



WARNING

CALIFORNIA PROPOSITION 65

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.

91K4-07310-EN

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FOREWORD

This manual contains a number of instructions and safety recommendations regarding driving, handling, lubrication, maintenance, inspection and adjustment of the excavator.

The manual is to promote safety maintenance and enhance machine performance.

Keep this manual handy and have all personnel read it periodically.

If you sell the machine, be sure to give this manual to the new owners.

This machine complies with EC directive "2006/42/EC".

1. Read and understand this manual before operating the machine.

This operator's manual may contain attachments and optional equipment that are not available in your area. Please consult your local Hyundai distributor for those items you require.

Improper operation and maintenance of this machine can be hazardous and could result in serious injury or death.

Some actions involved in operation and maintenance of the machine can cause a serious accident, if they are not done in a manner described in this manual.

The procedures and precautions given in this manual apply only to intended uses of the machine.

If you use your machine for any unintended uses that are not specifically prohibited, you must be sure that it is safe for you and others. In no event should you or others engage in prohibited uses of actions as described in this manual.

2. Inspect the jobsite and follow the safety recommendations in the safety hints section before operating the machine.

3. Use genuine Hyundai spare parts for the replacement of parts.

We expressly point out that Hyundai will not accept any responsibility for defects resulting from non-genuine parts or non workmanlike repair.

In such cases Hyundai cannot assume liability for any damage.

Continuing improvements in the design of this machine can lead to changes in detail which may not be reflected in this manual. Consult Hyundai or your Hyundai distributor for the latest available information for your machine or for questions regarding information in this manual.

EMISSION-RELATED COMPONENTS WARRANTY (USA AND CANADA ONLY)

Hyundai shall have obligation under the EPA (Environmental Protection Agency) regulation of warranty about Emission-related components. This warranty shall exist for 1,500 hours or two years, whichever occurs first.

Naturally, this warranty does not cover to damage arising from accident, misuse or negligence, use of non-Hyundai parts, or from alterations not authorized by Hyundai.

※ **Emission-related components according to the EPA regulation.**

1. Air-induction system.
2. Fuel system.
3. Ignition system.
4. Exhaust gas recirculation systems.
5. After treatment devices.
6. Crankcase ventilation valves.
7. Sensors.
8. Electronic control units.

BEFORE SERVICING THIS MACHINE

It is the responsibility of the owner and all service and maintenance personnel to avoid accidents and serious injury by keeping this machine properly maintained.

It also is the responsibility of the owner and all service and maintenance personnel to avoid accidents and serious injury while servicing the machine.

No one should service or attempt to repair this machine without proper training and supervision.

All service and maintenance personnel should be thoroughly familiar with the procedures and precautions contained in this manual.

All personnel also must be aware of any federal, state, provincial or local laws or regulations covering the use and service of construction equipment.

The procedures in this manual do not supersede any requirements imposed by federal, state, provincial or local laws.

Hyundai can not anticipate every possible circumstance or environment in which this machine may be used and serviced.

All personnel must remain alert to potential hazards.

Work within your level of training and skill.

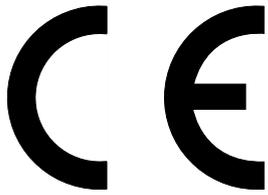
Ask your supervisor if you are uncertain about a particular task.

Do not try to do too much too fast.

Use your common sense.

EC REGULATION APPROVED

- Noise level (EN474-1 : 2006 and 2000/14/EC) are as followings.
LWA : 94 dB (EU only)
LPA : 77 dB
- The value of vibrations transmitted by the operator's seat are lower than standard value of (EN474-1 : 2006 and 2002/44/EC)



EC Declaration of Conformity
(Original instruction)

This declaration of conformity is issued under the sole responsibility of manufacturer:

HYUNDAI CONSTRUCTION EQUIPMENT CO., LTD.
12th Fl., Hyundai Bldg. 75, Yulgok-ro, Jongno-gu,
Seoul 03058, Korea

Hyundai Construction Equipment Europe N.V located at Hyundailaan 4, 3980 Tessenderlo, Belgium, as authorized representative in the European Community is authorized to compile the technical construction file and declares that the product:

Type: *****
Model: *****
Serial number (PIN): *****

is in conformity with the relevant provisions of the Community harmonization legislation:

2006/42/EC - Machinery directive
2014/30/EU - Electromagnetic compatibility directive
2000/14/EC - Noise emission outdoor equipment directive
2002/44/EU - Exposure of workers to vibration risks directive
their amendments, and other applicable directives.

EMC (2014/30/EU)

Certificate number: *****
Date: DD/MM/YYYY
Notified body: *****

Noise levels (2000/14/EC)

Certificate number: *****
Date: DD/MM/YYYY
Conformity assessment proc.: Annex VIII Full Quality Assurance
Notified body: *****

Measured sound power level: nnn.n dB(A)
Guaranteed sound power level: nnn.n dB(A)

Engine information

Manufacturer : *****
Engine model name: *****
Type-approval number: *****
Stage (Regulation) : STAGE ** (**/**/**)
Gross Power (SAE J1995): ***kW / ****rpm
Net Power (SAE J1349): ***kW / ****rpm

Harmonized standards, other technical standards and specifications applied:

EN 474-1:2006+A*:**** (EMM - Safety - Part 1); EN 474-3:2006+A*:**** (EMM - Safety - Part 3); EN ISO 3471:2008 (EMM - ROPS: Lateral/Vertical/Longitudinal loads); EN ISO 3449:2008 (EMM - FOPS: Level II cabin); ISO 2631-1:1997 & ISO 2631-1:1997/Amd1 :2010 (Whole-body vibration); EN ISO 5349-1:2001 & EN ISO 5349-2:2001 & EN ISO 5349-2:2001/A1:2015 (Hand-arm vibration)

Managing Director
Place, date of issue: Tessenderlo Belgium, DD MM YYYY

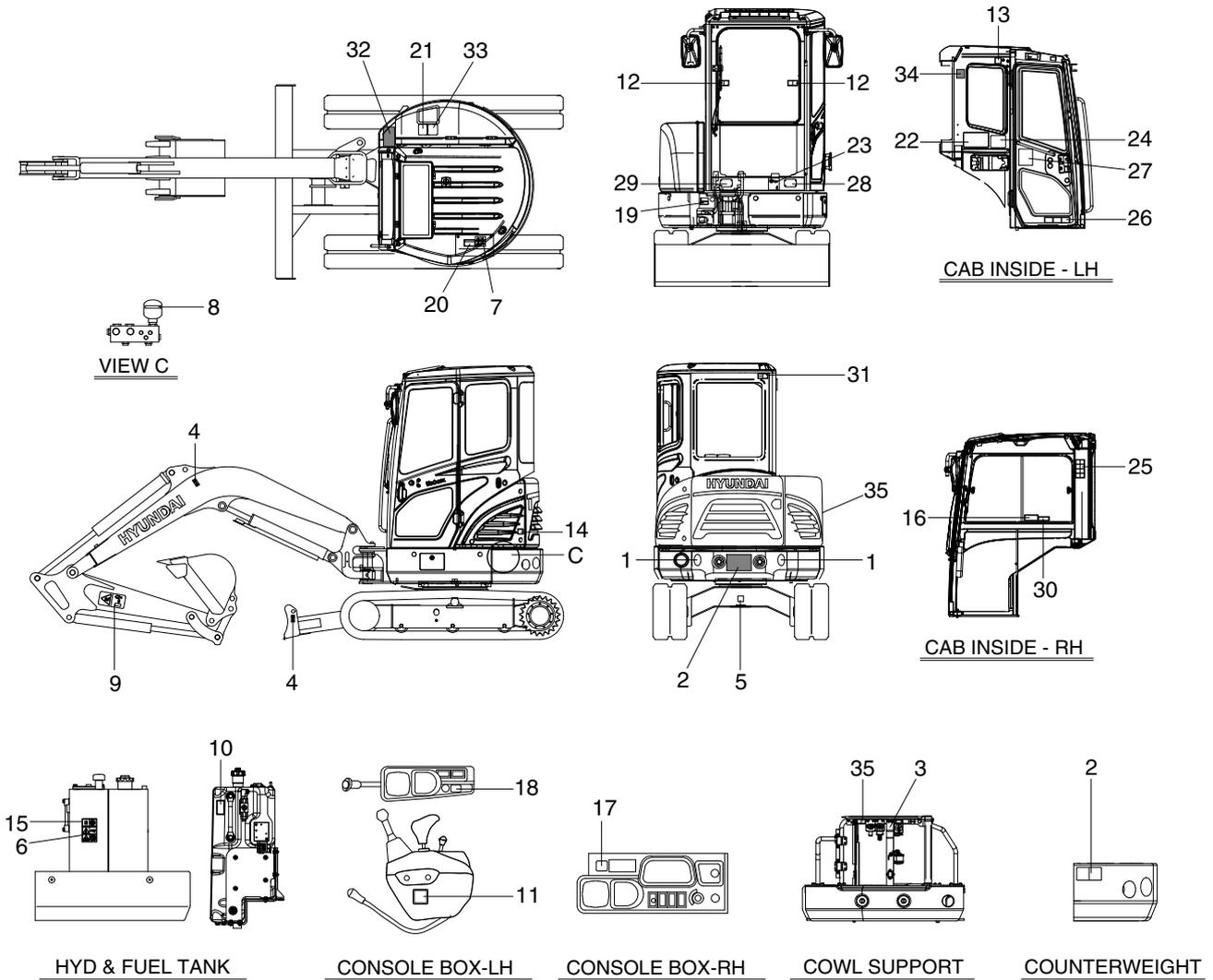
TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

Machine Serial No.	
Engine Serial No.	
Manufacturing year	
Manufacturer Address	Hyundai Heavy Industries co., Ltd. 1000, Bangeojinsunhwan-doro, Dong-Ku, Ulsan 682-792, Korea
Distributor for U.S.A Address	Hyundai Heavy Industries U.S.A, Inc 6100 Atlantic Boulevard Norcross GA 30071 U.S.A
Distributor for Europe Address	Hyundai Heavy Industries Europe N. V. Vossendal 11 2240 Geel Belgium
Dealer Address	

SAFETY LABELS

1. LOCATION

Always keep these labels clean. If they are lost or damaged, attach them again or replace them with a new label.



- | | | |
|------------------------|-----------------------------|-----------------------------------|
| 1 Reflecting | 13 Hammer | 25 Cab general caution |
| 2 Keep clear (rear) | 14 Battery position | 26 Frame general warning |
| 3 Engine room caution | 15 Fuel shut off | 27 Machine control pattern change |
| 4 Lifting point | 16 Machine control ideogram | 28 Name plate |
| 5 Tie | 17 Dozer control ideogram | 29 ROPS plate |
| 6 Hydraulic oil lub | 18 Engine control ideogram | 30 Water separator |
| 7 Battery accident | 19 Grease | 31 Beacon lamp |
| 8 Accumulator | 20 Electric welding | 32 Step tread |
| 9 Keep clear (attach) | 21 Fueling | 33 Ultra low sulfar diesel |
| 10 Change way | 22 Service instruction | 34 Fire extinguisher |
| 11 Console tilting | 23 Noise level | 35 Cover close/open |
| 12 Front window safety | 24 Lifting chart | |

30Z9AK0FW01

2. DESCRIPTION

There are several specific warning labels on this machine please become familiarized with all warning labels.

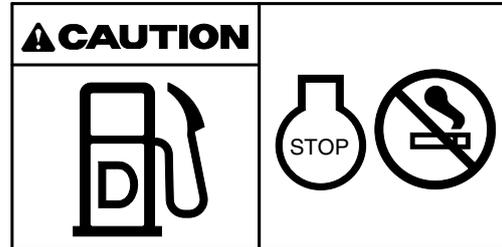
Replace any safety label that is damaged, or missing.

1) FUELING (item 21)

This warning label is positioned on the right side of fuel filler neck.

▲ Stop the engine when refueling.

All lights or flames shall be kept at a safe distance while refueling.



R35Z70FW04

2) BATTERY ACCIDENT (item 7)

This warning label is positioned on the battery cover.

▲ Electrolyte containing sulfuric acid cause severe burns. Avoid being in contact with skin, eyes or clothes. In the event of accident flush with sufficient water, call a physician immediately.

※ Maintain the electrolyte at the recommended level. Add distilled water to the battery only when starting up, never when shutting down.

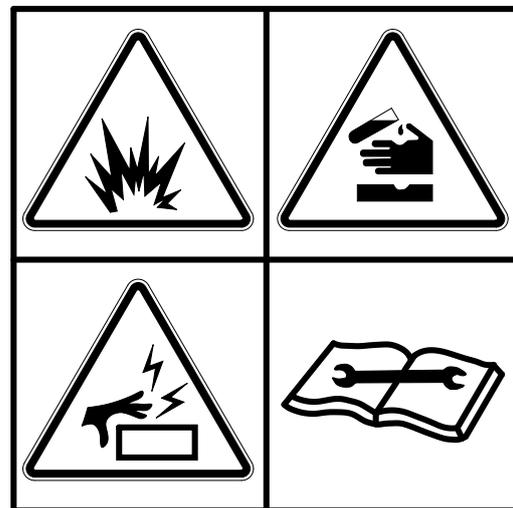
With electrolyte at proper level, less space may cause the gases to be accumulated in the battery.

▲ Extinguish all smoking materials and open flames before checking the battery.

▲ Do not use matches, lighters or torches as a light source near the battery for the probable presence of explosive gas.

▲ Do not allow unauthorized personnel to change the battery or to use booster cables.

▲ For safety from electric shock, do not battery terminals with a wet hand.



36070FW05

3) KEEP CLEAR (ATTACH) (item 9)

This warning label is positioned on both side of the boom.

- ⚠ **Serious injury or death can result from falling of the attachment.**
- ⚠ **To prevent serious injury or death, keep clear the underneath of attachment.**

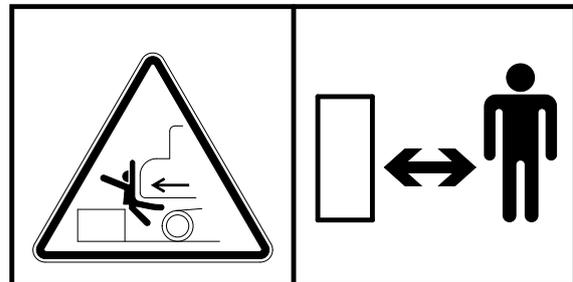


R5570FW31

4) KEEP CLEAR (REAR) (item 2)

This warning label is positioned on the counterweight.

- ⚠ **To prevent serious personal injury or death keep clear of machine swing radius.**
- ⚠ **Do not deface or remove this label from the machine.**

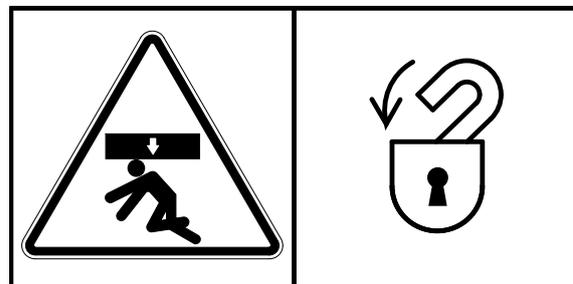


R35Z70FW09

5) SAFETY FRONT WINDOW (item 12)

This warning label is positioned on the both side window of the cab.

- ⚠ **Be careful that the front window may be promptly closed.**

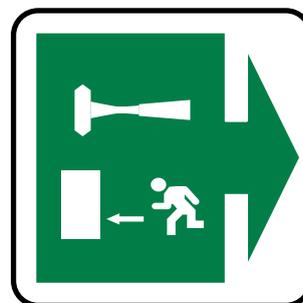


21070FW24

6) HAMMER (item 13)

This warning label is positioned on the cab door.

- ⚠ **The right side window serves us an alternate exit.**
- ⚠ **At case of emergency, use the hammer for braking the right side window of the cab.**

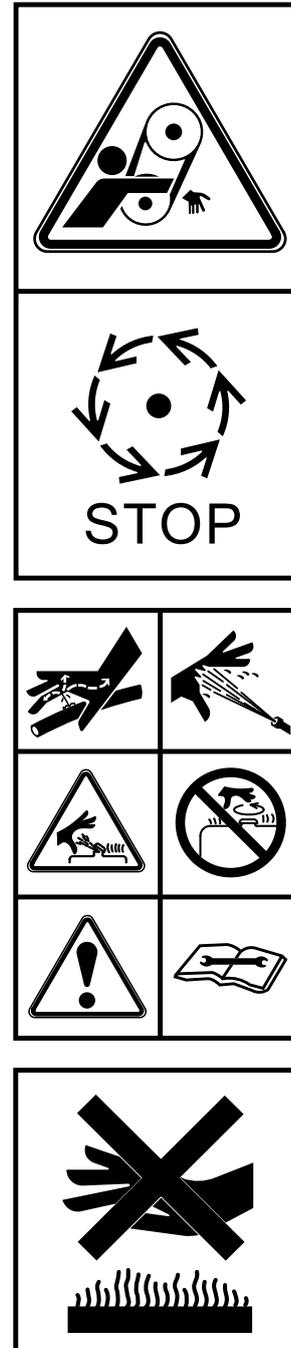


R25Z9A0FW25

7) ENGINE ROOM CAUTION (item 3)

This warning label is positioned on the cowl support.

- ▲ Do not open the engine hood during the engine's running.
- ▲ Escaping fluid under pressure can penetrate the skin causing serious injury.
- ※ Study the service manual before service job.
- ▲ Never open the filler cap while engine running or at high coolant oil temperature.
- ▲ Study the operator's manual before starting and operating machine.
- ▲ Do not touch exhaust pipe or it may cause severe burn.

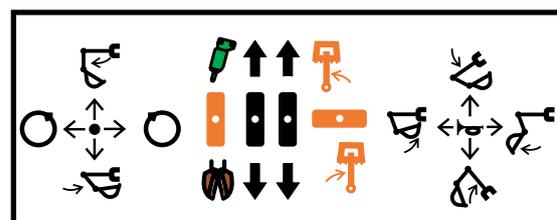


R5570FW14

8) MACHINE CONTROL IDEOGRAM (item 16)

This warning label is positioned in right window of the cab.

- ▲ Check the machine control pattern for conformance to pattern on this label. If not, change label to match pattern before operating machine.
- ▲ Failure to do so could result in injury or death.
- ※ See page 4-7 for details.



R25Z9A0FW19

9) CAB GENERAL CAUTION (item 25)

This warning label is positioned on the right side window of the cab.

- ▲ **Serious injury or death can result from contact with electric lines.**

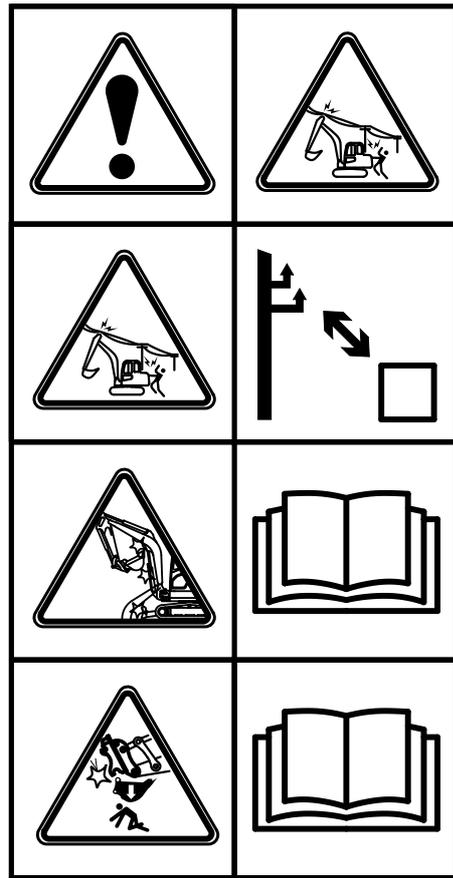
An electric shock being received by merely coming into the vicinity of an electric lines, the minimum distance should be kept considering the supply voltage as page 1-7.

- ▲ **Serious injury or death can result from dropping bucket.**

- ▲ **Operating the machine with quick clamp switch unlocked or without safety pin of moving hook can cause the bucket to drop off.**

- ▲ **Be careful to operate machine equipped with quick clamp or extensions.**

- ▲ **Bucket may hit cab, canopy, boom and boom cylinders when it reached vicinity of them.**

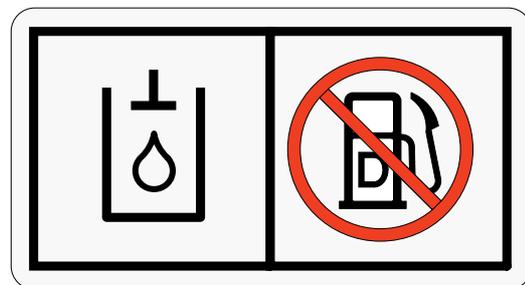


R25Z9A0FW11

10) FUEL SHUT OFF (item 15)

This warning label is positioned on the hydraulic tank.

- ※ **Fill only hydraulic oil.**
- ※ **Do not fill the diesel fuel.**

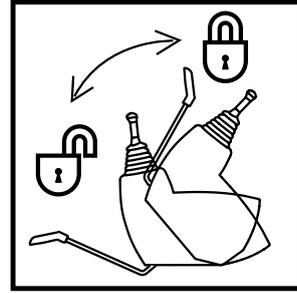


140WH90FW51

11) CONSOLE TILTING (item 11)

This warning label is positioned on the LH console box.

- ※ **Before you get off the machine be sure to tilt the LH console box.**



R5570FW17

12) HYDRAULIC OIL LUBRICATION (item 6)

This warning label is positioned on the right side of air breather.

- ※ **Do not mix with different brand oils.**
- ▲ **Never open the filler cap while engine running or at high hydraulic oil temperature.**
- ▲ **Loosen the cap slowly and release internal pressure completely.**

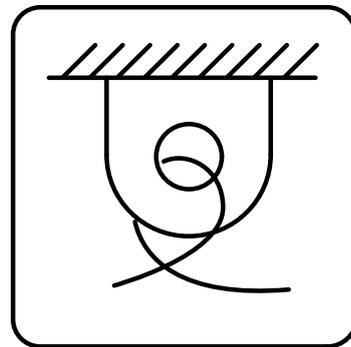


21070FW08

13) TIE (item 5)

This warning label is positioned on the lower frame.

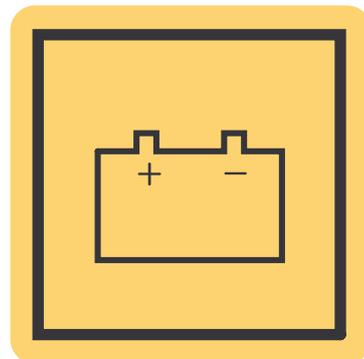
- ※ **Never tow the machine using tie hole, because this may break.**
- ※ **See page 4-10 for detail.**



4507A0FW02

14) BATTERY POSITION (item 14)

This warning label is positioned on the battery cover.

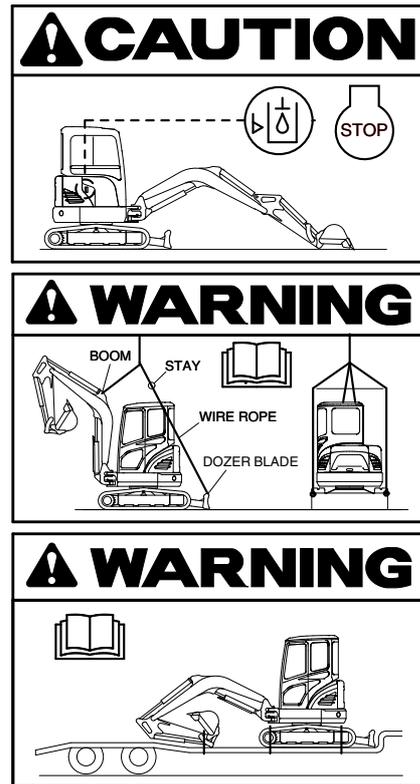


38090FW03

15) FRAME GENERAL WARNING (item 26)

This warning label is positioned on the right side of cowl.

- ▲ **Study the operator's manual before transporting the machine, if provided and tie down arm and track to the carrier with lashing wire.**
- ※ See page 5-6 for details.
- ▲ **Make sure wire rope is proper size and keep correct hoisting method.**
- ※ See page 5-7 for details.
- ▲ **Place the bucket on the ground whenever servicing the hydraulic system.**
- ※ Check oil level on the level gauge.
- ※ Refill the recommended hydraulic oil up to specified level if necessary.

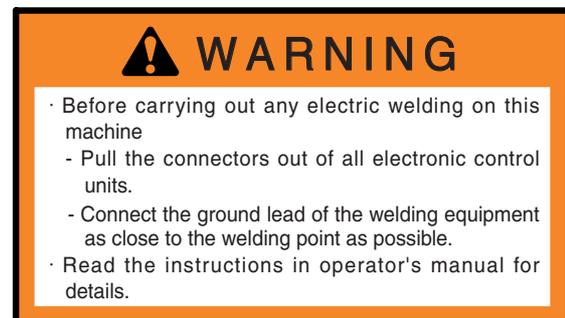


R25Z9A0FW12

16) ELECTRIC WELDING (item 20)

This warning label is positioned on the battery cover.

- ▲ **Before carrying out any electric welding on this machine follow the below procedure.**
 - Pull the connectors out of all electric control units.
 - Connector the ground lead of the welding equipment as close to the welding point as possible.
- ※ See page 6-36 for detail.

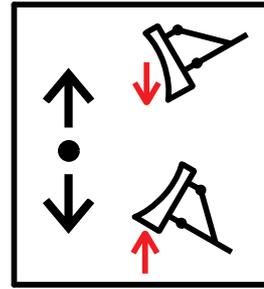


7807AFW20

17) DOZER CONTROL IDEOGRAM (item 17)

This warning label is positioned on the RH console box.

- ※ See page 4-7 for details.
- ※ Guidelines for using the general dozer blade.
 - Be careful not to apply an excessive load when using a blade.
 - Avoid impacts and loads on the bottom due to machine modification or excessive working conditions.
 - Check the BLADE UP status before traveling the machine.
 - Avoid any collision with the upper working device and the blade.
 - Do not move machine in the blade jack up state.
 - When using blade jack up, use it in an environment where the ground is not rough and the machine and ground are same level.



R25Z9A0FW06

18) ACCUMULATOR (item 8)

This warning label is positioned on the accumulator of the solenoid valve.

- ※ The accumulator is filled with high-pressure nitrogen gas, and it is extremely dangerous if it is handled in the wrong way. Always observe the following precautions.
 - ▲ Never make any hole in the accumulator expose it to flame or fire.
 - ▲ Do not weld anything to the accumulator.
- ※ When carrying out disassembly or maintenance of the accumulator, or when disposing of the accumulator, it is necessary to release the gas from the accumulator. A special air bleed valve is necessary for this operation, so please contact your Hyundai distributor.



1107A0FW46

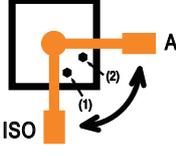
19) MACHINE CONTROL PATTERN CHANGE (item 27)

This warning label is positioned on the left side door of the cab.

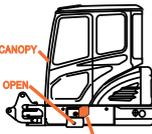
- ⚠ **Check the machine control pattern for conformance to pattern on this label. If not, change label to match pattern before operating machine.**
- ⚠ **Failure to do so could result in injury or death.**

⚠ WARNING

- THE MACHINE CONTROL PATTERN CAN EASILY BE CHANGED TO THE "ISO TYPE" OR TO THE "A TYPE" BY CHANGING THE POSITION OF THE LEVER-PATTERN.
- BEFORE STARTING THIS MACHINE, CHECK THE LEVER PATTERN VALVE LOCATED LH SIDE COVER. SERVICE COVER OPEN



ISO



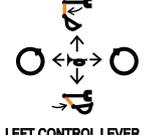
CABIN or CANOPY
LEVER PATTERN VALVE

- HOW TO USE :
 1. LOOSEN BOLT(1) OR BOLT(2).
 2. MOVE LEVER TO THE "ISO" OR "A" POSITION.
 3. AFTER SETTING THE PATTERN, TIGHTEN BOLT TO SECURE LEVER.
 - BOLT(1) FOR "ISO" PATTERN
 - BOLT(2) FOR "A" PATTERN
- REFER TO OPERATOR'S MANUAL FOR DETAILS.

ISO TYPE

POSITION OF LEVER-PATTERN :





LEFT CONTROL LEVER



RIGHT CONTROL LEVER

A TYPE

POSITION OF LEVER-PATTERN :





LEFT CONTROL LEVER



RIGHT CONTROL LEVER

R25Z9A0FW07

20) WATER SEPARATOR (item 30)

This warning label is positioned on the right side window of the cab.

- ※ **In order to protect high pressure fuel system, please drain water in water separator before starting the engine.**

⚠ CAUTION

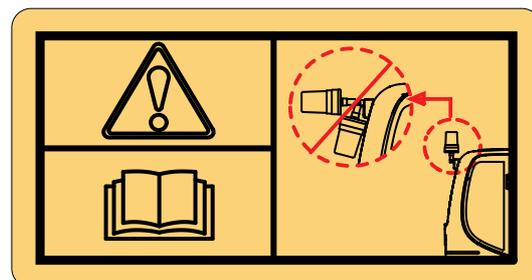
- In order to protect high pressure fuel system, please drain water in water separator before starting the engine.

559S0FW07

21) BEACON LAMP (item 31)

This warning label is positioned on the rear outside of the cab.

- ※ **Make sure the beacon lamp maintains a vertical position.**
A horizontal position can result in a decrease in life time of the lamp due to the infiltration of foreign substances such as dust or water.
- ※ **While the machine transfer, the beacon lamp is easy to break. In the case, change the position of the lamp to the horizontal.**

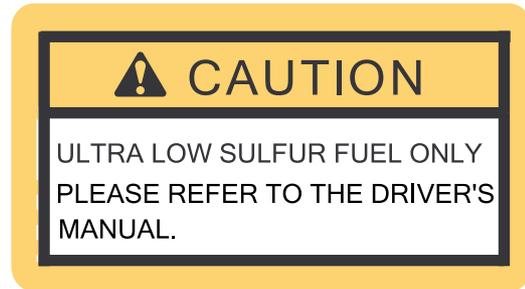


140Z90FW49

22) ULTRA LOW SULFUR DIESEL (item 33)

This warning label is positioned on the right side of fuel filler neck.

- ※ **Use ultra low sulfur fuel only.**
- ※ **Ultra low sulfur fuel sulfur content \leq 15 ppm**

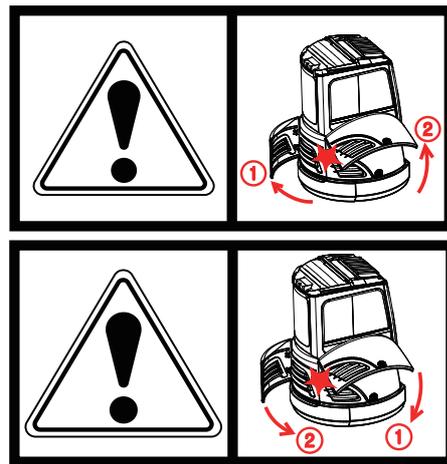


2609A0SL03

23) COVER OPEN/CLOSE (item 35)

This warning label is positioned on the cover of cowl.

- ※ **When open or close the cover, refer to the decal.**



30Z9A0FE11

MACHINE DATA PLATE

DO NOT DEFACE OR REMOVE THIS PLATE
이 명판을 훼손하거나 오손시키지 마시오

MACHINE TYPE / MODEL
PRODUCT IDENTIFICATION NUMBER
ENGINE POWER
OPERATING MASS

477, Bundanguseo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13553, Korea
91LM-14112

HD HYUNDAI CONSTRUCTION EQUIPMENT

For general

DO NOT DEFACE OR REMOVE THIS PLATE
이 명판을 훼손하거나 오손시키지 마시오

MACHINE TYPE / MODEL		
PRODUCT IDENTIFICATION NUMBER / VEHICLE IDENTIFICATION NUMBER		
ENGINE POWER	MAX. AXLE LOAD (FRONT / REAR)	
OPERATING MASS / GROSS VEHICLE WEIGHT	MFG. YEAR	YEAR INTO SERVICE

477, Bundanguseo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13553, Korea
91LM-14162

HD HYUNDAI CONSTRUCTION EQUIPMENT

For EU only

DO NOT DEFACE OR REMOVE THIS PLATE
이 명판을 훼손하거나 오손시키지 마시오

MACHINE TYPE
MODEL
MAX. CERTIFIED WEIGHT
STANDARDS ROPS : ISO 12117-2 TOPS : EN 13531 / ISO 12117 FOG : ISO 10262 (LEVEL 1)

477, Bundanguseo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13553, Korea
91MQ-01282

HD HYUNDAI CONSTRUCTION EQUIPMENT

For ROPS

DO NOT DEFACE OR REMOVE THIS PLATE
이 명판을 훼손하거나 오손시키지 마시오

MACHINE TYPE
MODEL
STANDARDS FOG : ISO 10262 (LEVEL 1)

477, Bundanguseo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13553, Korea
94MS-01281

HD HYUNDAI CONSTRUCTION EQUIPMENT

For FOG

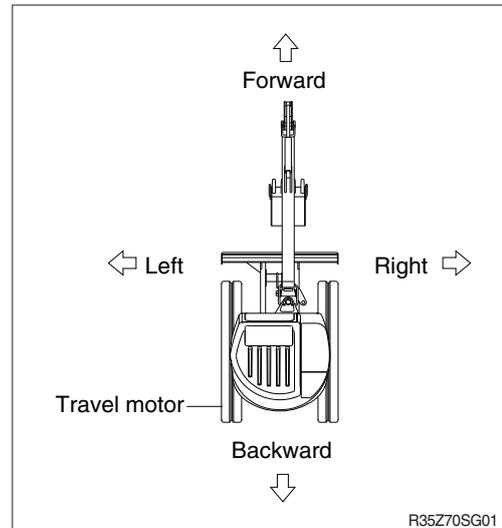
MEX0MD01

※ The machine serial number assigned to this particular machine should be used when requesting information or ordering service parts for this machine from your authorized HD Hyundai Construction Equipment dealer. The machine serial number is also stamped on the frame.

GUIDE

1. DIRECTION

The direction of this manual indicate forward, backward, right and left on the standard of operator when the travel motor is in the rear and machine is on the traveling direction.

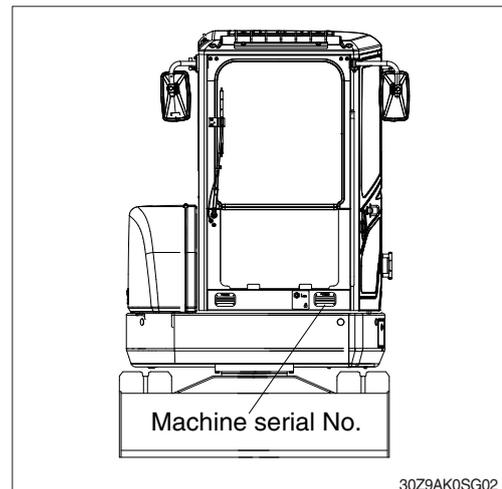


2. SERIAL NUMBER

Inform following when you order parts or the machine is out of order.

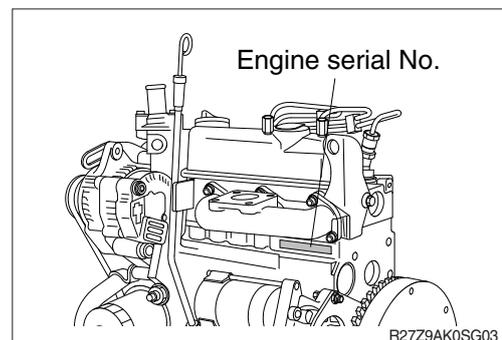
1) MACHINE SERIAL NUMBER

The numbers are located below the front window of the operator's cab.



2) ENGINE SERIAL NUMBER

The numbers are located on the engine name plate.



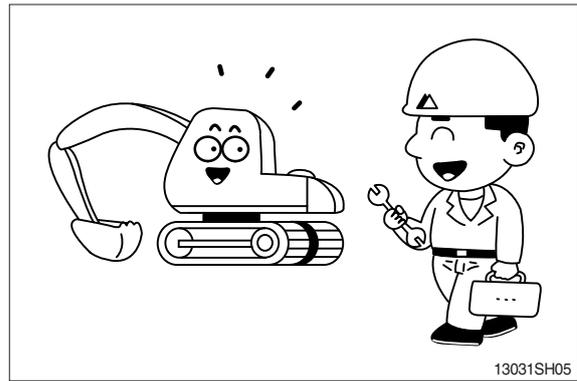
3. SYMBOLS

▲ Important safety hint.

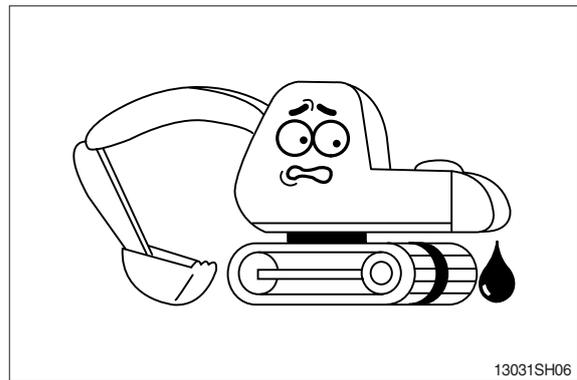
△ It indicates matters which can cause the great loss on the machine or the surroundings.

※ It indicates the useful information for operator.

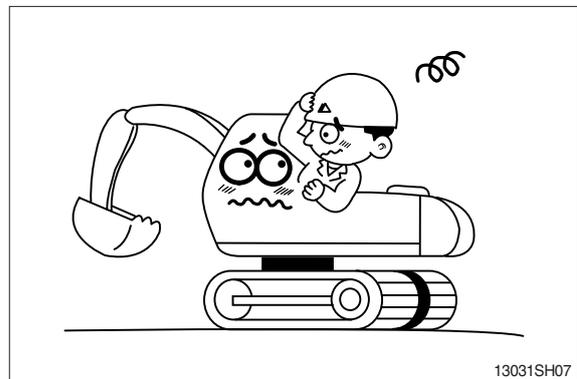
Check daily according to the operation manual.
Repair the damaged parts and tighten the loosened bolts.



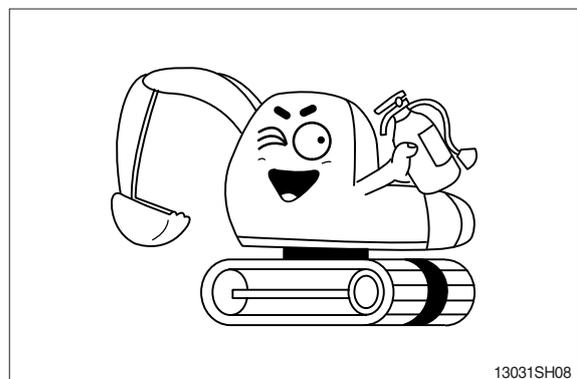
Check for leakage of engine oil, hydraulic oil, fuel and coolant.
Keep machine clean, clean machine regularly.



Do not operate the machine if it requires repairs.
Operate after complete repair.



Be prepared if a fire starts.
Keep a fire extinguisher handy and emergency numbers for a fire department near your telephone.



UNAUTHORIZED MODIFICATION

Any modification made without authorization from Hyundai can create hazards.

Before making a modification, consult your Hyundai distributor. Hyundai will not be responsible for any injury or damage caused by any unauthorized modification.

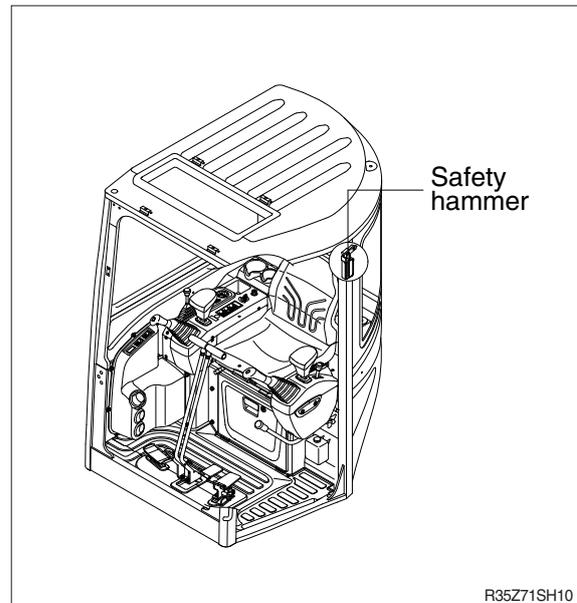
PREPARE FOR EMERGENCY

Only in case of emergency, use the installed hammer for breaking the windshield of the cab, and then exit carefully.

Have a fire extinguisher and first aid kit ready for emergencies such as fires or accidents.

Learn how to use the fire extinguisher.

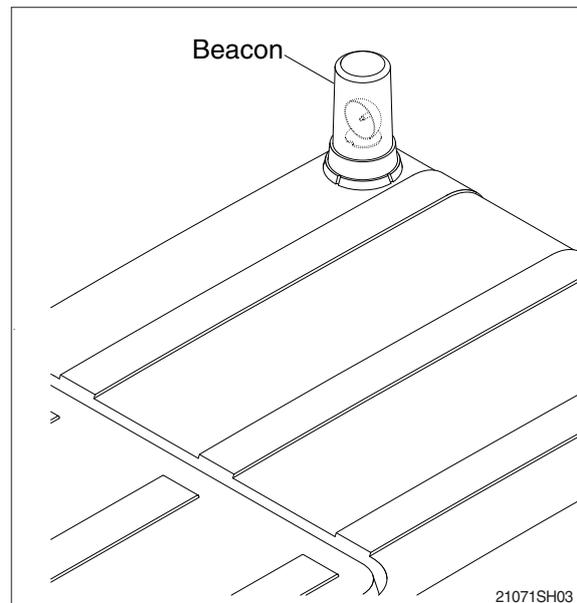
Be sure you know the phone numbers of persons you should contact in case of an emergency.



ROTATING BEACON

When you operate a machine on a road or beside a road, a rotating beacon is required to avoid any traffic accident.

Please contact your Hyundai distributor to install it.



PRECAUTIONS FOR ATTACHMENTS

When installing and using an optional attachment, read the instruction manual for the attachment and the information related to attachments in this manual.

Do not use attachments that are not authorized by Hyundai or your Hyundai distributor. Use of unauthorized attachments could create a safety problem and adversely affect the proper operation and useful life of the machine.

Any injuries, accidents, product failures resulting from the use of unauthorized attachments are not the responsibility of Hyundai.

SAFETY RULES

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

Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.

When working with another operator or a person on worksite traffic duty, be sure all personnel understand all hand signals that are to be used.

SAFETY FEATURES

Be sure all guards and covers are in their proper position. Have guards and covers repaired if damaged.

Use safety features such as safety lock and seat belts properly.

Never remove any safety features. Always keep them in good operating condition.

Improper use of safety features could result in serious bodily injury or death.

MACHINE CONTROL PATTERN

Check machine control pattern for conformance to pattern on label in cab.

If not, change label to match pattern before operating machine.

Failure to do so could result in injury.

FIRE PREVENTION AND EXPLOSION PREVENTION

Regeneration

The exhaust gas temperatures during regeneration will be elevated. Follow proper fire prevention instructions and use the disable regeneration function when appropriate.

General

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

To minimize the risk of fire or explosion, the following actions are recommended.

Always perform a Walk-Around Inspection, which may help you identify a fire hazard.

Do not operate a machine when a fire hazard exists. Contact your dealer for service.



3001SH01

Understand the use of the primary exit and alternative exit on the machine.

Do not operate a machine with a fluid leak. Repair leaks and clean up fluids before resuming machine operation. 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.

Do not weld on or drill holes in the engine cover. Flammable material such as leaves, twigs, papers, trash may accumulate in engine compartment.

Remove flammable material such as leaves, twigs, papers, trash and so on. These items may accumulate in the engine compartment or around other hot areas and hot parts on the machine.

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

Clean all accumulations of flammable materials such as fuel, oil, and debris from the machine.

Do not operate the machine near any flame.

Keep shields in place. Exhaust shields (if equipped) protect hot exhaust components from oil spray or fuel spray in a break in a line, in a hose, or in a seal. Exhaust shields must be installed correctly.

Do not weld or flame cut on tanks or lines that contain flammable fluids or flammable material. Empty and purge the lines and tanks. Then clean the lines and tanks with a nonflammable solvent prior to welding or flame cutting. Ensure that the components are properly grounded in order to avoid unwanted arcs.

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

Inspect all lines and hoses for wear or deterioration. Replace damaged lines and hoses. The lines and the hoses should have adequate support and secure clamps. Tighten all connections to the recommended torque. Damage to the protective cover or insulation may provide fuel for fires.

Store fuels and lubricants in properly marked containers away from unauthorized personnel. Store oily rags and flammable materials in protective containers. Do not smoke in areas that are used for storing flammable materials.



3001SH02

Use caution when you are fueling a machine. Do not smoke while you are fueling a machine. Do not fuel a machine near open flames or sparks. Always stop the engine before fueling. Fill the fuel tank outdoors. Properly clean areas of spillage.



Never store flammable fluids in the operator compartment of the machine.

3001SH03

Battery and battery cables

The following actions are recommended to minimize the risk of fire or an explosion related to the battery.



3001SH04

Do not operate a machine if battery cables or related parts show signs of wear or damage. Contact your dealer for service.

Follow safe procedures for engine starting with jump-start cables. Improper jumper cable connections can cause an explosion that may result in injury.

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

Gases from a battery can explode. Keep any open flames or sparks away from the top of a battery. Do not smoke in battery charging areas.

Never check the battery charge by placing a metal object across the terminal posts. Use a voltmeter in order to check the battery charge.

Daily inspect battery cables that are in areas that are visible. Inspect cables, clips, straps, and other restraint for damage. Replace any damaged parts. 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

Replace damaged battery cable (s) and replace any related parts. Eliminate any fouling, which may have caused insulation failure or related component damage or wear. Ensure that all components are reinstalled correctly.

An exposed wire on the battery cable may cause a short ground if the exposed area comes into contact with a grounded surface. A battery cable short produces heat from the battery current, which may be a fire hazard.

An exposed wire on the ground cable between the battery and the disconnect switch may cause the disconnect switch to be bypassed if the exposed area comes into contact with a grounded surface. This action may result in an unsafe condition for servicing the machine. Repair components or replace components before servicing the machine.

▲ Fire on a machine can result in personal injury or death. Exposed battery cables that come into contact with a grounded connection can result in fires. Replace cables and related parts that show signs of wear or damage. Contact your Hyundai Heavy Industries dealer.

Wiring

Check electrical wires daily. If any of the following conditions exist, replace parts before you operate the machine.

- Fraying
- Signs of abrasion or wear
- Cracking
- Discoloration
- Cuts on insulation
- Other damage

Make sure that all clamps, guards, clips, and straps are reinstalled correctly. This action will help to prevent vibration, rubbing against other parts, and excessive heat during machine operation.

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

Consult your Hyundai Heavy Industries dealer for repair or for replacement parts.

Keep wiring and electrical connections free of debris.

Lines, Tubes, and Hoses

Do not bend high-pressure lines. Do not strike high-pressure lines. Do not install any lines that are bent or damaged. Use the appropriate backup wrenches in order to tighten all connections to the recommended torque.

Check lines, tubes, and hoses carefully. Wear Personal Protection Equipment (PPE) in order to check for leaks. Always use a board or cardboard when you check for a leak. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

Replace the affected parts if any of the following conditions are present :

- End fittings are damaged or leaking.
- Outer coverings are chafed or cut.
- Wires are exposed.
- Outer coverings are swelling or ballooning.
- Flexible parts of the hoses are kinked.
- Outer covers have exposed embedded armoring.
- End fittings are displaced.

Make sure that all clamps, guards, and heat shields are installed correctly. During machine operation, this action will help to prevent vibration, rubbing against other parts, excessive heat, and failure of lines, tubes, and hoses.

Do not operate a machine when a fire hazard exists. Repair any lines that are corroded, loose, or damaged. Leaks may provide fuel for fires. Consult your Hyundai Heavy Industries dealer for repair or for replacement parts.

Ether

Ether (if equipped) is commonly used in cold weather applications. Ether is flammable and poisonous.

Do not spray ether manually into an engine if the machine is equipped with a thermal starting aid for cold weather starting.

Use ether in ventilated areas. Do not smoke while you are replacing an ether cylinder or while you are using an ether spray.

Do not store ether cylinders in living areas or in the operator compartment of a machine. Do not store ether cylinders in direct sunlight or in temperatures above 49°C(120.2 °F). Keep ether cylinders away from unauthorized personnel.

Fire Extinguisher

As an additional safety measure, keep a fire extinguisher on the machine.

Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher regularly. Follow the recommendations on the instruction plate.

Consider installation of an aftermarket Fire Suppression System, if the application and working conditions warrant the installation.

Fire Safety

※ **Locate secondary exits and how to use the secondary exits before you operate the machine.**

※ **Locate fire extinguishers and 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. The following actions should only be performed if the actions do not present a danger or risk to you and any nearby people. At all times you should assess the risk of personal injury and move away to a safe distance as soon as you feel unsafe.

Move the machine away from nearby combustible material such as fuel/oil stations, structures, trash, mulch and timber.

Lower any implements and turn off the engine as soon as possible. If you leave the engine running, the engine will continue to feed a fire. The fire will be fed from away damaged hoses that are attached to the engine or pumps.

If possible, turn the battery disconnect switch to the OFF position. Disconnecting the battery will remove the ignition source in the event of an electrical short. Disconnecting the battery will eliminate a second ignition source if electrical wiring is damaged by the fire, resulting in a short circuit.

Notify emergency personnel of the fire and your location.

If your machine is equipped with a fire suppression system, follow the manufacturers procedure for activating the system.

※ **Fire suppression systems need to be regularly inspected by qualified personnel. You must be trained to operate the fire suppression system.**

Use the on-board fire extinguisher and use the following procedure :

1. Pull the pin.
2. Aim the extinguisher or nozzle at the base of the fire.
3. Squeeze the handle and release the extinguishing agent.
4. Sweep the extinguisher from side to side across the base of the fire until the fire is out.

Remember, if you are unable to do anything else, shut off the machine before exiting. By shutting off the machine, fuels will not continue to be pumped into the fire.

If the fire grows out of control, be aware of the following risks :

- Tires on wheeled machines pose a risk of explosion as tires burn. Hot shrapnel and debris can be thrown great distances in an explosion.
- Tanks, accumulators, hoses, and fittings can rupture in a fire, spraying fuels and shrapnel over a large area.

Remember that nearby 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.

Fire extinguisher Location

Make sure that a fire extinguisher is available. Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher. Obey the recommendations on the instruction plate.

Mount the fire extinguisher in the accepted location per local regulations.

If your machine is equipped with a ROPS structure, strap the mounting plate to the ROPS in order to mount the fire extinguisher. If the weight of the fire extinguisher exceeds 4.5 kg (10 lb), mount the fire extinguisher near the bottom of the ROPS. Do not mount the fire extinguisher at the upper one-third area on the ROPS.

Do not weld the ROPS structure in order to install the fire extinguisher. Also, do not drill holes in the ROPS structure in order to mount the fire extinguisher on the ROPS.

Consult your Hyundai Heavy Industries dealer for the proper procedure for mounting the fire extinguisher.

THE EUROPEAN UNION PHYSICAL AGENTS (VIBRATION) DIRECTIVE 2002/44/EC

Vibration Data for Earth-moving Machines

Information Concerning Hand/Arm Vibration Level

When the machine is operated according to the intended use, the hand/arm vibration of this machine is below 2.5 m/s².

Information Concerning Whole Body Vibration Level

The highest root mean square value of weighted acceleration to which the whole body is subjected, is less than 0.5 m/s².

This section provides vibration data and a method for estimating the vibration level for earth moving machines.

Vibration levels are influenced by many different parameters. Many items are listed below.

- Operator training, behavior, mode and stress
- Job site organization, preparation, environment, weather and material
- Machine type, quality of the seat, quality of the suspension system, attachments and condition of the equipment

It is not possible to get precise vibration levels for this machine. The expected vibration levels can be estimated with the information in below Table in order to calculate the daily vibration exposure. A simple evaluation of the machine application can be used.

Estimate the vibration levels for the three vibration directions. For typical operating conditions, use the average vibration levels as the estimated level. With an experienced operator and smooth terrain, subtract the Scenario Factors from the average vibration level. For aggressive operations and severe terrain, add the Scenario Factors to the average vibration level in order to obtain the estimated vibration level.

※ All vibration levels are in meter per second squared.

ISO Reference Table A – Equivalent vibration levels of whole body vibration emission for earthmoving equipment.

Machine family	Machine kind	Typical operating condition	Vibration Levels			Scenario Factors		
			X axis	Y axis	Z axis	X axis	Y axis	Z axis
Excavator	Compact crawler excavator	Excavating	0.33	0.21	0.19	0.19	0.12	0.10
		Hydraulic breaker app.	0.49	0.28	0.36	0.20	0.13	0.17
		Transfer movement	0.45	0.39	0.62	0.17	0.18	0.28
	Crawler excavator	Excavating	0.44	0.27	0.30	0.24	0.16	0.17
		Hydraulic breaker app.	0.53	0.31	0.55	0.30	0.18	0.28
		Mining application	0.65	0.42	0.61	0.21	0.15	0.32
		Transfer movement	0.48	0.32	0.79	0.19	0.20	0.23
	Wheeled excavator	Excavating	0.52	0.35	0.29	0.26	0.22	0.13
Transfer movement		0.41	0.53	0.61	0.12	0.20	0.19	

ISO Reference Table A – Equivalent vibration levels of whole body vibration emission for earthmoving equipment.

Machine family	Machine kind	Typical operating condition	Vibration Levels			Scenario Factors		
			X axis	Y axis	Z axis	X axis	Y axis	Z axis
Loader	skid steer loader (tracks)	V-shaped motion	1.21	1.00	0.82	0.30	0.84	0.32
	Wheel backhoe loader	Excavating	0.28	0.26	0.20	0.09	0.16	0.06
	Wheel loader	Load and carry motion	0.84	0.81	0.52	0.23	0.20	0.14
		Mining application	1.27	0.97	0.81	0.47	0.31	0.47
		Transfer movement	0.76	0.91	0.49	0.33	0.35	0.17
		V-shape motion	0.99	0.84	0.54	0.29	0.32	0.14

※ Refer to “ISO/TR 25398 Mechanical Vibration-Guideline for the assessment of exposure to whole body vibration of ride on operated earthmoving machines” for more information about vibration. This publication uses data that is measured by international institutes, organizations and manufacturers. This document provides information about the whole body exposure of operators of earthmoving equipment.

Guidelines for Reducing Vibration Levels on Earthmoving Equipment

Properly adjust machines. Properly maintain machines. Operate machines smoothly. Maintain the conditions of the terrain. The following guidelines can help reduce the whole body vibration level :

1. Use the right type and size of machine, equipment, and attachments.
2. Maintain machines according to the manufacturer's recommendations.
 - a. Tire pressures
 - b. Brake and steering systems
 - c. Controls, hydraulic system and linkages
3. Keep the terrain in good condition.
 - a. Remove any large rocks or obstacles.
 - b. Fill any ditches and holes.
 - c. Provide machines and schedule time in order to maintain the conditions of the terrain.
4. Use a seat that meets "ISO 7096". Keep the seat maintained and adjusted.
 - a. Adjust the seat and suspension for the weight and the size of the operator.
 - b. Inspect and maintain the seat suspension and adjustment mechanisms.
5. Perform the following operations smoothly.
 - a. Steer
 - b. Brake
 - c. Accelerate
 - d. Shift the gears.
6. Move the attachments smoothly.
7. Adjust the machine speed and the route in order to minimize the vibration level.
 - a. Drive around obstacles and rough terrain.
 - b. Slow down when it is necessary to go over rough terrain.
8. Minimize vibrations for a long work cycle or a long travel distance.
 - a. Use machines that are equipped with suspension systems.
 - b. Use the ride control system on machines.
 - c. If no ride control system is available, reduce speed in order to prevent bounce.
 - d. Haul the machines between workplaces.
9. Less operator comfort may be caused by other risk factors. The following guidelines can be effective in order to provide better operator comfort:
 - a. Adjust the seat and adjust the controls in order to achieve good posture.
 - b. Adjust the mirrors in order to minimize twisted posture.
 - c. Provide breaks in order to reduce long periods of sitting.
 - d. Avoid jumping from the cab
 - e. Minimize repeated handling of loads and lifting of loads.
 - f. Minimize any shocks and impacts during sports and leisure activities.

