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General Safety Practices
Frame, Springs and Wheels
VN, VHD

General Safety Practices

The following information covers General Safety Practices for components related to frames, springs and wheels.

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 chock the wheels. Failure to do so can result in unexpected vehicle movement and can cause serious personal injury 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.

DANGER

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

WARNING

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

WARNING

Before beginning any work on any part of the air system, be certain that the air pressure has been released. Failure to do so may cause a component to violently separate, which can result in serious personal injury.

Welding

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

Pneumatic components store compressed air and can separate violently during disassembly or removal. Before servicing any part of the pneumatic (air) system, completely release the air pressure. Failure to do so can result in serious personal injury or death.

WARNING

Use a welding face mask to protect eyes and face and welding gloves to protect the hands when welding. Failure to follow these recommendations may result in personal injury to the eyes or skin.

CAUTION

Welding on trucks can damage the vehicle electrical system/components due to the voltage and current spikes that normally occur when welding. It is preferable to avoid welding on an assembled truck. However, if any structure on or in contact with the vehicle must be welded, follow the recommendations below:

- Before welding on the vehicle, disconnect power to the component being welded.
- Disconnect both the positive (+) and negative (-) battery cables. Disconnect the negative cable first. Reconnect the positive cable first. Vehicles equipped with battery “quick disconnect” must still have the cables removed directly at the battery.
- Disconnect engine/starter ground from the chassis. This connection is located outside the left-hand frame rail in the engine compartment. Disconnect the power harness and vehicle interface harness at the engine Electronic Control Unit (ECU).
- If vehicles are equipped with systems that have their own Electronic Control Units (ECUs), such as ABS brakes, Vehicle ECU, or instrument cluster disconnect each control unit at each electrical connection. This “opens” the circuit and will prevent transient voltage from reaching one ECU to another.
- Attach the welder ground cable as close to the weld as possible (no more than 2 feet from the part being welded).
- Do not connect the welder ground cable to the engine ECU or the ECU cooling plate.
- Welding cables should not be allowed to lay on/near or cross over any electrical wiring or electronic component during the welding procedure.
- After the welding process has been completed and the welded parts have cooled, inspect wiring and components for possible shorts or damage which would allow the possibility of drawing excessive currents or cause short circuits when the batteries are reconnected.

CAUTION

DO NOT WELD on the engine or engine components. Welding on the engine or components mounted on the engine can cause serious damage to the Engine ECU and other electrical components.

Welding anywhere on the truck chassis requires that certain precautionary measures be taken. This is required to prevent damage to electrical, as well as electronic systems, wiring harness and components.

Before welding on the vehicle:

- 1 Disconnect power to the vehicle.
- 2 Disconnect both the positive (+) and negative (-) battery cables. Disconnect the negative cable first. (When reconnecting, connect the positive cable first.)

Note: Disconnect other ECU grounds from the battery before disconnecting the main ground (to avoid damage to the ECUs).

- 3 Disconnect the engine/starter ground from the chassis.
- 4 Disconnect the power harness and vehicle interface harness at the Engine Electronic Control Unit (EECU).
- 5 Disconnect all electronically controlled modules and devices, including:
 - Governor Controls
 - Shutdown/Warning Electronics
 - Starter and Ignition Controls
 - Engine and Vehicle ECUs
 - Transmission ECU
 - Anti-lock Brake (ABS) ECU

- Chassis ECU
- Electronic Speedometer/Tachometer
- Other ECUs

(This prevents the possibility of alternate paths for induced voltage and currents being created and damaging those components.)

- 6 Disconnect the electrical connectors at the rear of the instrument cluster.
- 7 Attach the welder ground cable as close as possible to the weld (no more than 60 cm (24 in.) from the part being welded).
- 8 Do not connect the welder ground cable to the engine ECU or the ECU cooling plate.

There are certain basic common sense rules also to be followed when welding, including (but not limited to):

- Welding cables should not be allowed to lie on/near or cross over any electrical wiring or electronic component during the welding procedure.
- After the welding process has been completed and the welded parts have cooled, inspect wiring and components for possible shorts or damage which would allow the possibility of drawing excessive currents or cause short circuits when the batteries are reconnected.

Routing and Clipping

A truck chassis must sometimes undergo a great amount of rework to suit various body applications; in such cases, welding and movement of components may be necessary. With this in mind, removal of wiring and wiring hazards must be done prior to the rework operation and reinstalled when the work is completed. However, if this is not practical, the electrical wires, harnesses, and components must be shielded from the rework and welding process. When finished, all wiring and components must be re-installed as closely as possible to how they were before removal.

