PUB 20058674-B 2021.05English

VOLVO

Volvo Construction Equipment

volvoce.com

OPERATOR'S MANUAL

L25 ELECTRIC

English

Volvo Construction Equipment
Building Tomorrow

OPERATOR'S MANUAL

L25 ELECTRIC

⚠WARNING: Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel.

⚠ADVERTENCIA: Respirar los gases del escape de motores a diésel le expone a químicos conocidos por el Estado de California como causantes de cáncer y defectos de nacimiento u otros daños reproductivos.

- Siempre encienda y opere el motor en un área bien ventilada.
- Si es en un área cerrada, ventile el orificio del escape hacia el exterior.
- No modifique ni altere el sistema de escape.
- No encienda el motor, excepto cuando sea necesario.

Para mayor información visite www.P65warnings.ca.gov/diesel.

⚠WARNING: Operating, servicing and maintaining a passenger vehicle or offroad vehicle can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

⚠ADVERTENCIA: Operar, dar servicio y mantenimiento a un vehículo de pasajeros o vehículo todo terreno puede exponerle a químicos incluyendo gases del escape, monóxido de carbono, ftalatos y plomo, los cuales son conocidos por el Estado de California como causantes de cáncer y defectos de nacimiento u otros daños reproductivos. Para minimizar la exposición, evite respirar los gases del escape, no encienda el motor excepto si es necesario, dé servicio a su vehículo en un área bien ventilada y utilice guantes o lave sus manos frecuentemente cuando dé servicio a su vehículo. Para mayor información visite www.P65Warnings.ca.gov/passenger-vehicle.

Foreword

OPERATOR'S MANUAL

This operator's manual is intended as a guide for the correct use and maintenance of the machine. Read this manual carefully before you start and move the machine or before you carry out any preventive maintenance.
Keep this manual in the lockable storage compartment so that it is always available for easy reference. Replace it immediately if it is lost.
The operator's manual describes the applications for which the machine was primarily designed. It has been written to be valid on all markets. Therefore, please ignore any sections which do not relate to your machine or to the work that you do not perform with your machine.

NOTE!
If the manual covers more than one machine, the information relates to all machines unless otherwise specified.

When designing this machine, much time has been invested in achieving the best possible efficiency and safety. But accidents do happen, and most of them can be attributed to human error. A safety-conscious person and a well-maintained machine make up a reliable, powerful, and profitable combination. **Therefore, read the safety instructions and follow them.**
We constantly strive to develop and improve the efficiency of our products by making changes to their design. We reserve the right to make design modifications to the products even after they have been delivered. Also, we reserve the right to change data and equipment, as well as the service and maintenance instructions, without prior notice.

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The original language is English. Original instructions.
2021.05

Safety regulations

The machine operator is responsible for being aware of and complying with the relevant, legally prescribed, national and regional safety instructions. The safety instructions in this operator's manual are applicable as basic requirements, but national or local regulations that are more strict should be followed.

⚠ DANGER

The safety symbol combined with this signal word indicates a hazardous situation which, if not avoided, ***will result in death or serious injury.*** Danger is limited to the most extreme situations.

⚠ WARNING

The safety symbol combined with this signal word indicates a hazardous situation which, if not avoided, could result in ***death or serious injury***.

⚠ CAUTION

The safety symbol combined with this signal word indicates a hazardous situation which, if not avoided, could result in ***moderate or minor injury***.

NOTICE

Indicates a potentially hazardous situation which may result in machine damage.

NOTE!
Used in order to refer to installation, operating, or maintenance information which is important but not danger-related.

Get to know the capacity and limits of your machine!

Identification numbers

In order to avoid queries when ordering spare parts or in case of enquiries by phone or in writing please make a note of the machine data on the page below.

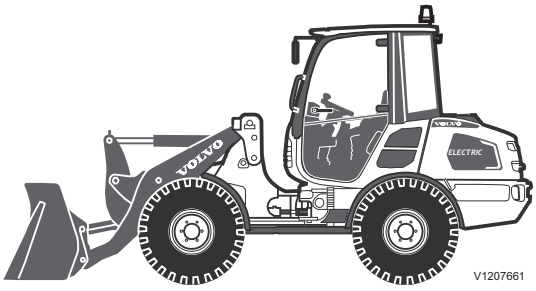
Manufacturer:	Volvo Construction Equipment Germany GmbH, Max-Planck-Straße 1, 54329 Konz, Germany
Model/Type:	
Product identification number:	
Year of manufacture:	

Model specific information
The information in the manual applies to all machine models unless otherwise stated.

Contact information
Please send any comments about the Operator's Manual to om@volvo.com

Table of contents

Presentation



Intended use

The basic machine is intended to be used under normal conditions, that is, outdoors, above ground, off-road, for earthmoving operations, at an ambient temperature between -10 °C (14 °F) and +40 °C (104 °F) with only the operator in the cab. Conditions that deviate from this are also described in the Operator's Manual.

If it is used for other purposes or in potentially dangerous environments, e.g., explosive and/or flammable environments or areas with dust containing asbestos, special safety regulations must be followed and the machine must be equipped for such use and handling. Contact the manufacturer/dealer for more information.

The machine is designed for a max. total weight (incl. equipment and attachments), see page *203*. The max. weight applies when the machine is equipped for certain applications approved by Volvo. If the maximum weight is exceeded, safety is compromised. In addition, no manufacturer warranties will apply. However, always pay attention to national regulations for operating on public roads.

The machine is equipped with electric motors and may behave differently than with a diesel engine. The machine operates silently and responsively. Persons within audible reach may need to be aware of the machine in operation.

In the event of a dangerous situation, the emergency stop switch must be used immediately (see information on page *26*).

Environmental requirements

Be aware of the environment when operating and during service and maintenance of the machine. Always follow local and national environmental legislation applicable to all handling of the machine.

Frame

Articulating and oscillating joint concept. Front and rear frame designed for maximum ground clearance with rugged articulation joint bearings.

Motor

The machine is equipped with two 48 V electric motors.
Driveline: 22 kW (Peak: 36 kW)
Hydraulic: 14 kW (Peak: 32 kW)

They are driven by a chargeable traction battery under the rear hood. It is charged at the left side using the enclosed cable with type-2 plug (read instruction on page *174*).

NOTE!
Local regulations may apply to ensure the utilization of approved electrical charging points.

Electrical system

The electrical system is a 48 volt system with six battery modules under the rear hood on the rear side. The battery disconnect switch is located under the rear hood on the right side.

Open Source Software

Your construction machine includes various control systems and software programs. Some of those are open source software, which among other things means that you may have the right to gain access to the source code. This depends on the license terms for the respective software as agreed between the Volvo group and the respective licensors.

For further information about Volvo’s use of open source software and about where you can get access to the relevant source code, as well as the applicable copyright notices and developer credits, license terms and legal disclaimers, please visit www.opensource.volvotrucks.com.

Transmission

Two-stage single speed transmission, fully controllable under load, also for reversing of direction (forward and reverse) and in all speed ranges. Maximum pushing power is achieved in all speed ranges.

Axles: All wheel drive via two planetary axles.

Differential lock: 100% hydraulically activated differential lock in both axles.

Brake system

Disc brake on front axle for both service and parking brake.

Steering system

Central hydrostatic oscillating articulated steering with dampened side oscillation.

Cab

Cab and Canopy

The cab and canopy is approved as a protective structure according to falling object protective structure (FOPS) and rollover protective structure (ROPS) standards. See page *9*. If any part of the protective structure is damaged, replace the entirety immediately.

If the machine is equipped with a cab, it will have a heating and ventilation system.

The machine with canopy have a foldaway cover to protect the front instrument panel against vandalism. The cover is lockable with the ignition key.

Never carry out any unauthorised alterations to the cab or canopy, for example: lowering the roof height, drilling, welding on brackets for a fire extinguisher, radio aerial or other equipment. Discuss any planned alterations to the cab or canopy with a local authorised dealer or distributor. Volvo Construction Equipment will decide whether the alteration may void the warranty.

Cab's emergency exits

The emergency exit is the right hand side window.

FOPS and ROPS

The cab is approved as a protective cab according to the FOPS and ROPS standards, see page *200*. FOPS is an abbreviation of Falling Object Protective Structure and ROPS is an abbreviation of Roll Over Protective Structure.

If any part of the cab's protective structure is affected by any remaining deformation or failures, the cab shall be inspected immediately and necessary actions shall be taken. Contact Volvo or a Volvo dealer for an inspection and action.

Never perform any unauthorized modifications to the cab, e.g., lowering the roof height, drilling, welding on brackets for fire extinguisher, radio aerial, or other equipment, without first, via a dealer, having discussed the modifications with personnel at Volvo Construction Equipment's Engineering Department. This department will decide whether the modification may cause the approval to become void.

Hydraulic system

The hydraulic system is an open centre system, which means that the oil flows constantly through the system. A priority valve provides priority oil supply from the pump for the work hydraulic to the steering system. When the hydraulic control levers are in neutral position, the oil flows almost pressureless through the circuit.

Equipment

The machine can be equipped with different types of optional equipment depending on the customer requirements and different markets. Contact your dealer for further information.

Modifications

Modifications of this machine, including the use of unauthorized attachments, accessories, units, or parts, may affect the machine's integrity (condition) and/or the machine's ability to function in the way for which it is designed. Persons or organizations performing unauthorized modifications assume all responsibility for consequences that arise due to modifications or can be attributed to modifications, including damages to the machine.

No modifications of any kind may be performed on this product unless each specific modification first has been approved in writing by Volvo Construction Equipment. Volvo Construction Equipment reserves the right to reject all warranty claims that have arisen due to or can be traced to unauthorized modifications.

Modifications may be considered to be officially approved, if at least one of the following conditions has been met:

1 The attachment, the accessory, the unit, or the part has been manufactured or distributed by Volvo Construction Equipment and has been installed according to the factory-approved method described in a publication available from Volvo Construction Equipment; or

2 The modification has been approved in writing by the Engineering Department for the relevant product line at Volvo Construction Equipment.

Anti-theft system

An installed anti-theft device makes it more difficult to steal the machine. Volvo supplies anti-theft devices as optional equipment. If your machine is not yet equipped with one, check the possibilities of having such a device installed by your dealer.

CareTrack/Information Systems

Volvo Construction Equipment machines are equipped with CareTrack and/or one or more other systems which may gather and store information about the machine (the "**Information Systems**"), including but not limited to information relating to machine condition and performance, and information relating to the operation of the machine (together, the "**Machine Data**"). You agree not to interfere with the operation of the telematics device in any way.

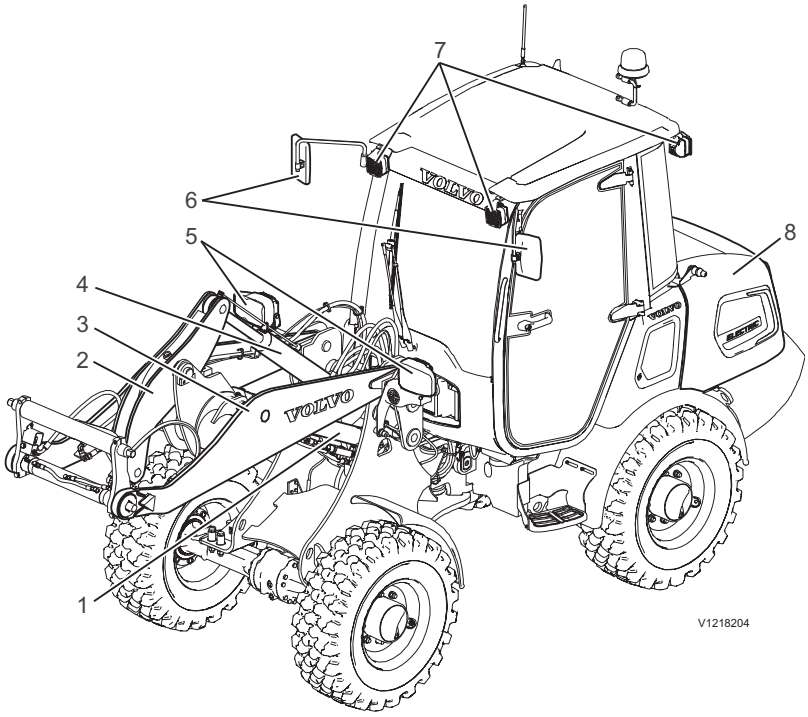
CareTrack makes it easier to plan for service and reduces costly downtime. Productivity is improved by knowing if machines are being operated correctly and how much fuel is being consumed. CareTrack also allows the customer to restrict the operating area of the machine, by using virtual fences. This helps to eliminate unauthorized machine use and theft. For further information,

contact a Volvo Construction Equipment dealer. The CareTrack system transmits data, in the same way a mobile phone does, with a maximum output rate of 10 W. The transmitter is always on and the operator cannot switch it off. Local precautions and restrictions applicable to mobile phones, for example safety distance, also apply to the CareTrack system.

Volvo Construction Equipment may: (i) access the Information Systems at any time (including remote access); (ii) gather the Machine Data; (iii) store the Machine Data on Volvo Group systems; (iv) use the Machine Data in order to provide services to its customers, as well as for its own internal and other reasonable business purposes; and (v) share the Machine Data within the Volvo Group and with selected third parties.

Machine Data may include personal information about the operator, which may therefore be gathered, stored, used, shared or otherwise processed by Volvo Construction Equipment in accordance with its privacy notice (available at https://www.volvogroup.com/en-en/privacy.html). If you have any questions or concerns concerning the processing of your personal information by Volvo Construction Equipment, please contact Volvo's group privacy officer at gpo.office@volvo.com or by post: AB Volvo, Att: Group Privacy Office, Dept AA14100, VGHQ , SE-405 08 Göteborg, Sweden, or by phone at: +46 (0)31 66 00 00.

Machine view



1	Lift cylinder	5	Headlamps for roading
2	Tilt linkage	6	Mirrors
3	Lift arms	7	Working lamps
4	Tilt cylinder	8	Rear hood

CE-marking, EMC-directive

CE-marking

(Declaration of Conformity)

This machine is CE-marked. This means that, when delivered to the customer, the machine meets the applicable "Essential Health and Safety Requirements" according to EU's so-called Machine Safety Directive, 2006/42/EC.

The person making any changes that affect machine safety is also responsible for the same.

As proof of that the requirements are met, an EU Declaration of Conformity and a sound certificate regarding sound level in dB(A) are supplied with the machine. The sound certificate includes both measured external values and guaranteed sound level. These declarations are issued by Volvo for each individual machine. This EU declaration also covers attachments manufactured by Volvo. The documentation is valuable and should be kept safe and **saved for at least ten years. The document should always accompany the machine when it is sold.**

If the machine is used for other purposes or with other attachments than described in this manual, safety must be ensured all times and in each separate case. A modification may in certain cases require new CE-marking and issuing of a new EU declaration of conformity. The person performing the modification is responsible for this.

EU's EMC-directive

The machine's electronic equipment may in some cases cause interference with other electronic equipment, or be subjected to external electromagnetic interference which may result in safety risks.

The EU EMC-directive on "Electromagnetic compatibility", 2014/30/EC, provides a general description of what requirements can be made of the machine from a safety perspective, where limit values have been established in international standards.

A machine or device must meet the standards in order to be CE-marked. Our machines are tested especially for electromagnetic interference. The

machine's CE-marking and the declaration of conformity also include the EMC-directive.

If other electronic equipment is installed on this machine, the equipment must be CE-marked and tested on the machine for electromagnetic interference.

Declaration of Conformity

The following pages show an example of a general translated copy of the declaration of conformity for machine and a general translated copy of the declaration of conformity for attachments in the category **“interchangeable equipment”** (attachments that can be changed by operator).

NOTE! Declaration of conformity only applies within the European Union.

Valid for Volvo Wheel Loaders

EU DECLARATION OF CONFORMITY FOR MACHINES (IIA)

Volvo Construction Equipment Germany GmbH, D-54329 KONZ, Germany, hereby declares that the product:

Manufacturer	Volvo Construction Equipment
Type:	Wheel loader LYYYY
Product identification number (PIN):	*VCELXXXXXXXXXXXXX*

for which this declaration is intended, meets the relevant regulations for "Essential Health and Safety Requirements" according to:

European Council's directive 2006/42/EC for machines,

European Council's directive 2000/14/EC for noise emission to the environment from outdoor equipment

European Council's directive 2014/30/EC for electromagnetic compatibility, as well as amendments of these for machines, and other applicable directives.

Governing harmonised standards:

EN 474-1:2006+A6:2019 Earthmoving machines – Safety general requirements,

EN 474-3:2006+A1:2009 Earthmoving machines – Requirements for Loaders.

This declaration only covers the machine in the condition in which it was introduced on the market, and does not include components that have been retrofitted or work after this which has been done by the end-user.

Authorized issuer's signature and person authorized to compile the technical file which has been established in the European Community:

.....

Signature / Clarification of signature (print)

.....

Occupation or title

.....

Address and date of issue

Signature of authorised representative in the European Community with authorisation to complete the manufacturing process and produce the manufacturer's declaration of conformity (if applicable)

.....

Signature / Clarification of signature (print)

.....

Occupation or title

.....

Address and date of issue

This declaration covers attachments that have been developed, designed/approved, marked, and marketed by the manufacturer mentioned above.

The machine owner must save this declaration for at least ten years after delivery.

Valid for attachments in the category "interchangeable equipment" (attachments that can be changed by operator) for Volvo Wheel Loaders

EU DECLARATION OF CONFORMITY FOR MACHINES (IIA)

Volvo Construction Equipment Germany GmbH, D-54329 KONZ, Germany, hereby declares that the product:

Manufacturer	Volvo Construction Equipment
Model / Type number *):	YYYYY
Serial number:	XXXXXXXXXX

for which this declaration is intended, meets the relevant regulations for "Essential Health and Safety Requirements" according to:

European Council's directive 2006/42/EC for machines and supplements for machines, and other applicable directives.

Governing harmonised standards:

EN 474-1:2006+A6:2019 Earthmoving machines – Safety general requirements,

EN 474-3:2006+A1:2009 Earthmoving machines – Requirements for loaders.

This declaration only covers the machine in the condition in which it was introduced on the market, and does not include components that have been retrofitted or work after this which has been done by the end user

Authorized issuer's signature and person authorized to compile the technical file which has been established in the European Community:

.....

Signature / Clarification of signature (print)

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Occupation or title

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Address and date of issue

Signature of authorised representative in the European Community with authorisation to complete the manufacturing process and produce the manufacturer's declaration of conformity (if applicable)

.....

Signature / Clarification of signature (print)

.....

Occupation or title

.....

Address and date of issue

The machine owner must save this declaration for at least ten years after delivery.

Communication equipment, installation

NOTICE

All installation of optional electronic communication equipment must be performed by trained professionals and in accordance with the Volvo Construction Equipment instructions.

Protection against electromagnetic interference

This machine has been tested in accordance with EU directive 2014/30/EC governing electromagnetic interference. It is therefore very important that all non-approved electronic accessories, such as communication equipment, should be tested before installation and use, since they can cause interference to the electronic systems of the machine.

Guidelines

The following guidelines must be followed during installation:

- The antenna placement must be chosen to give good adaptation to the surroundings.
- The antenna cable must be of the coaxial type. Be careful to ensure that the cable is undamaged, that the sheath and braid are not split at the ends, the braid covers the connector ferrules and has good galvanic contact with them.
- The mating surface between the antenna mounting bracket and the bodywork must have clean metal surfaces, with all dirt and oxide removed. Protect the mating surfaces against corrosion after installation to maintain good galvanic contact.
- Remember to separate interfering and interfered cables physically. Interfering cables consist of the communication equipment's supply cables and antenna cable. Interfered cables are those which are connected to electronic devices in the machine. Install the cables as close as possible to earthed (grounded) sheet metal surfaces, since the sheet metal has a shielding effect.

Safety components

Genuine Volvo spare parts guarantee the best service life, reliability, and safety for the machine and operator. If reliable and purpose-built parts are not used, your safety, health, and the machine's function may be compromised. Contact your dealer and state the machine's model designation/serial number (PIN-number) when ordering spare parts. Position of PIN-plate, see section "Product plates".

Your Volvo dealer always has up-to-date spare part information that is updated at regular intervals via the information system PROSIS.

Safety-classified machine and spare parts

Safety-classified machine and spare parts means that the components are intended to fulfil a safety function.

Examples of safety-classified machine parts/ spare parts

- Removable protective devices/guards over rotating parts and hot surfaces
- Protective plates, rails, covers, and steps
- Components included in systems to reduce sound and vibrations
- Components included in systems to improve the operator's visibility
- Complete operator's seat incl. seat belt
- Decals and plates
- Cab filter

NOTE!
Safety-classified machine and spare parts shall be reinstalled, repaired, or replaced immediately if they have been removed or damaged.

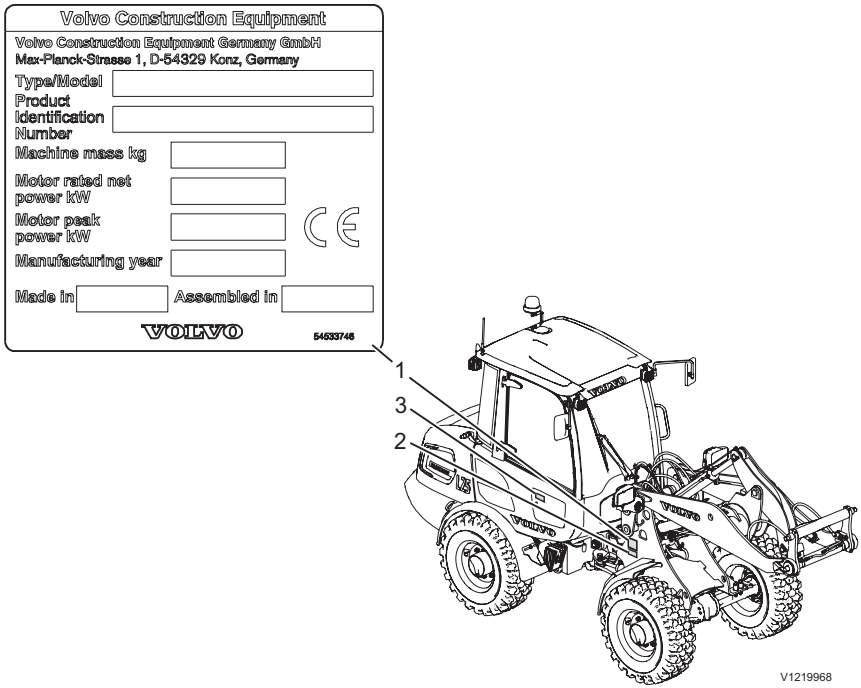
When changing machine operator/owner, malfunctions and defects of safety-classified machine and spare parts shall be reported immediately and an action plan shall be established.

There is more important information in this Operator’s Manual about the components that are considered safety-classified.

Product plates

The following illustrations and descriptions show the identification plates on the machine.

When ordering spare parts or in case of enquiries by phone and in correspondence model designations and product identification number must be specified.

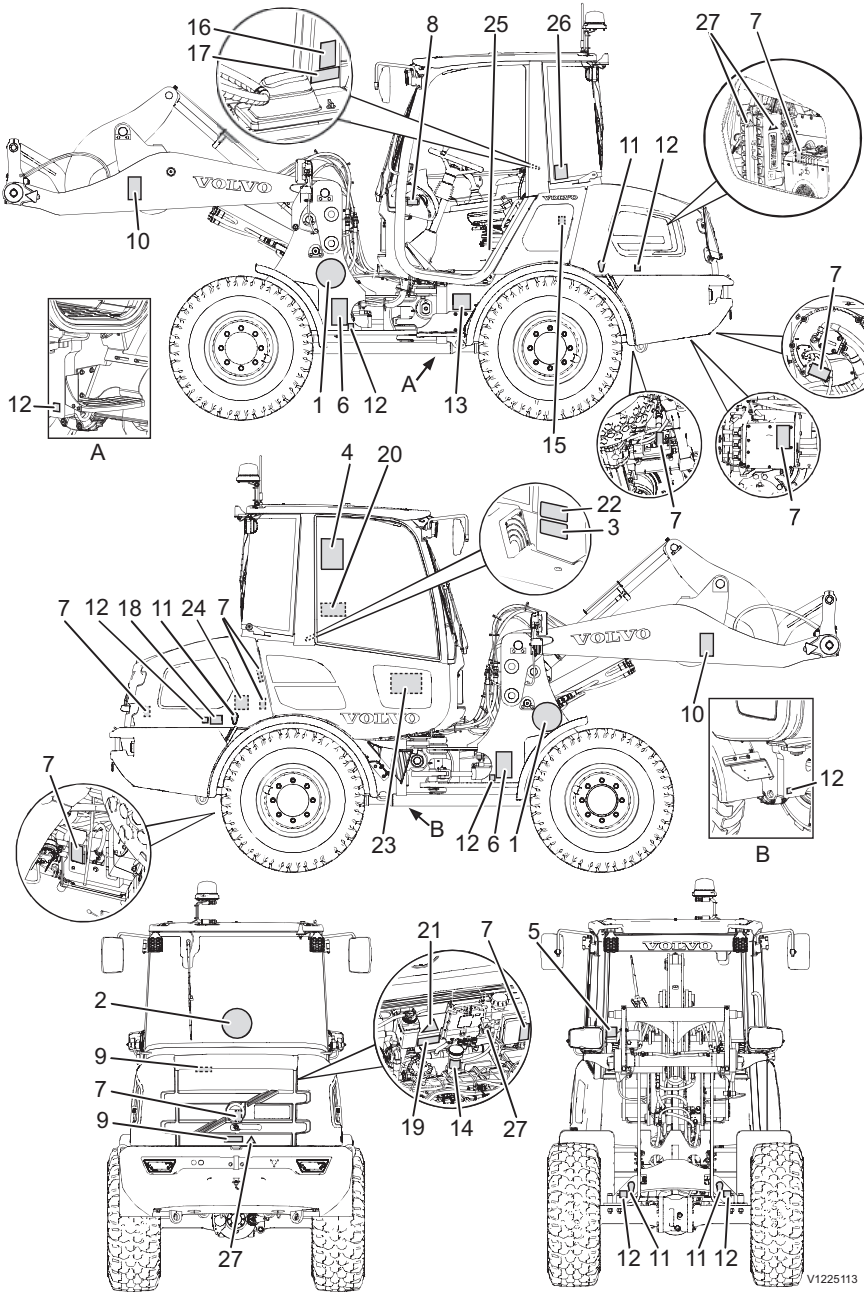


1 Identification plate
Contains name and address of manufacturer, model designation and product identification number (serial-no.). The product identification number (serial-no.) is additionally stamped on the right hand side of the front frame.

2 Additional type plate
Depending on the target market and based on national legal requirements, additional type plates containing specific information may be affixed to the machine.

3 Cab
The manufacturing number of the cab is stamped on the right side, below the window.

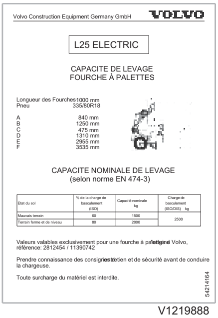
Information and warning decals



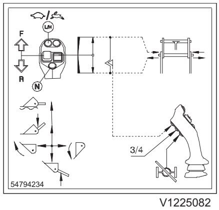
1 16 km/h

2 16 km/h

3
Driveline shutoff via seat belt (optional equipment) (positioned inside the cab)



4 Pallet fork lift capacity

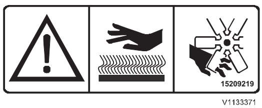


5
Control functions on a single lever with integrated auxiliary hydraulic functions

6 WARNING!
Articulation area Nobody is allowed stay within the unsecured articulation area.

7 WARNING!
Electrical hazards
Operators are not allowed to disassemble covers and connections, read Operator’s manual.

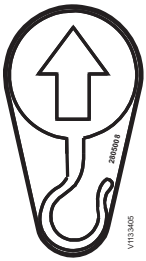
8 WARNING!
First read the Operator's Manual



9 WARNING!
Rear hood only to be opened when the electric motor has stopped.
Due to the risk of injury by rotating parts it is dangerous to open the rear hood while the electric motor is running.

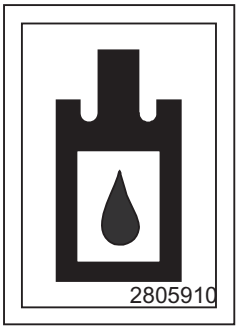
10 WARNING!
Do not walk under raised lifting arms. Stay at a safe distance from the machine.

12 Attaching point for lashing

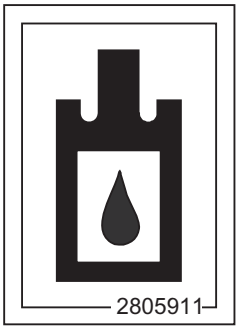


11 Point for lifting

13 WARNING!
Safety alert symbol: Danger area in the immediate vicinity of the machine

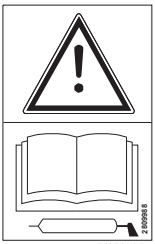


14 Hydraulic oil filling point



15 Brake fluid

NOTE!
If the hydraulic system is filled with biodegradable hydraulic oil from the factory (see sticker on filler neck) only the oil quality specified on the sticker must be used to fill up or when changing the oil.

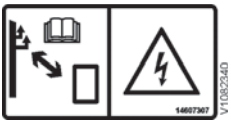


V1027915

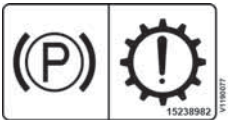
16 Warning!
Operation and maintenance The instructions and warnings in the operating manual must be read carefully before using the machine for the first time. The technical documentation can be found in the storage compartment to the right beside the operator's seat.

V1184897

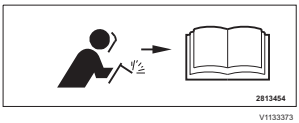
18 Battery disconnector



20 Power lines, min clearance.



22
Driveline shutoff via parking brake (positioned inside the cab)



V1133373

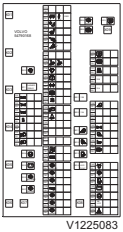
17 WARNING! Before welding: Read the Operator's manual
For electric welding the earth terminal must be connected directly to the part to be welded. Disconnect the battery completely.

V1184902

19
Use Volvo coolant VCS only

V1184903

21 Hot coolant

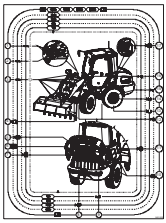

V1225083

23 Fuse assignment
This decal is located on the service door, see electric system.

V1219891

24 Fuses and relays
This decal is located in the battery compartment on the right hand side, see electric system.

26 Sound capacity level
Sound capacity level (LwA) around the machine


V1219892

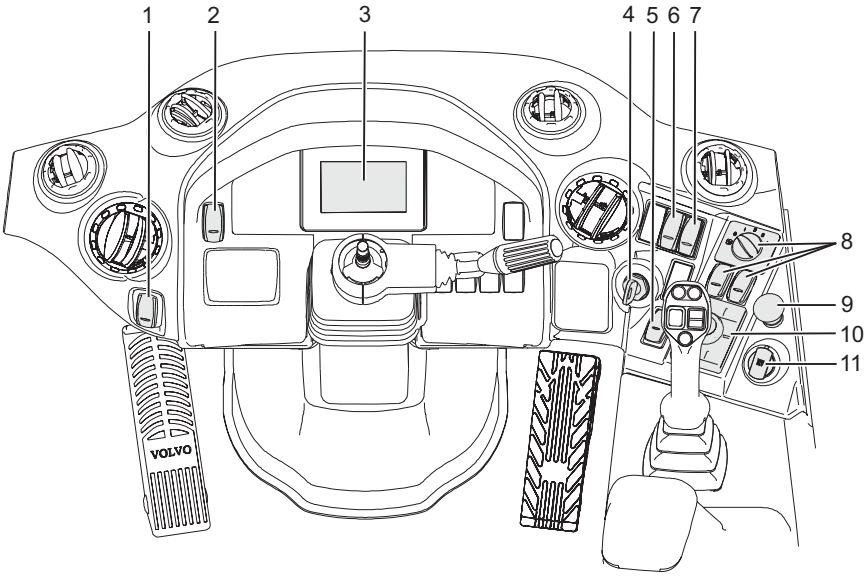
25 Lubrication and service chart

V1225084

27 WARNING!
Electrical hazards

Instrument panels
Instrument panel, front

Front instrument panel



1	Hazard flashers	7	Rotating beacon (Optional equipment)
2	Attachment unlock	8	Climate control system
3	Display	9	Emergency stop
4	Ignition	10	Keypad
5	Wiper and washer	11	Power socket, 12 V
6	Headlights		

Hazard flashers

1. Hazard flashers

All direction indicators on the machine will flash together. The hazard flashers can be used even if the ignition key is in the position 0.

