CONTENTS

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.

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.

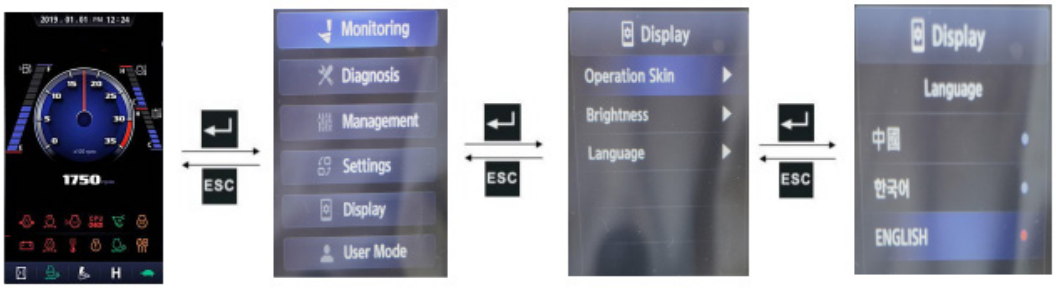
Work within your level of training and skill.

Ask your supervisor if you are uncertain about a particular task. Do not try to do too much too fast.

Use your common sense.

※ How to adjust the language of cluster

User can select preferable language and all displays are changed the selected language.



EC REGULATION APPROVED

· Noise level (EN474-1 : 2006 and 2000/14/EC) are as followings.

LWA : 102 dB (EU only)

LPA : 78 dB

· The value of vibrations transmitted by the operator's seat are lower than standard value of (EN474-1 : 2006 and 2002/44/EC)

CE

EC Declaration of Conformity

1. HYUNDAI CONSTRUCTION EQUIPMENT EUROPE N.V VOSSENDAAL 11, 2440 GEEL (Belgium), as authorized representative in the European Community of HYUNDAI CONSTRUCTION EQUIPMENT Co. Ltd.(Korea) certifies that the construction equipment machinery.

   Machine Type : *******
   Brand : HYUNDAI
   Model : *****
   Serial No : ***
   Year of Manufacturing : 20**

2. Manufacturer — Hyundai Construction Equipment Co. Ltd.
   12th, Fl., Hyundai Bldg. 75, Yulgok-ro, Jongno-Gu, Seoul, Republic of Korea

   Authorized representative : HYUNDAI CONSTRUCTION EQUIPMENT EUROPE N.V.
   Owner of the technical file for machine production : VOSSENDAAL 11, 2440 GEEL
   BELGIUM

3. Harmonized European directives : 2006/42/EC (Machinery), 97/68/EC (Exhaust Gas Emission), 2004/108/EC (Electromagnetic Compatibility), 200/14/EC (Noise Emission)

4. Engine Manufacturer : ********
   - Engine Type : **********
   - Gross Power : *** kW / **** rpm (SAE J1995)
   - Net Power : *** kW / **** rpm (SAE J1349)

5. Noise level (Noise Emission Directive 2000/14/EC)
   - Certificate No : **********
   - Issue Date : DD/MM/YYYY
   - Conformity Assesment Procedure : **********
   - Notified Body Involved : **********
     ****
     ****
   - Measured Sound Power Level : ** dB(A)
   - Guaranteed Sound Power Level : ** dB(A)

6. EMC Certification (EMC Directive 2004/108/EC)
   - Certificate No : *********
   - Issued Date : DD/MM/YYYY
   - Notified Body Involved : ***********
     ****
   - Standard(s) : *******

7. Remarks

   J. C. JUNG
   MANAGING DIRECTOR
   Place and date of issue :

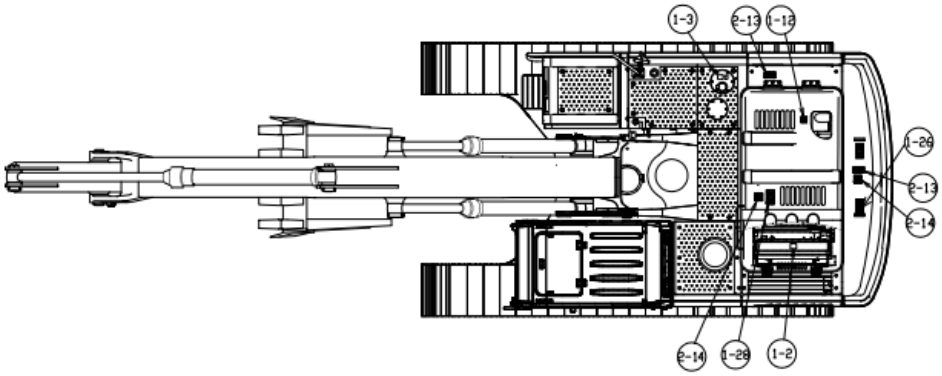
TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

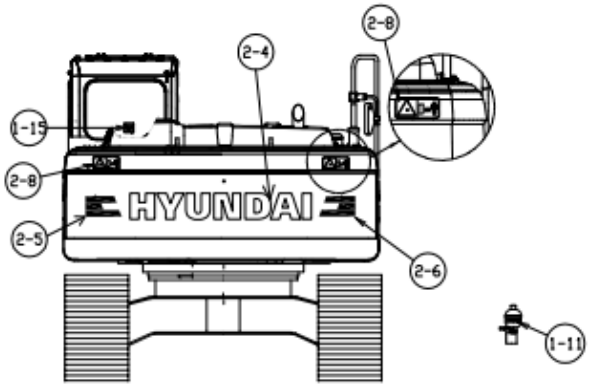
Machine Serial No.	
Engine Serial No.	
Manufacturing year	
Manufacturer Address	Hyundai Construction Equipment co., Ltd. 12th, Fl., Hyundai Bldg. 75, Yulgok-ro, Jongno-Gu, Seoul, 03058, Korea
Distributor for U.S.A Address	Hyundai Construction Equipment U.S.A, Inc 6100 Atlantic Boulevard Norcross GA 30071 U.S.A
Distributor for China Address	Hyundai (jiangsu) construction machinery co., LTD No. 288, Hehai West Road Xinbei District Changzhou City Jiangsu Province
Dealer Address	

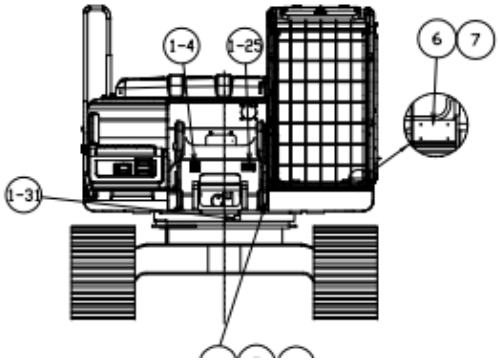
SAFETY LABELS

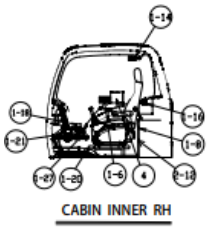
1. LOCATION

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

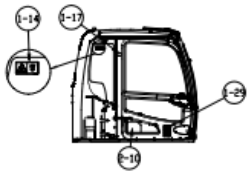




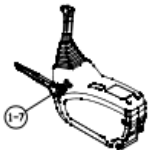




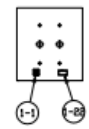
CABIN INNER RH



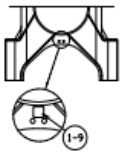
CABIN INNER LH



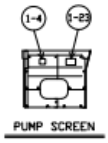
LH CONSOLE BOX



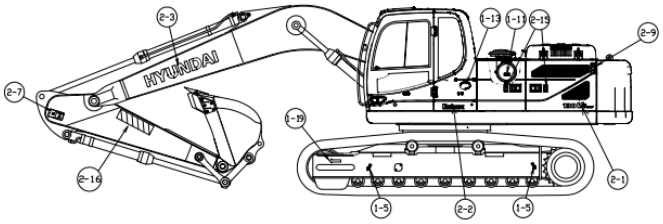
BATTERY COVER

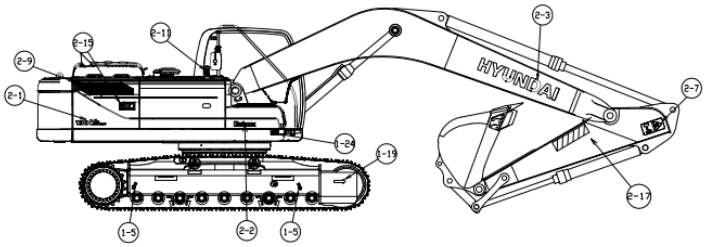


LOWER FRAME



PUMP SCREEN





ITEM	Part Name	Q'TY
5	EXEMPTION PLATE	1
4	FOPS FOG PLATE	1
3	LIFTING CHART	1

2-17	REFLECTOR/RH	1
2-16	REFLECTOR/LH	1
2-15	STAY FIX	2
2-14	NO STEP	2
2-13	FALLING	2
2-12	CONSOLE TILTING	1
2-11	FUELING-CHINA	1
2-10	SERVICE INSTRUCTION	1
2-9	KEEP CLEAR/SIDE	2
2-8	KEEP CLEAR/REAR	2
2-7	KEEP CLEAR/ATTACH	2
2-6	REFLECTING-RH	1
2-5	REFLECTING-LH	1
2-4	HYUNDAI LOGO	1
2-3	HYUNDAI LOGO	2
2-2	LOGO-ROBEX	2
2-1	MODEL NAME	2

1-32	FUSE CAUTION	1
1-31	SWING BEARING	1
1-30	RCV/LEVER PATTERN	1
1-29	CABIN RH PILLAR(LC)	1
1-28	SHEARING	1
1-27	WATER SEPARATOR	1
1-26	LIFTING EYE	2
1-25	R/GEAR GREASE	1
1-24	TRANSPORTING	1
1-23	HYD. OIL LEVEL	1
1-22	ECU CONNECTOR	1
1-21	TURBOCHARGER	1
1-20	SAFETY SEAT	1
1-19	DIRECTION	2
1-18	CAUTION KEY OFF	1
1-17	FIRE EXTINGUISHER	1
1-16	HAMMER	1
1-15	SAFETY RR WINDOW	1
1-14	SAFETY FR/WINDOW	2
1-13	LOW EMISSION ENG	1
1-12	TURBO COVER	1
1-11	AIR CLEANER	1
1-10	ACCUMULATOR	1
1-9	TIE	2
1-8	AIRCON FILTER	1
1-7	SAFETY LEVER	1
1-6	CONTROL IDEOGRAM	1
1-5	SLINGING IDEOGRAM	4
1-4	H/PRESSURE HOSE	2
1-3	HYD. OIL LUB.	1
1-2	RADIATOR	1
1-1	BATT. ACCIDENT	1

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. If a safety label is attached to a part that is replaced, install a safety label on the replacement part.

1) BATTERY ACCIDENT (item 1-1)

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 terminal with a wet hand.

2) RADIATOR CAP (item 1-2)

This warning label is positioned on the radiator.

⚠ Never open the filler cap while engine running or at high coolant temperature.

3) HYDRAULIC OIL LUBRICATION (item 1-3)

※ This warning label is positioned on the top of the hydraulic tank.

⚠ Do not mix with different brand oils.
Never open the filler cap while high temperature.

⚠ Loosen the cap slowly and release internal pressure completely.

4) HIGH PRESSURE HOSE (item 1-4)

This warning label is positioned on the screen plate.

⚠ Escaping fluid under pressure can penetrate the skin causing serious injury.

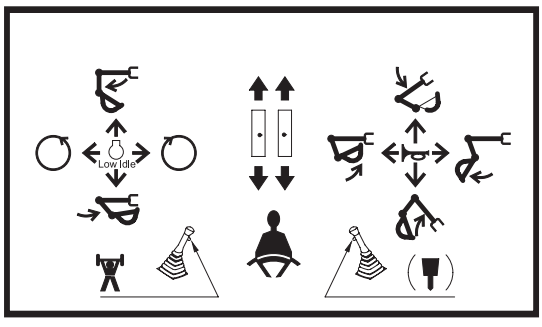
※ Study the service manual before service job.

5) CONTROL IDEOGRAM (item 1-6)

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.

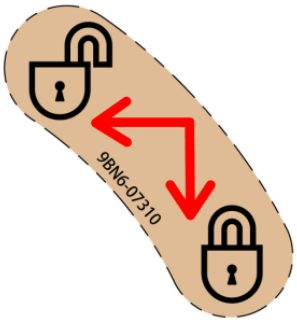
⚠ Failure to do so could result in injury or death.



6) **SAFETY LEVER** (item 1-7)

This warning label is positioned on the cover of the safety lever.

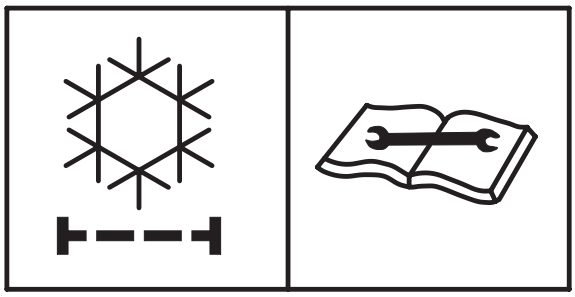
⚠ **Before you get off the machine be sure to place the safety lever LOCKED position.**



7) **AIR CONDITIONER FILTER** (item 1-8)

This warning label is positioned on the air conditioner cover.

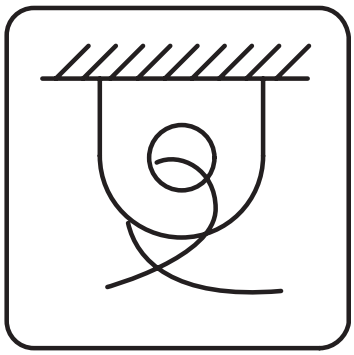
※ **Periodic and proper inspection, cleaning and change of filter prolong air conditioner life time and maintain good performance.**



8) **TIE** (item 1-9)

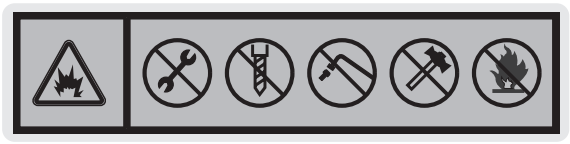
This warning label is positioned on the lower frame.

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



9) **ACCUMULATOR** (item 1-10)

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**

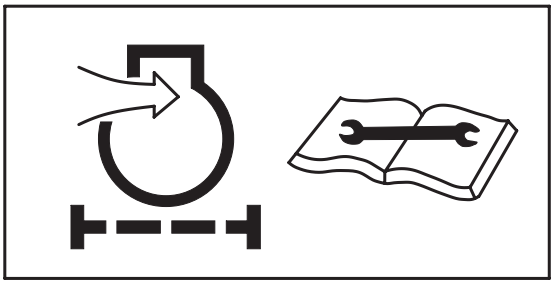
⚠ **expose it to flame or fire.**

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.**

10) **AIR CLEANER FILTER** (item 1-11)

This warning label is positioned on the air cleaner cover.



※ **Periodic and proper inspection, cleaning and change of elements prolong engine life time and maintain the good performance of engine.**

11) **TURBOCHARGER COVER** (item 1-12)

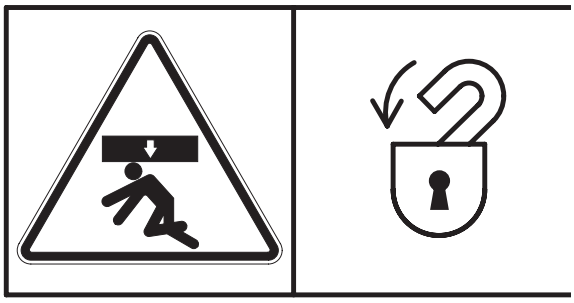
This warning label is positioned on the turbocharger cover.

⚠ **Do not touch turbocharger or it may cause severe burn.**

12) **SAFETY FRONT WINDOW** (item 1-14)

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

Be careful that the front window may be promptly closed.



13) **SAFETY REAR WINDOW** (item 1-15)

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

※ **The rear window serves as an alternate exit.**

※ **To remove rear window, pull the ring and push out the glass.**

14) **HAMMER** (item 1-16)

This tag is located in the cockpit right center by the window.

※ **In case of emergency, use escape hammer to break this window for escape.**

15) **FIRE EXTINGUISHER**(item 1-17)

This tag is located in the rear left of the cockpit.

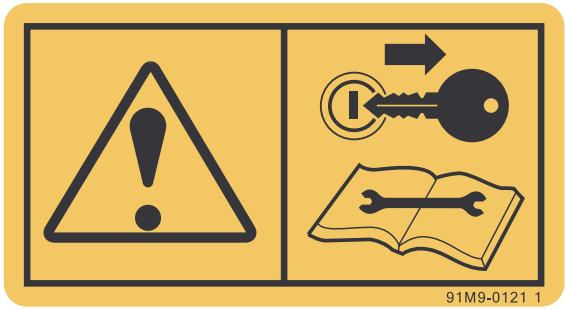
※ **Read and understand the instructions on the extinguisher label.**

16) **CAUTION KEY OFF** (item 1-18)

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

⚠ **Park on a flat place and stop the engine for inspecting and repairing. Properly TAG machine is not operational. (remove start key)**

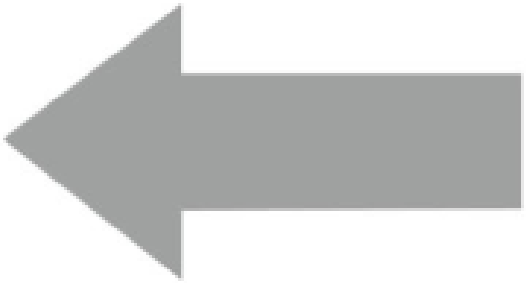
※ **Extreme care shall be taken during maintenance work.**



17) **DIRECTION** (item 1-19)

This label is on the side frame of the lower frame at the guide wheel

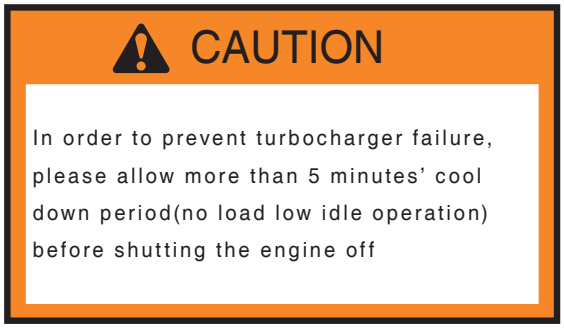
※ **The arrow indicates the direction in which the excavator is moving**



18) **TURBOCHARGER** (item 1-21)

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

⚠ **In order to prevent turbocharger failure, please allow more than 5 minutes' cool down period (no load low idle operation) before shutting the engine off.**

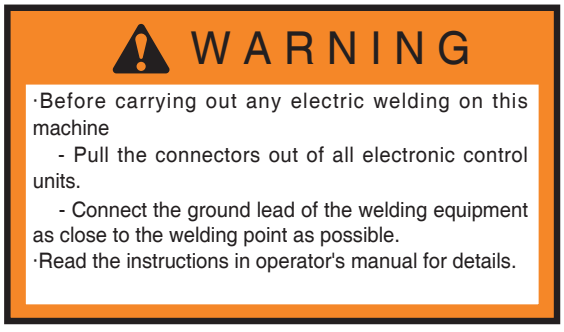


19) **ECU CONNECTOR** (item 1-22)

This warning label is positioned on the battery cover.

⚠ **Before carrying out any electric welding on this machine, follow the below procedure.**

- Pull the connector out of all electric control units.
- Connector the ground lead of the welding equipment as close to the welding point as possible.



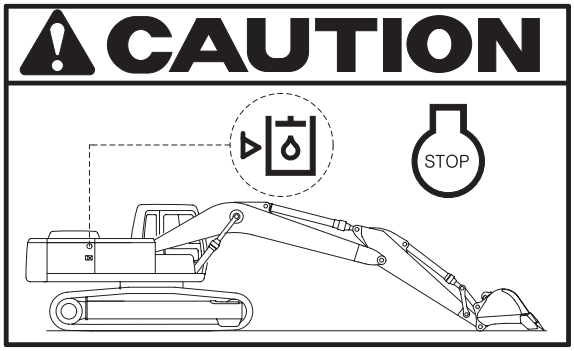
20) **HYDRAULIC OIL LEVEL** (item 1-23)

This warning label is positioned on the screen plate.

⚠ **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.**



21) **TRANSPORTING** (item 1-24)

This warning label is positioned right side of upper frame.

⚠ **Study the operator's manual before transporting the machine, if provided and tie down arm and track to the carrier with lashing wire.**

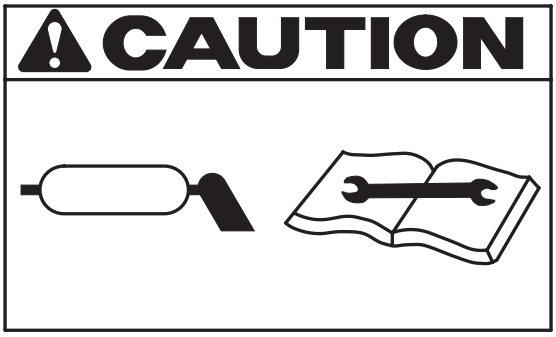
See page 5-6 for details.

22) **REDUCTION GEAR GREASE** (item 1-25)

This warning label is positioned in the front of upper frame.

⚠ **Grease is under high pressure.**

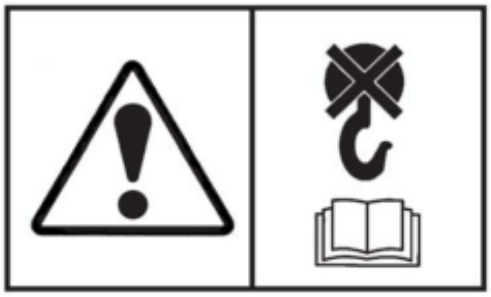
⚠ **Grease coming out of the grease plug under pressure can penetrate the body causing injury or death.**



23) **LIFTING EYE** (item 1-26)

This warning label is positioned on the counterweight.

⚠ **Do not lift the machine by using lifting eyes on the counterweight or the lifting eyes may be subject to overload causing its breaking and possible personal injury.**



24) **WATER SEPARATOR** (item 1-27)

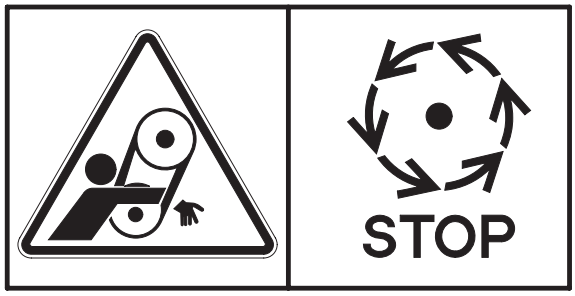
In order to protect high pressure fuel system. Please drain water in water separator beforestarting the engine.

25) **SHEARING-ENGINE HOOD** (item 1-28)

This warning label is positioned on the engine hood.

⚠ **Don't open the engine hood during the engine's running.**

⚠ **Don't touch exhaust pipe or it may cause severe burn.**

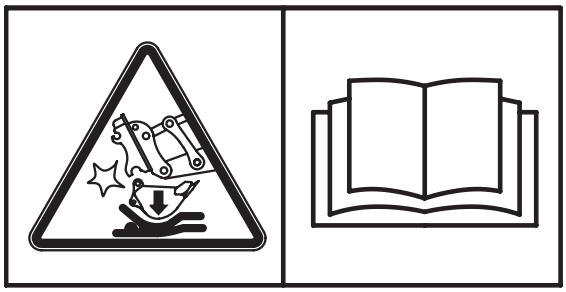


26) **RCV LEVER PATTERN** (item 1-30)

This warning label is positioned on top of LH console box.

⚠ **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**



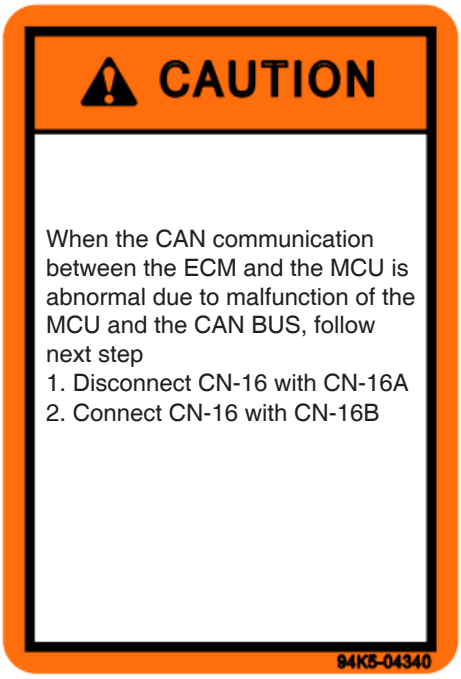
27) **SWING BEARING** (item 1-31)

This warning label is positioned in the front of swing ring gear.

28) **FUSE CAUTION** (item 1-32)

When the CAN communication between the ECM and the MCU is abnormal due to malfunciton of the MCU and the CAN BUS,follow next step.

⚠ **Disconnect CN-16 with CN-16A**
Connect CN-16 with CN-16B



29) **REFLECTING** (item 2-5,2-6)

This warning label is positioned on the rear of counterweight.

⚠ **To prevent serious personal injury or death keep clear of machine swing radius.**

⚠ **Do not deface or remove this label from the machine.**

30) **KEEP CLEAR / ATTACH** (item 2-7)

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

⚠ **Serious injury or death can result from falling of the attachment.**

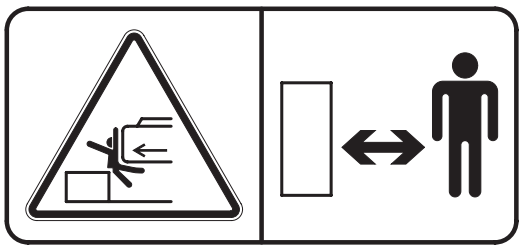
⚠ **To prevent serious injury or death, keep clear the underneath of attachment.**

31) **KEEP CLEAR / REAR** (item 2-8)

This warning label is positioned on the rear of counterweight.

⚠ **To prevent serious personal injury or death keep clear or machine swing radius.**

⚠ **Do not deface of remove this label from the machine.**



32) **KEEP CLEAR / SIDE** (item 2-9)

This warning label is positioned on the side of LH rear side cover.

⚠ **To prevent serious personal injury or death keep clear of machine swing radius.**

⚠ **Do not deface or remove this label from the machine.**

33) **FUELING** (item 2-11)

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.**

34) **FALLING** (item 2-13)

This warning label is positioned on the top of the hydraulic tank.

⚠ **Falling is one of the major cause of per-sonal injury.**

⚠ **Be careful of slippery conditions on the platforms, steps and handrails when standing on the machine.**

35) **NO STEP** (item 2-14)

This warning label is positioned on the engine hood and counterweight.

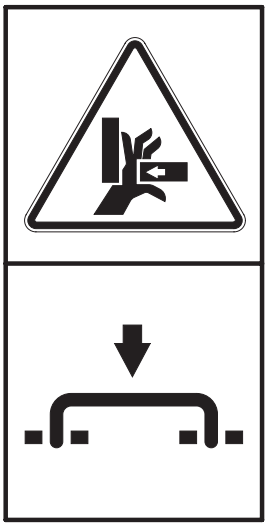
⚠ **Don't step on the engine hood and counterweight.**

36) **STAY FIX** (item 2-15)

This warning label is positioned on the side cover.

⚠ **Be sure to support the stay when the door needs to be opened.**

⚠ **Be careful that the opened door may be closed by the external or natural force like strong wind.**



37) **REFLECTOR** (item 2-16,2-17)

This warning label is positioned on both sides of the arm.

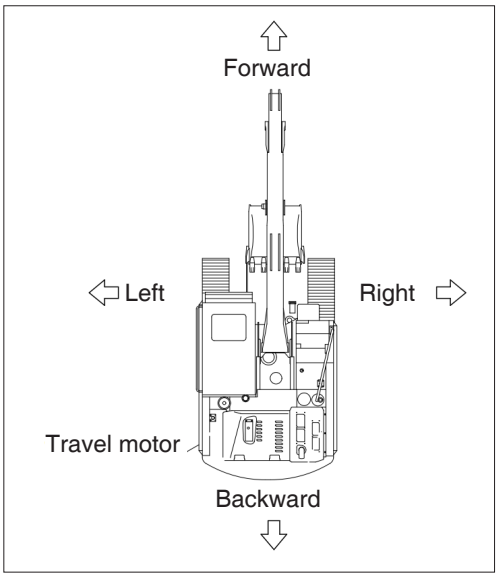
⚠ **To prevent serious personal injury or death keep clear of machine swing radi-us.**

⚠ **Be careful that the opened door may be closed by the external or natural force like strong wind.**

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.

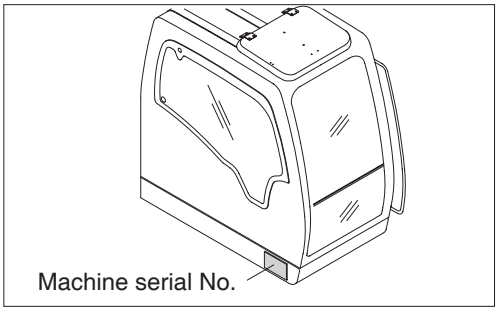


2. SERIAL NUMBER

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

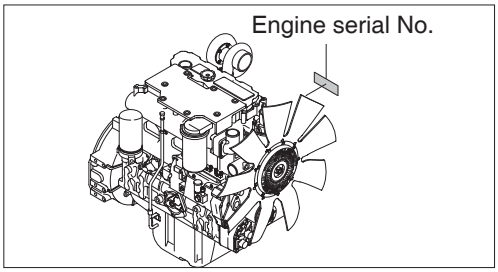
1) MACHINE SERIAL NUMBER

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



2) ENGINE SERIAL NUMBER

The numbers are located on the engine name plate.



3. INTENDED USE

This machine is designed to be used mainly for the following work.

- Digging work
- Loading work
- Smoothing work
- Ditching work

4. 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.

MACHINE DATA PLATE

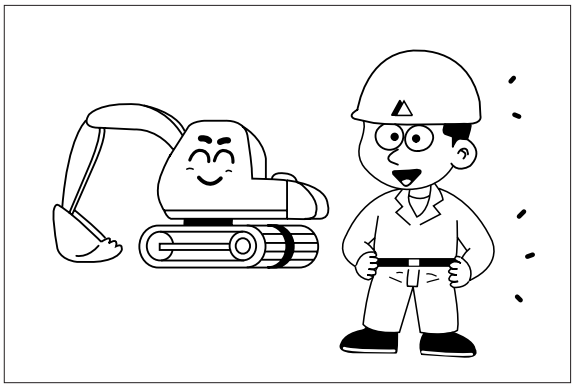
EAC

1 Machine type / model 2 Product identification number 3 Engine power
4 Operating mass

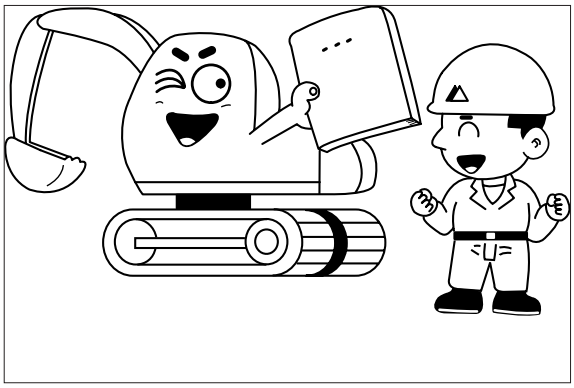
※ The machine serial number assigned to this particular machine and should be used when requesting information or ordering service parts for this machine from your authorized HYUNDAI dealer. The machine serial number is also stamped on the frame.

1. BEFORE OPERATING THE MACHINE

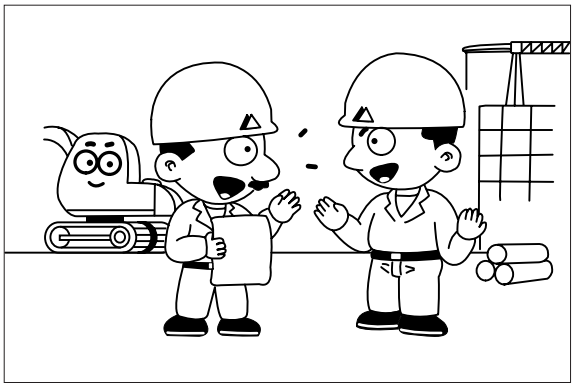
Think-safety first.
In special situation, wear protective clothing including a safety helmet, safety shoes, gloves, safety glasses and ear protection as required by the job condition.
Almost every accident is caused by disregarding the simple and fundamental safety hints.



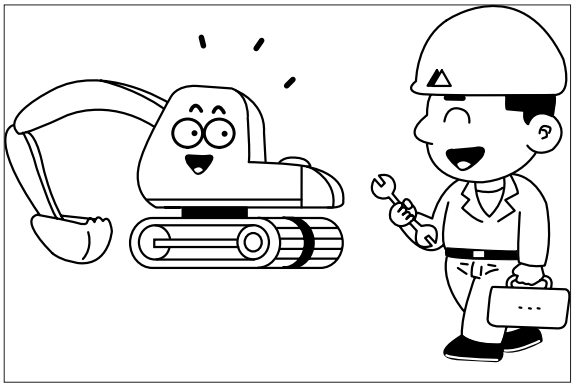
Be sure to understand thoroughly all about the operator's manual before operating the machine. Proper care is your responsibility.



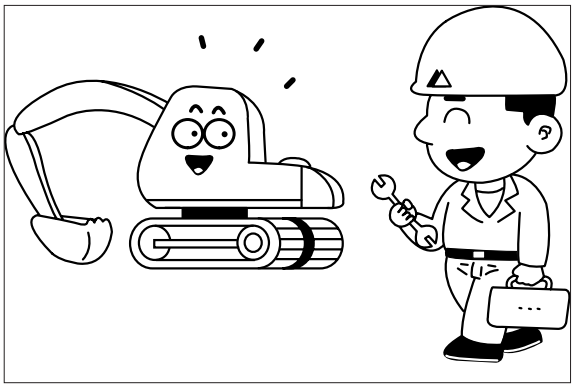
Fully understand the details and process of the construction before starting the work.
If you find anything dangerous on the job, consult with the job supervisor for the preventive measures before operating the machine.



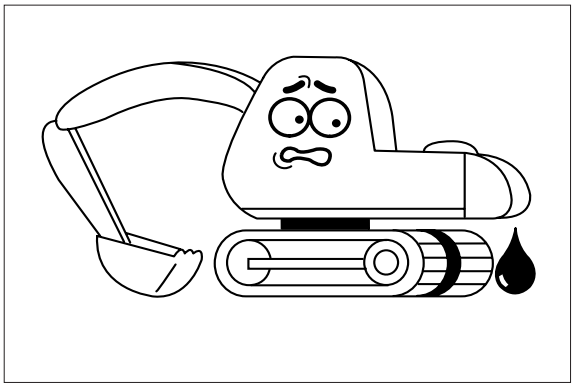
Do not operate when tired, or after drinking alcoholic beverages or any type of drugs.



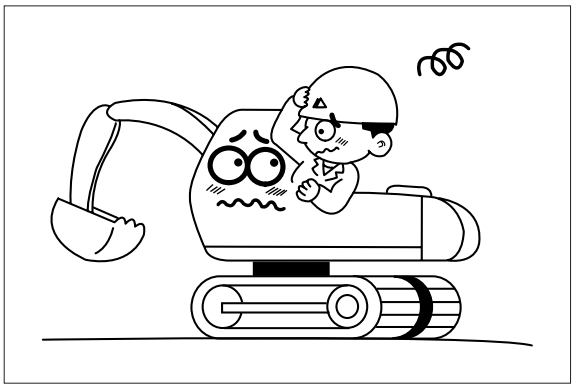
Check daily according to the operation manual. Repair the damaged parts and tighten the loosened bolts.



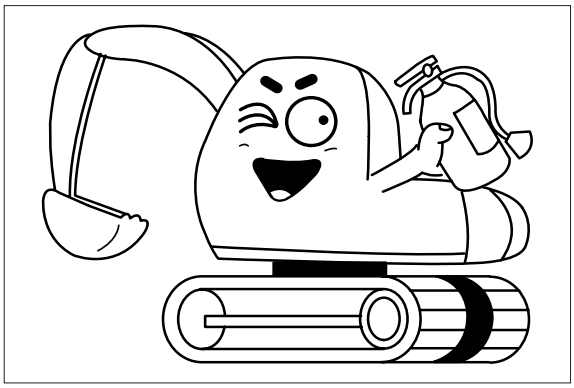
Check for leakage of engine oil, hydraulic oil, fuel and coolant.
Keep machine clean, clean machine regularly.



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.

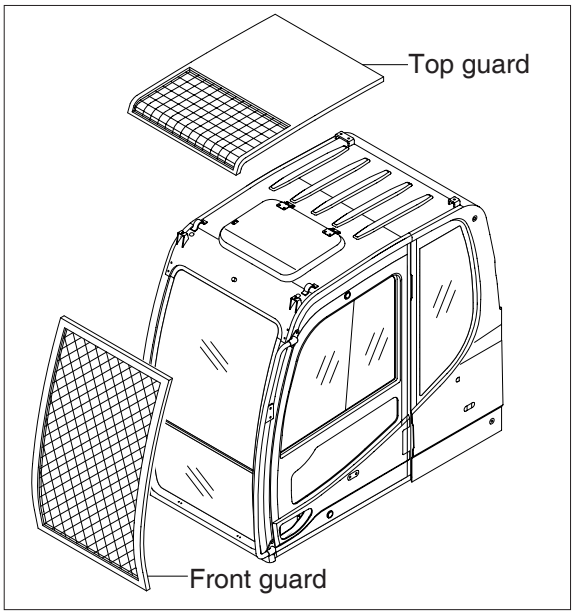


PROTECTION AGAINST FALLING OR FLYING OBJECTS

If there is any danger of falling or flying objects hitting the operator, install protective guards in place to protect the operator as required for each particular situation.

Be sure to close the front window before commencing work.

Make sure to keep all persons other than operator outside the range of falling or flying objects.
In case you need top guard, front guard and FOPS (falling object protective structure), please contact Hyundai distributor in Europe.



