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General Safety Practices
Miscellaneous
VN, VHD

General Safety Practices

The following information covers General Safety Practices for components included in group 9.

There is no substitute for common sense and careful practices in the workplace. Improper practices or carelessness can cause burns, cuts, mutilation, asphyxiation, or other bodily injury or death.

This information contains general safety precautions and guidelines that must be followed to reduce risk to personal safety. Special safety precautions are listed in specific procedures when they apply.

Read and understand all of the safety precautions and guidelines before performing any repair.

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General

General Safety Practices

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

Exhaust gases contain carbon monoxide. When testing a vehicle with the engine running, conduct the test outdoors or use a properly vented exhaust hose. Prolonged or excessive exposure may cause serious illness or death.

DANGER

Never work under or around a vehicle unless it is supported on jack stands of adequate rating. Failure to use adequate jack stands can result in the vehicle falling, which can cause serious injury or death to anyone under the vehicle.

WARNING

When disconnecting battery cables, disconnect the ground (negative) cable first to prevent personal injury from electrical shock.

WARNING

Always wear appropriate eye protection to prevent the risk of eye injury due to contact with debris or fluids.

WARNING

HOT ENGINE! Keep yourself and your test equipment clear of all moving parts or hot engine parts and/or fluids. A hot engine and/or fluids can cause burns or can permanently damage test equipment.

WARNING

Clean up fuel spills immediately. Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

WARNING

Do not work near the fan with the engine running or the ignition in the ON position. The engine fan can engage at any time without warning. Anyone near the fan when it turns on could be seriously injured.

CAUTION

Possible damage to electronic components. Turn the vehicle ignition switch OFF before disconnecting or connecting any electrical components. Failure to de-energize circuits may result in electronic equipment damage.

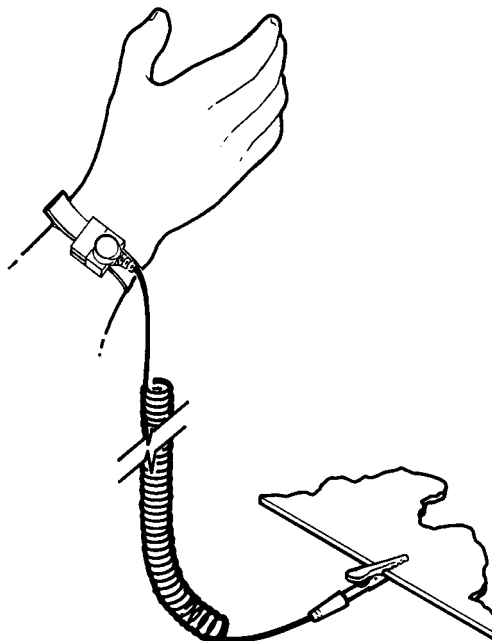
Preventing Electrostatic Discharge (ESD)

CAUTION

A wrist grounding strap must be worn when working on electronic equipment such as the instrument cluster. This is to prevent electrostatic discharge (ESD), which can damage electronic components. To use the wrist strap in a vehicle, attach the alligator clip to the nearest electrical ground such as a metal mounting screw, a ground terminal or preferably a ground stud.

Human skin can hold more than 1000 volts of static electricity. Although getting a static shock is annoying, it is not dangerous because there is so little energy stored by clothing. But when dealing with circuits designed to sense differences smaller than 1 volt, electrostatic discharge can be a subtle but destructive problem. Circuit boards mounted in the instrument cluster or in modules mounted elsewhere may not fail immediately after being hit with a static discharge. Rather they may work for a while, then fail for no apparent reason. The culprit then is often the normal warming up and cooling down process of the module, engine or cab interior.

Grounding straps are available for minimal cost from electronic supply stores. Grounding straps consist of a wrist strap, a coiled extension wire and an alligator clip. Be sure to purchase one with a long enough extension wire to allow free movement.



