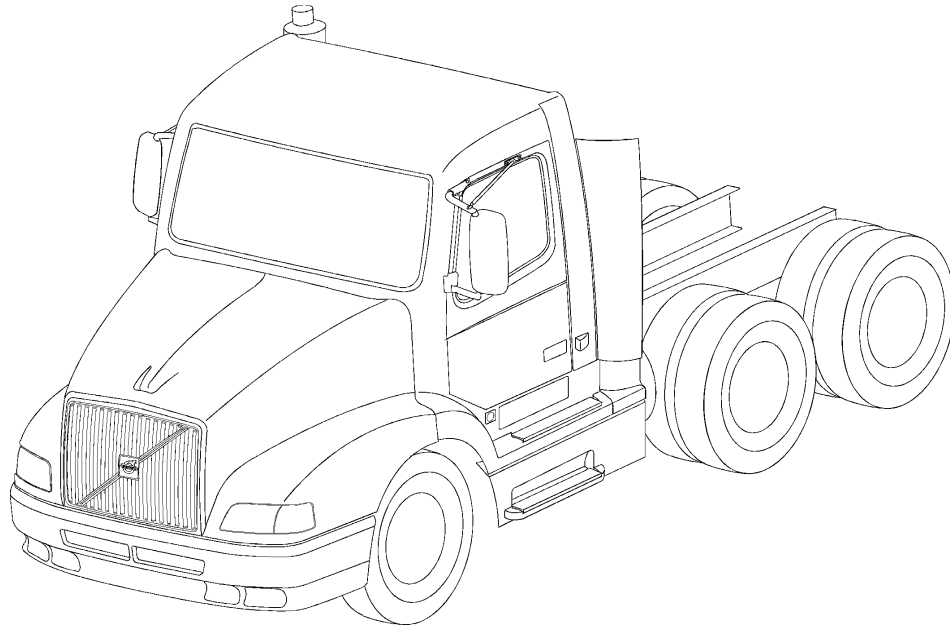
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General

Preventive Maintenance



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Introduction

This manual describes inspection and lubrication requirements during the Annual Service of Volvo vehicles. The purpose for performing the preventive maintenance is to ensure that the vehicle is safe and roadworthy over its full lifetime.

The driver is taking part in the continuous preventive maintenance program by completing the required Daily Pre-trip Inspection. This is a purely visual inspection that is designed to detect any obvious problems that would make the vehicle unsafe to take on the road. Added to the Pre-trip Inspection is the Preventive Maintenance Program that is typically carried out by trained personnel using a systematic approach to cover all important components of the new vehicle.

Preventive maintenance is a planned vehicle maintenance program that provides an orderly series of servicing and inspecting procedures. A well applied maintenance program realizes the investment made in the vehicle. The difference between a poorly maintained vehicle and a well maintained vehicle will not show up until later mileages. Good maintenance is necessary to assure the designed life expectancy of the vehicle and its individual components.

Maintenance Coverage

There is no firm maintenance program that will apply to all operations. A basic maintenance program is not difficult to set up; to make the program the most effective takes time and effort, and is based around the needs and experiences of each individual operation. The program in this service manual covers all types of Volvo VN/VHD vehicles with medium to high mileages and sometimes high loads.

Use this established maintenance program as a base to tailor an individual maintenance program for customers that have requirements that are outside of the scope of this program.

To establish an individual program, look at information sources that are usually available, such as:

- Driver's repair or complaint reports.
- Unusual parts usage.
- Repetitive failures or problems found in inspection.
- Unscheduled maintenance or repairs.
- Road failures.

Program Structure

This maintenance program has been based on the progress in vehicle technology and increases in oil quality to simplify the maintenance.

For simplified scheduling, the program has tied maintenance to logical time or mileage limits that make it easy to anticipate needed servicing. For the majority of on-highway operators, the 24,000 km (15,000 miles) or 4 months schedule can be used with little change.

It is important that the scheduled intervals are followed as limits. Maintenance can be done before either 24,000 km (15,000 miles) have been reached or before 4 months are up but must be made at or before either the mileage or the time limit has been reached.

Advantages

A well-planned preventive maintenance program offers the following advantages:

- The lowest attainable maintenance cost.
- Maximum vehicle uptime.
- Better fuel economy.
- Reduced road failures; greater dependability.
- Increased customer confidence, better public relations.
- Less possibility of accidents due to defective equipment.
- Fewer driver complaints.

Regardless of the planning and the details of the maintenance program, the success of the program hinges on the caliber of workmanship in performing the actual inspection. A major cause of failure is a "pencil inspection"; that is, the mechanic checks off each operation as being OK without making the actual inspection. A "pencil inspection" defeats the purpose of the inspection, which is to detect an impending failure.

Maintenance Form

A service manual is issued detailing the current inspection forms. Forms are created for different users but all with the same references to this document. When the inspection point is carried out, check the box if the item is OK. If further work, such as adjustment, repair, etc., needs to be performed, check that box and go on with the next inspection point. Items noted as being faulty or in need of adjustment need to be shown to the customer and scheduled for repair.