Attachment unlock

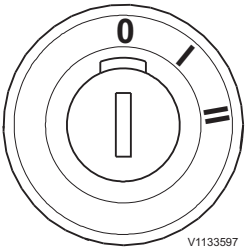
2. Attachment unlock

For more details, see *Attachments, connecting and disconnecting*

Display

3. Display

In addition to alarm texts the display also shows e.g. operating information and settings. For more information, see *31*.



Ignition

4. Ignition

NOTE!
Starting the electric motors is described on page *81*.

The ignition has 3 positions:

0 Off (key-turn electric system stop)
I Ignition On
II Cranking

Wiper and washer

5. Wiper and washer

NOTE!
Washing and wiping can take place without the front wiper being on.

Three-position switch:
- Upper part of switch pressed in = Washer pump rear on.
- Middle position = Wiper on
- Lower part of switch pressed in = off

Headlights

6. Headlights

NOTE!
To be able to turn on the work lights (via the keypad), the headlights must be on first.

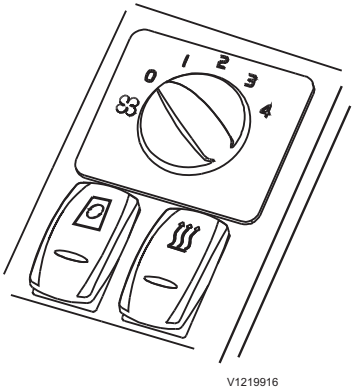
Three-position switch:
- Upper part of switch pressed in = headlights are on.

- Switch in middle position = parking lights and instrument lights are on.
- Lower part of switch pressed in = lights are off.

Rotating beacon

7. Rotating beacon (Optional equipment)

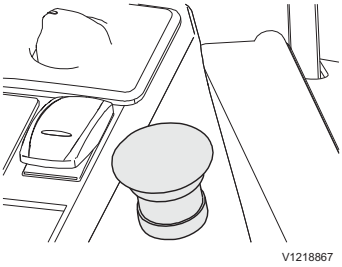
Two-position switch:
- Upper part of switch pressed in = rotating beacon is on.
- Lower part of switch pressed in = rotating beacon is off.



Climate control system

8. Climate control system

For information about the climate control system, see page *63*.



Emergency stop

9. Emergency stop

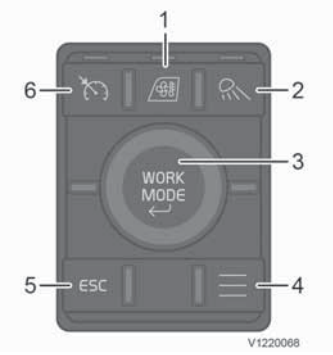
In case of any dangerous situation, such as unexpected movements, strange machine behavior or fire, push down the emergency stop button.
By pressing this button, the power supply to the electric motors will be disconnected.
Stop the machine by braking.

⚠ WARNING

Risk of crushing.
The emergency stop button does not switch off the functions of lowering the boom or tilting the attachment.

Be aware that you do not trigger these functions accidentally.

NOTE!
When pressing the emergency button, only the power supply to the electric motors is disconnected. Be aware, that the mechanical brake system and emergency steering function remain in function. Be aware, that the brake support from the electric motor for the driveline will be disabled and the braking behavior changes.
Be aware, that the support of the steering system is switched of and steering behavior will change.



Keypad

10. Keypad

1 **Climate**
– Long press: Climate menu

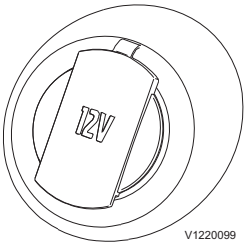
2 **Work lights**
– Short press: ON / OFF
– Long press: Setup work lights

3 **Enter button, scroll wheel and WORK MODE button**
– Turn the wheel left or right to scroll in a menu.
– Press to select in a menu.
The button is also to display the menu for work mode and tool:
– Short press: Select menu for work mode and tool.
– Long press: Setup current work mode or tool.

4 **Menu**
– Short press: Menu

5 **ESC**
– Short press: Back
– Long press: Back to home screen

6 **Cruise Control**
– Short press: Set speed



Power socket, 12 V

11. Power socket, 12 V

For charging of, e.g., mobile telephone.

Display unit

NOTE!
Prevent machine damage by taking correct action. Read this section thoroughly, understand the instructions, and familiarize yourself with instrument panel before attempting to operate the machine.

The display unit consists of two parts:
- Display, see *26*.
- Keypad, see *26*.

Start sequence

When the ignition key is turned to position 1 the home screen will appear. If the antitheft system is active, the antitheft screen will be displayed to enter the PIN code, see page *40*.

Home screen

Home screen

The home screen is the first screen that is displayed after the display unit starts (the ignition key is turned to position 1). If the machine is equipped with antitheft, the home screen is displayed after entering the PIN code, see page *40*. The home screen is the basic screen that is displayed while operating the machine.
The home screen will change depending on the work mode selected for the machine.

The home screen is divided in three parts:

1 Displays symbols for Warning (red), Caution (orange) and Information (blue). Also the current time is displayed here.

NOTE!
Pay attention to this part when working with the machine. The Warning symbol displays critical information that requires an action!

2 Displays machine status depending on selected work mode. Selected gear and the traction battery state of charge is always displayed. The machine's speed is displayed when driving.
3 Displays indicator icons to advise or alert of a specific status or condition.

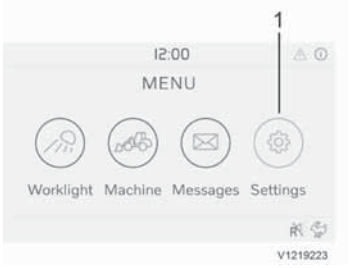
1 Menu button

Menu button on keypad

From menu button you can find sub menus for: settings; messages; information about e.g. battery consumption, work time; status for e.g. software, electric system and hydraulics.

Short press the menu button, select desired menu by turning the WORK MODE button and press the WORK MODE button.

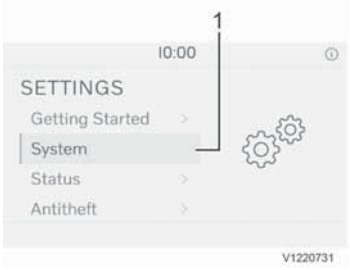
In this Operator's Manual we show just a few examples of how to navigate from the Menu button.



1 Settings

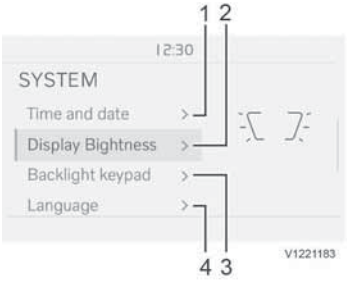
Settings menu
Example of how to navigate in Settings menu.

Short press the menu button on the keypad. Select **Settings** by turning the WORK MODE button and press the WORK MODE button.



1 System

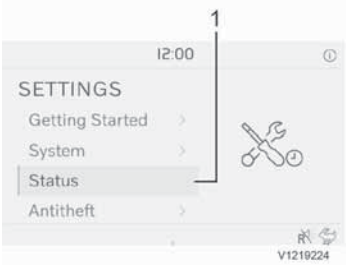
Settings > **System**
Select **System** by turning the WORK MODE button and press the WORK MODE button.



System menu
1 Time and date
2 Display brightness
3 Backlight keypad
4 Language

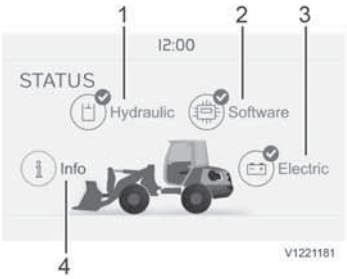
In System menu, settings can be made for e.g. time and date, display brightness, backlight for keypad and language. Also information about software licenses is found here.

In **About** > **Licenses** you find information about e.g. open source software licenses.



1 Status

Settings > **Status**
Select **Status** by turning the WORK MODE button and press the WORK MODE button.

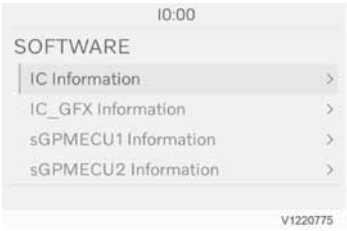


Status menu
1 Hydraulic
2 Software
3 Electric
4 Info

In Status menu you can find status of e.g. the hydraulics, software, electric system and information about e.g. operating hours, kWh counter.

Status of the hydraulics

In **Hydraulic** you can find the current hydraulic oil temperature and the pilot pressure.



Software

In **Software** you can find the software of the different ECUs of the loader.

Electric

In **Electric** you can find e.g. the voltage level of the 12 V battery.

Charging

Charging

The charging status is shown on display when the charge cable is plugged in.

NOTE!
It is not possible to drive when charging.

1 Cruise Control

Cruise Control

Short press activates the Cruise control and sets the current speed.
Turn off the Cruise control by pressing the Cruise control button or the brake pedal.

When the Cruise control is activated the symbol is green.

1 Cruise control symbol

1 WORK MODE button

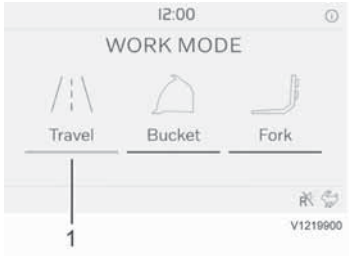
Work Mode

From WORK MODE button you can change between different work modes e.g. Travel, Bucket, Fork and Tool.

Short press the WORK MODE button, select desired work mode by turning the WORK MODE button and press the WORK MODE button.

In this Operator's Manual we show a few examples of how to navigate between the work modes.

Travel mode



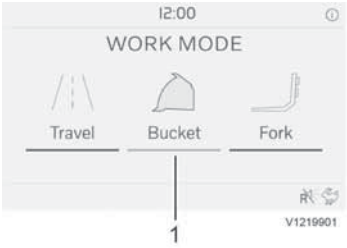
1 Travel

Select **Travel** by turning the WORK MODE button and press the WORK MODE button.

NOTE!
When travel mode is selected the machine is automatically setup according to the latest settings done in TRAVEL SETUP.

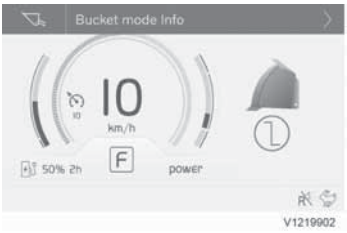
NOTE!
In some countries it is **illegal** to drive on public roads with work lights turned on and / or the machine's hydraulics unlocked.
The operator has the responsibility to check the countries legal requirements before driving on public roads with the work lights turned on and / or the machine's hydraulics unlocked.

To go to **TRAVEL SETUP**, long press the WORK MODE button in the Travel mode.



1 Bucket

Bucket mode
Select **Bucket** by turning the WORK MODE button and press the WORK MODE button.



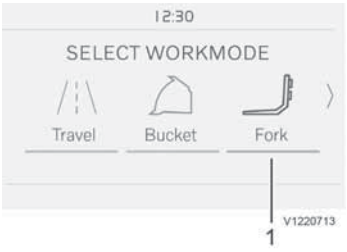
Bucket mode info

In Bucket mode the functions is dedicated to material handling.

Presets for bucket mode

Turn the WORK MODE button to show the Presets for bucket mode.

In Bucket mode info you can find the presets for e.g. the sensitivity of the joystick / hydraulics, traction, 3rd and 4th hydraulics, boom suspension. These presets are accessible from the BUCKET SETUP.



1 Fork

To go to **BUCKET SETUP**, long press the WORK MODE button in the Bucket mode.

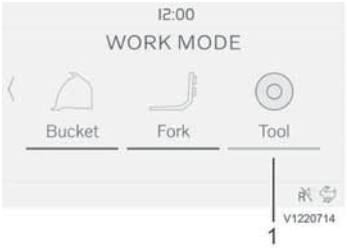
Fork mode
In Fork mode the functions is dedicated to fork handling.

To prevent uncontrolled lowering of the load in Fork mode, it is not possible to lower the boom or tilt the attachment forward after a machine shutdown while the ignition key is in running, position (1).

NOTE!
If in any emergency case it is needed to lower the boom or tilt the attachment forward after a shutdown or breakdown of the electric motors with ignition key in position (1), use the Bucket mode.

NOTE!
Before starting maintenance or repair work, make sure that the electric motors are turned off, the ignition key is in position (1) **and the Bucket mode is selected**. The control levers and knobs for the work hydraulics must be operated several times to end-positions. Work on hydraulic system must only be performed by a qualified service technician.

To go to setups for Fork mode, long press the WORK MODE button in the Fork mode.



1 Tool

Tool mode
In Tool mode the functions is dedicated to tool handling. E.g. the tool speed is adjusted in the tool setup.

To go to **TOOL SETUP**, long press the WORK MODE button in the Tool mode.

Setups for Bucket , Fork and Tool

When selecting a work mode other than travel mode, it is possible to adjust the settings for e.g. sensitivity, traction and Boom Suspension System (optional equipment) according to the operator requirement.

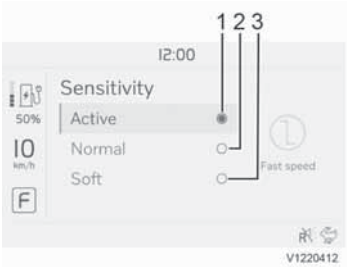
To go to settings for desired function, long press the WORK MODE button, in the selected work mode.

1 Sensitivity

Sensitivity setting

Sensitivity helps to adjust how sensitive the machine will be to the operator's maneuvering.

Select **Sensitivity** by turning the WORK MODE button and press the WORK MODE button.

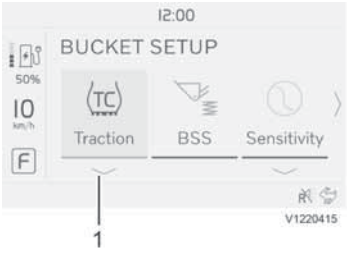


Sensitivity settings

1 Active
2 Normal
3 Soft

There are three sensitivity settings: Active, Normal and Soft.

- **Active** – Active/Responsive machine behavior higher machine acceleration and deceleration. The response of the joystick is also high in this setting.
- **Normal** – Reduced maximum acceleration and deceleration compared to active mode. More precise operation of the joystick compared to active mode.
- **Soft** – Allows for detailed operation of the machine. Reduced maximum acceleration and deceleration and highly precise operation with joystick is possible.

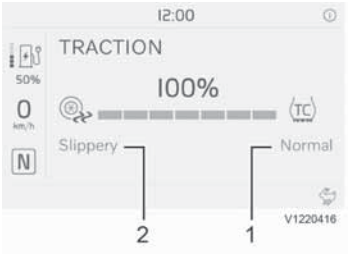


1 Traction

Traction setting

Traction setting helps the operator adjust the maximum tractive force of the machine. It reduces the amount of wheel slippage when driving through slippery terrain.

Select **Traction** by turning the WORK MODE button and press the WORK MODE button.



Traction settings
1 Normal
2 Slippery

1 Boom suspension system (BSS)

There are two traction settings: Normal and Slippery.

- **Normal** – Full tractive force is available during acceleration and deceleration
- **Slippery** - The tractive force can be adjusted between 40% - 80% by using the WORK MODE button. The maximum acceleration and deceleration is also reduced according to the selected traction value.

NOTE!
The braking torque from the electric drive will decrease considerably, when a low tractive force is set in slippery mode.

Boom Suspension System (BSS) setting (Optional equipment)
When Boom Suspension System (BSS) is enabled, the whole boom will be suspended by the hydraulic system, which increases the driver comfort, especially on rough terrain and a fully loaded bucket.

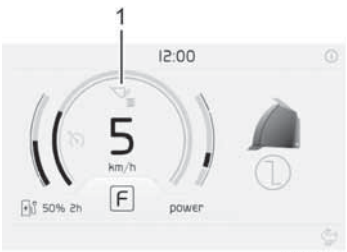
Select **BSS** by turning the WORK MODE button.

NOTE!
Boom Suspension System can not be activated while operating.
Boom Suspension System must be turned off during precision work with the attachment.

Before enabling the BSS, lower the attachment to the ground.
If the BSS is enabled with the attachment raised, the BSS will be activated only when the attachment first is lowered to the ground.

There are two BSS settings: enabled and disabled. The setting is changed by pressing the WORK MODE button.

- BSS enabled. – BSS icon on setup screen (green).
- BSS disabled – BSS icon on setup screen (gray).



BSS icon on Bucket mode screen

1 BSS indicator icon (gray in standby)
BSS indicator icon (green when active)

When BSS is enabled, an indicator icon is shown on the screen in Bucket mode and in Fork mode.

When BSS is enabled, the BSS will remain in standby mode (grey BSS indicator icon) under following conditions:
- The machine is in standstill
- The travel speed is below 2 km/h (1.2 mph)
- The attachment is lowered to the ground.

The BSS is activated (green BSS indicator icon) under following conditions:
- When the speed is greater then 3 km/h (1.9 mph)
- When the attachment is raised off the ground.

Boom Suspension System is turned off by the setup screen or by turning off the machine.

Antitheft screen

(Optional equipment)

The antitheft screen requires that the operator enters a valid 4–digit PIN code to start the machine. There are two PIN codes available, the operator and the owner PIN.

Antitheft screen

How to enter PIN code

The antitheft screen begins with the PIN code entry for the first digit. Use the **WORK MODE** button to enter the PIN code:

NOTE!
When entering the PIN code, the current digit being entered is highlighted with an orange (yellow, if screen in night mode) line under it.

1 Turn the **WORK MODE** wheel to change the digit (begins with the first digit). The number displayed will change as the wheel is turned.
2 Press the **WORK MODE** button to enter the digit. The display will accept the input and the next digit will be ready for input.
3 Repeat until all digits are entered.

NOTE!
Use the ESC button on the keypad to go back.

If either the operator or the owner PIN were entered correctly, the display will proceed to the home screen.

Failed attempts

Only three incorrect attempts are permitted. After each incorrect entry of the PIN code, the display will show the operator how many attempts remain. After three incorrect attempts, the machine will be locked down and the display will provide a 5-digit recovery code that is needed to unlock the machine.

If the machine becomes locked, contact your Volvo Construction Equipment dealer and provide the recovery code to reset the machine.

Remember to change the operator and the owner PIN code after a successful recovery since both PIN codes have be reinitialized to "0000".

PIN change

The operator can change the operator or the owner PIN in the antitheft display menu. The following information needs to be provided:
- The actual operator or owner PIN code.
- The new PIN code and a confirmation of the new PIN code

Remember, the PIN codes are hierarchical, i.e. the operator can change either the operator or the owner PIN code by providing the actual owner PIN code. But the operator can only change the operator PIN code if the actual operator PIN code was provided.

Immobilized mode

If the recovery code was entered incorrectly for three times, the machine will be immobilized and no operation is possible. Please perform a full machine shutdown to reenter the recovery mode.

Indicator icons

Various icons is displayed on the home screen, depending on operating conditions and machine status.
When red icons are displayed and a warning message is also displayed, any instructions provided should be followed immediately.

Warning and caution icons may be displayed along with other icons and also may include instructions.

Warning (red)

- **Warning (red)** — A critical operating condition exists and the operator must take action to resolve the reason for the warning immediately.

Caution (yellow)

- **Caution (yellow)** — Operating conditions exist that should be checked the next time the machine is stopped.

Information (blue)

- **Information (blue)** — The information icon indicates that there is an information message in the message center.

Parking brake (red)

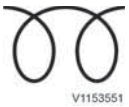
Parking brake (red) — The parking brake is applied. The buzzer sounds and an alarm text is shown on the display unit if a directional gear is selected.

Seat belt (red)

Seat belt (red) — The seat belt icon indicates that the seat belt is not fastened while the electric motor is running. Fasten the seat belt before continuing.

Low battery voltage, 12 V (yellow)

Low battery voltage, 12 V (yellow) — Low battery voltage, 12 V.



Precharge (yellow)

Precharge (yellow) — Startup sequence of the traction battery in progress.

Coolant temperature high (red)

Coolant temperature high (red) — The coolant temperature is high. Do not continue operation. Wait for the coolant to cool down and the coolant temperature high icon to go off.

Hydraulic oil temperature high (red)

Hydraulic oil temperature high (red) — The hydraulic oil temperature is high. Do not continue operation. Wait for the hydraulic oil temperature to drop down and the hydraulic oil temperature high icon to go off.

Hydraulic oil temperature is low (red)

Hydraulic oil temperature is low (red) — The hydraulic oil temperature is low. The maximum speed of electric motor of the hydraulic system is reduced.

Hill hold (green)

Hill hold (green) — The hill hold is activated.

High speed (green)

High speed (green) — The high speed icon is displayed when the machine travel speed is in high speed mode.

Low speed (green)

Low speed (green) — The low speed icon is displayed when the machine travel speed is in low speed mode.

High beams (blue)

High beams (blue) — High beam headlights are on.

Low beams (green)

Low beams (green) — Low beam headlights are on.

Work lights, front / rear (green)

Work lights, front / rear (green) — Work lights front and rear are on.

Work lights, front (green)

Work lights, front (green) — Work lights, front are on.

Work lights, rear (green)

Work lights, rear (green) — Work lights, rear are on.

Rear view mirror heating (green)

Rear view mirror heating (green) — Rear view mirror heating is on.

Trailer direction indicator (green)

Trailer direction indicator (green) — Trailer direction indicator is on.

Emergency switch active (red)

Emergency switch active (red) — Emergency switch is active.

Hydraulic oil filter clogged (red)

Hydraulic oil filter clogged (red) — Hydraulic oil filter is clogged.

Differential lock engaged (yellow)

Differential lock engaged (yellow) — The differential lock is engaged.

12 Volt supply (green)

12 Volt supply (green) — The 12 Volt supply is activated.

Attachment unlock (yellow)

Attachment unlock (yellow) — The attachment is unlocked.


V1220297

Working hydraulics lock (yellow)

Working hydraulics lock (yellow) — The working hydraulics is locked. it is not possible to use the single control lever.


V1220543

Boom Suspension System, BSS

Boom Suspension System, BSS
— (Green) Boom Suspension System, BSS is active.
— (Gray) Boom Suspension System, BSS is on standby mode.


V1220352

Bucket float (green)

Bucket float (green) — The bucket float is active.


V1220364

Rotating beacon (green)

Rotating beacon (green) — The rotating beacon is on.


V1220366

Reverse alarm deactivated (green)

Reverse alarm deactivated (green) — The reverse alarm is deactivated.

V1220367

3rd hydraulic hold (green)

3rd hydraulic hold (green) — If 3rd hydraulic hold is active, the hydraulic oil flow to the 3rd function, e.g. a sweeper, is locked. The operator can release the 3rd function roller knob on the single control lever. See page *51* for more information about the single control lever.


V1220617

Machine derate (yellow)

Machine derate (yellow) — Full machine power is limited e.g. due to state of charge or ambient temperature.


V1220701

Hot shutdown (blue)

Hot shutdown (blue) — When the machine is shutdown and e.g. the hydraulic oil temperature is too high, the fan turns on to cool down the hydraulic oil. The fan will automatically shutdown safely.

Traction slippery (green)

Traction slippery (green) — The traction is set to slippery.

Recuperation

1 Recuperation bar (blue)
2 Charge icon (blue)

Recuperation — The recuperation bar shows when the traction battery recovers energy. When the recuperation has been ongoing more than 2 secundes a charge icon is shown.

System messages

When the system has messages for the operator, a collapsed view of the message will be displayed at the top of the home screen. There are three different types of messages: warning, caution and information. When a message is first displayed, it will be in collapsed view at the top of the display. If the arrow is present, a full screen view of the message can be displayed by using the **WORK MODE** button/wheel.

Warning messages

Warning messages have the highest priority and will be displayed instead of any cautions or information messages that may have been previously displayed.
While warning messages are present, the system will beep repeatedly, continuously.

1 Icon — Warning messages are displayed with a white icon on a red background. The icon will vary depending on the reason for the warning.
2 Message — The displayed message, in collapsed view, is an action for the operator.
3 Arrow — If the arrow is present, there is additional information. Use the **WORK MODE**

Home screen with collapsed warning message, example

1 Icon to indicate the reason for the warning
2 Action for the operator
3 Arrow, if present, indicates that additional information is available

button/wheel to select and view the message in full screen view.

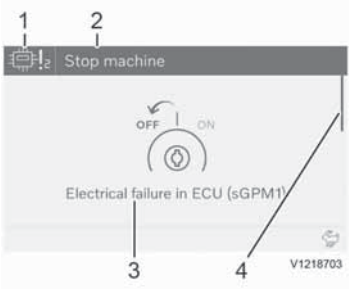
NOTE!
Warning messages can not be dismissed. Instead, the operator must take action to resolve the reason for the warning.

Warning messages, full screen view

The full screen view of a warning message gives details about the reason for the warning. If a scroll bar is present on the right, the **WORK MODE** button can be used to scroll the message and view additional information such as:

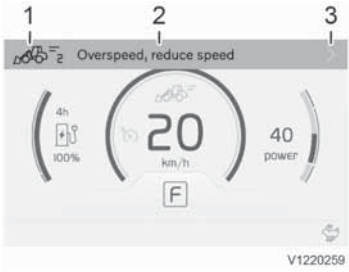
- Error code
- Source of the error
- First event (when the event first occurred)
- Number of times the event has occurred
- Last event (when the event last occurred)

NOTE!
Use the **ESC** button on the keypad to return to the collapsed view of the message.



Full screen view, example warning message

1 Icon to indicate the reason for the warning
2 Action for the operator
3 Detailed message
4 Scroll bar.



Caution message, collapsed view, example

1 Icon to indicate the reason for the caution
2 Action for the operator
3 Arrow, if present, indicates that additional information is available

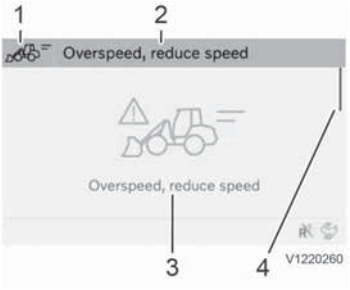
Caution messages

Caution messages have the second highest priority and will be displayed only if no warning messages are present. Caution messages will be displayed instead of any information messages that may have been previously displayed.
When a caution message is displayed, the system will beep two times only.

1 Icon — Caution messages are displayed with a black icon on an orange background. The icon will vary depending on the reason for the caution.
2 Message — The displayed message, in collapsed view, is an action for the operator.
3 Arrow — If the arrow is present, there is additional information. Use the **WORK MODE**

button/wheel to select and view the message in full screen view.

NOTE!
Caution messages can be dismissed, while in collapsed mode, by pressing the **ESC** button on the keypad and if no other caution messages or information messages are present, the display will return to the home screen with only one icon at the top right to indicate that there are messages present.



Full screen view, example caution message

1 Icon to indicate the reason for the caution
2 Action for operator
3 Detailed message
4 Scroll bar. If present, scroll to see more.

Caution messages, full screen view

The full screen view of a caution message gives details about the reason for the caution. If a scroll bar is present on the right, the **WORK MODE** button/wheel can be used to scroll the message and view additional information.

NOTE!
Use the **ESC** button on the keypad to return to the home screen with only a caution icon to indicate that there are caution messages.

Information message, collapsed view, example

1 Icon to indicate the reason for the information
2 Short version of the message
3 Arrow, if present, indicates that additional information is available

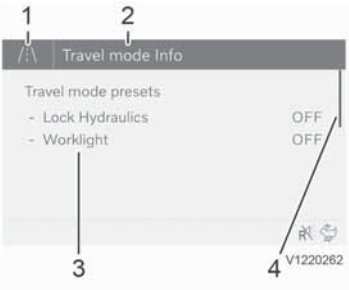
Information messages

Information messages have the third highest (lowest) priority and will be displayed only if no warning or caution messages are displayed. Messages with higher priority will be displayed instead of any information messages that may have been previously displayed.
When an information message is displayed, the system will beep once only.

1 Icon — Information messages are displayed with a white icon on a blue background. The icon will vary depending on the reason for the information.
2 Message — The displayed message, in collapsed view, could be a shortened version to tell the operator how to react.
3 Arrow — If the arrow is present, there is additional information. Use the **WORK MODE**

button/wheel to select and view the message in full screen view.

NOTE!
Information messages can be dismissed, while in collapsed mode, by pressing the **ESC** button on the keypad and if no other information messages are present, the display will return to the home screen with only an information icon to indicate that there are information messages.



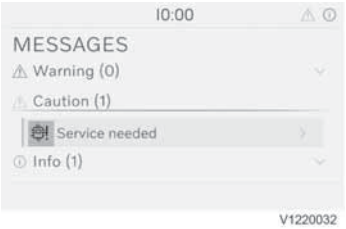
Full screen view, example information message

1 Icon to indicate the reason for the caution
2 Brief message
3 Detailed message
4 Scroll bar. If present, scroll to see more.
(scroll bar not shown)

Information messages, full screen view

The full screen view of an information message gives details about the reason for the information. If a scroll bar is present on the right, the **WORK MODE** button can be used to scroll the message and view additional information.

NOTE!
Use the **ESC** button on the keypad to return to the collapsed view of the message.



Messages menu

Messages menu

To view the messages menu:
1 Press the menu button on the keypad.
2 Use the **WORK MODE** wheel to select **MESSAGES**. The messages menu will be displayed.
3 Use the **WORK MODE** button to select and view details about a message.

Home screen, message icons

1 Caution message icon (yellow)
2 Information message icon (blue)

Dismissed messages

Messages that have been dismissed by the operator will be indicated with only an icon at the top right of the display.

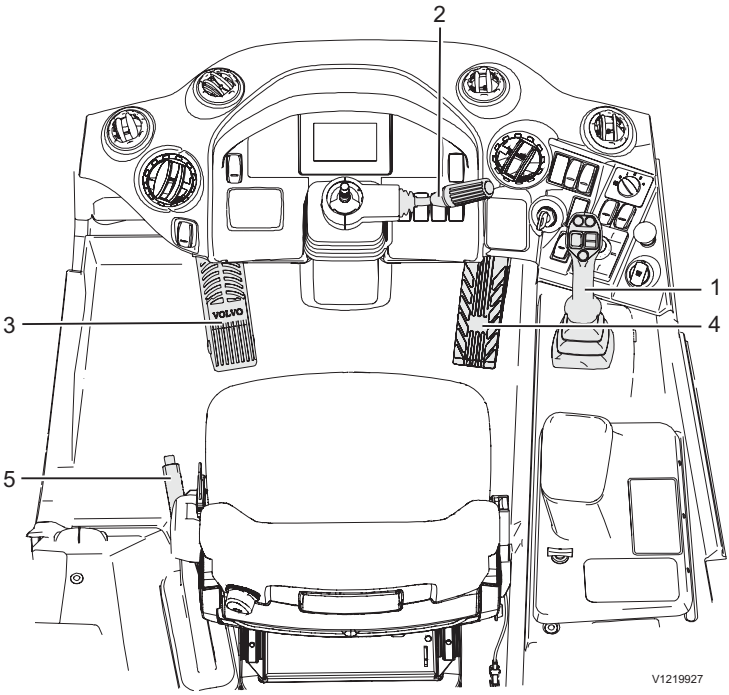
NOTE!
Warning messages can not be dismissed. Therefore, their icon will not be displayed. Dismissed and active messages can be viewed in the messages menu.

