

OPERATOR'S MANUAL

ECR25D, EC27D ECR25D S/N 25001-





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

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

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

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

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

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

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

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

EC27D/ECR25D

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

Table of contents Presentation Instrument panels Other controls Operating instructions Operating techniques Safety when servicing Maintenance Specifications Alphabetical index

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

Enter the identification number of machine and machine parts. This number must be specified when contacting the manufacturer to order spare parts. Positions and explanation of the PIN plates, see page *21*.

Manufacturer:	Volvo Construction Equipment sas rue Pierre Pingon BP 01303 Belley Cedex France
PIN (Product Identification Number) of machine:	
Engine:	



Table of contents

Foreword	1
Identification numbers	3
Presentation	9
Machine view	15
CE-marking, EMC-directive	16
Communication equipment, installation	
Safety components	
Product plates	
Information and warning decals	
USA federal clean air act	
Instrument panels	
Instrument panel, left	33
Display unit	37
Other controls	40
Controls	40
ROPS	
Operator comfort	5′
Operating instructions	60
Safety rules when operating	
Measures before operating	70
Starting engine	7′
Stopping	
Parking	
Retrieving and towing	
Attachments, alternative lowering	
Transporting machine	X.

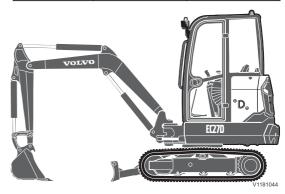
Operating techniques	. os
Eco driving	90
Whole-body vibrations	91
Rules for digging	93
Working within dangerous areas	94
Attachments	102
Attachments, connecting and	
disconnecting	
Attachment brackets	
Hydraulic attachment bracket	108
Pressure release	
Buckets	112
Offset boom	113
Special hydraulics	114
Hammer	115
Hose rupture valves	121
Tracks	122
Lifting objects	123
Signalling diagram	127
Safety when servicing	130
Service position	131
Before service, read	
Entering, leaving and climbing the machine	135
Fire prevention	136
Handling hazardous materials	139
Handling line, tubes and hoses	
Maintenance	
Lubrication and service chart	
Maintenance service, every 10 hours	
Maintenance service, every 70 hours	
Maintenance service, every 250 hours	
Maintenance service, every 500 hours	
Maintenance service, every 1000 hours	
Maintenance service, when required	
widing indice service, writing required	107

Specifications	176
Recommended lubricants	176
Fuel system	181
Service capacities and change intervals	187
Engine	188
Electrical system	189
Cab	192
Hydraulic system	194
Specifications	195
Machine weights	196
Ground pressure	197
Dimensions	198
Working ranges	200
Recommended bucket sizes	201
Digging forces	203
Lifting capacities	204
Hammer (hydraulic breaker)	214
Service history	216
Alphahatical index	224



Presentation

Valid for serial numbers			
Model version Serial number start Serial number stop			
ECR25D	Belley 25001	Belley 29999	



Intended use

The machine is intended to be used under normal conditions for the applications described in the Operator's Manual. If it is used for other purposes or in potentially dangerous environments, for example explosive atmospheres, flammable environment or areas with dust containing asbestos, special safety regulations are to be followed and the machine to 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 engine is a 3-cylinder D1.1A type diesel engine with water cooling.

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 intended for USA and Canada 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 and Canada, unless the engine is replaced by an engine valid for the applicable market. Which market the engine is designed for is shown on the exhaust decal (see page 21)

Electrical system

Valid for serial numbers		
Model version	Serial number stop	
ECR25D	Belley 25001	Belley 29999

The machine has four electronic units:

- V-ECU (optional equipment, vehicle unit for boom swing, X1 and X3 proportional functions, auto idle)
- I-ECU (display unit)
- A-ECU (anti theft, optional)
- W-ECU (caretrack, optional)

The display unit shows information, e.g machine status, control lamps, gauges, settings and information/warning lights. A buzzer is integrated in the I-ECU to warn the operator in addition to some warning lights.

To select various functions there are two instrument panels with switches and controls. Activation and control of the excavating functions is mostly done with the buttons on the control levers.

Most of the relays and fuses are grouped in the electrical box under the cover on the left side of the machine. The battery disconnect switch is located under the rear hood, see page 145.

Cab

The cab is approved as a protective structure according to the following standards:

- TOPS (Tip-Over Protective Structure), ISO 12117 / EN13531
- ROPS (Roll Over Protective Structure), ISO 3471

 OPG (Operator Protective Guard) Level 1 on top, ISO 10262

The OPG level 2 is an option.

These tests are based on the heaviest machine weight configuration, unless otherwise stated.

If any part of the cab's protective structure is affected by plastic deformation or rupture, the cab shall be immediately replaced.

If the machine is equipped with a cab, i.e. with side windows and side door, it will have heating and ventilation. The rear window can be broken with an emergency hammer and used as an emergency exit.

Never carry out any unauthorised alterations to the cab without first, through a dealer, having discussed the alteration with personnel at the Volvo Construction Equipment Engineering Department. This department will decide whether the alteration may cause the TOPS-, ROPS- and OPG-approval to become void.

Hydraulic system

Closed circuit hydraulic load-sensing system, allowing full independence of the individual movements.

Equipment

The machine can be provided with different types of optional equipment, depending on the requirements of different markets. Examples of such equipment are attachment quick coupler and hydraulic breaker.

Modifications

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

Unauthorised modifications on the upperframe can have an influence on the ROPS protection system which is intended to secure the driver in case of an accident.

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.

Travel system

Valid for serial numbers		
Model version	Serial number start	Serial number stop
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The travel motion is accomplished by the main chassis via two rubber tracks (steel tracks optional available for EC27D). The tracks are each driven by a two speed travel motor.

Slewing system

The slewing ring is driven by a hydraulic motor, which is protected against excess pressure by high pressure relief valves.

Anti-theft device

(optional equipment)

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

CareTrack

(optional equipment)

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, daily usage hours, that can be sent by wireless transmission to a computer. The service history can be reviewed on a secure website and service reminders can be sent both by email and on a mobile phone. Part changes can be planned for specific wear parts and reminders can be send when the changes are due.

The geofence and timefence functionality gives the opportunity to decide in which geographical boundaries and at which times the machine must operate. An alarm can be send by email or to a mobile phone if it breaks those rules.

CareTrack makes it easier to plan for service and reduces costly downtime.

It 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. CareTrack is available in different versions, depending on the required information level. For further information contact a Volvo Construction Equipment dealer.

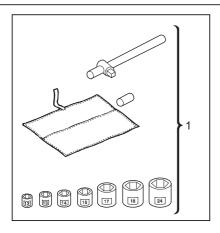
The CareTrack system transmits data, in the same way a mobile phone does, with a maximum output rate of 10 W. The transmitter is always on and the operator cannot switch it off.

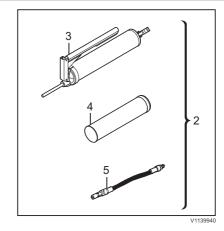
Local precautions and restrictions applicable to mobile phones, for example safety distance, also apply to the CareTrack system.

Tool kit

(optional equipment)

The tool kit is located under the seat and consists of following tools:



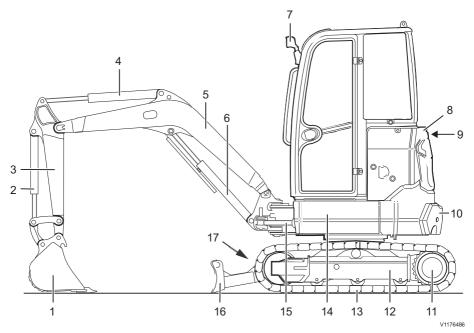


Tools of the tool kit

- 1 Wrench with different sizes of nuts
- 2 Grease gun (3) with cartridge (4) and extension (5)

Machine view

Valid for serial numbers		
Model version	Serial number start	Serial number stop
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Component location

1	Bucket	10	Additional counterweight (optional)
2	Bucket cylinder	11	Travel motor
3	Dipper arm	12	Undercarriage
4	Dipper arm cylinder	13	Tracks
5	Boom	14	Superstructure
6	Boom cylinder	15	Boom offset cylinder
7	Working lights	16	Dozer blade
8	Rear hood (Engine hood)	17	Dozer blade cylinder
9	Battery disconnect switch (under the rear hood, see page <i>145</i>)		



CE-marking, EMC-directive

CE marking

(Declaration of Conformity)

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

The manufacturer is not responsible for unauthorized changes that can affect machine safety.

An EU Declaration of Conformity as well as a sound certificate regarding sound power in dB(A) are supplied as proof that the requirements are fulfilled. The sound certificate includes both measured external values and guaranteed sound power level. These declarations are issued by Volvo for every individual machine. This EU-declaration also includes attachments manufactured by Volvo. The documentation is a valuable document and shall be saved in a safe location for at least ten years. The documentation shall always accompany the machine when it is sold.

If the machine is used for other applications or with other attachments than described in this manual, safety must always be ensured in each individual case. A change may in certain cases require a new CE-marking and issuing of a new EU Declaration of Conformity. The person responsible for this is the same person who makes the change.

EU EMC Directive

The machine's electronic equipment may in some cases interfere with other electronic equipment, or be interfered with by external electromagnetic interference, which may result in safety risks.

The EU EMC directive 2004/108/EC about "Electromagnetic compatibility" provides a general description of what requirements can be made of the machine from a safety perspective, where permitted limit values have been determined and stated in international standards.

A machine or device must meet the requirements to be CE-marked. Our machines have been specially tested for electromagnetic interference.

The machine's CE-marking 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.

EU conformity certificate

Valid for serial numbers			
Model version Serial number start Serial number stop			
ECR25D	Belley 25001	Belley 29999	

We, the manufacturer

Volvo Construction Equipment sas Rue Pierre Pingon BP 01303 Belley Cedex

France

The technical documentation is maintained by: Mr. Marc Gergaud, Volvo Construction Equipment, Belley France

declare that the following equipment Excavator

Model	Serial Number	Output	Representative Sound Power Level (LWA)	Guaranteed Sound Power Level (LWA)	Year of CE- Marking
ECR25D		15.6 kW	93 dB(A)	93 dB(A)	
EC27D		13.0 KVV	95 db(A)	95 db(A)	

complies with the following relevant directives:

- EC Directive "Machinery" 2006/42/EU
- EC Directive "Noise Emission" 2000/14/EU
- EC Directive "EMC" 2014/30/EU
- As well as EC Directive "Low Voltage" 2014/35/EU for electric heating / electric generator

Applied harmonized standards especially:

- EN 474-1 and EN 474-5
- The EN and ISO Standards specified under Chapter 2 of EN 474-1 and EN 474-5

The assessment of conformity method used to determine the guaranteed sound power level complies with Article 14 item 3 of Directive 2000/14/EU.

Certified European institute, Cofrac 1-0606, LNE – France 1, rue Gaston Boissier 75724 Paris Cédex 15

Belley, <dd.mm.yyyy>

<N. N.>

General Manager

Volvo Construction Equipment sas

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 according to EU's directive 2014/30/EC that regulates electromagnetic interference. Therefore, it is very important that all non-approved electronic accessories, such as communication equipment, are tested before they are installed and used, since they may interfere with the machine's electronic system.

Guidelines for installing aerial

The guide lines listed below must be followed during installation:

- The position of the aerial must be selected to provide satisfactory adaptation to the surrounding area.
- The aerial downlead must be of the coaxial cable type. Make sure that the cable is undamaged, that the screen is not split at the ends and that it thoroughly surrounds the contact sheaths and has good galvanic contact with the same.
- The surface between the mounting bracket for the aerial and the point of attachment must be free from dirt and oxide. Apply corrosion protection to the surfaces after installation so that good galvanic contact is maintained.
- Take care to separate cables that may cause interference from those which may suffer interference. Cables that may cause interference are voltage feed cables and the aerial cable to the communication equipment. Cables that may suffer from interference are connecting cables for the electronics of the machine. Install cables as close as possible to plate surfaces which are connected to ground (earthed), as these have a screening 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.

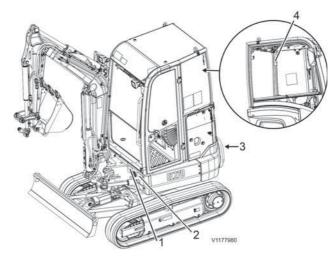
There is more important information in this Operator's Manual about the components that are considered safety-classified.

Product plates

Valid for serial numbers				
Model version	Serial number start	Serial number stop		
ECR25D	Belley 25001	Belley 29999		

The following illustrations and descriptions show the product plates on the short swing radius excavator.

When ordering spare parts or for short enquiries by phone and in correspondence you should always specify model designations and product identification number.



VCE	E C 3 5	C C 0	00	1 2	3 4	5
		- :	1			
Α .	В	c		D		

Example of 17 digit PIN number on PIN plate

- A World Manufacturing Code
- B Machine description
- C Check letters
- D Serial number

1 Product Identification plate (PIN)

The product plate contains name and address of manufacturer, model/type designation and 17 digit PIN number.

2 Supplementary PIN plate (EU countries only)

The supplementary plate contains information about machine mass in kg, engine net power in Kw, manufacturing year, machine serial number and a CE-mark.

Machine mass

The machine mass in kg on the supplementary PIN plate is based on the most standard definition of the machine in accordance with ISO 6016.

For safety reasons, 103% of the machine mass will be shown on the supplementary PIN plate.

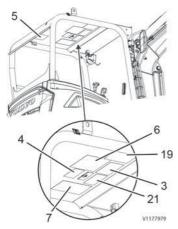
3 Engine identification plate

The engine identification contains information about manufacturer, designation and engine serial number.

4 TOPS/ROPS and OPG plate

The plate is located inside the cab on the left back column (in canopy under the roof). TOPS (Tip-Over-Protection-Structure) and ROPS (Roll-Over-Protection-Structure) provide roll over protection in case the machine should turn over. OPG (Operator Protective Structure) provides protection against falling down objects.

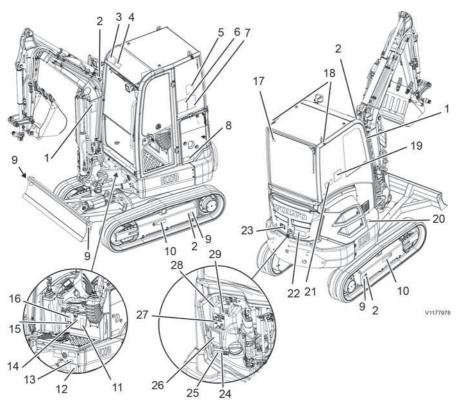
Information and warning decals



Different positions in canopy

Valid for serial numbers			
Model version	Serial number start	Serial number stop	
ECR25D	Belley 25001	Belley 29999	

The operator should know and pay attention to the information and warning plates/decals which are positioned on the machine. All plates/decals are not installed on all machines, as they are market and machine dependent. The decals/plates must be kept free from dirt, so that they can be read and understood. If they have been lost or no longer are legible, they must be replaced immediately. The part number (order number) is given on the respective plates/decals and in the Parts Catalogue.



NOTE!

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



1 WARNING Do not stand in the vicinity of a raised load.

(decal on both sides of the boom)



2 Lifting points.

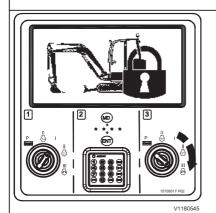
(2 lifting points undercarriage / 2 lifting points on boom)



3 WARNING! High voltage. Keep sufficient distance from electrical power lines.



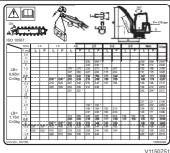
4 WARNING! Operate backhoe from operator's seat only (North America only).



5a Immobiliser System with keypad (optional equipment), see instructions on page 33.

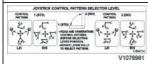


5b Immobiliser Antenna System (optional equipment), see instructions on page Instrument Panel / Right.



7 Lubrication and maintenance chart

6 Lifting capacities (not in machines without safety valves)



8 WARNING! Read and understand control pattern before selecting lever position (North America only).



9 Tie down points.

(2 tie down points on blade / 2 tie down points on undercarriage)



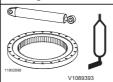
10 WARNING! Track tension, check the tension every 250 hours - read the Operator's Manual.



11 WARNING! Move the control lockout lever up to lock the system securely when leaving the machine.



12 Sound power level outside the machine



13 Slewing ring lubrication



V107690

14 WARNING! First read the Operator's Manual.



15 Switchover valve (hammer/clamshell)



16 WARNING! Fasten seat belt when operating the machine.



17 Alternative exit path



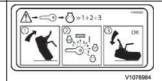
18 No lifting point! (on both sides of the machine)



19 Operator's stand control elements



20 WARNING! Do not step on this surface.



21 Locking console / procedure to start



22 WARNING! Rotating parts and hot surfaces



23 WARNING! Do not enter the machine's working area. Risk for crushing.



24 Fuel filler point

EPA REGULATION

USE LOW SULFUR FUEL OR ULTRA LOW SULFUR FUEL ONLY

V1077005

25 Use low sulfur fuel (North America only)



26 WARNING! No ether (North America only)



27 WARNING! Read and understand the hydraulic oil filling instruction before filling.



28 Hydraulic oil filler point



29 Battery disconnect switch

USA federal clean air act

The Federal Clean Air Act Section 203.a (3) prohibits the removal of air pollution control devices or the modification of an EPA-certified non-road engine to a non certified configuration.

The Federal regulations implementing the Clean Air Act for non-road engines, 40 CFR 89.1003(a)(3)(i), reads as follows:

The following acts and the causing thereof are prohibited:

For a person to remove or render inoperative a device or element of design installed on or in a non-road engine vehicle or equipment in compliance with the regulations under this part prior to its sale and delivery to the ultimate purchaser or for a person knowingly to remove or render inoperative such a device or element of design after the sale and delivery to the ultimate purchaser.

The law prescribes a fine of up to \$2,750 USD for each violation.

An example of a prohibited modifications is the recalibration of the fuel system so that the engine will exceed the certified horsepower or torque.

You should not make a change to an EPA-certified non-road engine that would result in an engine that does not match the engine configuration certified to meet the Federal Standards.

Customer Assistance

Volvo Construction Equipment wishes to help assure that the Emission Control System Warranty is properly administered. In the event that you do not receive the warranty service to which you believe you are entitled under the Emission Control System Warranty, you should contact the nearest Volvo Construction Equipment regional office for assistance.

Normal non-road engine use

The maintenance instructions are based on the assumption that this conventional machine will be used as designated in the operator's instruction manual and operated only with the specified fuel and lubrication oils.

Non-road engine maintenance

This is a non-road engine of conventional design and any local dealer may perform the necessary non-road emission control maintenance as defined in this manual.

Volvo recommends that the purchaser use the service program for the non-road engine, known as preventative maintenance, including the recommended engine emission control maintenance.

In order to document that the proper regular maintenance has been performed on the non-road engine, Volvo recommends that the owner keep all records and receipts of such maintenance. These records or receipts should be transferred to each subsequent purchaser of the non-road engine.

Service performed by your local dealer

Your local dealer is best suited to give you good, dependable service since he has trained service technicians and is equipped with genuine original manufacturer's parts and special tools and the latest technical publications. Discuss your servicing and maintenance requirements with your local dealer. He can tailor a maintenance program for your needs.

For scheduled service or maintenance, it is advisable to contact your local dealer in advance to arrange for an appointment to ensure availability of the correct equipment and service technician to work on your machine. In this way you will assist your local dealer in reducing the time required to do service on your machine.

Preventive maintenance program

In order for the conventional non-road engine to retain the reliability and performance parameters such as noise level and emission levels it had when delivered, it is essential that it receives regularly scheduled service, inspections, adjustments, and maintenance.

Fuel system

Fuel recommendations:

The fuel used must be clean, completely distilled, stable and non-corrosive. Distillation range, cetane level and sulfur content are most important when selecting fuel for optimum combustion and minimum wear.

Engine working conditions and ambient temperature influence the selection of the fuel with respect to cold handling properties and cetane levels.

In cold weather conditions, below 0 °C (32 °F), the use of lighter distillate or higher cetane level fuel are recommended. (Final boiling point maximum 349 °C (660 °F) and cetane minimum 45.).

In order to avoid excessive sedimentation and to minimise the emissions of sulfur dioxide, the fuel's sulfur content should be as low as possible. The diesel fuels recommended for use shall meet ASTM designation: D 975 no. 1D (C-B) or no. 2D (T-T) with a cetane level above 42 and sulfur content not exceeding 0.05 percent by weight.

Check for fuel leaks (with the engine running at high idle):

■ Visually check unions and hose connections.

Check the condition of the fuel hoses for:

- Ageing
- Cracks
- Blisters
- Scuffing

Check the condition of the fuel tank:

- Drain condensation water.
- Check for cracks.
- Check for leaks.
- Check the mounting.

Check the turbocharger:

Visually check for leaks in the intake hoses and exhaust pipe of the turbocharger.

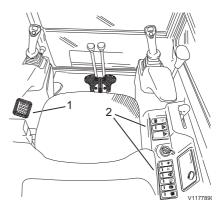
Instrument panels

Valid for serial numbers				
Model version	Serial number start	Serial number stop		
ECR25D	Belley 25001	Belley 29999		

NOTE!

Do not operate the machine until you are familiar with the function and position of the instruments and operating controls. Carefully read through this Operator's Manual, this is a matter of your safety!

Keep the manual in the cab, so that it is always at hand when needed.



	Instrument panel, left: Immobiliser system (optional equipment)
2	Instrument panel, right

Instrument panel, left

Valid for serial numbers				
Model version	Serial number start	Serial number stop		
ECR25D	Belley 25001	Belley 29999		

Immobiliser System (optional equipment)

NOTE!

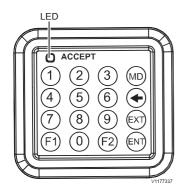
The machine can be equipped with an Immobiliser System with keypad or an Immobiliser Antenna System at ignition (see page *Instrument Panel / Right*).

