Quality Changes the World

Crawler Hydraulic Excavator

SY26U

Operation Manual

Contact

SANY Europe GmbH

Sany Allee 1
50181 Bedburg
Germany

E-Mail: service@sanyeurope.com
Web: www.sanyeurope.com

Tel.: -49 2272 90531 100
Fax: -49 2272 90531 109
Service Number: 00800 88888 318

Spare parts number:14155497

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EC declaration of conformity

According to the EC Machinery Directive 2006/42/EC (Annex II A)

Manufacturer name and address:

SANY HEAVY MACHINERY LIMITED

East Huancheng Road Kunshan Development Zone

Jiangsu; P.R. China

We hereby declare that the machine described below

Product designation	Hydraulic excavator
Type designation	SY26U

complies with all the relevant regulations of Machinery Directive 2006/42/EC.

We declare compliance with other directives also applicable to the machine:

- EMC Directive (2014/30/EU)
- Outdoor Noise Directive (2000/14/EC)
- Vibration Directive (2002/44/EC)
- Noise Directive (2003/10/EC)

Sound power (LwA) [dB] :	93

Applied harmonised standards:

- EN 474-1:2006+A3:2013 – Earth-moving machinery – Safety – Part 1: General requirements
- EN 474-5:2006+A2:2012 – Earth-moving machinery – Safety – Part 5: Requirements for hydraulic excavators

Authorised representative for the compilation of the relevant technical documentation:

SANY Europe GmbH

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Sany Allee 1

50181 Bedburg

Germany

Bedburg

Haijun Deng, Managing Director

Name and position of the undersigned

Introduction

⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

1.Introduction

1.1 Foreword

Please read and understand the user manual before machine startup, operator control, maintenance or repair.

The advices of the user manual must be followed. These instructions are a requirement for safe machine operation and for the safety of personnel.

Failure to observe the safety regulations can lead to property damage, serious injuries or death.

The user manual helps with:

- Using the machine in an optimal manner
- Preventing accidents
- Avoiding machine malfunctions due to improper operation
- Avoiding unintended use
- Increasing reliability
- Minimising repair costs and downtime
- Extending the machine's service life

A printed copy of the user manual must be made available near the machine.

This is a translation of the original instructions. In case of doubt, the German wording shall take precedence.

1.2 Structure of the instructions

Structure of the instructions

This user manual consists of:

- Operating manual for the machine operator
- Maintenance manual for the maintenance technician
- Diagrams for the maintenance technician
- Installation instructions for the assembly personnel or Loading information for the carrier.

The user manual will be supplied in hard copy in the local language of the operating company. The loading instructions are provided in the form of a card. A CD ROM is included that also contains the original user manual in German. This user manual also includes functions that are marked as options. These functions are not included in every machine.

Chapter structure

The operating and maintenance instructions are divided into chapters and subchapters.

Header

The header contains the number of pages, the chapter heading (in bold) and the heading of the respective subchapter. The chapter numbers with an orange background are provided on the outer edge as an aid to orientation.

Handling instructions

The handling instructions show how to perform a task step by step. The handling instructions include:

- No, one or more than one operational requirement. A pointed arrow (≻) introduces an operational requirement.
- Operational steps. Every operational step includes instructions. The operational steps are numbered in the order they are to be completed.
- No, one or more than one interim result. An empty arrow (⇨) introduces an interim result. Interim results are followed by additional operational steps.
- At least one final result. A double arrow (») introduces a final result.

If the carrying out the handling instructions or an operational step is connected with a danger, relative safety instructions will make reference to this prior to the handling instructions or the operational step.

Markings

Markings are used to make the text easier to follow. The following markings are used:

[F1]	Keys, softkeys, switches, buttons
[F1]+[F2]	Press key combinations at the same time
[F1] [F2]	Press key combinations in succession
«Menu»	Menu names, system messages
«Menu» «Submenu»	Menu sequences
(1)	Position numbers that are found in the figures

Safety instructions

Most accidents are caused by failure to follow the safety instructions. In this user manual, dangers are pointed out by safety instructions. The safety instructions are structured as follows.

⚠ CAUTION
Type and source of the danger Description of the imminent danger, for example an imminent injury. • 1. Measures for averting the danger • 2. Measures for averting the danger

Safety instructions are classified by a danger sign (exclamation mark in a yellow warning triangle), a signal word (DANGER, WARNING, CAUTION or ATTENTION) and a corresponding colour (red, orange, yellow or blue).

Signal word	Colour	Meaning
DANGER	Red	For an immediate thread of danger. If the danger is not averted, threat of death or serious injuries.
WARNING	Orange	For a possibly dangerous situation. If this situation is not averted, it may result in death or serious injuries.
CAUTION	Yellow	For a possibly dangerous situation. If this situation is not averted, it may result in minor, reversible injuries.
NOTICE	Blue	If refers to possible threats of machine damage.

Other information

⚠ CAUTION
Introduces important information, such as manufacturer recommendations for the smooth operation of the machine.

Safety

⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

2.Safety

2.1 Intended use

The machine may only be used for the following operations:

- Loosening, picking up, transporting and releasing soil, stones and other materials
- Excavating
- Clearing, if the machine is equipped with a blade.
- Lifting and transporting individual loads using sling gear, although manual help is required to attach and release the load

The machine can be used under the following conditions:

- Ambient temperature: -20 °C to + 40 °C
- Height above sea level: up to 1200 m

The intended use also includes observance of the user manual and compliance with the maintenance and test conditions.

2.2 Incorrect use

includes:

- Carrying passengers
- Lifting people
- Using the machine as a lifting platform
- Using the machine in contaminated areas
- Using the machine in explosive atmospheres
- Driving at inappropriate speeds over uneven ground
- Driving on public roads
- Driving over obstacles such as mounds of earth, large stones, tree stumps, etc.
- Travelling on slopes where the tracks cannot find sufficient grip
- Travelling on slopes above 25° (47 %)
- Demolition work
- Overhead work
- Using the boom to help negotiate a slope where the tracks cannot find sufficient grip
- Turning the machine on slopes, driving downhill or turning the boom while driving downhill
- Braking abruptly
- Driving while operating the equipment or lifting objects
- Abruptly switching from drive into reverse at high speeds using the travel control levers and pedals
- Driving through water that is deeper than the track rollers
- Fastening lifting devices, such as ropes, to the equipment and lifting objects with them
- Using the equipment while the hydraulic cylinder is completely retracted or extended

- Using the momentum/rotary motion of the equipment for demolition work or lifting
- Entering the bucket with full force into the ground below for digging
- Using the full force of the bucket to strike an object in order to break it up
- Using the weight of the equipment for demolition work
- Using the bucket for bedrock excavation work
- Operating the machine with unapproved spare parts
- Converting or altering the machine without prior agreement from SANY

In the case of improper use, SANY is not liable for any personal injuries or damage to the environment and the machine itself.

2.3 Operator duties

The machine operator must be at least 18 years old and be in possession of the qualifications required locally by law:

- Professional suitability according to national standards
- Safety briefing

The operator has the following responsibilities:

- Operating the machine
- Daily check of the machine for visible damage and defects.
- Immediately reporting damage and defects found as well as any changes in operational performance to the appropriate maintenance personnel
- Checking fill levels and topping up the operating fluids
- Lubricating moving parts
- If present, filling up the lubricating grease at a central lubrication system

2.4 Obligations of maintenance personnel/specialised personnel

Maintenance/specialist personnel have the following responsibilities:

- Performing all maintenance work thoroughly and on-time according the maintenance schedule
- Observance of the maintenance schedule
- Maintenance and servicing obligation

⚠ CAUTION

Operating the machine
If maintenance or assembly personnel have to operate the machine, the same obligations as for the operating personnel additionally apply.

2.5 Hazards around the machine

2.5.1 Hazards around the machine

Not all dangers resulting from the machine environment can be prevented.

2.5.2 Ground

When the machine is on non-load-bearing, soft or uneven ground, driving over obstacles or on steep surfaces (slope above 15°), it can topple over and lead to death or serious injury. The machine can be damaged.

Prevention:

- Only operate the machine on load-bearing ground.
- Check the load-bearing capacity of bridges and paths before travelling on them.
- Check the height and width of tunnels before driving through them.
- Do not park the machine on slopes.
- Do not drive the machine over obstacles high enough to cause the machine to become unbalanced.

Gas, water or power lines installed underground can be damaged during digging or excavating work. This can lead to serious injuries or machine damage.

Prevention:

- Observe local regulations.
- Before beginning digging or excavating work, check if gas, water or power lines are installed in the ground.

2.5.3 Power cables

Due to the machine's height, it can collide with power supply lines. This can lead to death or serious injuries. The machine can be damaged.

The following safety clearances from power cables must be maintained. This clearance must not fall below the minimum clearance.

Nominal voltage [V]		Safety clearance [m]
Up to 1000		1
Above 1000 to	110 000	3
Above 110000 to	220 000	4
Above 220000 to	380000	5
In the case of unknown nominal voltage		5

If working under power cables cannot be avoided, the following safety measures must be taken:

- Observe the applicable local regulations.
- Use a marshaller to inform the operator as to the current distance from the power cables.
- Wear rubber shoes and protective gloves.
- Cover seat with a rubber cover.
- Avoid contact with machine parts that can conduct electricity.
- Do not enter or exit the machine under power cables, but rather only after the specified safety clearance has been reached.

2.5.4 Flammable/explosive environment

The machine's operating fluids, such as fuel, oil, lubricant and coolant, are highly inflammable and combustible. When operating the machine near an open flame or flying sparks, there is therefore a danger of fire or explosion for the machine. This can lead to death or serious injuries. The machine can be damaged.

Prevention:

- Do not operate the machine in a flammable or explosive environment (for example, in environments with flammable dust)
- Only operate the machine in well ventilated spaces
- Smoking and naked flames are not permitted while refuelling
- Smoking and naked flames are not permitted while working on the battery

2.5.5 Storms

When operating the machine during a storm, there is a danger that the machine's control system will be damaged. Therefore, cease all operation during a storm.

When operating the lifting tackle, the person guiding the load outside of the cabin is in particular danger of being struck by lightning. Therefore, stop operating the lifting tackle immediately during storms and find a protected area.

2.5.6 Poor visibility

When operating the machine in poor visibility (for example, due to darkness, fog or high amounts of dust in the air), special safety measures must be taken:

- Switch on work spotlights
- Mark obstacles
- Have a marshaller provide signals
- Activate windscreen wiper

2.5.7 Extreme climatic conditions

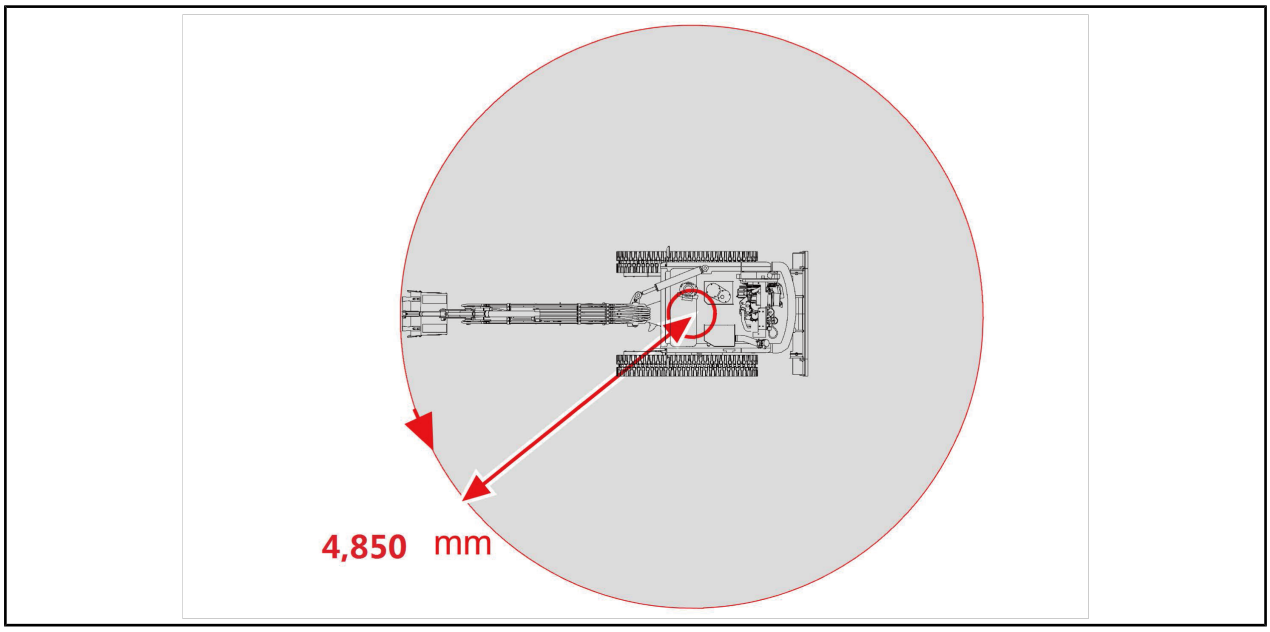
Cease operating under extreme climatic conditions if the protection provided by heating and weather-resistant clothing is insufficient.

2.6 Hazard points on the machine

2.6.1 Hazard points on the machine

Not all dangers resulting from the machine can be prevented.

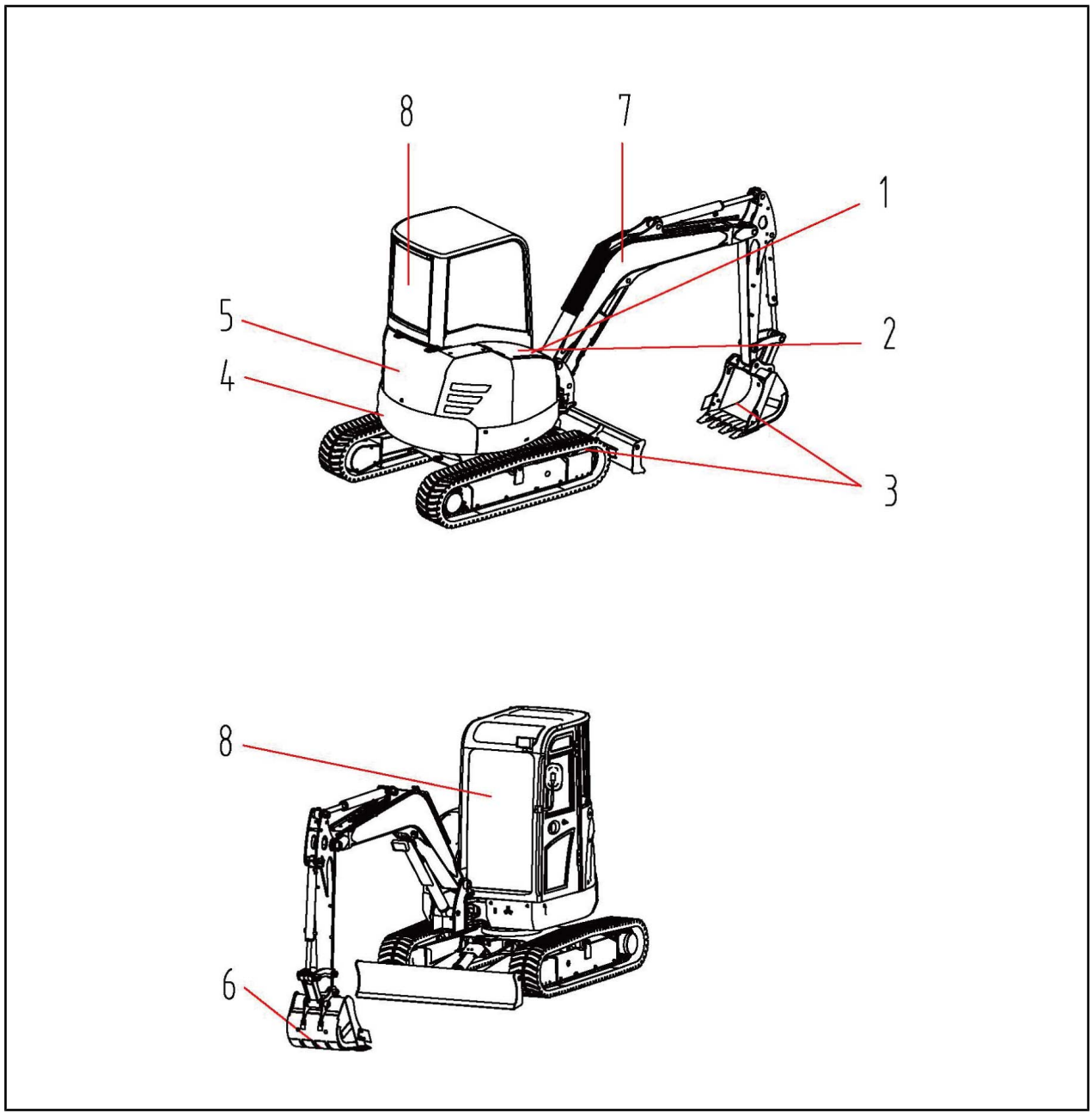
2.6.2 General dangers



working area

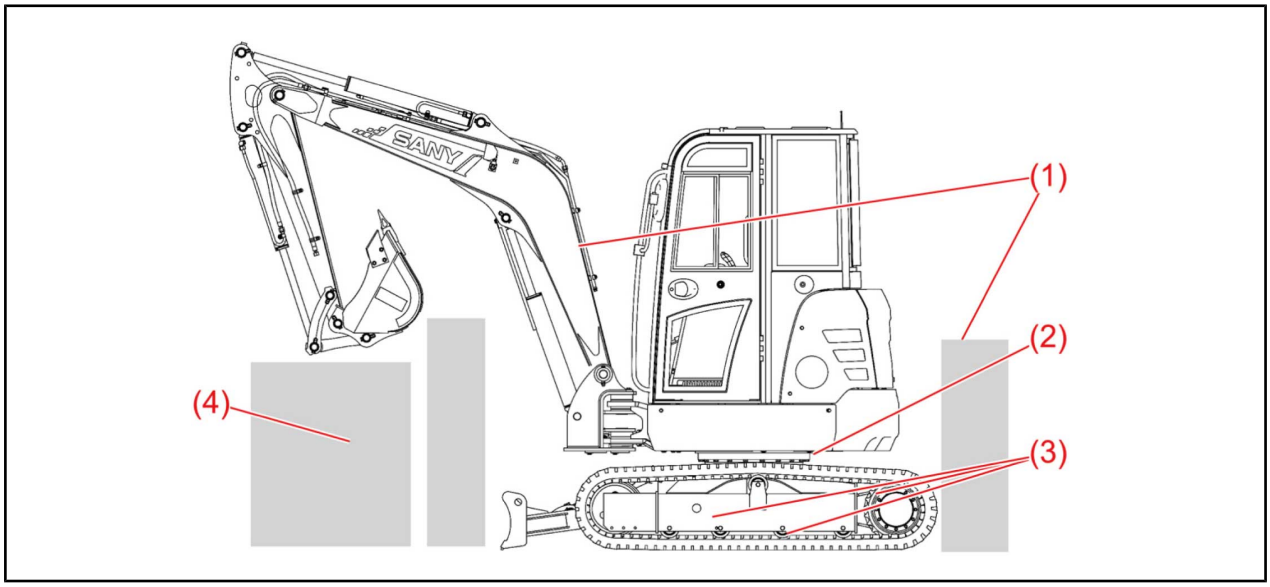
The presence of others around the machine for longer than is necessary is not permitted. Within the work area, the danger exists of body parts suffering bruises, contusions or potentially severe

levels of compression, as well as the possibility of being knocked to the ground when the machine is turning.



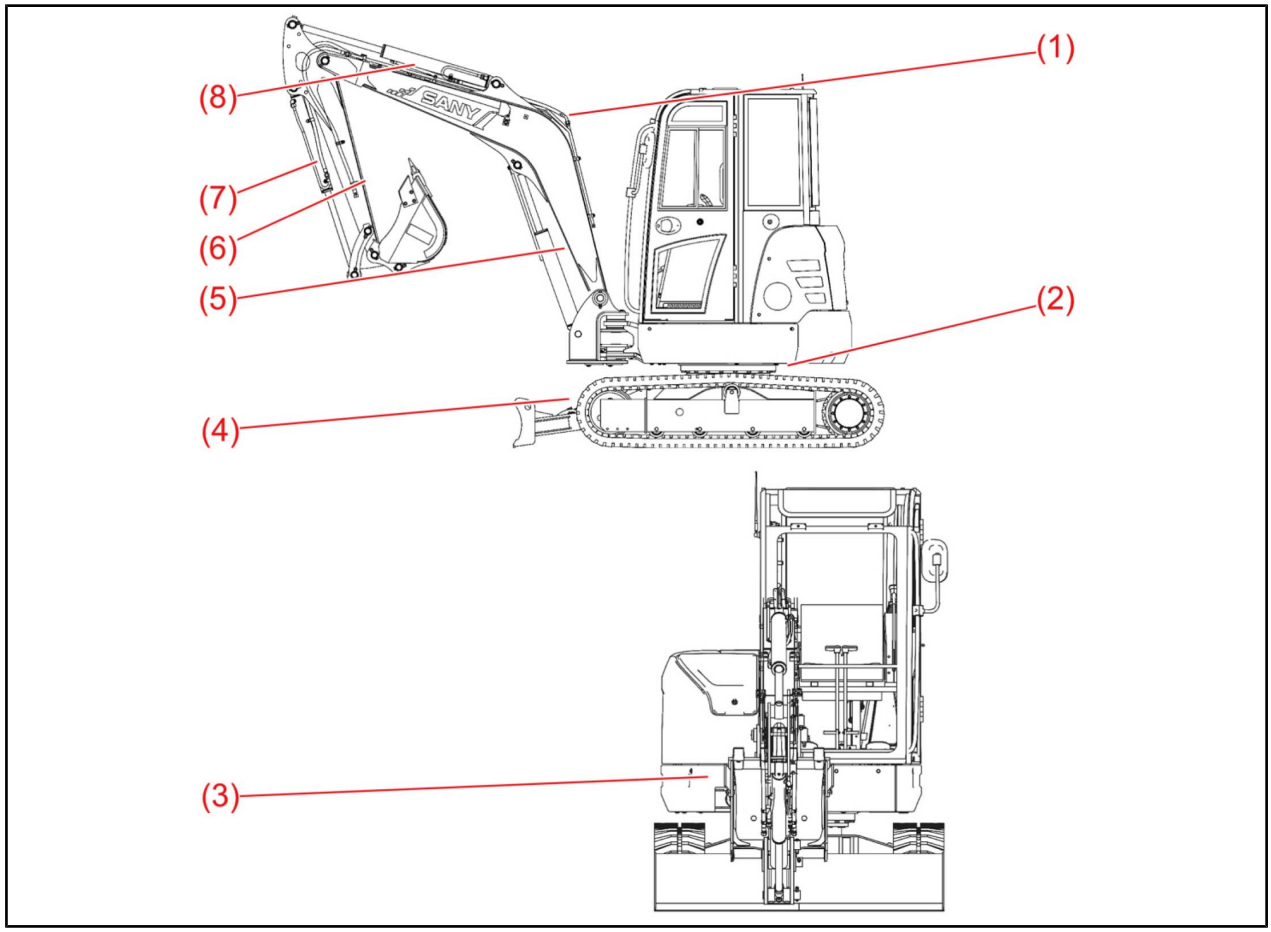
	Location	Hazard
(1)	Tank filler neck	Poisoning due to inhalation, serious to fatal burns due to ignition of the vapours
(2)	Battery compartment	Acid burns
(3)	Chain, work equipment	Bruising, crushing from being caught or being pulled along
(4)	Exhaust system	Burns, poisoning due to inhaling poisonous fumes
(5)	Rear side maintenance cover	Burning
(6)	Below the bucket	Danger from falling objects
(7)	Boom	Hazard of bumping your head
(8)	Windows	Head injuries if inserted windscreen is poorly secured and falls down

2.6.3 Mechanical dangers



	Location	Danger
(1)	In front of and behind the machine	Danger of being crushed when the machine starts to move
(2)	Tracks	Danger of being pulled along by the chain when the machine starts to move
(3)	Chain drive, running rollers and rollers, drive motor	Danger of crushing arm, hand or finger
(4)	Below the raised bucket	Danger from falling objects

2.6.4 Hydraulic dangers

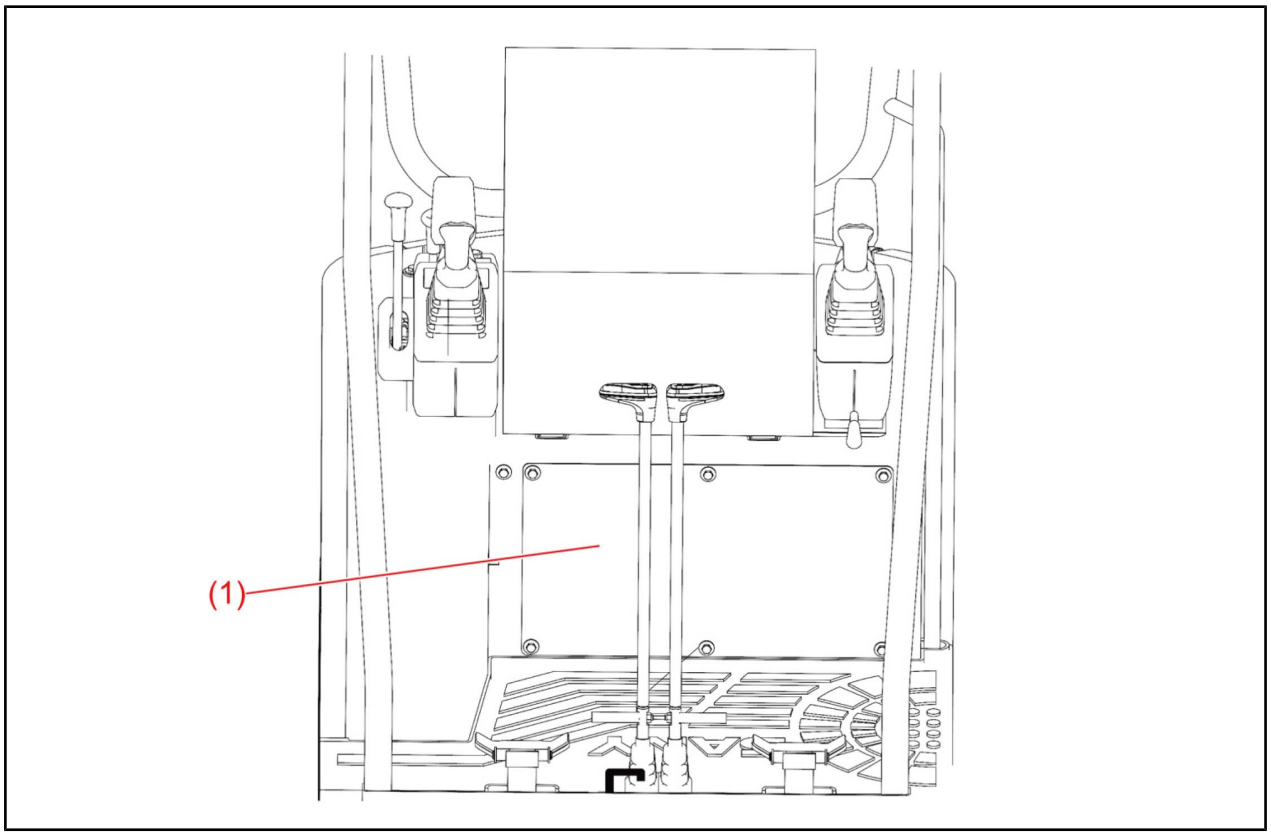


	Location	Hazard
(1)	Connections for the transition between high-pressure hose and boom	High pressure, leaking hydraulic oil
(2)	Hydraulic hose connections between slewing gear and chassis	High pressure, leaking hydraulic oil
(3)	Boom swivel cylinder connections and high-pressure hoses	High pressure, leaking hydraulic oil
(4)	Connections and high-pressure hoses for blade cylinder	High pressure, leaking hydraulic oil
(5)	Connections and high-pressure hoses for boom cylinder	High pressure, leaking hydraulic oil
(6)	Connections and high-pressure hoses for work equipment	High pressure, leaking hydraulic oil
(7)	Connections and high-pressure hoses for bucket cylinder	High pressure, leaking hydraulic oil
(8)	Connections and high-pressure hoses for arm cylinder	High pressure, leaking hydraulic oil

In addition to the pressure-generating components, the high-pressure hoses and their respective connections constitute particular hydraulic hazard zones.

Prior to performing maintenance work on the hydraulic accumulator, the pressure must first be released.

2.6.5 Electrical dangers



Electrical hazard zones

	Location	Hazard
(1)	Fuse box	Electric shock

In normal operation, all electrical machine components are protected against environmental influences and contact. During maintenance and repair operations, components left open are electrical hazard zones.

2.6.6 Dangers from lifting equipment

The following dangers can result from the lifting equipment:

Retrofitting

The machine may only be retrofitted with authorised lifting equipment. If in doubt, related questions can be addressed to SANY. If the machine is equipped with a quick-change unit, the lifting equipment may be exchanged by the operator. To avoid injuries and damage to the machine, the operating instructions for the lifting equipment and the operating instructions for the machine must be observed.

Combining lifting equipment

When combining lifting equipment, the excavator may behave in an unusual manner. For example, combined lifting equipment may be able swing out further and thus reach the cabin. Serious injuries or damage to the machine can result from this. When combining lifting equipment, work must be conducted cautiously until the operator becomes familiar with the modified behaviour of the excavator.

2.7 Personal protective equipment

The personal protective equipment includes different components depending of the respective activities.

- **Safety helmet**: The safety helmet reduces the risk and severity of head injury. A safety helmet must be worn during machine operation, maintenance and repair work.
- **Protective clothing**: Protective clothing protects the body from injury, or reduces the severity of injuries sustained as a result of contact with fire, heat, cold and corrosive substances. A protective suit must be worn during machine operation, maintenance and repair work.

Safety shoes: Safety shoes protect feet from injury or limit the severity of injuries resulting from:

1. Colliding with hard objects.

2. Walking on sharp parts.

3. Falling of heavy objects.

Safety footwear must be worn during machine operation, maintenance and repair work.

- **Ear protectors**: Ear protectorsprotect the ears against exposure to noise. Wearing ear protectors is recommended above a sound level of 80 dB(A) and is obligatory above 85 dB(A).

2.8 Safety systems and protective devices

Careful operation is the most import factor in avoiding accidents.

To assist the operator, the machine is equipped with various safety systems and protective devices. These help to prevent accidents. Some of these devices actively support the operator. Others

are only used when an emergency occurs. The functions are explained in the corresponding sections for the machine description.

- Emergency stop
- Emergency exit (with cabin option)
- Safety bar
- Visual and acoustic driver warning system
- Horn
- Fire extinguisher
- Rear-view mirror
- Seat belt
- Handles
- Load—holding valves
- safety markings
- Overload warning when operating lifting gear (optional)

2.9 Safety markings

Table 2–1 Prohibition signs

Sign	Location	Meaning
	On the rear side maintenance door	Open flame prohibited.
	On the right-hand cover	Do not step on

Table 2–2 Warning signs

Sign	Location	Meaning
	Engine, exhaust, hydraulic pump	Warning of hot surfaces.
	On the battery	Warning of danger due to batteries.
	Exhaust	Warning: risk of contact with substances that cause irritation or are harmful to health
	Vicinity of engine fan	Warning: risk of injury due to engine fan
	Vicinity of fan belt	Warning: danger of entanglement
	Cooler	Warning: risk of contact with hot fluids and vapours
	On the front side under the cabin	The container is pressurised
	Boom	Warning: risk of injury due to boom.
	Upper windscreen	Warning: risk of injury due to unsecured windscreen

Table 2–3 Mandatory signs

Sign	Location	Meaning
	Near the hydraulic pump on the cover	Use protective goggles / protective mask
	Near the hydraulic pump on the cover	Use protective gloves
	Inside on the window of the cabin	Use the safety belt
	Inside on the window of the cabin	Observe the operating manual

Table 2–4 Fire protection and emergency signs

Sign	Location	Meaning
	Next to the fire extinguisher in the cabin, and at other fire extinguishers, depending on the equipment fitted	Indicates the location of the fire extinguisher
	On the window or the door that are suitable for use as an emergency exit	Emergency exit

Table 2–5 General information

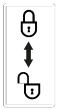
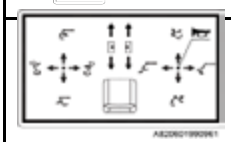
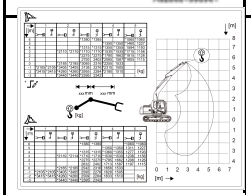
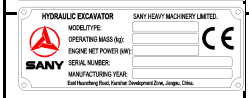
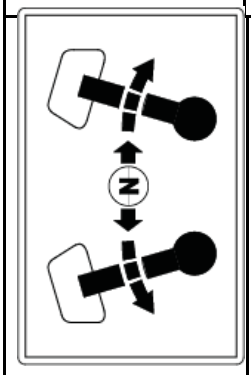
Sign	Location	Meaning
	Next to the rating plate	Noise level next to the machine
	On the fastening eyelets	The machine can be fastened securely here
	On the load points	The machine can be attached here
	At the machine’s centre of gravity	Centre of gravity of the machine
	Safety bar	Safety bar and emergency stop
	On the right side window of the cabin	Overview of the joystick and pedal / drive lever motions
	On the right side window of the cabin. For further information, see Lifting range	Lifting range
	On the lower right side on the exterior of the cabin For further information, see Rating plate	Machine marking
	On the pedal for the boom swivel	Overview of boom swivel movement
	In the cabin	Blade steering movement

Table 2–5 General information (continue)

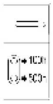
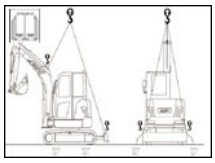
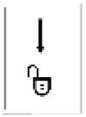
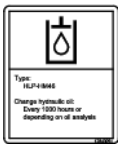
	Hydraulic oil tank	Hydraulic oil level
	Battery isolator switch	Battery isolator switch
	Emergency stop	Emergency stop
	On the front right-hand side under the cabin	Rotatable mounting lubrication points
	On the front right-hand side under the cabin	Lifting position
	On the top of the counterweight	Additional equipment information
	In the cabin in the vicinity of the door	Set the safety bar to the unlocking position.

Table 2–6 Maintenance information

Sign	Location	Meaning
	Hydraulic oil tank	Specifications for the hydraulic oil
	Fuel tank	Only fill with diesel fuel
	Water separator	Water separator
	In the toolbox next to the grease gun; for more information see Lubrication schedule	Indicates the lubrication points on the machine

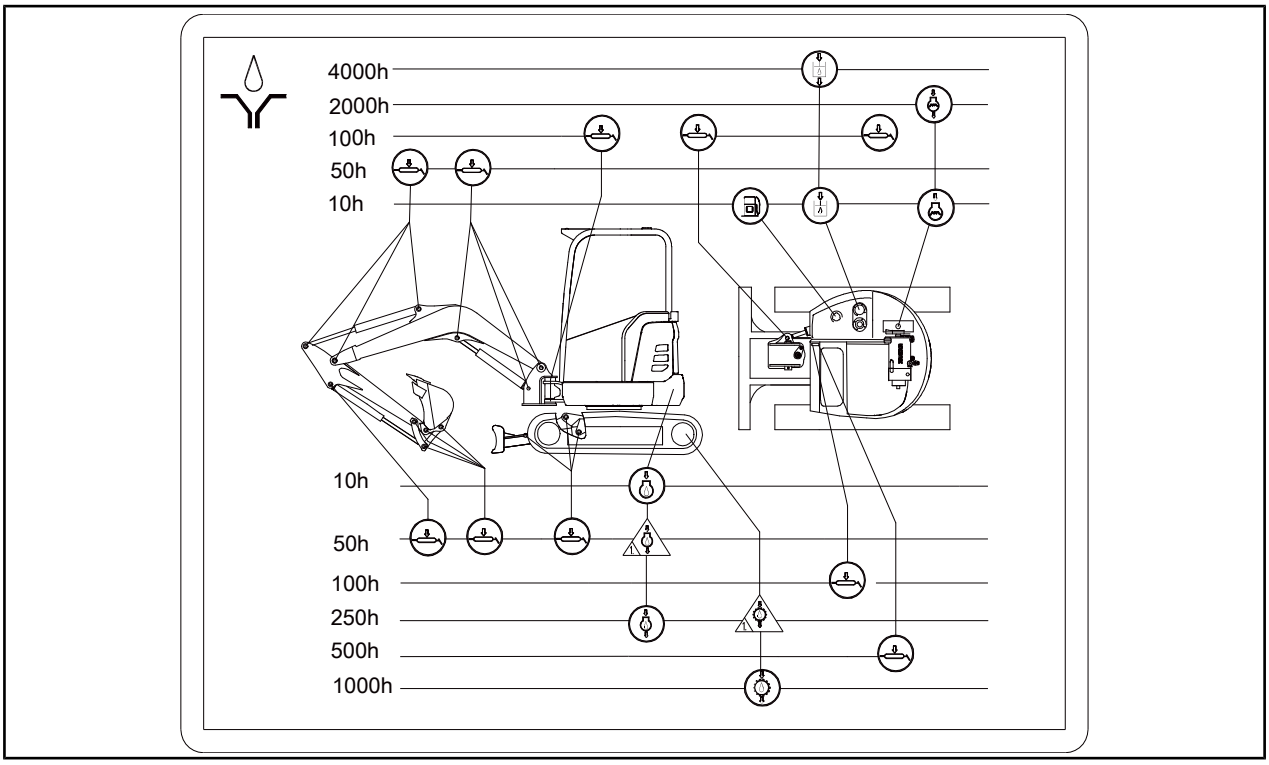
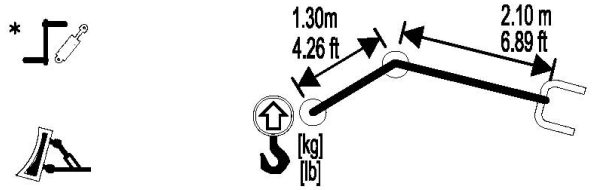


Table 2–7 Lubrication schedule

Symbol	Meaning
	Top up the fuel
	Lubrication
	Replace the hydraulic oil for the first time Maintenance personnel only
	Check the engine oil and top up if necessary
	Change the engine oil Maintenance personnel only
	Check the coolant and top up if necessary
	Changing the coolant
	Check the gearbox oil and have it topped up by maintenance personnel if necessary
	Change the gear oil Maintenance personnel only
	Check the hydraulic oil and top up if necessary
	Change the hydraulic oil or perform an oil analysis Maintenance personnel only

[m] [ft]	2.0 6.6		3.0 9.8		4.0 13.1		MAX	
	[kg] [lb]							
4.0 13.1							*693 *1525	584 1285
3.0 9.8			*623 *1373	470 1034			*540 *1188	365 803
2.0 6.6			*707 *1558	459 1010	*501 *1102	282 620	*493 *1085	282 620
1.0 3.3			*937 *2061	421 926	*717 *1577	274 603	*507 *1115	256 563
0 0	*1521 *3346	715 1573	*1095 *2409	398 876	*732 *1610	267 587	*582 *1280	263 579
-1.0 -3.3	*1807 *3975	722 1588	*1012 *2226	395 869			*730 *1606	316 695
-2.0 -6.6	*883 *1943	786 1729					*609 *1340	576 1267



[m] [ft]	2.0 6.6		3.0 9.8		4.0 13.1		MAX	
	[kg] [lb]							
4.0 13.1							*693 *1525	584 1285
3.0 9.8			564 1241	470 1034			438 963	365 803
2.0 6.6			549 1208	459 1010	340 748	282 620	340 748	282 620
1.0 3.3			515 1133	421 926	332 730	274 602	310 682	256 563
0 0	910 2002	715 1573	488 1074	398 876	324 713	267 587	320 704	263 579
-1.0 -3.3	917 2017	722 1588	485 1067	395 869			385 847	316 695
-2.0 -6.6	*883 *1943	786 1729					*609 *1340	576 1267

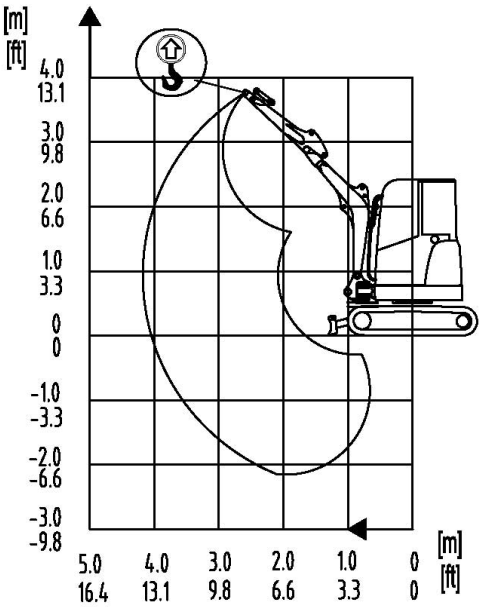


Table 2–8 Lifting range

Symbol	Meaning
	Value applies for lifting loads from the front.
	Value applies for lifting loads from the side.
	Load attachment point
	Values apply for lifting loads when the blade is raised
	Values apply for lifting loads when the blade is lowered
	Limitation of the load to be raised due to the hydraulic system

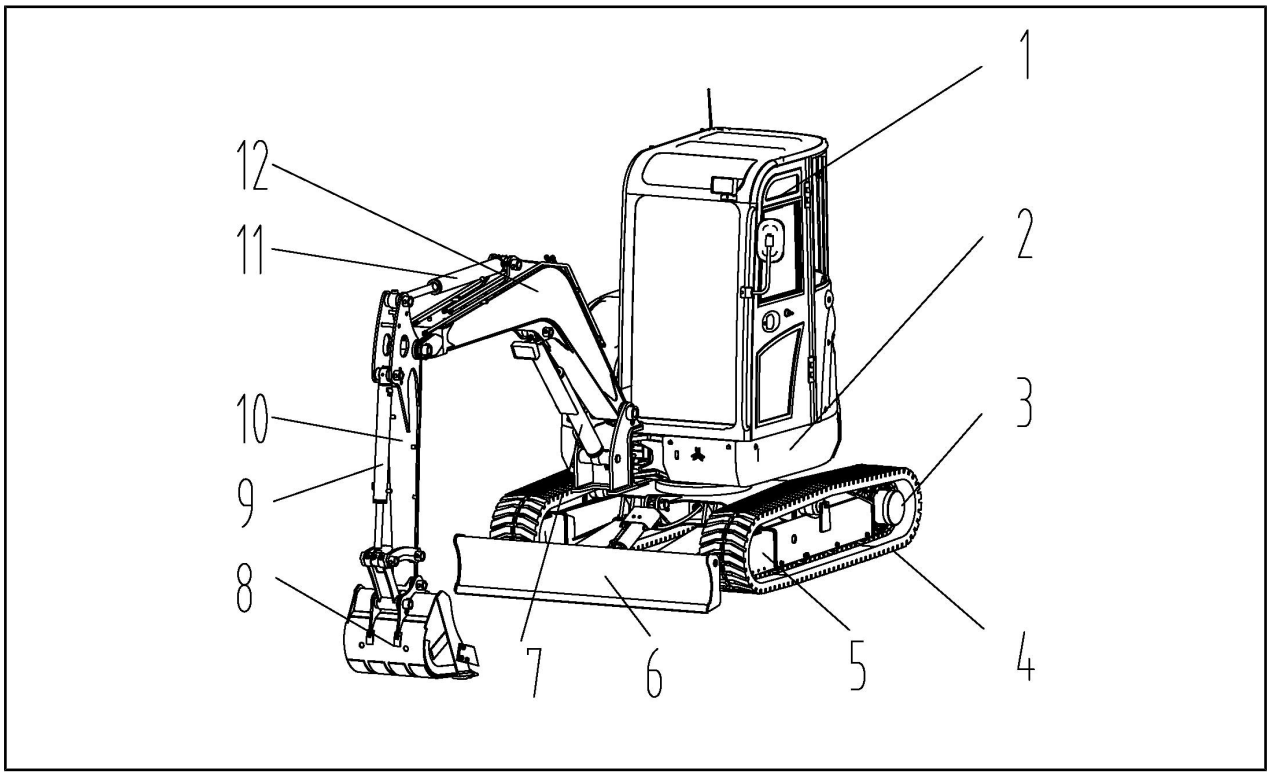
Machine description

⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

3.Machine description

3.1 Overview



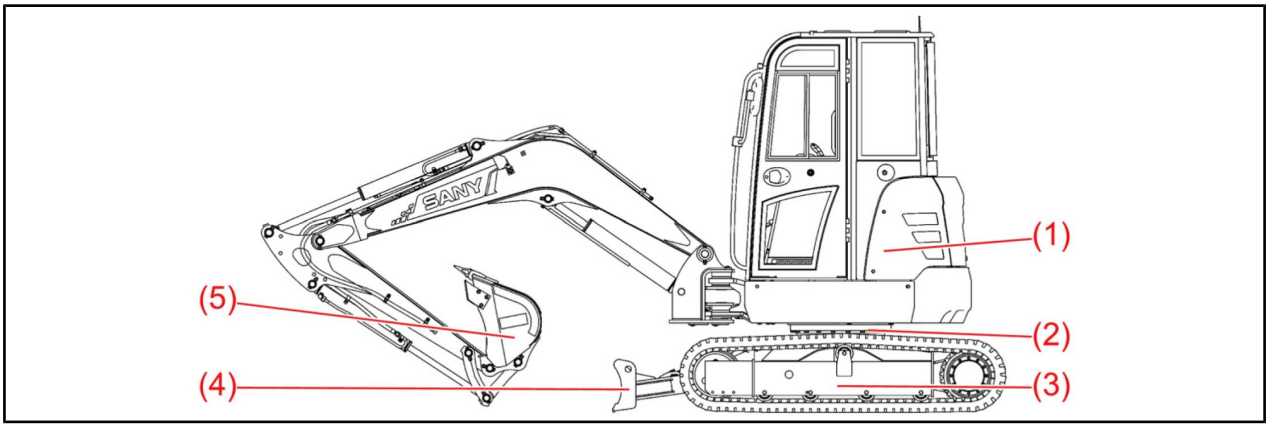
(1)	cabin	(7)	Boom cylinder
(2)	Upper carriage	(8)	Bucket
(3)	Drive motor	(9)	Bucket cylinder
(4)	Track shoe	(10)	Excavator arm
(5)	Idler	(11)	Arm cylinder
(6)	Blade	(12)	Boom

3.2 Features

The machine is designed for digging and clearing.

The machine is operated from the cabin. Together with the boom and the mounted work equipment, the rotating upper carriage allows for flexible operation and an adjustable work area. With different equipment, subsoils with different properties can be handled.

