

OPERATION MANUAL

SK17SR

APPLICABLE No.

SK17SR-5 PU10-20000~



READ, UNDERSTAND AND FOLLOW ALL SAFETY PRECAUTIONS AND INSTRUCTIONS FOUND IN THIS MANUAL BEFORE OPERATING THE MACHINE.

Book Code No. **S2PU00027ZE02**
(MUB42ENMA00102)

2015.11(EU)

[S2PU00027ZE02] [1204CsCshWbYs]

KOBELCO CONSTRUCTION MACHINERY CO., LTD. THANK YOU FOR PURCHASING A KOBELCO MACHINE

Read this manual carefully to find out how to use and maintain your machine correctly.

If the safety rules are not respected, injury may be caused or the equipment may be damaged.

This manual must be considered as a permanent part of your machine and must not be separated from the machine when you sell it.

This machine has been designed metrically. The measurements contained in this manual are also metric.

Only use metric equipment and tools.

The right and left hand sides are determined by facing the forward movement direction.

The warranty is a part of the KOBELCO product support programme for customers who use and maintain their equipment as described in this manual. If the equipment has been used incorrectly or modifications have been made to transform its performances beyond the original factory specifications, the warranty expires and the improvements on site under warranty are rejected. The use of fuel beyond the specifications required or boosting the machines' engines will cancel the warranty.

All the information, illustrations and specifications contained in this manual are based on the latest product information available on publication. KOBELCO reserves the right to modify the information and illustrations in this manual without notice. For any further information, please contact your approved KOBELCO dealer.

The images that appear in this booklet are provided for information purposes and may vary according to each model.

WARNING

Never try to run or use this machine without having read and understood all the applicable security messages contained in this manual.

Injury may be caused if the safety messages are not respected.

To ensure that this manual remains available for other users, always put it back in its compartment when it is not being used.





Kobelco Construction Machinery Europe B.V.
Veluwezoom 15
NL-1327 AE Almere
Netherlands

'EC' DECLARATION OF CONFORMITY

The undersigned declare that the machine described below :

- Has been designed in compliance with the following European Directives, as amended, and the regulations transposing them into laws
- Has been produced by

YANMAR Construction Equipment Europe S.A.S.
25, Rue de la Tambourine
F-52115 Saint Dizier CEDEX

1. 2006/42/EC « Safety of machine »

1.1 European Harmonised standards under which conformity is declared

EN 474-1:2006+A4:2013
EN 474-5:2006+A3:2013

1.2 Main safety components installed and supplied with the machine

- 1.2.1 Falling Object Protective Structure (F.O.P.S) **XXX**
- 1.2.2 Object handling application kit (EN474-5 §5.6.4 ; EN474-1 Annex E) **XXX**
- 1.2.3 Cab front guard **XXX**
- 1.2.4 Tip Over Protective Structure (T.O.P.S) **XXX**
- 1.2.5 Quick coupler (Attachement bracket) **XXX**

1.3 Name and adress of the representative authorised to compile the technical file

Kobelco Construction Machinery Europe B.V.
Veluwezoom 15
1327 AE Almere, The Netherlands

2. 2000/14/EC "Noise emission"

2.1 Conformity assessment procedure followed

2000/14/EC Annex VI

2.2 Name and address of the notified body involved

CETIM Centre Technique des Industries Mécaniques
52, Avenue Félix LOUAT
BP 80067
60304 SENLIS CEDEX France

2.3 Measured sound power level LWA (ref. 1 pW)

91,8 dBA

2.4 Guaranteed sound power level LWA (ref. 1 pW)

93 dBA

2.5 Engine power (as defined by ISO 14396)

10,1 kW * 2200 rpm

2.6 Holder of the technical documentations

YANMAR Construction Equipment Europe S.A.S.

3. 2004/108/EC "Electromagnetic Compatibility (EMC)"

3.1 European Harmonised standards under which conformity is declared

EN 13309:2010

4. Other Applicable directive(s)

97/68/EC

5. Manufacturer

YANMAR Construction Equipment Europe S.A.S

6. Category

Hydraulic Excavator (<6 tons)

7. Type

SK17SR

8. Serial number

XXXXXXXXXXXXXXXXXX

Authorized Signature of Declarant

XX/XX/XXXX

Jean-Marc REYNAUD

General manager



REFERENCE INFORMATION

Note information about your KOBELCO machine here.

Always use these references for everything to do with your KOBELCO machine.

Model name :	
Machine serial number :	
Serial number of the engine :	
Your KOBELCO dealer :	
Address :	
Telephone :	





INTRODUCTION

This User and Maintenance Manual has been designed to provide you with important information and the suggestions you need for safe and effective use of the machine. Read the manual before you use the machine to familiarise yourself with the operation, verification and maintenance procedures and instructions. A serious accident may be caused if you do not respect the precautions contained in this user manual or use any procedures that are not recommended.

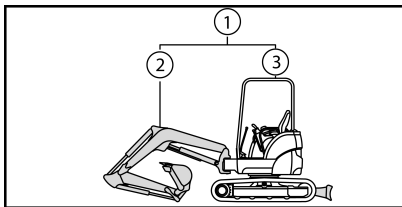
DANGER

Incorrect use of the machine may cause serious injury or even death. Personnel involved in using and maintaining the machine must familiarise themselves with the content of this manual before carrying out a task.

- Do not start the machine before you have familiarised yourself with the content of this manual.
- The personnel responsible for using the machine must keep this manual within easy reach and consult it from time to time.
- If you lose or damage the manual, order a new one immediately from your dealer.
- When you sell the machine to another user, do not forget to pass on the manual at the same time.
- KOBELCO provides its customers with products that conform to the regulations and industrial standards that apply in their respective countries. If you are using a KOBELCO machine that you have bought from a foreign company, you should be aware that certain safety mechanisms may be missing from the machine. Consult your dealer to find out whether your machine complies with the regulations and industrial standards that apply in your country.
- Some of the machine's specifications may differ from those described in the manual because the machine's design and performances have been improved. If you have any comments to make concerning the content of the manual, do not hesitate to consult your dealer.
- The important safety instructions are presented in this manual in sections:
 -  **1 Basic precautions** , page 39
 -  **2 Usage precautions** , page 43

Consult these pages and respect these safety instructions before starting up the machine.

- In this manual, the main product sections are designated as follows :







- (1) **Machine** = whole product
- (2) **Equipment** = part including the arm, the boom, the bucket or any other accessory
- (3) **Basic machine** = part comprising the upper structure and the lower frame



SAFETY SIGNALS

The following signals are used in this manual to indicate the severity of the risks that may be encountered if the warnings concerning the product are not respected :

 DANGER	Dangerous situation imminent that may cause death or serious injury.
 WARNING	Potentially dangerous situation likely to cause death or serious injury.
 CAUTION	Potentially dangerous situation likely to cause slight or medium-seriousness injury .
 IMPORTANT	Remarks or instructions to be respected to ensure the completely safe operation and maintenance of the machine.

 **WARNING**

The operator of this machine must be competent and trained in its use.

 **WARNING**

Never try to operate or repair the machine if you have not read and understood all the applicable warnings and usage instructions contained in this manual and on the safety signals on this machine. Physical injury may be caused if the safety instructions are not respected.

 **WARNING**

Never modify the design of the machine or its engine.

Never remove or deactivate the protections or safety mechanisms installed.

Any unauthorised modification to the design or use of unauthorised accessories may cause physical damage.

In addition, in that these actions would constitute an explicit violation of the terms of the KOBELCO Product Warranty, the applicable warranty would also become null and void.

TABLE OF CONTENTS

A	Description and illustration of the machine	1
1	Applications and regulations	3
1.1	Applications	3
1.2	Warranty	3
1.3	Driving permits	3
2	Identification plates	4
2.1	Machine serial number plate	4
2.2	Engine serial number plate	4
2.3	EPA information plate	4
2.4	Spare parts order and intervention request	5
3	Warning labels	6
3.1	Location of the warning adhesive labels	6
3.2	Explanation of the warning adhesive labels	8
4	Identification of important parts	11
4.1	General view of the machine	11
4.2	Commands and switches	12
5	Description of the driving position	13
5.1	Dashboard	13
5.1.1	Diesel gauge	14
5.1.2	Cooling fluid temperature indicator	14
5.1.3	Engine oil pressure alert indicator	14
5.1.4	Battery charge warning alert	15
5.1.5	Water temperature alarm light	15
5.1.6	Preheating light	15
5.1.7	Time counter	16
5.1.8	Time display button	16
5.2	Switches	17
5.2.1	Start key	17
5.2.2	Headlight switch	18
5.2.3	Horn	18
5.2.4	Circuit breaker	18
5.3	Joysticks and pedals	19
5.3.1	Locking lever	20
5.3.2	Right command lever	20
5.3.3	Left command lever	21
5.3.4	Travel levers and pedals	21
5.3.5	Throttle lever	22
5.3.6	Blade lever	23
5.3.7	Protection of pedals	23
5.3.8	P.T.O. pedal	24
5.3.9	Boom rotation pedal	24
5.3.10	2nd speed pedal	24
5.3.11	Track spacing lever	25
5.4	Power socket	25
5.5	Driver's seat	26
5.6	Location for the tools and user manual	27
5.6.1	User manual	27
5.7	Fuses	27
5.7.1	Fusebox	27
5.8	Headlights	28
6	Covers	29

6.1	Bonnet	29
6.2	Cover B	30
7	Options	31
7.1	Document holder	31
7.2	Antistarter mechanism with keypad	31
7.3	Anti-starter with key	31
7.4	Quick hitch	32
7.5	Mechanical quick hitch	32
7.5.1	Mechanical quick hitch RETROMATIC MORIN	33
7.5.2	Mechanical quick hitch CSERI	34
B	Operating instructions	37
1	Basic precautions	39
1.1	Comply with your workplace's safety rules	39
1.2	Put the safety mechanisms in place	39
1.3	Wear suitable clothing and protective equipment	39
1.4	Do not drive under the influence of alcohol, drugs or medication	40
1.5	Provide adequate ventilation when working in an enclosed space	40
1.6	Protect plants from hot air and exhaust fumes	40
1.7	Keep fuel and oil away from sparks	41
1.8	Avoid removing the caps when the temperatures are high	41
1.9	Avoid crush injuries due to accessories	41
1.10	Have an extinguisher and a first aid kit	42
1.11	Avoid any unauthorised modifications	42
1.12	Precautions for optional parts and tools	42
2	Usage precautions	43
2.1	Precautions before starting the engine	43
2.1.1	Make sure that your workplace is safe	43
2.1.2	Clean the machine	43
2.1.3	Check the safety structures	44
2.1.4	Check the position of the blade	44
2.1.5	Accessing the machine	45
2.1.6	Fasten your safety belt and adjust the rearview mirror(s)	45
2.2	Movement precautions	45
2.2.1	Machine's Danger Zone	45
2.2.2	Movement and accessories	46
2.2.3	Driving the machine on a slope	47
2.3	Working precautions	48
2.3.1	Precautions for using the equipment	48
2.3.2	Dangerous tasks	49
2.3.3	Working near electricity lines	50
2.3.4	Working near obstacles	50
2.3.5	Emergency stop and securing the machine	50
2.3.6	Working on a slope	51
2.3.7	Working in an area covered with snow	51
2.3.8	Working on unstable ground	51
2.3.9	Working in a submerged area	52
2.3.10	Working in a muddy area	52
2.3.11	Working in an area with reduced visibility	53
2.4	Parking precautions	54
2.5	Precautions for the accessories	55
2.6	Precautions for using optional accessories	55
2.7	Precautions for the battery	56
3	Precautions for the engine	57

4	Checks before starting the machine	58
4.1	Overall visual inspection	58
4.2	Checking and topping up the level of cooling fluid	59
4.3	Checking and topping up the engine oil level	60
4.4	Checking and topping up the fuel level	61
4.5	Checking and topping up the hydraulic oil level	62
5	Checks after start-up	64
6	Checks after use	66
7	Using the machine in cold weather	67
7.1	Preparation for use in cold weather	67
7.2	Starting in cold weather	67
7.3	Precautions after use	68
7.4	When cold weather is over	68
8	Rubber tracks	69
8.1	Correct use of rubber tracks	69
8.2	Rubber track warranty	69
8.3	Precautions for using rubber tracks	70
8.4	Track maintenance	71
8.5	Track replacement	71
9	Handling the bucket	72
9.1	Machine stability when using with a bucket or an accessory	72
9.2	Compatible accessories	75
9.3	Operation of the retro bucket	76
9.4	Digging trenches	76
9.5	Loading	76
10	Handling of accessories	77
10.1	Hydraulic hammer SOCOMEC	77
11	Accessory change by direct coupling	79
11.1	Dismantling the accessory	79
11.2	Mounting the accessory	81
11.2.1	Loading bucket	81
12	Implementing the 3rd hydraulic circuit	82
12.1	Description	82
12.1.1	3rd circuit selector	82
12.1.2	3rd circuit pedal	83
12.2	Mounting the accessory	83
12.3	Precautions for using the accessory	83
13	Transporting the machine	84
13.1	Loading/unloading the machine	84
13.1.1	Precautions for loading/unloading the machine	84
13.1.2	Procedure	85
13.2	Immobilising the machine on the truck	85
13.3	Tying down the machine	86
13.4	Slings the machine	87
14	Detecting anomalies	89
14.1	phenomena that do not constitute faults	89
14.2	Detecting anomalies	89
14.2.1	Engine	90
14.2.2	Electrical equipment	90
14.2.3	Machine structure	92
15	If the battery is discharged	93
15.1	Precautions for connecting and disconnecting the starter cables	93
15.2	Connecting the starter cables	94

15.3	Starting the engine	94
15.4	Disconnecting the starter cables	94
15.5	Charging the battery	95
16	Towing the machine	96
C	Periodic maintenance programme	97
1	Periodic inspections and upkeeps	99
2	Maintenance precautions	101
2.1	Precautions before maintenance	101
2.1.1	Removing the residual pressure	101
2.1.2	Place a warning label	101
2.1.3	Establish a safety perimeter	101
2.1.4	Keep the machine clean	102
2.2	Precautions during maintenance	102
2.2.1	Oil and grease	102
2.2.2	Tools	103
2.2.3	Parts	103
2.2.4	Dismantling the accessory	103
2.2.5	Working under the machine	103
2.2.6	Lighting	104
2.2.7	Battery	104
2.2.8	Hoses	104
2.2.9	Radiator ventilator	104
2.2.10	Soldering	105
2.2.11	Waste processing	105
3	Recommended greases and fluids	106
4	First maintenance	107
4.1	After the first 50 hours of service	107
4.2	After the first 250hours of service	107
5	List of periodic inspections and maintenance operations	108
6	Maintenance by the operator	111
6.1	Daily maintenance	111
6.1.1	Checking the machine before use	111
6.1.2	Checks after using the machine	111
6.1.3	Checking the commands	111
6.1.4	Checking the seat	111
6.1.5	Greasing points	113
6.1.6	Cleaning the separator/decanter	113
6.1.7	Purging the fuel tank	114
6.1.8	Checking the hydraulic hoses	114
6.1.9	Visual inspection of the fuel hoses	114
6.2	Maintenance every 50 hours	114
6.2.1	Greasing the pin and rotation crown	114
6.2.2	Greasing the track spacing piston	115
6.3	Non periodic maintenance	115
6.3.1	Fuse replacement	115
6.3.2	Replacing a bulb	115
6.4	Rubber track maintenance	116
6.4.1	Checking the condition of the tracks	116
6.4.2	Track replacement	117
6.4.3	Tension check	117
6.4.4	Increasing the tension	119
6.4.5	Releasing the tension	120
7	Maintenance by the dealer	121

D	Conservation and storage	123
1	Conservation	125
2	Storage	126
3	Recommissioning	127
E	Technical data	129
1	Specifications	131
2	Working dimensions	132
3	Noise emitted by the machine	133
4	Vibrations emitted by the machine	134
	Appendices	139
A	Control sheets to be photocopied	140
B	Notes	147
C	Lashing record.....	148
	Index.....	149

A Description and illustration of the machine

CHAPTERS COVERED IN THIS PART:

- 1 APPLICATIONS AND REGULATIONS
- 2 IDENTIFICATION PLATES
- 3 WARNING LABELS
- 4 IDENTIFICATION OF IMPORTANT PARTS
- 5 DESCRIPTION OF THE DRIVING POSITION
- 6 COVERS
- 7 OPTIONS



1 APPLICATIONS AND REGULATIONS

1.1 Applications

The machine is designed to carry out the following tasks :

- excavation
- ground levelling
- shovelling
- trench digging and ridging
- loading

 **CAUTION**

The machine must not be used for any tasks that are not covered.

 **CAUTION**

It is forbidden to transport or lift people with the machine.

1.2 Warranty

Refer to the maintenance book.

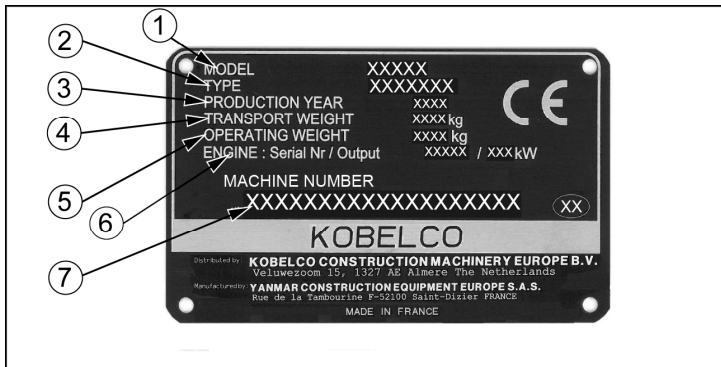
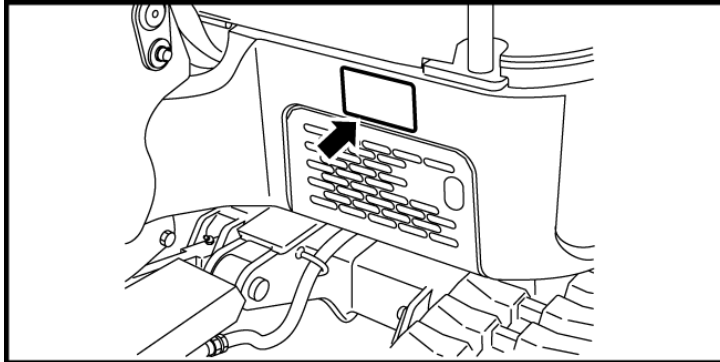
1.3 Driving permits

Before using this machine, check the requirements applicable to its use concerning the driving permits. Respect all applicable laws. See your dealer for questions about usage permits.

2 IDENTIFICATION PLATES

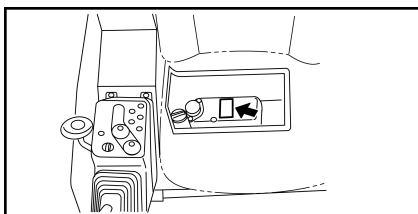
2.1 Machine serial number plate

- The machine's serial number plate is located on the rotating frame, as shown opposite. Never remove this plate for any reason.



- 1= Model name
- 2= Type (Machine Category)
- 3= Date of manufacture of the machine
- 4= Transport weight (Machine weight without operator, equipped with a standard bucket and tanks topped off)
- 5= Weight of the machine (with operator +75 kg)
- 6= Serial number and engine power
- 7= Machine serial number

2.2 Engine serial number plate

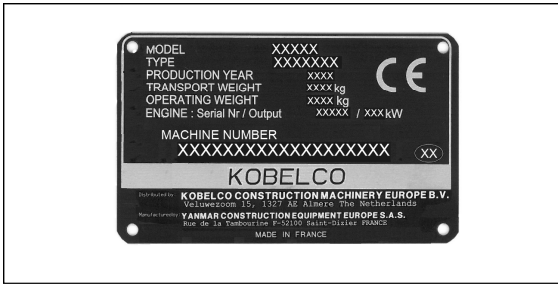


The engine's serial number plate is located on the top of the lifting arm lever cover and on the adhesive label located inside the bonnet. Never remove this plate for any reason.

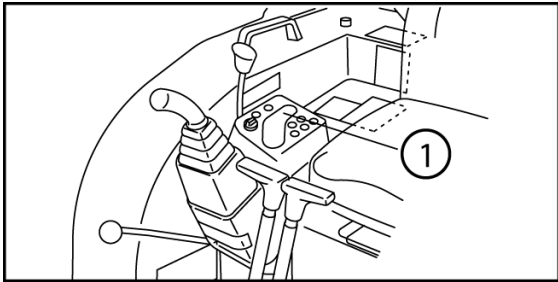
2.3 EPA information plate

The EPA information plate is attached to the engine. Never remove this plate for any reason.

2.4 Spare parts order and intervention request



When you order spare parts or call for an intervention, tell your dealer the model name, the serial number of the machine and the serial number of the engine and the number of hours displayed on the time counter.

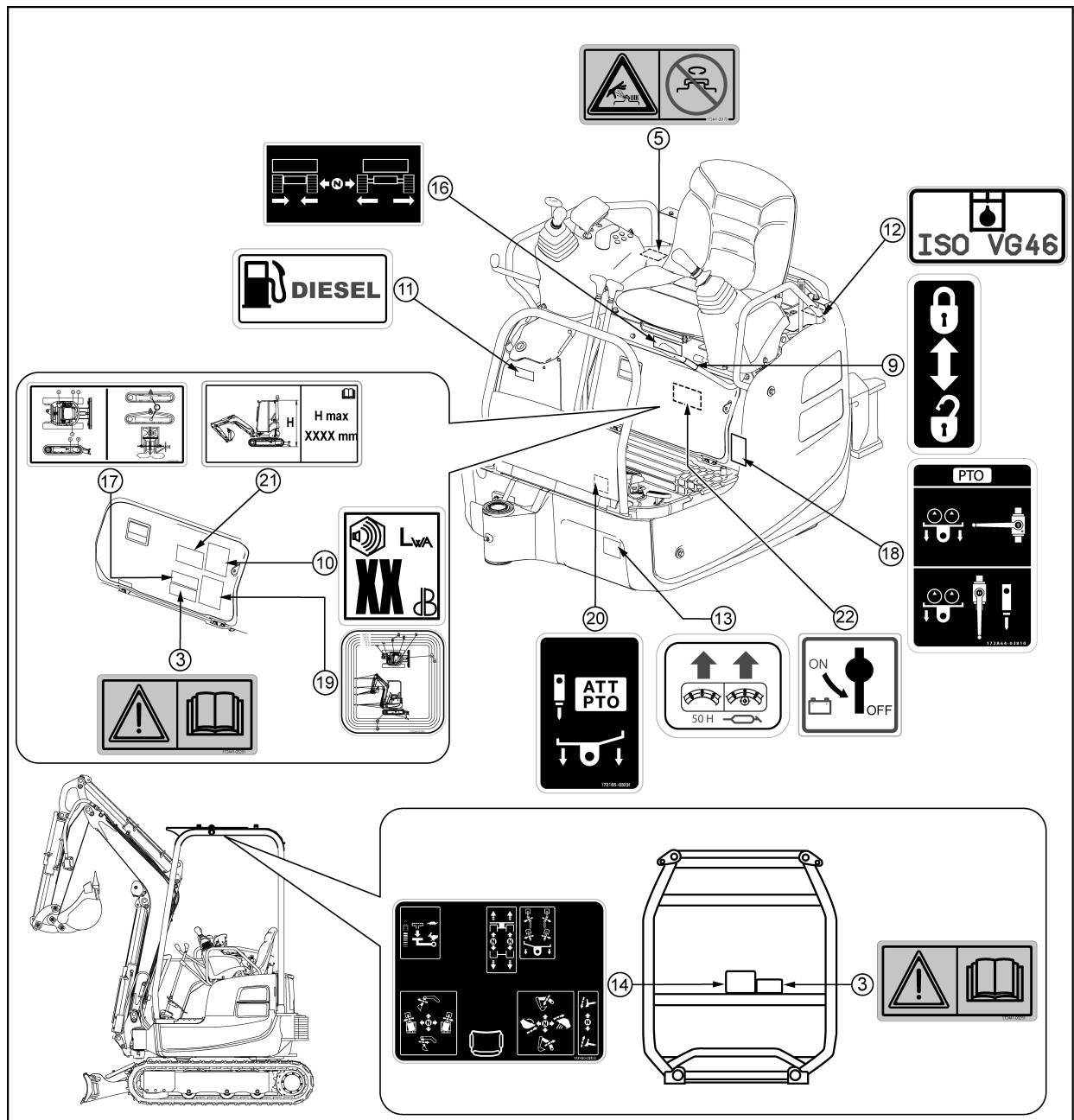


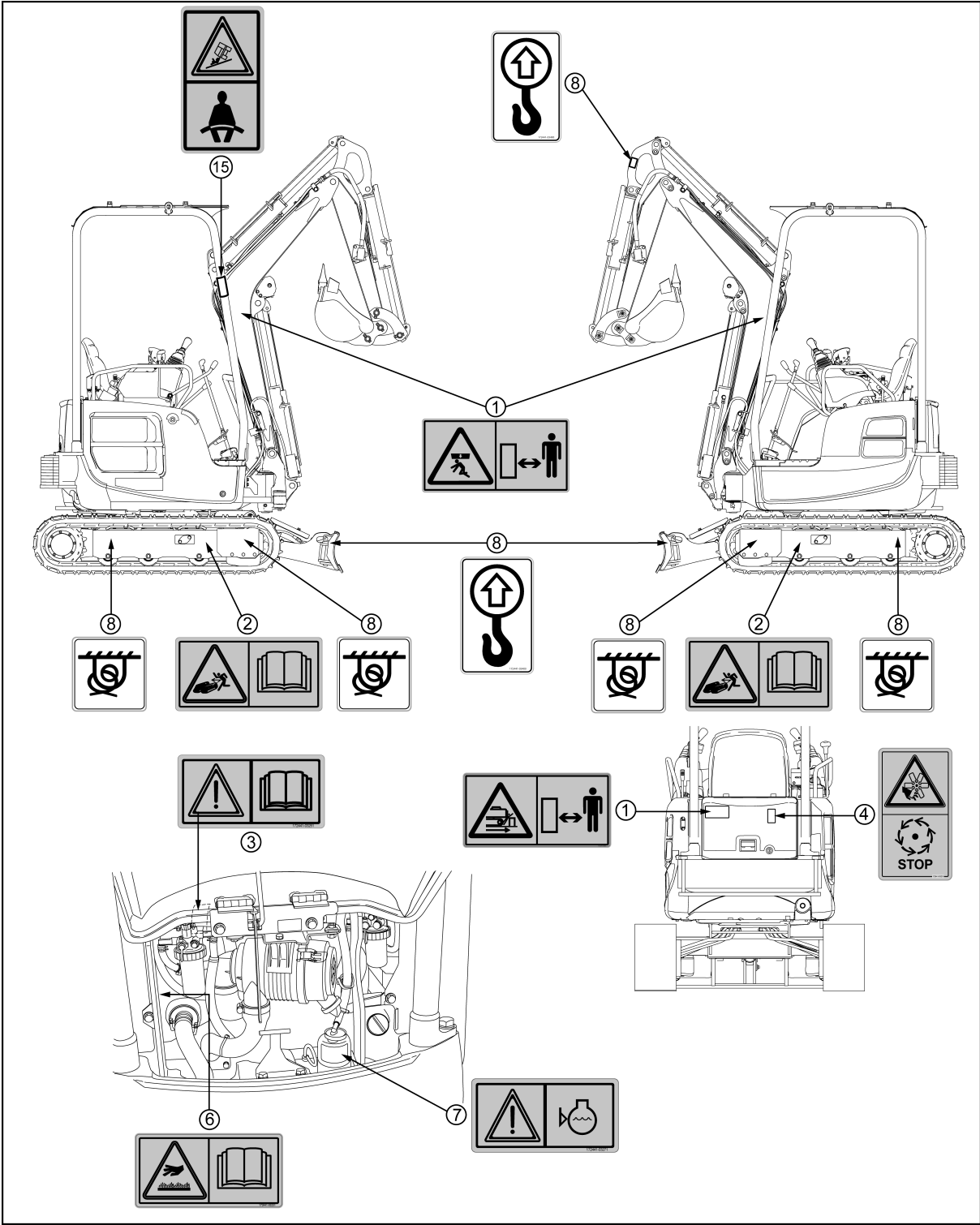
1 = Time counter

3 WARNING LABELS







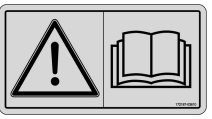






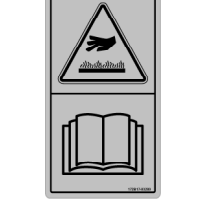



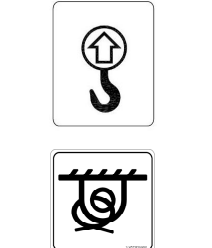


- Several safety messages are configured on the machine. The description and location of all the safety messages are provided in this chapter. Check regularly to see whether all the messages are in the correct location and are legible.
- If an adhesive label is missing, damaged or illegible, replace it straight away. In the same way, if an adhesive label is on a part that has been replaced, add a new adhesive label to the new part.
- Contact your KOBELCO dealer to obtain new adhesive labels. The part code number is clearly indicated on each label.