1. Keypad

- LED Shows system status by flash codes (see table below)
- ①-⑨ Number keys to enter codes
 - Fi) Function key 1
 - F2 Function key 2
 - MD key to enter Codes
 - Arrow key
 - Exit key
 - Enter key

2. LED flash codes

No.	Status	Flash Code	Cyclic
0	disarmed	on for 3 s.	
1	armed	flashes every 0.5 s. for 60 s.	no
2	code stored/accepted	2 flashes	
3	code already in memory / program mode canceled	3 flashes	yes
4	program mode		no
5a	code failure	5 flashes + 4 flashes	yes
5b	code failure	4 flashes	yes
6	timeout	5 flashes	no
7	memory full	6 flashes	110
8	all codes deleted	7 flashes	
9	memory empty	flash every 0.1 s.	Voc
10	factory mode	flash every 0.5 s.	yes
11	monitoring mode	flash every 1 s.	



3. Concept

The Immobiliser System is delivered without Master or User Codes

The 6-digit Master Code must be programmed to activate the system (follow item 4).

Then 4-digit User Code(s) must be programmed (follow item 5).

The machine can be started with User Code(s) only (6).

After you are logged in and ignition is off, you can start the engine again within 15 minutes (Flash Code 1, armed). If 15 minutes have elapsed (Flash Code 11, Monitoring), code must be entered again. If a Master Code is lost, contact a Volvo authorised dealer

4. Programming 6-digit Master Code

- 1 Precondition: No Master Code in memory.
- 2 Insert ignition key into ignition switch and turn it to running position (position 1, see page Instrument Panel / Right).
 - → Flash Codes 0 (disarmed) and then 10 (factory mode) appear.
- 3 Enter key combination for **6-digit Master Code** as shown.
- 4 Repeat step 3 to confirm.
 - → Flash Code 2 (code stored/accepted) appears.
- 5 4-digit User Code(s) can be programmed now.

5. Programming 4-digit User Code(s)

- 1 Precondition: Master Code programmed.
- 2 Insert ignition key into ignition switch and turn it to running position (position 1).
 - → Flash Code 1 (armed): Still logged in within 15 min. elapse time after ignition off.
 - → Flash Code 11 (monitoring): Log in with key combination for **6-digit Master Code** as shown.
- 3 Enter new key combination for 4-digit User Code as shown.
 - → Flash Code 2 (code stored/accepted) appears.
- 4 Repeat step 3 for additional **4-digit User** Code(s).
- 5 Engine can be started now.



Key combination for 6-digit Master Code



Key combination for 6-digit Master Code



Key combination for 4-digit User Code

6. Operating

NOTE!

Operating is only possible when you are logged in with 4-digit User Code!

- 1 Precondition: Master Code and User Code(s) programmed.
- 2 Insert ignition key into ignition switch and turn it to running position (position 1).
 - → Flash Code 1 (armed): Still logged in within 15 min. elapse time after ignition off. Go to step 3.
 - → Flash Code 11 (monitoring): Log in with key combination for **4-digit User Code** as shown.
- 3 You can start the engine now.

NOTE!

When a wrong User Code is used 5 times, the Immobiliser System will be locked for 10 minutes. The lock-out time will not be reset by switching off power for the A-ECU. The correct 4-digit User Code will reset the counter.

7. Deleting all 4-digit User Codes

NOTE!

Changing the 6-digit Master Code also deletes all 4-digit User Codes (see item 8).

- 1 Insert ignition key into ignition switch and turn it to running position (position 1).
- 2 Log in with key combination for 6-digit Master Code as shown.
 - → Flash Code 4 (program mode) appears.
- 3 Repeat step 2.
- 4 Press (and (2).
 - → Flash Code 8 appears (all codes deleted).



Key combination for 4-digit User Code

Key combination for 6-digit Master Code



Key combination to delete all codes

8. Changing 6-digit Master Code with © NOTE!

All saved 4-digit User Codes will be deleted when the 6-digit Master Code is changed!

- 1 Precondition: Master Code programmed.
- 2 Insert ignition key into ignition switch and turn it to running position (position 1).
 - → Flash Code 11 (monitoring)
- 3 Enter key combination to change 6-digit Master Code as shown.



Key combination to change 6-digit Master Code



Key combination for NEW 6-digit Master Code

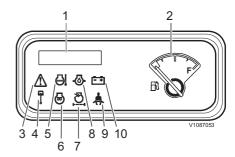
- 4 Enter key combination for **NEW 6-digit Master Code** as shown.
- 5 Repeat step 4 to confirm.
 - → Flash Code 2 (code stored/accepted) appears.
- 6 You can program new 4-digit User Code(s) now (see item 5.).

Display unit

The display unit is located on the right instrument panel.

An automatic test is performed on the I-ECU when the ignition key is turned to running position. For 3 seconds all the control lamps light up, buzzer sounds and fuel gauge needle goes to maximum position.

The preheating control lamp goes out as soon as the operating temperature is reached.



4	0 " 1 1
1	Operating hour meter
2	Fuel level gauge
3	Central warning lamp
4	Offset control lamp
5	Engine temperature control lamp
6	Preheating control lamp
7	Air filter control lamp
8	Engine oil pressure control lamp
9	Seat belt control lamp
10	Battery charge control lamp

1. Operating hour meter

- The operating hour meter shows the total number of machine operating hours.
- Maintenance work is to be carried out according to the reading of the operating hour meter.

2. Fuel level gauge

- The fuel level gauge shows the level in the fuel tank.
- Always refuel in due time, thus to prevent air from entering into the fuel system.











3. Central warning lamp (red)

The lamp lights up when control lamps 5, 7, 8 or 10 light up. The buzzer sounds when control lamp 5 and 8 lights up. If any red control lamp lights up, shut down the engine immediately, determine the cause and have the cause of the fault corrected as quickly as possible, or contact our service department.

4. Offset control lamp (green)

- The offset control lamp lights up green after offset switch on the right hand control lever has been switched to offset.
- If the accessory flow setting menu is activated, this symbol is flashing, in this case, this means that we are in settings menu.

NOTE!

While turning ON the ignition switch or lowering the arm rest, a neutral detection is performed for the roller switch on the right control lever. The offset control lamp blinks when the roller is not in its neutral position and the proportional function (X1 or boom offset) is disabled.

The function becomes active (operational) once the roller comes back to its neutral position.

5. Engine temperature control lamp (red)

- The engine temperature control lamp lights up in case of impermissibly high engine temperatures and the buzzer sounds.
- Shut down the engine, perform trouble shooting, if necessary contact a qualified service technician.

6. Preheating control lamp (yellow)

Ignition key in preheating position, the control lamp lights up and goes out as soon as the specified operating temperature is reached.

7. Air filter control lamp (yellow)

- The control lamp informs about the condition of the air filter.
- If the control lamp lights up during operation in connection with central warning lamp (3), shut down the engine, clean or replace the air filter immediately, if necessary contact a qualified service technician.









Central warning lamp



Engine temperature control lamp



Engine oil pressure control lamp

8. Engine oil pressure control lamp (red)

- The control lamp indicates low engine oil pressure.
- If the control lamp lights up during operation in connection with general control light (3), shut down the engine and perform trouble shooting. If necessary contact a qualified service technician.

9. Seat belt control lamp (red)

Always fasten your seat belt when operating the machine.

■ The control lamp will illuminate when the seat belt is not fastened. The control lamp goes out as soon as the seat belt is fastened.

10. Battery control lamp (red)

- The control lamp indicates the charge condition of the battery. The control lamp lights up if the battery is not being charged.
- If the control lamp lights up during operation in connection with general control lamp (3), turn off the engine, perform trouble shooting. If necessary contact a qualified service technician.

Automatic engine shutdown function

This function is made to avoid engine damage. In case of low oil pressure or high water temperature (or both) the central warning lamp, the related lamps (engine temperature control or engine oil pressure control) and the buzzer are activated.

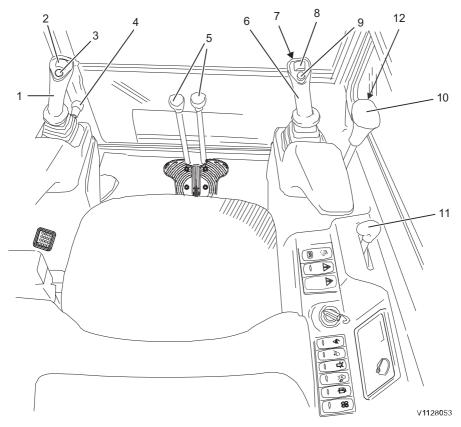
The engine will shut down automatically if these warning conditions are still valid after 15 seconds.

To retrieve the machine out of a dangerous area the engine can be restarted.

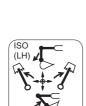
■ Turn the key to off position and start the engine again. The countdown resets and if conditions are still valid it will shut down again after 15 seconds.

Other controls Controls

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999



Left hand control lever for attachments
Proportional roll switch to control X3 hydraulic
flow (optional equipment)
now (optional oquipmont)
Horn
Control lockout lever for hydraulics
Comband layers for two value ation
Control levers for travel motion
Right hand control lever for attachments
Push button for X1 max flow
Push bullon for AT max now
Proportional roll switch or two buttons to control X1 or boom offset hydraulic flow



Decal ISO control pattern



Decal STD control pattern

9	Offset boom or X1 selection (optional, if not assigned here, the switch is on the instrument panel, right, see page <i>Instrument Panel / Right</i>)
10	Dozer blade control lever
11	Throttle lever
12	Button to activate fast travel speed gear

1. Left control lever for attachments (ISO control pattern)

- Lever forward: Extending the dipper arm.
- Lever backward: Retracting the dipper arm.
- Lever to the right: Slewing movement to the right.
- Lever to the left: Slewing movement to the left.

Left control lever for attachments (STD control pattern, North America only)

- Lever forward: Boom down.
- Lever backward: Boom up.
- Lever to the right: Slewing movement to the right.
- Lever to the left: Slewing movement to the left.

NOTE!

Market dependent optional equipment. North America only. See Control pattern selector switch in this chapter.



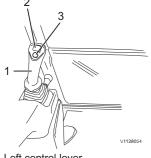
Risk of serious accidents.

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.

2. Proportional Roll switch to control X3 hydraulic flow (optional equipment)

■ Proportional roller to operate optional equipment (X3, for example rototilt bucket).



Left control lever

Hydraulic oil flow, changing maximum setting for X3

There is a possibility to set the maximum hydraulic oil flow used for X3, see "Hydraulic oil flow, changing maximum setting for X1 and X3" under the explanation of position 8.

3. Horn

■ Button depressed: Horn signal.

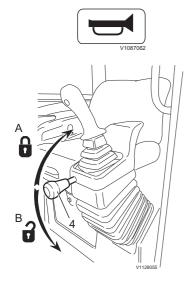
4. Control lockout lever for working and travel

■ Shift the lever to position (A). The operating levers for working and travel hydraulics are locked (no movement possible).

NOTE

The control lockout lever must be fully in the upper end position to secure that the hydraulic is locked.

■ Shift the lever forward to position (B). The operating levers for working and travel hydraulics are unlocked (working position).





Risk of crushing.

A raised attachment could fall and cause crushing injury.

Before leaving the cab, always lower all attachments to the ground and lock the control functions.

5. Control levers for travel motion

When the dozer plate is in the rear position (180° rotation), the travel system operation is reversed.



Risk of fatal accidents.

Unexpected driving direction could lead to accidents resulting in serious injury or death.

Always check the driving direction before moving the machine.

- Push both levers forward: Forward travel.
- Pull both levers backward: Reverse travel.
- Push right lever forward: Turn left.
- Push left lever forward: Turn right.

NOTE!

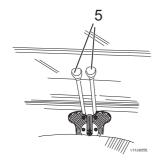
When operating the travel levers the travel alarm (optional equipment) emits a warning signal.

6. Right control lever for attachments (ISO control pattern)

- Lever forward: Boom down.
- Lever backward: Boom up.
- Lever to the right: Empty the bucket (opening).
- Lever to the left: Fill the bucket (closing).

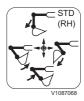
Right control lever for attachments (STD control pattern, North America only)

- Lever forward: Extending the dipper arm.
- Lever backward: Retracting the dipper arm.
- Lever to the right: Empty the bucket (opening).

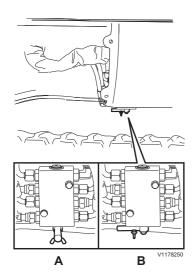


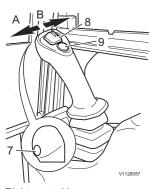


Decal ISO control pattern



Decal STD control pattern





Right control lever

■ Lever to the left: Fill the bucket (closing).

NOTE!

Market dependent optional equipment. North America only. Control pattern selector switch, see below.

Control pattern selector switch (ISO/STD) (optional equipment)

A WARNING

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.

NOTE!

Market dependent optional equipment. North America only. Control pattern selector switch, see below.

The selector switch is located on the left hand side of the machine. You have access from underneath the counterweight.

- Loosen the wing bolt, until the switch can be moved.
- Position A: ISO control pattern.
- Position **B**, switch in driving direction: STD control pattern.
- Close the wing bolt.

7. Push button for X1 max flow

Actuation of the switch executes the function of the first auxiliary with maximum hydraulic flow.



8. Proportional roll switch or two buttons to control X1 or boom offset hydraulic flow

- Roller in central position (neutral)/no button pressed: No oil flow
- Roller to the left (A)/left button pressed: Increases/turns on the oil flow for the function of optional equipment or boom offset to the desired direction. For example thumb opens or offset boom to the left.
- Roller to the right (B)/right button pressed: Increases/turns on the oil flow for the function of optional equipment or boom offset to the desired direction. For example thumb closes or offset boom to the right.
- Roller to the left (A) in X1 mode: accessory flow through pipe on left side of boom
- Roller to the right (B) in X1 mode: accessory flow through pipe on right side of boom

NOTE!

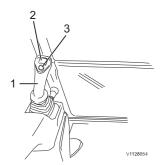
While turning ON the ignition switch or lowering the arm rest, a neutral detection is performed for the roller switch on the right control lever. The offset control lamp blinks when the roller is not in its neutral position and the proportional function (X1 or boom offset) is disabled.

The function becomes active (operational) once the roller comes back to its neutral position.

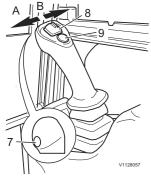
Hydraulic oil flow, changing maximum setting for X1 and X3 (optional equipment, only if machine is equipped with proportional roll switch)

There is a possibility to set the maximum hydraulic oil flow used for the first auxiliary (X1) and for X3.

Select the boom offset mode. The control lamp in the instrument panel lights up when the offset boom is activated.







Right control lever

NOTICE

Boom offset must be selected before changing the maximum hydraulic oil flow setting. If attachment movement is selected this can result in an unexpected movement of the optional equipment.

- 2 First press the button for X1 max flow (7) and then at the same time press selector switch (9) on the right control lever. Keep both switches depressed for 5 seconds until the boom offset control lamp is flashing in the instrument panel. As long as the control lamp flashes the attachment movement is activated and changing the maximum hydraulic oil flow setting is possible.
- 3 To change the setting for the X1: Move the proportional roller (8) on the right control lever to the left or right until the wanted maximum hydraulic oil flow is reached. Keep the proportional roller in this position and press the button for X1 max flow (7) to confirm. The maximum flow will be saved for left and right direction together.
- 4 To change the setting for the X3: Move the proportional roller (2) on the left control lever to the left or right until the wanted maximum hydraulic oil flow is reached. Keep the proportional roller in this position and press the button for X1 max flow (7) on the right control lever to confirm.
 - The maximum flow will be saved for left and right direction together.
- 5 Make sure that the control lamp for boom offset on the information panel has stopped flashing.

Exit without saving a new value:

- 1 Shift the control lockout lever upwards.
- 2 Turn the ignition key to off position.
- 3 Control lamp flashes more than 15 minutes.

NOTE!

It's also possible to exit calibration mode with proportional roller in neutral position and pressing the button for X1 max flow (7)!

9. Offset boom or X1 selection

 When actuating this switch (9), function of the proportional roller on the right hand lever changes between offset boom and attachment movement.

The switching mode can operate only if the roller is in neutral position.

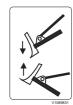
NOTE!

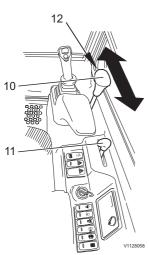
The control lamp in the instrument panel lights up when operation with the offset boom is activated.

10. Dozer blade control lever

The control lever controls the position of the dozer blade.

- Lever forward: Dozer blade down.
- Lever backward: Dozer blade up.





11. Throttle lever

- Pull the lever back to raise the engine speed.
- Push the lever fully forward before shutting down the engine.

12. Button to activate fast travel speed gear

■ Hold button depressed: Fast speed is activated.

■ Button released: Fast speed is deactivated.

NOTE!

Fast speed is automatically disabled when the button is released. The switch for fast speed in the right instrument panel does not have to be activated.

ROPS

ROPS Cab (Roll Over Protective Structure)

Valid for serial numbers			
	Model version	Serial number start	Serial number stop
	ECR25D	Belley 25001	Belley 29999

The cab is designed to ensure minimum crash protection space according to the standard currently being developed by the International Standard Organization.

NOTE!

Do not jump out of cab if the machine should roll over. Stay in seat wearing seat belt.

Protection from falling or scattering materials (optional equipment)

OPG Level 1

The cab is made from toughened glass. This allows the cab to be certified Operator Protective Guards level 1 (OPG1) when the front windscreens are in place and locked down.

Toughened glass will protect the operator from debris projection for example during breaker operations.

The top of the canopy is approved as a protective structure according to the OPG (Operator Protective Guard) Level 1. OPG 1 front is available as option on canopy.

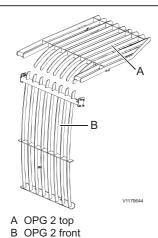
OPG Level 2

To comply with OPG (Operator Protective Guards) Level 2, machines must be equipped with:

- An additional top protective structure made of solid steel plates. This guard will protect the operator from an object of 227Kg (500lb) falling from 5.2 meter (17 ft) above the cab.
- An additional front protective structure made of solid steel plates. This guard must absorb 5800 J energy to protect the operator from large objects approaching from the front.



OPG 1 front for canopy



By installing OPG 2 top (A) and front (B), cab and canopy are approved according to OPG Level 2.

Install the necessary protection guards in accordance with work site conditions and local government recommendations. Consult your local Volvo Construction Equipment dealer.

In working conditions where falling or scattering materials are capable of entering the cab, for example in mining applications and when operating with a hammer (hydraulic breaker), protective roof and window guards should be installed.

If you have a canopy version of the machine, a hammer (hydraulic breaker) protection kit is also available. Consult your local Volvo Construction Equipment dealer for information about when the different options can be used.

NOTICE

Always, check clearance between bucket and Cab/ OPG guard. Slowly cycle bucket to check for interference with the Cab/OPG guard. Pay close attention when quick couplers are used and/or when buckets have lifting eyes welded.

Operator comfort

Operator seat

A correctly adjusted operator's seat is an essential contribution to operator comfort and safety!

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.

Operator's seat, adjusting



Risk of serious accidents.

Sudden movement of operator's seat could cause loss of machine control. This could result in accidents with serious injuries.

Always stop the machine before adjusting the operator's seat.



Risk of serious injury.

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

Always lock the control lock out lever before adjusting the seat.



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

Operator's seat, option variant A

Horizontal adjustment

- 1 Pull lever (1) slightly up.
- 2 Adjust the seat to the desired position.
- 3 Check that the seat has properly engaged.

Backrest adjustment

- 1 Pull lever (2) slightly up.
- 2 Adjust the inclination of the backrest.

NOTE!

Adjusting the backrest automatically changes the horizontal adjustment of the seat!

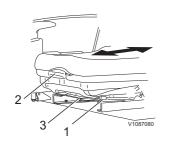
Weight adjustment

Resetting to zero:

Pull lever (3) fully back to reset the weight adjustment to the minimum weight.

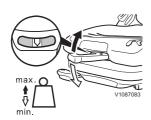
Adjustment depending on the weight of the operator:

Pull lever (3), until the desired weight is displayed.









Operator's seat, option variant B

Horizontal adjustment

- 1 Pull lever (1) slightly up.
- 2 Adjust the seat to the desired position.
- 3 Check that the seat has properly engaged.

Backrest adjustment

Turn the knob (2) to the desired setting.

Weight adjustment

Pull lever (3) upwards or downwards until the desired weight adjustment is reached.

Operator's seat, option variant C

Horizontal adjustment

- 1 Pull lever (4) slightly up.
- 2 Adjust the seat to the desired position.
- 3 Check that the seat has properly engaged.

Backrest adjustment

- 1 Pull up lever (6).
- 2 Adjust the inclination of the backrest. Release the lever to lock the backrest.
- 3 Check that the backrest has properly engaged.

Weight adjustment

The weight is adjusted with the operator sitting in the seat.

- 1 Pull lever (5) fully out, stay in this position and move lever upwards or downwards until the desired weight adjustment is reached. When the minimum/maximum has been reached you can notice an empty movement in the lever.
- 2 The weight has been set correctly when the arrow is in the middle of the viewing window.
- 3 Lock the lever again.









By turning the adjustment knob (7) the curvature in the upper and lower part of the backrest is adjusted.

- A Maximum curvature on the upper part of the backrest
- B No curvature
- C Maximum curvature on the lower part of the backrest

Seat belt

NOTE!

A seat belt that is damaged or has been stretched in an accident must be replaced immediately.

NOTICE

Due to soiling by water and dirt the seat belt must be replaced every 3 years!

- Modifications to the belt or its mountings are not permitted.
- The belt is intended for one adult person only.
- Change the belt every three year regardless of its condition.

When the seat belt needs to be washed:

- Use a mild soap solution.
- Allow the belt to dry while it is fully pulled out, before retracting it.
- Make sure the belt is fitted in a correct way.

Power socket

The power socket is used for electrical devices such as a mobile phone charger or to supply electricity to a lamp. (Voltage: 12 V, Amperage: 5 A, Power: 60 W).

The power socket is placed on the left hand side of the operator's seat.