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Disconnecting/Connecting the Battery

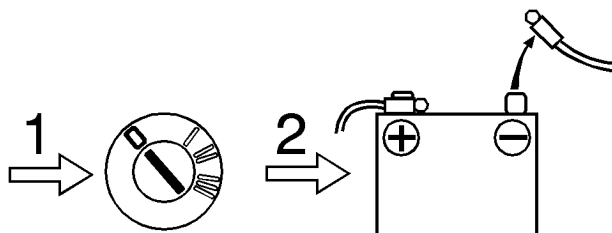
WARNING

Personal injury risk. If a new SRS ECU or airbag module has been installed, make sure that there is nobody inside the cab when connecting the battery, and that the cab doors and driver side window are closed. Otherwise, personal injury may result due to possible deployment of the airbag.

Note: Leave the passenger side window open because power locks may lock the doors when the battery is reconnected.

CAUTION

When disconnecting the battery, disconnect any ground cables connected to the battery (such as engine ECU, satellite system, etc.). Disconnect those grounds **first** to avoid damaging electrical components.



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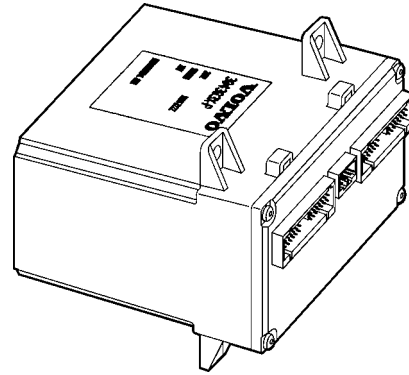
ECUs (Electronic Control Units)

ECUs consist of sophisticated electronics that can be permanently damaged if not treated properly.

To prevent serious damage to ECUs, please follow these important guidelines:

CAUTION

Before beginning a procedure in which the battery must be disconnected, turn the ignition OFF and disconnect any ground cables connected to the battery (such as engine ECU, satellite system, etc.). Disconnect those grounds **first** to avoid damaging electrical components. Then disconnect battery negative and positive terminals (disconnect the ground terminal first).



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Vehicle ECU

FCC, F/CMVSS, and Canadian RFN Requirements

All Volvo trucks built by and fully completed by Volvo comply with FMVSS and CMVSS No. 108, Lamps, Reflective Devices, and Associated Equipment, as well as other applicable FMVSS and CMVSS that are affected by electrical components.

Incomplete Vehicles (Cab/Chassis) will conform to these Federal and Canadian Motor Vehicle Safety Standards according to the stipulations and conditions referred to in the Incomplete Vehicle Document provided with each incomplete vehicle.

Note: Any item installed by Volvo to achieve this conformance must not be altered, changed, or converted.

Any device that emits Radio-frequency (RF) energy, such as AM/FM radios, radio-controlled secondary systems, or mobile communications systems marketed in the USA, are subject to the rules and regulations of the Federal Communications Commission (FCC), 47 C.F.R. Part 2 & 15. Devices marketed in Canada are subject to Canadian Stds. RSS-119 and RSP-100.

Wire Troubleshooting and Repair

Continual electrical problems may be the result of incomplete or inadequate diagnosis and improper repairs. Unless the root cause of a problem is determined, it will fail again, i.e., a blown fuse will blow again unless the cause of the overload is located. Make every effort to determine the root cause of a failure.

When troubleshooting,

- Never pierce wiring insulation with test probes.
- Do not pierce through seals on water-resistant connectors.
- Never insert test probes into connectors. The probes may spread the terminals and cause intermittent faults.



WARNING

Improper repair or modification of wiring can result in the failure of the vehicle's electronic systems, a short circuit, and personal injury from a fire.



CAUTION

Follow Volvo's instructions on "Data Link Troubleshooting and Repair" in group 371 if repairs are needed to wires 406 (yellow), 407 (green) or 408 (shielded). These wires carry the high-speed communications between the electronic systems in the vehicle.



CAUTION

Follow Volvo's instructions on "Data Link Troubleshooting and Repair" in group 371 if repairs are needed to data link wiring (wires 400 or 401). These wires are used for the transmission of data for diagnostic messages and gauges. Improper repair can cause these functions to fail.