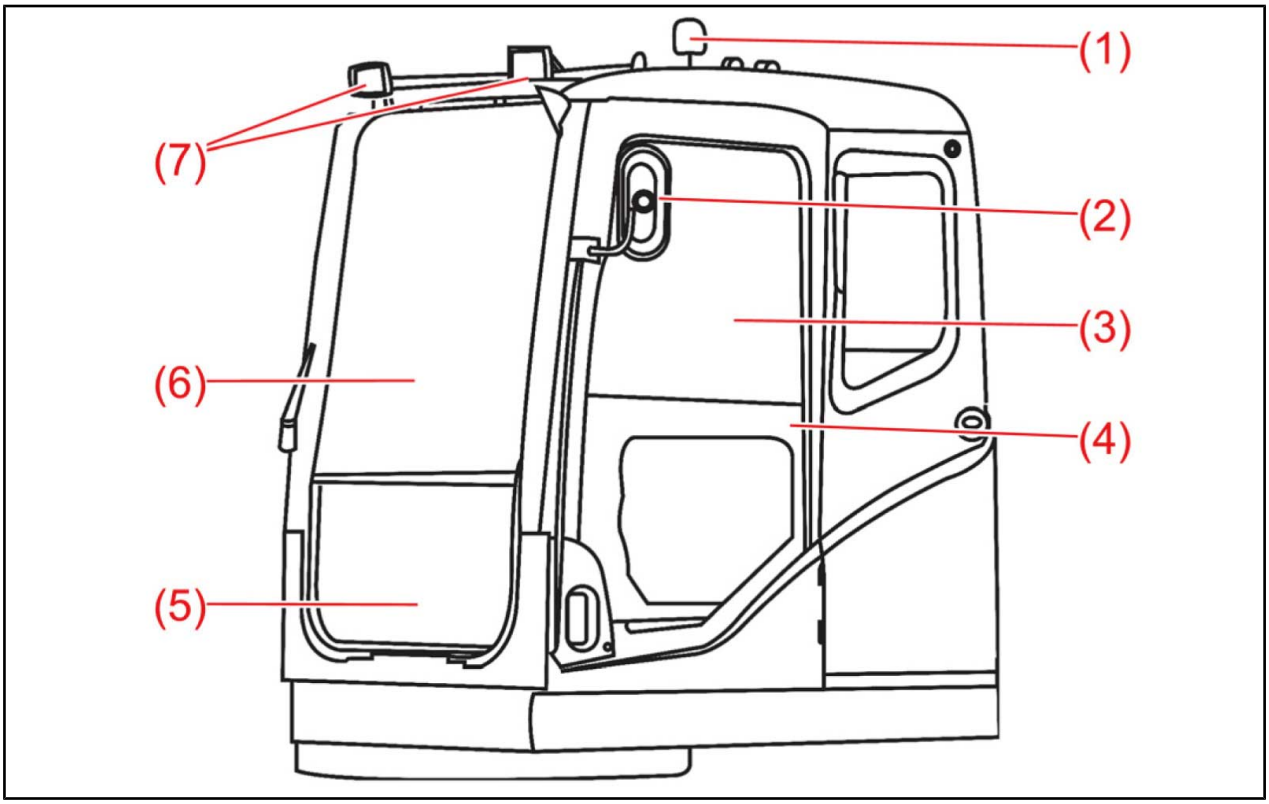
3.3 Assemblies



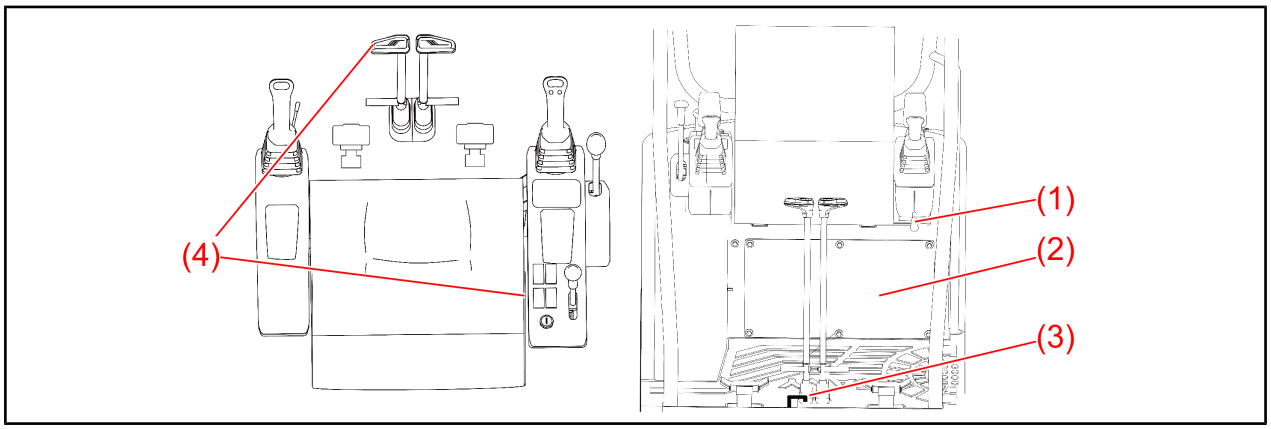
(1)	Upper carriage	(4)	Blade
(2)	Slewing gear	(5)	Work equipment
(3)	Under carriage		

3.4 Cab

3.4.1 Cab



(1) Visual driver warning
(2) Mirrors
(3) Cabin door window
(4) Door handle
(5) Lower windscreen
(6) Upper windscreen
(7) Working lights



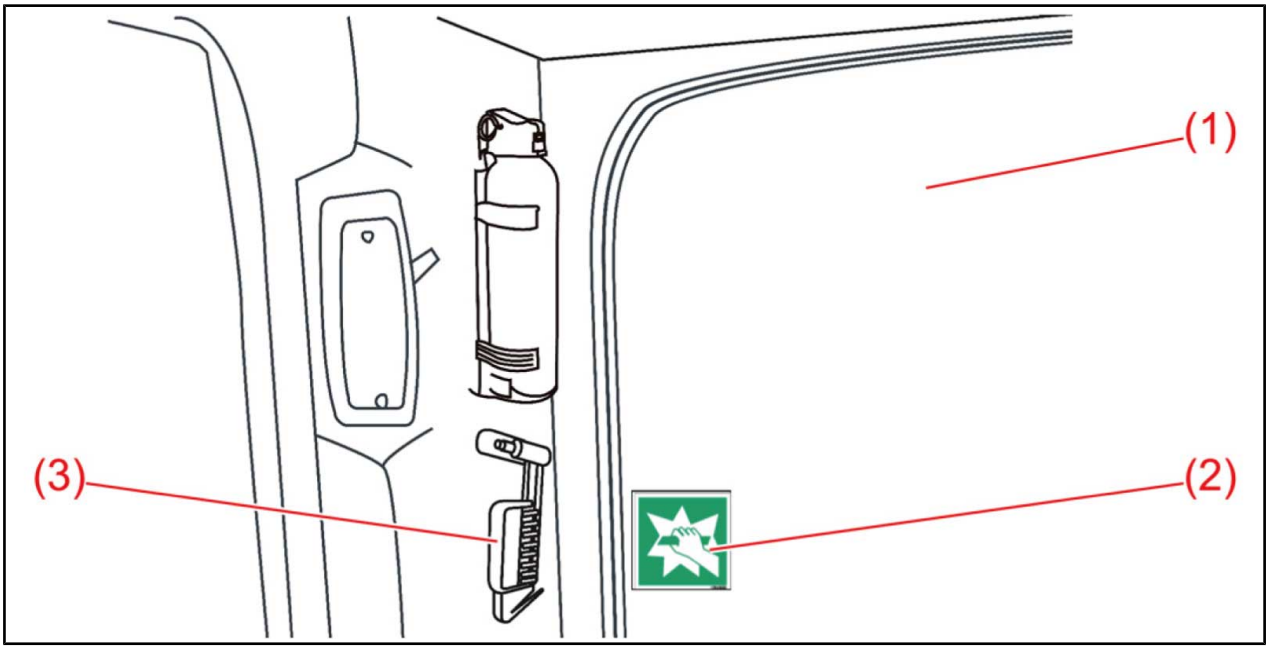
(1) Emergency exit
(2) Safety bar
(3) Toolbox
(4) Transport safety equipment
(5) Controls
(6) Emergency hammer
(7) Fire extinguisher

The machine is operated from the cabin. It can be entered from the left-hand side.

3.4.2 Cup holder

If the cup holder is not in use, it can be folded away to prevent damage.

3.4.3 Emergency exit



(1) Emergency exit

(3) Emergency hammer

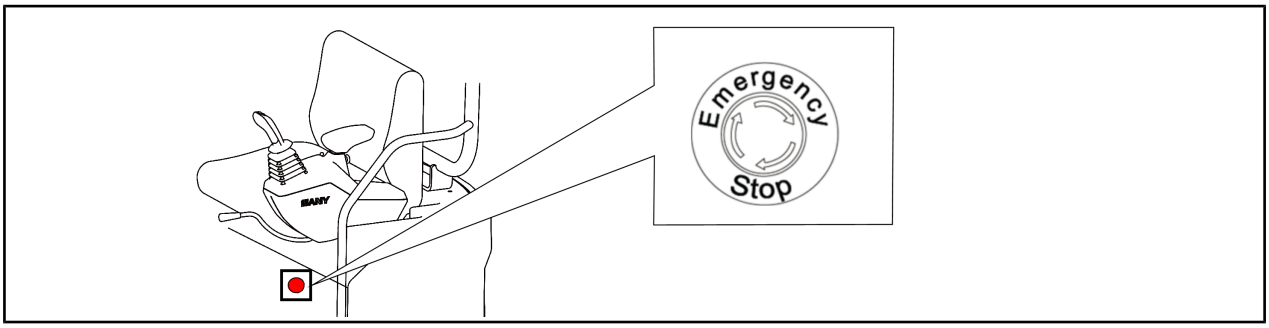
(2) Emergency exit marking

In order to be able to climb down from the machine safely in an emergency, the rear window can be used as an EMERGENCY exit, if exiting by the door is not possible.

Break the glass with the emergency hammer.

The emergency exit is now open.

3.4.4 EMERGENCY stop



An [EMERGENCY stop] button is provided for safely switching off the machine in the event of an emergency. EMERGENCY stop Safety systems and protective devices

In the case of an EMERGENCY stop, all of the machine’s movements are stopped. The engine is switched off.

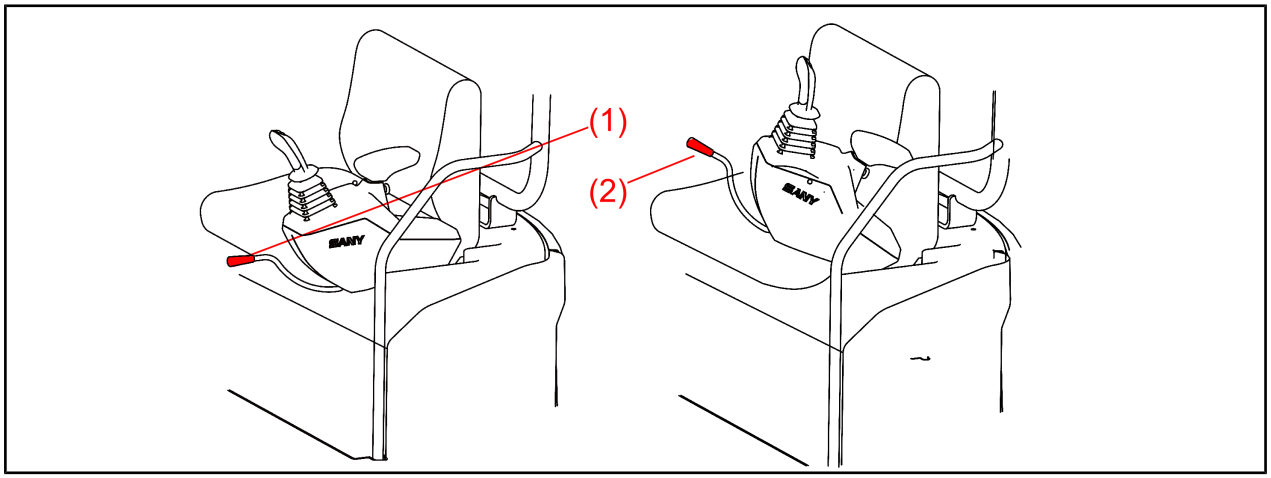
The EMERGENCY stop should only be used in dangerous situations in order to stop and switch off the machine.

Before starting to drive again, all EMERGENCY stops must be unlocked and the machine must be restarted.

3.4.5 Horn

The operator can use the horn to warn persons in the vicinity of the machine that the machine and/or parts of its equipment is about to move.

3.4.6 Safety lever



Safety lever

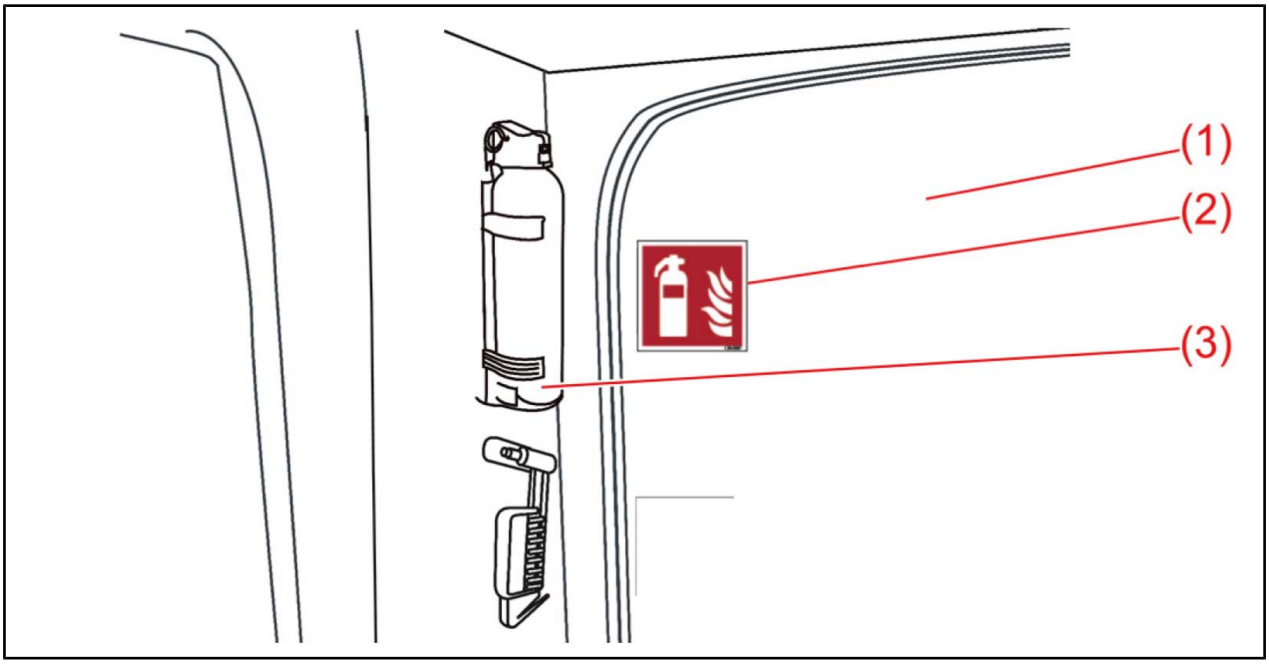
(1) Unlocking position (2) Locking position

The safety lever prevents the controls of the drive control system, turning mechanism and equipment from being operated accidentally.

Setting	Function
Locked	To lock, pull the lever up. The machine cannot be started. The machine reacts to movements of the drive levers and joystick.
Unlocked	To unlock, push the lever down. The machine can be started. The machine ignores movements of the drive levers and joystick.

The safety bar must always be moved into the locking position whenever leaving the driver's seat.

3.4.7 Fire extinguisher



(1) Rear window

(2) Fire extinguisher marking

(3) Fire extinguisher

The cabin has a fire extinguisher inside the cabin on the rear panel. The position of the fire extinguisher is marked with an indicating plate.

Incipient fires in the cabin must be extinguished using the fire extinguishers located in the cabin. If it is not possible to put out the fire, the cabin must be left immediately using the escape path.

⚠ CAUTION

Saving oneself always has priority.

3.4.8 Rear-view mirrors

The machine has several rear-view mirrors.

The rear-view mirrors expand the visual range of the machine operator to the area next to and behind the machine. The rear-view mirrors can be folded and must be folded out during operation. The operator must adjust the rear-view mirrors to suit his needs every time before driving off.

3.4.9 Seat belt

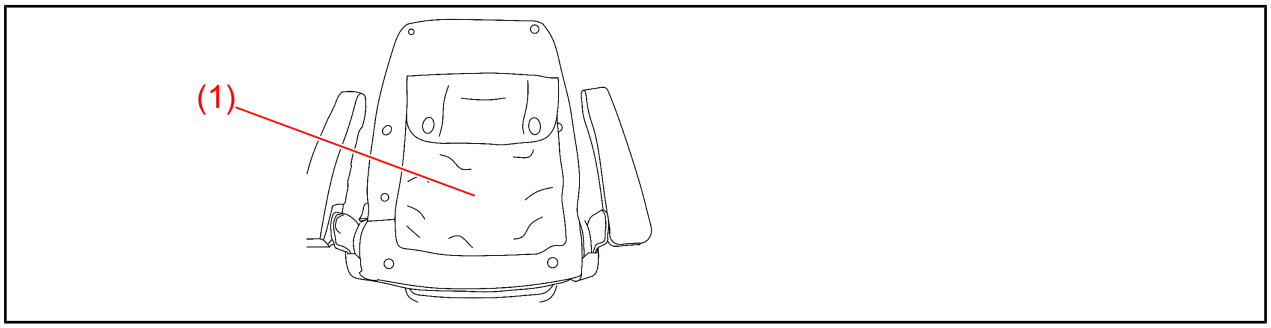
The operator's seat is fitted with a seat belt.

The seat belt is a system of restraint that prevents the operator from being tossed about as a result of unexpected machine movements or even being thrown out of the machine. The seat belt is extended in the event of a collision, thereby limiting the deceleration forces.

3.4.10 Acoustic driver warning

When the driver warning is activated, an acoustic warning signal (beep) sounds while the vehicle is in motion.

3.4.11 Document pouch



(1) Document pouch

The pouch is located on the backrest of the seat.

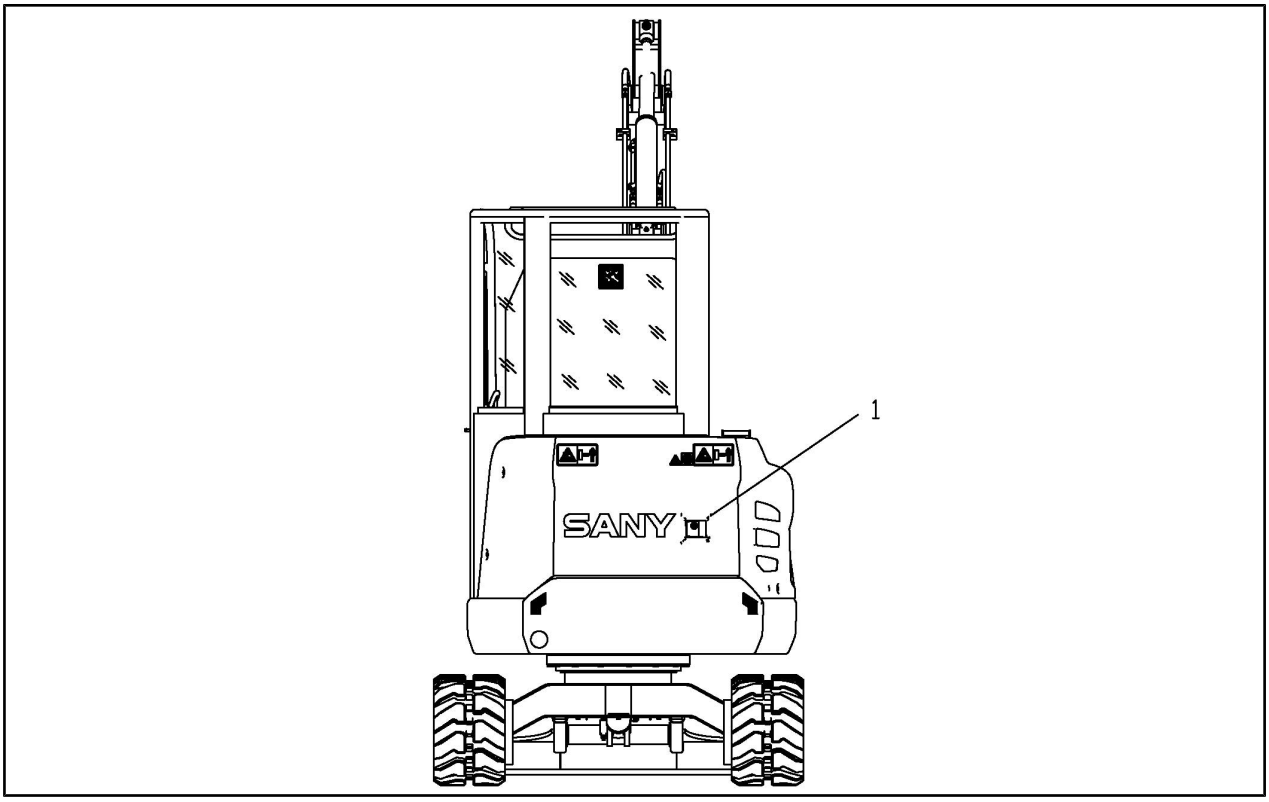
Manuals for operation and maintenance can be stored in this pouch so that they are always available for reference.

3.5 Maintenance doors

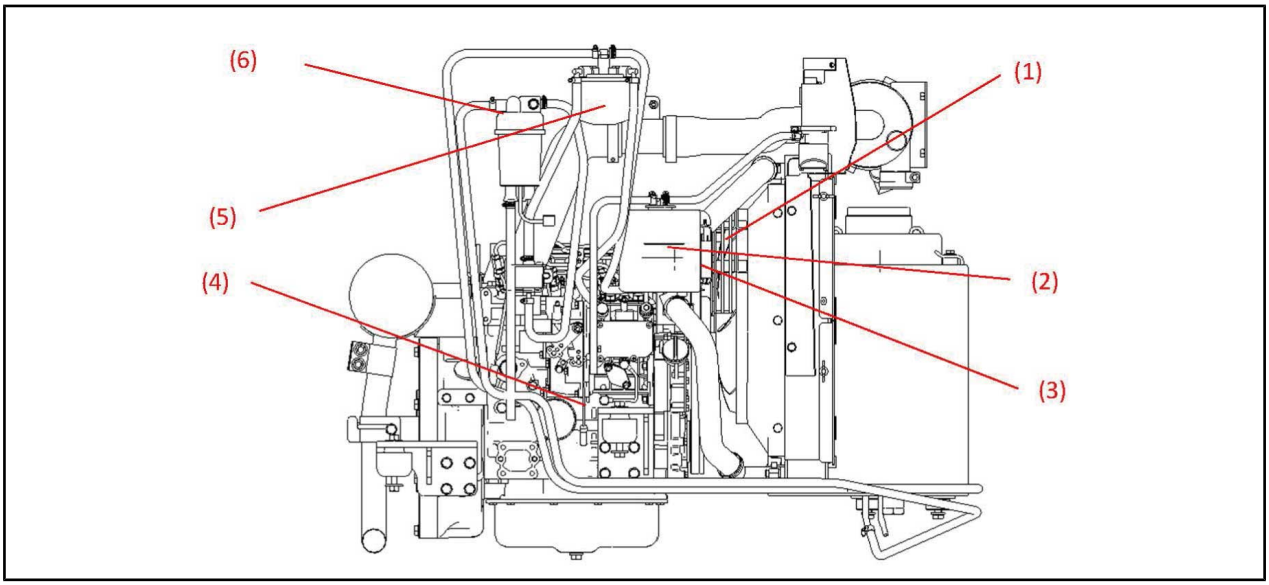
3.5.1 Maintenance doors

The maintenance covers can only be locked and unlocked with the corresponding key.

3.5.2 Rear side maintenance cover

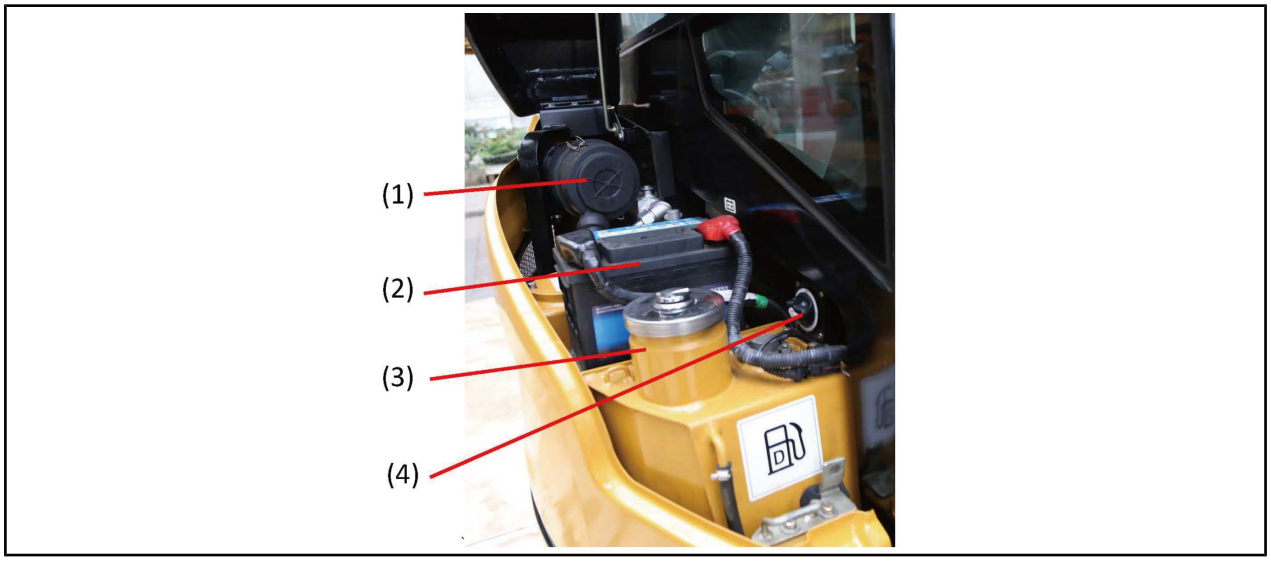


(1) Rear maintenance door



(1)	Fan	(4)	Oil dip stick
(2)	Expansion tank coolant	(5)	Fuel filter
(3)	Engine oil filler opening (behind expansion tank)	(6)	Fuel pre-filter

3.5.3 Front right cover



(1) Engine air filter

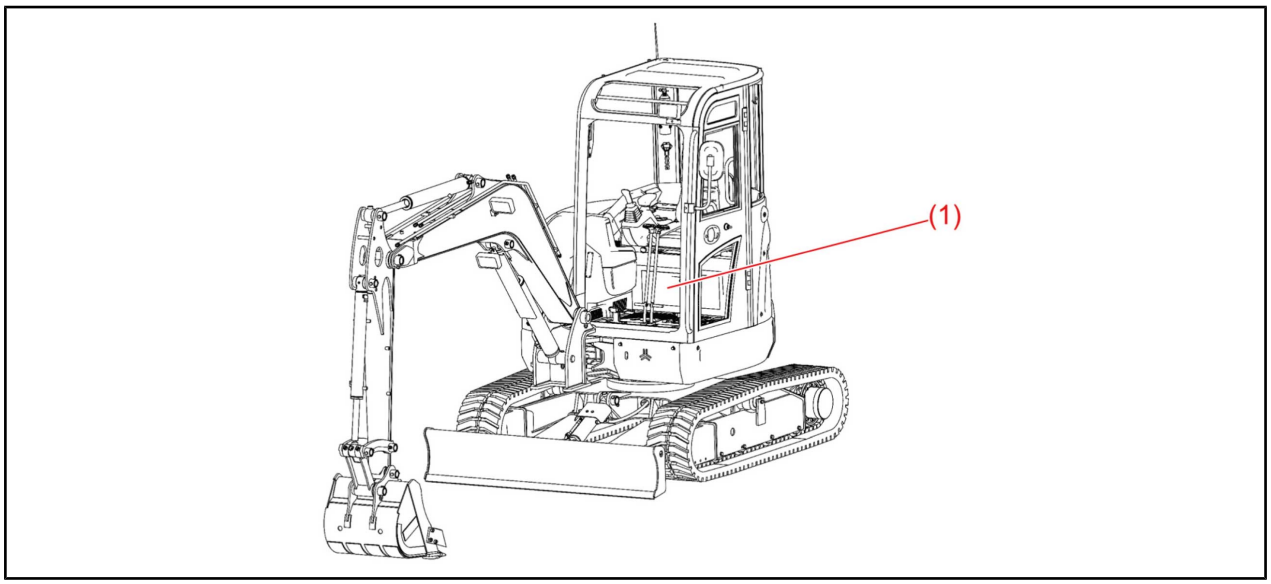
(2) Battery

(3)Tank filler needs for diesel

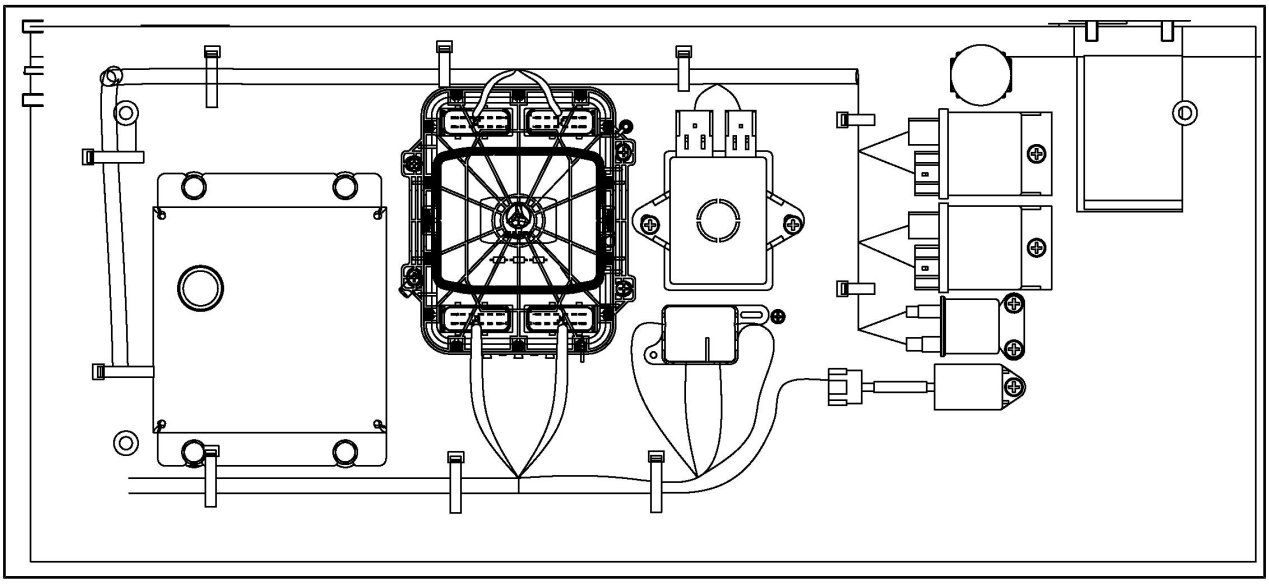
(4)Battery disconnect switch

The filler neck of the fuel tank is secured by a cover which has to be opened and closed again using a key.

3.5.4 Under the seat



(1) Maintenance door below seat

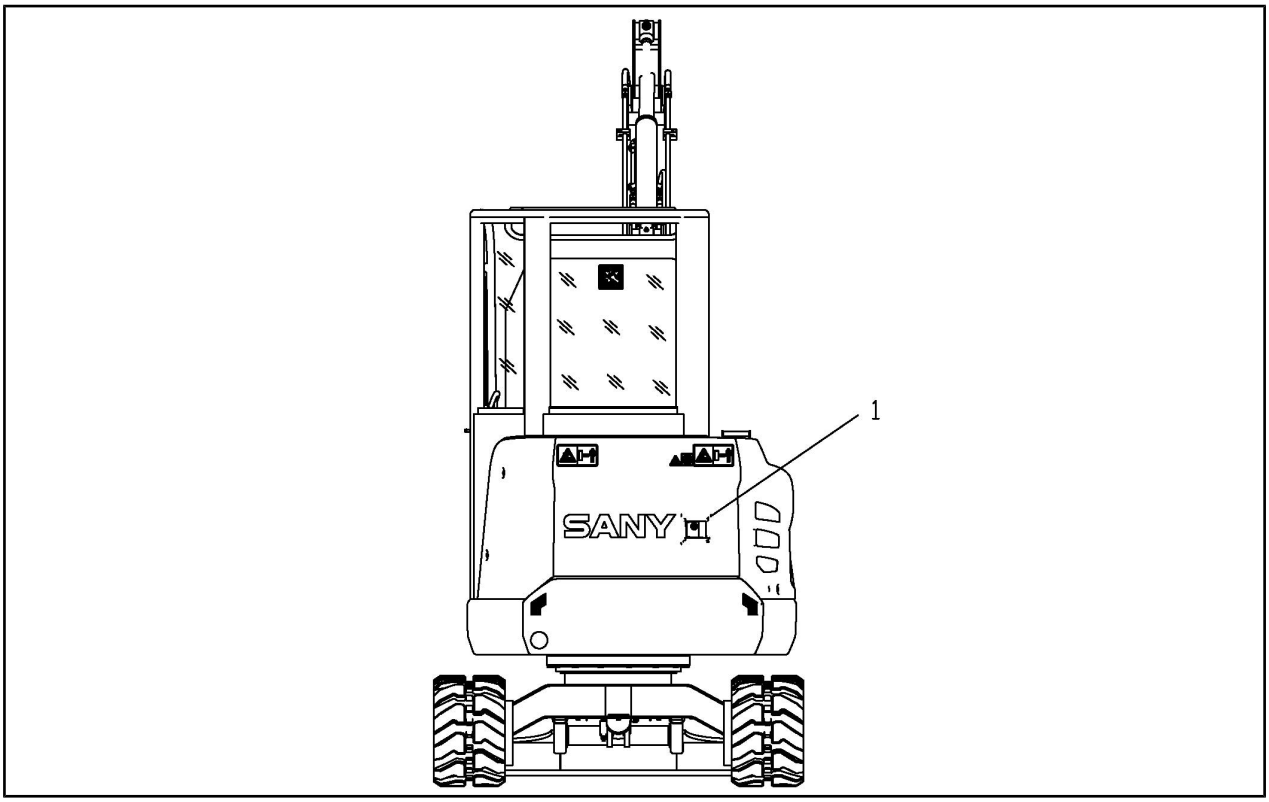


(1) Fuses

The door can be opened with a key.

3.6 Motor and gear units

3.6.1 Diesel engine

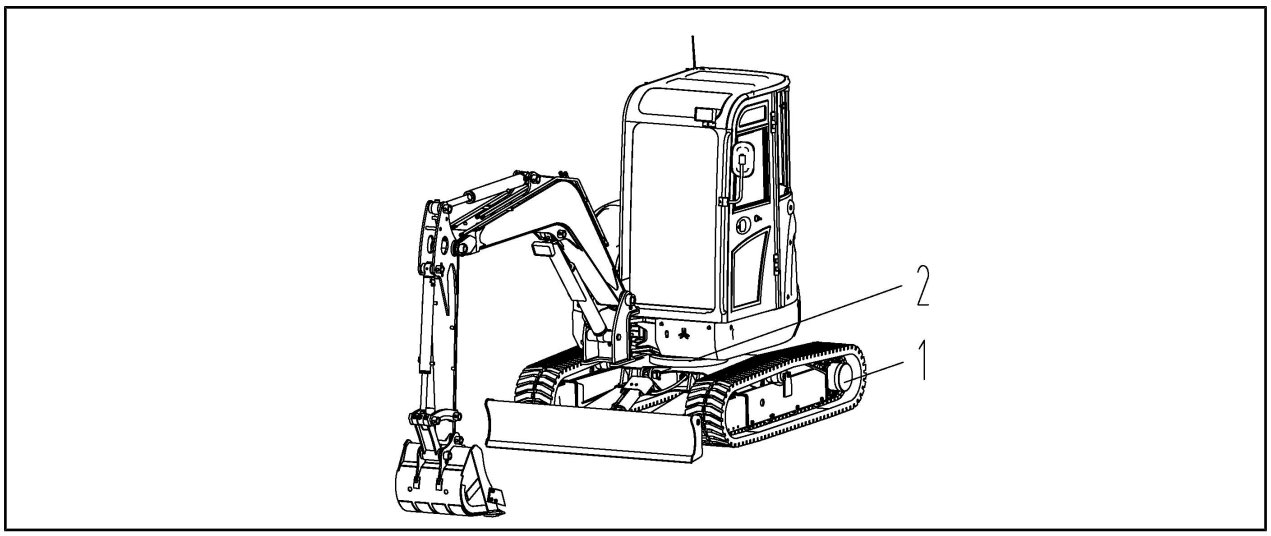


(1) Rear maintenance door

The engine is operated with diesel. It powers the hydraulic pumps, the drive motors and the rotary gear box.

The engine is located behind the rear maintenance door.

3.6.2 Track Drive System and Swing Motor



(1) Drive motor (2) Rotation engine

The track drive system of the excavator is powered by axial piston motors, with one each fitted per chain. These motors allow speeds of 2.4 km/h in low gear and 4.5 km/h in high gear.

The drive is fitted in the rear sections of the chains.

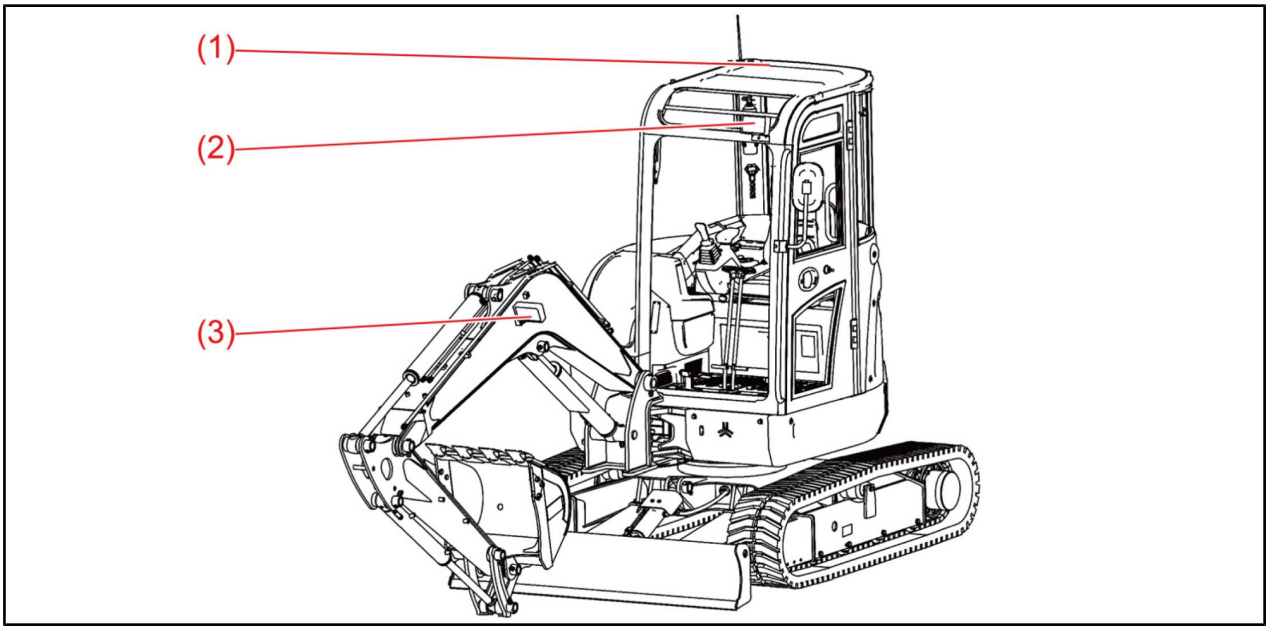
A variable-displacement motor drives the slewing ring and allows 10 rotations per minute.

3.7 Hydraulic system

The machine is equipped with one hydraulic circuit. The hydraulic pump is connected to several hydraulic motors.

3.8 Electrical system / control

3.8.1 Lighting system



(1) Visual driver warning

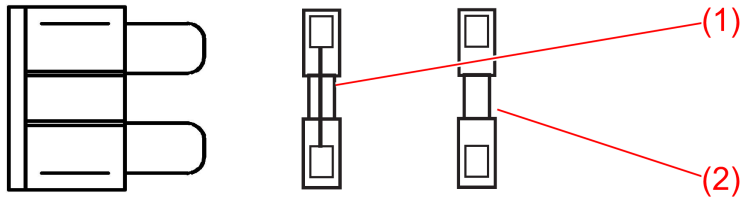
(2) Work spotlight on the cabin

(3) Work spotlight on the boom

3.8.2 Fuses

flat vehicle fuses

The machine is protected by standard-size flat vehicle fuses. The fuses must be replaced once they have tripped. In a defective fuse, the wire at the top of the fuse is defective.



(1) Fuse intact

(2) Fuse must be exchanged

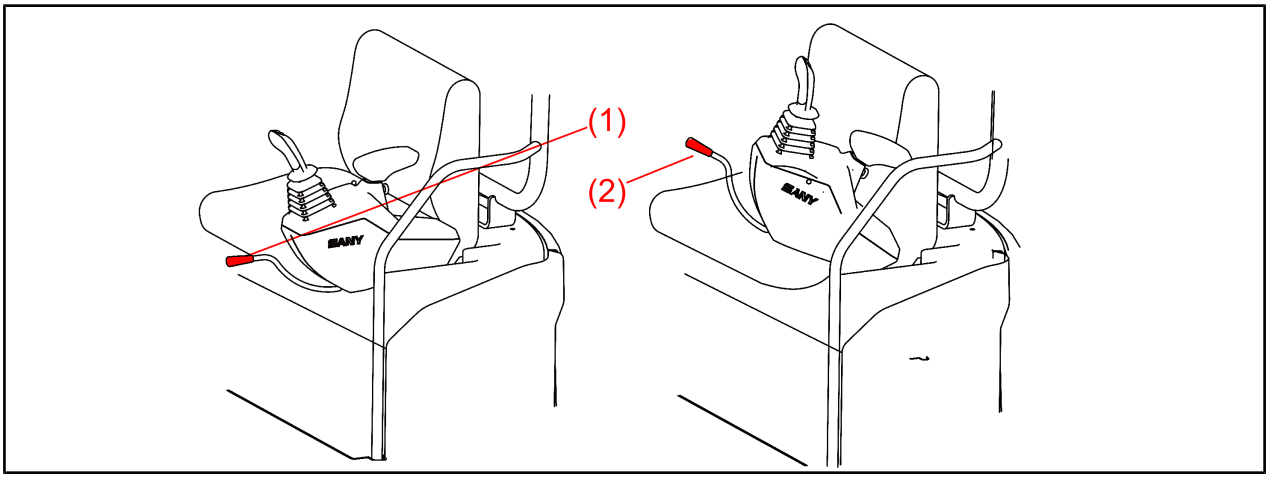
Table 3–1 Fuses

ID	Rated current	User
F1	–	Free
F2	10 A	Driver warning system
F3	15 A	Horn
F4	25 A	Working lights
F5	15 A	Windscreen wiper/wiper fluid, Radio
F6	5 A	Air conditioning control panel
F7	–	Free
F8	20 A	free
F9	10 A	12 V power supply
F10	10 A	Air conditioning compressor
F11	25 A	Display
F12	–	Free
F13	–	Free
F14	20 A	Cigar Lighter，cabin lamp
F15	–	Free
F16	–	Free

Colour codes for the fuses:

1 A	1 A	black	10 A	10 A	red
2 A	2 A	grey	15 A	15 A	blue
3 A	3 A	purple	20 A	20 A	yellow
5 A	5 A	light brown	25 A	25 A	clear
7,5 A	7,5 A	brown	30 A	30 A	green

3.8.3 Emergency stop



(1) Unlocked position (2) Locked position

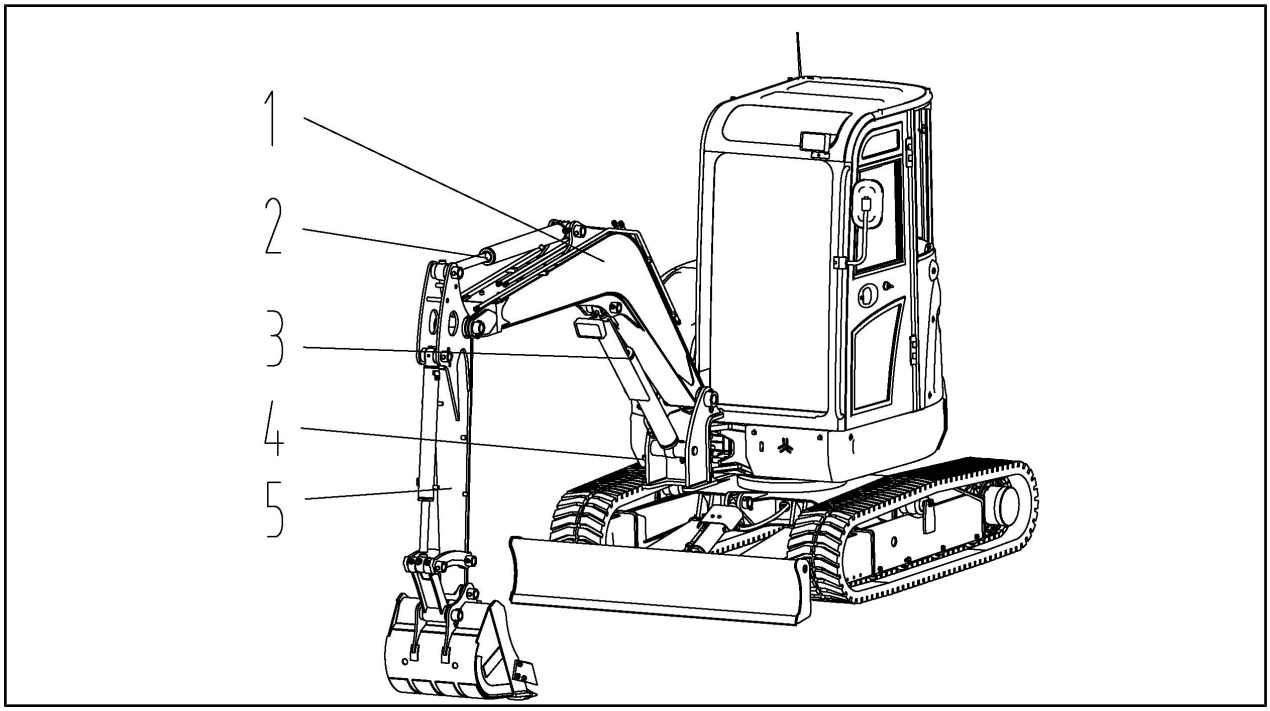
In an emergency, the operator can bring the machine to a safe state by opening the safety bar on the left-hand side of the seat. Opening the safety bar securely switches off all machine movements.

The safety bar must always be pulled up into the locked position when leaving the cabin.

3.8.4 Acoustic driver warning

When the driver warning is activated, an acoustic warning signal (beep) sounds while the vehicle is in motion.

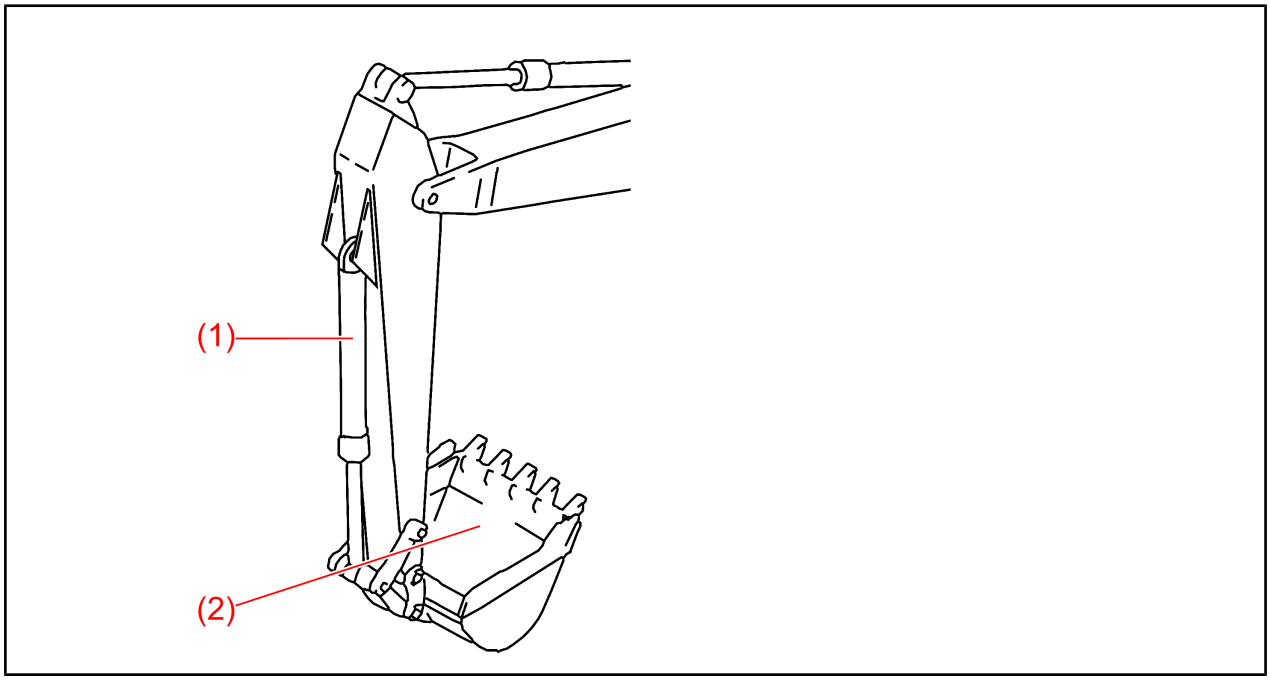
3.9 Boom



(1)	Boom	(4)	Arm swivel cylinder
(2)	Arm cylinder	(5)	Excavator arm
(3)	Boom cylinder		

Boom and excavator arm are moved by hydraulic cylinders.