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999





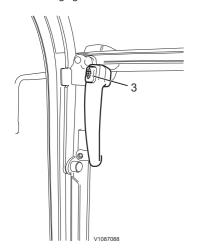
1 Heater

Heater

The heater (1) is located inside the cab on the right side.



- 1 Windscreen
- 2 Working lights



Windows

Upper windscreen

Loosen windscreen (1):

- 1 Push the buttons (3) on both sides.
- 2 Then push the windscreen upward under the cab roof.



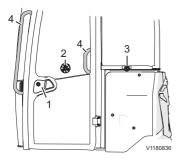
The windscreen is fastened in the roof when you hear a click.

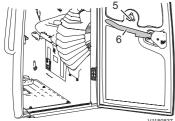
Close windscreen:

- 1 Push the buttons (3) on both sides.
- 2 Push the windows down into position.

Working lights

Working lights (2) are used to illuminate the working area under insufficient light conditions. The working lights are mounted at the front (standard) and rear (optional equipment) of the cab.





Door

Valid for serial numbers			
	Model version	Serial number start	Serial number stop
	ECR25D	Belley 25001	Belley 29999



Risk of falling.

Careless mounting and dismounting of the machine could result in falling and injury.

Always use the three-point approach to access or leave the machine by using two hands and one foot or one hand and both feet. Use stepping surfaces and handholds. Always face the machine when entering or stepping down from the machine. Do not jump off!

- The cab door is fitted with an external door handle with a lock (1) and an internal door handle (6).
- The door can be locked in open position by application of manual force (a fixed locking bolt (3) on the cab engages in the round bolt receptacle (2) in the door).
- By pressing the unlocking button (5) the cab door can be unlocked and closed.
- Make sure that the cab is parallel to tracks when entering the machine. That allows best possible access situation.

Operator's manual, storage

The operator's manual is stored in the lockable storage box under the operator seat. Keep the manual in the storage box so that it is always at hand.

Fire extinguisher, location

Possible location for a fire extinguisher is, if you have a canopy, behind the seat against the rear plate and, if you have a cab, along the right hand rear pillar.



Emergency exit

The alternative exit path is through the rear window (its location is marked with the information decal shown to the left). In case of a turnover or accident, if the door is blocked, use the emergency hammer, located on the rear pillar on the left hand side of the machine, to brake the window and leave the cab.

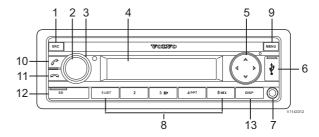
Audio system

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

(optional equipment)

The audio system (optional equipment) is located below the cab roof on the right hand side of the machine.

Radio with USB, SD and Bluetooth



1	SCR button	8	Preset 1–5
2	ON/OFF button	9	MENU button
3	Volume control	10	Green phone button
4	Display	11	Red phone button
5	SEARCH/ CHANGE/SELECT button	12	SD card slot
6	USB socket	13	DISP button
7	Front AUX-IN socket		

1 SCR button

Select memory bank or audio source. Short press: Select RADIO, BT STREAM, USB FRONT, USB REAR, SD, AUX FRONT or AUX REAR source. Long press: Activate Travel-Store function in radio mode.

2 ON/OFF button

Short press: Switch on sound system. In operation: Mute sound system. Long press: Switch off sound system.

3 Volume control

Adjust the volume

In the menu: Change the settings.

Fast-Browse mode: Select folder and track.

4 Display

5 SEARCH/CHANGE/SELECT button UP/DOWN

In the menu: Select menu item. Radio mode: Start seek tuning.

MP3/WMA/iPod mode: Change to next or

previous folder.

LEFT/RIGHT

In the menu: Change menu level.
Radio mode: Adjust the stations.
Other operating modes: Select a track.

6 USB socket

7 Front AUX-IN socket

8 Preset 1-5

Short press: Call up the stored station in radio mode.

Long press: Store station in the current memory bank in radio mode.

9 MENU button

Short press: Open and close the menu. Long press: Start the scan function.

10 Green phone button

Short press: Answering a call, special dial Long press: Activate voice dialing

11 Red phone button

Ending, rejecting a phone call

12 SD card slot

13 DISP button

Switch display

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

Valid for serial nu		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999



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.

In order for you to have the best possible visibility when travelling with the machine, sit in the seat and place the boom as in the picture. The distance between bucket and ground (A) should be 400 mm (15.7 in).

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



V1077562

The distance between bucket and ground (A) should be 400 mm for best visibility when travelling.

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 127.
- 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.

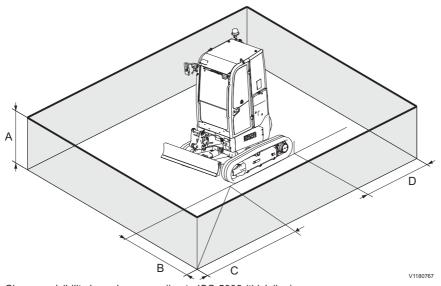
Conforming to the standard is a requirement in EUcountries and provides for improved visibility around the machine.

Mirror setting

Mirrors, adjusting

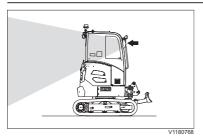
ISO 5006 states that an imaginary boundary line around the machine must be visible to the operator.

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

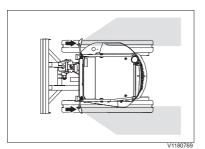


Close-up visibility boundary according to ISO 5006 (thick line)

- A 1.0 m (39.4 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 (left mirror optional)



Machine's top view (left mirror optional)

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.

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.
- 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

Follow the safety rules in the Operator's Manual before performing any operation.

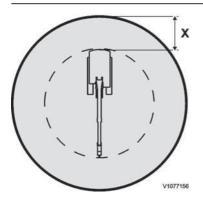
Operator obligations



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.
- Operate the machine in such a way that the risk of accidents is minimized for both operator and persons present at the work site.
- You must be thoroughly familiar with how to operate and maintain the machine and should complete adequate training on the machine.
- You must follow the Operator's Manual rules and recommendations, but also pay attention to any statutory and national regulations or specific requirements or risks which apply at the work site.
- You must be well-rested and must never operate the machine when under the influence of alcohol, medicine or other drugs.
- You are responsible for any load carried by the machine 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 on machine inclination, machine speed when load raised high and quick steering, and the influence of different attachments.
- You must check that the mirrors are in good condition, clean, and properly adjusted for good visibility before operating the machine.



- You must be in control of the working area of the machine.
 - Prevent persons from walking or standing under raised excavating equipment, unless it has been made safe or supported.
 - Prevent persons from entering or remaining in the danger area, that is a distance of at least 7 m (23 ft) in all directions from operating machines. Danger area could varies depending on work task and/or attachments used. The operator may allow a person to remain in the danger area, but should then observe caution and operate the machine only when the person is visible or has given clear indications of where he or she is.
 - Prevent persons from being in the cab of a vehicle which is placed so that there is 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 protected to withstand the impact of such external forces.
 - Make sure you know the weight limitation of working ground.

You may only take an instructor on board, if there is an approved place for the same.



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



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.
- Always sit in the operator seat with the seat belt fastened when starting the engine/machine and when operating controls, e.g. levers and switches.
- Check that the seat belt is not worn, see page 54
- The machine must be operational, i.e. faults which can cause accidents must be rectified.
- Suitable clothing for safe handling and a hard hat should be worn.
- Keep your hands away from areas where there is a risk of crushing, e.g. covers, door and window.
- Use steps and handholds when entering or leaving the machine. Use the three-point grip, i.e. two hands and one foot or two feet and one hand. Always face the machine do not jump!
- 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.
- The cab is designed to meet the requirements for falling objects, the weight of which agrees with testing methods according to ROPS-standard (Roll Over Protective Structure), OPGstandard

(Operator Protective Structure) and TOPS (Tip-Over Protective Structure), see page 10.

- During electrical storms, do not enter or exit the machine.
 - If you are off the machine, stay well away from the machine until the electrical storm passes.
 - If you are in the cab, remain seated with the machine stationary until the electrical storm passes. Do not touch controls or anything metal.
- Always wear approved respirator for the materials being used.
- When travelling on, for example, very rough and uneven ground, the operator may be thrown about and contact with the windshield is possible. Reduce this potential hazard by travelling at low speed and be extra careful under these conditions. Also wear a hard hat.

Stability when working

The stability of the machine is subjected to considerable changes. The operator himself must observe all special regulations applicable to every operation in order to obtain full working safety.



Risk of machine damage! Improper use could cause serious machine damage.

Never anchor or fix the undercarriage to the ground or any object when digging or lifting.

NOTE!

A pre requisite for good stability is that the machine is parked on level ground of sufficient load bearing capacity. Care should be taken if the ground is soft and uneven, sloped, in danger of collapsing, side stress and other dangerous situations.

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.
- Use lights, hazard flashers and rotating warning beacon according to national traffic regulations.

Periodic replacement of critical parts for safety

To ensure safety at all times when operating or driving the machine, periodic maintenance must always be carried out. To further improve safety, 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 changes as time passes, or they easily wear or deteriorate. However, it is difficult to judge the condition of the parts simply by periodic maintenance, so they should always be replaced after a fixed time has passed, regardless of their condition. It is necessary to ensure that they always maintain their function completely.

However, if these parts show any abnormality before the replacement 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 trained personnel at a workshop.

Inspection interval	Item
Daily	Fuel / hydraulic hose - leakage of connections and end fittings
Monthly	Fuel / hydraulic hose - leakage, damage of connections and end fittings
Yearly	Fuel / hydraulic hose - leakage, damage, deformity and aging of connections and end fittings

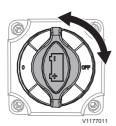
Safety critical parts for	Replacement interval	
Engine	Fuel hoses and clamps	Check every 250 hours,
Lingine	Air intake line	replace if required
Cab / Canopy	Seat belt	Every 3 years



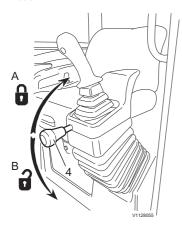
Measures before operating

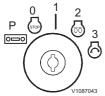
For safety, observe the following rules.

- Read the Operator's manual.
- Carry out daily service, see page Lubrication and service chart. 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).



Battery disconnect switch under the rear hood





- P: Radio and cab interior light
- 0: Engine off
- 1: Running position / Ignition
- 2: Preheating
- 3: Start the engine

Starting engine

Valid for serial numbers			
Model version	Serial number start	Serial number stop	
ECR25D	Belley 25001	Belley 29999	

- 1 Turn on the electric supply with the battery disconnect switch (see position under rear hood on page *145*).
- 2 Shift control lockout lever (4) to position (A). You are now able to start the engine and the operating levers for working and travel hydraulics are locked (no movement possible).

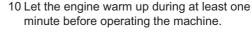
NOTE!

The control lockout lever must be fully in the upper end position to secure that the hydraulic is locked.

- 3 Insert the ignition key into the ignition switch and turn it to running position (position 1). All control and function lamps (except preheating lamp) light up for a period of approx. 3 seconds.
- 4 The control lamps engine oil pressure and battery charge control must light up.
- 5 Adjust the throttle lever to the minimum engine speed.
- 6 Turn the key to preheating (position 2).
- 7 Preheat depending on engine temperature. At colder temperatures longer preheating is needed. The preheating control light goes out after 5 seconds. However, if the ignition key remains in preheating position, the preheating function remains active, even though the control lamp is off.
- 8 Once the preheating control lamp has gone out turn the ignition key to position start the engine (position 3) and start the engine. As soon as the engine starts, release the ignition key. Do not continue to start for longer than 25 seconds without interruption.
- 9 If the engine does not start turn the ignition key back to engine off position and repeat the starting procedure.

NOTE!

Turn the key off before re-starting the engine to prevent starter damages.



11 Shift control lockout lever to horizontal position to be able to operate the machine.

Avoid excessive loading of the engine immediately after starting. Observe the warm-up instructions.

Warm-up instructions

- 1 Start the engine.
- 2 After a longer period of standstill and particularly at temperatures around or below the freezing point the engine must be warmed up at medium speed.
- 3 Run the engine warm for about 5–10 minutes at approx. 1/2 engine speed. During this period frequently operate the levers for the working hydraulics, whenever possible.

NOTICE

Do not turn off the battery disconnect switch when the engine is running. The electrical system may be damaged.

NOTE!

Turn the key off before re-starting the engine to prevent starter damages.



Control lamp for preheating





These control lamps must light up when you turn the ignition key to position 1.

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

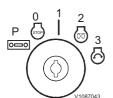


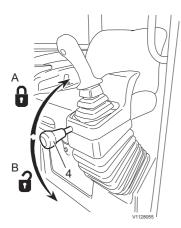
Do not turn the ignition key while the engine is running, as this will generate a surge voltage that may damage the electrical system.

- 1 Start the engine.
- 2 After a longer period of standstill and particularly at temperatures around or below the freezing point the excavator must be warmed up by running the engine at medium speed.
- 3 Run the excavator warm for about 5 to 10 minutes at approx. 50% engine speed. During this period frequently operate the levers for the working hydraulics, whenever possible.

Stopping

Valid for serial numbers			
Model version	Serial number start	Serial number stop	
ECR25D	Belley 25001	Belley 29999	







Battery disconnect switch under rear hood.

A WARNING

Risk of crushing.

A raised attachment could fall and cause crushing injury.

Before leaving the cab, always lower all attachments to the ground and lock the control functions.

- 1 If possible park the machine on solid and level ground and lower the attachment and dozer blade to the ground.
- 2 Make sure that the cab is parallel to tracks, that allows best possible leaving situation.
- 3 Reduce the engine speed: Set the throttle lever to idle speed position.

NOTE!

Do not shut the engine down all of a sudden from full load, but let it idle for a short while for temperature equalization.

- 4 To shut the engine down turn the ignition key to "Stop engine" (position 0). The control levers for working and travel hydraulics are locked (no movement possible).
- 5 All control lamps go out.
- 6 Check whether all switches and controls are switched off or deactivated.
- 7 Remove the ignition key to prevent unauthorised use of machine.
- 8 Interrupt the electric supply with the battery disconnect switch.

NOTE!

If you want to stop all movements of the machine quickly, without turning the ignition key, shift the control lockout lever to position (A).

After operation

■ The fuel tank should not be left dry. This prevents the formation of condensation water.

Parking

Valid for serial numbers			
Model version Serial number start		Serial number stop	
ECR25D	Belley 25001	Belley 29999	



Risk of crushing.

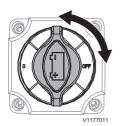
A raised attachment could fall and cause crushing injury.

Before leaving the cab, always lower all attachments to the ground and lock the control functions.

- 1 Park the machine on firm, horizontal ground.
- 2 Open the bucket totally and lower it to the ground. Lower the dozer blade to the ground. If this is not possible, use the bucket and dozer blade to secure the machine to a fixed object.
- 3 Check that all switches and controls are in off position or in neutral.
- 4 Turn off the engine and pull out the ignition key.
- 5 Check that there is enough anti-freezing solution in the cooling system (see page 103) and in the windscreen washer reservoir if the temperature can fall below -20 °C (-4 °F) during parking.
- 6 Close and lock windows, door and covers.
- 7 Disconnect the battery by turning the battery disconnect switch to position OFF.

Keep in mind that the theft and burglary risk can be minimised by:

- removing the starter key when the machine is left unattended
- locking doors and covers after working hours
- turning off the current with the battery disconnect switch and locking the rear hood
- parking the machine where the risk of theft, burglary and damage is minimised
- removing all valuables from the cab such as cellular phone, computer, radio and bags
- chaining the machine.



Battery disconnect switch under rear hood

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.

Long-term parking



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

- 1 Carry out the measures as described on previous page. Remember that the ground on which the machine is to stand may shift depending on the weather. Therefore take suitable action.
- 2 The temperature must not fall below -40 °C (-40 °F) or exceed +70 °C (158 °F).
- 3 Check that the batteries are fully charged.
- 4 Wash the machine and touch up any damaged paint finish to avoid rusting.
- 5 Rust-proof exposed components, lubricate the machine thoroughly and grease all unpainted surfaces like cylinder rods etc.
- 6 Fill the fuel tank and the hydraulic oil tank to the max. marks.
- 7 Cover the exhaust pipe (for outdoors parking).
- 8 Drain water from any compressed-air reservoirs.
- 9 Make sure the freezing point of the coolant is sufficiently low (in cold weather).
- 10 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.

Check after long-term parking

- All oil and fluid levels
- Tension of all belts
- Air cleaner unit



Long-term parking position

■ Track tension

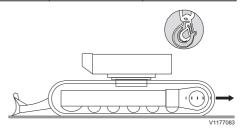
NOTE!

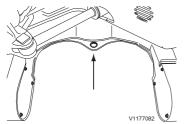
If a preservative has been used on the machine to prepare it for long term storage, follow the manufacturer's instructions for any necessary safety precautions and the method of removal.

Retrieving and towing

Towing

	Valid for serial numbers			
	Model version	Serial number start	Serial number stop	
ECR25D		Belley 25001	Belley 29999	





The towing eye is located on the lower frame

In case the machine needs to be retrieved, either for safety reasons, or under certain operational conditions, the machine can be towed by using the towing eye located on the lower frame. Before towing ensure that the towing linkage is properly connected, adequate for the purposes.

NOTE!

Use a steel chain of suitable strength to tow the machine. The machine should be towed at low speed and keep the towing distance as short as possible (the crawler tracks do not move).

The 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.

Towing force: 2350 daN MAX

Attachments, alternative lowering



Risk of crushing.

Incorrect function of the line rupture valves may cause uncontrolled lowering of the attachment. Do not enter under the attachment when working with the alternative lowering function.



Risk of crushing.

A raised lift arm can drop down. This can result in serious injuries. Lower the lift arm to the ground before performing any service or adjustment.

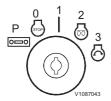
Even in technical incidents the attachment can be lowered to the ground.

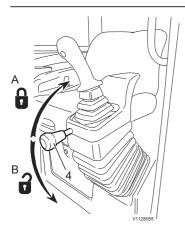
Lowering attachment using accumulator pressure

In case of standstill or engine defect.

If the electric power circuit is available and the accumulator is pressurised, it is possible to lower the attachment with the control levers.

1 Insert the ignition key into the ignition switch and turn it to running position (position 1).





- 2 Shift control lockout lever (4) to position (B). The control levers for working and travel hydraulics are unlocked (movement possible).
- 3 The control levers (1) and (6) (see page 40) can be used to lower the attachment.

NOTE!

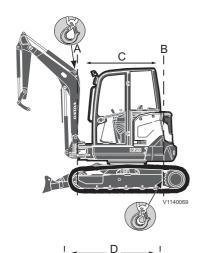
If lowering of the attachment is not possible because the accumulator is depressurized, restart the engine to pressurize the accumulator.

Relieving residual pressure from the accumulator

- 1 Turn the ignition key to running position (1).
- 2 Move the control lockout lever down to unlock the system.
- 3 Shift the rollers on the joysticks to the right and to the left.
- 4 Then move the joysticks in all directions a couple of times to release all residual pressure.

NOTE!

Before lifting the control lockout lever to position A, lower the attachment to the ground.



Transporting machine

When transporting the machine pay attention to applicable regulations regarding weight, width, height, length and securing the load. Make sure that the ramp is of ample width, stability, thickness and length. Remove sludge, grease, oil etc. from ramp and trailer in order to avoid slipping of the machine Block both crawler tracks after loading and lash the machine down with chains and belts of sufficient capacity for the respective load.

Lifting machine

Valid for serial nu		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999



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.

NOTE!

Only use lifting points intended for lifting.

Make sure that the machine is in the same position as shown in the illustration. Use the specified lifting points to lift the machine. Two lifting points on the lower frame (one on each side) and one lifting point on the boom. The illustration shows the location of the lifting points.

- 1 Park the machine on ground as solid and level as possible.
- 2 Remove any attachments.
- 3 Position dipper arm, boom and blade as shown in the illustration.
- 4 Close and lock windows, doors and hoods securely.
- 5 Shut off the engine and put the control lockout lever fully in the upper end position.
- 6 Make sure that nobody is in the machine while lifting.

7 Use suitable lifting equipment to lift the machine. Make sure that the lifting chains are strong enough for the weight of the machine. For machine weight, see page 196.

NOTE!

Volvo is not responsible neither for lifting equipment nor for lifting techniques.

8 The distance (C) between axis (A) and (B) at the lifting points on the boom/undercarriage and distance (D) must be observed when lifting.

	С	D
EC27D	915 mm (36.02 in)	1550 mm
ECR25D	1295 mm (50.98 in)	(61.02 in)

9 Maintain good visibility of the machine at all times during the lift.



The lifting equipment attached to the lower frame must be vertical when lifting to prevent any damage to the machine.

Valid for serial numbers			
Model version Serial number :		Serial number stop	
ECR25D Belley 25001		Belley 29999	

Loading machine on truck or trailer



Risk of fatal accidents.

Unexpected driving direction could lead to accidents resulting in serious injury or death.

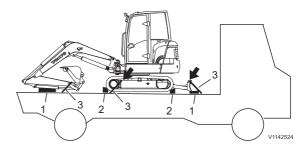
Always check the driving direction before moving the machine.

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.

If the machine is too high to fit in the transporting vehicle it is possible to tilt the rotating warning beacon (optional equipment). This will reduce the total height of the machine.

Tying down machine



Tying down on truck (example)



Tying down on small trailer (3.5 t) (Use anti-slide mat for steel tracks) A: Driving direction

1 Drive the machine onto the truck or small trailer (3.5 t).

NOTE!

To avoid tilting, the boom must be in direction towards the ramp.

NOTE!

Never operate any lever other than the travel levers (pedals) while the machine is on the loading ramp.

- 2 Align the machine's tracks to the ramp. On a trailer, the dozer blade must be facing the back of the trailer.
- 3 Park the machine on the truck or trailer.
- 4 According on situation (tie-down points etc.) you can rotate the swinging superstructure by 180°. On a small trailer the direction as shown in illustration above (according driving direction A) is mandatory.

5 Put a suitable wooden block (1) under the attachment and the dozer blade.

NOTE!