1 Active — The 48V system is active

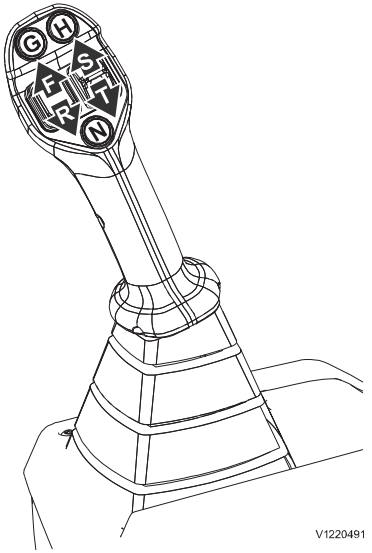
Operational state information

NOTE!
When the operator leaves the seat and the 48V system is still active, the display informs about it.

Other controls
Controls



1	Single control lever with integrated Aux hydraulic functions
2	Multi functional lever (light switch / direction indicators / warning horn / windscreen wiper/washer system)
3	Brake pedal, auto-hold function
4	Drive pedal
5	Parking brake lever



1 Single control lever with integrated Aux hydraulic functions

Travelling direction selection

The left control knob is spring-centred.
Forward: Roll the left control knob fully forward (F).
Rearward: Roll the left control knob fully backwards (R).
Neutral: Press button (N) to go to neutral position.

Gear selection

Press button (G) : toggle speed between low and high.

⚠ WARNING

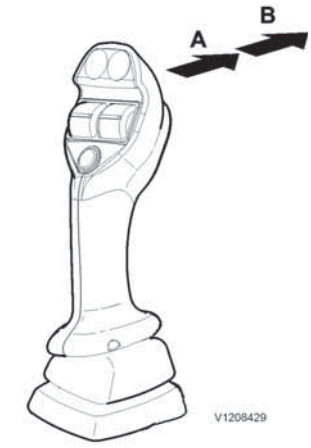
Risk of fatal accident.
The machine can begin to move.
Never leave the machine with the engine running unless gear shift lever is in the N (neutral) position and the parking brake applied.

NOTE!
The control lights on the central instrument will display the selected gear together with the selected travelling direction.

NOTICE

Always make sure that the parking brake is fully released and that the respective control lamp is out.

NOTE!
When changing from forward to reverse or vice versa, the speed of the machine should be reduced as much as possible, particularly if the machine is working on firm ground.



Float function activation

Loader functions

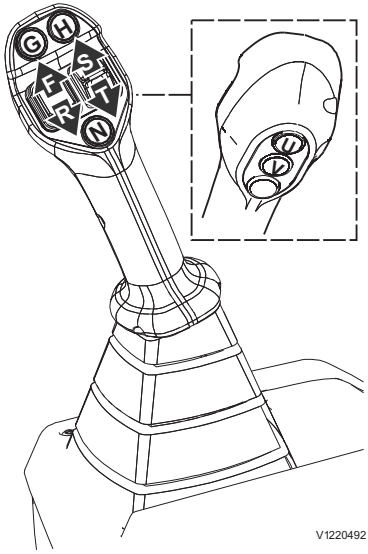
NOTE!

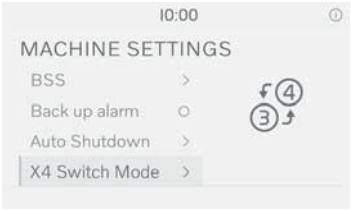
Moving the lever to any end position (left, right, back or front) increases the speed of the electric motor for the hydraulics, so that the hydraulic flow increases — even without pressing the accelerator pedal.

Neutral position: Not activated (spring-centred)
A Lowering
B Float position

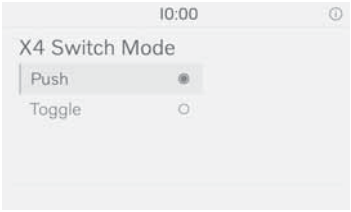
- Move the lever to position B (overcome a slight resistance) and let it remain there for min. 0.5 s → float function is activated. A symbol will be shown in the display.
- Lever can be released back to neutral position → float function remains activated.
- Any lifting movement of the lever, after going to neutral position → float function is disabled.
- Tilting in and out is possible while float function is activated.

Controls for Attachment locking and Aux hydraulics





X4 Switch Mode = Aux hydraulics



Alternate between Push/Toggle

Neutral position: Not activated (spring-centred)
Unlocking / Aux hydraulic flow: Roll the right control knob forward (S) proportional to the demanded speed resp. oil flow.
Locking / Aux hydraulic flow: Roll the right control knob backwards (T) proportional to the demanded speed resp. oil flow.
Detent function: Button U pressed in.
Press V to alternate between 3rd and 4th hydraulic function.
The function is depending on settings in the X4 Switch Mode in the display. Select between Push and Toggle mode (see pics). The 4th hydraulic function is an option.

NOTE!
This control knob provides proportional control. The more the knob is moved out of neutral position the higher the attachment speed resp. the oilflow will be.

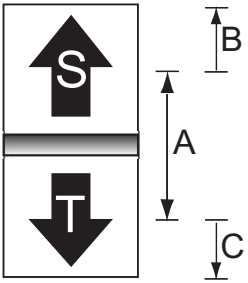
Detent function: by pressing in U botton, detent function can lock the operation of rolling the knob S/T.

Activation:
1 Operate the roller control knob to the wanted position and hold it there.
2 Press and release the detent button (U) to store the position.
3 Release the roller controller knob.

Deactivation: Press the detent button when roller control knob is not operated at all.

NOTE!
The detent function must not be used for locking or unlocking the attachment.

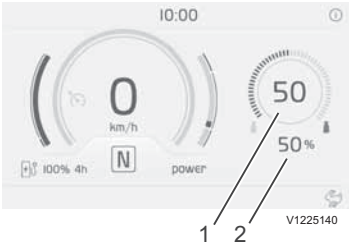
NOTE!
When detent function has been activated, the roller control knob returns to centre position.



V1220142

A Increase/decrease 5% each 100ms
B Increase/decrease 25% each 100ms
C Increase/decrease 25% each 100ms

Adjusting flow after detent function is activited: When detent function is activited, it is possible to adjust the flow by rolling control knob S/T depended on the direction at activation. Rolling into the same direction as at activation will increase the flow incrementally and vice versa.



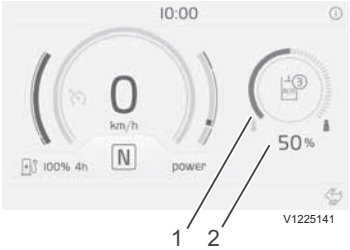
V1225140

1 Stored X3 hold value
2 Current 3rd or 4th hydraulic flow

(3rd hydraulic hold function is not enabled)

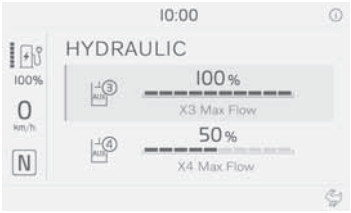
Resume/reset flow setting after deactivate detent function: after detent function is deactivitate, it is possible to resume/reset flow settings by:
- short press on the detent button (U) again, the machines resumes the previous adjusted flow and direction settings again
- long press on the detent button (U), machine will reset the previous flow settings

Press V to alternate between 3rd and 4th hydraulic function (Optional Equipment).

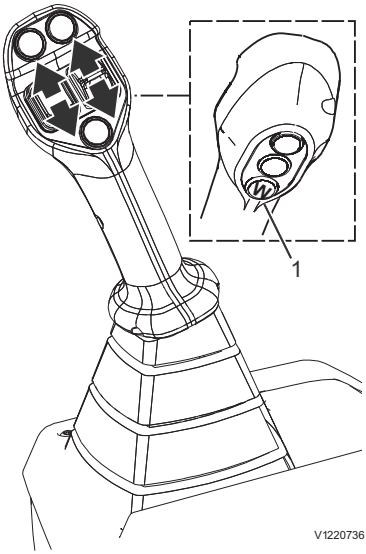


V1225141

1 3rd hydraulic hold active
2 Current hold value



V1225142



V1220736

1 Differential lock (W)

Maximum flow limitation for 3rd and 4th hydraulic function

The overall maximum flow for the 3rd and 4th hydraulic function can be set in the display (see pic). The operator needs to enter the workmode settings (long press on Workmode button on Jog dial) and enter the “Hydraulics” tab. The setting is in percentage with respect to the maximum flow.

Differential locks

To improve the traction of the machine on soft and slippery soil, the differential lock, which works on all four wheels, can be engaged by depressing and holding the push button (W) depressed.

NOTICE

The differential lock must only be engaged when the machine is standing. Make sure, that under no circumstances, the differential lock is activated when the wheels are turning with different speeds.

When the differential lock is engaged, a symbol in the display unit is shown, see page *41*.

If only one wheel of an axle turns although the differential lock switch is depressed, interrupt the drive and operate the steering to help the dog clutch to engage.

The differential lock may be disengaged while driving.

NOTICE

When cornering on hard ground the differential lock must be switched off.

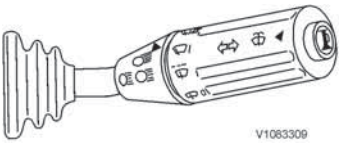
NOTICE

The differential lock should only be used when operating on slippery ground. When operating on firm ground, particularly when turning, the differential lock must be disengaged.

NOTICE

If the machine has become stuck and one of the wheels is spinning, the wheel must be stopped before engaging the differential lock. Otherwise the drive axle system may be damaged.

NOTE!
If there is risk of getting stuck, engage the differential lock before the machine has got stuck.



2 Multi functional lever

Direction indicator, warning horn
- Lever forward = Left hand direction indicator
- Lever backward = Right hand direction indicator
- Button depressed = Horn

Headlights
- Lift the lever towards the steering wheel = High / low beams

Windscreen washer system
- Push the ring towards the steering wheel = Windscreen washer system

Windscreen wiper (turning of lever)
- Position (“J”) = Interval wiper
- Position **0** = Neutral
- Position **I** = Windscreen wiper, normal speed
- Position **II** = Windscreen wiper, fast

Program an interval

The standard interval for the windscreen wiper is three seconds.
To adjust this interval:
1 Determine the time for your new interval.
2 Shift quickly (<1 sec) from position (“J”) and back.
3 Wait for the time that you have determined as your new interval.
4 Go back to position (“J”).

3 Brake pedal, auto-hold function

See page *84*.

4 Drive pedal

The travel speed is controlled by the drive pedal.

5 Parking brake lever

The control light is activated when the parking brake lever operated and has left its bottom position.

When a gear has been selected the operation of the parking brake lever will cause the transmission to neutral gear.

Operator comfort

Silent standby mode

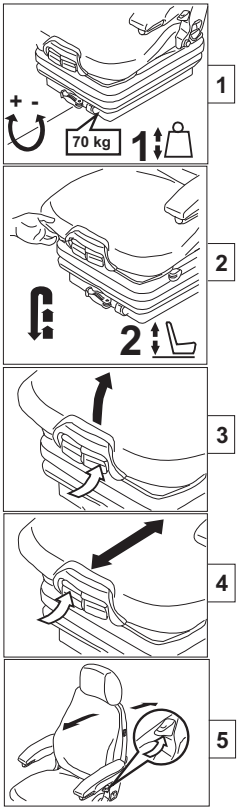
To suppress any noise emission from the machine all electric motors are shut down if the machine is in standstill and the hydraulic controls are released for at least 20 seconds. The timer can be canceled to force an immediate shutdown by pressing the neutral button on the joystick. In addition, the timeout is adjustable in the range of 2 to 60 seconds in the AUTO SHUTDOWN menu.

NOTE!
The electric motor for the hydraulic system will be occasionally activated for a short duration of time in the Silent standby mode to maintain the pilot pressure.

The machine will instantaneously return to operational mode if the hydraulic controls are activated or a driving direction was selected on the joystick.

NOTE!
The Silent standby mode is not activated if the hydraulic oil temperature is too high. The hydraulic motor will remain activated to support the cooling process.

NOTE!
The machine will automatically go into neutral if the brake pedal is not applied in this mode.



V1132211

Operator seat

The operator's seat meets the criteria according to EN ISO 7096. Briefly, this means that the seat is designed to minimize whole-body vibrations during machine operation. The amount of vibration depends on different factors, many of which are not related to the construction of the machine, such as ground conditions, speed and operating techniques. Note the following:

- Adjust the seat according to the operator's weight and height.
- Keep the ground on the work site in good condition.
- Choose the correct operating technique and speed for the current conditions.

NOTICE

Do not adjust the operator seat while the machine is moving.

A correctly adjusted operator's seat enhances operator comfort and safety. An incorrectly adjusted seat may lead to injuries. The adjustments that can be made are:

1 **Weight adjustment:** Turn the lever until your weight is shown on the indicator.

NOTE!
Do not sit in the seat while adjusting.

2 **Height adjustment:** Lift the operator's seat to the desired height until it audibly snaps into place. When the seat has been raised above the highest setting (end-stop) it drops back down to its lowest position.

3 **Seat cushion angle adjustment:** Pull up on the left handle and push down or pull up the front part of the seat cushion to adjust to desired angle.

4 **Seat depth adjustment:** Pull upon the right handle and move the seat cushion forward or backward to desired position.

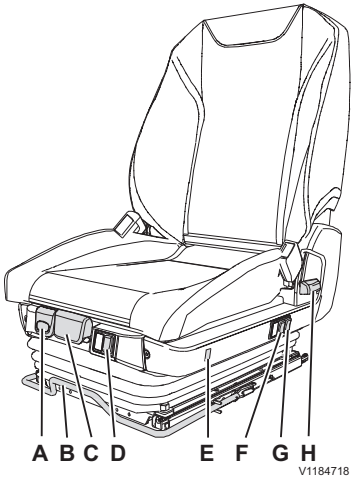
NOTE!
After fore-aft adjustment, the lock handle must lock into place with an audible click. Then it should not be possible to move the operator's seat.

5 **Backrest adjustment:** Pull up the lock catch and move the backrest to the desired position. Then release the lock catch.

NOTE!
The backrest is spring-loaded to forward direction when the lock catch is pulled upward.

NOTE!
It should not be possible to move the backrest when the lock catch has been released.

Air suspended seat (optional equipment)



A **Seat inclination adjustment:** Pull the handle and incline the seat by applying or releasing force on the front part of the seat. Release the handle to lock in desired position.

B **Horizontal adjustment:** Pull the lever and move seat forward or backwards. Release the lever to lock in desired position.

C **Cushion depth adjustment:** Pull the handle and move the seat cushion forward or backwards. Release the handle to lock in desired position.

D **Weight and height adjustment:** Press the button to adjust the seat to desired height. If the seat does not withstand bumps it is adjusted to soft (low).

E **Seat heating:** Press the button to switch between on and off.

F **Upper lumbar support:** Press the button to adjust for desired upper lumbar support.

G **Lower lumbar support:** Press the button to adjust for desired lower lumbar support.

H **Backrest adjustment:** Pull the handle and adjust by applying or releasing force on the backrest. Release the handle to lock in desired position.

Seat belt

WARNING

Risk of serious injury!
Unexpected machine movement can cause the operator to be ejected from the machine, causing serious injuries.
Operate the machine only while seated in the operator seat with the seat belt fastened.

The seatbelt is critical to operator safety. It must always be worn and fastened when the machine is used to prevent the operator from being ejected out of the cab or off the operator platform if the machine rolls over, tips over, or is involved in an accident. A fastened seatbelt also helps the operator to maintain control of the machine if it moves suddenly or in an unexpected way. Failure to use the seatbelt when the machine is used can lead to serious injuries or fatal accidents. The seatbelt is only intended for one adult. Make sure that the seatbelt is reeled-in when not in use.

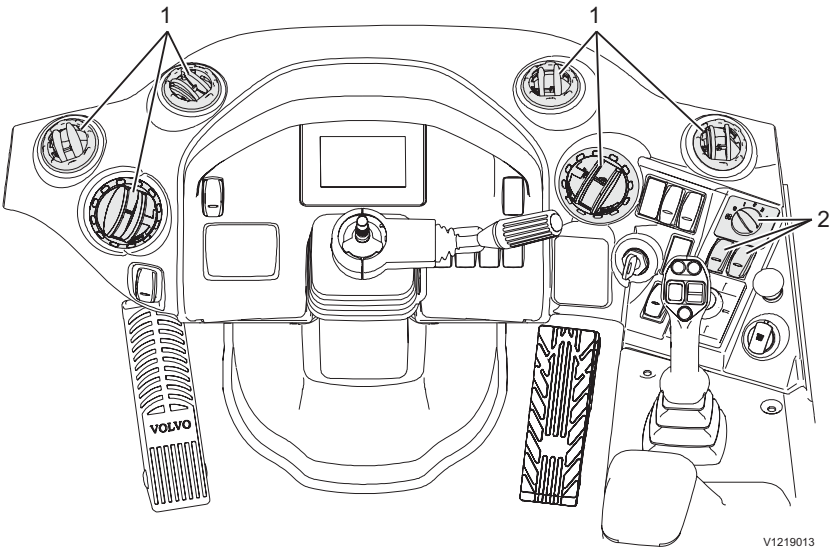
WARNING

Risk of serious injury or death.
A damaged seat belt could cause serious injury or death.
Check the seat belt and associated parts before start of machine operation.

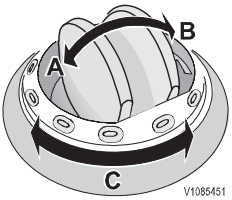
Check the seatbelt and associated parts every day. Make sure that fasteners and installation parts are well-tightened. Replace the whole seatbelt immediately if there is any wear, the belt is worn, frayed, has loose stitching, if the belt is deformed, or if the seatbelt's reel does not work. Replace the seatbelt if the machine has been involved in an accident where the belt has been stretched, strained, or subjected to high forces. Check fasteners and installation parts. It is forbidden to change or modify the belt or its attachments and fasteners. Only use warm water when cleaning, do not use cleaning agents or detergents. Let the belt dry while it is pulled out, before reeling it in.
Volvo Construction Equipment recommends replacement of seatbelt units every 3rd year regardless of appearance.

Climate control system

Climate control system



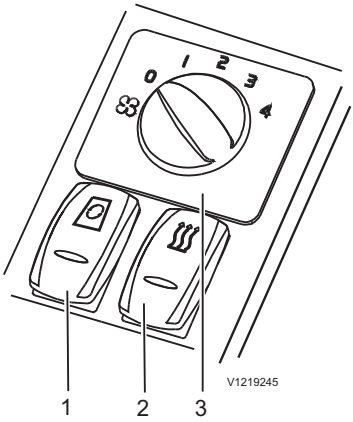
1 Air nozzles
2 Climate control system



A Open
B Closed
C Air flow direction

Air nozzles

Open the ventilation nozzles and adjust the direction of the air to obtain the best possible air distribution.

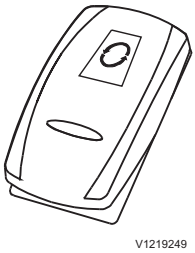


Climate control system

1 Circulation of air

2 Temperature control

3 Fan control



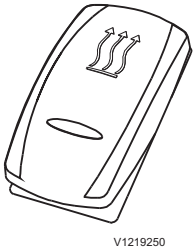
Circulation of air

1 Circulation of air

Fresh air is used for the cab ventilation if the switch is in off position.

Press switch to activate circulation of air.

Circulation of air may be used as a setting for reducing the intake of bad-smelling air. This also reduces the accumulation of dust in the cab ventilation filters.



Temperature control

2 Temperature control

Three-position switch

- Upper part of switch pressed in = Heating Level 2 (Max. Heating)

NOTE!
The machine will not start if the switch for temperature control is in 2nd position.

- Middle position = Heating Level 1
- Lower part of switch pressed in = Off

NOTE!
Temperature control should be at Off before starting the machine.

Fan control

3 Fan control

Fan control in four steps. Position 0 = fan turned off.

NOTE! All fan positions can be used for heating and defrosting.

Climate control system, adjusting

The instructions below are basic recommendations. Each operator should experiment to achieve the best possible working environment in the cab.

For the best temperature control in the cab try to have as many nozzles as possible open.

How to achieve ...

... comfortable working temperature:

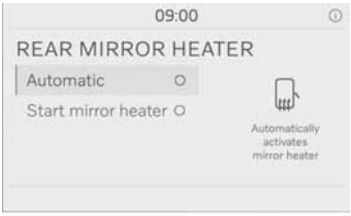
- All nozzles fully open.
- During warm outdoor climate - air conditioning switched on.
- Temperature control set to required temperature.
- The best warming effect in the cabin is achieved with the fan control in position 2 or 3, the temperature regulator to highest position and circulation.
- If the "fresh air" is used and the temperature regulator is in the highest position, fresh air will flow into the driver's cab through a dust filter.

... demisting all windows:

- The front nozzles directed towards the windscreen.
- Floor nozzles under instrument panel closed.
- The rear nozzles should be directed towards the rear window / side window.
- The fan control in position 2 or 3, the temperature regulator to highest position and circulation.

Electric heating rear view mirrors

1 Climate button



Electric heating mirrors help clear away ice, snow and fog from the rear view mirrors.
Select rear mirror by long pressing the climate button on the keypad or select climate after pressing menu button on the keypad and choose climate.

- Select automatic to automatically heat the rear mirrors.
- Select start mirror heater option to heat the mirror for 30mins.

NOTE!
If a low voltage on the 12v is detected, then the electric heating rear view mirrors are turned off.

Provide for good ventilation

Do not operate the machine for long periods without ventilation or with the cab fully closed without having the fan turned on.

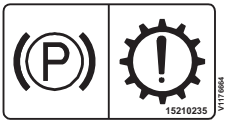
Poorly ventilated air can cause tiredness (lack of oxygen).

Operating instructions

This section contains rules that must be followed for safe work with the machine. However, these rules are to be followed in conjunction with laws and other national regulations applicable to road safety and labour welfare.

Alertness, judgement and respect for applicable safety regulations are conditions for avoiding risk of accidents.

Driveline shutoff



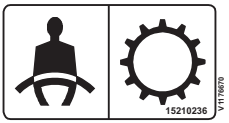
Decal for driveline shutoff via parking brake (positioned in the cab)

Driveline shutoff via parking brake

The function prevents the machine from being driven unless the parking brake has been released.

Gear is forced to neutral if the parking brake is applied.

NOTE!
Apply the foot brake before releasing the parking brake.

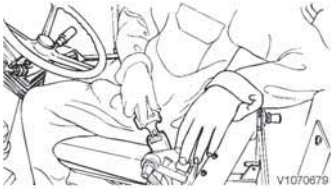


Driveline shutoff via seat belt (positioned in the cab)

Driveline shutoff via seat belt (optional equipment)

The function prevents the machine from being driven unless the seat belt has been fastened.

NOTE!
Apply the foot brake before releasing the parking brake.



⚠ WARNING

Risk of personal injury or death.
If the parking brake is applied or the seat belt is unfastened during operation, the travel speed will be reduced inadvertently which may result in accidents.
During operation, the seat belt must remain fastened and the parking brake must not be applied.

NOTE!
Driving will still be possible even if the seat belt is unfastened during operation but an audible alarm and a red message in the display will be shown.

NOTICE

Do not apply the parking brake while the machine is moving. The parking brake should only be used when the machine has been stopped or as an emergency brake.

Propeller shaft

The propeller shaft design is maintenance-free.

In extreme operating conditions, for example when the propeller shaft was taken unter mud and water accidentially, the propeller shaft can make noise during steering. Then, the propeller shaft may need to be lubricated. For further information, contact your dealer.

Visibility

⚠ WARNING

Risk of serious accidents.
Machine parts, equipment or load could obstruct the operator‘s view. Operating or driving with obstructed operator‘s view could cause serious accidents.
Use a signal man if operator‘s view is obstructed.

It may be impossible to obtain visibility all around the machine. To achieve acceptable visibility, optional devices can be used.

In order to minimize risks caused by restricted visibility, follow rules and procedures established by the work site management. For example:

- Make sure that operators and personnel on the work site have received thorough safety instructions.
- Control the traffic flow of machines and other vehicles. If possible, avoid reversing.
- Limit the machine's operating area.
- Use a signal man to assist the operator. Use hand signals according to the signal diagram, see page *129*.
- Make available equipment for two-way communication as needed.
- Make sure that persons on the site communicate with the operator before approaching the machine.

The standard ISO 5006 "Earthmoving machinery – Operator’s field of view") covers the operator's visibility around the machine and is intended to be used to measure and evaluate visibility. Compliance with this standard is a requirement in EU-countries and gives improved visibility around the machine.

The machine is tested according to methods and criteria for this standard. The method used to evaluate visibility cannot cover all points regarding operator visibility, but it does give information to determine if optional devices for indirect visibility are needed, e.g., warning systems.

The test was conducted on stationary machine with standard equipment and standard attachments. If the machine is modified or equipped with other equipment or attachments, resulting in reduced visibility, it shall be tested again according to ISO 5006 and, if neccessary, be equipped with extra help devices.

If other equipment or attachments are used and visibility has been reduced, the operator must be informed.

The danger area around an operating machine forms a circle with a radius of least 7 m.

Actions before and during operation

- Walk around the machine and check that there are no obstacles next to the machine.
- Check that mirrors and other visibility-enhancing devices are in good condition, clean, and adjusted correctly.
- Check that the horn, back-up warning signal, and the rotating beacon (optional equipment) work properly.
- Check if the management has established rules and procedures for the work site.
- Always pay attention around the machine to identify and avoid any obstacles.
- Prevent persons from entering or remaining in the danger area, i.e. the area around the machine and at least 7 m (23 ft) beyond the maximum reach of the attachment. The operator may allow a person to remain in the danger area, but should then observe caution and operate the machine only when the person is visible or has given clear indications of where he or she is.

Safety rules when operating

Operator obligations

⚠ WARNING

Risk of fatal accidents.
Unauthorised persons within the work area around the machine could lead to serious crushing injury.
• Clear all unauthorised personnel from the working area.
• Keep a lookout in all directions.
• Do not touch control levers or switches during start.
• Sound the horn before beginning operation.

NOTE!
Make yourself familiar with all controls to safely operate the machine.

NOTE!
Make sure no other person is on or close to the machine when the ignition key is switched ON.

- The machine operator must operate the machine in such a way that the risk of accidents is minimized for the operator, other road users, and persons present on the work site.
- The machine operator must be thoroughly familiar with how to operate and maintain the machine, and it is recommended that operators receive the necessary training on the machine.
- The machine operator must follow the rules and recommendations given in the Operator's Manual, but also pay attention to any statutory and national regulations or specific requirements or risks that apply at the work site.
- The machine operator must be thoroughly rested and must never operate the machine under the influence of alcohol, medicine, or other drugs.
- The machine operator is responsible for the machine's load both when operating on public roads as well as when working on site.
  - There must be no risk of the load falling off while operating.
  - Refuse to take a load that is an obvious safety risk.

The danger zone around operating machines is at least 7 m (275.5 in).

- Respect the rated load capacity of the machine. Note the effect of varying distances to the centre of gravity and the effect of additional units.

■ The machine operator must be in control of the machine's work area.
  - Prevent persons from walking or standing under raised lift arms, unless they have been secured or supported.
  - Prevent persons from entering or remaining in the danger zone, that is, the area around the machine and at least 7 m (275.5 in) beyond the attachment's maximal reach.

■ The machine operator is responsible for the machine not being used to transport or lift persons, unless it is equipped and approved for this purpose. Contact a dealer for more information.

Accidents

⚠ WARNING

Risk of serious injury.
More than one person in the cab while operating could cause accidents and serious injury.
Only the operator, seated in the operator's seat, may be in the cab when operating. All other persons must keep at a safe distance from the machine.

■ Accidents and also incidents should be reported to the site management immediately.

■ If possible leave the machine in position.

■ Only take necessary action so as to reduce the effect of damage, especially personal injuries. Avoid action which may make an investigation more difficult.

■ Take part in the emergency plan for the working site or other instructions about measurements in case of accidents.

■ Wait for further instructions from the site management.

Machine operator safety

■ Always use the seatbelt.

- Always sit in the operator's seat with the seatbelt fastened when starting the machine (electric motor) and when operating levers and switches.
- Check that the seat belt is not worn, see page *61*.
- The machine must be operational, i.e. faults which can cause accidents must be rectified.
- Suitable clothing for safe handling and a hard hat should be worn.
- A loose mobile telephone must not be used, as it may interfere with important electronics. The mobile telephone must be connected to the electrical system of the machine and have a fixed external aerial installed according to the instructions of the manufacturer.
- Keep your hands away from areas where there is a risk of crushing, e.g. covers, door and windows.
- Use steps and handholds when entering or leaving the machine. Use the three-point grip, i.e. two hands and one foot or two feet and one hand. Always face the machine – do not jump!
- The door must be closed when working and operating.
- The vibration (shaking) which arises when operating may be harmful to the operator. Reduce this by:
  - adjusting the seat and tightening the seat belt.
  - picking the smoothest operating surface for the machine (levelling the surface when necessary).
  - adapting the travelling speed.

- The cab is for the protection of the machine operator and it meets the requirements for Roll Over Protective Structures according to the testing standard "ROPS". Therefore, hold firmly onto the steering wheel if the machine should roll over - do not jump!
- The cab is also designed to meet the requirements for falling objects, the weight of which agrees with testing methods according to "FOPS".
- Only walk and stand on surfaces which have slip protection.

■ Do not enter or leave the machine during a thunderstorm.
- If you are outside the machine, keep a good distance away from the machine until the thunderstorm has passed.
- If you are in the cab, remain seated with the machine stationary until the thunderstorm passes. Do not touch any controls or anything made of metal.

Machine with Canopy

■ Always wear suitable safety glasses.

Operating on public roads

■ Road signs, barrier arrangements, and other safety devices that may be required when considering traffic speed, intensity, or other local conditions must be used.

■ When moving a machine with a suspended load, special attention must be observed. When required, a signal man must be used.

■ Rotating beacon may be used:
- on machine during road maintenance work, e.g., snow removal.
- on attached or connected implement that is wider than the machine itself.
- when the machine is an obstacle or danger to other traffic.
- when working on or by the side of the road.
- follow local rules and regulations.

NOTE!
If the foldable version of the rotating beacon (optional equipment) is installed, it shall be completely folded upwards to the highest position to maintain visibility.

Travelling on public roads

■ As a machine operator you are considered to be a road user and therefore required to know and follow local regulations and national traffic regulations.

■ It is important to remember that the machine, compared to other traffic, is a slow-moving and wide vehicle that may be an obstacle. Keep this in mind and pay attention to the traffic behind you. Facilitate overtaking.

SMV-sign

- SMV-sign (Slow-Moving Vehicle) shall be used. It should be placed in a position at the rear on the machine where it is clearly seen, not inside the rear window or any other window. It should be located at a height of 0.6–1.8 m (23.6–70.9 in) above the ground measured from the bottom of the sign.
- The attachment should be empty, lowered to the transport position (30–40 cm (12–16 in) above ground) and fully tilted back.
- Attachments with grapple, 4–in-1 buckets, tipping buckets or similar shall be in closed respectively down position.
- The front end of the material handling arm must be marked with a red flag.
- All work lights and any rotating beacon should be off.
- Hazard flashers may not be used except in emergency situations.
- Attachments and buckets that restrict visibility must not be used.
- Make sure that large attachments/buckets do not get in the way of the headlights. According to legislation, the machine's headlights must provide sufficient light and visibility in front of the machine.
- Additional tools such as buckets, shovels, and iron bars must be thoroughly secured with tensioning straps or chains.
- If a trailer is to be towed behind the machine, see page *90*.
- The connecting device on the counterweight must not be used when recovering, towing, or when operating on roads. Follow national regulations.