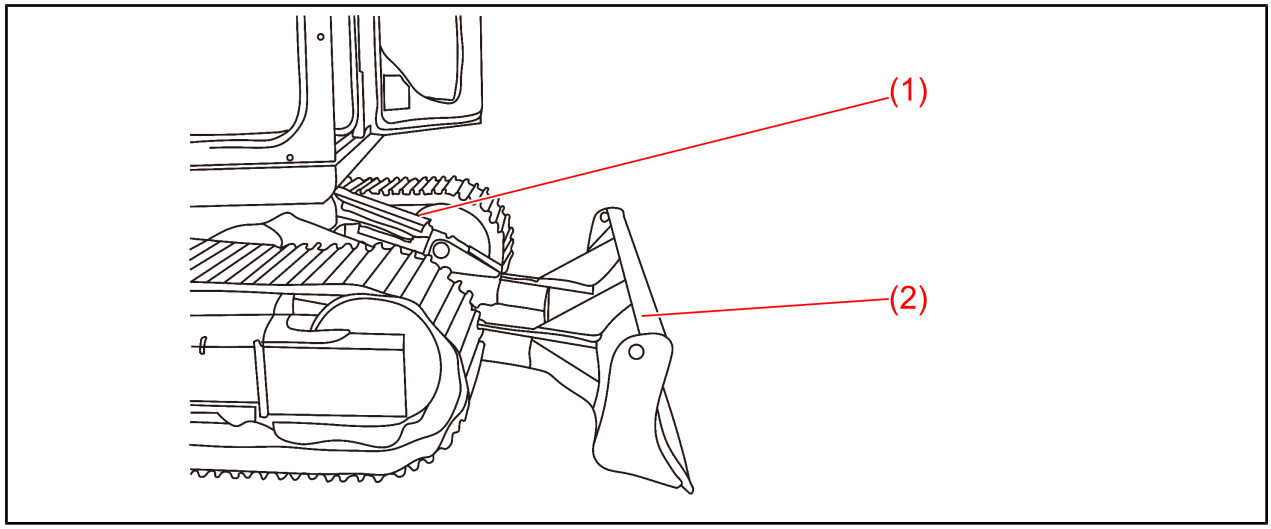
3.10 Bucket



(1) Bucket cylinder (2) Bucket

The bucket is moved by the bucket cylinder on the excavator arm. The bucket can be replaced. Buckets are available in varying styles. The width and number of the teeth can vary. By changing the bucket, the excavator can be adjusted to suit various working conditions.

3.11 Blade



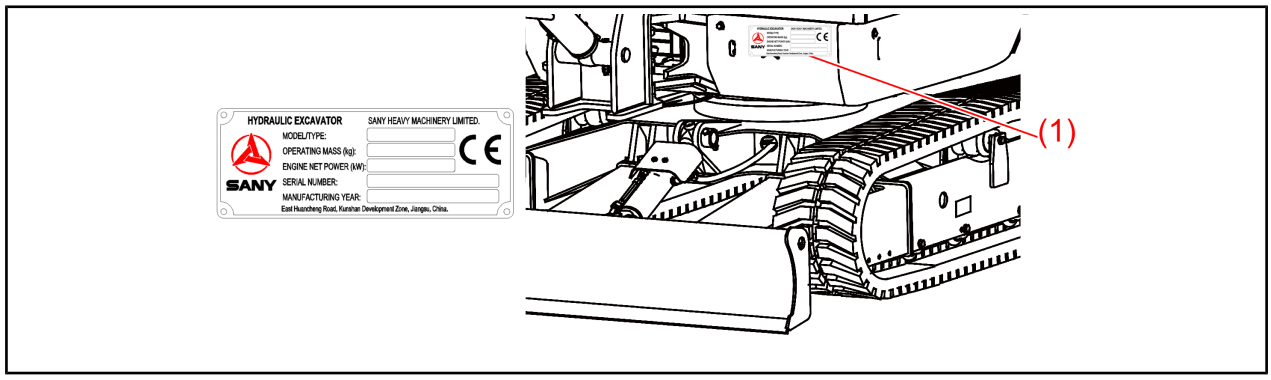
(1) Blade cylinder (2) Blade

The blade is connected to the undercarriage and moves up and down with the help of the blade cylinder.

3.12 Machine identification

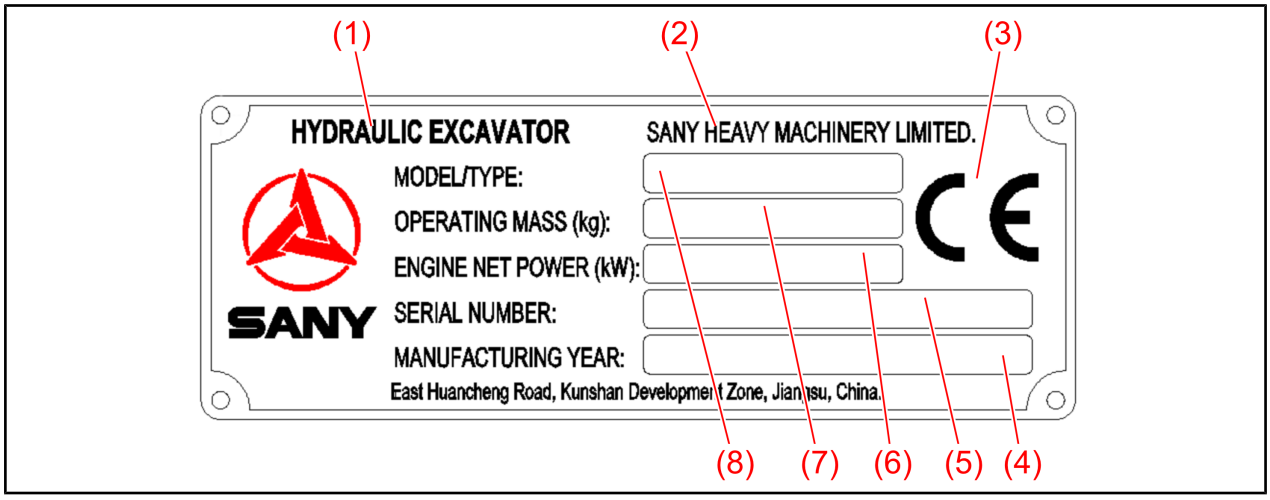
The serial and model numbers on the components are used exclusively by your SANY agent when ordering replacement parts or identifying your tools. It is advisable to keep the information in this manual for future use. The locations of the rating plates are listed below.

Machine identification



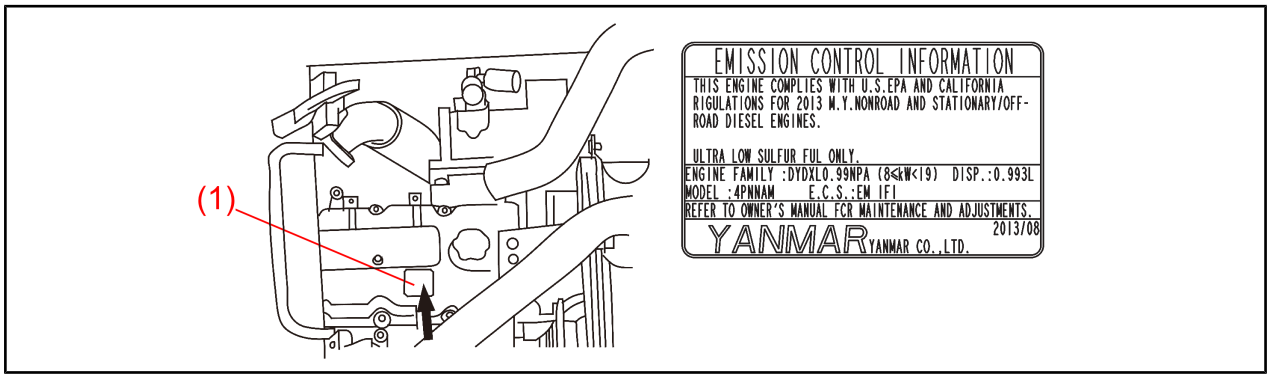
(1) Product rating plate for excavator

Rating plate



(1)	Machine designation	(5)	Serial number
(2)	Manufacturer	(6)	Performance
(3)	CE label	(7)	Weight
(4)	Year of construction	(8)	Product type

Engine identification

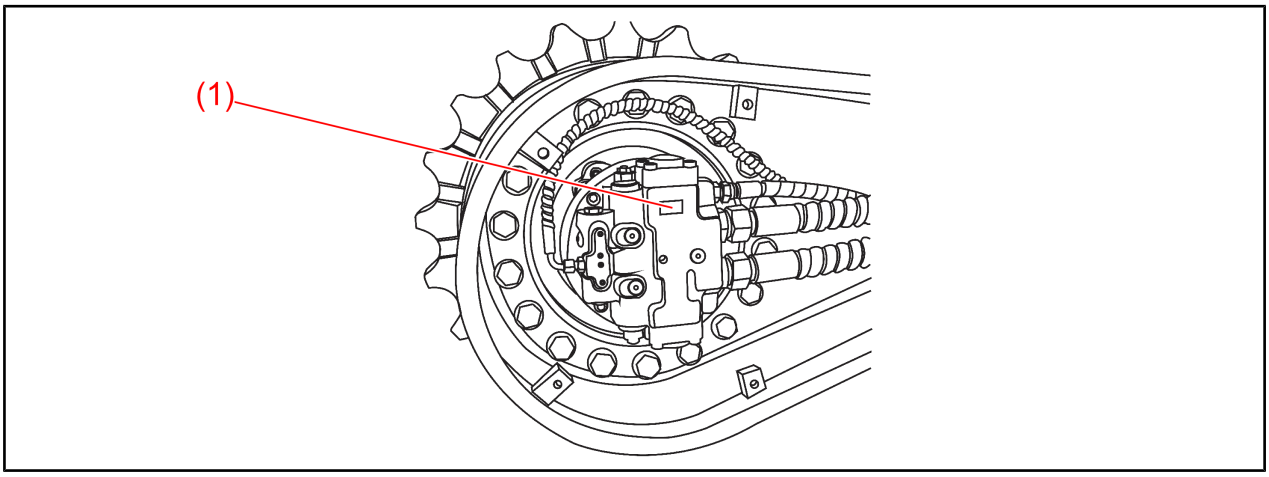


(1) Engine rating plate (example)

Model: _____

ID no.: _____

Identification of the right or left drive motor

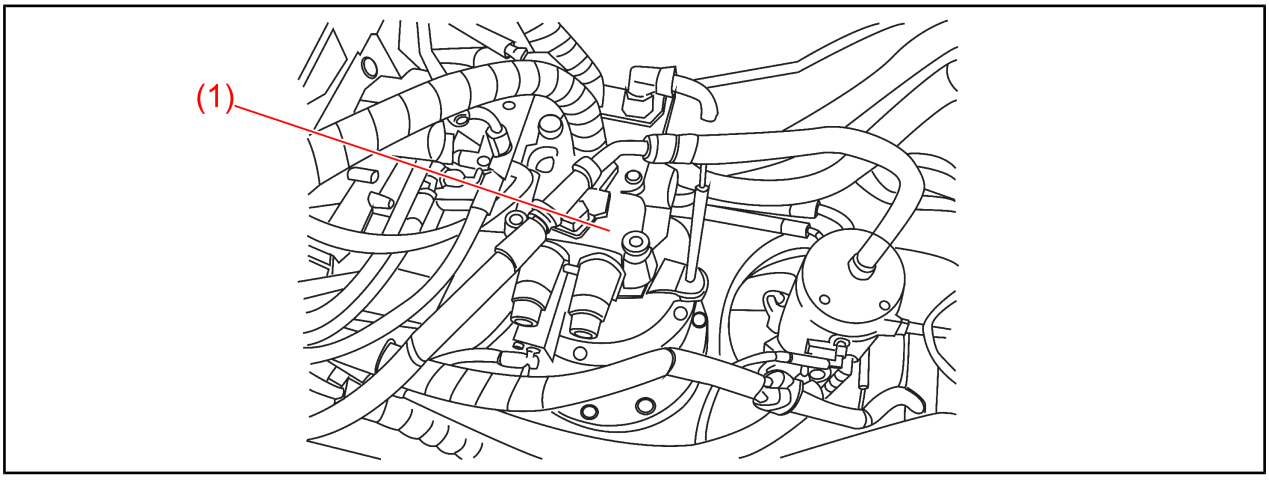


(1) Drive motor rating plate

Model: _____

ID no.: _____

Swing motor identification

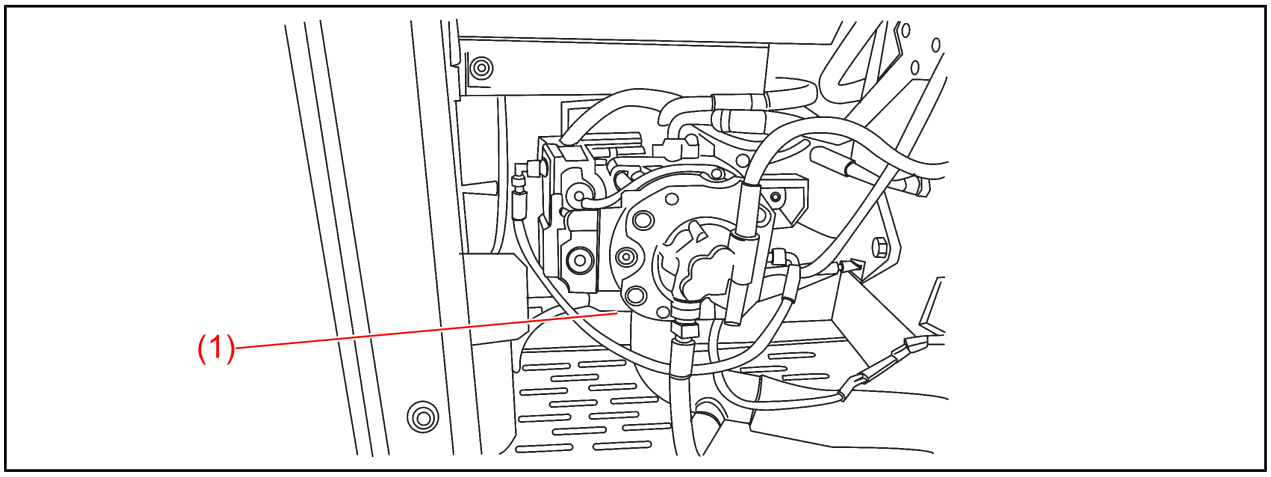


(1) Swing motor rating plate

Model: _____

ID no.: _____

Hydraulic pump identification

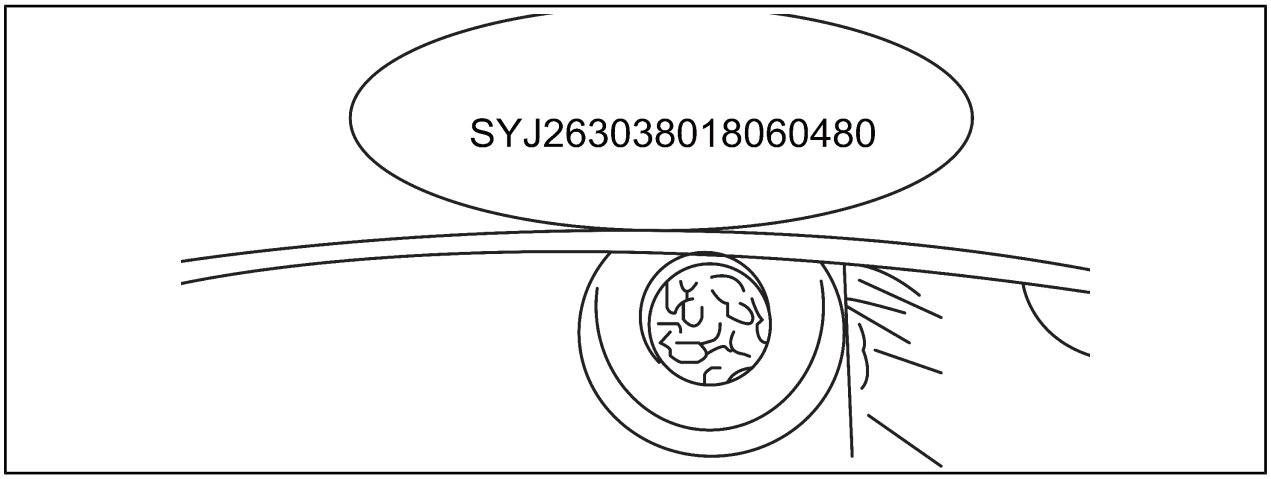


(1) Hydraulic pump rating plate

Model: _____

ID no.: _____

Vehicle identification number



The vehicle identification number is stamped into the front part of the chassis.

SANY

Operation and display elements

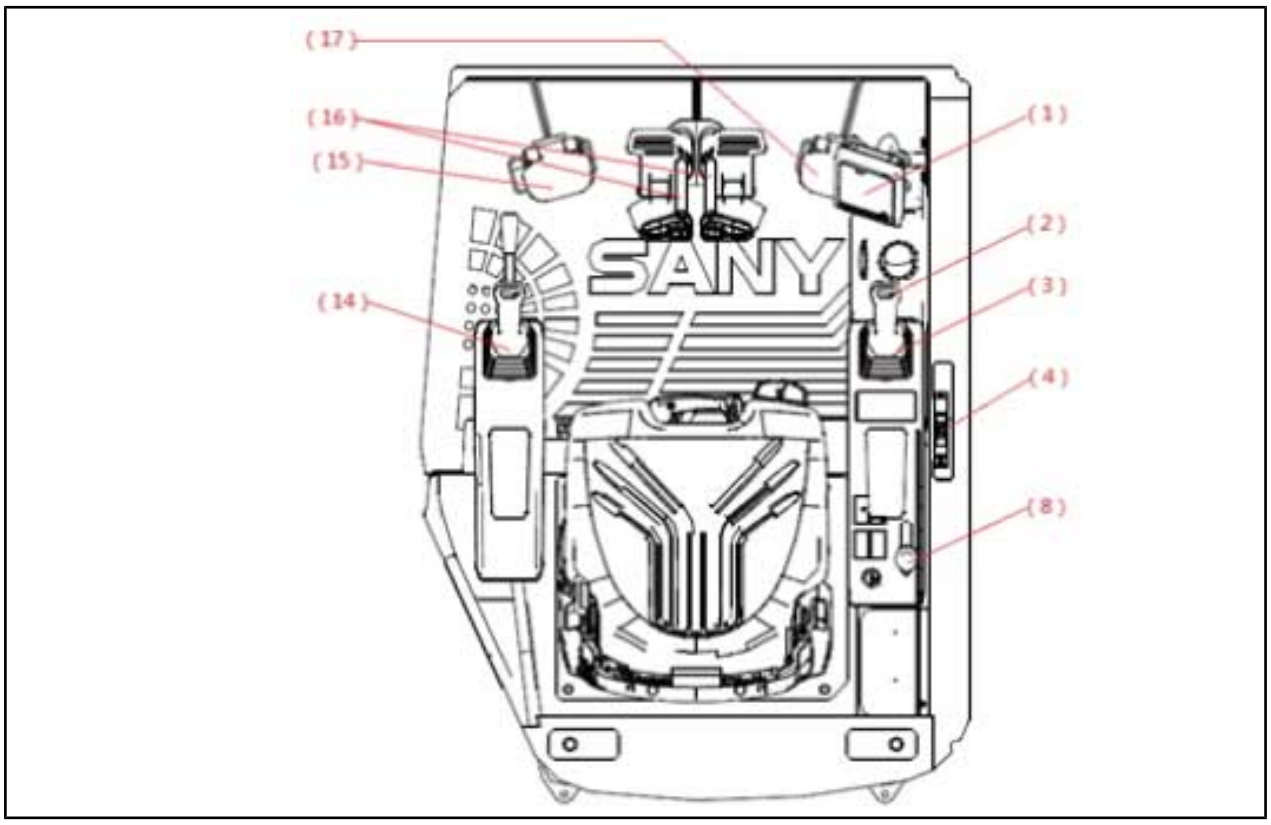
⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

4.Operation and display elements

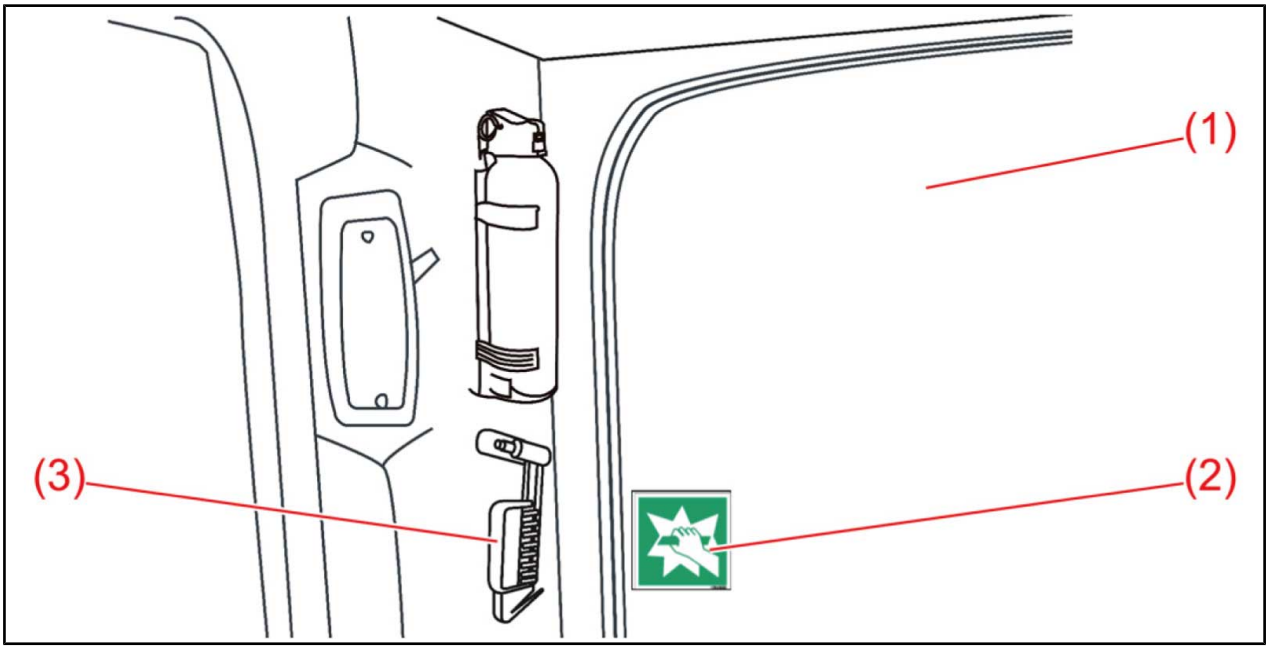
4.1 In the cab

4.1.1 Overview



(1)	Display	(10)	Ignition lock
(2)	Horn button	(11)	Windscreen washing system button
(3)	Right joystick	(12)	Windscreen wiper switch
(4)	Dozer blade controller	(13)	EMERGENCY stop button
(5)	Switch for working lights	(14)	Left joystick
(6)	Radio control panel	(15)	Optional
(7)	Driver warning switch	(16)	Drive lever
(8)	Throttle lever	(17)	Pedal for boom swivel
(9)	Air conditioner control panel		

4.1.2 Emergency exit



(1) Emergency exit

(2) Emergency exit marking

(3) Emergency hammer

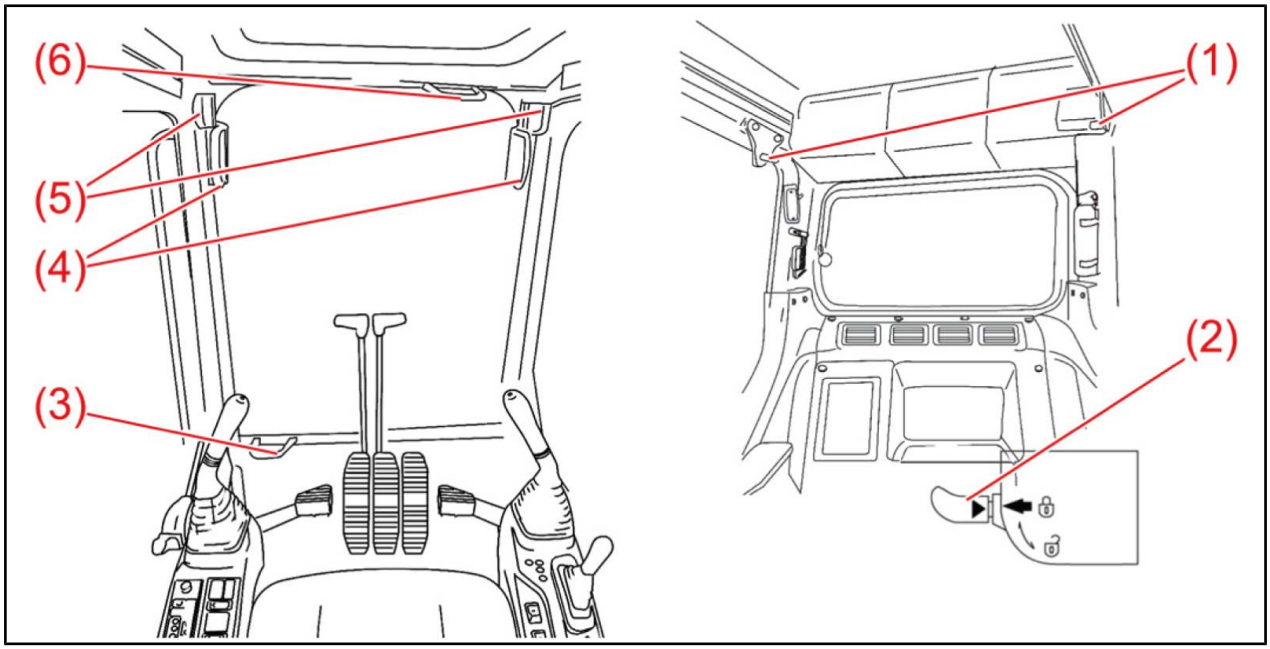
In order to be able to climb down from the machine safely in an emergency, the rear window can be used as an EMERGENCY exit, if exiting by the door is not possible.

Break the glass with the emergency hammer.

The emergency exit is now open.

4.1.3 Upper windscreen

4.1.3.1 Overview



(1) Latch
(2) Lock
(3) Lower handle
(4) Handles
(5) Lever
(6) Upper handle

The windscreen can be slid under the roof of the cabin.

4.1.3.2 Opening the upper windscreen

➢ Machine is parked on uneven subsoil.

➢ Safety bar in locked position.

➢ Windscreen wiper in the correct position.

1. Hold the left and right grips of the front window and pull both levers so as to release the locks on top of the front window. ⇨ The roof hatch is now unlocked.

2. Hold the lower handle in the cabin with the left hand and the upper handle with the right hand. Push the window upwards.

3. Push the window toward the latch in the rear of the cabin until the window locks securely into position.

4. Ensure that the lever is in the LOCK position.

5. Ensure that the arrow on the latch is aligned with the arrow on the lever. ⇨ The lock then activates.

6. If the arrow on the latch is not aligned with the arrow on the lever, the lock has not been activated. Repeat step 5 to activate the lock.
» The upper windscreen is now open.

4.1.3.3 Closing the upper windscreen

➢ Machine is parked on uneven subsoil.

➢ Safety bar in locked position.

1. Pull the left and right grips and the levers downward in order to release the locks.

2. Hold the lower handle with the left hand and the upper handle with the right hand. Push the window forward and lower it slowly.

3. When the lower portion of the front window is at the same level as the upper portion of the lower window, push the front window forward so that both the left and right latches of the locks engage.

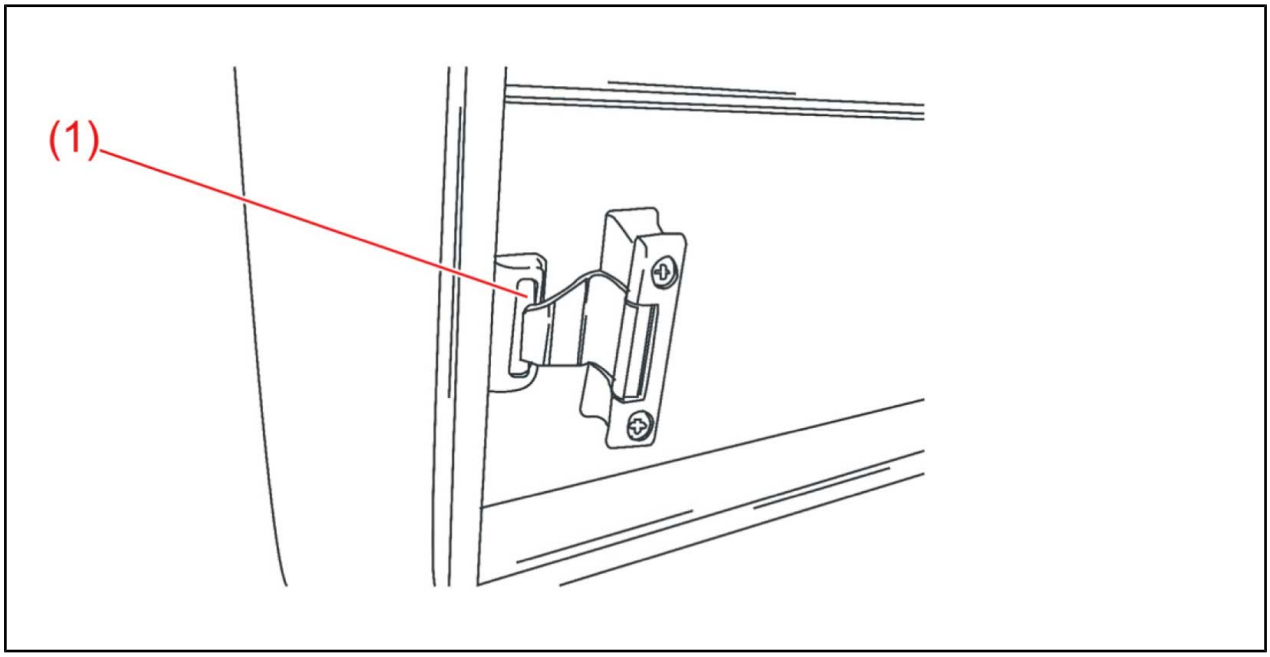
4. Ensure that the lever is in the LOCK position.

5. Ensure that the arrow on the latch is aligned with the arrow on the lever ⇨ The lock then activates.

6. If the arrow on the latch is not aligned with the arrow on the lever, the lock has not been activated. Repeat the process to activate the lock.
» The upper windscreen is now closed.

4.1.4 Cab door window

4.1.4.1 Overview



(1) Catch lock

4.1.4.2 Opening the cabin door window

1. Unlock the latch.

2. Push the windscreen back.
» The cabin door window is now open.

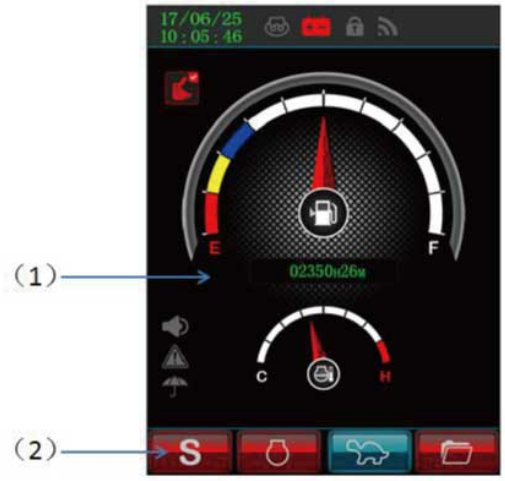
4.1.4.3 Closing the cabin door window

1. Push the windscreen back.

2. Once the cabin door window has been closed, ensure that the catch lock is correctly engaged.
» The cabin door window is now closed.

4.1.5 Monitoring and control unit

4.1.5.1 Overview



(1) Display (2) Function keys (F1-F4)

A detailed description of the display elements: See also Main display.

4.1.5.2 Display

The display shows the operating states, system information or programming information. This depends on the indicator status selected. The displayed information appears as symbols or text. Some functions can only be accessed by maintenance personnel with a password.

4.1.5.3 Function keys

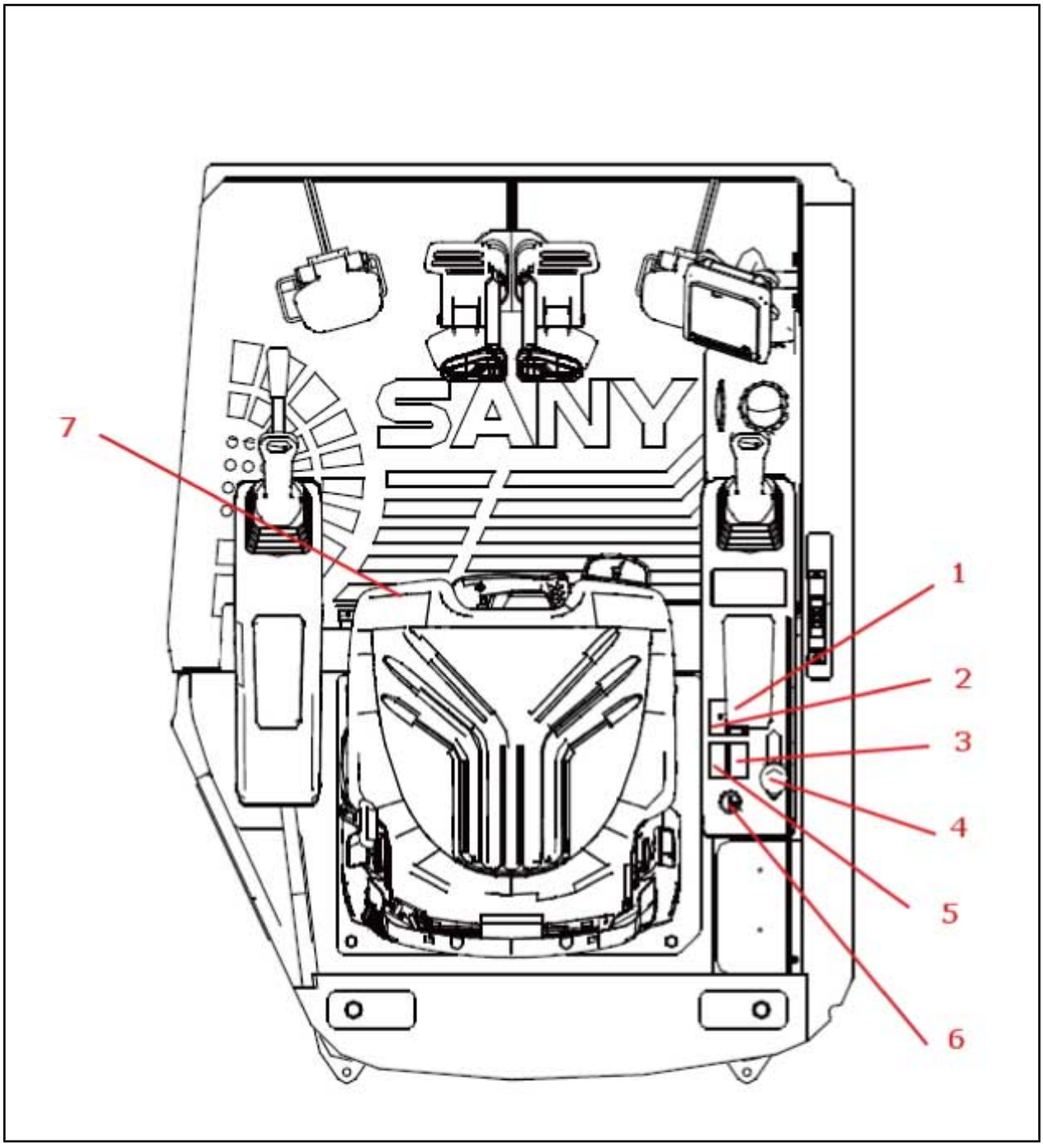
The function keys switch the display to different modes or open advanced functions. Each function is directly shown on the display screen above the key.

See also

Main display

4.1.6 Toggle switch and buttons

4.1.6.1 Toggle switch and buttons



(1) Operation of working lights

(3) Operation of windscreen wiper

(3) Operation of driver warning

(4) Throttle lever

(5) Operation of windscreen

(6) Ignition lock

(7) EMERGENCY stop button

4.1.6.2 Switch for work spotlights

The work spotlight switch is used to switch the spotlights on the boom and on the cabin on and off.

4.1.6.3 Driver warning switch

The driver warning switch is used to switch the driver warning on the cab roof on and off.

4.1.6.4 Windscreen wiper switch

Activate the switch to improve visibility during rain or when the windscreen is very dirty. The windscreen wiper is activated. Pressing the switch in the opposite direction deactivates the windscreen wiper.

Activate the windscreen washing system first if the windscreen is dry and very dirty. The spray of cleaning fluid prevents damage to the windscreen.

⚠ CAUTION
Before activating the switch, ensure that the front windscreen is closed.

4.1.6.5 Windscreen washing system button

Activating this button causes wiper fluid to be sprayed onto the windscreen.

Hold the button down to spray more wiper fluid. Release the switch.

The switch automatically returns to its starting position and the spray stops.

⚠ CAUTION
Before activating the button, ensure that the front windscreen is closed.

4.1.6.6 Horn button

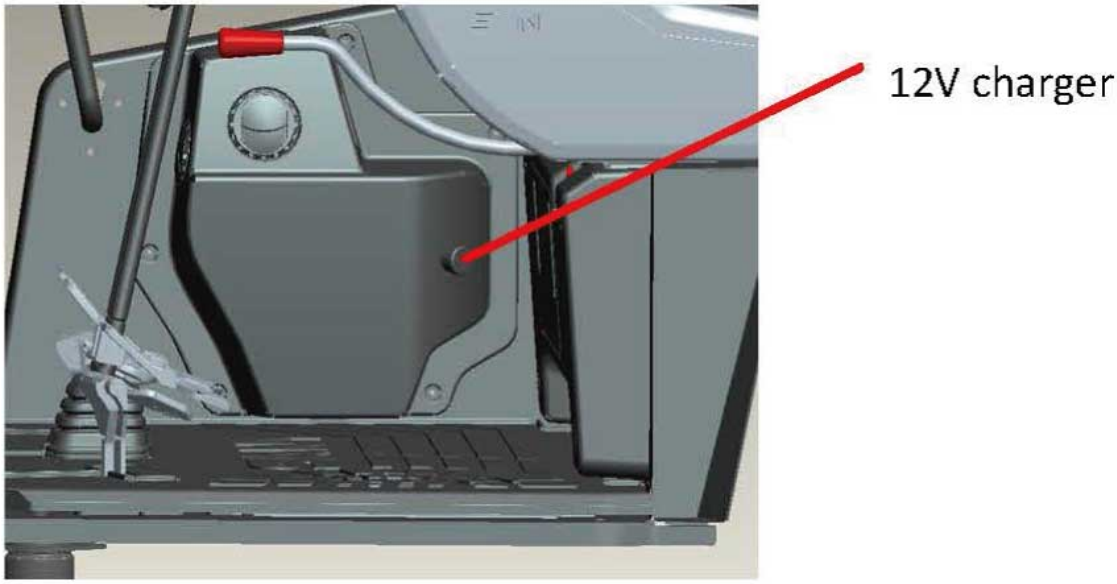
The horn sounds when the horn button is pressed.

4.1.6.7 EMERGENCY STOP

The machine is equipped with an EMERGENCY stop button in the footwell.

In an emergency, pushing the EMERGENCY stop button brings the machine to a safe condition. Pushing the EMERGENCY stop button safely switches off all machine movements.

4.1.6.8 12V charger

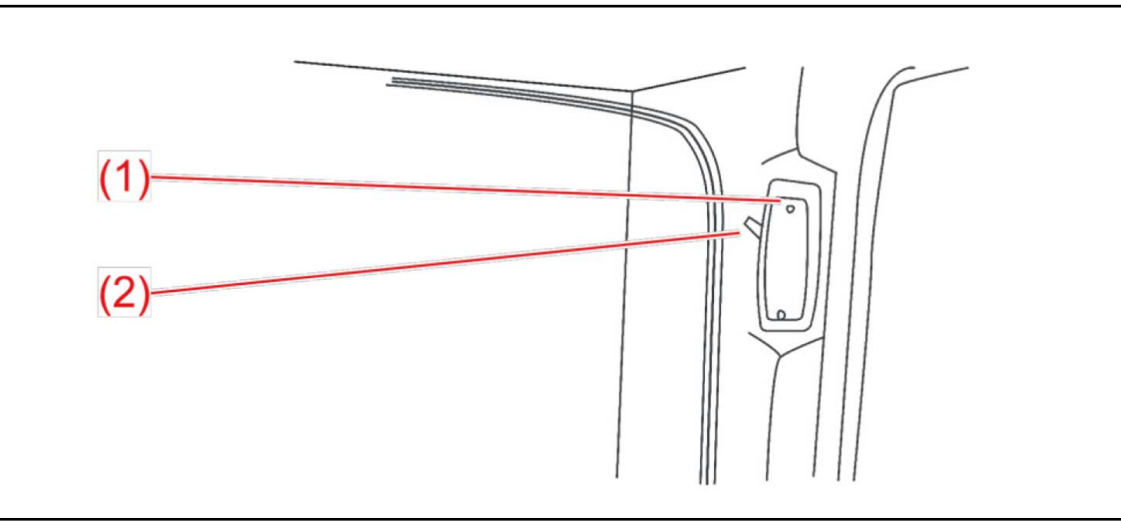


This switch can be used to light a cigarette. Push in the lighter.

It springs back a few seconds later. Pull it out to light a cigarette.

When the lighter is removed, the socket can be used as power source for devices with a rated power of less than 96W(12V×8A).

4.1.6.9 Cab lamp



(1) Cab lamp (2) On/off switch

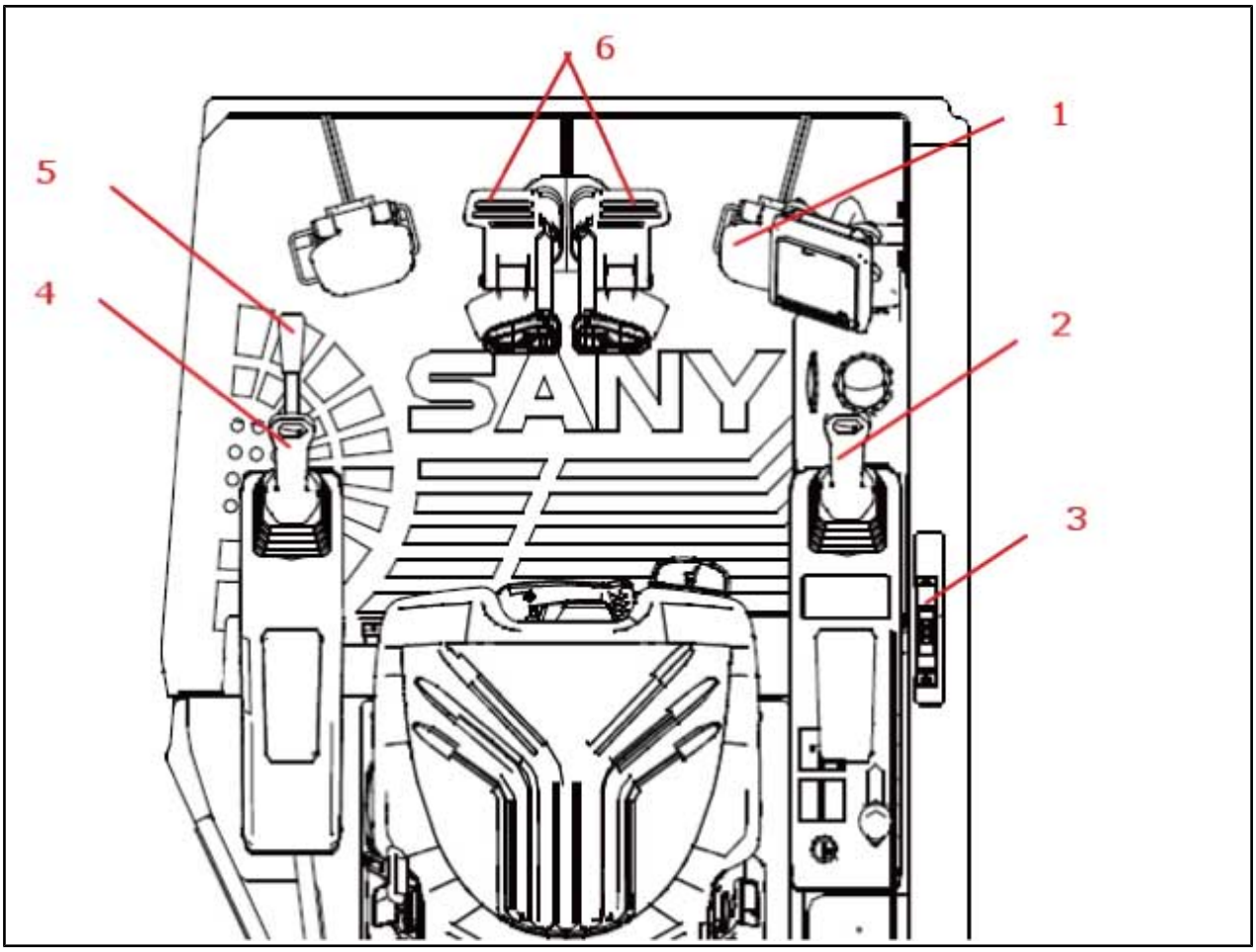
The cab light is mounted in the rear section of the cab.

Activate the switch to turn the cab lamp on or off.

The cab lamp can also be switched on when the ignition lock is set to OFF.

4.1.7 Joysticks and pedals

4.1.7.1 Overview



(1) Pedal for boom swivel
(2) Right joystick
(3) Dozer blade controller
(4) Left joystick
(5) Safety bar
(6) Drive lever

4.1.7.2 Throttle

Machine damage from inadvertent activation of the pedals Inadvertent operation of the pedals or the throttle can lead to abrupt machine motions or machine damage.

• Only place feet on the pedals to drive.

The drive levers are used to determine the direction of movement of the machine. The pedals are connected to the relevant drive lever. They can be used as an alternative to the drive levers. The left drive lever controls the left crawler; the right drive lever controls the right crawler.

