# **OPERATOR'S MANUAL**

EC140E



## EC140E L/EC140E LM

## **Foreword**

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 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.

## **OPERATOR'S MANUAL**

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#### 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 only in cases where no legislated safety instructions are in force.



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.



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



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

Make a note below of the identification numbers of the machine and its components. Always use this information when contacting the manufacturer and when ordering spare parts.

Manufacturer:	Volvo Group Korea Co., Ltd. Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea 51710
Machine PIN (Serial number)	
Engine	
Main pump	
Swing motor	
Track motor	
Main control valve	

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



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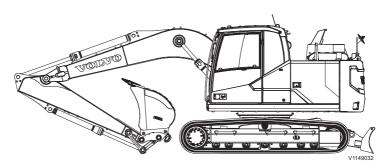
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## **Presentation**



#### Intended use

The machine is intended to be used under normal conditions for the applications described in this manual. If it is used for other purposes or in potentially dangerous environments, for example explosive atmosphere, flammable environment or areas with dust containing asbestos and so on, special safety regulations must be followed and the machine be equipped for such use. Contact the manufacturer / dealer for further information.

## **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.

## **Engine**

The machine is equipped with a straight fourcylinder, four-stroke, turbocharged diesel engine with direct injection and charge-air cooler.

The engines are equipped to meet the legal requirements for exhaust emissions according to

US Tier 4 final, California Tier 4 final, or EU Stage V.

#### NOTE!

Machines with engines for the US market may not be sold or used within the EU, and machines with engines for the EU market may not be sold or used within the USA, unless the engine is replaced with an engine valid for the applicable market. The market for which the engine is intended is indicated on the emission plate and by the engine's serial number (see page 24).

In order to reduce nitrogen oxides, particles, hydrocarbons and carbon monoxide, the engine includes external, cooled exhaust gas recirculation (EGR) and an exhaust aftertreatment system (EATS) with AdBlue®/DEF injection.

The exhaust aftertreatment system is a certified spark arrestor in accordance with Directive 97/68/EC and EN 1834.

#### AdBlue®/DEF information

AdBlue®/DEF is needed for the reduction of nitrogen oxides (NOx). AdBlue®/DEF is filled in a separate tank on the machine that is completely separate from the fuel tank. AdBlue®/DEF must not be mixed into the diesel tank and diesel must not be mixed into the AdBlue®/DEF.

For distribution of AdBlue®/DEF (only valid for US market):

- Volvo CE Customer Support: 1-877-823-1111 (business hours)
- www.volvoce.com (outside of business hours)

For distribution of AdBlue®/DEF (all other markets), please contact your local Volvo dealer for more information.

See page *324* for information about filling AdBlue®/DEF.

## Exhaust aftertreatment system

The engine features an exhaust aftertreatment system (EATS) in the form of two mufflers. The first one contains a diesel oxidation catalyst (DOC) and a diesel particulate filter (DPF) to reduce emissions of particulate matter (PM). The second one contains a selective catalytic reduction catalyst (SCR) to reduce nitrogen oxide (NOx) emissions. AdBlue®/DEF is injected into the exhausts in order to reduce NOx.

The DPF traps particles from the engine exhausts and, since it is continuously loaded with these particles from the exhausts, it needs to be regenerated in order to burn off the particles. Regeneration is also required to release trapped sulphur (SO<sub>2</sub>) and other substances that are trapped in the SCR and reduce the SCR's efficiency if they are not removed.

In order to ensure reduction of NOx-emissions, the EATS is monitored by the aftertreatment control module (ACM).

For more information, see page 184.

## Delayed engine shutdown

(optional equipment)

This software function assists to ensure that the engine is cooled before switching off the ignition. If the machine is operated with high engine load, the turbo needs to cool down at idle status before engine shutdown. But this recommendation is not always followed. Therefore, this software feature helps operators maintain this approach. For more information, see page 44 and 197.

## **Electrical system**

The electrical system consists of engine starting system, charging system, machine monitoring system, engine / pump control system and air conditioning system.

The machine is equipped with a high capacity electrical system well protected. Waterproof double-lock harness plugs are used to secure corrosion-free connections. The main relays and solenoid valves are shielded to prevent damage. The master switch is standard.

#### Automatic idling system

Automatic idling system reduces engine speed to idle when the levers and pedals are not activated for a certain period of time, resulting in less fuel consumption and low cab noise level.

## Automatic engine shut-down system (Optional equipment)

Automatic engine shut-down system is to stop the engine automatically when the machine is not operated for a certain period of time. Default time is set at 5 minutes and can be changed with Volvo's service tool only. Contact a workshop authorized by Volvo.

#### Automatic engine shut-down conditions

- Control lockout lever is down.
- Engine speed control switch is not changed.
- DPF regeneration is not on progress.

1 minute before engine shut-down, info screen will be displayed on IC (Instrument Cluster) so that the operator can cancel engine shut-down by pushing the keypad ESC button or moving the control lockout lever up or changing engine speed control switch (at the control lockout lever down position).

### Cab

The operator's cab has easy access via a wide door opening. The cab is supported on hydraulic dampening mounts to reduce shock and vibration level. These along with sound absorbing lining provide low noise levels. The cab has excellent allround visibility. The front windshield can easily slide up into the ceiling, and the lower front glass can be removed and stored in the side door.

## Integrated air-conditioning and heating system

The pressurized and filtered cab air is supplied by an automatically-controlled fan. The air is distributed throughout the cab from 14 vents.

#### Ergonomic operator's seat

The adjustable seat and joystick console move independently to accommodate the operator. The seat has 12 different adjustments plus a seat belt for the operator's comfort and safety.

#### FOPS and FOG

The cab is designed to meet the requirements for falling objects, the weight of which agrees with testing methods according to FOPS and FOG. The cab is approved as a part of protective structure according to FOPS and FOG standards. (FOPS: ISO10262 (Level II), FOG: ISO10262:1998 (Level II) and SAE J1356)

FOPS is an abbreviation of Falling Object Protective Structure (top guard) and FOG is an abbreviation of Falling Object Guard (top guard and front guard).

#### **ROPS**

The cab is approved as a part of protective structure according to ROPS standard (ISO12117-2:2008).

## Hydraulic system

The hydraulic system, known as the "Automatic Sensing Work Mode" is designed for high-productivity, high-digging capacity, high-maneuvering precision and excellent fuel economy. The summation system, priority systems, and regeneration system provide optimum performance.

- 1 Summation system: Combines the flow of both hydraulic pumps to ensure quick cycle times and high productivity.
- 2 Boom priority: Gives priority to the boom up function for faster cycle times during loading and deep excavations.
- 3 Arm priority: Gives priority to the arm operating function for faster cycle times during digging and dumping.
- 4 Swing priority: Gives priority to the swing function during trenching application to improve productivity.
- 5 Regeneration system: Prevents cavitation and provides flow to other functions during simultaneous operations for maximum productivity.
- 6 Power boost: All digging and lifting forces are increased.
- 7 Holding valves: Boom and dipper arm holding valves are provided to minimize cylinder drifting while holding loads.

#### Track motor and gearbox

The track motor is a variable axial piston motor that consists of a housing, a rotary group and a port plate. The housing contains the swash angle control screw. The rotary group consists of the cylinders and the pistons. The port plate consists of the counterbalance valve, the check valves, the relief valves and the displacement changeover valve. Track motor also includes the spring applied, hydraulically released parking brake assembly. The gearbox has a two-stage planetary mechanism has two sets of sun gears, planetary gears and pinion gears, driven by the splined output shaft of the track motor mounted directly to the gearbox.

#### Swing motor and gearbox

The swing motor is a fixed axial piston motor. The rotary group consists of a cylinder block and nine pistons located in the cylinder. The cover section has relief valves, an anti-cavitation valves and anti-rebound valves. The housing has a time delay valve and a disk type brake.

The gearbox is composed of the sun gear, the planetary gear, the pinion gear and the housing. The power supplied to the output shaft of the swing motor reduces motor speed through the sun gear and the planetary gear, developing high torque that is transmitted to the pinion gear.

## **Equipment**

The machine can be equipped with different types of optional equipment, depending on the requirements of different markets. Examples of such equipment are automatic engine shutdown, and automatic lubricating system (standard on certain markets).

#### Modifications

Modifications of this machine and its components such as engine and auxiliary system, including the use of unauthorized attachments, accessories, units, or parts, may affect the machine's integrity (condition), the machine's ability to function in the way for which it is designed and voids the EU typeapproval of the machine and engine- and auxiliary system. 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 device (optional equipment)

An installed anti-theft device makes it more difficult to steal the machine. Volvo Construction Equipment can supply an anti-theft device as optional equipment. If your machine is not equipped with such a device, look into the possibility of having one installed by a qualified service technician.

## Logged machine data

The machine is equipped with a software system, which records various information about the machine and this information is transferred from the machine to Volvo and used by Volvo and its authorized workshops in the product development process and for possible malfunction detection. Questions regarding this information can be directed to your dealer.

#### CareTrack

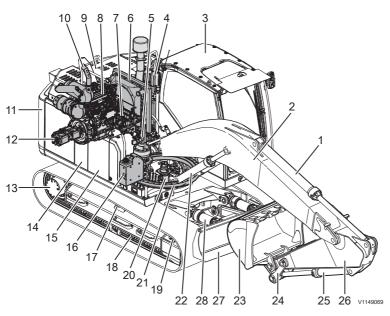
The machine may be equipped with CareTrack, a telematics system developed by Volvo Construction Equipment. The system stores machine data, e.g., machine position, operating hours, fuel consumption, fuel level, that can be sent by wireless transmission to a computer. CareTrack is available in different versions, depending on the required information level.

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.

## Machine view



1	Dipper arm cylinder	15	Fuel tank
2	Boom	16	AdBlue®/DEF tank
3	Operator cab	17	Top roller
4	Air cleaner	18	Bottom roller
5	Swing motor and gearbox	19	Idler
6	Charge air cooler, hydraulic oil cooler, and radiator	20	Turning joint
7	Main control valve	21	Swing ring gear
8	Engine	22	Boom cylinder
9	Rear hood	23	Bucket
10	Muffler	24	Link
11	Counterweight	25	Bucket cylinder
12	Main pump	26	Dipper arm
13	Track motor and gearbox	27	Dozer blade
14	Hydraulic tank	28	Dozer blade cylinder



## CE-marking, EMC-directive

### **CE** marking

(Declaration of Conformity : Only applies to machines marketed within the EU/EEA.)

This machine is CE marked. This means that when delivered the machine meets the applicable "Essential Health and Safety Requirements", which are given in the EU Machinery Safety Directive, 2006/42/EC.

Any person carrying out changes that affect the safety of the machine, is also responsible for the same.

As proof that the requirements are met, the machine is supplied with an EU Declaration of Conformity, issued by Volvo CE for each separate machine. This EU declaration also covers attachments manufactured by Volvo CE. The documentation is a valuable document, which should be kept safe and retained 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 at all times and in each separate case be maintained. The person carrying out such action is also responsible for the action which, in some cases, may require a new CE marking and the issue of a new EU Declaration of Conformity.

#### **EU EMC Directive**

The electronic equipment of the machine may in some cases cause interference to other electronic equipment, or suffer from external electromagnetic interference, which may constitute safety risks. The EU EMC directive about "Electromagnetic compatibility", 2014/30/EC, provides a general description of what demands can be made on the machine out of a safety point of view, where permitted limits have been determined and given according to international standards. A machine or device which meets the requirements should be CE marked. Our machines have been tested particularly for electromagnetic interference. The CE marking of the machine and the declaration of conformity also cover the EMC directive. If other electronic equipment is fitted to this machine, the equipment must be CE marked and tested on the machine with regard to electromagnetic interference.

#### EC DECLARATION OF CONFORMITY FOR MACHINERY (IIA)

Volvo Construction Equipment hereby declares that the below specified product:

Manufacturer: Volvo Construction Equipment AB

Address: Seongsan-gu, Changwon-si, Gyeongsangnam-do, 51710

Country: Korea

Category: Earth Moving Machinery

Make: Volvo

Type: Hydraulic Excavator

Model: ECXXXX, ECRXXXX, EWXXXX

Power [kW]: XXX

Representative sound pressure [dB(A)]: XXX Guaranteed sound pressure [dB(A)]: XXX

PIN: \*VCEXXXXXXXXXXXXXXXXX

In conjunction with

Type: N/A Model: N/A s/n: N/A

in the state in which it was placed on the market, and excluding components added and/ or operations carried out subsequently is in conformity with the relevant provisions of Essential Health and Safety requirements of:

EC Directive "Machinery": 2006/42/EC
EC Directive "Outdoor Noise": 2000/14/EC

EC Directive "Electromagnetic Compatibility": 2014/30/EC

and their amendments relating to machinery, and other applicable directives

The following harmonized standards apply:

Earth Moving machinery - Safety Part 1: EN 474-1:2006+A6:2019 Earth Moving machinery - Safety Part 5: EN 474-5:2006+A3:2013 Technical file compiled by: XXXXXX, D-54329 KONZ, Germany

Notified Body: 0026; Vincotte NV/SA, Jan Olieslagerslaan35, B-1800 Vilvoorde, Belgium

This declaration includes attachments developed designed/approved, marked and marketed by above-mentioned manufacturer.

the identity and sign empowered to draw behalf of the manuf	v up the decla facturer	the identity and authorised repre		the	
Changwon, Korea	dd/mm	уууу	Place	date	year

## Communication equipment, installation



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!

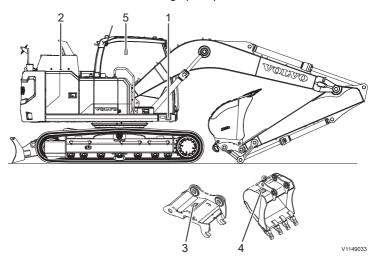
Safety-classified machine and spare parts shall be reinstalled, repaired, or replaced immediately if they have been removed or damaged.

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**

Please refer to the figure below to locate the product plate, engine plate, cab plate and attachment plates. Always use the Product Identification Number (PIN) provided on the vehicle and/or engine plates for troubleshooting purposes and/or when ordering spare parts.



### 1 Product plate

This plate with Product Identification Number, PIN, for the complete machine indicates the model designation, serial number and when applicable, machine weight, engine power, manufacturing year and CE approval. The plate is positioned on the right side of the superstructure.

### 2 Engine

The engine type designation, part and serial numbers are stamped on the top of valve cover.

### 3 Attachment quick coupler

This nameplate is attached on the outside of the quick coupler and indicates the supplier code, serial number, part number and weight.

#### 4 Bucket

This nameplate is attached on the top of the bucket and indicates the bucket model order number, serial number, supplier code, rated capacity, weight, cutting width, tooth part number and adapter part number.

#### 5 Cab

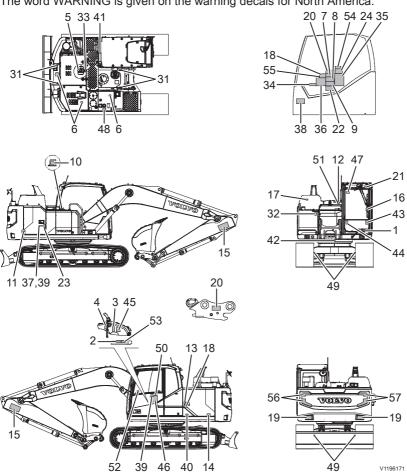
The nameplate is attached on the inside of the cab and indicates the product number, serial number, model type, and weight.

## Information and warning decals

Information and warning decals are affixed to the machine on strategic locations to remind operators and maintenance personnel specific safety precautions. All decals are not installed on all machines, as they are market and machine dependent. The decals must be kept free from dirt, so that they can be read and understood. If a decal is lost or becomes illegible, it must be replaced immediately. The part number (order number) is given on the respective decals and in the Parts Catalogue.

#### NOTE!

The word WARNING is given on the warning decals for North America.



### Warning decals



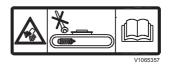
1 WARNING! Read the Operator's manual.



3 WARNING! When leaving the machine, move the control lockout lever down to lock the hydraulic system.



5 WARNING! Hot and pressurised coolant when opening radiator cap.



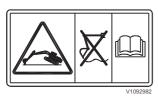
2 WARNING! High pressure, do not unscrew the recoil spring when tensioning tracks – read the Operator's manual. See page 340.



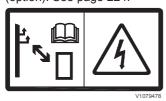
4 WARNING! Do not start the engine.



6 WARNING! Do not step on this surface.



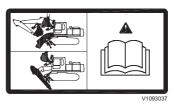
7 WARNING! Do not use floating function while the machine is jacked up – read the Operator's manual. Boom floating (option). See page 224.



9 WARNING! High voltage, keep safe distance from electrical power lines. Read the Operator's manual. See page 213.



11 WARNING! Risk of explosion – read the Operator's manual. See page *346*.



8 WARNING! Operating the optional attachment. Equipment may strike the cab or machine.



10 WARNING! No smoking when fuel filling.



12 WARNING! Hot surfaces and rotating parts

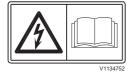


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13 WARNING! Risk of falling from machine.



15 WARNING! Raised attachment, keep a safe distance from the machine.



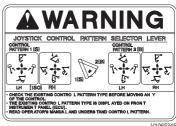
17 WARNING! Electric shock.



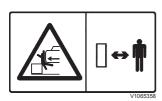
14 WARNING! Risk of electrical shock, corrosive burns and explosion – read the Operator's manual.



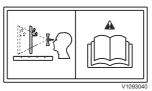
16 WARNING! Lock the windshield. WARNING! Insert safety lock before getting into hazardous area.



18 WARNING! Pattern change valve selector (option). See page *95*.



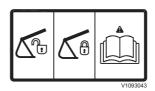
19 WARNING! Crushing area, keep a safe distance from the machine.



21 WARNING! Risk of visual distortion through roof window - read the Operator's manual.



23 WARNING! Engine preheater (option).



20 WARNING! Before working after connecting and disconnecting attachment - read the Operator's manual. (Attachment quick coupler, option)



22 WARNING! Overload warning button. See page 79.

⚠ 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 infomation go to WWW.P65warnings.ca.gov/diesel.

**▲WARNING:**Operating, servicing and maintaining a passenger vehicle or off-road 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 nformation go to WWW.P65Warnings.ca.gov/passenger-vehicle.

24 WARNING! California Proposition 65 requirements (for North America).

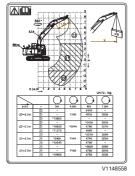
#### Information decals



31 Lifting point.



33 Coolant information – read the Operator's manual. See page *320*.



35 Lifting capacity (option). See page 401.

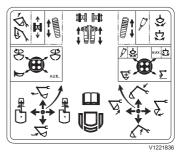


32 AdBlue®/DEF, filling. See page 324.

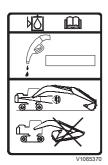
(	Mode	Applications		
	Н	Heavy duty	Maximum productivity, High Speed.	
			Most general application, Optimum speed.	
			Maximum lifting force, Precise control speed.	
[	Ţ I	Idle	Warm-up, Low idle speed.	

V1065367

34 Mode application (option).



36 Lever and pedal functions (option).



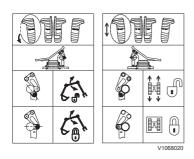
37 Machine position when checking hydraulic oil level.



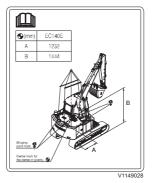
39 Type of hydraulic oil filled at factory (option).



41 Sound pressure level in cab (option).



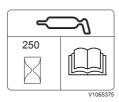
43 Optional pedal operation (option).



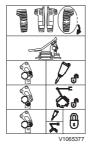
38 Lifting instruction. See page 205.



40 Battery disconnect switch.



42 Greasing interval – read the Operator's manual.



44 Optional pedal operation (option).



45 Sound power level outside machine.



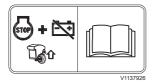
47 Emergency exit.



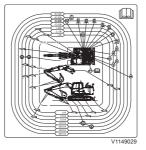
49 Tie-down point.



51 Hood stay lever operation.



53 Emergency stop switch. See page 95.



46 Lubrication and service chart. See page *291*.



48 Sulphur content information (A: for North America, B: for Europe and Other markets). See page *358*.



50 Long life hydraulic oil. See page 351.



52 Be careful when opening the cab door. Risk of cab door window damage.

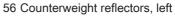


54 Refrigerant information. See page *313*, *285* and *374*.





55 Dozer blade. See page 95.





57 Counterweight reflectors, right

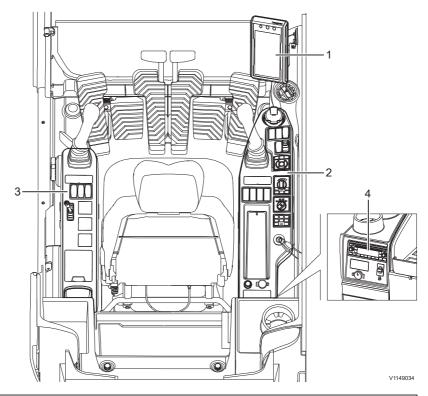
#### Instrument panels



Risk of serious injury.

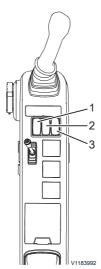
Operating the machine without sufficient skills and knowledge of the content in the Operator's Manual could lead to loss of machine control and could cause serious injuries including death.

Carefully read through the Operator's Manual and learn the warning signs, symbols and operating instructions before attempting to operate the machine.



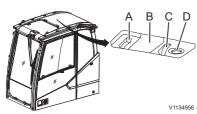
1 Front instrument panel (Instrument Cluster)
2 Right instrument panel
3 Left instrument panel
4 Rear instrument panel

#### Instrument panel, left



- 1 Interior light switch
- 2 Rotating beacon switch (optional equipment)
- 3 Attachment quick coupler switch, left (optional equipment)

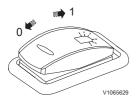


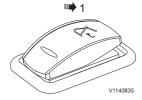


#### 1 Interior light switch

- Position 0: Interior light is OFF
- Position 1: Interior light (B) will be turned on when the cab door is open. After closing the cab door, the interior light will be turned off automatically.
- Position 2: Interior light is ON

The switch (A) for the interior light will only work when this switch is in the "ON" position (2). The reading light (D) can be turned on with switch (C) regardless of the position of the interior light switch.







Warning! Quick coupler unlocked



Confirm quick coupler is locked

## 2 Rotating beacon switch (optional equipment)

- Position 0: Rotating beacon is OFF
- Position 1: Rotating beacon is ON

This switch is used to activate the rotating beacon when the swing system is activated.

### 3 Attachment quick coupler switch, left (optional equipment)

This switch has 2 different functions of the attachment quick coupler according to the operating condition.

Press down 1: Attachment quick coupler, opening control

The switch is returned automatically. Press the switch for more than 0.7 seconds to open the attachment quick coupler.

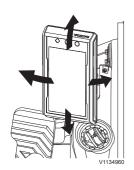
When the attachment quick coupler is open, the buzzer sounds and the warning message and indicator are displayed on the IC (Instrument Cluster).

#### NOTE!

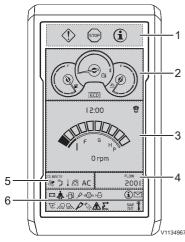
The attachment quick coupler switch for initiating on the right instrument panel must be pressed first to activate this switch. See page *79* for the operation.

■ Press down 1: Attachment quick coupler, confirming control

When the check message for confirming appears on the IC (Instrument Cluster), press the switch for more than 0.7 seconds to confirm that the attachment quick coupler is locked. Then the buzzer sound will be turned off and the check message and indicator will disappear.



Adjustable direction of IC (Instrument Cluster)



- 1 Central warning light screen
- 2 Gauge screen
- 3 Time and engine speed screen
- 4 Hydraulic flow screen
- 5 CCM (Climate Control Module) screen
- 6 Indicator screen

#### Instrument panel, front

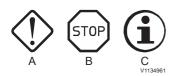
The front instrument panel can be adjusted for better operator comfort.

#### NOTE!

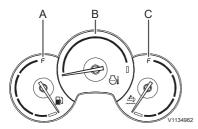
Prevent machine damage by taking correct action. Read thoroughly and understand the instructions in this section to familiarize yourself with the front instrument panel before trying to operate the machine.

#### NOTE!

The front instrument panel is designed to display one of the supported languages. Refer to page 44 for details on how to set the language and the units.



- A Check, amber B Warning, red
- C Information, blue



- A Fuel level gauge
- B Engine coolant temperature gauge
- C AdBlue®/DEF level gauge

#### 1 Central warning light

There are three different types of light.

For more information, see page 44.

#### NOTE!

If the central warning light flashes or lights up while operating, follow the instructions on the display unit.

#### 2 Gauges

The gauges are always shown unless a warning message is activated.

#### Fuel level gauge

The gauge shows the level in the fuel tank and it has a red mark indicating "fuel empty". When the gauge is in this area, the fuel left is about 10% of total tank capacity. Refuel the machine immediately in order to avoid air entering the system. If the machine runs out of fuel during operation, refuel and refer to page 328 for correct instructions to bleed air from the fuel system.

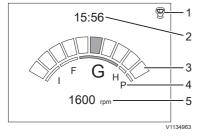
Fuel tank capacity, see page 366.

#### Engine coolant temperature gauge

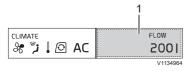
The gauge shows the temperature of the engine coolant and it has a red mark meaning "engine overheated".

#### NOTE!

The red central warning light flashes, if the coolant temperature becomes abnormally high. Turn off the engine immediately and check the cause.



- 1 Joystick shortkey
- 2 Time
- 3 Engine speed step
- 4 Work mode index
- 5 Actual engine speed



1 Flow rate for X1

#### AdBlue®/DEF level gauge

The gauge shows the level in the AdBlue®/DEF tank and it has a red mark indicating "AdBlue®/DEF empty". When the gauge is in this area, the AdBlue®/DEF left is about 10% of total tank capacity.

Capacity of AdBlue®/DEF tank, see page 366.

#### 3 Time and engine speed

Time segment displays the current time. Refer to page 44 for instructions on how to set current time on the main screen.

Engine speed screen is displayed when the "Menu screen" is not shown in the "Main screen". For main menu screen, see page 44.

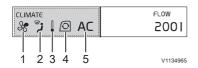
The "Engine speed step" selected on "Engine speed control switch" is displayed on an engine speed graph which is a segmented bar graph. The actual speed is displayed below the engine speed graph (maximum four-digit number). When the engine is off, engine speed is displayed as "0".

#### NOTE!

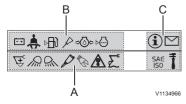
Engine speed and work mode may vary according to the optional equipment.

#### 4 Hydraulic flow

Calculated value for X1 flow option is displayed on the segment called "Flow segment". Refer to page 44 for flow setting instructions.



- 1 Fan speed
- 2 Air flow direction
- 3 Temperature
- 4 Air flow circulation
- 5 Air conditioning status



- A Function indicators
- B Warning indicators
- C Fixed indicators

#### 5 CCM (Climate Control Module)

CCM segment displays the status of the CCM (Climate Control Module). This includes temperature setting, fan speed, air flow direction, circulation, and air conditioning status. Refer to page 118 for more details.

#### 6 Indicators

Indicator screen displays indicators as symbols that show users important information easily and quickly. Indicators are divided into three types; function indicator, warning indicator, and fixed indicator.

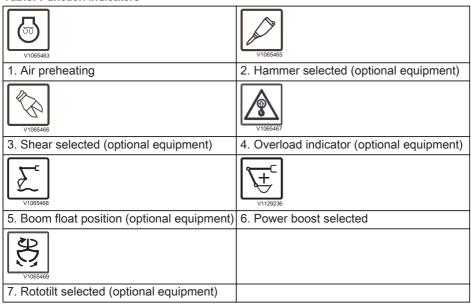
#### NOTE!

Fixed indicators are always displayed on the right side.

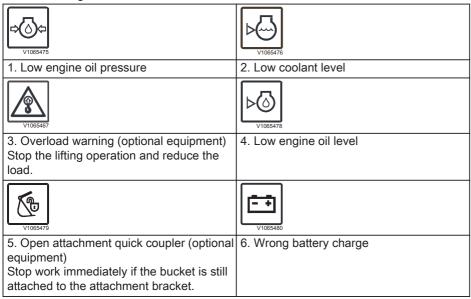
- Indicators fill the space from left to right.
- An indicator that has higher priority is put on the left side of the one that has lower priority.
- Indicators on both sides can extend their display area to the other side if there is no indicator on the other side.
- When the whole area is filled and there are more indicators to display, indicators keep replacing the others so that the user can see all indicators.

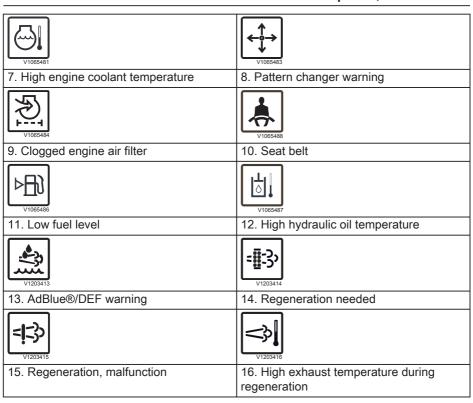
#### Indicators and their priorities are as follows;

#### Table. Function indicators

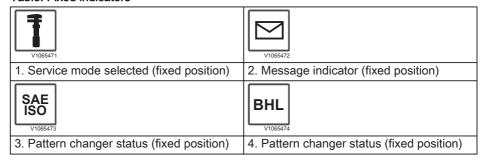


#### Table. Warning indicators



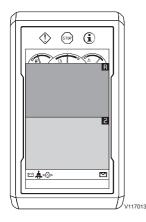


#### Table. Fixed indicators









#### Display unit

#### Start sequence

Initial start sequence is performed as follows.

#### A Volvo logo

If the operator turns the ignition switch to the operating position, the Volvo logo on the IC (Instrument Cluster) screen lights up for a few seconds.

#### NOTE!

Enter the code for the anti-theft system (if installed), see page *69*. If the engine is restarted within 15 seconds (time is adjustable with Volvo's service tool, Tech Tool) after having turned it off, the code does not have to be entered again.

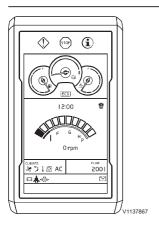
#### B Daily maintenance

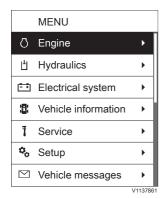
The user can see daily maintenance items once a day. This screen is dismissed by pressing the ESC button or SELECT button and disappears automatically after 5 seconds if there is no button input.

- Engine oil level
- Coolant level
- Water separator
- Air cleaner
- Hydraulic oil level

#### C Camera screen (if installed)

All the cameras installed on the machine will be displayed on the IC (Instrument Cluster) when engine is running. The camera screen is dismissed by pressing the ESC button on the keypad.





#### D Main screen

After the camera screen is dismissed, the main screen is displayed.

#### NOTE!

Indicator for seat belt will be displayed for 3 seconds on the "Daily maintenance" screen or main screen. Fasten the seat belt before operating the machine.

#### NOTE!

Camera screen can be shown again

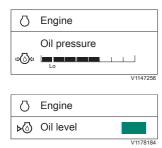
- when camera button is pressed or
- when operating control lever (joystick) / pedal or
- no keypad signal during 10 seconds.

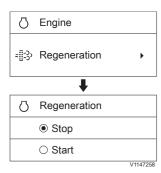
This function is always to check for obstacles or person near the machine. For detailed information about camera control, see page *134*.

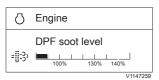
#### Main menu

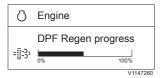
The main menu is reached by pressing the SELECT button on the keypad.

Scroll the list by using the arrow buttons on the keypad. When a folder is highlighted, its subscreens are shown when pressing the SELECT button. Use the arrow buttons to scroll between the subscreens. Cancel the action at any time by pressing the ESC button on the keypad.









#### Subscreens

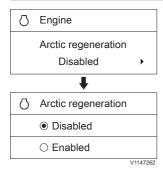
- 1 Engine
  - Oil pressure: This shows the measured value of the engine oil pressure. When the bar graph is green, the value is OK, within normal operation range. When the bar graph is red, the value is abnormal.
  - Oil level: This indicator shows the measured value of the engine oil level. The following color of the indicator only shows when the ignition switch is on. If the engine is running, the indicator shows no color.
    - **Green:** The value is between 30%-100%, the oil level is OK.
    - Yellow: The value is between 3%-30%, check the oil level with the dipstick at next daily maintenance.
  - Red: The value is between 0%-3%, the oil level is too low. Check the oil level immediately with the dipstick and take the necessary actions.
  - **Grey:** System failure. Contact a workshop authorized by Volvo.
  - Regeneration: The operator can perform a regeneration with "Start" in the menu when the Diesel Particulate Filter has collected enough soot. When selecting "Stop" in the menu, the regeneration which is in progress will be cancelled. Refer to page 184 for more detailed information.
    - Stop
    - Start

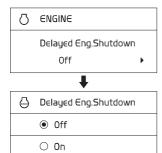
■ DPF soot level: This shows the level of soot that has accumulated within the DPF.

#### NOTE!

Contact a workshop authorized by Volvo for detailed information on the soot level.

■ DPF Regen progress: This shows the measured value of DPF regeneration progress. Regeneration is complete when the bar graph reaches 100%.

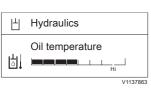




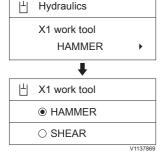
- Arctic regeneration (optional equipment): Arctic regeneration mode is used for machines that operate in extreme cold climate areas where the machines need to be left running aroundthe-clock without operator presence. To use this optional mode, the parked regeneration mode should be selected in advance. When selecting "Enabled" in this menu, the parked regeneration is started automatically when needed without any further operator action. This function will only be active while in parked mode, regardless of regeneration mode and will be "Disabled" by default at startup or when leaving the parked mode. This means that the regeneration system can remain in an optimal mode, even after longer periods of idling.
  - Disabled
  - Fnabled

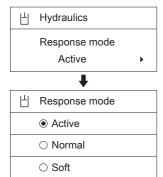
#### ■ Delayed Eng. Shutdown (optional equipment)

- Off
- On: This function controls the after-cooling of the engine after the ignition has been turned off. It secures that the engine is running until it is sufficiently cooled and then shuts it down. The time required for the after-cooling is maximum 2 minutes (exceptional case: just after regeneration- max. 20 mins). The remaining time from ignition key has been turned off to shutdown is shown in the display. It is possible to abort the after-cooling and shut down the engine directly by pressing ESC, via the battery disconnect switch, by raising control lockout lever or by using any emergency stop, but it is not recommended. A message will pop-up at restart if the engine has been shut down before the after-cooling is completed. For more information, see page 197.









#### 2 Hydraulics

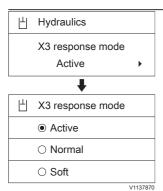
- Oil temperature: This shows the measured value of hydraulic oil temperature. When the bar graph is green, the value is OK, within normal operation range. When the bar graph is red, the value is abnormal.
- Hammer op. hours (optional equipment): This shows the counted value of hammer operating time in the unit hours and it can not be reset to zero.

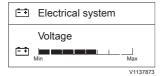
#### NOTE!

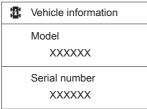
Refer to this "Hammer op. hours" for service interval when replacing the hammer return filter

- X1 work tool (optional equipment): This informs the operator which tool is selected at the moment instead of bucket such as a hydraulic breaker (hammer) or shear. It also allows the operator to select a preset tool showing the name and settings of each tool. When pressing the arrow button, another preset work tool is displayed. When pressing the SELECT button for another tool, the screen reverts the screen to the former screen displaying the name of the newly selected tool. For setting of X1 tool, refer to Menu-> Setup-> X1 work tool.
- Response mode (optional equipment): This informs the operator which response mode is selected at the moment. It also allows to select a response mode from 3 different modes. The operator can select a response mode from the three modes with the arrow buttons. When pressing the SELECT button, the marked response mode is set. The screen reverts to the former screen displaying the name of the newly selected item.
- Active
- Normal
- Soft

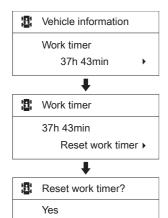
The operator can adjust the movement sensitivity of attachments when operating the levers. "Active" mode is the most sensitive.







V1140744



■ X3 response mode (optional equipment): This informs the operator which X3 response mode is selected at the moment. It also allows to select a response mode from 3 different modes. The operator can select a X3 response mode from the three modes with the arrow buttons. When pressing the SELECT button, the marked response mode is set. The screen reverts to the former screen displaying the name of the newly selected item.

- Active
- Normal
- Soft

The operator can adjust the movement sensitivity of attachments when operating the levers. "Active" mode is the most sensitive.

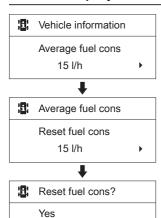
#### 3 Electrical system

■ Voltage: This shows the measured value of voltage of the battery. When the bar graph is green, the value is OK, within normal operation range. When the bar graph is red, the value is abnormal.

#### 4 Vehicle information

- Model: This shows the machine's model name.
- Serial number: This shows the machine's serial number.

- Work timer: This shows the counted work time.
- Reset work timer: Work time can be reset by pressing the SELECT button when the "Work timer" value is highlighted. Press ESC button to "Cancel" or SELECT button to "Yes".



- V1140745
- Vehicle information Current fuel cons Ambient temperature 25.0 °C

- Average fuel cons.: This shows the calculated average fuel consumption from the last 24 hours.
- Reset fuel cons: Fuel consumption can be reset by pressing the SELECT button when the "Average fuel cons" value is highlighted. Press the ESC button to "Cancel" or SELECT button to "Yes".

- Current fuel cons.: This shows the calculated fuel consumption at the current time.
- Ambient temp: This shows the measured ambient temperature.

#### 5 Service

This subscreen shows the service items with "time remaining" value. Press the SELECT button to adjust interval or to check detail information.

#### ■ Engine oil/filter

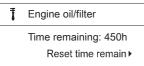
 Interval: This shows the value of engine oil/ filter interval in the unit hours. According to engine oil/filter type, the operator can adjust engine oil/filter interval. The setting range is 50
 1000 hours

# For Service Engine oil/filter 450h

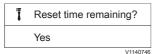




V1137878



V113787



remaining" and "Interval" will pop up on the IC (Instrument Cluster). Service the maintenance items which should be serviced in that interval. For the service interval and maintenance items, see page *367*.

Reset time remaining?: After servicing the maintenance items, the time can be reset.

- Time remaining: This shows the value for

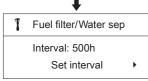
remaining time to next engine oil/filter service.

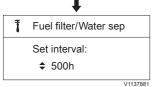
When the "Time remaining" reaches 40 h, 20 h, and 0 h, the check screen with "Time

 Reset time remaining?: After servicing the maintenance items, the time can be reset.
 Press ESC button to "Cancel" or SELECT button to "Yes". When the time is reset, the next service interval and "Time remaining" will be displayed.

If the operator does not replace the engine oil/ filter and resets this value, it turns to zero and then to negative.

# Fuel filter/Water sep





Fuel filter/Water sep

Time remaining: 450h

Reset time remain •

V1137882

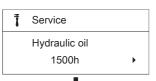
Reset time remaining?
Yes

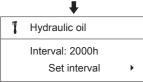
#### ■ Fuel filter/Water sep

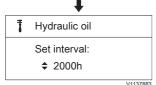
 Interval: This shows the value of fuel filter/ water separator interval with in the unit hours.
 The operator can adjust fuel filter/water separator interval. The setting range is 50 ~ 500 hours.

- Time remaining: This shows the value for remaining time for next fuel filter/water separator service.
  - When the "Time remaining" reaches 40 h, 20 h, and 0 h, the check screen with "Time remaining" and "Interval" will pop up on the IC (Instrument Cluster). Service the maintenance items which should be serviced in that interval. For the service interval and maintenance items, see page *367*.
- Reset time remaining?: After servicing the maintenance items, the time can be reset.
   Press ESC button to "Cancel " or SELECT button to "Yes". When the time is reset, the next service interval and "Time remaining" will be displayed.

If operator does not maintain the parts and reset this value it turns to zero and then to negative.







Hydraulic oil

Time remaining: 1500h

Reset time remain >

V1137884

Reset time remaining?
Yes

Hammer Op hours:
20h

#### ■ Hydraulic oil

 Interval: This shows the value of hydraulic oil interval in the unit hours. The operator can adjust the hydraulic oil interval. The setting range is 100 ~ 5000 hours.

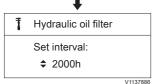
- Time remaining: This shows the value for remaining time to next hydraulic oil service. When the "Time remaining" reaches 40 h, 20 h, and 0 h, the check screen with "Time remaining" and "Interval" will pop up on the IC (Instrument Cluster). Service the maintenance items which should be serviced in that interval. For the service interval and maintenance items, see page 367.
- Reset time remaining?: After servicing the maintenance items, the time can be reset.
   Press ESC button to "Cancel" or SELECT button to "Yes". When the time is reset, the next service interval and "Time remaining" will be displayed.
  - If operator does not maintain the parts and reset this value it turns to zero and then to negative.
- Hammer op. hours: This shows the counted value of hammer operating time in the unit hours. "Hammer op. hours" is not adjustable. It is automatically reset to zero when "Time remaining" is reset and shows the hammer operating hours from the reset point.

# T Service Hydraulic oil filter 1500h

Hydraulic oil filter

Interval: 2000h

Set interval



† Hydraulic oil filter

Time remaining: 1500h

Reset time remain ▶

Reset time remaining?
Yes

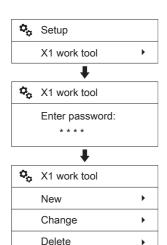
Hydraulic oil filter

Hammer Op hours:
20h

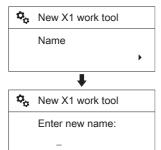
#### ■ Hydraulic oil filter

 Interval: This shows the value of hydraulic oil filter interval in the unit hours. The operator can adjust the hydraulic oil filter interval. The setting range is 100 ~ 2000 hours.

- Time remaining: This shows the value for remaining time to next hydraulic oil filter service.
  - When the "Time remaining" reaches 40 h, 20 h, and 0 h, the check screen with "Time remaining" and "Interval" will pop up on the IC (Instrument Cluster). Service the maintenance items which should be serviced in that interval. For the service interval and maintenance items, see page *367*.
- Reset time remaining?: After servicing the maintenance items, the time can be reset.
   Press ESC button to "Cancel " or SELECT button to "Yes". When the time is reset, the next service interval and "Time remaining" will be displayed.
  - If operator does not maintain the part and reset this value it turns to zero and then to negative.
- Hammer op. hours: This shows the counted value of hammer operating time in the unit hours. "Hammer op. hours" is not adjustable. It is automatically reset to zero when "Time remaining" is reset and shows the hammer operating hours from the reset point.



V1137890



#### 6 Setup

There are sub-items, "X1 work tool", "X3 Operation", "Auto idle time", "Anti-theft system", "Joystick shortkey", "Language", "Units", "Time/date", "Display light", and "Keypad backlight".

#### ■ X1 work tool

This is to preset the X1 setting so that operators can use it simply by selecting the tool from the list.

**Enter password**: Enter the password to proceed with the setting for X1 tools. The password screen is displayed whenever the password is set using Volvo's service tool.

There are 3 sub-items which are,

- New
- Change
- Delete

Use the arrow buttons to place the cursor (highlighting bar) on the required item, and then press the SELECT button.

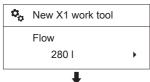
#### New

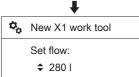
The New setting is used to add new X1 tools. Follow the steps from 1 through 8, described below, to set and "Save" the parameters for the new attachment.

#### NOTE!

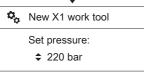
If the "Save" procedure described in 8 is not performed, all settings are cancelled automatically.

- 1 Select "New" after entering "X1 work tool".
- 2 Name: Enter the name of the tool.
- Use the arrow UP and arrow DOWN button to select the characters (A,B...Z,0,1...9).
- Use the SELECT button to enter the selected character.
- Press the SELECT button once again to save the name.
- Use the ESC button to delete the entered character.

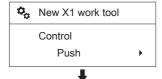


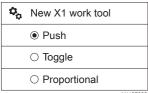






V1137892



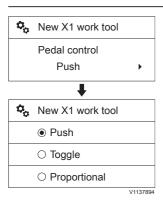


V1137893

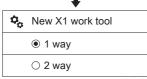
- 3 Flow: Set the flow rate when this optional function is selected.
- Select the preferred flow rate value using the arrow buttons.
- Save the selected value using the SELECT button. Use the ESC button to cancel without saving.
- 4 Pressure: Set the pressure when this optional function is selected.
- Select the preferred pressure value using the arrow buttons.
- Save the selected value using the SELECT button. Use the ESC button to cancel without saving.
- 5 Control: Choose the control type.
- Select the preferred control type using the arrow buttons.
- Save the selected item using the SELECT button. Use ESC button to cancel without saving.

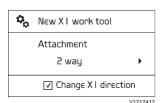
For information on control types, see page 78.

- Push
- Toggle
- Proportional









New X1 work tool

Save

- 6 Pedal control: Choose the pedal control type.
- Select the preferred control type using the arrow buttons.
- Save the selected item using the SELECT button. Use ESC button to cancel without saving.

For information on control types, see page *78*.

- Push
- Toggle
- Proportional
- 7 Attachment: Choose the 1 way or 2 way control.

Select the preferred setting using the arrow buttons. Save the selected item using the SELECT button. Use ESC button to cancel without saving.

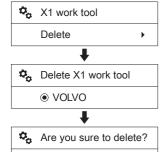
- 1 way
- 2 way: if select the check box , X1 flow direction (operating direction) will be changed.
- 8 Save: Save the setting.
- Select "Save" and press the SELECT button to save all settings including "Name", "Flow", "Pressure", "Control", "Pedal control", and "Attachment".

#### NOTE!

After entering the new settings, the "Save" procedure should be performed to record the new parameters in the system memory. If the "Save" procedure is not performed, all the settings will be cancelled automatically.

- If some items are not set up, the error message "Fill out all items" will appear.
- 9 The added X1 tool is newly listed.





Yes

V1140747

#### Change

This is to modify the setting of preset X1 tools.

- 1 Select "Change" after entering "X1 work tool".
- 2 Select the tool to be modified using the arrow buttons and press the SELECT button.
- 3 Follow the same procedures from 2 to 8 explained in "New" section described above to change the setting.
- 4 There are some restrictions when modifying the setting:
  - The "Name" of two default X1 tools "HAMMER" and "SHEAR" are not modifiable.
  - The "HAMMER" can not be "2-way".
- 5 The modified X1 tool is listed.

#### Delete

Use the arrow buttons to place the cursor (highlighting bar) on the required item, and then press the SELECT button.

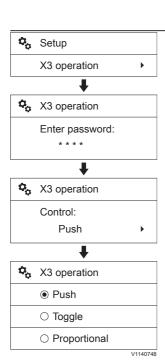
To delete the preset "X1 work tool", proceed as follows:

- 1 Select "Delete" after entering "X1 work tool".
- 2 Select the tool to delete using the arrow buttons and press the SELECT button.

#### NOTE!

Current preset X1 tool and default tools are not displayed.

3 Are you sure to delete?: Confirming message is displayed on the screen, press SELECT button to "Yes" or ESC button to "Cancel".



#### ■ X3 Operation

**Enter password**: Enter the password to proceed with the setting for X3 tools. The password screen is displayed whenever the password is set using Volvo's service tool.

Place the mark at the preferred item from the three listed with the arrow button.

When the SELECT button is pressed, the marked item is set. The screen reverts to the former screen displaying the newly selected item.

Refer to page 78 for more detailed information on control types.

If select the check box  $\sqrt{\ }$ , X3 flow direction (operating direction) will be changed.



V1217413



**\$** 5 s

V1137900

#### ■ Auto idle time

The basic concept of "Auto idle" is to reduce fuel consumption. The engine rpm will be lowered automatically to idle mode, if the Auto idle button is ON and any of control levers (pedals) or engine speed control switch are not operated for a certain time.

The operator can set Auto idle time from 3 seconds to 20 seconds.

■ Anti-theft system: See page 69 for information.



Set joystick shortkey

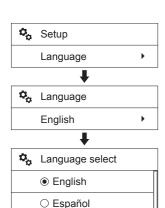
None

Audio mute

Wiper

Camera

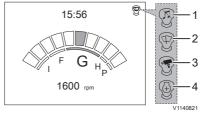
Power max



○ 한국어 ○ Deutsch

V1137903

■ Joystick shortkey: Operator can use a function easily with a button of the left control lever. See page 95 for the position of the button. It also allows selection of a function from 5 different functions. The operator can select a function from 5 different functions with the arrow buttons. When pressing the SELECT button, the marked function is set. The screen reverts to the former screen displaying the name of the newly selected item. Also the selected item is displayed with a symbol on the IC (Instrument Cluster).



- 1 Audio mute
- 2 Wiper
- 3 Camera
- 4 Power max

#### ■ Language

Supported languages are listed in the screen in the form of their own languages.

Use the arrow buttons to scroll up and down to find your specific language. Press the SELECT button to select the chosen language. The screen reverts to the former screen displaying the newly selected language.

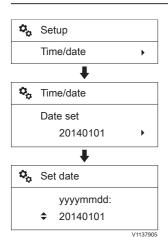


#### ■ Units

Two unit systems are displayed: "Metric" and "US". The operator can select one of the two using the arrow button and save it by pressing SELECT button.

The units stored in the IC (Instrument Cluster) are as follows;

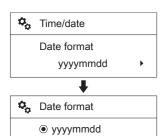
Item	Metric	US
Time	h	h
Fluid rate	l/h	g/h
Volume	L	G
Voltage	٧	V
Current	Α	Α
Temperature	°C	°F
Revolution	rpm	rpm
Speed	km/h	mph
Pressure	bar	psi
Distance	km	mile





12:30

V1137906



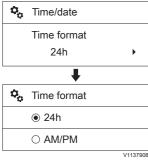
mmddyyyyddmmyyyy

V1137907

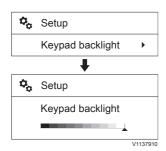
#### ■ Time/Date

 Date set: This is for adjusting the date. The preset date format is shown in the first row of the screen. The operator can adjust the date with arrow, ESC, and SELECT buttons.
 SELECT and ESC buttons are used to move ahead or go back with the cursor. Arrow buttons are used to adjust each segment of the date.

- Time set: This is for adjusting the time. The
  preset clock format is shown in the first row of
  the screen. The operator can adjust the time
  with arrow, ESC, and SELECT buttons.
  SELECT and ESC buttons are used move
  ahead or go back with the cursor. Arrow
  buttons are used to adjust each segment of the
  time.
- Date format: The items "yyyymmdd",
   "mmddyyyy", and "ddmmyyyy" decide how the
   IC (Instrument Cluster) shows the date. "yyyy"
   means year, "mm" means month, and "dd"
   means day.







 Time format: The items "24h" and "AM/PM" decide how the IC (Instrument Cluster) describes the time, 24-hour-system or 12hour-system.

#### ■ Display light

This is for changing the contrast of the IC (Instrument Cluster). The adjusting bar in the screen is controlled with the arrow buttons and the value is set with the SELECT button. The contrast is independently adjustable for day and night.

#### Contrast (Day/Night)

- When adjusting the "Contrast(Day)", the machine's work lights should be turned off.
- When adjusting the "Contrast(Night)", the machine's work lights should be turned on.

#### ■ Keypad backlight

The brightness of the keypad backlight is changed by the adjustment. The adjusting bar in the screen is controlled with the arrow buttons and the value is set with the SELECT button.

## Instrument panels Oisplay unit

✓ Vehicle messages♦ Engine system



Check at next stop

System failure (Engine system)

Fault Active: Yes Error Code: P203A86 Source: ECM First Event: 20140101

Last Event: 20140101

No. Events: 2

V1137911

#### 7 Vehicle messages

This shows the headlines of messages. There are no errors or warning messages in normal operation.

If an abnormal condition is sensed, then the message will display the specific error/failure. Contact a workshop authorized by Volvo for advice, if needed.

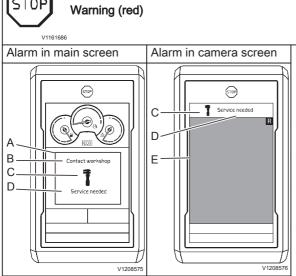
When pressing the SELECT button to view detail information about a headline, the displayed information replaces the whole "main screen".

The information content includes;

- Fault Active
- Error Code
- Source
- First Event
- No. of events
- Last event

#### Alarm texts

The information to the operator is shown in the display unit in the form of alarm texts, which are divided into three classes: Warning, Check and Information.



- This screen is used to warn the operator when the electronic system senses a machine malfunction or a safety related failure.
- The red central warning symbol is shown.
- The buzzer will sound until the required action has been taken.
- The alarm text will be shown until the required action has been taken.
- Check the alarm text in a red box for the cause of the alarm and the required action.
- Very time-critical information/high priority or safety-related procedure.

Immediate action needed.

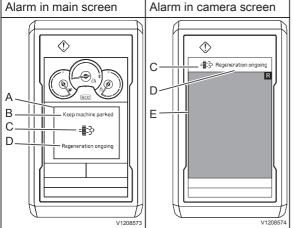
- Stop the machine or operate equipment in a safe way as soon as possible.
- 2 Perform a requested action before any operation.
- 3 Turn off the engine if required.
- Repair if possible or contact a qualified service technician.

- A Information box (red)
- B Text area for action
- C Symbol area (red)
- D Text area for cause or detailed information
- E Camera screen



#### Check (amber)

V116168



- A Information box (amber)
- B Text area for action
- C Symbol area (amber)
- D Text area for cause or detailed information
- E Camera screen

- This screen is used to inform the operator when a partial failure of the machine is detected.
- The amber central caution symbol is shown.
- The buzzer sounds four times.
- Press the SELECT button to obtain more information about the malfunction.
- Alarm text is shown until it is acknowledged by pressing the ESC button.
- Check the alarm text in an amber box for the cause of the alarm and the required action.
- Medium time-critical information/ medium priority.
- Needs to be attention and/or further monitoring is required but it is not necessary to stop the machine immediately.
- Check the machine before next operation. Repair if possible or contact a qualified service technician.