NOTICE

Follow national and state regulations.

Safety rules in case of fire

NOTE!

Do not try to extinguish a fire in the traction battery. Only when fire has not moved over to the traction battery yet, it shall be extinguished.

If your own safety is not at immediate risk, take the following actions.

In case of fire on the work site

1 If possible, move the machine away from the hazardous area.
2 Lower the attachment to the ground.
3 Turn off the electric motors by turning the start key counter-clockwise.
4 Leave the cab.
5 Turn off the main electric power with the battery disconnector.
6 If possible, take active part in putting out the fire and call the fire department if needed.

In case of fire in the machine

If the machine is being operated:
1 If possible, park in a fireproof location.
2 Lower the attachment to the ground.
3 Turn off the elctric motors by turning the start key counter-clockwise.
4 Leave the cab.
5 If possible, turn off the main electric power with the battery disconnector.
6 Try to put out the fire.
7 Call the fire department if needed.

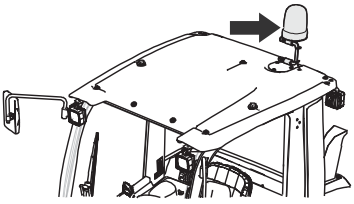
Rotating warning beacon

The rotating warning beacon is available in different versions.

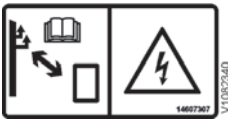
NOTE!
When the foldable version of the rotating warning beacon is in use it must be in its unfolded position, see illustration.

Make sure that the foldable rotating warning beacon is locked in its upper end position (unfolded position) before switching it on.

For more information about the usage of the rotating warning beacon, see page *74*.



Rotating warning beacon, unfolded position



Power lines, minimum clearance

DANGER

Risk of electrocution
Working near or making contact with overhead power lines may lead to electrical flashover and electrocution.
Always keep the minimum clearance from overhead power lines.

High voltage is lethal and could be powerful enough to destroy machine and attachments. Always contact the local authority before starting work near overhead power lines.

Operating the machine near overhead power lines requires special precautions.

- Consider all overhead power lines to be energised with electric power, even lines that are supposed to be without electric power.
- Contact with overhead power lines may cause a temporary power outage. The power may return automatically without any warning.
- There is a risk of electrocution if anyone touches both the machine and the ground at the same time.
- Always be aware of the very serious risk if the machine comes into contact with high voltage.
- Remember that the voltage in the power line determines the safety distance.
- Electrical flashovers may damage the machine and injure the operator at great distances from the power line.
- Always keep the minimum distance from overhead power lines.

Minimum distance from overhead power lines

Voltage of overhead power lines Volt (V)	Minimum distance	
	m	ft
up to 50,000	3	10
50,000 to 69,000	4	13
69,000 to 138,000	5	16.4
138,000 to 250,000	6	20
250,000 to 500,000	8	26

500,000 to 550,000	11	35
550,000 to 750,000	13	43
more than 750,000	14	46

Know the location and voltage of all overhead power lines on the work site before operating the machine.
Contact the local authority if there is any question about the power lines being energised or their voltage.

Keep the following in mind to ensure safety when operating:

- Know what to do if there is an electrical flashover that involves a person or machine.
- Operate the machine at slower than normal operation speed when working near power lines.
- Long-span power lines can sway and reduce the clearance.
- Be careful when travelling over uneven ground which could cause the machine to become unstable.
- Keep all persons away from the machine whenever it is close to power lines.
- Do not allow persons to touch the machine or its load before it is confirmed to be safe.
- When a machine is in contact with an overhead line, do not allow anyone to come near or touch the machine. Stay away from the machine and call for help.
- Never touch a person who is in contact with an energised power line.

If your machine comes into contact with overhead power lines:

- Stay in the operator seat while the machine is in contact with the power line.
- Warn personnel outside the machine to not touch any part of the machine and to stay away.
- Stay in the operator seat and lower any raised parts in contact with the overhead power lines, or drive the machine away from the overhead power lines if it is possible.
- If contact cannot be broken, stay in the operator seat until you know that the power is off.
- If you need to get out of the machine to call for help or because of fire, jump out as far as you can without touching any wires or the machine, stay upright, keep your feet together and hop to safety.

Failure to follow this instruction could result in electrocution or death!

Measures before operating

1 Carry out daily service, see page *152*. (Make sure that the freezing point of the coolant is sufficiently low in cold weather and that the lubricating oil is intended for winter use.)

2 Clean/scrape the windows.

3 Check that there are no faulty/loose parts or leaks which can cause damage.

4 Check that the battery disconnect switch is switched on.

5 Check that the frame joint lock has been disconnected.

6 Check that the wheels are not blocked.

7 Check that the covers on the machine are attached, closed and secured and that the rear hood is closed.

8 Check that there are no persons in the vicinity of the machine, see page *71*.

9 Adjust the operator seat (see page *59*) and the steering wheel (see page *51*).

10 Fasten the seat belt.

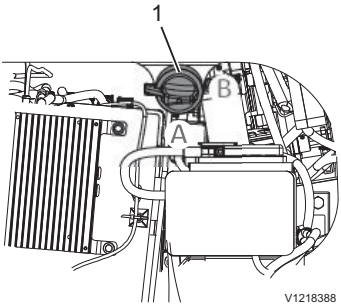
11 Check that the battery is charged.

Starting machine

Starting the Electric System

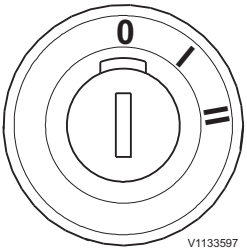
NOTE!
The machine will not start if the switch for temperature control is in 2nd position.

NOTE!
Electricity should always be switched off when the machine is not in use and parked. The battery disconnect switch is located on the right hand side underneath the rear hood (see picture).



1 Battery disconnect switch
A Battery connected
B Battery disconnected

1 Turn the 12 V battery disconnect switch (1) to position A (12 V battery connected).

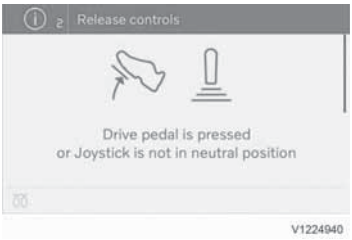


2 Turn the key in the ignition switch to operating position (I).
→ Wait until the display turns on and the standard operating screen is shown.

3 Briefly turn the key to cranking position (II) and release to operating position (I).

NOTE!
Make sure that the heater switch is at Off position before cranking.

2 Pre-charge symbol



4 Wait until the pre-charge symbol (2) disappears.

NOTE!
After the precharge symbol (2) has disappeared, the travel direction and speed are visible on the display. This is the indication that the 48V system is active.

NOTE!
While the pre-charge symbol is shown in the display, the electric motor of the hydraulic system may increase rotation speed and load the pilot system.

NOTE!
If the drive pedal is pressed or if the joystick is not in neutral position when the precharge symbol is shown, then a notification to release controls is shown as soon as the precharge symbol disappears. Operator will not be able to operate the machine until the controls are released.

5 Sound the horn.

6 Check that the attachment is fastened securely to the machine by pressing it against the ground.

7 Release the parking brake.

8 Select travel direction and start operating.

Starting with booster batteries

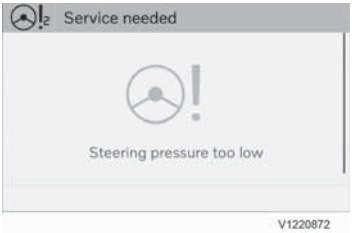
The L25 Electric must never be started with a booster battery.

Steering

The machine is frame-steered (articulated) and has a hydrostatic powered steering system.

This system employs hydraulic power to supplement the muscular power of the operator to effect steering of the machine.

NOTE!
If "Steering pressure too low" appears in the display, stop the machine immediately and contact a qualified service technician.



Steering pressure too low

Braking

Brake smoothly. This is especially important when operating with a load and on slippery ground.

Parking brake

NOTICE

Do not apply the parking brake while the machine is moving. The parking brake should only be used when the machine has been stopped or as an emergency brake.

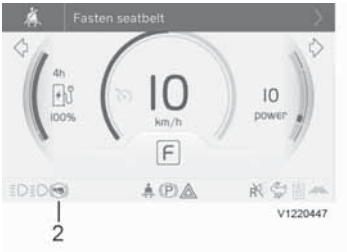
NOTE!
When the parking brake is operated, the transmission will be forced into (N) neutral gear and free rolling is possible.

Service brake

Use the brake pedal to reduce the speed or to stop the machine.

NOTE!
The auto-hold function only works while the operator sits on the seat (sensor-controlled).

1 Activate the brake pedal.
2 Release the pedal and accelerate the machine slightly.



2 Auto-hold symbol

NOTE!
Using the auto-hold function will heat up the electric motor for the driveline. In case of longer standing still, apply the parking brake.

Use the auto-hold function to stop and start at a slope. The function is activated when the brake pedal is slightly actuated. The machine will be hold for a short time after releasing the brake pedal. Using the accelerator pedal switches off the auto-hold function.

Brake support

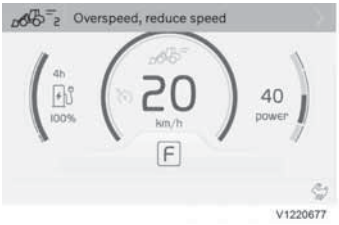
The electric motor of the driveline supports the brake system and can help to decelerate the machine, when the operator releases the accelerator pedal. In some conditions the brake support from the electric motor driveline can be reduced (e.g. low/high ambient temperatures, high state of charge (SOC) of the traction battery).

NOTE! The rotation speed of the electric motor of the hydraulics may increase while the function is activated.

Overspeed monitoring of the electric motor for the driveline

Always respect the maximum machine speed of 16 km/h. In case of overpeed, a two-stage warning will inform the operator.

This function monitors the speed of the electric motor for the driveline and alarms if the electric motor speed exceeds a defined threshold. The buzzer sounds and warning messages (see illustrations) are shown in the display. Lower the machine speed with the brake pedal until the alarm disappears.



Overspeed, reduce speed (yellow)

NOTE!
Yellow overspeed warning (yellow display warning, one-time acoustic signal):
Use the service brake, reduce the speed.

Overspeed, reduce speed (red)

NOTE!
Red overspeed warning (red display warning, continuous acoustic signal):
Use the service brake, reduce the speed.
In case of further acceleration (> ~ 24 km/h):
The electric brake support stops.
Mechanical damage of the driveline system is possible.

Stopping

NOTICE

Do not turn off the battery disconnect switch when the electric motors are running. The electrical system may be damaged.

1 Reduce machine speed.

2 Brake the machine to a stop and shift to neutral.

3 Lower the attachment to the ground.

4 Apply the parking brake.

5 Turn off the ignition key.

6 Switch off the battery with the battery disconnect switch (see picture on page *81*.)

If the operator has to leave the cab with the electric motors running, he has to exit carefully to avoid turning the steering wheel inadvertently as the operator leaves the cab. This applies particularly if the steering wheel is provided with a knob.

NOTE!
Never leave the cabin without having the parking brake applied.

NOTICE

Use handholds to access the cab. Always use the 3-point approach to access or leave the cab, i.e. two hands and one foot.

Parking

Parking and Storage

1 If possible, place the machine on level ground. If this is not possible, block the wheels so that the machine cannot start rolling. Lower the attachment against the ground.

2 Check that all switches and controls are in the "off" position or in neutral.

3 Apply the parking brake after the machine has come to a complete standstill.

4 Remove the keys.

5 Turn off the electric power with the battery disconnect switch (see picture on page *81*). If the machine is to be parked for more than one day it is recommended that the traction batteries are charged to between 50 and 70 percent.

6 Lock all covers, rear hood, windows and the door.

Remember that the risk of theft and break-in can be minimized if one:

- removes the ignition key when the machine is left unattended.
- locks all covers, rear hood, windows and the door after end of the working shift.
- turns off the electric power with the battery disconnector and removes the handle.
- avoids parking the machine in places with high risk of theft, break-ins and malicious damage.
- removes all valuable items from the cab, e.g., mobile telephone, computer, radio, and bags.

Long-term parking and taking machine out of service

NOTICE

If the machine is not going to be used every day, all cylinders should be protected against corrosion.

- The temperature may not be below -20 °C (-4 °F) or above +45 °C (113°).
- Check that the 12V batteries are fully charged.

- The traction battery should be charged to between 50 and 70 percent.

NOTE!
Traction battery: Battery restrictions in case of long-term parking for the machine: No more than 20 days at 0% charge level.
Traction battery: Battery restrictions in case of long-term parking for the batteries: No more than 250 days.

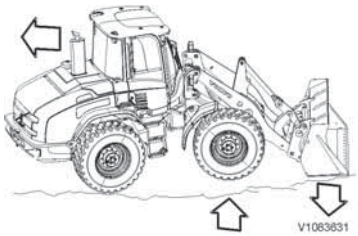
- Carry out the measures as described above.
- Wash the machine and touch up any damaged paint finish to avoid rusting.
- Treat exposed parts with rustproofing, lubricate the machine thoroughly and apply grease to unpainted surfaces (lift and tilt cylinders, etc.).
- Fill the hydraulic oil tank to the max. marks.
- Remove the fuse for the voltage converter and radio. Otherwise there is a risk that the batteries will be discharged.
- Check the tire inflation pressure and protect the tires against strong sunlight.

Check after long-term parking and after machine has been out of service

- All oil and fluid levels
- Tension of all belts
- Tire inflation pressure
- Install the fuse for the voltage converter and radio

NOTE!
If any protective agents (rustproofing, etc.) have been used on the machine to prepare for long-term parking, follow the manufacturer's instructions for safety measures and methods for removing.

Measures when getting stuck



(Principle illustration)

What to do if the machine gets stuck

If the machine has gotten stuck, it is usually best to reverse out. If you cannot reverse or move forward, try the following:

1 Engage the differential lock.
2 Reverse and alternate steering the machine to left full lock and then to right full lock ("duck walk").

If only the front wheels have become stuck, proceed in either of the following ways:

1 Lift the front wheels, supporting the machine on the floor of a flat bucket, and reverse.
2 Steer to the right or to the left, press the bucket against the ground, lift up the front wheels and steer the other way, raise the bucket slightly and reverse.
3 Lift up the front wheels using the bucket. Manually fill the holes under the wheels with branches, pieces of wood, or similar, and reverse.
4 If the machine needs to be recovered, see page *90*.

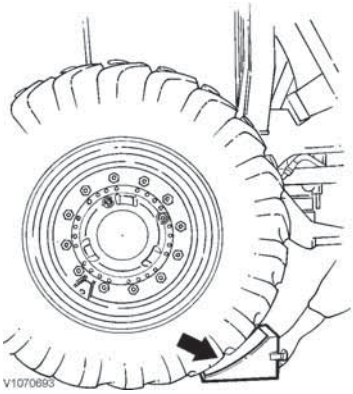
NOTE!
The propeller shaft may need to be lubricated, see page *68*.

NOTE!
Respect the operating instructions for differential lock, see page *Differential locks*.

Retrieving and towing

WARNING

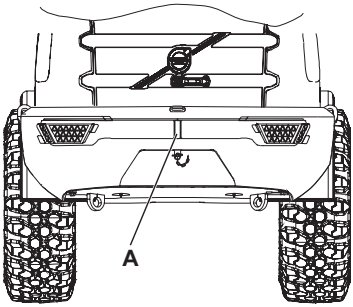
Risk of runaway machine.
Improper recovering or towing methods or faulty equipment could cause the machine to break away from the towing vehicle, causing accidents, serious injury or death.
Always apply parking brake and block the wheels to prevent the machine from moving while attaching the towing equipment.



NOTICE

Risk of machine damage.
Retrieving and towing of the machine could cause serious damage to the electric system.
The machine should be transported to the nearest safe place only in emergency situations in hazardous areas.

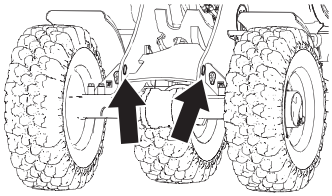
NOTE!
The towing hitch at the rear end of the machine must not be used to tow a trailer.



A Tow hitch (for recovering backward)

Actions

- If possible, the electric motors should be running so that the steering works.


V1225239

Lashing points (for recovering forward)

Recovering

Use a towbar or other suitable tools to pull the machine to a suitable location or passable road.

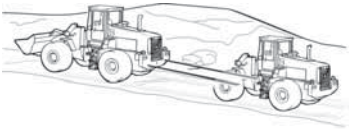
- When recovering backward, use the tow hitch (A) on the counterweight.
- When recovering forward, use the two lashing points on the front frame.

Maximum total force when recovering:

- Backward: 40 kN (8992 lbf)
- Forward: 40 kN (8992 lbf)

After retrieving to a safe place, the machine must be stopped and parked, read and follow the instructions on pages Stopping and Parking and Storage.
Do not try to perform a recovering. Contact a qualified service technician.

Towing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(Principle illustration)

The towing vehicle or machine must weigh at least as much as the machine that is to be towed, and it must have sufficient engine power and braking capacity to pull and brake both machines on any uphill or downhill grades.

NOTE!
Use a steel chain of suitable strength to tow the machine. The machine should be towed at low speed and keep the towing distance as short as possible.

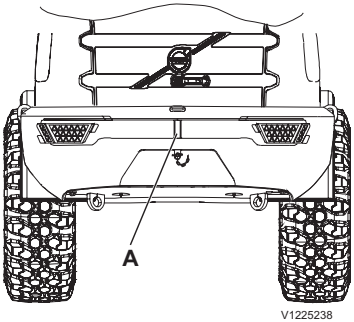
NOTE!
For longer distances the machine must be transported on a transport vehicle or trailer.

Follow national regulations where required.

After towing

Before the towbar or wire is removed, the following safety actions should be taken:

1 If possible, place the machine on level ground.
2 Apply the parking brake or block the wheels to prevent the machine from rolling.

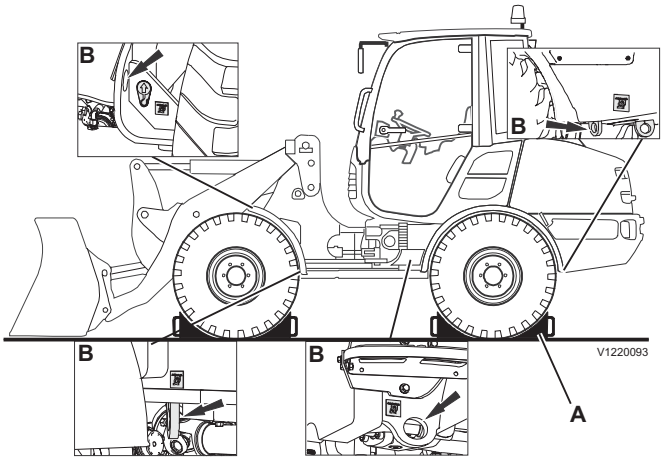


Tow hitch on counterweight

Tow hitch on counterweight

Maximum temporary force on the tow hitch (towbar) on the counterweight including attachment bracket must not exceed a horizontal force of 40 kN (8992 lbf) and a vertical force of 4 kN (899 lbf).

Transporting machine



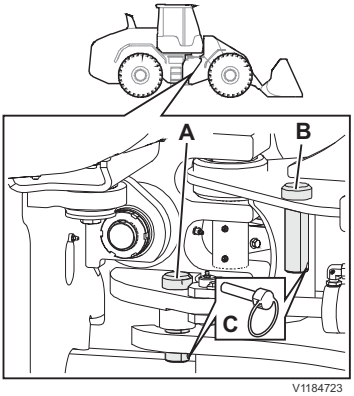
A Block the wheels
B Lashing points

NOTICE

The person in charge of the transport must see to that loading, positioning, lashing and transporting the machine on a trailer or other vehicle is done according to applicable laws and regulations for the country or state in question. For further information, contact your dealer.

On another vehicle

- If the machine is lifted up onto another vehicle, the frame joint must be locked.
  - Use the intended lifting points for any lifting, see figure.
  - Lock the frame joint with the lock bolt and the lock pin.
- If the machine is driven up onto another vehicle, the frame joint must not be locked.
- The frame joint must be locked when the machine has been driven up on the trailer and reached final position.
- Tie down (lash) the machine.



Frame joint lock
A Lock bolt (in lock position)
B Lock bolt (in stowed position)
C Lock pin

Tying down machine

- Block the wheels.
- Tie down (lash) the machine using the intended lashing points so that the machine cannot tip or begin to roll.

Across ramp

- First check that the ramp is wide enough, that it has the required strength, and that it cannot be displaced.

In elevator or other confined space

1 Reverse the machine in.
2 Apply the parking brake and turn off the electric motors before starting the elevator.

In addition, ensure national or state regulations are followed.

Securing cargo (machine) that has been loaded

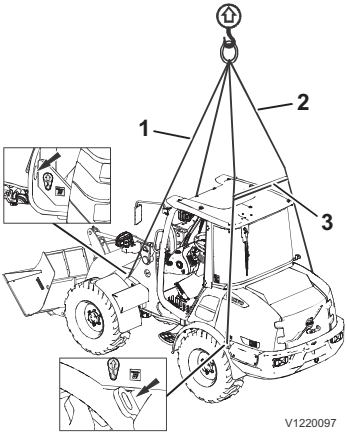
See the following conditions for securing a machine that has been loaded.

Conditions for securing cargo

- The machine is subjected to a max. acceleration of; 0.8 g forward, 0.5 g backward, 0.5 g sideways, and 0.2 g upward.(1)
- Acceleration forward, backward, and sideways act individually and they are combined with 1 g downward.(1)
- Acceleration upward is not combined with other accelerations.(1)
- A safety factor of 1.25 has been used to compensate for uneven distribution of forces in the lashings. The arrangement can also withstand an acceleration of 1 g forward without safety factor.(1)
- The machine (with or without attachment) is manufactured by Volvo Construction Equipment.
- The machine has new or normally used rubber tires or wood-covered rims of pine or birch. If the wood-covering is made of birch, then rubber spacers shall be used between wood-covering and ground surface for the friction 0.5. If rubber spacers are not used the friction is only 0.2.
- The machine stands centred sideways (± 5 cm (2 in)) and is supported on at least half of the tires' width.
- The parking brake is applied and functional, and can handle an inclination (grade) of at least 14°.
- The frame joint is locked.

1. The acceleration data meets the basic requirements in almost all road regulations and standards, however, certain countries may have national rules and guidelines that require other or supplementary blocking and/or lashing.

- The machine is loaded and secured in such a way that no parts, i.e., painted surfaces or tires, can be damaged.
- The machine is loaded on a vehicle with a trailer bed made of wood, plyfa (plywood), grooved aluminium plates, unpainted or painted steel plates.
- The distance sideways between tie-down points on the load-carrying transport vehicle is approx. 2,500 mm (100 in).
- The lashings are pre-loaded to at least 4,000 N during the whole transport.
- The tie-down points on the trailer have at least the same breaking strength as the lashings.
- The lashings are located symmetrically in pairs and are fastened in the intended tie-down points on the machine. Only one lashing shall be fastened to each tie-down point.
- It shall not be possible for the tie-down hooks to lose their grip if the lashings become slack.
- Safe loading in the chain (MSL/LC/SWL) is at least 50% of the breaking strength (MBL).
- Dampers should be used when short, vertical lashings are used on machines with rubber tires to reduce the jerking and shocks to which the chains may be subjected.
- When using blocks, these must be well fastened, have an angle of approx. 37° (3:4:5), a height of at least 25 cm (10 in), and be located in pairs; 1, 2, 3, or 4 pairs according to above tables with block placement.
- Placement of rubber tires/wood-covered rims against wheel slots corresponds to the use of blocks.
- Blocking of the bucket, lifting device, back of the machine, or the wheel pairs turned in the travel direction with at least half of the steering wheel radius against the swan neck or corresponding direction forward, prevents forward movements.
- Blocking of adequate height acting on the inside or outside of all four wheels prevents sideways movement.



Lifting points and lengths

1 3.3 meter (130 in)
2 3.6 meter (140 in)
3 1.5 meter (60 in)

Lifting machine

1 Lock the frame joint.
2 Lift the machine in the intended lifting eyes (see figure).

Operating techniques

The following pages contain advice and instructions on how to operate the machine and examples of how the most common attachments are used. It is important that the correct operating techniques are used to carry out the work in a safe and efficient way.

Whole-body vibrations

Whole-body vibrations generated by construction machines are influenced by a number of factors, such as work methods, ground conditions, and machine speed, etc.

The operator can affect the actual vibration levels to a great extent, since it is the operator who controls the machine's speed, work method, and haul route. Therefore, the result can be a range of different vibration levels for the same type of machine. For cab specifications, see page *200*.

Guidelines for reducing vibration levels for earthmoving machines

- Use the proper type and size of machine, with tires, optional equipment and attachments for the application.
- Keep the ground and haul roads in good condition.
  - Remove any large rocks or obstacles.
  - Fill any ditches and holes.
  - Provide equipment and schedule time to maintain ground conditions.
- Adjust speed and haul route to minimize vibration levels.
  - Drive around obstacles and rough ground conditions.
  - Reduce the speed, if it is necessary to travel across uneven ground.
- Maintain machines according to the manufacturer's recommendations.
  - Tire pressure
  - Brake and steering systems.
  - Operating controls, hydraulic system, and linkage.
- Make sure that the operator's seat is maintained and correctly adjusted.
  - Adjust the seat and its suspension according to the operator's weight and height.
  - Check and maintain the seat suspension and adjustment mechanisms.
  - Use the seatbelt and adjust it correctly.
- Steer, brake, accelerate, shift gears, and operate the attachments smoothly.
- Minimize vibrations for long work cycles or long-distance travel.

- Use Boom Suspension System if the machine is equipped with such a system.
- If the machine is not equipped with a Boom Suspension System, reduce speed to prevent bouncing and rocking.
- Transport the machine when there are long distances between work sites.

Backpain, suspected of originating from whole-body vibrations, may be caused by other risk factors. The following guidelines can be effective in minimizing risks of backpain:

- Adjust the seat and operating controls so that good posture is obtained.
- Adjust the mirrors to minimize twisting of the body.
- Plan for and take breaks in order to avoid long periods of sitting still in one position.
- Do not jump down from the machine.
- Minimize repeated handling and lifting of objects.

Working within dangerous areas

- Do not operate too close to the edge of a dock, ramp, etc.
- Operate slowly in tight spaces and check that there is enough room for machine and load.
- Operating under ground requires special equipment. Talk to your dealer.
- Use the machine's lights when working in poor light conditions, e.g., indoors and in tunnels.
- The machine must be specially equipped when operating and working in a contaminated environment or health hazardous area. Talk to your dealer. Also check the local regulations before you enter the area with the machine.

Underground cables and pipes

Make sure that authorities or companies responsible for cables and pipes have been contacted and that their instructions are followed. Also check which rules apply to ground personnel regarding exposing cables and pipes. Normally only the service companies' own personnel may expose and arrange provisional suspension of cables.

Make use of a signal man when you cannot see the actual point where you are working or when the position of the pipe or cable is critical, see page *129*.The position of the pipe or cable may deviate from the drawing or distances may be incorrectly determined. Regard all electrical cables as live.

Working on slopes

⚠ WARNING

Risk of injury or death.
Machine could become unstable while operating on slopes or steep grades resulting in loss of control, tipover or rollover.
Operate machine up or down slope. Avoid turning and operating across the slope. Exercise extreme caution when working on a steep grade.

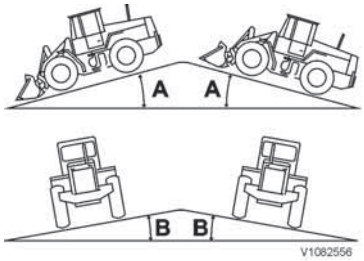
- When working on a slope or grade, pay attention to the current weather and ground conditions in order to not jeopardize safety.
- Be careful when opening the door since it may be difficult to control with the machine leaning at an

angle. When closing the door, make sure that it closes completely.

- Operate slowly when approaching or running down a grade.
- Do not operate faster down a grade than the machine can run up the grade.
- Do not change travel direction when operating on a slope, and do not operate across a slope.
- If the machine slides, lower the bucket to the ground immediately. The machine may roll over if it becomes unbalanced. Do not turn with a load in the bucket if the machine does not stand completely stable. If absolutely necessary, pile up earth material on the slope so that the machine can be parked on a level and stable surface.
- If the electric motor stops when the machine is on a slope, lower the attachment to the ground.
- Do not operate in a slope with no attachment equipped.

NOTICE

Follow the recommendations for maximum permitted angle in the table below. Machine function may be compromised, e.g., lubrication, if recommendations are not followed. This may result in machine damage.



Maximum permitted angle

A Machine affected in fore-aft direction

B Machine affected sideways

Maximum permitted angle

See the figure to the left to see how each angle (A and B) affect the machine.

Machine affected in fore-aft direction (angle A)		Machine affected sideways (angle B)	
Continuous effect	Temporary effect	Continuous effect	Temporary effect
A = 15°	A = 25°	B = 10°	B = 20°

Working in water and on boggy ground

NOTICE

Check the water depth before taking the machine into the water.

NOTICE

The water may not reach over the bottom edge of seals for hubs, propeller shafts, and rear axle oscillation bearing.

NOTE!
The propeller shaft may need to be lubricated, see page *68*.

When crossing a body of water with the machine, the water level may not reach higher than the bottom edge of seals for hubs, propeller shafts, and rear axle oscillation bearing. Pay attention if the water is turbid or cloudy, there may be hidden obstacles or dangerous deep hollows in the bottom. Refrain from operating in the area if you are not certain that it is safe to do so.

- After working in water, the grease points that have been under water must be greased to force out any water.
- Check that no water has penetrated the transmission or axles.

Working where there is risk of landslip

Always check the ground conditions before beginning to work. If the ground is soft, great care must be taken when positioning the machine. Thawing of frozen ground, rain, traffic, piling and blasting are factors which increase the risk of landslip. The risk also increases on sloping ground.

- Do not operate too close to the edge of a steep slope or road bank. Take care when working in a place where the machine may tip.
- Take care when working on river banks or in other similar places where the ground is soft. There is a risk that the machine, because of its own weight and own vibrations, may sink and this could lead to accidents.
- Keep in mind that the ground conditions may have changed after heavy rain. Therefore, be careful when restarting work. This is particularly important when working near the edge of ditches,

road verges or similar, as the ground may easily give way after it has been raining.

Working in cold weather

⚠ WARNING

Risk of crushing injury.
The hydraulic system could respond slowly at low temperatures and could cause unexpected machine movements.
Operate carefully until the hydraulic system has reached operating temperature.

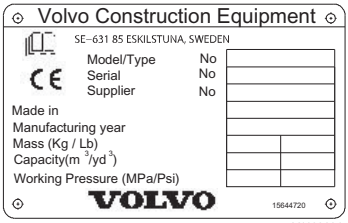
Read the advice for start, see page *81*.

The windows should be free from ice and snow before starting to use the machine. Acceptable visibility is always a 'must have' condition, see page *68*.

- Watch out for slippery parts on the machine. Only step on slip-protected areas.
- Use an ice scraper to remove ice from the windows. If needed, use a scraper with a long handle or a ladder.

⚠ WARNING

Risk of frostbite.
Bare skin can freeze stuck to cold metal which could cause injury.
Use personal protective equipment when handling cold objects.