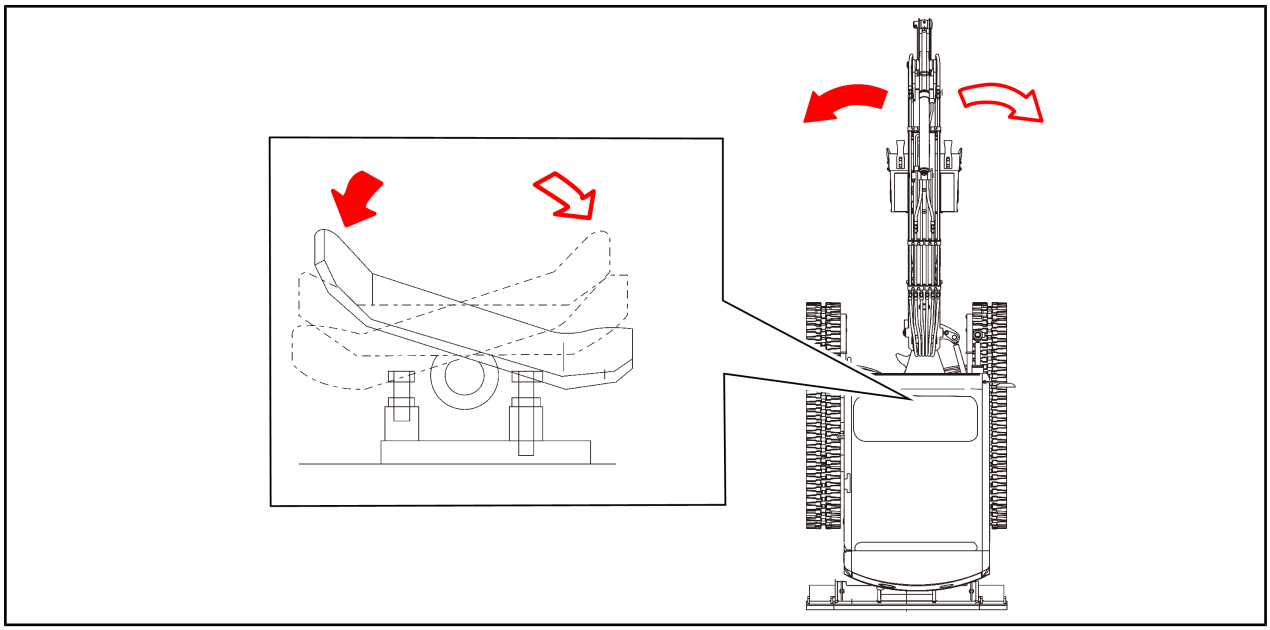
Setting	Function
Forward	Drive forward
Neutral	The machine stands still
Reverse	Drive backward
Opposite direction	Rotate in place

If the undercarriage is facing towards the rear, the direction of travel when operating the drive lever will be the opposite way. The machine drives forward in reverse and backward in forward drive. The directions of travel for left and right are also the opposite.

As a result, the orientation of the undercarriage must be checked before operating the drive lever. The undercarriage is facing the front if the drive sprocket is in back.

▪ If the drive levers are enabled, the engine speed increases to the value set using the throttle control lever.

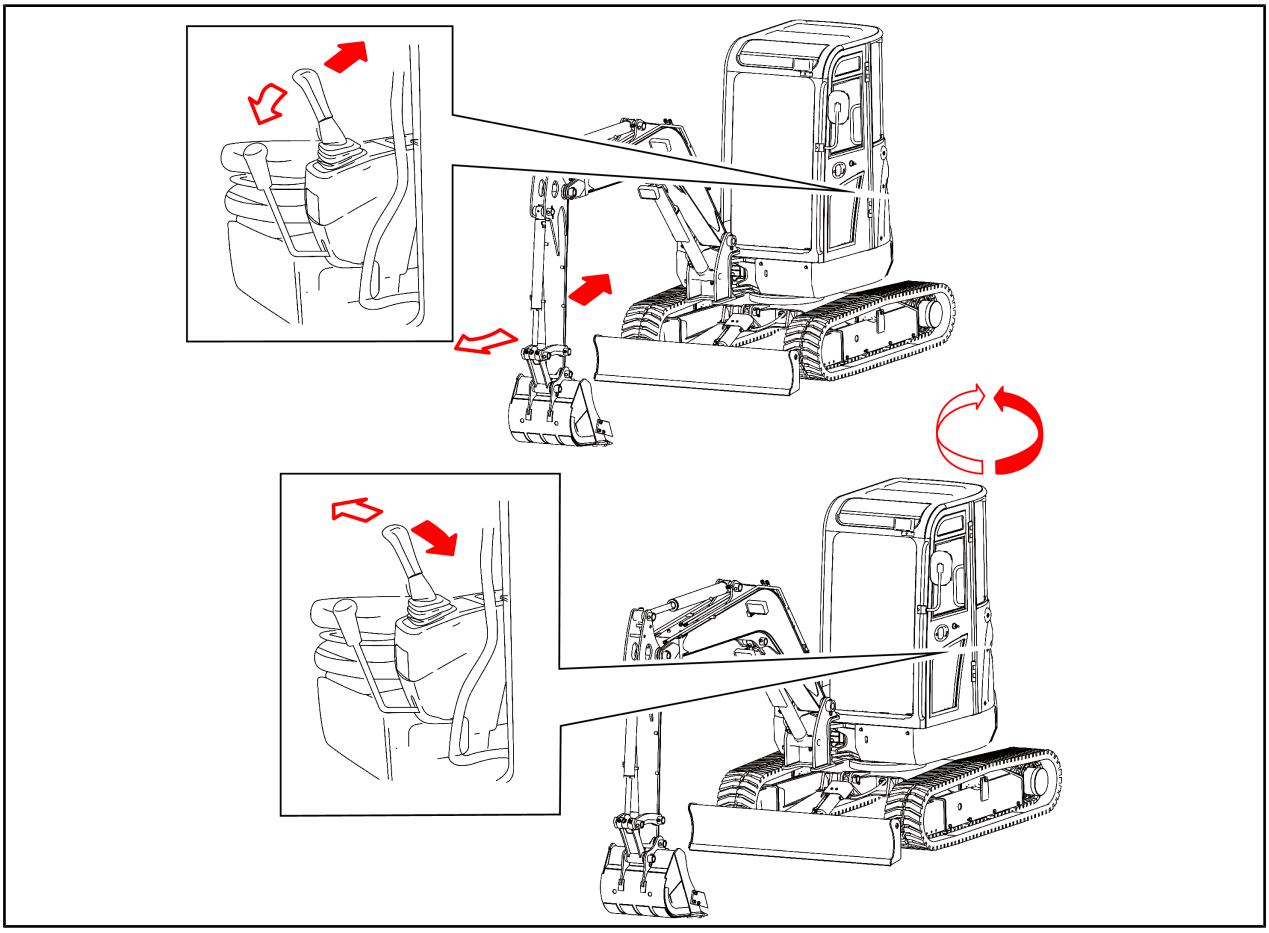
4.1.7.3 Pedal for boom swivel



Setting	Function
Left	Boom swivels to the left
Right	Boom swivels to the right

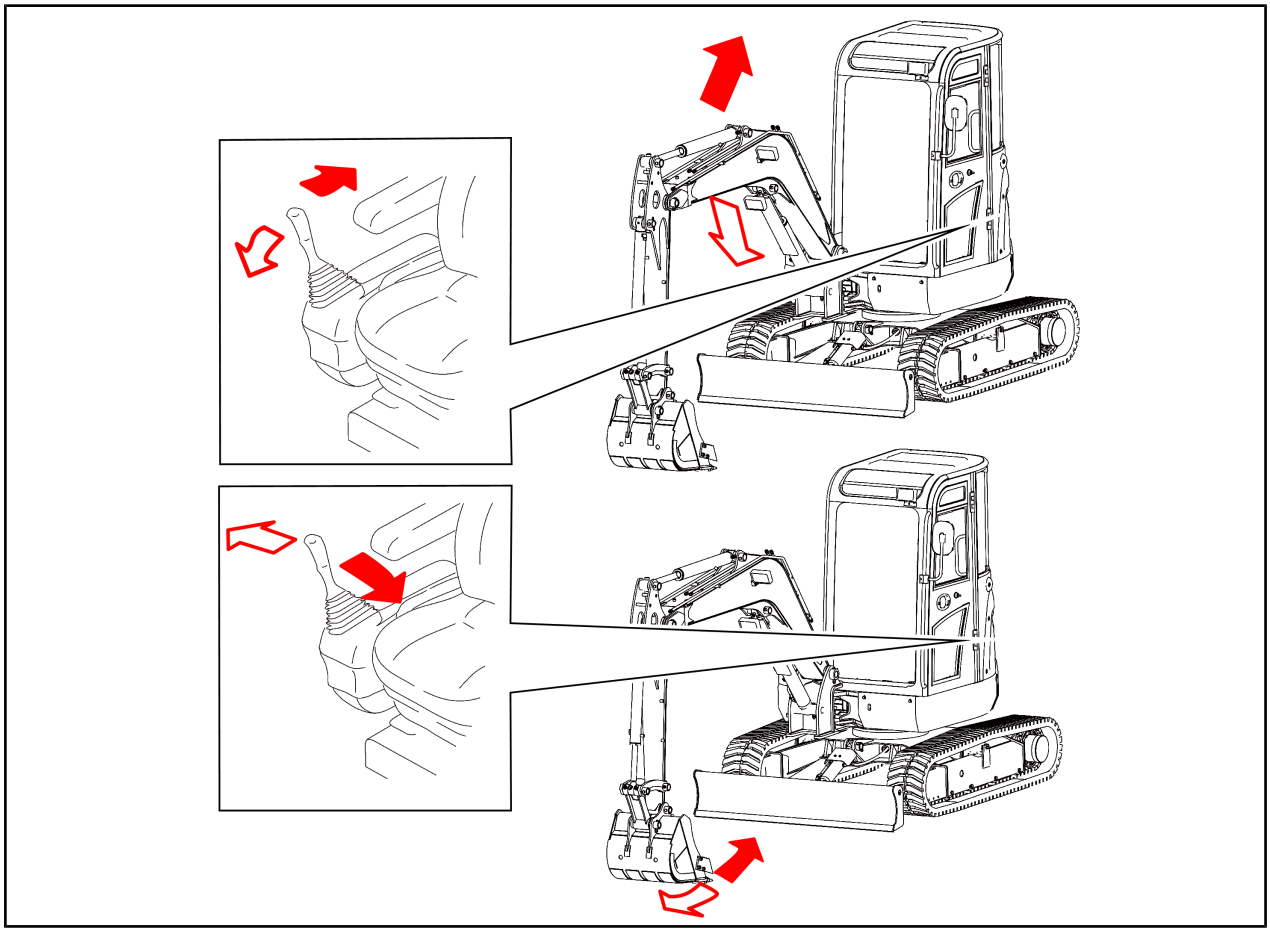
The pedal is secured against unintentional operation by a cover. The pedal must be folded out before operating the boom.

4.1.7.4 Left joystick



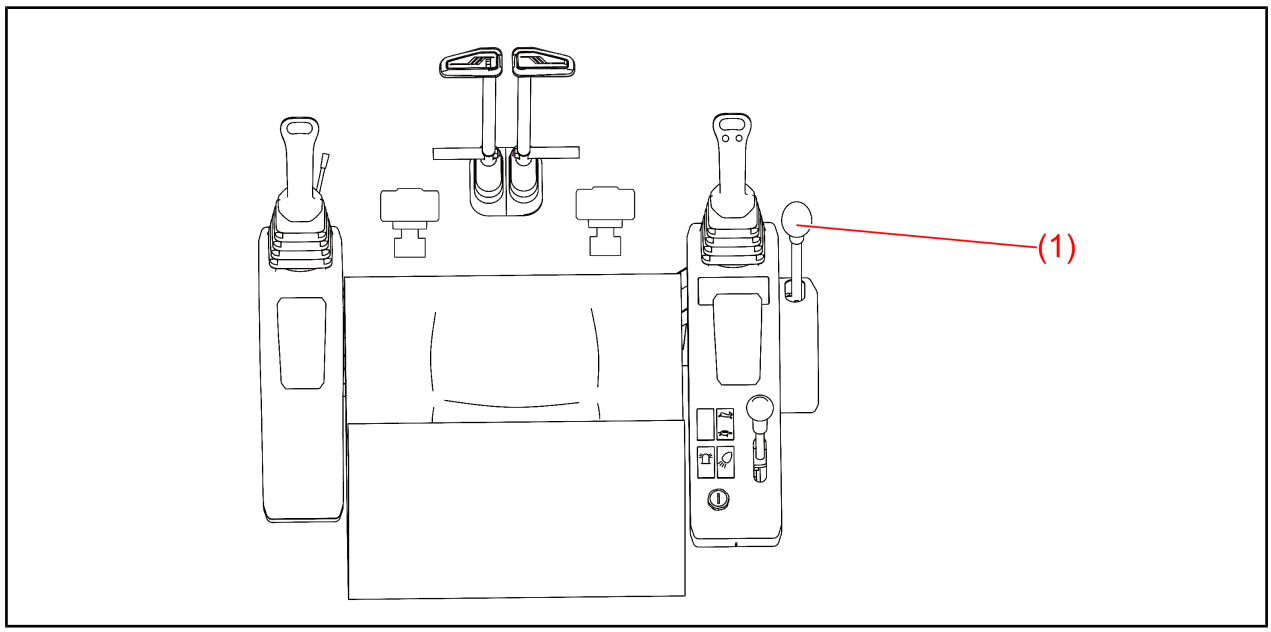
Setting	Function
Forward	Move the excavator arm away from the operator
Reverse	Move the excavator arm toward the operator
Left	Turn the upper carriage anticlockwise
Right	Turn the upper carriage clockwise

4.1.7.5 Right joystick



Setting	Function
Forward	Lower the boom
Reverse	Lift boom
Left	Fold in the bucket
Right	Fold out the bucket

4.1.7.6 Blade control system



(1) Blade control system

Setting	Function
Forward	Lowering the blade
Reverse	Raising the blade

4.1.8 Heating System

4.1.8.1 Control Panel

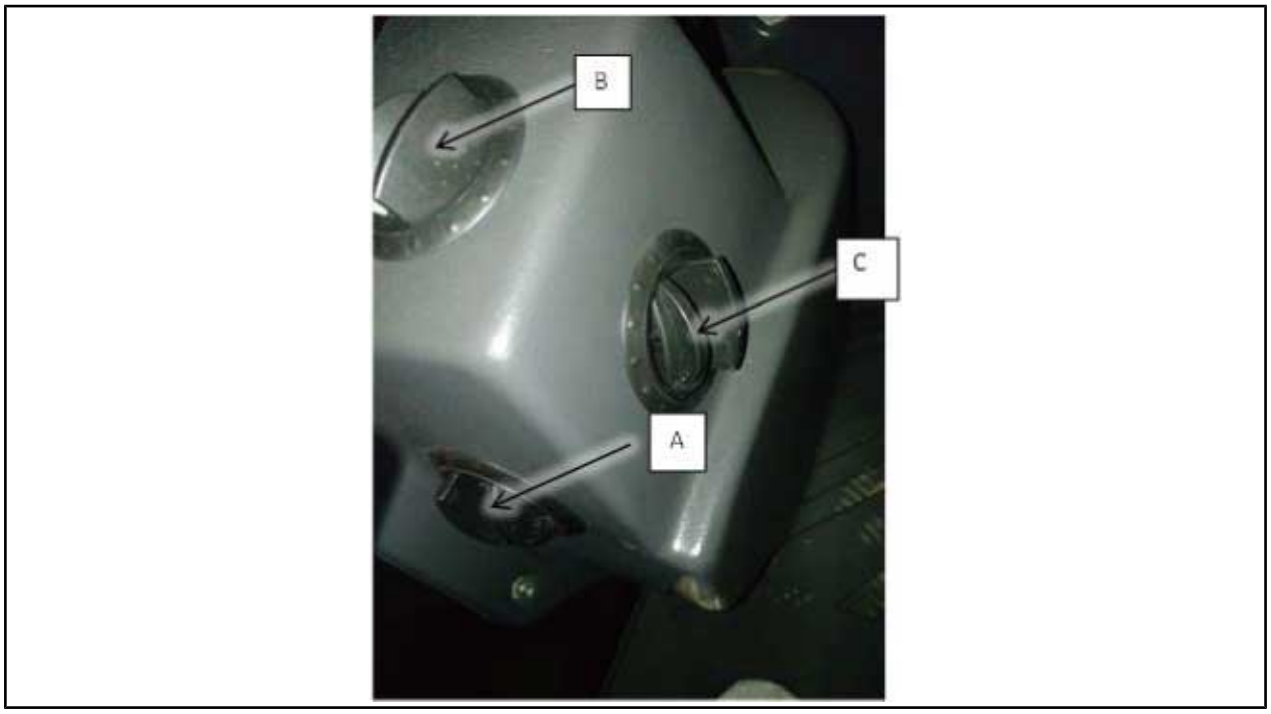
Air Volume Regulator: Regulate air volume (levels 1, 2 and 3 from minimum to maximum) in cooling or heating mode. The zero position is the OFF switch of blower.

- Since the heating system is in connection with water tank, the tank must be drained empty to prevent freezing cracks of the heater pipes when ambient temperature is below -35°C and the air conditioner is not used for a long period of time

1. Start the engine.

2. Turn the air volume regulator to the right side to positions 1, 2 and 3. The blower is started and begins to deliver air to the cab.

4.1.8.2 Air outlets



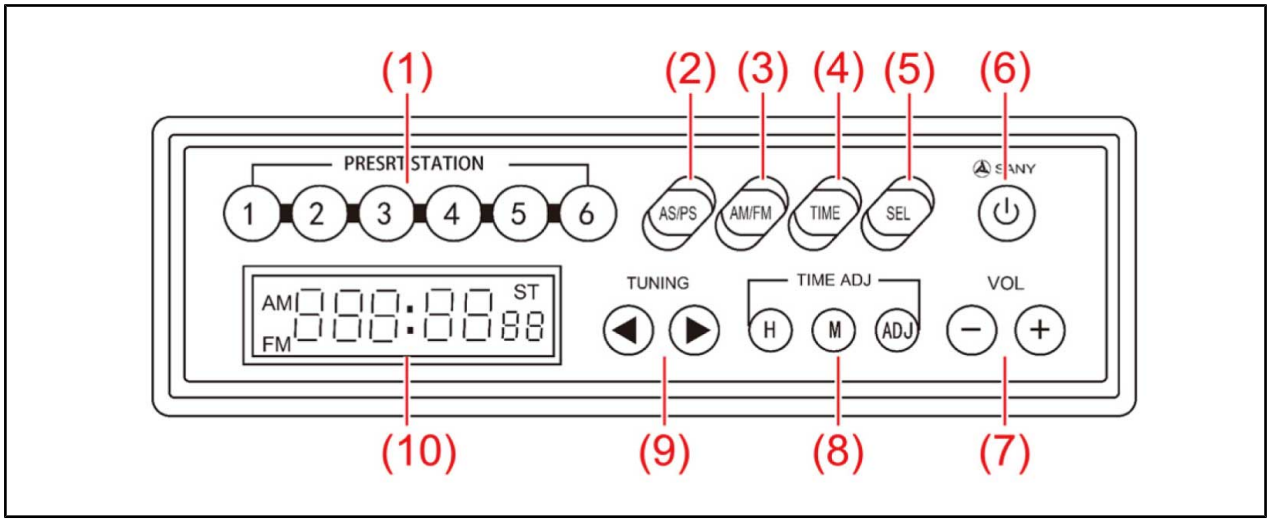
A: One outlet for defrosting

B: One outlet for face

C: One outlet for the side

4.1.9 Radio

4.1.9.1 Overview



(1) Assignment button
(2) AS/PS button
(3) FM/AM band selector
(4) Time indicator
(5) Sound effect button
(6) ON button
(7) Volume control
(8) Time settings button
(9) Tuning button
(10) Display

Set the radio volume so that sounds from outside can be heard. To avoid damage, do not clean the control panel and buttons of the radio with benzene, thinning agents or other solvents.

For cleaning, use only a soft, dry cloth. Excessive dirt on the radio may be wiped off with alcohol.

If the battery is removed or replaced, the saved stations and time will be erased and must be reset.

4.1.9.2 Operation elements

Preset button

Saved stations are selected with the [preset] button

AS/PS button

The [AS/PS] button can be used to automatically scan for stations and to save them.

FM/AM band selector

Use [FM/AM] to switch between the two bands.

Time indicator

The display shows the radio frequency by default. If the [time indicator] button is pushed, the display shows the current time for 5 second and then returns to the frequency display.

If the [time indicator] button is pushed for longer than 5 seconds, the region (ASIA – EU) can be called up.

Sound effects button

The [sound effect] button can be used to choose between the VOL - BAS – TRE – Balance sound effects. If more than 5 seconds past without the host system being pressed, the frequency reappears on the display.

The set sound effects are displayed on the air conditioner display.

On button

The radio is turned on and off using the [ON] button.

Volume control

Setting	Function
[+ button]	Increase the volume. The maximum volume is 40.
[- button]	Decrease the volume. The minimum volume is 0.

After 5 seconds, the frequency reappears on the display screen.

Time setting button

The time is reset by using the [time setting] button.

Setting	Function
H	Hour
M	Minute
ADJ	Reset the time to minute 00

Tuning button

The frequency can be changed by using the [tuning] button.

Button	Function
Left	Switch to a lower frequency
Right	Switch to a higher frequency

Air conditioner display

The band, radio frequency, memory space and time are shown on the display screen.

4.1.9.3 Operation

Turning the radio on and off

1. Push the [ON button].
⇨ The radio is switched on.
⇨ The frequency is displayed on the air conditioner display.

2. Push the [ON button] again » The radio is switched off.

Selecting saved stations

To listen to a saved station, press the corresponding preset button for at least 1.5 seconds.

Search radio stations

1. Push the [ON button].
⇨ The frequency appears on the display screen.

2. Press a [tuning button] to select the frequency.
There are two ways to search for a radio station (manually or automatically)

Manual search

Press and hold one of the [tuning buttons] until the desired frequency appears on the display screen.

⇨ Once the upper or lower limit of the frequency band has been reached, the search starts from the beginning of the band (from max to min or min to max).

Automatic search

1. Press one of the [tuning buttons].
⇨ The automatic search for radio stations begins.
⇨ The search ends once a station has been found.

2. Press one of the [tuning buttons] to search for the next station.

3. To stop the automatic search, press the [tuning button] during the automatic search.
⇨ The dial returns to the last frequency found before the [tuning button] was pressed.
» The radio station has been selected.

Manually saving radio stations

1. Push the [ON button].
⇨ The frequency appears on the display screen.

2. Press a [tuning button] to select the frequency. The user can select between the manual or automatic search.

3. As soon as the desired frequency appears on the display screen, press one of the [preset buttons] for at least 1.5 seconds to confirm it.
⇨ The music is muted. The music plays again once the saving operation is complete.
⇨ The number of the preset button and the frequency are displayed. The saving process has ended.

4. Once the saving process has been completed, the saved station can be listened to by pressing one of the [preset buttons] (for at least 1.5 seconds).
» The radio stations have now been saved manually.

Automatically saving radio stations

The stations can be saved automatically using the [AS/PS] button.

➢ The radio plays.

1. Press the [AS/PS] button

⇨ The saved stations are scanned through and played for 10 seconds while the number of the saved station blinks on the display screen.
⇨ Pressing the [AS/PS] button again allows the station currently playing to be selected.

2. Press and hold down the [AS/PS] button for at least 2 seconds.
» This starts the auto-scan for the current stations. The 6 radio stations with the strongest signals are saved.

Sound effect options

VOL - Volume:

- Press the [+ button] to raise the volume to a maximum of 40.
- Press the [- button] to lower the volume to a minimum of 0.

BAS - Bass:

- Press the [SEL button] to select the sound effect and BAS.
- Press the [VOL button] within 5 seconds to select a bass level between +7 and -7.

TRE - Treble:

- Press the [SEL button] to select the sound effect and TRE.
- Press the [VOL button] within 5 seconds to select a treble level between +7 and -7.

BAL - Balance:

- Press the [SEL button] to select the sound effect and BAL.
- Press the [VOL button] within 5 seconds to select the balance between the right and left audio channels from L9 to R9.

BAL.0 means that both audio channels are balanced.

In each mode, the previous indicator reappears if no button is pressed for more than 5 seconds.

Correct time setting

1. Press the [time indicator button].
⇨ The time is displayed.

2. Press the [time display button] within 5 seconds to set the hour and minute.

Hour setting:

1. Press the [H button] once.
⇨ The hour indicator jumps forward by 1 hour.

2. Hold down the [H button].
⇨ The hours continue to run until the [H button] is released.

3. Once the desired hour is reached, release the [H button].
» The hours have now been set.

Minute setting

1. Press the [M button] once.
⇨ The minute indicator jumps forward by 1 minute.

2. Hold down the [M button].
⇨ The minutes continue to run until the [M button] is released.

3. Once the desired minute is reached, release the [H button].
» The minutes have now been set.

Time setting with ADJ button

Press the ADJ button.

- If 00-05 minutes are displayed, the time is reset to 00 minutes and 00 seconds. (The hours do not change.)
- If 55-59 minutes are displayed, the time is reset to 00 minutes and 00 seconds. (The hours increase.)
- If 06-54 minutes are displayed, the time cannot be adjusted. (The time remains the same).

For example:

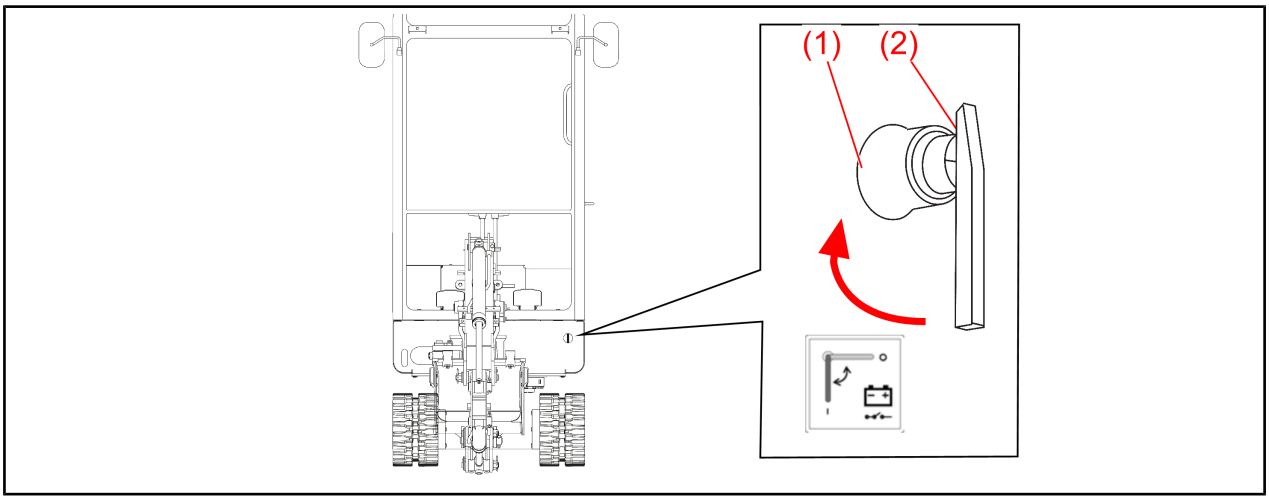
10:05→10:00

10:59→11:00

10:26→10:26

4.2 Outside the cab

4.2.1 Main switch



(1) Main switch lock (2) Main switch

The main switch of the machine is a battery isolator switch.

4.2.2 Maintenance covers

⚠ CAUTION

Injury caused by abrupt closure of the maintenance cover

Head injuries or injury to fingers and hand caused by unexpected closure of the maintenance cover.

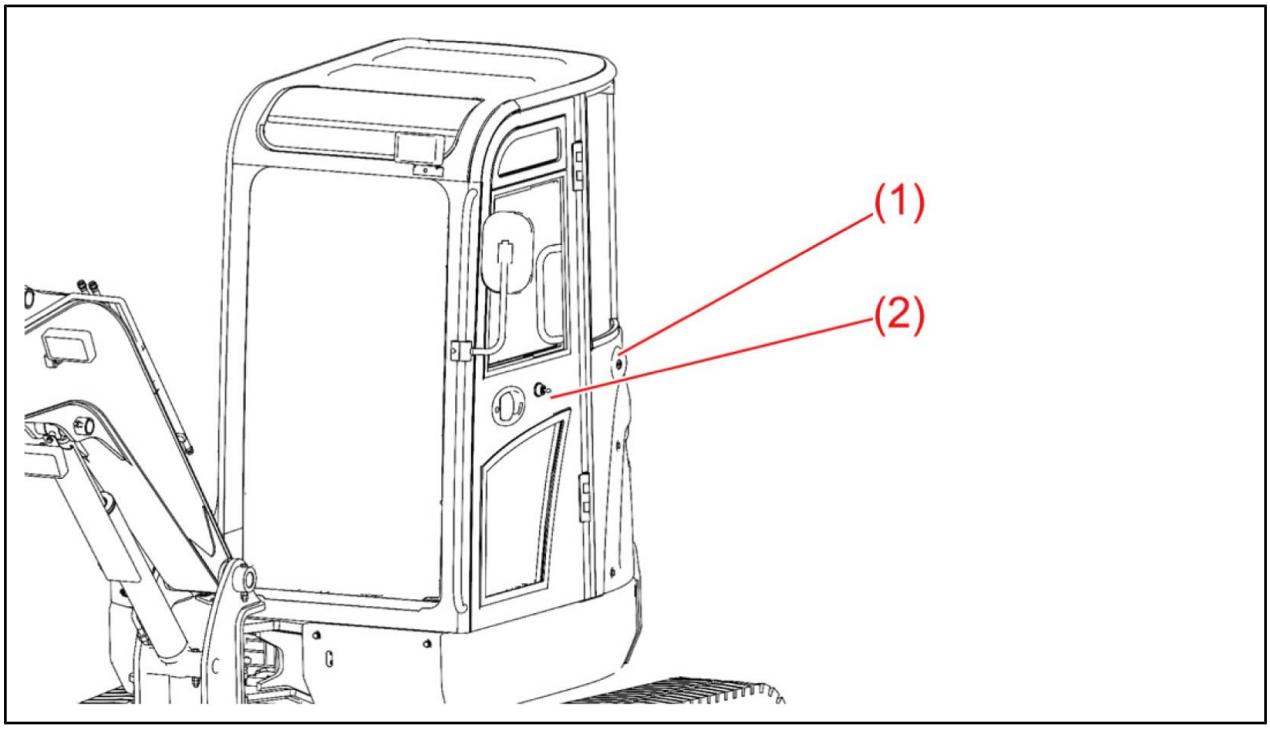
- Park the machine on even ground below before opening the maintenance cover.
- Always open the maintenance cover fully.

4.2.3 Locking the door

⚠ CAUTION

Injuries from abruptly closing the door Injuries to fingers and hands can result from unexpectedly closing the cab door.

- Never unlock the cab door on a slope.
- Park the machine on even ground before unlocking the cab door.
- Never hold hands or other body parts out of the cab.
- Never place hands on the door frames before the door has been unlocked.



(1) Locking device

Opening and locking the door

Open the door and press it into the locking device until the locking device engages.

» The door has now been locked.

Close the door

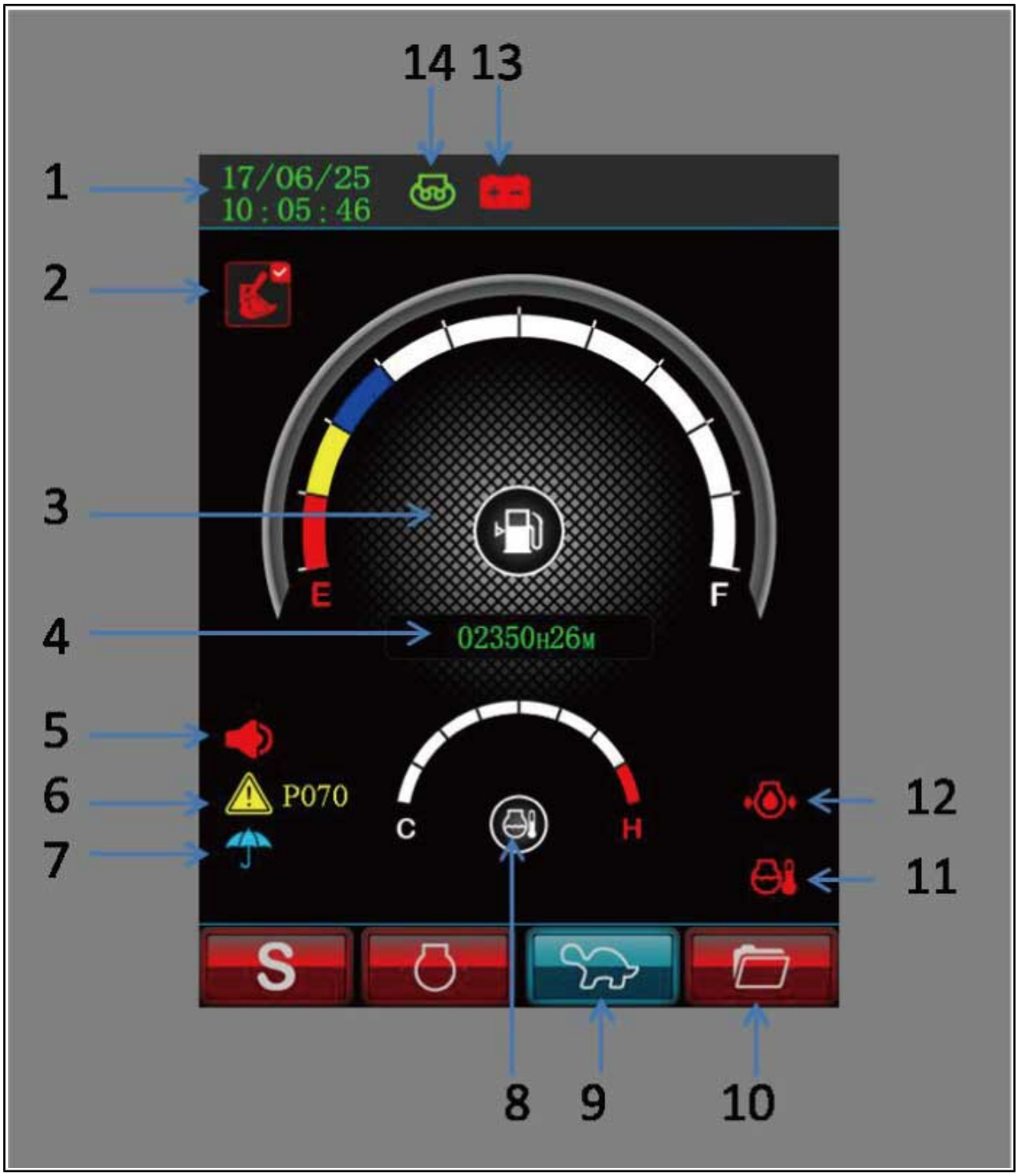
1. Release the locking from inside the cab by pressing the button.

2. Close the door.
» The door has now been closed.

4.3 User interfaces

4.3.1 Main display

If the ignition key is turned to “ON” when starting the machine, the SANY logo appears on the screen for about 2 seconds. The main display screen appears after the initialisation display screen. All information necessary for operation is displayed. The symbols indicate the current status.


14
13
1
17/06/25
10:05:46
2
3
E
F
4
02350H26M
5
6
P070
7
C
H
12
11
S
8
9
10

NO.	Function	Description
(1)	System time and date	The current time is displayed.
(2)	Operating implement	The current operating implement is displayed..
(3)	Fuel level	Display via a scale. If the fill level is in the area marked in red, the warning light will turn on.
(4)	Counter for hours of operation	The hours of operation are displayed using the format: hhhhhHmmM.
(5)	Severe failure alarml	It indicates that the severe failures happened.
(6)	Failure code	The current failure code is displayed. If failure code display,enter“Failure Code” page to check the meaning of the failure code.
(7)	Maintenance symbol	This icon appears if any scheduled maintenance is due. Green: Maintenance required, refer to the section 3.3.13 Maintenance Information.
(8)	Coolant temperature	The coolant temperature (49—120°C) is displayed via segments on a scale. If the temperature exceeds 110 ° C, the corresponding portion of the semicircle lights up orange. Information on the fault is displayed at the same time.
(9)	[F3] Switch between slow travel / fast travel	 Fast travel  Slow travel
(10)	[F1] Switch operating mode	It indicates that you can press this key to enter access function list interface.
(11)	Coolant temperature alarm	It indicates that the coolant temperature is high.
(12)	Engine oil pressure alarm	It indicates that the engine oil pressure is low.
(13)	Battery charge symbol	It indicates that the battery is in discharging.
(14)	Preheat symbol	It indicates that the engine is in the status of preheating.

Before starting operation

⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

5.Before starting operation

5.1 Before starting operation

⚠ CAUTION

If there is clear damage to or defects in the safety and monitoring equipment, do not operate the machine.

Before starting the engine, a series of daily checks must be performed. With these checks, the operator must ensure that the machine is in proper condition and that the safety equipment is fault-free.

⚠ WARNING

Fire danger resulting from spilled consumables in the engine compartment.
Heat in the engine compartment can ignite spilled consumables and lead to severe burns and engine damage.

- Determine the cause of the consumables spill immediately.
- Immediately eliminate the cause, for example, leakage.
- Remove the spilled consumables immediately.

5.2 Daily checks

Interval	Maintenance work	I	C	R	L	A
Before starting to drive	Coolant	I				A
	Engine oil	I				A
	Fuel level	I				A
	Windscreen washer fluid	I				A
	Fuel-water separator prefilter	I				A
	Cabling	I				
	Exhaust	I	C			
	Window-panes, mirrors, lights		C			
	Sight glass equipment		C			

5.3 Cleaning before starting operations

Cleaning some machine components helps ensure safe operation. The following parts must be cleaned of dirt before starting operation daily:

- Glass elements in the cabin,
- Mirrors,
- Sight glasses of the operating fluid tanks,

- Display.

5.4 Visual inspection

5.4.1 Pipelines

The operator must check the pipelines for firm seating before driving off.

5.4.2 Exhaust system, engine and components that heat up

Before every start, the exhaust system, engine and components that heat up during operation must be visually inspected. The components must be checked for flammable materials, such as dry leaves, and these materials must be removed if applicable.

5.4.3 Engine visual inspection

Before each start, the engine must be inspected visually.

Check for the following:

- Leaking oil, fuel or coolant
- Loose screws
- Worn or loose belts
- Loose pipe connections
- Damaged electrical cables
- Damaged hoses

Damage to the engine may only be rectified by appropriately trained personnel. It is therefore important to report any damage discovered to maintenance personnel without delay.

Eliminating defects:

- Determine the causes of leaks and eliminate them.
- Exchange worn or damaged cables, lines, belts and hoses.
- Loose screws and bolts must be tightened with the specified tightening torque.
  See also Tihtening torques

5.4.4 Hydraulic system

The hydraulic cylinders and the hydraulic hoses must be visually inspected before every start.

Check for the following:

- Cracks/tears in the hydraulic cylinders and the hydraulic hoses
- Secure installation of hydraulic hoses and hydraulic connections
- Leaks (hydraulic oil)

Damage to the hydraulic system may only be rectified by appropriately trained personnel. It is therefore important to report any damage discovered to maintenance personnel without delay.

5.4.5 Work equipment

The boom, excavator arm and tool must be visually examined before every start.

Check for the following:

- Leaks in the hydraulic cylinders
- Leaks in the hydraulic connections
- Damaged hoses
- Damaged electrical cables
- Cracks or deformation on the boom, excavator arm, bucket, bucket teeth or other tools

Damage may only be rectified by appropriately trained personnel. It is therefore important to report any damage discovered to maintenance personnel without delay.

5.4.6 Lower structure

The lower structure must be visually examined before every start.

Attention must be paid to the following:

- Damage to the lower structure (tracks, lead sprocket and drive sprocket)
- Loose screws and bolts
- Wear and leaks (hydraulic oil)

Damage to the lower structure and the hydraulic system may only be rectified by appropriately trained personnel. It is therefore important to report any damage discovered to maintenance personnel without delay.

Loose screws and bolts must be tightened by the operator with the specified tightening torque.

See also Tightening torques

5.4.7 Handles

The grab handles must be visually inspected every time before starting the machine.

Attention must be paid to the following:

- Firm seating of the grab handles

- Loose screws and bolts

Loose screws and bolts must be tightened by the operator to the specified tightening torques.

See also Tightening torques .

5.4.8 Safety markings

Before each start, check that the safety markings are complete and legible.

Incomplete, damaged or illegible markings must be replaced immediately.

In cases of doubt, refer to the signage plan on the product CD-ROM.

5.5 Checking and lubricating the blade

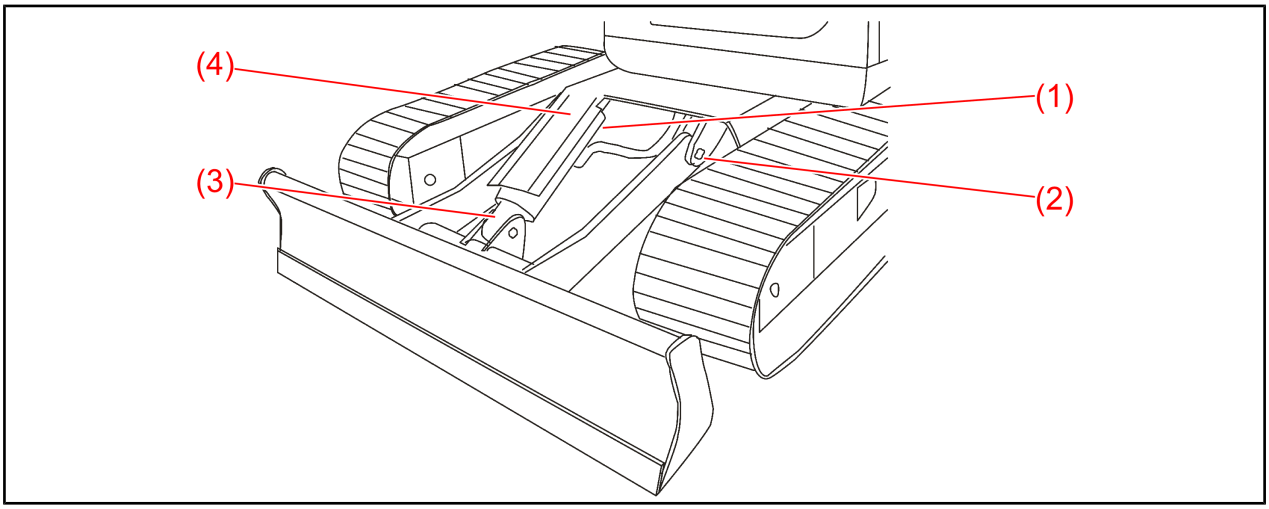
The blade must be visually inspected and the holding pins lubricated every time before starting the machine.

Visual inspection

- Leaks (hydraulic oil)
- Loose screws and bolts
- Damage and wear

Damage to the hydraulic system may only be removed by appropriately trained personnel. It is therefore important to immediately report any damage discovered to maintenance personnel. Loose screws and bolts must be tightened by the operator.

Lubrication



(1)	Rod-side fastening pins	(3)	Cylinder-side fastening pins
(2)	Left bearing	(4)	Right bearing

The lubrication points on the fastening pins of the hydraulic cylinder and the blade must be lubricated before starting by using the grease gun.

5.6 Consumables and residues

5.6.1 Consumables and residues

⚠ CAUTION

Machine damage caused by unsuitable operating fluids, damage caused by too high a fill level.
The use of unsuitable operating fluids can damage the machine. Too high a fill level can lead to fluid spraying out or overflowing, and to overheating and damage.

- Use only recommended consumables.
- Do not fill beyond maximum fill level.

The level of the following consumables must be checked and refilled if necessary:

- Hydraulic fluid
- Coolant
- Engine oil
- Fuel

The water separator must be checked for residues, which must be removed if detected:

5.6.2 Fuel

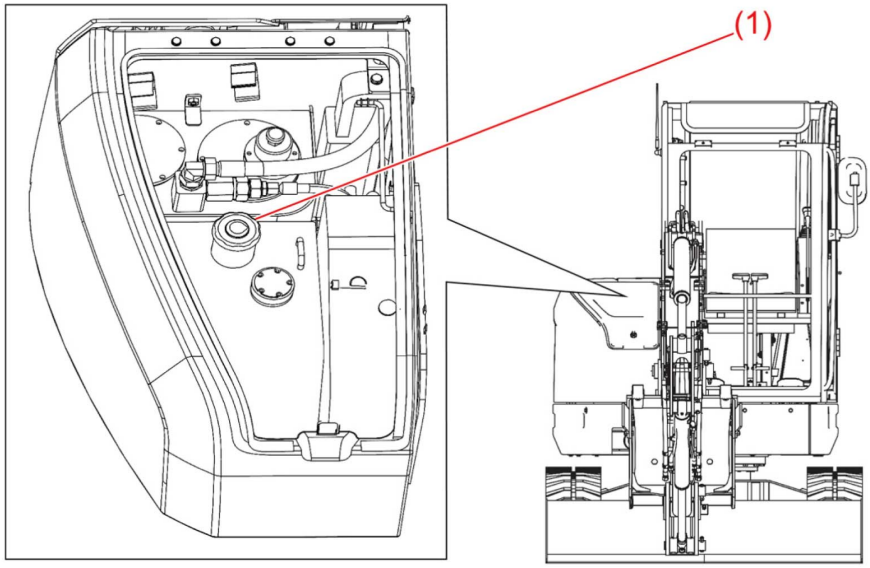
⚠ CAUTION

Burns from igniting fuel:
Spilt fuel can ignite and lead to burns and damage to machinery.

- Pour in fuel slowly and carefully.
- Remove spilt fuel without delay.

⚠ CAUTION

If the ventilation hole in the tank cover is blocked, the fuel tank pressure may fall so low that the fuel no longer flows. Always keep the ventilation hole clean.



(1) Tank cover

➢ The safety bar is in the locked position.

1. Turn the ignition key to the ON position.

2. Check the fuel level on the display.

3. Once the check has been performed, turn the ignition key to the OFF position.

4. If the fuel level is low, unscrew the tank cover on the fuel tank and fill with fuel until the fuel level indicator reaches the highest level.

5. After filling up, press the fuel level indicator downwards along with the tank cover. Make sure that the fuel level indicator does not get caught on the opening.

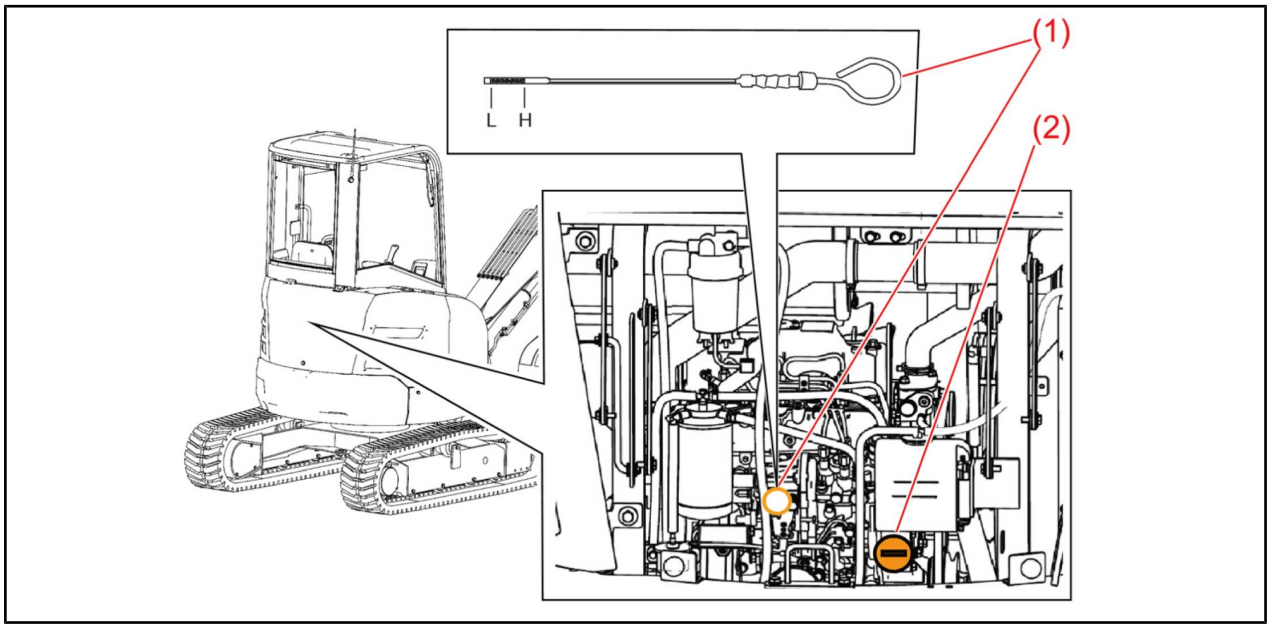
6. Tighten the tank cover.
» The fuel level has now been checked.