There are many time — and/or mileage-based — service items that are not listed on the form. Look at the end of this document for a listing of additional components that may need to be serviced, depending on the mileage or time since last service.

Maintenance Records

It is important to use the inspection form together with other reports to come up with the best maintenance program for a specific application. Use driver's reports, complaints, parts usage, repetitive failures, previous repair orders, road failures, etc. to build a maintenance picture of the customer operation.

Records should be collected over the lifetime of the vehicle to form a permanent vehicle record file. The vehicle file should be used to customize the operational maintenance needs.

The "Driver Inspection Form" is also required by Federal law. The use of this inspection report makes the driver a part of the maintenance program and places direct responsibility on the driver to report problems that may come up during operation. When properly used, there should be no excuse for a defective vehicle being in service.

Note: The included Annual Service checklist is an uncontrolled copy. The document may be updated without notice.

Annual Inspection

Note: For further information refer to Publication 177-500, "Preventive Maintenance, Basic Service, VN,VHD."

The Annual inspection is carried out yearly in addition to a Basic inspection. This inspection is designed to open up components for inspection or using test equipment to record performance.

The ideal time to carry out the Annual inspection is right before the hardest season, which means just before winter in the cold weather climates or just before summer in the hot weather climates.

All inspection points are to be carried out as verification of function or condition. Any defects are noted on the inspection form for later correction, if so ordered by the vehicle owner.

Note: The standard repair time for performing the Annual Service Preventive Maintenance is based on inspection without repair or adjustment, and Oil and Filter Change.

Other Inspection

There are additional service points that are carried out at specific mileage or time intervals. These are not part of the Preventive Maintenance basic time. They should be scheduled as an adjustment or repair job carried out at the same time as the Preventive Maintenance, and are listed in this document as reminders only.

Noise Emissions

Volvo Trucks North America, Inc. warrants to the first person who purchases this vehicle for purposes other than resale and to each subsequent purchaser, that this vehicle as manufactured by Volvo Trucks North America, Inc. was designed, built and equipped to conform, with all applicable U.S. EPA Noise Control Regulations, at the time it left the control of Volvo Trucks North America, Inc.

This warranty covers this vehicle as designed, built and equipped by Volvo Trucks North America, Inc., and is not limited to any particular part, component or system of the vehicle manufactured by Volvo Trucks North America, Inc. Defects in design, assembly or in any part, component or system of the vehicle as manufactured by Volvo Trucks North America, Inc., which, at the time it left the control of Volvo Trucks North America, Inc. caused noise emissions to exceed Federal standards, are covered by this warranty for the life of the vehicle.

Tampering with Noise Control System

Federal law prohibits the following acts or the causing thereof:

(1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use;

or

(2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

Among those acts presumed to constitute tampering are the acts listed below:

Noise Shields and Insulation

Removing or rendering inoperative the engine and/or transmission noise deadening panels, shields or insulating materials.

Removing or rendering inoperative the cab tunnel or hood noise insulating materials.

Removing or rendering inoperative any truck body mounted sound insulation components and/or shields (e.g., cab or fender shields, skirts, wheel housing splash shields, etc.).

Engine Control and Fuel Systems

Removing or rendering inoperative, or modifying the engine control system (such as the ECU or the fuel system components) in order to allow the engine to operate outside of the manufacturer's specifications (e.g., exceeding the manufacturer's engine speed limits).

Cooling System

Removing or rendering inoperative cooling system components (e.g., temperature-controlled fan clutch, fan shroud, fan ring, recirculation shields, etc.).

Exhaust System

Removing or rendering inoperative exhaust system components (e.g., muffler, pipes, clamps, etc.).

Air Intake System

Removing or rendering inoperative air intake/induction system components (e.g., filter, filter housing, ducts, etc.).

Safety Advice



DANGER

Never operate a diesel engine in an area where hydrocarbon vapors (gasoline for example) are present or are suspected to be present. Hydrocarbon vapors can enter the air intake and make the engine over-speed, causing severe damage and/or explosion or fire. Serious personal injury or death can occur.



DANGER

Before working on a vehicle, set the parking brakes, place the transmission in neutral, and block the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury or death.



DANGER

When entering and exiting the cab, use caution. Always have a firm hand hold and/or stable foot position before transferring weight to that position. Do not carry anything when entering or exiting. Make sure the soles of your shoes and the cab steps are free from dirt, grease, oil or moisture before using the steps. Failure to do so can result in a fall, and serious personal injury or death may occur.



DANGER

If using a jack and/or jack stands, choose proper fault-free equipment. Failure to do so can result in equipment failures and personal injury or death may occur.

Note: During the Preventive Maintenance inspection, check the condition of warning labels on the vehicle. If a label is damaged or defaced to the point where the message cannot be read, note on the inspection form to have it replaced.