UNAUTHORIZED MODIFICATION

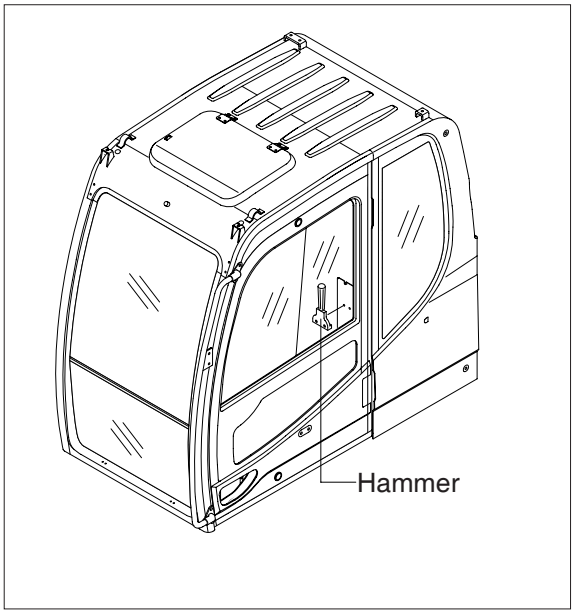
Any modification made without authorization from Hyundai can create hazards.

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.

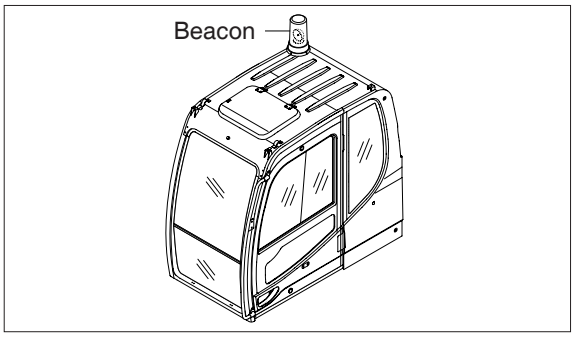
Be sure you know the phone numbers of persons you should contact in case of an emergency.



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.

The stability of this machine is enough to be used for general work. When you operate this machine, allow for the lifting capacity tables. If you want to use other special applications (not covered in this manual), you have to attach additional counterweight or be cautious while running the machine.

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.

CALIFORNIA PROPOSITION 65

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

This product contains or emits chemicals known to the State of California to cause cancer or birth defects or other reproductive harm.

Battery posts, terminals and related accessories contain lead and lead compounds.
WASH HANDS AFTER HANDLING

Do not load the machine with the lifting eyes on the counterweight.

⚠ The wrong loading method can result in serious bodily injury or death.

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.

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.

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.

Battery and battery cables

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

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 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 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 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 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/s^2.

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/s^2.

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.

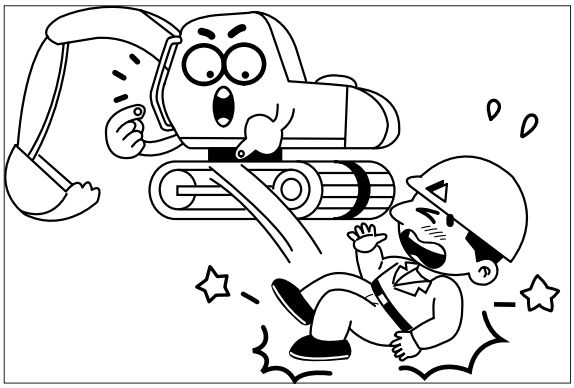
Sources

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.

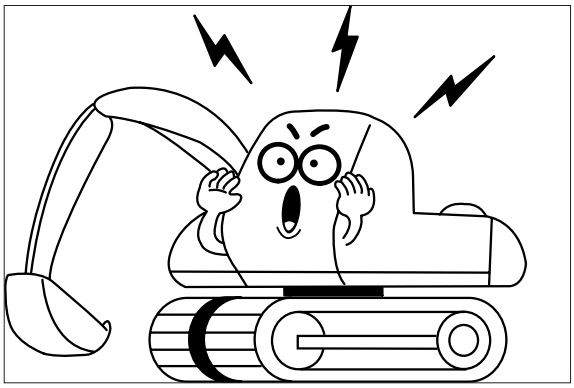
You should check the original directive. This document summarizes part of the content of the applicable law. This document is not meant to substitute the original sources. Other parts of these documents are based on information from the United Kingdom Health and Safety Executive.

2. DURING OPERATING THE MACHINE

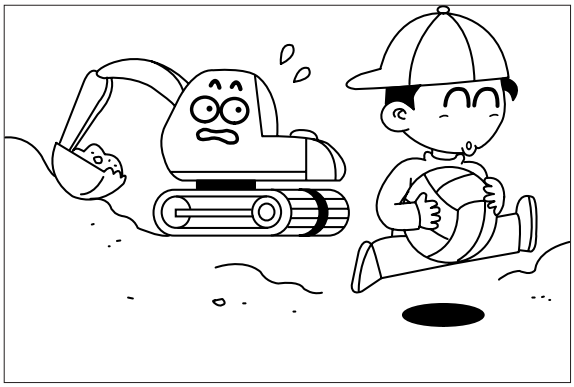
Use the handle and footstep when getting on or off the machine.
Do not jump on or off the machine.



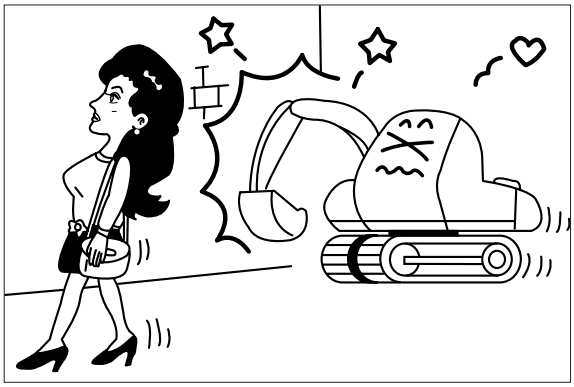
Sound the horn to warn nearby personnel before operating the machine.
Remove all the obstacles like frost on the window before operating the machine for the good visibility.



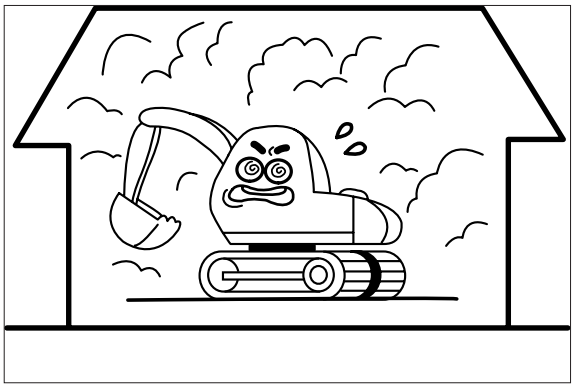
Operate carefully to make sure all personnel or obstacles are clear within the working range of the machine.
Place safety guards if necessary.



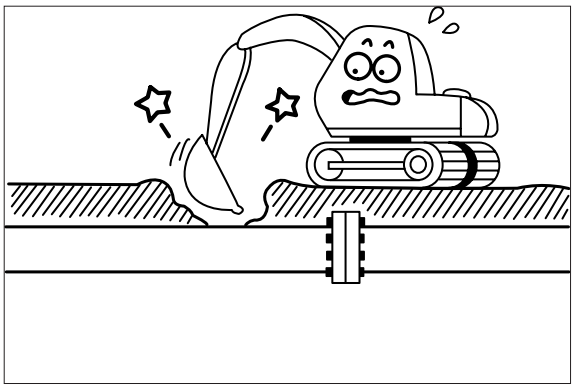
When using the work equipment, pay attention to job site.



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

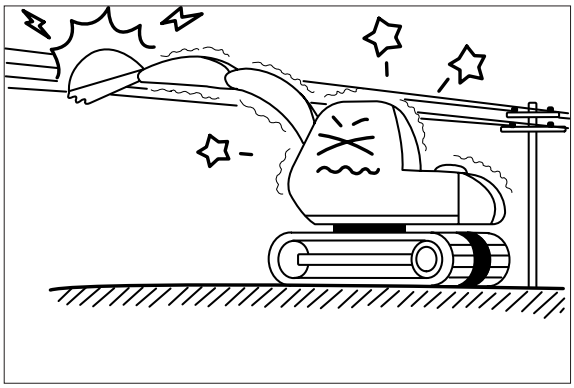


Check the locations of underground gas pipes or water line and secure the safety before operation.

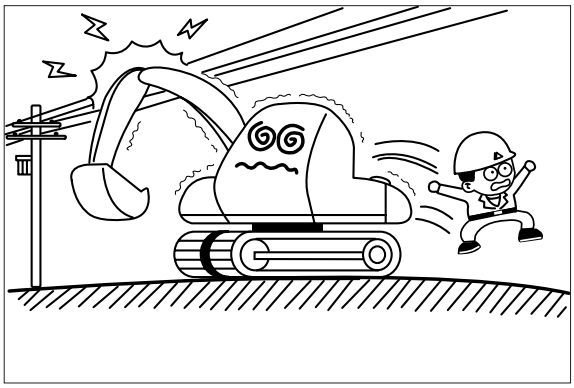


The operating near the electrical lines is very dangerous.
Operate within safe working range permitted as below.

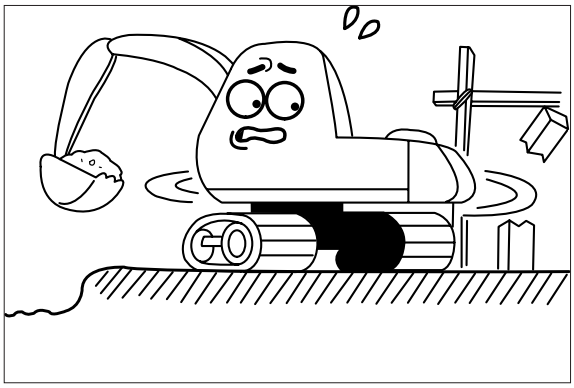
Supply voltage	Min safe separation
6.6 kV	3m (10 ft)
33.0 kV	4m (13 ft)
66.0 kV	5m (16 ft)
154.0 kV	8m (26 ft)
275.0 kV	10m (33 ft)



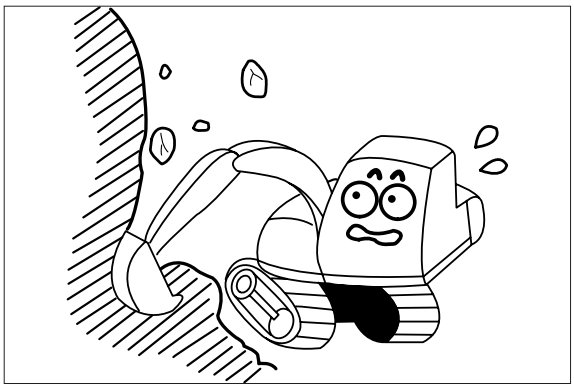
If the machine touches the electric power lines, keep sitting on the operator's seat and make sure the personnel on the ground not to touch the machine until turning off the electric current. Jump off the machine without contacting the machine when you need to get off.



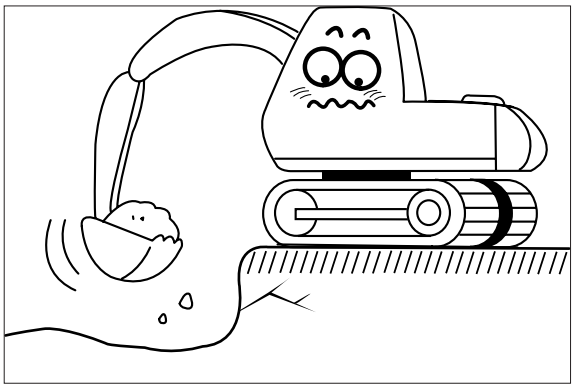
Watch out for obstacles.
Be particularly careful to check the machine clearance during the swing.



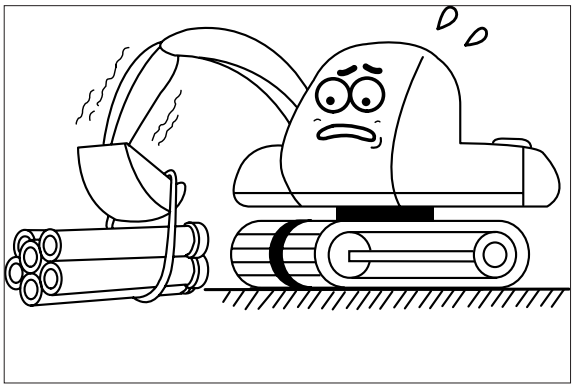
When using the machine as breaker or working in a place where stones may fall down, cab roof guard and head guard should be provided for proper protection.



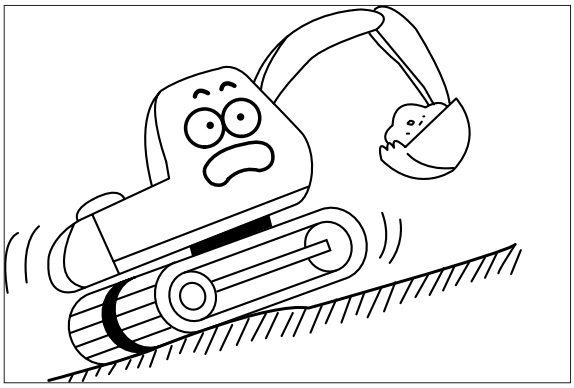
Avoid operating on a cliff or soft ground as there is danger of rolling over.
Make sure to get off easily as keeping the track at a right angle and putting the travel motor into the backward position when working on a cliff or soft ground inevitably.



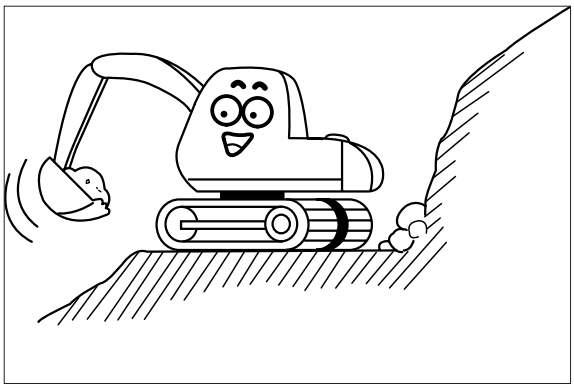
Operate for the lifting work considering the capacity of machine, weight and width of the load.
Be careful not to lift exceeding the machine capacity as it can be the cause of machine damage and safety accident.



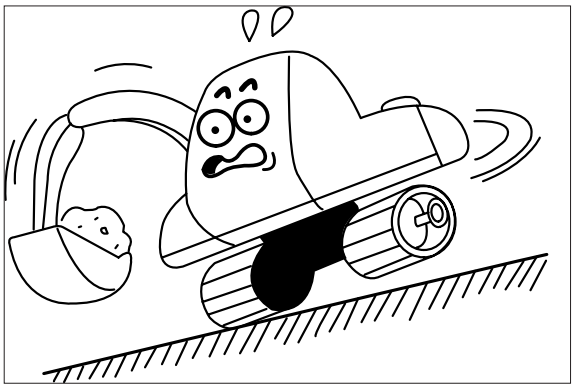
The operation on a slope is dangerous.
Avoid operating the machine on a slope of over 10 degree.



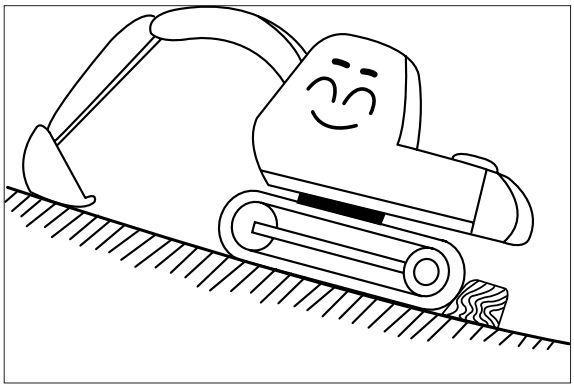
Operate the machine after making ground flat when operation is required on a slope.



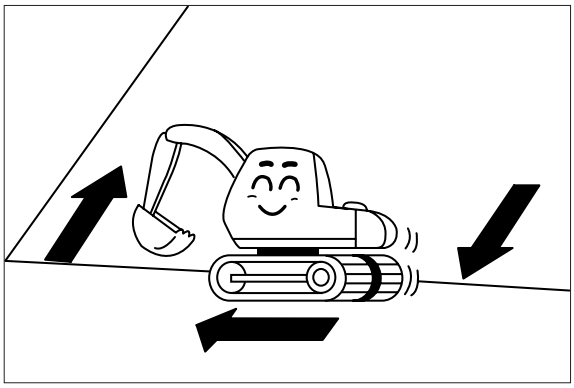
The swing on the slope can be danger of rolling over.
Do not operate to swing the machine with the bucket loaded on a slope since the machine may lose its balance under such an instance.



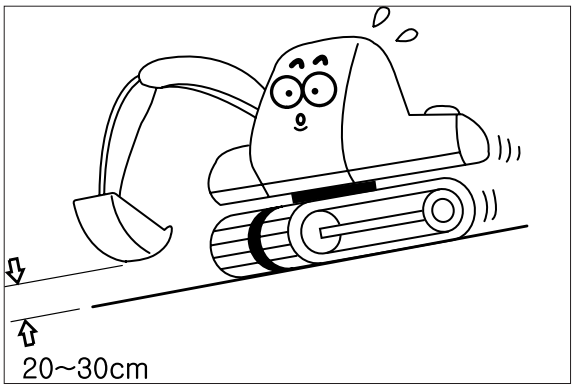
Avoid parking and stopping on a slope.
Lower the bucket to the ground and block the track when parking.



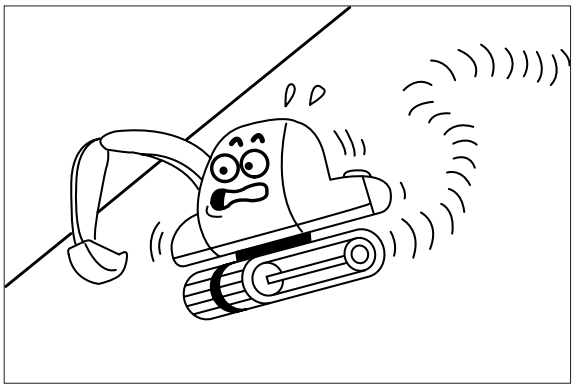
Avoid traveling in a cross direction on a slope as it can cause the danger of rolling over and sliding.



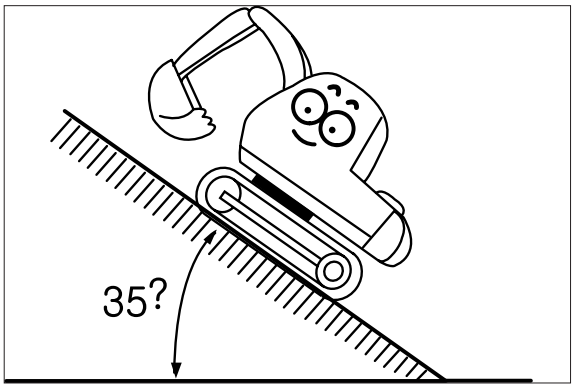
Traveling on a slope is dangerous.
Be sure to operate slowly when traveling down a slope and maintain the bucket at a height of 20~30 ㎝ (1 ft) above the ground so that it can be used as brake in an emergency.



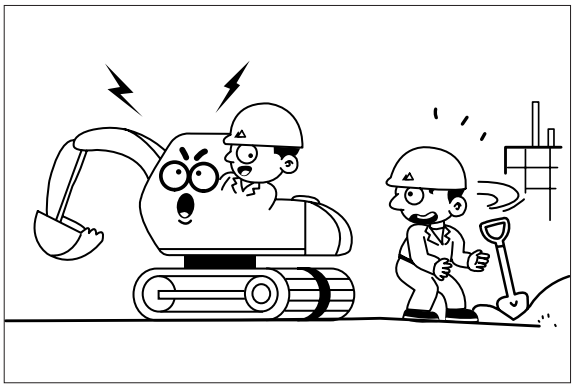
Steering of the machine while traveling on a slope is dangerous.
When an inevitable turning of direction is required, turn on the flat and solid ground.



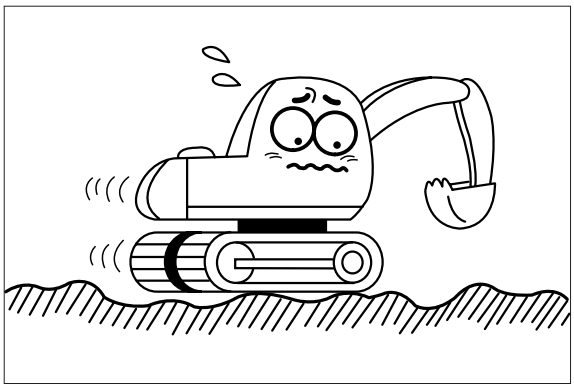
The engine angularity limits are 35 degree.
Do not operate by more than the engine limits in any case.



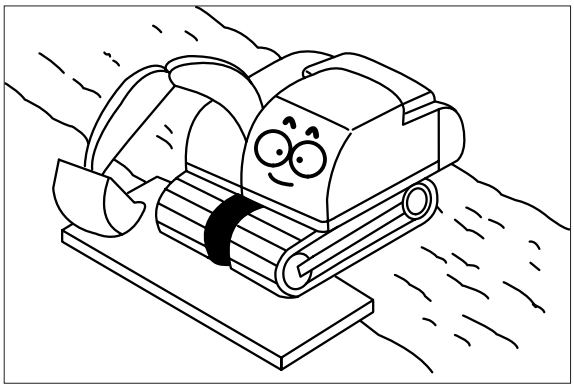
Before traveling the machine, sound the horn to warn nearby personnel.
Operate forward and backward correctly with confirming the location of the travel motor.



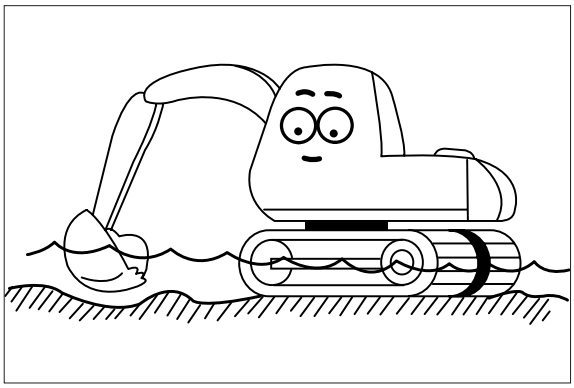
Slow down when traveling through obstacles or uneven ground.



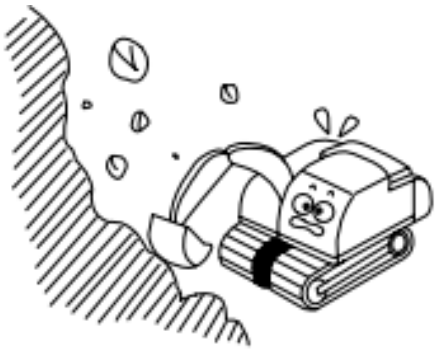
When working on soft ground, place mats or wood boards on the ground to prevent the machine sinking.



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.



This machine has ROPS / FOG with option.
Do not attempt to repair a rollover protective structure (ROPS) after an accident.
Repaired structures do not provide the original structure and protection.
Test and approved as a protective CAB according to ROPS and FOG standard.
Meets : ISO 10262 / 3449 / 12117-2
SAE J1356 / JISO 3449



MOUNTING AND DISMOUNTING

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

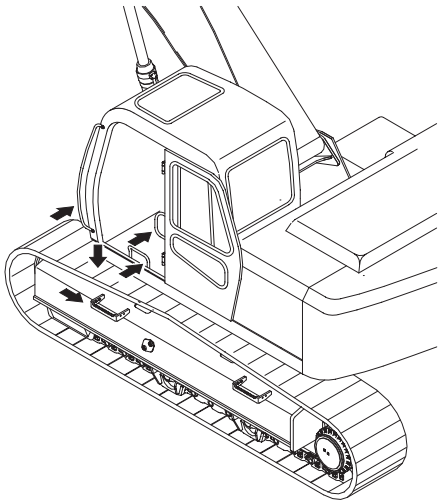
When mounting or dismounting, always face the machine and use the handrails, machine or track frame steps, and track shoes. Additional track frame step can be fitted for wider optional shoe. In this case please contact your Hyundai distributor.

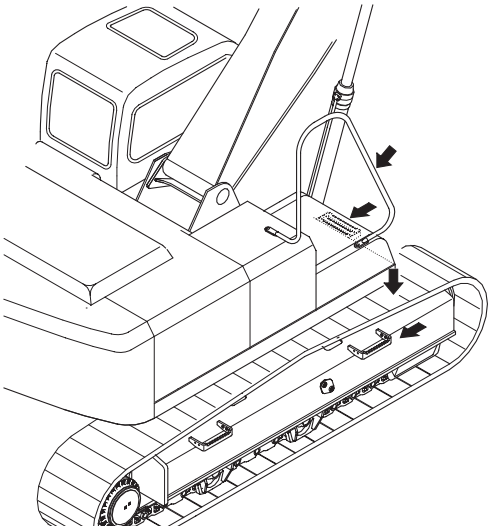
Do not hold any control levers when getting on or off the machine.

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

Always remove any oil or mud from the handrails, steps 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.





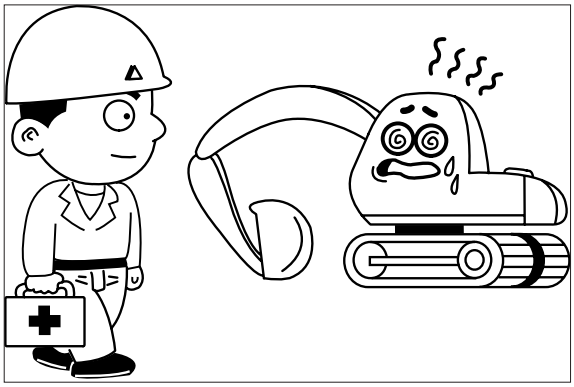
KEEP RIDERS OFF MACHINE

Riders on a machine are subject to injury such as being struck objects and being thrown off the machine.

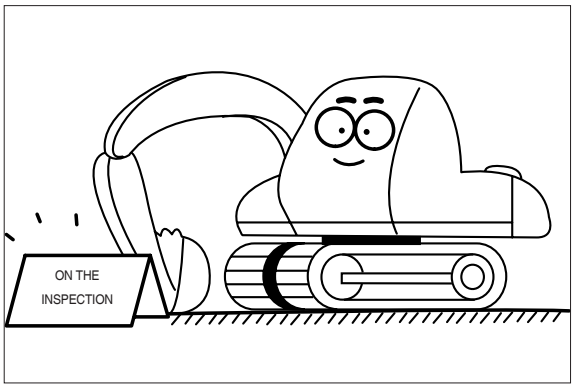
Only allow the operator on the machine. Keep riders off.

3. DURING MAINTENANCE

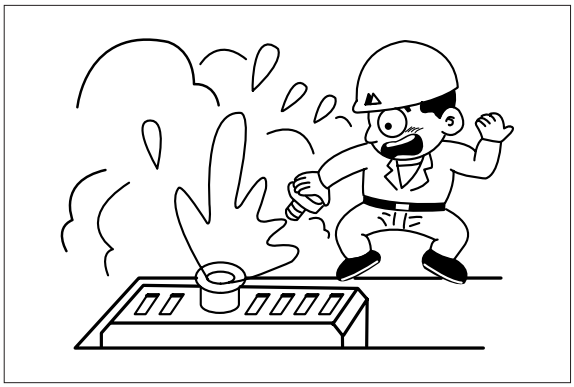
Stop the engine immediately when the trouble of the machine is found.
Inspect immediately the cause of trouble such as vibration, overheating and trouble in the cluster then repair.



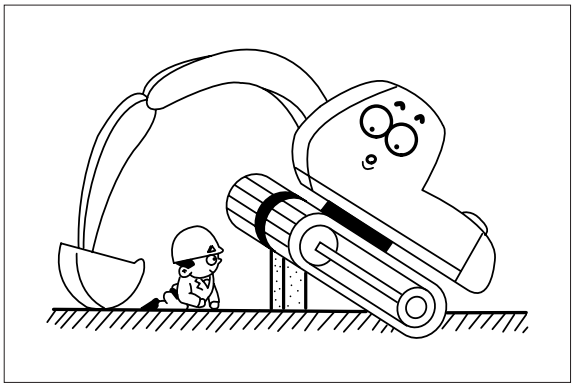
Park on a flat place and stop the engine for inspecting and repairing. Properly TAG machine is not operational. (remove start key)
Extreme care shall be taken during maintenance work. Parts may require additional safe guard.



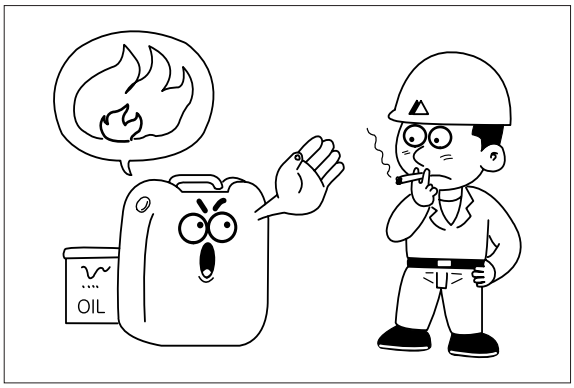
Do not remove the radiator cap from hot engine. Open the cap after the engine cools, below 50 °C (122 °F) to prevent personal injury from heated coolant spray or steam.



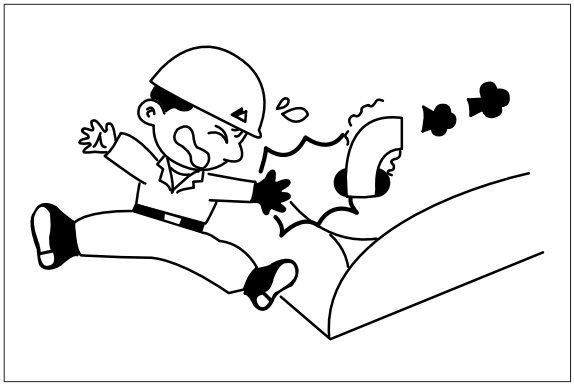
Do not work below the machine.
Be sure to work with proper safety supports.
Do not depend on the hydraulic cylinders to hold up the equipment and attachment.



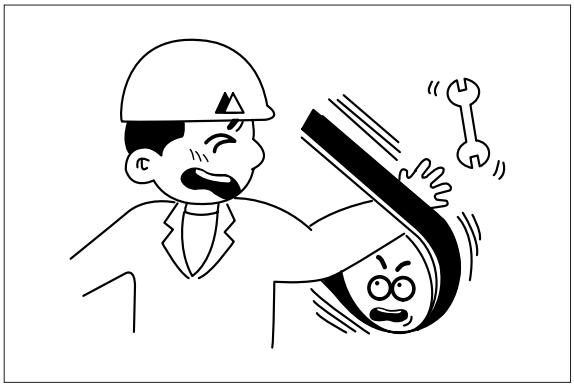
There is the danger of fire in fuel and oil.
Store in cool and dry area, away from any open flames.



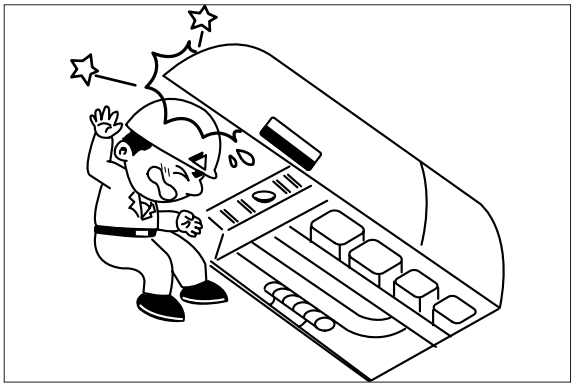
Do not touch exhaust pipe, or may cause severe burn.



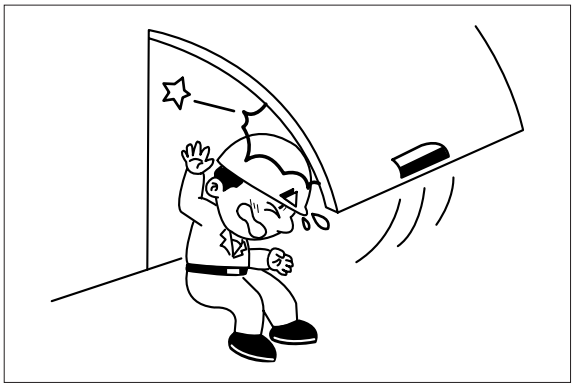
Do not open the engine hood and covers while the engine is running.



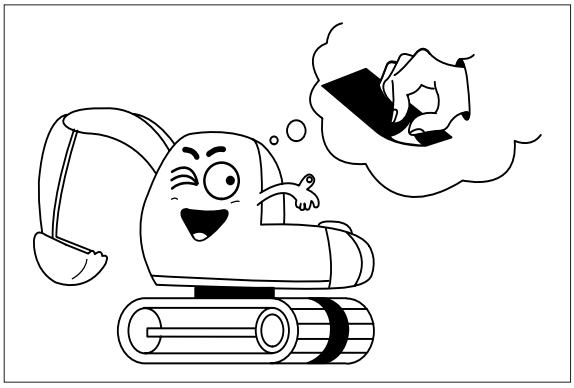
Be careful of not hitting the edges when you service engine.



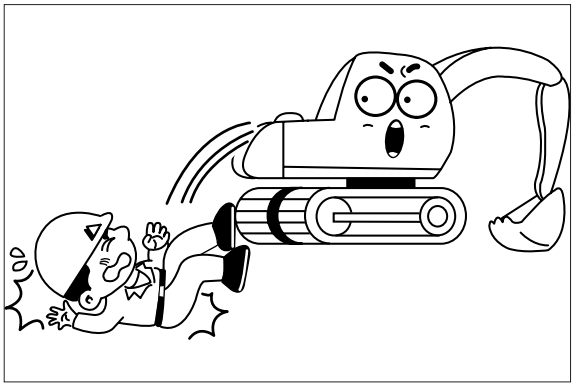
Be careful that the front window may be promptly closed.
Be sure to support stay, when the side door needs to be opened.
Be careful that the open side door may closed by the external or natural force like strong wind.



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.

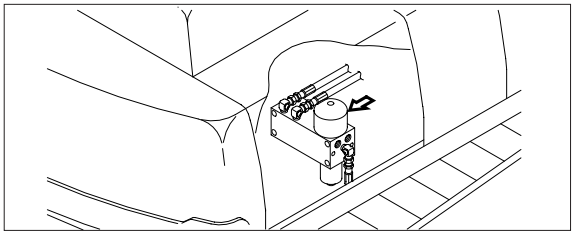


Be careful of not touching slip, fall down etc., when you work at the upper frame to service engine and/ or other component.



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.

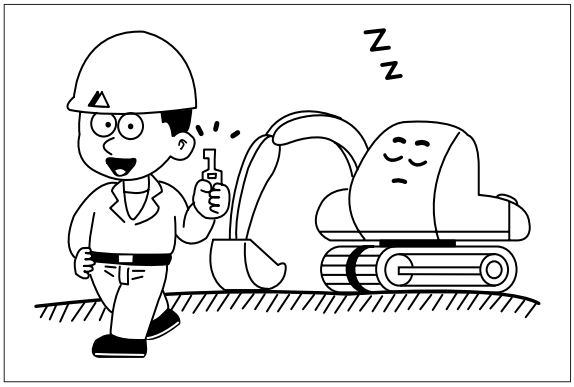


LIFT EYES CAN FAIL

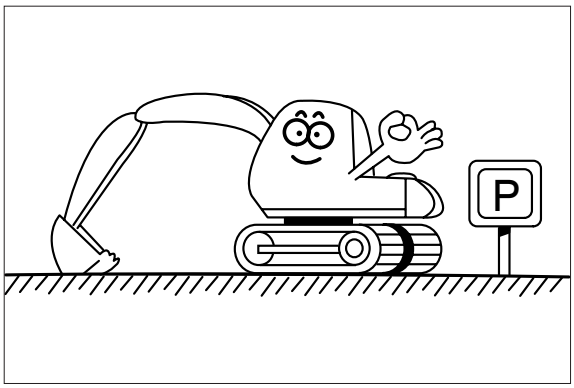
Lift eyes or tank can fail when lifting tank containing fluids resulting in possible personal injury.
Drain tank of all fluids before lifting.

4. PARKING

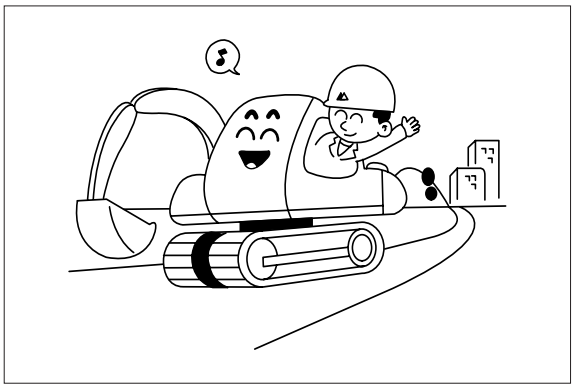
When leaving the machine after parking, lower the bucket to the ground completely and put the safety lever at parking position then remove the key.
Lock the cab door.



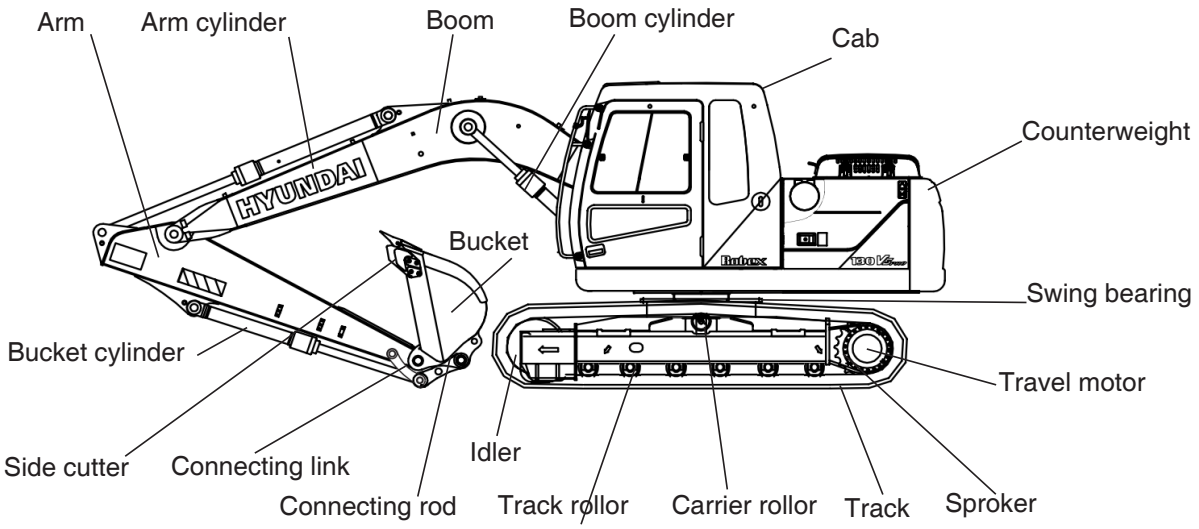
Park the machine in the flat and safe place.