5.6.3 Engine oil

⚠ WARNING

Burns from contact with the hot engine or with hot engine oil.
After turning off the engine, the engine and the engine oil are very hot. Contact can lead to severe burns on hands and rest of body.

- Allow the engine to cool off for at least 15 minutes before checking the level of the engine oil.



(1) Oil dip stick (2) Filler hole

Check the level

1. Open the maintenance door.

2. Remove the oil dipstick and clean it with a cloth.

3. Insert the dipstick as far as it will go into the engine oil tank and pull it out again.
   ⇨ The oil level must be between the H and L marks.

   ⇨ If the oil level is between the H and L marks, close the rear side maintenance door.

   ⇨ If the oil level is below the L mark, top up the oil.

   ⇨ If the oil level is above the H mark, inform maintenance personnel.

» The engine oil level has now been checked.

Topping up the engine oil

If the oil level is below the L mark, more oil must be filled into the opening.

The filler hole is located behind the expansion tank for the engine coolant.

1. Open the maintenance door.

2. Carefully remove the coolant expansion tank out of the holder

3. Open the engine oil filler opening.

4. Top up the engine oil.

5. Check the oil level with the dipstick.

⇨ The oil level must be between the H and L marks on the dipstick.

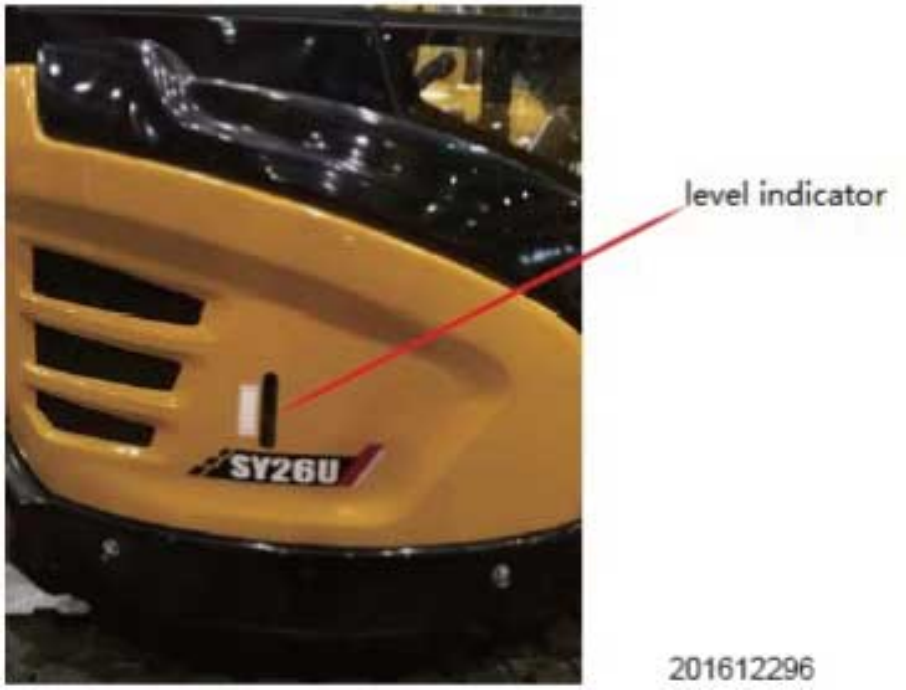
⇨ If the oil level is between the H and L marks, place the oil dipstick back in the engine oil tank, close the filler opening, refit the coolant expansion tank into the holder and close the rear side maintenance door.

⇨ If the oil level is below the L mark, fill more oil into the opening.

⇨ If the oil level is above the H mark, inform maintenance personnel.

» The engine oil has now been topped up.

5.6.4 Hydraulic oil



(1) Level indicator

➢ The machine is safely parked.

1. Open the maintenance door.

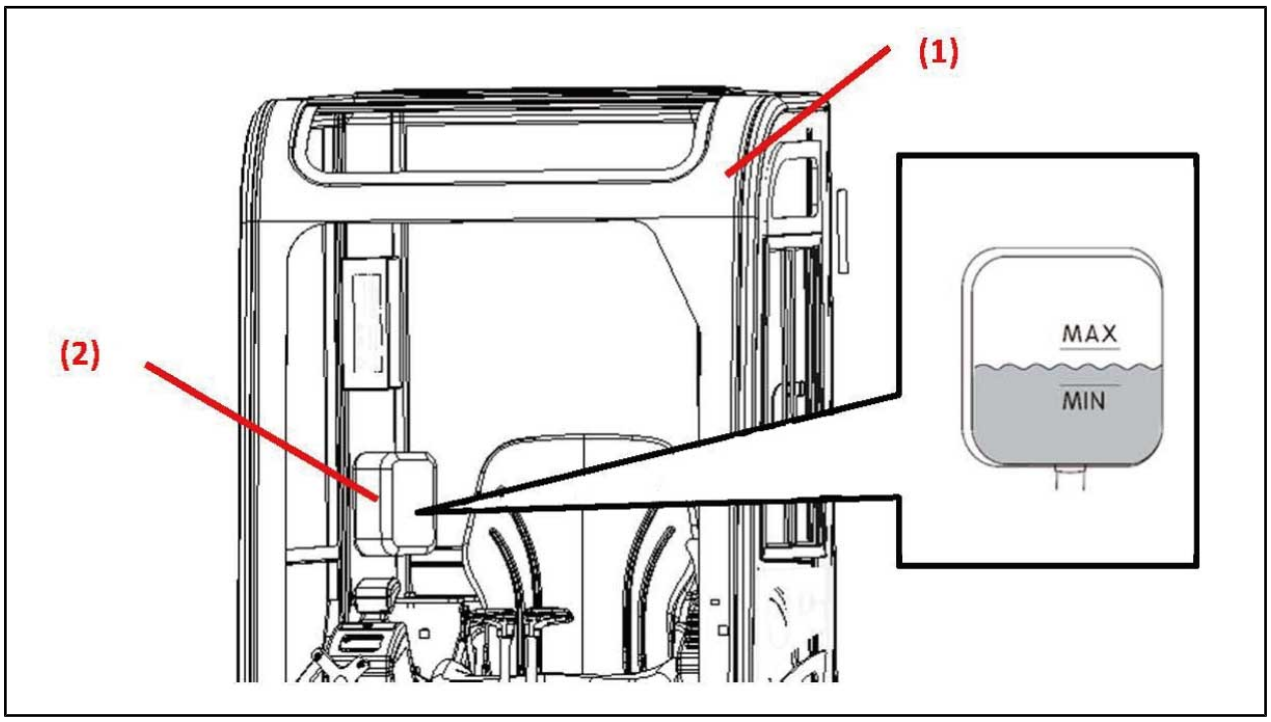
2. Check the level.

⇨ The fill level must be positioned between the MIN and MAX marks.

⇨ If the fill level is below the MIN mark or above the MAX mark, the maintenance personnel must be informed.

» The hydraulic oil level has now been checked.

5.6.5 Windscreen wiper fluid



(1) Cab (2) Windscreen wiper fluid tank

1. Open the maintenance door.

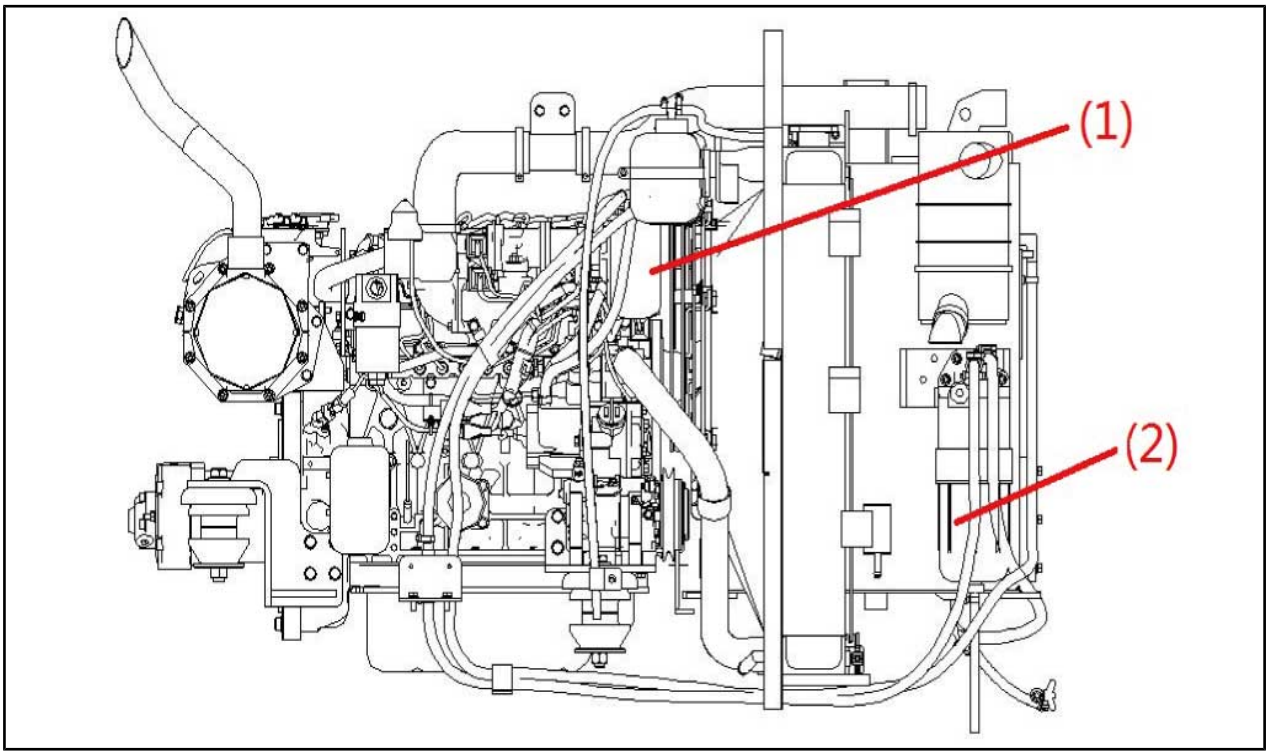
2. Check the tank level.

3. Fill with fluid as necessary.

» The windscreen washer fluid level has now been checked.

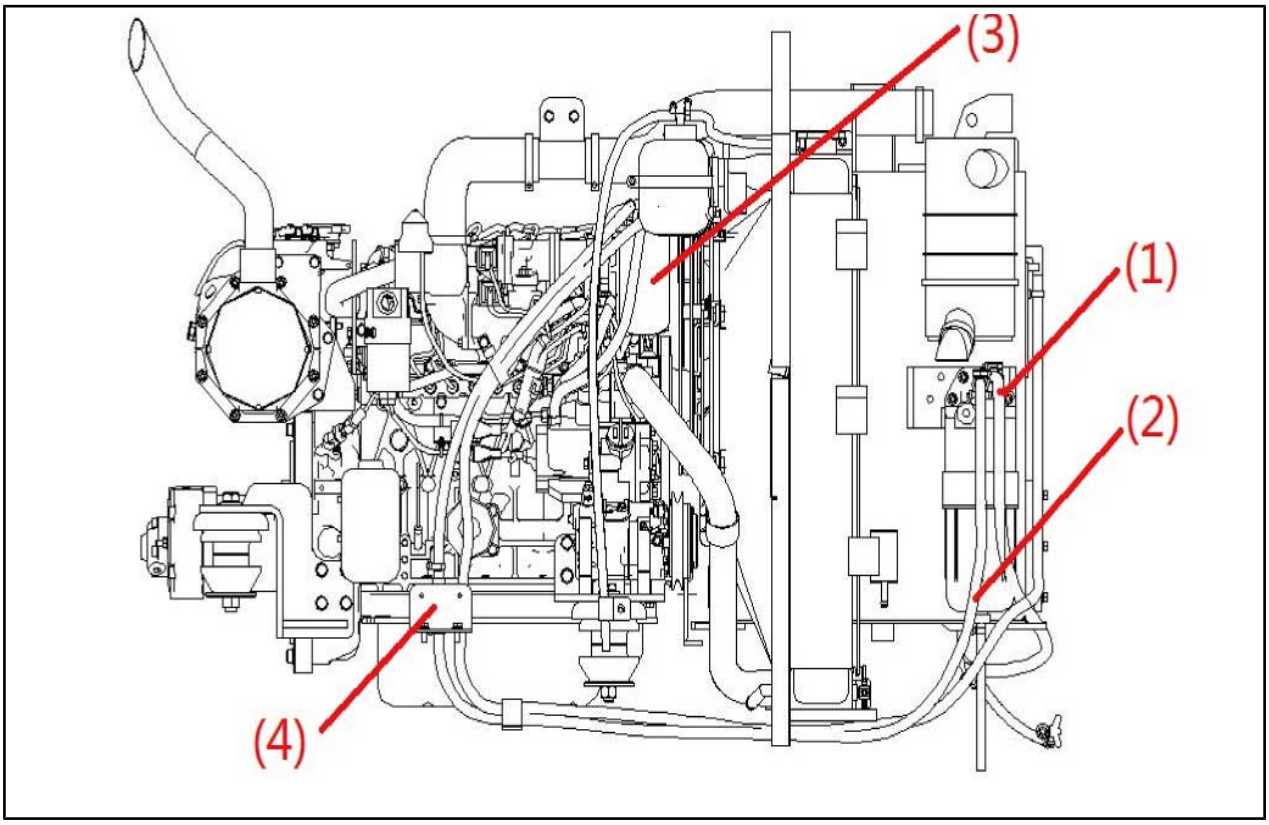
5.6.6 Water separator

The fuel prefilter is equipped with a water separator. Before starting, the water separator must be checked for water and deposits and emptied.



(1) Fuel filter

(2) Fuel pre-filter

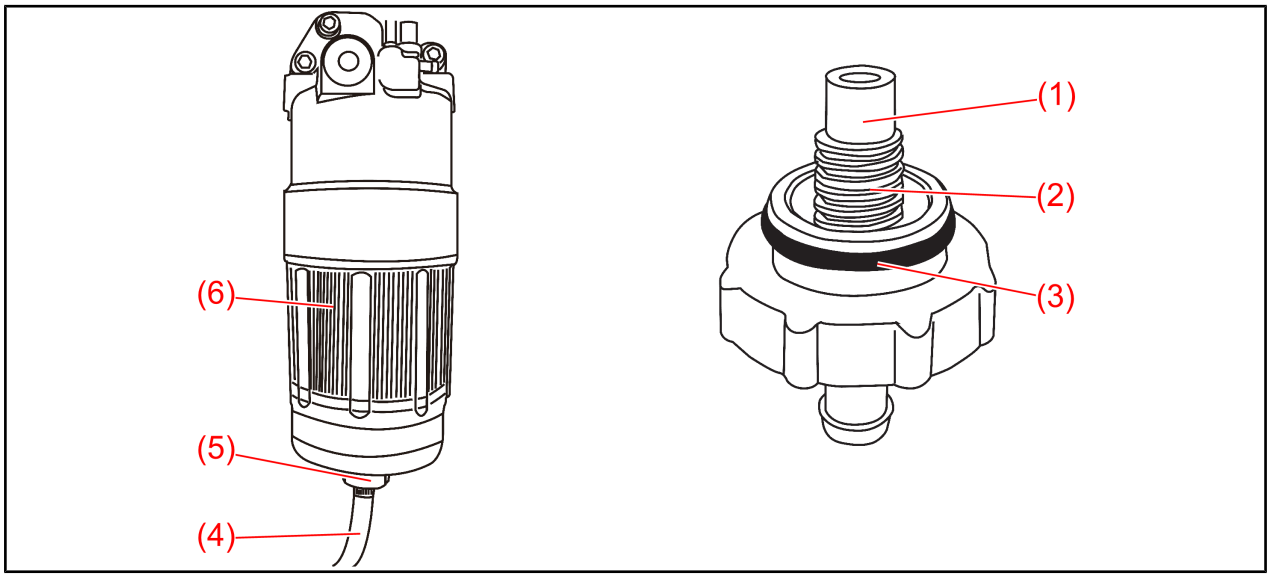


(1) Shut-off valve

(2) Fuel pre-filter

(3) Fuel filter

(4) Transfer pump



(1)	Valve outlet	(4)	Drain hose
(2)	Threads	(5)	Drain valve
(3)	O-ring	(6)	Housing

Draining the water and deposits

➢ The maintenance door is open.

1. If water or deposits can be seen through the transparent housing, place a container under the drain hose.

2. Open the drain valve.
⇨ Water and deposits flow out.

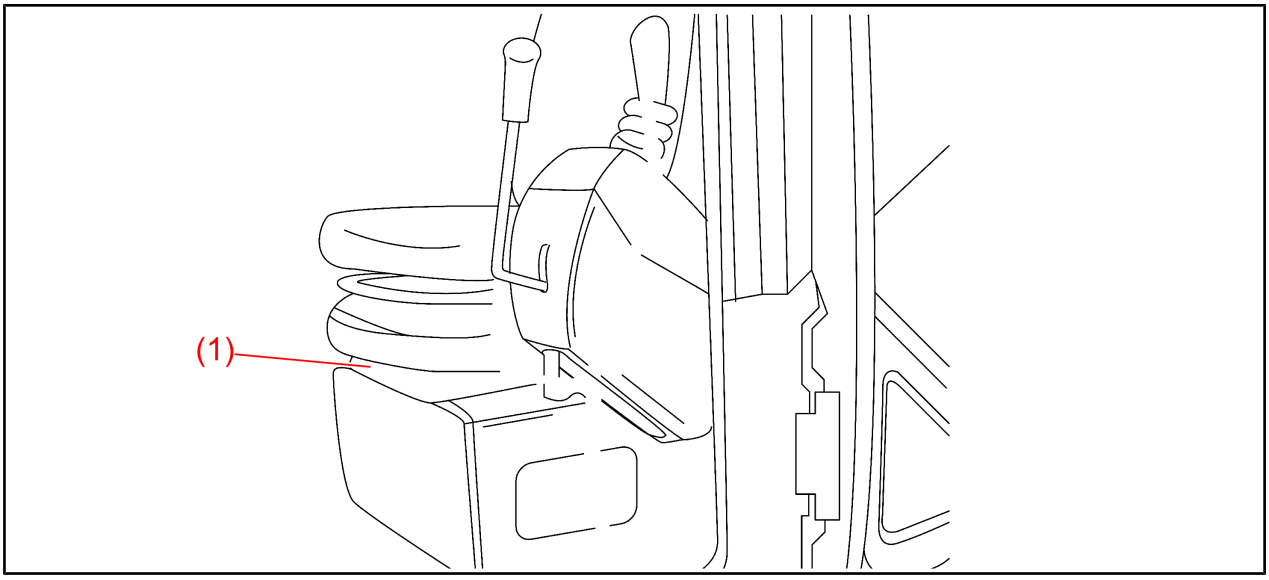
3. Close the drain valve as soon as fuel begins to flow out of the drain hose.
» The water separator has now been checked.

5.7 Setting up the operating position

5.7.1 Setting up the operating position

To increase safety and avoid long-term damage to health, the operator must adjust the settings for the seat, side view mirror and air conditioning to his needs before starting work.

5.7.2 Seat



(1) Seat lever

Before operation and after a change of operator, the position of the seat must be adjusted to the personal needs of the operator.

The seat must be set so that the operator can comfortably operate the drive levers, control levers, pedals and switches from the seat.

Moving the seat forward/backward

The seat can be moved forward and backward along with both armrests and the safety bar.

➢ The safety bar is in the locking position.

1. Pull the seat lever.

2. Push the seat to the desired position.

3. Release the lever again.
» Push the seat forward or backward.

5.8 Functions check

5.8.1 Functions check

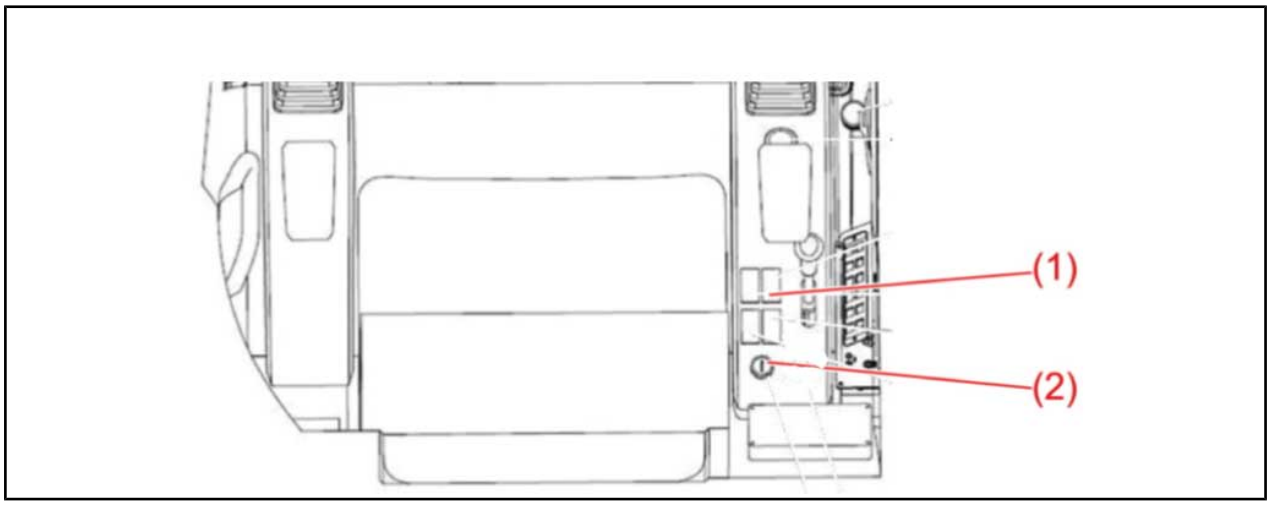
The sound operation of the components listed below is essential for safe machine operation and must therefore be checked before starting

Maintenance personnel must be informed immediately if any components are defective.

5.8.2 Seat belt

The machine may only be operated with a fastened and functional seat belt. Damage to the belt or its latches must be reported to maintenance personnel without delay.

5.8.3 Lighting system



(1) Switch for work spotlights (2) Ignition switch

1. Turn the ignition switch to the ON position.
⇨ The power is now turned on for the machine.

2. Activate the switch for the working lights
⇨ The working lights are now switched on..

3. Visually inspect the working lights.

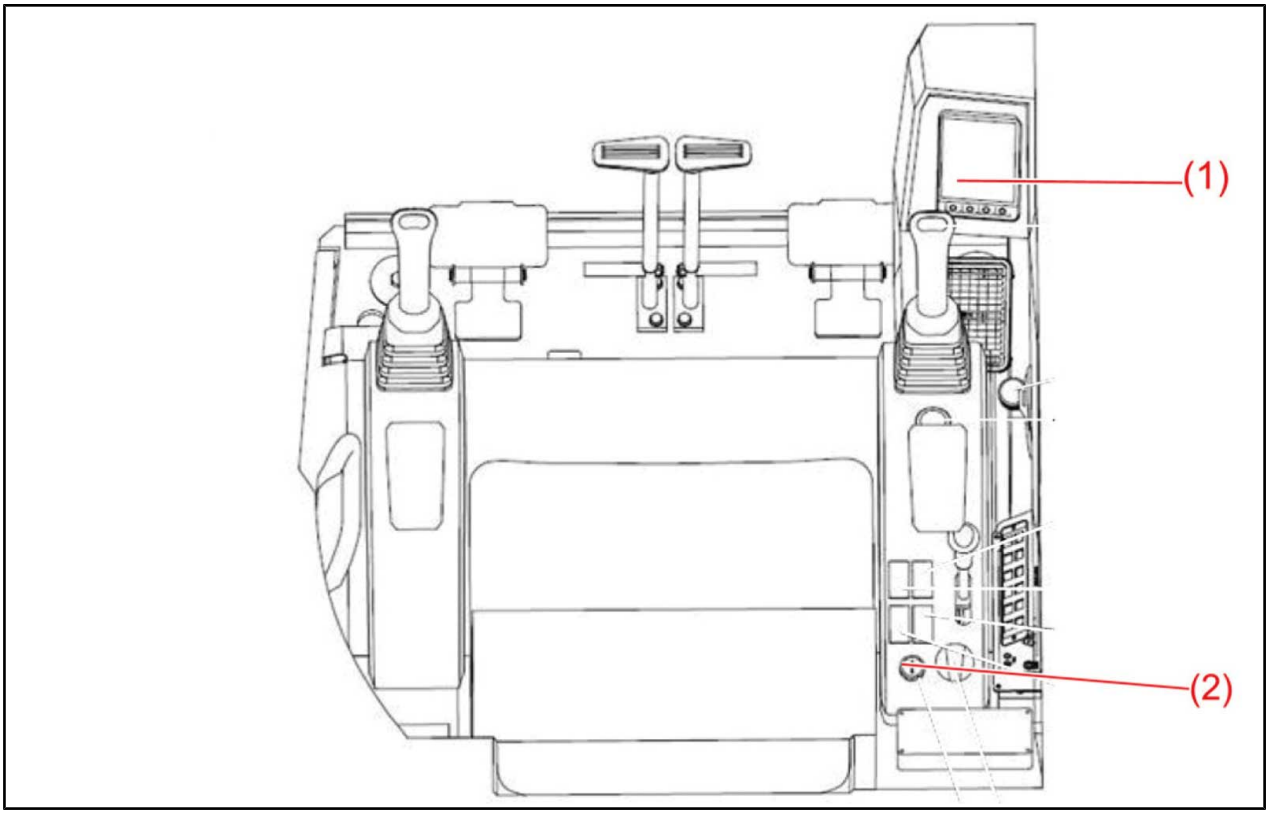
4. Clean the working lights if necessary.
» The working lights have now been checked.

5.8.4 Horn

1. Turn the ignition switch to the ON position.
⇨ The power is now turned on for the machine.

2. Press the horn button (1).
⇨ The horn sounds.
» The horn has now been checked.

5.8.5 Monitor



(1) Monitor start screen (2) Ignition lock

1. Turn the ignition lock to the “ON” position.
⇨ The power is now turned on for the machine.
⇨ The monitor lights up.
» The monitor function has now been checked.

5.8.6 Safety lever

The machine may only be operated if the safety bar functions correctly.

➢ The machine is switched off.

➢ The safety bar is open.

1. Start the machine.

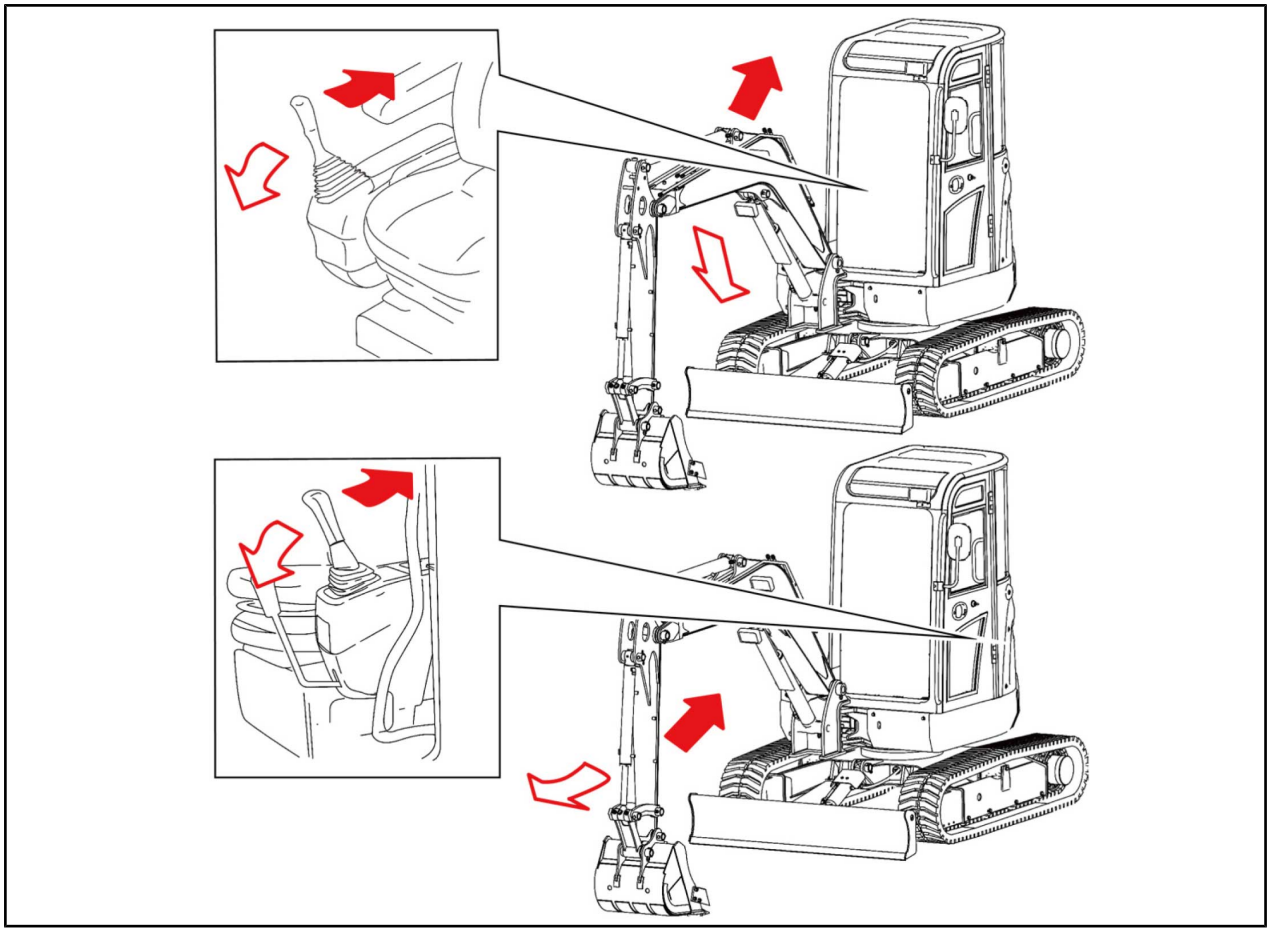
2. Close the safety bar.

3. Operate the machine using the drive pedals and joysticks.
» Correct operation of the safety bar has been checked.

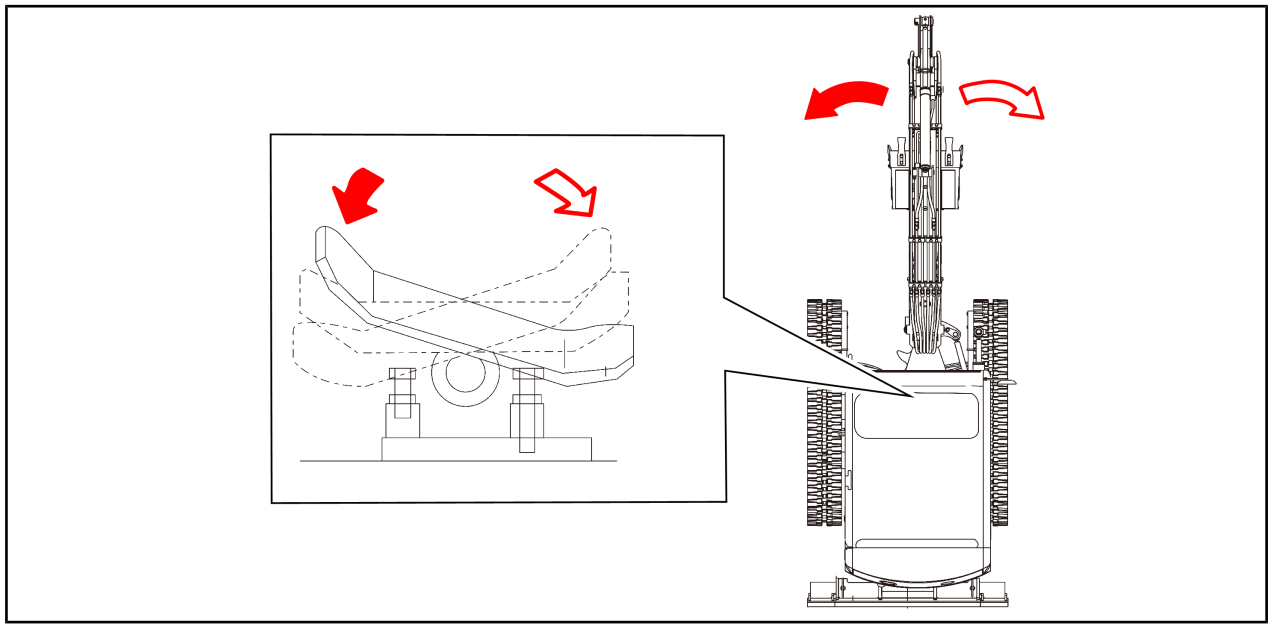
If the machine moves while the drive levers are in neutral and the safety bar is in the unlocked position, there is a machine error.

In such a case, the safety bar should be set back to the locking position and then the engine should be switched off. In case of any malfunctions, contact your SANY agent.

5.8.7 Boom and excavator arm



Lifting and lowering the boom and the excavator arm



Swinging the boom

➢ The machine has been started.

1. Pull back on the left joystick.
   ⇨ The excavator arm moves toward the excavator.

2. Move the left joystick to the centre position.
   ⇨ The movement of the excavator arm stops.

3. Push forward on the left joystick.
   ⇨ The excavator arm moves away from the excavator.

4. Let go of the left joystick.
   ⇨ The joystick returns to the centre position.
   ⇨ The movement of the excavator arm stops.
   » The correct operation of the boom and excavator arm has now been checked.

1. Pull back on the right joystick.
   ⇨ The boom will lift up.

2. Move the right joystick to the centre position.
   ⇨ The boom movement stops.

3. Push forward on the right joystick.
   ⇨ The boom will lower.

4. Let go of the right joystick.
   ⇨ The joystick returns to the centre position.
   » The boom movement stops.

» The correct operation of the boom has now been checked.

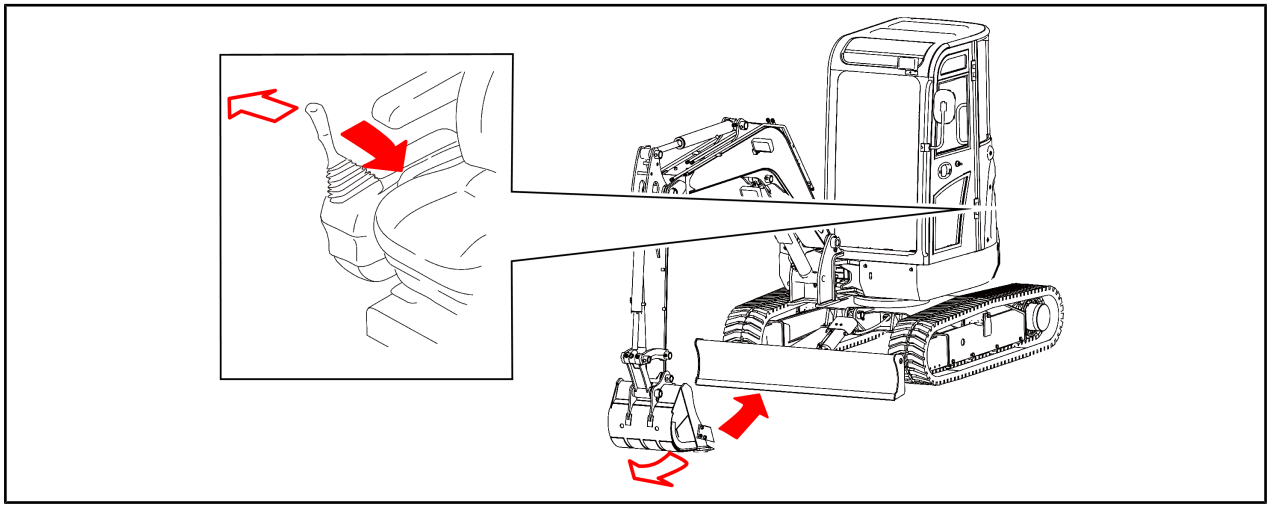
1. Tilt the pedal for swinging the boom to the right.
⇨ The boom swivels to the right.

2. Tilt the pedal for swinging the boom to the left.
⇨ The boom swivels to the left.

3. Release the pedal for swinging the boom.
⇨ The pedal returns to its initial position.
» The boom movement stops.

» Correct swinging of the boom has now been checked.

5.8.8 Bucket



Folding the bucket in and out

➢ The machine has been started.

1. Push the right joystick to the left.
⇨ The bucket folds in.

2. Move the right joystick to the middle position.
⇨ The bucket movement stops.

3. Push the right joystick to the right.
⇨ The bucket folds out.

4. Let go of the right joystick.
⇨ The joystick returns to the middle position.
⇨ The bucket movement stops.

» The correct operation of the bucket has now been checked.

5.8.9 Blade

➢ The machine has been started.

1. Push forward on the blade lever.
   ⇨ The blade is lowered.

2. Release the lever.
   ⇨ The blade movement stops.

3. Pull back on the blade lever.
   ⇨ The blade is raised.

4. Release the lever.
   ⇨ The blade movement stops.
   » The correct operation of the blade has now been checked.

Operator control

⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

6.Operator control

6.1 Starting the machine

6.1.1 Starting the machine

⚠ WARNING

Danger of poisoning from exhaust fumes

Breathing in poisonous exhaust fumes when starting and driving in enclosed spaces can lead to poisoning.

- Only start and drive the machine in spaces that are sufficiently ventilated.

Starting the machine

➢ Battery isolation switch in position I – on.

1. Push the throttle control lever to the MIN position.

2. Turn the ignition key to the START position and hold it for a maximum of 10 seconds.
   ⇨ The engine starts.
   ⇨ If the engine does not start, wait at least 2 minutes and then attempt to start the engine again.

3. Release the ignition key.
   ⇨ The ignition key goes into the ON position.

4. Wait until the oil pressure is in the normal range and the oil pressure signal becomes silent.
   ⇨ If the oil pressure is not in the normal range after 4 to 5 minutes, turn off the engine and check the oil level.
   » The engine has been started.

6.1.2 Warm up the engine at low outside temperatures

At outside temperatures under 5° C, arming up the engine is required. Otherwise the machine may react in a delayed manner to abrupt and quick motions during operation.

1. Turn the ignition to the START position.
   ⇨ The engine starts.
   ⇨ If the engine does not start, wait at least 2 minutes, warm up the engine again and start it.

2. Set the speed to approx 1200 rpm using the speed selection switch and allow the engine to run without a load for about 5 minutes.

3. Afterwards, set the speed to approx 1400 rpm using the speed selection switch.

4. Activate the boom, excavator arm and bucket for 5-10 minutes.

5. Repeat the previous 3 steps until the coolant temperature (see the display indicator) and the hydraulic oil temperature (50~80° C) are in the normal range.

» The machine is now warmed up.

6.2 Driving the machine

6.2.1 Driving the machine

⚠ CAUTION

Forwards and backwards depend on the position of the upper structure and the lower structure in relation to each other. If the drive sprocket is at the front, the throttle levers and accelerator pedals must be moved opposite to the direction of movement of the machine, i.e. for forward travel, the throttles are pulled towards the operator.

6.2.2 Preparing for driving

➢ The machine environment must be checked and obstacles must be removed.

1. Turn the speed selection switch to the MAX position.

⇨ The engine speed increases.

2. Press the horn.

3. Set the safety lever to the unlocking position.

4. Lift the work equipment 40-50 cm above the ground below.

5. Lift the boom if it is blocking the view (if applicable).

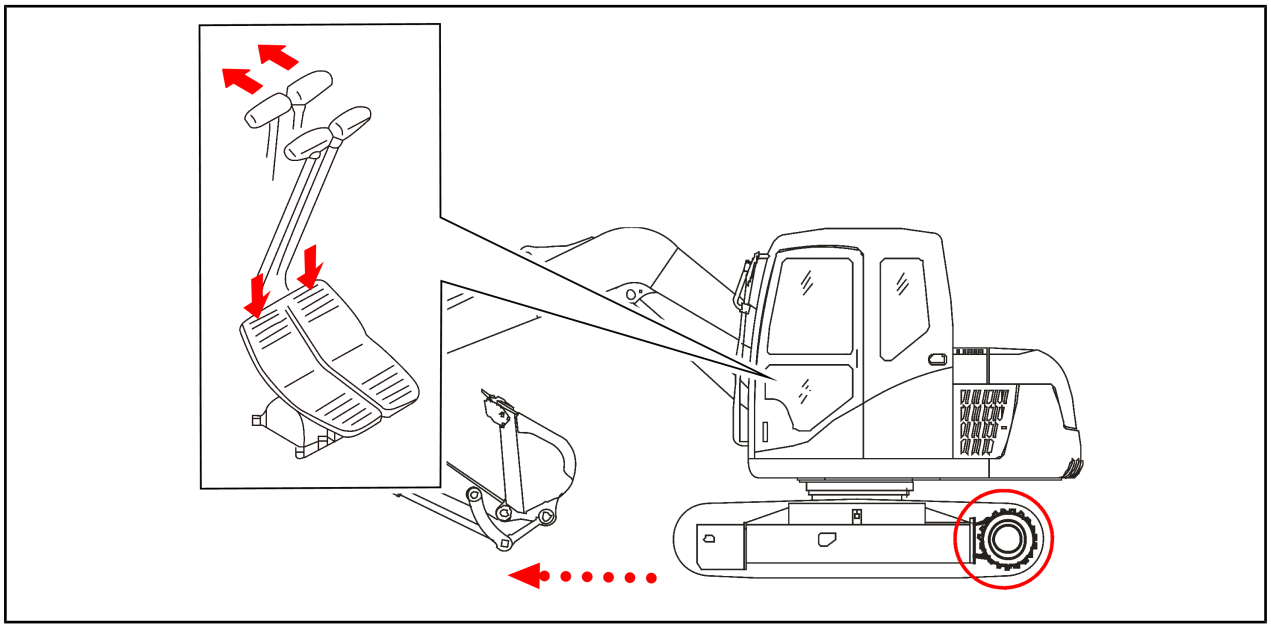
6. Determine the position of the drive sprocket and, therefore, the relative direction of travel.

» The machine is now ready to be driven.

6.2.3 Driving forwards

For straight-ahead travel, both tracks are moved at the same speed. As soon as one crawler is moved more slowly than the other, the machine changes its direction of travel towards the slower crawler.

Drive motors behind the cabin



Driving forwards straight ahead

➢ The machine is standing still.

➢ Both drive levers are in the neutral (N) position.

1. Slowly push both drive levers forwards.
   » The machine drives forwards.

Correcting direction of travel to the right

➢ Machine travels forwards

1. Pull the right drive lever backwards in the direction of the neutral position (N).
   » Machine changes its direction of travel to the right.

   » The direction of travel has been changed.

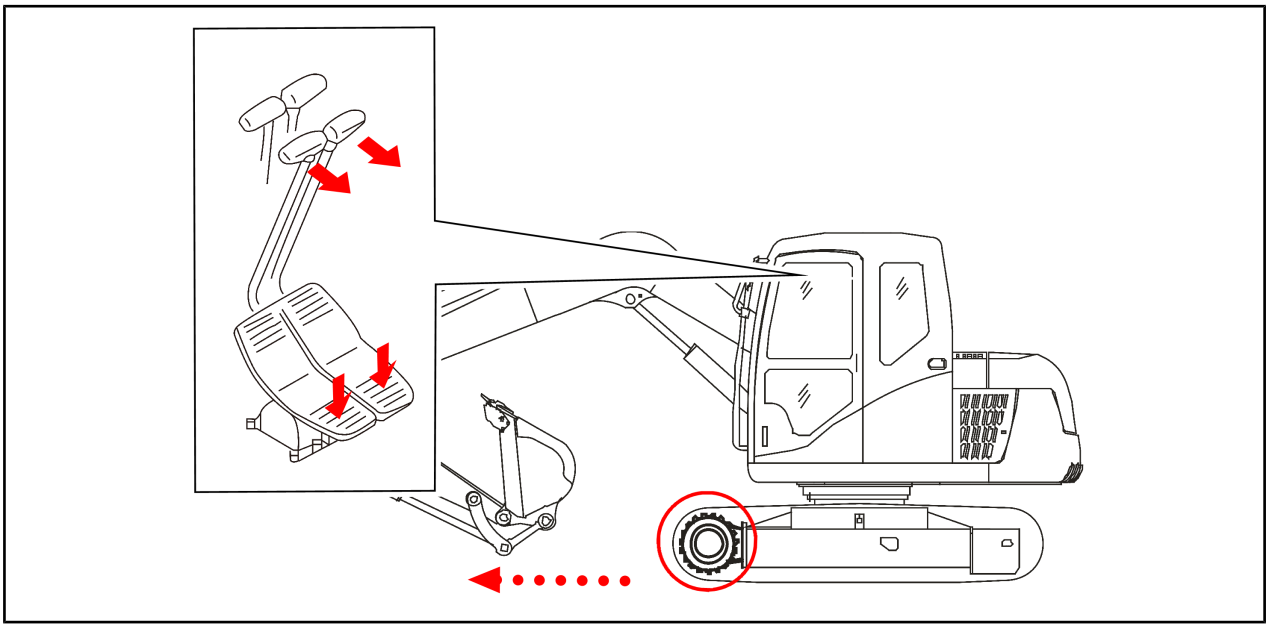
Correcting direction of travel to the left

➢ Machine travels forwards

1. Pull the left drive lever backwards in the direction of the neutral position (N).
   » Machine changes its direction of travel to the left.

   » The direction of travel has been changed.

Drive motors in front of the cabin



Driving forwards straight ahead

➢ The machine is standing still.

➢ Both drive levers are in the neutral (N) position.

1. Slowly pull both drive levers backwards.
   » The machine drives forwards.

Correcting direction of travel to the right

➢ Machine travels forwards

1. Push the left drive lever forwards in the direction of the neutral position (N).
   » Machine changes its direction of travel to the right.

   » The direction of travel has been changed.

Correcting direction of travel to the left

➢ Machine travels forwards

1. Push the right drive lever forwards in the direction of the neutral position (N).
   » Machine changes its direction of travel to the left.

   » The direction of travel has been changed.

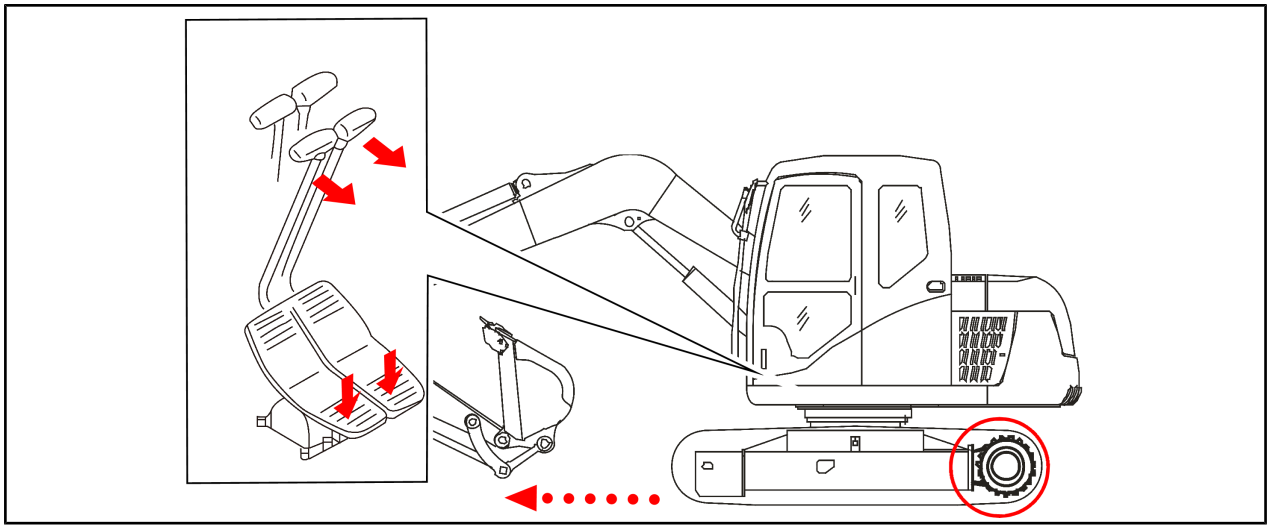
6.2.4 Driving backwards

⚠ CAUTION

There is a blind spot behind the machine so use particular caution when driving in reverse.