Sources

The vibration information and calculation procedure is based on "ISO/TR 25398 Mechanical Vibration-Guideline for whole body vibration exposure of operators of earthmoving equipment. The method is based on measured vibration emission under real working conditions for all machines.

You should check the original directive. This document summarizes part of the content of the applicable law. This document is not meant to substitute the original sources. Other parts of these documents are based on information from the United Kingdom Health and Safety Executive.

MODIFICATIONS

Modifications to the machine, including use of unauthorized accessories and spare parts, may affect the machine's condition and its ability to function as it was designed. No changes of any kind may be performed without first obtaining written approval from Hyundai Heavy Industries. Hyundai Heavy Industries reserves the right to refuse all warranty claims that have resulted due to or can be attributed to unauthorized modifications.

Never modify the operator's cabin by welding, grinding, drilling holes or adding attachments unless instructed by Hyundai Heavy Industries in writing. Changes to the cabin can cause loss of operator protection from roll-over and falling objects, and result in death or serious injury.

The person who performs unauthorized modifications assumes all responsibility for consequences that arise due to the modification or can be attributed to the modification, including damage to the machine.

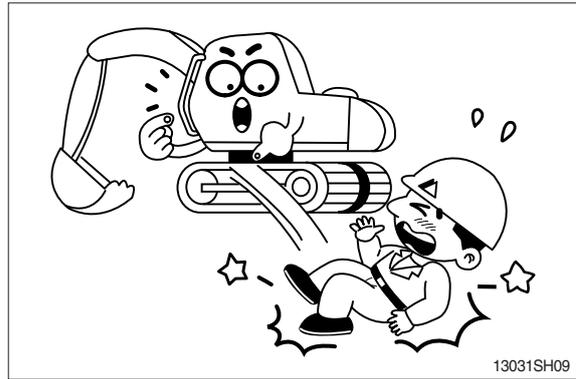
Modifications may be considered to be officially approved, if at least one of the following conditions has been met :

1. The attachment, the accessory, or the spare part has been made or distributed by Hyundai Heavy Industries and has been installed according to approved methods described in a publication available from Hyundai Heavy Industries; or
2. The modification has been approved in writing by the Engineering Department at each product company within Hyundai Heavy Industries.

2. DURING OPERATING THE MACHINE

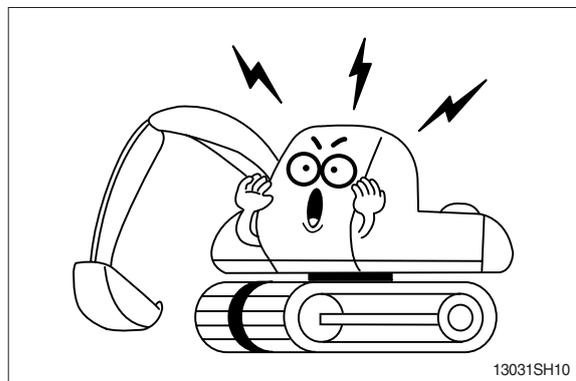
Use the handle and footstep when getting on or off the machine.

Do not jump on or off the machine.



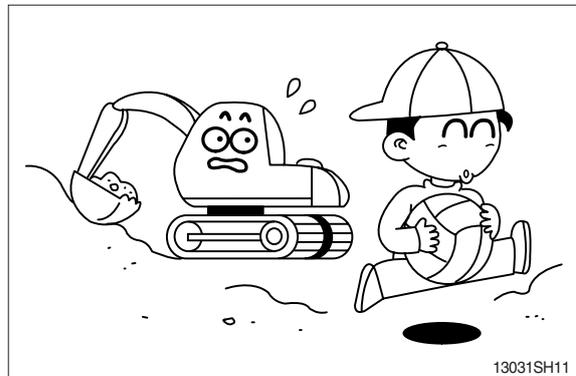
Sound the horn to warn nearby personnel before operating the machine.

Remove all the obstacles like frost on the window before operating the machine for the good visibility.



Operate carefully to make sure all personnel or obstacles are clear within the working range of the machine.

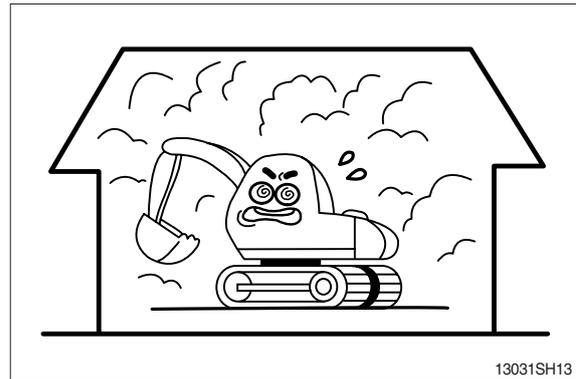
Place safety guards if necessary.



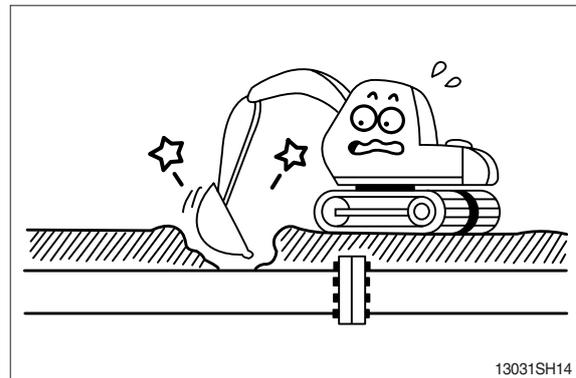
When using the work equipment, pay attention to job site.



Provide proper ventilation when operating engine in a closed area to avoid the danger of exhaust gases.



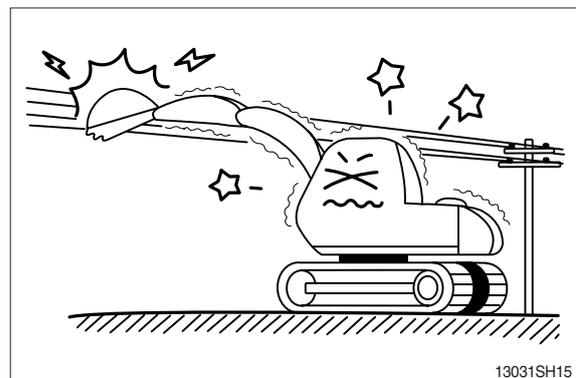
Check the locations of underground gas pipes or water line and secure the safety before operation.



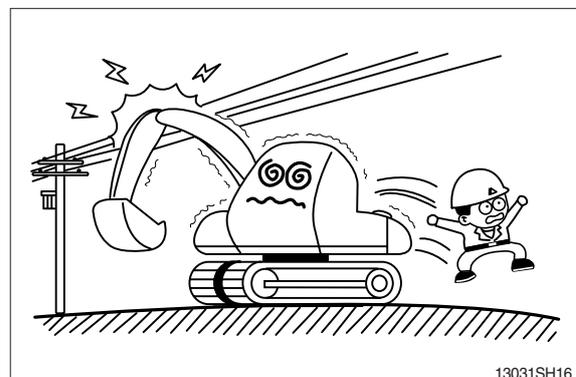
The operating near the electrical lines is very dangerous.

Operate within safe working range permitted as below.

Supply voltage	Min safe separation
6.6 kV	3m (10 ft)
33.0 kV	4m (13 ft)
66.0 kV	5m (16 ft)
154.0 kV	8m (26 ft)
275.0 kV	10m (33 ft)

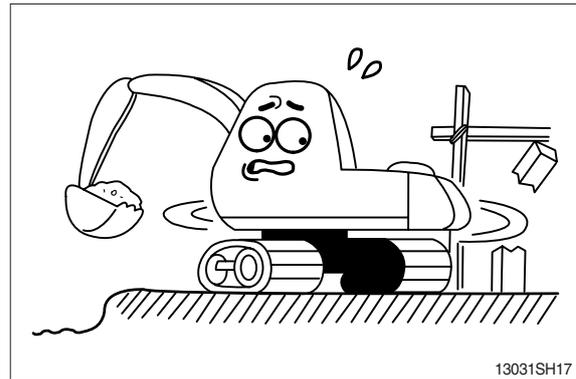


If the machine touches the electric power lines, keep sitting on the operator's seat and make sure the personnel on the ground not to touch the machine until turning off the electric current. Jump off the machine without contacting the machine when you need to get off.

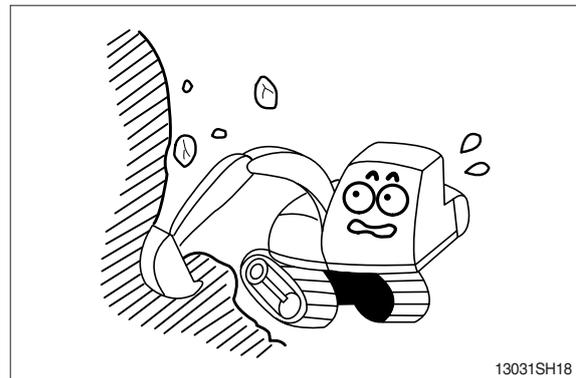


Watch out for obstacles.

Be particularly careful to check the machine clearance during the swing.

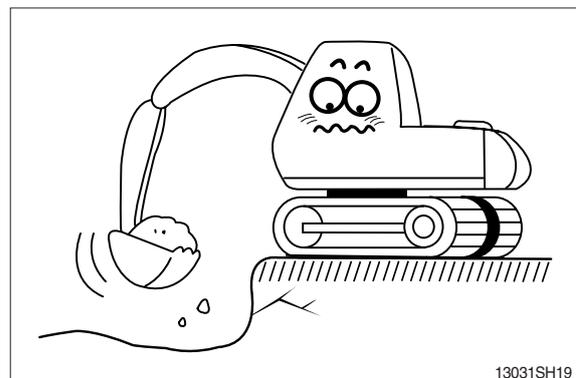


When using the machine as breaker or working in a place where stones may fall down, cab roof guard and head guard should be provided for proper protection.



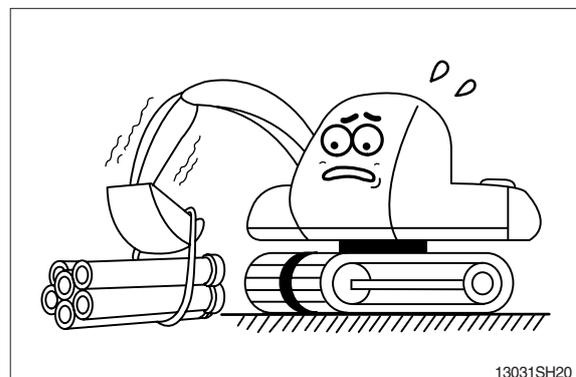
Avoid operating on a cliff or soft ground as there is danger of rolling over.

Make sure to get off easily as keeping the track at a right angle and putting the travel motor into the backward position when working on a cliff or soft ground inevitably.

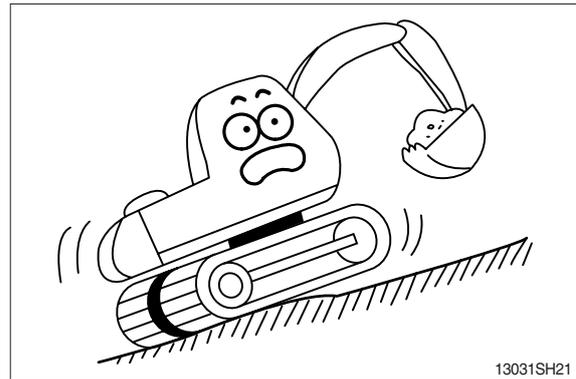


Operate for the lifting work considering the capacity of machine, weight and width of the load.

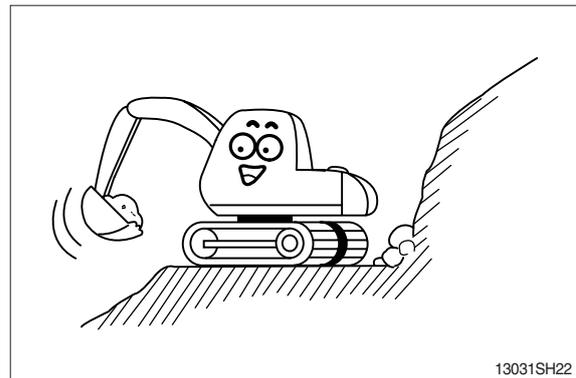
Be careful not to lift exceeding the machine capacity as it can be the cause of machine damage and safety accident.



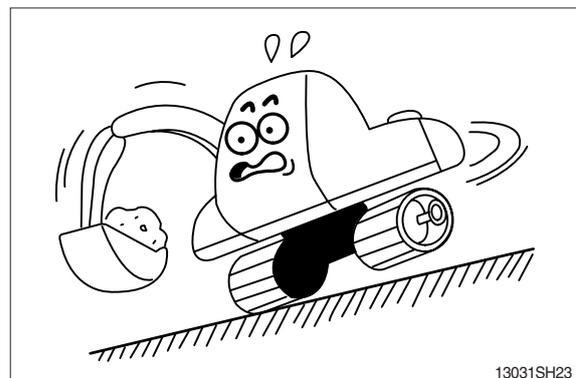
The operation on a slope is dangerous.
Avoid operating the machine on a slope of over
10 degree.



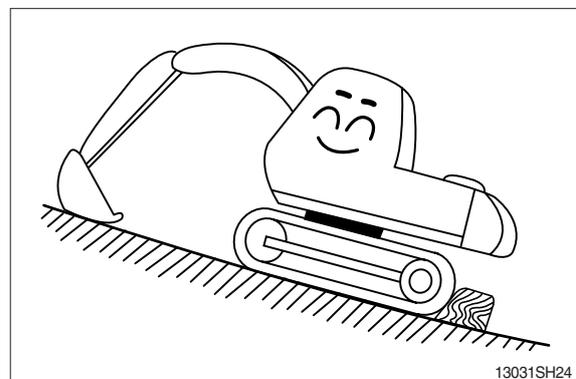
Operate the machine after making ground flat
when operation is required on a slope.



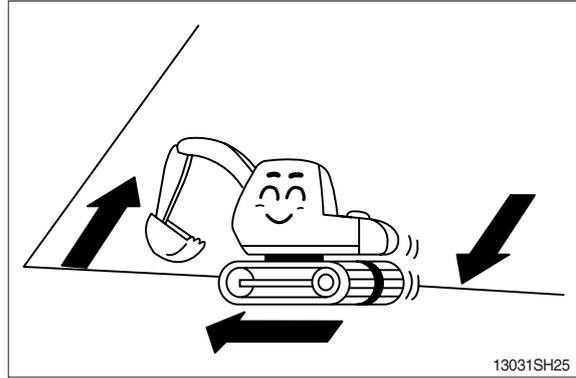
The swing on the slope can be danger of rolling
over.
Do not operate to swing the machine with the
bucket loaded on a slope since the machine
may lose its balance under such an instance.



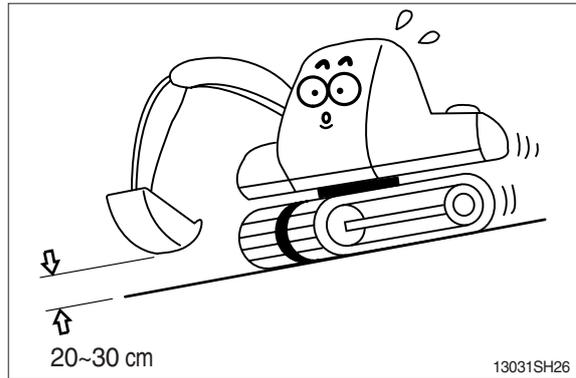
Avoid parking and stopping on a slope.
Lower the bucket to the ground and block the
track when parking.



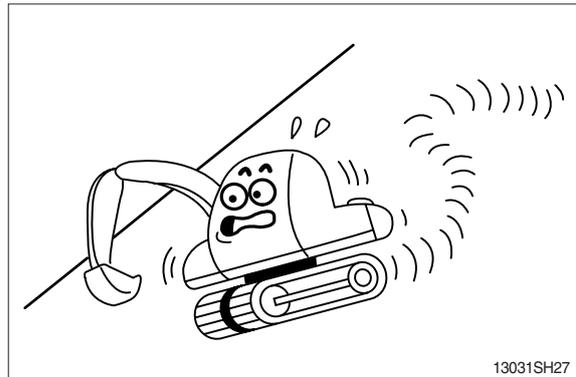
Avoid traveling in a cross direction on a slope as it can cause the danger of rolling over and sliding.



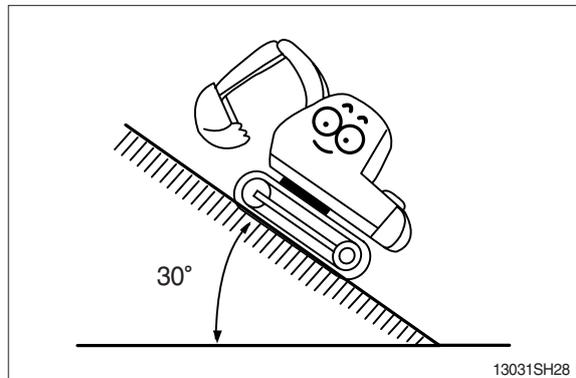
Traveling on a slope is dangerous. Be sure to operate slowly when traveling down a slope and maintain the bucket at a height of 20~30 cm (1 ft) above the ground so that it can be used as brake in an emergency.



Steering of the machine while traveling on a slope is dangerous. When an inevitable turning of direction is required, turn on the flat and solid ground.

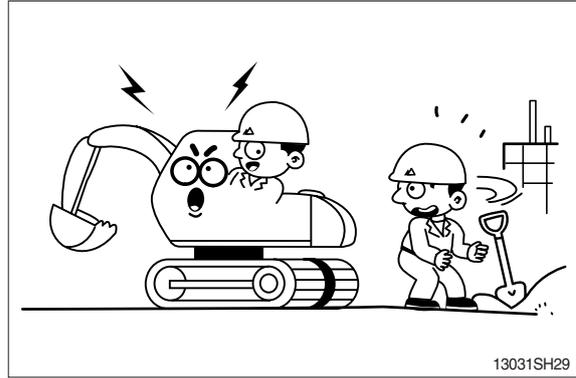


The engine angularity limits are 30 degree. Do not operate by more than the engine limits in any case.

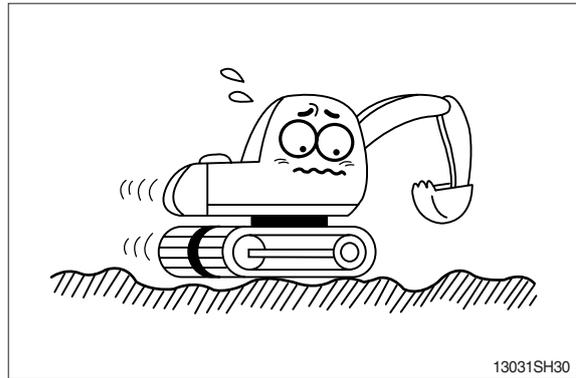


Before traveling the machine, sound the horn to warn nearby personnel.

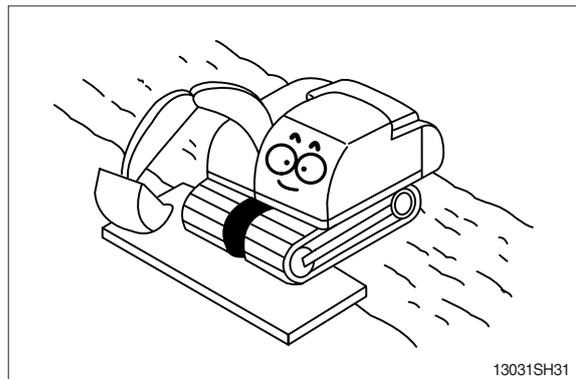
Operate forward and backward correctly with confirming the location of the travel motor.



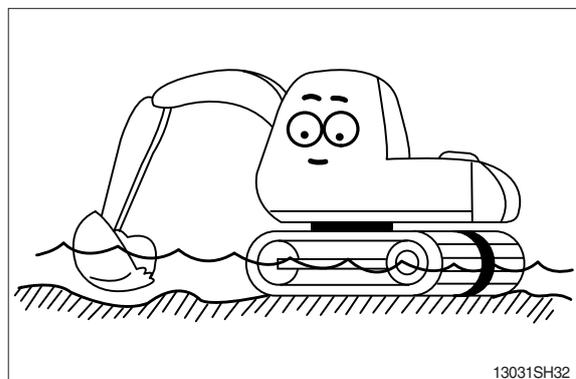
Slow down when traveling through obstacles or uneven ground.



When working on soft ground, place mats or wood boards on the ground to prevent the machine sinking.



When operating in water or when crossing shallow, check the bed soil condition and depth and flow speed of water, then proceed taking care that water is not above carrier roller.



MOUNTING AND DISMOUNTING

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

When mounting or dismounting, always face the machine and use the handrails, machine and track shoes.

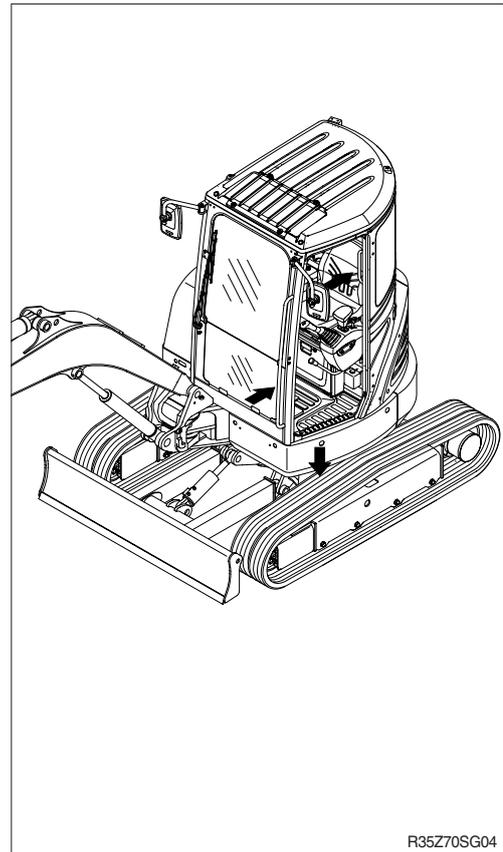
Do not hold any control levers when getting on or off the machine.

Ensure safety by always maintaining at least three-point contact of hands and feet with the handrails, and track shoes.

Always remove any oil or mud from the handrails and track shoes. If they are damaged, repair them and tighten any loose bolts.

If grasping the door handrail when mounting or dismounting or moving on the track, open and lock the door securely in the open position.

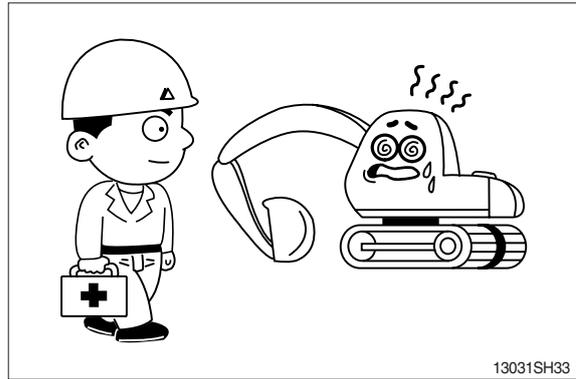
Otherwise, the door may move suddenly, causing you to lose balance and fall.



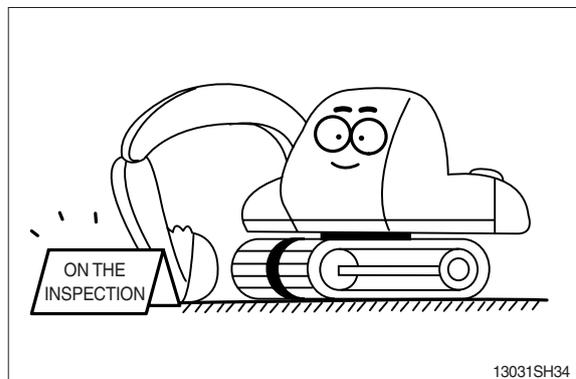
3. DURING MAINTENANCE

Stop the engine immediately when the trouble of the machine is found.

Inspect immediately the cause of trouble such as vibration, overheating and trouble in the cluster then repair.



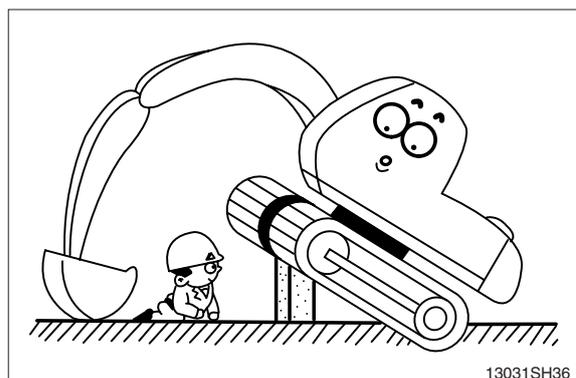
Park on a flat place and stop the engine for inspecting and repairing. Properly TAG machine is not operational. (Remove start key)
Extreme care shall be taken during maintenance work. Parts may require additional safe guard.



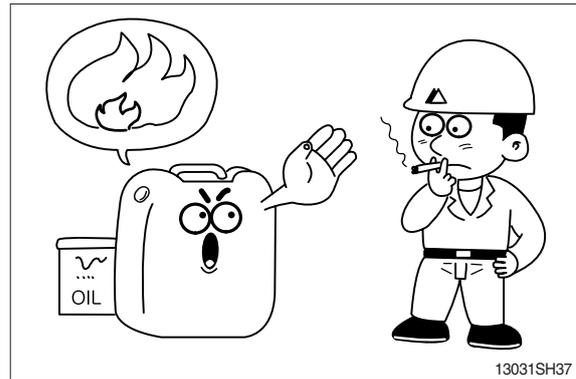
Do not remove the radiator cap from hot engine. Open the cap after the engine cools, below 50°C(112°F) to prevent personal injury from heated coolant spray or steam.



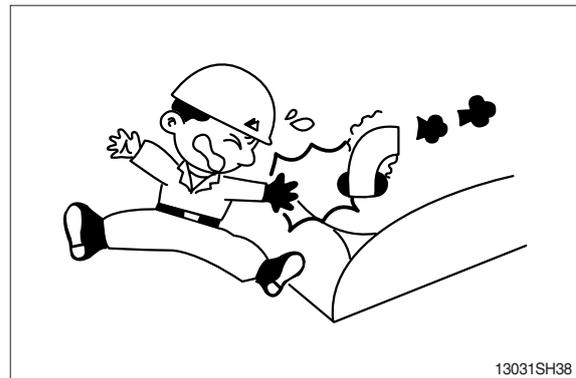
Do not work below the machine.
Be sure to work with proper safety supports.
Do not depend on the hydraulic cylinders to hold up the equipment and attachment.



There is the danger of fire in fuel and oil.
Store in cool and dry area, away from any open flames.



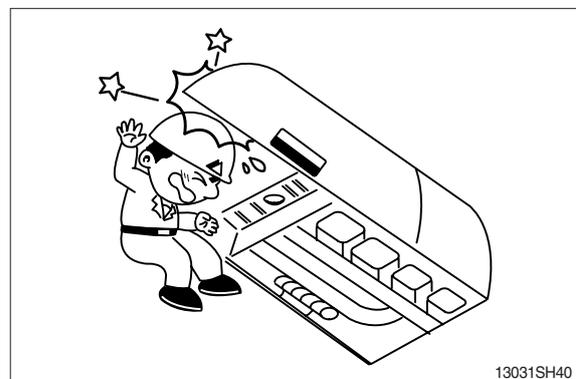
Do not touch exhaust pipe, or may cause severe burn.



Do not open the engine hood and covers while the engine is running.

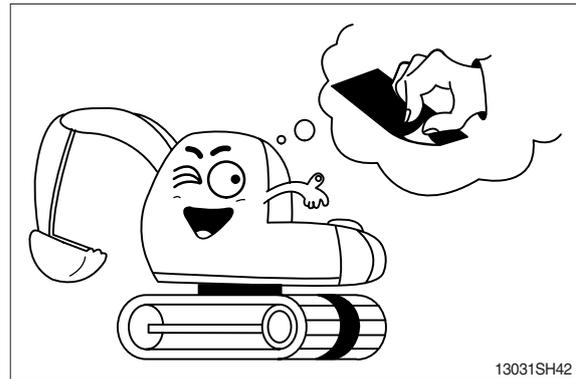


Be careful of not hitting the edges when you service engine.

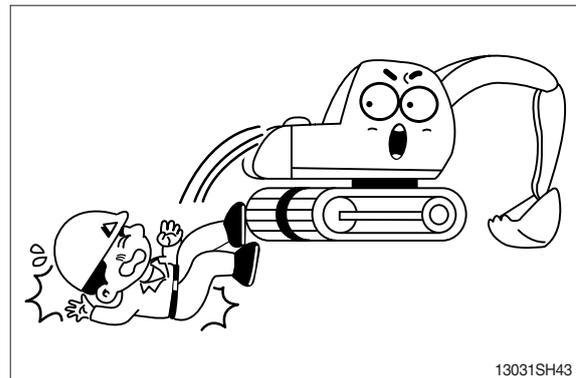


The antislip protection should be replaced if they have become worn or have been printed over.

Be sure to free of oil, water and grease etc.



Be careful of not touching slip, fall down etc., when you work at the upper frame to service engine and/or other component.

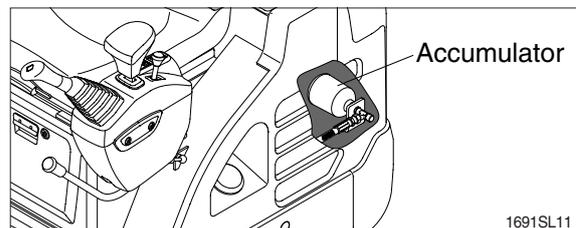


HIGH PRESSURE GAS

Contain high pressure gas.

To avoid explosion and personal injury, do not expose to fire, do not weld, do not drill.

Relieve pressure before discharging.



LIFT EYES CAN FAIL

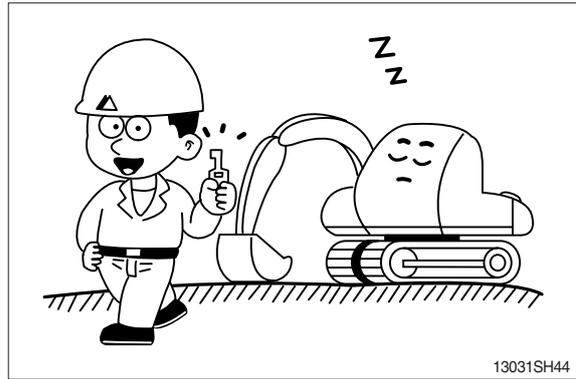
Lift eyes or tank can fail when lifting tank containing fluids resulting in possible personal injury.

Drain tank of all fluids before lifting.

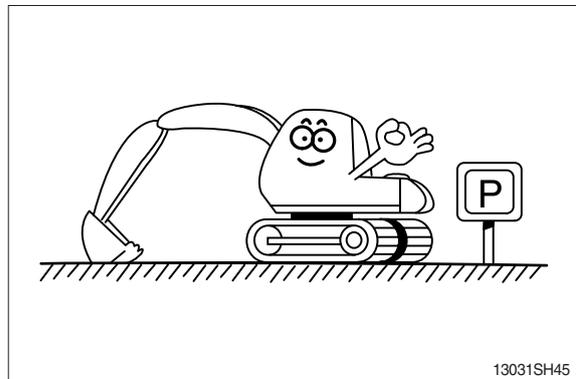
4. PARKING

When leaving the machine after parking, lower the bucket to the ground completely and put the safety lever at parking position then remove the key.

Lock the cab door.

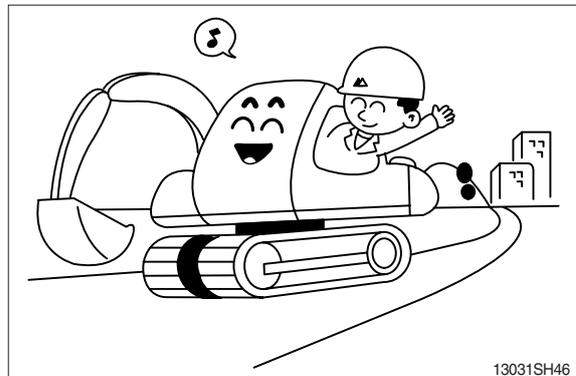


Park the machine in the flat and safe place.



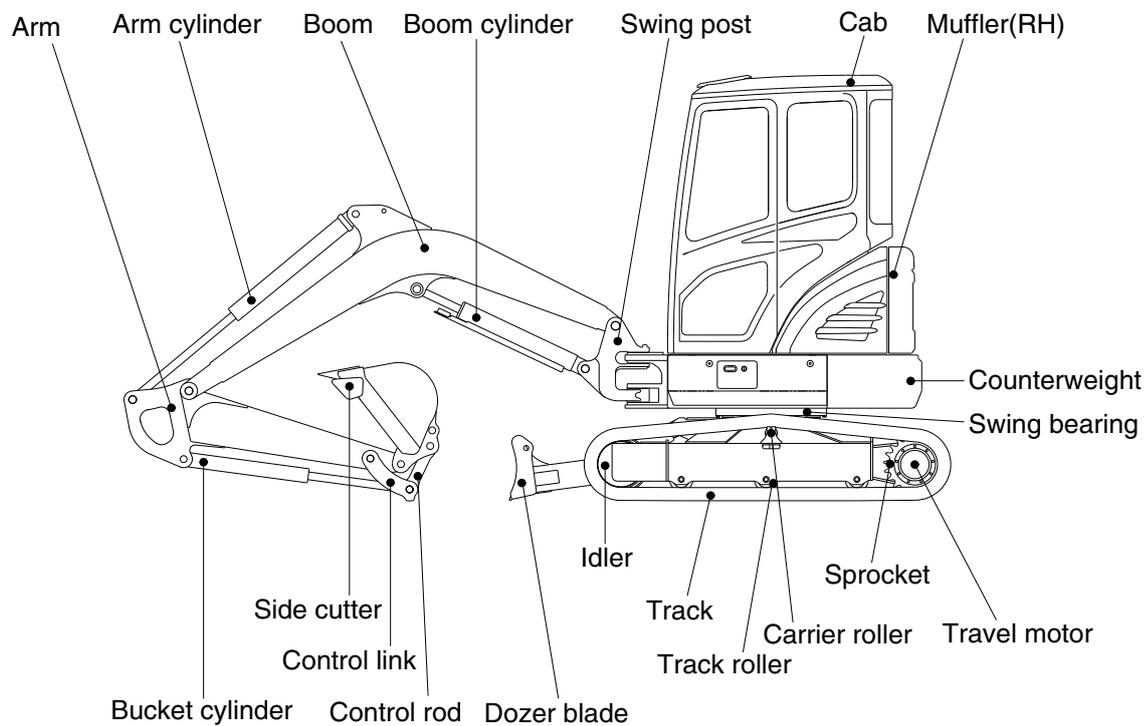
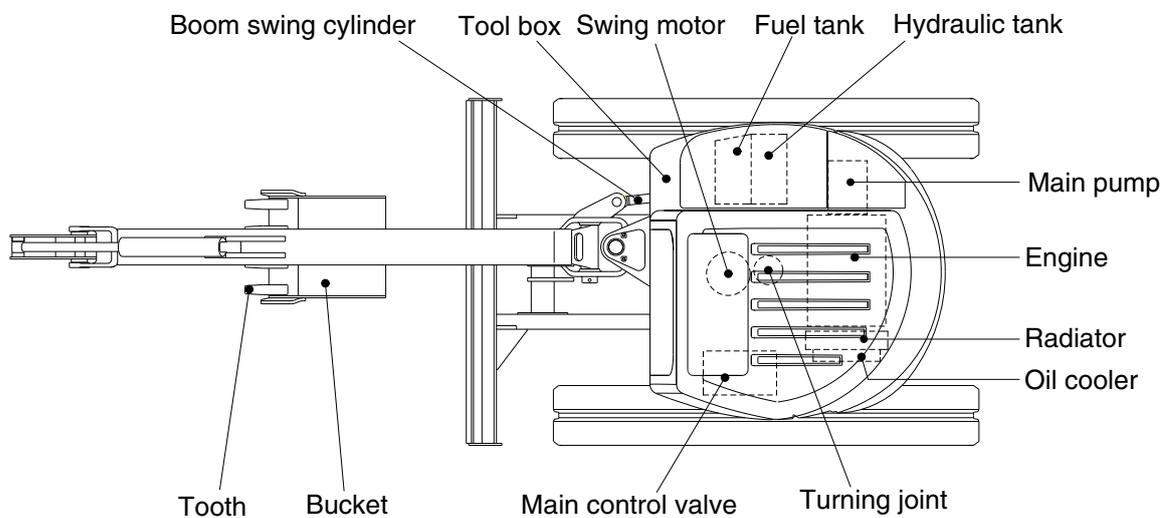
Hope you can work easily and safely observing safety rules.

For safe operation, observe all safety rules.



SPECIFICATIONS

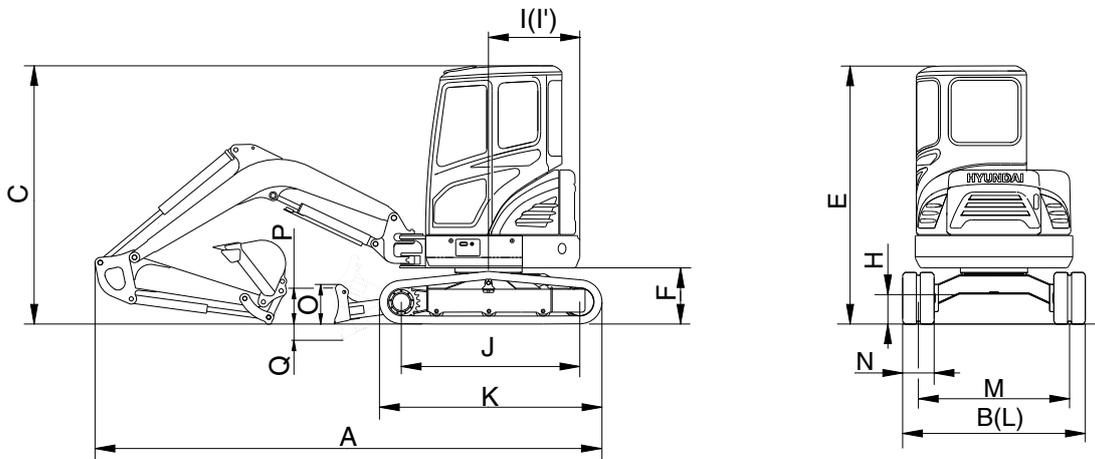
1. MAJOR COMPONENT



30Z9AK2SP01

2. SPECIFICATIONS

1) 2.03 m (6' 8") MONO BOOM, 1.12 m (3' 8") ARM, WITH BOOM SWING POST

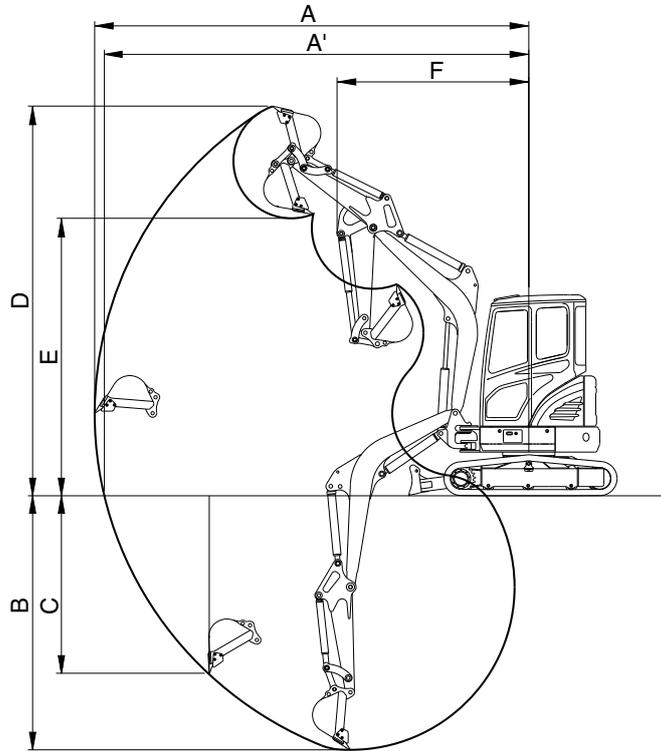


30Z9AK2SP02

Description		Unit	Specification
Operating weight (cabin / canopy)		kg (lb)	3005 (6620) / 2895 (6380)
Bucket capacity (SAE heaped), standard		m ³ (yd ³)	0.08 (0.10)
Overall length	A	mm (ft-in)	4180 (13' 3")
Overall width, with 300 mm shoe	B		1550 (5' 1")
Overall height (cabin / canopy)	C		2485 (8' 2") / 2465 (8' 1")
Overall height of (cabin / canopy)	E		2485 (8' 2") / 2465 (8' 1")
Ground clearance of counterweight	F		540 (1' 9")
Minimum ground clearance	H		290 (0' 11")
Rear-end distance	I		775 (2' 7")
Rear-end swing radius	I'		775 (2' 7")
Distance between tumblers	J		1550 (4' 11")
Undercarriage length	K		1970 (6' 6")
Undercarriage width	L		1500 (4' 11")
Track gauge	M		1250 (4' 1")
Track shoe width, standard	N		300 (9.8")
Height of blade	O		300 (1' 0")
Ground clearance of blade up	P		350 (1' 2")
Depth of blade down	Q		370 (1' 3")
Travel speed (low/high)			km/hr (mph)
Swing speed		rpm	9.1
Gradeability		Degree (%)	30 (58)
Ground pressure 300 mm rubber shoe (cab / canopy)		kgf/cm ² (psi)	0.27 (3.84) / 0.26 (3.70)

3. WORKING RANGE

1) 2.03 m (6' 8") MONO BOOM WITH BOOM SWING POST



30Z9AK2SP03

Description		1.12 m (3' 8") Arm
Max digging reach	A	4650 mm (15' 3")
Max digging reach on ground	A'	4515 mm (14' 10")
Max digging depth	B	2500 mm (8' 2")
Max vertical wall digging depth	C	2085 mm (6' 10")
Max digging height	D	4270 mm (14' 10")
Max dumping height	E	2890 mm (9' 6")
Min swing radius	F	2055 mm (6' 9")
Boom swing radius (left/right)		75°/50°
Bucket digging force	SAE	17.9 kN
		1830 kgf
		4030 lbf
	ISO	20.1 kN
		2050 kgf
		4520 lbf
Arm crowd force	SAE	13.1 kN
		1340 kgf
		2950 lbf
	ISO	13.7 kN
		1400 kgf
		3090 lbf

4. WEIGHT

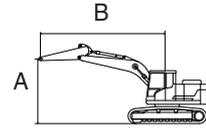
Item	kg	lb
Upperstructure assembly	1640	3620
Main frame weld assembly	310	684
Engine assembly	136	300
Main pump assembly	19	42
Main control valve assembly	25	55
Swing motor assembly	34	75
Hydraulic oil tank assembly	35	77
Fuel tank assembly	15	33
Boom swing post	80	180
Counterweight	230	507
Cab assembly	210	460
Lower chassis assembly	910	2010
Track frame weld assembly	400	880
Swing bearing	50	110
Travel motor assembly	36	80
Turning joint	11	24
Track recoil spring	14	31
Idler	21	45
Carrier roller	3	7
Track roller	10	22
Sprocket	7	15
Rubber track (300 mm)	149	328
Dozer blade assembly	125	275
Front attachment assembly (2.03 m boom, 1.12 m arm, 0.08 m ³ SAE heaped bucket)	330	730
2.03 m boom assembly	94	207
1.12 m arm assembly	54	119
0.08 m ³ SAE heaped bucket	62	137
Boom cylinder assembly	26	57
Arm cylinder assembly	26	57
Bucket cylinder assembly	20	44
Bucket control link assembly	20	45
Dozer cylinder assembly	24	53
Boom swing cylinder assembly	23	51

5. LIFTING CAPACITIES

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R30Z-9AK	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1120	220	250	-	Down	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree



Lift-point height (A)		Lift-point radius (B)										At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach
														
3.5 m (11.5 ft)	kg lb											*720 *1590	560 1230	2.64 (8.6)
3.0 m (9.8 ft)	kg lb					*690 *1520	460 1010					*620 *1370	410 900	3.20 (10.5)
2.5 m (8.2 ft)	kg lb					*690 *1520	460 1010	*700 *1540	350 770			*580 *1280	340 750	3.55 (11.7)
2.0 m (6.6 ft)	kg lb			*830 *1830	600 1320	*760 *1680	450 990	*720 *1590	350 770			*570 *1260	300 660	3.78 (12.4)
1.5 m (4.9 ft)	kg lb			*1060 *2340	570 1260	*870 *1920	430 950	*780 *1720	340 750			*580 *1280	280 620	3.91 (12.8)
1.0 m (3.3 ft)	kg lb			*1300 *2870	550 1210	*990 *2180	420 930	*840 *1850	330 740			*600 *1320	270 600	3.95 (13.0)
0.5 m (1.6 ft)	kg lb			*1450 *3200	530 1170	*1090 *2400	400 880	*890 *1960	320 710			*650 *1430	270 600	3.91 (12.8)
Ground Line	kg lb	*1550 *3420	730 1610	*1500 *3310	520 1150	*1130 *2490	400 880	*900 *1980	320 710			*740 *1630	290 640	3.78 (12.4)
-0.5 m (-1.6 ft)	kg lb	*2020 *4450	730 1610	*1450 *3200	510 1120	*1100 *2430	390 860	*850 *1870	320 710			*820 *1810	310 680	3.56 (11.7)
-1.0 m (-3.3 ft)	kg lb	*1770 *3900	740 1630	*1300 *2870	520 1150	*970 *2140	400 880					*840 *1850	360 790	3.21 (10.5)
-1.5 m (-4.9 ft)	kg lb	*1330 *2930	750 1650	*950 *2090	530 1170							*830 *1830	490 1080	2.66 (8.7)

Note 1. Lifting capacity are based on SAE J1097 and ISO 10567.

- Lifting capacity does not exceed 75% of tipping load with the machine on firm, level ground or 87% of full hydraulic capacity.
- The load point is a hook located on the back of the bucket.
- *Indicates load limited by hydraulic capacity.

※ Lifting capacities are based upon a standard machine conditions.

Lifting capacities will vary with different work tools, ground conditions and attachments.

The difference between the weight of a work tool attachment must be subtracted.

Consult your Hyundai dealer regarding the lifting capacities for specific work tools and attachments.

※ Please be aware of the local regulations and instructions for lifting operations.

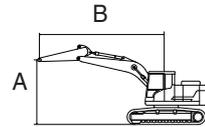
▲ Failure to comply to the rated load can cause possible personal injury or property damage.

Make adjustments to the rated load as necessary for non-standard configurations.