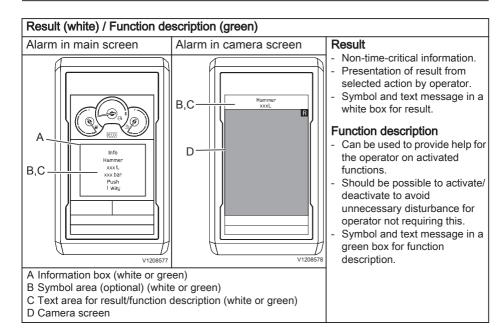
#### Information (blue)

V1161688

# Alarm in main screen Alarm in camera screen C Washer fluid level low Washer fluid level low V1208571 V1208571

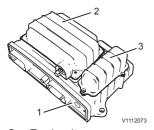
- A Information box (blue)
- B Text area for action
- C Symbol area (blue)
- D Text area for cause or detailed information
- E Camera screen

- This screen is used to give useful information about the machine.
- The blue central information symbol is shown.
- The buzzer sounds twice.
- The alarm text is shown for eight seconds and then changes to the operating display or can be hidden immediately by pressing the ESC button.
- Check the alarm text in a blue box for the cause of the alarm and the required action.
- Low time-critical information/low priority.
- Need to be alerted, but active attention or system monitoring is not required.
- Check the machine before next operation. Repair if possible or contact a qualified service technician.



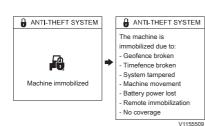
# Exhaust aftertreatment system, alarms requiring special actions

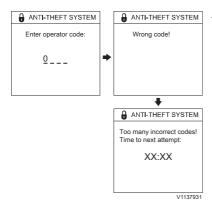
See page 192 for detail.



CareTrack unit

- 1 WFCU
- 2 Satellite modem
- 3 Back-up battery





Enter operator code Wrong code Too many incorrect codes Time to next attempt

#### CareTrack with anti-theft

## CareTrack with anti-theft (optional equipment)

CareTrack with anti-theft function works by WECU, web portal, Volvo's service tool (Tech Tool), GPMECU1, and IC (Instrument Cluster). The anti-theft function is to immobilize the machine according to the following conditions.

- Wrong code alarm
- Geofence broken
- Timefence broken
- System tampered
- Machine movement
- Battery power lost
- Remote immobilization
- No coverage
- ECU tampered

#### Machine immobilized information

This screen is to warn the operator when the machine is immobilized. To get more information about the message on the screen, press the SELECT button. To go back to the previous screen, press the ESC button.

#### Wrong code alarm

- When the machine is turned on, the authorization code display is shown if the anti-theft system is selected as an optional equipment. Wrong code display appears on the IC when the operator or machine owner has entered the wrong code. After 3 inputs of an incorrect code, the authorization will be limited for 5 minutes and a wrong code alarm will send to the CareTrack portal. The default code lock's delay time is 2 minutes and it can be changed with Volvo's service tool.



Enter owner code





#### NOTE!

When the delay time is shown, press and hold the SELECT button to enter the owner code.

- There are 3 levels for authorizing machine operation.
  - Level 1: This is the operator code with 4 digits which are set by the machine owner in IC menu or CareTrack portal.
  - Level 2: This is a machine owner PIN code with 6 digits which are set using Volvo's service tool.
  - Level 3: This is a one-time code with 8 digits which are obtained from the CareTrack portal.

#### Geofence broken

 When the machine owner activates a geofence in the CareTrack portal and the machine is outside the geofence, the geofence broken message will appear on the IC.

- When the machine owner activates a geofence and configures automatic immobilization in the CareTrack portal and the machine is outside the geofence, the geofence broken warning message will appear on the IC and the machine is immobilized at the next stop.
- WECU sends the warning message to the CareTrack portal.
- The warning condition is revoked when the machine is inside the geofence.







Anti-Theft system tampered Immobilization at next stop

1/1155538

#### Timefence broken

- When the machine owner activates a timefence in the CareTrack portal and the machine is outside the timefence, the timefence broken message appears on the IC.
- When the machine owner activates a timefence and configures automatic immobilization in the CareTrack portal and the machine is outside the timefence, the timefence broken warning message appears on the IC and the machine is immobilized at the next stop.
- WECU sends the warning message to the CareTrack portal.
- The warning condition is revoked when the machine is inside the timefence.

#### System tampered

- GPS tampered
  - If the machine lost GPS antenna cable connection, the GPMECU1 informs the operator with the warning message on the IC and activates machine immobilization.
- GSM/3G tampered
  - If someone cuts the GSM/3G antenna, the GPMECU1 informs the operator with the warning message on the IC and activates machine immobilization.
- Open box detection
  - If someone tries to open the WECU enclosure, the GPMECU1 informs the operator with the warning message on the IC and activates machine immobilization.
- SIM card tampered
  - If someone removes or changes the SIM card, the GPMECU1 informs the operator with the warning message on the IC and activates machine immobilization.

#### NOTE!

WECU sends the warning message to the CareTrack portal.



Contact service

ECU

ECU

Electronic sys power lost
Machine will be inoperable

V1137938



Remote immobilization activated by level 3 Immobilization at next stop

V113793



Remote immobilization activated by owner Immobilization at next stop

V1137940

#### Machine movement

- If the machine moves 100 metres without its own power, the WECU detects the machine movement and the machine will be immobilized and WECU sends the warning message to the CareTrack portal.
- After the machine has been immobilized, the warning message will appear on the IC before the authorization code display.
- The machine owner or dealer can mobilize (deimmobilize) the machine with codes for Level 2 and Level 3.

#### **Battery power lost**

- If the WECU is disconnected from battery power cable or detects the battery supply voltage lower than 8 V, the WECU operates on its own internal battery.
- The GPMECU1 activates machine immobilization and the red warning message will appear on the IC.
- WECU sends the warning message to the CareTrack portal.
- The warning condition is revoked when the trigger has disappeared.

#### Remote immobilization

- If dealer (level 3 code owner) requests machine immobilization in the CareTrack portal, the remote immobilization warning message will appear on the IC and the machine is immobilized at the next stop.
- If machine owner requests machine immobilization in the CareTrack portal, the remote immobilization warning message will appear on the IC and the machine is immobilized at the next stop.



V1139554



V1137942



V1139558



V1155510

#### No coverage

- If the WECU has not been connected to the CareTrack portal for the number of days set by Volvo's service tool, the machine will be immobilized.
- The no coverage days warning will appear at every start with number of remaining days set by Volvo's service tool.
- The active trigger and no coverage counter can be reset using a one-time code or Volvo's service tool.
- If the machine gets a connection to the CareTrack portal, the machine will be mobilized (deimmobilized) and the coverage counter is reset.

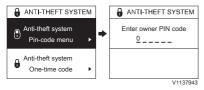
## **ECU** tampered

- When the machine is turned on, the WECU and GPMECU1 check the machine serial number of the other ECUs. If the machine's serial number is different, the GPMECU1 prevents machine start immediately and a warning message will appear on the IC.
- If the WECU is disconnected from key on cable and the machine is turned on, the GPMECU1 prevents machine start immediately and a warning message will appear on the IC.
- The warning condition is revoked when the trigger has disappeared.

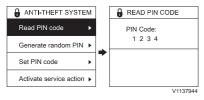
# Anti-theft system, setup menu

This menu is used for setting up the anti-theft system. This menu is divided into two sub-menus as follows

1 **Pin-code menu**: The machine owner's PIN code is required to access this menu. (6 digits)

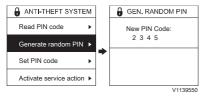


#### Enter owner PIN code



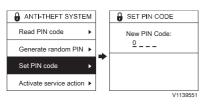
■ Read PIN code: This sub-menu allows the machine owner to read the current PIN code. (4 digits)

#### PIN Code



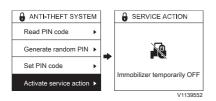
Generate random PIN: This sub-menu allows the machine owner to generate a random PIN code. (4 digits)

#### New PIN Code



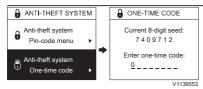
■ Set PIN code: This sub-menu allows the machine owner to set a preferred PIN code. (4 digits)

#### New PIN Code



Immobilizer temporarily OFF

■ Activate service action: This sub-menu is used for activating service actions such as moving the machine, replacing the machine battery and disconnecting the GPS antenna. This disables the anti-theft system except for remote immobilization, no coverage immobilization and machine serial number check, and the WECU informs the CareTrack portal. The anti-theft system will be activated when the ignition is turned on the next time.



Current 8-digit seed Enter one-time code

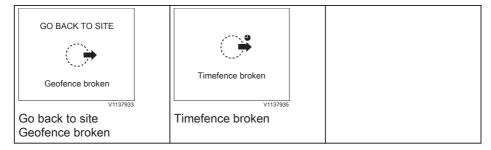
2 One-time code: This is used for setting a one-time code when the machine is immobilized with level 3 remote immobilization or no coverage warning condition.

The machine owner gets the one-time code from the dealer. The dealer gets an 8-digit random code in the CareTrack portal with 8-digit seed (number shown on IC) and machine serial number.

# Alarm texts for anti-theft system

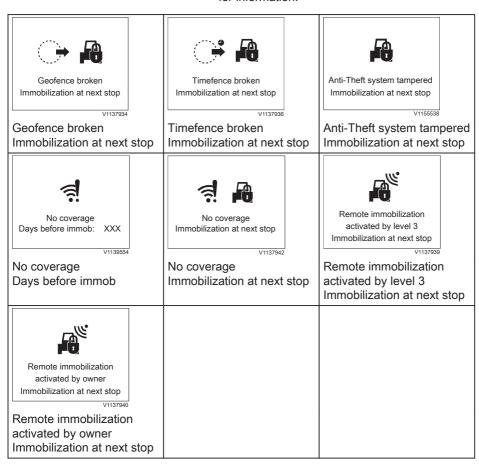
#### Information

- The blue information symbol is shown.
- The buzzer sounds two times.
- Alarm text is shown for seven seconds and then changes to operating display.



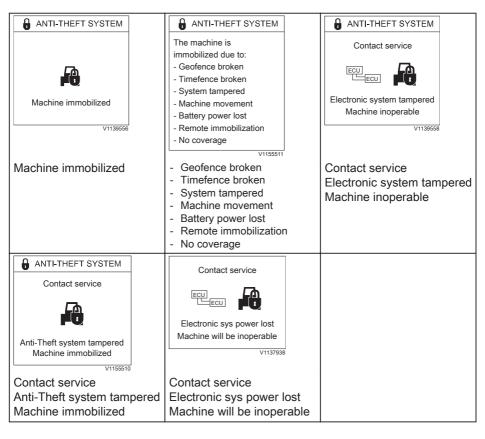
#### Check

- The amber central warning symbol is shown.
- The buzzer sounds four times.
- Press SELECT button to obtain more information about the malfunction.
- Alarm text is shown until confirmation is performed by pressing ESC button.
- Repair or contact a workshop authorized by Volvo for information.

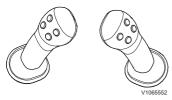


#### Warning

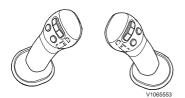
- The red central warning symbol is shown.
- The buzzer will sound until the required action has been performed.
- The alarm text will be shown until the required action has been performed.
- Repair or contact a workshop authorized by Volvo for information.



# New X1 work tool Push Toggle Proportional



Control lever with on/off switch



Control lever with proportional switch

# Control types for X1 and X3 operation

If a machine has a "proportional control option" for X1 or X3, the user can set one of these 3 types. Otherwise the user is only allowed to set one of 2 types that are "Push" or "Toggle". Refer to page 95 for more details on optional levers.

- Push
- Toggle
- Proportional

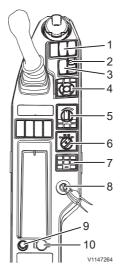
#### Control using on/off switch on the control lever

- 1 Toggle type in the IC (Instrument Cluster) Actuator for X1 or X3 is activated by pressing the on/off switch on the control lever and it will stay active even when the switch is released. The actuator will be deactivated when the same switch is pressed again or the other switch for opposite direction is pressed.
- 2 Push type in the IC (Instrument Cluster) Actuator for X1 or X3 is activated while the on/off switch is pressed (On position). The function will be deactivated when the on/off switch is released.

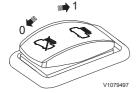
# Control using proportional switch on the control lever

- Toggle and Push-button type in the IC (Instrument Cluster)
  - These controls with proportional switch are similar as the ones with on/off switch but it has a special point to activate the actuator because the proportional switch also has a proportional value.
  - In toggle type, the actuator will be activated by moving the proportional switch to one direction and it will be deactivated when the switch is moved to same direction again or to opposite direction.
- 2 Proportional type in the IC (Instrument Cluster) Actuator for X1 or X3 is activated proportional to the movement of the proportional switch.

# Instrument panel, right



- 1 Air compressor switch (optional equipment)
- 2 Attachment quick coupler switch, right (optional equipment)
- 3 Travel speed switch
- 4 IC (Instrument Cluster) control keypad
- 5 Machine control keypad
- 6 Wiper and washer control switch
- 7 Audio remote control switch with Bluetooth
- 8 Ignition switch
- 9 Cigarette lighter (optional equipment)
- 10 Power socket



# 1 Air compressor switch (optional equipment)

This switch is used to operate the air compressor inside the cab.

- Position 0: Air compressor is OFF
- Position 1: Air compressor is ON

#### NOTE!

The switch is returned automatically.



A Lock device



Unlock quick coupler



Confirm quick coupler is locked

# 2 Attachment quick coupler switch, right (optional equipment)

- Position 0: Attachment quick coupler, lock control
- Position 1: Attachment quick coupler, initiating control

Press down to release the red lock device (A) and then press the switch to position (1) to initiate the attachment quick coupler.

When the attachment quick coupler is initiated, the buzzer sounds and the check message and indicator are displayed on the IC (Instrument Cluster).

#### NOTE!

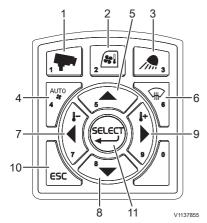
The attachment quick coupler switch for activation on the left instrument panel must be pressed to open the attachment quick coupler. See page 36 for operation.

After installing the attachment quick coupler, press the switch to position (0) to close the attachment quick coupler. When the switch is in position (0), the buzzer sounds and the check message for confirming and indicator are displayed on the IC (Instrument Cluster).

#### NOTE

Press the attachment quick coupler switch on the left instrument panel to confirm that the attachment quick coupler is locked. See page *36* for the operation.





- 1 Camera button
- 2 HVAC control button
- 3 Work lights control button
- 4 HVAC auto-mode select button
- 5 Arrow up button
- 6 Defroster select button
- 7 Arrow left button
- 8 Arrow down button
- 9 Arrow right button
- 10 ESC button
- 11 SELECT button

#### 3 Travel speed switch

- Position 0: Travel at LOW speed only
- Position 1: Travel at LOW or HIGH by automatic shift according to travel condition

#### NOTE!

Stop the machine before selecting a different travel speed. Select "Position 0 (low speed)" for travelling on a slope, on soft ground, in restricted spaces and when the machine is loaded onto or unloaded from a transport vehicle.

#### 4 IC (Instrument Cluster) control keypad

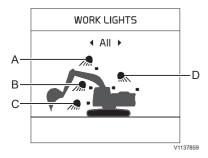
#### 1) Camera button (if installed)

This button is used to control the camera screen in the IC (Instrument Cluster).

- A short press on the camera button shows the camera view with the gauges at the top of the screen.
- A long press on the camera button shows the camera configuration bar. For detailed information about camera control, see page 134.

#### 2) HVAC control button

This button is used to control the HVAC system. See page *118*.



- A Boom work light
- B Cab front light
- C Deck work light
- D Cab rear and counterweight lights

#### 3) Work lights control button

This button is used to control the work lights on the boom, cab, deck, and counterweight.

- Press the button short to turn on or off the work lights. All settings remain if the system is turned off.
- Press and hold in the button to set the work lights.
   Use the arrow buttons to select the required work
   light, and then press the SELECT button on the
   IC control keypad to turn on or off the work light.
   When selecting "All", all work lights are turned on
   or off.

#### 4) HVAC auto-mode select button

This button is used to control the HVAC system. See page *118*.

#### 5) Arrow up button

This button is used to scroll between items and adjust each segment on the screen.

#### 6) Defroster select button

This button is used to activate the defroster. See page 118.

#### 7) Arrow left button

This button is used to move the cursor to the left. Also press the button in order to decrease values.

#### 8) Arrow down button

This button is used to scroll between items and adjust each segment on the screen.

#### 9) Arrow right button

This button is used to move the cursor to the right. Also press the button in order to increase values.

# 10) ESC button

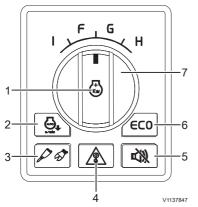
This button is used to go back to the previous screen or to cancel without saving.

The ESC button is also used to turn off the warning

The ESC button is also used to turn off the warning light and sound.

#### 11) Select button

This button is used to confirm the item or setup that the user selects.



- 1 Power max. mode switch
- 2 Auto idle button
- 3 Hammer/Shear button
- 4 Overload warning button
- 5 Travel alarm stop button
- 6 ECO button
- 7 Engine speed/Work mode control switch

# 5 Machine control keypad

#### 1) Power max. mode switch

Press down this switch to activate power maximum mode.

#### At step 9 of the engine speed control switch,

Normal condition = H-mode

Press down the switch = P-mode

If the machine is not operated in P-mode for more than 5 seconds and the auto idle selector switch is activated, the engine speed automatically goes down to idle mode. When the machine is operated again, it returns to P-mode again. In P-mode, it becomes H-mode if step 9 is selected after turning the engine speed control switch to another step.

#### 2) Auto idle button

Auto idle button activates or deactivates "Auto idle" function of the GPMECU1 (General Purpose Machine Electronic Control Unit1).

The engine speed will be reduced automatically to idle in order to reduce fuel consumption if any of control levers, travel levers (pedals) or engine speed control switch are not operated for 5 seconds. If any one of the above is operated, the engine speed returns to the speed set with the engine speed control switch.

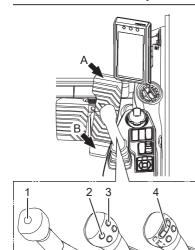
#### 3) Hammer/Shear button

This button is used to activate the hammer/shear function.

#### NOTE!

Select the X1 work tool on the IC (Instrument Cluster), see page *44* for details.

Shortcut function for X1 work tool change in IC By keeping the hammer/shear button (3) for more than 2 seconds, the X1 work tool menu can be opened directly without navigating through the setup menu.



D

# If a pedal is provided with X1 option (hammer/shear)

The pedal should be adjusted if it is used for hammer or shear. Refer to page *95* for details.

- Hammer mode Hammer will work when the pedal is pressed forward (A).
- Shear mode
  Shear will work when the pedal is pressed forward (A) or backward (B).

#### NOTE!

This instruction can be changed according to the types of operating lever. For more information about operating levers, see page *95*.

#### If control lever with one button (C) is installed

■ Hammer mode Hammer will work when button (1) is pressed.

#### NOTE!

When the hammer/shear function is not activated if this button is pressed, the power boost will be activated.

# If control lever with four buttons (D) is installed

■ Hammer mode Hammer will work when button (2) is pressed.

#### NOTE!

There will be no response when button (3) is pressed.

■ Shear mode Shear will work when button (2) or (3) is pressed.

# If control lever with proportional switch (E) is installed

Hammer mode Hammer will work when proportional switch (4) is moved to left side.

#### NOTE

There will be no response when the proportional switch is moved to right side.

Shear mode Shear will work when proportional switch (4) is moved to left or right side.

#### 4) Overload warning button

Overload warning button activates or deactivates "Overload warning" function. This button is to

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display a symbol and to generate an alarm if the "overload signal" is detected.

- First event of overloading: The pop-up message will be displayed and a warning alarm sounds.
   The warning indicator is also shown on indicator screen. The pop-up message will disappear only when the ESC button is pressed.
- When the event occurs again when operating the machine: A warning alarm sounds and the indicator is shown. When reducing the load, the alarm and indicator will turn off.

#### 5) Travel alarm stop button

Travel alarm stop button is used to activate or deactivate "Travel alarm" function of the GPMECU1 (General Purpose Machine Electronic Control Unit1). "Travel alarm" function is activated whenever the ignition switch is on.

#### NOTE!

When starting the machine travel, the travel alarm always sounds for 5 seconds even though the travel alarm stop function is activated.

#### 6) ECO button

ECO function is a mode for fuel economy when working with the machine.

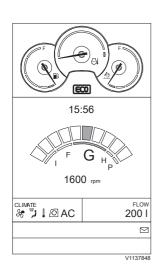
When pressing the ECO button on the keypad, then pump control works for fuel economy. The button will light up and also an ECO symbol is shown on the IC (Instrument Cluster) when activated. Press the button again to disable the function and the button light and symbol on the IC will turn off.

#### NOTE!

When the ignition switch is on, ECO mode is always activated automatically. (except North America region)

#### NOTE!

This mode is only available for P-, H-, G1-, G2-, G3-, and G4-mode of the engine speed/work mode control switch.





## 7) Engine speed/Work mode control switch

Nine (ten in cases where P-mode is used) different throttle positions are available through the control of this switch. Turning this switch, the engine speed will change incrementally. According to the selected engine speed, work mode will be set automatically and setting mode is displayed on the main screen in the front instrument panel.

## North America (normal mode)

Mode		Switc h step	Engine speed (±40 rpm) (no load/load)	Remarks
Heavy	Н	9	2100 / 2000 over	For maximum productivity during hard digging and trenching
General	G1	8	2000 / 1900 over	
	G2	7	1900 / 1800 over	For economical operation during
	G3	6	1800 / 1700 over	general applications
	G4	5	1600 / 1500 over	
Fine	F1	4	1500 / -	For Maximum lifting power and
	F2	3	1400 / -	moderate control
Idle	I1	2	1100 / -	For low idle, warm-up, and high-
	12	1	950 / -	precision operation

# North America (ECO mode)

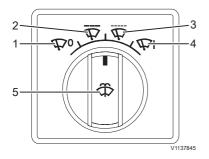
Mode		Switc h step	Engine speed (±40 rpm) (no load/load)	Remarks
Heavy	н	9	2100 / 2000 over	For maximum productivity during hard digging and trenching
General	G1	8	2000 / 1805 over	
	G2	7	1900 / 1710 over	For economical operation during
	G3	6	1800 / 1615 over	general applications
	G4	5	1600 / 1425 over	
Fine	F1	4	1500 / -	For Maximum lifting power and
	F2	3	1400 / -	moderate control
ldle	11	2	1100 / -	For low idle, warm-up, and high-
	12	1	950 / -	precision operation

# Except North America (normal mode)

Mode		Switc h step	Engine speed (±40 rpm) (no load/load)	Remarks
Power max.	Р	9	2100 / 2000 over	For maximum productivity during hard digging and trenching
Heavy	Н		2000 / 1900 over	For moderately hard operations
	G1	8	1900 / 1800 over	
General	G2	7	1800 / 1700 over	For economical operation during
General	G3	6	1700 / 1600 over	general applications
	G4	5	1600 / 1500 over	
Fine	F1	4	1500 / -	For Maximum lifting power and
	F2	3	1400 / -	moderate control
Idle	11	2	1100 / -	For low idle, warm-up, and high-
lule	12	1	950 / -	precision operation

# Except North America (ECO mode)

Mode		Switc h step	Engine speed (±40 rpm) (no load/load)	Remarks
Power max.	Р	9	2100 / 2000 over	For maximum productivity during hard digging and trenching
Heavy	Н		2000 / 1805 over	For moderately hard operations
	G1	8	1900 / 1710 over	
General	G2	7	1800 / 1615 over	For economical operation during
General	G3	6	1700 / 1520 over	general applications
	G4	5	1600 / 1425 over	
Fine	F1	4	1500 / -	For Maximum lifting power and
FILLE	F2	3	1400 / -	moderate control
Idle	I1	2	1100 / -	For low idle, warm-up, and high-
lule	12	1	950 / -	precision operation



# 6 Wiper and washer control switch

Turn the wiper and washer control switch to the desired position.

- 1) Wiper off
- 2) Wiper interval 1: After one operation, off for 5 seconds
- 3) Wiper interval 2: After one operation, off for 2 seconds
- 4) Wiper continuous
- **5) Washer:** Press down this switch to work the washer

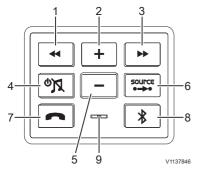
# NOTICE

Do not keep the washer switch pressed in for more than 20 seconds. Do not use the washer, if the reservoir for washer fluid is empty.

#### NOTE!

When using the joystick shortkey;

- Press the joystick shortkey button briefly on the left control lever for the wiper operation.
- Keep pressing the button for the wiper and washer operation.



- 1 Auto-select channel button (downward)
- Music select button (backward)
  2 Volume up button
- 3 Auto-select channel button (upward) Music select button (forward)
- 4 Power on/off, Mute toggle button
- 5 Volume down button
- 6 Source change button
- 7 Call button
- 8 Bluetooth button
- 9 Call mic

# 7 Audio remote control switch with Bluetooth

#### 1) Auto-select channel button (downward)

Press the button to search channels automatically. It searches the lower frequencies automatically and stops at a receivable frequency.

#### Music select button (backward)

It selects the previous song in the play list in your mobile phone.

When music plays for more than 1 second, it turns back to the start of the song, and if you press the button again, it returns to the previous song.

#### 2) Volume up button

Press the button to increase the volume. Keep pressing it to increase volume gradually.

## 3) Auto-select channel button (upward)

Press the button to search channels automatically. It searches the higher frequencies automatically and stops at a receivable frequency.

#### Music select button (forward)

It selects the next song in the play list in your mobile phone.

#### 4) Power on/off, Mute toggle button

Press the button to turn On/Off the audio power and to change between Mute/Output.

- Press shortly → Mute/Press shortly → Unmute
- Keep pressing the button → Power off

#### 5) Volume down button

Press the button to reduce volume. Keep pressing it to reduce the volume gradually.

# 6) Source change button

By pressing the FM/AM button, the radio starts and radio modes change (RADIO/USB/AUX).

By pressing this button, you can change the source of music played by the audio system. When you press this button in Bluetooth mode, it changes into Connected Audio Control Mode.

#### 7) Call button

Press Bluetooth (connected audio control mode) button for actions related to calls, including calling/hanging up/answering/rejecting.

When the phone rings, this button flashes green, and during a conversation, the light is on with fixed green.

- Not calling: Calling
- In calling: Hanging-up

- Flashing (phone ringing): Answering
- Keep pressing the button while flashing: Rejecting
- Call function of the button above calls the previous number

#### 8) Bluetooth button

When the ignition switch is on, Bluetooth button flashes green automatically for 20 seconds to connect Bluetooth devices. Connect the machine's Bluetooth device with your mobile phone. The machine's device name is shown on your phone as "VOLVO".

By pressing this button, the following functions will work according to the machine's Bluetooth connection status.

- Not connected: Requesting connection to the previously connected device
- Connected: Change to Bluetooth mode

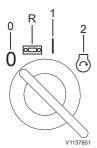
#### NOTE!

When your mobile phone is connected to the machine, Bluetooth button's light is on with fixed green.

Keep pressing the button when connected:
 Disconnect Bluetooth

#### 9) Call mic

When you talk using a hands-free device, you can transmit a voice with this mic.



OFF position (0)
Radio position (R)
Operating (preheating) position (1)
Start position (2)

# 8 Ignition switch

This ignition switch has four positions. Make sure to activate the battery disconnect switch before trying to start engine.

#### OFF position (0)

Turn the ignition switch to position (0) to turn off engine.

#### Radio position (R)

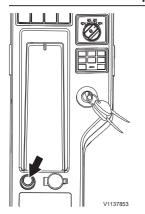
Turn the ignition switch to position (R) to turn on the radio.

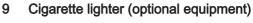
#### Operating (preheating) position (1)

The machine is equipped with an automatic engine preheating system. When the ignition switch is turned to position (1), the vehicle's electronic system will be active, thus activating the automatic engine preheating system.

#### Start position (2)

When the ignition switch is turned to position (2) the starter motor will be engaged to crank the engine, provided that the battery disconnect switch has been activated. The starter motor will not crank as long as the control lockout lever is in unlocked (up) position. Refer to page 111 for details on the control lockout lever.





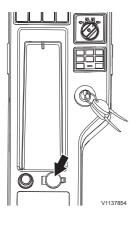
Press it down, and in a few seconds it will return to original position. At this time it is ready to use (24 V).



The voltage in the cigarette lighter socket is 24 V. Therefore, do not connect any 12 V appliances.



This socket is for electrical appliances such as a mobile phone charger. Capacity: under 12 V (10 A)



# Instrument panel, rear



- 1 Power socket
- 2 Service socket
- 3 Audio system (optional equipment)
- 4 Auxiliary heater (optional equipment)

#### 1 Power socket

This socket is for electrical appliances such as a mobile phone charger or refrigerator.

Capacity: 24V (10A)

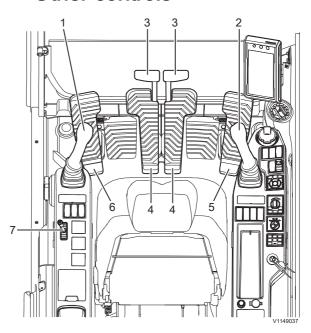
#### 2 Service socket

This socket is for Volvo's service tools (MATRIS and Tech Tool).

**3** Audio system (optional equipment) See page *128*.

**4** Auxiliary heater (optional equipment) See page *139*.

# Other controls



1	Left control lever
2	Right control lever
3	Travel levers
4	Travel pedals
5	Optional pedal (X1)
6	Optional pedal (Straight travel) Optional pedal (Variable adjustable boom)
7	Dozer blade lever

The control levers of this machine is set from factory to operate in ISO/SAE standard operating pattern for optimum machine performance.

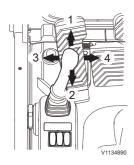
Some machines may have the optional pattern change valve. Refer to page *95* for more details.

On machines equipped with the optional pattern change valve, the indicator of chosen pattern will be shown on the IC (Instrument Cluster).

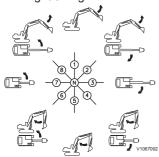
# **Controls**

#### 1 Left control lever

This lever is for swing superstructure and moving dipper arm.



- 1 Dipper arm out
- 2 Dipper arm in
- 3 Left swing
- 4 Right swing



- N Neutral (superstructure and dipper arm in neutral position)
- 1 Dipper arm out
- 2 Dipper arm out and swing superstructure right
- 3 Swing superstructure right
- 4 Dipper arm in and swing superstructure right
- 5 Dipper arm in
- 6 Dipper arm in and swing superstructure left
- 7 Swing superstructure left
- 8 Dipper arm out and swing superstructure left

2

Right control lever

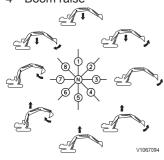
This lever is for moving boom and bucket.



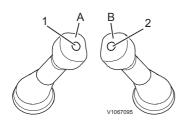
Bucket in Bucket out

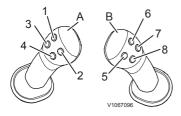
1

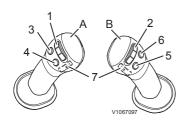
- Boom lower
- Boom raise



- N Neutral (boom and bucket are maintained at rest position)
- Lower boom
- 2 Lower boom and bucket out
- 3 Bucket out
- 4 Raise boom and bucket out
- 5 Raise boom
- 6 Raise boom and bucket in
- 7 Bucket in
- 8 Lower boom and bucket in







#### Control lever with one button

- A Left operating lever
- B Right operating lever
- 1 Horn button
- 2 Boost/hammer button

#### NOTE!

When the hammer select switch is activated, the boost function does not work.

#### Control lever with four buttons

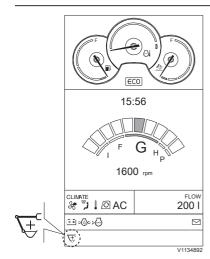
- A Left operating lever
- B Right operating lever
- 1 Rotator button (X3) Clockwise rotation
- 2 Rotator button (X3)
  Counterclockwise rotation
- 3 Horn button
- 4 Joystick shortkey button
- 5 X1 hammer button or
  - X1 shear close
- 6 X1 unassigned or
  - X1 shear open
- 7 Float button
- 8 Boost button

# Control lever with three buttons and proportional switch

- A Left operating lever
- B Right operating lever
- 1 Proportional switch for X3 (rotator)
  - Left clockwise rotation
  - Right counterclockwise rotation
- 2 Proportional switch for X1 (hammer/shear) Left - shear close
  - Right shear open
- 3 Horn button
- 4 Joystick shortkey button
- 5 Boost button
- 6 Float button
- 7 Unassigned

#### NOTE!

Before operating the control levers for X1 or X3 operation, make sure to read and understand the different control types for the different buttons and switches, refer to page 78 for details.



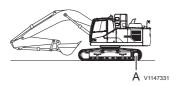
Indicator for power boost

#### Power boost function

The power boost is designed to increase dipper arm / bucket forces, and lifting capacities. When digging in P, H or G modes in extremely hard digging conditions, it is recommended to press the power boost button before starting the digging cycle.

Digging force will be increased for 9 seconds, which is sufficient time for the operator to load the bucket. After the 9-second period, the power boost is turned off automatically.

The power boost indicator is shown on the indicator screen of IC (Instrument Cluster) whenever it is activated. In F-mode, the power boost is activated continuously for maximum lifting capacity.



A Sprocket

#### 3 Travel levers

## 4 Travel pedals

These are used to move and stop the machine.

# NOTICE

In this Operator's Manual front, forward, rear, rearward, right and left are based on the premiss that the sprockets are placed behind the cab. Pay attention to this before control levers and pedals are used.

If you want to travel the machine continuously, keep in mind below operating conditions.

Ground conditions	Operation	
Flat, normal or soft soil	Do not travel continuously for more than 2 hours. If you want to travel for more than 2 hours at high speed, stop for more than 20 minutes. Otherwise, track rollers and idlers could be overheated and lead to oil leakage.	
	NOTE! Travel the machine to forward direction (to idler side) to reduce wear to moving parts of the undercarriage.	
Uneven or tough soil (mixed of gravels, stones, boulders, other obstacles or on a slope)	Travel the machine at low speed and do not travel continuously for more than 1 hour. If you want to travel for more than 1 hour, stop for more than 20 minutes. Otherwise, track rollers and idlers could be overheated and lead to oil leakage.	
	NOTE! Travel the machine to forward direction (to idler side) to reduce wear to moving parts of the undercarriage.	



#### N Neutral (machine stops)

- 1 Forward Push the lever forward or press down front end of the pedal to advance the machine, when the sprocket is at the rear of the machine.
- 2 Reverse Pull the lever rearward or press down rear end of the pedal to reverse the machine, when the sprocket is at the rear of the machine.

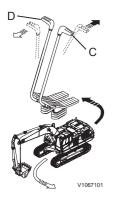
#### NOTE!

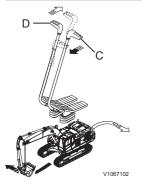
When the sprockets are at the front side of the machine, the machine will be moved to the opposite direction as to above.

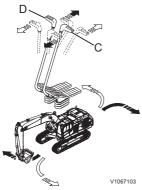
- The distance the travel levers/pedals are pulled or pushed determines the travel speed of the machine. That is, if the levers/pedals are pushed or pulled fully, the machine will travel at the maximum speed, provided that the high travel speed has been selected and the engine RPM is at full throttle position.
- The machine brakes are engaged automatically when the travel controls are moved to the neutral position. To reduce the travel speed, slowly return the travel controls to the center (neutral) position.
- In cold weather, the travel function may be heavier than normal due to the oil viscosity.

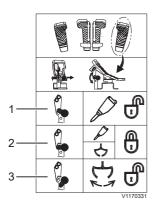
#### Left turn

- 1 When the sprockets are at the rear side of the machine Push the right lever (D) forward, the RH track rotates forward and the machine travels forward as it turns to the left.
  Pull the left lever (C) backward, the LH track rotates in reverse and the machine travels backward as it turns to the left.
- When the sprocket is at the front side of the machine Operate levers (C or D) in the opposite direction as to above.









#### Right turn

1 When the sprockets are at the rear side of the machine

Push the left lever (C) forward, the L/H track rotates forward and the machine travels forward as it turns to the right.

Pull the right lever (D) backward, the R/H track rotates in reverse and the machine travels backward as it turns to the right.

When the sprocket is at the front side of the machine Operate levers (C or D) in the opposite direction as to above.

#### Spin turn

1 When the sprockets are at the rear side of the machine

Pull the left lever (C) backward, the L/H track rotates in reverse; simultaneously push right lever (D) forward, the R/H track rotates forward and the machine turns on the spot quickly to the left

Pull the right lever (D) backward, the R/H track rotates in reverse; simultaneously push left lever (C) forward, the L/H track rotates forward and the machine turns on the spot quickly to the right.

When the sprocket is at the front side of the machine

Operate levers (C or D) in the opposite direction as to above.

# 5 Optional pedal (X1)

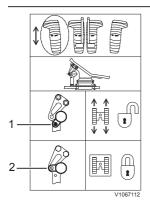
Position 1: Operating hammer

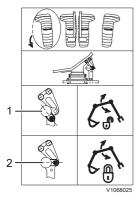
Position 2: Lock the pedal

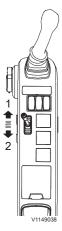
Position 3: Operating shear or crusher

# NOTICE

Make sure that the pedal is in locked position when it is not used in order to prevent unwanted manoeuvres.







# 6 Optional pedal (straight travel)

Position 1: Operating straight travel

Position 2: Lock the pedal

# NOTICE

Make sure that the pedal is in locked position when it is not used in order to prevent unwanted manoeuvres.

# Optional pedal (Variable adjustable boom)

Position 1: Operating variable adjustable boom

Position 2: Lock the pedal

# NOTICE

Make sure that the pedal is in locked position when it is not used in order to prevent unwanted manoeuvres.

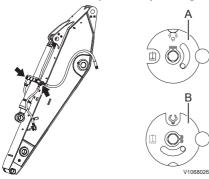
# 7 Dozer blade lever (optional equipment)

Position 1: Dozer blade lower Position 2: Dozer blade raise

# **Optional parts**

#### Bucket/grapple valve position

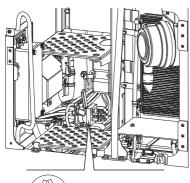
Select the correct position by turning the nut with a wrench.

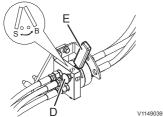


A Bucket position B Grapple position

#### Changing control pattern of the machine (optional equipment)

Position S: ISO/SAE typePosition B: Backhoe loader type







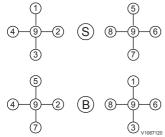
Risk of serious accidents.

Unfamiliar control patterns could cause confusion and accidents resulting in serious injury.

Use extreme caution when using the control levers after changing the control pattern and until you become familiar with the new pattern.

# NOTICE

Selected control pattern is shown on the front instrument panel. It is important to check this before using the machine.

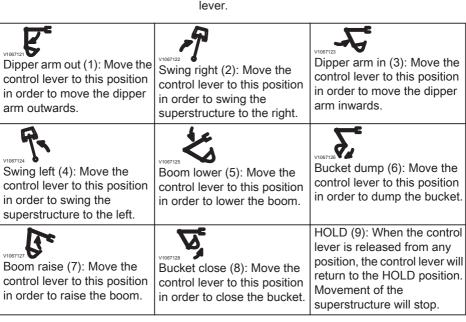


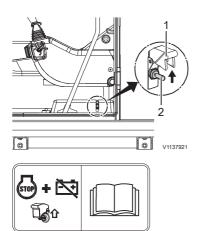
The machine control pattern can easily be changed to the ISO/SAE system or to the backhoe loader hydraulic system by changing the position of pattern change valve (if fitted).

Use the following procedure to change the position of the pattern change valve (The standard position of machine is ISO/SAE pattern type (S).

- 1 Pull the knob (D) down and move the lever (E) to S (ISO/SAE type) position or to the B (Backhoe loader type) position by turning.
- 2 After you set the machine control pattern, release the knob.

The patterns on the left side of the illustration show the possible configurations for the left control lever. The patterns on the right side of the illustration show the possible configurations for the right control lever





# **Emergency stop switch**

#### NOTE!

Emergency stop switch must be used only in case of emergency situation.

If it is abused or misused by the operator, it could cause serious failure of the engine and machine. Never use the emergency stop switch for the purpose of shutting off the normal machine.

Turn the ignition switch to the OFF position. If the engine does not stop or in emergency, perform the following procedure.

■ Open cover (1) and push switch (2) upward to stop the engine.

#### NOTE!

This switch turns off the engine as well as the battery disconnect switch at the same time.

■ Return the switch to the original position. The engine will be enabled to start.

#### NOTE!

Do not operate the machine again until the malfunction has been corrected.

# Cab

# **ROPS (Roll Over Protective Structure)**

The cab is designed to ensure minimum crash protection space according to ROPS standard for excavator (ISO12117-2:2008).

The installation of any additional equipments resulting in exceeding maximum tested machine weight on a ROPS identification plate, may void ROPS certification.

Do not jump out of cab if the machine should roll over. Keep stay in seat wearing seat belt. If any part of the cab's protective structure is affected by plastic deformation or failures, the cab shall be replaced immediately.

#### NOTE!

Never carry out any unauthorized alterations to the cab, for example lowering the roof height, drilling, welding on brackets for fire extinguisher, radio aerial or other equipment, without first having discussed the alteration with personnel at the Volvo Engineering Department. This department will decide whether the alteration may cause the approval to become void.

It is important that all parties concerned are aware of these regulations.

# Protection from falling or scattering materials (optional equipment)

Install the necessary protection guards according to working conditions where falling or scattering materials are capable of entering the operator's cab.

## FOG (Falling Object Guard) and FOPS (Falling Object Protective Structure)

FOG and FOPS should be adopted when the machine is expected to work in an area where materials are capable of falling to the cab. Especially, in mining applications, FOG shall be adopted.

#### Safety net

Install safety net to minimize the possibility of breaking windshield when working with a breaker.

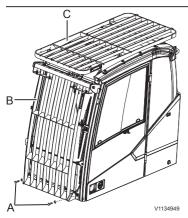
The above recommendations are based on standard working, install the necessary additional protection guards in accordance with job site conditions and local government regulations. Contact authorized Volvo dealer to meet local regulations.

Any damage can affect the strength of the structure. Contact a qualified service technician for repairing safety structure after damage.

Prevent persons from entering or remaining in the dangerous area.

#### NOTICE

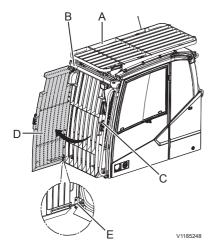
Check the clearance between bucket and cab or spill guard by carefully moving the bucket as close to the cab as possible. The risk of the bucket knocking against the cab is greater if attachment quick coupler is used or if the bucket is provided with lifting eyes.



#### A Screws B+C FOG C FOPS

#### Windshield with FOG (tilting type), cleaning

- 1 Remove the screws (A), and then tilt the FOG.
- Clean the windshield.
- 3 Fasten the screws (A) with regulated torque by pushing the FOG. (48 ± 4.9 Nm / 4.9 ± 0.5 kgfm / 35.5 ± 3.6 lbf ft)
  Do not operate the machine while FOG (Falling Object Guard) is tilted. Otherwise, FOG can be damaged by the bucket.



#### Windshield with FOG (hinge type), cleaning

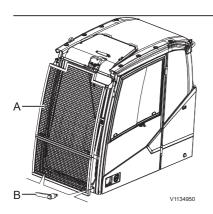
- 1 Pull handle (C) to open front guard (D).
- 2 Hang stopper (E) in a hole to lock the front guard.
- 3 Clean the windshield.

#### NOTE!

Do not operate the machine while the front guard is opened. Otherwise, the front guard can be damaged by the bucket.

A FOPS
A+B FOG
C Handle
D Front guard
E Stopper

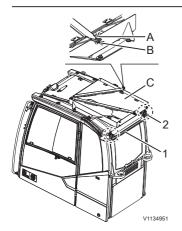




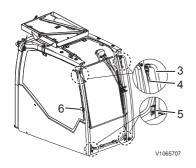
- Α Safety net
- Handle В

#### Windshield with safety net, cleaning

- 1 Remove the handle (B), and then take away the safety net.
- 2 Clean the windshield.
- 3 Install the safety net.
- 4 Fasten the handle (B) by pushing the safety net.



- A Wing nut
- B Pin
- C Covers
- 1 Rear bracket
- 2 Rear handrail



- 3 Front handrail
- 4 Front brackets
- 5 Lower brackets
- 6 Side bracket

#### Anti-vandal kit (optional equipment)

#### NOTE!

Clean mud, grease, oil, and debris from track surface, steps, walkways, and working platforms before installing the anti-vandalism covers.

Anti-vandal covers are stored on the cab. The wing nut (A) should be tightened and the pin (B) should also be in right position not to be loosen when operating the machine.

Six brackets are needed to install the covers.

- To install the rear bracket (1), remove the rear handrail (2) and reinstall it with rear bracket.
- Install two front brackets (4). For right side of front bracket, remove the front handrail (3) and reinstall it with front bracket.
- Install two lower brackets (5).
- Install the side bracket (6).

#### Tightening torque:

(1):  $24 \pm 2.4$  Nm /  $2.5 \pm 0.3$  kgf m /  $17.8 \pm 1.8$  lbf ft (2):  $85 \pm 8.8$  Nm /  $8.7 \pm 0.9$  kgf m /  $62.9 \pm 6.5$  lbf ft (3),(4),(5):  $48 \pm 4.9$  Nm /  $4.9 \pm 0.5$  kgf m /  $35.5 \pm 3.6$  lbf ft

(6):  $10 \pm 1.0 \text{ Nm} / 1.0 \pm 0.1 \text{ kgf m} / 7.4 \pm 0.7 \text{ lbf ft}$ 

#### NOTE!

When storing the covers (C), make sure that the locking screws do not cause interference between covers.

#### Control lockout system



Risk of serious injury.

Uncontrolled touch of control lever can cause unexpected movement of machine or parts. This could result in serious injury.

Always lock the control lockout lever before starting the engine or before leaving the operator's seat.

#### Unlocked position (A)

The control lockout lever is in **"Unlocked"** position (A) for working and travelling operations.

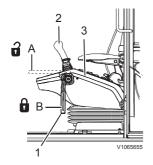
When the control lockout lever is in this position the engine can not be started.

#### Locked position (B)

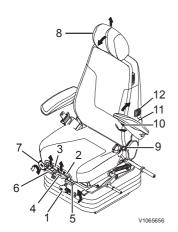
The control lockout lever is used to lock out the attachment, swing and travel unit.

Place this lever on the left control console to **"Locked"** position (B) to lock out the hydraulic control levers and pedals.

When the control lockout lever is in this position the engine can be started.



- 1 Control lockout lever
- 2 Left control lever
- 3 Left control console
- A Unlocked position
- B Locked position



- 1 Weight adjustment
- 2 Fore & aft adjustment, seat cushion
- 3 Angle adjustment, seat cushion
- 4 Horizontal adjustment, top seat
- 5 Horizontal adjustment, top seat and consoles
- 6 X-Isolator adjustment (optional equipment)
- 7 Height adjustment, consoles
- 8 Headrest adjustment
- 9 Backrest angle adjustment
- 10 Armrest adjustment
- 11 Lumbar support adjustment
- 12 Seat heating switch (optional equipment)

#### Operator comfort

#### Operator seat

The operator seat meets the requirements according to EN ISO7096. The operator seat is designed to provide maximum comfort and reduce vibration to the operator during normal machine operation.

#### NOTE!

Adjusting the seat should always be done when the machine is stationary.

#### NOTE!

Make sure that no objects are placed within the moving area of the operator's seat.



Risk of serious injury.

Uncontrolled touch of control lever can cause unexpected movement of machine or parts. This could result in serious injury.

Always lock the control lockout lever before starting the engine or before leaving the operator's seat.

#### NOTICE

Installation and maintenance of the operator seat may only be carried out by authorised and competent personnel.

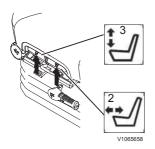
#### NOTICE

To obtain maximum comfort and eliminate the risk of accidents, you must make sure that all seat adjustments have been carried out correctly before starting the machine.

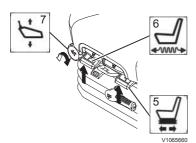
#### NOTE!

The seat is intended for use by one seated occupant only.

A Ride indicator







#### Mechanical suspension seat

#### 1 Weight adjustment

Adjust the seat to the drivers weight by turning the weight adjusting handle. The set weight should be within the green zone of the ride indicator.

#### 2 Fore & aft adjustment, seat cushion

Lift the lever (2) and adjust the seat cushion fore & aft.

#### 3 Angle adjustment, seat cushion

Lift the lever (3) and adjust the angle of the seat cushion. It may be necessary to reduce occupant pressure on the seat cushion when performing this adjustment.

#### 4 Horizontal adjustment, top seat

It is possible to move the seat forwards and backwards relative to the control consoles. Lift the handle (4) and move the seat so that the consoles are in the desired position relative to the seat. The locking lever must latch in the desired position. It should not be possible to move the seat into another position when it is locked.

#### 5 Horizontal adjustment, top seat and consoles

The seat and the consoles can be adjusted forwards and backwards. Lift the lever (5) and move the seat and consoles to the desired position. The locking lever must latch in the desired position. It should not be possible to move the seat into another position when it is locked.

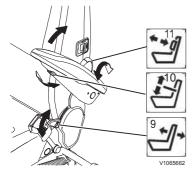
#### 6 X-Isolator adjustment (optional equipment)

It is possible to adjust the seat to provide fore and aft isolation. It can be used to reduce fore and aft shocks of the seat. Lift the lever (6) to activate the isolator, push down to deactivate this adjustment.

#### 7 Height adjustment, consoles

Rotate the handle (7) and adjust the height of the control consoles.







- 0 Seat heating, OFF
- 1 Seat heating, ON

#### 8 Headrest adjustment

The headrest can be adjusted for height by pulling up or down. End stops limit the movement. It can be also adjusted for angle by pushing forwards or backwards. End stops limit the movement.

#### 9 Backrest angle adjustment

Pulling up the control handle (9) releases the backrest latch. The back of the seat can then be reclined backwards or forwards to the desired position. Releasing the handle allows the backrest to move to a latching position.

The locking lever must latch in the desired position. It should not be possible to move the backrest into another position when it is locked.

#### 10 Armrest adjustment

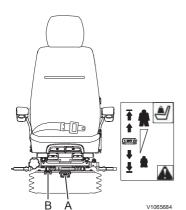
Inclination of the armrest can be changed by turning the adjustment knob (10) mounted on the underside of the armrest. The armrests can be manually tipped up if required.

#### 11 Lumbar support adjustment

Rotate the knob (11) in the direction of the arrow to increase the amount of lumbar support (five positions). Further rotation in the same direction causes the lumbar support to return to minimum.

#### 12 Seat heating switch (optional equipment)

This is used to warm up the operator seat. The seat heating will activate when this switch is in position (1) and the temperature is under 26 °C (79 °F). The seat heating stops when the temperature is up to 36 °C (97 °F), and will activate again when the temperature turns down under 26 °C (79 °F) again.



A Adjusting lever

#### B Ride indicator

#### NOTICE

To reduce the risk of fire the seat heating must be switched off before you leave the seat.

#### Air suspension seat (optional equipment)

The operator seat is also available with air suspension for even better comfort. The adjusting possibilities are the same as for a mechanical suspension seat except adjustment of air suspension.

To adjust air suspension of the seat,

- 1 Turn the ignition switch "ON" or start engine.
- 2 Lift operator's weight off the seat.
- 3 Lift and hold the lever (A) until air bag is completely inflated.
- 4 Sit and push down the lever (A) to deflate.
- 5 Stop deflating when seat starts lowering. The set weight should be within the green zone of the ride indicator.

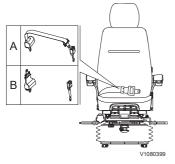
#### NOTE!

After adjusting the suspension with operator's weight, the suspension height should be in the position within suspension stroke.

Seat belt telltale - 2 points type



Seat belt telltale - 3 points type



A Retractable type (2 inches) B Retractable type (3 inches)

#### Seat belt



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 seat belt is critical to operator safety and must be worn at all times during machine operation to prevent the operator from being ejected from the cab or the operator platform if the machine rolls over or is involved in an accident. A fastened seat belt also helps the operator to maintain control of the machine if it moves suddenly or in an unexpected way. Failure to wear a seat belt during machine operation could result in serious injury or death. The seat belt is intended for one adult only. Keep the belt rolled up when not in use.



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.

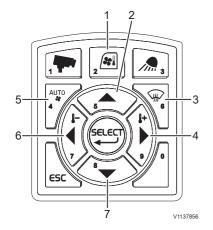
Check the seat belt and associated parts daily. Ensure mounting hardware is tight. Replace the entire seat belt immediately if there is any wear, the webbing is worn, cut, has loose stitching, the belt is deformed or the seat belt retractor does not work. Replace the seat belt if the machine has been involved in an accident where the belt has been subjected to high strain or loading. Inspect mounting hardware. Changes to the belt or its mountings must never be made.

Only clean with warm water, do not use soap or detergent. Let the belt dry while it is fully pulled out before rolling it in.

Volvo Construction Equipment recommends replacing seat belt assemblies every 3 years regardless of appearance.

#### Green light beacon (optional equipment)

To recognize easily about fasten status of seat belt at outside of machine, this option can be installed. Green light beacon is standard in certain markets. Beacon lights up when you wear seat belt.



#### Climate control system

# HVAC system (Heating, Ventilation, Air Conditioning)

The machine can be equipped with different kinds of systems, for example, with air conditioning unit or heater with air conditioning unit. Before operating the system, check the detailed information for your machine.

