Kubota

MINI EXCAVATOR

GB

MODEL

U17-3α

CE

OPERATING INSTRUCTIONS

W9232-8135-3 - Original - 03/2012

Dear valued customer,

please fill in the form below. Your information will help us to help you.

Type:
YOC:
Serial #:
Shipment date:

Please contact your KUBOTA dealer for any additional information or troubleshooting procedures not mentioned in these operating instructions.

We also point out that the contents of these operating instructions are not part of an earlier existing agreement, promise or legal relationship or amend these. All responsibilities arise of the respective sales contract containing the complete and exclusively valid contractual warranty. See the "Duties, liability and warranty" section (page 12). This documentation does neither extend nor restrict the contractual warranty.

KUBOTA Baumaschinen GmbH reserves its right to change the information contained in this document with respect to future technical development without altering the basic characteristics of the excavators described herein and without amending this document.

Table of contents

Abbreviations

1/min	revolutions per minute
%	percent
°	degrees
°C	degree Celsius
A	Ampere
acc.	according
API	American Petroleum Institute
approx.	approximately
ASTM	American Society for Testing and Materials
bar	bar
CECE	Committee for European Construction Equipment
CO_2	carbon dioxide
dB	Decibel
DIN	Deutsches Institut für Normung (German Institute for Standards)
e.g.	For example
EMC	Electromagnetic compatibility
EN	European standard
GL	Ground level
incl.	including
ISO	International Organization for Standardization
kg	Kilogramme
km/h	Kilometre per hour
kN	Kilonewton
kV	Kilovolt
kW	Kilowatt
L	Litre
L/min	Litres per minute
LpA	Sound pressure level operator's place
LwA	Measured sound power level
m	Metre
m/s^2	Metre per square second
m^3	Cubic metre
max.	Maximum
mm	Millimetre
MPa	Megapascal
N	Newton
resp.	Respectively
s	Second
t	Ton
V	Volt

General symbols


Warning light


Fuel display


Engine oil display


Charge display


Glow display


Hydraulic oil


Travel speed


Low speed


Forward travel


Backward travel


Extendable track width


Raise boom


Lower boom


Arm dump


Arm crowd


Bucket crowd


Bucket dump


Swivel boom (left)


Swivel boom (right)


Dozer up


Dozer down

Lever direction


Control lever direction


Rotary beacon indicator on/off


Display selector switch


Working light button

GENERAL INFORMATION

Foreword

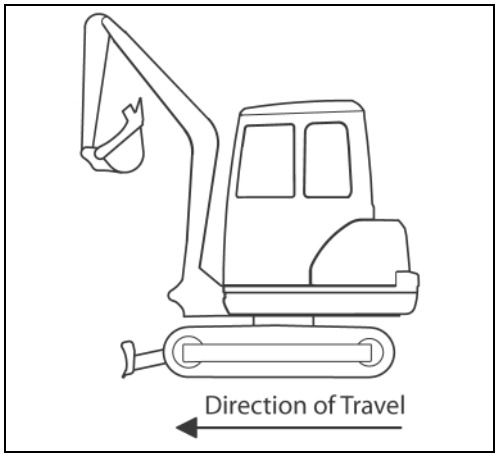
These operating instructions apply only for the KUBOTA excavator model U17-3α which complies with the EC declaration of conformity as stated below (page 10).

Safety instructions, the rules and regulations for the use of excavators given in these operating instructions apply to the excavators mentioned in this documentation.

It is the responsibility of the owner(s):

- to ensure local, regional and national regulations are observed,
- to observe the bodies of rules (laws, regulations, guidelines, etc) stated in the operating instructions to ensure safe handling of the equipment,
- to ensure that the operating instructions are always available for the operating personnel and the information, such as notes, warnings and safety rules and regulations, are followed in all points.

The terms "front" and "direction of travel" refer to the view of the operator when seated on the operator's seat. Forward direction of travel means that the dozer is at the front when driving forwards as shown in the figure.



The symbols for operating and safety instructions are listed under "Safety symbols" (page 14).

EC declaration of conformity

With the EC declaration of conformity, KUBOTA Baumaschinen GmbH certifies that the excavator is in conformity with the valid standards and regulations at the time of marketing. The CE conformity marking is located on the type plate and indicates compliance with the regulations.

If the excavator is modified or retrofitted without the approval of the manufacturer, the safety of the excavator may be affected, thus invalidating the EC declaration of conformity.

The EC declaration of conformity is attached to the operating instructions for delivery of the excavator.

Keep the EC declaration of conformity in a safe place and show it, if requested, to the responsible authorities.

Should the EC declaration of conformity get lost, please contact your KUBOTA dealer.

Date of issue of the operating instructions

The date of issue of the operating instructions is printed on the bottom right of the front page of the book.

Operating personnel

The duties of personnel with respect to operation, servicing, repairs and safety inspections must be set forth clearly by the owner.

Personnel in training are allowed to work on or with the excavator only under the supervision of an experienced operator.

Operator

According to industrial safety regulations, only persons who were instructed in the operation of the excavator, who have proven their ability to the owner (employer) and who can be expected to perform their duties in a reliable way are allowed to operate the excavator independently.

Only trained and instructed personnel are allowed to work on or with the excavator.

Only instructed personnel are allowed to start the excavator and operate the controls.

Trained personnel

Trained personnel are skilled persons with a technical qualification who are able to determine damages to the excavator and perform repairs in their area of qualification (e.g. hydraulic or electrical engineering).

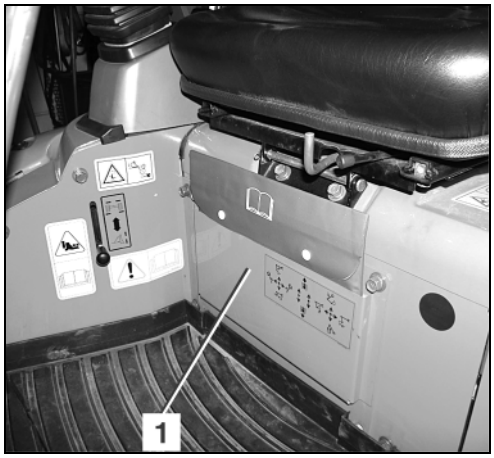
Skilled personnel

Based on their training and experience in their field, skilled personnel must have sufficient knowledge in excavator engineering and be familiar with the applicable national worker's protection regulations, safety regulations and the generally accepted technical rules so that they can assess the safe condition of the excavator.

Location of the operating instructions

The operating instructions must always be kept on the excavator. If the operating instructions have become illegible due to continuous use, the owner (operator) must order a replacement from the manufacturer.

The compartment (1) for the operating instructions is under the operator's seat.



Spare parts

Genuine spare parts can be ordered from KUBOTA dealers by stating the model and the serial # of the excavator.

The item numbers for the spare parts are indicated in the parts catalogue.

SAFETY RULES

Basic safety instructions

- The EC machine utilization directive (2009/104/EC) dated 16/09/2009 applies for the operation of the aforementioned excavator.
- The information in these operating instructions applies for maintenance and repairs.
- National rules and regulations apply where applicable.

Duties, liability and warranty

A basic requisite for the safe handling and problem-free operation of the excavator is the knowledge of the safety instructions and safety regulations.

These operating instructions, in particular the safety instructions, must be followed by all persons working near or with the excavator. Above and beyond this, the safety rules and regulations applicable for the site must also be observed.

Hazards occurring during the handling of the excavator:

- The excavators are manufactured according to the state of technology and the recognized safety rules. Nevertheless, danger to the life and limbs of the operator or a third party, or damage to the excavator or to other property can occur. The excavator(s) may only be used

  → for the approved use and

  → in a completely safe operating state.

  Malfunctions which can reduce safety must be repaired immediately.

Warranty and liability

The scope, period and form of the warranty are set forth in the sales and delivery conditions of the manufacturer. The operating instructions valid at the time of delivery shall be the basis for any warranty claims arising from errors in the valid operating instructions (page 10). The following applies above and beyond the sales and delivery conditions: No warranty or liability shall be assumed for personnel and property damages resulting from one or more of the following reasons:

- unapproved use of the excavator,
- improper starting, operation and maintenance of the excavator,
- operation of the excavator with defective safety devices or improperly installed or non-operational safety and protective devices,
- ignorance or non-observance of these operating instructions,
- insufficiently qualified or insufficiently instructed operating personnel,
- improperly performed repairs,
- unauthorised engineering changes to the excavator,
- poor surveillance of machine parts subject to wear,
- catastrophes caused by the effect of foreign objects or an act of God.

Safety rules

The owner must ensure at his own responsibility that

- the safety rules are observed (page 12),
- unapproved use and unauthorised operation (page 15) are excluded and
- the approved use (page 15) is ensured and the excavator is operated in accordance with the contractual conditions of use.

Safety symbols

The following terms and hazard symbols are used in these operating instructions:

Identifies important operating procedure information which may not be immediately evident to the operator.

Identifies operating procedures which must be followed exactly to prevent damage to the excavator or other property.

Identifies operating procedures which must be followed exactly to prevent danger to persons.

Identifies possible hazards in the handling of batteries.

Identifies possible hazards from caustic materials (battery acid).

Identifies possible hazards from explosive materials.

Prohibits the use of fire, ignition sources, and smoking.

Prohibits the spraying of water.

Identifies operating procedures for the proper disposal and storage of ensuing waste materials.

Approved use

The excavators specified in this operating instructions may only be used to loosen the ground, excavating, picking up, transporting and dumping soils, rocks and other materials, for work with the dozer or with a breaker. The load may be transported largely without driving the excavator. Do not exceed the maximum lifting capacity.

Approved use also includes:

- observation of all notes in these operating instructions,
- regular servicing,
- regular safety inspections.

Unapproved use

Any improper use – i.e. any deviation from the information in the "Approved use" section (page 15) of these operating instructions – is considered an unapproved use. This also applies to the non-observance of the standards and guidelines listed in these operating instructions.

Hazards can occur in case of improper use. Such improper uses include:

- using the excavator to lift loads without suitable load lifting attachments,
- using the excavator in contaminated environments,
- using the excavator in closed rooms or with insufficient ventilation,
- using the excavator under conditions of extreme temperatures (extreme heat or cold),
- using the excavator for underground works,
- using the excavator to transport persons in the bucket, and
- using the excavator for tearing down walls with the bucket.

Special duties of the owner

Owner of the excavator in the sense of these operating instructions is any person or company which uses the excavator itself or on whose order it is used. In special cases (e.g. leasing, rental), the owner is the person who must perform the duties arising from operation according to the conditions of the contract between owner and user of the excavator.

The owner must ensure that the excavator is only used properly and that any danger to the life and health of the user or others who are in the proximity of the user are eliminated. Furthermore, observance of the safety rules and observance of the operating, maintenance and repair regulations must be ensured. The owner must make sure that all operators and users have read and understood these operating instructions.

Persons who work with or on the excavator must be provided by the operator with, and where applicable use suitable personal protective equipment (PPE), for example suitable working clothes, safety shoes, safety helmets, eye protection, ear protection and air-filter masks. The owner/employer bears the main responsibility for the PPE, which is specified by the safety rules for particular types of activity.

Refuse such as old oil, fuel, hydraulic fluid, coolant and batteries comes under the category of toxic waste and can be a hazard to the environment, people and animals.

Disposal must be undertaken in an appropriate way, according to legally prescribed pollution control and safety regulations.

If you have questions about the correct disposal or storage of refuse and toxic waste, contact your KUBOTA dealer or a local waste management contractor.

Noise emission and vibration

The values specified in this manual have been identified in the test cycle at an identical machine and are valid for a standard equipment machine. The determined values are shown in the Specifications (page 32).

Noise emission

The noise levels were determined using the method of determining the guaranteed sound pressure level of ISO 4871 based on directive 2000/14/EC, appendix VI.

The noise levels shown are not applicable for the determination of additional workplace noise emissions. The actual noise levels may need to be determined directly at the workplaces, subject to actually existing conditions (other noise sources, special operating conditions, sound reflections).

Depending on the actual noise emissions the owner must provide the necessary personal protective equipment to the operator (ear protection).

Noise of a noise level of more than 85 dB (A) can cause hearing damage.
From a noise level of 80 dB (A), the use of an ear protection is recommended.
From a noise level of 85 dB (A), the operator must wear an ear protection.

Vibrations

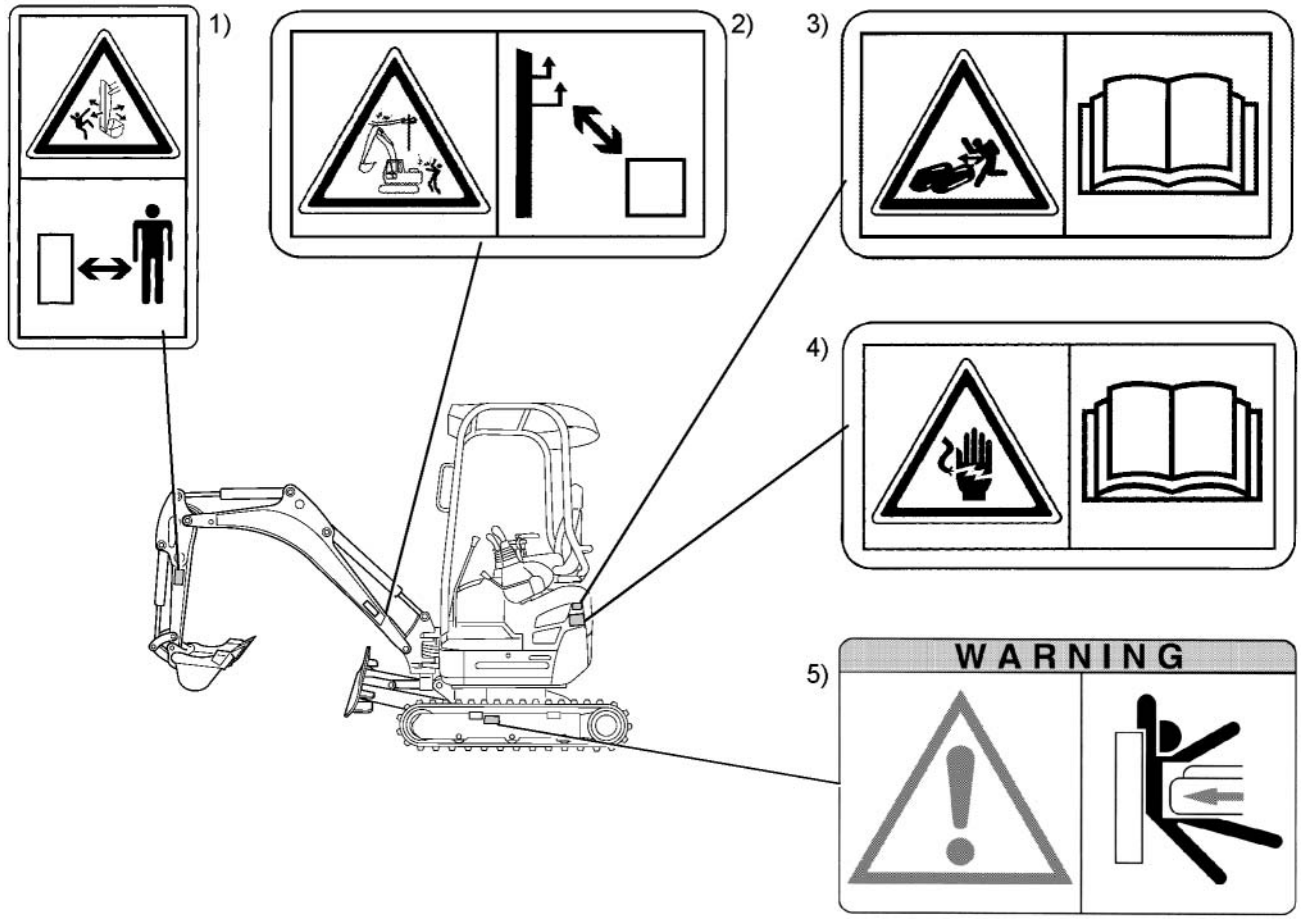
The vibrations at the machine have been determined at an identical machine.

The vibration stress on the operator over a longer period of time must be determined by the owner at the site of application, in compliance with directive 2002/44/ EC in order to consider individual magnitudes of influence.

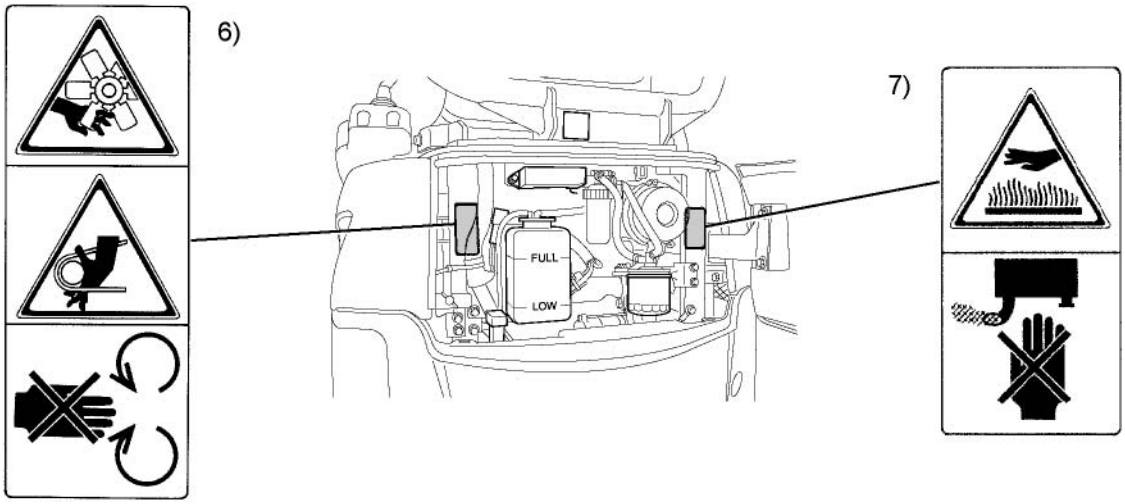
Safety labels on the excavator

Keep the safety and warning symbols (labels) on the excavator clean and legible, replacing them if necessary.

The positioning of the safety symbols is illustrated in the following figures.

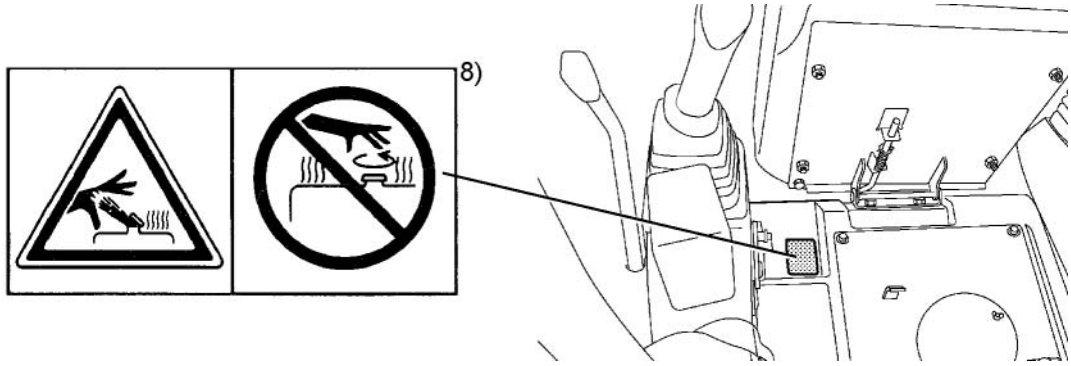


1) Code #: RD517-5789-0 (both sides)
2) Code #: RD517-5788-0
3) Code #: RD517-5795-0
   For information about loosening the crawler, consult the operating instructions.
4) Code #: RD517-5786-0
5) Code #: RA028-5728-0
   Do not enter the manoeuvring area.

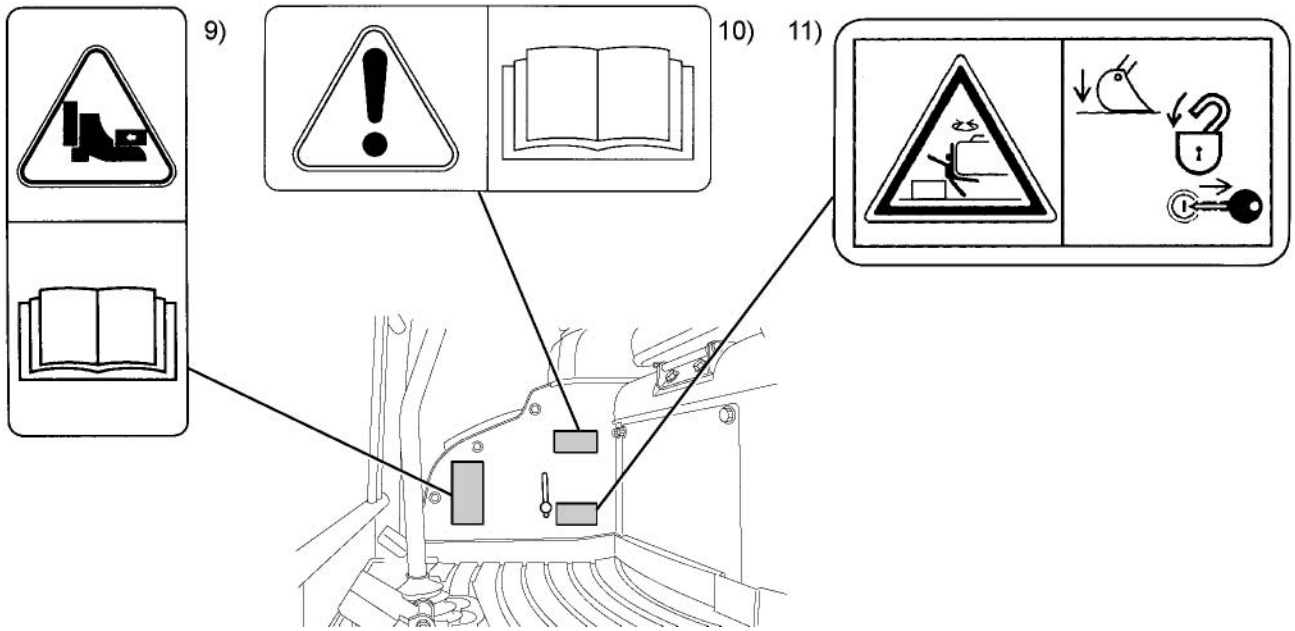


6) Code #: RC418-5737-0
Keep away from fan and drive belt.

7) Code #: TC030-4958-0
Do not touch hot parts, such as exhaust muffler, etc.



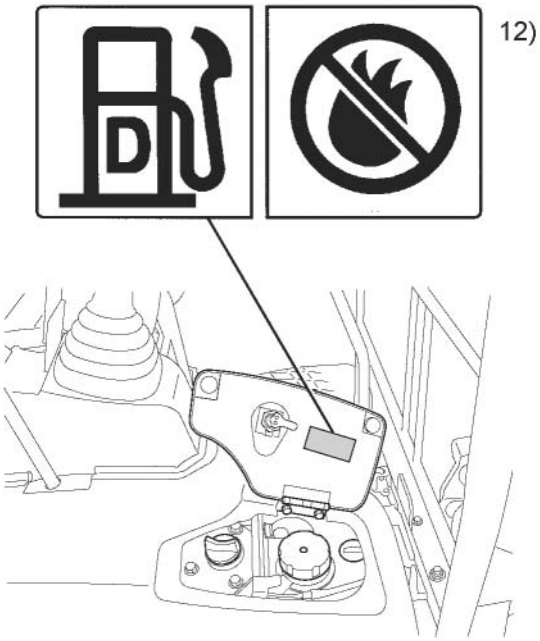
8) Code #: RD517-5754-0



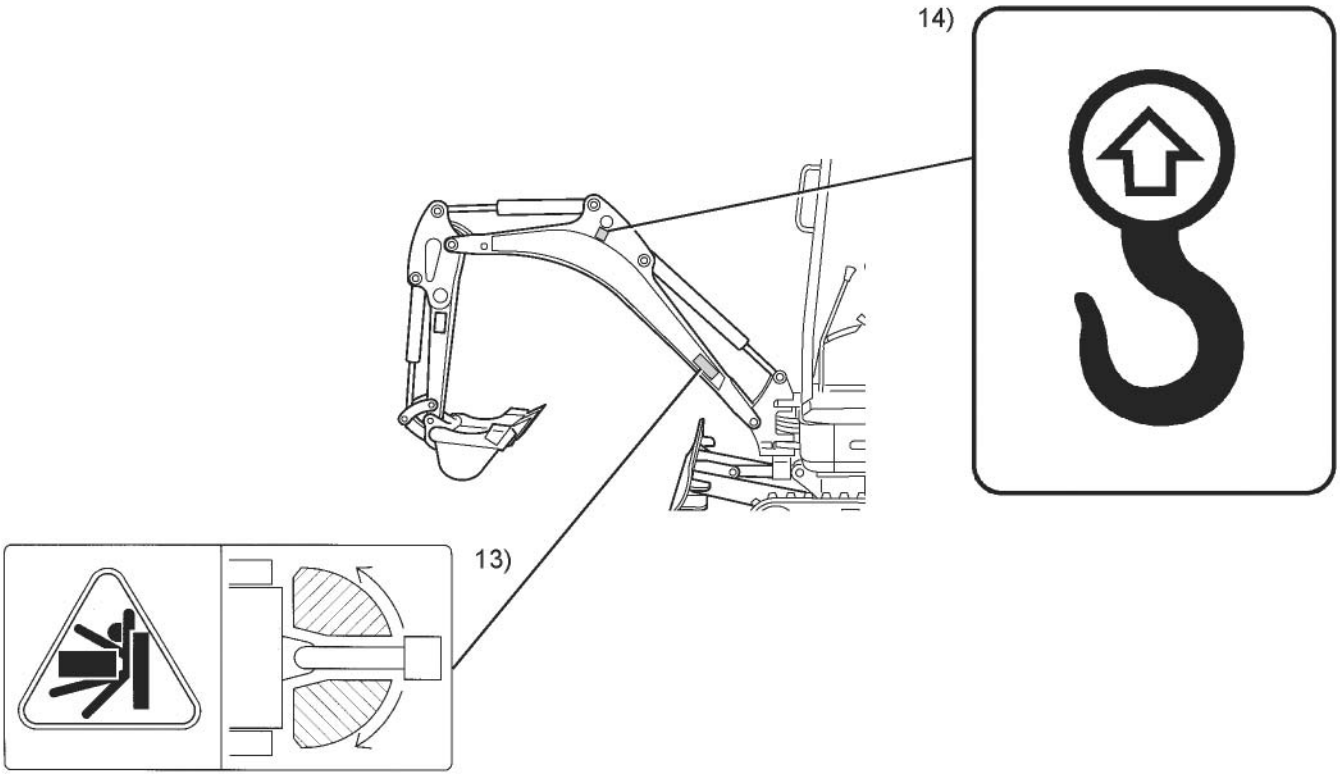
9) Code #: RA118-5776-0
Do not move the foot outside the front part of the boom swing pedal → risk of crushing.

10) Code #: 69198-5784-0
Read the operating instructions and make sure you have understood the manual before starting or operating the excavator.

11) Code #: RD517-5783-0

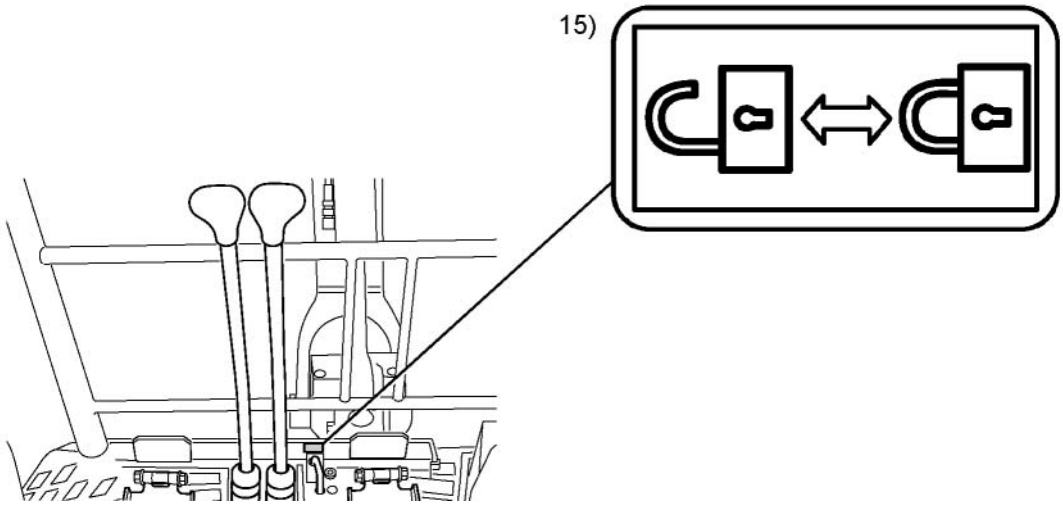


12) Code #: RB238-5736-0
For diesel fuel only! Keep away from fire.