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R30Z-9AK	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1120	220	250	-	Up	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree

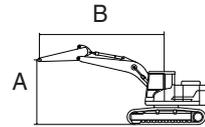


Lift-point height (A)		Lift-point radius (B)										At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach
														m (ft)
3.5 m (11.5 ft)	kg lb											660 1460	530 1170	2.64 (8.6)
3.0 m (9.8 ft)	kg lb					530 1170	430 950					480 1060	380 840	3.20 (10.5)
2.5 m (8.2 ft)	kg lb					530 1170	430 950	410 900	330 730			400 880	320 710	3.55 (11.7)
2.0 m (6.6 ft)	kg lb			710 1570	560 1230	520 1150	420 930	400 880	320 710			350 770	280 620	3.78 (12.4)
1.5 m (4.9 ft)	kg lb			680 1500	530 1170	510 1120	400 880	400 880	320 710			330 730	260 570	3.91 (12.8)
1.0 m (3.3 ft)	kg lb			650 1430	510 1120	490 1080	390 860	390 860	310 680			320 710	260 570	3.95 (13.0)
0.5 m (1.6 ft)	kg lb			630 1390	490 1080	480 1060	380 840	380 840	300 660			320 710	260 570	3.91 (12.8)
Ground Line	kg lb	890 1960	670 1480	620 1370	480 1060	470 1040	370 820	380 840	300 660			340 750	270 600	3.78 (12.4)
-0.5 m (-1.6 ft)	kg lb	890 1960	670 1480	620 1370	480 1060	470 1040	370 820	370 820	300 660			370 820	290 640	3.56 (11.7)
-1.0 m (-3.3 ft)	kg lb	900 1980	680 1500	620 1370	480 1060	470 1040	370 820					430 950	340 750	3.21 (10.5)
-1.5 m (-4.9 ft)	kg lb	920 2030	700 1540	630 1390	490 1080							580 1280	450 990	2.66 (8.7)

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R30Z-9AK	Cabin	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1120	220	250	-	Up	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree

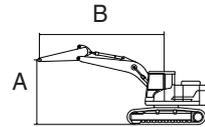


Lift-point height (A)		Lift-point radius (B)										At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach
														m (ft)
3.5 m (11.5 ft)	kg											*720	580	2.64
	lb											*1590	1280	(8.6)
3.0 m (9.8 ft)	kg					590	470					530	420	3.20
	lb					1300	1040					1170	930	(10.5)
2.5 m (8.2 ft)	kg					590	470	450	360			440	350	3.55
	lb					1300	1040	990	790			970	770	(11.7)
2.0 m (6.6 ft)	kg			780	620	580	460	450	360			390	320	3.78
	lb			1720	1370	1280	1010	990	790			860	710	(12.4)
1.5 m (4.9 ft)	kg			750	590	560	450	440	350			370	300	3.91
	lb			1650	1300	1230	990	970	770			820	660	(12.8)
1.0 m (3.3 ft)	kg			720	560	550	430	430	340			360	290	3.95
	lb			1590	1230	1210	950	950	750			790	640	(13.0)
0.5 m (1.6 ft)	kg			700	540	530	420	420	340			360	290	3.91
	lb			1540	1190	1170	930	930	750			790	640	(12.8)
Ground Line	kg	990	750	690	530	530	410	420	330			380	300	3.78
	lb	2180	1650	1520	1170	1170	900	930	730			840	660	(12.4)
-0.5 m (-1.6 ft)	kg	990	750	690	530	520	410	420	330			410	320	3.56
	lb	2180	1650	1520	1170	1150	900	930	730			900	710	(11.7)
-1.0 m (-3.3 ft)	kg	1000	760	690	540	530	410					480	380	3.21
	lb	2200	1680	1520	1190	1170	900					1060	840	(10.5)
-1.5 m (-4.9 ft)	kg	1020	770	710	550							640	500	2.66
	lb	2250	1700	1570	1210							1410	1100	(8.7)

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R30Z-9AK	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1120	350	250	-	Down	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree

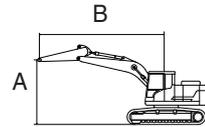


Lift-point height (A)		Lift-point radius (B)										At max. reach				
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach		
															m (ft)	
3.5 m (11.5 ft)	kg lb													*720 *1590	630 1390	2.64 (8.6)
3.0 m (9.8 ft)	kg lb					*690 *1520	520 1150							*620 *1370	470 1040	3.20 (10.5)
2.5 m (8.2 ft)	kg lb					*690 *1520	520 1150	*700 *1540	400 880					*580 *1280	390 860	3.55 (11.7)
2.0 m (6.6 ft)	kg lb			*830 *1830	680 1500	*760 *1680	510 1120	*720 *1590	400 880					*570 *1260	350 770	3.78 (12.4)
1.5 m (4.9 ft)	kg lb			*1060 *2340	650 1430	*870 *1920	490 1080	*780 *1720	390 860					*580 *1280	330 730	3.91 (12.8)
1.0 m (3.3 ft)	kg lb			*1300 *2870	630 1390	*990 *2180	480 1060	*840 *1850	380 840					*600 *1320	320 710	3.95 (13.0)
0.5 m (1.6 ft)	kg lb			*1450 *3200	610 1340	*1090 *2400	470 1040	*890 *1960	370 820					*650 *1430	320 710	3.91 (12.8)
Ground Line	kg lb	*1550 *3420	840 1850	*1500 *3310	600 1320	*1130 *2490	460 1010	*900 *1980	370 820					*740 *1630	330 730	3.78 (12.4)
-0.5 m (-1.6 ft)	kg lb	*2020 *4450	840 1850	*1450 *3200	590 1300	*1100 *2430	460 1010	*850 *1870	370 820					*820 *1810	360 790	3.56 (11.7)
-1.0 m (-3.3 ft)	kg lb	*1770 *3900	850 1870	*1300 *2870	600 1320	*970 *2140	460 1010							*840 *1850	420 930	3.21 (10.5)
-1.5 m (-4.9 ft)	kg lb	*1330 *2930	860 1900	*950 *2090	610 1340									*830 *1830	560 1230	2.66 (8.7)

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R30Z-9AK	Cabin	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1120	350	250	-	Down	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree

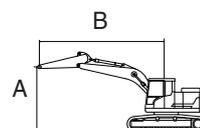


Lift-point height (A)		Lift-point radius (B)										At max. reach			
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach	
														kg	lb
3.5 m (11.5 ft)	kg												*720	690	2.64
	lb												*1590	1520	(8.6)
3.0 m (9.8 ft)	kg					*690	570					*620	510	3.20	
	lb					*1520	1260					*1370	1120	(10.5)	
2.5 m (8.2 ft)	kg					*690	560	*700	440			*580	430	3.55	
	lb					*1520	1230	*1540	970			*1280	950	(11.7)	
2.0 m (6.6 ft)	kg			*830	740	*760	550	*720	440			*570	380	3.78	
	lb			*1830	1630	*1680	1210	*1590	970			*1260	840	(12.4)	
1.5 m (4.9 ft)	kg			*1060	710	*870	540	*780	430			*580	360	3.91	
	lb			*2340	1570	*1920	1190	*1720	950			*1280	790	(12.8)	
1.0 m (3.3 ft)	kg			*1300	680	*990	530	*840	420			*600	350	3.95	
	lb			*2870	1500	*2180	1170	*1850	930			*1320	770	(13.0)	
0.5 m (1.6 ft)	kg			*1450	660	*1090	510	*890	410			*650	350	3.91	
	lb			*3200	1460	*2400	1120	*1960	900			*1430	770	(12.8)	
Ground Line	kg	*1550	920	*1500	650	*1130	510	*900	410			*740	370	3.78	
	lb	*3420	2030	*3310	1430	*2490	1120	*1980	900			*1630	820	(12.4)	
-0.5 m (-1.6 ft)	kg	*2020	920	*1450	650	*1100	500	*850	410			*820	400	3.56	
	lb	*4450	2030	*3200	1430	*2430	1100	*1870	900			*1810	880	(11.7)	
-1.0 m (-3.3 ft)	kg	*1770	930	*1300	660	*970	510					*840	460	3.21	
	lb	*3900	2050	*2870	1460	*2140	1120					*1850	1010	(10.5)	
-1.5 m (-4.9 ft)	kg	*1330	940	*950	670							*830	610	2.66	
	lb	*2930	2070	*2090	1480							*1830	1340	(8.7)	

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
R30Z-9AK	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1120	350	250	-	Up	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree

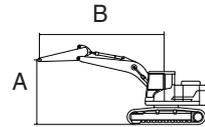


Lift-point height (A)		Lift-point radius (B)										At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach
														m (ft)
3.5 m (11.5 ft)	kg											*720	600	2.64
	lb											*1590	1320	(8.6)
3.0 m (9.8 ft)	kg					600	490					540	440	3.20
	lb					1320	1080					1190	970	(10.5)
2.5 m (8.2 ft)	kg					600	490	460	380			450	370	3.55
	lb					1320	1080	1010	840			990	820	(11.7)
2.0 m (6.6 ft)	kg			800	640	590	480	460	370			410	330	3.78
	lb			1760	1410	1300	1060	1010	820			900	730	(12.4)
1.5 m (4.9 ft)	kg			770	610	580	460	450	370			380	310	3.91
	lb			1700	1340	1280	1010	990	820			840	680	(12.8)
1.0 m (3.3 ft)	kg			740	580	560	450	450	360			370	300	3.95
	lb			1630	1280	1230	990	990	790			820	660	(13.0)
0.5 m (1.6 ft)	kg			720	570	550	440	440	350			370	300	3.91
	lb			1590	1260	1210	970	970	770			820	660	(12.8)
Ground Line	kg	1020	780	710	560	540	430	430	350			390	310	3.78
	lb	2250	1720	1570	1230	1190	950	950	770			860	680	(12.4)
-0.5 m (-1.6 ft)	kg	1020	780	710	550	540	430	430	350			420	340	3.56
	lb	2250	1720	1570	1210	1190	950	950	770			930	750	(11.7)
-1.0 m (-3.3 ft)	kg	1030	790	710	560	540	430					490	390	3.21
	lb	2270	1740	1570	1230	1190	950					1080	860	(10.5)
-1.5 m (-4.9 ft)	kg	1050	800	730	570							660	520	2.66
	lb	2310	1760	1610	1260							1460	1150	(8.7)

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R30Z-9AK	Cabin	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1120	350	250	-	Up	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree

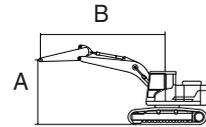


Lift-point height (A)		Lift-point radius (B)										At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach
														m (ft)
3.5 m (11.5 ft)	kg											*720	650	2.64
	lb											*1590	1430	(8.6)
3.0 m (9.8 ft)	kg					660	530					590	480	3.20
	lb					1460	1170					1300	1060	(10.5)
2.5 m (8.2 ft)	kg					660	530	510	410			500	400	3.55
	lb					1460	1170	1120	900			1100	880	(11.7)
2.0 m (6.6 ft)	kg			*830	690	650	520	510	410			450	360	3.78
	lb			*1830	1520	1430	1150	1120	900			990	790	(12.4)
1.5 m (4.9 ft)	kg			840	670	630	510	500	400			420	340	3.91
	lb			1850	1480	1390	1120	1100	880			930	750	(12.8)
1.0 m (3.3 ft)	kg			810	640	620	490	490	390			410	330	3.95
	lb			1790	1410	1370	1080	1080	860			900	730	(13.0)
0.5 m (1.6 ft)	kg			790	620	600	480	480	390			410	330	3.91
	lb			1740	1370	1320	1060	1060	860			900	730	(12.8)
Ground Line	kg	1120	850	780	610	600	470	480	380			430	340	3.78
	lb	2470	1870	1720	1340	1320	1040	1060	840			950	750	(12.4)
-0.5 m (-1.6 ft)	kg	1120	860	780	610	590	470	480	380			470	370	3.56
	lb	2470	1900	1720	1340	1300	1040	1060	840			1040	820	(11.7)
-1.0 m (-3.3 ft)	kg	1130	860	780	610	600	470					540	430	3.21
	lb	2490	1900	1720	1340	1320	1040					1190	950	(10.5)
-1.5 m (-4.9 ft)	kg	1150	880	800	630							730	580	2.66
	lb	2540	1940	1760	1390							1610	1280	(8.7)

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R30Z-9AK	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1350	220	250	-	Down	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree

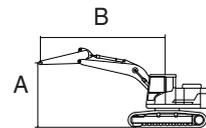


Lift-point height (A)		Lift-point radius (B)										At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach
														m (ft)
3.5 m (11.5 ft)	kg											*550	460	2.99
	lb											*1210	1010	(9.8)
3.0 m (9.8 ft)	kg											*490	360	3.48
	lb											*1080	790	(11.4)
2.5 m (8.2 ft)	kg					*590	460	*620	350			*470	300	3.80
	lb					*1300	1010	*1370	770			*1040	660	(12.5)
2.0 m (6.6 ft)	kg					*670	450	*660	350	*470	270	*460	270	4.01
	lb					*1480	990	*1460	770	*1040	600	*1010	600	(13.1)
1.5 m (4.9 ft)	kg	*1220	830	*920	580	*790	430	*720	340	*680	270	*470	260	4.13
	lb	*2690	1830	*2030	1280	*1740	950	*1590	750	*1500	600	*1040	570	(13.5)
1.0 m (3.3 ft)	kg			*1180	550	*930	420	*790	330	*710	270	*480	250	4.17
	lb			*2600	1210	*2050	930	*1740	730	*1570	600	*1060	550	(13.7)
0.5 m (1.6 ft)	kg	*1340	730	*1380	530	*1040	400	*860	320	*740	260	*520	250	4.13
	lb	*2950	1610	*3040	1170	*2290	880	*1900	710	*1630	570	*1150	550	(13.5)
Ground Line	kg	*1540	720	*1480	510	*1110	390	*890	310	*610	260	*580	260	4.01
	lb	*3400	1590	*3260	1120	*2450	860	*1960	680	*1340	570	*1280	570	(13.2)
-0.5 m (-1.6 ft)	kg	*2020	720	*1480	510	*1120	390	*890	310			*670	280	3.80
	lb	*4450	1590	*3260	1120	*2470	860	*1960	680			*1480	620	(12.5)
-1.0 m (-3.3 ft)	kg	*1920	720	*1380	510	*1040	390					*790	320	3.49
	lb	*4230	1590	*3040	1120	*2290	860					*1740	710	(11.4)
-1.5 m (-4.9 ft)	kg	*1570	730	*1140	520	*800	400					*800	400	3.01
	lb	*3460	1610	*2510	1150	*1760	880					*1760	880	(9.9)
-2.0 m (-6.6 ft)	kg	*890	760									*740	650	2.21
	lb	*1960	1680									*1630	1430	(7.2)

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R30Z-9AK	Cabin	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1350	220	250	-	Down	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree

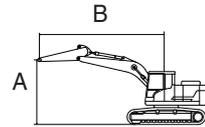


Lift-point height (A)		Lift-point radius (B)										At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach
														kg
3.5 m (11.5 ft)	kg											*550	500	2.99
	lb											*1210	1100	(9.8)
3.0 m (9.8 ft)	kg											*490	390	3.48
	lb											*1080	860	(11.4)
2.5 m (8.2 ft)	kg					*590	510	*620	390			*470	340	3.80
	lb					*1300	1120	*1370	860			*1040	750	(12.5)
2.0 m (6.6 ft)	kg					*670	500	*660	390	*470	310	*460	310	4.01
	lb					*1480	1100	*1460	860	*1040	680	*1010	680	(13.1)
1.5 m (4.9 ft)	kg	*1220	910	*920	640	*790	480	*720	380	*680	300	*470	290	4.13
	lb	*2690	2010	*2030	1410	*1740	1060	*1590	840	*1500	660	*1040	640	(13.5)
1.0 m (3.3 ft)	kg			*1180	610	*930	460	*790	370	*710	300	*480	280	4.17
	lb			*2600	1340	*2050	1010	*1740	820	*1570	660	*1060	620	(13.7)
0.5 m (1.6 ft)	kg	*1340	810	*1380	580	*1040	450	*860	360	*740	290	*520	280	4.13
	lb	*2950	1790	*3040	1280	*2290	990	*1900	790	*1630	640	*1150	620	(13.5)
Ground Line	kg	*1540	800	*1480	570	*1110	440	*890	350	*610	290	*580	290	4.01
	lb	*3400	1760	*3260	1260	*2450	970	*1960	770	*1340	640	*1280	640	(13.2)
-0.5 m (-1.6 ft)	kg	*2020	800	*1480	560	*1120	430	*890	350			*670	310	3.80
	lb	*4450	1760	*3260	1230	*2470	950	*1960	770			*1480	680	(12.5)
-1.0 m (-3.3 ft)	kg	*1920	800	*1380	570	*1040	430					*790	350	3.49
	lb	*4230	1760	*3040	1260	*2290	950					*1740	770	(11.4)
-1.5 m (-4.9 ft)	kg	*1570	810	*1140	570	*800	440					*800	440	3.01
	lb	*3460	1790	*2510	1260	*1760	970					*1760	970	(9.9)
-2.0 m (-6.6 ft)	kg	*890	840									*740	720	2.21
	lb	*1960	1850									*1630	1590	(7.2)

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R30Z-9AK	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1350	220	250	-	Up	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree

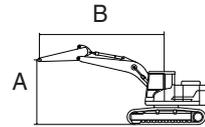


Lift-point height (A)		Lift-point radius (B)										At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach
														kg
3.5 m (11.5 ft)	kg											530	430	2.99
	lb											1170	950	(9.8)
3.0 m (9.8 ft)	kg											410	330	3.48
	lb											900	730	(11.4)
2.5 m (8.2 ft)	kg					540	430	410	330			350	280	3.80
	lb					1190	950	900	730			770	620	(12.5)
2.0 m (6.6 ft)	kg					530	420	410	330	320	260	320	260	4.01
	lb					1170	930	900	730	710	570	710	570	(13.1)
1.5 m (4.9 ft)	kg	1010	780	690	540	510	410	400	320	320	250	300	240	4.13
	lb	2230	1720	1520	1190	1120	900	880	710	710	550	660	530	(13.5)
1.0 m (3.3 ft)	kg					660	510	490	390	310	250	290	230	4.17
	lb					1460	1120	1080	860	680	550	640	510	(13.7)
0.5 m (1.6 ft)	kg	900	680	630	490	480	380	380	300	310	240	290	230	4.13
	lb	1980	1500	1390	1080	1060	840	840	660	680	530	640	510	(13.5)
Ground Line	kg	880	660	610	470	470	360	370	290	300	240	300	240	4.01
	lb	1940	1460	1340	1040	1040	790	820	640	660	530	660	530	(13.2)
-0.5 m (-1.6 ft)	kg	880	660	610	470	460	360	370	290			330	260	3.80
	lb	1940	1460	1340	1040	1010	790	820	640			730	570	(12.5)
-1.0 m (-3.3 ft)	kg	890	670	610	470	460	360					370	290	3.49
	lb	1960	1480	1340	1040	1010	790					820	640	(11.4)
-1.5 m (-4.9 ft)	kg	900	680	620	480	470	370					470	370	3.01
	lb	1980	1500	1370	1060	1040	820					1040	820	(9.9)
-2.0 m (-6.6 ft)	kg	*890	700									*740	600	2.21
	lb	*1960	1540									*1630	1320	(7.2)

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R30Z-9AK	Cabin	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1350	220	250	-	Up	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree

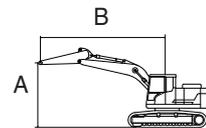


Lift-point height (A)		Lift-point radius (B)										At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach
														
3.5 m (11.5 ft)	kg											*550	470	2.99
	lb											*1210	1040	(9.8)
3.0 m (9.8 ft)	kg											460	370	3.48
	lb											1010	820	(11.4)
2.5 m (8.2 ft)	kg					590	470	460	370			390	320	3.80
	lb					1300	1040	1010	820			860	710	(12.5)
2.0 m (6.6 ft)	kg					580	460	450	360	360	290	360	290	4.01
	lb					1280	1010	990	790	790	640	790	640	(13.1)
1.5 m (4.9 ft)	kg	1110	850	760	600	560	450	440	350	360	280	340	270	4.13
	lb	2450	1870	1680	1320	1230	990	970	770	790	620	750	600	(13.5)
1.0 m (3.3 ft)	kg			730	570	550	430	430	340	350	280	330	260	4.17
	lb			1610	1260	1210	950	950	750	770	620	730	570	(13.7)
0.5 m (1.6 ft)	kg	1000	750	700	540	530	420	420	330	350	270	330	260	4.13
	lb	2200	1650	1540	1190	1170	930	930	730	770	600	730	570	(13.5)
Ground Line	kg	980	740	690	530	520	410	420	330	340	270	340	270	4.01
	lb	2160	1630	1520	1170	1150	900	930	730	750	600	750	600	(13.2)
-0.5 m (-1.6 ft)	kg	980	740	680	520	520	400	410	320			370	290	3.80
	lb	2160	1630	1500	1150	1150	880	900	710			820	640	(12.5)
-1.0 m (-3.3 ft)	kg	990	740	680	530	520	400					420	330	3.49
	lb	2180	1630	1500	1170	1150	880					930	730	(11.4)
-1.5 m (-4.9 ft)	kg	1000	750	690	530	530	410					520	410	3.01
	lb	2200	1650	1520	1170	1170	900					1150	900	(9.9)
-2.0 m (-6.6 ft)	kg	*890	780									*740	670	2.21
	lb	*1960	1720									*1630	1480	(7.2)

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R30Z-9AK	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1350	350	250	-	Down	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree

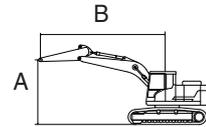


Lift-point height (A)		Lift-point radius (B)										At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach
														kg
3.5 m (11.5 ft)	kg											*550	520	2.99
	lb											*1210	1150	(9.8)
3.0 m (9.8 ft)	kg											*490	410	3.48
	lb											*1080	900	(11.4)
2.5 m (8.2 ft)	kg				*590	520	*620	400				*470	350	3.80
	lb				*1300	1150	*1370	880				*1040	770	(12.5)
2.0 m (6.6 ft)	kg				*670	510	*660	400	*470	320		*460	320	4.01
	lb				*1480	1120	*1460	880	*1040	710		*1010	710	(13.1)
1.5 m (4.9 ft)	kg	*1220	940	*920	660	*790	500	*720	390	*680	320	*470	300	4.13
	lb	*2690	2070	*2030	1460	*1740	1100	*1590	860	*1500	710	*1040	660	(13.5)
1.0 m (3.3 ft)	kg			*1180	630	*930	480	*790	380	*710	310	*480	290	4.17
	lb			*2600	1390	*2050	1060	*1740	840	*1570	680	*1060	640	(13.7)
0.5 m (1.6 ft)	kg	*1340	840	*1380	610	*1040	470	*860	370	*740	310	*520	290	4.13
	lb	*2950	1850	*3040	1340	*2290	1040	*1900	820	*1630	680	*1150	640	(13.5)
Ground Line	kg	*1540	830	*1480	590	*1110	460	*890	370	*610	300	*580	300	4.01
	lb	*3400	1830	*3260	1300	*2450	1010	*1960	820	*1340	660	*1280	660	(13.2)
-0.5 m (-1.6 ft)	kg	*2020	830	*1480	590	*1120	450	*890	360			*670	320	3.80
	lb	*4450	1830	*3260	1300	*2470	990	*1960	790			*1480	710	(12.5)
-1.0 m (-3.3 ft)	kg	*1920	830	*1380	590	*1040	450					*790	370	3.49
	lb	*4230	1830	*3040	1300	*2290	990					*1740	820	(11.4)
-1.5 m (-4.9 ft)	kg	*1570	840	*1140	600	*800	460					*800	460	3.01
	lb	*3460	1850	*2510	1320	*1760	1010					*1760	1010	(9.9)
-2.0 m (-6.6 ft)	kg	*890	870									*740	*740	2.21
	lb	*1960	1920									*1630	*1630	(7.2)

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R30Z-9AK	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		2030	1350	350	250	-	Up	-	-	-

·  : Rating over-front

·  : Rating over-side or 360 degree

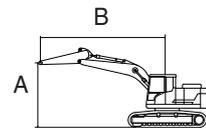


Lift-point height (A)		Lift-point radius (B)										At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach
														kg
3.5 m (11.5 ft)	kg											*550	490	2.99
	lb											*1210	1080	(9.8)
3.0 m (9.8 ft)	kg											470	380	3.48
	lb											1040	840	(11.4)
2.5 m (8.2 ft)	kg					*590	490	470	380			410	330	3.80
	lb					*1300	1080	1040	840			900	730	(12.5)
2.0 m (6.6 ft)	kg					600	480	460	380	370	300	370	300	4.01
	lb					1320	1060	1010	840	820	660	820	660	(13.1)
1.5 m (4.9 ft)	kg	1140	880	780	620	580	470	450	370	370	300	350	280	4.13
	lb	2510	1940	1720	1370	1280	1040	990	820	820	660	770	620	(13.5)
1.0 m (3.3 ft)	kg			750	590	560	450	440	360	360	290	340	270	4.17
	lb			1650	1300	1230	990	970	790	790	640	750	600	(13.7)
0.5 m (1.6 ft)	kg	1030	780	720	570	550	440	430	350	360	290	340	270	4.13
	lb	2270	1720	1590	1260	1210	970	950	770	790	640	750	600	(13.5)
Ground Line	kg	1010	770	710	550	540	430	430	340	350	280	350	280	4.01
	lb	2230	1700	1570	1210	1190	950	950	750	770	620	770	620	(13.2)
-0.5 m (-1.6 ft)	kg	1010	770	700	550	530	420	420	340			380	300	3.80
	lb	2230	1700	1540	1210	1170	930	930	750			840	660	(12.5)
-1.0 m (-3.3 ft)	kg	1010	770	700	550	530	420					430	340	3.49
	lb	2230	1700	1540	1210	1170	930					950	750	(11.4)
-1.5 m (-4.9 ft)	kg	1030	780	710	560	540	430					540	430	3.01
	lb	2270	1720	1570	1230	1190	950					1190	950	(9.9)

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
		Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
R30Z-9AK	Cabin	2030	1350	350	250	-	Up	-	-	-

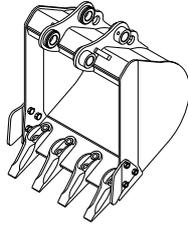
·  : Rating over-front

·  : Rating over-side or 360 degree



Lift-point height (A)		Lift-point radius (B)										At max. reach						
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		4.0 m (13.1 ft)		Capacity		Reach				
																m (ft)		
3.5 m (11.5 ft)	kg															*550	530	2.99
	lb															*1210	1170	(9.8)
3.0 m (9.8 ft)	kg															*490	420	3.48
	lb															*1080	930	(11.4)
2.5 m (8.2 ft)	kg					*590	530	510	420						450	360	3.80	
	lb					*1300	1170	1120	930						990	790	(12.5)	
2.0 m (6.6 ft)	kg					650	520	510	410	410	330				410	330	4.01	
	lb					1430	1150	1120	900	900	730				900	730	(13.1)	
1.5 m (4.9 ft)	kg	*1220	960	850	670	640	510	500	400	400	330				380	310	4.13	
	lb	*2690	2120	1870	1480	1410	1120	1100	880	880	730				840	680	(13.5)	
1.0 m (3.3 ft)	kg			820	640	620	490	490	390	400	320				370	300	4.17	
	lb			1810	1410	1370	1080	1080	860	880	710				820	660	(13.7)	
0.5 m (1.6 ft)	kg	1130	860	790	620	600	480	480	380	390	320				380	300	4.13	
	lb	2490	1900	1740	1370	1320	1060	1060	840	860	710				840	660	(13.5)	
Ground Line	kg	1110	850	780	610	590	470	470	380	390	310				390	310	4.01	
	lb	2450	1870	1720	1340	1300	1040	1040	840	860	680				860	680	(13.2)	
-0.5 m (-1.6 ft)	kg	1110	840	770	600	590	460	470	370						420	330	3.80	
	lb	2450	1850	1700	1320	1300	1010	1040	820						930	730	(12.5)	
-1.0 m (-3.3 ft)	kg	1120	850	770	600	590	460								470	380	3.49	
	lb	2470	1870	1700	1320	1300	1010								1040	840	(11.4)	
-1.5 m (-4.9 ft)	kg	1130	860	780	610	600	470								590	470	3.01	
	lb	2490	1900	1720	1340	1320	1040								1300	1040	(9.9)	
-2.0 m (-6.6 ft)	kg	*890	880												*740	*740	2.21	
	lb	*1960	1940												*1630	*1630	(7.2)	

6. BUCKET SELECTION GUIDE



0.08 m³ SAE
heaped bucket

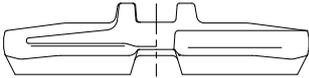
Capacity		Width		Weight	Recommendation
SAE heaped	CECE heaped	Without side cutter	With side cutter		2.03 m (6' 8") boom
					1.12 m (3' 8") arm
0.08m ³ (0.10yd ³)	0.06 m ³ (0.08 yd ³)	450 mm (17.7")	510 mm (20")	60 kg (132 lb)	Applicable for materials with density of 1600 kgf/m ³ (2700 lb /yd ³) or less

7. UNDERCARRIAGE

(1) TRACKS

X-leg type center frame is integrally welded with reinforced box-section track frames. The design includes dry tracks, lubricated rollers, idlers, sprockets, hydraulic track adjusters with shock absorbing springs and assembled track-type tractor shoes with triple grousers.

(2) TYPES OF SHOES

Model	Shapes		Rubber track	
			Cab	Canopy
				
R30Z-9AK	Shoe width	mm (in)	300 (12")	300 (12")
	Operating weight	kg (lb)	3005 (6620)	2895 (6380)
	Ground pressure	kgf/cm ² (psi)	0.29 (4.12)	0.27 (3.84)
	Overall width	mm (ft-in)	1550 (5' 1")	1550 (5' 1")

(3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	1 EA
Track rollers	3 EA

8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Kubota D1305
Type	4-cycle vertical overhead valve, diesel fuel
Cooling method	Water cooling
Number of cylinders and arrangement	3 cylinders, in-line
Firing order	1-2-3
Combustion chamber type	Swirl chamber type
Cylinder bore × stroke	78 × 88 mm (3.07" × 3.46")
Piston displacement	1261 cc (77.0 cu in)
Compression ratio	24 : 1
Rated gross horse power (SAE J1995)	24.9 Hp at 2400 rpm (18.5 kW at 2400 rpm)
Maximum torque at 1600 rpm	8.3 kgf · m (60.0 lbf · ft)
Engine oil quantity	5.7 l (1.5 U.S. gal)
Dry weight	102 kg (225 lb)
High idling speed	2350 ± 50 rpm
Low idling speed	1400 ± 50 rpm
Rated fuel consumption	192 g/Hp · hr at 2400 rpm (257 g/kW · hr at 2400 rpm)
Starting motor	12V-1.4 kW
Alternator	12V-40 A
Battery	1 × 12 V × 58 Ah (5h rating)

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 12 cc/rev
Rated oil flow	2 × 27.6 l /min (7.3 U.S. gpm / 6.1 U.K. gpm)
Rated speed	2300 rpm

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	8.5/4.5 cc/rev
Rated oil flow	19.6/10.4 l /min (5.2/2.7 U.S. gpm / 4.3/2.3 U.K. gpm)

4) MAIN CONTROL VALVE

Item	Specification
Type	Sectional, 9 spools (12 blocks)
Operating method	Hydraulic pilot system
Main relief valve pressure : P1, P2 / P3	220 kgf/cm ² (3130 psi) / 175 kgf/cm ² (2490 psi)
Overload relief valve pressure	240 kgf/cm ² (3410 psi)

5) SWING MOTOR

Item	Specification
Type	Fixed displacement axial piston motor
Capacity	12.5 cc/rev
Relief pressure	170 kgf/cm ² (2420 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	7.0 kgf · m (50.6 lbf · ft)
Brake release pressure	25~50 kgf/cm ² (356~710 psi)
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	220 kgf/cm ² (3130 psi)
Reduction gear type	2-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	19 kgf/cm ² (270 psi)
Braking torque	5.7 kgf · m (41 lbf · ft)

7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	∅ 75 × ∅ 45 × 565 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	∅ 70 × ∅ 45 × 500 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	∅ 55 × ∅ 35 × 420 mm
	Cushion	-
Boom swing cylinder	Bore dia × Rod dia × Stroke	∅ 75 × ∅ 40 × 400 mm
	Cushion	-
Dozer cylinder	Bore dia × Rod dia × Stroke	∅ 95 × ∅ 50 × 140 mm
	Cushion	-

※ Discoloration of cylinder rod can occur when the friction reduction additive of lubrication oil spreads on the rod surface.

※ Discoloration does not cause any harmful effect on the cylinder performance.

8) BUCKET

Item	Capacity		Tooth quantity	Width	
	SAE heaped	CECE heaped		Without side cutter	With side cutter
Standard	0.08 m ³ (0.10 yd ³)	0.06 m ³ (0.08 yd ³)	4	450 mm (17.7")	510 mm (20")

9. RECOMMENDED OILS

HYUNDAI genuine lubricating oils have been developed to offer the best performance and service life for your equipment. These oils have been tested according to the specifications of HYUNDAI and, therefore, will meet the highest safety and quality requirements.

We recommend that you use only HYUNDAI genuine lubricating oils and grease officially approved by HYUNDAI.

Service point	Kind of fluid	Capacity ℓ (U.S. gal)	Ambient temperature °C (°F)							
			-50 (-58)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Engine oil pan	Engine oil	5.7 (1.5)	★SAE 5W-40				SAE 30			
			SAE 10W				SAE 10W-30			
			SAE 15W-40							
Final drive	Gear oil	0.6×2 (0.16×2)	★SAE 75W-90				SAE 85W-140			
Hydraulic tank	Hydraulic oil	Tank; 27 (7.1) System; 55 (14.5)	★ISO VG 15				ISO VG 46, HBHO VG 46★ ³			
							ISO VG 68			
Fuel tank	Diesel fuel★ ¹	30 (7.9)	★ASTM D975 NO.1				ASTM D975 NO.2			
Fitting (grease nipple)	Grease	As required	★NLGI NO.1				NLGI NO.2			
Radiator (reservoir tank)	Mixture of antifreeze and soft water★ ²	5.0 (1.3)	Ethylene glycol base permanent type (50 : 50)							
			★Ethylene glycol base permanent type (60 : 40)							

SAE : Society of Automotive Engineers

API : American Petroleum Institute

ISO : International Organization for Standardization

NLGI : National Lubricating Grease Institute

ASTM : American Society of Testing and Material

★ : Cold region (Russia, CIS, Mongolia)

★¹ : Ultra low sulfur diesel
- sulfur content ≤ 15 ppm

★² : Soft water
City water or distilled water

★³ : Hyundai Bio Hydraulic Oil

※ Using any lubricating oils other than HYUNDAI genuine products may lead to a deterioration of performance and cause damage to major components.

※ Do not mix HYUNDAI genuine oil with any other lubricating oil as it may result in damage to the systems of major components.

※ Do not use any engine oil other than that specified above, as it may clog the diesel particulate filter(DPF).

※ For HYUNDAI genuine lubricating oils and grease for use in regions with extremely low temperatures, please contact HYUNDAI dealers.

CONTROL DEVICES

1. CAB DEVICES

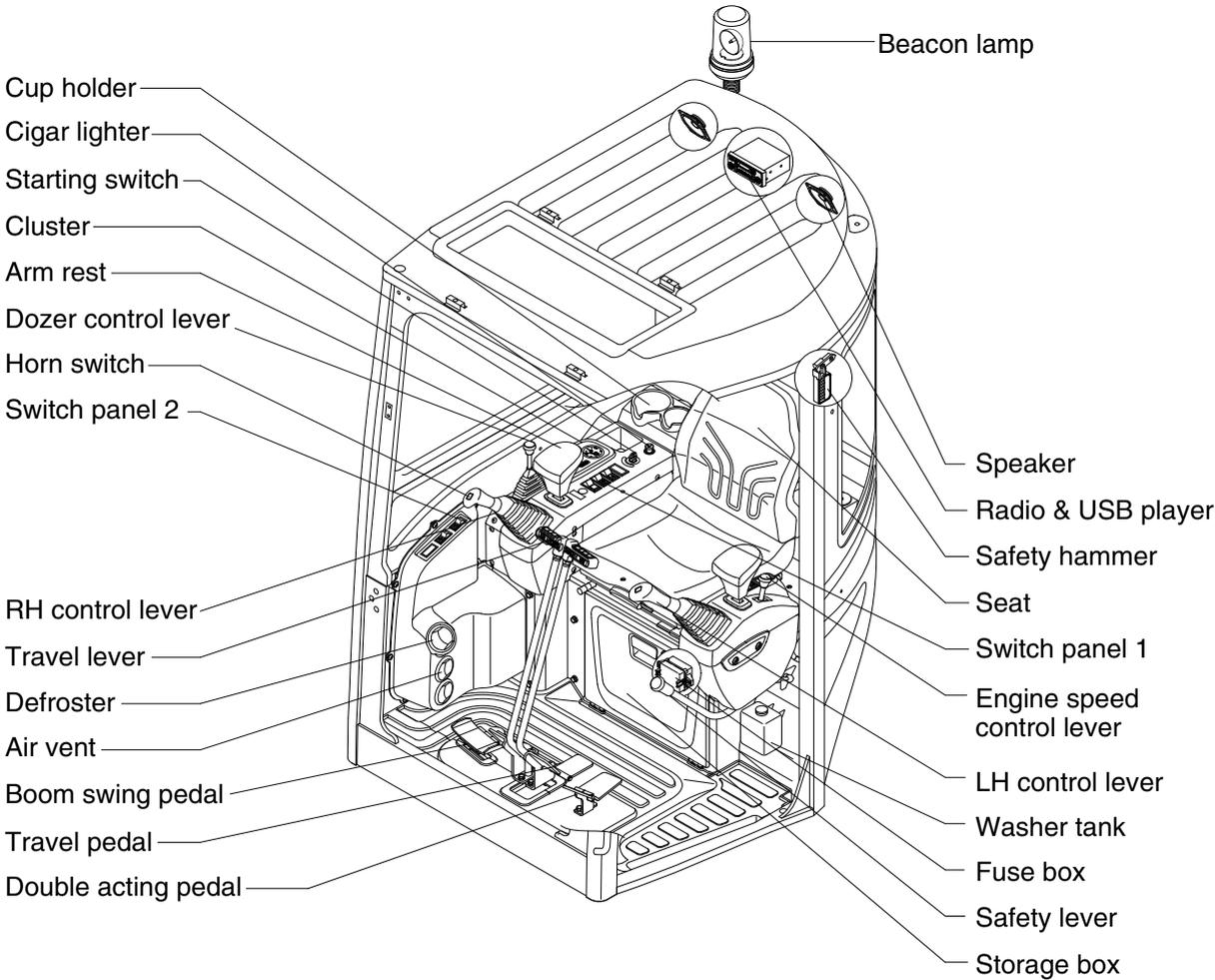
1) The ergonomically designed console box and suspension type seat provide the operator with comfort.

2) ELECTRONIC MONITOR SYSTEM

(1) The centralized electronic monitor system allows the status and conditions of the machine to be monitored at a glance.

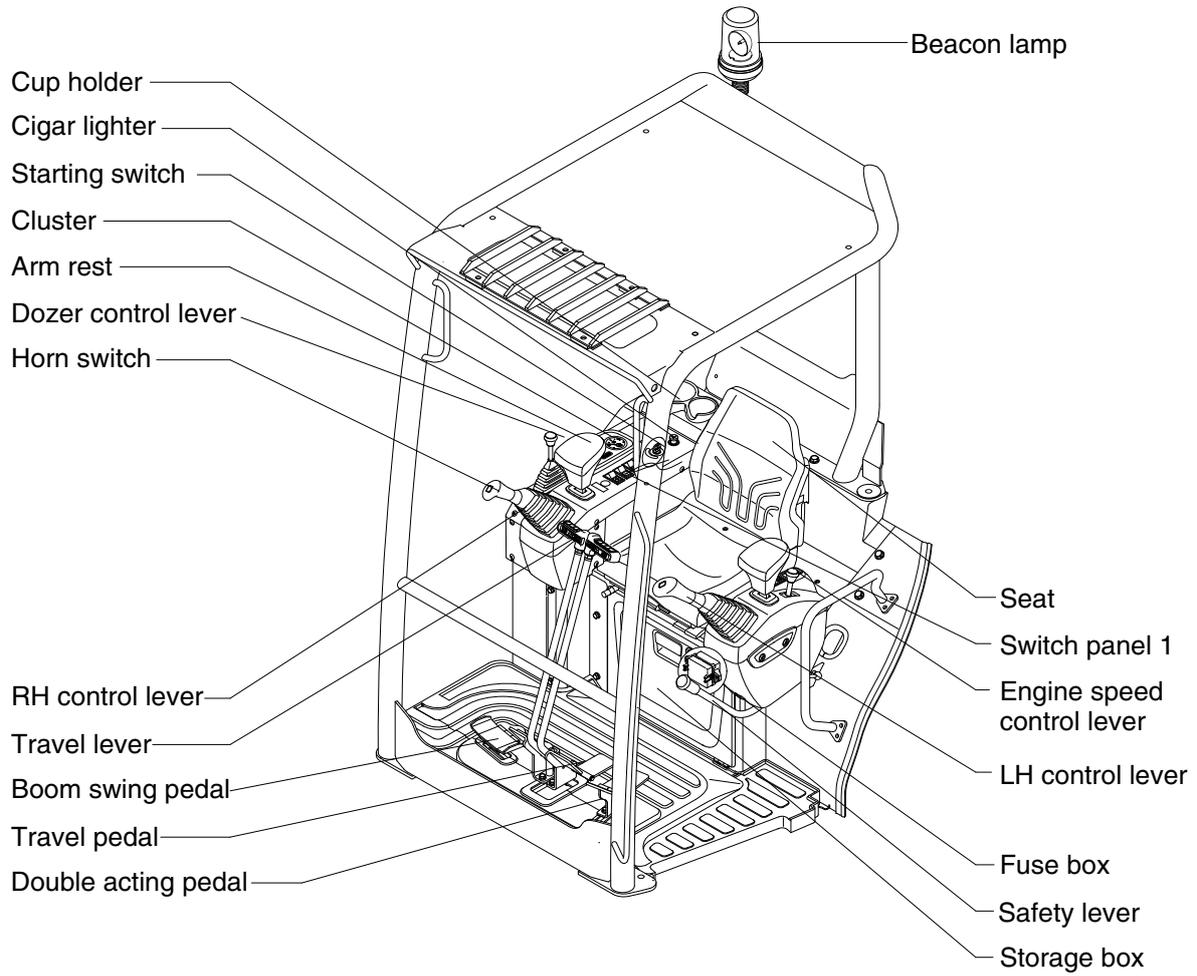
(2) It is equipped with a safety warning system for early detection of machine malfunction.

■ CAB TYPE



30Z9AK3CD11

■ CANOPY TYPE



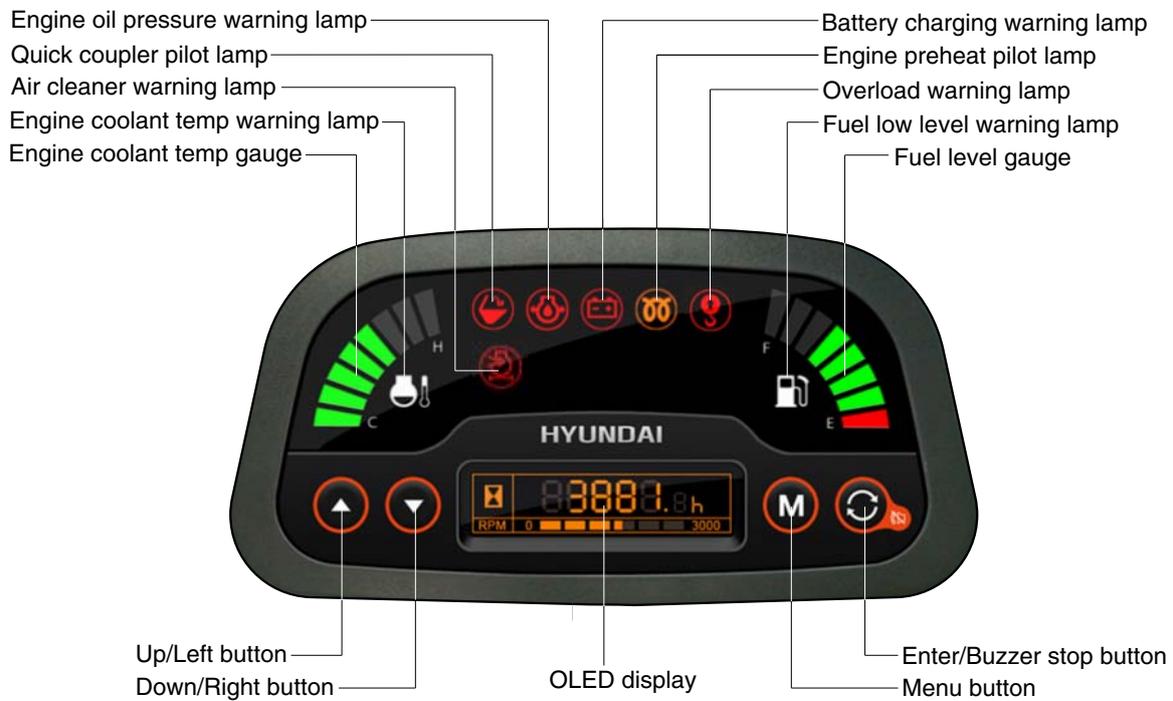
30Z9AK3CD80

2. CLUSTER

The cluster consists of gauges and lamps as shown below, to warn the operator in case of abnormal machine operation or conditions for the appropriate operation and inspection.

- Gauges : Indicate operating status of the machine.
- Warning lamp : Indicate abnormality of the machine (red).
- Pilot lamp : Indicate operating status of the machine.

- ※ **The cluster installed on this machine does not entirely guarantee the condition of the machine. Daily inspection should be performed according to chapter 6, Maintenance.**
- ※ **When the cluster provides a warning, immediately check the problem and perform the required action.**



R25Z9AK3CD03

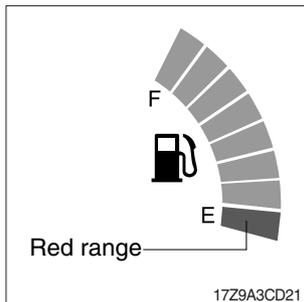
1) GAUGES AND DISPLAYS

(1) Service meter



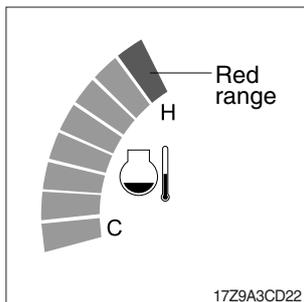
- ① This meter shows the total operation hours of the machine.
- ② Always ensure the operating condition of the meter during the machine operation.
Inspect and service the machine based on hours as indicated in chapter 6, maintenance.

(2) Fuel gauge



- ① This gauge indicates the amount of fuel in the fuel tank.
- ② Fill the fuel when the red range or warning lamp  ON.
* If the gauge illuminates the red range or warning lamp  ON even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

(3) Engine coolant temperature gauge



- ① This indicates the temperature of coolant.
· Red range : Above 115°C (239°F)
- ② When the red range pointed or warning lamp  ON, engine do not abruptly stop but run it at medium speed to allow it to cool gradually, then stop it.
Check the radiator and engine.
* If the engine is stopped without cooled down running, the temperature of engine parts will rise suddenly, this could cause severe engine trouble.

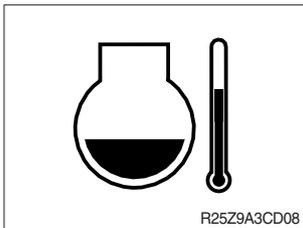
2) WARNING AND PILOT LAMPS

(1) Fuel low level warning lamp



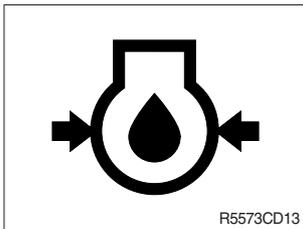
- ① This lamp ON and buzzer sounds when the level of fuel is below 5.5 l (1.5 U.S. gal).
- ② Fill the fuel immediately when the lamp ON.

(2) Engine coolant temperature warning lamp



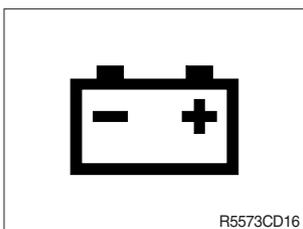
- ① This lamp ON and buzzer sounds when the temperature of coolant is over the normal temperature 115°C (239°F).
- ② Check the cooling system when the lamp ON.

(3) Engine oil pressure warning lamp



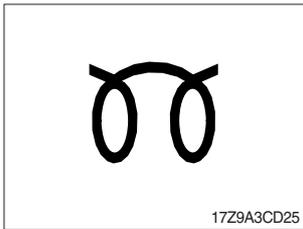
- ① This lamp ON and buzzer sounds after starting the engine because of the low oil pressure.
- ② If the lamp ON during engine operation, shut OFF engine immediately. Check oil level.

(4) Battery charging warning lamp



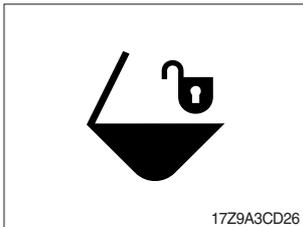
- ① This lamp ON and buzzer sounds when the starting switch is ON, it is turned OFF after starting the engine.
- ② Check the battery charging circuit when this lamp blinks during engine operation.

(5) Engine preheat pilot lamp



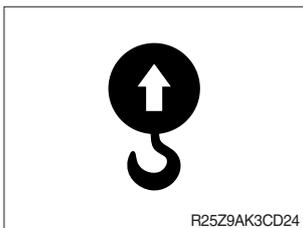
- ① When the start switch turn to HEAT position, pilot lamp comes ON.
- ② Refer to the page 4-4 for details.

(6) Quick coupler lock pilot lamp



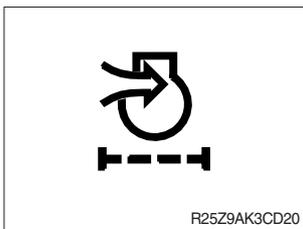
- ① When the quick coupler switch turned ON, this lamp turn ON and the buzzer sounds.
- ② This lamp turned OFF and the buzzer stop when the quick coupler switch turned OFF.

(7) Overload warning lamp



- ① When the machine is overload, this lamp ON during the overload switch is ON.
- ② Reduce the machine load.

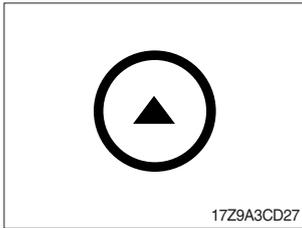
(8) Air cleaner warning lamp



- ① This lamp ON when the filter of air cleaner is clogged.
- ② Check the filter and clean or replace it.

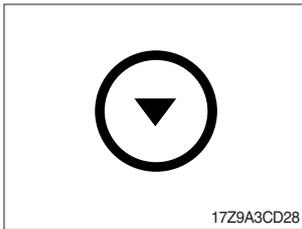
3) BUTTONS

(1) Up/left button



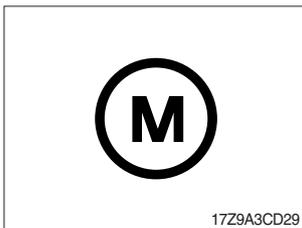
- ① Move in menu (up, left)
- ② Increase input value.

(2) Down/right button



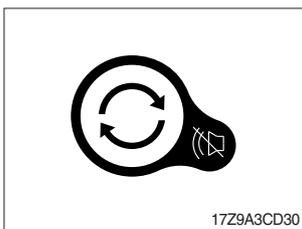
- ① Move in menu (down, right)
- ② Decrease input value.

(3) Menu button



- ① Current display to next display.

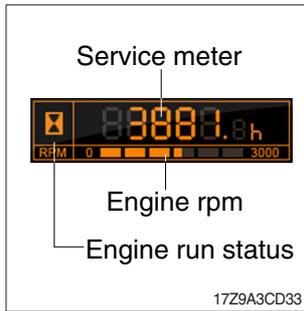
(4) Enter and buzzer stop button



- ① Select menu (enter).
- ② Stop buzzer sound when sound is ON.

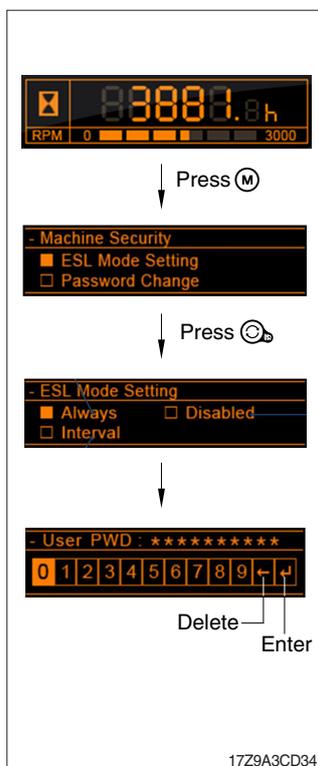
4) OLED display

(1) Main display



- ① **Service meter** : This meter shows the total operation hours of the machine.
- ※ **Always ensure the operating condition of the service meter during the machine operation.**
- ② **Engine rpm** : This displays the engine speed.
- ③ **Engine run status** : This displays the engine run status.

(2) Machine security



① ESL (Engine Starting Limit) mode setting

- ESL mode is designed to be a theft deterrent or will prevent the unauthorized operation of the machine.
- If the ESL mode was selected Always, the password will be required when the start switch is turned ON.
- Disable : Not used ESL function.

Always: The password is required whenever the operator start engine.

Interval : The password is required when the operator start engine first. But the operator can restart the engine within the interval time without inputting the password.

The interval time can be set maximum 2 days.

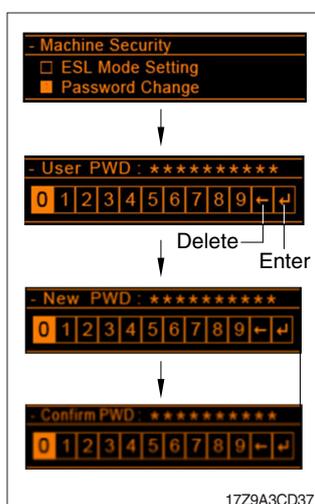
· Interval time

- If set interval time to 5 minutes, ESL system is activated after 5 minutes. Therefore, the password does not need to restart engine within 5 minutes.

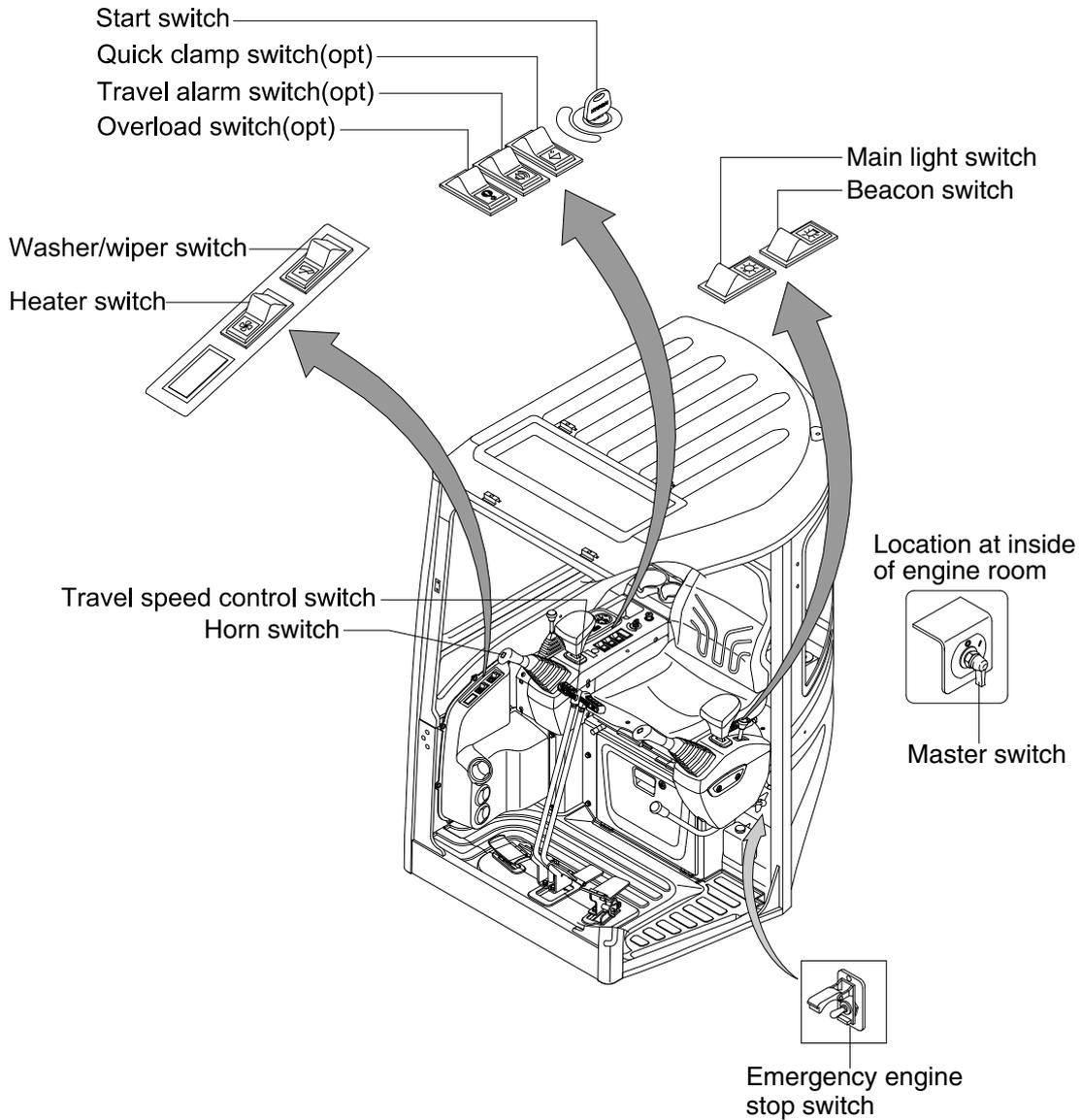
※ **Default password : 00000**

② Password change

- Input 5 to 10 digits and press Enter.

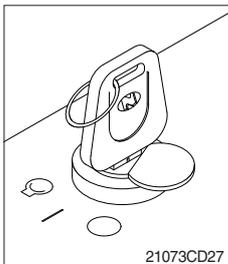


3. SWITCHES



30Z9AK3CD13

1) STARTING SWITCH

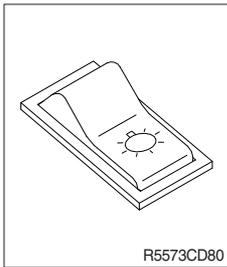


(1) There are three positions, OFF, ON and START.

- ○ (OFF) : None of electrical circuits activate.
- | (ON) : All the systems of machine operate.
- Ⓞ (START) : Use when starting the engine. Release key immediately after starting.

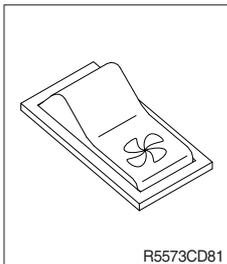
※ **Key must be in the ON position with engine running to maintain electrical and hydraulic function and prevent serious machine damage.**

2) MAIN LIGHT SWITCH



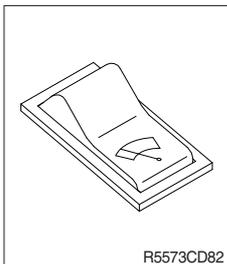
- (1) This switch use to operates the head light and work light by two step.
- First step : Head light and cluster illumination lamp comes ON.
 - Second step : Work light comes ON. Also, the below indicator lamp comes ON.

3) HEATER SWITCH



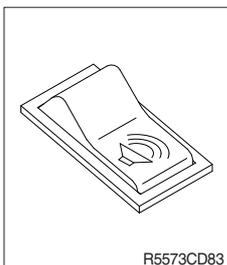
- (1) This switch use to operates the heater by two step.
- First step : Low fan speed
 - Second step : High fan speed

4) WIPER AND WASHER SWITCH



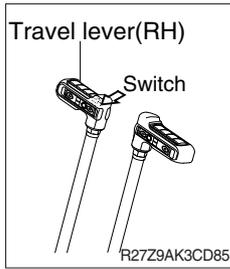
- (1) The switch use to operates the wiper and washer by two step.
- First step : The wiper operates.
 - Second step : The washer liquid is sprayed and the wiper is operated only while pressing. If release the switch, return to the first step position.

5) TRAVEL ALARM SWITCH (option)



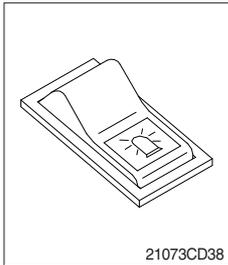
- (1) This switch is the signal to alarm surroundings when the machine travels to forward and backward.
- (2) On pressing this switch, the alarm operates only when the machine is traveling.

6) TRAVEL SPEED CONTROL SWITCH



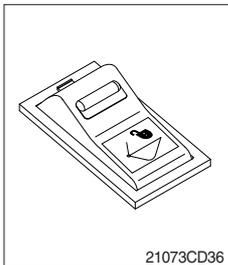
- (1) This switch is to control the travel speed which is changed to high speed by pressing the switch and low speed by pressing it again.
- (2) When the machine travel high speed, the travel speed pilot lamp lights ON.

7) BEACON SWITCH (option)



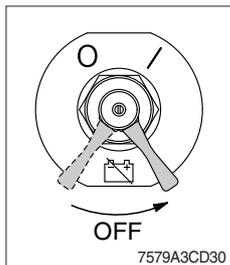
- (1) This switch turns ON the rotary light on the cab.
- (2) The below indicator lamp is turned ON when operation this switch.

8) QUICK COUPLER SWITCH (option)



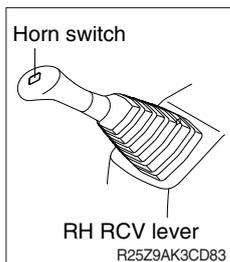
- (1) This switch is used to engage or disengage the moving hook on quick coupler.
- ※ Refer to the page 8-6 for details.

9) MASTER SWITCH



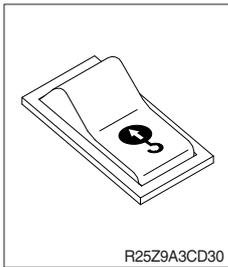
- (1) This switch is used to shut off the entire electrical system.
 - (2) I : The battery remains connected to the electrical system.
O : The battery is disconnected to the electrical system.
- ※ **Never turn the master switch to O (OFF) with the engine running. It could result in engine and electrical system damage.**

10) HORN SWITCH



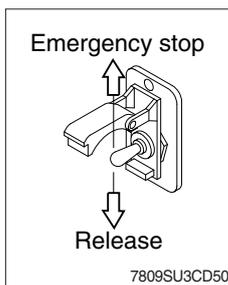
- (1) This switch is at the top of right side control lever.
On pressing, the horn sounds.