For straight-ahead travel, both tracks are moved at the same speed. As soon as one crawler is moved more slowly than the other, the machine changes its direction of travel towards the slower crawler.

Drive motor behind the cabin



Travelling straight ahead backwards

➢ The machine is standing still.

➢ Both drive levers are in the neutral (N) position.

1. Slowly pull both drive levers backwards.
   » The machine drives backwards.

Correcting direction of travel to the right

➢ Machine travels backwards

1. Push the left drive lever forwards in the direction of the neutral position (N).
   » Machine changes its direction of travel to the right.

   » The direction of travel has been changed.

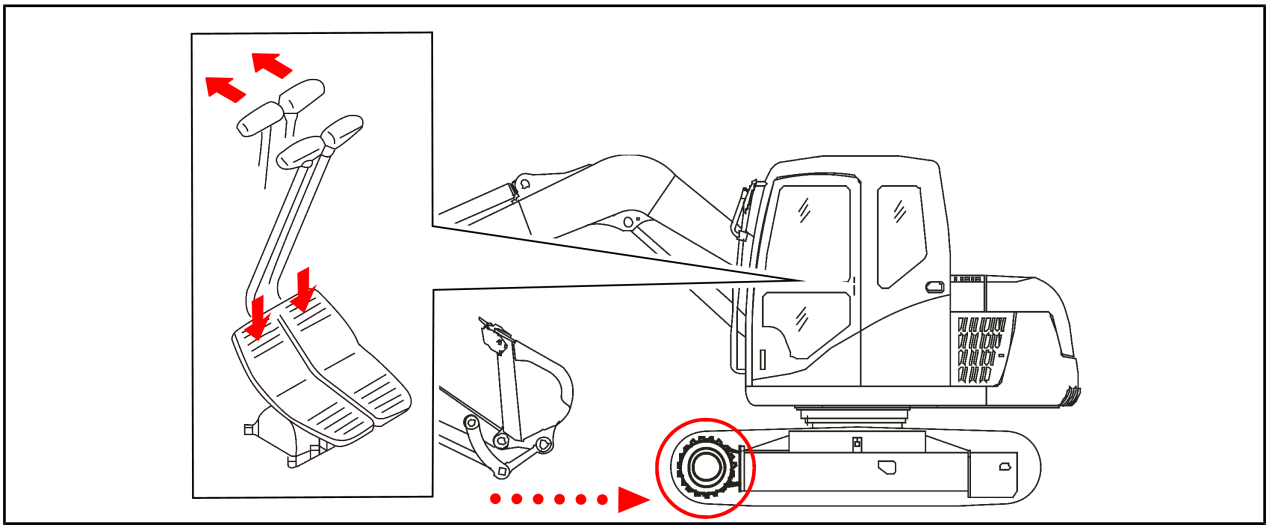
Correcting direction of travel to the left

➢ Machine travels backwards

1. Push the right drive lever forwards in the direction of the neutral position (N).
   » Machine changes its direction of travel to the left.

» The direction of travel has been changed.

Drive motor in front of the cabin



Travelling straight ahead backwards

➢ The machine is standing still.

➢ Both drive levers are in the neutral (N) position.

1. Slowly push both drive levers forwards.
   » The machine drives backwards.

Correcting direction of travel to the right

➢ Machine travels backwards

1. Pull the right drive lever backwards in the direction of the neutral position (N).
   » Machine changes its direction of travel to the right.

   » The direction of travel has been changed.

Correcting direction of travel to the left

➢ Machine travels backwards

1. Pull the left drive lever backwards in the direction of the neutral position (N).
   » Machine changes its direction of travel to the left.

   » The direction of travel has been changed.

6.2.5 Stopping the machine

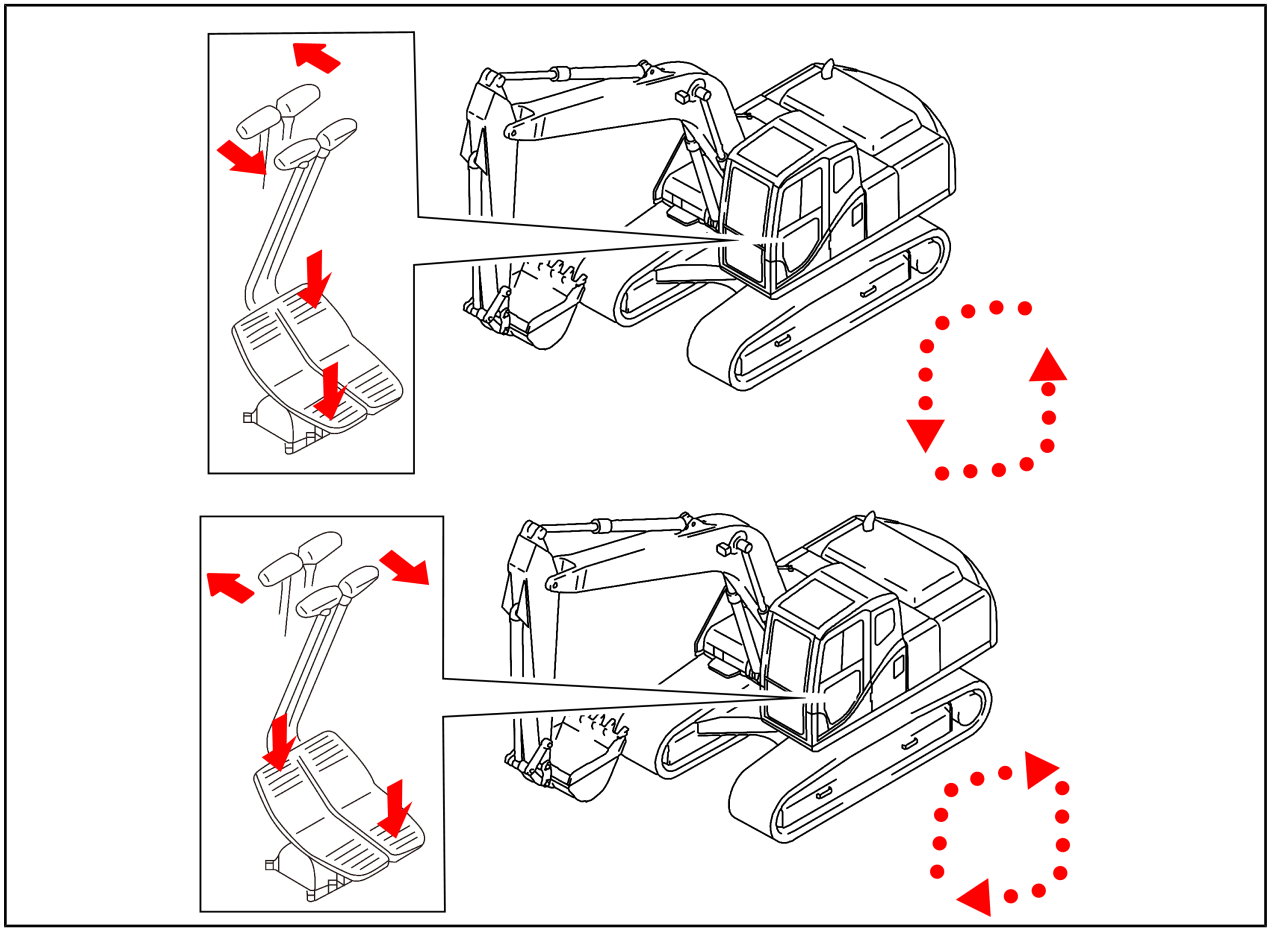
⚠ CAUTION

Frequent, abrupt stops shorten the service life of the machine. As a result, always allow the machine to slow down before stopping.

➢ Decrease the travelling speed.

1. Bring both throttles into the neutral (N) position.
   » The machine is stopped.

6.2.6 Turning the machine in place



The machine can turn in place. To do this, turn the two tracks in opposite directions.

Turn the machine to the left

➢ The machine is in operation.

➢ The machine is standing still.

1. Check the slewing area for obstacles and persons.

2. Activate the horn.

3. Pull the left drive lever and simultaneously push the right drive lever.
   ⇨ The machine turns in anticlockwise direction.

4. Bring the drive levers into the middle position.
   ⇨ The turning motion stops.
   » The machine is facing in a new direction.

Turn the machine to the right

➢ The machine is in operation.

➢ The machine is standing still.

1. Check the slewing area for obstacles and persons.

2. Activate the horn.

3. Pull the right drive lever and simultaneously push the left drive lever.
   ⇨ The machine turns in clockwise direction.

4. Bring the drive levers into the middle position.
   ⇨ The turning motion stops.
   » The machine is facing in a new direction.

6.2.7 Driving on a slope

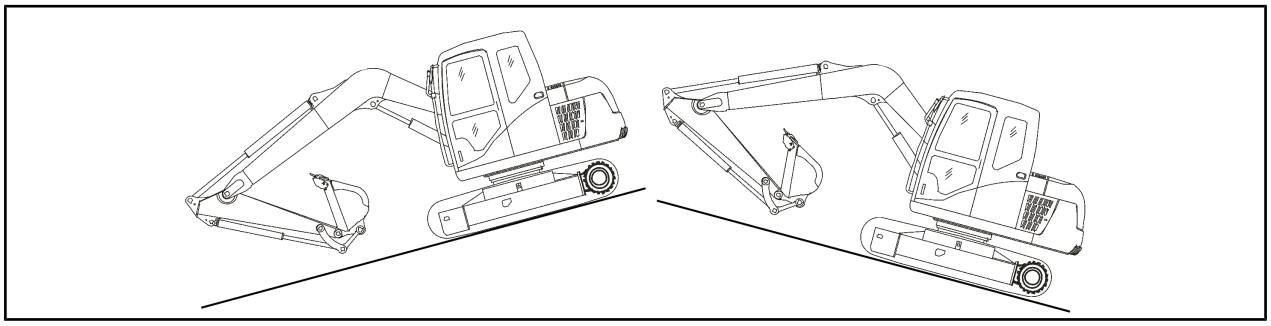
⚠ CAUTION

Toppling of the machine on a slope

There is a danger of injury if the machine becomes unbalanced on a slope and topples over.

- Drive slowly straight ahead.
- Do not drive backwards.
- Do not turn or drive diagonally to the slope.
- Do not rotate the machine.
- Drive with the equipment lowered (20 to 30 cm above the ground).
- The boom and the equipment must be facing in the direction of travel.
- Do not open or close the cab door.

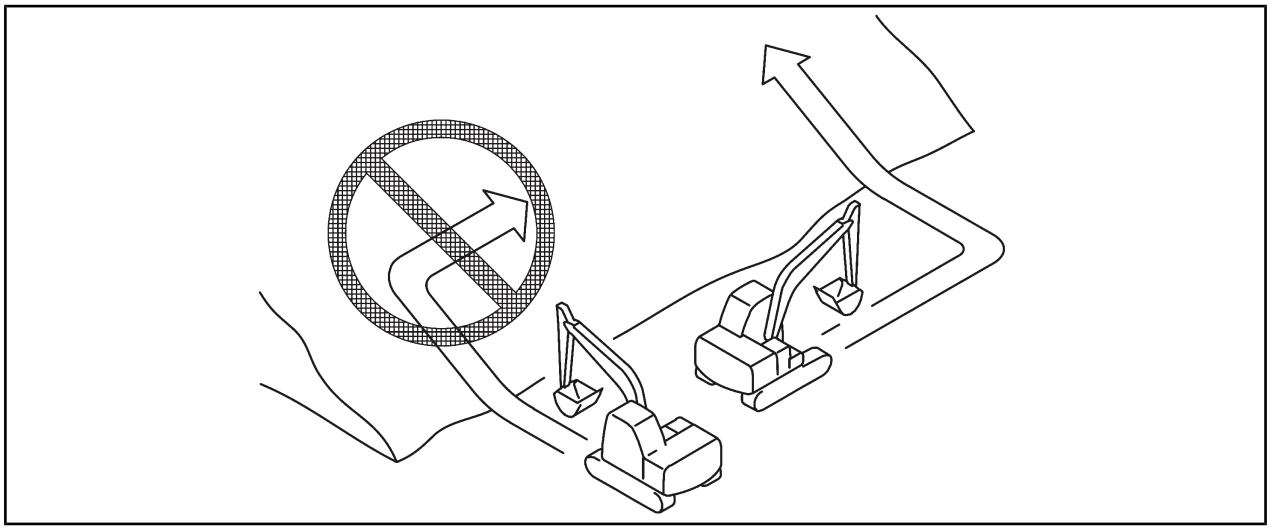
Sloping terrain must only be driven over with the steering set straight ahead and the machine facing directly uphill or downhill.



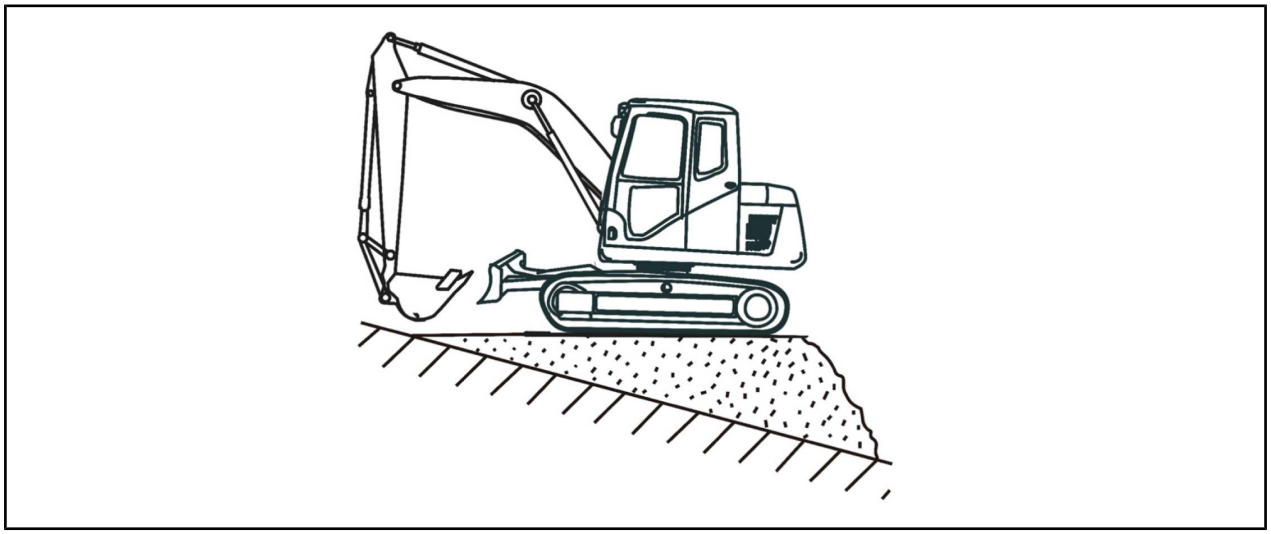
Driving on a slope

Sloping terrain with an uphill gradient above 30° or a downhill gradient above 58% must not be driven over.

Regardless of the gradient, slopes must not be driven over if the chains cannot find sufficient grip.



Working on sloping terrain



Working on sloping terrain

Before working on a slope, a platform must first be raised, for example using earth, in order that the machine stands on level ground below during the work.

Engine failure on sloping terrain

If the engine cuts out while travelling on sloping terrain, proceed as follows:

1. Move throttles to the position N (neutral).
2. Lower equipment onto the ground below.
3. Stop the machine safely.
4. Start the engine again.
   » The engine is running.

6.2.8 Driving on uneven ground

⚠ CAUTION

Toppling of the machine on uneven ground

There is a danger of injury and machine damage if the machine becomes unbalanced on uneven ground and topples over.

- Drive around obstacles
- Remove obstacles
- Drive over obstacles slowly and in a centred manner

Driving on uneven ground, particularly over obstacles such as large stones, steep embankments or tree stumps, can cause the machine to become unbalanced and topple over.

The speed of the machine must be adapted to the state of the ground. The more uneven the ground is, the slower one must drive.

Negotiating unavoidable obstacles

1. Position the equipment low to the ground (20 to 30 cm above the ground).
2. Slowly drive the machine forwards.
3. Drive over the obstacle with the tracks centred on the obstacle.
   » The obstacle has now been negotiated successfully.

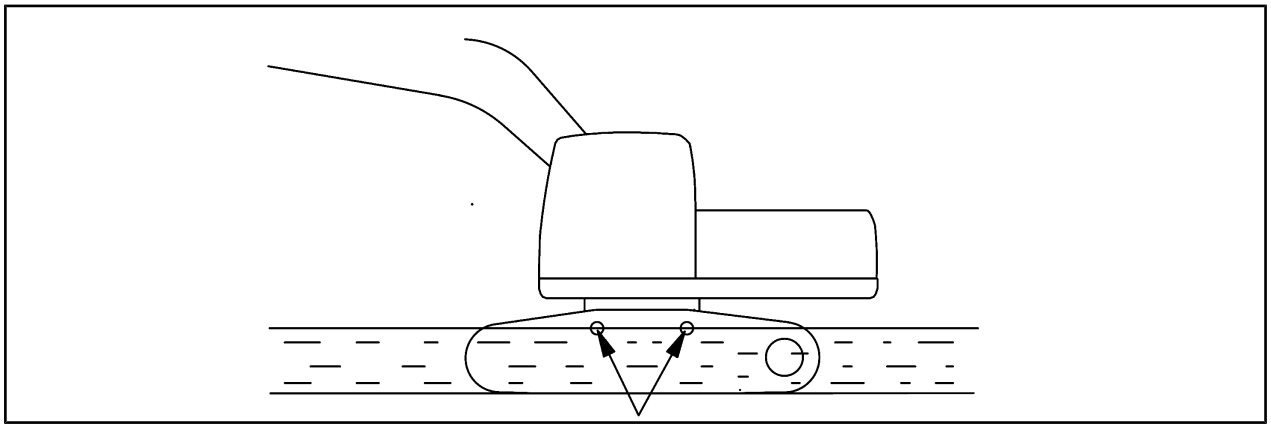
6.2.9 Driving through water

NOTICE

Machine damage from water penetration

If the water level rises above the rollers, water can enter the machine and damage it.

- Check the depth of the water before driving through it.
- Check the load-bearing capacity of the ground.



The machine may only drive through and in water if it can be ensured that the water level will remain below the rollers.

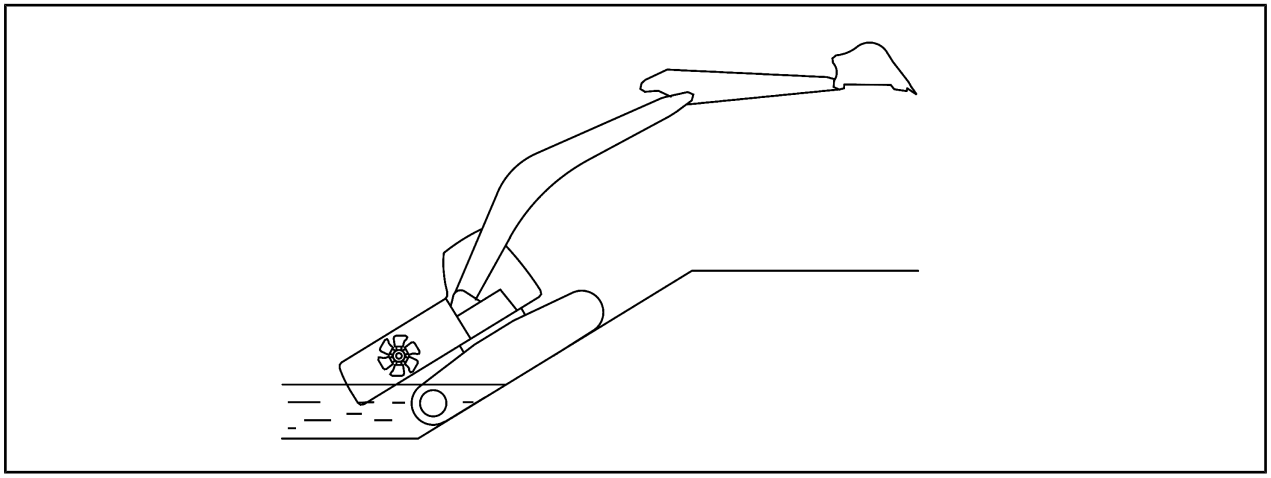
Leaving water on slopes

NOTICE

Machine damage from water penetration

When leaving water on slopes, the rear of the machine can be submerged under water so that the engine is damaged.

- Check the slope.
- If the slope is 15° or greater, find another exit route.



Relubrication

The machine parts that have been under water during work, particularly the coupling for changing the equipment, must be relubricated immediately afterwards.

⚠ CAUTION

Avoid environmental damage resulting from consumables. Observe applicable laws for the disposal of materials harmful to the environment.

1. Apply new lubricating grease until the old lubricant has fully been replaced.

2. Dispose of old lubricating grease in an environmentally sound manner.

» Relubrication is now complete.

If the water has reached the slewing gear, the lubrication must be replaced:

➢ A receptacle is provided for catching the gear oil/water mixture.

1. Open the gear oil drain plug.

2. Allow slurry and water to drain out.

3. Wipe the slewing area clean with a cloth.

4. Close the gear oil drain plug once again.

5. Top-up the gearbox oil.

6. Lubricate the slewing ring and rotating joint.

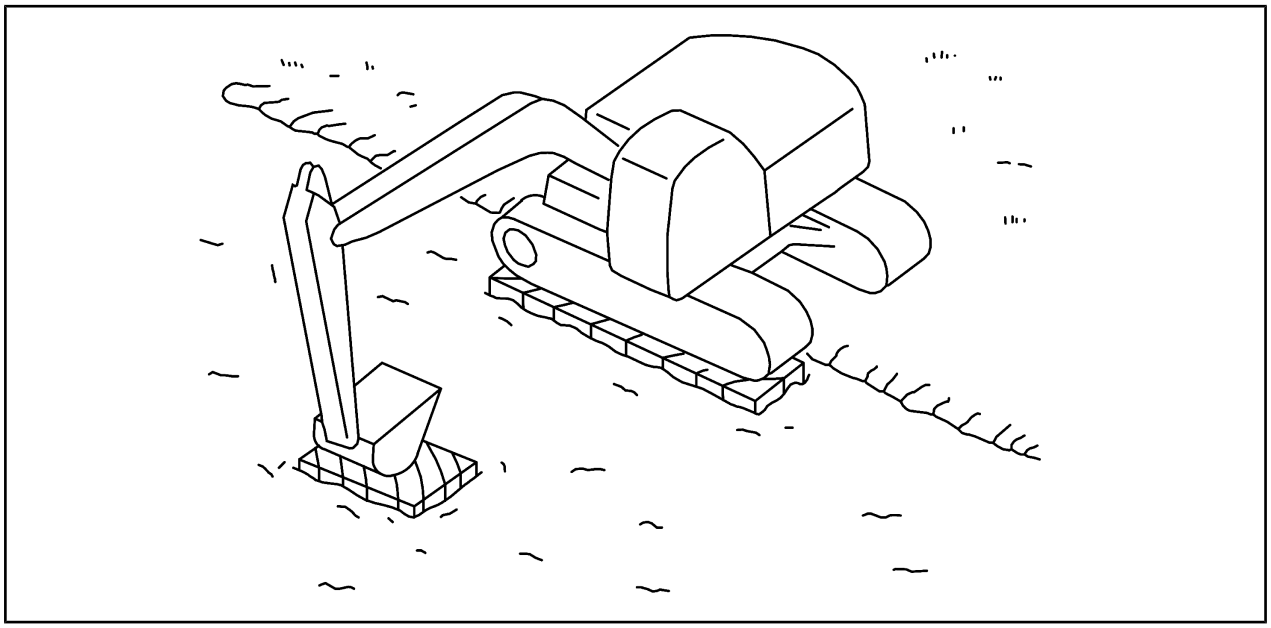
7. Dispose of the gear oil/water mixture in an environmentally sound manner.

» The gear oil has now been replaced.

6.2.10 Driving through sludge

The machine may drive through and in sludge. However, care must be taken to prevent the machine from becoming stuck. If this occurs, the machine can be freed from the sludge in the following ways.

A chain drive is stuck



The work equipment can be used to raise the chain drive that is stuck and to place objects underneath in order to provide assistance.

➢ A chain of the machine is stuck.

1. Turn the upper carriage to the side of the chain that is stuck until it is at a 90° angle to the chain.

2. Lower the bucket to the ground.
   ⇨ The boom and excavator arm are positioned at an angle of 90° to 110° in relation to each other.

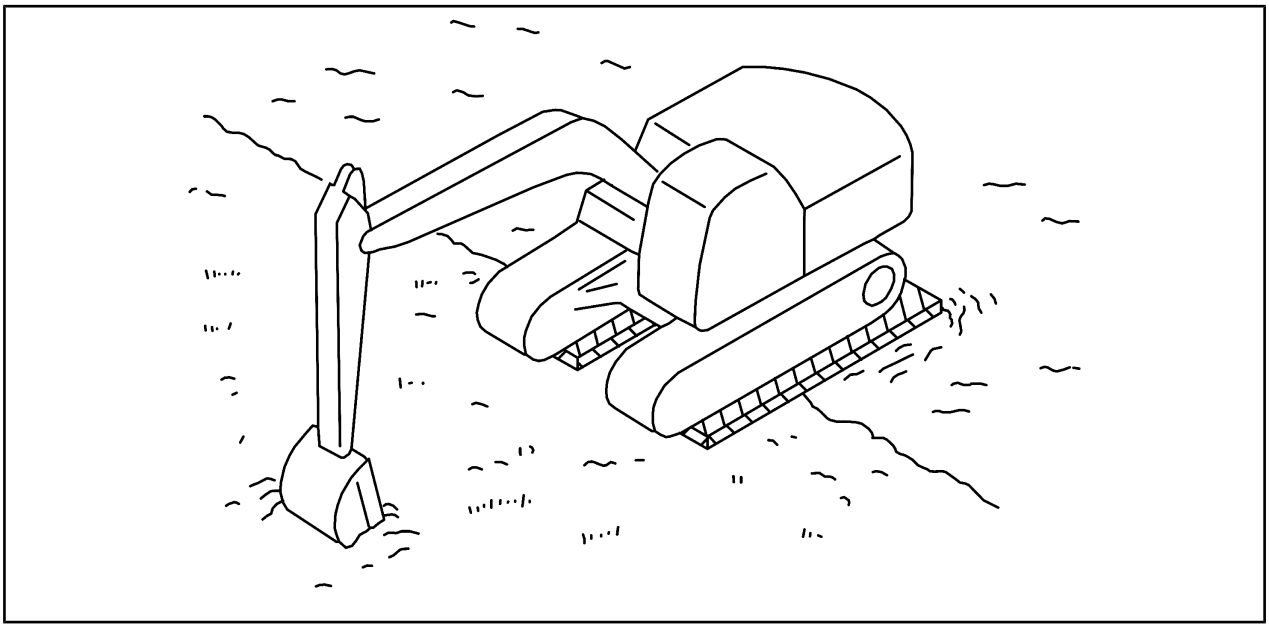
3. Lift the under carriage by further lowering the boom.

4. Place wooden boards or similar objects under the chain.

5. Lower the under carriage on to the boards.

6. Carefully drive out of the sludge.
   » The machine is now out of the sludge.

Both chains are stuck



➢ Both chains of the machine are stuck.

1. Turn the upper carriage onto the side of one the chains which are stuck until it is positioned at an angle of 90° to the chain.

2. Lower the bucket to the ground.

3. The boom and excavator arm are positioned at an angle of 90° to 110° in relation to each other.

4. Lift the under carriage by further lowering the boom.

5. Place wooden boards or similar objects under the chain.

6. Raise the boom and turn the upper carriage through 180° until the boom is positioned at an angle of 90° in relation to the chain.

7. Repeat steps 2 to 5.

8. Lift boom.

9. Turn the upper carriage to the direction of travel.

10. Drive the bucket into the earth.

11. Retract the excavator arm as if the arm was about to be used for excavating.

12. Carefully drive in the direction of the work equipment.

» The machine is now out of the sludge.

6.3 Operating the equipment

6.3.1 Operating the equipment

The boom and the excavator arm are operated using both joysticks. They can be moved forward and backward, up and down or from side to side. When the joystick is released, it returns to the middle position and the movement of the boom or excavator arm stops.

The movements can be combined with one other by simultaneously engaging the joysticks and / or diagonal motions. The speed of each movement is determined by the force exerted on the joystick. More force means a quicker motion.

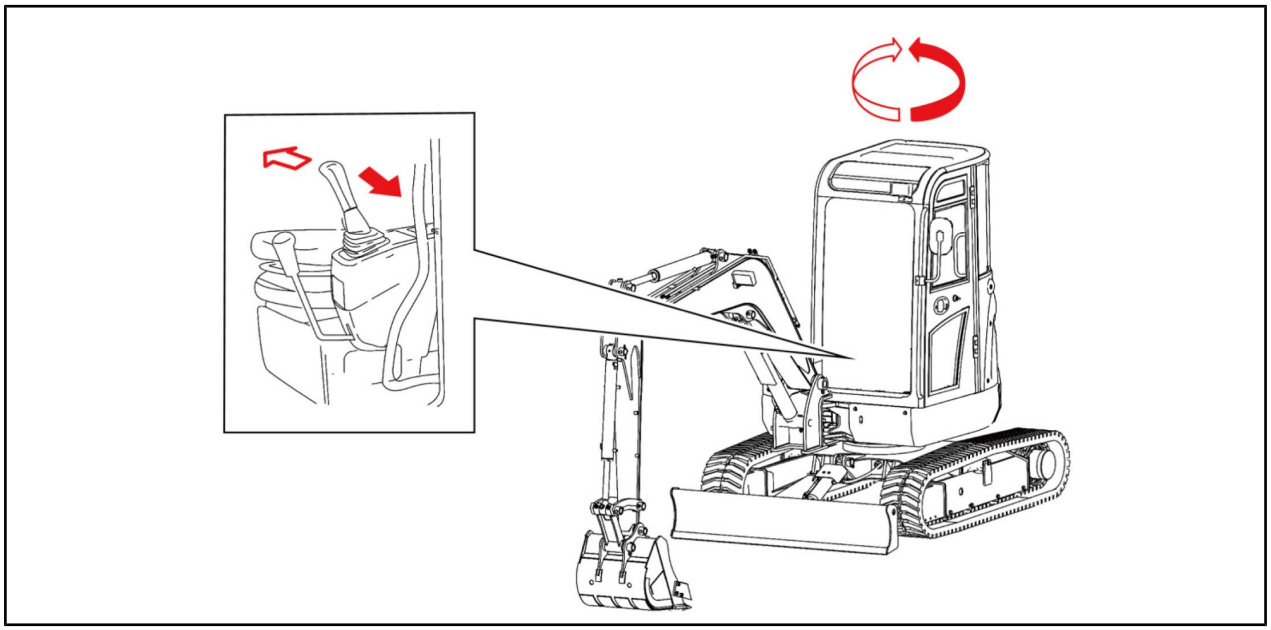
6.3.2 Turning upper structure

⚠ CAUTION

Risk of crushing when the machine is turned

During turning, the upper structure protrudes beyond the lower structure. Persons can be hit and trapped by the upper structure and objects can be hit or trapped by the upper structure.

- Watch out for persons in the turning radius.
- Watch out for obstructions in the turning radius.



The upper structure can be moved with the boom around the vertical axis of the excavator. The lower structure remains stationary during this turning movement. The movement is performed using the left-hand joystick.

➢ The machine is in operation.

➢ The machine is stationary.

1. Check turning area for obstacles and the presence of other persons.

2. Press the horn.

3. Push the left joystick to the right.
   ⇨ The upper structure rotates to the right.

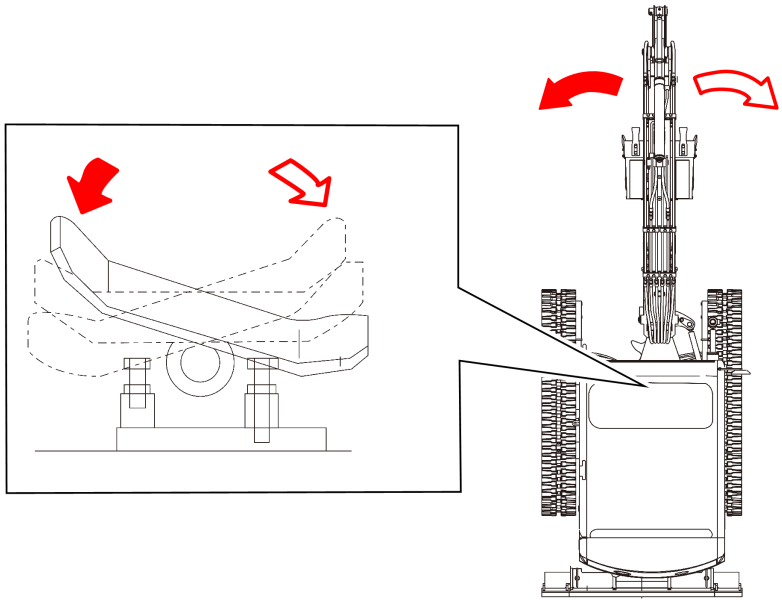
4. Move the joystick to the middle position.
   ⇨ The turning movement stops.

5. Push the left joystick to the left.
   ⇨ The upper structure rotates to the left.

6. Let go of the joystick.
   ⇨ The joystick returns to the middle position.
   ⇨ The turning movement stops.
   » The upper structure is now facing in a new direction.

6.3.3 Swivelling the boom

The boom can be swivelled to the left or right in order to move the bucket to the correct position.



Swivelling the boom

➢ The machine is in operation.

1. Tilt the pedal for swivelling the boom to the right.
   ⇨ The boom swivels to the right

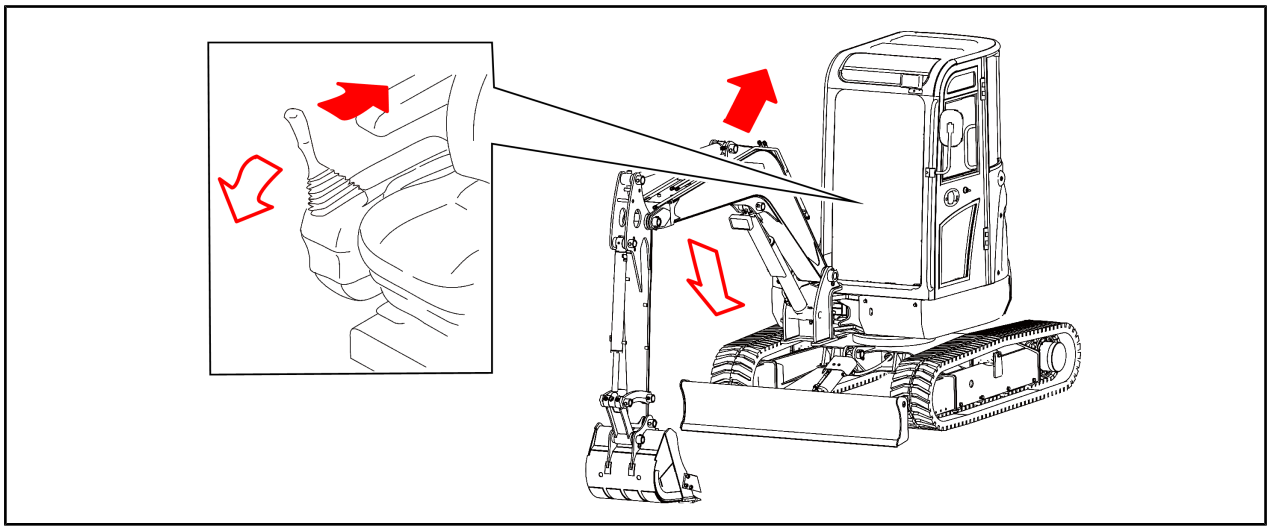
2. Set the pedal for swivelling the boom to the middle position.
   ⇨ The boom movement stops.

3. Tilt the pedal for swivelling the boom to the left.

⇨ The boom swivels to the left

4. Release the pedal for swivelling the boom.
   ⇨ The pedal returns to its initial position
   » The boom movement stops.

6.3.4 Lifting and lowering the boom



The boom can be raised or lowered in order to move the bucket into the correct position.

➢ The machine is in operation.

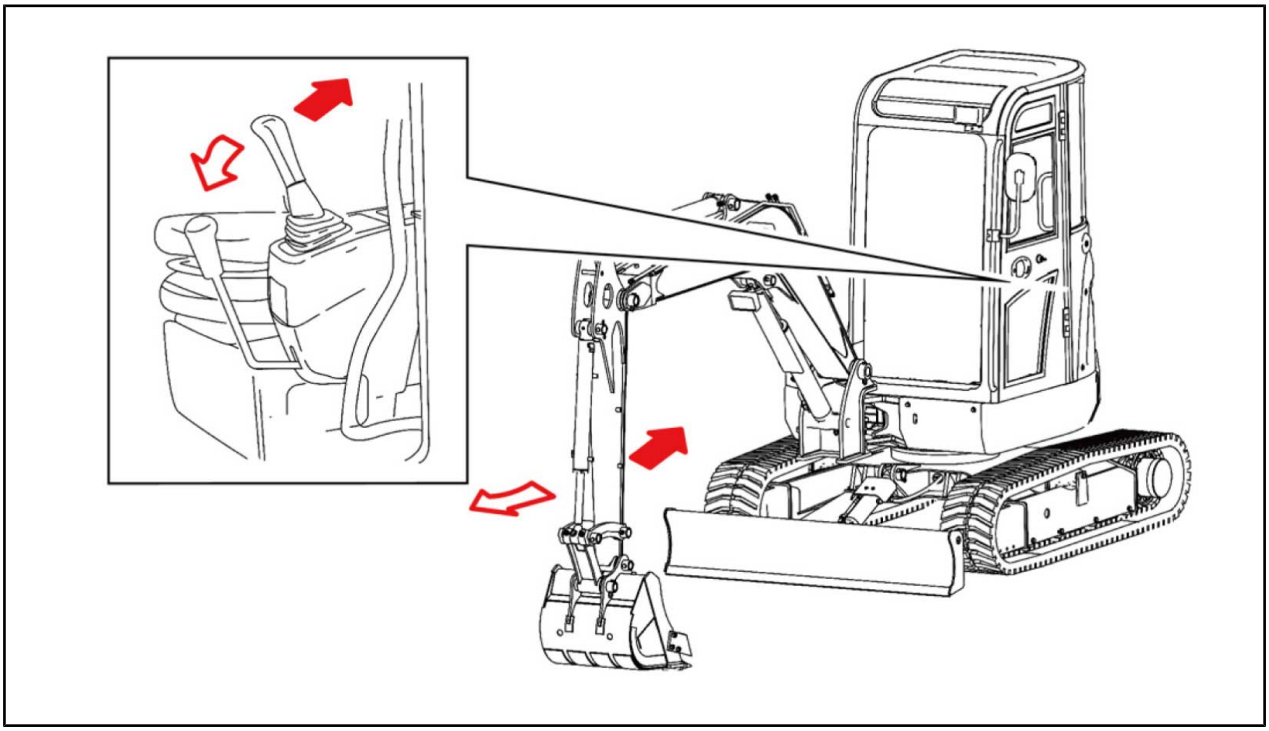
1. Pull back on the right joystick.
   ⇨ The boom will lift.

2. Move the joystick to the middle position.
   ⇨ The movement stops.

3. Push forward on the right joystick.
   ⇨ The boom will lower.

4. Let go of the joystick.
   ⇨ The joystick returns to the middle position.
   ⇨ The movement stops.
   » The boom is now in position.

6.3.5 Move the excavator arm forward and back



The excavator arm can be moved forward and backward in order to bring the bucket into the correct position.

➢ The machine is in operation.

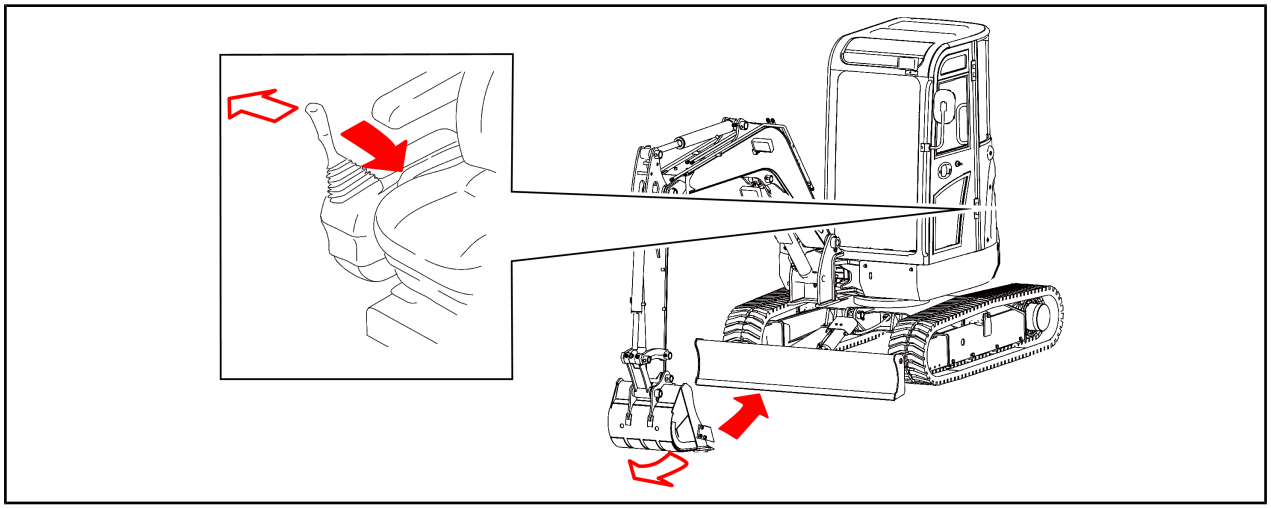
1. Pull back on the left joystick.
   ⇨ The excavator arm moves toward the excavator.

2. Move the joystick to the middle position.
   ⇨ The movement stops.

3. Push forward on the left joystick.
   ⇨ The excavator arm moves away from the excavator.

4. Let go of the joystick.
   ⇨ The joystick returns to the middle position.
   ⇨ The movement stops.
   » The excavator arm is in position.

6.3.6 Folding the bucket in and out



The bucket can be folded in or out in order to pick up or deposit excavated material.

The bucket is folded in or out using the right-hand joystick.

➢ The machine is in operation.

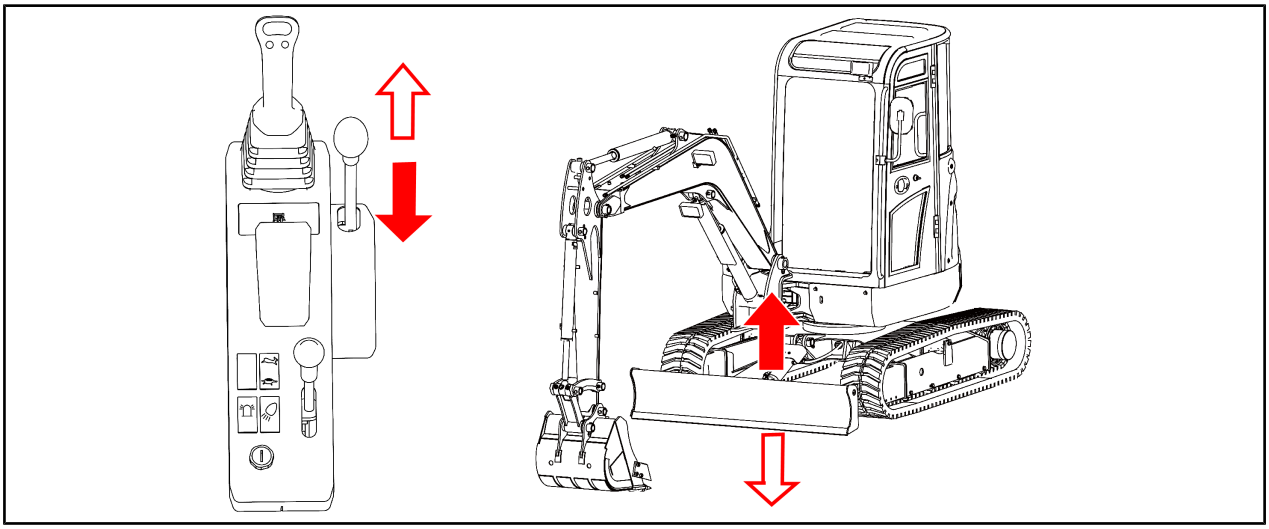
1. Push the right joystick to the left.
⇨ The bucket folds out.

2. Move the joystick to the middle position.
⇨ The movement stops.

3. Push the right joystick to the right.
⇨ The bucket folds in.

4. Let go of the joystick.
⇨ The joystick returns to the middle position.
⇨ The movement stops.
» The bucket is in position.

6.3.7 Raising and lowering the blade



➢ The blade can be moved up and down. The blade can be sunk into the ground below.

➢ The machine is in operation.

1. Slide blade lever forward.
   ⇨ The blade is lowered.

2. Release the lever.
   ⇨ The movement stops.

3. Pull the blade lever backwards.
   ⇨ The blade is raised.

4. Release the lever.
   ⇨ The movement stops.
   » The blade is in position.

6.4 Digging

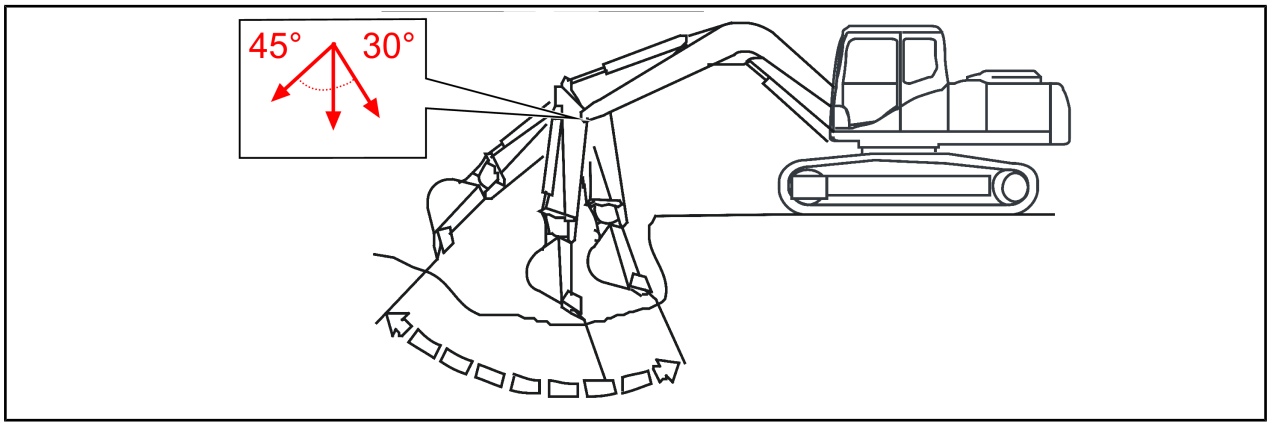
6.4.1 Digging

Machine damage from use with hydraulic cylinders fully extended or retracted

Damage to the hydraulic cylinders

- Do not use the equipment with hydraulic cylinders fully extended or retracted.

The optimal digging range of the excavator arm varies. The digging range changes depending on the depth of the dig.