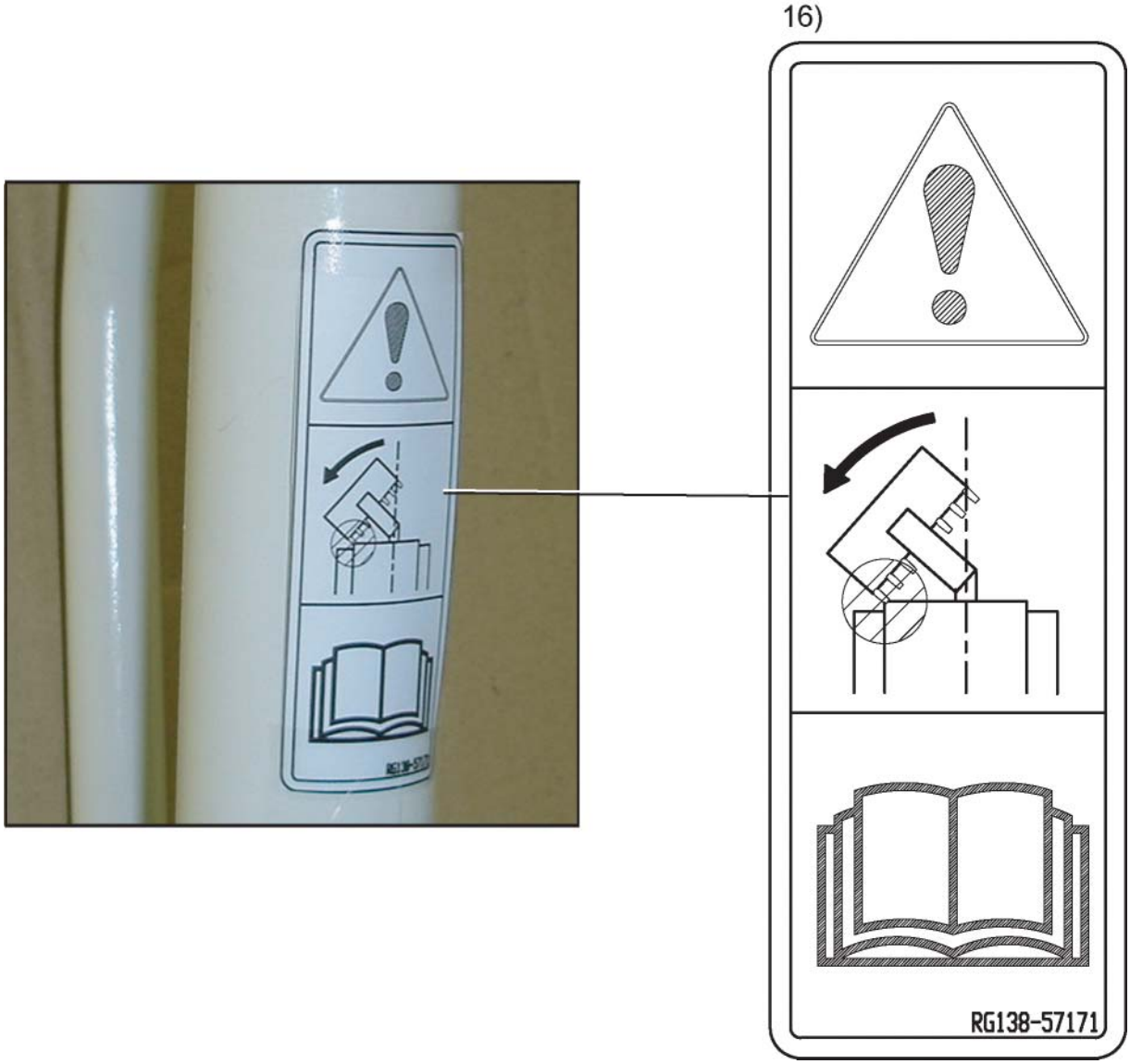


13) Code #: 69198-5722-0 (both sides)
Do not enter the swivel area.

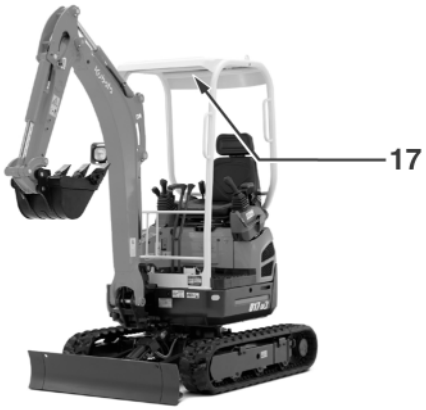
14) Code #: RC108-5796-0 (both sides)



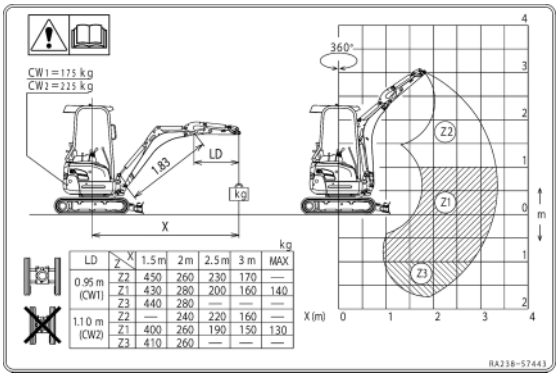
15) Code #: RA011-5753-0



16) Code #: RG138-5717-0
When using a wider or deeper bucket take care when swinging or pulling in the front attachments that the bucket does not hit the canopy.



17) Teile-Nr.: RA238-5744-0
U17-3α



LD	Z \ X	1.5 m	2 m	2.5 m	3 m	MAX
0.95 m (CW1)	Z2	450	260	230	170	—
	Z1	430	280	200	160	140
	Z3	440	280	—	—	—
1.10 m (CW2)	Z2	—	240	220	160	—
	Z1	400	260	190	150	130
	Z3	410	260	—	—	—

kg

Safety devices

Before starting the excavator, all safety devices must be installed properly and operational. No manipulation of safety devices, e.g. the shorting of limit switches, is allowed.

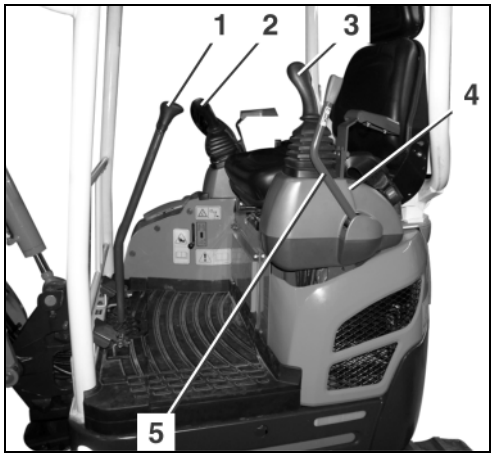
Protective devices may only be removed after

- The excavator is standing still and the engine is stopped
- and secured against restarting (starter switch in STOP position and key removed).

Locking the controls

The left and right control levers (2 and 3) and the drive levers (1) are completely disabled when the console (4) is raised. This allows safe getting on and off. The console is unlocked and raised with the control lever lock (5).

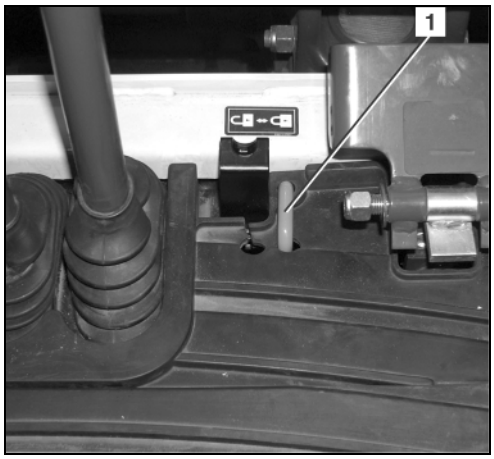
The functionality for the boom swing and the dozer, however, are not affected by the control lever lock.



Locking the swivel frame

If the swivel frame lock (1) is in the bottom position, the swivel frame and the track frame are interlocked.

Prior to locking the swivel frame, the swivel frame and the track frame have to be aligned together in a parallel position.



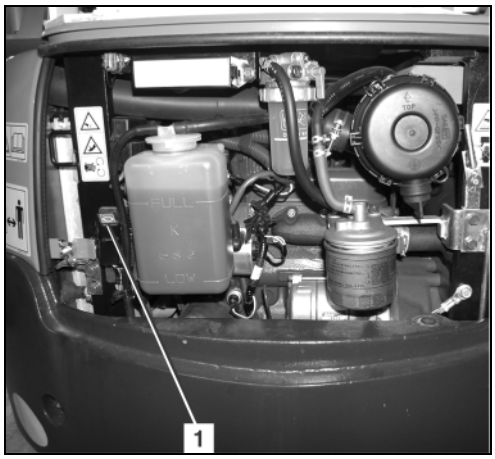
Engine stop knob

If the electrical system fails, the engine can be shut off manually.

To stop the engine:

- Open the engine compartment cover (1) (page 74).

- Open the cap (1) on the fuse holder and remove the fuse.



Roll-over protection (ROPS)

- The protective roof or cab is designed as roll-over protection (ROPS) and has been tested.
- The seat belt must be fastened while the excavator is being operated.
- Do not make any structural changes to the roll-over protection.
- At the time of damage, please contact your KUBOTA dealer. (Do not repair!)
- Never operate the excavator without the roll-over protection.

Hazards coming from the hydraulic system

If hydraulic oil gets into the eyes, rinse them immediately with clear water and subsequently seek medical aid.

Do not allow hydraulic oil to contact the skin or clothing. Skin parts which may have come in contact with hydraulic oil must be washed with water and soap immediately, if possible. Do this thoroughly and repeatedly, otherwise there is a risk of damage to the skin.

Immediately take off any clothes dirtied or soaked with hydraulic oil.

Persons who have inhaled hydraulic oil vapours (mist) should be taken to a doctor immediately.

If leaks have occurred in the hydraulic system, the excavator may not be taken into operation or, if in operation, operation must cease at once.

Do not use the naked hand to search for leaks; always use a piece of wood or cardboard. Protective clothing (eye protection and gloves) must be worn when seeking leaks.

Leaking hydraulic oil must be bound immediately with an oil binding agent. The contaminated oil binding agent must be stored in suitable containers and in accordance with the valid regulations.

Combating fire

In the event of fire in the electrical or hydraulic system, use a CO_2 fire extinguisher to combat the fire.

RECOVERY, LOADING AND TRANSPORT

Safety rules for recovery

- For recovery of the excavator, a towing vehicle of at least the same weight class as the excavator must be used.
- A tow bar must be used for the recovery. If a tow rope is used, an additional vehicle to brake the excavator must also be attached. The tow bar or tow rope must be suitable for the recovery of the excavator in respect of the towed load. Do not use damaged recovery aids.
- Do not step into the danger zone between the vehicles during the recovery procedure. If a tow rope is used, keep a distance of at least 1½ times the length of the rope.
- Use the towing eye on the track frame for the recovery.
- The above safety rules also apply if the excavator is used as the towing or recovery vehicle.
- Observe the admissible values for the towed load and the maximum pressing load vertical down on the towing eye during recovery, see "Specifications" (page 32).

Safety rules for hoisting the excavator with a crane

- The lifting gear for hoisting must be suitable for the weight of the excavator.
- Before the lifting gear is attached, check that the specified safety inspections have been performed and the lifting gear is in perfect condition.
- The excavator may only be lifted at the points provided. Do not attach the lifting gear to any other grommets or areas as this can lead to substantial damage.
- Always adhere to the valid safety regulations for the lifting of loads.
- The excavator must be secured with a holding rope when it is being lifted.
- The crane operator is responsible for the observance of these safety rules.

Safety rules for transport

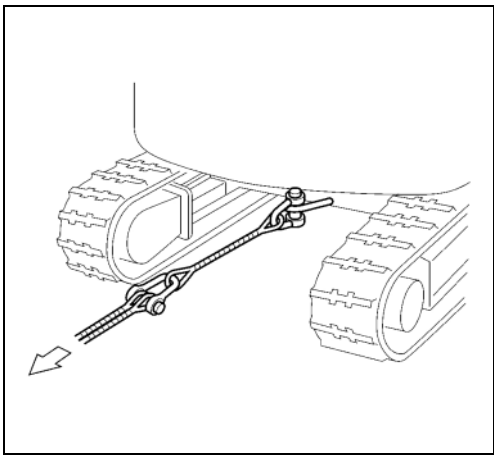
- The ramps must have a sufficient load capacity for bearing the weight of the excavator. They must be placed securely on the transport vehicle and fastened.
- Support the loading area at the rear of the transport vehicle with sufficiently dimensioned supports.
- The ramps must be wider than the track of the excavator and have footboards on the side.
- The transport vehicle must be designed for the load of the excavator.
- Place the left and the right ramp so that the centre line of the transport vehicle is aligned with the centre line of the excavator to be loaded.
- Do not drive the excavator onto the transport vehicle without ramps and with the boom.
- Engage the parking brake of the transport vehicle and secure its front and rear wheels with chocks.
- Secure the excavator against sliding on the transport vehicle with chocks or chains or with suitable tiedown straps. The chocks must be secured at the crawlers and on the transport vehicle with suitable means. The operator of the transport vehicle is responsible for the secure fastening of the excavator on the vehicle.
- A guide is required for driving the excavator onto and off the transport vehicle. The guide is responsible for the safe loading. The excavator may only be moved on instruction of the guide; the operator and guide must always have eye contact. If this is not possible, the operator must stop the excavator immediately.
- When driving with an excavator loaded, always keep a clearance of 1.0 m to overhead power lines. Observe the applicable traffic rules and regulations.

Recovery

Adhere to the safety rules (page 12) and the safety rules for recovery (page 25).

A recovery is only allowed over a short distance and at walking speed (0.5 m/s ~ 1.0 m/s).

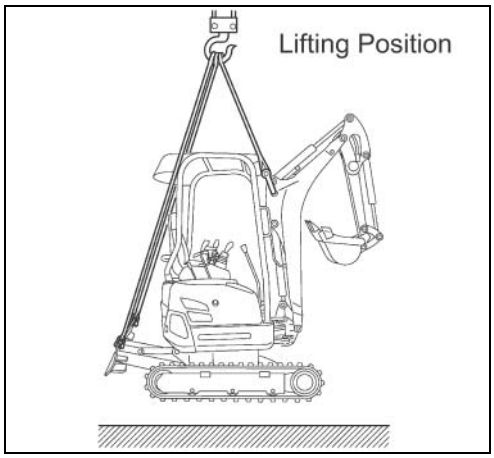
- Attach the tow bar or tow rope to the towing eye (see figure) on the excavator and to the towing vehicle. The tow bar should be mounted at a right angle to the vehicles.



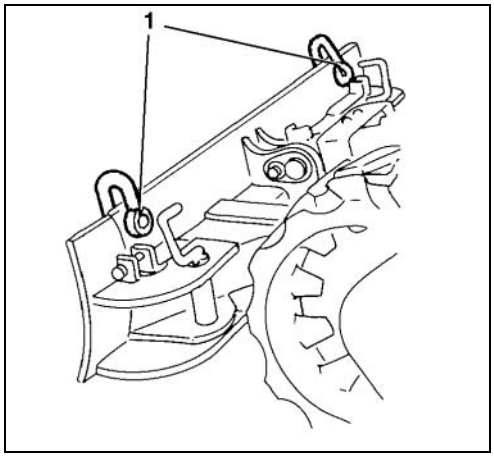
- If the towing eye of the excavator is not accessible, a tow rope can also be fastened around the centre of the dozer blade.
- During the recovery procedure, the operator must be seated on the operator's place.
- Drive slowly with the towing vehicle to avoid abrupt loads.

Hoisting the excavator with a crane

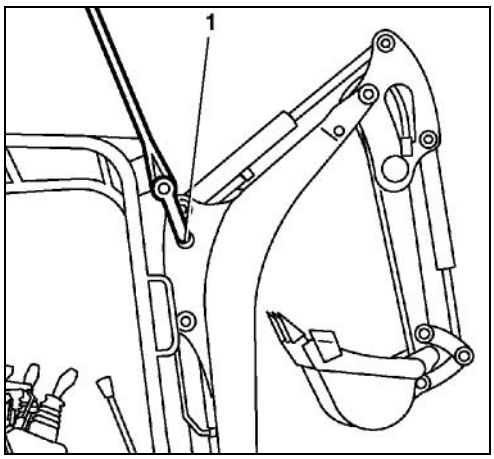
Adhere to the safety rules (page 12) and the safety rules for hoisting the excavator with a crane (page 25).



- Bring the excavator to the lifting position (see figure) on level ground.
- Swivel the swivel frame so that the dozer is located at the rear (page 61).
- Lock the swivel frame (page 23).
- Lift the dozer until the dozer cylinders are fully retracted.
- Completely extend the bucket cylinder and arm cylinder.
- Completely retract the boom cylinder.
- Attach the lifting gear with shackles to the lifting eye (1) on each side of the dozer.

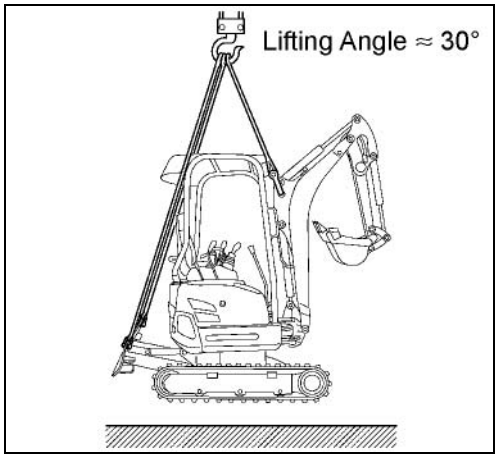


- Attach the lifting gear with a shackle to a lifting eye (1) on one side of the boom.



- As soon as the lifting gear is attached to the excavator, press cloths between lifting gear and excavator to protect the excavator.

- Always keep the machine level. Be sure that the centre line of the crane hook is aligned as exactly as possible with the centre line of the excavator and that the lifting angle is as specified. Lift the excavator.



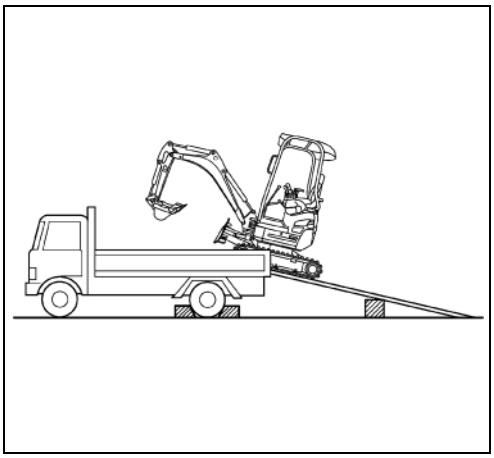
The excavator may only be lifted at the points provided. Do not attach the lifting gear to any other eyes or areas as this can lead to substantial damage.

Transport on a flat bed trailer

Adhere to the safety rules (page 12) and the safety rules for transport (page 26).

- Place the loading ramps on the transport vehicle at an angle of 10° to 15°. Observe the track width.

- Bring the excavator exactly into line with the ramps and drive up straight.



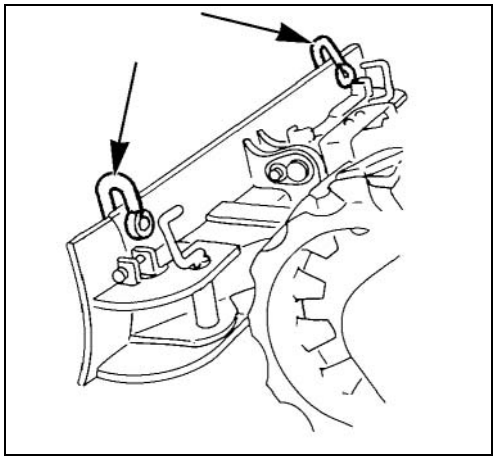
Do not turn or steer while driving up the ramps; if necessary, reverse the excavator and drive up again after realigning it.

DANGER
No person is allowed to stand in the loading area during movement. Risk of bruising.

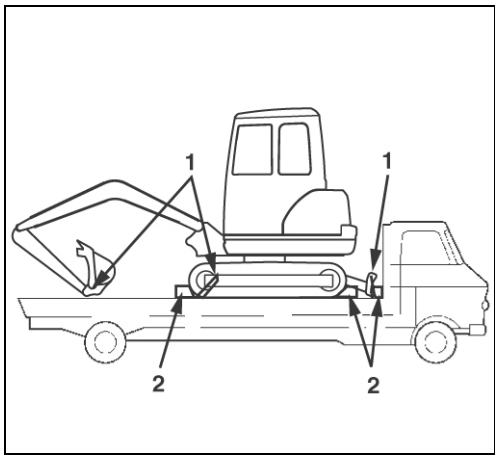
Take care during swivel operations, the front attachments could thrust against the transport vehicle. This could damage the transport vehicle and the excavator.

- Turn swivel frame by 180° until the front attachments face the rear of the transport vehicle.

For protecting the vehicle, tie down the points as shown in the figure.



- For safe attachment, swing out the arm and bucket and lower the boom to the ground until the bucket linkage touches the loading area.
- Secure the chains and the dozer with beams (2).
- Secure the excavator against sliding on the transport vehicle with chocks or chains at the specified positions (1) (note the vehicle weight).



- Lock the excavator after hoisting.

DESCRIPTION OF THE EXCAVATOR

Model overview

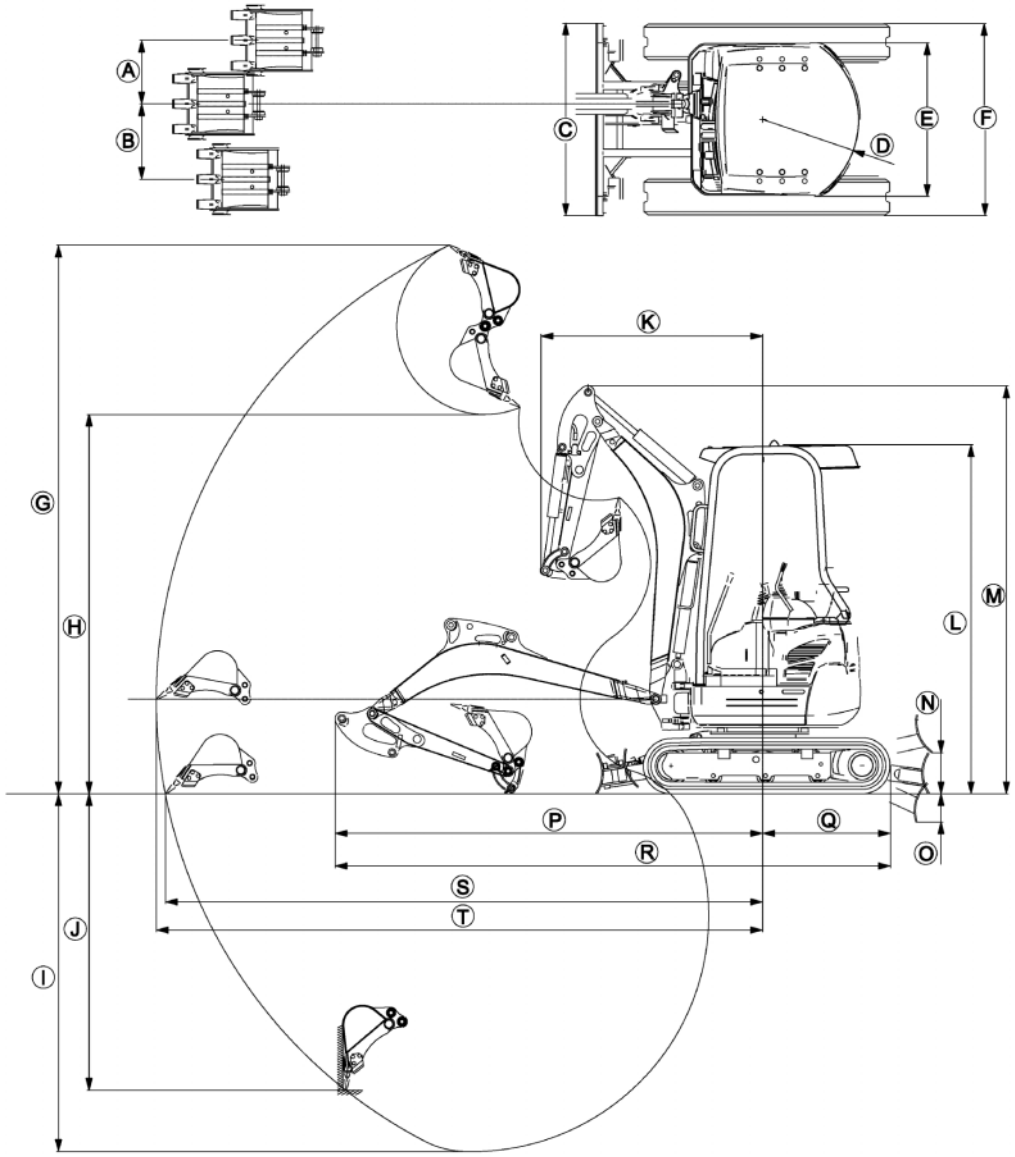
The excavator is only shipped as canopy version.

Model U17-3α

Dimensions

For the dimensions of the U17-3α, refer to the following figure and table.

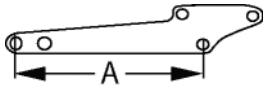
U17-3α Dimensions



All dimensions in mm

U17-3α	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1*	510	385	990/ 1240	620	990	990/ 1240	3540	2440	2310	1910	1440	2340	2630	280	190	2750	795	3545	3840	3900
2*				650			3610	2520	2460	2010	1480					2760		3555	3970	4030

Arm version

Name		Type	
1*	Standard arm		A = 950 mm
2*	Long arm		A = 1100 mm

Specifications

Following are the specifications for these series.

Specifications for the U17-3α

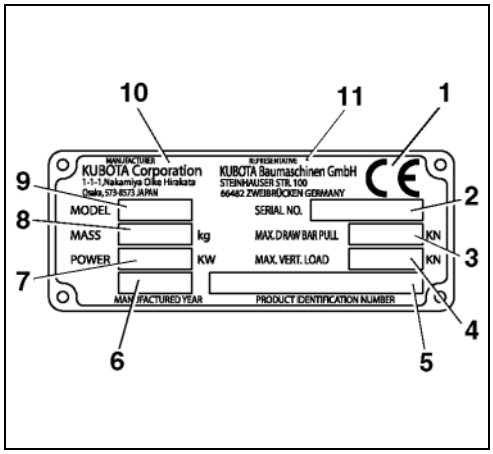
			KUBOTA Excavator
Model name			U17-3α
Type (rubber crawler)			Canopy
Operating weight	(without operator)	kg	1650/1700*
Bucket	Volume	m³	0,04
	Width	mm	400
Engine	Type		3 cylinder diesel engine, water-cooled
	Model name		KUBOTA D902-BH-1
	Displacement	cm³	898
	Engine performance ISO 9249	kW	11,8
	Rated speed	1/min	2300
Performance	Swivel speed (swivel frame)	1/min	9,1
	Vehicle speed	fast km/h	4,1
		slow km/h	2,1
	Ground pressure (without operator)	kPa (kgf/cm²)	27 (0,28)/28 (0,29)*
	Climbing performance	% (degrees)	27 (15)
	Max. lateral sway	% (degrees)	18 (10)
Dozer (width x height)		mm	990 x 260; 1240 x 260
Swing angle of the boom	Left	rad (degrees)	1,13 (65)
	Right	rad (degrees)	1,01 (58)
Auxiliary port connector	Max. volume (theoretical)	L/min	27
	Max. pressure	MPa	18,6
		(kgf/cm²)	190
Volume of the fuel reservoir		L	19
Pulling capacity of the towing eye		N	32300
Tongue load at the towing eye		N	2700
Noise level	LpA	dB (A)	79
	LwA	(2000/14/EC) dB (A)	92
Vibration at the drive lever**		m/s²	< 3,0
Vibration at the control lever**		m/s²	< 4,5
Vibration at the operator's seat**		m/s²	< 0,5
Vibration at the bottom plate**		m/s²	< 0,9
Vibration at the wrist rest**		m/s²	-

* Long arm

** These values are measured under specific conditions at maximum engine speed and can deviate, depending on the operating situation.

Identification of the excavator

The type plate of the excavator is located at the front of the swivel frame. The owner should enter the stamped data in the field on the back of the front cover.



1. CE marking
2. Serial #
3. Max. pulling capacity at the towing eyes
4. Max. vertical load at the towing eyes
5. Product ID number
6. Year of construction
7. Engine performance
8. Operating weight
9. Model name
10. Manufacturer
11. Representative

Equipment

The standard equipment of the excavator can be enhanced by optional equipment (accessories).