11) OVERLOAD SWITCH (option)



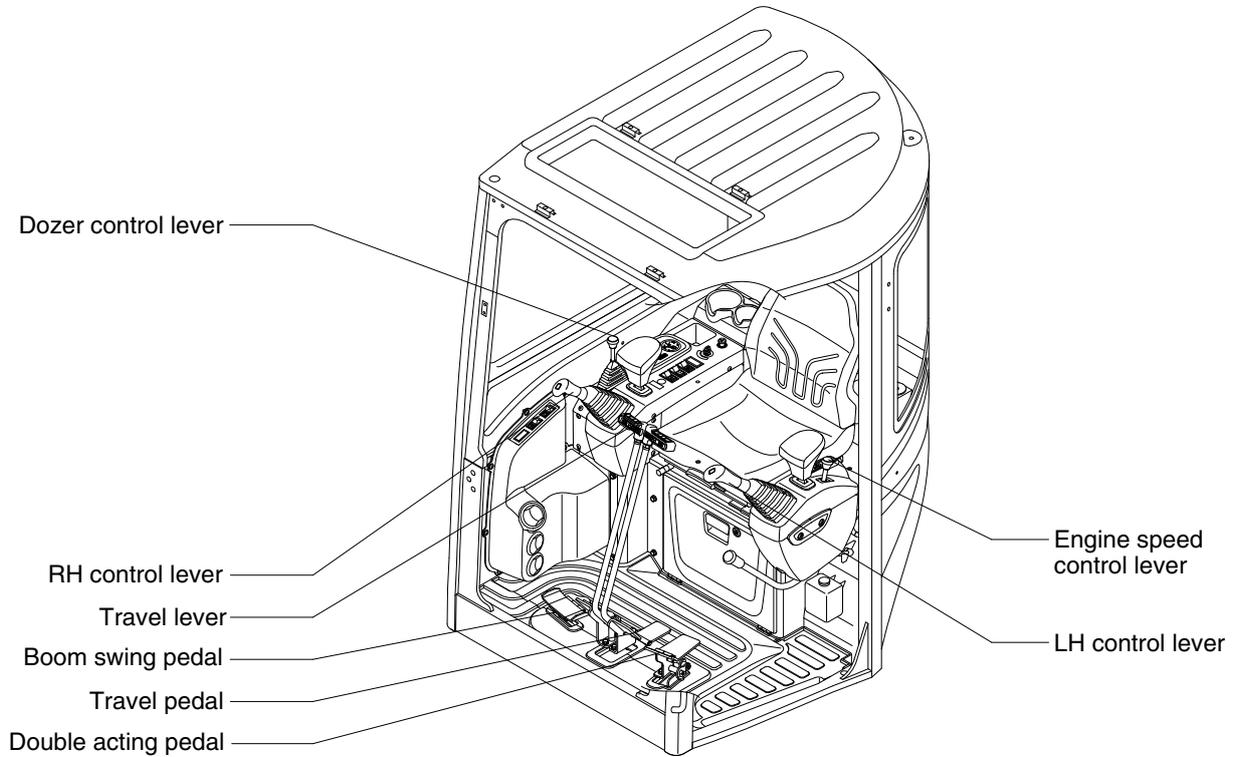
- (1) When this switch turned ON, buzzer makes sound and overload warning lamp comes ON in case that the machine is overload.
- (2) When it turned OFF, buzzer stops and warning lamp goes out.

12) EMERGENCY ENGINE STOP SWITCH



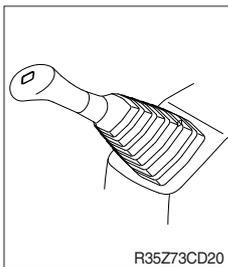
- (1) This switch is used to emergency stop the engine.
※ **Be sure to keep the emergency switch on the release position when restart the engine.**

4. LEVERS AND PEDALS



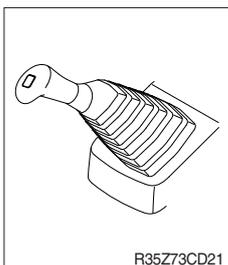
R27Z9AK3CD12

1) LH CONTROL LEVER



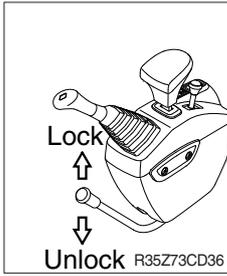
- (1) This joystick is used to control the swing and the arm.
- (2) Refer to operation of working device in chapter 4 for details.

2) RH CONTROL LEVER



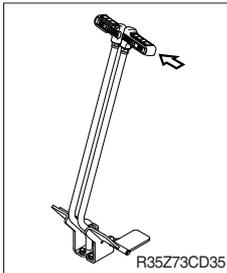
- (1) This joystick is used to control the boom and the bucket.
- (2) Refer to operation of working device in chapter 4 for details.

3) SAFETY LEVER



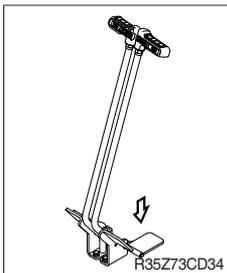
- (1) All control levers are disabled from operation by locating the lever to lock position as shown.
 - ※ **Be sure to raise the lever to LOCK position when leaving from operator's seat.**
- (2) By pushing lever to UNLOCK position, machine is operational.
 - ※ **Do not use the safety lever for handle when getting on or off the machine.**

4) TRAVEL LEVER



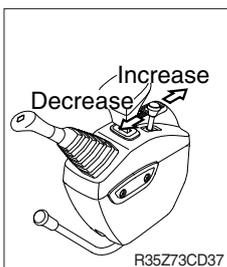
- (1) This lever is mounted on travel pedal and used for traveling by hand. The operation principle is same as the travel pedal.
- (2) Refer to traveling of the machine in chapter 4 for details.

5) TRAVEL PEDAL



- (1) This pedal is used to move the machine forward or backward.
- (2) If left side pedal is pressed, left track will move.
If right side pedal is pressed, right track will move.
- (3) Refer to traveling of machine in chapter 4 for details.

6) ENGINE SPEED CONTROL LEVER



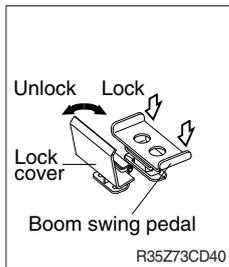
- (1) This lever is used to increase or decrease the rotation speed of engine.
- (2) Move the lever backward to increase engine RPM. Move the lever forward to decrease engine RPM.
- (3) When stopping the engine, move the engine speed control lever forward completely and turn key OFF.

7) DOZER CONTROL LEVER



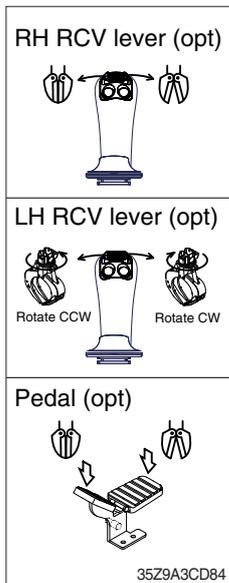
- (1) This lever is used to operate the dozer blade.
- (2) If the lever is pushed forward, the dozer blade will be going down.
If the lever is pulled back, the dozer blade will be going up.

8) BOOM SWING PEDAL



- (1) This pedal is used to swing the boom to the right and left direction.
- (2) Move the lock cover to unlock position by foot.
- (3) The pedal is pressed to left side, boom will swing to the left direction.
The pedal is pressed to right side, boom will swing to the right direction.

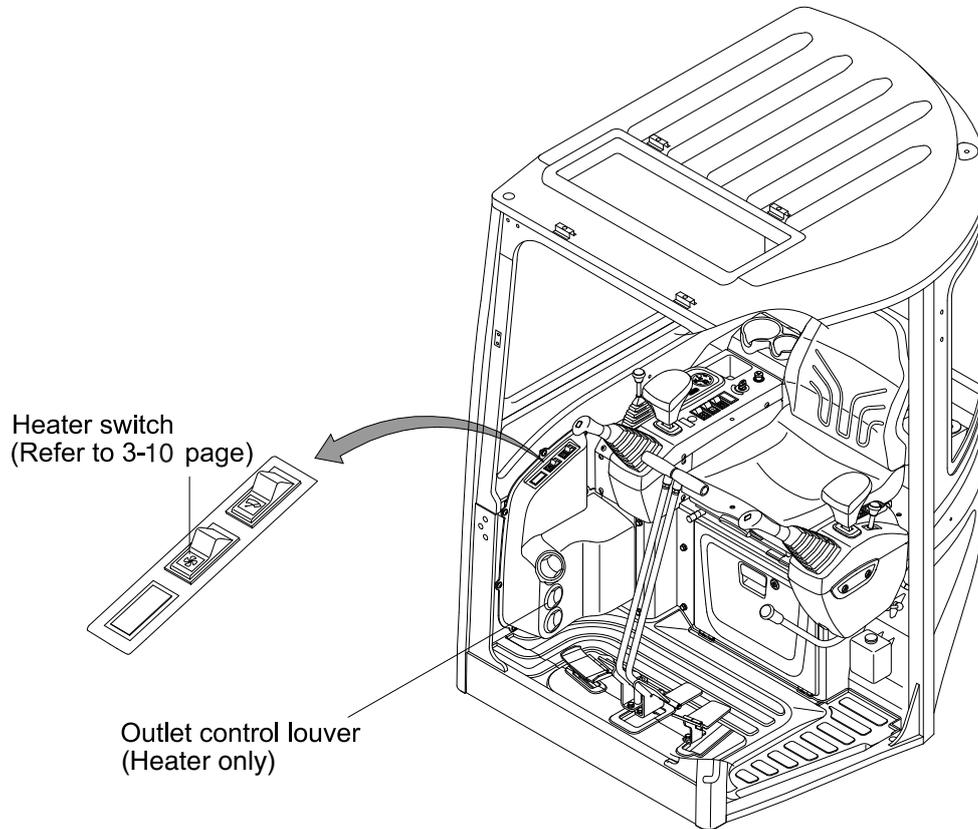
9) DOUBLE ACTING SWITCH AND PEDAL (option)



- (1) This switch and pedal operate the breaker or clamshell or shear if equipped.
- ※ This switch applies to double action hydraulic attachment circuit.
 - ※ This pedal applies to single or double action hydraulic attachment circuit.
 - ※ Refer to page 4-23.

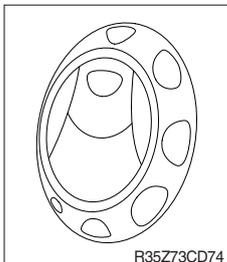
5. HEATER

Heater is equipped for pleasant operation against outside temperature.



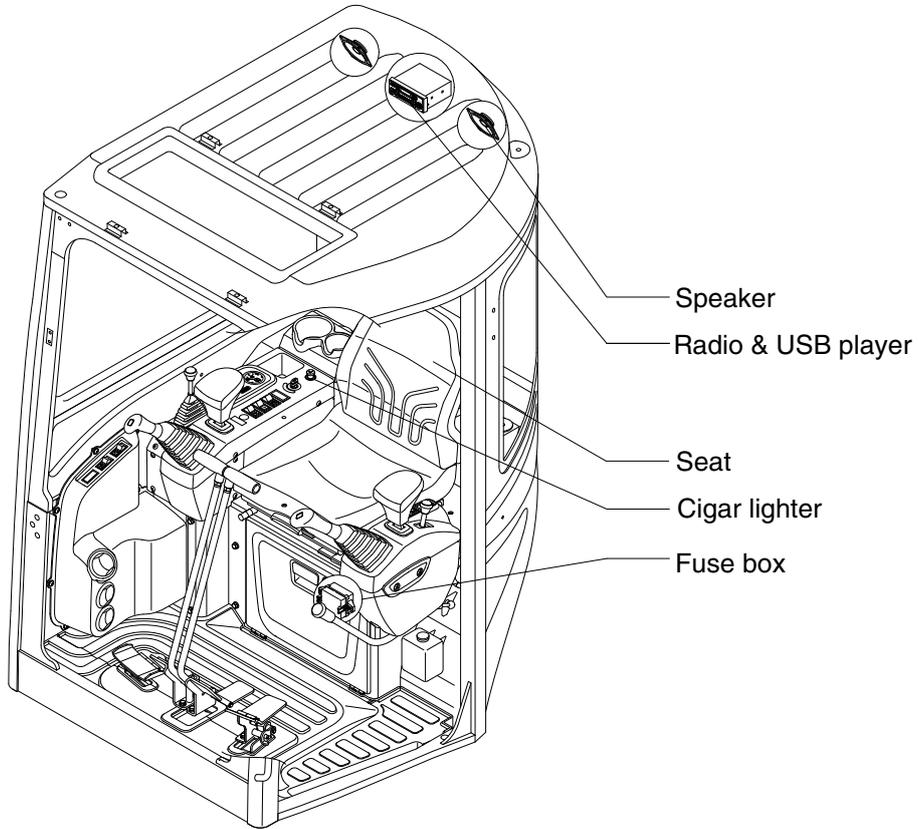
R25Z9AK3CD81

1) OUTLET CONTROL LOUVER



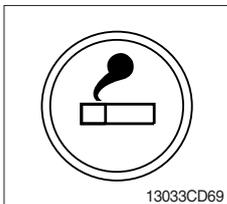
(1) The direction of air can be controlled.
It can be closed or opened.

6. OTHERS



R25Z9A3CD14

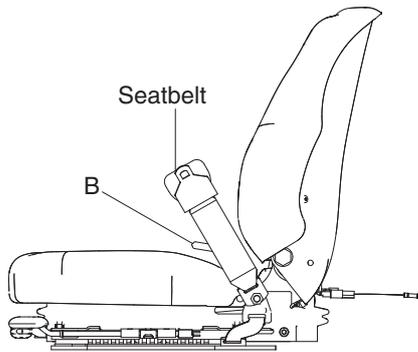
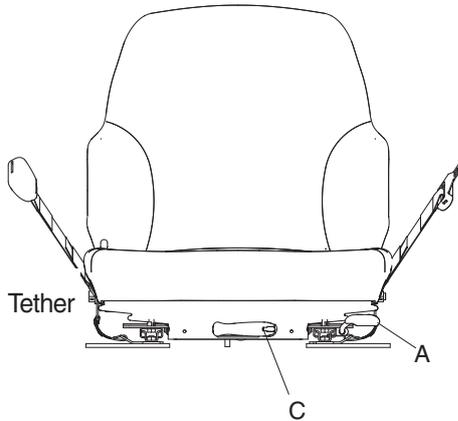
1) CIGAR LIGHTER



- (1) This can be used when the engine starting switch is ON.
 - (2) The lighter can be used when it springs out in a short while after being pressed down.
- ※ **Service socket**
Use cigar lighter socket when you need emergency power.
Do not use the lighter exceeding 12V, 120W.

2) SEAT

The seat is adjustable to fit the contours of the operator's body. It will reduce operator fatigue due to long work hours and enhance work efficiency.



R27Z93CD16

(1) For/aft adjustment (A)

The seat can be positioned over a range 52mm, giving you plenty of room to maneuver in every height and work situation.

(2) Seatback angle adjustment (B)

The seatback adjusts over a range of -5° to $+25^{\circ}$ with 18 locking positions, to give your back full support for every job and make sure you feel best.

(3) Weight adjustment (C)

Just sit down, press the smooth-action lever, click, and you're primed for action, with optimum suspension for all operator weights between 45 and 136 kg (99 and 300 lb). Design comfort with driver appeal-it only takes one simple action to adjust the suspension to the ideal sitting position that's best for you and your back.

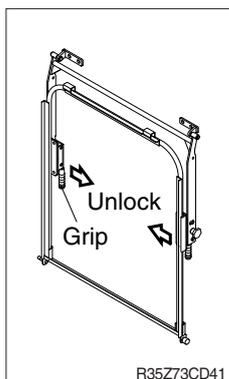
(4) Seatbelt system

The seatbelt provides freedom of movement, yet ensure that you're safety restrained in your seat, even if your vehicle should crash or tip over.

▲ Always check the condition of the seat belt and mounting hardware before operating the machine.

▲ Replace the seat belt at least once every three years, regardless of appearance.

3) UPPER WINDSHIELD



(1) Perform the following procedure in order to open the upper windshield.

① Hold both grips that are located both side of the windshield frame.

② Move grips to inside in order to release the lock latches.

Hold both grips and push the windshield upward.

③ Hold both grips and back into the storage position.

Release both grips carefully until lock latches are into the locking position.

④ Hold both grips and back into the storage position.

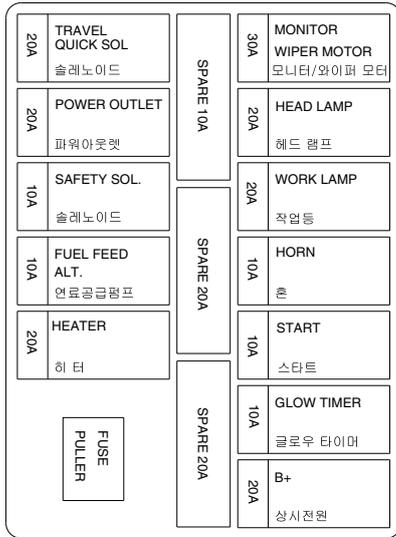
⑤ Release both grips carefully until lock latches are into the locking position.

▲ When working, without having locked the windshield by the auto lock (by pushing the windshield to the rear until it's completely fixed), please be careful as it can cause personal injury if the windshield is not fixed or falls off.

(2) Perform the following procedure in order to close the upper windshield.

Reverse step ① through step ⑤ in order to close the upper windshield.

4) FUSE BOX



R25Z9AK3CD60

(1) The fuses protect the electrical parts and wiring from burning out.

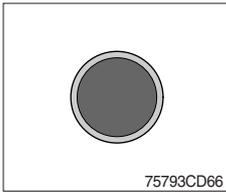
(2) The fuse box cover indicates the capacity of each fuse and circuit it protects.

※ **Replace a fuse with another of the same capacity.**

▲ **Before replacing a fuse, be sure to turn OFF the starting switch.**

■ GENERAL

(1) Power and volume button



① Power ON/OFF button

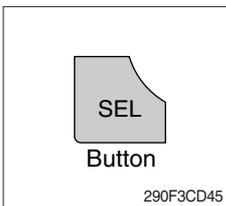
Press power button to turn the unit ON or OFF shortly.

When the power is ON, the previous mode (last memory) will appear.

② Volume up / down control

Turn volume up / down button right to increase the volume level. The level will be shown in VOLUME xx on the LCD display. Turn it left to decrease the volume level. After 5 seconds of volume indication, display will return to the previous mode.

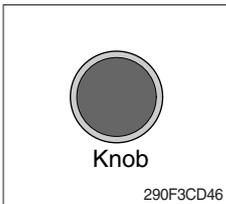
(2) Sound function selection button/knob (audio selection)



① This button is to adjust the sound. Each time you press SEL button shortly, LCD displays each mode as follows :

BASS → TREBLE → BAL → LOUD → EQ → BASS

※ When this button is pressed, LCD display shows selected function for 5 seconds and then returns back to the previous mode. On selected function, level can be controlled by turning this button. The display will automatically return to normal indication in 5 seconds after the last adjustment is made or when another function is activated.



② Bass control

To adjust the bass level, first select the bass mode by pressing the SEL button until BASS indication appears on the LCD display. Within 5 seconds of choosing the bass mode, turn selection knob right / left to adjust the bass level as desired.

The bass level will be shown on the LCD display from a minimum of BASS -10 to a maximum of BASS +10.

The display will automatically return to the normal indication in 5 seconds after the last adjustment or when another function is activated.

③ Treble control

To adjust the treble level, first select the treble mode by pressing the SEL button until TREBLE indication appears on the LCD display. Within 5 seconds of choosing the treble mode, turn selection knob right / left to adjust the treble level as desired.

The treble level will be shown on the LCD display from a minimum of TREBLE -10 to a maximum of TREBLE +10.

The display will automatically return to the normal indication in 5 seconds after the last adjustment or when another function is activated.

④ Balance control

To adjust the left-right speaker balance, first select the balance mode by pressing the SEL button until the BAL indication appears on the LCD display.

Within 5 seconds of choosing the balance mode, turn selection knob right / left to adjust the balance as desired.

The balance position will be shown on the LCD display from BAL 10L (full left) to BAL 10R (full right).

When the volume level between the left and right speakers is equal, BAL L=R will be shown on the LCD display panel.

The display will automatically return to the normal indication in 5 seconds after the last adjustment or when another function is activated.

⑤ Loud control

When listening to music at low volume levels, this feature will boost the bass and treble response.

This action will compensate for the reduction in bass and treble performance experienced at low volume.

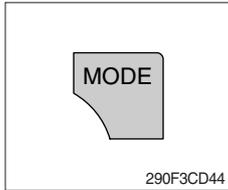
To select the loudness feature, press SEL button until LOUD ON or LOUD OFF is displayed, then turn selection knob left or right to activate or deactivate loudness.

⑥ Equalizer (EQ)

You can select an equalizer curve designed for 4 music types (POP, ROCK, CLASSIC, JAZZ).

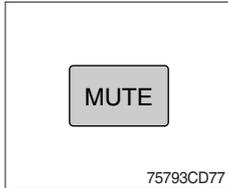
To select the desired curve, first select the EQ mode by pressing SEL button until the "EQ OFF" indication appears on the display panel. Within 5 seconds of choosing the EQ mode, turn selection knob to select an equalizer curve as desired.

(3) Mode button



- ① Press mode button to select RADIO / USB / AUX / BT audio.

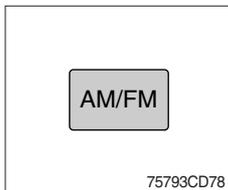
(4) Audio mute button



- ① Press mute button momentarily to mute volume and MUTE mark will blink on the LCD display. Press the button again to return to the mode in use before the mute mode was activated.

■ RADIO

(1) AM / FM / LW band selector

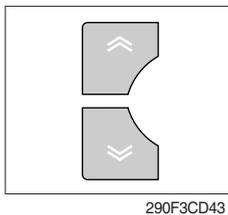


- ① Each time this button is pressed, the radio band is changed. Each time this button is pressed, LCD displays each band as follows :

FM1 → FM2 → FM3 → AM → LW → FM1

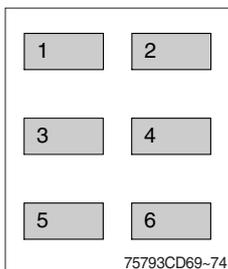
※ LW band is only available for Europe.

(2) Up / down tuning



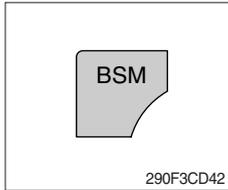
- ① To automatically select a radio station, momentarily press the up tune seek button  or down tune seek button  for less than 3 seconds to search for the closest radio station. To manually select a radio station, press the up tuning & down tuning button for longer than 3 seconds. The radio frequency will move up or down step by step each time you press button.

(3) Station pre-set button



- ① Pressing these buttons shortly will recall your favorite pre-set radio stations. To store your favorite stations into any of the 6 pre-set memories in each band (AM/FM/LW), use the following procedure :
 - a. Turn the radio ON and select the desired band.
 - b. Select the first station to be pre-set using the manual up/down or automatic seek tuning control button.
 - c. Press the chosen pre-set button to store your selected station into and continue to hold it in. The beep sound will be momentarily heard and the pre-set number will appear on the LCD display indicating that the station is now set into that pre-set memory position and can be recalled at any time, by pressing that pre-set button.

(4) Pre-set scan (PS) / Best station memory (BSM) button



① Pre-set scan (PS)

Press BSM button shortly to scan the 6 pre-set station stored the memories on each band (AM/FM/LW).

The unit will stop at each pre-set station (the pre-set number on the LCD display will flash during pre-set scan operation) and remain on the selected frequency. Press the button momentarily again to remain on the station currently being heard.

② Best station memory (BSM)

Pressing BSM button for longer than 2 seconds will activate the BSM tuning feature which will automatically scan and enter each station into memory.

If you have already set the pre-set memories to your favorite stations, activating the BSM tuning feature will erase those stations and enter the new ones.

This BSM feature is most useful when traveling in a new area where you are not familiar with the local stations.

■ USB PLAYER



(1) USB function

① Connect a USB device if you want to listen to MP3 file in a USB device.

② It will automatically play MP3 file in the USB device and the LCD display will show "READING USB".

※ If there are no files on USB device, playback will revert back to the previous mode after displaying "NO FILE".

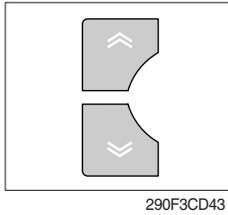
(2) AUX function

① If you want to listen to music of a external audio device, connect a external audio device through AUX cable.

② Change AUX mode by pressing MODE button.

If audio file of Audio device is playing, you can listen to music through speaker.

(3) File selection & cue / review button



① File selection function

This button is used to select file up / down.

Each time the forward file select \blacktriangleright is pressed, file number is increased.

Each time the backward file select \blacktriangleleft is pressed, file number is decreased.

② Cue / review functions

High-speed audible search of file on a USB can be made by this button (the cue and review functions).

Press and hold the cue button \blacktriangleright to advance rapidly in the forward direction or the review button \blacktriangleleft to advance rapidly in the backward direction.

(4) MP3 directory / file searching

① The D-, D+ button is used to select a particular directory and file.

Press and hold for more than 3 seconds while playing MP3 file.

Turn right / left the selection knob to search the directory. Press the button when you find the wanted directory.

For example, the directory search generally changes in two methods depending on the order of writing as follows.

· Method 1 : ROOT → Dir01 → Dir02 → Dir03 → Dir04 → Dir05 → Dir06 → Dir07 → ROOT

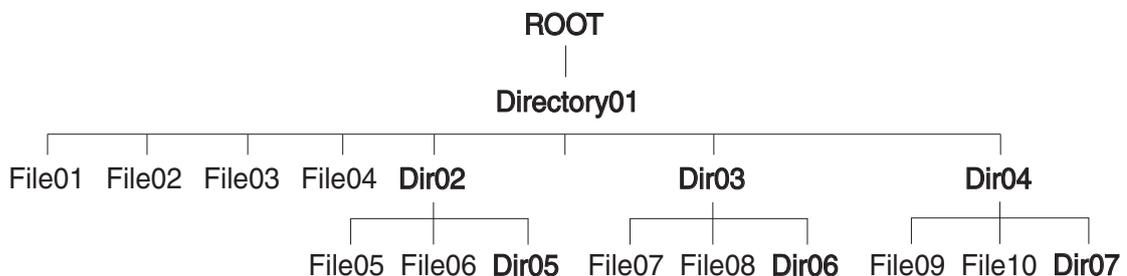
· Method 2 : ROOT → Dir01 → Dir02 → Dir05 → Dir03 → Dir06 → Dir04 → Dir07 → ROOT

If you want to search the file in the located directory, turn right / left the selection knob consecutively. Press the button when you find the wanted file. The unit will then play the selected file.

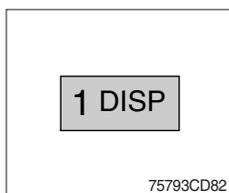
For instance, the file search changes in Dir01 as follows.

File01 → File02 → File03 → File04 → File01

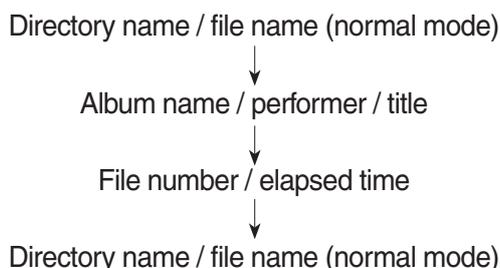
※ MP3 directory / file configuration



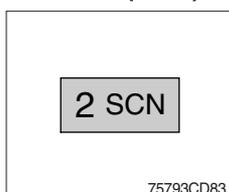
(5) ID3 v2 display



- ① Disp button is used to change the display information.
While playing an MP3 file, you can change the file information shown on the LCD display.
Each time you press DISP (display), the display changes to show the following.
- ※ If the MP3 disc does not have any ID3 information, the display will show NO ID3 on LCD display.

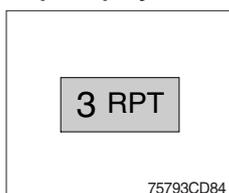


(6) File scan (SCN)



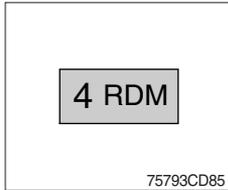
- ① During USB play, press SCN button to play the first 10 seconds of each file on the whole file on the USB (SCN mark will appear on the LCD display).
When a desired file is reached, press the SCN button again to cancel the function.
The unit will then play the selected file.
- ※ In case of playing MP3 file, when the SCN (scan) button is pressed and held for longer than 2 seconds, the SCN mark will blink on the LCD display and all files in the selected directory will be introduced until the file scan mode is cancelled by pressing the SCN button again or by activating the random or repeat functions.

(7) Repeat play selector (RPT)



- ① During USB play, press RPT button to play the selected file repeatedly (RPT will appear on the LCD display).
Play of the file will continue to repeat until this button is pressed again and the RPT disappears from the LCD display.
- ※ In case of playing MP3 file, when the RPT button is pressed and held longer than 2 seconds, the RPT mark will blink on the LCD display and play all files in the selected directory and will be repeated until the directory repeat mode is cancelled by pressing the repeat button again or by activating the scan or random functions (RPT mark will disappear from LCD display).

(8) Random play selector (RDM)

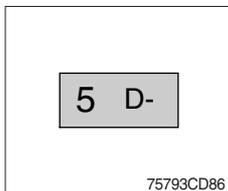


① During USB play, press RDM button to play the files on the USB in a random shuffled order (RDM will appear on the LCD display). The file select function will also select file in the random order instead of the normal process.

The random play mode can be cancelled by this button again.

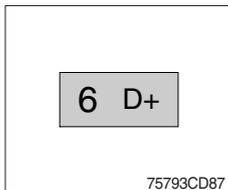
※ In case of MP3 file, when the random button is pressed and held longer than 2 seconds, the RDM mark will blink on the LCD display and play all files in directory randomly until the directory random mode is cancelled by pressing the random button again or by activating the scan or repeat functions (RDM mark will disappear from LCD display).

(9) Directory down



① Press D- button briefly while playing MP3. The previous directory is located each time you press this button.

(10) Directory up



① Press D+ button briefly while playing MP3 . The next directory is located each time you press this button.

※ If the MP3 file does not have a directory, the unit play MP3 at 10-file intervals.

※ If any MP3 file does not exist in USB, this button can not operate.

RADIO AND USB PLAYER (MACHINE SERIAL NO.: #0022~)



9403CD101

■ FRONT PANEL PRESENTATION

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1  Power ON/OFF,
Volume UP/DOWN button</p> <p>2  Manual UP/DOWN Tuning,
File search, SEL button</p> <p>3  Mode button,
Audio mute button</p> <p>4  Radio seek up button</p> <p>5  Radio seek down button</p> <p>6  Station preset 1
DIS Display button</p> <p>7  Station preset 2</p> <p>8  Station preset 3
RPT Repeat play button</p> <p>9  Station preset 4
RDM Random play button</p> | <p>10  Station preset 5
DIR- Directory down button</p> <p>11  Station preset 6
DIR+ Directory up button</p> <p>12  Scan play button (SCAN)
Best station memory (BSM) button</p> <p>13  Track up button</p> <p>14  Track down button</p> <p>15  USB connector</p> <p>16  AUX IN Jack</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

■ GENERAL

(1) Power and volume button



① Power ON / OFF button

Press power button (1) to turn the unit on or off.

② Volume UP/DOWN control knob

Turn VOL knob (1) right to increase the volume level.

Turn VOL knob (1) left to decrease the volume.

After 5 seconds the display will return to the previous display mode.

③ Initial volume level set up

I-VOL is the volume level the unit will play at when next turned on.

To adjust the I-VOL level, press and hold VOL button (1) for longer than 2 seconds. The current volume level displays on the display panel.

Then turn button (1) right or left to set the volume level as the I-VOL level.

④ Clock ON/OFF control

The CLOCK was default at off status. To turn CLOCK ON, press and hold VOL button (1) for longer than 2 seconds to display I-VOL, then short press VOL again, turn VOL knob while CLOCK OFF display, then the CLOCK ON will be displayed.

※ **Due to time tolerance, the clock display on the Audio unit might have little difference.**

⑤ Clock adjustment

With CLOCK ON selected, press VOL knob again after CLOCK ON display, the hour will blink, turn VOL knob right or left to adjust hour.

Simply press VOL again, the minute will blink, turn VOL knob to adjust minute. Then press VOL again to confirm the clock once finished.

(2) Menu Selection



- ① This button can adjust the sound effect and other things.
Each time you press this button (2), LCD displays as follows :

BAS → TREB → BAL L=R → FAD F=R → EQ → LOUD ON →
BEEP 2ND

On each setting, the level can be controlled by turning TUNE knob (2).
When the last adjustment is made, after 5 seconds, the display will automatically return to the previous display mode.

② Bass control

To adjust the bass tone level, first select the bass mode by pressing SEL button (2) repeatedly until BASS appears on the display panel. Then turn knob (2) right or left within 5 seconds to adjust the bass level as desired. The bass level will be shown on the display panel from a minimum of BASS-7 to a maximum of BASS+7.

③ Treble control

To adjust the treble tone level, first select the treble mode by pressing SEL button (2) repeatedly until TREB appears on the display panel. Then turn knob (2) right or left within 5 seconds to adjust the treble level as desired. The treble level will be shown on the display panel from a minimum of TREB -7 to a maximum of TREB +7.

④ Balance control

To adjust the left-right speaker balance, first select the balance mode by pressing SEL button (2) repeatedly until BAL indication appears on the display panel. Then turn knob (2) right or left within 5 seconds to adjust the balance as desired. The balance position will be shown by the bars on the display panel from BAL 10R (full right) to BAL 10L (full left).

⑤ Fader control

To adjust the front-rear speaker balance, first select the fader mode by pressing SEL button (2) repeatedly until FADER indication appears on the display panel. Then turn knob (2) right or left within 5 seconds to adjust the front-rear speaker level as desired. The fader position will be shown by the bars on the display panel from FAD 10F (full front) to FAD 10R (full rear).

⑥ EQ control

You can select an equalizer curve for 4 music types (CLASSIC, POP, ROCK, JAZZ). Press button (2) until EQ is displayed, then turn knob (2) right or left to select the desired equalizer curve. Each time you turn the knob, LCD displays as follows :

EQ OFF → CLASSIC → POP → ROCK → JAZZ

- ※ When the EQ mode is activated, the BASS and TREBLE modes are not displayed.

⑦ Loud control

When listening to music at low volume levels, this feature will boost the bass and treble response. This action will compensate for the reduction in bass and treble performance experienced at low volume.

To select the loudness feature, press button (2) until LOUD is displayed, then turn knob (2) right or left to activate or deactivate loudness.

⑧ Beep control

To adjust the BEEP mode, first select the BEEP mode by pressing button (2) repeatedly until BEEP indication appears on the display panel. Then turn knob (2) left or right within 5 seconds to select BEEP 2ND, BEEP OFF or BEEP ON.

- BEEP 2ND : You will only hear the beep sound when the buttons are held down for more than 2 seconds.
- BEEP OFF : You can not hear the sound beep when you press the buttons.
- BEEP ON : You can hear the beep sound each time you press the buttons.

(3) Mute control

- ① Press and hold MUTE button (3) for over 2 seconds to mute sound output and MUTE ON will blink on the LCD. Press the button again to cancel MUTE function and resume to normal playing mode.

(4) Mode selection

- ① Repeat press MODE button (3) to switch between FM1, FM2, AM, USB, AUX, BT MUSIC.
- ※ If there is no USB, AUX, Bluetooth Phone connected, it would not display USB, AUX, BT when you press button (3).

■ RADIO

(1) Mode button



- ① Repeat press MODE button to select FM1, FM2 or AM.

(2) Manual tuning button



- ① To manually tune to a radio station, simply turn encoder TUNE (2) left or right to increase or decrease the radio frequency.

(3) Auto tuning button



- ① To automatically select a radio station, simply press Seek up or Track down button.



(4) Station preset button



- ① In radio mode, pressing buttons (6) to (11) will recall the radio stations that are memorized. To store desired stations into any of the 6 preset memories, in either the AM or FM bands, use the following procedure :

- a. Select the desired station.
- b. Press and hold one of the preset buttons for more than 2 seconds to store the current station into preset memory. Six stations can be memorized on each of FM1, FM2, and AM.

(5) Preset scan (PS) / Best station memory (BSM) button



① Press BSM button (12) momentarily to scan the 6 preset stations stored in the selected band. When you hear your desired station, press it again to listen to it.

Press BSM button (12) for longer than 2 seconds to activate the Best Station Memory feature which will automatically scan and enter each station into memory.

※ **If you have already set the preset memories to your favorite stations, activating the BSM tuning feature will erase those stations and enter into the new ones. This BSM feature is most useful when travelling in a new area where you are not familiar with the local stations.**

■ USB PLAYER

(1) USB playback



- ① The unit was equipped with a front USB jack and also a rear USB Jack.

With a USB device plugged in the front USB jack, it will be detected as front USB mode. And with a USB device plugged in the rear USB jack, it will be detected as rear USB. To get to a USB mode, press MODE (3) button momentarily or insert the USB device in front or rear USB jack.

- ※ If no mp3 or wma files in USB device, it will convert to the previous mode after display NO FILE.

(2) Track Up / Down button



- ① Press SEEK up (13) or TRACK down (14) to select the next or previous track. Press and hold the buttons to advance the track rapidly in the forward or backward direction.



(3) MP3 directory / File searching



- ① Button (2) is used to select a particular directory and file in the device. Turn button (2) right or left to display the available directories. Press button (2) momentarily when the desired directory is displayed, then turn button (2) right or left again to display the tracks in that directory. Press button (2) to begin playback when the desired file is displayed.

(4) Directory Up / Down button



- ① During MP3/WMA playback, simply press DIR- button (10) to select the previous directory (if available in the device); simply press DIR+ button (11) to select the next directory (if available in the device).

- ※ If the USB device does not contain directories, it would play MP3/WMA tracks at 10- file when you press DIR- button (10), and play MP3/WMA tracks at 10+ file when you press DIR+ (11) button.

(5) Track Scan Play (SCAN) button



- SCAN playback : Simply press SCAN (12) button to play the first 10 seconds of each track.
- SCAN folder : Press and hold SCAN button for longer than 2 seconds to scan play the tracks in current folder.
- SCAN off : Simply press it again to cancel SCAN feature.

(6) Track Repeat Play (RPT) button



- REPEAT playback : Simply press RPT (8) button to play current track repeatedly.
- REPEAT folder : Press and hold RPT for longer than 2 seconds to repeat play the tracks in current folder.
- REPEAT off : Simply press it again to cancel REPEAT feature.

(7) Track Random Play (RDM) button



- RANDOM playback : Simply press RDM (9) button to play the tracks in the device in a random sequence.
- RANDOM folder : Press and hold RDM button for longer than 2 seconds to random play the tracks in current folder.
- RANDOM off : Simply press it again to cancel RANDOM feature.

(8) ID3 v2 (DISP)



- ① While a MP3 file is playing, press DISP button (6) to display ID3 information. Repeat push DISP button (6) to show directory name / file name and album name / performer / title.

※ **If the MP3 disc does not have any ID3 information, it will show NO ID3.**

* USB Information and Notice

a. Playback FILE SYSTEM and condition allowance.

- FAT, FAT12, FAT16 and FAT32 in the file system.
- V1.1, V2.2 and V2.3 in the TAG (ID3) version.

b. Display up to 32 characters in the LCD display.

c. No support any of MULTI-CAED Reader.

d. No high speed playback but only playing with normal full speed.

※ **DRM files in the USB may cause malfunction to playback in the radio unit.**

※ **The temperature below -10 Celsius, the audio unit with USB hook up would be affected to play well.**

■ AUX OPERATION

It is possible to connect your portable media player to the audio system for playback of the audio tracks via the cab speakers.

To get the best results when connecting the portable media to the audio system, follow these steps :

- Use a 3.5 mm stereo plug cable to connect the media player headphone socket at each end as follows.
 - Adjust the portable media player to approximately 3/4 volume and start playback.
 - Press the MODE button (3) on the audio unit to change into AUX mode.
 - The volume and tone can now be adjusted on the audio unit to the desired level.
- ※ **The audio quality of your media player and the audio tracks on it may not be of the same sound quality as the audio system is CD Player.**
- ※ **If the sound of the media player is too low compared with the radio or CD, increase the volume of the player.**
- ※ **If the sound of the media player is too loud and/or distorted, decrease the volume of the player.**
- ※ **When in AUX mode, only the Volume, Bass, Treble, EQ and Mode functions of the audio unit can be used.**

■ RESET AND PRECAUTIONS

(1) Reset function

Interfering noise or abnormal compressed files in the MP3 disc or USB instrument may cause intermittent operation (or unit frozen/locking up). It is strongly recommended to use appropriate USB storage to not cause any malfunction to the audio unit. In the unlikely event that the player fails to operate correctly, try to reset unit by any of following two methods.

① press and hold   simultaneously for about 5 seconds. (without Bluetooth)

② Take out the fuse for the audio system in the vehicle once and then plug it back in.

※ It will be necessary to re-enter the radio preset memories as these will have been erased when the microprocessor was reset.

※ After resetting the player, ensure all functions are operating correctly.

(2) Precautions

When the inside of the cab is very cold and the player is used shortly after switching on the heater, moisture may form on the disc or the optical parts of the player and proper playback may not be possible.

If moisture forms on the optical parts of the player, do not use the player for about one hour. The condensation will disappear naturally allowing normal operation.

① Operation voltage : 9~32 volts DC, negative

② Output power : 40 watts maximum (20 watts x 2 channels)

③ Tuning range

Area	Band	Frequency range	Step
USA	FM	87.5~107.9 MHZ	200K
	AM	530~1710 KHZ	10K
EUROPE	FM	87.5~108.0 MHZ	50K
	AM	522~1620 KHZ	9K
ASIA	FM	87.5~108.0 MHZ	100K
	AM	531~1602 KHZ	9K
LATIN	FM	87.5~107.9 MHZ	100K
	AM	530~1710 KHZ	10K

● AREA Selection :

- To select an area, press and hold related buttons at FM1 band for about 3 seconds.
- USA Area: Press and hold mode + 1DIS buttons for 3 seconds
- EUROPE Area: Press and hold mode + 2 buttons for 3 seconds
- ASIA Area: Press and hold mode + 3RPT buttons for 3 seconds
- LATIN Area: Press and hold mode + 4RDM buttons for 3 seconds.

④ USB version : USB 1.1

1. SUGGESTION FOR NEW MACHINE

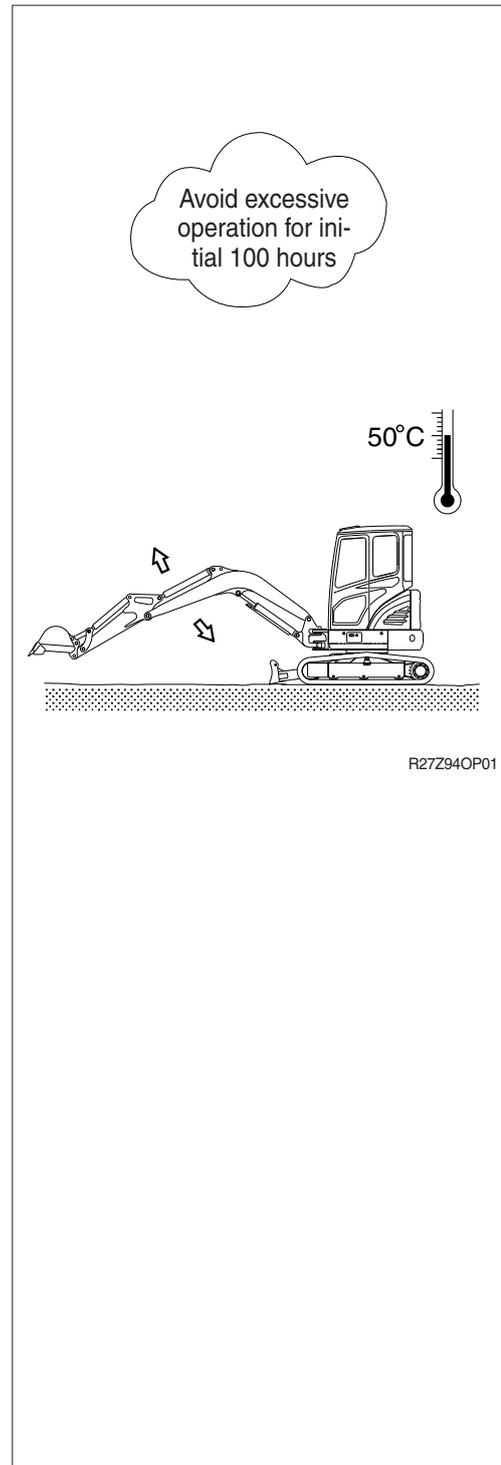
- 1) It takes about 100 operation hours to enhance its designed performance.
- 2) Operate according to below three steps and avoid excessive operation for the initial 100 hours.

Service meter	Load
Until 10 hours	About 60%
Until 100 hours	About 80%
After 100 hours	100%

※ **Excessive operation may deteriorate the potential performance of machine and shorten lifetime of the machine.**

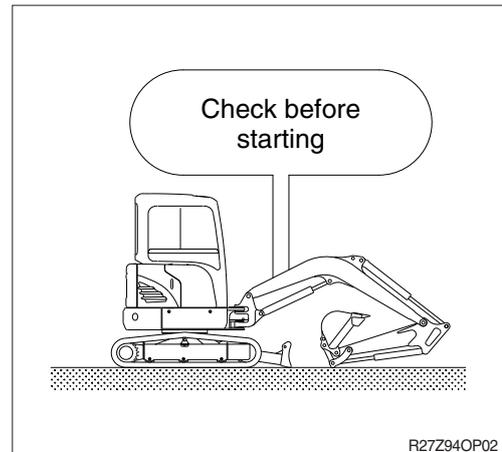
- 3) Be careful during the initial 100 hours operation
 - (1) Check daily for the level and leakage of coolant, engine oil, hydraulic oil and fuel.
 - (2) Check regularly the lubrication and fill grease daily all lubrication points.
 - (3) Tighten bolts.
 - (4) Warm up the machine fully before operation.
 - (5) Check the gauges occasionally during the operation.
 - (6) Check if the machine is operating normally during operation.
- 4) Replace followings after initial 250 hours of operation.

Checking items	Hours
Engine oil	250
Engine oil filter element	
Fuel filter element	
Hydraulic oil return filter element	
Pilot line filter element	
Travel reduction gear oil	



2. CHECK BEFORE STARTING THE ENGINE

- 1) Look around the machine and under the machine to check for loosen nut or bolts, collection of dirt, or leakage of oil, fuel or coolant and check the condition of the work equipment and hydraulic system. Check also loosen wiring, and collection of dust at places which reach high temperature.
※ **Refer to the daily check on the chapter 6, maintenance.**
- 2) Adjust seat to fit the contours of the operator's body for the pleasant operation.
- 3) Adjust the rear view mirror.

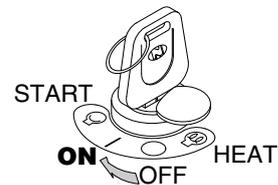


3. STARTING AND STOP THE ENGINE

1) CHECK INDICATOR LIGHTS

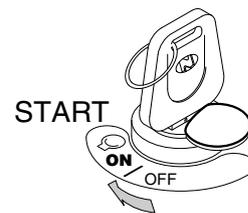
- (1) Check if all the operating lever is on the neutral position.
 - (2) Turn the starting switch to the ON position, and check following.
 - ① If all the lamps light ON and buzzer sounding for 6 seconds.
 - ② Only below lamps will light ON and all the other lights will turn OFF after 2 seconds.
 - Engine oil pressure warning lamp (1)
 - Battery charging warning lamp (2)
- ※ If the ESL mode is set to the Always, enter the password to start engine.
- ※ If the password has failed 5 times, please wait 10 minutes before re-attempting to enter the password.
- ※ Refer to the page 3-8 for ESL mode setting.

S/NO.: #0344



R25Z9AK4OP05

S/NO.: #0345-

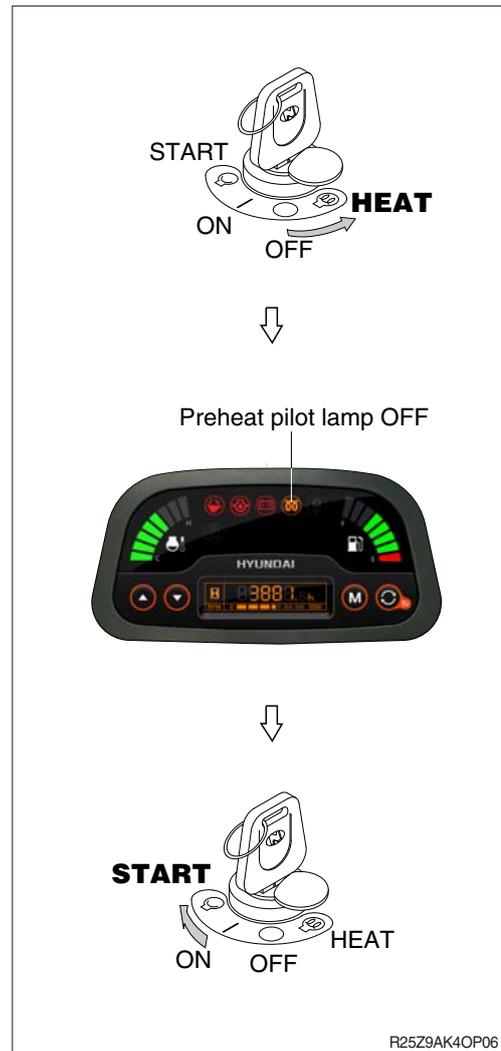


R25Z9AK4OP05K

2) STARTING ENGINE : Machine serial No. -#0344

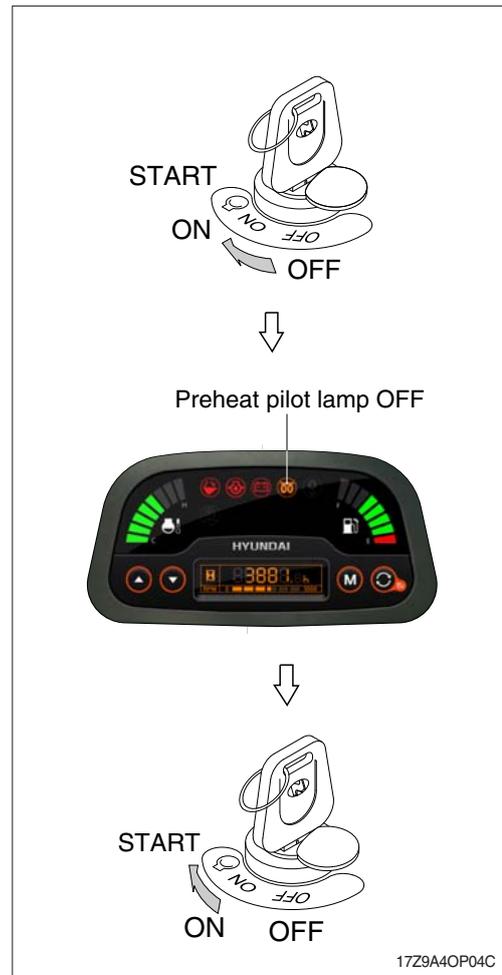
- ※ Sound horn to warn surroundings after checking if there are obstacles in the area.
- ※ Replace the engine oil and fuel referring to recommended oils at page 2-12.
- ※ Fill anti-freeze solution to the coolant as required.

- (1) Check if all levers are on the neutral position.
 - (2) If the weather temperature is below 10°C, the start switch turn HEAT position.
 - (3) After the preheat pilot lamp OFF, start engine by turning the starting switch to the START position.
 - (4) Release the starting switch immediately after starting engine to avoid possible damage to the starting motor.
- ※ If the engine does not start, the start switch turn HEAT position for preheating.
After the preheating, start the engine again.
 - ※ If the engine does not start, allow the starter to cool for 10~20 seconds before attempting to start the engine again.
At the cold, allow 2 minute before attempting to start the engine again.



STARTING ENGINE : Machine serial No. #0345-

- ※ Sound horn to warn surroundings after checking if there are obstacles in the area.
 - ※ Replace the engine oil and fuel referring to recommended oils at page 2-12.
 - ※ Fill anti-freeze solution to the coolant as required.
- (1) Check if all levers are on the neutral position.
 - (2) If the weather temperature is below 10°C, the start switch turn ON position.
 - (3) After the preheat pilot lamp OFF, start engine by turning the starting switch to the START position.
 - (4) Release the starting switch immediately after starting engine to avoid possible damage to the starting motor.
- ※ If the engine does not start, the start switch turn ON position for preheating.
After the preheating, start the engine again.
 - ※ If the engine does not start, allow the starter to cool for 10~20 seconds before attempting to start the engine again.
At the cold, allow 2 minute before attempting to start the engine again.



3) INSPECTION AFTER ENGINE START

Inspect and confirm the following after engine starts.

- (1) Is the level gauge of hydraulic oil tank in the normal level?
- (2) Are there leakages of oil or water?
- (3) Are all the warning lamps OFF(2~6)?
- (4) Is the indicator of engine coolant temperature gauge(1) in the normal zone?
- (5) Is the engine sound and the color of exhaust gas normal?
- (6) Are the sound and vibration normal?

- ※ Do not increase engine speed quickly after starting, it can damage engine or turbocharger.
- ※ If there are problems in the control panel, stop the engine immediately and correct problem as required.

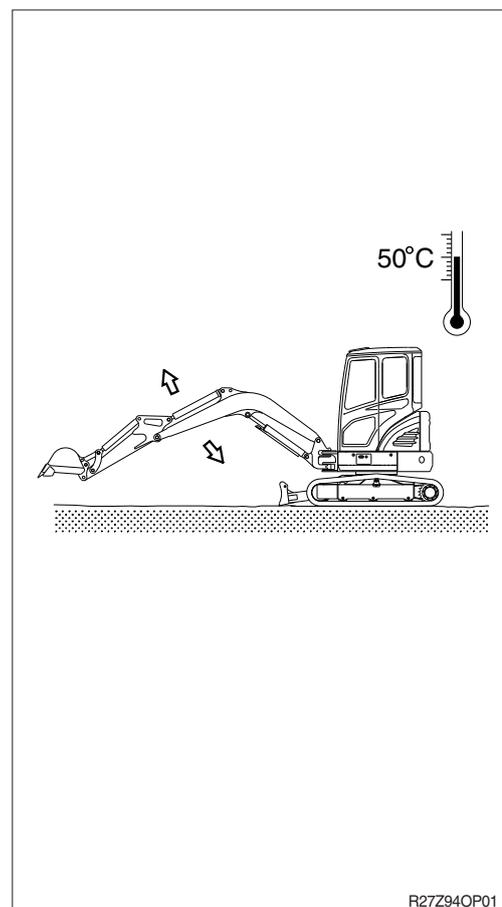


R25Z9AK4OP08

4) WARMING-UP OPERATION

- ※ The most suitable temperature for the hydraulic oil is about 50°C (122°F). It can cause serious trouble in the hydraulic system by sudden operation when the hydraulic oil temperature is below 25°C (77°F). Then temperature must be raised to at least 25°C (77°F) before starting work.

- (1) Run the engine at low idling for 5 minutes.
- (2) Speed up the idling and run the engine at mid-range speed.
- (3) Operate bucket lever for 5 minutes.
 - ※ Do not operate anything except bucket lever.
- (4) Run the engine at the high speed and operate the bucket lever and arm lever for 5-10 minutes.
 - ※ Operate only the bucket lever and arm lever.
- (5) This warming-up operation will be completed by operation of all cylinders several times, and operation of swing and traveling.
 - ※ Increase the warming-up operation during winter.