#### 1) HVAC control button

- Press the button briefly to turn on/off the HVAC system. All settings remain if the system is turned off.
- Press and hold in the button to setup the HVAC system.

#### NOTE!

Even if the HVAC system is turned off, when CCM (Climate Control Module) gets an auxiliary heater signal, the CCM turns on the cooling fan setting 1st step in manual mode.

#### 2) Arrow up button

This button is used to scroll between items and adjust each segment on the screen.

#### 3) Defroster select button

Press the button to activate the defroster. Fresh air mode is selected automatically. In auto mode, if this button is pressed, mode shall change to manual mode.

#### NOTE!

After 20 minutes, this setting is automatically returned to the previous mode.

#### 4) Arrow right button

temperature.

This button is used to scroll between items and adjust each segment on the screen.

Press this button in order to increase the

#### 5) HVAC auto-mode select button

This button is used to select the auto-mode for temperature setting. Required temperature can be changed on the setup menu.

#### 6) Arrow left button

This button is used to scroll between items and adjust each segment on the screen. Press this button in order to decrease the temperature.

#### 7) Arrow down button

This button is used to scroll between items and adjust each segment on the screen.

#### **HVAC** setup

Press and hold in the HVAC control button (1) to setup the HVAC system.

#### A) Climate mode selection

This is for selecting climate mode. (auto, manual, or defrost)

Mode selection and fan speed in manual mode are controlled with the arrow left or arrow right button.

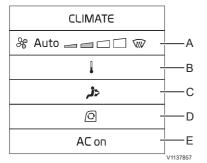
#### B) Temperature control

■ Auto mode: Temperature can be adjusted with the arrow left or arrow right button.

Default setting value is  $22^{\circ}$ C (71.6°F) and the setting range is  $16^{\circ}$ C ~  $32^{\circ}$ C (60.8°F ~  $89.6^{\circ}$ F). If the temperature sensor in cab fails, auto mode shall turn off.

See page 44 for details on how to change the temperature unit from degrees Centigrade to Fahrenheit.

■ Manual mode: Temperature is divided into 8 steps and it can be adjusted with the arrow left or arrow right button. According to the selected step, the temperature will be changed automatically.



#### C) Air flow direction

This is for selecting the direction of the air flow.

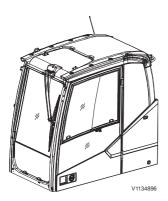
#### D) Air flow circulation

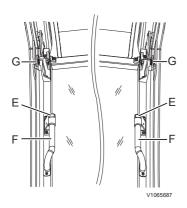
This is for selecting the circulation of the air flow. (recycle the air inside the cab or draw fresh air from the outside into the cab)

When defrost mode is activated, fresh air mode is selected automatically.

#### E) Air conditioner on/off

This is for turning the air conditioner on/off.





#### Windows

#### Front windshield, opening

#### NOTICE

Move the control lockout lever down to its lower position before you open or close the windscreen.

- 1 Lower the attachment to the ground and stop the engine.
- 2 Push both buttons (E) in order to unlatch the windshield from the locked position (G) while holding both grips (F), and then move the windshield upward.

#### NOTE!

Stop lifting as soon as the windshield is unlatched.

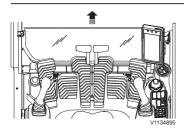
3 Hold both grips (F) only and pull the windshield upward and rearward, and then fix it in the locked position.

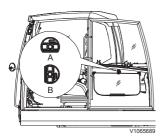
#### NOTE!

If the windscreen is cracked, it must be replaced immediately. Contact a qualified service technician for replacing.

#### Front windshield, closing

- 1 Lower the attachment to the ground and stop the engine.
- 2 Push the both buttons (E) with holding both grips (F) to move the windshield out of the lock position.
- 3 Grip handle (F) only and pull the windshield downward slowly.
- 4 Fix the windshield securely and tighten in the locked position (G).

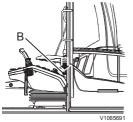




Locking handle for lower window

- A Unlock position
- B Lock position





#### Lower window, removing

- 1 Open the front windshield.
- 2 Grip the upper part of lower windshield with both hands and pull it upward.
- 3 Put the removed windshield in the storing position inside the cab door.
- 4 Turn the locking handle to lock position (B).

#### NOTE!

Ensure that the lower windshield is locked correctly in the storing position.

#### NOTE!

Be careful not to drop the windshield when releasing the locking handle.

#### Door

Door lock (A) is used to keep the cab door secure in the open position.

- 1 Push the door against outside of the cab.
- 2 Ensure it is securely fixed to the lock (A)

Press the lever (B) inside the cab to release the door.

# 3 3 V1134898

- 1 Front sun shade
- 2 Roof sun shade
- 3 Rear sun shade

# A B

V1155532

A Rain shield B Sun shield

#### Sun shade

Use the front, roof and rear sun shades to protect from the sun light coming in through windows.

#### Rain shield

#### (optional equipment)

A rain shield prevents rain from falling on the operator's feet when windshield is open.

#### NOTICE

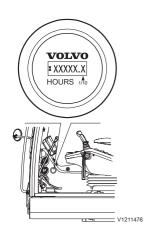
With certain attachment combinations there is a risk that the attachment may strike the cab. Avoid damage by being careful when working close to the machine.

#### Sun shield

#### (optional equipment)

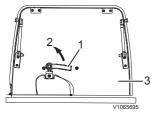
A sun shield on the roof reduces incoming light and heat radiation further.

When installing the sun shield roof, consider other optional equipments, for example, rain shield, antivandal kit and so on.





The hour meter shows the total number of hours the engine has operated. It records the hour only when the engine is running.



- 1 Handle
- 2 Open direction
- 3 Roof hatch

#### Roof

#### Roof hatch, open

- 1 Grip the handle (1) and turn it to open direction (2).
- 2 Open the roof (3).

#### NOTICE

The roof hatch must be securely locked when transporting.

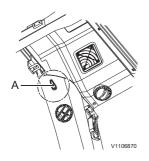
#### NOTE!

Cab with fixed roof hatch is provided as an optional equipment. In this case, there is no handle and gas spring.









#### Storage compartment

A storage compartment is located at the rear side of operator seat.

#### NOTE!

Do not store tools in the storage compartment. This could damage the compartment.

#### Cup and drink holder

Use the cup and drink holder to hold a soft drink can in place.

#### Ashtray (optional equipment)

Pull the top edge of the ashtray (A) in order to open it.

Pull the ashtray upward out of the console when cleaning it.

#### NOTE!

Make sure that you close the ashtray after use in order to prevent any possibility of fire.

#### NOTE!

The ashtray can be put into the cup and drink holder.

#### Coat hook

The coat hooks (A) are inside the cab.

#### NOTE!

Do not hook any item that may obstruct the view of the operator.



#### Operator's manual, storage

Operator's manual storage is located at the backside of seat. Keep the manual in the storage so that it is always at hand.

#### Fire extinguisher, location

#### (optional equipment)

Mount fire extinguisher as follows, Remove two screws inside of caps (1) installed on the rear side in a cab and then install the fire extinguisher.



The cab has two emergency exits, the door and the rear windshield.

Regardless of the rear windshield types, break the glass with the hammer attached on the rear side in a cab.

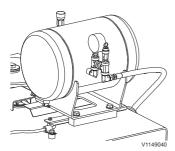


The hammer must not be removed from its position or be used at other occasions than in an emergency situation. If the hammer should be lost, it must be replaced immediately.



There is a knife on the hammer for the emergency exit. Cut off the seat belt with the knife, if the buckle cannot be undone.





Air compressor tank

#### Air compressor

#### (optional equipment)

The air compressor is used primarily to clean the dust from inside the cab, and the engine air cleaner.

1 Press the air compressor switch to ON position to operate the compressor, see page 79.

#### NOTE!

When the tank pressure of the compressor is under 0.74 MPa (7.5 kgf cm<sup>2</sup>) (107 psi), the compressor works. However, when the tank pressure is 0.98 MPa (10 kgf cm<sup>2</sup>) (142 psi) or the motor has run over 20 minutes, the compressor shuts down.

2 Clean out the dust with the air gun.

#### NOTE!

The air gun and hose are stored inside the cab.

#### Caution for operation

Never use compressed air for cleaning clothes or persons.



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.

- Do not touch the surface of compressor while it is running. The case temperature can reach about 130°C.
- Bleed the air in the tank after using the compressor.
- Do not disassemble and modify the compressor.
- Do not use the compressor extensively in humid areas or on rainy days.

#### Audio system

- 1 Radio setting method by region
  - Europe: Press the AM/FM button, and then press preset 6 for 2 seconds.

#### NOTE!

Setting is completed when "EU" message is shown.

■ North America: Press the AM/FM button, and then press preset 1 for 2 seconds.

#### NOTE!

Setting is completed when "NA" message is shown.

■ Others: Press the AM/FM button, and then press preset 5 for 2 seconds.

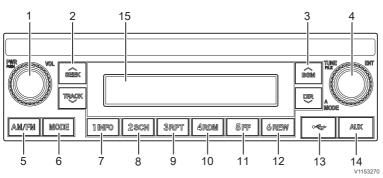
#### NOTE!

Setting is completed when "INT" message is shown.

#### 2 Tuning ranges

	Band	Frequency
Europe	FM	87.50 ~ 108.00 MHz
	AM (MW)	531 ~ 1629 KHz
	LW	144 ~ 288 KHz
North	FM	87.50 ~ 108.00 MHz
America	AM	530 ~ 1710 KHz
Others	FM	87.50 ~ 108.00 MHz
	AM	531 ~ 1629 KHz

# Radio and USB-MP3 Player (optional equipment)



1	Power and Volume	9	Preset 3 / Repeat
2	Seek and Track	10	Preset 4 / Random
3	BSM and DIR	11	Preset 5 / Fast Forward
4	Tune, A mode, and File	12	Preset 6 / Rewind
5	AM / FM	13	USB
6	Mode	14	AUX
7	Preset 1 / Info	15	LCD panel
8	Preset 2 / Scan		

#### ■ Power and Volume setting button (1)

- Power button

Press the power button to turn on the audio system. While the audio is operating, press the button to turn off the power.

- Volume button

Turn the volume button clockwise to increase the volume and counter-clockwise to decrease the volume.

#### ■ SEEK and TRACK button (2)

Broadcast automatically search button (SEEK / TRACK)

The buttons are used to automatically search for broadcasts, pressing the button will automatically search and stop at a frequency with the best reception.

SEEK: Searches frequencies higher than current frequency

TRACK: Searches frequencies lower than current frequency

Track up / down button (SEEK / TRACK)
 While playing a USB-device, press the SEEK
 button to play the beginning of the next song.
 Press the TRACK button to return to the
 beginning of the current song. Press the button
 again to play the beginning of the previous
 song.

#### ■ BSM and DIR button (3)

- Best Station Memory button (BSM)
   Press the BSM button to automatically save frequencies with the best reception in presets (1 INFO ~ 6 REW).
- Directory up / down button (BSM / DIR)
   If there are more than 2 folders in the USB-device, pressing the BSM up / DIR down button will move to the previous or next directory.

   If there are no folders in the USB-device, then pressing the button will move up / down within the folder in 10 file increments.

#### ■ TUNE, A MODE, and FILE button (4)

- Broadcast manual search button (TUNE)
The button is used to search for frequencies
manually, a tune of the SEEK STEP will change
the frequency.

Turn the button clockwise to increase the frequency and counter-clockwise to decrease the frequency.

Sound setting button (A MODE)
 Press the sound setting (A MODE) button to set sound.

Each press of the button will change the sound setting in the following order.

 $\mathsf{BASS} \to \mathsf{MIDDLE} \to \mathsf{TREBLE} \to \mathsf{BALANCE} \to \mathsf{FADER} \to \mathsf{LOUD}$ 

After selecting the desired setting, turn the sound setting (A MODE) button clockwise / counter-clockwise to adjust the sound setting value.

Finding and Playing file (FILE)
 While a USB-device is playing, turn the FILE
 button left / right to find the desired song and press the FILE button to play.

#### ■ Radio select (AM / FM) button (5)

 Each press of the AM / FM button will change the radio mode in the following order.
 FM1 → FM2 → AM → FM1

#### ■ MODE select button (6)

Press the MODE button to change to RADIO / USB / AUX modes.

- USB select button
   While playing a different mode, press the
   MODE button to convert to USB mode.
   Connecting a USB-device to the audio system
   will automatically convert to USB mode even if
   another mode is playing and then songs on the
   USB-device are played automatically.
- AUX select button
   While playing a different mode, press the
   MODE button to convert to AUX mode.
   Connecting your portable media player to the
   audio system will automatically convert to AUX
   mode even if another mode is playing and then
   songs on the portable media player are played
   automatically.
- PRESET buttons (7, 8, 9, 10, 11, and 12)
  Select the preset button (7, 8, 9, 10, 11, and 12)
  to which you want to save the selected
  frequency. Press and hold the preset button.
  The frequency will be saved to the preset button
  to the sound of a beep. The saved frequency
  number will be displayed on the LCD panel.

#### ■ INFO button (7)

Each time the INFO button is pressed, the info on the currently playing song will be displayed in the following order.

File Name → Folder Name → Title Name → Artist Name → Album Name → Play Time

#### ■ Scan and Directory scan button (8)

While music is playing, press briefly on the SCN button to scan each song within the current directory for 10 seconds in sequential order. While music is playing, press and hold the SCN button to scan each song in the USB-device for 10 seconds in sequential order.

#### ■ Repeat and Directory repeat button (9)

While music is playing, press briefly on the RPT button to repeat the currently playing song. Press and hold the RPT button to sequentially repeat all songs within the current directory. (However, for Directory RPT, music files in the USB-device must be saved in directory format.)

#### ■ Random and Directory random button (10)

While music is playing, press briefly on the RDM button to randomly play the songs in the current directory.

While music is playing, press and hold the RDM button to randomly play all songs in the USB-device.

#### ■ Fast forward button (11)

While a USB is operating, press and hold the FF button to fast-forward the song. When fast-forward is complete, the next song will play from the beginning even if you continue holding the button. Pressing the button briefly will not operate FF.

#### ■ Rewind button (12)

While a USB is operating, press and hold the REW button to rewind the song. When rewind is complete, the current song will play from the beginning even if you continue holding the button. Pressing the button briefly will not operate REW.

#### ■ USB-connector (13)

It is the connector for direct connection of a USB-device. Connecting a USB-device to the audio system will play the songs on the USB-device.

#### NOTE!

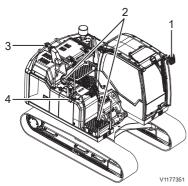
When using an external USB-device, make sure to keep the device disconnected and connect only some time after turning on the vehicle's ignition switch. The USB-device may be damaged if the USB-device already is connected when the ignition switch is turned on. (A USB-device is not an electric automotive part.)

#### ■ AUX-connector (14)

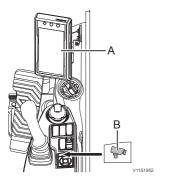
It is the connector for connecting your portable media player using an AUX cable. AUX cable is not supported.

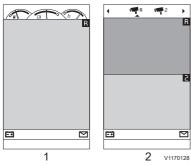
#### NOTE!

The device will not operate when playing a format which is not MP3 or WMA file formats.



Mirrors and cameras (if installed)





- 1 Camera view with gauges
- 2 Camera view with configuration bar

#### Vision system

The machine has a lot of equipment for the operator to minimize visibility hazards. Using this equipment, the operator must always ensure good visibility of the surroundings when operating the machine.

- 1 Left mirror
- 2 Right mirrors

#### NOTE

Right mirrors are used as aids for better visibility.

- 3 Rear-view camera
- 4 Side-view camera

#### NOTE!

Any modifications done to the machine that affect the operator's visibility must be verified by a Volvo dealer.

#### Camera system (if installed)

The camera screen in the IC (Instrument Cluster) (A) is shown if any condition of below is met:

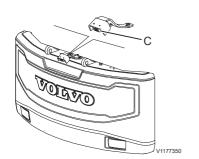
- by pressing the camera button (B) on the keypad or
- when operating any control lever (joystick) / pedal or
- without keypad signal during 10 seconds.
- A short press on the camera button shows the camera view with gauges (1):

This camera view (1) shows the camera screen (depending on the selected configuration) with the fuel level, engine coolant temperature, and AdBlue®/DEF level.

- A long press on the camera button shows the camera view with configuration bar (2):

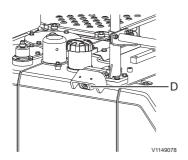
camera view.

camera view with configuration bar (2):
This camera view (2) shows the camera screen with the camera configuration bar at the top.
The camera configuration bar is used to show or hide camera views on the IC (Instrument Cluster).
Press the camera button (B) on the keypad to rotate the camera views clockwise.
Select one of the camera icons and press
SELECT on the keypad to show or hide this



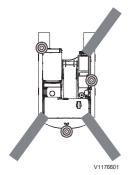
#### Rear-view camera (if installed)

The rear-view camera (C) is installed on top of the counterweight.



#### Side-view camera (if installed)

The side-view camera (D) is installed on the guardrail on the machine's right side.



Camera position Stitching area

#### **Volvo Smart View**

#### (Optional equipment)

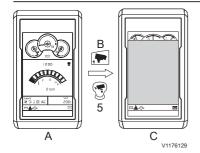
Volvo Smart View (VSV) shows a real-time, overhead view of the machine during operation. This system helps your visibility and to see all angles (360°).

#### NOTE!

Volvo Smart View is a synthetic view which is intended to be used as a convenient vision-assist system. Always check visually around the machine, especially the stitching areas, to be sure.

#### NOTE!

A Volvo dealer may have to perform a VSV-calibration if any installed camera position is changed.



- A Main screen of IC
- B Camera button on keypad
  - Short press: VSV-screen
  - Long press: VSV-configuration
- C Volvo Smart View screen

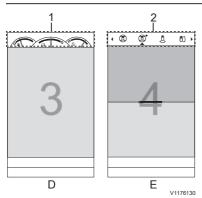
If the camera button (B) or joystick shortkey (5) is pressed briefly: single view is shown according to the view sequence below. Press the button (B) or (5) until the desired view is shown.

Split-view<sup>(1)</sup> → Top view 1 (long range view) → Top view 2 (short range view) → Side mirror view → Rear view → Right side view → Off

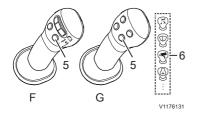
- Top view 1 (long range view): synthetically created allround view generated from the installed cameras. This view could be used for checking objects/people at relatively long distance around the machine.
- Top view 2 (short range view): synthetically created allround view generated from the installed cameras. This view could be used for checking objects/people near the machine
- Side mirror view: Left and right mirror view are also displayed on Top view 1. This view could be used for checking objects/people to the side of the machine (especially stitching areas).
- Rear view: this view is only transmitted by the rear view camera.
- Right side view: this view is only transmitted by the right side view camera.
- Off: turn OFF the VSV-system. Main screen is displayed on IC.

#### NOTE!

Always turn on the camera view(s) when operating the machine. For more information, see page 44 and 134.



D VSV-screen E VSV-configuration screen



#### Shortkey (multifunctions) button (5) on left lever

F Proportional switch type G

Four-button type

### If the camera button (B) is pressed for more than 1

configuration bar (2) is shown. Select two types of views with 4 icons.

#### Split-view setting

(ਿੱ) **Top view 2** (short range view) ↔ (ਿੱ) **Side** mirror view ↔

☐ Rear view ↔ ☐ Right side view

#### NOTE!

The displayed gauges (1) can be different according to machine type.

#### NOTE!

VSV-system supports single view (3) among five views or split-views (4) within Top view 2, Mirror view, Rear view and Right side view.

VSV can be turned ON using the shortkey button (5) if this button is assigned to the camera function (6). For more information about joystick shortkey, see page 44. (MENU --> Setup --> Joystick shortkey —> Camera)

If necessary, an additional camera may be installed according to user need. In this case, the VSVsystem can be turned ON using camera button (B) on the keypad. An additional camera view is only shown using joystick shortkey button (5). (MENU — > Setup —> Joystick shortkey —> Extension camera)

#### NOTE!

According to machine options, an extension camera can not be installed. Contact an authorized Volvo dealer to install an extension camera and for additional information.

#### **Auxiliary heater**

#### (Optional equipment)

Check which of the two auxiliary heater control unit versions is installed in your machine.

The auxiliary heater is used for heating the engine coolant by a fuel combustion unit while the engine is stopped. It consists of the fuel tank, fuel pump, water pump, the timer and the heating unit. The auxiliary heater facilitates the engine start and heating the cab in severe cold weather.

The heated coolant is circulated through the engine block → water pump → auxiliary heater → heater core → engine block.

The auxiliary heater timer can be used to make the necessary settings for operation of the heater.

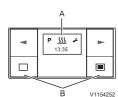
#### **Button functions**

If the display is not lit the timer must be activated. SHORTPRESS on one of the four buttons, the start display appears in the display, then continue with the operation or setting.

All functions can be set and, if necessary, changed with only 4 buttons.

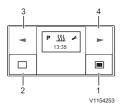
#### 1 Power on / confirm button

- SHORTPRESS button
  - if the display shows OFF → Timer On, the start display appears.
  - A selected function is confirmed.
  - Inputs are confirmed.
- LONGPRESS button: The button must be pressed for longer than 2 seconds.
  - The heater is switched on immediately if On or OFF appears in the display.



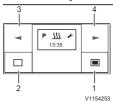
A Display window

B Buttons



- 1 Power on / confirm button
- 2 Power off / cancel / exit setting button
- 3 Backward button
- 4 Forward button

# Other controls Operator comfort



- 1 Power on / confirm button
- 2 Power off / cancel / exit setting button
- 3 Backward button
- 4 Forward button

#### 2 Power off / cancel / exit setting button

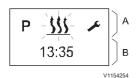
- SHORTPRESS button
  - The displayed, activated function is ended, other activated functions are retained.
  - With each SHORTPRESS the display changes to a next-higher level up to Timer OFF.
  - The start display appears and no function is active: → Timer OFF.
  - Timer is in submenu → the setting is exited, already set values are not saved.
  - If the display shows OFF → Timer On, the start display appears.
- LONGPRESS button: The button must be pressed for longer than 2 seconds.
  - All functions are ended.
  - If the display shows OFF → Timer On, the start display appears.

#### 3 Backward button

- Timer is in the Main menu and the start display appears → in the Menu bar the next, left-hand symbol appears in the middle and flashing.
- Timer is in the submenu →the displayed value is changed (smaller), or the next selection is displayed.
- If the display shows OFF → Timer On, the start display appears.

#### 4 Forward button

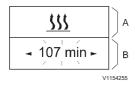
- Timer is in the Main menu and the start display appears → in the Menu bar the next, right-hand symbol appears in the middle and flashing.
- Timer is in the submenu → the displayed value is changed (larger), or the next selection is displayed.
- If the display shows OFF → Timer On, the start display appears.



Main menu

A Menu bar

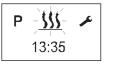
B Status area



Submenu

A Menu bar : activated function

B Input area



V1154256

#### Operation and setting/adjustment

#### Main menu

#### Menu bar

The following menu items can be selected.

Symbol	Function
333	Heating ON / OFF
٦	Settings
P	Program / Preselection

#### Status area

If no menu item is activated, the current time is displayed in the status area.

If a menu item is activated (heating, settings or program / preselection), different information is displayed in the status area.

#### Submenu

In the submenu, the symbol of the selected menu item appears in the middle of the display. The corresponding set value is displayed flashing in the entry area and can be set using the Backward button (3) or Forward button (4) and confirmed with the Confirm button (1).

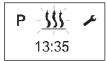
#### Start display after switching ON

if no menu item is activated, the start display appears with a flashing heater symbol in the Menu bar, with the current time in the status area.

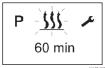
#### Other possible actions are:

- Heating immediately with LONGPRESS button (1).
- Heating on with SHORTPRESS button (1), in addition confirm and set the operating time.
- Select a new menu item.









#### 1 Heating ON / OFF

- Heating immediately with LONGPRESS (without settings)
- 1 Press the LONGPRESS button (1) for longer than 2 seconds.
- 2 Screen shows remaining operating time.
- 3 If LONGPRESS is pressed during heating mode, the display switches to the heating submenu set and set operating time. During heating mode it is possible to switch to another menu item.
- Heating on with SHORTPRESS and with settings
  - 1 Press the SHORTPRESS button (1) for less than 2 seconds.

#### NOTE!

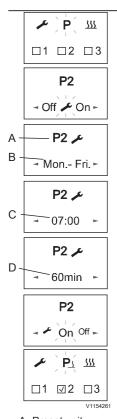
The following settings and confirmations (operating time) are always required.

- 2 If necessary, use the BACKWARD or FORWARD button to set the operating time. Press the confirm button (1) to confirm the operating time.
- Heating OFF
- Press the button (2) for longer than 2 seconds. → all active functions are ended.
- Press the button (2) for less than 2 seconds. → heater OFF.

After the heating off the start display appears. if the vehicle lighting is off the display lighting goes out after 10 seconds.

#### The following actions are possible during the heating off display:

- Use the forward or backward button to select a menu item. Press the SHORTPRESS button (2), the start display appears.
- Press the SHORTPRESS button (1), the heating submenu is displayed.



- A Preset unit
- B Preset day
- C Departure time
- D Operating time

2 General information on programming the preset time

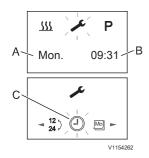
Timer can be used to program 3 preset times. The 3 preset times can either all take place on one weekday or can be distributed between different weekdays. 3 weekday ranges are available to choose from, these can each be started daily with a preset time.

# ■ Weekday ranges:

Day: Once

Sat-Sun: 2x Heating Mon-Fri: 5x Heating Mon-Sun: 7x Heating

- If the system is activated with programmed weekday range, all weekdays are worked through consecutively; after that renewed programming is required.
- If the timer with a programmed weekday range Mon Fri is activated on Wednesday, the heater heats on Thursday and Friday, the heater is not operated on Saturday and Sunday. From Monday to Wednesday of the following week the operation is continued with the set defaults (5x heating). After a weekday range has been worked through renewed programming is required.
- Departure time operating mode (factory setting) Under the following conditions the preselected heating mode is not started on the current day.
  - The current day and the preselected day are identical.
  - The current time lies within the time period, departure time minus operating time.



- A Current day
- B Current time
- C Settings submenu bar

# Example:

Current day / preselected day: Mon

Current time: 06:45
Departure time: 07:00
Operating time: 60 minutes
Duration: 06:00 to 07:00

The current time lies within the time period.

the heater is not switched on.

The program will be run during the next week.

# ■ Program preset times

- 1 Use the backward or forward button to select the Program symbol in the menu bar.
- 2 Confirm the Program menu by pressing the confirm button (1).

If the Program symbol is marked with  $\mathbf{P}_{\underline{3}}$ , a or several program memories is/are already activated.

Activated program memories are marked in the display with a  $\sqrt{\ }$ .

# 3 Settings

This function is for setting current day and time.

- 1 Use the backward or forward button to select the setting symbol in the menu bar.
- 2 Confirm the setting menu by pressing the confirm button.
- 3 Use the backward or forward button to select the submenu which want to change the setting.
- 4 Press the confirm button to confirm the setting value.

# **Error messages**

In the event of a fault the following displays are possible:

Display	Description	Remedy
INIT	- Automatic detection is active.     - The auxiliary heater timer has been disconnected from the power supply and then reconnected.	Wait until the automatic detection has finished, then set the time and weekday.
NO SIGNAL V1154444	- No communication.	Check and if necessary renew the heater fuse. Contact a workshop authorized by Volvo.
P <u>\$\$\$\$</u> Error	- Heater fault.	Contact a workshop authorized by Volvo.
- + V1154447	- Voltage too low.	Charge battery, if necessary contact a workshop authorized by Volvo.

# NOTE!

If you are unable to remedy the error or fault, contact a workshop authorized by Volvo.

# Winter season preparation for auxiliary heater

Operator should exhaust remaining summer diesel in fuel line of auxiliary heater before winter season comes. Remaining summer diesel can cause plugging in fuel line if temperature drops in sudden because of wax crystallization. Run auxiliary heater at least 15 minutes until remaining diesel is exhausted.

When operator runs machine in winter season, it is recommended to fill fuel tank over 70%. If fuel tank has much empty space, it makes moisture inside of fuel tank. It can go to fuel line of auxiliary heater and frozen moisture sometimes makes fuel feeding problem.

# Fuel quality requirements for auxiliary heater

If the heater is run from a separate fuel tank, comply with the following rules.

- If ambient temperatures over 0 °C; Use diesel fuel according to DIN EN 590.
- If ambient temperatures from 0 °C to -20 °C; Use winter diesel fuel according to DIN 590.
- If ambient temperatures from -20 °C to -40 °C; Use Arctic diesel or Polar diesel.

#### NOTE!

- Used oil is not allowed.
- After refuelling with winter or cold diesel or the listed blends, the fuel pipes and the metering pump must be filled with the new fuel by letting the heater run for 15 minutes.
- Volvo does not recommend mixing Kerosene with diesel due to unstable combustion which causes decrease of durability of auxiliary heater and makes bad exhaust gas.
- Volvo recommends to use commercial additives which improve wax crystallization of diesel fuel in cold weather if it is difficult to use Arctic diesel or Polar diesel.

# Operation with bio-diesel fuel

The heater is approved for operation with bio-diesel up to a temperature of -8 °C (the flowability reduces at temperatures below 0 °C).

## NOTE!

- If operated with bio-diesel (100% operation and blends), the heating output of the heater reduces.
- A reduced heater life is to be expected if constantly operated with 100% bio-diesel.
- Standard diesel fuel contains up to 20% biodiesel. This does not have any effect on the life of the heater.

Contact a workshop authorized by Volvo for detailed information.

# **Auxiliary heater**

(Optional equipment)



Risk of fire and explosion.

A running auxiliary heater in the immediate vicinity of flammable gases, fumes, liquids or dust could cause fire and explosion.

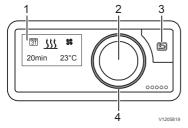
Do not use the auxiliary heater if the machine is in an environment in which flammable gases, fumes, liquids or dust are present or could be present.



Risk of suffocation.

Exhaust fumes from the auxiliary heater contain carbon monoxide, a colorless, odorless gas, which is fatal when inhaled in a confined area.

Do not use the auxiliary heater if the machine is located in enclosed rooms without proper ventilation.



- 1 Display
- 2 Operating button
- 3 BACK button
- 4 LED ring

The auxiliary heater timer is used to select the operation mode, for setting the operating time, for preselecting the starting time and for switching the heater ON or OFF.

#### 1. Display

The display shows the following parameters:

- Current operating mode
- Current interior temperature
- Operating mode
- Timer positions
- Settings
- Error messages

# 2. Operating button

The operating button is used to operate, select and program all the functions and values in the auxiliary heater timer.

**Turning** selects a value/function within a menu.

- Turning to the right increases a value or selects the next menu item to the right.
- Turning to the left decreases a value or selects the next menu item to the left.
- If the timer is in sleep mode (display OFF), pressing or turning "wakes up" the active display mode.
  - If the heater is switched off, the Start mask will be displayed.
- When the heater is running, the currently remaining operating time of the heater is displayed.

#### NOTE!

- A LONGPRESS (minimum 2 seconds) immediately starts the heater. The standard operating time is set at the factory to 30 minutes.
- During operation, a LONGPRESS (minimum 2 seconds) immediately switches off the heater.

#### 3. BACK button

The BACK button causes a jump back to the menu or command at the next higher level. If the timer is in sleep mode (display OFF), pressing "wakes up" the active display mode.

- If the heaters is switched off, the Start mask will be displayed.
- When the heater is running, the currently remaining operating time of the heater is displayed.

# 4. LED ring

The LED ring indicates the different operating modes with different colors.

- Red ring: Heating mode
- Blue ring: Ventilation mode
- Orange ring: Residual heat mode
- White ring: System configuration
- Red flashing ring: Fault in the heater or in the timer.

# Operation and settings

# Activating the timer

If the display is not lit, the timer has to be activated. Pressing the operating button or BACK button displays the Start mask.

## Display

The display is lit:

- During operation of the timer
- When the heater is ON (the display goes out after approx. 30 seconds).

## Display goes out:

- No settings are made.
- No heater is switched on.

The timer then goes to sleep mode. Before going to sleep mode, an overview mask is displayed. The timer has to be activated (see above) before a new input can be made.

# Activating a function

The symbol of the function to be activated appears in the middle and flashes in the display.

Flashing function / flashing value

- Select the flashing function in the menu bar by pressing the operating button.
- Increase or decrease the flashing value by turning the operating button. Then confirm the selected value by pressing the operating button.

# Cancel settings

#### NOTE!

Settings and changes must always be confirmed by pressing the operating button, otherwise they will be lost.

# Setting the operating time

The operating time can be set individually using the operating button.

- Turning to the right increases the operating time.
- Turning to the left decreases the operating time.
- Setting range for the operating time: minimum 10 minutes to maximum 120 minutes in one minute steps.

The operating time can be prolonged to infinite.
 Above the 120th minute, the input is made in 60-minute steps.

# Operating modes

# Heating mode

In this mode, the heater heats the vehicle engine via the coolant circuit and the cab via the HVAC system (Heating, Ventilation, Air Conditioning).

## Ventilation mode

In this mode, the heater supplies the cab with fresh outdoor air via the HVAC system (Heating, Ventilation, Air Conditioning).

#### Residual heat mode

In this mode, the heating system uses the residual heat in the coolant circuit of the warm engine and distributes heated air in the cab.

#### Menus and functions

#### Menu Bar

The following menus can be selected from the menu bar (turn the operating button to the right):

Symbol	Function
333	Heat
33	Ventilate
(1)	Residual heat
*	Settings
31	Timer

#### Status area

When the menu (heating, ventilation, settings, timer or residual heat) is activated, various items of information are displayed in the status area.

# Input area

In the menu bar, the symbol of the selected menu item appears in the middle of the display. The corresponding setting value flashes in the input area and can be altered by turning the operating button to the left or right and confirmed by pressing.

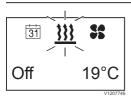


- A Menu bar
- B Status area



Example: Heating ON, operating time 107 minutes

- A Menu bar
- B Input area



Start mask, heating

# **Heating**

In the Start mask, a flashing heater symbol in the menu bar and the current temperature and status of the heater are displayed.

Possible actions are:

- Heating immediately with LONGPRESS
  - Press operating button for longer than 2 seconds.
  - Heating mode starts immediately with the last operating time used. The LED ring lights up red and the residual heating mode time is displayed.

#### NOTE!

The function LONGPRESS ON is not available in ventilation and residual heat mode.

- Heating ON with settings
  - Press the operating button.
  - Select the operating time by turning the operating button.
  - Confirm the operating time by pressing the operating button.
  - Heating mode starts with the set operating time.
     The LED ring lights up red, the residual heating time and the current temperature are displayed.
  - Heating mode ends at the end of the set operating time.

Changing the operating time during heating mode:

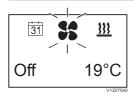
- Press the operating button.
- Select and confirm flashing menu }}.
- Select and confirm the settings by turning and pressing the operating button.
- Set the desired operating time by turning and press to confirm.
- Heating mode is continued with the set operating time. The LED ring lights up red and the residual heating mode time is displayed.

# HEATING OFF during heating mode:

- Press the operating button.
- Select and confirm flashing menu }}.
- When OFF flashes on the display, press the operating button again.
- Heating mode is terminated.

#### NOTE!

LONGPRESS terminates heating mode immediately and the heater is also switched off.



Start mask, ventilation

## Ventilation

In the Start mask, a flashing fan symbol **\$**; in the menu bar and the current temperature and status of the heater are displayed.

- Press the operating button.
- Select the operating time by turning the operating button and confirm, or confirm the displayed operating time.
  - Ventilation mode starts with the set operating time. The LED ring lights up blue and the residual ventilation mode time is displayed.
- Ventilation mode ends at the end of the set operating time.

Changing the operating time during ventilation mode:

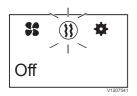
- Press the operating button.
- Select and confirm flashing menu \$\$.
- Select and confirm the settings by turning and pressing the operating button.
- Set the desired operating time by turning and press to confirm.
  - Ventilation mode is continued with the set operating time. The LED ring lights up blue, the residual ventilation mode time and the current temperature are displayed.

Ventilation OFF during ventilation mode:

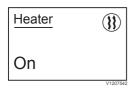
- Press the operating button.
- Select and confirm flashing menu \$\$.
- When OFF flashes on the display, press the operating button again.
- Ventilation mode is terminated.

#### NOTE!

LONGPRESS terminates ventilation mode immediately and the heater is also switched off.



Start mask, residual heat



Residual heat mode ON

## Residual heat mode

In the Start mask, a flashing heater symbol in a circle (1) in the menu bar and the current status of the heater are displayed.

In the residual heat mode, the heating system uses the residual heat in the coolant circuit of the warm engine and distributes heated air in the cab.

In this operating mode, only the water pump and fan are in operation.

#### NOTE!

Residual heat mode cannot be used if the coolant temperature is too low.

#### Residual heat mode ON

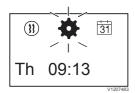
- Press the operating button and select ON.
  - Residual heat mode starts if there is residual heat in the engine coolant.
  - The LED ring lights up orange. The operating time of the heating mode depends on the available residual heat.
  - The operating status and mode of the heater appear on the display.

#### Residual heat mode OFF

- Press the operating button and select OFF.
  - Residual heat mode stops.

## NOTE!

LONGPRESS stops the residual heat mode immediately.



Start mask, settings

# **Settings**

In the Start mask, a flashing gear wheel & in the menu bar and the set day of the week and the current time are displayed.

#### Possible actions are:

- Standard settings for day of the week, time and temperature format
- Heating at high altitudes: ON / OFF
- Low temperature during heating: ON / OFF
- Fault diagnosis: Display of error messages
- Reset user settings

# Standard settings

#### Set time:

- ② Select and confirm.
- Set the hours and confirm.
- Set the minutes and confirm.

#### Set time format:

- 12 Select and confirm.
- Select between 12 h and 24 h format and confirm.

## Set weekday:

- M Select and confirm.
- Set the day of the week and confirm.

# Set temperature format:

- Select and confirm.
- Select between degrees Celsius and degrees Fahrenheit and confirm.

#### Low temperature heating mode

The low temperature heating mode is a comfort function at higher outdoor temperatures.

The function modifies the control thresholds of the heater in order to harmonize heating mode, e.g. in the summer months.

- W Select and confirm.
- Select between ON and OFF and confirm.

# Resetting the user settings

- Select and confirm.
- YES resets the user settings in the timer and deletes the programmed times, date and other settings.
- NO retains the existing user settings in the timer.

#### Timer

The timer selection menu controls up to three programmable timer positions. The timer positions can either all take place on one weekday or can be distributed between different weekdays or weekday ranges.

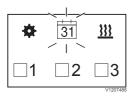
Weekday ranges, e.g. Monday – Friday: 5 x heat Monday – Sunday: 7 x heat

If a programmed weekday range is activated, all the days of the week are processed in turn as long as the timer is active. Renewed programming is not necessary.

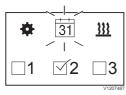
#### NOTE!

- If the timer is activated with a programmed weekday range Monday – Friday on Sunday, the heater heats from the following Monday to Friday with the set defaults. (5x heating)
- If the timer is activated with a programmed weekday range Monday – Friday on Wednesday, the heater heats on Wednesday, Thursday and Friday. In the following week, operation is continued with the set defaults on Monday and Tuesday. (5x heating)
- When a weekday range has been processed, the time position has to be reactivated for the following week.

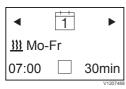
The heater starts on the selected day on reaching the set starting time.



Display if no timer is activated.



Display if a timer is activated, here T2.



T1 with factory settings

# Programming the timer

- Display ON, the Start mask appears.
- Select in the menu bar is with the operating button.

 Confirm timer selection by pressing the operating button.

The first timer position T1 appears. Turn the operating button to select the alternative timer positions T2 or T3.

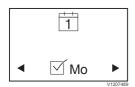
- The factory settings are:
  - Heating mode
  - Weekday range Monday Friday
  - Starting time: 7:00 h
- Operating time: 30 minutes
- Call up timer T1 by pressing the operating button. You are now in configuration mode.

#### NOTE!

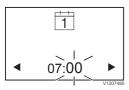
The heater is connected to the battery, the operating time of the heater should not exceed the following working time of the machine. This will ensure that the battery is sufficiently charged.

## Example:

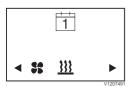
Operating time of the heater: 25 minutes
Working time of the machine: minimum 25 minutes



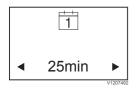
Operating day



Starting time



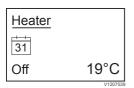
Operating mode



Operating time



T1 settings



Timer activated

## Possible settings

- Timer T1 ON / OFF by turning and pressing the operating button.
- After selecting in the menu bar, select the day of the week / weekday range by turning the operating button.

Each day of the week is selected individually and confirmed by pressing. Pressing a second time deselects the day of the week again.

At the end of the selection, turn the operating button to [OK] and press to confirm.

- Setting the starting time.
   Turning and pressing confirms first the hour, then the minutes.
- Selection of heating or ventilation mode.

- Select the operating time.
   minimum 10 minutes maximum 120 minutes
- After activation of timer T1, the following appears on the display:
  - Heating mode
  - Weekday range Monday Friday
  - Starting time: 6:30 h
  - Operating time: 25 minutes
- Timer T1 is activated. The heater will be started at the set time on the next working day and will run for 25 minutes.
- If a timer is activated, the timer symbol appears on the display.

Timer positions T2 and T3 can be configured in the same way.

#### NOTE!

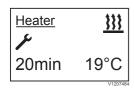
To edit an existing timer, first select the timer and then press the operating button to switch to configuration mode. Then carry out the steps as described above.

#### Deactivate timer

To deactivate a timer position, first select the timer with the operating button. Press once and with OFF flashing, press the operating button again. All operating settings of the timer remain saved.

## NOTE!

When a weekday range has been processed, the time position has to be reactivated for the following week.



# Fault diagnosis

If a fault occurs, the symbol  $\nearrow$  appears on the display during operation.

The LED ring flashes red as soon as a fault occurs. It stops flashing when the error message has been cancelled by pressing the operating button.

Fault diagnosis can also be called up with the function  $\cancel{k}$  in menu .

- Select and confirm.
- Select and confirm the heater or timer.
- The faults are displayed in the order of their occurrence.

Further information see table below.

# Possible error messages on the display

Display	Description	Remedy
1	Fault in the heater.	Contact a qualified service technician.
Service V1205824		
Undervoltage	Undervoltage applied at the heater control box without interruption for at least 20 seconds.	Check battery for a drop in voltage. Charge the battery, if necessary contact a qualified service technician.
Overvoltage V1205826	Overvoltage applied at the heater control box without interruption for at least 20 seconds.	Check battery, if necessary contact a qualified service technician.
Fuel Supply or Pump	Fault in the fuel supply or fuel pump.	Check the fuel line to the heater for free passage. Check cables for continuity, short circuit and damage. Pull the plug off the fuel pump and inspect for damage. Check the fuel level in the fuel tank. Contact a qualified service technician.

Display	Description	Remedy
Water Circuit or Pump	Water temperature in the heater too high.	Check the water pump for proper function. Check the water circulation in the water circuit. The heater can be reset to the delivery condition by removing the heater fuse. Contact a qualified service technician.
Overheat. Heater locked.	Overheating of the heater detected. The heater is interlocked for safety reasons.	Check the heater and the water circuit for leaks. The heater can be reset to the delivery condition by removing the heater fuse. Contact a qualified service technician.
Restricted Operation	Emergency running of the heater.	There is a fault in the heater. Restricted operation is still possible. Contact a qualified service technician.
■ 1 ► Ext. Temp. Sensor defective	The external temperature sensor is defective.	Contact a qualified service technician.
defective 2 Int. Temp. Sensor defective	The internal temperature sensor is defective.	Contact a qualified service technician.
Rotary Knob jammed	The operating button is blocked.	Can the operating button be freed again by hand? Contact a qualified service technician.

Display	Description	Remedy
Pushbuton jammed	The button is blocked.	Can the button be freed again by hand? Contact a qualified service technician.
7	Timer mode is not permitted during ADR mode. (a)	Contact a qualified service technician.
Timer mode not allowed		
■ 8 ■ Operation	The heater is in auxiliary heating mode via Switching Plus and cannot be operated	Contact a qualified service technician.
not supported	via Timer control unit during this time.	
9 ▶	Communication error on the CAN bus link.	Contact a qualified service technician.
CAN communication error		

a) ADR mode is reserved for vehicles transporting hazardous goods on the road. Not applicable for the machine.

#### NOTE!

If you are unable to remedy the error or fault, contact a qualified service technician.

# Winter season preparation for auxiliary heater

Operator should exhaust remaining summer diesel in fuel line of auxiliary heater before winter season comes. Remaining summer diesel can cause plugging in fuel line if temperature drops in sudden because of wax crystallization. Run auxiliary heater at least 15 minutes until remaining diesel is exhausted.

When operator runs machine in winter season, it is recommended to fill fuel tank over 70%. If fuel tank has much empty space, it makes moisture inside of fuel tank. It can go to fuel line of auxiliary heater and frozen moisture sometimes makes fuel feeding problem.

# Fuel quality requirements for auxiliary heater

If the heater is run from a separate fuel tank, comply with the following rules.

- f ambient temperatures over 0 °C; Use diesel fuel according to DIN EN 590.
- If ambient temperatures from 0 °C to -20 °C; Use winter diesel fuel according to DIN 590.
- If ambient temperatures from -20 °C to -40 °C; Use Arctic diesel or Polar diesel.

#### NOTE!

- Used oil is not allowed.
- After refuelling with winter or cold diesel or the listed blends, the fuel pipes and the metering pump must be filled with the new fuel by letting the heater run for 15 minutes.
- Volvo does not recommend mixing Kerosene with diesel due to unstable combustion which causes decrease of durability of auxiliary heater and makes bad exhaust gas.
- Volvo recommends to use commercial additives which improve wax crystallization of diesel fuel in cold weather if it is difficult to use Arctic diesel or Polar diesel

# Operation with bio-diesel fuel

The heater is approved for operation with bio-diesel up to a temperature of -8 °C (the flowability reduces at temperatures below 0 °C).

In case of storage periods longer than 30 days it is advisable to use FAME-free products, as ageing effects can have a negative effect on the fuel, especially regarding its flow properties and filterability.

#### NOTE!

Blending with max.30% FAME according to EN14214 is permitted.

# Operating instructions

This chapter contains rules which must be followed in order to operate the machine safely. However, these rules are to be followed in conjunction with laws or 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.

# Running-in instructions

During the first 100 hours, the machine should be operated with a certain care. It is important to check oil and fluid levels often during the running-in period.

# Visibility



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 not be possible to provide direct visibility to all areas around the machine. To achieve acceptable visibility, additional devices such as warning systems, mirrors, and closed-circuit television cameras (CCTV) may be used.

In order to minimize hazards that may be caused by restricted visibility, rules or procedures shall be established by the job site management. For example:

#### NOTE!

Some parts of the basic machine may restrict visibility, for example, the cab's pillars, frames, exhaust pipe, engine hood, as well as optional equipment such as buckets, pallet forks, grapples, and so on. The load that is handled with these attachments may also restrict visibility.

- Ensure that operators and job site workers have received thorough safety instructions.
- Control the traffic patterns for the machine and other vehicles. Avoid travelling in reverse if possible.
- Restrict the machine's operating area.
- Use a signalman to help the operator. Use signals according to the signal diagram, see page 266.
- Provide two-way communication equipment if necessary.
- Ensure that job site workers communicate with the operator before approaching the machine.
- Use warning signs.

Standard ISO 5006 "Earthmoving machinery-Operator's field of view" deals with the operator's visibility around the machine and is meant to be used for measuring and evaluating the visibility.

The machine is tested by methods and performance criteria according to this standard. The visibility method used may not include all aspects of the operator's visibility, but provides information for determining if additional devices for indirect visibility, such as warning systems, are necessary.

The test was performed on machines with standard equipment and attachment. If the machine is modified or fitted with other equipment or attachment, which results in impaired visibility, it should be re-tested according to ISO 5006.

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

Conforming to the standard is a requirement in EUcountries and provides for improved visibility around the machine.

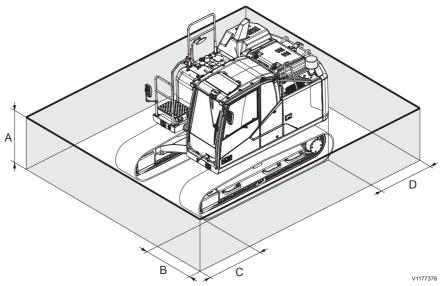
# Mirror and camera (if installed) settings Mirrors, adjusting

ISO 5006 states that an imaginary boundary line around the machine must be visible to the operator.

- Park the machine straight and on level ground.
- Adjust the mirrors until the imaginary boundary line is visible to the operator, see figure below.

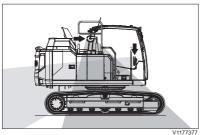
#### NOTE!

Cameras may be also used to create visibility on the rectangular boundary. (Cameras are not adjustable on the machine.)

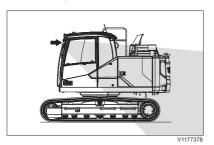


Close-up visibility boundary according to ISO 5006 (thick line)

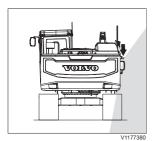
- A 1.2 m (47.2 in)
- B 1.0 m (39.4 in)
- C 1.0 m (39.4 in)
- D 1.0 m (39.4 in)



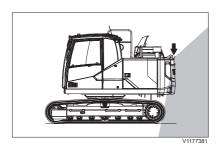
Machine's right view



Machine's left view



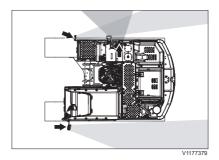
Machine's rear view



Machine's left view

## Rear-view mirrors

Using the rear-view mirrors, check that you have as good visibility as possible towards the machine's superstructure and lower frame, and with as wide angle as possible. If not, adjust the rear-view mirrors until good visibility is obtained, see figures.



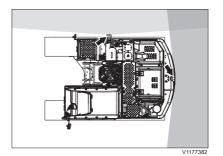
Machine's top view

# Rear-view and Side-view cameras (if installed)

Check the rear-view and side-view camera's display screens, which are focused on the visible areas, for good visibility.

#### NOTE!

Cameras are not adjustable on the machine.



Machine's top view

# Measures 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 correctly adjusted.
- Clean the cameras, if cameras are installed.

#### NOTE!

When you have direct access to the cameras for cleaning, be sure to use an appropriate external ladder or an appropriate platform.

- Check that the horn, back-up/travel alarm and rotating beacon (optional equipment) are working correctly.
- Check if the management has established rules or procedures for the work site.
- Always pay attention around the machine to identify any obstacles.
- Prevent persons from entering or remaining in the work area, i.e., the area around the machine and at least 7 m (23 ft) beyond the maximum reach of the attachment. However, depending on the job site's organization, the operator may allow a person to remain in the work area, but must then observe caution and operate the machine only when the person can be seen or has given clear indications of where he or she is.

Never allow any person to walk or stand under raised equipment or suspended loads.

# Safety rules when operating

# Operator obligations



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.
- The operator must operate the machine in such a way that the risk of accidents is minimized for both the operator and persons present on the work site.
- The operator must be thoroughly familiar with how to operate and maintain the machine and should undergo adequate training on the machine.
- The operator must follow the rules and recommendations in the Operator's Manual, but must also pay attention to any legislation and national regulations or specific requirements or risks that apply at the work site.
- The operator must be thoroughly rested and must never operate the machine when under the influence of alcohol, medicine, or other drugs.
- The operator is responsible for any load while working with the machine.
  - There must be no risk of the load falling off while operating.
  - Refuse to take a load which is an obvious safety risk.
  - Respect the stated maximum load for the machine. Pay attention to the effect of different distances to the centre of gravity and the effects of different attachments.

■ The operator must check that the mirrors and cameras (if installed) are in good condition, clean, and adjusted correctly for good visibility before operating the machine.

#### NOTE!

Cameras (if installed) are not adjustable on the machine. Check that the camera screen is displayed correctly on the IC (Instrument Cluster) when pressing the camera button on the keypad.

- The operator must be in control of the machine's work area.
  - Prevent persons from walking or standing under raised excavating equipment or suspended loads, unless it has been made safe or supported.
  - Prevent persons from entering or remaining in the work area, i.e., the area around the machine and at least 7 m (23 ft) beyond the maximum reach of the attachment. However, depending on the job site's organization, the operator may allow a person to remain in the work area, but must then observe caution and operate the machine only when the person can be seen or has given clear indications of where he or she is.
  - Prevent persons from being in the cab of a vehicle that is in a location with a risk that the cab may be hit by other machines or falling objects, for example, stones or logs. This does not apply if the cab is sufficiently strong or is protected to withstand the impact of such external forces.
  - Make sure that you know the weight limitation of the ground on which the machine is working.

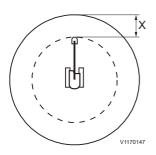
The operator may only take an instructor on board, if there is an approved instructor's seat in the machine.



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.



# Accidents

- 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.
- Wait for further instructions from the site management.

# Operator safety

- The machine must be operational, that is faults which can cause accidents must be rectified.
- Suitable clothing for safe handling and a hard hat should be worn.
- Mobile phone should not be used when operating the machine. Follow all national regulations for mobile phone use during operation!
- Always sit in the operator seat when starting the engine/machine.
- Keep your hands away from areas where there is a risk of crushing, for example covers, door and window.
- Always use the seat belt.
- Check that the seat belt is not damaged or worn.
- Use steps and handholds when entering or leaving the machine. Use the three-point grip, that is two hands and one foot or two feet and one hand. Always face the machine do not jump!
- The door must be closed.
- Check that the attachment is properly attached and locked.
- 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 your speed.
- In case of travelling on uneven ground, do not let the machine lean more than 10° to one side.
- The cab has two emergency exits, the door and the rear window.
- Only walk and step on surfaces which are provided with anti-slip protection.