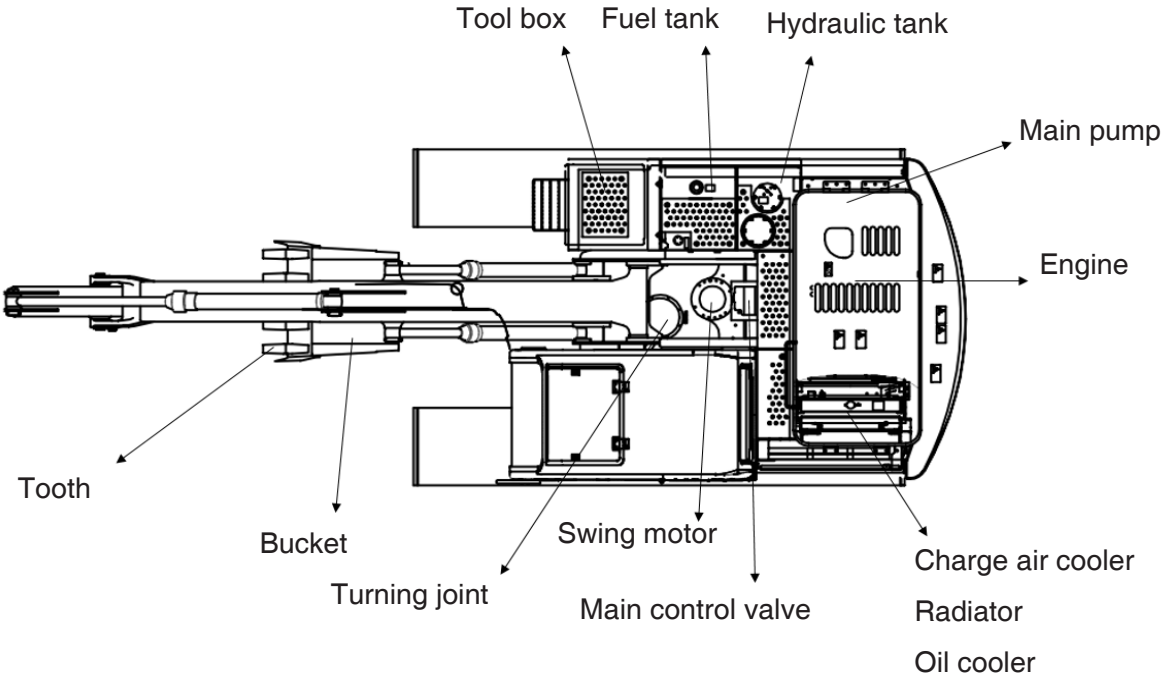


Hope you can work easily and safely observing safety rules.
For safe operation, observe all safety rules.

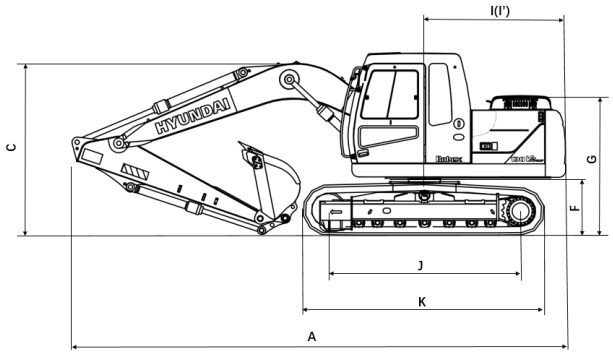


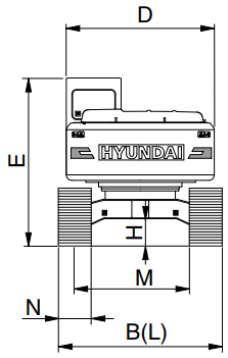
1. MAJOR COMPONENT





2. SPECIFICATIONS

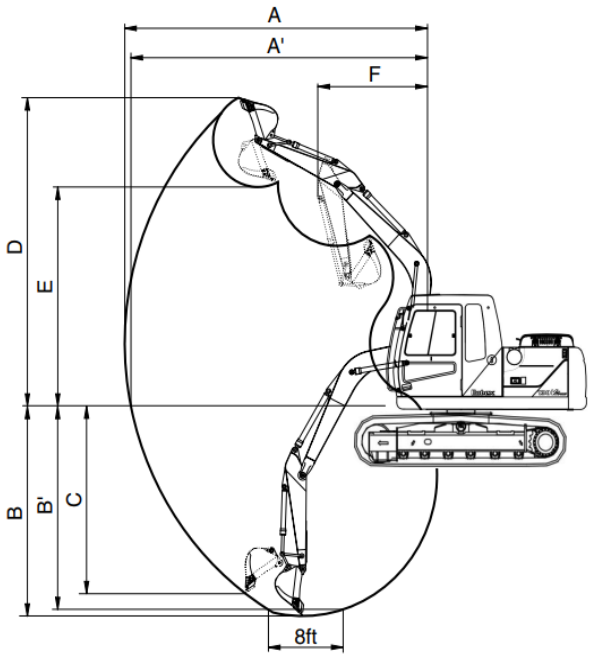




Description		Unit	Specification
Operating weight		kg (lb)	13400 (29541)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	0.52(0.68)
Overall length	A	mm (ft-in)	7820 (25' 8")
Overall width, with 500 mm shoe	B		2500 (8' 2")
Overall height	C		2850 (9' 4")
Superstructure width	D		2476 (8' 1")
Overall height of cab	E		2860 (9' 5")
Ground clearance of counterweight	F		935(3' 11")
Engine cover height	G		2215(7' 3")
Minimum ground clearance	H		440 (1' 5")
Rear-end distance	I		2000(6' 7")
Rear-end swing radius	I'		2000 (6' 7")
Distance between tumblers	J		2830 (9' 3")
Undercarriage length	K		3580 (11' 9")
Undercarriage width	L		2500 (8' 2")
Track gauge	M		2000 (6' 7")
Track shoe width, standard	N		500 (20")
Travel speed (low/high)		km/hr (mph)	3.2/5.5(2.0/3.4)
Swing speed		rpm	12.0
Gradeability		Degree (%)	35 (70)
Ground pressure (500 mm shoe)		kgf/cm^2(psi)	0.43(6.11)
Max traction force		kg (lb)	13300(29320)

3. WORKING RANGE

·4.60 m (15' 1") BOOM



Description		2.5 m (8' 2") Arm
Max digging reach	A	8330mm (27' 4")
Max digging reach on ground	A'	8180mm (26' 10")
Max digging depth	B	5550 mm (18' 3")
Max digging depth (8ft level)	B'	5340 mm (17' 6")
Max vertical wall digging depth	C	5330 mm (17' 6")
Max digging height	D	8500mm (27' 11")
Max dumping height	E	6060mm (19' 11")
Min swing radius	F	2650mm (8' 8")
Bucket digging force	SAE	87.3[94.8] kN
		8900 [9660] kgf
		19620 [21300] lbf
	ISO	102 [110.8] kN
		10400[11290] kgf
		22930[24890] lbf
Arm crowd force	SAE	62.8 [68.2] kN
		6400 [6950] kgf
		14110[15320] lbf
	ISO	65.7 [71.4] kN
		6700[7270] kgf
		14770[16040] lbf

[ ] : Power boost

4. WEIGHT

Item	R130VSPRO	
	kg	lb
Upperstructure assembly	5630	12420
Main frame weld assembly	1160	2560
Engine assembly	335	739
Main pump assembly	100	220
Main control valve assembly	140	310
Swing motor assembly	120	260
Hydraulic oil tank assembly	160	350
Fuel tank assembly	130	290
Counterweight	2000	4410
Cab assembly	500	1100
Lower chassis assembly	5340	11760
Track frame weld assembly	1590	3510
Swing bearing	190	410
Travel motor assembly	480	1060
Turning joint	50	110
Track recoil spring and idler	210	460
Idler	250	550
Carrier roller	40	90
Track roller	490	1080
Track-chain assembly (500 mm standard triple grouser shoe)	1010	2230
Front attachment assembly (4.6 m boom, 2.5 m arm, 0.52 m^3 SAE heaped bucket)	2420	5330
4.6 m boom assembly	830	1830
2.5 m arm assembly	435	960
0.52 m^3 SAE heaped bucket	472	1041
Boom cylinder assembly	130	290
Arm cylinder assembly	160	350
Bucket cylinder assembly	100	220
Bucket control linkage assembly	90	200

5. LIFTING CAPACITIES

1) 4.60m (15' 1") boom, 2.50 m (8' 2") arm equipped with 0.52 m³ (SAE heaped) bucket and 500 mm (24") triple grouser shoe and 2000 kg (4410 lb) counterweight.

 : Rating over-front

 : Rating over-side or 360 degree

Load point height		Load radius								At max. reach		
		1.5 m (5.0 ft)		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		Capacity		Reach
												m(ft)
6.0 m (20 ft)	kg									*2810	1920	6.69
	lb									*6190	4230	(21.9)
4.5 m (15.0 ft)	kg							*2770	2270	2440	1500	7.53
	lb							*6110	5000	5380	3310	(24.7)
3.0 m (10.0 ft)	kg			*4930	*4930	*3830	3570	*3380	2190	2170	1310	7.95
	lb			*10870	*10870	*8440	7870	*7450	4830	4780	2890	(26.1)
1.5 m (5.0 ft)	kg			*8030	6240	*5010	3300	3380	2070	2100	1250	8.03
	lb			*17700	13760	*11050	7280	7450	4560	4630	2760	(26.3)
Ground Line	kg			*8780	5800	5200	3090	3270	1970	2180	1300	7.77
	lb			*19360	12790	11460	6810	7210	4340	4810	2870	(25.5)
-1.5 m (-5.0 ft)	kg	*5740	*5740	*9910	5700	5080	2990	3220	1920	2500	1500	7.15
	lb	*12650	*12650	*21850	12570	11200	6590	7100	4230	5510	3310	(23.5)
-3.0 m (-10.0 ft)	kg	*8760	*8760	*9040	5770	5100	3000			3340	2030	6.01
	lb	*19310	*19310	*19930	12720	11240	6610			7360	4480	(19.7)
-4.5 m (-15.0 ft)	kg			*6590	6030							
	lb			*14530	13290							

Note: 1. Lifting capacity are based on SAE J1097 and ISO 10567.
2. Lifting capacity of the ROBEX series does not exceed 75% of tipping load with the machine on firm, level ground or 87% of full hydraulic capacity.
3. The load point is a hook located on the back of the bucket.
4. *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.

⚠ Failure to comply to the rated load can cause possible personal injury or property damage.
Make adjustments to the rated load as necessory for non-standard configurations.

6. BUCKET SELECTION GUIDE

1) GENERAL BUCKET

0.52 m^3 SAE
heaped bucket

Capacity		Width		Weight	Recommendation
					4.60 m (15' 1") boom
SAE heaped	CECE heaped	Without side cutter	With side cutter		2.5 m arm (8' 2")
0.52m^3 (0.68yd^3)	0.45m^3 (0.59 yd^3)	915 mm (36.0")	1015mm (40.0")	472kg (1041 lb)	Applicable for materials with density of 1600 kg/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		Triple grouser
			
R130VS PRO	Shoe width	mm (in)	500 (20)
	Operating weight	kg (lb)	13400 (29541)
	Ground pressure	kgf/cm^2 (psi)	0.43(6.11)
	Overall width	mm (ft-in)	2500 (8' 2")

3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	1 EA
Track rollers	6 EA
Track shoes	44 EA

4) SELECTION OF TRACK SHOE

Suitable track shoes should be selected according to operating conditions.

Method of selecting shoes

Confirm the category from the list of applications in **table 2**, then use **table 1** to select the shoe. Wide shoes (categories B and C) have limitations on applications. Before using wide shoes, check the precautions, then investigate and study the operating conditions to confirm if these shoes are suitable. Select the narrowest shoe possible to meet the required flotation and ground pressure. Application of wider shoes than recommendations will cause unexpected problem such as bending of shoes, crack of link, breakage of pin, loosening of shoe bolts and the other various problems.

※ **Table 1**

Track shoe	Specification	Category
500 mm triple grouser	Standard	A

※ **Table 2**

Category	Applications	Precautions
A	Rocky ground, river beds, normal soil	· Travel at low speed on rough ground with large obstacles such as boulders or fallen trees

8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Cummins F3.8
Type	4-cycle turbocharged charger air cooled diesel engine
Cooling method	Water cooling
Number of cylinders and arrangement	4 cylinders, in-line
Firing order	1-3-4-2
Combustion chamber type	Direct injection type
Cylinder bore × stroke	102× 115 mm
Piston displacement	3760 c c
Compression ratio	17 : 1
Rated gross horse power (SAE J1995)	115 Hp at 2200 rpm (86 kW at 2200 rpm)
Maximum torque	48 kgf·m (3471 lbf·ft) at 1100 -1700 rpm
Engine oil quantity	11ℓ(2.9 U.S. gal, C l-4)
Dry weight	335 kg (739 lb)
Low idling speed	2200± 50 rpm
High idling speed	800± 50 rpm
Rated fuel consumption	185.9 g/Hp·hr at 2200 rpm
Starting motor	24V-4.8KW
Alternator	28V-70A
Battery	2 × 12V × 72Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 72.9 cc/rev
Maximum pressure	350 kgf/cm^2 [380 kgf/cm^2]
Rated oil flow	2 × 124ℓ/min
Rated speed	1700 rpm

[ ]: Power boost

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	15cc/rev
Maximum pressure	40 kgf/cm^2
Rated oil flow	25.5ℓ/min

4) MAIN CONTROL VALVE

Item	Specification
Type	11 spools
Operating method	Hydraulic pilot system
Main relief valve pressure	350 kgf/cm^2 [380 kgf/cm^2]
Overload relief valve pressure	400 kgf/cm^2

[ ]: Power boost

5) SWING MOTOR

Item	Specification
Type	Axial piston motor
Capacity	72 cc/rev
Relief pressure	280 kgf/cm^2
Braking system	Automatic, spring applied hydraulic released
Braking torque	640 kgf·m
Brake release pressure	24 kgf/cm^2
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Axial piston motor
Relief pressure	400 kgf/cm^2
Capacity (max / min)	77.1/45 cc/rev
Reduction gear type	Planetary differential
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	9.5 kgf/cm^2
Braking torque	29.5 kgf·m

7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	∅105×∅75×1075 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	∅115×∅80×1138 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	∅100×∅70×850 mm
	Cushion	Extend and retract

※ **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) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
R130VSPRO	Standard	500 mm (20")	0.43 kgf/cm^2 (6.11 psi)	44	2500 mm (8' 2")

9) BUCKET

Item		Capacity		Tooth quantity	Width	
		SAE heaped	CECE heaped		Without side cutter	With side cutter
R130VSPRO	Standard	0.52m^3 (0.68 yd^3)	0.45 m^3 (0.59yd^3)	5	915mm (36.0")	1015mm(40.0")

9. RECOMMENDED OILS

Use only oils listed below. Do not mix different brand oil.
Please use HYUNDAI genuine oil and grease.

Service point	Kind of fluid	Capacity ℓ	Ambient temperature °C(°F)
			-50 (-58) / -30 (-22) / -20 (-4) / -10 (14) / 0 (32) / 10 (50) / 20 (68) / 30 (86) / 40 (104)
Engine oil pan	Engine oil	11	★ SAE 5W-40 SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	3.5	★ SAE 80W-90
Final drive		2.2×2	SAE 85W-140
Hydraulic tank	Hydraulic oil	Tank 124 System 210	★ ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	270	★ 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★1	15.5	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 : Soft water
City water or distilled water

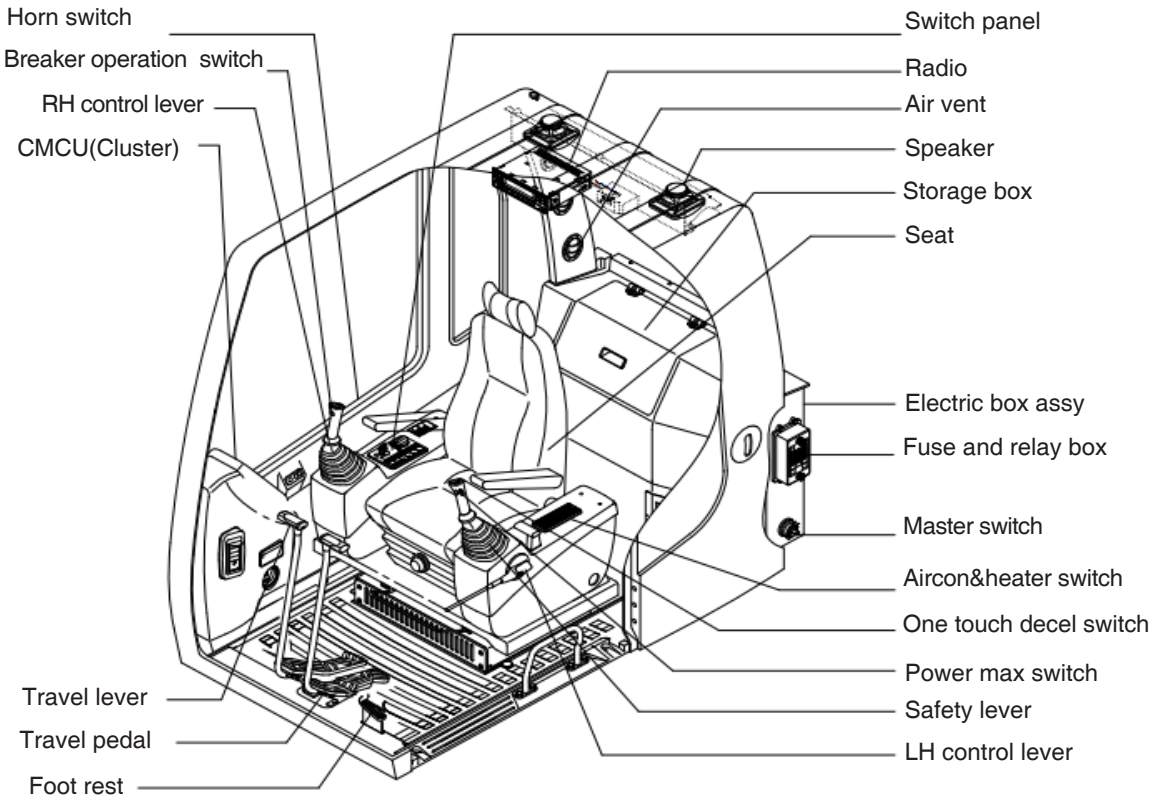
1. CAB DEVICES

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.



2. CLUSTER(CMCU)

1) STRUCTURE

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

·LCD : Indicate operating status of the machine.

·Warning lamp : Indicate abnormality of the machine(Red).

·Pilot lamp : Indicate operating status of the machine(Amber)

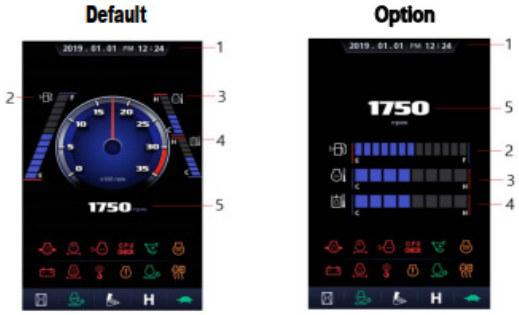
※ The cluster installed on this machine does not entirely guarantee the condition of the machine. Daily inspection should be performed according to chapter 6, Maintenance.

※ When the cluster provides a warning immediately check the problem, and perform the required action.

※ The warning lamp pops up and/or blinks and the buzzer sounds when the machine has a problem. The warning lamp blinks until the problem is cleared.

2) GAUGE

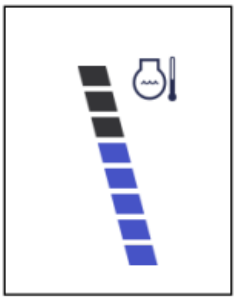
(1) Operation screen



1 Time display
2 Fuel level guage
3 Engine coolant temperature guage
4 Hydraulic oil temperature guage
5 Engine speed(rpm)
RPM / Tripmeter display

※ Operation screen type can be set by the screen type menu of the display.

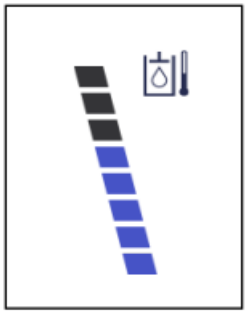
(2) Engine coolant temperature gauge



① This gauge indicates the temperature of coolant in 9 step guage .
- 0 step: Below 30°C (86°F)
- 1 ~ 7step: 30–104°C (86–219°F)
- 8 step: Above 104°C (219°F)

② When the warning light flashes red, do not immediately extinguish the engine, keep running at intermediate speed,gradually cool and then turn off.

(3) Hydraulic oil temperature gauge



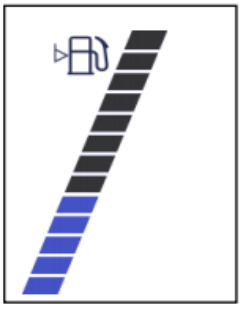
① This gauge indicates the temperature of hydraulic oil in 9 step guage .
- 0 step: Below 30°C (86°F)
- 1 ~ 7step : :: 30–104°C (86–219°F)
- 8 step: Above 104°C (219°F)

② The gauge between 1st and 7th steps illuminates when operating

③ Keep idling engine at low speed until the gauge between 1nd and 7th steps illuminates, before operation of machine.When the gauge of 8th steps illuminates,reduce the load on the system.

④ If the gauge stays in the8 steps, stop the machine and check the cause of the problem.

(4) Fuel level gauge



① This gauge indicates the amount of fuel in the fuel tank.
② Fill the fuel when the 1st step or fuel icon blinks in red.

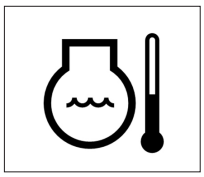
(5) RPM / Tripmeter display

① This displays the engine rpm or the tripmeter.

3) WARNING LAMPS

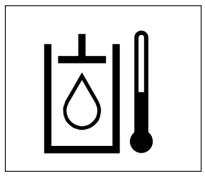
※ The warming lamp lights ON and the buzzer sounds when the machine has a problem. In this case, press the buzzer stop switch and buzzer stop, but the warming lamp lights until the problem is cleared

(1) Engine coolant temperature



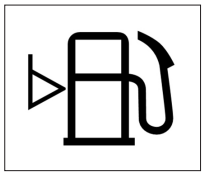
① The lamp is ON and the buzzer sounds when the cooling water temperature is over the reference temperature (105°C)
② Check the cooling system when the lamp keeps ON.

(2) Hydraulic oil temperature



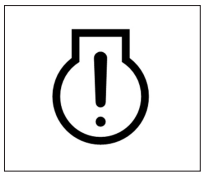
① The lamp is ON and the buzzer sounds when the cooling water temperature is over the reference temperature (105°C)
② Check the cooling water level if this warning lamp is ON.

(3) Fuel level



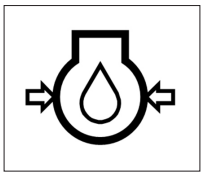
① This warning lamp pops up and the buzzer sounds when the level of fuel is below 31ℓ (8.2 U.S. gal).
② Fill the fuel immediately when the lamp blinks.

(4) Check engine warning lamp



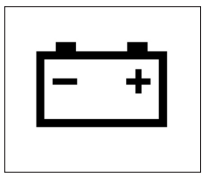
① This lamp blinks and the buzzer sounds when the communication between CPU controller and ECU on the engine is abnormal, or if any fault code received from ECU
② Check the communication line between them. If the communication line is OK, then check the fault code on the cluster

(5) Engine oil pressure warning lamp



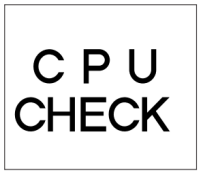
① This lamp blinks when the engine oil pressure is low.
② If the lamp blinks, shut OFF the engine immediately. Check oil level.

(6) Battery charging warning lamp



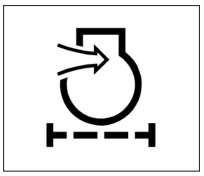
① This lamp blinks when the battery charging voltage is low.
② Check the battery charging circuit when this lamp blinks.

(7) CPU check warning lamp



① If any fault code is received from CPU controller, this lamp blinks and the buzzer sounds.
② Check the communication line between CPU controller and cluster

(8) Air cleaner warning lamp



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

(9) Overload warning lamp (opt)

① When the machine is overload, the overload warning lamp blinks during the overload switch is ON. (if equipped)
② Reduce the machine load.

(10) Engine oil filter clogged warning lamp

① This warning lamp pops up and the buzzer sounds when the engine oil filter is clogged.
② Check the filter and clean or replace it.

4) PILOT LAMPS

(1) Mode pilot lamps

No	Mode	Pilot lamp	Selected mode
1	Power mode	M	Max power mode
		H	High power mode
		S	Standard power mode
2	User mode	U	User preferable power mode
3	Work mode		General operation mode
			Heavy duty work mode
4	Travel mode		Low speed traveling
			High speed traveling
5	Auto idle mode		Auto idle

(2) Power max pilot lamp

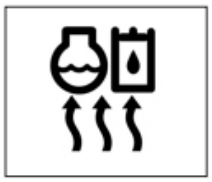
① The lamp will be ON when pushing power max switch on the LH RCV lever.

② The power max function is operated maximum 8 seconds.

(3) Preheat pilot lamp

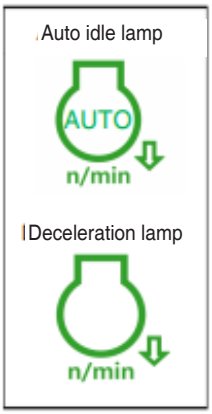
① Turning the start key switch ON position starts preheating in cold weather.
② Start the engine after this lamp is OFF.

(4) Warming up pilot lamp



① This lamp is turned ON when the coolant temperature is below 30˚C(86˚F).
② The automatic warming up is cancelled when the engine coolant temperature is above 30˚C, or when 10 minutes have passed since starting the engine.

(5) Decel pilot lamp



① The auto idle mode pilot lamp will light up when the Auto idle function is selected.
② a. Operating one touch decel switch on the RCV lever makes the Deceleration lamp ON.
b. When the Auto idle funciton is selected, and all levers and pedals are in the neutral position, the Auto idle lamp and Deceleration lamp will be ON.
③ One of the lever or pedal is operated, the Deceleration lamp will go OFF and the engine speed returns to the previous conditions.
※ One touch decel is not available when the auto idle pilot lamp is turned ON.

(6) Engine run status indicated lamp

① This lamp indicated engine status.
When the engine and hour meter is running,this lamp is turn ON.

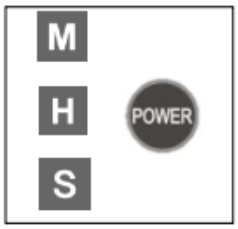
(7) Coolant level warning lamp

① This warning lamp indicates lack of coolant.
② Check and refill coolant.

5) SWITCHES

※ When the switches are selected, the pilot lamps are displayed on the LCD.

(1) Power mode switch



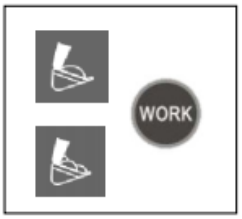
① This switch is to select the machine power mode and selected power mode pilot lamp is displayed on the pilot lamp position.

·M : Max power mode

·H : High power mode

·S : Standard power mode

(2) Work mode switch



① This switch is to select the machine work mode, which shifts from general operation mode to optional attachment operation mode.

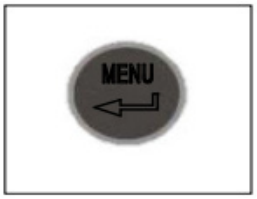
· : General operation mode

· : Crusher operation mode (if equipped)

(3) User mode switch

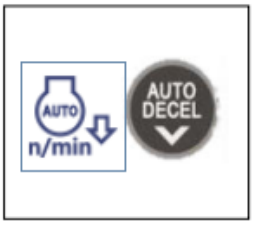
① This Switch select User Mode

(4) Menu switch



① This switch used to select the main menu and subordinate menu on the LCD

(5) Auto idle/ buzzer stop switch



① This switch is used to activate or cancel the auto idle function. when all levers and pedals are in a nautral position,automatically reduces engine speed and saves fuel.
·Pilot lamp ON : Auto idle function is activated.
·Pilot lamp OFF : Auto idle function is cancelled.

(6) Travel speed control switch

① This switch is used to select the travel speed alternatively.
· : High speed
· : Low speed

(7) Escape switch

① This switch is used to return to the previous menu or parent menu.

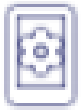
(8) Buzzer stop switch

① This switch is used to turn off the buzzer. The buzzer buzzes 2 seconds after the start switch is first turned on,stopping is a normal phenomenon

② When something goes wrong with the equipment, the red light goes on and the buzzer goes off. It can be opened in this case the switch stops the buzze

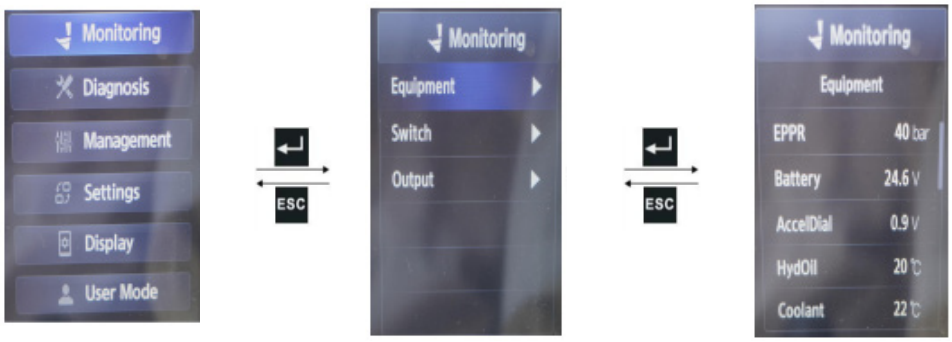
6) MAIN MENU

(1) Structure

No	Main menu	Sub menu	Description
1		Equipment Switch Output	Device information and status Switch state output state
2		Current Error Recorded Error	CMCU, engine ECM fault record confirmation and delete
3		Equipment maintenance	Change the exchange cycle of oil and filter element Initialization of service time
4		Time Setting Machine Security Dual Mode Camera	Set time Set startup limits and change passwords Mode changes Camera Settings
5		Operation Skin Brighteness Language	Select boot Mode Set screen brightness Language Settings
6		UserModeSetting	Set engine high speed idling speed automatic decompression speed EPPR valve input current value

(2) Monitoring

① Equipment



· Equipment status information.

② Switch

· Switch status information.

③ Output

· Output status information

(3) Diagnosis

① Current Error

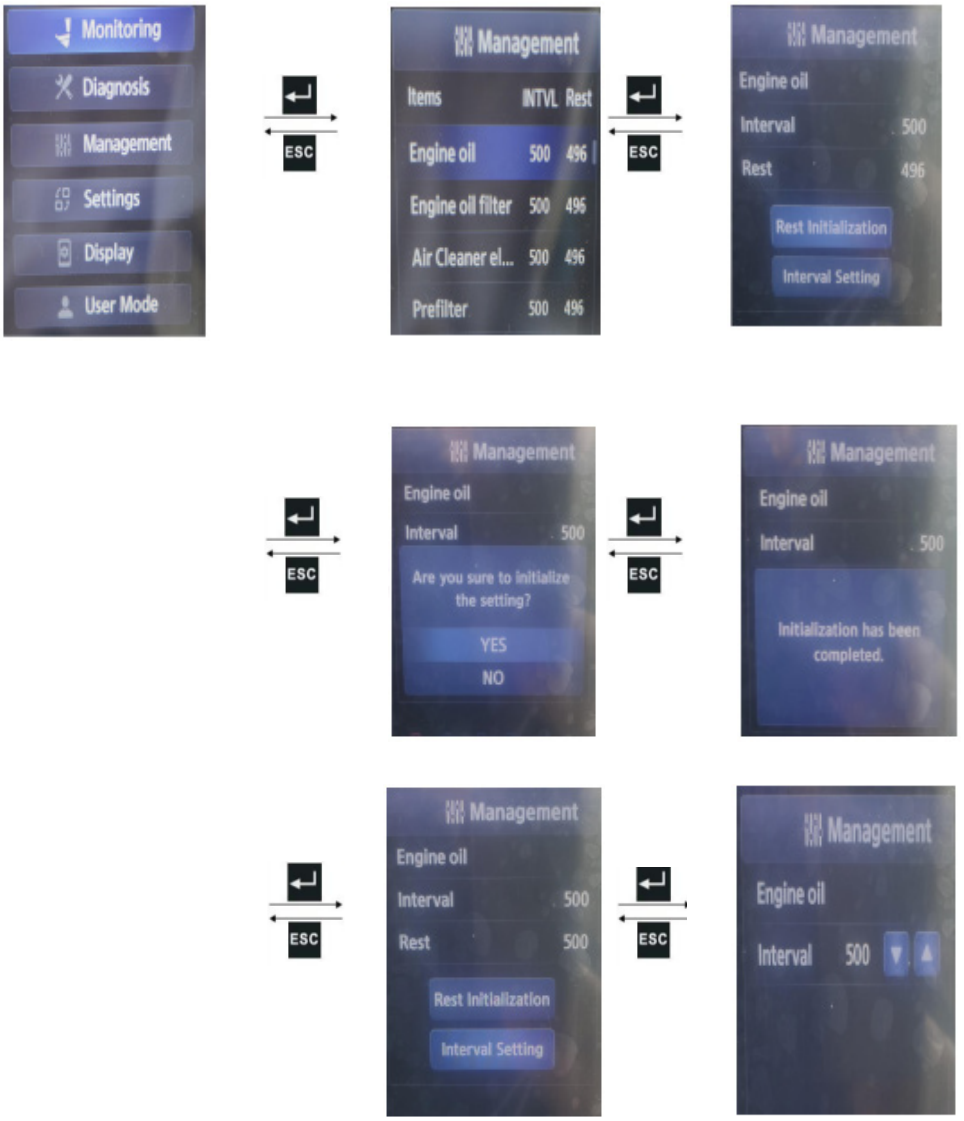
· Equipment status information.

② Recorded Error

· You can check past CMCU or engine ECM failures

(4) Management

① Maintenance information



· The exchange cycle and remaining time of consumables can be confirmed.
· Remaining time initialization: The remaining time can be initialized.
· Change the switching period: You can set the switching period.

(5) Settings

① Time setting

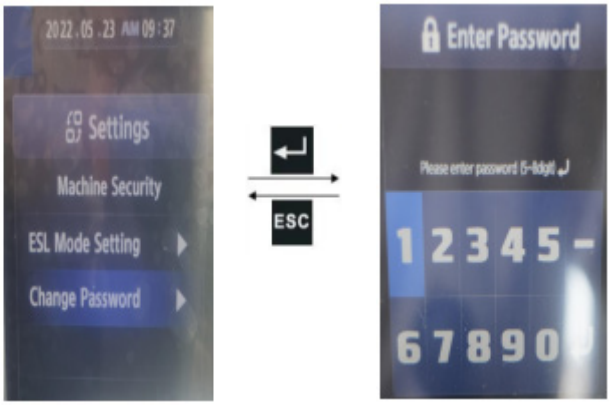
② **Machine security**

· **ESL mode**

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

  Enable (always) : The password is required whenever the operator start engine.

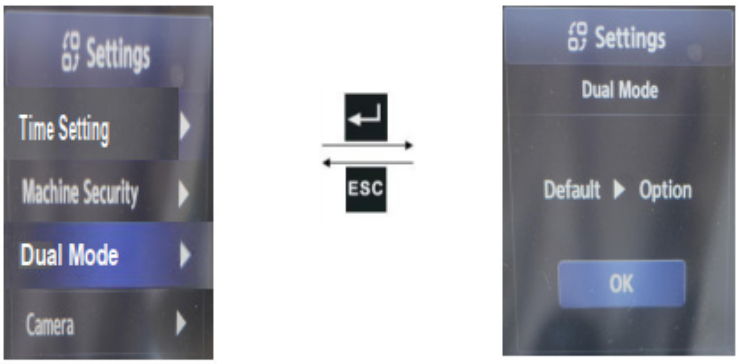
  Enable (interval) : The password is required when the oper-ator start engine first. But the operator restarts the engine within the interval time, the password is not required. The maximum period can be set to 7 days.



· **Password change**

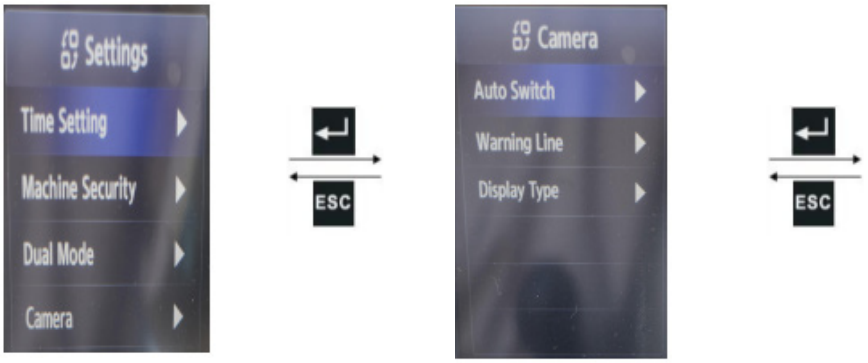
- The password is 5~8 digits. Enter the password and press ↵
- The initial password is 00000.

③ Dual mode



· You can change the mode of the device.