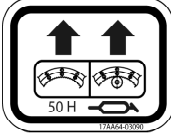

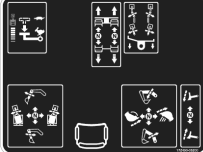



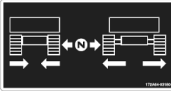

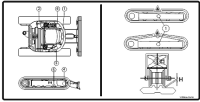


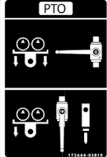

3.1 Location of the warning adhesive labels



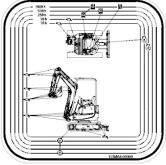




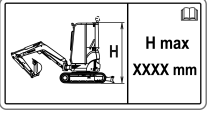





3.2 Explanation of the warning adhesive labels

1		<p>Machine's Danger Zone</p> <p> 2.2 Movement precautions , page 45</p> <p> 2.2.4 Dismantling the accessory , page 105</p> <p> 2.2.1 Machine's Danger Zone, page 45</p>
2		<p>Pressurised product. Read the user manual.</p> <p> 6.4 Rubber track maintenance , page 118</p>
3		<p>Read the user manual.</p> <p> 2.1.5 Accessing the machine , page 45</p> <p> 2 Usage precautions , page 43</p>
4		<p>Do not remove the protective casings while the machine is running.</p> <p> 2.2.9 Radiator ventilator , page 106</p>
5		<p>Pressurised elements. Do not unscrew while the liquid is hot.</p> <p> 1.8 Avoid removing the caps when the temperatures are high , page 41</p>
6		<p>Hot surfaces.</p> <p> 4.3 Checking and topping up the engine oil level, page 60</p>
7		<p>Level of engine cooling fluid.</p> <p> 4.2 Checking and topping up the level of cooling fluid , page 59</p>
8		<p>Transporting the machine</p> <p> 13.4 Slings the machine , page 89</p> <p> 13.3 Tying down the machine , page 88</p>

9		 5.3.1 Locking lever , page 20
10		<p>Measured sound pressure</p>  3 Noise emitted by the machine , page 135
11		 4.4 Checking and topping up the fuel level , page 61
12		<p>Hydraulic oil</p>  3 Recommended greases and fluids , page 108  4.5 Checking and topping up the hydraulic oil level , page 62
13		<p>Using a grease pump, grease the pin and the rotation crown at the greasers indicated with arrows on the figure opposite.</p>  6.2.1 Greasing the pin and rotation crown , page 116
14		<p>This sticker describes the operation of the machine controls and their location relative to the operator seat.</p>  5.3 Joysticks and pedals, page 19
15		<p>Always fasten your safety belt and adjust it before starting the machine.</p>  2.1.6 Fasten your safety belt and adjust the rearview mirror (s) , page 45
16		<p>Track spacing lever</p>  5.3.11 Track spacing lever , page 24
17		<p>Filler holes for various reservoirs on the machine and track tension system.</p>  3 Recommended greases and fluids , page 108  6.4 Rubber track maintenance , page 118
18		<p>Use this valve to select the 3rd hydraulic circuit in single or dual effect.</p>  12.1.1 3rd circuit selector , page 83

3 Warning labels

19		<p>Scheduled maintenance points of the machine (lubrication, filters...)</p> <p> 1 Periodic inspections and upkeeps, page 101</p> <p> 6.1.5 Greasing points , page 114</p>
20		<p>Use this pedal to command the accessory.</p> <p> 5.3.8 P.T.O. pedal , page 24</p>
21		<p>Before starting the machine transportation, check the total height of the load.</p> <p> 13.3 Tying down the machine , page 88</p>
22		<p>Circuit breaker</p> <p> 5.2.4 Circuit breaker, page 19</p>

4 IDENTIFICATION OF IMPORTANT PARTS

4.1 General view of the machine

A= Right

B= Left

C= Front

D= Rear

1= Blade

2= Boom cylinder

3= Bucket

4= Axes

5= Bucket link

6= Arm

7= Bucket cylinder

8= Arm cylinder

9= Boom

10= Blade cylinder

11= Throttle lever

12= Locking lever

13= Sprocket wheel

14= Track roller

15= Idle wheel

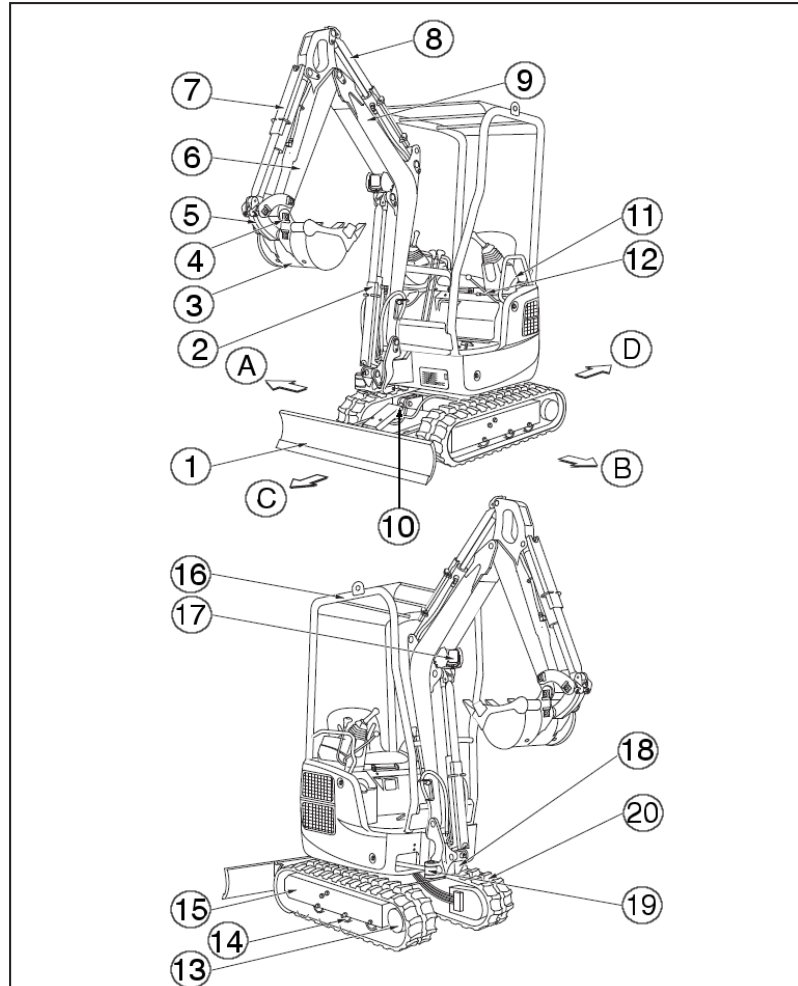
16= Canopy

17= Boom headlamp

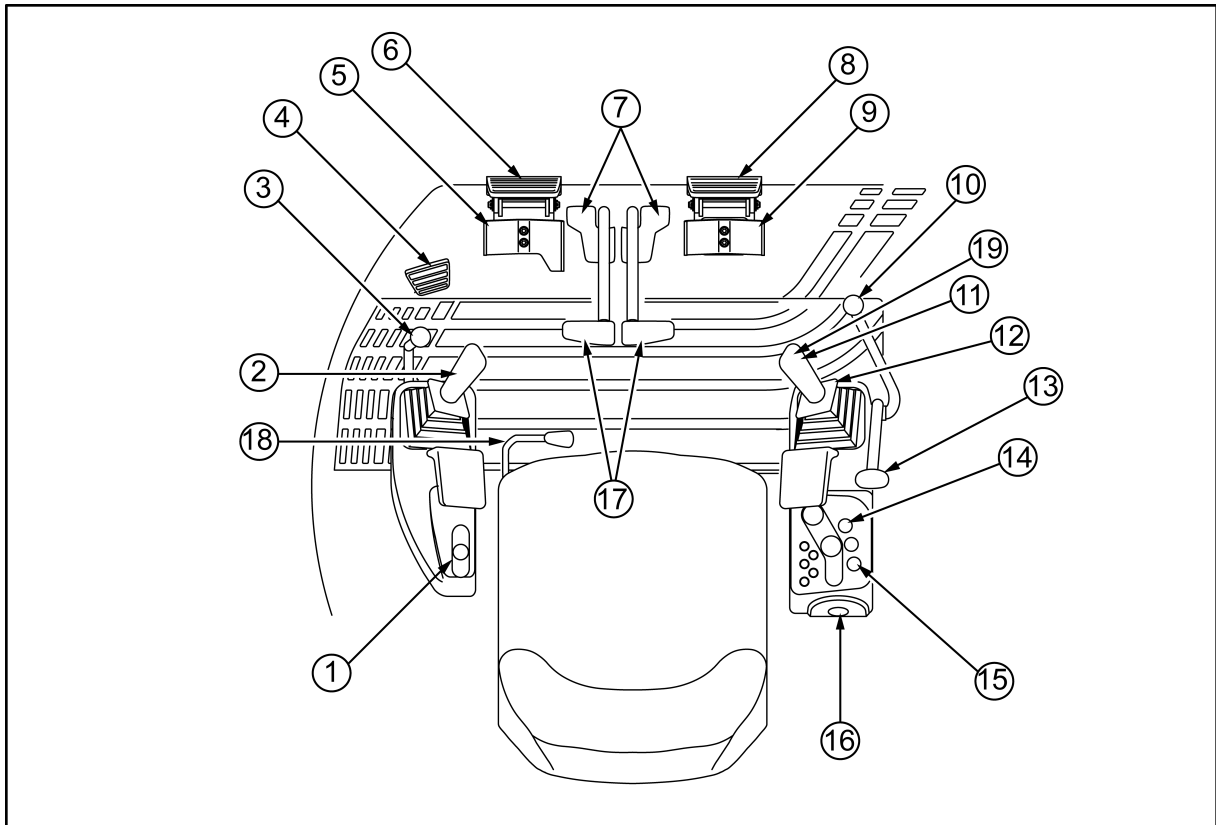
18= Boom base

19= Boom rotation cylinder

20= Track



4.2 Commands and switches



1= Throttle lever

2= Left command lever

3= Locking lever

4= 2nd speed pedal

5= P.T.O. pedal

6= Foot rest

7= Side movement pedals

8= Foot rest

9= Boom rotation pedal

10= Locking lever

11= Horn

12= Right command lever

13= Blade lever

14= Headlight switch

15= Control panel

16= Start key

17= Slide movement levers

18= Track spacing lever

19= 3rd hydraulic circuit control (P.T.O.1)

5 DESCRIPTION OF THE DRIVING POSITION

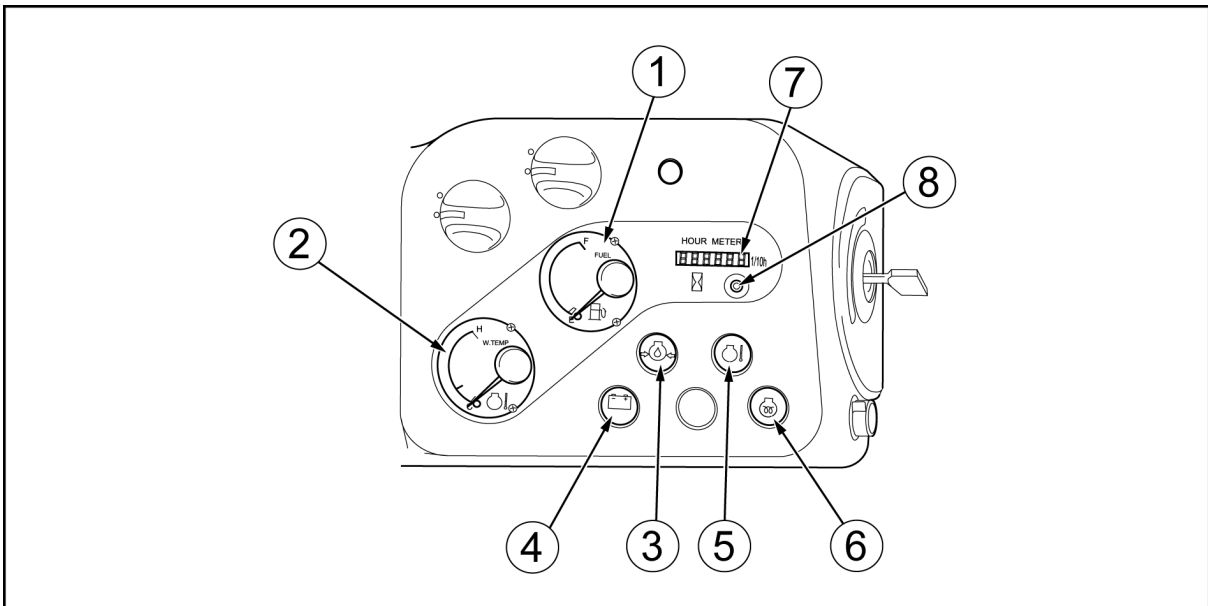
This section describes the different command mechanisms necessary to operate the machine. In order to work in complete safety and comfort, it is vital that you understand how to operate and use these mechanisms.

5.1 Dashboard

- When the starter key is in ON position, the lights come on and the alarm sounds. If one of the lights does not come on then its bulb is blown. (Only the water temperature alarm light goes off after a few seconds.)
- All the lights go off after the engine is started. If a problem occurs when starting, a light comes on and the alarm sounds.

WARNING

When an indicator light comes on and the alarm sounds during operation, stop the engine immediately and follow the steps recommended in this manual.



1= Diesel gauge

2= Cooling fluid temperature indicator

3= Engine oil pressure alert indicator

4= Battery charge warning alert

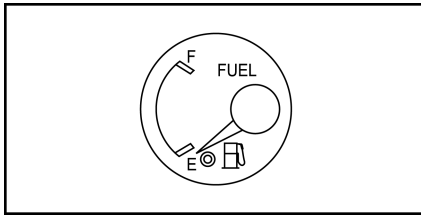
5= Water temperature alarm light

6= Preheating light

7= Time counter

8= Time display button

5.1.1 Diesel gauge



F = Full

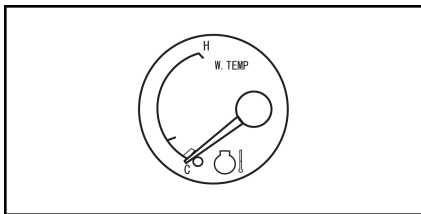
E = Empty

- The diesel gauge operates when the starter key is in ON position. It indicates the level of diesel in the tank.
- When the indicator needle is close to E, fill up as soon as possible.
- It is not normal for the gauge needle not to immediately and precisely indicate the level of diesel when the starter key is in ON position.

Note

The gauge indication is affected by the level of machine tilt.

5.1.2 Cooling fluid temperature indicator



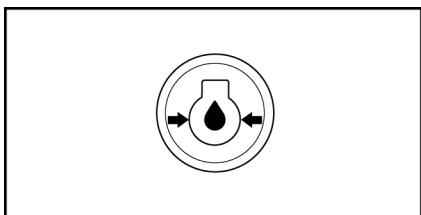
C = cold

H = hot

- It indicates the temperature of the engine cooling fluid. The normal temperature is close to zone (1) during normal operation.
- If the temperature of this coolant reaches the limit (2) during working, then slow the engine down and wait for it to return to normal.
- When the engine is cold, top up with cooling fluid following the procedure described in chapter

 **4.2 Checking and topping up the level of cooling fluid , page 59**

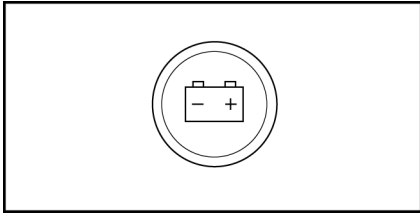
5.1.3 Engine oil pressure alert indicator



If the engine oil pressure falls below the normal level, the warning light comes on and the alarm sounds. In this case, shut down the engine

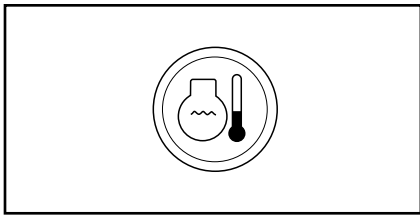
 **14.2.1 Engine , page 92**

5.1.4 Battery charge warning alert



- If the battery is not correctly charged, the warning light will come on.
- In this case, check the battery charge circuit.
- If you detect any faults, contact your dealer.

5.1.5 Water temperature alarm light

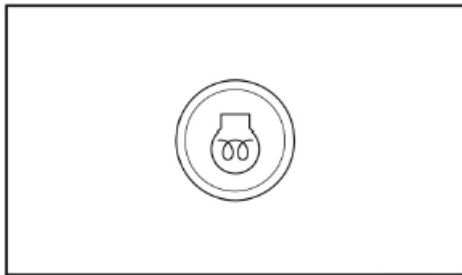


- When the starter key is in ON position, the light comes on and goes off a few seconds later.
- If the temperature rises abnormally during operation, the light comes on and the alarm sounds indicating that the engine is overheating.

1. Slow the engine for a while then shut it down.
2. When the engine is cold, top up with cooling fluid following the procedure described in chapter

 **4.2 Checking and topping up the level of cooling fluid , page 59**

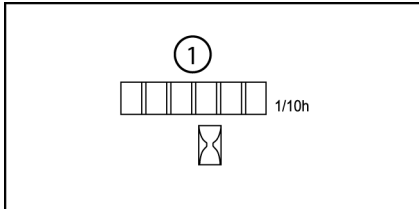
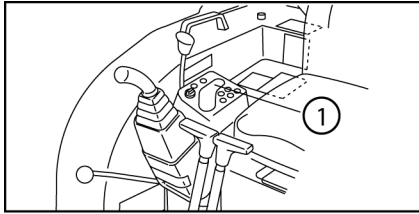
5.1.6 Preheating light



- When the starter switch is in AIR HEATER position, the preheating light comes on then goes off after 15 seconds to indicate that the engine may be started.

5 Description of the driving position

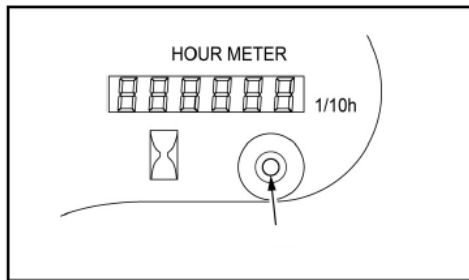
5.1.7 Time counter



1 = Time counter

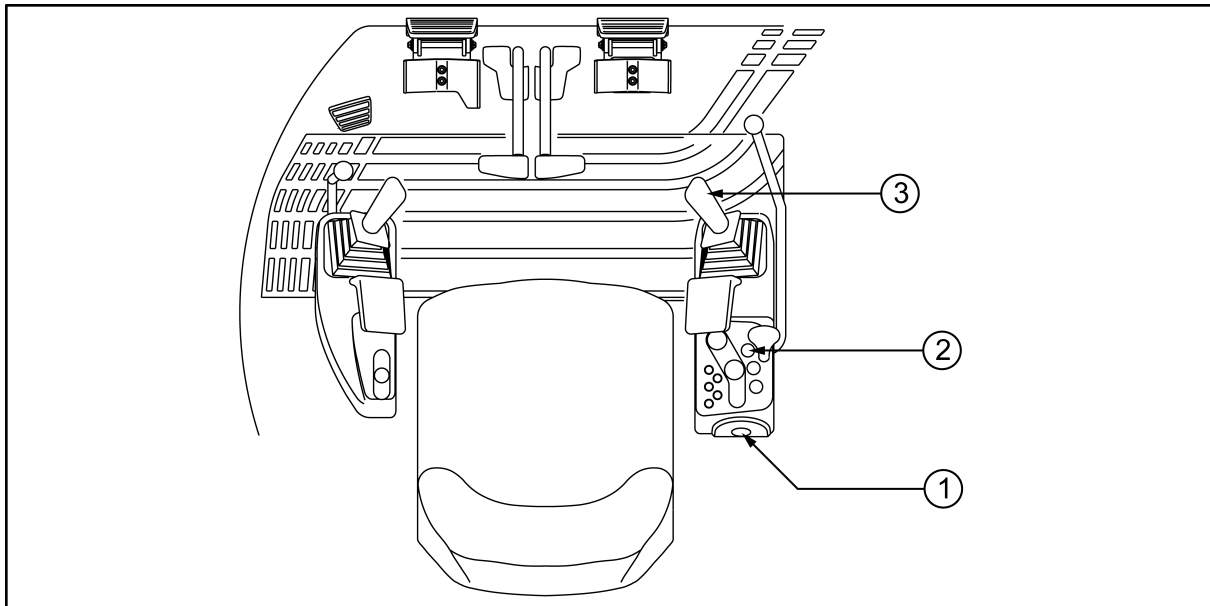
- The time counter indicates the number of hours for which the machine has been working.
- Reading this time counter will help you define the intervals between maintenance operations.
- When the engine is running, the time counter permanently records the time even if the machine is not being used.
- The time counter records "1" for one hour without considering the engine rotation speed.
- The decimal to the far right records "1" for 0.1 hours (6 minutes).

5.1.8 Time display button



When the starter switch is set to OFF, press this button to display the machine service time.

5.2 Switches



1= Start key

2= Headlight switch

3= Horn

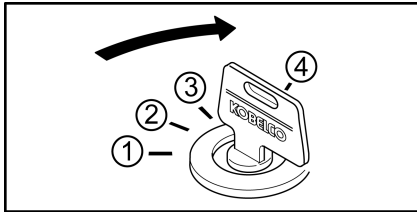
5 Description of the driving position

5.2.1 Start key

IMPORTANT

The machine is fitted with an electrical safety system. If the locking levers are not in safety position, the engine cannot start.

- Use this command to start and stop the engine.



1= AIR HEATER

2= OFF

3= ON

4= START

OFF position = shutdown

Turn the key to OFF position to switch off the engine and disconnect the electrical circuit.

ON position = operation

Turn the key to the ON position to turn on the power circuit and the charging circuit. Keep the key in this position while the engine is running.

START position = startup

Turn the key to START position to start the engine. Release the key after the engine starts and it will return itself to ON position.

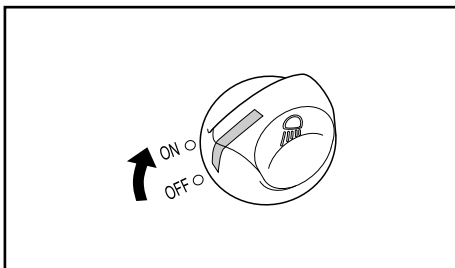
AIR HEATER position = pre-heating

- Turn the key to AIR HEATER position to warm up the air by aspiration and start the engine more easily in cold weather. (Use this position when the exterior temperature is low.)
- If the engine is not running and the key is in ON position an alarm will sound. Turn the key to OFF position to stop this alarm.

Note

The starter key is also used to open/close cover B, the bonnet and the cab's side door.

5.2.2 Headlight switch

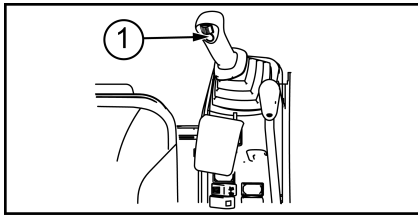


- ON : The headlights come on.
- OFF : The headlights switch off.

IMPORTANT

Do not leave the headlights switched on when the engine is not running. The battery will discharge and the engine will be unable to start.

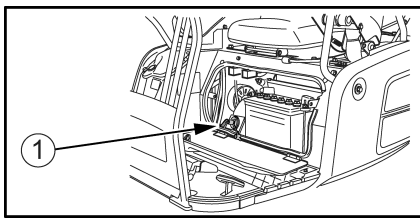
5.2.3 Horn



Press the switch at the top of the right joystick to activate the horn.

1= Horn

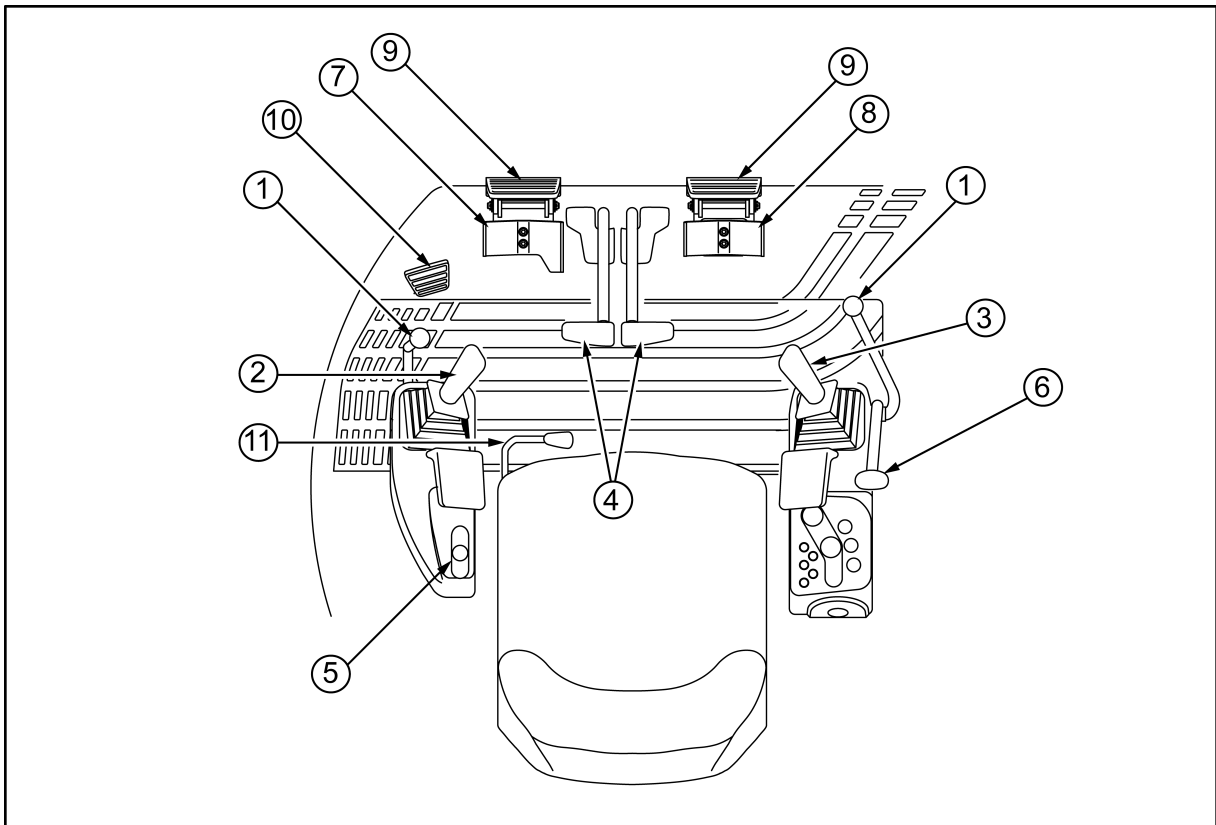
5.2.4 Circuit breaker



This switch is used to disconnect the battery directly.

1 = Circuit breaker

5.3 Joysticks and pedals



1= Locking lever

2= Left command lever c

3= Right command lever

4= Travel levers and pedals

5= Throttle lever

6= Blade lever

7= P.T.O. pedal

8= Boom rotation pedal

9= Protection of pedals

10= 2nd speed pedal

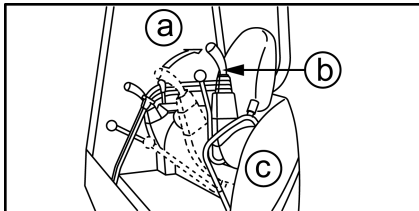
11= Track spacing lever

5.3.1 Locking lever

⚠ WARNING

The blade movement is not secured by the locking lever, even when the latter is in the locked position.

- The locking levers condemn the joysticks as well as the travel.
- When you raise the left hand locking lever, the left hand command lever is raised.



- a = Locking
- b = Locking lever
- c = Left hand side

⚠ IMPORTANT

The machine is fitted with a hydraulic safety system. If the lever is in safety position, all the hydraulic cylinders for the boom, the arm, the bucket and the blade and the rotation of the boom and the side may movement cannot be activated, even though the right and left hand command levers may be moved.

⚠ WARNING

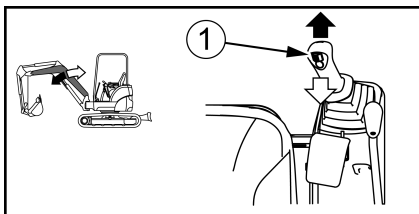
Place the locking lever(s) in locked position as soon as you leave the seat.

⚠ WARNING

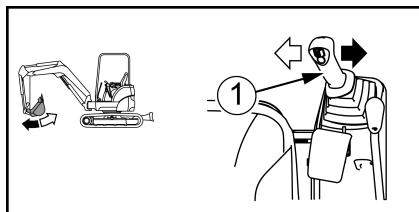
The movement relationship between the command lever mechanism and the equipment movements they produce are described in detail in this manual. To avoid any accidents due to handling errors, it is prohibited to modify the hydraulic circuit when reconnecting the hydraulic cylinder hoses and valves.

5.3.2 Right command lever

- The right hand command lever is used to handle the boom and the bucket.



- Handling the arrow
- 1 = Right command lever

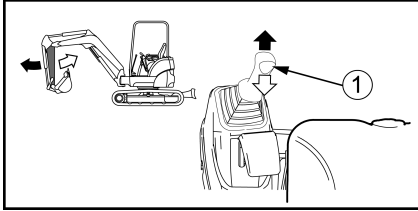


- Handling the bucket
- 1 = Right command lever

- When you release the lever, it returns to neutral position and the respective movements stop.

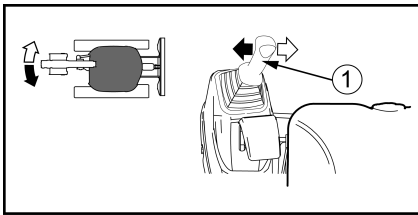
5.3.3 Left command lever

- The left hand joystick is used to control the arm movements and the rotation of the upper part.



Handling the arm

1 = Left command lever



Rotation of the upper part

1 = Left command lever

- When you release the lever, it returns to neutral position and the respective movements stop.

5.3.4 Travel levers and pedals

⚠ DANGER

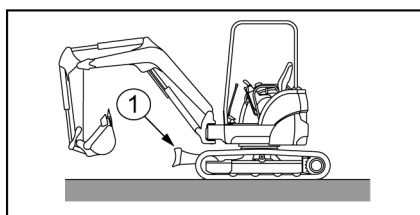
Incorrect use of the machine may cause serious injury or even death. Personnel involved in using and maintaining the machine must familiarise themselves with the content of this manual before carrying out a task.