When machine shall be loaded on a small trailer and is equipped with steel tracks, an anti-slide mat with the indicated friction coefficient has to be used. No blocks (1) or wheel chocks (2) need to be used then.

- 6 Place the attachment and the dozer blade on the wooden blocks (1) as shown on the illustration.
- 7 Stop the machine and remove the ignition key.
- 8 Switch off the battery disconnect switch.
- 9 Lock the cab door and all lockable covers.
- 10 Secure both tracks with wheel chocks (2).
- 11 Tie the machine with chains and belts (3) with the cross tie down procedure (see following instructions) to the loading platform of the truck/ trailer. Use the indicated angles and tie down forces!

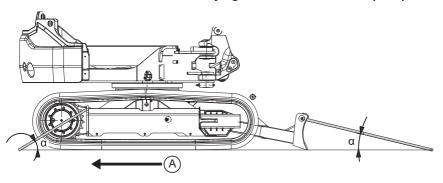
Cross tie down procedure

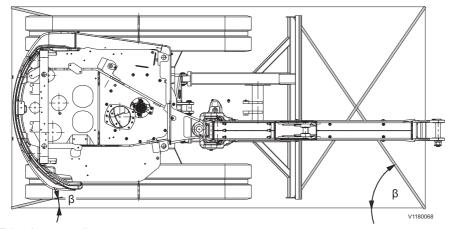
- 1 Fix the chains and belts to the tie down points of machine and truck/trailer as shown in illustrations.
- 2 Tight the chains and belts in a loose way first.
- 3 Then tight the chains and belts solidly one after the other obliquely opposite.

NOTE!

During transportation the fixture has to be rechecked and probably tight again.

Tying down on small trailer (3.5 t)

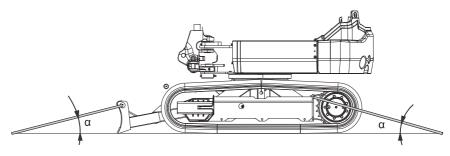


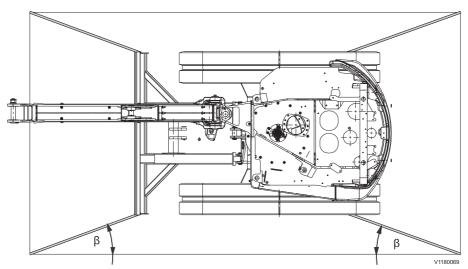


Tying down on trailer
A: Driving direction of trailer

Tying-down on small trailer (3.5t)				
		steel tracks	rubber tracks	
Tie-down angles	α	0°-70°	5°–90°	
ne-down angles	β	0°-45°	20°-70°	
Anti-slide mat	•	mandatory (µ= 0.6)	optional	
Mechanical stops (blocks and chocks) optional manda Tie-down forces Refer to max. tie-down forces of fixing points of the company of		optional	mandatory	
		fixing points of trailer.		

Tying down on truck





Tying down on truck

Tying-down on truck			
		steel tracks	rubber tracks
Tie-down angles	α	0°–80°	10°–90°
rie-down angles	β	15°–75°	5°–85°
Mechanical stops (blocks and chocks)		mandatory	
Tie-down forces Refer		to max. tie-down forces of fixing points of truck.	

Unloading

- 1 Remove the chains, belts and wheel chocks.
- 2 Raise excavating equipment and dozer blade.
- 3 Remove the wooden blocks below the attachment and the dozer blade.

- 4 Slowly drive to the beginning of the ramp, lift the excavating equipment position and drive forwards until the machine tips on to the ramp.
- 5 Drive down slowly until the machine reaches level ground.

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.

Eco driving

Operating in an environmental friendly way will reduce fuel consumption and emissions and can also lower wear on the machine.

Always try to:

■ Stay in the most economical area Reduce rpm's in order to stay in the most economical area.

■ Do not idle unnecessarily A machine turned off does not consume any fuel.

■ Plan your work site

Take care of your work area and plan its layout with regard to the machines that will work there. Your work will be much more productive and organized. Keep the ground even and free from larger stones or other objects that form obstacles.

■ Cooperate

Consult with other operators so that machines and trucks work together in the most effective way.

■ Use the right equipment

The right equipped machine saves on fuel and maintenance. See the operating techniques chapter for further information about equipment.

Contact your local Volvo Construction Equipment dealer for further information and the possibility to attend a Volvo training for fuel efficient machine operating.

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 *192*.

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 tension.
 - Brake and steering systems.
 - 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.
- 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, see page 65.

- 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.
- Look after your workmates! Make sure that they take care. No persons, apart from the operator, may, unnecessarily, 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 control levers, the operator must assure him or her self of that the anticipated movements are obtained when actuating control levers. An unexpected movement may entail risk of an accident.

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.

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.

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.

NOTICE

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

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 127. 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

Valid for serial numbers			
Model version	Serial number start	Serial number stop	
ECR25D	Belley 25001	Belley 29999	



Risk of tipping over.

When working on uneven slopes and ground the machine can tip over.

Make sure the maximum machine inclination is not exceeded and that the inclination angle is not increased by an obstacle.



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.

	In any machine position the maximum machine inclination should not be more than ^(a)	Manageable gradients ^(b) (engine lubrication)	Manageable gradients ^(c) (engine lubrication)
EC27D	α = 22.5° (41.4 %)	α = 20°	α = 30°
ECR25D	α = 16.5° (30 %)	(36 %)	(58 %)





- a) (α = 50% of tipping limit)
- b) manageable gradient continually
- c) manageable gradient for maximum 10 minutes
 - 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 arm at 90 110°, raise the bucket 20 30 cm (7.9–11.8 in) from the ground
 - If the engine shuts down on a slope, lower the attachment to the ground. Do not operate the swing function since the superstructure may swing under its own weight and cause tipping or side slipping.
 - Do not park the machine on a slope and leave it unattended.

Working in water and on boggy ground

When wading with the machine across a water course, use the bucket as a "feeler" if the water is muddy. The water course may have hidden obstacles under the surface or the depth may change suddenly, endangering the operator and the machine. While wading, stop the machine now and then and swing the bucket sideways just above the bottom. This operation reveals stones or other obstacles. Prod the bottom with the bucket to measure the depth in order to discover any dangerous hollows.

After working in water, the lubrication points on the undercarriage, which have been under water, must be lubricated, so that the water is driven out. Check also that no water has entered the travel gearbox.



Risk of machine damage.

When operating the machine in water, the water can damage the machine parts.

When operating in water, do not exceed the maximum permissible water depth.

NOTE!

The water must not reach higher than the middle of the upper roller.

Heavy timber mats can be used to support the machine when working on boggy ground. The mats should be kept as flat and clean as possible.

Working where there is risk of landslip

Always check ground conditions before beginning to work. If the ground is soft, great care must be taken when positioning the machine. Thawing of frozen ground, rain, traffic, piling and blasting are factors which increase the risk of landslip. The risk also increases on sloping ground. If it is not possible to dig with sufficiently slanting trench sides, they must be shored up.

- Do not place excavated material too close to the edge as its weight may cause a landslip. Loose clay should be placed at least 5 m (16 ft) away from the edge.
- Do not dig under the machine.
- Do not operate too close to the edge of a steep slope or road bank. Take care when working in a place where the machine may tip.
- Take care when working on river banks or in other similar places where the ground is soft. There is a risk that the machine, because of its own weight and own vibrations, may sink and this could lead to accidents.
- Keep in mind that the ground conditions may have changed after heavy rain. Therefore, be careful when restarting work. This is particularly important when working near the edge of ditches, road verges or similar, as the ground may easily give way after it has been raining.

Working in cold weather



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.

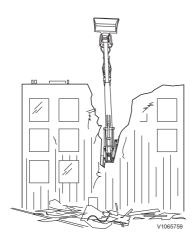
The hydraulic system could respond slowly at low temperatures and could cause unexpected machine movements.

Operate carefully until the hydraulic system has reached operating temperature.

Read the advice for starting, see page 71. 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.



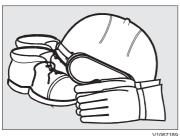
Demolition work

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.

NOTE!

For hydraulically controlled attachments: Release the hydraulic pressure in the system before removing or connecting hydraulic hoses for hydraulically controlled attachments. See page 111 for the procedure to release the hydraulic system 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.

NOTE!

Any persons involved in the process of changing attachments must be familiar with the operation of the machine and should know the signalling pattern.

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 in a hydraulically controlled bracket which allows rapid changes of attachments.

Always follow Volvo Construction Equipment recommendations when choosing attachments. If other attachments are used, follow the operator's manuals from the respective supplier.

EU Machine Safety Directive is stated on the product plate of the machine by the way of a CE marking. Therefore, this marking also covers attachments which are designed and marked by

Volvo Construction Equipment, as they are an integrated part of the machine and adapted to the machine. Volvo Construction Equipment is not responsible for attachments manufactured by other companies. Such attachments must be CE marked and accompanied by a Declaration of Conformity and user instructions.

It is the responsibility of the machine owner to make sure that the 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.

The machine is prepared for various different attachments, e.g. hammer (hydraulic breaker). In order to be able to connect these hydraulically to the machine, the pressure in the hydraulics must be released by moving the control levers in all directions.

NOTE!

Depending on the attachments the stability of the machine may vary.

The certification of each attachment and separate Operator's manual should be provided to the customers by the manufacturer of the attachment.

Attachments, connecting and disconnecting



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.



Risk of serious injury or death.

Worn or damaged machine parts can cause malfunction resulting in serious injury or death.

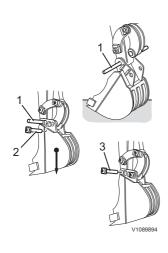
Check relevant machine parts regularly. If wear or damage occurs stop operating immediately and call for immediate corrective maintenance.

Installing a bucket with manual fastening

- 1 Position the excavating equipment to the bucket to be installed
- 2 Align bores in dipper arm and bucket.
- 3 Insert a Ø 20 mm (0.787 in) assembly rod into the bore.
- 4 Raise the excavating equipment and operate the bucket cylinder until the bores in bucket and toggle link are in line.
- 5 Insert locking bolt (2) and secure it with the split pin.
- 6 Remove assembly rod (1), insert locking bolt (3) and secure it with the split pin.

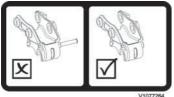
NOTE!

Disassembly of the bucket takes place in reverse order.





- 1 Front hook
- 2 Rotating hook
- 3 Locking pin
- 4 Linch pin



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Working with extracted locking pin is hazardous and not allowed. Always make sure that the locking pin is securely fastened.

Attachment brackets

Volvo Attachment bracket

NOTE!

For other types of attachment brackets please refer to the separate attachment bracket Operator Manuals.



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.

NOTICE

There is a risk of loss of stability and tip-over when the attachment bracket is in shovel position. The load is moved forward and may exceed the machine's lifting capacity.

NOTICE

The attachment bracket increases the total length of the dipper arm. Be careful when moving the bucket and dipper arm towards the machine, there is a risk of damaging the machine.

The attachment bracket is not designed as a lifting device. Do not use the front hook or the rotating hook for lifting. Only specially designed pin-on attachments may be hooked to the attachment bracket.

Mechanical attachment bracket, bucket installation

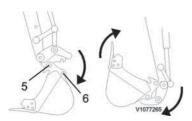


Risk of crushing.

An unsecured attachment could fall and cause serious injury or death.

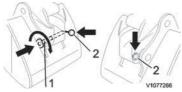
Always ensure the attachment is properly secured by pressing the front part of the attachment to the ground until the machine is slightly lifted.

Connecting bucket



Lower the attachment bracket towards the rear bucket pin and tilt the bucket rearwards

- 5 Front bucket pin
- 6 Rear bucket pin



Rotate the locking pin back 90°. Insert the locking pin. Insert the linch pin through the locking pin.

- 1 Locking pin
- 2 Linch pin



Extract the linch pin and the locking pin. Rotate the locking pin 90° to lock it in extracted position.

- 1 Remove the linch pin and extract the locking pin.
- 2 Rotate the locking pin 90° to lock it in extracted position.
- 3 Lower the dipper arm into a position where the attachment bracket connects with the front bucket pin.
- 4 Lower the attachment bracket towards the rear bucket pin. Tilt the bucket rearwards (bucket in) until the hook on the attachment bracket is in contact with the rear bucket pin.
- 5 Position the bucket 20 cm (8 in)above the ground.
- 6 Engage the bar in the bucket in the rotating hook and press it down to fully engage the rear bucket pin.
- 7 Lower the bucket to the ground.
- 8 Rotate the locking pin back 90°.
- 9 Insert the locking pin.
- 10 Insert the linch pin through the end of the locking pin.
- 11 Check that the bucket is securely fastened by simultaneously pressing the bucket to the ground and forward.

Disconnecting bucket

- 1 Lower the bucket to the ground.
- 2 Extract the linch pin and the locking pin.
- 3 Rotate the locking pin 90° to lock it in extracted position.
- 4 Position the bucket 10 cm (4 in) above the ground.



To release the attachment bracket, insert the release bar and pull.



Release the attachment bracket from the bucket.

5 Insert the release bar into the hole at the back of the attachment bracket.

6 Pull the release bar to release the attachment bracket from the rear bucket pin.



Risk of crushing.

The bucket is only attached in the front bucket pin. The bucket could fall and cause crushing injury.

Keep a safe distance.

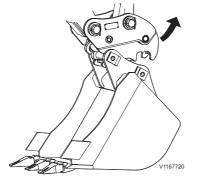
- 7 Place the bucket on the ground.
- 8 Lift the attachment bracket in direction from the bucket to release the front bucket pin.

Hydraulic attachment bracket

Volvo Hydraulic Quick Coupler (Universal Pin Grabber type)

(optional equipment)

Disconnecting a bucket or another attachment



Quick coupler, hook off



Risk of crushing!

Attachments that move unexpectedly can cause injuries.

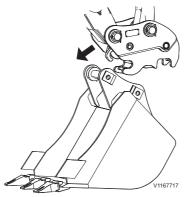
Make sure people stay out of the working area when connecting or disconnecting attachments.



Quick coupler, move

- 1 Place the machine on firm and level ground.
- 2 Lower the dozer blade and the boom to the ground.
- 3 Curl in the bucket completely towards the dipper arm (to release the locking mechanism).
- 4 Press the attachment quick coupler switch to open the attachment quick coupler (unlock position). See page 33 for operating of the attachment quick coupler switch. When the attachment quick coupler is being opened, a warning symbol appears on the display unit, the central warning lamp lights up and the buzzer sounds (unlock position).
- 5 Lower the bucket and curl out to lift up the attachment quick coupler from the bucket.
- 6 Place the bucket flat on the ground and unhook it.
- 7 Press the switch (lock position).

Connecting a bucket or another attachment



Quick coupler, moving to upper pin



Quick coupler, hook in

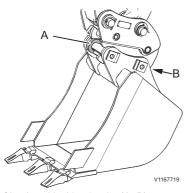


Risk of crushing.

Falling attachment could result in severe injury or death.

Make sure that the attachment, hydraulic hoses and connections are undamaged and securely fastened.

- 1 Place the machine on firm and level ground.
- 2 Lower the dozer blade and the boom to the ground.
- 3 Curl in the bucket completely towards the dipper arm (to release the locking mechanism).
- 4 Press the attachment quick coupler switch to open the attachment quick coupler (unlock position). See page 33 for operating of the attachment quick coupler switch. When the attachment quick coupler is being opened, a warning symbol appears on the display unit, the central warning lamp lights up and the buzzer sounds (unlock position).
- 5 Curl out the attachment quick coupler and hook it onto the bucket pin.



Check red locking hooks (A, B)



- 6 Slowly curl in the attachment quick coupler fully towards the bucket.
- 7 Press the switch (lock position) to lock the bucket in position.
- 8 Check, that both red locking hooks (A, B) are closed around the pins.

- 9 A message in the display unit will ask you if the attachment is locked to the attachment quick coupler. Check if both red locking hooks (A, B) are closed around the pins and press ESC to confirm.
- 10 Lift and curl in the bucket fully towards the dipper arm and hold it there for approximately 5 seconds to ensure the attachment quick coupler has fully locked on to the bucket.

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 not sure if the bucket is securely locked to the attachment quick coupler, get out and check the red latch has closed around the bucket pin.



Do not use the machine, if the attachment bracket is not working correctly.

NOTE!

If you use the Quick Coupler's lifting eye, read the chapter "Lifting objects" in the Operator's Manual before.

Pressure release

Before removing or connecting hydraulic hoses the pressure in the hydraulic system must be released.



Risk of high pressure injection.

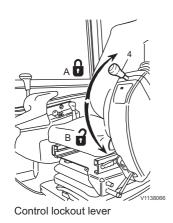
Residual pressure in the hydraulic system could lead to oil under high pressure jetting out and cause serious injury, even if the engine has not been running for some time.

Always release the pressure before any kind of service of the hydraulic system is carried out.

- 1 Place the machine on firm and level ground.
- 2 Lower the attachment and the blade to the ground.
- 3 Shut down the engine and turn the ignition key to running position/ignition.
- 4 Move the control lockout lever (4) down to unlock the system.
- 5 Shift the rollers on the joysticks a couple of times to the right and to the left.
- 6 Then move the joysticks and the driving levers in all directions a couple of times to release all residual pressure.
- 7 To release the pressure in the accessory line (X1) and boom offset: Select function and shift the rollers on the joysticks to the right and to the left in accessory line (X1) position and in boom offset position.

NOTE!

It must be strictly assured that the engine cannot be started after hydraulic couplings have been opened.



Buckets

Working with buckets

Digging a trench

When excavating a trench it is recommended to dig in layers, thus to obtain a level trench bottom. Use a combination of bucket, dipper and boom motions to maintain the angle of the bucket while digging.

- 1 Anchor the dozer blade into the ground behind the machine.
- 2 Extend the excavating equipment and place the bucket vertically with teeth on the ground.
- 3 Start digging by operating the bucket cylinder. Simultaneously operate the bucket and the dipper arm cylinders once half of the digging cycle has been reached.

NOTE!

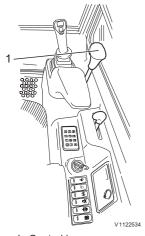
Do not dig the bucket too deep into the ground, since this would block the digging action. However, should this occur, slightly raise the boom. Work in a smooth way and avoid quick movements.

Completely close the bucket when filled. Raise the boom and simultaneously start the swing motion, until the unloading position is reached.

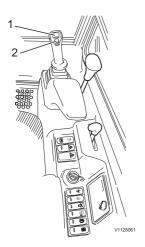
Backfilling or grading

- 1 In order to backfill a trench, position the machine perpendicularly to the trench and press the dozer blade against the ground.
- 2 Once the machine starts to push correctly do not leave the dozer blade control lever (1) in maximum position, but release it.

Do not use the bottom of the bucket to level the ground by swinging it back and forth. This is the purpose of the dozer blade.

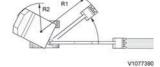


1 Control lever





Control lamp for offset boom



Offset boom

Valid for serial numbers				
Model version	Serial number start	Serial number stop		
ECR25D	Belley 25001	Belley 29999		

When it comes to digging a trench along a wall, you can use the lateral offsetting function.

- 1 If the function for offset boom is not activated, push button (2) to activate it. You know that the function is activated when the control lamp is on.
- 2 Use the proportional roller (1) on the right hand lever to operate the offset boom.
 - Switch to the left: Offset boom to the left.
 - Switch to the right: Offset boom to the right.

NOTE!

While turning ON the ignition switch or lowering the arm rest, a neutral detection is performed for the roller switch on the right control lever. The offset control lamp blinks when the roller is not in its neutral position and the proportional function (X1 or boom offset) is disabled.

The function becomes active (operational) once the roller comes back to its neutral position.

This work can be accomplished under confined spatial conditions. With reference to the axis of the slewing superstructure the offset can have the following values.

Offset in degree (°)	to left	to right
	72°	56°

Dipper arm, minimum radius, mm (in)				
Туре		ECR25D	EC27D	
R1	to left	1555 mm (61.2 in)	1346 mm (53 in)	
	to right	1902 mm (74.9 in)	1697 mm (66.8 in)	
R2		750 mm (29.5 in)	1080 mm (42.5 in)	
		823 mm (32.4 in) ^(a)	1153 mm (45.4 in) ^{a)}	

a) with additional counterweight

Special hydraulics

Release the hydraulic pressure in the system before removing or connecting hydraulic hoses for hydraulically controlled attachments. See page 111 for the procedure to release the hydraulic system 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.

NOTE!

Any persons involved in the process of changing attachments must be familiar with the operation of the machine and should know the signalling pattern.

Volvo supplies a wide range of hydraulic tools. All tools and optional equipment are described in the Attachment Catalogue. Contact a Volvo dealer for further advice.

Hammer

Working with hammer

(hydraulic breaker)



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.

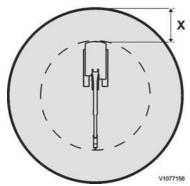
NOTICE

The standard version of the hammer must not be used under water. If water fills the space where the piston strikes the tool, a strong pressure wave is generated and the hammer may be damaged.

NOTICE

If the hammer is connected to an attachment bracket, the attachment bracket should be checked regularly for damage.

- 1 Turn the shut off valve 90 degrees anti-clockwise to set the hammer position (oil direct to tank).
- 2 Prepare the machine for normal excavation work. Move the machine to the required position. Lower the dozer blade to the ground.
- 3 Set the engine speed to the recommended engine RPM for correct amount of oil supply.



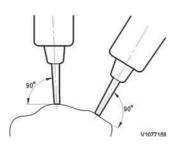
Risk zone when operating the hammer. X = Must be determined by the operator.

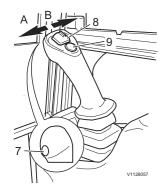


The shut off valve is located in the cabin on the right hand side close to the floor mat.



Position for hammer use





4 Place the boom and hammer in the breaking position. Quick and careless boom movements could result in damage to the hammer.