- During electrical storms, do not attempt to enter or exit the machine.
  - If you are off the machine, stay well away from the machine until the storm passes.
  - If you are in the cab, remain seated with the machine stationary until the storm passes. Do not touch controls or anything metal.
- In all kinds of works (travelling, digging, loading, hammering, and so on), place the idler side in front to reduce the travel drive damage due to incorrect operating position.
- When DPF regeneration;
  - Make sure that there is no flammable material around the machine, especially in the engine compartment, this is important to prevent risk of fire.
  - Clean all flammable materials from the machine. See pages 278, 332 and 334 for detailed information.
  - Move the machine to safety area, if there is a risk that people may get too close and then perform the regeneration.



Risk for fire.

Regeneration generates hot exhaust and causes hot exhaust pipe. Do not perform regeneration in a flammable environment.

# Operating on public roads

- Road signs, traffic restricting arrangements and other safety devices, which may be required when considering traffic speed and intensity or other local conditions, must be used.
- When moving the machine with a suspended load, special attention must be observed. when required, request the help of a signal man.
- Warning beacon may by used:
  - On attached or connected implement, which is wider than the vehicle itself.
  - When the vehicle constitutes a hindrance or danger to other traffic.
  - When working on or by the side of the roadway.

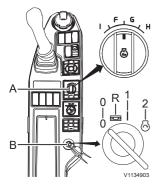
# V1065709

# Measures before operating

# NOTICE

The safety regulations and operating instructions issued by the manufacturer must be strictly observed.

- Read the Operator's manual.
- Carry out daily service, see page 291. In cold weather, make sure that the freezing point of the coolant is sufficiently low and that the lubricating oil is intended for winter use.
- Clean / scrape ice off the windows.
- Clean the dust around engine, battery and cooler.
- Check the level of hydraulic fluid, refill if required.
- Check that there is sufficient fuel in the fuel tank.
- Check that there are no faulty, loose parts or leaks, which can cause damage.
- Check that the battery disconnected switch is switched on.
- Check for cracks on frame and tracks.
- Check that hoods and covers are closed.
- Make sure fire extinguisher if equipped is fully charged.
- Inspect steps and handholds for damage or loose parts. Make necessary repairs if needed.
- Check that there are no persons in the vicinity of the machine.
- Adjust the operator seat and fasten the seat belt.
- Adjust and clean the mirrors.
- Inspect working and other lights for proper operation.
- Travel alarm should be on before operating the machine.
- Inspect the failure of gauges in the instrument panels.
- Check the function of the attachment quick coupler (optional equipment).



A Engine speed control switch B Ignition switch

Off position (0)
Radio position (R)
Operating (preheating) position (1)
Start position (2)

# Starting engine

#### NOTE!

Make sure the control lockout lever is in downward (lockout) position, otherwise the engine cannot be started.



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.

# NOTICE

Do not keep the ignition switch in starting position for more than 20 seconds, as this may seriously damage the starting system. If the engine does not start, turn the switch back to stop position and wait a couple of minutes before the next starting attempt.

# NOTICE

If the engine sounds or runs strangely or if strong vibrations arise, the ignition switch must be turned to stop position immediately.

# NOTICE

Wait until the electronic system is completely shut down before restarting.

- 1 Turn the engine speed control switch (A) to the low speed position and turn the key to operating position.
- 2 Sound the horn and let other workers and bystanders know you are starting the machine. For the start-up sequence, see page 44.
- 3 Turn the key to the start position.
- 4 Release the key when the engine has started.
- 5 Warm up the machine.



Result pop-up message

# NOTE!

A message may be shown if the engine is not allowed to run at low idling speed for at least 2 minutes before it is turned off.

Cool down the engine sufficiently before turning it off.



Preheating indicator

# V1149043

Socket for block heater

# Starting engine in cold weather

- 1 Turn engine speed control switch (A) to the low speed position.
- 2 Turn the key to the running (preheating) position and keep it there while the preheating is working. The preheating indicator will be displayed on the indicator screen of IC (Instrument cluster).
- 3 When the preheating is finished, sound the horn and let other workers and bystanders know you are starting the machine.
- 4 Turn the key to the starting position.
- 5 Release the key when the engine has started.
- 6 Warm up the machine. Run at low speed and with a light load until the oil in the engine and hydraulic system has warmed up.

# NOTICE

Run the engine at low idling speed for 10–15 minutes to warm the engine and the hydraulic system at temperatures below –15 °C (+5 °F) before putting the machine to work.

Use recommended lubricating oil for winter use. See page *351*.

During the cold season, fill the fuel tank after work has finished for the day to counteract the formation of condensation water in the tank.

# Engine block heater

# (optional equipment)

This equipment is used to reduce the engine load which cause the wear in the engine when starting the machine in cold weather region.

# NOTICE

The machine may be equipped with cylinder block heater for either 120 V or 240 V. Compare the specified voltage of the external power supply and with that of the cylinder block heater.

## Starting with booster batteries



Risk of explosion.

Batteries could explode due to the current surge if a fully charged battery is connected to a completely discharged or frozen battery.

Do not boost start a machine with a completely discharged or frozen battery.

When starting with booster batteries, check that the booster batteries or other power source have the same voltage as the batteries of the machine. If the batteries in another machine are used the engine of that machine must be turned off.

## NOTICE

Do not attempt to start the engine while the battery charger is still connected to the mains. This may cause serious damage to the electronic control units.

- 1 Turn OFF the battery disconnect switch.
- 2 Remove the protections from the battery pole studs.

#### Connect two 12 V batteries as follows:

- 3 Connect one of the jump leads between (+) terminal on the battery of the machine and the (+) terminal on the booster battery.
- 4 Connect the other jump lead between the (-) terminal of the booster battery and a grounding point on the machine.

## NOTICE

Do not connect ground to the undercarriage on the machine. This may seriously damage the swing bearing.

- 5 Connect the batteries of the machine by turning on the battery disconnect switch.
- 6 Start the engine with the ignition switch in a cab.
- 7 Leave the batteries connected for 5-10 minutes after starting the engine.
- 8 Disconnect the jump lead from the chassis connection on the machine, and then disconnect the other end of the jump lead from the (-) terminal on the booster battery.
- 9 Finally disconnect the jump lead between the (+) terminals.
- 10 Re-install the battery pole stud protections.

## Warming up

Machine may respond slowly at low temperatures. Operate carefully until the system has reached normal temperature. Otherwise unexpected movements may occur.

## Hydraulic system, warming up

The oil in machine's hydraulic system is used for operating the hydraulic cylinders of the equipment as well as the hydraulic motors for travelling and swinging. When the oil is cold it is viscous.

Therefore the machine's hydraulic functions operate slower than when the oil is warm.

Malfunctions may result if one or more of the machine functions are forced against end-position without first having warmed up the system.

#### NOTE!

Operate the machine functions (travel, swing, and attachments) very slowly and carefully.



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.



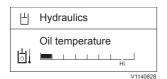
Do not rush warming of the oil, since forced warming can damage the machine.



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.



Hydraulic oil temperature screen

- 1 Start the engine and let it run at low idle for 5 minutes.
- 2 Then increase engine speed to approx. 1,200 rpm.
- 3 Carefully follow the instructions given below.
  - If the green bar for hydraulic oil temperature covers more than one gradation, perform the next steps 4 and 5.
  - If the green bar for hydraulic oil temperature covers less than one gradation, raise the boom slightly from the ground and operate bucket-in and bucket-out using the control lever for 5 minutes (stop operation for 2-3 seconds after 1 operation, i.e. bucket-in or out). After 5 minutes, if the green bar for hydraulic oil temperature has not reached one gradation, operate bucket-in using the control lever and hold the control lever in that position for 10 seconds to reach relief pressure. Release the control lever for 5 seconds and then repeat the operation until the green bar has reached one gradation.
- 4 Run out the bucket cylinder using the control lever and let the bucket move to its end-position.
- 5 Then carry out a number of boom, dipper arm, swing, and travel movements with the machine to distribute the warmed hydraulic oil to all hydraulic cylinders and motors.

Carry out these movements until the hydraulic system has reached working temperature/rapid working movements.

## Travelling a short distance

Moving the machine a short distance (for example, when loading onto or off a trailer) may be done without a complete warm-up. This operation must be done with great care. Under these conditions the engine speed must not exceed 1,200 rpm and the travel speed control should be in low speed position.

## Operating



In order not to jeopardise the lubrication of the engine, the machine must not be inclined more than 35 degrees in either direction. In addition it may be unsuitable to operate at this inclination as the machine may become unstable and unbalanced, depending on the load.

#### NOTE!

Do not jack the track up more than 35 degrees using attachment. Otherwise counterweight can be damaged.

#### NOTE!

If the machine is equipped with travel warning system, a warning alarm sounds when levers or pedals are actuated.

For more operating information, see page 95.

## Exhaust aftertreatment system

## Regeneration



Risk of burns.

Engine and exhaust system components get very hot and can cause severe burns.

Avoid contact with engine compartment covers, engine components and exhaust system until the engine is cooled down.

#### NOTE!

Some smoke might be seen coming from the exhaust stack during regeneration of the aftertreatment system on a machine run on diesel fuel with high sulfur content.

The purpose of regeneration is to raise the temperature in the aftertreatment system so that any trapped substances are burned off to allow the system to regain its full capacity.

#### Normal operation

During normal operation, passive regeneration occurs continuously.

## Parked regeneration

Parked regeneration may be necessary if

- previous regeneration steps have failed or have been cancelled repeatedly
- too much time has passed since the last regeneration
- the aftertreatment system has accumulated excessive amounts of particles or sulphur

No work can be performed during a parked regeneration. The engine speed is raised during a parked regeneration. It is not advisable to cancel a parked regeneration which is in progress, except in an emergency.

To start a parked regeneration, the operator must stop the machine, lower the control lockout lever to

O	Regeneration
	○ Stop
	<ul><li>Start</li></ul>

lock the system and select "Start" in the regeneration menu on the IC (Instrument Cluster).

#### NOTE!

The operator can start the regeneration immediately by pressing the SELECT button on the IC (Instrument Cluster) control keypad when an alarm indication for regeneration pops up on the IC (Instrument Cluster).

#### NOTE!

Make sure that there is no flammable material around the machine, especially in the engine compartment before starting the regeneration, this is important to prevent risk of fire. Clean all flammable materials from the machine. See pages 278, 332 and 334 for detailed information.

During regeneration, the HEST (High exhaust temperature) lamp is on, see symbol. This is to indicate that regeneration is in progress and that the exhaust temperature has increased. Do not turn off the engine while the HEST lamp is on.

#### NOTE!

The machine must be in an area that is not heatsensitive while the symbol is lit.

#### Service regeneration

If a requested regeneration is delayed for too long, the PM (particulate matter)-load in the DPF (diesel particulate filter) and the amount of sulphur in the SCR (selective catalytic reduction) will be too high for a safe parked regeneration. Then regeneration must be started with Volvo's service tool in order to perform a safe regeneration.

## **Fuel consumption**

During a parked regeneration, the fuel consumption may increase.

## **Delaying regeneration**

The operator can delay the regeneration by pressing the ESC button on the IC (Instrument Cluster) control keypad when an alarm indication for regeneration pops up on the IC (Instrument Cluster). The alarm indication will pop up again after 15 minutes or when the engine is restarted. Delayed regeneration may be useful if the machine is in a heat-sensitive environment.

#### NOTE!



HEST (High exhaust temperature) lamp, regeneration in progress

## It is important to not delay regeneration unnecessarily.

#### Possible consequences of delaying regeneration:

- engine derate.
- higher fuel consumption.
- shorter diesel particulate filter service life.
- damage to the aftertreatment system.

## Cancelling parked regeneration

#### NOTE!

#### Only cancel in an emergency.

1 Select "Stop" in the regeneration menu on the IC (Instrument Cluster).

An alarm indication on the instrument panel confirms that regeneration has been cancelled.

Regeneration is cancelled automatically when:

- a malfunction occurs
- machine operation starts and a parked regeneration is in progress
- the machine is turned off



Regeneration cancelled

Alarms that re	Alarms that require specific action			
Text on display panel	Display indication	Alarm level	Action	
Park soon Parked regeneration needed	Warning, amber  V1128635	- buzzer sounds - amber central warning on	1 Park the machine in a non-heat-sensitive area. 2 Move the control lockout lever down to lock the system. 3 Start regeneration.  NOTE! Regeneration is cancelled if the control lockout lever is set to unlocked position or the engine is turned off.  NOTE! The idle speed will be increased during the entire regeneration process.	

Start regeneration Parked regeneration possible Press	Warning, amber	- buzzer sounds - amber central warning on	Park the machine in a non-heat-sensitive area.     Move the control lockout lever down to lock the system.     Start regeneration.
[SELECT] to start			NOTE! Regeneration is cancelled if the control lockout lever is set to unlocked position or the engine is turned off. NOTE! The idle speed will be increased during the entire regeneration process.
Keep machine parked Regeneratio n ongoing	Warning, amber	- buzzer sounds - amber central warning on	Keep the machine parked.
Regeneratio n cancelled	Warning, amber	- buzzer sounds - amber central warning on	Restart regeneration when possible.

Park machine Parked regeneration required	Warning, amber	buzzer sounds     amber central     warning on	Park the machine in a non-heat-sensitive area.     Move the control lockout lever down to lock the system.     Start regeneration.
			NOTE! Regeneration is cancelled if the control lockout lever is set to unlocked position or the engine is turned off. NOTE! The idle speed will be increased during the entire regeneration process.
Park safely Service regeneration needed	Warning, red	- buzzer sounds - red central warning on	Park the machine in a non-heat-sensitive area.     Move the control lockout lever down to lock the system.     Turn off the engine.     Contact a qualified service technician for regeneration.  NOTE!  Regeneration is only possible using Volvo's service tool.

Park machine Service needed Derate active	Warning, red	- buzzer sounds - red central warning on - engine performance is significantly reduced	1 Park the machine in a non-heat-sensitive area. 2 Move the control lockout lever down to lock the system. 3 Turn off the engine. 4 Contact a qualified service technician for replacement of the diesel particulate filter.  NOTE! The soot load can only be reset by qualified service technician.
Regeneratio n not needed	Information, blue	- buzzer sounds - blue central warning on	1 No action required.
Continue operation Low temperature Regeneratio n pending	Warning, amber	- buzzer sounds - amber central warning on	1 Continue operating the machine to warm up the exhaust aftertreatment system.
Service needed Regeneratio n not possible System failure	Warning, amber	- buzzer sounds - amber central warning on	Service required.     Contact a qualified service technician.
Lower CTRL lockout lever Regeneratio n needed	Warning, amber	- buzzer sounds - amber central warning on	Park the machine in a non-heat-sensitive area.     Move the control lockout lever down to lock the system.     Start regeneration.

F				
Set engine speed as I2 Parked	Warning, amber	- buzzer sounds	1	Set the engine speed
		<ul> <li>amber central warning on</li> </ul>		control switch as I2 mode.
regeneration			2	Park the machine in a non-heat-sensitive
needed				area.
	V1128635		3	Move the control
				lockout lever down to
				lock the system.
			4	Start regeneration.
Park safely	Information, blue	- buzzer sounds	1	Park the machine in a
Only		- blue central		non-heat-sensitive
available	<b>.</b>	warning on		area.
when parked	( 🖜 ) = =;;[六〉		2	Move the control
	💻 -			lockout lever down to
	V1088268		_	lock the system.
	V 1066206		3	Start regeneration.
Arctic regen	Information, blue	- buzzer sounds	1	Park the machine in a
disabled		- blue central		non-heat-sensitive
	II • • • • • • • • • • • • • • • • • •	warning on	_	area.
	( 🖜 ) =;;;=5>		2	0110011 11101 1110 1110110
				regeneration mode in
	V1088268			IC (Instrument
	V 1000200			Cluster) menu is
				enabled.

## **Emission compliance**

The aftertreatment system is monitored by diagnostic systems in the control units to ensure reduced emissions. If the system does not meet the emission requirements, it should not be possible to use the machine for work as usual. This takes place by a reduction of engine power (derate).

#### Engine power is reduced if:

- The level in the AdBlue®/DEF tank is too low
- AdBlue®/DEF is of low quality
- There is a problem/malfunction with the aftertreatment system

There are two levels of engine power reduction (derate) that are activated after a certain time depending on the type of problem, as well as if the malfunction reoccurs or not.

#### Restoring engine function

If the engine is restarted (by turning the ignition off and on) when engine power has been reduced, then full engine power (called restored engine function) can be obtained twice during derate level 1. This can be done in case of a danger or hazard and, e.g., if the machine has to be moved. This will not extend the time for activation of derate level 2.

# Exhaust aftertreatment system, alarms requiring special actions

#### NOTE!

The display text will show "AdBlue®" in machines for the European market and "DEF" in machines for the US market.

AdBlue®/DEF level monitoring			
Display figure	Alarm level	Action	
_	- solid symbol	Turn off the engine.     Fill AdBlue®/DEF in the     AdBlue®/DEF tank.	
Refill AdBlue  VI126376  AdBlue empty Derate active	- buzzer sounds 4 times - amber central warning on  - flashing symbol - torque reduction	Turn off the engine.     Fill AdBlue®/DEF in the AdBlue®/DEF tank.	
Park safely  V1126376  AdBlue empty Full derate soon	- buzzer sounds continuously - red central warning on  STOP  - flashing symbol - torque reduction	Turn off the engine.     Fill AdBlue®/DEF in the AdBlue®/DEF tank.	
Refill AdBlue  V1126376  AdBlue empty Full derate active	- buzzer sounds continuously - red central warning on  STOP  - flashing symbol - forced idle or torque and speed reduction (depending on market)	Turn off the engine.     Fill AdBlue®/DEF in the     AdBlue®/DEF tank.	

AdBlue®/DEF quality monitoring			
Display figure	Alarm level	Action	
Replace AdBlue  V1126376  Wrong AdBlue quality  Derate soon	- buzzer sounds 4 times - amber central warning on  - solid symbol	Contact a qualified service technician.	
Replace AdBlue  V1126376  Wrong AdBlue quality  Derate active	- buzzer sounds 4 times - amber central warning on  - flashing symbol - torque reduction	Contact a qualified service technician.	
Park safely  VII26376  Wrong AdBlue quality Full derate soon	- buzzer sounds continuously - red central warning on  STOP  - flashing symbol - torque reduction	Contact a qualified service technician.	
Replace AdBlue  VI126376  Wrong AdBlue quality  Full derate active	- buzzer sounds continuously - red central warning on  STOP  - flashing symbol - forced idle or torque and speed reduction (depending on market)	Contact a qualified service technician.	

SCR-system failure monitoring			
Display figure	Alarm level	Action	
Check SCR-system  V1201756  SCR-system failure  Derate soon	- buzzer sounds 4 times - amber central warning on  - solid symbol	Contact a qualified service technician.	
Check SCR-system  V1201756  SCR-system failure  Derate active	- buzzer sounds 4 times - amber central warning on  - flashing symbol - torque reduction	Contact a qualified service technician.	
Park safely  VIZO1756  SCR-system failure Full derate soon	- buzzer sounds continuously - red central warning on  STOP  - flashing symbol - torque reduction	Contact a qualified service technician.	
Check SCR-system  V1201756  SCR-system failure  Full derate active	- buzzer sounds continuously - red central warning on  STOP  - flashing symbol - forced idle or torque and speed reduction (depending on market)	Contact a qualified service technician.	

DPF-system failure monitoring			
Display figure	Alarm level	Action	
Check DPF-system	- buzzer sounds 4 times - amber central warning on	Contact a qualified service technician.	
	- solid symbol		

Check DPF-system	- buzzer sounds 4 times - amber central warning on  - solid symbol	Contact a qualified service technician.
Check DPF-system	- buzzer sounds 4 times - amber central warning on  - solid symbol	Contact a qualified service technician.

## **Stopping**

- 1 Select as level ground as possible to park the machine.
- 2 Lower the attachment to the ground.
- 3 Leave the engine running at low idling speed (I2-mode) for approx. 2 minutes before shutting off the engine. Otherwise the lubrication of the turbocharger may be disrupted, resulting in shorter service life and great risk of bearing seizure.
- 4 Turn the ignition switch to stop position.
- 5 Move the control lockout lever down to lock the hydraulic system securely.
- 6 If the machine is to be left for any length of time, the battery disconnect switch should be turned off

Keep in mind that the risk of theft and burglary can be minimised by:

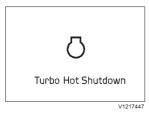
- Removing the ignition switch when the machine is left unattended.
- Locking doors and covers after working hours.
- Turning off the current with the battery disconnect switch.
- Parking the machine where the risk of theft, burglary and damage is minimised.
- Removing all valuables from the cab, such as mobile phone, computer, radio and bags.
- Chaining the machine.

By etching in the PIN-number or the national licence plate number of the machine on its windows, it is easier to identify stolen machines.

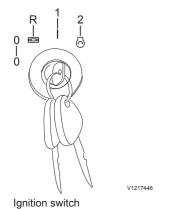
# DELAYED SHUTDOWN A 2:00 B Abort with ESC C

Info. pop-up message

- A Delayed shutdown
- B Remaining time
- C Abort with ESC



Results in a pop-up message



## Delayed engine shutdown

# (optional equipment- restarting engine when delayed engine shutdown is activated)

The delayed engine shutdown function controls the after-cooling of the engine after **the ignition has been turned off**. It ensures that the engine is running until it is sufficiently cooled and then shuts it down. Remaining time will be shown in a pop-up message and it is possible to abort the after-cooling and shut down the engine directly by pressing the ESC button. **But it is not recommended**.

If you abort this function by pressing the ESC button or via the battery disconnect switch or by using any emergency stop, this results in a pop-up message being shown at next start up.

The operator can also restart engine by turning the ignition switch to position (1) while countdown is in progress.

The delayed engine shutdown function is connected with the automatic engine shutdown system, which is optional equipment. If both of functions are activated at the same time, the delayed engine shutdown is prioritized because of its important purpose. The battery will be connected during the entire shutdown phase and the lights will be turned off, as with normal key shutdown.



## **Parking**

## NOTICE

Choose level ground for parking the machine. If the machine has to be parked on an incline, the tracks must be blocked with wooden blocks and the bucket teeth pressed into the ground.

- 1 Park the machine with proper condition that the piston rods of the attachments will be protected against moisture, dust and damage.
- 2 Follow the paragraphs 3 6 above of "Stopping".
- 3 Make sure that there is enough anti-freeze in the cooling system (see page 320) and in the washer fluid at temperatures below 0 °C (32 °F) when the machine is parked.
- 4 Make sure that the AdBlue®/DEF tank is completely filled.
- 5 The temperature may not be below -40 °C (-40 °F) or above +40 °C (104 °F) if the machine will be parked for up to two months.
- 6 Close and lock all windows, doors and all covers.

# Long-term parking (parking for longer time than two months)

Follow the instructions as for parking and in addition to that:

- 1 The temperature may not be below -40 °C (-40 °F) or above +25 °C (77 °F).
- 2 Wash the machine and touch up the paint finish to avoid rusting.
- 3 Check the machine for leakage of oil or water, and defects of the attachments and the tracks. Replace or repair all damaged or worn parts.
- 4 Treat exposed parts with anti-rust agent, lubricate the machine thoroughly and apply grease to unpainted surfaces like cylinders.
- 5 Fill the fuel tank and the hydraulic oil tank to the maximum marks.
- 6 Make sure that the freezing point of the coolant is sufficiently low (in cold weather).
- 7 Place the machine on level, firm ground where there is no risk of freezing, landslide or flooding.
- 8 When storing machines in extreme cold temperatures, remove batteries and store them at room temperature. Make sure to place the batteries over a wooden/plastic/rubber surface.

9 Cover the exhaust pipe (for parking out-of-doors).



Start the engine once a month and run it at low idling speed for one hour. Operate all function cycles when working temperature has been reached.

#### Check after long-term parking

- All oil and fluid levels
- Tension of all belts
- Air cleaner
- Batteries
- Lubricate all greasing points
- Wipe off grease from piston rods
- Hydraulic hoses
- Seals
- That the AdBlue®/DEF pump unit filter is replaced if the machine is parked for longer than four months. Contact a qualified service technician.

#### NOTE!

If a preservative has been used on the machine to prepare it for long term storage, follow the manufacturer's instructions for any necessary safety precautions and the method of removal.

## Retrieving and towing



Risk of personal injury.

Faulty or improper lifting equipment could cause the machine to break away from the lifting vehicle, causing accidents, serious injury or death.

Use certified cables, lifting straps, slings, shackles and hooks with adequate load capacity and never lift the machine with a person in or on the machine.



Risk of runaway machine.

Improper towing methods or faulty equipment could cause the machine to break away from the towing vehicle, causing accidents, serious injury or death.

Carefully follow the towing instructions and use only certified towing equipment with adequate load rating.



Only use the rear-mounted towing hook and the attaching point for a towing bar for towing the machine.

Retrieval device is used when the machine is in the event of slipping into swampy ground or being disabled.

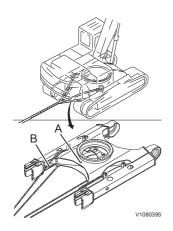
- 1 Attach a wire rope to be retrieved or to tow the machine as shown in the illustration. Ensure that the towing linkage is properly connected, adequate for the purposes.
- 2 Towing speed for short distance is maximum 2 km/h and use other transportations for long distance.
- 3 Keep the tow line angle as small as possible
- 4 Angle for pulling should not exceed 20° from the horizontal line of tow lope and longitudinal axis of the machine. Be careful there should not be also interference with parts of the machine.

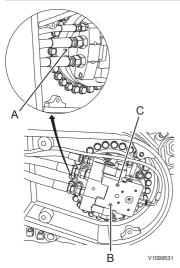
There is a hole (A) on the lower frame to fit the shackle only for towing light objects.

- 1 The shackle must be used for the hole (A).
- 2 Permissible forces of the hole (A) for towing is as follows.
  - 6,600 kg (14,550 lb)

#### NOTE!

Do not use shackle holes (B) to retrieve or tow the machine. These holes are only for anchoring when transporting the machine, see page 204.





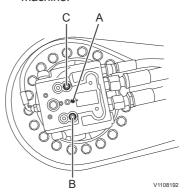
#### EC140E LM

- A Brake released port
- B Pressure gauge port
- C Pressure gauge port

#### Manual release of travel brake

If it is impossible to operate the machine due to the failure of the components in the track motor, the travel brake should be released. Contact a qualified service technician for detailed information.

- 1 Apply constant hydraulic pressure of 3.9 MPa (40 kgf cm², 569 psi) at port (A) of the track motor using external pressure source to keep the brake released.
- 2 Connect a hydraulic hose between port (B) and port (C) after removing plugs to move the machine.



#### EC140E L

- A Brake released port
- B Pressure gauge port
- C Pressure gauge port

## Transporting machine

# Measurements before transporting machine

## 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.

## NOTICE

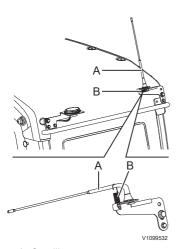
If vandal protection is installed on the machine, it should be removed before the machine is transported. Check local or national regulations.

# Total and disassembled specifications, weight and dimension

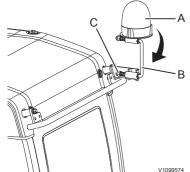
The weight and dimension are very useful for estimating the method for how the disassembled parts are supposed to be transported. To comply with the laws and regulations in a certain region, use the specifications for total and disassembled parts. See pages 384, 377 and 388.

## Sunlight protection, closing

The sunlight protection may be opened while transporting the machine because of vibration. Therefore it should be closed tightly not to be opened.



- A Satellite antenna
- B Spring



#### Satellite antenna, folding (optional equipment)

When transporting the machine or using the machine in an area limited the height, the satellite antenna can be damaged.

Fold satellite antenna (A) using spring (B) like the figure. In this case, it may be limited for satellite communication of the machine.

#### Halogen beacon lamp, folding (optional equipment)

When transporting the machine, fold bracket (B) with rotating beacon lamp (A) not to be damaged.

- Loosen screw (C) and then turn down rotating beacon lamp (A).
- 2 Fasten the screw (C).

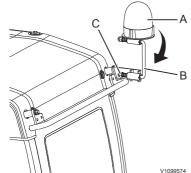
## LED rotating beacon, disassembling (optional equipment)

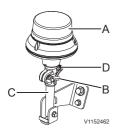
When transporting the machine, disassemble rotating beacon (A) not to be damaged.

- 1 Loosen wing screw (B) and disassemble rotating beacon (A).
- 2 Keep rotating beacon (A) in the cab during transportation.
- 3 Put rubber cover (D) on bracket (C).

#### NOTE!

If you remove the rotating beacon, be sure to put the rubber protection on the fixing tube. This will avoid rust and other possible damages.





## Tying down machine



Risk of crushing.

Make sure that no persons are standing pear.

Make sure that no persons are standing near the vehicle while loading.

#### NOTE!

Make sure that loading ramps and platforms are free from oil, mud, ice and similar so that the machine does not begin to slip.

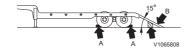
## NOTICE

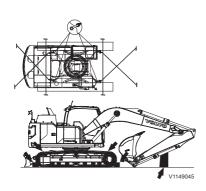
The function for automatic idling must be deactivated with the button on the keyboard in order to avoid that the speed increases during loading and unloading of the machine.

## NOTICE

Select low engine speed and low travelling speed for loading and unloading the machine.

- 1 Place the trailer on a firm and level ground.
- 2 Apply the brake of the trailer.
- 3 Insert blocks (A) in front of and behind the tyres of trailer.
- 4 Fix loading ramps (B) securely.
  - Make sure that the strength, width, length and thickness of the planks are safe for loading.
  - Make sure that the angle of loading ramp is 15° or less.
- 5 Check whether the right and the left loading ramps are of the same height.
- 6 Decide the direction and travel slowly onto the loading ramps and trailer bed / platform. Block each track and secure the machine with tie downs of adequate load rating so that the machine cannot move.
  - Load the machine so that the bucket cylinder rod does not contact the trailer
  - Never operate any lever other than the travel levers (pedals) while the machine is on the loading ramp.





## NOTICE

Do not extend dipper arm or bucket cylinders to their end positions as they then run the risk of being damaged.

- 7 Stop the machine.
- 8 When some parts of machine are disassembled, load the disassembled components on the trailers properly. If necessary, put the blocks behind or below the components.
- 9 Remove the ignition switch.
- 10 Turn OFF the battery disconnect switch.
- 11 Lock the door and the access covers.
- 12 Cover the exhaust pipe to prevent turbocharger from damage.
- 13 Ensure that the machine or disassembled components are firmly secured.

## Lifting machine



Risk of personal injury.

Faulty or improper lifting equipment could cause the machine to break away from the lifting vehicle, causing accidents, serious injury or death.

Use certified cables, lifting straps, slings, shackles and hooks with adequate load capacity and never lift the machine with a person in or on the machine.



Risk of crushing.

Falling load could cause serious injury.

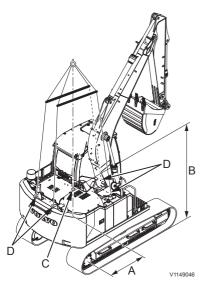
Do not stand under a suspended load. Use appropriate loading and lifting equipment.

#### NOTE!

Incorrect or faulty equipment or improper lifting methods may cause accidents. Therefore, carefully follow the instructions given below.

Lift the machine on flat, even and level ground.

- 1 Start the engine, and arrange the bucket, dipper arm and boom as illustrated. Position the superstructure boom forward over the idlers.
- 2 Move the control lockout lever down to lock the system securely, see page 111.
- 3 Stop the engine, check the safety around the machine.
- 4 Close and lock the windshield, cab door and engine hood securely.
- 5 As shown in the decal for lifting, connect lifting cables or slings with sufficient strength for the machine weight at the lifting points correctly.
- 6 After installation of all hoisting equipment, lift the machine a little to check its balance, if satisfactory, lift it slowly and evenly.
- 7 Maintain good visibility of the machine at all times during the lift. And continuously check that the machine is level.



- A 1232 mm (48.5 inches)
- B 1444 mm (56.9 inches)
- C Center mark for the center of gravity
- D Lifting points

## Operating techniques

The excavator is a multi-task machine capable of being fitted with multitude special attachments to perform many types of work. This chapter contains information and instructions regarding the best operating practices to improve efficiency, including examples on how the most common attachments are used. It is important that the correct technique is used to obtain safe and efficient use of the machine.

## Whole-body vibrations

Whole-body vibration emission on construction machinery are affected by a number of factors, such as working mode, ground conditions, speed, and so on.

To a large extent the operator can influence the actual vibration levels, because the operator controls the speed of the machine, its working mode, the travel path, and so on.

Therefore, the result can be a range of different vibration levels for the same type of machine. For cab specifications, see page *373*.

# Guidelines for reducing vibration levels on earthmoving machines

- Use the proper type and size of machine, with optional equipment and attachments for the application.
- Keep the terrain and haul roads in good condition.
  - Remove any large rocks or obstacles.
  - Fill any ditches and holes.
  - Provide equipment and schedule time to maintain terrain conditions.
- Adjust the speed and travel path to minimize the vibration level.
  - Drive around obstacles and rough terrain conditions.
  - Reduce the speed when it is necessary to go over rough terrain.
- Maintain machines according to the manufacturer's recommendations.
  - Track tensions. (crawler machine only)
  - Tire pressures. (wheel machine only)
  - Brake and steering systems. (wheel machine only)
  - Controls, hydraulic system and linkages.
- Keep the seat maintained and adjusted.
  - Adjust the seat and its suspension according to the weight and size of the operator.
  - Inspect and maintain the seat suspension and adjustment mechanisms.
  - Use the seat belt and adjust it correctly.

- Steer, brake, accelerate, shift gears, and move the attachments smoothly. (wheel machine only)
- Minimize vibrations for long work cycle or long distance travelling.
  - Use suspension systems if available.
  - If no suspension system is available, reduce speed to prevent bouncing.
  - Transport machines when there are long distances between worksites.

Back pain associated with whole-body vibrations may be caused by other risk factors.

The following guidelines can be effective to minimize risks of back pains:

- Adjust the seat and controls to achieve good posture.
- Adjust the mirrors to minimize twisted posture.
- Provide breaks to reduce long periods of sitting.
- Avoid jumping down from the machine.
- Minimize repeated handling and lifting of loads.
- Maintain reasonable weight and physical condition.

## Rules for digging



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.

First read the safety rules for operating, see pages 170, 171, 172, and 174.

- Always prepare work by carefully studying drawings and regulations that apply to the site. Also study the ground conditions and what the risk areas on the site look like. Turn off gas, electricity and water supplies, if this is necessary. Mark the position of cables and pipes.
- Fence off the area around the machine, if there is a risk that people may get too close. Pay attention to a swinging machine.
- Look after your workmates! Make sure that they take care. No persons, apart from the operator, may be present within the working area of the machine. Teach them to be on their guard against collapsing banks and rolling stones and to be prepared to dash for safety. Changes in stress in a bank immediately prior to a landslip are indicated by small streams of loose material just where the cracks are forming.
- If the machine is provided with optional equipment, which is operated with the pedals, the operator must assure him or her self of that the anticipated movements are obtained when actuating the pedals. An unexpected movement may entail risk of an accident.
- A cab provided with protective grill over the roof window meets the requirements for falling object guard in accordance with stated testing methods (FOPS/ISO 10262). Use the falling object guard when there is risk of heavy, falling objects.

## NOTICE

With certain attachment combinations there is a risk that the attachment may strike the cab. Avoid damage by being careful when working close to the machine.

- Never swing the bucket or load above people.
- Never use the bucket for chopping.
- If uncontrolled movements should occur, first release levers and pedals, then shut off the engine immediately by turning the ignition switch to the stop position.
- If red warning lamps light up and/or the buzzer is sounding, the engine must be stopped immediately and the cause investigated.
- The machine must not be equipped with a larger bucket/attachment than permitted.
- When using equipment which generate knocks or vibrations, for example hammer, the hydraulic cylinders must not be operated closer than 10 cm (4 in) from their end-of -stroke positions.
- In case of fire, the battery disconnect switch should be turned off, if possible. See page 274.

#### Loading on to a vehicle



Risk of crushing.

Material may fall off when loading a vehicle.

Make sure that no persons are standing near the vehicle while loading.

- If possible, position the machine higher than the vehicle to be loaded.
- Place the vehicle to be loaded so that the machine does not have to swing and lift more than necessary.
- Make sure that the driver of the vehicle to be loaded stays outside the working area of the machine and never swing the bucket over the cab of the vehicle to be loaded.
- Do not load the vehicle unevenly and avoid unnecessary spillage when loading. Do not make the load so high that earth and stones fall over the platform sides.
- Release the load carefully.

#### When working, do not:

- use the swing force for raking over the ground, demolition of buildings or thrusting bucket teeth into the ground. It may cause damage to the machine and attachments.
- dig by using the travelling motors or thrusting bucket teeth into the ground. This can overload the rear of the machine and damage the track drive.
- extend the hydraulic cylinder to its end of stroke. This can overload the stop in the cylinder and shorten the life span of the machine. Work with as much clearance as possible.
- work by slamming the bucket into the ground.Do not perform digging by dropping the boom, or using the bucket instead of a pick. Striking digging or continuous striking can overload the rear of the machine or damage the attachment. It is also very dangerous.
- carry out lifting work. Basically, using this machine as a crane is prohibited. However, local or national regulations may allow it on some markets. If permitted, a properly installed rated bucked hook and certified slings / shackles are required. Contact a workshop authorised by Volvo Construction equipment.
- operate by dropping the machine body.

## Working within dangerous areas

- Observe great care at marked danger areas.
- Do not operate too close to the edge of a quay, ramp, ditch and so on.
- Move slowly when working in confined spaces and check that there is sufficient room for machine and load.
- When working under ground, special equipment, for example certified engine is required within the EU and in EES countries. Talk to your dealer.
- When working in low light conditions, for example buildings and tunnels, use head light.
- Do not operate the machine when visibility is poor such as a heavy fog, snow or rain.
- When working in an area which is contaminated or dangerous to one's health, the machine must be especially equipped for this purpose. Talk to your dealer. Check also local regulations before entering the area.

## High voltage overhead power line



Risk of electrocution

Working near or making contact with overhead power lines may lead to electrical flashover and electrocution.

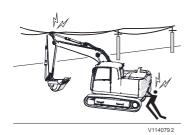
Always keep the minimum clearance from overhead power lines.



Risk of electrocution.

Contact with live parts will cause death or serious injury.

Never touch live electrical parts.





High voltage is lethal and the current sufficiently strong to destroy both machine and attachments. Your life is in danger if you come into contact with or close to high voltage power lines. Always contact the power company responsible before beginning any work near high voltage power lines. Go through the special instructions issued by the power company for work/presence near the power lines. Regard all power lines as if they were live even if they are supposed to be without current. Working when the machine or its load at any time is closer than the minimum safety distance to a power line, is taking a very serious risk.

Remember that the voltage of the power line determines the safety distance. Electrical flashover may occur and damage machine and operator at fairly great distances from the power line.

Voltage	Minimum distance to power line
0 ~ 50 kV	3 m (10 ft)
50 ~ 69 kV	4.6 m (15 ft)
69 ~ 138 kV	5 m (16.4 ft)
138 ~ 250 kV	6 m (20 ft)
250 ~ 500 kV	8 m (26 ft)
500 ~ 550 kV	11 m (35 ft)
550 ~ 750 kV	13 m (43 ft)
750 kV~	14 m (46 ft)

## NOTICE

The operator should have secure visibility when working around the power lines.

## NOTICE

When transporting the machine also take overhead power lines into consideration.



Remember that the roof window may distort how distance is perceived.

- Keep the following in mind to ensure safety when operating.
  - Operate the machine slower than normal operation in the vicinity of power lines.
  - Consider the long-span power line, which can sway and reduce the clearance.
  - Pay attention when travelling over uneven ground that could cause the machine to lose balance.
  - Keep all persons away from the machine whenever it is close to power lines.
  - Prohibit persons from touching the machine or its load before it is confirmed to be safe.
- Find out what action to take if a person has been exposed to an electric shock.
- Procedure if a machine touches the power line.
  - The operator should stay inside the cab.
  - All other persons should keep away from the machine, ropes, and load.
  - The operator should try to remove the machine from contact by moving it in the reverse direction from that which caused the contact.
  - If the machine cannot be moved away from contact, the operator should remain inside cab until the lines have been de-energized.

# Overhead railway power lines



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.



Risk of electrocution.

Contact with live parts will cause death or serious injury.

Never touch live electrical parts.

Loading and unloading is only permissible between the boundary signs. The signs may be mounted directly on the power line or on special posts.

- Contact authorised railway personnel to obtain permission to load or unload.
- After any breaks in the work, always contact the railway personnel again.

# 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 266. The position of the pipe or cable may deviate from the drawing or distances may be incorrectly determined. Regard all electrical cables as live.

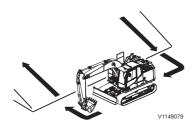
# Working on slopes



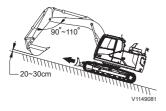
In order not to jeopardise the lubrication of the engine, the machine must not be inclined more than 35 degrees in either direction. In addition it may be unsuitable to operate at this inclination as the machine may become unstable and unbalanced, depending on the load.

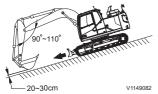
## Caution on a slope

- Be careful when opening or closing the doors on a slope, operational force may be changed rapidly. Make sure to keep the doors closed.
- Do not descend backward on a slope.
- Operate the travel function slowly when approaching or descending a slope.
- Do not change direction or travel a cross on a slope. Change direction on level ground, if necessary first come down to level ground and make a detour.
- If the machine slides, immediately lower the bucket to the ground. The machine can turn over due to unbalance. Especially, do not swing with loaded bucket. In unavoidable case, pile up earth on the slope, and then make the machine level and stable.
- While travelling on a slope, keep the angle between boom and dipper arm at 90 110 °, raise the bucket 20 30 cm from the ground
- While travelling down on a slope, keep the angle between boom and dipper arm at 90 - 110°, raise the bucket 20 - 30 cm from the ground and travel at low speed.











If the shoes slip on a slope, thrust bucket into the ground, and pull the dipper arm in to assist the track drive to move the machine up the slope.

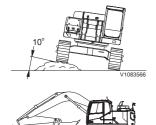
# In case of engine failure

In case of engine shut down while travelling on a slope, put the travel lever to neutral position and lower bucket down to the ground, then start the engine.

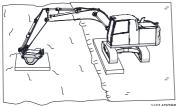
If the engine shuts down on a slope, do not operate the swing function, since the superstructure may be swung under its own weight and cause tipping or side slipping.

# Travelling on uneven ground

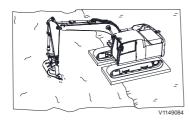
- In case of travelling on uneven ground, reduce travel speed and operate the machine so as not to lean to one side more than 10°.
- In case of travelling on flat ground, retract the attachment and raise it 40 50 cm from the ground.



40~50cm









- 1 Top roller
- 2 Water level

# Working in water and on boggy ground

Be very careful when working on boggy ground.

# In case that one track gets bogged

If one track gets bogged down, raise this track using the bucket and put a plank under the track.

When the machine is lifted with the aid of the boom or the dipper arm, the bottom of the bucket should rest on the ground not the bucket teeth.

Set the angle between boom and dipper arm at 90 ° ~ 110 °.

After working in water or escaping from boggy ground, replenish the grease to the attachment pins or the areas affected by the water. Check the idler, rollers and track drive case oil, if contaminated, change the oil.

# In case both tracks get bogged

In case that both tracks get bogged down, put planks under each track. Thrust the bucket into the ground, pull with the dipper arm as when digging, and move the travel lever forward to escape.

# Permissible depth of water

Pay attention to the permissible water depth in order to avoid damage to the machine.

Permissible working depth in water is the center of top rollers.

Do not fully submerge the top rollers.

Upon leaving the water, make sure all the grease is replenished in the areas affected by the water, for example bucket pin and so on, remove the old grease completely regardless of the maintenance period. Also check the oil in the travel drive for contamination, and if necessary, replace it.

# Working in cold weather



Risk of electrical shock.

Personal injury results if a body part comes into contact with a machine that conducts electric power.

Disconnect the electrical engine heater before working on the machine.



Risk of frostbite.

Bare skin can freeze stuck to cold metal which could cause injury.

Use personal protective equipment when handling cold objects.



Risk of crushing injury.

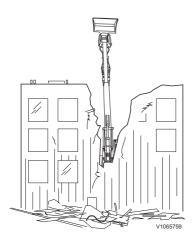
The hydraulic system could respond slowly at low temperatures and could cause unexpected machine movements.

Operate carefully until the hydraulic system has reached operating temperature.

Read the advice for starting, see page 176. Use appropriate fluids for the ambient working temperatures. (see recommended fluids in specification section.)

The windows must be free from ice and snow before putting the machine to work.

- Watch out for ice on the machine causing slippery conditions. Step only onto anti-slip surfaces.
- Use an ice scraper on a long handle or a ladder when removing ice from the windows.



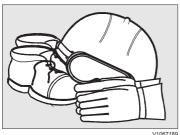
## **Demolition work**

The machine is often used for demolition work. Be extremely careful and study the work site thoroughly. Use fall protection over the cab against falling objects.

- Make sure that the material, on which the machine is standing, cannot collapse or slide.
- Operate the machine on firm level ground, if necessary prepare the area with another machine first.
- Do not work close to free-standing walls, which may fall over the machine.
- At all times be aware of where your workmates are. Do not work if anyone is dangerously close to the demolition object.
- Leave sufficient space in front of the machine for debris to fall to the ground and not hit the cab.
- Fence off the dangerous part of the work site.
- Spray water over the demolition site to prevent harmful dust from spreading.

Boots with steel reinforcements in the soles and toe caps, protective goggles and a hard hat are obvious protective items to be worn on a demolition site.

If the machine is equipped with special demolition equipment, read the supplied instruction booklet about the safety risks that might occur and how the demolition equipment is used.



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# **Attachments**



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 direct-mounted attachments or attachments mounted with a hydraulically controlled quick coupler which allows rapid changes of attachments.

Always follow Volvo recommendations when choosing attachments. (1)(2) If other attachments are used, follow the Operator's manuals from the respective suppliers.

It is the responsibility of the machine owner to make sure that these attachments are approved for mounting on the machine. The machine owner is responsible for the safety of the combination machine – attachment.

For more detailed information regarding the choice of attachments, contact a Volvo Construction Equipment dealer. (3)

The machine is prepared for several types of attachments, e.g. hammer, tiltrotator, grading bucket. In order to be able to connect these hydraulically to the machine, the pressure in the hydraulics must be released, see page *345*.

1. Scan the QR code. Volvo attachment selector mobile app is here! (for Google Play Store



2. Scan the QR code. Volvo attachment selector mobile app is here! (for Apple App Store

 Scan the QR code>click the "Show all local websites">select your region with suitable language> click the "Contact us" to contact Volvo Construction Equipment dealer for further information.



The certification of each attachment and separate Operator's manual should be provided to the customers by the manufacturer of the attachment.

# WARNING X

# Boom float position, description

Float position means that both the boom cylinders' piston and piston rod sides are connected to the hydraulic tank. The boom then floats with the weight of the attachments when operating the boom lever forward. The boom lifting is not affected by float position.

Float position gives better fuel economy, faster excavation cycle, less wear and less vibration. When the float position is engaged, the hydraulic oil of the machine can be used for other purposes than lowering the boom, such as the dipper arm and/or bucket operation. These functions then become faster and more efficient.

#### Keep the following in mind.

- Always make sure that the boom operating lever is in the neutral position before activating the float position.
- Do not select the float position mode while the track or tracks are elevated. Selecting the float position mode and operating the boom operating lever forward (boom down position) while the track or tracks are elevated could cause the machine to drop down suddenly.
- Do not release float position mode while the boom operating lever forward (boom down position) and bucket or tool is on the ground. This could cause the machine to tilt up suddenly.
- Do not attempt to lift the track or tracks while the machine is in float position mode.



- 1 Float On / Off button
- 2 Control lever with four buttons



Indicator on the instrument panel

Use the float position when the attachment has to follow the irregular ground, such as for bedrock clearance, grapple handling and when unloading barges and flatbeds. Float position also makes unloading more manageable.

- 1 Select the float position using button 1 on the right control lever in order to activate the float function. The control lever should have the float function, see page *95*. The float operation indicator on the front instrument panel lights up.
- 2 Float position is only in operation when you push the boom operating lever forward. When the attachment is to follow the ground, the boom operating lever must therefore be held forwards all the time. The boom can then move upward and downward freely depending on the state of the ground.
- 3 Deactivate the float position by pressing the button 1 again. The indicator on the instrument panel will go out.

#### NOTE!

When the boom float function is on, the function will remain even if the ignition switch is off and on again. The indicator on the instrument panel will be also displayed.

# Attachments, connecting and disconnecting

Attachment quick coupler, S60



Risk of crushing.

Falling attachments could result in severe injury or death.

Make sure the attachment bracket is properly locked before starting work.



Risk of crushing.

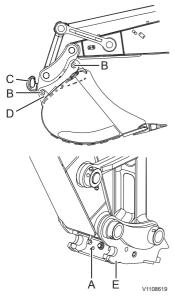
An unsecured attachment could fall and cause serious injury or death.

Always ensure the attachment is properly secured by pressing the front part of the attachment to the ground until the machine is slightly lifted.

The attachment quick coupler consists of flat mounting plates which are attached to the end of dipper arm and bucket link. There are two hooks (E) on the plate for the pins (B) on the bucket.

There is a lift hook (C) on the attachment quick coupler (optional).

The attachment quick coupler is equipped with a double-acting hydraulic cylinder. The quick coupler's lock wedge (D) is fitted to its piston rod. Servo pressure acts on the piston of the lock cylinder, locking the bucket in place against bucket pin (B). This means that the lock wedge adjusts itself and provides gap-free locking.



- A Red indicator pin
- B Bucket pins
- C Lift hook
- D Lock wedge
- E Hooks for gripping attachment

When the lock wedge (D) is released, the servo pressure is transferred to the piston rod side. If necessary, the release pressure can be increased by loading the bucket cylinder in its end position.

There is a red indicator pin (A) on the quick coupler, which is pulled in when the lock wedge is in the locked position and pushed out when the lock wedge is released.

By means of the lift hook, the machine can be used for lifting operations. Since the hook is located on the attachment quick coupler, it can be used without a bucket. This improves visibility for the operator and increases the maximum permissible load.

#### NOTE!

See page 260 for information on the lifting objects.





The attachment quick coupler may be open regardless of what is indicated by the alarm signal or on the instrument panel. Therefore, always check that the attachment quick coupler is locked securely. Also read the instructions in the operator's manual.



Risk of crushing.

If the pressure in the attachment quick coupler cylinder drops, the attachment could fall off and cause serious crushing injury or death.

Never install shut-off valves in the lines leading to the cylinder for the attachment quick coupler.

# Bucket, removing



Risk of crushing!

Attachments that move unexpectedly can cause iniuries.

Make sure people stay out of the working area when connecting or disconnecting attachments.

- 1 Park the machine on even, firm and level ground with the bucket resting on the ground.
- 2 Press down to release the red lock device (A) on the right-hand attachment quick coupler switch and then press the switch to position (1) to initiate the attachment guick coupler. When the attachment guick coupler is initiated, the buzzer sounds and the check message and indicator are displayed in the IC (Instrument Cluster). See page 79 for more information.
  - 3 Press the left-hand attachment quick coupler switch for more than 0.7 seconds to open the attachment quick coupler. The switch is returned automatically. See page 36 for more information.



Attachment quick coupler switch, right



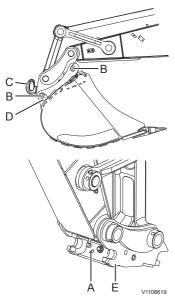
Attachment quick coupler switch, left



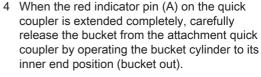
Warning! Quick coupler unlocked

#### NOTE!

When the attachment quick coupler is open, the buzzer sounds and the warning message and indicator are displayed in the IC (Instrument Cluster).



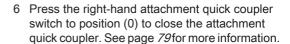
- A Red indicator pin
- B Bucket pins
- C Lift hook
- D Lock wedge
- E Hooks for gripping attachment



#### NOTE!

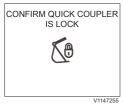
If the red indicator pin (A) is not extended, increase the hydraulic pressure to the lock cylinder by carefully moving the bucket cylinder to its outer end position (bucket in), and keeping it under pressure for about a second.

5 Disconnect the bucket by extending the dipper arm and raising the boom.





Attachment quick coupler switch, right



Confirm quick coupler is locked

#### NOTE!

When the switch is in position (0), the buzzer sounds and the check message for confirmation and indicator are displayed in the IC (Instrument Cluster).



Attachment quick coupler switch, left

7 Press the left-hand attachment quick coupler switch for more than 0.7 seconds to confirm that the attachment quick coupler is locked. Then the buzzer sound will be turned off and the check message and indicator will disappear. See page 36 for more information.

# Bucket, installing

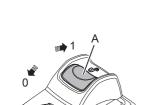


Risk of crushing!

Attachments that move unexpectedly can cause injuries.

Make sure people stay out of the working area when connecting or disconnecting attachments.

- 1 Park the machine on even, firm and level ground.
- 2 Press down to release the red lock device (A) on the right-hand attachment quick coupler switch and then press the switch to position (1) to initiate the attachment quick coupler. When the attachment quick coupler is initiated, the buzzer sounds and the check message and indicator are displayed in the IC (Instrument Cluster). See page 79 for more information.
- 3 Press the left-hand attachment quick coupler switch for more than 0.7 seconds to open the attachment quick coupler. The switch is returned automatically. See page 36 for more information.



Attachment quick coupler switch, right



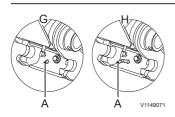
Attachment quick coupler switch, left



Warning! Quick coupler unlocked

#### NOTE!

When the attachment quick coupler is open, the buzzer sounds and the warning message and indicator are displayed in the IC (Instrument Cluster).



- G Indicator pin fully retracted : lock position
- H Indicator pin fully extended : unlock position
- A Red indicator pin



Attachment quick coupler switch, right



Confirm quick coupler is locked

4 Check that the red indicator pin (A) is fully extended.

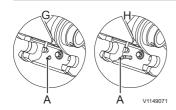
#### NOTE!