⚠ WARNING

Before handling the travel levers, check whether the machine is in normal or reverse position. The machine is in the normal position when the blade is on the same side as the work equipment.

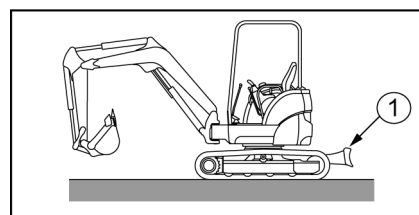
If the machine is in the reverse position, the displacement levers must be handled in reverse to move forward and backward.

Normal position

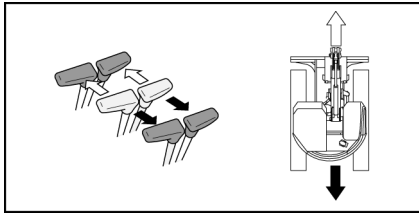


1 = Blade

Opposite position

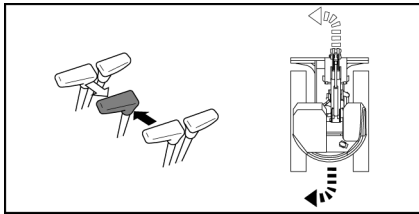


5 Description of the driving position



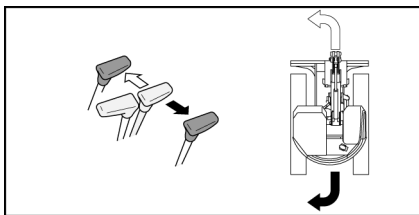
- To move the machine forward, push the travel levers, or press the back of the pedals.

To move the machine backwards, pull the travel levers, or press the back of the travel pedals.



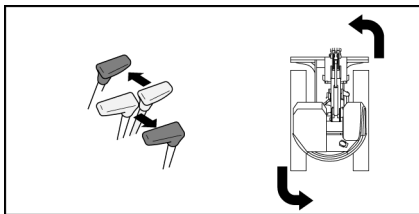
- To turn to the left with the machine moving:
 1. Position the travel levers forward or rearward.
 2. Turn the travel lever left into neutral to turn the machine.

To turn right, do the same thing with the right travel lever.



- To turn to the left with the machine stopped:
 1. Position the travel levers in the neutral position.
 2. Push the right travel lever to rotate forward or pull the right travel lever to turn backwards.

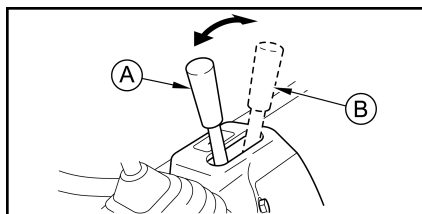
To turn right, do the same thing with the left travel lever.



- To make a rotating turn of the machine to the left:
 1. Position the travel levers in the neutral position.
 2. Push the right travel lever forward and pull the left travel lever rearward.

To make a rotating turn of the machine to the right, reverse the operation of the levers.

5.3.5 Throttle lever

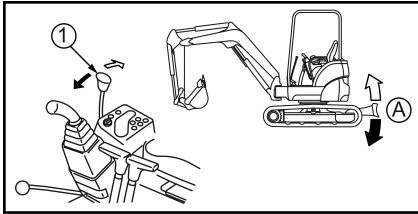


- The accelerator lever controls the engine rotation speed.

A = Slowdown : push the lever fully forward.

B = Full gas : pull the lever fully back.

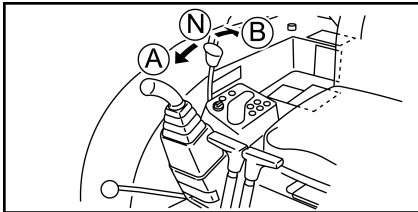
5.3.6 Blade lever



- Use this lever to command the blade.

A = Operating the blade

1 = Blade lever



- Push the lever forward to lower the blade. (A)
- Pull the lever back to raise the blade. (B)
- If the lever is released, it return to neutral position and the blade remains in its position. (N)

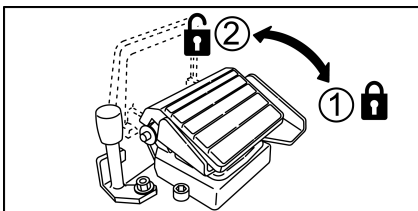
WARNING

The blade movement is not secured by the locking lever, even when the latter is in the locked position.

Do not operate the blade lever when you are not using it.

5.3.7 Protection of pedals

- The P.T.O. and boom rotation pedals each have their own protection.
- Fold the protection to lock the pedal. It may then be used as a foot rest.



1= Unlocked


2= Locked

WARNING

To avoid the risk of any inappropriate or involuntary use, always place the pedals in locked position when they are not being used.

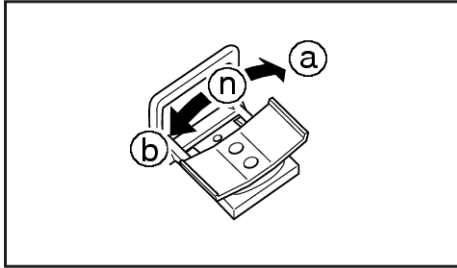
5.3.8 P.T.O. pedal

- Use this pedal to command the accessory. Refer to chapter:

 12 Implementing the 3rd hydraulic circuit , page 83

5.3.9 Boom rotation pedal

- Use this pedal to pivot the boom to the left or right.

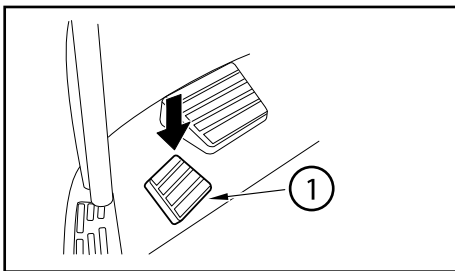


a= Rotate right: press right

b= Rotate left: press left

n= If the pedal is released, it returns to the neutral position and the boom keeps its position.

5.3.10 2nd speed pedal



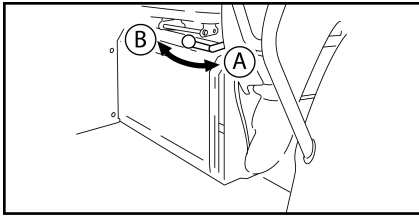
- Press this pedal to increase the side movement speed.

1= 2nd speed pedal

IMPORTANT

**Do not move the machine at high speed for a prolonged period.
Do not press this pedal while the blade is being operated.**

5.3.11 Track spacing lever



Use this lever to increase or reduce the track spacing for a good working position.

A = Increase spacing

B = Reduce the spacing

⚠ WARNING

Operate the track spacing lever at a medium engine rate to avoid any danger.

When changing the track spacing, the tracks move sideways. Activate the track spacing lever from the operator seat only, in order to avoid getting your body stuck between the tracks and the upper structure or between the tracks and any nearby obstacles.

⚠ WARNING

Do not use the track spacing lever when the machine is in motion.

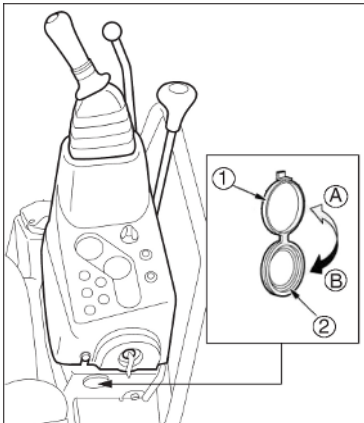
⚠ IMPORTANT

- **Mud or concrete stuck to the track spacing change system may cause an abnormal operation.**
- **If mud sticks to the moving parts of the track spacing change system, make it work by spreading and then close up the tracks to remove it before it hardens.**
- **Do this operation regularly while using the machine and after use.**
- **During cold weather, to avoid blocking the moving parts with mud or frozen water, clean them thoroughly after use.**

Note

The track position use with the tracks apart ensures better stability.

5.4 Power socket



- 1= Lid
- 2= Power socket
- A = open
- B = close

IMPORTANT

Always close the lid if the plug is not used to seal for dust.
Prolonged use when the engine is switched off may damage the battery.

5.5 Driver's seat

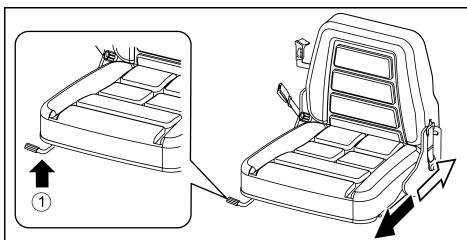
- Adjust the seat position so that the driver can operate the controls easily and comfortably.

⚠ WARNING

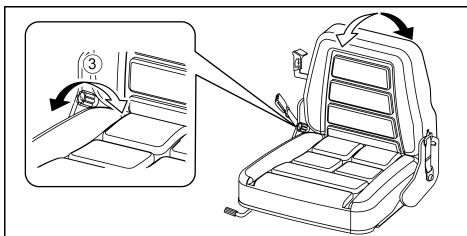
Do not adjust the seat position when you are working on the machine; adjust it before you start.

Always fasten your safety belt and adjust it before starting the machine.

Seat position adjustment

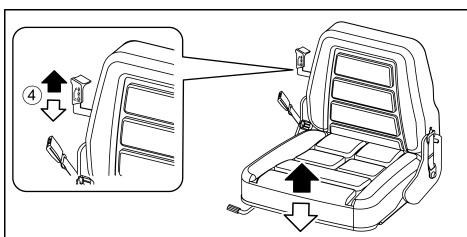


- Pull the lever (1) to move the seat forward and back.



- Pull lever (3) to adjust the seat back.

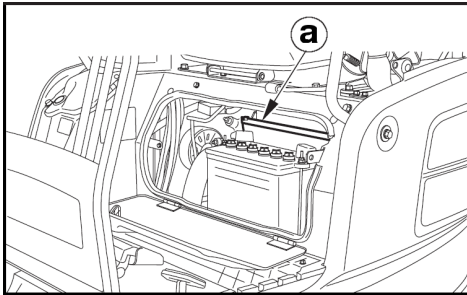
Suspension adjustment



- The seat suspension (4) can be adjusted according to the weight of the driver:
 - ⇨ Firm suspension
 - ⇐ Flexible suspension

5.6 Location for the tools and user manual

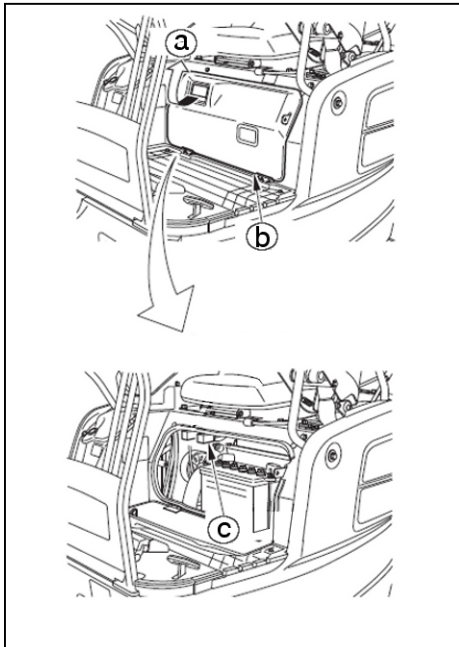
5.6.1 User manual



- The location for the user manual is under the driver's seat.

a = User manual

5.7 Fuses



- The fuses protect the equipment and the electrical cabling against a surge. In case of a bad contact, or if the electrical system does not work when the key is on, replace the faulty fuse with a fuse in good condition.

6.3.1 Fuse replacement , page 117

- The general supply fuses are located beside the battery, under the seat.
- The fusebox is underneath the driver's seat.

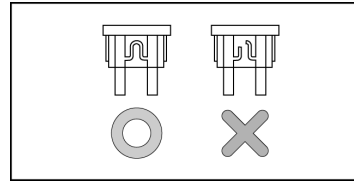
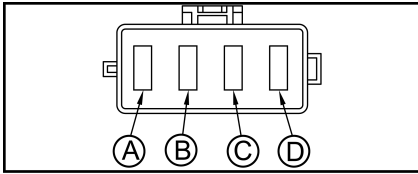
a = opening

b = Cover the storage box

c = Fusebox

5 Description of the driving position

5.7.1 Fusebox



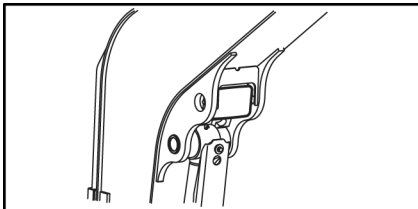
Symbol	Fuse capacity	Circuit name
A	15A	Enginestop solenoid Current limiter Electric engine fuel supply pump Timer
B	15A	Boom headlamp Horn High speed valve
C	15A	Dashboard Cut-off valve Safety relay Movement alarm
D	15A	Spare fuses

5.8 Headlights

WARNING

The headlight becomes very hot when it is operating. Never touch it with your bare hands before it has cooled down to avoid any risk of burning.

Boom headlamp



6 COVERS

6.1 Bonnet

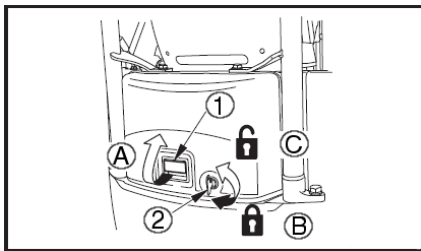
- The filling ports for the hydraulic oil tanks, engine oil, and coolant gauge are under the bonnet.

⚠ WARNING

Do not open the bonnet during machine operation. Verification and topping off of the various levels should be done when the engine is stopped and the temperatures are brought back down.

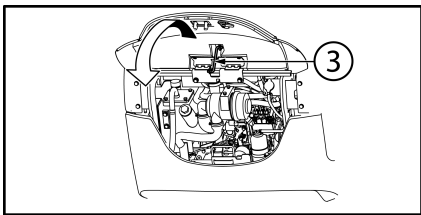
Opening the cover

1. Insert the starter key into the lock.
2. Turn the key anti-clockwise.
3. Pull the handle to unlock the safety mechanism. The cover opens.
4. Lock the cover using the rod.



- 1 = Handle
2 = Key
A = Pull
B = Locked
C = Unlocked

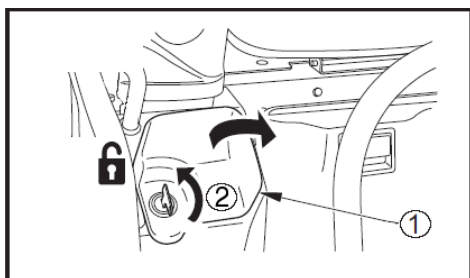
Closing the cover



1. Lift the cover slightly and press the rod to release it.
 2. Close the cover.
 3. Press on it until you hear a click.
 4. Turn the key clockwise to activate the lock.
- 3= Stem

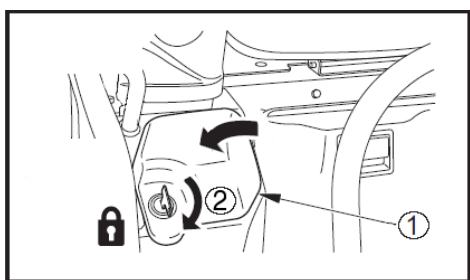
6.2 Cover B

Opening the cover



1. Insert the starter key into the lock. (2)
2. Turn the key anti-clockwise.

Closing the cover

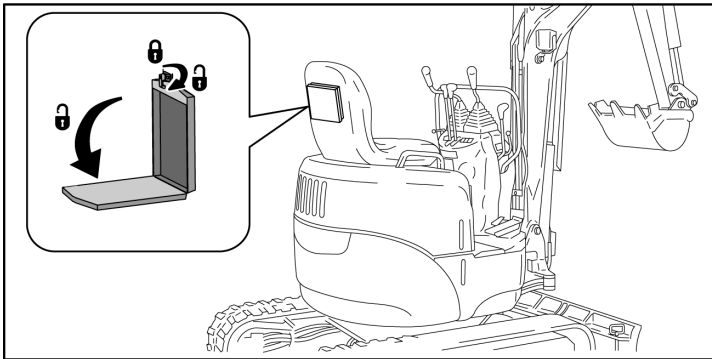


1. Close the cover. (1)
2. Press on it until you hear a click.
3. Turn the key clockwise to activate the lock. (2)

7 OPTIONS

- Mounting options that are not authorised by KOBELCO may cause accidents and reduce the machine's life span.
- The installation and use of unauthorised parts may lead to the warranty being cancelled.

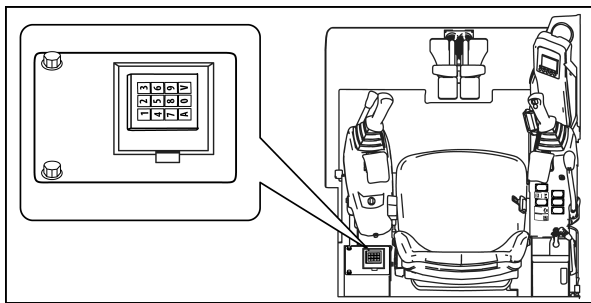
7.1 Document holder



- The machine can be fitted when this option is requested.
- The location for the document box is behind the driver's seat.
 - Pull the tab to unlock the box and open it.
 - To close it, push the lid until it locks.

7.2 Antistarter mechanism with keypad

- The machine can be equipped on demand with this option.
- The antistarter mechanism with keypad is constituted of a antistarter box and a keypad installed in the driver's post.
- For more details, refer to the user manual of the fabricant provided with the machine.



1. Once the user code has been programmed, type A and the 4 digits of the code directly and confirm with the V button.

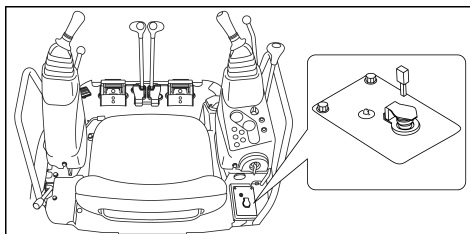
Note

When the code is recognised, the green light (to the left) will light up.

2. Then turn the starter key within 60 seconds.

7.3 Anti-starter with key

- The machine can be fitted when this option is requested.
- The immobilizer key consists of an immobilizer box and a key reader installed in the cockpit.
- For more information, consult the instructions supplied with the device.



1. To start the engine, insert the MED electronic key into its housing, remove it and start the engine within 30 seconds.

Note

Once the time has passed, repeat the whole procedure.

2. The anti-start mechanism is triggered 30 seconds after the contact key is turned to OFF.

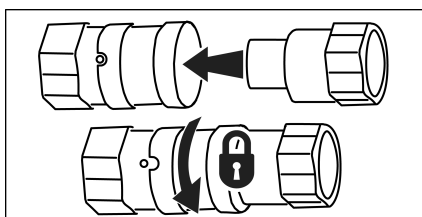
7.4 Quick hitch

CAUTION

Before any connection or disconnection of the hydraulic hoses, remove the residual pressure from the hydraulic circuit.

 **2.1.1 Removing the residual pressure, page 103**

Connecting



1. Insert the adapter into the receiver. A slight click indicates that the connection is successful. The ball is released from the adapter groove located on the receiver.
2. Turn the adapter on the receiver to secure the connection.

Note

Before each use, clean the receiver surfaces.

Disconnecting

To disconnect, turn the adapter to align the ball with the groove located on the receiver and slide the adapter backwards.

7.5 Mechanical quick hitch

⚠ IMPORTANT

Use KOBELCO original parts as recommended in the parts catalogue.

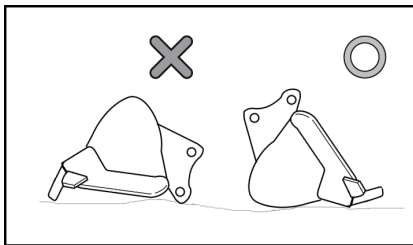
IMPORTANT

Before using an accessory requiring hydraulic power, check the pressure compatibility from the machine specifications chart.

 1 Specifications , page 133

⚠ WARNING

Before mounting a bucket or an accessory on your machine, make sure that:



- the bucket or accessory is compatible with the capabilities of your machine;

 9.2 Compatible accessories , page 75

- the bucket or accessory mounting operation is performed on a level and stable ground;
- the bucket or accessory is properly positioned to be installed on the machine.

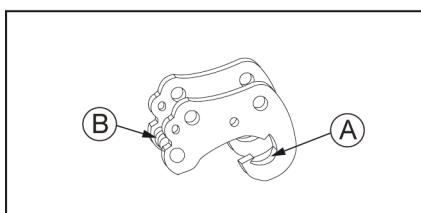
⚠ WARNING

Check the condition of the interface between the quick hitch and the accessory (cleanliness, shocks...).

It is forbidden to operate the bucket or accessory if improperly locked in quick hitch, because in the case of improper installation it may fall during use.

7.5.1 Mechanical quick hitch RETROMATIC MORIN

Quick hitch structure

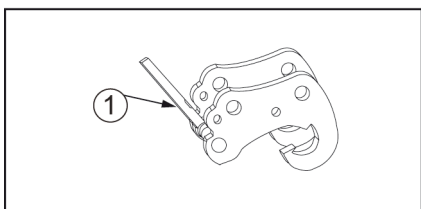
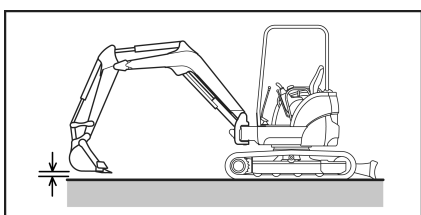


The quick hitch system is composed of:

A= Fastening hooks

B= Locking pins

Dismantling the accessory



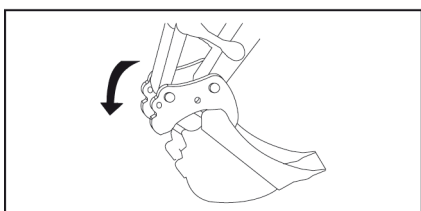
1. Park the machine preferably on a stable, flat and level surface.
2. Place the accessory at about 5 cm above the ground.
3. Be equipped with the wrench supplied with the accessory and insert it into the quick hitch hole.
4. Turn the key (1) to disengage the bucket or accessory locking pin.

⚠ DANGER

By pressing the key, the bucket or accessory detaches and comes into contact with the ground. Take care not to get your hands or feet crushed by the bucket or accessory.

5. Remove the key and store it.
6. Manoeuvre the arm to disengage the tool's quick hitch.

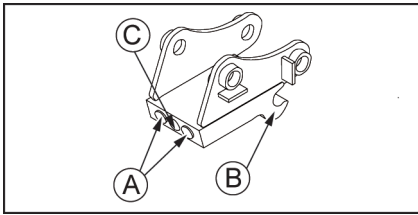
Mounting the accessory



1. Place the accessory on a stable, flat surface.
2. Clean all the parts.
3. Place the arm equipped with the quick hitch on the accessory to engage the accessory hooks on the bucket or accessory pin.
4. Rotate the quick hitch by slowly lowering the boom to fully engage the quick hitch to the bucket or the accessory.
5. Manoeuvre the bucket or accessory to low height from the ground to see if it is locked in the quick hitch.

7.5.2 Mechanical quick hitch CSERI

Quick hitch structure



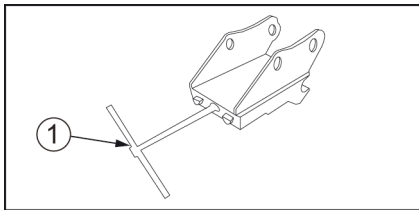
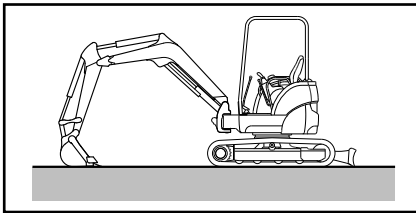
The quick hitch system is composed of:

A= Locking pins

B= Fastening hooks

C= Locking screw

Dismantling the accessory



1. Park the machine preferably on a stable, flat and level surface.
2. Place the accessory on the ground.
3. Be equipped with the wrench supplied with the accessory and insert it into the quick hitch hole.
4. Turn the key (1) to disengage the bucket or accessory locking pin.
5. Remove the key and store it.
6. Retract the bucket cylinder to disengage the rear of quick hitch.
7. Slowly remove the boom from the machine to completely free the quick hitch from the bucket or accessory.

Mounting the accessory

1. Place the accessory on a stable, flat surface.
2. Clean all the parts.

Note

Make sure the locking pins are retracted into the quick hitch.

If the pins are in the extended position:

- a. Be equipped with the wrench supplied with the accessory and insert it into the quick hitch hole.
 - b. Turn the key (1) to disengage the bucket or accessory locking pin.
 - c. Remove the key and store it.
3. Place the arm equipped with the quick hitch on the accessory to engage the accessory hooks on the bucket or accessory pin.
 4. Rotate the quick hitch slowly lifting the boom to fully engage the quick hitch to the bucket or accessory.
 5. Manoeuvre the bucket or accessory to low height from the ground to see if it is locked in the quick hitch.



B Operating instructions

CHAPTERS COVERED IN THIS PART:

- 1 BASIC PRECAUTIONS
- 2 USAGE PRECAUTIONS
- 3 PRECAUTIONS FOR THE ENGINE
- 4 CHECKS BEFORE STARTING THE MACHINE
- 5 CHECKS AFTER START-UP
- 6 CHECKS AFTER USE
- 7 USING THE MACHINE IN COLD WEATHER
- 8 RUBBER TRACKS
- 9 HANDLING THE BUCKET
- 10 HANDLING OF ACCESSORIES
- 11 ACCESSORY CHANGE BY DIRECT COUPLING
- 12 IMPLEMENTING THE 3RD HYDRAULIC CIRCUIT
- 13 TRANSPORTING THE MACHINE
- 14 DETECTING ANOMALIES
- 15 IF THE BATTERY IS DISCHARGED
- 16 TOWING THE MACHINE

1 BASIC PRECAUTIONS

CAUTION

The user must determine whether dangerous phenomena may occur in an application, for example, the release of toxic gases, or whether the ground conditions require specific precautions. The user establish the measures to be taken to eliminate or reduce the risks.

1.1 Comply with your workplace's safety rules

- This machine must only be used and maintained by qualified personnel.
- When using or maintaining the machine, comply with all safety rules, precautions and procedures at all times.
- Any task performed in teams or with a flagman should be performed based on regulatory signals.

DANGER

The machines are not designed to work in explosive or polluted environments.

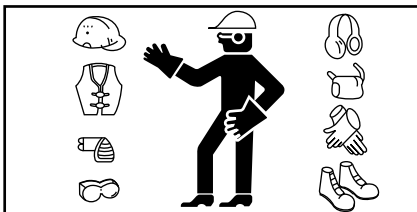
1.2 Put the safety mechanisms in place

- Make sure that all covers and all housings are properly installed in their respective positions. If any of them are damaged, repair them immediately.
- The use of safety mechanisms, such as locking lever(s) must be mastered and understood by the machine's operator.

5.3.1 Locking lever , page 20

- Never remove the safety mechanisms. Check that they are operating correctly at all times. If the safety mechanisms are operating incorrectly this may cause serious physical injury.

1.3 Wear suitable clothing and protective equipment

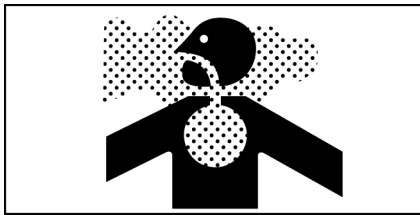


- Never wear bulky clothing or jewellery that may be caught in the control levers or a part of the machine. Also avoid wearing soiled work clothes, which can be risky when using the machine.
- Wear a helmet, protective goggles, safety shoes, a mask, gloves and any other protective equipment necessary to suit the working conditions.

1.4 Do not drive under the influence of alcohol, drugs or medication.

- Never use the machine if you are under the influence of alcohol, if you are ill or if you do not feel well as this may cause an accident.

1.5 Provide adequate ventilation when working in an enclosed space

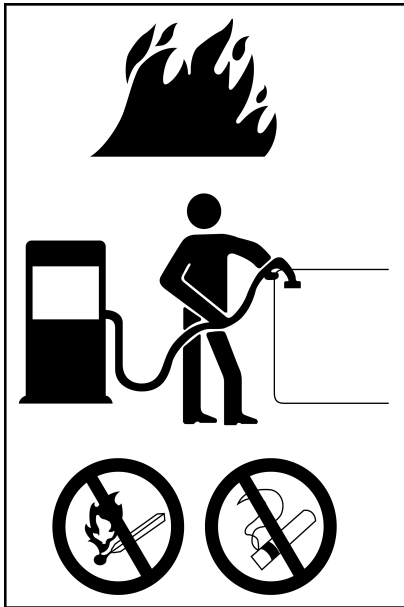


- The engine exhaust fumes are harmful to the human body and it is very dangerous to inhale them. When you start the engine in an enclosed space, open the windows and doors to let air circulate.
- Never let the engine idle unnecessarily and never leave the engine running when you are not using the machine.
- Provide respirators based on working conditions to ensure the machine operator works safely.

1.6 Protect plants from hot air and exhaust fumes

- The silencer and radiator release hot air and exhaust fumes at high temperatures. If the hot air directly reaches a plant, it alters its state and may cause its death.
- Protect plants from hot air and exhaust fumes with a protective plate when you are working near a hedge or plants.

1.7 Keep fuel and oil away from sparks



- Leaving flames near fuel, oil, hydraulic oil or anti-freeze solutions, which are highly flammable and dangerous, may cause a fire.
- Specific attention must be paid to the following points :
 - Keep flammable materials away from cigarettes, lit matches or any source of fire.
 - Never top up any fluids while the engine is running. Do not smoke when topping up any fluids.
 - Tighten the fuel and oil tank caps firmly.
- Store fuel and oil in a cool, well-ventilated place away from direct sunlight.
- The fuel and oil must be stored in a place that responds to applicable safety regulations. Unauthorised personnel must not enter this area.