- 5 Place the tool perpendicular to the surface of the object. Keep the feed force aligned with the tool. Avoid small irregularities on the object which will break easily and cause either idle strokes or an incorrect working angle. When demolishing vertical structures (e.g. brick walls), place the tool perpendicular to the wall.
- 6 Press the hammer firmly against the object. Do not pry the hammer with the boom. Do not press too hard or too gently with the boom.
- 7 Start the hammer.
- Press button (7) or move the roller switch to the right (B) to activate the hammer function.
- Release the button or roller switch to deactivate the hammer function.

NOTE!

Listen to the sound of the hammer when 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.

Connecting with pivot pins

Before removing or connecting hydraulic hoses the pressure in the hydraulic system must be released, see page 111 for the procedure to release the hydraulic 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.



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.

NOTE!

The linkage could change position during changing attachment, pay attention on moving parts.

- 1 Place the machine on firm and level ground.
- 2 Slowly lower and align the boom, until fastening bores (2) of the hammer are flush with the holes in the boom.
- 3 Insert pivot pins (1) into fastening bores (2).
- 4 Clean the hydraulic connections on hammer and dipper arm.

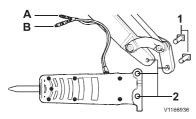
NOTICE

Protect the hydraulic connections against dirt, because only this will ensure the correct function of hydraulic connections and hydraulic system.

- 5 Release the pressure from the hydraulic system according to the procedure on page 111.
- 6 Connect the hydraulic hoses (pressure line (A) and return line (B)) of the hammer to the hydraulic connections on the boom.
- 7 Lock the hydraulic couplings.

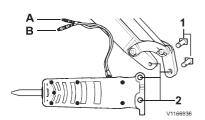
NOTICE

The machine hydraulic oil level must be checked after the hammer has been operated for 2–3 minutes.



Connecting with pivot pins

- A Pressure line B Return line
- _
- 1 Pivot pins
- 2 Fastening bores



Connecting / disconnecting with pivot pins

- A Pressure line
- B Return line
- 1 Pivot pins
- 2 Fastening bores

Disconnecting with pivot pins

- 1 Place the machine on firm and level ground.
- 2 Lower the boom and place the hammer flat on the ground.
- 3 Release the pressure from the hydraulic system according to the procedure on page 111.
- 4 Remove the ignition key to make sure the engine cannot be started.
- 5 Unlock the hydraulic couplings.
- 6 Disconnect the hydraulic hoses (pressure line (A) and return line (B)) of the hammer from the hydraulic connections on the boom.
- 7 Drive pivot pins (1) out of fastening bores (2) on the boom to loosen the hammer.

Connecting to an attachment bracket

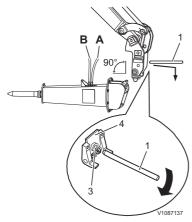
Valid for serial numbers				
Model version	Serial number start	Serial number stop		
ECR25D	Belley 25001	Belley 29999		

For connecting and disconnecting a hydraulic breaker from an attachment bracket, refer to the attachment bracket Operator's Manual.

NOTE!

Take care during disconnection, hydraulic breakers have a high inertia due to the weight and could fall out of the attachment bracket coupler during disconnection. Always connect and disconnect as close as possible to the ground.

Release the pressure from the hydraulic system before opening any hydraulic connectors according to the procedure on page 111.



Mechanical attachment bracket

- A Pressure line
- B Return line

Disconnecting from a mechanical attachment

The hammer is removed outside the machine with the help of a metal bar (1) (part of the on-board equipment), which is used to operate the releasing mechanism on the interlocking plate (4).

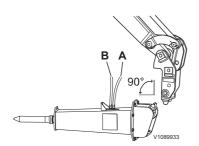
- 1 Place the machine on firm and level ground.
- 2 Lower the boom and place the hammer flat on the ground with an angle of 90° as shown.
- 3 Release the pressure from the hydraulic system before opening the hydraulic connectors according to the procedure on page *111*.
- 4 Remove the ignition key to make sure the engine cannot be started.
- 5 Unlock the hydraulic couplings.
- 6 Disconnect the hydraulic hoses (pressure line (A) and return line (B)) of the hammer from the hydraulic connections on the boom.
- 7 Insert the unlocking bar (1) into the opening (3) and press it down to unlock the interlocking plate (4).

NOTE!

The unlocking bar (1) is stored between the windscreen and the control levers for travel operation.

Disconnecting from a hydraulic attachment

The hammer is operated from the operator's stand via the hydraulically actuated unlocking device.



Hydraulically attachment bracket

- A Pressure line
- B Return line



Attachment bracket switch

- Place the machine on firm and level ground.
 Apply the parking brake and set the transmission to neutral.
- 2 Lower the boom and place the hammer flat on the ground with an angle of 90° as shown.
- 3 Press the attachment bracket switch to activate the hydraulic unlocking of the hammer from the attachment bracket.

If you have single acting system the lock will be open as long as you are pressing the switch. As soon as you release the switch the attachment bracket is locked.

If you have double acting system the attachment bracket will remain unlocked even when you release the switch. Push the switch one more time to lock the attachment bracket. The buzzer will sound as long as the attachment bracket is opened.

For further information, see page 33.

- 4 Turn off the engine release the hydraulic pressure according to procedure on page 111. Remove the ignition key to make sure the engine cannot be started.
- 5 Turn the black safety rings and pull them back to unlock the hydraulic couplings.
- 6 Disconnect the hydraulic hoses (pressure line (A) and return line (B)) of the hammer from the hydraulic connections on the boom.

Hose rupture valves

(optional equipment)



Risk of crushing by falling attachments. Hydraulic or mechanical failure could cause the attachments to fall, resulting in severe personal injury or death.

Ensure no persons can enter the danger zone until the failure is resolved.

If the machine is equipped with a hose rupture valves, it will reduce the falling speed of the boom if a hose bursts.

Lowering the boom with hose rupture protection

In case of standstill or engine defect and power failure during loading operation, the accumulator pressure is sufficient to lower the attachment to the ground with the control levers.

NOTE!

Too low pressure in the accumulator may make it impossible to lower the attachment.

Tracks

When using rubber tracks



Risk of crushing.

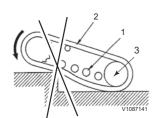
Moving tracks could cause serious crushing injury. Always ensure that no persons are near the tracks while the machine is in motion.

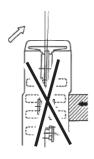
Moving over obstacles

- When reversing over an obstacle, a gap is formed between the rollers (1) and track (2). There is a risk of the rubber tracks coming off.
- If the machine continues to reverse, a gap is formed between the rollers, idler (3) and the track. The track may then come off when turning in a condition where the track can not move to the side because of the obstacle it is passing over or because of some other object.

NOTE!

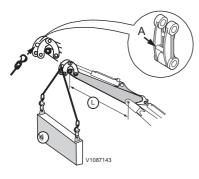
Ensure the tracks are always aligned with rollers and idler. Avoid turning and reversing movements when going over obstacles. Avoid obstacles that load the tracks unilaterally.













The blade must be in upper position during lifting operation if no hydraulic safety valve is installed.

The hydraulic safety valve on the blade is an optional equipment, but mandatory in EU market if blade on floor is used.

Lifting objects

Always use appropriate lifting hook and read the table stating the lifting capacities for object handling operation. Within EU countries the transport of objects in lifting gear operation is prohibited if the machine is not equipped with a hydraulic safety valve on the boom (optional equipment). Various countries have their own regulations concerning the use of the machine for lifting work. For more detailed information you should contact a qualified service technician.

Only lift objects using the approved lifting point on the machine (A). Contact your Volvo dealer if any doubt.



Risk of crushing.

Falling load could cause serious injury.

Do not stand under a suspended load. Use appropriate loading and lifting equipment.

NOTICE

Do not use damaged, broken or uncertified lifting devices.



Risk of crushing.

Swinging objects could cause serious injury.

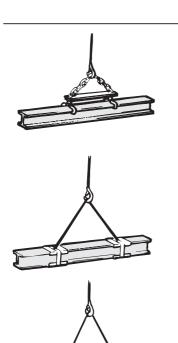
Always ensure no persons are in the danger zone before lifting or moving objects.

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

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.

- 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.
 - 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 track size.
 - 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.
- 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.
- Do not use the swing or arm-in operation to drag a load.



Stability

The stability of working machines is highly changeable and exposed to great variations

In order to carry out the work safely, the operator must himself or herself think about and take into consideration the particular conditions that apply at a specific moment.

■ Operate on solid, flat, level ground.

NOTICE

For safe engine lubrication the machine must not be tilted by more than the values specified in these operating instructions. In addition it may be unsuitable to operate at this inclination as the machine may become unstable and unbalanced, depending on the load.

NOTICE

Risk of machine damage! Improper use could cause serious machine damage.

Never anchor or fix the undercarriage to the ground or any object when digging or lifting.

- Make sure that the ground is firm and safe. Unstable ground, for example loose sand or soft earth, may make the work unsafe, if loads, close to the maximum values in the loading table, are taken.
- Do not make fast slewing movements with a suspended load. Bear the centrifugal force in mind.

Fastening long lifting slings

- Boards, planks, steel reinforcement or similar should have the sling arranged so that they cannot fall out of the loops.
- Girders should generally be lifted with a clamping device.
- Padding made from, for example, cut up compressed-air hoses, may be used in order to protect the slings.
- The slings should be well tightened.

Lifting capacities

Lifting capacities are 75% of the tipping load or 87% of the hydraulic limit.

NOTE!

If the overload warning buzzer (optional equipment) sounds, you have reached the maximum lifting limit. Immediately lower the equipment and unload some of the weight or move to a more safe position where the light does not illuminate.

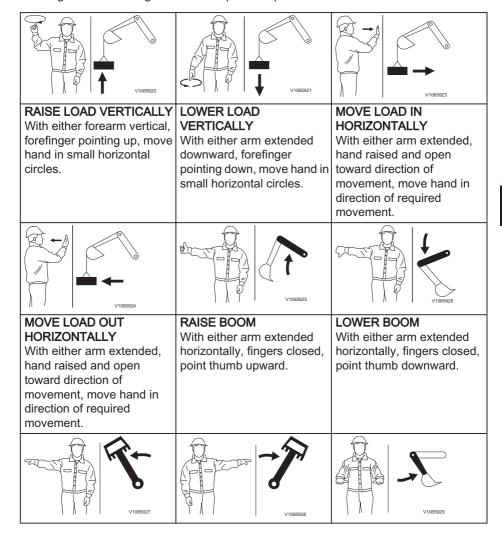
For lifting capacities specifications, see page 204.

Signalling diagram

Manual signalling to an 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 earth moving 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.



SLEW

With either arm extended horizontally, point with forefinger to direction of slew rotation.

DIPPER ARM INWARD

With both hands clenched. point thumbs inward.











DIPPER ARM OUTWARD With both hands clenched,

point thumbs outward.

RETRACT TELESCOPIC **BOOM**

With both hands clenched. point thumbs inward.

EXTEND TELESCOPIC BOOM

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.

TURN

Raise forearm with closed fist indicating inside of turn. Move other fist in vertical circle indicating direction of track or wheel rotation.













TURN

Raise forearm with closed fist indicating inside of turn. Move other fist in vertical circle indicating direction of track or wheel rotation.

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.











THIS FAR TO GO **TRAVEL** Raise forearm with closed fist indicating inside of turn. With hands raised and open Move other fist in vertical circle indicating direction of track inward, move hands or wheel rotation. laterally, indicating distance to go. MOVE SLOWLY STOP **EMERGENCY STOP** With either arm extended Place one hand motionless With both arms extended in front of hand giving motion laterally, hand open laterally, hands open signal. Raise load slowly is downward, move arm back downward, wave arms back shown. and forth. and forth. STOP ENGINE RETRACT TELESCOPIC **EXTEND TELESCOPIC** Draw thumb or forefinger DIPPER ARM **DIPPER ARM** With either arm outstretched With either arm outstretched across throat. horizontally in front of body, horizontally in front of body, close fingers and point close fingers and point thumb in direction of thumb in direction of required movement. required movement.

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.

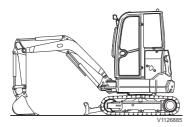
Further safety rules and warnings texts are given within the respective sections.



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

Thorough maintenance and care (as well as the immediate rectification of possibly occurring faults) are the best prerequisites for a permanent availability of the machine and low repair requirements.

Before starting maintenance or repair work:

- Park the machine on level ground.
- Lower the working attachments and the blade to the ground.
- Depressurize the hydraulic system according to procedure on page 111.

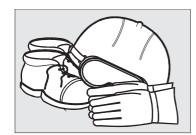


Risk of burns!

Hot machine parts could cause burns.

Allow hot machine parts to cool before performing adjustments or service. Wear personal protective equipment.

- Pull the ignition key off and pull down the control lockout lever in order to eliminate the risk of unintended starting of the engine.
- Turn the battery disconnect switch off when servicing the machine.
- The stability of the machine is a prerequisite for safe assembly, maintenance and repair work.
- When replacing spare parts make sure to use genuine Volvo spare parts. Do not use any spare parts of lower quality.
- Cleanliness is decisive for the operating safety of the complete machine. Always keep the maintenance location clean and tidy.



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 19.
- Measures to be taken in connection with electric welding, see page *Welding*.
- 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

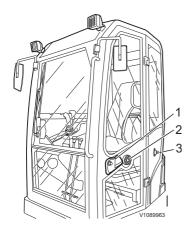
Be conscious of the environment when carrying out service and maintenance. Oil and other liquids dangerous to the environment and released into the environment will cause damage. Oil degrades very slowly in water and sediment. One litre of oil can destroy millions of litres of drinking water.

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.

Entering, leaving and climbing the machine





- The cab door is fitted with an external door handle with a lock (1) and an internal door handle.
- The door can be locked in open position by application of manual force (a fixed locking bolt (3) on the cab engages in the round bolt receptacle (2) in the door).
- By pressing the unlocking button the cab door can be unlocked and closed.
- Always use the three-point approach to access the cab by using two hands and one foot or one hand and both feet. Use stepping surfaces and handholds. Always face the machine when entering the cab.



Leaving cab

- Stop engine and remove key before leaving the cab to prevent unauthorised use of machine.
- Make sure that the cab is parallel to tracks, that allows best possible leaving situation.
- Use the three-point approach to leave the cab by using two hands and one foot or one hand and both feet. Use stepping surfaces and handholds. Always face the machine when leaving the cab. Do not jump off!

Alternative exit path

The alternative exit path is the rear window (its location is marked with an information decal). In case of a turnover or accident and when the door is blocked, break the glass with the hammer attached to the rear wall inside the cab.

Fire prevention

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 key to stop position.
- 5 Exit the cab.
- 6 Call the fire brigade.
- 7 If possible to access safely, turn off the battery disconnect 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 139.

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.

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

Starting with booster batteries, see page 73.

Charging batteries, see page *Battery, charging*.

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

Safety when servicing Handling hazardous materials

142

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

Handling line, tubes and hoses



Risk of high pressure injection.

Leaks from high pressure hoses could cause serious injury to skin and eyes.

If high pressure hoses are loose or leaking, contact a qualified service technician.

Keep away from fluid that is spraying out. Use a stiff piece of cardboard to check for leaks. Never use your hands to check for leaks.

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

If any of the following conditions are found, replace the parts. Consult your Volvo dealer.

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

NOTICE

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



Maintenance

If the machine is to function satisfactorily and at lowest possible cost, it requires careful maintenance.

This section describes maintenance and service jobs that the operator can do. Other maintenance and service jobs require trained workshop personnel, special equipment or spare parts and should be done by a qualified service technician.

The chapter "Lubrication and service chart" (see page 148) presents all the jobs and actions that are included in the machine's service program.

Service history

After each completed service by a qualified service technician, the service history should be filled in, see page *216*. 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.

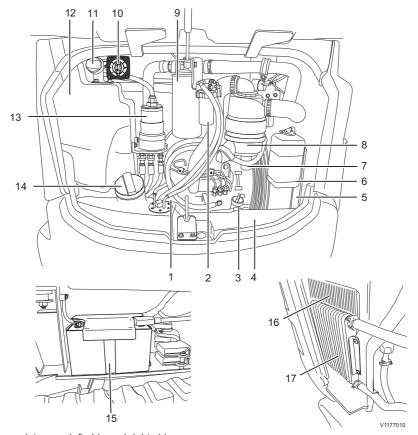
Service Programme

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.

Service points

Valid for serial numbers			
Model version	Serial number start	Serial number stop	
ECR25D	Belley 25001	Belley 29999	



Service points rear, left side and right side

1	Engine oil dipstick (not visible on picture)
2	Fuel pre-filter / water seperator
3	Engine oil filler neck
4	Engine oil filter (not visible on picture, access from the bottom of the machine)
5	Radiator

Maintenance

146

6	Expansion tank
7	Fuel filter
8	Air filter
9	Hydraulic oil filter
10	Battery disconnect switch
11	Hydraulic tank breather
12	Hydraulic oil tank
13	Hydraulic oil level sight glass including hydraulic oil filling
14	Fuel filler neck
15	Battery
16	Radiator
17	Hydraulic oil cooler

Lubrication and service chart

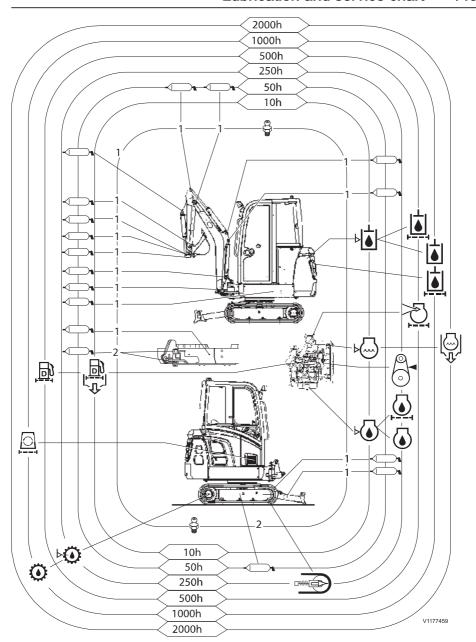
Symbol key

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

V1072402	Lubrication	⊳ ₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	Check travel gear oil
1072398	Fuel system	VECTAGES	Check track tension
V1077018	Drain condensation water	V1077029	Check the hydraulic oil level
V1077017	Replace fuel filter	V1077034	Change the hydraulic oil
▶	Check coolant level	V5607000	Replace the hydraulic oil filter
V4077022	Change coolant	O VEDTTOOM	Check the V-belt tension
V1087231	Clean air filter	⊳ ₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	Check engine oil level
V1087232	Change air filter	\(\overline{\chi_{1072393}}\)	Change engine oil
V1087233	Replace cab ventilation filter	V1077015	Replace engine oil filter
V1077034	Change travel gear oil	V1072403	Grease nipple

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

Every: 10, 50, 250, 500, 1000, 1500, 2000 and 3000 operating hours (according to Service Programme of the machine).



When required	Page
Fuel, filling	164
Batteries, charging	165
Alternator	167
Welding. Any unauthorized welding leads to a loss of warranty.	167
Cleaning machine	167
Paint finish maintenance	169
Touch-up painting	169
Cleaning engine compartment	170
Washer reservoir	170
Front windscreen rail, lubricate	171
Bucket teeth, replacing	171
Seat belt, replace (minimum every third year or latest after 1500 hours)	Workshop job ⁽¹⁾

DAILY (every 10 hours)	Page
General inspection (machine, leakages, connections, function of control elements, lights, loose or lost of bolts)	
Test-run and check (start, stop, instruments, warning lamps, lights, wiper, washer, horn, decals, reflectors, back-up/travel alarm, heater and so on) (check end-position dampening, cylinder at boom)	
Machine, visual check (for leakages, loose connections, external damages, cracks and wear damages)	
Fan belt, visual check (for cracks and interferences)	
Engine oil level, check	155
Coolant level, check	154
Water separator, check and drain if necessary	156
Hydraulic oil level, check	154

EVERY 50 hours After carrying out daily service	Page
Lubrication according to Lubrication chart	see Lubrication chart and page 157
Hydraulic oil filter, replace (once after the first 50 hours , then every 500 hours)	workshop job ⁽¹⁾

FIRST 50 hours inspection

This inspection shall be performed by a qualified service technician.

EVERY 250 hours After carrying out daily and 50 hours services	Page
Engine oil, change	workshop job ⁽¹⁾
Engine oil filter, replace (with every engine oil change)	workshop job ⁽¹⁾
Track unit, check tension and condition	158
Track gearbox oil level, check	workshop job ⁽¹⁾
Fan belt, check and adjust tension	workshop job ⁽¹⁾

EVERY 500 hours	Page
After carrying out daily, 50 and 250 hours services	
Fuel hoses and clamps, check and replace when necessary (minimum	workshop
once a year)	job ⁽¹⁾
Radiator and hydraulic oil cooler, check, clean when necessary (check more often when working under dirty or dusty conditions!)	160
Radiator hoses and clamps, check and replace when necessary (minimum	
once a year)	job ⁽¹⁾
Hydraulic oil filter, replace (first after 50 hours)	workshop
	job ⁽¹⁾
Hydraulic pump, suction hose and pressure hose, check and replace if	workshop
necessary	job ⁽¹⁾
Water separator filter element, draining and cleaning	workshop
	job ⁽¹⁾ , see
	instruction
	after daily check on
	page <i>156</i>
Fuel filter element, replacing (minimum every year)	workshop
	job ⁽¹⁾
Hoses for boom-, dipper-, and bucket-cylinder, check and replace if	workshop
necessary	job ⁽¹⁾
Hose on boom for X1 and X3, check and replace if necessary	workshop job
	(1)

^{1.} Contact a qualified service technician.