If the red indicator pin (A) is not extended, increase the hydraulic pressure to the lock cylinder by carefully moving the bucket cylinder to its outer end position (bucket in), and keeping it under pressure for about a second.

- 5 Operate the dipper arm to such a position that the two hooks on the attachment quick coupler engage the bucket's front pin.
- 6 Slowly turn the attachment quick coupler towards the bucket by moving the bucket cylinder (bucket in) until the quick coupler mates correctly against the bucket.
- 7 Check that the attachment quick coupler is correctly aligned against the tip of the bucket, if necessary, adjust with dipper arm or boom movements.
- 8 Press the right-hand attachment quick coupler switch to position (0) to close the attachment quick coupler. See page 79 for more information.

#### NOTE!

When the switch is in position (0), the buzzer sounds and the check message for confirmation and indicator are displayed in the IC (Instrument Cluster).



9 Check that red indicator pin (A) is fully retracted into the attachment quick coupler.

G Indicator pin fully retracted

: lock position

H Indicator pin fully extended

: unlock position

A Red indicator pin



Attachment quick coupler switch, left



10 Press the left-hand attachment quick coupler switch for more than 0.7 seconds to confirm that the attachment quick coupler is locked. Then the buzzer sound will be turned off and the check message and indicator will disappear. See page 36 for more information.

- 11 Perform the following tests to check that the attachment quick coupler is fastened securely.
  - Press the bucket against the ground.
  - Operate the bucket cylinder in and out to check that lock wedge (D) is seated securely. If you are not sure, check that lock wedge (D) has gone into the hook.
  - Do not use the machine if the attachment quick coupler is not working.
  - Contact a workshop authorized by Volvo if anything is wrong.



Risk of crushing.

If the red warning lamp for open attachment bracket lights up while working, the attachment could fall off and cause serious crushing injury or death.

Stop working with the machine immediately and make sure the attachment bracket is properly locked before starting to work again.

# Attachment quick coupler, U14-U52



Risk of crushing.

Falling attachments could result in severe injury or death.

Make sure the attachment bracket is properly locked before starting work.



Risk of crushing.

An unsecured attachment could fall and cause serious injury or death.

Always ensure the attachment is properly secured by pressing the front part of the attachment to the ground until the machine is slightly lifted.

The attachment quick coupler is equipped with a double-acting hydraulic cylinder. The hook for gripping the attachment is fitted to its piston rod. The hydraulic system's pressure acts on the lock cylinder's piston, locking the attachment in place against the rear bucket pin. This means that the hook adjusts itself and provides gap-free locking.

When checking from the cab if the attachment quick coupler is locked or unlocked, slowly curl out the bucket/attachment and dipper arm.

By means of the lifting eye, the machine can be used for lifting operations. Since the lifting eye is located on the attachment quick coupler, it can be used without a bucket. This improves visibility for the operator and increases the maximum permissible load.

#### NOTE!

See page 260 for information on the lifting objects.

# Bucket, removing

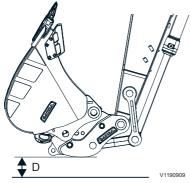


Risk of crushing!

Attachments that move unexpectedly can cause injuries.

Make sure people stay out of the working area when connecting or disconnecting attachments.

- 1 Park the machine on firm and level ground.
- 2 Curl in the bucket completely towards the dipper arm (to release the lock mechanism).



D = 200 mm (7.87 inches)



Attachment quick coupler switch, right

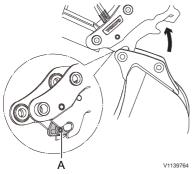


Attachment quick coupler switch, left

- 3 Press down to release the red lock device (A) on the right-hand attachment quick coupler switch and then press the switch to position (1) to initiate the attachment quick coupler. When the attachment quick coupler is initiated, the buzzer sounds and the check message and indicator are displayed in the IC (Instrument Cluster). See page 79 for more information.
- 4 Press the left-hand attachment quick coupler switch for more than 0.7 seconds to open the attachment quick coupler. The switch is returned automatically. See page *36* for more information.



Warning! Quick coupler unlocked



Attachment quick coupler, unhooking A Front lock device



Attachment quick coupler switch, right



Confirm quick coupler is locked

#### NOTE!

When the attachment quick coupler is open, the buzzer sounds and the warning message and indicator are displayed in the IC (Instrument Cluster).

5 Make sure that the front lock device (A) is fully opened to unhook it from the bucket pin. Otherwise, the bucket pin cannot disengage correctly.

#### NOTE!

If the front lock device (A) is not opened, increase the hydraulic pressure to the lock cylinder by carefully moving the bucket cylinder to its outer end position (bucket in), and keeping it under pressure for about a second.

- 6 Lower the bucket and curl out to lift up the attachment quick coupler from the bucket.
- 7 Place the bucket flat on the ground and unhook it
- 8 Press the right-hand attachment quick coupler switch to position (0) to close the attachment quick coupler. See page 79 for more information.

#### NOTE!

When the switch is in position (0), the buzzer sounds and the check message for confirmation and indicator are displayed in the IC (Instrument Cluster).



Attachment quick coupler switch, left

9 Press the left-hand attachment quick coupler switch for more than 0.7 seconds to confirm that the attachment quick coupler is locked. Then the buzzer sound will be turned off and the check message and indicator will disappear. See page 36 for more information.

# Bucket, installing

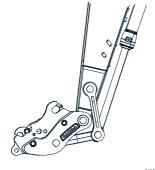


Risk of crushing!

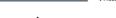
Attachments that move unexpectedly can cause injuries.

Make sure people stay out of the working area when connecting or disconnecting attachments.

- 1 Park the machine on firm and level ground.
- 2 Curl in the bucket completely towards the dipper arm (to release the lock mechanism).

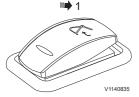


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Attachment quick coupler switch, right

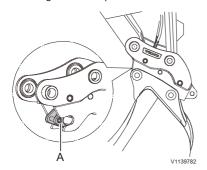


Attachment guick coupler switch, left

- 3 Press down to release the red lock device (A) on the right-hand attachment quick coupler switch and then press the switch to position (1) to initiate the attachment quick coupler. When the attachment quick coupler is initiated, the buzzer sounds and the check message and indicator are displayed in the IC (Instrument Cluster). See page 79 for more information.
- 4 Press the left-hand attachment quick coupler switch for more than 0.7 seconds to open the attachment quick coupler. The switch is returned automatically. See page *36* for more information.



Warning! Quick coupler unlocked



Bucket in locked position A Front lock device



Attachment quick coupler switch, right



Confirm quick coupler is locked

#### NOTE!

When the attachment quick coupler is open, the buzzer sounds and the warning message and indicator are displayed in the IC (Instrument Cluster).

5 Make sure that the front lock device (A) is fully opened before hooking it onto the bucket pin. Otherwise, the bucket pin cannot be engaged correctly.

#### NOTE!

If the front lock device (A) is not opened, increase the hydraulic pressure to the lock cylinder by carefully moving the bucket cylinder to its outer end position (bucket in), and keeping it under pressure for about a second.

- 6 Curl out the attachment quick coupler and hook it onto the bucket pin.
- 7 Slowly curl in the attachment quick coupler fully towards the bucket.
- 8 Press the right-hand attachment quick coupler switch to position (0) to close the attachment quick coupler. See page 79 for more information.

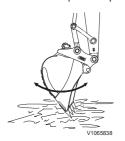
#### NOTE!

When the switch is in position (0), the buzzer sounds and the check message for confirmation and indicator are displayed in the IC (Instrument Cluster).

- 9 Visually check that the front lock device is fully engaged.
- 10 Lift and curl in the bucket fully towards the dipper arm and hold it there for approximately 5 seconds to ensure that the attachment quick coupler has locked securely to the bucket.



Attachment quick coupler switch, left



- 11 Press the left-hand attachment quick coupler switch for more than 0.7 seconds to confirm that the attachment quick coupler is locked. Then the buzzer sound will be turned off and the check message and indicator will disappear. See page 36 for more information.
  - 12 Perform the following tests to check that the attachment quick coupler is fastened securely.
    - Press the bucket against the ground. In this position, curl the bucket in and out to check that it is locked in the correct position.
    - If you are uncertain about whether the bucket is securely locked to the attachment quick coupler, get out and check that the front lock device is fully engaged.
    - Do not use the machine if the attachment quick coupler is not working.
    - Contact a workshop authorized by Volvo if anything is wrong.



Risk of crushing.

If the red warning lamp for open attachment bracket lights up while working, the attachment could fall off and cause serious crushing injury or death.

Stop working with the machine immediately and make sure the attachment bracket is properly locked before starting to work again.

# Attachment quick coupler, E14-E48



Risk of crushing.

Falling attachments could result in severe injury or death.

Make sure the attachment bracket is properly locked before starting work.



Risk of crushing.

An unsecured attachment could fall and cause serious injury or death.

Always ensure the attachment is properly secured by pressing the front part of the attachment to the ground until the machine is slightly lifted.

The attachment quick coupler is equipped with dual automatic locking system. The hook for gripping the attachment is fitted to its piston rod. The hydraulic system's pressure acts on the lock cylinder's piston, locking the attachment in place against the rear bucket pin. This means that the hook adjusts itself and provides gap-free locking.

When checking from the cab if the attachment quick coupler is locked or unlocked, visually check that the front lock device is fully engaged and then slowly curl out the bucket/attachment and dipper arm.

By means of a lifting device such as an eye and hook, the machine can be used for lifting operations. Since the lifting device is located on the attachment quick coupler, it can be used without a bucket. This improves visibility for the operator and increases the maximum permissible load.

#### NOTE!

See page 260 for detailed information.

# Bucket, removing



Risk of crushing!

Attachments that move unexpectedly can cause injuries.

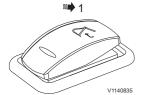
Make sure people stay out of the working area when connecting or disconnecting attachments.

- 1 Park the machine on firm and level ground.
- 2 Lower the boom and bucket to the ground.
- 3 Press down to release the red lock device (A) on the right-hand attachment quick coupler switch and then press the switch to position (1) to initiate the attachment quick coupler.

  When the attachment quick coupler is initiated, the buzzer sounds and the check message and indicator are displayed in the IC (Instrument Cluster). See page 79 for more information.
- 4 Press the left-hand attachment quick coupler switch for more than 0.7 seconds to open the attachment quick coupler. The switch is returned automatically. See page 36 for more information.



Attachment quick coupler switch, right



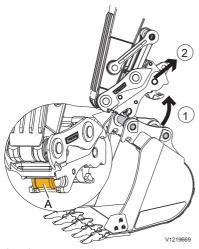
Attachment quick coupler switch, left



Warning! Quick coupler unlocked

#### NOTE!

When the attachment quick coupler is open, the buzzer sounds and the warning message and indicator are displayed in the IC (Instrument Cluster).



Attachment, removing A Front lock device

5 Make sure that the front lock device (A) is fully opened to unhook it from the bucket pin. Otherwise, the bucket pin cannot disengage correctly.

#### NOTE!

If the front lock device (A) is not opened, increase the hydraulic pressure to the lock cylinder by carefully moving the bucket cylinder to its outer end position (bucket in), and keeping it under pressure for about a second.

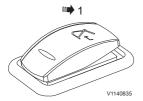
- 6 Lift up the attachment quick coupler from the rear bucket pin (1).
  Operate the dipper arm to outward (2) in order to disengage it from the front bucket pin.
- 7 Press the right-hand attachment quick coupler switch to position (0) to close the attachment quick coupler. See page 79 for more information.



Attachment quick coupler switch, right



Confirm quick coupler is locked



Attachment quick coupler switch, left

#### NOTE!

When the switch is in position (0), the buzzer sounds and the check message for confirmation and indicator are displayed in the IC (Instrument Cluster).

8 Press the left-hand attachment quick coupler switch for more than 0.7 seconds to confirm that the attachment quick coupler is locked. Then the buzzer sound will be turned off and the check message and indicator will disappear. See page 36 for more information.

# Bucket, installing

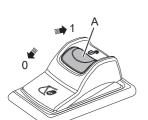


Risk of crushing!

Attachments that move unexpectedly can cause injuries.

Make sure people stay out of the working area when connecting or disconnecting attachments.

- 1 Park the machine on firm and level ground.
- 2 Press down to release the red lock device (A) on the right-hand attachment quick coupler switch and then press the switch to position (1) to initiate the attachment quick coupler. When the attachment quick coupler is initiated, the buzzer sounds and the check message and indicator are displayed in the IC (Instrument Cluster). See page 79 for more information.
- 3 Press the left-hand attachment quick coupler switch for more than 0.7 seconds to open the attachment quick coupler. The switch is returned automatically. See page 36 for more information.



Attachment quick coupler switch, right



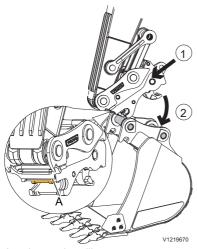
Attachment quick coupler switch, left



Warning! Quick coupler unlocked

#### NOTE!

When the attachment quick coupler is open, the buzzer sounds and the warning message and indicator are displayed in the IC (Instrument Cluster).



Attachment, installing
A Front lock device

4 Make sure that the front lock device (A) is fully opened before hooking it onto the bucket pin. Otherwise, the bucket pin cannot be engaged correctly.

#### NOTE!

If the front lock device (A) is not opened, increase the hydraulic pressure to the lock cylinder by carefully moving the bucket cylinder to its outer end position (bucket in), and keeping it under pressure for about a second.

- 5 Curl out the attachment quick coupler and hook it onto the front bucket pin (1).
- 6 Slowly curl in the attachment quick coupler fully towards the rear bucket pin (2).
- 7 Press the right-hand attachment quick coupler switch to position (0) to close the attachment quick coupler. See page 79 for more information.



Attachment quick coupler switch, right



Confirm quick coupler is locked

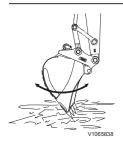


Attachment quick coupler switch, left

#### NOTE!

When the switch is in position (0), the buzzer sounds and the check message for confirmation and indicator are displayed in the IC (Instrument Cluster).

- 8 Visually check that the front lock device is fully engaged.
- 9 Lift and curl the bucket in and out to check that the attachment quick coupler has locked securely to the bucket.
- 10 Press the left-hand attachment quick coupler switch for more than 0.7 seconds to confirm that the attachment quick coupler is locked. Then the buzzer sound will be turned off and the check message and indicator will disappear. See page 36 for more information.



- 11 Perform the following tests to check that the attachment quick coupler is fastened securely.
  - Press the bucket against the ground. In this position, curl the bucket in and out to check that it is locked in the correct position.
  - Do not use the machine if the attachment quick coupler is not working.
  - Contact a workshop authorized by Volvo if anything is wrong.

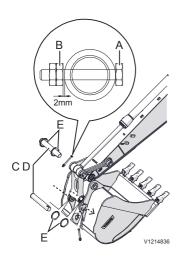


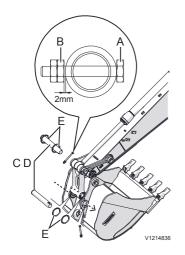
Risk of crushing.

If the red warning lamp for open attachment bracket lights up while working, the attachment could fall off and cause serious crushing injury or death.

Stop working with the machine immediately and make sure the attachment bracket is properly

locked before starting to work again.





# **Buckets**

Bucket, changing Bucket, removal



Risk of splinter injury.

Striking the bucket pin with a hammer could cause metal chips to fly around and cause serious splinter injury.

Always wear face and eye protection, hard hat and gloves while removing and installing the bucket pins.

- 1 Lower the bucket lightly on the ground.
- 2 Remove the lock screw (A) and nut (B) of each pins.
- 3 Remove pins (C and D) and O-rings (E), then remove the bucket.

# NOTICE

Block the removed bucket to stabilise it. Keep the pins clean and do not damage the O-ring.

**Bucket, Installation** 



Risk of cutting and crushing.

Loose parts could cause crushing and cutting injury. Never use your fingers for checking alignment between loose parts. Always use a tool.

- 1 Align the dipper arm and links to the bucket.
- 2 Put O-rings (E) at the holes for the dipper arm and link. Align the holes between bucket and dipper arm and links.
- 3 Apply grease to the holes.
- 4 Insert pins (C and D).
- 5 Install lock screw (A) and nut (B) of each pins.

# NOTICE

Make sure that there is a clearance of at least 2 mm (0.08 in) between nut and pin boss. Lubricate the pin.

# Working with buckets



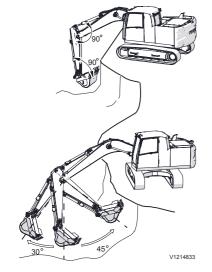
Select a suitable attachment that fits the machine on which it is to be installed. The types of attachments that can be installed vary with the machine type. Contact a workshop authorised by Volvo.

The machine is prepared for several different type of optional equipment to perform many types of work. Only the simplest operations are described below.

#### Backhoe work

Backhoe work is digging the material at a lower level than the machine is located.

When the angle between bucket cylinder and links, dipper arm cylinder and dipper arm is set to 90° respectively, the working efficiency of each cylinder will be at its maximum. Take advantage of this angle to improve the work efficiency. The range for effective digging is when the dipper arm is between 30° forward and 45° rearward. There may be a little difference according to digging depth. Do not use the cylinder up to its stroke end, but only within this range.



# Ditching work

Install a proper bucket for ditching. Place the machine where the ditching is performed effectively.

In case of a wide ditch, dig both sides in first, and then dig the center area.





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# Loading work

Position the hauler or truck so as to achieve a small swing movement and good visibility for the operator to work effectively.

Also load over the rear side of the dump truck rather than over the side, as this makes the operator work easier and increases efficiency.

# Hammer

# Hammer (hydraulic breaker)

Select the proper attachment in accordance with the machine on which the attachment is installed. The type of attachment which can be installed varies with the machine type.

Use only a hydraulic breaker that is recommended by Volvo.

For more attachment information, refer to the Volvo attachment selector mobile application<sup>(1)(2)</sup> or contact Volvo Construction Equipment dealer.<sup>(3)</sup>

#### NOTE!

For complete instructions for the hydraulic breaker, read the separate Operator's Manual for the hammer.

Do not operate the hydraulic breaker until you read and understand both machine and hydraulic breaker manuals.

#### NOTE!

Lubricate the excavator units (such as boom, arm and linkages) twice a day.

If the machine is provided with an attachment quick coupler, this must be checked every day at the same time as rectifying any play.

1. Scan the QR code. Volvo attachment selector mobile app is here! (for Google Play Store)



2. Scan the QR code. Volvo attachment selector mobile app is here! (for Apple App Store)



3. Scan the QR code>click the "Show all local websites">select your region with suitable language>click the "Contact us" to contact Volvo Construction Equipment dealer for further information.





Risk of severe personal injury.

While working with the hammer flying chips of rock could cause severe injury.

Provide protective nets for the windscreens. Keep windows and door closed and prevent persons from entering the risk zone when operating the hydraulic breaker.

#### Main work applications

#### NOTE!

The machine images in this section are from one of the excavators. However the guideline is valid for all excavators.

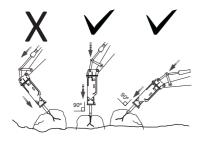
- Breaking stone
- Demolition work
- Road repairing

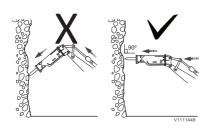
The machine is widely used for the demolition of buildings, breaking road surfaces, tunnelling work, smashing slag, and breaking or cutting stone.

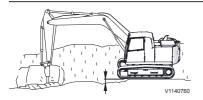
Press the tool (chisel) firmly onto the surface at a right angle as shown.

#### NOTE!

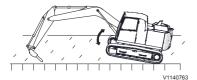
The standard hydraulic breaker must not be used underwater. If the water fills the space where the piston strikes the tool, a strong pressure wave is generated and the hydraulic breaker may be damaged.



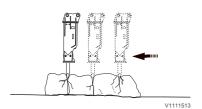




When striking, press the tool firmly onto the surface, and lift the frame about 5 cm (2 in). Never raise the machine unnecessarily high.

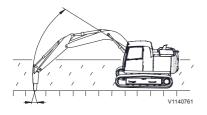


Do not raise the machine by extending the bucket cylinder to maximum.

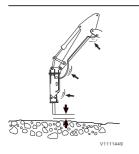


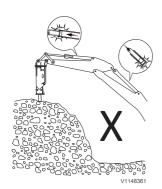
If the surface is repeatedly struck but it is not broken within 30 seconds, move the hydraulic breaker to break from the end portion.

Also, if the block has not cracked after a series of approximately ten strokes, change the point of attack.



The striking direction of tool and hydraulic breaker body are slightly deviated. Therefore, adjust the bucket cylinder so that the direction for body and tool is always the same.

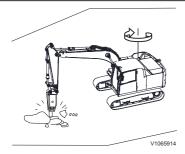




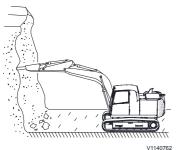
Listen to the sound of the hydraulic breaker while you are using it. If the sound becomes weaker and the impact less efficient, the tool is misaligned with the material and/or there is not enough feed force on the tool. Realign the tool and press the tool firmly against the material.

Stop operation if hydraulic hoses shake abnormally. Immediately stop the operation. Otherwise this may result in serious failure in the hydraulic system including pumps. Check the gas pressure of the back head and accumulator and charge the pressure to the recommended value. See the breaker's manual for detailed information.

Do not operate the bucket, arm and boom cylinders closer to their end positions than 10 cm (4 in) to prevent cylinder's damage.



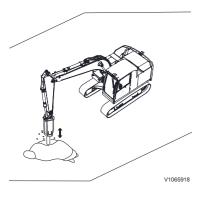
Do not swing the machine during breaking work.



Avoid working with the hydraulic breaker horizontally or in an upward direction. This will cause significant wear.

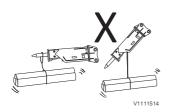


Do not bend with the tool to make a hole in the ground.

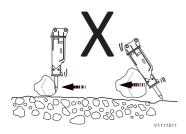


Do not break the materials using the drop force of the boom. The machine structure can be damaged. Press the tool firmly against the surface so idle striking is avoided.

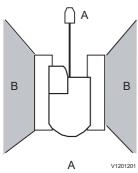
Do not move the tool while it is striking a blow.



The hydraulic breaker is not designed to lift or transport loads. The hydraulic breaker may easily be damaged and it is very dangerous.



Avoid moving and collecting objects using the hydraulic breaker.



The best working area is in the longitudinal direction of the undercarriage and within an approximate 45° sector in both directions (A).

Do not operate the hydraulic breaker in area (B). The machine can be unstable and undercarriage components may fail as a result of excessive loads on the undercarriage.

- A Longitudinal direction of the undercarriage
- B Across undercarriage: not recommended

#### Hose rupture valves

(Optional equipment)



Do not dismantle the hose rupture valve as it is pressurised. Contact a workshop authorised by Volvo if problems arise.



Risk of serious injury.

Working under an attachment that is not properly supported could cause serious injury.

Before working under an attachment, ensure the attachment is properly supported and the control lockout lever has been locked and the engine is shut off. Ensure that nobody enters the cab while working under the attachment.

### Attachment lowering after hose rupture

#### When engine is running

Lower the boom or dipper arm with the operating levers in the usual way. Collect the oil from the ruptured hose in a suitable vessel.

#### When engine is stopped

The servo hydraulic pressure is maintained by a pressure in accumulator for a few minutes, which permits the operator to lower the boom or dipper arm in the usual way with operating levers. Do not wait too long to lower the boom, the servo hydraulic pressure will reduce at a speed depending on your machine's condition and equipment. Collect the oil from the ruptured hose in a suitable yessel.

When engine is stopped and with no servo hydraulic pressure



Risk of high pressure injection.

The hydraulic oil is under high pressure.

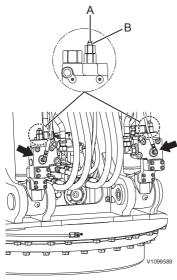
Discharging hydraulic oil will cause serious injury when injected into the skin.

Depressurize the hydraulic system before connecting or disconnecting hydraulic hoses.

#### NOTICE

Always use personal protective equipment, such as working gloves, overalls and face protection or protective goggles with side protection before you release excess pressure in a hydraulic hose or pipe connection.

- 1 Loosen lock nut (B) and turn adjusting screw (A) counter-clockwise slowly.
  - Before turning the adjusting screw, mark its position to facilitate assembling later (setting pressure: 35.8 MPa, 365 kgf cm², 5192 psi) The boom will then slowly be lowered to the ground.
- 2 Turn adjusting screw (A) to its original position.
- 3 Hold adjusting screw (A) securely and tighten lock nut (B).
- 4 Contact an authorized Volvo Construction Equipment dealer workshop.



Hose rupture valves

- A Adjusting screw
- B Lock nut

#### Selecting track shoes

Grouser	Use	Precautions when using
A 500 mm 600 mm	Rocky ground, normal soil	Travel in low speed when travelling on rough ground with obstacles such as large boulders and fallen trees.
B 700 mm 750 mm 800 mm	Soft ground	Travel in high speed only on flat ground. When it is impossible to avoid travelling over obstacles, lower the travel speed to approximately half of low speed.
		NOTE! Cannot be used on rough ground where there are large obstacles such as boulders or fallen trees.
C 900 mm	Extremely soft ground (boggy ground)	Use only for ground where "A" and "B" are impossible to use. Travel in high speed only on flat ground. When it is impossible to avoid travelling over obstacles, lower the travel speed to approximately half of low speed.
		NOTE! Cannot be used on rough ground where there are large obstacles such as boulders or fallen trees.
D Rubber pad	Pavement	Use only on pavement  NOTE!  Cannot be used on rough ground

#### Rubber shoe/pad usage

When using rubber shoe/pad, keep the following in mind.

#### 1 Rubber track tension

Correct tension adjustment is critical for optimum performance. If the tension is too low, detracking may occur and rubber shoe (shoes) may become damaged as a result. For more information about track tension checking, see page 301.

#### 2 Ground condition

- Use rubber shoe (shoes) only on pavement. Otherwise the durability is rapidly reduced due to the rubber shoe(s) cut-off and wear especially on:
- concrete crushed pieces
- sand
- reinforcing bars
- projected pieces of glass
- Do not use rubber shoe(s) when travelling on concrete sideways, on rocky ground, or on stony river beds.

- Be careful not to slip on water, snow or sand. Especially be careful when loading and unloading the machine.
- Durability of the rubber track may not be guaranteed with special attachment mounted.

#### 3 Driving techniques

- Driving slowly and turning with a large radius compared to fast small radius turns will extend shoe(s) life.
- High friction caused by fast turns on concrete surfaces can lead to detracking and rubber abrasion.

#### 4 Storage, maintenance

- Keep rubber shoe(s) oil and grease free.
- If long-term storage of the rubber shoe(s) is required, store from direct sun light or rain.
- Rubber shoe(s) can operate problem-free within a temperature range of –25°C ~ +55°C.

#### Lifting objects

There may be local and/or national regulations that govern the use of machines which apply for lifting operations. Obey the local and/or national regulations. Contact your local Volvo dealer for more information.

If the machine is used to lift objects within an area that is governed by the European Machinery Directive 2006/42/EC and its amendments, the machine must be equipped with following working devices.

- A load hooking device.
- A hose rupture valve on the boom or in some countries hose rupture valve on both boom and dipper arm is required depending on risk assessment. See page 256.
- A overloading warning device. See page 79.

Safe lifting make great demands on the operator. Read the below recommended steps before starting any lifting.

- Use qualified and properly trained operators who have:
- Specific machine knowledge and training.
  - Read and understand the operator's manual and its load charts. See page 401.
  - Specific machine knowledge and training how to properly rig the load.
  - Full responsibility for all aspects of the lift.
- Interrupt the lift if not fully confident of a safe lift.
- Select machine with sufficient capacity for the total expected load, reach and swing. Ideally, load should be less than the load listed on the load chart at maximum reach across the undercarriage. See page 401.
  - Know the mass (weight) of the item to be lifted.
  - Know the start and finish positions, load lifting position and setting position.
  - Know the machine configuration, especially the dipper arm and boom lengths and counterweight mass.
  - Choose the correct lifting chart taking into account all attachments and rigging materials that will be used during the lift. The weight of the rigging materials and attachments, should be deducted from the load capacity.
- Warm up the machine to normal working temperatures.

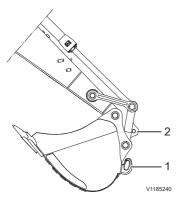
- Position the machine on firm level ground.
- Properly set outriggers and blade when applicable.
- Visually inspect the rigging materials for defects, cracks, or any other damage before lifting objects.
- Once the load is properly rigged, ensure all ground workers are clear of the load and the machine. If guiding of the load is necessary, use ropes or other type of slings tied to the load to keep ground workers at a safe distance.
- Use a trained signalman to direct all aspects of the move.

#### NOTICE

It is the responsibility of the owner or the operator to know and follow the local or national regulations that apply for lifting operations. For further information, contact your dealer.

Keep the following in mind to ensure the highest level of controllability and safety when lifting.

- Operate on solid, flat, level ground.
- If ground conditions are unstable, for example loose gravel, sand or water, do not work with loads close to the rated load maximums given on the machine load chart.
- Do not swing the excavator abruptly with a suspended load, the effects of centrifugal force will impair machine stability.
- Do not use the swing or dipper arm-in operation to drag a load.
- Do not operate the machine while someone is hanging on or in the bucket or attachments.



- 1 Lifting device on bucket
- 2 Lifting device on connecting rod

## 1 Load hooking device on bucket or attachment quick coupler

The lifting device whether mounted on a bucket or other attachment must not be subjected to lateral loads. The load must be applied longitudinally to the hook.

Always ensure that the load lies within the marked permissible lifting load of lifting device when manoeuvring the dipper arm and bucket.

Exceeding these limits can cause serious injury.

Remember that the operator is responsible in case of an accident.

#### NOTE!

Lifting capacity of hook on the bucket or attachment quick coupler could be lower than the machine's lifting capacity.

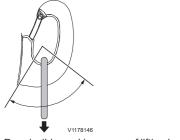
Visually check that the max. lifting capacity of hook marked on the bucket or attachment quick coupler. If the marking for lifting capacity on the bucket or attachment quick coupler is worn out, contact an authorized Volvo dealer for the information.

#### NOTE!

This represents the capacity of the hook and not the rated load capacity of the machine which varies according to ground conditions, reach, travel position and so on.

#### NOTE!

Only use lifting device recommended by Volvo in order to avoid damage to the machine. Contact your dealer for information regarding other lifting device.



Permissible working range of lifting hook



Risk of crushing.

A lifting hook loaded outside the permissible working range could cause the load to fall off and lead to serious crushing injury or death.

Never load the lifting hook outside the permissible working range.

#### NOTE!

Bear in mind that the lifting capacity of the machine is greater when the attachment is pulled in closer to the machine.

Lifting equipment and lifting hook must be clean and in a serviceable condition. Before lifting, check that the lifting device is correctly secured.



Risk of fatal accidents.

A suspended load could drop if the hydraulic system fails and cause fatal accidents and serious injury or death.

Never leave the machine with a suspended load.

#### 2 Load hooking device on connecting rod

Lifting device on connecting rod is designed to lift the marked permissible load on the lifting device. Consider also the lifting capacity of your machine, see page 401.

#### Overload warning



The overload warning does not give the actual machine limit, but constitutes an indication of a potential risk of tipping over in case of deteriorating stability.

The overload warning is engaged and disengaged using the button on the machine control keypad, see page 79.

#### NOTICE

The overload warning must always be engaged when lifting a suspended load.

When an overload is registered, the central warning lamp and the control lamp illuminate on the IC (Instrument Cluster) and the buzzer sounds. When digging, the overload warning should be disengaged.

#### Overload warning pressure

Default pressure of the overload warning system is 170 bar (2466 psi).

#### **NOTE!**

Overload warning pressure must be below the rated lifting capacity in accordance with European Machinery Directive 2006/42/EC, local and/or national government regulations. Contact your local Volvo dealer for more information.

If the default pressure needs to be adjusted in accordance with local and/or national government regulations, contact a qualified service technician.



Risk of accidents.

Overloading could lead to a turnover of the machine or to falling load and attachments.

Do not exceed the machine's maximum lifting capacity and never ignore the overload warning.

Lifting capacities are based on the machines with following conditions:

■ Lifting point: At the dipper arm end, without bucket



Overload warning (Red)

- Operator and all fluids (e.g., all the lubricants and fuel in the fuel tank are fully topped up.)
- Dozer blade/stabiliser is up (if equipped).

The values in the lifting capacities are in compliance with ISO10567. Rated loads do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. See page *401* for more information.

#### Overload warning system, checking

#### NOTE!

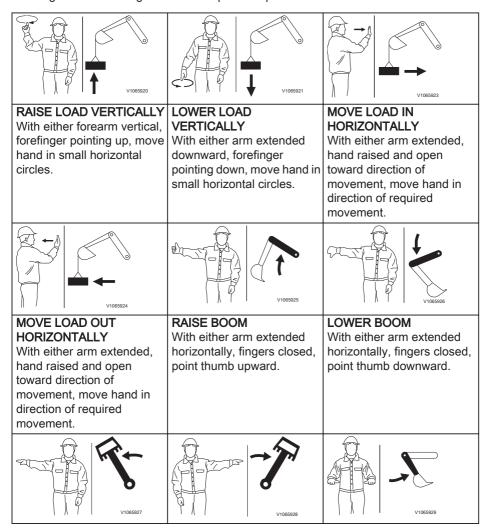
A check of the overload warning equipment must be carried out every 1000 hours, see page *317*.

#### Signalling diagram

#### Manual signalling to operator of a mobile excavator as per SAE J1307.

The primary use of hand signals is for a signalman to direct the lifting, handling, and placement of loads attached to working equipment. Hand signal usage may also be applicable to earthmoving operations and/or machine travel when the operator's visibility is obstructed.

If a rapid lifting, lowering or moving movement is required, the dipper arm movements should be carried out more lively. If two different machines are used for lifting the same load, there should be an agreement beforehand how the lift should be carried out and what signals should be given to the respective operators.



#### **SWING**

With either arm extended horizontally, point with forefinger to direction of swing rotation.

#### **DIPPER ARM INWARD**

With both hands clenched, point thumbs inward.













#### **DIPPER ARM OUTWARD**

With both hands clenched, point thumbs outward.

#### **CLOSE BUCKET**

Hold one hand closed and stationary. Rotate other hand in small vertical circle with forefinger pointing horizontally at closed hand.

#### OPEN BUCKET

Hold one hand open and stationary. Rotate other hand in small vertical circle with forefinger pointing horizontally at open hand.











#### **TURNTHIS FAR TO GO**

Raise forearm with closed fist indicating inside of turn. Move other fist in vertical circle indicating direction of track or wheel rotation.

#### THIS FAR TO GO

With hands raised and open inward, move hands laterally, indicating distance to go.











#### COUNTER ROTATE

Place hand on head indicating side or reverse track or wheel rotation. Move other hand in vertical circle indicating forward rotation of other track or wheel.

#### MOVE SLOWLY

Place one hand motionless in front of hand giving motion signal. Raise load slowly is shown.











TRAVEL Raise forearm with closed fis Move other fist in vertical circ or wheel rotation.	STOP With either arm extended laterally, hand open downward, move arm back and forth.			
V1065942	V1065922			
EMERGENCY STOP With both arms extended laterally, hands open downward, wave arms back and forth.	STOP ENGINE Draw thumb or forefinger across throat.			

## Safety when servicing

This section deals with the safety rules which should be followed when checking and servicing the machine. It also describes the risks when working with unhealthy material and ways to avoid personal injuries.

Further safety rules and warnings texts are given within the respective sections.



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

#### NOTE!

Before beginning any service work, the following measures must first be taken.

- 1 Position the machine on even, firm and level ground.
- 2 Put the attachment on the ground.Put the dozer blade on the ground if equipped.
- 3 Turn off the engine. After releasing the system and tank pressure, remove the ignition switch. See page *345*.
- 4 Make sure the control lockout lever is down to lock the system securely, see page *111*.
- 5 Pressurized lines and vessels should have the pressure released gradually to avoid risks.
- 6 Allow the machine to cool.

A suitable position is stated in the description for the different service operations. If no particular position is stated, the machine should be parked in service position A.

#### Service position A

Retract the bucket and dipper arm cylinder completely, and then lower the boom on the ground.



#### Service position B

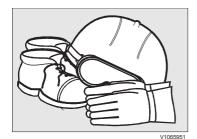
Extend the bucket cylinder completely, retract the dipper arm cylinder completely and lower the boom on the ground.



#### Before service, read

#### Preventing personal injury

- 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 jewellery, which can get caught and cause injury.
- Always wear a hard hat, protective goggles, gloves, protective shoes and other protective articles when the work so requires.
- Make sure that the ventilation is sufficient when starting the engine indoors.
- Do not stand in front of or behind the machine when the engine is running.
- If service work has to be carried out under raised lifting arms, these must first be secured. (Engage the control lever lockout and apply the parking brake if the machine is equipped with one).
- Turn off the engine before opening the rear door and engine cover.
- When the engine is stopped, 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.
- When checking for leaks, use paper or hardboard, not your hand.
- Make sure that stepping surfaces, handholds and anti-slip surfaces are free from oil, diesel fuel, dirt and ice. Never step on parts of the machine that are not intended for this.
- It is important to use correct tools and equipment. Broken tools or equipment should be repaired or changed.



#### Preventing 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 Construction Equipment 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 carried out in accordance with the manufacturer's instructions in order to eliminate interference with the electronic system and components intended for the function of the machine, see page 22.
- Measures to be taken in connection with electric welding, see page 331.
- Make sure that all covers on the machine are in position before the engine is started and the machine is put to work.

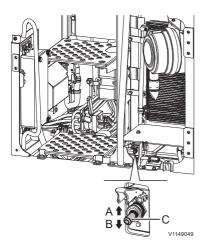
#### Preventing environmental influence

Be conscious of the environment when carrying out service and maintenance. Oil and other liquids dangerous to the environment and released into the environment will cause damage. Oil degrades very slowly in water and sediment. One litre of oil can destroy millions of litres of drinking water.

#### NOTE!

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

- When draining, oils and liquids must be collected in suitable vessels and steps taken to avoid spillage.
- Used filters must be drained of all liquid before they are passed on as waste. Used filters from machines which work in environments with asbestos or other dangerous dust, must be placed in the bag supplied with the new filter.
- Batteries contain substances dangerous to the environment and health. Used batteries must therefore be handled as waste dangerous to the environment.
- Consumables, for example used rags, gloves and bottles may also be contaminated with oils and liquids dangerous to the environment and must in that case be treated as waste dangerous to the environment.



- A ON position
- B OFF position
- C Battery disconnect switch

# A B

Electrical distribution box

- A Relavs
- B Fuses

#### Battery disconnect switch

#### NOTICE

Do not turn off the battery disconnect switch when the engine is running. The electrical system may be damaged.

Battery disconnect switch (C) is located inside the left side door of the machine. When welding, servicing of electrical system or after finishing work of the day for safety, the battery disconnect switch should be turned off.

#### NOTE!

Make sure that the indicator light goes out after turning off the battery disconnect switch. This may take a couple of minutes depending on the system status at the time.

#### Electrical distribution box

Relays and fuses are in the electrical distribution box which is located on the rear side of cab.

#### NOTICE

Never install a fuse with a higher amperage than what is stated on the decal. Risk of damage or fire on the circuit board.

Relays and fuses are easily accessible after discovering the cover of box. A decal which shows the exact positions and specifications of respective relays and fuses is provided on the outside of cover, see page *370*.

#### NOTE!

If a fuse blows repeatedly in the same position, the cause of the fault has to be investigated.

#### Hydraulic system



Any work on the hydraulic system requires great demands on cleanliness. Even very small particles can cause damage or clog up the system. Therefore, wipe areas in question clean before any work is carried out.

The complete hydraulic system including the pressure-limiting valves is set to the correct values from factory.

For any work on the hydraulic system and on pressure-limiting valves the values and tolerances from the Volvo service manual must be applied, otherwise the guarantee from the manufacturer will be void.

Only a qualified service technician is allowed to work on the hydraulic system.

#### Hydraulic oil

#### NOTE!

Hydraulic oil is hazardous to the environment. Immediately use barriers to contain spilled oil and follow local regulations concerning hazardous materials.

#### **NOTICE**

Only hydraulic oil that is approved by Volvo may be used.

#### NOTICE

Use the same hydraulic oil that is already in the system. The hydraulic system may be damaged if different brands of hydraulic oil are mixed.

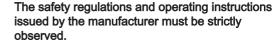
#### Hydraulic bio oil

- 1 When changing from a mineral oil to a bio oil, the oil must be drained as much as possible and it is required to flush the hydraulic system.
- 2 For the drain points and changing method, please contact the workshop authorized by Volvo Construction Equipment.

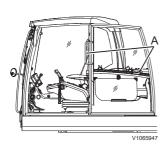
# Entering, leaving and climbing the machine

# Entering, leaving and climbing the machine





- Do not jump on/off a machine, especially never get on/off when the machine is in motion.
- Never grasp the control lever to climb on/off.
- Use handrails and steps when entering, leaving or climbing onto the machine.
- Use the three-point grip, which is two hands and one foot or two feet and one hand.
- Always face the machine.
- Always wipe snow, mud and oil off all footboards, handrails and your footwear, and, in particular clean the windows, rear-view mirrors and lights.
- Clean your boots and wipe your hands before getting onto the machine.
- Do not climb onto the engine hood.
- Do not lean on the guardrails and handrails.
- Do not use the hand grip (A) on the cab door as a support when entering, leaving and climbing onto the machine. It is not strong enough to be used as a support. It must only be used for closing the door.





#### Fire prevention

#### NOTE!

Using the machine in environments with high risk of fire or explosion requires special training and equipment.

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

- Do not smoke or have an open flame near a machine when filling with fuel or when the fuel system is opened and in contact with the surrounding air.
- 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 the service is to be carried out. Oil and water can make the floor 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, for example underbelly plates are free from dust and oil. Besides reducing the risk of fire, it is also easier to detect faulty or loose components.

#### NOTE!

Take great care if a high-pressure wash is used for cleaning. Electrical components and electrical leads can be damaged even at a moderately high pressure and temperature. Protect electrical leads in an appropriate way.

- Take extra care when cleaning a machine working in a fire-sensitive environment, for example saw-mill and refuse dumps. The risk of spontaneous combustion can be further reduced by installing insulation of the silencer guard.
- It is important that the fire extinguisher is maintained in order to work when it is needed.
- Check that fuel lines, hydraulic and brake hoses and electrical cables have not been damaged by chafing or are not in danger of being damaged in that way because of incorrect installation or clamping. This applies particularly to unfused cables, which are red and marked R (B+) and routed:
  - between the batteries
  - between battery and starter motor
  - between alternator and starter motor Electrical cables must not lie directly against oil or fuel lines.
- Do not weld or grind on components which are filled with flammable liquids, for example 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

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 the machine is in motion.
- 2 Lower attachments to the ground.
- 3 Move the control lockout lever to locked position, if so equipped.
- 4 Turn the ignition switch to stop position.
- 5 Exit the cab.
- 6 Call the fire brigade.
- 7 If possible to access safely, turn off the battery disconnect switch or emergency stop switch.
- 8 Attempt to put out the fire, if possible. Otherwise, move away from the machine and out of the danger zone.

#### Actions after fire

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

- Use thick, protective gloves made of rubber and wear goggles.
- Never touch burnt components with your bare hands in order to avoid contact with melted polymer materials. First wash thoroughly with plenty of lime water (a solution consisting of calcium hydroxide, that is slaked lime in water).
- Handling heated fluoro-carbon rubber, see page 281.

# Handling hazardous materials Heated paint



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



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.

#### Crystalline silica (quartz) dust



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 personnel protection equipment. Also check the local / national regulations regarding silica / silicosis.

#### **Batteries**



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, for example 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.
- When removing a battery, disconnect the ground cable first and when installing, connect the ground cable last in order to reduce the risk of sparks.
- Discarded batteries must be taken care of according to national environmental requirements.
- Charging batteries, see page 329.
- Starting with booster batteries, see page 179.

#### 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 *374* 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



Risk of high pressure injection.

Oil or fuel leaks from high pressure hoses could cause serious injury caused by high pressure injection.

If oil or fuel leaks from high pressure hoses or loose screws are found, stop operations immediately and contact a qualified service technician.

- 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. (leakage, damage, deformity and aging)
- Do not reuse hose, tube and fittings.
- Do not use your bare hand to check for leaks.
- Tighten all connections. Consult your Volvo Construction Equipment dealer for the recommended tightening torque.

If any of the following conditions are found, replace the parts. Consult your Volvo Construction Equipment dealer.

- Connections and end fittings are damaged, leaking, deformed or aged.
- 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.



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**

If the machine is to function satisfactorily and at lowest possible cost, it requires careful maintenance.

Regarding intervals for other maintenance, see the "Service Programme" or the "Lubrication and Service Chart" in this chapter.

#### Lubrication and service chart

The section "Lubrication and service chart" describes the maintenance work which the operator can carry out. If certain operations require trained workshop personnel and special equipment, this will be indicated.

#### Service history

After each completed service by a qualified service technician, the service history should be filled in, see page *413*. Service history is a valuable document, which is referred to when 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.

#### **Delivery Instructions**

When handing the machine over, the dealer must give the buyer "Delivery instructions" according to

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.

### Lubrication and service chart

#### Lubrication

Lubrication is an important part of preventive maintenance. The service life of bushings, bearings and bearing pins can be extended considerably if the machine is lubricated in a correct way. A lubrication chart makes lubrication work easier and reduces the risk of forgetting greasing points.

#### Lubrication has two main purposes:

- To supply grease to the bearing in order to reduce wear between the pin and the bearing.
- To replace old and dirty grease. The grease stored inside the outer seal collects dirt and water and prevents them from penetrating into the bearing.

## NOTICE

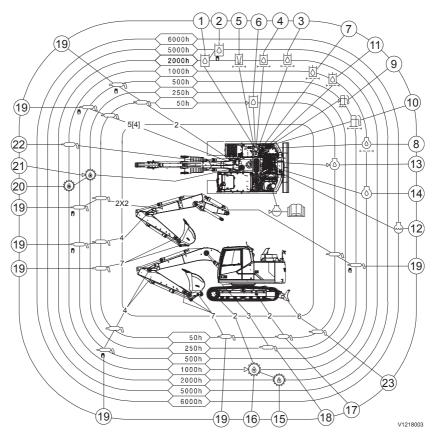
Wipe off grease nipples and grease gun before greasing, so that dirt and sand are not introduced through the grease nipples into the bearings.

## Symbol key

These standard symbols are used in the Lubrication and service chart, see the adjacent table.

	Engine oil	<b>-</b>	Grease lubrication	( <u>\$</u> )	Swing drive gear oil change
b(s)	Swing drive gear oil check	$\triangleright (\widehat{\Phi})$	Travel gear oil check	(1)	Travel gear oil change
	Hydraulic oil		Hydraulic oil level		Hydraulic oil filter
	Hydraulic tank, air breather filter		Fuel filter		Water separator
	Engine, coolant		Engine, coolant filter	<b>⊳</b> ₩	Engine coolant level
b(0)	Engine oil level		Engine oil filter		Operator manual
	Air cleaner filter				

### Lubrication and service chart



#### NOTE!

The service history on page 413 must be filled in after each service from 500 hours.

#### NOTE!

Contact a qualified service technician for "Workshop job".

## 292

When required	Item	Page
Check the coolant level (1)	-	339
Check and drain the water separator (1)	-	327
Drain the sediment from fuel tank	Workshop job	-
Clean the primary filter of air cleaner (1)	-	335
Check the battery condition	-	330

DAILY (every 10 hours)	Item	Page
Check the track shoe screws	-	297
Check the washer fluid level	-	298

Every 50 hours	Item	Page
Check the engine oil level, or <sup>(1)</sup>	13	299
Check the hydraulic oil level	6	300
Check the track tension	17	301
Lubricate to attachments	19	303
Lubricate to the dozer blade unit	23	303

Every 250 hours after carrying out Daily and 50 hours services	Item	Page
Check the oil level of swing drive unit	21	307
Clean the cab prefilter	-	309
Lubricate the swing gear bearing	18	308
Drain the water from the air compressor tank (2 times per 250 hours in humid weather)	-	310
Clean the air filter of the air compressor	-	310

Every 500 hours after carrying out Daily, 50 and 250 hours services	Item	Page
Perform the parked service regeneration to reset EATS before changing the engine oil	Workshop job (1)	-
Change the engine oil and engine oil filter <sup>(2)</sup> - Only applies to the machine with Volvo Performance engine oil filter The interval varies depending on oil grade and the fuel's sulphur content, see page <i>354</i> .	Workshop job	-
Change the fuel filter	10 Workshop job	-
Change the water separator filter element	9 Workshop job	-
Clean the radiator, oil cooler and condenser fins (3)	-	311
Clean the main filter of air conditioner	-	313
Change the main filter of air conditioner (HEPA filter, optional equipment)	-	313
Check the belt tension for air conditioning	Workshop job	-

<sup>1.</sup> Volvo's service tool is required

<sup>2.</sup> Or at least once a year

<sup>3.</sup> Or when required

Change the engine oil and engine oil filter (3)

- Only applies to the machine with Volvo High Performance

- The interval varies depending on oil grade and the fuel's

Page

316

317

317 317

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22

11

20

8. 14

Workshop job

Workshop job

Workshop job

Workshop job

Workshop job

Workshop job

engine oil filter.

sulphur content, see page 354.

<sup>1.</sup> First change: 500 hours

<sup>2.</sup> Or at least once a year

<sup>3.</sup> Or at least once a year

Every 2000 hours after carrying out Daily, 50, 250, 500 and 1000 hours services	Item	Page
Check the coolant content (1)	-	320
Clean the suction strainer of hydraulic tank (2)	3 Workshop job	-
Change the primary filter of air cleaner (3)	-	319
Change the cab prefilter	-	319
Change the air breather filter on hydraulic tank	5 Workshop job	-
Change the air ventilation filter on fuel tank	Workshop job	-
Change the oil of track drive unit (4)	15 Workshop job	-
Change the hydraulic oil (mineral oil)  If Hydraulic Breaker (hammer) is equipped, change the hydraulic oil according to frequency of HB use  - Frequency of HB use (50%): every 1000 hours  - Frequency of HB use (100%): every 600 hours	1 Workshop job	-
Change the main filter of air conditioner	-	319
Change the hydraulic oil return filter <sup>(4)</sup> If Hydraulic Breaker (hammer) is equipped, change the hydraulic return filter according to frequency of HB use - Frequency of HB use (50%): every 1000 hours - Frequency of HB use (100%): every 500 hours	4 Workshop job	-
Check the valve clearance	Workshop job	-
Change the air filter of the air compressor	-	321

<sup>1.</sup> Or every year

<sup>2.</sup> Or when required

<sup>3.</sup> Or at least once a year

<sup>4.</sup> First change: 500 hours

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Every 4000 hours after carrying out Daily, 50, 250, 500, 1000 and 2000 hours services	Item	Page
Change the secondary filter every 3rd time primary filter is replaced <sup>(1)</sup>	-	322
Change the CareTrack backup battery (2)	Workshop job	-

Every 5000 hours after carrying out Daily, 50, 250, 500, 1000, 2000 and 4000 hours services	Item	Page
Change the hydraulic oil (bio oil and long life hydraulic oil)  If Hydraulic Breaker (hammer) is equipped, change the hydraulic oil according to frequency of HB use - Frequency of HB use (50%): every 1000 hours - Frequency of HB use (100%): every 600 hours	2 Workshop job	-

Every 6000 hours after carrying out Daily, 50, 250, 500, 1000, 2000, 4000 and 5000 hours services	Item	Page
Change the coolant (3)	12 Workshop job	-
Change the air breather filter on AdBlue®/DEF tank	Workshop job	-
Change the AdBlue®/DEF pump unit filter	Workshop job	-

Every 8000 hours after carrying out Daily, 50, 250, 500, 1000, 2000, 4000, 5000 and 6000 hours services	Item	Page
Clean the diesel particulate filter	Workshop job	-

<sup>1.</sup> Or at least every 2 years

<sup>2.</sup> Or at least every 3 years

<sup>3.</sup> Or at least every 4 years

# Maintenance service, every 10 hours

## Track unit, checking shoe screws

Check the shoe screws daily.

If track shoe screws (A) are loose, the track shoes are likely to be damaged.

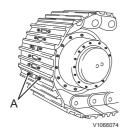
- 1 Swing the superstructure to the side and raise the track using boom down operation.
- 2 Turn the track slowly in forward and reverse direction several time. Check for missing, loose or damaged shoe screws and shoes. If needed, tighten the screws to specified torque below.
  - EC140E L: 42 ± 4 kgf m (412 ± 40 N m) (303 ± 29 lbf ft)
  - EC140E LM: 85 ± 5 kgf m (834 ± 49 N m) (614 ± 36 lbf ft)



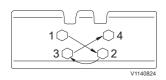
It is very important that loose track shoe screws and nuts are removed fully and that the threads are cleaned. Clean the track shoes before they are installed and the screws tightened.

3 After tightening, check whether the nut and the shoe are in full contact with the mating surfaces of the link.

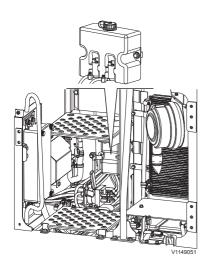
Tighten the screws in the order as shown in the figure.



A Shoe screw



Order to tighten the screws



Washer reservoir

#### Washer reservoir

Check the fluid level daily.

#### NOTE!

When the temperature is below freezing point, antifreeze should be added to the washer fluid. Follow the manufacturer's recommendations as regards the ambient temperature.

#### Excavator unit, greasing

Grease the excavator unit every 10 hours or daily only during first 100 hours.

After first 100 hours of operation, grease the excavator unit every 50 hours or weekly.

See page 303.

# Maintenance service, every 50 hours

### Engine oil level, checking



Risk of serious injury.

Rotating parts could cause serious cutting or crushing injury.

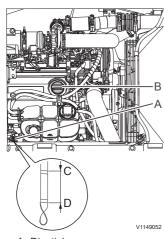
Never open the engine hood when the engine is running.

