



202510000

MX350

HYDRAULIC EXCAVATOR

Yanmar Power 4F

OWNER'S MANUAL

Important Safety Information

Most accidents related to product operation, maintenance and repair are caused by ignoring basic safety rules or protective measures. If you are aware of potential hazards, you can prevent accidents before they occur. Personnel must be familiar with potential hazards and possess the necessary training and skills to troubleshoot problems.

Improper operation, lubrication, maintenance, and repair are all dangerous, and may lead to death in severe cases.

Do not perform any operation, lubrication, maintenance, or repair of the machine until you have read and understood the relevant instructions in this manual.

Safety precautions and warnings can be found both in this manual and on the product itself. Ignoring these warnings may result in death.

Hazards are marked with "Safety Warnings" that contain "Signal Words" such as "Danger", "Warning", and "Caution", etc. The safety warning label "Warning" is shown below:



! WARNING

This meaning of this safety warning label is as follows:

Caution! Pay attention! Your safety is at stake!

The safety hazard is explained using text or diagrams below the warning label.

Operations that could cause damage to the machine are marked both in this manual and on the machine itself using the labels "Caution" or "Warning".

KIOTI cannot predict every hazard in the work environment; therefore the warnings in this manual and on the machine should not be considered exhaustive. When using a tool, procedure, working method, or operation technique that is not explicitly recommended by KIOTI, you must pay special attention to the safety of yourself and others. You should ensure that the operation, lubrication, maintenance, or repair procedure does not damage the machine or create unsafe conditions.

The instructions, values, and illustrations in this manual are based on the most current information available at the time of writing. Continuous improvements in the design of this machine may cause variations in some details, which may not be reflected in this manual. For the latest information on the machine, or for questions about the information in this manual, please contact KIOTI or a KIOTI distributor.

**CALIFORNIA
Proposition 65 Warning**



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

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.
- For more information go to www.P65warnings.ca.gov/diesel.

Battery post, terminal and related accessories contain lead and lead compounds, Always wear gloves or wash your hands frequently when servicing your machine. For more information go to www.p65warnings.ca.gov/fact-sheets/lead-and-lead-compounds.

KIOTI CONNECT APP



(1) QR Code

You can download the KIOTI Connect App by scanning the QR code, visiting www.kioticonnect.com or downloading it from the App Store or Google Play.



KIOTI Connect is a user-friendly app that harnesses AI and real-time data transmission to streamline equipment connectivity and maintenance.

As a KIOTI equipment owner, you can use this free app to access real-time data benefits, including equipment location, performance, and diagnostics monitoring. With AI-powered features like an agricultural GPT for quick information access and consumables data analysis, you can optimize performance, streamline operations, and achieve more. Plus, with predictive maintenance and data-driven decision-making, you'll enjoy increased efficiency and uptime.

FUNCTION

NOTICE

Features marked with the [*] symbol can be used without telematics.

1. Geofence + Operation Hours

Enhanced security to protect your investment

2. SOS Alerts

Safety and emergency support for those who matter most

3. Work History

Proof of project completion and workload management

4. Consumables Monitoring

Minimize downtime and extend equipment life

5. Diagnostic Trouble Codes (DTC)

Accurate troubleshooting and repair guidance

6. Location Tracking

Quick and reliable equipment recovery

7. Stats + Maintenance Records*

Transparency and improved resale value

8. Remote Updates & Diagnostics

Convenient and timesaving

9. Multi-Tractor Management*

Efficient record-keeping across multiple units

10. KIOTI AI*

Instant answers tailored to agriculture and KIOTI equipment

Contents

Preface.....	1
Read This Manual	1
Test Standard	2
Product Information	3
Safety Information.....	4
Safety Information	4
Safety Labels.....	4
General Safety.....	17
General Safety Considerations	17
Unauthorized Modification.....	18
Wear Well-fitting Clothes and Protective Equipment	18
Fire Extinguisher and First Aid Kit.....	19
Electrical Storm Injury Prevention	19
Electromagnetic Interference	19
Fire & Explosion Prevention	20
Fire Prevention	20
Actions if Fire Occurs	21
Precautions after Fire	22
Emergency Measures	22
Operator Station	23
Precautions when Mounting and Exiting the Machine	23
Precautions When Standing up from Operator's Seat.....	24
Precautions when Leaving Machine	24
Do not Get Caught in Work Equipment.....	24
Precautions Related to Protective Structures	24
Protection against Falling, Flying or Intruding Objects	25
Actions in the Event of Damage to Safety Structure.....	25
Information on Attachments	26
Attachment Cautions	26
Storing Attachments	26
Precautions Related to Cab Glass	26
Precautions for Broken Cab Glass.....	26
Keep Cab Glass Clean	26
Method for Selecting Window Washer Fluid	26
Precautions When Running Engine inside Building.....	26
Precautions When Using Hammer.....	27
Precautions for Operation	27

Know Your Machine	27
Precautions about Working Area	27
Know Your Working Area	27
Unauthorized Personnel	28
Signalman	28
No People on Attachments	28
Check Signs and Signalman's Signals	28
Ensure Good Visibility	28
Precautions when Mounting and Exiting the Machine	29
Starting the Machine	29
Before Starting the Machine	29
Machine Starting	30
Operation in Cold Weather	31
Ether	31
Start Engine with Jumper Cables	31
Precautions for Machine Operation	32
Before Operating the Machine	32
Precautions for Operation	32
Special Precautions for Machine Operation	35
Precautions When Travelling	37
Precautions on Slopes	38
Safety for Children	39
Precautions when Standing up from Operator's Seat	40
Precautions when Parking and Leaving the Machine	40
Precautions when Loading and Transporting the Machine	40
Precautions when Towing the Machine	41
Precautions When Lifting the Machine	42
Precautions for Maintenance	42
Precautions before Starting Inspection and Maintenance	42
Prepare the Work Area	42
Use Proper Equipment and Tools	42
Only Authorized Personnel	42
Display Warning Tag during Inspection and Maintenance	43
Stop Machine Before Carrying out Inspection and Maintenance	43
Properly Support the Structure	43
Precautions when Installing, Removing, or Storing Attachments	44
Precautions for Inspection and Maintenance	44
Turn Battery Disconnect Switch to OFF Position	44
Precautions on Maintenances when the Machine is Running	44

Handling of Abnormal Problems.....	44
Precautions for Working at High Places.....	44
Precautions when Working on Machine.....	45
Precautions when Working under Machine or Work Equipment	45
Precautions for Welding Operations	45
Handle Batteries	46
Precautions when Using Hammer.....	47
Crushing and Cutting Prevention	47
Precautions for High-pressure Fluid.....	48
Safe Disposal of Waste Liquids.....	49
Precautions for Lines, Pipes, and Hoses	49
Precautions for High Voltage.....	50
Precautions for Noise	50
Precautions When Adjusting Track Tension	50
Do not Disassemble Recoil Spring.....	50
Information on Using Accumulators	50
Precautions for Compressed Air and Water	51
Regular Cleaning of the Machine.....	51
Maintenance of Air Conditioner.....	51
Selecting Proper Window Washer Fluid.....	52
Applications and Specifications.....	53
Applications	53
Specifications	54
Transport Dimensions	54
Operating Range	56
Operation Manual.....	60
Machine Overview	60
Introduction to Parts	62
Operating Gear.....	62
Operating Gear Locations	62
Pilot Shutoff Lever	63
Hand Control Levers.....	63
Switches on Hand Control Levers.....	63
Travel Control Lever and Travel Pedal	65
Boom Offset Control Pedal.....	67
Dozer Control Lever	67
Control Panel.....	73
A/C Panel.....	74
Start Switch.....	76

Rocker Switch Combination	77
Related Cab Components	78
Seat Belt	78
Alternate Emergency Exit.....	79
Mechanical Damping Seat	79
Armrest	81
Rearview Mirrors--Adjust.....	81
Cab Door Lock.....	81
Cab Window	82
Storage Box in Cab	83
Fire Extinguisher.....	83
Radio	83
Socket.....	84
Interior Light.....	84
Other Components of the Machine	84
Battery Disconnect Switch.....	84
Alternate Lowering of Boom	85
Machine Operation	86
Before Operation	86
Daily Inspections	87
Machine Starting and Shutdown	88
Machine Starting.....	88
Engine Warm-up.....	89
Hydraulic System Warm-up (Manual)	90
Turning off the Machine.....	91
Travel Control	91
Swing Operation	94
Work Implement Control	94
Arm Operation Control.....	95
Boom Operation Control.....	95
Bucket Operation Control	95
Auxiliary Pedal	96
Lever Operation Mode Switching.....	97
Working Mode Selection	98
Working Speed Selection	98
Avoid Improper Operation	98
Precautions for Operation	102
Driving and Operation on Slopes	102
Driving on Roads with Obstacles	103

Driving on Uneven Roads	103
Working in Muddy Water	104
Working on Loose Ground	104
Precautions for Long Distance Travel	105
Recommended Operations	105
Preparation for Operation	105
Excavation	105
Trench Excavation	106
Excavation of Box Pit	106
Excavation in Loose Soil	107
Excavation in Hard Soil	107
Excavation of Banks	107
Leveling of Working Face	108
Lifting Operation	109
Dump Truck Loading Operation	110
Reduction of Energy Consumption	110
Precautions for Dozer Operation	111
Bucket--Replace	111
Bucket--Remove	111
Bucket--Install	112
Machine Parking	113
Leaving the Machine	114
Checks after Operation	114
Inspection and Cleaning	114
Transportation Information	115
Loading of the Machine	115
Lifting the Machine	118
Machine Traction	119
Operating under Low Temperature	120
Long-term Storage	120
Moving Machine from Storage	121
Maintenance Manual	122
Maintenance Guidance	122
Precautions Before Machine Maintenance	122
Precautions After Machine Maintenance	124
Maintenance Door	125
Maintenance Outline	126
Fluids and Lubricants	126
Recommended Fuel, Coolant and Grease	129

Fluid Refill Capacities and Change Interval	130
Maintenance Intervals and Lubrication Diagram.....	131
List of Tightening Torque for Fasteners	134
List of Vulnerable Parts	137
Parts to be Replaced Regularly	138
Daily Inspection	139
Maintenance Interval Table	140
Maintenance Contents	140
Power System	141
Radiator Assembly and Condenser Core--Clean.....	141
Engine Air Intake System--Check	142
Air Filter and Elements--Clean/Replace	142
Fuel Tank Water and Impurities--Remove	143
Fuel--Check/Add.....	144
Engine Oil--Check/Add	145
Engine Oil--Change	146
Engine Oil Filter--Replace	148
Coolant--Check/Add	149
Coolant--Change	150
Fuel Water Separator (Fuel Primary Filter)--Clean/Replace.....	152
Fuel Fine Filter--Replace	153
Tension and Condition of Crankcase Belt--Check	154
Hydraulic System.....	154
Hydraulic Oil--Check/Add	154
Hydraulic Oil--Change	155
Filter Element of Hydraulic Tank Breather--Replace	157
Oil Return Filter Element of Hydraulic Oil Tank--Replace	158
Hydraulic Oil Suction Filter Element--Replace.....	159
Travel Reduction Gear Oil Level--Check	160
Travel Reduction Gear Oil--Change.....	161
Electrical System	163
Fuse--Check/Replace	163
Instruments--Check	166
Lights and Horn--Check	167
Looseness or Corrosion of Battery Terminals--Check.....	167
Structural System	168
Torque of Bolts and Nuts--Check.....	168
Torque of Swing Bearing Mounting Bolts--Check	168
Bucket Teeth Adapter--Replace	169

Track Tension--Check/Adjust	170
Work Implement and Cylinder--Lubricate	172
Swing Gear--Lubricate	174
Swing Bearing Guideway--Lubricate	175
Air Conditioning System	176
Tension and Condition of Air Conditioning Compressor Belt--Check	176
Fresh Air Filter of Air Conditioner--Clean/replace	176
Air Recirculation Filter of Air Conditioner--Clean/replace	177
Refrigerant Leakage--Check	178
Cab	179
Seat Belt--Check	179
Cab Floor Mat--Clean	179
Accessories and Optional Equipment	180
Precautions for Using Attachments and Optional Equipment	180
Recommended Combinations for Different Work Implements	182
Arm Front End and Pin Size	184
Quick Coupler System	185
Connection of Quick Coupler Lines	185
Quick Coupler Switch	185
Bucket or Attachment--Connect	186
Bucket or Attachment--Disconnect	187
Auxiliary Pipe System	188
Auxiliary Pipe under Pedal Control & Manual Switching of One- and Two-way Pipes	188
Attachment Connection	189
Machine Operation	189
Switching between One/Two-way Pipe	190
Auxiliary Pipe under Control of Electric Proportional Hand Control Lever & Manual Switching of One- and Two-way Pipes	191
Attachment Connection	192
Machine Operation	192
Flow Rate Adjustment	193
Switching between One/Two-way Pipe	194
Dozer Runout Line	194
Machine Operation	194
Boom Runout and Auxiliary Low Flow Pipeline	195
Machine Operation	195
Recommended Operations of Breaking Hammer	196
Proper Position	196
Orientation	197

Precautions for Safe Operation	197
Fault Diagnosis.....	200
Fault Code Table	200

Preface

WARNING

KIOTI recommends that any service parts used for maintenance, repair or replacement of this machine should be genuine new KIOTI or KIOTI approved rebuilt parts or assemblies or others parts of equivalent quality, and that the engine be serviced by an authorized KIOTI distributor. Failure to follow these recommendations could result in ineffective service, damage to the product or safety risks (including personal injury or death).

Read This Manual

This manual gives details of the operation and methods of inspection and maintenance for this machine that must be obeyed in order to use the machine safely. Most accidents are caused by the failure to follow fundamental safety rules for the operation and maintenance of machines.

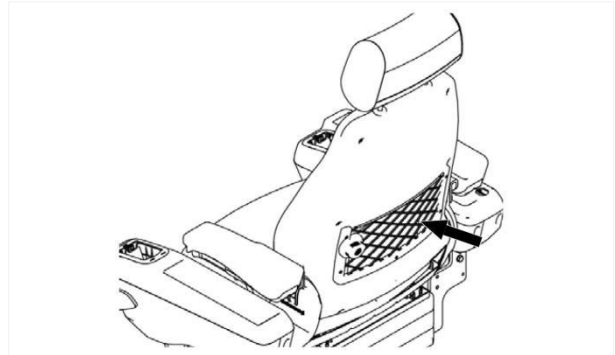
Read, understand and follow all precautions and warnings in this manual and on the machine before performing operation and maintenance. Failure to do so may result in serious injury or death.

KIOTI cannot predict every circumstance that might involve a potential hazard when the machine is used or maintained. Therefore, the safety messages in this manual and on the machine may not include all possible safety precautions.

If you perform any operation, inspection, or maintenance under conditions that are not described in this manual, understand that it is your responsibility to take the necessary precautions to ensure safety. In no event should you or others engage in the prohibited uses or actions described in this manual. It is dangerous to perform improper operation and maintenance of the machine. It may cause serious injury or death.

If you sell the machine, be sure to give this manual to the new owner together with the machine.

Always keep this OWNER'S MANUAL in the indicated location so that all relevant personnel can read it at any time. It is recommended to keep it in the document box behind the operator's seat.



If this manual is lost or damaged, contact KIOTI or your KIOTI distributor. In order to arrange the proper OWNER'S MANUAL, you will need to tell them the machine model name and the serial No, so as to arrange for its replacement immediately.

For details regarding the machine model name and the serial No., see the machine nameplate.

This manual uses the International System of Units (SI) for units of measurement. For reference, units that have been used in the past are given in { }.

The explanations, values, and illustrations in this manual have been prepared based on the latest information available as of the date of its publication. Continuing improvements in the design of this machine can lead to changes in detail which may not be reflected in this manual. Consult KIOTI or your KIOTI distributor for the latest available information of your machine or for questions regarding information in this manual.

The numbers in the illustrations correspond to the numbers in () in the text. (Example: 1 → (1))

KIOTI delivers machines that comply with all applicable regulations and standards of the country to which it has been shipped. If this machine has been purchased in another country, it may lack certain safety devices and specifications that are necessary for use in your country. If there is any question about whether your product complies with the applicable standards and regulations of your country, consult your KIOTI distributor before operating the machine.

Test Standard

Noise

Two labels indicating the machine noise level are affixed on the machine.

Sound pressure level at the operator's station, measured according to ISO 6396 (Dynamic test method, simulated working cycle).

Sound pressure level at the operator's station is 78dB(A).

Sound power level emitted by the machine, measured according to ISO 6395 (Dynamic test method, simulated working cycle). This is the guaranteed value as specified in European directive 2000/14/EC.

Sound power level emitted by the machine is 94dB(A).

Vibration Levels

When used for its intended purpose, levels of vibration for the earth-moving machine transmitted from the operator's seat are lower than or equal to the tested vibrations for the relative machinery class in compliance with ISO 7096.

The hands and arms are exposed to a weighted root mean square acceleration that is less than 2.5m/s².

The body is exposed to a weighted root mean square acceleration that is less than 0.5m/s².

Measurements are obtained on a representative machine using the procedures in the following standards:

"ISO 2631-1"

"ISO 5349-1"

"ISO 5349-2"

Visibility from Operator's Seat

This machine complies with the visibility standard (ISO 5006: 2017). This machine maintains a proximity visibility of a height of 1.2m at a point 1m away from the outside surface of the machine, and a visibility for a radius of 12m.

Cab and Guard Test

The cab of this machine shall comply with the requirements of ISO12117-1 2008, a test standard for the Tip Over Protective Structure (TOPS).

Engine Power Test

The gross power of the engine is tested according to SAE J1995 (without the cooling fan).

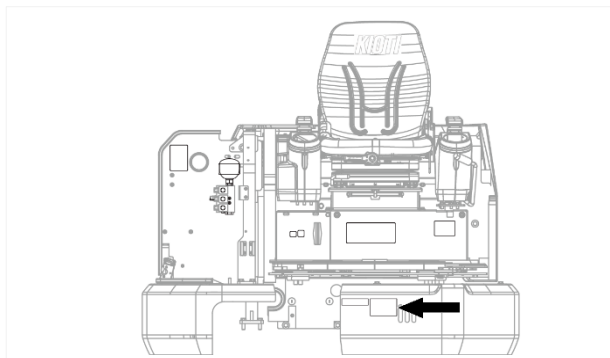
The net power of the engine is tested according to SAE J1349 (minus the power consumed by the cooling fan).

Product Information

When requesting service or ordering replacement parts, inform your KIOTI distributor of the following items.

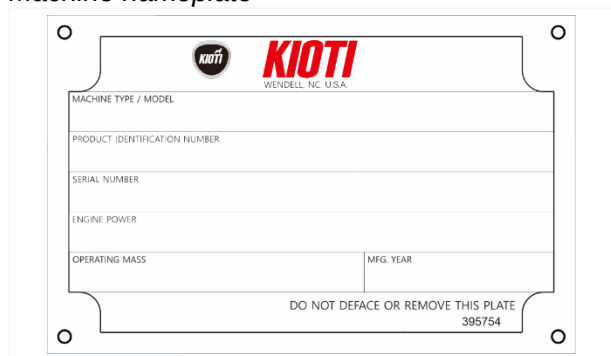
PIN Nameplate

The PIN nameplate is located at the front of the machine.



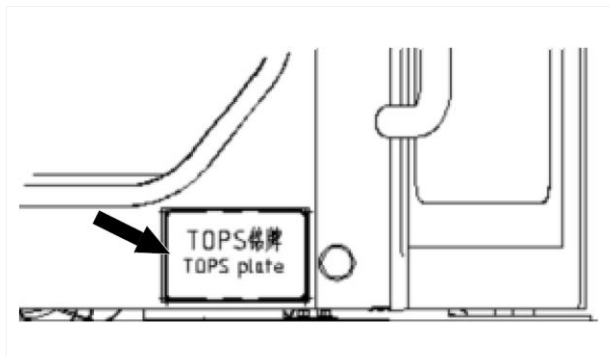
The design of the nameplate differs according to the district, including information: hydraulic excavator model, product identification number (PIN), operating mass, engine power, production date etc.

Machine nameplate



TOPS Cab Nameplate

The TOPS nameplate is located in the lower right corner of the operator's cab.



Safety Information

⚠ WARNING

To enable you to use the machine safely, and to prevent personal injury to operators, service personnel or bystanders, the precautions and warnings included in this manual and the safety signs attached to the machine must always be observed.

Safety Information

To identify important safety messages in the manual and on the machine labels, the following signal words are used.



The "Safety Alert Symbol" identifies important safety messages on machines, in manuals, and elsewhere. When you see this symbol, be alert to the risk of personal injury or death. Follow the instructions in the safety message.

⚠ DANGER

This signal word indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

This signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

This signal word indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices that may cause property damage.

Safety Labels

⚠ WARNING

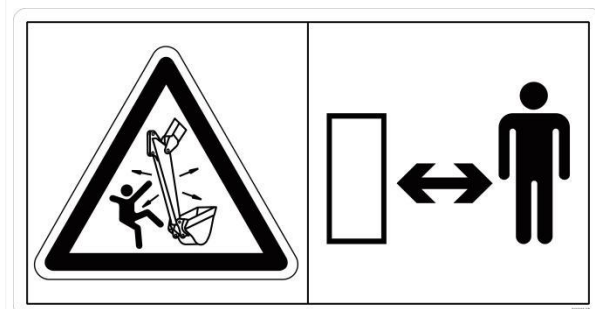
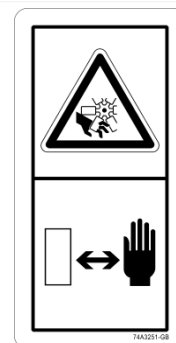
Be sure that you fully understand the correct position, content and how to avoid a danger shown in the safety labels.

Safety labels are affixed to the machine to inform the operator or maintenance worker on the spot when carrying out operation or maintenance of the machine that may involve hazard.

This machine uses "Safety labels using pictograms" to indicate safety procedures.

Safety Labels Using Pictograms

Safety pictograms use a picture to express a level of hazardous condition equivalent to the signal word. These safety pictograms use pictures in order to let the operator or maintenance worker understand the level and type of hazardous condition at all times. Safety pictograms show the type of hazardous condition at the top or left side and the method of avoiding the hazardous condition at the bottom or right side. In addition, the type of hazardous condition is displayed inside a triangle and the method of avoiding the hazardous condition is shown inside a frame at the bottom or right side.



KIOTI cannot predict every circumstance that might involve a potential hazard in operation and maintenance. Therefore, the safety messages in this manual and on the machine may not include all possible safety precautions.

If any procedures or actions not specifically recommended or allowed in this manual are used, it is your responsibility to take the necessary steps to ensure safety.

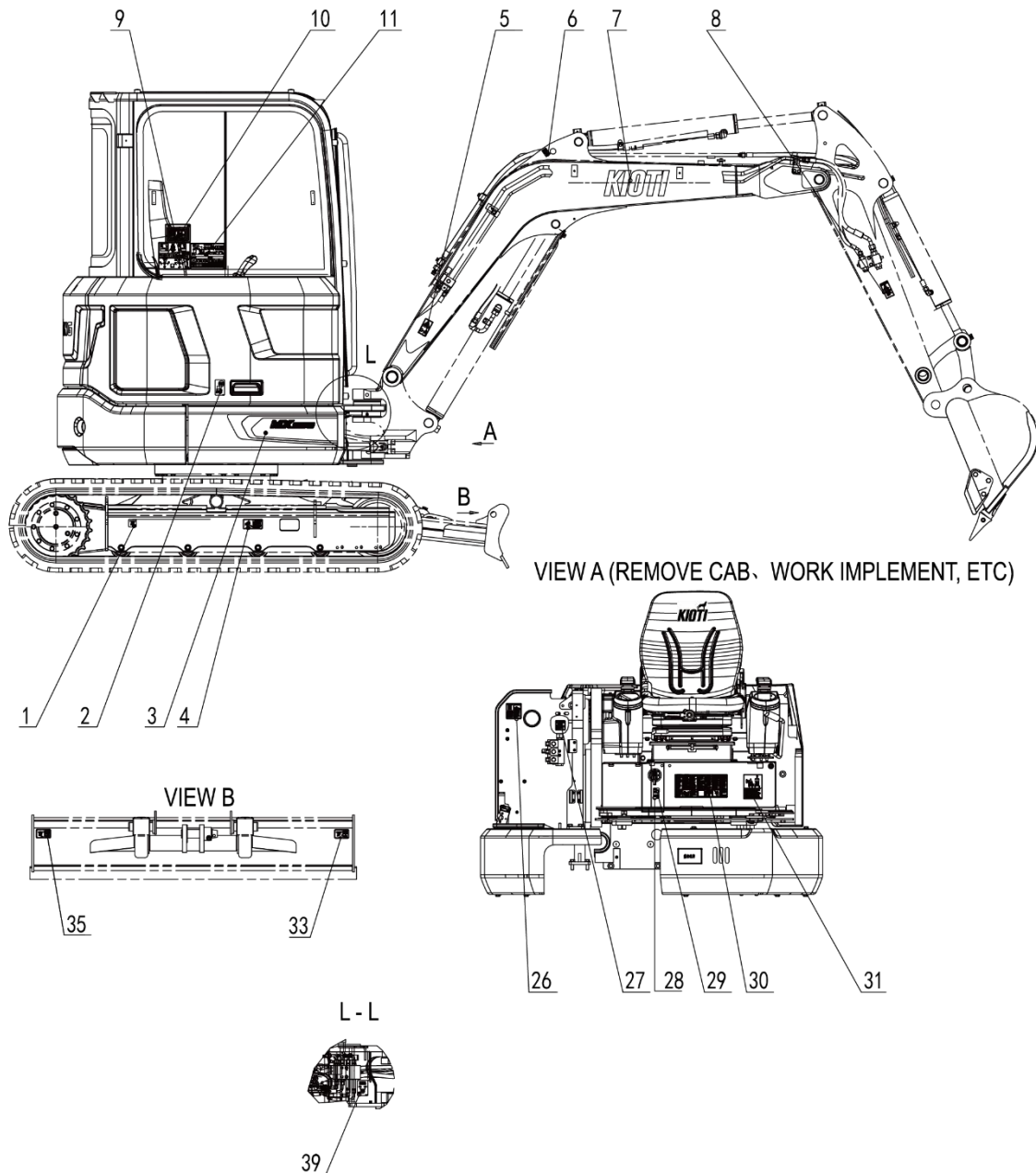
In no event should you engage in prohibited uses or actions described in this manual.

Handle the warning signs and safety labels properly

Always keep the safety labels clean so that you can read it properly. When cleaning the safety labels, do not use organic solvents or gasoline. These may cause the labels to peel off.

If the safety labels are damaged, lost, or cannot be read properly, replace them with new ones. If need to replace the parts with safety labels, please note that the new safety labels should be affixed to the corresponding new parts. For details of the part numbers for the safety labels, see this manual or the actual label, and place an order to your KIOTI distributor.

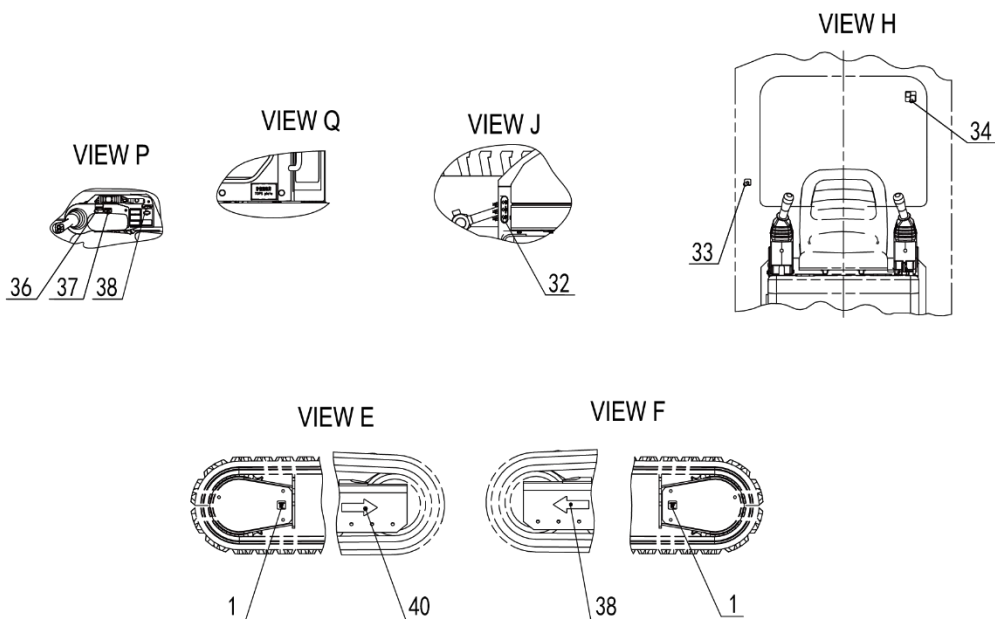
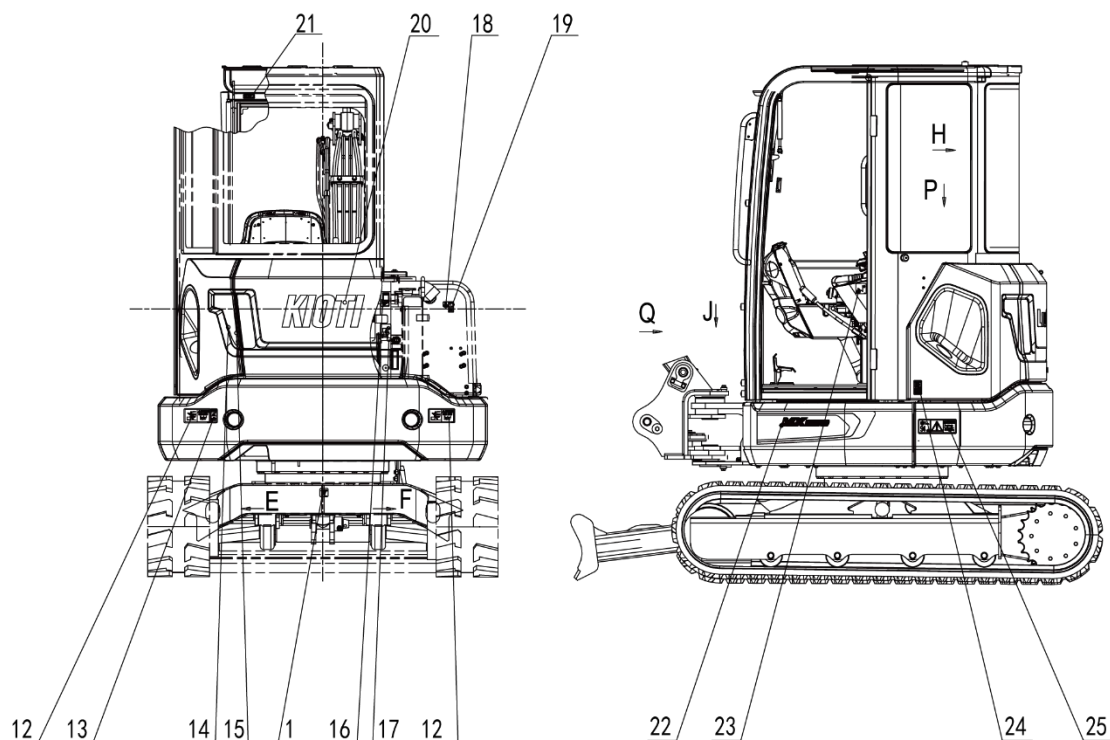
There are also other labels in addition to the warning signs and safety labels. Handle those labels in the same way.



1. INFORMATION DECAL
6. DECAL GROUP
27. WARNING DECAL
30. DECAL GROUP
35. DECAL GROUP

4. WARNING DECAL
8. DANGER DECAL
28. INFORMATION DECAL
31. WARNING DECAL

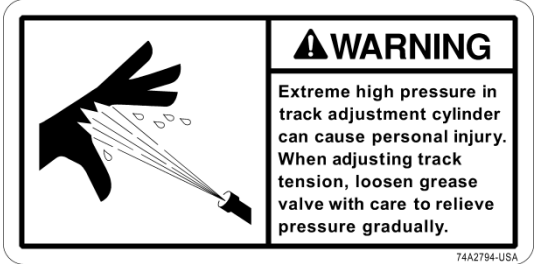
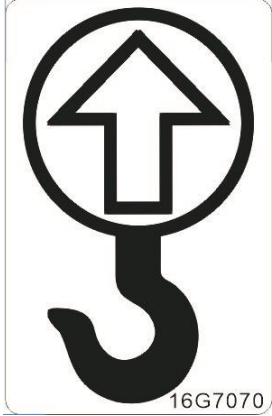
5. DANGER DECAL
26. INFORMATION DECAL
29. INFORMATION DECAL
33. INFORMATION DECAL



1.INFORMATION DECAL
16.WARNING DECAL
21.DECAL GROUP
25.DECAL GROUP

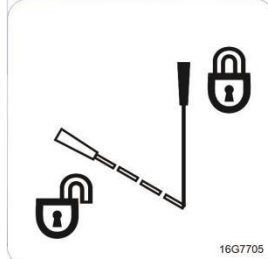
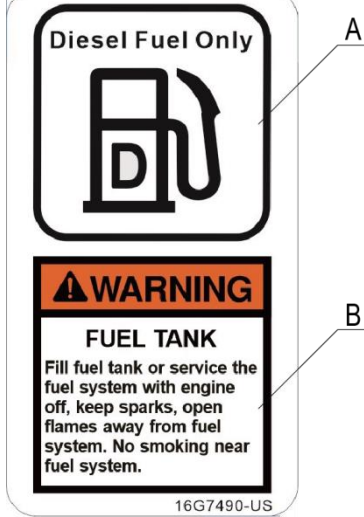
12.DANGER DECAL
18.INFORMATION DECAL
23.INFORMATION DECAL
33.INFORMATION DECAL

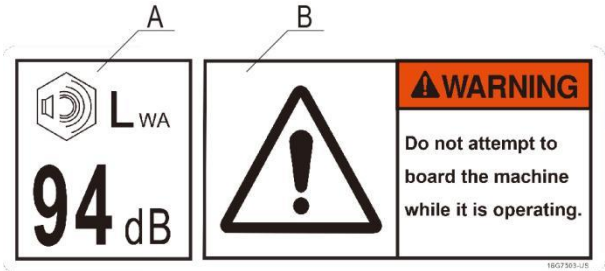
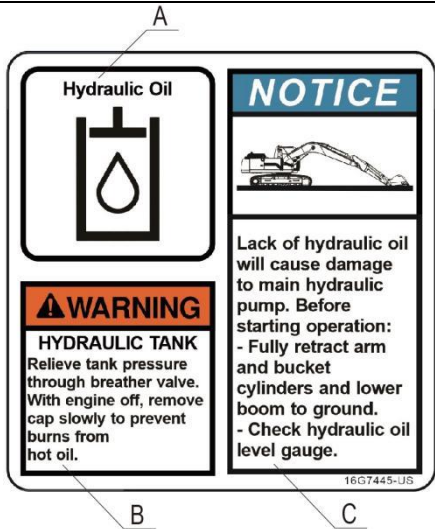
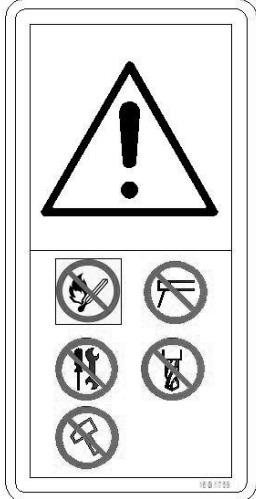
13.CAUTION DECAL
19.WARNING DECAL
24.DECAL GROUP
34.INFORMATION DECAL

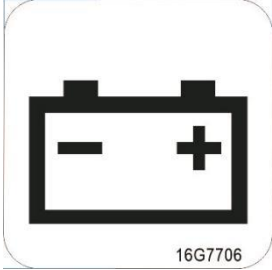
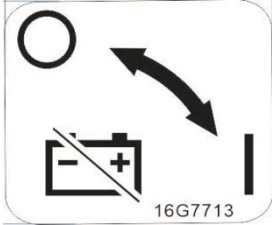
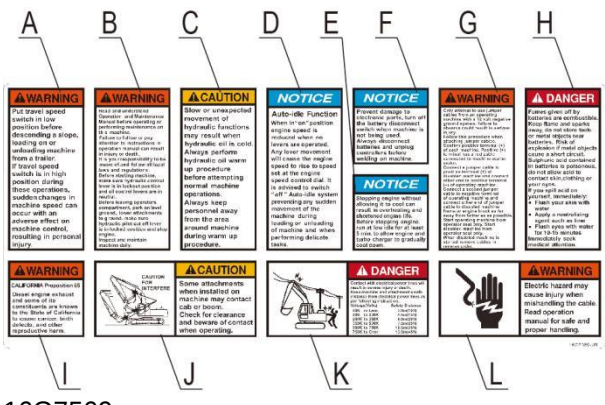
1.INFORMATION DECAL Tie-down point indication decal.	 16G7277
4.WARNING DECAL Extreme high pressure in track adjustment cylinder can cause personal injury. When adjusting track tension, loosen grease valve with care to relieve pressure gradually.	 74A2794
5.DANGER DECAL CRUSH HAZARD Keep clear of machine during operation.	 79A5847
6.INFORMATION DECAL Lifting point signs.	 16G7070

6.DECAL GROUP A. INFORMATION DECAL Ear-side noise level (internal noise). B. CAUTION DECAL Falling front window can cause injury. Always lock securely in place with locks on both sides.	 16G7348
8.DANGER DECAL CRUSH HAZARD. Keep clear of machine during operation.	 79A5226
12.DANGER DECAL CRUSH HAZARD Keep clear of swing area.	 16G7442

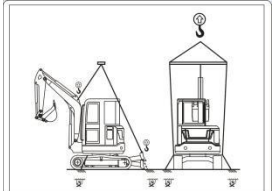
13. CAUTION DECAL HOT SURFACE Keep clear.	 16G7443-US 16G7443
16. WARNING DECAL CUTTING HAZARD Keep clear or stop engine before servicing.	 16G7449-US 16G7449
18. INFORMATION DECAL Coolant filler position indication decal.	 16G7450-US 16G7450

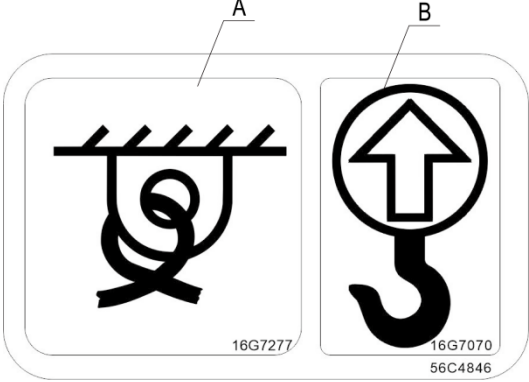
19. WARNING DECAL HOT LIQUID UNDER PRESSURE Service when cool.	 16G7504
22. DECAL GROUP A. INFORMATION DECAL Ear-side noise level (internal noise). B. CAUTION DECAL Falling front window can cause injury. Always lock securely in place with locks on both sides.	 16G7348
23. INFORMATION DECAL Pilot shutoff lever.	 16G7705
24. DECAL GROUP A. INFORMATION DECAL Filler position indication decal (diesel). B. WARNING DECAL FUEL TANK Fill fuel tank or service the fuel system with engine off, keep sparks, open flames away from fuel system. No smoking near fuel system.	 16G7490

25.DECAL GROUP A. INFORMATION DECAL External noise level. B. WARNING DECAL Do not attempt to board the machine while it is operating	 16G7503
26.DECAL GROUP A. INFORMATION DECAL Filler position indication decal (hydraulic oil). B. WARNING DECAL HYDRAULIC TANK Relieve tank pressure through breather valve. With engine off, remove cap slowly to prevent burns from hot oil. C. INFORMATION DECAL Lack of hydraulic oil will cause damage to main hydraulic pump. Before starting operation: - Fully retract arm and bucket cylinders and lower boom to ground. - Check hydraulic oil level gauge.	 16G7445
27.WARNING DECAL CONTAINS HIGH PRESSURE GAS To avoid explosion and personal injury, do not expose to fire, do not weld, do not drill. Relieve pressure before discharging.	 16G1759

28.INFORMATION DECAL Battery position indication decal.	 16G7706
29.INFORMATION DECAL Battery disconnect switch operation.	 16G7713
30.DECAL GROUP A. WARNING DECAL Put travel speed switch in low position before descending a slope, loading on or unloading machine from a trailer. If travel speed switch is in high position during these operations, sudden changes in machine speed can occur with an adverse effect on "machine control," resulting in personal injury. B. WARNING DECAL Read and understand OWNER'S MANUAL before operating or performing maintenance on this machine. Failure to follow or pay attention to instructions in operation manual can result in injury or death. It is your responsibility to be aware of and follow all local laws and regulations. Before starting machine make sure hydraulic control lever is in lockout position and all control levers are in neutral. Before leaving operators compartment, park on level ground, lower attachments to ground, make sure hydraulic pilot cut off lever is in locked position and stop engine. Inspect and maintain machine daily. C. WARNING DECAL Slow or unexpected movement of hydraulic functions may result when hydraulic oil is cold. Always perform hydraulic oil warm up procedure before attempting normal machine operations.	 16G7569

Always keep personnel away from the area around machine during warm up procedure. D. WARNING DECAL When in "on" position engine speed is reduced when no levers are operated. Any lever movement will cause the engine speed to rise to speed set at the engine speed control dial. It is advised to switch "off" Auto-idle system preventing any sudden movement of the machine during loading or unloading of machine and when performing delicate tasks. E. INFORMATION DECAL Prevent damage to electronic parts due to electricity leakage or other accidents, turn off the battery disconnect switch when the machine is not being used. Always disconnect batteries and unplug controllers before welding on machine. F. INFORMATION DECAL Stopping engine without allowing it to cool can result in overheating and shortened engine life. Before stopping engine, run at low idle for at least 5 min. to allow engine and turbo charger to gradually cool down. G. WARNING DECAL Only attempt to use jumper cables from an operating machine with a 12 volt negative ground system, failure to observe could result in serious injury. Follow this procedure when attaching jumper cables. Confirm positive terminal (+) of each machine. Positive (+) terminal has a red cable connected to machine starter motor. Connect a jumper cable to positive terminal (+) of disabled machine and connect other end to positive terminal (+) of operating machine. Connect a second jumper cable to negative terminal of operating machine and connect other end of jumper cable to disabled machine frame or engine block as far away from batteries as possible. Start operating machine from operator seat only. Start disabled machine from operator seat only. When disabled machine is started, remove cables in reverse order. H. DANGER DECAL Fumes given off by batteries are combustible. Keep flame and sparks away, do not store tools or metal objects near batteries. Risk of explosion if metal objects cause a short circuit. Sulphuric acid contained in batteries is poisonous, do not allow acid to contact skin, clothing or your eyes. If you spill acid on yourself, immediately: - Flush your skin with water - Apply a neutralizing agent such as soda bicarbonate - Flush eyes with water for 10-15minutes Immediately seek medical attention. I. WARNING DECAL CALIFORNIA Proposition 65	
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Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm. J. CAUTION DECAL Some attachments when installed on machine may contact cab or boom. Check for clearance and beware of contact when operating. K. DANGER DECAL Contact with electrical power lines will result in severe injury or death. Keep machine and attachment a safe distance from electrical power lines as per following instruction. Voltage(Volts) Safety Distance 50k or Less 3.0m(10ft) 50k to 200k 4.5m(15ft) 200k to 350k 6.0m(20ft) 350k to 500k 7.5m(25ft) 500k to 750k 10.5m(35ft) 750k to Over 13.5m(45ft) L. WARNING DECAL Electric hazard may cause injury when mishandling the cable. Read operation manual for safe and proper handling.	
31.WARNING DECAL 1. Refer to the pin nameplate on the machine for the machine mass. 2. The machine mass on the pin nameplate does not include optional attachment. 3. Use correct authorised equipment for lifting, and must calculate the maximum load capacity of the authorised equipment to ensure security. 4. The authorised equipment should be firmly fastened to the lifting eye of the boom and dozer blade where tie-down decal is attached.	 1.Refer to the pin nameplate on the machine for the machine mass. 2. The machine mass on the pin nameplate does not include optional attachment. 3. Use proper rated cables and slings for lifting, and must calculate the maximum load capacity of the crane and slings to ensure security. 4. The steel wire ropes should be firmly fastened to the lifting eye of the boom and dozer blade where tie-down decal is attached. 16G7447
33.INFORMATION DECAL Fire extinguisher indication decal.	 16G7707 16G7707

34.INFORMATION DECAL If the door of cab can not be opened, use the safety hammer to break the glass of the window, and leave the machine through the window.	 74A2808
35.DECAL GROUP A. INFORMATION DECAL Tie-down point indication decal. B. INFORMATION DECAL Lifting point signs.	 56C4846

General Safety

General Safety Considerations

Before performing operation, inspection, or maintenance, read this manual thoroughly, and read the safety labels on the machine carefully and obey the warnings. If there is any place in this manual that you do not understand, ask the person in charge of safety for explanation. Failure to do so could lead to severe injury or death.



Only trained and authorized personnel can operate and maintain the machine.

Follow all safety, precautions, and instructions in this manual when operating or performing inspection or maintenance on the machine.

Concentrate on operating and maintaining the machine, otherwise accidents may occur easily.

If you are not feeling well, or if you are under the influence of alcohol or medication, do not operate the machine. Your ability to safely operate or repair your machine may be severely impaired, putting yourself and everyone else on your job site in danger.

When cooperating with other personnel, it is necessary to discuss the operation content firstly, and use the determined signals to perform the operation.

Be sure that all guards, covers, cameras, and mirrors are in their proper position. Repair them immediately if they are damaged.

If you find any problem in the machine during operation or maintenance (noise, vibration, smell, incorrect gauges, smoke, oil leakage, etc., or any abnormal display on the warning devices or monitor), report to the person in charge and take the necessary action. Do not operate the machine until the problem has been corrected.

Ensure that all shielding and cover plates are fixed to the machine. Repair them immediately if they are damaged.

Keep the machine free of debris, grease, tools, and other miscellaneous items, especially the instrument panels, passages, and ladders.

Fix all loose items such as lunch boxes, tools, etc.

Understand the using method of the safety related devices and use them properly. Never remove any safety related devices. Always keep them in good operating condition.

The machine shall not be used for lifting personnel in any case.

Unauthorized persons are not allowed on or around the machine.

Do not allow anyone to climb on the work equipment or other attachment, otherwise, there is a risk of falling and serious personal injury or death.

When inspecting an open fuel tank or water tank, keep foreign materials from entering system components. Before opening the lid, empty your clothes pockets. Move the wrench and nut very carefully.



Never put maintenance or servicing liquids into a glass container. Use a suitable container to collect the discharged liquids.

Promptly report all required repairs. For any damaged part of the machine, please repair it immediately.

Unauthorized Modification

It is prohibited to modify the machine without KIOTI's authorization, and KIOTI is not responsible for any consequences of such modifications.

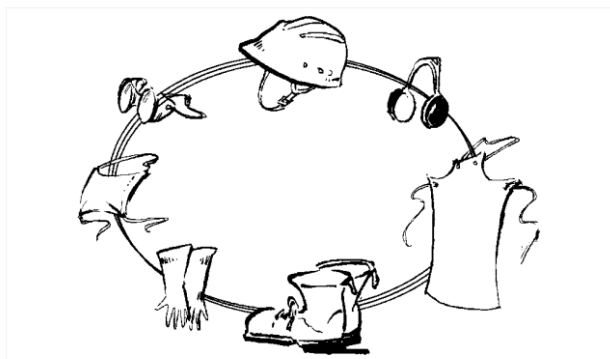
Any modification made without authorization from KIOTI can create hazards. Before making a modification, consult your KIOTI distributor.

Wear Well-fitting Clothes and Protective Equipment

Do not wear loose-fitting clothing, jewelry, or have unsecured long hair. They may get caught in control systems or moving parts, causing severe injury or death.



Always wear a hard hat and protective eyeglasses. Wear safety shoes, mask, ear plugs, gloves, and safety belt when operating or maintaining the machine.



Use safety goggles, safety glasses, or a face mask to protect your eyes from high-pressure liquids while servicing the battery, and to protect from flying debris while the machine is running and tools are being used. Wear a protective mask while disassembling springs or adding acid to the battery. Wear a safety helmet or face shield while welding or using a cutting torch. Qualified insulating gloves and shoes shall be worn when conducting live maintenance and testing.

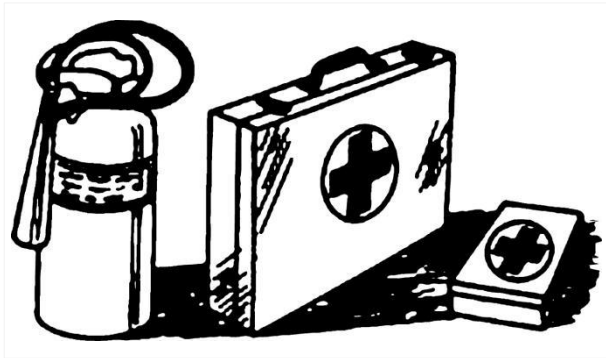


In noisy environments, wear appropriate hearing protection devices such as ear muffs or earplugs to avoid damage to your hearing.



Check that all personal protective items function properly before using them.

Fire Extinguisher and First Aid Kit



Observe the following precautions to prepare for action if any serious personal injury or death or fire should occur.

- Fire extinguishers suitable for electrical fires must be provided at key positions in the cab, beside the rectifier cabinet (if equipped) and the power distribution cabinet (if equipped). The operator must know where the fire extinguisher is stored, and read the labels to ensure that you know how to use them for the possibility of fires.

⚠ CAUTION

Do not weld or drill holes on the ROPS & OPG column to install a fire extinguisher.

- Perform periodic inspection and maintenance to ensure that the fire extinguisher can always be used. Follow the recommendations on the instruction label.
- Provide a first aid kit in the storage point. Perform periodic checks and add to the contents if necessary.
- Know what to do in case of fire or injury.
- Know how to deal with the emergency of fire or injury. Prepare in advance the phone numbers of relevant personnel to contact in case of emergency (physicians, emergency services, fire department, etc.). Post these phone numbers in designated locations and ensure that all personnel know these numbers and how to contact them.

Electrical Storm Injury Prevention

Never attempt to mount or exit the machine when lightning is striking nearby.

If a lightning strike occurs and you are in the driver's cab, then stay in the cab. If there is no driver's cab or if you are standing on the ground, then stay far away from the machine.



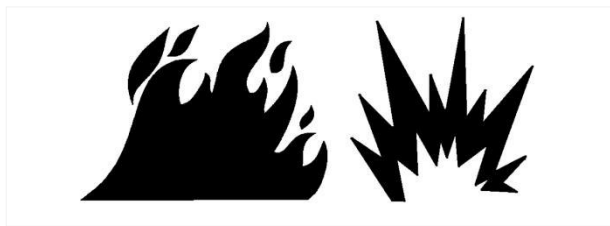
Electromagnetic Interference

When the machine is operating close to a source of high electromagnetic interference, such as a radar station, some abnormal phenomena may be observed.

- The display on the monitor panel may behave erratically.
- The warning buzzer may sound.

These effects do not signify a malfunction and the machine will return to normal as soon as the source of interference is removed.

Fire & Explosion Prevention



Fire Prevention

Always perform a walk-around inspection, which may help you identify a fire hazard.

Combustible and flammable material substances

All fuels, most lubricants and some coolant mixtures are flammable.

Clean up any flammable materials that accumulate on the machine, such as fuel, lubricants, leaves, twigs, papers, trash, and so on. These items may accumulate in the hood or around other hot areas and hot parts on the machine, which may cause a fire.

Store fuel and lubricants in properly labeled containers. Prevent their use by unauthorized personnel. Put greasy rags and other combustible materials into a safe container and place them in a safe location.

Fires can occur if fuel leaks onto hot surfaces or electrical components. Properly clean areas of spillage.

Do not operate a machine with a fluid leak. Repair leaks and clean up fluids before operating the machine. Fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire. A fire may cause personal injury or death.

Dust that is generated from repairing nonmetallic parts may be flammable and explosive. Repair such components in a ventilated area away from open flames or sparks. Use suitable Personal Protection Equipment (PPE).

Battery and battery cables

⚠ WARNING

Do not mix batteries of different brands for the same battery pack.

Do not mix batteries of old and new for the same battery pack to prevent affecting the service life of the battery pack.

An exposed wire on the battery cable may cause a short to ground if the exposed area comes into contact with a grounded surface, which may be a fire hazard. Do not operate a machine if battery cables or related parts show signs of wear or damage. Contact your dealer for service.

Gases from a battery can explode. Do not operate the machine near an open flames or sparks. Do not smoke when observing the battery electrolyte levels. Do not smoke in battery charging areas. Do not use cell phones or other electronic devices in battery charging areas.

Improper jumper cables may cause an explosion and lead to personal injury. Follow the correct procedures when starting the machine that has a battery low on electrolytes with a normal negative ground connection.

Do not charge a frozen battery. This may cause an explosion.

Do not touch batteries with metal objects, otherwise the batteries may explode due to a short circuit. Use a voltmeter in order to check the battery charge.

Daily inspect battery cables, clips, straps, and other restraints that are in areas that are visible for damage. Replace them immediately if damaged. Ensure that all components are reinstalled correctly.

Check for signs of the following, which can occur over time due to use and environmental factors:

- Fraying
- Abrasion
- Cracking
- Discoloration
- Cuts on the insulation of the cable
- Fouling

- Corroded terminals, damaged terminals, and loose terminals

Wiring

Check the electric circuit periodically to avoid fire caused by overload or short circuit.

Check the wires every day for looseness, fraying, abrasion, cracking, discoloration, and cuts on the insulation. Replace the damaged wires in time.

Tighten any loose power supplies.

The lines and the hoses should have adequate support and secure clamps. Tighten all connections to the recommended torques.

Attaching electrical wiring to hoses and tubes that contain flammable fluids or combustible fluids should be avoided.

Keep wiring and electrical connections free of debris.

Refueling precautions

Do not smoke while refueling, in a refueling area, where flammable materials are stored, or when maintaining fuel systems. Do not use cell phones or other electronic devices while you are refueling. Perform refueling and maintenance away from open flames and sparks. Turn off the engine before filling the fuel tank. Refuel outdoors.



Avoid static electricity risk when fueling. Ultra low sulfur diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations with a higher sulfur content. Avoid death or serious injury from fire or explosion. Consult with your fuel or fuel system supplier to ensure that the delivered fuel meets the fuel standards.

Other precautions

Do not weld or flame cut on pipes that contain flammable liquids. Empty and purge the tanks or pipes. Clean the tanks or pipes with a nonflammable solvent before welding or flame cutting.

Keep the hood closed and access doors in working condition in order to permit the use of fire suppression equipment, in case a fire should occur.

Actions if Fire Occurs

⚠ CAUTION

Locate emergency exits and understand how to use the emergency exits before you operate the machine.

Locate fire extinguishers and understand how to use a fire extinguisher before you operate the machine.

If you find that you are involved in a machine fire, your safety and that of others on site is the top priority. At all times you should assess the risk of personal injury and move away to a safe distance as soon as you feel unsafe.

If the fire occurs, be aware of the following risks:

- Tanks, accumulators, hoses, and filters can rupture in a fire, spraying fuels and shrapnel over a large area.
- Remember that nearly all of the fluids on the machine are flammable, including coolant and oils. Additionally, plastics, rubbers, fabrics, and resins in fiberglass panels are also flammable.

Only if there is no danger or risk to you and others on site, perform the following operations:

- If a fire occurs during the charging, must turn off the power supply of the device before proceeding with the next fire extinguishing action.
- Move the machine away from areas with combustible materials, such as fuel stations, structures, trash, mulch and timber.
- Lower any implements and turn off the machine.

- If possible, turn the battery disconnect switch to the OFF position. Disconnecting the battery will eliminate a second ignition source if electrical wiring is damaged by the fire, resulting in a short circuit.
- Notify the Fire Department of the fire and your location.
- Use the on-board fire extinguisher. Refer to the instructions of the fire extinguisher for the specific operation methods. If the harness catches fire, use a carbon dioxide fire extinguisher.

If you are unable to do anything else, please escape immediately:

- Turn the start switch to OFF position.
- Use the handrails and steps to escape from the machine.
- Do not jump off the machine. There is the danger of falling and it may cause personal injury.
- Do not breathe the fumes. The fumes generated by a fire contain harmful materials which have a bad influence on your body when they are inhaled. If accidentally inhale heavy smoke, transfer and consult a doctor for treatment as soon as possible.

Precautions after Fire

After a fire, harmful compounds may be left. If it touches your skin, it may have a bad influence on your body.

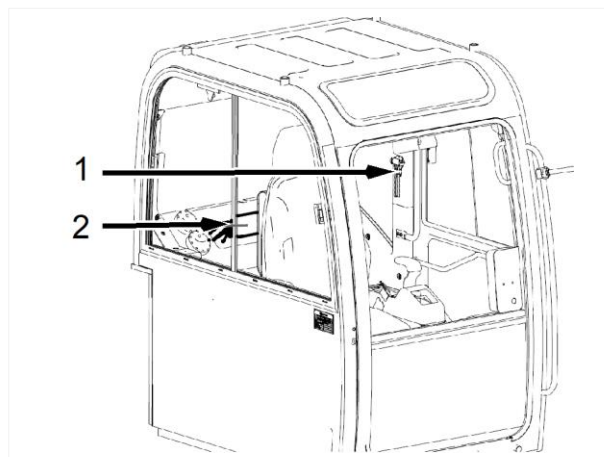
Be sure to wear rubber gloves when handling the materials left after the fire. The material of the gloves, which is recommended is polychloroprene (Neoprene) or polyvinyl chloride (in the low temperature environment). When wearing cotton work gloves, wear rubber gloves under them.

Emergency Measures

Collision or falling

Stop the machine stably, open the cab, turn off the start switch and battery disconnect switch, and leave the machine quickly.

In the event of an emergency, use the emergency hammer placed inside the cab to break the window glass and escape from the cab.



1. Emergency hammer
2. Fire extinguisher (optional)

When breaking glass, it is necessary to close your eyes and cover eyes with your arms.

When escaping, remove the pieces of glass from the window frame first and be careful not to cut yourself on the glass. Be careful also not to slip on the broken pieces of glass on the ground.

Soaking or wading shutdown

If the machine falls into water or is soaked in water due to an accident, pay attention to the following precautions:

1. Do not power on the machine.
2. Inform KIOTI service personnel or dealers.

⚠ CAUTION

When the machine is soaked in water due to weather or special reasons, do not power on the machine, otherwise, it may cause safety risks or secondary damage of the machine.

Operator Station

This machine is equipped with a cab that meets with the industry standard ISO 3411, which specifies space requirements for cabs.

Any modifications or additional equipment added to the inside of the operator station should not project into the operator space. The addition of a radio, fire extinguisher, and other equipment must be installed so that the defined operator space is maintained. Any item that is brought into the cab should not project into the defined operator space. A lunch box or other loose items must be secured. Otherwise, these objects will pose an impact hazard during travel over rough terrain or in the event of the machine tipping.

Precautions in the cab:

- When entering the cab, always remove all mud and oil from the soles of your shoes. If you operate the pedal with mud or oil affixed to your shoes, your foot may slip and this may cause a serious accident.
- Do not bring any dangerous objects, such as flammables and explosives, into the cab.
- Do not stick suction pads to the window glass. Suction pads act as a lens and may cause fire.
- Do not place objects with convex lens effects (such as glass balls, magnifying glasses, reading glasses, etc.) near or applied on the windows. Such lens may form a convex lens effect when lights are passed through cause a fire.
- Do not use a cellular phone when driving or operating the machine. This may lead to mistakes in operation, and may cause serious personal injury or death.
- Do not leave parts or tools around the cab. If tools or parts enter the control equipment, it may obstruct their operation and move the machine unexpectedly, resulting in serious personal injury or death.

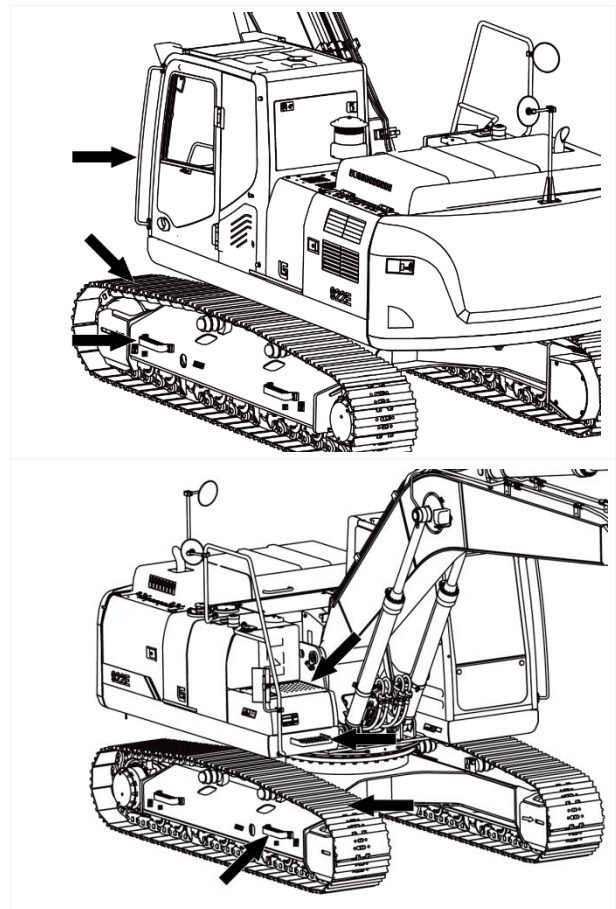
Precautions when Mounting and Exiting the Machine

Clean any oil or mud from the handrails and steps before mounting or exiting the machine.

Do not climb on the step if it is damaged.

If handrails and steps are damaged or deformed, repair them immediately. Please consult your KIOTI distributor and ask for repair or replacement of the step. Tighten loose bolts.

Only step on parts of the machine that have steps or handrails.



Always face the machine when getting on and off. Hold the handrails, step on the steps, and maintain three points of contact (two feet and one hand or two hands and one foot).



Never jump on or off the machine. Never get on or off a moving machine.

If the machine starts to move when there is no operator on the machine, do not jump on to the machine and try to stop it.

Never use any control lever or door handle as a handrail while getting on or off the machine.

Do not grab a foldable mirror as a handrail since it turns.

Never climb on the hood or covers without anti-skid design.

Do not climb onto or off of the machine while carrying tools or other items. Use rope to lift the required tools onto the operating platform.

Precautions When Standing up from Operator's Seat

Before standing up from the operator's seat, such as when opening or closing the front window or ceiling window, when removing or installing the bottom window, or adjusting the position of the seat or leaving the seat, always lower the work equipment to the ground, set the pilot shutoff lever to the LOCK position, and stop the machine. If the control levers are touched by mistake, there is danger that the machine may suddenly move and cause serious personal injury or death.

Precautions when Leaving Machine

Always lower the work equipment to the ground, set the pilot shutoff lever to the LOCK position, and stop the machine.

When leaving the machine, lock all places and always take the key with you.

Do not Get Caught in Work Equipment

The clearance in the area around the work equipment changes according to the movement of the link. If you are caught, this may lead to serious personal injury or death. Do not allow anyone near any of the rotating or telescopic parts.

Precautions Related to Protective Structures

A Roll Over Protective Structure (ROPS) (if equipped) and an Operator Protective Guard (OPG) (if equipped) of the operator's cab can be used to protect the operator by absorbing the impact energy.

As for the machine equipped with ROPS, if the machine weight (mass) exceeds the certified value (shown on ROLL-OVER PROTECTIVE STRUCTURE (ROPS) CERTIFICATION plate), ROPS will not be able to fulfill its function. Do not increase machine weight beyond the certified value by modifying the machine or by installing attachments to the machine.

Also, if the function of the protective equipment is impeded, the protective equipment will not be able to protect the operator, and the operator may suffer injury. Always observe the following.

- If the machine is equipped with a protective structure, do not remove the protective structure and perform operations without it.
- If the protective structure is welded, or holes are drilled in it, or it is modified in any other way, its strength may drop. Any modification is prohibited.
- If the protective structure is damaged or deformed by falling objects or by rolling over, its strength will be reduced and it will not be able to fulfill its function properly. In such cases, always consult your KIOTI distributor.
- Even if the protective structure is installed, always fasten your seat belt properly when operating the machine. If you do not fasten your seatbelt properly, it may not be effective.
- When the cab must be modified due to certain conditions, please consult your KIOTI distributor to avoid damaging the protective structure.

Protection against Falling, Flying or Intruding Objects

On jobsite where there is a danger of falling objects, scattering fragments, and things which may intrude into operator's cab, install the necessary equipment to protect the operator depending on the working conditions.

When operating on jobsite, such as mines or quarries where there is a hazard of falling rocks, install Falling Object Protective Structure (FOPS) and a front guard, and use a fully transparent laminated coating sheet on the front glass. Keep all the windows and doors closed when operating. In addition, always check that there is no one except the operator in the surrounding area where there is a danger of falling objects, scattering fragments.

When performing breaker operations, install a front guard and use a fully transparent laminated coating sheet on the front glass. Keep all the windows closed when operating. In addition, always check that there is no one except the operator in the surrounding area where there is a danger of scattering fragments.

Above precautions are developed for the standard jobsite. Depending on the conditions of the jobsite, installation of additional guards is necessary

Do not operate the machine without the necessary guards. Be sure to consult with your KIOTI distributor about necessary guards.

Actions in the Event of Damage to Safety Structure

The following components comprise the machine safety structure that can prevent injury to the operator from falling objects, flying objects and intruding objects as detailed in the previous section.

- Operator's cab
- Operator Protective Guard (OPG)
- Front window guard

In the event any of the above parts become broken or damaged such that their function would be impaired, they must be replaced with genuine KIOTI replacement parts.

No attempt should be made to repair these parts as this may have an adverse effect on component strength or durability.

If such a repair is undertaken without authorisation from KIOTI there is a danger that a problem might occur that will lead to serious personal injury.

KIOTI can not take any responsibility for accidents, failures or damage caused by unauthorised repair to the above mentioned components.

If in doubt please contact your KIOTI distributor.

Information on Attachments

Attachment Cautions

Installation and adjustment of attachments must be performed by qualified personnel. Operators should be trained to operate and maintain attachments in strict accordance with the relevant manuals.

When installing and using replacement attachments, read the relevant instructions in the attachment manual as well as this manual.

Improper installation of attachments or accessories will not only cause safety hazards, but will also adversely affect the machine's operations and the service lifespan of the equipment.

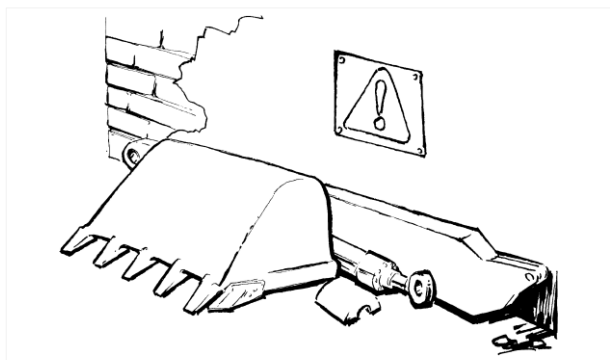
Without authorization, any modification of attachments is strictly prohibited.

Do not use any attachments that are not authorized by Kioti. Use of unauthorized attachments may cause safety hazards and adversely affect the machine's normal operation and its service lifespan.

Kioti is not responsible for any injuries, accidents, or damage to the machine caused by the use of unauthorized attachments.

Storing Attachments

To avoid serious injury or death from tip overs, store all attachments and tools in a safe location. Keep children and bystanders away from the storage area.



Precautions Related to Cab Glass

Precautions for Broken Cab Glass

If the cab glass is broken during operations, stop operations and repair the cab glass immediately.

If the cab glass on the work equipment side is broken, there is a hazard that the operator may be directly hit or caught in the work equipment. If the glass is broken, stop operation immediately and replace the glass.

If the ceiling window is scratched, replace it with the new one as soon as possible. If the ceiling window is scratched and is not replaced, there is a danger that any rocks falling on it will cause it to break, leading to injury to the operator.

Keep Cab Glass Clean

Keep cab glass clean to ensure good visibility during operation.

Method for Selecting Window Washer Fluid

Use an ethyl alcohol base washer liquid.

Do not use methyl alcohol base washer liquid, otherwise it may cause injury to your eyes.

Precautions When Running Engine inside Building

The engine exhaust gas contains substances that may damage your health or even cause death.

Start or operate the engine in a place where there is good ventilation. If the engine or machine must be operated inside a building or underground, where the ventilation is poor, take measures to remove the engine exhaust gas and bring in ample fresh air.



Precautions When Using Hammer

When using a hammer, pins may come out or metal particles may be scattered. It is dangerous and may cause serious personal injury or death.

Always observe the following:

- If hard metal parts (such as pins, bucket teeth, bearings and etc.) are hit with a hammer, pieces might be scattered, and it may cause serious personal injury or death. Always check that there is no one in the surrounding area. Always wear protective eyeglasses and gloves.



- If the pin is hit with high force, it may come out, and injure people in the surrounding area. Do not allow anyone to enter the surrounding area.

Precautions for Operation

Know Your Machine

Be able to operate all equipment on the machine. Understand the positions and functions of all control systems, instruments, switches, buttons, indicators, and control devices, etc.

Understand the width of your equipment so as to keep proper spacing when operating the equipment near the fences or boundary obstacles.

Understand the load capacity, speed range, braking and steering characteristics, turning radius, and operating height.

Remember that rain, snow, ice, gravel, soft soil, etc. can all change the machine's work capacity.

Study the safety decals (DANGER, WARNING, CAUTION) and other signage on the machine.

Learn and understand the various rules for operation, and fully understand the hand gesture signals of the signaler. Only take signals from one person at a time.

Precautions about Working Area

Know Your Working Area

Make every effort to learn about your work area in advance to avoid various hidden hazards on the work site.

Check for: the locations of slopes; open trenches; falling or hanging objects; soil conditions (soft or hard); puddles and swampy areas; stones and tree stumps; buried foundations, roots, or wall boundaries; the outer limits of the areas where garbage is buried or that are filled in with earth, holes, obstacles, and mud or ice; traffic; dense dust, smoke, or fog; buried or hanging electricity, gas, telephone, water, sewage or other utility lines.

If necessary, request the utility companies to mark, shut off, or relocate these lines before you start work.

Unauthorized Personnel

Take necessary measures to prevent any unauthorized personnel from entering the work area.

Signalman

If it is necessary to work on a highway, a work site traffic signalman is required to ensure the safe passage and walking or install guardrails around the work site.

No People on Attachments

Never let anyone climb on the work equipment or other attachments. There is a hazard of falling and suffering serious personal injury or death.

Check Signs and Signalman's Signals

If signals and labels are not clear, serious personal injury can result from downward slip, overturn or accidental contact with nearby people or obstacles. Always observe the following.

- Set up labels to inform of road edges and soft ground. If the visibility is not good, position a signalman if necessary. Operator should pay careful attention to the labels and follow the instructions from the signalman.
- Only one signalman should give signals.
- Make sure that all workers understand the meaning of all signals, signs, and labels before starting work.

Ensure Good Visibility

To assist with job site organisation during use of this machine, a visibility map is provided that shows an approximation of any masking to visibility between the 1m rectangular boundary and the 12m test circle.

Based upon the information supplied in the visibility map the site operator may wish to provide additional measures where it is felt necessary or provide additional instruction to personnel.

Although this machine is equipped with rear view mirrors and cameras to ensure good visibility, there are places that can not be seen from the operator's seat. Be careful when performing operation.

When driving the machine or performing operations in places with poor visibility, it is dangerous and may cause serious personal injury or death because it is difficult to check for obstacles and condition of the job site. When driving the machine or performing operations in places with poor visibility, always observe the following.

- Allocate a signalman for jobsite duty if there are areas where the visibility is poor. And only signalman can give signals.
- When working in dark places, turn on the working lamp and headlamps installed to the machine, and set up additional lighting in the work area if necessary.
- Stop operations if the visibility is poor because of mist, snow, rain, or dust.
- When checking the mirrors installed to the machine, remove all dirt and adjust the angle of the mirrors to ensure good visibility.
- Clean off any dirt from the lens of cameras installed to the machine, and make sure that the camera gives a clear view.