EVERY 500 hours After carrying out daily, 50 and 250 hours services	Page
Quick coupler lock mechanism, check and replace if necessary	workshop job ⁽¹⁾
Primary air filter, cleaning and replace (or earlier when warning light illuminates)	161
Exhaust manifold, check for damages and leakages, mounting screws (minimum once a year)	workshop job ⁽¹⁾
Intake air line, replace (minimum once a year)	workshop job ⁽¹⁾
Coolant, check and adjust if necessary (only VOLVO coolant VCS, minimum every year)	workshop job ⁽¹⁾

EVERY 1000 hours After carrying out daily, 50, 250 and 500 hour services	Page
Hydraulic oil, change (if using bio oil, every 750 hours)	workshop job (1)
Hydraulic oil filter in filling device, replace (if using bio oil, every 750 hours)	workshop job ⁽¹⁾
Hydraulic pressure, check	workshop job ⁽¹⁾
Valve clearance, check and adjust	workshop job ⁽¹⁾
Track gearbox oil, change	workshop job ⁽¹⁾
Cab, main filter, replace	workshop job ⁽¹⁾
Secondary air filter, replace (or earlier when primary filter is replaced the third time, minimum every second year, optional equipment)	163

EVERY 1500 hours After carrying out daily, 50, 250 and 500 hour services	Page
Injection nozzle pressure, check	workshop job ⁽¹⁾
Fuel injectors, check and clean if necessary	workshop job ⁽¹⁾
Crankcase breather system, check	workshop job ⁽¹⁾
Seat belt, replacing (minimum every third year)	workshop job ⁽¹⁾

^{1.} Contact a qualified service technician.

EVERY 2000 hours After carrying out daily, 50, 250, 500, and 1000 hour services	Page
Coolant, change (minimum every fourth year, only VOLVO coolant VCS)	workshop job ⁽¹⁾
EVERY 3000 hours	Page

EVERY 3000 hours After carrying out daily, 50, 250, 500, 1000, and 1500 hour services	Page
Injection timing, check	workshop job ⁽¹⁾
Injection pump, check	workshop job (1)

Maintenance service, every 10 hours

Coolant level, checking

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999



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
- Put on personal protective equipment, including face shield, apron, and gloves
- Turn the pressure cap slowly to release any pressure

The coolant expansion tank (1) is located under the rear hood.

Once the cooling system has cooled down, the coolant level must be between the FULL (MAX) and LOW (MIN) marks in the coolant expansion tank (1).

If the coolant level is near the LOW (MIN), top up with coolant.

Coolant level, topping up



In order to avoid damage to engine and cooling system, different brands of coolant or corrosion protection must not be mixed.

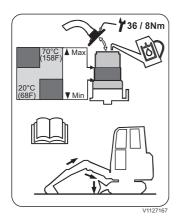
- Slowly remove the cap from the expansion tank

 (1) and relieve the pressure in the cooling system.
- 2 Top up coolant.
- 3 Reinstall the cap on the expansion tank.

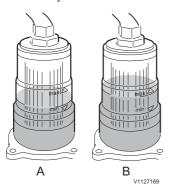
If the warning of high coolant temperature is shown on the display unit stop the engine immediately. Check the coolant level and top up as explained if necessary.







Decal on hydraulic oil tank



- A Correct hydraulic oil level (cold machine)
- B Correct hydraulic oil level (hot machine)

Hydraulic oil level, checking

Valid for serial nu		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

When you check the oil, the temperature of the oil must be between 20 °C (68 °F) and 50°C (122 °F) [±5 °C (9 °F)].

- 1 Park the machine on horizontal ground.
- 2 Operate all cylinders to both directions while the engine is running.
- 3 Arrange the machine as shown on the decal:
 - dozer blade on the ground
 - equipment parallel to the axis of the machine
 - bucket cylinder out and dipper arm cylinder in
 - equipment lowered to the ground
- 4 Open the rear hood.
- 5 Check the hydraulic oil level in the sight glass.
- At 20°C (cold machine), the hydraulic oil level must be above the minimum level and well below the maximum level (A).
- At 50°C (hot machine), the hydraulic oil level must be below the maximum level and well above the minimum level (B). If necessary, fill hydraulic oil through filler neck on the hydraulic oil level sight glass.

For quality of hydraulic oil please refer to the table of fuels and lubricants on page 180.

NOTE

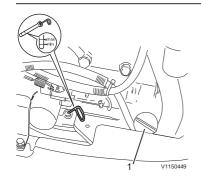
If the hydraulic system is filled with biodegradable hydraulic oil from the factory (see sticker on filler neck), only the oil quality specified on the sticker must be used to fill up or when changing the oil.

Take care of filters/oils/liquids in an environmentally safe way, see page *132*.

Engine oil level, checking

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

1 Stand the machine on level ground.





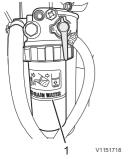
- 3 Pull out the dipstick and wipe it clean with a lintfree cloth, reinsert it until it bottoms and pull it back out.
- 4 The oil level should reach the upper mark (MAX).
- 5 If the oil level is near or even below the bottom mark (MIN), top up oil immediately through the oil filler (1) to avoid severe engine damage. Don't fill over upper mark (MAX)! For quality of oil refer to the table of fuels and lubricants, page 176).

Water separator, checking and draining

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999



- 1 Open the rear hood.
- 2 Check the sight glass of the water separator for water and dirt accumulations.
- 3 If the water level is over or near the drain water mark (1) or dirt accumulations can be seen, the water separator must be drained and cleaned.



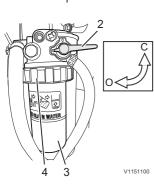
Water separator, draining and cleaning

- 1 Close the fuel valve (2) by turning it counterclockwise to position C.
- 2 Place a suitable collecting vessel underneath the water separator.
- 3 Release the swivel nut (4) and remove the sight glass (3).
- 4 Drain the content into the collecting vessel.

NOTE

Do the work in an environmentally safe manner.

- 5 Clean the sight glass (3) and install it again with the swivel nut (4).
- 6 Open the fuel valve (2) by turning it clockwise to position O.



Maintenance service, every 50 hours



Bearings, greasing

Valid for serial nu		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

The service life of bushings and pivot pins can be extended considerably, if the machine is greased regularly and in the correct way.

Before greasing, place the machine on horizontal ground and extend the equipment in the front, so that all cylinder grease points are accessible.

The greasing of bearings has two main purposes:

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

Therefore, grease the bearing until new, clean grease is forced out through the outer seal. For recommended grease, see page *176*.

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

Maintenance service, every 250 hours

Track unit, checking tension

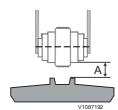
Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

NOTE!

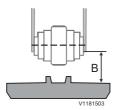
Incorrect tension reduces the lifetime of the tracks. A too low track tension increases the risk of detracking.

- 1 Park the machine on horizontal ground.
- 2 Lower the dozer blade in the back to the ground until the tracks are slightly raised (see picture).
- 3 Lower the bucket to the ground, operate the boom until the machine is raised (see picture).
- 4 Run the tracks several times in forward and reverse.
- 5 For rubber tracks, measure (on both tracks) sag (A) under the roller which is the closest to the center of the undercarriage, between the track pad and the track roller.
- 6 The rubber track is correctly tensioned when a sag (A) of 15 to 25 mm (0.59 to 0.98 in), target: 20 mm (0.79 in) is reached.





Sag A for rubber tracks
The correct distance (A) is between 15
and 25 mm (0.59 and 0.98 in), target: 20
mm (0.79 in).



Sag B for steel tracks
The correct distance (B) is between 140
and 150 mm (5.51 and 5.91 in), target:
145 mm (5.71 in).

- 7 For steel tracks, measure (on both tracks) sag (B) from the frame of undercarriage under a roller until the surface of steel tracks.
- 8 The steel track is correctly tensioned when a sag (B) of 140 to 150 mm (5.51 to 5.918 in), target: 145 mm (5.71 in) is reached.

NOTICE

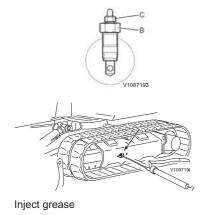
Risk of environmental pollution!

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.

- 9 In order to reduce sagging of the track, press grease through grease nipple (C) into the adjustment cylinder.
- 10 In order to increase sagging of the track loosen valve unit (B) by one revolution, so that the grease can be drained off. Tighten the valve unit when the sag of the track is correct.
- 11 Run the track several times in forward and reverse and verify that the sag is still correct.



For quality of grease please refer to the table of fuels and lubricants on page *176*.



Maintenance service, every 500 hours

Radiator and coolers, cleaning

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999



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.



Hot machine parts could cause burns.

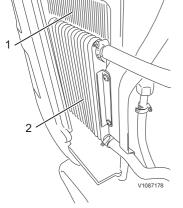
Allow hot machine parts to cool before performing

adjustments or service. Wear personal protective equipment.

Remove the cover on the right hand side of the machine to access the radiator and hydraulic oil cooler as follows:

- 1 Remove the screw on left side of the panel.
- 2 Push the lower area of panel and turn in clock wise to remove it.
- 3 Reinstall the cover again after the service is done.

Always clean radiator (1) and hydraulic oil cooler (2) with compressed air from inside to outside.



- 1 Radiator
- 2 Hydraulic oil cooler

NOTICE

Preferably only clean the radiator fins with compressed air! Only clean the engine with water, when it is cold!

For better cleaning of the cooling fins the hydraulic oil cooler may be removed from the radiator.

Unscrew the hydraulic oil cooler

- Loosen the two screws on the hydraulic oil cooler.
- 2 Swing the hydraulic oil cooler carefully to the side.

Cleaning the cooling fins

Clean the cooling fins on radiator and hydraulic oil cooler with compressed air.

Fasten the hydraulic oil cooler

- 1 Position the hydraulic oil cooler correctly.
- 2 Tighten the screws on the hydraulic oil cooler.

Primary air filter, cleaning and replacing

Valid for serial nu		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

Air filter, cleaning



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.

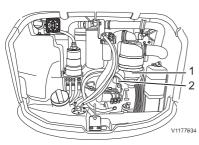
NOTE!

Avoid damaging or denting of the front face of the filter

Never clean the filter by knocking it against a hard object.

Clean the primary filter as needed.

- 1 Open the locking hooks for the housing lid (1) and remove filter from the housing.
- 2 Bang the filter several times with the front face vertically against the palm of your hand or against a flat and soft surface.
- 3 Blow the filter out with dry compressed air (pressure not higher than 5 bar (75.5 psi)) from inside under an oblique angle, until the out flowing air is free of dust.



- 1 Housing lid
- 2 Dust valve

4 Then inspect the filter with a lamp from inside to outside for possible cracks.

NOTE!

Use only genuine filters. Non-genuine filters do not fit and cause danger to the engine!

NOTE!

Operating the machine without air filter can lead to major damage. Make sure an air filter is always fitted!

Air filter, replacing

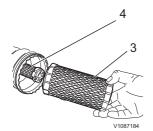
Replace the primary filter once a year or earlier if clogging signal goes on.

NOTE!

Don't clean the primary filter more than five times. In this case the filter must be replaced. The filter must also be replaced if it is damaged or if the display "Engine air filter blocked" shows up after cleaning .

- 1 Open the locking hooks for the housing lid and remove primary filter (3).
- 2 Replace the filter and close the housing lid with the locking hooks.

Take care of filters/oils/liquids in an environmentally safe way, see page 132.



Maintenance service, every 1000 hours

Secondary air filter, replacing

Valid for serial nu	mbers	
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999



(optional equipment)

NOTE!

Read full instruction according to primary air filter on page 161.

NOTE!

Use only genuine filters. Non-genuine filters do not fit and cause danger to the engine!

NOTE!

Operating the machine without air filter can lead to major damage. Make sure an air filter is always fitted!

Replace secondary filter (4) when you have replaced the primary air filter three times or every second year.

The secondary filter must not be cleaned. The engine must not be operated just with the secondary filter installed.

Take care of filters/oils/liquids in an environmentally safe way, see page 132.

Maintenance service, when required

Fuel, filling

Valid for serial numbers			
Model version	Serial number start	Serial number stop	
ECR25D	Belley 25001	Belley 29999	

Clean fuel is essential for trouble-free of the diesel engine. For fuel quality, see page 181, for alternative fuels and their maintenance intervals requirements, see page 183.

Fuel tank

Any repair or modification of the fuel tank must be done by a qualified service technician.



Risk of explosion!

Flammable liquids could explode.

Smoking, open flame and fire are prohibited.

Check the fuel level on the instrument panel while the engine is running.

NOTE!

The fuel tank should be filled at the end of each working day. This prevents the formation of condensation water, as far as possible. In case of excessive contamination of the fuel the fuel tank can be drained via the drain plug (under the tank on the left hand side of the frame) by a service technician.

Check the fuel tank capacity on page 187.



- 1 Park the machine on level ground and place it in service position, see page 131.
- 2 Open the rear hood.
- 3 Turn the battery disconnect switch off.
- 4 Open the fuel filler cap (1).
- 5 Fill through the fuel filler neck.
- 6 Reinstall the fuel filler cap (1).



Battery disconnect switch under rear hood



1 Fuel filler cap under rear hood

Fuel system, bleeding

The machine has a selfbleeding system.

Batteries, charging

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999



Risk of fire and explosion.

Battery gas contains hydrogen and is flammable and could explode.

Do not open a battery close to sources of fire such as open flames, cigarettes or sparks.



Risk of serious injury.

Short-circuit, open flames or sparks near a charging battery could lead to an explosion.

Switch off charge current before 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.

Contact with battery acid causes serious chemical burns.

Always wear personal protective gloves, goggles and clothing when handling batteries.



Risk of chemical burns.

The battery electrolyte contains corrosive sulphuric acid which could cause severe chemical burns.

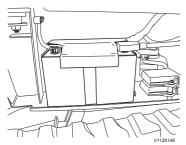
If electrolyte spilled on your bare skin, remove it immediately and wash the affected area with soap and plenty of water. If it gets into your eyes or any other sensitive body part, rinse with plenty of water and seek immediate medical attention.

Battery disconnect switch

The battery disconnect switch must always be switched off during longer resting periods of the machine, repair work in the elektrik system and battery charging in mounted status.



Battery disconnect switch under rear hood



The battery is located under the lower left hood.

Access to the battery

- 1 Open the rear hood and switch off the battery disconnect switch.
- 2 Unscrew the four screws (not thoroughly, so they remain in the hood) of the lower hood on left side.
- 3 Remove the hood.

The battery is maintenance free.

- To remove the battery, disconnect the negative terminal (-) first.
- To re-install the battery, connect the positve terminal (+) first.
- Any contact between a tool and the cable connecting the positive terminal and the frame may cause sparks.

Alternator

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

- The alternator is sensitive to incorrect connections. The connecting poles of the battery must never be mixed up by mistake. The poles are distinctly marked with (+) or (-). Incorrect connection immediately damages the rectifier in the alternator.
- Make sure that cable lugs and poles are clean, well tightened and greased with Vaseline or similar.

Welding

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

NOTE!

Welding on the machine is not allowed. If welding on the machine is needed, it has to be approved by Volvo Construction Equipment. Otherwise all additional welding is under customer responsibilities. Any unauthorized welding could lead to a loss of warranty.

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.



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 136.

- 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

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

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 a transparent waxy anti-rust agent.
- A protective layer of underseal may be applied under the mudguards where mechanical wear is expected.

Touch-up painting

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

- 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

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999



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 Washer reservoir

Washer reservoir

	Valid for serial numbers		
	Model version	Serial number start	Serial number stop
Model version ECR25D		Belley 25001	Belley 29999

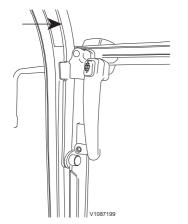
Fill up with washing fluid in the washer reservoir (1). It is located inside the cab on the right side.

Front windscreen rails

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

The front windscreen rails must be kept lubricated.

Start at one end of the rail and lubricate with grease all the way to the other end.



VIITA RS

Needed tools incl. Special tool

Bucket and ripper teeth, replacing

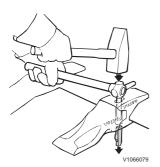


Risk of splinter injury.

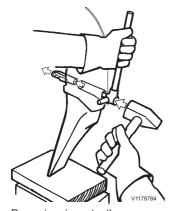
When striking metal objects with a hammer, flying metal chips could cause serious splinter injury to eyes and other body parts.

Always wear personal protective equipment and eye protection when replacing bucket teeth.

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.



Removing bucket tooth



Removing ripper tooth

Removing bucket tooth

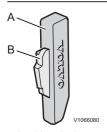
- 1 Lower the bucket to the ground and angle it slightly upward.
- Clean the opening for tooth adapter locking device.
- 3 Knock out the locking device with a hammer and the special tool or other suitable drift.
- 4 Remove tooth.

Removing ripper tooth

- 1 Lower the tooth onto stable ground as shown.
- 2 Clean the opening for tooth adapter locking device.
- 3 Knock out the locking device with a hammer and the special tool or other suitable drift.
- 4 Remove tooth.

Installing tooth

- 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.

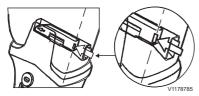


Locking device
A Steel pin
B Lock retainer



Locking device in bucket tooth

The locking device should be just below
the scored line.



Locking device in ripper tooth

- 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 <u>Bucket tooth:</u> 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.

7 Ripper tooth: Knock down the locking device further with a hammer and the tool or other suitable drift until the upper part is just below the shown line in the hole and is engaged.

NOTE!

Replace the steel pin in connection with replacement of tooth adapter.

Maintenance under special environmental conditions

Valid for serial numbers		
Model version	Serial number start	Serial number stop
ECR25D	Belley 25001	Belley 29999

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.	98
Water or near the ocean	When operating the machine, make sure to check and lubricate attachment points affected by water regularly.	-
	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.	-
	Use the recommended lubricants.	176
Freezing weather	Fully charge the batteries regularly, electrolyte may freeze. Ventilate well especially when the batteries are charged in a confined space.	165
	When storing machines in extremely cold temperature, remove batteries and store them at room temperature.	76
	Before parking, remove the mud and the dirt from the tracks.	-
Demolition work	Use fall protection over the cab against falling objects.	101
Low fuel	Drain the sediments in fuel tank at shorter service intervals.	Workshop job ⁽¹⁾
quality	Change the engine oil and engine oil filter at shorter service intervals.	Workshop job ⁽¹⁾

Conditions	Maintenance	Related page
	Check regularly that hose and pipe connections from the air cleaner to the engine induction manifold do not leak.	-
	Clean the air filter at shorter service intervals.	161 163
Dusty atmosphere	Clean the clogging net for radiator and oil cooler at shorter service intervals.	160
аппоорного	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.	167
	Pay attention to and clean the engine compartment and surrounding areas regularly.	170

Specifications Recommended lubricants

The Volvo lubricants have been specially developed to fulfil the demanding operating conditions, in which Volvo CE's machines are used in. The oils have been tested according to Volvo CE's 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 (e.g. biologically degradable oil) is to be used.

NOTE!

BIO-OIL and mineral oil must be disposed separately. Mixing is prohibited!

	Oil quality	Viscosity under different ambient temperatures			
Engine	Engine oil Volvo Ultra Diesel Engine Oil	°C -30 -20 -10 0 +10 +20 +30 +40 +50 °F -22 -4 -14 +32 +50 +68 +86 +104 +122 SAE 10W-30***			
	API / CD, CF, CF-4, CI-4	*SAE 15W-40 SAE 10W-40 SAE 5W-30***			
		SAE 5W-40			
Hydraulic system	Hydraulic oil Acc. to ISO 6743/4 HV or DIN 51524-HVLP Volvo Super Hydraulic Oil ISO 6743/4 Volvo Biodegradable Hydraulic oil	°C -30 -20 -10 0 +10 +20 +30 +40 +50 °F -22 -4 +14 +32 +50 +68 +86 +104 +122 ISO VG 32 ISO VG 46 ISO VG 68 ISO VG 32 ISO VG 68 ISO VG 46 ISO VG 46			
Travel gear	Gear oil Volvo Super Transmission Oil API GL5	°C -30 -20 -10 0 +10 +20 +30 +40 +50 °F -22 -4 +14 +32 +50 +68 +86 +104 +122 SAE 90 SAE 140 SAE 80W-90 or 85W-90 V1087238			

Fuel	Diesel ASTM D975	°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 V1087239
Lubrication points	Lubrication grease ISO 6743/0 Volvo Super Grease Lithium EP2	°C -30 -20 -10 0 +10 +20 +30 +40 +50 °F -22 -4 +14 +32 +50 +68 +86 +104 +122 Multi purpose NLGI2
Cooling system	Coolant	Use Volvo coolant VCS, see page <i>Coolant</i> .

ASTM: American Society of Testing and Material

SAE: Society of Automotive Engineers

ISO: International Standardization Organization

API: American Petroleum Institute

NOTE!

Use engine oil of type SAE 10W, SAE 10W/30 or SAE 15W/40, if the engine is to be started under an ambient temperature of less than 0 $^{\circ}$ C (32 $^{\circ}$ F), even if the daytime temperature rises up to 10 $^{\circ}$ C (50 $^{\circ}$ F).

Engine oil

	Sulphur content in the fuel				
Oil grade	< 0.3 %	0.3 % ~ 0.5 %	> 0.5 %		
Oil grade	Oil changing interval				
Volvo Ultra Diesel Engine Oil or VDS-3 or VDS-2 + ACEA-E7 or VDS-2 + API CI-4 or VDS-2 + EO-N Premium plus	250 hour	125 hour	75 hour		
VDS-2	250 hour	125 hour	75 hour		
VDS + ACEA-E3 or ACEA : E7, E5, E4 or API : CI-4, CH-4, CG-4	125 hour	75 hour	50 hour		

Coolant

Only use Volvo Coolant VCS when topping up or changing coolant. To avoid damage to engine and cooling system, different coolants or corrosion protection must not be mixed. When using concentrated Volvo Coolant VCS and clean water, the mixture should contain 40–60% concentrated coolant and 60–40% clean water. The amount of concentrated coolant must never be less than 40% of the total mixture, see table below.

Freeze protection down to	Mixed-in amount of concentrated coolant
-25 °C (-13 °F)	40%
-35 °C (-31 °F)	50%
-46 °C (-51 °F)	60%

The concentrated coolant must not be mixed with water that contains a high degree of lime (hard water), salt or metals.