④ Camera

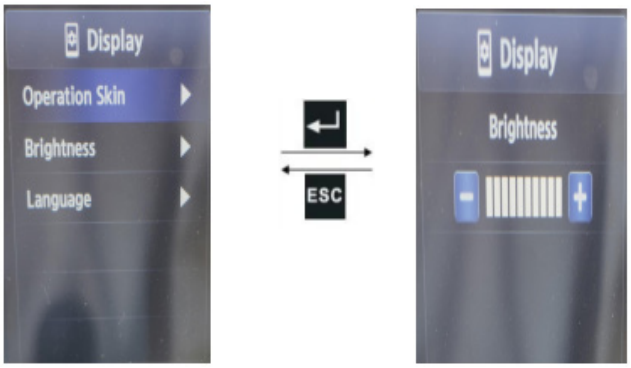


(5) Display

① Operation skin

· You can set the screen type. (Analog/digital)

② Brightness



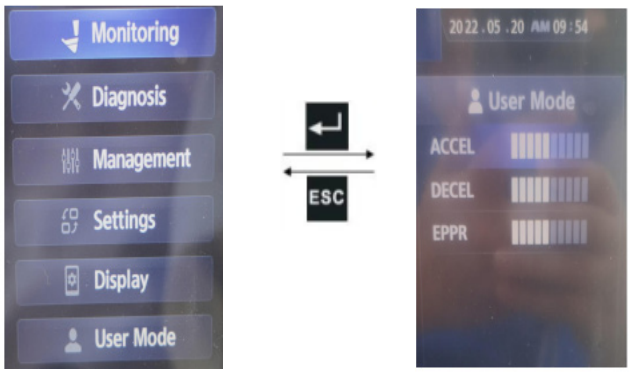
· You can set and store the values of engine high-speed idling RPM, autotorque reduction RPM and EPPR valve input current respectively in user mode (U).
· The menu is only accessible when user mode (U) is selected.

③ Language

· User can select preferable language and all displays are changed the selected language.

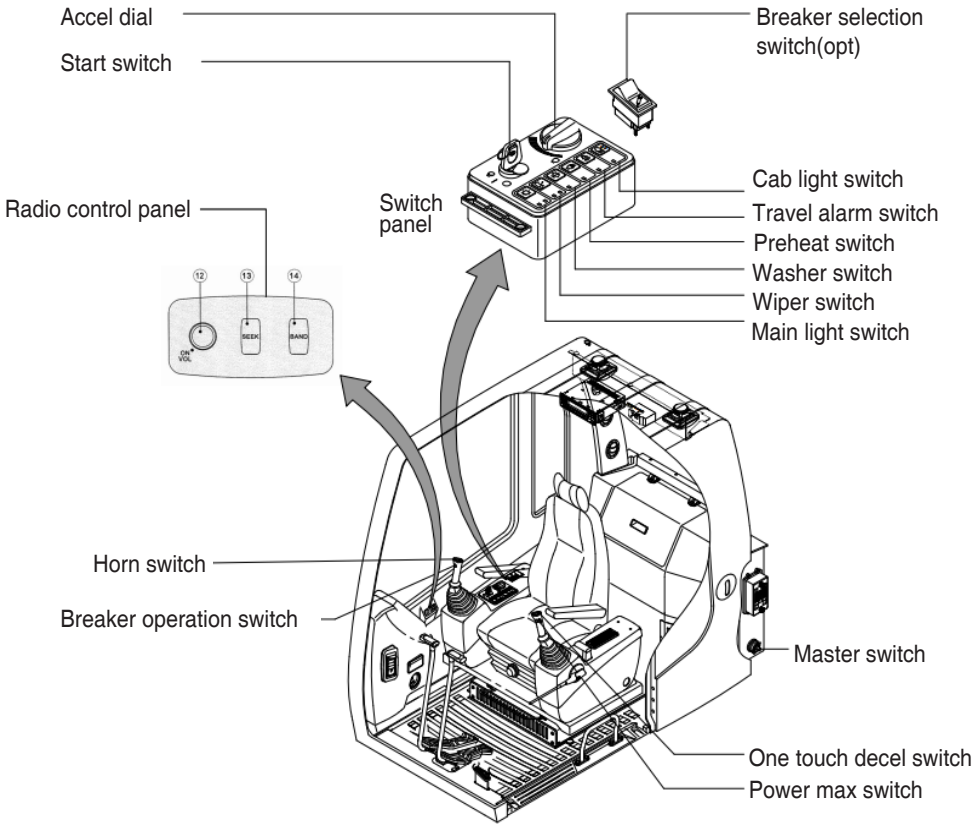
(6) User mode

① User mode switch

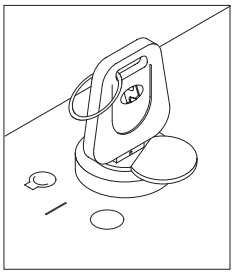


· You can set and store the values of engine high-speed idling RPM, autotorque reduction RPM and EPPR valve input current respectively in user mode (U).
· The menu is only accessible when user mode (U) is selected.

3. SWITCHES



1) STARTING SWITCH



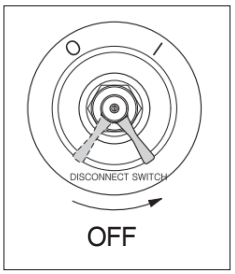
(1) There are three positions, OFF, ON and START.

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

※ If you turn ON the starting switch in cold weather, the fuel warmer is automatically operated to heat the fuel by sensing the coolant temperature. Start the engine in 1~2 minutes after turning ON the starting switch. More time may take according to ambient temperature.

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

2) 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.

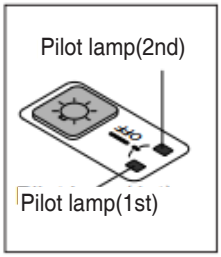
※ **Never turn the master switch to O (OFF) with the engine running. Engine and electrical system damage could result.**

3) ACCEL DIAL SWITCH

(1) There are 10 dial setting.

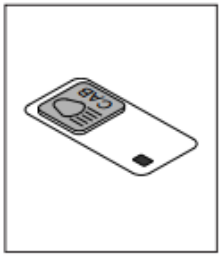
(2) Setting 1 is low idle and setting 10 is high idle.
- By rotating the accel dial to right : Engine speed increases
- By rotating the accel dial to left : Engine speed decreases

4) MAIN LIGHT SWITCH



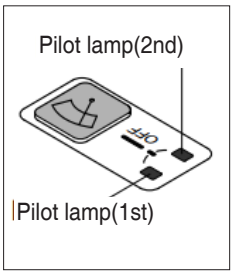
(1) This switch used to operate the head light and work light.
- Mode 1: The beacons of the head light and instrument are ON.
- Mode 2: The work light and the beacon below it are ON.

5) CAB LIGHT SWITCH (option)



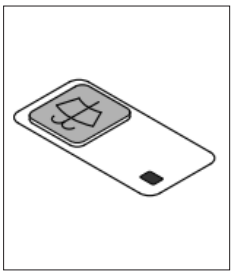
(1) This switch turns ON the cab light on the cab.

6) WIPER SWITCH



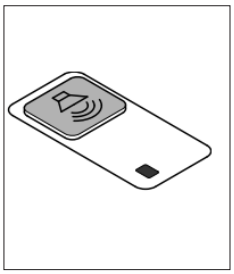
(1) This switch used to operate wiper.
- **Press the switch once to intermittently operate wiper.**
- **Press the switch once more to operate wiper low speed.**
- **Press the switch again return to a first step position.**
- **Press the switch more than one second to turn off wiper.**

7) WASHER SWITCH



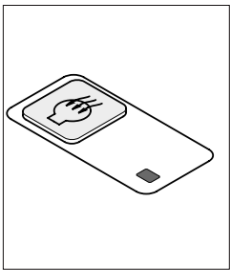
(1) The washer liquid is sprayed and the wiper is operated only while pressing this switch.
(2) The indicator lamp is turned ON when operating this switch.

8) TRAVEL ALARM SWITCH



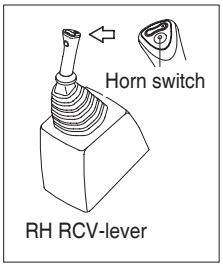
(1) This switch is to activate travel alarm function surrounding when the machine travels.
- **ON : The travel alarm function is activated.**
- **OFF : The travel alarm function is not activated.**

9) PREHEAT SWITCH



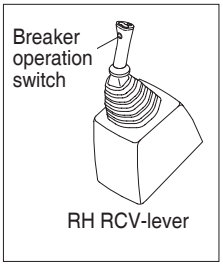
(1) This switch is used for starting the engine in cold weather. If pressed, preheated the intake air to get easier engine starting.
※ **Never hold the push button switch in for more than 5 seconds, as this can damage the electric valve solenoid.**
(2) **The indicator lamp is turned ON when operating this switch.**

10) HORN SWITCH



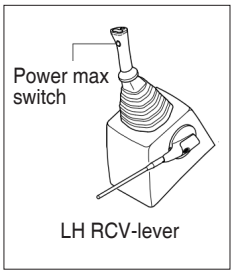
(1) This switch is at the top of right side control lever.
On pressing, the horn sounds.

11) BREAKER OPERATION SWITCH



(1) On pressing this switch, the breaker operates only when the breaker operation mode is selected.

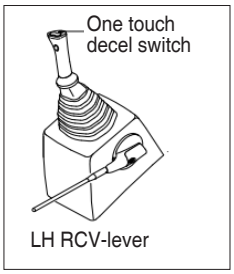
12) BREAKER OPERATION SWITCH



(1) This switch activate power max function.
When this switch is kept pressed, hydraulic power of work equipment will increased approx 110 percent during 8 seconds.

(2) After 8 seconds, function is cancelled automatically even switch is keep pressed.

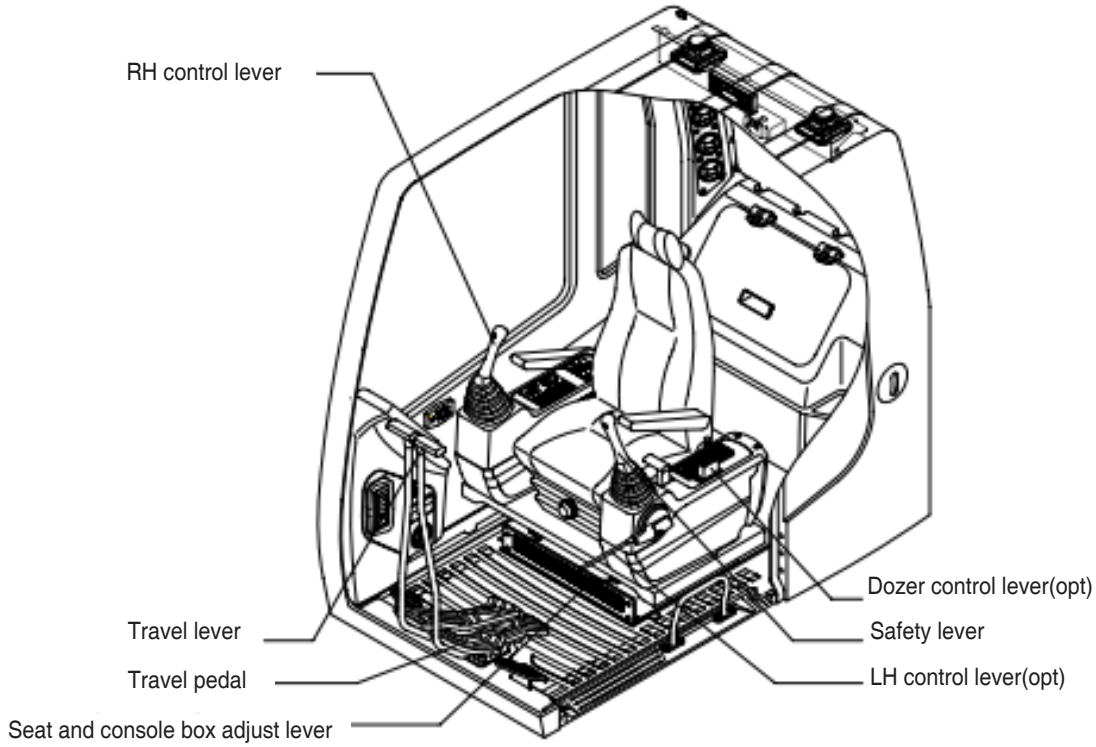
13) ONE TOUCH DECEL SWITCH



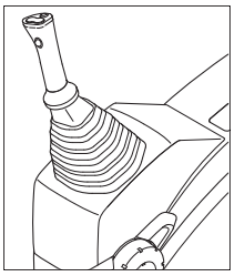
(1) This switch is used to actuate the deceleration function quickly.

(2) The engine speed is increased to previous setting value by pressing the switch again.

4. LEVERS AND PEDALS



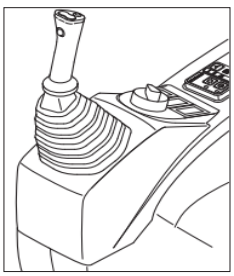
1) LH CONTROL LEVER



(1) This joystick is used to control the swing and the arm.

(2) Refer to operation of working device in chapter 4 for details.

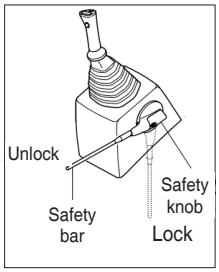
2) RH CONTROL LEVER



(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



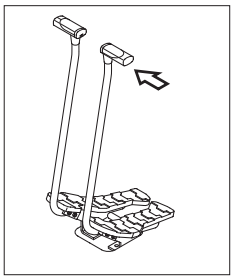
(1) All control levers and pedals are disabled from operation by locating the lever to lock position as shown.

※ **Be sure to lower the lever to LOCK position when leaving from operator's seat.**

(2) By pull lever to UNLOCK position, the machine is operational.

※ **Do not use the safety lever for handle when getting on or off the machine.**

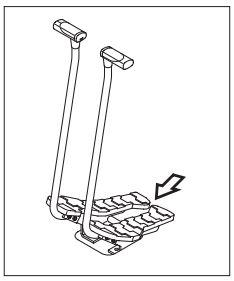
4) TRAVEL LEVER



(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) SEAT AND CONSOLE BOX ADJUST LEVER

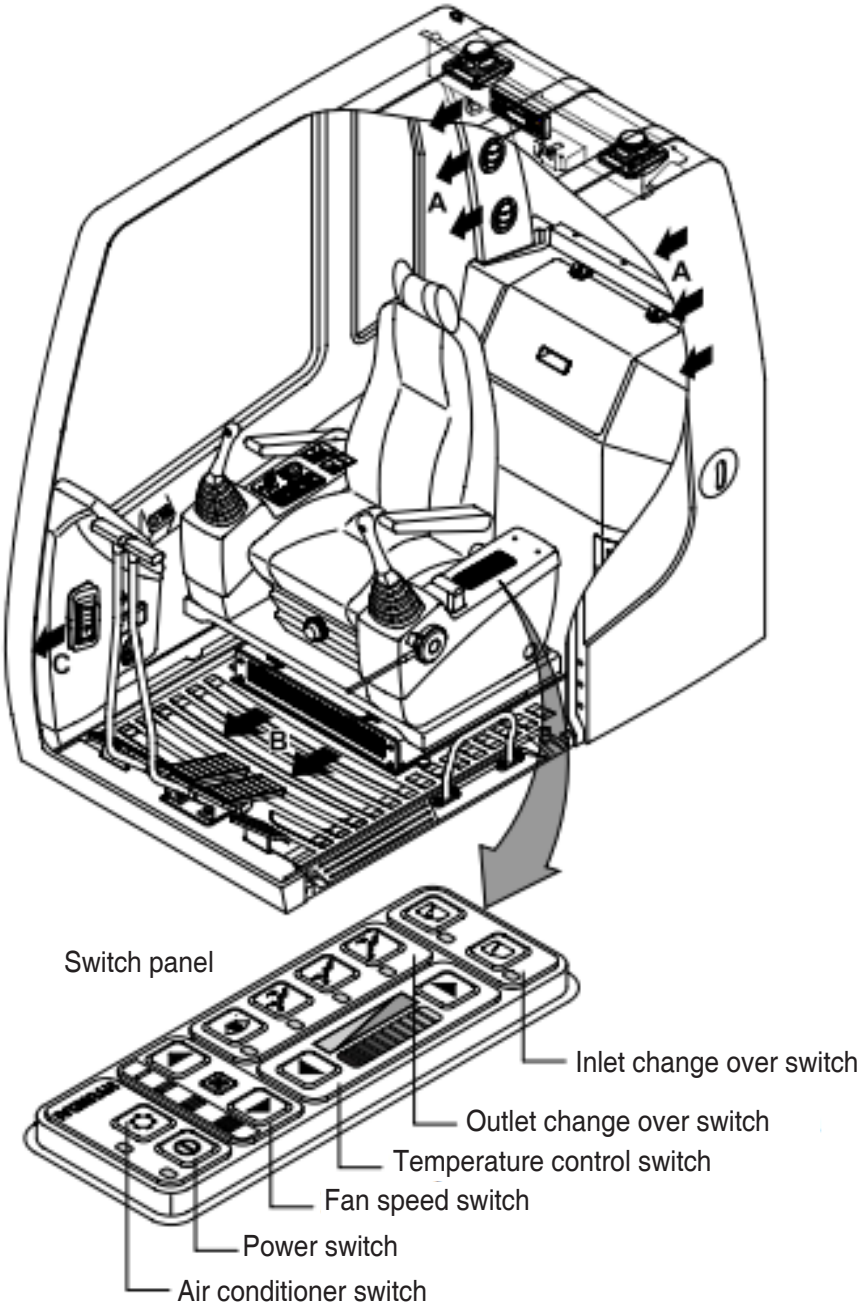
(1) This lever is used to move the seat and console box to fit the contours of the operator's body.

(2) Pull the lever to adjust forward or backward over 220㎜(8.7").

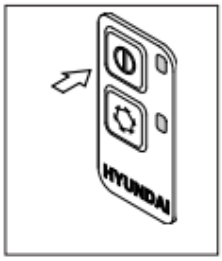
5. AIR CONDITIONER AND HEATER

■ THE AIR CONDITIONER AND HEATER ARE PROVIDED TO ENSURE THE COMFORT DURING OPERATION.

• Location of air flow ducts



1) POWER OFF SWITCH

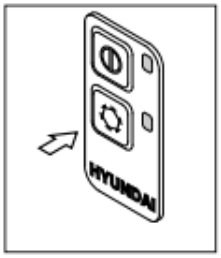


(1) This switch makes the system and the LED OFF.
Just before the power OFF, set values are stored.

(2) Default setting values

Function	Air conditioner	Fan speed	Outlet	Temperature	Inlet
Max warn	OFF	1	Face	Max cool	Recirculation

2) AIR CONDITIONER SWITCH (compressor switch)



(1) Operating this switch turns the compressor and the LED simultaneously on or off.

(2) In accordance with the temperature sensed by duct (evaporator) sensor, compressor turns ON or OFF automatically.

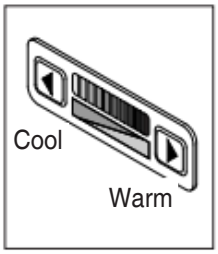
※ **Air conditioner operates to remove vapor and drains water through a drain hose. Water can be sprayed into the cab in case that the drain cock at the ending point of drain hose has a problem.**
In this case, exchange the drain cock.

3) FAN SPEED SWITCH

(1) It is possible to control the fan to four steps

(2) The first step or the fourth step gives 5 times beeps

4) TEMPERATURE CONTROL SWITCH



(1) There are 9 steps to control temperature from max cool to max warm controlled up and down by 1 step.

(2) Max cool and max warm arouse 5 times beeps.

(3) For the max warm or the max cool it's better to be configured as following table.

Temperature	Air conditioner	Fan speed	Outlet	Inlet
Max cool	ON	4	Face	Recirculation
Max warm	OFF	3	Foot	Fresh

5) OUTLET CHANGE OVER SWITCH

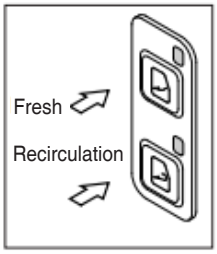
(1) Operating this switch, it beeps and displays symbol of each mode in order.
• A type : Vent → Vent/Foot → Foot → Foot/Def → Vent

Switch position		Mode			
Outlet	A		●	●	
	B	●		●	●
	C				●

(2) When defroster switch operating, INLET switch turns to FRESH mode and air conditioner switch turns ON.

(3) In case of heating range (5~Max warm), air conditioner won't turns ON.

6) INLET CHANGE OVER SWITCH



(1) It is possible to change the air-inlet method.

① **Fresh air**
Inhaling air from the outside.

※ **Check out the fresh air filter periodically to keep a good efficiency.**

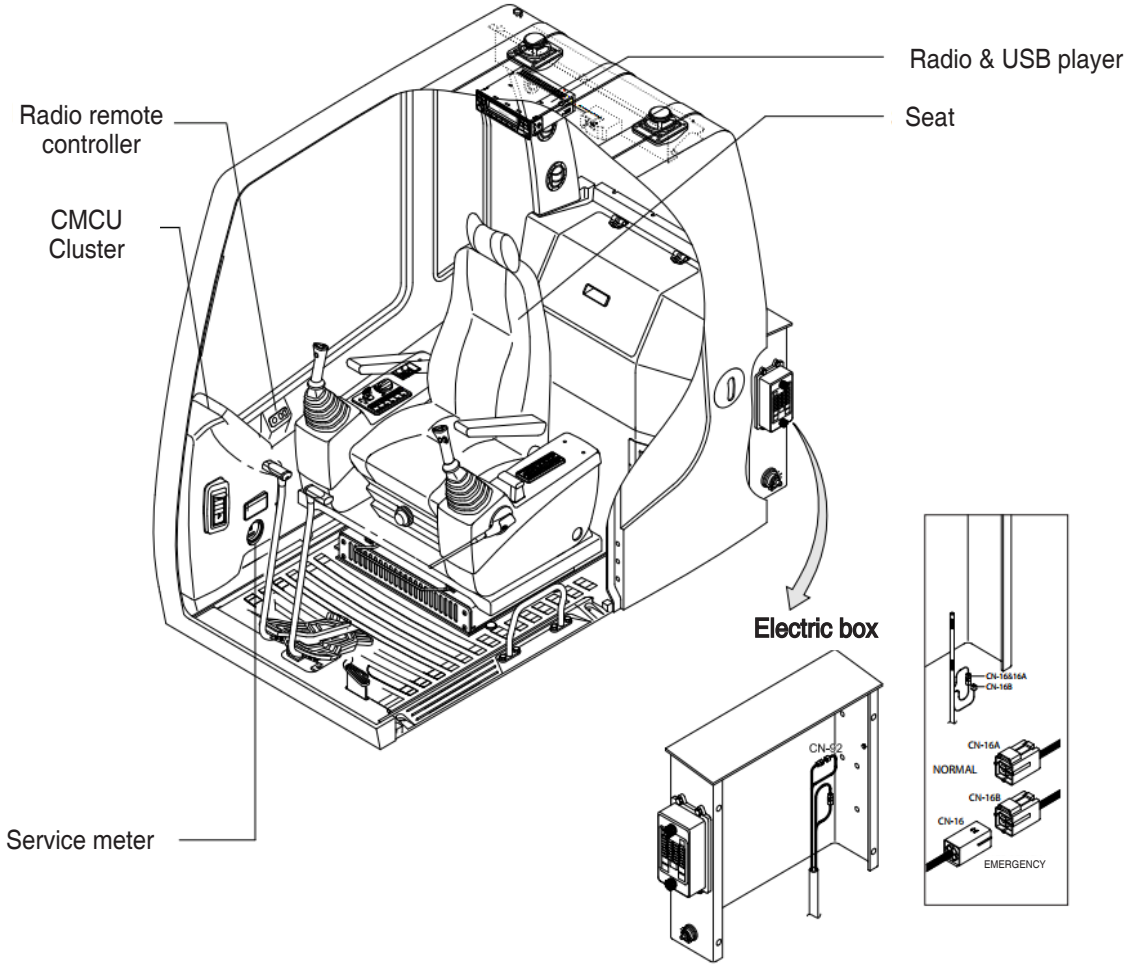
② **Air recirculation**
It recycles the heated or cooled air to increase the energy efficiency.

※ **Change air occasionally when using recirculation for a long time.**

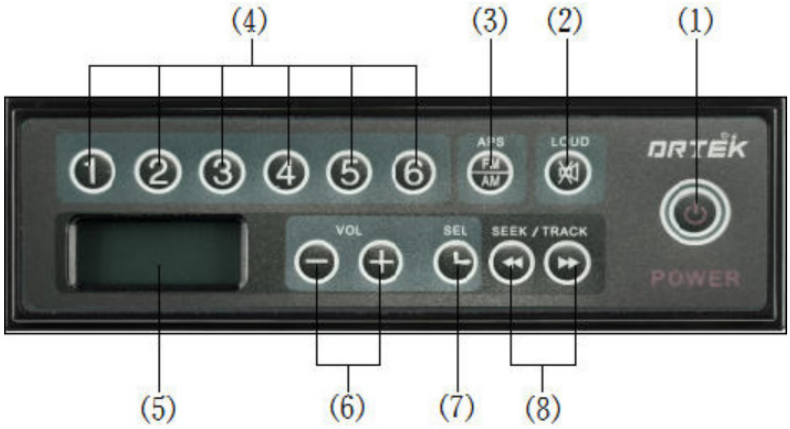
※ **Check out the recirculation filter periodically to keep a good efficiency.**

(2) **Recirculation function operates when the system is OFF but it can be changed whenever needed.**

6. OTHERS


Radio & USB player
Seat
Radio remote controller
CMCU Cluster
Service meter
Electric box
CN-92
CN-16&16A
CN-16B
CN-16A
NORMAL
CN-16B
CN-16
EMERGENCY

1) RADIO



(1)Power
(2)Mut/Loudness
(3)APS/Band
(4)Memory radio
(5)LCD
(6)VOL +/-
(7) Sound effect / clock setting
(8) Radio search

(1) Power

▶ Short press this key to start up,
▶ Long press this key to shut down in the power on state.

(2)Mut/Loudness

▶ Short press, mute on / off
▶ Long press, loudness on / off

(3)APS/Band

▶ Short press to switch the band between FM1 / FM2 / AM1 / AM2
▶ Long press to automatically search stations from the low end of the frequency in the current band, and the searched stations are stored in the preset stations in turn

(4)Memory radio

When receiving,
▶ Short press to select the corresponding preset radio station.
▶ Long press and hold to save the listening frequency to the corresponding preset station.

(5)LCD display screen

Displays the frequency information and status currently received.

(6)VOL+/-

Press the Vol + / - key to increase or decrease the volume.

(7)Sound effect / clock setting

▶ Short press the display clock and press this key within 5 seconds to enter the sound effect setting.

Volume: When LCD show “VOL”then press < VOL+/- > to adjust

Bass : When LCD show“BAS”then press < VOL+/- >to adjust

Treble : When LCD show“TRE”then press < VOL+/- >to adjust

Balance: When LCD show“BAL”then press < VOL+/- >to adjust

▶ When the clock is displayed, press and hold this key to enter the clock adjustment. Preset and held <SEL> for few seconds to enter clock adjust mode , then press <VOL+/-> to adjust hours up/dow , after that softly touch <SEL> change to minutes mode , then press <VOL+/-> to adjust minutes up/down , finally softly touch <SEL> again to back original mode When adjust hours or minutes , if preset and held <SEL> then option to 12 or 24 hour display

▶ If the key is not pressed within 5 seconds, return to the playback information display

(8)Radio search

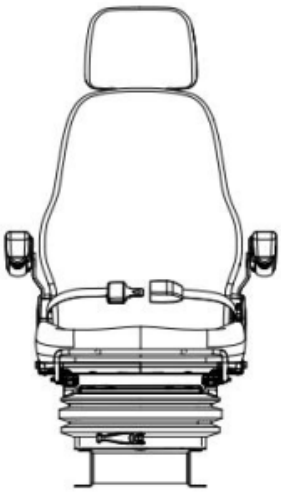
When listening to the radio station, it is used to search the station forward and backward.

(9)Specification

FM
Usual senstivity 10 dB
S/N ratio 60 dB
AM
Usual senstivity 30 dB
S/N ratio 60 dB
Others
Power supply 12V / 24V
Max output 10×2 / 25×2 W

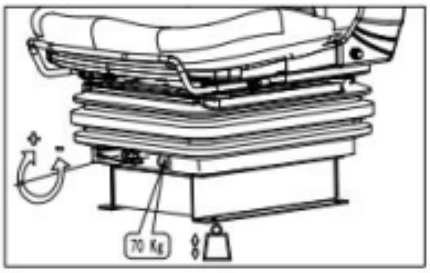
2) SEAT

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.



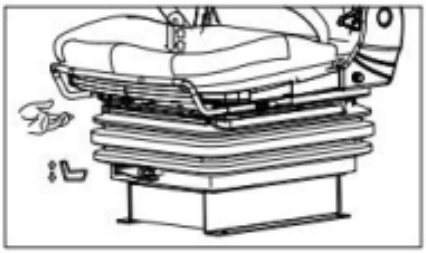
(1) Technical characteristics

① Maximum suspension stroke of vibration reduction is 90mm.
② Stepless adjustment according to the body weight between 50-130kg.
③ The adjustable range of backrest Angle is 136.5°.the
④ adjustable range of front and rear seats is 165mm. Seat headrest height adjustment 120mm.
⑤



(2) Shock absorber weight adjustment instructions

① Rotating weight adjustment handle.
② Clockwise (+) rotating the handle increases the weight adjustment scale value, counterclockwise rotating the handle decreases the weight adjustment scale value.
③ After reaching the personal comfortable weight scale release the weight adjustment handle.



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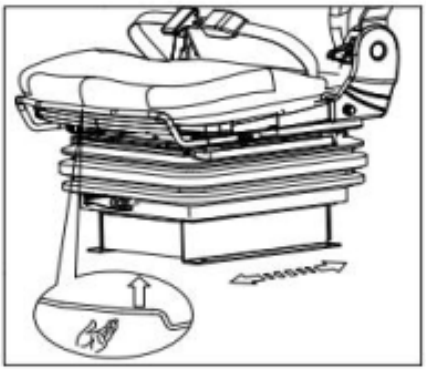
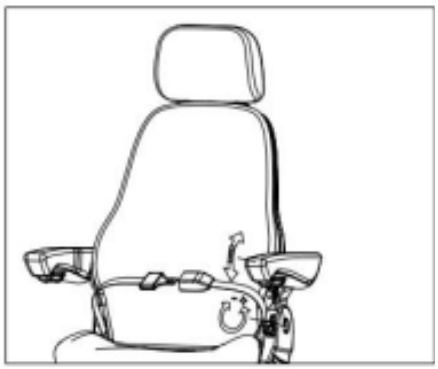


(4) Seat front and rear adjustment instructions

① Move the seat slideway to adjust the handle.

② Drag the seat forward or backward to slide back and forth.

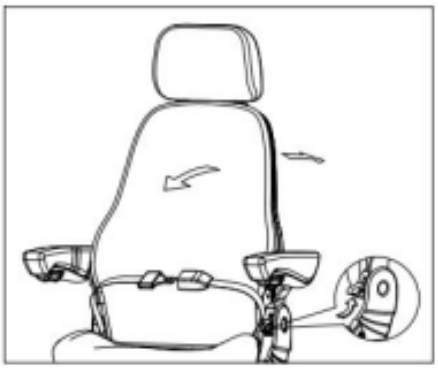
③ After adjusting to a proper position, release the adjusting handle of the guide rail.



(5) Handrail adjustment instructions

① Rotate the handwheel at the bottom of the handrail to adjust the Angle of the handrail; When adjusting, the hand cannot press above, need to lift up handrail slightly adjust again.

② When the handwheel rotates outward (+), the front end of the handrail rises; When the handwheel rotates inward (I), the front end of the handrail is lowered.

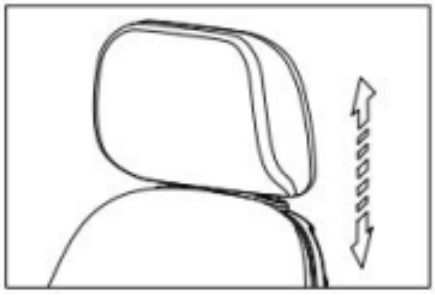


(6) Backrest Angle adjustment instructions

① Pull the backrest adjustment handle on the left side of the seat.

② After pulling the handle, lean forward or backward to adjust the backrest Angle.

③ After reaching the Angle of personal comfort, release the adjusting handle of backrest.



(7) Seat headrest adjustment instructions

① To raise, hand directly hold the headrest up.

② Downward, hand directly grasp the head pillow pressure can be.

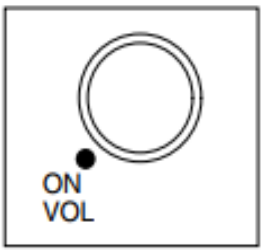
(8) Matters needing attention

① When adjusting the seat before and after adjusting the Angle of the backrest, the adjusting handle plate should be in place and the lock should be completely removed before adjustment.

② After adjustment, the return position of each handle should be in place to ensure reliable locking mechanism.

③ When the weight adjustment scale reaches the red-warning line, it is forbidden to adjust downward again!

3) RADIO REMOTE CONTROLLER BUTTON



(1) Power and volume switch

① This switch is turned to right, power will be turned ON and the sound is increased.

② If it is turned to left, volume will be decreased and power will be turned OFF

※ This switch does not operate when turning ON the cassette radio power.

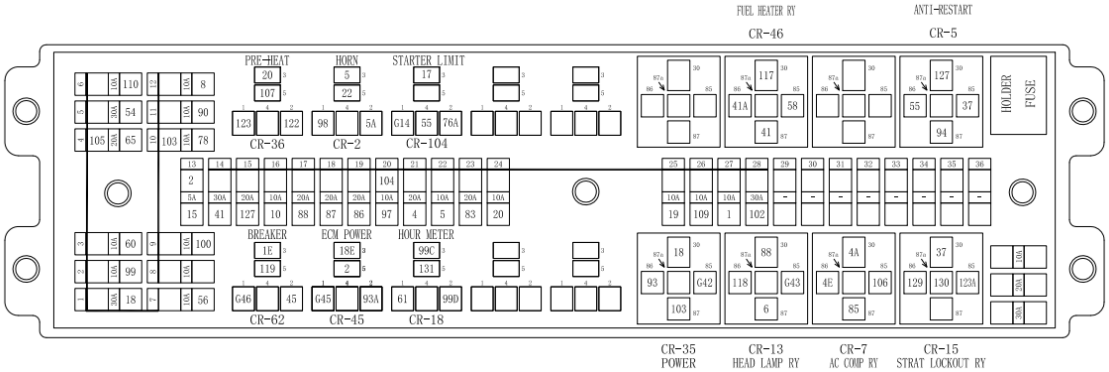
(2) Seek button

① If this seek button is pressed, the radio automatically stops at the next frequency of broadcasting for your listening.

(3) Band button

① You can listen to broadcasting on AM or FM band by pressing this band selection button.

4) FUSE & RELAY BOX



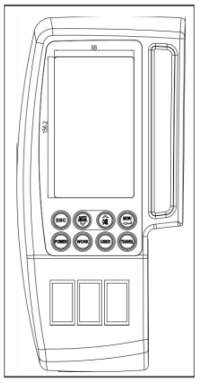
(1) The fuses protect the electrical parts and wiring from burning out.

(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.**

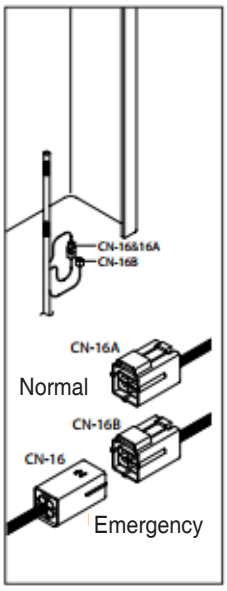
5) CMCU(cluster&machine control unit integration)



(1) Cluster and MCU integrated configuration, with all MCU functions.

(2) To match the pump absorption torque with the engine torque, MCU varies EPPR valve output pressure, which control pump discharge amount whenever feedbacked engine speed drops under thereference rpm of each mode set.

6) EMERGENCY ENGINE SPEED CONTROL CONNECTOR



(1) When the CAN communication between the ECM and the MCU is abnormal due to malfunction of the MCU, change CN-16 connection from CN-16A to CN-16B and then control the engine speed by rotating accel dial switch.

※ **Never connect connector CN-16 with CN-16B when MCU is in normal operation.**

7) SERVICE METER

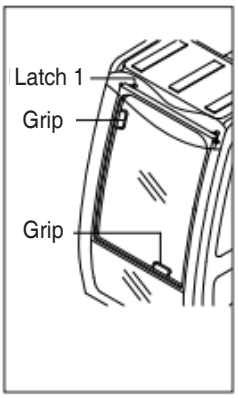
(1) This meter shows the total operation hours of the machine.

(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.

8) USB SOCKET

(1) Connect other auxiliary equipment as required

9) UPPER WINDSHIELD



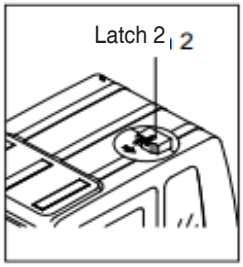
(1) Perform the following procedure in order to open the upper windshield.

① Release both latches(1) in order to release the upper windshield.

② Hold both grips that are located at the bottom of the windshield frame and at the top of the windshield frame push the windshield upward.

③ Hold both grips that are provided on the windshield frame and back into the storage position until auto lock latch(2) is engaged, move the levers of both latches(1) into the locked position. Push the levers toward the rear of the cab in order to hold the windshield in storage position.

⚠ **When working, without having locked the windshield by the auto lock (by pushing the windshield to the rear untill 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.

① Move the lever of the auto lock latch(2) in the direction of the arrow in order to release the auto lock latch.

② Reverse above step ① through step ③ in order to close the upper windshield.

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	
Water separator	
Hydraulic oil return filter	
Hydraulic oil tank drain filter cartridge	
Pilot line filter	
Swing reduction gear case oil	

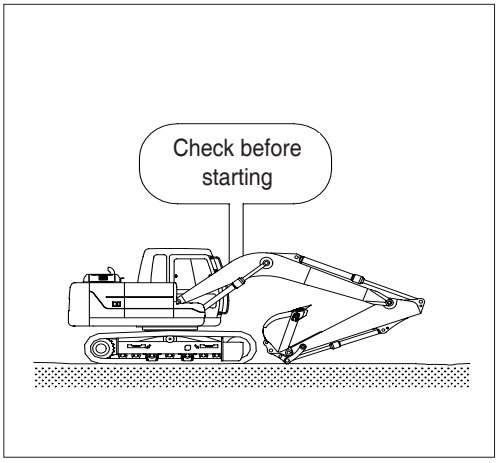
2. CHECK BEFORE STARTING THE ENGINE

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 levers are in 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 or 2 seconds.

② Only below lamps will light ON and all the other lights will turn OFF after 2 seconds.