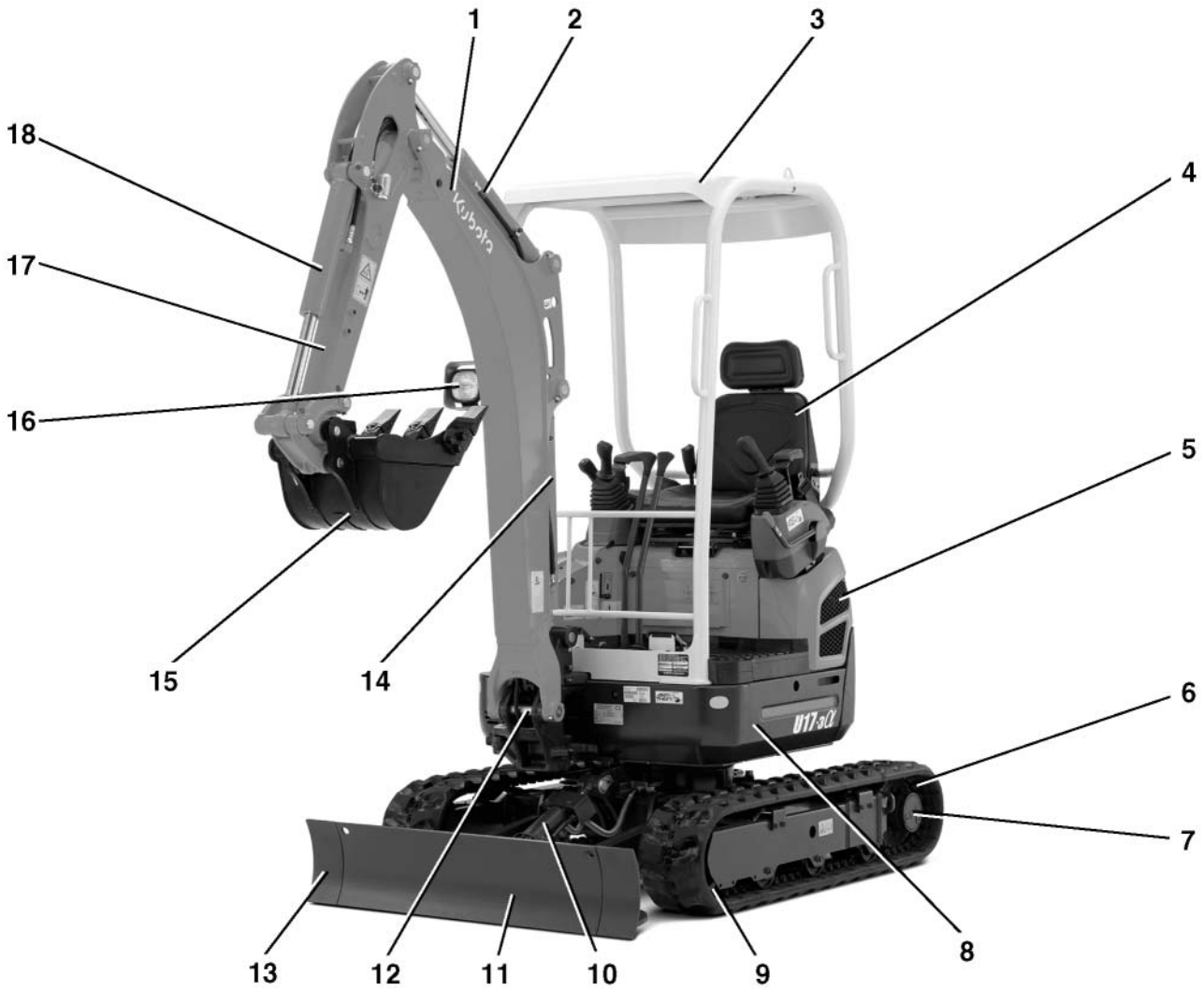
Standard equipment

This model has the following standard equipment:

- Operating instructions
- Folder for the operating instructions
- Illustrated parts catalogue
- Filter wrench
- Grease gun
- Spare fuse (50 A)

ASSEMBLY AND FUNCTIONS

Component overview

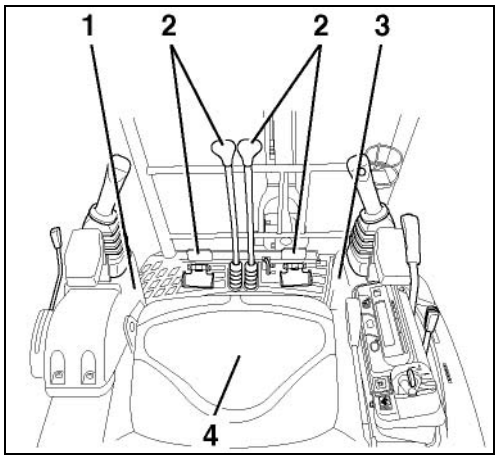


1. Boom
2. Arm cylinder
3. Canopy
4. Operator's seat
5. Engine compartment cover
6. Drive sprocket
7. Drive unit
8. Swivel frame
9. Idler
10. Dozer cylinder
11. Dozer
12. Swing block
13. Dozer enlargement
14. Boom cylinder
15. Bucket
16. Working light
17. Arm
18. Bucket cylinder

Operator's place

The operator's place is located in the middle of the excavator. It includes the following control elements:

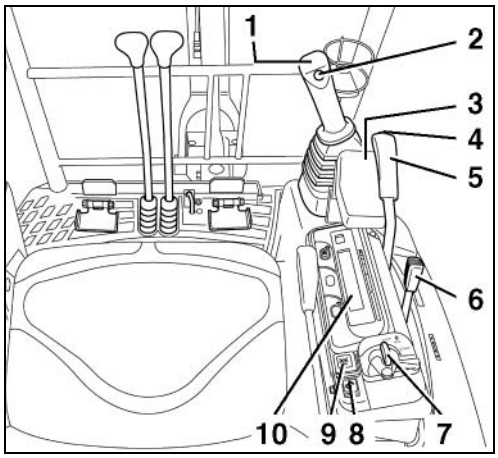
1. Left control console
2. Drive levers and control pedals
3. Right control console
4. Operator's seat



Right control console

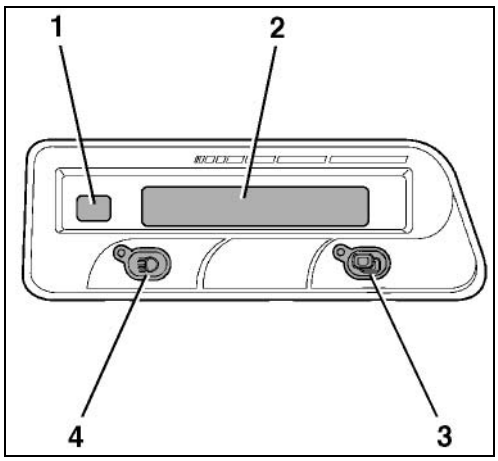
The right control console (see figure) includes the following components:

1. Right control lever
2. Horn switch
3. Wrist rest
4. Travel speed button
5. Dozer control lever
6. Throttle lever
7. Starter switch
8. Travel speed indicator
9. Rotary beacon button
10. Display



The display contains the following displays and indicators:

1. Warning light
2. Display
3. Display selector switch
4. Working light button



Description of the components of the right control console

1. **Right control lever**
   The functions of the right control lever are described in the "Controls" section (page 37).

2. **Horn switch**
   Depressing the horn switch activates the horn.

3. **Wrist rest**
   The wrist rest allows fatigue-free operation of the control lever.

4. **Travel speed button**
   The travel speed button switches the HI speed mode on and off.

5. **Dozer control lever**
   The functions of the dozer control lever are described in the "Controls" section (page 37).

6. **Throttle lever**
   The operator can use this lever to set the engine RPM to any desired speed.

7. **Starter switch**
   The starter switch serves as the master switch for the entire machine and as switch for pre-glowing and starting the engine.

8. **Travel speed indicator**
   The travel speed indicator lights up when the travel speed mode is activated.

9. **Rotary beacon button**
   The rotary beacon is switched on with this button.

10. **Display**
    The functions of the display are described in the "Displays and indicators – description" section (page 35).

Displays and indicators – description

1. **Warning light**
   The warning light flashes yellow or red when a fault occurs.

Operations must cease immediately when the warning light flashes red.

2. **Display**
   Depending on the operating situation, the display shows the fuel level, engine temperature, the hours of operation, speed and various indicator symbols. The chapter for the operation gives a detailed description of the individual displays based on specific operating situations.

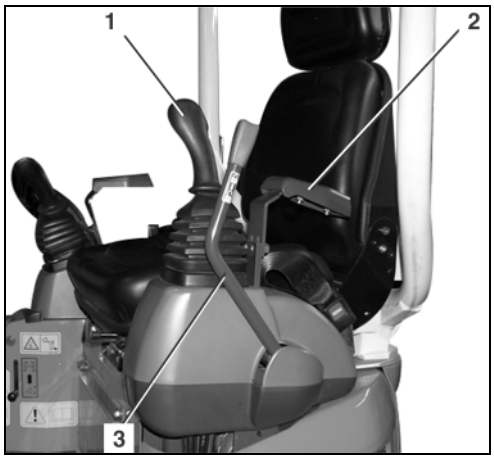
3. **Display selector switch**
   Toggles between two different types of display.

4. **Working light button**
   Switches the working lights on and off.

Left control console

The left control console includes the following components:

1. Left control lever
2. Wrist rest
3. Control lever lock



Description of the components of the left control console

1. Left control lever
The functions of the left control lever are described in the "Controls" section (page 37).

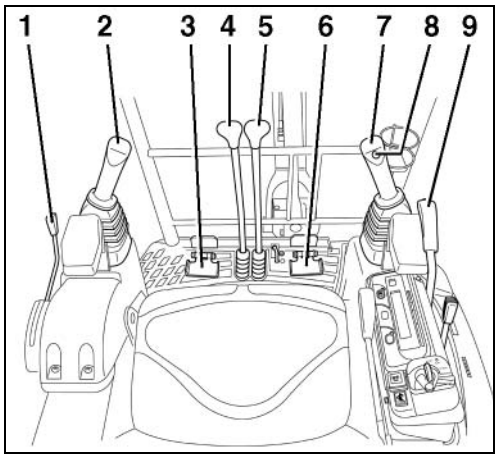
2. Wrist rest
The wrist rest allows fatigue-free operation of the control lever.

3. Control lever lock
The operation of the control lever lock is described in the "Controls" section (page 37).

Controls

The controls include the following components:

1. Control lever lock
2. Left control lever
3. Auxiliary port pedal
4. Left drive lever
5. Right drive lever
6. Boom swing pedal
7. Right control lever
8. Horn switch
9. Dozer control lever



Description of the controls

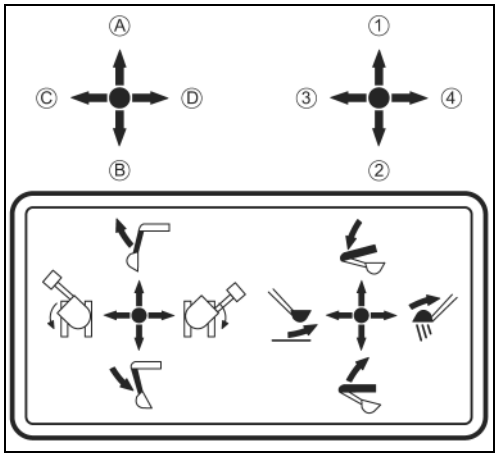
1. Control lever lock

To mount and dismount the cab, the console must be raised by pulling up the control lever lock. The engine can only be started if the console is raised. The controls are only operational when the console is lowered and the control lever lock is in the "down" position.

2. Left control lever

The left control lever is used to swivel the swivel frame and move the arm. See the control lever table below for details.

The figure shows, in connection with the following table, the functions of the left and right control levers.



Control lever		Movement
Right control lever	1	Lower boom
	2	Raise boom
	3	Bucket crowd
	4	Bucket dump
Left control lever	A	Arm dump
	B	Arm crowd
	C	Swivel frame to the left
	D	Swivel frame to the right

3. Auxiliary port pedal

The auxiliary port pedal is used to operate an implement.

4./5. Left and right drive levers

With the drive levers the excavator can be driven forwards and backwards and also turned. The left drive lever controls the left track and the right drive lever controls the right track.

6. Boom swing pedal

This pedal is used to swing the boom right and left.

7. Right control lever

The right control lever is used to move the boom and the bucket. See "Control lever" table above.

8. Horn button

Depressing the horn button activates the horn.

9. Dozer control lever

The dozer control lever is used to raise or lower the dozer. Pushing the lever forward lowers the dozer and pulling it back raises it.

Other machine components

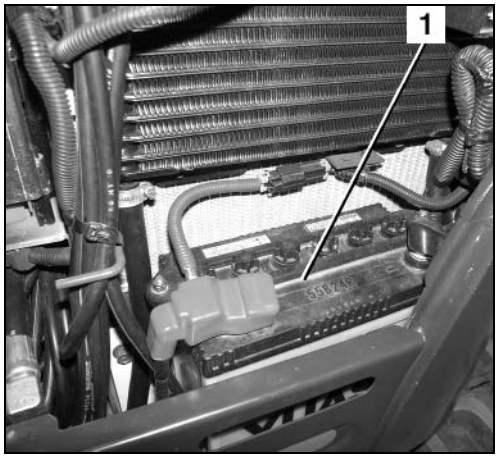
The following details the other machine components.

Fuse box

The fuse box (1) is positioned inside the engine compartment on top of the coolant expansion reservoir.

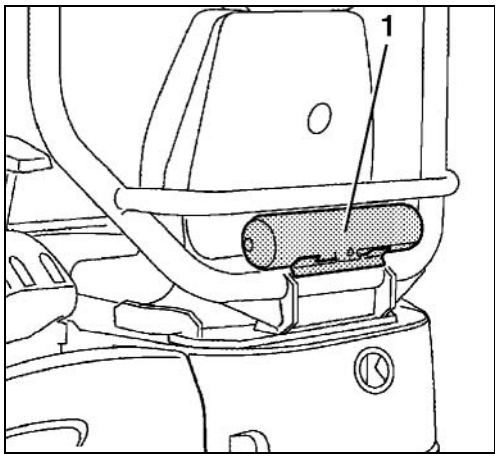
Battery

The battery (1) is positioned at the left side of the machine behind the side cover.



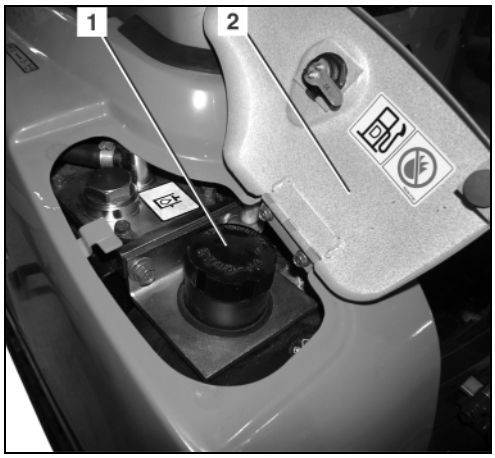
Tool compartment

The tool compartment (1) is positioned at the rear of the operator's seat.



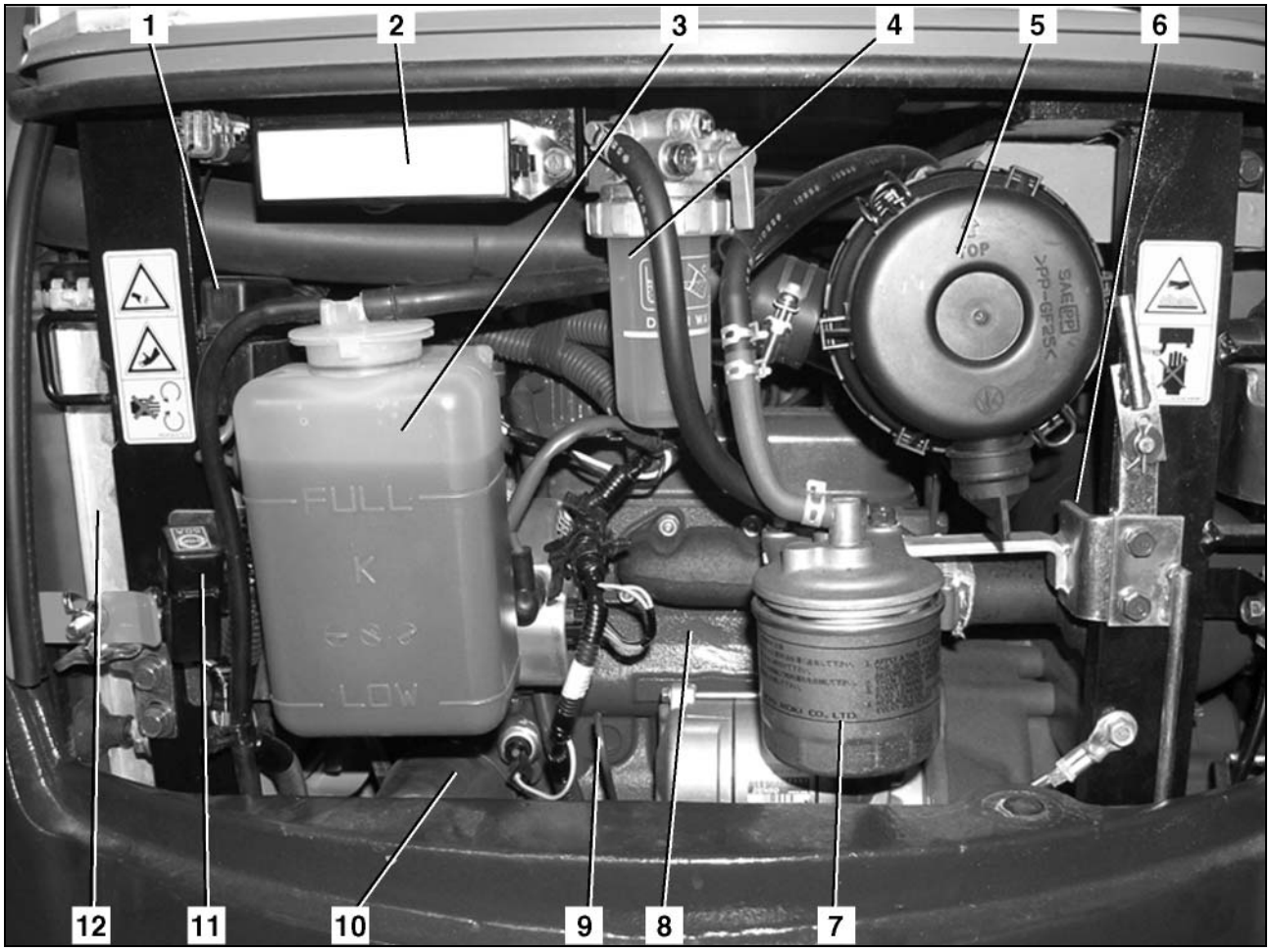
Fuel tank filler neck

The fuel tank filler neck (1) is positioned under the fuel filler flap (2) at the front right side of the excavator. The fuel filler flap can be locked.



Engine compartment

The engine compartment (see figure below) is positioned at the rear of the swivel frame; it is covered by a lockable cover.



1. Main fuse
2. Fuse box
3. Coolant expansion reservoir
4. Water separator
5. Air filter
6. Exhaust silencer
7. Fuel filter
8. Engine
9. Oil dipstick
10. Oil filter
11. Engine stop knob
12. Radiator

Hydraulic system

The controls, except the dozer control lever, the boom swing pedal, the auxiliary port pedal and the drive levers, activate a pilot control circuit.

The accumulator (figure below, position 1) allows the boom and arm to be lowered in case of an engine failure.

The hydraulic oil tank contains the suction filter and the return filter.

1. Accumulator
2. Filler port
3. Hydraulic oil tank cap
4. Hydraulic oil tank
5. Sight glass for hydraulic oil level
6. Hydraulic oil pump

OPERATION

Safety rules for operation

- The safety instructions (page 12) must be followed.
- The excavator may only be operated according to its approved use (page 15).
- The excavator may only be operated by trained personnel (page 10).
- Do not operate the excavator when under the influence of drugs, medication or alcohol. Stop operation when getting tired. The operator must be physically capable of operating the excavator safely.
- The excavator should only be operated if all safety and protective devices are fully operational.
- Before starting or working with the excavator, make sure that there is no danger for any person nearby.
- Before starting the excavator, it must be checked for external damage and operability, and the pre-start checks must be carried out. If defects are detected, the excavator should only be taken into operation after the defects have been repaired.
- Wear tightly fitting working clothes in accordance with the trade association regulations.
- During the operation of the excavator, nobody except the operator is allowed to get on the excavator or to be inside the excavator.
- For getting on and off, the swivel frame should be put in an angle which allows the operator to use the crawler as a step.
- Always stop the engine when leaving the excavator. In exceptional cases, e.g. for troubleshooting, the excavator can also be left with the engine running. The operator must make sure that the control levers are locked during such an operation. The controls may only be used while the operator is sitting on the operator's seat.
- During operation the operator must remain seated on the operator's seat with tightly fastened seat belt. Arms, legs or head must not protrude beyond the swivel frame at any time.
- If the operator leaves the excavator (e.g. for breaks or at the end of work), the engine must be stopped and the excavator must be secured against restarting by removing the key. The control levers are to be locked. Before leaving the excavator, park the machine so that it can not move.
- Whenever work is interrupted, the bucket must always be lowered to the ground.
- Do not allow the engine to run indoors, unless the room is equipped with an exhaust gas extraction system or otherwise well ventilated. The exhaust gas contains carbon monoxide, a colourless, odourless, and lethal gas.
- Never crawl under the excavator before the engine is stopped, the key is removed and the excavator is secured against moving.
- Never crawl under the excavator if it is only raised with the bucket or the dozer. Always use suitable supports.

Guiding the operator

- If the operator's working and driving area is obscured, the operator must be supported by a guide.
- The guide must be capable of performing this kind of work.
- Before starting work, the guide and the operator must agree the necessary signals.
- The guide's position must be clearly visible by the operator.
- The operator must stop the excavator immediately if the eye contact to the guide is interrupted.
  → As a rule, either the excavator or the guide may move, never both at once!

Working in the vicinity of overhead power lines

When working with the excavator in the vicinity of overhead power lines and tram lines, a minimum distance as specified in the following table must be maintained between the excavator and its attachments and the power line.

Rated voltage [V]		Safe distance [m]
	up to 1 kV	1.0 m
over 1 kV	up to 110 kV	3.0 m
over 110 kV	up to 220 kV	4.0 m
over 220 kV	up to 380 kV or when rated voltage is unknown	5.0 m

If safe distances can not be maintained, the power lines must be switched off in coordination with their owner or provider and secured against making them live again.

When approaching overhead power lines, any possible movements of the excavator must be taken into consideration.

Unevenness of the ground or sloping the excavator can reduce the safe distance.

Wind can cause the overhead power lines to sway, thus reducing the safe distance.

In case of a power cross-over, leave the danger zone with the excavator, if possible, by taking suitable measures. If this is not possible, do not leave the operator's place, warn any approaching persons of the danger, and have the power switched off.

Working in the vicinity of underground power lines

Before starting with excavation work, the owner of the excavator or the person responsible for the work must check if there are any underground power lines in the proposed working area.

If there are underground power lines present, the position and routing of the power lines must be determined together with the owners or operators and the required safety measures must be determined.

If power lines are encountered or accidentally damaged, the operator must stop working immediately and inform the responsible person.

Initial operation

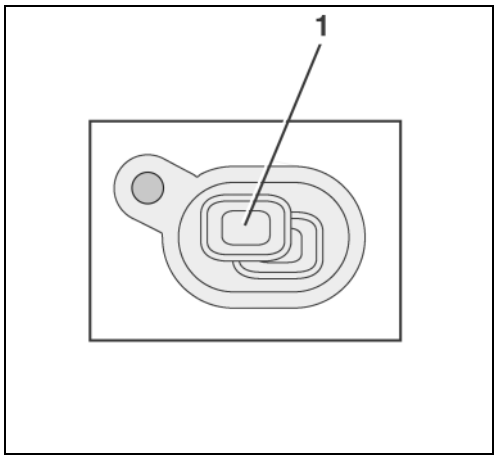
Before initial operation, the excavator must first be checked visually for external transit damages and checked if the shipped equipment is complete as ordered.

- Check fluid levels as described in the "Maintenance" section (page 84).
- For a description of all operation features, see the "Operating the excavator" section (page 46) as well as the following sections.

If defects are detected, please inform your dealer immediately.

Setting the display language

- Press and hold the display selector switch (1) and turn the starter switch to the RUN position at the same time. The model is shown in the display. Release the display selector switch to show the currently selected language.



English
Français

- To select the desired language, repeatedly press the display selector switch until the desired language is shown. Press and hold the display selector switch to store the selected language.

Running-in of the excavator

During the first 50 hours of operation, the following points should be adhered to in all cases:

- Do not operate the excavator with full speed and full load.
- When working in cold weather, allow some extra time for the engine to warm up.
- Make sure the engine always runs at a low speed.

Special maintenance instructions

- Change the oil in the drive units after the first 50 hours of operation.
- Change the return filter of the hydraulic system after the first 250 hours of operation.

Operating the excavator

For a safe excavator operation, see the following sections.

Pre-operational services

For the performance of the services, the excavator must be parked on level ground and the key must be removed. Also, the control levers and the swivel frame have to be locked (page 23).

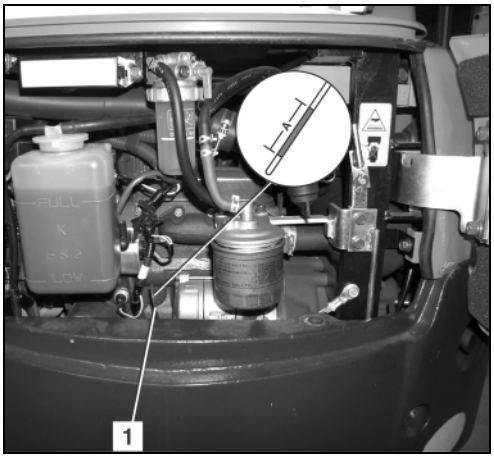
- Open the engine compartment cover (page 74). Always close the engine compartment cover after the work is done.

Walk-around inspection

- Check the excavator for visible damage, loose screws and leaks.
- Check the existence and legibility of the safety instructions (labels) on the excavator. Replace the safety instructions if necessary (page 17).

Checking the engine oil level

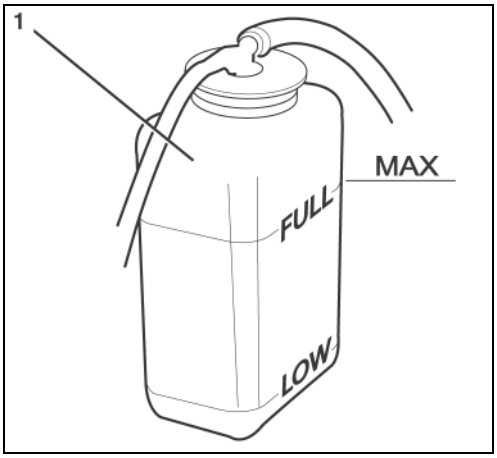
- Pull out the oil dipstick (1) and wipe it with a clean cloth.
- Insert the oil dipstick completely and pull it out again. The oil level should be in the "A" area. If the oil level is too low, add engine oil (page 91).



When the oil level is too high or too low, the engine might get damaged during operation.

Checking the coolant level

- Check the coolant level in the expansion reservoir (1). The fluid level must be between FULL and LOW.



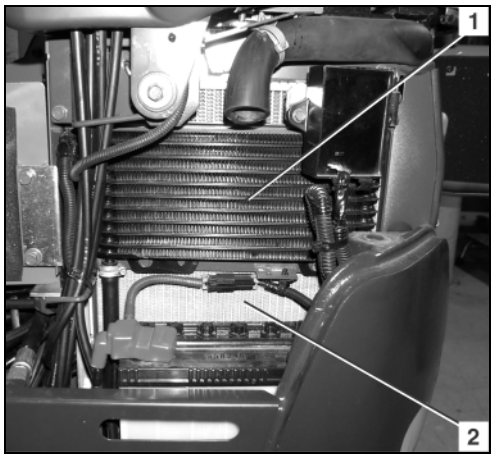
STOP *Do not open the radiator cap.*

If the coolant level is below the LOW mark, refill (page 89).

If the coolant level is below the LOW mark a short time after adding coolant, the cooling system is leaky. The excavator must only be started again after the fault is repaired.

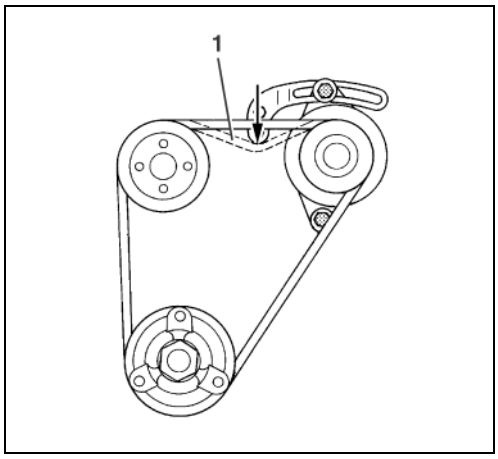
Checking the radiator and the oil cooler

- Open the left side cover (page 75).
- Check the radiator (2) and oil cooler (1) for leaks and debris (e.g. leaves).
- If there are leaves or other debris between the radiator and cooler, clean the radiator (page 90).



Checking the V-belt

- Open the engine compartment cover under the operator's seat (page 74).
- Check the V-belt (1) for cracks and proper tension. It should be possible to depress the V-belt for about 10 mm. If the tension is too low, tighten the V-belt (page 90).



Checking the exhaust system for leaks

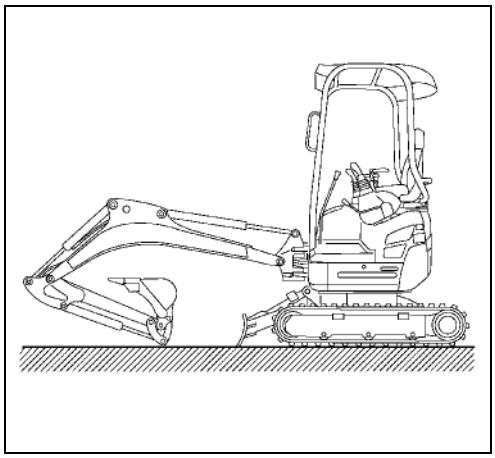
- Check the exhaust system for leaks and security (formation of cracks).

If the inspection is carried out when the engine is warm, there is a risk of burns at the exhaust system.

- If the exhaust system is leaky or loose, the excavator may only be taken into operation after the defects are eliminated.

Checking the oil level of the hydraulic system

To determine the oil level exactly, do the following: Fully pull in the bucket and arm, lower the dozer to the ground, adjust the extendable track width to standard track width, align the front attachments with the swing mechanism in a straight line to the swivel frame and lower the boom to the ground.

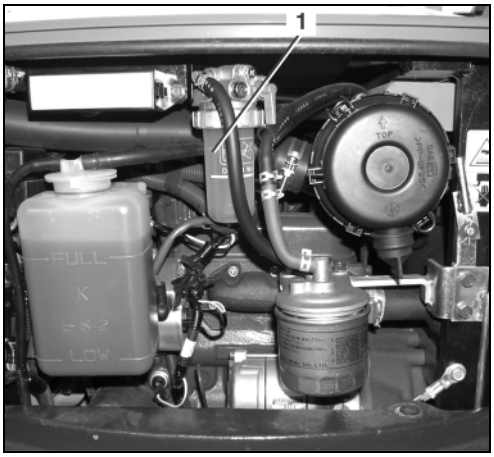


- Check the oil level in the sight glass (1). The oil level should be half way up the sight glass. Carefully check the position of the hydraulic cylinders again before refilling. For more information, see the "Refilling hydraulic oil" section (page 96).

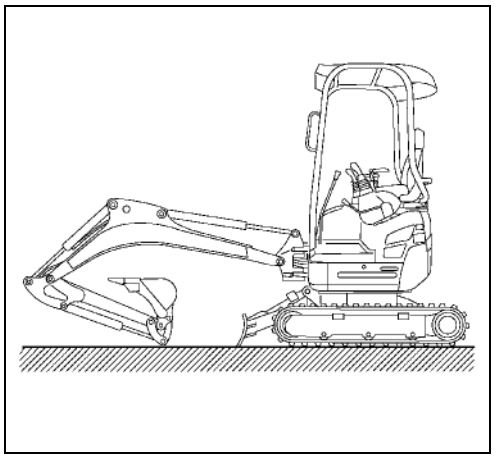
Checking the water separator of the fuel system

Check the water separator (1) for water content and contamination, clean if necessary (page 95).

A red plastic ring in the water separator floats on the water.