CAUTION

If a circuit must be added to the electrical system, and it will carry high currents or frequencies, route it in a location AWAY from wires 400 and 401 to prevent mutual inductance from interfering with data link functions.



Data Link Wiring

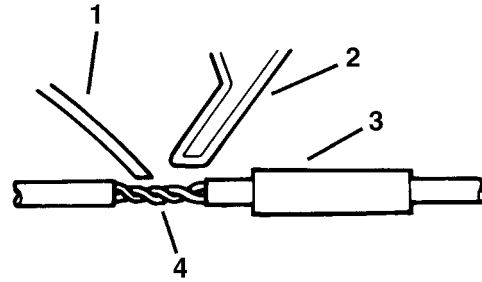
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Wire Splicing

Note: Wiring terminal and connector repair requires the use of proper terminals (Packard, JAE, etc.) and specialized tools. The following procedures are for general wiring repairs only.

Should splicing be necessary, follow these guidelines:

- When possible, replace a damaged wire rather than repairing it. If this is not possible, solder or splice the wires and use heat-shrink tubing with sealant over the splice.
- For crimp and seal repairs, splice or terminal connections with heat-shrink covering are recommended. If non-heat shrink connectors are used, a separate piece of heat-shrink tubing must be used to seal the connection.
- When replacing wires use the correct wire size. Never replace a wire with one of a smaller size or replace a fusible link with a wire of a larger size. Secure each harness or wire in place to prevent chafing or damage to the insulation due to vibration.
- For solder repairs, do not use acid core solder. When soldering wiring always use rosin flux solder to bond the splice. Use sealant-shrink tubing to cover all splices or bare wires.
- It is very important when soldering electrical terminals to obtain a good soldered joint. Use a quality soldering iron such as a Weller Model 440D or equivalent. A good quality soldering iron will offer dual heat in a medium range (145/210 watts). Use Kester alloy SN60, Flux-44 Rosin, 0.80 mm (0.032 in.) maximum diameter or equivalent.



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Wire splicing

- 1 Solder
- 2 Soldering iron
- 3 Heat shrink tubing with sealant
- 4 Wires twisted

Protecting the Circuit

Any change done to the existing vehicle wiring should only be done with extreme caution and a study of the vehicle electrical system. Changes must be clearly thought out and the effect on the system must be considered to ensure that adequate circuit protection will be provided and that undesirable current paths are not created.

All circuits must be protected (whether standard or added) by a base vehicle breaker or fuse. In many cases it is recommended that one be added to the base electrical system by the body builder or installer. When additional loads are added to the standard vehicle protected circuit, you must ensure that the total of the current draw on that protected vehicle circuit is less than 80% of the base vehicle fuse rating or less than 100% of standard vehicle circuit breaker rating. It should be noted that a calculation of total current draw is the sum of the base vehicle circuit

requirement plus the total of the add-on component current requirement. This can be measured by the use of an ammeter.

Increasing the rated capacity of a factory installed fuse or circuit breaker is prohibited. As a general rule, the total electrical load on a circuit cannot (after the addition of electrical equipment) exceed 80% of the fuse or 100% of the circuit breaker rating for that circuit. Nor should the total load exceed the rated capacity of any limiting devices, such as switches and relays for that circuit.

If the total electrical load to be added to the circuit exceeds the value of the circuit protection, or the value of its limiting components, those items cannot be added directly to the circuit.

Radio Frequency Interference (RFI)

During the alteration/modification process the installer, manufacturer, or modifier must take the proper precautionary measures to maintain the RFI integrity of the original installed components.

Both the U.S. and Canada have rules and regulations that affect devices that emit RF energy. (Reference FCC, 47 C.F.R., part 2 & 15; also Canadian Std. RSS-119 and RSP-100.)