Precautions when Mounting and Exiting the Machine

Clean any oil, grease or mud from the handrails and steps before mounting or exiting the machine. Repair any damaged parts and tighten loose bolts.

Only step on parts of the machine that have steps or handrails.

Face the machine when getting on and off. Hold the handrails, step on the steps, and maintain three points of contact (two feet and one hand or two hands and one foot).



Never jump on or off the machine.

Never get on or off the machine while it is moving.

If the machine starts to move when there is no operator on the machine, do not jump on the machine and try to stop it.

Never use any control lever or door handle as a handrail while getting on or off the machine.

Never climb on the hood or covers without anti-skid design.

Do not climb onto or off of the machine while carrying tools or other items. Use rope to lift the required tools onto the operating platform.

Starting the Machine

Before Starting the Machine

Remove any obstructions from the driving path of the machine. Beware of dangerous objects and hazardous areas such as high-voltage electrical lines, ditches, etc.

Before starting work, inspect the machine carefully to check that all systems are in good operating condition. Make sure there is no other people is on, off and around the machine. Have all other people near the machine leave the work area.

Before mounting the machine, clean off any mud, oil or sand from your shoes.

Ensure that all access doors and cab doors are closed.

Secure all open or closed doors, windows and hoods.

Check that all safety and protective devices such as panels, guards, covers, etc. are installed properly.

Check to ensure that all structural and covering parts are in good condition and without distortion due to collision. Promptly repair any damaged parts.

Check to ensure that the coolant level, fuel level and engine oil level are normal. Promptly drain off any water or sediment in the fuel water separator.

Check to ensure that there is no oil or fuel leakage, the air filter is not blocked, and the hoses and steel pipes are not worn.

Check to ensure that there is no mud or dust accumulated around the movable parts of any pedals, and check that the pedals work properly.

Check to ensure the wiring harnesses for no wear or abrasion. Check to ensure that fuses are intact and all connections are tight.

Check to ensure all fasteners for security and make sure that none are missing. Replace any damaged or missing parts and perform the lubrication tasks at the lubrication points specified in the Periodic Maintenance Schedule as necessary.

Clean off any dirt from the windows, light covers and rear view mirrors on the machine, and keep them clean. Adjust the angle of the rear view mirrors to ensure good visibility.

Clean off any dirt from the lens of cameras on the machine, and make sure that the camera gives a clear view.

Remove any loose objects from the driver's cab. They can interfere with the controls and cause accidents.

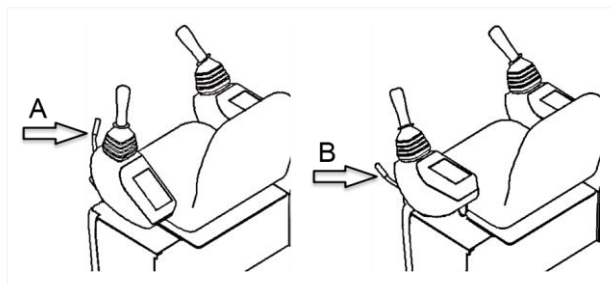
Adjust the seat and armrests to the proper position and check to ensure that the seat belt and seat belt anchoring device are not damaged.

Turn on the power but do not start the engine. Check to ensure that all instruments work properly.

Ensure that the wipers are working properly. Check to ensure that the machine's lighting system is working properly and that there is sufficient lighting in the working area. If any problem is found, repair it immediately.

Ensure that the control levers are in the Neutral position.

Check if the pilot shutoff lever is in the LOCK position before starting the engine.



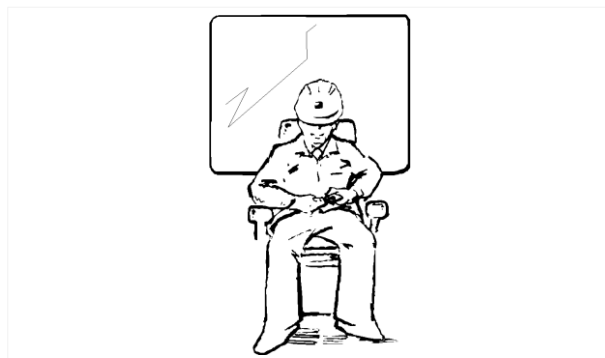
A: LOCK
B: UNLOCK

Machine Starting

Do not start the machine or touch the levers, if there is a "DO NOT OPERATE!" warning tag displayed. It means that someone is performing inspection and maintenance of the machine. If the warning tag is ignored and the machine is operated, the person performing inspection or maintenance may be caught in the rotating parts or moving parts. It is dangerous and may cause serious personal injury or death.

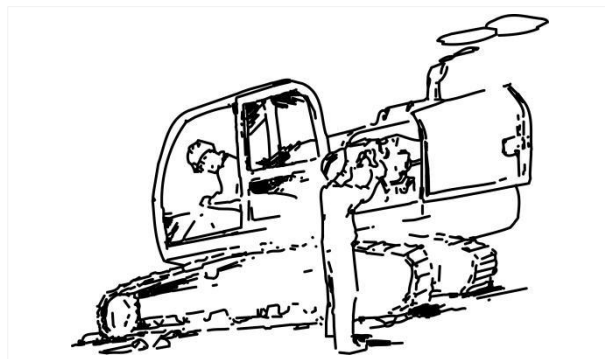


Make sure that the operator is in the seat with the seat belt securely fastened before starting the machine.



Ensure the pilot shutoff lever (if equipped) is in the LOCK position before starting the machine. Make sure that the engine speed knob is in the lowest gear.

When starting the machine, sound the horn as a warning.



Prohibit anyone other than the operator to get on the machine.

Only start the engine while sitting in the operator's seat. It is strictly forbidden to short-circuit the starter motor to start the engine. Bypassing the starting system in this way will cause damage to the machine's electrical system.

After starting the machine, observe the pressure gauges, instruments, and indicator lights to ensure that they are working properly and that the readings are within operating range.

Observe and listen to the machine carefully. Ensure that there is not any problem in the sound, vibration, heat and smell of the machine, or abnormalities of instruments. If you detect any malfunctioning or abnormality, stop the machine immediately and resolve the issue before proceeding.



Operation in Cold Weather

Be sure to perform the warm-up operation before operating the machine. Particularly in a cold weather, be sure the warming-up operation is completed. If the warm-up operation is not performed thoroughly, and the work equipment is operated, the reaction of the work equipment to the operation of the control levers and pedals will be slow and the movement of it may not be what the operator intended.

If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a hazard that this will ignite the battery and cause the battery to explode.

Before charging or starting the engine with a different power source, melt the battery electrolyte and check that there is no leakage of electrolyte before starting.

Ether

Do not use ether to start the machine. Any attempt to start the engine with ether may result in serious engine damage or personal injury.



Start Engine with Jumper Cables

If any mistake is made in the method of connecting the jumper cables, it may cause the battery to explode, so always observe the following.

Always wear protective eyeglasses and rubber gloves when starting the engine by using the jumper cables.

When connecting a normal machine to a failed machine with the jumper cables, always use the normal machine with the same battery voltage as the failed machine.

When starting the engine with the jumper cables, perform the starting operation with 2 workers (one worker sitting in the operator's seat so as to control the machine whenever needed and the other working with the battery).

When starting from another machine, be careful that the normal machine does not contact with the failed machine.

When connecting the jumper cables, turn the start switch to OFF position for both the failed machine and the normal machine. If the failed machine has a battery disconnect switch, turn it to OFF position, and turn it ON again after connecting the cables.

Be sure to connect the positive (+) cable first when installing the jumper cables. Disconnect the negative (-) cable (ground side) first when removing them.

When disconnecting the jumper cables, take care not to bring the clips in contact with each other or with the machine.

It is dangerous that the machine may move when the power is connected.

Precautions for Machine Operation

Before Operating the Machine

Fasten the seat belt.

Adjust the rearview mirrors to have a good view of the surrounding area from the operator's seat.

Make sure that the horn, reverse signal alarm (if equipped), and other warning devices are working properly.

Ensure that the machine, work implement, travel and swing systems are all in good working conditions.

Check to ensure that the movement of the machine matches the display on the schematic decal. If it does not match, replace it immediately with the schematic decal.

Check to ensure there is not any problem in the sound, vibration, heat and smell of the machine, or abnormalities of instruments. Also check that there is no leakage of oil or fuel.

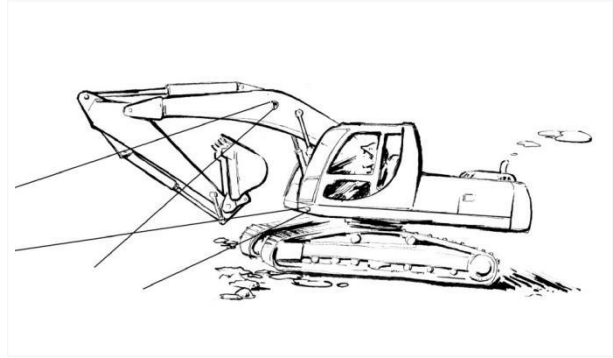
If any problem is found, repair it immediately.

Precautions for Operation

Before driving on public roads, check that the machine meets the requirements of local traffic laws and regulations, and obtain a road driving permit from the relevant authority. Follow the local traffic regulations when driving on public roads.

Before driving the machine, you should carefully observe the surroundings, and find out the relationship between the direction that you want to go in and the pedal / operating lever. You can depress the front part of the pedal, or push the operating lever to drive the machine into the low speed state.

Dust, heavy rain, and heavy fog will blur your vision. You should keep the windows, mirrors, and lights clean and in good condition. When the visibility decreases, you should decrease the speed and use the proper lighting.



An increase in temperature will cause the surface of the ground to become soft. Make sure that the ground at the working area is firm enough to support the machine. When operating on an icy road surface, you should be careful to prevent tip over.

If driving or operating the machine with a bad view or in a crowded area, you should work with a signaler, keep the signaler within the field of your vision, and coordinate your hand signals.



You should not extend any part of your body out of the window frame. If your body extends out of the window frame, and you move a control lever by mistake, you may be injured by the boom. If the window is missing or damaged, you should replace it immediately.

When the operation is close to a sunken pit, use the travel motor at the rear end to position the machine. Drive the machine on a flat and hard ground as much as possible. Drive the machine in a straight line as much as possible by making slight changes in the direction.

When driving on roads, place boards to prevent damage to the road surface. Take care when driving the machine on asphalt roads in the summer.

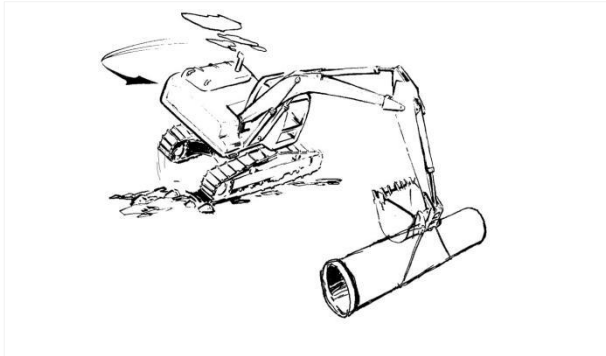
When driving across a railway, place boards to prevent damage to the railway.

When driving across a river, measure the depth of the river with the bucket, and travel at low speed. When the surface of the water is higher than the top end of the track carrier roller, do not cross the river.

Reduce the engine speed when driving on rough ground, which will reduce the possibility of damaging the machine.

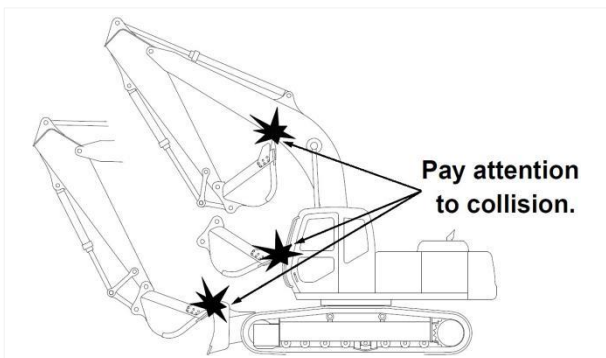
Avoid any operations that could damage the tracks and the chassis. To avoid slipping, wipe off the snow and ice on the track shoes before loading and unloading the machine onto or from the trailer in winter.

This machine must not be used to carry out any form of lifting operation and log loading operation.

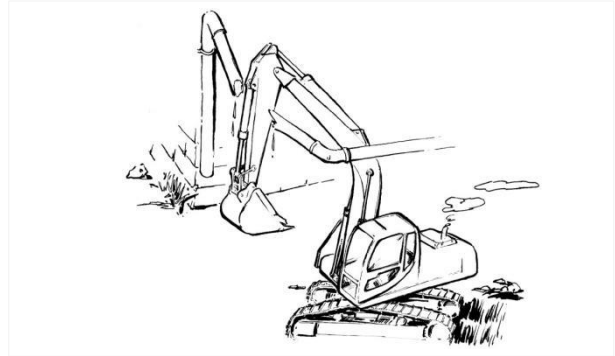


If the machine tilts during operation, you should not jump out of the vehicle! You should fasten the safety belt firmly and keep your hands and feet in the cab to avoid being thrown out by the machine and causing serious injury or death.

The attachment equipped on the machine may impact and damage the other parts of the machine during operation. Check the operating safety distance of the attachment before operation, and operate it carefully when it gets closer to the other parts.



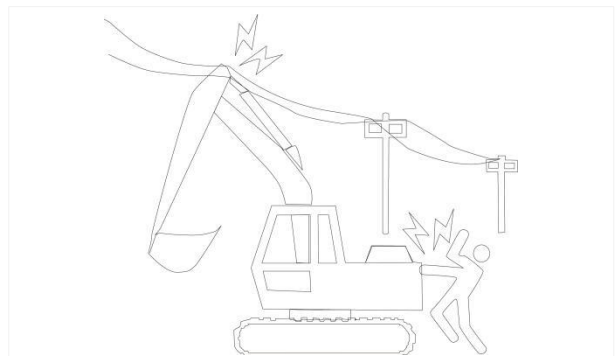
You should prevent the boom and bucket from contacting with any overhead obstacle.



When digging down deeply, you should prevent the bottom of the boom and the hose of the bucket cylinder from bumping against ground. The bucket is used for digging only, and should not be used for crushing rock or chiseling holes in rock. Before digging, you should be aware of the locations of cables, gas pipes, and water pipes, and mark out the underground utilities.



Contact with electrical wires may cause accidents, such as injury or death. Do not allow any part of the machine to get close to electrical wires. Check the area above the machine, and know the exact distances between electrical wires, the machine, and the ground. It is best to cut off the power supply if possible. If cutting off the power supply is not possible, you need to ask a signaler to guide you.



If the machine has contacted a high voltage wire:

- Alert all persons to keep away from the machine.

- If you can disconnect the contact point, separate the high voltage wire from the machine and leave the area of danger.
- If you cannot disconnect the contact point, stay inside the cab until the electricity provider cuts off the wire and informs you that the power supply has been cut off.
- If a fire occurs, hold your feet as close as possible and jump off the machine without your hands touching the ground. Try to jump to a safe place away from the machine and power source.

You should avoid operating on a cliff or on a soft ground where there is a danger of tipping over. If you inevitably have to operate on a cliff or on soft ground, in order to get off the machine easily, you should keep the tracks perpendicular to the edge of the working area.

In addition, in order to prevent the machine from tipping or falling due to the collapse of the shoulder or the settlement of the foundation, it is necessary to ensure that the machine has sufficient safety distance from the edge of the foundation. If there is an area that cannot be seen by the driver, please provide command personnel.



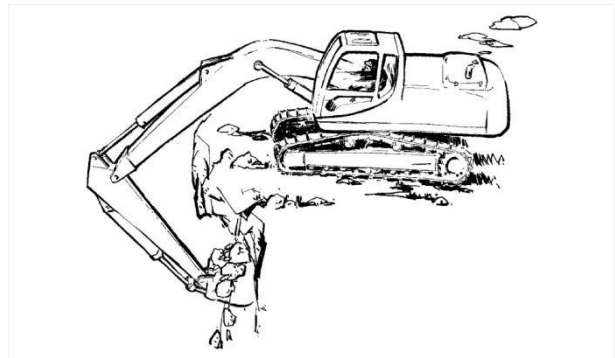
When working in a dangerous area, in particular, operating at the edge of an excavation area, you should especially be on your guard. You should make sure that the machine keeps a sufficient distance away from the edge so as to avoid collapse.

You should not dig under a crag, because the collapse of the edge of the crag or a landslide will cause injury. When operating, you should not let the machine get close to hanging objects or the edge of material stacks.



When operating along river banks, under hanging objects, or inside buildings, you should be cautious of falling rock or earth, and be cautious of hanging branches and avoid dangerous situations that may lead to collapse.

You should not dig right under the machine as this may cause a collapse and the machine will sink into the ditch dug, causing accidents.



For a quick escape in an emergency, set the tracks at right angles to the road shoulder or cliff with the sprocket at the rear when performing operations.

Do not pass the bucket over the heads of other workers or over the operator's seat of dump trucks or other hauling equipment. There is a danger that the load may spill or the bucket may hit the dump truck and cause serious personal injury or death.

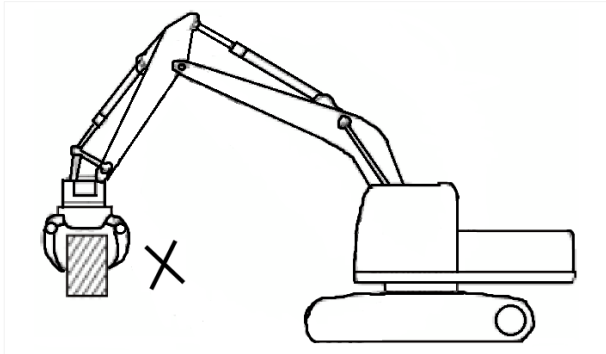
Generally speaking, the machine is more liable to tip over when the work equipment is at the side than when it is at the front or rear of the machine.

Be extremely careful when swinging the work equipment from the front or rear to the side of machine while it is carrying a load. It is dangerous that the machine may tip over.

When using a breaker or other heavy work equipment, it is dangerous that the machine may lose its balance and tip over. When operating the machine on the flat ground as well as on slopes, observe the following.

- Do not suddenly lower, swing, or stop the work equipment.
- Do not suddenly extend or retract the boom cylinder. It is dangerous that the machine may tip over by the impact.

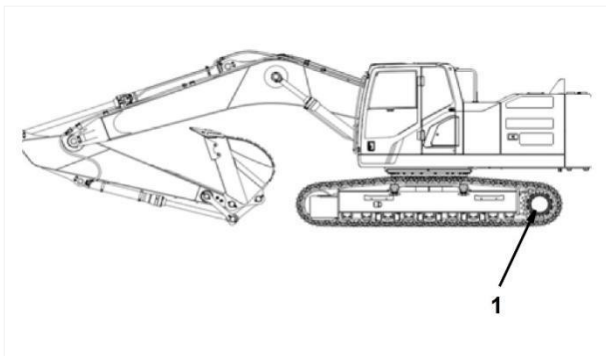
In the operation using the fork or grapple, do not attempt to pick up an object with the tips. The picked up object can easily slip off. Machine may be damaged, or personal injury or death may occur.



Special Precautions for Machine Operation

When Traveling in Forward or Reverse and Swing

When driving the machine, drive with sprocket (1) at the rear of the machine. If sprocket (1) is at the front, the operation of the travel levers will be the opposite of the actual direction of travel, so there is a hazard that the machine may travel in an unexpected direction, leading to serious injury or death.



1. Sprocket

Always lock all the doors and windows of the cab in position regardless of whether it is open or closed.

Always close all the windows and doors on jobsites where there is danger of scattering fragments, and things which may intrude into operator's cab.

Prohibit anyone other than the operator to get on the machine.

No one is allowed in the area around the machine. If there are any people in the area around the machine, there is danger that they may be hit or caught by the machine, and this may lead to serious personal injury or death. Before starting travel or swing, be sure to observe the following.

- Always operate the machine only when seated on the operator's seat.
- Before starting to move, check again that there are no people or obstacles in the surrounding area.
- Before moving, sound the horn to warn people in the surrounding area.
- Check that the travel alarm and other alarms work properly.
- If there is an area in the rear of the machine which cannot be seen, position a signalman. Drive or swing slowly, and be extremely careful not to hit any people or object.

Always be sure to perform the above precautions even when the machine is equipped with mirrors and cameras.

Precautions When Operating on Snow or Frozen Surface

Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not perform abrupt lever operation. Machine may slip even on a slight slope. Be particularly careful when working on slopes.

Frozen road becomes soft when the temperature rises, and the machine may tip over or get trapped in the soft ground. Be particularly careful when working on frozen road.

It is dangerous that the machine enters deep snow. The machine may tip over or become buried in the snow. Be careful not to go off the road or to get trapped in a drift of snow.

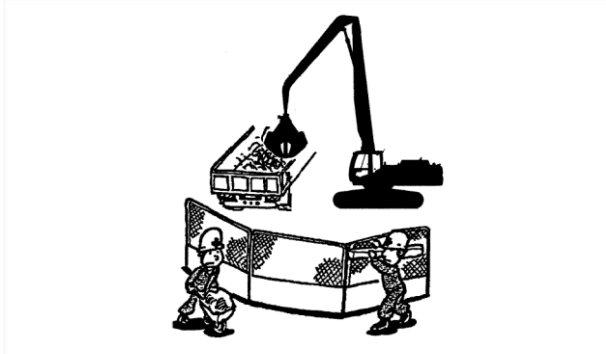
When performing snow removal, the road and objects placed beside the road are buried in the snow and cannot be seen. Be careful.

Do not Enter the Operation Site

The personnel near the running machine may be impacted by the rotating front end attachment and the arm, or may be clamped between other articles, which may cause serious personal injury and death.

Please take measures to keep people away from the working range of the machine.

Before driving the machine, please confirm if there are people and obstacles other than the guide within the working range.



Precautions for Operation

If the boom and arm are lifted, the attachment and the arm may collide with each other, please be careful!



When an attachment passes over a person's head or a truck's seat, it may come into contact with a dropped material or attachment and cause personal injury or death, which is very dangerous! Please do not let it pass over people's heads.



Do not use it as a crane! It may cause serious personal injury or death.

This machine is not provided with lifting device for lifting goods.



Drive Slowly and Carefully

Violent operation will increase the risk of falling due to impact.

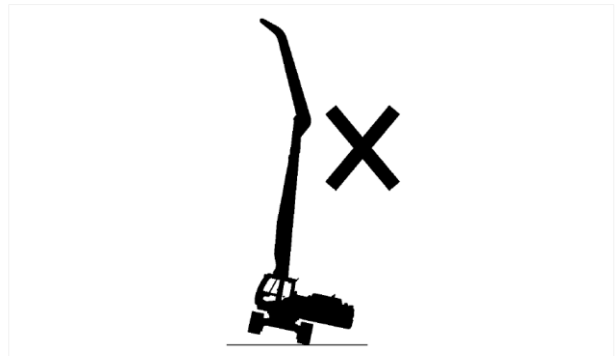
Please operate slowly and carefully, especially start slowly when driving.

In addition, do not rush or stop when turning! The main body of the machine becomes unstable due to the shaking of the attachment. It is very dangerous!

Precautions for Fall Back

When the boom is lifted to the highest position and the arm is stretched out or retracted to the maximum limit position, the center of gravity of the machine body will move backward and the stability of the rear part will become worse.

Avoid violent operation under or near these postures.



In addition, on slopes or trailers, keep the work implement as low as possible.

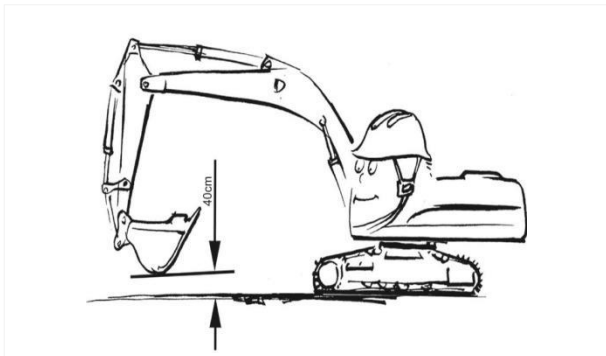
Precautions When Travelling

Before operating the machine on roads, check whether the machine meets the requirements of the local laws and regulations for road operation. Make sure that you get the road operating permission from relevant road administration offices. Observe the local traffic regulations when driving the machine on roads.

Before driving the machine, you should carefully observe the surroundings, and make it clear that the relationship between the direction that you want to go in and the pedal / operating lever. You can depress the front part of the pedal, or push the operating lever to drive the machine into the low speed state.

When driving the machine or performing operations, always keep a safe distance from people, structures, or other machines to avoid coming into contact with them.

When travelling on a level ground, keep the work equipment approximately 40 to 50 cm above the ground. Otherwise, the work equipment may get stuck in the ground and the machine may tip over.



If the view to the right side is poor, raise the boom to ensure better visibility.

Always turn the auto-deceleration switch OFF (cancel) when driving the machine on rough ground or steep slopes. If the machine is operated with the auto-deceleration system ON (activated), the engine speed will rise and the machine travel speed may suddenly become faster.

Try to avoid travelling over obstacles. If the machine has to travel over an obstacle, keep the work equipment close to the ground and travel at low speed. Do not drive it over obstacles which make the machine tilt largely to the right or left, otherwise, the machine tips over easily to the right or left.



When driving the machine on the rough ground, drive it at low speed and do not operate the steering suddenly. There is a danger that the machine may tip over. The work equipment may hit the ground, and the machine may lose its balance, or it may damage the machine or structures in the area.

When using the machine, to prevent serious personal injury or death caused by the work equipment or by the machine tipping over due to overloading, do not use the machine beyond the permitted performance of the machine (such as the maximum permitted load for the structure of the machine).

When passing over bridges or structures, check first that the structure is strong enough to support the weight of the machine. When passing on a public road, check with authorities concerned and observe their instruction.

When operating in tunnels, under bridges, or other places where the height is limited, operate slowly and be extremely careful not to let the machine body or work equipment hit anything.

Precautions on Slopes

Precautions when Travelling on Slopes

⚠ WARNING

Do not drive in reverse when going down a hill. Do not turn or operate the work equipment when working on a slope to prevent the machine from tipping.

Swinging the bucket downhill with a load in the bucket is extremely dangerous. If necessary, set up a platform with soil on the slope to keep the machine level while operating.

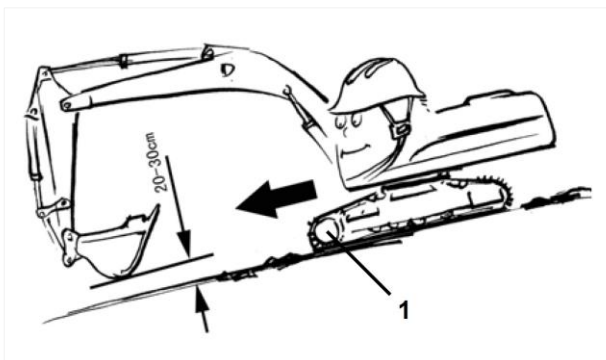
Do not drive the machine up or down a steep slope to avoid the hazard of tipping over.

When driving the machine uphill, if the track slips or the machine needs extra force to drive the machine forward, do not use the arm force to avoid the hazard of tipping over.



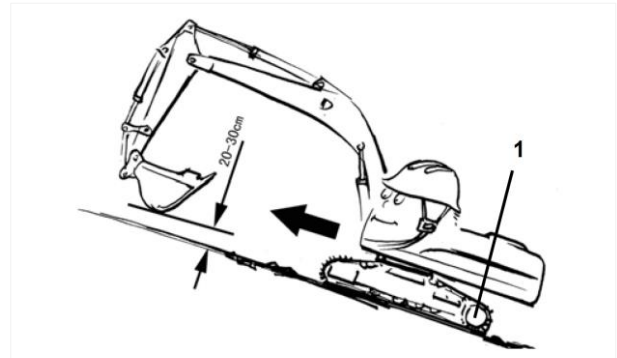
Keep the work equipment approximately 20 to 30 cm above the ground.

When driving downhill, keep at low speed by using the travel control lever and engine speed knob. If the slope gradient exceeds 15°, lower the work equipment as shown in the figure and lower the engine speed.



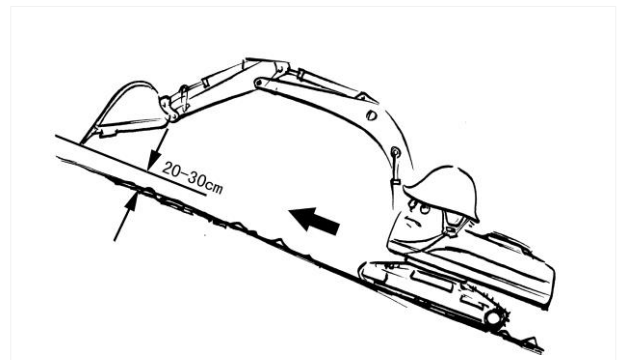
1. Travel motor

When driving the machine up a slope with a gradient below 15°, lower the work equipment as shown in the figure.



1. Travel motor

When driving the machine on a steep slope with a gradient above 15°, extend the work equipment forward to maintain stability, and raise the work equipment off the ground for 20–30 cm and drive at low speed.

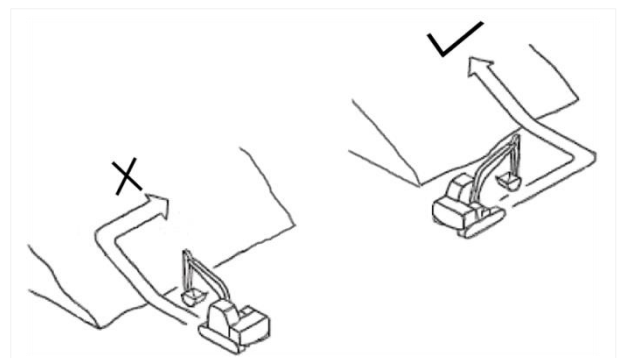


Driving downhill

When driving downhill, pushing the travel control lever to the NEUTRAL position can stop the machine from moving.

Always drive the machine straight up or down a slope. Driving the machine at an angle or across the slope is extremely dangerous.

Do not turn on slopes or drive across slopes. Always go down to a flat place to change the position of the machine, then drive it on to the slope again.



Do not drive the machine on a slope covered with the steel plates. Even with slight slopes there is a hazard that the machine may slip.

Drive the machine at low speed on the grass or fallen leaves. Even with slight slopes, there is a hazard that the machine may slip.

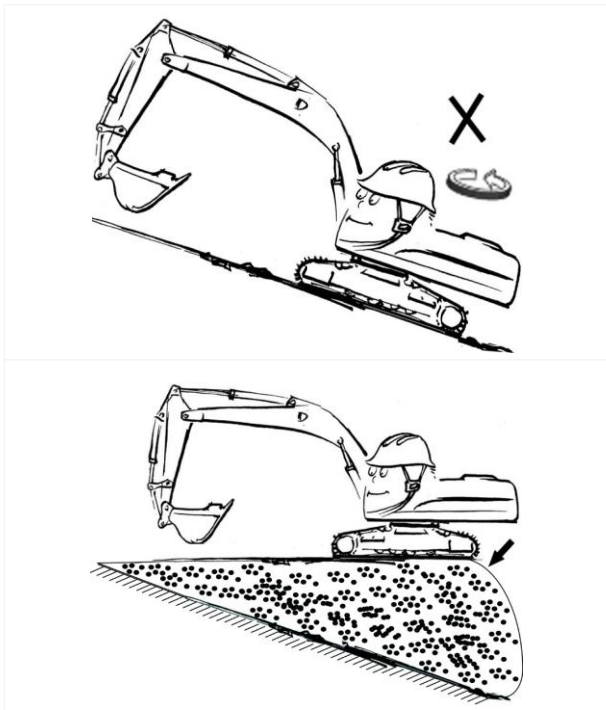
Engine shuts down on the slope: When driving uphill, if the engine shuts down, you need to push all of the control levers to Neutral position, and set the pilot shutoff lever to LOCK position, then starting the engine again.

Precautions when Operating on Slope

If the engine stops on the slope, do not use the control lever on the left to swing the machine, as the upper structure will swing under its own weight.

Be careful when opening or closing the cab door on a slope. The weight of the door can cause it to open or close suddenly. Make sure to lock the door securely.

When working on slopes, there is a hazard that the machine may lose its balance and turn over when performing swing or work equipment operations. This may lead to serious personal injury or death. Always provide a stable place when performing these operations, and operate carefully.



Do not swing the work equipment from the uphill side to the downhill side when the bucket is loaded. If the machine has to be used on a slope, pile the soil to make a platform to keep the machine as horizontal as possible.

Do not work on a slope covered with the steel plates. Even with slight slopes there is a hazard that the machine may slip.

Safety for Children

Tragedy can occur if the operator is not alert to the presence of children. Children generally are attracted to machines and the work they do. If children are in the vicinity of the machine and are not at a suitable distance and in the field of vision of the operator, this can lead to serious accidents or even death of the children.

Safety rules

1. Never assume that children will remain where you last saw them.
2. Keep children out of the work area and under the watchful eye of another responsible adult.
3. Be alert and shut your machine down if children enter the work area.
4. Never carry children on your machine. There is not a safe place for them to ride. They may fall off and be run over or interfere with your control of the machine.
5. Never allow children to operate the machine even under adult supervision.
6. 6. Never allow children to play on the machine or on the attachments.
7. Use extra caution when backing up. Look behind and down to make sure the area clear before moving.
8. When parking your machine, if at all possible, park on a firm, flat and level surface; if not, park across a slope. Lower the bucket and dozer to the ground, stop the machine, release pressure in the hydraulic system, place the pilot control lock lever in the locked position, remove the key (if equipped) and lock the cab door, before you leave.

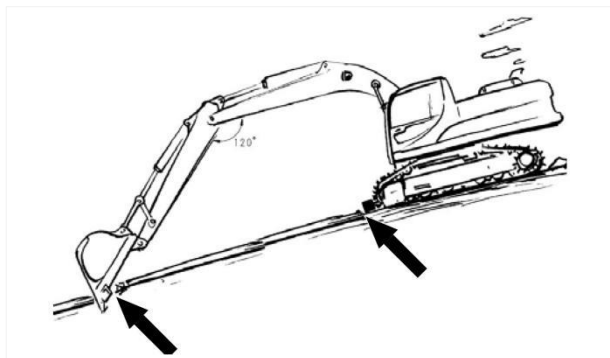
Precautions when Standing up from Operator's Seat

Before standing up from the operator's seat (such as when opening or closing the front window or ceiling window, when removing or installing the bottom window, or adjusting the position of the seat or leaving the seat), always lower the work equipment to the ground, set the pilot shutoff lever to the LOCK position, and stop the machine (turn the start switch to the OFF position). If the control levers are touched by mistake, there is danger that the machine may suddenly move and cause serious personal injury or death.

Precautions when Parking and Leaving the Machine

Park the machine on a level surface where there is no danger of falling stones or landslides. If the ground is low, make sure there is no danger of flooding.

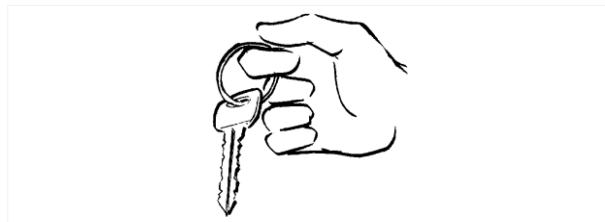
If it is necessary to park the machine on a slope, set the work equipment on the downhill side and dig it into the ground. In addition, place blocks under the tracks at the downhill side on both sides to prevent the machine from moving.



Do not park the machine on a road that is under construction. If it is necessary to park in such a place, then according to local regulations, you must use flags during the daytime and signal lights or flashing lights during nighttime to warn other personnel and vehicles.

After the machine is parked, always lower the bucket to the ground. Set the pilot shutoff lever to the LOCK position, and apply the parking brake.

Keep the engine at idle for 5 minutes to allow it to cool down, then shut off the engine. Remove the key (for the machine started or stopped with a key).



Turn the battery disconnect switch (if equipped) to the OFF position to prevent damage or battery discharge due to a short circuit.

If the machine will not be operated for a month or more, remove the batteries from the machine.

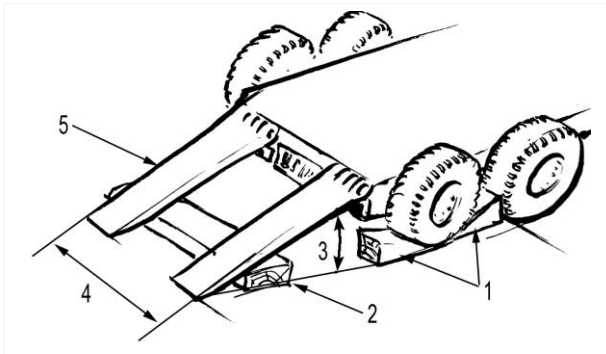
Lock all equipment with the key when leaving the machine. Remove the key and carry it with you.

Precautions when Loading and Transporting the Machine

Improper handling and transporting the machine may cause the serious personal injury or death. Always obey the following requirements:

- When transporting the machine, follow all national and local regulations regarding limits on weight, length, width, and height.
- Before transporting, check the permitted height, width, and load weight along the entire transportation route. The total height, width, and weight of the machine after being placed on the transportation vehicle must not exceed the limits set forth in the relevant local regulations.
- When the machine is transported on a public road, notify the authorities concerned and receive permission of the transportation from them.
- This machine may need to be divided into components for transportation depending on the regulation. When transporting the machine, consult your KIOTI distributor.
- Clean ice, snow, or other slippery material from the loading dock and from the truck bed before you load the machine onto the transport vehicle. This will prevent the machine from slipping in transit. This will also prevent the machine from moving during transportation.

- Perform loading and unloading on a firm, level ground only. Avoid road edge or place near the cliff.
- Select low travel speed and disable the automatic idling function when the machine is getting on/off a trailer or running on a narrow road surface.
- Chock the trailer wheels or the truck wheels before you load the machine to ensure that the vehicle will not move.



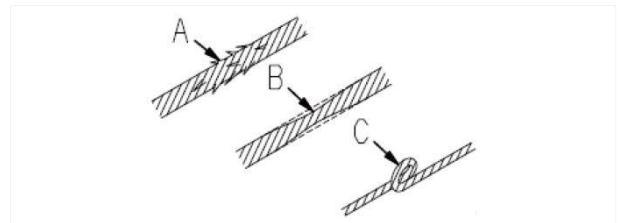
1. Wedge
2. Block
3. Angle (not exceeding 15°)
4. Ramp distance
5. Ramp

- Use ramps between the trailer and machine and make sure that the ramps are at the same level. The ramp gradient should not exceed 15°.
- Use ramps of suitable size, strength, and height. Keep the ramp angle as low as possible. Make sure the ramps are non-slip and free of mud and snow.
- Always fold the mirrors and stow the radio antenna.
- For machines equipped with a cab, always lock the door after loading the machine. To prevent the door from opening during transportation.
- When it is necessary to remove handrails and steps, take care not to lose removed handrails and steps. Install the removed handrails and steps securely.
- Secure the machine with chains and blocks. Keep bystanders away. Secure all working devices and place them in the transport position.

Precautions when Towing the Machine

Choose improper towing equipment and wrong towing method may cause serious personal injury. Always pay attention to the following matters:

- Always confirm that the wire rope for towing has ample strength for the weight of the machine being towed.
- Do not apply force to the steel ropes suddenly.
- Never use the wire rope which has cut strands (A), reduced diameter (B), or kinks (C). There is a danger that the rope may break during the towing operation.



- Place some protective materials between the steel ropes and track frame.
- Always wear leather gloves when handling the wire rope.
- Never tow a machine on a slope.
- When towing, keep any personnel away from the steel ropes to avoid personnel injuries caused by broken ropes.

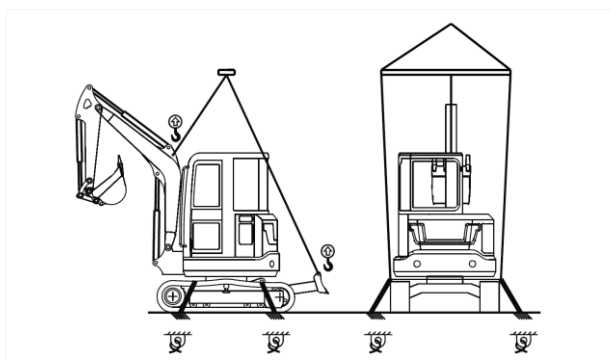
Precautions When Lifting the Machine

Read the PIN nameplate on the machine for the operating weight before lifting the machine. The operating weight on the PIN nameplate does not include optional attachments.

Use the correct authorised equipment for lifting, and must calculate the maximum load capacity of the equipment to ensure security.

keep levelling in lifting.

Performing lifting operations with the use of the foot step is prohibited.



Precautions for Maintenance

Precautions before Starting Inspection and Maintenance

Prepare the Work Area

Select an area without landslides, falling stones, or flooding.

Select a flat ground.

Select a clean and level indoor area with sufficient space to carry out any repair work, and make sure it has adequate lighting and ventilation.

Make sure the floor is clean. Wipe up any fuel, oil, lubricants, and water. Lay sand or another absorbent material on slippery surfaces. Keep the work area clean and dry.

Use Proper Equipment and Tools

Use proper equipment and tools to check and maintain the machine. Using damaged, deformed, or low quality tools, or making improper use of the tools may cause serious personal injury or death.

Only Authorized Personnel

As long as maintenance of the machine is continued, do not allow unauthorized personnel to come near the workplace. They might get unexpected personal injury from, for instance, touching machine. If necessary, employ a guard.

Guards are installed in the area of the engine should only be removed by KIOTI service engineer. Unless specific instructions are given in this manual, otherwise, personal disassembly of parts should be avoided.

When repairing the machine or when removing and installing the work equipment, appoint a leader and follow his/hers instructions during the operation in order to prevent personal injuries caused by being caught or pinched.

For safe dismantling of the machine, please contact your KIOTI distributor.

Display Warning Tag during Inspection and Maintenance

Before maintenance, attached the "DO NOT OPERATE!" warning tag or similar tag to the start switch or control levers.



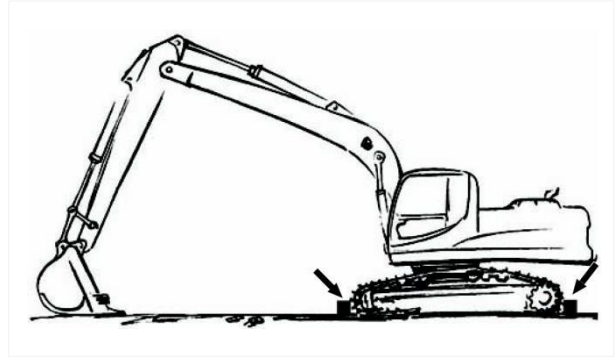
If necessary, put up signs around the machine as well.

When not using this warning tag, keep it in the toolbox. If there is no toolbox, keep it in the pocket for OWNER'S MANUAL.

Stop Machine Before Carrying out Inspection and Maintenance

If you are caught or pinched between the work equipment during operation, or exposed to high temperature or high-pressure liquids, it is dangerous and may cause serious personal injury or death. Always observe the following.

- Lower the work equipment to the ground before performing any inspection and maintenance.
- Turn the start switch to the ON position. Operate the work equipment control lever back and forth, right and left a few times fully to release the remaining internal pressure in the hydraulic circuit. Then move pilot shutoff lever to the LOCK position and turn the start switch to the OFF position.
- Check that the battery relay is off and main power is not conducted. (After turning the start switch to the OFF position, wait for approximately 1 minute and press the horn switch. If the horn does not sound, power is not conducted).
- Block the tracks from movement.



Properly Support the Structure

While servicing, the attachment or mechanism is usually raised a small distance from the ground. If it is necessary to work on or under a raised structure, you must support the structure safely.

Do not use concrete blocks as supports. Even small loads can cause concrete blocks to crack.

The structure must be fixed firmly on the supports. Never work under a structure that only has a single support, such as concrete blocks, etc. Concrete blocks may break and cause serious personal injury or death.

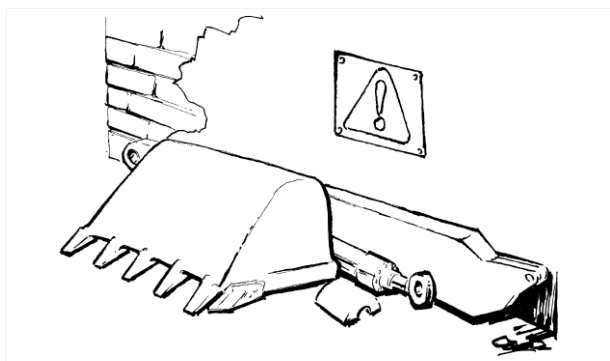
Make sure the hoists or hydraulic jacks you use are in good condition and strong enough to handle the weight of the component. Never use hydraulic jacks at places where the machine is damaged, bent, or twisted. Never use if the element wire of wire rope is frayed, twisted or pinched. Never use bent or distorted hooks.

Precautions when Installing, Removing, or Storing Attachments

Appoint a leader before starting removal or installation operations for attachments.

Place attachments that have been removed from the machine in a stable condition so that they do not fall.

Store attachments and tools safely so as to prevent them from falling and causing serious injury or death. And take steps to prevent unauthorized persons from entering the storage area.



Precautions for Inspection and Maintenance

Turn Battery Disconnect Switch to OFF Position

In the following cases, turn the start switch to OFF position and check that the system operating lamp is off.

Turn the battery disconnect switch to OFF position while you check and handle batteries, otherwise, serious personal injury or death by such as an electric shock may occur.

- When storing the machine for a long time (more than 1 month)
- When repairing the electrical system
- When performing electric welding
- When handling the battery
- When replacing the fuse, etc.

Precautions on Maintenances when the Machine is Running

If it is necessary to perform the maintenance with the machine running, at least two workers are required to perform the operation. Always observe the following.

- One worker must always sit in the operator's seat and be ready to stop the machine at any time. All workers must maintain contact with the other workers.
- Rotating parts such as the fan, fan belt (if equipped) are dangerous that they may easily catch a body part or an object someone wears. Be careful not to come close to the rotating part.
- Never drop or insert tools or other objects into the fan, fan belt (if equipped), or other rotating parts. They may contact the rotating parts and break, and be scattered. It is dangerous.
- Lower the work equipment fully to the ground, lock the work implement control lever in the Neutral position to prevent the machine from moving. Engage the parking brake.
- Do not touch the control levers or pedals. If it is necessary to operate the control levers or pedals, always give a signal to your fellow workers to evacuate them to a safe place.

Handling of Abnormal Problems

If you find any problem in the machine during operation or maintenance (noise, vibration, smell, incorrect gauges, smoke, oil leakage, etc., or any abnormal display on the warning devices or monitor), report to the person in charge and take the necessary action. Do not operate the machine until the machine has been repaired.

Precautions for Working at High Places

When working at high places, use a step ladder or other stand, and fix the qualified anti-fall sling or rope to the machine to ensure that the work can be performed safely. There is a danger falling from height that can lead to serious personal injury or death.

Precautions when Working on Machine

When performing maintenance work on the machine, maintain the foothold clean and orderly to prevent falling. Always observe the following.

- Avoid spilling of oil and grease.
- Do not litter the tools.
- Watch your step when walking around on the machine and observe the surrounding area.
- Remove mud and grease stuck to the shoe sole.
- Never jump down from the machine. When getting on and off the machine, always face the machine and maintain at least three-point contact (both feet and one hand, or both hands and one foot) with the handrails and steps to ensure that you support yourself.
- You must walk along the access aisle for checking being paved with non-slip pads. Never climb on the hood and cover to prevent personal injuries from falling or falling over due to losing your footing.

Precautions when Working under Machine or Work Equipment

Machine or work equipment may fall, and it is dangerous that serious personal injury or death may occur. Always observe the following.

- Make sure the hoists or hydraulic jacks you use are in good condition and strong enough to handle the weight of the component. Never use hydraulic jacks at places where the machine is damaged. Never use if the element wire of wire rope is frayed, twisted or pinched. Never use bent or distorted hooks.
- It is extremely dangerous to work under the machine if the track shoes are lifted off the ground and the machine is supported only with the work equipment. Never work under the work equipment or the machine at this time. If any of the control levers is touched by accident, or there is damage occurring to the hydraulic piping, the work equipment or the machine will suddenly fall and cause serious personal injury or death.

- If it is necessary to raise the work equipment or the machine and then go under it to perform inspection or maintenance, support the work equipment and machine securely with supports which is strong enough to support the weight of the work equipment and machine. If the work equipment and machine are not supported, they may come down and it may cause serious personal injury or death.
- Never use concrete blocks for supports. Concrete blocks may break under even light loads.

Precautions for Welding Operations

Welding operations must always be performed by a qualified welder and in a place equipped with proper equipment. The operator must take the following precautions when welding.

- Before carrying out the welding operations, park the machine on a level ground, with the parking brake engaged, and turn off the battery disconnect switch if equipped. If not, turn the start switch to the OFF position, and disconnect the battery, controllers, GPS, and other electrical units to prevent damage to them.
- Clean up all flammable materials before operation.
- Remove the paint from the areas to be welded in order to prevent the generation of harmful gases.
- Do not inhale the smoke from burning paint.
- Never weld pipes that are pressurized, or close to rubber hoses or electrical wires.
- Wear eye protection and protective clothing when welding.
- Maintain proper ventilation of the welding site.
- Always have a fire extinguisher at the site.

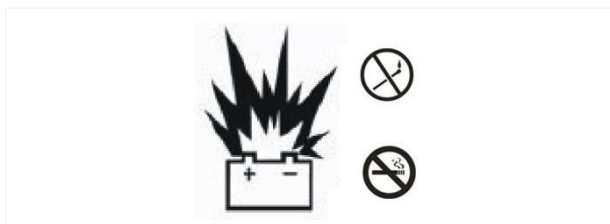


Handle Batteries

Danger of Battery Exploding

When the battery is being charged, flammable hydrogen gas is generated and may explode. In addition, the battery electrolyte includes dilute sulphuric acid. Any mistake in handling may cause serious personal injury, explosion, or fire, so always observe the following:

- Do not smoke or bring any open flame close to the battery.



- Do not touch batteries with metal objects, otherwise the batteries may explode due to a short circuit.
- Do not use or charge the battery if the battery electrolyte is below LOWER LEVEL mark. This may cause an explosion. Always perform periodic inspection of the battery electrolyte level, and add purified water (such as a commercial battery fluid) to UPPER LEVEL mark.
- Do not use a dry wipe to clean the battery. A wet wipe will prevent fire or explosion from static electricity.
- Hydrogen gas is generated when the battery is being charged, so remove the battery from the machine, take it to a well-ventilated place, remove the battery caps, then perform the charging.
- After charging, tighten the battery caps securely.

Danger from Dilute Sulphuric Acid

The battery electrolyte contains dilute sulphuric acid. Electrolyte is an acidic. Do not let it come into contact with the skin or eyes. Always observe the following.

- Always safety goggles and protective clothing when handling or maintaining the battery, and insulating gloves are recommended.



- If your eyes come into contact with the acid, flush eyes with water for 10-15 minutes and seek medical attention right away.
- If your clothes and skin come into contact with the acid, immediately flush your clothes and skin with water, and apply a neutralizing agent such as soda bicarbonate.

Danger of Sparks

Sparks may be generated and they can cause a fire. Always observe the following:

- Do not let tools or other metal objects make any contact between the battery cables. Do not leave tools lying around near the battery.
- Before removing the battery cables, turn the start switch to OFF position and check that the system operating lamp goes out. When removing the battery cables, remove the ground cable (negative (-) cable) first. When installing, connect the positive (+) cable first, then connect the ground.
- Tighten the battery cable terminals securely.
- Secure the battery firmly in the specified position.

Precautions when Using Hammer

When striking objects with a hammer, such as pins, bucket teeth, cutting edges, or bearings etc., be sure to wear safety goggles and gloves and make sure that no one is nearby to prevent debris or pins from flying out and injuring other persons, causing serious personal injury or death.

Make sure that no one is nearby when pressing out locking pins to avoid injury other persons. Wear safety goggles to avoid eye injuries.

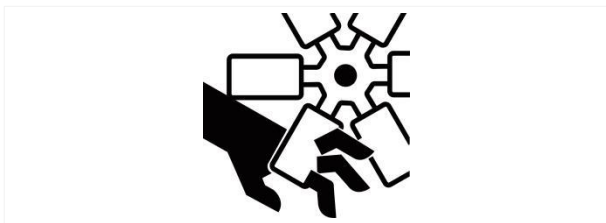
Crushing and Cutting Prevention

Never repair or service the machine with the machine running to avoid accidents. Unless otherwise stated, do not make any adjustments while the machine is operating or starting.

If the machine must be repaired with the machine running, make sure that a qualified operator is available in the cab to shut down the machine if required. Never leave the machine under unattended operation control.

Make sure that the engine fan blades are free of debris and miscellaneous items. Fan blades can cut through or throw out tools or debris that fall into them.

Keep a safe distance from rotating or moving parts or turn off the machine when servicing. Otherwise, rotating or moving parts pose cutting or crush hazards.



Do not place hands, arms, or any other body parts between any parts that can move relative to each other. This includes between the working device and cylinders, or between the machine and the working device, or between any articulation position. Otherwise, may cause serious personal injury or death.



Properly support the equipment when working underneath the working device. Do not rely on the hydraulic cylinders to support the working device. Otherwise, the working device could fall when the control mechanism moves, or when a hydraulic hose leaks.



For components with protective guards installed, if it is necessary to remove the guard to perform repairs or maintenance, be sure to re-install the guard afterwards.

Do not use twisted or worn cables. Wear gloves during use and transport.

Do not touch the control lever and pedal. When it is necessary to operate the control lever and pedal, please remind people around to move to a safe place.

Burn Prevention

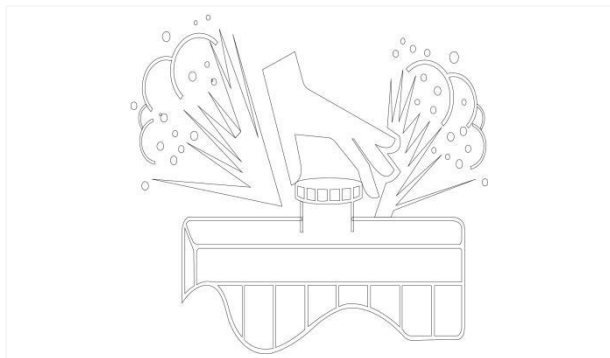
Some components and oil may become hot after the machine has been in operation for some time. Ensure that the components have cooled down and can be touched by a bare hand before performing any repairs or inspection.

High-temperature Parts

To prevent burns from touching high-temperature parts, when checking or performing maintenance after stopping engine, check the related parts, such as engine, aftertreatment device (if equipped), etc. have been cooled down to touch with bare hand before checking or maintenance.

High-temperature Coolant

Do not touch the coolant when the machine is running. During operation, the coolant is very hot and under pressure. Hot water and steam are present in the radiator and all hoses attached to it. Touching these may lead to burns.

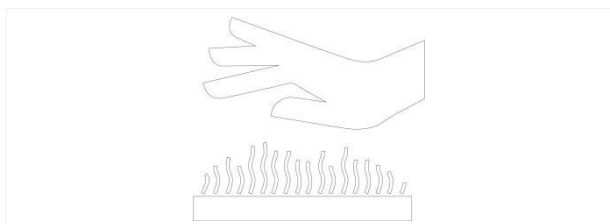


Before checking the coolant level, shut off the machine and wait until the radiator filler cap is cool enough to touch with a bare hand before opening. Loosen the filler cap slowly to release the pressure.

The coolant is an alkaline substance that can cause personal injury. Do not let it come into contact with the skin, eyes, or mouth. Otherwise, may cause injury.

High-temperature Oil

Do not let high-temperature oil or high-temperature components come into contact with the skin. High-temperature oil and components can cause severe burns.



To prevent burns from high-temperature oil spurting out or from touching high-temperature parts when checking or draining the oil, such as drain oil from the hydraulic oil tank, shut off the machine, wait for the oil to cool down to a temperature where the cap or plug can be touched by a bare hand. Then, loosen the cap or plug slowly to release the internal pressure.

Release system pressure before removing any hydraulic oil hoses, fittings, or similar parts.

Precautions for High-pressure Fluid

⚠ WARNING

High-pressure oil can cause burns. The oil outlet plugs of high-pressure oil lines splash onto the skin will cause serious personal injury.

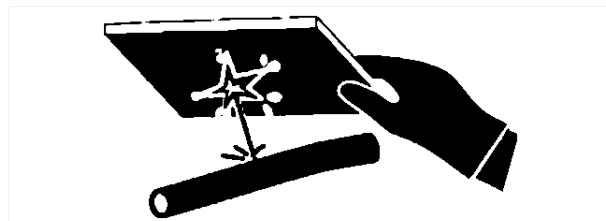
Release the internal pressure of pipelines and ensure that the oil has cooled down before repairing or removing all hoses, fittings, or similar parts.

Pressure can be trapped in the fuel pipeline and hydraulic circuit long after the engine has been stopped. The pressure can cause hydraulic fluid or items such as pipe plugs to escape rapidly if the pressure is not relieved correctly. This will cause serious personal injury or death.

Stop engine and wait for at least 10 minutes to allow the internal pressure to go down before performing inspection or maintenance of the fuel pipeline. Always loosen the fuel pipeline between the pump and the fuel rail at the fuel rail position to release pressure. Keep both hands away from the fuel pipeline when loosening it.

Before removing any hydraulic components or parts, first release the pressure in the system. Be careful when opening hydraulic hoses or fittings. When the oil sprays out, the released pressure can cause the hose to sweep back and forth. Refer to the section "Pilot Oil Filter--Replace" of the chapter "Maintenance Manual" for the steps to release residual pressure.

Wear safety goggles and leather gloves when checking for leaks. Use a board or cardboard to check for leaks, never bare hands. If there is any leakage from the pipeline or hoses, the surrounding area may be wet, so check for cracks in the pipeline and for swelling in the hoses.



Even high-pressure fluid leaks the size of a pinhole can pierce flesh or splash eyes, causing serious personal injury or death. Consult a physician immediately if sprayed with high-pressure oil.



Safe Disposal of Waste Liquids

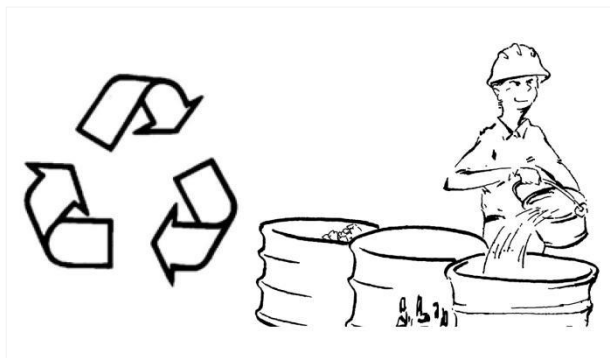
Improper disposal of waste liquids can cause harm to the environment. Do not pour waste liquids onto the ground, down a drain, or into rivers, seas, or lakes.

Follow local laws and regulations when disposing of harmful objects, such as lubricating oil, fuel, coolant, solvent, filters, batteries etc..

Any liquids spilled while inspecting, servicing, testing, adjusting, or repairing the machine must be stored in a container.

Prepare a suitable container to collect liquids before opening any liquid chambers or disassembling any liquid-containing components.

Never use food or beverage containers, as this might lead to someone consuming the liquid by accident.



Precautions for Lines, Pipes, and Hoses

Do not bend or hammer on high-pressure hoses. Do not install abnormally bent or damaged hoses or pipes onto the machine.

Use the appropriate torque wrenches in order to tighten all line connections to the recommended torque within the scope of technical requirements.

When checking for leaks, refer to the section "High-pressure Fluid" in the Safety Manual for the personal protection.

Promptly repair any loose or damaged fuel or lubricant lines and hydraulic system hoses and pipes. Leaks can cause fires. Consult your Kioti distributor for repairs or replacements.

If any of the following problems are found, replacement is necessary.

- Fittings are damaged or leaking.
- The hose outer sheath is worn or cut and the reinforcing wire is exposed.
- The hose has localized swelling.
- The hose is obviously twisted or oblique.
- The hose's reinforcing wire is embedded in the outer sheath.
- The end fitting is misaligned.

To avoid overheating due to vibration or friction against other components, ensure that all hose clamps, guards, and heat shields are installed properly.

When removing pipelines connected to the air conditioner's compressor, do not allow open flames nearby. Otherwise, toxic gases may be produced, resulting in poisoning.

Precautions for High Voltage

When the engine is running and immediately after it is stopped, high voltage is generated inside the engine controller and the engine injector. Never touch the inside of the engine controller or the injector part of the engine, and there is danger of electric shock. If it is necessary to touch the inside of the engine controller or the injector part of the engine, consult your KIOTI distributor.

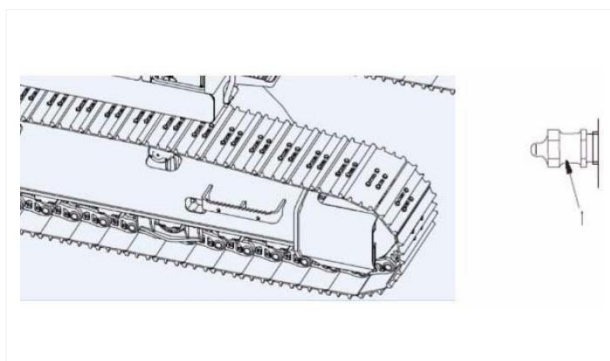


Precautions for Noise

When performing maintenance of the engine and you are exposed to noise for long periods of time, wear ear covers or ear plugs while working. Otherwise, the noise is too loud, and it may cause temporary or permanent hearing problems.

Precautions When Adjusting Track Tension

Grease is pumped into the track tension adjustment system under high pressure. If the specified procedure for maintenance is not followed when making adjustment, grease drain plug may fly out and cause serious injury or death or property damage.



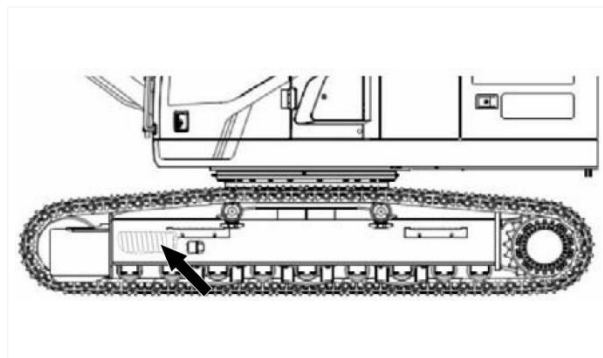
1. Grease drain plug

When loosening grease drain plug to loosen the track tension, never loosen it more than 1 turn. Loosen the grease drain plug slowly.

Never put your face, hands, feet, or any other part of your body close to grease drain plug.

Do not Disassemble Recoil Spring

Never disassemble the recoil spring assembly.



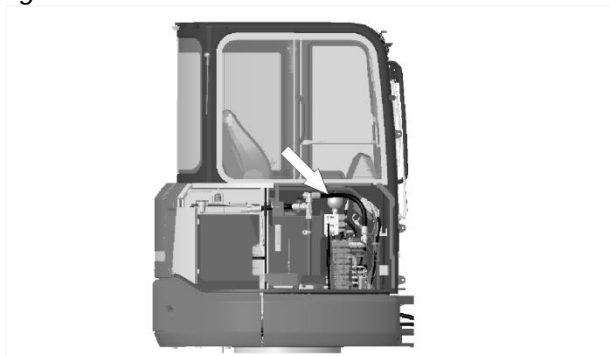
The recoil spring assembly has a powerful spring that acts to reduce the impact on the idler. If it is disassembled by mistake, the spring may shoot out and cause serious personal injury or death. If it is necessary to disassemble it, ask your KIOTI distributor to perform the work.

Information on Using Accumulators

The accumulator contains high-pressure nitrogen gas, which is dangerous. Observe following requirements and use the accumulator properly.

- Inspect the accumulator before charging it with nitrogen. Do not charge the accumulator if it is not equipped with a nameplate, the nameplate has fallen off or has become unreadable, or the casing has defects that might impact its safe use.
- Only charge the accumulator with nitrogen. To avoid explosion, do not charge the accumulator with oxygen, compressed air, or other flammable gases.
- Charge slowly to avoid breaking the capsule. The accumulator's gas valve should be installed pointing vertically upwards. The accumulator must be firmly secured to its frame, but not welded.
- Never drill holes in the accumulator. Do not bring open flames or heat sources near the accumulator.
- Do not perform any welding on the accumulator. The accumulator is a high-pressure container that should be replaced and repaired by a professional.
- Always release the gas before disposing of the accumulator.

The position of the accumulator is shown in the figure below



The accumulator serves as an emergency power source to safely lower the work implement to ground level in the event of power source failure.

Precautions for Compressed Air and Water

Compressed air and water can cause debris and/or hot water to be blown out. This action could result in personal injury or death. Wear protective clothing, safety footwear, gloves, safety goggles or a protective face mask for cleaning.

The maximum air pressure for cleaning purposes must be reduced to 0.2MPa (30 psi). The maximum water pressure for cleaning purposes must be below 0.275MPa (40 psi).

Avoid directly spraying electronic components with pressurized water.

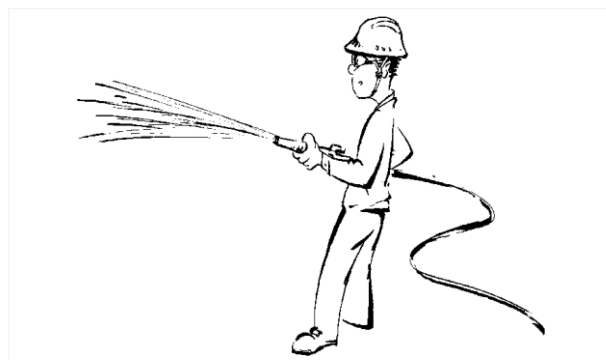
Do not allow water to enter the engine aftertreatment system (if equipped).

Regular Cleaning of the Machine

To avoid possible injury or damage to the machine, all oil and dirt accumulated should be removed. The inside of hood, radiator, battery, hydraulic hose, fuel tank, and cab should be kept clean.

When cleaning the machine, the machine should be turned off. The electrical components should be prevented damage from contacting with water.

Wear non-slip shoes when cleaning to prevent slipping on wet surfaces.



When spraying the machine with water at high pressure, take care not to let high-pressure water strike your body or throw mud or dirt into your eyes.

Never use high-pressure water gun or other water spraying tools to wash the items in the cab. Only wipe and clean the items in the cab, otherwise there will be a danger of failure or misoperation. If there is any misoperation, the machine may suddenly move off, it is dangerous and may cause serious personal injury or death.

Turn off the battery disconnect switch after stopping using the machine. Otherwise, the electrical system malfunction may occur.

Maintenance of Air Conditioner

Never loosen any parts of the cooling circuit. If air conditioner refrigerant gets into your eyes, it may cause loss of sight; if it contacts your skin, it may cause frostbite.

Smoking is prohibited during air conditioner maintenance, and the work must be performed away from open flames. If there is refrigerant gas, inhaling the smoke produced from contact between the refrigerant and flames or a lighted cigarette will cause personal injury or death.

Selecting Proper Window Washer Fluid

Be careful when using cleaning agents. Do not use flammable materials such as diesel or gasoline to clean parts. These are fire hazards.



Applications and Specifications

Applications

Usage

The machine mainly applied to excavation, loading, leveling, crushing, hoisting, demolition and other operations in various earthwork and stonework projects such as highway, construction, water conservancy, mine, and tunnel.

This machine is applicable for the digging and loading of soil from class I to IV. (Soil and rock can be divided into sixteen classes according to the degree of difficulty in digging.)

This machine can also be equipped with a bucket, hydraulic hammer, ripper, lotus grab bucket and other operating attachments.

This machine is a kind of general-purpose engineering machinery and is not suitable for flammable, explosive, and dusty environments, and those with poisonous gases.

Typical Applications

- Excavation
- Trench excavation
- Loading
- Leveling
- Breaking
- Demolition

Requirements of Work Environments

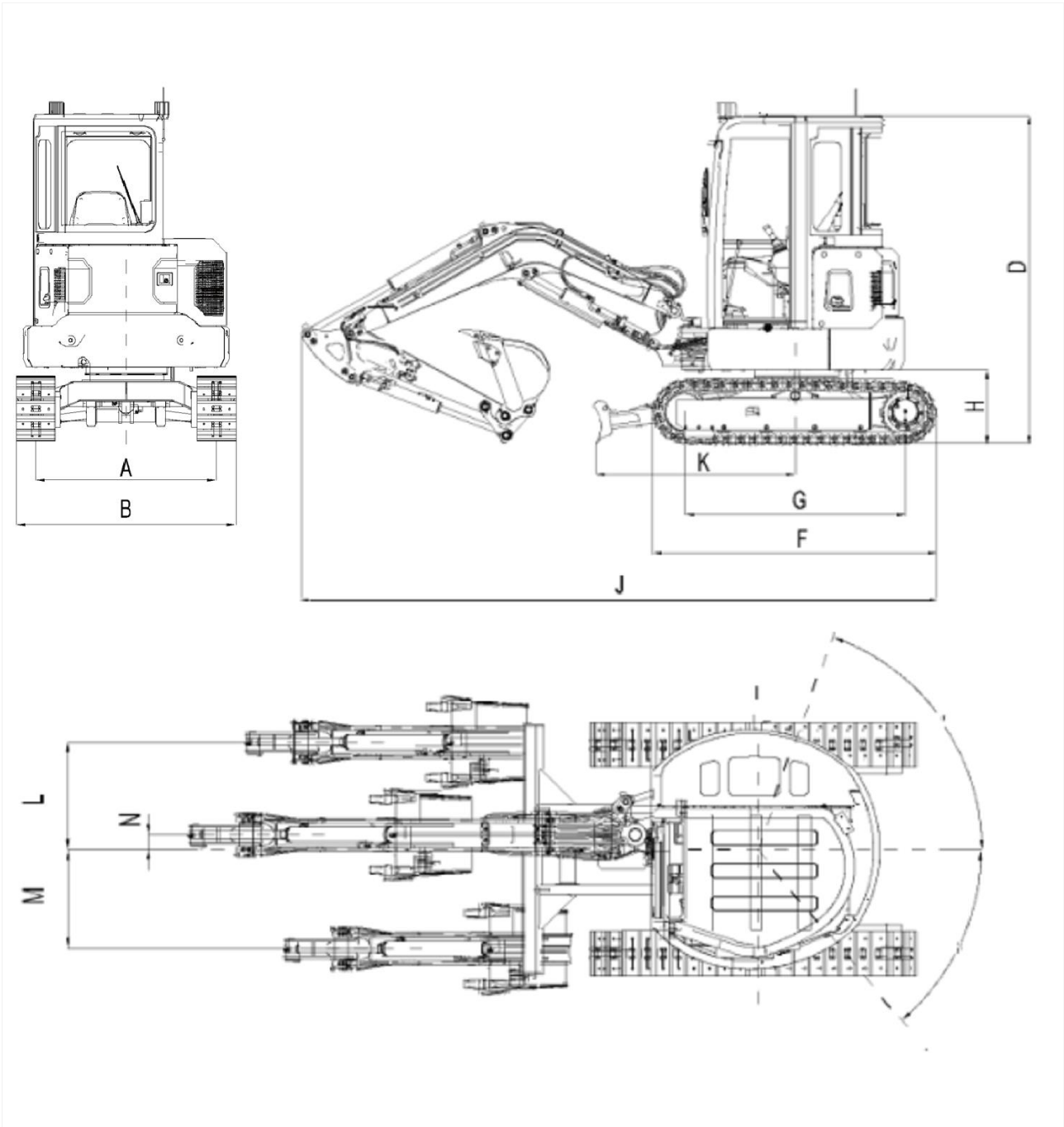
Altitude: $\leq 1200\text{m}$

Environmental temperature: $-20\text{ }^{\circ}\text{C} \sim 40\text{ }^{\circ}\text{C}$

Water Depth: Cannot exceed the center of carrier roller wherever the machine works (at level ground or on a slope).