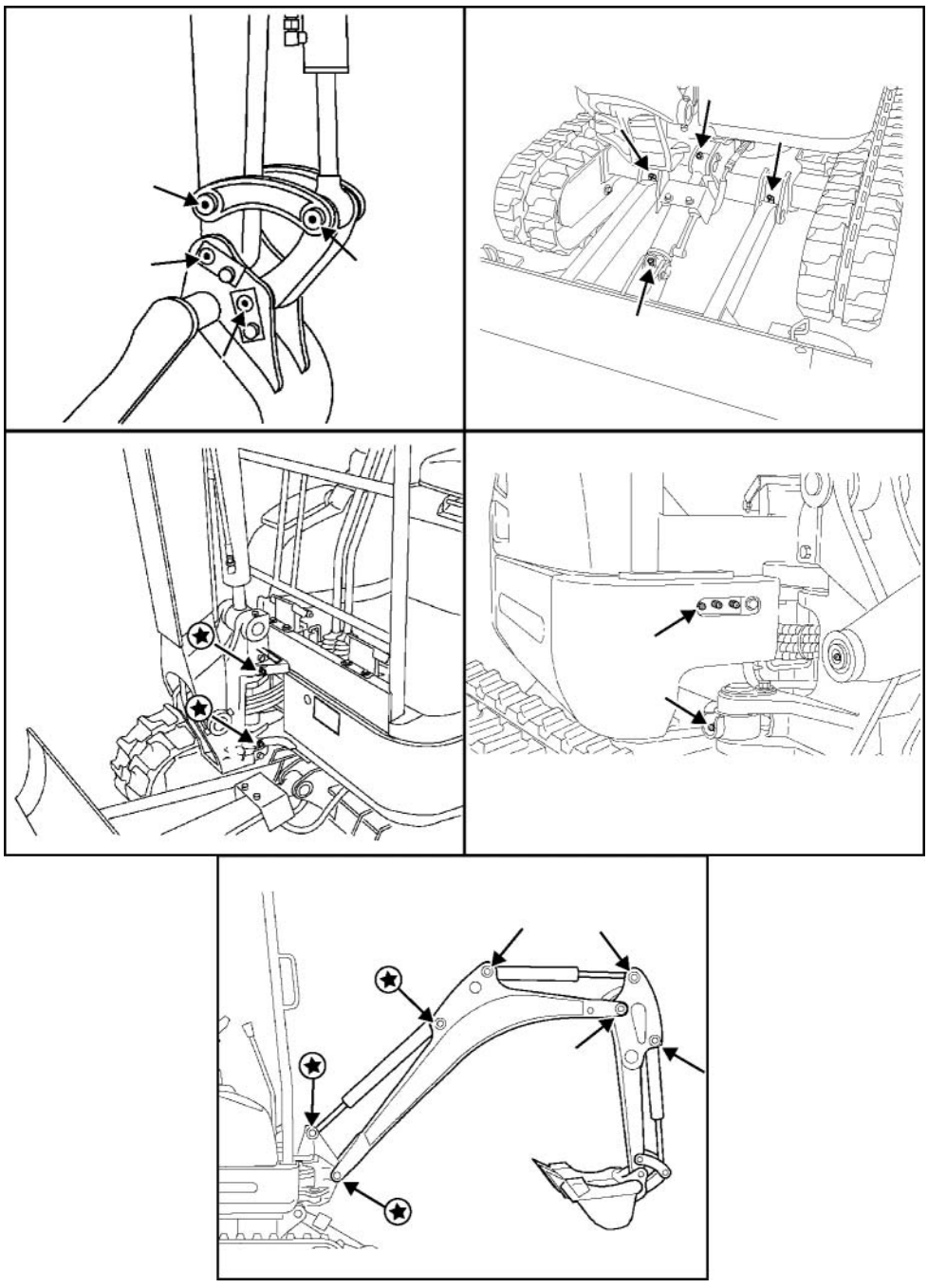
Lubrication



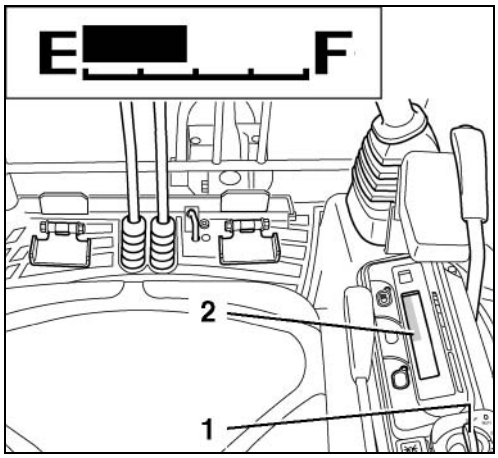
- Start the engine (page 53).
- Position the boom, arm, bucket and dozer as shown in the figure. Lock the control lever, stop the engine and remove the key. See the "Operating the controls during excavation work" section (page 61).
- Lubricate all grease points (see figure below) with grease - see the "Recommended lubricants" section (page 105) - until fresh grease emerges.

During the first 50 hours of operation, grease all grease nipples marked ⊛ using "Anti-Seize" grease.

Wipe emerged grease off immediately and store dirty cleaning cloths in the containers provided until their disposal.



Checking the fuel level of the fuel tank



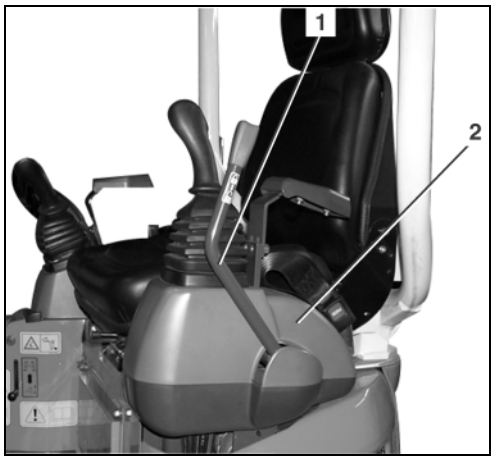
- Turn the starter switch (1) to the RUN position.
- Check the fuel level at the fuel gauge (2). If Fuel is shown in the display, there are only 2.0 L of fuel left in the fuel tank.

- If the fuel level is too low, refuel the excavator (page 72).

Setting up the workplace

When getting on and off the excavator, always make sure the control levers and the swivel frame are locked (page 23).

Getting on



- Move the left control console (2) up as far as possible by pulling the control lever lock (1) up.

The control console must remain in this position until the engine has started, as the engine can only be started in this position.

- Get on the excavator by using the crawler as a step.
- Sit down on the operator's seat.

Adjusting the operator's seat

Adjust the operator's seat so that fatigue-free and comfortable working is possible. It should be possible to operate all controls safely.

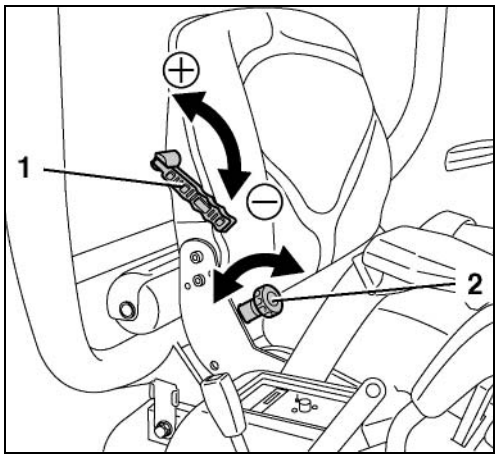
Horizontal seat adjustment (seat stand-off)

Pull the horizontal seat adjustment lever (1) sideways and move the seat to the desired position by moving it forward or back, then release the lever.

STOP *Check that the seat is locked into place.*

Spring adjustment (operator's weight)

The seat can be set to the weight of the operator with the adjustment grip (1). Turning the adjustment grip towards "+" increases spring tension (heavier operator), turning the grip towards "–" reduces spring tension (lighter operator). Adjust the seat so that a comfortable cushioning is achieved.



Backrest adjustment

By turning the adjustment grip (2) you can adjust the desired position of the backrest. The backrest should be adjusted so that the operator can safely operate the control levers with the back resting completely on the backrest.

Seat belt

- Fasten the seat belt.
- Adjust the length of the seat belt by lengthening or shortening the belt so that the belt fits comfortably.

STOP *Do not operate the excavator without the seat belt fastened.*

Safety instructions for starting the engine

The excavator is equipped with an anti-theft system (page 76).

When starting the excavator for the first time on a work day, carry out the pre-operational services (page 46).

Make sure that there are no persons within the excavator's working area. It is essential to warn persons in the vicinity of the excavator by briefly honking the horn.

Make sure that all operational controls are in the neutral position.

Starting the excavator is only allowed when the operator is sitting on the operator's seat.

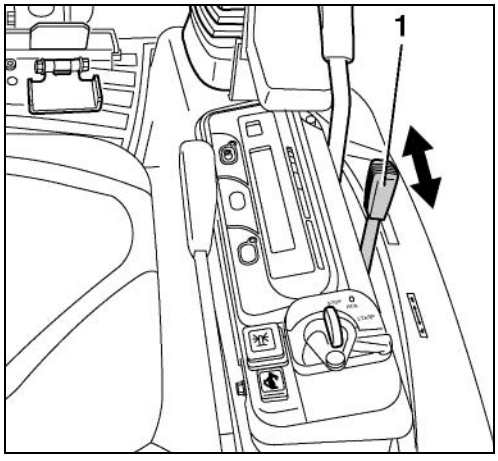
Before starting the engine, make the necessary operator station adjustments (page 51).

If the engine does not start immediately, cease the starting procedure. Wait a short time before reattempting a start. If the engine does not start after several attempts, contact skilled personnel. If the battery is discharged, jump-start the excavator (page 70).

Do not use Start Pilot or similar substances as a starting aid.

Starting the engine

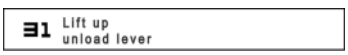
- Move the throttle lever (1) to .



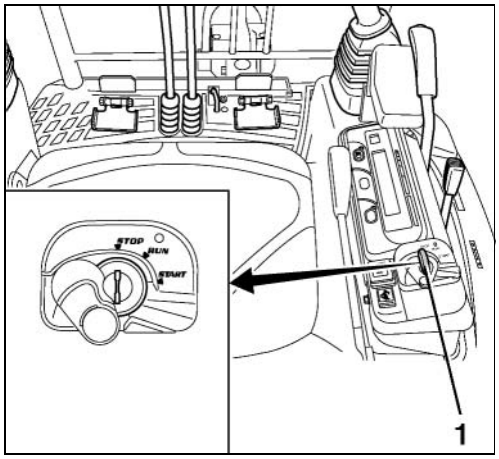
The excavator is equipped with an anti-theft system. If someone tries to start the excavator with the wrong key, the following message will be displayed:

If the bunch of keys contains metal parts, such as key rings or other keys, the engine might fail to start.

If the control lever lock is not raised, the following message will be displayed:



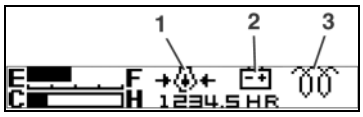
- Insert the key (1) into the starter switch and turn it to the RUN position.



The preglowing indicator (display below, position 3) comes on briefly. The engine can be started after it goes off.

The engine oil pressure indicator (display below, position 1) lights up and goes off after the engine has started.

The charge lamp (display below, position 2) lights up and goes off after the engine has started.



If Fuel is shown in the display, there are only approx. 2 L of fuel left in the fuel tank. Refuel the excavator (page 72).

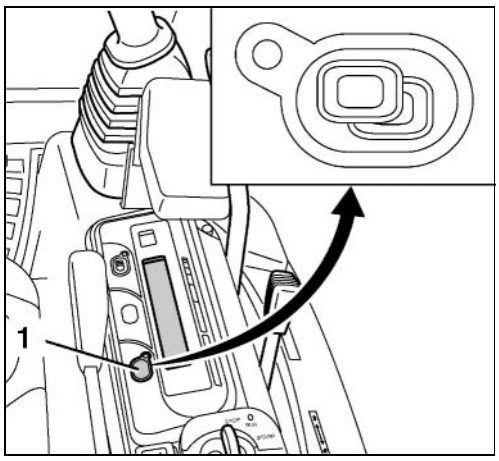
- Turn the starter switch to the START position and hold it there until the engine has started. Release the starter switch.
- Lower the left control console and make sure that the control lever lock engages.
- Run the engine briefly at idling speed.

Operate the engine at low speed until operating temperature is reached.

Set the engine speed required for operation:

- Move the throttle lever towards  until the engine reaches the required speed.

Using the display selector switch (1) you can switch between the engine speed and the hours of operation.



The time meter (display indication below) shows the actual hours of operation of the excavator (independent from the engine speed).

The speed indicator (display indication below) shows the current engine speed.

Check the displays and indicators during operation (page 55).

Stopping the engine

Make sure idle speed is set when stopping the engine. When stopping the engine with a higher speed, the turbocharger may get damaged due to insufficient lubrication.

If the engine is to be stopped to take the excavator out of operation, the services for placing the excavator out of operation (page 68) must be carried out.

- Turn the starter switch to the STOP position and remove the key.

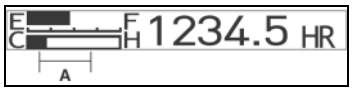
Observation of the displays after starting and during operation

The operator must observe the indicators and displays after starting and during operation.

If the Engine oil message appears during operation, stop the engine immediately and contact skilled personnel.

If the Charge message appears during operation, stop the engine immediately. Check if the V-belt is very loose or broken; if necessary, contact skilled personnel.

Watch the coolant temperature gauge, the bar should be inside the A range.



If the bar rises towards the H during excavator operation, stop the engine immediately and check the coolant level in the expansion reservoir. Do not open the radiator cap → risk of scalding. If the water level is below the LOW mark, allow the engine to cool completely and add coolant (page 89).

Check the cooling system for leaks; if necessary, contact skilled personnel.

Check if the V-belt is very loose or broken; if necessary, contact skilled personnel.

Check if the air intake in the right side panel, the radiator and the oil cooler are very dirty. If necessary, clean the radiator (page 90).

The same applies if the warning light flashes red and the following message displays:

Watch the fuel gauge. If the bar is near to the E, refuel the excavator (page 72). The same applies if the warning light (2 L of fuel remaining) flashes yellow and the following message displays:

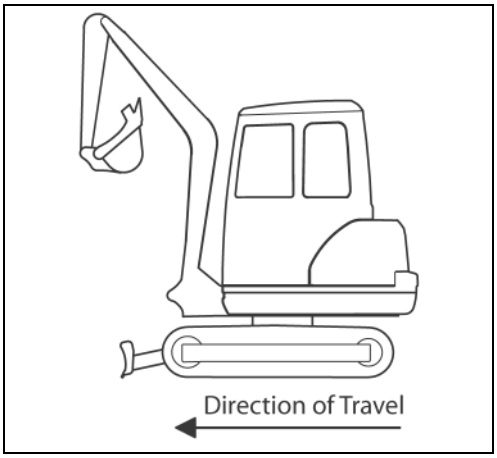
Also stop the engine immediately if

- the engine speed rises or drops suddenly,
- abnormal noises are heard,
- the excavating devices do not respond to the control lever as expected or
- the exhaust fumes are black or white. When the engine is still cold, white smoke for a short time is normal.

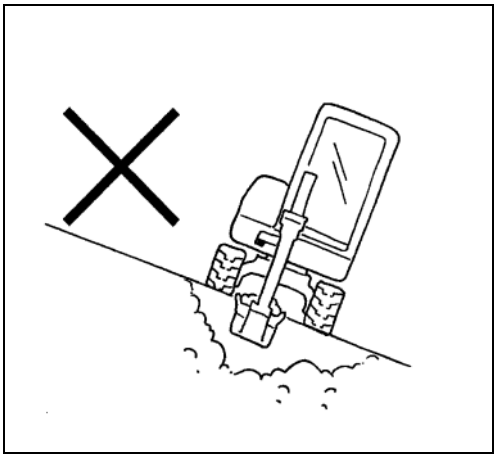
Driving the excavator

- Adhere to the general safety rules (page 12) and the safety rules for operation (page 43).
- Carry out pre-operational services (page 46).
- Start the engine (page 53).
- Check the displays and indicators (page 55).

Ensure that the boom and the dozer are in the direction of travel as shown in the figure.



When driving with the excavator, always observe the following safety instructions.



- Lock the swivel frame (page 23).

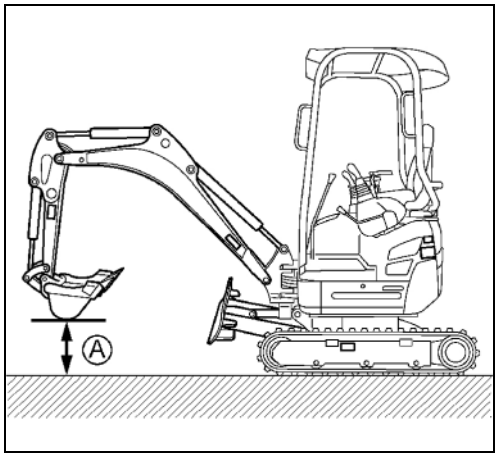
When working on slopes, observe the tilt of the excavator (see figure).

Max. lateral sway → 18 % resp. 10°

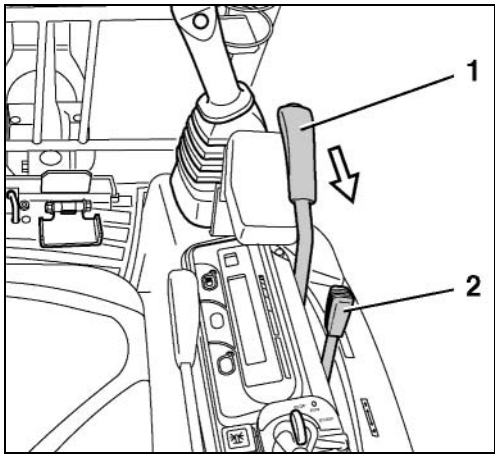
Climbing performance → 27 % resp. 15°

- Keep the bucket as low as possible when driving.
- Check the ground for stability, and verify if there are holes or other potential obstacles.

- Approach overhangs and edges of ditches carefully as they could cave in.
- Drive slowly downhill, do not allow the vehicle speed to increase uncontrollably.
- When driving, the bucket should be approx. 200 to 400 mm (A) over the ground (see figure).



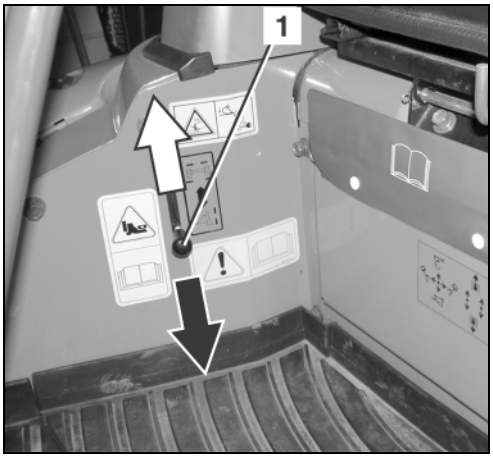
- Raise the dozer to the top position by pulling the dozer control lever (1) back.
- Using the throttle lever (2), set the engine speed to the required value.



Adjusting the track width

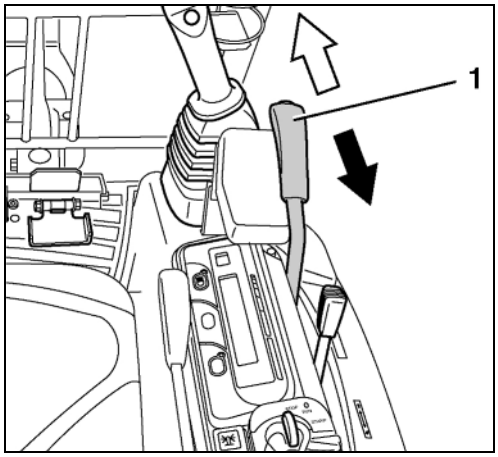
Adjust the desired track width prior to operation. To do this:

- Move the selector lever for the dozer/extendable track width (1) fully upwards (figure, position ⇧).



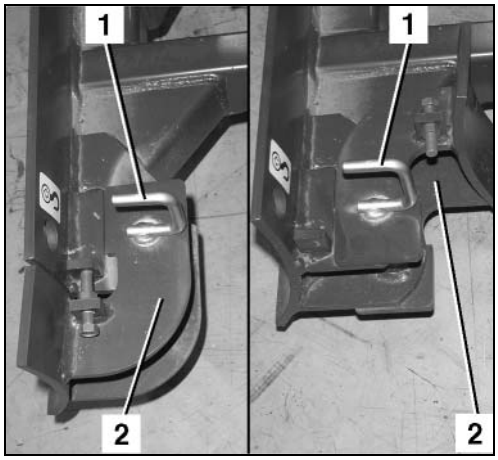
When changing the track width (figure below) always make sure to touch the stoppers, thus avoiding accidental movements during work.

- Using the dozer control lever (1), adjust the desired track width.
- To decrease the track width from 1240 to 990 mm, move the dozer control lever backward (figure, position ↓).
- To increase the track width from 990 to 1240 mm, move the dozer control lever forward (figure position ↑).
- After adjusting the track width, immediately move the selector lever for the dozer/extendable track width fully downwards (figure above, position ↓).



STOP

Do not operate the excavator with the narrow track width (990 mm), risk of tipping. Always use the standard track width (1240 mm) unless you pass through narrow places on level ground.



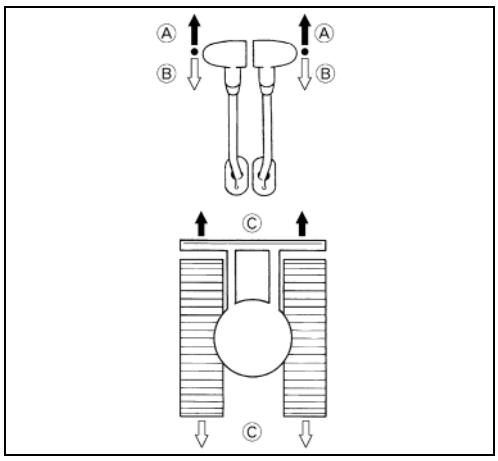
Changing the standard dozer width to narrow:

- Pull out the lock pin (1) and remove the dozer extension (2).
- Attach the dozer extension as shown in the figure, fit in the lock pin.
- Use the same procedure for the other side (left or right) as well as for the adjustment of the track width from narrow to standard.

Driving

- Push both drive levers simultaneously forward to drive the excavator straight. Releasing the drive levers stops the excavator immediately.
  To reverse the excavator, pull both drive levers back simultaneously.

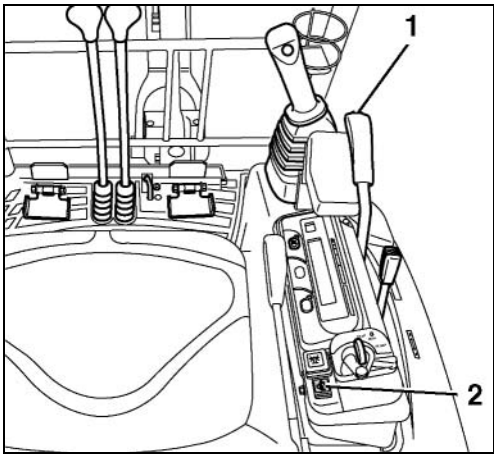
(A) Forward
(B) Reverse
(C) Straight



STOP

If the dozer is not at the front, as shown in the figure, but at the rear, the operation of the drive levers is exactly opposite. Drive levers forward → the excavator drives backwards.

- To drive faster, press the travel speed button (1).
- An audible signal sounds and the indicator (2) comes up. Pressing the travel speed button again switches back to normal speed.



Do not drive fast on muddy or uneven terrain, also if another control is operated (e.g. turning the swivel frame).

Turning

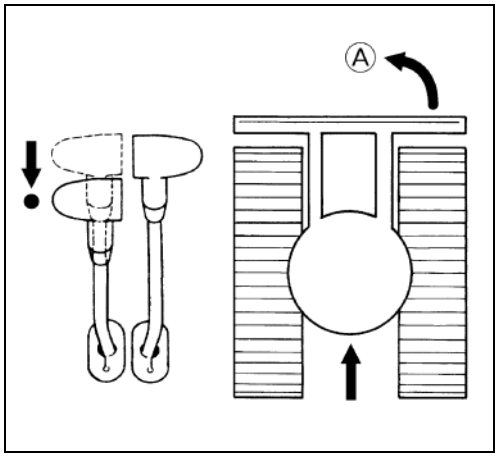
Turns are described for the forward direction of travel with the dozer at the front. If the dozer is positioned at the rear, the steering movements should be in the opposite direction.

When making turns, be sure nobody is standing within the swing area of the excavator.

During driving

- Pull the left drive lever to neutral, leave the right drive lever pushed forward.

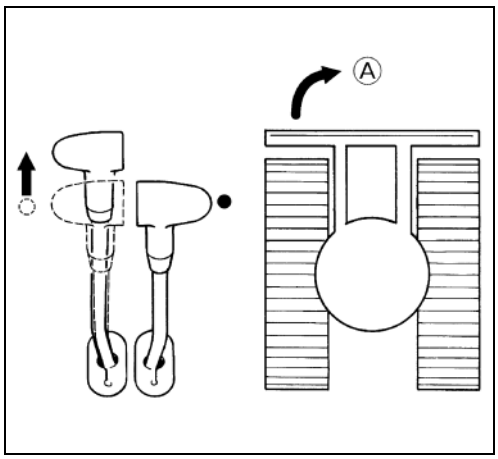
(A) The excavator makes a left turn.



From a standing position

- Leave the right drive lever in neutral, push the left drive lever forward. In this case, the turning radius is determined by the right track.

(A) The excavator makes a right turn.

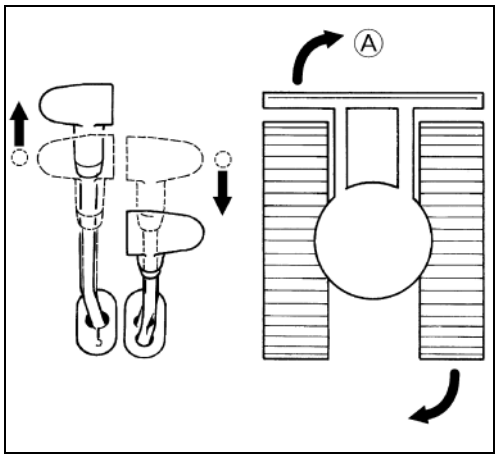


Turning on the spot

Do not make a turn on the spot with the travel speed button actuated.

- Move the drive levers in opposite directions. The tracks will turn in opposite directions. The centre of the vehicle is its vertical axis.

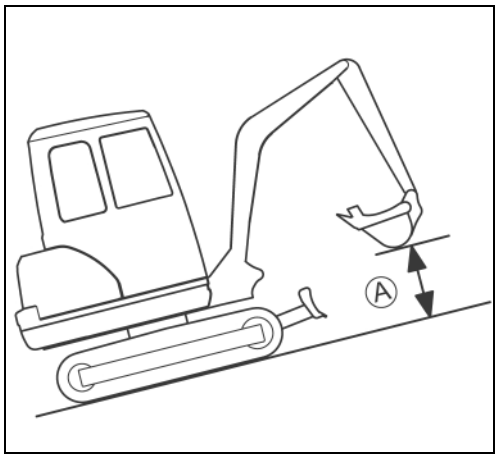
(A) Turning on the spot to the right.



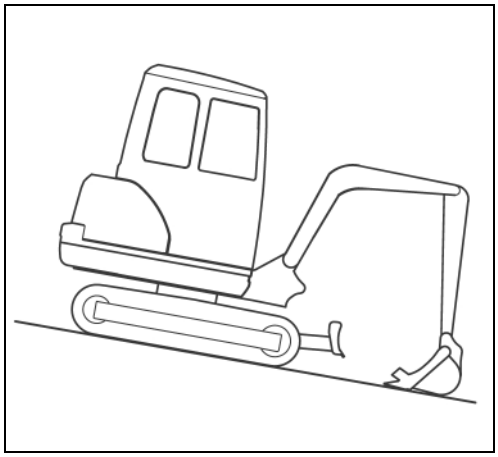
Driving uphill and downhill

Exercise extreme caution when driving up and down a slope. Do not use the travel speed button.

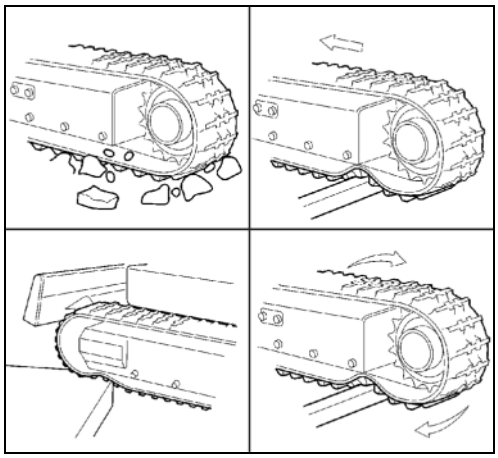
- When driving on gradients, raise the bucket approx. 200 to 400 mm (A) above the ground (see figure).



- When driving on gradients, let the bucket slide over the ground if the terrain allows it.



Notes for rubber crawler operation



- Driving or turning on sharp objects or over steps causes excessive wear on the rubber crawlers and will lead to breaking of the rubber crawler or cause the crawler running surface and the steel inserts to be cut.
- Make sure that no foreign objects get stuck in the rubber crawler. Foreign objects lead to excessive crawler wear and can cause it to break.
- Keep oil products away from the rubber crawlers.
- Remove any fuel or hydraulic oil spilled on the rubber crawlers.

Making sharp turns

- On streets with a high-friction tarmac, e.g. concrete, do not make sharp turns.

Protecting the crawler against salt

- Do not work with the machine on the seashore. (The salt will cause the steel insert to corrode.)

Operating the controls during excavation work

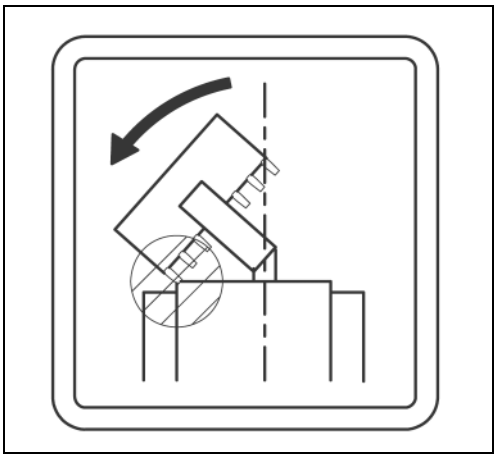
Always observe the following safety instructions when working with the excavator.

- Never crush concrete or boulders using side boom swings with the bucket.
- Do not use the dropping action of the bucket for excavation.
- Never fully extend the cylinders. Always keep a certain safety margin, especially when operating with a breaker (accessory).
- Never use the bucket as a hammer to drive posts into the ground.
- Do not drive or dig with the bucket teeth rammed into the ground.
- When loading soil, do not dig the bucket deeply into the ground. Instead, make relatively shallow slices with the bucket out as far as possible. This technique reduces the stress on the bucket.
- When working in water, the water should only reach up the lower edge of the swivel frame.
- After using the machine in water, always grease the pins at the bucket and arm with grease until the old lubricating grease emerges.
- When digging with the boom above the dozer, make sure that the boom cylinder does not come into contact with the dozer.

- Never use the excavator as a crane, unless it is equipped with craning equipment (accessory).
- Adhering soil can be shaken off when the bucket is being emptied by moving the cylinder to the end of the stroke. Should this not suffice, swing out the arm as far as possible and operate the bucket back and forth.
- When excavating, always lower the dozer completely onto the ground.