Check the oil level when the check screen for low engine oil level pops up in the front instrument panel, see page 44. Aside from this, check the oil level every 50 hours.

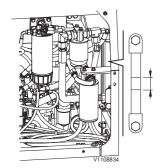
#### NOTE!

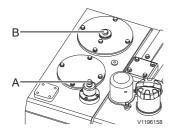
Check the oil level when the machine has cooled down. (at least 30 minutes after turning off the engine)

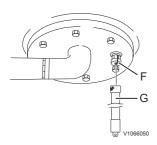
- 1 Position the machine on even, firm and level ground.
- 2 Open the engine hood.
- 3 Pull out dipstick (A) and wipe it with a clean cloth.
- 4 Push it in and pull it out again.
- 5 If the oil level is between (C) and (D), it is normal. If the oil level is below (D), refill the oil to proper level through filler port (B). For the recommended engine oil, see page 351.



- A Dipstick
- B Filler port
- C Oil level, High
- D Oil level, Low







#### Hydraulic oil level, checking

#### Check the oil level every 50 hours.

- 1 Park the machine in service position B, see page 270.
- 2 Move the control lockout lever down to lock the system securely and stop the engine.
- 3 Open the side door on the right side of the machine and check the oil level in the sight gauge. If the level is in the center of the gauge, the level is correct.
- 4 If the level is low,
  - Press breather (A) to release the internal pressure at the tank.
  - Remove filling plug (B) and top up with hydraulic oil.

#### NOTE!

To top up the oil efficiently press air breather again.

- Check the level.
- If the level is normal, install the filling plug.

## NOTICE

Use the same hydraulic oil that is already in the system. The hydraulic system may be damaged if different brands of hydraulic oil are mixed.

- 5 If the level is high,
  - Place a suitable sized container under the hydraulic tank.
  - Remove the protecting cap (F) and attach drain hose (G).
  - Drain the oil into a container.

## NOTICE

Take care of filters, oils and liquids in an environmentally safe way.

- Disconnect the drain hose and install the protecting cap.

### Track unit, checking tension

Check the track tension every 50 hours.



Risk of crushing.

Raised equipment may drop if the hydraulic system fails or if the control is operated. Falling equipment may cause serious injury or death.

Always make sure that raised equipment is supported by a mechanical device before walking or working under it.

#### NOTE!

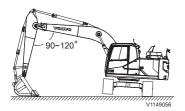
To check the track tension, the track must be raised off the ground.

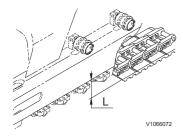
When two persons are working, the operator should follow the sign of the maintenance worker.

The degree of wear condition of track link pins and bushings varies with the working condition or the characteristics of soil. Check the track tension often and keep it to the specified value.

When working in wet sand or clay, it sticks to and packs between moving undercarriage components. This can prevent mating parts from properly engaging each other, which cause interference and high loads. Due to abrasive particles in the material it significantly accelerates wear rates of the sprockets, pins / bushings, idlers and track links as the track load and tension increase. Generally, packing effects cannot be controlled except by constant cleaning or removal of the material. Therefore thoroughly clean the undercarriage at least daily or more often according to soil conditions in job-site.

When working in stony or rocky ground, the track tension should be adjusted tightly because the tight tension helps to make contact and matching of undercarriage components engaged each other. A loose track is one of the main causes of improper engaging of undercarriage components, which may result in following failures; wear of the track link/roller, loosening of the shoe screw, creeping/shifting of the track link pin and crack of the track link. Contact your Volvo dealer for detailed information.





- 1 Swing the superstructure to the side and raise the track by using boom and dipper arm. For this movement, operate the lever slowly.
- 2 Turn the track slowly in forward and reverse direction several time. Stop the track while moving in the reverse direction.
- 3 Measure the track slack (L) at the center of track frame, the clearance between the bottom of track frame and the upper surface of track shoe.
- 4 Adjust the track tension according to the soil characteristics.

Recommended track tension is as below,

Working condition	Clearance (L) (mm) (in)
General soil	260 - 280 (10.2- 11.0)
Rocky ground	240 - 260 (9.4 - 10.2)
Moderate soil like gravel, sand, snow, and so on.	280 - 300 (11.0 - 11.8)

#### Excavator unit, greasing

Grease the excavator unit every 50 hours or weekly.

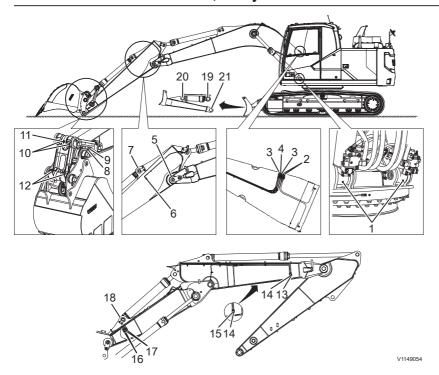
During the first 100 hours, the excavator unit should be greased every 10 hours or daily.

#### NOTE!

Under severe operating conditions where mud, water, and abrasive material may enter the bearings, or after using the hydraulic hammer, the excavator unit should be greased every 10 hours or daily.

When greasing by hand, lower the attachment to the ground as illustrated, and stop the engine. Grease through the grease nipples using a hand or power grease gun. After greasing, clean off the superfluous grease.

Immediately after working under water, grease the submerged parts such as the bucket pins to remove the old grease, regardless of the grease interval. For grease specification, see page *351*.



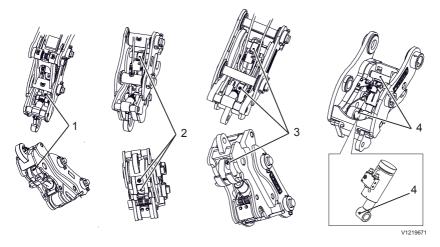
- Boom cylinder mounting pin (2 points) 1
- 2 Boom mounting pin (2 points)
- 3 Boom cylinder rod end pin (2 points)
- 4 Dipper arm cylinder mounting pin (1 point)
- Pin between boom and dipper arm (2 5 points)
- 6 Dipper arm cylinder rod end pin (1 point) 17 Boom cylinder rod end pin (2 points)
- Bucket cylinder mounting pin (1 point) 7
- Pin between dipper arm and bucket (1 point)
- Pin between dipper arm and link (1 point) 20 Dozer blade cylinder mounting pin (2 9
- points)
- 11 Bucket cylinder rod end pin (1 point)

- 12 Pin between bucket and connecting rod (2 points)
- 13 Second boom cylinder rod end pin (1 point)
- 14 Pin between boom and second boom (2 points)
- 15 Dipper arm cylinder mounting pin (1 point)
- 16 Boom mounting pin (2 points)
- 18 Second boom cylinder mounting pin (1 point)
- 19 Dozer blade cylinder rod end pin (2 points)
- points)
- 10 Pin between connecting rod and link (2 21 Dozer blade mounting pin (2 points)

## Attachment quick coupler, greasing

## Grease should be applied as follows

- Grease at grease nipple(s) every 50 hours or every 5 times of operating.
- Apply 3 shots to each grease nipple.



1	Attachment quick coupler, E5 type (2 points)	
2	Attachment quick coupler, E8 type (3 points)	
3	Attachment quick coupler, E14-E48 type (3 points)	
4	Attachment quick coupler, U5- U52 type (3 points)	

# Maintenance service, every 250 hours

#### Swing drive unit



Always clean around the oil dipstick before you check the oil level. Dirt in the oil damages the swing gearbox.

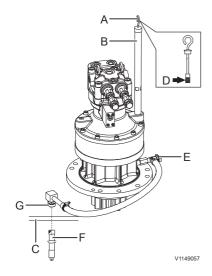
It is very important that the oil level is always correct and that it is checked at working temperature.

- **Too little oil** may lead to insufficient lubrication of the swing drive unit and cause costly damage.
- Too much oil may lead to oil foaming, and cause the swing drive unit to overheat.



Risk of burns!

Hot liquids and machine parts can cause burns. Allow the machine to cool before beginning any service.

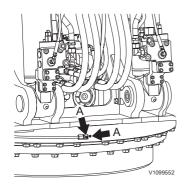


### Swing drive unit, checking oil level

Check the oil level every 250 hours.

- 1 Pull out oil dipstick (A) and wipe it with a clean cloth.
- 2 Insert oil dipstick and pull it out again.
- 3 Check the oil level. If the level is in the center of "D", the level is correct.
- 4 If the level is low, top up oil through oil filler hole (B) to correct level.
- 5 If the level is high,
  - Open the drain valve (E).
  - Remove the under cover (C).
  - Place a suitable sized container under the protection cap (G).
  - Open the protection cap (G).
  - Attach the drain hose (F) and drain the oil to the correct level.
  - Disconnect the drain hose.
  - Close the protecting cap.
  - Close the drain valve.

For oil specification, see page 351.



### Swing gear bearing, greasing

#### Grease the swing gear every 250 hours.

- 1 Park the machine on level ground.
- 2 Lower the bucket to the ground.
- 3 Move the control lockout lever down to lock the hydraulic system securely and stop the engine. See page 111.
- 4 Fill the grease in the grease nipples (A) using a hand or power grease gun.
- 5 Apply grease to the swing bearing until grease can be seen from the swing bearing seals.
- 6 Take care not to supply excessive mount of grease.
- 7 After greasing, clean off the superfluous grease completely.

### Cab prefilter, cleaning and replacing

If the cab prefilter is clogged, the fresh air flow rate will be reduced. Therefore, clean it periodically.

Clean the cab prefilter every 250 hours and replace it every 2000 hours.



Risk of hazardous inhalation.

Dangerous dust can lead to serious health problems.

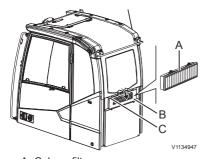
Always wear personal protective equipment, including filter mask, eye protection and appropriate gloves when handling and cleaning the engine compartment, coolers and air filters.

- 1 Turn the screw to counter clockwise using a L wrench.
- 2 Tilt the cover (B) towards rear side and take out the prefilter (A).
- 3 Clean the prefilter with compressed air.

#### NOTE!

When using compressed air, keep the nozzle at a distance from the filter to prevent damage. Clean the filter with compressed air with a maximum pressure of 0.2 MPa (2 kgf cm<sup>2</sup>) (29 psi).

- 4 If the prefilter is damaged or heavily contaminated, replace it with a new one.
- 5 Install the prefilter and close the cover.



- A Cab prefilter
- B Cover
- C Screw



A Air compressor tank

B Drain valve

## Air compressor, air tank water, draining

Drain the water from the air compressor tank every 250 hours.

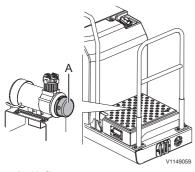
#### NOTE!

Drain the water 2 times per 250 hours in humid weather.

- 1 Open drain valve (B) under air compressor tank (A) and drain the water from the tank.
- Close the drain valve.

### Air compressor, air filter, cleaning

Clean the air filter of the air compressor every 250 hours.



A Air filter cover



Risk of hazardous inhalation.

Dangerous dust can lead to serious health problems.

Always wear personal protective equipment, including filter mask, eye protection and appropriate gloves when handling and cleaning the engine compartment, coolers and air filters.

- 1 Open the tool box on the machine's right side.
- 2 Remove air filter cover (A) by turning clockwise slightly.
- 3 Clean the air filter inside the cover with compressed air.
- 4 Install the cover.

## Maintenance service, every 500 hours

### Radiator and coolers, cleaning

Cleaning interval depends on the environmental condition the machine is operating. Therefore, clean all fins when required or at least every 500 hours.



Risk of hazardous inhalation.

Dangerous dust can lead to serious health problems.

Always wear personal protective equipment, including filter mask, eye protection and appropriate gloves when handling and cleaning the engine compartment, coolers and air filters.



Risk of serious injury.

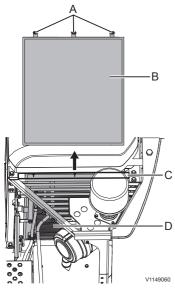
Compressed air, water jets or steam may cause damage to unprotected skin and eyes.

Always wear personal protective gloves, goggles and clothing when using compressed air, water jets or steam.

## NOTICE

DO NOT use steam to clean the condenser core. The refrigerant can overheat! When cleaning with water, protect the electrical components.

If the engine temperature becomes too high even though the coolant level is correct, the radiator should be cleaned.



- A Wing nuts
- B Radiator screen
- C Hole
- D Condenser

- 1 Open the left side door of the machine.
- 2 Remove the leaves attached to condenser (D).
- 3 Remove wing nuts (A).
- 4 Pull out radiator screen (B) through hole (C).
- 5 Clean the radiator screen.
- 6 Clean any mud, dust or leaves attached to the radiator fins and oil cooler fins with compressed air or steam.
- 7 Check the rubber hose for wear and cracks. If damaged, replace it. Check the hose clamp for looseness.
- 8 Reinstall the screen with the wing nuts.

## NOTICE

When using compressed air, keep the nozzle at a distance from the fins to prevent damage. Damaged fins may cause leakage or overheating.

If the engine temperature still remains high after cleaning the cooler, contact a workshop authorized by Volvo for remedial action.

## Air conditioning filter, cleaning and replacing

If the air conditioner filter is clogged, the air flow as well as the cooling and heating capacity will be reduced. Therefore, clean it periodically.



Risk of hazardous inhalation. Dangerous dust can lead to serious health problems.

Always wear personal protective equipment, including filter mask, eye protection and appropriate gloves when handling and cleaning the engine compartment, coolers and air filters.

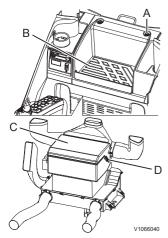
#### NOTE!

If the machine is operated in particularly dusty environment or in air with hazardous material to human such as asbestos, special filter should be used. Contact your Volvo dealer for more information.

## NOTICE

Refrigerant R134a adds to the greenhouse effect and may not be released.

Clean the filter every 500 hours and replace it every 2000 hours.



- A Screws (4 EA)
- B Rubber mat
- C Cover
- D Latches (4 EA)

- Unscrew 4 screws (A). Two are under rubber mat (B).
- 2 Disconnect the wire harness of the air conditioner.
- 3 After opening the 4 latches (D), open the cover (C) and take out the filter.
- 4 Clean the filter with compressed air.

#### NOTE!

When using compressed air, keep the nozzle at a distance from the filter to prevent damage. Clean the filter with compressed air with a maximum pressure of 0.2 MPa (2 kgf cm<sup>2</sup>) (29 psi).

- 5 If the filter is damaged or heavily contaminated, replace it with a new one.
- 6 Install the filter, and assemble them in reverse order.

## High Efficiency Particulate Air filter (HEPA, optional equipment)

Do not reuse or clean HEPA filter. Only replace the filter with a new one every 500 hours.

#### NOTE!

Filter changes are to be done by a qualified service technician, and HEPA filter must always be handled with extra care. When changing HEPA filter, the used filter shall be placed in the plastic bag that is supplied with a new filter. Never shake the filter, place it carefully in the supplied plastic bag. Then the plastic bag shall be sealed and deposited with at a suitable location for hazardous waste, such as asbestos waste.



Risk of hazardous inhalation.

Dangerous dust can lead to serious health problems.

Always wear personal protective equipment, including filter mask, eye protection and appropriate gloves when handling and cleaning the engine compartment, coolers and air filters.

# Maintenance service, every 1000 hours

#### Track drive unit



Always clean around the level plug before you check the oil level. Dirt in the oil damages the track gearbox.

It is very important that the oil level is always correct and that it is checked at working temperature.

- Too little oil may lead to insufficient lubrication of the track drive unit and cause costly damaged.
- Too much oil makes the oil foaming and cause the track drive unit to overheat.



Risk of burns!

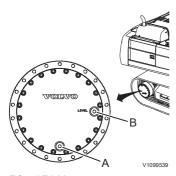
Hot liquids and machine parts can cause burns. Allow the machine to cool before beginning any service.



Risk of high pressure injection.

Residual pressure in the hydraulic system could lead to oil under high pressure jetting out and cause serious injury, even if the engine has not been running for some time.

Always release the pressure before any kind of service of the hydraulic system is carried out.



EC140E LM

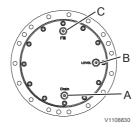
A Drain and filling plug B Level checking plug

## Track drive unit, checking oil level

#### Check the oil level every 1000 hours.

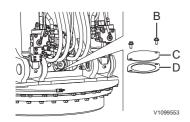
- 1 Turn the case so that drain plug is located at the bottom.
- 2 Remove the level checking plug. If the oil is about to overflow from the hole, the level is correct.

If the oil is low, top up the oil to the correct level through the filling plug. (If necessary, turn the case so that filling plug is located at the top.) For oil specification, see page *351*.



#### EC140E L

- A Drain plug
- B Level checking plug
- C Filling plug



### Swing bath, grease checking

Check the grease condition and level every 1000 hours.

- 1 Park the machine on a level ground and move the superstructure as shown in the figure.
- 2 Lower the bucket to the ground.
- 3 Turn the ignition switch to stop position.
- 4 Move the control lockout lever down to lock the system securely. See page 111.
- 5 Remove screws (B) and the cover (C).
- 6 Check the level and condition of the grease. Fill if needed.
- 7 Inspect the seal (D). Replace the seal if damaged.
- 8 Install the cover.

#### NOTE!

If the grease is contaminated or discoloured with water, contact a workshop authorized by Volvo for changing the grease.

### Cab door hinges, greasing

Grease the cab door hinges every 1000 hours.



A Grease points

#### Overload warning

Check the overload warning system every 1000 hours according to below procedure.

- 1 Place the machine on level and firm ground.
- 2 Engage the overload warning with the button on the keypad, see page 79.
- 3 Operate the boom cylinders to their upper end positions.

The overload warning signal should sound and the overload symbol should appear in the IC

## Maintenance Maintenance service, every 1000 hours

318

(Instrument Cluster). If not contact a qualified service technician.

# Maintenance service, every 2000 hours

Engine air cleaner primary filter, replacing

See page 335.

Cab prefilter, cleaning and replacing See page 309.

Air conditioning filter, cleaning and replacing

See page 313.

#### Coolant



If the warning of high coolant temperature is shown on the display unit, the engine must be stopped immediately.

Check the coolant contents (%) every 2000 hours or every 1 year.

The cooling system is filled with Volvo Coolant VCS, which fulfils the highest requirements regarding freeze-, corrosion-, and cavitation protection. To avoid damage to the engine, it is very important that Volvo Coolant VCS is used when filling or changing the coolant.

Volvo Coolant VCS is yellow and a decal by the filling point shows that the system is filled with this coolant (see picture).



## NOTICE

Volvo Coolant VCS must never be mixed with any other coolant or corrosion protection to avoid damage to the engine.

The cooling system capacity when changing, see page *366*.

If concentrated Volvo Coolant VCS and clean water (see page 355) is used, the table below shows the approximate amount of concentrated coolant needed for freezing protection. The content of Volvo Coolant VCS must never be less than 40% of the total mixture.

If in doubt of the water's quality, use the readymixed Volvo Coolant VCS, which contains 40% concentrated coolant.

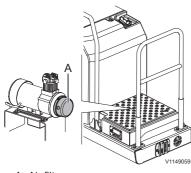
## NOTICE

In order to avoid damage to engine and cooling system, different brands of coolant or corrosion protection must not be mixed.

Freeze protection down to	Content of concentrated coolant
-25 °C (-13 °F)	40%
-35 °C (-31 °F)	50%
-46 °C (-51 °F)	60%

#### Air compressor, air filter, replacing

Change the air filter of the air compressor every 2000 hours.



A Air filter cover



Risk of hazardous inhalation.

Dangerous dust can lead to serious health problems.

Always wear personal protective equipment, including filter mask, eye protection and appropriate gloves when handling and cleaning the engine compartment, coolers and air filters.

- 1 Open the tool box on the machine's right side.
- 2 Remove air filter cover (A) by turning clockwise slightly.
- 3 Change the air filter inside the cover with a new one.
- 4 Install the cover.

# Maintenance service, every 4000 hours

Engine air cleaner secondary filter, replacing

See page 338.

# Maintenance service, when required

# Engine oil level, checking

See page 299.

Fuel, filling



Risk of fire.

Burning fuel can cause fatal injuries. Stop the engine before filling fuel.



Risk of fire and explosion.

A running auxiliary heater during fuel filling could cause fire and explosion.

Switch off the auxiliary heater before filling fuel.

# NOTICE

Risk of fuel tank contamination.

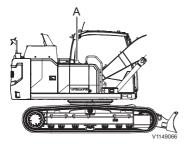
Accidental filling of AdBlue®/DEF in to the fuel tank causes fuel tank contamination.

Only use AdBlue®/DEF filling equipment that has a valve that opens only on machines equipped with a magnetic ring in the AdBlue®/DEF filler neck to avoid fuel tank contamination.

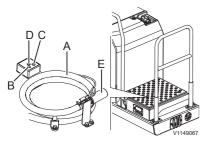
- 1 Carefully clean around the fuel filler cap on the fuel tank before removing it.
- 2 Open the fuel filler cap (A) and fill fuel in the tank.
- 3 Check the fuel level on IC (Instrument Cluster). See page *38*.

Avoid spilling fuel when filling, which attracts dirt. If fuel is spilled, clean it up immediately. During the cold season, fill up the fuel tank to

prevent water condensing in the tank. For the capacity of fuel tank, see page *366*.



A Fuel filler cap



- A Fuel filler pump hose
- B Start button (green)
- C Stop button (red)
- D Manual control button
- E Strainer cover

# Filling with auto shut-off controller (optional equipment)

Fuel filler pump is installed in the tool box. Use it when filling fuel in the tank.

#### NOTE!

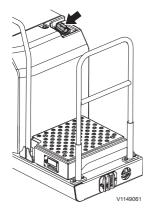
This pump is provided with an electronic overfilling protection.

- 1 Carefully clean around the fuel filler cap on the fuel tank before removing it.
- 2 Open the fuel filler cap on the fuel tank.
- 3 Remove the strainer cover (E) which is installed to protect the strainer from dust at the end of hose (A).
- 4 Put the pump hose with strainer into the fuel barrel
- 5 Press the green start button (B). The pump will run as long as the tank is not full.
  - At any time during the refuelling or when the drum has been emptied, the pump may be stopped by pressing the red button (C).
  - The pump will automatically stop when the fuel level sensor is actuated. The pump cannot be restarted until the fuel from the tank is used.
- 6 Fold the hose and reinstall the strainer cover.

# NOTICE

Never allow the fuel filling pump to run dry. The pump may be damaged.

# AdBlue®/DEF, filling



AdBlue®/DEF tank cap

# NOTICE

Risk of machine damage.

Refilling fluids with anything other than what is specified in this manual could cause permanent damage to the catalyst system.

Only refill fluids with those specified in this procedure.

# NOTICE

Risk of fuel tank contamination.

Accidental filling of AdBlue®/DEF in to the fuel tank causes fuel tank contamination.

Only use AdBlue®/DEF filling equipment that has a valve that opens only on machines equipped with a magnetic ring in the AdBlue®/DEF filler neck to avoid fuel tank contamination.

# NOTICE

Risk of machine damage.

AdBlue®/DEF is highly corrosive. If the tank is overfilled, AdBlue®/DEF may leak out through the air vent pipe. If the tank is overfilled and the fluid in it freezes, the tank and hoses can be permanently damaged.

Do not overfill the tank. Always stop filling when the fluid level reaches the filling port or when an automatic filling nozzle shuts off.

#### NOTE!

Do not fill with any fluid other than that specified in ISO 22241-1. We recommend that you do not reuse drained AdBlue®/DEF due to the risk of contamination.

AdBlue®/DEF tank capacity, see page 366.

#### NOTE!

Be careful not to overfill AdBlue®/DEF more than the tank capacity, otherwise it could overflow from the air breather line of the tank.

AdBlue®/DEF quality, see page 364.

If the AdBlue®/DEF level is low, an alarm indication is displayed. Fill the AdBlue®/DEF tank with AdBlue®/DEF.

- AdBlue®/DEF is not classified as a hazardous substance but should still be handled with care. It is highly corrosive.
- If it comes into contact with the skin, rinse well with water.
- If it comes into contact with the eyes, rinse thoroughly for several minutes. Consult a doctor if necessary.
- If inhaled, breathe fresh air and contact a doctor if necessary.
- If swallowed, drink water and contact a doctor.
- Do not allow AdBlue®/DEF to come into contact with other chemicals.
- AdBlue®/DEF is not combustible. If AdBlue®/DEF is exposed to high temperatures it will decompose into ammonia and carbon dioxide.
- AdBlue®/DEF must not be mixed into the diesel tank and diesel must not be mixed into the AdBlue®/DEF tank.

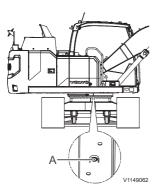
#### NOTE!

AdBlue®/DEF filling equipment must be designed for a maximum filling rate of 40 litres/minute, and adjustable to a rate below 40 litres/minute. If filling problems occur and remain after the filling filter has been cleaned, please refer to the manual for the filling equipment and take the necessary action.

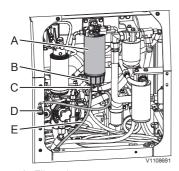
For distribution of AdBlue®/DEF (only valid for US market):

- Volvo CE Customer Support: 1-877-823-1111 (business hours)
- www.volvoce.com (outside business hours)

For distribution of AdBlue®/DEF (all other markets), please contact your local Volvo dealer for more information



A Drain plug



- A Filter element
- B Bowl
- C Drain valve
- D Sensor connector
- E Drain hose

# AdBlue®/DEF tank, draining

- 1 Park the machine on a level ground and move the superstructure as shown in the figure.
- 2 Lower the bucket to the ground.
- 3 Turn the ignition switch to stop position.
- 4 Move the control lockout lever down to lock the system securely. See page 111.
- 5 Remove drain plug (A) using a L wrench from the tank.
- 6 Drain AdBlue®/DEF into a container.

# NOTICE

Take care of filters, oils and liquids in an environmentally safe way.

7 Install the drain plug to the tank.

# Water separator, draining

The water separator filter element is designed to remove the water from the fuel supplied to the engine.

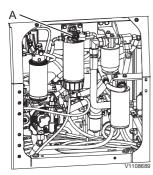
Check and drain the water in the water separator filter element when the check screen for water in fuel pops up on the IC (Instrument Cluster).

- 1 Place a suitable sized container under drain hose (E).
- 2 Open the drain valve (C) and drain the sediment into a container.

# NOTICE

Take care of filters, oils and liquids in an environmentally safe way.

3 Close the drain valve (C).



A Hand pump

# Fuel system, bleeding

Air must be bled out of the fuel injection system whenever the machine runs out of fuel while the engine is running.

# NOTICE

Under no circumstances must starting attempts be made before the system has been bled. The fuel feed pump may be seriously damaged.

#### NOTE!

Do not spill fuel on electrical components.

- 1 Turn hand pump (A) counterclockwise to unlock the plunger.
- 2 Pump hand pump (A) until a heavy resistance can be felt in the hand pump.
- 3 Push hand pump (A) fully and turn it clockwise to lock the plunger.
- 4 Start the engine and let it run in idle for 3 minutes.
- 5 If the engine is difficult to start, repeat (1) to (3).

#### NOTE!

Do not use the hand pump when the engine is running.

6 Check for leakages.

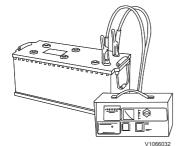
#### Batteries, charging



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.

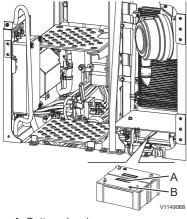




Risk of chemical burns.

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.

- Always turn off the charging current before the charging lead clips are removed.
- Ventilate well, especially if the battery is charged in a confined space.



A Battery decal B Indicator

# Battery condition, check

#### NOTE!

This type of battery is maintenance free (MF) so it is not possible to check the electrolyte level, only a battery condition check is available.

- 1 Ensure the battery disconnect switch is at off position and remove the battery cover.
- 2 Check the condition of battery through indicator (B) according to guidance on battery decal (A).

Indicator color		
Green	Normal	
Black	Black Need charging	
White	Need checking	

#### Welding

The following measures should be taken before starting electric welding on the machine or attachments connected to the machine.

- 1 Turn off the electric power with the battery disconnect switch.
- 2 Disconnect the batteries, both the plus and minus terminal.
- 3 Disconnect the electronic units; GPMECU1 (General Purpose Machine Electronic Control Unit1), EMS (Engine Management System), IC (Instrument Cluster), CCM (Climate Control Module) and so on. For further information, contact a workshop authorized by Volvo Construction Equipment.
- 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.
- 5 Ventilate well, specially if the welding is performed in a confine space.
- 6 Remove all paint from an area of at least 10 cm (4 in) around the welding point.



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.



A fire extinguisher should be easily accessible during all welding work.

#### NOTE!

The weld will be related with inferior quality and strength, never weld directly on a painted surface.

# 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.

# NOTICE

Avoid using strong cleaning agents or chemicals in order to minimise the risk of damage to the paint finish.

# NOTICE

Soil and clay may damage or cause wear to moving parts of the undercarriage. Therefore, all parts must be cleaned regularly from of soil and clay.

#### NOTE!

Daily clean the areas on the machine where dust, chips and similar may collect in order to minimise the risk of fire, see page *278*.

- Place the machine in a place intended for cleaning.
- Follow the instructions supplied with the car care product.
- The water temperature must not exceed 80 °C (176 °F).
- If high-pressure wash is used, keep a distance of at least 40 cm (16 in) between the seals and the nozzle. Keep a distance of 30 cm (12 in) between nozzle and other machine surface. Too high pressure and too short distance may cause damage.

#### NOTE!

Protect electrical leads in an appropriate way and be careful not to damage the cab prefilter when cleaning the machine.

# NOTICE

Do not spray with high pressure into the sealing of the slewing ring, the water may penetrate and affect the characteristics of the grease.

- 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.

#### Paint finish maintenance

- Machines which are used in corrosive environment suffer more from rust than others. As a preventive measure it is recommended that the paint finish should be maintained every sixth months.
- 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 Dinitrol 447 (or corresponding) may be applied under the mudguards where mechanical wear is expected.

#### Touch-up painting

- Check if there are any damaged areas of the paint finish.
- At first clean the machine.
- Rectify any damage to paint finish in a professional way.

# Cleaning engine compartment



Risk of serious injury.

Rotating parts could cause serious cutting or crushing injury.

Never open the engine hood when the engine is running.



Risk of burns.

Engine and exhaust system components get very hot and can cause severe burns.

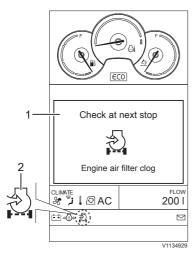
Avoid contact with engine compartment covers, engine components and exhaust system until the engine is cooled down.

Machines operating in dusty environment or environment exposed to fire hazards for example, wood-processing, woodchip handling or grain handling and animal feed industries require daily attention and cleaning of the engine compartment and surrounding areas.

When operating in other environments, inspection and cleaning is required at least once a week.

Loose material is removed with for example compressed air.

Cleaning should preferably be carried out at the end of the working shift before the machine is parked. Use personal protective equipment such as protective goggles, gloves and respirator. After cleaning, check and rectify any leaks. Close all covers and hoods.



- 1 Check screen
- 2 Indicator

#### Engine air cleaner

The air cleaner prevents dust and other impurities from entering the engine. The air first passes through the primary filter and then the secondary filter.

The degree of engine wear depends largely on the cleanliness of the induction air. Therefore, it is very important that the air cleaner should be checked regularly and maintained correctly. Observe great cleanliness when working with the air cleaner and filters.

# NOTICE

Do not, under any circumstances, run the engine without a filter or with a damaged one. Always have a spare filter at hand and keep it well protected from dirt.

Check regularly that hose and pipe connections from the air cleaner to the engine induction manifold do not leak.

# Engine air cleaner primary filter, cleaning and replacing

Clean the filter when the check screen for engine air filter clog pops up on the IC (Instrument Cluster). The filter may be cleaned, at the most, five times. Thereafter or after maximum 1 year, the filter should be replaced. Also replace the filter if it is damaged



Risk of hazardous inhalation.

Dangerous dust can lead to serious health problems.

Always wear personal protective equipment, including filter mask, eye protection and appropriate gloves when handling and cleaning the engine compartment, coolers and air filters.

# NOTICE

Risk of machine damage! Dust could enter the air intake system if the secondary filter comes off.

If the secondary filter comes off, clean the air cleaner housing thoroughly and make sure no dust enters the air intake system before reinstalling the secondary filter.

- Do not use compressed air.
- Vacuum cleaning is recommended, because it minimizes the risk that dust enters the air intake system.
- A wet cloth may be used but be careful not to push any dust into the air intake system.

#### NOTE!

Do not clean the filter if the check screen does not pop up on the IC (Instrument Cluster).

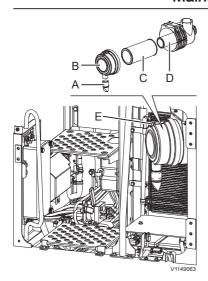
#### NOTE!

Use Volvo genuine air filters. Otherwise Volvo may not support the engine failures.

If the indicator is still alight after replacing or cleaning the primary filter, the secondary filter must be replaced.

As the length of time between filter replacements depends entirely on the operating environment of the machine, it may sometimes be necessary to replace the filter more often.

When cleaning the primary filter, mark it on the secondary filter to recognize primary cleaning times.

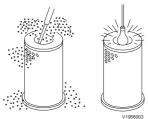


#### Mechanical cleaning

- 1 Open the left side door of the machine.
- 2 Pull finger (E) and turn cover (B) counterclockwise to open it.
- 3 Press with both thumbs on primary filter (C) at the same time as you pull it out. This is to prevent the secondary filter (D) from coming out together with the primary filter.
- 4 Carefully tap the end of the primary filter against a soft and clean surface.
- 5 Install the primary filter and the cover.

#### NOTE!

Do not tap against a hard object.

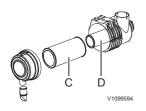


#### Cleaning with compressed air

- 1 Use clean and dry compressed air with a max. pressure of 500 kPa (5 bar) (73 psi). Do not hold the nozzle closer than 3 ~ 5 cm (1 ~ 2 in).
- 2 Blow the filter from the inside along the folds.
- 3 Check the filter with the aid of a lamp.
- 4 If there is the smallest hole, scratch, crack or other damage, the filter must be discarded.
- 5 Install the primary filter and the cover.

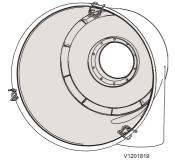
#### NOTE!

To discover the damage more easily, this check should be made in a darkened room.



C Primary filter

D Secondary filter



Use vacuum cleaner to clean the air cleaner outlet.

# Engine air cleaner secondary filter, replacing

Replace the secondary filter every 3rd time primary filter is replaced or at least every 2 years.

If the indicator is still alight even though the primary filter has been cleaned or replaced, the secondary filter should be replaced.

The secondary filter (D) works as a protective filter in case the primary filter (C) should be damaged.

#### NOTE!

The secondary filter should not be removed or cleaned! It acts as a protective filter in case the primary filter is damaged and should be replaced by a qualified service technician at the specified service interval or when required.



Risk of hazardous inhalation.

Dangerous dust can lead to serious health problems.

Always wear personal protective equipment, including filter mask, eye protection and appropriate gloves when handling and cleaning the engine compartment, coolers and air filters.

# NOTICE

Risk of machine damage!

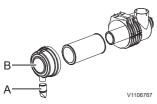
Dust could enter the air intake system if the secondary filter comes off.

If the secondary filter comes off, clean the air cleaner housing thoroughly and make sure no dust enters the air intake system before reinstalling the secondary filter.

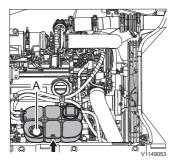
- Do not use compressed air.
- Vacuum cleaning is recommended, because it minimizes the risk that dust enters the air intake system.
- A wet cloth may be used but be careful not to push any dust into the air intake system.

# NOTICE

Take care of filters, oils and liquids in an environmentally safe way.



- A Vacuator valve
- B Cover



A Filler cap

# Engine air cleaner cover, cleaning

The cover for aircleaner should be cleaned when the primary filter is cleaned.



Risk of hazardous inhalation.

Dangerous dust can lead to serious health problems.

Always wear personal protective equipment, including filter mask, eye protection and appropriate gloves when handling and cleaning the engine compartment, coolers and air filters.

- 1 Remove the cover (B) and valve (A) from the air cleaner.
- 2 Empty and clean the cover and valve.
- 3 Reinstall them on the air cleaner.

# Radiator and coolers, cleaning

See page 311.

# Coolant level, checking

Check the coolant level when the warning screen for low coolant level pops up on the IC (Instrument Cluster), see page *44*.



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 engine.
- Allow the engine to cool
- Turn the pressure cap slowly to release any pressure.
- 1 Position the machine on even, firm and level ground.
- 2 Open the engine hood.
- 3 Check the coolant level. If the coolant level is lower than "MIN" marking on the tank, top up the coolant through filler cap between "MIN" and "MAX" level.

# Track unit, adjusting tension



Risk of serious injury

Recoil spring cylinder is filled with pressurised grease. High pressure grease in the cylinder could cause serious injury or death.

Always keep face, hands and body away from the grease nipple and valve when adjusting the track tension or loosening the track. Never remove the grease fitting or nut and valve assembly to release grease.

#### Tightening track tension - reducing slack

- 1 Fill the grease through grease nipple (B) using a grease gun with high pressure.
- 2 Check the tension by moving the machine forward and rearward.
- 3 Check the tension again. If not correct, adjust it again.

#### Loosening track tension - increasing slack

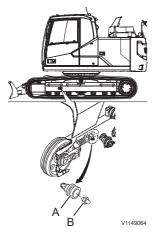
1 Loosen the valve (A) gradually to drain the grease, but not more than one turn.
If the grease does not drained smoothly, move the machine forward and rearward.

# NOTICE

#### Risk of environmental pollution!

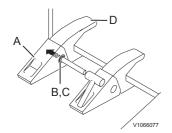
The grease in the track adjustment cylinder is under high pressure and large quantities of grease will be quickly released if the valve is loosened too much. Never loosen the valve by more than two turns when draining the grease.

- 2 Close the valve (A) but do not tighten excessively as the fitting may be damaged.
  - The valve (A) assembly, tightening torque: 7.0 kgf m (51 lbf ft) (69 N m)
- 3 Check the tension by moving the machine forward and rearward.
- 4 Check the tension again. If not correct, adjust it again.



A Valve B Grease nipple





#### Bucket teeth, replacing

Replace the bucket teeth before the adaptors wear away.



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.

- Lower the bucket to the ground and position it to the easiest posture for working.
- Stop the engine before replacing the bucket tooth.

#### For side pin locking system

- 1 Lower the bucket horizontally and place it on a block.
- 2 Stop the engine and move the control lockout lever down to lock the system securely.
- 3 Drive out the pin (B) using a hammer and punch. Be careful not to damage the locking washer (C). Use a round bar with a smaller diameter than the pin as a punch.
- 4 Clean the surface of adapter (D) and insert a new locking washer (C) in the correct place, and then install a new tooth (A).
- 5 Drive the pin (B) into the pin groove until the pin is flush with the tooth.

#### For Volvo tooth system I (VTS)

Replace the bucket teeth before the adaptors wear away.



Risk of splinter injury.

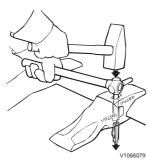
Striking the bucket pin with a hammer could cause metal chips to fly around and cause serious splinter injury.

Always wear face and eye protection, hard hat and gloves while removing and installing the bucket pins.

A special tool may be ordered to facilitate replacement of teeth. The tool are available in different sizes depending on tooth size. Contact your dealer for further information.



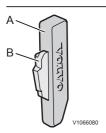
Special tool



Knock out the locking device

#### Removing tooth

- 1 Lower the bucket horizontally on a block and angle it slightly upward.
- 2 Stop the engine and move the control lockout lever down to lock the system securely.
- 3 Clean the opening for tooth adapter locking device.
- 4 Knock out the locking device with a hammer and the tool or other suitable drift.
- 5 Remove tooth.



#### Locking device

- A Steel pin
- B Lock retainer



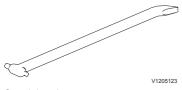
The locking device should be just below the scored line



- 1 Clean the front part of the tooth adapter and the hole for the locking device.
- 2 Install the tooth so that the guide lugs fit in the tooth adapter recesses.
- 3 Replace lock retainer (B) with a new part.
- 4 Install the locking device so that the chamfered part points downward and the lock retainer points forward.
- 5 Knock down the locking device with a hammer until it is level with the upper part of the tooth adapter.
- 6 Knock down the locking device further with a hammer and the tool or other suitable drift until the upper part is just below the scored line in the hole.

#### NOTE!

Replace the steel pin in connection with replacement of tooth adapter.



Special tool

# Bucket teeth, replacing

#### For Volvo tooth system II (VTS)

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.

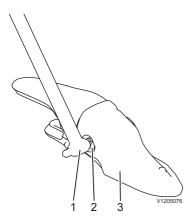


Risk of crushing by falling attachments. Hydraulic or mechanical failure may cause the attachments to fall, resulting in severe personal injury or death.

Always support any attachment before adjusting or servicing it.

#### Removing tooth

1 Lower the bucket to the ground and angle it slightly upward.

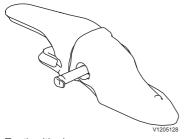


- 1 Special tool
- 2 Pin
- 3 Tooth

- 2 Clean the square hole in the pin.
- 3 Install the tool in the pin and turn it 90 degrees either way to unlock it.
- 4 Turn the tool back and forth, with an outwards motion, until the pin is removed. Use the pry bar end of the tool if the pin gets stuck.
- 5 Remove the tooth.

#### Installing tooth

- 1 If changing the position of a tooth, check that the retainer is not bent or damaged.
- 2 Check that the pin is not bent or damaged.
- 3 Clean the front part of the adapter and the holes for the pin.
- 4 Place the tooth on the adapter.
- 5 Place the pin in the tooth. Check that the pin flange is aligned with the tooth.
- 6 Install the tool in the pin and turn it back and forth, with an inwards motion, until the pin is installed. A click sound will occur.
- 7 Check that the tooth is secured to the adapter.



Tooth with pin

# VIIIAORES

Breather on the hydraulic tank

# Hydraulic system, releasing pressure



Risk of high pressure injection.

Residual pressure in the hydraulic system could lead to oil under high pressure jetting out and cause serious injury, even if the engine has not been running for some time.

Always release the pressure before any kind of service of the hydraulic system is carried out.

Use the greatest caution when working on the hydraulic system. Remove system pressure and tank pressure:

- 1 Place attachment on the ground and shut down engine.
- 2 After engine is shut down, turn ignition switch to running position (Do not start engine).
- 3 Keep the control lockout lever up (unlocked position) and move all control levers and pedals to release main system pressure from all lines.
- 4 Turn ignition switch to OFF position, remove the key and tag the machine to indicate that the unit is under service.
- 5 Lower the control lockout lever (locked position).
- 6 Press the pressure relief valve located on the hydraulic tank breather valve to release tank pressure.

# Accumulator, handling



Risk of serious injury.

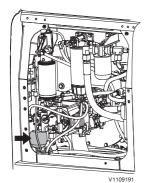
Accumulators are charged with highly pressured nitrogen. Improper handling could lead to an explosion causing serious injury.

Work on an accumulator must only be done by a qualified service technician.

- Do not hit, drill or weld the accumulator.
- Keep it away from open flame or other highly heated sources.
- If you operate the operating lever downward just after the engine stops, the accumulator allows the attachment to move by its own weight.
- After releasing the pressure in accumulator, move the control lockout lever down to lock the system securely, see page 111.

# Accumulator, emergency operation

- 1 Stop the engine by turning the ignition switch to stop position.
- 2 Turn the ignition switch to running position.
- 3 Move the control lockout lever up to unlock the system, see page 111.
- 4 Put the operating lever to boom down position to lower the attachment by its own weight.
- 5 Move the control lockout lever down to lock the system securely.



Accumulator

#### Accumulator, pressure releasing

- Lower the attachment or load completely to the ground.
- 2 If using X1 or X3 axillary hydraulic circuit, do not activate.
- 3 After turning off the engine, turn the ignition switch to operating position.
- 4 Move the control lockout lever up to unlock the system.
- 5 To release the pressure in the control circuits and accumulator, move the operating levers and pedals forward / rearward and left / right to their respective end positions.
- 6 Turn the ignition switch to stop position.
- 7 Move the control lockout lever down to lock the system securely.

# Recommended intervals for critical parts

To ensure safety at all times when operating or driving the machine, periodic maintenance must always be carried out. To maintain safety over time, it is also recommended that periodic check or replacement of the parts given in the table below, is carried out. These parts are closely connected to safety and fire prevention. The material ages or materials are wearing with foreseeable deterioration. If these parts show any abnormality before the recommended interval has passed, they should be repaired or replaced immediately. If the hose clamps show any deterioration, such as deformation or cracking, replace the clamps at the same as the hoses. When replacing the hoses, always replace the O-rings, gaskets, and other related parts at the same time. The replacements should be carried out by a qualified service technician.

Inspection interval	Item	
Daily	Fuel / hydraulic hoses - leakage of connections and end fittings	
Monthly	Fuel / hydraulic hoses - leakage, damage of connections and end fittings	
Yearly	Fuel / hydraulic hoses - leakage, damage, deformity and aging of connections and end fittings	

Critical parts list for periodic replacement	Recommended interval	
Fuel hoses	Every 2 years or 4000 hours, which occurs first	
Hydraulic hoses	Every 6 years or 6000 hours, which occurs first	
Seat belt	Every 3 years	

# Maintenance under special environmental conditions

Conditions	Maintenance	Related page
	Before operating, check the tightness of plugs and all drain hoses and cocks.	-
	After working, replenish the grease to the attachment pins or the areas affected by the water.	219
Water or near the ocean	When operating the machine, make sure to check and lubricate attachment points affected by water regularly.	298
	After working near the ocean, clean the machine thoroughly with fresh water and service the electrical parts to prevent from corrosion. It is highly recommended to use dielectric grease in all harness connecting points for better sealing and to prevent corrosion.	-
	After working, fill up the fuel tank to prevent water from condensing in the tank.	323
	Use the recommended lubricants.	351
Freezing weather	Fully charge the batteries regularly, electrolyte may freeze. Ventilate well especially when the batteries are charged in a confined space.	329
	When storing machines in extremely cold temperature, remove batteries and store them at room temperature.	198
	Before parking, remove the mud and the dirt from the tracks.	-
Demolition work	work Use fall protection over the cab against falling objects.	
Low fuel guelity	Drain the sediments in fuel tank at shorter service intervals. (1)	-
Low fuel quality	Change the engine oil and engine oil filter at shorter service intervals. (1)	-

	Check regularly that hose and pipe connections from the air cleaner to the engine induction manifold do not leak.	335
	Clean the air filter at shorter service intervals.	335
Dusty atmosphere	Clean the clogging net for radiator and oil cooler at shorter service intervals.	339
	Clean the areas on the machine where dust, chips and similar may collect at shorter service intervals in order to minimize the risk of fire.	332
	Pay attention to and clean the engine compartment and surrounding areas regularly.	334
	Use a suitable track for the ground conditions. If in doubt, contact your closest Volvo dealer for proper advice.	258
Rocky ground	Use a suitable attachment for the ground conditions such as a heavy duty bucket. (1)	-
Hammer operation	Change the hydraulic oil and return filter of hammer circuit at shorter service intervals. (1)	-

# Specifications Recommended lubricants

#### Recommended lubricants

The Volvo lubricants have been specially developed to fulfil the demanding operating conditions, in which Volvo excavators are used in. The oils have been tested according to Volvo excavator specifications and therefore meet the high requirements for safety and quality. Other mineral oils can be used if they conform to our viscosity recommendations and meet our quality requirements. The approval of Volvo is required, if any other oil base quality (for example biologically degradable oil) is to be used.

System	Oil grade	Recommended viscosity at varying ambient temperature
Engine	Engine oil For detail, see page <i>354</i> .	°C -30 -20 -10 0 +10 +20 +30 +40 +50 °F -22 -4 -14 +32 +50 +68 +86 +104 +122  SAE 10W-30***  *SAE 15W-40  SAE 5W-30***  SAE 5W-40
Fuel	Diesel fuel For detail, see page 358.	"C -30 -20 -10 0 +10 +20 +30 +40 +50 "F -22 -4 -14 +32 +50 +68 +86 +104 +122 ASTM D975 No.1 ASTM D975 No.2  NOTE!  The fuel should at least meet the legal requirement, and national and international standards for marketed fuels, for example : EN590 (with nationally adapted temperature requirements), ASTM D975 No 1-D and No 2-D, JIS KK 2204.
Cooling system	Volvo Coolant VCS Ready Mixed For detail, see page 355.	Volvo Coolant VCS Ready Mixed should be used only.  NOTE!  The content of Volvo coolant must not be less than 40% of the total mixture.

<sup>\*:</sup> Installed at factory

<sup>\*\*\*:</sup> VDS-4 or VDS-4.5 approved oils only. Other oils can be used up to +30°C (86°F).

System	Oil grade	Recommended viscosity at varying ambient temperature
Hydraulic system	Hydraulic oil for severe cold area or if siberian option kit is installed	°C -30 -20 -10 0 +10 +20 +30 +40 +50 °F -22 -4 -14 +32 +50 +68 +86 +104 +122 ISO VG15
	Volvo Hydraulic Oil Volvo 98609 Extra 46 or Volvo Hydraulic Oil Volvo 98609 Extra 68	°C -30 -20 -10 0 +10 +20 +30 +40 +50 °F -22 -4 -14 +32 +50 +68 +86 +104 +122 ISO VG32 HV ISO VG46 HV
	Volvo Hydraulic Oil Volvo 98610 Biodegradable 46	°C -30 -20 -10 0 +10 +20 +30 +40 +50 °F -22 -4 -14 +32 +50 +68 +86 +104 +122 Bio oil VG46
		NOTE! If the machine is filled with Volvo Biodegradable hydraulic oil this oil must also be used when filing and changing. The mineral oil content in bio oil should not exceed 2% when changing from mineral oil to bio oil. Contact a workshop authorised by Volvo.
	Volvo Hydraulic Oil Volvo 98620 Ultra 46 (long life oil) or Volvo Hydraulic Oil Volvo 98620 Ultra 68 (long life oil)	°C -30 -20 -10 0 +10 +20 +30 +40 +50 °F -22 -4 -14 +32 +50 +68 +86 +104 +122 ISO VG32 ISO VG46 ISO VG68

System	Oil grade	Recommended viscosity at varying ambient temperature	
Track gearbox	Volvo Axle Oil 80W-90 GL-5 or	°C -30 -20 -10 0 +10 +20 +30 +40 +50 °F -22 -4 -14 +32 +50 +68 +86 +104 +122	
Swing gearbox	Volvo Axle Oil 85W-140 GL-5 or Volvo Axle Oil Volvo	*SAE 90 SAE 140 GO102	
PTO gearbox (EC950 only)	97317 75W-80 GO102 or Volvo Axle Oil Limited Slip 85W-90 GL-5	Or corresponding gearbox oil below.  - Mobil SHC630  - Chevron Cetus HiPerSYN Oil 220	
Swing ring gear (Bath and Ball)	Volvo Lithium Grease EP2	©C -30 -20 -10 0 +10 +20 +30 +40 +50	
Pin and bushing	Ultra Grease Moly EP2 or Volvo Lithium Grease EP2 <sup>(a)</sup> For detail, see page 357.	°C -30 -20 -10 0 +10 +20 +30 +40 +50 °F -22 -4 -14 +32 +50 +68 +86 +104 +122 *1SO-L-XBCFB2*  Or corresponding grease on lithium base with EP** additives and consistency NLGI class 2.	
Air conditioner system	Refrigerant	HFC R134a	

a)Volvo Lithium Grease EP2 is not recommended when the ambient temperature is above 40 °C.

<sup>\*:</sup> Installed at factory

<sup>\*\*:</sup> Extreme Pressure

# **Engine oil**

Follow recommended change intervals according to the oil's grade and sulphur content in the fuel.

	Sulphur content in the fuel, ppm (10000 ppm = 1%)	
Oil grade	< 15	15 - 500   500 - 3000   3000 - 5000   > 5000
		Oil change interval (hours)
Volvo Engine Oil VDS-4.5 10W-30 or		
Volvo Engine Oil VDS-4.5	1000 <sup>(a)</sup>	
<b>15W-40</b> or	1000	
Other approved VDS-4.5 oil		
Volvo Engine Oil VDS-4.5		
10W-30 or		Not applicable
Volvo Engine Oil VDS-4.5 15W-40 or	- 500 <sup>(b)</sup>	Not applicable
Other approved VDS-4.5 oil		
Volvo Engine Oil VDS-4	300 (4)	
10W-30 or		
Volvo Engine Oil VDS-4 15W-40 or		
Other approved VDS-4 oil		
ACEA: E9	250	Not applicable
API: CJ-4 or CK-4	230	Not applicable

- a) Only applies to the machine with Volvo High Performance engine oil filter.
- b) Only applies to the machine with Volvo Performance engine oil filter.
  - ACEA: European Automobile Manufacturers Association
  - API: American Petroleum Institute

#### 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:

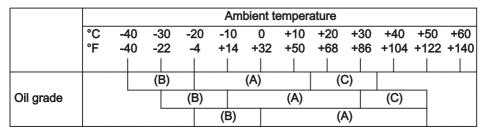
Description	Value
Total number of solid particles	< 340 ppm
Total hardness	< 9.5° dH
Chloride	< 40 ppm
Sulphate	< 100 ppm
pH value	5.5-9
Silica	< 20 mg SiO <sub>2</sub> /litre
Iron	< 0.10 mg Fe/litre
Manganese	< 0.05 mg Mn/litre
Electrical conductivity	< 500 μS/cm
Organic material, COD-Mn	< 15 mg/litre

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 engine damage.

# Hydraulic oil

Only use Volvo genuine hydraulic oil approved by Volvo Construction Equipment must be used. Do not mix different brands of hydraulic oil as this can lead to damage in the hydraulic system.

For the hydraulic oil specification, see page 351.