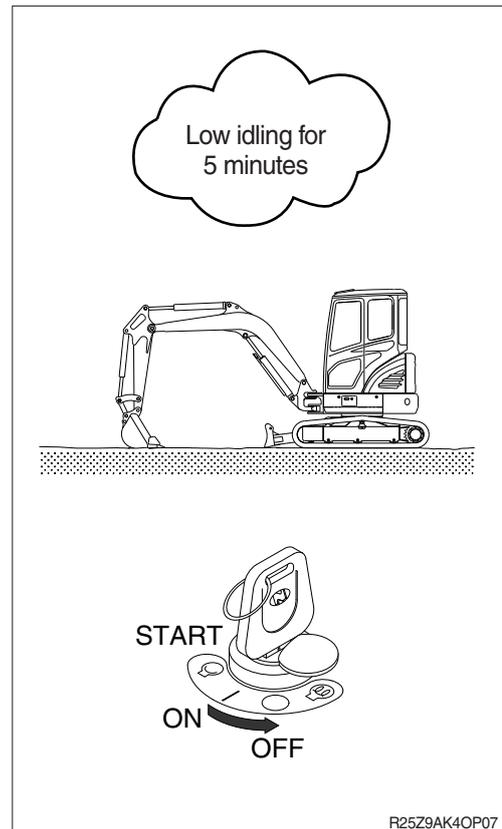


R27Z94OP01

5) TO STOP THE ENGINE

- ※ If the engine is abruptly stopped before it has cooled down, engine life may be greatly shortened. Consequently, do not abruptly stop the engine apart from an emergency.
- ※ In particular if the engine has overheated, do not abruptly stop it but run it at medium speed to allow it to cool gradually, then stop it.

- (1) Down the bucket on the ground then put all the levers in the neutral position.
- (2) Run the engine at low idling speed for about 5 minutes.
- (3) Return the key of starting switch to the OFF position.
- (4) Remove the key to prevent other people using the machine and LOCK safety lever.
- (5) Lock the cab door.

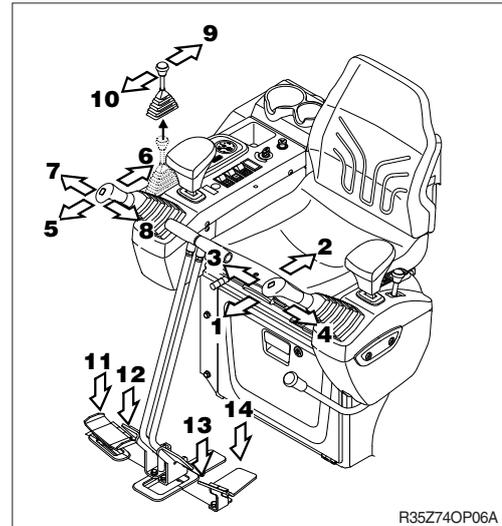


4. OPERATION OF WORKING DEVICE

※ **Confirm the operation of control lever and working device.**

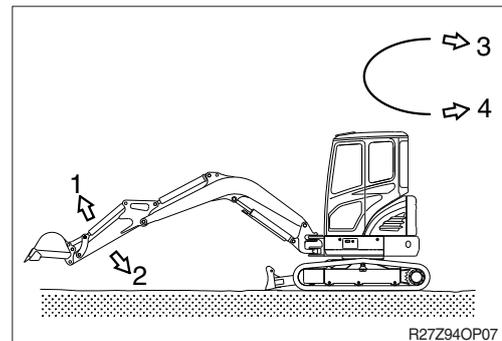
- 1) Left control lever controls arm and swing.
- 2) Right control lever controls boom and bucket.
- 3) When you release the control lever, control lever returns to neutral position automatically.

※ **When operating swing, consider the swing distance by inertia.**



※ **Left control lever**

- 1 Arm roll-out
- 2 Arm roll-in
- 3 Swing right
- 4 Swing left

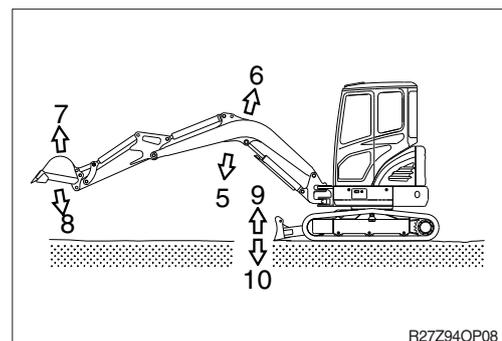


※ **Right control lever**

- 5 Boom lower
- 6 Boom raise
- 7 Bucket roll-out
- 8 Bucket roll-in

※ **Dozer control lever**

- 9 Dozer blade up
- 10 Dozer blade down

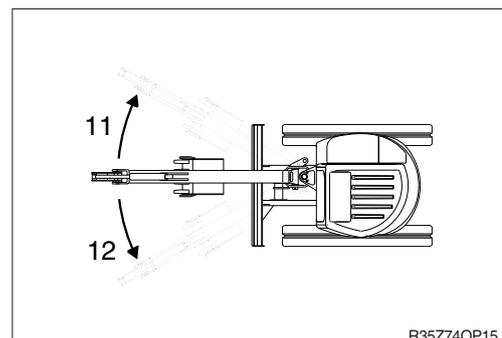


※ **Boom swing pedal**

- 11 Boom swing right
- 12 Boom swing left

※ **Option control pedal**

- 13, 14 Refer to optional attachment



5. TRAVELING OF THE MACHINE

1) BASIC OPERATION

(1) Traveling position

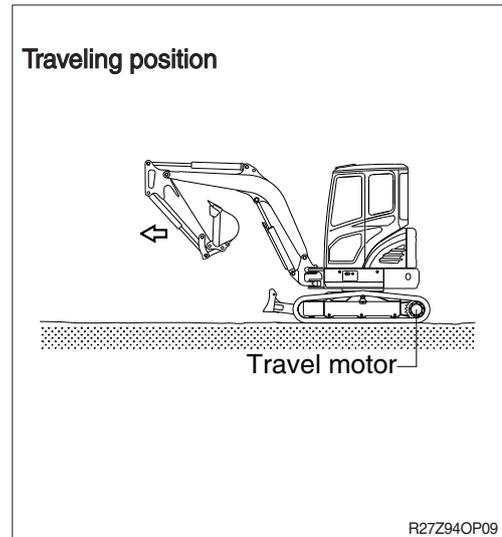
It is the position which the traveling motor is in the rear and the working device is forward.

- ▲ **Be careful as the traveling direction will be reversed when the whole machine is swung 180 degree.**

(2) Traveling operation

It is possible to travel by either travel lever or pedal.

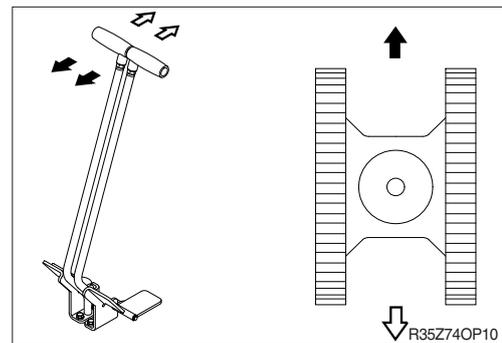
- ※ **Do not travel continuously for a long time.**
- ※ **Reduce the engine speed and travel at a low speed when traveling on uneven ground.**



(3) Forward and backward traveling

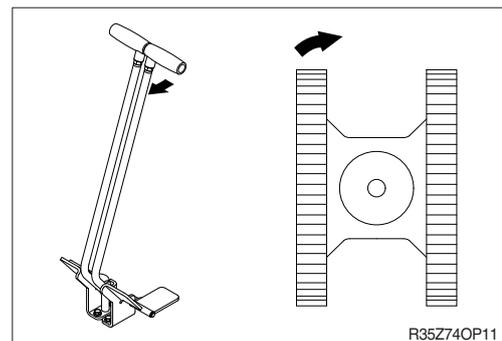
When the left and right travel lever or pedal are pushed at the same time, the machine will travel forward or backward.

- ※ **The speed can be controlled by the operation stroke of lever or pedal and change of direction will be controlled by difference of the left and right stroke.**



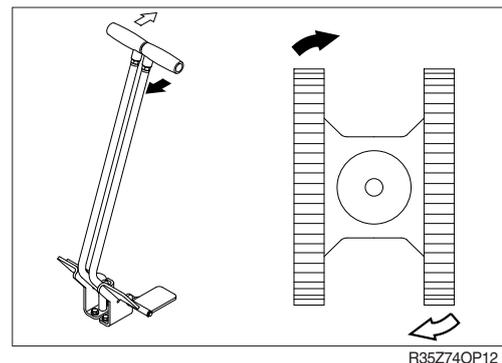
(4) Pivot turning

Operating only one side of lever or pedal make the change of direction possible by moving only one track.



(5) Counter rotation

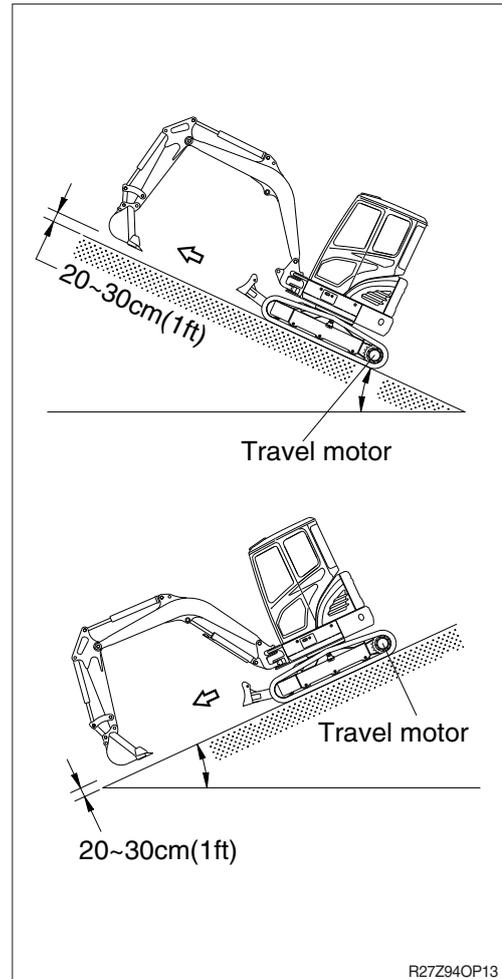
It is to change the direction at the original place by moving the right and left track. Both side of lever or pedal are operated to the other way at the same time.



2) TRAVELING ON A SLOPE

- (1) Make sure that the travel lever is properly maneuvered by confirming the travel motor is in the right location.
 - (2) Lower the bucket 20 to 30 cm (1 ft) to the ground so that it can be used as a brake in an emergency.
 - (3) If the machine starts to slide or loses stability, lower the bucket immediately and brake the machine.
 - (4) When parking on a slope, use the bucket as a brake and place blocks behind the tracks to prevent sliding.
- ※ Machine cannot travel effectively on a slope when the oil temperature is low.
Do the warming-up operation when it is going to travel on a slope.
- ▲ Be careful when working on slopes. It may cause the machine to lose its balance and turn over.

- ▲ Be sure to keep the travel speed switch on the LOW (turtle mark) while traveling on a slope.

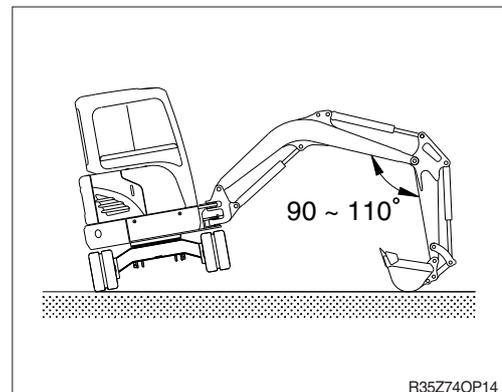


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3) TRAVELING ON SOFT GROUND

- ※ If possible, avoid to operate on soft ground.

- (1) Move forward as far as machine can move.
- (2) Take care not to go beyond the depth where towing is impossible on soft ground.
- (3) When driving becomes impossible, lower bucket and use boom and arm to pull the machine. Operate boom, arm, and travel lever at the same time to avoid the machine sinking.



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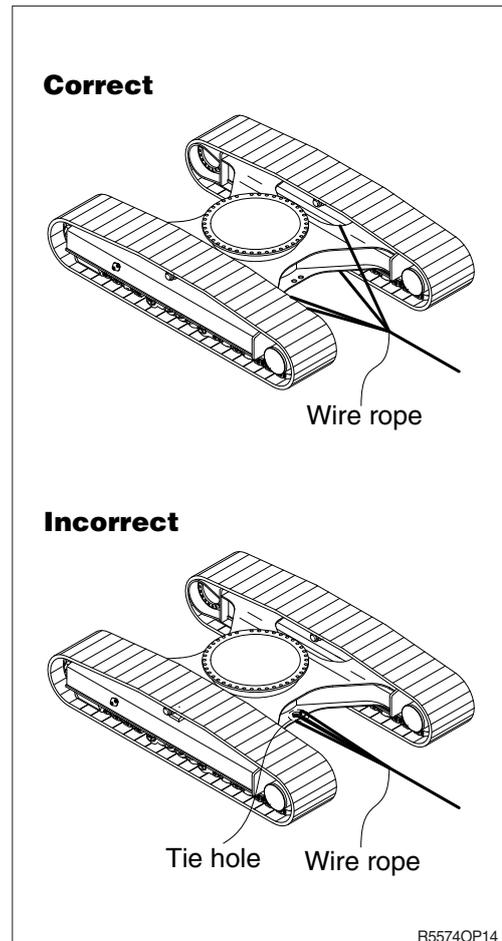
4) TOWING THE MACHINE

Tow the machine as follows when it can not move on it's own.

- (1) Tow the machine by other machine after hook the wire rope to the frame as shown in picture at right.
- (2) Hook the wire rope to the frame and put a support under each part of wire rope to prevent damage.

※ **Never tow the machine using the tie hole, because this may break.**

▲ **Make sure no personnel are standing close to the tow rope.**

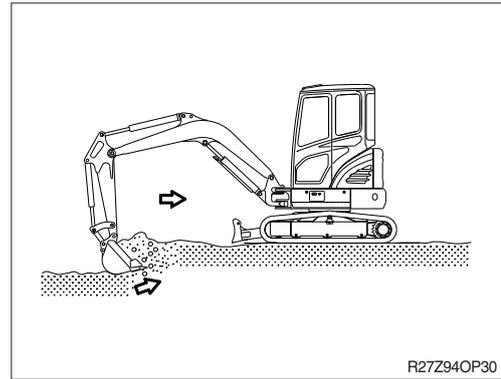


6. EFFICIENT WORKING METHOD

- 1) Do the digging work by arm.

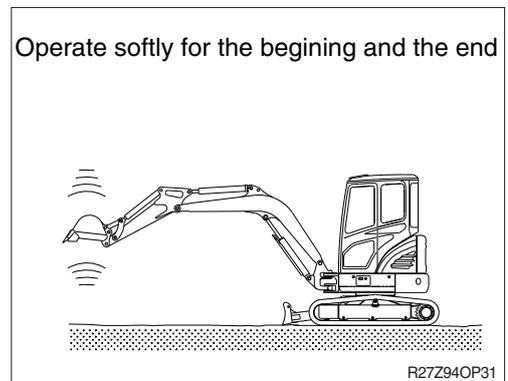
Use the pulling force of arm for digging and use together with the digging force of the bucket if necessary.

- ※ Consult the local regulations and instructions when using the dozer blade for additional machine stability. For the installation of a dozer cylinder safety valve, please contact your Hyundai dealer.

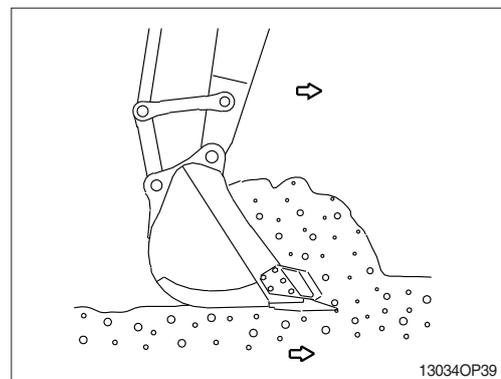


- 2) When lowering and raising the boom operate softly for the beginning and the end.

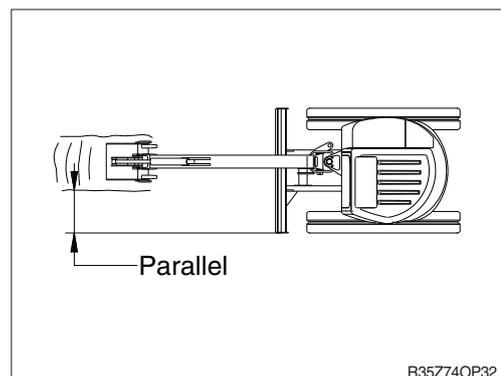
In particularly, sudden stops while lowering the boom may cause damage to the machine.



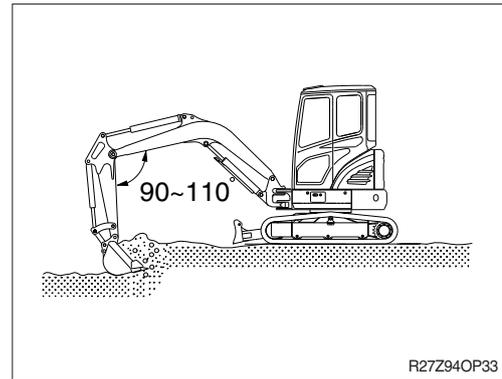
- 3) The digging resistance and wearing of tooth can be reduced by putting the end of bucket tooth to the digging direction.



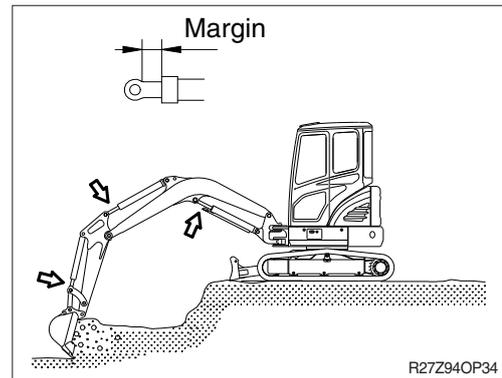
- 4) Set the tracks parallel to the line of the ditch to be excavated when digging ditch. Do not swing while digging.



- 5) Dig slowly with keeping the angle of boom and arm, 90-110 degree when maximum digging force is required.

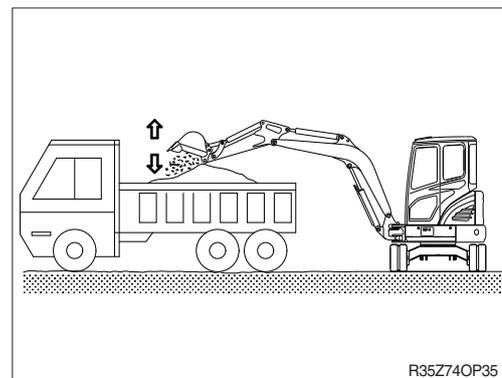


- 6) Operate leaving a small safety margin of cylinder stroke to prevent damage of cylinder when working with the machine.

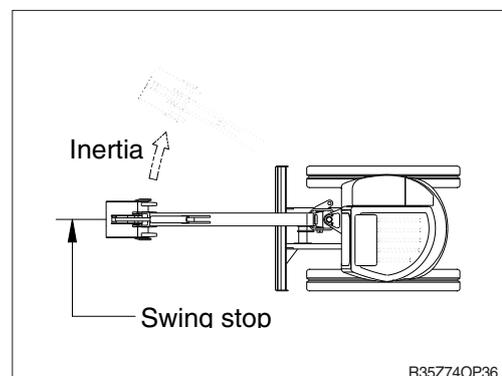


- 7) Keep the bucket to the dumping position and the arm horizontal when dumping the soil from the bucket.
Operate bucket lever 2 or 3 times when hard to dump.

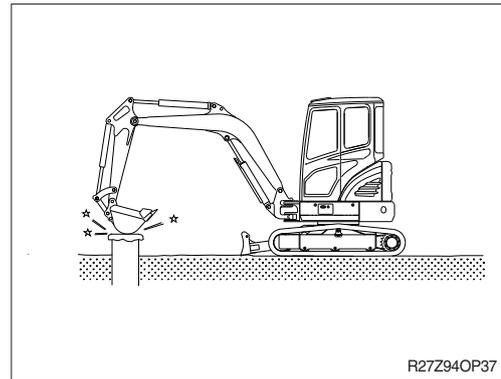
※ Do not use the impact of bucket tooth when dumping.



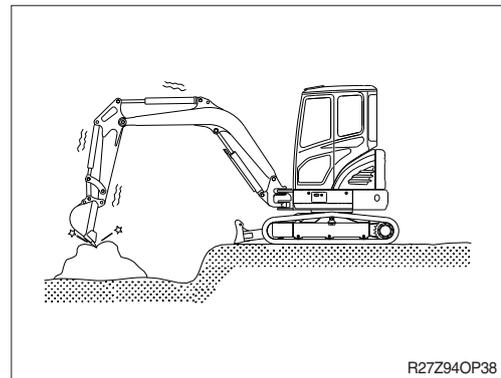
- 8) Operate stop of swing considering the swing slip distance is created by inertia after neutralizing the swing lever.



- 9) Do not use the dropping force of the work equipment for digging.
The machine can be damaged by the impact.



- 10) Do not use the bucket to crack hard objects like concrete or rocks.
This may break a tooth or pin, or bend boom.



11) NEVER CARRY OUT EXCESSIVE OPERATIONS

Operation exceeding machine performance may result in accident or failure.

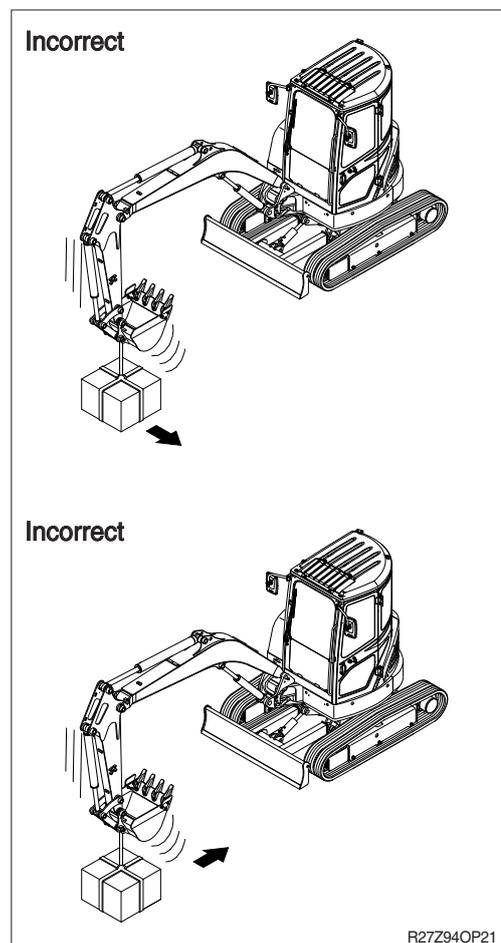
Never carry out operations which may damage the machine such as overload or over-impact-load.

Never travel while carrying a load.

- ※ Consult the local regulations and instructions for carrying out lifting operations. In accordance with EN 474-5 the machine must be equipped with following devices.

- a lifting device, f.e. lifting hook, lifting eye
- *an overload warning device (option)
- *safety valves on the arm and the boom cylinder (option)
- *a safety valve on the dozer cylinder (option) if the dozer blade is used to increase the machine stability.

* : Please contact your Hyundai dealer for installation.



12) BUCKET WITH HOOK

When carrying out lifting work, the special lifting hook is necessary.

The following operations are prohibited.

- Lifting loads with a wire rope fitted around the bucket teeth.
- Lifting loads with the wire rope wrapped directly around the boom or arm.

When performing lifting operation, securely hook the wire rope onto the special lifting hook.

When performing lifting operation, never raise or lower a person.

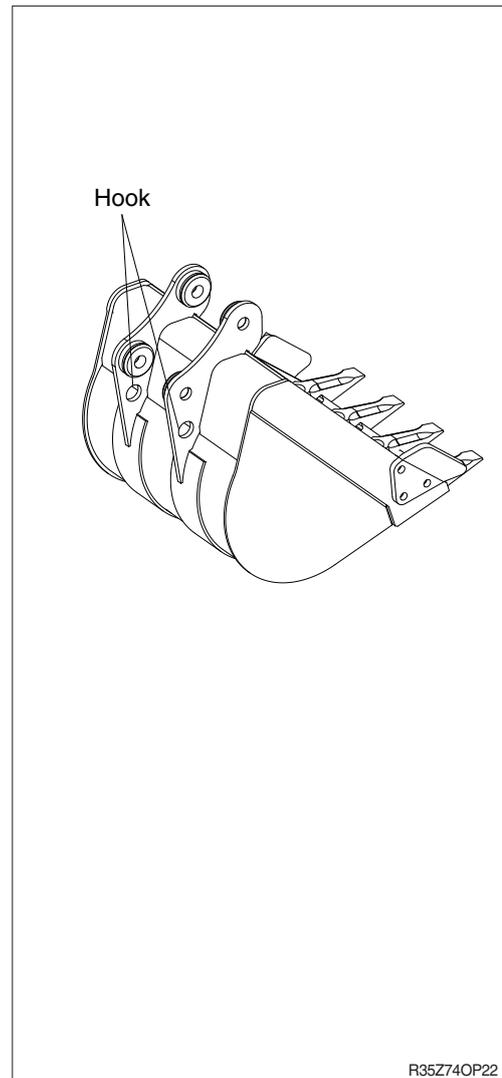
Due to the possible danger of the load falling or of collision with the load, no persons shall be allowed in the working area.

Before performing lifting operation, designate an operation supervisor.

Always execute operation according to his instructions.

- Execute operating methods and procedures under his direction.
- Select a person responsible for signaling. Operate only on signals given by such person.

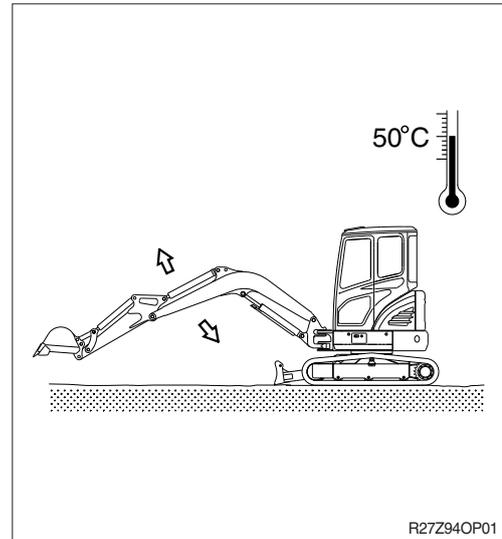
Never leave the operator's seat while lifting a load.



7. OPERATION IN THE SPECIAL WORK SITES

1) OPERATION THE MACHINE IN A COLD WEATHER

- (1) Use proper engine oil and fuel for the weather.
- (2) Fill the required amount of antifreeze in the coolant.
- (3) Refer to the starting engine in cold weather.
Start the engine and extend the warming up operation.
- (4) Be sure to open the heater cock when using the heater.
- (5) Always keep the battery completely charged.
※ **Discharged batteries will freeze more easily than fully charged.**
- (6) Clean the machine and park on the wood plates.



2) OPERATION IN SANDY OR DUSTY WORK SITES

- (1) Inspect air cleaner element frequently. Clean or replace element more frequently, if warning lamp comes ON and buzzer sounds simultaneously, regardless of inspection period.
※ **Replace the inner and outer element after 4 times of cleaning.**
- (2) Inspect radiator, oil cooler and condenser frequently, and keep cooling fins clean.
- (3) Prevent sand or dust from getting into fuel tank and hydraulic tank during refilling.
- (4) Prevent sand or dust from penetrating into hydraulic circuit by tightly closing breather cap of hydraulic oil tank. Replace hydraulic oil filter and air breather element frequently. Also, replace the fuel filter frequently.
- (5) Keep all lubricated part, such as pins and bushings, clean at all times.
- (6) If the air conditioner and heater filters clogged, the heating or cooling capacity will drop. Clean or replace the filter element more frequently.
- (7) Clean electrical components, especially the starting motor and alternator to avoid accumulation of dust.

3) SEA SHORE OPERATION

- (1) Prevent ingress of salt by securely tightening plugs, cocks and bolts of each part.
- (2) Wash machine after operation to remove salt residue.
Pay special attention to electrical parts, and hydraulic cylinders and track tension cylinder to prevent corrosion.
- (3) Inspection and lubrication must be carried out more frequently.
Supply sufficient grease to replace all old grease in bearings which have been submerged in water for a long time.

4) OPERATION IN MUD, WATER OR RAIN WORK SITES

- (1) Perform a walk around inspection to check for any loose fittings, obvious damage to the machine or any fluid leakage.
- (2) After completing operations, clean mud, rocks or debris from the machine. Inspect for damage, cracked welds or loosened parts.
- (3) Perform all daily lubrication and service.
- (4) If the operations were in salt water or other corrosive materials, make sure to flush the affected equipment with fresh water.

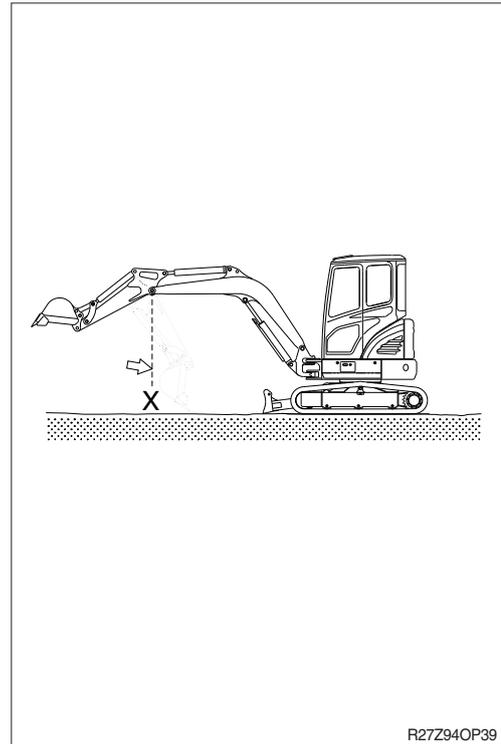
5) OPERATION IN ROCKY WORK SITES

- (1) Check for damage to the undercarriage and for looseness, flaws, wear and damage in bolts and nut.
- (2) Loosen the track tension a little when working in such areas.
- (3) Do not turn the undercarriage directly over the sharp edge rock.

8. NORMAL OPERATION OF EXCAVATOR

Followings may occur during operation due to the nature of a hydraulic excavator.

- 1) When rolling in the arm, the roll-in movement stop momentary at point **X** in the picture shown, then recovers speed again after passing point **X**.
The reason for this phenomenon is that movement by the arm weight is faster than the speed of oil flow into the cylinder.
- 2) When lowering the boom, one may hear continuous sound.
This is caused by oil flow in the valve.
- 3) Overloaded movement will produce sound caused by the relief valves, which are for the protection of the hydraulic systems.
- 4) When the machine is started swing or stopped, a noise near the swing motor may be heard. The noise is generated when the brake valve relieves.



9. ATTACHMENT LOWERING (When engine is stopped)

1) On machines equipped with an accumulator, for a short time (within 2 minutes) after the engine is stopped, the attachment will lower under its own weight when the attachment control lever is shifted to **LOWER**. That happens only starting switch **ON** position and safety lever **UNLOCK** position. After the engine is stopped, set the safety lever to the **LOCK** position.

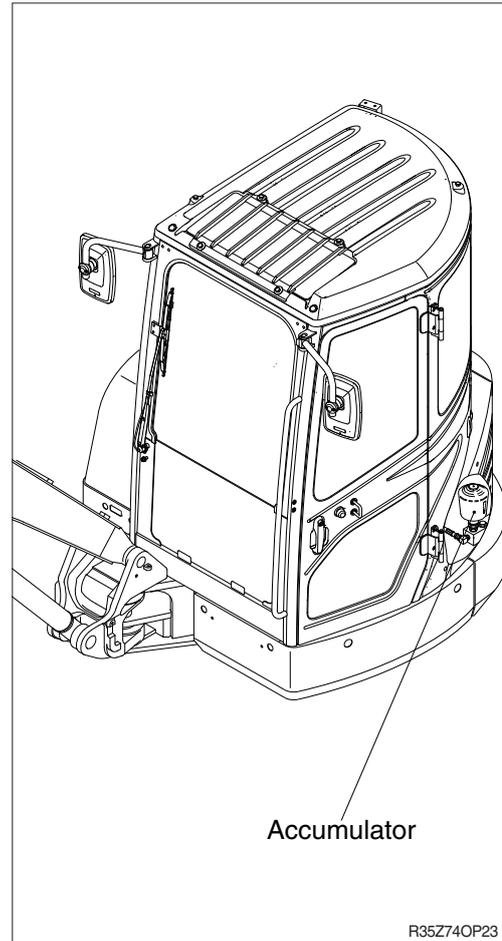
▲ Be sure no one is under or near the attachment before lowering the boom.

2) The accumulator is filled with high-pressure nitrogen gas, and it is extremely dangerous if it is handled in the wrong way. Always observe the following precautions.

▲ Never make any hole in the accumulator expose it to flame or fire.

▲ Do not weld anything to the accumulator.

※ When carrying out disassembly or maintenance of the accumulator, or when disposing of the accumulator, it is necessary to release the gas from the accumulator. A special air bleed valve is necessary for this operation, so please contact your Hyundai distributor.



10. STORAGE

Maintain the machine taking care of following to prevent the deterioration of machine when storing the machine for a long time, over 1 month.

1) BEFORE STORAGE

(1) Cleaning the machine

Clean the machine. Check and adjust tracks.
Grease each lubrication part.

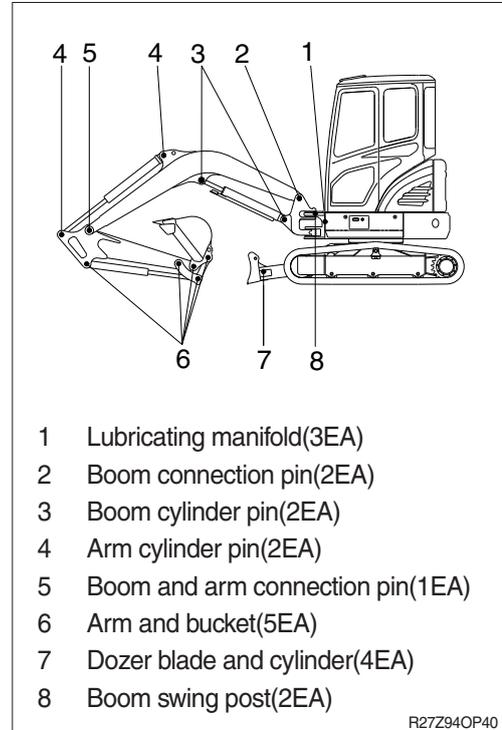
(2) Lubrication position of each part

Change all oil.

※ **Be particularly careful when you reuse the machine.**

As oil can be diluted during storage.

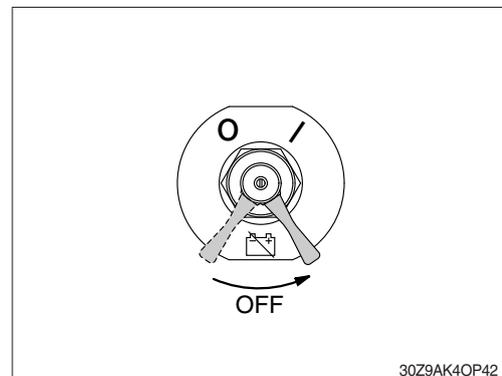
Apply an anticorrosive lubricant on the exposed part of piston rod of cylinder and in places where the machine rusts easily.



(3) Master switch

Turn OFF the master switch mounted at inside of engine room and store the machine.

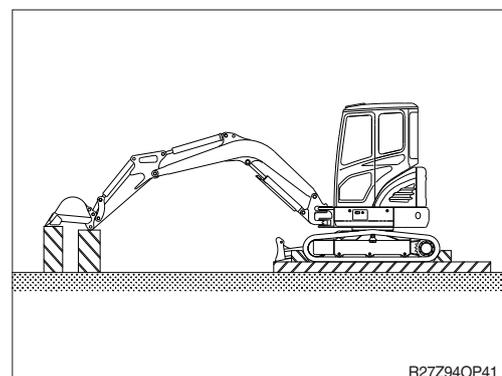
(4) Be sure to mix anticorrosive antifreezing solution in the radiator.



(5) Prevention of dust and moisture

Keep machine dry. Store the machine setting wood on the ground.

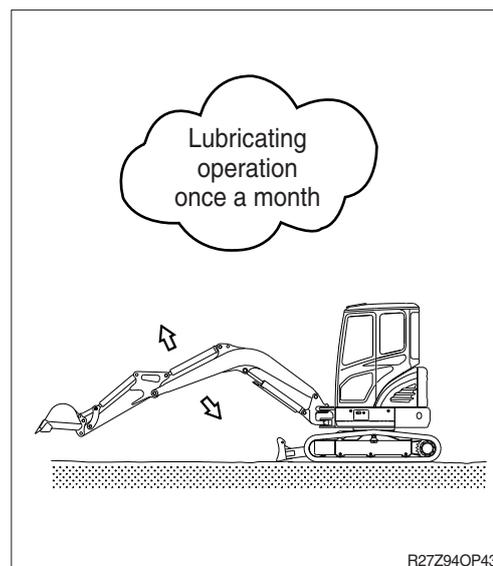
- ※ **Cover exposed part of piston rod of cylinder.**
- ※ **Lower the bucket to the ground and set a support under track.**



2) DURING STORAGE

Start engine and move the machine and work equipment once a month and apply lubrication to each part.

- ※ Check the level of engine oil and coolant and fill if required when starting engine.
- ※ Clean the anticorrosive on the piston rod of cylinder.
- ※ Operate the machine such as traveling, swing and work equipment operation to make sure enough lubrication of all functional components.

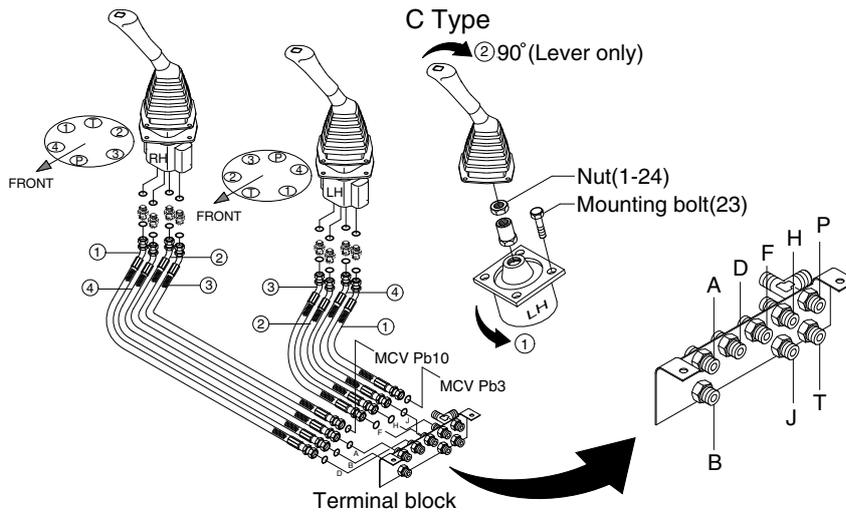


3) AFTER STORAGE

Carry out the following procedure when taking out of a long time storage.

- (1) Wipe off the anticorrosive lubricant on the hydraulic piston rod.
- (2) Completely fill fuel tank, lubricate and add oil.
- (3) **When storage period is 6 months over**
If the machine stock period is over 6 months, carry out the following procedure.
This procedure is to drain condensation water for the **swing reduction gear** durability.
 - ※ Remove the drain port plug and drain the water until the gear oil comes out and then tighten the drain plug.
 - ※ Refer to the service instruction, section 6 for the drain plug location.
 - ※ If the machine is stored without carrying out the monthly lubricating operation, consult your Hyundai dealer for service.

11. RCV LEVER OPERATING PATTERN



※ Whenever a change is made to the machine control pattern also exchange the pattern label in the cab to match the new pattern.

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Pattern	Operation		Control function	Hose connection (port)				
	Left RCV lever	Right RCV lever		RCV lever	Change of Terminal block			
					From	To		
ISO Type			Left	1 Arm out	②	H	-	
				2 Arm in	④	J	-	
				3 Swing right	③	F	-	
				4 Swing left	①	MCV Pb3	-	
	Hyundai			Right	5 Boom lower	④	B	-
					6 Boom raise	②	A	-
					7 Bucket out	①	D	-
					8 Bucket in	③	MCV Pb10	-
A Type			Left	1 Boom lower	②	H	B	
				2 Boom raise	④	J	A	
				3 Swing right	③	F	-	
				4 Swing left	①	MCV Pb3	-	
	Hyundai			Right	5 Arm out	④	B	H
					6 Arm in	②	A	J
					7 Bucket out	①	D	-
					8 Bucket in	③	MCV Pb10	-
B Type			Left	1 Boom lower	②	H	B	
				2 Boom raise	④	J	A	
				3 Bucket in	③	F	MCV Pb10	
				4 Bucket out	①	MCV Pb3	D	
	Hyundai			Right	5 Arm out	④	B	H
					6 Arm in	②	A	J
					7 Swing right	①	D	F
					8 Swing left	③	MCV Pb10	MCV Pb3
C Type			Left	① Loosen the RCV lever mounting bolt (77) and rotates lever assy 90° counterclockwise; then install. ② To put lever in correct position, disassemble nut (24) and rotates only lever 90° clockwise.				
			Right	Same as ISO type				

2) PATTERN CHANGE VALVE INSTALL (option)

- ※ If the machine is equipped with the pattern change valve, the machine operation pattern can be easily changed.
- ※ Whenever a change is made to the machine control pattern also exchange the pattern label in the cab to match the new pattern.

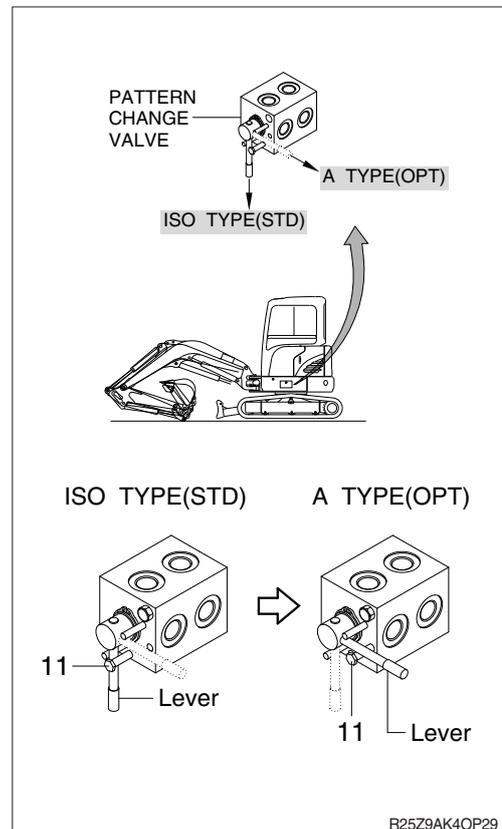
Operation	ISO type	A type
Left RCV lever		
Right RCV lever		

(1) The machine control pattern can be easily changed from the "ISO type" to "A type" by changing the position of the lever.

▲ **Before starting the machine, check the lever position of pattern change valve and actual operating of attachment.**

(2) Change of operating pattern

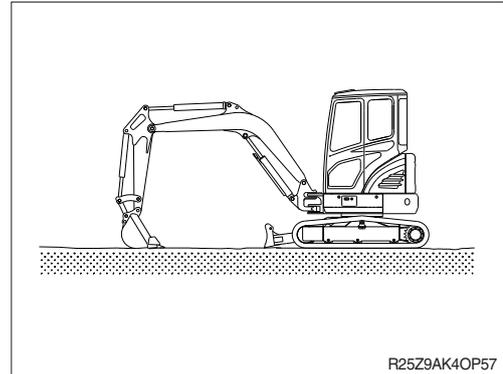
- ① Loosen the bolt (11).
- ② Move lever from the "ISO type" to "A type" position.
- ③ After the lever is set, tighten the bolt in order to secure the lever.



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12. SWITCHING HYDRAULIC ATTACHMENT CIRCUIT

- 1) The combined hydraulic attachment circuit is capable of providing single action or double action.
- 2) The position of 3 way valve selects the single action hydraulic attachment circuit or the double action hydraulic attachment circuit.
- 3) Before you change the flow mode of hydraulic attachment circuit, place the machine in the servicing position as shown. Stop the engine.



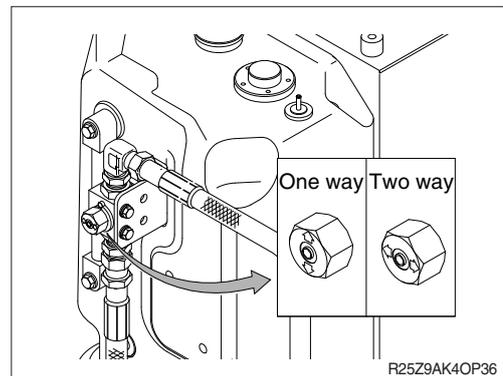
- 4) Use the spanner to turn the bolt of 3 way valve. Make sure that you turn the bolt between one way and two way.

(1) One way flow (hydraulic breaker)

Turn the arrow to the vertical position.

(2) Two way flow (clamshell or shear)

Turn the arrow to the horizontal position.



13. HANDLING THE RUBBER TRACKS

1) USING THE RUBBER TRACKS PROPERLY

Rubber tracks have some advantages over steel tracks.

However, you cannot take full advantage of them if you use them in the same manner as steel ones. Use care in operating with rubber tracks in accord with the conditions of the work site and the type of work.

Comparison table of rubber and steel tracks

	Rubber	Steel
Low vibration	Excellent	Ordinary
Smooth travel	Excellent	Good
Silent travel	Excellent	Ordinary
Less damage to paved roads	Excellent	Ordinary
Simple handling	Excellent	Ordinary
Susceptibility to damage (strength)	Ordinary	Excellent
Drawber full	Excellent	Excellent

Rubber tracks have many advantages inherent in the unique properties of the material. On the other hand, however, they are low in strength. It is essential that you fully understand the properties of rubber tracks, and observe the precautions for operating and handling them to prolong their life and get the most out of them. Be sure to read this section for using the rubber tracks before using them.

2) WARRANTY FOR RUBBER TRACKS

The rubber tracks are not warranted for free repair or replacement if they are damaged because of misuse by the customer, including the failure to comply with the prohibitions and the instructions for safe operation; (for example, the failure to check the tension of the rubber tracks or service the rubber tracks properly, or "using the rubber tracks on surfaces and terrains which could physically damage them".)

3) PROHIBITIONS FOR USING THE RUBBER TRACKS

- (1) Do not operate or turn on surfaces of terrains that have sharp stones, a hard, uneven rock base, or that expose the tracks to steel rods, scrap iron, or edges of iron plates. Failure to observe these prohibitions may damage the rubber tracks.
- (2) Do not operate the machine on a stony surface like a riverbed. Doing this may damage the rubber tracks by catching gravel in the tracks or may cause the tracks to come off. Forcibly pushing obstacles will also shorten the life of the rubber tracks.
- (3) Prevent the rubber tracks from getting exposed to oil, fuel or chemical solvents. If they are exposed, immediately wipe them. Also, do not travel on roads which have oily surfaces.
- (4) When storing the rubber tracks for a long time period (more than three months), avoid placing them in a place subject to direct exposure to sunlight or rain.

- (5) Do not operate the machine when the tracks will be exposed to heat, (i.e., near an open-air fire, on a steel plate that has been exposed to the blazing sun, or on a hot asphalt road.)
- (6) Never run on one rubber track while the other is held above the ground with the implement. Doing this may damage the rubber track or cause it to come off.

4) PRECAUTIONS FOR USING THE RUBBER TRACKS

Observe the following precautions when operating the machine :

- (1) Never spin-turn on concrete or asphalt roads.
- (2) Do not change course suddenly. Doing this will cause the rubber track to wear early or be damaged.
- (3) Do not turn the machine across a large level gap while traveling . Remember that running over a level gap at a right angle will prevent the track from coming off.
- (4) Slowly lower the machine after it has been lifted above the ground with the implement.
- (5) It is not recommended that the machine be used to handle any materials that become oily after being crushed (e.g., soybeans, corn, rapeseed oil seeds, etc.). After unavoidably using the machine to handle such materials, clean the tracks with water.
- (6) It is not recommended that the machine be used to handle materials such as salt, ammonium sulfate, potassium chloride, potassium sulfate, or superphosphate of lime. Handling these materials may affect the core metal adversely. After using the machine to handle such materials, clean the tracks with water.
- (7) Do not operate the machine at the seashore. Doing this may affect the core metal adversely due to the salt content.
- (8) If a rubber track is cracked, it could be easily damaged when exposed to salt, sugar, wheat, or soybeans. Be sure to repair any cracks in the rubber track to prevent rubber chips from getting into the materials being handled.
- (9) Do not allow the rubber track to rub against a concrete wall.
- (10) The rubber tracks are prone to slip on snow or on a frozen road. Be careful of skidding when traveling or operating on a slope in cold weather.
- (11) Operating the machine in extremely cold weather will deteriorate the rubber tracks, shortening their life.
- (12) Use the rubber tracks between -25°C to +55°C (-13°F to +131°F) because of the physical characteristics of rubber.
- (13) Be careful not to damage the rubber tracks with the bucket while operating the machine.

5) BE CAREFUL NOT TO COME OFF THE RUBBER TRACKS

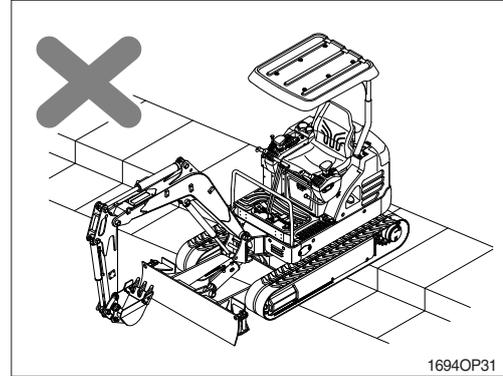
Keep the tracks in appropriate tension to prevent them from coming off.

If the tension is too low, the rubber tracks may come off under the following conditions.

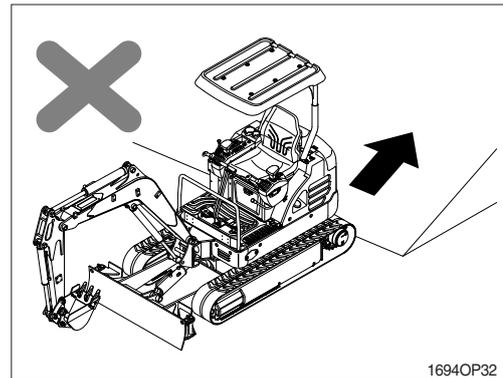
Even if the tension is adequate, take care when operating the tracks under these conditions.

Some illustrations in this section can be different from your machine.

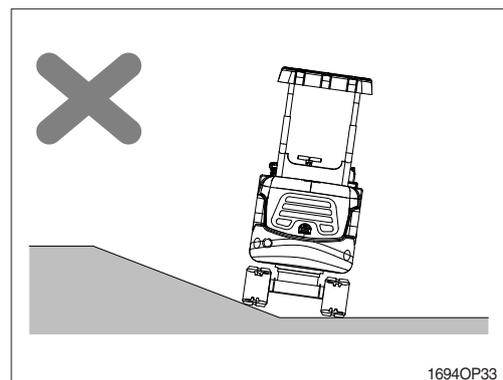
- (1) Do not steer the machine at an angle other than 90 degrees across a large level gap created by a curbstone or a rock [approximately more than 20 cm (8")]. Run over a level gap at a right angle only to prevent the tracks from coming off.



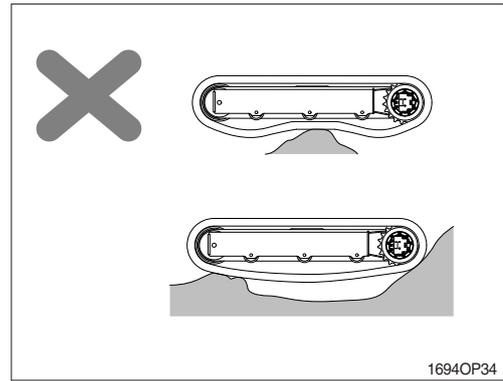
- (2) Do not steer the machine across a boundary between the flat ground and a slope, while moving backwards. If such travel is not avoidable, slow down the speed.



- (3) Do not travel with the track on one side on a slope or on convex ground (causing a machine angle of more than 10 degrees), and with the track on the other side on flat ground, to prevent the rubber track from being damaged. Be sure to travel with the tracks on both sides on the same level surface.

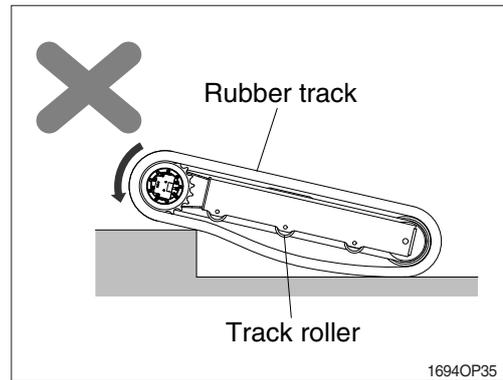


(4) The three cases illustrated above are those which could cause the rubber tracks to loosen. In addition, do not subject machine to such ground conditions as are illustrated in the figure at the right.

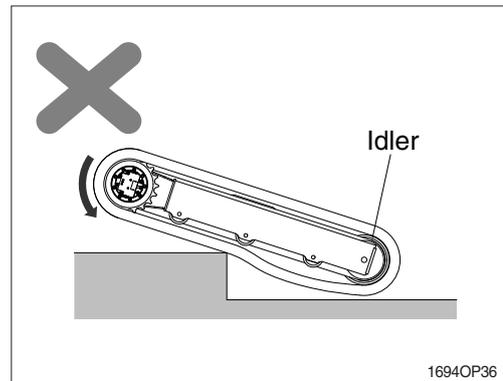


HOW THE RUBBER TRACKS COME OFF

(5) When running over a level gap, a clearance is created between the tracks and the track rollers. At this point, the tracks tend to come off.

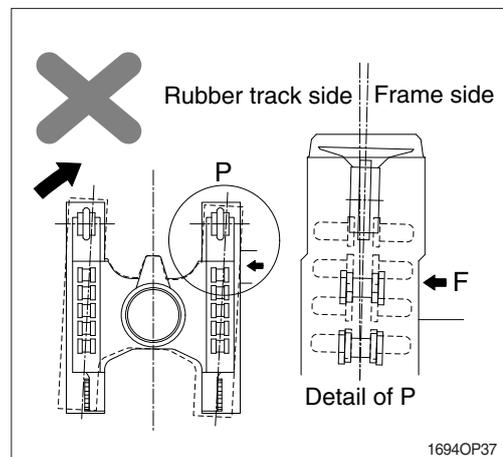


(6) If the machine is traveling in reverse, clearance may also be created between the track rollers and the rubber tracks, and between the idlers and the rubber tracks, causing the rubber tracks to come off.

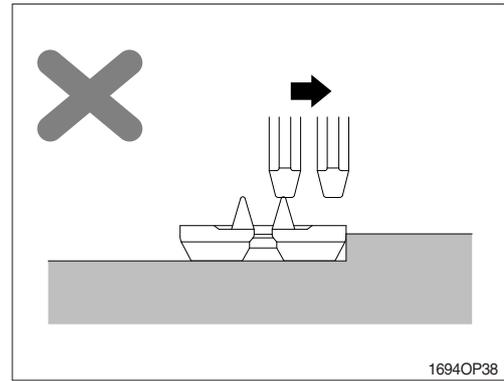


(7) Other situations to be avoided.