1.8 Avoid removing the caps when the temperatures are high



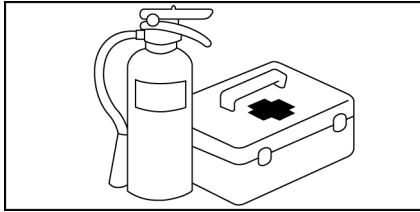
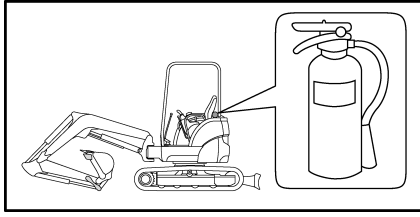
- The engine coolant is hot and under pressure after stopping the machine.
- The removal of the cap or draining the coolant in such conditions may cause burns.
- When you remove the radiator cap, shut down the engine and let the coolant cool down enough then gently turn the cap to release all the pressure.

1.9 Avoid crush injuries due to accessories



- Keep your hands, arms and other parts of your body away from moving parts, between the machine's accessories or between the hydraulic cylinder and the accessories as jamming points may be created.

1.10 Have an extinguisher and a first aid kit



- The workplace must be equipped with an extinguisher. Read the instructions on the adhesive labels to find out how to use it.
- Place a first aid kit in a specific location.
- Specify the action to be carried out in the event of a fire or accident.
- Indicate the person to be contacted in the event of an emergency and leave the emergency call number near your telephone.
- A location to install an extinguisher is provided inside the machine's cab.

1.11 Avoid any unauthorised modifications

Any unauthorised modification to the design or use of unauthorised accessories may cause physical damage. KOBELCO cannot be held responsible for any physical injuries, accidents, failure or damage to the machine due to any unauthorised modifications.

In addition, in that these actions would constitute an explicit violation of the terms of the KOBELCO Product Warranty, the applicable warranty would also become null and void. If you want to modify your machine, you must contact your dealer.

1.12 Precautions for optional parts and tools

- Any modifications that are not approved by KOBELCO may cause safety risks.
- If the equipment you want to add to your machine is not listed by KOBELCO, you must contact your dealer. KOBELCO cannot be held responsible for any physical injuries, accidents, failure or damage to the machine due to any unauthorised modifications. Any unauthorised modification will lead to the KOBELCO warranty being cancelled.
- When you install or use optional accessories, read their operating instructions and the section in the manual that relates to the installation of accessories

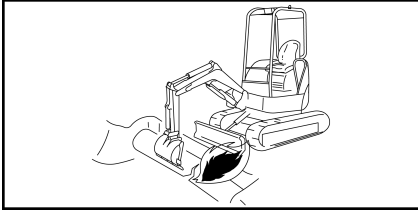
11 Accessory change by direct coupling, page 80

- Only use accessories authorised by KOBELCO. The use of unauthorised accessories risks affecting not only the safety of the machine but also its operation or life span.
- The use of unauthorised equipment will contravene the terms of the KOBELCO warranty and cancel it.

2 USAGE PRECAUTIONS

2.1 Precautions before starting the engine


2.1.1 Make sure that your workplace is safe



- Before you start the engine, make sure that there is no danger in your working area.

If there are any underground installations such as water or gas pipes, high voltage lines or other elements, contact the companies responsible to locate them exactly and to avoid damaging them.

- Examine the field and the ground and decide on the best way to work.
- When working on the street, make sure the worksite is secure.
- If you have to use the machine under specific conditions (water, snow, etc.)

 **2.3.7 Working in an area covered with snow , page 51**

2.1.2 Clean the machine

Cleaning

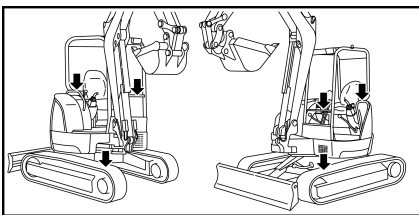


- Wood chips, dead leaves, detritus and other flammable materials around the engine may catch fire. Clean these materials from the machine.

- Dirt, oil and snow on the cab floor, the levers, handles or steps are slippery and dangerous. Clean them completely.
- Proceed to the checks:

 **4 Checks before starting the machine , page 58**

Keep the headlights and mirrors clean



- To clean the cab exterior:
 - Be sure to keep three points of support with the machine when cleaning the external elements (e.g. mirrors).
 - Use the support points identified in the illustration opposite.
 - If 3 points of stable support are not accessible for cleaning or maintenance of the external elements, use adapted equipment in order to safely work on the machine.
- Check that your machine is fitted with headlights and specific working lamps and that they are working correctly.

WARNING

The projector becomes very hot when it is working. Never touch it with bare hands until it has cooled down to avoid any risk of burning.

2.1.3 Check the safety structures

- The standard machine is equipped with a Falling Objects Protection Structure (FOPS) on the machine's roof.
- For your safety, the machine includes a protection structure in the event of it turning over (ROPS), for protection against falling objects (FOPS) and protection against side tipping (TOPS). Never modify any of these structures' elements.
- The protection structures mounted on the machine comply with the recommendations of:
 - **ROPS:** ISO 3471
 - **FOPS:** ISO 3449

For the specifications of these structures, refer to the table below:

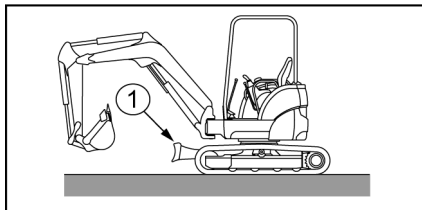
Type	ROPS / TOPS
Weight (in conformity with CE standards) kg	1950

- If one of the safety structures is damaged, have it replaced immediately to avoid any injury. Do not repair or modify it.

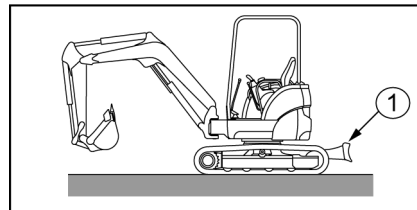
2.1.4 Check the position of the blade

- Check the position of the blade before operating the side movement levers. When the blade is at the back, the operation of the side movement levers is reversed.

Normal travel



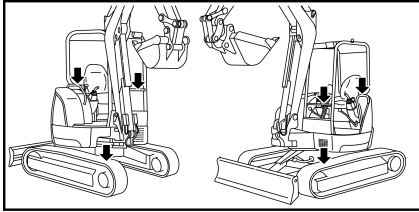
Reverse slide movement



1 = Blade

2.1.5 Accessing the machine

- Do not jump on or out of the machine. Do not climb into or out of the machine when it is operating as this may cause physical injuries.
- When you enter and leave the machine, face the machine and use the handles and the top of the track.



- Use the contact points indicated by arrows in the illustration opposite to climb onto and descend from the machine.
- Do not use the command levers as handles.
- Always maintain three points of contact.
- If the handles or the track is dirty or covered with oil, wash them off.

CAUTION

Make sure that you do not bang your head against the rearview mirror when you climb into or out of the canopy.

2.1.6 Fasten your safety belt and adjust the rearview mirror(s)



- The operator's seat is fitted with a safety belt.
- Always fasten your safety belt and adjust it before starting the machine.

WARNING

The seat belt must be replaced after an accident or if it is damaged.

- The seat and its support must be checked by your dealer after an accident.
- If the seat and/or its support are damaged they must be replaced immediately.
- Adjust the rearview mirror(s) so that you have perfect visibility around the machine.

2.2 Movement precautions

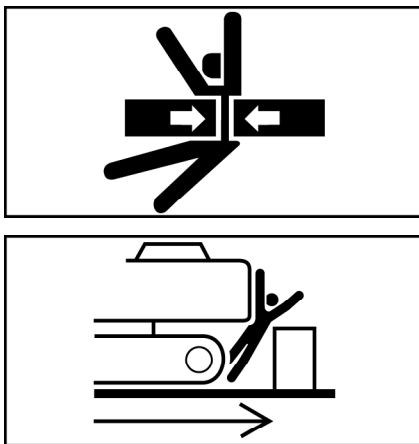
2.2.1 Machine's Danger Zone

⚠ DANGER

The operator must manipulate the machine controls from the operator seat. Any use of the machine controls from the ground is strictly prohibited because it can lead to physical injury.

⚠ WARNING

Start the engine and run the machine only from the operator seat.

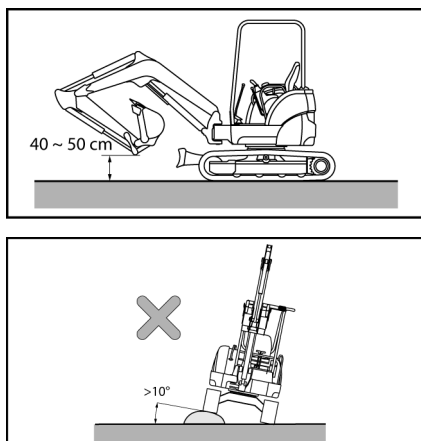


- A signaller must be provided when the working site is dangerous or has poor visibility.
- Keep all other people away from the working site or movement route of the machine.
- Keep any other persons out of the danger zone represented by the equipment's operating radius.
Equipment operating range = 4,5m
- Alert people nearby using the horn or any other signal before starting the machine.

⚠ DANGER

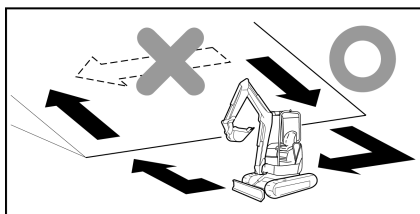
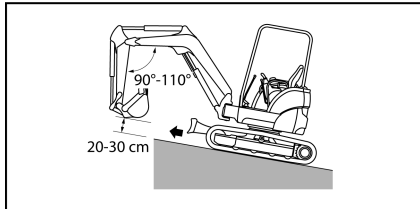
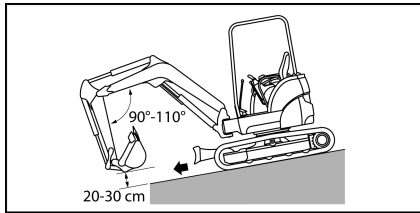
If a person is in the machine's danger zone, it may be struck by the machine's moving parts or be wedged between the machine's lower and upper parts, which can result in serious injury or death.

2.2.2 Movement and accessories



- When moving the machine, keep the bucket between 40 and 50 cm above the ground with the boom and arm folded .
- If you need to use the command levers when moving, do not make any sudden movements when operating them.
- Move the machine at low speed and slow down when turning on hilly terrain.
- Avoid driving over obstacles if possible. Avoid them or remove them. If this is not possible, drive the machine at low speed keeping the tool near the ground. Never travel over obstacles that risk tilting the machine by over 10 degrees.

2.2.3 Driving the machine on a slope



- Drive the machine carefully on a slope to avoid any tipping over or slipping to the side.
- When driving the machine on a slope, keep the bucket between 20 and 30 cm above the ground to be able to lower it to the ground and stop the machine in the event of an emergency.

WARNING

Never travel across a slope of 20° or more as the machine may tip over.

- Never turn the machine on a slope and do not move it across a slope. Descend to flat ground and then turn.

Note

For the maximum acceptable slope:

 **1 Specifications , page 133**

- The machine will slide easily on grass, dead leaves or a damp metal plate, even with a slight tilt. Drive the machine carefully at low speed to prevent it slipping.

WARNING

The machine may lose its balance and tip over when rotating the upper part or when the equipment is working on a slope.

Do not pivot the upper structure with a load in the bucket. If the rotation cannot be avoided, provide a bank to keep the machine as horizontal as possible. Then turn the upper structure.

Braking when descending on a slope

- When going downhill, you can automatically stop the machine by putting the travel levers in neutral.

If the track slides

- If the tracks slide and you can not climb a slope with the travel motors alone, plant the bucket into the ground, retract the arm and move forward. Repeat this operation as many times as necessary.

If the engine stops

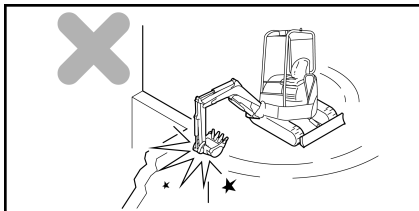
- If the engine stops when climbing an incline, position the travel levers in the neutral position and lift the locking lever, then stop the machine and restart the engine. If the machine does not start, pull the locking lever and check the fuel level.

2.3 Working precautions

2.3.1 Precautions for using the equipment

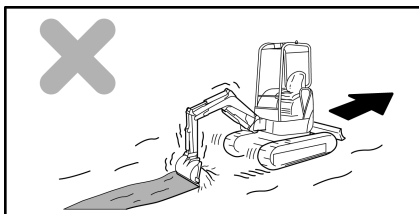
WARNING

Do not use the equipment's command levers during side movement. Stop the side movement then use the equipment.



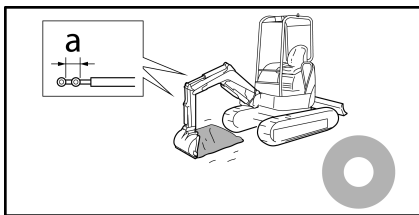
- **Do not use the equipment's rotation force.**

Do not use the rotation force to level the ground or break a wall. Do not use the bucket's teeth to dig the ground during rotation. This may damage the equipment.



- **Do not use the equipment's side movement force (except where unavoidable).**

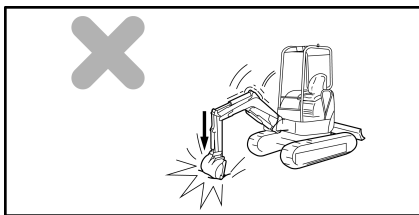
Do not use the side movement force to dig the ground with the bucket's teeth in contact with the ground. This may apply excessive force to the rear of the machine and shorten its life span.



- **Do not use the hydraulic cylinder to the end of its run.**

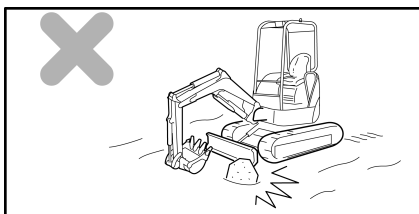
a = play

This may apply excessive force to the cylinder's stop piece and may reduce the equipment's life span. Maintain safe room for manoeuvre.



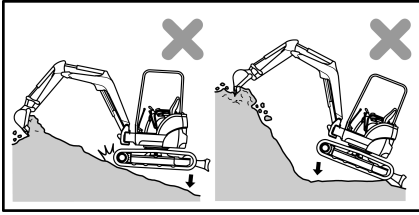
- **Do not use the bucket's dropping force.**

Do not use the bucket's dropping force to dig the ground as with a pick or harvester. This may apply excessive force to the rear of the machine and shorten its life span. In addition, this may cause a serious accident.



- **Do not strike the blade against a rock or stone.**

This may damage the blade or hydraulic cylinder.



- **Do not use the machine's lowering force.**

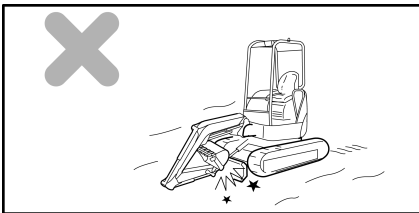
Note

Do not use the machine's lowering force to dig the ground.

- **When excavating a hard rock, keep the machine's tracks flat on the ground.**

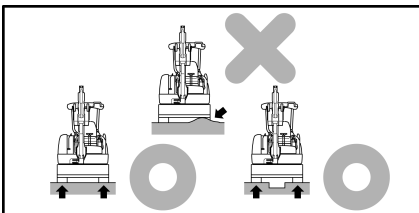
Note

It is also recommended to break hard rock into several pieces using other means to prevent damage to the machine.



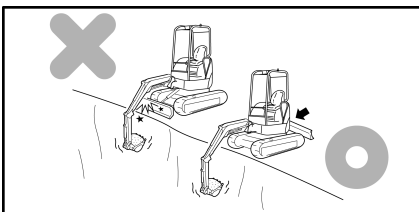
- **Be careful when pulling the equipment out.**

When you retract the equipment for side movement and transport, make sure that the bucket and blade do not come into contact.



- **Support the blade on both sides.**

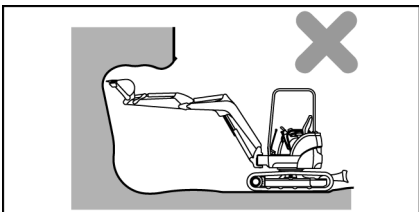
When you use the blade as a support, press the blade down on both sides.



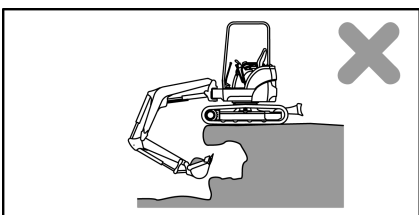
- **Pay attention to the blade during excavation.**

When carrying out a deep excavation on the ground in front of the blade, make sure that the blade does not come into contact with the boom cylinder. Place the blade at the back if it is not in use.

2.3.2 Dangerous tasks

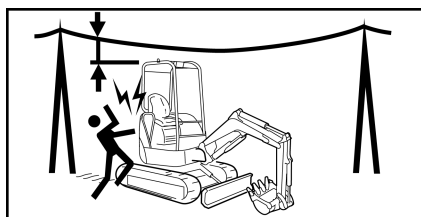


- Digging from the top is dangerous as there is a risk of rock falls or landslides.



- Digging from the bottom is dangerous as this may destabilise and tip over the machine.

2.3.3 Working near electricity lines



⚠ DANGER

Working close to overhead electricity lines is very dangerous and specific precautions must be taken.

- For this manual, you are considered as working near overhead electricity lines once the equipment or your machine's load can reach the minimum distances indicated in the table below.
- Follow these procedures to prevent any accident or injury :
 - Wear shoes with rubber or leather soles.
 - Use a signaller to warn the operator when the machine is too close to an electrical line.
 - If the machine is to enter into contact with a cable, the operator must not leave his seat.
 - Warn all personnel on the ground to stay far enough away from the machine.
- To determine the voltage of the wires on the work site, contact the electricity production company concerned.

	Voltage (V)	Minimum safety distance (m)
Transformer	≤ 100/200	2
	≤ 6600	2
Transmission line	≤ 22000	3
	≤ 66000	4
	≤ 154000	5
	≤ 275000	7

2.3.4 Working near obstacles

- When moving in a tunnel, under a bridge or when you are working in an area near tall obstacles, drive the machine carefully to avoid knocking the boom, the arm or the accessory against these obstacles.

2.3.5 Emergency stop and securing the machine

In case of an emergency stop of the machine, immediately put the accessory or load being handled on the ground according to the following procedure:

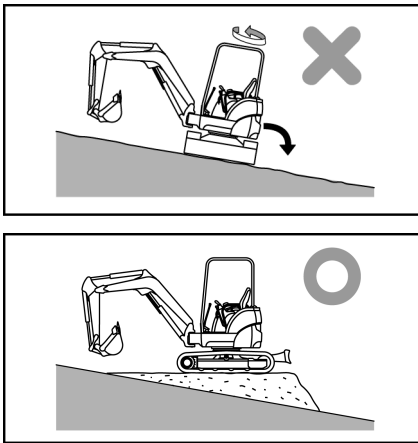
In case of hose rupture or imminent dangerous phenomenon due to loss of control of the machine, release the machine controls and immediately lift the safety lever. The machine's power circuits are cut, except the one controlling the blade.

Note

If necessary, move the ignition key to OFF to stop the engine.

1. Lower the lock lever.
2. Set the starter key to ON position.
3. Use the joysticks to lower the boom and place the accessory or load on the ground.
4. Raise the lock lever.
5. Turn the key to OFF position to switch off the engine and disconnect the electrical circuit. Remove the key from the ignition.

2.3.6 Working on a slope



- Make sure that the machine does not lose its balance and tip over when rotating the upper structure or when rotating equipment on a slope.
- Do not pivot the upper structure with a load in the bucket.
- If the rotation cannot be avoided, provide a bank to keep the machine as horizontal as possible. Then turn the upper structure.

Note

For the maximum acceptable slope: :

 1 Specifications , page 133

2.3.7 Working in an area covered with snow

- Ground covered with snow and icy roads are dangerous as the machine may slip, even on a slight incline. Drive the machine at reduced speed; do not stop or turn suddenly.
- Remove the snow carefully as verges or other potential dangers may be buried beneath the snow.

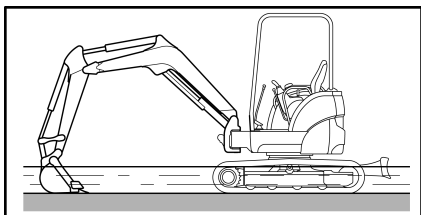
2.3.8 Working on unstable ground

WARNING

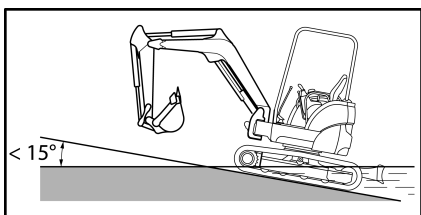
Unstable ground increase the risks of the machine tipping over.

- Keep away from cliffs, verges and ditches as the ground there is unstable. There is a risk that it will give way because of the machine's vibrations or weight, which would cause the machine to tip over or fall. Be careful when working immediately after rainfall or an explosion as the ground is unstable.
- Infill and ground near trenches are not stable and risk giving way because of the weight or vibrations of the machine, which would cause the machine to tip over or fall. Be especially carefully when working on this type of ground.
- When you are working in an area with a high risk of rock fall, wear a helmet and remain under the canopy or in the cab.

2.3.9 Working in a submerged area



- Before you use the machine in a submerged area, examine the condition of the ground and the depth and flow of the water.
- The maximum depth of water in which the machine may be used is located up to the centre of the carrying roll.



IMPORTANT

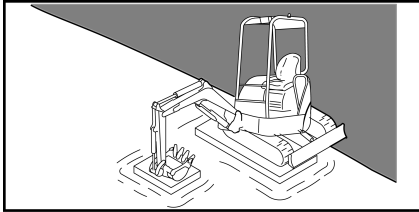
When you come out of the water, if the machine is climbing a slope with an angle of over 15°, there is a risk that the rear of the upper structure will remain submerged in the water, which risks damaging the radiator when it stirs up the water. Be aware of this when you exit the water.

- After use, apply a large quantity of grease to the moving parts (in particular the bucket pin) which have been submerged in water for a long period until the grease used is extruded from the bearings.
- Then wipe off the extruded grease with a cloth.

2.3.10 Working in a muddy area

- Operate the machine carefully so that it does not get stuck. If it does get stuck, release it using the following procedures.

If only one track is stuck

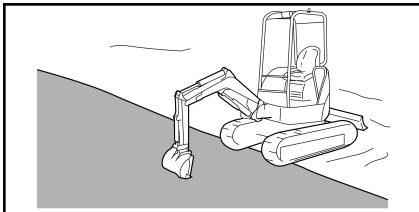


1. Place the bucket on the muddy side.
2. Lift the track.
3. Place wood or a wedge under the track runners.
4. Raise the bucket.

IMPORTANT

When you raise the machine, support yourself on the ground with the lower part of the bucket (and not with the teeth). The angle between the boom and the arm must be 90° to 110°.

If both tracks are stuck



1. Place a log or piece of wood under the tracks.
2. Push the bucket into the firm ground.
3. Retract the arm as if to dig and move forward with the side movement levers to get out of the mud.

2.3.11 Working in an area with reduced visibility

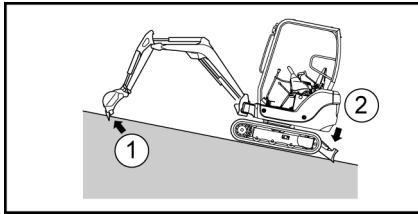
- When working in a dimly-lit area, switch on the lights and front headlights and provide additional lighting if necessary.
- Stop all work when fog, snow or rain hinders your visibility.

2.4 Parking precautions

IMPORTANT

Park the machine preferably on a stable, flat and level surface.

- If you need to park on a slope:



1 = Bucket in the ground

2 = Blade in the ground

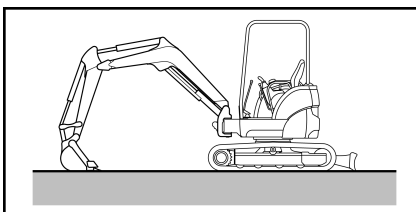
1. Verify that the ground offers sufficient stability over time to maintain the machine position.
2. Place the blade on the side of the slope and plant it in the ground.
3. Place the bucket opposite the blade and plant it also in the ground.
4. If you can not follow this procedure, add a wooden wedge on the uphill side of the slope at the tracks.

1. Release the right and left side movement levers in neutral position to stop the machine.
2. Run the engine on idle with the accelerator lever.

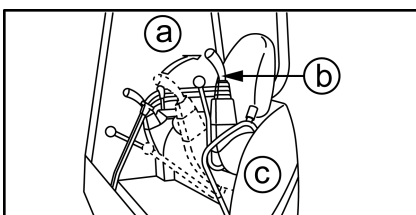
IMPORTANT

Stopping the engine after a rotation at high speed risks reducing its life span. Do not stop the engine suddenly except in an emergency.

If the engine is overheating, do not stop it immediately. Reduce the engine temperature progressively by running it at an intermediate rotation speed before stopping it.



3. Lower the bucket to place its lower surface in contact with the ground.
4. Lower the blade to the ground.

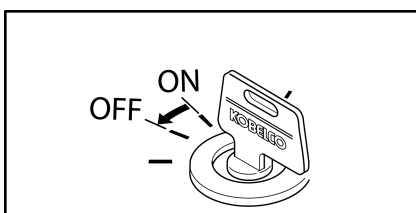


5. Pull the locking levers back.

a = Locking

b = Locking lever

c = Left hand side



6. Turn the key to OFF position to switch off the engine and disconnect the electrical circuit.

7. Remove the key from the ignition.

⚠ WARNING

Do not touch the command levers before switching off the engine, or else the equipment or the machine may move suddenly and cause a serious accident.

2.5 Precautions for the accessories

CAUTION

An accessory that is not adapted to the machine may imbalance it.

- When you mount or remove an accessory, follow these precautions :
 1. Place the machine on flat, firm ground.
 2. Stop the engine.
 3. Keep the parts clean and well greased.
 4. Never mount any accessories that exceed the maximum accepted dimensions.
 5. Do not stay beneath a suspended load.
- The user must read and keep the instructions related to mounting and using accessories.

2.6 Precautions for using optional accessories

- An accessory that is very long may imbalance the machine and cause it to tip over when it descends a slope or pivots on a slope.

 **2.2.3 Driving the machine on a slope , page 47**

 **2.3.6 Working on a slope , page 51**

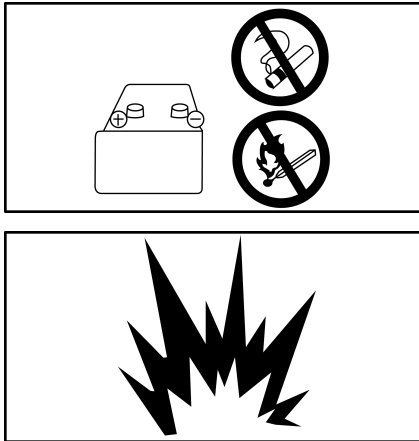
- If you mount a particularly heavy accessory on the machine, the inertia of the upper structure will increase and continue to rotate over a long distance once the rotation lever has been released.
- This may give the operator a false impression of the distance to be respected between the pivoting accessory and a nearby object and may strike the accessory against the object. To avoid this type of accident, stop the rotation as soon as possible.
- Because of the increase in the inertia, the accessory will fall a greater distance away after it has been stopped in the air. There will be major unplanned drift for the accessory.
- Check that the arm and the boom are correctly mounted. If this is not the case, accidents or damage may occur. Contact your dealer if you have any questions relating to mounting the boom or the arm.
- If you mount a long accessory, you may incorrectly estimate the distance between the accessory and a nearby object and strike the accessory against the object. Provide enough room between the long accessories and the nearby objects.

2.7 Precautions for the battery

- The battery is located under the seat.

DANGER

Be careful when handling the battery.




- The battery electrolyte can cause severe burns to the eyes or skin. Always wear safety glasses and clothes when handling the battery.
- If the battery electrolyte comes into contact with your skin or clothes, rinse it off immediately in a large quantity of water and consult a doctor.
- An explosion may occur as the hydrogen produced by the battery is flammable. Keep the battery away from all flames and sparks.

- If you accidentally swallow any of the battery's electrolyte, drink a large quantity of water, milk or fresh eggs and consult a doctor immediately.
- Before inspecting or handling the battery, switch off the engine and turn the starter switch to OFF.
- Make sure that you do not cause a short circuit by touching the battery terminals with a tool.
- If a terminal connection comes loose, sparks may be caused because of a poor contact and may cause an explosion. Make sure that the terminals are connected safely.