Specifications

Transport Dimensions



Item	Unit	MX350
** & *** Operating mass	kg/lb	3860~4130 (cab)/ 8511~9106(cab)
The range of bucket capacity	m ³	0.06~0.11
Standard bucket capacity	m ³	0.11
Travel speed (High/Low)	km/h	4.2/2.3 (Aidi travel motor)
Swing speed	r/min	10
Gradeability	°	30° (58%)
Ground pressure	kPa	33.6
J: Overall length	mm	4810
Overall width (300 mm track shoe width)	mm	1700
Overall height	mm	2500
D: Overall height of cab	mm	2500
*H: Counterweight clearance	mm	580
Rear-end swing radius	mm	850
G: Length of track on ground	mm	1675
F: Undercarriage length	mm	2100
A: Track gauge	mm	1400
B: Undercarriage width (300 mm track shoe width)	mm	1700
K: Distance from dozer to swing center	mm	1517
L: Distance to swing center (swing right)	mm	772
M: Distance to swing center (swing left)	mm	538
N: Distance from implement to swing center	mm	100
α: Work equipment swing left	°	72°
β: Work equipment swing right	°	58°

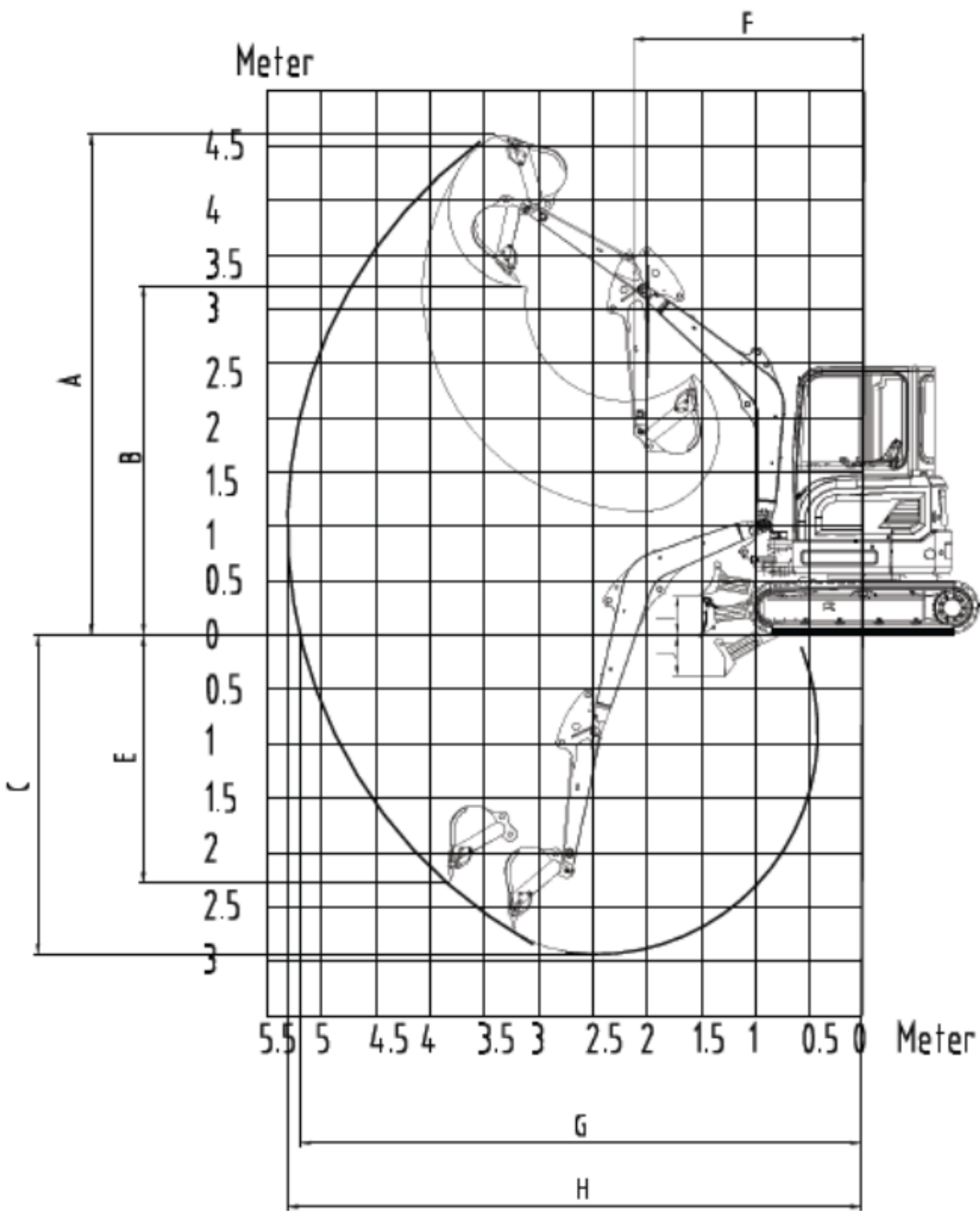
Note:

Dimensions marked with an asterisk (*) exclude the grouser height.

** Operating mass is dependent on exact machine configuration. Information in the operator manual is given for guidance only. For exact machine specific mass refer to the machine name plate.

*** Operating mass includes mass of an operator at 75kg, full tank of fuel and other fluid systems filled to specific level.

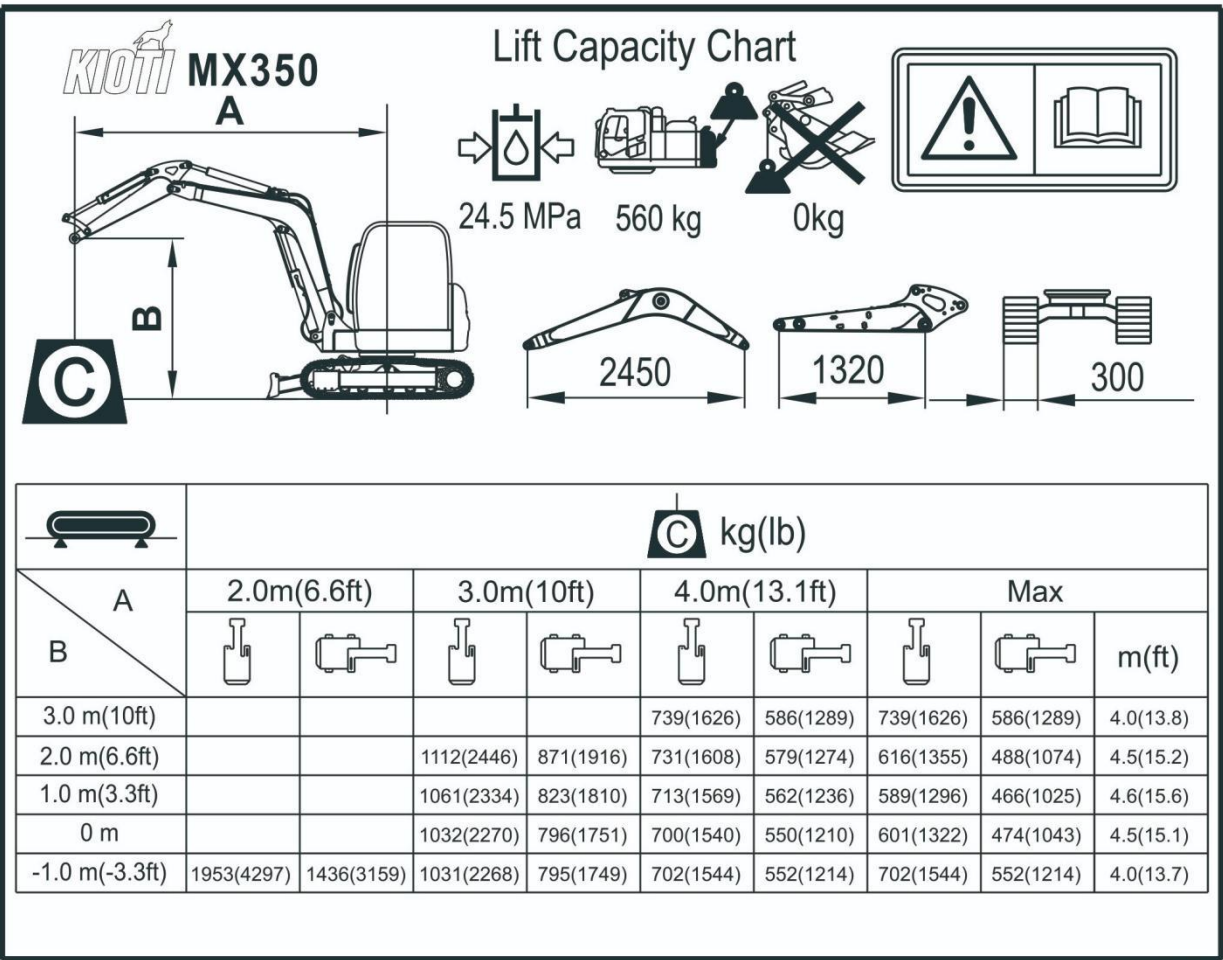
Operating Range



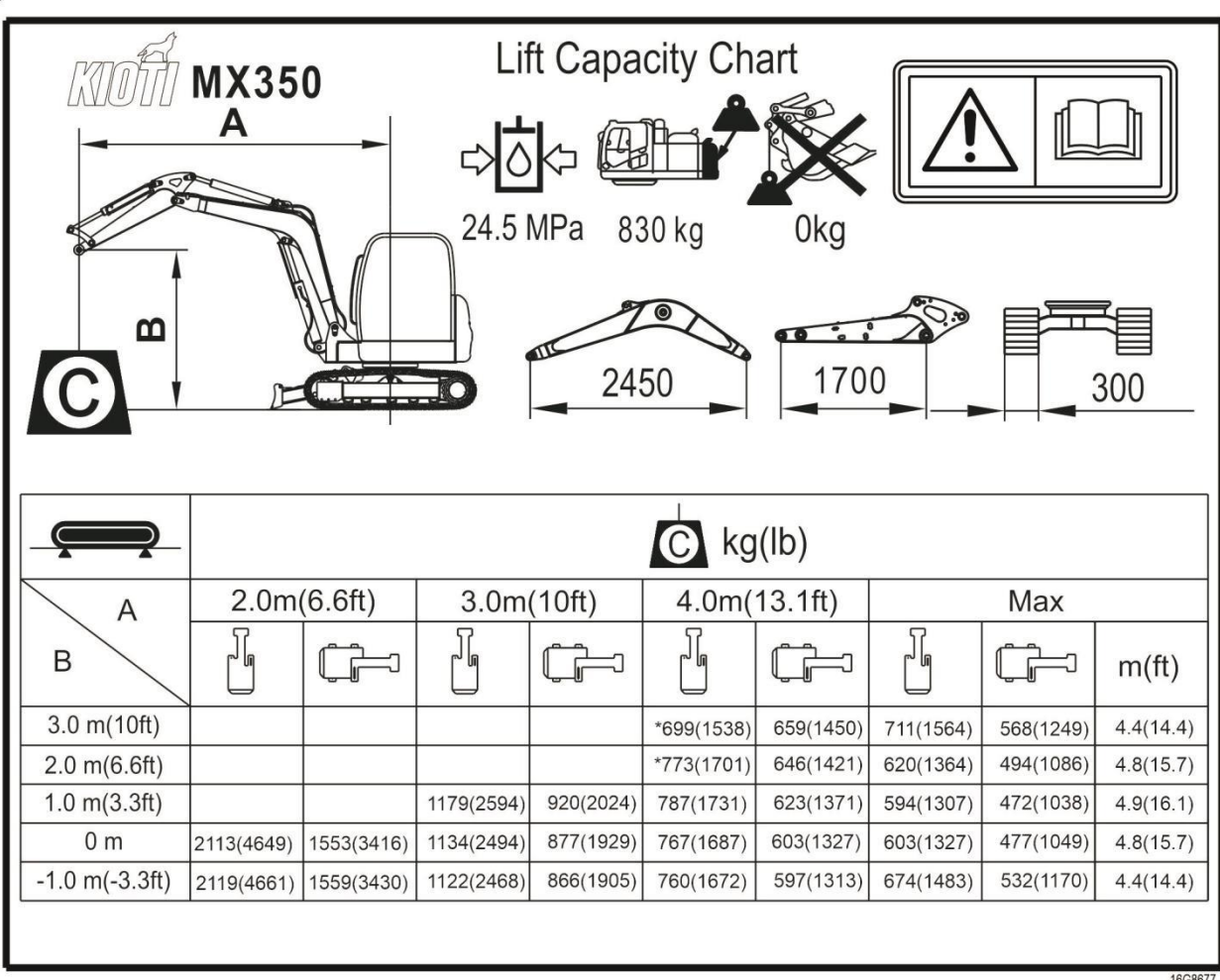
Item	Unit	MX350
Arm length	mm	1320
H: Maximum digging radius	mm	5385
G: Maximum ground digging radius	mm	5270
C: Maximum digging depth	mm	3085
E: Maximum vertical digging depth	mm	2503
B: Maximum dumping height	mm	3310
A: Maximum cutting height	mm	4710
F: Minimum swing radius	mm	2416
Maximum bucket digging force	kN	30
Maximum arm digging force	kN	22
I/J: Dozer up/down	mm	370/390

Note: Dimensions marked with an asterisk (*) exclude the grouser height.

Lift capacity of MX350

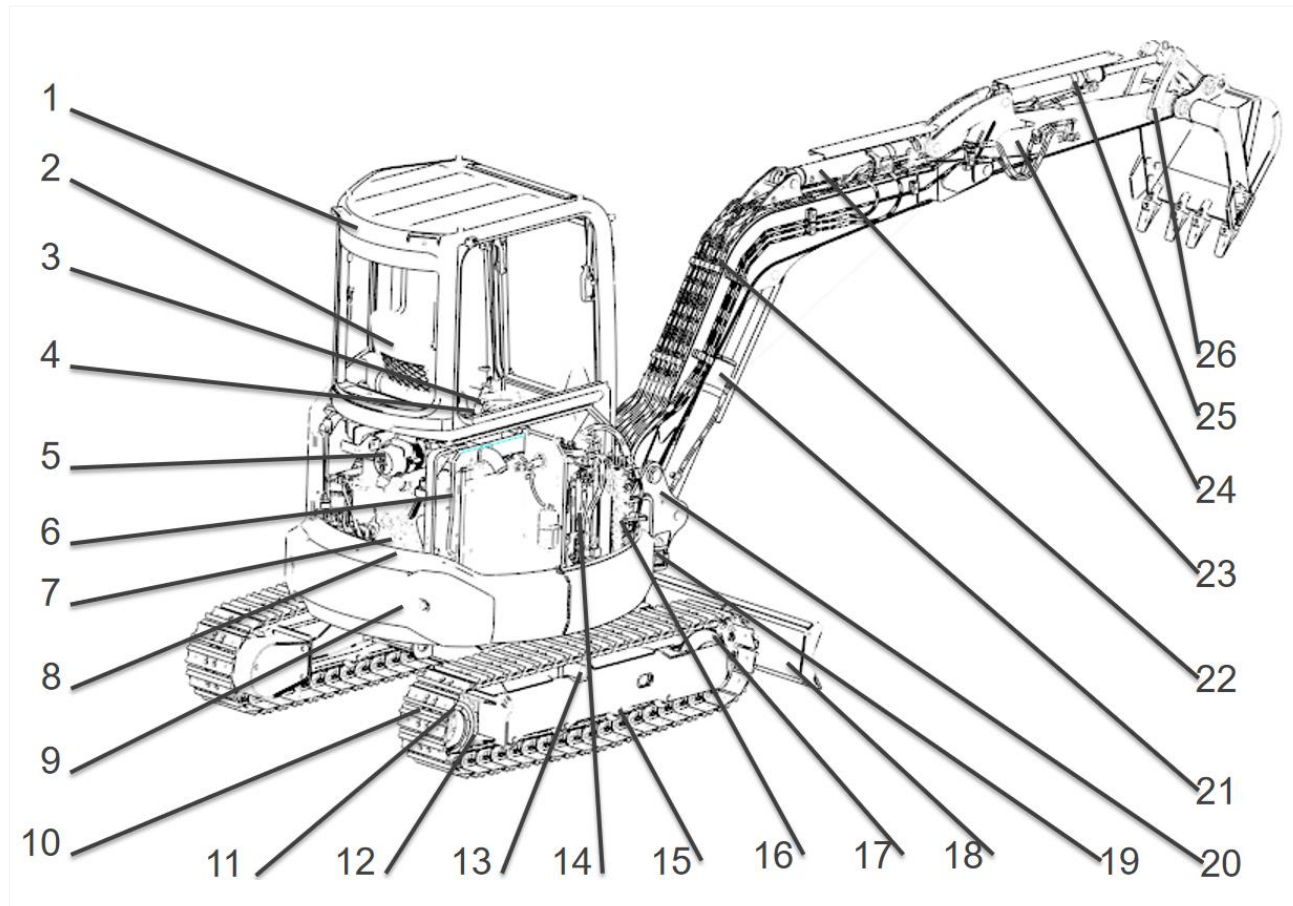


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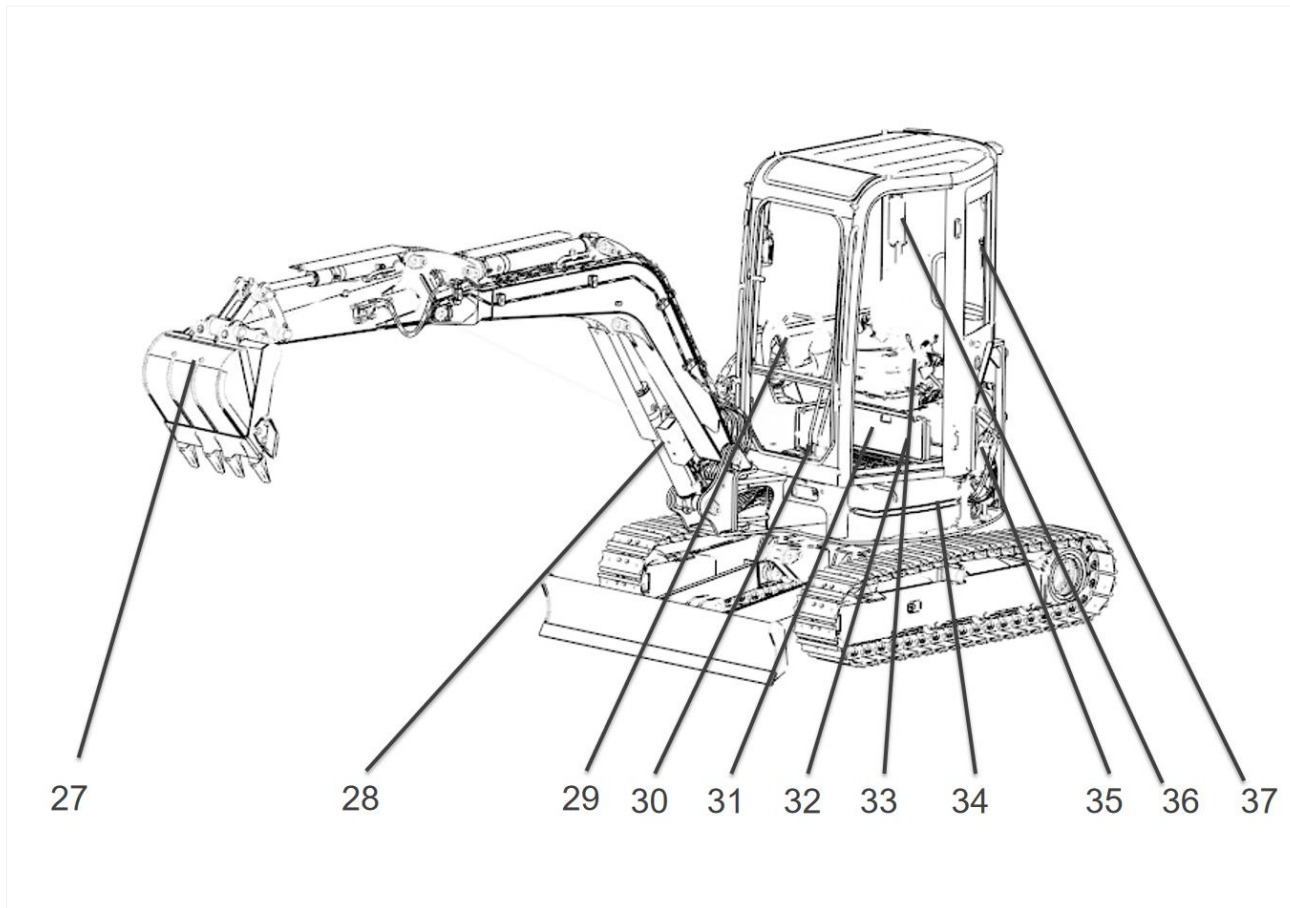
Operation Manual

Machine Overview



1. Cab
2. Operator's seat
3. Right hand control lever
4. Throttle knob
5. Air filter
6. Radiator
7. Engine
8. Cover
9. Counterweight
10. Track
11. Travel motor
12. Sprocket
13. Carrier roller
14. Hydraulic oil tank

15. Track roller
16. Valve
17. Idler
18. Dozer
19. Runout cylinder
20. Rotating bracket
21. Boom cylinder
22. Boom
23. Arm cylinder
24. Arm
25. Bucket cylinder
26. Linkage and rocker



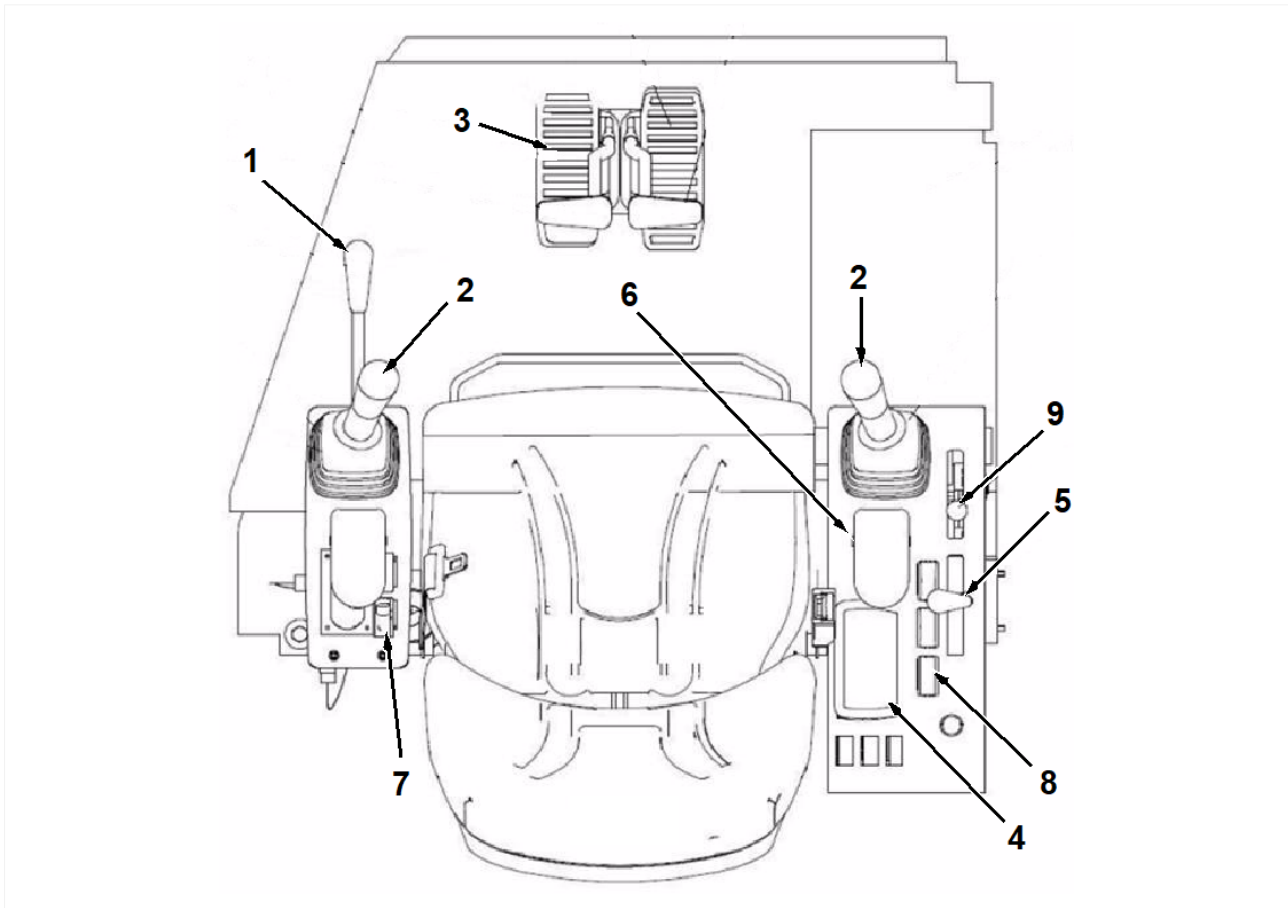
- 27. Bucket
- 28. Explosion-proof valve
- 29. Instrument
- 30. Travel control lever
- 31. Battery
- 32. Fuse box

- 33. Right hand control lever
- 34. Fuel tank
- 35. Main pump
- 36. Fire extinguisher
- 37. Emergency Hammer

Introduction to Parts

Operating Gear

Operating Gear Locations



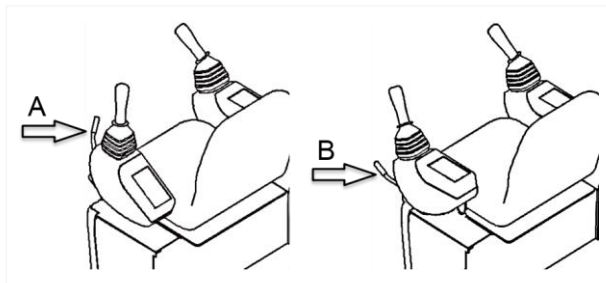
1. Pilot shutoff lever
2. Hand control lever
3. Travel control lever and travel pedal
4. Monitor
5. Engine speed control lever
6. Start switch
7. Switch panel on left console
8. Switch panel on right console
9. Dozer control lever

Pilot Shutoff Lever

The pilot shutoff lever is located on the left of the left armrest box. The pilot shutoff lever controls the power-on and power-off of the solenoid proportional valve. It is a device to lock the work implement, swing, traveling and attachment control lever.

Lock

Move the travel control lever/ pedal and the hand control lever to the Neutral position. Move the pilot shutoff lever to the LOCK position, and then all the original factory-installed hydraulic control devices will be inoperative.



A: LOCK
B: UNLOCK

⚠ CAUTION

Before starting the machine, push the pilot shutoff lever to the LOCK position. If the pilot shutoff lever is in the UNLOCK position, the start switch will be inoperative.

⚠ WARNING

When stopping the machine and leaving the operator's seat, pilot shutoff lever must be pushed to the LOCK position. If not, the pilot shutoff lever may move, causing serious accidents or injuries.

Unlock

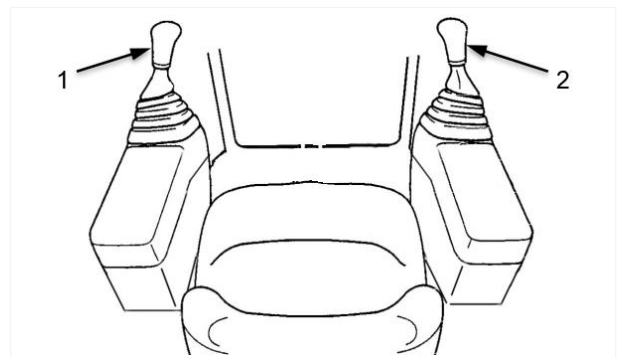
Move the pilot shutoff lever to the UNLOCK position, and then all the original factory-installed hydraulic control devices will be operative.

Hand Control Levers

The hand control levers are used to control the work implement and swing of the machine. For more information about the functions of the hand control levers, please refer to "Work Implement Control".

Switches on Hand Control Levers

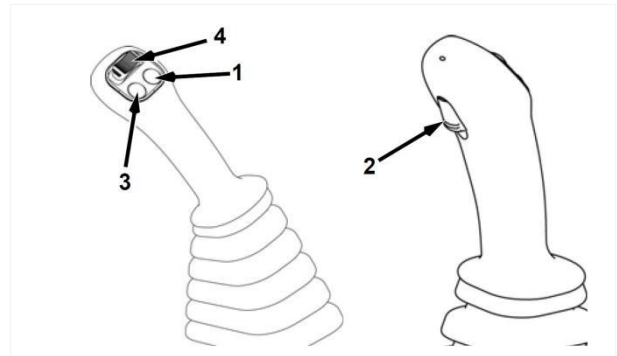
The button switches on the left and right hand control levers may have one or more combinations to meet users' different requirements. Refer to the relevant button instruction based on the machine configuration.



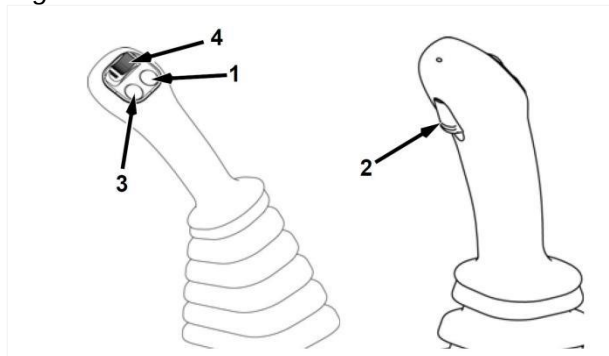
1. Left hand control lever
2. Right hand control lever

Electric proportional hand control lever

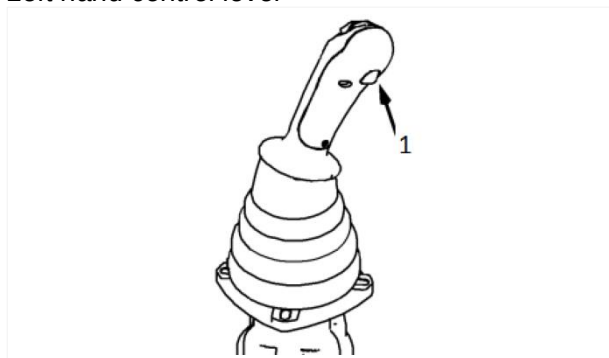
Left hand control lever



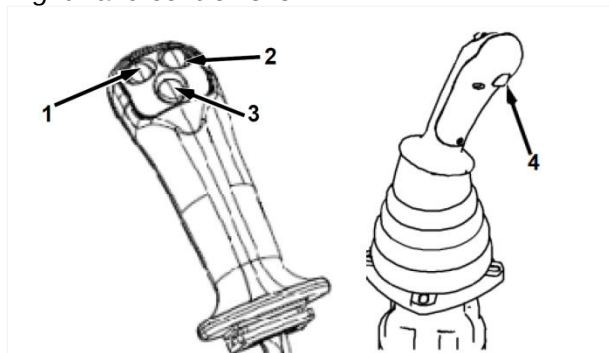
1. Spare
2. Lock button
3. Boom runout and auxiliary low flow button
4. Thumb wheel

Right hand control lever

1. Horn button
2. Lock button
3. Spare
4. Thumb wheel: Breaking operation of hammer (one-way) / Opening operation of shear (two-way)

Hand control lever*Left hand control lever*

1. Spare

Right hand control lever

1. Spare
2. Spare
3. Horn button
4. Spare

Horn button

Press the button to sound the horn.

One/two-way attachment control

One-way or two-way operation of an auxiliary working device can be selected according to requirements. Refer to the section "One-way or Two-way Operation of an Auxiliary Working Device" for more information.

Attachment left/right rotating control

Electric proportional hand control lever: In normal state, the thumb wheel is in the NEUTRAL position. Rotate the thumb wheel to the left to turn the attachment to the left. Rotate the thumb wheel to the right to turn the attachment to the right. The switch will reset to the NEUTRAL position after being released, and the attachment stops rotating.

Hand control lever: Press the attachment rotating button to turn the attachment to the left or right. When the button is released, the attachment stops rotating.

Auxiliary flow control

Control the auxiliary flow through the electric proportional hand control lever (hand control lever without this function). The left electric proportional hand control lever controls the auxiliary low flow (that is the swing speed of the attachment). The right electric proportional hand control lever controls the auxiliary high flow (that is the opening/closing speed of the attachment, and breaking speed of the hammer).

Rotate the thumb wheel to the maximum range to realize full flow output (the fastest action speed of the attachment). Release the thumb wheel to return to the neutral position, the auxiliary output will stop (the attachment has no action).

If need to set and lock the flow (that is locking the action speed of the attachment), rotate the thumb wheel to the desired flow position, meanwhile, press and hold the lock button for one second. Release the thumb wheel and lock button after the LED light on the hand control lever is lit. The attachment action continues and the action speed of the attachment remains the same.

To cancel the flow lock, press the flow lock button to stop the flow output, and the LED light on the hand control lever is off.

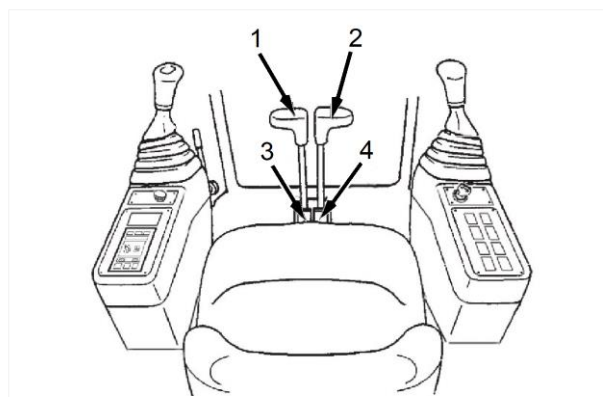
The upper limit value of the flow output can be limited through the display. Refer to "Display" for specific operations.

Attachment opening/closing control

Electric proportional hand control lever: In normal state, the button is in the NEUTRAL position. Press the button to the left to open the attachment. Press the button to the right to close the attachment. The switch will reset to the NEUTRAL position after being released, and the attachment stops opening/closing.

When the machine is equipped with hydraulic hammer, press the button to the left, the hydraulic hammer is working. When the button is reset to the NEUTRAL position or pressed to the right, the hydraulic hammer does not work.

Travel Control Lever and Travel Pedal



1. Left travel control lever
2. Right travel control lever
3. Left travel pedal
4. Right travel pedal

The left and right travel control levers and the left and right travel pedals are used to control the travel direction of the machine.

See the following instructions on how to operate the travel control levers:

Push the travel control lever forward (direction a), and the machine will travel forward;

Pull the travel control lever backward (direction b), and the machine will travel backward;

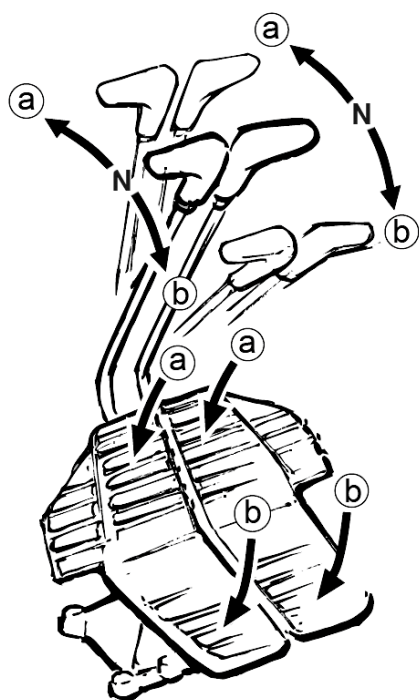
When the travel control lever is at the NEUTRAL (N) position, the machine will stop traveling.

See the following instructions on how to operate the travel pedal:

Depress the pedal forward (direction a), and the machine will travel forward;

Depress the pedal backward (direction b), and the machine will travel backward;

When the travel pedal is at the NEUTRAL (N) position, the machine will stop traveling.



⚠ WARNING

Do not step on the pedals unless you intend to drive the machine; otherwise, a serious accident could result due to the sudden movement of the machine caused by an unintended start.

Before operating the travel control lever, check which direction the track frame faces. (The track frame is facing forward when the idler is at front and the sprocket is at rear.)

When the track frame is facing backward (the travel motor is at front), the machine will move in the opposite direction of the travel control lever.

When traveling for a long distance, make sure the idler is at front and the sprocket is at rear.

⚠ CAUTION

The long distance travel of machine mainly refers to continuous traveling distance exceeding 100 meters or continuous traveling time exceeding 3 minutes.

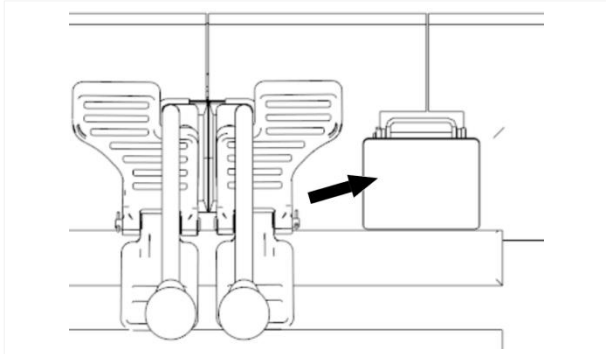
If the machine needs long distance travel, it's suggested to use trailer. As long distance continuous travel may cause track roller's lubricant temperature to rise beyond the standard, and damage the track roller.

If the condition is limited, and long distance is a must, please follow below steps:

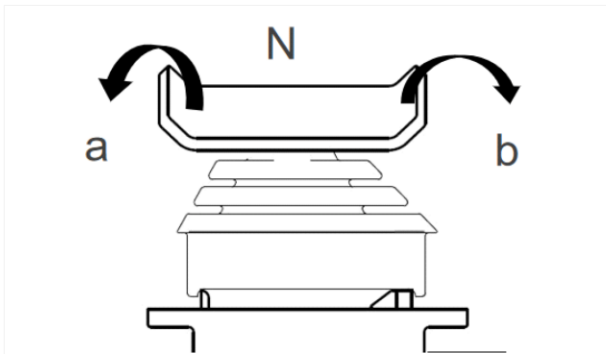
Ground conditions	Speed gear	Process instructions
Flat and normal ground	High speed "rabbit" gear	Once the machine travels for 20 minutes with its idler facing ahead, it shall be stopped for 10 minutes to cool down the travel motor. The machine can travel by repeating such steps. During traveling, a water truck can be used to spray water onto the track rollers within a safe distance, which can cool the track rollers quickly and prevent overheating.
Uneven, gravel, slope, scree, or coarse soil ground	Low speed "tortoise" gear	Once the machine travels for 30 minutes with its idler facing ahead, it shall be stopped for 10 minutes to cool down the travel motor. The machine can travel by repeating such steps. During traveling, a water truck can be used to spray water onto the track rollers within a safe distance, which can cool the track rollers quickly and prevent overheating.

Boom Offset Control Pedal

The boom offset pedal is located on the right side of the right hand control lever, and is used to control the boom offset.



Depress the pedal to the left (direction a), the boom swings to the left. Depress the pedal to the right (direction b), the boom swings to the right. Release the pedal, the pedal will reset to the NEUTRAL position (direction N) automatically, and the boom stop moving.



⚠ CAUTION

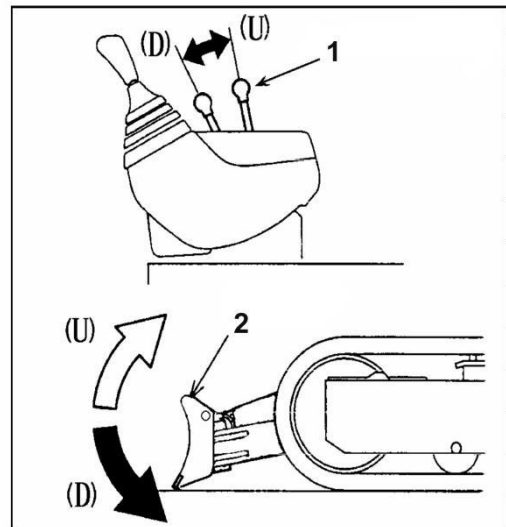
When operating the boom offset function, please pay attention to whether there are other objects blocking the left and right direction of the working device. Beware of collisions!

Dozer Control Lever

The dozer control lever is located near the right armrest, and is used to control the dozer operation.

Push the control lever to position U, and the dozer will be lifted;

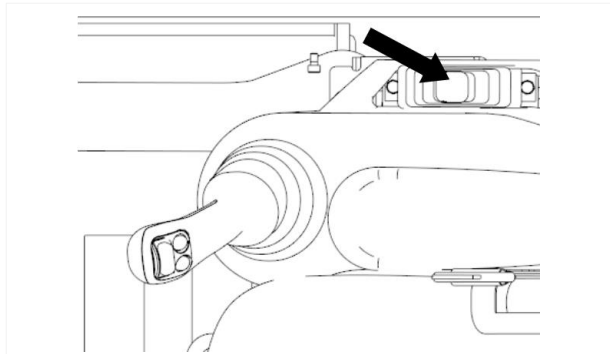
Push the dozer control lever from position D to the end, the floating function of the dozer is turned on.



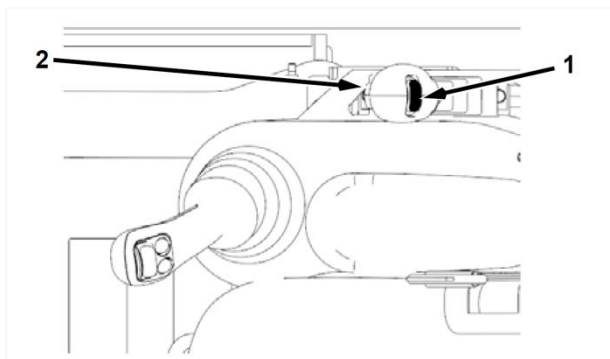
- 1. Dozer control lever
- 2. Dozer
- U: Dozer up
- D: Dozer down

Travel Speed switch

If the machine equipped with the opening/closing hand control lever, the travel speed switch is located on the top of the dozer control lever.



If the machine equipped with the electric proportional hand control lever, the travel speed switch is located on the back of the dozer control lever (as shown in the figure).



1. Thumb wheel
2. Travel speed switch

Normally, the switch is set to low speed by default with the “rabbit” indicator turned off. Press this button to switch to high speed, then the “rabbit” indicator turns on. Press the button again to return to low speed, then the “rabbit” indicator goes out.

Press the switch repeatedly, can realize the cycle switching between high and low speed.

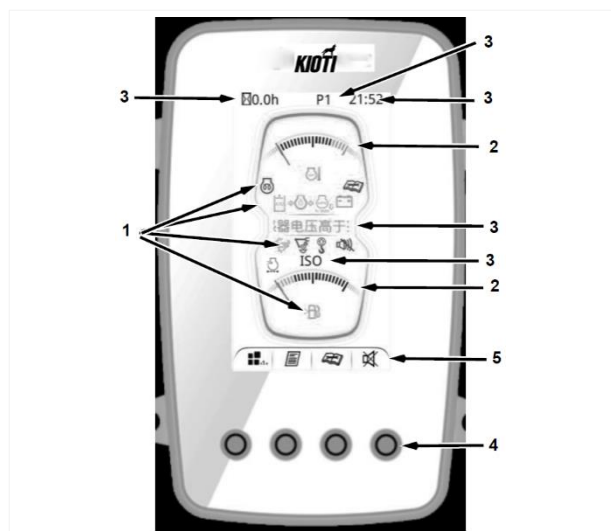
The thumb wheel is used to control the dozer offset. Rotate the thumb wheel to the left, the dozer swings to the left. Rotate the thumb wheel to the right, the dozer swings to the right. When the thumb wheel is in the NEUTRAL position, the dozer stops moving.

⚠ CAUTION

Select low travel speed and disable the automatic idling function when the machine is getting on/off a trailer or running on a narrow road surface.

Display

This display mainly includes indicators, gauges, the service hour meter, and buttons.



1. Function status indicators
2. Gauges (Engine coolant temperature gauge/ Fuel level gauge)
3. Monitors
4. Function switch
5. Maintenance

Function status indicators

⚠ WARNING

When a warning is active for the indicators and gauges, check the alarm unit and gauge immediately, and maintain or repair if necessary. The alarm unit and gauge cannot guarantee that the machine is in good condition. Do not use the monitoring gauges and the alarm unit as the only tool for checks. Maintain and inspect the machine regularly. Consult your Kioti dealer for more information.



Preheat indicator

On: The engine is preheating.

Off: The engine is not preheating.



Engine coolant temperature alert indicator

Red: Coolant temperature is too high (red alarm text displayed on the gauge text prompt area, and the buzzer sound to alarm);

White: Coolant temperature is normal.

When the coolant temperature is too high, stop operating at once and lower the engine speed to low idle speed until the coolant temperature drops to the normal range.

If this indicator illuminates in a short time again when the machine continues working, stop the engine immediately to check the coolant level, fan belt, engine thermostat, etc. Determine the problem and service and maintain the machine if necessary.

⚠ CAUTION

Excessive engine coolant temperature will affect the normal operation of the engine.



Maintenance indicator

Indicator is turned on to remind the operator that a certain part needs to be maintained. Short press the function button to display which maintenance item needs to be done as soon as possible.

After the maintenance is completed, please confirm the maintenance condition on the instrument. After pressing and holding the maintenance functioning switch for 3 sec, the maintenance icon will shut down and the maintenance confirmation is completed.

If the maintenance is not confirmed, the indicator will flicker to prompt on each power-on.



Attachment flow control function indicator

On: Activates attached flow rate control function.

Off: Inactivates attached flow rate control function.

**Engine oil pressure alert indicator**

On: Indicating low engine oil pressure (machine is energized and not started);

Flashing: Warning for low engine oil pressure (engine running);

Off: Engine oil pressure is normal.

**Idle indicator (not available in this machine)**

The symbol notifies the operator on whether the idle function is turned on. (Turned on by default)

On: Activates automatic idling function.

Off: Inactivates automatic idling function.

**Generator charge indicator**

On: Machine is not charging (the machine is energized and not started).

Flashing: Charging alarm (engine running).

Off: Charging is normal.

**Travel speed setting**

On: High-speed travel mode.

Off: Low-speed travel mode.

**Quick coupler indicator**

Flashing: Activates quick coupler function (buzzer beeps);

Off: inactivates quick coupler function

**Lift overload alert indicator (not available in this machine)**

On: Activates Lifting mode;

Flashing: Warning for hoisting overload in the lifting mode;

Off: Inactivates Lifting mode.

**Traveling alert indicator**

The symbol shows whether the traveling alert function is turned on. According to the operation of the traveling alert function switch, the monitor shows as below:

On: Turn off the traveling alert function.

Off: Turn on the traveling alert function.

**Engine intake air filter alert indicator**

On: The engine intake air filter is blocked. Stop the engine, clean and maintain the engine intake air filter.

Off: Engine intake air filter is normal.

**Fuel level alarm indicator**

Check if the indicating machine fuel level is lower than the alarm value (default 10%).

Flashing: Remaining fuel in the tank is too low (red alarm text displayed on the gauge text prompt area, and the buzzer sound to alarm, and alarm status can be muted);

Off: Fuel level is higher than the set alarm value.

Gauges**Engine coolant temperature gauge**

This is a engine coolant temperature gauge. When the pointer enters the red area, it represents the high temperature, and the engine coolant temperature indicator will flicker, with the buzzer beeping simultaneously. Relative inspection or lowering gear is needed to ensure the machine normal usage.



Fuel level gauge

This gauge indicates the percentage of the amount of fuel remaining in the fuel tank of the diesel engine. When the pointer enters the red area, it means that the tank is running out of fuel. the fuel level alarm icon will flicker, with the buzzer beeping simultaneously. Fuel should be filled on time to prevent the machine from running out of fuel.

Monitors

Monitor will display the interface for operating parameters, time, date, etc. of the machine.



LCD monitor

This monitor displays the accumulated work hours of the machine.



Gear monitor

This monitor displays the current work gear and working mode.



Time monitor

This monitor displays the real time.



Text prompt area

It is used to display the alarm text, fault code and prompt information.

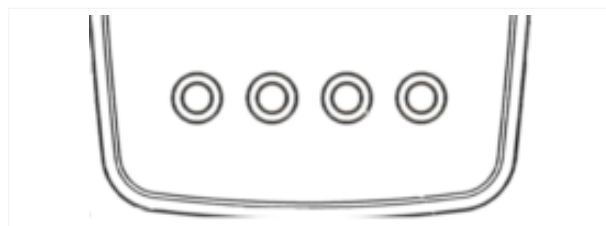
Normally, no content is displayed. When the alarm text, fault code and prompt information need to be displayed, the corresponding content will be displayed. When several messages occur, the monitor will display the messages cyclically.



Working mode monitor

This monitor displays the current working mode.

Function Switch



Four function switches are available on the panel. They are soft buttons. The function icon are located on the display above the button. The button functions vary depending on the interface. The specific functions are shown in the below table:

Indicator icon	Function
	Menu indicator
	Maintenance indicator
	Mute indicator
	Auto idling indicator
	Traveling alert indicator
	Lift overload alert indicator
	Confirm indicator
	Cancel/ back indicator
	Up/ (+) indicator
	Down/ (-) indicator
	Right indicator
	Working mode switching indicator

Indicator icon	Function
	Page turning indicator

Maintenance

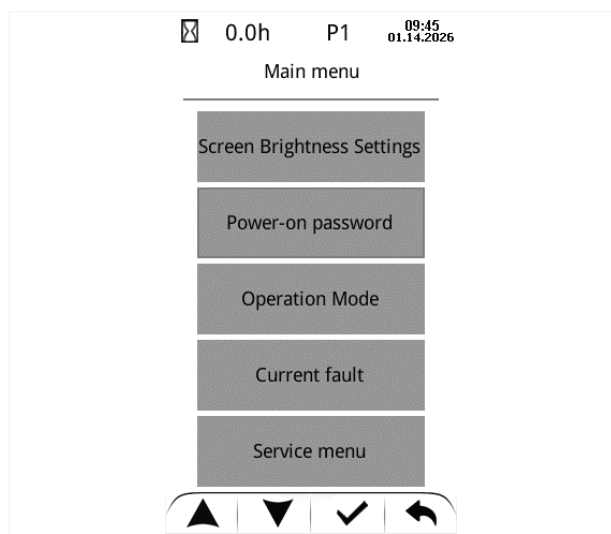
- When the machine has operated for the number of hours at which maintenance is recommended, the monitor will show maintenance icon to remind operators that maintenance is required.
- Press the maintenance function button to enter maintenance menu. Upon the completion of maintenance, perform confirmation on the instrument. The maintenance icon will be extinguished and the maintenance has been confirmed.
- See the table below for the maintenance codes, items and time.

Instrument code	Maintenance item	Maintenance Interval (h)
b-001	Check the engine oil level.	8 (Maintenance items for 8h can be viewed through the instrument maintenance button, and the instrument maintenance icon does not prompt.)
b-002	Check the coolant level (auxiliary radiator).	
b-003	Check the hydraulic oil level.	
b-004	Drain the fuel-oil water separator.	
b-005	Lubricate (apply grease to) both the dozer blade and work implement pivots.	50
b-006	Lubricate (apply grease to) the swing gear.	
b-007	Drain water from the fuel tank.	
b-008	Check the traveling crawler belt for tightness, and adjust as needed.	100
b-009	Check the fan belt for tightness, and adjust as needed.	

Instrument code	Maintenance item	Maintenance Interval (h)
b-010	Check the traveling reducer gear for its oil level.	250
b-011	Replace the engine oil.	
b-012	Replace the engine oil filter element.	
b-013	Lubricate (apply grease to) the swing bearing.	500
b-014	Replace the fuel filter element.	
b-015	Replace the air filters.	
b-016	Replace the oil for the traveling reducer gear.	1000
b-017	Replace the return oil filter element of the hydraulic oil tank.	
b-018	Replace the hydraulic oil.	2000
b-019	Replace the hydraulic oil suction filter element.	
b-020	Replace the antifreeze.	

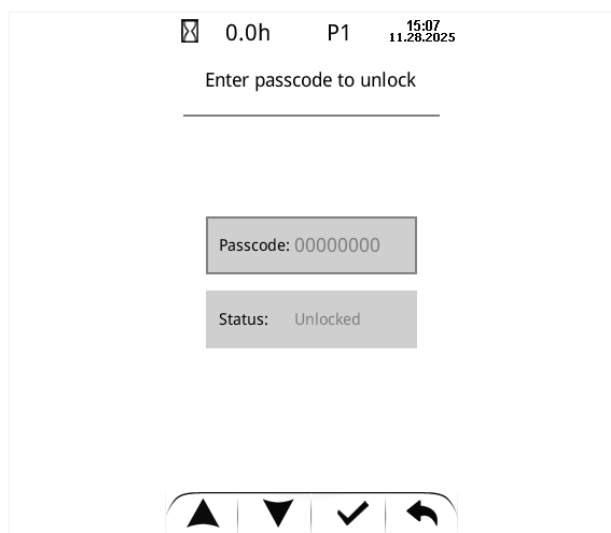
Power-on password setting

This function allows the user to set the power-on password.



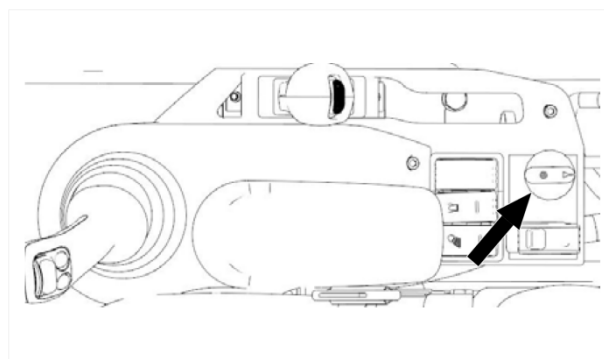
In the main interface of the display screen, press the "Menu" soft key to enter the main menu interface. Press the "Up/Down" key to select the "Enter password to unlock" item, and press the "Confirm" key to enter the "Enter password to unlock" interface.

Starting password setting



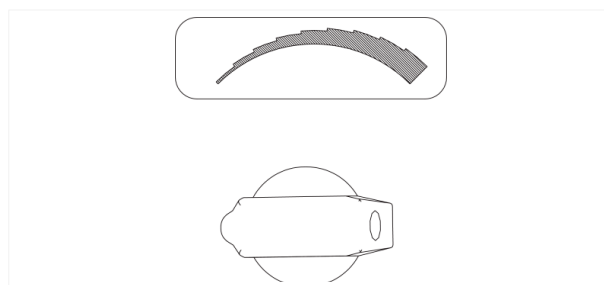
The default password is "00000000". When the password is "00000000", the machine startup password protection function is cancelled. After entering the password, you can enter the password setting page to reset the password.

Control Panel



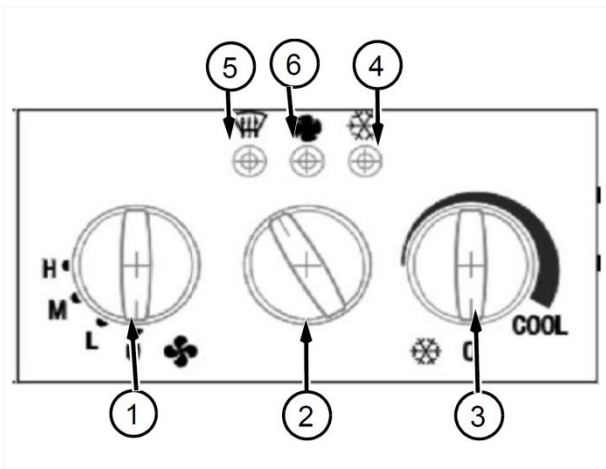
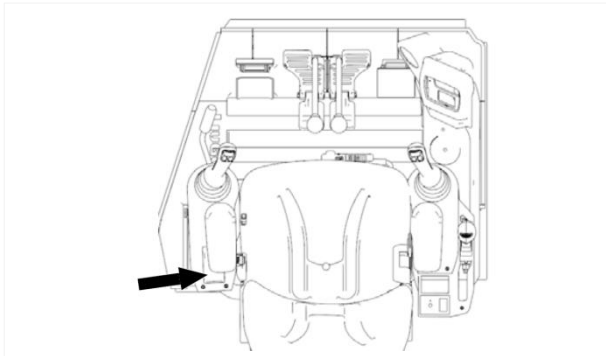
Engine speed knob

The throttle percentage of the machine can be adjusted by operating the engine speed knob (corresponding to the engine speed). After the machine starts, turn the engine speed knob to automatically adjust the speed steps from 1 to 10, specifically, turn the engine speed knob clockwise to increase the speed and counterclockwise to decrease the speed, and the display shows the change of speed at the same time.



A/C Panel

The A/C panel is located on the left armrest box.



1. Fan speed switch
2. Warm air/fresh air/cool air select switch
3. Temperature control switch
4. Warm air indicator
5. Fresh air indicator
6. Cool air indicator



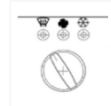
Fan speed switch

When the heating-only air conditioner panel is energized, turn the fan speed switch to adjust the fan speed.

Four positions are available: high (H), medium (M), low (L), off (O).

CAUTION

If the engine is shut down, the air conditioner can not be used.



Warm air/fresh air/cool air select switch

This switch is used to shift warm air, fresh air and cool air.

The fresh air mode is selected when the switch is in the middle position, the fan indicator (5) illuminates, and the fresh air will be sent out from the vent.

The warm air mode is selected when the switch is turned anticlockwise towards the warm air indicator (4) (red indicator), the warm air indicator (4) (red indicator) illuminates, and the warm air will be sent out from the vent.

The cool air mode is selected when the switch is turned clockwise towards the cool air indicator (6) (green indicator), the cool air indicator (6) (green indicator) illuminates, and the cool air will be sent out from the vent.

CAUTION

When the cool air/fresh air mode is used, manually close the engine warm water valve for the machine without solenoid valve.

When the warm air mode is used, ensure that the engine warm water valve is open.



Temperature control switch

This switch is used to set the air conditioner temperature when starting the cool air mode.

Turn the switch clockwise to reduce the air conditioner temperature; turn the switch anticlockwise to increase the air conditioner temperature.

When the switch is turned counterclockwise to the "O" position, the compressor stops working, but the fan is still running, and the fresh air is sent out from vent.

Starting explanation of air conditioner

After the engine is started, turn the fan speed switch clockwise to turn on air conditioner; turn the fan speed switch anticlockwise to "O" position to turn off air conditioner.

CAUTION

During winter, turn on the air conditioner for 20 minutes to run the compressor to avoid leakage of coolant. This keeps the compressor in best condition.

After filling the refrigerant, and using the air conditioner for the first time, the air conditioner should be idle for 20 minutes. If the temperature difference is large or if the air conditioner is not used for a long time, it should be run at slow speed for 20 minutes.

Explanation of heating

In heating mode, the user needs to adjust the setting temperature by his/her own. Turn the warm air/fresh air/cool air select switch to the warm air position. Open the engine side manual water valve manually (when starting the cooling mode, the manual water valve needs to be closed manually), and the system enters heating state.

Explanation of cooling

In cooling mode, the user needs to adjust the setting temperature and fan speed by his/her own. The system automatically turns on/ off the cooling state based on the comparison between the actual temperature and the set temperature in the cab. The display screen will automatically display the various working state transition.

When the detected temperature of the anti-frost temperature sensor is lower or equal to the set temperature, the system is in the ventilated state. When the detected temperature of the anti-frost temperature sensor is higher than the set temperature (+2°C), the system enters to cooling state.

Turn the fan speed switch to "O" position to turn off warm air system.

Cooling

1. After starting the engine, turn the warm air/fresh air/cool air select switch towards the cool air indicator (6) (green indicator).
2. Turn the fan speed switch clockwise, the cool air indicator (6) (green indicator) will light. It indicates the air conditioning system starts cooling and cool air will be sent to cab through air vent.
3. Adjust the temperature in cab through the temperature control switch.

CAUTION

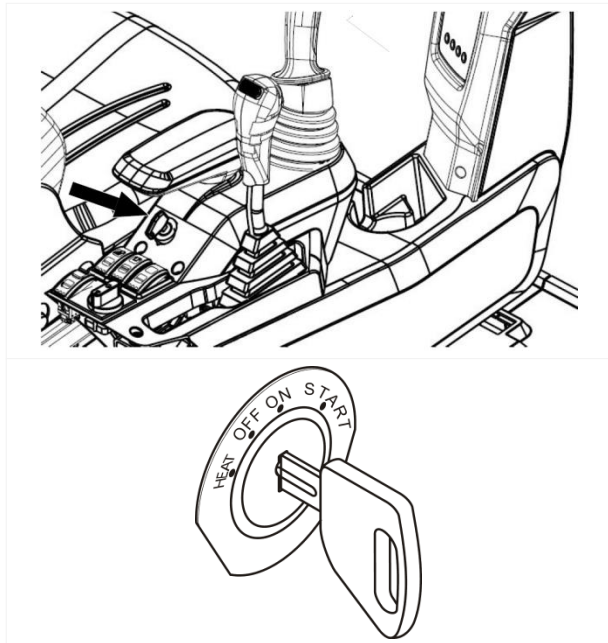
When the air conditioning system is cooling, do not turn the temperature control switch to highest position and the fan speed switch to the low position at the same time, so as to prevent the evaporator from frosting and affecting the cooling effect.

Start Switch

The start switch, which is used to start or shut down the engine, is located on the console on the right side of the driver's seat.

Start or stop the machine with the key

This kind of start switch has four positions: "HEAT", "OFF", "ON" and "START".



- **HEAT**—Forcedly cold start (preheating position) (not used). In cold weather, users also can manually preheat the engine according to actual needs. Turn the start switch to the HEAT position to realize forcedly cold start. The manual preheat can not exceed 15 seconds. When the manual preheat is completed, the start switch key will reset to the OFF position automatically after being released. Then turn the start switch to the START position to start the engine.

⚠ CAUTION

Do not exceed 15 seconds when preheating the engine; otherwise, the battery will be discharged partially, which will result in insufficient power in the battery.

- **OFF**—The power of the machine is turned off. At this position, all of the electrical appliances are turned off.

⚠ CAUTION

Only insert or take out the start switch key from the OFF position!

- **ON**—The power of the machine is turned on. Turn the start switch clockwise to the ON position. At this position, the electricity circuit is energized. When the machine is running, keep the start switch on this position.
- **START**—Start the engine. Turn the start switch clockwise to the START position and the engine will start at this position. Release the start switch key at this position, then the key will reset to the ON position automatically. In normal conditions, the engine will run in 10 seconds.

⚠ CAUTION

The pilot shutoff lever must be at the LOCK position, and other control levers and pedals must be in Neutral position before starting the engine.

⚠ WARNING

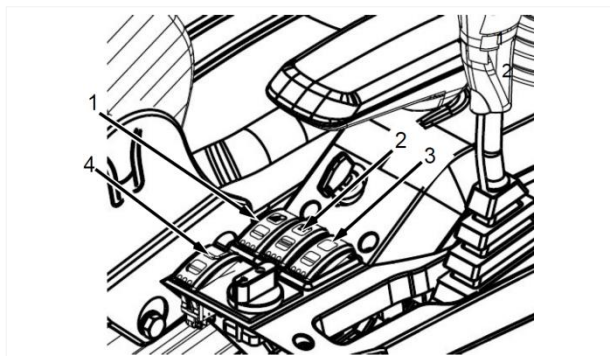
If the engine fails to start, turn the start switch to the OFF position before restarting or the starter motor could be damaged!

Do not engage the start switch for more than 30 seconds at a time. Wait at least 2 minutes before restarting. Do not attempt to start up more than three times consecutively. After your third try, you must allow the starter motor and choke solenoid to cool down sufficiently. Failure to comply could shorten the service life of the battery as well as damage the starter motor and solenoid.

Difference between start switch and disconnect switch

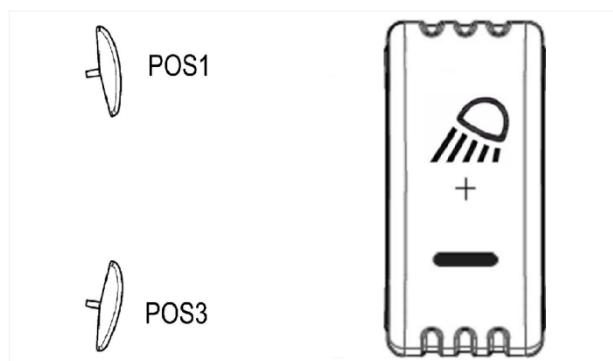
Turn of the battery disconnect switch, that is, the electrical system of the machine is turned off. If only turn off the start switch, the battery remains connected to the electrical system of the machine, and some electrical components can still work.

Rocker Switch Combination



1. Work light switch
2. Rotating beacon switch
3. Wiper switch
4. Quick coupler switch

Work light switch



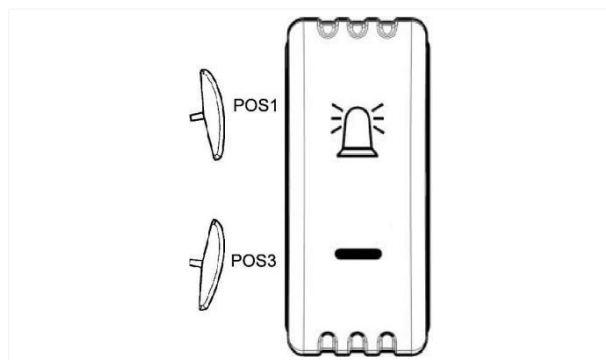
This is a two-position switch.

POS3 is the default position of the switch, where the lights are turned off.

POS1 is the position where the lights are turned on.

The work lights can only be turned on when the start switch is turned on.

Rotating beacon switch

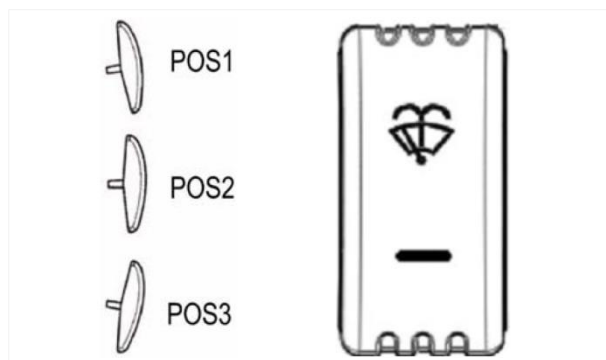


This is a two-position switch.

In POS1, the switch is turned on and the rotating beacon on the top of the cab is lit.

POS3 is the default position of the switch where the rotating beacon on the top of the cab is off.

Windshield wiper and washer switch



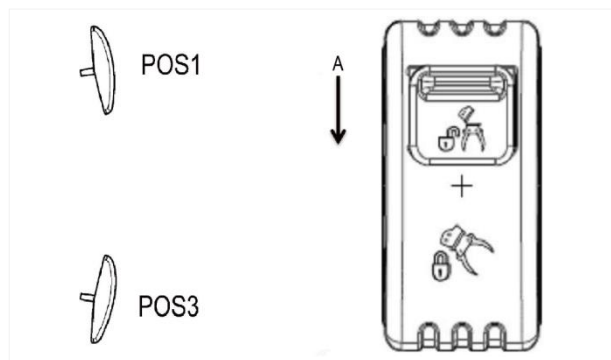
This is a three-position switch.

In POS1, the switch is turned on, the washer starts to spray water while the wiper operates.

In POS2, the switch is turned on, only the wiper starts to operate.

POS3 is the default position of the switch where the wiper is disabled.

Quick coupler switch



This switch is used to control the quick coupler. It is equipped with a spring-loaded lock button to prevent accidental contact. To operate the switch, push the lock button to the A direction to release the switch.

With the lock button held to the A direction, press the button to the POS1 position to disconnect the bucket or work attachment. The lock button will reset after being released, and at this time is no need to press the lock button. Press the button to the POS3 position, to connect the bucket or work attachment.

⚠ CAUTION

When the switch is enabled, the buzzer will sound an alarm to lock or unlock the work attachment.

For more information on quick coupler switch, please refer to “Quick Coupler System” in the section “Accessories and Optional Equipment”.

Related Cab Components

Seat Belt

⚠ WARNING

Check the seat belt for wear before starting the machine.

Replace the seat belt immediately if it is damaged.

Always fasten the seat belt before operating the machine.

Do not twist the seat belt when fastening it.

Pass belt as low as possible around the hips, not around the stomach.

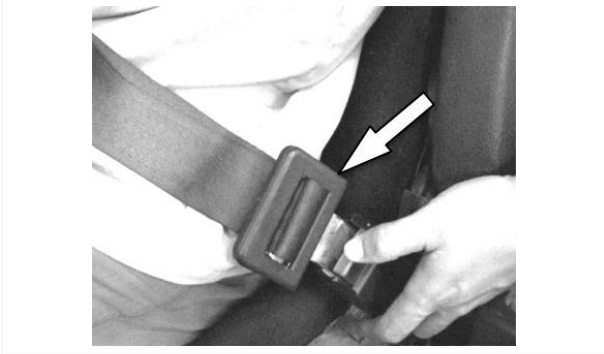
This seat belt is provided for the operator's safety. Different styles of seat belt can be configured according to the customer's needs. Fasten the seat belt before operating the machine. Before using the seat belt, check the seat belt for wear and tightness, and replace it if necessary.

Adjust the length of the seat belt before using it in order to ensure safety and comfort. The length of the seat belt can be adjusted by moving the position of the catch on the safety belt.

Every seat belt is provided with a date, so replace the seat belt according to the date label attached.

The seat belt consists of a metal catch and a belt buckle. The buckle of the seat belt is located at the rear left side of the seat. Insert the metal catch of the seat belt into the buckle. An audible click indicates that the catch has been engaged. A red button is provided on the belt buckle. To release the catch, press the red button. Before using the seat belt, check whether the buckle of the seat belt can lock and release normally.

When the operator sits in the driver's seat and fasten the seat belt, the seat belt indicator (if equipped) will light up.



Alternate Emergency Exit

The rear window can be used as the alternate emergency exit. You can use the emergency hammer to break the rear window glass and then climb out from the rear window opening to leave the cab.

The emergency hammer is located at the left rear of the operator's seat, next to the rear window glass.



Mechanical Damping Seat

⚠ CAUTION

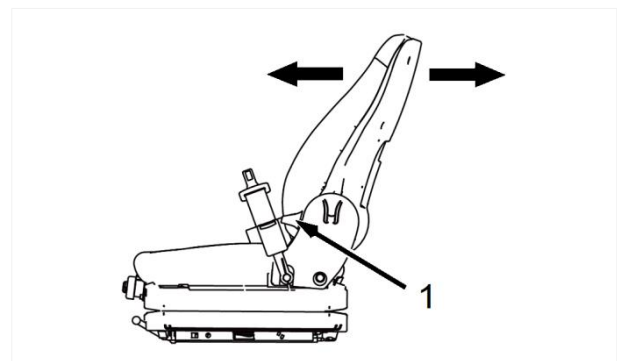
The seat is not allowed to be adjusted while the machine is running to avoid accidents!

⚠ CAUTION

Before operation starting or after changing operators, the seat shall be adjusted to facilitate the operator to operate the lever and switch freely and conveniently with the back against the seat.

Backrest Angle Adjustment

When sitting, firstly, the driver's back must close to the backrest cushion; secondly, lift the handle of the angle adjuster upward, and at the same time, press the backrest cushion backward to a suitable angle, and finally release the handle.



1. Adjusting handle

⚠ WARNING

Do not adjust the seatback without sitting on it. Do not adjust the seatback when the driver's back is not relying on it in order to prevent the driver's body from being hurt by the hitting force of rebounding forward of the backrest cushion.

Seat Belt Adjustment

Fasten the seat belt: insert the belt latch plate into the buckle and hear a clicking sound of the buckle, that is, the safety belt is buckled-up.