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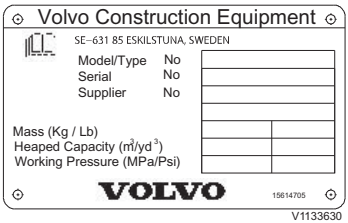
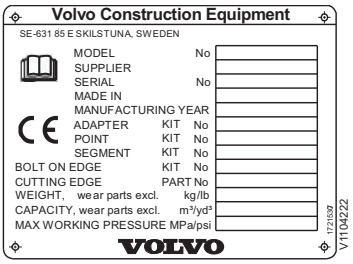
Shall be fastened on, e.g., attachment bracket, log grapple, log fork, material handling arm (CE-marking)



V1133630

Shall be fastened on, e.g., attachment bracket, log grapple, log fork, material handling arm, and pallet fork frame



Shall be fastened on, e.g., bucket with hydraulically operated moving parts (side-tip and high-tip function), and bucket with thumb (clamping arm) (CE marking)

Attachments

WARNING

Risk of fatal accidents.
Using attachments for lifting or transporting persons may lead to fatal accidents with serious crushing injury or death.
Never use attachments for lifting or transporting persons.

Using the correct attachment for a particular job is a deciding factor when it comes to the capacity of the machine. The machine has either a pin-on attachment or a hydraulically operated attachment bracket, which allows rapid changes of attachments.

Follow instructions in the Operator's Manual.

According to EU's machine directive there shall be a CE-marking on the machine's product plate (see figures) as well as a "Declaration of conformity". This marking also covers attachments designed by Volvo and adapted for Volvo wheel loaders since they are an integrated part of the machine and adapted to the machine.

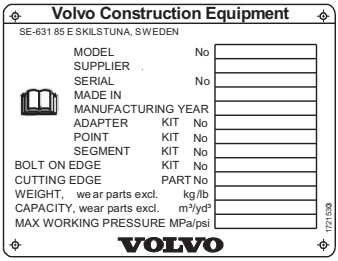
Attachments in the category **"interchangeable equipment"**[1)] (attachments that can be changed by operator) designed by Volvo are CE-marked and adapted for Volvo wheel loaders and are supplied with a "Declaration of Conformity" as well as instructions.

The machine owner is responsible for the attachments being approved for installation on the machine. The machine owner is responsible for the safety of the combination machine – attachment.

For more detailed information about selecting attachments, contact a Volvo dealer to get a copy of the attachment catalogue.

The machine is prepared for different attachments. In order to connect these hydraulically to the machine, the hydraulics must first be depressurized, see page *111*.

The machine's stability may vary depending on the attachments and the density of the material.



Both pin-on and hook-on. Shall be fastened on all buckets without hydraulically operated moving parts. This plate is for general use

1) **"Interchangeable equipment"** (attachments that can be changed by operator) means that the attachment requires the combination hydraulic attachment lock and together with hydraulic attachments, for example, a log grapple, a 3rd hydraulic function is needed, and in some cases also a 4th hydraulic function.

Transporting attachments with another vehicle

Follow the tie-down/lashing instructions according to standard EN 12195-1, as well as local transport rules.

Attachment brackets

Separate attachment locking

WARNING

Risk of crushing!
Attachments that move unexpectedly can cause injuries.
Make sure people stay out of the working area when connecting or disconnecting attachments.

WARNING

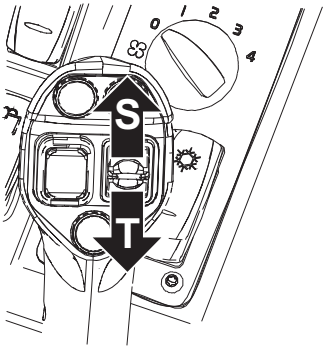
Risk of crushing.
Unlocked attachments could become loose and fall and cause serious injury.
Always make sure the attachment is locked before operating. Be aware of controls that could unlock and release attachments.

NOTE!
The 3rd hydraulic function should always be used when connecting or disconnecting attachment.

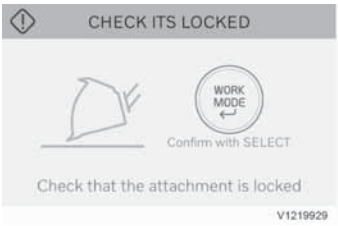
Connecting

1 Press in the upper part of the separate attachment lock switch, and while the switch is pressed in, roll the right roller control forward (S) in order to retract the lock pins.
2 Tilt forward approx. 15° and hook on the attachment.
3 Raise the lift arms until the attachment is lifted off the ground and then tilt back to align the lock pins with the bores of the attachment.
4 Lock the attachment by rolling the right roller control backward (T).

Separate attachment lock switch



S and T



Check that the attachment is locked

WORK MODE button

The attachment is locked

Separate attachment unlock switch

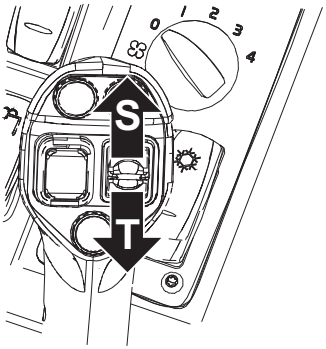
5 Check that the attachment is locked correctly and securely by pressing the front edge against the ground. If it is locked, the front wheels will begin to rise up.

NOTE!
Do not press the tines of the pallet forks against the ground to check for locking – the tines may bend. When connecting pallet forks, check visually for correct locking.

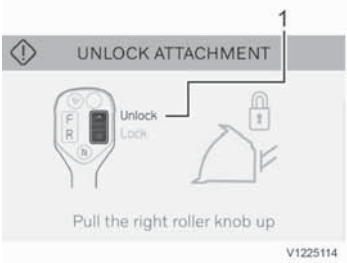
6 Press the WORK MODE button to confirm.

Disconnecting

1 The attachment should be in a level position just above the ground.



S and T



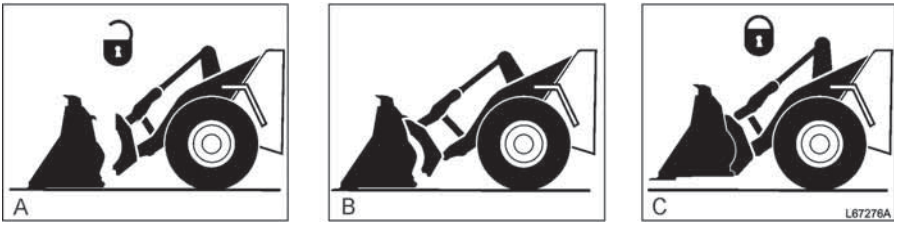
Unlock attachment
1 Unlock

Warning message: Attachment unlocked.

2 Press in the the separate attachment unlock switch, and while the switch is pressed in, roll the right roller control forward (S) in order to retract the lock pins.
3 Lower the attachment until it has completely disengaged from the attachment bracket.
4 Reverse away from the attachment.

5 Delete the warning massage in the display by pressing the ESC button on the keypad.

NOTE!
Pay attention when driving without attachment because the machine get lighter on the front axle and can tip over easier.

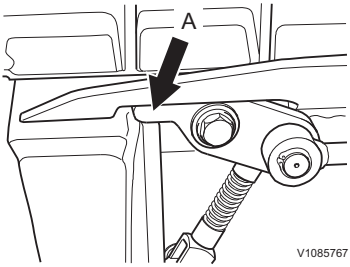


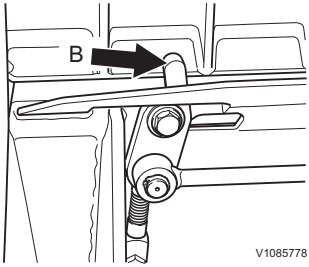
A Attachment bracket's lock pins in unlocked position
B Tilt forward approx. 15° and hook the bracket into the upper attaching points on the attachment
C Lift, tilt-back until level and lock with the attachment bracket's lock pins

Skid steer carrier type

(optional equipment)

The skid steer attachment carrier is a hydraulically operated quick change equipment carrier.





Connecting and disconnecting

Use the same procedure as for separate attachment locking (see page *106*) to connect and disconnect the attachment. Check position of the locking lever, see below.

Locking lever

Lever in horizontal position (A) = "unlocked"
Lever in vertical position (B) = "locked"

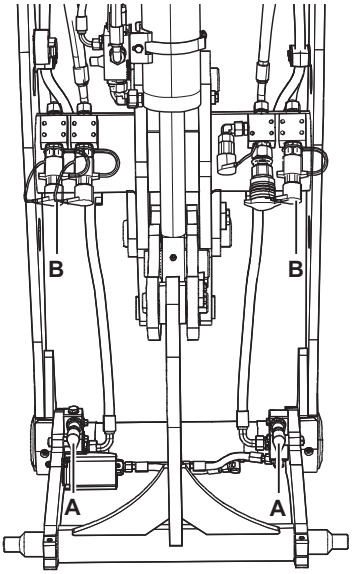
WARNING

Risk of crushing.
Falling attachments could result in severe injury or death.
Make sure the attachment bracket is properly locked before starting work.

WARNING

Risk of crushing.
Unlocked attachments could become loose and fall and cause serious injury.
Always make sure the attachment is locked before operating. Be aware of controls that could unlock and release attachments.

The payload depends on the installed attachment and needs to be examined and approved by Volvo.



Auxiliary hydraulic circuits
A 3rd hydraulic function
B 4th hydraulic function

Hydraulic function, 3rd and 4th

(Optional equipment)

WARNING

Risk of crushing.
Sudden movement of attachments may cause serious injury or death to personnel near the machine.
Quick-acting controls operate the optional attachments. Operate the controls carefully.

NOTICE

When connecting or disconnecting hydraulic couplings, ensure that the couplings and the surrounding area are clean.

Make sure that the hydraulic oil in the attachment that is to be connected is not contaminated (foreign particles, water, etc.) and that it is of the same quality as that in the machine itself.

NOTE!
The exact positions of the hoses and couplings could differ, from what is shown in the illustration to the left, depending on which auxiliary hydraulic options are installed on the machine.

Connecting

1 See page *106*. Follow the instructions for connecting.
2 Place the attachment level on the ground.
3 Depressurize the 3rd and 4th hydraulic function, see page *111*.
4 Clean the hydraulic couplings thoroughly, both on the machine and the attachment.The dust covers shall be fitted to the dedicated pins next to the couplings.
5 Connect the attachment's hydraulic hoses to the machine.
6 Connect the attachment’s electrical connector to the machine (if present)

NOTE!
Always check the operating control functions of the attachment before starting to work!

Disconnecting

1 Place the attachment level on the ground.

2 Depressurize the 3rd and 4th hydraulic function, see page *111*.
3 Disconnect the attachment's electrical connector to the machine (if present)
4 Disconnect the attachment's hydraulic hoses from the machine.
5 After disconnecting the hoses: clean the hydraulic quick couplings from oil and protect all with caps.
6 Make sure that the attachment cannot fall over after disconnecting.
7 See page *106*. Follow steps 2–4 to disconnect the attachment from the machine.

Pressure release

Residual pressure in the hoses makes it very difficult to disconnect or connect the quick-couplings.

This is facilitated, by releasing the pressure in the hydraulic system, when, for example, you want to disconnect a hydraulic hose:
1 Stop the electric motors.
2 Ignition switch in position 1.
3 Move the control for the relevant function back and forth several times, and hold it in its end-position for three seconds.

NOTE!
Releasing pressure is not possible in travel and fork mode.

NOTE!
For pressure release of the 4th hydraulic function move the relevant levers - according to the control lever version. See page *110*.

The pressure in hoses from timber grapples can be released in the following way:
1 Close the clamping arm fully.
2 Make a quick movement with the lever in the opposite direction.

The hoses become "slack" when the pressure is released.

NOTICE

The attachment should always rest on the ground when the pressure is released.

Excess pressure in a hydraulic attachment can be released by slackening the lock nut between the hose and the hydraulic pipe and then tightening it again. Meanwhile watch the attachment.

Collect the surplus oil.

Loading

For loading functions, see page *51*.

- For loading, the blocking of the working hydraulics must be deactivated.
- To pick up solid, cohesive materials it is recommended to quickly shift from tilting forward to tilting backwards when entering into the material. This eases entering of the bucket into the material.
- During the transport of the picked up material the bucket should not be higher than 0.5 m (20 in) above the ground.
- You should never drive longer distances with a high raised loaded bucket.
- When lever (1) is in "float mode", the bucket rests on the ground "without force" and can be used e.g. to level the tracks when reversing.

NOTE!

For road travel and maintenance work, the working hydraulics must be blocked to prevent unintended actuation.

Buckets

When the machine is used with a bucket, a working load of 50 % of the tipping load for a fully steered machine is permissible. Depending on application and/or machine size the manufacturer often recommends a utilisation lower than 50%.

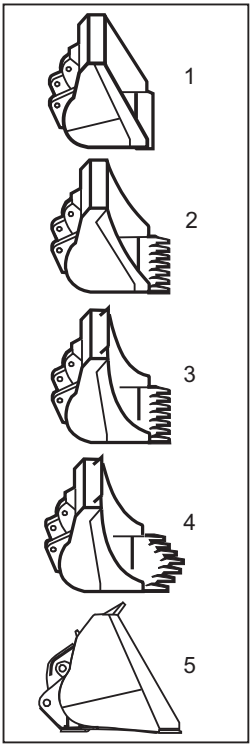
For information about weight, volume, load, edge savers, etc., contact your dealer to obtain the attachment catalogue.

Bucket teeth, changing, see page *184*.

⚠ WARNING

Risk of fatal accidents.
Using attachments for lifting or transporting persons may lead to fatal accidents with serious crushing injury or death.
Never use attachments for lifting or transporting persons.

NOTE!
Excavating or surface stripping must not be carried out at high speed, if the bucket is tilted more than 15°, and a fully tilted bucket must be avoided.



The five most common types of buckets:

1 Straight bucket without teeth (Loose material, sand, soil, artificial fertilizer)
2 Straight bucket with teeth (Hard material, gravel, mud, digging work)
3 Straight rock bucket with teeth (Hard materials, stone, gravel with highly abrasive wear)
4 Spade-nose bucket with teeth (Hard and rocky material, hard gravel and blasted rock)
5 Bucket for stockpile loading (Loose sand, gravel, and crushed materials)

Choosing bucket

- The choice of bucket is dependent on the condition of the material (hard/loose), its density (heavy/light) and on the tipping load of the machine.
- A too large bucket relative to the density of the material and the tipping load of the machine will give the impression that the machine is weak and unstable and will not increase the productivity.

For choosing buckets, contact you dealer to obtain the attachment catalogue.

NOTICE

Check the bolt torques after the first four hours of operation, according to the table below.

Tightening torque for edge savers and segments with bolted joints (bolt grade 10.9)	
Size	**Tightening torques**
M16	275 ± 45 Nm
M20	540 ± 90 Nm
M24	900 ± 140 Nm
1 1/4”	2160 ±345 Nm

To obtain efficient and safe operation it is important to keep the following points in mind:

- Select the correct bucket.
- Level the ground on the work site as much as possible and make sure that the ground is firm.
- Avoid wheel spin by adapting the electric motor speed and by transferring as much weight as possible onto the front wheels. This is achieved by raising the bucket slightly after it has begun to enter the material.
- Work with the machine straight against the material to obtain the greatest penetration. This also contributes to reduced tire wear.

Gravel and stockpile loading

1 Adjust the bucket so that it is level and lower it to the ground just in front of the gravel stockpile.
2 Penetrate the material. When the machine has almost come to a standstill due to the machine's maximum tractive effort being reached, begin to

raise the bucket and tilt back at the same time with short lever movements.

If possible, avoid tilting the bucket forward when filling it. Exaggerated lever movements cause wheel spin. Never enter the material at high speed.

Suitable bucket:	**Straight bucket with or without teeth**

⚠ WARNING

Risk of crushing.
Falling load could cause serious injury.
Do not stand under a suspended load. Use appropriate loading and lifting equipment.

Excavating

- When excavating and surface stripping, start by angling down the bucket 2–3°.
- Operate in 1st gear and at low electric motor speed. Gradually increase electric motor speed and raise the bucket slightly at the same time.
- If the ground conditions are poor and the wheels tend to spin, use the differential lock.

NOTE!
Never engage the differential lock when one of the wheels is spinning. Let up the accelerator pedal until the wheel stops.

Suitable bucket:	**Straight with or without teeth (alt. levelling bucket)**
Suitable gear:	**Automatic shift-down**
BSS:	**Not activated**

Transporting load (load carrying)

- The bucket should be tilted back all the way and held in the carry position 30–40 cm (12–16 in) above the ground.

NOTE!
If the Boom Suspension System is installed and activated, but does not engage, raise the lift arms slightly.

- Keep the haul road smooth and free from stones and other objects. There is always spill from a bucket that is too full.
- Even out the road on the way back if necessary.

Suitable maximum speed:	**Approx. 15 km/h (9.3 mph)**
BSS:	**Activated**

NOTE!
Remember that the stability of a heavily loaded machine changes when it is steered.

Dumping load

NOTE!
Operate very carefully if visibility is limited by the load or the attachment. Walk around the machine before starting and make sure that no persons remain in or enter the machine's work area. If you are uncertain, raise the load and check the conditions in the work area by looking under the load and operating at low speed. If necessary, arrange for a signalman to take charge and to help the operator in difficult circumstances. Work very carefully in order to prevent injuries and damage to property.

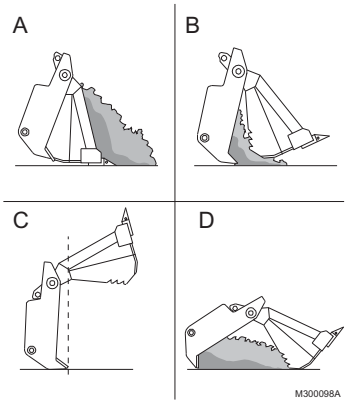
- When working on a grade, try to arrange so that the load can be dumped uphill. This affects the machine's stability in a positive way.
- Keep the bucket as low as possible when dumping the load for easier positioning of the load and less impact from the load.
- When loading rock, try to fill the first bucket with as fine material as possible in order to reduce the impact of subsequent larger rocks.

Positioning of hauler

- Positioning of the hauler (transport vehicle) is of great importance to making the loading operation efficient.
- The operator should indicate where the hauler is to stand, suitably by "pointing" with the bucket. Having done so, the loader operator is responsible for that place being safe.

Levelling

- The bucket should lie flat against the ground. To be able to fill any hollows you should have material in and in front of the bucket when operating forwards.
- To finish off the levelling operation, keep the edge of the bucket slightly downward and reverse while pressing the bucket lightly against the ground.



A Loading
B Scraping
C Levelling
D Gripping

Suitable bucket: **Straight without teeth (alt. levelling bucket)**

BSS: **Not activated**

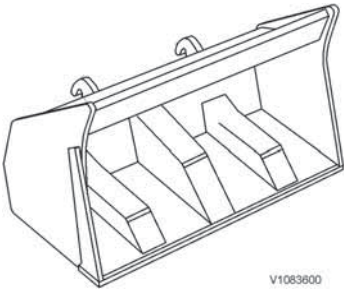
Multi-purpose bucket (optional equipment)

The multi-purpose (4-in-1) bucket is most suitable for all different types of earthmoving operations as well as for levelling, scraping, and gripping.

- The front grapple is operated with control lever 2 (version 1A) or right roller control (version 1B). See page *51* and onward.

NOTE!
When levelling in reverse gear, the front grapple on the bucket must only be partly open, so that any obstructions such as rocks or tree trunks do not damage or distort the front grapple. Travel speed must be matched to the condition of the road.

- Material that is trapped between the lock cylinder and rear clam must be removed immediately, otherwise the cylinder's piston rod may be damaged or bent.
- Check the hydraulic lines at regular intervals for leaks and visible external damage, replace if needed.
- Grease the bearings for the clamshell bucket and the lock cylinders every **50 operating hours**. For quality of grease, see page *188*.
- Always release the pressure in the hydraulic system before starting maintenance or repair work.
- Work in hydraulic systems must only be performed by authorized personnel.



High-tip bucket (optional equipment)

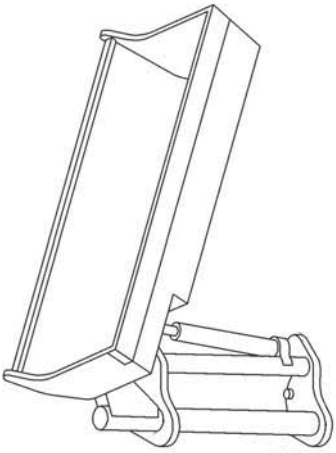
NOTE!
Avoid tilting the high-tip bucket with the standard tipping function or, if necessary, tilt only at low tilt speed, so that the bucket remains tilted back all the way on the carrier.

The high-tip bucket is a combination of carrier and bucket. During tilting the carrier acts like an extension of the boom, thus providing high dump height. When loading and transporting, the bucket is tilted back between the carrier, and the bucket is in almost the same position as a standard bucket; thus there are barely any disadvantages with

regards to breakout force, lifting force, and tipping load.

- The bucket cylinder is operated in the 'tilt function' with control lever 2 (version 1A) or right roller control (version 1B). See page *51* and onward.
- For loading, transporting, and lifting, tilt back the bucket all the way.
- Only empty the bucket when the desired lifting height has been reached.
- Avoid tilting the high-tip bucket forward or backward with full power against the end-stops to prevent damages to the bucket and cylinders.

■ Clean the carrier arms regularly from dirt deposits.
■ Check the hydraulic lines at regular intervals for leaks and visible external damage, replace if needed.
■ Check the rubber pads on the tilt-back stops at regular intervals, replace if needed.
■ Lubricate the bucket support and cylinder bearings every **50 operating hours**. For quality of grease, see page *188*.
■ Always release the pressure in the hydraulic system before starting maintenance or repair work.
■ Work in hydraulic systems must only be performed by authorized personnel.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Side-tip bucket (optional equipment)

The side-tip bucket is suitable for all kinds of earthmoving operations such as backfilling trenches without a lot of turning.

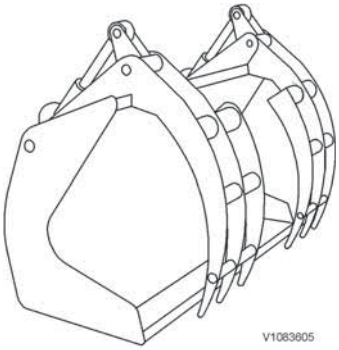
- The bucket cylinder is operated in the "tilt function" with control lever 2 (version 1A) or right roller control (version 1B). See page *51* and onward.
- For loading, transporting, or lifting the load higher, the bucket must be tipped over until it is stopped by the support.
- When dumping (using side-tipping), all of the load should be dumped just before the maximum side tilt position is reached. If there is still some load left in the bucket, tilt it back carefully (not at full

power) to prevent damage to the bucket and cylinder.

NOTE!
NOTE! Never try to empty the bucket by steering the machine! Steering may affect the stability of the machine. If load gets stuck in the bucket, lower the bucket and remove the load. Clean the bucket if necessary. Therefore, do not perform any unnecessary steering movements when the lift arms are up and the bucket cylinder is fully extended.

NOTE!
For longer transport and road travel, the bucket must generally be locked correctly and secured on the support.

- Check the hydraulic lines at regular intervals for leaks and visible external damage, replace if needed.
- Lubricate the bucket support and cylinder bearings every **50 operating** hours. For quality of grease, see page *188*.
- Always release the pressure in the hydraulic system before starting maintenance or repair work.
- Work in hydraulic systems must only be performed by authorized personnel.

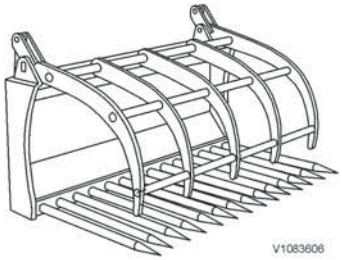


Scrap bucket (optional equipment)

NOTE!
If using this attachment the machine must be equipped with a tilt speed limiter (optional equipment). Contact your dealer for further information.

The scrap bucket is most suitable for loading of light metal scrap, e.g., aluminium scrap, tin plate, and similar bulky materials.

- The attachment is operated with control lever 2 (version 1A) or right roller control (version 1B). See page *51* and onward.

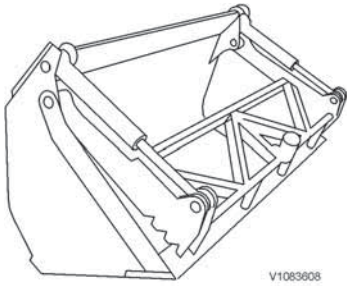


Universal fork with hydraulic grapple (optional equipment)

The universal fork is most suitable for loading and transporting, e.g., biological waste, tree branches, hay, manure, and similar bulky materials.

- The grapples are operated with control lever 2 (version 1A) or right roller control (version 1B). See page *51* and onward.
- When entering the material keep the grapple fully open, otherwise the resulting very high pressure may cause leaks in hoses and seals.
- Do not operate the grapple with full power against the end-stop. The cylinders may be damaged due to high opening/closing speed.

■ Material that is trapped between the cylinder and bucket must be removed immediately, otherwise the cylinder's piston rod may be damaged or bent.
■ Check the hydraulic lines at regular intervals for leaks and visible external damage, replace if needed.
■ Grease the bearings on the grapple and cylinders every **50 operating hours**. For quality of grease, see page *188*.
■ Always release the pressure in the hydraulic system before starting maintenance or repair work.
■ Work in hydraulic systems must only be performed by authorized personnel.



Clamshell bucket (optional equipment)

NOTE!
If using this attachment the machine must be equipped with a tilt speed limiter (optional equipment). Contact your dealer for further information.

The clamshell bucket (also called mulch grapple bucket) is most suitable for loading bulky materials, e.g., biological waste, tree branches, bulky waste.

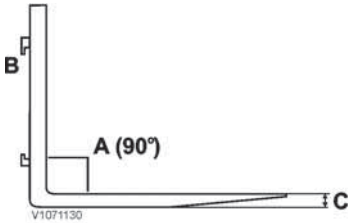
- The clamshell is operated with control lever 2 (version 1A) or right roller control (version 1B). See page *51* and onward.
- When entering the material keep the clamshell fully open, otherwise the resulting very high pressure may cause leaks in hoses and seals.

- Do not operate the clamshell with full power against the end-stop. The cylinders may be damaged due to high opening/closing speed.

NOTE!
In order to manoeuvre the shredder machine with the ball button tilt the clamshell bucket fully backwards and close the clamshell.

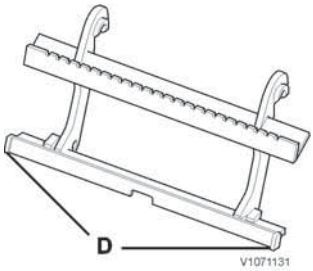
- Material that is trapped between the cylinder and bucket must be removed immediately, otherwise the cylinder's piston rod may be damaged or bent.
- Check the hydraulic lines at regular intervals for leaks and visible external damage, replace if needed.
- Grease the bearings on clamshell and cylinders every **50 operating hours**. For quality of grease, see page *188*.
- Always release the pressure in the hydraulic system before starting maintenance or repair work.
- Work in hydraulic systems must only be performed by authorized personnel.

Pallet forks



Checking fork tines

A	Angle
B	Attaching lugs
C	Thickness



Fork frame

D	Stop

NOTICE

Only pallet forks approved for the machine by Volvo may be used.

Pallet forks may only be used for the intended application;
therefore they may not be used as pry bars to break out a stump, large rock, or similar.
They may not be overloaded or loaded obliquely.
They may not be used as lifting equipment together with chains or slings to lift objects.

Fork tine back frame and fork tines must be dimensioned to withstand loads which the lifting capacity of the machine permits.

Pallet forks and fork retainer must be kept free from dirt and rust and be well greased for best possible function.

NOTICE

With attached loading fork the machine must not be used in public traffic.

NOTICE

Make sure that the stops that prevent the fork arms from sliding off the fork frame are properly located. This is particularly important when the fork arms are moved sideways manually. Make sure that the fork arms are locked against the fork retainer, so that the fork arms are prevented from moving sideways.

- Check the pallet forks regularly as regards wear. It is particularly important to check the heel of the fork tine.
- Check that stops (D) for the fork arms are properly located.
- Check that the fork arms are locked against the fork frame.
- The fork tine should not be used any more if:
  - the fork tine has been worn down to 90% of its original thickness.
  - the angle between fork tine's point and shank has become greater than 93°.
  - the attaching eyes are worn or cracked.
- Do not use welding to repair cracks or wear.

Adjusting fork tines' position sideways

1 Place the fork tines just above ground level and tilt max. 15° forward.
2 Open the fork tines' lock and move the fork tines sideways to desired position.
3 Close the fork tines' lock so that the fork tines cannot move sideways.

Material handling arm

(optional equipment)

WARNING

Risk of fatal accidents.
Unauthorised persons within the work area around the machine could lead to serious crushing injury.
• Clear all unauthorised personnel from the working area.
• Keep a lookout in all directions.
• Do not touch control levers or switches during start.
• Sound the horn before beginning operation.

WARNING

Risk of fatal accidents.
Using attachments for lifting or transporting persons may lead to fatal accidents with serious crushing injury or death.
Never use attachments for lifting or transporting persons.

NOTE!
There is no end-stop beyond the maximum length of the inner arm, so there is a risk that the inner arm is pulled loose if the maximum load is exceeded. The operator is responsible for the load being lifted not exceeding the maximum load limits for the machine and the forks.

NOTE!
Deactivate the Boom Suspension System (BSS) if equipped. High accuracy is required for loading or unloading.

For specifications, see page *207*.

Road sweeping (optional equipment)

NOTE!

For connecting and disconnecting hydraulic hoses for 3rd hydraulic function, see page *110*. Always check the control functions for the attachment before starting to work.

- When using the machine on public roads check which local and national regulations concerning the attachment of road sweeping equipment must be complied with.
- The road sweeping machine is most suitable for sweeping paved surfaces, **but not for hazardous substances and health threatening dusts.**
- Connect the hydraulic hoses correctly so that the hoses are free and not squashed when starting the road sweeper.
- For road sweeping machines with water spraying device plug the electric plug for the water pump into the socket on the right hand side on the lifting frame work.
- During operation make sure that the height adjustable supporting wheels are adjusted to such a height, that the horizontally adjusted broom drum only just touches the ground. The weight of the road sweeping machine must always rest on the supporting wheels and not on the brushes. If the brushes are adjusted too low the broom bristles will brake and the steering rollers will vibrate.
- All guards and safety devices must always be in place. During work the resting supports must be in raised position.
- The working speed should be 4-8 km/h (2.5-5 mph) (select speed range gear stage "1" [turtle]).
- Grease all lubrication points on the road sweeping machine after approx. 30 operating hours (for quality of grease, see page *188*).
- The condition of hydraulic oil lines must be examined at least once every year, replace if necessary.

Lifting objects

NOTICE

Use a safe lifting device with the proper rated capacity for the job.

The lifting devices that are used shall be adapted to and approved for the machine on which they are used.

NOTICE

Do not use damaged, broken or uncertified lifting devices.

NOTICE

Various countries have their own regulations concerning the use of the machine for lifting work, e.g. lifting freely suspended loads. For more detailed information you should contact your authorised Volvo dealer.

NOTICE

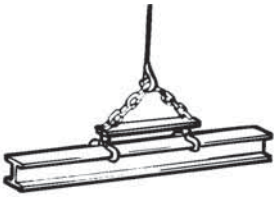
Observe the nominal loads that apply to the machine while transporting.

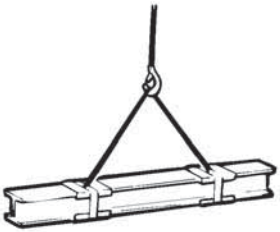
Stability

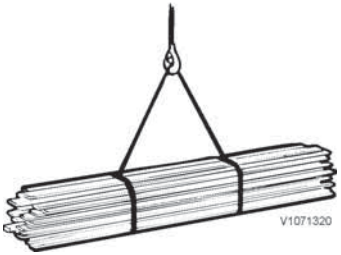
The stability of machines at work changes and is subject to great variations.