The following is an example list of precautionary measures to be taken, however there are many others that should be considered:

- Metallic components added to the chassis or the body must be grounded to the chassis.
- Electrical grounds on all components must be retained.
- Drive belts added or changed must be "static conductive."

- Fan, water pump, power steering, and other belts should be of the same type or equal to the original equipment. Any type that builds up static electrical charges is not acceptable.
- Electric circuits should not be located within 8 in. (200 mm) of any electrical noise source (such as alternator wiring, ignition wires, tachometer circuits, starter motor and wiring). In some cases involving extra sensitive circuits, it may be necessary to shield the circuits as well.

Any item installed to suppress RFI emissions, and that is subsequently removed during alteration or repair, must be reinstalled on the vehicle upon completion of the vehicle adaptation. It must be reinstalled exactly in the manner it was originally installed by Volvo.

Fifth Wheel

The following dangers, warnings, and cautions are applicable to fifth wheel operations on Volvo vehicles.

DANGER

Check that the transmission is in neutral, the wheels to the trailer are chocked and that the parking brake is applied. Failure to do so can result in unintended trailer movement, serious injury or death.

DANGER

Stay clear when suspension air is released. Chassis may drop quickly and can cause serious injury or death to anyone under the vehicle.

DANGER

Activation of the kingpin lock release switch **only** unlocks the kingpin latch mechanism. To relock the latch mechanism, you **must** pull forward and then back up to reengage the kingpin lock mechanism. Failure to follow these instructions can result in separation of the trailer from the tractor causing personal injury or death.

DANGER

It is important that the operating and service procedures pertaining to fifth wheels be fully understood and closely followed. Failure to properly couple the tractor and trailer can result in their separation, causing death and property damage.

WARNING

The lock is spring loaded. To avoid injury use a pry bar to rotate the jaw when opening or closing the locking mechanism. Keep hands away to avoid injury.

WARNING

If the jaw is not in the open position use a pry bar to rotate the jaw to the open position. The lock is spring loaded. Keep hands away to avoid injury.

WARNING

Eye injury hazard. Wear eye protection when welding or grinding any part of the truck, trailer, or fifth wheel. Failure to use eye protection could result in severe eye injury and blindness.

CAUTION

The vehicle must never be driven with the air springs deflated. Damage to air suspension parts will occur if springs are not inflated properly.

CAUTION

The trailer must be stopped and the trailer brakes locked or damage to the tractor and/or trailer may result from uncontrolled sliding of the fifth wheel.

CAUTION

Do not operate the vehicle if the plungers are not fully engaged and the trailer landing gear is not fully retracted. Doing so may cause damage to the tractor, trailer, and landing gear.

Towing Configurations

The following danger, warnings, and cautions are applicable to non-fifth wheel operations on Volvo vehicles.

DANGER

Do not use the tow eyes for raising the front of the vehicle; the tow eyes can break. Do not crawl under a vehicle suspended by tow eyes. Failure to follow these instructions can result in serious personal injury or death.

WARNING

Do not tow a vehicle backwards when equipped with roof air fairings. The fairings act as an air scoop and may break off. Failure to follow this warning may lead vehicle damage and personal injury.

WARNING

Vehicles with air fairings or large superstructures are tall. Make sure that the total height of the vehicle, when it is raised up behind the wrecker, does not exceed the maximum allowed height for local underpasses. Failure to follow this instruction may lead to vehicle damage and personal injury.

WARNING

If a vehicle with air suspension is lifted by the rear frame member, there is a risk that the air springs will separate from the spring plates. When towing has been completed, never use your hands to reposition the air springs. There is a great risk that your hand will be caught between spring and plate causing personal injury.

CAUTION

If the vehicle becomes disabled, it is very important to tow it properly. Failure to do so can cause damage to the frame and body parts. Follow the instructions below to avoid damage.

CAUTION

It is recommended that the front bumper be removed when lifting with the front tow eyes/hooks. Failure to remove the front bumper can cause possible component damage.

CAUTION

The driveshaft must be removed before towing the vehicle. Failure to remove the driveshaft may result in damage to the transmission.