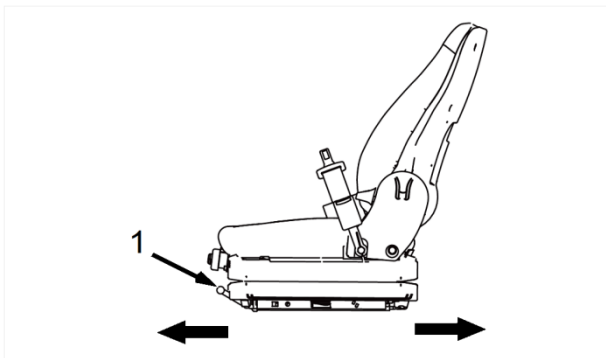
Unfasten the seat belt: press the red button in the buckle, then the plate will automatically release and spring out, that is, the seat belt is unfastened.

Seat belt length adjustment: pull the adjusting buckle and webbing forward or backward for adjustment.



Slide Rail Front/Back Adjustment

First, sit on the seat. Grasp the plastic handle position. Lift the handle lever upward to unlock, and slide the seat forward/backward to a suitable position. Release the handle lever and hear a slight "clicking" sound when the sliding rail clamping teeth are stuck in the slot.



1. Adjusting handle

If there's no clicking sound or the slide rail can move back and forth, it indicates that the slide rail clamping teeth do not enter the slot, and the slide rail is not locked. Therefore, there are potential safety hazards, and it needs to be adjusted again.

⚠ CAUTION

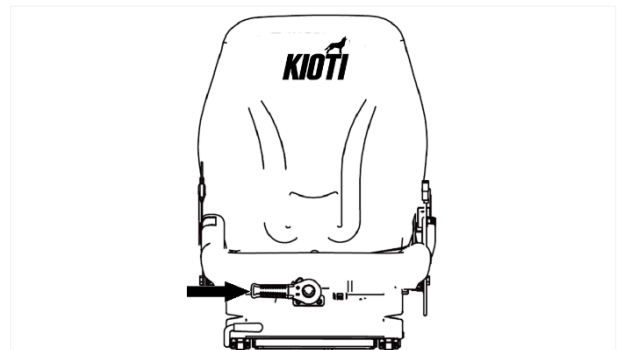
When adjusting, do not lift the handle rod with force to prevent the lever from twisting and deforming; or damaging the unlocking device.

⚠ CAUTION

The driver shall not step on the handle rod with the foot to avoid deformation, fracture, and damage of the handle rod.

Weight Adjustment

Before starting up, the driver shall adjust the displayed seat weight to corresponding values according to the actual body weight. If feeling it is hard or soft, you can appropriately increase or decrease the value (the weight value only serves as a reference for adjustment, and the specific number shall be subject to the driver's comfort). For adjusting weight numbers, lift the handle upward to increase and press the handle downward to decrease.



⚠ CAUTION

The displayed number changes with the seat damping, so do not sit on the seat when adjusting the seat weight value.

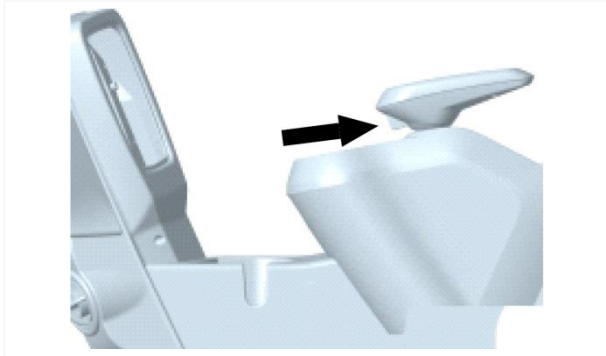
The minimum limit of weight adjustment is 50KG, and the maximum limit is 130KG; that is, the seat is suitable for people with 50-130KG. It is recommended that the drivers within this weight range use the seat in order to avoid affecting comfort or overweight pressure and causing seat damage.

Do not use excessive force when adjusting. Do not continue to adjust if the value reaches the limit position so as to avoid loosening and damaging the adjusting

screw.

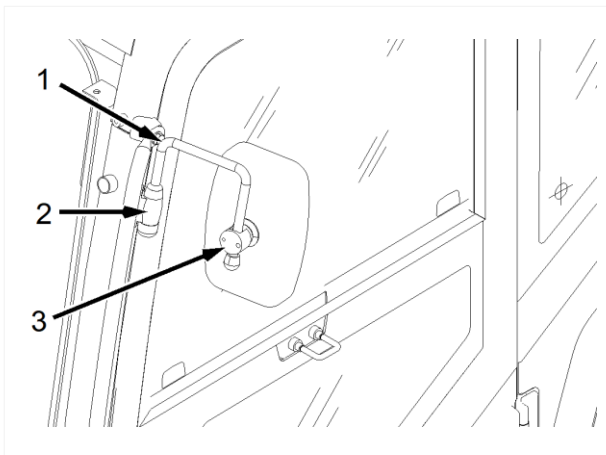
Armrest

By triggering the switch, can easily adjust the height and angle of the armrest to a comfortable position for human body.



Rearview Mirrors--Adjust

Before operating the machine, adjust the rearview mirrors and make sure the operator has a good rear view when sitting on the seat.



1. Bracket of rearview mirror
2. Support of rearview mirror
3. Universal joint

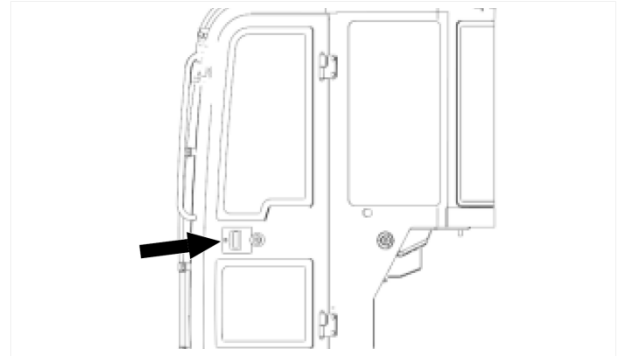
1. Loosen the inner hexagon bolt of the rearview mirror bracket. Rotate the rearview mirror and rearview mirror bracket around the rearview mirror support together.
2. Use a universal joint to rotate and fine-tune the rearview mirror separately.

Cab Door Lock

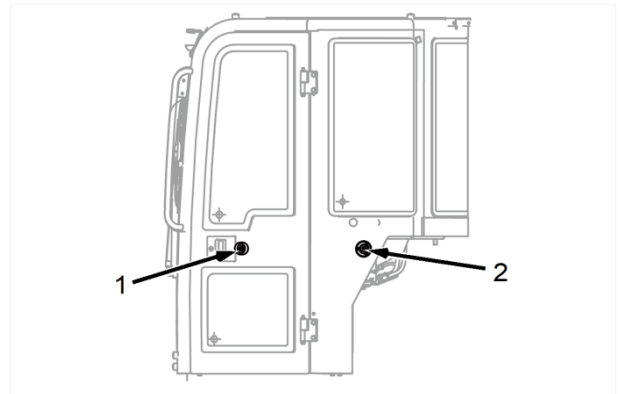
Door Lock

Open the cab door from the outside of the cab: insert the key and turn it clockwise 180° before taking it out, and pull outwards the external handle of the door lock to open the door.

Lock the door: before locking the door, first close it. Insert the key and rotate it counterclockwise for 180°, and take it out.



Latch

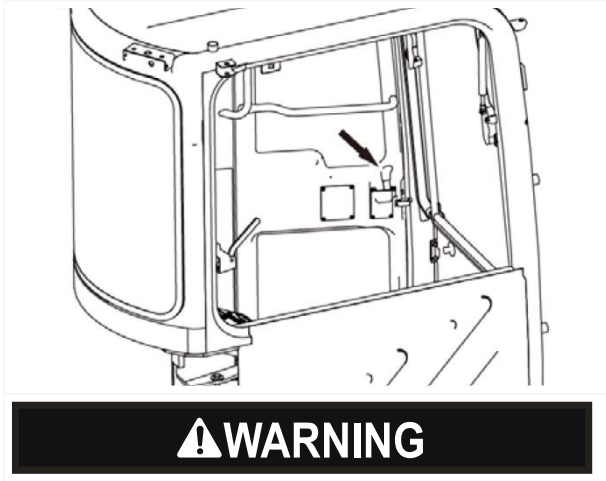


1. Latch
2. Buckle

When opening the door to 180°, the latch on the door is stopped by the buckle behind and the door will be fixed in that position.

Latch Handle

The latch handle is located at the lower side of the doorpost. When the latch is locked, pull the latch handle downward to unlock the latch, then close the door.

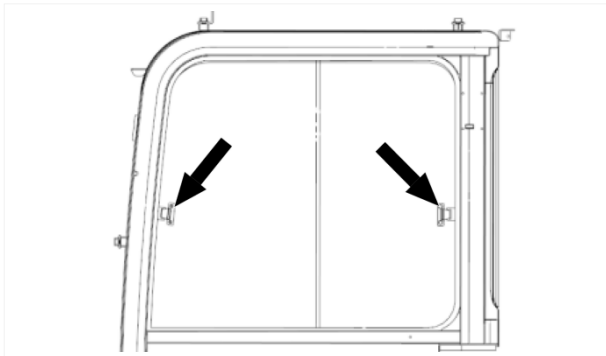


Before the driver operates the machine, close the door to the cab first to ensure safety.

Cab Window

Sliding Window

To open the window, first release the window latch and then slide the window to the required position.

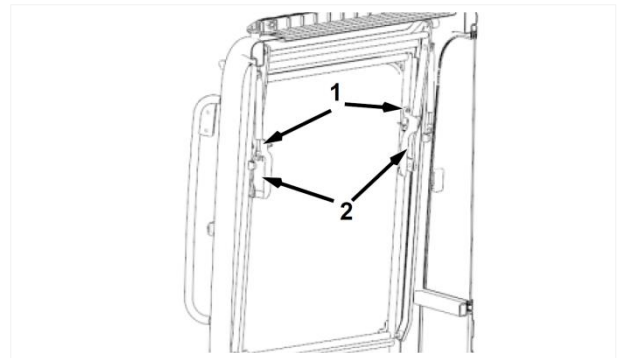


Front Movable Window (if equipped)

To make the cab fully ventilated, the front movable window can be fully opened.

⚠ WARNING

Open or close the window carefully to avoid personal injury. When opening the window, the lock lever must be in the lock position to avoid sudden movement of the machine if the lever is accidentally touched.

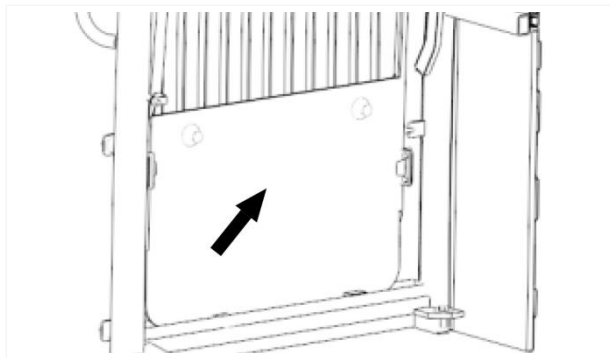


1. Front movable window lock
2. Handle

1. Press the front movable window lock on the window handle to loosen the automatic locking latch.
2. Hold two handles on the window frame and pull up the window.
3. Hold the two handles on the window frame and move the window to the storage position until the automatic locking latch near the ceiling is engaged.
4. Press the front movable window lock on the window handle to loosen the automatic locking latch.
5. Close the front movable window in reverse order as shown in Steps 1 to 3.

Front Lower Window (if equipped)

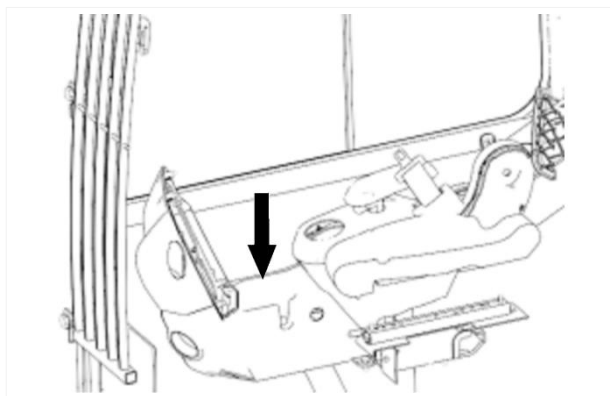
To take out the front lower window glass, lift up the front movable window to be locked and then take out the front lower window glass. It is recommended to place the front lower window glass on the tray.



Storage Box in Cab

Cup Holder

The cup holder is located on the right front side of the operator's seat.



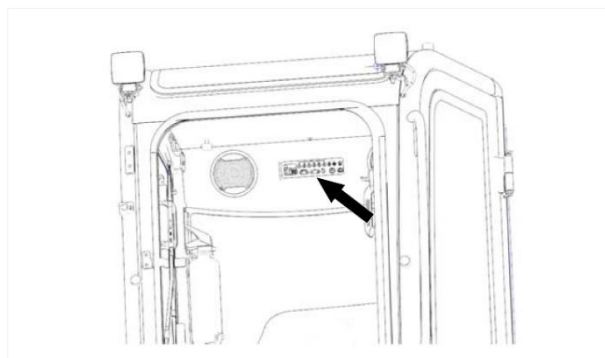
Fire Extinguisher

The fire extinguisher is located behind the driver's seat. The instructions on the nameplate of the fire extinguisher shall be read and understood carefully in advance in case of an emergency.

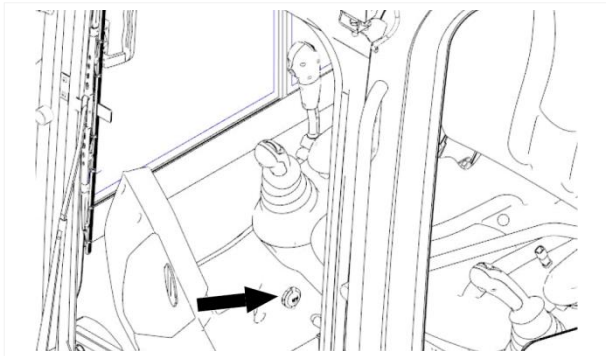


Radio

The radio is located on the top of the cab. Refer to the Audio Setting for the operations instructions.



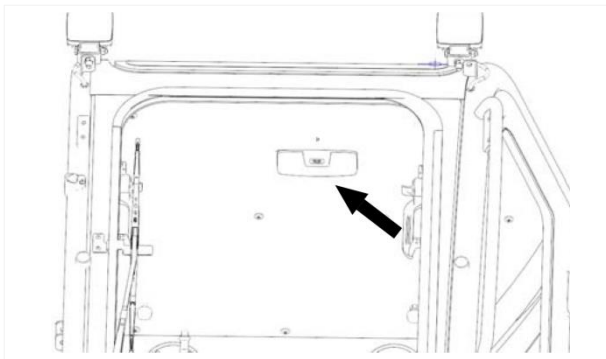
Socket



It is a power interface for on-board devices with a maximum current of 10A, and a voltage of 12V. The socket can be used for other adapters.

Interior Light

The interior light is located on the roof of the cab with a switch that features three positions.



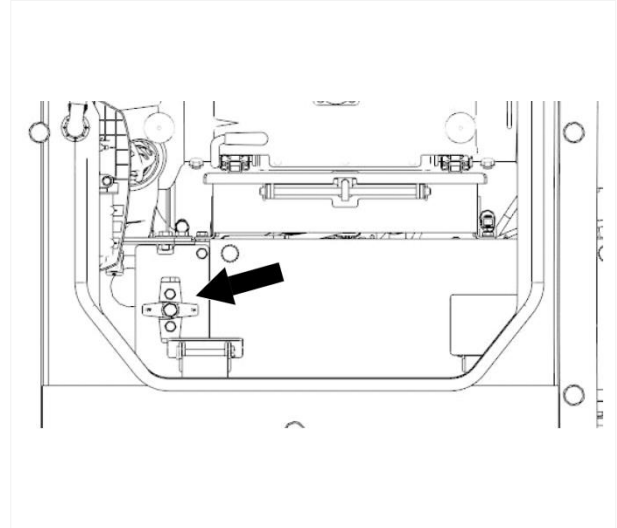
Turn the switch to the OFF position, the dome light will be always off;

Turn the switch to the ON position, the interior light will be always on (the start switch needs to be turned to the ON position).

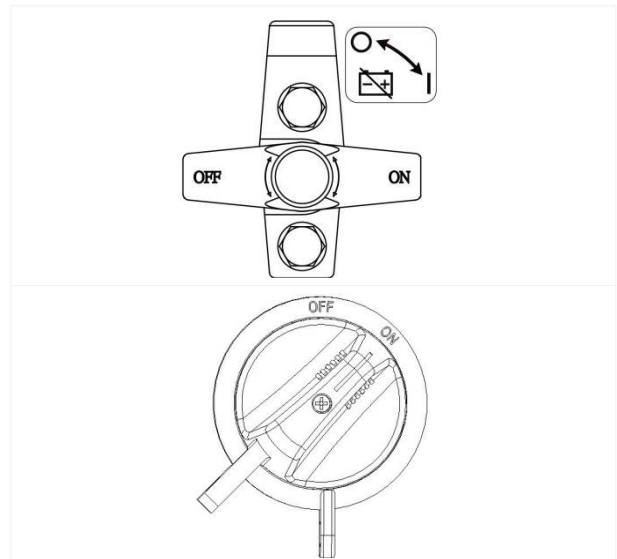
Other Components of the Machine

Battery Disconnect Switch

The battery disconnect switch is located in the lower right corner of the operator's seat.



The battery disconnect switch is used for disconnecting the battery supply. Rotate the handle to turn on or off the switch.

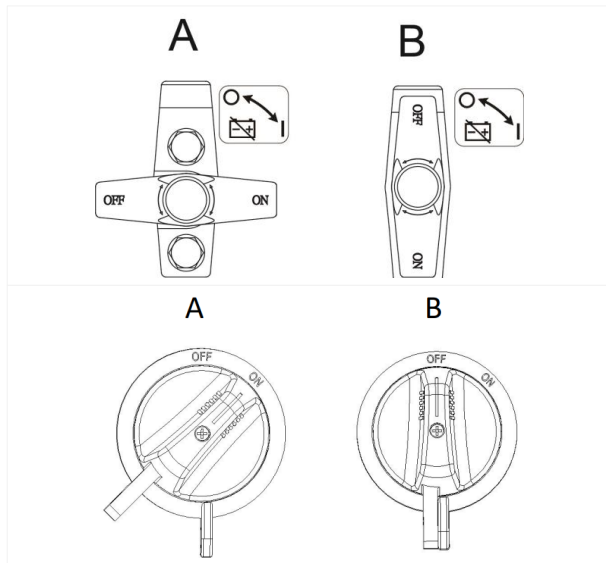


Battery disconnect switch--ON: turn the handle clockwise or counterclockwise to the position shown in the figure to turn on the switch.

Turn on battery disconnect switch before starting the machine.

Battery disconnect switch--OFF: turn the handle clockwise or counterclockwise to the position shown in the figure to turn off the switch.

Turn off the battery disconnect switch to turn off the electrical system.



A: ON
B: OFF

⚠ WARNING

Do not turn off the battery disconnect switch while the machine is running. Damage to the electrical system can occur.

Turn off the battery disconnect switch after the machine stops working to avoid electric leakage and other accidents. When welding the machine, disconnect the battery disconnect switch and the plugs of the instrument system, otherwise, it will burn the components on the instrument panel.

Alternate Lowering of Boom

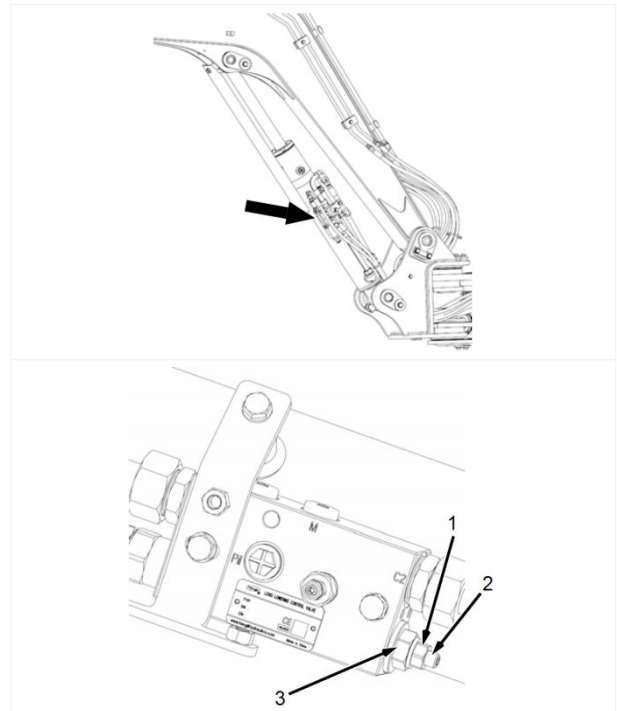
When the power system of the machine fails to operate or the hydraulic system fails to work due to a fault, the boom in the lifting position needs to be lowered manually to prevent the sudden drop of the work implement, which could result in an accident.

⚠ WARNING

To avoid injury, ensure that no one stands under and around the work implement when the boom is manually lowered.

Machine with Load Maintaining Valves

When the machine is equipped with a load maintaining valve for boom, two persons shall simultaneously adjust the relief valves of the load maintaining valves to control the lowering of boom.



1. Locking nut
2. Inner hexagon screw
3. Nut

1. On the inner hexagon screw, mark the initial relative position of the screw to the nut with a marking pen;
2. Loosen the locking nut;
3. Slowly loosen the inner hexagon screw counterclockwise (remember the number of turns for loosening to facilitate recovery) until the boom is lowered to the ground;

4. Ensure that the boom is placed on the ground and tighten the inner hexagon screw to the initial position;
5. Tighten the locking nut.

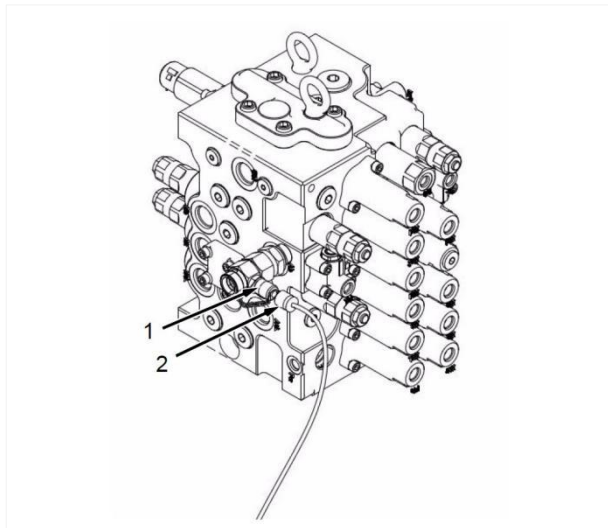
Machine without Load Maintaining Valve

When the machine is not equipped with load maintaining valve, the hydraulic oil can be drained through the pressure measuring connector on the large-cavity oil circuit of boom to lower the boom.

⚠ CAUTION

An oil drainage pipe needs to be prepared (in a form of pressure gauge line).

1. Unscrew the protective cover of the pressure measuring connector;



1. Pressure measuring connector (with protective cover)
 2. Oil drainage pipe
2. Slowly screw the oil drainage pipe into the pressure measuring connector to discharge the hydraulic oil until the boom is lowered to the ground;
 3. Ensure that the boom is placed on the ground and the oil drainage pipe is unscrewed;
 4. Tighten the protective cover of the pressure measuring connector.

Machine Operation

Before Operation

Mounting and Exiting the Machine

Clean any oil or mud from the handrails and steps before mounting or exiting the machine. Any damaged parts must be repaired, and loose bolts must be tightened.

Only step on parts of the machine that have steps or handrails.

Face the machine when getting on and off. Hold the handrails, step on the steps, and maintain three points of contact (two feet and one hand or two hands and one foot).



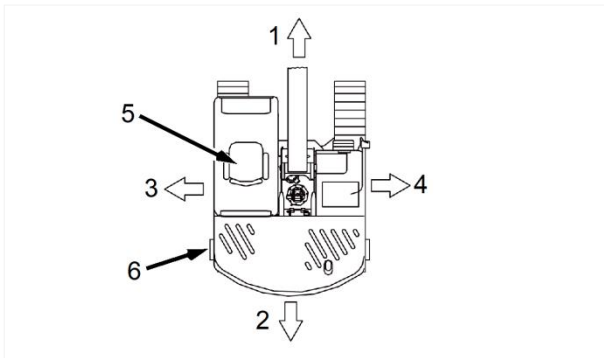
Never jump off the machine.

Never get on or off the machine while it is moving.

Never use any control lever as a handrail while getting on or off the machine.

Do not climb onto or off of the machine while carrying tools or other items. Use rope to lift the required tools onto the operating platform.

Direction



1. Front
2. Rear
3. Left
4. Right
5. Cab
6. Travel motor

The directions of left, right, front and rear in this manual are determined based on the fact that the cab is located at front while the travel motor is located at rear.

Daily Inspections

⚠ WARNING

Hot oil and parts may cause injuries. Do not contact hot oil or parts with skin.

The coolant is hot and under pressure during operation.

The coolant level can be checked only after the machine is shut down and the pressure cap of the cooling system is cooled enough to be touched by bare hands.

Slowly unscrew the cooling system pressure cap to release the pressure.

Cooling system additives contain alkali. Avoid contact with skin and eyes to prevent personal injury.

To maximize the service life of the machine, complete a thorough walk-around inspection before you mount the machine and before you start the machine.

1. Check the work implement, linkage mechanism, and attachments for damage or excessive wear. Perform repairs if necessary.
2. Check the work light for damage and replace it when necessary.
3. Check the hood for accumulation of waste and remove them when necessary.
4. Check the cooling system for leaks, damaged hoses, or accumulated waste. Fix all leakages. Remove debris from the radiator.
5. Check all belts (if equipped) of the machine. Replace worn, scratched, or cracked belts (if equipped).
6. Check the hydraulic system for leakage. Check the oil tank, cylinder, pump valve, motor, hose, and other components to eliminate any leakage in the hydraulic system.
7. Check the area around and under the machine for loose bolts and trash buildup.
8. Ensure that all cover plates, guard plates, steps, and handrails are firmly installed in place. Clean steps, aisles, and handrails. Carry out any necessary repair.
9. Check the cab and armrest box for accumulated waste and keep these areas clean.

10. Adjust the rearview mirror for best view.

For information regarding daily checks, please refer to the "Every 8 Service Hours or Every Day" in the chapter "Maintenance Interval Table".

Machine Starting and Shutdown

Machine Starting

⚠ WARNING

Before starting the machine, sound the horn to ensure that no other personnel except the operator is working on or near the machine and keep the machine under the control of the operator at all times.

Do not attempt to start the machine by shorting the starting circuit, which may result in serious injury, death, or fire.

Ensure good ventilation when starting the machine in a confined space.

Do not use starting aid fluid; otherwise, an explosion could result.

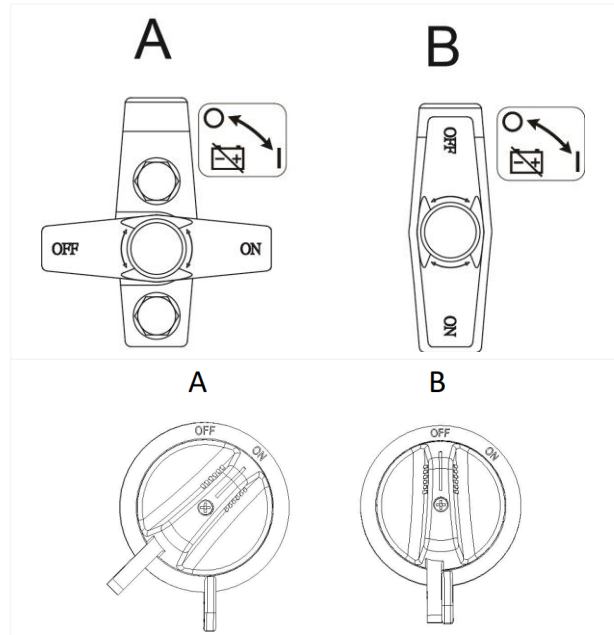
⚠ CAUTION

If the engine fails to start, turn the start switch to the OFF position before restarting or the start switch could be damaged!

The starting time shall not exceed 15s; If the starting is unsuccessful, wait at least 30s before restart. Otherwise, the service life of the battery will be reduced and the starter motor may be damaged.

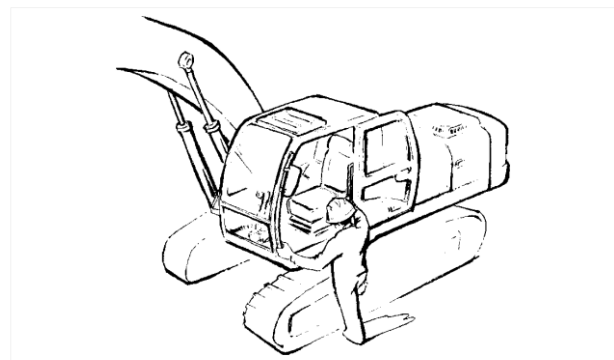
Turn the engine speed knob to the lowest setting before starting. If the speed is accelerated instantaneously at high starting setting, the engine parts may be damaged.

1. Before starting, check the levels for engine antifreeze, oil, fuel, and hydraulic oil. Check the sealing conditions of each oil pipe, water pipe, and fuel pipe. Check the battery for damaged wires or loose connectors.
2. Turn on the disconnect switch as shown below.

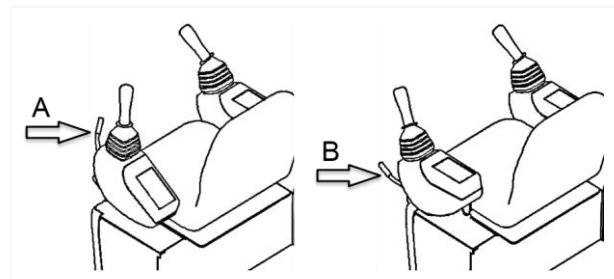


A: ON
B: OFF

3. Mount and dismount the machine according to the safety regulations.

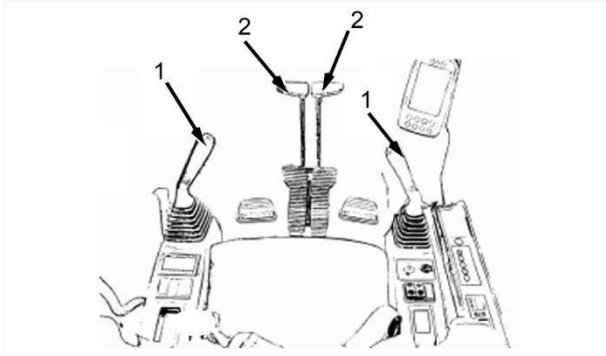


4. Close the door of the cab. Check if the seat belt is in good condition and fasten it.
5. Make sure the pilot shutoff lever is in the LOCK position. If not, push the lever to the LOCK position (as shown below). Otherwise, the machine will not start.

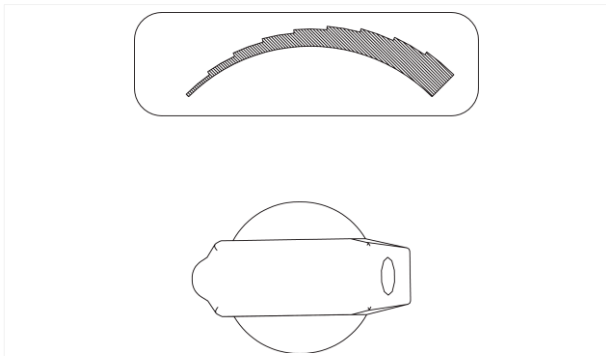


A: LOCK
B: UNLOCK

6. Check whether the hand control levers (1) and travel control levers (2) are in the NEUTRAL position. If not, push them to the NEUTRAL position.



7. Check whether the engine speed knob is set to low speed. If not, set the switch to low speed.



8. Turn the start switch to the ON position to turn on the power. Sound the horn to warn others that the machine is going to start operating.
9. Start the machine according to the following operation instructions:

For the machine started or stopped with the key, turn the start switch to the START position to start the machine. In normal conditions, the machine will run in 10 seconds. Release the key to let it reset to the ON position.



Engine Warm-up

⚠ CAUTION

Preheat the engine for every start. This will help to extend the service life of the machine.

1. Engine Starting

For the machine started or stopped with the key, turn the start switch to the START position to start the machine. In normal conditions, the engine will run in 10 seconds. Release the key to let it reset to the ON position.



2. Warm up the engine at idle speed after starting the engine. Check the coolant temperature gauge. Run the engine with full speed only after the coolant temperature reaches 55°C and the engine oil temperature reaches 45°C.
3. Check the readings of all gauges to make sure they are in the normal range. Check that all the lights, indicators, horn, and windshield wiper work normally.
4. Turn the engine speed control lever to the middle position to idle the engine for about 5 minutes.

Hydraulic System Warm-up (Manual)

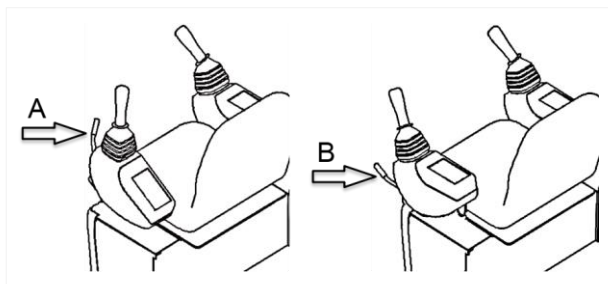
⚠ WARNING

In severe cold weather, the work implement will move slowly if it has not been warmed up sufficiently. Therefore, warm up the machine before operating. If any trouble is found, turn the start switch to the OFF position to make an emergency stop!

⚠ CAUTION

Warm the hydraulic system before operating. After warming up the machine, all the services will respond quickly without delay.

1. Push the pilot shutoff lever to the UNLOCK position (as shown below).



A: LOCK
B: UNLOCK

2. Operate the hand control levers slowly to extend and retract the boom cylinder, bucket cylinder, and arm cylinder until the stroke ends repeatedly for 5 minutes to quickly raise the hydraulic oil temperature.

Break-in

The break-in of a new machine is an important procedure for prolonging the service life of the machine. Following the break-in requirements can eliminate faults and prevent accidents. The user must read these guidelines for break-in of a new machine and how to operate and maintain the machine after purchase.

Break-in-Requirements for New Machines:

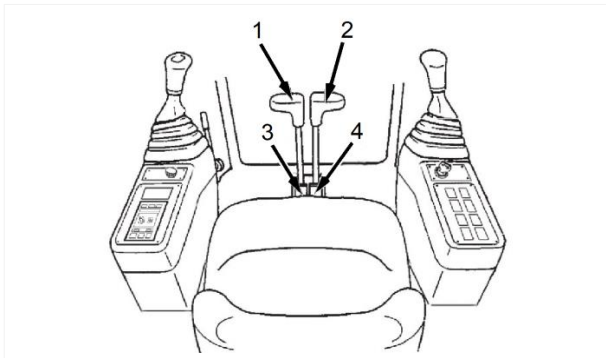
- Break-in of a new machine is 100 hours.
- Start the engine and run at idling speed for 15 seconds. Do not attempt to operate the hand control levers or the engine speed knob.
- Run the machine at idling speed for 5 minutes for every start-up.
- When shifting gears, do not skip gear on the engine speed knob. Turn it to the adjacent gear first, and then turn it to the next adjacent gear after the engine speed is adjusted to the corresponding value. Operate in sequence until the required gear is reached.
- Avoid heavy load or high speed operation during the break-in period.
- Avoid sudden startup, acceleration, steering, or braking except in emergencies.
- It is recommended to dig loose soil during the first 50 hours in break-in period. Do not operate harshly and each loading should be 1/2 of the bucket capacity.
- After the 50 hours of the break-in, the loading amount can gradually increase, but do not exceed 3/4 of the bucket capacity, and the operation speed should be reduced properly.
- Always pay attention to the operation of each machine mechanism. Any abnormal phenomena occurs during the operation, the machine should be immediately stopped to check the cause and the abnormal phenomena should be eliminated.
- Check that all bolts and nuts are tight.

Turning off the Machine

⚠ CAUTION

Do not shut down the engine immediately after the engine runs with a load; otherwise, the engine will overheat and its service life will be shortened.

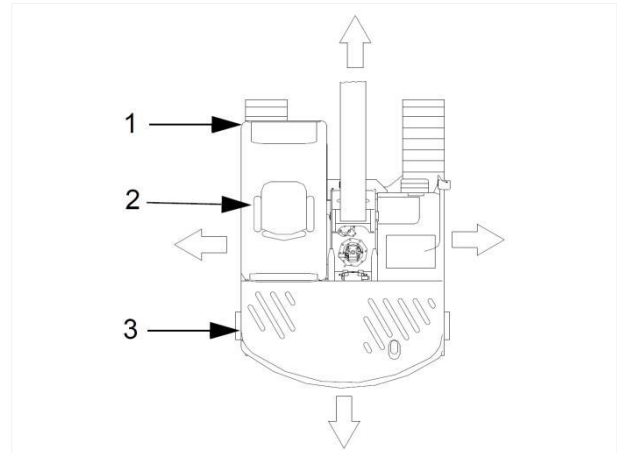
1. Park the machine on flat ground. Push the left and right travel control levers and the left and right travel pedals to the NEUTRAL position.



1. Left travel control lever
 2. Right travel control lever
 3. Left travel pedal
 4. Right travel pedal
2. Lower all the work implement onto the ground and apply a slight downward pressure to the bucket.
 3. Run the machine at idling speed for 5 minutes to allow sufficient cooling of parts.
 4. Turn the start switch to the OFF position and take out the key (for the machine started or stopped with a key).
 5. Push the pilot shutoff lever to the OFF position and turn every switch to the NEUTRAL or OFF position.

Travel Control

1. Push the pilot shutoff lever to the UNLOCK position.
2. Operate the hand control levers to lift the bucket at about 20mm to 30mm above the ground.



1. Idler
2. Cab
3. Travel motor

⚠ CAUTION

Do not step on the pedals unless you intend to drive the machine; otherwise, a serious accident could result due to the sudden movement of the machine caused by an unintended start.

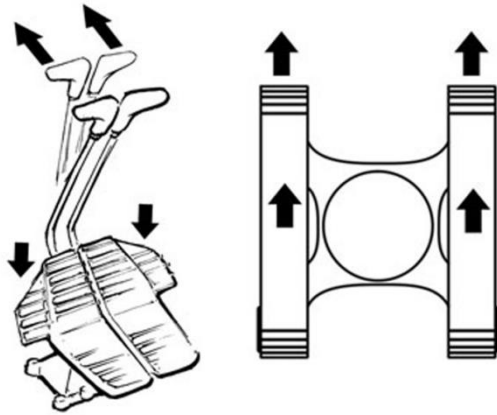
Before operating the travel control lever, check which direction the track frame faces. (The track frame is facing forward when the idler is at front and the sprocket is at rear.)

When the track frame is facing backward (the travel motor is at front), the machine will move in the opposite direction of the travel control lever.

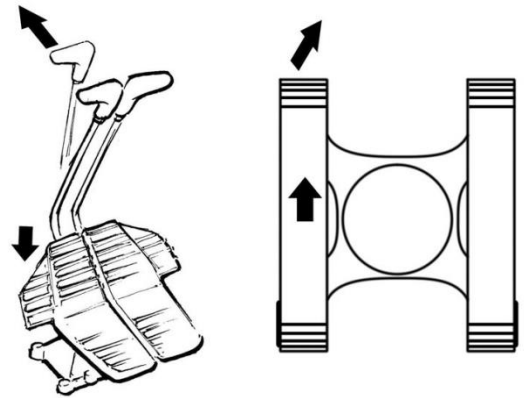
When traveling for a long distance, make sure the idler is at front and the sprocket is at rear.

Operate the travel control lever for the following actions of machine:

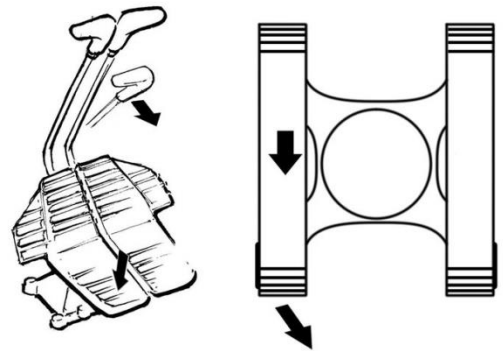
Forward



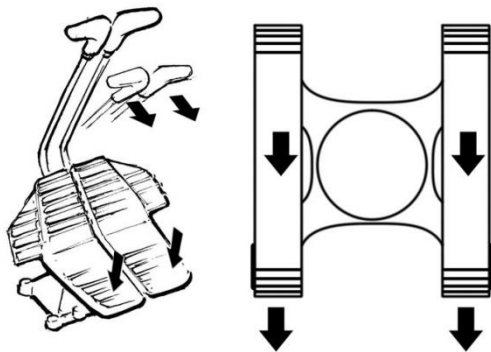
Right forward



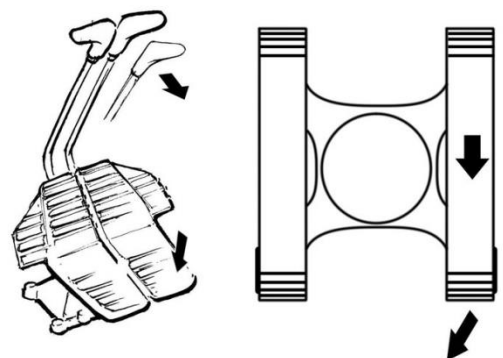
Left backward



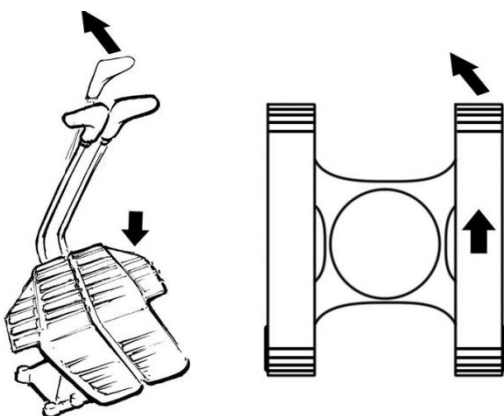
Backward



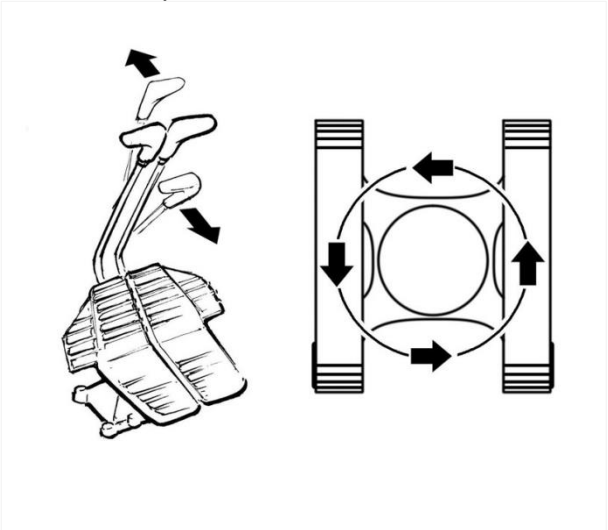
Right backward



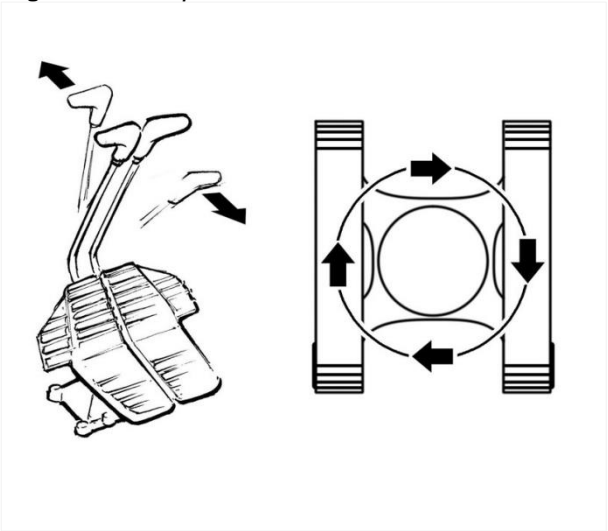
Left forward



Left turn on spot



Right turn on spot



⚠ CAUTION

The long distance travel of machine mainly refers to continuous traveling distance exceeding 100 meters or continuous traveling time exceeding 3 minutes.

If the machine needs long distance travel, it's suggested to use trailer. As long distance continuous travel may cause track roller's lubricant temperature to rise beyond the standard, and damage the track roller.

If the condition is limited, and long distance is a must, please follow below steps:

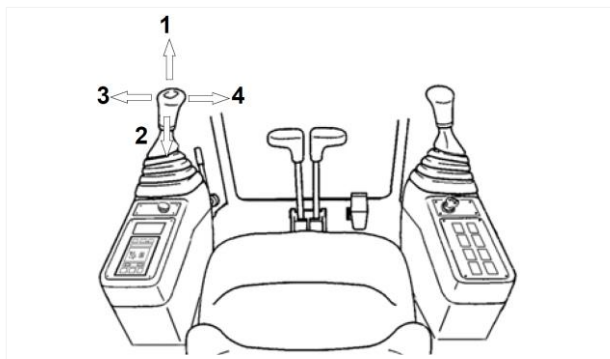
Ground conditions	Speed gear	Process instructions
Flat and normal ground	High speed "rabbit" gear	Once the machine travels for 20 minutes with its idler facing ahead, it shall be stopped for 10 minutes to cool down the travel motor. The machine can travel by repeating such steps. During traveling, a water truck can be used to spray water onto the track rollers within a safe distance, which can cool the track rollers quickly and prevent overheating.
Uneven, gravel, slope, scree, or coarse soil ground	Low speed "tortoise" gear	Once the machine travels for 30 minutes with its idler facing ahead, it shall be stopped for 10 minutes to cool down the travel motor. The machine can travel by repeating such steps. During traveling, a water truck can be used to spray water onto the track rollers within a safe distance, which can cool the track rollers quickly and prevent overheating.

Swing Operation

⚠ CAUTION

Be familiar with every control position and function before operating. You should not extend any part of your body out of the window frame. If not, the control lever could be operated by your body accidentally and you will be injured by the boom. If the window is missing or damaged, you should replace it immediately.

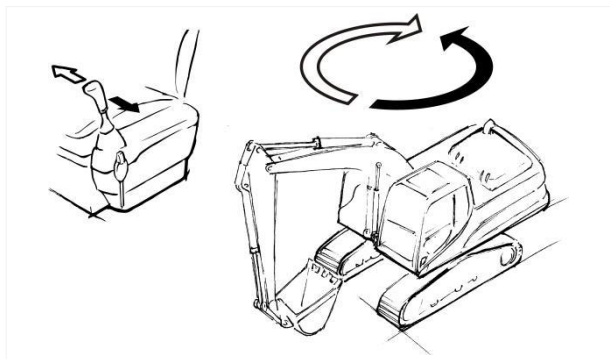
The left hand control lever is used to control the arm operation and swing operation. After being released, the control lever will reset to the NEUTRAL position and the arm/swing mechanism will stop moving.



1. Arm extend
2. Arm retract
3. Swing left
4. Swing right

Position (3) and (4) of the left hand control lever are used for the swing operation of the machine. After being released, the control lever will reset to the NEUTRAL position and the swing mechanism will stop moving.

Move the hand control lever to the left or right to swing the upper structure left and right.



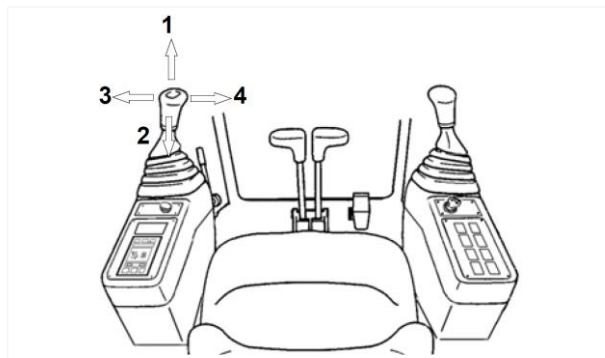
Work Implement Control

⚠ CAUTION

Be familiar with every control position and function before operating. You should not extend any part of your body out of the window frame. If not, the control lever could be operated by your body accidentally and you will be injured by the boom. If the window is missing or damaged, you should replace it immediately.

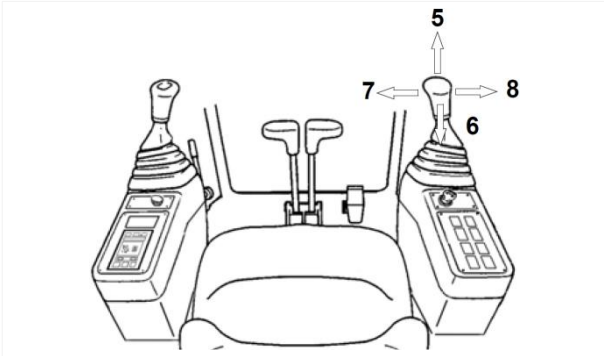
The left hand control lever is used to control the arm operation and swing operation.

After being released, the control lever will reset to the NEUTRAL position and the arm/swing mechanism will stop moving. Moving the control lever diagonally can perform both functions at the same time.



1. Arm extend
2. Arm retract
3. Swing left
4. Swing right

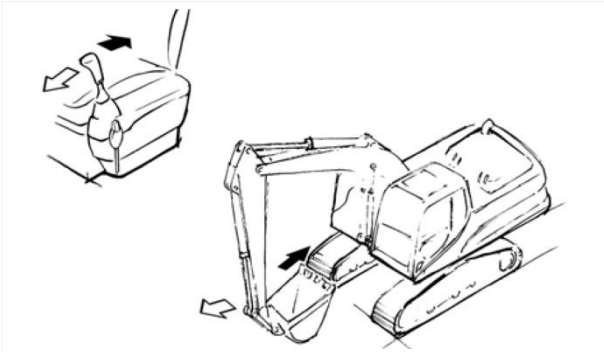
The right hand control lever is used to control the boom and bucket operation. After being released, the control lever will reset to the NEUTRAL position automatically, and the boom and bucket will stop moving. Moving the control lever diagonally can perform both functions at the same time.



- 5. Boom down
- 6. Boom up
- 7. Bucket in (dig)
- 8. Bucket out (dump)

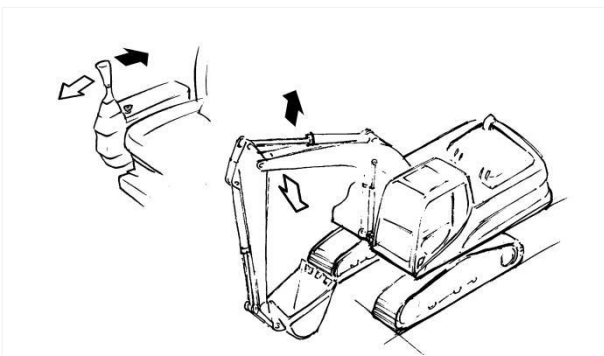
Arm Operation Control

The arm can be extended or retracted by moving the left hand control lever forward or backward.



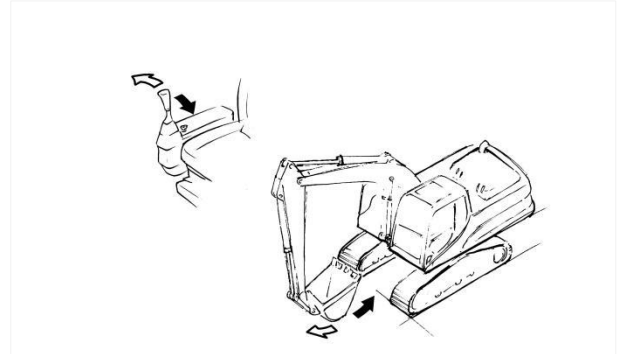
Boom Operation Control

The boom can be lowered or lifted by moving the right hand control lever forward or backward.



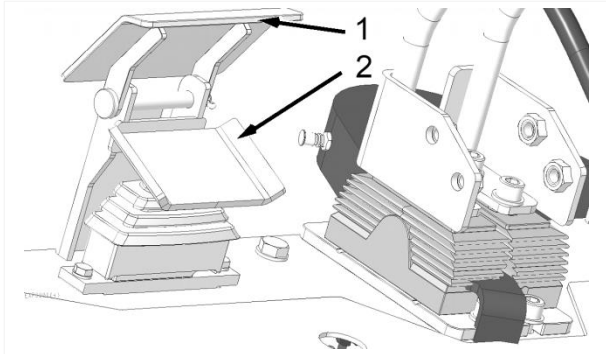
Bucket Operation Control

Bucket excavation or unloading can be performed by moving the right hand control lever left or right.



Auxiliary Pedal

The auxiliary pedal is located on the left side of the left travel pedal. The auxiliary pedal is used to control the attachment operation such as hydraulic hammer or hydraulic shear, etc.



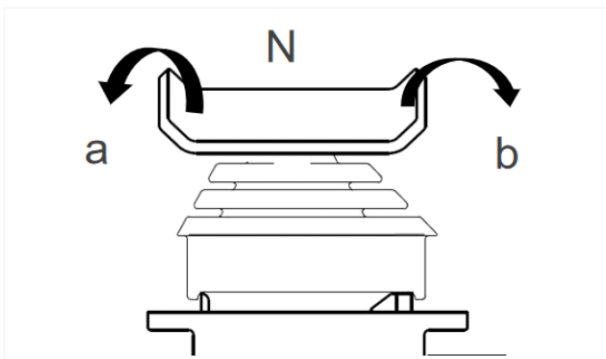
1. Cover
2. Auxiliary pedal

When operate the pedal, open the cover firstly.

When the one-way auxiliary pipe is connected, depress the pedal to the left (direction a) to control hydraulic hammer breaking;

When the two-way auxiliary pipe is connected, depress the pedal to the left (direction a) and the right (direction b) to control the opening and closing operation of the hydraulic shear separately;

Release the pedal, the pedal will reset to the NEUTRAL position (direction N) automatically, and the attachment stop moving.



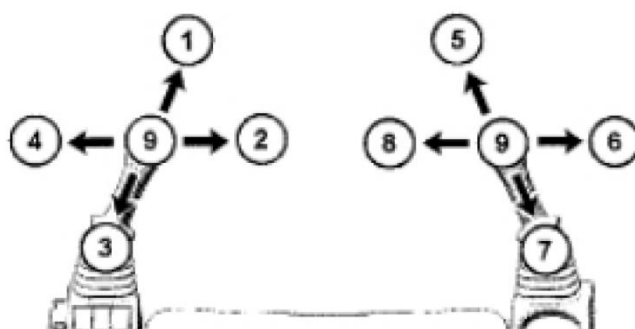
Refer to “Accessories and Optional Equipment” for the operation of setting the auxiliary pipe to the one-way or two-way.

Lever Operation Mode Switching

⚠ WARNING

The operation of the machine changes after the switching of the operation mode. Please read the warning information and understand relevant contents before switching the operation mode, and confirm the operation of the machine after switching the operation mode.

The operation mode of the machine can be changed. The machine provides four operation modes, namely ISO/SAE, MHI, BHL, and SCM, and the ISO/SAE standard mode is enabled by default. Users can select MHI mode /BHL mode /SCM mode based on their own needs.



- | | |
|-------------------------|--------------------------|
| 1. Left lever forward | 2. Left lever rightward |
| 3. Left lever backward | 4. Left lever leftward |
| 5. Right lever forward | 6. Right lever rightward |
| 7. Right lever backward | 8. Right lever leftward |
| 9. Lever at middle | |

Lever actions for the four modes are shown below:

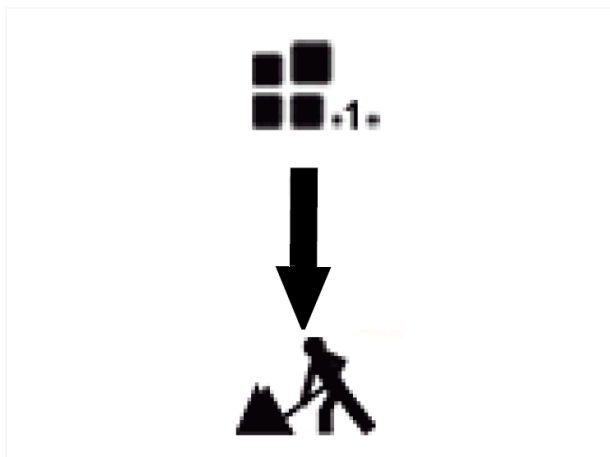
Operation mode	①Left lever forward	②Left lever rightward	③ Left lever backward	④Left lever leftward	⑤Right lever forward	⑥Right lever rightward	⑦Right lever backward	⑧ Right lever leftward
ISO/SAE	Arm extend	Swing right	Arm retract	Swing left	Boom down	Bucket out (unload)	Boom up	Bucket in (dig)
MHI	Swing right	Arm retract	Swing left	Arm extend	Boom down	Bucket out (unload)	Boom up	Bucket in (dig)
BHL	Boom down	Swing right	Boom up	Swing left	Arm extend	Bucket out (unload)	Arm retract	Bucket in (dig)
SCM	Boom down	Bucket out (unload)	Boom up	Bucket in (dig)	Arm extend	Swing right	Arm retract	Swing left

For specific operations on lever operation mode switching, please refer to "Operation Settings" in the chapter "Monitoring System".

Working Mode Selection

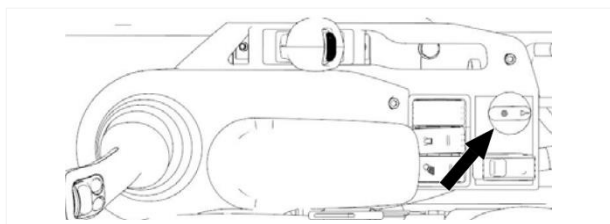
The user can set the power mode to the most effective mode that matches the current working condition. Use the following operation methods to enter the power mode selection screen.

Press the soft button “Flip” and “Power mode switching” in sequence to enter the power mode.



Power mode	Applicable operations
P mode (Power)	Efficient mode. Applicable to heavy load conditions for higher work efficiency.
E mode (Economy)	Economy mode. Applicable to light load conditions for lower fuel consumption.
B mode (Breaking)	Crushing mode. It is suitable for crushing conditions.

Working Speed Selection

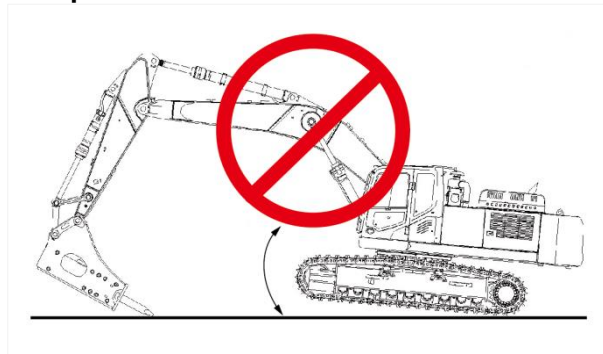


The engine speed (level 1-10) can be adjusted through the engine speed knob on the control panel. The current level of engine speed is displayed in the status information area on the main screen of the display.

For specific operations on the selection of working levels, please refer to “Engine speed knob”.

Avoid Improper Operation

Do not use hammer to support the machine for operations



Do not carry out following operations with swing force:

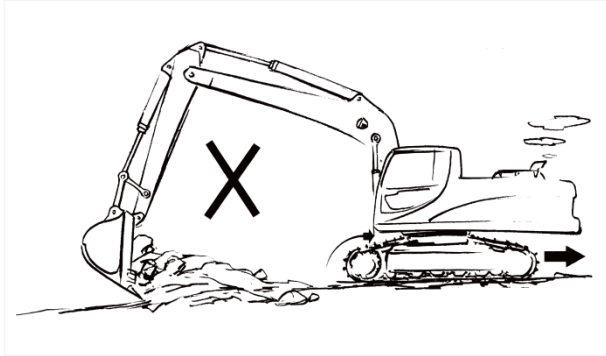
1. Do not use the swing force for compacting or breaking.
2. Do not rotate the machine when the bucket teeth are in the soil.
3. With an attachment fitted, do not lift the machine using the boom and arm, and then operate the swing function.



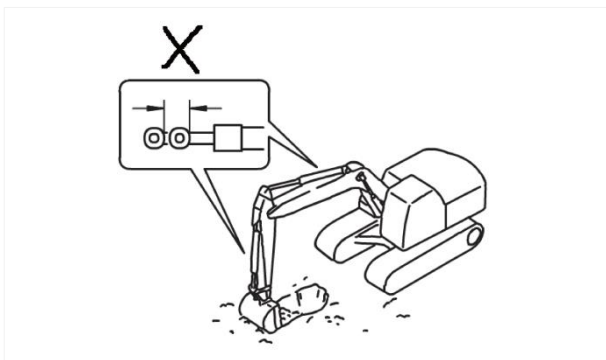
Such improper operation is dangerous and will significantly shorten the service life of the machine.

Do not carry out the following operations with travel force:

Do not plough the ground with the bucket. Using the driving force to dig will damage the machine or work implement.



Do not carry out the following operations when the hydraulic cylinder reaches its end of stroke:

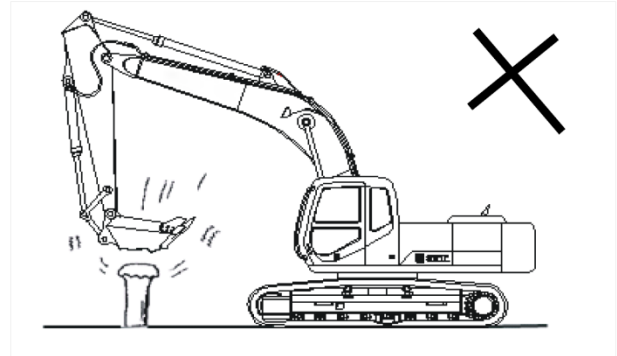


Operating the machine when the cylinder piston rod reaches its end stroke will damage the work implement and hydraulic cylinder. Do not operate the machine when the cylinder is fully retracted or extended.

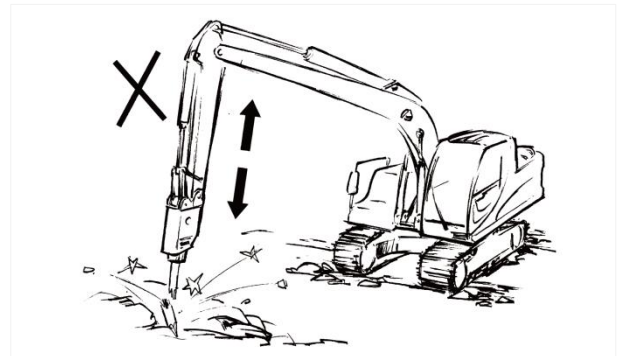
Try not to operate the hydraulic cylinder using short strokes repeatedly. Oil in the cylinder will fail to flow back to the radiator for cooling, which could cause a high temperature in the cylinder and cause the piston rod coating to be burnt and the piston rod to be discolored. If this is unavoidable, operate the cylinder for a longer stroke to let the oil flow back to the oil tank for cooling.

Do not carry out the following operations with the attachment's descending force:

1. Do not use the falling force of the bucket for digging, hammering, or pile driving. This will shorten the service life of the machine significantly.

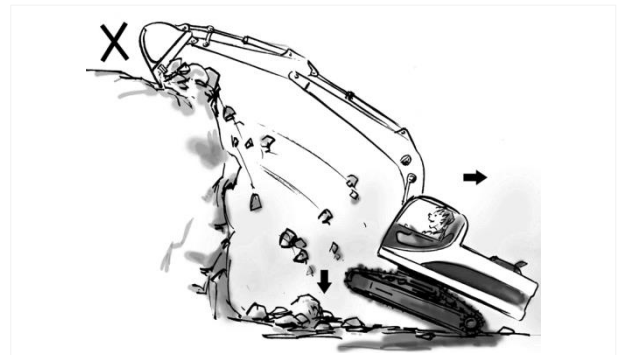


2. Do not break the ground with the attachment's falling force. This will significantly shorten the service life of the machine.

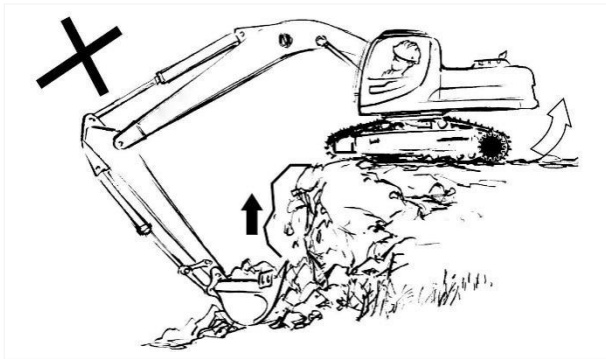


Do not carry out following operations with the machine's descending force:

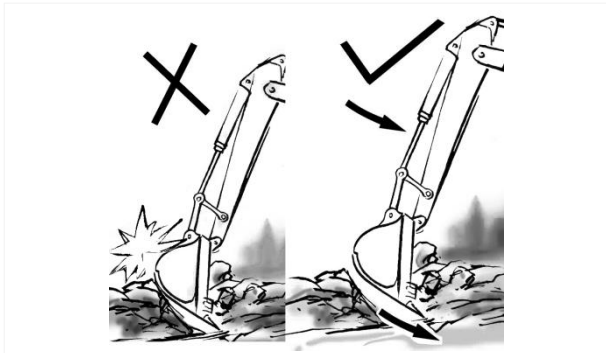
1. Do not excavate with the machine's descending force.



2. Do not lift the rear end of the machine to use the falling force of that weight as additional digging force. This may cause serious damage to the machine.



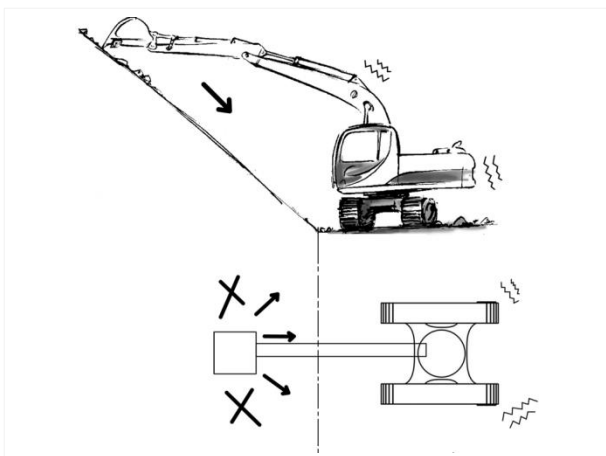
Do not use the bucket as a lever:



Do not place the bucket on or between rocks as a lever for excavation. This will exert too much force on the chassis and bucket and therefore damage the machine.

In this case, only the power of the arm or bucket can be used for excavation. If excessive force is applied, the safety valve of the hydraulic system will control the force within an appropriate range to prevent damage to the machine.

Improper operation when the attachment is higher than the machine.



If the machine swings and excavates at the same time and the bucket is higher than the machine, the bucket teeth will slide down on the rock surface when they are not engaged into hard rocks. In this case, the machine may strongly vibrate, which may crack or damage the work equipment.

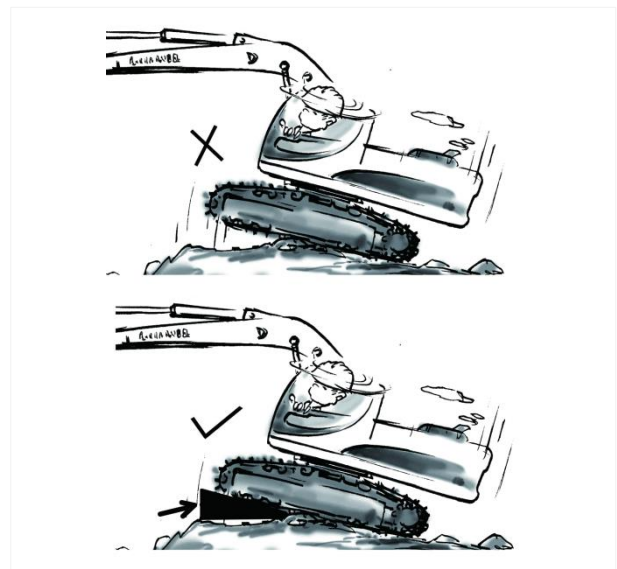
If the bucket body slides and collides with the rock, it will generate excessive impact load on the work implement and the frame, thereby shortening the service life of the machine.

Direct excavation on hard rocky ground is prohibited.

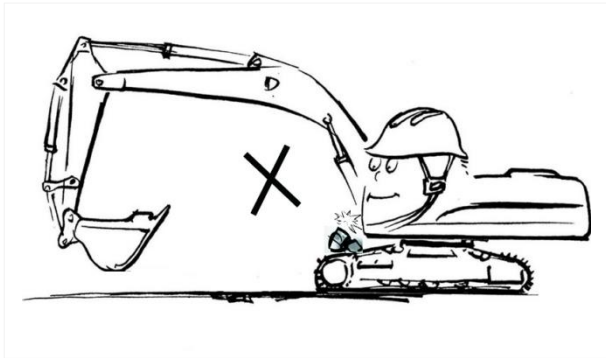
Do not excavate hard rocky ground directly. It is recommended to excavate after the ground has been broken. This will not only protect the machine from damage, but also help to improve economic efficiency.

Do not operate when the machine is unstable.

If the machine is operated with unstable chassis, torsional load will be applied on the frame, thus shortening the service life of the machine. In this case, methods such as placing embankment in front of the chassis can be adopted to stabilize the machine before operation.



Do not rotate and travel when there are rocks or gravel on the upper part of the track.



In case of swinging and traveling with rocks or gravel on the upper part of the track, the platform bottom plate and frame may be hit and damaged. In serious cases, hydraulic components may be damaged. During the machine operation, it is necessary to constantly check the upper part of the track for rocks and gravel.

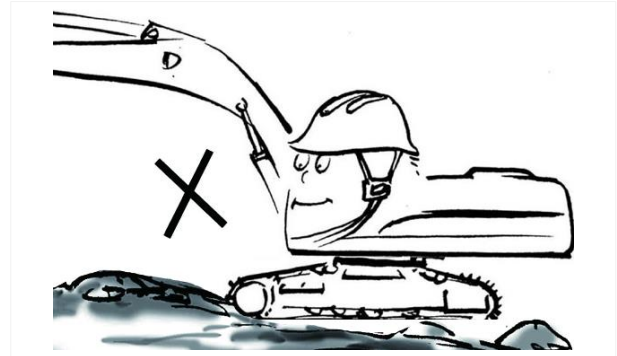
Do not change gears suddenly while driving at high speed



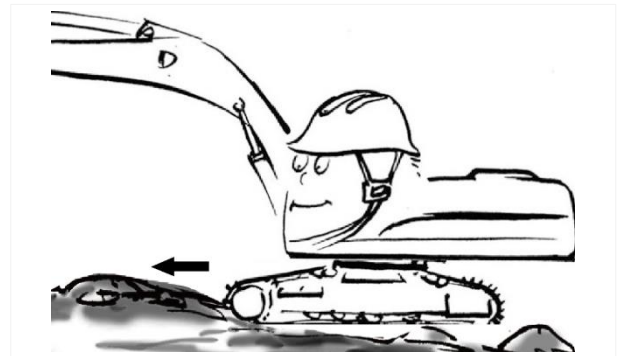
- Do not operate the lever and pedal suddenly, or move the machine rapidly in any way.
- Do not push the travel control lever suddenly from FORWARD to REVERSE (or from REVERSE to FORWARD).
- When driving at high speed, do not suddenly operate the lever or pedal (or release the lever or pedal suddenly) to stop the machine.
- Do not switch the working mode and working speed gear during traveling.
- Do not switch between fast and slow gears during traveling.

Do not drive the machine at high speed on rough terrains.

If the machine runs at a high speed on rough and rugged terrain, the chassis will suffer greater load, which shortens the service life of the chassis.



When driving on rough and rugged terrain, it is necessary to position the idler in front of the machine in the driving direction, and drive the machine at a low speed.



Do not run the machine continuously for a prolonged time.

1. If the machine runs continuously for a prolonged time, the lubricating oil temperature of the track roller and the driving device will rise, which may lead to oil seal fracture or oil leakage.

When the machine runs at a high speed for more than 1.5 hours or at a low speed for more than 1 hour, it needs to be shutdown for 30 minutes to allow the lubricating oil for the track roller and the travel reduction gear to cool down.