6.4.2 Digging trenches

Machine damage from use with hydraulic cylinders fully extended or retracted

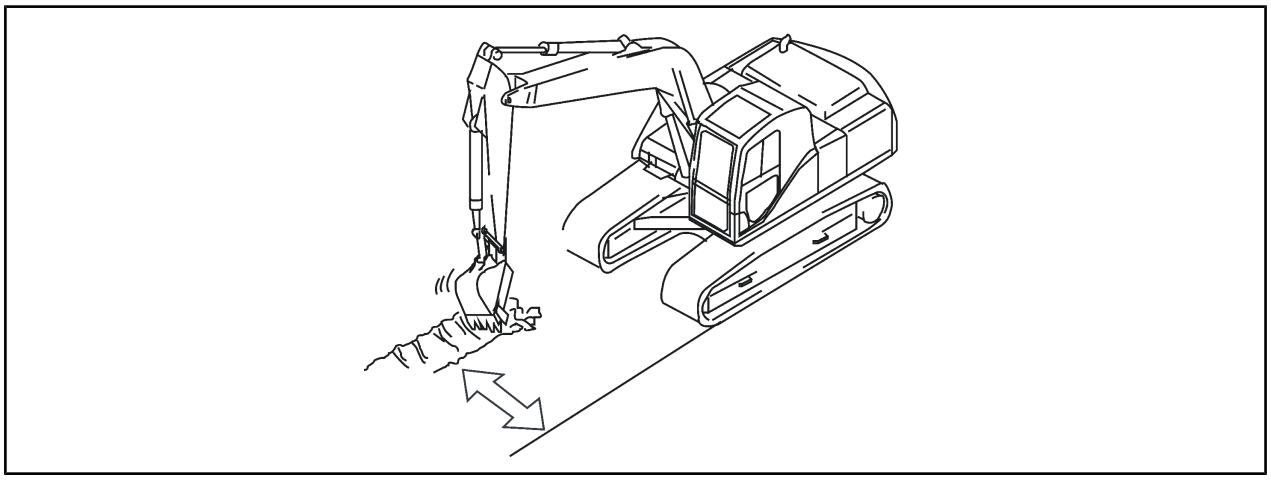
Damage to the hydraulic cylinders

- Do not use the equipment with hydraulic cylinders fully extended or retracted.

Machine damage from supporting the hydraulic force with driving motions

Using driving motions to support the hydraulic force can shorten the service life of the machine and increase the frequency of required machine maintenance.

- Do not support the hydraulic force of the equipment with driving motions.



Excavating the ditch

Excavating a ditch to the width of the bucket

1. Position the tracks parallel to the intended line of the ditch.

2. Excavate the ditch.
   » Ditch is now excavated.

Excavating a ditch wider than the bucket

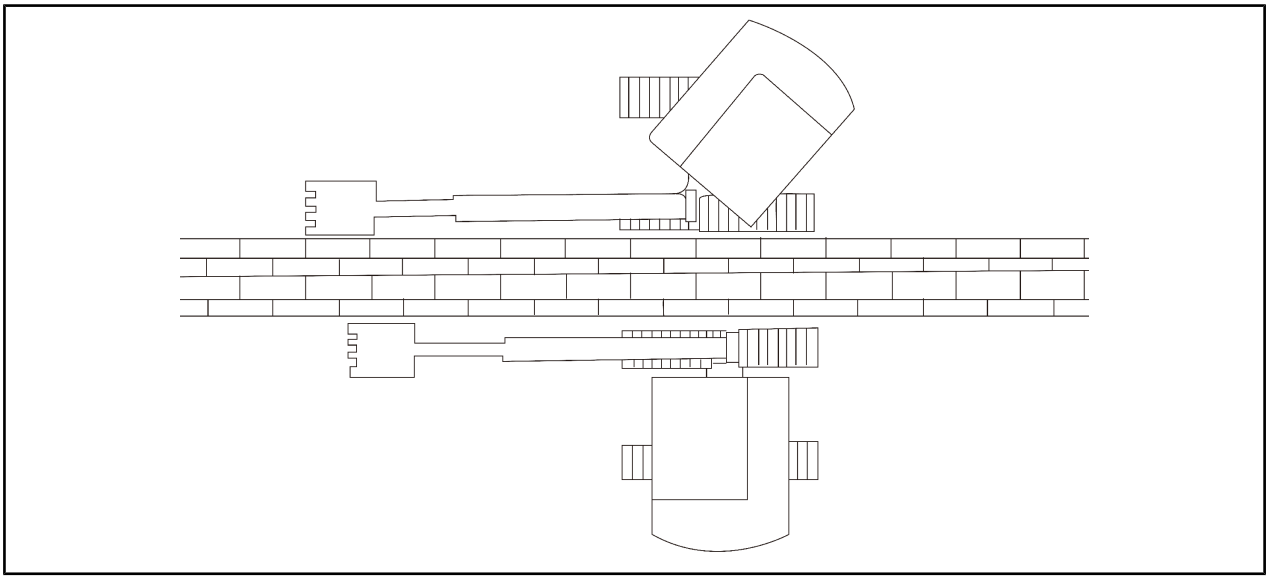
1. Position the tracks parallel to the intended line of the ditch.

2. Excavate one outside edge of the ditch.

3. Excavate the other outside edge of the ditch.

4. Excavate the middle of the ditch between the two edges.
   » Ditch is now excavated.

6.4.3 Excavating a ditch along a wall



When excavating a ditch along a wall, use the option for swivelling the boom.

6.4.4 Excavating

Machine damage from use with hydraulic cylinders fully extended or retracted

Damage to the hydraulic cylinders

- Do not use the equipment with hydraulic cylinders fully extended or retracted.

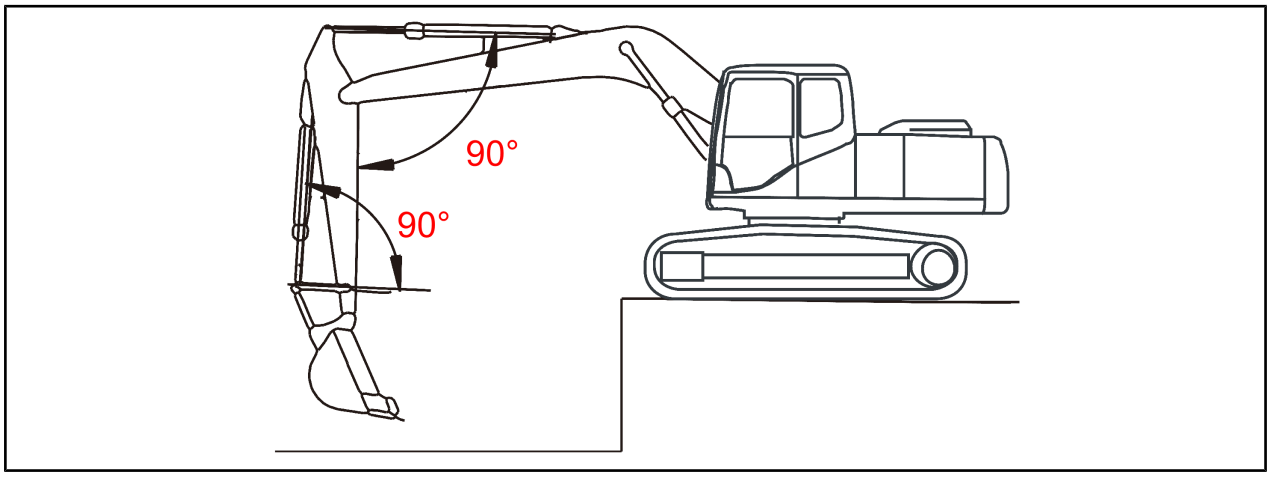
Machine damage from supporting the hydraulic force with driving motions

Using driving motions to support the hydraulic force can shorten the service life of the machine and increase the frequency of required machine maintenance.

- Do not support the hydraulic force of the equipment with driving motions.

When digging, the machine can excavate a pit below the height at which it is standing.

The maximum power transmission from the hydraulic cylinders to the bucket is reached when the angle between arm cylinder and bucket cylinder, as well as between bucket cylinder and coupling rod, is 90°.



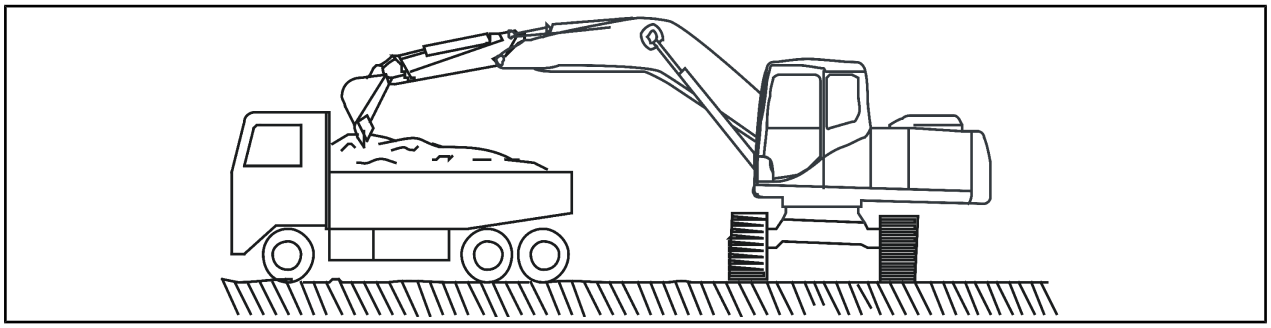
6.5 Loading

Danger of injury as a result of the machine tipping over from overload

If the machine loads that are too heavy, drives with loads or lifts loads with an extended boom, it can become unbalanced and topple over. This can result in operator injury and damage to the machine.

- Do overload the machine.
- Loads may only be transported slowly and close to the ground.
- To not extend the boom when lifting loads.

In order to avoid personal injuries, always ensure that no persons are in the loading area before loading commences. This can be achieved, for example, through appropriate barriers.



The following must be observed when loading:

- Position the machine in such a way so that the machine operator has a good view of the loading area (for example, the dump truck).
- Turn the upper structure of the machine 90° to the tracks.
- Load the dump truck from behind.
- Keep the rotational angle as small as possible to limit the loading time.

6.6 Leveling

Machine damage from use with hydraulic cylinders fully extended or retracted

Damage to the hydraulic cylinders

- Do not use the equipment with hydraulic cylinders fully extended or retracted.

1. Slide the blade lever forward until the desired penetration depth (maximum 338 mm) is reached.
   ⇨ The blade is sunk into the ground below.

2. Drive the machine backward and forward using the drive levers.
   » The ground is now level.

6.7 Loading

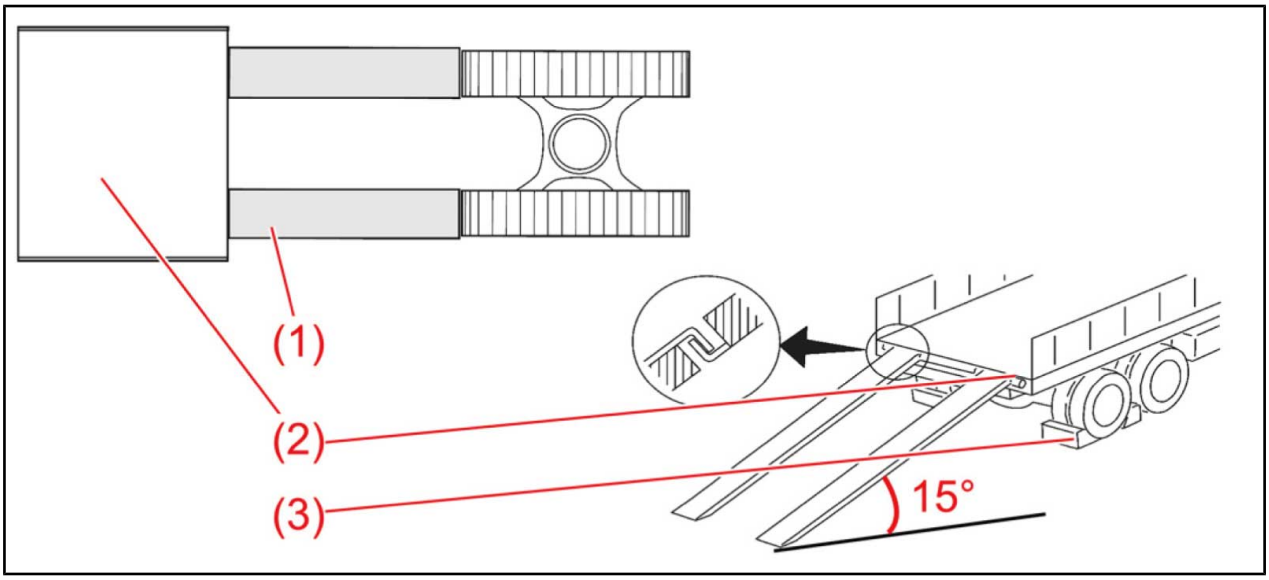
6.7.1 Preparation

⚠ CAUTION

Check specifications

Before preparing the machine for loading, read the machine specifications in the attachment of this manual.

See also Specifications



(1) Ramp

(2) Transport trailer

(3) Safety chocks for transport trailer

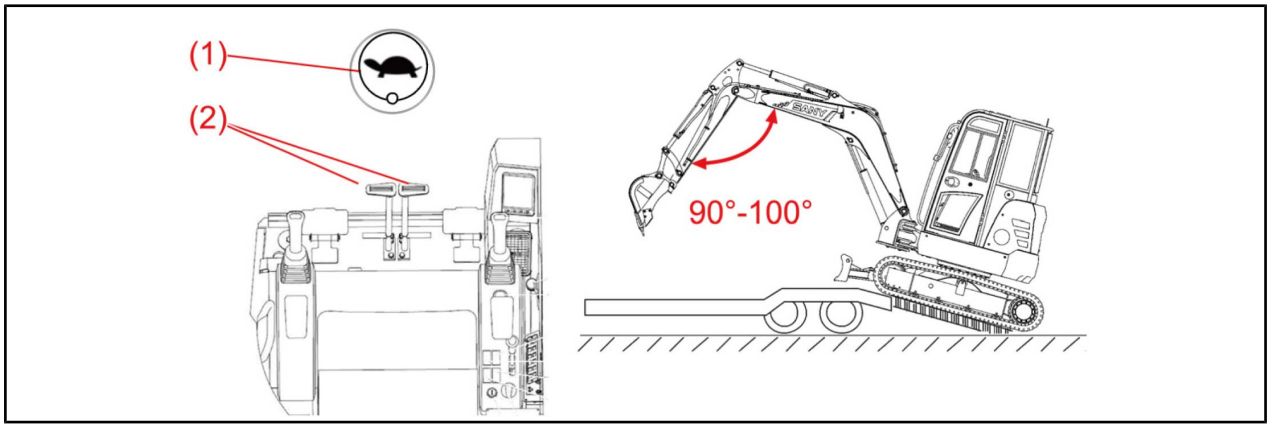
The following must be observed when loading the excavator:

- The excavator may only drive onto the transport trailer and ramps if these have a sufficient load-bearing capacity for the machine.
- Ramps must be set up parallel to each other and be at least as wide as the tracks.

- Ramps may have a slope no greater than 15°. ▪ Ramps must be securely fastened to the trailer.
- The trailer and ramp must be located on ground below that is even and has sufficient load-bearing capacity.
- The transport trailer must be secured against rolling away.
- Before driving onto the transport trailer, tracks, ramps and transport trailer must be cleaned of mud, grease and oil.

6.7.2 Driving onto the ramps and transport trailer

Driving up ramp forwards



(1) Fast/slow travel switch (2) Drive lever

The excavator may drive up the ramps when it is travelling straight ahead. The equipment must be positioned in front of the machine in the direction of travel. The equipment must be lowered.

Regardless of the inclination, ramps must not be driven over if the chains cannot find sufficient grip.

While travelling onto ramps or transport trailers, no operation elements other than the drive pedals or drive lever may be used. The upper carriage and boom must not be moved during motion. While on ramps or transport trailers, never turn the machine but rather move it backwards to the initial position in order to correct the direction of travel.

➢ The tracks are now aligned with the ramp and trailer.

➢ The work equipment is lowered and is positioned in front of the machine.

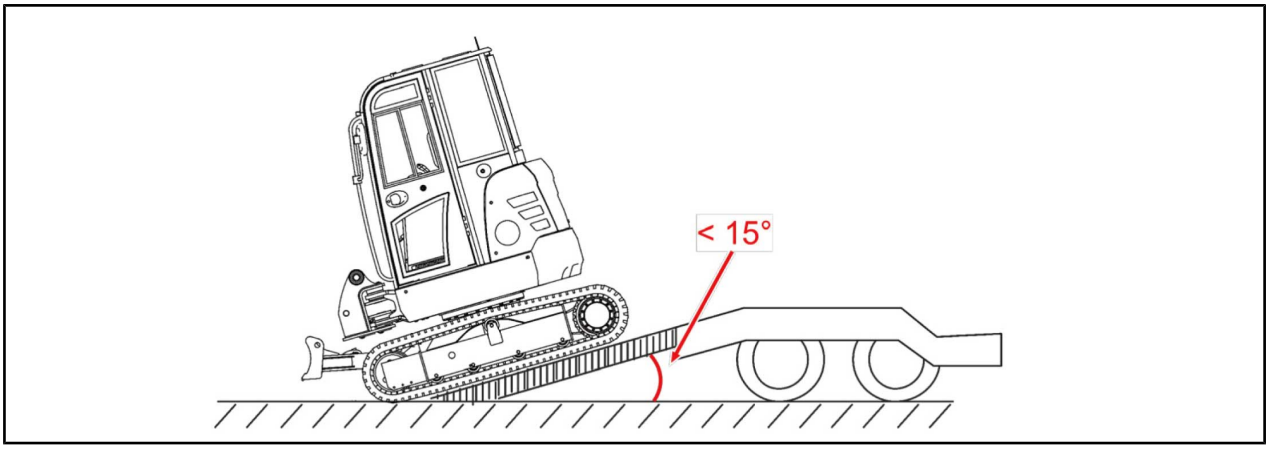
1. Push the throttle lever to the MIN position to reduce the engine speed.

2. Slowly drive straight ahead up the ramp. While driving, operate both drive levers or drive pedals slowly and at the same time.

3. Drive particularly slowly at the end of the ramp and when positioned above the transport trailer tyres.

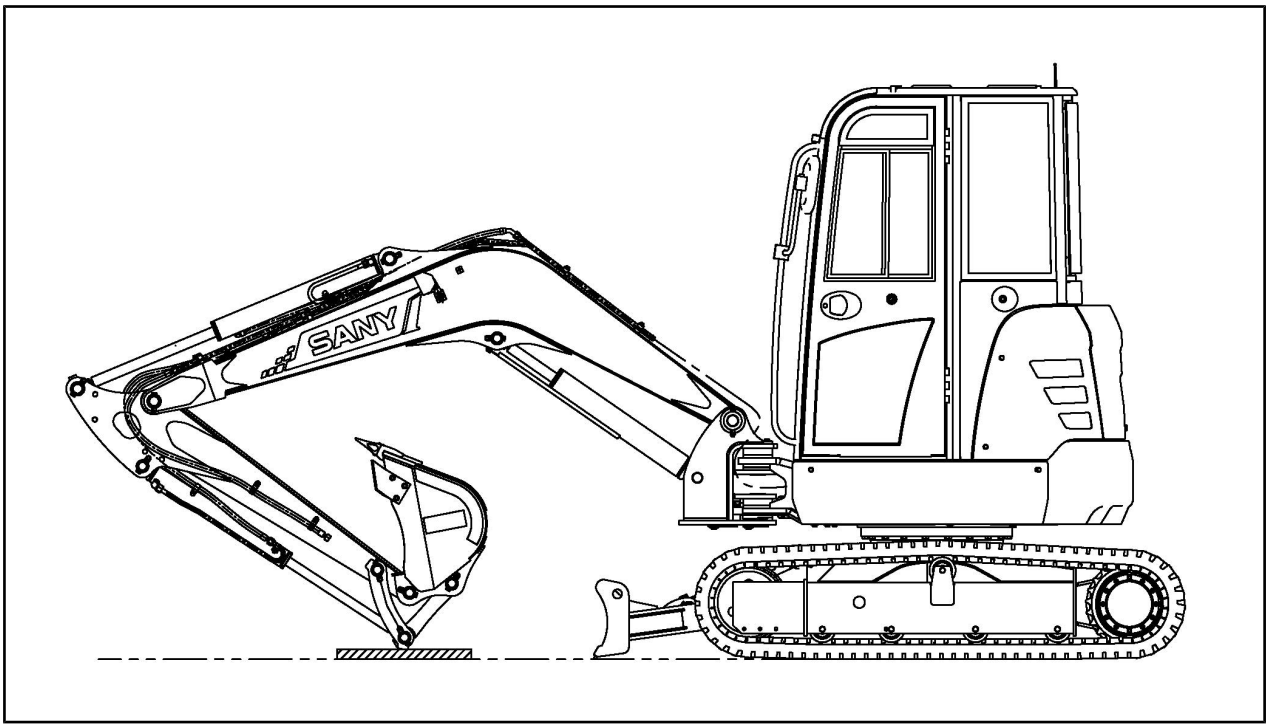
» The machine is at its end position on the transport trailer.

Driving up ramp backwards



If no work equipment is installed on the machine, it should be driven up the ramp in the reverse direction.

6.7.3 Securely parking the machine on the transport trailer



➢ The machine is on the transport trailer.

1. Fold in the bucket completely.

2. Lower the boom.

3. Turn the upper carriage 180° so that the work equipment faces opposite the direction of travel of the means of transport.

4. Slowly lower the boom and set down the excavator arm on a wooden block so that neither the bucket nor the transport trailer can be damaged.

5. Switch off the machine.

6. Move the safety bar to the locked position.

7. Secure the maintenance door against unintentional opening.

8. Fit the transport safety equipment.

9. Retract the mirrors.
   » The machine is safely parked.

The person who loads the machine is also responsible for lashing it down ready for transport.

⚠ CAUTION

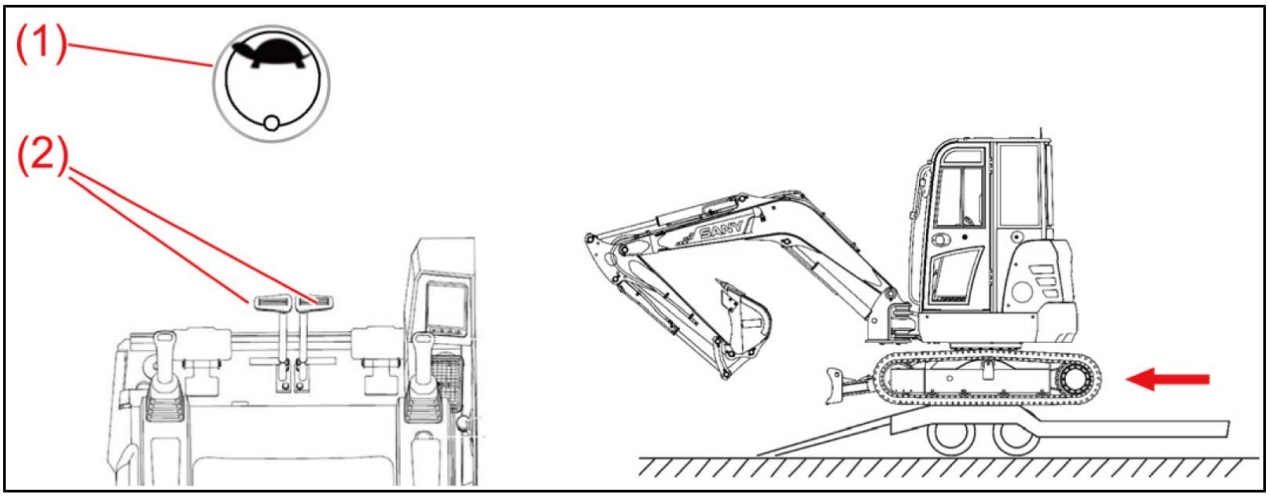
Observe the loading chart and technical specifications
The machine's technical specifications are listed in the appendix of this operating manual.
Further information on loading the machine onto a transport trailer can be found in the loading instructions.

6.7.4 Driving off the ramps and transport trailer

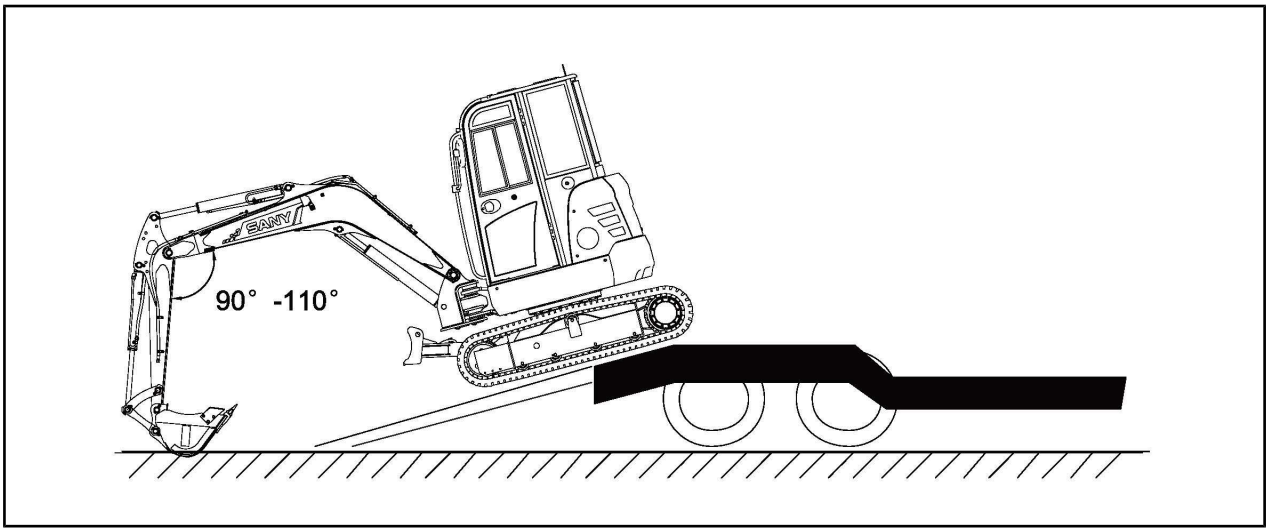
⚠ WARNING

Machine toppling and falling off while on ramps
There is a danger of injury if the machine becomes unbalanced while on ramps, topples and falls off.

- Drive slowly straight ahead.
- Do not turn or drive diagonally to the ramp.
- Drive with the equipment lowered (20 to 30 cm above the ground).
- The boom and the equipment must be facing in the direction of travel.
- Do not open the cab door.



(1) Fast/slow travel switch (2) Drive lever



➢ The wooden block for protecting the bucket has now been removed.

➢ Chains and ropes have been removed.

➢ Set the safety bar to the unlocking position.

➢ Transport safety equipment is removed.

1. Start the machine.

2. Slowly raise the boom.

3. Push the throttle lever to the MIN position to reduce the engine speed.

4. Slowly drive straight ahead, until the machine is positioned over the wheels of the transport trailer. While driving, opera-te both drive levers or drive pedals slowly and at the same time.

5. Stop before the ramp.

6. Before driving off the ramp, adjust the angle between the excavator arm and boom to 90-110°.

7. Lower the bucket to so that it is suspended 20–30 cm above the ground.

8. Carefully drive the machine off the ramp As the machine moves, slowly move the excavator arm and boom, while operating both drive levers or drive pedals slowly at the same time.

» The machine is on stable ground.

6.7.5 Lifting the machine

⚠ CAUTION

Observe the loading chart and technical specifications
The machine's technical specifications are listed in the appendix of this operating manual.
Further information on loading the machine onto a transport trailer can be found in the loading instructions.

Before the ropes can be fastened, the machine must be safely parked.

1. Fold in the bucket completely.

2. Lower the boom and turn the upper carriage 180° so that the work equipment faces opposite the direction of travel of the means of transport.

3. Slowly lower the boom and set down the excavator arm on a wooden block so that neither the bucket nor the transport trailer can be damaged.

4. Switch off the machine.

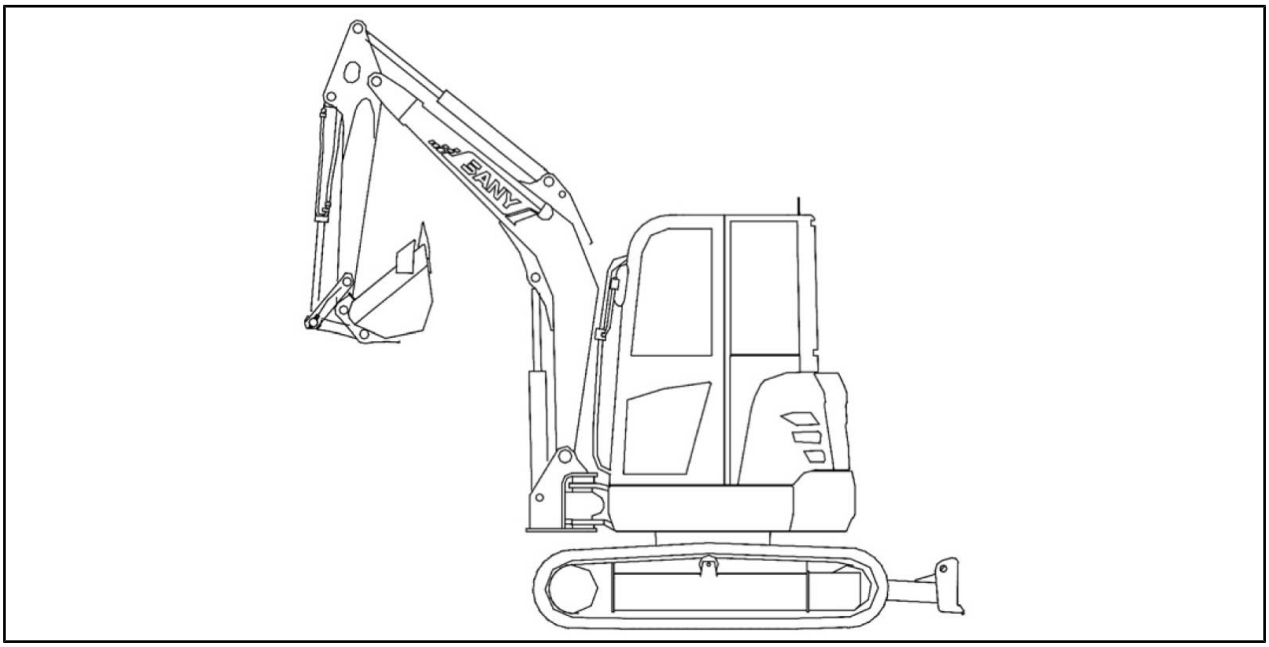
5. Move the safety bar to the locked position.

6. Secure all doors and maintenance doors against unintentional opening.

7. Fit the transport safety equipment.

8. Retract the mirrors.

» The machine is securely parked in the loading position.

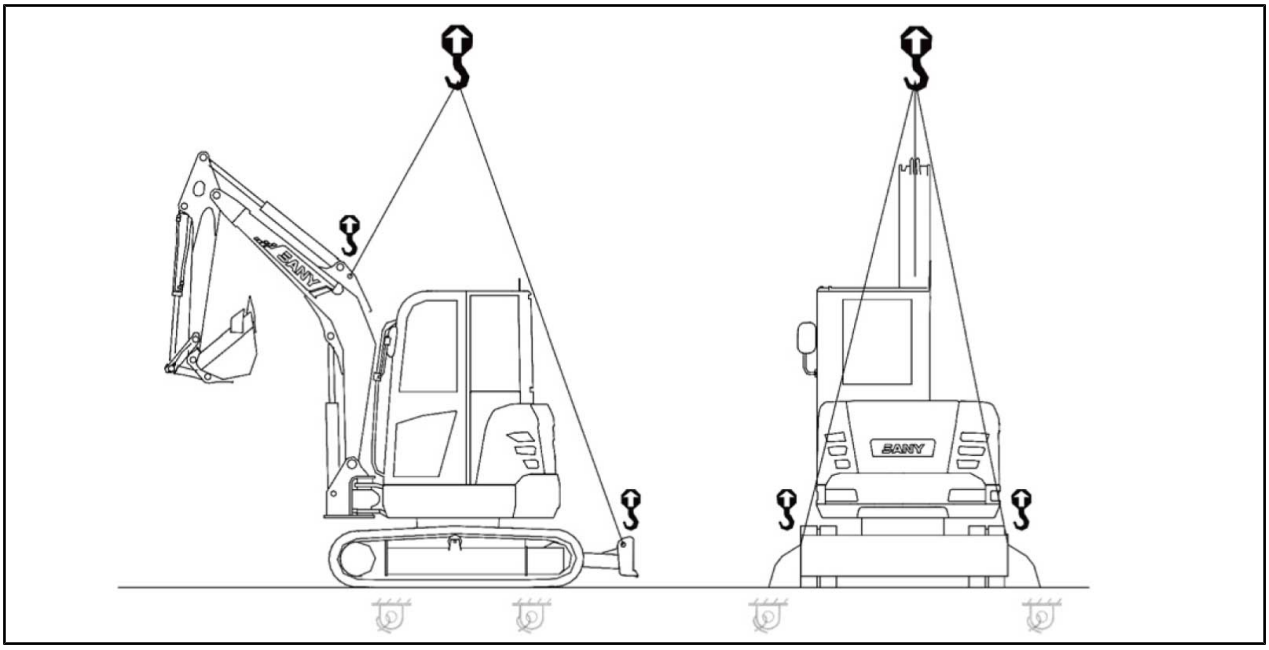


Machine in loading position

➢ The machine is securely parked in the loading position.

1. Attach ropes at the points indicated.

2. The machine is now ready to be lifted.



(1) Crane hook

(2) Lifting points of the machine between the carrier rollers

The crane operator is responsible for checking the ropes as well as for lifting and transporting the machine.

6.8 Lifting

⚠ WARNING

Serious injuries and machine damage from swinging or falling loads

Particularly when moving, loads can begin to swing, come lose and come crashing down. This can lead to injuries to persons guiding the load or to the operator, as well as to machine damage.

- Secure the loads.
- Let a second person guide the loads.
- Loads may only be transported slowly and close to the ground.
- Always keep an eye on the loads and the person guiding the loads.

⚠ CAUTION

Danger of injury as a result of the machine tipping over from overload

If the machine loads that are too heavy, drives with loads or lifts loads with an extended boom, it can become unbalanced and topple over. This can result in operator injury and damage to the machine.

- Do not overload the machine.
- Loads may only be transported slowly and close to the ground.
- To not extend the boom when lifting loads.

⚠ CAUTION

In order to avoid personal injuries, always ensure that no persons are in the lifting area before lifting operations commence. This can be achieved, for example, through appropriate barriers.

The machine may be used for lifting and transporting individual loads (with the aid of various types of sling gear), including, for example, setting down or lifting out pipes, shaft rings, or containers (tanks), loading or unloading devices, auxiliary equipment or components, and positioning or lifting out trench shoring equipment.

The following must be observed:

- The machine must be standing on or driven over ground below that is flat and has a sufficient load-bearing capacity.
- The items of load suspension equipment used must only be fitted to the attachment point provided .
- The items of load suspension equipment used must comply with statutory requirements.
- The loads must be attached in such a way that they cannot slip out of place or fall down.
- Loads must be carried and guided as close to the ground as possible.
- The load that is raised with the boom can be moved by turning the upper structure or driving the machine.
- Persons appointed to guide the load and the "slinger" (who attaches the lifting gear) must always be within the operator's field of vision.

- National regulations relating to the operator's level of qualification must be observed, and in some cases, the operator may require a crane driver's licence .
  Specifications regarding the loads to be lifted are shown in the attachment. See also Lifting range.
  The overload warning system must be switched on in during operation with lifting gear. The warning is given at 2 levels.

Display	Warning level	Consequence
Button lights up green	Overload warning activated	
Button lights up yellow	75% of the permitted load has been reached	
Button lights up yellow, over-load alert warning light lights up red, audible warning signal sounds	Maximum permitted load has been reached	Perform no movements that lead to a further load increase

6.9 Operation at low external temperatures

⚠ WARNING

Severe burns from coolant
The coolant can be easily ignited.
- No open flames when working with coolant.

⚠ WARNING

Eye and skin injuries from coolant
Contact with coolant can damage eyes and skin.
- Wear safety goggles and protective gloves.
- If eyes or skin come in contact with coolant, wash the affected body parts thoroughly with water and seek medical attention if necessary.

Machine damage from unsuitable cooling or lubricating agent

At low external temperatures, unsuitable cooling and lubricating agents can lead to engine and gear damage.
- Use only the lubricating and cooling agents intended for low external temperatures.

⚠ CAUTION

Avoid environmental damage resulting from consumables.
Observe applicable laws for the disposal of materials harmful to the environment.

When operating the machine at low external temperatures (< 5° C), it is possible that the engine may not start, the coolant may freeze or the battery capacity may be reduced.

To avoid limitations in operation, observe the following:

- Use consumables intended for low temperatures.
- Depending on the operating instructions, cover or remove the battery and store it in a warm place during interruptions to operation.

6.10 Parking the machine

The machine must be parked on ground that is secure, even and load-bearing. If the machine must be parked on a slope, the chains must be secured using blocks. Depending on the ground below, the bucket can now be driven into the ground to provide an additional safeguard. The operator must not leave the seat until the safety bar is in the locking position.

1. Stop the machine.

2. Push the throttle lever to the MIN position to reduce the engine speed**.**

3. Lower the work equipment horizontally until the underside touches the ground.

4. Lower the blade until its lower edge touches the ground below.

5. On the monitor, check the temperature of the cooling water and the engine oil pressure. If the coolant temperature is in the red area, it must be cooled until the indicator reaches the yellow area.

6. Move the safety bar to the locked position.

7. Turn off the engine.

8. Exit the machine and block the chains (if necessary).
   » The machine is parked.

6.11 Securing the machine

The machine must be secured for prolonged operational breaks and when travelling is complete.

➢ The machine is parked.

1. Replace the removed windscreens (if applicable).

2. Close open windows.

3. Close the cab door.

4. Close the fuel tank cap.

5. Lock the maintenance doors.

Cleaning

⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

7.Cleaning

7.1 Cleaning

It is recommended to clean the machine daily.

⚠ CAUTION

Always carry out cleaning work in a de-energised condition.

7.2 Cleaning at the end of operations

The machine may only be cleaned at the end of operations in the foreseen cleaning areas.

The machine can be cleaned using a high-pressure cleaner. It is recommended to operate the high-pressure cleaner only on the lowest level and at a distance of at least 30 cm from the machine to prevent damaging the rubber gaskets.

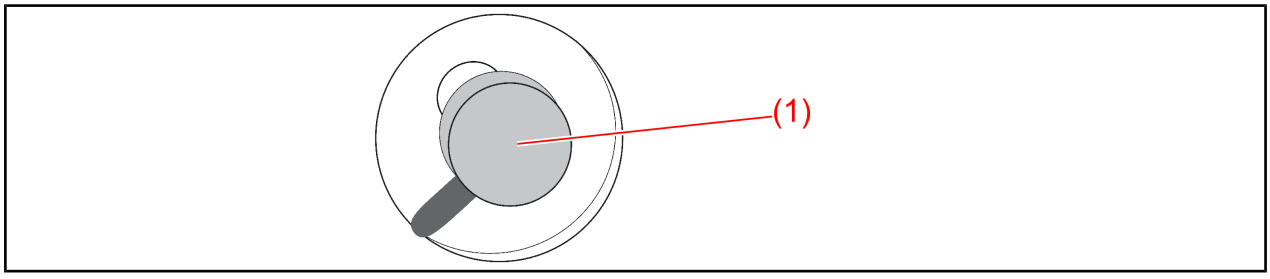
Only standard commercial detergents for high-pressure cleaners may be used.

Do not direct the jet of the high-pressure cleaner on the following components:

- Control box,
- Plug connections,
- Cooler,
- Battery cases,
- Foam plastic,
- Greasing nipples of the central lubrication system,
- Tyre valves.

The following can be cleaned using a water hose:

- Cooler
- Grease nipples. All grease nipples must be sealed with a protective cap (1) during cleaning.



Greasing nipples

Running in the machine

The machine was carefully adjusted and tested prior to delivery.

To ensure a long service life for the machine, SANY recommends the maintenance of a running-in period of 100 hours of operation following initial start-up.

Error detection

⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

8.Error detection

8.1 Operator

The first step in troubleshooting is to observe the indicator elements in the cabin. The light in the right-hand operating area indicates a fault without providing exact information about the cause. The operator must stop operation and determine the cause of the error. Further information is available on the display.

If the machine exhibits error functions or poor performance, the operator must also immediately stop operation and determine the cause of the error.

The software offers a wide range of troubleshooting possibilities. The start screen graphically represents all error messages. The operator can access more information by selecting the corresponding function unit using the function keys.

The operator has the possibility to remedy errors that are described in the operating manual in the Troubleshooting chapter. Any other errors must be fixed by maintenance or service personnel.

8.2 Maintenance personnel

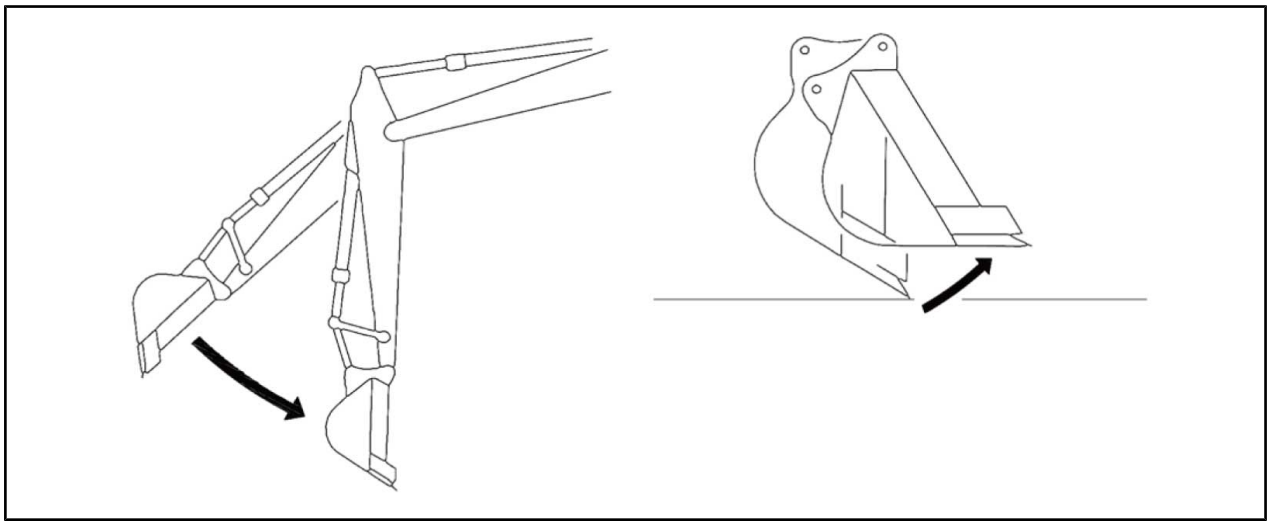
The maintenance technician carries out the work listed in the maintenance manual and also helps with troubleshooting. By entering a password, the maintenance technician can obtain more information via user interfaces in the display than the operator.

8.3 Service personnel

The service technician has further troubleshooting possibilities available. By entering a password, the service technician can use the user interfaces on the display to receive additional information.

The technical documents from the supplier are also available. These include troubleshooting information for the engine, gearbox, hydraulics and spreader.

8.4 Supposed errors

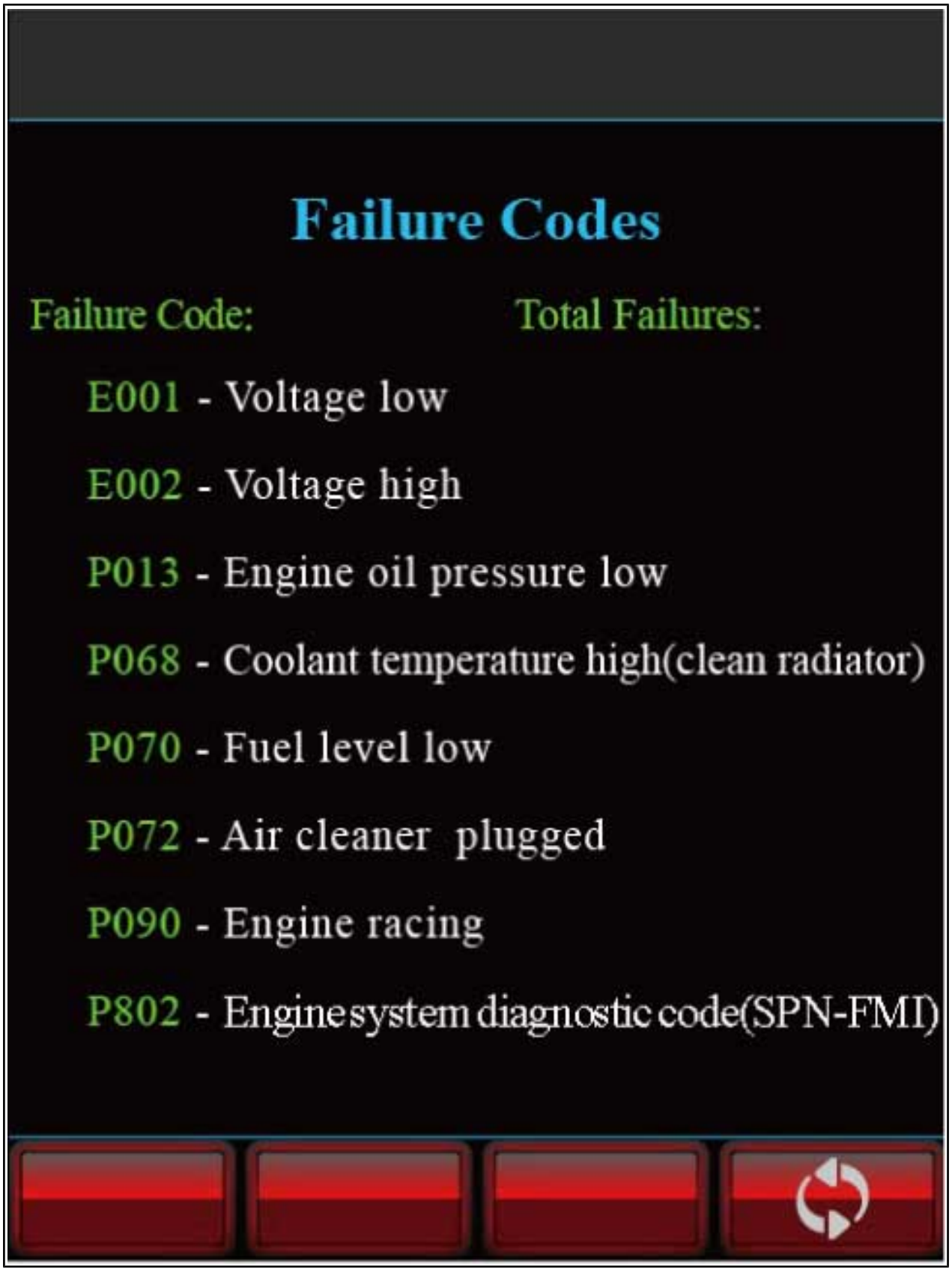


The irregularities described below are not faults but intentional deviations:

- The speed of travel of the excavator arm may suddenly fall if the excavator arm is retracted and the work equipment is also lowered when under no load and the excavator is in a virtually vertical position.
- The speed of travel of the bucket may suddenly fall if the bucket teeth are positioned almost parallel to the ground.
- The brake valve produces noise when the swivelling operation is started or stopped.
- The drive sprocket produces noise when the machine travels downwards at low speed.

8.5 Error codes

The error code shown on the display can be used to conduct an error analysis.


Failure Codes
Failure Code:
Total Failures:
E001 - Voltage low
E002 - Voltage high
P013 - Engine oil pressure low
P068 - Coolant temperature high(clean radiator)
P070 - Fuel level low
P072 - Air cleaner plugged
P090 - Engine racing
P802 - Engine system diagnostic code(SPN-FMI)

Error elimination

⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

9.Error elimination

9.1 Troubleshooting and eliminating errors

9.1.1 Engine

Fault	Possible cause	Fault diagnostics	Troubleshooting
The engine does not start	Battery does not activate	Check the position of the battery switch	Activate the battery with the battery switch
	Battery error / the battery is not connected correctly	Check that the battery poles are free of dirt deposits and correctly connected	If the battery is defective, contact maintenance personnel
	Battery is depleted	Check the battery voltage (engine switched off) 11–14 V	Charge or replace battery
	The fuse has tripped.	Check the fuse	Replace defective fuse
	No fuel		Top up the fuel
	Incorrect start process		Start the machine correctly
Engine stops right after starting	Battery is depleted	Check the battery voltage (engine switched off) 11–14 V	Charge or replace battery
Engine overheats	Coolant level too low	Check the level of the coolant compensation vessel	Let the engine cool and fill the coolant
Low engine oil pressure	Too little engine oil	The alarm on the display lights up	Checking the engine oil and refilling

9.1.2 Electrics

Fault	Possible cause	Fault diagnostics	Troubleshooting
Work spotlight goes out	The fuse has tripped	Check the fuse F4	Replace defective fuse
	Bulb is defective	Open the affected lamp and check the bulb	Replace the bulb
Horn does not work	The fuse has tripped	Check the fuse F3	Replace defective fuse

Fault	Possible cause	Fault diagnostics	Troubleshooting
The windscreen wiper does not function	The fuse has tripped	Check the fuse	Replace defective fuse
Windscreen washing system does not work	The fuse has tripped	Check the fuse	Replace defective fuse
	Windscreen wiper fluid has been used up	Check the level of the windscreen wiper fluid	Fill the windscreen wiper fluid
Radio has switched off	The fuse has tripped	Check the fuse F5	Replace defective fuse
Display has switched off	The fuse has tripped	Check the fuse F11	Replace defective fuse
Warm Air blower	The fuse has tripped	Check the fuse F10	Replace defective fuse

Fault	Possible cause	Fault diagnostics	Troubleshooting
All other faults			Contact maintenance personnel

9.2 Carrying out measures to eliminate errors

9.2.1 Overview

Do not disassemble the components too hurriedly.