CAUTION

To start the engine using the connection cables, comply with the procedure described

 **15 If the battery is discharged , page 95**

3 PRECAUTIONS FOR THE ENGINE

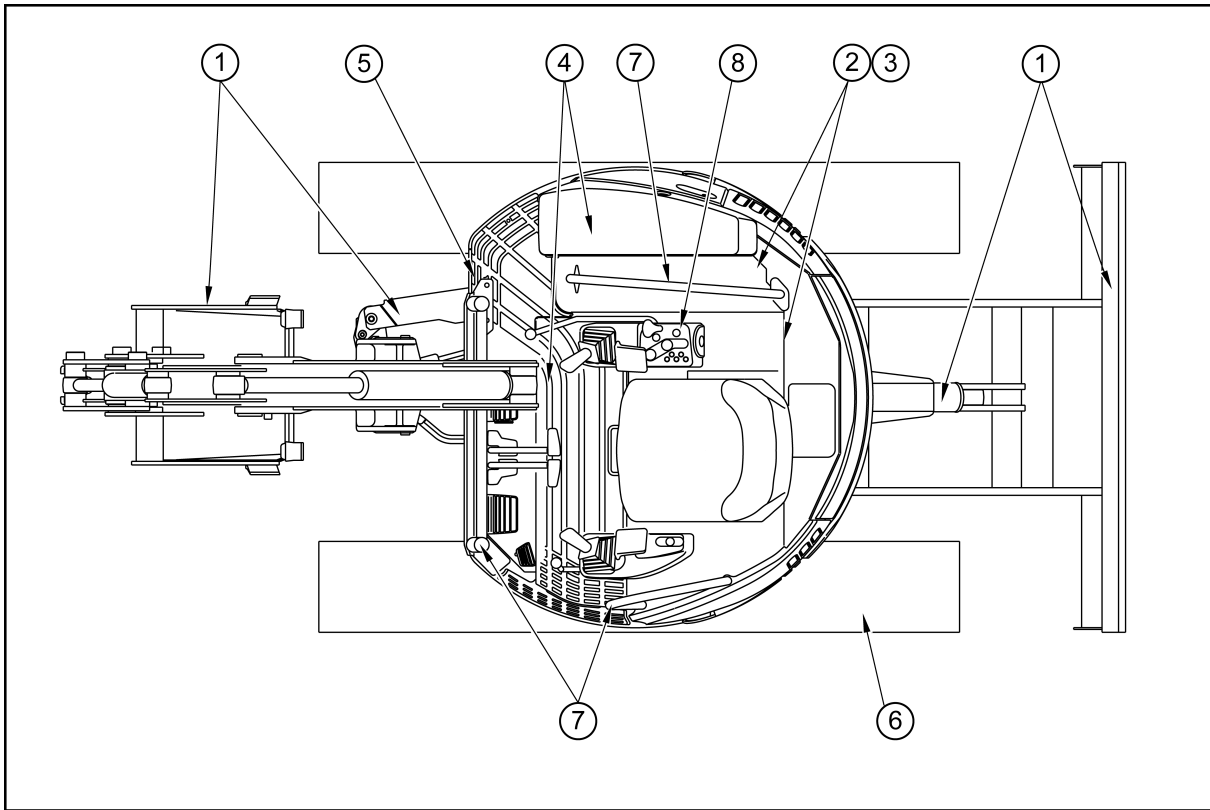
- It is vital that you respect a running in period for the machine during the first hundred hours of service (read the time counter). During this period, the machine must not be used with an excessive load, even though it has been correctly prepared and checked before despatch. Otherwise there is a risk that its performance will be affected and its life span shortened.
- When running in the machine, make sure to :
 - Preheat the engine by running it on idle for 5 minutes after starting it.
 - Do not run the machine with a heavy load or at a high speed.
 - Do not start, accelerate or stop the engine suddenly.
 - Do not change direction too suddenly.

Note

Observe these precautions throughout the life of the machine in order to preserve the good condition of the engine.

4 CHECKS BEFORE STARTING THE MACHINE

4.1 Overall visual inspection



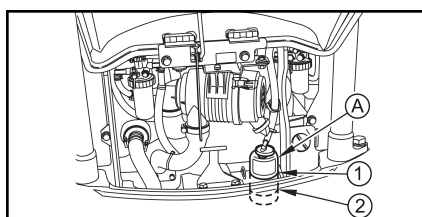
WARNING

If there is any fuel on hot areas or if there are any fuel and/or oil leaks, this may cause a fire. Carefully check these possible causes of fire. If there are any faults, contact your dealer.

1	Check the hydraulic components : wear and leaks around the cylinders, damage to the hoses and connectors come loose.
2	Clean the dust and combustible materials (dead leaves, chips) on areas where heat develops : around the engine, the battery and the radiator.
3	Check that there are no oil leaks from the engine or water leaks from the cooling system.
4	Check that there are no oil leaks from the hydraulic system, the hydraulic oil tank, the pipes and seals.
5	Check that there are no traces of grease or leaks from the hydraulic pipes.
6	Check that there are no brakes, wear or play on the bolts and there are no oil leaks on the track rollers (runners, sprockets and rollers).
7	Check that the bolts have not broken or come loose.
8	Check that the red ring on the water decantor is pushed onto the lower part of the bowl. If the ring floats in the bowl, this means that water has mixed with the diesel. In this case, take out the bowl and remove the water.

4.2 Checking and topping up the level of cooling fluid

- Check the level of cooling fluid every day according to the following procedure :
 1. Place the machine on flat ground.
 2. Stop the engine.
 3. Wait until the engine and the radiator have cooled down.
 4. Open the bonnet with the ignition key.
 5. Lock it with the safety rod.
 6. Check that the level of fluid in the tank is between the min and max markers.



A = expansion flask
1 = maxi
2 = mini

- If the level is below the min marker:
 1. Take the cap off the tank.
 2. Top up to the maximum marker.
 3. Close the tank again.
 4. Close the engine bonnet.

IMPORTANT

If the tank is empty, check for leaks and the water level in the radiator. If the level of water in the radiator is low, top it up in the radiator then in the tank.

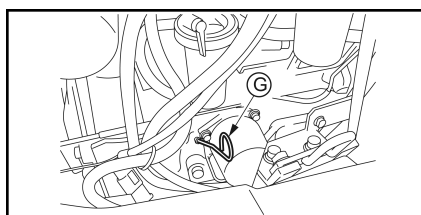
WARNING

Only remove the radiator cap to top up the radiator.

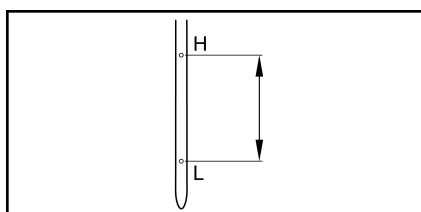
Replacing the cooling fluid :

The cooling fluid must be changed every 1000 hours. Contact your dealer.

4.3 Checking and topping up the engine oil level



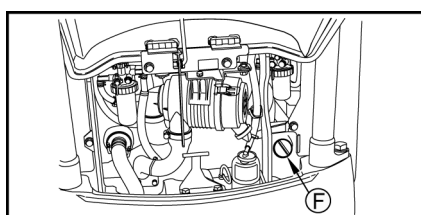
1. Wait until the engine has cooled down.
2. Open the bonnet with the ignition key. Lock it with the safety rod.
3. Read the engine oil gauge. (G)



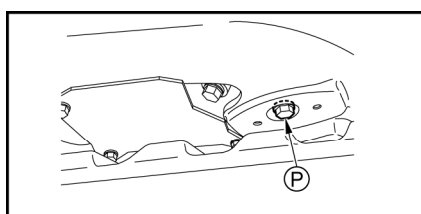
⚠ WARNING

At operating temperature, the oil and the gauge area are hot.

Avoid the hot oil or the components coming into contact with your skin to avoid any physical injuries.



4. Clean the gauge with a cloth to remove any oil deposits.
5. Insert the gauge into its tube.
6. Remove it. The engine oil level must be between markers H and L.



- If the oil level is below marker L, open the filling hole and top up to marker H.

F = Filler hole

- If the oil level is above marker H, remove the excess quantity of oil via the drainage cap (P) then check the level again.

Note

Do not pour the excess engine oil onto the ground or the road.

- Once the engine oil is at the appropriate level, close the bonnet again.
- Select the oil according to the temperature. If you start the engine at temperatures below 0°C, use an SAE 10W, an SAE 10W-30 or SAE 15W-40 even though the daytime temperature rises to 10°C.

	Temperatures °C								Quantity prescribed (L)	
	-	-20	-10	0	10	20	30	+		
En- gine oil	SAE 10W CD								2,8 + 0,4	Oil filter
	SAE 10W-30CD									
	SAE 15W-40 CD									

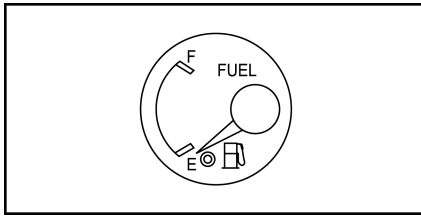
IMPORTANT

Do not mix different types of oils. If you need to top up the oil with a different make or type from the oil left in the tank, remove the remaining oil completely.

Replacing the engine oil :

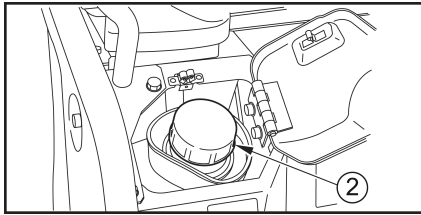
1 Periodic inspections and upkeeps, page 101

4.4 Checking and topping up the fuel level



F = Full

E = Empty



1 = Cover R

2 = Cap

1. Set the starter key to ON position.
2. Determine the fuel level by looking at the fuel gauge on the dashboard.
3. Set the starter key to OFF position.

Only use the recommended diesel :

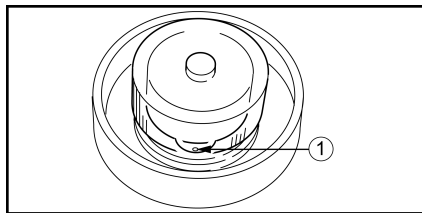
- ISO 8217 DMX
- EN 590:96

Minimum cetane index: 45.

	Temperatures °C								Quantity prescribed (L)
	-	-20	-10	0	10	20	30	+	
Diesel				N° 2-D					20,0
					N° 3-D				
					N° 3-D (S)				

WARNING

If you spill any fuel, wipe it up with a cloth.



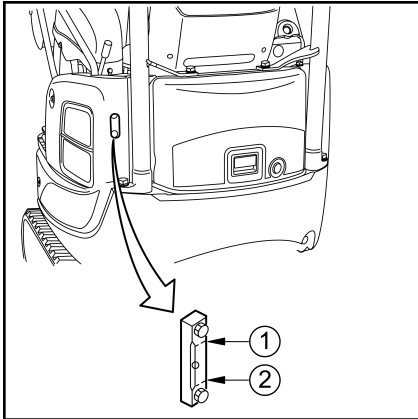
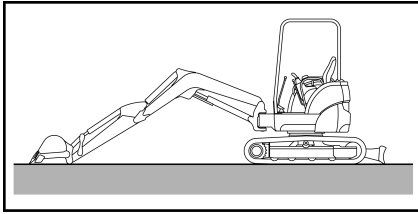
1 = Event

6. Close the tank again.
7. Close the right hand cover.

Note

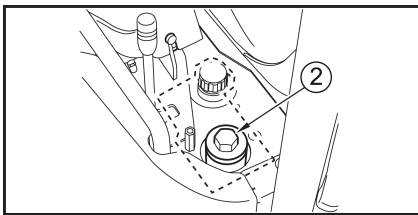
If the cap vent holes are plugged, the pressure in the reservoir may vary and the fuel supply will be faulty. To avoid this happening, clean these vents air holes regularly.

4.5 Checking and topping up the hydraulic oil level



1 = Upper limit

2 = Lower limit



2 = Filler hole

1. Put the machine in the position shown opposite: blade back and lowered to the ground, equipment parallel to the tracks, boom cylinder half out, arm cylinder retracted to the end of its run, bucket teeth on the ground.
2. Stop the engine.
3. Determine the oil level by looking at the gauge on the machine's left hand cover. The bearing must be between the gauge's upper and lower markers.

Note

The oil level varies according to the oil temperature.

- Before start-up, the oil level must be on or around the central point of the gauge scale (oil temperature : 10 to 30°C).
 - During normal operation, the oil level must be around the upper limit marker on the oil gauge scale (oil temperature : 50 to 80°C).
4. If the oil level is below the minimum marker, top up as follows :
 - a. Open the left hand cover.
 - b. Open the hydraulic oil tank opening cap.
 - c. Top up through the filler hole, keeping an eye on the gauge located on the tank.
 5. Close the tank again.
 6. Close the left hand cover.

IMPORTANT

Do not top the hydraulic oil over the upper limit marker on the oil level gauge. An excessive quantity of hydraulic fluid may damage the hydraulic system by applying too much pressure to these components, which would cause a dangerous high pressure leak.

4 Checks before starting the machine

	Temperatures °C								Quantity prescribed (L)
	-	-20	-10	0	10	20	30	+	
Hydraulic oil									16,5 in the tank 9,5 the rest

IMPORTANT

Do not mix different types of oils. If you need to top up the oil with a different make or type from the oil left in the tank, remove the remaining oil completely.

Replacing the hydraulic oil :

- The hydraulic oil must be replaced every 1000 hours. Contact your dealer.

5 CHECKS AFTER START-UP

WARNING

Emergency stop : if an abnormal action occurs, turn the key in the ignition switch to the OFF position. The electrical system is interrupted and the engine stops. Ask your dealer to check the machine.

If you do not use the pre-heating, the machine may respond slowly to the command levers or not operate correctly, especially in cold weather.

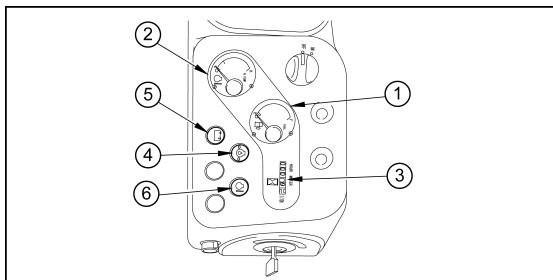
IMPORTANT

The hydraulic oil must be at a temperature from 50°C to 80°C. If the temperature is low, wait until it reaches 20°C before using the equipment. If you need to use a command lever before the oil reaches this temperature, handle it gently.

Do not accelerate suddenly if the engine is not hot.

After the engine starts, do not use the machine immediately but respect the following procedure :

1. Run the engine on idle and check that the engine oil pressure alarm light is off.
2. Check that the gauges and the screen correspond to the following statuses :



1=	Diesel gauge	normal
2=	Cooling fluid temperature indicator	normal
3=	Time counter	normal
4=	Engine oil pressure alert indicator	off
5=	Battery charge warning alert	off
6=	Water temperature alarm light	off

3. Pull the throttle lever to the centre point between idle and full throttle. Run the engine about 5 minutes with no load at the intermediate rotational speed.
4. Unlock the locking levers and lift the bucket from the ground.
5. Use the joysticks to extend and retract the bucket and arm cylinders to the end of their run. Alternately run the bucket cylinder for 30 seconds then the arm cylinder for 30 seconds over a total duration of around 5 minutes to raise the hydraulic oil temperature to at least 20°C.

IMPORTANT

When moving the accessory, make sure it does not hit the ground or the machine.

IMPORTANT

Check that there is no abnormal noise in the hydraulic circuit.

6. Check the colour of the exhaust gas, the noise and the vibrations of the machine.
7. Raise the locking lever to ensure that no handling of the equipment and no rotation of the upper structure is possible with the joysticks.
8. Unlock the locking lever and activate the joysticks to check that everything is operating normally.
9. If you observe the slightest anomaly during this procedure, contact your dealer.

6 CHECKS AFTER USE

If the machine is used in a rocky place :

- Check for damage to the lower chassis.

If the machine is used in a dusty place :

- Check whether the air filter is clogged.
- Check the air filter cartridge regularly.
- Check whether the radiator vents are clogged.
- Clean or replace the fuel filter cartridge regularly.
- Clean the electrical equipment, particularly the starter and the alternator to avoid any dust deposits.

If the machine is used in mud, snow or sand :

- Clean the machine.
- Check there are no cracks or damage.
- Check that no nuts or screws are missing.
- Apply grease to all equipment axes that have been submerged in mud, snow or sand.

7 USING THE MACHINE IN COLD WEATHER

7.1 Preparation for use in cold weather

- In cold weather, you may have difficulty starting the engine because the coolant and fuel can be frozen.
- Consequently, take the following measures :
 1. Use oil and fuel suitable for the outside temperature.


 **3 Recommended greases and fluids , page 108**

2. Keep the battery charged. In cold weather, remove the battery after using the machine and store it in a heated room to facilitate restarting the machine.

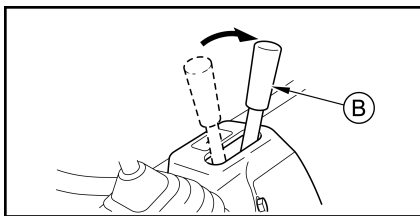
7.2 Starting in cold weather

WARNING

Consult these pages and respect these safety instructions before starting up the machine.

 **2.1 Precautions before starting the engine , page 43**

1. Pull the acceleration lever back to full gas position.



B= Throttle lever

2. Turn the key in the starter switch to place it in AIR HEATER position. Hold it for 10 to 15 seconds to preheat the engine intake air.
3. Turn the key to START position to start the engine. Release the key after the engine starts and it will return itself to ON position.
4. When the engine speed increases, push the accelerator forward to the idle position.

IMPORTANT

Do not leave the key in START position for over 10 seconds.

If the engine does not start, position the key at OFF. Wait 30 seconds then restart the engine.

Moving or operating the machine without warming it up first may affect its performance.

7.3 Precautions after use

To avoid that the machine is jammed due to mud, water or frozen deposits on the rubber tracks :

1. Park the machine on firm, dry ground or place boards on the ground and park the machine on these boards to avoid the tracks freezing on the ground.
2. Drain the water built up in the fuel system by turning the evacuation tap to avoid and freezing.
3. Cover the battery or place it in a warm place and reinstall it on the machine the next morning.

7.4 When cold weather is over

- When the exterior temperature increases, replace the greasing oil and the fuel

 **3 Recommended greases and fluids , page 108**

8 RUBBER TRACKS

8.1 Correct use of rubber tracks

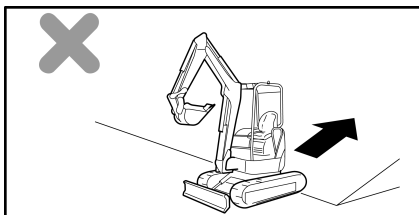
- Rubber tracks have certain advantages over steel tracks. However, you cannot get the full benefit out of rubber tracks if you use them in the same way as steel tracks.
- Use the rubber tracks moderately according to the conditions at the work site and the type of work.

8.2 Rubber track warranty

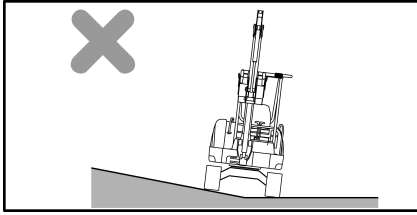
- The rubber tracks are not guaranteed for repair and replacement if they are damaged following careless use by the user : lack of check of the track tension or incorrect maintenance, use of the tracks on surfaces or terrain likely to damage them.

8.3 Precautions for using rubber tracks

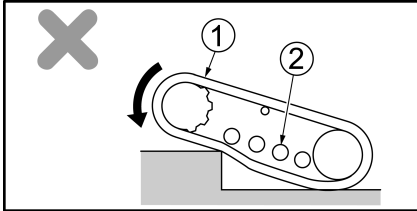
- Do not use them or pivot them on broken stones, a hard, rough rock base or around steel or iron rods or the edges of iron plates.
- Do not use the machine on rocky ground such as a river bed as there is a risk that the tracks will be damaged by gravel entering the runners or the tracks becoming loose. Pushing earth by force will reduce the tracks' life span.
- Avoid the rubber becoming stained by oil, fuel or chemical solvents. If the tracks are dirty, wipe them immediately. Do not travel across oily surfaces.
- When you do not use the machine for a period of over 3 months, avoid placing the tracks in a place that is directly exposed to sunlight or rain.
- Never drive on heated surfaces such as fires in the open air, a steel plate exposed to the sun or a hot asphalt road.
- Never drive on a track when the other track is held above the ground with the equipment. This may damage the tracks or cause them to come off.
- Never turn on the spot on concrete or asphalt roads.
- Do not suddenly change the speed. You risk wearing or damaging the track.
- Never rotate on ground with a significant difference in level. Climb a step at a right angle to avoid the tracks coming off.
- Gently lower a machine that has been raised from the ground with the equipment.
- We do not recommend that you use the machine to handle materials that become oily once crushed (soya, wheat grains, compressed colza oil yeast, etc.). After use, clean the machine fully with water.
- We do not recommend that you use the machine to handle materials such as salt, ammonium sulphate, potassium chloride, potassium sulphate or super lime biphosphate. Transporting these materials risks damage the metals' adhesion. After use, clean the machine fully with water.
- Avoid the tracks coming into contact with concrete walls.
- The tracks tend to slip on snow or icy roads. Check that you do not slip when moving or working on a slope in cold weather.
- Operating the machine in extremely cold weather may damage the rubber tracks and reduce their life span. Given the physical characteristics of rubber, observe the operating temperatures specified in this manual.
- Do not damage the tracks with the bucket when using the machine.



- Do not drive on the boundary between a flat surface and a slope to climb in reverse. Otherwise, reduce the speed.



- Do not drive with a track on a slope or convex surface (one that generates an angle of over 10°) and the other track on flat ground; this will damage the tracks. Drive with both tracks on the same flat surface.

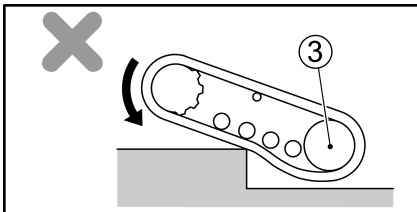


- Keep the tracks at their adequate tension to avoid them coming off. If the voltage is too low, the machine can throw a track in the following circumstances:

- When there is a significant difference in level, there is a spacing between the tracks and the rollers.

1 = Track

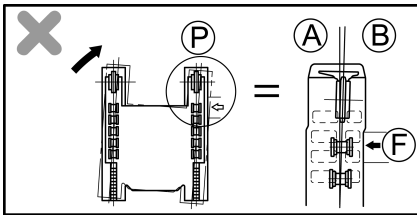
2 = Tightener roller



- When you carry out side movement in reverse, there is another spacing between the tension roller and the track.

3 = Idle wheel

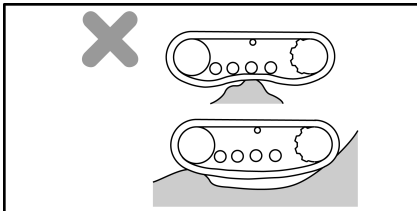
- when the machine is moving although the tracks have been blocked to the side by an obstacle.



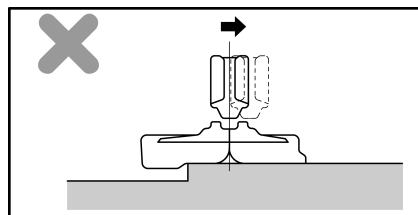
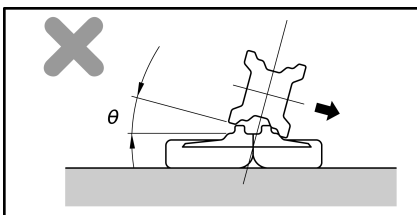
- when the idler pulley and the rollers are not aligned with respect to the tracks.

A = Chassis side

B = Rubber track side



- when you are reversing under these conditions.



8.4 Track maintenance

 6.4 Rubber track maintenance , page 118





8.5 Track replacement

 6.4.2 Track replacement , page 119

9 HANDLING THE BUCKET

9.1 Machine stability when using with a bucket or an accessory

- The maximum weight when in use in bucket mode or with accessories ensure machine dynamic stability in use. It corresponds to the maximum weight allowed at the end of the empty arm.
- This weight is determined for the machine on a flat and firm ground under the most unfavourable conditions and is indicated in the table below.

	950 mm	-	
	105	-	
	190	-	

- It must absolutely be taken into account by the operator before using the machine for excavation, levelling operations or in working conditions with the accessories.
- Depending on the machine configuration (arm length, presence of a counterweight...) and working conditions, the operator must make sure that :
 - The equipment and accessories selection is made according to the nature of the task to be carried out and according to the machine's stability limits.
 - the total weight of the quick hitch, the accessories used (bucket, hydraulic hammer...) and the load handled does not exceed the maximum weight allowed.
- The capabilities of the machine are given for a working position with the undercarriage expanded to give the machine more stability.

WARNING

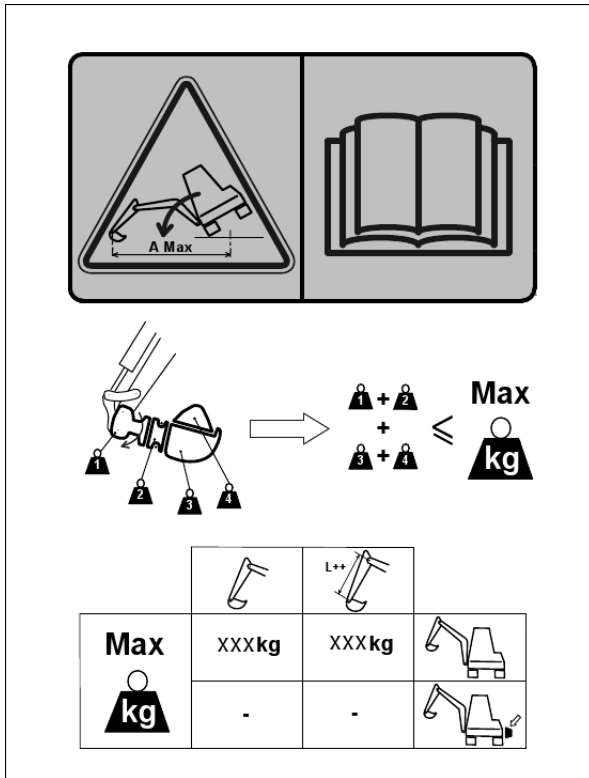
Using the machine with the undercarriage retracted must be limited to moving without rotation of the turret. This use is under the responsibility of the user and is strongly discouraged.

DANGER

Any excess can lead to a loss of stability of the machine and tip it over. KOBELCO CONSTRUCTION MACHINERY CO., LTD. accepts no responsibility in case of non compliance with the safety instructions described in this chapter.

WARNING

When using the machine with a heavy accessory (bucket in loader mode or log loader for example) associated with travel movement, the maximum weight guaranteeing the stability of the machine and the loads shown in the lifting table must be reduced by 20%.



To determine the weight that your machine will handle, make the following calculation:

Weight handled =	
+	Weight of equipped quick hitch
+	Weight of the accessory (hammer, empty bucket...)
+	Bucket load capacity x material density)

This operation is reminded by a sticker affixed in the cab interior and visible from the driver's compartment. Compare the result with the maximum weight under condition of use with bucket, shovel or with accessories.

Weight of quick hitch and accessories (hammer, empty bucket...):

Please refer to the stickers or C.E. and manufacturer's plates affixed on the accessories mounted on your machine.

C.E. sticker sample



Manufacturer's plate example



9 Handling the bucket

Weight of material handled:

The bucket loading capacity (or SAE volume) allows calculating the weight of material handled in the bucket (in case of full buckets) and it takes into account the extra weight caused by the dome piling of certain materials. To determine the weight of materials handled, make the following calculation:

$$\text{Weight of materials (kg)} = \text{Load Capacity (L)} \times \text{Density}$$

Materials	Density
Sand	1,64
Clay	1,7
Mud	1,8
Gravel	1,5

The density of the materials has a great influence on the weight of the load handled. The opposite table specifies the density of the most commonly handled materials.

9.2 Compatible accessories

- These accessories are given for 1.8 density materials with a full bucket forming a dome in accordance with ISO standard 7451. For particular operations or with materials of different densities (partial bucket filling due to fluid products such as mud) larger buckets may be used.
- In this case it is the responsibility of the user to ensure that the machine stability limit is not exceeded. The machine could tip over, which could cause serious physical injuries and extensive material damage.

9.1 Machine stability when using with a bucket or an accessory, page 72

- Do not use accessories that are not listed in this chapter. The user must ensure that the accessory is compatible with the capabilities of the machine and the task at hand. If in doubt, contact the accessory manufacturer or dealer.
- The capabilities of the machine are given for a working position with the undercarriage expanded to give the machine more stability.

Mounting without quick hitch

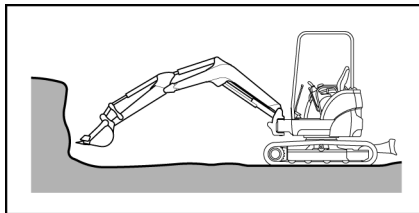
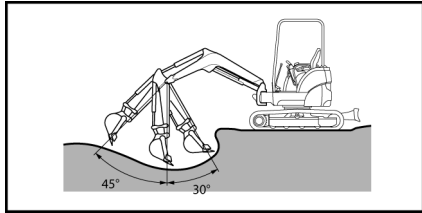
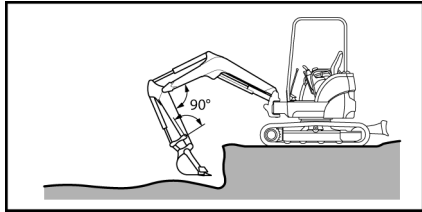
Bucket	Retro bucket	G1600
	Ditching bucket	G1C1000
	Swivel ditching bucket	-
	Loading bucket	-
Hydraulic hammer		DMS95

Mounting with quick hitch

Mechanical cam (ACB Morin)	Quick hitch	Module	GMO0100
	Bucket	Retro bucket	GMO02R0600
		Ditching bucket	GMO02C0800
		Swivel ditching bucket	-
		Loading bucket	-
		Hydraulic hammer	DMS95

Mechanical wedge (CSERI)	Quick hitch	GCSMS01B	
	Bucket	Retro bucket	GCS01BT0600
		Ditching bucket	GCS01BC0850
		Swivel ditching bucket	GCS01BP0800
		Loading bucket	-
Hydraulic hammer	DMS 95		


9.3 Operation of the retro bucket



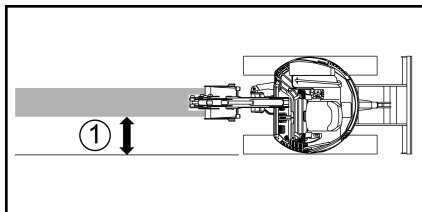
- The retro bucket is adapted to dig the ground at a level below the machine.
- The maximum digging force is obtained when the angle between the bucket cylinder and the bucket arm and the angle between the arm cylinder and the arm is 90°.
- For maximum effectiveness, handle the arm within the range illustrated opposite : 45° forward and 30° back.
- Do not move the equipment to the end of the cylinder run.