- Engine oil pressure warning lamp.
- Battery charging warning lamp .

2) STARTING ENGINE IN NORMAL TEMPERATURE

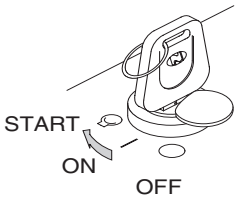
※ Sound the horn to warn the surroundings after checking if personnel or obstacles are in the area.

(1) Turn the starting switch to START position to start the engine.

※ Do not hold the starting switch in the START position for longer than 20 seconds.
The start system may be seriously damaged.

※ If the engine does not start, allow the stater to cool for about 2 minutes before re-attempting to start the engine again.

(2) Release the starting switch instantly after the engine starts to avoid possible damage to the starting motor.



3) STARTING ENGINE IN COLD WEATHER

※ **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 the anti-freeze solution to the coolant as required.**

※ **If you turn ON the starting switch, the fuel warmer is automatically operated to heat the fuel by sensing the coolant temperature.**

(1) Check if all the levers are in the neutral position.

(2) Turn the accel dial switch to low idle position.

(3) Turn the starting switch to the ON position, and wait 1~2 minutes. More time may take according to ambient temperature.

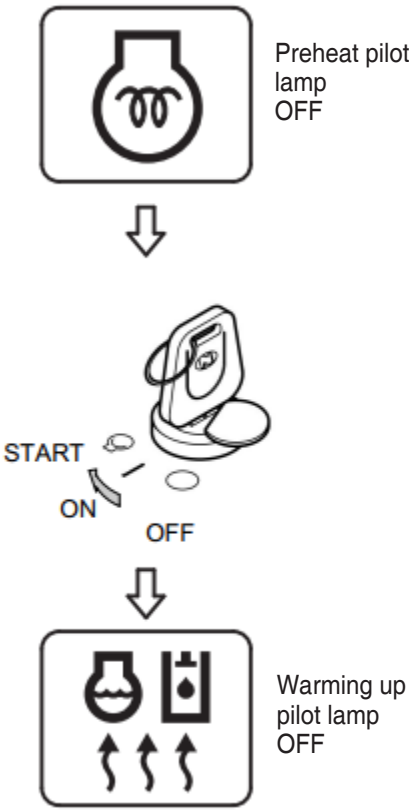
(4) Wait for five minutes to warm up the engine after the preheating pilot lamp off, and than turn the starting switch to the START position to start the engine.

※ **If the engine does not start, allow the starter to cool for about 2 minutes before attempting to start the engine again.**

(5) Release the starting switch immediately after starting engine.

(6) If the temperature of the coolant is lower than 30˚C the warming up automatically starts.

※ **Do not operate the working devices, or convert the operation mode into other mode during the warming up.**



4) INSPECTION AFTER ENGINE START

Inspect and confirm the following after engine starts.

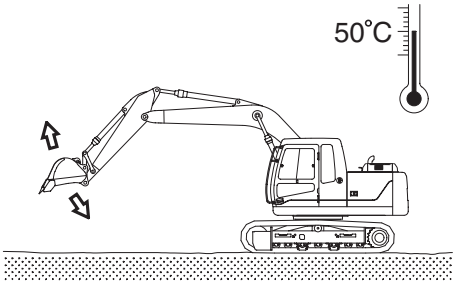
(1) Is the level gauge of hydraulic oil tank in the normal level?
(2) Are there leakages of oil or water?
(3) Are all the warning lamps turned OFF ?
(4) Are the indicator of water temperature gauge and hydraulic temperature gauge in the operating range?
(5) Are the engine sound and the color of exhaust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

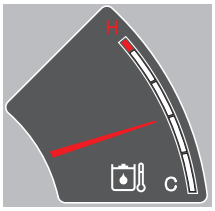
※ **Do not increase engine speed quickly after starting, it can damage engine or turbocharger.**

※ **If there are problems in the cluster, stop the engine immediately and correct problems as required.**

5) 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 idle speed for 5 minutes.

(2) Speed up the engine by accel dial 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.

6) 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.**

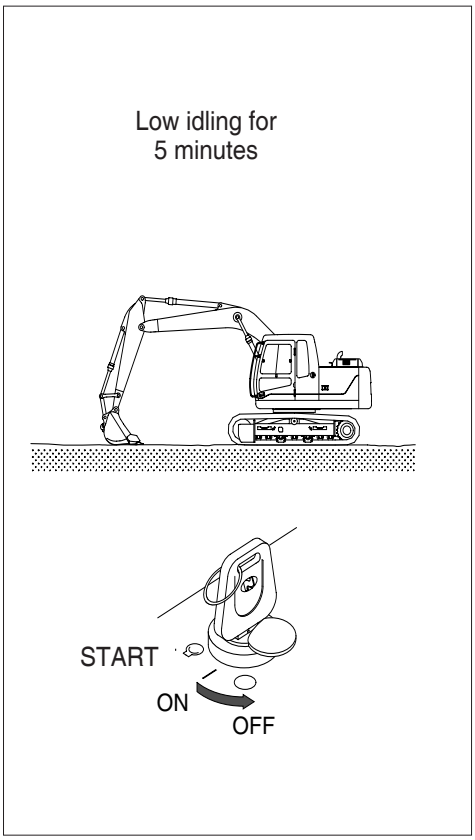
(1) Down the bucket on the ground then put all the levers in the neutral position.

(2) Run the engine at low idle 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. MODE SELECTION SYSTEM

1) STRUCTURE OF MECHATRONICS SYSTEM

CAPO, Computer Aided Power Optimization system, is the name of mode selection system developed by Hyundai.

※ **Please refer to chapter 3, cluster for below modes setting.**

(1) Power mode

Power mode designed for various work loads supports high performance and reduces fuel consumption.

- M mode: Max power mode
- H mode: High power mode
- S mode: Standard power mode

(2) Work mode

One of the two work modes can be selected for the optimal work condition of the machine operation.

① **General operation mode**

② **Heavy duty work mode**

(3) User mode

① User mode is useful for setting the user preperable power quickly.
(engine speed, power shift and idle speed)

② There are two methods for use of user mode.

a. **In operation screen**

User mode switch is used to memorize the current machine operating status and activate the memorized user mode.

b. **In menu**

Engine high idle rpm, auto idle rpm and pump torque (power shift) can be modulated and memorized separately in menu status.

Each memory mode has a initial set which

- are mid-range of max engine speed, power shift and auto idle speed.

- High idle rpm, auto idle rpm and EPPR pressure can be adjusted and memorized in the U-mode.

(4) Travel mode

: Low speed traveling.

: High speed traveling.

(5) Auto idle mode

Pilot lamp ON : Auto idle function is activated.

Pilot lamp OFF : Auto idle function is canceled.

(6) Monitoring system

Information of machine performance as monitored by the MCU can be displayed on the LCD.

Self diagnostic system

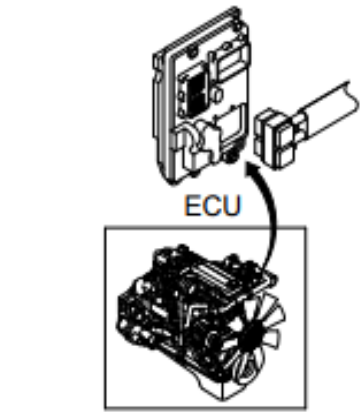
(7) CMCU

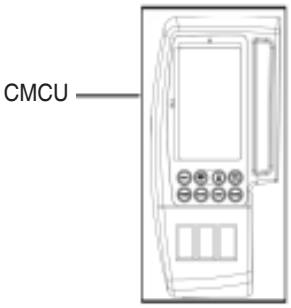
① The CMCU controller diagnoses problems in the CAPO system caused by electric parts' malfunction and by open or short circuit, which are displayed on the LCD as error codes (2 digit).

Engine controller (ECU)

② **If the engine or relevant system has problem ECU diagnoses and displays on the LCD as fault codes (3 digit or more).**

※ Consult Hyundai or Huyndai dealer for details.





(8) Anti-restart system

The system protects the starter from inadvertent restarting after the engine is already operational.

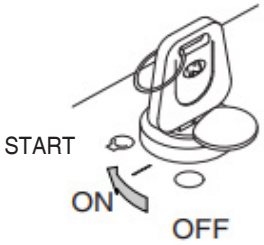
2) HOW TO OPERATE MODE SELECTION SYSTEM

(1) When start key switch is turned ON

① When start key switch is turned on, the cluster turns on and buzzer sounds for 4 seconds. And then main information as gauges and engine speed are displayed on LCD.

② Initial default mode settings are dispalyed in the cluster.

Mode		Status
Power mode	S	ON
Work mode		ON
Travel mode	Low ( )	ON
Auto idle		ON



※ **These setting can be changed at U mode.**

③ Self-diagnostic function can be carried out from this point.

(2) After engine start

① When the engine is started, rpm display indicates low idle.

② If coolant temperature is below 30˚C, the warm-ing up pilot lamp lights ON and after 4 seconds the engine speed increases automatically to warm up the machine.

- After 2-3 minutes, you can select any mode depending on job requirement.

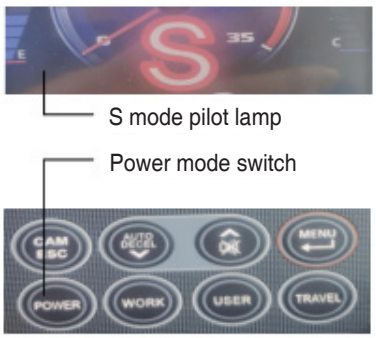
3) SELECTION OF POWER MODE

(1) S mode

When the accel dial is at setting 10 and auto decel mode is cancelled and S mode is selected.

Engine rpm	Effect
1400 ± 50	Same power as non mode type machine.

※ **When the accel dial is located below 9 the engine speed decreases about 50~100 rpm per dial set.**

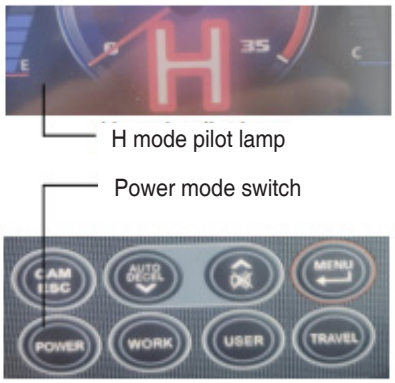


(2) H mode

When the accel dial is at setting 10 and auto decel mode is cancelled and H mode is selected.

Engine rpm	Effect
1600 ± 50	Standard power

※ **When the accel dial is located below 9 the engine speed decreases about 50~100 rpm per dial set.**

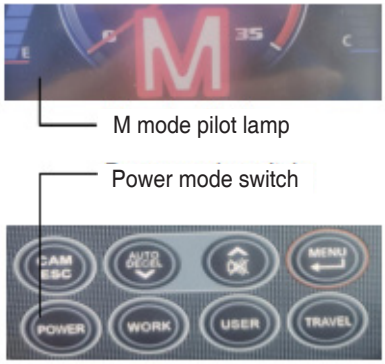


(3) M mode

When the accel dial is at setting 10 and auto decel mode is cancelled .

Engine rpm	Effect
1800 ± 50	Approximately 120 % of power and speed available than S mode.

※ **When the accel dial is located below 9 the engine speed decreases about 50~100 rpm per dial set.**



5. OPERATION OF THE WORKING DEVICE

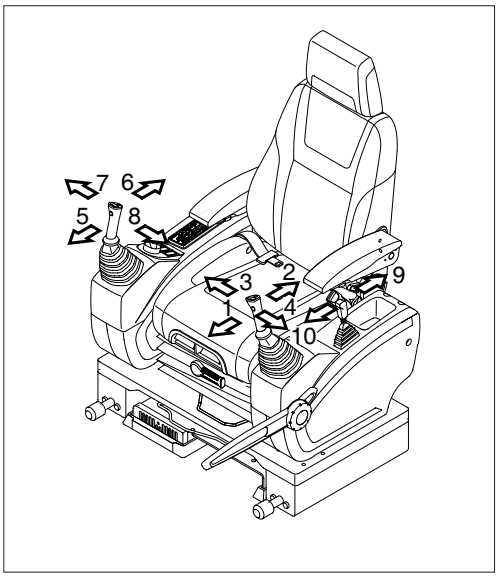
※ **Confirm the operation of control lever and working device.**

1) Left control lever controls arm and swing.

2) Right control lever controls boom and bucket.

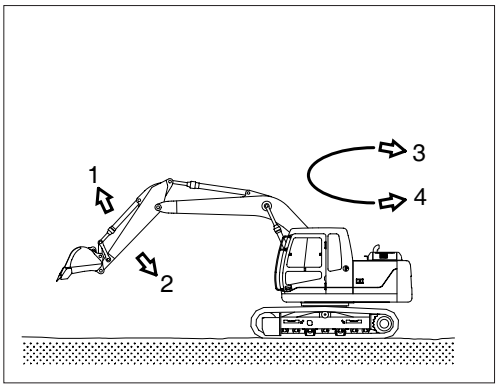
3) When you release the control lever, control lever returns to neutral position automatically.

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



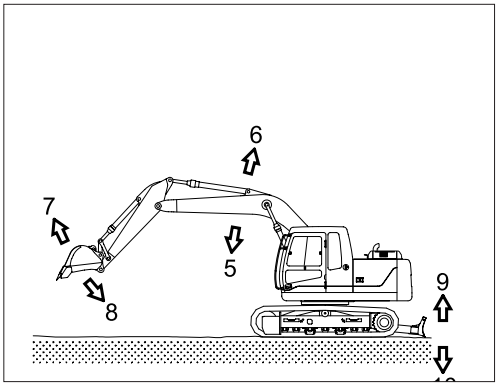
※ **Left control lever**

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



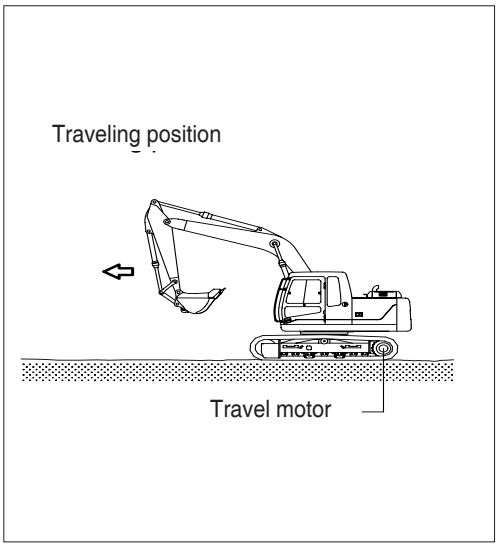
※ **Right control lever**

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



6. 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.

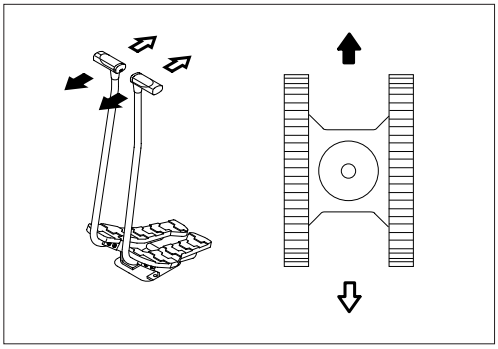
⚠ **Be careful as the traveling direction will be reversed when the whole machine is swinged 180 degree.**

(2) Traveling operation

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

※ **Do not travel continuously for a long time.**

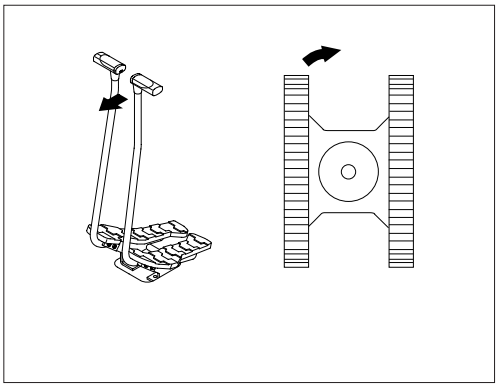
※ **Reduce the engine speed and travel at a low speed when traveling on uneven ground.**



(3) Forward and backward traveling

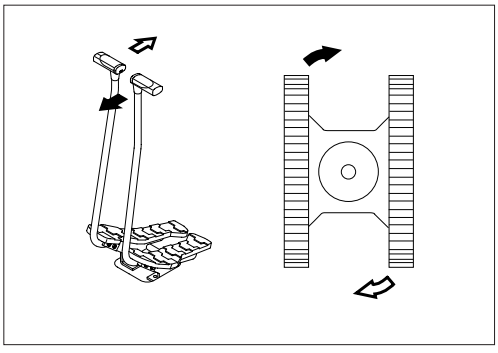
When the left and right travel lever or pedal are pushed at the same time, the machine will travel forward or backward.

※ **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 ㎝ (1 ft) to the ground so that it can be used as a brake in an emergency.

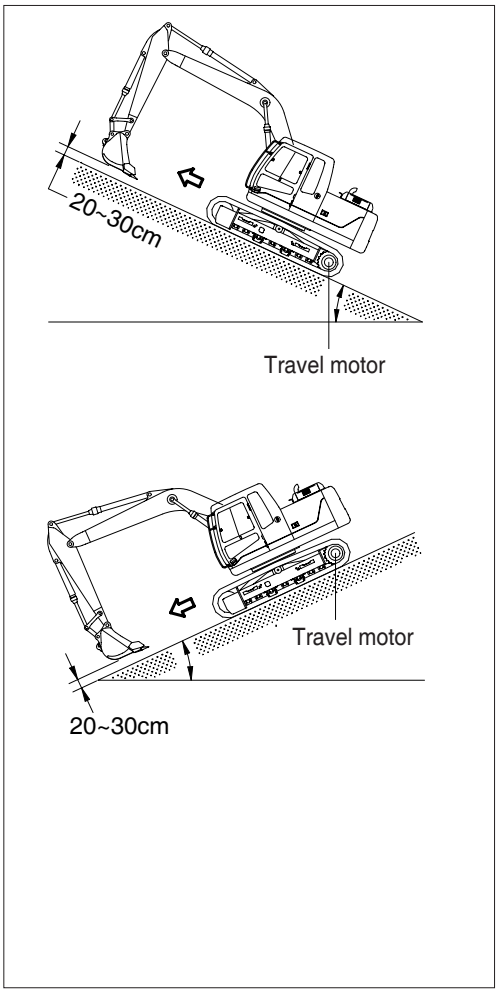
(3) If the machine starts to slide or loses stability, lower the bucket immediately and brake the machine.

(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.**



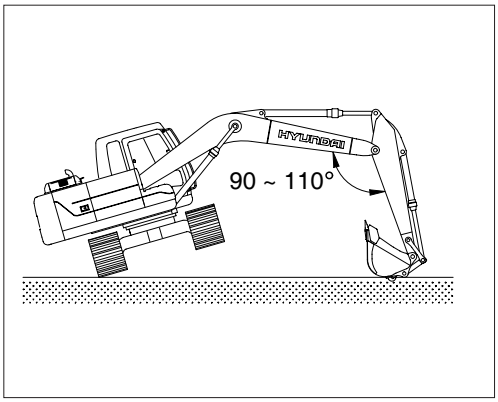
3) TRAVELING ON SOFT GROUND

※ **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.



4) TOWING THE MACHINE

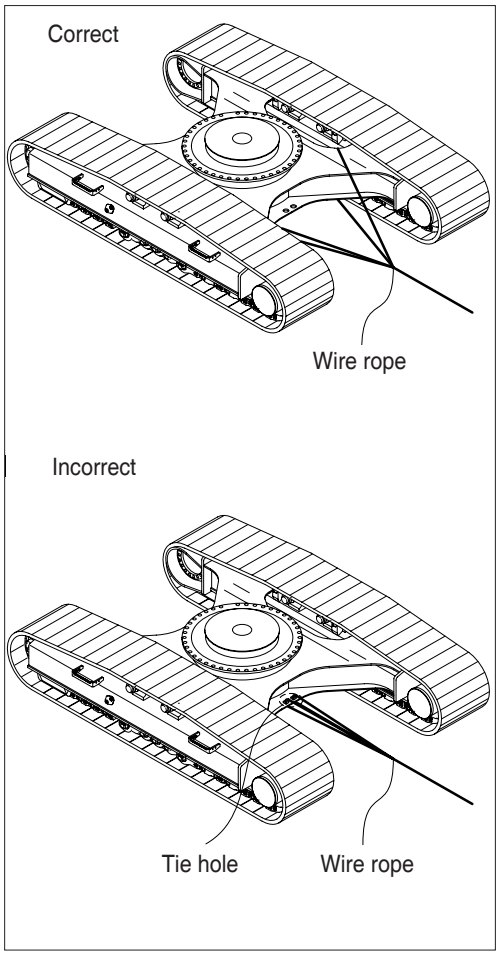
Tow the machine as follows when it can not move on it's own.

(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.

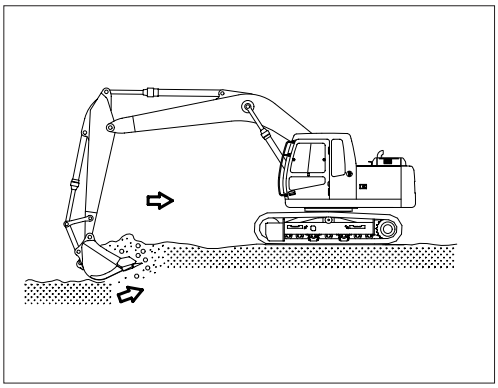
※ **Never tow the machine using only the tie hole, because this may break.**

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

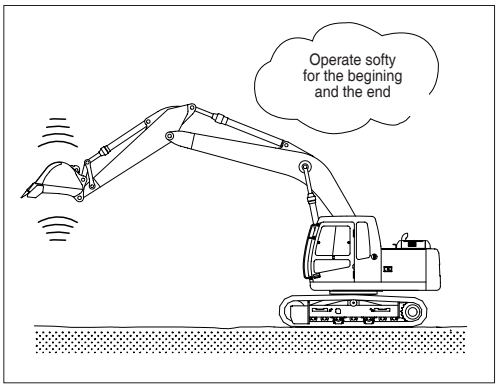


7. EFFICIENT WORKING METHOD

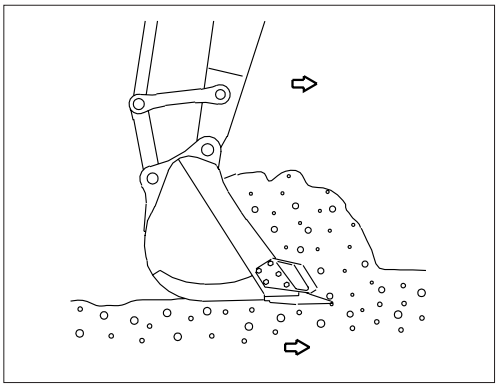
1) Do the digging work by arm.
   Use the pulling force of arm for digging and use together with the digging force of the bucket if necessary.



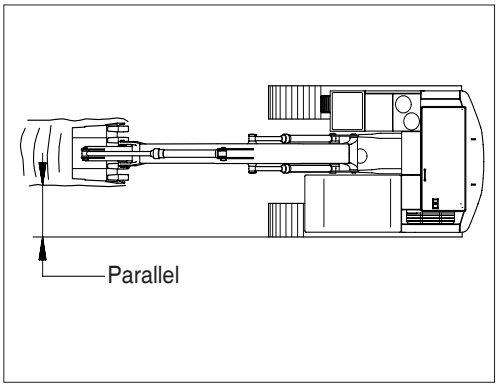
2) When lowering and raising the boom operate softly for the beginning and the end.
   In particularly, sudden stops while lowering the boom may cause damage to the machine.



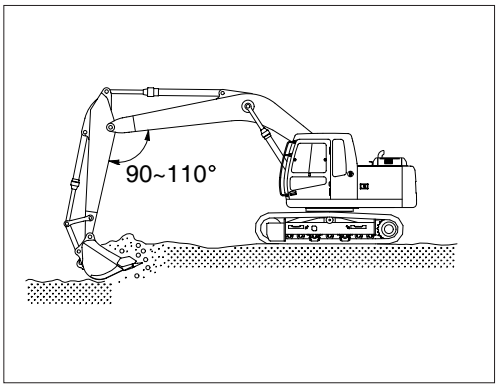
3) The digging resistance and wearing of tooth can be reduced by putting the end of bucket tooth to the digging direction.



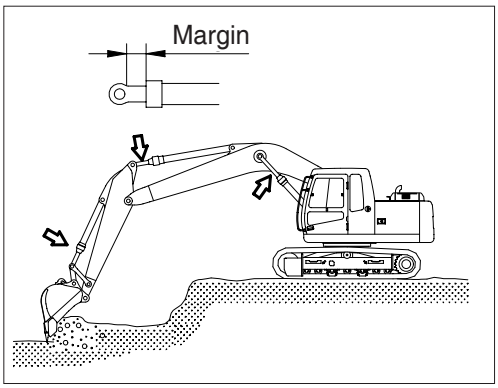
4) Set the tracks parallel to the line of the ditch to be excavated when digging ditch. Do not swing while digging.



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

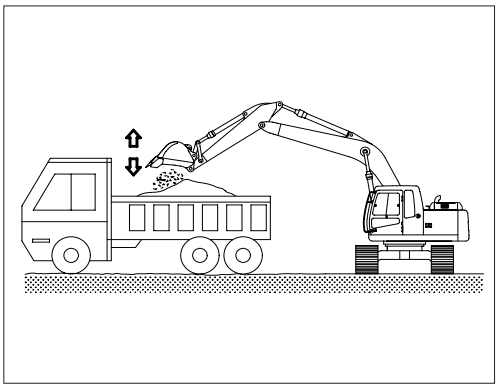


6) Operate leaving a small safety margin of cylinder stroke to prevent damage of cylinder when working with the machine.

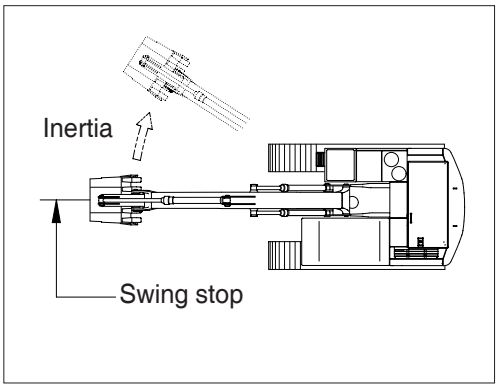


7) Keep the bucket to the dumping position and the arm horizontal when dumping the soil from the bucket.
Operate bucket lever 2 or 3 times when hard to dump.

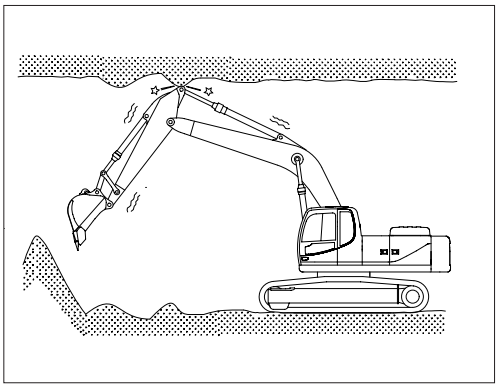
※ **Do not use the impact of bucket tooth when dumping.**



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

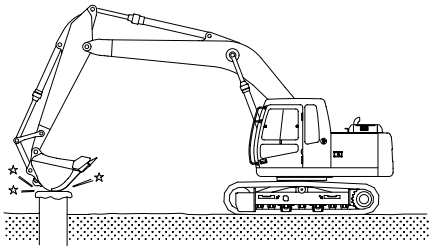


9) If the excavation is in an underground location or in a building, make sure that there is adequate overhead clearance and that there is adequate ventilation.



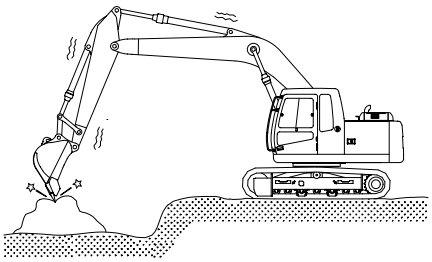
10) Do not use the dropping force of the work equipment for digging.
The machine can be damaged by the impact.

Incorrect



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

Incorrect



12) NEVER CARRY OUT EXCESSIVE OPERATIONS

Operation exceeding machine performance may result in accident or f-ailure.

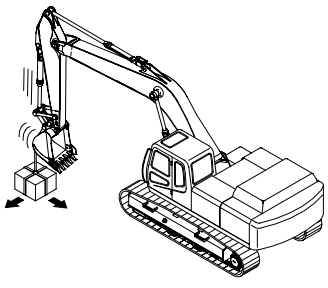
Carry out lifting operation within specified load limit.

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

Never travel while carrying a load.

In case you need installing over load warning device for object handling procedure, please contact Hyundai distributor.

Incorrect



13) 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.

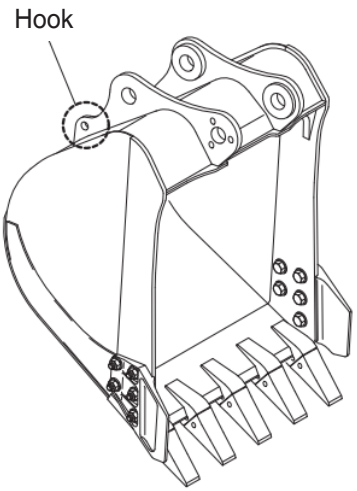
When performing lifting operation, never raise or lower a person.

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.

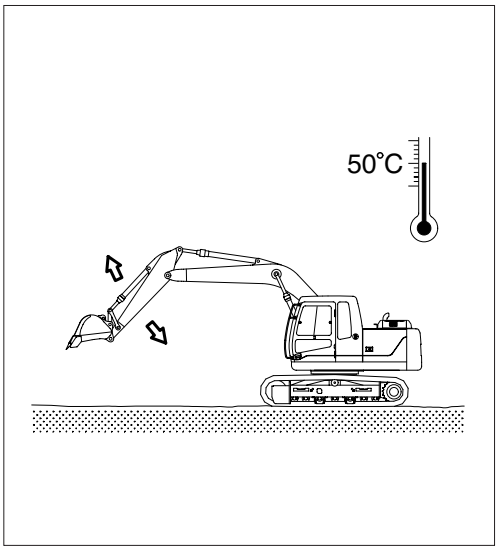
- Execute operating methods and procedures under his direction.
- Select a person responsible for signaling. Operate only on signals given by such person.

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



8. 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

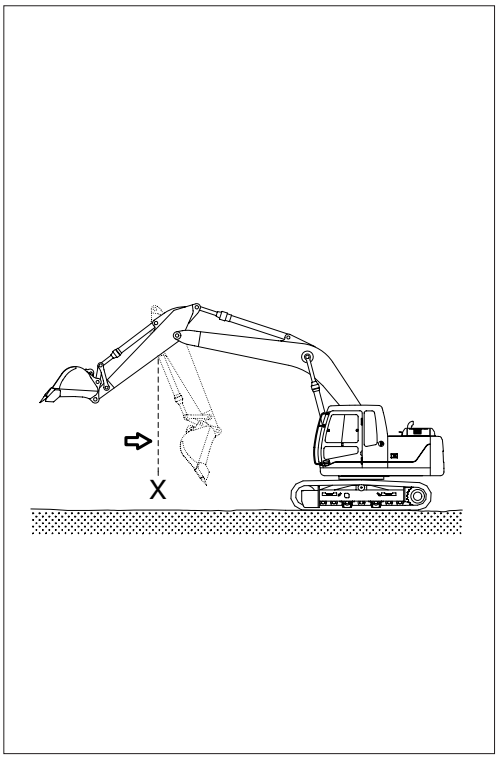
(1) Check for damage to the undercarriage and for looseness, flaws, wear and damage in bolts and nut.

(2) Loosen the track tension a little when working in such areas.

(3) Do not turn the undercarriage directly over the sharp edge rock.

9. 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.

10. ATTACHMENT LOWERING (when engine is stopped)

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

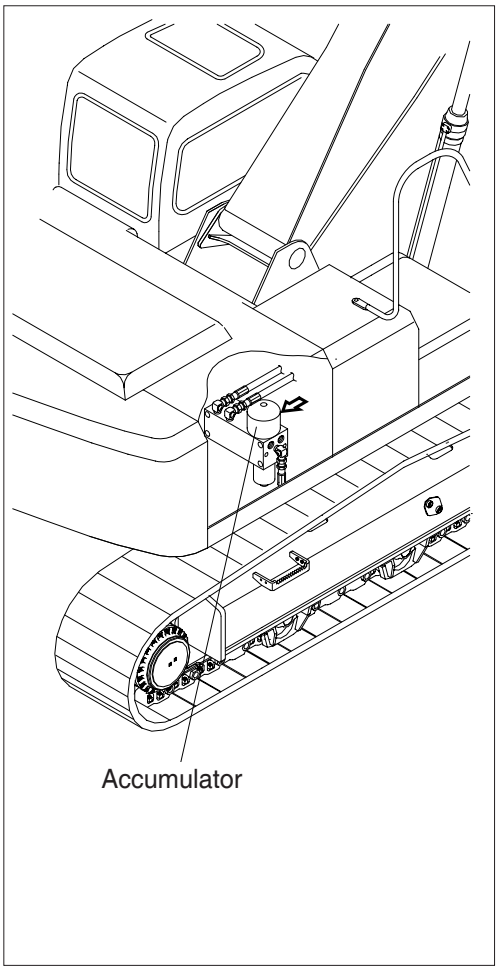
⚠ **Be sure no one is under or near the attachment before lowering the boom.**

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.**



11. 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.

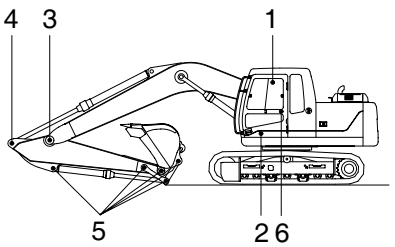
(2) Lubrication position of each part

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.



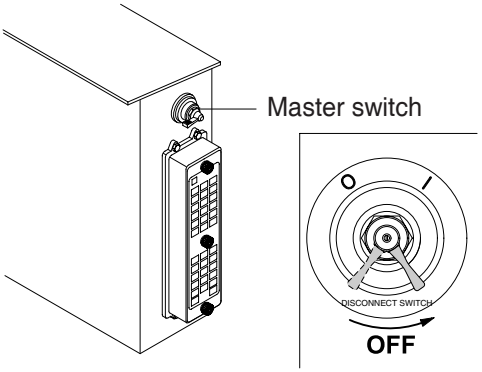
1 Lubricating manifold (5EA)
2 Boom cylinder pin (2EA)
3 Boom and arm connection pin (1EA)
4 Arm cylinder pin (rod side, 1EA)
5 Arm and bucket (6EA)
6 Boom rear bearing center (1EA)

(3) Master switch

Turn OFF the master switch mounted electric box and store the machine.

⚠ Off the master switch after lamp off.

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

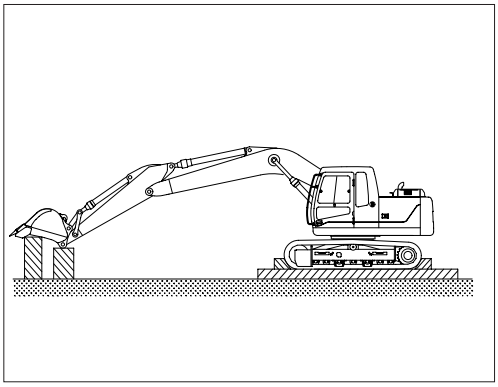


(5) Prevention of dust and moisture

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

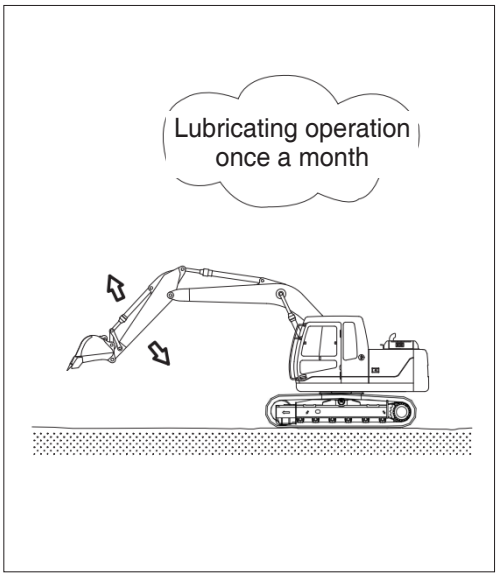
※ Cover exposed part of piston rod of cylinder.

※ 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.

※ BATTERY

① Once a month, start the engine for 15 minutes (or use a charger) to charge the battery.

② Every 2 months, check the battery voltage and keep battery voltage over 25.08V.

③ If the machine stock period is over 6 months, disconnect the battery negative (-) terminal.

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.

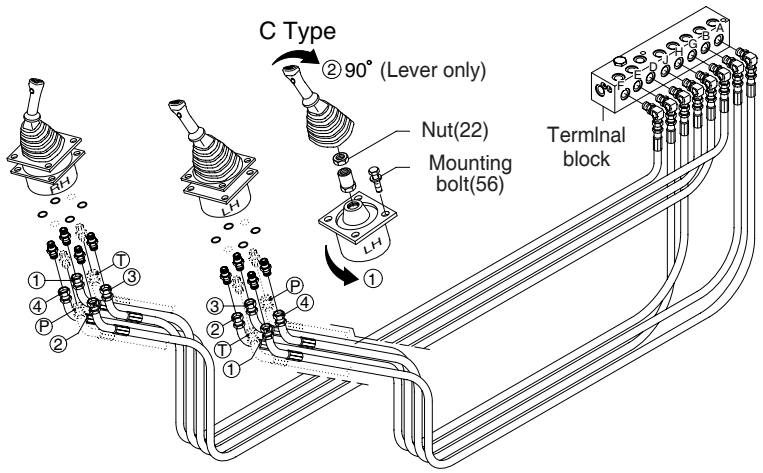
※ Remove the drain port plug and drain the water until the gear oil comes out and then tighten the drain plug.

※ 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.