For precautions regarding machine traveling, please refer to "Travel Control".

- The chassis may be damaged if the machine runs continuously for a prolonged time with the track being loose. Therefore, when the machine is running for a prolonged time, the track tension shall be checked every 1.5 hours and any adjustment shall be made in case of a loose track.

For the adjustment of track tension, please refer to "Track Tension--Check/Adjust".

Precautions for Operation

Driving and Operation on Slopes

Lift the bucket about 20 to 30cm off the ground when traveling.

Always operate or travel in a reliable manner and stop safely at any time if the machine slips or becomes unstable.

Do not work or travel on steel-covered slopes. Even a slight slope is dangerous for the machine may slip.

Do not make turns on slopes or try to cross slopes. Be sure to carry out these operations at a flat place. It may be a longer but safer route.

Do not open or close the door while the machine is on a slope. Whether the cab door is open or closed, always keep the door lock in the correct position.

It is not recommended to drive on steep slopes with a gradient over 33° to avoid the danger of the machine tipping over.

When driving on a slope with a gradient of no more than 33° , switch the travel motor and engine gear to a low-speed gear and keep running at a low speed.

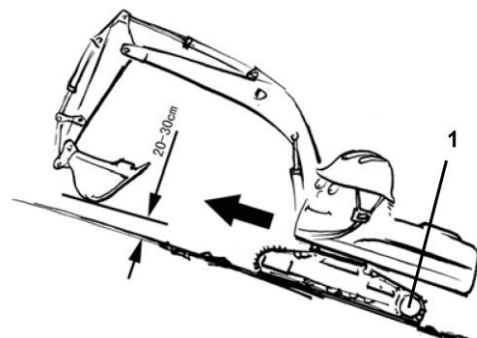
Precautions when Driving Uphill

⚠ WARNING

When driving the machine uphill, if the track slips or the machine needs extra force to drive the machine forward, do not use the arm force to help the machine go uphill, otherwise the machine may tip over.

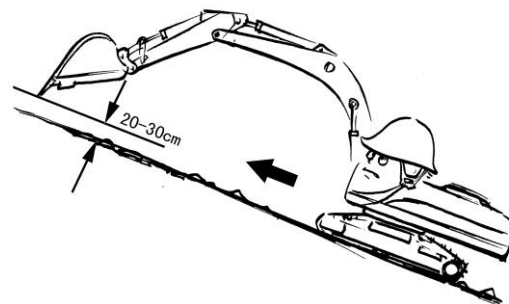


When the machine is on a hillside with a gradient lower than 15° , set the working equipment as shown in the figure and drive at a low speed.



1. Travel motor

When the machine is over a steep slope with a gradient over 15° , extend the work implement forward to improve the balance, keep the work implement about 20 - 30 cm above the ground, and drive at a low speed.



Precautions when Driving Downhill

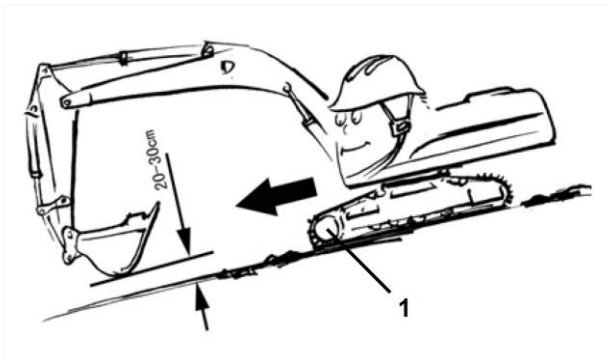
⚠ WARNING

Do not drive in reverse when driving downhill.

When driving downhill, pushing the travel control lever to the NEUTRAL position can stop the machine from moving.

When driving downhill, keep at low speed by using the travel control lever and engine speed knob.

When driving down on a slope with a gradient over 15°, set the working equipment as shown in the figure and drive at a low speed.



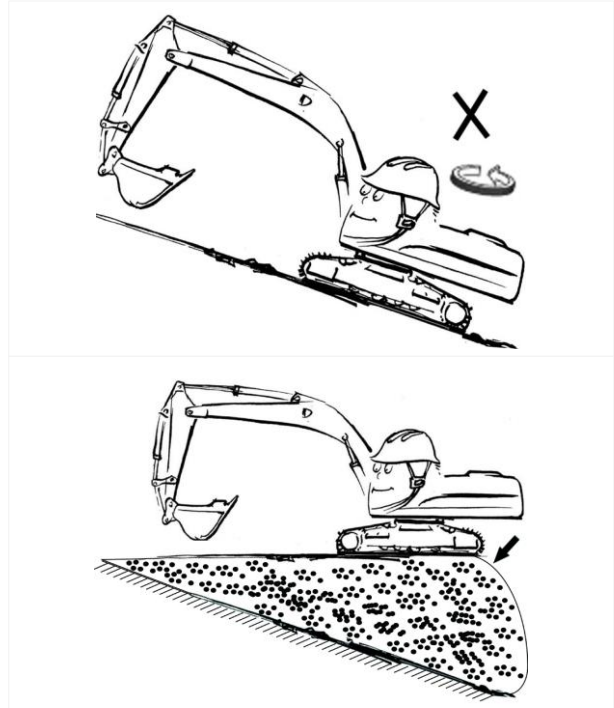
1. Travel motor

Precautions on Slopes

When the engine is facing down a slope, do not swing the machine with the hand control lever. The upper structure may swing under its own weight.

Engine shuts down on the slope: When driving uphill, if the engine shuts down, you need to push all of the control levers to Neutral position, and set the pilot shutoff lever to LOCK position, then starting the engine again.

When swinging or operating the working equipment on a slope, the machine may lose balance and tip over. Swinging the bucket downhill with a load in the bucket is extremely dangerous. Such operations shall be avoided to the greatest extent. If necessary, build a platform on the slope so that the machine can be horizontal.



Driving on Roads with Obstacles

Drive the machine to across the boulders, tree stumps or other obstacles may cause a huge impact on the chassis (especially on the tracks), and damage the machine. Therefore, remove the obstacles as much as possible or drive the machine detour around the obstacles or take other measures to avoid directly driving the machine across any obstacles.

Driving on Uneven Roads

When driving on rough and rugged terrain, it is necessary to position the idler in front of the machine in the driving direction, and drive the machine at a low speed.

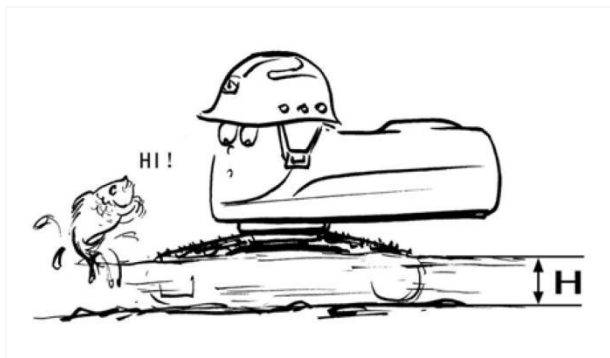
Working in Muddy Water

⚠ CAUTION

When driving the machine out of the water, if the angle of the machine to the ground exceeds 15° , the rear end of the upper mechanism will enter the water. The water will be raised by the cooling fan and this will damage the cooling fan. Be very careful when driving the machine out of the water.

Do not drive the machine in water, mud or sand that exceeds the center of upper carrier roller.

If the machine needs to work under water, make sure that the ground is strong enough to support the machine and the water is below the carrier roller.



Check the machine position frequently if it works under water. If necessary, adjust the machine position in the water.

After completing the work, make sure to add grease to the parts soaked in the water for a long time until the old grease overflows. (Special attention needs to be paid around the bucket pins.)

Prevent the swing bearing raceway, swing bearing gear and center joint from being submerged. If the swing bearing raceway, swing bearing gear and center joint are submerged, refer to the "Maintenance Manual" contents to drain the slurry and water, and clean the swing area. Lubricate the swing bearing raceway and swing bearing gear.

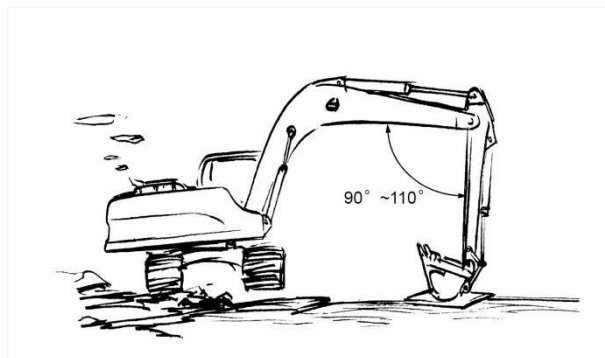
Working on Loose Ground

If the machine needs to drive on very loose ground, use a plate to make sure that the ground is strong enough to support the machine.



If the machine works on very loose ground or the machine is blocked from moving, clean the surrounding area of track frame.

Rotate the upper structure to 90° and lower the bucket to lift the track off ground. Keep the boom and arm at an angle of 90° or 110° , then lower the bucket to the ground.



⚠ CAUTION

Slowly lift the single side track, and pay attention to safety.

Rotate the track forward and backward to remove the mud and dirt on the track.

Lower the engine speed and travel speed, drive the machine slowly to hard ground.

If the machine is blocked and engine can be started, towing is allowed. Install the authorised towing equipment correctly.

Precautions for Long Distance Travel

The long distance travel of excavator refers to continuous travel distance of more than 100 meters or continuous travel time of more than 3 minutes.

The long distance travel may cause the roller body temperature of track roller and carrier roller to rise. When the roller body temperature exceeds 75°, the seal may be damaged, resulting in seal failure and oil leakage. After oil leakage, the roller shaft and sleeve are in a dry friction state, which will lead to excessive wear and failure in a short period of time.

To prevent roller body from heating up too quickly, the following measures can be taken:

Before long distance travel, the soil around the tracks and rollers should be removed. Dry soil can easily cause significant wear on tracks and rollers, thereby shortening their service life.

During traveling:

1. Stop for 10 minutes for every 20 minutes of traveling uphill and downhill.
2. Stop for 10 minutes for every 30 minutes of traveling on the flat ground.
3. During traveling, a water truck can be used to spray water onto the track rollers within a safe distance, which can cool the track rollers quickly and prevent overheating.

When the temperature of any track roller (usually check the first and last track rollers) exceeds 90°, immediately stop traveling until the temperature drops to 40° before continuing traveling.

Recommended Operations

Preparation for Operation

Operate the machine only on flat ground. Before operating, level the job site to remove an uneven surface, fill a pit or remove sharp stones.

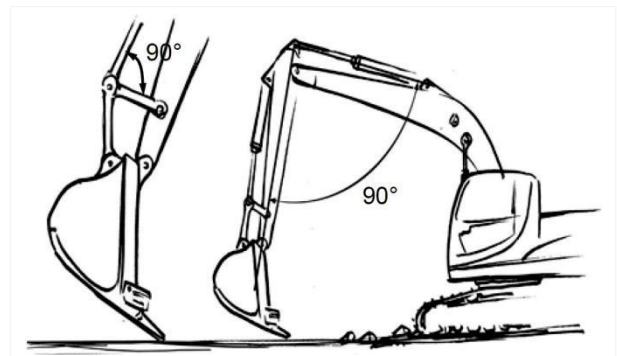
You should learn about the area where you will be working in advance. You should check: the position of a slope, visible ditches, falling or hanging objects, conditions of soils (soft or hard), accumulated water and swamp areas, rock and stubs, hidden groundwork, posts or the outer limits of walls, the outer limits of the areas where garbage is buried or that are filled in with earth, holes and openings, obstacles, mud or ice, traffic, heavy dust, heavy smoke, heavy fog, the exact locations of the cables or pipes for power supply, gas supply, phone service, water supply, sewage disposal and other utilities that are hidden or hung. If necessary, before starting work, you should ask the utility companies to mark out, close or move out these utilities.

In addition to the following, the scope of application can be further expanded by various attachments.

Excavation

Backhoe is applicable to excavating areas below the machine.

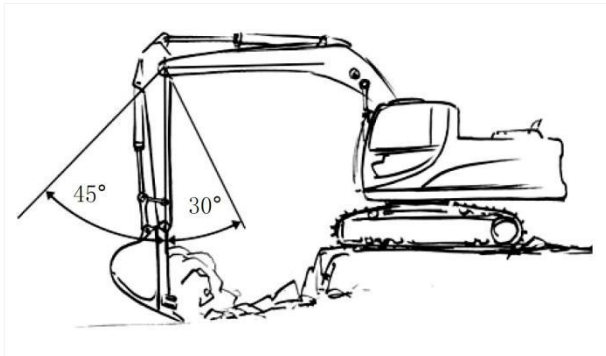
When the machine is in the state as shown in the figure (the angle between bucket cylinder and rocker is 90° and the angle between arm cylinder and arm is 90°), the maximum digging force of each cylinder thrust can be obtained.



During excavating, you can effectively use this angle to optimize productivity.

The range of excavation with the arm is from 45° further away from the machine to 30° closer to the machine.

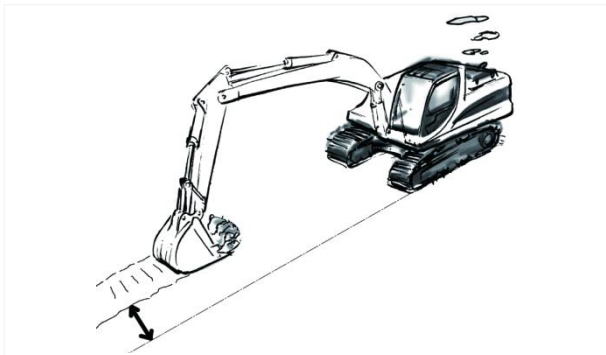
There may be some differences depending on the depth of excavation, but try to keep within the range described above rather than operating the cylinder to the end of the stroke.



Trench Excavation

An excavation bucket is provided for digging more effectively, and the excavation track shall be set parallel to the trench being excavated.

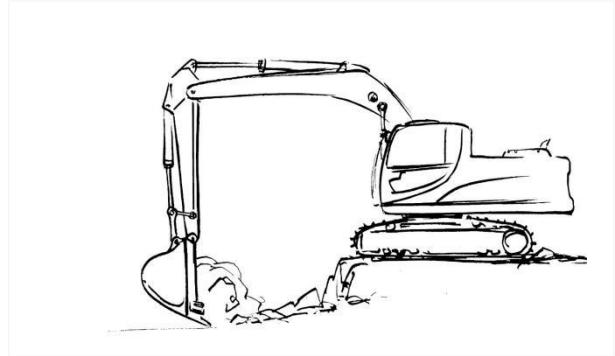
To dig a wider trench, first dig both sides, and then the middle part.



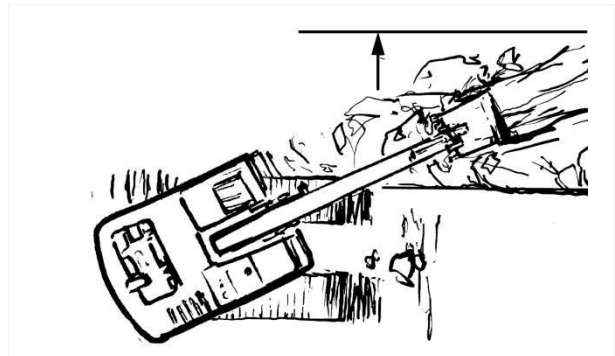
Excavation of Box Pit

An excavator can be used to dig a box pit with both length and width two times those of bucket and a depth equivalent to the bucket height.

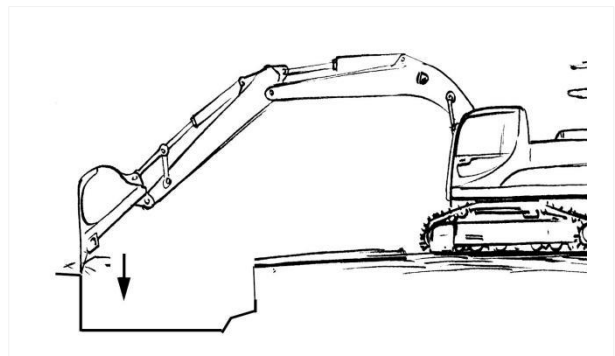
During excavation, adjust the bucket teeth to be perpendicular to the ground surface, and then operate the boom, bucket rod and bucket together to gradually excavate downwards, ensuring that the excavation plane is straight.



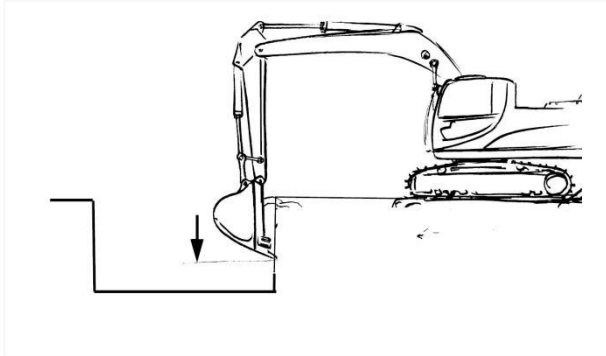
The vertical leveling of left and right side faces of pit shall be carried out in accordance with the main points of trench excavation.



At the beginning of leveling of side face far away from the excavator, the bucket rod shall extend to about 80% of its full length rather than 100%. Move the bucket teeth against the excavation surface. Lower the boom and withdraw the bucket rod at the same time. Meanwhile, open the bucket little by little to ensure that the side face is vertical and even.



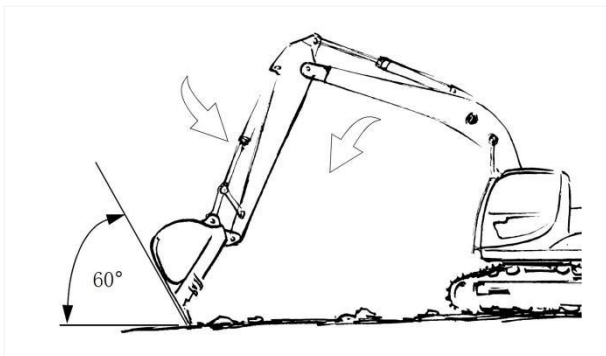
When leveling the side face near the excavator body, move the bucket teeth against the excavation surface and adjust the bucket rod to be perpendicular to the ground surface; lower the boom and extend the bucket rod; meanwhile, gradually open the bucket to ensure that the working face is vertical and even.



When leveling the pit bottom surface, move the bucket teeth against the pit bottom, and then move the bucket for excavation with its bottom horizontally.

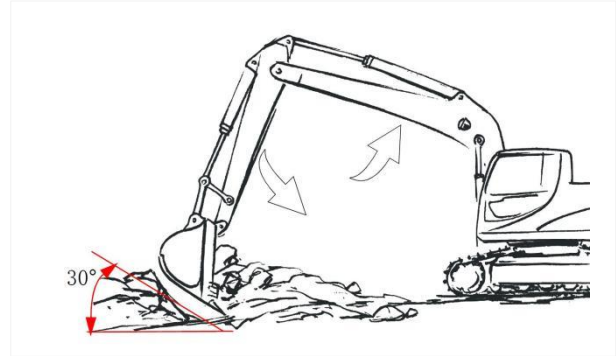
Excavation in Loose Soil

In case of excavation on loose soils, the angle of bucket bottom should be about 60° (increasing about 20% workload compared with natural angle); the boom shall be lowered while the bucket arm is withdrawn till 2/3 of bucket edge is below the ground surface; then, the bucket and its rod shall be used together for excavation.



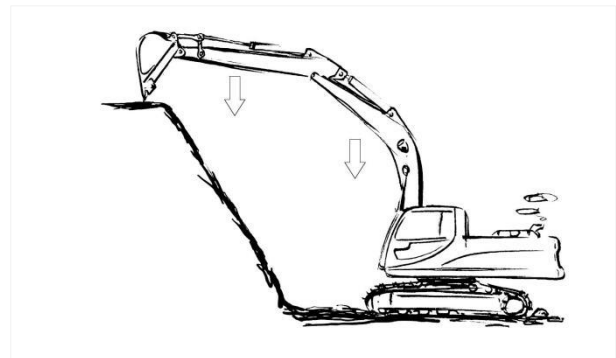
Excavation in Hard Soil

In case of excavation on natural ground surface with sandy soils, the angle of bucket bottom should be about 30° ; the bucket shall be withdrawn till 1/3 of bucket edge is below the ground surface; the angle between bucket bottom and ground surface shall be kept at 30° during microoperation (lifting of boom); the bucket rod shall be withdrawn horizontally; according to the condition of the soil entering the bucket, excavate with the bucket.



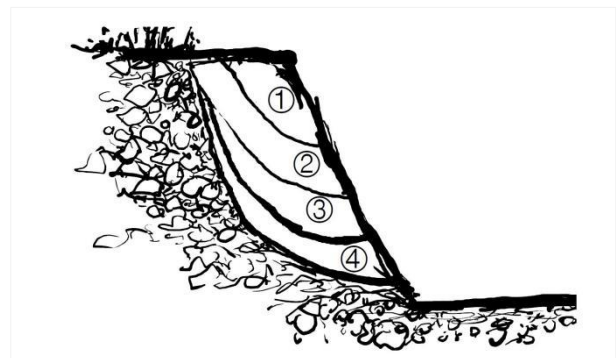
Excavation of Banks

During excavation of banks, the angle of bucket bottom shall be almost 90° ; then, the bucket rod shall be withdrawn and the boom shall be lowered for excavation.



Excavation sequence of banks:

1. In case of (1) and (2), both bucket and its rod shall be used for excavation. In this case, the force shall not be too strong because the front part of machine body may tilt (the falling impact is very strong when the load is released).
2. In case of (3) and (4), the boom shall be used for pushing and the excavation shall be carried out by virtue of machine weight. In this case, the boom shall be properly lifted to avoid excessive tilting of machine body.



Leveling of Working Face

Leveling of ground surface

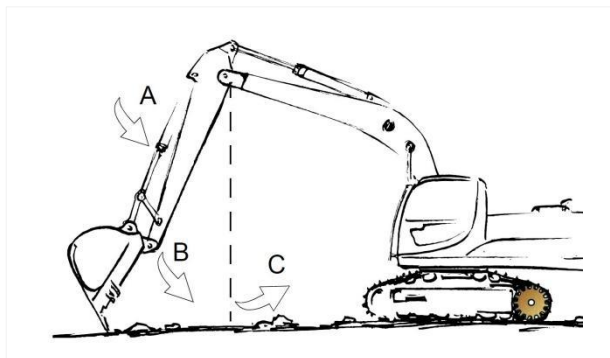
There are two operating methods for leveling the ground surface, namely, leveling with bucket teeth and leveling with bucket bottom.

1. Leveling with bucket teeth

Horizontally move the bucket teeth on the ground surface to level both soils and stones.

Extend the bucket rod and lower the boom till the bucket teeth is perpendicular to the ground surface. Slowly lift the boom and simultaneously withdraw the bucket rod.

Once the bucket rod moves beyond the perpendicular position, slowly lower the boom to keep the bucket moves on the ground surface smoothly.



A. Movement direction of bucket rod

B. Lift of boom

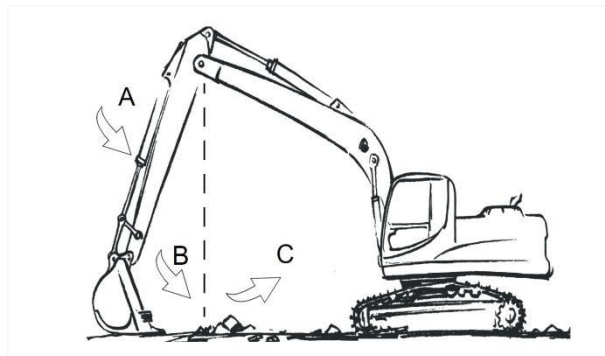
C. Lowering of boom

To keep the bucket teeth moving horizontally, the leveling of ground surface can be completed by simultaneously operating the boom, bucket rod and bucket in a harmonious manner.

2. Leveling with bucket bottom

Horizontally move the bucket bottom on the ground surface to gather both soils and stones together.

Extend the bucket rod and lower the boom till the bucket bottom is parallel to the ground surface. Before the bucket rod reaches its perpendicular position, withdraw the bucket rod and lift the boom little by little to keep the bucket bottom moving horizontally.



A. Movement direction of bucket rod

B. Lift of boom

C. Lowering of boom

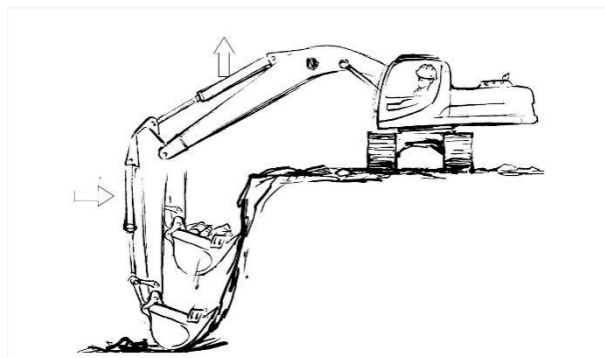
After the bucket rod moves beyond the perpendicular position, withdraw the bucket rod and simultaneously lower the boom little by little. Note that the bucket shall be moved back to its original position little by little.

To keep the bucket bottom moving horizontally, the boom, bucket rod and bucket shall be operated at the same time.

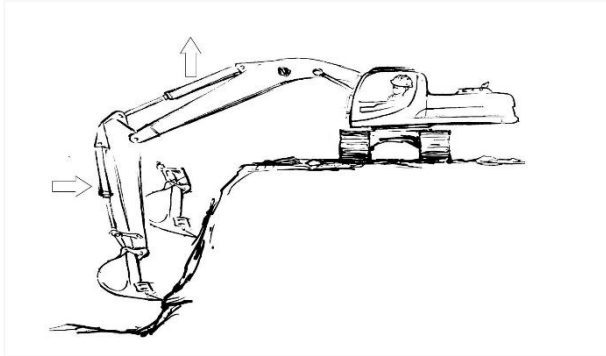
The leveling with bucket bottom also applies to leveling of farmland.

Leveling of working face on slope

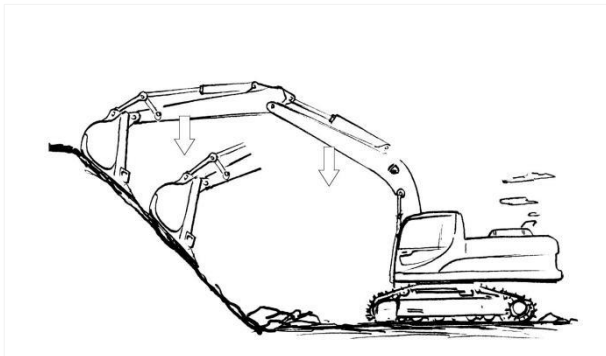
If a working face is covered with loose soils, slightly push and press the ground surface with the bucket bottom, keep a certain angle of bucket bottom, and lift the boom and withdraw the bucket rod.



If the working face is a natural ground surface, slightly excavate and cut the ground surface with the bucket.



If the working face is above the excavator, adjust the angle of bucket bottom to be identical with the slope angle of working face; then, lower the boom and withdraw the bucket rod at the above angle of bucket bottom; finally, use the bucket teeth for backing-off cutting. When the angle of bucket bottom is too large, the bucket teeth will enter the working face so the backing-off cutting will be excessive. That is to say, it is very important to keep the angle of bucket bottom properly. If the angle of bucket bottom cannot be corrected in time, pause the boom and bucket rod, correct the angle, and perform the operations again.



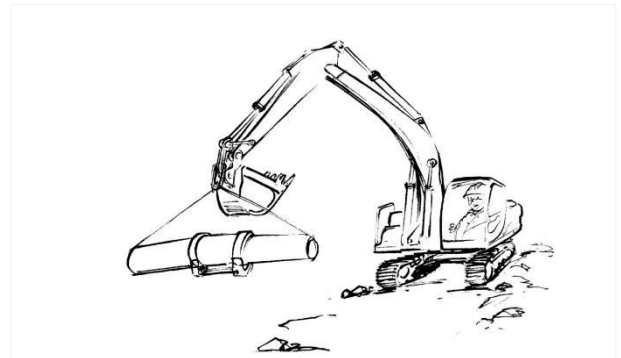
During rough leveling, the bucket rod shall be operated with its full travel and the operation speed is high. During precise leveling, the bucket rod shall be operated with its half travel. During fine leveling, the operation shall be carried out with the engine running at the 50%~70% of its full speed.

Lifting Operation

⚠CAUTION

The machine power, rated capacity and width should be taken into account before lifting. Do not exceed the lift capacity of the machine, otherwise, damage and personnel injury will result.

This excavator only can be used for lifting when the bucket is provided with a special hook. Standard buckets can not be used for lifting.



Make sure that the shackle, lifting ropes, hooks and so on are free from wear or damage. Make sure all of the lifting devices have proper capacity.

Rotate the upper structure to locate the sprocket at the rear side.

Lower the engine speed when lifting.

Practice a lift in advance. Secure the lifted load to the lifting device. Lift the load off ground for 50 mm and rotate the upper structure by 90° to the other side. Operate the work equipment slowly to lift the load away from the excavator to avoid shake or movement. If necessary, use an extra towing rope to control the lifting.

If the load or the excavator is unstable, put the load onto ground and stop lifting.



Do not move the load suddenly. Do not lift the load overhead.

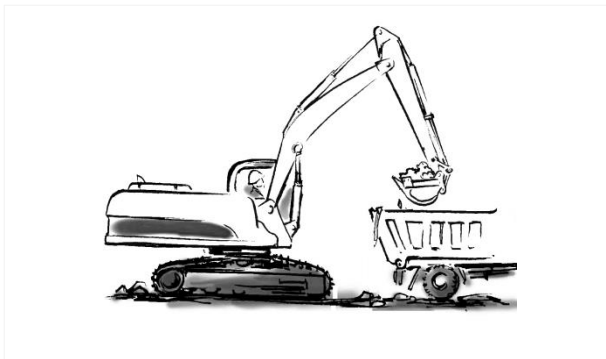
Keep anyone away from the load until it is laid on the ground securely.

Use a signalman and obey his signals when several operators work at the same time.

Dump Truck Loading Operation

In a place where the swinging angle is limited, the dump truck shall be placed in a way that is easy for the user to see to improve the work efficiency.

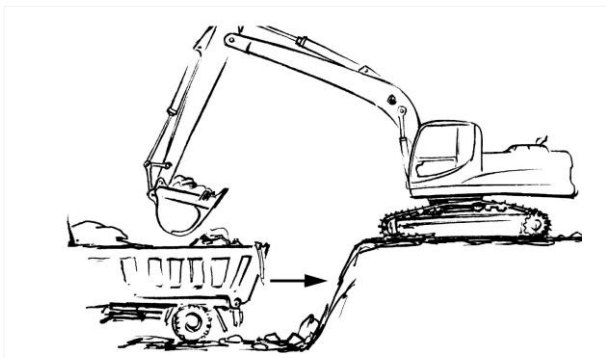
It is easier but takes more work to load from the back of the dump truck body than from the side.



There are two methods for transferring materials from excavator to dump truck, namely, backhoe loading method and rotary loading method.

Backhoe loading method

It is to load a dump truck from a foundation higher than the truck. This method has advantages of relatively high efficiency, open view and easy loading.

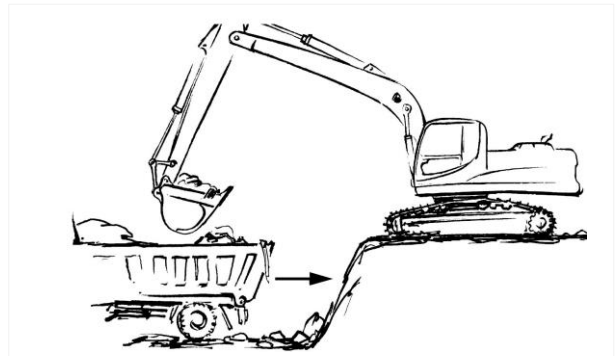


In case of this method, a platform as high as or a little higher than the dump truck can be built up, and the platform shall be flat and solid.

When the dump truck backs up, the driver shall pay attention to the position of bucket. After the truck moves in a position convenient for observation, the excavator operator shall honk to tell the truck driver to stop.

Rotary loading method

When an excavator and a dump truck are on the same horizontal foundation, the excavator must turn back for loading. The work efficiency of this method is lower than that of the previous one, and this method is only adopted in restricted sites.



Loading from the rear of the dump truck body is easier than loading from the side, and loading efficiency is higher.

In case of the last operation, the bucket rod shall be extended, and the bucket and its rod shall be used together to level the soils in the truck compartment.

Reduction of Energy Consumption

The methods for reducing energy consumption are as follows:

- Avoid unnecessary engine idling
- Avoid hydraulic pressure relief
- Run the engine at a low speed
- Avoid excavation at a high place
- Run with minimum swing angle
- Travel at low speed

We can provide users with operational training to improve work efficiency and reduce energy consumption. If necessary, please contact your Kioti dealer for details.

Precautions for Dozer Operation

The dozer can only be used for dozing. Do not use it for digging; otherwise, the dozer or the undercarriage system will be damaged.

The dozer cannot bear a large or offset load; otherwise, the dozer or the undercarriage system will be damaged.

When traveling, keep the dozer away from any fixed obstacles; otherwise, the dozer or the undercarriage system will be damaged.

Do not touch an obstacle with the dozer; otherwise, the dozer, cylinder, undercarriage system, or other parts of the machine will be damaged.

When the machine travels forward, be careful as the dozer may contact the boom cylinder or bucket.

When digging, operate the dozer backward to maintain safety.

When operating the bucket near the dozer, pay attention not to hit the dozer.

When using the dozer for lifting the machine, make sure the road surface is firm and level and the dozer contacts the ground evenly.

Bucket--Replace

Bucket--Remove

⚠ WARNING

Failure to follow the installation and removal instructions provided below may result in injury or death. If there are more than one personnel installing and removing operation tools, special attention must be paid.

Determine the verbal communication language and hand gestures to be used during installation.

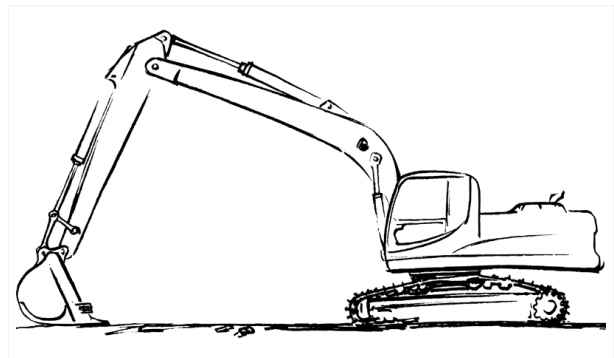
Pay attention to the sudden movement of the front bucket link and working tools.

Do not put your finger into the hole of the support pin when it is aligned with the hole.

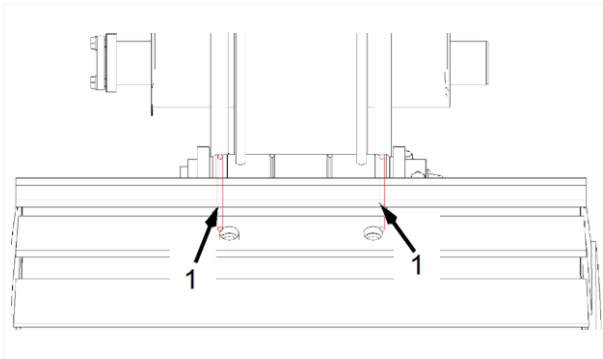
⚠ CAUTION

To remove the bucket pin without causing damage to the pin, bearing, and O-rings, place the bucket on the ground with the arm vertically as shown below.

1. Start the machine and park the machine on a hard and horizontal surface. Position the bucket, arm, and bucket link as shown and turn off the machine.



2. Slide the O-ring (1) out of the pin joint and onto the bucket wear plate.



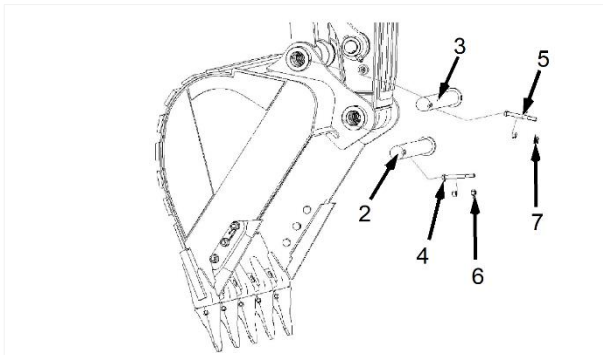
1. O-ring

⚠ WARNING

When removing the pin assembly, the bucket link assembly may swing out of the bucket. To avoid personal injury, do not stand in front of the bucket link assembly when removing the pin assembly.

⚠ CAUTION

Due to the large pressure on the support pin, it may not be easy to remove the support pin. The pressure on the support pin can be relieved by adjusting the front bucket link.



2. Support pin
3. Support pin
4. Anchor bolt
5. Anchor bolt
6. Nut
7. Nut

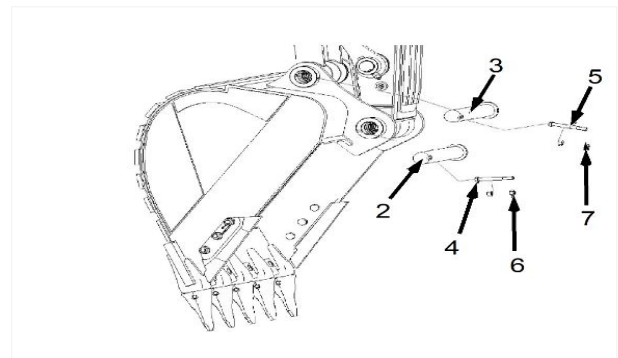
3. Remove the support pin (3) by removing the nut (7) and anchor bolt (5) from it.
4. Remove the support pin (2) by removing the nut (6) and anchor bolt (4) from it.
5. Start the machine and lift the arm out of the bucket.
6. Remove the O-ring (1) from the bucket flange.

⚠ CAUTION

After removing the support pin, make sure that the support pin is not contaminated by grit or dirt. Ensure that the seals of the arm end and bucket link end are not damaged.

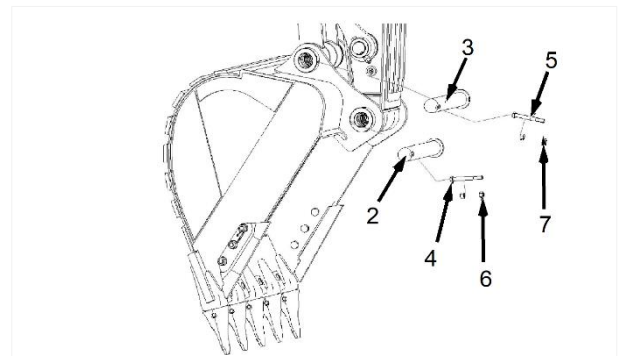
Bucket--Install

1. Clean each pin and its hole and lubricate each pin hole with MSO2 grease.
2. Install the O-ring (1) on the wear plate of the bucket.



1. O-ring

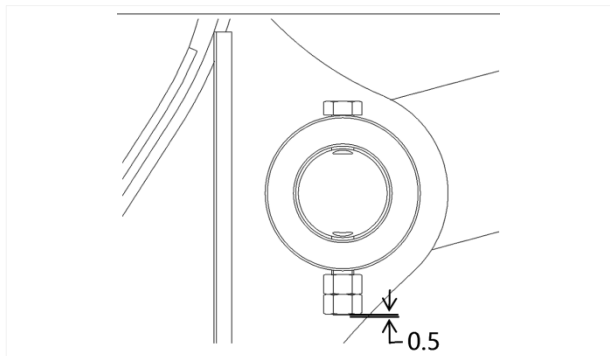
3. Start the machine, lower the arm into the bucket until the pin holes are in alignment with each other, then stop the machine.



2. Support pin
3. Support pin
4. Anchor bolt
5. Anchor bolt
6. Nut
7. Nut

4. Install the support pin (2) and align the anchor bolt hole on the support pin with the anchor bolt hole on the bucket.
5. Install the anchor bolt (4) and nut (6).
6. Slide the O-ring (1) onto the pin joint between the bucket and the arm.

7. Start the machine, place the bucket link into the bucket until the pin holes are in align with each other, then stop the machine.
8. Install the support pin (3), align the anchor bolt hole on the support pin with the anchor bolt hole on the bucket.
9. Install the anchor bolt (5) and nut (7).
10. Slide the O-ring (1) onto the pin joint between the bucket and the bucket link assembly.



11. Tighten the anchor nuts (6) and (7) to position the outer nuts. Make the nut flush with the end of the anchor bolt, or 0.5mm (0.02inch) beyond the end of the anchor bolt.
12. For bucket pin lubrication, please refer to "Bucket Link--Lubricate".

Machine Parking

⚠ WARNING

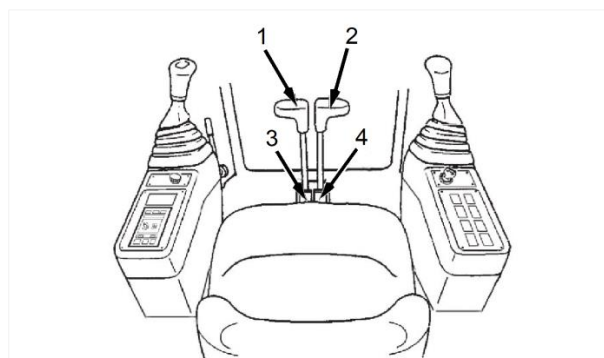
Machines left unattended while the machine is running may result in personal injury or death. Before leaving the control console, put the travel control lever in neutral, lower the working tools to the ground, stop all working tools, and place the pilot shutoff lever in the LOCK position.

⚠ CAUTION

Place the machine on a firm and level ground and do not park the machine on a slope. If it is unavoidable to park the machine on a slope, the track must be securely jammed.

When the machine is stopped, the swing brake will engage automatically, and when the machine is running and the pilot lever is operated, the swing brake will be released.

1. Push the left and right travel control levers and the left and right travel pedals to NEUTRAL to stop the machine.



1. Left travel control lever
 2. Right travel control lever
 3. Left travel pedal
 4. Right travel pedal
2. Push the engine speed control lever forward to the most front end to idling speed to reduce the engine speed.
 3. Lower all the work implement onto the ground and apply a slight downward pressure to the bucket.
 4. Push the pilot shutoff lever to the OFF position and turn every switch to the NEUTRAL or OFF position.
 5. Run the machine at idling speed for 5 minutes to allow parts to cool down evenly.

6. Turn the start switch to the OFF position.
Take out the key (if equipped).

⚠ CAUTION

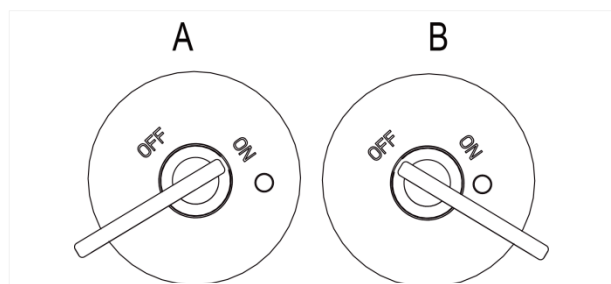
Do not shut down the engine immediately after the engine runs with a load; otherwise, the engine will overheat and its service life will be shortened.

Leaving the Machine

⚠ CAUTION

Close windows, roof ventilation windows and cab doors when parking the machine. Avoid the electrical components in the operator's cab from being affected by the bad weather.

1. Inspect the hood for debris. Clean out any debris and paper to prevent a possible fire.
2. Remove all flammable debris in order to reduce a fire hazard. Properly dispose of all debris.
3. Turn the start switch to the OFF position.
Take out the key (if equipped).
4. Turn the battery disconnect switch to the OFF position after waiting for about 2 minutes.



A: ON
B: OFF

5. Close all covers, lock all equipment, and remove the key.
6. Close the cab door.
7. Use the steps and the handrail when you get off the machine. Face the machine and use both hands. Make sure that the steps are clear of debris before you dismount.

⚠ CAUTION

If the machine has not been filled with antifreeze, after the machine is parked for winter, all coolant in the engine system, cooling system, and air conditioning system (if equipped) should be drained promptly so as to prevent the machine from being damaged by frost. If the machine has been filled with antifreeze before leaving the factory, refer to the instructions on the antifreeze labels.

Checks after Operation

Inspection and Cleaning

The following checks and cleanups shall be carried out regularly after works are completed.

1. Walk around the machine to check the working equipment, machine exterior, and undercarriage. Prevent oil or coolant leakage. Repair in case of any defects.
2. Fill the fuel tank.
3. Check engine compartment for paper and debris. Clean up all paper and debris to eliminate fire hazards.
4. Clear mud and such from the undercarriage.

Transportation Information

Loading of the Machine

⚠ WARNING

When the auto idling function is enabled, the auto idling function will be disabled when the control lever or travel pedal is operated, and the engine speed will automatically increase. When the machine is loaded or unloaded from the truck or when operating in narrow areas, the auto idling function shall be disabled to prevent sudden movement of the machine, which may result in serious injury or death.

⚠ CAUTION

Obey the appropriate laws that govern limits to the load (weight, length, width, and height).

Before shipping, be sure to investigate heights, widths, and permitted load capacities along the transportation route. The total height, width, and weight of the machine after being placed on the transportation vehicle shall not exceed the relevant regulations.

Clean ice, snow, or other slippery material from the loading dock and from the truck bed before you load the machine onto the transport vehicle. This will prevent the machine from slipping in transit. This will also prevent the machine from moving during transportation.

Procedures for loading the machine onto the trailer:

⚠ CAUTION

Load or unload the machine on flat and firm ground.

Clear the oil, dirt and debris etc. from the slope and trailer platform, preventing the machine from slipping.

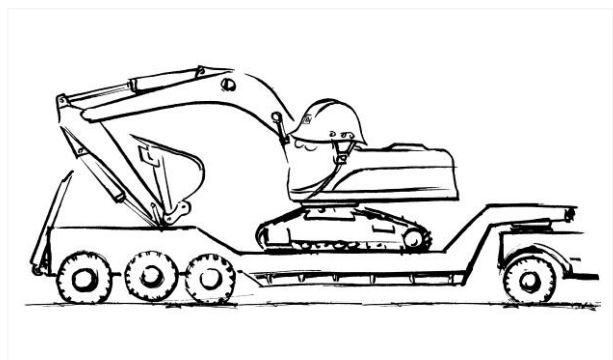
If the work implement or counterweight are removed when the front and rear directions of the upper platform and chassis frame are not fully aligned, the stability of the machine may be affected severely, which may cause machine turnover and personnel injuries and deaths.

Fully align the front and rear directions of the upper platform and chassis frame, make the dozer fully support the ground, and then the work implement and counterweight can be removed.

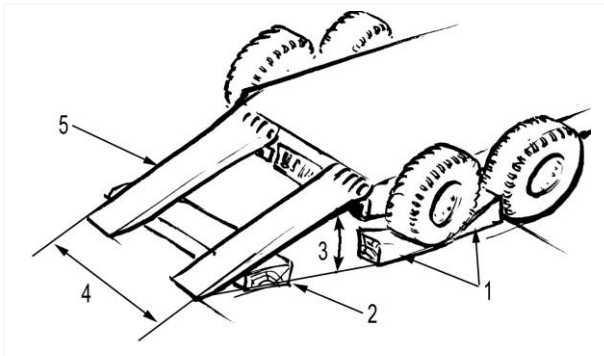
After removing the work implement and weight, do not rotate the upper platform, and do not move or drive the machine, otherwise, the machine may be turned over.

It is necessary to drive at a low speed when getting on and off the trailer, lift the dozer to the highest position, and then adjust the centers of the track to make them to be aligned with the center line of the slope, after that drive to the slope, and do not swing the excavator on the slope.

When the wheels driving around the corner of the slope, be careful to slowly adjust the work implement to prevent the bucket from colliding the trailer platform or the ground.



1. Chock the trailer wheels or the truck wheels before you load the machine to ensure that the vehicle will not move.



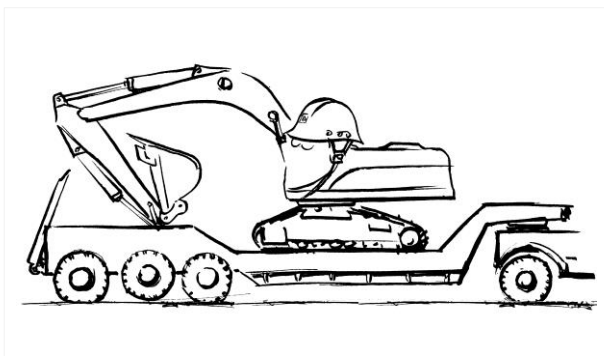
1. Wedge
 2. Block
 3. Angle (Max. angle is 15°)
 4. Distance between the ramps
 5. Ramp
2. Use ramps between the trailer and machine and make sure that the ramps are at the same level. The ramp gradient should not exceed 15°.
 3. Push the pilot shutoff lever to the UNLOCK position.
 4. Turn the travel speed switch to low speed.

⚠ CAUTION

Select low travel speed and disable the automatic idling function when the machine is getting on/off a trailer or running on a narrow road surface.

When getting in and off the trailer, it is necessary to have special personnel stand on the ground for observing and directing the operations.

5. Drive the machine slowly up the ramp. Stop the machine when the machine gets to the center of the trailer.



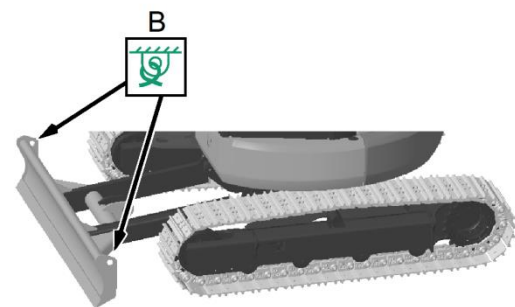
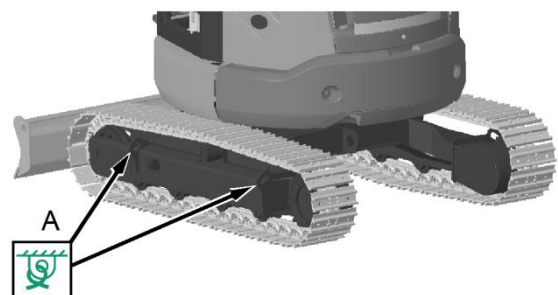
6. Push the left and right travel control levers to the NEUTRAL position after stopping the machine. Lower the bucket to the floor of the trailer.
7. Push the hand control levers to the NEUTRAL position.

8. Push the pilot shutoff lever to the LOCK position. Turn every switch to the NEUTRAL or OFF position. Stop the machine, remove the key (for the machine started or stopped with a key).
9. Lock each door and window.
10. Cover the exhaust outlet to prevent the turbocharger from rotating during transportation; otherwise, damage to the turbocharger can result.
11. Use a strong chain or rope to fasten all corners of the machine securely to the trailer. Place wedges under the front and rear sides of the tracks. (Refer to the figures below for the anchor positions depending on machine configuration.)

⚠ CAUTION

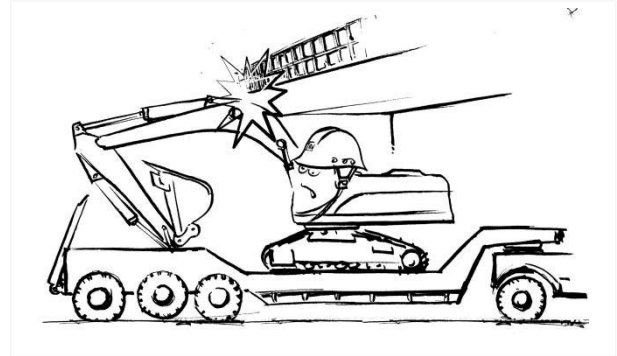
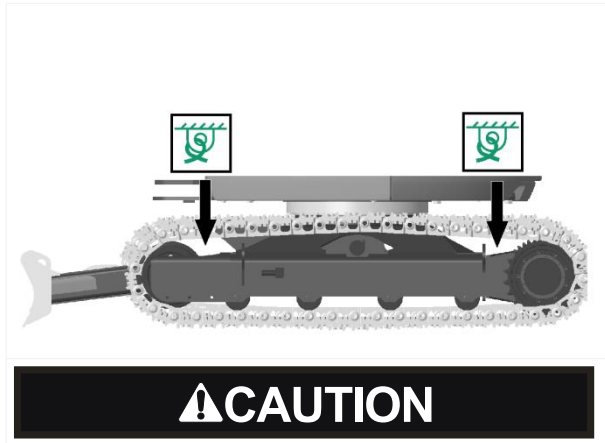
Before anchoring, the swing locating pin shall be inserted into the hole of the travel frame.

Configuration 1: There are two anchor points (A) on the outside of the left and right track frames respectively, and there are two anchor points (B) on the bulldozer blade. The anchor points (A) and (B) in the following figure should be used to secure the machine.



Configuration 2: The anchor points at the front of the machine are identical to configuration 1. That is, there are two anchor points (B) on the dozer blade.

To secure the rear of the machine authorised tie down equipment shall be passed through the gap between the track frame and track on both sides of the machine. Both left and right track frames need to be secured.



Fasten the chassis frame with chain or steel ropes.

Do not fasten the chain or steel ropes to the hydraulic pipes or hoses or across rubber tracks.

12. Pull and rotate the rotation warning light (if it is optional) in the rear upper part of the cab downward, preventing it from being scratched and damaged during transportation.
13. During transporting, lock the swing lock pin (if it is optional) between the upper platform and the chassis frame, preventing the upper platform from swinging during transportation.



When moving or towing the machine, avoid the boom and arm contacting overhead objects in order to prevent serious injury to bystanders or damage to structures.

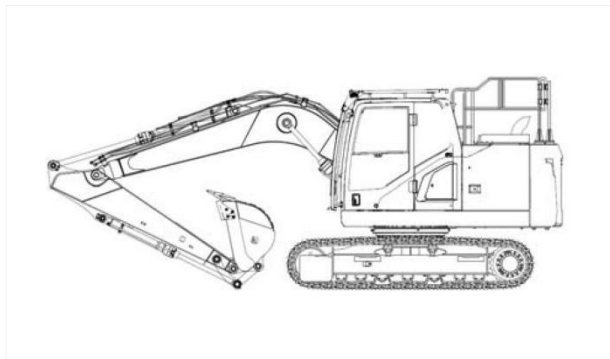
Lifting the Machine

⚠ WARNING

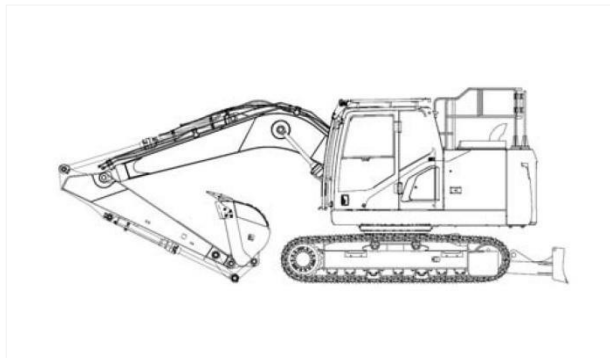
Improper lifting and fastening of the machine can cause load movement, personal injury, or machine damage. Only the correct rated steel rope and lifting tools can be used for the lifting and fastening points provided.

1. Calculate the maximum lift weight of the crane and loading capacity of the lifting device to ensure lifting safety. For the lifting weight of each type, please check the operating weight on the PIN nameplate.
2. Start the machine and lay the work implement as shown in the figure.

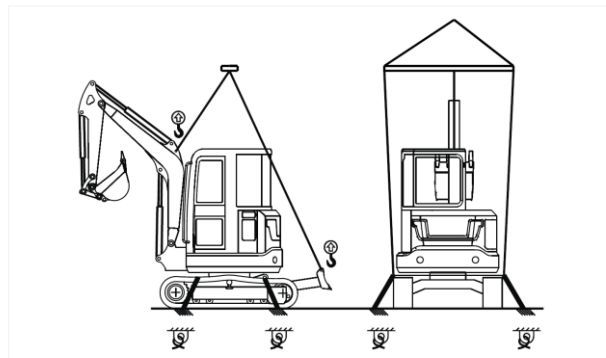
Without dozer



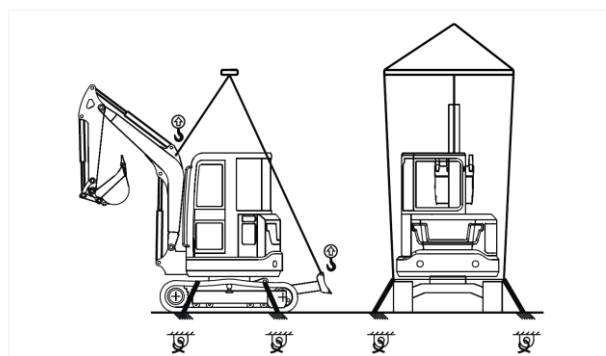
With dozer



3. Push the pilot shutoff lever to the LOCK position so that the machine cannot be operated.
4. Shut down the machine and check the surrounding area of the machine. Then, close and lock the cab door, windows, and hood.
5. Lifting symbols are provided on the track. (See the following figure) The lifting devices should be attached to the lifting point securely.



6. As shown in figure, connect a suitable authorised equipment to the lifting points, and the lifting rope on the equipment shall be of appropriate length to ensure the lifting points share the same load.



⚠ CAUTION

The machine can only be lifted from approved lifting points and by approved lifting devices.

7. After the lifting devices are securely attached to the lifting point, lift the machine slightly to check the balance. If unbalanced, put the machine down and adjust. Repeat checking for the balance until the machine is totally balanced and safe for lifting.

Machine Traction

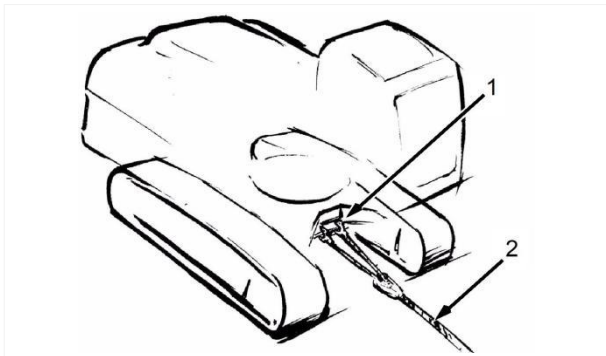
⚠ WARNING

The machine must be towed with steel ropes that are strong enough to withstand the weight of the machine being towed.

Do not apply force to the steel ropes suddenly.

If the machine is stuck in mud and cannot be driven out by propelling itself forward, steel tow ropes should be used.

1. When towing, keep any personnel away from the steel ropes to avoid personnel injuries caused by broken ropes.
2. If the machine is damaged but still can be operated, attach a steel tow rope to the track frame (see the following figure), and tow it to hard ground with another machine. Ensure that the steel rope is secured to the track frames of both machines. Place some protective materials between the steel ropes and track frame.



1. Hook
2. Steel rope

3. As the figure shows, attach a U hook to the hook hole of the machine frame. Keep the steel rope and the track frame horizontal.
4. During traction, the driver must operate the machine to make the travel motor in the working rotation state, and the machine travel in the slow gear to avoid damage to the travel motor.
5. During traction, the traction shall be slow and uniform, and the recommended speed shall not exceed 2.6 km/H.
6. Avoid long-distance traction, it is recommended that the traction distance does not exceed 50m.

7. The passive traction force shall not exceed 30kN.

⚠ CAUTION

A hook hole is provided on the track frame, which can be used to tow articles, and the maximum force on the hook hole shall not exceed 30kN.

Do not tow the machine when the machine loses power or the travel motor can not rotate to work. Please contact the local dealer for handling. Forced towing may damage the travel motor.

Operating under Low Temperature

⚠ WARNING

The antifreeze is toxic, do not discharge it in to the environment. It shall be disposed of in accordance with the relevant local laws and regulations. In case the antifreeze gets into eyes or on skin, rinse it off with plenty of water and seek medical attention immediately.

- At low temperatures, the engine may be difficult to be started, and the coolant may freeze, thereby damaging the engine. Add antifreeze to the coolant. Use appropriate antifreeze, low viscosity fuel oil, hydraulic oil, and lubricating oil according to local ambient temperature. After the weather turns warm, change all fuel, hydraulic oil, and lubricating oil. Refer to “Fluids and Lubricants” for the brand and grade of oil to use.
- In severe cold areas, use anti-cold batteries. As the ambient temperature drops, the electrolyte may be frozen. In order to prevent the loss of battery capacity, cover the battery or move it to a warm place and install it the next day. Then, the machine can be started more easily.
- After the daily operation, the diesel tank and the water solution collected at the bottom of the fuel-water separator shall be discharged in time to prevent freezing and blocking. Besides, sludge, water, and snow on the machine shall be thoroughly removed. It is necessary avoid damaging the seal performance due to sludge, water or snow entering and freezing at the position that is sealed.
- Park the machine on dry and hard ground. If impossible, park the machine on wooden boards. The wooden boards can prevent the machine from being frozen to the ground.

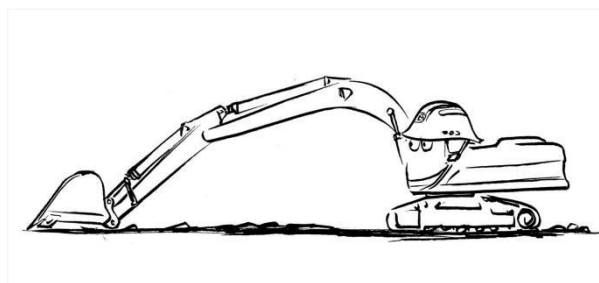
Long-term Storage

⚠ WARNING

If anti-rust work is required indoors, open doors and windows to improve ventilation and prevent gas poisoning.

⚠ CAUTION

When storing the machine (for no less than 1 month), place the machine in the position shown in the figure below to protect the oil cylinder and prevent the piston rod from rusting.



Before storage

1. Clean and dry every part of the machine and store it in a dry warehouse. If the machine has to be stored in the open air, park the machine on concrete ground and cover the machine with canvas.
2. Top up the fuel oil tanks to the maximum fill levels. Lubricate every moving pin and drive shaft. Change the hydraulic oil.
3. Paint a thin layer of grease on the exposed parts of the hydraulic oil cylinder piston rods.
4. Remove batteries from the machine and store in a separate place.

During storage

1. Start the machine once every month and run every system, and lubricate every part of the moving pins and drive shafts to ensure each moving part is lubricated. Charge the battery.
2. Before starting the machine, wipe off grease from the hydraulic oil cylinder piston rods. After operation, paint a layer of grease on them.
3. Paint antirust additive on parts that rust easily.

CAUTION

If antirust agent is used indoors, doors and windows shall be opened regularly to keep ventilation so as to eliminate toxic gases.

Before reuse

1. Change the engine oil, hydraulic oil, gear oil and anti-freeze.
2. Lubricate all moving pins and shafts.
3. Before starting the machine, wipe off grease from the hydraulic oil cylinder piston rods.

CAUTION

If the machine is not coated with antirust agent each month during storage, consult with your KIOTI dealer.

Moving Machine from Storage

Carry out the following maintenance procedures when the machine is stored for a long time.

- Check all of the hoses and connections.
- If the extended piston rod is coated with grease, wipe the grease off.
- Adjust the tension of the alternator belt and fan belt.
- Add the fuel tank and discharge air in the fuel system. Check the fuel level.
- Fill the DEF tank (COLD weather excepted). If the interior of the DEF tank is dry and the DEF deposits, it may cause component operation failure.
- Start the engine. Before the engine is fully loaded, run the engine at middle speed for several minutes. Operate the control levers for swinging, digging, and other hydraulic operations repeatedly several times.
- Check all of the systems carefully before the machine is fully loaded.
- Install a new fuel filter. Replace the engine filter and inject engine oil into the engine.
- If the DEF has been stored in the DEF tank for more than 1 year, please contact your local KIOTI dealer for replacement. DEF shall be handled in accordance with applicable local laws and regulations. The DEF stored for a long time may contain ammonia gas.
- Please replace the DEF in a well-ventilated place and be careful not to inhale its vapour.

CAUTION

If the machine is stored for a long time, the grease layer on the surfaces of internal parts of hydraulic components could be damaged.

Operate the control lever for running, swinging, and digging operations repeatedly for 2- 3 times to lubricate the surfaces of internal parts of hydraulic components.

Maintenance Manual

⚠ WARNING

Before reading this section, please read and make sure you understand the contents of "SAFETY".

Do not perform any inspection and maintenance operations not specified in this Manual.

If your machine has problems, you must maintain the machine or contact your dealer before operating.

Maintenance Guidance

Precautions Before Machine Maintenance

⚠ WARNING

If forgetting to check and verify the machine before maintenance, unexpected problems may occur, which can lead to personal injury.

Do not perform any inspection and maintenance operations not specified in this Manual.

Check Instrument Maintenance Cycle Readings

Check instrument maintenance cycle readings daily to confirm that whether necessary maintenance time has been met.

The times in the maintenance interval schedule is for normal operation. If the machine is operated in severe conditions, maintenance must be performed more frequently.

Replace with Genuine KIOTI Parts

KIOTI recommends using the genuine KIOTI parts specified in the Parts Manual for replacement.

Use Genuine KIOTI Lubricant

KIOTI recommends using genuine KIOTI lubricating oil for machines. In addition, oil with corresponding viscosity shall be used according to the ambient temperature.

Use Clean Cleaning Fluid

When using window cleaning fluid, prevent dirt from being mixed with it.

Use Clean Lubricants

Use clean oil and grease. Keep oil and grease containers clean and avoid foreign matters touching oil and grease.

Check Oil and Use Filter

When changing the oil, check the used oil and filter for metal particles or other foreign matters. In case of finding a large amount of metal particles or other foreign matter, it should be reported to the responsible person in time and appropriate measures should be taken.

Precautions for Fuel Filling

If your machine is fitted with a filter, do not remove the filter when refueling.

Precautions for Welding

When welding, turn off the power supply of the machine, and disconnect the battery disconnect switch. Remove the start switch key (if equipped).

Avoid continuous application of a voltage that is over 200 V.

Connecting earth cables within the welding area of 1 m. If the earth cables are connected near the gauges or connectors, it may cause the instrument faults.

Avoid seals, bearings, or bushings entering the area between the weld point and the earthing point. Seals and similar items may catch fire due to sparks and thereby damage nearby components.

Avoid using the area around the work implement pin or hydraulic cylinder as an earthing point. Sparks in this area can damage the electroplated part of work implement pin or hydraulic cylinder.

Welding Operation Specifications

WARNING

Never use the earth position of electrical parts on the machine as that of the welder.

When performing welding near the earth position of an electrical part, always disconnect the earth position of this electrical part, and perform welding operations only after ensuring that the welding circuit of the welder does not pass through this electrical part. Otherwise it will result in damage to this electrical part or even result in a fire.

Never weld any pipe or container with oil fluid. Never weld any sealed container or container which is poorly ventilated.

Do not allow the flying sparks and dross spatter produced during welding to come into contact with the cables, rubber hoses, and other flammable materials, and thus cause a fire and resulting in loss and injury.

To avoid possible damage to the machine, read and understand the following cautions before welding, and always observe the welding operation procedures as follows:

1. Park the machine on flat ground.
2. Turn off the power supply of the machine.
3. Turn off the battery disconnect switch to disconnect the battery and frame.
4. Disconnect the battery disconnect switch and the plugs of the instrument before welding to avoid damaging the electronic parts.
5. If your machine is equipped with other electronic components such as loudspeakers, remove all connectors of the electronic components connected to the machine harness before welding to avoid possible loss.
6. Clear away paint from the parts to be welded to prevent harmful fumes from being produced.
7. Clamp the earth cables of the welder with the parts to be welded, and keep the earth position close to the welding location.
8. Check and confirm that the circuits from the earth cables to the welded parts do not pass through any of the following parts:

- a. Bearings
- b. Hydraulic cylinders
- c. Controllers or other electronic parts internal circuits

This avoids damage to the following parts:

- a. Bearings
- b. Hydraulic parts
- c. Electronic parts
- d. Other possible parts on the machine

Use proper safety welding operation procedures for welding.

Avoid Dropping Items Inside the Machine

When opening the inspection window or fuel tank filler for inspection, pay attention to avoid nuts, bolts, or tools dropping into the machine, otherwise, it may cause damage or functional failure of the machine and cause machine fault. Be sure to remove anything that falls into the machine.

Avoid carrying unnecessary items in your pockets and carry only those items that are necessary for inspection.

Precautions for Dusty Environments

Clean the radiator fins and other parts of the heat exchanger more frequently to avoid blockage of the radiator fins.

Replace fuel filters more frequently.

When checking and replacing oil or oil filter, the machine shall be moved to a dust-free place to avoid dust entering the system.

Clean electrical components, especially the starter motor and the alternator, to avoid dust accumulation.

Avoid Mixing of Oils

Avoid mixing oils of different brands or grades. If it is required to add oil of different brands or grades, drain the old oil before adding the oil of a new brand or a different grade.

Lock the Inspection Cover

Firmly lock the inspection cover with a lock rod. Unlocked inspection covers risk being suddenly closed by wind during inspection or maintenance, resulting in personal injury.

Precautions for Air Drainage of Hydraulic Circuit

Air must be drained from the hydraulic circuit when repairing or replacing the hydraulic equipment or disconnecting hydraulic lines.

Precautions for Installing the Hydraulic Hose

When removing parts with O-rings or seal rings, clean the mounting surfaces and then replace them with new parts. Be sure to reinstall the O-rings or seal rings.

When installing hoses, avoid severe twisting or bending of hoses. Otherwise, it will greatly shorten the service life of the hose and may cause damages.

Check Electrical Wiring

WARNING

If a fuse burns out frequently or a short-circuit occurs, determine the cause and conduct repairs or contact a KIOTI dealer for assistance. Keep the battery surface clean.

Check the fuse for damage. Check the circuit for broken or shorted wires. Check the terminals for loose connections and tighten any loose parts.

Check the circuits of the battery, starter motor and alternator.

Contact a KIOTI dealer for more information about the solutions.

Check Air Conditioner

Check whether the fan speed switch is in the “fresh air” position, and the transfer switch is in the disconnected position. If not, turn it to the desire position.

Check Gauges

CAUTION

Before starting the machine, make sure other personnel are not on or near the machine. Make sure the operator is in control of the machine.

Check the gauges, lighting, indicators, horn, and wipers (if equipped) to make sure they are working properly. Contact a KIOTI dealer if any problem is found.

Precautions After Machine Maintenance

Verification after Inspection and Maintenance

If forgetting to verify the inspection and maintenance, accidents may occur, which can lead to personal injury. The following principles shall be observed at all times:

Inspection after Machine Shutdown

Are there forgotten inspection items and maintenance points?

Are all inspection and maintenance items performed correctly?

Have tools or parts dropped into the machine? It is extremely dangerous if parts fall into the machine and get stuck by the lever mechanism.

Is there leakage of coolant or oil? Are all nuts and bolts are tightened?

Inspections with Machine Running

Refer to “Machine Starting” for details on inspection of machine when running. Special attention shall be paid to safety during the inspection.

Increase engine speed and check for leakage of fuel, oil or coolant.

Check if the areas after maintained are working properly.

Oil shall Match the Ambient Temperature

Fuel or lubricating oil must be selected based on ambient temperature.