- To dig at a level above the machine, install the bucket in the reverse position.

 **11.2.1 Loading bucket , page 81**

 **9.1 Machine stability when using with a bucket or an accessory, page 72**

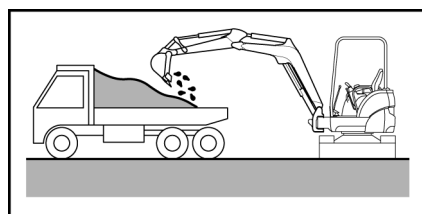
9.4 Digging trenches



1 = Parallel

- To increase the effectiveness of the machine, place an appropriate bucket to dig a trench and position the tracks in parallel on each side of the trench to be dug.
- To dig a wide trench, dig on the two sides then the centre.

9.5 Loading



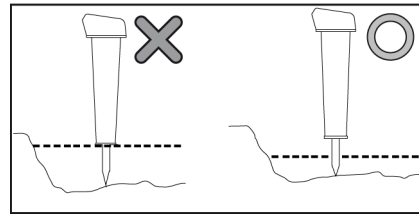
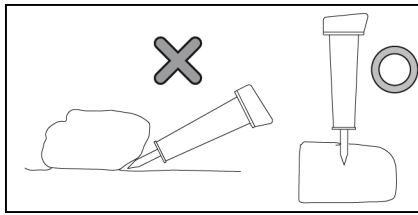
- To increase effectiveness, position the skip truck at a location where the operator may view it and where the machine's rotation angle is minimised.
- Load the earth from the back of the truck to facilitate loading and maximise the quantity of earth loaded.

10 HANDLING OF ACCESSORIES

10.1 Hydraulic hammer SOCOMEC *Usage recommendations*

WARNING

During the work phase, keep everyone out of the 20m danger zone.



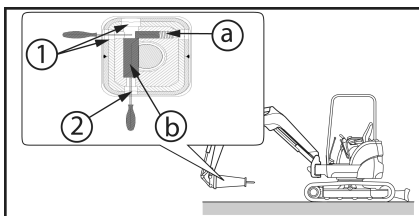
Note

The hammer can only operate within the following temperature range:
[-5°C ~ +45°C]

- To avoid damaging the structure of the hammer and minimize vibration, the operator must be smooth when using the tool. Be sure to set the engine speed if you are using a hammer.
- Once the work requiring the hammer is finished, set the hammer vertically with respect to the ground and leave it in this position to facilitate drainage of condensation on the side of the piston.

Tool change

1. Park the machine preferably on a stable, flat and level surface.
2. Place the accessory at about 30 cm above the ground in horizontal position.
3. Stop the engine.
4. To remove the tool from the housing:



- a. Use a lever to press the pin (A) and to push it into its housing (1) (2 cases possible depending on model).
- b. Use a second lever to press the stop swivel pin (B) and push it out completely (2).
- c. Remove the tool from the seat.

5. Apply plenty of grease to the part in the new tool guide.
6. Manually fit the flat end of the tool into the guide.
7. Push and turn the tool in order to position it parallel to the pin housing
8. Use a lever to press the pin stop and make it fit into place
9. Insert the pin until the pin stop returns to its position.

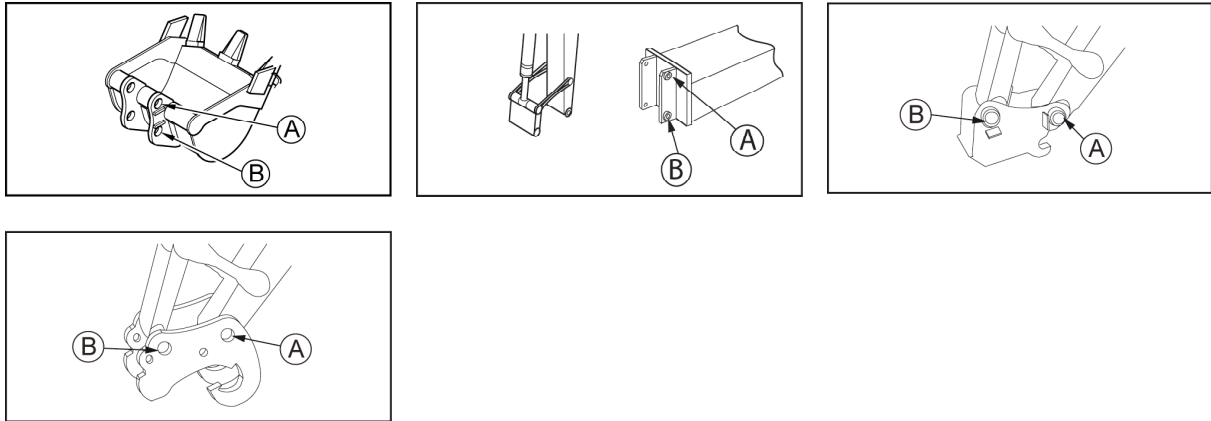
Note

There are different forms of tools that can equip the hammer. Contact your dealer.

- If the hammer is inactive for a long period, you must:
 - Pull out the tool and, after pushing the piston as high as possible (using a tube) grease it thoroughly and reassemble the tool. This prevents oxidation of the piston end.
 - Shelter the hammer in a confined area that is protected from the weather.

11 ACCESSORY CHANGE BY DIRECT COUPLING

11.1 Dismantling the accessory



A & B = Bucket or attachment bore

1. Place the machine on flat ground.
2. Place the accessory at about 5 cm above the ground.
3. Stop the engine.
4. Clean all the parts.
5. Remove the swivel pin from the A bore and the swivel pin from the B bore.

IMPORTANT

- **Protect the various elements from dirt and dust.**
- **Take care not to damage seals on each bushing side.**
- **Check the good state of o-rings. Replace it if damaged.**

11.2 Mounting the accessory

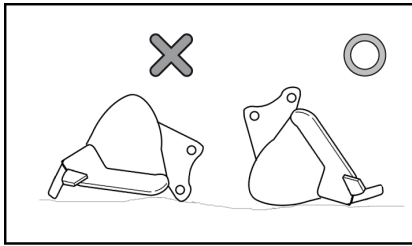
IMPORTANT

Before using an accessory requiring hydraulic power, check the pressure compatibility from the machine specifications chart.

 1 Specifications , page 133

WARNING

Before mounting a bucket or an accessory on your machine, make sure that:



- the bucket or accessory is compatible with the capabilities of your machine;
- the bucket or accessory mounting operation is performed on a level and stable ground;
- the bucket or accessory is properly positioned to be installed on the machine.

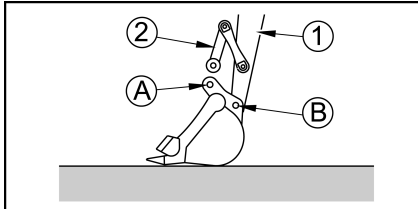
1. Clean and lubricate the bores.
2. Put the o-rings in place.
3. Align the arm with bore A, and the pin with bore B.
4. Put the bolts in place on axes A and B.
5. Grease the hinged parts.

11.2.1 Loading bucket

IMPORTANT

Protect the various elements from dirt and dust.

Take care not to damage seals on each bushing side.



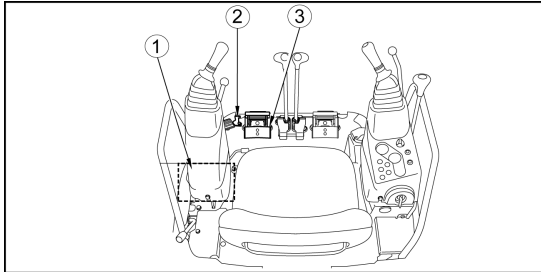
1 = Arm

2 = Bucket link

1. Clean and lubricate the bores.
2. Put the o-rings in place.
3. Align the pin bore with the bucket A bore.
Add shims to compensate for play if necessary.
4. Insert the swivel pin into bore A.
5. Lift the equipment and align the arm bore with the bucket B bore holding the bucket about 5 cm of the ground.
Add shims to compensate for play if necessary.
6. Insert the swivel pin into bore B.
7. Put the bolts in place on axes A and B.
8. Grease the hinged parts.

12 IMPLEMENTING THE 3RD HYDRAULIC CIRCUIT

12.1 Description



1= 3rd circuit selector

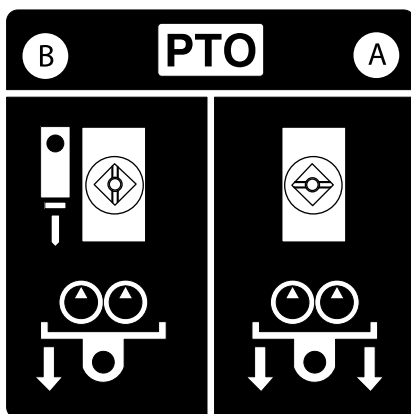
2= Pedal locking

3= 3rd circuit pedal

CAUTION

Do not operate the controls of the 3rd circuit if there are no installed accessories.

12.1.1 3rd circuit selector

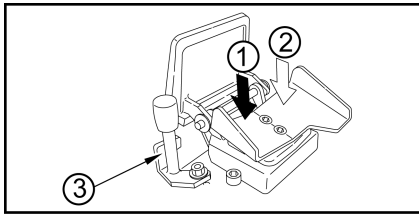


- Use this valve, located near the battery, to select the single or double acting 3rd hydraulic circuit.

A = 3rd circuit - dual effect

B = 3rd circuit - single effect with direct tank return

12.1.2 3rd circuit pedal



1 = 3rd circuit - single effect with direct tank return

2 = 3rd circuit - dual effect

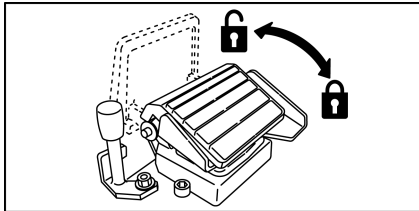
3 = Pedal locking

- Application example: hydraulic hammer

1. Turn the valve lever to select single or dual effect. The 3rd circuit selector is then set to single effect.

2. Unfold the foot rest.

3. Press the left hand side of the pedal (1) to implement the accessory.




IMPORTANT

Lock the pedal when the auxiliary circuit is not used.

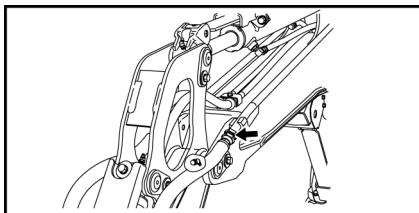
12.2 Mounting the accessory

WARNING

Before performing any maintenance operation, remove residual pressure in the hydraulic circuit.

 2.1.1 Removing the residual pressure, page 103

Always drain the machine's oil into a safe container and never directly onto the ground.



1. Stop the engine.

2. Remove the caps.

3. Connect the hydraulic tool's hoses.

Hydraulic oil rate at nominal engine speed :

 1 Specifications , page 133

12.3 Precautions for using the accessory

- Follow the procedures described in the user manual provided by the accessory's manufacturer.

Hydraulic hammer (single action accessory)

- Set the return pipe selector valve to the position for a single action accessory.
- The hammer works when the proportional roller is operated.

Tilting bucket

- Position the return circuit selector valve to the position for a dual action accessory.
- Use the proportional roller to operate the accessory.

13 TRANSPORTING THE MACHINE

WARNING

Choose a road taking account of the width, height and weight of the machine loaded on the truck.

Transport the machine safely according to the rules associated with applicable legislation.

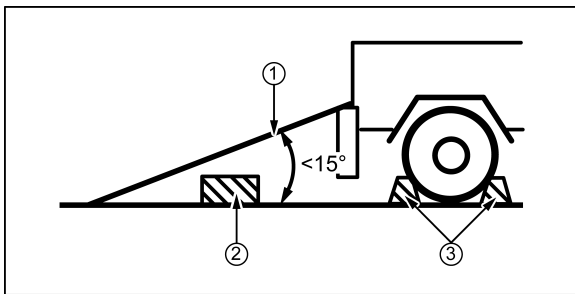
13.1 Loading/unloading the machine

13.1.1 Precautions for loading/unloading the machine

- Load or unload the machine on a flat, firm surface, a good distance away from any verges.
- Use adequate power ramps with hooks at their extremities.
- Make sure the ramps are sufficiently wide, long and thick to hold the machine so that you can load it and unload it safely. If the ramps flex excessively, consolidate them with wedges.
- Install the ramp safely on the truck deck so that they do not become detached.
- Clean grease, oil and any other slippery deposits from the ramps and remove the mud from the tracks to avoid the machine sliding sideways on the plates.
- Do not load or unload the machine if the ramps are slippery due to rain, snow or frost.
- Load or unload the machine at reduced speed.
- Never change the direction of travel on the ramps. If you need to change your path, take the ramps down, and do it on the ground.

13.1.2 Procedure

1. Engage the truck's brake.
2. Position butresses to immobilise the truck.
3. Position the ramp plates on the truck deck so that the centre of the truck and the centre of the machine are aligned. Check that the left and right ramp plates are at the same level.
4. The angle between the ground and the ramp plates must be less than 15°.



- 1 = Ramps
- 2 = Wedge
- 3 = Stops

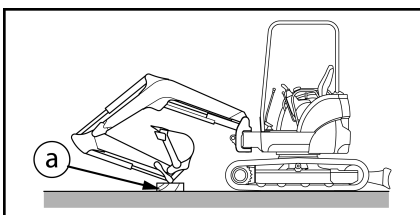
Note

Determine the spacing between the ramp plates based on the centre of the track runners.

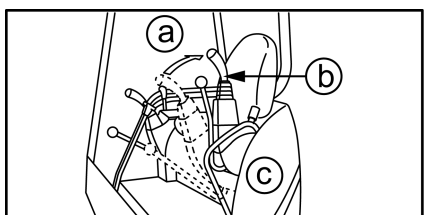
5. Place the accelerator pedal to idle position.
6. Direct the machine towards the ramp plates at low speed and load the machine onto the truck. Do not use levers other than the side movement levers when travelling across the ramp plates.

13.2 Immobilising the machine on the truck

Once the machine is in a suitable position on the truck, immobilise it as follows :



1. Lower the blade to the ground.
2. Completely extend the track spacing cylinder to prevent the tie-down accessories from relaxing during transport.
3. Fold the bucket and the arm to the maximum, then lower the boom to wedge the arm on a wooden block.(a)
4. Turn the key to OFF position to switch off the engine and disconnect the electrical circuit. Remove the key from the ignition.



5. Lock the control levers with the locking lever.
- a = Locking
 - b = Locking lever
 - c = Left hand side

Note

The hydraulic brake locks the rotation motor.

13.3 Tying down the machine

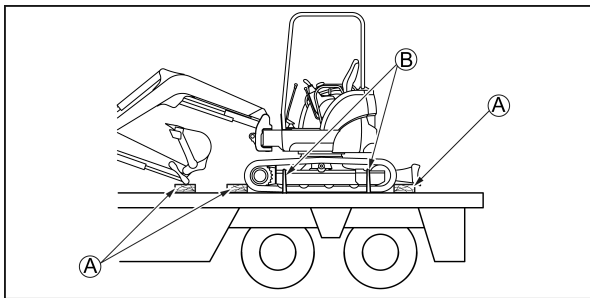
⚠ WARNING

Do not perform the tie-down if a person stands on the machine or on an accessory.

⚠ WARNING

Use a tie-down accessory (belt, chain, cable) compatible with the weight of the machine and compliant with European standards.

Check the tie-down accessory labelling to know the WLL¹. In the absence of or damage to the accessory labelling, do not use it without being assured of its WLL¹.



A= Wedge

B= Slings

1. Check the condition of the transport vehicle surface. If the surface is greasy, it must be cleaned before installing the machine on the transport vehicle.

Note

If the transport vehicle surface is steel, provide a non-slip mat or spacers to prevent the machine tracks from slipping.

2. Check the WLL² of the tie-down points of the transport vehicle, it must be at least the WLL¹ recommended for tying down the accessories.

		WLL ¹ min (daN)
Tie-down accessories	2	3t

3. Tie-down the machine at the points provided for that purpose and that are indicated on the machine.

3 Warning labels, page 6

⚠ WARNING

Before starting the machine transportation, check the total height of the load.

1. Working Load Limit (WLL)

13.4 Slings the machine

⚠ WARNING



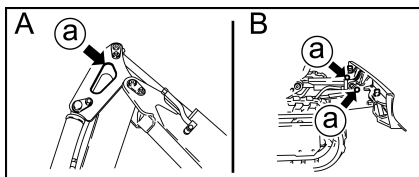
Never lift the machine with someone on it or on an accessory.
Use a slinging method that is compatible with the weight of the machine and that complies with current standards.

If you do not lift the machine as shown, it will be out of balance.

Do not pivot the machine when it has been raised.

Never walk under or beside a suspended machine.

1. Pivot the upper structure so that the blade is behind the operator's seat.
2. Lift the blade to the maximum limit.
3. Place the equipment in the longitudinal axis of the machine.
4. Place all the equipment cylinders to maximum extension (except the rotation cylinder).
5. Stop the engine, put the levers in the locked position and check that you have left nothing around the operator's seat before leaving the machine.

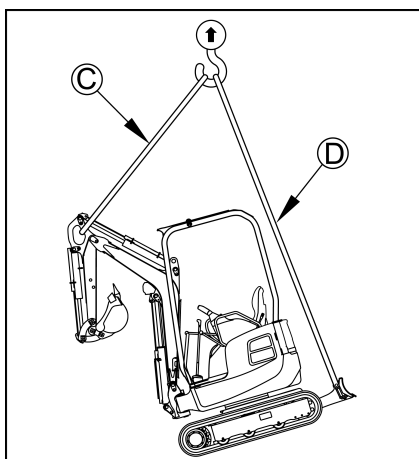


A = Front side

B = Back side

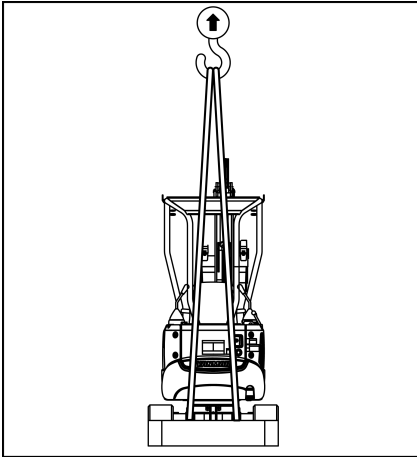
a = Lifting holes at each end

 **3 Warning labels, page 6**



- Lift the machine as follows:
 1. Hook the shackles to the suspension holes at the rear (2 points).
 2. Pass the sling through the arm's sling suspension hole. Install the sling in a sleeve or a sheath to protect it from sharp edges of the machine during slinging.
 3. Load lifting accessories carefully.
 4. Gently suspend the machine and wait until it stabilises before continuing to lift it.

13 Transporting the machine



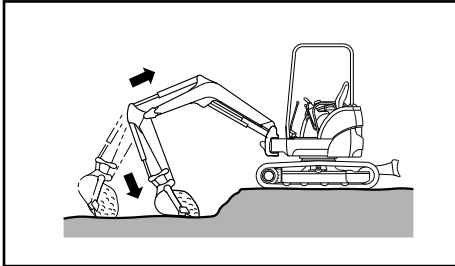
	Length (m)	C.M.U. ² (t)
C	2 m	2
D	4 m x 2	2

2 Working Load Limit (WLL)

14 DETECTING ANOMALIES

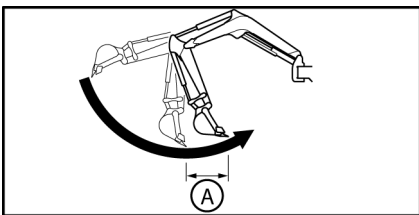
14.1 phenomena that do not constitute faults

The following phenomena are not faults :



- **Bucket shaking**

When the boom is raised immediately after the arm is extended while the bucket is pulled back, the bucket may shake. This is not a fault.



- **Discontinuous movement of the arm**

When you dig the ground with the arm, the arm may slow down temporarily in an almost vertical position. This is not a fault and occurs especially when the motor speed is low.

A = Slowdown is noticeable on this range.

- **Shift in the position of the upper chassis**

When you turn the machine suddenly, as in turning or pivoting, the upper chassis may be slightly offset.

- **Thermal shock for the side movement motor**

If, during cold weather, the hydraulic oil temperature rises to over 60°C in relation to the exterior temperature, during an unloading operation without movement after the engine starts the machine may not pivot because of a thermal shock. This is not a fault.

- **The rotation cylinder extends during excavation**

The rotation cylinder may extend in certain situations or excavation positions. This is not a fault.

- **Delayed reaction to the response to change of speed**

At slow engine rate, a reaction delay may occur when you reduce the speed. This phenomenon is not a breakdown.

14.2 Detecting anomalies

- Contact your dealer when the solution to the problem is indicated in brackets in the tables below.
- If an anomaly or a problem occurs and its cause is not one of those indicated below, ask your dealer to carry out a repair.

14.2.1 Engine

Problem	Cause	Solution
Vapour comes out of the radiator.	Lack of cooling water.	Check the cooling water level. If necessary, top up the water. (Check any water leaks on and around the filling hole).
	Ventilator belt slack.	Adjust the belt tension.
	Build up of dust and tartar in the cooling circuit.	Drain the cooling circuit, clean it completely and fill it again.
The water temperature alarm light comes on.	Defective thermostat.	Replace the thermostat.
	Radiator blade blocked or twisted.	Clean or repair the blade.
	Defective electric circuit.	Check or replace the electric circuit.
The starter works correctly but the engine does not start.	Lack of fuel.	Top up the fuel tank.
	Air in the fuel circuit.	Repair the air leak. (Evacuate the air from the fuel circuit).
	Defective fuel injection pump or injector performance altered.	(Replace the pump or the injector).
	Inadequate compression.	(Check and repair).
	Blown fuse.	Replace the fuse.
	Stop solenoid damaged. Broken filament.	(Check and repair).
Black smoke escapes from the machine.	Air filter element blocked.	Clean or repair the element.
	Altered injector performances.	(Check and repair).
	Inadequate compression.	(Check and repair).
The smoke is white or blue-white.	Too much oil in the oil casing.	Drain the oil from the casing to the specified level.
	Inadequate fuel.	Replace the fuel with a recommended fuel.
	Piston or segment used.	(Repair).

14.2.2 Electrical equipment

Problem	Cause	Solution
Positioning the starter switch to START does not launch the starter motor.	Defective electric circuit.	Check and replace the electric circuit.
	Defective starter switch.	Replace the starter switch.
	Battery insufficiently charged.	Recharge the battery.
	Defective starter motor.	(Check and repair).
The maximum engine speed does not provide enough power to the lights.	Defective electric circuit.	Check the play and the proper connection of the terminals. Repair if necessary.
	Defective alternator or regulator.	(Check and repair).
When the engine is running, the lamp is very bright and burns out frequently.	Defective regulator.	(Replace the regulator).
Battery leak.	Defective battery.	Replace the battery.
The starter speed is too low.	Defective electric circuit.	Check and replace the electric circuit.
	Battery insufficiently charged.	Recharge the battery.
	Defective starter motor.	(Check and repair).

14.2.3 Machine structure

Problem	Cause	Solution
The power or speed of the moving parts is low.	Lack of pressure due to wear on the hydraulic pump.	(Replace the hydraulic pump).
	Pressure drop in the distributor below the set value.	(Check and repair the valves).
	Damaged hydraulic cylinder.	(Check and repair).
	Insufficient quantity of hydraulic oil.	Fill the hydraulic oil to the required level.
	Clogged filter.	Clean or replace the filter.
The upper part does not rotate or does not rotate smoothly.	The rotation brake is not unlocked.	Unlock the rotation locking lever.
	Insufficient quantity of grease.	Check and lubricate.
	Defective rotation brake valve.	(Check and repair).
	Defective rotation motor.	(Check and repair).
The hydraulic oil temperature is too high.	Insufficient quantity of hydraulic oil.	Fill the hydraulic oil to the required level.
	Overload	Reduce the load.
The machine does not move forward in a straight line.	Track incorrectly tightened or foreign body jammed.	Adjust or clean.
	Damaged hydraulic motor.	(Check and repair).
	Defective hydraulic pump.	(Check and repair).
	Defective safety valve.	(Check and repair).
	Sprocket, tightening roller or track-er roller damaged.	(Check and repair).

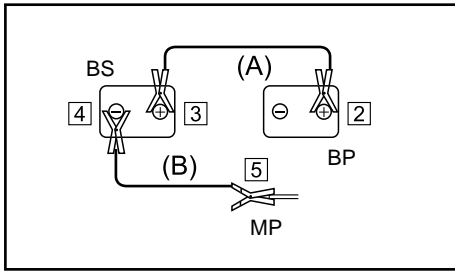
15 IF THE BATTERY IS DISCHARGED

15.1 Precautions for connecting and disconnecting the starter cables

 **WARNING**

- **When you start the engine using connection cables, wear protective goggles.**
- **If you start the engine by taking electrical power from another machine, check that your machine does not come into contact with the other machine.**
- **To connect the starter cables, start with the positive terminal. To disconnect them, start with the negative terminal (mass).**
- **If a tool comes into contact with the machine's positive terminal, there is a risk of sparks.**
- **Do not connect the connection cables to the terminals in reverse polarity. For example, never connect the negative terminal on one machine to the positive terminal on the other machine.**
- The capacity of the starter cables and the size of the clips must be adapted to the size of the battery.
- Check that there is no damage, cracks or corrosion on the starter cables and clips.
- The machines' batteries must have the same capacity.

15.2 Connecting the starter cables



BS = backup battery

BP = battery broken down

MP = machine engine broken down

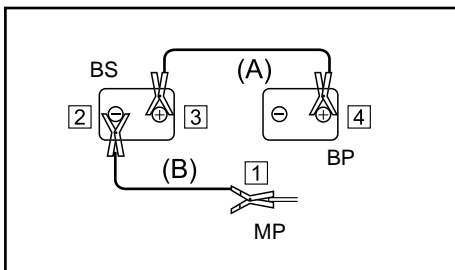
1. Set the start switches on both machines to OFF.
2. Connect the clip of the red starter cable (A) to the positive terminal of the battery on the machine that has broken down.
3. Connect the other clip of the red starter cable (A) to the positive terminal of the battery on the repair machine.
4. Connect the clip of the black starter cable (B) to the negative terminal of the battery on the repairing machine.
5. Connect the other clip of the black starter cable (B) to the engine block of the machine that has broken down.

15.3 Starting the engine

1. Check that the cables are connected safely to the battery terminals.
2. Start the engine on the repair machine and increase the engine speed to maximum.
3. Turn the starter switch of the machine that has broken down to START to start the engine. If the engine does not start, wait at least two minutes before trying again. Do not stop the engine on the repair machine and keep the engine speed at full rate.

15.4 Disconnecting the starter cables

- After starting the engine on the machine that has broken down, disconnect the starter cables in reverse order to the connection procedure.



BS = backup battery

BP = battery broken down

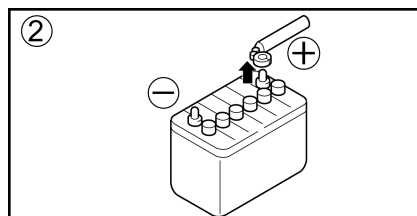
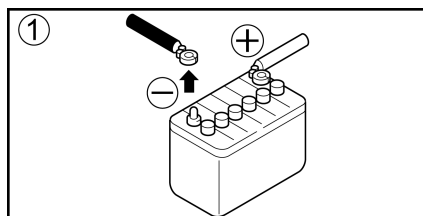
MP = machine engine broken down

1. Remove the clip of the black starter cable (B) from the engine block of the machine that has broken down.
2. Remove the clip of the black starter cable (B) from the negative terminal of the battery on the repairing machine.
3. Remove the clip of the red starter cable (A) from the positive terminal of the battery on the repairing machine.
4. Remove the clip of the red starter cable (A) from the positive terminal of the battery on machine that has broken down.

15.5 Charging the battery

Disconnecting

- To disconnect, start with the negative terminal. (-)



Charging the battery

⚠ WARNING

Remove the cables from the positive and negative terminals of the battery before setting the battery to charge. Otherwise, abnormal voltage may be applied to the alternator and may damage it.

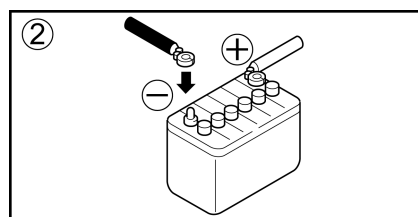
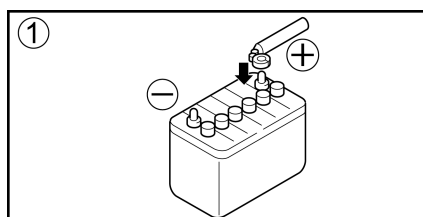
⚠ WARNING

Do not connect the connection cables to the terminals in reverse polarity. For example, never connect the negative terminal on one machine to the positive terminal on the other machine. A polarity reversal may damage the alternator.

- When the battery is charging, remove all the plugs to release the gases generated.
- If the battery overheats (the electrolyte temperature exceeds 45°C), stop the operation.
- Stop the charging operation as soon as the battery is charged. If you continue, the following faults may occur :
 - battery overload
 - reduction in the battery electrolyte
 - battery failure
- The battery must only be handled once the cables have been disconnected (except for checking the level of electrolyte and the specified electrolyte density measurement).