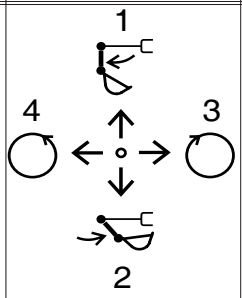
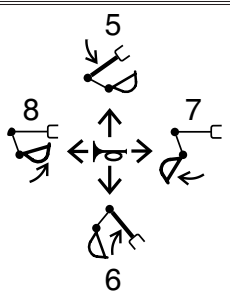
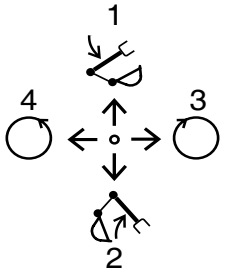
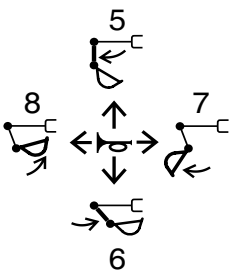
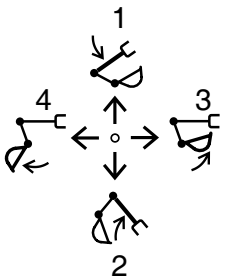
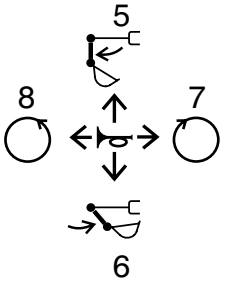
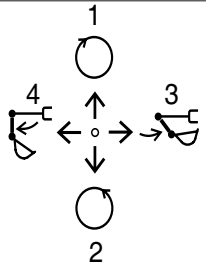
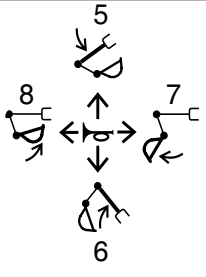
12. RCV LEVER OPERATING PATTERN

1) PATTERN CHANGE VALVE NOT INSTALL (standard)



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

※ **The hose modification works must be carried out between RCV lever and terminal block (Not between terminal block and MCV).**

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	D	-
				2 Arm in	④	E	-
				3 Swing right	③	B	-
				4 Swing left	①	A	-
			Right	5 Boom lower	④	J	-
				6 Boom raise	②	H	-
				7 Bucket out	①	G	-
Hyundai				8 Bucket in	③	F	-
A Type			Left	1 Boom lower	②	D	J
				2 Boom raise	④	E	H
				3 Swing right	③	B	-
				4 Swing left	①	A	-
			Right	5 Arm out	④	J	D
				6 Arm in	②	H	E
				7 Bucket out	①	G	-
				8 Bucket in	③	F	-
B Type			Left	1 Boom lower	②	D	J
				2 Boom raise	④	E	H
				3 Bucket in	③	B	F
				4 Bucket out	①	A	G
			Right	5 Arm out	④	J	D
				6 Arm in	②	H	E
				7 Swing right	①	G	B
				8 Swing left	③	F	A
C Type			Left	① Loosen the RCV lever mounting bolt (41) and rotates lever assy 90˚ counterclockwise; then install. ② To put lever in correct position, disassemble nut (22) and rotates only lever 90˚ clockwise.			
			Right	Same as ISO type			

1. PREPARATION FOR TRANSPORTATION

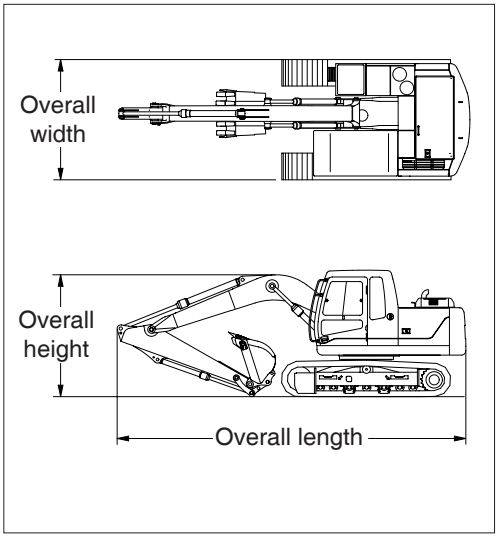
1) When transporting the machine, observe the various road rules, road transportation vehicle laws and vehicle limit ordinances, etc.

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.

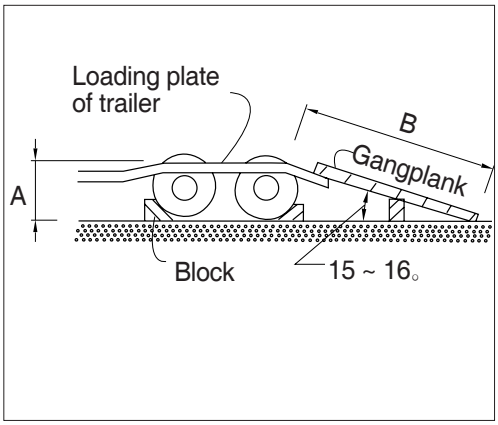
4) Get the permission from the related authority if necessary.

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

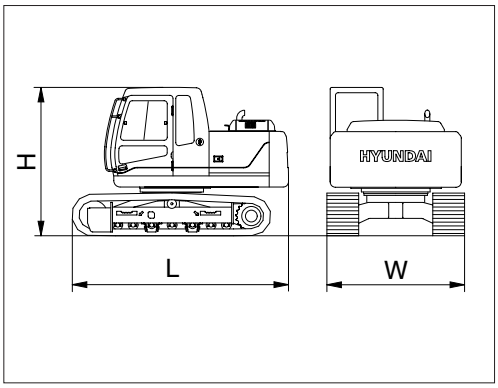


2. DIMENSION AND WEIGHT

(1) Base machine

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	7820 (25' 8")
H	Height	mm (ft-in)	2775 (9' 1")
W	Width	mm (ft-in)	2500 (8' 2")
Wt	Weight	kg (lb)	11600(25580)

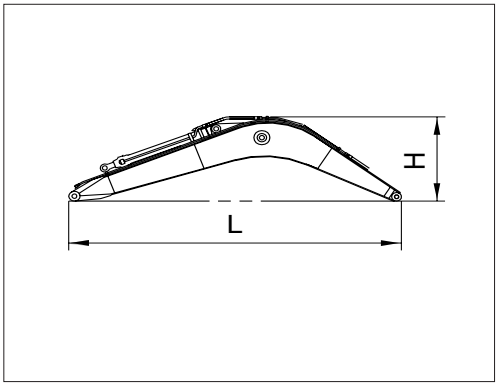
※ With 500 mm (19' 7")triple grouser shoes and 2000kg (4110 lb) counterweight.



(2) Boom assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	4750(15' 7")
H	Height	mm (ft-in)	1340 (4' 5")
W	Width	mm (ft-in)	520 (1' 8")
Wt	Weight	kg (lb)	1020(2250)

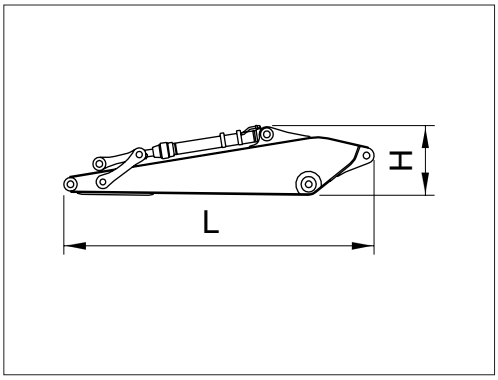
※ 4.60 m (15' 1") boom with arm cylinder (included piping and pins).



(3) Arm assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	3240(10' 8")
H	Height	mm (ft-in)	740 (2' 5")
W	Width	mm (ft-in)	380 (1' 3")
Wt	Weight	kg (lb)	620(1370)

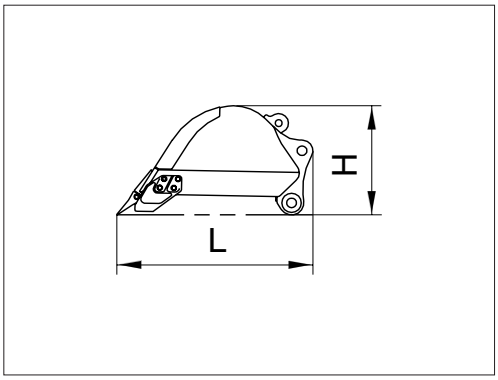
※ 2.5 m (8' 2") arm with bucket cylinder (included linkage and pins).



(4) Bucket assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1400 (4' 7")
H	Height	mm (ft-in)	800 (2' 7")
W	Width	mm (ft-in)	1015 (3' 4")
Wt	Weight	kg (lb)	480 (1060)

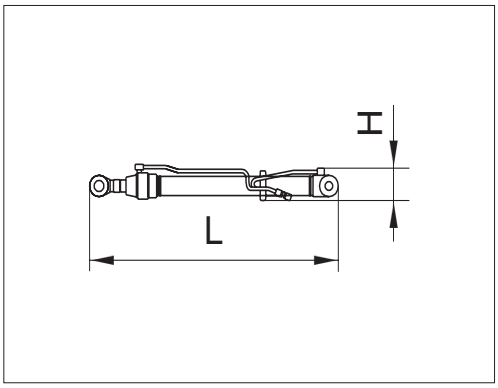
※ 0.52 m^3 (0.68 yd^3) SAE heaped bucket (included tooth and side cutters).



(5) Boom cylinder

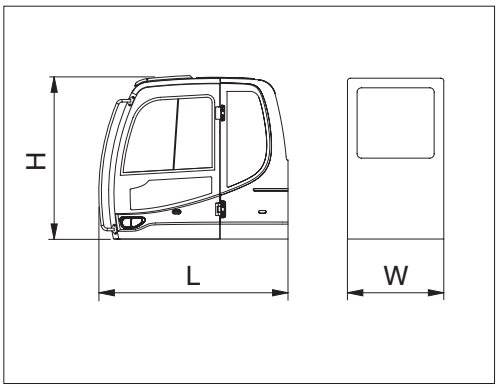
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1760 (5' 9")
H	Height	mm (ft-in)	210 (0' 8")
W	Width	mm (ft-in)	310 (1' 0")
Wt	Weight	kg (lb)	260 (570)

※ Included piping.



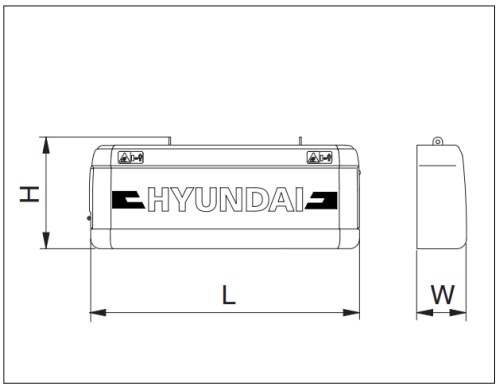
(6) Cab assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2000 (6' 7")
H	Height	mm (ft-in)	1740 (5' 9")
W	Width	mm (ft-in)	1288 (4' 2")
Wt	Weight	kg (lb)	500 (1100)



(7) Counterweight

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2475 (8' 1")
H	Height	mm (ft-in)	1050 (3' 5")
W	Width	mm (ft-in)	450 (1' 6")
Wt	Weight	kg (lb)	2000 (4410)

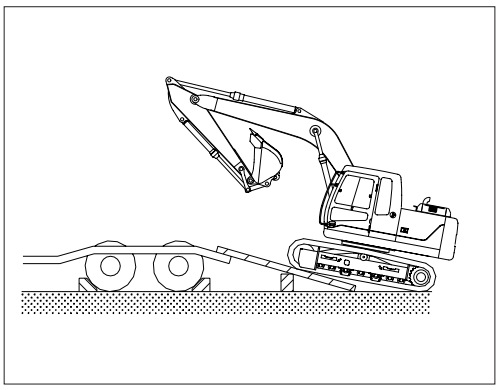


3. LOADING THE MACHINE

1) Load and unload the machine on a flat ground.

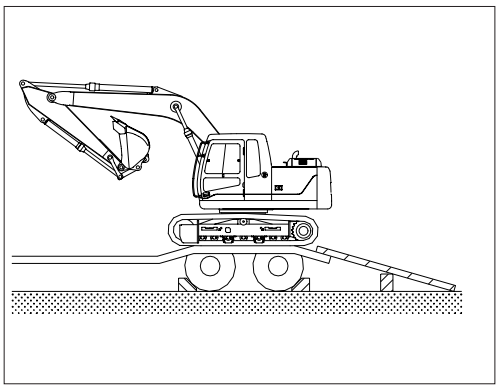
2) Use the gangplank with sufficient length, width, thickness and gradient.

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.

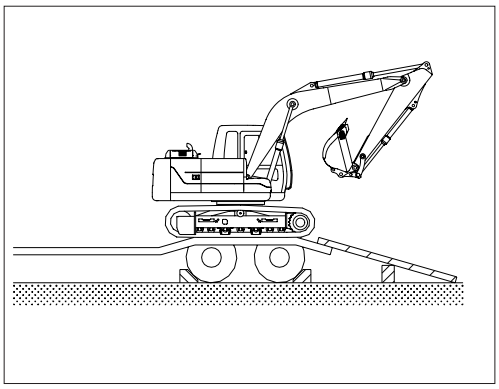


4) Do the following after loading the machine to the trailer.

(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.

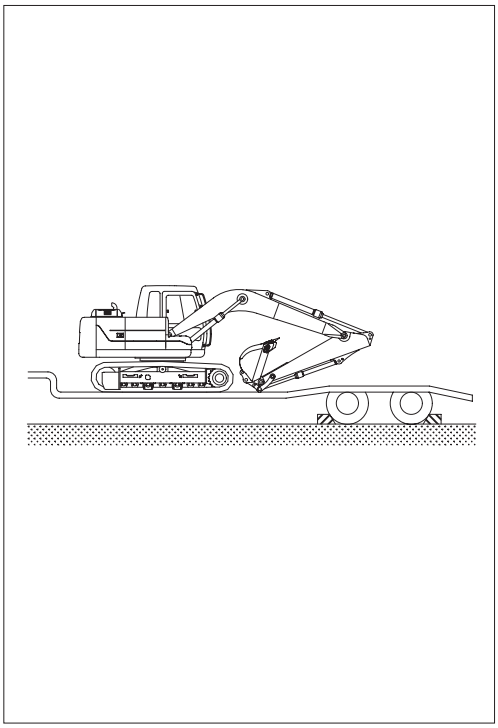
※ **Place rectangular timber under the bucket cylinder to prevent the damage of it during transportation.**

⚠ **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.**

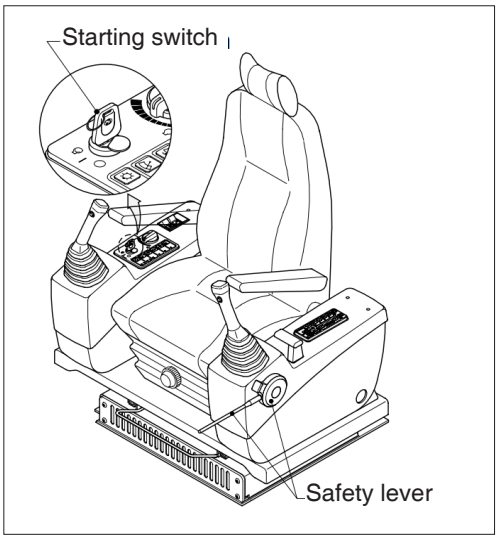


4. FIXING THE MACHINE

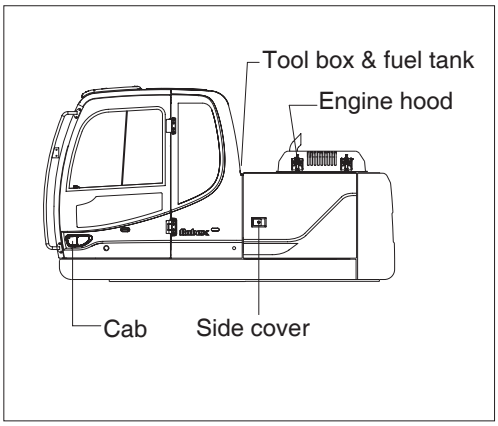
1) Lower down the working device on the loading plate of trailer.

2) Keep the safety lever on the LOCK position.

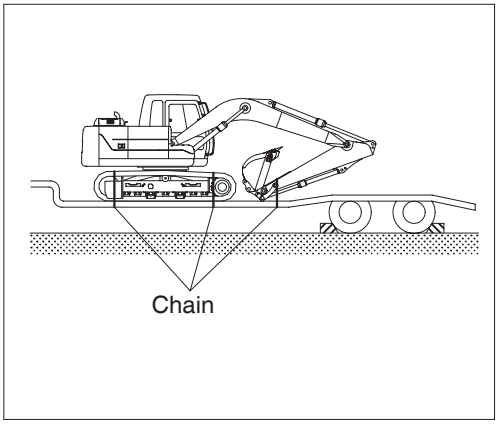
3) Turn OFF all the switches and remove the key.



4) Secure all locks.



5) 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.

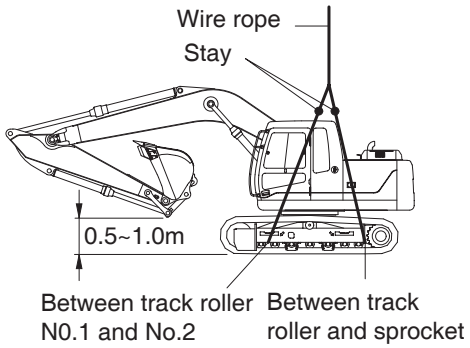
⚠ **Make sure wire rope is proper size.**

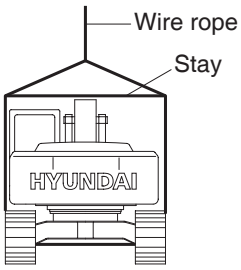
⚠ **Place the safety lever to LOCK position to prevent the machine moving when hoisting the machine.**

⚠ **The wrong hoisting method or installation of wire rope can cause damage to the machine.**

⚠ **Do not load abruptly.**

⚠ **Keep area clear of personnel.**





REAR VIEW

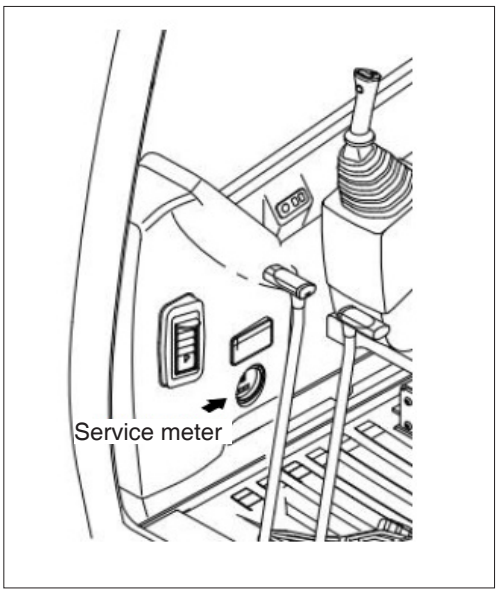
1. INSTRUCTION

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 control panel.

(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.

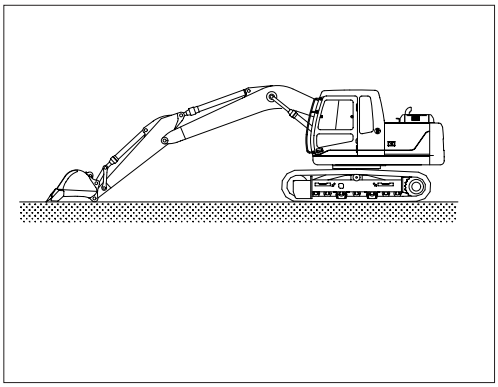
(8) Confirm if the cluster is in the normal condition after completion of service.

(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

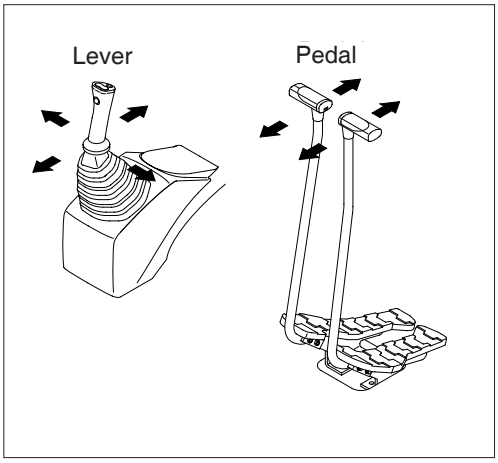
※ **Spouting of oil can cause the accident when loosening the cap or hose right after the operating of machine as the machine or oil is on the high pressure on the condition.**
Be sure to relieve the pressure in the system before repairing hydraulic system.



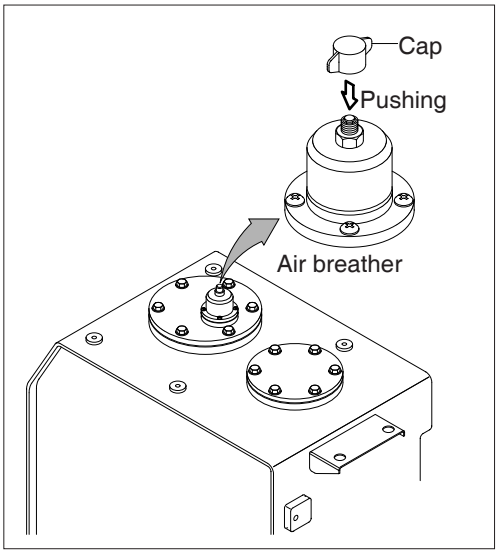
(1) Place machine in parking position, and stop the engine.

(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.**



(3) Loosen the cap and relieve the pressure in the tank by pushing the top of the air breather.



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.

<table>
<tr><th colspan="3">Periodical replacement of safety parts</th><th>Interval</th></tr>
<tr><td colspan="2" rowspan="2">Engine</td><td>Fuel hose (tank-engine)</td><td rowspan="2">Every
2 years</td></tr>
<tr><td>Heater hose
(heater-engine)</td></tr>
<tr><td rowspan="6">Hydraulic system</td><td rowspan="3">Main circuit</td><td>Pump suction hose</td><td rowspan="3">Every
2 years</td></tr>
<tr><td>Pump delivery hose</td></tr>
<tr><td>Swing hose</td></tr>
<tr><td rowspan="3">Working device</td><td>Boom cylinder line hose</td><td rowspan="3">Every
2 years</td></tr>
<tr><td>Arm cylinder line hose</td></tr>
<tr><td>Bucket cylinder line hose</td></tr>
</table>

※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	
	kg·m	lb·ft	kg·m	lb·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	
	kg·m	lb·ft	kg·m	lb·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

5) TIGHTENING TORQUE OF MAJOR COMPONENT

No.	Descriptions		Bolt size	Torque	
				kgf·m	lbf·ft
1	Engine	Engine mounting bolt (engine-bracket, FR)	M12 × 1.75	11.5 ± 1.0	81.2 ± 7.2
2		Engine mounting bolt (engine-bracket, RR)	M12 × 1.75	11.5 ± 1.0	81.2 ± 7.2
3		Engine mounting bolt (bracket-frame, FR)	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
4		Engine mounting bolt (bracket-frame, RR)	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
5		Radiator mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
6		Coupling mounting socket bolt	M16 × 2.0	22.0± 1.0	159 ± 7.2
7		Main pump housing mounting bolt	M10 × 1.5	6.5 ± 0.7	47.0± 5.1
8	Hydraulic system	Main pump mounting socket bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
9		Main control valve mounting bolt	M12 × 1.75	12.2 ± 1.3	88.2 ± 9.4
10		Fuel tank mounting bolt	M20 × 2.5	57.8 ± 5.8	418 ± 42.0
11		Hydraulic oil tank mounting bolt	M20 × 2.5	57.8 ± 5.8	418 ± 42.0
12		Turning joint mounting bolt, nut	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
13	Power train system	Swing motor mounting bolt	M16 × 2.0	29.6 ± 3.2	214 ± 23.1
14		Swing bearing upper part mounting bolt	M18 × 2.5	41.3 ± 4.0	299 ± 28.9
15		Swing bearing lower part mounting bolt	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
16		Travel motor mounting bolt	M16 × 2.0	25.7 ± 4.0	186 ± 28.9
17		Sprocket mounting bolt	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
18	Under carriage	Upper roller mounting bolt, nut	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
19		Lower roller mounting bolt	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
20		Track tension cylinder mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
21		Track shoe mounting bolt, nut	5/8 - 18UNF	42 ± 4.0	304± 28.9
22		Track guard mounting bolt	M16 × 2.0	29.6 ± 3.2	214± 23.1
23	Others	Counterweight mounting bolt	M27 × 3.0	140 ± 15	1013 ± 108
24		Cab mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
25		Operator's seat mounting bolt	M 8 × 1.25	4.05 ± 0.8	29.3 ± 5.8
26		Under cover mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7

※ For tightening torque of engine and hydraulic components, see engine maintenance guide and service manual.

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), ★SAE 5W-40 (API CH-4)
Hydraulic oil	Conventional hydraulic oil (ISO ★VG 32, VG 46, VG 68)
Swing and travel reduction gear	SAE 85W-140 (API GL-5)
Grease	Lithium base grease NLGI No. 2
Fuel	ASTM D975-No. 2
Coolant (DCA4)	ASTM D6210 Mixture of 50% ethylene glycol base antifreeze and 50% water. Mixture of 60% ethylene glycol base antifreeze and 40% 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
DCA4 : Brand name of Chemical Additive manufactured by the Cummins Fleetguard Co

★Cold region
Russia, CIS, Mongolia

2) RECOMMENDED OILS

Use only oils listed below. Do not mix different brand oil.
Please use HYUNDAI genuine oil and grease.

Service point	Kind of fluid	Capacity ℓ	Ambient temperature °C(°F) -50 (-58) -30 (-22) -20 (-4) -10 (14) 0 (32) 10 (50) 20 (68) 30 (86) 40 (104)
Engine oil pan	Engine oil	11	SAE 5W-40 SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	3.5	SAE 80W-90
Final drive		2.2×2	SAE 85W-140
Hydraulic tank	Hydraulic oil	Tank 124 System 210	★ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	270	★ 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★1	15.5	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 : Soft water
City water or distilled water

4. MAINTENANCE CHECK LIST

1) DAILY SERVICE BEFORE STARTING

Check items	Service	Page
Visual check		
Engine oil level	Check, Add	6-18
Coolant level	Check, Add	6-20
Fan belt tension	Check, Adjust	6-26
Air cleaner	Check, Clean, Add	6-29
Fuel tank	Check, Refill	6-29
Prefilter	Check, Clean	6-31
Hydraulic oil level	Check, Add	6-32
★ Attachment pin and bushing	Lubricate	6-41
·Boom cylinder tube end		
·Boom foot		
·Boom cylinder rod end		
·Arm cylinder tube end		
·Arm cylinder rod end		
·Boom + Arm connecting		
·Bucket cylinder tube end		

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

2) EVERY 50 HOURS SERVICE

Check items	Service	Page
Fuel tank (water, sediment)	Drain	6-29
Swing reduction gear oil	Check, Add	6-35
Track tension	Check, Adjust	6-37
Attachment pin and bushing	Lubricate	6-41
·Bucket cylinder rod end		
·Bucket + Arm connecting		
·Bucket control link + Arm		
·Bucket control rod		

3) INITIAL 50 HOURS SERVICE

Check items	Service	Page
Attachment pin and bushing ·Boom cylinder tube end ·Boom foot ·Boom cylinder rod end ·Arm cylinder tube end ·Arm cylinder rod end ·Boom + Arm connecting ·Bucket cylinder tube end	Lubricate	6-41

4) EVERY 200 HOURS SERVICE

Check items	Service	Page
★ Return filter	Replace	6-33
★ Pilot line filter	Replace	6-34
★ Drain filter cartridge	Replace	6-34

★ Replace 3 filters for continuous hydraulic breaker operation only.

5) INITIAL 250 HOURS SERVICE

Check items	Service	Page
Engine oil	Change	6-18, 19
Engine oil filter	Replace	6-18, 19
Fuel filter	Replace	6-30
Prefilter (water, element)	Replace	6-31
Hydraulic return filter	Replace	6-33
Pilot line filter	Replace	6-34
Drain filter cartridge	Replace	6-34
Swing reduction gear oil	Change	6-35

6) EVERY 250 HOURS SERVICE

Check items	Service	Page
Bolts & Nuts	Check, Tight	6-8
·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		
Swing bearing grease	Lubricate	6-35
Attachment pin and bushing	Lubricate	6-41
·Boom cylinder tube end		
·Boom foot		
·Boom cylinder rod end		
·Arm cylinder tube end		
·Arm cylinder rod end		
·Boom + Arm connecting		
·Bucket cylinder tube end		
Battery (voltage)	Check	6-42
Aircon & heater outer filter	Check, Clean	6-45,46

7) EVERY 500 HOURS SERVICE

Check items	Service	Page
★Engine oil	Change	6-18, 19
★Engine oil filter	Replace	6-18, 19
Coolant test (DCA4 concentration)	Test, Add	6-21
Radiator, cooler fin and charge air cooler	Check, Clean	6-25
☆Air cleaner element (primary)	Check, Clean, Change	6-29
Fuel filter element	Replace	6-30
Prefilter	Replace	6-31

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

☆ 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.

8) EVERY 1000 HOURS SERVICE

Check items	Service	Page
Hydraulic oil return filter	Replace	6-33
Drain filter cartridge	Replace	6-34
Pilot line filter	Replace	6-34
Swing reduction gear oil	Change	6-35
Travel motor reduction gear oil	Change	6-36
Grease in swing gear and pinion	Change	6-36
Air breather element	Replace	6-34

9) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Coolant	Change	6-21, 22, 23, 24
Hydraulic oil ★1	Change	6-32
Hydraulic tank suction strainer	Check, Clean	6-33

★1 Conventional hydraulic oil

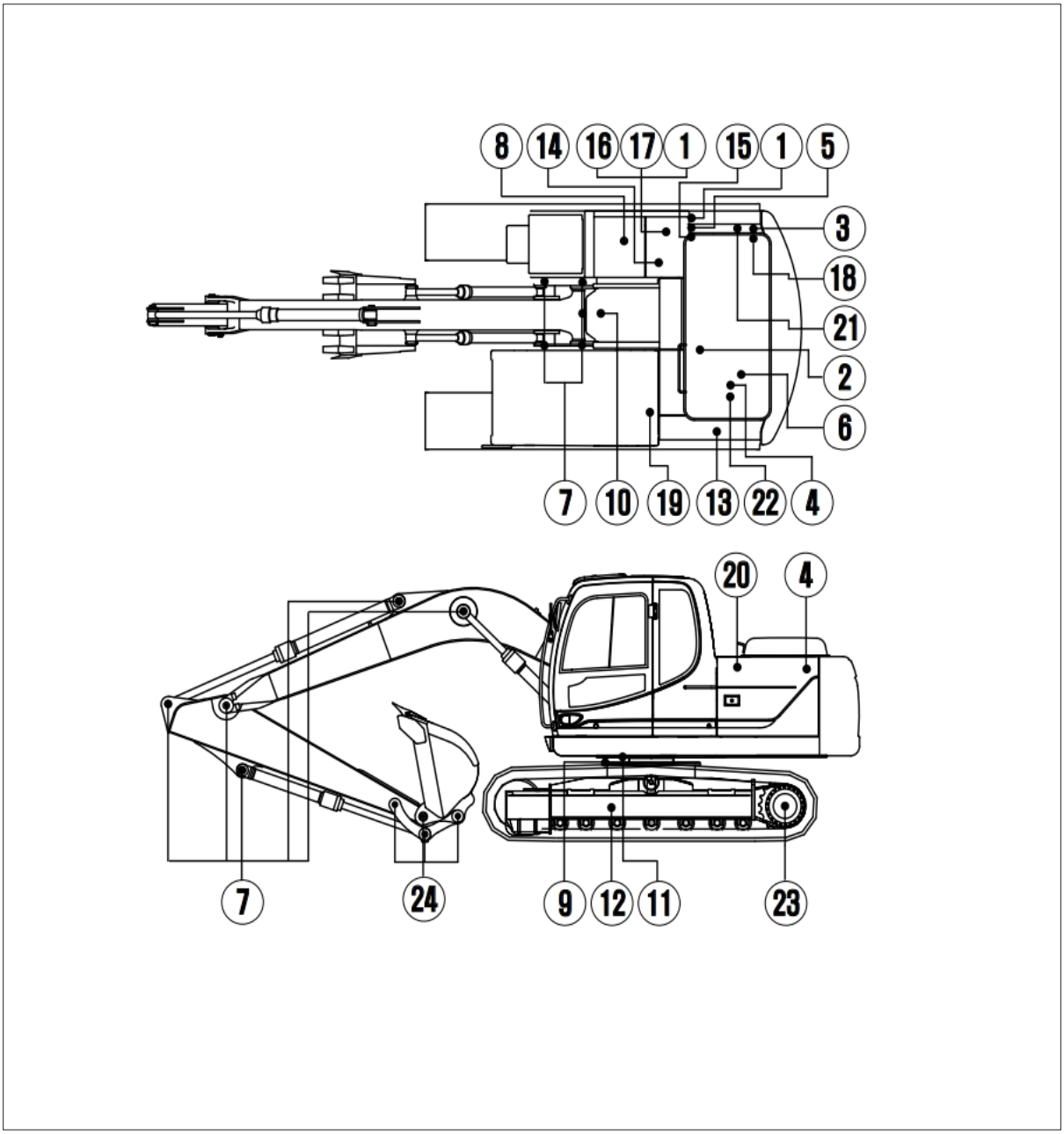
★ Change oil every 600 hours of continuous hydraulic breaker operation.

10) WHEN REQUIRED

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

Check items	Service	Page
Engine lubrication system		
·Engine oil	Change	6-18, 19
·Engine oil filter	Replace	6-18, 19
Engine cooling system		
·Coolant	Add or Change	6-21, 22, 23, 24
·Radiator	Clean or Flush	6-21, 22, 23, 24
·Charge air cooler	Check	6-25
Engine air system		
· Air cleaner element (safety) · Air cleaner element (primary)	Replace Clean or Replace	6-29
Fuel system		
·Fuel tank	Drain or Clean	6-296-30
·Fuel filter element	Replace	6-31
·Prefilter	Clean or Replace	
Hydraulic system		6-32
·Hydraulic oil	Add or Change	6-33
·Return filter	Replace	6-33
·Suction strainer	Clean	6-34
·Drain line filter	Replace	6-34
·Pilot line filter	Replace	6-34
·Element of breather	Replace	6-34
Under carriage		6-37
·Track tension	Check, Adjust	
Bucket		6-38
·Bucket assy	Replace	6-39
·Tooth	Replace	6-39
·Linkage	Adjust	
Air conditioner and heater		6-45
·Fresh air filter	Clean, Replace	6-46
·Recirculation filter	Clean	
Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-

5. MAINTENANCE CHART



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.

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	124(32.8)	1
	2	Engine oil level	Check, Add	EO	11 (2.9)	1
	4	Radiator coolant	Check, Add	C	15.5(4.1)	1
	5	Prefilter (water, element)	Check, Clean	-	-	1
	6	Fan belt tension and damage	Check, Adjust	-	-	1
	8	Fuel tank	Check, Refill	DF	270(71)	1

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ(U.S.gal)	Service points No.
50 Hours or weekly	7	Attachment pins & bushing	Check, Add	PGL	-	11
	8	Fuel tank (water, sediment)	Check, Clean	-	-	1
	10	Swing reduction gear case	Check, Add	GO	3.5(0.8)	1
	12	Track tension	Check, Adjust	PGL	-	2
	24	Bucket connecting rod pin	Check, Adjust	PGL	-	6
250 Hours	7	Attachment pins & bushing	Check, Add	PGL	-	11
	9	Swing bearing grease	Check, Add	PGL	-	2
	13	Battery (voltage)	Check	-	-	1
	19	Aircon and heater fresh air filter	Check, Clean	-	-	1
500 Hours	2	Engine oil	Change	EO	11(2.9)	1
	3	Engine oil filter	Replace	-	-	1
	5	Prefilter	Replace	-	-	1
	20	Air cleaner element (primary)	Check, Clean	-	-	1
	21	Fuel filter element	Replace	-	-	1
	22	Radiator, oil cooler, charge air cooler	Check, Clean	-	-	3
1000 Hours	6	Fan belt tensioner	Check, Replace	-	-	1
	10	Swing reduction gear case	Change	GO	3.5(0.8)	1
	11	Swing gear and pinion grease	Change	PGL	7.4kg (16.3 lb)	1
	14	Hydraulic oil return filter	Replace	-	-	2
	15	Drain filter cartridge	Replace	-	-	1
	16	Air breather element	Replace	-	-	1
	18	Pilot line filter element	Replace	-	-	1
	23	Travel reduction gear case	Change	GO	2.2(0.7)	2
2000 Hours	1	Hydraulic oil ★1	Change	HO	124(32.8)	1
	4	Radiator coolant	Change	C	15.5 (4.1)	1
	17	Hydraulic oil suction strainer	Check, Clean	-	-	1
As required	-	Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-	-	-
	19	Aircon & heater fresh filter	Replace	-	-	1
	19	Aircon & heater recirculation filter	Clean, Replace	-	-	1
	20	Air cleaner element (primary, safety)	Replace	-	-	2

★1 Conventional hydraulic oil

※ Oil symbol

Please refer to the recommended lubricants for specification.

C : Coolant **PGL : Grease** **EO : Engine oil**

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.

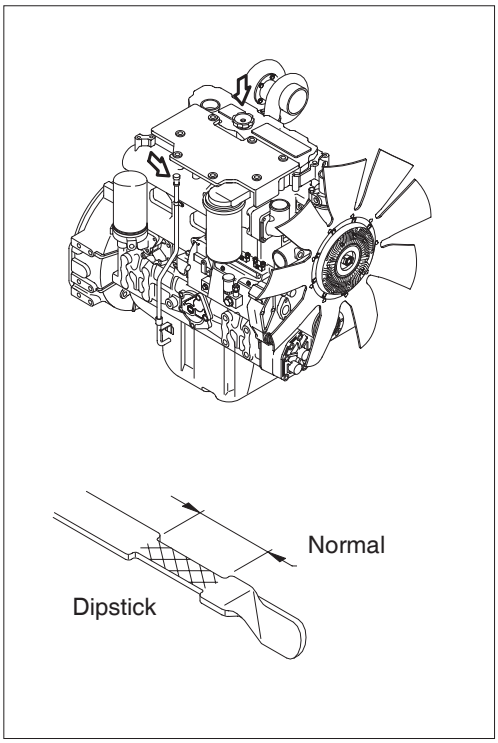
(2) Check the oil level by inserting the dipstick completely into the hole and pulling out again.