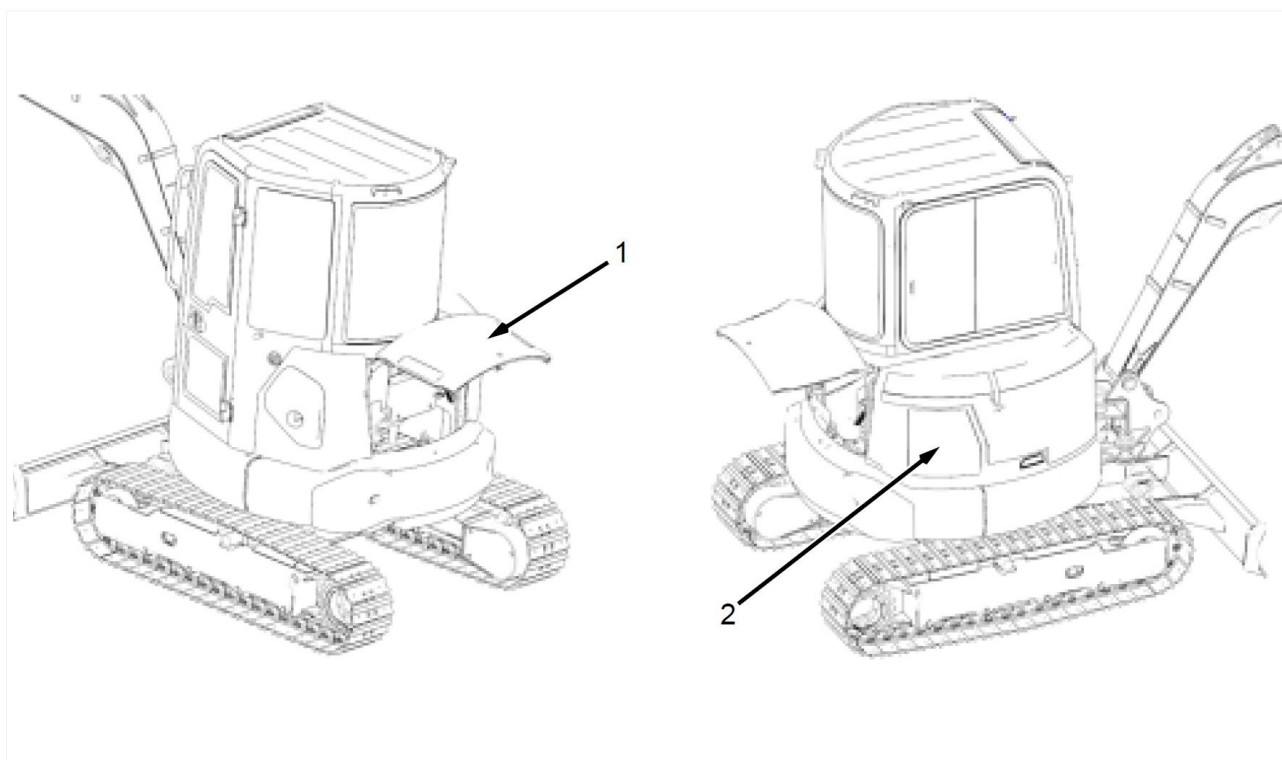
Refer to “Fluids and Lubricants” for details on oil selection.

Safely Close the Hood

When closing the hood after inspection or maintenance, ensure that the latch is securely locked.

If the hood is not properly locked, the danger of hood opening may occur.

Maintenance Door



1. Rear hood
2. Right side door

Maintenance Outline

Fluids and Lubricants

Oil type	Oil viscosity & grade	Ambient temperature	Note
Grease	2# MSO ₂ lithium based grease	-20~40°C (-4~104°F)	Use for pin: Connecting pins of bucket, arm and boom Use for gear: swing bearing gear, swing bearing hob, swing reduction gear bearing, main motor bearing (if equipped), drum sprocket chain (if equipped).
	2# extreme pressure lithium based grease	-20~40°C (-4~104°F)	
	2# graphene reinforced extreme pressure grease ★	-20~40°C (-4~104°F)	
	2# graphene reinforced low temperature extreme pressure lithium-based grease ★ ★	-40~40°C (-40~104°F)	
Diesel engine oil	15W-40 (API CF-4) ★	-15~40°C (5~104°F)	Used for engine crankcase, fuel injection pump, and regulator, etc.
	10W-30 (API CF-4)	-25~30°C (-13~86°F)	
	5W-40 (API CF-4)	-30~40°C (-22~104°F)	
	0W-30 (API CF-4)	-35~30°C (-31~86°F)	
Diesel engine oil (not applicable)	15W-40 (API CI-4)	-15~40°C (5~104°F)	Used for engine crankcase, fuel injection pump, and regulator, etc.
	10W-30 (API CI-4)	-25~30°C (-13~86°F)	
	5W-40 (API CI-4)	-30~40°C (-22~104°F)	
	0W-30(API CI-4)	-35~30°C (-31~86°F)	
Diesel engine oil (not applicable)	15W-40 (API CJ-4)	-15~40°C (5~104°F)	Used for engine crankcase, fuel injection pump, and regulator, etc.
	10W-30 (API CJ-4)	-25~30°C (-13~86°F)	
	5W-40 (API CJ-4)	-30~40°C (-22~104°F)	
	0W-30 (API CJ-4)	-35~30°C (-31~86°F)	
	0W-40 (API CJ-4)	-35~40°C (-31~104°F)	
Diesel	0# ★	4°C up (39.2°F up)	T4F shall use ultra-low sulfur diesel
	-10#	-5°C up (23°F up)	
	-20#	-14°C up (6.8°F up)	
	-30#	-29°C up (-20.2°F up)	

Oil type	Oil viscosity & grade	Ambient temperature	Note
	-35#	-29°C up (-20.2°F up)	
	-50#	-44°C up (-47.2°F up)	
DEF (not applicable)	Meets GB29518, ISO22241-1 or DIN 70070 DEF content (mass fraction): 31.8% ~ 33.2%		
Coolant	-45#	-40~45°C (-40~114°F)	If using coolant stock solution other than the recommended brand, please follow the instructions of that brand, and mix according to the actual applicable temperature.
	-35#	-30~45°C (-22~114°F)	
	-50#	-45~50°C (-49~122°F)	
	-60#	-55~50°C (-67~122°F)	
	VCS-2 (VOLVO)	-37°C (-34.6°F)	
Gear oil	SAE80W-90 (API GL-5)	-20~49°C (-4~120.2°F)	Used for transfer case (not applicable)
	SAE75W-90 (API GL-5)	-40~49°C (-42~120.2°F)	
	Shell Omala Oil S2 G220	/	
	SAE85W-140 (API GL-4)	-15~49°C (5~120.2°F)	Used for swing reduction gear (maintenance-free)
	SAE85W-140 (API GL-5)	-15~49°C (5~120.2°F)	
	SAE80W-90 (API GL-5)	-25~49°C (-12~120.2°F)	
	SAE75W-90 (API GL-5)	-40~49°C (-42~120.2°F)	
	SAE80W-90 (API GL-5) ★	-25~49°C (-12~120.2°F)	Used for travel reduction gear
	SAE85W-90 (API GL-5)	-15~49°C (5~120.2°F)	
	SAE75W-90 (API GL-5)	-40~49°C (-42~120.2°F)	
	SAE80W-90 (API GL-5)	-25~49°C (-12~120.2°F)	Used for drive axle wheel edges, main drive, gearbox (not applicable)
	SAE85W-90 (API GL-5)	-15~49°C (5~120.2°F)	
Hydraulic oil	L-VG 46 long service life anti-wear hydraulic oil ★	-20~40°C (-4~104°F)	Used for hydraulic system
	L-VG 46W long service life and wide temperature range anti-wear hydraulic oil	-28~40°C (-18.4~104°F)	
	L-HM 32 high pressure and high definition anti-wear hydraulic oil	-20~20°C (-4~68°F)	
	L-HM 46 high pressure and high definition anti-wear hydraulic oil	-15°C~45°C (5~113°F)	
	L-HM 68 high pressure and high definition anti-wear hydraulic oil	-10~40°C (14~104°F)	
	L-HS 32 extremely low temperature anti-wear hydraulic oil	-30~40°C (-22~104°F)	

Oil type	Oil viscosity & grade	Ambient temperature	Note
	L-HS PLUS 22 extremely low temperature anti-wear hydraulic oil	-40~35°C (-40~95°F)	
	L-HS PLUS 22 extremely low temperature anti-wear hydraulic oil (extremely cold)	-50~35°C (-58~95°F)	
	DTE 10		
Refrigerant	R134a		Used for air conditioning system
Brake fluid (not applicable)	DOT4	-30~50°C (-22~122°F)	Used for clutch control system
Lubricating oil (not applicable)	CS4000	-20~65°C (-4~149°F)	Used for air compressor of fertilizer and fertilization system.

Note: ★ Product is recommended to be filled. ★ ★ Product is recommended to be filled in extremely cold areas.

⚠ CAUTION

Do not mix the oil of the same specifications but of different brands. Clean the system before adding oil from a different brand.

Replace the lubricant periodically even if the lubricant looks very clean as the lubricant might deteriorate after a long period of time.

Appropriate fuel, coolant and grease shall be selected according to the local minimum temperature when using the machine.

Oil designated by KIOTI is recommended. When using non-specified oil, please contact your local KIOTI dealer to confirm the time of oil replacement.

Recommended Fuel, Coolant and Grease

⚠CAUTION

The use of genuine KIOTI oil is the premise to ensure the reliability and durability of KIOTI equipment and components.

In order to keep your machine in optimum condition for the long term, the instructions in this OWNER'S MANUAL must be followed.

Failure to follow these instructions can result in shortened service life or excessive wear on engines, powertrain, cooling system, or other components.

KIOTI does not recommend any commercial lubricant additives, although commercially available lubricant additives may or may not be beneficial to the machine.

KIOTI recommends the use of genuine KIOTI oil, otherwise, the replacement cycle of the oil filter may be shortened, causing adverse effects on the engine, such as reduction of lubrication function due to oil deterioration, resulting in failure, shortening the service life of the machine, reducing performance and increasing fuel consumption.

Appropriate fuel, coolant, and grease shall be selected according to the local minimum temperature when using the machine.

Separate equipment is required if the machine is operating at a temperature of no higher than -20 °C. Please consult your KIOTI dealer for further details.

Fuel Recommendations

⚠CAUTION

Fuel used in North America must meet the North America Off-road T4F Certification (engines equipped with exhaust after-treatment system must use the fuel with a sulfur content of lower than 0.001% (≤ 10 ppm (mg/kg))).

The high-pressure fuel injection equipment requires high-precision parts and lubricant, the durability will be significantly reduced if low-viscosity oil with low lubrication ability is used.

Coolant Recommendations

Choose a coolant according to the local minimum temperature. The freezing point of the fluid should be around 10°C lower than the local minimum temperature in general.

When replacing the coolant, please opt for KIOTI Machinery's special coolants, such as HEC-II-35 or HEC-II-45, and add the solution according to the instructions.

If you need to purchase other brands of coolant, please consult your KIOTI dealer for support.

⚠CAUTION

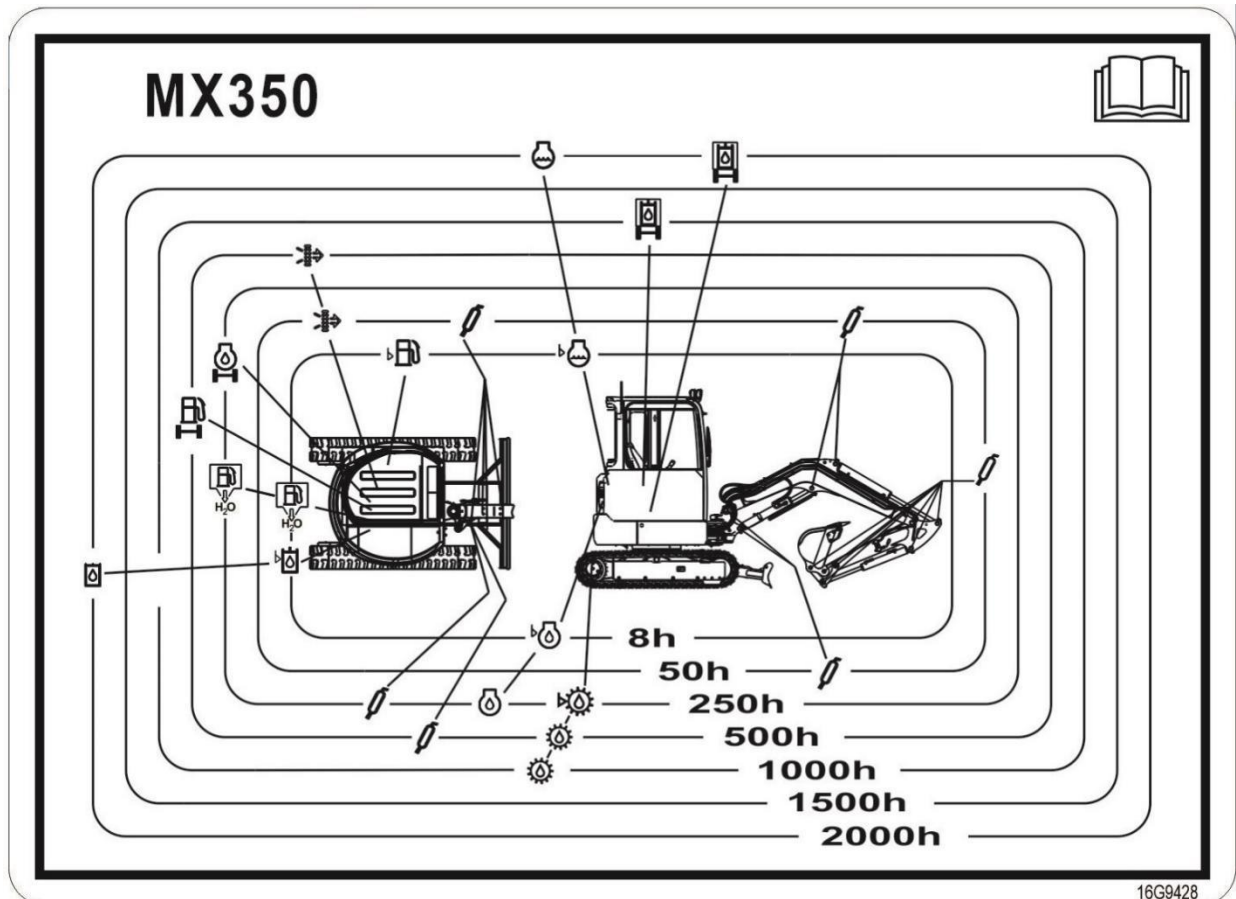
Water alone must not be used as coolant. Only using water as coolant can cause corrosion at engine operating temperatures. In addition, water alone does not provide adequate protection against boiling and freezing.

Fluid Refill Capacities and Change Interval

Item	Interval (service hours)	Approximative Quantity (L)
Diesel engine oil	250	7L
Swing motor (Maintenance-free)	/	/
Travel motor	First 500-hour replacement, regular 1000-hour replacement	0.5L×2
Hydraulic oil	2000	58L
Diesel	As required	/
Antifreeze	2000	7L
Refrigerant (R134a)	As required	600ml
DEF (not applicable)	/	/
Oil-bath pre-filter (not applicable)	/	/
Drum motor transmission lubricating oil (not applicable)	/	/
Transmission lubricating oil (not applicable)	/	/
Upper transmission gear oil (not applicable)	/	/
Lower transmission gear oil (not applicable)	/	/
Drive axle gear oil (not applicable)	/	/

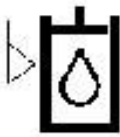
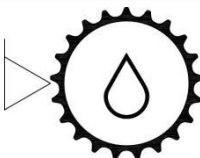
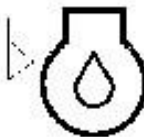
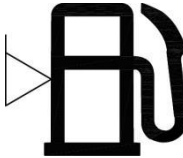
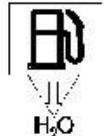
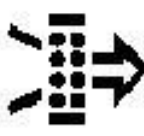
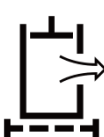
Note: Please refer to the lubrication decal for the actual additive amount. The maintenance intervals stated in this manual are determined according to the service hour meter or calendar intervals shown (daily, weekly, monthly, etc). KIOTI recommends that maintenance should be performed according to whichever of the above-mentioned intervals occurs first. Refer to the "Maintenance Interval Table" for details.

Maintenance Intervals and Lubrication Diagram



Note: This figure is only a schematic illustration. Please refer to the schematic diagram pasted on the machine for the specific maintenance interval.

Lubrication diagram labels

Labels	Descriptions	Labels	Descriptions
	Change the hydraulic oil		Check the hydraulic oil level
	Replace the hydraulic oil filter		Check the gear oil level
	Apply the gear oil		Check the engine oil level
	Change the engine oil		Replace the engine oil filter element
	Check the coolant level		Change the coolant
	Check the fuel level		Replace the fuel tank filter
	Fuel filter drainage		Clean the air filter
	Apply grease		Check the DEF level
	Replace DEF filter		Replace the air filter element or the recirculating air filter of the air conditioner
	Clean the air filter element or the recirculating air filter of the air conditioner		Replace the breather valve filter element

Labels		Descriptions	Labels		Descriptions
		Replace the engine oil filter for the first time			Replace the fuel tank filter for the first time
		Change the gear oil for the first time			Replace the engine oil for the first time
		Clean the fresh air filter of the air conditioner			Replace the fresh air filter of the air conditioner

List of Tightening Torque for Fasteners

⚠CAUTION

In case of nuts, bolts, or other parts are not tightened according to specified torque, the tightened parts may become loose or damaged, resulting in machine failure or operation problems. Be careful when tightening the parts.

For common bolts and nuts without special instructions, the tightening torque is shown in the table below.

Fastening bolts in special parts of the machine, such as engine flywheel housing, coupling and radiator, depends on the thread base material that is aluminum or other materials, please refer to the "Service Manual" or consult your KIOTI dealer.

The torque unit is kgf.m. For example, If a 1 m spanner is used to tighten the bolts or nuts with 12 kgf applied, the torque would be: $1 \text{ m} \times 12 \text{ kgf} = 12 \text{ kgf.m}$. When using a 0.25 m spanner acting with the same torque: $0.25 \text{ m} \times (\text{required force})\text{kgf} = 12 \text{ kgf.m}$, the force required will be: $12 \div 0.25 = 48 \text{ kgf}$.

If it is required to replace nuts or bolts, KIOTI suggests using genuine KIOTI parts with the same size as the parts being replaced.

Tightening torque of common bolts (N.m)

Materials and heat treatment			Mild steel or medium carbon steel			Quenching and tempering of low carbon alloy steel or medium carbon steel		
Performance grade of bolts			4.6~4.8	5.6~5.8	6.8	8.8	10.9	12.9
Yield strength (N/mm2)			240	300	480	640	900	1080
Nominal diameter of bolt (mm)	6	Tightening torque (Nm)	4.5±0.5	6±1	7±1	10.5±1.5	14±1.5	18±2
	8		11±1	13±1.5	16±3	26±3	33±3	45±5
	10		22±2	28±3	34±6	52±6	72±6	90±10
	12		40±4	50±5	57±10	90±10	120±10	150±14
	14		62±7	80±10	90±14	145±15	195±15	245±30
	16		100±10	125±15	140±20	225±25	305±25	380±50
	18		135±15	170±20	200±30	310±35	415±35	520±70
	20		190±20	240±30	280±45	430±50	600±55	750±100
	22		260±30	320±30	390±60	585±70	800±70	1000±140
	24		340±35	410±40	490±80	760±90	1020±90	1280±180
	27		490±40	630±70	710±120	1100±130	1500±130	1850±250
	30		610±70	800±50	900±150	1470±170	1850±170	2500±300
	33		780±100	960±140	1260±200	2050±230	2500±230	3450±350
	36		1000±100	1260±140	1500±200	2580±280	3100±280	4500±500
	39		1100±130	1300±240	1800±240	3350±350	3800±350	5700±800
	42		1520±140	1900±200	2300±300	4130±420	4600±420	7000±900
	48		2200±200	2900±350	3450±390	6200±640	7100±6400	

Note:

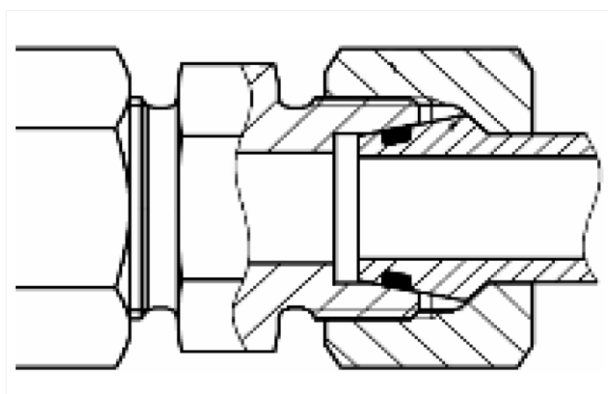
1. The tightening torque in the above table is a non-lubricated value, which refers to the state where no auxiliary materials are added to the thread;

2. The tightening torque of ordinary fine thread bolts (ordinary fine thread nuts) is increased by 10% on the basis of the above table.

For 24° tapered O-ring sealed pipe joint without special instructions, the thread fastening torque is shown in the table below.

Tightening torque for bolts of 24° tapered O-ring sealed pipe joint

Series	Thread size	Inner diameter of hose (mm)	Tightening torque	
			N.m	kgf.m
Light hoses	M12× 1.5	5	16±1	1.6±0.1
	M14× 1.5	6.3	26±2.6	2.6±0.26
	M16× 1.5	8	38±3.8	3.9±0.38
	M18× 1.5	10	45±4.5	4.6±0.45
	M22× 1.5	12.5	67±6.7	6.8±0.67
	M26× 1.5	16	96±9.6	9.8±0.96
	M30× 2	19	126±12.6	12.8±0.126
	M36× 2	25	137±6	14.0±0.6
	M45× 2	31.5	226±11	23.0±1.1
	M52× 2	38	347±16	35.4±1.6
Heavy hoses	M14× 1.5	5	26±2	2.6±0.2
	M16× 1.5	6.3	42±2	4.2±0.2
	M18× 1.5	6.3	53±2	5.4±0.2
	M20× 1.5	8	63±3	6.4±0.3
	M22× 1.5	10	79±4	8.0±0.4
	M24× 1.5	12.5	84±4	8.6±0.4
	M30× 2	16	126±6	12.8±0.6
	M36× 2	19	179±8	18.0±0.8
	M42× 2	25	263±12	26.8±1.2
	M52× 2	31.5	368±17	37.6±1.7



The light and heavy series of hoses are distinguished by the color of the dots on the hose sleeve (as shown in the figure below). The "green" dots represent the light series, while the "red" dots represent the heavy series.



For flanged sealed pipe joints without special instructions, the bolt torque tightening is shown in the table below.

Bolt size	Performance grade of bolts	Tightening torque	
		N.m	kgf.m
M8	8.8	25.2±1.2	2.57±0.12
M10		52.5±2.5	5.35±0.25
M12		96.6±4.6	9.85±0.47
M16		220±10	22.5±1.07
M20		420±20	42.8±2.0
M8	10.9	33.6±1.6	3.42±0.16
M10		73.5±3.5	7.5±0.35
M12		136±6	12.8±0.6
M16		310±15	31.6±1.5
M20		577±27	58.9±2.8

List of Vulnerable Parts

Replace vulnerable parts such as filters or air filters during scheduled maintenance or before reaching wear limits. Vulnerable parts shall be replaced correctly to ensure more economical use of the machine. When replacing the parts, Kioti recommends using genuine Kioti parts.

Due to Kioti's continuous efforts to improve product quality, the part number of vulnerable parts may change. Please inform your Kioti dealer of the machine serial number and verify the latest part number when ordering parts.

Vulnerable parts mainly include maintenance parts and wearing parts. Refer to the "Maintenance Interval table" for the maintenance cycle. The list of parts is shown in the following table.

No.	Parts	Comment
1	Engine oil filter element	
2	Fuel filter element (fuel primary filter)	
3	Fuel filter element (fuel secondary filter)	If equipped
4	Fuel filter element (fuel fine filter)	
5	Air filter element (main filter element)	
6	Air filter element (safety filter element)	
7	Air pre-filter element	If equipped
8	Coolant filter element	If equipped
9	Transfer case gear oil filter element	If equipped
10	Transfer case breather	If equipped
11	DEF tank sensor filter screen	If equipped
12	DEF pump filter element	If equipped
13	Overflow pipe filter element	If equipped
14	Hydraulic oil suction filter element	
15	Hydraulic oil return filter element	
16	Pilot filter element	If equipped
17	Hydraulic tank breather	
18	Hammer oil return filter element	If equipped
19	Pump oil return pipe filter element	If equipped
20	Air conditioning outer filter element	If equipped
21	Air conditioning inner filter element	If equipped
22	Bucket teeth	If equipped
23	Bucket teeth pin	If equipped
24	Side teeth of bucket	If equipped

Parts to be Replaced Regularly

⚠CAUTION

The parts related to safety and fire protection listed in the service life table must be replaced regularly to extend the safe working duration of the machine. Material quality of these components changes over time and is likely to wear out or deteriorate. However, it is difficult to determine the extent of wear or degradation during regular maintenance. Therefore, they need to be replaced with new parts regardless of their conditions after a period of use. This is important to ensure that these components always maintain their full performance.

In addition, if any abnormality is found on these parts, they shall be replaced with new parts even if they are not due for regular replacement.

If any hose clamp is damaged, such as distorted or cracked, the clamp shall be replaced at the same time as the hose is replaced.

For hydraulic hoses that do not need to be replaced regularly, the following inspections shall also be carried out. Tighten all loose hoses as needed and replace defective hoses.

When replacing hoses, O-rings, gaskets and other similar parts must also be replaced at the same time.

Please contact your KIOTI dealer to replace the parts whose service life has been determined and which need to be replaced regularly.

List of Parts with Service Life Determined and to be Regularly Replaced:

No.	Parts to be regularly replaced		Replacement intervals
1	Fuel system	Fuel pipe	Every two years or 4,000 hours (whichever comes first)
2	Engine lubrication system	Turbocharger lubricating pipe (if equipped) Engine oil tube	
3	Hydraulic system	Main pump oil suction pipe Hose from main pump to main control valve	
		Oil inlet and outlet hose of swing motor Hose from main control valve to center joint Travel circuit hose	
		Work implement hose ● Hose from main valve to boom root section ● Boom cylinder hose ● Arm cylinder hose ● Bucket cylinder hose ● Accessory device connection hose	
		Pilot accumulator (if equipped)	

Daily Inspection

CAUTION

Watch carefully for leakage. If you find leakage, service it. If you suspect leakage or observe leakage, check the fluid level more frequently.

Before starting the machine every day, check the following items:

1. Check the inside of the hood and clean the accumulated sundries from the hood and the radiator.
2. Check the engine for damaged parts.
3. Check the swing reduction, travel reduction, main pump, control valve for leakage. Repair the leakage point.
4. Check the hydraulic oil tank, all of the tubes and hoses, plugs, seals, connectors and grease fittings for leakage. Repair the leakage and replace the hose if necessary.
5. Check all of the implements, cylinders and linkage for damage, cracks and lashes.
6. Check the substructure (track, carrier roller, idler, protective cover) for damage, cracks, bolts for looseness, sprocket for oil leakage.
7. Check handrails for damage, bolts for looseness.
8. Check the bucket with hook (if equipped) for damage.
9. Check the air inlet and outlet of the evaporator in the air conditioner. Clear away the cotton, paper, plastic and film that can block the air inlet.
10. Check all the lighting equipment and replace cracked bulbs and glass if necessary.
11. Check the cab and keep the cab tidy.
12. Check the instrument panels and indicators for damage. Replace damaged parts if necessary.
13. Check the seat belt, buckle and tighten the bolts. Replace the worn or damaged parts if necessary.
14. Adjust the rearview mirrors and check the window to ensure good vision for the driver. Clean the windows if necessary.
15. Check the travel frame, track, sprocket, idler, track roller, carrier roller etc. for foreign objects entanglement. If so, clean up in time, otherwise safety accidents may occur.

Maintenance Interval Table

CAUTION

Read and understand all the safety instructions, warnings and indications before any operations or maintenance.

The maintenance intervals stated in this manual are determined according to the service hour meter or calendar intervals shown (daily, weekly, monthly, etc). KIOTI recommends that maintenance should be performed according to whichever of the above-mentioned intervals occurs first.

Under extremely severe, dusty, or wet operating conditions, more frequent lubrication than is specified in the "Maintenance Intervals" chart may be necessary.

Perform servicing on items at multiples of the original requirement. For example, at every 500 service hours or 3 months, also service those items listed under every 250 service hours or monthly, every 50 service hours or weekly, and every 8 service hours or daily.

The following guidelines should be followed if the service hours are not met:

Items listed between 8 and 100 service hours should be performed at least every 3 months.

Items listed between 250 and 500 service hours should be performed at least every 6 months.

Items listed between 1000 service hours and 2500 service hours should be performed at least every year.

Note: Refer to the Diesel Engine OWNER'S MANUAL shipped with the machine for not covered matters of engine maintenance contents.

Maintenance Contents

As required

- 1.Fuse--Check/Replace
- 2.Bucket Teeth Adapter--Replace
- 3.Cab Floor Mat--Clean

Every 8 service hours or every day

- 1.Fuel--Check/Add
- 2.Engine Oil--Check/Add
- 3.Coolant--Check/Add
- 4.Fuel Tank Water and Impurities--Removal
- 5.Hydraulic Oil--Check/Add
- 6.Monitor and Control Panel--Check
- 7.Lights and Horn--Check
- 8.Track Tension--Check/Adjust
- 9.Work Equipment and Oil Cylinders--Lubricate (After the new machine runs for 100 hours, apply grease every 8 hours.)
- 10.Seat Belt--Check

First 50 service hours

- 1.Torque of Bolts and Nuts--Check

Every 50 service hours or every week

- 1.Air Filter--Clean
- 2.Work Equipment and Oil Cylinder--Lubricate

First 100 service hours

- 1.Torque of Swing Bearing Mounting Bolts--Check

Every 100 service hours or two weeks

- 1.Work Equipment and Oil Cylinder--Lubricate

Every 250 service hours or one month

- 1.Fuel Filter--Replace
- 2.Fuel Pre-filter--Replace
- 3.Engine Oil Filter--Replace
- 4.Engine Oil--Change
- 5.Engine Air Intake System--Check
- 6.Tension and Condition of the Engine Drive Belt--Check
- 7.Travel Reduction Gear Oil Level--Check
- 8.Torque of Bolts and Nuts--Check
- 9.Swing Bearing Guideway--Lubricate

- 10. Fresh Air Filter of Air Conditioner--Clean
- 11. Air Recirculation Filter of Air Conditioner--Clean

First 500 service hours

- 1. Travel Reduction Gear Oil--Change

Every 500 service hours or three months

- 1. Air Filter Element--Replace
- 2. Radiator Assembly, Condenser, and Fuel Cooler Core--Clean
- 3. Looseness or Corrosion of Battery Terminals--Check
- 4. Torque of Swing Bearing Mounting Bolts--Check
- 5. Swing Gear--Lubricate
- 6. Refrigerant Leakage--Check

Every 1000 service hours or six months

- 1. Travel Reduction Gear Oil--Change
- 2. Filter Element of Hydraulic Oil Tank Breather--Replace
- 3. Oil Return Filter Element of Hydraulic Oil Tank--Replace (Ordinary oil return filter element)
- 4. Fresh Air Filter of Air Conditioner--Replace

Every 2000 service hours or every year

- 1. Coolant--Replace
- 2. Hydraulic Oil Suction Filter Element--Replace
- 3. Hydraulic Oil--Change (Ordinary hydraulic oil)
- 4. Air Recirculation Filter of Air Conditioner--Replace

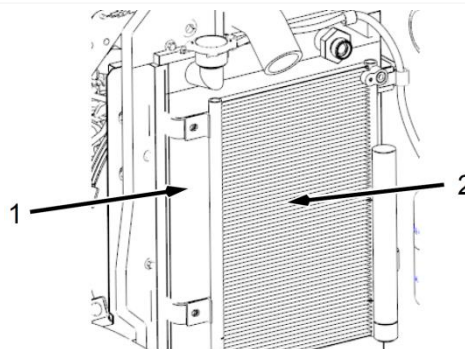
Power System

Radiator Assembly and Condenser Core--Clean

⚠ WARNING

Air pressure can cause personal injury. When using compressed air. Keep any and all passersby away to avoid personal injury caused by flying debris. At the same time, wear protective mask and protective clothing.

When cleaning the exterior of the radiator group with compressed air, the maximum air pressure at the nozzle shall be lower than 205 kPa (30 psi).



- 1. Radiator assembly
- 2. Condenser

- 1. Open the right side door of the machine.
- 2. The radiator assembly can be purged with compressed air or cleaned with water.

⚠ CAUTION

Periodically check the surface of the condenser tube and its fin for contamination and clean them.

Pay close attention to the condenser fins and do not damage them. Adjust the fins using screwdriver or pliers if they are twisted.

For working conditions such as high dust or cotton wool, the cleaning time of the condenser should be shortened according to the actual situation to avoid abnormal cooling caused by the radiator corrosion or poor radiator.

Engine Air Intake System--Check

Check the air intake system for cracked hoses, loose clamps, and holes. Tighten or replace parts to make sure the air intake system is sealed.

Air Filter and Elements--Clean/Replace

⚠ CAUTION

When replacing the air filter element or maintaining the pre-filter, the engine must be stopped, otherwise, it may be damaged.

When there is no alarm from the air filter service indicator shown on the display or when the scheduled maintenance interval is not reached, do not open the air filter, otherwise, dust and debris may enter the air filter.

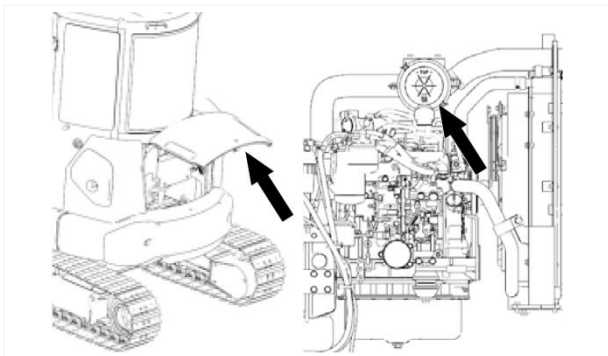
If there is an alarm from the air filter service indicator shown on the display, service the air filter promptly.

The main filter element should be replaced after being cleaned for 6 times. The main filter element should be replaced once every year, even though it has not been cleaned for 6 times.

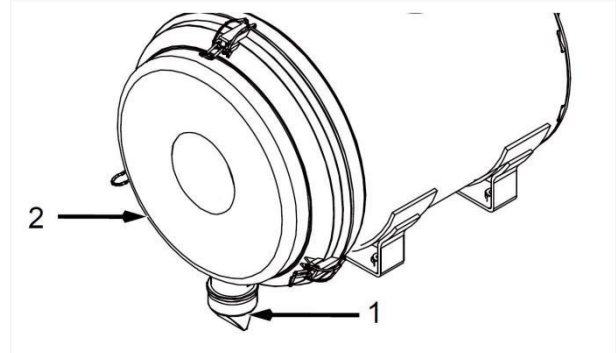
⚠ WARNING

The main filter element can be cleaned, while the safety filter element can not be cleaned. If the filter element needs to be replaced, the main filter element and the safety element must be replaced at the same time.

1. Park the machine on flat ground and stop the engine.
2. Open the rear hood of the machine to access the air filter.

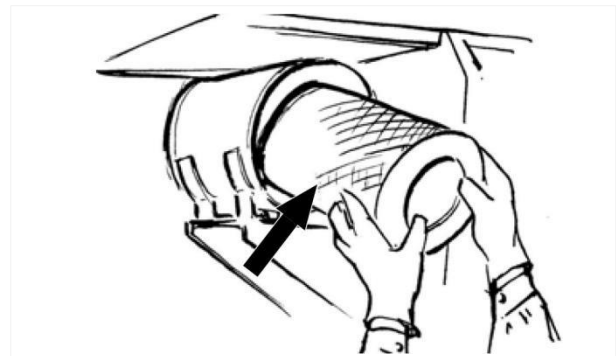


3. Press the dust exhaust valve to exhaust the dust.

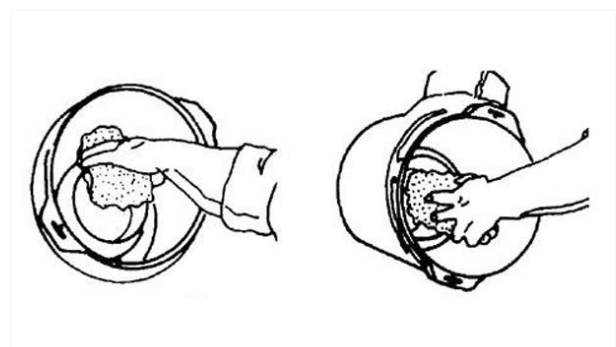


1. Dust exhaust valve
2. Outer cover

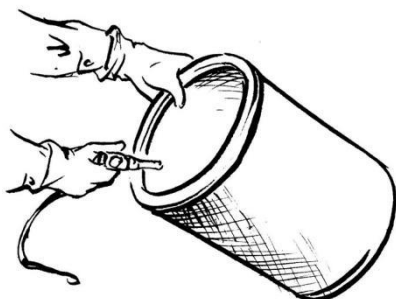
4. Carefully remove the dust and dirt around the air filter. Remove the outer cover of the air filter.
5. Gently shake the main filter element left and right by hand. Take out the main filter element along the direction of the housing. The safety filter element cannot be cleaned. If need to replace the safety filter element, gently shake the safety filter element left and right, and pull out the safety filter element slowly.



6. Check the main filter element.
 - a) Replace the main filter element if any damage is found to pleats and gaskets.
 - b) Clean the main filter element if it is not damaged.
7. Clean the inner wall of the air filter housing.



8. Clean the main filter element with compressed air (below 300 kPa). First spray outwards along the pleats from inside the main filter element, then repeat spraying the pleats along the inside and outside surface of the main filter element.



⚠ CAUTION

Do not hit the main filter element when cleaning it. Otherwise the engine could be damaged.

9. After cleaning the main filter element, check the filter paper of filter element for damage. If the filter paper is damaged, replace with a new main filter element.
10. Install a clean main filter element into the air filter and ensure an even contact at the end of the main filter element. Do not use tools to avoid any damage to the main filter element.
11. Clean and install the cap of the air filter, making sure that the inner cap's gasket in the air filter contacts evenly with the air filter housing.

⚠ CAUTION

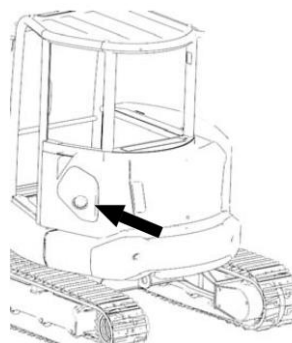
If the engine intake air filter alert indicator still on or the black smoke still exhausts after cleaning the main filter element, replace it with a new main filter element. The main filter element and the safety filter element should be replaced at the same time.

Fuel Tank Water and Impurities-- Remove

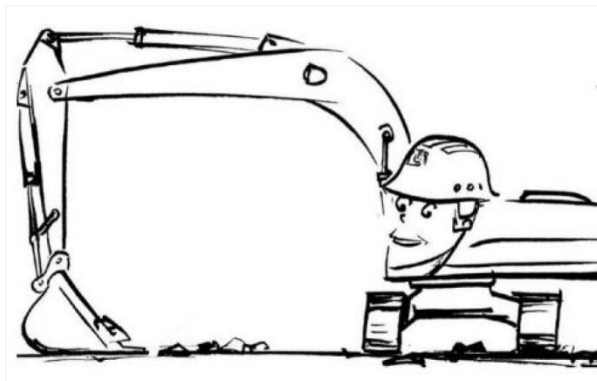
⚠ CAUTION

If the fuel is mixed with water or dirt, the fuel pump and fuel injection nozzle cannot work properly and will quickly wear. Measures should be taken to remove water and impurities in fuel.

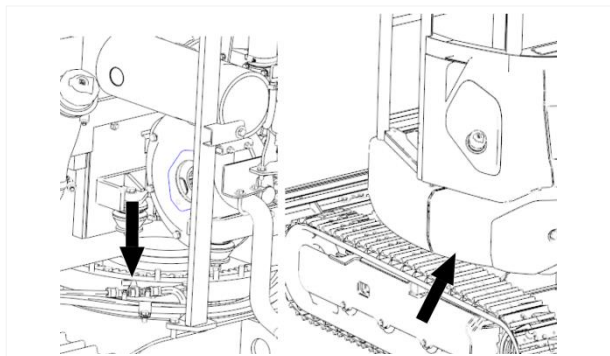
The fuel tank is located on the left side of the machine.



1. Swing the revolving frame to 90°, park the machine on flat ground, and lower the bucket to the ground for easier access.



2. Shut down the engine. Take the key out of the start switch (for the machine started or stopped with a key).
3. Unscrew the fuel tank filler cap to release pressure. Unscrew the drain valve under the fuel tank to drain water and impurities at the bottom of the fuel tank and collect with a suitable container. Screw the drain valve and the filler cap after a few seconds.



4. If it is possible, fuel should be stood for 24 hours before the tank is filled.
5. After each working shift, add fuel and expel the humid air in the fuel tank.
6. Every time after replenishing the tank, wait for 5 to 10 minutes before starting the engine so that water and impurities can sink to the bottom of the tank.

⚠ CAUTION

Add fuel before the tank is empty. Any residual fuel at the bottom of the fuel tank that contains water and impurities will affect the normal operation of the engine. Drain and clean the fuel tank before adding fuel if the tank is empty.

Fuel--Check/Add

⚠ CAUTION

Fuel is highly flammable and dangerous. Naked flames shall be extinguished before refueling, otherwise, a fire could result.

Avoid fuel spillage when refueling. If there is a spillage, wipe it clean thoroughly. Remove the soil or sand in case fuel spills on them.

Avoid touching clothes and skin when refueling. Wash hands immediately after refueling.

In case the fuel gets into eyes, rinse it off with plenty of water and seek medical attention immediately.

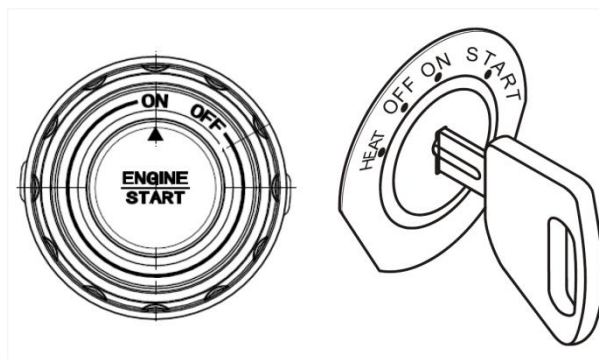
⚠ CAUTION

The diesel used must meet the requirements of local laws and regulations. See the relevant content in "Fluids and Lubricants" for details.

Fuel Level--Check

The fuel level gauge is shown on the display in the cab.

1. Turn the start switch (or key) to the ON position to connect the power supply of the machine.



2. Check the fuel level display on the instrument. When the fuel level is in the red zone, it indicates that the fuel volume is 10% or less and refueling is needed.



3. After checking the fuel level, rotate the start switch (or key) counterclockwise to the OFF position.

Fuel--Add

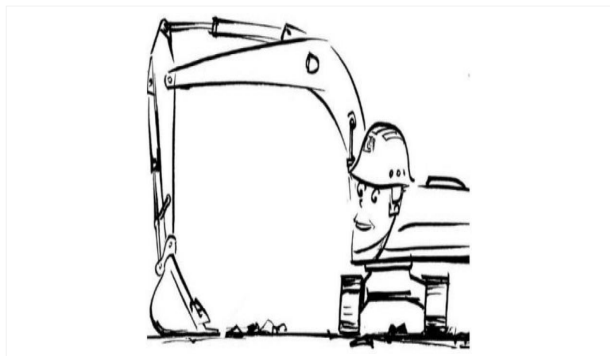
⚠CAUTION

The diesel used must meet the requirements of local laws and regulations. For details, please refer to "Fluids and Lubricants".

If the fuel level is insufficient, add fuel promptly.

The fuel tank is located on the left side of the cab.

1. Insert the key into fuel tank cap and rotate to the open position, open cap to add fuel.



2. If using a refueling gun with automatic stop function to add fuel, the refueling can be stopped after the refueling gun jumps. If using a refueling tank to add fuel, observe that the fuel level rises to the lower end of the refueling port to stop refueling.

Engine Oil--Check/Add

⚠WARNING

When checking the engine oil, do not touch the hot oil and heated parts to prevent burns.

⚠CAUTION

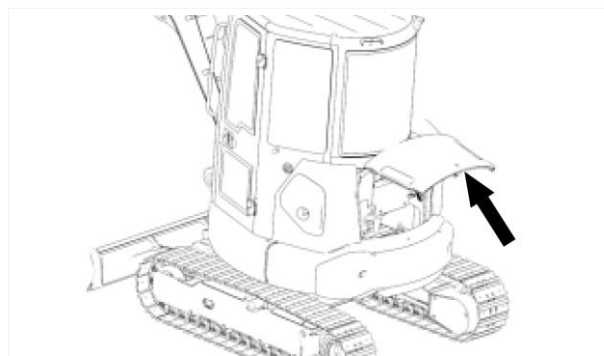
Too much or too little engine oil can result in damage to the engine.

When checking the oil level, the engine shall be stopped and wait at least 15 minutes for the oil to return to the oil pan.

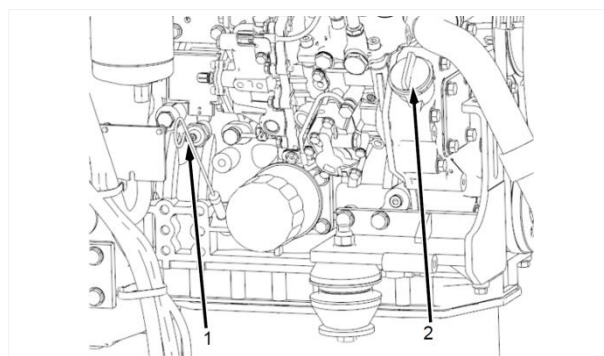
The machine shall be parked on flat ground in order to check the accurate oil level.

The machine is equipped with engine oil level sensor and oil dipstick.

1. Open the rear hood to access the engine oil dipstick handle and the engine oil filler.

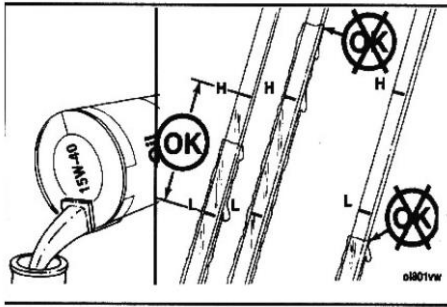


2. Rotate the oil dipstick handle 90° counterclockwise and pull it out.



1. Engine oil dipstick
2. Engine oil filler cap

3. Wipe off the oil on the dipstick and reinsert it to the lowest position.
4. Pull out the dipstick again and check the level scale.

Proper engine oil level range**⚠ CAUTION**

The engine oil level is between "L" and "H" scale, too high or too low engine oil level will affect the normal operation of the machine.

5. If the oil level is below the "L" scale, please unscrew the oil filler cap and add oil. If the oil level is above the "H" scale, please open the drain valve of the oil pan at the bottom of the engine and drain some oil.

⚠ CAUTION

Before adding oil, please clean the oil filler cap, and place the removed cap in a clean area to prevent the portion extending into the filler from dust and debris.

If the oil is contaminated or deteriorated, please replace the oil immediately.

⚠ CAUTION

The oil added shall be of Grade CF-4 or higher. If there is no applicable oil, please consult local service provider.

6. After filling the oil, close the oil filler cap.
7. Close the rear hood.

Engine Oil--Change**⚠ WARNING**

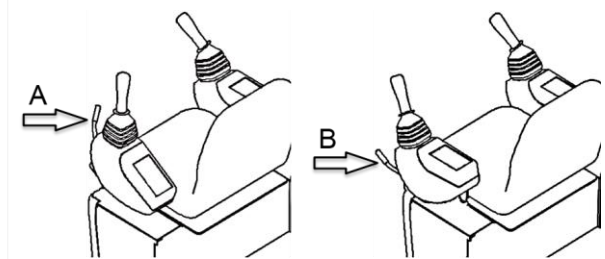
Hot oil and hot parts may cause personal injuries, please avoid contacting with skin.

⚠ CAUTION

When the oil in the crankcase is discharged while it is still hot, waste particles suspending in the oil can be discharged. Waste particles will settle to the crankcase bottom as the oil cools. They cannot be removed by draining the oil, and will recirculate in the engine lubrication system with the new oil added.

Steps for replacing the engine oil:

1. Park the machine on flat ground. Run the engine at idle speed until the water temperature reaches normal working temperature. Stop the engine. Push the pilot shutoff lever to the LOCK position.

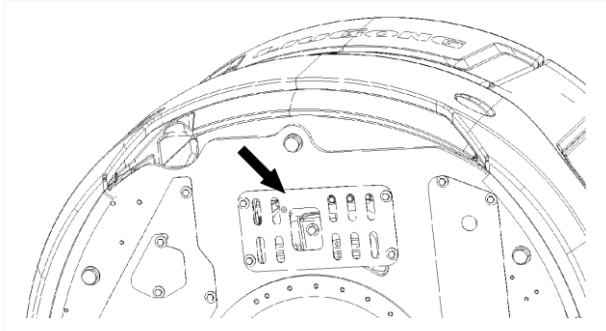


A LOCK
B UNLOCK

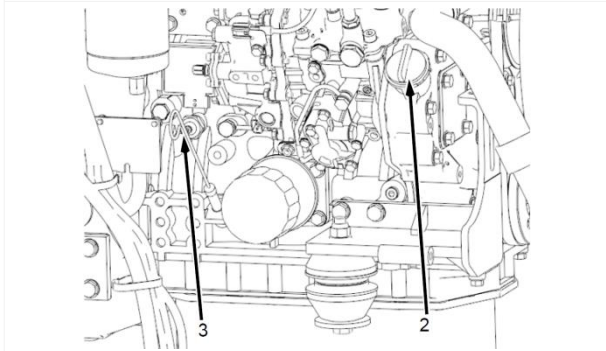
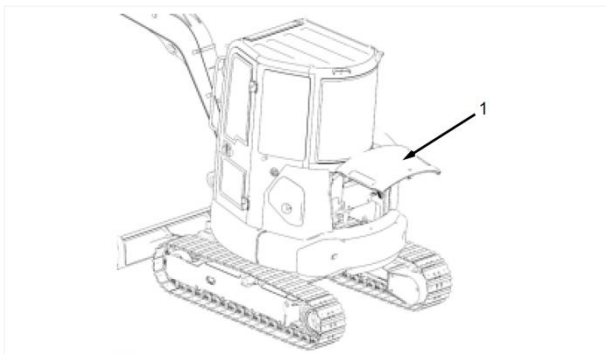
⚠ CAUTION

Refer to "Safe Disposal of Waste Liquids" for information on holding the spilled fluid and treat the discharged fluid in accordance with local regulations.

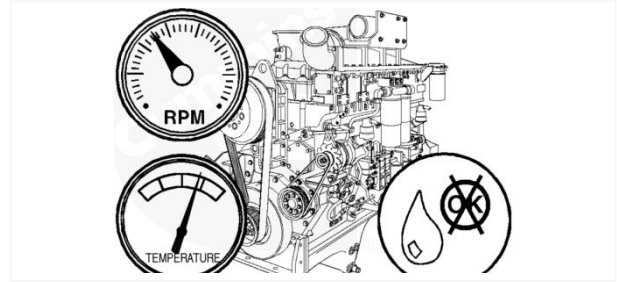
2. Open the drain valve or drain plug on the oil pan to drain the oil into a suitable container.



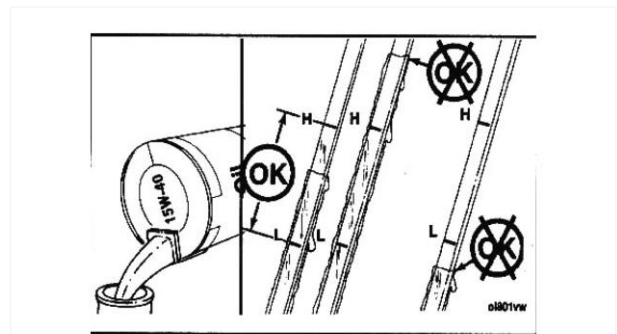
3. Close the drain valve or tighten drain plug, and install the bottom sealing plate.
4. Refer to "Engine Oil Filter--Replace" to replace the engine oil filter.
5. Open the engine hood, remove the oil filler cap and fill with new oil. Please refer to "Fluid Refill Capacities and Change Interval" for the filling capacity.



1. Engine oil dipstick
2. Engine oil filler cap
6. Clean and close the oil filler cap tightly.
7. Run the engine at idle speed to check the engine oil filter and oil drain valve for leakage.



8. Turn off the engine and wait for about 15 minutes to allow the oil to fully return to the crankcase. Check the engine oil level again; the oil level should be between the "L" and "H" scales on the oil dipstick. If the oil level is below the "L" scale, please replenish the oil; if the oil level is above the "H" scale, please open the drain valve of the oil pan at the engine bottom and drain some oil.



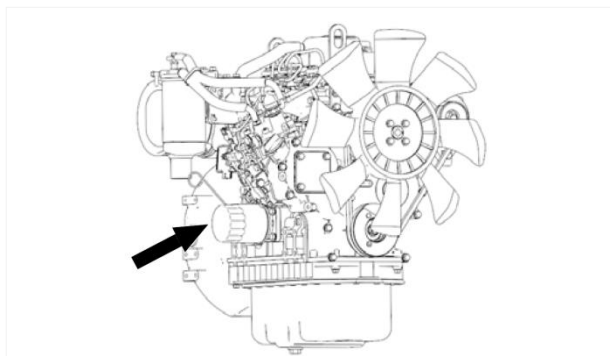
⚠ CAUTION

Either too much or too little oil in the engine crankcase can result in damage to the engine.

9. Close the rear hood.

Engine Oil Filter--Replace

Open the rear hood to access the engine oil filter.

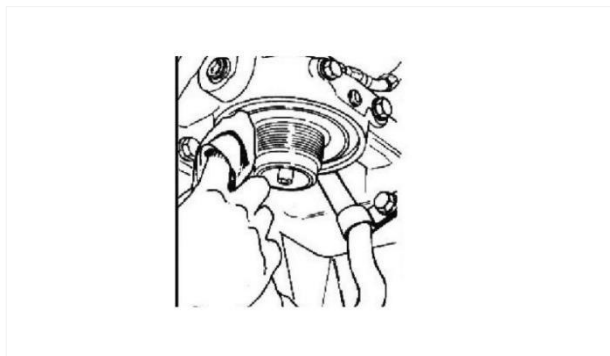


1. Clean the area around the support of the engine oil filter. Remove the engine oil filter with a strap wrench, and pour the oil into a suitable container.

⚠ CAUTION

Refer to "Safe Disposal of Waste Liquids" for information on holding the spilled fluid and treat the discharged fluid in accordance with local regulations.

2. Clean the surface of the gasket of the housing with a clean cloth. Remove the O-ring that is stuck on the filter head.



3. Install a new O-ring, replenish the oil filter with clean engine oil, and apply a coat of clean engine oil on the gasket surface.



4. Install the engine oil filter by hand until the filter housing contacts the base, and then tighten the oil filter with the strap wrench to 3/4 turn.

⚠ CAUTION

Mechanical over tightening may damage the thread or the seal of the engine oil filter element.

5. Close the rear hood of the machine.

Coolant--Check/Add

⚠ WARNING

When the machine has stopped, the temperature of the hood surface and the power high temperature components are high. Before opening or closing the hood, ensure that the power high temperature components are completely cooled down.

⚠ WARNING

Hot coolant, steam, and alkali can cause personal injury.

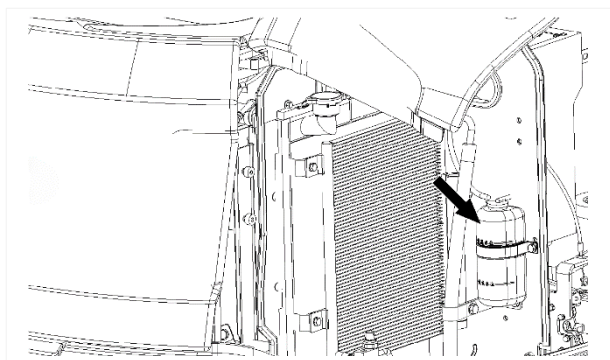
The pressure and temperature of the coolant are high during operation, and the hot coolant can cause serious burns.

⚠ WARNING

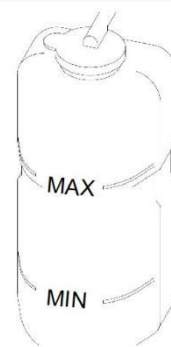
Coolant is mainly composed of cooling water, antifreeze solution and additives which contain alkali and shall be prevented from contacting with skin and eyes.

Coolant Level--Check

1. Park the machine on flat ground and stop the machine.
2. Open the right side door of the machine to access the auxiliary tank



3. Check the auxiliary tank and ensure that the coolant level is between the "MAX" and "MIN" scales. If the level is lower than the "MIN" scale, please add coolant promptly.



⚠ CAUTION

If the coolant needs to be replenished daily, check whether there is leakage in the cooling system. If leakage is found, eliminate the leakage and add coolant until it reaches the proper level.

Coolant--Add

⚠ WARNING

Coolant is flammable. Never expose it to an open flame.

Never use water as the coolant; otherwise, it will cause corrosion damage to the entire cooling system.

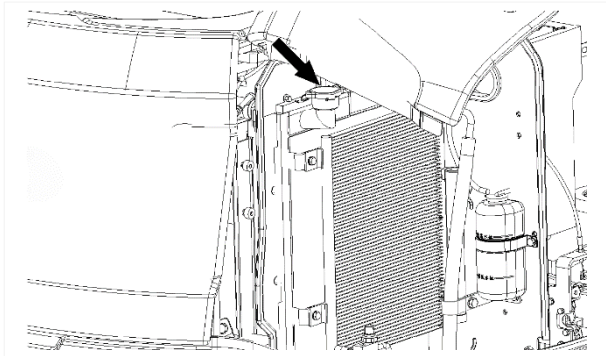
Before opening the coolant filler cap, stop the machine first. After the coolant filler cap is cooled down enough to be contacted with bare hands, slowly loosen the coolant filler cap to release the pressure in order to avoid being scalded by high temperature steam or splashing coolant.

⚠ CAUTION

Choose a coolant according to the local minimum temperature. The freezing point of the coolant should be around 10 °C lower than the local minimum temperature in general.

When replacing the coolant, please opt for Kioti Machinery's specified coolant, such as HEC-II-35 or HEC-II-45, and add the coolant according to the instructions. If you need to purchase other brands of coolant, please consult your local dealer for support.

1. Mix the water and coolant completely according to desired density level of the coolant. Park the machine on flat ground and stop the machine.
2. Open the right side door of the machine to access water radiator filler cap.



3. After the coolant temperature drops down below 50°C, slowly screw out the radiator coolant filler cap to release pressure in order to avoid being scalded by high temperature vapor or splashing coolant.

⚠ CAUTION

Refer to "Safe Disposal of Waste Liquids" for information on holding the spilled fluid and treat the discharged fluid in accordance with local regulations.

4. Add the coolant slowly until the level reaches within 1 cm below the filler of the water radiator, and keep it steady for 10 min.

⚠ CAUTION

When adding coolant, bleed air from the cooling system lines.

5. Keep the coolant filler cap open, start the machine and run at idle speed for 5 minutes. When the coolant temperature rises above 85°C, run the machine at idle speed for another 5 minutes.
6. Check the coolant level again, and continue to add coolant until the level reaches 1 cm below the filler cap of the water radiator if necessary.
7. Check the seals of the coolant filler cap, and replace if damaged.
8. After filling the radiator, add coolant to the auxiliary tank until the coolant level reaches the middle of the auxiliary tank.

Coolant--Change

⚠ CAUTION

Hot coolant, steam, and alkali can cause personal injury.

The pressure and temperature of the coolant are very high during operation, and the hot coolant can cause serious burns. To open the cap, turn off the machine first. After the pressure cap is cooled down enough to be contacted with bare hands, slowly loosen the pressure cap to release the pressure.

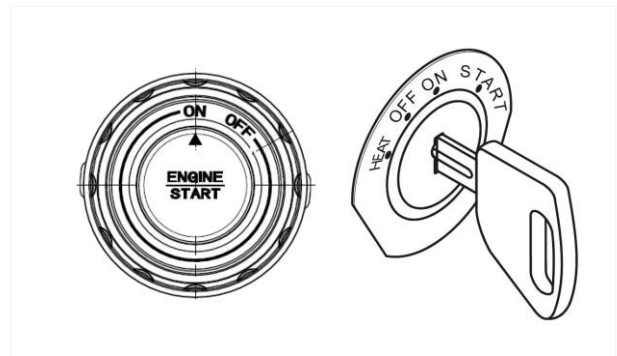
⚠ WARNING

Coolant is mainly composed of cooling water, antifreeze solution and additives which contain alkali and shall be prevented from contacting with skin and eyes.

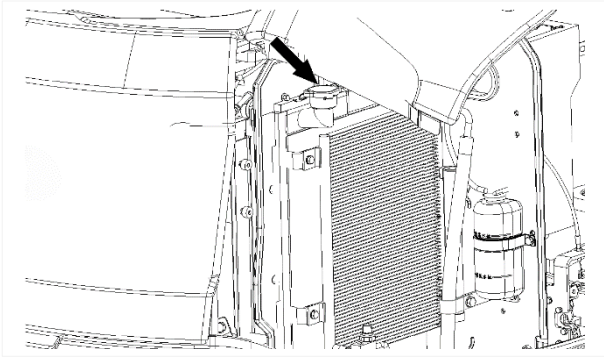
Completely replace the coolant every 2,000 service hours or two years (whichever comes first) and clean the cooling system. Clean the cooling system before that interval if the coolant is polluted, the power system is excessively hot, or air bubbles appear in the radiator.

Steps for cleaning the cooling system:

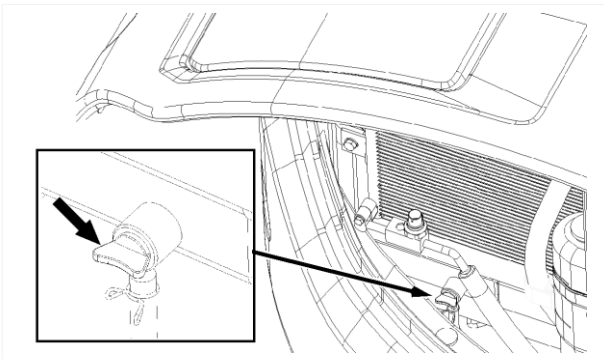
1. Turn the start switch to the ON position to turn on the power of the machine.



2. Start the machine. Turn off the air conditioner AC, and adjust the temperature of the air conditioner to the maximum. Run the machine at idle speed for 5 min, and turn off the machine.
3. Slowly unscrew the coolant filler cap to release pressure after the coolant temperature is below 50°C.



4. Open the drain valve at the bottom of the water radiator, drain the coolant and collect it with a suitable container.



5. After draining the coolant, close the water valve at the bottom of the water radiator.
6. Check all fluid lines and clamps of the cooling system for damage, and replace if necessary.
7. Check the water radiator for leakage, damage, and dirt build-up, and clean and maintain if necessary.
8. Add cleanser which is a mixture of water and sodium carbonate into the cooling system, in the mixing ratio of 0.5 kilograms of sodium carbonate to 23 liters of water. The cleanser should be filled to the normal fluid level and kept stable for 10 minutes.

⚠ CAUTION

When adding cleanser into the cooling system, expel air from cooling system lines. During the cleaning of the cooling system, never cover the coolant filler while running the machine.

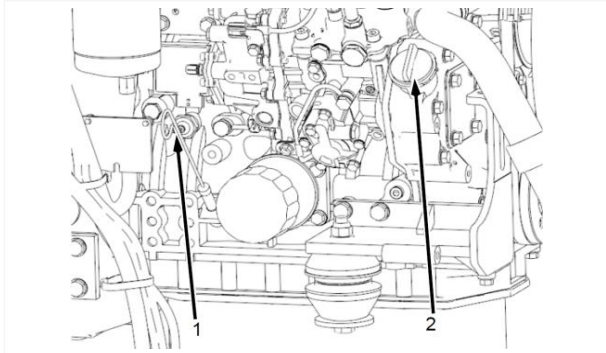
9. Keep the coolant filler cap open, start the machine and run at idle speed for 5 minutes. When the coolant temperature is rises above 85°C, run the machine at idle speed for another 5 minutes.
10. Stop the machine, and drain out the

cleanser.

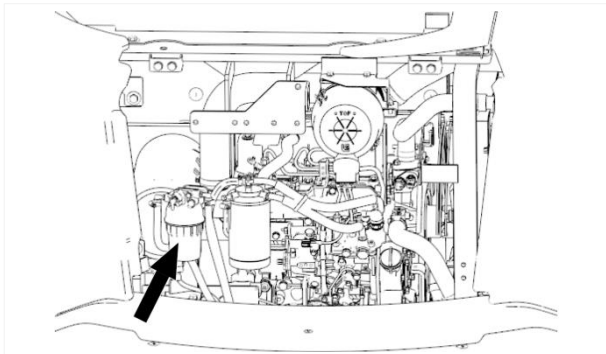
11. Add clean water to the cooling system to the normal level and keep it stationary for ten minutes. Keep the coolant filler cap open, start the machine and run at idle speed for 5 minutes. When the coolant temperature is rises above 85°C, run the machine at idle speed for another 5 minutes.
12. Stop the machine and drain the water from the cooling system. If the drained water is still dirty, clean the system again till the drained water runs clean.
13. Close all discharge valves. Then add new coolant in accordance with the operating procedures on "Coolant--Check/Add".
14. Replace the coolant of water radiator and the auxiliary tank (optional) at the same time.

Fuel Water Separator (Fuel Primary Filter)--Clean/Replace

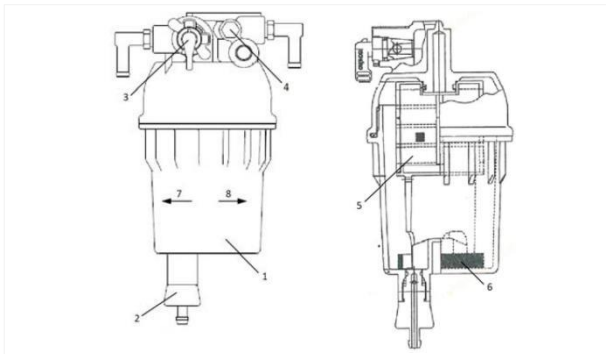
1. Stop the engine. Open the rear hood of the machine after the engine is cooled down.



2. Place a suitable container under the fuel filter to collect impurity.



3. Close the fuel tap of the fuel water separator.



1. Cup
2. Drain plug
3. Fuel tap
4. Valve
5. Fuel water separator element
6. Floating ring
7. Left hand direction
8. Right hand direction

4. Loosen the drain plug to drain the impurity.
5. Rotate the cup in the left hand direction as shown in the figure. Hold the cup carefully to prevent fuel from spilling. If there is any spilling, wipe it immediately.

6. Take out the floating ring from the cup. Pour the impurity into the container, and dispose the impurity properly.
7. Clean the fuel water separator element and the inner of the cup. If the element replacement cycle has been reached, replace with a new element. Replace the components if damaged.
8. Install the fuel water separator element and the O-ring onto the bracket. Check the O-ring, replace if deformed or damaged
9. Tighten the cup in the right hand direction as shown in the figure. Install the fuel water separator onto the bracket, and the installation tightening torque is 11-15ft-lb (15-20N·m, 1.5-2.0kgf·m).
10. Close the drain plug, and open the fuel tap of the fuel water separator.
11. Turn the start switch to the ON position, and hold for 10-15 seconds, so that the electrical fuel pump can start the fuel system.
12. Close the rear hood of the machine.

⚠ CAUTION

Do not start the engine directly through the starter motor, which may cause the starter motor overheating and damage the relevant components.

Fuel Fine Filter--Replace

⚠ WARNING

Failure to follow the steps listed below may cause personal injury or death.

Wipe all leaked or splashed fuel clean. Do not smoke while maintaining the fuel system or during work. Fuel that leaks or spills onto hot surfaces or electrical components can cause a fire.

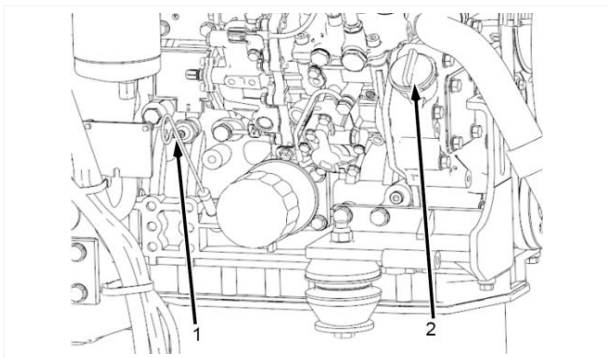
When replacing the fuel fine filter, be sure to turn the battery disconnect switch to the "Disconnect" position or disconnect the battery.

⚠ CAUTION

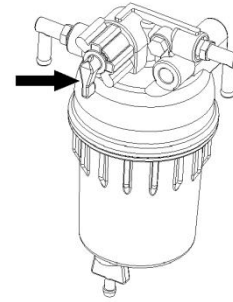
Before installing the fuel fine filter, do not fill fuel into the fuel fine filter, otherwise the fuel cannot be effectively filtered. Contaminated fuel will speed up the wear of the fuel system components.

To prevent dirt from entering the fuel system, clean the area around the fuel system components to be disconnected. Install dust caps on all disconnected components of the fuel system.

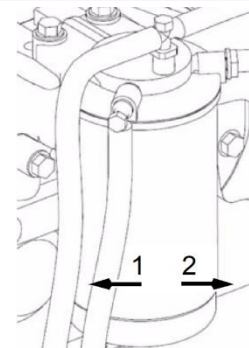
1. Stop the engine. Open the rear hood of the machine after the engine is cooled down.



2. Place a suitable container under the fuel fine filter to collect impurity. Close the fuel tap of the fuel pre-filter (fuel primary filter).



3. Rotate the fuel fine filter to the left with a wrench to loosen and remove it. When disassembling the fuel fine filter, hold carefully to prevent fuel from spilling. If there is any spilling, wipe it immediately.



1. Left
2. Right
4. Clean the surface of the mounting support with a piece of non-fibrous cloth. Apply a coat of fuel on the gasket of the fuel fine filter.
5. Install a new fuel fine filter, manually rotate it to the right until it contacts with the surface of the mounting support. Then tighten it with a wrench to 14-17ft·lb (19.6-23.5N·m or 2.0-2.4kgf·m) or use a wrench to rotate an additional turn.
6. Open the fuel tap of the fuel pre-filter (fuel primary filter).
7. Turn the start switch to the ON position, and hold for 10-15 seconds, so that the electrical fuel pump can start the fuel system.

⚠ CAUTION

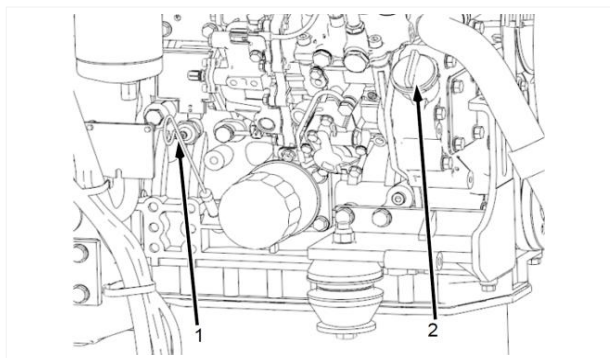
Do not start the engine directly through the starter motor, which may cause the starter motor overheating and damage the relevant components.

Tension and Condition of Crankcase Belt--Check

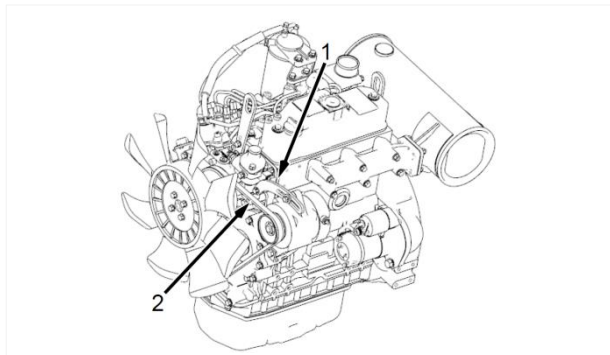
⚠CAUTION

The belt tensioner equipped on the engine can automatically adjust the belt tension to the correct value.

Open the rear hood of the machine to access the belt.