The clean water for the cooling system must also meet the following requirements:

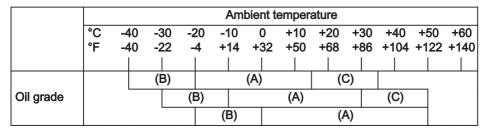
Description	Value
Total number of solid particles	< 340 ppm
Total hardness	< 9.5° dH
Chloride	< 40 ppm
Sulphate	< 100 ppm
pH value	5.5-9
Silica	< 20 mg SiO ₂ /litre
Iron	< 0.10 mg Fe/litre
Manganese	< 0.05 mg Mn/litre
Electrical conductivity	< 500 µS/cm
Organic material, COD-Mn	< 15 mg/litre

If there is any doubt about the water quality, use ready-mixed Volvo Coolant VCS, which contains 40% concentrated coolant. Do not mix with any other ready-mixed coolants since this may result in 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 176.



- (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.

Fuel system

For fuel specification according to the ambient temperature, please contact a workshop authorized by Volvo Construction Equipment.

Quality requirements

The fuel should at least meet the legal requirements, and national and international standards for marketed fuels, for example: EN590 (with nationally adapted low temperature requirements), ASTM D 975 No 1D and 2D, JIS KK 2204.

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 legal requirements, the sulphur content in the diesel fuel must not exceed 0.001 percent (10 ppm) by weight.

For fuel specification according to the working temperature, please contact a workshop authorized by Volvo Construction Equipment.

Biodiesel fuel

Vegetable oils and/or ester, also referred to as biodiesel, e.g. methyl esper or rapeseed (RME), are in some markets offered both as a pure product or for mixing with diesel fuel.

Volvo Construction Equipment accept an additive quantity of max. 7 % bio-diesel fuel to the diesel fuel ready-mixed from the oil manufacturers.

An additive component of more than 7% of biodiesel may have the following effects:

- increased emission of nitric oxides (therefore does not meet existing legislation requirements)
- shorter lifetime of engine and injection system
- increased fuel consumption
- change in engine power
- halving of the interval between engine oil changes
- shortened lifetime of rubber materials in the fuel system
- impaired cold handling properties of the fuel

- limited storage life of the fuel which may lead to clogging of the fuel system, if the machine has not been used over a long period.

Warranty

The warranty does not apply to damage caused by an admixture of more than 7% of biodiesel fuel.

Alternative fuels

Valid for serial numbers			
Model version Serial number start Serial number stop			
ECR25D	Belley 25001	Belley 29999	

This statement is only valid for Volvo branded engines, but also includes engines for DD25 and C-series Skid Steer Loaders where warranty is provided by Volvo.

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 oxygen-free hydrocarbon product that is very similar to distillate diesel fuel and is well suited for use in diesel engines. HVO that conforms to CEN prEN 15940 is approved for use in all Volvo Construction Equipment diesel engines with no changes to maintenance intervals.

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 ASTM D7467

Engine emission designation	Engine size	Acceptable 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	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 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)			
EU Stage II / US Tier 2 * EU Stage IIIA / US Tier 3 *	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)		Up to B20	

^{*} 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

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 after-treatment 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 cleaning, repairing or replacing of SCR parts.

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.

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.

Service capacities and change intervals

Change capacities

Valid for serial numbers			
Model version Serial number start Serial number stop			
ECR25D	Belley 25001	Belley 29999	

Filling capacities Litres (US gal.)	ECR25D/EC27D
Fuel tank	29 (7.66)
Cooling system (total)	4 (1.06)
Engine oil including filter	5.1 (1.35)
Hydraulic oil tank	23 (6.08)
Hydraulic system (total)	33 (8.72)
Travel gear	2 x 0.6 (2 x 0.16)

Change intervals

Please see lubrication and service chart on page Lubrication and service chart.

Engine

Engine

Designation	VOLVO D1.1A
Combustion method	Spherical type
Emission certification	EPA TIER4F
Engine power, net (ISO 3046-1 for EU market) (SAE J1995 for US market)	14,8 kW at 2400 rpm
Engine power, gross (ISO 3046-1 for EU market) (SAE J1995 for US market)	15,6 kW at 2400 rpm
Max. torque ISO 3046-1	71,4 Nm at 1600 rpm
Number of cylinders	3
Cylinder bore	78 mm (3,07 in)
Stroke	78,4 mm (3,09 in)
Displacement	1123 cc
Compression ratio	24
Firing sequence	1–2–3
Idling speed, low	1300 rpm
Idling speed, high	2620 rpm (or less)

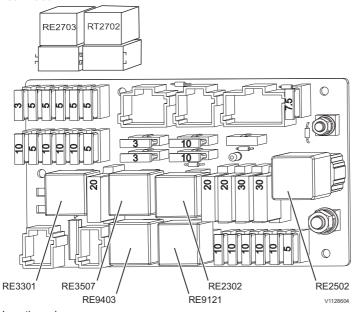
Electrical system

Valid for serial numbers		
Model version	Serial number stop	
ECR25D	Belley 25001	Belley 29999

System voltage	12 V
Batteries (Quantity)	1
Battery voltage	12 V
Battery capacity	70 Ah
Alternator (Rated voltage/amperage/power output)	12 V / 40 A / 540 W
Starter motor (Rated voltage/capacity)	12 V / 1.4 kW

Relays and fuses

Relays and fuses are located on the left hand side of the machine behind the side cover. The fuse box includes also a fuse test socket. The battery disconnect switch is under the rear hood.



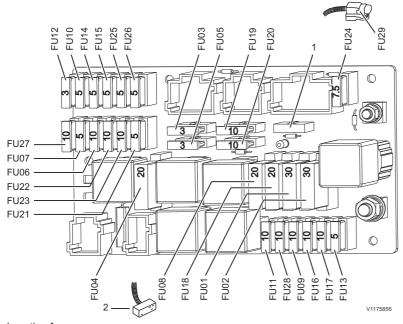
Location relays

Relays

Relay	Function	
RE2703	Auto shutdown	
RT2702	Timer relay (optional auto shutdown with delay)	
RE2302	Engine stop	

Specifications 190 Electrical system

RE2502	Power supply, engine (pre-heating relay)
RE3301	Starter
RE3507	Working lights
RE9121	not used
RE9403	not used



Location fuses

- 1 Fuse test socket
- 2 TechTool service socket

Fuses

Fuse	Fuse type	Ampere	Function
FU01	Maxi fuse	30 A	Main fuse
FU02	Maxi fuse	30 A	Pre-heating plugs
FU03	Mini fuse	3 A	Pre-heating relay
FU04	Maxi fuse	20 A	Starter motor
FU05	Mini fuse	3 A	Pre-heating relay and Display
FU06	Mini fuse	10 A	V-ECU (optional equipment) supply
FU07	Mini fuse	5 A	Alternator
FU08	Maxi fuse	20 A	Engine stop (Relay)
FU09	Mini fuse	10 A	not used
FU10	Mini fuse	5 A	High speed

Fuse	Fuse type	Ampere	Function
FU11	Mini fuse	10 A	not used
FU12	Mini fuse	3 A	not used
FU13	Mini fuse	5 A	I-ECU
FU14	Mini fuse	5 A	Overload function
FU15	Mini fuse	5 A	Travel alarm
FU16	Mini fuse	10 A	Horn
FU17	Mini fuse	10 A	Rotating beacon
FU18	Mini fuse	20 A	Main working lights
FU19	Mini fuse	10 A	Rear and boom working lights
FU20	Mini fuse	10 A	Front working lights
FU21	Mini fuse	5 A	Power outlet
FU22	Mini fuse	10 A	Heater on switch, heater fan motor, AC motor
FU23	Mini fuse	10 A	Wiper
FU24	Mini fuse	7,5 A	Radio
FU25	Mini fuse	5 A	Safety armrest switch
FU26	Mini fuse	5 A	Instrument cluster supply / I-ECU
FU27	Mini fuse	10 A	Anti-theft, CareTrack (A-ECU)
FU28	Mini fuse	10 A	Anti-theft (A-ECU)
FU29	Mini fuse	10 A	CareTrack (W-ECU)

- The V-ECU (optional equipment) controls the boom swing proportional function, the X1 proportional function, the X3 proportional function and auto idle.
 In case of malfunction on the fuse FU06 these functions will be out of order.
- A H-ECU is not assigned anymore. Its former functions are integrated into this new VECU now.
- The I-ECU (integrated in display) controls the display function and the engine stop function. In case of malfunction on fuse FU13 or FU26, these functions will be out of order.

NOTE!

Use only fuses of specified capacity (Ampere rating).

Cab

General	
Cab interior, upholstery and insulation	Fire retardant (fire resistant) ISO 3795 and EN 474–1
Cab filter	Conforms to 43m ³ /hour (1519 cu ft)
Operator seat	Operators seat meets the criteria of EN ISO 7096. Seat belt meets criteria of EN ISO 6683
Adjustment for operator weight	50-130 kg (110-287 lb)
Upholstery	Fire resistant
Lap type seat belt with reel	Yes (optional equipment)

Vibration and sound information

Hand-arm vibrations

Emission of hand-arm vibration during real operating conditions at its intended use is less than $2.5 \text{ m/s}^2 \text{ RMS}$ (root mean square) (8.1 ft/s²) acceleration according to ISO 8041.

Whole-body vibrations

Emission of whole-body vibration during real operating conditions at its intended use is according to the table below.

Typical	Vibration emission	Vibration emission	Vibration emission
operating	value	value	value
conditions	1.4a _{w,eqx}	1.4a _{w,eqy}	a _{w,eqz}
	RMS	RMS	RMS
Excavating	0.33 m/s ² (1.08 ft/s ²)	0.21 m/s ² (0.69 ft/s ²)	0.19 m/s² (0.62 ft/s²)
Hydraulic breaker app.	0.49 m/s ² (1.61 ft/s ²)	0.28 m/s ² (0.92 ft/s ²)	0.36 m/s ² (1.18 ft/s ²)
Transfer movement	0.45 m/s ² (1.48 ft/s ²)	0.39 m/s ² (1.28 ft/s ²)	0.62 m/s ² (2.03 ft/s ²)

The following vibration directions are defined:

x = fore and aft

y = lateral

z = vertical

The whole-body vibration values given above have been taken from ISO/CEN Technical Report.

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 "Whole-body vibrations".

Sound information

	Canopy	Cab
Sound pressure level (LpA) at operator position (Measurement according to ISO 6396)	78 LpA dB(A)	78 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)	93 LwA dB(A)	93 LwA dB(A)

Hydraulic system

Hydraulic system

Valid for serial numbers			
Model version	Serial number start	Serial number stop	
ECR25D	Belley 25001	Belley 29999	

	ECR25D	EC27D	
Closed centre Load Sensing hydraulic system providing total independence of each movement.			
Type Open circuit			
Servo pressure	35 bar	(508 psi)	
Standby pressure	19 bar (290 psi)		
Operating pressure: Hydraulic system	250 bar (3626 psi)		
Secondary pressure			
Boom cylinder	300 bar (4351 psi)		
Bucket cylinder	280 bar (4061 psi)		
Dipper arm cylinder	300 bar (4351 psi)	280 bar (4061 psi)	
X1 Accessory 250 bar (3626 psi)		(3626 psi)	

Specifications

Transmission

Valid for serial numbers			
Model version	Serial number start	Serial number stop	
ECR25D	Belley 25001	Belley 29999	

Travel system	ECR25D	EC27D
Travel speed	1. Gear: 2.4 km/h	1. Gear: 2.6 km/h
	(1.5 mph)	(1.6 mph)
	2. Gear: 4.5 km/h	2. Gear: 4.8 km/h
	(2.8 mph)	(3 mph)
Braking system		
Primary brake	Hydrostatic brake on both motors. If the traveling levers are released, the machine will come to a stop after a few seconds.	
Secondary brake	Hydrostatic brake on one motor (in case one counterbalance valve fails). If the traveling levers are released, the machine will come to a stop after a few seconds.	
Parking brake	Place the bucket and the blade to the ground.	

Slewing system

Valid for serial numbers			
Model version	Serial number start	Serial number stop	
ECR25D	Belley 25001	Belley 29999	

Slewing system	ECR25D	EC27D	
Slewing ring with internal gearing and remote lubrication.			
Slewing speed	9.5	rpm	

Brake system	
Parking brake	Automatic (interlocking of slewing superstructure spring friction brake).
Primary brake	Hydrostatic brake. Release slewing gear control lever in order to stop the slewing gear.

Machine weights

Machine weights

Valid for serial numbers			
Model version	Serial number start	Serial number stop	
ECR25D	Belley 25001	Belley 29999	

The total machine weight (as specified on the machine's PIN plate) is calculated according to ISO 6016.

ECR25D	
Configuration	Weight
Standard operational weight / MuC* (Machine with 250 mm (9.84 in) rubber tracks, cab, short arm, pin-on bucket 500 and 75 kg (165 lb) operator.)	2490 kg (5490 lb)
Maximum machine weight (Machine with 250 mm (9.84 in) rubber tracks, cab, long arm, add. counterweight (100 kg/220 lb), hydraulic breaker HB03TLN with pin-on attach (187 kg/412 lb), with several options, with OPG level 2 and 120 kg (265 lb) operator)	2960 kg (6526 lb)
Weight reduction with canopy	– 88 kg (194 lb)
Additional weight with 300 mm (11.8 in) rubber tracks	+ 78 kg (172 lb)

EC27D	
Configuration	Weight
Standard operational weight / MuC* (Machine with 300 mm (11.8 in) rubber tracks, cab, short arm, pin on bucket 500 and 75 kg (165 lb) operator)	2730 kg (6090 lb)
Maximum machine weight (Machine with 300 mm (11.8 in) rubber tracks, cab, long arm, add. counterweight (100 kg/220 lb), hydraulic breaker HB03TLN with pin-on attach (187 kg/412 lb), with several options, with OPG level 2 and 120 kg (265 lb) operator)	3200 kg (7055 lb)
Weight reduction with canopy	– 88 kg (194 lb)

^{*} MuC = Most usual configuration

Ground pressure

Valid for serial numbers				
Model version Serial number start Serial number stop				
ECR25D	Belley 25001	Belley 29999		

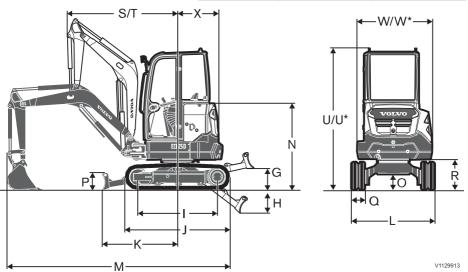
(including operator of 75 kg)

ECR25D			
Version	Rubber tracks 250 mm (9.84 in)	Rubber tracks 300 mm (11.81 in)	Steel tracks 300 mm (11.81 in)
Cab		0.27 kg/cm² (26.5 kPa/3.8 psi)	0.28 kg/cm² (27.5 kPa/4 psi)
Canopy		0.26 kg/cm ² (25.5 kPa/3.7 psi)	0.27 kg/cm² (26.5 kPa/3.8 psi)

EC27D			
Version	Rubber tracks	Rubber tracks	Steel tracks
	250 mm (9.84 in)	300 mm (11.81 in)	300 mm (11.81 in)
Cab	0.33 kg/cm²	0.28 kg/cm²	0.29 kg/cm²
	(32.4 kPa/4.7 psi)	(27.5 kPa/4 psi)	(28.4 kPa/4 psi)
Canopy		0.27 kg/cm ² (26.5 kPa/3.8 psi)	0.28 kg/cm ² (27.5 kPa/4.1 psi)

Dimensions

Valid for serial numbers				
Model version Serial number start Serial number stop				
ECR25D	Belley 25001	Belley 29999		



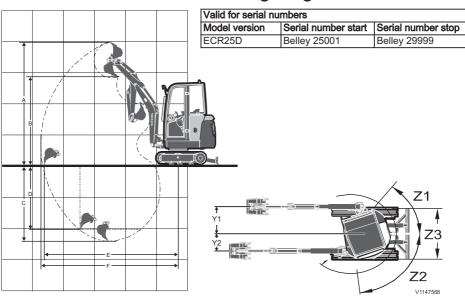
Version	ECF	R25D	EC:	27D	
Dipper arm	Short arm 1050 mm (41.3 in)	Long arm 1350 mm (53.1 in)	Short arm 1200 mm (47.2 in)	Long arm 1500 mm (59.1 in)	
G		401 mm	(15.8 in)		
Н		422 mm	(16.6 in)		
I		1440 mm	n (56.7 in)		
J		1906 mm (75 in)			
K	1365 mm (53.7 in)				
L (with 300 mm tracks)		1550 mm (61 in)			
M without additional counterweight	3987 mm (157 in)	N.A.	3935 mm (154.9 in)	3803 mm (149.7 in)	
M with additional counterweight	4060 mm (159.6 in)	3940 mm (155.1 in)	4008 mm (157.8 in)	3876 mm (152.6 in)	
N	1570 mm (61.8 in)				
0	290 mm (11.4 in)				
Р	315 mm (12.4 in)				
Q	250/300 mm (9.8/11.8 in)				
R	554 mm	554 mm (21.8 in) 559 mm (22 in)			

Version	ECR25D EC27D		27D	
Dipper arm	Short arm		Short arm 1200 mm (47.2 in)	Long arm 1500 mm (59.1 in)
S (Front slew radius)	2002 mm (78.8 in)	2025 mm (79.7 in)	1712 mm (67.4 in)	1760 mm (69.3 in)
T (Front slew radius with max. offset)	1555 mm (61.2 in)		1346 mm (53 in)	1389 mm (54.7 in)
U (Canopy)	2505 mm (98.6 in)			
U* (Cab)		2535 mm	n (99.8 in)	
W (Canopy)	4240 (52.0 :)			
W* (Cab)	1340 mm (52.8 in)			
X (Tail slew radius)	750 mm (29.5 in)	825 mm (32.5 in)	2.5 1080 mm (42.5 in)	

NOTE!

The machine specifications are given for information only and may be amended by the manufacturer at any time without prior notice.

Working ranges



Working ranges	ECR25D EC27D		27D	
Dipper arm	1050 mm (41.3 in)	1350 mm (53.2 in)	1200 mm (47.2 in)	1500 mm (59.1 in)
A. Maximum cutting height	' '	4183 mm (164.7 in)		
B. Maximum dumping height		3070 mm (120.9 in)		
C. Maximum digging depth (with dozer blade lowered to ground)	1	2761 mm (108.7 in)		2786 mm (109.7 in)
D. Maximum vertical wall digging depth		2119 mm (83.4 in)		
E. Maximum digging reach at ground level		4602 mm (181.2 in)		
F. Maximum digging reach	l	4768 mm (187.7 in)		
Y1	784 mm (30.9 in) 542 mm (21.3		(21.3 in)	
Y2	496 mm	(19.5 in)	279 mn	n (11 in)
Z1	5	6°	5	3°
Z2	72° 72.5°		.5°	
Z3 (with 300 mm (11.8 in) tracks)	1550 mm (61 in)			

Recommended bucket sizes

Valid for serial numbers				
Model version Serial number start Serial number stop				
ECR25D	Belley 25001	Belley 29999		

Volvo recommended buckets, pin on type				
EC27D/ECR25D	Cutting Width mm (in)	Capacity I (gal.)	Weight kg (lb)	
	250 (9.8)	34 (9)	40 (88.2)	
	300 (11.8)	42 (11)	44 (97)	
	350 (13.8)	56 (14 0)	50 (110 2)	
Conoral nurnoso	400 (15.7)	- 56 (14.8)	50 (110.2)	
General purpose	450 (17.7)	65 (17.2)	54 (119)	
	500 (19.7)	74 (19.5)	59 (130)	
	600 (23.6)	92 (24.3)	65 (143.3)	
	750 (29.5)	119 (31.4)	78 (172)	
Fixed ditching	1200 (47.2)	125 (33)	90 (198.4)	
Fixed ditching	1300 (51.8)	141 (37.2	96 (211.6)	
Tiltable ditching	1200 (47.2)	125 (33)	176 (388) ^(a)	
	1200 (41.2)	120 (00)	131 (288.8) ^(b)	

a)EC27D only

b)ECR25D only

Volvo recommended buckets, Lehnhoff quick coupler				
EC27D/ECR25D	Cutting Width mm (in)	Capacity I (gal.)	Weight kg (lb)	
	300 (11.8)	43 (11.4)	50 (110.2)	
	400 (15.7)	56 (14.8)	56 (123.5)	
General purpose	500(19.7)	77 (20.3)	65 (143.3)	
	600 (23.6)	92 (24.3)	72 (158.7)	
	700 (27.6)	111 (29.3)	81 (178.6)	
Fixed ditching	1200 (47.2)	125 (33)	96 (211.6)	
i ixed ditalling	1300 (51.8)	141 (37.2)	102 (224.9)	
Tiltable ditching	1200 (47.2)	405 (22)	172 (379.2) ^(a)	
	1200 (47.2)	125 (33)	138 (304.2) ^(b)	

a)EC27D only

b)ECR25D only

Volvo recommended buckets, symm	netrical type, In	terface: S40		
EC27D/ECR25D	Bucket Width mm (in)	Cutting Width mm (in)	Capacity I (gal.)	Weight kg (lb)
General purpose GPX with teeth	515	550	95	113 (249)
General purpose GPX without teeth	(20.3)	(21.7)	(25.1)	100 (220)
Cable bucket CAX	315	350	50 (13.2)	74 (163)
Sabio suoker 577X	(12.4)	(13.8)	85 (22.5)	95 (209)
Tiltrotator grading bucket TGX	1075 (42.3)	1100 (43.3)	120 (31.7)	124 (273)
Tiltable ditching bucket	1164 (45.8)	1200 (47.2)	125 (33)	136 (300)

Contact your dealer to define the optimal tool for your business.