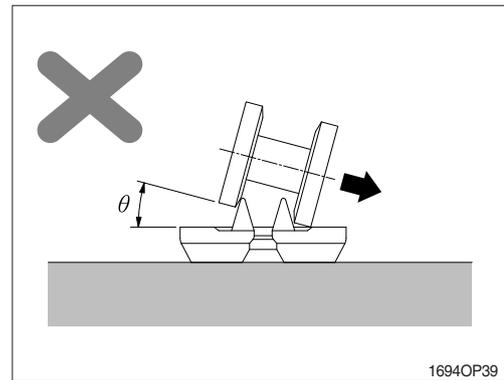
- ① When the machine changes the travel direction while the rubber tracks are blocked sideways by an obstacle or the like.
- ② When the idler and the track rollers are misaligned from the core metal, due to rubber track misalignment.



- ③ Traveling in reverse under the condition illustrated will cause the rubber tracks to come off.



- ④ Changing the travel direction of the machine under the condition illustrated will cause the rubber tracks to come off.

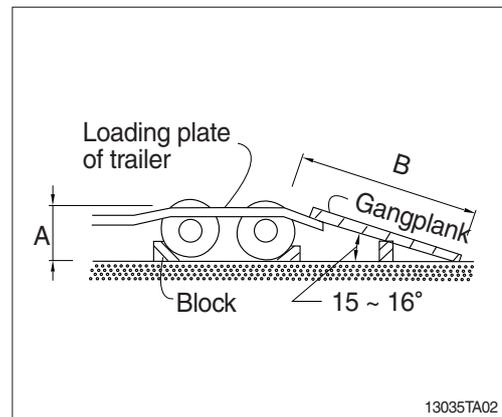
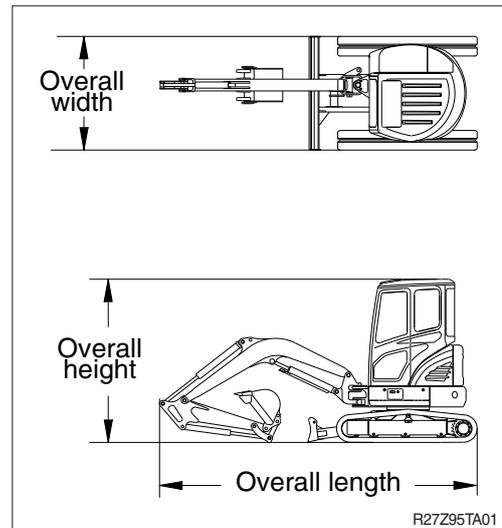


1. PREPARATION FOR TRANSPORTATION

- 1) When transporting the machine, observe the various road rules, road transportation vehicle laws and vehicle limit ordinances, etc.
- 2) Select proper trailer after confirming the weight and dimension from the chapter 2, specification.
- 3) Check the whole route such as the road width, the height of bridge and limit of weight and etc., which will be passed.
- 4) Get the permission from the related authority if necessary.
- 5) Prepare suitable capacity of trailer to support the machine.

- 6) Prepare gangplank for safe loading referring to the below table and illustration.

A	B
1.0	3.65 ~ 3.85
1.1	4.00 ~ 4.25
1.2	4.35 ~ 4.60
1.3	4.75 ~ 5.00
1.4	5.10 ~ 5.40
1.5	5.50 ~ 5.75



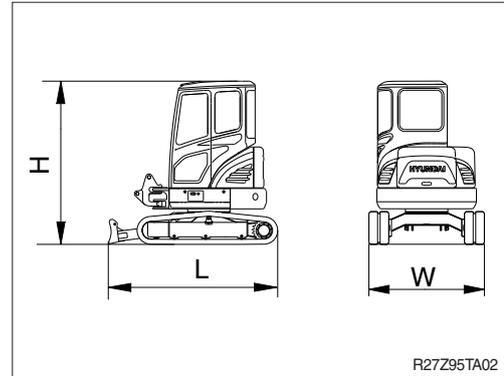
2. DIMENSION AND WEIGHT

1) ROBEX 30Z-9AK

(1) Base machine

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2470 (8' 1")
H	Height	mm (ft-in)	2500 (8' 2")
W	Width	mm (ft-in)	1550 (4' 11")
Wt	Weight	kg (lb)	2675 (5900)

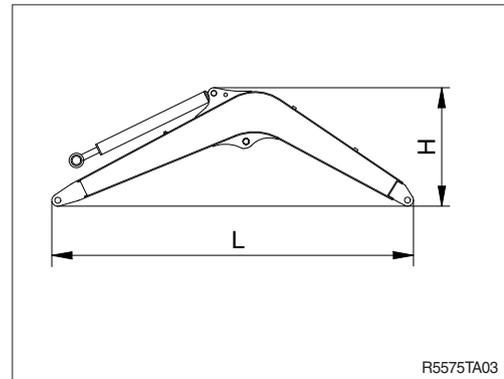
※ With 300 mm (12") triple grouser shoes and 230 kg (507 lb) counterweight.



(2) Boom assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2120 (6' 11")
H	Height	mm (ft-in)	870 (2' 10")
W	Width	mm (ft-in)	265 (10")
Wt	Weight	kg (lb)	135 (300)

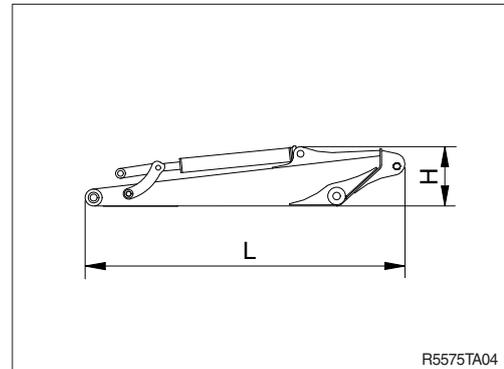
※ 2.03 m (6' 8") boom with arm cylinder (included piping and pins).



(3) Arm assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1430 (4' 8")
H	Height	mm (ft-in)	375 (1' 3")
W	Width	mm (ft-in)	150 (6")
Wt	Weight	kg (lb)	100 (220)

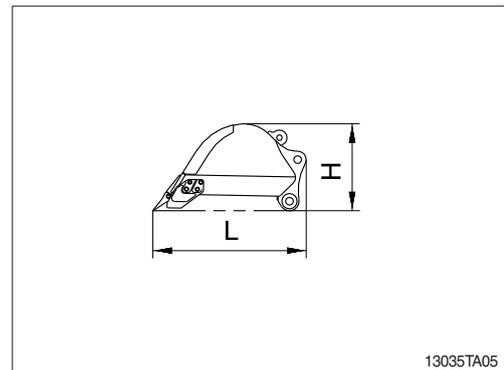
※ 1.12 m (3' 8") arm with bucket cylinder (included linkage and pins).



(4) Bucket assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	745 (2' 5")
H	Height	mm (ft-in)	450 (1' 6")
W	Width	mm (ft-in)	510 (1' 8")
Wt	Weight	kg (lb)	60 (130)

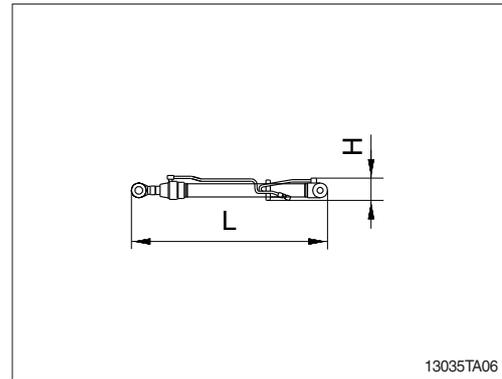
※ 0.08 m³ (0.10 yd³) SAE heaped bucket (included tooth and side cutters).



(5) Boom cylinder

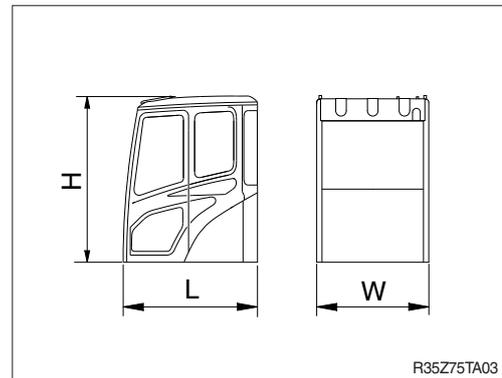
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	990 (3' 3")
H	Height	mm (ft-in)	120 (5")
W	Width	mm (ft-in)	250 (10")
Wt	Weight	kg (lb)	35 (80)

※ Included piping.



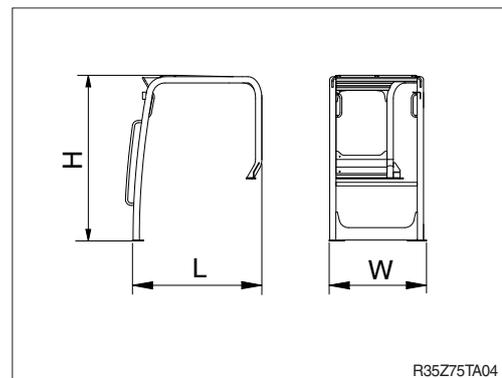
(6) Cab assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1300 (4' 3")
H	Height	mm (ft-in)	1620 (5' 4")
W	Width	mm (ft-in)	1110 (3' 8")
Wt	Weight	kg (lb)	230 (507)



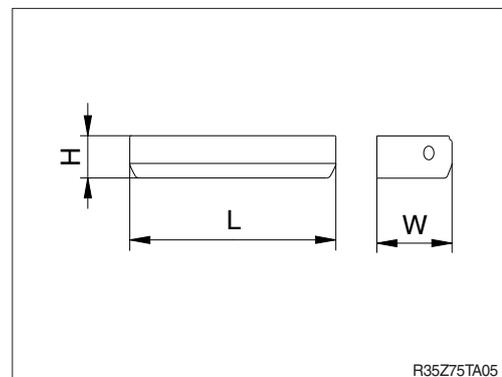
(7) Canopy assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1590 (5' 3")
H	Height	mm (ft-in)	1600 (5' 3")
W	Width	mm (ft-in)	935 (3' 1")
Wt	Weight	kg (lb)	92 (203)



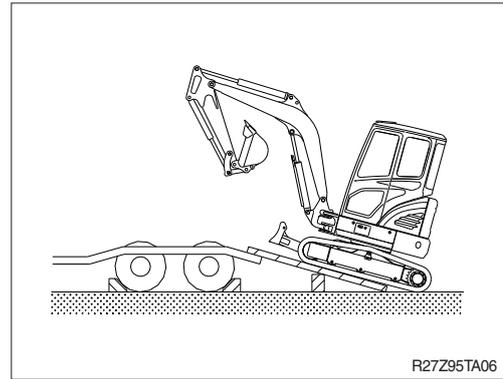
(8) Counterweight

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1369 (4' 6")
H	Height	mm (ft-in)	310 (1' 0")
W	Width	mm (ft-in)	467 (1' 7")
Wt	Weight	kg (lb)	230 (507)

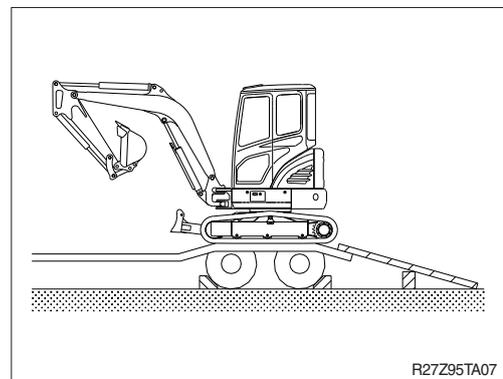


3. LOADING THE MACHINE

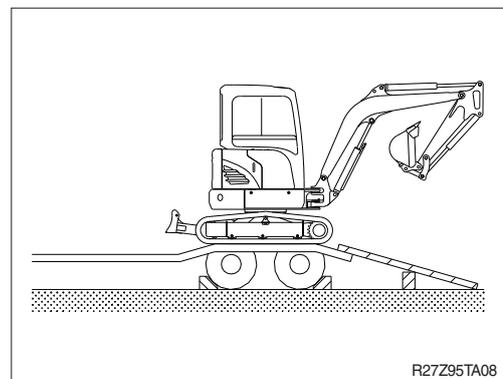
- 1) Load and unload the machine on a flat ground.
- 2) Use the gangplank with sufficient length, width, thickness and gradient.
- 3) Place the safety lever to the LOCK position (if equipped) before fixing the machine at the bed of trailer and confirm if the machine parallels the bed of trailer.
Keep the travel motor in the rear when loading and in the front when unloading.



- 4) Do the following after loading the machine to the trailer.
 - (1) Stop loading when the machine is located horizontally with the rear wheel of trailer.



- (2) Place the safety lever to the LOCK position (if equipped) after the swing the machine 180 degree.



(3) Lower the working equipment gently after the location is determined.

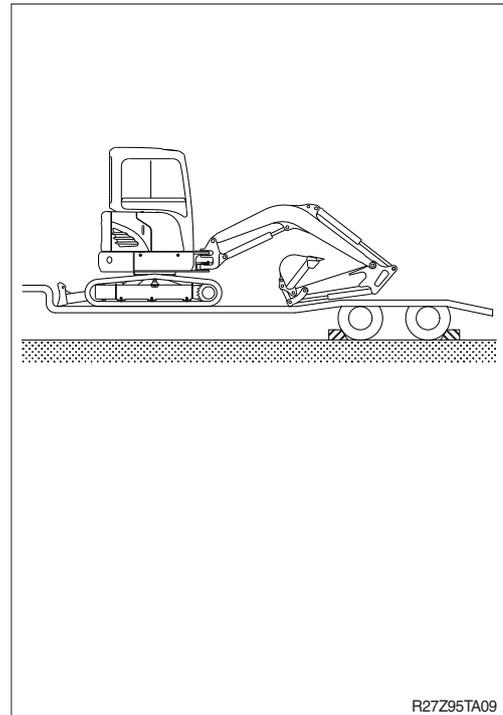
※ Place rectangular timber under the bucket cylinder to prevent the damage of it during transportation.

▲ Be sure to keep the travel speed switch on the LOW (turtle mark) while loading and unloading the machine.

▲ Avoid using the working equipment for loading and unloading since it will be very dangerous.

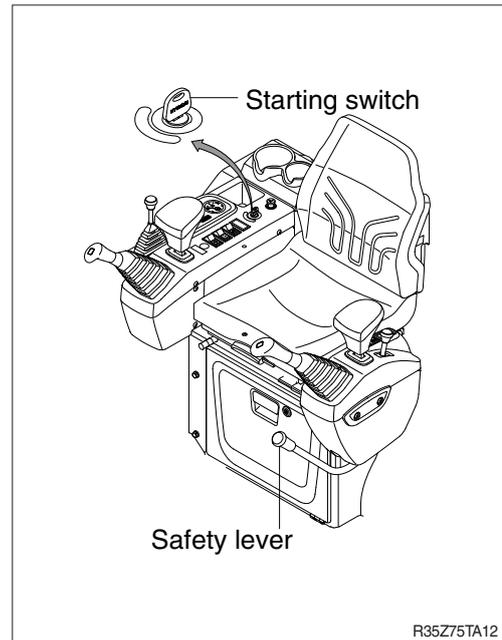
▲ Do not operate any other device when loading.

▲ Be careful on the boundary place of loading plate or trailer as the balance of machine will abruptly be changed on the point.

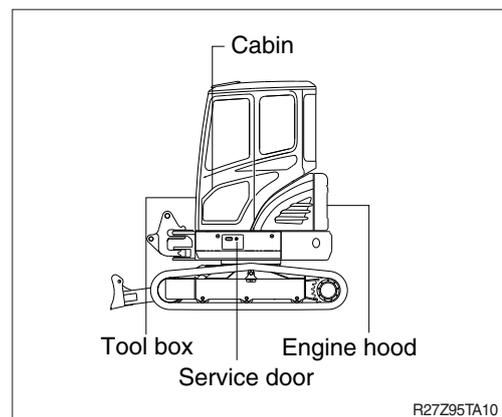


4. FIXING THE MACHINE

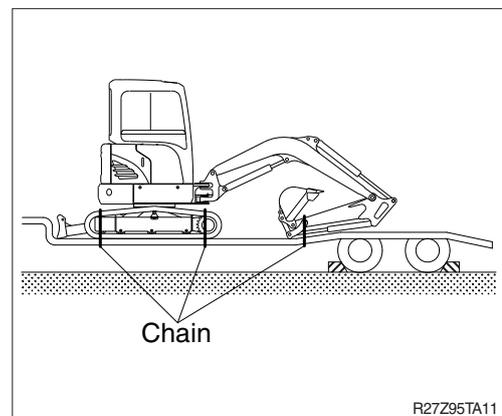
- 1) Lower down the working device on the loading plate of trailer.
- 2) Keep the safety lever on the **LOCK** position.
- 3) Turn **OFF** all the switches and remove the key.



- 5) Secure all locks.



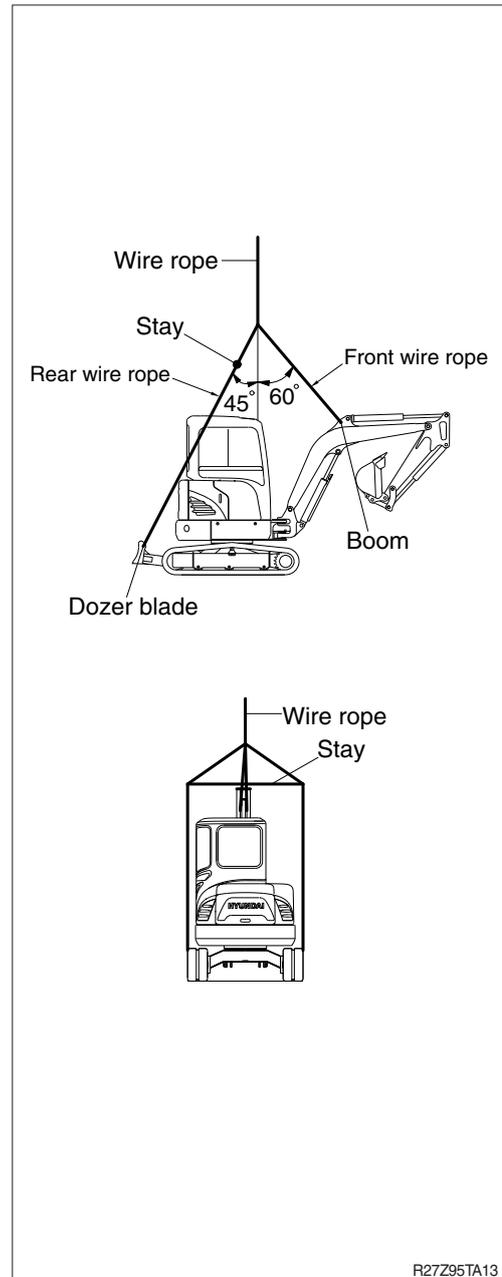
- 6) Place timber underneath of the track and fix firmly with wire rope to prevent the machine from moving forward, backward, right or left.



5. LOADING AND UNLOADING BY CRANE

- 1) Check the weight, length, width and height of the machine referring to the chapter 2, specification when you are going to hoist the machine.
 - 2) Use long wire rope and stay to keep the distance with the machine as it should avoid touching with the machine.
 - 3) Put a rubber plate contact with wire rope and machine to prevent damage.
 - 4) Place crane on the proper place.
 - 5) Install the wire rope and stay like the illustration.
 - 6) The maximum angle of the front wire rope must not exceed 60 degrees and the angle of the rear wire rope 45 degrees.
- ※ If there is no stay, keep the angle of the rear wire rope below 15 degrees to avoid interference with the machine.

- ▲ Make sure wire rope is proper size.
- ▲ Place the safety lever to LOCK position to prevent the machine moving when hoisting the machine.
- ▲ The wrong hoisting method or installation of wire rope can cause damage to the machine.
- ▲ Do not load abruptly.
- ▲ Keep area clear of personnel.
- ▲ Maintain center of gravity and balance when lifting.
- ▲ Never lift the machine with a person in the cab or on the machine.



1. INSTRUCTION

1) INTERVAL OF MAINTENANCE

- (1) You may inspect and service the machine by the period as described at page 6-11 based on hour meter at cluster.
- (2) Shorten the interval of inspect and service depending on site condition. (Such as dusty area, quarry, sea shore and etc.)
- (3) Practice the entire related details at the same time when the service interval is doubled.
For example, in case of 100hours, carry out all the maintenance 「Each 100hours, each 50 hours and daily service」 at the same time.



2) PRECAUTION

- (1) Start to maintenance after you have the full knowledge of machine.
- (2) The monitor installed on this machine does not entirely guarantee the condition of the machine. Daily inspection should be performed according to clause 4, maintenance check list.
- (3) Engine and hydraulic components have been preset in the factory. Do not allow unauthorized personnel to reset them.
- (4) Ask to your local dealer or Hyundai for the maintenance advice if unknown.
- (5) Drain the used oil and coolant in a container and handle according to the method of handling for industrial waste to meet with regulations of each province or country.

3) PROPER MAINTENANCE

(1) Replace and repair of parts

It is required to replace the wearable and consumable parts such as bucket tooth, side cutter, filter and etc., regularly.

Replace damaged or worn parts at proper time to keep the performance of machine.

(2) Use genuine parts.

(3) Use the recommended oil.

(4) Remove the dust or water around the inlet of oil tank before supplying oil.

(5) Drain oil when the temperature of oil is warm.

(6) Do not repair anything while operating the engine.

Stop the engine when you fill the oil.

(7) Relieve hydraulic system of the pressure before repairing the hydraulic system.

(8) Confirm if the cluster is in the normal condition after completion of service.

(9) For more detail information of maintenance, please contact local Hyundai dealer.

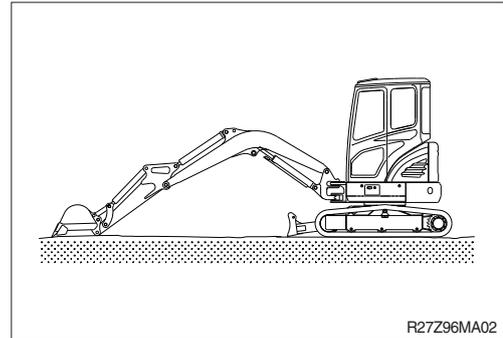
※ **Be sure to start the maintenance after fully understand the chapter 1, safety hints.**

4) RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM

※ Spouting of oil can cause the accident when loosening the cap or hose right after the operating of machine as the machine or oil is on the high pressure on the condition.

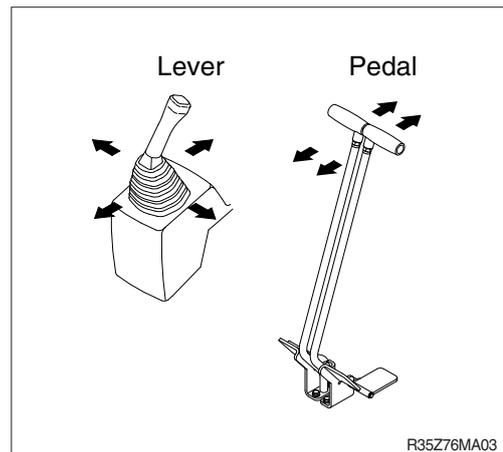
Be sure to relieve the pressure in the system before repairing hydraulic system.

- (1) Place machine in parking position, and stop the engine.



- (2) Set the safety lever completely in the release position, operate the control levers and pedals fully to the front, rear, left and right, to release the pressure in the hydraulic circuit.

※ This does not completely release the pressure, so when serving hydraulic component, loosen the connections slowly and do not stand in the direction where the oil spurt out.



5) PRECAUTION WHEN INSTALLING HYDRAULIC HOSES OR PIPES

- (1) Be particularly careful that the joint of hose, pipe and functioning item are not damaged.
Avoid contamination.
- (2) Assemble after cleaning the hose, pipe and joint of functioning item.
- (3) Use genuine parts.
- (4) Do not assemble the hose in the condition of twisted or sharp radius.
- (5) Keep the specified tighten torque.

6) PERIODICAL REPLACEMENT OF SAFETY PARTS

(1) It is desirable to do periodic maintenance the machine for using the machine safely for a long time.

However, recommend to replace regularly the parts related safety not only safety but maintain satisfied performance.

(2) These parts can cause the disaster of life and material as the quality changes by passing time and it is worn, diluted, and gets fatigued by using repeatedly.

These are the parts which the operator can not judge the remained lifetime of them by visual inspection.

(3) Repair or replace if an abnormality of these parts is found even before the recommended replacement interval.

Periodical replacement of safety parts		Interval	
Engine	Fuel hose (tank-engine)	Every 2 years	
	Heater hose (heater-engine)		
Hydraulic system	Main circuit	Pump suction hose	Every 2 years
		Pump delivery hose	
		Swing hose	
	Working device	Boom cylinder line hose	Every 2 years
		Arm cylinder line hose	
		Bucket cylinder line hose	
		Dozer cylinder line hose	
		Boom swing cylinder line hose	

※ 1. Replace O-ring and gasket at the same time when replacing the hose.

2. Replace clamp at the same time if the hose clamp is cracked when checking and replacing the hose.

2. TIGHTENING TORQUE

Use following table for unspecified torque.

1) BOLT AND NUT

(1) Coarse thread

Bolt size	8T		10T	
	kgf · m	lbf · ft	kgf · m	lbf · ft
M 6 × 1.0	0.85 ~ 1.25	6.15 ~ 9.04	1.14 ~ 1.74	8.2 ~ 12.6
M 8 × 1.25	2.0 ~ 3.0	14.5 ~ 21.7	2.7 ~ 4.1	19.5 ~ 29.7
M10 × 1.5	4.0 ~ 6.0	28.9 ~ 43.4	5.5 ~ 8.3	39.8 ~ 60
M12 × 1.75	7.4 ~ 11.2	53.5 ~ 81.0	9.8 ~ 15.8	70.9 ~ 114
M14 × 2.0	12.2 ~ 16.6	88.2 ~ 120	16.7 ~ 22.5	121 ~ 163
M16 × 2.0	18.6 ~ 25.2	135 ~ 182	25.2 ~ 34.2	182 ~ 247
M18 × 2.5	25.8 ~ 35.0	187 ~ 253	35.1 ~ 47.5	254 ~ 344
M20 × 2.5	36.2 ~ 49.0	262 ~ 354	49.2 ~ 66.6	356 ~ 482
M22 × 2.5	48.3 ~ 63.3	349 ~ 458	65.8 ~ 98.0	476 ~ 709
M24 × 3.0	62.5 ~ 84.5	452 ~ 611	85.0 ~ 115	615 ~ 832
M30 × 3.0	124 ~ 168	898 ~ 1214	169 ~ 229	1223 ~ 1656
M36 × 4.0	174 ~ 236	1261 ~ 1704	250 ~ 310	1808 ~ 2242

(2) Fine thread

Bolt size	8T		10T	
	kgf · m	lbf · ft	kgf · m	lbf · ft
M 8 × 1.0	2.2 ~ 3.4	15.9 ~ 24.6	3.0 ~ 4.4	21.7 ~ 31.8
M10 × 1.2	4.5 ~ 6.7	32.5 ~ 48.5	5.9 ~ 8.9	42.7 ~ 64.4
M12 × 1.25	7.8 ~ 11.6	56.4 ~ 83.9	10.6 ~ 16.0	76.7 ~ 116
M14 × 1.5	13.3 ~ 18.1	96.2 ~ 131	17.9 ~ 24.1	130 ~ 174
M16 × 1.5	19.9 ~ 26.9	144 ~ 195	26.6 ~ 36.0	192 ~ 260
M18 × 1.5	28.6 ~ 43.6	207 ~ 315	38.4 ~ 52.0	278 ~ 376
M20 × 1.5	40.0 ~ 54.0	289 ~ 391	53.4 ~ 72.2	386 ~ 522
M22 × 1.5	52.7 ~ 71.3	381 ~ 516	70.7 ~ 95.7	511 ~ 692
M24 × 2.0	67.9 ~ 91.9	491 ~ 665	90.9 ~ 123	658 ~ 890
M30 × 2.0	137 ~ 185	990 ~ 1339	182 ~ 248	1314 ~ 1796
M36 × 3.0	192 ~ 260	1390 ~ 1880	262 ~ 354	1894 ~ 2562

2) PIPE AND HOSE (FLARE type)

Thread size (PF)	Width across flat (mm)	kgf · m	lbf · ft
1/4"	19	4	28.9
3/8"	22	5	36.2
1/2"	27	9.5	68.7
3/4"	36	18	130
1"	41	21	152
1-1/4"	50	35	253

3) PIPE AND HOSE (ORFS type)

Thread size (UNF)	Width across flat (mm)	kgf · m	lbf · ft
9/16-18	19	4	28.9
11/16-16	22	5	36.2
13/16-16	27	9.5	68.7
1-3/16-12	36	18	130
1-7/16-12	41	21	152
1-11/16-12	50	35	253

4) FITTING

Thread size	Width across flat (mm)	kgf · m	lbf · ft
1/4"	19	4	28.9
3/8"	22	5	36.2
1/2"	27	9.5	68.7
3/4"	36	18	130
1"	41	21	152
1-1/4"	50	35	253

4) TIGHTENING TORQUE OF MAJOR COMPONENT

No.	Descriptions	Bolt size	Torque		
			kgf · m	lbf · ft	
1	Engine	Engine mounting bolt (engine-bracket)	M10 × 1.25	7.4±1.5	53.5±10.9
2		Engine mounting bolt (bracket-frame)	M12 × 1.75	13±1.0	94±7.2
3		Radiator mounting bolt, nut	M12 × 1.75	12.8±3.0	93±22.0
4		Coupling mounting bolt	M12 × 1.75	9.3±0.5	67±3.6
5	Hydraulic system	Main pump mounting bolt	M12 × 1.75	10±1.0	72±7.2
6		Main control valve mounting bolt	M10 × 1.5	6.9±1.4	50±10.0
7		Fuel tank mounting bolt	M12 × 1.75	12.8±3.0	93±22.0
8		Hydraulic oil tank mounting bolt	M12 × 1.75	12.8±3.0	93±22.0
9		Turning joint mounting bolt, nut	M10 × 1.5	6.9±1.4	50±10.0
10	Power train system	Swing motor mounting bolt	M16 × 2.0	29.7±4.5	215±32.5
11		Swing bearing upper mounting bolt	M12 × 1.75	12.3±1.2	89±9.0
12		Swing bearing lower mounting bolt	M12 × 1.75	12.3±1.2	89±9.0
13		Travel motor mounting bolt	M12 × 1.75	13.8±2.0	100±14.0
14		Sprocket mounting bolt	M12 × 1.75	12.3±1.2	89±9.0
15	Under carriage	Carrier roller mounting bolt, nut	M12 × 1.75	12.3±1.2	89±9.0
16		Track roller mounting bolt	M16 × 2.0	29.7±3.0	215±22.0
17	Others	Counterweight mounting bolt	M20 × 2.5	57.8±6.4	418±46.3
18		Additional counterweight mounting bolt	M24 × 3.0	100±15	723±108
19		Cab and canopy mounting bolt	M12 × 1.75	12.8±3.0	92±22.0
20		Operator's seat mounting bolt	M 8 × 1.25	1.17±0.1	8.5±0.7

3. FUEL, COOLANT AND LUBRICANTS

1) NEW MACHINE

New machine used and filled with following lubricants.

Description	Specification
Engine oil	SAE 15W-40 (API CI-4)
Hydraulic oil	Hyundai genuine long life hydraulic oil (ISO VG 46, VG 68) Conventional hydraulic oil (ISO VG 15, ★Cold region) Hyundai Bio Hydraulic Oil (HBHO, ISO VG 46)
Swing and travel reduction gear	SAE 85W-140 (API GL-5)
Grease	Lithium base grease NLGI No. 2
Fuel	ASTM D975-No. 2, ★ ¹ Ultra low sulfur diesel
Coolant	Mixture of 50% ethylene glycol base antifreeze and 50% water.

SAE : Society of Automotive Engineers

API : American Petroleum Institute

ISO : International Organization for Standardization

NLGI : National Lubricating Grease Institute

ASTM : American Society of Testing and Material

★ Cold region

- Russia, CIS, Mongolia

★¹ Ultra low sulfur diesel

- sulfur content ≤ 15 ppm

2) RECOMMENDED OILS

HYUNDAI genuine lubricating oils have been developed to offer the best performance and service life for your equipment. These oils have been tested according to the specifications of HYUNDAI and, therefore, will meet the highest safety and quality requirements.

We recommend that you use only HYUNDAI genuine lubricating oils and grease officially approved by HYUNDAI.

Service point	Kind of fluid	Capacity ℓ (U.S. gal)	Ambient temperature °C (°F)							
			-50 (-58)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)
Engine oil pan	Engine oil	5.7 (1.5)	★SAE 5W-40				SAE 30			
			SAE 10W				SAE 10W-30			
			SAE 15W-40							
Final drive	Gear oil	0.6 × 2 (0.16 × 2)	★SAE 75W-90				SAE 85W-140			
Hydraulic tank	Hydraulic oil	Tank; 27 (7.1) System; 55 (14.5)	★ISO VG 15				ISO VG 46, HBHO VG 46★ ³			
							ISO VG 68			
Fuel tank	Diesel fuel★ ¹	30 (7.9)	★ASTM D975 NO.1				ASTM D975 NO.2			
Fitting (grease nipple)	Grease	As required	★NLGI NO.1				NLGI NO.2			
Radiator (reservoir tank)	Mixture of antifreeze and soft water★ ²	5.0 (1.3)	Ethylene glycol base permanent type (50 : 50)				★Ethylene glycol base permanent type (60 : 40)			

SAE : Society of Automotive Engineers

API : American Petroleum Institute

ISO : International Organization for Standardization

NLGI : National Lubricating Grease Institute

ASTM : American Society of Testing and Material

★ : Cold region (Russia, CIS, Mongolia)

★¹ : Ultra low sulfur diesel
- sulfur content ≤ 15 ppm

★² : Soft water
City water or distilled water

★³ : Hyundai Bio Hydraulic Oil

※ Using any lubricating oils other than HYUNDAI genuine products may lead to a deterioration of performance and cause damage to major components.

※ Do not mix HYUNDAI genuine oil with any other lubricating oil as it may result in damage to the systems of major components.

※ Do not use any engine oil other than that specified above, as it may clog the diesel particulate filter(DPF).

※ For HYUNDAI genuine lubricating oils and grease for use in regions with extremely low temperatures, please contact HYUNDAI dealers.

4. MAINTENANCE CHECK LIST

1) DAILY SERVICE BEFORE STARTING

Check items	Service	Page
Visual check		
Fuel tank	Check, Refill	6-24
Hydraulic oil level	Check, Add	6-25
Engine oil level	Check, Add	6-17
Coolant level	Check, Add	6-19
Water separator	Check, Drain	6-24
Fan belt tension	Check, Adjust	6-22
★ Attachment pins	Lubricate	6-33
· Boom cylinder head and rod		
· Boom connecting		
· Arm cylinder head and rod		
· Boom + Arm connecting		
· Bucket cylinder head		

★ Lubricate every 10 hours or daily for initial 100 hours.

2) EVERY 50 HOURS SERVICE

Check items	Service	Page
Fuel tank (water, sediment)	Drain	6-24
Fuel filter element	Check, Clean	6-24
Track tension	Check, Adjust	6-30
Swing gear and pinion	Lubricate	6-28
Lubricate pin and bushing	Lubricate	6-33
· Bucket cylinder rod		
· Arm + Bucket connecting		
· Arm + Link, Bucket control		
· Bucket control rod		
· Boom swing post + Upper frame connecting		
· Boom swing cylinder head and rod		
· Dozer blade + Lower frame connecting		
· Dozer blade cylinder head and rod		

3) INITIAL 50 HOURS SERVICE

Check items	Service	Page
Boom swing cylinder	Lubricate	6-33
Bolts & Nuts	Check, Tight	6-7
· Sprocket mounting bolts		
· Travel motor mounting bolts		
· Swing motor mounting bolts		
· Swing bearing mounting bolts		
· Engine mounting bolts		
· Counterweight mounting bolts		
· Turning joint locating bolts		
· Track shoe mounting bolts and nuts		
· Hydraulic pump mounting bolts		

※ **Service the above items only for the new machine, and thereafter keep the normal service interval.**

4) EVERY 200 HOURS SERVICE

Check items	Service	Page
★ Hydraulic oil return filter	Replace	6-27
★ Pilot line filter element	Replace	6-28

★ **Replace 2 filters for continuous hydraulic breaker operation only.**

5) EVERY 250 HOURS SERVICE

Check items	Service	Page
★ Engine oil	Change	6-17, 18
★ Engine oil filter	Replace	6-17, 18
Battery (voltage)	Check	6-34
Boom swing cylinder	Lubricate	6-33
Swing bearing	Lubricate	6-28
Bolts & Nuts	Check, Tight	6-7
· Sprocket mounting bolts		
· Travel motor mounting bolts		
· Swing motor mounting bolts		
· Swing bearing mounting bolts		
· Engine mounting bolts		
· Counterweight mounting bolts		
· Turning joint locating bolts		
· Track shoe mounting bolts and nuts		
· Hydraulic pump mounting bolts		
Attachment pins	Lubricate	6-33
· Boom cylinder head and rod		
· Boom connecting		
· Arm cylinder head and rod		
· Boom + Arm connecting		
· Bucket cylinder head		

★ If you use high sulfur containing fuel above than 0.5% or use low grade of engine oil reduce change interval.

6) INITIAL 250 HOURS SERVICE

Check items	Service	Page
Fuel filter element	Replace	6-24
Hydraulic oil return filter	Replace	6-27
Pilot line filter element	Replace	6-28
Travel reduction gear oil	Change	6-29

※ Service the above items only for the new machine, and thereafter keep the normal service interval.

7) EVERY 400 HOURS SERVICE

Check items	Service	Page
Fuel filter element	Replace	6-24

8) EVERY 500 HOURS SERVICE

Check items	Service	Page
Radiator and cooler fin	Check, Clean	6-22
☆ Air cleaner element (primary)	Inspect, Clean	6-23

- ☆ **Clean the primary element only after 500 hours operation or when the air cleaner warning lamp blinks.
Replace primary element and safety element after 4 times cleanings of primary element.**

9) EVERY 1000 HOURS SERVICE

Check items	Service	Page
Travel reduction gear oil	Change	6-29
Hydraulic oil return filter	Replace	6-27
Pilot line filter element	Replace	6-28

10) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Coolant* ¹	Change	6-19, 20, 21, 22
Hydraulic oil* ¹	Change	6-26
HBHO (Hyundai Bio Hydraulic Oil, ISO VG 46)* ²	Change	6-26
Hydraulic tank suction strainer	Check, Clean	6-27

*¹ Conventional

*² If do not want to change HBHO every 2000 hours, contact HYUNDAI dealer and ask about SAMPLING.

※ **Change hydraulic oil every 600 hours of continuous hydraulic breaker operation.**

11) EVERY 5000 HOURS SERVICE

Check items	Service	Page
Hydraulic oil* ³	Change	6-26

*³ Hyundai genuine long life

※ **Change hydraulic oil every 1000 hours of continuous hydraulic breaker operation.**

12) EVERY 6000 HOURS SERVICE

Check items	Service	Page
Coolant* ³	Change	6-19, 20, 21, 22

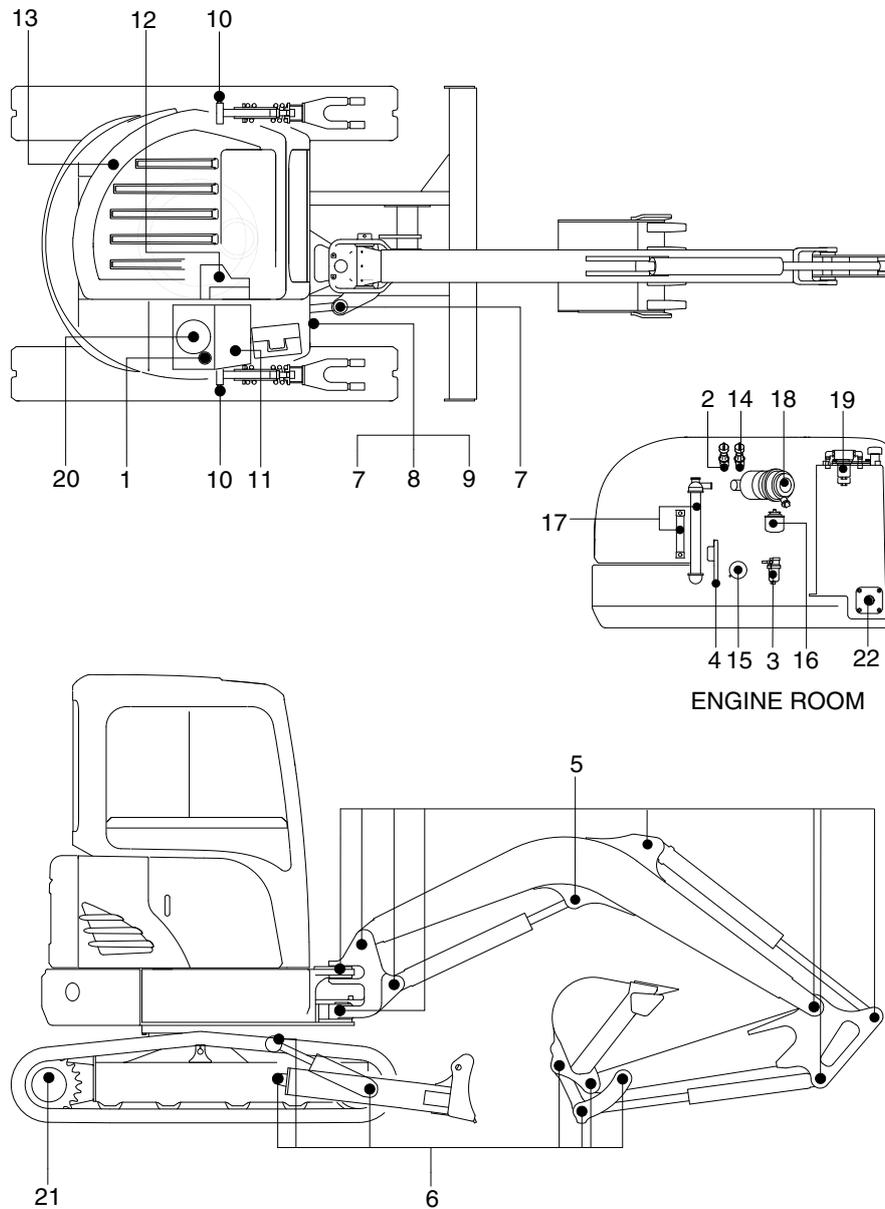
*³ Hyundai genuine long life

13) WHEN REQUIRED

Whenever you have trouble in the machine, you must perform the service of related items, system by system.

Check items	Service	Page
Fuel system		
· Fuel tank	Drain or Clean	6-24
· Water separator	Drain or Replace	6-24
· Fuel filter element	Replace	6-24
Engine lubrication system		
· Engine oil	Change	6-17, 18
· Engine oil filter	Replace	6-17, 18
Engine cooling system		
· Coolant	Add or Change	6-19, 20, 21, 22
· Radiator	Clean or Flush	6-19, 20, 21, 22
Engine air system		
· Air cleaner (safety and primary)	Replace	6-23
Hydraulic system		
· Hydraulic oil	Add or Change	6-26
· Hydraulic oil return filter	Replace	6-27
· Pilot line filter element	Replace	6-28
· Suction strainer	Clean	6-27
Under carriage		
· Track tension	Check, Adjust	6-30
Bucket		
· Tooth	Replace	6-32
· Side cutter	Replace	6-31
· Linkage	Adjust	6-31
· Bucket assy	Replace	6-31
Heater		
· Heater filter	Clean, replace	6-37

5. MAINTENANCE CHART



R27Z9AK6MA30

Caution

1. Service intervals are based on the hour meter reading.
2. The number of each item shows the lubrication point on the machine.
3. Stop engine while filling oil, and use no open flames.
4. For other details, refer to the service manual.

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ (U.S.gal)	Service points No.
10 Hours or daily	1	Hydraulic oil level	Check, Add	HO	27 (7.1)	1
	2	Radiator coolant	Check, Add	C	5.0 (1.3)	1
	3	Water separator	Drain	-	-	1
	4	Fan belt tension and damage	Check, Adjust	-	-	1
	14	Engine oil level	Check, Add	EO	5.7 (1.5)	1
50 Hours or weekly	6	Bucket linkage & blade pins	Check, Add	PGL	-	9
	9	Swing gear and pinion	Lubricate	PGL	-	1
	10	Track tension	Check, Adjust	PGL	-	2
	11	Fuel tank (water, sediment)	Check, Clean	DF	-	2
	16	Fuel filter element	Check, Clean	-	-	1
Initial 50 Hours	5	Attachment pins	Check, Add	PGL	-	9
	7	Boom swing cylinder	Check, Add	PGL	-	2
250 Hours	5	Attachment pins	Check, Add	PGL	-	9
	7	Boom swing cylinder	Lubricate	PGL	-	2
	8	Swing bearing	Check, Add	PGL	-	1
	13	Battery (voltage)	Check, Clean	-	-	1
	14	Engine oil	Change	EO	5.7 (1.5)	1
	15	Engine oil filter	Replace	-	-	1
Initial 250 Hours	16	Fuel filter element	Replace	-	-	1
	19	Pilot line filter element	Replace	-	-	1
	20	Hydraulic oil return filter	Replace	-	-	1
	21	Travel reduction gear case	Change	GO	0.6 (0.16)	2
400 Hours	16	Fuel filter element	Replace	-	-	1
500 Hours	17	Radiator and cooler fin	Check, Clean	-	-	2
	18	Air cleaner element (primary)	Clean	-	-	1
1000 Hours	19	Pilot line filter element	Replace	-	-	1
	20	Hydraulic oil return filter	Replace	-	-	1
	21	Travel reduction gear case	Change	GO	0.6 (0.16)	2
2000 Hours	1	Hydraulic oil* ¹	Change	HO	27 (7.1)	1
	1	Hydraulic oil (HBHO)* ²	Change	-	27 (7.1)	1
	2	Radiator coolant* ¹	Change	C	5.0 (1.3)	1
	22	Hydraulic oil suction strainer	Check, Clean	-	-	1
5000 Hours	1	Hydraulic oil* ³	Change	HO	27 (7.1)	1
6000 Hours	2	Radiator coolant* ³	Change	C	5.0 (1.3)	1
As required	12	Heater filter	Replace	-	-	1
	18	Air cleaner element (safety, primary)	Replace	-	-	2
	19	Pilot line filter element	Replace	-	-	1

*¹ Conventional *² Hyundai Bio Hydraulic Oil *³ Hyundai genuine long life

※ Oil symbol : Please refer to the recommended lubricants for specification.

DF : Diesel fuel

GO : Gear oil

HO : Hydraulic oil

C : Coolant

PGL : Grease

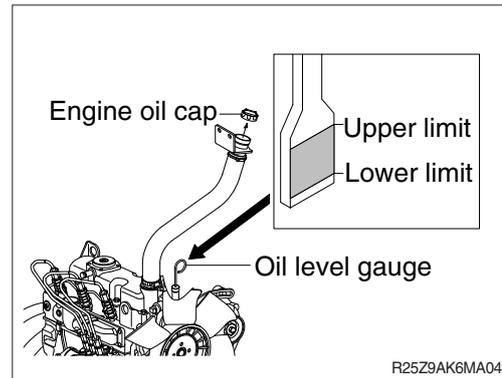
EO : Engine oil

6. SERVICE INSTRUCTION

1) CHECK ENGINE OIL LEVEL

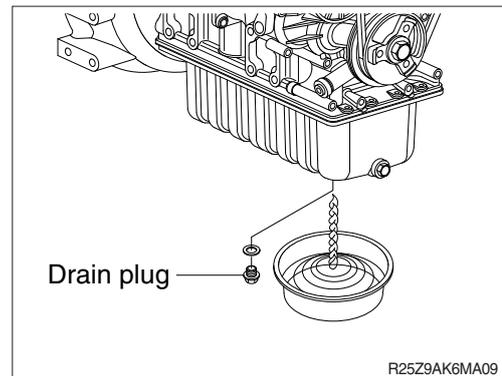
Check the oil level with the machine on a flat ground before starting engine.

- (1) Pull out the dipstick and wipe with a clean cloth.
- (2) Check the oil level by inserting the dipstick completely into the hole and pulling out again. Check to see that the oil level lies between the two notches.
- (3) If oil level is LOW, add oil and then check again.
 - ※ If the oil is contaminated or diluted, change the oil regardless of the regular change interval.
 - ※ Check oil level after engine has been stopped for 15 minutes.
 - ▲ Do not operate unless the oil level is in the normal range.

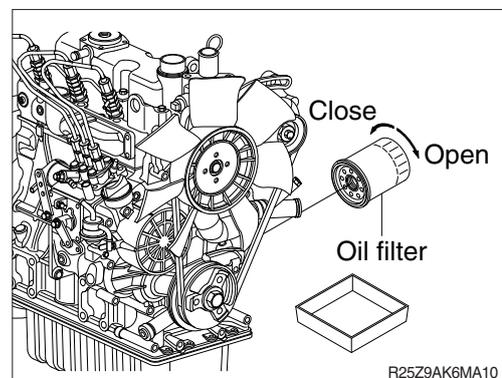


2) REPLACEMENT OF ENGINE OIL AND OIL FILTER

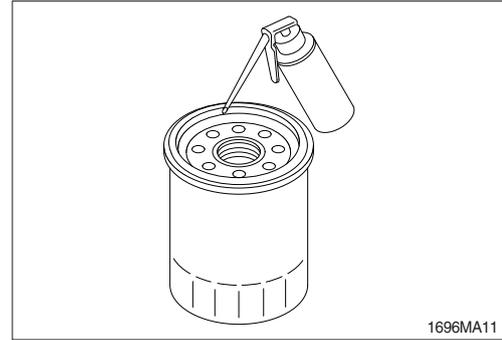
- (1) Warm up the engine.
- (2) Remove the drain plug.
 - ※ A drain pan with a capacity of 7 liters (1.8 U.S. gallons) will be adequate.



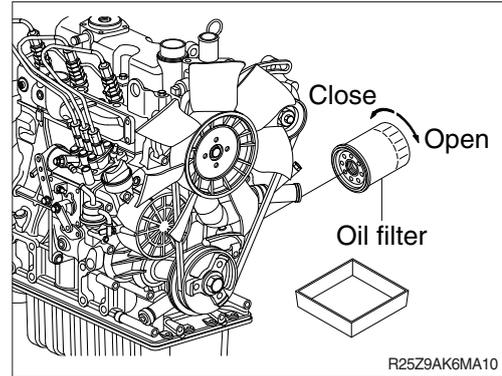
- (3) Clean around the filter head, remove the filter with a filter wrench and clean the gasket surface.



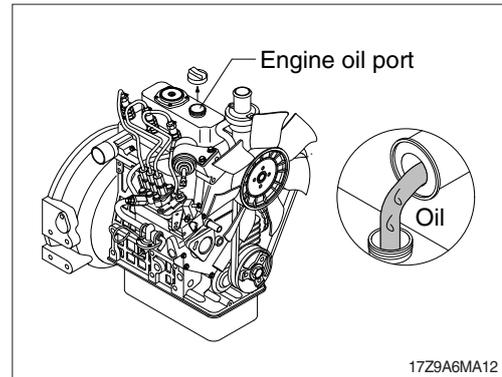
- (4) Apply a light film of lubricating oil to the gasket sealing surface before installing the filters.



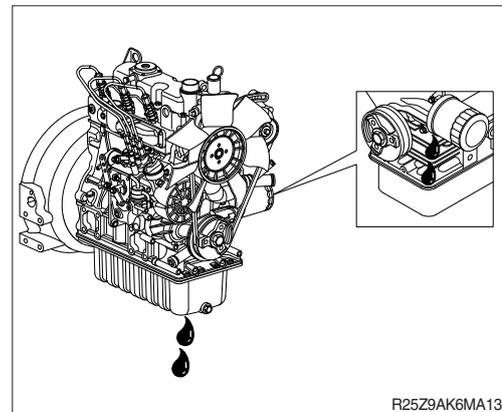
- (5) To install the filter, screw it in by hand.
※ **Mechanical over-tightening may distort the threads or damage the filter element seal.**
· Install the filter as specified by the filter manufacturer.



- (6) Fill the engine with clean oil to the proper level.
· Quantity : 5.7 l (1.5 U.S.gallons)



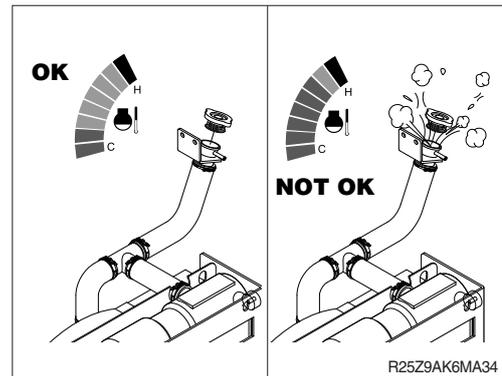
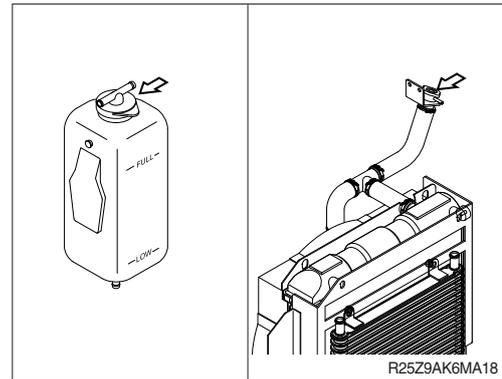
- (7) Operate the engine at low idle and inspect for leaks at the filters and the drain plug.
Shut the engine off and check the oil level with the dipstick. Allow 15 minutes for oil to drain down before checking.



3) CHECK COOLANT

- (1) Check if the level of coolant in reservoir tank is between FULL and LOW.
- (2) Add the mixture of antifreeze and water after removing the cap of the reservoir tank if coolant is not sufficient.
- (3) Be sure to add the coolant by opening the cap of radiator when coolant level is below LOW.
- (4) Replace gasket of radiator cap when it is damaged.

▲ Hot coolant can spray out if radiator cap is removed while engine is hot. Remove the cap after the engine has cooled down.



4) FLUSHING AND REFILLING OF RADIATOR

- (1) Change coolant

▲ Avoid prolonged and repeated skin contact with used antifreeze.

Such prolonged repeated contact can cause skin disorders or other bodily injury.

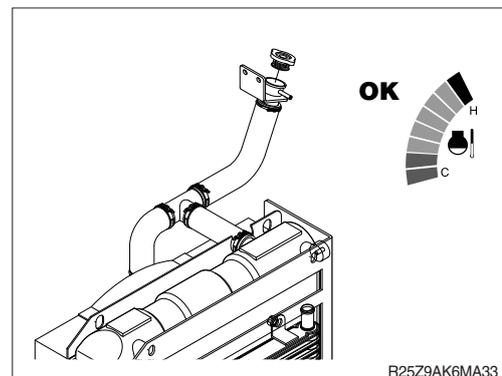
Avoid excessive contact-wash thoroughly after contact.

Keep out of reach of children.

※ **Protect the environment : Handling and disposal of used antifreeze can be subject to federal, state, and local law regulation.**

Use authorized waste disposal facilities, including civic amenity sites and garages providing authorized facilities for the receipt of used antifreeze.