(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.**

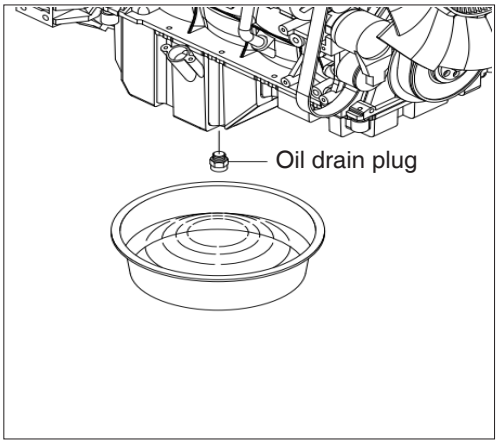


2) REPLACEMENT OF ENGINE OIL AND OIL FILTER

(1) Warm up the engine.

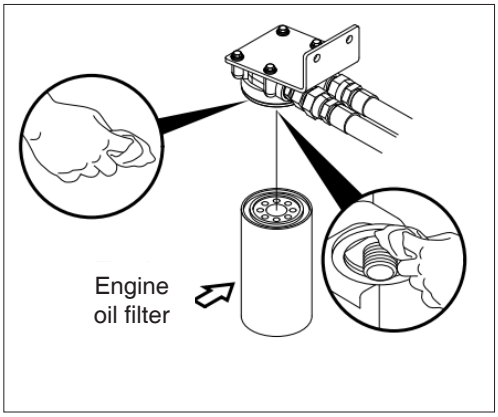
(2) Remove the plug and allow the oil to drain.

※ **A drain pan with a capacity of 15 liters (4.0 U.S. gallons) will be adequate.**



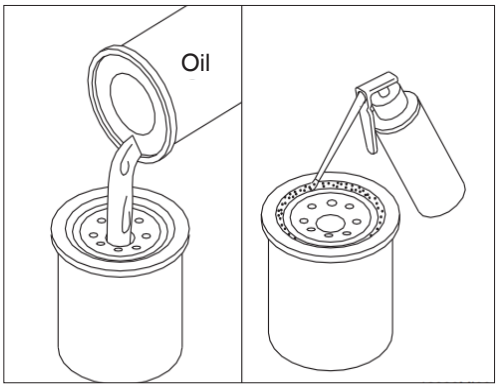
(3) Clean around the filter head, remove the filter and clean the gasket surface.

※ **The O-ring can stick on the filter head.**
Make sure it is removed before installing the new filter.



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

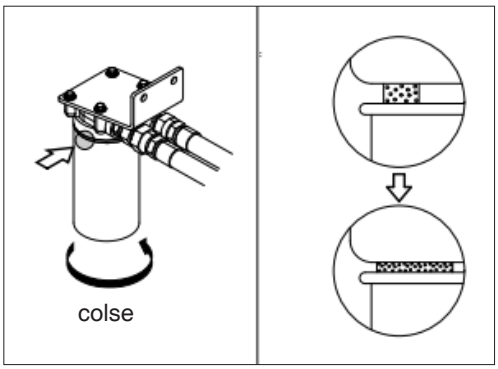
※ **Fill the filters with clean lubricating oil.**



(5) Install the filter to the filter head.

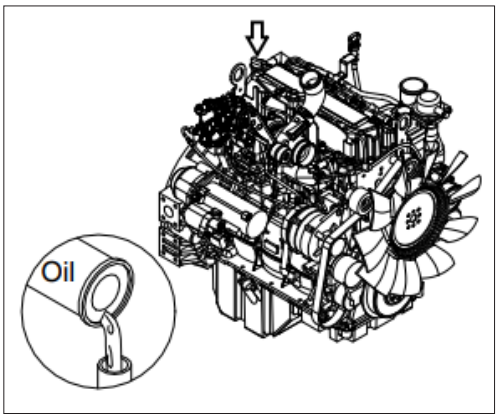
※ **Mechanical over-tightening may distort the threads or damage the filter element seal.**

·Install the filter as specified by the filter manufacturer.



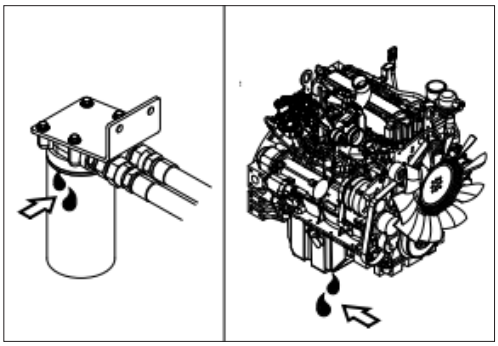
(6) Fill the engine with clean oil to the proper level.

·Quantity : 11 (2.9 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 15minutes for oil to drain down before checking.



3) CHECK COOLANT

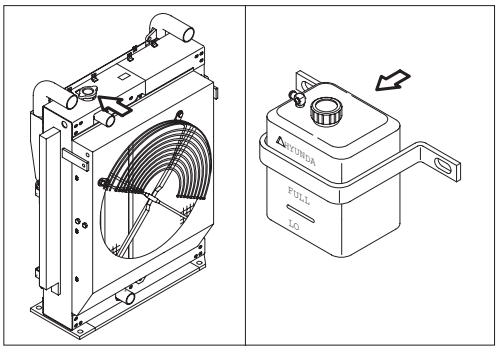
(1) Check if the level of coolant in reservoir tank is between FULL and LOW.

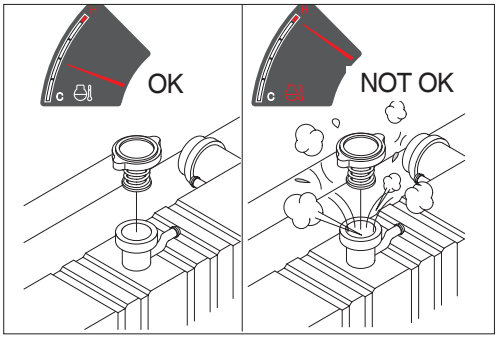
(2) Add the mixture of antifreeze and water after removing the cap of the reservoir tank if coolant is not sufficient.

(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.**





3-1) COOLANT TEST STRIPS INSTRUCTIONS

(1) Pre-test instruction

Recommended testing frequency - at every coolant filter change interval.

① Collect coolant sample from the radiator drain valve.
- Do not collect from the coolant recovery or overflow system
- Coolant must be between 10~54℃ when tested
- Room temperature is best.

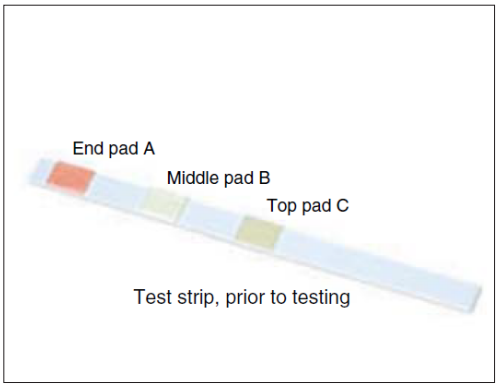
② For accurate results, test must be completed within 75 seconds.
- Follow recommended test times. Use a stopwatch.

③ Record and track results.

(2) Test instruction

① Remove one strip from bottle and replace cap immediately.
Do not touch the pads on the end of the strip. Discard kit if nitrite test pads of unused strips have turned brown.

② Dip strip for 1 second in coolant sample, remove, and shake strip briskly to remove excess liquid.



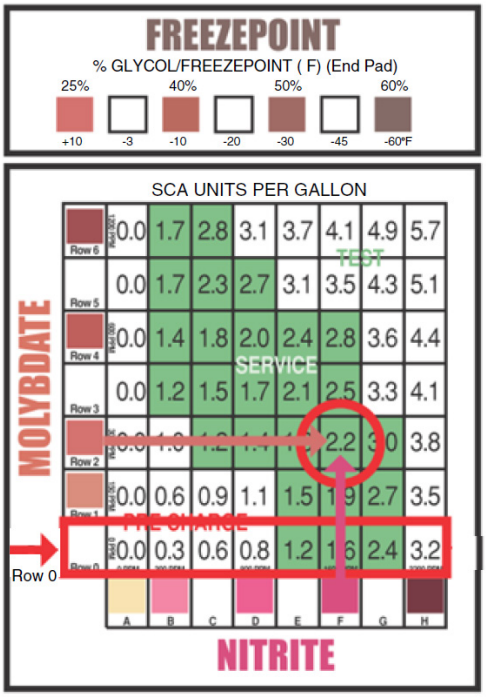
③ 45 seconds after dipping strip, compare results to color chart and record in the following order:

for DCA4:

④ All three readings must be completed no later than 75 seconds after dipping strip.

⑤ If uncertain about the color match, pick the low numbered block.
ex.) If nitrite color is not F, use column E.

⑥ Determine where the molybdate level intersect the nitrite level on the chart. The amount of SCA units per gallon in the cooling system is given where the molybdate row intersect the nitrite column.



(3) Maintenance actions based on results

① **Above normal**

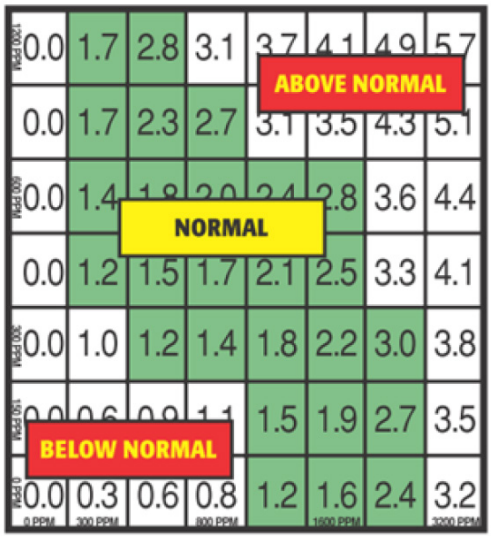
ABOVE NORMAL - Do not replace the coolant filter or add DCA4 liquid until additive concentration falls below 3 units per gallon.
- Test at every subsequent coolant filter change interval.

② **Normal**

NORMAL - Continue to replace the coolant filter at your normal interval.

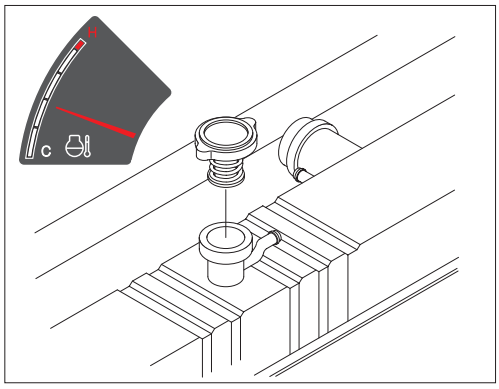
③ **Below normal**

BELOW NORMAL - Replace the coolant filter and add 1 pint of additive per each 4 gallons of coolant.
- Replace the coolant filter and add 40 cc of additive per each 1 liter of coolant.



※ If you need part number of Test kit or DCA4, please see Parts Manual.

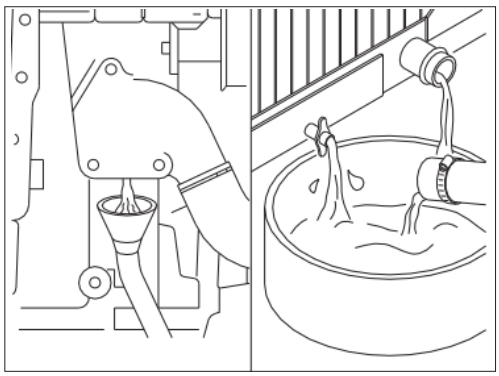
3-2) FLUSHING AND REFILLING OF RADIATOR



(1) Change coolant

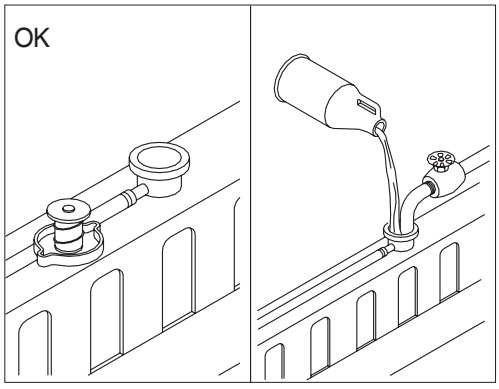
⚠ Avoid prolonged and repeated skin contact with used antifreeze. Such prolonged repeated contact can cause skin disorders or other bodily injury.
Avoid excessive contact-wash thoroughly after contact.
Keep out of reach of children.

※ 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℃ (122℉) 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 removing the plug in the bottom of the water inlet. A drain pan with a capacity of 40 liters (10 U.S. gallons) will be adequate in most applications.

(2) Flushing of cooling system

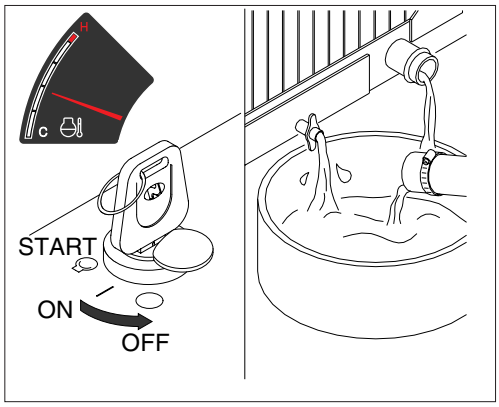


① Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).

※ 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.

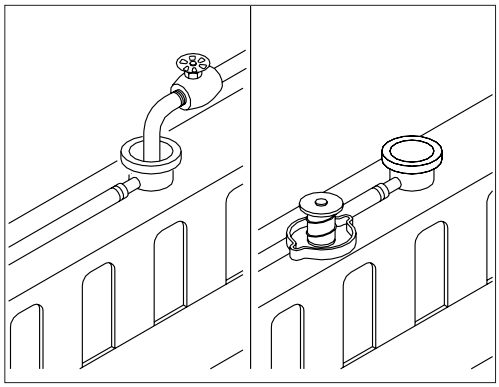
② Operate the engine for 5 minutes with the coolant temperature above 80℃ (176℉) .
Shut the engine off, and drain the cooling system.



③ Fill the cooling system with clean water.

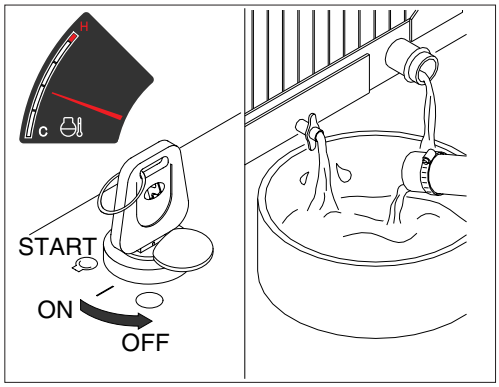
※ **Be sure to vent the engine and aftercooler for complete filling.**

※ **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.**

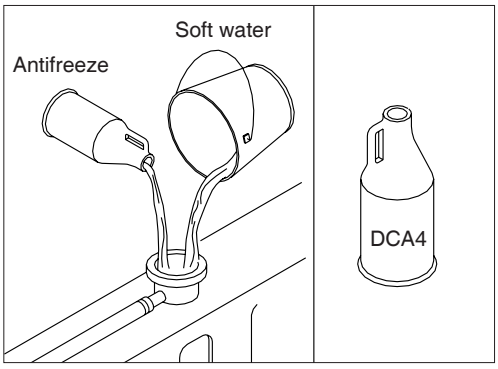


3-3) Cooling system filling

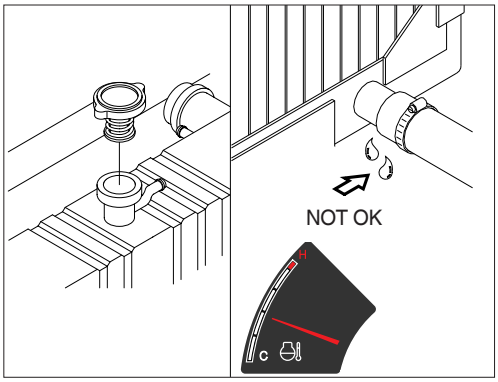
① Use a mixture of 50 percent soft water and 50 percent ethylene glycol antifreeze to fill the cooling system.

※ **Never use water alone for coolant.**
This can result in damage from corrosion.

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



② 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.

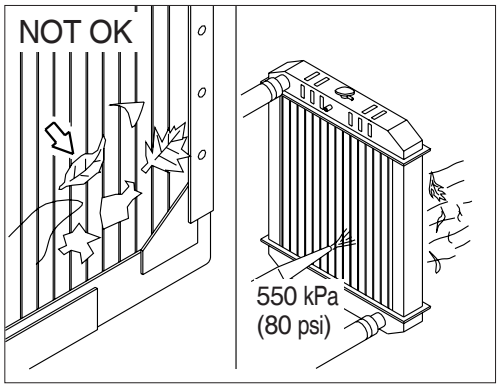


6) CLEAN RADIATOR AND OIL COOLER

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.

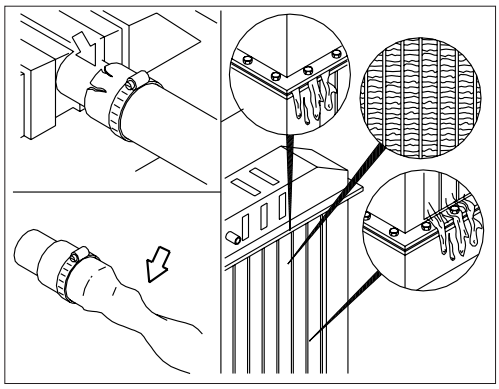
(2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.
Blow the air in the opposite direction of the fan air flow.



(3) Visually inspect the radiator for bent or broken fins.

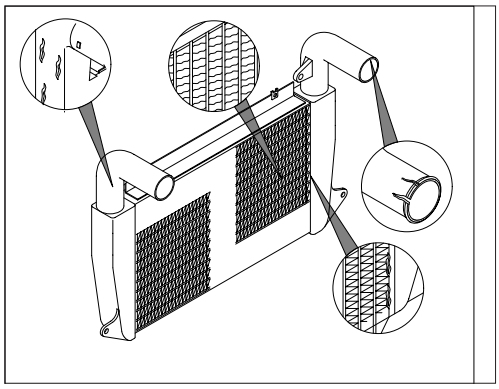
※ **If the radiator must be replaced due to bent or broken fins which can cause the engine to overheat, refer to the manufacturer's replacement procedures.**

(4) Visually inspect the radiator for core leaks.



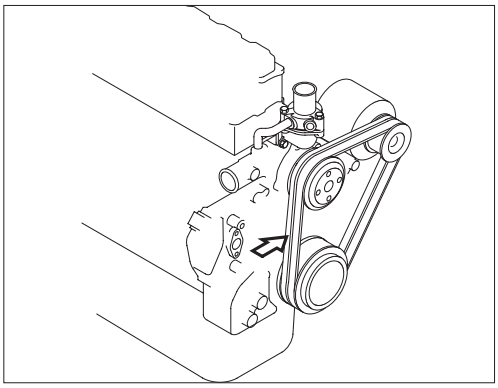
7) CHECK CHARGE AIR COOLER

Inspect the charge air cooler for dirt and debris blocking the fins. Check for cracks, holes, or other damage. If damage is found, please contact Hyundai distributor.

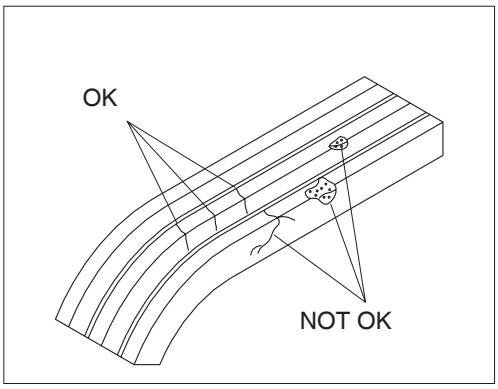


8) FAN BELT TENSION

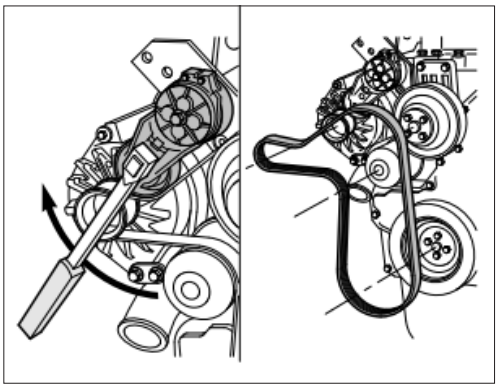
(1) Measure the belt deflection at the longest span of the belt.
·Maximum deflection : 7.0±1.0 mm
(0.28±0.04 inch)



(2) Inspect the drive for damage.



(3) Inspect the drive belt and fan hub.

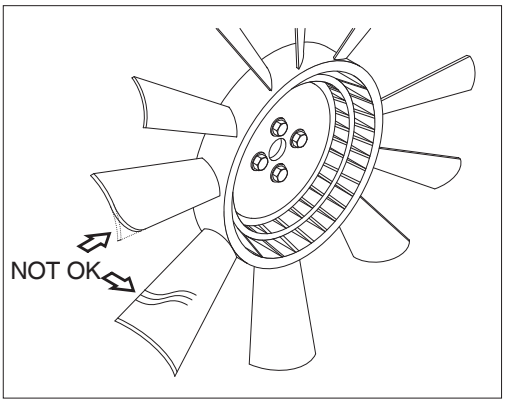


9) INSPECTION OF COOLING FAN

⚠ 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.

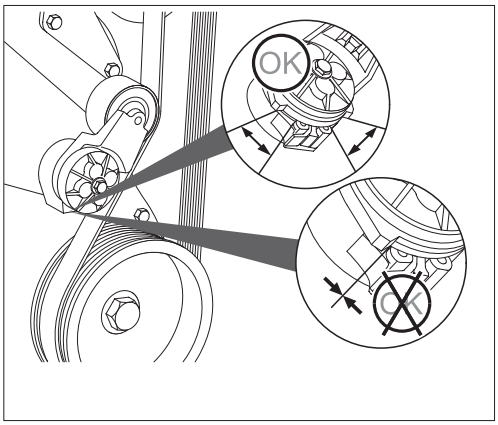
※ Rotate the crankshaft by using the engine barring gear.

※ 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.

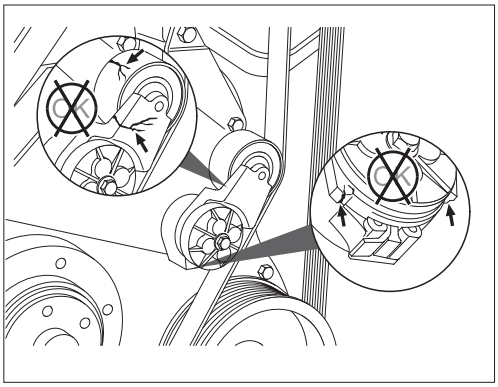


10) BELT TENSIONER, AUTOMATIC ADJUSTMENT

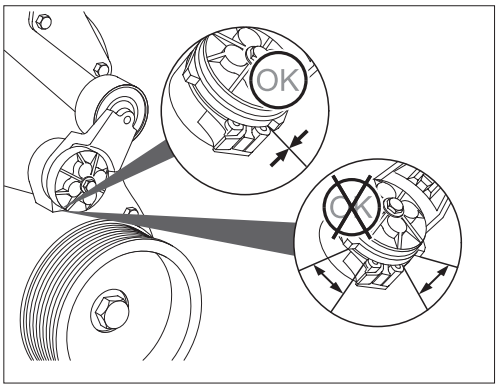
(1) Every 1000 hours, or 1 year, whichever occurs first, inspect the automatic belt tensioner.
With the engine turned off, check that neither the top nor bottom tensioner arm stop is touching the cast boss on the tensioner body. If either of the stops is touching a boss, the alternator belt must be replaced. Check to make sure the correct belt part number is being used it either condition exists.



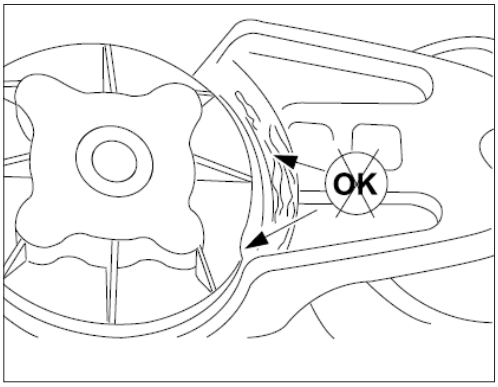
(2) Check the tensioner pulley and body for cracks. If any cracks are noticed, the tensioner must be replaced. Refer to a Cummins Authorized Repair facility. Check the tensioner for dirt buildup. If this condition exists, the tensioner must be removed and steam-cleaned.



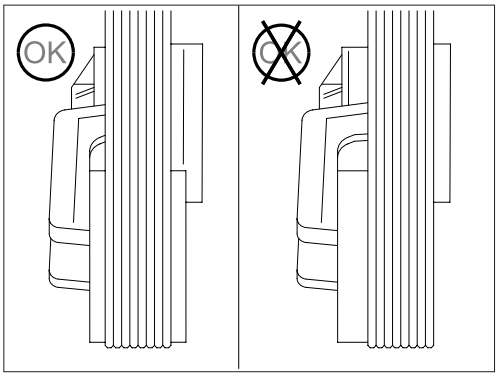
(3) Check that the bottom tensioner arm stop is in contact with the bottom tensioner arm stop boss on the tensioner body. If these two are not touching, the tensioner must be replaced.



(4) Inspect the tensioner for evidence of the pivoting tensioner arm contacting the stationary circular base. If there is evidence of thess two areas touching, the pivot tube bushing has failed and the tensioner must be replaced.



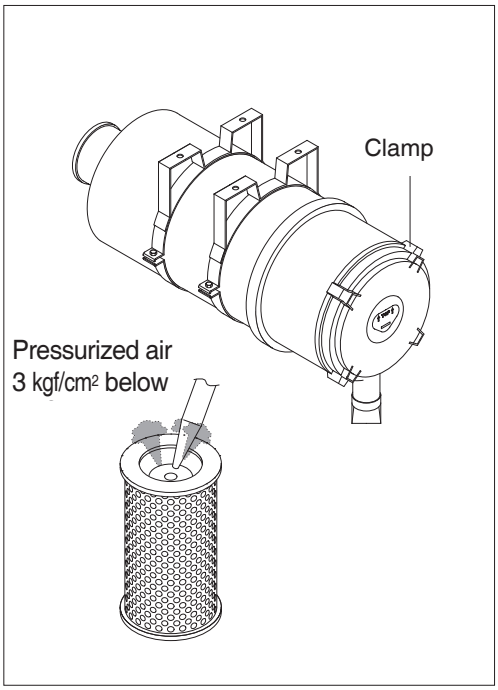
(5) Check the location of the drive belt on the belt tensioner pulley. The belt should be centered on,
or close to the middle of the pulley. Misaligned belts, either too far forward or backward, can cause belt wear, belt roll-offs, or increase uneven tensioner bushing wear.



11) CLEANING OF AIR CLEANER

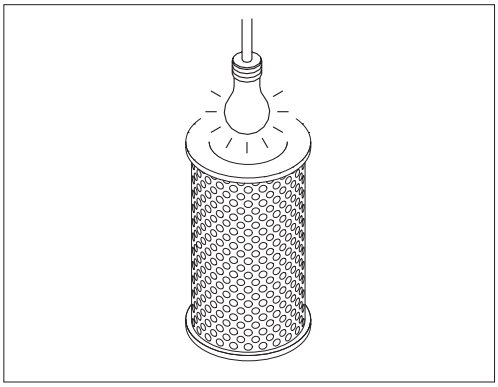
(1) Primary element

① Open the 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 tighten wing nut.
※ **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.**

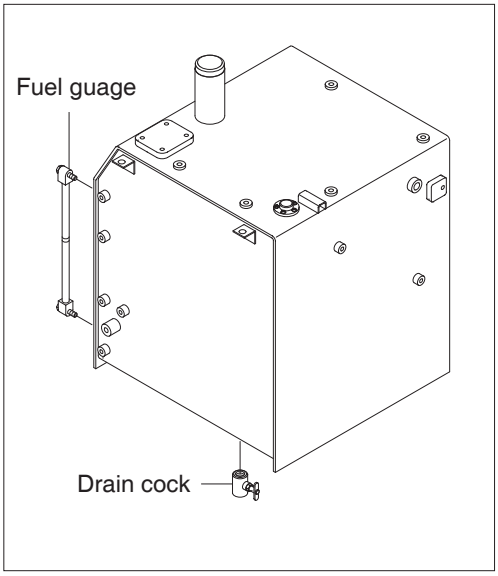


12) FUEL TANK

(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 cock.

※ **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.



13) REPLACEMENT OF FUEL FILTER

(1) Clean around the filter head, remove the filter and clean the gasket surface.

(2) Replace the O-ring.

※ **Make sure O-ring does not stick to filter head. Remove O-ring with screwdriver if necessary.**

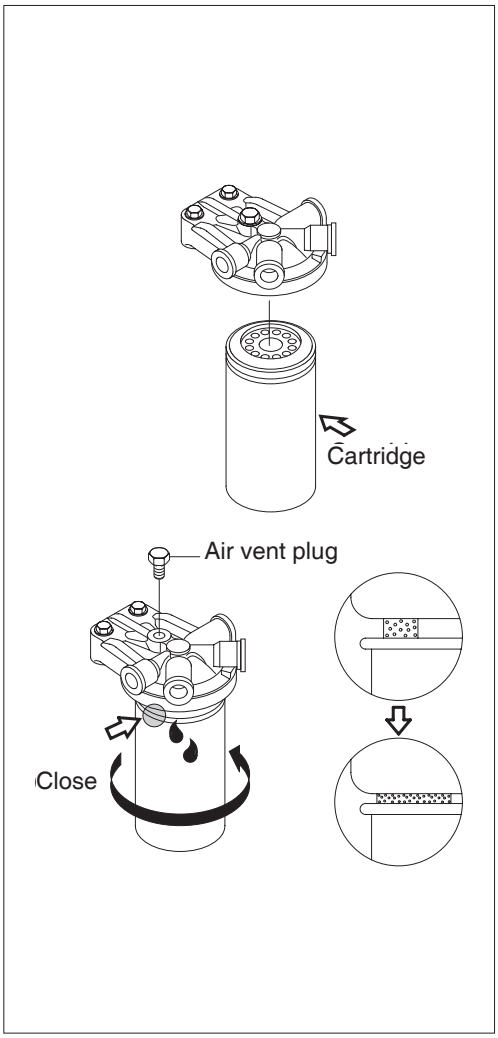
(3) Apply engine oil on the gasket of new filter when mounting, and tighten 3/4 to 1 turn more after the gasket touches the filter head.

※ Mechanical overtightening can distort the threads or damage the filter element seal.

(4) Relieve the air after mounting.

※ **Do not pre-fill an on-engine fuel filter with fuel. The system must be primed after the fuel filter is installed. Pre filling the fuel filter can result in debris entering the fuel system and damaging fuel system components.**

※ **Check for fuel leakage after the engine starts. If air is in the fuel system, the engine will not start. Start engine after bleeding the air according to the method of bleeding air.**



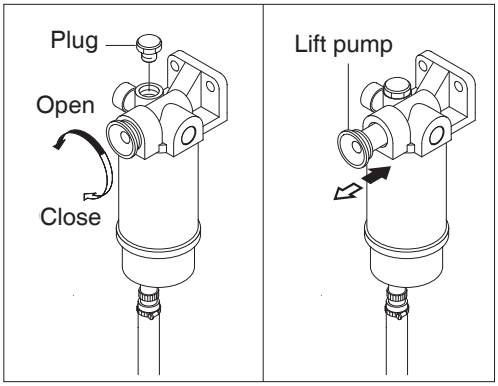
14) BLEEDING THE FUEL SYSTEM

(1) Loosen fuel supply line plug at the outlet of prefilter.

(2) Do hand-priming the lift pump repeatedly until air bubbles comes out from fuel supply line completely.

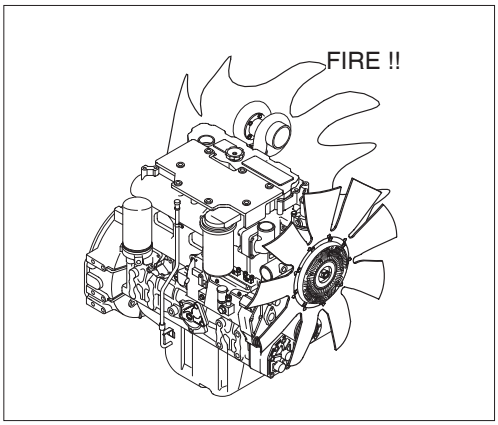
(3) Tighten fuel supply line to its origin position.

⚠ **The fuel pump, high-pressure fuel lines and fuel rail contain very high-pressure fuel. Never loosen any fittings while the engine is running. Personal injury and property damage can result. Wait at least 10 minutes after shutting down the engine before loosening any fittings in the high-pressure fuel system to allow pressure to do decrease to a lower level.**



15) 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.



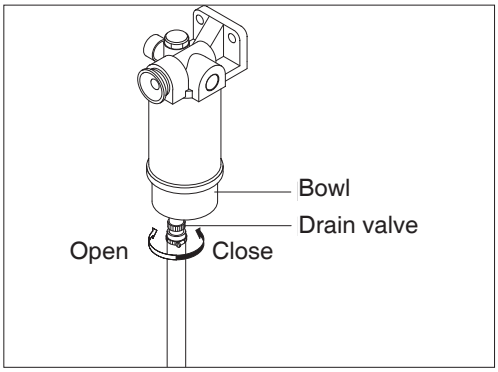
16) PREFILTER

※ Inspect or drain the collection bowl of water daily and replace the element every 500hours.

(1)

① Drain water

② Open bowl drain valve to evacuate water.
Close drain valve.



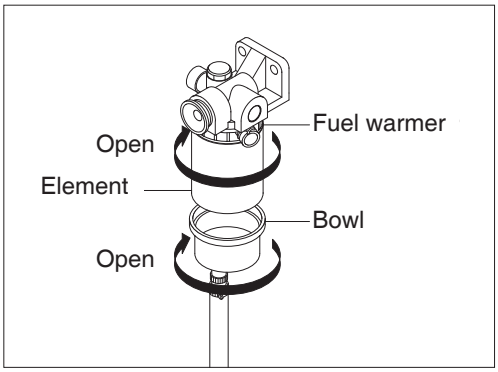
(2) Replace element

① Drain the unit of fuel. Follow "Drain water" instructions above.

② Remove element, fuel warmer and bowl from filter head.

※ The bowl is reusable, do not damage or discard.

③ Separate element from bowl. Clean bowl and seal gland.

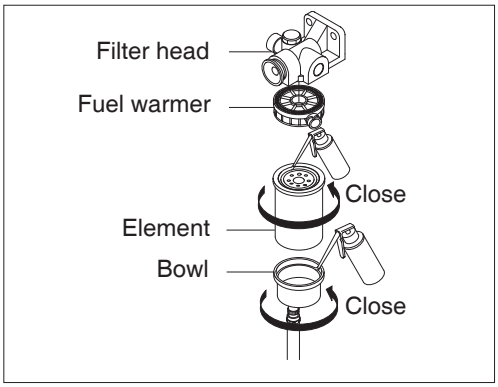


④ Lubricate new bowl seal with clean fuel or motor oil and place in bowl gland.

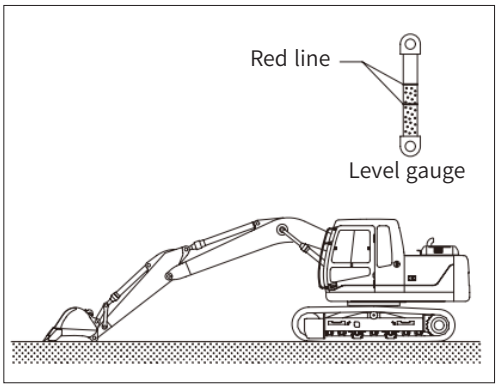
⑤ Attach bowl to new element firmly by hand.

⑥ Lubricate new element seal and place in element top gland.

⑦ Attach the element, fuel warmer and bowl to the head.



17) HYDRAULIC OIL CHECK

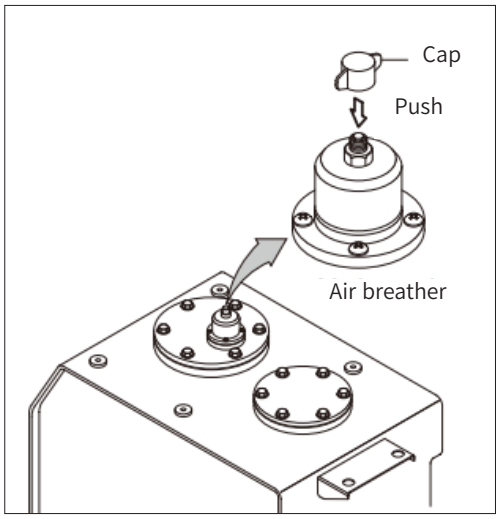


(1) Stop the engine after retract the arm and bucket cylinders, then lower the boom and set the bucket on the ground at a flat location as in the illustration.

(2) Check the oil level at the level gauge of hydraulic oil tank.

(3) The oil level is normal if between the red lines.

18) FILLING HYDRAULIC OIL



(1) Stop the engine to the position of level check.

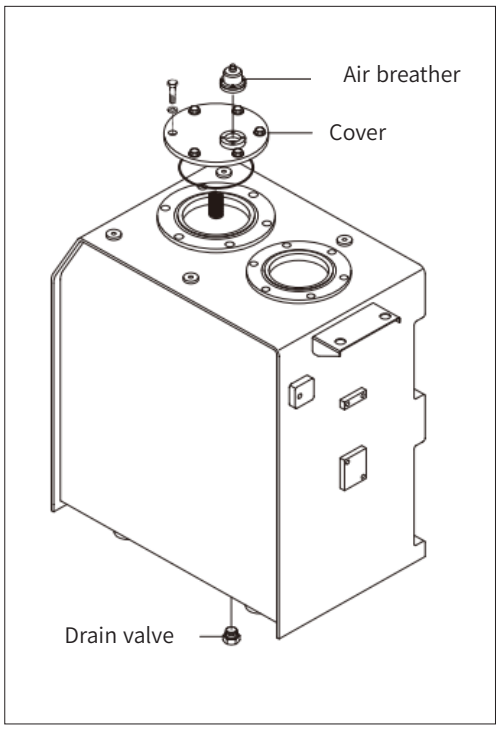
(2) Relieve the pressure in the tank by pushing the top of the air breather.

(3) Remove the breather on the top of oil tank and fill the oil to the specified level.
· Tightening torque : 1.44±0.3 kgf·m
(10.4±2.1 lbf·ft)

(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.