For work to be done safely, the operator must keep in mind and consider the special conditions at the time.

- Standing the machine on a horizontal, stable and secure surface is one prerequisite for high stability.
- Watch out for soft, uneven, or sloping ground, as well as ground where there is risk of landslides. Be very careful with loading the machine sideways and in connection with other similar high-risk work. If the machine stands on sloping ground, the centre of gravity is displaced and the machine may end up in a position where it rolls over.
- Make sure that the ground surface is stable and secure. Unstable ground, e.g. loose sand or wet earth can make work unsafe.







- Do not turn suddenly with a suspended load. Remember the centrifugal force.
- Operate the machine slowly and carefully.
- Make sure that visibility is not reduced by big loads. If needed, get help from a signal man.

Slinging long loads

- Boards, planks, reinforcing irons or similar should have the sling(s) arranged so that the load cannot fall out.
- In general, girders should be lifted with a clamping device.
- Padding made from, for example, split compressed air hoses may be used in order to protect the slings.
- The slings should be well tightened.

Running checks of lifting attachments

Continuous supervision should be carried out at regular intervals by a knowledgeable and experienced person and arranged by the employer. Should wear, cracks or other deficiencies, which may jeopardise the safety of the machine or the lifting equipment, be noticed during the running checks, the machine or the lifting equipment must not be used.

Signalling diagram

If the operator's visibility is restricted, e.g., due to a big load, use a signal man.

The faster lifting, lowering, or movement that is required, the livelier the signal man's movements should be. If two or several operators use the same signal man, determine ahead of time how the lift is to be done and how signals shall be given to each operator.

START
Arms extended horizontally with palms facing forward

STOP
Right arm pointing up with palm facing forward

END
Hands held together at chest height

RAISE
Right arm pointing up with palm facing forward and hand moving slowly in a circle

LOWER
Right arm pointing down with palm facing forward and hand moving slowly in a circle

VERTICAL DISTANCE
Hands indicate relevant distance

MOVE FORWARD
Both arms bent with palms facing up and underarms moving slowly and repeatedly up towards the body

OPERATE IN INDICATED DIRECTION
Arm extended horizontally with palm facing down and small movements back and forth slowly to the right

MOVE BACK
Both arms bent with palms facing down and underarms moving slowly and repeatedly down away from the body

OPERATE IN INDICATED DIRECTION
Arm extended horizontally with palm facing down and small movements back and forth slowly to the left

DANGER (EMERGENCY STOP)
Both arms up with palms facing forward

HORIZONTAL DISTANCE
Hands indicate relevant distance

Safety when servicing

This section deals with the safety rules that must be followed when checking and servicing the machine. Volvo will not accept any responsibility if other tools, lifting devices, or work methods described in this publication are used.

Other safety rules, information and warning texts are given in each section.

NOTE!
Lifting and supporting of the machine may only be performed by trained personnel.

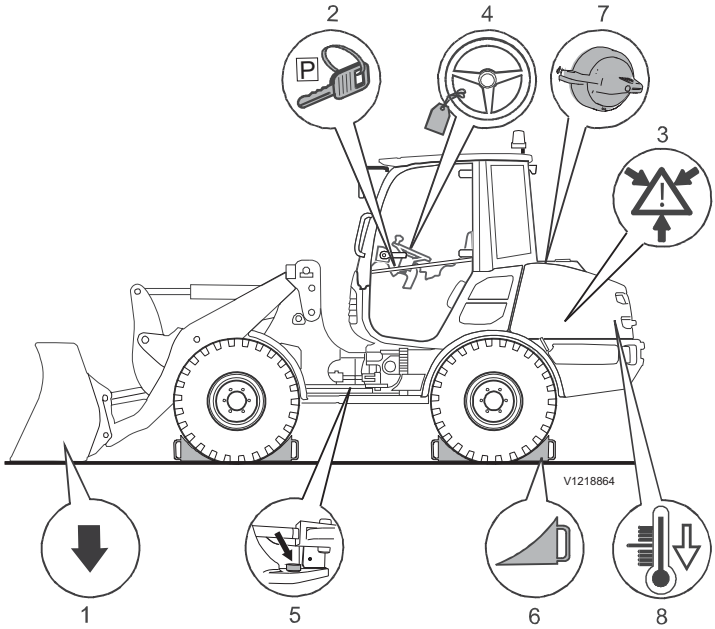
⚠ WARNING

Risk of burns!
Hot machine parts could cause burns.
Allow hot machine parts to cool before performing adjustments or service. Wear personal protective equipment.

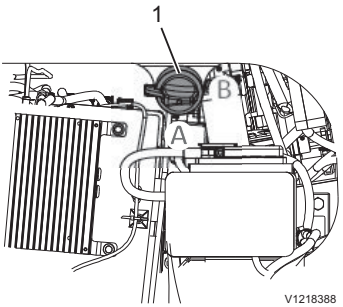
Service position

BEFORE you begin service work the machine must be placed on level ground and prepared as shown below.

AFTER you have completed the service, any guard plates must be re-installed and all covers are to be closed and locked.



1	The attachment should be resting on the ground, or the loader arms should be safely supported.	5	Lock the articulation joint.
2	Apply the parking brake. Turn off the electric motors.	6	Block the wheels in a safe way, e.g. with wheel blocks.
3	Carefully release the pressure in pressure lines and accumulators to avoid risks.	7	Switch off the battery disconnect switch (see illustration below) and lock it against unintended activation.
4	Attach a black and yellow label to the steering wheel.	8	Open the rear hood and allow the machine to cool down.



1 Battery disconnector switch
A Battery connected
B Battery disconnected

Safety brace (optional equipment)

NOTE!
The safety brace should only be used if a support such as in the service position with raised loader arms (see above) is not available.

NOTE!
Service work underneath the loading unit is to be performed by qualified service technician and shall not be done by the operator.

⚠ WARNING

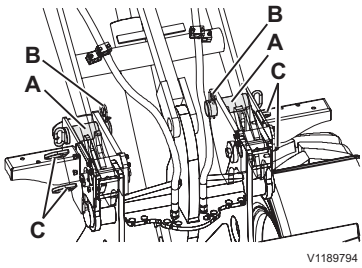
Risk of crushing.
If the raised loader arms drop crushing injuries could occur.
Safely support the loader arms, before persons start working below the loader arms.

Setting the safety brace in support position

1 Empty the bucket (or the attachment) and tilt it fully forward.
2 Raise the loaders arms to the highest position.

NOTE!
Check that the bucket (or the attachment) is completely empty and make sure that there are no persons in a position below the raised loader arm.

3 Remove the cotter pin and pull out the lock pins from their stowage position.
4 Push the lock pins fully into the holes until they stop against their handles and secure with the cotter pins.



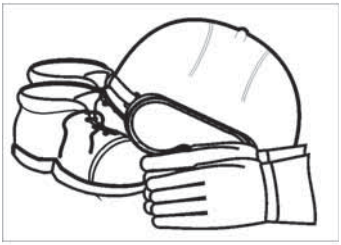
A Lock pin
B Cotter pin
C Holders for stowage position

5 Carefully lower the loader arms until the rest on the lock pins.

NOTE!

If the safety brace, or any parts associated with this equipment, should be damaged, the damaged parts must be taken out of use and replaced immediately. Contact a qualified service technician.

Before service, read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Prevent personal injuries

- Read the Operator's Manual before the service work is started. It is also important to read and follow information and instructions on plates and decals.
- Do not wear loose-fitting clothing or jewelry, which can get caught and cause injury.
- Always use a hard hat, safety glasses, gloves, and protective footwear when required by the job.
- Do not stand in front of or behind the machine when the machine is running.
- Turn off the machine and turn off the battery disconnect switch before removing any protective covers or opening the rear hood.
- When the machine is turned off, there is a remaining accumulated pressure in the pressurized systems. If a system is opened without having first released the pressure, liquid under high pressure will jet out.
- Use a piece of paper or cardboard to check for leaks, never use your hand.
- Make sure that steps, handles, and slip-protected surfaces are free from oil, dirt, and ice.
- Only step on parts of the machine provided with slip-protection.
- It is important to use correct tools and equipment. Broken tools or equipment should be repaired or replaced.
- If service work has to be done under a raised attachment, first secure the attachment. Lock the control lever lockout in the upper position.

Prevent machine damage

- When lifting or supporting the machine or parts of the machine, use equipment with a sufficient lifting capacity.
- Lifting devices, tools, working methods, lubricants and parts prescribed in the Operator's Manual should be used. Volvo CE will not accept any responsibility otherwise.
- Make sure that no tools or other objects, which may cause damage, have been forgotten in or on the machine.
- Release the pressure in the hydraulic system before starting the service work.
- Never set a relief valve to a higher pressure than that recommended by the manufacturer.

- Machines, which are used within a polluted or in another way insanitary area should be equipped for this kind of work. Special safety regulations apply when servicing such a machine.
- When installing two-way radio, mobile telephone, or similar equipment, the installation should be performed according to the manufacturer's instructions in order to eliminate interference with the electronic system and components intended for the machine's function, refer to page *18*.
- Actions to be taken in connection with electric welding, refer to page *Welding*.
- Make sure that all protective covers, and the rear hood are in place before the battery disconnect switch is turned on and the machine is used.
- Use the three-point method (two feet and one hand) when cleaning or scraping the windows, mirrors and cameras.

Prevent environmental impact

Be aware of the environment when performing service and maintenance. Oil and other liquids harmful to the environment and released into the environment will cause damage. Oil degrades very slowly in water and sediment. The machine shall be cleaned in a facility with an oil separator or equivalent equipment.

NOTE!
In common for all points below is that all waste is to be handed over to a treatment and disposal company approved by the authorities.

- When draining, oils and liquids must be collected in suitable containers and actions must be taken to avoid spills.
- Used filters must be drained of all liquid before they are handled as waste.
- Batteries contain substances dangerous to the environment and health. Therefore used batteries must be handled as environmentally hazardous waste.
- Consumables, e.g. used rags, gloves, and bottles may also be contaminated with oils and liquids that are hazardous to the environment. In such cases they must be treated as environmentally hazardous waste.

Fire prevention

WARNING

Risk of fire.
Operating in environments with flammable or other explosive particulates in the air could increase the risk of fire.
Use special equipment and proper ventilation when operating in hazardous environments.

There is always a risk of fire. Find out what kind of fire extinguisher is used on your working site and how to use it. If the machine is equipped with a fire extinguisher, it should be kept inside the cab on the left side of the operator.

If the machine is to be provided with a hand-held fire extinguisher, it should be of the ABE type (ABC in North America). The designation ABE means that it is possible to extinguish fires in both solid organic material and liquids, and that the fire extinguishing compound does not conduct electricity. Efficiency class I means that the effective operating time of the extinguisher must not be less than 8 seconds, class II at least 11 seconds and grade III at least 15 seconds.

A hand-held fire extinguisher ABE I normally corresponds to a powder content of 4 kg (8.8 lb) (EN-grade 13A89BC), standard EN 3-1995, parts 1, 2, 4 and 5.

Fire prevention measures

- Diesel fuel oil is flammable and must not be used for cleaning. Use conventional car care products meant for cleaning or degreasing. Also bear in mind that certain solvents can cause skin rashes, damage to the paint finish and constitute fire hazard.
- Keep the place clean where service work is to be done. Oil and water can make the floor and steps slippery, and is also dangerous in connection with electrical equipment or electrically powered tools. Oily and greasy clothes are a serious fire hazard.
- Check daily that the machine and the equipment are free from dust and oil. This reduces the risk

of fire and it is also easier to detect defective or loose parts.

NOTE!
Be careful when using a high-pressure washer for cleaning. Electrical components and the insulation on wiring can be damaged even at relatively low pressure and temperature. Protect electrical components and wiring in an appropriate manner.

- Be extra thorough when cleaning a machine that is operated in a conditions with high risk of fire, e.g., saw mills and landfill sites. The risk of spontaneous combustion can be reduced further by installing insulation on the muffler.
- It is important that the fire extinguisher is maintained in order to work when it is needed.
- Check that hydraulic hoses, brake hoses, and electrical wiring do not have any chafing damage or risk being exposed to chafing due to incorrect installation or clamping. This applies especially to unfused cables, which are red, are marked R (B +), and are routed:

- between the batteries
- between battery and starter motor
- between alternator and starter motor

NOTE!
This applies to all battery cables including 48V cables and especially to all orange power lines and for the unfused red battery cable, which is routed between the 12V battery and the 12V main distribution.

Electrical cables must not have direct contact with oil lines.

- Do not weld or grind on components which are filled with flammable liquids, e.g. tanks and hydraulic pipes. Exercise care with such work also in the proximity of such places. A fire extinguisher should be kept near to hand.

Actions in case of fire

NOTE!
Do not try to extinguish a fire in the traction battery. Only when fire has not moved over to the traction battery yet, it shall be extinguished.

If the circumstances permit and your own safety is not jeopardised, take the following steps at the slightest sign of fire:

1 Stop the machine, if it is moving.

2 Lower the attachments to the ground.
3 Move the lock-out lever, if installed, to locked position.
4 Turn the start key to the stop position.
5 Exit the cab.
6 Call the fire department.
7 Turn off the battery disconnector, if it can be reached safely.
8 Try to put out the fire, if possible. Otherwise move away from the machine and the danger area.

Actions after a fire

The following safety precautions must be taken when handling a machine that has been exposed to fire or other intense heat:

- Use safety goggles and thick rubber gloves.
- Never touch burnt components with your bare hands to avoid contact with melted polymers. First wash thoroughly with lime water (a solution of calcium hydroxide, that is, slaked lime in water).
- Handling heated fluor rubber, see page *140*.

Handling hazardous materials

Heated paint

⚠ WARNING

Risk of toxin inhalation.
Burning of painted, plastic or rubber parts produces gases that could damage respiratory tracts.
Never burn painted or rubber parts or any plastics.

Heated paint gives off poisonous gases. Therefore, paint must be removed from an area with a radius of at least 10 cm (4 in) before carrying out welding, grinding or gas cutting. In addition to the health hazard, the weld will be of inferior quality and strength, which, in the future, may cause the weld to break.

Methods and precautionary measures when removing paint

- Blasting
  - use respiratory protective equipment and protective goggles
- Paint remover or other chemicals
  - use a portable air extractor, respiratory protective equipment and protective gloves
- Grinding machine
  - use a portable air extractor, respiratory protective equipment and protective gloves and goggles

Never burn painted parts after they have been discarded. They should be disposed of by a licensed disposal plant.

Heated rubber and plastics

Polymer materials can, when heated, form compounds which are dangerous to health and environment and must therefore never be burned when scrapped.

If gas cutting or welding is to be carried out near such materials, the following safety instructions must be followed:

- Protect the material from heat.
- Use protective gloves, protective goggles and respiratory protective equipment.

Heated fluoro-carbon rubber

⚠ WARNING

Risk of serious injury.
At very high temperatures fluoro-carbon rubber forms substances which are very corrosive to skin and lungs.
Always wear personal protective equipment.

When handling a machine which has been damaged by fire or been exposed to intense heat, the following measures should be taken:

- Use thick, rubber gloves and wear protective goggles.
- Discard gloves, rags and other items that have been in contact with heated fluoro-carbon rubber after first having washed these items in lime water (a solution of calcium hydroxide, that is slaked lime in water).
- The area around a part which has been very hot and which may be made of fluoro-carbon rubber should be decontaminated by thorough and ample washing with lime water.
- As a precaution, all seals (O-rings and other oil seals) should be handled as if they were made of fluoro-carbon rubber.
- The hydrofluoric acid may remain on the machine parts for several years after a fire.
- If swelling, redness or a stinging feeling appears and one suspects that the cause may be contact with heated fluoro-carbon rubber, contact a medical doctor immediately. Several hours may pass, however, before any symptoms appear and there is no immediate warning.
- The acid cannot be rinsed or washed off from the skin. Treat instead with Hydrofluoric Acid Burn Jelly or similar before contacting a medical doctor.

Batteries

WARNING

Risk of chemical burns.
The battery electrolyte contains corrosive sulphuric acid which could cause severe chemical burns.
If electrolyte spilled on your bare skin, remove it immediately and wash the affected area with soap and plenty of water. If it gets into your eyes or any other sensitive body part, rinse with plenty of water and seek immediate medical attention.

- Do not smoke near batteries as these give off explosive gases.
- Make sure that metal objects, e.g. tools, rings and watch straps, do not come into contact with the battery pole studs.
- Make sure the protections are always installed over the battery pole studs.
- Do not tilt a battery in any direction. Battery electrolyte may leak out.
- Do not connect a discharged battery in series with a fully charged battery. Risk for explosion.
- Discarded batteries must be taken care of according to national environmental requirements.

Starting with booster batteries, see page *81*.

Charging batteries, see page *174*.

Crystalline silica (quartz) dust

WARNING

Risk of hazardous inhalation.
Working in environments containing dangerous dust can lead to serious health problems.
Wear personal protective equipment when working in dusty environments.

Crystalline silica is a basis component of sand and granite. Therefore, many activities at construction and mining sites, such as trenching, sawing and boring, produce crystalline silica dust. This dust can cause silicosis.
The employer or working site management should provide the operator with information about the presence of crystalline silica in the work site along

with specific work instructions and precautions and also necessary personal protective equipment.
Also check the local / national regulations regarding silica / silicosis.

Refrigerant

Environmental precautions

The air conditioning system of the machine is filled with R134a refrigerant at the factory. R134a refrigerant is a flourinated greenhouse gas and contributes to global warming.

Do not release refrigerant into the environment. See page *Refrigerant* for the amount of R134a refrigerant in your machine and its global warming potential.

Safety precautions

Work on the air conditioning system must only be performed by a qualified service technician. Do not attempt to perform work on the air conditioning system.

Wear safety goggles, chemical resistant gloves (e.g., neoprene or butyl rubber) and appropriate personal protective equipment to protect bare skin when there is a risk of contact with refrigerant.

Actions in case of exposure

Eye contact: Rinse with warm water and apply a light bandage. Seek medical attention immediately.

Limited skin contact: Rinse with warm water and apply a light bandage. Seek medical attention immediately.

Extensive skin contact: Rinse with warm water and carefully heat the area with warm water or warm clothing. Seek medical attention immediately.

Inhalation: Leave the area and find fresh air. Seek medical attention immediately.

Handling line, tubes and hoses

WARNING

Risk of high pressure injection.
Leaks from high pressure hoses could cause serious injury to skin and eyes.
If high pressure hoses are loose or leaking, contact a qualified service technician.
Keep away from fluid that is spraying out.
Use a stiff piece of cardboard to check for leaks.
Never use your hands to check for leaks.

- Do not bend high pressure lines.
- Do not strike high pressure lines.
- Do not install any lines that are bent or damaged.
- Check lines, tubes and hoses carefully.
- Do not reuse hose, tube and fittings.
- Do not use your bare hand to check for leaks.
- Tighten all connections. Contact an authorized dealer for information about the recommended tightening torque.

The parts must be replaced if any of the following conditions are found. Contact a qualified service technician.

- End fittings are damaged or leaking.
- Outer coverings are chafed or cut.
- Strengthening wires are exposed.
- Outer coverings are ballooning.
- Flexible part of the hoses are kinked.
- End fittings are displaced.
- Foreign material is embedded in the coverings.

NOTICE

Make sure that all clamps, guards and heat shields are correctly installed. This contributes to preventing vibrations, chafing against other parts and excessively strong generation of heat.

Maintenance

This section describes maintenance and service jobs that the operator can do. Other maintenance and service jobs should be performed by a qualified service technician.

The page *152* presents all the jobs and actions that are included in the machine's service program. This page also makes it clear which jobs in the service program can be done by the operator, and which ones should be performed by a qualified service technician.

Service history

The service history shall be filled in after every completed service by a qualified service technician, see page *208* . The service history is a valuable document which can be referred to when, e.g. selling the machine.

Arrival Inspection

Before the machine leaves the factory, it is tested and adjusted. The dealer or distributor must also carry out arrival inspections according to the applicable form.

Delivery Inspection

Before the machine leaves the factory, it is tested and adjusted. The dealer or distributor must also carry out delivery inspections according to the applicable form.

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Delivery Instructions

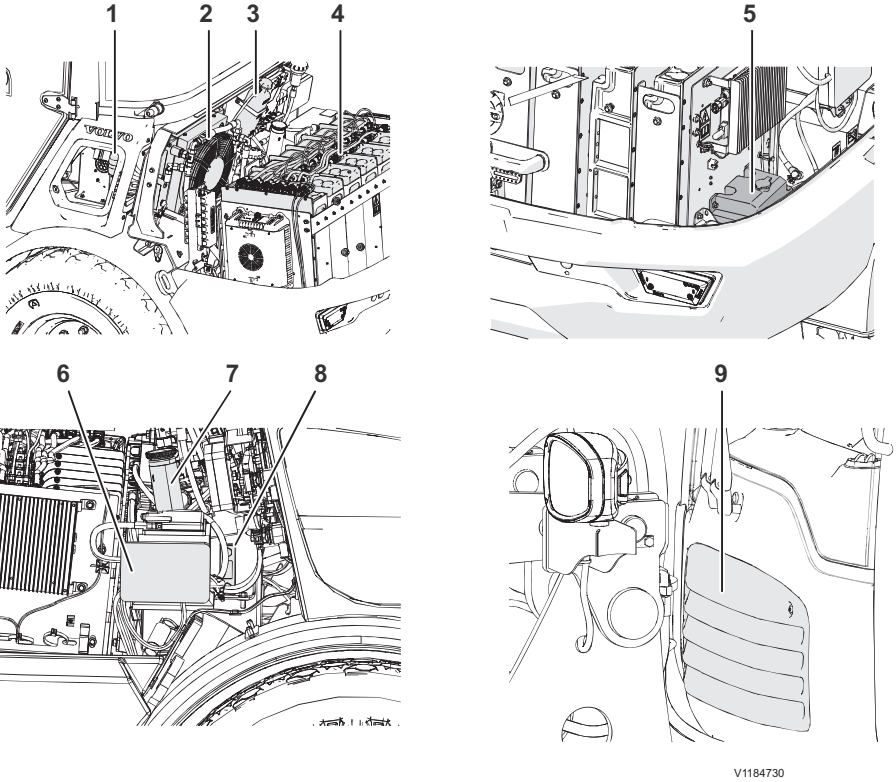
When handing the machine over, the dealer must give the buyer delivery instructions according to the applicable form, which must be signed, if the warranty is to apply.

Service Programme

For any factory warranty to be valid, the machine shall be maintained according to the service program established by Volvo. The service program is continuous with fixed intervals. The operating time between intervals only applies if the machine is used in normal environment and operating conditions. Ask your Volvo dealer what is right for your specific machine.

There is one inspection in addition to the continuous program, a first inspection at the first 500 hours. This inspection shall be performed by a qualified service technician.

Service points



1	Brake fluid reservoir	6	Fuse box
2	Cooling package	7	Hydraulic oil filling point
3	Coolant level (on expansion tank) Coolant filling point	8	Hydraulic oil level glass
4	Battery tray, 48V cables, connectors, plugs and sockets	9	Cab ventilation filters (behind the cover)
5	Windscreen washer reservoir		

Lubrication and service chart

Lubrication

The service life of bushings and pivot pins can be considerably extended by regularly greasing the machine in the correct way.

The greasing of bearings has two main purposes:

- Add grease to the bearing to reduce friction between the pin and bushing.
- Replace old grease that may contain dirt particles. The grease in the space inside the outer seal collects dirt and prevents dirt and water from penetrating into the bearing.

NOTICE

Wipe off grease nipples and grease gun before greasing, so that dirt and sand are not introduced through the grease nipples into the bearings.

Grease the bearing until new clean grease is forced out through the outer seal. For recommended grease, see page *187*.

Between 10–15 strokes with a normal handheld grease gun is required to grease a bearing in the boom.

Symbol key

The following standard symbols are used in the lubrication and maintenance chart.


V1219906

Cooler

Transmission

Hydraulic system

Brake system


V1220096

Axles


V1219907

Battery charging

Battery

Coolant

Air conditioning


V1219912

Tyre pressure

Lubrication

Grease nipple

Oil/liquid

Filters

Level check

Belt tension


V1219908

Lights


V1219909

Bolts tightening


V1219910

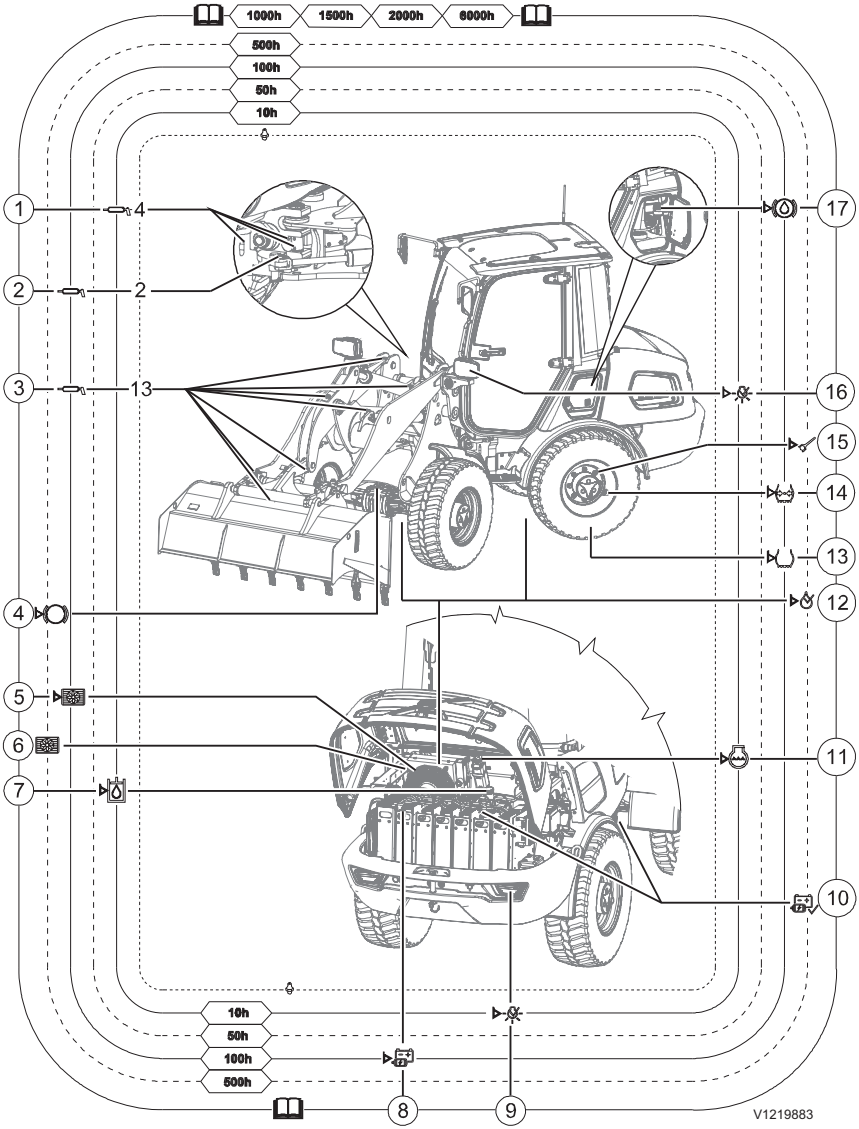
Draining

Tyre

Lubrication and service chart

Intervals:

Daily (every 10 hours), 50, 100, 500, 1000, 1500, 2000, 3000 and 6000 hours (symbol explanation, see page *150*).



Pos.	Page	Action
		DAILY (every 10 hours)
9 16	*156*	Test-run and check
	158	Battery disconnect switch
7	*158*	Check the hydraulic oil level
11	*159*	Check the coolant level
1	*159*	Lubricate the articulation joints
		B = EVERY 100 HOURS **After performing Daily service and A-service**
8		Visual check battery tray, 48V cables, connectors, plugs and sockets without unplugging.
13 14	*161*, *162*	Check tires (air pressure and damage) (a)
5	*164*	Check the cooler and radiator and clean them if needed
3	*162*	Lubricate the lifting frame(b)
17	*164*	Check the brake fluid level(c)
2	*163*	Lubricate the steering cylinder bearings (d)
		D = EVERY 500 HOURS **After performing Daily service, A-, B-, and C-service**
		Check for leaks
10	Contact a qualified service technician	Check of 48V battery, battery tray, 48V cables, grounding cables of Emob components, Connectors, Sockets **NOTE!** Because of the risk of electric shock, operator is not allowed to perform this checking.
15	*170*	Check torque of wheel nuts
4	Contact a qualified service technician	Check the brake disc and pads for service and parking brake
6	*164*	Clean the cooler and radiator (e)

a)Check daily if there is a risk of damage to the tires, e.g., when handling sharp rocks.

b) Lubricate daily in tough operating conditions.

c)Change brake oil every 2 years.

d)Lubricate every 50 hours in aggressive/corrosive environment.

e)When operating under especially dusty conditions, the cooler and radiator should be checked daily.

Lubrication and service chart

Intervals:
Every 1000, 1500, 2000, and 6000 hours (symbol explanation, see page *150*).

Measures that can be carried out by the operator:

Page	EVERY 1000 HOURS
171	Perform a brake test for the parking brake
Page	**EVERY 2000 HOURS**
Page	**EVERY 4000 HOURS**
61	Check the seat belt

Measures that should be carried out by the operator when required:

Page	Measure
172	Charge the batteries
179	Check the fuses and the relays (12V only)
180	Check the axle oil level
180	Check the washer fluid level
181	Clean the cab ventilation filter
181	Clean the machine
182	Maintain the paint finish
183	Clean the battery and service compartment
184	Replace bucket teeth
185	Check the wheel bolt tightening

Measures that should be carried out by a qualified service technician at below stated intervals:

EVERY 1000 HOURS
- Check cab ventilation filter - Drain Hydraulic tank sediment - Check battery - Check steering lock - Check steering pressure - Check working hydraulic pressure - Check steering accumulator pressure - MATRIS, and Tech Tool, reading
EVERY 1500 HOURS
Change the oil in the front axle (a)
Change the oil in the rear axle with transfer box (a)
Change the hydraulic oil (a)(b)(c)
Replace the hydraulic oil filter (a)
Replace the hydraulic system breather filter (a)
EVERY 2000 HOURS
Check the coolant mixture
EVERY 6000 HOURS
Change the coolant (d)

a) At least once a year.

b) When using external hydraulic equipment, e.g., road sweeper, drill, snow blower, or similar, the oil should be changed every 1000 hours.

c)The oil change interval is every 3000 hours if Volvo Hydraulic Oil Ultra is used.

d) Change coolant every 6000 hours or at least every fourth year.

Maintenance service, every 10 hours

Test-run and check

Performed daily.

Warning decals

1 Check that all warning decals are in place, are legible, and are not damaged, see page *21*.

External check

1 Check that the machine does not have any external damage or defective/loose parts. Especially tires, hoses, and pipes.

2 Check that there are no visible leaks.

3 Clean/scrape windows and rear-view mirrors.

4 Check that the work lights and headlights are clean and intact.

5 Check that the back-up camera (optional equipment) is clean and intact.

6 Check that the frame joint lock has been disconnected.

7 Check that rear hood, underbody skid plates, and protective plates are closed.

8 Check all reflectors.

9 Check that the wheels are not blocked.

10 Check that the battery disconnector is on.

Lights, instruments, and controls

1 Adjust the steering wheel and the operator's seat. For adjusting the operator's seat, see page *59*.

2 Turn the ignition to position 1 (operating position) and check that all control lights turn on and that the gauges indicate readings.

3 Check function of the work lights and headlights.

4 Check that the lap-type seatbelt can be buckled up and is not damaged. Fasten the lap-type seatbelt.

5 Check that there are no persons near the machine, see page *71*.

6 Turn the ignition to position 2 (start position).

7 Check that all control and warning lights are off. When the parking brake is applied, the warning light for parking brake will be on.