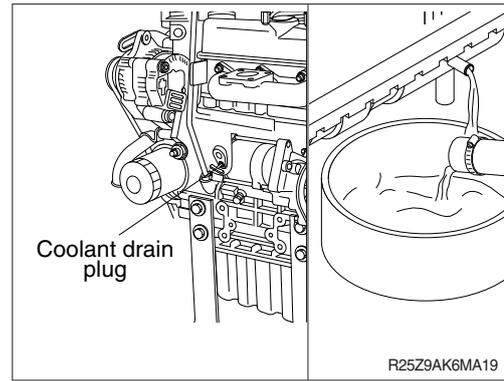
If in doubt, contact your local authorities for guidance as to proper handling of used antifreeze.



- ▲ Wait until the temperature is below 50°C (122°F) before removing the coolant system pressure cap.

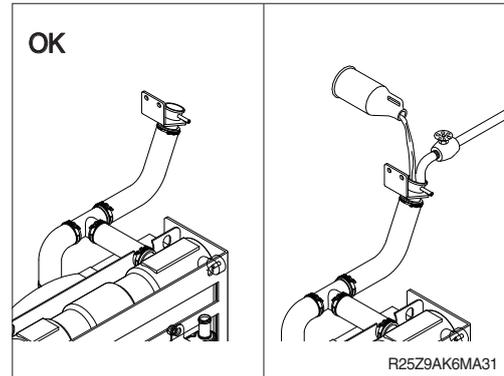
Failure to do so can cause personal injury from heated coolant spray.

Drain the cooling system by opening the drain valve on the radiator and opening the drain cock on the engine. A drain pan with a capacity of 10 liters (2.6 U.S.gallons) will be adequate in most applications.

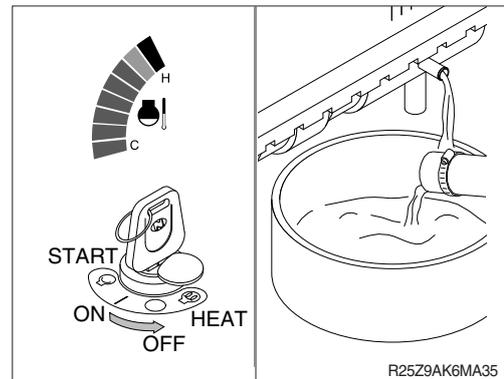


(2) Flushing of cooling system

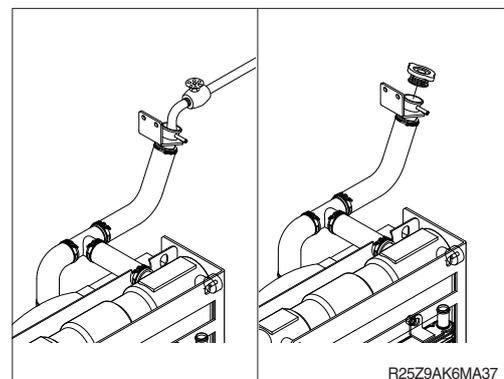
- ① Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).
 - ※ Use 0.5 kg (1.0 pound) of sodium carbonate for every 23 liters (6.0 U.S. gallons) of water.
 - ※ Do not install the radiator cap. The engine is to be operated without the cap for this process.



- ② Operate the engine for 5 minutes with the coolant temperature above 80°C (176°F). Shut the engine off, and drain the cooling system.

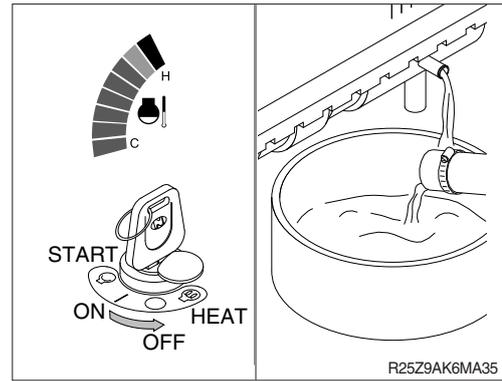


- ③ Fill the cooling system with clean water.
 - ※ Be sure to vent the engine and aftercooler for complete filling.
 - ※ Do not install the radiator cap or the new coolant filter.



- ④ Operate the engine for 5 minutes with the coolant temperature above 80°C (176°F).
Shut the engine off, and drain the cooling system.

※ If the water being drained is still dirty, the system must be flushed again until the water is clean.

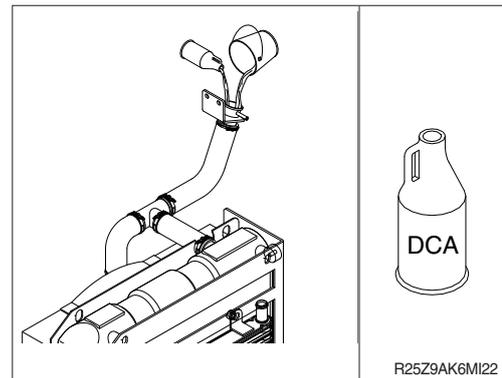


(3) Cooling system filling

- ① Use a mixture of 50 percent soft water and 50 percent ethylene glycol antifreeze to fill the cooling system. Refer to the page 6-9.

※ Use the correct amount of DCA4 corrosion inhibitor to protect the cooling system.

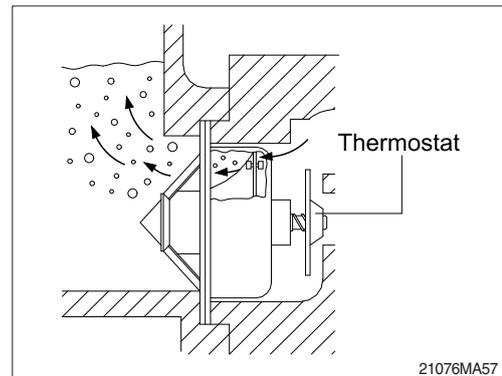
※ Do not use hard water such as river water or well water.



- ② The system has a maximum fill rate of 14 liters (3.5 U.S. gallons) per minute.
Do not exceed this fill rate.

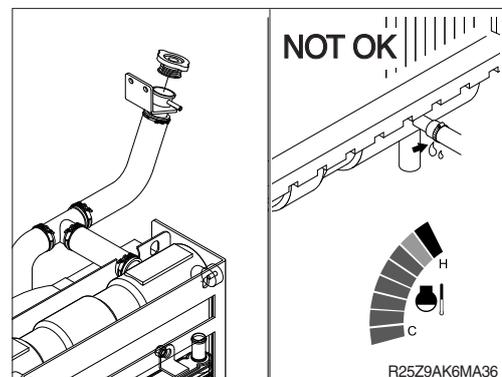
※ The system must be filled slowly to prevent air locks.

During filling, air must be vented from the engine coolant passage.



- ③ Install the pressure cap. Operate the engine until it reaches a temperature 80°C (176°F), and check for coolant leaks.

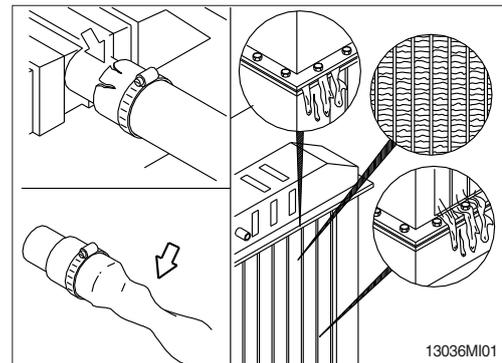
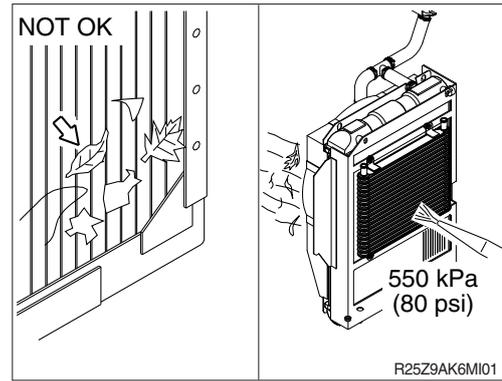
Check the coolant level again to make sure the system is full of coolant.



5) CLEAN RADIATOR AND OIL COOLER

Check, and if necessary, clean and dry outside of radiator and oil cooler. After working in a dusty place, clean radiator more frequently.

- (1) Visually inspect the radiator for clogged radiator fins.
- (2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.
Blow the air in the opposite direction of the fan air flow.
- (3) Visually inspect the radiator for bent or broken fins.
 - ※ If the radiator must be replaced due to bent or broken fins which can cause the engine to overheat, refer to the manufacturer's replacement procedures.
- (4) Visually inspect the radiator for core and gasket leaks.

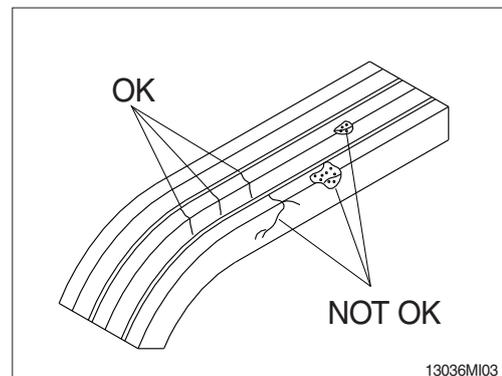
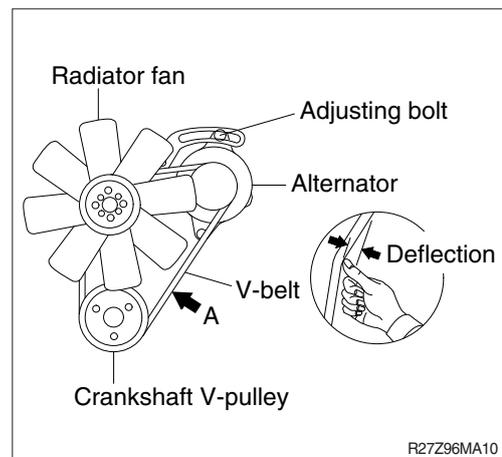


6) FAN BELT TENSION

- (1) Press the V-belt at the midpoint of the alternator pulley and the crankshaft pulley, and measure the deflection of the belt.

Item	Standard value (mm)
V-belt tension Belt deflection when pressed with a force of approx. 10 kgf·m (22.0 lbf·ft)	7.0 ~ 9.0

- (2) If the measured deflection does not conform to the standard value, loosen the adjusting bolt and move the alternator for adjustment.
- (3) Inspect the drive for damage.



7) INSPECTION OF COOLING FAN

▲ Personal injury can result from a fan blade failure. Never pull or pry on the fan. This can damage the fan blade and cause fan failure.

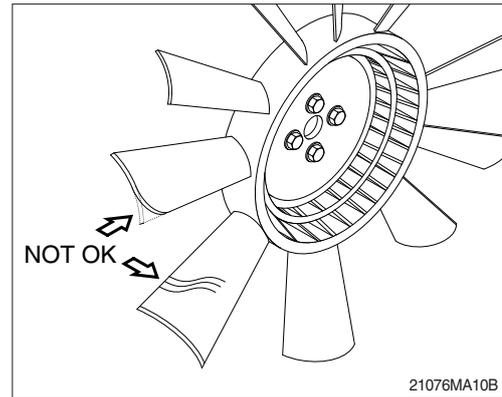
※ Rotate the crankshaft by using the engine barring gear.

※ A visual inspection of the cooling fan is required daily.

Check for cracks, loose rivets, and bent or loose blades.

Check the fan to make sure it is securely mounted. Tighten the capscrews if necessary.

Replace any fan that is damaged.



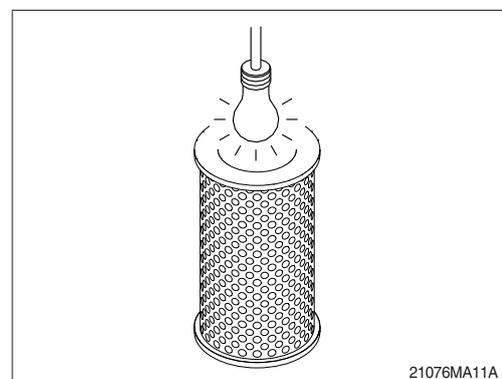
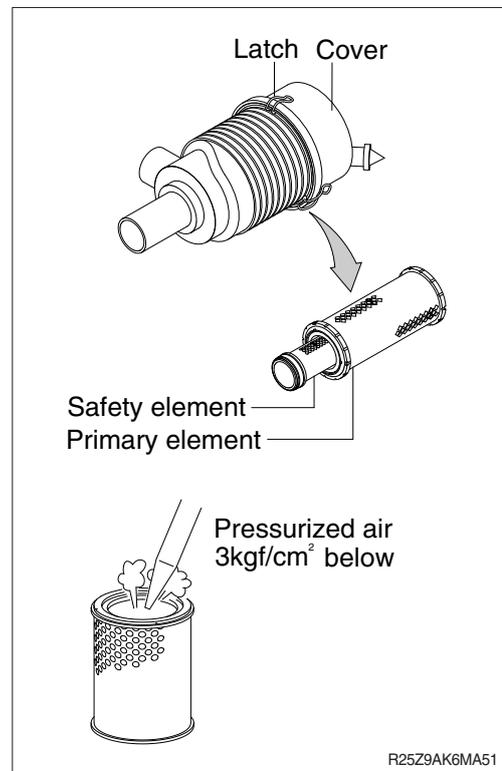
8) CLEANING OF AIR CLEANER

(1) Primary element

- ① Open cover and remove the element.
 - ② Clean the inside of the body.
 - ③ Clean the element with pressurized air.
 - Remove the dust inside of the element by the pressurized air (below 3 kgf/cm², 40 psi) forward and backward equally.
 - ④ Inspect for cracks or damage of element by putting a light bulb inside of the element.
 - ⑤ Insert element and close cover.
- ※ Replace the primary element after 4 times cleanings.

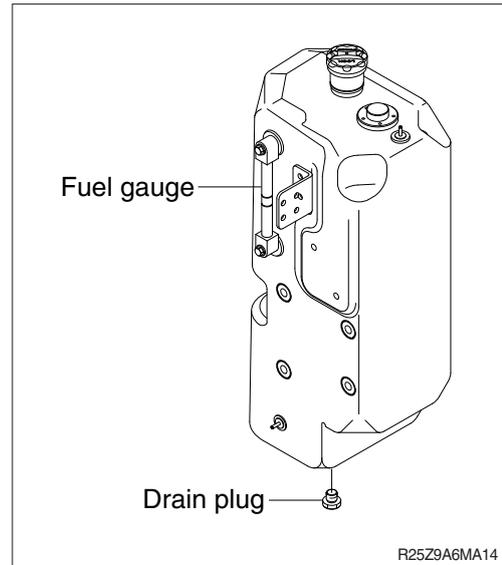
(2) Safety element

- ※ Replace the safety element only when the primary element is cleaned for the 4 times.
- ※ Always replace the safety element. Never attempt to reuse the safety element by cleaning the element.



9) FUEL TANK

- (1) Fill fuel fully when system the operation to minimize water condensation, and check it with fuel gauge before starting the machine.
 - (2) Drain the water and sediment in the fuel tank by opening the drain plug.
 - ※ **Be sure to LOCK the cap of fuel tank.**
 - ※ **Remove the strainer of the fuel tank and clean it if contaminated.**
- ▲ **Stop the engine when refueling.**
All lights and flames shall be kept at a safe distance while refueling.



10) REPLACING THE FUEL FILTER AND WATER SEPARATOR

(1) Fuel filter

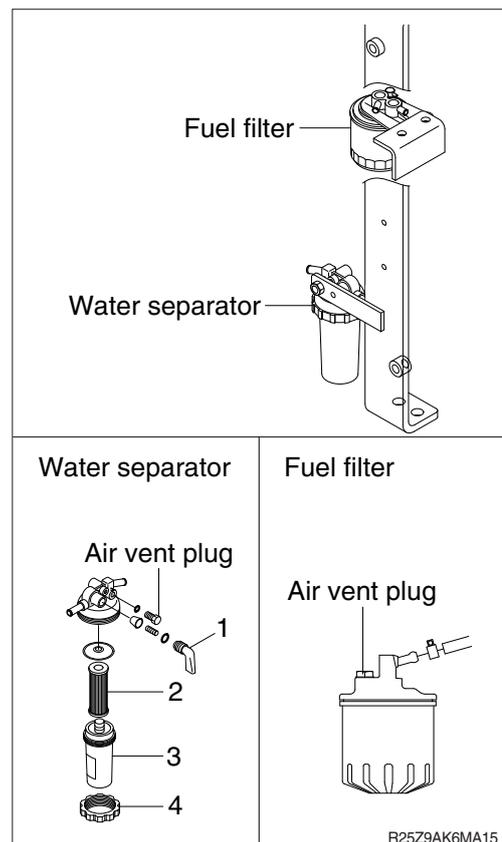
Water and dust in fuel are collected in the filter. So, change the filter every 400 hours service.

- ① Remove the used filter with filter wrench.
- ② Apply a thin film of fuel to the surface of new filter gasket before screwing on.
- ③ Then tighten enough by hand.
- ④ Loosen the air vent plug to let the air out.
- ⑤ Start engine and check for fuel leakage.

(2) Water separator

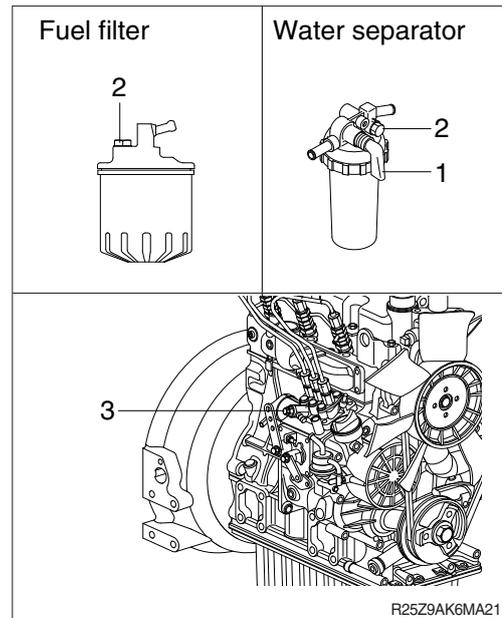
- ① Close the fuel cock (1).
 - ② Unscrew the retaining ring (4) and remove the cup (3), and rinse the inside with kerosene.
 - ③ Replace the element (2).
 - ④ Reassemble the water separator, keeping out dust and dirt.
 - ⑤ Bleed the fuel system. Refer to page 6-25.
- ※ **Clean element (2) every 100 hours.**
 - ※ **Be sure to clean the cup (3) periodically.**

- ▲ **Make sure that any fire hazard is not around the work area when handling fuel.**
Wipe off spilled fuel thoroughly. It can cause a fire.



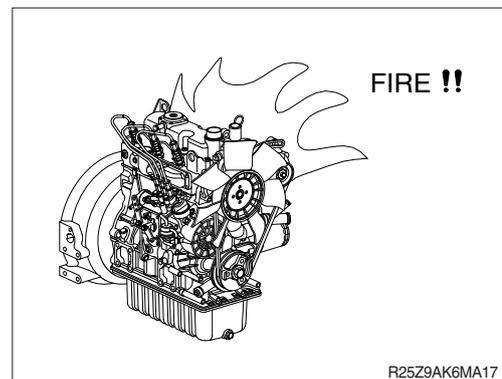
11) BLEEDING THE FUEL SYSTEM

- (1) Fill the tank with fuel and open the cock (1).
 - (2) Loosen the air vent plug (2) a few turns.
 - (3) Screw back the plug when bubbles do not come up any more.
 - (4) Open the air vent cock (3) on top of the fuel injection pump.
 - (5) Turn the start switch to the ON position and hold it in the position for 10~15 seconds to operate the fuel feed pump.
 - (6) Close securely the air vent cock (1) after air bleeding.
- ※ **Always keep the air vent cock on the fuel injection pump closed except when air is vented, or it may cause the engine to stop.**



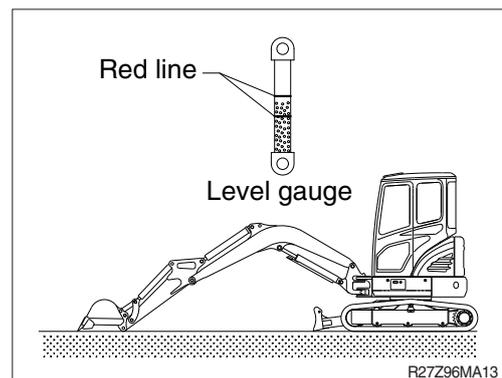
12) LEAKAGE OF FUEL

- ▲ Be careful and clean the fuel hose, injection pump, fuel filter and other connections as the leakage from these part can cause fire.



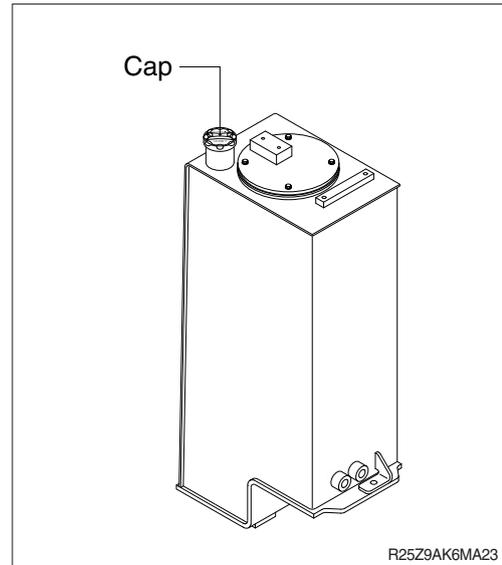
13) HYDRAULIC OIL CHECK

- (1) Stop the engine after retract the arm and bucket cylinders, then lower the boom and set the bucket on the ground at a flat location as in the illustration.
- (2) Check the oil level at the level gauge of hydraulic oil tank.
- (3) The oil level is normal if between the red lines.



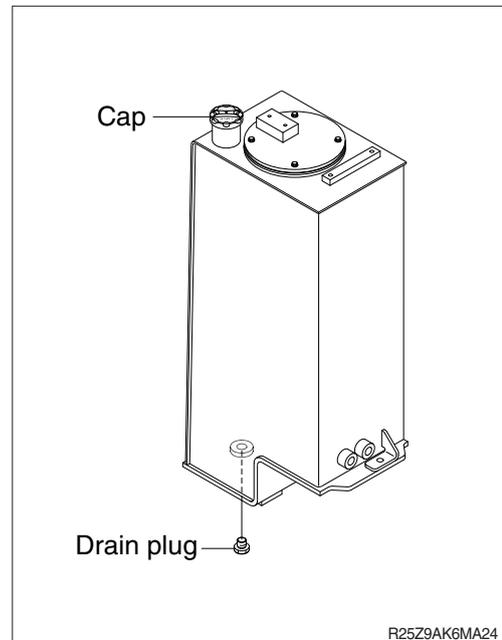
14) FILLING HYDRAULIC OIL

- (1) Stop the engine to the position of level check.
- (2) Loosen the cap.
- (3) Fill the oil to the specified level.
- (4) Start engine after filling and operate the work equipment several times.
- (5) Check the oil level at the level check position after engine stops.

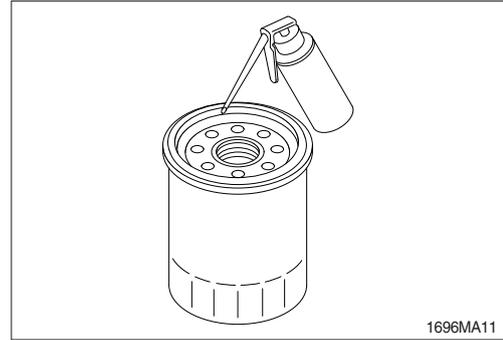


15) CHANGE HYDRAULIC OIL

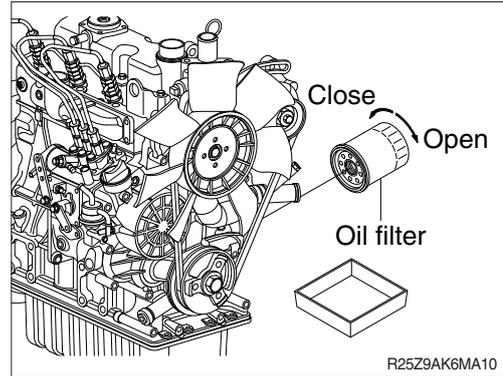
- (1) Lower the bucket on the ground pulling the arm and bucket cylinder to the maximum.
- (2) Loosen the cap.
- (3) Prepare a suitable container.
- (4) To drain the oil loosen the drain plug at the bottom of the oil tank.
- (5) Fill proper amount of recommended oil.
- (6) Put the cap.
- (7) Bleed air hydraulic pump loosen the air breather at top of hydraulic pump assembly.
- (8) Start engine and run continually. Release the air by full stroke of each control lever.



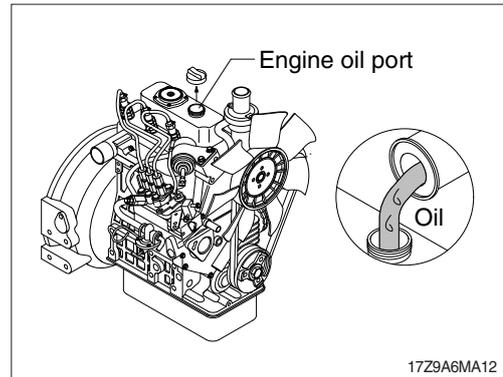
- (4) Apply a light film of lubricating oil to the gasket sealing surface before installing the filters.



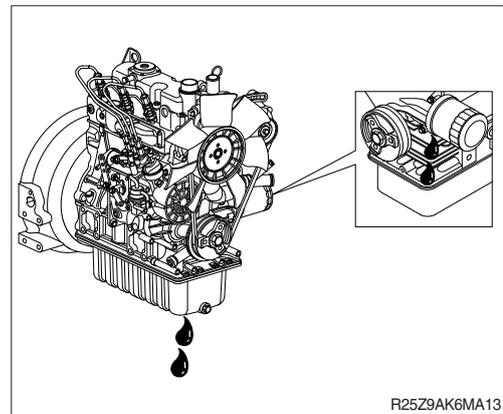
- (5) To install the filter, screw it in by hand.
※ **Mechanical over-tightening may distort the threads or damage the filter element seal.**
· Install the filter as specified by the filter manufacturer.



- (6) Fill the engine with clean oil to the proper level.
· Quantity : 5.7 l (1.5 U.S.gallons)



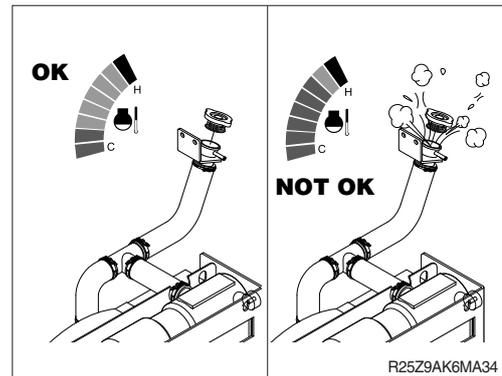
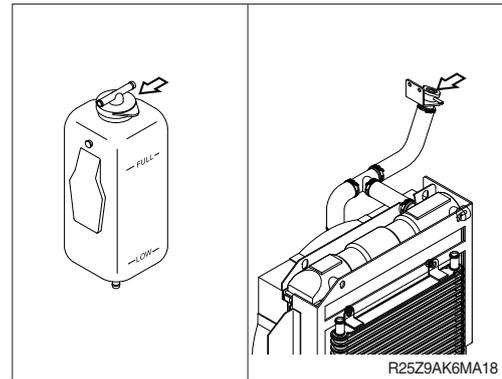
- (7) Operate the engine at low idle and inspect for leaks at the filters and the drain plug.
Shut the engine off and check the oil level with the dipstick. Allow 15 minutes for oil to drain down before checking.



3) CHECK COOLANT

- (1) Check if the level of coolant in reservoir tank is between FULL and LOW.
- (2) Add the mixture of antifreeze and water after removing the cap of the reservoir tank if coolant is not sufficient.
- (3) Be sure to add the coolant by opening the cap of radiator when coolant level is below LOW.
- (4) Replace gasket of radiator cap when it is damaged.

▲ Hot coolant can spray out if radiator cap is removed while engine is hot. Remove the cap after the engine has cooled down.



4) FLUSHING AND REFILLING OF RADIATOR

- (1) Change coolant

▲ Avoid prolonged and repeated skin contact with used antifreeze.

Such prolonged repeated contact can cause skin disorders or other bodily injury.

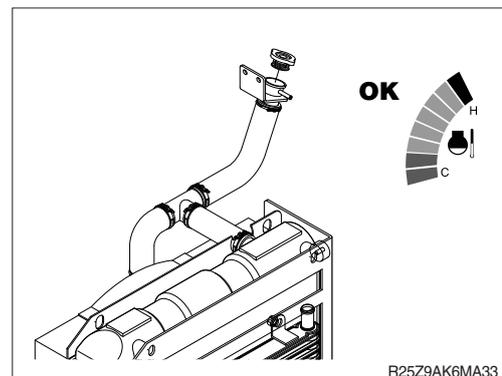
Avoid excessive contact-wash thoroughly after contact.

Keep out of reach of children.

※ **Protect the environment : Handling and disposal of used antifreeze can be subject to federal, state, and local law regulation.**

Use authorized waste disposal facilities, including civic amenity sites and garages providing authorized facilities for the receipt of used antifreeze.

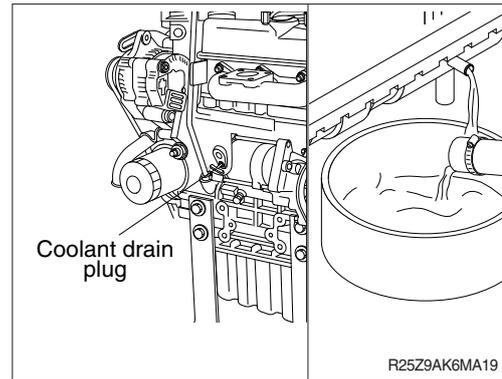
If in doubt, contact your local authorities for guidance as to proper handling of used antifreeze.



- ▲ Wait until the temperature is below 50°C (122°F) before removing the coolant system pressure cap.

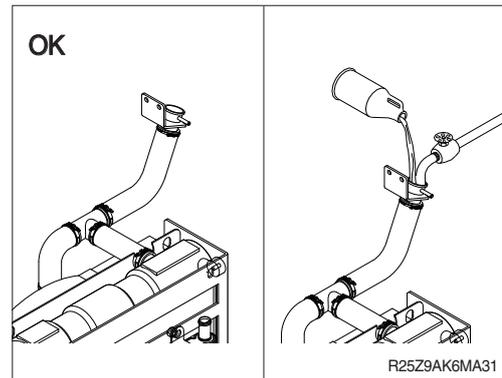
Failure to do so can cause personal injury from heated coolant spray.

Drain the cooling system by opening the drain valve on the radiator and opening the drain cock on the engine. A drain pan with a capacity of 10 liters (2.6 U.S.gallons) will be adequate in most applications.

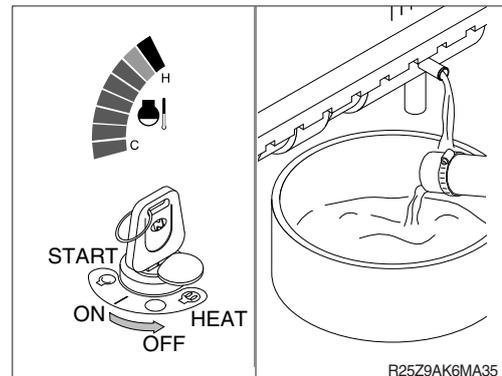


(2) Flushing of cooling system

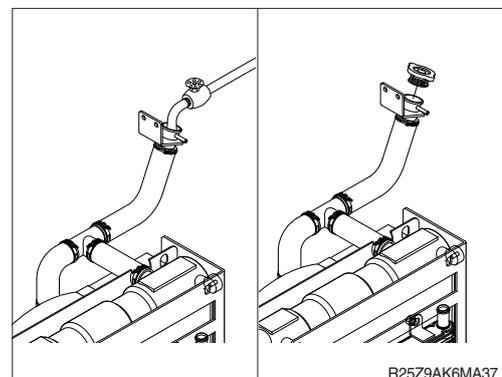
- ① Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).
 - ※ Use 0.5 kg (1.0 pound) of sodium carbonate for every 23 liters (6.0 U.S. gallons) of water.
 - ※ Do not install the radiator cap. The engine is to be operated without the cap for this process.



- ② Operate the engine for 5 minutes with the coolant temperature above 80°C (176°F).
Shut the engine off, and drain the cooling system.

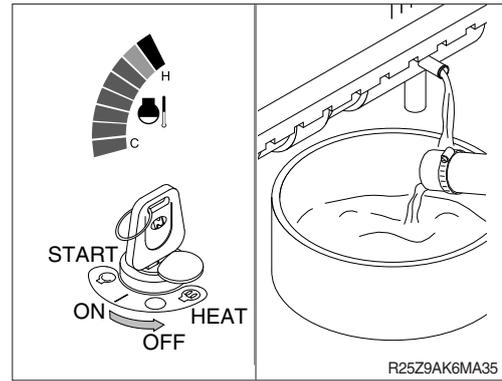


- ③ Fill the cooling system with clean water.
 - ※ Be sure to vent the engine and aftercooler for complete filling.
 - ※ Do not install the radiator cap or the new coolant filter.



- ④ Operate the engine for 5 minutes with the coolant temperature above 80°C (176°F).
Shut the engine off, and drain the cooling system.

※ If the water being drained is still dirty, the system must be flushed again until the water is clean.

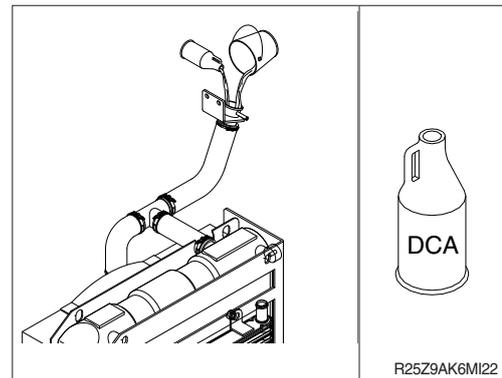


(3) Cooling system filling

- ① Use a mixture of 50 percent soft water and 50 percent ethylene glycol antifreeze to fill the cooling system. Refer to the page 6-9.

※ Use the correct amount of DCA4 corrosion inhibitor to protect the cooling system.

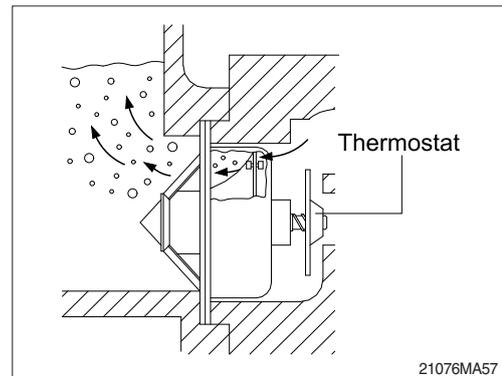
※ Do not use hard water such as river water or well water.



- ② The system has a maximum fill rate of 14 liters (3.5 U.S. gallons) per minute.
Do not exceed this fill rate.

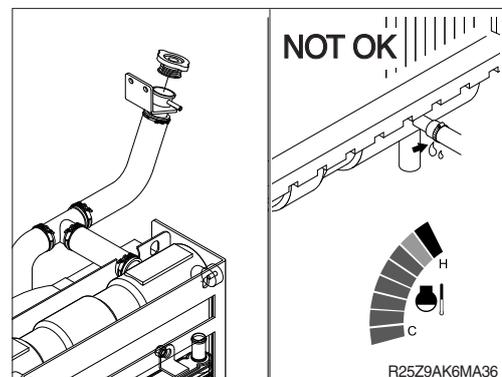
※ The system must be filled slowly to prevent air locks.

During filling, air must be vented from the engine coolant passage.



- ③ Install the pressure cap. Operate the engine until it reaches a temperature 80°C (176°F), and check for coolant leaks.

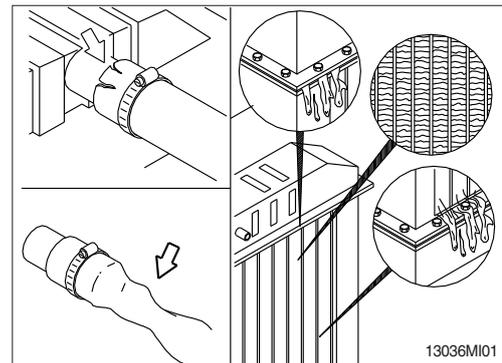
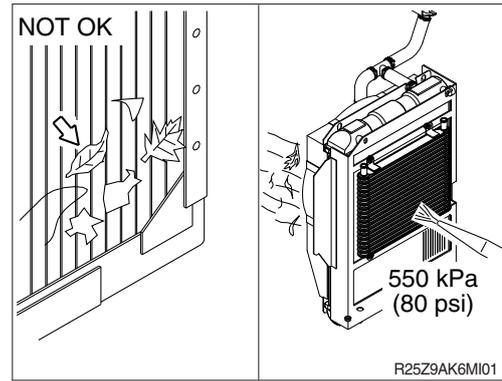
Check the coolant level again to make sure the system is full of coolant.



5) CLEAN RADIATOR AND OIL COOLER

Check, and if necessary, clean and dry outside of radiator and oil cooler. After working in a dusty place, clean radiator more frequently.

- (1) Visually inspect the radiator for clogged radiator fins.
 - (2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.
Blow the air in the opposite direction of the fan air flow.
 - (3) Visually inspect the radiator for bent or broken fins.
- ※ If the radiator must be replaced due to bent or broken fins which can cause the engine to overheat, refer to the manufacturer's replacement procedures.
- (4) Visually inspect the radiator for core and gasket leaks.

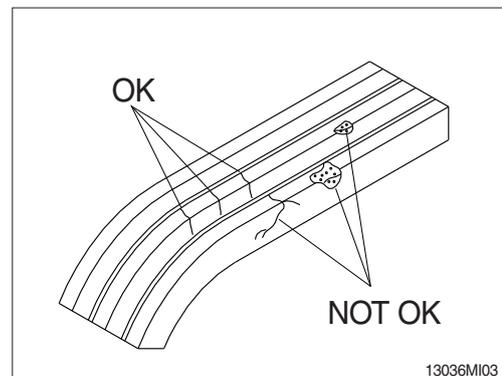
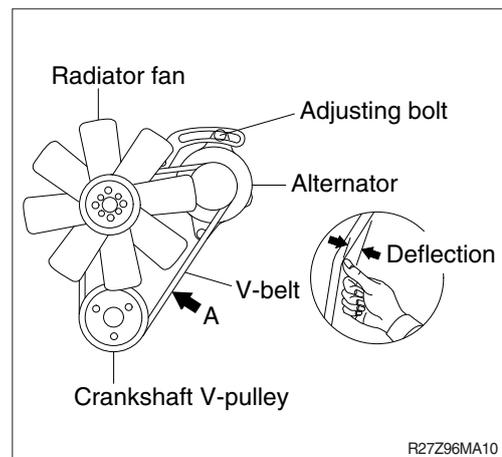


6) FAN BELT TENSION

- (1) Press the V-belt at the midpoint of the alternator pulley and the crankshaft pulley, and measure the deflection of the belt.

Item	Standard value (mm)
V-belt tension Belt deflection when pressed with a force of approx. 10 kgf·m (22.0 lbf·ft)	7.0 ~ 9.0

- (2) If the measured deflection does not conform to the standard value, loosen the adjusting bolt and move the alternator for adjustment.
- (3) Inspect the drive for damage.



7) INSPECTION OF COOLING FAN

▲ Personal injury can result from a fan blade failure. Never pull or pry on the fan. This can damage the fan blade and cause fan failure.

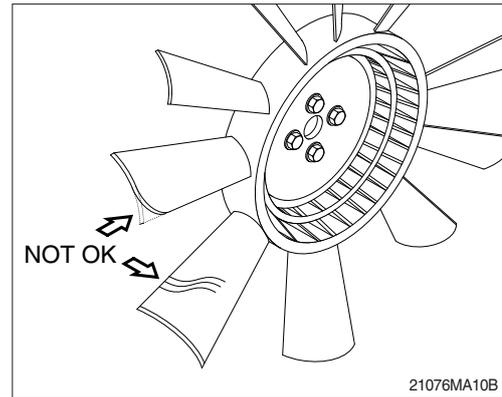
※ Rotate the crankshaft by using the engine barring gear.

※ A visual inspection of the cooling fan is required daily.

Check for cracks, loose rivets, and bent or loose blades.

Check the fan to make sure it is securely mounted. Tighten the capscrews if necessary.

Replace any fan that is damaged.



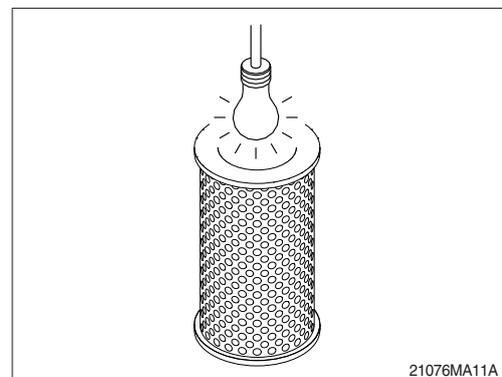
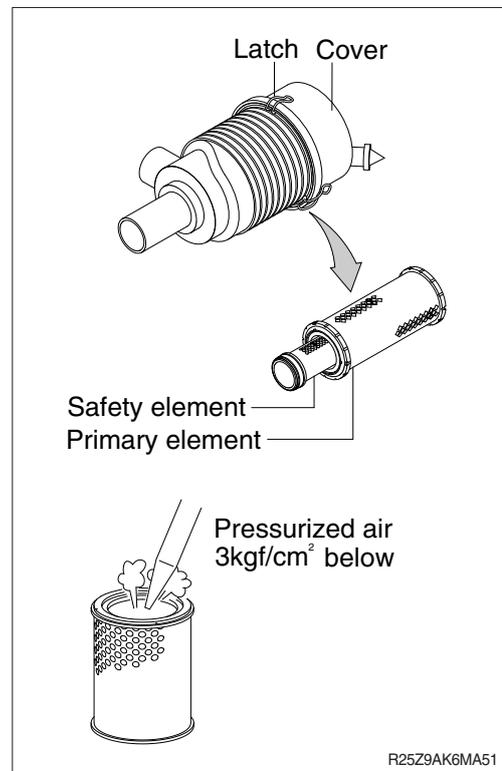
8) CLEANING OF AIR CLEANER

(1) Primary element

- ① Open cover and remove the element.
 - ② Clean the inside of the body.
 - ③ Clean the element with pressurized air.
 - Remove the dust inside of the element by the pressurized air (below 3 kgf/cm², 40 psi) forward and backward equally.
 - ④ Inspect for cracks or damage of element by putting a light bulb inside of the element.
 - ⑤ Insert element and close cover.
- ※ Replace the primary element after 4 times cleanings.

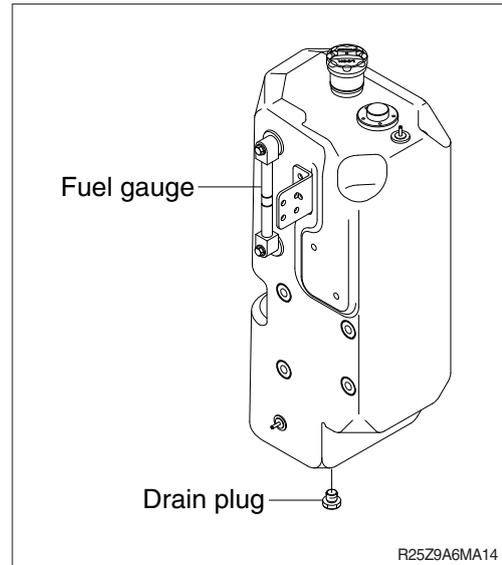
(2) Safety element

- ※ Replace the safety element only when the primary element is cleaned for the 4 times.
- ※ Always replace the safety element. Never attempt to reuse the safety element by cleaning the element.



9) FUEL TANK

- (1) Fill fuel fully when system the operation to minimize water condensation, and check it with fuel gauge before starting the machine.
 - (2) Drain the water and sediment in the fuel tank by opening the drain plug.
 - ※ **Be sure to LOCK the cap of fuel tank.**
 - ※ **Remove the strainer of the fuel tank and clean it if contaminated.**
- ▲ **Stop the engine when refueling.**
All lights and flames shall be kept at a safe distance while refueling.



10) REPLACING THE FUEL FILTER AND WATER SEPARATOR

(1) Fuel filter

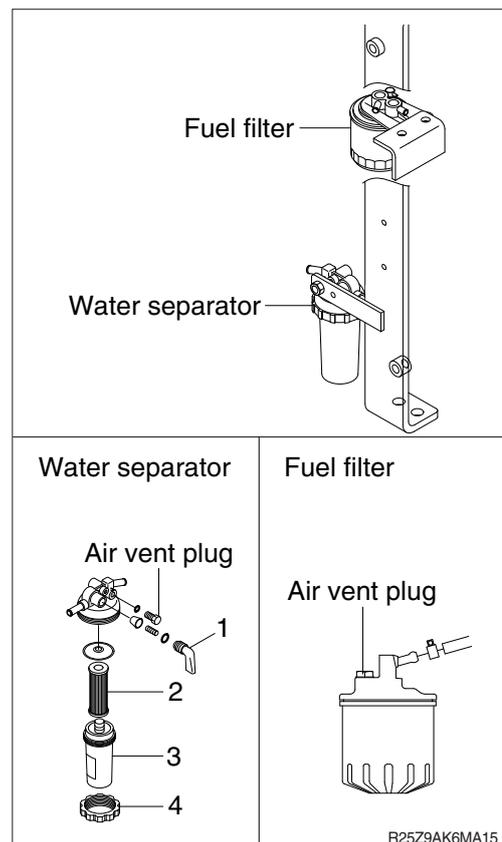
Water and dust in fuel are collected in the filter. So, change the filter every 400 hours service.

- ① Remove the used filter with filter wrench.
- ② Apply a thin film of fuel to the surface of new filter gasket before screwing on.
- ③ Then tighten enough by hand.
- ④ Loosen the air vent plug to let the air out.
- ⑤ Start engine and check for fuel leakage.

(2) Water separator

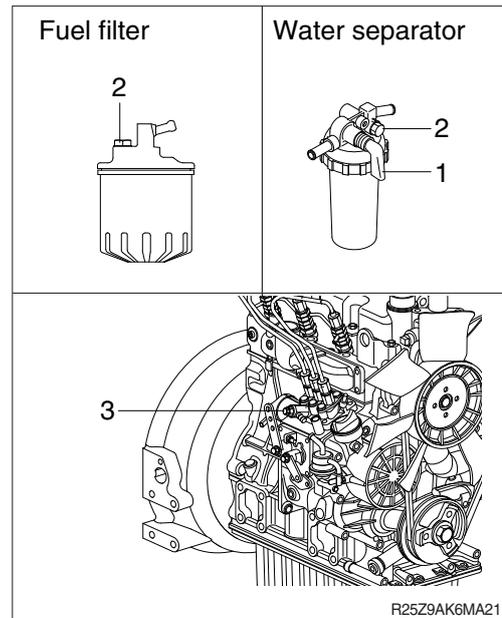
- ① Close the fuel cock (1).
 - ② Unscrew the retaining ring (4) and remove the cup (3), and rinse the inside with kerosene.
 - ③ Replace the element (2).
 - ④ Reassemble the water separator, keeping out dust and dirt.
 - ⑤ Bleed the fuel system. Refer to page 6-25.
- ※ **Clean element (2) every 100 hours.**
 - ※ **Be sure to clean the cup (3) periodically.**

- ▲ **Make sure that any fire hazard is not around the work area when handling fuel.**
Wipe off spilled fuel thoroughly. It can cause a fire.



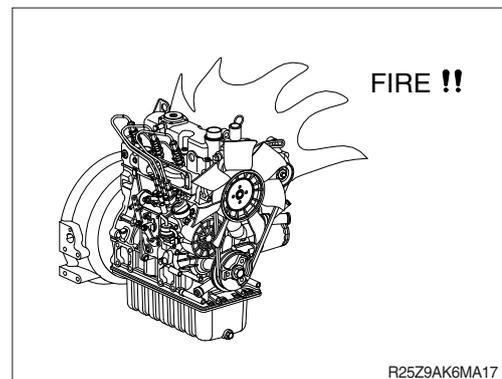
11) BLEEDING THE FUEL SYSTEM

- (1) Fill the tank with fuel and open the cock (1).
 - (2) Loosen the air vent plug (2) a few turns.
 - (3) Screw back the plug when bubbles do not come up any more.
 - (4) Open the air vent cock (3) on top of the fuel injection pump.
 - (5) Turn the start switch to the ON position and hold it in the position for 10~15 seconds to operate the fuel feed pump.
 - (6) Close securely the air vent cock (1) after air bleeding.
- ※ **Always keep the air vent cock on the fuel injection pump closed except when air is vented, or it may cause the engine to stop.**



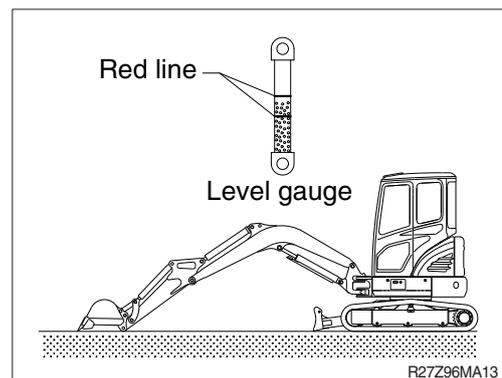
12) LEAKAGE OF FUEL

- ▲ Be careful and clean the fuel hose, injection pump, fuel filter and other connections as the leakage from these part can cause fire.



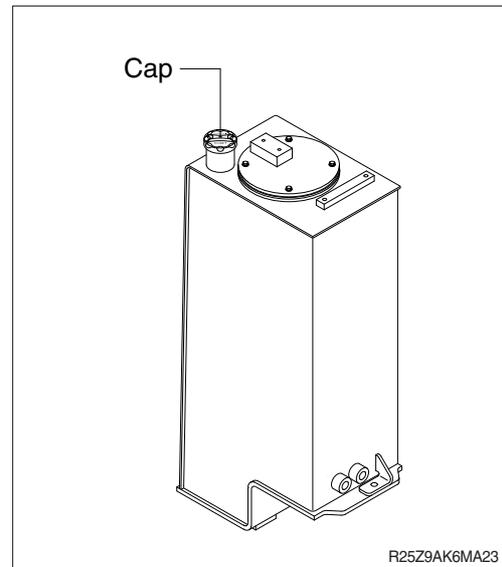
13) HYDRAULIC OIL CHECK

- (1) Stop the engine after retract the arm and bucket cylinders, then lower the boom and set the bucket on the ground at a flat location as in the illustration.
- (2) Check the oil level at the level gauge of hydraulic oil tank.
- (3) The oil level is normal if between the red lines.



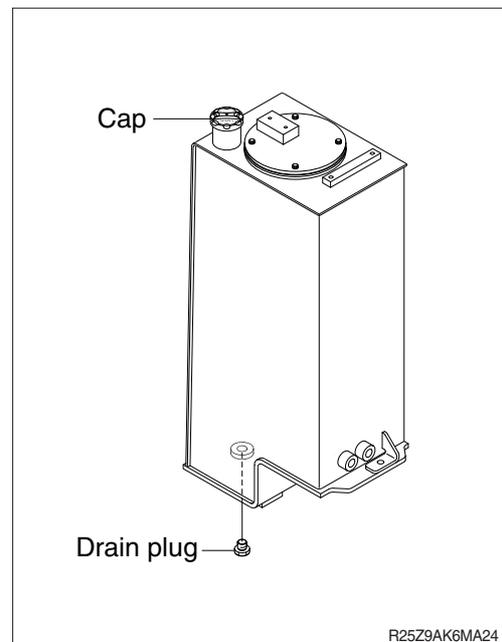
14) FILLING HYDRAULIC OIL

- (1) Stop the engine to the position of level check.
- (2) Loosen the cap.
- (3) Fill the oil to the specified level.
- (4) Start engine after filling and operate the work equipment several times.
- (5) Check the oil level at the level check position after engine stops.



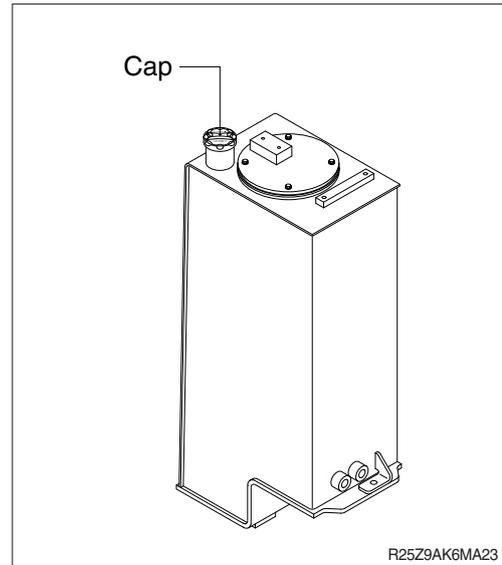
15) CHANGE HYDRAULIC OIL

- (1) Lower the bucket on the ground pulling the arm and bucket cylinder to the maximum.
 - (2) Loosen the cap.
 - (3) Prepare a suitable container.
 - (4) To drain the oil loosen the drain plug at the bottom of the oil tank.
 - (5) Fill proper amount of recommended oil.
 - (6) Put the cap.
 - (7) Bleed air hydraulic pump loosen the air breather at top of hydraulic pump assembly.
 - (8) Start engine and run continually. Release the air by full stroke of each control lever.
- ※ In case of injecting Bio oil (PANOLIN HLP SYNTH 46) to machines that have formerly used different hydraulic oil, the proportion of residual oil must not exceed 2 %
- ※ Do not mix any other Bio oil, use only PANOLIN HLP SYNTH 46 as bio oil.
- If changing to Bio oil, contact HYUNDAI dealer.



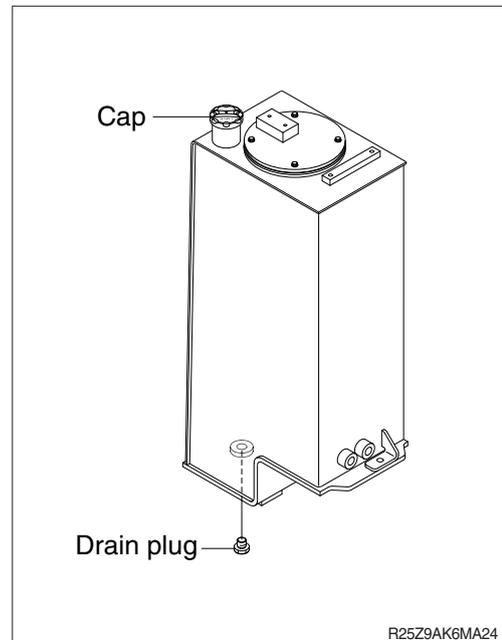
14) FILLING HYDRAULIC OIL

- (1) Stop the engine to the position of level check.
- (2) Loosen the cap.
- (3) Fill the oil to the specified level.
- (4) Start engine after filling and operate the work equipment several times.
- (5) Check the oil level at the level check position after engine stops.