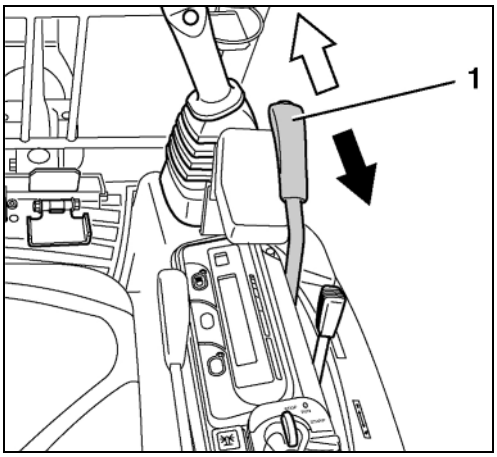
Notes for using wider and deeper buckets

When using a wider or deeper bucket take care when swinging or pulling in the front attachments that the bucket does not hit the canopy.



Operating the dozer

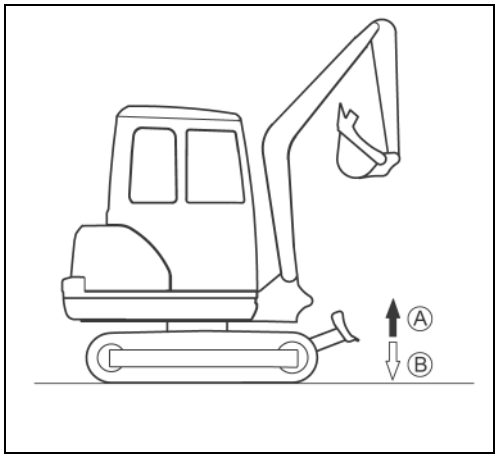
When working with the dozer, operate both drive levers with the left hand and the dozer control lever with the right hand.



- To lift the dozer, pull the dozer control lever (1) back (figure, position ⇩).
- To lower the dozer, push the dozer control lever (1) forward (figure, position ⇧).

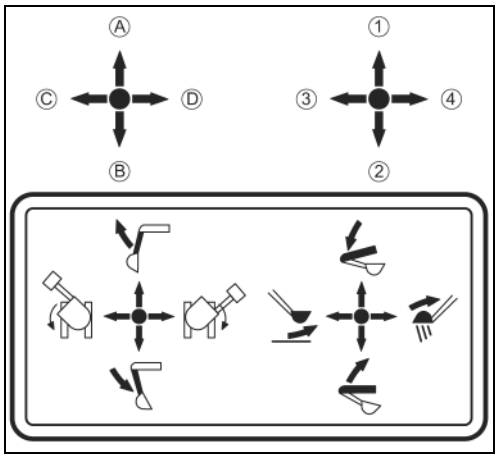
(A) Dozer up.

(B) Dozer down.



Overview of control lever functions

The figure shows, in connection with the following table, the functions of the left and right control levers.

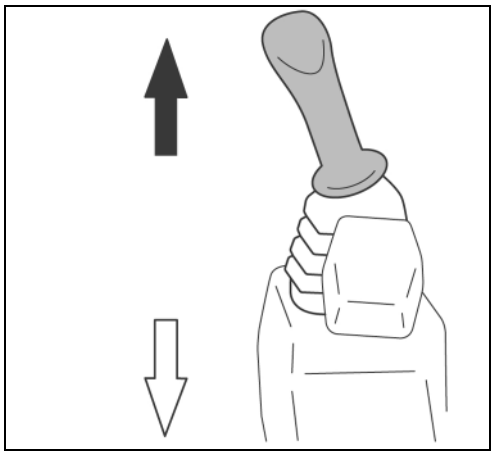


Control levers		Movement
Right control lever	1	Lower boom
	2	Raise boom
	3	Bucket crowd
	4	Bucket dump
Left control lever	A	Arm dump
	B	Arm crowd
	C	Swivel frame to the left
	D	Swivel frame to the right

Operating the boom

- To raise the boom, pull the right control lever (figure, position ⇩) back.

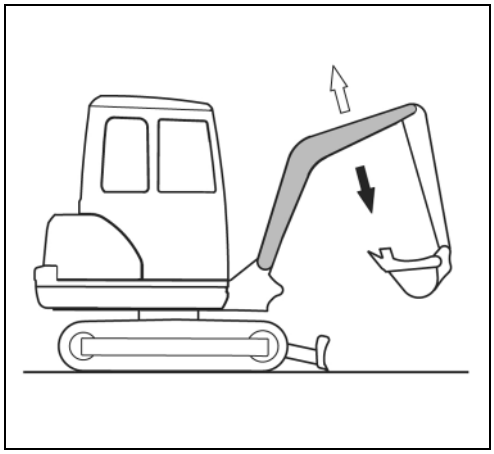
The hydraulic cylinder of the boom is equipped with a cushioning function, which prevents the excavated material in the bucket from falling out. When the hydraulic system operating temperature is low, the cushioning is delayed for approx. 3 to 5 s. This delay is due to the viscosity of the hydraulic oil and is not a malfunction.



- To lower the boom, push the right control lever forward (figure, position ⇧).

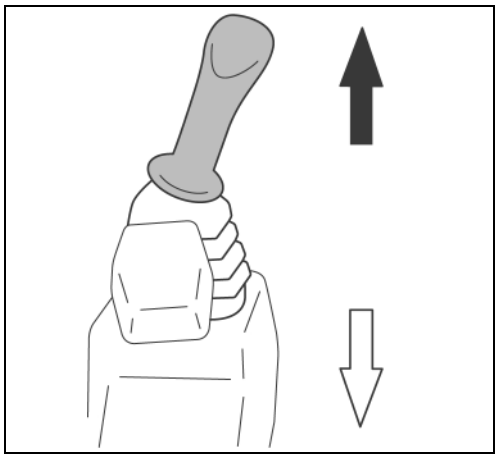
Watch the boom during lowering, so that the boom or the bucket teeth do not hit the dozer.

The boom moves as shown in the figure.

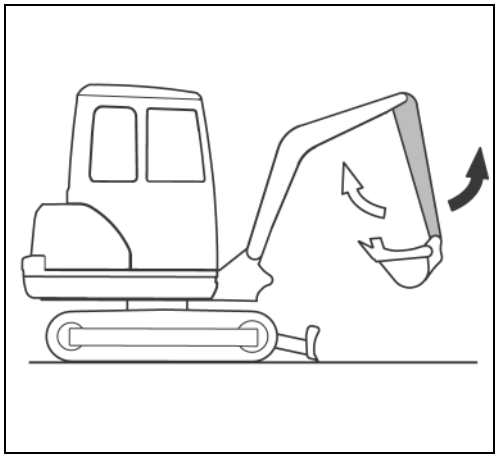


Operating the arm

- To dump the arm, push the left control lever forward (figure, position ↑).
- To crowd the arm, pull the left control lever back (figure, position ↓).

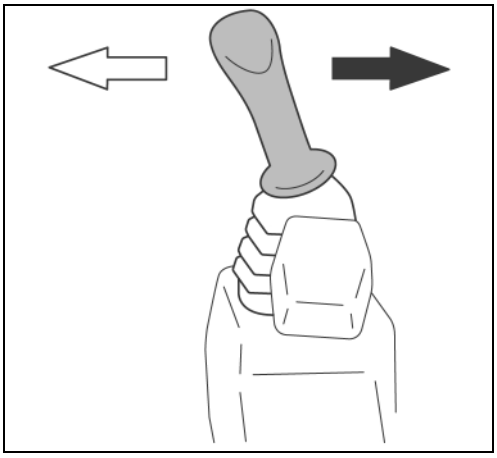


The arm moves as shown in the figure.



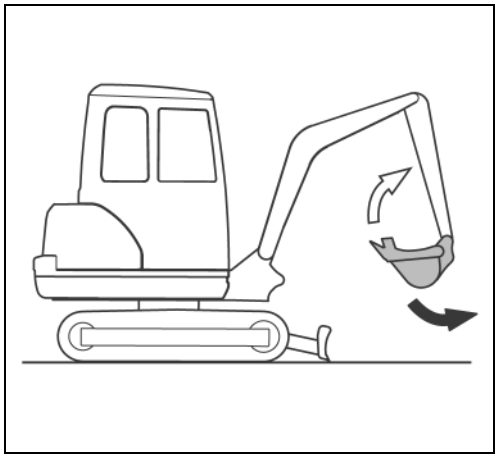
Operating the bucket

- To crowd (digging) the bucket, move the right control lever to the left (figure, position ←).
- To dump (empty) the bucket, move the right control lever to the right (figure, position →).



When crowding the bucket, take care that the teeth do not hit the dozer.

The bucket moves as shown in the figure.

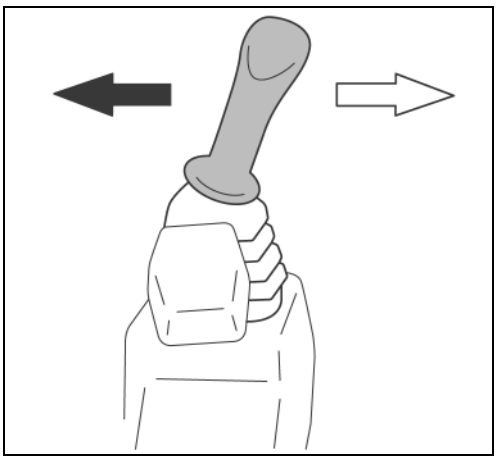


Swivelling the swivel frame

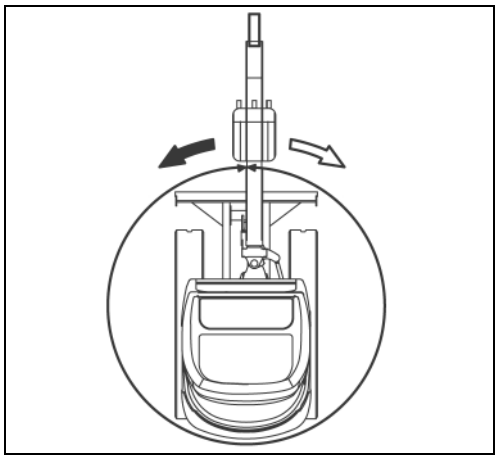
No person is allowed to stand in the swivel area during the movement.

Swivel carefully to avoid any contact of the front attachments with adjacent objects.

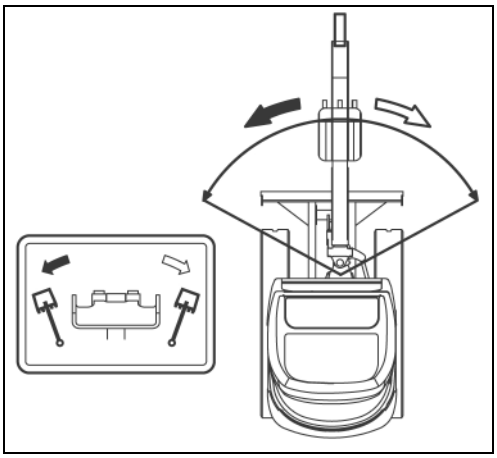
- To turn anticlockwise, move the left control lever to the left (figure, position ←).
- To turn clockwise, move the left control lever to the right (figure, position ⇨).



The turning operation takes place as shown in the figure.



Swinging the boom



No person is allowed to stand in the swing area during the movement. Do not move the foot outside the front part of the boom swing pedal → risk of crushing.

Swing carefully to avoid any contact of the front attachments with adjacent objects.

- To swing the boom counter-clockwise, press the boom swing pedal on the left-hand side (figure, position ←).
- To swing the boom clockwise, press the boom swing pedal on the right-hand side (figure, position →).

The figure details the swing movement.

The boom swing control pedal can be secured against inadvertent operation by lowering the locking flap. Fold the locking flap when the boom swing pedal is not in use.

Operating the auxiliary port

Implements are operated using the auxiliary port.

Only implements approved by KUBOTA may be used. The implements must be operated in accordance with the operating instructions supplied with them.

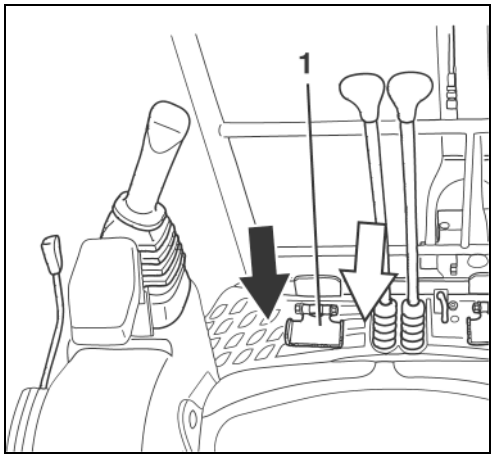
For auxiliary port specifications, see the "Specifications" section (page 32).

The auxiliary port pedal (figure below, position 1) may only be activated when an implement is attached.

If the auxiliary port has not been in use over a long period of time, dirt may have accumulated on the pipe connections. Before installing the implement, drain approx. 0.1 L of hydraulic oil at each port.

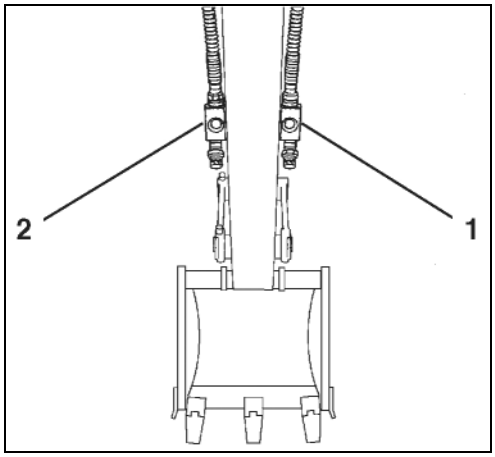
Catch the drained hydraulic oil in a container and discard it in accordance with the valid environmental regulations.

- Depressing the right-hand part of the pedal (figure, position) sends oil pressure to the connection (figure below, position 1).
- Depressing the left-hand part of the pedal (figure, position) sends oil pressure to the connection (figure below, position 2).



(1) Connection for right-hand part of pedal

(2) Connection for left-hand part of pedal



The auxiliary port can be secured against inadvertent operation by lowering the locking flap. Fold the locking flap when the auxiliary port pedal is not in use.

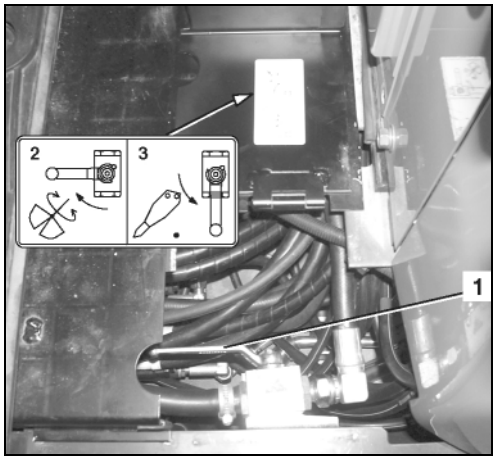
Return change-over valve

The change-over valve has two settings.

When "direct return flow" (3) is enabled, the return flow is directed from the implement to the hydraulic oil tank. The return flow is via the right port at the arm only.

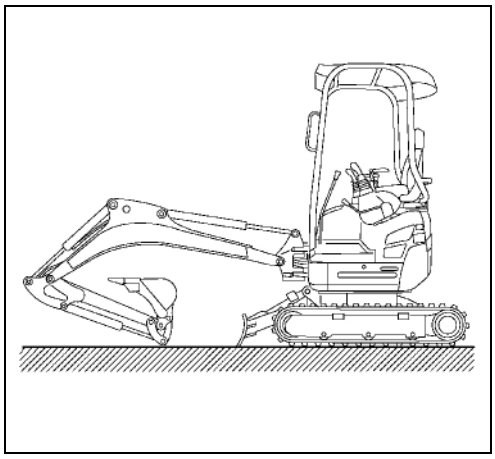
When "indirect return flow" (2) is enabled, the return flow is directed from the implement to the hydraulic oil tank via the control valve. In that case, the return flow may use the left or right port on the arm (depending on the auxiliary port pedal position).

Move the change-over valve (1) to the required position as shown on the sticker (see figure), depending on the action of the implement being used (rotary or hammering).

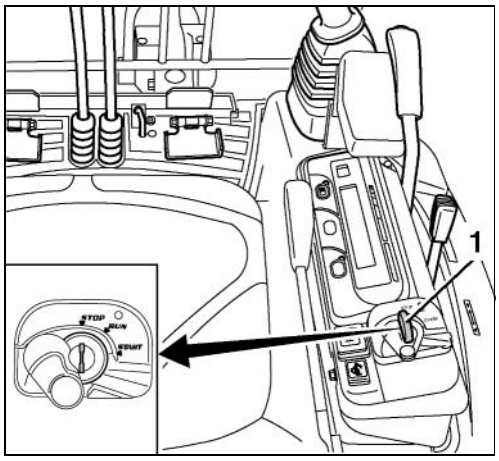


Placing out of operation

Park the excavator in such a way that it can not move and is secured against unauthorised use.

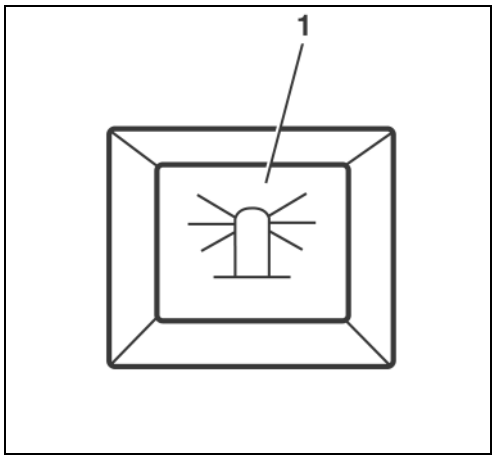


- Drive the excavator on level ground. The machine should be parked under a roof.
- Fully pull in the bucket and arm, lower the dozer to the ground, adjust the extendable track width to standard track width, align the front attachments with the swing mechanism in straight line to the swivel frame and lower the boom to the ground.
- Reduce the engine speed to idle speed.
- Turn the starter switch (1) to the STOP position, remove the key. The key must remain with the operator.
- Open the seat belt and lock the swivel frame and the control levers (page 23).
- Check the excavator for external damage and for leaks. Any defects must be repaired before the next start.
- In case of a heavy accumulation of dirt in the area of the tracks and the hinges at the front attachments, clean the excavator (page 89).
- Refuel the excavator, if necessary (page 72).



Operating the rotary beacon (accessories)

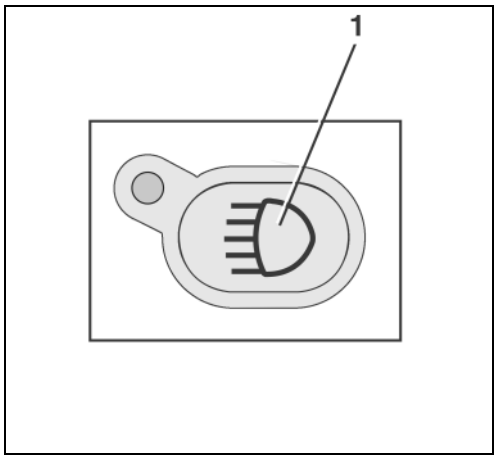
- The starter switch is in the RUN position.
- Press the rotary beacon button (1). Press the button again to switch the beacon off.



Operating the working lights

- The starter switch is in the RUN position.
- Press the working light button (1). Both the working lights and the instrument lighting are turned on.
- Press the button again to switch off.

During work on public roads other road users must not be blinded.



Cold weather operation

Operating the excavator at an ambient temperature below 5 °C is regarded as cold weather operation.

Necessary preparations prior to the winter season

- If necessary, replace the engine oil and hydraulic oil with those of the viscosities specified for winter.
- Only use regular diesel fuel with winter additives. Do not mix petrol and diesel fuel.
- Check the battery (page 98). In case of extremely low temperatures, it may be necessary to remove the battery after work and store it in a heated room.
- Check the antifreeze strength in the cooling system (page 89). If necessary, add antifreeze until the protection ranges from -25 °C to -40 °C.

Operation during the winter season

- The excavator must be cleaned after work is finished (page 89). Special attention must be paid to the crawlers, the front attachments and the piston rods of the hydraulic cylinders. If the excavator is cleaned with a water jet, it must then be parked in a dry, frost-free and well-ventilated enclosed space.
- If necessary, park the excavator on boards or mats in order to prevent freezing to the ground.
- Before starting, check if the piston rods of the hydraulic cylinders are free of ice to avoid damage. Also check if the crawlers are frozen to the ground. If so, do not take the excavator into operation.

STOP

Be careful when getting on and off, the crawler could be slippery.

- Do not put a load on the excavator immediately after starting. Before you start working with the front attachments, warm up the excavator until the operating temperature is reached. Do not warm up the excavator at idling position

Jump-starting the excavator

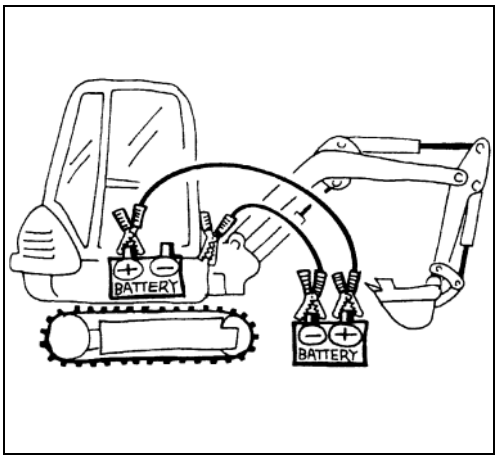
Only a vehicle or starting device with a 12V power supply may be used.

The operator must remain seated on the operator's place, the battery jumper cables must be connected by a second person.

- Make the battery accessible, and remove the positive terminal cover.
- Position the other vehicle or starting machine beside the excavator.

Only use cables with an appropriate cross section as jumper cables.

- Connect the positive terminal of the excavator battery with the positive terminal of the helping vehicle (see figure).
- Connect the negative terminal of the helping vehicle to the frame of the excavator. Do not use the negative terminal of the excavator battery. The connecting point on the frame must be blank and clean.



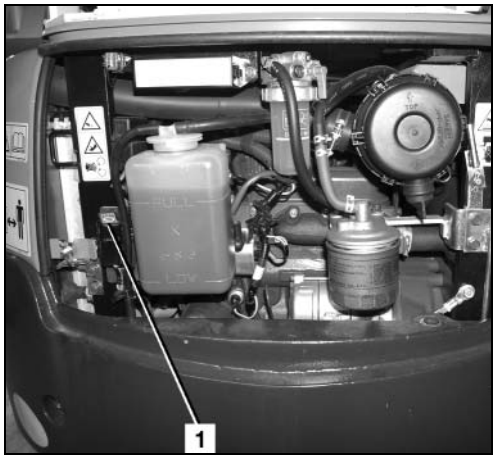
- Start the helping vehicle and let it run at a higher idle speed.
- Start the excavator and let it run. Check if the charge lamp turns off after starting.
- Disconnect the jumper cable at the frame of the excavator first, and then at the negative terminal of the helping vehicle.
- Disconnect the second jumper cable from the positive terminal of the excavator battery first, and then from the positive terminal of the helping vehicle.
- Refit the positive terminal cover on the excavator battery and install the cover and rubber mat.
- If the jumper cables will be required for the next start of the excavator, check the battery and the alternator's charging circuit, contact skilled personnel, if necessary.

Emergency stop functions

In case of emergency, you can switch off the engine and lower the boom manually.

Manual engine stop

If the engine cannot be stopped with the key, it can be stopped manually.



You can only stop the engine with the ignition switch when the throttle lever is pushed back (idle speed).

- Open the engine compartment cover (page 74).
- Open the cap (1) on the fuse holder and remove the main fuse.

The excavator may only be taken back into operation after the malfunction has been eliminated.

Manual lowering of the front attachments

The boom and arm can be lowered in case of an engine failure or if malfunctions occur in the hydraulic system.

- The starter switch is in the RUN position.
- If necessary, lower the boom and the arm with the control lever as described in the "Operating the controls during excavation work" section (page 61).

Make sure nobody is standing in the lowering area before starting the emergency lowering procedure.

The lowering function is available only for a short time, as it is controlled by the accumulator in the hydraulic system. The cylinders extend or retract by force of gravity.

Refuelling the excavator

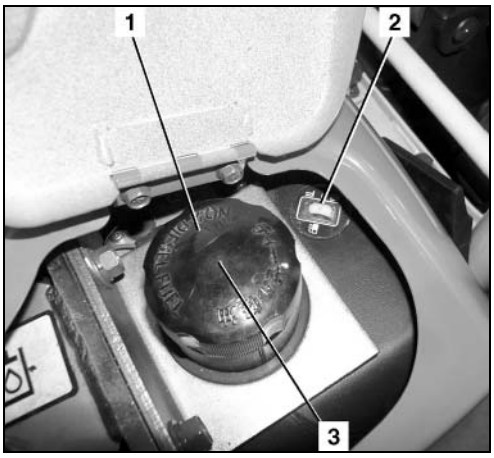
When refuelling the excavator, smoking, an open flame, or other sources of ignition are not allowed. The danger zone has to be clearly marked with signs. In the danger zone, there has to be a fire extinguisher.

Spilled fuel must be bound immediately with an oil binding agent. The contaminated oil binding agent must be disposed of in accordance with the applicable environmental regulations.

If no pumping station is available, the diesel fuel may only be stored in approved canisters.

Refuel the excavator in time so that the fuel tank is not running empty. Air in the fuel system can damage the fuel injection pump.

- Stop the engine.
- Open the fuel filler flap (page 75).
- Open the filler cap (1).
- Fill in diesel fuel.



The fuel display (2) is positioned next to the filler plug. When the fuel tank is almost full (only 2 L missing), the display indicator starts moving towards "F" (full). Check the display to avoid overfilling.

- Clean the air tank ventilation (3) inside the filler cap.

Mud at the ventilation causes a depression inside the fuel reservoir.

- Attach the filler cap and lock the fuel filler flap.

Bleeding the fuel system

If the excavator fuel tank was run empty or the water separator was cleaned, the fuel system must be bled.

- To bleed the fuel system, move the starter switch to the RUN position. The electrical fuel pump will bleed the fuel system automatically within approx. 60 s.
- If the bleeding was insufficient, the engine will stop again. In this case repeat the procedure.

Replacing the fuses

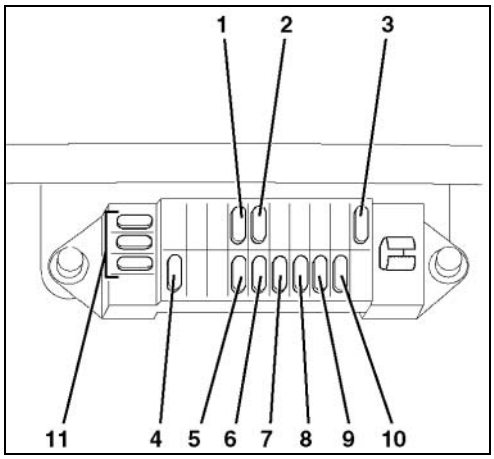
Defective fuses may only be replaced with fuses of the same type and same rating.

The bypassing of fuses, for example by a wire, is not allowed.

If the malfunction can not be remedied by replacing the fuse, or if the fuse blows again when starting, contact skilled personnel.

- Open the engine compartment cover (page 74).
- Remove the defective fuse from the fuse box (1) and replace it.
- The fuse layout is shown in the next section.
- Replace the corresponding defective main fuse or alternator circuit fuse in the fuse holder (2).

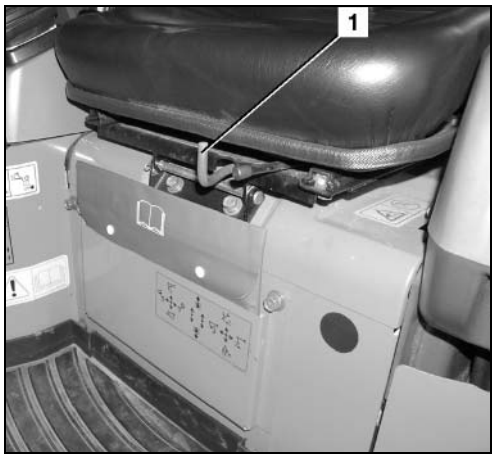
Fuse layout of the fuse box



No.	Capacity	Circuit
(1)	5 A	Preheating system
(2)	5 A	Main fuse for the anti-theft system
(3)	15 A	Charging socket
(4)	10 A	Fuse for the anti-theft system
(5)	5 A	Automatic starter release
(6)	10 A	Rotary beacon
(7)	15 A	Working light
(8)	10 A	Horn
(9)	5 A	Control lever lock, speed switch
(10)	10 A	Alternator, fuel pump, indicators
(11)	5 A, 10 A, 15 A	Spare fuses

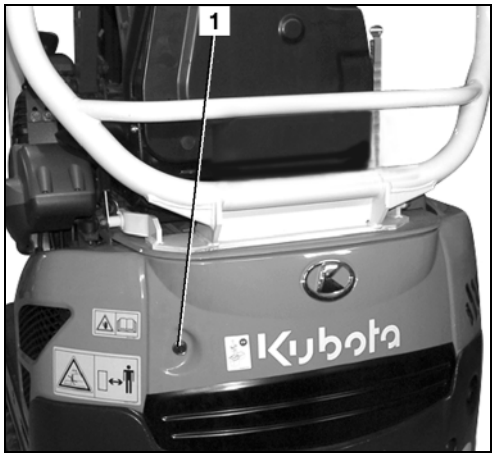
Tilting the operator's seat

- Pull lever (1) forward and tilt the seat forward. When swinging the seat back, make sure the seat engages.

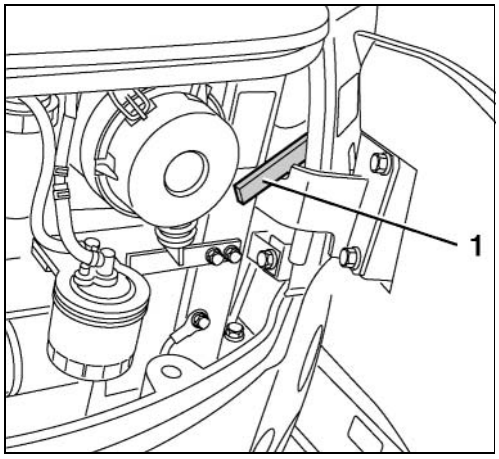


Opening and closing the engine compartment cover

- Insert the key in the lock (1) of the engine compartment cover, turn it clockwise, then depress the lock.