Avoid routing of wire through areas which are exposed to wheel splash, etc. When this is not possible, adequate protection of the wire must be provided by way of shielding and proper clipping procedures in order to avoid damage from ice, stones, and other road debris. In addition to the above, any routing of wires and harness assembly under the frame side members (or frame flange) should be discouraged. Damage to wires, etc., from miscellaneous off road material (rocks, tree limbs, etc.) can be very severe and costly.

All wires should be routed through the holes provided in sheet metal, castings, and frame brackets. These holes should always be provided with some sort of protective material—such as nylon conduit, grommets, etc. Clearance of at least 75 mm (3 in.) should be provided for wire routing near any moving parts. These wires should be secured tightly and covered with conduit.

Any wire connected to circuit components such as switches and relays (in exposed locations) must be provided with a drip loop to prevent moisture from running down the wire to the device.

When wiring is routed between two parts that may experience movement, the wiring should be secured to each part with enough slack to allow the wire to flex. In all cases, avoid routing wire close sharp edges, screws, fasteners, etc. If this cannot be avoided, various types of protective devices should be used. (These can include conduit, shields, caps, grommets, etc.) Wire should never pass through or over a metal edge without a protective shield and fastener within 75 mm to 125 mm (3 in. to 5 in.) on each side of the edge. Avoid areas where temperature exceeds +80 °F (+27 °C). In areas around the exhaust system, wire should be routed and fastened no closer than 150 mm (6 in.); high temperature type insulation should be installed.

All wiring tie downs, grommets and retainers on Volvo chassis were designed and fitted for material installed by Volvo. Any new or additional wires and harness assemblies require additional tie downs or fasteners. Do not force additional wire through factory-installed tie downs, etc.

Routing/Clipping Guidelines

- Electrical cables cannot be bundled with fuel or hydraulic lines. However, they may be routed parallel but separate, provided they are routed above the fuel or hydraulic lines.
- Excess cable must fold back on itself only once (see illustration, Fig. 1: Acceptable fold-back of excess cable, page 6).
- Minimum bend radii of electrical cables is 1.5 times the cable diameter.
- Electrical cable and wiring harnesses that are protected by plastic conduit must not be bundled with coolant hoses.
- Overlay or optional high current electrical cables must be routed independent of all other routings.
- Where cables must flex between moving parts, the last supporting clip must be securely mounted so that relative movement does not promote chafing.
- Clipping brackets should be designed and mounted to adequately support the bundle. Clips should be mounted in a hanging position or supported along three quarters of the horizontal mounting surface. Bundles must be supported at 450 mm (18 in.) maximum intervals; a cable tie may be used between clip points.
- Electrical cables or wiring harnesses that route along or through abrasive surfaces must not touch these surfaces. Additionally, there must be a protective covering suitable to withstand chafing.
- The edges of all members through which unprotected cable passes must be bushed with suitable grommets.

- Electrical wiring harnesses and cables must NOT be located within 130 mm (5 in.) of engine exhaust-related components or other high heat sources. Harnesses should not be installed in any area directly above engine exhaust-related components.
- Electrical cables and wiring harnesses must not support any mechanical loads other than their own mass.
- Electrical cables and wiring harnesses are prohibited from being located in areas that experience routine exposure to diesel fuel, hydraulic fluid, or oil spillage (i.e. under filters, below overflow vents, etc.).

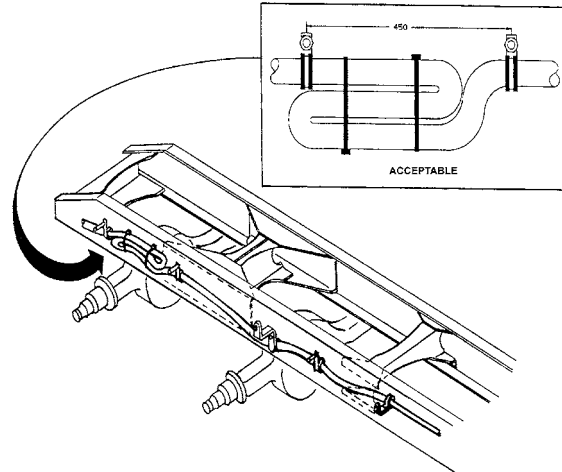


Fig. 1: Acceptable fold-back of excess cable