Digging forces

Valid for serial numbers							
Model version	Serial number start	Serial number stop					
ECR25D	Belley 25001	Belley 29999					

Digging forces with buckets	n direct mounted	ECF	R25D	EC27D					
Dipper arm, mm (i	n)	1050 (41.4)	1350 (53.2)	1200 (47.2)	1500 (59.1)				
Bucket radius	SAE, at bucket tooth		626 ((24.6)					
mm (in)	ISO, at bucket blade	568 (22.4)							
Break-out force	SAE, at bucket tooth	20.26	(4555)	22.31 (5015)					
kN (lbf)	ISO, at bucket blade	22.33	(5020)	24.59 (5528)					
Tear-out force	SAE, at bucket tooth	17.28 (3885)	14.64 (3291)	17.63 (3963)	15.12 (3399)				
kN (lbf)	ISO, at bucket blade	17.76 (3993)	14.97 (3365)	18.06 (4060)	15.43 (3469)				
Angle of rotation, I	oucket	20)5°	203°					

Lifting capacities

Valid for serial numbers								
Model version Serial number start Serial number stop								
ECR25D	Belley 25001	Belley 29999						

NOTFI

Do not transport objects in lifting gear operation if the machine is not equipped with a line rupture valve on the boom, appropriate lifting hook, an overload warning function and a table stating the nominal lifting loads for lifting gear operation. The lifting table is a decal inside the cab.

Lifting capacities are 75% of the tipping load or 87% of the hydraulic limit.

Load capacities marked with an asterisk (*) are limited by machine's hydraulic lifting capacity rather then tipping load.

The specified values are valid for a machine:

without attachment and without attachment bracket.

NOTE!

If handling is accomplished in lifting gear operation the weight of the attachments must be subtracted from the values stated in the table.

- on level and firm ground.
- with rubber tracks.
- equipment during full rotation.
- equipment parallel to the axis of the superstructure.
- with a 75 kg (165 lb) driver in the cab.

Lifting capacities ECR25D, Cab, with safety valves on dipper arm and boom (not on dozer blade)

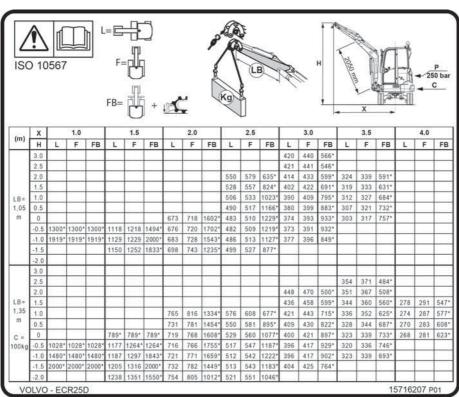
OK OK SO 1056	**************************************		Ko			L	F=		H	X		250 t
	X (m)	1.	0	2	.0	3	.0	4	.0	M	ax	Xmax
	H (m)	L	E	L	F	L	F	L	F	L	F	Amax
	3					420	440			408	427	3048
	2,5					421	441			336	351	3429
	2				i ii	414	433			300	313	3667
LB=	1,5					402	422			279	292	3806
1.05m	1					390	409			270	282	3858
1.05111	0,5					380	399			271	283	3824
C= 0kg	0			673	718	374	393			281	294	3706
C- UNG	-0,5	1300 *	1300 *	676	720	373	391			305	319	3489
	-1	1919*	1919 *	683	728	377	396			355	372	3144
	-1,5			698	743					473	499	2600
	-2											
	2,5									314	329	3752
	2					448	470			284	297	3971
LB=	1,5					436	458	278	291	268	280	4094
1.35m	1			765	816	421	443	274	287	259	272	4142
1.55111	0,5		I	731	781	409	430	270	283	260	272	4111
C= .	0		I	719	768	400	421	268	281	268	281	4002
100kg	-0,5	1028 *	1028 *	716	766	396	417			286	300	3807
lookg	-1	1480 *	1480 *	721	771	396	417			323	339	3502
	-1,5	2000 *	2000 *	732	782	404	425			396	417	3046
	-2			754	805					604	641	2314

V1176309

C = additional counterweight

^{* =} Limited by machine's hydraulic lifting capacity rather than tipping load.

Lifting capacities ECR25D, Cab, with safety valves on dipper arm, boom and dozer blade



V117631

C = additional counterweight

^{* =} Limited by machine's hydraulic lifting capacity rather than tipping load.

Lifting capacities ECR25D, Canopy, with safety valves on dipper arm and boom (not on dozer blade)

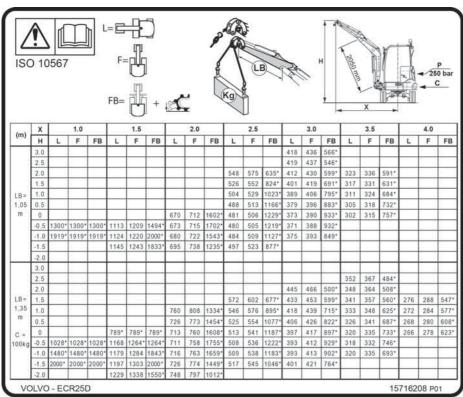
OK OK SO 1056	° 37		Kg			L.	F=		H	20050 mm		250 C
	X (m)	1.	0	2	.0	3	.0	4	.0	M	ax	Xmax
T	H (m)	L	F	L	F	L	F	L	F	L	F	Alliax
	3				Ü	418	436			406	424	3048
	2,5					419	437			335	349	3429
LB=	2	2		- 4		412	430	l l		298	310	3667
	1,5					401	419			278	289	3806
1.05m	1			i	ľ	389	406	1		269	280	3858
1.05m	0,5		127104 10774	19.15W 357		379	396	a von Leavan		269	280	3824
C- OI [0			670	712	373	390	C100 C		280	291	3706
C= 0kg	-0,5	1300 *	1300 *	673	715	371	388			304	317	3489
	-1	1919 *	1919 *	680	722	375	393			354	369	3144
- 1	-1,5			695	738					471	495	2600
	-2				li .							
	2,5									312	325	3752
- 1	2					445	466			282	294	3971
LB=	1,5			S		433	453	276	288	266	277	4094
1.35m	1			760	808	418	439	272	284	258	269	4142
1.35m	0,5	The second second		726	773	406	426	268	280	258	269	4111
~ l	0			713	760	397	417	266	278	266	278	4002
C=	-0,5	1028 *	1028 *	711	758	393	412			284	297	3807
100kg	-1	1480 *	1480 *	716	763	393	413	1		320	335	3502
	-1,5	2000 *	2000 *	726	774	401	421	ĵ		393	413	3046
	-2		-	748	797	_				600	634	2314

V1176311

C = additional counterweight

^{* =} Limited by machine's hydraulic lifting capacity rather than tipping load.

Lifting capacities ECR25D, Canopy, with safety valves on dipper arm, boom and dozer blade



V1176312

C = additional counterweight

^{* =} Limited by machine's hydraulic lifting capacity rather than tipping load.

Lifting capacities, EC27D, Cab (A) and Canopy (B) (North America only)

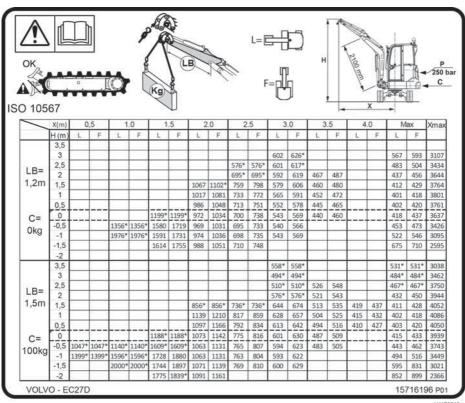
			1 (3-3.5)			6-7)	3 (9	9-10)		Maxi (X)	(d)
		H m (ft-in)	Kg	Lbs	Kg	Lbs	Kg	Lbs	Kg	Lbs	m (ft-in)
ž		3.0 (9-10)					602	1327	567	1250	3,11 (10-0.6
	L=	2.0 (8-7)			576*	1270°	467	1030	437	963	3,64 (11-0,4
		1.0 (3-3.5)			733	1616	452	996	401	884	3,8 (12-0,5
	1.2m	0	1199*	2643°	700	1543	440	970	402	886	3,76 (12-0,2
	(47.2 in)	-1.0 -(3-3.5)	1356°	2989°	695	1532	540	1190	453	999	3,43 (11-0,2
Α –		-2.0 -(6-7)	1614	3558	710	1565		10200	675	1488	2,6 (8-0,8)
Α .		3.0 (9-10)					494*	1089*	484*	1067	3,48 (11-0,3
	L=	2.0 (6-7)					510*	1124*	432	952	3,94 (12-0,6
	1.5m	1.0 (3-3.5)			736*	1623*	504	1111	402	886	4,09 (13-0.5
	(59,1 in)	0			775	1709	487	1074	403	888	4,05 (13-0,4
4-4	(59, 1 in)	-1.0 -(3-3.5)	1140°	2513°	763	1682	483	1065	443	977	3,74 (12-0,2
7		-2.0 -(6-7)	1744	3845	769	1695	600	1323	595	1312	3,02 (9-0,4
1 /		3.0 (9-10)					581	1281	547	1206	3,11 (10-0,€
15 -1 53	L=	2.0 (6-7)			576*	1270°	449	990	421	928	3,64 (11-0,4
	1.2m	1.0 (3-3.5)			706	1556	435	959	385	849	3,8 (12-0,5
	(47.2 in)	0	1199*	2643°	673	1484	423	933	386	851	3,76 (12-0,2
	(41.2 m)	-1.0 -(3-3.5)	1356*	2989*	668	1473	518	1142	435	959	3,43 (11-0,2
В		-2.0 -(6-7)	1554	3426	683	1506		di managari	650	1433	2,6 (8-0,8)
В		3.0 (9-10)	77.77.7				494*	1089*	484*	1067*	3,46 (9-0,2
	L=	2.0 (6-7)				CHARGO N	504	1111	317	699	3,94 (12-0,6
	1.5m	1.0 (3-3.5)			736*	1623°	486	1071	387	853	4,09 (13-1)
	(59,1 in)	0	1188*	2619°	748	1649	470	1036	388	855	4,05 (12-0,4
1 2	(55,1111)	-1.0 -(3-3.5)	1140*	2513*	736	1623	466	1027	427	941	3,74 (12-0,2
		-2.0 -(6-7)	1685	3715	742	1636	579	1276	574	1265	3,02 (9-0,4
		3.0 (9-10)					626*	1380*	622*	1371*	3,11 (11-0,6
THE .	L=	2.0 (6-7)			576*	1270*	617*	1360*	583*	1285*	3,64 (11-0,4
	1.2m	1.0 (3-3.5)			870*	1918*	718*	1583*	590*	1301*	3,8 (12-0,5
	(47.2 in)	0	1199*	2643°	1211*	2670°	825*	1819*	661*	1457*	3,76 (12-0,2
Α	(41 E III)	-1.0 -(3-3.5)	1356*	2989°	1261*	2780°	967*	2132*	850°	1874*	3,43 (11-0,2
and		-2.0 -(6-7)	2000*	4408*	1044*	2302*			968*	2134*	2,6 (8-0,8)
		3.0 (9-10)			6		494*	1089*	484*	1067*	3,46 (9-0.2
В	L=	2.0 (6-7)					510*	1124*	456*	1005*	3,94 (12-0,6
	1.5m	1.0 (3-3.5)		10000	736*	1623*	647*	1426*	463*	1021*	4,09 (13-1)
1 3	(59,1 in)	0	1188*	2619*	1125*	2480*	782*	1724*	510*	1124*	4,05 (12-0,4
1.4	feet i mit	-1.0 -(3-3.5)	1140*	2513*	1309*	2886*	855*	1885*	639*	1409*	3,74 (12-0,2
		-2.0 -(6-7)	1839*	4054*	1203*	2652*	899*	1982*	886*	1953*	3,02 (9-0,4

V1194149

C = additional counterweight

^{* =} Limited by machine's hydraulic lifting capacity rather than tipping load.

Lifting capacities EC27D, Cab, with safety valves on dipper arm and boom (not on dozer blade)



V1176313

C = additional counterweight

^{* =} Limited by machine's hydraulic lifting capacity rather than tipping load.

Lifting capacities EC27D, Cab, with safety valves on dipper arm, boom and dozer blade

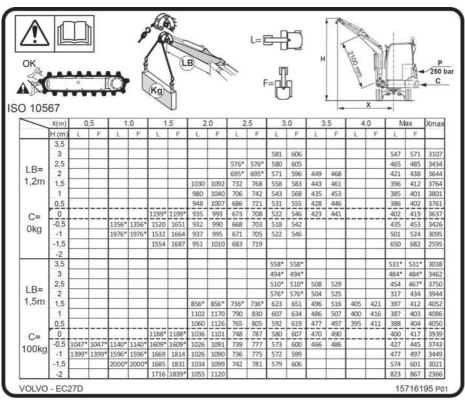
1056	<u> </u>		= G F= FB=		+ 10	¢	,	Kg	1	B	3		+	2100 mm	×		Y The
	X (m)		1.0		-	2.0			3.0			4.0			Max	71	×
	H (m)	L	F	FB	L	F	FB	L	F	FB	L	F	FB	L	F	FB	max
	3				7			602	626*	626*				567	593	622*	3107
	2,5							601	617*	617*	Ü			483	504	587*	3434
LB=	2							592	619	673*	Ü			437	456	583*	3644
1,2m	1,5				1067	1102*	1102*	579	606	766*	1			412	429	590*	3764
1,2111	1				1017	1081	1473*	565	591	870*	Ų			401	418	617*	3801
C=	0,5	0000000	5765ECS	8000000	986	1048	1710*	552	578	963*	e mage	7255636	reserve.	402	420	661*	3761
	0				972	1034	1804*	543	569	1024*				418	437	744*	3637
0 kg	-0,5	1356*	1356*	1356*	969	1031	1793*	540	566	1038*	13.55	1000	200	453	473	850*	3426
	-1	1976*	1976*	1976*	974	1036	1688*	543	569	967*	ji			522	546	911*	3095
	-1,5				988	1051	1440*							675	710	968*	2595
	3,5					1100		558*	558*	558*	1			531*	531*	531*	3038
Ores.	3							494*	494*	494*				484*	484*	484*	3462
LB=	2,5							510*	510*	510*	ļ.			467*	467*	467*	3750
1,5m	2	, ,			72	ļ, ,		576*	576*	576*	Ų.			432	450	456*	3944
12	1,5				856*	856*	856*	644	674	677*	419	437	581*	411	428	463*	4052
	1			- 5	1139	1210	1258*	628	657	794*	415	432	676*	402	418	482*	4086
	0,5	L			1097	1166	1576*	613	642	905*	410	427	647*	403	420	510*	4050
C=	0	0.00			1073	1142	1752*	601	630	991*		STATES	SAMAS	415	433	553*	3939
100	-0,5	1140*	1140*	1140*	1063	1131	1810*	594	623	1036*		100.00		443	462	639*	3743
kg	-1	1596*	1596*	1596*	1063	1131	1770*	593	622	1025*				494	516	777*	3449
-	-1,5	2000*	2000*	2000*	1071	1139	1618*	600	629	899*				595	831	886*	3021
	71.52			-	1091	44.04	1264*							852	899	957*	2366

V1176314

C = additional counterweight

^{* =} Limited by machine's hydraulic lifting capacity rather than tipping load.

Lifting capacities EC27D, Canopy, with safety valves on dipper arm and boom (not on dozer blade)

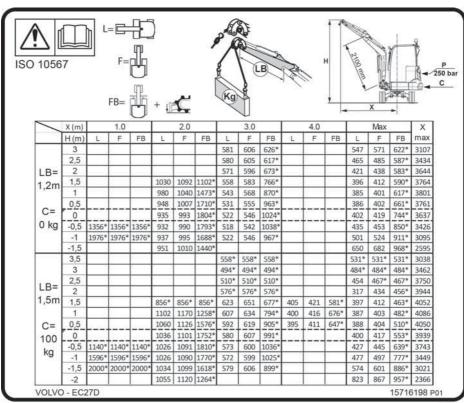


V1176315

C = additional counterweight

^{* =} Limited by machine's hydraulic lifting capacity rather than tipping load.

Lifting capacities EC27D, Canopy, with safety valves on dipper arm, boom and dozer blade



V117631

C = additional counterweight

^{* =} Limited by machine's hydraulic lifting capacity rather than tipping load.

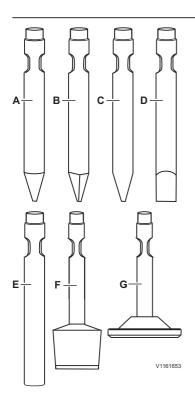
Hammer (hydraulic breaker)

Valid for serial numbers								
Model version	Serial number start	Serial number stop						
ECR25D	Belley 25001	Belley 29999						

Hydraulic breaker

EC27D/ECR25D	HB03TLN	HB200Plus (North America only)
Operating weight	175 kg (385.8 lb)	not applicable
Breaker weight	153 kg (337.3 lb)	155 kg (341.7 lb)
Overall length	1488 mm (58.58 in)	1129 mm (44.45 in)
Tool diameter	57 mm (2.24 in)	50 mm (1.97 in)
Flow rate	23–70 l/min (6–18.5 US gal/ min)	30–63 l/min (8–16.6 US gal/ min)
Operating pressure	9–12 MPa	12-14 MPa
Impact rate	600–1500 bpm	1000–2000 bpm
Sound power level	110 dB(A)	124 dB(A)

Breaker brackets for HB03TLN	Pin on type	Lehnhoff	Symmetrical type (S40)
Weight	18 kg (39.7 lb)	20 kg (44.1 lb)	17.5 kg (38.6 lb)



Hammer tools

- A Moil point
- B Pyramid moil
- C Chisel parallel
- D Chisel transversal
- E Blunt
- F Spade
- G Compacting plate

Service history

Service 50 hou	rs	Type of service	Signature and stamp
Date	Hours	☐ 50 hours inspection	
Service 250 ho	ours	Type of service	Signature and stamp
Date	Hours	Service and Maintenance	
Service 500 ho	urs	Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	
Service 750 ho	urs	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 1000 h	ours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 1250 h	ours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 1500 h	ours	Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	
Service 1750 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 2250 h	ours	Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	

Service 2500 hours		Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 2750 h	iours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 3000 h	iours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 3250 h	iours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 3500 h	iours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 3750 h	iours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
		<u> </u>	10.
Service 4000 h		Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 4250 h	iours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 4500 h	nours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	Oignatare and stamp
		_	

Service 4750 hours		Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 5000 h	OLIFO.	Type of service	Signature and stomp
Date	Hours	Service and maintenance	Signature and stamp
Date	riours	Service and maintenance	
Service 5250 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 5750 hours		Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 6000 hours		Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 6250 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 6750 hours		Type of service	Signature and stamp
Date	Hours	Service and maintenance	·
Service 7000 hours		Type of service	Signature and stamp
Date	Hours	Service and maintenance	

Service 7250 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	
Service 7500 h	ACLURO.	Type of service	Signature and stamp
			Signature and Stamp
Date	Hours	Service and maintenance	
Service 7750 h	iours	Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	
Service 8000 h	iours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 8250 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	
Service 8500 hours		Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 8750 h	iours	Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 9000 hours		Type of service	Signature and stamp
Date	Hours	☐ Service and maintenance	
Service 9250 hours		Type of service	Signature and stamp
Date	Hours	Service and maintenance	
Service 9500 hours		Type of service	Signature and stamp
Date	Hours	Service and maintenance	

Specifications 220 Service history

Service 9750 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	

Alphabetical index	Engine oil
Apriabotical mack	Engine oil level, checking
A	Entering, leaving and climbing the machine
Access to cab	Environmental requirements9
Accidents	Equipment11
Alternative fuels	EU conformity certificate18
Alternator	F
Anti-theft device	
Arrival Inspection	Fire extinguisher, location
Attachments	Front windscreen rails171
Attachments, alternative lowering80	Fuel system181
Attachments, connecting and	Fuel, filling164
disconnecting	_
Audio system	G Cround procesure
	Ground pressure197
B Batteries, charging165	H
Bearings, greasing	Hammer115
Before service, read	Hammer (hydraulic breaker)
Buckets	Handling hazardous materials
	Handling line, tubes and hoses
C	High voltage overhead power line94
Cab	Hose rupture valves
CareTrack	Hydraulic oil
Change capacities	Hydraulic oil level, checking155
Change intervals	Hydraulic system11, 194
Cleaning engine compartment	I
Cleaning machine	Information and warning decale 22
Communication equipment, installation 19	Information and warning decals
Connecting to an attachment bracket 118	Instrument panel, left
Connecting with pivot pins116	Interiored use
Controls40	L 105
Coolant179	Leaving cab
Coolant level, checking154	Lifting capacities
D	Lifting objects
Delivery Inspection144	Long-term parking77
Delivery Instructions144	Lubrication and service chart147
Demolition work 101	M
Digging forces203	Machine view15
Dimensions	Machine weights
Disconnecting from a hydraulic	Maintenance service, every 10 hours 154
attachment119	Maintenance service, every 1010drs 134
Disconnecting from a mechanical	Maintenance service, every 250 hours. 158
attachment	Maintenance service, every 50 hours 157
Disconnecting with pivot pins118	Maintenance service, every 500 hours. 160
Display unit	Maintenance service, when required 164
Door	Maintenance under special
E	environmental conditions 174
Eco driving	Measures before operating70
Electrical system	Modifications11
Emergency exit	0
Engine9, 188	Offset boom

Alphabetical index

222

Operating on public roads67Operator comfort51Operator obligations64Operator safety66Operator seat51Operator's manual, storage57Operator's seat, adjusting52	
Paint finish maintenance	
R Radiator and coolers, cleaning	
Safety components 20 Safety rules when operating 64 Seat belt 54 Secondary air filter, replacing 163 Service capacities and change intervals 187 Service history 144, 216 Service points 145 Service Programme 144 Signalling diagram 127 Slewing system 12, 195 Special hydraulics 114 Specifications 195 Starting engine 71 Starting with booster batteries 73 Stopping 75 Symbol key 147	
T Tool kit	

U Underground cables and pipes USA federal clean air act	. 97 . 29
V Visibility	. 60
W Warming up Washer reservoir Water separator, checking and draining Welding When using rubber tracks Whole-body vibrations Windows Working in cold weather Working in water and on boggy ground. Working on slopes Working ranges Working where there is risk of landslip Working with buckets Working with hammer	171 156 167 122 . 91 . 56 100 . 98 . 97 200 . 99
Working within dangerous areas	.94