1. Check the tensioner to ensure it can turn freely.



1. Tensioner
2. Drive belt

2. Visually inspect the engine drive belt for cross-surface cracks. If there are belt cracks in its lengthways or belt material falling off, replace it with a new belt. For more information on the replacement procedure, refer to the Engine OWNER'S MANUAL.

Hydraulic System

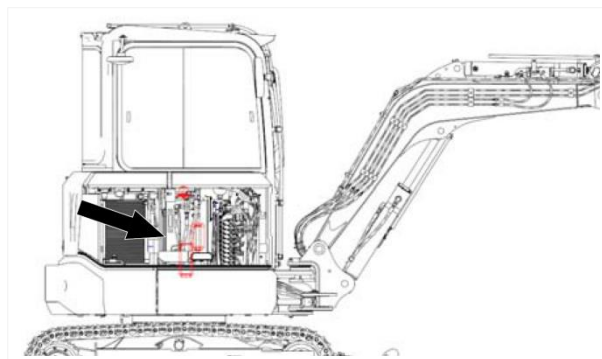
Hydraulic Oil--Check/Add

⚠CAUTION

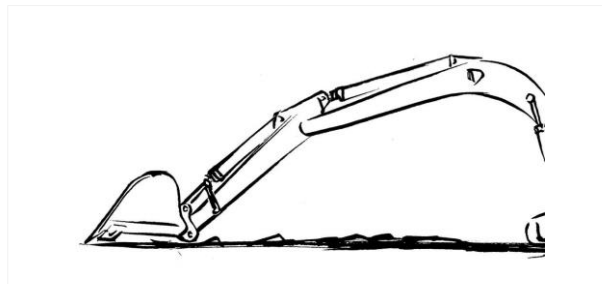
Please take preventive measures when adding hydraulic oil. Pour the hydraulic oil slowly into the tank to prevent the oil from splashing and spraying out of the tank.

Pay attention to the hydraulic oil cleanliness during handling in order to prevent foreign matter from entering the hydraulic system.

The hydraulic oil tank is located at the right side of the machine.

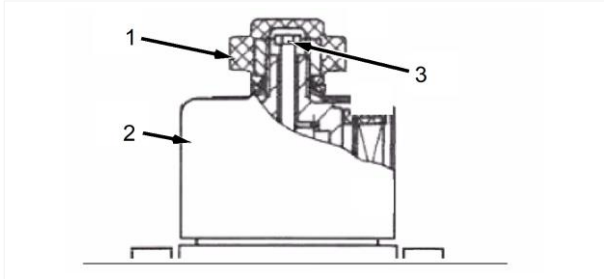


1. Park the machine on flat ground.
2. Position the machine with the arm cylinder and bucket cylinder fully retracted, and lower the bucket onto the ground.



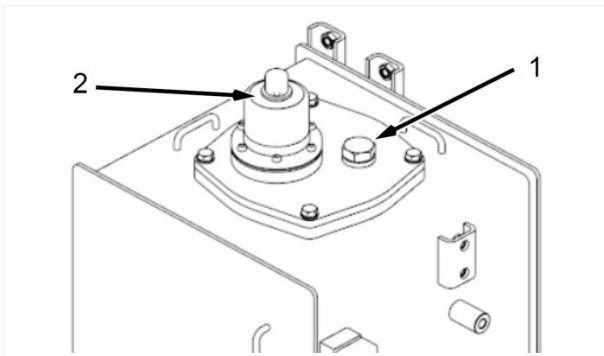
3. Shut down the engine. Turn the start switch to the ON position to keep the circuit connected.
4. Push the pilot shutoff lever to the UNLOCK position.
5. Turn the pilot control lever to the maximum angle to release the pressure in the respective pipeline.
6. Pull the pilot shutoff lever to the LOCK position.

7. Shut down the machine. Turn the start switch to the OFF position and remove the key (if equipped).
8. Loosen the dust cap on the breathing valve, press down the manual air outlet rod to exhaust any gas inside and release the pressure (do so for about 5 seconds), and then screw on the dust cap.



1. Dust cap
2. Cap
3. Air outlet rod

9. Check the sight glass on the hydraulic oil tank. The hydraulic oil level should be in the middle of the sight glass. Add hydraulic oil if the level is low.



1. Sight glass
2. Breathing valve

10. Remove the hydraulic oil tank cap to add oil, and check the sight glass again. Install the hydraulic oil tank cap after refueling.

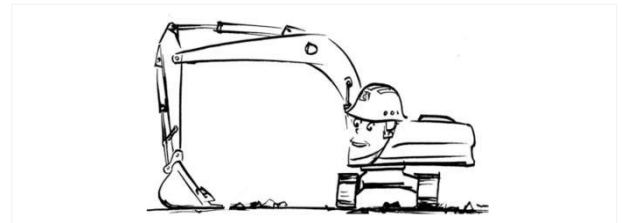
Hydraulic Oil--Change

⚠ CAUTION

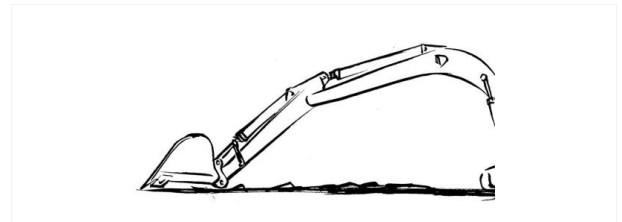
Care must be taken in order to ensure that fluids are contained properly during the procedures of inspection, maintenance, testing, adjustment, and repair of the equipment. Prepare to collect the fluid with suitable containers and dispose of all fluids in accordance with local regulations before disassembling.

1. Hydraulic oil tank--drain

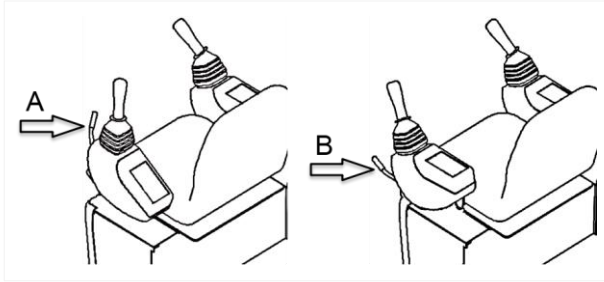
1. Swing the revolving frame to 90° and park the machine on flat ground for easier operation.



2. Start and run the machine at idling speed for 10 minutes, repeatedly raise or lower the boom, and tilt back or dump the bucket for several times to raise the hydraulic oil temperature. Position the machine with the arm cylinder and bucket cylinder fully retracted, and lower the bucket onto the ground.

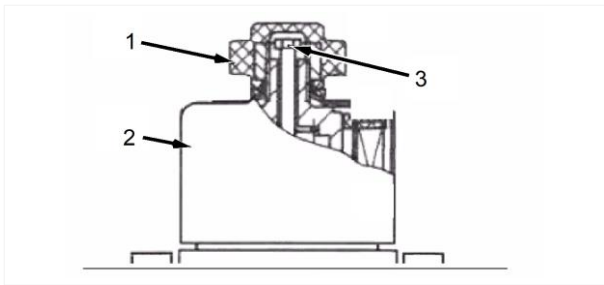


3. Shut down the engine. Turn the start switch to the ON position to keep the circuit connected.
4. Push the pilot shutoff lever to the UNLOCK position.
5. Turn the pilot control lever to the maximum angle to release the pressure in the respective pipeline.
6. Pull the pilot shutoff lever to the LOCK position.



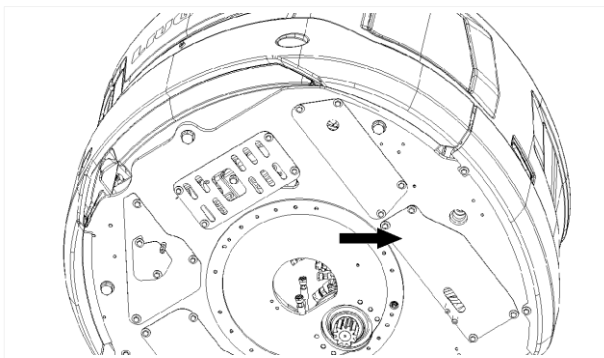
A: LOCK
B: UNLOCK

7. Shut down the machine. Turn the start switch to the OFF position and remove the key (if equipped).
8. Clean the top of hydraulic tank to prevent dust from getting into the hydraulic oil system.
9. Loosen the dust cap on the breathing valve, press down the manual air outlet rod to exhaust any gas inside and release the pressure (do so for about 5 seconds), and then screw on the dust cap.

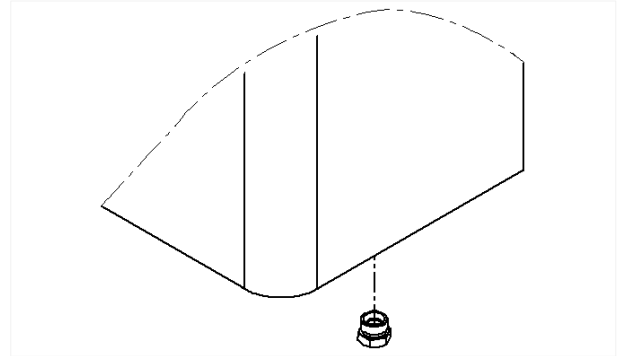


1. Dust cap
2. Cap
3. Air outlet rod

10. Remove the bottom sealing plate.

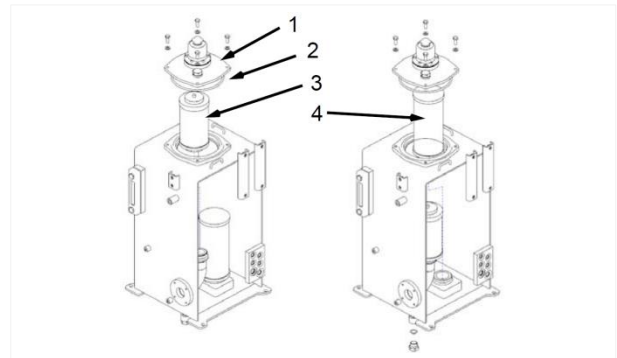


11. Clean the oil outlet of hydraulic tank. Unscrew the oil drain plug to drain the oil. Collect the oil with a suitable container.



2. Hydraulic oil tank--clean

1. Remove the anti-slip plate (if equipped), refer to "Oil Return Filter Element of Hydraulic Oil Tank--Replace" and "Hydraulic Oil Suction Filter Element--Replace" sections to remove the oil suction filter element and oil return filter element, and dispose the used filter element properly.



1. Cover
2. O-ring
3. Oil return filter element
4. Oil suction filter element

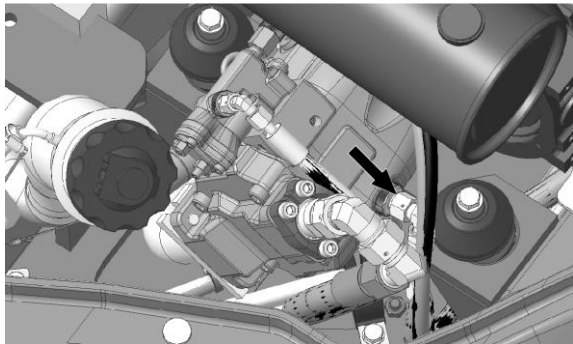
2. Wash the bottom and four walls of the hydraulic oil tank with fuel. Then wipe with clean cloth. Wash the bottom and four walls of the hydraulic oil tank with hydraulic oil again.
3. Wash the cover of the hydraulic tank, oil drain plug, etc. with nonflammable detergent. Dry them using compressed air or allow to air dry. Install a new oil suction filter element and oil return filter element back into the hydraulic oil tank.
4. Refer to "Hydraulic Oil--Check/Add", add hydraulic oil to a proper position.
5. Install the breathing valve. Ensure that filter and suspension rod are fixed to their correct positions. Tighten the bolt to a torque of 49 N.m.

3. Pump--refuel and exhaust

⚠ CAUTION

If the hydraulic pump is not filled with oil, it will be damaged when the machine is started.

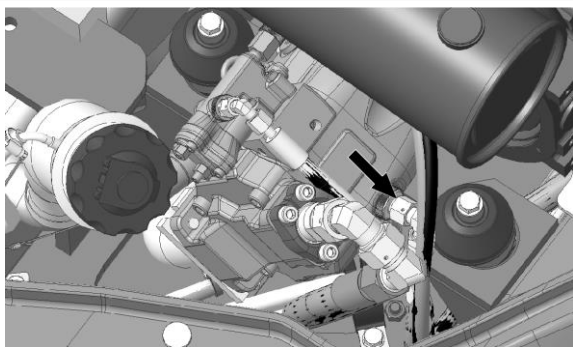
1. After the machine is shut down and cooled, loosen the oil drain hose on the main pump, inject the oil into the pump through the fitting, and install the oil drain hose.



2. Start and run the machine at low speed. Put a "DO NOT OPERATE" tag on the pilot shutoff lever. Make sure the pilot shutoff lever is in the LOCK position.



3. After the machine is shut down and cooled, slowly loosen the fitting to release the air. When the oil flows out of the fitting, tighten the hose fitting.

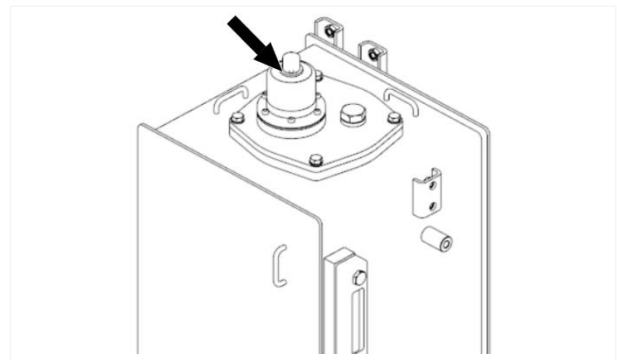


4. Operate the control lever slowly for about 15 minutes to exhaust the air in the system.

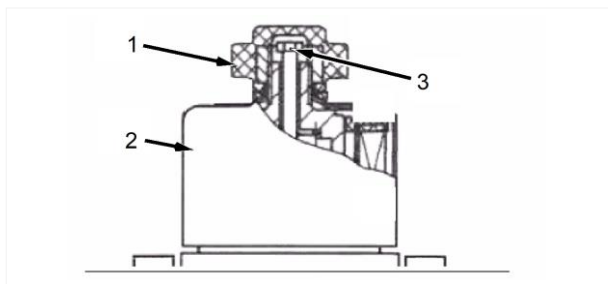
5. Position the machine with the arm cylinder and bucket cylinder fully retracted.
6. Stop the machine, and remove the key (if equipped).
7. Pull the pilot shutoff lever to the LOCK position.
8. Check the sight glass of the hydraulic oil tank. Add hydraulic oil if necessary.

Filter Element of Hydraulic Tank Breather--Replace

The breathing valve is located on the hydraulic oil tank filler.



1. Park the machine on flat ground and lower the bucket onto the ground.
2. Shut down the engine. Turn the start switch to the ON position to keep the circuit connected.
3. Push the pilot shutoff lever to the UNLOCK position.
4. Turn the pilot control lever to the maximum angle to release the pressure in the respective pipeline.
5. Pull the pilot shutoff lever to the LOCK position.
6. Shut down the machine. Turn the start switch to the OFF position and remove the key (if equipped).
7. Loosen the dust cap on the breathing valve, press down the manual air outlet rod to exhaust any gas inside and release the pressure (do so for about 5 seconds), and then screw on the dust cap.



1. Dust cap
2. Cap
3. Air outlet rod

8. Unscrew the cap, remove the used filter element and replace it with a new one. Install the cap and the dust cap.

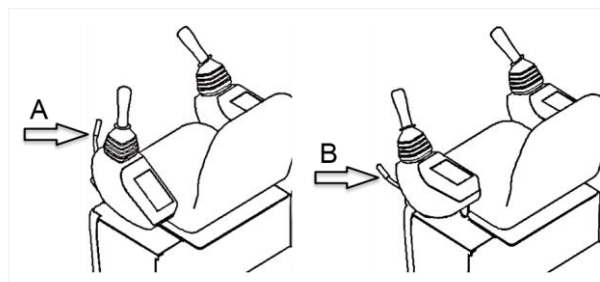


Oil Return Filter Element of Hydraulic Oil Tank--Replace

⚠ CAUTION

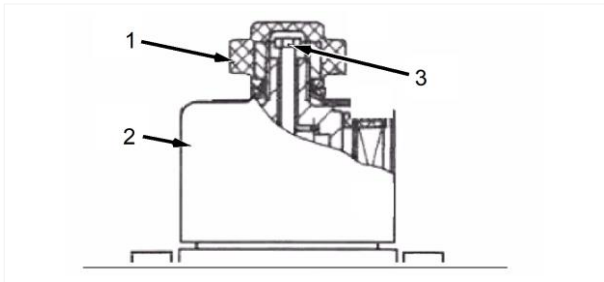
Before opening the hydraulic oil tank cap, stop the machine, and remove the hydraulic oil tank cap slowly to prevent burns caused by hot oil after releasing the internal pressure of the hydraulic oil tank through the breather.

1. Park the machine on flat ground and lower the bucket onto the ground.
2. Shut down the engine. Turn the start switch to the ON position to keep the circuit connected.
3. Push the pilot shutoff lever to the UNLOCK position.
4. Turn the pilot control lever to the maximum angle to release the pressure in the respective pipeline.
5. Pull the pilot shutoff lever to the LOCK position.



- A: LOCK
B: UNLOCK

6. Shut down the machine. Turn the start switch to the OFF position and remove the key (if equipped).
7. Loosen the dust cap on the breathing valve, press down the manual air outlet rod to exhaust any gas inside and release the pressure (do so for about 5 seconds), and then screw on the dust cap.

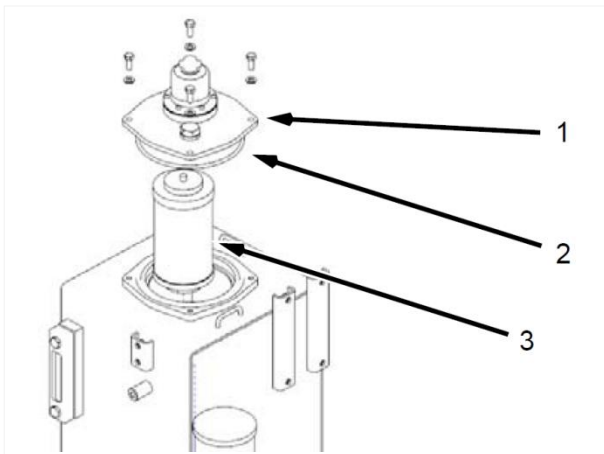


1. Dust cap
2. Cap
3. Air outlet rod

⚠ CAUTION

To overcome the spring tension, press the hydraulic oil tank cap when removing the last two bolts.

8. Clean the top of hydraulic tank to prevent dust from getting into the hydraulic oil system.
9. Remove the hydraulic oil tank cap, O-ring and oil return filter element in order.



1. Hydraulic oil tank cap
2. O-ring
3. Oil return filter element

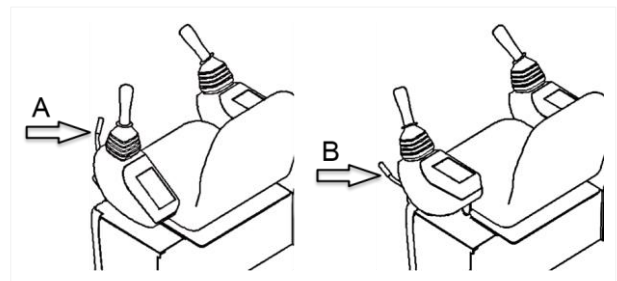
10. Replace with a new oil return filter element and O-ring. Install the hydraulic oil tank cap and other components in reverse order of removal steps.
11. Check the sight glass of the hydraulic oil tank. Add hydraulic oil if necessary.

Hydraulic Oil Suction Filter Element-- Replace

⚠ CAUTION

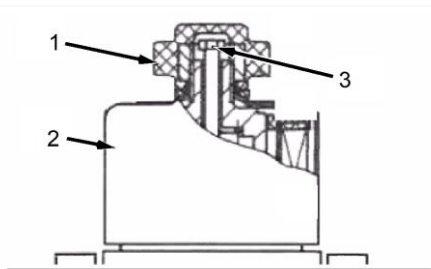
Care must be taken in order to ensure that fluids are contained properly during the procedures of inspection, maintenance, testing, adjustment, and repair of the equipment. Prepare to collect the fluid with suitable containers and dispose of all fluids in accordance with local regulations before disassembling.

1. Park the machine on flat ground and lower the bucket onto the ground.
2. Shut down the engine. Turn the start switch to the ON position to keep the circuit connected.
3. Push the pilot shutoff lever to the UNLOCK position.
4. Turn the pilot control lever to the maximum angle to release the pressure in the respective pipeline.
5. Pull the pilot shutoff lever to the LOCK position.

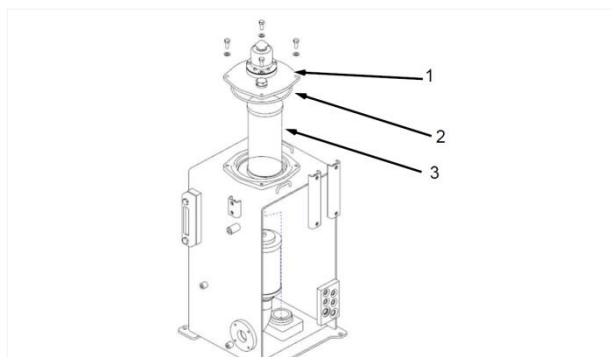


- A: LOCK
B: UNLOCK

6. Shut down the machine. Turn the start switch to the OFF position and remove the key (if equipped).
7. Loosen the dust cap on the breathing valve, press down the manual air outlet rod to exhaust any gas inside and release the pressure (do so for about 5 seconds), and then screw on the dust cap.



1. Dust cap
 2. Cap
 3. Air outlet rod
8. Clean the top of hydraulic tank to prevent dust from getting into the hydraulic oil system. Remove the hydraulic oil tank cap, O-ring and oil suction filter element in order.

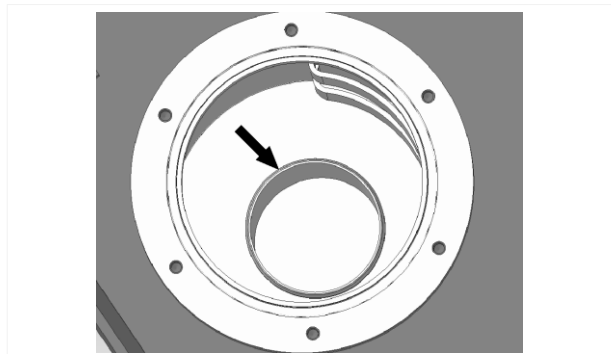


1. Hydraulic oil tank cap
2. O-ring
3. Oil suction filter element

⚠ CAUTION

Do not drop the small components, such as springs, washers, nuts, etc. into the oil tank.

9. Install a new oil suction filter element into the oil tank, and snap the filter element into the locating bush of the oil tank base.



10. Install hydraulic oil tank cap and other components in reverse order of removal steps. Make sure that the boss of the hydraulic oil tank cap is snapped into the connecting seat of the filter element assembly.

11. Check the sight glass of the hydraulic oil tank. Add hydraulic oil if necessary.

Travel Reduction Gear Oil Level--Check

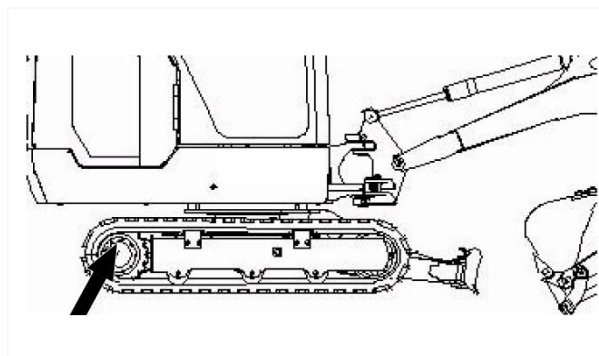
⚠ WARNING

After turning off the machine, wait until the oil temperature drops to prevent burns.

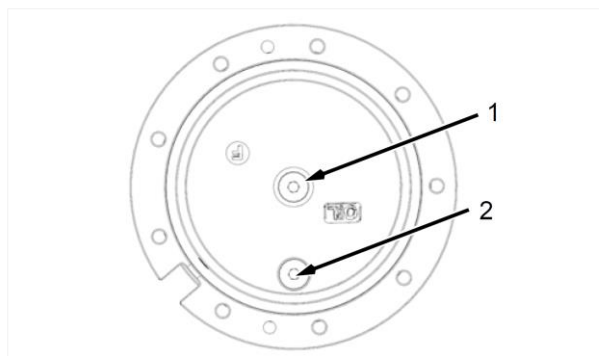
Loosen the plug screw slowly to release the remaining pressure in the tank to prevent danger.

⚠ CAUTION

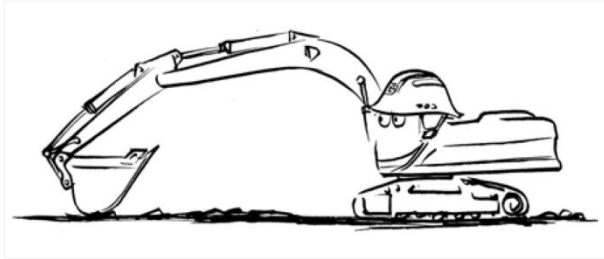
The oil level plugs on the left and right travel motor will not be on the horizontal line at the same time, so check the oil level of the left and right travel motor individually.



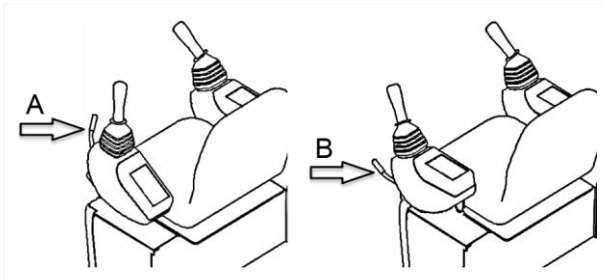
1. Park the machine on flat ground.
2. Wipe off each filling position before checking. Drive the machine slowly so that the oil level check plug (oil fill plug) of the travel motor is exactly on the horizontal oil level line. If there is no horizontal oil level line, place each oil plug in the position shown as below figure.



1. Oil level check plug (oil fill plug)
2. Oil drain plug
3. Lower the work implement to the ground and stop the machine securely.



4. Shut down the machine, turn the start switch to the OFF position, and remove the key (if equipped).
5. Pull the pilot shutoff lever to the LOCK position.



A: LOCK
B: UNLOCK

6. Unscrew the oil level check plug (oil fill plug) slowly to release the pressure after the gear oil cools down completely, and then remove the plug.

⚠ WARNING

The gear oil temperature might be very high. Wear protective equipment and handle carefully to avoid personnel injuries.

7. The oil should be overflowing the plug hole. If the oil amount is insufficient, add gear oil through the oil level check plug (oil fill plug).
8. Wrap the thread of the plug screw of the oil level check plug (oil fill plug) with sealing tape, install and tighten the plug with a tightening torque of 49 N.m (5 kgf.m).
9. Check the gear oil level of the other travel motor as above.

Travel Reduction Gear Oil--Change

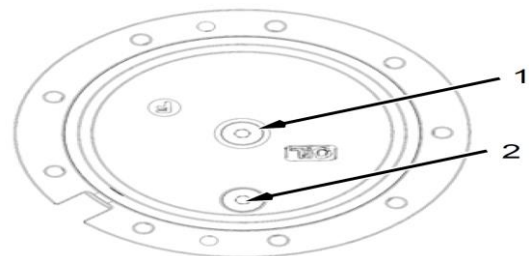
⚠ CAUTION

Care must be taken in order to ensure that fluids are contained properly during the procedures of inspection, maintenance, testing, adjustment, and repair of the equipment. Prepare to collect the fluid with suitable containers and dispose of all fluids in accordance with local regulations before disassembling.

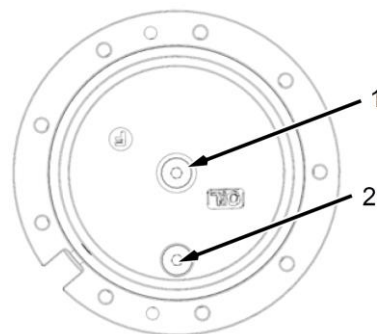
⚠ CAUTION

Drain the oil only after the machine has been working for some time so that the impurities in the housing are in suspension.

The position of the travel motor and reduction gear is as follows:

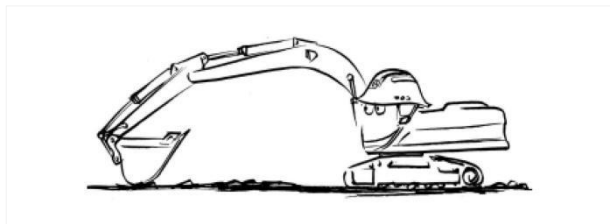


1. Park the machine on level ground.
2. Wipe off each filling position before checking. Drive the machine slowly so that the oil level check plug (oil fill plug) of the travel motor is exactly on the horizontal oil level line. If there is no horizontal oil level line, place each oil plug in the position shown as below figure.



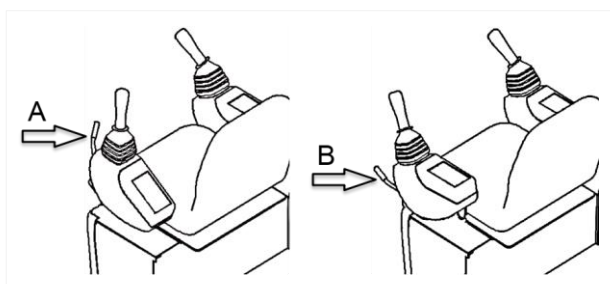
1. Oil level check plug (oil fill plug)
2. Oil drain plug

3. Lower the bucket to the ground and stop the machine securely.



11. Repeat the above-mentioned procedure on the travel motor reducer on the other side.

4. Shut down the machine, turn the start switch to the OFF position, and remove the key (if equipped).
5. Pull the pilot shutoff lever to the LOCK position.



A: LOCK
B: UNLOCK

6. Unscrew the oil level check plug (oil fill plug) slowly to release the pressure after the gear oil cools down completely, and then remove the plug.

⚠ WARNING

Purge air from the travel motor only when the hydraulic oil in the travel motor has been drained out.

⚠ WARNING

The gear oil temperature might be very high. Wear protective equipment and handle carefully to avoid personnel injuries.

7. Loosen the oil drain plug to drain the oil.
8. Wrap the thread of the plug of the oil drain plug with sealing tape, install and tighten the oil drain plug with a tightening torque of 49 N.m (5 kgf.m).
9. Add oil through the oil level check plug (oil fill plug) until the oil overflows the plug hole.
10. Wrap the thread of the plug screw of the oil level check plug (oil fill plug) with sealing tape, install and tighten the plug with a tightening torque of 49 N.m (5 kgf.m).

Electrical System

Fuse--Check/Replace

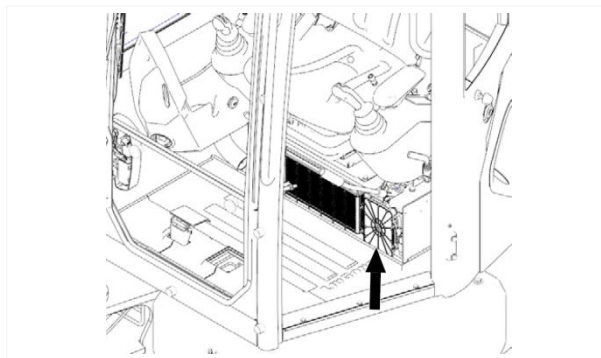
⚠ WARNING

Replacing fuses with the same type and size from different brands is allowed.

If the fuse is frequently blown and replaced, there may be a circuit failure. Contact your KIOTI dealer.

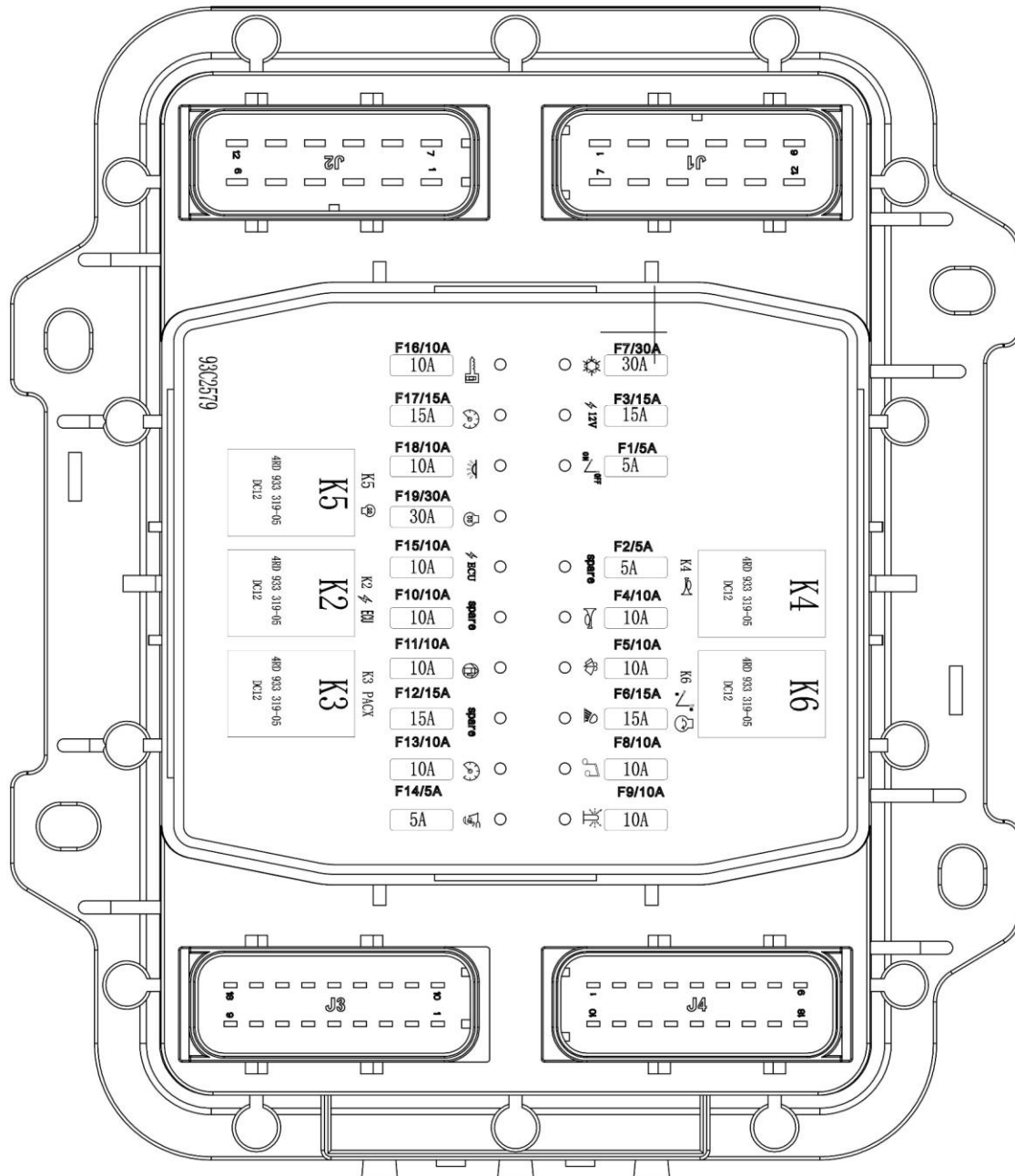
Fuse Box (low current)

The fuse box (low current) is located below the operator's seat. Open the access door and the fuse box cover to check and replace the fuse.



The fuse box panel is equipped with a safety clip for replacing the fuse.

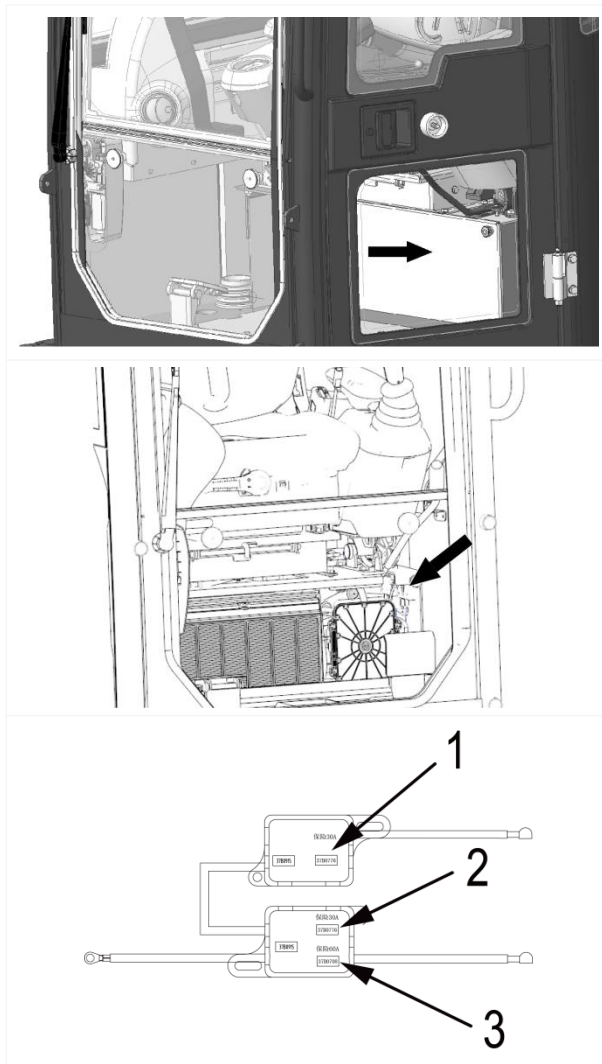
Fuse model	Color
5A	Gray brown
7.5A	Brown
10A	Red
15A	Blue
20A	Yellow
25A	Beige
30A	Green



①	pilot cut-off		
②	spare		
③	12V Power Interface		
④	horn		
⑤	wiper, washer	option	
⑥	work lights		
⑦	A/C	option	
⑧	radio	option	
⑨	rotating beacon	option	
⑩	spare		
⑪	alternator, fuel pump		
⑫	spare		
⑬	monitor/controller		
⑭	Quick changing		
⑮	ECU power		
⑯	ignition switch		
⑰	monitor		
⑱	dome light	option	
⑲	preheat		

Fuse Box (high current)

The fuse box (high current) is located under the driver's seat. Open the cover to access it.

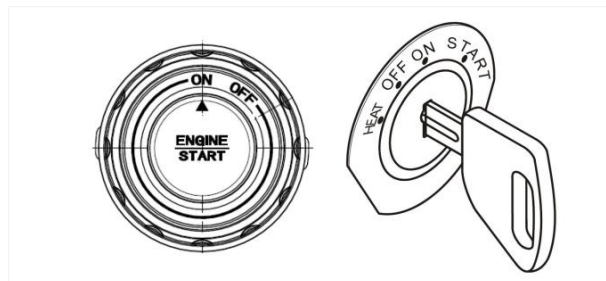


1. ECU, preheat, interior light general fuse (30A): used to protect the circuit between the fuse box (low current) and the fuse box (high current).
2. Start relay fuse (30A): used to protect the start motor coil and its circuit.
3. Main power supply relay fuse (60A): used to protect the circuit between the cab fuse box (low current), the main power supply relay and the fuse box (high current).

Instruments--Check

Instrument Working Conditions--Check

1. Turn the start switch to the ON position to turn on the power of the machine.



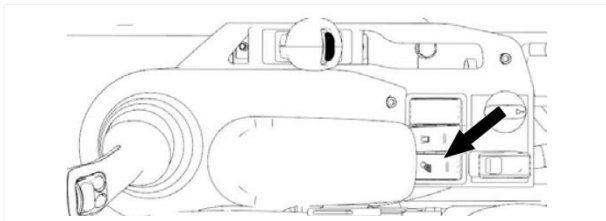
2. Check whether the monitor is on and enter the prompt screen of the control pattern selection.
3. Check for fault icons or fault codes in the monitor alarm area. Check whether the fuel level, coolant temperature, and hydraulic oil temperature indicated on the home screen are normal.



Lights and Horn--Check

Lights Working Conditions--Check

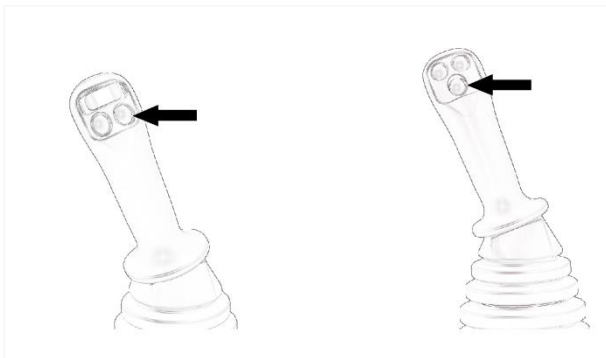
1. Turn the start switch to the ON position to connect the power supply of the machine.
2. Press the work light switch and check whether the work light is on.



3. Upon checking, press the work light switch again to turn off the work light.

Horn Working Conditions--Check

1. Turn the start switch to the ON position to connect the power supply of the machine.
2. Press the horn button on the right hand control lever and check whether the horn makes a sound immediately. (Refer to "Switches on Hand Control Levers" for the horn button position on the control lever)



Looseness or Corrosion of Battery Terminals--Check

⚠ WARNING

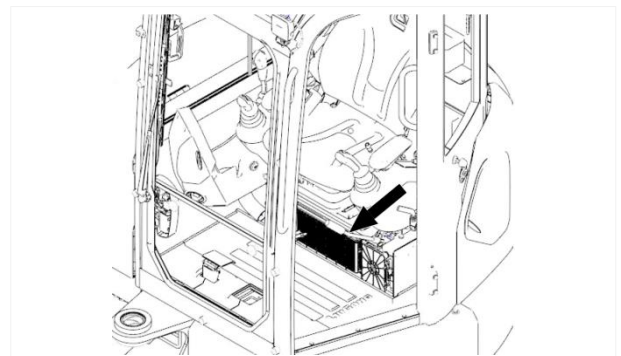
Batteries give off flammable fumes or gases which can explode. Keep batteries away from sparks and open flames.

Never place metal objects on the battery surface, otherwise, the battery may explode due to short circuit.

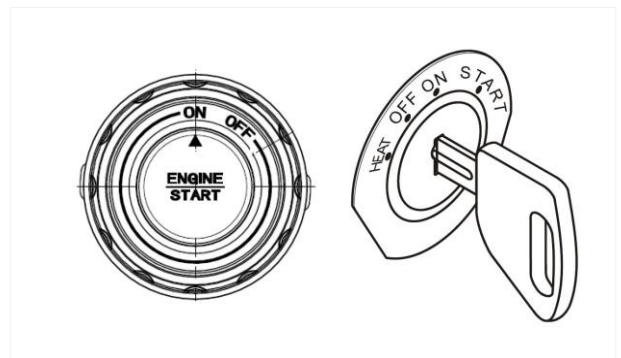
The electrolyte in the battery is a kind of acid substance, which can cause serious injury when contacting the skin and eyes, therefore, please wear goggles and protective clothing when maintaining the battery.

If the electrolyte contacts the skin and eyes, rinse immediately with plenty of soapy water, neutralize the acid with baking soda. Rinse eyes with clean water for 10 to 15 minutes, and seek medical attention immediately.

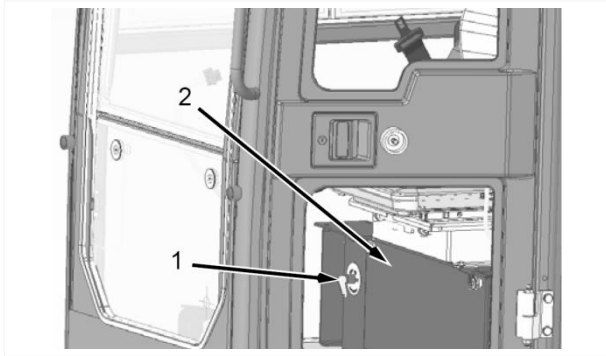
The battery is located below the operator's seat.



1. Turn the start switch to the OFF position, and remove the key (if equipped).



2. Turn the battery disconnect switch to the OFF position. Remove the left coaming to access battery terminals.



1. Battery disconnect switch
2. Battery cover
3. Check whether the battery terminals are loose or corroded. Clean the battery terminals and battery surface with a piece of clean cloth.
4. Check the battery cable for wear and damage.
5. Carry out any necessary repair. If necessary, replace the battery cable or battery.

Structural System

Torque of Bolts and Nuts--Check

If there is any looseness, tighten to the specified torque.

Replace the bolts and nuts with new ones of the same quality or a higher quality.

Use a torque wrench to check and tighten bolts and nuts.

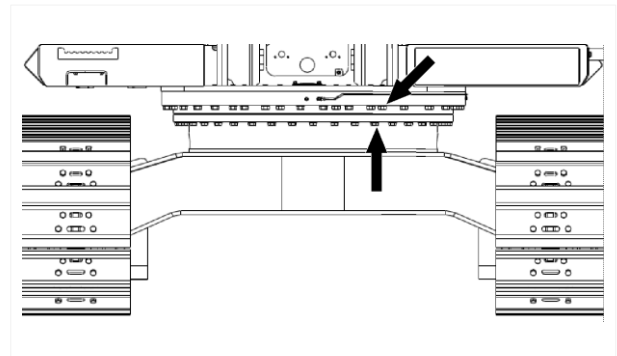
Ensure the threads are clean when mounting or replacing.

Apply lubricant to bolts and nuts to maintain their frictional coefficients.

If the bolts on the counterweight are loose, contact your dealer or service center.

Torque of Swing Bearing Mounting Bolts--Check

During the service life of the swing bearing, make sure that the bolts have sufficient pre-tightening force. Regularly check the pre-tightening torque of the bolts, and tighten the bolts again. If there is any looseness, tighten to the specified torque.



Replace the bolts with new ones of the same quality or a higher quality.

Use a torque wrench to check and tighten bolts.

Ensure the threads are clean when mounting or replacing. Apply thread fastening glue to bolts to maintain their frictional coefficients. If the bolts on the counterweight are loose, contact your dealer or service center.

Bucket Teeth Adapter--Replace

⚠ WARNING

Before replacing the bucket teeth adapter, pad up the bucket.

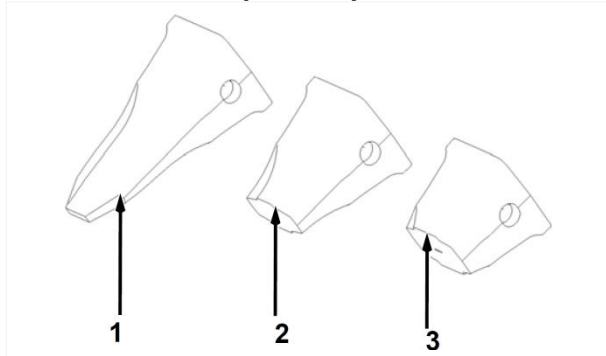
When hammering, the pin may fly off and injure the people nearby.

When hammering the pin, please wear a protective face mask to prevent eye injuries, and make sure that there are no bystanders around.

⚠ CAUTION

Refer to "List of Tightening Torque for Fasteners" for the specific tightening torque value of the bolts.

Bucket Teeth Adapter--Replace



1. Adapter that is usable
2. Adapter that needs to be replaced
3. Adapter that is overly-worn

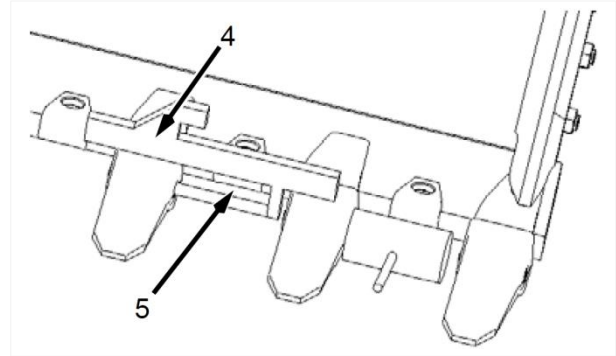
Check the wear of the bucket adapter. Replace the bucket adapter if it is worn out.

1. Remove the pin from the bucket adapter. in the following ways.

Method 1: Strike out the pin from the side of bucket retainer with a hammer and punch.

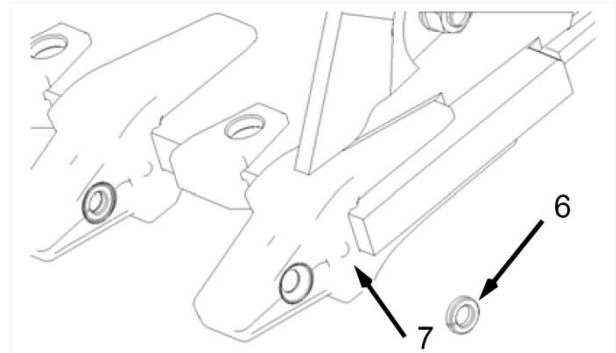
Method 2: Perform steps (a) to (c) with a pin guide.

- a. Place a guide pin on the bucket adapter.
- b. Align the pin puller (5) with the pin.
- c. Strike the pin guide on the back of the tool (4) and remove the pin.

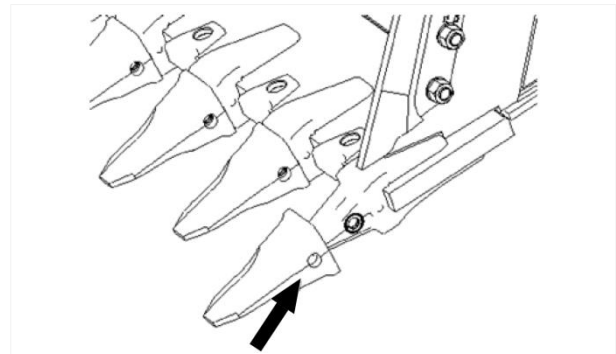


4. Back of the pin guide
5. Pin extractor

2. Clean the tooth holder and pin.
3. Install the retainer assembly (6) into the counterbore on the side of the tooth holder (7). Make sure that the "outer" mark on the surface of the retainer assembly is visible.



6. Check ring assembly
7. Tooth holder



⚠ CAUTION

Discard the old pin and the retainer assembly. Please use new pins and new retainer assembly when replacing the adapter. Refer to the relevant illustrated Parts Manual of the machine.

4. Install a new bucket adapter on the tooth holder.

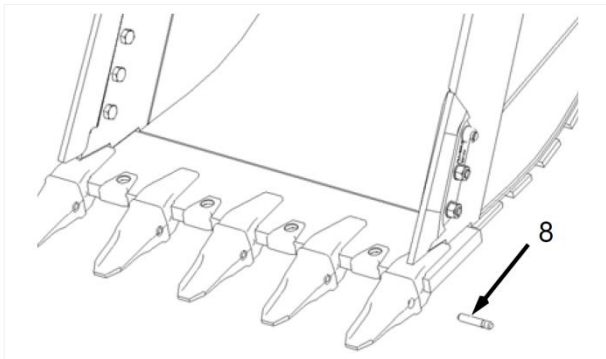
⚠ CAUTION

The bucket adapter can be turned 180° to allow it to wear evenly, and the outer adapter can also be switched to the inner side. Check the adapter on a regular basis. Turn the adapter over if it's worn. Normally the adapter on the outer side is worn the most.

5. Strike the pin into the bucket adapter. This pin can be installed as follows:

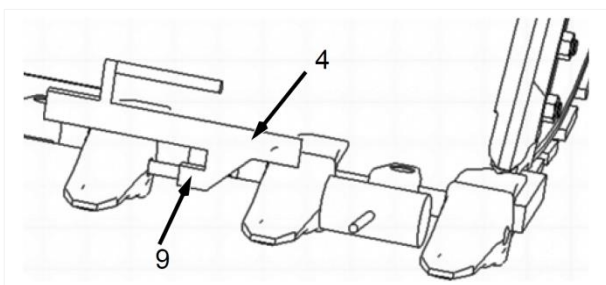
Method 1: From the same side of the retainer, drive the pins into the bucket adapter, retainer assembly, and tooth holder.

Method 2: Perform steps (a) to (d) with a pin guide.

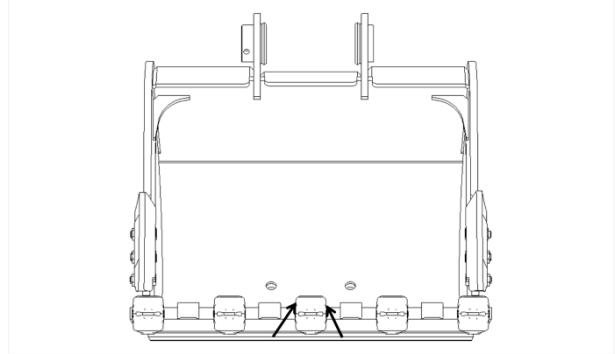


8. Pin

- Insert the pin (8) into the bucket adapter.
- Install the pin guide across the bucket adapter so as to fit the pin into the counterbore of the pin fastener (9).
- Strike the back of the pin guide (4) with a hammer to insert the pin.



- Strike the end of the tool until the pin is fully inserted.

**Track Tension--Check/Adjust****⚠ WARNING**

Do not check for lubricating grease overflow by observing through the filler valve. Grease ejecting out of the filler valve under pressure can penetrate the human body and cause serious injury.

It is good practice to check whether the track is loose by observing the track or adjusting the cylinder of the track. Do not loosen the filler valve more than one turn.

If the track is not loose, close the filler valve and contact the maintenance service provider designated for the machine or the supplier.

⚠ CAUTION

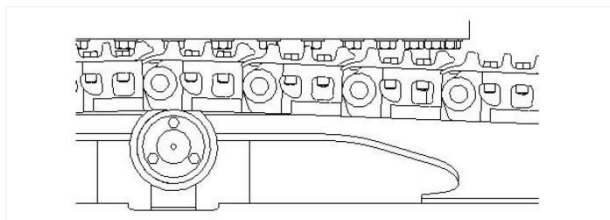
Make sure that the track is adjusted properly so as to prolong the service life of the track and drive components.

The track tension shall be adjusted according to the current working conditions. If the ground is muddy, try to keep the track slack.

Check the sag of the track after the soil stuck in the track are completely cleaned.

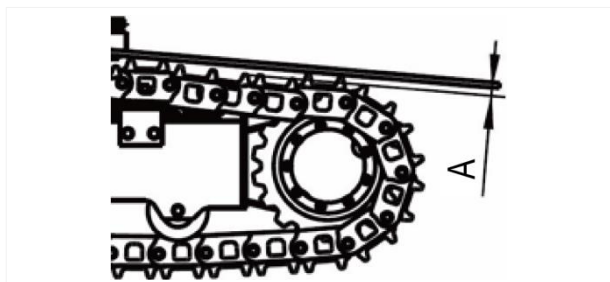
Track Tension--Check

1. Operate the machine in the direction of the idler.
2. When a track pin is above the front carrier roller, stop the machine.



3. Check whether there is excessive soil accumulated on the track. Remove if any.
4. Check the sag of the track.

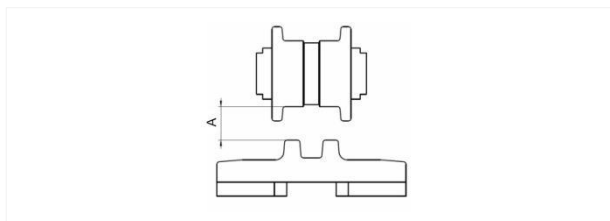
For the steel track, measure the distance (A) between the towing plate and the driving wheel. The sag regulation of the metal track is 20~30mm.



If the machine equipped with the rubber track, measure the distance (A) between the middle track roller and the upper surface of the track link.

Standard value of track tension

Track type	Standard value A
Rubber track	15~20mm



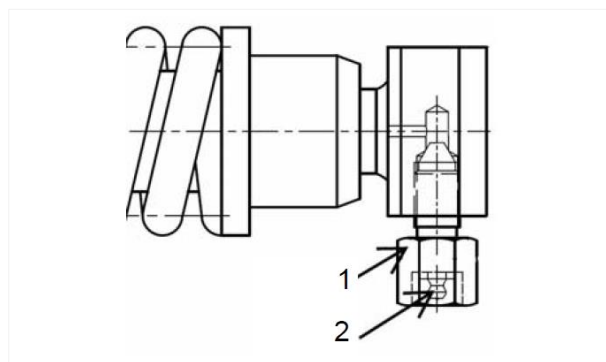
5. If the track is too tight or too loose, its tension should be adjusted.

Track Tension--Adjust

If the track tension is abnormal, adjust it as per the following steps:

Track Tension--Increase

1. Clean the driving wheel, track rail and the grease fitting.
2. Rotate the direction of the grease fitting to a convenient position for operation. Connect the grease gun to add grease until the sag is within the recommended limit.



1. Valve
2. Grease fitting

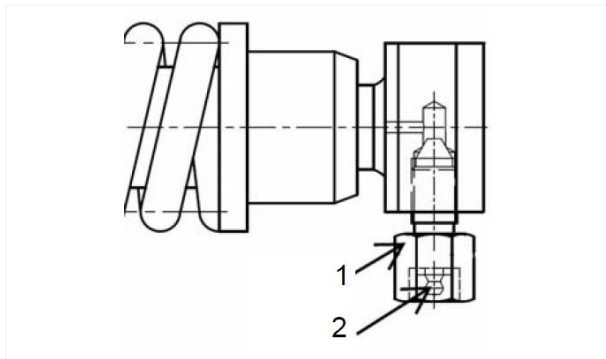
⚠ WARNING

The valve may fly out due to the high-pressure grease inside, therefore, do not loosen the filling valve more than one turn.

3. To confirm that the track shoes are under normal tension, run the machine at low idle speed and drive the machine for the entire length of the track to prevent foreign objects from seizing the track, and then slowly stop the machine.
4. After adjustment, re-measure according to the above steps to ensure that the track tension is normal.

Track Tension--Reduce

1. Clean the driving wheel, track rail and the grease fitting.
2. Slowly rotate the valve in a counterclockwise direction. The valve is released for 1 to 1.5 turns, and the grease will be drained from the grease outlet. If the grease does not drain smoothly, lift the track off the ground and slowly rotate the track.



1. Valve
2. Grease fitting

⚠ WARNING

The valve may fly out due to the high-pressure grease inside, therefore, do not loosen the filling valve more than one turn.

3. To confirm that the track shoes are under normal tension, run the machine at low idle speed and drive the machine for the entire length of the track to prevent foreign objects from seizing the track, and then slowly stop the machine.
4. After adjustment, re-measure according to the above steps to ensure that the track tension is normal.

⚠ CAUTION

If the track is still very tight after counterclockwise turning, or loose after filling with grease, this is abnormal. In this case, do not disassemble the track tension adjuster. Contact your KIOTI dealer immediately.

Work Implement and Cylinder--Lubricate**⚠ CAUTION**

If any abnormal sound occurs at any lubricating point, apply grease regardless of the lubrication cycle.

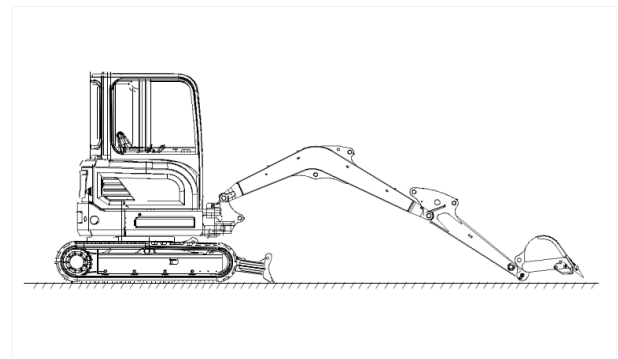
After performing under-water excavation, grease the wet pin shaft in time.

If the machine is working under heavy loads, such as breaking with a hydraulic hammer, the lubrication cycle shall be shortened accordingly.

Be careful when climbing the machine for lubrication. Stand firmly and clean up the oil and mud at the standing position in advance to avoid slipping.

Steps of greasing:

1. Park the machine on flat and solid ground, place the work implement on the ground as shown in the figure (the arm cylinder and bucket cylinder are fully retracted), and turn off the machine.



2. Before adding lubricating grease, clean all the grease fittings first.
3. Fill the lubricating grease with a grease pump or grease gun into the grease fitting as indicated by the arrow.
4. After applying the grease, wipe off the used grease that was ejected.

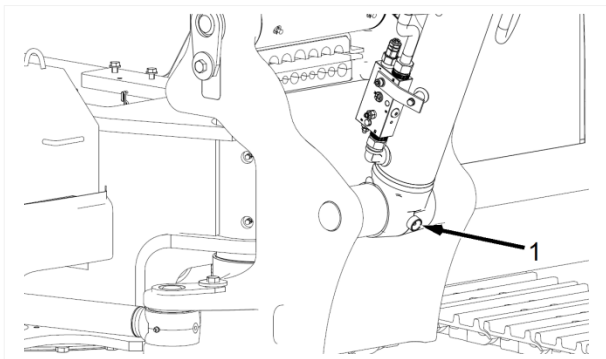
⚠ CAUTION

KIOTI recommends using molybdenum grease to lubricate the boom and arm linkage.

When installing the bucket for the first time, fully fill all chambers of the bucket control bucket link with grease.

Add grease through the nozzle of the lubrication point in the figure below.

Bottom pin of boom cylinder--lubricate

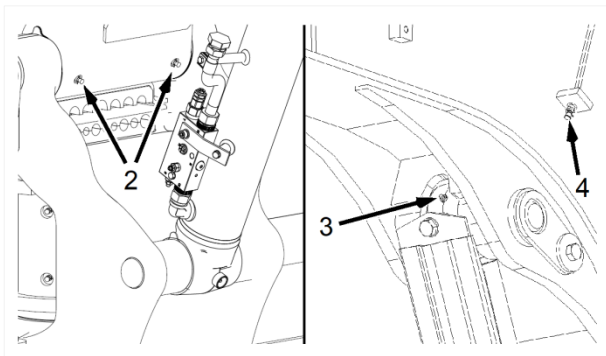


1. Bottom pin of boom cylinder (2 pcs)

Regularly apply grease every 50 service hours. But during the first 100 service hours of new machine operation, apply grease every 8 service hours.

Fill the lubricating grease through the greasing fitting as shown in the figure above.

Boom pin, piston rod pin of boom cylinder and arm cylinder bottom pin--lubricate



2. Boom pin (2 pcs)
3. Piston rod pin of boom cylinder (2 pcs)
4. Arm cylinder bottom pin

Regularly apply grease every 50 service hours. But during the first 100 service hours of new machine operation, apply grease every 8 service hours.

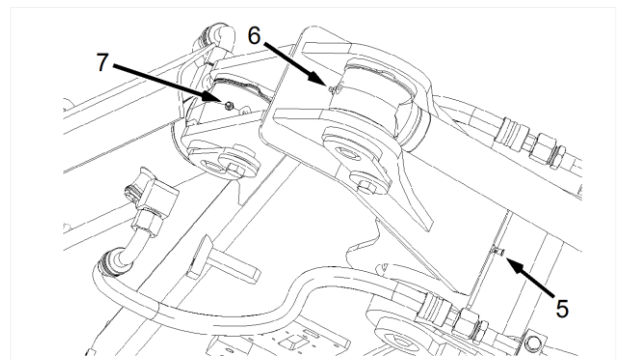
Fill the lubricating grease through the greasing fitting as shown in the figure above.

⚠ CAUTION

In order to lubricate the lower boom bearing and the piston rod end bearing of the boom cylinder, add lubricating grease through (2), (3), and (4).

First, add lubricating grease when the boom is lifted and the optional parts are suspended. When the boom is lowered and the optional parts are placed on the ground, apply slight downward pressure and refill the lubricating grease.

Pin connecting the boom and arm, piston rod pin of arm cylinder, and bucket cylinder bottom pin--Lubricate

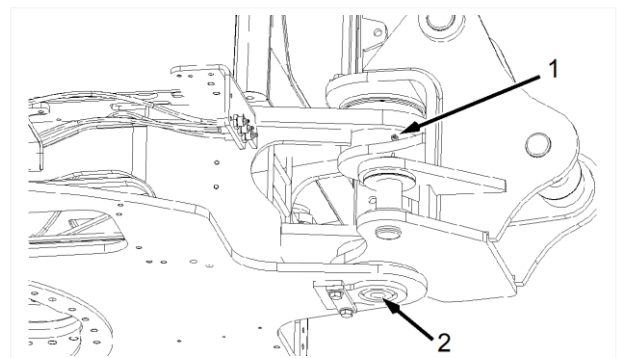


5. Pin connecting the boom and arm
6. Piston rod pin of arm cylinder
7. Bucket cylinder bottom pin

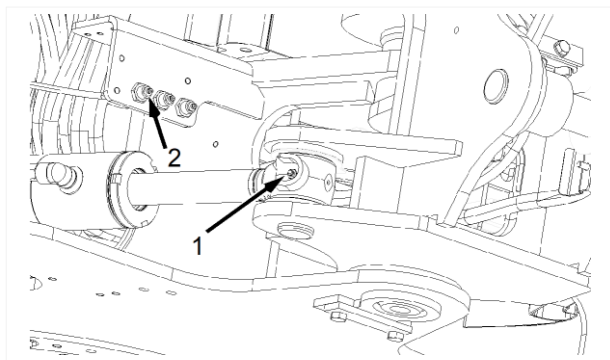
Regularly apply grease every 50 service hours. But during the first 100 service hours of new machine operation, apply grease every 8 service hours.

Fill the lubricating grease through the greasing fitting as shown in the figure above.

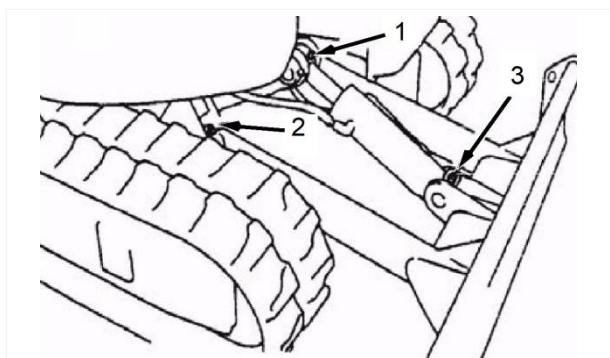
Turret deflection position--Lubricate



1. Connecting pin at the upper hinge of the turret
2. Connecting pin at the lower hinge of the turret

Turret cylinder--lubricate

1. Piston rod pin of turret cylinder
2. Bottom pin of deflection cylinder

Dozer assembly--Lubricate

1. Piston rod pin of dozer cylinder
2. Pin connecting the dozer and the travel frame (bilateral symmetry)
3. Bottom pin of dozer cylinder

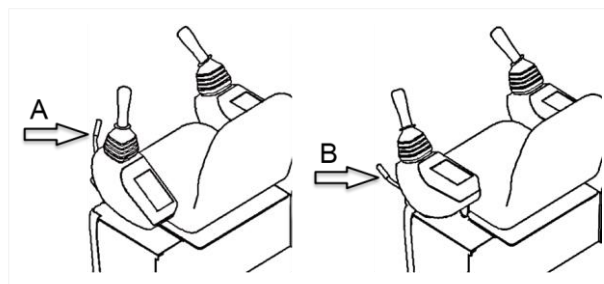
Regularly apply grease every 50 service hours. But during the first 100 service hours of new machine operation, apply grease every 8 service hours.

Fill the lubricating grease through the greasing fitting as shown in the figure above.

Swing Gear--Lubricate**⚠ CAUTION**

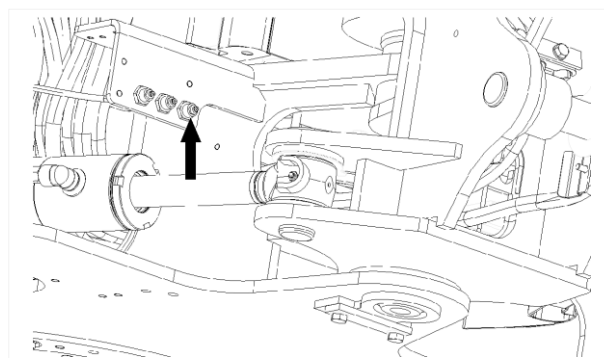
Lubricate the swing gear and upper structure with only one person. Before using the machine, keep any other personnel clear of the machine.

1. Park the machine on flat ground. Lower the bucket to the ground.
2. Turn the start switch to the OFF position to stop the machine and remove the key (if equipped).
3. Pull the pilot shutoff lever to the LOCK position.



- A: LOCK
B: UNLOCK

4. When the upper platform is static, add grease to the oil cup in front of the swing platform through grease gun.

**⚠ CAUTION**

If any water or mud is found on the grease, all the grease in the internal gear shall be replaced.

5. Start the machine, and raise the bucket off the ground for about 0.5 m, then rotate the upper structure for 90°. Then lower the bucket onto the ground.

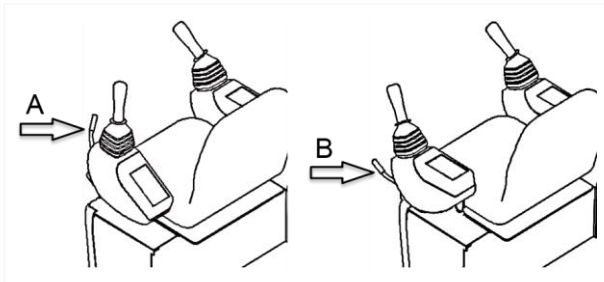
6. Repeat the above method three times starting from step 2. That is, grease shall be added four times in total, with about 60g each time (about 25 times for the grease gun).
7. If any water or mud is found on the grease, replace all grease of internal gear.

Swing Bearing Guideway--Lubricate

⚠CAUTION

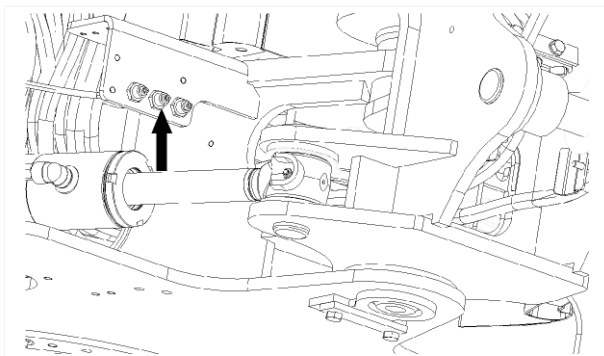
Lubricate the swing gear and upper structure with only one person. Before using the machine, keep any other personnel clear of the machine.

1. Park the machine on flat ground. Lower the bucket to the ground.
2. Turn the start switch to the OFF position to stop the machine, and remove the key (if equipped).
3. Pull the pilot shutoff lever to the LOCK position.



A: LOCK
B: UNLOCK

4. Add grease into the grease fitting when the upper structure is in static state.



5. Start the machine. Raise the bucket off the ground for about 0.5 m, then rotate the upper structure for 90°. Lower the bucket onto the ground.
6. Repeat the above operation three times starting from step 2.

7. Continue to add grease into the grease fittings until grease overflows the swing bearing seals.
8. The filling capacity for the grease is about 0.5kg.

⚠CAUTION

Do not overfill grease.

Air Conditioning System

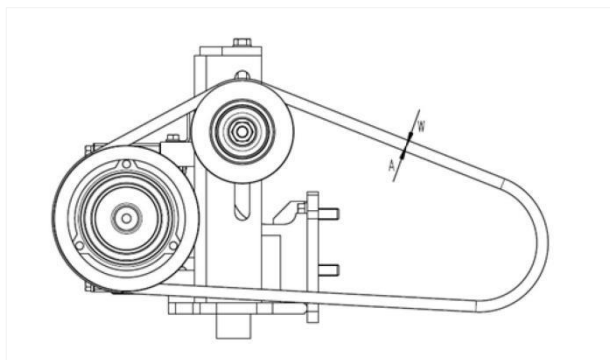
Tension and Condition of Air Conditioning Compressor Belt--Check

⚠CAUTION

If you hear a howling sound when increasing the throttle in the process of operating the machine. Stop the engine immediately to check the belt tension.