8 Check that the horn works.

Brake system (service brake)

1 Let the electric motor idle until the pressure has built up.

2 Release the parking brake and press down the brake pedal all the way.

3 Move off carefully and test-brake. The brakes should be applied smoothly and not generate any noise.

Brake system (parking brake)

⚠ WARNING

Risk of crushing!
Unexpected machine movement could lead to serious injury.
Never perform parking brake test when persons are located in the danger zone.

1 No load must be carried in/on the working attachment.

2 The working attachment should be kept in transport position.

3 Park the machine in a 20% slope.

4 Apply the parking brake. Leave the electric motors running.

5 Neutral position should be selected, see page *51*.

6 Check that the parking brake is able to hold the machine from moving.

NOTE!
If the machine moves, the parking brake must be checked further. Contact a qualified service technician.

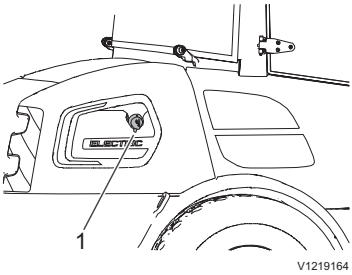
Steering system

1 Turn the steering wheel to the left and right.

2 Check whether the steering is running smoothly, responsively and without noise.

NOTE!
Contact a qualified service technician if there is a problem with any of the items above.

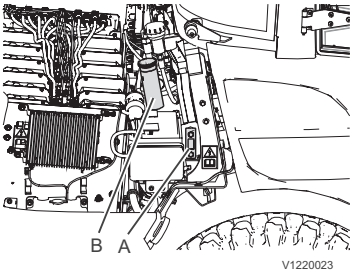
Battery disconnect switch



1 Battery disconnect switch

NOTE!
With the electric motor off and the start key in position 0, turn off the electric power with the battery disconnect switch daily as well as when the machine is not used. This saves the battery.

Hydraulic oil level, checking



A Hydraulic oil level gauge
B Hydraulic oil filling pipe

Check the hydraulic oil level every 10 hours.

Travel/working and steering hydraulics work with one common oil household.

1 Place the machine on firm and level ground.
2 Lower the lifting arms to the ground.
3 Turn off the electric motor and apply the parking brake.
4 Open the rear hood.
5 Check the oil level in hydraulic oil level glass. The oil level gauge(A) must be filled to the middle.

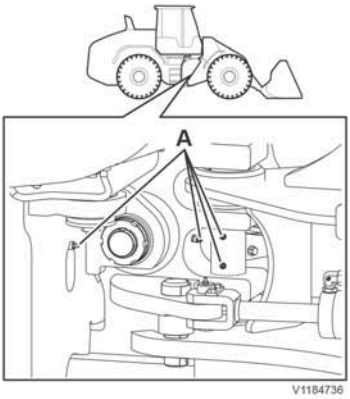
NOTE!
When the hydraulic oil temperature is high (max. 80 °C / 176 °F), the oil level may rise to the top of the oil glass.

6 If necessary, fill with hydraulic oil via the filling pipe (B).

NOTE!
If biologically degradable hydraulic oil is being used, the same type of oil must be used when topping up and when changing hydraulic oil. Different types of biologically degradable hydraulic oils may not be mixed. Mineral oil may not be used together with biologically degradable hydraulic oil. When changing from mineral oil to biologically degradable hydraulic oil, contact a qualified service technician.

NOTE!
For recommended hydraulic oil, see page *187*.

Articulation joints, lubricating



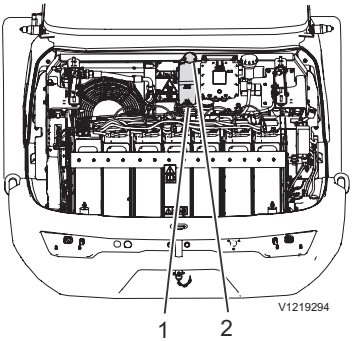
A Grease nipples

Grease the nipples every 10 hours.

For general information about lubrication, see page *149*.

For quality of grease, see page *188*.

Coolant, checking level and refilling



1 Expansion tank
2 Expansion tank cap

Check the coolant level every 10 hours.
1 Turn off the electric motor and apply the parking brake.
2 Open the rear hood.
3 Check that the coolant level is between the markings MIN and MAX on the expansion tank.
4 If the level is too low, top up with coolant, see below.

Topping up coolant

NOTICE

Risk of machine damage.
Mixing different coolants and corrosion preventives could damage the machine.
Use only Volvo Coolant VCS when filling the coolant system.

1 Make sure the cooling system has cooled down.

⚠ WARNING

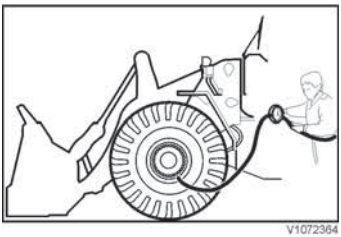
Risk of scalding and severe burns to unprotected skin.
High-pressurised hot coolant may rush out of expansion tank and cause severe burns. Before removing the expansion tank pressure cap:

- **Shut down the machine.**
- **Allow the machine to cool.**
- **Turn the pressure cap slowly to release any pressure.**

2 Slowly loosen the expansion tank cap.
3 Top up with coolant until the coolant level is between the markings MIN and MAX on the expansion tank.
4 Reinstall the expansion tank cap tightly and check the system for leaks.

Maintenance service, every 100 hours

Tyres, checking air pressure



WARNING

Risk of explosion.
Inflating a tyre could cause it to explode. An exploding tyre could lead to lethal injuries.
Use a self-attaching air chuck with a hose long enough to enable the tyre to be inflated without standing in front of the rim and as far away as possible. Make sure no one stands in front of, or passes, the rim during inflation.

Recommended air pressures should normally be followed, see page *199*. Special ground conditions may require adjustment of the air pressure. Follow the tire supplier's instructions and do not exceed the maximum permitted air pressures.

The tyre pressure may have been raised before the machine was delivered from the factory. Therefore, check and adjust the tyre pressure according to recommendations, before putting the machine to work for the first time.

WARNING

Risk of explosion.
Attempts to repair or weld a rim with an inflated tyre fitted could cause the rim to split or the tyre to explode. An exploding tyre could lead to lethal injuries.
Repair work on tyres and rims must be carried out by a qualified service technician.

The instructions stated below apply to an inflated tyre where the pressure needs to be increased. If the tyre has lost all pressure, a trained service engineer should be called in.
- When checking the air pressure, the tyre should be cold and the machine be without a load.
- Ask all other persons to leave the danger area (in front of the rim).

- Stand by the tire's tread. Tire installed on a split rim may explode and cause injuries or, in the worst case, death.
- Use a long air hose (with a self-attaching air chuck) which allows you to stand outside the danger area.
- Tyres on stored wheels (spare wheels) should be kept in a lying down position and only be inflated sufficiently to keep the rim parts in position.
- Do not re-inflate a tyre, if the machine has been operated with a tyre pressure that has been below 80% of the lowest recommended tyre pressure according to the specifications, or if the tyre and/ or rim are obviously damaged or are suspected of being damaged.

Tyres, checking wear

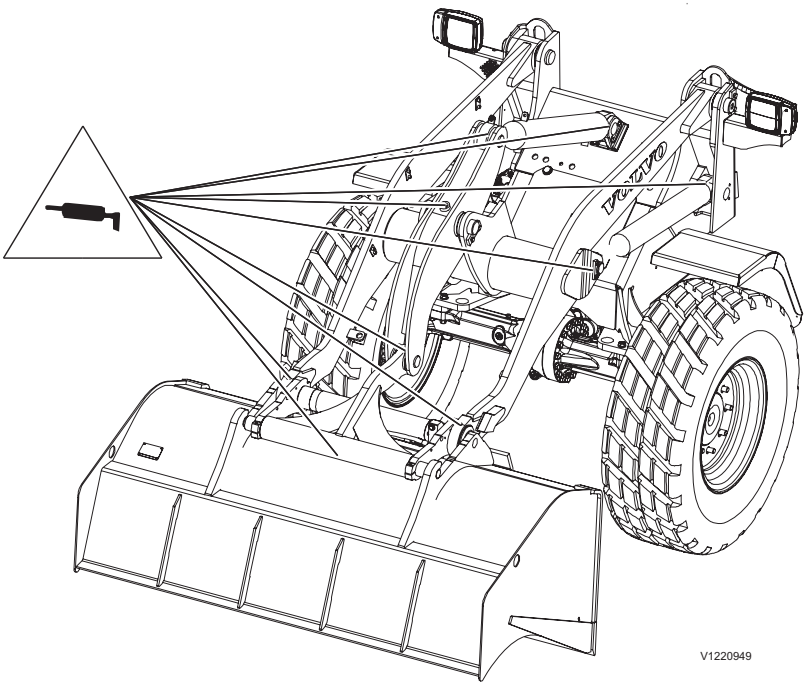
Check:

- that there is enough tread on the tire.
- the tread, so the cord is not visible.
- the sides of the tires, so that there are no deep cuts in to the cord.

Lifting frame, lubricating

Grease the lifting frame every 100 hours.

NOTE!
Grease daily in tough operating conditions.



Grease nipples

1 Lower the lift arms to the ground.
2 Turn off the electric motor and apply the parking brake.
3 Lift and tilt hydraulics should be without pressure.
4 Clean the grease nipples before greasing.
5 Lubrication is sufficient if grease comes out from the bearing.

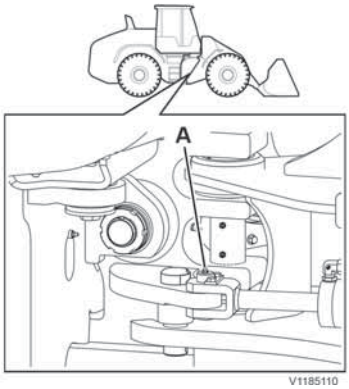
For general information about lubrication, see page *149*.

For quality of grease, see page *187*.

Steering cylinder bearings, lubricating

Grease the bearing every 100 hours.

NOTE!
Grease every 50 hours in aggressive/corrosive environment.

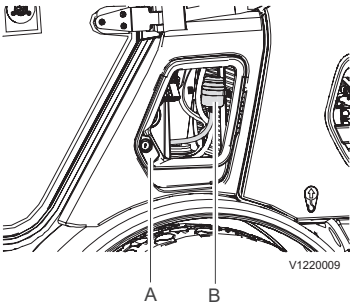


A Grease nipple

Greasing bearings

1 Lower the lift arms to the ground.
2 Turn off the electric motor and apply the parking brake.
3 Lift and tilt hydraulics should be without pressure.
4 Clean the grease nipple before greasing.
5 Lubrication is sufficient if grease comes out from the bearing.

For quality of grease, see page *187*.



A Service hatch
B Brake fluid compensation tank

Brake fluid level, checking

Check the brake fluid level every 100 operating hours.

The brake fluid level must reach the MAX-mark on the compensation tank. If the fluid level is below the MAX-mark:

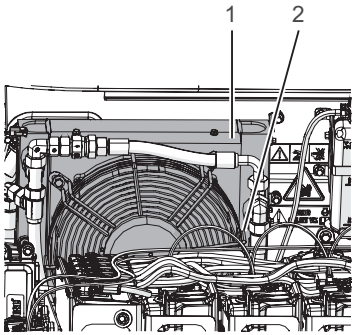
1 Open the service hatch.
2 Open the tank cover.
3 Top up brake fluid to the MAX-mark.

NOTE!
Brake fluid quality = mineral oil, see *187*.

NOTE!
Replace leaking and externally damaged brake hoses and brake lines immediately. External damage are corrosion symptoms (wear, chafing, squashing etc.).

NOTE!
For safety reasons change the brake fluid every 2 years.

Take care of filters/oils/liquids in an environmentally safe way, see page *135*.



Cooling package
1 Oil cooler
2 Coolant radiator

Coolers, cleaning

WARNING

Risk of crushing and cutting.
Rotating parts could cause serious injury.
Shut down the machine before cleaning the machine or any component of the machine.

WARNING

Risk of serious injury.
Compressed air, water jets or steam may cause damage to unprotected skin and eyes.
Always wear personal protective gloves, goggles and clothing when using compressed air, water jets or steam.

NOTE!
When using compressed air, always keep the nozzle at a distance from the fins in order to prevent damage. Damaged fins can cause leaks or overheating.

NOTE!
High-pressure wash must not be used!

NOTE!
The grilles in the rear hood are close-meshed to protect radiator and coolers from incoming dirt, for example pebble and leaves. Even particles as fluff will be kept away to a certain extent. Therefore the grilles should be cleaned regularly.

Clean the radiator and oil cooler every 100 hours to safeguard sufficient cooling.

NOTE!
When operating under especially dusty conditions the radiator and the coolers should be checked daily or even in shorter intervals.

1 Turn off the electric motor and apply the parking brake.
2 Switch off the battery disconnect switch.
3 Blow the radiator and the coolers with compressed air from the fan side until the fans are free from dust.
4 Check all radiator hoses for leaks. Replace faulty parts and tighten loose hose clamps.

48V system, visual checking

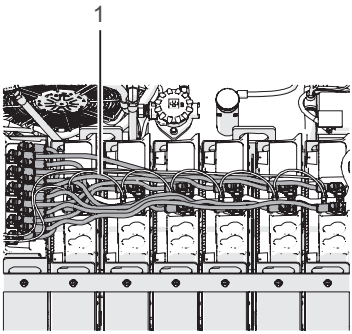
DANGER

Risk of electrocution.
Contact with live parts will cause death or serious injury.
Never touch live electrical parts.

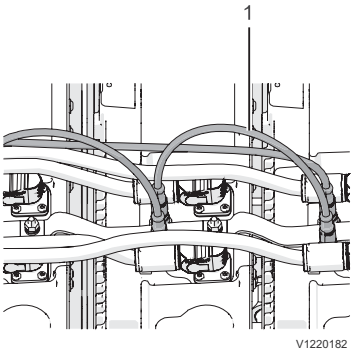
NOTE!
Operator are not allowed to touch or unplug cables, connectors and fuses!

1 Inspect the traction battery frame/mounting for deformation, cracks and corrosion.

2 Inspect the 48V wiring and connectors for damage like isolation cracks, abrasion, excessive bending or stretching.

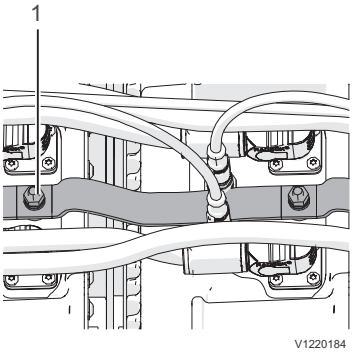


1 48V wiring and connectors



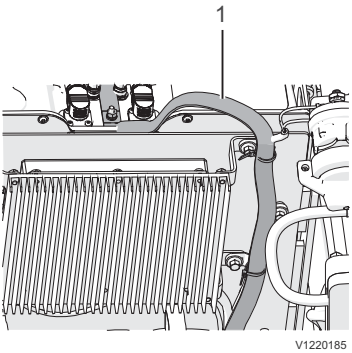
1 Communication cables (data cables) and connectors

3 Inspect the communication cables (data cables) and connectors for damage like isolation cracks, abrasion, excessive bending or stretching.



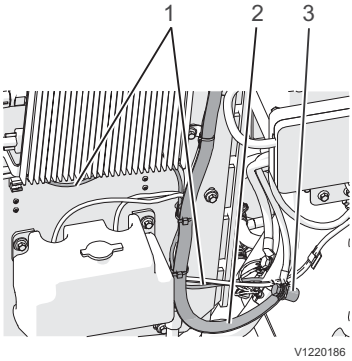
1 Ground wiring and connectors

4 Inspect the ground wiring and connectors for damage like isolation cracks, abrasion, excessive bending or stretching.



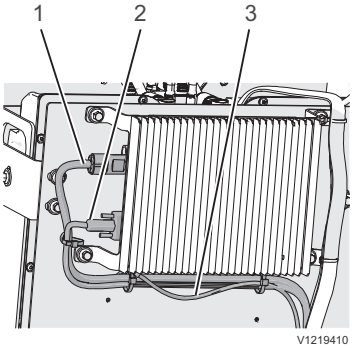
Ground wiring and connectors

5 Inspect the ground wiring (1) and connectors for damage like isolation cracks, abrasion, excessive bending or stretching.



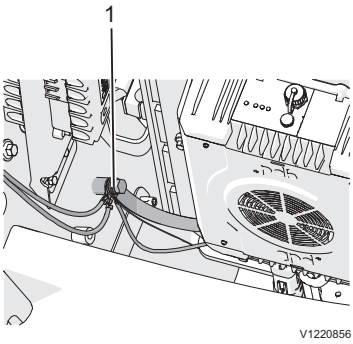
Ground wiring and ground connector

6 Inspect the ground wirings (1, 2) and ground connector (3) for damage like isolation cracks, abrasion, excessive bending or stretching.



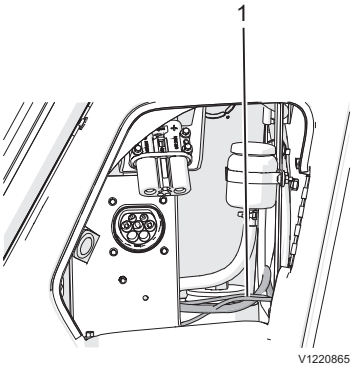
Wiring of the DC/DC converter

7 Inspect the wiring (1, 2) and ground wiring (3) of the DC/DC converter for damage like isolation cracks, abrasion, excessive bending or stretching.



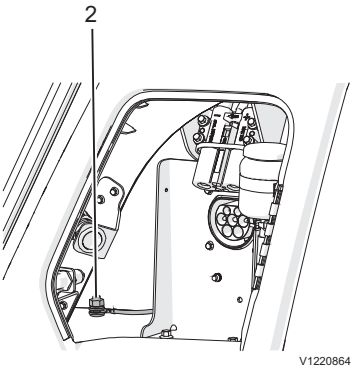
Ground wiring and ground connector, left machine sight

8 Inspect the ground wirings and ground connector (1) for damage like isolation cracks, abrasion, excessive bending or stretching.



Wiring, charging connector

9 Inspect the wirings (1) for damage like isolation cracks, abrasion, excessive bending or stretching.



Ground wiring and ground connector, charging connector

10 Inspect the ground connector (2) for damage like isolation cracks, abrasion, excessive bending or stretching.

Maintenance service, every 500 hours

Wheel bolts, checking tightening

After having changed a tyre or if the wheel has been removed and installed for any other reason, the wheel nuts must be check-tightened after eight hours of operation.

Tightening torque: 450 Nm (332 lbf ft)

Maintenance service, every 1000 hours

Parking brake function, checking

WARNING

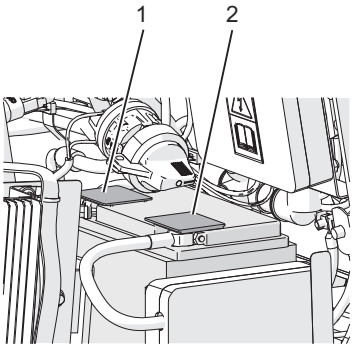
Risk of crushing!
Unexpected machine movement could lead to serious injury.
Never perform parking brake test when persons are located in the danger zone.

1 No load must be carried in/on the working attachment.
2 The working attachment should be kept in transport position.
3 Park the machine in a 20% slope.
4 Apply the parking brake. Leave the machine running.
5 Neutral position should be selected, see page *51*.
6 Check that the parking brake is able to hold the machine from moving.

NOTE!
If the machine moves, the parking brake must be checked further. Contact a qualified service technician.

Maintenance service, when required

Batteries, charging

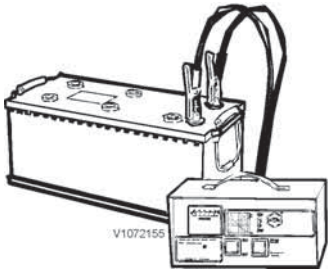


Battery

A Cover for negative pole (-)
B Cover for positive pole (+)

The original battery installed in the machine is completely impermeable and maintenance free. The battery may only be replaced by a battery with identical technological characteristics. This rules out the danger of service personnel being affected by acid or acid vapour should the machine tip over.

- Charging the 12V battery with an external charger in the vehicle is only allowed when the main switch is turned into OFF position
- In order to remove the battery firstly disconnect the clamp for the negative pole (-). In order to install the battery firstly connect the clamp for the positive pole (+). Any contact made between a tool and the cable connecting the positive clamp and the frame may cause sparks.
- For longer storage periods disconnect the battery.



⚠ WARNING

Risk of serious injury.
Short-circuit, open flames or sparks near a charging battery could lead to an explosion.
Switch off charge current before connecting and disconnecting charging cable clamps. Never charge a battery near open flames or sparks. Always charge a battery in well-ventilated areas.

⚠ WARNING

Risk of chemical burns.
The battery electrolyte contains corrosive sulphuric acid which could cause severe chemical burns.
If electrolyte spilled on your bare skin, remove it immediately and wash the affected area with soap and plenty of water. If it gets into your eyes or any other sensitive body part, rinse with plenty of water and seek immediate medical attention.

NOTE!
Check that the cable terminals and pole studs are clean, well tightened and coated with vaseline or similar.

NOTE!
Dispose old batteries environmentally.

For safety regulations, see page *140*.

Three-phase generator

- The connecting poles of the battery must never be mixed up by mistake. The poles are distinctly marked with (+) or (-). Incorrect connection immediately damages the rectifier in the generator.
- Check that the cable terminals and pole studs are clean, well tightened and coated with vaseline or similar.

Welding

The following actions should be taken before starting electric welding on the machine or attachments connected to the machine:

1 Turn off the current with the battery disconnect switch.
2 Disconnect the batteries, start with the minus terminal and then the plus terminal.

3 Unplug the electronic units. For more information, contact a qualified service technician.
4 Connect the welding equipment’s ground connection as close to the welding point as possible and make sure that the current does not pass across a bearing.

See also page *137*.

Traction battery, charging

NOTE!

- Charging cable delivered with the machine shall be used.
- The grid (house etc.) and socket of the power source needs to be designed for the applied current.
- The grid (house etc.) shall have a residual current device.
- Charging cable, plug, socket and 48V cable can get hot while charging.
- If a cable reel is used, it shall be unrolled completely.

NOTE!
Before operating and recharging the traction battery, make sure to read all instructions carefully.

NOTE!
During the charging of the traction battery, always make sure that the close environment of the electric compartment be dry and free of flammable agents.

NOTE!
Local regulations may apply for to ensure the utilization of approved electrical charging points.
It is recommended to always use Volvo-approved charging cable.

NOTE!
Make sure to rest the working attachment to the ground all time during charging.

NOTE!
Carefully check for corrosion or foreign material in the contacts of plug and socket.
Replace the charging cable when needed.
Do not abuse, damage, remove, and modify electrical parts of the machine or the charging equipment.
Do not use suspect equipment. Contact a qualified service technician if there is any question.

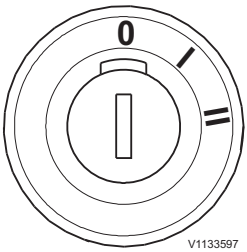
NOTE!
The charging cable should never be placed in water (like a puddle or rain) during charging.

NOTE!
Never charge the machine when the charging cable is connected on a wound up cable drum.

There are two ways to charge the traction batteries, standard charging and fast charging. The charging procedures are similar.

NOTE!
It is recommended to use the standard charging procedure when possible.

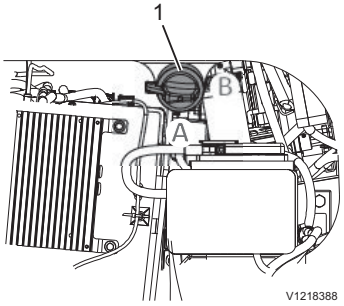
Standard Charging (AC) the traction battery



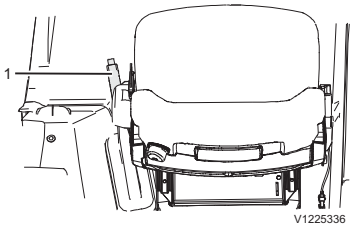
Ignition switch

1 The ignition switch shall be in position 0.

NOTE!
The battery main switch must be on.



1 Battery disconnect switch
A Battery connected
B Battery disconnected



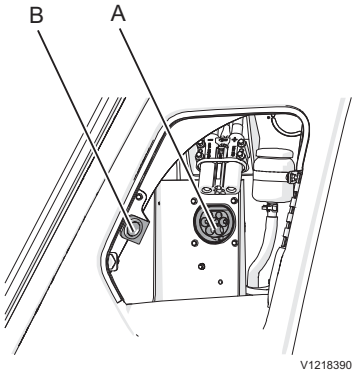
1 Parking brake

2 Apply the parking brake.

NOTE!
The machine can´t be charged if the parking brake is not applied.

3 Unlock the charging flap with the ignition key and open the charging flap on the left hand side behind the door.
4 Connect the charger cable to the power source.

NOTE!
Only use the charger cable delivered with the machine.



5 Plug the Type 2 charger cable into the socket (A) of the machine.
6 By pressing the charging initiating button (B) the cable connection will be locked and the charging process starts.
7 Close and lock the charging flap with the ignition key.

NOTE!
Close the charging flap within 10 seconds. Otherwise the procedure must be restarted.

A Socket for AC standard charging
B Charging initiating button

Status of indicator on the button
- Indicator lights up: ready to start charging
- Indicator blinks once every half second (1Hz): charging process starts/ongoing
- Indicator blinks at a higher frequency (5Hz): charging failed

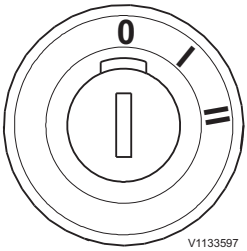
Charging Initiated

8 The display shows charging activity and its process.
9 To interrupt the charging, press the charging initiating button (B) again. This will unlock the charging cable connection.
→ The charging information on the display will disappear and the charging cable can be removed.

For charging time see page *194*.

Fast charging (DC) the traction battery

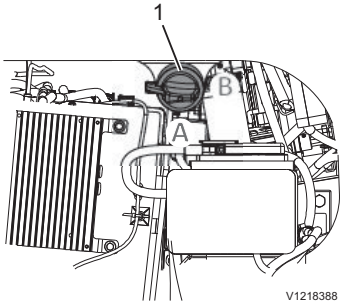
NOTE!
Make sure that there is at least three meters between the machine and the off-board charger.



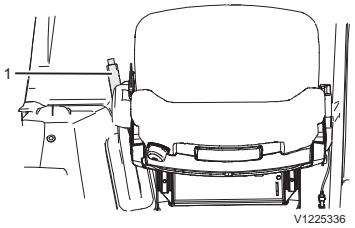
Ignition switch

1 The ignition switch shall be in position 0.

NOTE!
The battery main switch must be on.



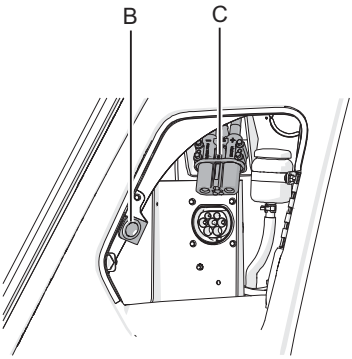
1 Battery disconnect switch
A Battery connected
B Battery disconnected



1 Parking brake

2 Apply the parking brake.

NOTE!
The machine can´t be charged if the parking brake is not applied.



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B — Charging initiating button
Status of indicator on the button
- Indicator lights up: ready to start charging
- Indicator blinks once every half second (1Hz): charging process starts/ongoing
- Indicator blinks at a higher frequency (5Hz): charging failed

C — Socket for DC fast charging

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Charging Initiated

3 Unlock the charging flap with the ignition key and open the charging flap on the left hand side behind the door.
4 Connect the plug of the off board fast charger to the power source.

NOTE!
Only use the charger cable delivered with the machine.

5 Plug the fast charger cable into the socket (C) of the machine.
6 Press the charging initiating button (B).
7 Close and lock the charging flap with the ignition key.

NOTE!
Close the charging flap within 10 seconds. Otherwise the procedure must be restarted.

8 The display shows charging activity and its process.
9 To interrupt the charging, press the charging initiating button (B) again or press the stop button on the off boardcharger.
→ The charging information on the display will disappear and the charging cable can be removed.

For charging time see page *194*.

Fuses and relays

For detailed information about fuses and relays, see page *190*.
If a problem should occur in one of the relays, this can temporarily be overcome, by replacing the defective relay with one that has a less important function. Check thoroughly that the relays are identical.

NOTICE

Risk of fire.
An inappropriate fuse could result in damage or fire on the circuit board.
Never install a fuse with a higher amperage than what is stated on the decal.

If the same fuse blows repeatedly, the cause must be investigated.

NOTE!
Only fuses and relays for 12V are allowed to be changed by operator.

Axles oil, checking level and refilling

Filling

WARNING

Risk of burns.
Hot oil can cause severe burns to unprotected skin.
Always wear personal protective gloves, goggles and clothing when handling hot oil.

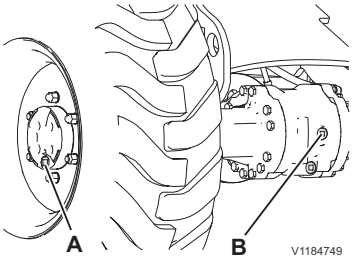
1 Place the machine in service position, see page *132*.
2 Check the oil level for front and rear axle including the axle hubs

Fill oil up to the edge by the level plug.

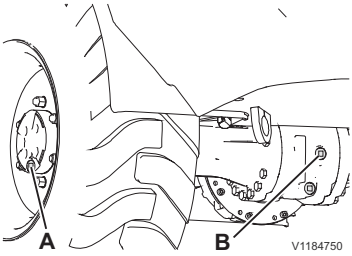
Operate the machine for a few minutes after filling. Check the level again, top up if needed.

Take care of filters, oils and liquids in an environmentally safe way. See page *135*.

Oil grade, see page *187*.

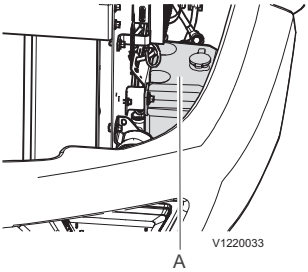


Front axle
A Level check and fill point
B Level check and fill point



Rear axle
A Level check and fill point
B Level check and fill point

Washer fluid, checking level and refilling

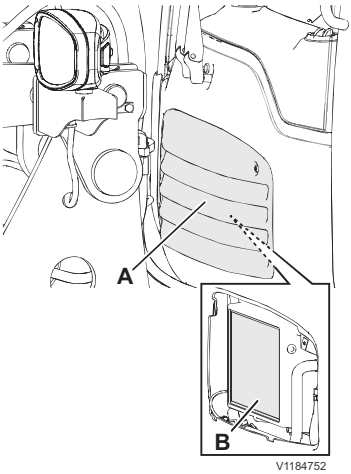


A Washer reservoir

The reservoir is used for the windshield and the rear window washer.

- Fill up washer reservoir (A) when necessary.
- With temperatures around or below freezing make sure that a sufficient amount of anti-freeze is added.

Cab ventilation filters, cleaning



A Filter cover
B Filter

NOTE!
The cab ventilation filter is only intended to separate particles (dust) from the air. Dangerous gases are not trapped by the filter.

NOTE!
Always wear mouth protection when cleaning the filter.

NOTE!
Make sure that the cab is fully closed to prevent dust from entering the cab interior.

1 Switch off heater.
2 Open the filter cover.
3 Remove the filter and clean it.
4 Reinstall the filter and the filter cover.

Cleaning machine

The machine should be cleaned regularly with conventional car care products in order to eliminate the risk of damage to the paint finish and other surfaces on the machine.