Specifications

Engines

General

For further information concerning component specifications see service information in Group 1, "Oil and Filter Change Intervals for Volvo Components," Publication Number 175-001, and appropriate vendor literature.

In a modern diesel engine it is very important to have regular oil changes. The demands of pulling high loads, pulling at high elevations, extreme high or low temperatures and longer service intervals, make the choice of correct oil a hard task. The Volvo dealer, the engine manufacturer or the oil manufacturer has the expertise to analyze driving conditions and to recommend which oil gives the best protection and economy.

Oil

The engine oil lubricates, seals, cools and cleans the engine. Filtering the intake air and using a low sulfur fuel helps the oil protect the engine parts. With better engine designs and improved oils, the service intervals have steadily increased. The interval choice depends on the engine manufacturer specifications. Make sure the correct oil type and also the correct viscosity are chosen for the mileage interval driven.

Periodic oil testing is recommended. The test results give a continuous picture of the health of the engine and can warn well in advance of a problem developing.

The intervals will not cover all applications. In on/off highway driving, severe off highway, continuous stop-and-go city driving and extremely high mileages, the oil change interval and preventive maintenance schedule need to be customized for the best protection and economy. The intervals listed in these specifications are guidelines that should be used in establishing a correct maintenance program.

CAUTION

Adding unknown additives may put the engine at risk of failure. There are many aftermarket oil additives that claim improved performance if added to the engine oil. Each oil type recommended already contains additives that have been tested by a collaboration with engine and oil manufacturers.

Synthetic oil is offered as an alternative to the traditional petroleum based oil for the engines. The ability of synthetic oil to protect the engine is better than regular oil but its life is the same as for regular oil. This is because of the combustion by-products that contaminate the oil. These contaminants will make the change intervals the

same as for regular oil. However, in extreme driving conditions, a synthetic oil may be the only choice for the application.

Note: It is not recommended to mix synthetic oils with petroleum-based oils.

Coolant

The engine coolant protects the cooling system from freezing or boil over problems. It also protects against corrosion and cylinder liner pitting. Coolant requirements are based on the additive levels present in the cooling system. To be able to run the cooling system as long as 2 years between coolant changes, there must be a replenishment of additives as they are used up. Testing should be done regularly to be sure the additive levels are within recommended levels.

Never run the engine with only water in the cooling system. Always use a mixture of clean water and a recommended antifreeze. The mixture should never be less than 40% antifreeze and 60% clean water or more than 60% antifreeze and 40% clean water.

Texaco Extended Life Coolant

Note: For further information on long life coolant refer to Service Bulletin 260-002, "Texaco Extended Life Coolant."

CAUTION

Texaco Long life coolant is colored red for identification purposes, so as not to mistake it for conventional, green coolant. Long life coolant will test as out of additives (SCA), but SCA should not be added.

Fleetguard ES Complete Long Life Coolant

Note: For further information on Fleetguard ES Complete Long Life Coolant refer to appropriate vendor literature.

Fuel

The sulfur content in low-sulfur fuel has been regulated to a maximum of 0.05% per weight for No.2-D diesel fuel. For fuels that have a sulfur content of 0.5% by weight and above, most engine manufacturers are requiring that oil is changed at shorter intervals. Sulfur creates highly acidic pollutants in the oil that break down the additives at a higher rate. If fuel with a higher sulfur content is used, the engine manufacturers recommend that the oil change intervals be reduced.

VOLVO ENGINES

Note: It is not recommended to mix synthetic oils with petroleum based oils.

For further information concerning component specifications see service information in Group 1, "Oil and Filter Change Intervals for Volvo Components," publication number 175-001, and appropriate vendor literature.

Maximum change intervals are 40,000 km (25,000 miles) if using oil that meets the Volvo Drain Specification -2 (VDS -2) . If the oil does not meet the requirements according to VDS, change intervals should be 24,000 km (15,000 miles) or less. Contact Volvo or a Volvo authorized dealer to obtain a list of approved VDS oils.

Shorter oil change intervals maybe required if the engine is operating in a dusty environment or if frequent stops and starts are made.

Supplemental coolant additives are recommended for all Volvo cooling systems. Antifreeze alone does not provide sufficient corrosion protection for heavy duty diesel engines.

If the fuel has a sulfur content exceeding 0.5% by weight, halve the indicated maximum mileage intervals.

Oil filters should always be changed when changing oil.

CUMMINS ENGINES

For further information, refer to the appropriate vendor literature.

If the engine is operating in ambient temperatures consistently below - 20 °C (0 °F) or above 40 °C (100 °F), perform maintenance at shorter intervals. Shorter intervals are also required if the engine is operating in a dusty environment or if frequent stops and starts are made.

Oil filters should always be changed when changing oil.

Supplemental coolant additives are recommended for all Cummins cooling systems. Antifreeze alone does not provide sufficient corrosion protection for heavy duty diesel engines.

Maximum Oil Drain Intervals

Note: Extended oil drain intervals are not recommended.