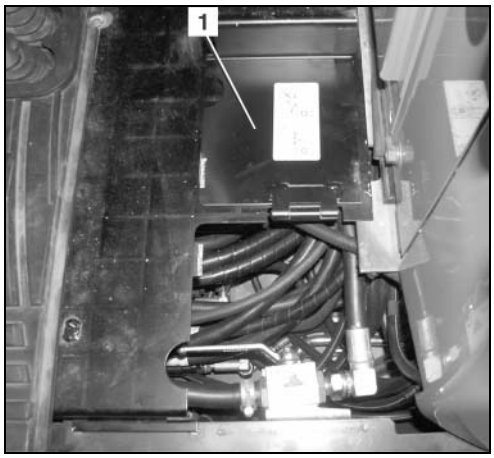


- Open the engine compartment cover and lock it using the lock (1).
- To close, unlock the lock and press the engine compartment cover into the lock. Insert the key into the lock and turn counter-clockwise to lock the engine compartment cover.

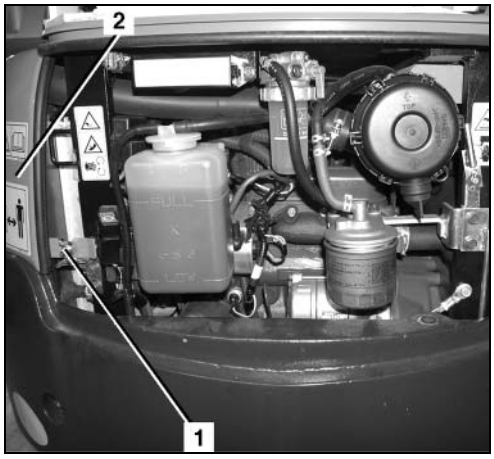


Opening and closing the left side cover

- Open the engine compartment cover (page 74).
- Remove the rubber mat and open the flap (1).

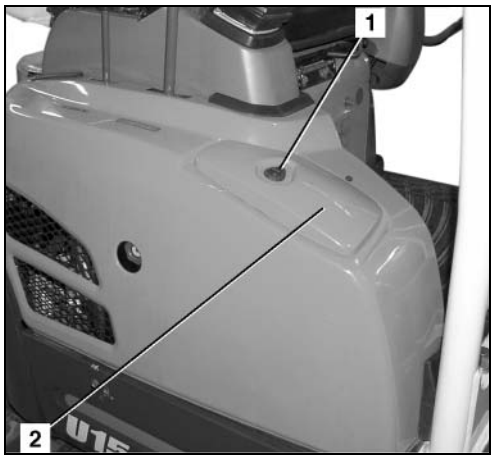


- Remove the wing nut (1).
- Open the left side cover (2).
- To close, shut the left side cover and tighten the wing nut, then refit the rubber mat.



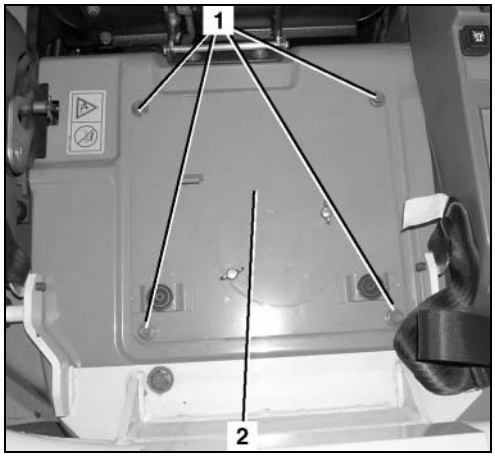
Opening and closing the fuel filler flap

- Insert the key in the lock (1) of the fuel filler flap (2), turn it anti-clockwise, then open the fuel filler flap.
- To close the fuel filler flap, depress the flap. Insert the key into the lock and turn it clockwise to lock the fuel filler flap.



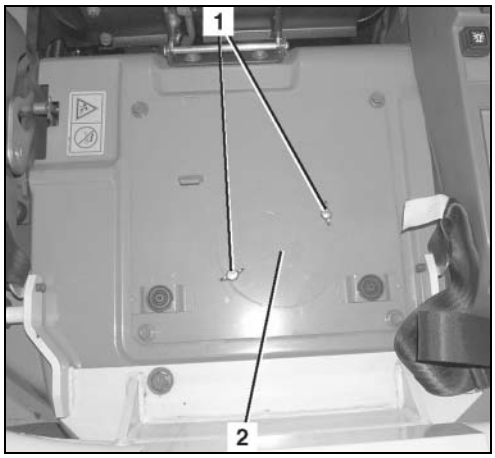
Removing and installing the engine compartment cover under the operator's seat

- Tilt the operator's seat (page 74).
- Remove the fastening screws (1) and remove the engine compartment cover (2).
- To mount, attach the engine compartment cover and tighten the fastening screws.



Removing and installing the cover under the operator's seat

- Tilt the operator's seat (page 74).
- Remove both wing screws (1) and the cover (2).
- To mount, attach the cover and tighten the wing screws.



Replacing the bucket

When replacing the bucket, make sure to wear an eye protection, a helmet and protective gloves.

During attaching and detaching, chippings and burrs may occur at the bolts or bushings. These may cause severe injuries.

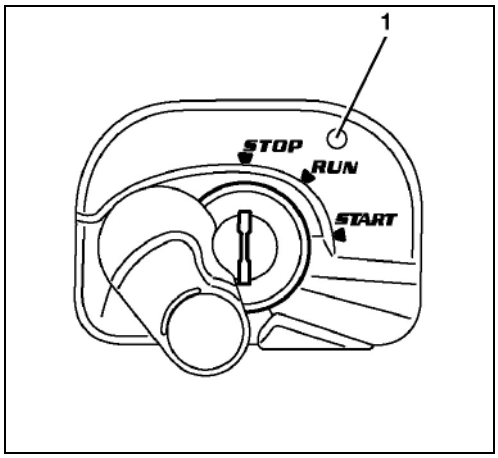
Never use your fingers for the alignment of the components (link, bucket, arm). The components may sever your fingers by uncontrolled movements.

Anti-theft system

The excavator is equipped with an anti-theft system that restricts the engine to be started using a registered key only. If a registered key gets lost or stolen, you can invalidate it. This will prevent the engine from being started with this key, thus protecting the vehicle against theft. The anti-theft system makes it difficult to steal the machine. However, it can not fully prevent theft.

If the main key switch is set to STOP, the indicator light (1) is illuminated, indicating the activation of the anti-theft system.

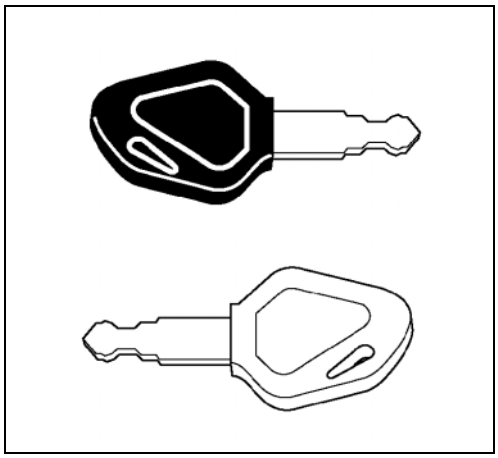
Make sure that the indicator light is illuminated when leaving the machine.



The vehicle comes with two different types of key:

Black (individual) key

- This key is used to start the engine.
- The engine can be started by inserting the key and turning it to the START position.
- To be able to start the engine with a black key, it must be registered using the red key.



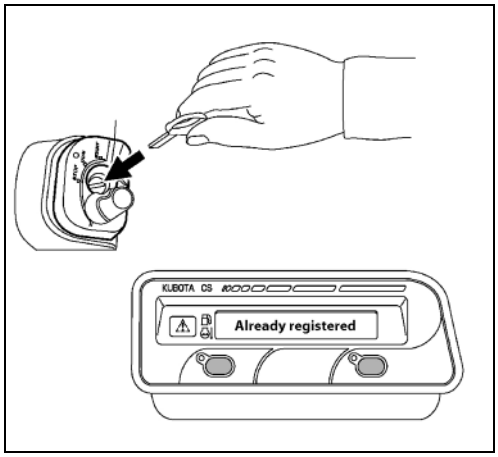
The engine can be started only with a key that was registered for the particular vehicle.
The scope of delivery includes two black keys, among them a spare key. The two black keys have already been registered. Up to four keys can be registered.

Red key (for registering)

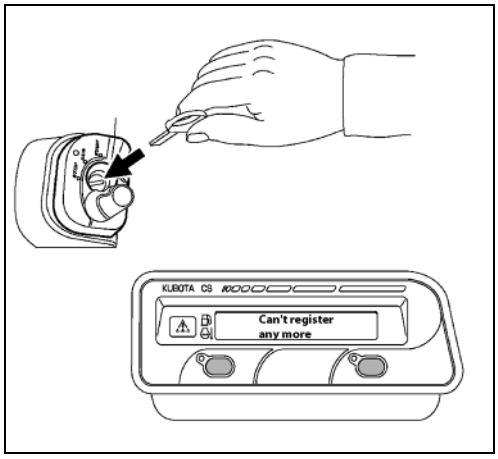
- If one of the black keys is lost, another black key can be registered using the red key (page 79).
- The engine can not be started with the red key.

The key system

- If a registered key is lost, the second and new black key must be re-registered. This procedure locks the lost or stolen black key, which can no longer be used to start the engine.
- If the red key is lost, the black keys can no longer be re-registered. Be sure to keep the red key in a secure location (such as a safe in the office). Never leave the key inside the machine. If it should get lost nevertheless, please contact your authorised dealer immediately.
- If six times attempts are made within one minute to turn the main key switch to the START position with a wrong or unregistered key, an acoustic signal will sound for 30 seconds. The signal will continue to sound even if the main key switch is turned to the STOP position again or the key is removed within this time period. When a key registered for this machine is inserted into the main key switch, the acoustic signal will be turned off.
- Do not use several of these keys in a bunch. This could lead to electrical interfering frequencies which might prevent the motor from starting.
- Use only the special KUBOTA key ring. Other key rings can lead to signal failures between the key and main key switch, and the engine can possibly not start or a key registration cannot be performed.
- After receiving the set of keys, separate them from each other. Always make sure the keys are not part of a bunch. If one of the black keys, for example, is inserted into the starter switch, the red key might be detected by the electronic system. This might lead to a failure of the electronic system.
- If machine malfunctions occur, please contact your Kubota dealer immediately in order to have the malfunction localised and remedied.
- Messages in the display can be shown in 11 languages.
  Your KUBOTA dealer can assist you in your language selection.
- If you erroneously attempt to register a black key that has already been registered, the display will show the "Already registered" message. This means that registration can not be done.



- If you attempt to register a fifth black key, the display will show the "Can't register any more" message. This means that the registration can not be done.



Registering a black key for the machine

Register a black key only under the following conditions:
Make sure that there are no persons within the excavator's working area. It is essential to warn persons in the vicinity of the excavator by briefly honking the horn.

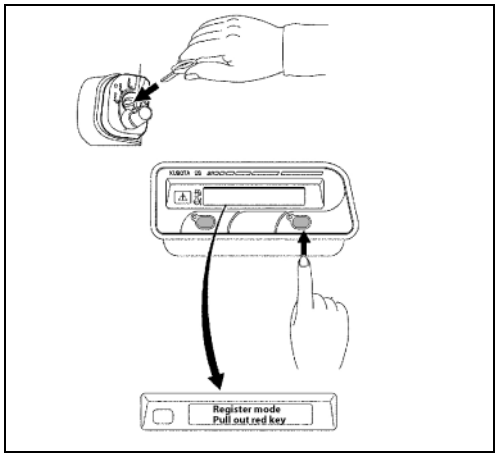
Make sure that all operational controls are in neutral position.

Starting the excavator is only allowed when the operator is sitting on the operator's seat.

Do not allow the engine to run indoors, unless the room is equipped with an exhaust gas extraction system or otherwise well ventilated. The exhaust gas contains carbon monoxide, a colourless, odourless, and lethal gas.

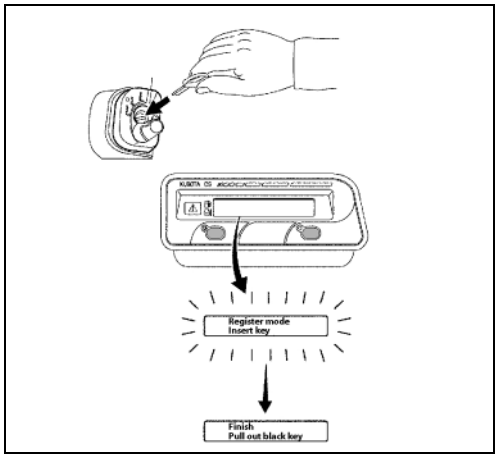
1. Insert red key into the starter switch.

Do not turn the key at this point. If the key is in the RUN position, turn it back to the STOP position.



2. Press the display selector switch.
3. The display shows the "Register mode - pull out red key" message.
4. Pull out the red key.
5. The display shows the "Register mode - insert key" message.
6. Insert black key into the starter switch.

Do not turn the key at this point. If the key is in the RUN position, turn it back to the STOP position.



7. The display shows the blinking "Register mode - insert key" message.

8. After a brief moment, the display shows the "Finish - pull out black key" message. This message indicates that the black key was registered for the given vehicle.

9. Once the black key is pulled out of the starter switch, the display will show the "Finish - pull out black key" message.

   Follow steps 5 to 8 to register a spare key. Up to four black keys can be registered.

10. Turn the key to the RUN position to finish the registration procedure.

11. One after the other, insert all registered black keys into the starter switch and check whether the engine can be started using these keys.

If a registered black key is lost, the other black keyes must be re-registered. This procedure locks the lost or stolen black key, which can no longer be used to start the engine.

TROUBLESHOOTING

The troubleshooting section includes only malfunctions and incorrect operations which must be remedied by the operator. Any other malfunctions may only be eliminated by trained personnel. The troubleshooting must be performed with the aid of the troubleshooting table. In order to locate a malfunction, first look in the MALFUNCTION column for the corresponding excavator malfunction. In the POSSIBLE CAUSE column you will find the possible causes for the malfunction. The REPAIR column indicates the required remedial measure. If the fault can not be remedied by the measure indicated in the REPAIR column, consult trained personnel.

Safety rules for troubleshooting

Adhere to the general safety rules (page 12) and the safety rules for operation (page 43).

The operator is not allowed to open the electrical and hydraulic system. These services are reserved for trained personnel.

During troubleshooting, the safety on and around the excavator must always be ensured.

If troubleshooting of the excavator calls for the bucket being raised, the operator may not stand in the area of the front attachments unless the front attachments are secured against inadvertent lowering by suitable measures.

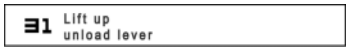
Troubleshooting: Pre-operational services

Malfunction	Possible cause	Repair
Start-up		
No function available when the starter switch is turned to the RUN position	Main fuse defective	Replace the main fuse (page 73).
Indicator lights do not come on as expected when the starter switch is turned to the RUN position	Defective fuse	Replace the fuses (page 73).
Starter does not turn when the starter switch is turned to the START position	Battery depleted Control lever lock not raised	Charge the battery (page 98). Jump-start the excavator (page 70). Raise the control lever lock.
Engine does not start when the starter switch is turned to the START position, but starter turns	Air in the fuel system Water in the fuel system	Check the fuel system for leaks and bleed it (page 72). Check the water separator for water content, drain if necessary (page 48).

Troubleshooting: Operation

Malfunction	Possible cause	Repair
Operation		
Exhaust gas colour very black	Air filter restricted	Check and clean the air filter (page 94).
Insufficient engine power	Air filter restricted	Check and clean the air filter (page 94).
	Fuel filter restricted or water in fuel system	Check the water separator for water content, drain if necessary (page 48), replace the fuel filter (page 94).
Coolant temperature too high (overheated)	Radiator dirty	Clean the radiator (page 90).
	Low coolant level	Check the coolant level, add coolant, if necessary (page 89).
	Cooling system components leaking	Check the cooling system for leaks. Please contact your KUBOTA dealer.
	V-belt too loose	Check and adjust the V-belt tension (page 90).
	Engine oil level too low	Check the engine oil level, add oil, if necessary (page 46).
Charge lamp lights up	V-belt too loose	Check and adjust the V-belt tension (page 90).
	Defective fuse in alternator circuit	Replace the fuses (page 73).
Deviation in driving direction of excavator	Crawler tension adjusted incorrectly	Check and adjust the crawler tension, if necessary (page 100).
No pilot-controlled hydraulic functions available	Defective fuse in fuse box	Replace the fuses (page 73).
Power of hydraulic functions is too low or disruptive	Hydraulic oil level too low	Check hydraulic oil level and top up, if necessary (page 96).
	Suction filter restricted	Change the suction filter in the hydraulic oil tank. Please contact your KUBOTA dealer.
Travel speed button does not work	Defective fuse in fuse box	Replace the fuses (page 73).
Horn and working light do not work	Defective fuse in fuse box	Replace the fuses (page 73).

Troubleshooting: Display indications

Display	Colour	Problem/Error	Preliminary Measure	Solution
	Yellow	• No fuel.	- -	Refill.
	Red	• Oil pressure too low.	Stop the engine immediately.	Engine may be defective. Immediately contact skilled personnel.
	Red	• Faulty battery charger circuit. • Charging error.	Check the V-belt. When the V-belt is OK, let the engine run until indicator goes out.	If the indicator does not go out, contact skilled personnel.
	Red	• Defective starter.	Jump-start the engine.	If the indicator still comes on after the external ignition, contact skilled personnel.
	Yellow	• Starting procedure with lowered control console.	Engine does not start up.	Lift the control console and repeat the starting procedure.
	Yellow	• Maintenance due.	- -	Run the maintenance procedure.
	Yellow	• Wrong key.	- -	Use correct key.
	- -	• Try starting the engine with the red key (for registration).	Engine does not start.	Try starting the engine with the black key.
- -	- -	• The key is attached to a metal object (such as a key ring).	Engine does not start.	Remove the metal object and retry.
- -	- -	• The key is part of a bunch of keys.	- -	Detach the proper key and retry.
No display (warning light flashes)	Red	• Short circuit in the sensor power source.	Working lights light up.	Contact skilled personnel.

MAINTENANCE

The "Maintenance" section includes all care and maintenance tasks to be performed on the excavator.

A careful maintenance of the excavator will guarantee functional safety and longer service life.

Neglect of the servicing will void the warranty and any liability by KUBOTA.

Only use spare parts that are recommended by the manufacturer. Non-approved spare parts of inferior quality or wrong classification result in an increased risk of accidents. Operators using non-approved spare parts are fully responsible for any damage arising thereof.

Safety rules for maintenance

- Persons who work with or on the excavator must be provided by the operator with, and where applicable use suitable personal protective equipment (PPE), for example suitable working clothes, safety shoes, safety helmets, eye protection, ear protection and air-filter masks. The owner/employer bears the main responsibility for the PPE, which is specified by the safety rules for particular types of activity.
- Maintenance, cleaning and care activities may only be carried out if the excavator is fully shut down. the excavator must be secured against starting by removal of the key. The bucket must always be lowered to the ground for servicing.
- The bucket must always be lowered to the ground for servicing.
- When defects are detected during servicing or maintenance, the excavator may only be operated after the defects are remedied. Repairs may only be carried out by trained personnel.
- When carrying out maintenance and care activities, always make sure that the excavator is secured and stable.
- When working on the fuel system, smoking, open flames and the operation of other ignition sources are not allowed. The danger zone has to be clearly marked with signs. A fire extinguisher must be kept at hand in the danger zone.
- All waste materials must be discarded in accordance with environmental protection regulations.
- Use the maintenance and care materials listed in the "Recommended lubricants" section (page 105).
- When working on the electrical system, disconnect it from the voltage source before starting the work. The work may only be carried out by technicians with electrical training.
- Always use a ladder or a scaffold if the work cannot be reached by the operator.
- The controls may only be used while the operator is sitting on the operator's seat.

Personnel requirements

- The operator may only carry out cleaning and care activities.
- The servicing may only be performed by trained personnel.

General maintenance chart: 50 to 500 hours of operation

Operator servicing

General maintenance	Elapsed hours of operation											
	50	100	150	200	250	300	350	400	450	500	Interval	Page
Checking the engine oil level											daily	46
Check hydraulic oil level											daily	48
Check fuel level											daily	51
Check coolant level											daily	46
Lubricate front-end attachments											daily	49
Checking the radiator and oil cooler											daily	47
Check electric cables and connections											daily	102
Check water separator											daily	48
Check V-belt											daily	47
Lubricate the swivel gear	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	50 h	99
Battery service	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	50 h	97
Tracks and chassis: clean, visually inspect and check tension	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	weekly (50 h)	100
Check nuts and bolts		❍		❍		❍		❍		❍	100 h	103
Check, clean air filter 1.)				❍				❍			200 h	94
Grease the pitch bearing				❍				❍			200 h	99
Drain water from the fuel reservoir										❍	500 h	95

1.) Under dusty conditions the air filter must be cleaned more frequently or replaced.

General maintenance chart: 550 to 1000 hours of operation

Operator servicing

General maintenance	Elapsed hours of operation											
	550	600	650	700	750	800	850	900	950	1000	Interval	Page
Checking the engine oil level											daily	46
Check hydraulic oil level											daily	48
Check fuel level											daily	51
Check coolant level											daily	46
Lubricate front-end attachments											daily	49
Checking the radiator and oil cooler											daily	47
Check electric cables and connections											daily	102
Check water separator											daily	48
Check V-belt											daily	47
Lubricate the swivel gear	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	50 h	99
Battery service	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	50 h	97
Tracks and chassis: clean, visually inspect and check tension	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	weekly (50 h)	100
Check nuts and bolts		❍		❍		❍		❍		❍	100 h	103
Check, clean air filter 1.)		❍				❍				❍	200 h	94
Grease the pitch bearing		❍				❍				❍	200 h	99
Drain water from the fuel reservoir										❍	500 h	95

1.) Under dusty conditions the air filter must be cleaned more frequently or replaced.

Servicing maintenance chart: 50 to 500 hours of operation

Servicing by skilled personnel or KUBOTA dealer

Servicing	Elapsed hours of operation *											
	50	100	150	200	250	300	350	400	450	500	Interval	Page
Check/adjust V-belt tension					❍					❍	250 h	90
Check coolant hoses and clamps					❍					❍	250 h	91
Grease pilot valve linkage					❍					❍	250 h	102
Replace coolant hoses and clamps					❍					❍	250 h	--
	Please contact your KUBOTA dealer.											
Change engine oil and oil filter										❍	500 h	91
Replace the fuel filter 4.)										❍	500 h	94
Change return filter for the hydraulic oil tank 3.)					●					❍	500 h	--
	Please contact your KUBOTA dealer.											
Replace the drive unit oil	●									❍	500 h	101
Change hydraulic oil and suction filter 2.)	Please contact your KUBOTA dealer.										1000 h	--
Replace the in-line filter	Please contact your KUBOTA dealer.										1000 h	--
Replace the air filter elements 1.)											1000 h	94
Change running gear and track roller oil	Please contact your KUBOTA dealer.										2000 h	--
Check alternator and starter motor	Please contact your KUBOTA dealer.										2000 h	--
Check electric cables and connections	Please contact your KUBOTA dealer.										annually	102
Safety inspection											annually	107
Replace the coolant and rinse the cooling system											every 2 years	93
Change hydraulic hoses	Please contact your KUBOTA dealer.										every 6 years	--

* The servicing identified with ● must be carried out after the specified hours of operation after initial operation have been reached.

1.) Under dusty conditions the air filter must be cleaned more frequently or replaced.
2.) When using a breaker over 20% → every 800 h.
When using a breaker over 40% → every 400 h.
When using a breaker over 60% → every 300 h.
When using a breaker over 80% → every 200 h.
3.) When using a breaker up to 50% → every 200 h.
When using a breaker over 50% → every 100 h.
Replace the return filter approximately 250 hours after the initial operation.
4.) Earlier if necessary.

Servicing maintenance chart: 550 to 1000 hours of operation

Servicing by skilled personnel or KUBOTA dealer

Servicing	Elapsed hours of operation											
	550	600	650	700	750	800	850	900	950	1000	Interval	Page
Check/adjust V-belt tension					❍					❍	250 h	90
Check coolant hoses and clamps					❍					❍	250 h	91
Grease pilot valve linkage					❍					❍	250 h	102
Replace coolant hoses and clamps					❍					❍	250 h	--
	Please contact your KUBOTA dealer.											
Change engine oil and oil filter										❍	500 h	91
Replace the fuel filter 4.)										❍	500 h	94
Change return filter for the hydraulic oil tank 3.)										❍	500 h	--
	Please contact your KUBOTA dealer.											
Replace the drive unit oil										❍	500 h	101
Change hydraulic oil and suction filter 2.)	Please contact your KUBOTA dealer.										1000 h	--
Replace the in-line filter	Please contact your KUBOTA dealer.										1000 h	--
Replace the air filter elements 1.)											1000 h	94
Change running gear and track roller oil	Please contact your KUBOTA dealer.										2000 h	--
Check alternator and starter motor	Please contact your KUBOTA dealer.										2000 h	--
Check electric cables and connections	Please contact your KUBOTA dealer.										annually	102
Safety inspection											annually	107
Replace the coolant and rinse the cooling system											every 2 years	93
Change hydraulic hoses	Please contact your KUBOTA dealer.										every 6 years	--

1.) Under dusty conditions the air filter must be cleaned more frequently or replaced.
2.) When using a breaker over 20% → every 800 h.
When using a breaker over 40% → every 400 h.
When using a breaker over 60% → every 300 h.
When using a breaker over 80% → every 200 h.
3.) When using a breaker up to 50% → every 200 h.
When using a breaker over 50% → every 100 h.
4.) Earlier if necessary.

Cleaning the excavator

Before cleaning, shut down the engine and secure it against starting.

If a steam cleaner is used for cleaning the excavator, do not direct the steam jet at electric components.

Do not direct a water jet into the intake opening of the air filter.

Do not clean the excavator with inflammable liquids.

The excavator may only be washed at suitable places (using oil and grease separators).

The excavator can be cleaned with water and a commercial cleaning agent. Make sure no water gets into the electrical system.

Use a plastic cleaner for plastic parts.

Maintenance

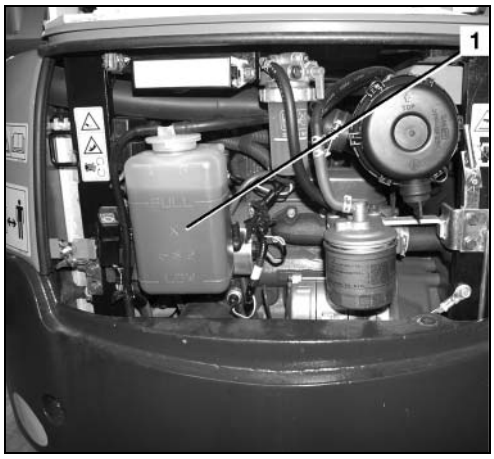
Adhere to the instructions for regular servicing to keep the excavator in good condition.

Re-filling the coolant

- Check the antifreeze content with an antifreeze tester. The protection should be for -25 °C.

The antifreeze portion of the coolant should not exceed 50%.

- Open the engine compartment cover (page 74).
- Open the coolant expansion reservoir cap while the engine is cold and fill pre-mixed coolant up to the FULL mark (1).



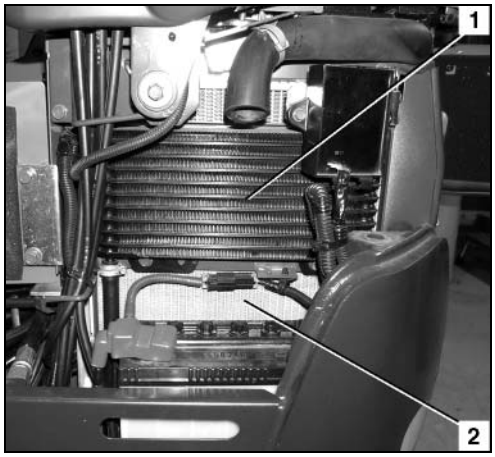
If the coolant expansion reservoir was completely empty, check the coolant level in the radiator.

To check the fluid level of the radiator, open the engine compartment cover under the operator's seat (page 76).

Do not open the radiator cap while the engine is still hot, risk of scalding.

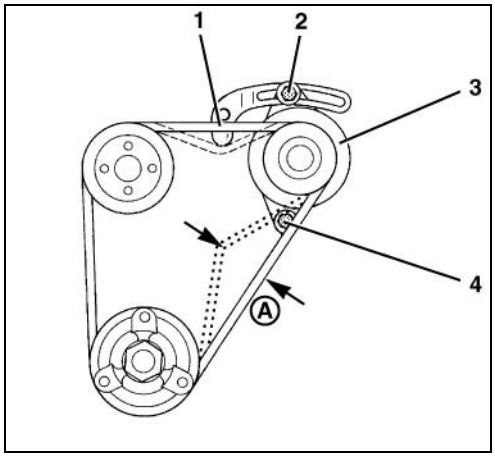
- Remove the radiator cap (1) by turning it anticlockwise.
- The coolant level should be at the lower mark of the filler plug; if not, add coolant.
- Refit the radiator cap and close the expansion reservoir.
- Close the engine compartment cover.

Cleaning the radiators



- Open the left side cover (page 75).
- Open the engine compartment cover under the operator's seat (page 76).
- Clean the radiator (1 and 2) from the engine side with a water jet or with compressed air. Do not use high-pressure cleaners.
- Check the radiator for damage after cleaning it.
- Close the engine compartment cover and the left side cover.

Checking and adjusting the V-belt tension



- Open the engine compartment cover under the operator's seat (page 76).
- Depress the V-belt (1) at point "A". The V-belt deflection should be approx. 8 mm.
- Check the V-belt for proper condition and cracks.
- To tighten the V-belt, loosen the mounting screws (2 and 4), swing the alternator (3). Tighten the fastening screws and check the tension of the V-belt.
- Close the engine compartment cover under the operator's seat.

Checking the coolant hoses

Carry out the inspection while the engine is cold.

- Open the engine compartment cover (page 74).
- Open the engine compartment cover under the operator's seat (page 76).

Check all hose connections to the engine, coolant expansion reservoir and the radiator for condition (cracks, bulges, hard spots) and firm seating of the clamps. If necessary, have the hoses replaced by trained personnel.

- Close the engine compartment covers.

Replacing the engine oil and oil filter

The engine oil change must be carried out while the engine is warm.