15) CHANGE HYDRAULIC OIL

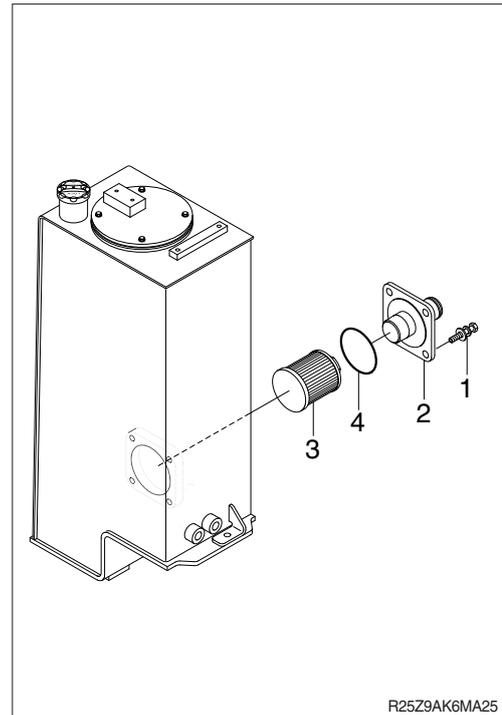
- (1) Lower the bucket on the ground pulling the arm and bucket cylinder to the maximum.
 - (2) Loosen the cap.
 - (3) Prepare a suitable container.
 - (4) To drain the oil loosen the drain plug at the bottom of the oil tank.
 - (5) Fill proper amount of recommended oil.
 - (6) Put the cap.
 - (7) Bleed air hydraulic pump loosen the air breather at top of hydraulic pump assembly.
 - (8) Start engine and run continually. Release the air by full stroke of each control lever.
- ※ In case of injecting HBHO (Hyundai Bio Hydraulic Oil) to machines that have formerly used different hydraulic oil, the proportion of residual oil must not exceed 2 %
- ※ Do not mix any other Bio oil, use only HBHO as bio oil.
- If changing to Bio oil, contact HYUNDAI dealer.



16) CLEAN SUCTION STRAINER

When changing hydraulic oil, remove the suction strainer and clean it.

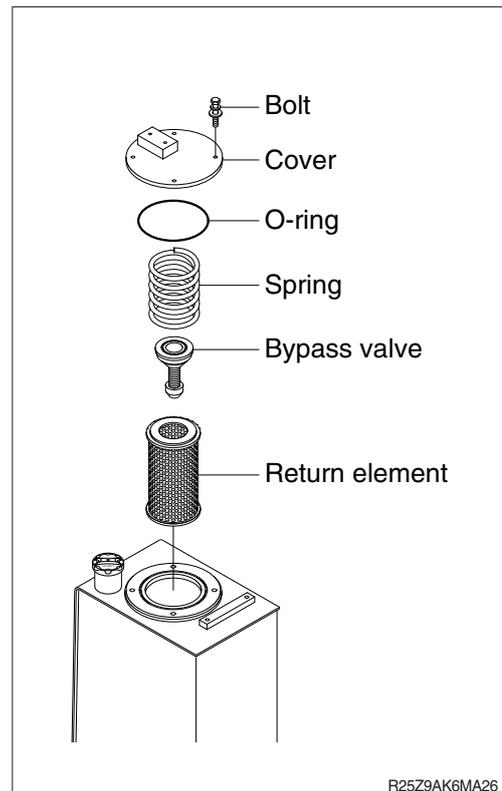
- (1) Remove the bolt (1) and suction cover (2)
 - Tightening torque : $6.9 \pm 1.4 \text{ kgf} \cdot \text{m}$
($50 \pm 10 \text{ lbf} \cdot \text{ft}$)
 - (2) Remove the suction strainer (3) from suction cover (2)
 - (3) Wash the foreign material on the suction strainer with gasoline or cleaning oil.
 - (4) Replace the suction strainer if it is damaged.
 - (5) Assemble with reverse order of disassembly.
Be sure to install a new O-ring (4) and reinsert in the oil tank.
- ※ **Do not remove the bolt (1) from hydraulic tank before the hydraulic tank was empty.**



17) REPLACEMENT OF RETURN FILTER

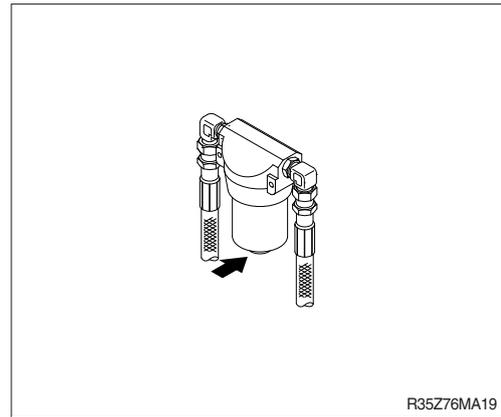
Replace as follows paying attention to the cause to be kept during the replacement.

- (1) Remove the cover.
 - Tightening torque : $6.9 \pm 1.4 \text{ kgf} \cdot \text{m}$
($50 \pm 10 \text{ lbf} \cdot \text{ft}$)
- (2) Remove the spring, by-pass valve, and return filter in the tank.
- (3) Replace the element with new one.



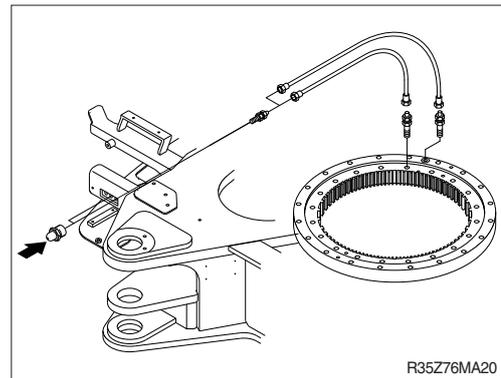
18) REPLACE OF PILOT LINE FILTER

- (1) Loosen the nut positioned on the filter body.
 - (2) Pull out the filter element and clean filter housing.
 - (3) Install the new element and tighten using specified torque.
- ※ **Change cartridge after initial 250 hours of operation. Thereafter, change cartridge every 1000 hours.**



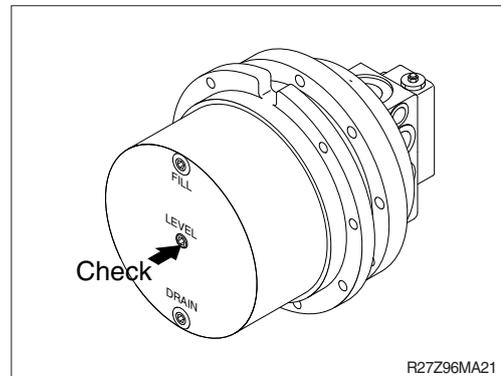
19) LUBRICATE SWING BEARING

- (1) Grease at 2 fitting.
- ※ **Lubricate every 250 hours.**



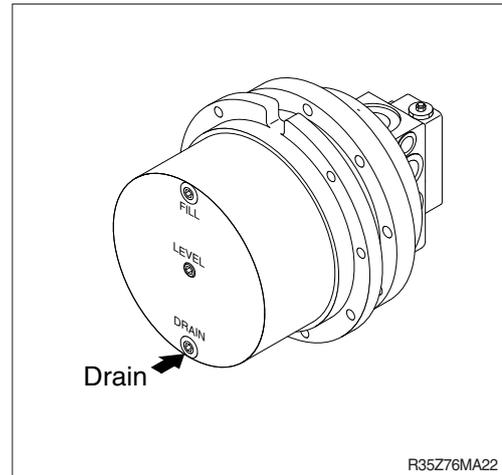
20) CHECK THE TRAVEL REDUCTION GEAR OIL

- (1) Operate the machine to the position of drain plug down to the flat ground.
- (2) Loosen the level plug and check the oil level. If the level is at the hole of the plug, it is normal. Fill the oil if it is not sufficient.
Amount of oil : 0.6 l (0.16 U.S.gal)



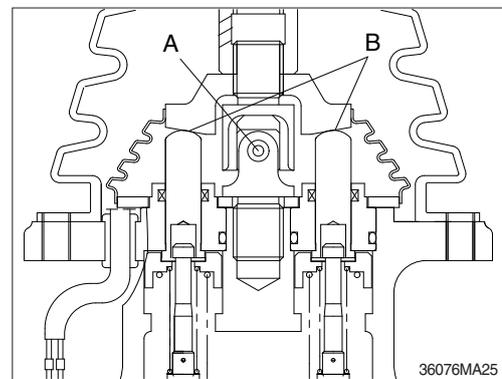
21) CHANGE OF THE TRAVEL REDUCTION GEAR OIL

- (1) Raise the temperature of the oil by traveling machine first.
- (2) Stop when the position of the drain plug is down.
- (3) Loosen the level plug and then the drain plug.
- (4) Drain the oil to adequate container.
- (5) Tighten the drain plug and fill specified amount of oil at filling port.
- (6) Tighten the level plug and travel slowly to check if there is any leakage of oil.



22) LUBRICATE RCV LEVER

Remove the bellows and with a grease gun grease the joint part (A) and sliding parts (B).



23) ADJUSTMENT OF TRACK TENSION

- ※ It is important to adjust the tension of track properly to extend the lifetime of track and traveling device.
- ※ The wear of pins and bushings on the undercarriage will vary with the working conditions and soil properties.
It is thus necessary to continually inspect the track tension so as to maintain the standard tension on it.

- (1) Raise the chassis with the boom and arm.
 - (2) Measure the distance between bottom of lower roller and rubber track.
- ※ **Remove mud with rotating the track before measuring.**

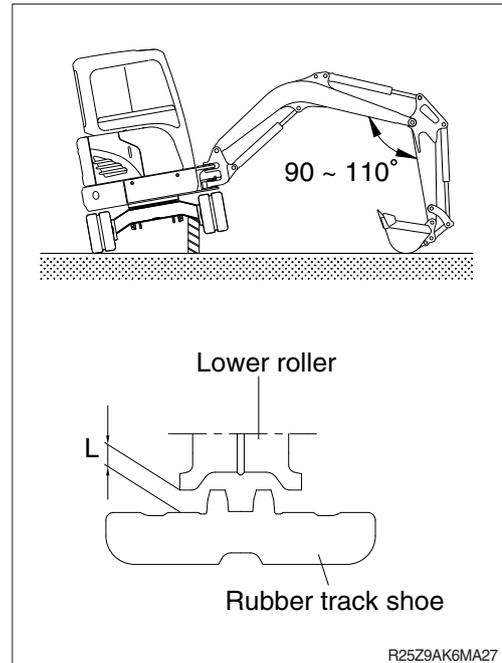
- (3) If the tension is tight, drain the grease in the grease nipple and if the tension is loose, charge the grease.

▲ **Personal injury or death can result from grease under pressure.**

▲ **When loosening the grease nipple, do not loosen more than one turn as there is a danger of a spring coming out of the nipple because of the high pressure inside.**

- ※ **When the grease is drained, move the track to the forward and backward slightly.**

If the track tension is loose even after the grease is charged to the maximum, change the pins and bushings as there are worn seriously.



Rubber track

Length (L)	
5~10 mm	0.2~0.4"

24) REPLACEMENT OF BUCKET

▲ When knocking the pin in with a hammer, metal particles may fly and cause serious injury, particularly if they get into your eyes. When carrying out this operation, always wear goggles, helmet, gloves, and other protective equipment.

※ When the bucket is removed, place it in a stable condition.

※ When performing joint work, make sure signals to each other and work carefully for safety's sake.

(1) Lower the bucket on the ground as the picture shown in the right.

(2) Lock the safety lever to the LOCK position and stop the engine.

(3) Remove the stopper bolts (1) and nuts (2), then remove pins (3, 4) and remove the bucket.

※ When removing the pins, place the bucket so that it is in light contact with the ground.

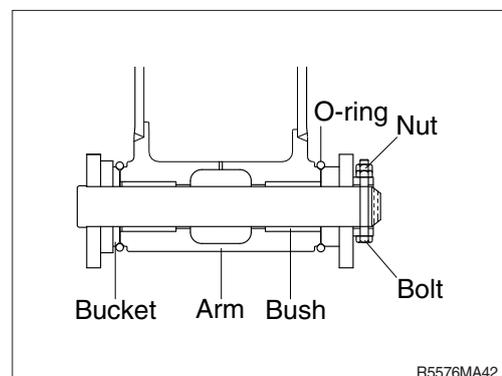
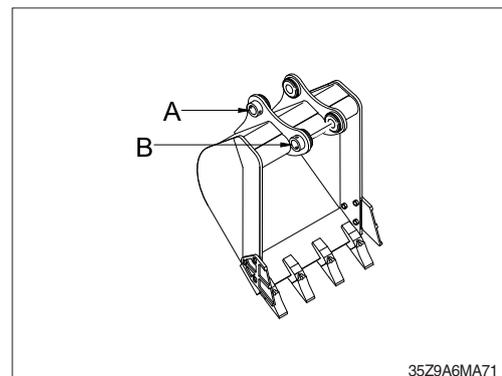
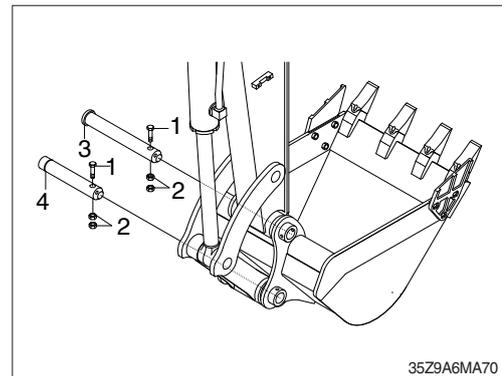
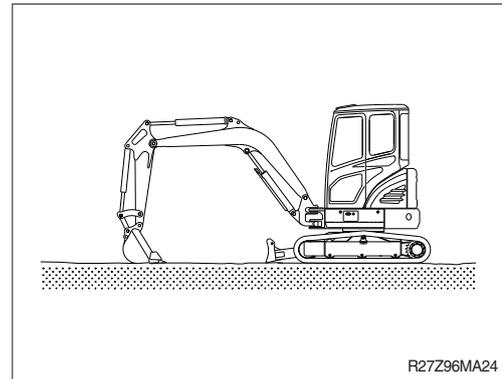
※ If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.

※ After remove the pins, make sure that they do not become contaminated with sand or mud and that the seals of bushing on both sides do not become damaged.

(4) Align the arm with holes (A) and the link with holes (B), then coat with grease and install pins (3, 4)

※ When installing the bucket, the O-rings are easily damaged, so fit the O-rings on the boss of the bucket as shown in the picture. After knocking the pin, move the O-ring down to the regular groove.

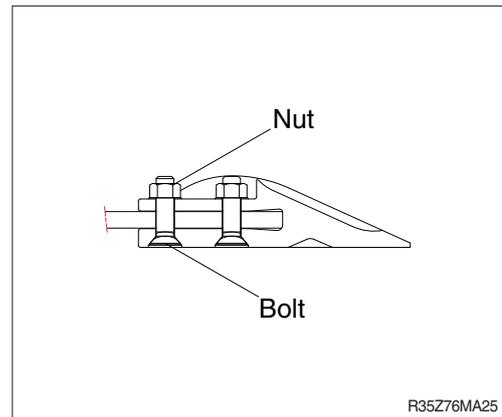
(5) Install the stopper bolt (1) and nuts (2) for each pin, then grease the pin.



25) REPLACEMENT OF BUCKET TOOTH

- (1) Loosen the bolts and nuts.
- (2) Remove dust and mud from surface of bucket by using knife.
- (3) Fit news tooth to bucket.
- (4) Fasten bolts and nuts.

- ▲ **Personal injury can result from bucket falling.**
- ▲ **Block the bucket before changing tooth tips or side cutters.**



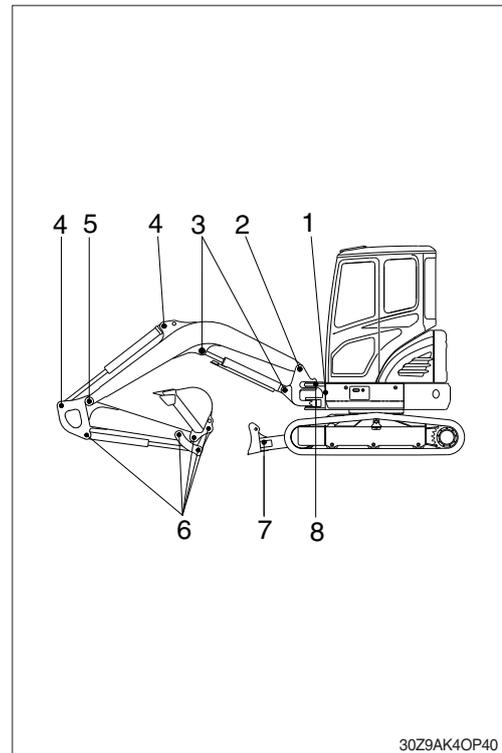
26) LUBRICATE PIN AND BUSHING

(1) Lubricate to each pin of working device

Lubricate the grease to the grease nipple according to the lubricating interval.

No.	Description	Qty
1	Lubrication manifold at upper frame	3
2	Boom connection pin	2
3	Boom cylinder (head and rod side)	2
4	Arm cylinder pin (head and rod side)	2
5	Boom and arm connection pin	1
6	Bucket cylinder pin (head and rod)	2
	Bucket link (control rod)	1
	Arm and bucket connection pin	1
	Arm and control link connection pin	1
7	Dozer connection pin	2
	Dozer cylinder pin	2
8	Boom swing post	2
	Boom swing cylinder	2

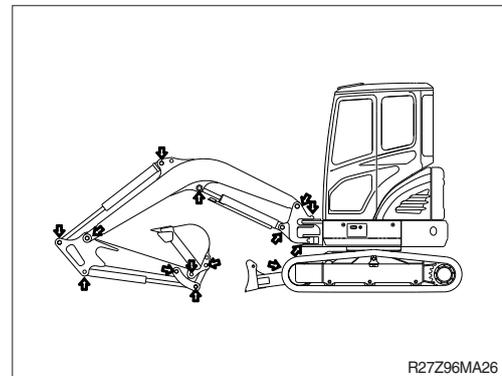
※ Shorten lubricating interval when working in the water or dusty place.



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(2) Dust seals are mounted on the rotating part of working device to extend the lubricating interval.

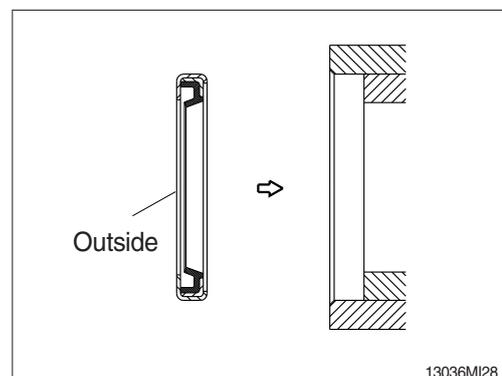
※ Mount the lip to be faced outside when replace the dust seal.



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※ If it is assembled in wrong direction, it will cause fast wear of pin and bushing, and create noise and vibration during operation.

※ Assemble the seal same direction with picture and use with plastic hammer when replace.

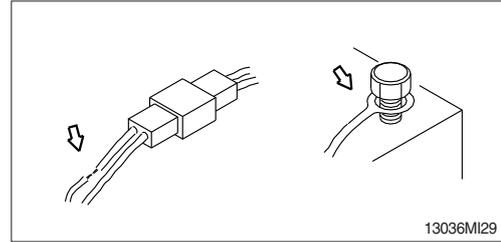


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7. ELECTRICAL SYSTEM

1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



2) BATTERY

(1) Clean

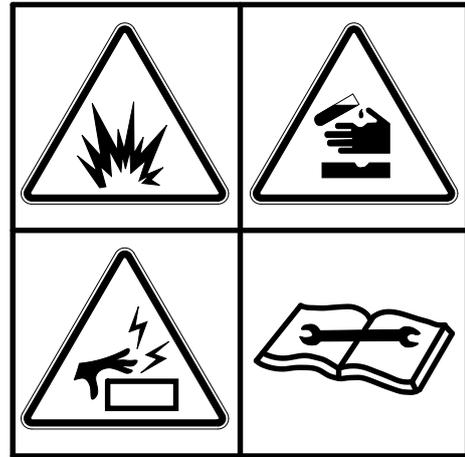
① Wash the terminal with hot water if it is contaminated, and apply grease to the terminals after washing.

⚠ **Battery gas can explode. Keep sparks and flames away from batteries.**

⚠ **Always wear protective glasses when working with batteries.**

⚠ **Do not stain clothes or skin with electrolyte as it is acid.**

Be careful not to get the electrolyte in eyes. Wash with clean water and go to the doctor if it enters the eyes.



(2) Recycle

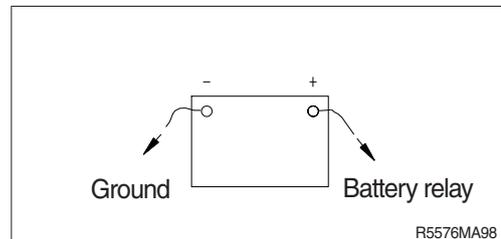
Never discard a battery.

Always return used batteries to one of the following locations.

- A battery supplier
- An authorized battery collection facility
- Recycling facility

(3) Method of removing the battery cable

Remove the cable from the ground connection first (⊖ terminal side) and reconnect it last when reassembling.



3) STARTING THE ENGINE WITH A BOOSTER CABLE

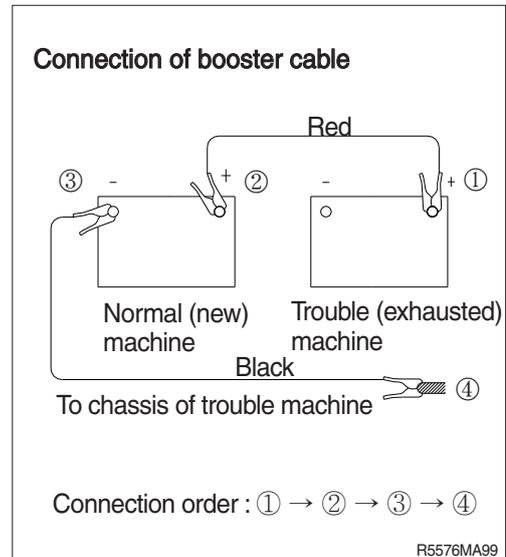
Keep following order when you are going to start engine using booster cable.

(1) Connection of booster cable

※ Use the same capacity of battery for starting.

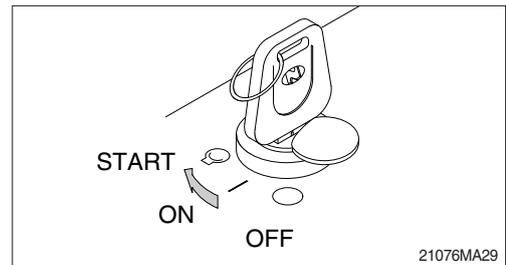
- ① Make sure that the starting switches of the normal machine and trouble machine are both at the OFF position.
- ② Connect the red terminal of booster cable to the battery (+) terminal between exhausted and new battery.
- ③ Connect the black terminal of the booster cable between new battery (-) terminal and chassis of trouble machine.

※ Keep firmly all connection, the spark will be caused when connecting finally.



(2) Starting the engine

- ① Starting the engine of the normal machine and keep it to run at high idle.
- ② Start engine of the trouble machine with starting switch.
- ③ If you can not start it by one time, restart the engine after 2 minutes.



(3) Taking off the booster cable

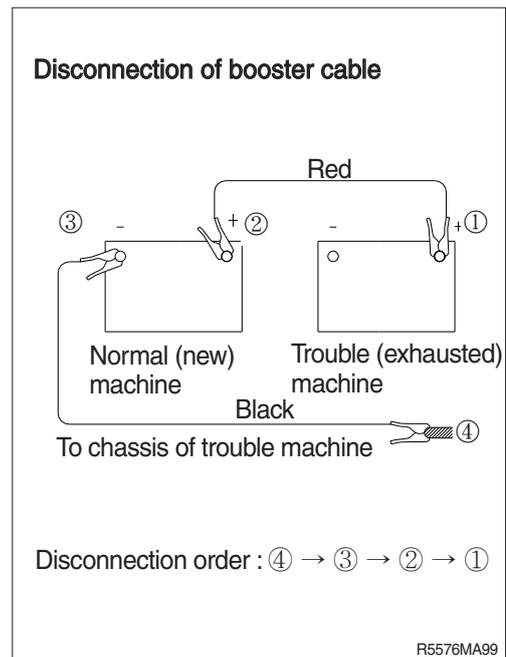
- ① Take off the booster cable (black).
- ② Take off the booster cable (red) connected to the (+) terminal.
- ③ Run engine with high idle until charging the exhausted battery by alternator, fully.

▲ Explosive gas is generated while using the battery or charging it. Keep away flame and be careful not to cause the spark.

※ Charge the battery in the well ventilated place.

※ Place the machine on the earth or concrete. Avoid charging the machine on the steel plate.

※ Do not connect (+) terminal and (-) terminal when connecting booster cable because it will be shorted.



(4) Welding repair

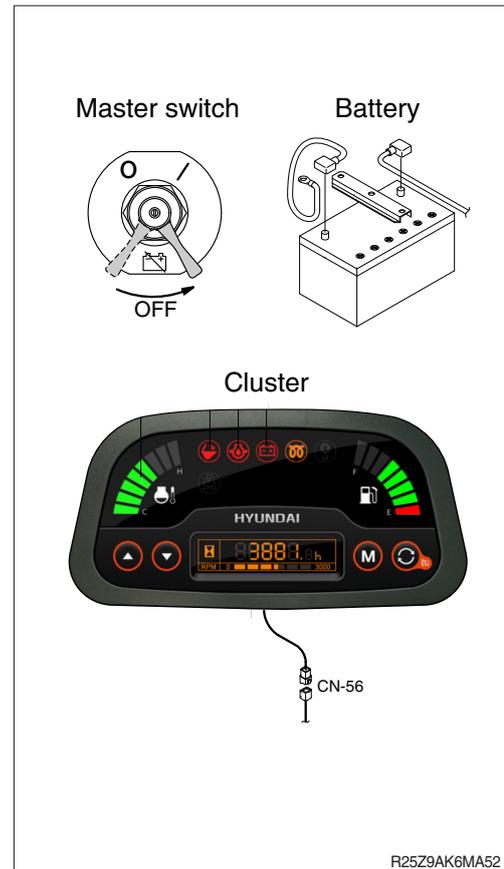
Before start to welding, follow the below procedure.

- ① Shut off the engine and remove the starting switch.
- ② Disconnect ground cable from battery by master switch.
- ③ Before carrying out any electric welding on the machine, the battery cables should be disconnected and the connector pulled out of the cluster.
- ④ Connect the earth (ground) lead of the welding equipment as close to the welding point as possible.

※ Do not weld or flame cut on pipes or tubes that contain flammable fluids. Clean them thoroughly with nonflammable solvent before welding or flame cutting on them.

▲ Do not attempt to welding work before carry out the above.

If not, it will caused serious damage at electric system.



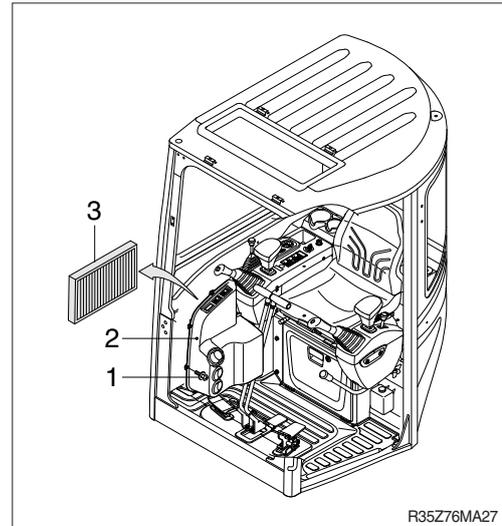
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8. HEATER

1) CLEAN AND REPLACE OF THE HEATER FILTER

※ **Always stop the engine before servicing.**

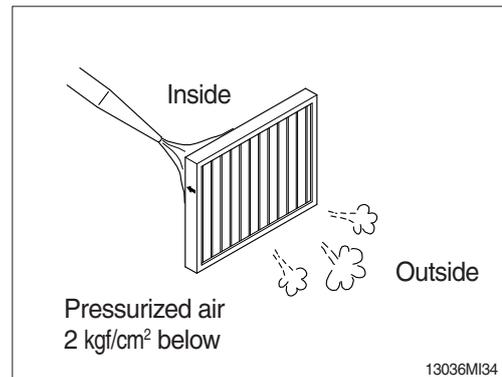
- (1) Remove the screw (1) and heater cover (2) on the right side of cabin.
- (2) Remove the heater filter (3).



- (4) Clean the filter using a pressurized air (below 2 kgf/cm², 28 psi).

△ **When using pressurized air, be sure to wear safety glasses.**

- (5) Inspect the filter after cleaning. If it is damaged or badly contaminated, use a new filter.



TROUBLESHOOTING GUIDE

1. ENGINE

※ This guide is not intended to cover every conditions, however many of the more common possibilities are listed.

Trouble	Service	Remark
The engine oil pressure lamp lights ON when engine speed is raised after completion of warm up.	<ul style="list-style-type: none"> · Add the oil to the specified level. · Replace the oil filter cartridge. · Check oil leakage from the pipe or the joint. · Replace the monitor. 	
Steam is emitted from the top part of the radiator (the pressure valve). Coolant level warning lamp lights ON.	<ul style="list-style-type: none"> · Supply the coolant and check leakage. · Adjust fan belt tension. · Wash out inside of cooling system. · Clean or repair the radiator fin. · Check the thermostat. · Tighten the radiator cap firmly or replace the packing of it. · Replace the monitor. 	
The engine does not start when the starting motor is turned over.	<ul style="list-style-type: none"> · Add fuel. · Repair where air is leaking into fuel system. · Check the injection pump or the nozzle. · Check the valve clearance. · Check engine compression pressure. 	
Exhaust gas is white or blue.	<ul style="list-style-type: none"> · Adjust to specified oil quantity. · Replace with specified fuel. 	
Exhaust gas occasionally turns black.	<ul style="list-style-type: none"> · Clean or replace the air cleaner element. · Check the nozzle. · Check engine compression pressure. · Clean or replace the turbocharger. 	
Combustion noise occasionally changes to breathing sound.	<ul style="list-style-type: none"> · Check the nozzle. 	
Unusual combustion noise or mechanical noise.	<ul style="list-style-type: none"> · Check with specified fuel. · Check over-heating. · Replace the muffler. · Adjust valve clearance. 	

2. ELECTRICAL SYSTEM

Trouble	Service	Remark
Lamp does not glow brightly even when engine runs at high speed. Lamp flickers while engine runs.	<ul style="list-style-type: none"> · Check for loose terminals and open-circuit wiring. · Adjust belt tension. 	
Battery charging lamp does not go out even when engine runs at high speed.	<ul style="list-style-type: none"> · Check the alternator. · Check and repair wiring. 	
Unusual noise is emitted from the alternator.	<ul style="list-style-type: none"> · Check the alternator. 	
Starting motor does not turn when starting switch is turned START.	<ul style="list-style-type: none"> · Check and repair the wiring. · Charge the battery. · Check the starting motor. · Check the safety relay. 	
The pinion of the starting motor keeps going in and out.	<ul style="list-style-type: none"> · Charge the battery. · Check the safety relay. 	
Starting motor turns the engine sluggishly.	<ul style="list-style-type: none"> · Charge the battery. · Check the starting motor. 	
The starting motor disengages before the engine starts up.	<ul style="list-style-type: none"> · Check and repair the wiring. · Charge the battery. 	
The engine oil pressure lamp does not light up when engine is stationary (when the starting switch is in ON position.)	<ul style="list-style-type: none"> · Check the monitor. · Check the caution lamp switch. 	
Battery charging lamp does not light up when the engine is stationary. (when the starting switch is in ON position.)	<ul style="list-style-type: none"> · Check the monitor. · Check and repair the wiring. 	

3. OTHERS

Trouble	Service	Remark
Track slip out of place. Excessive wear of the sprocket.	· Adjust tension of track.	
Bucket either rises slowly or not at all.	· Add oil to specified level.	
Slow speed of travel, swing, boom, arm and bucket.	· Add oil to specified level.	
Unusual noise emitted from pump.	· Clean the hydraulic tank strainer.	
Excessive oil temperature rise of hydraulic oil.	· Clean the oil cooler. · Adjust fan belt tension. · Add oil to specified level.	

HYDRAULIC BREAKER AND QUICK COUPLER

1. SELECTING HYDRAULIC BREAKER

- 1) Become familiar with the manual and select breakers suitable to machine specifications.
- 2) Make careful selection in consideration of oil quantity, pressure and striking force, to enable satisfied performance.
- 3) When apply a breaker to the machine, consult your local dealer of Hyundai for further explanation.

2. CIRCUIT CONFIGURATION

- 1) As for breaker oil pressure line, use extra spool of main control valve.
- 2) Set proper breaker pressure on load relief valve.
- 3) The pressure of the ROBEX27Z-9AK system is 220 kgf/cm² (3130 psi).
- 4) The accumulator should be used to the breaker charging and return line.
If the accumulator is not used, it will be damage as the input wave is delivered.
※ Keep the pressure pulsation of pump below 60 kgf/cm² (850 psi) by installing the accumulator.
- 5) Do not connect the breaker return line to the main control, but connect to the return line front of the cooler.
- 6) Do not connect the breaker return line to drain lines, such as of swing motor, travel motor or pump, otherwise they should be damaged.
- 7) One of spool of the main control valve should be connected to the tank.
- 8) Select the size of pipe laying considering the back pressure.
- 9) Shimless tube should be used for the piping. The hose and seal should be used Hyundai genuine parts.
- 10) Weld the bracket for pipe coupler to prevent damage caused by vibration.

3. MAINTENANCE

1) MAINTENANCE OF HYDRAULIC OIL AND FILTER

- (1) As machine with an hydraulic breaker provides the hydraulic oil becomes severely contaminated.
- (2) So, unless frequently maintained, the machine may easily go out of order.
- (3) Inspect and maintain hydraulic oil and 4 kinds of filter elements in particular, in order to prolong machine life.
- (4) Replace when the breaker work is used for short time according to the standard of right graph.

2) RELEASE THE PRESSURE IN BREAKER CIRCUIT

- When breaker operating is finished, stop engine and push pedal or switch for breaker to release pressure in breaker circuit. If pressure still remains, the lifetime of the diaphragm in the accumulator will be shortened.
- 3) Be careful to prevent contamination by dust, sand and etc.
If such pollution become mixed into the oil, the pump moving parts will wear abnormally, shorten lifetime and become damaged.
 - 4) When operating breaker, bolts and nuts of main equipment may be loosened by vibration. So, it must be inspected periodically.

Service interval

unit : hours

Attachment	Operating rate	Hydraulic oil	Filter element
Breaker	100 %	600* ¹	200
		1000* ²	

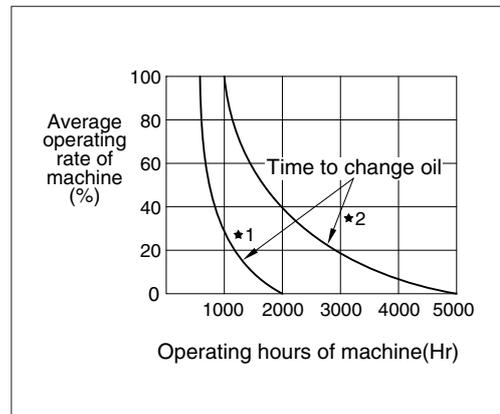
*¹: Conventional hydraulic oil

*²: Hyundai genuine long life hydraulic oil

● **Replace following filter at same time**

- Hydraulic oil return filter : 1 EA
- Pilot line filter element : 1 EA

Hyd oil change guide for hydraulic breaker



*¹: Conventional hydraulic oil

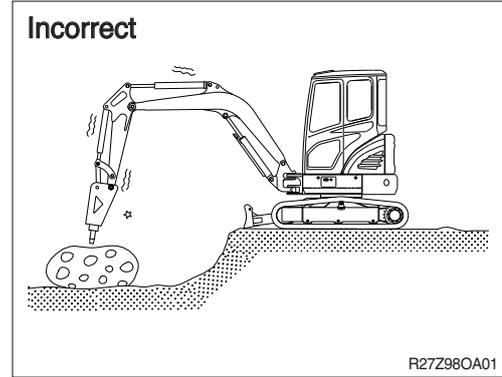
*²: Hyundai genuine long life hydraulic oil

4. PRECAUTIONS WHILE OPERATING THE BREAKER

1) DO NOT BREAK ROCK WHILE LOWERING

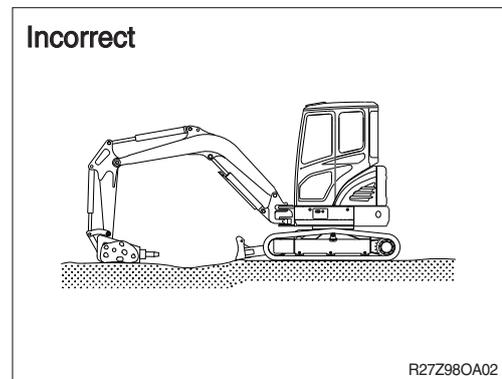
As the breaker is heavy in comparison with bucket, it must be operated slowly.

If breaker is rapidly pushed down, working device may be damaged.



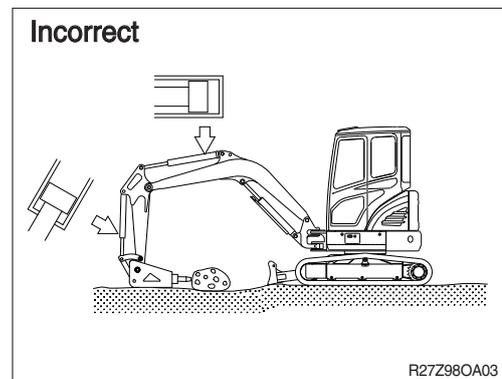
2) DO NOT USE BREAKER TO CARRY BROKEN STONE OR ROCK BY SWING OPERATING

This may damage the operation device and swing system.



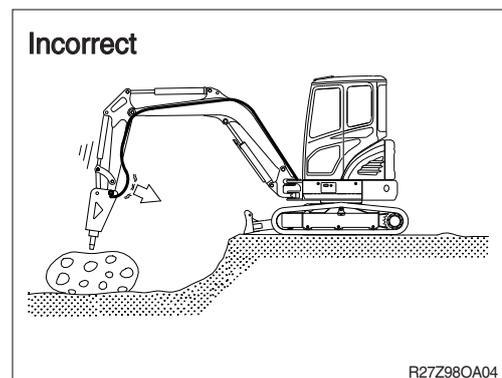
3) OPERATE BREAKER WITH A GAP IN EXCESS OF 100 mm (4 inches) FROM THE END OF THE STROKE TIP

If breaker is operated with the end tip, the cylinder may be damaged.



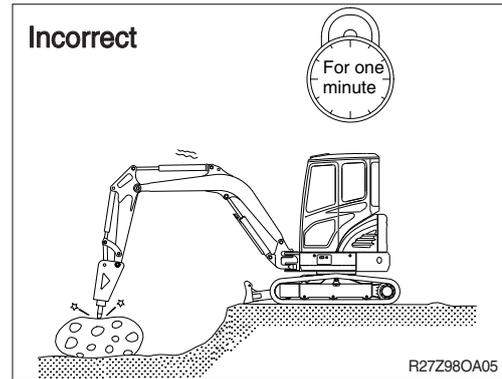
4) IF THE HYDRAULIC HOSES VIBRATE EXCESSIVELY

If the machine used in this condition continuously this will effect badly on the machine such as loosening bolt, oil leakage, damage of pump pipe and etc.



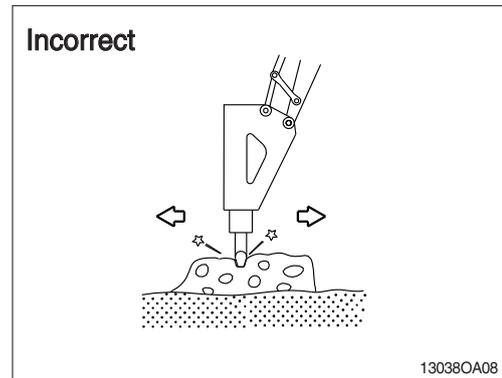
5) DO NOT CONTINUE TO WORKING OVER ONE MINUTE AT SAME POSITION OF BOOM AND ARM

This will increase the temperature of the oil, and cause problem in the accumulator and seals.



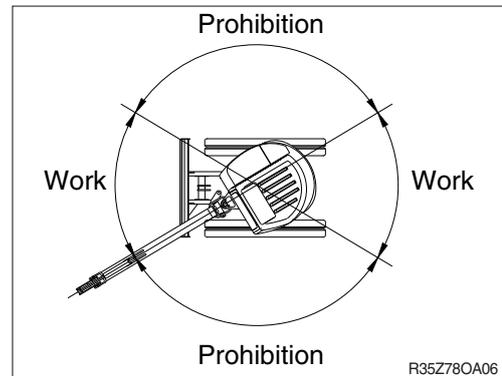
6) DO NOT MOVE MACHINE OR BREAKER WHILE STRIKING

Do not move hammer while striking.
This will cause damage to the working device and the swing system.



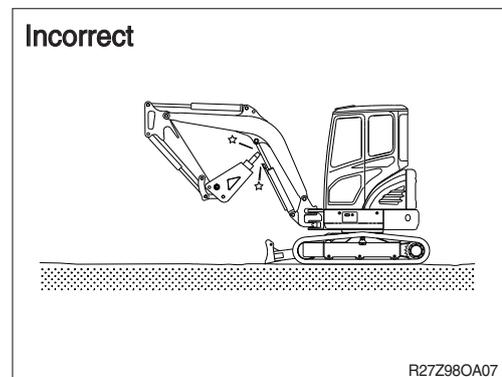
7) DO NOT WORK WHILE SWING STATE

Do not work while swing position of superstructure.
It cause the band of track shoe, oil leakage of roller.



8) TAKE CARE OF CHISEL AND BOOM INTERFACE

Make sure of the arm and bucket control lever operation.

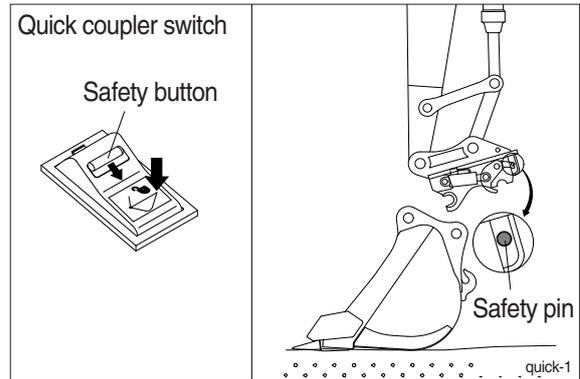


5. QUICK COUPLER

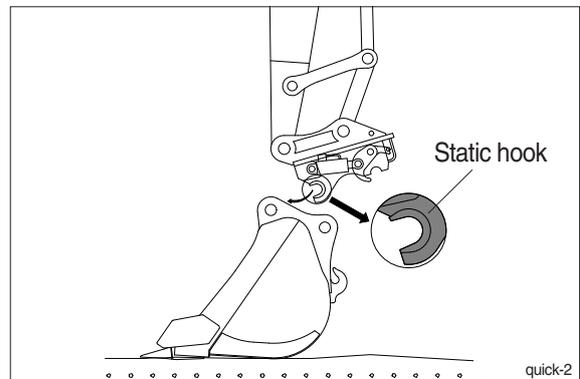
■ MACHINE SERIAL NO. : -#0539

1) FIXING BUCKET WITH QUICK COUPLER

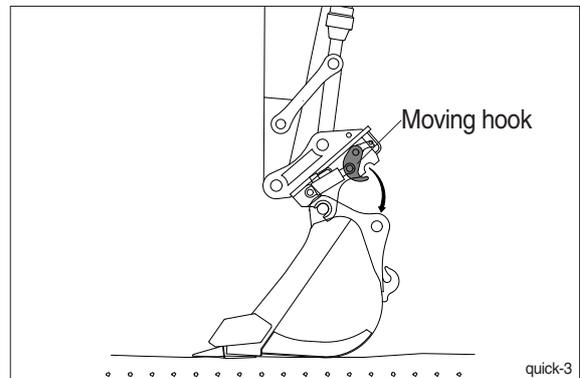
- (1) Before fixing bucket, remove safety pin of the moving hook.
- (2) Pulling safety button, press the quick coupler switch to unlock position. Then, the moving hook is placed on release position.



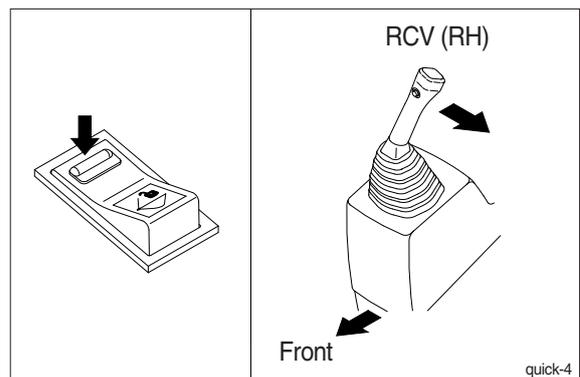
- (3) Aligning the arm and bucket, insert static hook of quick coupler to the bucket pin.



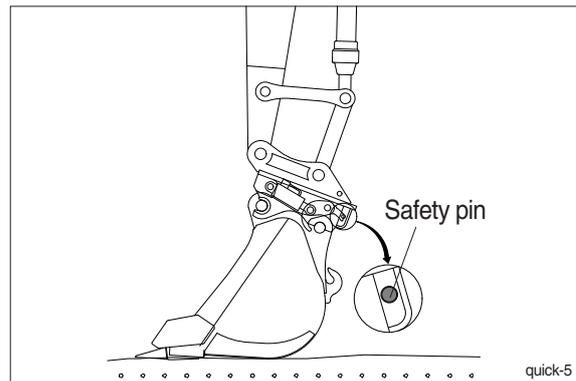
- (4) Operate RCV lever to bucket-in position. Then, the moving hook is coupled with the bucket link pin. Make sure that the moving hook is completely contacted with bucket link pin.



- (5) Press quick coupler switch to lock position. Operate RCV lever to bucket-in position.
※ **Be sure to check connection status between bucket pins and hooks of quick coupler**



- (6) After checking the connection status between bucket pins and hooks of quick coupler, insert safety pin of moving hook to lock position.



2) REMOVE BUCKET FROM QUICK COUPLER

Removing procedure is reverse of fixing.

3) PRE-CAUTION OF USING QUICK COUPLER

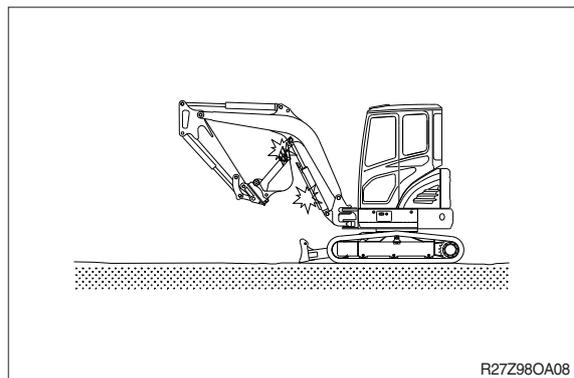
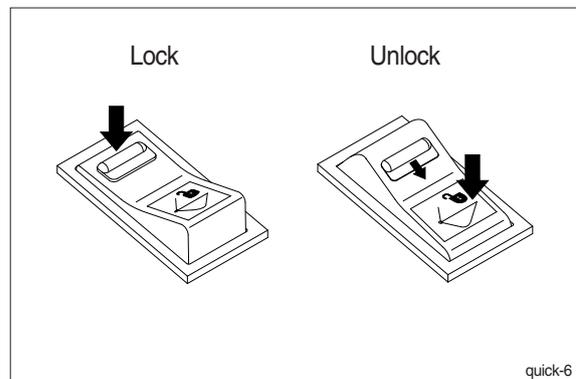
- ▲ When operating the machine with quick coupler, confirm that the quick coupler switch is lock position and safety pin of moving hook is inserted.

Operating the machine with quick coupler switch unlocked and without safety pin of moving hook can cause the bucket to drop off and bring about the accident.

- ▲ Serious injury or death can result from this accident.

- ▲ Be careful to operate the machine equipped with quick coupler. The bucket may hit cab, boom and boom cylinders when it reaches vicinity of them.

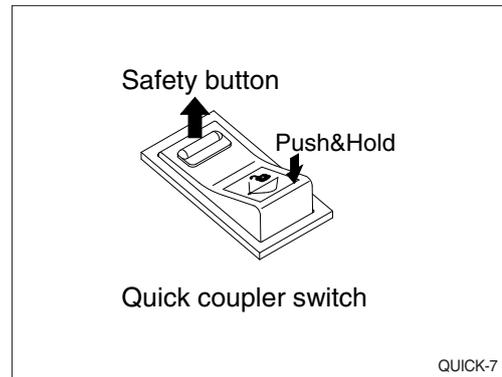
- ※ HYUNDAI will not be responsible for any injury or damage in case that safety pin is not installed properly.



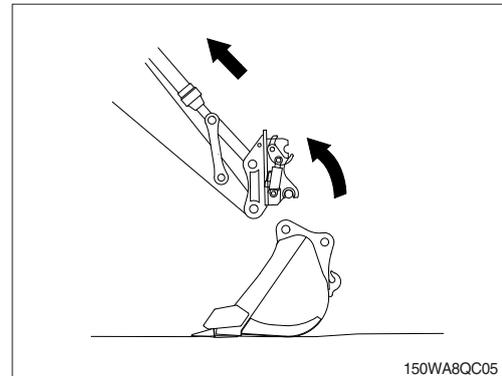
■ MACHINE SERIAL NO. : #0540-

1) FIXING BUCKET WITH QUICK COUPLER

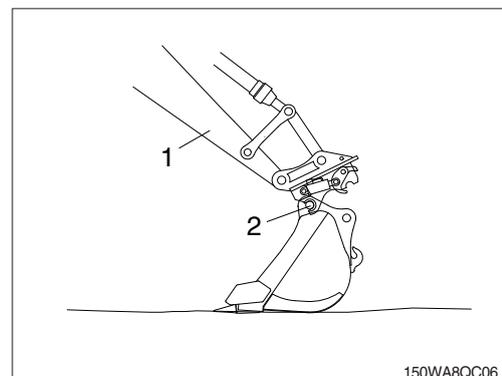
- (1) Park the excavator and attachment on firm and level ground.
- (2) After checking the safe environment conditions for installing/removing the quick coupler, perform the disengagement process.
- (3) To unlock the quick coupler switch, press the quick coupler disengagement switch.
 - To maintain the unlock status of the quick coupler the operator must maintain pressing the quick coupler switch.
 - The buzzer will start activating.



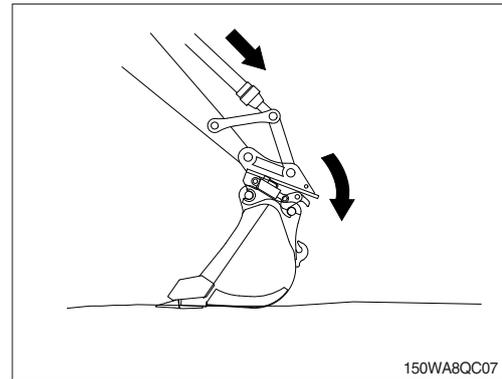
- (4) Retract the bucket cylinder. Align the quick coupler with attachment mounting pins or interface.



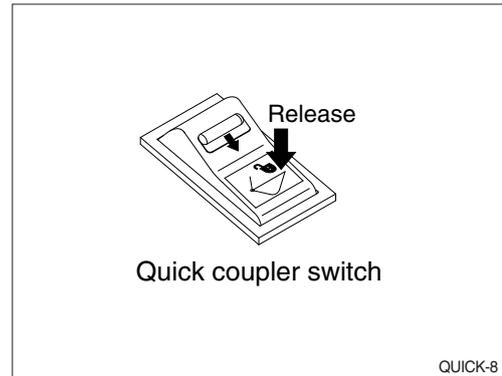
- (5) Move the arm (1) and raise it until hook engages the upper (2) pin or interface of attachment.



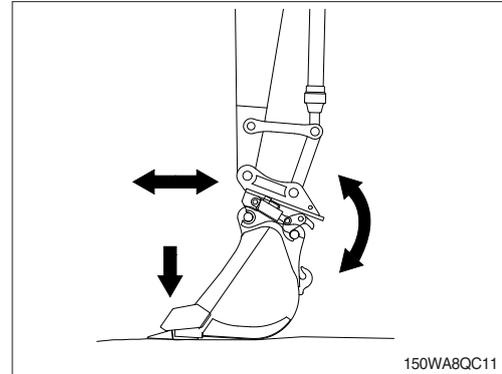
- (6) With the bucket crowded, engage the quick coupler to the lower attachment pin or interface.



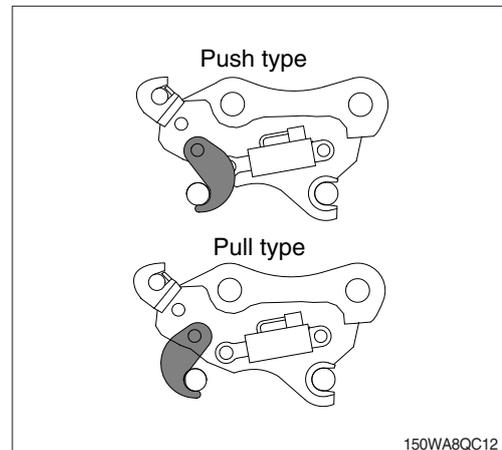
- (7) To confirm the engagement of the quick coupler, release the safety button to its original position.
- The buzzer will stop activating.



- (8) Shake the attachment vigorously and lower the boom to the ground and apply down pressure to the quick coupler and attachment to check that attachment is fully engaged and locked to the quick coupler.



- (9) Visually check that quick coupler is fully engaged and locked before operating the machine and attachment.



2) REMOVE BUCKET FROM QUICK COUPLER

Removing procedure is reverse of fixing.

3) PRE-CAUTION OF USING QUICK COUPLER

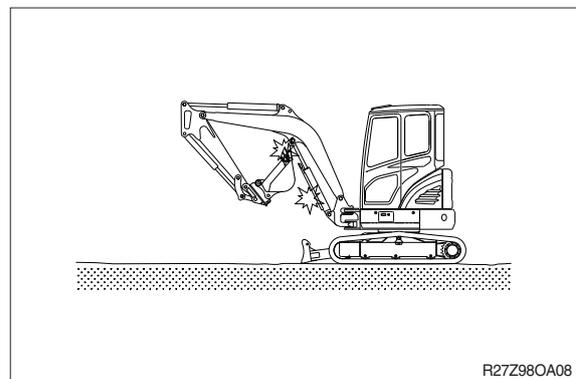
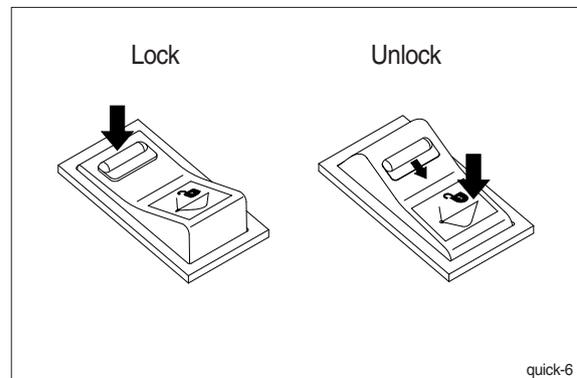
- ▲ When operating the machine with quick coupler, confirm that the quick coupler switch is lock position and safety pin of moving hook is inserted.

Operating the machine with quick coupler switch unlocked and without safety pin of moving hook can cause the bucket to drop off and bring about the accident.

- ▲ Serious injury or death can result from this accident.

- ▲ Be careful to operate the machine equipped with quick coupler. The bucket may hit cab, boom and boom cylinders when it reaches vicinity of them.

- ※ HYUNDAI will not be responsible for any injury or damage in case that safety pin is not installed properly.



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