- (A): Ambient temperature recommended for general use of hydraulic system and components.
- (B): Ambient temperature guide for machine operation from a hydraulic oil viewpoint only, it does not guarantee the completion machine for other conditions like engine starting performance. In this range a warming-up period is needed to obtain proper performance.
- (C): Ambient temperature range to operate machine under special conditions, not a recommendation for general use conditions.

#### Additional recommendation for severe cold areas

A field solution for severe cold condition of ambient temperature between -40°C and +20°C.

- Type : Anti-wear type hydraulic oil
- Viscosity characteristic

Viscosity index: More than 130

Kinematic Viscosity: Less than 5,000cSt at -40°C, More than 5.6cSt at +90°C

#### NOTE!

This value is approximately equivalent to ISO Viscosity grade #22.

#### NOTE!

It is minimum theoretical recommendation without the guarantee of machine condition.

### Grease

#### Recommended grease for all digging equipment greasing points

Manufacturer	Product name		
	Recommendations	Alternatives*	
VOLVO	Ultra Grease Moly EP2	Volvo Lithium Grease EP2	
CALTEX	Molytex EP2	Multifak EP2	
GULF	Gulflex Moly EP	Gulfcrown EP2	
EXXONMOBIL	Beacon EP2 Moly	Beacon EP2	
SHELL	Retinax HDX2 / Alvania HDX2	Retinax EP2 / Alvania EP2	
TOTAL	Multis MS2	Multis EP2	
CASTROL	Pyro LM	Pyroplex Red	

<sup>\*</sup> Alternatives are not recommended when the ambient temperature is above 40 °C.

#### Mixability of types of grease with different additives

	Mixability of types of grease with additives					
	Lithium	Calcium	Lithium complex	Calcium complex	Aluminiu m complex	Clay
Lithium	√	√	√			
Calcium	√	√	√			√
Lithium complex	√	√	√	√		
Calcium complex			√	√		
Aluminium complex			√		√	
Clay		√			√	√

√ : Acceptable

# Fuel system

#### Fuel

#### Fuel quality requirements

The fuel should at least meet the legal requirements, national and international standards for marketed fuels, for example: EN590 (with nationally adapted temperature requirements), ASTM D 975 No. 1D and 2D, JIS KK 2204. Fuel specification varies according to the working temperature. Please contact authorized Volvo dealer.

#### Sulphur content

According to current USA legal requirement, the sulphur content in the diesel fuel must not exceed 0.0015 percent (15 ppm) by weight.

According to current EU/other countries legal requirements, the sulphur content in the diesel fuel must not exceed 0.001 percent (10 ppm) by weight.

#### Bio-diesel fuel

Vegetable oils and / or esters, also called "bio-diesel", (e.g. rape-seed methyl ester RME fuel), which are offered on certain markets both as pure products and as mixed into the diesel fuel.

Volvo Construction Equipment accepts a maximum intermix of 7% bio-diesel fuel in the diesel fuel, ready mixed from the oil companies. A higher intermix than 7% of bio-diesel fuel may cause:

- Increased emission by nitrogen oxide, (thereby not meeting legal requirements)
- Shorter service life of engine and injection system
- Increased fuel consumption
- Altered engine output
- Shortening the engine oil change interval to a half
- Shortened service life of rubber materials in the fuel system
- Less good cold handling properties of the fuel
- Limit storage time for the fuel, which may cause clogging up of the fuel system if the machine is laid up for longer periods

#### Warranty condition

The warranty does not cover damage caused be an intermix of more than 7% of bio-diesel fuel.

#### Alternative fuels

This statement is only valid for Volvo branded engines.

Hydro-treated vegetable oil (HVO) and fatty acid methyl ester (FAME) biodiesel are both made from renewable raw materials such as vegetable oils and animal fats, but they are chemically processed in different ways.

#### Hydro-treated vegetable oil (HVO)

HVO is created using a chemical process called hydro-treating. Hydro-treating creates an oxygenfree hydrocarbon product that is very similar to distillate diesel fuel and is well suited for use in diesel engines. HVO fuels complying with the CEN diesel fuel standard EN 590:2013 or with the European Fuel Quality Directive 98/70/EC are approved for use in all Volvo Construction Equipment diesel engines with no changes to maintenance intervals. Paraffinic diesel fuels complying with the CEN standard EN 15940 may be used in all machines operating outside the European Union and for EU-certified engines up to the emission level Stage IV. These fuels may also be used for the EU-certified D11, D13 and D16 engines meeting the emission level Stage V.

#### Biodiesel

Biodiesel is a product made from renewable resources such as vegetable oils or animal fat. Biodiesel that has been chemically processed into fatty acid methyl ester (FAME) can be blended with distillate diesel fuel and used in some diesel engines. Unblended biodiesel is referred to as B100 because it is 100% biodiesel.

Rapeseed methyl ester (RME) is the most common type of FAME used in Europe. Soy methyl ester (SME) and sunflower oil methyl ester (SOME) are the most common types of FAME used in the US. Although use of FAME biodiesel is now a legal requirement in some markets, it is not as suitable for use in diesel engines as conventional diesel fuel or HVO (hydro-treated vegetable oil).

#### Biodiesel fuel requirements

The FAME biodiesel blends specified in the table below are approved for use if:

- The biodiesel is pre-blended by the fuel supplier
- The biodiesel used in the blend conforms to EN14214 or ASTM D6751
- The distillate fuel used in the blend meets fuel sulphur requirements
- The distillate fuel used in the blend conforms to EN590 or ASTM D975
- B1-B5 biodiesel blends conform to EN590 or ASTM D975
- B6-B7 biodiesel blends conform to EN590 or ASTM D7467

- B8-B20 biodiesel blends conform to EN16709(B20) or ASTM D7467

Engine emission designation	Engine size	Accepta ble blend
EU Stage II / US Tier 2 * EU Stage IIIA / US Tier 3 * EU Stage IIIB / US Tier 4 interim EU Stage IV / US Tier 4 final EU Stage V	Below D4 / 4 litres	Up to B7
EU Stage II / US Tier 2 * EU Stage IIIA / US Tier 3 * EU Stage IIIB / US Tier 4 interim EU Stage IV / US Tier 4 final	D4-D8	Up to B7
EU Stage II / US Tier 2 * EU Stage IIIA / US Tier 3 * US Tier 4 final, special North America arrangement **	D9-D16	Up to B20
EU Stage IIIB / US Tier 4 interim EU Stage IV / US Tier 4 final	D11– D16	Up to B10
EU Stage IIIB / US Tier 4 interim, equipped with High Sulphur Fuel Conversion Kit (only available in unregulated markets) EU Stage IV / US Tier 4 final, equipped with High Sulphur Fuel Conversion Kit (only available in unregulated markets)	D4-D16	Up to B20

Engine emission designation	size	Accepta ble blend
EU Stage V	D4_D16	Up to B7

<sup>\*</sup> As Tier 2 and Tier 3 emissions regulations ended in 2005 and 2010 respectively, engines produced since then typically **meet Stage II / Stage IIIA regulations**, allowing their sale in less regulated markets.

#### NOTE!

Failures directly caused by the use of poor quality biofuel, or any other fuel not conforming to standards, are not factory defects and the manufacturer's warranty does not apply.

#### Maintenance interval requirements

Additional service actions and shorter maintenance intervals are mandatory when using biodiesel blends above B10.

#### **Every 10 hours**

- Check the engine oil and change if it rises above the maximum fill level
- Inspect the fuel system components and replace as necessary

### Half of original interval

- Change the engine oil and filter
- Replace the fuel filter(s)

#### Every year, regardless of operating hours

- Change the engine oil and filter
- Clean the fuel tank

#### Effects of biodiesel on engine oil

Using biodiesel can lead to increased oil dilution. Use engine oil analysis tools frequently to check for fuel dilution and monitor engine oil condition. Check the engine oil level daily. Always change the engine oil if the oil level rises above the maximum fill level.

#### Effects of biodiesel on fuel systems

Biodiesel dissolves and loosens some fuel system deposits. During the initial conversion to biodiesel, loosened deposits will travel to the fuel filters and require more frequent fuel filter replacements. Start with new fuel filters when using biodiesel for the first time.

<sup>\*\*</sup> With additional restrictions and special operating conditions, equipment used in North America may operate on B20 diesel.

Biodiesel is aggressive to some materials used in fuel system components. Inspect seals, hoses, rubber and plastic components every 10 hours. Repair or replace any components that are damaged, softened or leaking. Clean biodiesel from painted surfaces immediately to prevent paint damage.

Biodiesel is more sensitive to bacteria and water contamination than distillate diesel fuel.

- Use as much fuel as possible before refilling the fuel tank in order to prevent bacteria growth if a machine is in regular use, e.g. regularly uses up a tank of fuel within a week. In climates where condensation is a risk, or when the machine is working for short durations, keep the fuel tank full.
- Do not use biodiesel in machines with low utilization or operating time.
- Do not store machines for more than 4 weeks without flushing biodiesel out of the fuel system by operating the machine through at least one full tank of distillate diesel fuel.
- Always follow the manufacturer's storage recommendations and "best-before" dates for each delivery of biodiesel.

# Effects of biodiesel on exhaust aftertreatment systems

Biodiesel leaves higher levels of ash in diesel particulate filters and may require more frequent diesel particulate filter (DPF) regeneration and cleaning. Biodiesel can cause deviations in temperatures and functionality of the DPF burner and may cause fault codes or errors. Biodiesel exhaust gas is aggressive to some materials used in selective catalytic reduction systems (SCR) and may require more frequent

Effects of biodiesel on cold weather operation Biodiesel has a high viscosity at temperatures below 0 °C (32 °F) and may cause problems starting the engine. Use a fuel heater or park machines in a heated building if possible.

cleaning, repairing or replacing of SCR parts.

#### Effects of biodiesel on engine performance Biodiesel B100 has about 8% lower energy density compared to regular diesel fuel. Blends equal or lower than B20 have a small impact on engine performance.

Effects of biodiesel on emissions compliance

Engines are certified to comply with U.S. EPA, California and EU emissions standards based upon the use of test fuels with specifications established by these regulatory agencies. Alternative fuels, including biodiesel, that are not substantially similar to the required test fuels may adversely affect engine emissions compliance. As a result, Volvo does not warrant that the engine will conform to applicable Federal or California and EU emissions limits when operated on, or having previously being operated on, biodiesel or other alternative fuels that are not substantially similar to specified test fuels used for certification, nor if biodiesel / regular diesel is used in blends that exceed the recommendations.

However, the use of biodiesel up to a maximum of 20% (B20) in and of itself, will not affect the manufacturer's mechanical warranty as to engine or emissions system, provided the bio fuel used in the blend conforms to the applicable standards and the additional steps outlined herein are followed.

#### AdBlue®/DEF



Risk of machine damage.

In the short term, use of the wrong fluid can lead to reduced engine power. In the long term, it can lead to damage to the SCR-system and the catalyst. Reusing AdBlue®/DEF can lead to contamination. Damages caused by the use of incorrect fluids will not be covered by the warranty.

Always use fluid specified in ISO 22241-1. Do not reuse drained AdBlue®/DEF.

For reducing nitrogen oxides (NO<sub>X</sub>) the engine is equipped with a selective catalytic reduction (SCR) system. A diesel exhaust fluid is needed for the process to work. The fluid is called AdBlue® in Europe and Asia, but in North America it is called Diesel Exhaust Fluid (DEF). When needed, the SCR system warms up the AdBlue®/DEF-tank and lines.

The fluid is filled in a separate tank, which is completely separated from the fuel tank. AdBlue®/DEF may not be mixed in the fuel tank and fuel may not be mixed in the AdBlue®/DEF-tank.

AdBlue®/DEF consists of urea crystals (32.5%) and distilled water (67.5%). It is transparent, clear, and has a slight odour of ammonia. The fluid is not considered to be hazardous, but should still be handled with care. It is very corrosive, especially with copper and aluminium. For this reason, avoid spilling the fluid on electric cables and components. Always wipe up any spilled AdBlue®/DEF.

AdBlue®/DEF is not a combustible product. When exposed to high temperatures it will convert to ammonia and carbon dioxide. The fluid should not come into contact with other chemicals or be mixed with other chemicals.

AdBlue®/DEF is sensitive to both high and low temperatures. It should not be exposed to direct sunlight for any extended period of time. If the machine is not in use, AdBlue®/DEF starts to freeze at -11 °C (12 °F). The fluid volume in the tank increases when frozen, this is why it is important to follow the recommended fill volume. AdBlue®/DEF does not break down or degrade when it freezes. The SCR-system will thaw the fluid so that it regains its concentration with maintained quality. The machine will work normally during the time that the fluid melts.

At AdBlue®/DEF temperatures above 20 °C (68 °F) the fluid starts to degrade. Then the fluid gives off ammonia, which is aggressive to materials such as rubber. At temperatures above 75–80 °C (167–176 °F), ammonia production increases. However, high temperatures are permitted for a short time.

AdBlue®/DEF should be stored in a cool, dry, and ventilated place. The fluid may not be stored in direct sunlight. The recommended storage temperature for AdBlue®/DEF is between -11 °C (12 °F) and 25 °C (77 °F). Under these conditions, storage life is approx. two years. Long-term storage of AdBlue®/DEF at a temperature above 25 °C (77 °F) can reduce the lifetime of the fluid. A short time exposure to higher temperatures has no impact on the quality.

#### NOTE!

If the machine is to be parked for an extended period of time (several months) in ambient temperatures above 40  $^{\circ}$ C (104  $^{\circ}$ F) the tank must be drained. This to prevent the fluid from having the wrong quality when starting the machine or that precipitates have a negative impact on the component parts.

#### NOTE!

If the tank has been drained completely it should be rinsed out with new AdBlue®/DEF before new fluid is filled. Never reuse old fluid. If distilled water or ordinary water is used when rinsing there is a risk that the system will generate an alarm due to wrong quality of AdBlue®/DEF.

#### NOTE!

Water of any kind should not be used when cleaning AdBlue®/DEF system or AdBlue®/DEF components since there is a risk that even a small amount of water remains in the system after cleaning. The only exceptions allowed are operations described in the service information made by Volvo.

AdBlue®/DEF is available in plastic container, barrel, IBC, or bulk. For information on ordering AdBlue®/DEF (only applies to USA-market):

- Volvo Construction Equipment: 1-877-823-1111 (office hours)
- www.volvoce.com (outside of office hours)

For information on ordering AdBlue®/DEF (other markets), contact your local Volvo dealer.

#### Actions in case of contact with AdBlue®/DEF:

- In case of skin contact, rinse thoroughly with water. The fluid may cause irritation of the skin.
- · In case of eye contact, rinse thoroughly for several minutes. If needed, contact a doctor for advice.
- In case of inhalation, breathe fresh air and contact a doctor if needed.
- · If swallowed, drink water and contact a doctor.

# Service capacities and change intervals

### Change capacities

Oils and other liquids		Change capacities
Engine oil, including filter		16 litres (4.2 US gal.)
Coolant		25 litres (6.6 US gal.)
Hydraulic tank		85 litres (22.5 US gal.)
Hydraulic system, total		230 litres (61 US gal.)
Swing gearbox		3.9 litres (1.0 US gal.)
Track gearbox (each)	EC140E L	2.2 litres (0.6 US gal.)
	EC140E LM	5.8 litres (1.5 US gal.)
Fuel tank		250 litres (66 US gal.)
Swing ring gear		9 litres (2.4 US gal.)
		8.1 kg (17.9 lb)
AdBlue®/DEF tank		20 litres (5.3 US gal.)

### Change intervals

#### Filter changes

Filter	Hours
Engine oil filter (a)	1000 <sup>(b)</sup>
	500 <sup>(c)</sup>
Fuel filter	500
Water separator filter element	500
Air cleaner, primary filter	After cleaning primary filter 5 times or every 2000 hours or maximum 1 year
Air cleaner, secondary filter	After changing primary filter 3 times or every 4000 hours or maximum 2 years
Air conditioner/heater main filter	2000
Air conditioner/heater main filter (HEPA filter, optional equipment)	500
Cab prefilter	2000
Cartridge of drain filter, hydraulic system	1000 (first change: 500 hours)
Return oil filter, hydraulic system	2000 (first change: 500 hours) *
Element of servo filter, hydraulic system	1000 (first change: 500 hours)
Air ventilation filter, fuel tank	2000
Air breather filter, hydraulic tank	2000
Air filter of air compressor	2000
Air breather filter, AdBlue®/DEF tank	6000
AdBlue®/DEF pump unit filter	6000

- a) Engine oil filter should be replaced every time the engine oil is changed.
- b) Only applies to the machine with Volvo High Performance engine oil filter.
- c) Only applies to the machine with Volvo Performance engine oil filter.
- \* When using the hydraulic hammer;
- Frequency of hammer use (50%): change the return oil filter every 1000 hours
- Frequency of hammer use (100%): change the return oil filter every 500 hours

#### Oil and liquid changes

Oil/liquid	Hours
Engine oil <sup>(a)</sup>	1000 or maximum 1 year whichever comes first <sup>(b)</sup>
	500 or maximum 1 year whichever comes first <sup>(c)</sup>
Coolant	6000 or maximum 4 years whichever comes first
Hydraulic oil (mineral oil)	2000 *
Hydraulic oil (bio oil and long life hydraulic oil)	5000 *
Swing drive unit oil	1000 (first change: 500 hours)
Track drive unit oil	2000 (first change: 500 hours)

- a) The interval varies depending on oil grade and the fuel's sulphur content, see page 354.
- b) Only applies to the machine with Volvo High Performance engine oil filter.
- c) Only applies to the machine with Volvo Performance engine oil filter.
- \* When using the hydraulic hammer;
- Frequency of hammer use (50%): change the hydraulic oil every 1000 hours
- Frequency of hammer use (100%): change the hydraulic oil every 600 hours

#### NOTE!

If a high water content or excessive contamination in the lubricants (e.g., engine oil, hydraulic oil, drive unit oil, etc.) is found by Volvo oil analysis, change the lubricants regardless of the change interval. Contact your Volvo dealer for detailed information on Volvo oil analysis.

### **Engine**

### Engine, specifications

Designation	D4J
Number of cylinders	4
Cylinder bore	101 mm (3.98 in)
Stroke	126 mm (4.96 in)
Displacement	4.04 litres (247 in <sup>3</sup> )
Injection order	1-3-4-2
Compression ratio	16.6:1
Power output at 33.3 r/s (2000 rpm)	90 kW (122 PS, 121 HP) SAE J1995 Gross
	89 kW (121 PS, 119 HP) ISO 9249 / SAE J1349 Net
Maximum torque	566 Nm (58 kgf m, 417 lbf ft) at 1500 rpm
Low idle	950 rpm
High idle	2100 rpm

#### Carbon dioxide emissions

#### NOTE!

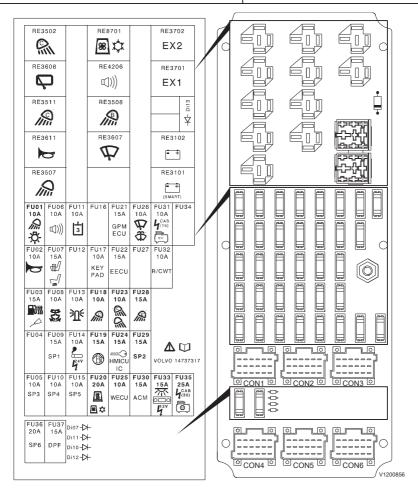
Only applicable to engine(s) quipped to meet the legal requirements for exhaust emissions according to EU Stage V.

The table below shows the value of the carbon dioxide (CO<sub>2</sub>) emission determined from EU-type approval testing of parent engine(s) in the warm part of the Non Road Transient Test Cycle (NRTC).

	Test cycle NRTC
Parent engine	With B7 fuel
D4J, CO <sub>2</sub> (g/kWh)	737.6

### **Electrical system**

System voltage	24 V
Starter	5.5 kW
Batteries	2 x 12 V
Alternator	28 V / 80 A
Horn sound level at 2 m	Min. 115 dB
Head light type	Halogen (70 W) LED (22 W)



### Relays

No.	Capacity	Appliance / Circuit
RE3502	Relay	Work light (Counterweight)
RE3608	Relay	Lower wiper
RE3511	Relay	Work light (Cab)
RE3611	Relay	Horn
RE3507	Relay	Work light
RE8701	Relay	Air conditioner
RE4206	Relay	Travel alarm
RE3508	Relay	Work light (Boom)
RE3607	Relay	Upper wiper
RE3702	Relay	Spare relay
RE3701	Relay	Spare relay
RE3102	Relay	Main 2
RE3101	Relay	Main 1

### **Fuses**

No.	Capacity	Appliance / Circuit
FU01	10A	Work light (Boom, Deck)
FU02	10A	Horn
FU03	15A	Water separator heater, Auto lubrication
FU04	-	-
FU05	10A	Spare
FU06	10A	Travel alarm
FU07	15A	Seat heater, Air suspended seat heater
FU08	10A	Tiltrotator
FU09	15A	Spare
FU10	10A	Spare
FU11	10A	Hydraulic option 3
FU12	-	-
FU13	10A	Rotating warning beacon
FU14	10A	Cigarette lighter, Power socket (24V)
FU15	10A	Spare

No.	Capacity	Appliance / Circuit
FU16	-	-
FU17	10A	Keypad
FU18	10A	Work light (Cab)
FU19	15A	Fuel filler pump
FU20	20A	Auxiliary heater, Air conditioner
FU21	15A	GPMECU (General Purpose Machine Electronic Control Unit)
FU22	15A	EMS (Engine Management System)
FU23	10A	Work light (Counterweight)
FU24	15A	Ignition switch, HMICU (Human Machine Interface Control Unit), IC (Instrument Cluster)
FU25	10A	WECU (Telematics ECU)
FU26	10A	Wiper and washer
FU27	-	-
FU28	15A	Work light (Boom)
FU29	15A	Spare
FU30	15A	ACM (Aftertreatment Control Module)
FU31	10A	Power outlet
FU32	10A	Removable counterweight
FU33	15A	Interior light, Audio, Power outlet
FU34	-	-
FU35	25A	Air compressor
FU36	20A	Spare
FU37	15A	Diesel Particulate Filter

### Cab

#### Operator seat

This machine is equipped with an operator seat, which meets the criteria of EN ISO 7096.

#### Vibration and sound information

#### Hand-arm vibrations

Weighted root mean square (RMS) acceleration emission of the machine to which the arm is subjected for an 8 hours and at typical operating conditions of the machine equipped with mechanical suspension seat, is as follow. Measuring was carried out according to ISO 5349-1, ISO 5349-2 and ISO 8041: 1990

Excavating, mining (quarry), transfer movement and hydraulic breaker application is less than 2.5 m/s² A(8)

#### Whole-body vibrations

Weighted root mean square (RMS) acceleration emission of the machine to which the body is subjected for an 8 hours and at typical operating conditions of the machine equipped with mechanical suspension seat, is as follow. Measuring was carried out according to ISO 2631-1: 1997 and ISO 8041: 1990

- Excavating, mining (quarry) and hydraulic breaker application is less than 0.5 m/s<sup>2</sup> A(8)
- Transfer movement (traveling) is 0.5 ~ 0.9 m/s<sup>2</sup> A(8)

#### NOTE!

These whole body vibration values was determined at particular operating and terrain conditions and it is therefore not representative for the various conditions in accordance with the intended use of the machine. Consequently this whole body vibration emission value declared by the manufacturer in accordance with European Standard is not intended to determine the whole body vibration exposure to the operator using this machine.

To ensure that the whole-body vibration emission during machine use is kept to a minimum, see page 208.

#### Sound information

Sound pressure level (LpA) at operator position (Measurement according to ISO 6396)	- Standard: 69 LpA dB(A) - Tropical: 70 LpA dB(A)
Sound power level (LwA) around the machine (Measurement according to 2000/14/EC with applicable appendices and measuring method according to ISO 6395)	- Standard: 100 LwA dB(A) - Tropical: 101 LwA dB(A)

### Refrigerant

Туре	Quantity	GWP <sup>(a)</sup>
	0.65 kg (1.4 lb) 930 CO <sub>2</sub> -eq	1430

a) Global warming potential (GWP) is a measure of how much heat a gas traps in the atmosphere relative to that of carbon dioxide ( $\rm CO_2$ ). GWP is calculated in terms of the 100–year warming potential of 1 kg of a greenhouse gas relative to 1 kg of  $\rm CO_2$ .

# Hydraulic system

Main pump	
Model	K5V80DT
Maximum flow rate	2 x 124 l/min (2 x 33 gpm)
Туре	Variable displacement, axial piston pump

Servo pump	
Maximum flow	20 l/min (5.3 gpm)
Relief pressure	3.9 MPa (40 kgf cm², 569 psi)

Main control valve			
Model	BK22		
Main relief pressure (Standard / Boost pressure)	32.4 / 34.3 MPa (330 / 350 kgf cm², 4693 / 4980 psi)		
Port relief pressure	Boom / Dipper arm / Bucket: 35.8 MPa (365 kgf cm², 5192 psi)		
2 stage port relief pressure (Standard)	Low / High: 20.6 / 35.8 MPa (210 / 365 kgf cm², 2987 / 5192 psi)		
Preset relief pressure (Option)	Low / High: 9.8 / 35.8 MPa (100 / 365 kgf cm², 1421 / 5192 psi)		

Control pedals				
Travel pedal	Model	PVD8P		
	Stroke	5.5 mm (0.21 in)		
	Operating force	10.6 Nm (1.08 kgf m) (7.84 lbf ft)		
X1 pedal	Model	RCV8C		
	Stroke	5.5 mm (0.21 in)		
	Operating force	9.84 Nm (1.0 kgf m) (7.28 lbf ft)		

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Control levers				
One button type (Semi-long)	Model	PV48K		
	Angle	Forward and backward: 19° Right and left: 25°		
	Operating force	Forward and backward: 2.21 Nm (0.23 kgf m) (1.63 lbf ft) Right and left: 2.45 Nm (0.25 kgf m) (1.81 lbf ft)		
Four buttons type Three buttons and proportional switch type	Model	PV48K		
	Angle	Forward and backward: 19° Right and left: 19°		
	Operating force	Forward and backward: 2.02 Nm (0.21 kgf m) (1.49 lbf ft) Right and left: 2.21 Nm (0.23 kgf m) (1.63 lbf ft)		

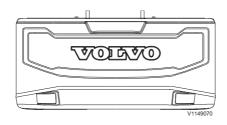
Track motor	
Model	EC140E L: TM22VC
	EC140E LM: EM140V
Туре	Variable displacement axial piston motor with mechanical brake
Relief valve setting pressure	34.3 MPa (350 kgf cm²) (4975 psi)
Brake type	Wet disc, spring applied, hydraulic released
Track gearbox	
Туре	2-stage planetary

Swing motor			
Model	M5X80CHB		
Туре	Fixed displacement axial piston motor with mechanical brake		
Relief valve setting pressure	24.5 MPa (250 kgf cm²) (3556 psi)		
Swing gearbox			
Туре	2-stage planetary		

## Machine weights

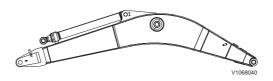
### Disassembled parts, weight

#### Counterweight, weight



Description	Unit	Counterweight	
Weight	kg	2100	2450
vveignt	lb	4630	5400

### Boom, weight

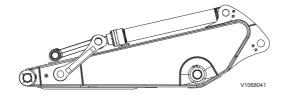


		Boom		
Description	Unit	4.0 m (13' 1") GP	4.6 m (15' 1") GP	4.6 m (15' 1") VA
Weight	kg lb	1050 2310	1100 2430	1900 4190

\* Includes cylinder, piping and pin

GP: General Purpose VA: Variable Adjustable

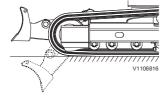
### Dipper arm, weight



		Dipper arm			
Description	Unit	1.9 m (6' 3") GP	2.1 m (6' 11") GP	2.5 m (8' 2") GP	3.0 m (9' 10") GP
Weight	kg lb	525 1160	555 1220	625 1380	685 1510

<sup>\*</sup> Includes cylinder, linkage and pin GP: General Purpose

### Dozer blade, weight



Description	Unit	Dozer blade
Woight	kg	458
Weight	lb	1010

### **Ground pressure**

For North America EC140E L

GP Boom (m/ft-in): 4.6 m / 15' 1" GP Arm (m/ft-in): 2.5 m / 8' 2"

Bucket (I/kg/lb): 540 I / 410 kg / 900 lb Counterweight (kg/lb): 2450 kg / 5400 lb

Description			Ground pressure (kPa/kgf cm²/psi)	Overall width (mm/ft-in)
	500 / 20	14160 / 31220	42.2 / 0.43 / 6.1	2490 / 8' 2"
Triple grouser	600 / 24	14360 / 31660	35.3 / 0.36 / 5.1	2590 / 8' 6"
	600 / 24 (HD)	14430 / 31820	35.3 / 0.36 / 5.1	2590 / 8' 6"
	700 / 28	14560 / 32100	31.4 / 0.32 / 4.6	2690 / 8' 10"
	750 / 30	14740 / 32500	29.4 / 0.3 / 4.3	2740 / 8' 12"
Rubber pad	500 / 20	14200 / 31310	42.2 / 0.43 / 6.1	2490 / 8' 2"

VA Boom (m/ft-in): 4.6 m / 15' 1" GP Arm (m/ft-in): 2.5 m / 8' 2"

Bucket (I/kg/lb): 540 I / 410 kg / 900 lb Counterweight (kg/lb): 2450 kg / 5400 lb

Description	Shoe width (mm/in)	Operating weight (kg/lb)	Ground pressure (kPa/kgf cm²/psi)	Overall width (mm/ft-in)
	500 / 20	14580 / 32150	43.1 / 0.44 / 6.3	2490 / 8' 2"
Triple grouser	600 / 24	14780 / 32590	36.3 / 0.37 / 5.3	2590 / 8' 6"
	600 / 24 (HD)	14850 / 32740	37.3 / 0.38 / 5.4	2590 / 8' 6"
	700 / 28	14980 / 33030	31.4 / 0.32 / 4.6	2690 / 8' 10"
	750 / 30	15160 / 33430	30.4 / 0.31 / 4.4	2740 / 8' 12"
Rubber pad	500 / 20	14620 / 32240	43.1 / 0.44 / 6.3	2490 / 8' 2"

GP : General Purpose VA : Variable Adjustable

#### EC140E L with dozer blade

GP Boom (m/ft-in): 4.6 m / 15' 1" GP Arm (m/ft-in): 2.5 m / 8' 2"

Bucket (l/kg/lb): 540 l / 410 kg / 900 lb Counterweight (kg/lb): 2450 kg / 5400 lb

Description Shoe width (mm/in) Operating w (kg/lb)		Operating weight (kg/lb)	Ground pressure (kPa/kgf cm²/psi)	Overall width (mm/ft-in)
	500 / 20	15100 / 33300	45.1 / 0.46 / 6.5	2490 / 8' 2"
Triple grouser	600 / 24	15300 / 33740	38.2 / 0.39 / 5.5	2590 / 8' 6"
	600 / 24 (HD)	15370 / 33890	38.2 / 0.39 / 5.5	2590 / 8' 6"
	700 / 28	15500 / 34180	33.3 / 0.34 / 4.8	2690 / 8' 10"
	750 / 30	15680 / 34570	31.4 / 0.32 / 4.6	2740 / 8' 12"
Rubber pad	500 / 20	15140 / 33380	45.1 / 0.46 / 6.5	2490 / 8' 2"

VA Boom (m/ft-in): 4.6 m / 15' 1" GP Arm (m/ft-in): 2.5 m / 8' 2"

Bucket (I/kg/lb): 540 I / 410 kg / 900 lb Counterweight (kg/lb): 2450 kg / 5400 lb

Description	Shoe width (mm/in)	Operating weight (kg/lb)	Ground pressure (kPa/kgf cm²/psi)	Overall width (mm/ft-in)
	500 / 20	15520 / 34220	46.1 / 0.47 / 6.7	2490 / 8' 2"
Triple grouser	600 / 24	15720 / 34660	39.2 / 0.4 / 5.7	2590 / 8' 6"
	600 / 24 (HD)	15790 / 34820	39.2 / 0.4 / 5.7	2590 / 8' 6"
	700 / 28	15920 / 35100	34.3 / 0.35 / 5.0	2690 / 8' 10"
	750 / 30	16100 / 35500	32.4 / 0.33 / 4.7	2740 / 8' 12"
Rubber pad	500 / 20	15560 / 34310	46.1 / 0.47 / 6.7	2490 / 8' 2"

GP : General Purpose VA : Variable Adjustable

### For Europe EC140E L

GP Boom (m/ft-in): 4.6 m / 15' 1" GP Arm (m/ft-in): 2.5 m / 8' 2"

Bucket (l/kg/lb): 540 I / 410 kg / 900 lb Counterweight (kg/lb): 2450 kg / 5400 lb

Description	Shoe width (mm/in)	Operating weight (kg/lb)	Ground pressure (kPa/kgf cm²/psi)	Overall width (mm/ft-in)
	500 / 20	14390 / 31730	43.1 / 0.44 / 6.3	2490 / 8' 2"
Triple grouser	600 / 24	14590 / 32170	36.3 / 0.37 / 5.3	2590 / 8' 6"
	600 / 24 (HD)	14660 / 32330	36.3 / 0.37 / 5.3	2590 / 8' 6"
	700 / 28	14790 / 32610	31.4 / 0.32 / 4.6	2690 / 8' 10"
	750 / 30	14970 / 33010	29.4 / 0.3 / 4.3	2740 / 8' 12"
Rubber pad	500 / 20	14430 / 31820	42.2 / 0.43 / 6.1	2490 / 8' 2"

VA Boom (m/ft-in): 4.6 m / 15' 1" GP Arm (m/ft-in): 2.5 m / 8' 2"

Bucket (l/kg/lb): 540 l / 410 kg / 900 lb Counterweight (kg/lb): 2450 kg / 5400 lb

Description			Ground pressure (kPa/kgf cm²/psi)	Overall width (mm/ft-in)
	500 / 20	14810 / 32660	44.1 / 0.45 / 6.4	2490 / 8' 2"
Triple grouser	600 / 24	15010 / 33100	37.3 / 0.38 / 5.4	2590 / 8' 6"
	600 / 24 (HD)	15080 / 33250	37.3 / 0.38 / 5.4	2590 / 8' 6"
	700 / 28	15210 / 33540	32.4 / 0.33 / 4.7	2690 / 8' 10"
	750 / 30	15390 / 33930	30.4 / 0.31 / 4.4	2740 / 8' 12"
Rubber pad	500 / 20	14850 / 32740	44.1 / 0.45 / 6.4	2490 / 8' 2"

GP : General Purpose VA : Variable Adjustable

#### EC140E L with dozer blade

GP Boom (m/ft-in): 4.6 m / 15' 1" GP Arm (m/ft-in): 2.5 m / 8' 2"

Bucket (I/kg/lb): 540 I / 410 kg / 900 lb Counterweight (kg/lb): 2450 kg / 5400 lb

Description			Ground pressure (kPa/kgf cm²/psi)	Overall width (mm/ft-in)
	500 / 20	15330 / 33800	46.1 / 0.47 / 6.7	2490 / 8' 2"
	600 / 24	15530 / 34240	38.2 / 0.39 / 5.5	2590 / 8' 6"
Triple grouser	600 / 24 (HD)	15600 / 34400	38.2 / 0.39 / 5.5	2590 / 8' 6"
	700 / 28	15730 / 34680	33.3 / 0.34 / 4.8	2690 / 8' 10"
	750 / 30	15910 / 35080	31.4 / 0.32 / 4.6	2740 / 8' 12"
Rubber pad	500 / 20	15370 / 33890	45.1 / 0.46 / 6.5	2490 / 8' 2"

VA Boom (m/ft-in): 4.6 m / 15' 1" GP Arm (m/ft-in): 2.5 m / 8' 2"

Bucket (l/kg/lb): 540 l / 410 kg / 900 lb Counterweight (kg/lb): 2450 kg / 5400 lb

Description	Shoe width (mm/in)	Operating weight (kg/lb)	Ground pressure (kPa/kgf cm²/psi)	Overall width (mm/ft-in)
	500 / 20	15750 / 34730	47.1 / 0.48 / 6.8	2490 / 8' 2"
Triple grouser	600 / 24	15950 / 35170	39.2 / 0.4 / 5.7	2590 / 8' 6"
	600 / 24 (HD)	16020 / 35320	40.2 / 0.41 / 5.8	2590 / 8' 6"
	700 / 28	16150 / 35610	34.3 / 0.35 / 5.0	2690 / 8' 10"
	750 / 30	16330 / 36010	32.4 / 0.33 / 4.7	2740 / 8' 12"
Rubber pad	500 / 20	15790 / 34820	47.1 / 0.48 / 6.8	2490 / 8' 2"

GP : General Purpose VA : Variable Adjustable

#### **EC140E LM**

GP Boom (m/ft-in): 4.6 m / 15' 1" GP Arm (m/ft-in): 2.5 m / 8' 2"

Bucket (I/kg/lb): 540 I / 410 kg / 900 lb Counterweight (kg/lb): 2450 kg / 5400 lb

Description Shoe width (mm/in)		Operating weight (kg/lb)	Ground pressure (kPa/kgf cm²/psi)	Overall width (mm/ft-in)	
	600 / 24	15780 / 34790	39.2 / 0.4 / 5.7	2590 / 8' 6"	
Triple grouser	700 / 28	15990 / 35260	34.3 / 0.35 / 5.0	2690 / 8' 10"	
	800 / 32	16410 / 36180	30.4 / 0.31 / 4.4	2790 / 9' 2"	
	900 / 36	16650 / 36710	27.5 / 0.28 / 4.0	2890 / 9' 6"	

VA Boom (m/ft-in): 4.6 m / 15' 1" GP Arm (m/ft-in): 2.5 m / 8' 2"

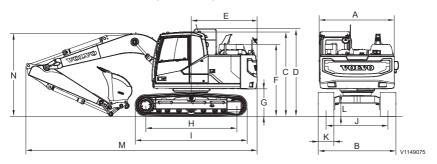
Bucket (I/kg/lb): 540 I / 410 kg / 900 lb Counterweight (kg/lb): 2450 kg / 5400 lb

Description			Ground pressure (kPa/kgf cm²/psi)		
	600 / 24	16200 / 35720	40.2 / 0.41 / 5.8	2590 / 8' 6"	
Triple grouser	700 / 28	16410 / 36180	35.3 / 0.36 / 5.1	2690 / 8' 10"	
	800 / 32	16830 / 37110	31.4 / 0.32 / 4.6	2790 / 9' 2"	
	900 / 36	17070 / 37640	28.4 / 0.29 / 4.1	2890 / 9' 6"	

GP : General Purpose VA : Variable Adjustable

### **Dimensions**

### Total machine, dimensions (EC140E L)

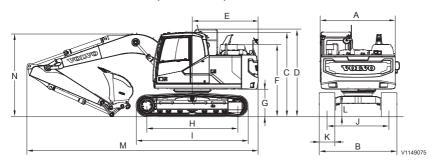


		Boom				
		4.6 m (15' 1")				
Description	Unit		Dipp	er arm		
		1.9 m (6' 3")	2.1 m (6' 11")	2.5 m (8' 2")	3.0 m (9' 10")	
A. Overall width of superstructure		2490 8' 2"	2490 8' 2"	2490 8' 2"	2490 8' 2"	
B. Overall width		2590 8' 6"	2590 8' 6"	2590 8' 6"	2590 8' 6"	
C. Overall height of cab		2800 9' 2"	2800 9' 2"	2800 9' 2"	2800 9' 2"	
D. Overall height of guardrail		-	-	-	-	
E. Tail swing radius	mm	2200 7' 3"	2200 7' 3"	2200 7' 3"	2200 7' 3"	
F. Overall height of engine hood	ft-in	2400 7' 10"	2400 7' 10"	2400 7' 10"	2400 7' 10"	
G. *Counterweight clearance		920 3' 0"	920 3' 0"	920 3' 0"	920 3' 0"	
H. Tumbler length		3040 10' 0"	3040 10' 0"	3040 10' 0"	3040 10' 0"	
I. Track length	•	3760 12' 4"	3760 12' 4"	3760 12' 4"	3760 12' 4"	
J. Track gauge		1990 6' 6"	1990 6' 6"	1990 6' 6"	1990 6' 6"	

K. Shoe width	mm in	600 24"	600 24"	600 24"	600 24"
L. *Minimum ground clearance		436 1' 5"	436 1' 5"	436 1' 5"	436 1' 5"
M. Overall length		7130 23' 5"	7720 25' 4"	7720 25' 4"	7650 25' 1"
M <sup>'</sup> . Overall length (Variable adjustable boom)	mm ft-in	-	7700 25' 3"	7660 25' 2"	7560 24' 10"
N. Overall height of boom		2870 9' 5"	2710 8' 11"	2830 9' 3"	3210 10' 6"
N <sup>'</sup> . Overall height of boom (Variable adjustable boom)		-	2720 8' 11"	2860 9' 5"	3310 10' 10"

<sup>\*</sup> Without shoe grouser

### Total machine, dimensions (EC140E LM)



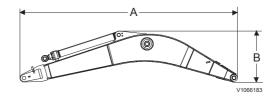
			В	oom				
		4.6 m (15' 1")						
Description	Unit	Dipper arm						
		1.9 m (6' 3")	2.1 m (6' 11")	2.5 m (8' 2")	3.0 m (9' 10")			
A. Overall width of superstructure		2490 8' 2"	2490 8' 2"	2490 8' 2"	2490 8' 2"			
B. Overall width		2690 8' 10"	2690 8' 10"	2690 8' 10"	2690 8' 10"			
C. Overall height of cab		2994 9' 10"	2994 9' 10"	2994 9' 10"	2994 9' 10"			
D. Overall height of guardrail		3130 10' 3"	3130 10' 3"	3130 10' 3"	3130 10' 3"			
E. Tail swing radius	mm	2200 7' 3"	2200 7' 3"	2200 7' 3"	2200 7' 3"			
F. Overall height of engine hood	ft-in	2590 8' 6"	2590 8' 6"	2590 8' 6"	2590 8' 6"			
G. *Counterweight clearance		1113 3' 8"	1113 3' 8"	1113 3' 8"	1113 3' 8"			
H. Tumbler length		3000 9' 10"	3000 9' 10"	3000 9' 10"	3000 9' 10"			
I. Track length		3790 12' 5"	3790 12' 5"	3790 12' 5"	3790 12' 5"			
J. Track gauge		1990 6' 6"	1990 6' 6"	1990 6' 6"	1990 6' 6"			

K. Shoe width	mm in	700 28"	700 28"	700 28"	700 28"
L. *Minimum ground clearance		580 1' 11"	580 1' 11"	580 1' 11"	580 1' 11"
M. Overall length		7140 23' 5"	7690 25' 3"	7720 25' 4"	7690 25' 3"
M <sup>'</sup> . Overall length (Variable adjustable boom)	mm ft-in	-	7700 25' 3"	7690 25' 3"	7640 25' 1"
N. Overall height of boom		2910 9' 7"	2780 9' 1"	2900 9' 6"	3210 10' 6"
N <sup>'</sup> . Overall height of boom (Variable adjustable boom)		-	2820 9' 3"	2950 9' 8"	3280 10' 9"

<sup>\*</sup> Without shoe grouser

### Boom and dipper arm

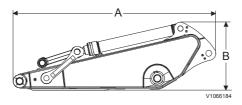
### Boom, dimension



			Boom	
Description	Unit	4.0 m (13' 1") GP	4.6 m (15' 1") GP	4.6 m (15' 1") VA
Length (A)		4200 (13' 9")	4770 (15' 8")	4765 (15' 8")
Height (B)	mm (ft in)	1400 (4' 7")	1370 (4' 6")	1225 (4' 0")
Width	(10 111)	545 (1' 9")	545 (1' 9")	545 (1' 9")

<sup>\*</sup> Includes dipper arm cylinder, piping and pin

#### Dipper arm, dimension

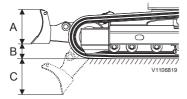


			Dippe	er arm	
Description	Unit	1.9 m (6' 3") GP	2.1 m (6' 11") GP	2.5 m (8' 2") GP	3.0 m (9' 10") GP
Length (A)		2600 (8' 6")	2800 (9' 2")	3200 (10' 6")	3700 (12' 2")
Height (B)	(ft in)	690 (2' 3")	710 (2' 4")	710 (2' 4")	780 (2' 7")
Width	()	300 (1' 0")	300 (1' 0")	300 (1' 0")	300 (1' 0")

<sup>\*</sup> Includes bucket cylinder, linkage and pin

GP: General Purpose VA: Variable Adjustable

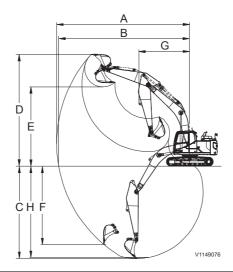
### Dozer blade, dimension



	Description	Unit	Dozer blade
Α	Height		580 (1' 11")
^	Width	mm	2590 (8' 6")
В	Lift height	(ft in)	480 (1' 7")
С	Digging depth		600 (1' 12")

# Working ranges

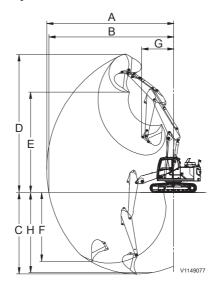
#### EC140E L with mono-boom



		Boom			
		4.6 m (15' 1")			
Description	Unit	ı	Dipper arn	n	
		2.1 m (6' 11")	2.5 m (8' 2")	3.0 m (9' 10")	
A. Maximum digging reach		7980 26' 2"	8360 27' 5"	8850 29' 0"	
B. Maximum digging reach on ground		7840 25' 9"	8220 27' 0"	8720 28' 7"	
C. Maximum digging depth		5160 16' 11"	5560 18' 3"	6060 19' 11"	
D. Maximum cutting height	mm	8120 26' 8"	8360 27' 5"	8710 28' 7"	
E. Maximum dumping height	ft in	5720 18' 9"	5950 19' 6"	6290 20' 8"	
F. Maximum vertical wall digging depth		3970 13' 0"	4330 14' 2"	4870 16' 0"	
G. Minimum front swing radius		2570 8' 5"	2630 8' 8"	2740 9' 0"	
H. Maximum digging depth (level the ground of 2.44 m (8'))		4900 16' 1"	5340 17' 6"	5880 19' 3"	

- Machine with direct fit bucket

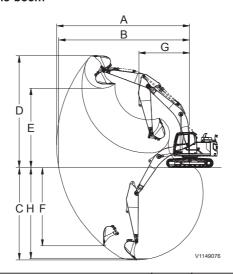
### EC140E L with variable adjustable boom



		Variable adjustable boom			
		4.6 m (15' 1")			
Description	Unit	I	Dipper arn	n	
		2.1 m (6' 11")	2.5 m (8' 2")	3.0 m (9' 10")	
A. Maximum digging reach		8080 26' 6"	8460 27' 9"	8960 29' 5"	
B. Maximum digging reach on ground		7930 26' 0"	8320 27' 4"	8830 29' 0"	
C. Maximum digging depth		5080 16' 8"	5480 18' 0"	5980 19' 7"	
D. Maximum cutting height	mm	9270 30' 5"	9630 31' 7"	10110 33' 2"	
E. Maximum dumping height	ft in	6730 22' 1"	7100 23' 4"	7570 24' 10"	
F. Maximum vertical wall digging depth		3970 13' 0"	4340 14' 3"	4830 15' 10"	
G. Minimum front swing radius		1740 5' 9"	1990 6' 6"	2410 7' 11"	
H. Maximum digging depth (level the ground of 2.44 m (8'))		4960 16' 3"	5360 17' 7"	5870 19' 3"	

<sup>-</sup> Machine with direct fit bucket

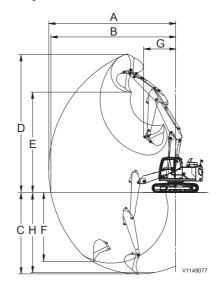
### EC140E LM with mono-boom



		Boom			
		4.6 m (15' 1")			
Description	Unit		Dipper arn	ı	
		2.1 m (6' 11")	2.5 m (8' 2")	3.0 m (9' 10")	
A. Maximum digging reach		7980 26' 2"	8360 27' 5"	8850 29' 0"	
B. Maximum digging reach on ground		7800 25' 7"	8180 26' 10"	8680 28' 6"	
C. Maximum digging depth		4960 16' 3"	5360 17' 7"	5860 19' 3"	
D. Maximum cutting height	mm	8320 27' 4"	8550 28' 1"	8910 29' 3"	
E. Maximum dumping height	ft in	5910 19' 5"	6150 20' 2"	6490 21' 4"	
F. Maximum vertical wall digging depth		3770 12' 4"	4140 13' 7"	4670 15' 4"	
G. Minimum front swing radius		2570 8' 5"	2630 8' 8"	2740 9' 0"	
H. Maximum digging depth (level the ground of 2.44 m (8'))		4710 15' 5"	5140 16' 10"	5680 18' 8"	

<sup>-</sup> Machine with direct fit bucket

### EC140E LM with variable adjustable boom



		Variable adjustable boom			
		4.6 m (15' 1")			
Description	Unit	I	Dipper am	า	
		2.1 m (6' 11")	2.5 m (8' 2")	3.0 m (9' 10")	
A. Maximum digging reach		8080 26' 6"	8460 27' 9"	8960 29' 5"	
B. Maximum digging reach on ground		7890 25' 11"	8290 27' 2"	8790 28' 10"	
C. Maximum digging depth		4890 16' 1"	5280 17' 4"	5790 19' 0"	
D. Maximum cutting height	mm	9470 31' 1"	9830 32' 3"	10300 33' 10"	
E. Maximum dumping height	ft in	6930 22' 9"	7290 23' 11"	7770 25' 6"	
F. Maximum vertical wall digging depth		3780 12' 5"	4140 13' 7"	4630 15' 2"	
G. Minimum front swing radius		1740 5' 9"	1990 6' 6"	2410 7' 11"	
H. Maximum digging depth (level the ground of 2.44 m (8'))		4760 15' 7"	5170 17' 0"	5680 18' 8"	

- Machine with direct fit bucket

### Recommended bucket sizes

#### For North America

For direct-fit	t buckets	(without	attachme	nt quick	coupler)							
							Recommended maximum material density (kg/m³)					
Bucket	Сар	Capacity Cutting width				ight	EC140E L, shoe 600 mm (24 in) with counterweight 2450 kg (5400 lb)  EC140E L, shoe 600 mm (24 in) with counterweight 2100 kg (4630 lb)					
type							4.6 n	n (15' 1") GP E	Boom	4.6	m (15' 1") GP	Boom
9,00									Dip	oer arm		
	Liter	yd <sup>3</sup>	mm	in	kg	lb	2.1 m (6' 11") GP	2.5 m (8' 2") GP	3.0 m (9' 10") GP	2.1 m (6' 11") GP	2.5 m (8' 2") GP	3.0 m (9' 10") GP
GP	660	0.86	1050	41.33	480	1058	1800	1800	1800	1800	1800	1800
(General	770	1.00	1200	47.24	540	1192	1800	1800	1800	1800	1800	1600
purpose)	250	0.32	450	17.71	330	728	1800	1800	1800	1800	1800	1800
	330	0.43	600	23.62	361	796	1800	1800	1800	1800	1800	1800
	420	0.54	750	29.52	391	864	1800	1800	1800	1800	1800	1800
	540	0.70	900	35.43	440	970	1800	1800	1800	1800	1800	1800
HD	250	0.32	450	17.71	319	704	2100	2100	2100	2100	2100	2100
(Heavy	330	0.43	600	23.62	352	777	2100	2100	2100	2100	2100	2100
duty)	420	0.54	750	29.52	384	847	2100	2100	2100	2100	2100	2100
	540	0.70	900	35.43	444	980	2100	2100	2100	2100	2100	2100

For direct-fit	buckets	(U type a	attachme	nt quick c	oupler)									
						Recommended maximum material den								
Bucket	Cap	acity	Cutting	g width	We	ight		EC140E L, shoe 600 mm (24 in) with counterweight 2450 kg (5400 lb)			EC140E L, shoe 600 mm (24 in) with counterweight 2100 kg (4630 lb)			
type									4.6 n	n (15' 1") GP E	Boom	4.6	m (15' 1") GP	Boom
9,50									Dip	per arm				
	Liter	yd <sup>3</sup>	mm	in	kg	lb	2.1 m (6' 11") GP	2.5 m (8' 2") GP	3.0 m (9' 10") GP	2.1 m (6' 11") GP	2.5 m (8' 2") GP	3.0 m (9' 10") GP		
GP	660	0.86	1050	41.33	480	1058	1800	1800	1800	1800	1800	1700		
(General	770	1.00	1200	47.24	540	1192	1800	1800	1500	1800	1600	1300		
purpose)	250	0.32	450	17.71	330	728	1800	1800	1800	1800	1800	1800		
	330	0.43	600	23.62	361	796	1800	1800	1800	1800	1800	1800		
	420	0.54	750	29.52	391	864	1800	1800	1800	1800	1800	1800		
	540	0.70	900	35.43	440	970	1800	1800	1800	1800	1800	1800		
HD	250	0.32	450	17.71	319	704	2100	2100	2100	2100	2100	2100		
(Heavy	330	0.43	600	23.62	352	777	2100	2100	2100	2100	2100	2100		
duty)	420	0.54	750	29.52	384	847	2100	2100	2100	2100	2100	2100		
	540	0.70	900	35.43	444	980	2100	2100	2100	2100	2100	2100		

For attachment quick coupler buckets (S type attachment quick coupler)												
Bucket type	Capacity		Cutting width		Weight		Recommended maximum material density (kg/m <sup>3</sup> )					
							EC140E L, shoe 600 mm (24 in) with counterweight 2450 kg (5400 lb)			EC140E L, shoe 600 mm (24 in) with counterweight 2100 kg (4630 lb)		
							4.6 m (15' 1") GP Boom			4.6 m (15' 1") GP Boom		
							Dipper arm					
	Liter	yd <sup>3</sup>	mm	in	kg	lb	2.1 m (6' 11") GP	2.5 m (8' 2") GP	3.0 m (9' 10") GP	2.1 m (6' 11") GP	2.5 m (8' 2") GP	3.0 m (9' 10") GP
GP (General purpose) [S6]	660	0.86	1050	41.33	478	1054	1800	1800	1800	1800	1800	1800
	770	1.00	1200	47.24	540	1191	1800	1800	1600	1800	1700	1400
	330	0.43	600	23.62	359	792	1800	1800	1800	1800	1800	1800
	420	0.54	750	29.52	389	859	1800	1800	1800	1800	1800	1800
	540	0.70	900	35.43	438	966	1800	1800	1800	1800	1800	1800
HD (Heavy duty) [S6]	330	0.43	600	23.62	350	772	2100	2100	2100	2100	2100	2100
	420	0.54	750	29.52	382	842	2100	2100	2100	2100	2100	2100
	540	0.70	900	35.43	443	978	2100	2100	2100	2100	2100	2100

#### NOTE!

Bucket capacity based on ISO 7451, heaped material with a 1:1 angle of repose.