Connecting

- To connect, start with the positive terminal. (+)



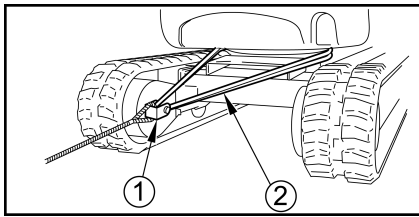
16 TOWING THE MACHINE

WARNING

Always tow a machine that has broken down in complete safety by using the suitable tools. An unsuitable procedure may cause serious physical injuries.

IMPORTANT

Check that the metal cables, the slings and the towing mechanisms to be used are resistant enough and that they are not cracked or broken. Never tow the machine that is only attached to a hook.



- When the machine gets stuck in the mud and cannot get out on its own, or when it is towing a heavy object, attach the sling as shown opposite.

1 = Shackles

2 = Slings

- Minimum capacities of the coupling devices to use:

	W.L.L. ³ (t)
Shackles	> 3
Slings	> 3

- When towing a machine with another machine, use a metal cable that is powerful enough for the machine's weight.
- Never tow the machine on a slope.
- Never use a deformed or damaged towing cable.
- Do not roll over the towing cable or the metal cable.
- When you hook on an object to be towed, make sure that there is no-one between the machine and the object.

3. Working Load Limit (WLL)

C Periodic maintenance programme

CHAPTERS COVERED IN THIS PART:

- 1 PERIODIC INSPECTIONS AND UPKEEPS
- 2 MAINTENANCE PRECAUTIONS
- 3 RECOMMENDED GREASES AND FLUIDS
- 4 FIRST MAINTENANCE
- 5 LIST OF PERIODIC INSPECTIONS AND MAINTENANCE OPERATIONS
- 6 MAINTENANCE BY THE OPERATOR
- 7 MAINTENANCE BY THE DEALER



1 PERIODIC INSPECTIONS AND UPKEEPS

○: Verification and adjustment

●: Replacement

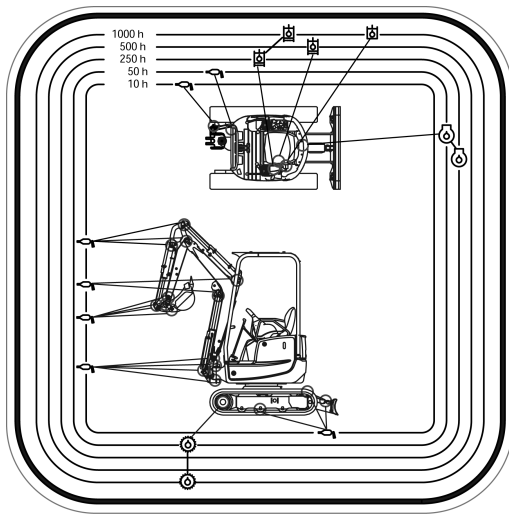
□: Cleaning






■: Greasing

Parts & Operations		Daily	Every 50h	Every 250h	Every 500h	Every 1000h / Every year	Every 2000h / Every two years
General.	Missing or broken parts	○					
	Tightening of nuts and bolts	○					
	Motor state	○					
	Machine	□					
Hydraulic circuit	Hydraulic oil	○				●	
	Aspiration filter					□	
	Hydraulic oil return filter		● 1st time		●		
	Operation of the accumulator	○					
Greasing	Greasing points	■					
	Rotation pin and crown		■				
	Track spacing piston		■				
Chassis	Bearing rollers and bearings, idler wheels	○				■	
	Track tension	○					
Electrical equipment	Headlights, horn, travel alarm	○					
	Dashboard and indicators	○					
	System state	○					
Engine	Water separator	○					
	GO filter			●			
	Air filter (dusty atmosphere every 250 h)				●		
	Engine oil	○	● 1st time		●		
	Oil filter		● 1st time		●		
	Cooling fluid	○				●	
	Belt	○				●	
	Radiator vents	○			□		
	Fuel hose, coolant hose						●
	Intake and exhaust valves					○	
	Injectors and injection pressure						○

1 Periodic inspections and upkeeps

Scheduled maintenance points of the machine (lubrication, filters...)



-  = Hydraulic oil
-  = Engine oil
-  = Hydraulic oil return filter
-  = Travel gears
-  = Greasing points

2 MAINTENANCE PRECAUTIONS

2.1 Precautions before maintenance

2.1.1 Removing the residual pressure

Before performing any maintenance operation, remove residual pressure in the hydraulic circuit.

1. Perform the machine's parking operations.

 **2.4 Parking precautions , page 53**

2. Turn the key to the OFF position to stop the machine's engine, then turn it to the ON position.

Note

The locking lever must be lowered.

3. Handle the following controls several times to remove the residual pressure:

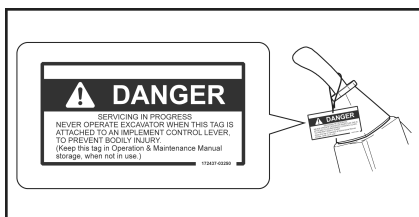
- Left command lever (Arm & Rotation of the upper part)
- Right command lever (Boom & Bucket)
- Blade lever
- 3rd hydraulic circuit control (**P.T.O. 1**)

4. Stop the engine by turning the key from ON position to OFF position.

5. Remove the key from the ignition.

The residual pressure in the accumulator is removed and there is no more pressure in the hydraulic circuit.

2.1.2 Place a warning label



WARNING

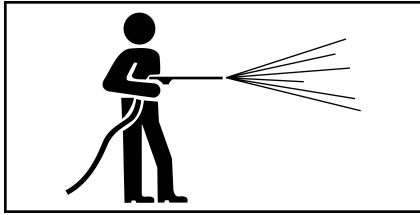
**Do not operate the control lever during servicing.
Maintenance personnel may be seriously injured.**

Place a MAINTENANCE IN PROGRESS label on the machine and on the joysticks.

2.1.3 Establish a safety perimeter

- Anyone who is not part of the maintenance team must be kept away from the working area.
- Pay attention to the safety of people nearby, notably during milling or welding operations or when a hammer is used.

2.1.4 Keep the machine clean

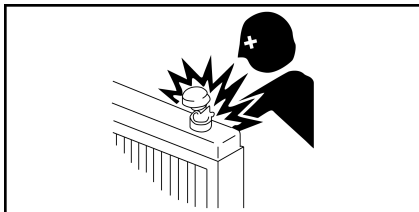


- Cleaning the machine will enable you to detect any leaks and defective parts quickly.
- Especially clean the filler cap, the vent hole and oil level glass gauge and prevent dust from mixing there.

- Spots of oil or grease or dispersed part fragments are dangerous and may cause slipping.
- Any water that gets into the electrical system may cause it to malfunction, leading to defective operation of the machine. This also risks causing short circuits that may cause a fire or electric shock.
- Do not spray any vapour directly onto the sensors or connectors.
- Do not use harsh chemicals to clean the machine, as these affect the visual and technical characteristics of the machine components. These products may also deteriorate the rigidity of the tank.
- Do not spill any water onto the dashboard.
- Do not spray water directly at high pressure onto the radiator or the oil radiator.
- Do not point the pressure washers on the electrical connectors.

2.2 Precautions during maintenance

2.2.1 Oil and grease



- Always use oils and greases recommended by KOBELCO.

 **3 Recommended greases and fluids ,
page 108**

- Use clean oils and greases. Avoid any contamination by dust.

WARNING

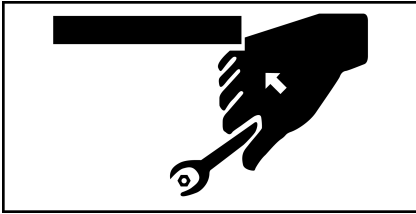
Oil, grease or other fluids may be sprayed when certain parts are maintained.

For maintenance in complete safety, respect to the letter the procedures described in the following chapters.

IMPORTANT

Do not mix different types of oils. If you need to top up the oil with a different make or type from the oil left in the tank, remove the remaining oil completely.

2.2.2 Tools



- Use tools that are adapted to the planned task.
- The use of damaged, worn or inappropriate tools is very dangerous and there is a risk that the machine will be damaged.


2.2.3 Parts

- Use KOBELCO original parts as recommended in the parts catalogue.
- Clean parts with a non-combustible and non-aggressive detergent.
- If you need to remove a seal or a hydraulic component, refer to the maintenance manual.


2.2.4 Dismantling the accessory



- If the scheduled task requires the dismantling of the accessory, remove it carefully by following the instructions described in this manual.

 **11.1 Dismantling the accessory, page 80**

- Reinstall it carefully and follow the instructions described in this manual.

 **11.2 Mounting the accessory, page 81**

2.2.5 Working under the machine

- Before you carry out any maintenance or repairs under the machine, place the accessory on the ground or in its lowest position.

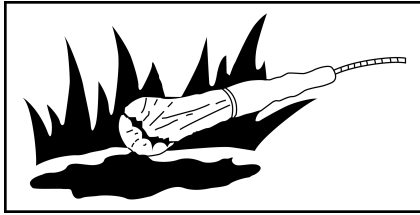


 **DANGER**

Park the machine on flat, firm ground.

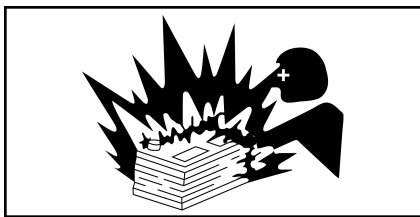
If the machine is not stable, do not carry out any maintenance under the machine.

2.2.6 Lighting



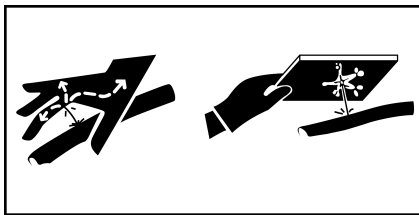
Use flameproof lighting when checking the fuel, oil, cooling water or battery electrolyte. If you do not, there is a risk of fire and explosion.

2.2.7 Battery



- Disconnect the negative terminal from the battery to disconnect the electric current when working on the electrical circuit (repair, welding).

2.2.8 Hoses



- Do not fold the high pressure hoses. Do not strike them against any hard objects.
- Damaged or incorrectly bent hoses, pipes and ducts explode easily under high pressure ; never re-use them.
- Fuel and oil leaks may cause a fire.

2.2.9 Radiator ventilator



WARNING

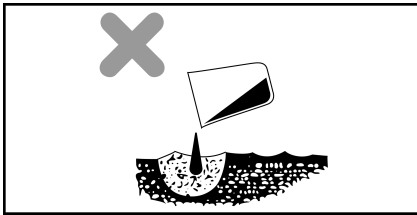
Never touch the moving radiator ventilator or the ventilator belt with an object as this may cause serious physical injuries.

2.2.10 Soldering

If you need to solder, respect the following points :

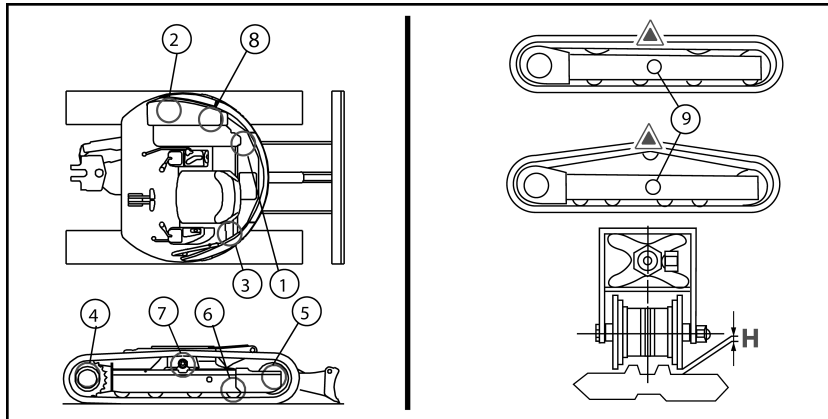
- Disconnect the battery cabling (negative terminal then positive terminal).
- Ground the machine no more than 1 metre away from the part to be welded.
- Make sure there are no seals or bearings between the soldered part and the earthed part.
- Do not earth near the axes of the equipment or the hydraulic cylinder.

2.2.11 Waste processing



- Always drain the machine's oil into a safe container and never directly onto the ground.
- When you get rid of toxic waste such as fuel, oil, cooling water, solvents, filters and used batteries, respect the regulations that apply to this subject.

3 RECOMMENDED GREASES AND FLUIDS



1= Engine oil

2= Fuel tank

3= Hydraulic oil

4= Sprocket wheel

5= Idle wheel

6= Track roller

7= Support roller

8= Cooling system

9= Greaser

- Select a fuel and an oil according to the machine's operating temperature.
- The machines may run on type B bio diesel.
- Always use a KOBELCO long-life cooling fluid.

IMPORTANT

Do not mix different types of oils. If you need to top up the oil with a different make or type from the oil left in the tank, remove the remaining oil completely.

Components	Fluid	Temperatures °C							Quantity prescribed (L)			
		-	-20	-10	0	10	20	30			+	
Thermal engine	Engine oil	SAE 10W CD									2,8 + 0,4	Oil filter
		SAE 10W-30CD										
		SAE 15W-40CD										
Hydraulic circuit	Hydraulic oil	ISO VG46									16,5	in the tank
											9,5	the rest
Fuel tank	Diesel	N° 2-D									20,0	-
		N° 3-D										
		N° 3-D (S)										
Cooling system	KOBELCO long life coolant							2,7	radiator			
								0,4	expansion flask			

4 FIRST MAINTENANCE

4.1 After the first 50 hours of service

- Have the engine oil and the engine oil filter element replaced.
- Greasing the pin and rotation crown
- Greasing the track spacing piston
- Replace the hydraulic fluid return filter element.
- Contact your dealer.

4.2 After the first 250hours of service

- Replace the fuel filter.
- Contact your dealer.

1 Periodic inspections and upkeeps, page 101



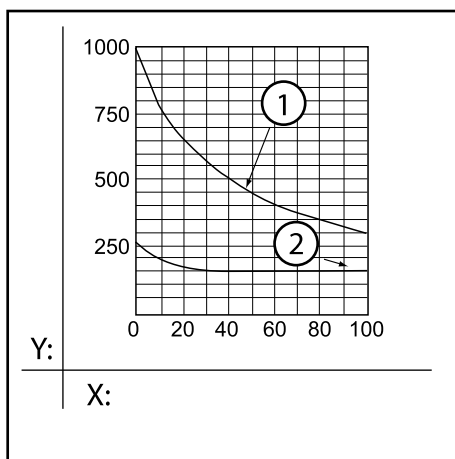
5 LIST OF PERIODIC INSPECTIONS AND MAINTENANCE OPERATIONS

- The table below indicates the maintenance intervals to be respected for optimum operation of the machine. Read the machine's time counter every day to check whether a procedure should be implemented.
- The inspection sheets provided at the end of this manual enable you to keep a trace of the maintenance operations carried out.

IMPORTANT

These are frequencies : for examplen the operations to be carried out every 50 hours must be carried out at 50h, 100h, 150h, 200h, etc.

- Certain intervals may vary if a hydraulic hammer is used. Refer to the corresponding notes.



Note

- If a hydraulic hammer is used, the return filter must be replaced after 100 or 150 hours of service for a new machine, then according to the diagram opposite.
- The hydraulic oil must be replaced more frequently if a hydraulic hammer is used. Comply with the diagram opposite.














1 = Hydraulic oil

2 = Hydraulic oil return filter




X = Hydraulic hammer usage rate (%)

Y = Replacement interval (h)

5 List of periodic inspections and maintenance operations

Parts	Operations
Daily	
Machine	 6.1.1 Checking the machine before use , page 113
Headlights	 6.3.2 Replacing a bulb , page 117
Commands	 6.1.3 Checking the commands , page 113
Seat	 6.1.4 Checking the seat , page 113
Greasing points	 6.1.5 Greasing points , page 114
Hydraulic oil	 4.5 Checking and topping up the hydraulic oil level , page 62
Hydraulic hoses	 6.1.8 Checking the hydraulic hoses , page 116
Fuel hoses	 6.1.9 Visual inspection of the fuel hoses, page 116
Fuel tank	 4.4 Checking and topping up the fuel level , page 61
Engine oil	
Cooling fluid	 4.2 Checking and topping up the level of cooling fluid , page 59
Tracks	 6.4 Rubber track maintenance , page 118
Radiator vents	Cleaning
Alternator belt	Tension check
Decanter/separator	 6.1.6 Cleaning the separator/decanter , page 115
Operation of the accumulator	Check
Electrical circuit	Check
Motor state	 14.2.1 Engine , page 92
Bearing rollers and bearings, idler wheels	Check

5 List of periodic inspections and maintenance operations

Every 50h	
Rotation pin and crown	 6.2.1 Greasing the pin and rotation crown , page 116
Every 250h	
Side movement and acceleration levers	Verification and adjustment
Fuel filter	Replacement
Parts	Operations
Every 500h	
Hydraulic oil return filter	Replacement
Fuel filter	Replacement
Air filter	Replacement
Engine oil	Replacement
Oil filter	Replacing the element
Radiator vents	Cleaning
Every 1000h	
Hydraulic oil	Replacement
Aspiration filter	Cleaning or replacement depending on the filter
Decanter/separator	Replacement
Alternator belt	Replacement
Cooling fluid	Replacement
Intake and exhaust valves	Play adjustment
Fuel injection valve	Verification and adjustment
Cylinder head block	Bolt re-tightening
Fuel pump	Check
Control filters	Replacement
Bearing rollers and bearings, idler wheels	Greasing
Every 2000h	
Injectors and injection pressure	Inspection and calibration
Fuel hose, coolant hose	Verification and replacement
Intake and exhaust valves	Running in
Fuel pump	Adjustment check
Non periodic	
Fuses	 6.3.1 Fuse replacement , page 117
Tracks	 6.4 Rubber track maintenance , page 118

6 MAINTENANCE BY THE OPERATOR

6.1 Daily maintenance

6.1.1 Checking the machine before use

- Before each use of the machine, visually check the following :
 - no missing, broken or loose parts
 - ventilator belt correctly tightened
 - no oil, water or fuel leaks
 - engine and battery in good condition
- To detect leaks, wear protective goggles and thick gloves. Use a piece of card or plywood to detect leaks/sprays of hot oil. Consult a doctor immediately if you are hit with any oil.
- Also check that the time counter, the headlights, the alarm and the lights are working correctly.
- If an element is not working or you think it is defective, shut down the machine's engine immediately and contact your dealer.
- If a headlight bulb is defective, consult chapter

 **6.3.2 Replacing a bulb , page 117**

6.1.2 Checks after using the machine

After each use, several checks must be carried out according to how the machine is used ; refer to chapter :

 **6 Checks after use , page 66**

6.1.3 Checking the commands

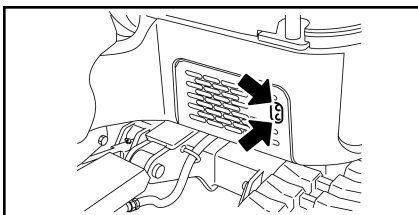
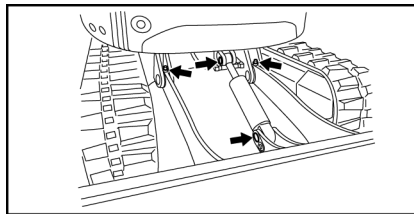
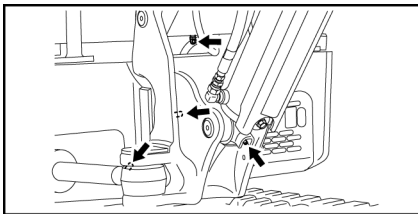
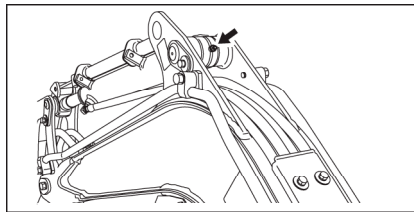
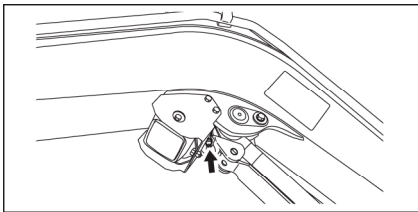
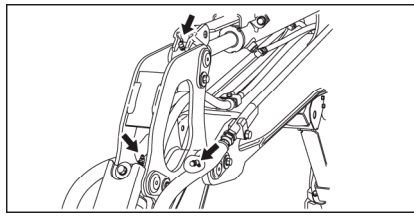
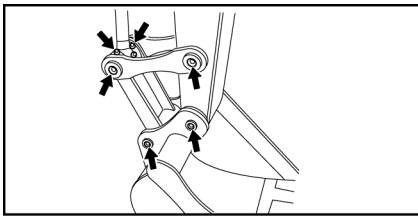
- Operate the commands.
- Release the levers, they should return to neutral position themselves.
- If they do not, contact your dealer.

6.1.4 Checking the seat

Check that the safety belt is present and in good condition.

6.1.5 Greasing points

- Grease the machine swivel pins daily using the nipples, and also before using the machine or after use in the rain, on soft ground or in muddy water.
- Proceed as follows :
 1. Lower the bucket and the blade to the ground.
 2. Stop the engine.
 3. Clean the greasing connectors indicated by the arrows on the figures.
 4. Grease them with a grease pump.
 5. Wipe off the excess grease with a cloth or equivalent.



6.1.6 Cleaning the separator/decanter

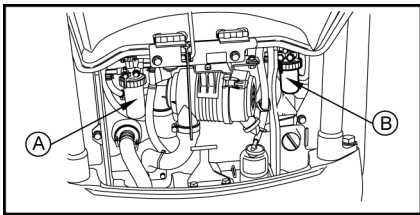
⚠ WARNING

Keep all sparks, flames or cigarettes away.

At operating temperature, the engine components are red hot and may cause burns.

Disconnect the battery mass and clean the separator when the engine has cooled down enough.

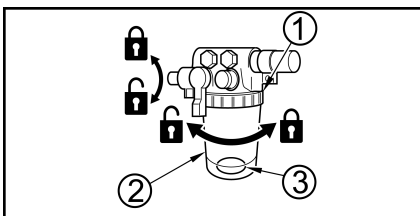
A diesel leak or spray onto a red hot element may cause a fire.



1. Open the rear bonnet.
2. Place a container under the separator.
3. Close the purge tap.

A = Fuel filter

B = Decanter/separator



4. Loosen the bowl tightening ring.

1 = Tightening ring

2 = Element

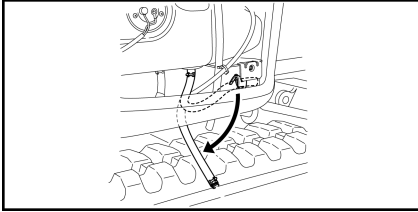
3 = Ring

5. Remove the bowl.
6. Empty into the container. Make sure you do not lose the red floater.
7. Remove the element and the holding ring.
8. Clean them and the inside of the bowl with clean diesel.
9. Check that the o-ring is not damaged or deformed. Replace it if necessary.
10. Refit the element and the bowl.
11. Open the tap.
12. Close the engine bonnet.

6.1.7 Purging the fuel tank

DANGER

Keep all sparks, flames or cigarettes away.



1. Pivot the upper structure so that the drainage cap under the fuel tank is opposite the blade between the two tracks.
2. Place a container to catch the fuel residue under the drainage tap.
3. Remove the drainage cap to purge the water and dirt left in the tank.
4. Once clean fuel starts to come out, reinstall the drain plug and tighten to the right torque.

Maximum torque = 7Nm

6.1.8 Checking the hydraulic hoses

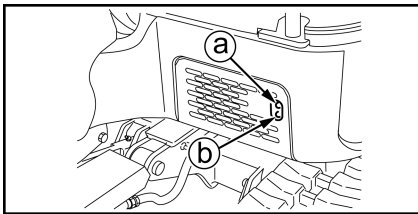
- Visually check that there are no oil leaks from the hydraulic hose connectors.

6.1.9 Visual inspection of the fuel hoses

- Visually check that the fuel does not leak from the fuel hose connectors.
- Also check that the hoses are not damaged. If there are any faults, contact your dealer.
- The fuel hoses must be changed every 2 years or every 2000 hours of service. Contact your dealer.

6.2 Maintenance every 50 hours

6.2.1 Greasing the pin and rotation crown



- Using a grease pump, grease the pin and the rotation crown at the greasers indicated with arrows on the figure opposite.

a = Rotation crown

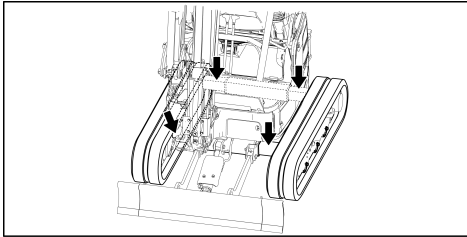
b = Pin

- Slowly pivot the upper structure until it has made one complete turn.

WARNING

Do not pivot the upper structure during greasing. Grease and pivot alternately to avoid any injury.

6.2.2 Greasing the track spacing piston



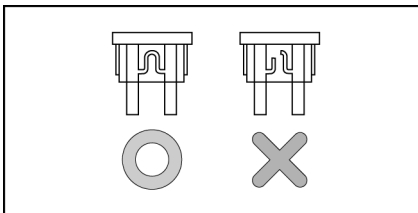
1. Completely extend the track spacing cylinder.
2. Apply a large quantity of oil or grease to the moving part.

6.3 Non periodic maintenance

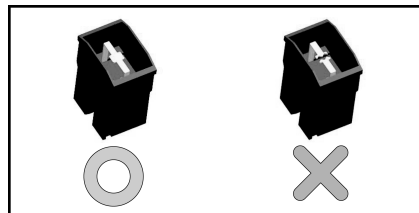
6.3.1 Fuse replacement

1. Set the starter key to OFF position.
2. Remove the lid from the fusebox.
3. Identify the burnt out fuse.
4. Replace it with an equivalent fuse.

Fuse strip



General supply fuses



IMPORTANT

An unsuitable fuse or a fuse holder with a short circuit may cause overheating and damage the indicator gauges, the electric circuit or the cabling.

- If a fuse burns out immediately after it is replaced, this means there is a problem in the electric circuit. Contact your dealer for a diagnostic and an intervention.

6.3.2 Replacing a bulb

- Wait several minutes after the engine has been stopped before changing a bulb.

Boom headlamp

1. Unscrew the headlight support.
2. Unscrew the four screws on the unit. Make sure that you do not lose the part of the unit that contains the glass.
3. Clip the ends of the holding spring to release the bulb-connector assembly.
4. Replace the burnt out bulb with an identical new one.
5. Insert the bulb-connector assembly into its housing.
6. Lock the holding spring.
7. Tighten the four screws on the unit again.
8. Tighten the unit back on the boom.

6.4 Rubber track maintenance

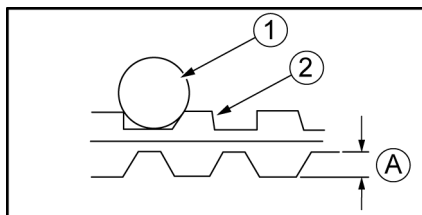
6.4.1 Checking the condition of the tracks

- The wear to the rubber tracks depends on the working conditions and the nature of the ground. Regularly check the wear and tension of the tracks.

Note

A new track must be checked for the first time after 30 hours.

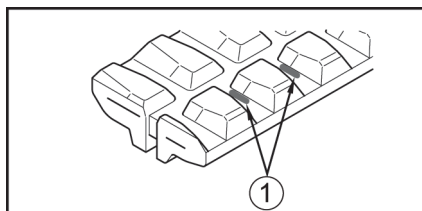
Height of the fixing nuts



- If height A is reduced by wear, the traction power reduces.
- If A is lower than or equal to 5 mm, replace the track.

1 = Track roller

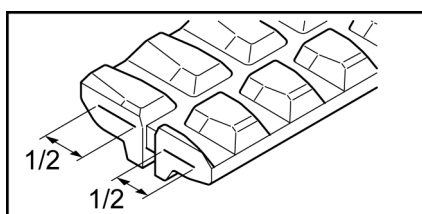
2 = Track



- If the track steel cables are uncovered over two or more joints, replace the tracks.
- If two or more links in the steel cable inside the track are exposed due to wear on the feet, replace the track.

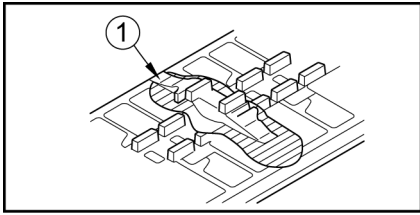
1 = Exposed steel cables

Steel cables for the rubber tracks



- If half or more of the cable bed is broken, replace the track.

Metal insert



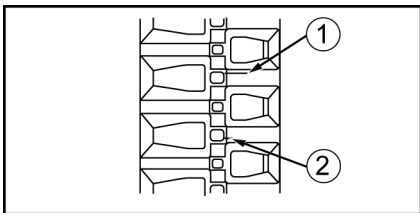
- If the metal inserts detach even at a single place, replace the track.

1 = Detachment of the metal insert

Greaser

- If the tracks are relaxed even after adjusting the tension, the lubrication nipple may have an internal failure. Contact your dealer for repair.

Crack



1 = Repair if over 60 mm

2 = Not yet to be repaired

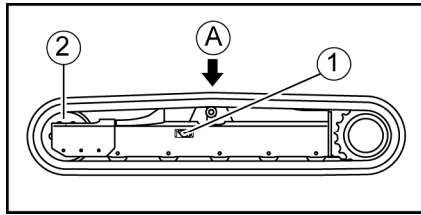
- If a crack appears between the track attachment inserts, repair it if the length of the crack reaches 60 mm. If the interior steel cable is exposed, repair the track immediately even if the crack is a small one.
- If the length of the crack is less than 30 mm or if the depth of the crack is less than 10 mm, you do not need to repair the track.

- To find out whether the track must be replaced, repaired or you can continue to use it, contact your KOBELCO dealer.

6.4.2 Track replacement

- If a track (or both tracks) needs to be replaced, contact your dealer.
- A new track must be checked for the first time after 30 hours.