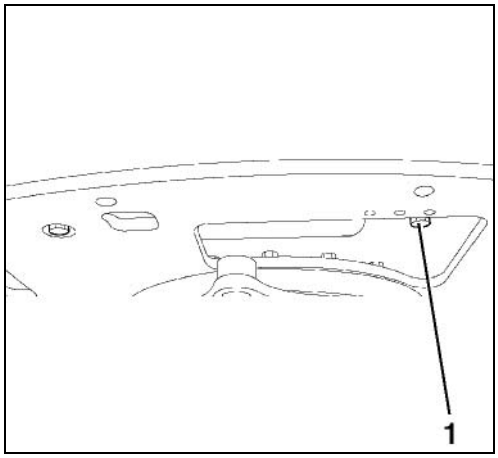
Caution: the engine oil and the oil filter are very hot → risk of scalding!

Place an oil pan with a capacity of about 5 L under the engine oil drain. The engine oil should not be allowed to seep into the earth and it must be discarded like the oil filter in accordance with the applicable environment protection regulations.

- Open the engine compartment cover (page 74).

Draining the engine oil

- Remove the oil drain plug (1) and let the engine oil drain into the oil drain pan. Install the oil drain plug using a new seal.



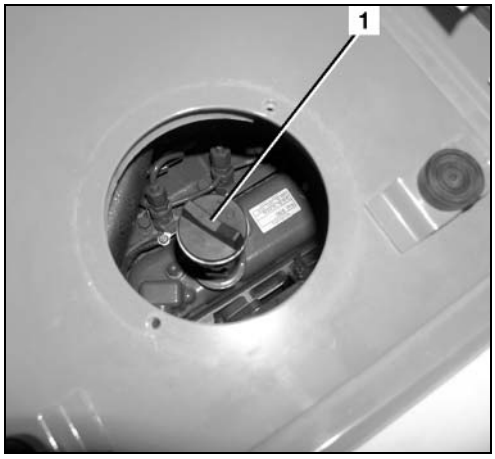
Replacing the oil filter

- Place an oil drain pan under the oil filter and remove the oil filter (1) with a filter wrench by turning it anticlockwise.
- Coat the sealing ring of the new oil filter with engine oil.
- Install and tighten the oil filter by hand. Do not use the filter wrench.

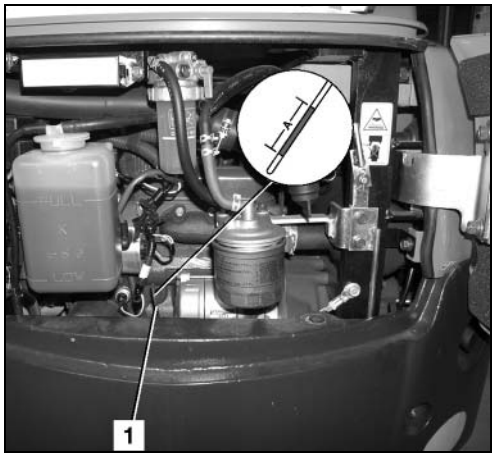
Filling the engine oil

- Open the cover under the operator's seat (page 76).
- Unscrew the oil filler cap (1) and fill engine oil. See the "Recommended lubricants" section (page 105).

Filling capacity: 3.6 L



- Start the engine. The engine oil pressure indicator should disappear immediately after the engine has started; if not, stop the engine immediately and notify trained personnel.
- Screw in the oil filler cap.
- Let the engine run for approx. 2 minutes and then stop it. Check the oil level after 5 minutes.
- Pull out the oil dipstick (1) and wipe it with a clean cloth.
- Insert the oil dipstick completely and pull it out again. The oil level should be in the A area. If the oil level is too low, add engine oil.

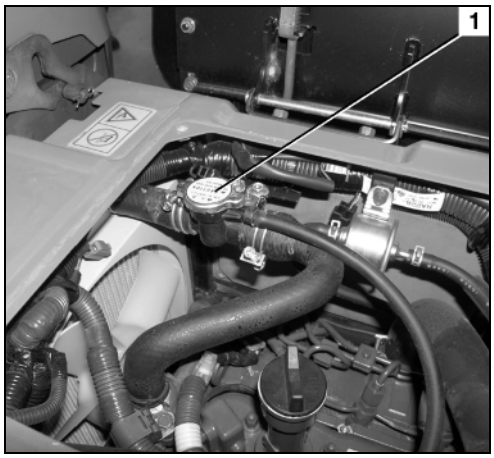


When the oil level is too high or too low, the engine might get damaged during operation.

- When changing the engine oil, fill engine oil up to the MAX mark.
- Close the cover under the operator's seat and the engine compartment cover.

Replacing the coolant

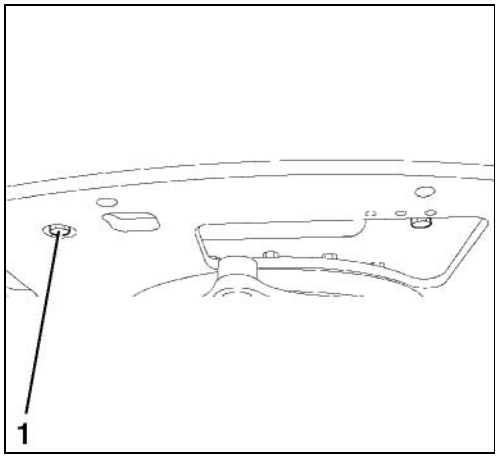
Drain the coolant only when the engine is cold.



Total cooling system capacity: 2,7 L

- Open the engine compartment cover (page 74).
- Open the engine compartment cover under the operator's seat (page 76).
- Open the radiator cap (1).
- Open the central coolant drain plug (1) and drain the coolant completely.

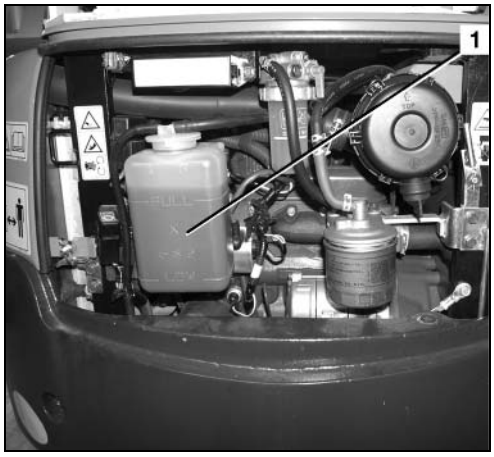
Fill the coolant in a container and dispose of it in accordance with the prevailing environmental protection regulations.



Purge the cooling system if the coolant is very dirty. To do this, spray water without additives into the cooling system with a hose through the filler opening until clear water emerges at the outlet.

- Close the central drain.
- Remove the coolant expansion reservoir (1) and drain it, cleaning it if necessary. Refit the reservoir.
- Fill the premixed coolant into the radiator and expansion reservoir.

Do not operate the cooling system with pure water (even in summer). The antifreeze also contains a corrosion inhibitor.

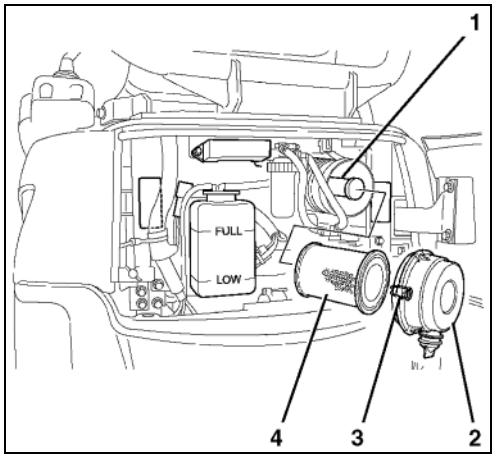


- Let the engine idle for about 5 min, shut it off and check the coolant level in the radiator. The coolant should reach the MAX. mark; if not, add coolant.
- Close the engine compartment covers.

Checking and cleaning the air filter

If the excavator is operated in a particularly dusty environment, the air filter must be checked more often.

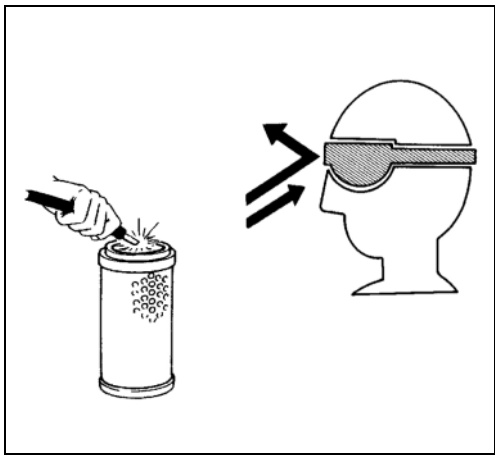
- Open the engine compartment cover (page 74).
- Open the clips (3) and remove the cover (2).
- Pull the outer filter element (4) out of the air filter case and check it for dirt.
- Clean the air filter case and cover without removing the inner filter element (1). Remove the inner filter element only when replacing it.
- Renew the outer filter element if it is damaged or too much dust has accumulated on it.



STOP

Do not clean the filter element with fluids. Never operate the engine without the air filter elements.

- Clean the outer filter element with compressed air (max. 5 bar) from the inside out without damaging the filter element. Wear eye protection for this service.
- Insert the outer air filter element and the cover with the TOP mark up.
- Close the engine compartment cover.

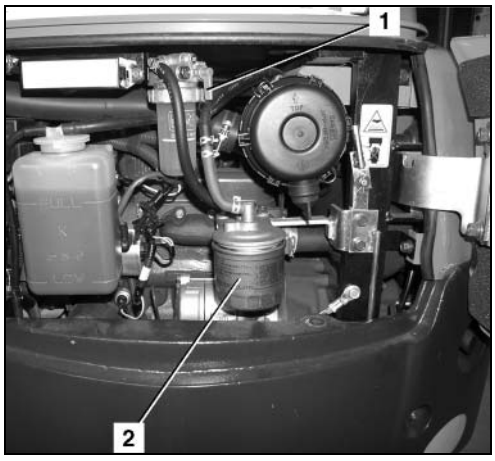


Replacing the fuel filter

- Open the engine compartment cover (page 74).
- Set the cock (1) horizontally to the C position.

Place a cleaning cloth under the fuel filter to prevent fuel from spilling on the ground.

- Remove the fuel filter (2).
- Wet the rubber seal of the new filter with fuel.

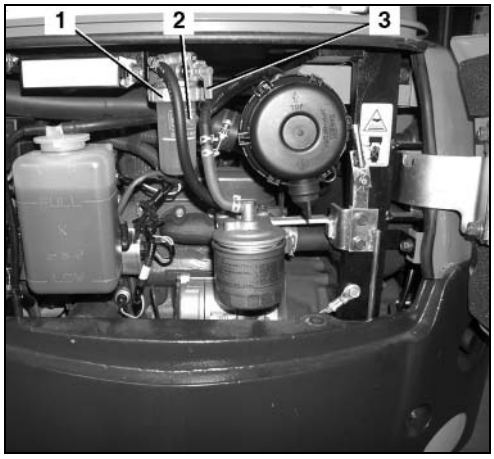


- Manually screw in the new filter.
- Reset the cock vertically to the O position.
- Bleed the fuel system (page 72).

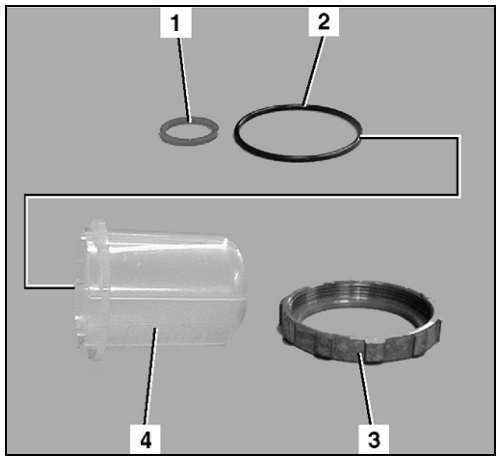
Cleaning the water separator

- Open the engine compartment cover (page 74).
- Set the cock (3) horizontally to the C position.

Place a cleaning cloth under the water separator to prevent fuel from spilling on the ground.

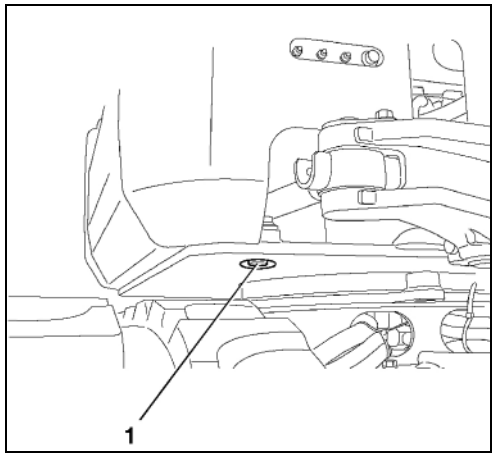


- Remove the filter cup retainer (1) while holding the cup (2).
- Remove the cup.
- Empty the cup (4) and clean it with clean diesel fuel.
- Replace the sealing ring (2).
- Apply a light coat of diesel fuel onto the sealing ring.
- Assemble the components in the order shown. Make sure to insert the floater (1). Tighten the filter cup retainer (3) by hand. Do not use a tool.
- Reset the cock vertically to the O position.
- Bleed the fuel system (page 72). Check the water separator for leaks at the same time.



Draining water from the fuel reservoir

- Place a container with a minimum capacity of 25 L under the fuel drain plug.
- Remove the drain plug (1) and drain the water.
- Install the drain plug with a new sealing ring on it.

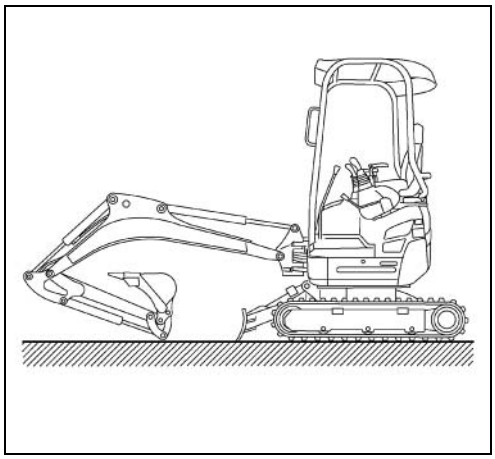


Replenishing hydraulic oil

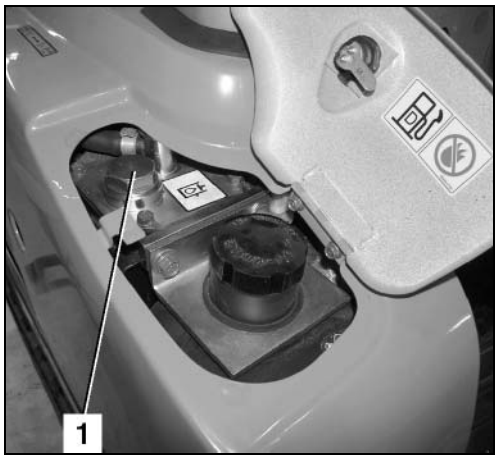
Pay attention to utmost cleanliness when servicing the hydraulic system.

This service may only be carried out after the hydraulic oil has cooled down.

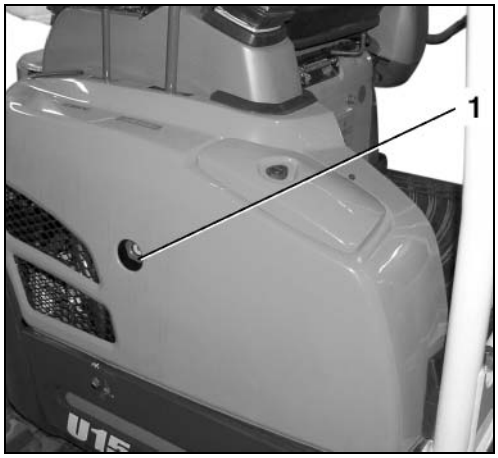
- Fully pull in the bucket and arm, lower the dozer to the ground, adjust the extendable track width to standard track width, align the front attachments with the swing mechanism in a straight line to the swivel frame and lower the boom to the ground.
- Open the fuel filler flap (page 75).



- Remove the oil filler cap (1).
- Insert a clean funnel with strainer into the filler opening.



- Fill hydraulic oil to half way up the sight glass (1).
- Screw in the oil filler cap.
- Start the excavator and operate all control functions.
- Check again the oil level of the hydraulic system.



Servicing the battery

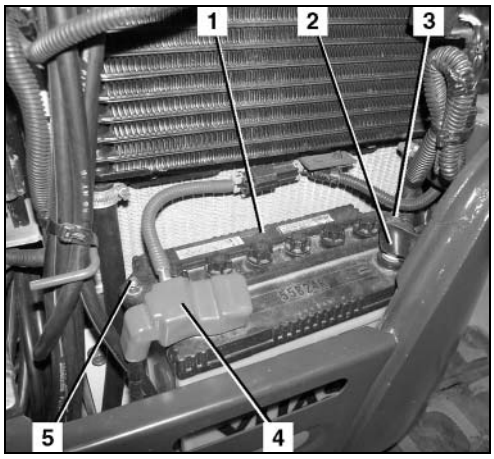
Battery acid is very caustic. Avoid contact with battery acid under all circumstances. If clothing, skin or eyes have come in contact with battery acid, rinse the affected parts immediately with water. If the eyes are affected, immediately seek medical attention! Neutralise spilled battery acid immediately.

When servicing a battery, always wear rubber gloves and eye protection.

- Open the left side cover (page 75). Always close the left side cover after the work is done.

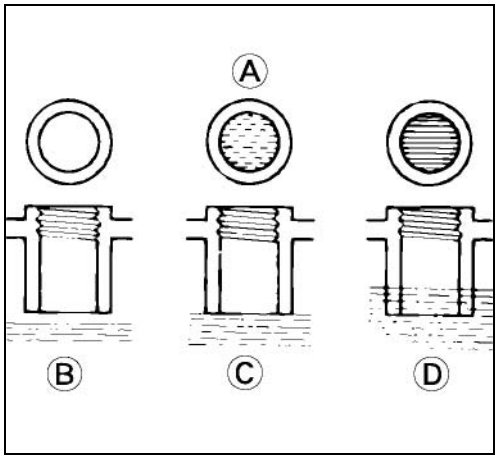
Battery service

- Regular maintenance can extend the life cycle of the battery considerably.
- Check the battery (1) for tightness, tighten with nuts (3 and 5), if necessary.
- Check the battery terminal (2 and 4) for cleanliness, cleaning it if necessary and covering it with petroleum jelly.



Be careful when cleaning the positive terminal - risk of short circuit! Do not use metal tools.

- Check the fluid level of the battery (figure above, position 1). The battery fluid level should be between LOWER LEVEL and UPPER LEVEL at the filler port (C); if necessary, add distilled water.



Do not open maintenance-free batteries!

Charging the battery

Charge batteries only in sufficiently ventilated rooms. Smoking, uncovered lights or fire are not allowed in these rooms.

Explosive gas is created when charging batteries. Open flames can cause an explosion.

Remove the fill caps when charging batteries that are virtually empty. Leave the fill caps inside (not empty) batteries that are only charged for maintenance purposes, the fill caps can stay in the batteries.

The battery can only be charged if the starter switch is in the STOP position and the key removed.

If the battery is charged when installed in the vehicle, the engine compartment cover must be left open during the charging procedure. After the charging procedure is completed, the engine compartment cover must be left open for ventilation for about 1 hour prior to start-up. → Risk of explosion.

- Check battery electrolyte level (page 98).
- Remove the negative terminal cover and take off the cable clamp. Put the clamp to the side so that contact with the negative terminal is excluded.
- Remove the positive terminal cover.
- Connect the battery charger to the battery according to the regulations of the charger manufacturer. Choose the normal (gentle) charging method.
- Clean the battery after charging and replenish the electrolyte, if necessary.

Checking the battery

- Charge the battery (page 98).
- Check the acid density with a hydrometer. The acid density should be between 1.24 and 1.28 kg/L. If the acid density differs considerably among the individual cells of a battery, the battery probably has a defect. Check the affected battery with a battery tester and contact trained personnel.

Removing/installing and replacing the battery

When disconnecting and connecting the battery, always observe the specified order. → Risk of short circuit!

- Remove the negative terminal cover and take off the cable clamp. Put the clamp to the side so that contact with the negative terminal is excluded.
- Remove the plus terminal cover and take off the cable clamp. Put the clamp to the side so that contact with the positive terminal is excluded.
- Remove the battery retainer and lift the battery out of the swivel frame.

When replacing the battery, always install a battery of the same type with the same power rating and the same dimensions.

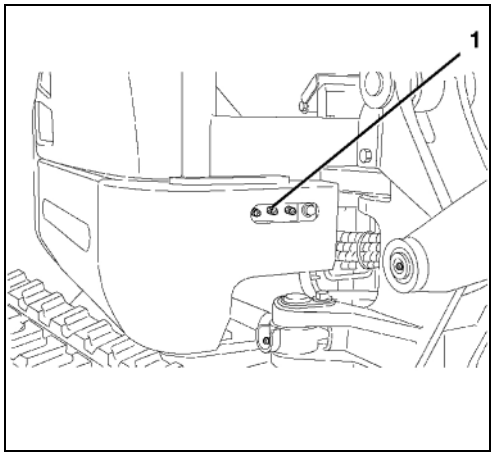
- Before installation, cover the battery terminals and cable clamps with petroleum jelly.
- Install the battery in the swivel frame and fasten it with the battery retainer. Check the battery for tightness. → Do not operate the excavator with a loose battery.
- Connect the positive cable clamp to the positive terminal (+) of the battery, install the positive terminal cover.
- Connect the negative terminal (-) of the battery, install the negative terminal cover.

Lubrication

The following describes all non-daily lubricating tasks at the attachments.

Greasing the swivel gear

- Fill grease through the grease nipple (1) with a grease gun.



Grease at each 90° position of the swivel gear. Fill a total of approx. 50 g of grease (20-30 shots with the grease gun). See the "Recommended lubricants" section (page 105).

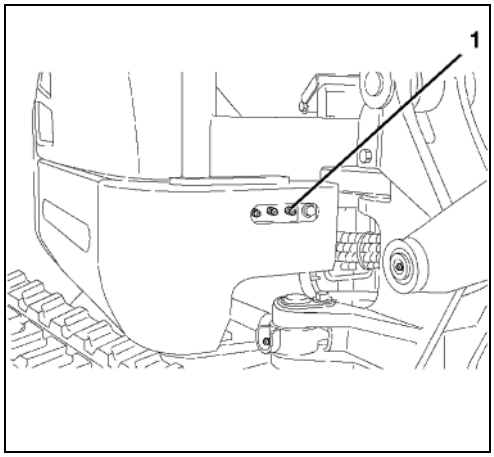
- Start the excavator and swivel the swivel frame 360° several times in succession to distribute the grease evenly.

STOP

When moving the swivel frame, make sure no person or material is in the swivel area.

Greasing the swivel bearing

- Fill grease through the grease nipple (1) with a grease gun.



Grease at each 90° position of the swivel bearing. Using the grease gun, apply 5 shots at every position. See the "Recommended lubricants" section (page 105).

STOP

When moving the swivel frame, make sure no person or material is in the swivel area. Turn the starter switch to the STOP position and remove the key before the next greasing procedure.

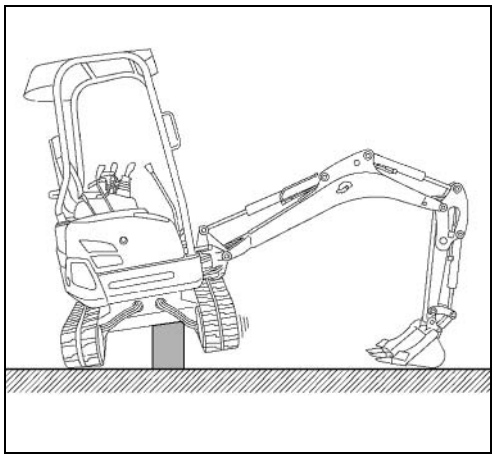
- Start the excavator and swivel the swivel frame by 90° several times. After greasing, swivel the swivel frame 360° several times to distribute the grease evenly.

Checking and adjusting the crawler tension

If the crawlers are too tight, wear is increased.

If the crawlers are too loose, wear is increased and the crawlers may come off.

When parking an excavator with rubber crawlers, ensure that the seam (∞) is on top half way between the two sliders. See figure in the "Checking the crawler tension" section (page 100).

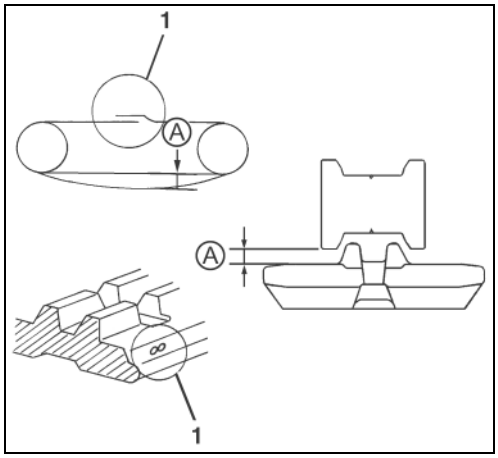


- Clean all parts of the running gear, paying particular attention to stones between the crawler and sprocket or idler. Clean in the area of the crawler tensioning cylinder.
- Swivel the swivel frame 90° to the direction of travel as shown in the figure.
- Lower the front attachments on the ground and raise the excavator about 200 mm off the ground on one side.

Have a guide supervise the procedure.

Support the excavator with appropriate supporting material, observing the vehicle weight.

Checking the crawler tension



- The crawler seam (1) is half way between idler and idler sprocket.
- Check the crawler sag as shown in the figure.

Crawler sag A	10-15 mm

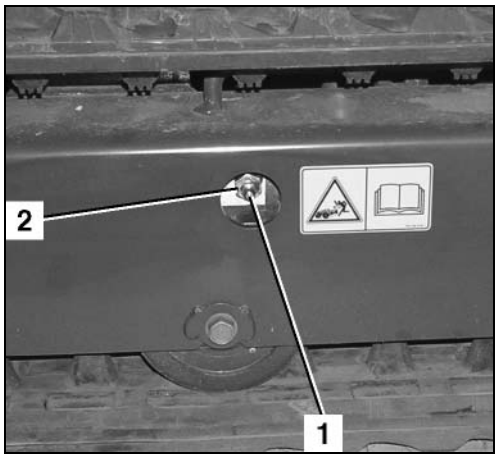
- If the crawler sag is more than 15 mm, adjust the crawler.
- If necessary, tighten or loosen the crawler.
- Start the engine and rotate the lifted crawler briefly.

Caution: The area around the rotating crawler must be free of persons. Turn the starter switch to the STOP position after turning and remove the key.

- Recheck the crawler tension, readjusting it if necessary.
- Perform the procedures on the second crawler.

Adjusting the crawler tension

Tightening the crawlers



- Position the grease gun on the grease nipple (1).
- Pump the grease gun until the specified crawler tension is obtained.

Loosening the crawlers

- Cautiously unscrew the pressure valve (figure above, position 2) and loosen the crawler.

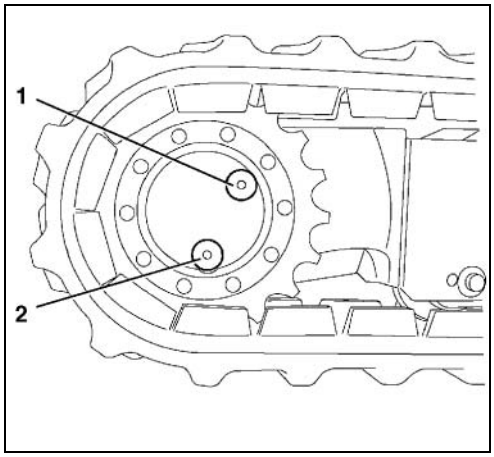
Grease could squirt out from the cylinder opening.

- Screw in the pressure valve and torque to 98-108 Nm.
- Tighten the crawler.

Replacing the drive unit oil

Only change the oil when the drive unit is warm to the hand; if not, drive the excavator warm.

- Park the excavator on level ground so that the drain plug (figure below, position 2) is positioned at the bottom.
- Place a catch tray with a minimum capacity of 2 L under the drain plug.
- Remove the drain plug and let the oil drain completely. Install the drain plug with a new sealing ring on it.
- Remove the oil filler plug (1).
- Fill oil as specified in the "Recommended lubricants" section (page 105). The oil level is the lower edge of the thread.

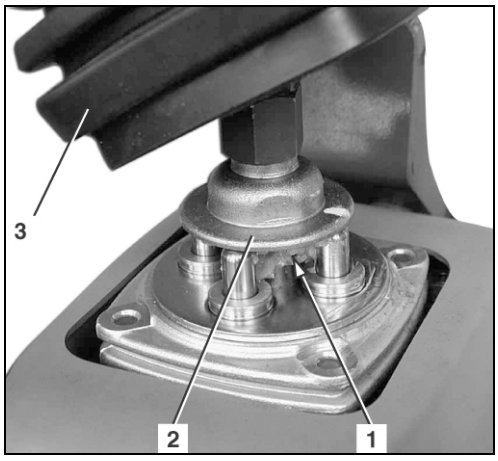


Capacity: 0.25 L

- Refit the oil filler plug with a new sealing ring and tighten it.
- Perform the same service on the second drive unit.

Greasing the pilot valve linkage

- Pull up the rubber boot on the control lever (3).
- Lubricate the u-joint (1) below the plate (2) with grease. See the "Recommended lubricants" section (page 105).
- Insert the rubber boot in the console.
- Carry out the service for the second control lever.



Checking the electric cables and connections

- Check all accessible electric cables, connectors and connections for condition and security.
- Repair or replace damaged parts.
- Check the fuse box and fuse holders for oxidation and dirt, clean if necessary.

Checking the bolted joints

The table below contains the torques for nuts and bolts. These may only be tightened with a torque wrench. Missing torques can be requested from KUBOTA.