#### NOTE!

The recommendations are given as a guide only, based on typical operation conditions.

#### NOTE!

#### For Europe

For direct-fit EC140E L,												
								Recomme	ended maximu	ım material d	ensity (kg/m <sup>3</sup> )	
Bucket	Cap	acity	Cutting	g width	We	ight	4	.6 m GP Boo	m	4.6 m V	'ariable adjusta	ble boom
type									Dip	per arm		
	Liter	yd <sup>3</sup>	mm	in	kg	lb	2.1 m GP	2.5 m GP	3.0 m GP	2.1 m GP	2.5 m GP	3.0 m GP
GP	660	0.86	1050	40.95	443	977	1800	1800	1800	1800	1800	1800
(General	770	1.00	1200	46.8	504	1111	1800	1800	1800	1800	1800	1800
purpose)	250	0.32	450	17.55	293	647	1800	1800	1800	1800	1800	1800
	330	0.43	600	23.4	324	715	1800	1800	1800	1800	1800	1800
	420	0.54	750	29.25	354	782	1800	1800	1800	1800	1800	1800
	540	0.70	900	35.1	403	889	1800	1800	1800	1800	1800	1800

For direct-fit EC140E L,												
								Recomme	ended maximu	ım material d	ensity (kg/m <sup>3</sup> )	
Bucket	Cap	acity	Cutting	g width	We	ight	4	.6 m GP Boo	m	4.6 m V	/ariable adjusta	ble boom
type									Dip	per arm		
	Liter	yd <sup>3</sup>	mm	in	kg	lb	2.1 m GP	2.5 m GP	3.0 m GP	2.1 m GP	2.5 m GP	3.0 m GP
GP	660	0.86	1050	40.95	443	977	1800	1800	1800	1800	1800	1800
(General	770	1.00	1200	46.8	504	1111	1800	1800	1600	1800	1800	1500
purpose)	250	0.32	450	17.55	293	647	1800	1800	1800	1800	1800	1800
	330	0.43	600	23.4	324	715	1800	1800	1800	1800	1800	1800
	420	0.54	750	29.25	354	782	1800	1800	1800	1800	1800	1800
	540	0.70	900	35.1	403	889	1800	1800	1800	1800	1800	1800

			or attachment quick coupler buckets (S type attachment quick coupler) C140E L, shoe 600mm with counterweight 2450 kg														
								Recomme	ended maximi	ım material d	ensity (kg/m <sup>3</sup> )						
Bucket	Сар	acity	Cutting	g width	We	ight	4	.6 m GP Boo	m	4.6 m V	/ariable adjusta	ble boom					
type		1 2							Dip	per arm							
	Liter	yd <sup>3</sup>	mm	in	kg	lb	2.1 m GP	2.5 m GP	3.0 m GP	2.1 m GP	2.5 m GP	3.0 m GP					
GP	660	0.86	1050	40.95	445	982	1800	1800	1800	1800	1800	1800					
(General	770	1.00	1200	46.8	508	1120	1800	1800	1700	1800	1800	1600					
purpose)	330	0.43	600	23.4	326	720	1800	1800	1800	1800	1800	1800					
	420	0.54	750	29.25	357	788	1800	1800	1800	1800	1800	1800					
	540	0.70	900	35.1	405	894	1800	1800	1800	1800	1800	1800					

#### NOTE!

Bucket capacity based on ISO 7451, heaped material with a 1:1 angle of repose.

#### NOTE!

The recommendations are given as a guide only, based on typical operation conditions.

#### NOTE!

For direct-fir EC140E LM												
								Recomme	ended maximu	um material d	ensity (kg/m <sup>3</sup> )	
Bucket	Сар	acity	Cutting	g width	We	ight	4	.6 m GP Boo	m	4.6 m \	/ariable adjusta	ble boom
type									Dip	per arm		
	Liter	yd <sup>3</sup>	mm	in	kg	lb	2.1 m GP	2.5 m GP	3.0 m GP	2.1 m GP	2.5 m GP	3.0 m GP
GP	660	0.86	1050	40.95	443	977	1800	1800	1800	1800	1800	1800
(General	770	1.00	1200	46.8	504	1111	1800	1800	1800	1800	1800	1800
purpose)	250	0.32	450	17.55	293	647	1800	1800	1800	1800	1800	1800
	330	0.43	600	23.4	324	715	1800	1800	1800	1800	1800	1800
	420	0.54	750	29.25	354	782	1800	1800	1800	1800	1800	1800
	540	0.70	900	35.1	403	889	1800	1800	1800	1800	1800	1800

For direct-fit EC140E LIV												
								Recomme	nded maximu	um material d	ensity (kg/m <sup>3</sup> )	
Bucket	Сар	acity	Cutting	g width	We	ight	4	.6 m GP Boo	m	4.6 m V	/ariable adjusta	ble boom
type									Dip	per arm		
	Liter	yd <sup>3</sup>	mm	in	kg	lb	2.1 m GP	2.5 m GP	3.0 m GP	2.1 m GP	2.5 m GP	3.0 m GP
GP	660	0.86	1050	40.95	443	977	1800	1800	1800	1800	1800	1800
(General	770	1.00	1200	46.8	504	1111	1800	1800	1800	1800	1800	1800
purpose)	250	0.32	450	17.55	293	647	1800	1800	1800	1800	1800	1800
	330	0.43	600	23.4	324	715	1800	1800	1800	1800	1800	1800
	420	0.54	750	29.25	354	782	1800	1800	1800	1800	1800	1800
	540	0.70	900	35.1	403	889	1800	1800	1800	1800	1800	1800

For attachm EC140E LM						quick co	upler)					
								Recomme	nded maxim	um material d	ensity (kg/m <sup>3</sup> )	
Bucket	Сар	acity	Cutting	g width	We	ight	4	.6 m GP Boo	m	4.6 m V	/ariable adjusta	ble boom
type									Dip	per arm		
	Liter	yd <sup>3</sup>	mm	in	kg	lb	2.1 m GP	2.5 m GP	3.0 m GP	2.1 m GP	2.5 m GP	3.0 m GP
GP	660	0.86	1050	40.95	445	982	1800	1800	1800	1800	1800	1800
(General	770	1.00	1200	46.8	508	1120	1800	1800	1800	1800	1800	1800
purpose)	330	0.43	600	23.4	326	720	1800	1800	1800	1800	1800	1800
	420	0.54	750	29.25	357	788	1800	1800	1800	1800	1800	1800
	540	0.70	900	35.1	405	894	1800	1800	1800	1800	1800	1800

#### NOTE!

Bucket capacity based on ISO 7451, heaped material with a 1:1 angle of repose.

#### NOTE

The recommendations are given as a guide only, based on typical operation conditions.

#### NOTE!

#### For Nordic

	or attachment quick coupler buckets (S type attachment quick coupler, S60) C140E L, shoe 600 mm with counterweight 2450 kg													
								Recommend	ed maximum	n material de	nsity (kg/m³)	)		
Bucket type	Cap	acity	Cutting	g width	We	ight	4.	6 m GP Boo	m	4.6 m Var	riable adjusta	able boom		
Bucket type									Dippe	er arm				
ĺ	Liter	yd <sup>3</sup>	mm	in	kg	lb	2.1 m GP	2.5 m GP	3.0 m GP	2.1 m GP	2.5 m GP	3.0 m GP		
GPX	650	0.85	940	37.00	514	1133	1800	1800	1800	1800	1800	1800		
General purpose	700	0.91	1000	39.37	535	1181	1800	1800	1800	1800	1800	1700		
extreme)	750	0.98	1050	41.33	563	1242	1800	1800	1600	1800	1800	1500		
TGX (Tilt-rotator grading extreme)	820	1.07	1600	62.99	518	1142	1600	1600	1500	1600	1600	1500		
CAX	325	0.42	500	19.68	366	807	1800	1800	1800	1800	1800	1800		
(Cable extreme)	540	0.70	700	27.55	453	998	1800	1800	1800	1800	1800	1800		

	For attachment quick coupler buckets (S type attachment quick coupler, S60) EC140E LM, shoe 700 mm with counterweight 2450 kg													
								Recommend	led maximun	n material de	nsity (kg/m <sup>3</sup> )	)		
Bucket type	Cap	acity	Cutting	g width	We	ight	4.	6 m GP Boo	m	4.6 m Vai	riable adjusta	ble boom		
Bucket type									Dippe	er arm				
l i	Liter	yd <sup>3</sup>	mm	in	kg	lb	2.1 m GP	2.5 m GP	3.0 m GP	2.1 m GP	2.5 m GP	3.0 m GP		
GPX	650	0.85	940	37.00	514	1133	1800	1800	1800	1800	1800	1800		
General purpose	700	0.91	1000	39.37	535	1181	1800	1800	1800	1800	1800	1800		
extreme)	750	0.98	1050	41.33	563	1242	1800	1800	1800	1800	1800	1800		
TGX (Tilt-rotator grading extreme)	820	1.07	1600	62.99	518	1142	1600	1600	1600	1600	1600	1600		
CAX	325	0.42	500	19.68	366	807	1800	1800	1800	1800	1800	1800		
(Cable extreme)	540	0.70	700	27.55	453	998	1800	1800	1800	1800	1800	1800		

#### NOTE!

Bucket capacity based on ISO 7451, heaped material with a 1:1 angle of repose.

#### NOTE!

The recommendations are given as a guide only, based on typical operation conditions.

#### NOTE!

## Digging forces

				Boom 4.6 m (15' 1")	
D	escription	Unit		4.6 m (15' 1")  Dipper arm  2.5 m (8' 2") (9' 10' 1274 1274 1274 1274 1274 1274 1274 180.5 80.5 82.10 18100 18100 18100 19200 19200 19200 19200 19200 19200 19200 19200 19200 19200 19200 20480 20480 20480 20480 20480 20480 20480 20480 18100 18100 18100 18100 191.1 9290 9290 20480 20480 20480 196.6 96.6 9852 21720 21720 21720 1720 1720 1720 1720	
			2.1 m (6' 11")		3.0 m (9' 10")
Buc	cket radius	mm ft-in	1274 4' 2"		1274 4' 2"
	Normal, SAE	kN kg lb	80.5 8210 18100	8210	80.5 8210 18100
Breakout	Power boost, SAE	kN kg lb	85.4 8709 19200	8709	85.4 8709 19200
force	Normal, ISO	kN kg lb	91.1 9290 20480	9290	91.1 9290 20480
	Power boost, ISO	kN kg lb	96.6 9852 21720	9852	96.6 9852 21720
	Normal, SAE	kN kg lb	69.6 7094 15640	6332	55.2 5634 12420
Tearout force	Power boost, SAE	kN kg lb	73.8 7525 16590	6713	58.6 5974 13170
T Cal Out 10106	Normal, ISO	kN kg lb	71.5 7289 16070	6477	8709 19200 91.1 9290 20480 96.6 9852 21720 55.2 5634 12420 58.6 5974
	Power boost, ISO	kN kg lb	75.8 7729 17040	6872	6092
Rotation	n angle, bucket	deg. (°)	175	175	175

			Varia	ble adjustable	boom
_				4.6 m (15' 1")	
D	escription	Unit			
			2.1 m (6' 11")	2.5 m (8' 2")	3.0 m (9' 10")
Buc	cket radius	mm ft-in	1274 4' 2"	1274 4' 2"	1274 4' 2"
	Normal, SAE	kN kg lb	80.5 8210 18100	80.5 8210 18100	80.5 8210 18100
Breakout	Power boost, SAE	kN kg lb	85.4 8709 19200	85.4 8709 19200	85.4 8709 19200
force	Normal, ISO	kN kg lb	91.1 9290 20480	4.6 m (15' 1")         Dipper arm         m       2.5 m       3.0 m         (8' 2")       (9' 10")         4       1274       1274         4' 2"       4' 2"       4' 2"         5       80.5       80.5         0       8210       8210         10       18100       18100         4       85.4       85.4         9       8709       8709         10       19200       19200         1       91.1       91.1         9       96.6       96.6         2       9852       9852         9852       9852       9852         20       21720       21720         3       62.1       55.2         4       6332       5634         4       6332       5634         40       13960       12420         3       65.9       58.6         6713       5974         40       14800       13170         5       63.5       56.3         6477       5743         7       6872       6092         15150	9290
	Power boost, ISO	kN kg lb	96.6 9852 21720	9852	9852
	Normal, SAE	kN kg lb	69.6 7094 15640	6332	5634
Tearout force	Power boost, SAE	kN kg lb	73.8 7525 16590	6713	5974
Tealout loice	Normal, ISO	kN kg lb	71.5 7289 16070	6477	5743
	Power boost, ISO	kN kg lb	75.8 7729 17040	6872	6092
Rotation	n angle, bucket	deg. (°)	175	175	175

### Lifting capacities

#### For North America

		5	ft	10	) ft	15	ft	20	) ft	25	5 ft	M	lax. Reac	h
EC140E L without dozer blade	Н	<b>P</b>		ů	<del>[]</del>	ů	<u> </u>	ů	<u> </u>	<b>P</b>	<u> </u>	<b>₽</b>	Ŧ	Max.
		lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	ft
	20 ft	-	-	-	-	*7470	*7470	-	-	-	-	*7730	7710	15.77
Boom: 4.6 m (15' 1")	15 ft	-	-	-	-	*7600	*7600	-	-	-	-	*7850	5470	19.49
Dipper arm: 2.1 m (6' 11") Shoe: 600 mm (24")	10 ft	-	-	*13270	*13270	*9380	7950	7950	5160	-	-	7130	4620	21.42
Shoe: 600 mm (24")	5 ft	-	-	-	-	*11650	7490	7770	4990	-	-	6710	4320	22.04
Counterweight: 2100 kg	0 ft	-	1	*12670	*12670	11680	7190	7620	4850	-	-	6890	4410	21.46
(4630 lb)	-5 ft	*11310	*11310	*20480	13010	11590	7110	-	-	-	-	7830	4980	19.59
	-10 ft	-	-	*17740	13280	*11710	7270	-	-	-	-	*10660	6710	15.95
Boom: 4.6 m (15' 1") Dipper arm: 2.5 m (8' 2") Shoe: 600 mm (24") Counterweight: 2100 kg	20 ft	-	-	-	-	*6350	*6350	-	-	-	-	*7080	6600	17.49
	15 ft	-	ı	-	-	*6740	*6740	*7080	5310	-	-	*7000	4920	20.90
	10 ft	-	-	*11370	*11370	*8570	8030	*7630	5190	-	-	6520	4230	22.70
	5 ft	-	1	*16030	13570	*10980	7530	7770	4980	-	-	6170	3970	23.28
Counterweight: 2100 kg (4630 lb)	0 ft	-	-	*13890	12940	11670	7170	7580	4820	-	-	6300	4030	22.74
(4630 ID)	-5 ft	*10250	*10250	*20840	12870	11510	7030	7520	4760	-	-	7030	4470	20.99
	-10 ft	*20220	*20220	*18770	13070	11610	7120	-	-	-	-	9120	5730	17.66
	20 ft	-	-	-	-	-	-	-	-	-	-	*6250	5540	19.57
	15 ft	-	-	-	-	-	-	*6140	5360	-	-	*5830	4310	22.66
Boom: 4.6 m (15' 1")	10 ft	-	ı	-	-	*7460	*7460	*6870	5190	-	-	*5800	3760	24.33
Dipper arm: 3.0 m (9' 10") Shoe: 600 mm (24")	5 ft	-	ı	*15710	13840	*10010	7560	7750	4960	-	-	5540	3540	24.87
Counterweight: 2100 kg	0 ft	-	-	*15160	12890	11630	7120	7520	4750	-	-	5620	3570	24.37
(4630 lb)	-5 ft	*8970	*8970	*20130	12650	11380	6910	7390	4630	-	-	6170	3900	22.74
	-10 ft	*16640	*16640	*19640	12760	11400	6920	-	-	-	-	7620	4790	19.72
	-15 ft	-	-	*15330	13220	-	-	-	-	-	-	*9920	7690	14.38

- 💾 : Along undercarriage, 🛀 : Across undercarriage, H : Lifting hook related to ground level
- 1. Machine in "Fine Mode-F" (Power Boost), for lifting capacities.
- 2. The above loads are in compliance with SAE and ISO Hydraulic Excavator Lift Capacity Standards.
- 3. Rated loads do not exceed 87% of hydraulic lifting capacity or 75% of tipping load.
- 4. Rated loads marked with an asterisk (\*) are limited by hydraulic capacity rather than tipping load.

		5	ft	10	) ft	15	ft .	20	) ft	25	5 ft	M	lax. Read	:h
EC140E L without dozer blade	Н	r de la companya de l	<del>[]</del>	ů.	<u> </u>	<b>P</b>	<del>[]</del>	ů	T.	Å	<u> </u>	<b>F</b>	F	Max.
		lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	ft
	20 ft	-	-	-	-	*7470	*7470	-	-	-	-	*7730	*7730	15.77
Boom: 4.6 m (15' 1")	15 ft	-	-	-	-	*7600	*7600	-	-	-	-	*7850	5820	19.49
Dipper arm: 2.1 m (6' 11")	10 ft	-	-	*13270	*13270	*9380	8440	*8210	5500	-	-	7530	4940	21.42
Shoe: 600 mm (24")	5 ft	-	-	-	-	*11650	7990	8200	5330	-	-	7100	4630	22.04
Counterweight: 2450 kg	0 ft	-	-	*12670	*12670	12340	7690	8050	5200	-	-	7280	4720	21.46
(5400 lb)	-5 ft	*11310	*11310	*20480	13880	12240	7610	-	-	-	-	8280	5330	19.59
	-10 ft	-	-	*17740	14150	*11710	7770	-	-	-	-	*10660	7160	15.95
	20 ft	-	-	-	-	*6350	*6350	-	-	-	-	*7080	7010	17.49
Boom: 4.6 m (15' 1")	15 ft	-	-	-	-	*6740	*6740	*7080	5660	-	-	*7000	5250	20.90
Boom: 4.6 m (15' 1") Dipper arm: 2.5 m (8' 2")	10 ft	-	-	*11370	*11370	*8570	8520	*7630	5530	-	-	6890	4520	22.70
Shoe: 600 mm (24")	5 ft	-	-	*16030	14450	*10980	8020	8200	5330	-	-	6530	4260	23.28
Counterweight: 2450 kg	0 ft	-	-	*13890	13820	12320	7670	8020	5160	-	-	6670	4320	22.74
(5400 lb)	-5 ft	*10250	*10250	*20840	13740	12170	7530	7950	5100	-	-	7440	4790	20.99
	-10 ft	*20220	*20220	*18770	13940	12260	7610	-	-	-	-	9630	6130	17.66
	20 ft	-	-	-	-	-	-	-	-	-	-	*6250	5890	19.57
	15 ft	-	-	-	-	-	-	*6140	5710	-	-	*5830	4610	22.66
Boom: 4.6 m (15' 1") Dipper arm: 3.0 m (9' 10") Shoe: 600 mm (24")	10 ft	-	-	-	-	*7460	*7460	*6870	5540	-	-	*5800	4030	24.33
	5 ft	-	-	*15710	14710	*10010	8060	*8020	5300	-	-	5870	3800	24.87
Counterweight: 2450 kg	0 ft	-	-	*15160	13760	*12180	7610	7950	5090	-	-	5960	3840	24.37
(5400 lb)	-5 ft	*8970	*8970	*20130	13520	12040	7400	7830	4980	-	-	6540	4190	22.74
, ,	-10 ft	*16640	*16640	*19640	13630	12050	7410	-	-	-	-	8060	5140	19.72
	-15 ft	-	-	*15330	14100	-	-	-	-	-	-	*9920	8210	14.38

- 山: Along undercarriage, 🖫 : Across undercarriage, H : Lifting hook related to ground level
- 1. Machine in "Fine Mode-F" (Power Boost), for lifting capacities.
- 2. The above loads are in compliance with SAE and ISO Hydraulic Excavator Lift Capacity Standards.
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- 4. Rated loads marked with an asterisk ( \* ) are limited by hydraulic capacity rather than tipping load.

#### For Europe

		1.5	m	3.0	) m	4.5	m	6.0	) m	7.5	m	M	lax. Reac	:h
EC140E L without dozer blade	Н	B		4	<del>[]</del>	ů	TT-	r de la company	<b>F</b>	r de la companya de l	<b>F</b>	<b>P</b>	F	Max.
		kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	m
	6 m	-	-	-	-	*3320	*3320	-	-	-	-	*3500	*3500	4.90
L	4.5 m	-	-	-	-	*3470	*3470	-	-	-	-	*3570	2610	5.98
Boom: 4.6 m Dipper arm: 2.1 m	3 m	1	-	*6230	*6230	*4330	3910	*3750	2550	-	-	3400	2230	6.54
Shoe: 600 mm	1.5 m	1	1	ı	-	*5390	3700	3800	2470	-	-	3220	2100	6.71
Counterweight: 2450 kg	0 m	1	ı	*5400	*5400	5730	3560	3730	2410	-	-	3300	2140	6.54
	-1.5 m	*5010	*5010	*9440	6460	5690	3520	-	1	-	-	3740	2410	5.98
	-3 m	-	-	*8220	6580	*5470	3590	-	-	-	-	*4820	3200	4.91
	6 m	-	-	-	-	*2840	*2840	-	-	-	-	*3210	3100	5.41
L	4.5 m	1	ı	ı	-	*3080	*3080	*3190	2630	-	-	*3170	2350	6.40
Boom: 4.6 m Dipper arm: 2.5 m Shoe: 600 mm Counterweight: 2450 kg	3 m	-	-	*5330	*5330	*3950	3950	*3490	2560	-	-	3110	2040	6.93
	1.5 m	-	-	-	-	*5070	3720	3810	2470	-	-	2960	1930	7.09
	0 m	-	-	*5970	*5970	5730	3550	3720	2390	-	-	3020	1960	6.93
	-1.5 m	*4550	*4550	*9610	6390	5650	3490	3690	2360	-	-	3360	2170	6.41
	-3 m	*8940	*8940	*8690	6480	5700	3520	-	1	-	-	4320	2750	5.42
	7.5 m	-	-	-	-	-	-	-	-	-	-	*2870	*2870	4.47
	6 m	-	-	-	-	-	-	*2860	2650	-	-	*2810	2620	6.04
	4.5 m	-	-	-	-	-	-	*2780	2650	-	-	*2640	2070	6.94
Boom: 4.6 m Dipper arm: 3.0 m	3 m	-	-	-	-	*3440	*3440	*3140	2570	-	-	*2630	1820	7.42
Shoe: 600 mm	1.5 m	-	-	*7320	6830	*4620	3730	*3680	2460	2700	1750	2660	1720	7.58
hoe: 600 mm counterweight: 2450 kg	0 m	-	-	*6510	6400	*5620	3530	3690	2360	-	-	2700	1740	7.42
	-1.5 m	*3990	*3990	*8760	6290	5600	3430	3630	2310	-	-	2960	1900	6.94
	-3 m	*7370	*7370	*9080	6340	5600	3430	3660	2330	-	-	3620	2310	6.04
	-4.5 m	-	-	*7210	6540	-	-	-	-	-	-	*4480	3590	4.48

- 1. Machine in "Fine Mode-F" (Power Boost), for lifting capacities.
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- 4. Rated loads marked with an asterisk (\*) are limited by hydraulic capacity rather than tipping load.

		1.5	m	3.0	) m	4.5	m	6.0	) m	7.5	5 m	N	lax. Read	ch
EC140E L without dozer blade	н	Ů	<del>[]</del>	į.	<del>[]</del>	<b>B</b>	<u>F</u>	ů	<del>[]</del>	Ů	<del>[]</del>	r de la companya de l	<del>[]</del>	Max.
		kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	m
	7.5 m	-	-	-	-	-	-	-	-	-	-	*5580	*5580	2.90
Variable adjustable boom:	6 m	-	-	*5070	*5070	*4800	4170	-	-	-	-	*3980	3470	5.01
4.6 m	4.5 m	-	-	*5470	*5470	*4950	4120	3980	2600	-	-	*3580	2540	6.07
Dipper arm: 2.1 m	3 m	-	-	-	-	*5740	3930	3930	2560	-	-	3350	2180	6.62
Shoe: 600 mm	1.5 m	-	-	-	-	5930	3700	3830	2470	-	-	3170	2050	6.80
Counterweight: 2450 kg	0 m	-	-	-	-	5760	3550	3750	2400	-	-	3260	2100	6.62
	-1.5 m	-	-	*9290	6440	5720	3520	3750	2400	-	-	3680	2360	6.08
	7.5 m	-	-	*5180	*5180	-	-	-	-	-	-	*4160	*4160	3.75
ariable adjustable boom:	6 m	-	-	*4390	*4390	*4320	4250	-	-	-	-	*3210	2990	5.54
	4.5 m	-	-	*4120	*4120	*4560	4170	4020	2640	-	-	*2930	2290	6.51
4.6 m Dipper arm: 2.5 m	3 m	-	-	-	-	*5390	3970	3940	2570	-	-	*2870	1990	7.02
Shoe: 600 mm	1.5 m	-	-	-	-	5960	3720	3830	2470	-	-	2910	1880	7.19
Counterweight: 2450 kg	0 m	-	-	-	-	5760	3550	3740	2380	-	-	2980	1920	7.02
•	-1.5 m	-	-	*9130	6380	5680	3480	3700	2350	-	-	3310	2120	6.51
	-3 m	-	-	-	-	*5410	3520	-	-	-	-	-	-	5.54
	7.5 m	-	-	*4120	*4120	*3610	*3610	-	-	-	-	*3250	*3250	4.64
	6 m	-	-	-	-	*3750	*3750	*3160	2660	-	-	*2660	2530	6.16
Variable adjustable boom:	4.5 m	-	-	*3000	*3000	*3780	*3780	*3850	2670	-	-	*2450	2010	7.05
4.6 m Dipper arm: 3.0 m	3 m	-	-	-	-	*4890	4020	3960	2580	*2550	1790	*2400	1770	7.52
Shoe: 600 mm	1.5 m	-	-	-	-	*5980	3740	3830	2460	2720	1750	*2470	1680	7.68
Counterweight: 2450 kg	0 m	-	-	-	-	5750	3530	3710	2350	2680	1710	*2660	1700	7.53
•	-1.5 m	*3630	*3630	*8260	6270	5630	3420	3650	2300	-	-	2910	1850	7.05
	-3 m	-	-	*8660	6330	5630	3430	3680	2330	-	-	3550	2250	6.17

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- 4. Rated loads marked with an asterisk (  $^{\star}$  ) are limited by hydraulic capacity rather than tipping load.

		1.5	m	3.0	) m	4.5	m .	6.0	) m	7.5	5 m	M	lax. Reac	h
EC140E L without dozer blade	Н	b	<del>I</del>	Ů	<del>[]</del>	<b>P</b>	<u>C</u>	ů	<del>[]</del>	ů	<u> </u>	<b>B</b>	<del>[]</del>	Max.
		kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	m
	6 m	-	-	-	-	*3320	*3320	-	-	-	-	*3500	*3500	4.90
	4.5 m	-	-	-	-	*3470	*3470	-	-	-	-	*3570	2650	5.98
Boom: 4.6 m	3 m	-	-	*6230	*6230	*4330	3970	*3750	2600	-	-	3460	2270	6.54
Dipper arm: 2.1 m Shoe: 700 mm	1.5 m	-	-	-	-	*5390	3760	3880	2520	-	-	3280	2140	6.71
Counterweight: 2450 kg	0 m	-	-	*5400	*5400	5840	3630	3810	2450	-	-	3360	2180	6.54
•	-1.5 m	*5010	*5010	*9440	6570	5800	3590	-	-	-	-	3810	2450	5.98
	-3 m	-	-	*8220	6690	*5470	3660	-	-	-	-	*4820	3260	4.91
	6 m	-	-	-	-	*2840	*2840	-	-	-	-	*3210	3150	5.41
Boom: 4.6 m Dipper arm: 2.5 m Shoe: 700 mm	4.5 m	-	-	-	-	*3080	*3080	*3190	2670	-	-	*3170	2400	6.40
	3 m	-	-	*5330	*5330	*3950	*3950	*3490	2610	-	-	*3160	2080	6.93
	1.5 m	-	-	-	-	*5070	3780	3880	2510	-	-	3010	1960	7.09
Counterweight: 2450 kg	0 m	-	-	*5970	*5970	5840	3620	3790	2430	-	-	3080	1990	6.93
	-1.5 m	*4550	*4550	*9610	6500	5760	3550	3760	2400	-	-	3430	2210	6.41
	-3 m	*8940	*8940	*8690	6590	*5770	3590	-	-	-	-	4400	2800	5.42
	7.5 m	-	-	-	-	-	-	-	-	-	-	*2870	*2870	4.47
	6 m	-	-	-	-	-	-	*2860	2690	-	-	*2810	2660	6.04
	4.5 m	-	-	-	-	-	-	*2780	2700	-	-	*2640	2110	6.94
Boom: 4.6 m	3 m	-	-	-	-	*3440	*3440	*3140	2610	-	-	*2630	1850	7.42
Dipper arm: 3.0 m Shoe: 700 mm	1.5 m	-	-	*7320	6940	*4620	3800	*3680	2500	2760	1790	2710	1760	7.58
hoe: 700 mm ounterweight: 2450 kg	0 m	-	-	*6510	6510	*5620	3590	3760	2400	-	-	2760	1770	7.42
	-1.5 m	*3990	*3990	*8760	6400	5700	3490	3700	2350	-	-	3020	1930	6.94
	-3 m	*7370	*7370	*9080	6450	5710	3500	3730	2370	-	-	3690	2350	6.04
	-4.5 m	-	-	*7210	6660	-	-	-	-	-	-	*4480	3660	4.48

- 1. Machine in "Fine Mode-F" (Power Boost), for lifting capacities.
- 2. The above loads are in compliance with SAE and ISO Hydraulic Excavator Lift Capacity Standards.
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- 4. Rated loads marked with an asterisk ( \* ) are limited by hydraulic capacity rather than tipping load.

		1.5	5 m	3.0	) m	4.5	m	6.0	) m	7.5	5 m	N	lax. Read	ch
EC140E L without dozer blade	н	ů.	<u>C</u>	b	<u>F</u>	Å	<b>(3</b>	<b>b</b>	<del>[]</del>	Ů	<u>C</u>	<b>B</b>	<del>[]</del>	Max.
		kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	m
	7.5 m	-	-	-	-	-	-	-	-	-	-	*5580	*5580	2.90
Variable adjustable boom:	6 m	-	-	*5070	*5070	*4800	4240	-	-	-	-	*3980	3520	5.01
4.6 m	4.5 m	-	-	*5470	*5470	*4950	4190	4050	2650	-	-	*3580	2590	6.07
Dipper arm: 2.1 m	3 m	-	-	-	-	*5740	3990	4000	2600	-	-	3410	2220	6.62
Shoe: 700 mm	1.5 m	-	-	-	-	6040	3760	3900	2510	-	-	3230	2090	6.80
Counterweight: 2450 kg	0 m	-	-	-	-	5870	3620	3830	2440	-	-	3320	2140	6.62
	-1.5 m	-	-	*9290	6560	5830	3580	3820	2440	-	-	3750	2400	6.08
	7.5 m	-	-	*5180	*5180	-	-	-	-	-	-	*4160	*4160	3.75
	6 m	-	-	*4390	*4390	*4320	4310	-	-	-	-	*3210	3040	5.54
	4.5 m	-	-	*4120	*4120	*4560	4240	4090	2690	-	-	*2930	2330	6.51
4.6 m Dipper arm: 2.5 m	3 m	-	-	-	-	*5390	4030	4020	2620	-	-	*2870	2030	7.02
Shoe: 700 mm	1.5 m	-	-	-	-	6070	3790	3900	2510	-	-	*2970	1920	7.19
Counterweight: 2450 kg	0 m	-	-	-	-	5870	3610	3810	2430	-	-	3040	1950	7.02
	-1.5 m	-	-	*9130	6490	5790	3540	3780	2400	-	-	3370	2160	6.51
	-3 m	-	-	-	-	*5410	3580	-	-	-	-	-	-	5.54
	7.5 m	-	-	*4120	*4120	*3610	*3610	-	-	-	-	*3250	*3250	4.64
	6 m	-	-	-	-	*3750	*3750	*3160	2710	-	-	*2660	2570	6.16
Variable adjustable boom:	4.5 m	-	-	*3000	*3000	*3780	*3780	*3850	2710	-	-	*2450	2050	7.05
4.6 m	3 m	-	-	-	-	*4890	4080	4030	2620	*2550	1820	*2400	1810	7.52
nnerarm 30 m. ⊢	1.5 m	-	-	-	-	*5980	3810	3900	2500	2770	1780	*2470	1710	7.68
Counterweight: 2450 kg	0 m	-	-	-	-	5850	3590	3780	2400	2730	1740	*2660	1730	7.53
5	-1.5 m	*3630	*3630	*8260	6390	5730	3490	3720	2340	-	-	2970	1890	7.05
	-3 m	-	-	*8660	6440	5740	3490	3750	2370	-	-	*3580	2290	6.17

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		1.5	m	3.0	) m	4.5	m .	6.0	) m	7.5	5 m	N	lax. Reac	h
EC140E L without dozer blade	н	Ď	<del>[]</del>	<b>B</b>	<u>C</u>	Ů	<del>[]</del>	ů	<del>[]</del>	<b>L</b>	<del>[]</del>	ů	<b>F</b>	Max.
		kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	m
	6 m	-	-	-	-	*3320	*3320	-	-	-	-	*3500	3450	4.90
	4.5 m	-	-	-	-	*3470	*3470	-	-	-	-	*3570	2490	5.98
Boom: 4.6 m	3 m	-	-	*6230	*6230	*4330	3750	*3750	2440	-	-	3280	2130	6.54
Dipper arm: 2.1 m Shoe: 700 mm	1.5 m	-	-	-	-	*5390	3530	3670	2360	-	-	3100	2000	6.71
Counterweight: 2100 kg	0 m	-	-	*5400	*5400	5540	3400	3600	2290	-	-	3180	2040	6.54
	-1.5 m	*5010	*5010	*9440	6160	5490	3360	-	-	-	-	3610	2290	5.98
	-3 m	-	-	*8220	6280	*5470	3430	-	-	-	-	*4820	3050	4.91
	6 m	-	-	-	-	*2840	*2840	-	-	-	-	*3210	2970	5.41
3oom: 4.6 m Dipper arm: 2.5 m Shoe: 700 mm	4.5 m	-	-	-	-	*3080	*3080	*3190	2520	-	-	*3170	2250	6.40
	3 m	-	-	*5330	*5330	*3950	3780	*3490	2450	-	-	3010	1950	6.93
	1.5 m	-	-	-	-	*5070	3550	3680	2350	-	-	2850	1830	7.09
Counterweight: 2100 kg	0 m	-	-	*5970	*5970	5530	3390	3590	2280	-	-	2910	1860	6.93
	-1.5 m	*4550	*4550	*9610	6100	5460	3320	3560	2250	-	-	3240	2060	6.41
	-3 m	*8940	*8940	*8690	6190	5500	3360	-	-	-	-	4170	2620	5.42
	7.5 m	-	-	-	-	-	-	-	-	-	-	*2870	*2870	4.47
	6 m	-	-	-	-	-	-	*2860	2530	-	-	*2810	2500	6.04
	4.5 m	-	-	-	-	-	-	*2780	2540	-	-	*2640	1970	6.94
Boom: 4.6 m	3 m	-	-	-	-	*3440	*3440	*3140	2450	-	-	*2630	1730	7.42
Dipper arm: 3.0 m	1.5 m	-	-	*7320	6530	*4620	3570	3670	2340	2610	1660	2560	1630	7.58
hoe: 700 mm counterweight: 2100 kg	0 m	-	-	*6510	6100	5510	3360	3560	2240	-	-	2600	1650	7.42
	-1.5 m	*3990	*3990	*8760	6000	5400	3270	3500	2190	-	-	2850	1800	6.94
	-3 m	*7370	*7370	*9080	6050	5400	3270	3530	2210	-	-	3490	2190	6.04
	-4.5 m	-	-	*7210	6250	-	-	-	-	-	-	*4480	3430	4.48

- 1. Machine in "Fine Mode-F" (Power Boost), for lifting capacities.
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		1.5	m	3.0	) m	4.5	m	6.0	) m	7.5	m	N	lax. Reac	h
EC140E L with dozer blade	н	Ů	<u>C</u>	Ů	<u>C</u>	b	<u>C</u>	Ů	<b>□</b>	Ů	<u>C</u>	b	<del>[]-</del>	Max
		kg	kg	m										
	6 m	-	-	-	-	*3320	*3320	-	-	-	-	*3500	*3500	4.90
Boom: 4.6 m	4.5 m	-	-	-	-	*3470	*3470	-	-	-	-	*3570	2920	5.98
Dipper arm: 2.1 m	3 m	-	-	*6230	*6230	*4330	*4330	*3750	2860	-	-	*3710	2500	6.54
Shoe: 500 mm	1.5 m	-	-	-	-	*5390	4160	*4170	2770	-	-	*3910	2360	6.71
Counterweight: 2450 kg	0 m	-	-	*5400	*5400	*6100	4020	*4520	2710	-	-	*4160	2410	6.54
Dozer blade: Down	-1.5 m	*5010	*5010	*9440	7380	*6220	3980	-	-	-	-	*4470	2710	5.98
	-3 m	-	-	*8220	7500	*5470	4050	-	-	-	-	*4820	3600	4.91
oom: 4.6 m ipper arm: 2.5 m	6 m	-	-	-	-	*2840	*2840	-	-	-	-	*3210	*3210	5.41
	4.5 m	-	-	-	-	*3080	*3080	*3190	2930	-	-	*3170	2630	6.40
	3 m	-	-	*5330	*5330	*3950	*3950	*3490	2870	-	-	*3160	2290	6.93
Shoe: 500 mm	1.5 m	-	-	-	-	*5070	4180	*3970	2770	-	-	*3340	2170	7.09
Counterweight: 2450 kg	0 m	-	-	*5970	*5970	*5920	4010	*4400	2690	-	-	*3740	2210	6.93
Dozer blade: Down	-1.5 m	*4550	*4550	*9610	7310	*6220	3950	*4520	2660	-	-	*4150	2440	6.41
	-3 m	*8940	*8940	*8690	7400	*5770	3980	-	-	-	-	*4510	3100	5.42
	7.5 m	-	-	-	-	-	-	-	-	-	-	*2870	*2870	4.47
	6 m	-	-	-	-	-	-	*2860	*2860	-	-	*2810	*2810	6.04
Boom: 4.6 m	4.5 m	-	-	-	-	-	-	*2780	*2780	-	-	*2640	2320	6.94
Dipper arm: 3.0 m	3 m	-	-	-	-	*3440	*3440	*3140	2870	-	-	*2630	2050	7.42
Shoe: 500 mm	1.5 m	-	-	*7320	*7320	*4620	4200	*3680	2760	*3110	1980	*2760	1940	7.58
ounterweight: 2450 kg	0 m	-	-	*6510	*6510	*5620	3990	*4190	2660	-	-	*3040	1970	7.42
Dozer blade: Down	-1.5 m	*3990	*3990	*8760	7210	*6110	3890	*4460	2610	-	-	*3590	2140	6.94
	-3 m	*7370	*7370	*9080	7260	*5950	3890	*4160	2630	-	-	*4100	2610	6.04
	-4.5 m	-	-	*7210	*7210	-	-	-	-	-	-	*4480	4050	4.48

- 1. Machine in "Fine Mode-F" (Power Boost), for lifting capacities.
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		1.5	5 m	3.0	) m	4.5	m	6.0	) m	7.5	m	N	lax. Reac	:h
EC140E L with dozer blade	н	Ď	<u>C</u>	<b>B</b>	<u>C</u>	ů	<del>[]</del>	r di	<del>[]</del>	<b>L</b>	<u>C</u>	ů	<del>[]</del>	Max.
		kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	m
	6 m	-	-	-	-	*3320	*3320	-	-	-	-	*3500	*3500	4.90
Boom: 4.6 m	4.5 m	-	-	-	-	*3470	*3470	-	-	-	-	*3570	3000	5.98
Dipper arm: 2.1 m	3 m	-	-	*6230	*6230	*4330	*4330	*3750	2940	-	-	*3710	2570	6.54
Shoe: 700 mm	1.5 m	-	-	-	-	*5390	4280	*4170	2860	-	-	*3910	2430	6.71
Counterweight: 2450 kg	0 m	-	-	*5400	*5400	*6100	4140	*4520	2790	-	-	*4160	2480	6.54
Dozer blade: Down	-1.5 m	*5010	*5010	*9440	7590	*6220	4100	-	-	-	-	*4470	2790	5.98
	-3 m	-	-	*8220	7720	*5470	4170	-	-	-	-	*4820	3710	4.91
	6 m	-	-	-	-	*2840	*2840	-	-	-	-	*3210	*3210	5.41
oom: 4.6 m ipper arm: 2.5 m hoe: 700 mm	4.5 m	-	-	-	-	*3080	*3080	*3190	3020	-	-	*3170	2710	6.40
	3 m	-	-	*5330	*5330	*3950	*3950	*3490	2950	-	-	*3160	2360	6.93
	1.5 m	-	-	-	-	*5070	4300	*3970	2850	-	-	*3340	2240	7.09
Counterweight: 2450 kg	0 m	-	-	*5970	*5970	*5920	4130	*4400	2770	-	-	*3740	2280	6.93
Dozer blade: Down	-1.5 m	*4550	*4550	*9610	7530	*6220	4060	*4520	2740	-	-	*4150	2520	6.41
	-3 m	*8940	*8940	*8690	7620	*5770	4100	-	-	-	-	*4510	3190	5.42
	7.5 m	-	-	-	-	-	-	-	-	-	-	*2870	*2870	4.47
	6 m	-	-	-	-	-	-	*2860	*2860	-	-	*2810	*2810	6.04
Boom: 4.6 m	4.5 m	-	-	-	-	-	-	*2780	*2780	-	-	*2640	2390	6.94
Dipper arm: 3.0 m	3 m	-	-	-	-	*3440	*3440	*3140	2960	-	-	*2630	2110	7.42
Shoe: 700 mm	1.5 m	-	-	*7320	*7320	*4620	4310	*3680	2840	*3110	2040	*2760	2010	7.58
Counterweight: 2450 kg	0 m	-	-	*6510	*6510	*5620	4110	*4190	2740	-	-	*3040	2030	7.42
Dozer blade: Down	-1.5 m	*3990	*3990	*8760	7420	*6110	4010	*4460	2690	-	-	*3590	2210	6.94
	-3 m	*7370	*7370	*9080	7480	*5950	4010	*4160	2710	-	-	*4100	2690	6.04
	-4.5 m	-	-	*7210	6700	-	-	-	-	-	-	*4480	4170	4.48

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		1.5	m	3.0	) m	4.5	m	6.0	) m	7.5	m	N	lax. Read	ch
EC140E L with dozer blade	н	Ů	<u>C</u>	ů	<del>[]</del>	Ů	<u>C</u>	Ů	<del>[]</del>	ů	<del>[]</del>	Ů	<u>C</u>	Max.
		kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	m
	7.5 m	-	-	-	-	-	-	-	-	-	-	*5580	*5580	2.90
Variable adjustable boom:	6 m	-	-	*5070	*5070	*4800	4770	-	-	-	-	*3980	3970	5.01
4.6 m	4.5 m	-	-	*5470	*5470	*4950	4720	*4100	2990	-	-	*3580	2930	6.07
Dipper arm: 2.1 m Shoe: 700 mm	3 m	-	-	-	-	*5740	4520	*4700	2950	-	-	*3510	2520	6.62
Counterweight; 2450 kg	1.5 m	-	-	-	-	*6600	4280	*4980	2860	-	-	*3650	2380	6.80
Dozer blade: Down	0 m	-	-	-	-	*6940	4130	*5060	2790	-	-	*4050	2440	6.62
	-1.5 m	-	-	*9290	7590	*6480	4100	*4440	2780	-	-	*4300	2740	6.08
	7.5 m	-	-	*5180	*5180	-	-	-	-	-	-	*4160	*4160	3.75
ariable adjustable boom:	6 m	-	-	*4390	*4390	*4320	*4320	-	-	-	-	*3210	*3210	5.54
	4.5 m	-	-	*4120	*4120	*4560	*4560	*4230	3030	-	-	*2930	2640	6.51
Dipper arm: 2.5 m	3 m	-	-	-	-	*5390	4560	*4480	2960	-	-	*2870	2310	7.02
Shoe: 700 mm	1.5 m	-	-	-	-	*6360	4310	*4850	2860	-	-	*2970	2190	7.19
Counterweight: 2450 kg	0 m	-	-	-	-	*6880	4130	*5040	2770	-	-	*3250	2230	7.02
Dozer blade: Down	-1.5 m	-	-	*9130	7520	*6650	4060	*4740	2740	-	-	*3820	2470	6.51
	-3 m	-	-	-	-	*5410	4100	-	-	-	-	-	-	5.54
	7.5 m	-	-	*4120	*4120	*3610	*3610	-	-	-	-	*3250	*3250	4.64
Variable adhustable because	6 m	-	-	-	-	*3750	*3750	*3160	3060	-	-	*2660	*2660	6.16
Variable adjustable boom: 4.6 m	4.5 m	-	-	*3000	*3000	*3780	*3780	*3850	3060	-	-	*2450	2330	7.05
Dipper arm: 3.0 m	3 m	-	-	-	-	*4890	4610	*4170	2970	*2550	2080	*2400	2060	7.52
Shoe: 700 mm	1.5 m	-	-	-	-	*5980	4330	*4620	2850	*3330	2040	*2470	1960	7.68
Counterweight: 2450 kg	0 m	-	-	-	-	*6710	4110	*4940	2740	*2880	2000	*2660	1990	7.53
Dozer blade: Down	-1.5 m	*3630	*3630	*8260	7410	*6740	4000	*4870	2690	-	-	*3070	2170	7.05
	-3 m	-	-	*8660	7470	*5900	4010	*3900	2710	-	-	*3580	2620	6.17

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		1.5	m	3.0	) m	4.5	m .	6.0	) m	7.5	5 m	M	lax. Read	h
EC140E LM	н	<b>P</b>	<del>[]</del>	<b>B</b>	<u>C</u>	Ů	<del>[]</del>	Ů	<del>[]</del>	<b>L</b>	<del>[]</del>	<b>B</b>	<del>[]</del>	Max.
		kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	m
	6 m	-	-	-	-	*3280	*3280	-	-	-	-	*3500	*3500	5.08
	4.5 m	-	-	-	-	*3550	*3550	*3560	2840	-	-	*3580	2780	6.07
Boom: 4.6 m	3 m	-	-	*6660	*6660	*4470	4230	*3800	2780	-	-	3630	2420	6.58
Dipper arm: 2.1 m Shoe: 700 mm	1.5 m	-	-	-	-	*5510	4020	4100	2700	-	-	3470	2300	6.71
Counterweight: 2450 kg	0 m	-	-	*5920	*5920	*6150	3890	4030	2640	-	-	3610	2380	6.49
• •	-1.5 m	*5680	*5680	*9340	7080	6130	3870	-	-	-	-	4150	2710	5.88
	-3 m	-	-	*7960	7210	*5240	3960	-	-	-	-	*4870	3720	4.71
	6 m	-	-	-	-	*2820	*2820	-	-	-	-	*3220	*3220	5.57
Boom: 4.6 m Dipper arm: 2.5 m Shoe: 700 mm	4.5 m	-	-	-	-	*3160	*3160	*3210	2860	-	-	*3160	2520	6.49
	3 m	-	-	*5740	*5740	*4090	*4090	*3540	2790	-	-	*3180	2220	6.97
	1.5 m	-	-	-	-	*5210	4030	*4040	2700	-	-	3200	2120	7.09
Counterweight: 2450 kg	0 m	-	-	*6280	*6280	*5990	3880	4010	2620	-	-	3300	2180	6.88
	-1.5 m	*5050	*5050	*9550	7010	6090	3830	3990	2600	-	-	3720	2440	6.31
	-3 m	*9660	*9660	*8480	7110	*5630	3880	-	-	-	-	*4550	3160	5.25
	7.5 m	-	-	-	-	-	-	-	-	-	-	*2860	*2860	4.73
	6 m	-	-	-	-	-	-	*2800	*2800	-	-	*2780	2750	6.18
	4.5 m	-	-	-	-	-	-	*2810	*2810	-	-	*2630	2220	7.02
Boom: 4.6 m	3 m	-	-	*4600	*4600	*3580	*3580	*3200	2790	-	-	*2640	1980	7.46
Dipper arm: 3.0 m Shoe: 700 mm	1.5 m	-	-	*7660	7360	*4770	4050	*3750	2680	2930	1930	*2780	1900	7.57
hoe: 700 mm ounterweight: 2450 kg	0 m	-	-	*6630	*6630	*5710	3850	3980	2590	-	-	2960	1940	7.38
	-1.5 m	*4370	*4370	*9250	6900	6030	3770	3930	2540	-	-	3270	2130	6.85
	-3 m	*7910	*7910	*8930	6970	*5870	3790	-	-	-	-	4070	2640	5.89
	-4.5 m	-	-	*6780	*6780	-	-	-	-	-	-	-	-	4.20

- 1. Machine in "Fine Mode-F" (Power Boost), for lifting capacities.
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- 3. Rated loads do not exceed 87% of hydraulic lifting capacity or 75% of tipping load.
- 4. Rated loads marked with an asterisk ( \* ) are limited by hydraulic capacity rather than tipping load.

		1.5	5 m	3.0	) m	4.5	5 m	6.0	) m	7.5	5 m	M	lax. Read	h
EC140E LM	н	<b>F</b>	<b>F</b>	<b>F</b>	ŧ		<del>[]</del>	<b>B</b>	<b>F</b>	<b>-</b>	<del>[]</del>	<b>F</b>	ŧ	Max.
		kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	m
	7.5 m	-	-	*5890	*5890	-	-	-	-	-	-	*5170	*5170	3.30
Variable adjustable boom:	6 m	-	-	*5090	*5090	*4760	4530	-	-	-	-	*3900	3570	5.19
4.6 m	4.5 m	-	-	*5740	*5740	*5020	4450	4280	2840	-	-	*3560	2710	6.17
Dipper arm: 2.1 m	3 m	-	-	-	-	*5860	4240	4210	2790	-	-	*3510	2360	6.67
Shoe: 700 mm	1.5 m	-	-	-	-	6340	4020	4120	2700	-	-	3430	2260	6.79
Counterweight: 2450 kg	0 m	-	-	-	-	6190	3890	4050	2630	-	-	3560	2330	6.58
	-1.5 m	-	-	*9070	7060	6160	3860	-	-	-	-	4080	2660	5.97
	7.5 m	-	-	*4960	*4960	-	-	-	-	-	-	*3950	*3950	4.06
ariable adjustable boom:  .6 m ipper arm: 2.5 m	6 m	-	-	*4290	*4290	*4310	*4310	-	-	-	-	*3160	3110	5.69
	4.5 m	-	-	*4220	*4220	*4640	4500	*4240	2880	-	-	*2910	2450	6.6
	3 m	-	-	-	-	*5520	4280	4230	2800	-	-	*2880	2170	7.06
Dipper arm: 2.5 m Shoe: 700 mm	1.5 m	-	-	-	-	6370	4040	4120	2700	-	-	*2990	2070	7.18
Counterweight: 2450 kg	0 m	-	-	*5730	*5730	6180	3880	4030	2620	-	-	3250	2130	6.98
	-1.5 m	-	-	*9640	6990	6120	3820	4010	2590	-	-	3660	2380	6.41
	-3 m	-	-	-	-	-	-	-	-	-	-	-	-	5.54
	7.5 m	-	-	-	-	*3860	*3860	-	-	-	-	*3120	*3120	4.9
	6 m	-	-	-	-	*3750	*3750	*3380	2910	-	-	*2620	*2620	6.31
Variable adjustable boom:	4.5 m	-	-	*3010	*3010	*3820	*3820	*3870	2900	-	-	*2430	2160	7.13
4.6 m	3 m	-	-	-	-	*5050	4330	*4230	2800	*2730	1970	*2400	1940	7.56
pper arm: 3.0 m noe: 700 mm	1.5 m	-	-	-	-	*6100	4050	4110	2680	2940	1930	*2480	1860	7.68
	0 m	-	-	*6050	*6050	6160	3850	4000	2580	-	-	*2700	1900	7.48
	-1.5 m	*4020	*4020	*8770	6880	6060	3760	3950	2540	-	-	*3140	2090	6.96
	-3 m	-	-	*8350	6960	*5710	3780	-	-	-	-	-	-	6.02

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## Service history

Service 500 ho	urs	Type of service	Signature and stamp
Date	Hours	☐ First 500 hours ☐ Service and maintenance	
Service 1000 h	iours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	organical and ottamp
Service 1500 h	ours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 2000 h	ours	Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	
Service 2500 h	ours	Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	
Service 3000 h	ours	Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	
Service 3500 h	ours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 4000 h	ours	Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	
Service 4500 h	ours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	

# Specifications 414 Service history

Service 5000 h	nours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 5500 h	nours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 6000 h	nours	Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	
Service 6500 h	nours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 7000 h	nours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 7500 h	nours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 8000 h		Type of service	Signature and stamp
Date	Hours	Service and maintenance	Signature and Stamp
Bato	T Tours		
Service 8500 h	nours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 9000 h	nours	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	, , , , , , , , , , , , , , , , , , ,



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