Air conditioner compressor belt tension: apply $Wd=58.5N$ of force at the center span of the pulleys (compressor pulley and engine pulley). The deflection A of the belt center distance should be 5 to 8 mm.

When belt deflection A is over 8 mm, please replace the belt in time.



When the belt has frays or cracks, please also replace the belt in time.

Based on the machine operation conditions (see belt abrasion level for reference), replace the belt every 1,000 hours of use.

Fresh Air Filter of Air Conditioner--Clean/replace

The air filter in the cab consists of fresh air filter and air recirculation filter. The degree of clogging of the filters is entirely dependent on the working environment of the machine.

⚠WARNING

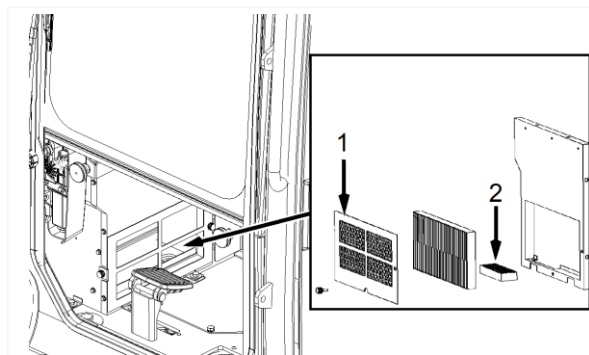
Fresh air device filters can only be used to filter dust in the air, not to filter toxic gases!

If the filter element is clogged, the amount of fresh air in the cab may be decreased.

Please wear goggles, dust shields, or other protective equipment when cleaning the dust or dirt with compressed air or high-pressure water to avoid serious injuries.

⚠CAUTION

The maintenance interval can be extended or shortened appropriately according to dust amount accumulated in the working environment. Replace the fresh air filter regularly.



1. Cover
2. Fresh air filter

1. Remove the cover.
2. Remove the fresh air filter.
3. Clean the filter element with compressed air. If the filter is too dirty or too oily, wash it with a neutral detergent. After washing the filter element with water, dry it thoroughly before reuse.

⚠ CAUTION

If the filter element is still blocked or damaged after cleaning, replace it with a new one.

4. Reinstall the cleaned filter to its original position.
5. If the machine has reached the time point for replacing the fresh air filter, please replace it with a new one to ensure the normal operation of the machine.

Air Recirculation Filter of Air Conditioner--Clean/replace

The degree of clogging of the filters is entirely dependent on the working environment of the machine.

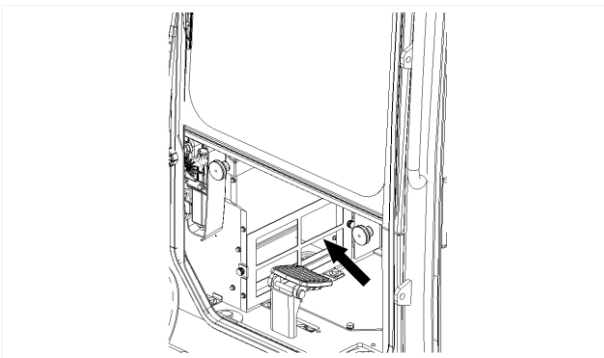
⚠ WARNING

If the air recirculation filter is blocked, the air volume will be reduced, and the air conditioning's cooling and heating effects will be reduced.

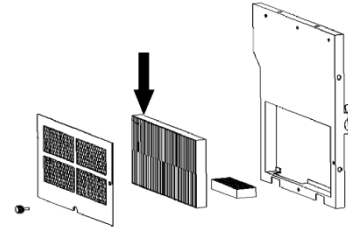
Please wear goggles, dust shields, or other protective equipment when cleaning the dust or dirt with compressed air or high-pressure water to avoid serious injuries.

The air recirculation filter is located on the evaporator in the front of the cab.

1. Remove the bolt and cover.



2. Remove the air recirculation filter.



3. Clean the filter element with compressed air. If the filter is too dirty or too oily, wash it with a neutral detergent. After washing the filter element with water, dry it thoroughly before reuse.

⚠ CAUTION

If the filter element is still blocked or damaged after cleaning, replace it with a new one.

Replace the air recirculation filter regularly.

4. Reinstall the cleaned filter to its original position.
5. If the machine has reached the time point for replacing the air recirculation filter, please replace it with a new one to ensure the normal operation of the machine.

Refrigerant Leakage--Check

⚠ WARNING

Wear goggles or protective masks when using refrigerants, adjusting pipe connectors, connecting high- and low-pressure combination gauges, or detecting leakage with refrigerant leakage detector.

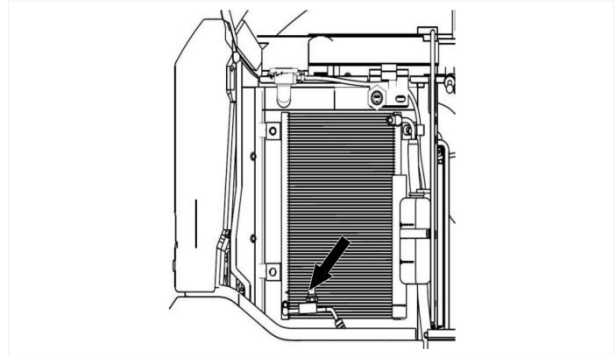
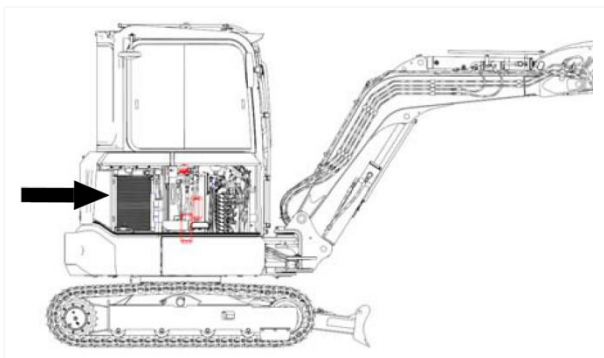
Personal injury or death could result due to inhaling refrigerant gas, after lighting a cigarette, or other sources of flame. Never smoke while maintaining the air conditioner or in places where refrigerant gas may be present.

When maintaining the air conditioning system, personal injury could result due to the high pressure, high temperatures, and abrasive chemicals present within of system. Moving parts and the rotating belt could also cause personal harm.

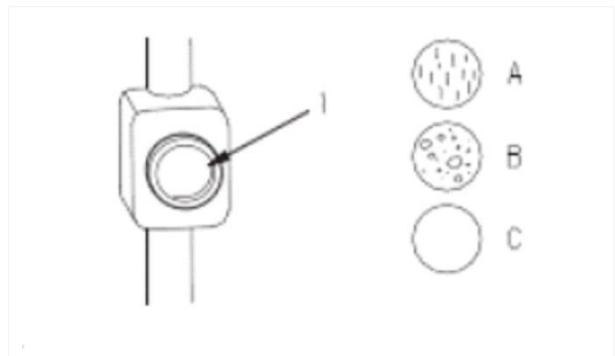
Never strike the refrigerant receiver, as heavy impacts could result in explosions and personal injury.

Refrigerant vapour could produce poisonous gas when it comes in contact with flame, and this could cause personal harm. When the refrigerant content in the air exceeds 25%, suffocation and death could result.

The sight glass is located on the outlet pipe joint of the condenser. Open the right side door to access it.



Under normal working conditions, refrigerant can be viewed through the sight glass. An even and stable refrigerant flow indicates that the refrigerant capacity is normal. If bubbles are found in the refrigerant, then replenish the refrigerant, as this indicates a refrigerant leak in the system.



- A. The refrigerant flows smoothly without bubbles;
- B. The refrigerant flows with bubbles and insufficient level. Please replenish it.
- C. The sight glass is colorless and transparent, indicating that there is no or excessive refrigerant.

⚠ CAUTION

In cold weather or when storing the machine for a long period of time (more than one month), run the air conditioner and air compressor for 10 minutes per week to prevent the air compressor from seizing due to a lack of oil.

Start the A/C at idle speed and keep it running for more than 10 minutes during commissioning. Never start the A/C at high speed to prevent the air compressor seizing due to a lack of circulatory oil.

⚠ CAUTION

R134a refrigerant is used in this air conditioning system. Do not use other refrigerants or low-quality refrigerants in order to avoid damaging the compressor.

Do not add excess refrigerant when replenishing the refrigerant to avoid damaging the compressor as a result of having insufficient space for refrigerant vaporization in the air conditioning system.

If refrigerant leakage is found, check all joints that connect to the hoses for any signs of looseness.

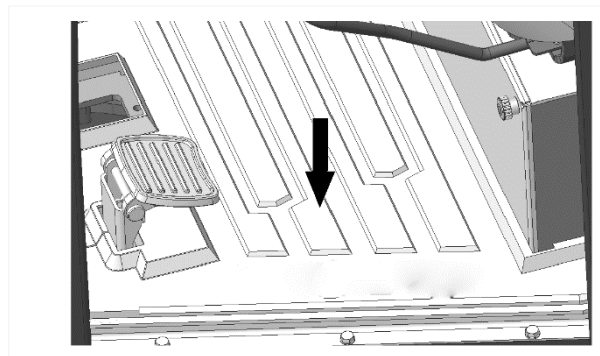
JSAM20 refrigeration oil is used in this system.

Cab

Seat Belt--Check

Refer to "Seat Belt" for details.

Cab Floor Mat--Clean



Remove the floor mats, wash the mats with clean water, and then install them step by step.

Accessories and Optional Equipment

⚠ WARNING

Before reading this section, please read and make sure you understand the contents of the chapter "SAFETY".

Precautions for Using Attachments and Optional Equipment

⚠ CAUTION

It is only allowed to install the accessories or optional equipment authorized by KIOTI. KIOTI shall not bear any responsibility for any action not authorized by KIOTI. KIOTI will not be responsible for any personal injury, malfunction or property loss caused by the use of unauthorized accessories or optional equipment.

Pay attention to safety when installing accessories or optional equipment on the machine. Please strictly observe the following precautions when selecting, installing, removing, or using accessories or optional equipment.

Precautions for Selection

Before installing accessories or optional equipment to the machine, please consult your KIOTI dealer. Depending on the type of accessories or optional equipment, it may be necessary to install FRONT guard, TOP guard, or other safety structures on the machine, and the accessories or optional equipment may hit the operator's cab.

Please read the operation and installation manuals carefully

Before installing or using any accessories or optional equipment, please read and understand the operating instructions of the accessories or optional equipment in detail.

If your manual is lost or damaged, please obtain a new copy from the accessory manufacturer or your KIOTI dealer.

Precautions for disassembly and installation

When removing or installing accessories or optional equipment, please pay attention to the following precautions and keep safe during operation.

- Removal and installation shall be performed on flat and firm ground.
- When there are 2 or more workers operating, appoint one of them as the leader and the other workers shall follow his/her instructions.
- A lifting machine shall be required to carry heavy objects (25 kg and above), which shall be operated by qualified operators. Never walk under the heavy objects lifted by the lifting machine.
- Do not conduct any operation under heavy objects lifted by the crane, but support it with a frame to prevent the load from falling.
- When unloading heavy objects, it is required to keep the machine balanced. In order to prevent the machine from turning over, if necessary, set up a frame before disassembling the parts.
- Before installation or after removing accessories or optional equipment, keep the frame stable to prevent it from falling.

- Please consult your KIOTI dealer for details of removal or installation.

Precautions for operations

Please keep the following precautions in mind when installing long or heavy work implements.

- Before operating the machine, please move it to a safe place for trial operation, so as to fully understand the movement, center of gravity, and working range of the machine.
- When the machine is at a certain angle, do not swing it back. If the machine swings back while being tilted, it may turn over.
- If a long work implement is installed, the working range will be increased. When operating the machine, keep a safe distance from obstacles in the peripheral area.
- If a heavy work implement is installed, the moving distance of the work implement will be increased before it stops completely, so it is necessary to reserve more space for its operation. Do not suddenly swing, lower, or stop the work implement, or suddenly extend or retract the boom cylinder to avoid the machine from turning over.

⚠ WARNING

When calculating the allowable weight of the bucket or attachment, the weight shall be accounted for by reference to the PIN nameplate. For attachments that do not bear load, such as a breaker, the weight shall not be greater than the minimum lifting capacity of the machine shown in the relevant lifting capacity diagram. For attachments bearing loads, such as a bucket or a grab, the sum of attachment weight with load shall not exceed the maximum lifting capacity of the machine shown in the relevant lifting capacity diagram.

Recommended Combinations for Different Work Implements

⚠ WARNING

Please read the operation manuals for the accessories and the chapters related to the accessories and optional equipment in the Manual.

Safety is concerned in the installation of any accessories or optional equipment. Please contact your KIOTI dealer before installation.

The installation of accessories or optional equipment without consulting KIOTI dealers will not only result in safety issues, but also may adversely affect the operation of the machine and the service life of the equipment.

KIOTI will not be responsible for any personal injury, product failure, or damage caused by the use of unauthorized accessories or optional equipment.

Accessories installation

⚠ WARNING

According to the type or combination of the work implement, the work implement may hit the cab or the excavator body.

When using an unfamiliar work implement for the first time, check whether there is any risk of interference and operate it carefully.

Recommended Work Implement

⚠ WARNING

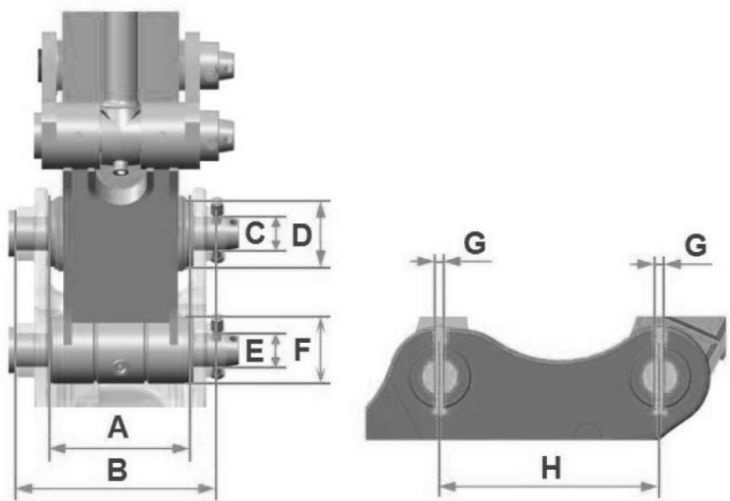
When calculating the allowable weight of the bucket or attachment, the weight shall be accounted for by reference to the lifting capacity label on the machine. For attachments that do not bear load, such as a breaker, the weight shall not be greater than the minimum lifting capacity of the machine shown in the relevant lifting capacity diagram. For attachments bearing loads, such as a bucket or a grab, the sum of attachment weight with load shall not exceed the maximum lifting capacity of the machine shown in the relevant lifting capacity diagram.

Configuration List of Bucket

Bucket type	Applicable conditions		Main technical specifications of bucket				MX350		
		Bucket capacity (m³)	Weight (kg)	Bucket width (mm)	Bucket depth (mm)	Width & depth ratio	Standard arm 1320mm	Long arm 1700 mm	Note
Standard bucket	I & II	0.11	106.5	610	381	1.54	●	●	/
Standard bucket	I & II	0.07 (four teeth)	85.76	458	381	1.20	○	○	Optional in non-CE areas, with bucket pliers
Standard bucket	I & II	0.07 (three teeth)	82.06	458	381	1.20	○	○	Optional in non-CE region
Standard bucket	I & II	0.07 (three teeth)	85.42	468	381	1.23	○	○	Available in both non-CE and CE region

●	Recommended standard	○	Recommended options	△	Available but not recommended	×	Unavailable
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Arm Front End and Pin Size



Model	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)	F(mm)	G(mm)	H(mm)
MX350	134.3~135	233	Φ40	Φ95	Φ40	Φ90	Φ12	185

Quick Coupler System

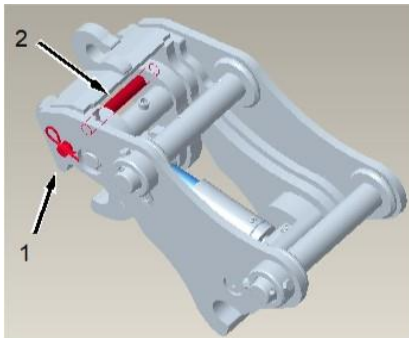
⚠ WARNING

Incorrect installation of accessories or optional parts will not only result in safety problems, but also negatively affect the operation and service life of the machine.

Customers can choose a machine that is equipped with quick coupler lines. You can also choose one with a quick coupler and various quick coupler attachments or use your own quick coupler and attachments. When using your own quick coupler, consult the manufacturer or dealer on the relevant dimensions to install the quick coupler and use the machine correctly.

⚠ WARNING

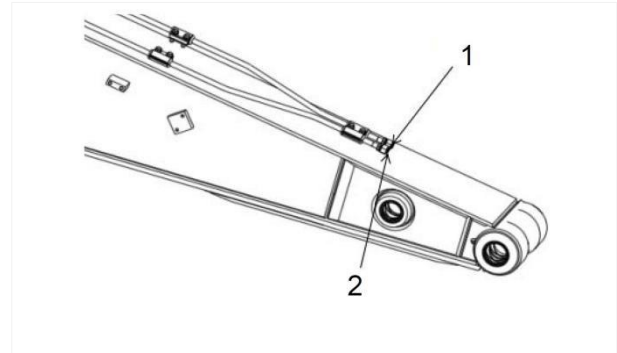
For the mechanical/hydraulic quick coupler with safety shaft, the safety shaft and stop ring must be installed before operation. Otherwise the user shall bear the responsibility for any accidents caused by failure to comply.



1. Stop ring
2. Safety shaft

Connection of Quick Coupler Lines

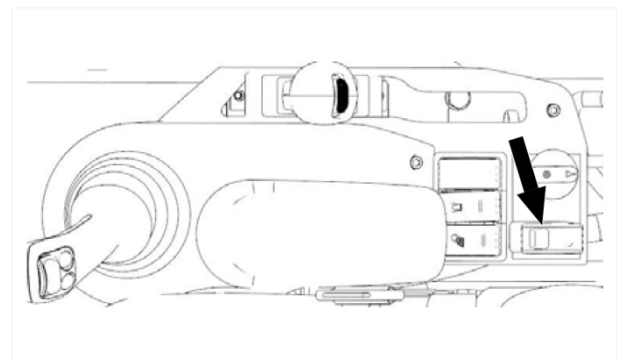
After the quick coupler is connected to the arm link and bucket link, the pipe adapter A of the front pipe of the arm is connected to the oil filler of cylinder head of the quick coupler cylinder, the pipe adapter B is connected to the oil filler of the cylinder rod, and they are tightened with a wrench.



1. Pipe adapter A
2. Pipe adapter B

Quick Coupler Switch

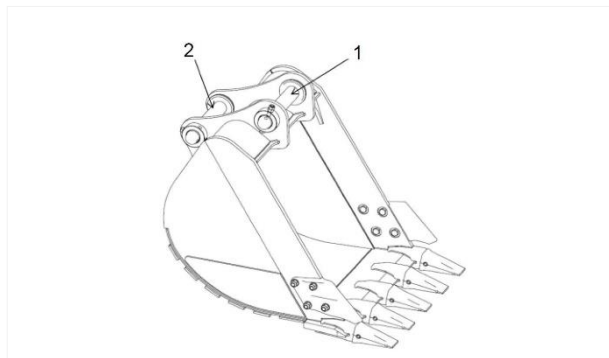
The quick coupler drive switch is located on the switch panel on the right side of the operator seat in the cab, the bucket or attachment can be disconnected after pressing this switch.



Bucket or Attachment--Connect

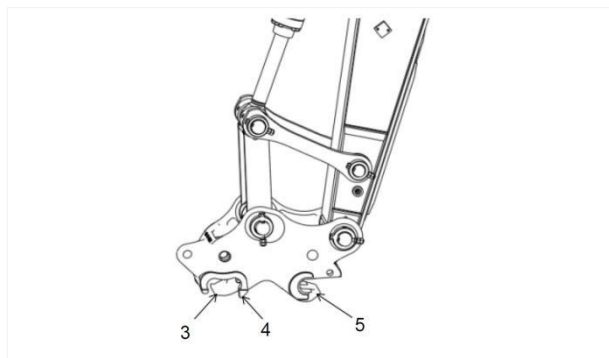
Operation steps:

1. Place the bucket or attachment on flat ground.
2. Ensure that the pin is installed on the bucket or attachment in the right position.



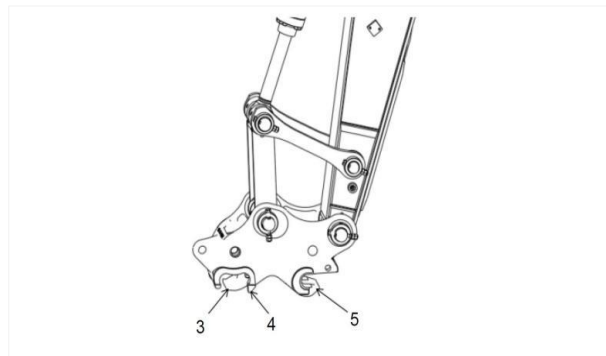
1. Rear pin
2. Front pin

3. In order to prevent the lock catch connected to the quick coupler cylinder from getting stuck, the bucket cylinder shall be extended to the limit before pressing the quick coupler switch. Press the switch and the buzzer will sound. Whilst the switch is in the down position (buzzer sounding), extend the bucket cylinder for 5 to 10 seconds to ensure that the quick coupler catch is fully released.



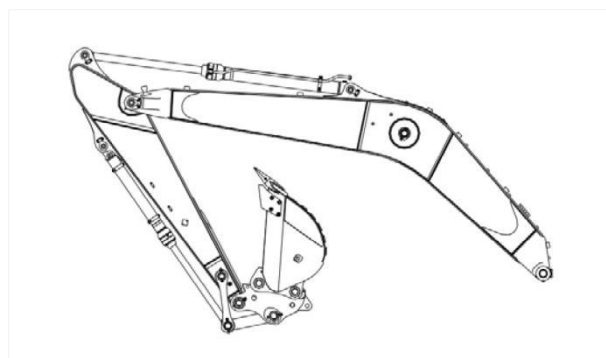
3. Lock catch
4. Front grab
5. Rear grab

4. Align the quick coupler with the bucket or attachment.
5. Operate the quick coupler to make its rear grab catch the rear pin shaft of the bucket or attachment.



1. Rear pin
2. Front pin

6. Extend the arm cylinder and bucket cylinder to the position shown in the figure below and visually check that the rear shaft of the bucket or attachment completely enters the front grab of the quick coupler.



7. Return the switch to the NEUTRAL (or OFF) position and the buzzer will stop sounding.
8. Extend the bucket cylinder for 5 to 10 seconds to allow the quick coupler cylinder to push the lock catch to lock the bucket or attachment.
9. Make sure that the quick coupler is locked with the bucket or attachment.
 - a. Retract the bucket cylinder, keep the arm perpendicular to the ground, and place the attachment on the ground;
 - b. Apply pressure on the attachment and lower the boom to press it to the ground;
 - c. Drag the attachment backward to see if it is loose.

Bucket or Attachment-- Disconnect

⚠ WARNING

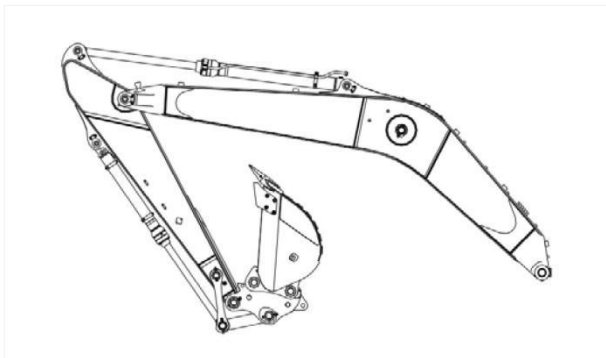
Place attachment or bucket in a safe place before disengaging the quick coupler. Disengage the quick coupler to make attachment or bucket disconnect in the control of an operator.

When attachment or bucket is in an unstable state or is with load, disconnecting attachment or bucket may result in serious injury or death.

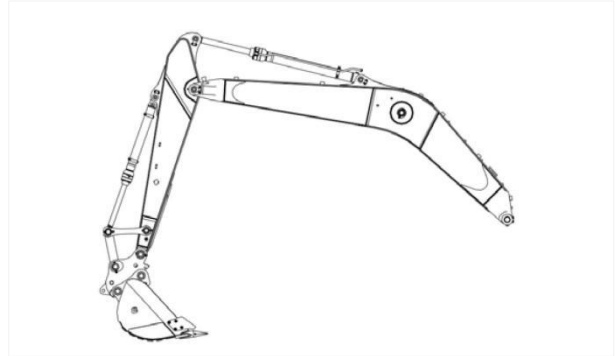
⚠ CAUTION

The auxiliary hoses of attachment must be disconnected before disengaging the quick coupler. Attachment will be pulled by the connected auxiliary hoses, which may cause damage to the machine or attachment.

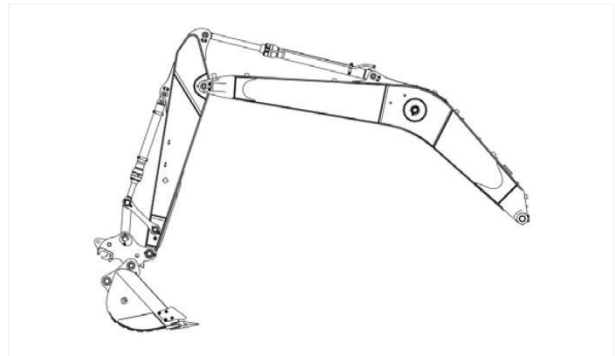
1. Extend the arm cylinder and bucket cylinder to keep the machine in the following posture. This operation shall be done before pressing the quick coupler switch.



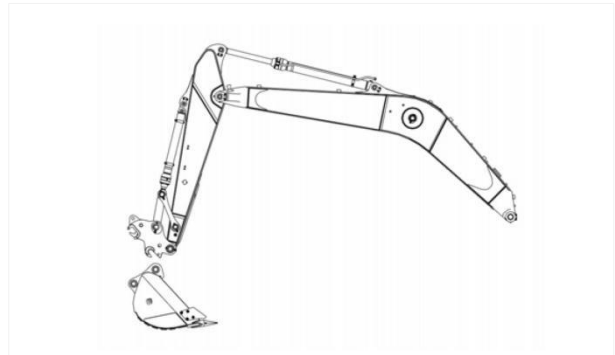
2. Press the quick coupler switch, and the buzzer sounds at the same time to remind the operator and surrounding personnel. At this time, extend the bucket and hold for 5 to 10 seconds to unlock the lock catch of the quick coupler.
3. Slowly move the boom, arm and bucket until the bucket or attachment is in the storage position near the ground.



4. Retract the bucket cylinder, allowing the quick coupler to release the front pin shaft.



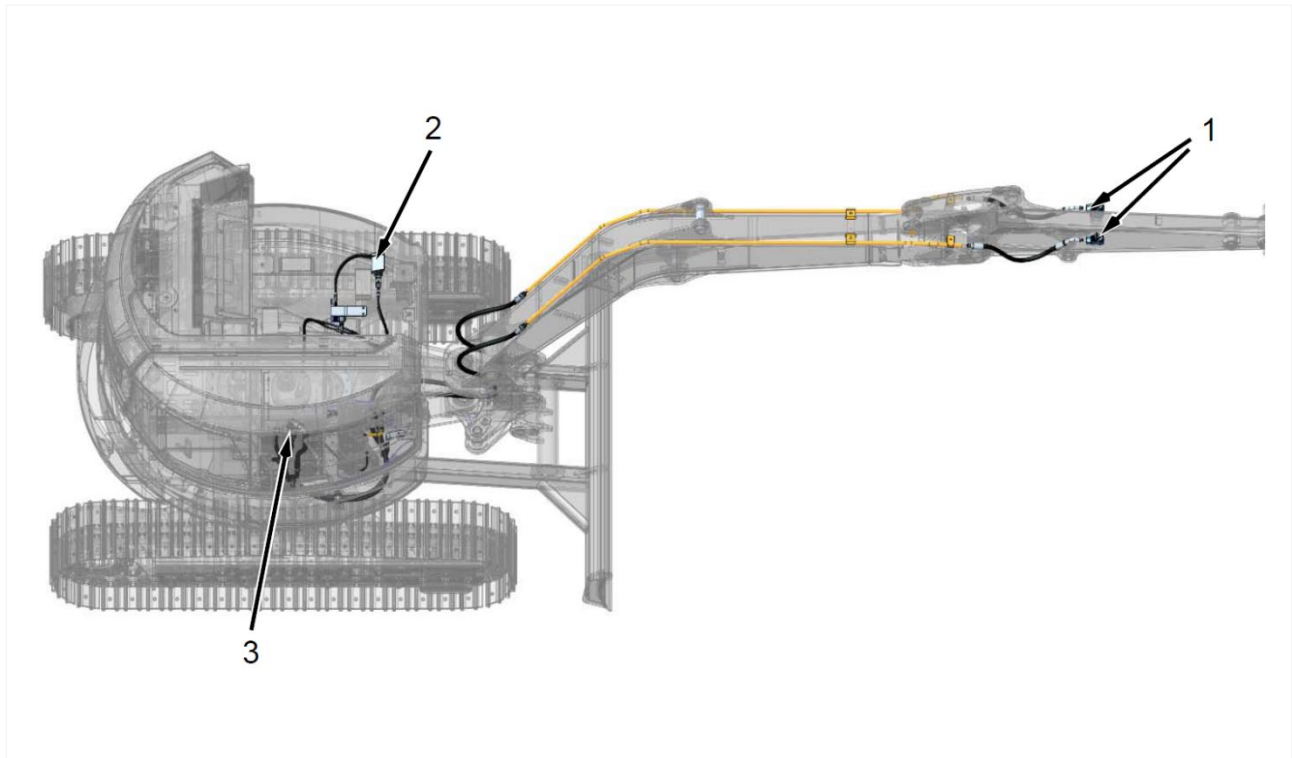
5. Keep turning the quick coupler upwards to loosen the rear shaft pin of the bucket or attachment.



6. Move the arm away from the bucket or attachment.
7. Return the switch to the NEUTRAL (or OFF) position and the buzzer will stop sounding.

Auxiliary Pipe System

Auxiliary Pipe under Pedal Control & Manual Switching of One- and Two-way Pipes

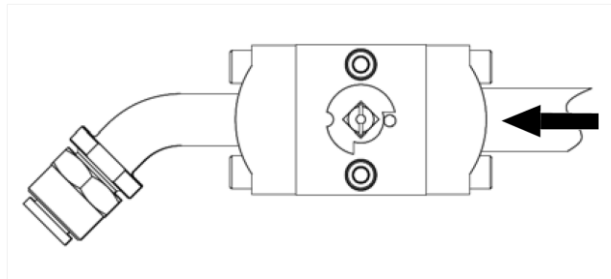


- 1. Stop valve
- 2. Pedal valve
- 3. Three-way ball valve

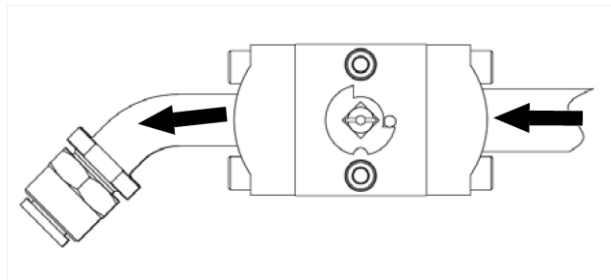
Attachment Connection

The stop valve has two states: OFF and ON.

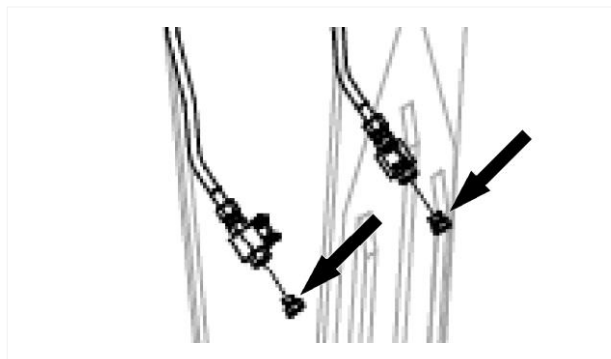
OFF



ON



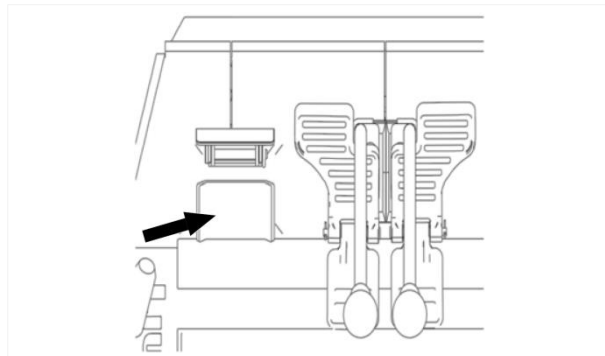
With the stop valve closed, unscrew the plug at the front of the stop valve with a wrench, and connect the hose of the attachment to the transition joint of the stop valve according to the principle of running from left to right.



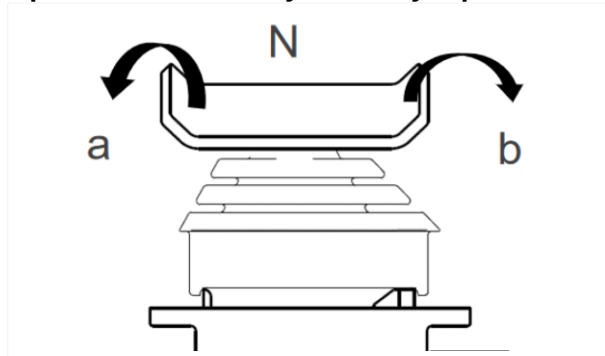
Machine Operation

Hammer/Hydraulic Shears Pedal

The single pedal on the left of the cab is for the breaker or the hydraulic shears.



Operation of Two-way Auxiliary Pipe



When performing breaking with this pedal:

Step on the pedal backward (Direction a) and the hammer is in working state;

Step on the pedal forward (Direction b), and no operation is performed;

When the pedal is in the neutral position (N), the hammer stops;

When operating the hydraulic shears with this pedal:

Step on the pedal backward (Direction a), and the hydraulic shears will open;

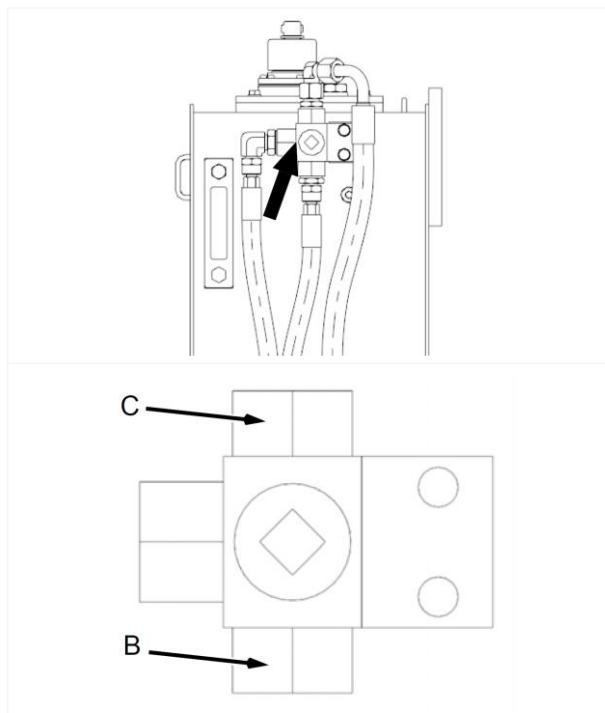
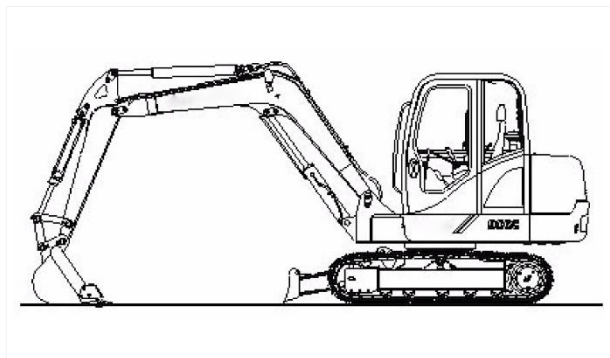
Step on the hammer pedal forward (Direction b), and the hydraulic shears will close;

When the breaker pedal is in the neutral position (N), the hydraulic shears will not work;

Switching between One/Two-way Pipe

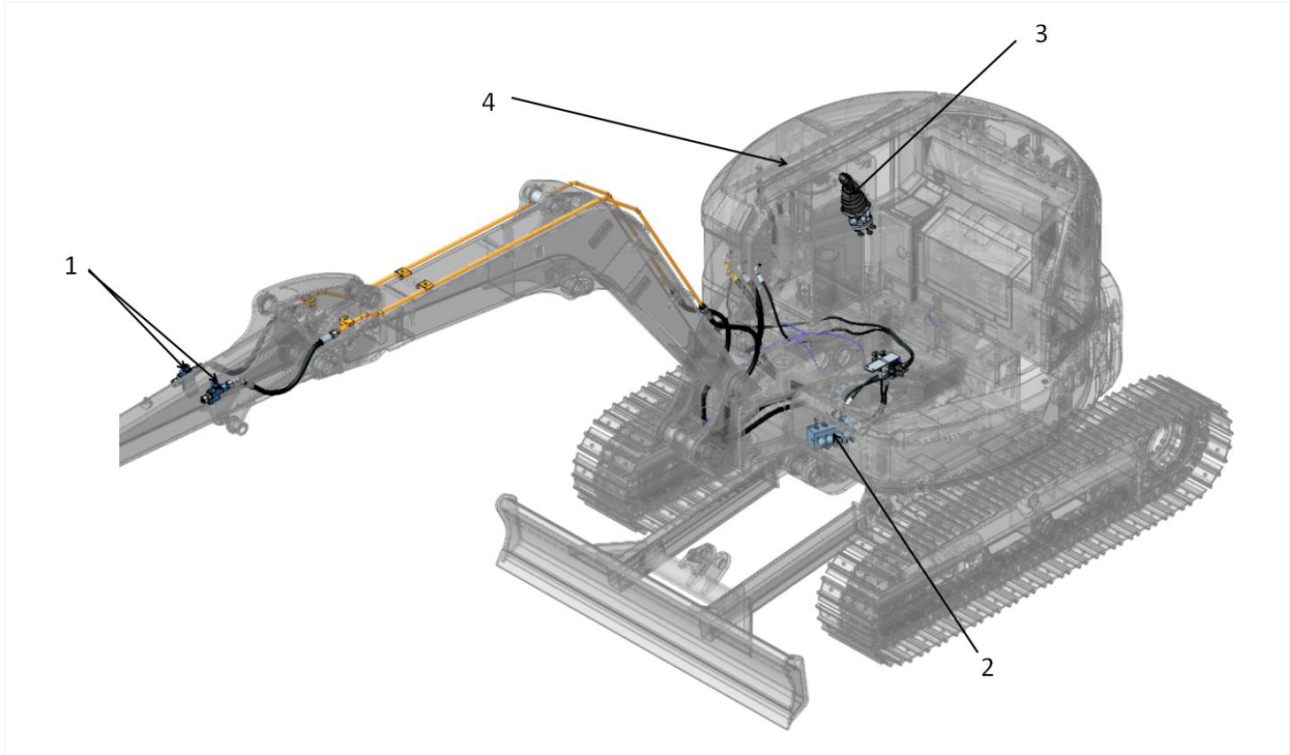
The one-way or two-way operation of an auxiliary working device can be achieved by controlling the hydraulic auxiliary pipeline.

1. Before changing the liquid flow mode of the hydraulic auxiliary pipeline, move the machine to the position as shown in the figure and then stop the machine.



2. Turn the tee valve via handle and confirm that the valve is turned in place, as shown in the figure.
 - a) When the handle is in position (C), the hydraulic hammer line is connected, and the one-way operation of auxiliary working device (hydraulic hammer) can be achieved by controlling the knob on the right hand control lever.
 - b) When the handle is in position (B), the two-way auxiliary line is connected, and the two-way operation of auxiliary working device (grab or hydraulic shear) can be achieved by controlling the knob on the right hand control lever.

Auxiliary Pipe under Control of Electric Proportional Hand Control Lever & Manual Switching of One- and Two-way Pipes

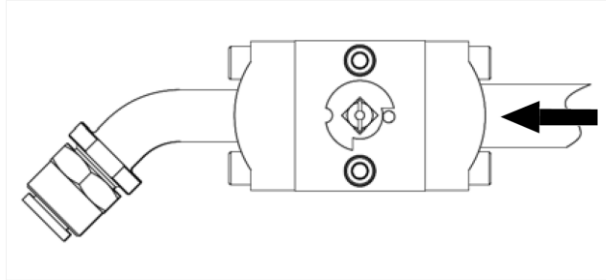


1. Stop valve
2. Proportional solenoid valve
3. Electric proportional hand control lever (right)
4. Three-way ball valve

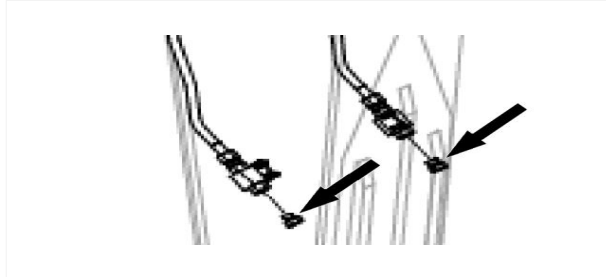
Attachment Connection

The stop valve has two states: OFF and ON.

OFF



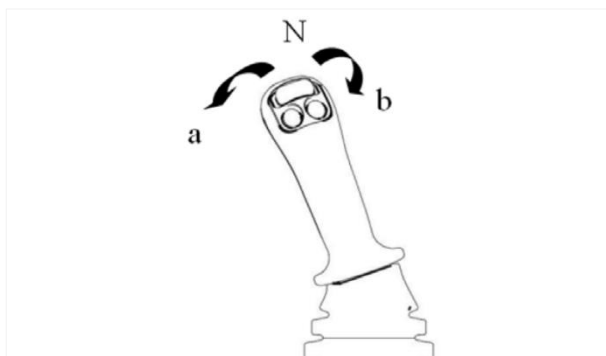
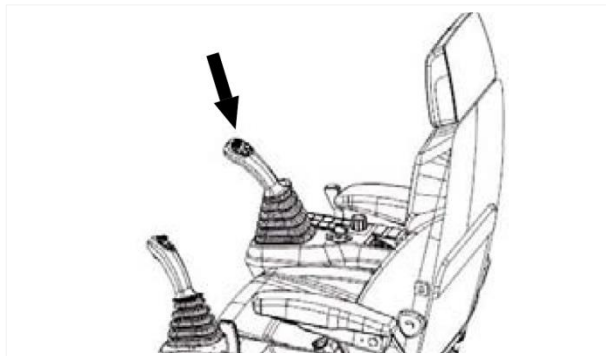
ON



With the stop valve closed, unscrew the plug at the front of the stop valve with a wrench, and connect the hose of the attachment to the transition joint of the stop valve according to the principle of running from left to right.

Machine Operation

The attachment operation of hydraulic shears and bucket clamp can be controlled by the roller switch on the left and right hand control lever.



When the machine is equipped with a hydraulic hammer:

Turn the roller switch to the left (Direction a), the hydraulic hammer operates.

Turn the roller switch to the right (Direction b) or when the roller switch is in the neutral position (N), the hydraulic hammer stops.

When the machine is equipped with hydraulic shears:

Turn the roller switch to the left (Direction a), the hydraulic shears open.

Turn the roller switch to the right (Direction b), the hydraulic shears close.

When the roller switch is in the neutral position (N), the hydraulic shears do not operate.

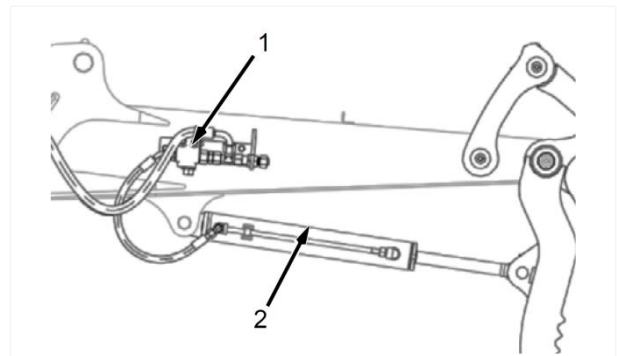
When the machine is equipped with a bucket clamp:

Turn the roller switch to the left (Direction a), the bucket clamp closes.

Turn the roller switch to the right (Direction b), the bucket clamp opens.

When the roller switch is in the neutral position (N), the bucket clamp do not operate.

The stop valve can control the on and off of the bucket clamp oil circuit.



1. Stop valve
2. Bucket clamp cylinder

Flow Rate Adjustment

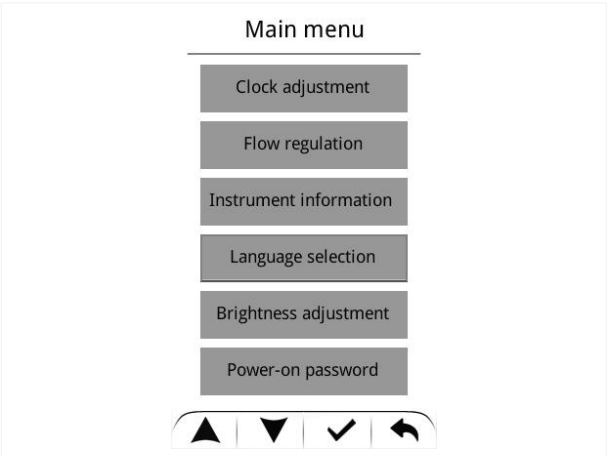
Parameter type	Setting range	Function
Flow rate adjustment	Instrument setting (0~450L/min adjustable)	Provide various flow required for users using different attachments

The specific operating methods are as follows:

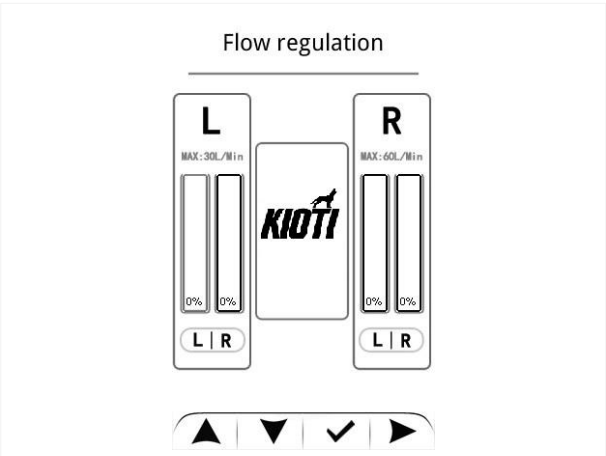
1. Select the application menu on the display.



2. Select flow regulation.



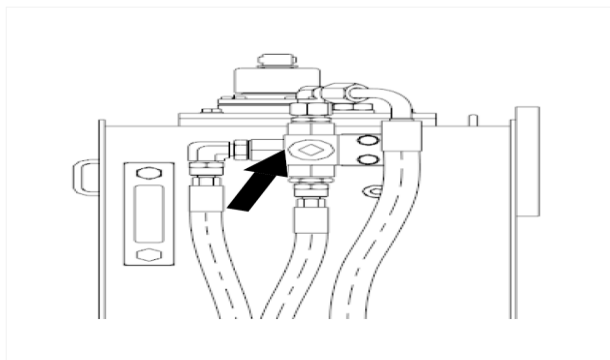
3. Set the flow rate.



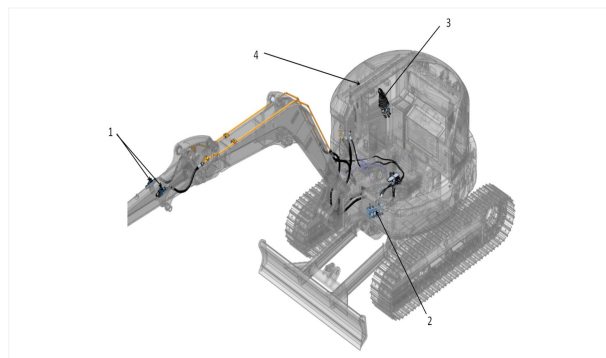
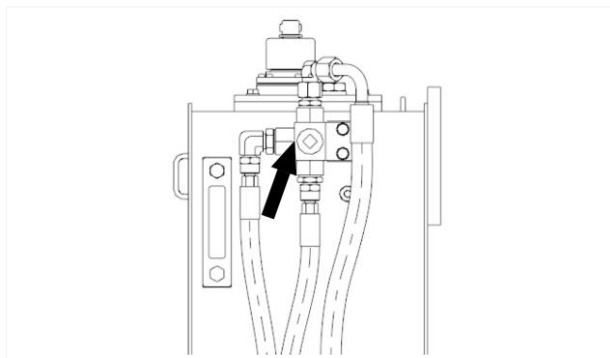
Switching between One/Two-way Pipe

The one-way or two-way operation of an auxiliary working device can be achieved by controlling the hydraulic auxiliary pipeline.

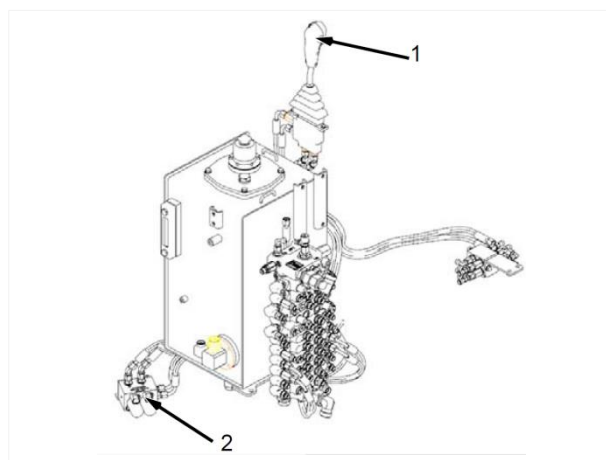
1. Before changing the liquid flow mode of the hydraulic auxiliary pipeline, move the machine to the position as shown in the figure and then stop the machine.



2. Turn the tee valve via handle and confirm that the valve is turned in place, as shown in the figure.
 - a) When the handle is in position (C), the hydraulic hammer line is connected, and the one-way operation of auxiliary working device (hydraulic hammer) can be achieved by controlling the knob on the right hand control lever.
 - b) When the handle is in position (B), the two-way auxiliary line is connected, and the two-way operation of auxiliary working device (grab or hydraulic shear) can be achieved by controlling the knob on the right hand control lever.



Dozer Runout Line



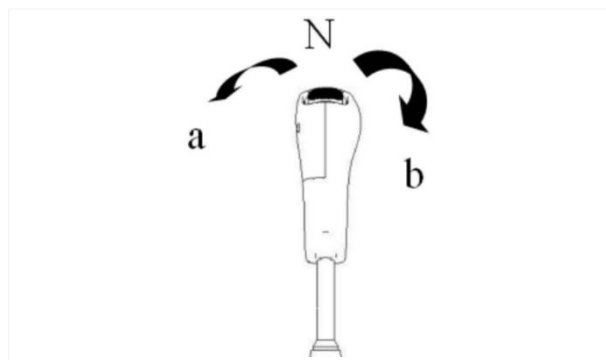
1. Dozer pilot valve
2. Solenoid valve

Machine Operation

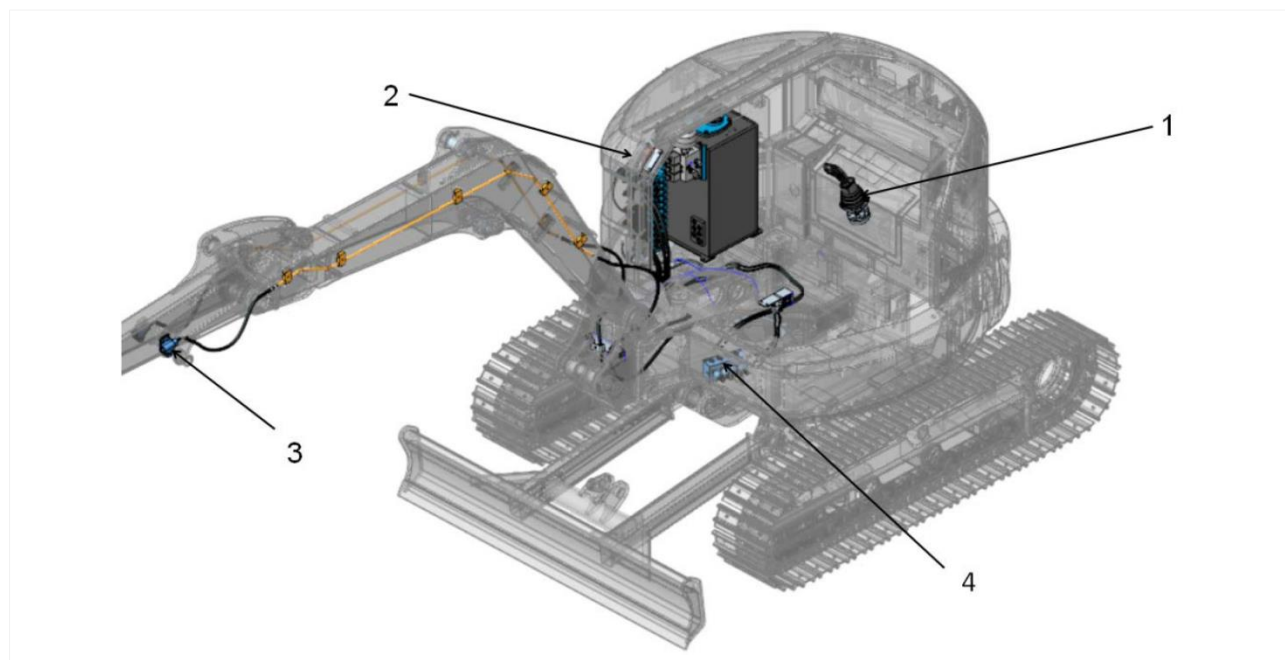
Turn the roller switch to the left (Direction a), the dozer deflects to the left.

Turn the roller switch to the right (Direction b), the dozer deflects to the right.

When the roller switch is in the neutral position (N), the dozer runout does not operate.



Boom Runout and Auxiliary Low Flow Pipeline



1. Electric proportional hand control lever (left)
2. Switching valve
3. Stop valve
4. Proportional solenoid valve

Machine Operation

Boom runout/auxiliary low flow

Turn the roller switch to the left (Direction a), the boom deflects to the left.

Turn the roller switch to the right (Direction b), the boom deflects to the right.

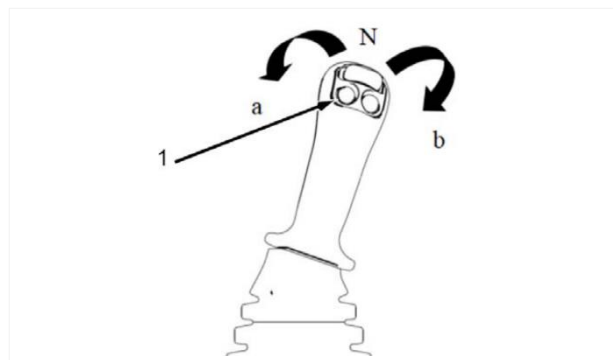
When the roller switch is in the neutral position (N), the boom runout does not operate.

Press the button (1) to switch to auxiliary low flow:

Turn the roller switch to the left (Direction a), the oil feed to the left.

Turn the roller switch to the right (Direction b), the oil feed to the right.

When the roller switch is in the neutral position (N), the auxiliary low flow does not operate.



Recommended Operations of Breaking Hammer

The size of the hydraulic hammer must match the size and weight of the machine. Consult the excavator manufacturer beforehand and only use hammers of the recommended specifications so as to prevent the hydraulic hammer and excavator from being damaged.

To install the hydraulic hammer properly and safely, it is recommended that the excavator manufacturer or excavator dealer install the hammer.

Refer to the Operator's Manual for the hydraulic hammer on how to operate and maintain the hammer.

⚠ WARNING

The installation and testing must be carried out by qualified and trained personnel. Strictly follow the hydraulic hammer operation manual to operate and maintain the hammer.

The operator must wear protective equipment to prevent injury from flying objects or debris when working.

It is prohibited to operate the hammer when a passer-by or bystander is nearby, to prevent injury to bystanders or passers-by from flying objects or debris.

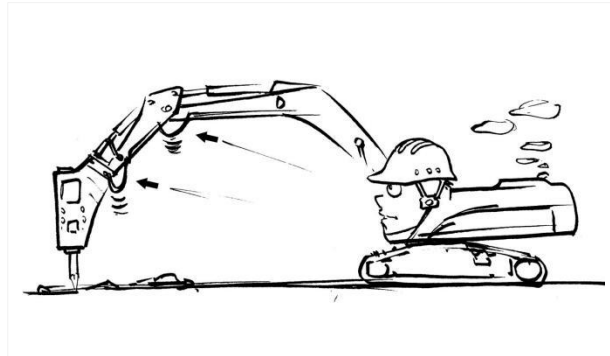
Wear protective goggles, a respirator, ear muffs, a helmet, and so on when operating the hammer.

The hammer can only be used within the specified scope. Do not exceed the specified scope of usage; otherwise, personal injury and death could result.

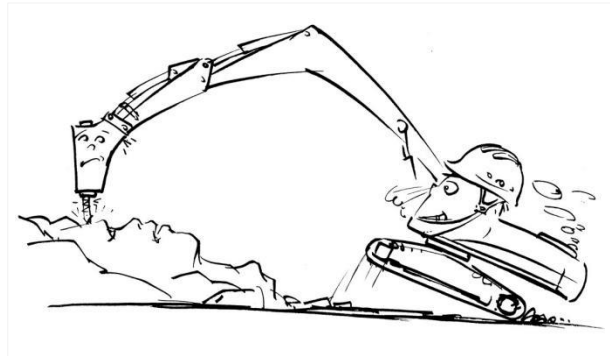
The hammer will become extremely hot during use. Do not touch it until the machine cools down completely.

Proper Position

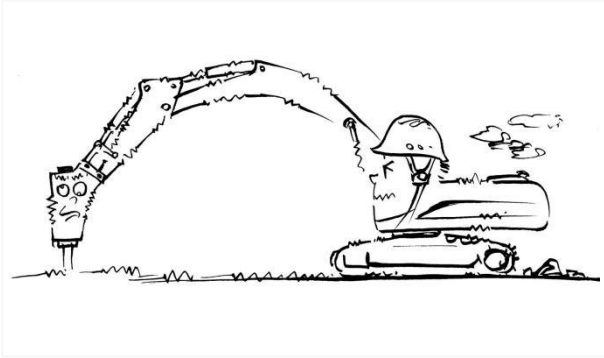
The hydraulic hammer must be properly positioned to apply the breaking force effectively. When the hammer is positioned incorrectly, the hammering energy from the piston is too weak to break rocks. Instead, the hammering force applies shocks to the hammer body, guard plates, work implement, thereby resulting in damage to those parts.



On the other hand, when the impact load is excessive for the position, the front of the base machine will be raised at the moment when the rocks are broken. As a result, the hammer body or end of the bracket may hit the rocks violently and be damaged.

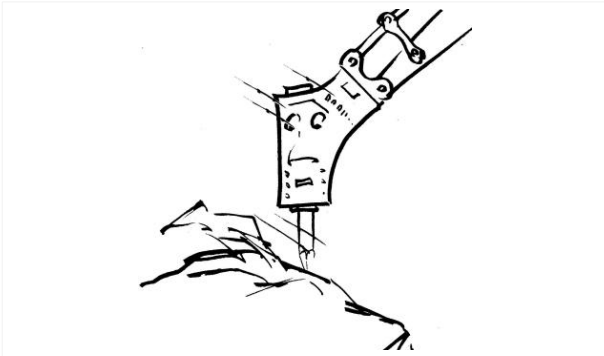


Avoid the above-mentioned operation as much as possible because improper hammering will cause vibration to be transmitted to the base machine. Therefore, make sure the position is correct before hammering. Thoroughly check and maintain the hammer periodically when the hammer is not used.

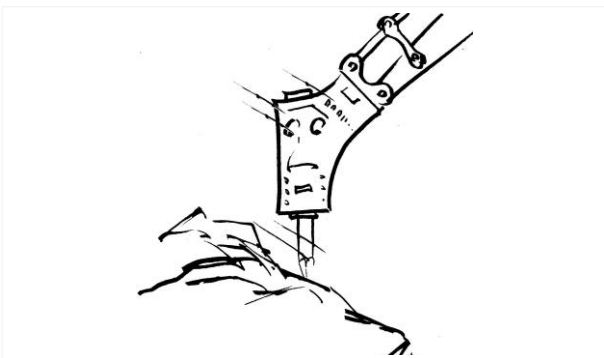


Orientation

The direction of the hydraulic hammer rod should be perpendicular to the surface being hammered. Try to maintain the orientation as much as possible.



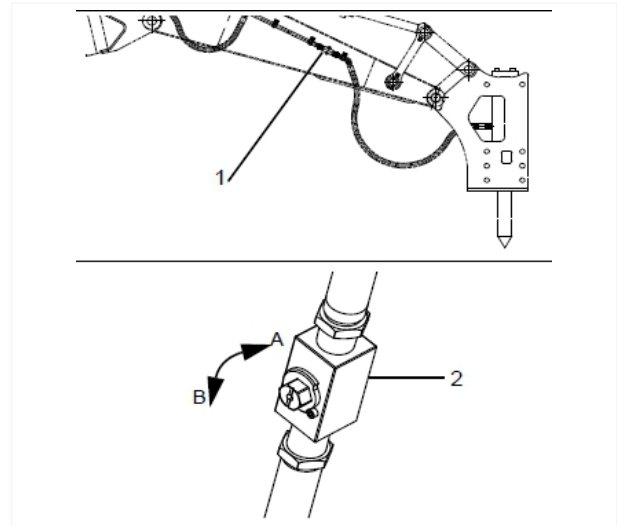
If the hammering surface is slanted, the rod may slide off the surface during hammering. This will cause the rod to be broken and the piston to be damaged.



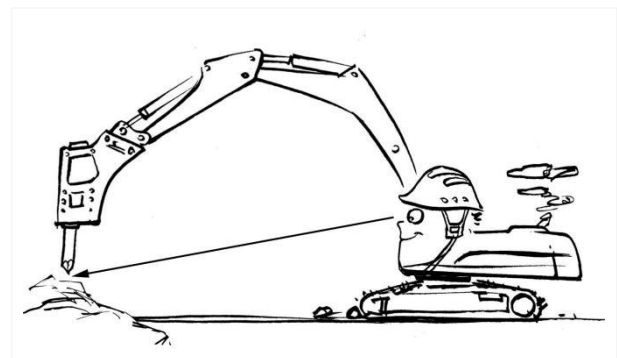
Before hammering, choose the proper position and make sure that the rod is secured and stable.

Precautions for Safe Operation

1. After the hydraulic hammer is installed and the lines are connected, turn the two stop valves of the hydraulic lines to position A (such that the marking on the stop valve knob is parallel with the axis of the stop valve) to connect the oil line.

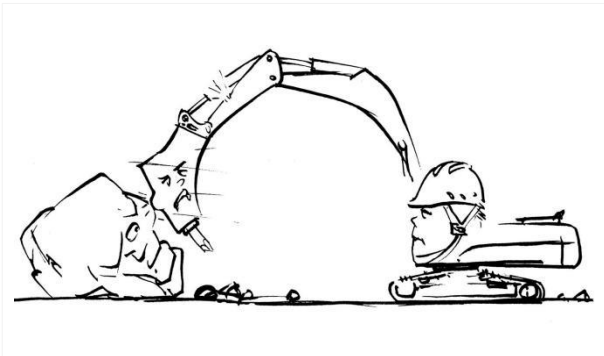


1. Stop valve position
2. Stop valve
A: Stop valve OPEN
B: Stop valve CLOSE
2. If the high pressure and low pressure hose of the hammer is too loose, stop immediately to check and repair. To ensure safety, also check for leakage at the same time.
3. Pay special attention at all times when hammering. Always keep the hammer within sight.

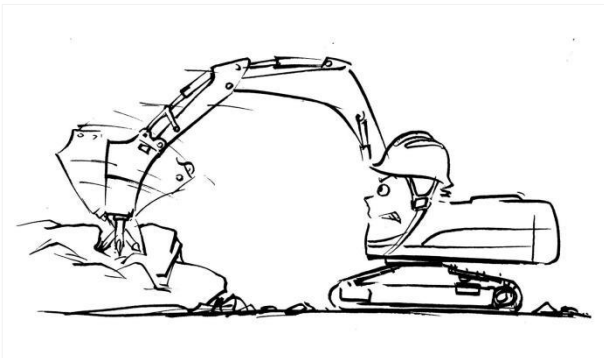


4. Stop hammering immediately if the rocks or materials have been crushed to avoid blank hammering. Blank hammering will loosen and damage the front body and bolt on the body, as well as cause damage to the machine.

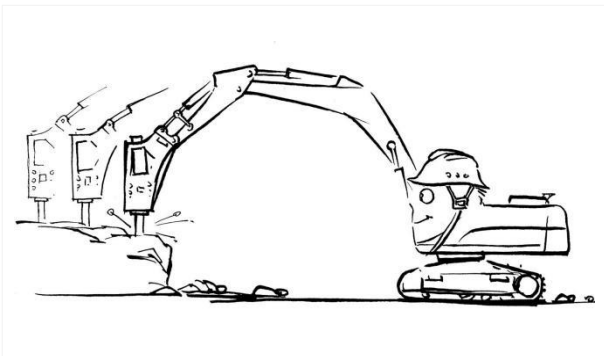
5. Do not move rocks with the hammer because that will result in breakage of the mounting bolt or bracket, rod, arm and boom, and even breakage of the boom.



6. Do not shake the rod when hammering to avoid damaging the bolt and rod.



7. Do not hammer continuously for more than 30 seconds. Change the position of the hammer if the surface being hammered does not break within 30 seconds.

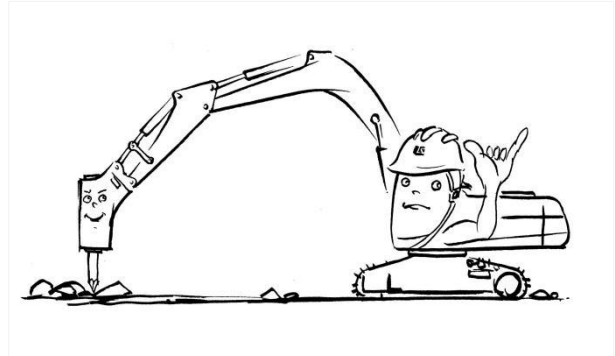


⚠ CAUTION

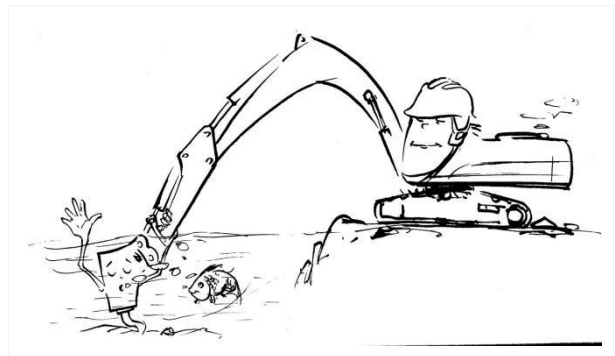
Hammering the same point continuously will cause excessive wear to the rod.

8. When the target is a larger or harder rock, choose to hammer it from the edge. No matter how big and hard the rock is, it is usually more productive to hammer from the edge.

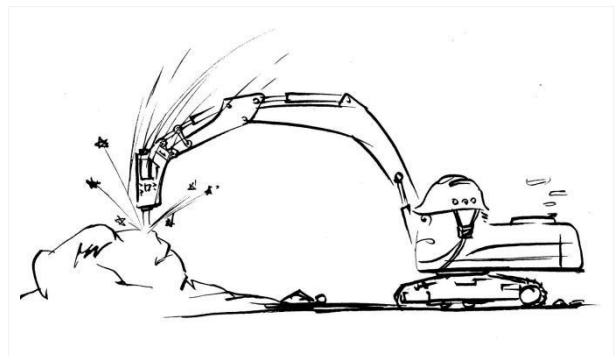
9. Operate the hammer in the proper working mode and at a suitable speed. Raising the speed more than necessary does not increase the hammering force, and instead increases oil temperature and affects the lubrication ability and performance, and causes damage to the hammer and machine.



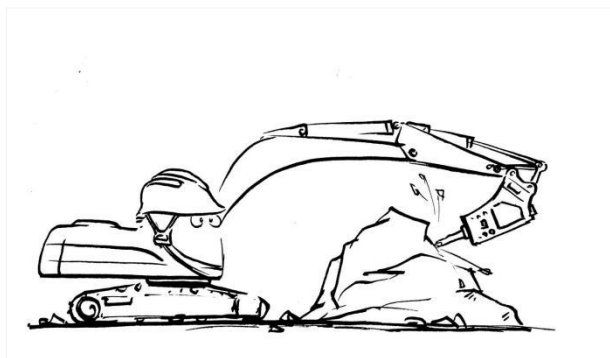
10. Do not operate the hammer in water and mud. Do not operate any part of the hammer in water and mud except for the rod; otherwise, the hammer will be worn prematurely.



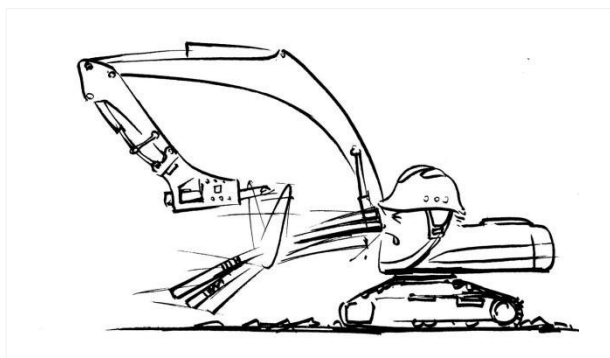
11. Do not allow the hammer to fall on a rock. Dropping the hammer will create excessive force on the hammer or the excavator, causing damage to the parts of the hammer or excavator.



12. Do not operate at a stroke end of the work cylinder because that will lead to damage to the cylinders and other parts of the excavator.



13. Do not use the hammer or rod for lifting. Doing so will cause damage to the hammer and is highly dangerous.



14. Do not use a hydraulic hammer housing or a drill rod to jack up the excavator except for the slight lifting of the tracks when the excavator presses the hydraulic hammer during the crushing operation.



⚠ CAUTION

Hammer slip may cause personal and machine damage.

15. Warm up the machine for ten minutes before a breaking operation, especially in winter.

Fault Diagnosis

Fault Code Table

Fault codes	Marking color	Description	Judgment method	Possible consequences
Display determination				
401101	Yellow	Cannot receive data from the engine controller	No engine controller data for 30s	The machine cannot communicate with the engine, and the machine does not work normally
401107	Yellow	Cannot receive data from the attachments controller	Cannot receive the source address 41 for 30s	The machine cannot communicate with the attachments controller, and the machine cannot work normally

Fault codes	Marking color	Description	Judgment method	Possible consequences
From the air conditioner module				
301005	Colourless	The air sensor inside the air conditioner is open-circuited	Air conditioner judgment	
301004	Colourless	The air sensor inside the air conditioner is short-circuited to ground		
301105	Colourless	The air sensor outside the air conditioner is open-circuited		
301104	Colourless	The air sensor outside the air conditioner is short-circuited to ground		
301219	Colourless	The air conditioner receives the incorrect water temperature signal		
301306	Colourless	The air conditioner solar radiation sensor is short-circuited to 5 V		
301405	Colourless	The pressure switch of the air conditioner is open-circuited		
301511	Colourless	The air conditioner blow-out vent is in fault		
301611	Colourless	The air conditioner mixing vent is in fault		
301705	Colourless	The air conditioner evaporation sensor is open-circuited		
301704	Colourless	The air conditioner evaporation sensor is short-circuited to ground		
301811	Colourless	The air conditioner fresh air vent is in fault		