Tightening torque for screws

Nm (kgf•m)

	4 T (4.6)	7 T (8.8)	9 T (9.8-10.9)
M 6	7.8~9.3 (0.8~0.95)	9.8~11.3 (1.0~1.15)	12.3~14.2 (1.25~1.45)
M 8	17.7~20.6 (1.8~2.1)	23.5~27.5 (2.4~2.8)	29.4~34.3 (3.0~3.5)
M 10	39.2~45.1 (4.0~4.6)	48.1~55.9 (4.9~5.7)	60.8~70.6 (6.2~7.2)
M 12	62.8~72.6 (6.4~7.4)	77.5~90.2 (7.9~9.2)	103.0~117.7 (10.5~12.0)
M 14	107.9~125.5 (11.0~12.8)	123.6~147.1 (12.6~15.0)	166.7~196.1 (17.0~20.0)
M 16	166.7~191.2 (17.0~19.5)	196.1~225.6 (20.0~23.0)	259.9~304.0 (26.5~31.0)
M 20	333.4~392.3 (34.0~40.0)	367.7~431.5 (37.5~44.0)	519.8~568.8 (53.0~58.0)

Note: When mounting the canopy, tighten 9 T screws with 7 T tightening torques

Tightening torque for hose clamps

Size	Torque in Nm
13-20	3.5
15-24	3.5
22-32	3.5-5
26-38	3.5-5
40-60	3.5-5
38-50	3.5-5
50-65	3.5-6
68-85	3.5-6

Tightening torque for hydraulic hoses

Wrench size	Torque in Nm	Hose size	Thread
14	20-25	DN 4-1/8“	M12x1.5
17	25-30	DN 6-1/4“	M14x1.5
19	30-35	DN 8-5/16“	M16x1.5
22	40-45	DN 10-3/8“	M18x1.5
27	50-55	DN 13-1/2“	M22x1.5

Also applies to adaptors with pre-installed nut

Tightening torque for hydraulic pipes

Wrench size	Torque in Nm	Pipe size	Thread
17	30-35	6x1	M12x1.5
17	30-35	8x1	M14x1.5
19	40-45	10x1.5	M16x1.5
22	60-65	12x1.5	M18x1.5
27	75-80	15x1.5	M22x1.5
30	90-100	16x2	M24x1.5
32	110-120	18x2	M26x1.5
36	130-140	22x2	M30x2
41	140-160	25x2.5	M36x2
27	60-65	15x1.5	M22x1.5 for ED-2 only

Tightening torque for hydraulic adapters

Thread	Wrench size	Torque in Nm	Pipe size	Thread
1/8“	14	15-20	4x1	M10x1.0
1/8“	17	25-35	6x1	M12x1.5
1/4“	19	34-45	8x1	M14x1.5
1/4“	19-22	40-55	10x1.5	M16x1.5
3/8“	22-24	45-65	12x1.5	M18x1.5
1/2“	27	70-80	15x1.5	M22x1.5
1/2“	27	80-90	16x2	M24x1.5
3/4“	32	100-120	18x2	M26x1.5
1“	36	120-140	22x2	M30x2

Recommended lubricants

- The excavator is shipped with ESSO NUTO H46 hydraulic oil.
- If bio oil is used, please contact your KUBOTA dealer.
- Use only API CF or API CI-4 grade engine oil. Do not use different grades, such as CF-4, CG-4 or CH-4.
- For the drive units use gear oil SAE 90 (API, CLA/GL5) in all seasons.
- The use of diesel fuel with a sulphur content of less than 0.10 % (1,000 ppm) is strongly recommended.
- When diesel fuel with a high sulphur content [between 0.50 % (5,000 ppm) and 1.0 % (10,000 ppm)] is used, the engine oil and engine oil filter must be replaced at shorter intervals (roughly half as long).
- Never use diesel fuel with a sulphur content exceeding 1.0 % (10,000 ppm).
- Diesel fuels complying with the current EN 590 or ASTM D975 are recommended.
  EN: European standard
  ASTM: American Society for Testing and Materials

	Range of use	Viscosity	Shell	Mobil	Exxon	MIL-Standard
1*	In winter or at low temperatures	SAE 10W	Shell Rotella T10W	Mobil Delvac 1310	XD-3 10W	MIL-L-2104C MIL-L-2104D
			Shell Rimula 10W		XD-3 Extra 10W	
		SAE 20W	Shell Rotella T20W-2	Mobil Delvac 1320	XD-3 20W-20	
			Shell Rimula 20W-2		XD-3 Extra 20W-20	
	In summer or at high ambient temperatures	SAE 30	Shell Rotella T30	Mobil Delvac 1330	XD-3 30	
			Shell Rimula 30		XD-3 Extra 30	
		SAE 40	Shell Rotella T40	Mobil Delvac 1340	XD-3 40	
			Shell Rimula 40		XD-3 Extra 40	
		SAE 50	Shell Rimula 50	Mobil Delvac 1350		
	All-weather engine oil	Multipurpose	Shell Rotella T15W		XD-3 15W40 XD-3 Extra 15W-40	
2*	In winter or at low temperatures	SAE 75	Shell Oil S 8643	Mobilube HD80W-90		MIL-L-2105C
		SAE 80	Shell Spirax HD80W	Mobilube HD80W-90		
	In summer or at high ambient temperatures	SAE 90	Shell Spirax HD90	Mobilube 46		MIL-L-2105
				Mobilube HD80W-90		MIL-L-2105C
		SAE 140	Shell Spirax HD140	Mobilube HD85W-140 Mobilube HD80W-140		MIL-L-2105C
	All-weather gear oil	Multipurpose	Shell Spirax HD80W Shell Spirax HD85W	Mobilube HD80W-90	GX80W-90	MIL-L-2105C
3*	In winter or at low temperatures	ISO 32	Shell Tellus T32	Mobil DTE-Oil 13	NUTO H32	
		ISO 46	Shell Tellus T46	Mobil DTE-Oil 15	NUTO H46	
	In summer or at high ambient temperatures	ISO 68	Shell Tellus T68	Mobil DTE-Oil 16	NUTO H68	
Grease			Shell Alvania EP2	Mobilux EP2	BEACON Q2	
Fuel		Summer diesel (ASTM D975/EN 590)				
Fuel below -5 °C		Diesel fuel for cold weather operation				
Antifreeze for the cooling system					G03-11 BVLK	
Special grease for use during the first 50 hours of operation		NLGI-1	WEICON ANTI-SEIZE			

1* Engine oil
2* Gear oil
3* Hydraulic oil

Excavator repairs

Repairs on the excavator may only be carried out by trained personnel.

If repairs are carried out on supporting parts, for example welding on frame parts, the work must be checked by an expert.

After repairs the excavator may only be taken into operation if its proper operation has been determined. For this check particular attention must be paid to the repaired parts and the safety devices.

SAFETY INSPECTION

All safety inspections are based on the national worker's protection regulations, safety regulations and technical specifications applicable to the country where the machine is deployed.

The operator (page 15) should arrange for the safety inspections to be performed at specified intervals according to national rules and regulations.

Because of special training and experience, this person must have sufficient excavator skills and should be familiar with the applicable national worker's protection regulations, safety rules and generally recognized technical rules to be able to assess the safe operating condition of the excavator.

The expert must keep his appraisal and evaluation neutral and must not be influenced by personal, economic or company interests. The inspection is a visual and functional check of all components for condition and completeness and of the effectiveness of the safety devices.

The performance of the inspection must be documented as an inspection report containing at least the following information:

- Date and scope of the inspection indicating all pending checks,
- Result of the inspection with a report of the determined faults,
- Assessment in respect to starting or continuing operation,
- Information on necessary follow-up inspections and
- Name, address and signature of the inspector.

The owner/employer (company) is responsible for the observance of the inspection intervals. The acknowledgement and the elimination of the determined faults must be confirmed by the owner/employer in writing, along with the date, in the inspection report.

The inspection report must be kept on file at least until the next inspection.

TAKING OUT OF SERVICE AND STORAGE

If the excavator is taken out of service for up to six months, the measures before, during and after taking out of service must be carried out as described below. If the vehicle is to be taken out of service for a period of over six months, contact the manufacturer for additional measures.

Safety rules for taking out of service and storage

The general safety rules (page 12), the safety rules for operation (page 43) and the safety rules for maintenance (page 84) apply.

When taking the excavator out of service, secure it against unauthorised use.

Storage conditions

The storage place must have a sufficient bearing capacity for the weight of the excavator.

The storage place must be frost-free, dry and well ventilated.

Measures before taking out of service

- Clean and dry the excavator thoroughly (page 89).
- Check the hydraulic oil level, add oil if necessary (page 48).
- Change the engine oil and oil filter (page 91).
- Drive the excavator to the storage place.
- Remove the battery (page 98) and store it in a dry and frost-free room. If necessary, connect it to a trickle charger.
- Grease the front attachments (page 49).
- Grease the swivel bearing (page 99).
- Grease the swivel gear (page 99).
- Check the antifreeze strength of the coolant, add coolant if necessary (page 89).
- Grease the hydraulic cylinder piston rods.

Measures during taking out of service

- Charge the battery regularly (page 98).

Start-up after taking out of service

- If necessary, clean the excavator thoroughly.
- Check the hydraulic oil for condensate water, replacing the oil if necessary.
- Install the battery (page 98).
- Check the safety devices for proper operation.
- Carry out pre-operational services (page 46). If defects are detected whilst starting the machine, the excavator may only be started up after the defects have been repaired.
- If the safety inspection is due while the vehicle has been taken out of service, the inspection must be performed before start-up.
- Start the engine (page 53). Run the excavator at idle and check all functions.

LIFTING CAPACITY OF THE EXCAVATOR

- The lifting capacity of the excavator is based on ISO 10567 and does not exceed 75% of the static tipping load or 87% of the hydraulic lifting capacity of the machine.

- The lifting capacity is measured at the front pin part of the arm with the arm fully extended. The boom cylinder is the operating cylinder.

STOP *The excavator as delivered may only transport materials in the bucket. The lifting of loads with the bucket or any other means of attachment is not allowed. The excavator can be retrofitted for lifting loads.*

- The lifting conditions are:

1. Over front end, dozer down, standard arm
2. Over front end, dozer up, standard arm
3. Over side, standard arm
4. Over front end, dozer down, long arm (accessory)
5. Over front end, dozer up, long arm (accessory)
6. Over side, long arm (accessory)

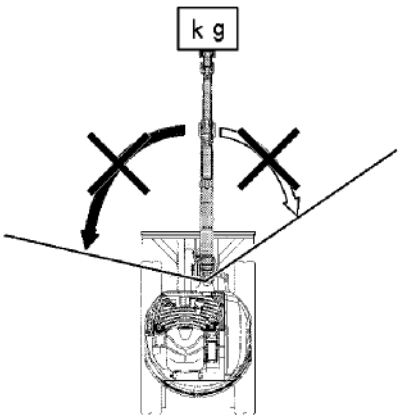
Dimensions for the arm, see table "Arm version" in the section "Dimensions" (page 31).

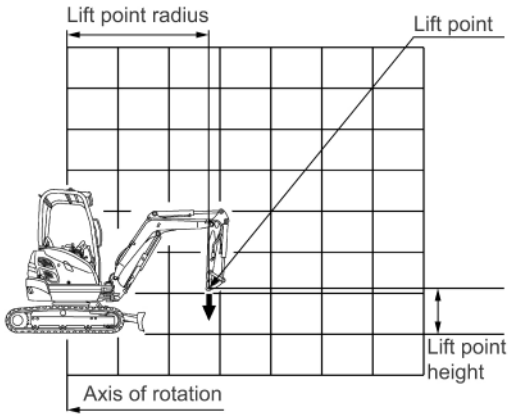
STOP *Do not lift loads which exceed the values indicated in the lifting capacity tables.*

STOP *The values given in the tables apply only to level and hard grounds. When working on soft ground, the machine can tip over easily, as the load is concentrated on one side only and the track or the dozer can dig into the ground.*

STOP *The values given in the tables apply only for loads without bucket. If a bucket is used, the weight of the bucket must be subtracted from the values in the tables. The weight of mounted accessories (e.g. breaker) must be subtracted from the lifting capacity.*

STOP *It is not allowed to swing the boom during lifting operation. The whole machine could tilt!*

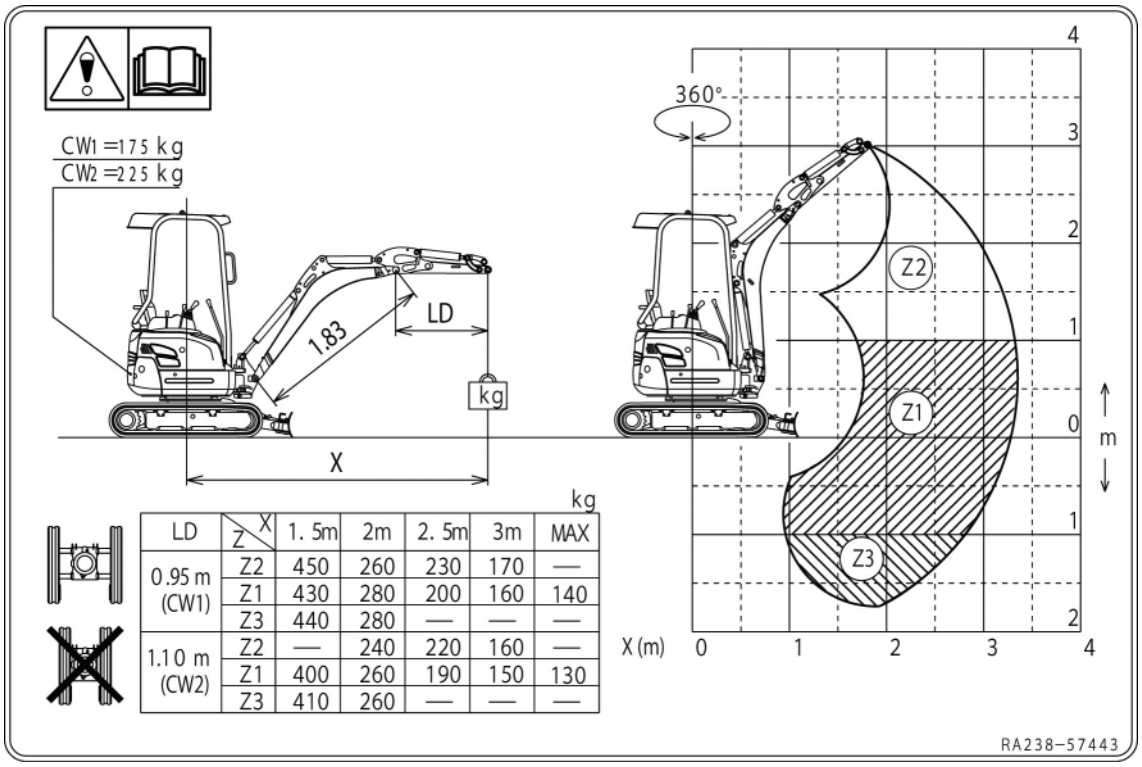




STOP ***When lifting loads using the excavator with a lifting capacity (acc. to ISO 10567:1992) of more than 1000 kg or a tilting moment > 40,000 Nm, the excavator should be equipped with additional devices as described in EN 474-5 / section 4.1.7.5.***

Max. lifting load during swivel operation is 360°

Standard arm vs. long arm l



kg

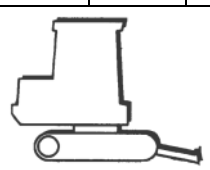
LD	Z \ X	1. 5m	2m	2. 5m	3m	MAX
0.95 m (CW1)	Z2	450	260	230	170	—
	Z1	430	280	200	160	140
	Z3	440	280	—	—	—
1.10 m (CW2)	Z2	—	240	220	160	—
	Z1	400	260	190	150	130
	Z3	410	260	—	—	—

Lifting capacity over front end, dozer blade down

MODEL	U17-3α
	KBM

SPECIFICATION	CANOPY VERSION WITH RUBBER CRAWLER
	Standard ARM

kN (t)

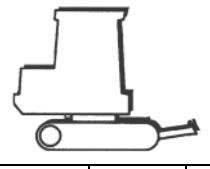
Height [mm]		LOAD RADIUS (mm)											
				Mini-mum	1500	2000	2500	3000	Maxi-mum				
	4500												
	4000												
	3500												
	3000												
	2500						3.1 (0.31)						
	2000					2.6 (0.27)	3.0 (0.31)						
	1500				4.4 (0.45)	3.8 (0.39)	3.4 (0.35)	3.1 (0.31)					
	1000					5.2 (0.53)	3.9 (0.40)	3.2 (0.32)					
	500					5.8 (0.59)	4.1 (0.42)	3.2 (0.33)	2.7 (0.28)				
GL	0					5.5 (0.56)	4.0 (0.41)	3.1 (0.31)					
	-500			6.1 (0.63)	6.8 (0.70)	4.9 (0.50)	3.6 (0.37)	2.7 (0.27)					
	-1000			9.2 (0.94)	5.8 (0.60)	4.1 (0.42)	3.0 (0.31)						
	-1500				4.5 (0.46)	3.1 (0.31)							
	-2000												
	-2500												

Lifting capacity over front end, dozer blade up

MODEL	U17-3α
	KBM

SPECIFICATION	CANOPY VERSION WITH RUBBER CRAWLER
	Standard ARM

kN (t)

Height [mm]		LOAD RADIUS (mm)											
				Mini-mum	1500	2000	2500	3000	Maxi-mum				
	4500												
	4000												
	3500												
	3000												
	2500						2.4 (0.25)						
	2000					2.6 (0.27)	2.4 (0.25)						
	1500				4.4 (0.45)	3.4 (0.34)	2.4 (0.24)	1.8 (0.18)					
	1000					3.2 (0.33)	2.3 (0.23)	1.8 (0.18)					
	500					3.0 (0.31)	2.2 (0.23)	1.7 (0.17)	1.5 (0.15)				
GL	0					3.0 (0.30)	2.2 (0.22)	1.7 (0.17)					
	-500			6.1 (0.63)	4.6 (0.47)	2.9 (0.30)	2.1 (0.22)	1.7 (0.17)					
	-1000			9.2 (0.94)	4.7 (0.48)	3.0 (0.30)	2.1 (0.22)						
	-1500				4.5 (0.46)	3.0 (0.31)							
	-2000												
	-2500												

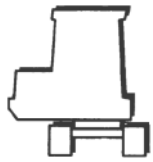
Lifting capacity of the excavator

Lifting capacity over side (track width 1240 mm)

MODEL	U17-3α
	KBM

SPECIFICATION	CANOPY VERSION WITH RUBBER CRAWLER
	Standard ARM

kN (t)

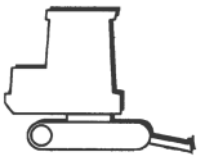
Height [mm]		LOAD RADIUS (mm)											
				Mini-mum	1500	2000	2500	3000	Maxi-mum				
	4500												
	4000												
	3500												
	3000												
	2500						2.3 (0.23)						
	2000					2.6 (0.27)	2.3 (0.23)						
	1500				4.4 (0.45)	3.1 (0.32)	2.2 (0.23)	1.7 (0.17)					
	1000					3.0 (0.30)	2.1 (0.22)	1.6 (0.17)					
	500					2.8 (0.29)	2.1 (0.21)	1.6 (0.16)	1.4 (0.14)				
GL	0					2.7 (0.28)	2.0 (0.20)	1.6 (0.16)					
	-500			6.1 (0.63)	4.2 (0.43)	2.7 (0.28)	2.0 (0.20)	1.6 (0.16)					
	-1000			9.1 (0.93)	4.3 (0.43)	2.7 (0.28)	2.0 (0.20)						
	-1500				4.3 (0.44)	2.8 (0.28)							
	-2000												
	-2500												

Lifting capacity over front end, dozer blade down

MODEL	U17-3α
	KBM

SPECIFICATION	CANOPY VERSION WITH RUBBER CRAWLER
	Long ARM

kN (t)

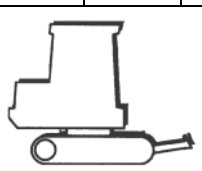
Height [mm]		LOAD RADIUS (mm)											
				Mini-mum	1500	2000	2500	3000	Maxi-mum				
	4500												
	4000												
	3500												
	3000					2.3 (0.24)							
	2500						2.5 (0.26)						
	2000						2.5 (0.26)	2.7 (0.27)					
	1500					3.0 (0.31)	3.0 (0.30)	2.8 (0.28)					
	1000					4.5 (0.46)	3.5 (0.36)	2.9 (0.30)					
	500					5.4 (0.55)	3.8 (0.39)	3.0 (0.31)	2.4 (0.25)				
GL	0				5.0 (0.51)	5.3 (0.54)	3.8 (0.39)	2.9 (0.30)					
	-500			5.3 (0.54)	7.0 (0.71)	4.8 (0.49)	3.6 (0.36)	2.7 (0.27)					
	-1000			7.7 (0.79)	6.0 (0.61)	4.1 (0.42)	3.1 (0.31)						
	-1500				4.7 (0.48)	3.2 (0.33)							
	-2000												
	-2500												

Lifting capacity over front end, dozer blade up

MODEL	U17-3α
	KBM

SPECIFICATION	CANOPY VERSION WITH RUBBER CRAWLER
	Long ARM

kN (t)

Height [mm]		LOAD RADIUS (mm)											
				Mini-mum	1500	2000	2500	3000	Maxi-mum				
	4500												
	4000												
	3500												
	3000					2.3 (0.24)							
	2500						2.3 (0.24)						
	2000						2.3 (0.24)	1.7 (0.18)					
	1500					3.0 (0.31)	2.3 (0.23)	1.7 (0.18)					
	1000					3.1 (0.31)	2.2 (0.22)	1.7 (0.17)					
	500					2.9 (0.30)	2.1 (0.22)	1.6 (0.17)	1.3 (0.14)				
GL	0				4.3 (0.44)	2.8 (0.28)	2.0 (0.21)	1.6 (0.16)					
	-500			5.3 (0.54)	4.3 (0.44)	2.8 (0.28)	2.0 (0.21)	1.6 (0.16)					
	-1000			7.7 (0.79)	4.4 (0.44)	2.8 (0.28)	2.0 (0.20)						
	-1500				4.4 (0.45)	2.8 (0.29)							
	-2000												
	-2500												

Lifting capacity over side (track width 1240 mm)

MODEL	U17-3α
	KBM

SPECIFICATION	CANOPY VERSION WITH RUBBER CRAWLER
	Long ARM

kN (t)

Height [mm]		LOAD RADIUS (mm)											
				Mini-mum	1500	2000	2500	3000	Maxi-mum				
	4500												
	4000												
	3500												
	3000					2.3 (0.24)							
	2500						2.2 (0.22)						
	2000						2.2 (0.22)	1.6 (0.17)					
	1500					3.0 (0.31)	2.1 (0.22)	1.6 (0.16)					
	1000					2.8 (0.29)	2.1 (0.21)	1.6 (0.16)					
	500					2.7 (0.27)	2.0 (0.20)	1.5 (0.16)	1.2 (0.13)				
GL	0				3.9 (0.40)	2.6 (0.26)	1.9 (0.19)	1.5 (0.15)					
	-500			5.3 (0.54)	3.9 (0.40)	2.5 (0.26)	1.9 (0.19)	1.5 (0.15)					
	-1000			7.7 (0.79)	4.0 (0.40)	2.5 (0.26)	1.9 (0.19)						
	-1500				4.0 (0.41)	2.6 (0.26)							
	-2000												
	-2500												

ACCESSORIES

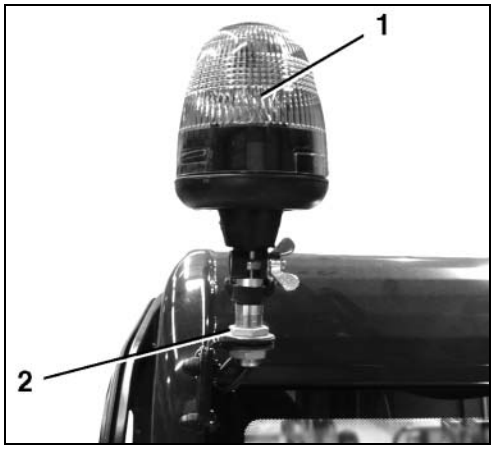
The accessories approved for this excavator by the respective countries are described in the following segments. For further accessories, please contact your KUBOTA dealer or authorized retailer.

Accessories from other manufacturers may only be fitted after prior written approval from KUBOTA. See also the "Approved use" section (page 15).

KUBOTA rotary beacon

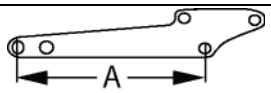
An optional rotary beacon (1) is available as an accessory. The beacon is mounted with a clip-on pedestal (2) at the rear end of the canopy.

The rotary beacon is switched on and off with the rotary beacon switch. (page 68).



KUBOTA long arm

An optional long arm is available.

Equipment	Name	Type		Field of application
[U17-3α]				
Arm	Long arm		A = 1100 mm	Deep digging and light excavation works

KUBOTA pipe safety valve

The pipe safety valve prevents the load from suddenly lowering during lifting in case a pipe or hose bursts. It is installed at the factory or can be retrofitted by your KUBOTA dealer.

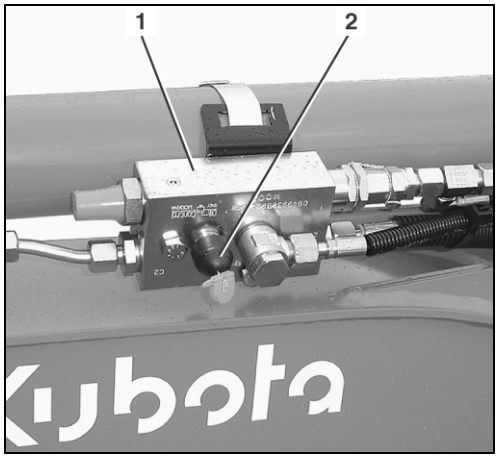
The hydraulic cylinders for

- boom (2),
- arm (1), and
- dozer (3)

are each equipped with a pipe safety valve located at the hydraulic port of the cylinders.

The pipe safety valve (1) is adjusted to the particular excavator at the factory and secured with a lead seal (2).

Removing the lead seal or manipulating the pipe safety valve will void the warranty.



Any manipulation can result in substantial personal injuries, even death, and is therefore strictly forbidden.

Any manipulation and repair of the pipe safety valves is forbidden. They may only be replaced by your KUBOTA dealer as a kit.

Note on the usage

- Check the lead seal of the pipe safety valve before using the excavator. Do not carry out any excavating work if the lead seal is not in place or the pipe safety valve is damaged.
- It is not allowed to swing the boom during lifting operation.

KUBOTA quick coupling systems and equipments

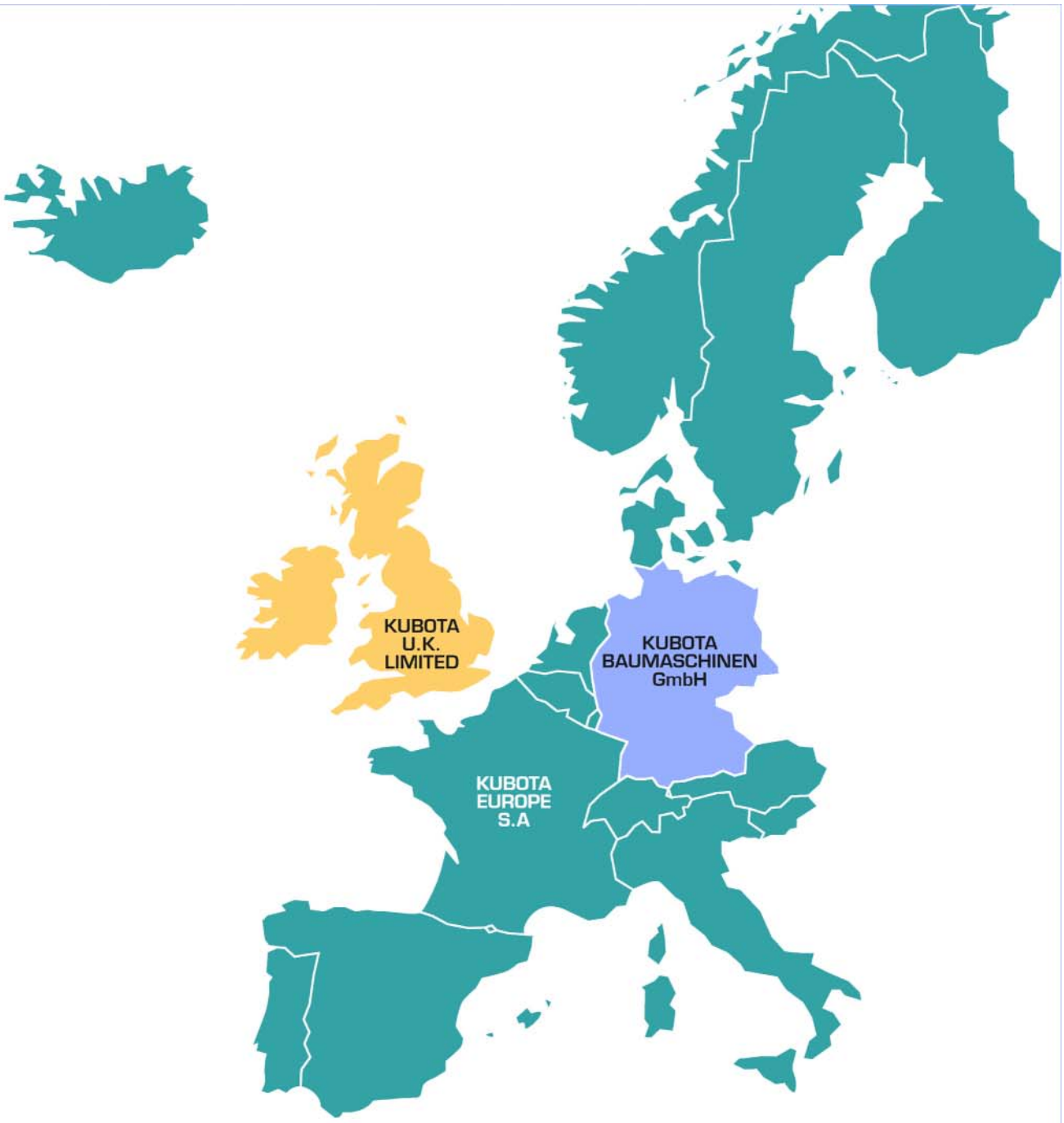
The quick coupling system is designed to be mounted with pins at the arm and the bucket linkage.
It is designed to receive KUBOTA bucket accessories only.

The related operating instructions are attached to the excavator's operating instructions.

For further information, please contact your KUBOTA dealer or authorized retailer.

KUBOTA bucket accessories

For further bucket accessories, please contact your KUBOTA dealer or authorized retailer.



KUBOTA EUROPE S.A.
19-25, rue Jules Vercruysse - BP 50088, Z.I.
95101 Argenteuil Cedex France
Tel. +33 (0)1 34 26 34 34 - Fax. +33 (0)1 34 26 34 21
www.kubota.fr

KUBOTA BAUMASCHINEN GmbH
Steinhauser Straße 100
66482 Zweibrücken
Tel. : +49 (0)6332 48 70 - Fax : +49 (0)6332 48 71 01
www.kubota-baumaschinen.de

KUBOTA U.K. LIMITED
Dormer Road, Thame Oxfordshire, OX9 3UN
Phone : +44 (0)184 421 4500 - Fax : +44 (0)184 421 6685
www.kubota.co.uk