6.4.3 Tension check

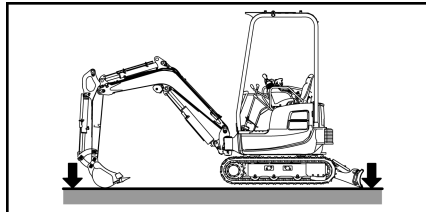


1. Move the machine so that the seal on the internal surface of the track is placed in the centre of the upper chassis.

A = Mark \triangle inside the track

1 = Cover

2 = Idle wheel



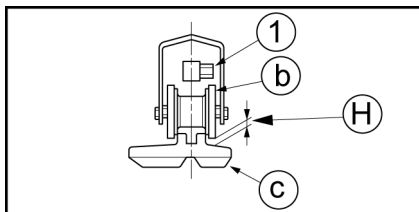
2. Raise the machine with the equipment by activating the command lever.

WARNING

Do not support the machine with the accessory only. The command levers may move or hydraulic oil may spill accidentally and cause the machine to fall.

When the machine is checked or adjusted by two people, one of them must commission the machine according to the signals given by the other person.

Be sure to perform the track tension verification on a firm and even surface. It is strictly forbidden to be positioned under the machine for the duration of the operation.



3. Check the tension. The play H between the external rolling surface of the second track roller on the tightener roller and the internal surface of the track must be 8 ~ 13 mm.

1 = Greaser

b = Track roller

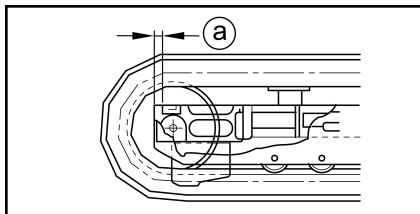
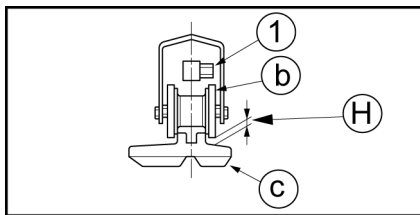
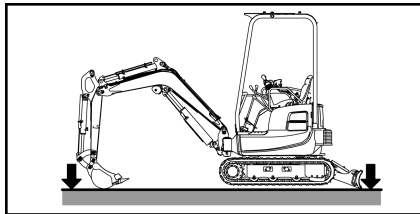
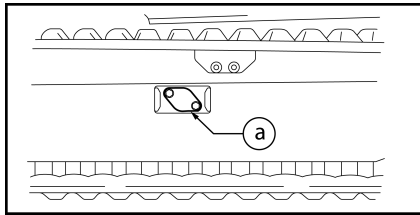
c = Track

- If the tension is incorrect, follow the procedures given in the following chapters to increase or release the track tension.

IMPORTANT

Perform a task with a relaxed track link may derail the track or cause premature wear of the undercarriage.

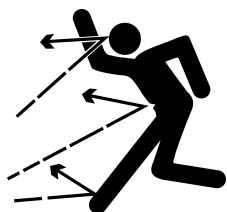
6.4.4 Increasing the tension



1. Prepare a grease pump.
2. Loosen the two screws and rotate the bottom cover to access the lubrication nipple.
a = Cover
b = Track roller
c = Track
3. Raise the machine with the equipment by activating the command lever.
4. Using the grease pump, inject grease with the greaser so that the play H is between 8 ~ 13 mm.
1 = Greaser
b = Track roller
c = Track
5. Proceed with the track tensioning. To check that the tension is correct, put the machine down and move it gently forwards and back.
6. Check the tension again. If it is still not correct, adjust it again.
7. Re-install the cover.

- The tension may be adjusted until the distance A is reduced to 0. If the voltage is still insufficient, the track must be replaced due to excessive wear. Contact your dealer for repair.
- If the tension is weak, even after grease is injected, the track must be replaced or a system tension check must be performed. Contact your dealer.

6.4.5 Releasing the tension

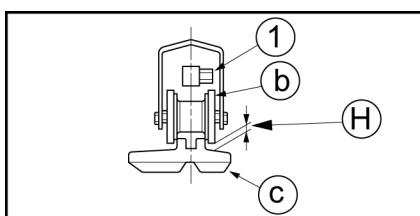
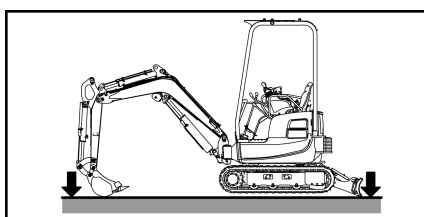
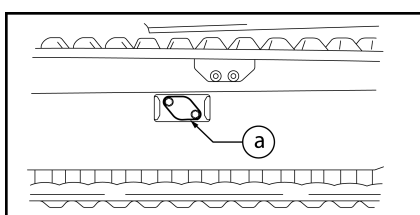


WARNING

Do not loosen the greaser by more than one turn. If it is loosened suddenly, the high pressure grease inside may escape or the valve may be ejected, which may cause serious injury.

When you check whether the grease has escaped, do not look inside the greaser but check that the track is released. Do not place your face, hand, legs or body in the direction of the greaser.

It is very dangerous to remove the grease using procedures other than those described here. If the track cannot be relaxed, ask your KOBELCO dealer to intervene.



1. Loosen the two screws and rotate the bottom cover to access the lubrication nipple.

a = Cover

2. Raise the machine with the equipment by activating the command lever.

3. Loosen the greaser.

4. Let the grease escape so that the track will extend.

1 = Greaser

b = Track roller

c = Track

5. Tighten the greaser. Tightening torque : 49,0 N•m.

6. Proceed with the track tensioning.

7. Check the tension again. If it is still not correct, adjust it again.

8. Wipe off the excess grease with a cloth or equivalent.

9. Re-install the cover.

IMPORTANT

The rubber track does not resist grease. Wipe the grease off completely as it may reduce the life time of the rubber tracks.

7 MAINTENANCE BY THE DEALER

Frequency	1st time	Parts	Operations
Every 250h	–	Fuel filter	Replacement
	–	Alternator belt	Tension check
	–	Air filter ⁴	Cleaning
Every 500h	50h	Hydraulic oil return filter	Replacement
	–	Air filter	Replacement
	50h	Engine oil	Replacement
	50h	Oil filter	Replacement
	–	Radiator vents	Cleaning
Every 1000h	–	Hydraulic oil	Oil replacement
	–	Side movement and acceleration levers	Verification and adjustment
	–	Bearing rollers and bearings, idler wheels	Greasing
	–	Aspiration filter	Cleaning or replacement depending on the filter
	–	Alternator belt	Replacement
	–	Cooling fluid	Replacement
	–	EGR valve	Cleaning
	–	Intake and exhaust valves	Play adjustment
	–	Fuel pump	Check
	–	Battery electrolyte	Density check
	–	Cylinder head block	Bolt re-tightening
Every 2000h	–	Fuel hose, coolant hose	Verification and replacement
	–	Injectors and injection pressure	Inspection and calibration
Non periodic	–	Cooling system	Cleaning

It is important to entrust the machine to a dealer at the intervals indicated so that the dealer can carry out the maintenance operations necessary for the machine to operate correctly.

You should also contact your dealer in the following cases :

- part missing, broken or loose
- horn defective
- time counter defective
- electric circuit defective
- battery defective
- light(s) defective

In general, contact your dealer as soon as you think something is wrong.

4. Dusty atmosphere

D Conservation and storage

CHAPTERS COVERED IN THIS PART:

- 1 CONSERVATION
- 2 STORAGE
- 3 RECOMMISSIONING

IMPORTANT

The conservation and storage of the machine must comply with standard NF ISO 6749 " Earth moving equipment, conservation and storage " of October 1987. The following chapters take part of the standard mentioned above but are not exhaustive. Refer to the standard for any additional information.

1 CONSERVATION

- Placing in conservation is intended to ensure the protection of the machine against corrosion from the environment and against minor damage that may occur during handling, transport and storage.
- Return the machine to good condition before placing it in conservation.
 1. Clean all the parts.
 2. Apply greasing oil and grease to the machine's metal surfaces and replace the engine oil.
 3. To avoid condensation in the fuel tank, drain the tank or fill it up.
 4. Apply a small quantity of rust protector to the exposed parts of the hydraulic cylinder rod.
 5. The battery must be disconnected. If the storage period exceeds one month, the battery must be removed and stored in a special room.
 6. Make sure the liquid in the cooling system has sufficient performance characteristics and is appropriate for the machine's storage temperatures.

 **3 Recommended greases and fluids , page 108**

If necessary, top up the water.

 **4.2 Checking and topping up the level of cooling fluid , page 59**

 **WARNING**

Do not open the bonnet during machine operation. Verification and topping off of the various levels should be done when the engine is stopped and the temperatures are brought back down.

7. Lock the joysticks and pedals using locking levers and pedal protectors.

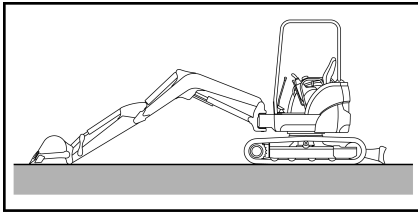
Note

The machine rusts easily if it is left near the sea or in a place exposed to sea winds. Apply rust protector to all the exposed parts of the piston rods and cover the machine with a polyethylene sheet or oiled paper. Certain rust protection solvents damage rubber materials. Make sure you use an adapted rust protector.

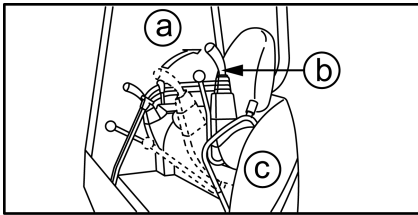
 **WARNING**

When you place the machine in an enclosed space, ventilate by opening the doors and windows to avoid any gas intoxication.

2 STORAGE



- You are recommended to store the machine in a closed and covered location.
 - If the machine is stored outdoors, park it on flat ground and cover it with a protective sheet.
 - The machine must be placed in the position illustrated opposite to protect the hydraulic cylinder rods against corrosion.
- In a long-term storage, move the machine at least once a month to form new oil on all the moving parts and remove the battery.
 - When you do not use the machine for a period of over 3 months, avoid placing the tracks in a place that is directly exposed to sunlight or rain.
 - The conservation and recommissioning instructions, as well as the conservation date must be placed in an impermeable envelope with a label and secured to the machine at a visible location.
 - To protect the machine against rainwater, trap it to avoid accumulation of water that can promote corrosion of metal parts.



- The locking lever(s) must be in locked in a position to avoid any possibility of the machine being activated accidentally.

a = Locking

b = Locking lever

c = Left hand side

- The machine in prolonged storage must be regularly inspected in terms of its external appearance, the condition of the protected surfaces and the protection materials. The inspection intervals are the following :
 - every 6 months under temperate weather conditions,
 - every 3 months under tropical, cold, Arctica or coastal weather conditions.

3 RECOMMISSIONING

WARNING

After storage of the machine at temperatures outside the machine's operating temperature range, make sure the temperature is again in the operating temperature range before restoring the machine to working order.

Before using the machine again after a storage period of two months, do the following:

1. Remove the protections on the hydraulic cylinder rods.
2. Apply a large quantity of oil or grease to the moving part.
3. Drain the water from the fuel tank, from the engine oil casing and from the hydraulic fluid tank by removing the drainage caps.
4. Leave the machine to warm up after you start the engine.

E Technical data

CHAPTERS COVERED IN THIS PART:

- 1 SPECIFICATIONS
- 2 WORKING DIMENSIONS
- 3 NOISE EMITTED BY THE MACHINE
- 4 VIBRATIONS EMITTED BY THE MACHINE

1 SPECIFICATIONS

Tracks		Rubber
H(track tension)	mm	8 ~ 13
Elements		Canopy

Weight (in conformity with CE standards)

Weight of the machine (with operator +75 kg)	kg	1765
--	----	------

Working range and performance

Operating temperature range	°C	-15 ~ 40
Bucket capacity, standard	m ³	0,05
Bucket width, standard	mm	450
Maximum depth < Blade lowered >	mm	2200 <2310>
Maximum vertical excavation depth	mm	1850
Maximum height reached	mm	3690
Maximum dumping height	mm	2630
Maximum range to ground	mm	3710
Minimum turning radius forward <Rotation of the boom>	mm	1535 <1380>
Boom rotation angle : left / right		42° / 65°
Maximum excavation force : bucket / arm	kN	15,2
Travel Speed : high/ low	km/h	4,3 / 2,1
Maximum slope		30°
Rotation speed	rpm	9,5
Average pressure on the ground, standard track	kg / cm ²	0,29

Hydraulic circuit

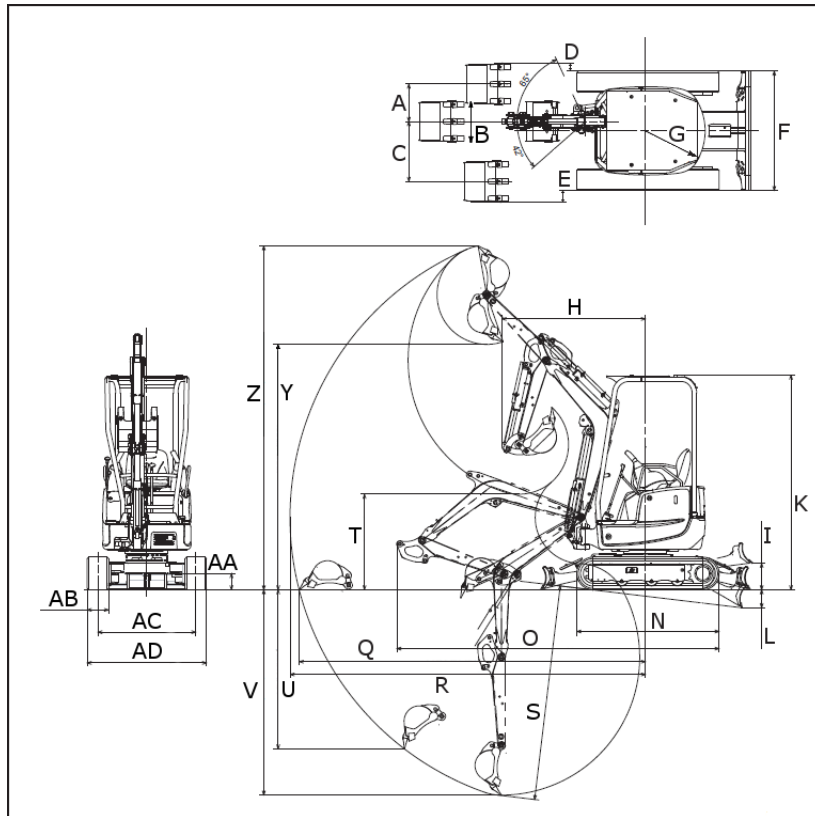
Hydraulic pump rate	L/min
17,6 x 2<variable rate pump> 13,2 x 1<geared pump> 11,2 x 1<Trochoid pump>	
Maximum hydraulic circuit pressure	MPa
20,6x2 ; 16,7x1 ; 2,9x1	



Engine : YANMAR 3TNV70-XBV

Type	3 cylinders , water cooling , direct Diesel injection diesel	
Power / revs	kW / rpm	10,1 / 2200
Capacity	cm ³	854
Compression rate with 250 rpm.		3,2
Injection pressure	MPa	12,3
Alternator capacity	V / A	12 / 20
Battery	V / Ah	12 / 45

Dependent on technical modifications.

2 WORKING DIMENSIONS

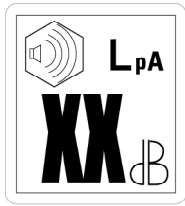


Unit : mm			
A	400	Q	3710
B	450	R	3810
C	640	S	2310
D	250 ⁵ / 85	T	1025
E	290 ⁵ / 125	U	1850
F	1280	V	2200
G	640	Y	2630
H <swing>	1535 / 1380	Z	3690
I	260	AA	175
K (Canopy)	2300	AB	230
L	205	AC	1050 ⁵ / 720
N	1525	AD	1280 ⁵ / 950
O	3450		

5. Tracks spread value

3 NOISE EMITTED BY THE MACHINE

Examination results :



LwA (dBA)	93
LpA/LAeq (dBA)	81
LpCrête (dBC)	109

Rounded values

LwA : weighted acoustic power level A.

LpA/LAeq : weighted acoustic pressure level A on operator's ears.

LpCrête : maximum value of the instant acoustic pressure measured with frequency weighting C.

Measurements carried out :

- machine in static position
- machine running at nominal power

LwA : determined and guaranteed according to Directive 2000/14/CE amended by Directive 2005/88/CE.

LpA/LAeq : measured and guaranteed according to standard NF-ISO 6396: 1997.

These values are declared in accordance with Directive 2006/42/CE and do not correspond to exposure values over 8h of work.

4 VIBRATIONS EMITTED BY THE MACHINE

Declared vibration value in accordance with EN 12096			Unit : m/s ²
Vibrations	Work cycle	Measured vibration emission value, a	Uncertainty, K
Hand-arm in m/s ²	Roadworks trench	< 2,5	–
	Levelling	< 2,5	–
	Displacement	3,22	0,60
	Hydraulic hammer	2,09	0,47
Full body in m/s ²	Roadworks trench	< 0,5	–
	Levelling	0,92	0,19
	Displacement	0,82	0,17
	Hydraulic hammer	< 0,5	–
Values determined in accordance with standards ISO 5349-2 & NF EN 1032			
Work cycle	Work cycle definition		
Roadworks trench	So called excavation work; bucket movements digging in the soil (packed earth).		
Levelling	Advance with blade in the down position and move backward with blade raised; on packed earth.		
Displacement	Loop circuits on the gravel storage area (approximate speed 4km/h - 2.6 mi/h) clockwise turn.		
Hydraulic hammer	Operation of hydraulic rock breaker for 20 seconds on a steel plate of 100x50x5cm placed on the ground.		

Note

These values are declared in accordance with Directive 2006/42/CE and do not correspond to exposure values over 8h of work.

The following provisions should be taken in order to transmit the minimum amount of vibration to the whole body while the machine is operating and to avoid damaging the operator's health :

- Adjust the seat according to the operator's size.
- Keep the terrain in good condition.
- Use the machine under the conditions provided for, taking account of the real conditions of the terrain and the specific effects of the vibration that results from the actual operation of the machine.

The user must read and keep the instructions related to mounting and using accessories.



Appendices



Additional informations:



- A Control sheets to be photocopied
- B Notes
- C Lashing record



A Control sheets to be photocopied



Photocopy the following sheets and carry out maintenance on your machine according to the number of hours of service.

Control sheet: Maintenance every 50 hours			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	 6.2.1 Greasing the pin and rotation crown , page 116	
Track spacing piston	Greasing	 6.2.2 Greasing the track spacing piston , page 117	

Control sheet: Maintenance every 50 hours			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	 6.2.1 Greasing the pin and rotation crown , page 116	
Track spacing piston	Greasing	 6.2.2 Greasing the track spacing piston , page 117	

Control sheet: Maintenance every 50 hours			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	 6.2.1 Greasing the pin and rotation crown , page 116	
Track spacing piston	Greasing	 6.2.2 Greasing the track spacing piston , page 117	

Control sheet: Maintenance every 50 hours			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	 6.2.1 Greasing the pin and rotation crown , page 116	
Track spacing piston	Greasing	 6.2.2 Greasing the track spacing piston , page 117	

Control sheet: Maintenance every 50 hours			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	 6.2.1 Greasing the pin and rotation crown , page 116	
Track spacing piston	Greasing	 6.2.2 Greasing the track spacing piston , page 117	

Control sheet: Maintenance every 250 hours			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	Dealer	
Track spacing piston	Greasing		
Side movement and acceleration levers	Verification and adjustment		
Air filter ⁵	Cleaning		
GO filter	Replacement		

Control sheet: Maintenance every 250 hours			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	Dealer	
Track spacing piston	Greasing		
Side movement and acceleration levers	Verification and adjustment		
Air filter ⁵	Cleaning		
GO filter	Replacement		

Control sheet: Maintenance every 250 hours			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	Dealer	
Track spacing piston	Greasing		
Side movement and acceleration levers	Verification and adjustment		
Air filter ⁵	Cleaning		
GO filter	Replacement		

Control sheet: Maintenance every 250 hours			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	Dealer	
Track spacing piston	Greasing		
Side movement and acceleration levers	Verification and adjustment		
Air filter ⁵	Cleaning		
GO filter	Replacement		

5. Dusty atmosphere

Control sheet: Maintenance every 500 hours			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	Dealer	
Track spacing piston	Greasing		
Engine oil	Replacement		
Oil filter	Replacement		
Radiator vents	Cleaning		
Side movement and acceleration levers	Verification and adjustment		
Hydraulic oil return filter	Replacement		
GO filter	Replacement		
Air filter	Replacement		

Control sheet: Maintenance every 500 hours			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	Dealer	
Track spacing piston	Greasing		
Engine oil	Replacement		
Oil filter	Replacement		
Radiator vents	Cleaning		
Side movement and acceleration levers	Verification and adjustment		
Hydraulic oil return filter	Replacement		
GO filter	Replacement		
Air filter	Replacement		

Control sheet: Maintenance every 500 hours			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	Dealer	
Track spacing piston	Greasing		
Engine oil	Replacement		
Oil filter	Replacement		
Radiator vents	Cleaning		
Side movement and acceleration levers	Verification and adjustment		
Hydraulic oil return filter	Replacement		
GO filter	Replacement		
Air filter	Replacement		

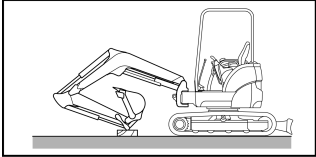
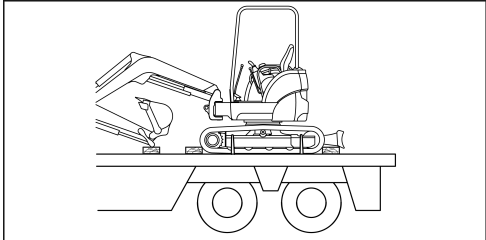

Control sheet: Maintenance every 1000 hours / Every year			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	Dealer	
Track spacing piston	Greasing		
Hydraulic oil	Replacement		
Bearing rollers and bearings, idler wheels	Greasing		
Engine oil	Replacement		
Oil filter	Replacement		
Aspiration filter	Cleaning or replacement depending on the filter		
Radiator vents	Cleaning		
Belt	Replacement		
Side movement and acceleration levers	Verification and adjustment		
Air filter	Replacement		
Hydraulic oil return filter	Replacement		
Battery electrolyte	Density check		
GO filter	Replacement		
Cooling fluid	Replacement		
Intake and exhaust valves	Verification and adjustment		
Fuel injection valve	Verification and adjustment		
Cylinder head block	Bolt re-tightening		

Control sheet: Maintenance every 1000 hours / Every year			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	Dealer	
Track spacing piston	Greasing		
Hydraulic oil	Replacement		
Bearing rollers and bearings, idler wheels	Greasing		
Engine oil	Replacement		
Oil filter	Replacement		
Aspiration filter	Cleaning or replacement depending on the filter		
Radiator vents	Cleaning		
Belt	Replacement		
Side movement and acceleration levers	Verification and adjustment		
Air filter	Replacement		
Hydraulic oil return filter	Replacement		
Battery electrolyte	Density check		
GO filter	Replacement		
Cooling fluid	Replacement		
Intake and exhaust valves	Verification and adjustment		
Fuel injection valve	Verification and adjustment		
Cylinder head block	Bolt re-tightening		

Control sheet: Maintenance every 2000 hours / Every two years			
Number of hours of service		hours	
Parts	Operations	Done by	the
Rotation pin and crown	Greasing	Dealer	
Track spacing piston	Greasing		
Bearing rollers and bearings, idler wheels	Greasing		
Hydraulic oil	Replacement		
Engine oil	Replacement		
Oil filter	Replacement		
Aspiration filter	Cleaning or replacement depending on the filter		
Radiator vents	Cleaning		
Belt	Replacement		
Side movement and acceleration levers	Verification and adjustment		
Hydraulic oil return filter	Replacement		
Battery electrolyte	Density check		
GO filter	Replacement		
Cooling fluid	Replacement		
Fuel pump	Verification and adjustment		
Fuel injection valve	Verification and adjustment		
Cooling system	Cleaning		
Fuel hose, coolant hose	Verification and replacement		
Intake and exhaust valves	Verification and adjustment		
Cylinder head block	Bolt re-tightening		
Air filter	Replacement		
Injectors and injection pressure	Verification and adjustment		

B Notes

C Lashing record

GENERAL PRINCIPLE OF APPLICATION																																	
Road transport	Model : SK17SR	Type of operation: Tie-down																															
	Activity:	Earthmover																															
	Group:	Excavator																															
	Subgroup:	Tracked excavator																															
	Category:	Mini tracked excavator																															
	Size:	L.= 3540mm /l.= 1980 mm / H.= 2300mm																															
<p>⚠ WARNING</p> <p>Do not perform the tie-down if a person stands on the machine or on an accessory.</p> <p>Use a tie-down accessory (belt, chain, cable) compatible with the weight of the machine and compliant with European standards.</p>																																	
<p>The tie-down process is defined based on the characteristics of a trailer with a Maximum Authorised Total Weight (MATW) of 3,5 – 34t</p> <ol style="list-style-type: none"> 1. Check the condition of the transport vehicle surface. If the surface is greasy, it must be cleaned before installing the machine on the transport vehicle. 2. Completely extend the track spacing cylinder to prevent the tie-down accessories from relaxing during transport. 3. Check the location and condition of the machine tie-down points. 4. Tie-down the machine at the points provided for that purpose and that are indicated on the machine. 																																	
<p>⚠ DANGER</p> <p>Blocking of turret (provided by the brake) Additional accessories (bucket, arm, etc) Rigging Tension in lashing accessories Measure the loading height Grip on truck bed (frost, snow...)</p> <p>* Using additional rigging accessories depends on the nature of the contact between the device and the transport vehicle and the weather conditions. Please refer to the machine user manual.</p> <p> 13.3 Tying down the machine , page 88</p>	<table border="1"> <thead> <tr> <th colspan="2">DEVICE</th> </tr> </thead> <tbody> <tr> <td>Weight of the vehicle (kg)</td> <td>1765</td> </tr> <tr> <th colspan="2">DEVICE CARRIER DEVICE</th> </tr> <tr> <td>Nature of the contact</td> <td>Steel-wood</td> </tr> <tr> <td>Angle range α</td> <td>–</td> </tr> <tr> <td>Angle range β</td> <td>–</td> </tr> <tr> <th colspan="2">ACCESSORIES</th> </tr> <tr> <td></td> <td>WLL⁶ min (daN)</td> </tr> <tr> <td>Wedge (Lengthwise direction FR)</td> <td>YES*</td> <td></td> </tr> <tr> <td>Wedge (Lengthwise direction RR)</td> <td>YES*</td> <td></td> </tr> <tr> <td>Wedge (Lateral direction)</td> <td>NONE*</td> <td></td> </tr> <tr> <td>Slip resistant mat</td> <td>NONE*</td> <td></td> </tr> <tr> <td>Tie-down accessories</td> <td>2</td> <td>3t</td> </tr> </tbody> </table>		DEVICE		Weight of the vehicle (kg)	1765	DEVICE CARRIER DEVICE		Nature of the contact	Steel-wood	Angle range α	–	Angle range β	–	ACCESSORIES			WLL ⁶ min (daN)	Wedge (Lengthwise direction FR)	YES*		Wedge (Lengthwise direction RR)	YES*		Wedge (Lateral direction)	NONE*		Slip resistant mat	NONE*		Tie-down accessories	2	3t
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Created: Updated: –																																	

6. Working Load Limit

INDEX

2nd speed pedal	24
3rd hydraulic circuit	83

A

Accessing the machine	45
Accessories.....	75, 78
Dismantling.....	80
adhesive labels	6
Applications	3

B

Basic precautions	39
Battery	
Battery charge warning alert	15
discharged.....	95
Battery charge warning alert	
Battery	15
Blade lever	23
Boom rotation pedal.....	24
Box oil	108

C

Check the position of the blade	44
Checking the commands	113
Checks	
before starting.....	58
Checks after start-up	64
Checks after using the machine	113
Conservation	127
Cover B	30
Covers	29

D

Daily maintenance	113
Dashboard	13
Detecting anomalies	91
Diesel	
type.....	108
Diesel gauge.....	14
Dismantling	
Accessories.....	80
Driver's seat	26
Driving the machine on a slope	47

E

Engine oil	108
------------------	-----

F

fuel	
type.....	108
Fuses	27

G

Greasing	
Greasing points	114

H

Headlights	28
Horn.....	18
Hydraulic oil	
Replenishment.....	62
type.....	108
Verification.....	62

J

Joysticks and pedals	19
----------------------------	----

L

Left command lever	21
Lifting capacities	137
Loading bucket	81
Locking lever	20

M

Maintenance every 50 hours	116
Mechanical quick hitch	32–34
Mounting the accessory	81

O

Options	31
---------------	----

P

Pedal	
3rd hydraulic circuit	24
Power socket	25
Precautions	

Accessories.....	55
Battery	56
Before starting the engine	43
Displacement.....	45
Optional parts and tools	42
Use.....	43
use of equipment	48
Work.....	48
Precautions for using optional accessories	55
Precautions for using rubber tracks	70
Protection of pedals.....	23
protective structures for the cabin	44

Q

Quick hitch	32
-------------------	----

R

Recommissioning	129
Rubber track maintenance	118
Rubber tracks	69
Running in.....	57

S

Safety signals	xi
Soldering	107
Specifications	133
Start key	17
Stopping the engine	53
Storage	128

T

Technical data	131
tension	119
Throttle lever.....	23
Tie-down	150
Time counter	16
Towing the machine	98
Track spacing	24
Transporting the machine	86
Travel	
Levers.....	21
Pedal.....	21

U

Use	
Maintenance	103
use of equipment	

Precautions	48
User manual	27

W

Work	
Precautions	48