If the components are disassembled immediately after the error occurred, the following happens:

- Parts not connected to the error or other parts are needlessly disassembled.
- It is not possible to fine the cause of error.

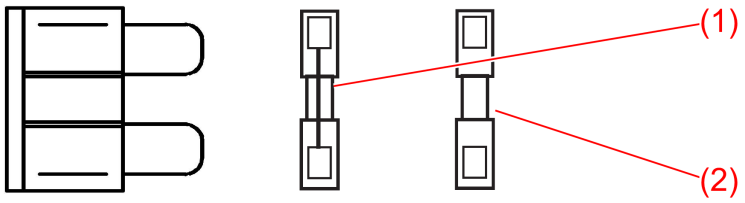
For this reason, when carrying out measures to eliminate error, care must be taken to conduct a comprehensive investigation beforehand and to carry out the measures according to the defined procedures.

Even if the error is eliminated, the same error can reoccur. To avoid this, investigate and eliminate the cause of the error.

9.2.2 Fuses

flat vehicle fuses

The machine is protected by standard-size flat vehicle fuses. The fuses must be replaced once they have tripped. In a defective fuse, the wire at the top of the fuse is defective.



(1) Fuse intact

(2) Fuse must be exchanged

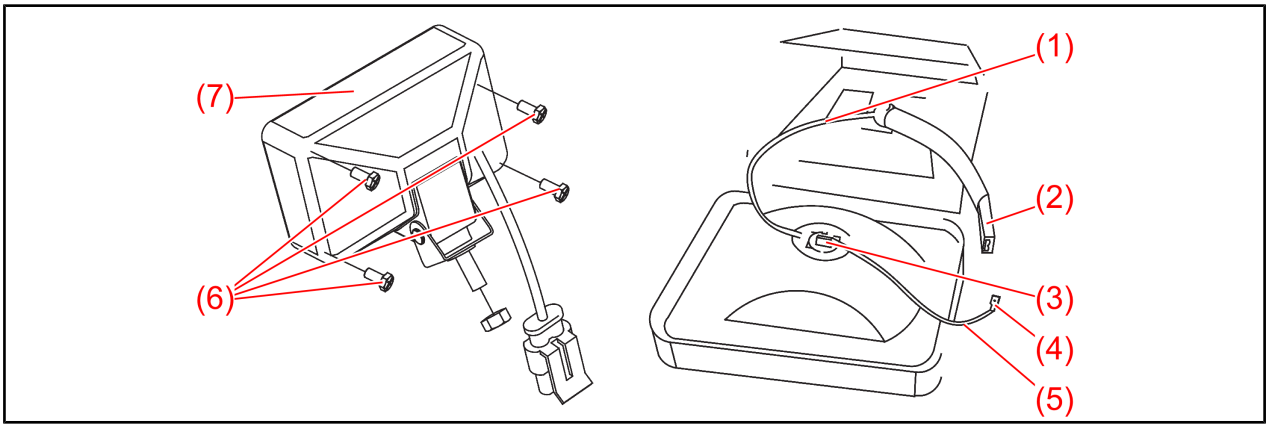
Fuses

ID	Rated current	User
F1	_	Free
F2	10 A	Driver warning system
F3	15 A	Horn
F4	25 A	Working lights
F5	15 A	Windscreen wiper/wiper fluid, Radio
F6	5 A	Air conditioning control panel
F7	_	Free
F8	20 A	free
F9	10 A	12 V power supply
F10	10 A	Air conditioning compressor
F11	25 A	Display
F12	_	Free
F13	_	Free
F14	20 A	Cigar Lighter，cabin lamp
F15	_	Free
F16	_	Free

Colour codes for the fuses:

1 A	1 A	black	10 A	10 A	red
2 A	2 A	grey	15 A	15 A	blue
3 A	3 A	purple	20 A	20 A	yellow
5 A	5 A	light brown	25 A	25 A	clear
7,5 A	7,5 A	brown	30 A	30 A	green

9.2.3 Replacing a work spotlight bulb



(1)	Grounding cable	(5)	Power cable
(2)	Bushing	(6)	Fastening screws
(3)	Lamp support bracket	(7)	Spotlight housing
(4)	Connector		

1. Park the machine.
2. Loosen the fastening screws of the spotlight housing.
3. Pull the power connector out of the connector cable socket.
4. Pull out the light bulb holder.
5. Replace the defective light bulb.
6. Insert the light bulb with mount.
7. Insert the power connector into the connector cable socket.
8. Close the spotlight housing and secure with fastening screws.
   » The light bulb has been replaced.

9.2.4 Starting assistance from additional batteries or generators

In the event of nearly or fully discharged batteries, a generator or a battery can be used for starting assistance.

⚠ WARNING

Deadly electric shock from incorrect connection of the starting assistance battery

Incorrectly connecting the battery for starting assistance can lead to serious injuries or death by electric shock.

- Only trained specialist personnel may carry out such actions for starting assistance.

➢ The ignition is switched off.

➢ All electrical devices are switched off.

1. Connect one end of the red jumper cable to the positive pole of the machine battery.
2. Connect the other end of the same cable to the plus pole of the battery used for starting assistance.
3. Connect one end of the black jumper cable to the negative pole of the battery used for starting assistance.
4. Connect the other end of the black jumper cable to the negative pole of the machine battery.
5. Start the engine.
6. Once the engine is running, remove the jumper cables in reverse order.

» The engine has been started.

Additional equipment

⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

10.Additional equipment

10.1 Overview

The machine can be equipped with additional equipment. The operating manual for the additional equipment must be understood and followed.

10.2 Unauthorized modifications

Any change made to the machine without SANY's approval can give rise to dangers.

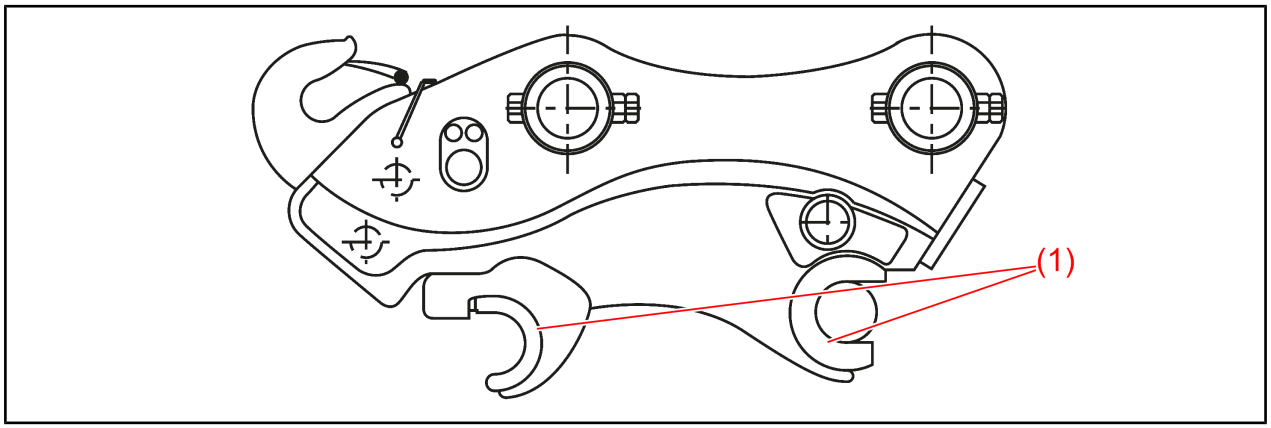
Modifications may only be carried out with the approval of SANY. SANY is not responsible for accidents or damage caused by unauthorized additional equipment or modifications.

10.3 Quick change system

10.3.1 Quick change system

⚠ CAUTION

This function is an option.



(1) Quick change system

With the quick change system, one person can change an item of work equipment by themselves. The operating manual for the quick change system must be followed.

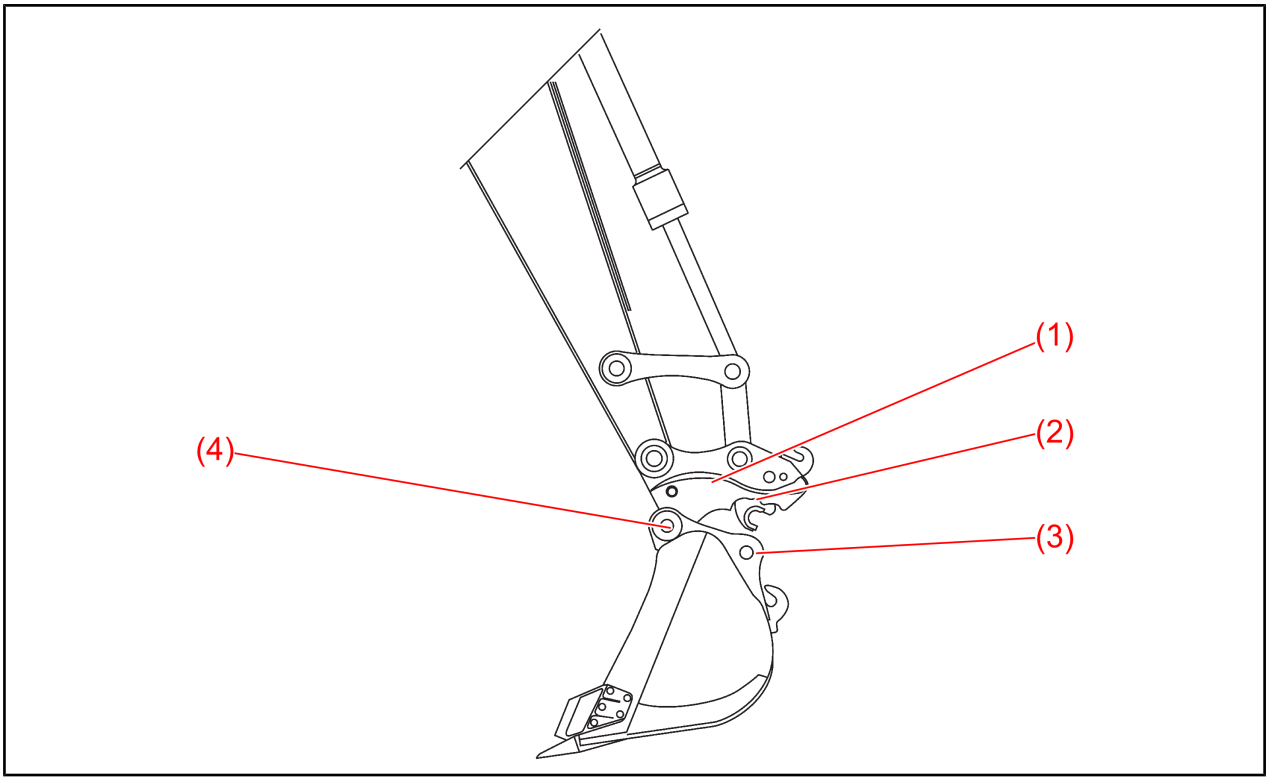
⚠ CAUTION

Risk of injury and machine damage from changes in operation

The quick change mechanism and the work equipment attached to it enlarge the swing radius of the excavator arm, which could cause the work equipment to reach the cab, thus injuring the operator and/or damaging the machine.

- Become familiar with the changes in operation before starting work.
- Retract the bucket cylinder before the arm cylinder.
- Extend the excavator arm first, then work with the excavator.
- Use the quick change mechanism only when work equipment is connected to it.
- Do not apply pressure when the quick change mechanism is touching the ground.

10.3.2 Fitting a bucket with the quick change mechanism



(1)	Quick change system	(3)	Bucket retaining pin
(2)	Jaws of quick change system	(4)	Locking pin

➢ The machine is parked.

1. Remove the locking pin on the quick change mechanism.

2. Press the button for activating the quick change mechanism (automatic reset) on the left control lever.

⇨ The opening between the movable and fixed jaws on the quick change mechanism becomes smaller.

3. Ensure that the fixed jaws on the quick change mechanism slowly close around the retaining pin of the bucket.

4. Slowly extend the bucket cylinder.
⇨ Move the movable jaws of the quick change mechanism to the retaining pin of the bucket.

5. Ensure that the fixed jaws on the quick change mechanism slowly close completely around the retaining pin of the bucket.

6. Release the button for activating the quick change mechanism
⇨ The quick change mechanism now encloses the retaining pin of the buckets.

7. Insert the locking pin.
» The bucket is now fitted.

Loading the machine

⚠ WARNING

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11.Loading the machine

11.1 Loading the machine

SANY

Loading Information

SY26U

V.11/2017 EN Translation of the original user manual; Spare parts number: 14155497

Machine identification number

Product designation:	Hydraulic excavator
Type designation:	SY26U
Contact:	SANY Europe GmbH SANY Allee 1 DE-50181 Bedburg
Service number:	00800 88888 318

⚠ WARNING

Danger of the machine slipping, turning or falling

Secure the machine:

- Use a non-slip mat.
- Only use the specified lashing points.
- Secure the upper carriage to prevent it from swinging (transport safety equipment).
- Always transport the machine with the maximum track width.

⚠ CAUTION

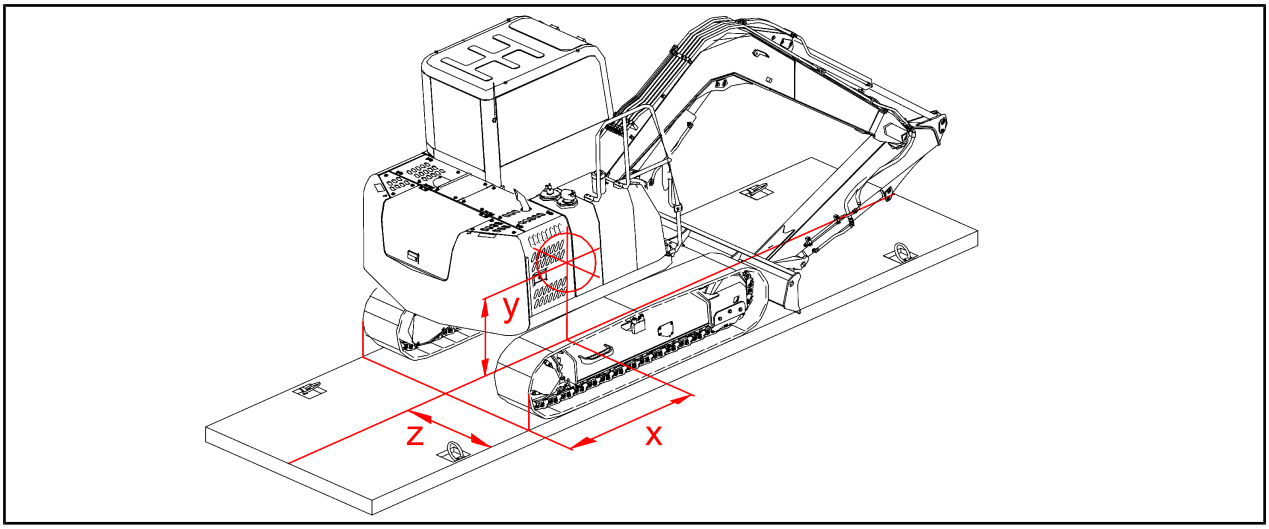
Select the lifting gear

If no lifting gear of the correct rating is available, use lifting gear of the next higher rating.

Technical data:	
Kerb weight [kg]	2680
Position of the centre of gravity [mm]	1,220/690/740
Loading dimensions (length/width/height) [mm]	4,285/1,550/2,430

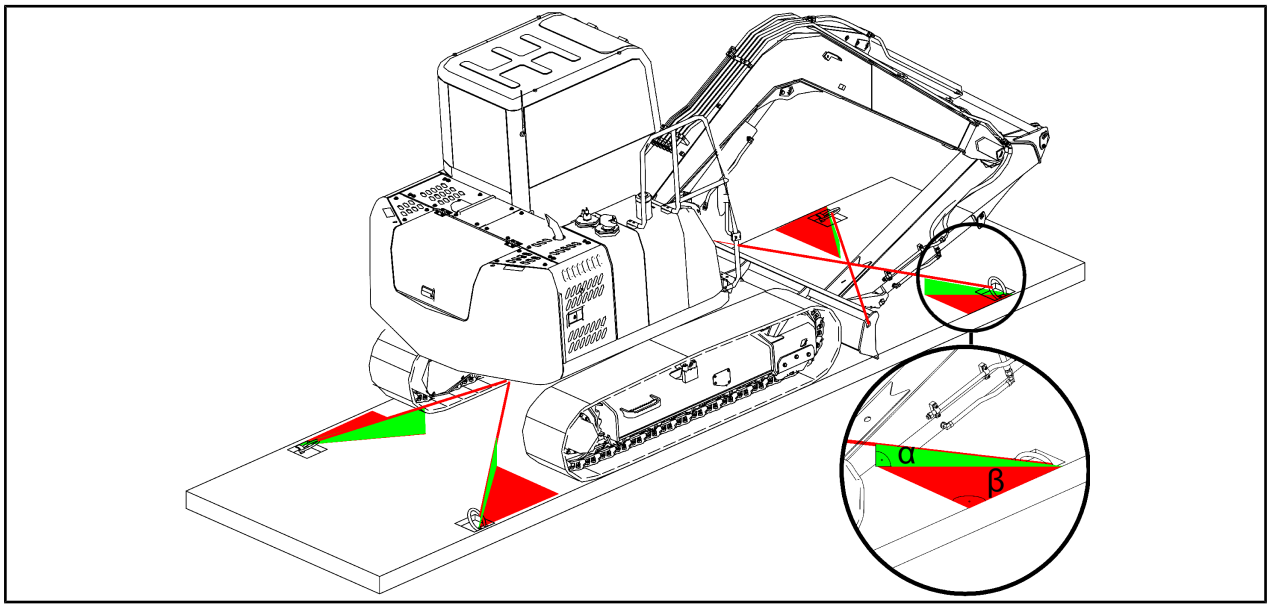
Position of the centre of gravity of the machine

An adhesive label marks the machine’s centre of gravity.



Lashing points

The machine must be lashed to the transport trailer at all the lashing points that are provided. The lashing points for the machine are marked.

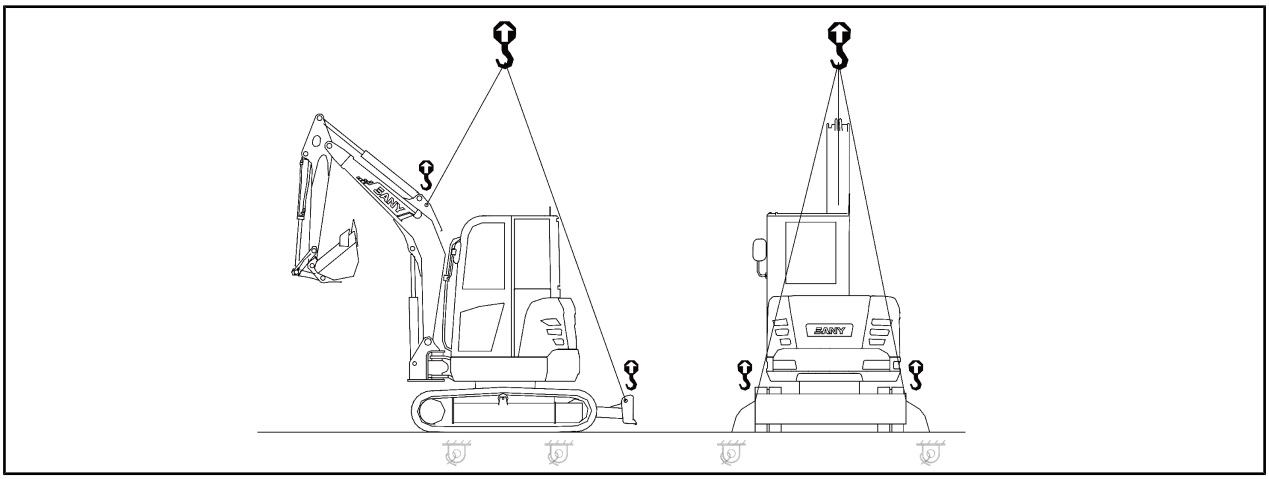


Interfaces:	
Type of contact	Metal / non-slip mat
Contact position	Chain on the loading surface
Type of lashing equipment	Chains with chain tensioner
Vertical lashing angle α [°]	5° < α < 15°
Horizontal lashing angle β [°]	30° < β < 70°
Adhesion coefficient of friction	0.6

Lashing point specification:	
Lashing force without non-slip pad [daN]	4 x 1000
Lashing point load marking	
Number of lashing points	3
Number of lashing points for means of transport	4

Lifting the machine

The machine must be lifted on all lashing points that are provided. The lifting points for the machine are marked.



Annex

⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

12.Annex

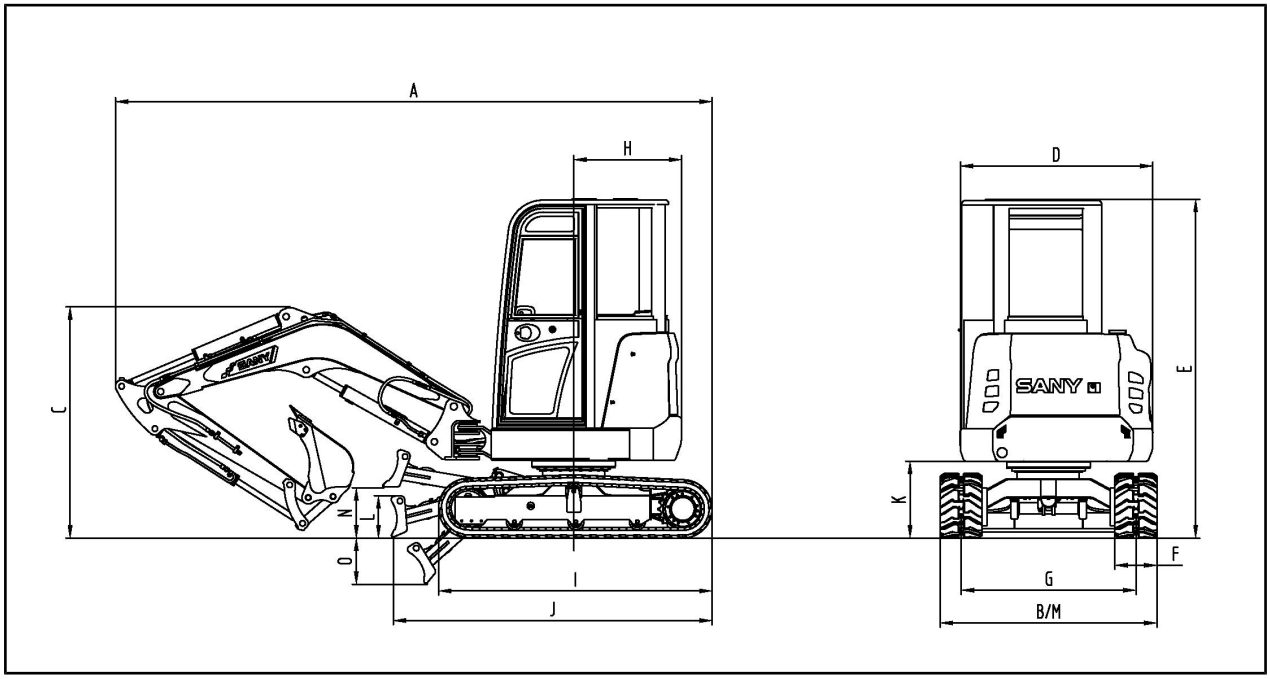
12.1 Specifications

Machine identification number	Value
Manufacturer	SANY HEAVY MACHINERY LIMITED
Type designation	SY26U
Drive	Diesel
Sound power LwA [dB]	93

Environmental conditions	Value
Max. altitude for use [m]	1,200
Ambient temperatures [°C]	-15 - +40

Engine

Performance	Value
Engine	Yanmar
Engine type	3TNV80F
Emission class	StageI V
Engine output / rotations [kW / rpm]	15.2/2500



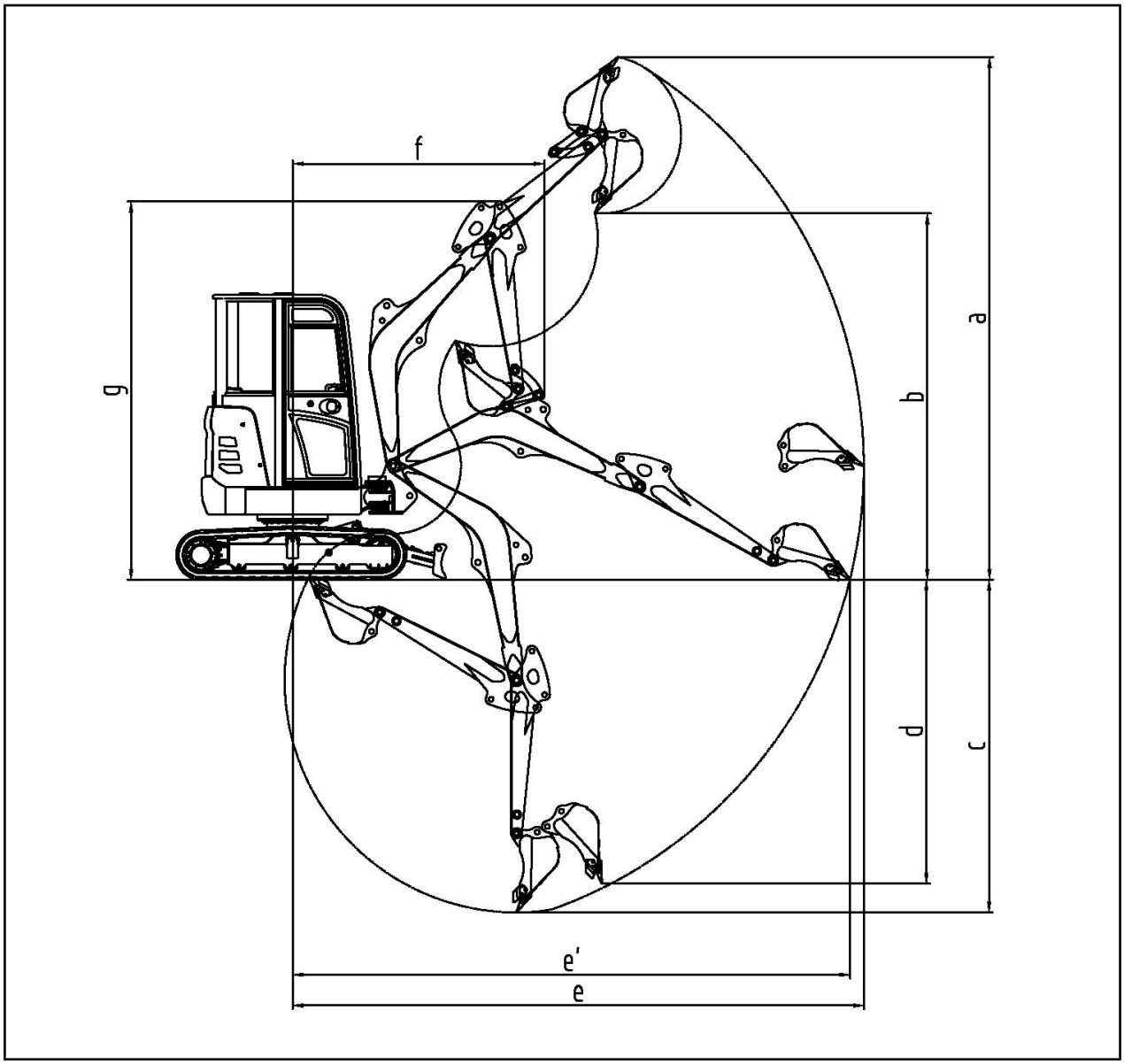
Dimensions and weight

Dimensions and weight		Value
	Kerb weight [kg]	2,680
A	Length over boom [mm]	4,285
B	Overall width [mm]	1,380
C	Height over boom [mm]	1,655
D	Width of upper structure [mm]	1,380
E	Height over upper structure [mm]	2,430
F	Shoe width [mm]	300
G	Track Gauge [mm]	1,250
H	Turning radius of upper structure (without work equipment) [mm]	775
I	Track length [mm]	1,960
J	Length of lower structure [mm]	2,280
K	Ground clearance of upper structure [mm]	550
L	Blade height [mm]	300
M	Blade width [mm]	1,550
N	Lowest point of the raised blade [mm]	360
O	Max. blade lowering [mm]	330

Performance

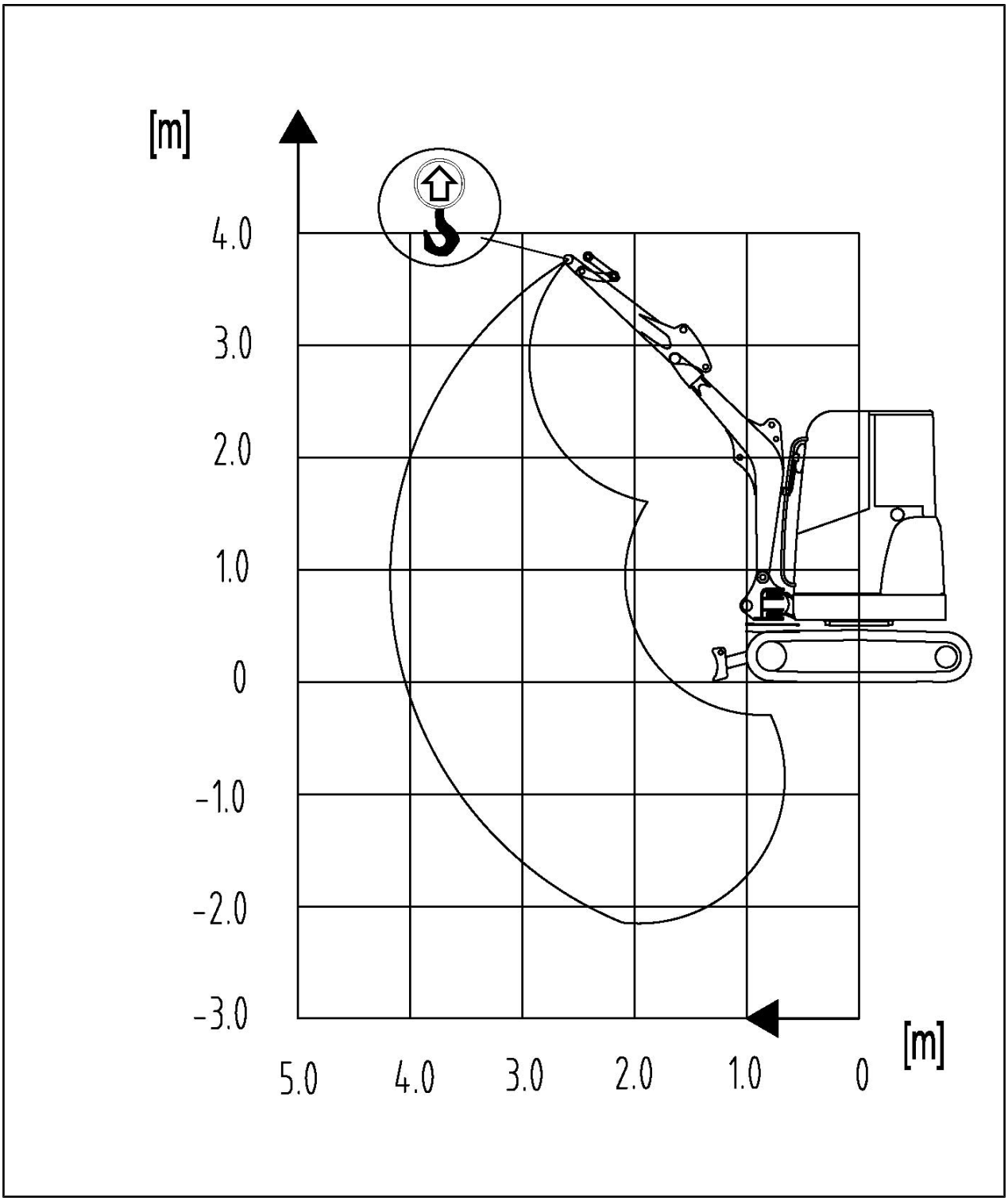
Performance	Value
Bucket capacity [m³]	0.06
Slow travel speed [km/h]	2.4
Fast travel speed [km/h]	4.5
No. of upper structure revolutions [rpm]	10
Arm digging force [kN]	14.2
Bucket digging force [kN]	24.3
Maximum slope in degrees [°]	25
Maximum slope in percent [%]	47
Maximum towing force [N]	20,000

12.2 Digging range



	Item	Value
a	Maximum digging height [mm]	4,410
b	Maximum dumping height [mm]	3,100
c	Maximum digging depth [mm]	2,820
d	Maximum vertical wall cut depth [mm]	2,760
e	Max. radius [mm]	4,850
e’	Max. digging reach on ground	4,740
f	Min. work equipment radius [mm]	2,110
g	Max. height at min. work equipment radius [mm]	3,200

12.3 Lifting range



The lifting range indicates the range of the excavator in lifting mode. The point of reference is the lifting point. The lifting range corresponds to the maximum values in the last column of the lifting capacity tables.

The values marked with * indicate the maximum load based on the hydraulic system. The other values indicate the maximum load based on the stability analysis.

A sticker on the machine indicates the applicable lifting range.

	Blade lifted		At the front
	Blade lowered		At the side
	Limitation on the load to be lifted due to the hydraulic system		Load lifting point

Lifting capacity with blade raised

 kg/m	2		3		4		max		mm
									
4							*693	584	2590
3			564	470			438	365	3550
2			549	459	340	282	340	282	4000
1			515	421	332	274	310	256	4180
0	910	715	488	398	324	267	320	263	4045
-1	917	722	485	395			385	316	3560
-2	*883	786					*609	576	2420

Lifting capacity with blade lowered

 kg/m	2		3		4		max		mm
									
4							*693	584	2590
3			*623	470	*501		*540	365	3550
2			*707	459	*717	282	*493	282	4000
1			*937	421	*732	274	*507	256	4180
0	*1521	715	*1095	398		267	*582	263	4045
-1	*1807	722	*1012	395			*730	316	3560
-2	*883	786					*609	576	2420

12.4 Tightening torques

12.4.1 Screws with strength classes 8.8, 10.9, 12.9

Screw	Strength class / tightening torques [Nm]		
	8.8	10.9	12.9
M6	9	14	16
M8	23	32	39
M10	44	65	76
M12	77	113	131
M14	122	180	212
M16	189	279	329
M18	270	387	450
M20	383	549	639
M22	522	747	873
M24	657	945	1089
M27	990	1395	1620
M30	1305	1890	2205
M33	1800	2520	3060
M8x1	24	36	42
M10x1.25	49	71	84
M12x1.25	86	126	149
M12x1.5	83	122	140
M14x1.5	135	198	234
M16x1.5	207	306	351
M18x1.5	315	441	522
M20x1.5	432	621	720
M22x1.5	576	828	963
M25x2	729	1044	1215
M27x2	1071	1530	1800
M30x2	1449	2070	2421

12.4.2 Screws with strength classes 10.9 and 12.9 for the excavator

Screw	Strength class / tightening torque [Nm]	
	10.9	12.9
M6	13.2±1.4	16.2±1.6
M8	31±3	38.7±4
M10	66±7	78±7
M12	113±10	137±10
M14	177±19	210±20
M16	279±30	339±30
M18	382±39	450±40
M20	549±59	664±59
M22	697±70	864±85
M24	927±103	1100±100
M27	1320±140	1683±150
M30	1785±170	2200±200
M33	2295±200	2900±280
M42	4700±450	5985±590
M48	7140±650	9100±900

12.4.3 Hydraulic hose screw connections for the excavator

Hoses			
Screw	Torque [Nm]	Fitting	Torque [Nm]
M14	24.5 ± 5	M14	34.3 ± 5
M18	51 ± 8	M16	54 ± 5
M22	74 ± 14	M18	70 ± 10
M26	105 ± 20	M20	93 ± 10
M30	135 ± 20	M22	125 ± 10
M36	166 ± 26	M24	142 ± 20
M42	240 ± 30	M26	180 ± 20

Pipes			
metric	**Torque [Nm]**	**imperial**	**Torque [Nm]**
M14	24.5 ± 5	G1/8“	16.7 ± 2
M16	45 ± 7	G1/4“	36.7 ± 2.5
M18	51 ± 8	G3/8“	73.5 ± 5
M20	58 ± 8	G1/2“	107.8 ± 7.8
M22	74 ± 14	G3/4“	161.7 ± 14.7
M24	74 ±14	G1“	220 ± 25
M26	105 ± 20		

Plugs			
metric	**Torque [Nm]**	**imperial**	**Torque [Nm]**
M20	49 ± 5	G3/8	68.6 ± 20
M24	68.6 ± 10		

Fittings	
imperial	**Torque [Nm]**
G3/4 (A)	161.7 ± 14.7

12.4.4 Other screw connections for the excavator

Components	Tightening torque
Tightening torque, track shoes [Nm]	/ (rubber)
Tightening torque, outer mirrors [Nm]	4.0~5.4
Tightening torque, lubricating valve, track tension [Nm]	60-80
Tightening torque, hydraulic oil suction filter [Nm]	135 ±20
Tightening torque, hydraulic oil return filter [Nm]	60-80
Tightening torque, drain opening track drive [Nm]	70 ±5
Tightening torque, hydraulic oil drain plug [Nm]	162 ±14
Tightening torque, filler neck, track drive [Nm]	17 ±2
Tightening torque, drain opening track drive [Nm]	70 ±5
Tightening torque, generator belt twistlock nut [Nm]	22.6–28.4
Tightening torque, generator belt mounting nut [Nm]	44.1–53.9
Tightening torque, hydraulic pump fastening screws [Nm]	206±5
Tightening torque, carrier roller fastening screws [Nm]	206±19
Tightening torque, track drive fastening screws [Nm]	206±19

12.5 Excavator buckets

Bucket type	Dirt work	Rock work
Capacity [m³]	0.06	/
Outside width [mm]	500	/
Weight [kg]	54.7	/
Standard excavator arm [m]	1.3	/
Note		

* Excavating or loading material with a specific weight of ≤ 1.8 t/m3

12.6 Operating material overview

12.6.1 Operating material overview

The following list provides you with information about the operating materials required for your machine.

Only use the materials indicated here for the operation and maintenance of your machine.

Operating materials include:

- Energy sources such as natural gas, petrol, diesel fuel, electric current, compressed air
- Coolant for cooling tools and machines, such as water, lubricant such as oil and grease.

12.6.2 Fluid capacities of the machine

	Tank contents and lubricant volumes
Engine oil [l]	3.4
Hydraulic system [l]	/
Hydraulic tank [l]	30
Cooling system [l]	6.5
Fuel tank [l]	34

12.6.3 Specifications for consumables

Operating fluids	Specification
Engine oil	SAE 15W-40 (-20 – 40 °C)
Hydraulic oil	SAE 30 (-20 – 40 °C)
	L-HV32 Low-temp, wear-resistant hydraulic oil (-30 – 10 °C)
	L-HM46 A, wear-resistant hydraulic oil (-10 – 50 °C)
	L-HM68, wear-resistant, hydraulic oil (10 – 50 °C)
Fuel (diesel)	ASTM D 975 No.2 (-10 – 50 °C)
	GB252 Super-20 Diesel fuel (-15 – 40 °C)
	GB252 Super -35 Diesel fuel (-20 – 30 °C)
Lubricating grease	NLGI No.2*
Coolant	TEEC-L35 antifreeze* (freezing point -37 °C/ vaporization point 129 °C [below 103,4 kPa])

*Recommended specification

12.6.4 Information about the use of grease

Environmental conditions

Temperature range	Measure
Permanent use under -10 °C	Check the grease specification for low temperature suitability.
Permanent use between -25 °C and -30 °C	It is recommended to use Total Multis MV2 also for general purposes.

12.6.5 Information about the use of fuel

Fuel recommendation

Engine type	Fuel
Stage IV engines	Ultra-Low-Sulphur-Diesel (ULSD) with maximum sulphur content of 15 ppm. Diesel according to EN590 has a maximum sulphur concentration of 10 ppm.
Stage III engines	Use of Ultra-Low-Sulphur-Diesel (ULSD) is recommended, otherwise shorten the oil change interval.

Glossary

⚠ WARNING

Read and understand all safety precautions and instructions in this manual before reading any other manuals provided with this machine and before operation or maintaining it. Failure to do this could result in death or serious injury.

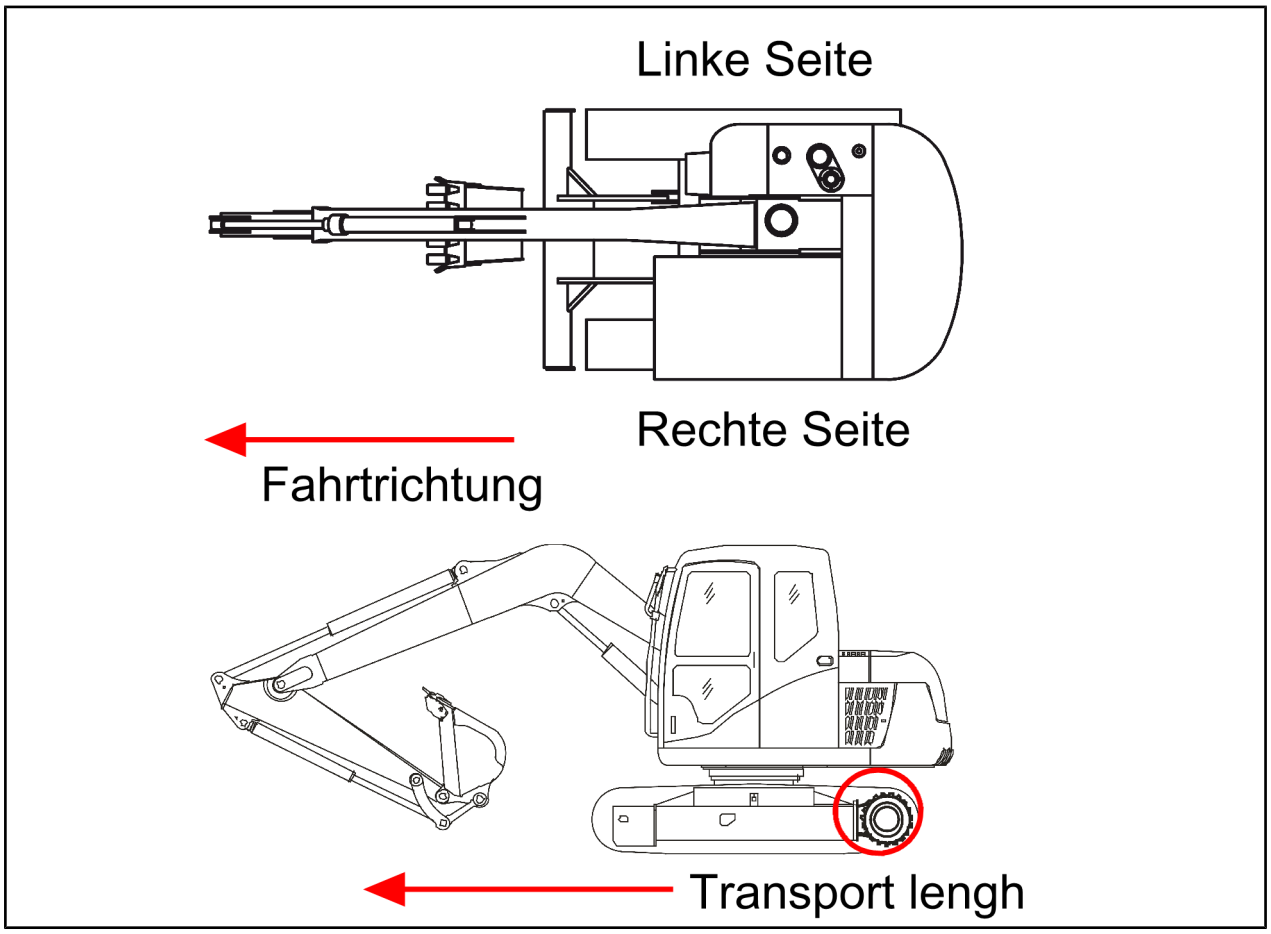
13.Glossary

13.1 Glossary

Assembly instructions

The assembly instructions help to assemble the machine before operation. They specify all work steps required to install the machine as intended by the manufacturer.

Directions



Emergency stop

In the case of a dangerous situation, it immediately places the machine in a safe condition. After actuating the emergency stop, the switch must be unlocked again and the safe condition of the machine must be confirmed by pressing a button.

Load-holding valves

Load-holding valves prevent the load from falling if there is an unexpected drop in the pressure of the hydraulic system.

Loading information

Data sheet or information card with instructions for safe loading and lashing the machine on a transport trailer.

Maintenance manual

The maintenance manual is intended for the operator's maintenance personnel. The maintenance technician can refer to this for all information regarding maintenance work on the machine to ensure that it can be operated safely.

Maintenance technician

Maintenance personnel have the following responsibilities: • Performing all maintenance work thoroughly and on-time according to the maintenance schedule • Observance of the maintenance schedule • Maintenance and servicing obligation. Maintenance personnel are specialist personnel.

Operator

The machine operator is obliged to only operate the machine in a perfect and undamaged condition. Maintenance and inspections are described in the operating instructions. The Operator must perform the following duties: • Defining the responsibilities of the individual target groups • Monitoring the observance of these responsibilities • Allowing only qualified personnel to work on the machine • Allowing only qualified personnel to operate the machine • Ensuring that local regulations are observed • Ensuring that only qualified personnel are present in the danger zone of the machine • Ensuring that recognised rules for work safety are observed • Disposing of the machine as required by law

Operator manual

The operator manual is aimed at the machine operator. It contains all information necessary for using the machine safely and in the intended manner.

Protective devices

Protective devices are used for the safety of machine operator and other people in the surrounding area. Protective equipment, for instance, includes fire extinguishers, rear-view mirror, reversing camera, lights, safety markings. The documentation shows what protective equipment is fitted on the machine. The operator is responsible to check protective equipment during daily inspections and keep them in a clean state.

Safety system

The machine's safety system consists of safety components and steering. Safety system components may only be maintained and replaced by the manufacturer. If errors that are captured by the safety system occur during operation, the machine is automatically switched to a safe mode.

Service technician

The service technician possesses special knowledge about individual components of the machine which goes beyond the knowledge of the maintenance technician. Certain work operations must only be carried out by service personnel. The service personnel is generally not staff employed by the owner/operator.

User

The operator of the machine must be at least 18 years old and be in possession of the qualifications required by the applicable local laws: • Professional suitability in accordance with national standards • Health and safety instruction The operator has the following responsibilities: • Operating the machine • Daily check of the machine for visible damage and defects • Reporting damage and defects found as well as any changes in operational performance immediately to the appropriate maintenance personnel • Checking fill levels and topping up the operating fluids • Lubricating the moving parts • Falls Filling the lubricating grease of a central lubricating system (if available)

User manual

Information that helps the operating, maintenance and assembly personnel to use the product safely and in the intended manner. The operating instructions consist of the operator manual, maintenance manual and assembly instructions as well as electrical and hydraulic diagrams.