NOTE!
The inside of the cab may not be cleaned with running water or other high-pressure fluid.

NOTICE

Avoid using strong cleaning agents or chemicals in order to minimise the risk of damage to the paint finish.

NOTE!
Daily clean the areas on the machine where dust, chips, and similar may collect in order to minimize the risk of fire, see page *183*.

Recommendations for cleaning the machine:
- Place the machine in a place intended for cleaning.
- Follow the instructions supplied with the car care product.
- The water temperature must not exceed 60 °C (140 °F).
- If high-pressure washer is used, keep a distance of at least 20– 30 cm (8–12 in) between the nozzle and the machine. Too high pressure and too short distance may cause damage.
- No electrical components shall be hit by direct water or through the mesh of the hood and flaps.

NOTICE

If you are using a high-pressure wash, take care so that the decals do not loosen.

- Use a soft sponge.
- Finish by rinsing the whole machine with only water.
- Always lubricate the machine after washing.
- Touch-up the paint finish when required.
- If a decal is tattered or illegible it must be replaced immediately, see page *21*.
- Avoid cleaning from underneath or contacting of the water jet with any electrical components directly.
- Inside the cab cleaning is only allowed with a damp cloth.

Paint finish maintenance

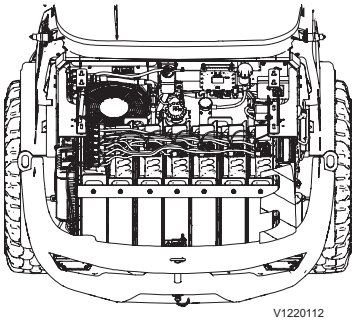
Machines used in corrosive conditions are more prone to rusting than others. As a preventive measure it is recommended that the paint finish should be maintained every sixth months.If there is any doubt whether the conditions are corrosive or not, contact your dealer.

- At first clean the machine.
- Apply Dinol 77B (or corresponding transparent waxy anti-rust agent) at a thickness of 70–80 µ.
- A protective layer of underseal Dinol 447 (or corresponding) may be applied under the mudguards where mechanical wear is expected.

Battery and service compartment, cleaning

Machines operating in dusty, fire-hazardous environments, e.g., log handling, woodchip handling, grain handling, and animal feed industries, require daily inspection and cleaning of the battery and service compartment and surrounding areas.

When operating in other conditions, checking and cleaning is required at least once a week.



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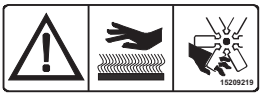
Areas that need to be checked and cleaned:

- The top of the hydraulic tank
- Also check and clean oil filling point and filters
- The space around cooling package to the rear frame.
- Inside cooling fans and casing
- Battery package and surrounding area

⚠ WARNING

Risk of burns.
The electric motor could be very hot and could cause severe burns.
Avoid contact with the electric motor until it is cooled down.



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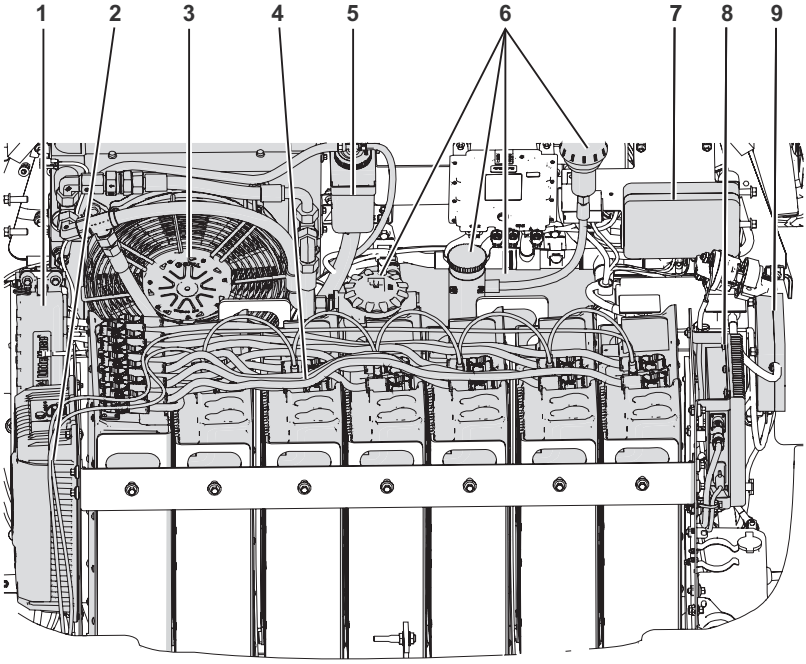
Decal on and behind rear hood

NOTE!
Local overheating due to high electric resistance caused by incorrect bolted connection or crimping can appear. Especially the traction battery can have hot surfaces, see also the corresponding decal (on and behind the rear hood).

- Preferably, the machine should be cleaned at the end of the work shift before it is parked.
- Use personal protective equipment such as protective goggles, gloves, and protective breathing equipment.
- Start with the highest areas on the machine and finish with the lowest.
- Loose material is removed mechanically, and only in special cases using compressed air. If compressed air is used, wear suitable breathing protection.

- After cleaning, check and repair any leaks. Close all covers and hoods.

Hot surfaces in the battery and service compartment



1. Fuse box	6. Hydraulic oil tank and related components
2. Onboard Charger	7. Fuse box
3. Radiator/cooler	8. DC/DC converter
4. Battery pack and connected 48V cables	9. Fuse box
5. Coolant expansion tank	

Bucket teeth, replacing

Special tool

The following information is valid for Volvo Tooth System.

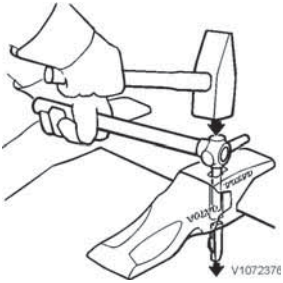
A special tool may be ordered to facilitate replacement of teeth. The tool is available in different sizes depending on tooth size. Contact your dealer for more information.

WARNING

Risk of splinter injury.
When striking metal objects with a hammer, flying metal chips could cause serious splinter injury to eyes and other body parts.
Always wear personal protective equipment and eye protection when replacing bucket teeth.

Removing tooth

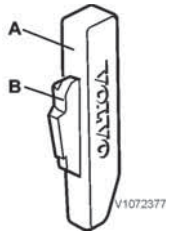
1 Lower the bucket to the ground and angle it slightly upward.
2 Clean the opening for tooth adapter's lock device.
3 Drive out the lock device with a hammer and the special tool or another suitable drift.
4 Remove the tooth.



Drive out the lock device

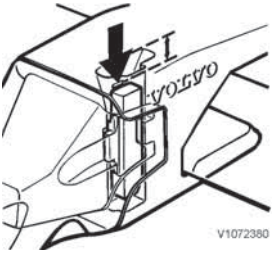
Installing tooth

1 Clean the front part of the tooth adapter and the hole for the lock device.
2 Install the tooth so that the guide lugs fit in the tooth adapter's recesses.
3 Replace the lock retainer (B) with a new one.



Lock device
A Steel pin
B Lock retainer

4 Install the lock device so that the chamfered part points down and the lock retainer points forward.
5 Drive down the lock device with a hammer until it is level with the upper part of the tooth adapter.
6 Drive down the lock device further with a hammer and the special tool or another suitable drift until the upper part is just below the line marking in the hole.



The lock device should be just below the line marking.

Replace the steel pin in connection with replacement of tooth adapter.

Wheel bolts, checking tightening

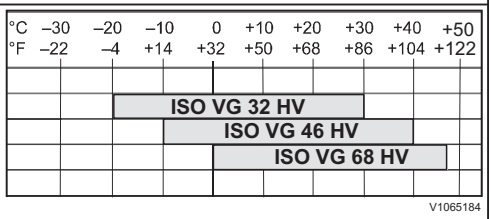
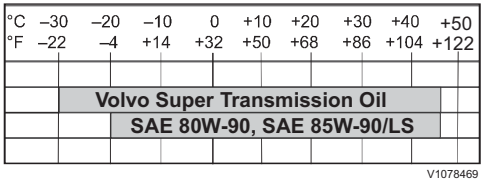
After having changed a tyre or if the wheel has been removed and installed for any other reason, the wheel nuts must be check-tightened after eight hours of operation.

Tightening torque: 450 Nm (332 lbf ft)

Specifications
Recommended lubricants

For questions about oils, lubricants, and extreme outdoor temperatures, contact your dealer for more information.

NOTE!
BIO-OIL and mineral oil (carbon-hydrogen-oil) must be disposed of separately. Mixing is prohibited!

	Oil grade	Recommended viscosity at varying ambient temperatures
HYDRAULIC SYSTEM Steering Travel hydraulics Working hydraulics	**Volvo Super Hydraulic Oil** Volvo Super hydraulic oil based on mineral oil HVLP according to DIN 51524-3 ISO 11158:HV. As an alternative: Volvo Hydraulic oil 46 Biodegradable. For further Information, contact an authorized dealer. **NOTE!** Do not mix bio-oil with mineral oil.	
BRAKE	Hydraulic oil VG 46 based on mineral oil	
AXLES Drive/ differential Transfer box	**Volvo transmission oil** API GL-5 API GL-5 / LS	
LUBRICATION POINTS	**Volvo Lithium Grease EP2** KP2N-30 acc. to DIN 51825/51502	
COOLING SYSTEM	**Volvo Coolant VCS** Only Volvo refrigerant VCS may be used.	

Coolant

Only use Volvo Coolant VCS when topping up or changing coolant. To avoid damage to engine and cooling system, different coolants or corrosion protection must not be mixed. When using concentrated Volvo Coolant VCS and clean water, the mixture should contain 40–60% concentrated coolant and 60–40% clean water. The amount of concentrated coolant must never be less than 40% of the total mixture, see table below.

Freeze protection down to	Mixed-in amount of concentrated coolant
-25 °C (-13 °F)	40%
-35 °C (-31 °F)	50%
-46 °C (-51 °F)	60%

The concentrated coolant must not be mixed with water that contains a high degree of lime (hard water), salt or metals.

The clean water for the cooling system must also meet the following requirements:

Description	Value
Total number of solid particles	< 340 ppm
Total hardness	< 9.5° dH
Chloride	< 40 ppm
Sulphate	< 100 ppm
pH value	5.5-9
Silica	< 20 mg SiO_2/litre
Iron	< 0.10 mg Fe/litre
Manganese	< 0.05 mg Mn/litre
Electrical conductivity	< 500 µS/cm
Organic material, COD-Mn	< 15 mg/litre

If there is any doubt about the water quality use ready-mixed Volvo Coolant VCS, which contains 40% concentrated coolant. Do not mix with any other ready-mixed coolants since this may result in cooling system damage.

Grease

Volvo Lithium Grease EP2

Or corresponding grease on lithium base with EP additives and consistency NLGI class 2.
If the machine is provided with automatic greasing system, other recommended lubricants apply.

Service capacities and change intervals

Change capacities

Front axle	5.5 litre (1.5 US gal)
Rear axle	5.5 litre (1.5 US gal)
Gear box	0.6 litre (0.2 US gal)
Hydraulic system, incl. tank	37 litre (9.8 US gal)
Coolant	3.2 litre (0.85 US gal)

Change intervals

Please see lubrication and service chart on page *152*.

Electrical system

System voltage	12 V
Battery	1 pc
Battery voltage	12 V
Battery capacity	52 Ah
Fully charged battery	approx. 12,75 V
Half-charged battery	approx. 12,0 V
Discharged	discharge stop at 10,5 V

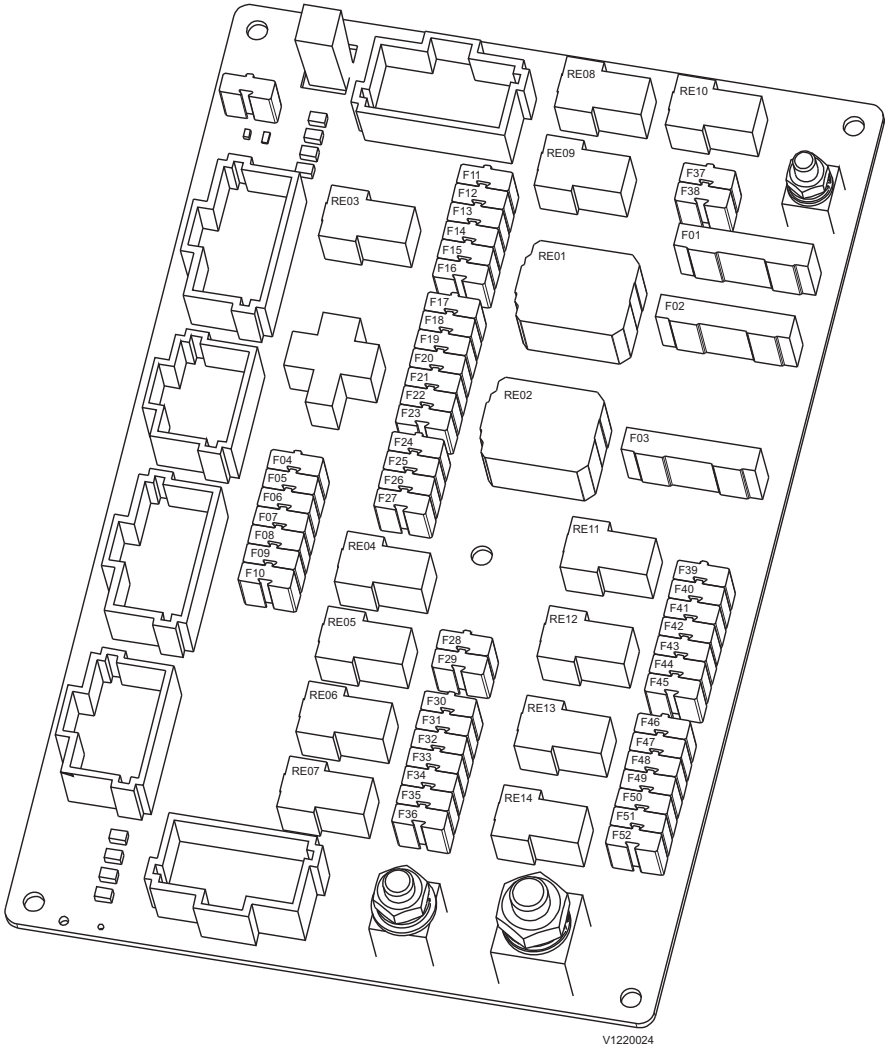
Bulbs	Watt	Socket
Head lights: - Travel lights, low beam - Travel lights, high beam	— 25 W/40 W H4	— P 43 t
Parking lights: - Front - Rear	— 0,4 W/2 W	BA 9 s
Number plate light	R 0.45 W	BA 15 s
Tail lights	R 4 W	BA 15 s
Brake lights	P 4 W	BA 15 s
Direction indicators, front/rear	P 8 W/P 4 W	BA 15 s
Interior light	P 5 W	BA 15 s
Working lights	55 W H3	PK 22 s
Working lights LED (option)	20 W	/
Rotating warning beacon	10 W H1	PK 14.5 s
Backup lights	N/A	N/A

Relays and fuses on the circuit board, 12V

NOTE!
Only fuses and relays for 12V are allowed to be changed by operator.

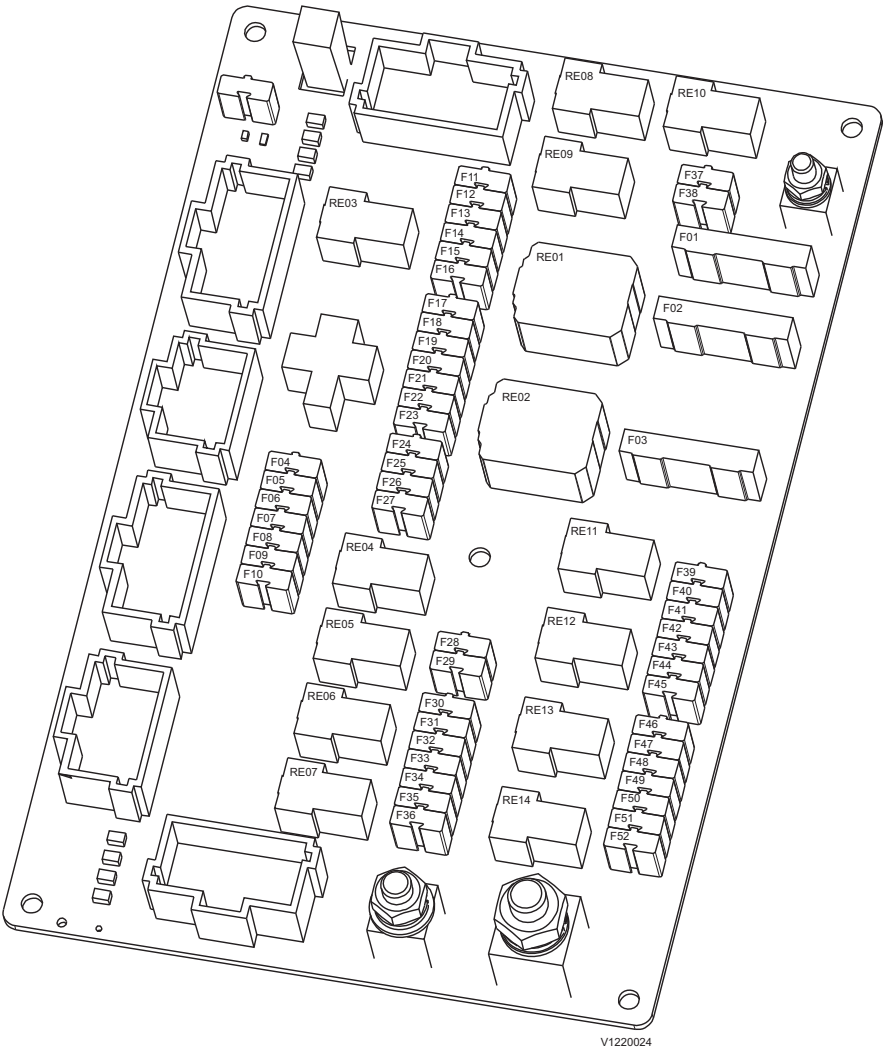
NOTE!
Only fuses and relays in this image are allowed to be changed by operator.

Relays



Relays					
RE		**FUNCTION**	**RE**		**FUNCTION**
01	F02	15B	09	F38	Stop light
02	F03	15A	10	F37	Sweeper
03	F19	Windshield wiper	11	F39	Work light Front
04	F50	Coolant pump	12	F43	Work light Rear
05	F49	Battery Management Unit	13	F48	Mirror demisting and defrosting
06	F30	sGPM1 & sGPM2 (Emergency button)	14	F51	4th hydraulic function
07	F35	sGPM2	RF1	/	Flasher relay
08	/	sGPM2			

Fuses



Fuses					
FU	**A**	**FUNCTION**	**FU**	**A**	**FUNCTION**
01	30	Cooling fan	27	10	
02	50	Ignition 15B	28	3	Electric fuel system
03	50	Ignition 15A	29	10	Radio
04	3	Position light Rocker switch	30	15	sGPM1 & sGPM2 (Emergency Button)

05	5	Position light front left and rear left	31	3	CIM
06	5	Position light front right and rear right	32	10	sGPM1
07	5	Interior heating	33	5	Ignition switch
08	10		34	3	I-ECU
09	3	Low beam Left	35	10	sGPM2
10	3	Low beam Right	36	5	sGPM2
11	3		37	20	Sweeper
12	10	Interior light Power outlet OBD, 5A	38	10	Stop light
13	20	Cab fan	39	5	Work light Front
14	20	Heated seat	40	15	
15	10	Boom suspension	41	15	
16	3	Attachment locking	42	10	Position light main
17	3		43	5	Work light Rear
18	5	Joystick Jogdial	44	5	Horn
19	10	Windshield washer and wiper	45	7,5	High beam
20	10	Rear window washer and wiper	46	3	Rotating beacon
21	7,5	Turn signals	47	3	TGW
22	3	Brake system	48	5	Mirror demisting and defrosting
23	3	Steering wheel	49	15	Battery Management Unit
24	7,5	Low beam	50	10	Coolant pump
25	3	Seat belt	51	5	4th hydraulic function
26	15		52	10	Hazard Flasher

Battery charging time

Household adapters:

230 VAC 6A (Household plug):	Approx. 25,0h
230 VAC 8A (Household plug):	Approx. 18,5h
230 VAC 10A (Household plug):	Approx. 14,5h
230 VAC 13A (Household plug):	Approx. 11,5h

Caravan adapter, CEE 16A adapter:

230 VAC 16A (Caravan plug):	Approx. 11,5h
400 VAC single phase use (400VAC 3Ph 16A):	Approx. 11,5h

Fast charging:

48 VDC 200A (Permanently installed):	Approx. 3,5h
48 VDC 360A (400V 3Ph 32A):	Approx. 2,0h

Transmission

Travel speeds	
Gear "1" (turtle) forward / reverse	0-8 km/h (0-4.97 mph)
Gear "2" (rabbit) forward / reverse	0-16 km/h (0-9.94 mph)

Axles

Front-/rear axles	Planetary axles
Differential lock	Dog clutch with 100% locking effect in both axles
Actuation	Electro-hydraulically switchable

Brake

Service brake	Hydraulically operated dry disc brake, mounted on front axle, acting on both axles
Quality of brake fluid	Hydraulic oil VG 46
Filling capacity	1.0 litre (0.26 US gal)
Parking brake	Dry disc brake on front axle. Hand lever operation.

Steering

Steering	Articulated frame, load sensing steering unit
Steering pump	Gear pump
Max pump flow at 3000 rpm	57 l/min (15.06 US gal/min)
Pressure relief setting	19 MPa (190 bar) (2755 psi)
Steering cylinders (singular)	Double acting
Steering lock	± 38°

Wheels

Tires	Air pressures: bar / psi	
	front	rear
335 / 80 R 18	3.75/54	2.25/33
365 / 70 R 18	3.5/51	2.0/29
405 / 70 R 18	2.75/40	2.0/29
340 / 80 R 18	3.25/47	2.25/33
340 / 80 R 18	3.25/47	2.25/32
340 / 80 R 18	2.75/40	2.0/29

The stated tyre pressures are guide values.

Tires
A max. difference of 1,5 % in the rolling circumference between left and right wheel is allowed. The advance of the front axle relative to the rear axle must be in the range of 0 and max. 3 %.

Wheel nuts, tightening torque

Tightening torque	450 Nm (332 ft lb)

Cab

General	
The cab is fitted on rubber elements, is insulated and has a flat floor with rubber mat.	
Tested and approved as a protective cab and meets standards according to EN ISO 3471:2008 and SAE 1040-MAY 94 (ROPS), EN ISO 3449:2008 and SAE J231 (FOPS).	
Number of emergency exits	1 (right hand side window)

Heating and ventilation
The basic version of the loader is provided with a heating and ventilation system with defrosting for all windows and the best possible air distribution.

Operator seat	
This machine is equipped with an operator seat, which meets the criteria of EN ISO 7096.	
Height adjustment (rapid adjustment)	80 mm (3.15 in)
Longitudinal adjustment	210 mm (8.3 in)
Adjustment for driver weight	50–130 kg (110–287 lbs)
Upholstery	Fire resistant
Lap type seat belt with reel	Yes

Hand and arm vibrations

The hand and arm vibrations generated during real operating conditions, if the machine is used as intended, is less than 2.5 m/s^2 RMS (root mean square) acceleration according to ISO 8041.

Whole-body vibrations

Whole-body vibrations generated during real operating conditions, if the machine is used as intended, is according to the following table.

Typical operating conditions	Vibration emission, value $a_{w,eqx}$ (m/s^2 RMS)	Vibration emission, value $a_{w,eqx}$ (m/s^2 RMS)	Vibration emission, value $a_{w,eqx}$ (m/s^2 RMS)
V-shaped loading and carrying work	0.6	0.6	0.6
Loading and carrying work	0.5	0.5	0.6
V-shaped loading and carrying work with pallet fork	0.5	0.5	0.5
Transporting operation	0.5	0.5	0.6

The following vibration directions are defined:
x = fore-aft
y = lateral
z = vertical

NOTE!
These values for generated whole-body vibrations were determined at special operating and ground conditions. Therefore they are not representative for all different conditions according to the intended use of the machine and should not be used as the only source to determine the whole-body vibrations to which an operator is exposed when using the machine. For this purpose, we recommend the information in ISO/CEN Technical Report.

To ensure that the generated whole-body vibrations are kept to the lowest possible value, see page *98*.

Sound information

Sound pressure level ($L_{pA)}$ at operator's position (Measurement method according to ISO 6396)	72 dB
Sound power level (L_{WA}) around the machine (Measurement method according to 2000/14/EC with applicable appendices and measurement method according to ISO 6395)	88 dB

Hydraulic system

Type	Open center system with main control valve electro-hydraulic controlled
Flow rate, nominal	57 l/min (15.1 US gal/min)
Tilt cylinder	Double acting
Lift cylinder	Double acting
Loading times:	
Lift - up (unloaded)	6 sec.
Dumping time	1.5 sec.
Lift - down (empty)	4 sec.

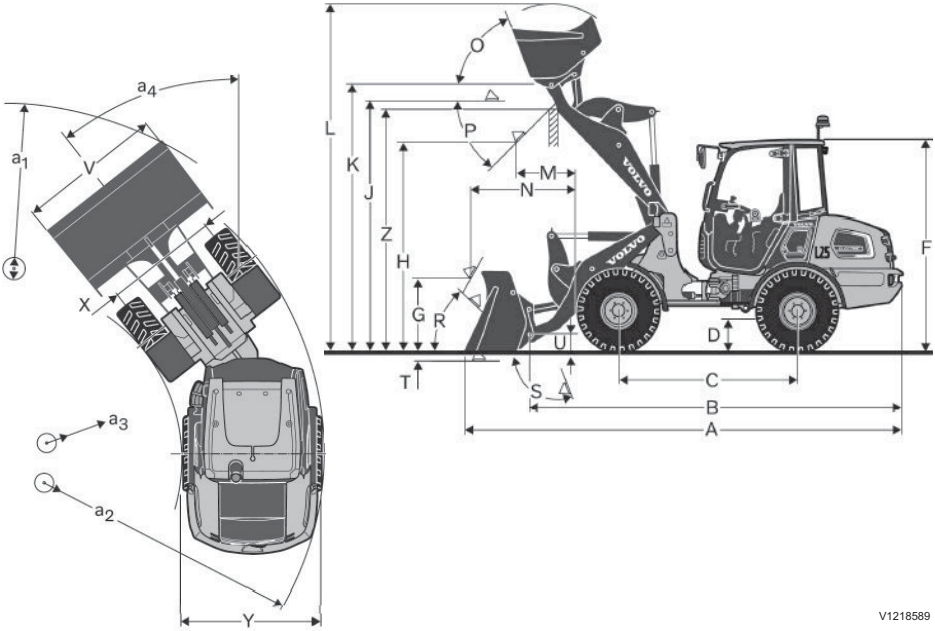
Machine weights

Operating weight The operating weight is the machine's most common configuration. The machine's most common configuration includes: - Bucket 0.9 m^3 (1.2 yd^3) - Tires 335/80 R18 - Standard boom - Operator and all fluids	5025 kg (11078 lb)
Max. machine weight Max. machine weight (incl. equipment and attachment) (1)	5500 kg (12125 lb)

Dimensions

Dimensions

L25 Electric with Z-Kinematic



Data with Z-attachment carrier and tires 335/80R18					
	mm	in		mm	in
B	4495	177	R	50°	
C	2125	83.7	S	138°	
D	290	11.4	U	200	7.9
F	2470	97.2	X	1402	55.2
G	850	33.5	Y	1735	68.3
J	2970	117	Z	2870	113
K	3170	124.8	a_2	4005	157.7
O	69°		a_3	2200	86.6
P	45°		a_4	± 38°	

Data according to bucket type L25 ELECTRIC with Z Kinematic, Z attachment carrier and tires 335/80R18		Bucket type			
		General purpose		Light material	4-in-1
Capacity heaped	m^3 yd^3	0.9 1.18	1.0 1.30	1.2 1.57	0.8 1.05
Material density	kg/m^3 lb/yd^3	1800 3034	1600 2697	1300 2191	1900 3203
Static tipping load straight (ISO 14397)	kg lb	3750 8267	3700 8157	3600 7937	3450 7606
Static tipping load at full turn, 38° (ISO 14397)	kg lb	3350 7385	3300 7275	3250 7165	3100 6834
Hydraulic lifting capacity, max.	kN lbf	55.0 12364	54.2 12185	52.8 11870	51.5 11578
Breakout force	kN lbf	54.5 12252	47.5 10678	42.0 9442	51.5 11578
A Total length	mm in	5275 207.7	5375 211.6	5480 215.7	5310 209.1
L Lifting height	mm in	4125 162.4	4170 164.2	4260 167.7	4080 160.6
V Bucket width	mm in	1800 70.9	1800 70.9	1800 70.9	1800 70.9
a1 Clearance circle	mm in	8725 343.5	8780 345.7	8840 348.0	8745 344.3
T Digging depth	mm in	100 3.9	100 3.9	100 3.9	105 4.1
H Dump height, 45°	mm in	2500 98.4	2425 95.5	2355 92.7	2470 97.2
M Reach at max. height	mm in	750 29.5	825 32.5	905 35.6	775 30.5
N Reach, max.	mm in	1525 60	1600 63	1675 65.9	1545 60.8
Operating weight	kg lb	5050 11133	5100 11244	5150 11354	5250 11574

Data with Loading Fork FEM2 and Forks 1200mm Distance to centre of gravity 500 mm	
Tipping load at full turn (ISO 14397)	2500 (5512) kg (lb)
Payload acc. to EN 474-3, 60/80%	1500/2000 (3307/4409) kg (lb)
Payload 80%, transport position, 38° full turn	2400 (5291) kg (lb)

Attachments

When selecting working attachments, observe the recommendations of the Volvo working attachment catalogue.

	Option number	Capacity m^3 / yd^3	Width mm ft in	Weight kg lb	Density kg/m^3 lb/ft^3
GP 1.2m^3 w/o teeth	113910 05	1.2 1.57	1800 5’ 9"	378 833	1300 81
GP 1.0m^3 VTS	113910 11	1.0 1.31	1800 5’ 9"	365 805	1600 100
GP 1.0m^3 w/o teeth	113910 12	1.0 1.31	1800 5’ 9"	345 761	1600 100
GP 0.9m^3 w/o teeth	113910 30	0.9 1.18	1800 5’ 9"	309 681	1800 112
GP 0.9m^3 VTS	113910 31	0.9 1.18	1800 5’ 9"	339 747	1800 112
MP 0.8m^3 w/o teeth	113910 91	0.8 1.05	1800 5’ 9"	515 1135	1900 119
MP 0.8 m^3 VTS	113910 92	0.8 1.05	1800 5’ 9"	537 1184	1900 119
MP 0.8m^3 w/o teeth SP	113913 43	0.8 1.05	1800 5’ 9"	534 1177	1900 119
MP 0.8m^3 VTS SP	113913 44	0.8 1.05	1800 5’ 9"	556 1226	1900 119
C3 SIT 0.8 m^3	281179 2	0.8 1.05	1900 6’ 2"	573 1263	1800 112
GRB 0.7m^3 w/o ext.	541333 84	0.7 0.92	1800 5’ 9"	350 772	2100 131

Material handling arm

Payload		Telescopic position	
900 kg	1984 lb	1660 mm	65 in
950 kg	2094 lb	1460 mm	58 in
1000 kg	2205 lb	1260 mm	50 in
1100 kg	2425 lb	1060 mm	42 in

Service history

Service 100 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 500 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 1000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 1500 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 2000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 2500 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 3000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 3500 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 4000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 4500 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 5000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 5500 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 6000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 6500 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 7000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 7500 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 8000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 8500 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 9000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 9500 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 10000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 10500 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 11000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 11500 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 12000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Alphabetical index