19) CHANGE HYDRAULIC OIL



(1) Lower the bucket on the ground pulling the arm and bucket cylinder to the maximum.

(2) Relieve the pressure in the tank by pushing the top of the air breather.

(3) Remove the cover.
·Tightening torque : 6.9±1.4 kgf·m
(50±10 lbf·ft)

(4) Prepare a suitable container.

(5) To drain the oil loosen the drain plug at the bottom of the oil tank.

(6) Fill proper amount of recommended oil.

(7) Put the breather in the right position.

(8) Bleed air hydraulic pump loosen the air breather at top of hydraulic pump assembly.

(9) Start engine and run continually. Release the air by full stroke of each control lever.

20) CLEAN SUCTION STRAINER

Clean suction strainer as follows paying attention to the cause to be kept during oil filling.

(1) Remove the cover on the top of the oil tank.
·Tightening torque : 6.9±1.4 kgf·m
(50±10 lbf·ft)

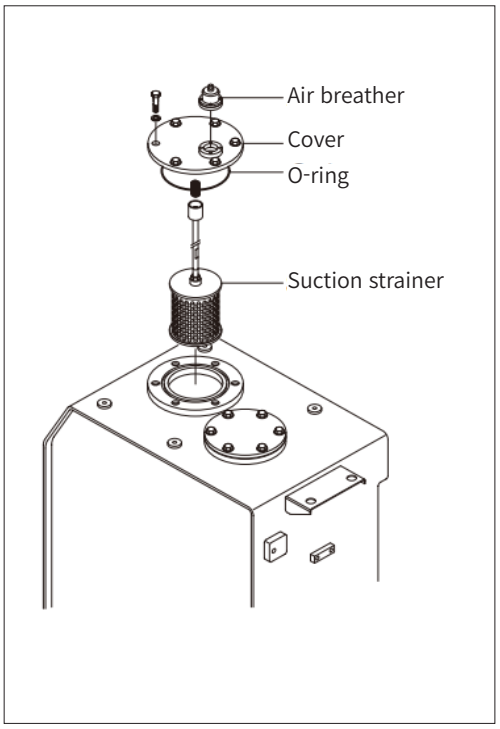
(2) Pull out the strainer in the tank.

(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 and reinsert in the oil tank.

※ **Loosen the bolt slowly at the cover can be spring out by the spring when removing it.**



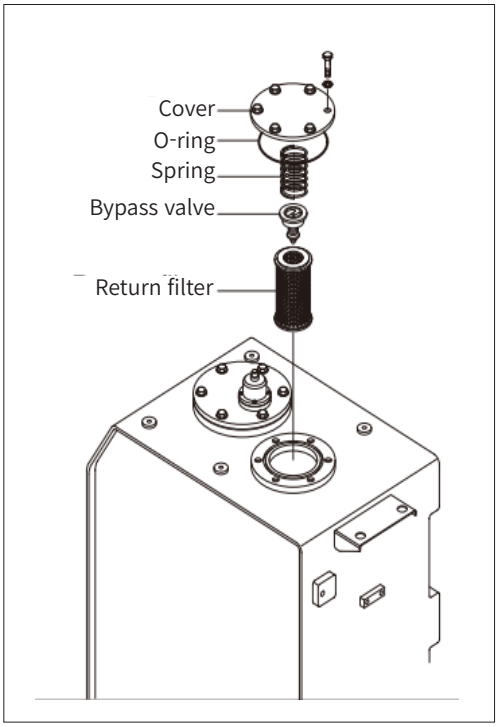
21) REPLACEMENT OF RETURN FILTER

Replace as follows paying attention to the cause to be kept during the replacement.

(1) Remove the cover.
·Tightening torque : 6.9±1.4 kgf·m
(50±10 lbf·ft)

(2) Remove the spring, by-pass valve, and return filter in the tank.

(3) Replace the element with new one.



22) REPLACEMENT OF ELEMENT IN HYDRAULIC TANK BREATHER

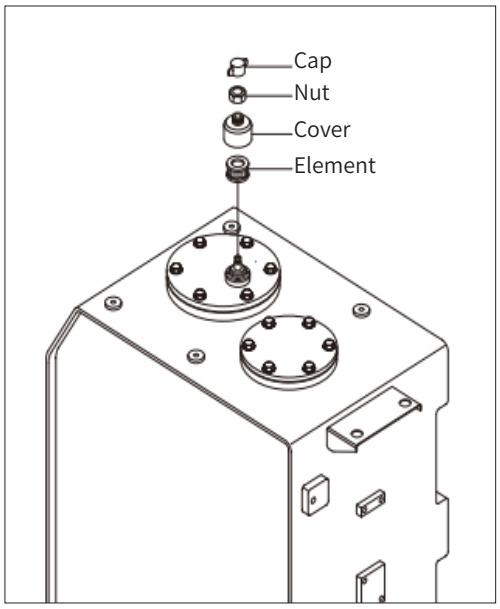
(1) Relieve the pressure in the tank by pushing the top of the air breather.

(2) Remove the cover.

(3) Remove the snap ring and pull out the filter element.

(4) Replace the filter element new one.

(5) Reassemble by reverse order of disassembly.
· Tightening torque : 0.2~0.3 kgf·m
(1.4~2.1 lbf·ft)

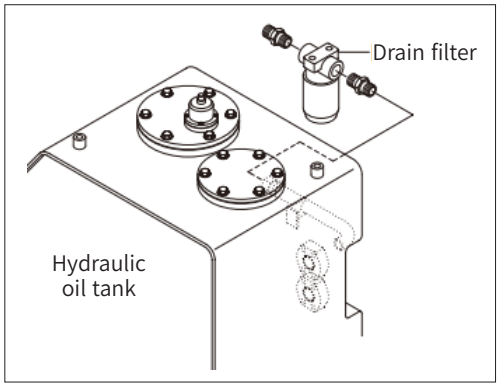


23) REPLACE OF DRAIN FILTER CARTRIDGE

Clean the dust around filter and replace with new one after removing the cartridge.

※ **Tighten about 2/3 turn more after the gasket of cartridge contacts seal side of filter body for mounting.**

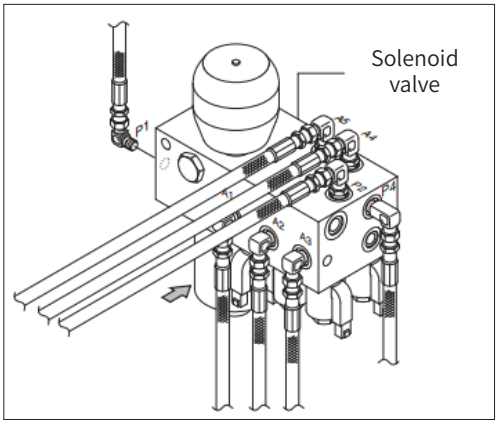
※ **Change cartridge after initial 250 hours of operation. Thereafter, change cartridge every 1000 hours.**



24) 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.**

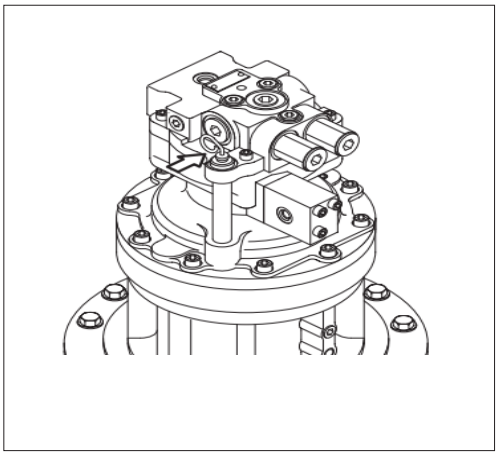


25) CHECK THE SWING REDUCTION GEAR OIL

(1) Pull out the dipstick and clean it.

(2) Insert it again.

(3) Pull out one more time to check the oil level and fill the oil if the level is not sufficient.



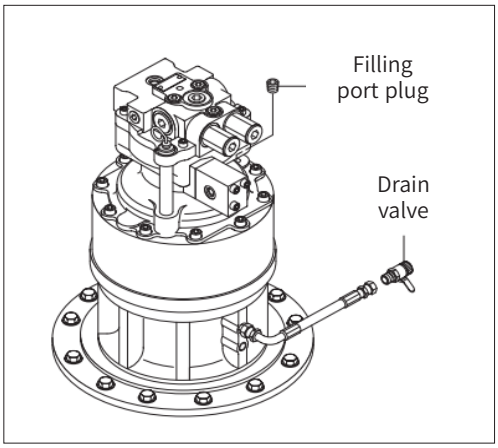
26) CHANGE SWING REDUCTION GEAR OIL

(1) Raise the temperature of oil by swinging the machine before replace the oil and park the machine on the flat ground.

(2) Prepare a proper container.

(3) Open the cap and loosen the drain valve.

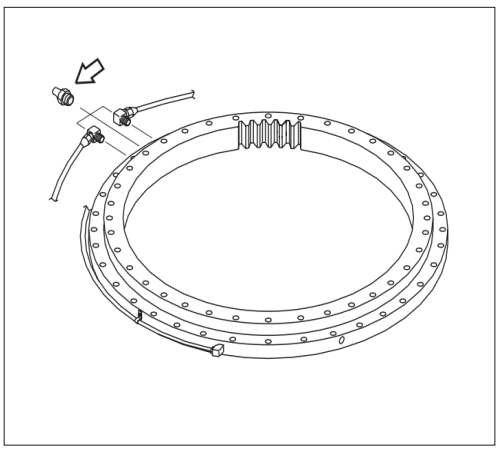
(4) Clean around the valve and close the drain valve and cap.
Fill proper amount of recommended oil.
·Amount of oil : 3.5ℓ(0.8 U.S.gal)



27) LUBRICATE SWING BEARING

(1) Grease at 2 fitting.

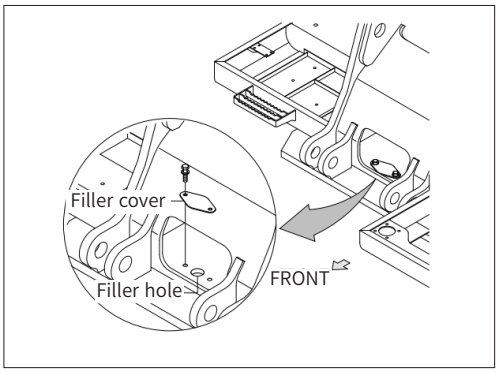
※ **Lubricate every 250 hours.**



28) SWING GEAR AND PINION

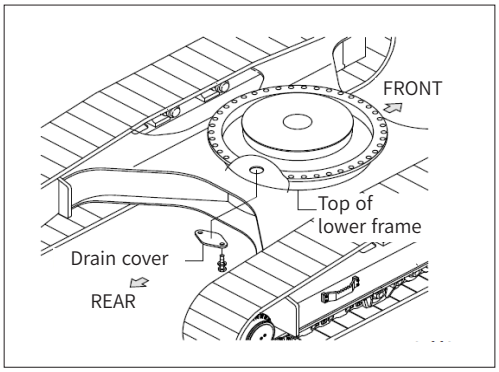
(1) Drain old grease

① Remove under cover of lower frame.
② Remove drain cover of lower frame.
③ Remove filler cover of upper frame.
④ Operate full turn (360。) of swing several times.



(2) Refill new grease

① Install drain cover.
② Fill with new grease.
③ Install filler cover.
·Capacity : 11.5 kg (25.4 lb)

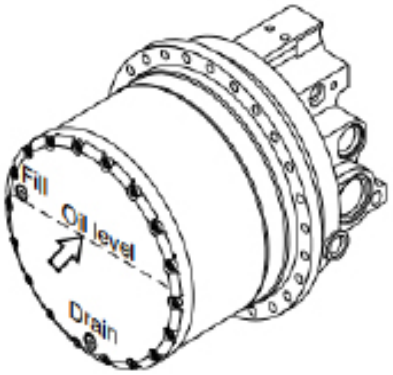


29) CHECK THE TRAVEL REDUCTION GEAR OIL

(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 : 2.2ℓ(0.7 U.S.gal)



31) CHANGE OF THE TRAVEL REDUCTION GEAR OIL

(1) Raise the temperature of the oil by traveling machine first.

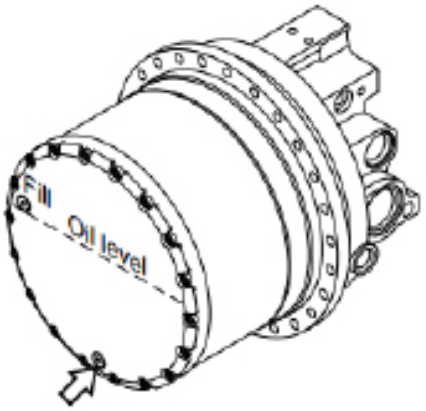
(2) Stop when the position of the drain plug is down.

(3) Loosen the level plug and then the drain plug.

(4) Drain the oil to adequate container.

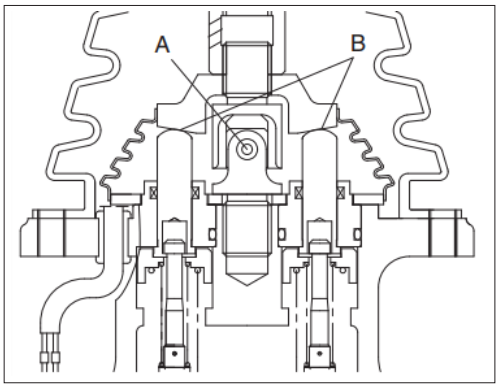
(5) Tighten the drain plug and fill specified amount of oil at filling port.

(6) Tighten the level plug and travel slowly to check if there is any leakage of oil.



32) LUBRICATE RCV LEVER

Remove the bellows and with a grease gun grease the joint part (A) and sliding parts (B).



33) ADJUSTMENT OF TRACK TENSION

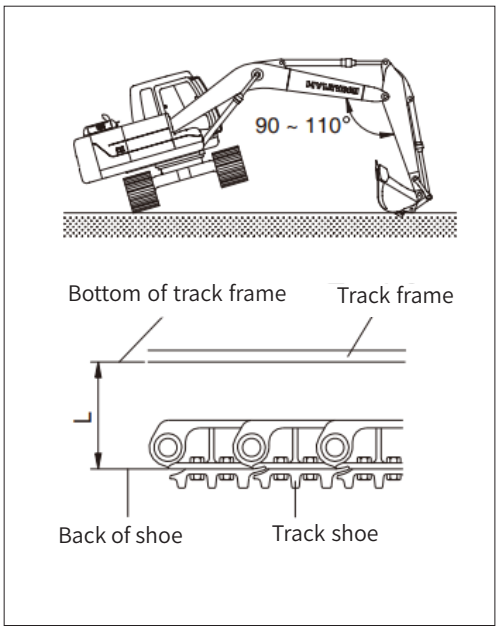
※ **It is important to adjust the tension of track properly to extend the lifetime of track and traveling device.**

※ **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 track frame on track center and track of shoe.

※ **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.**

⚠ **Unscrew the grease nipple after release the tension by pushing the poppet only when necessarily required.**
Grease leaking hole is not existing. So, while unscrew the grease nipple, grease is not leaking until the grease nipple is completely coming out.
If the tension is not released in advance, the grease nipple can be suddenly popped out by pressurized grease.

※ **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.

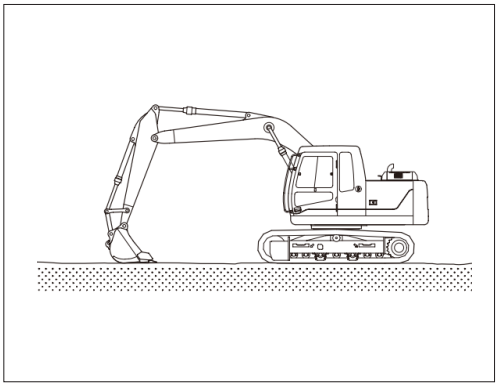
Working condition	Length (L)	
General	270~300 mm	10.6~11.8"

34) 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.**

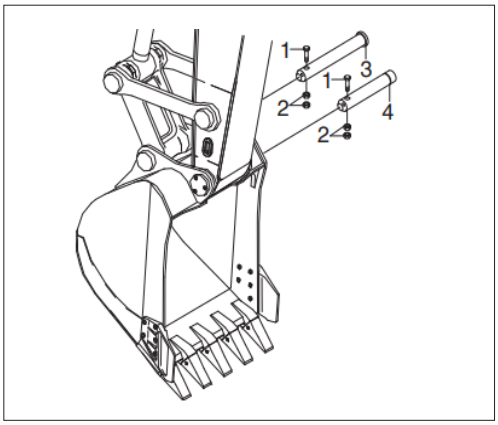
※ **When carrying out this operation, always wear goggles, helmet, gloves, and other protective equipment.**

※ **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.

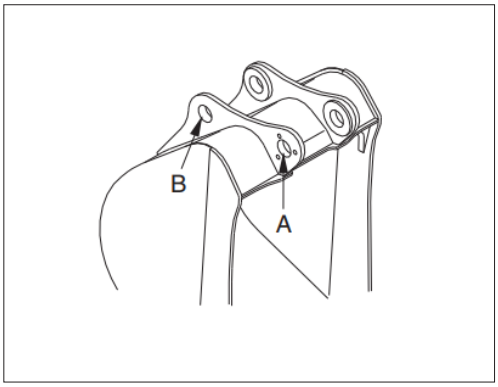


(3) Remove the stopper bolts (1) and nuts (2), then remove pins (3, 4) and remove the bucket.

※ **When removing the pins, place the bucket so that it is in light contact with the ground.**

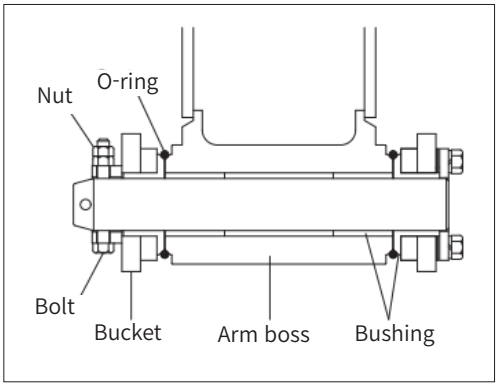
※ **If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.**

※ **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.



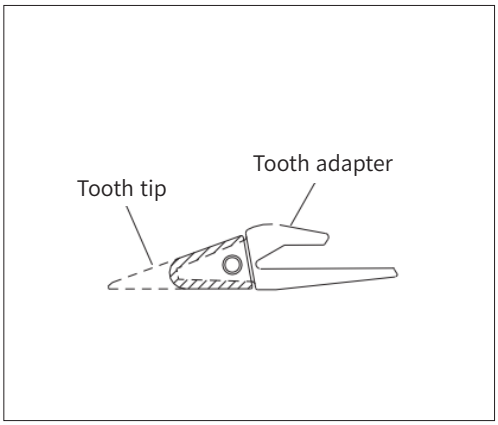
(5) Install the stopper bolt (1) and nuts (2) for each pin, then grease the pin.

35) REPLACEMENT OF BUCKET TOOTH

(1) Timing of replacement

① Check wearing condition as shown in the illustration and replace tooth tip before adapter starts to wear.

② If excessive use, tooth adapter has worn out, replacement may become impossible.



(2) Instructions for replacement

① Pull out pin by striking pin with punch or hammer, avoiding damage to locking washer.

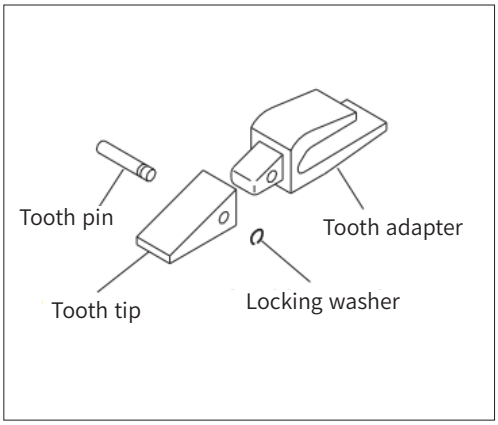
② Remove dust and mud from surface of tooth adapter by using knife.

③ Place locking washer in its proper place, and fit tooth tip to adapter.

④ Insert pin until locking washer is positioned at tooth pin groove.

⚠ Personal injury can result from bucket falling.

⚠ Block the bucket before changing tooth tips or side cutters.



36) ADJUSTMENT OF BUCKET CLEARANCE

(1) Lower the bucket on the ground as the picture shown in the right.

(2) Swing to the left and keep the arm boss to be contact to the bucket left.

(3) Lock the safety lever to the LOCK position and stop the engine.

(4) Measure the clearance (A) between bucket and arm boss. This is the total clearance.

(5) Adjusting

① Loosen bolt (2), and remove washer (3), plate (1) and shim (4).

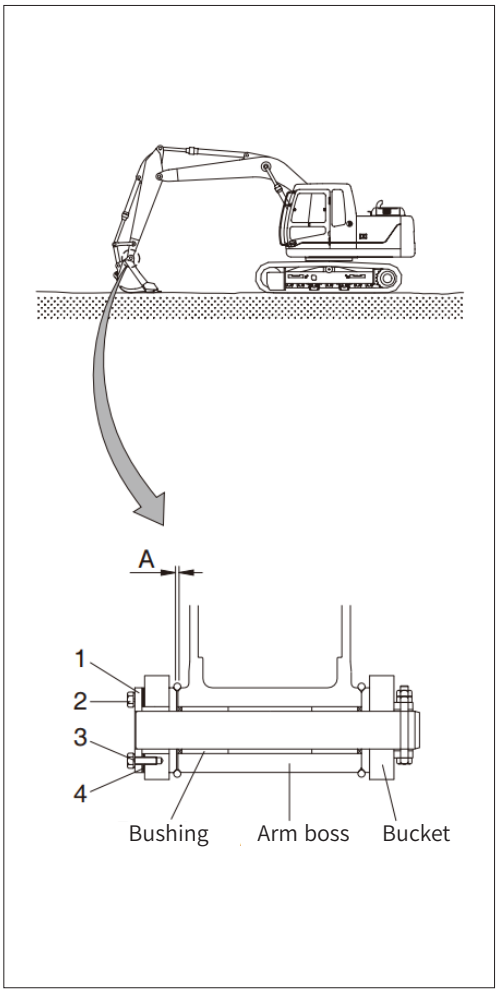
② Remove the shim equivalent value with measuring value.

③ Assemble the parts in the reverse order of removal.

·Tightening torque : 29.6±3.2 kgf·m
(214.0±23.1 lbf·ft)

·Normal clearance : 0.5 ~ 1.0 mm
(0.02 ~ 0.04 in)

※ If the bucket is not adjusted correctly, noise and vibration created during operation, and damaged O-ring, pin and bushing quickly.

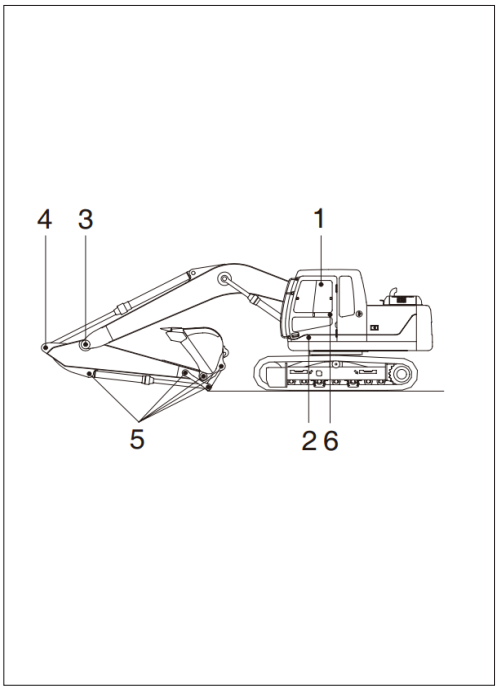


37) LUBRICATE PIN AND BUSHING

(1) Lubricate to each pin of working device

Lubricate the grease to the grease nipple according to the lubricating interval.

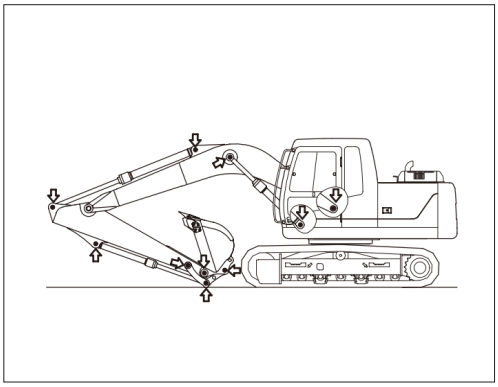
No.	Description	Qty
1	Lubrication manifold at boom	5
2	Boom cylinder pin	2
3	Boom and arm connection pin	1
4	Arm cylinder pin (rod side)	1
5	Bucket cylinder pin (head, rod)	2
	Bucket link (control rod)	3
	Arm and control link connection pin	1
	Arm and bucket connection pin	1
6	Boom rear bearing center	1



※ Shorten lubricating interval when working in the water or dusty place.

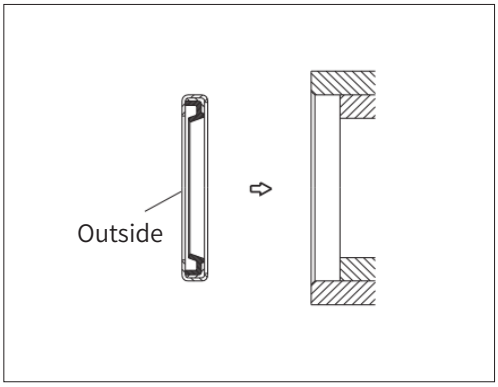
(2) Dust seals are mounted on the rotating part of working device to extend the lubricating interval.

※ Mount the lip to be faced outside when replace the dust seal.



※ If it is assembled in wrong direction, it will cause fast wear of pin and bushing, and create noise and vibration during operation.

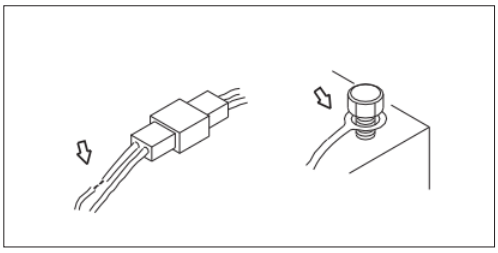
※ Assemble the seal same direction with picture and use with plastic hammer when replace.



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

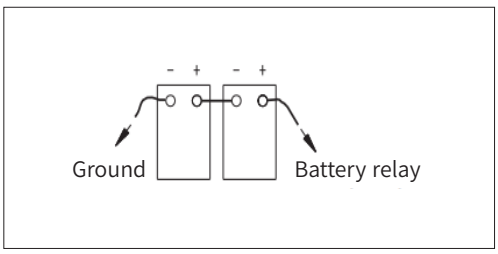
Never discard a battery.

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

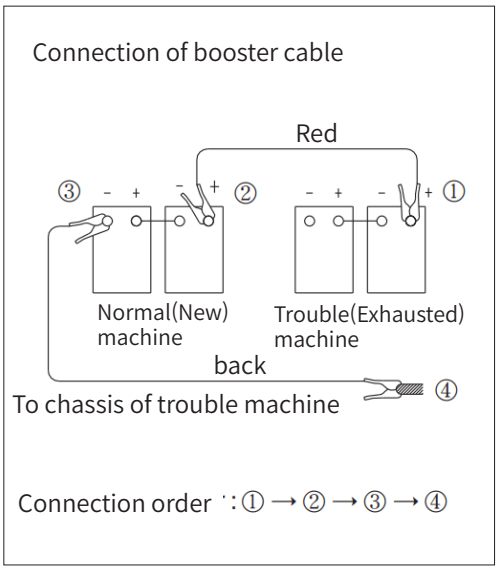
※ Use the same capacity of battery for starting.

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.

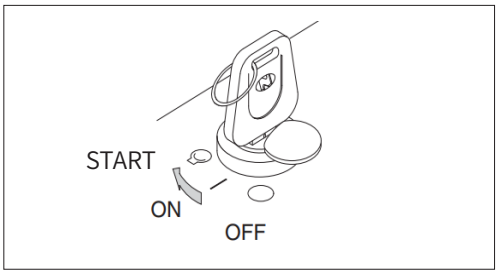


(2) Starting the engine

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.

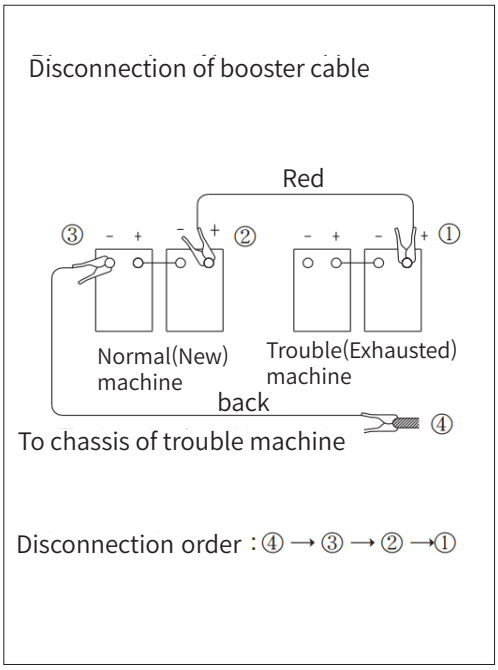
③ Run engine with high idle until charging the exhausted battery by alternator, fully.

⚠ 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.

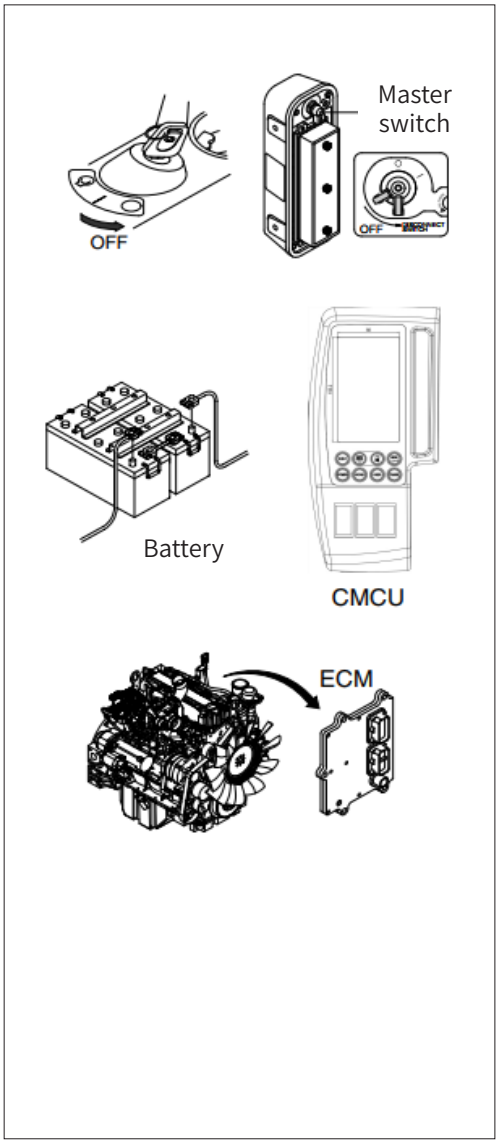
② Disconnect ground cable from battery by master switch.

③ Before carrying out any electric welding on the machine, the battery cables should be disconnected and the connectors pulled out of the electronic control units (MCU, cluster etc).

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.

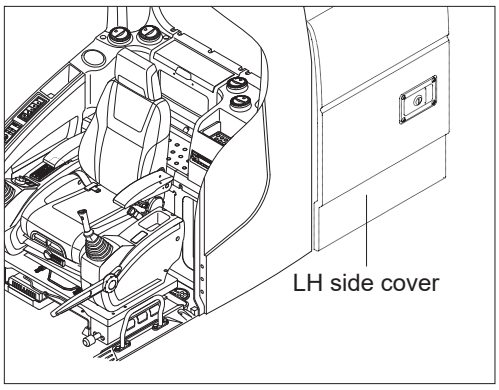


8. AIR CONDITIONER AND HEATER

1) CLEAN AND REPLACE OF FRESH AIR FILTER

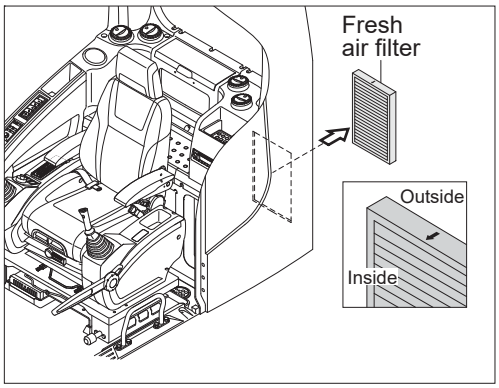
※ **Always stop the engine before servicing.**

(1) Open the LH side cover.



(2) Remove the fresh air filter.

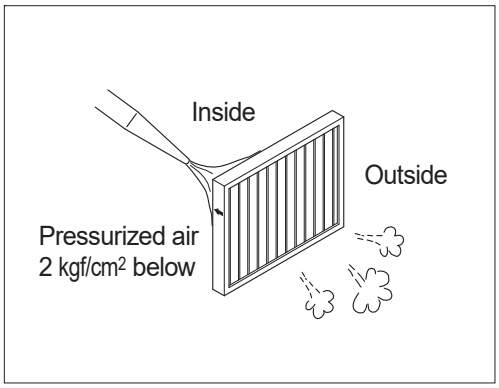
※ **When installing a filter, be careful not to change the filter direction.**



(3) Clean the filter using a pressurized air (below 2 kgf/cm^2, 28 psi).

△ **When using pressurized air, be sure to wear safety glasses.**

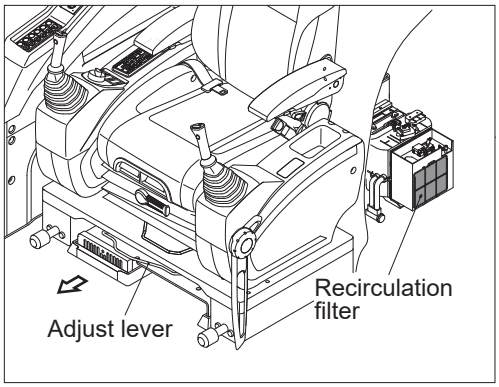
(4) **Inspect the filter after cleaning. If it is damaged or badly contaminated, use a new filter.**



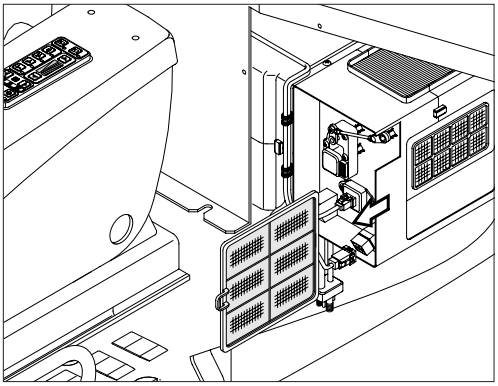
2) CLEAN AND REPLACE OF RECIRCULATION FILTER

※ **Always stop the engine before servicing.**

(1) Move seat and console box to arrow direction using the adjust lever.



(2) Remove recirculation filter

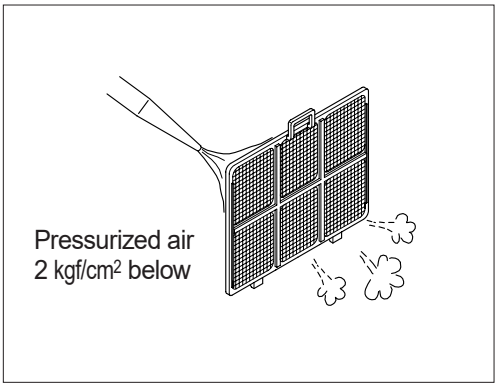


(3) Clean the recirculation filter using a pressurized air (below 2 kgf/cm², 28 psi) or washing with water.

△ **When using pressurized air, be sure to wear safety glasses.**

※ **Dry off after washing with water.**

(4) Inspect the filter after cleaning. If it is damaged or badly contaminated, use a new filter.



3) PRECAUTIONS FOR USING AIR CONDITIONER

(1) When using the air conditioner for a long time, open the window once every one hour.

(2) Be careful not to overcool the cab.

(3) The cab is properly cooled if the operator feels cool when entering there from outside (about 5°C lower than the outside temperature).

(4) When cooling, change air occasionally.

4) CHECK DURING SEASON

Ask the service center for replenishment of refrigerant or other maintenance service so that the cooling performance is not damaged.

5) CHECK DURING OFF-SEASON

Operate the air conditioner 2 or 3 times a month (each for a few minutes) to avoid loss of oil film in the compressor.

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.	• 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.	• 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.	• 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. • In cold weather, check if fuel warmer system is working normal.	
Exhaust gas is white or blue.	• Adjust to specified oil quantity. • Replace with specified fuel.	
Exhaust gas occasionally turns black.	• 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.	• Check the nozzle.	
Unusual combustion noise or mechanical noise.	• 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.	• 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.	• Check the alternator. • Check and repair wiring.	
Unusual noise is emitted from the alternator.	• Check the alternator.	
Starting motor does not turn when starting switch is turned ON.	• 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.	• Charge the battery. • Check the safety relay.	
Starting motor turns the engine sluggishly.	• Charge the battery. • Check the starting motor.	
The starting motor disengages before the engine starts up.	• Check and repair the wiring. • Charge the battery.	
The engine warming up lamp does not go ON.	• Check and repair wiring. • Check the monitor.	
The engine oil pressure lamp does not light up when engine is stationary (when the starting switch is in ON position.)	• 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.)	• 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 CLAMP

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.

※ The initial setting pressure of load relief valve for breaker must refer to the crusher manufacturer's requirements

3) The pressure of the ROBEX130VS PRO system is 350 kgf/cm^2 (4980 psi).

4) Adjusting oil quantity

1) According to the working flow parameters provided by the breaker manufacturer. the working flow of the breaker is adjusted by combining with the breaker detection tool

2) If the quantity of hydraulic oil is not controlled properly, it causes short lifecycle of the breaker and the machine by increased breaking force and count.

5) 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/cm^2 (853 psi) by installing the accumulator.**

6) Do not connect the breaker return line to the main control valve, but connect to the return line front of the cooler.

7) Do not connect the breaker return line to drain lines, such as of swing motor, travel motor or pump, otherwise they should be damaged.

8) One of spool of the main control valve should be connected to the tank.

9) Select the size of pipe laying considering the back pressure.

10) Shimless tube should be used for the piping. The hose and seal should be used Hyundai genuine parts.

11) Weld the bracket for pipe clamp 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 3 kinds of filter elements in particular, in order to prolong machine life.

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

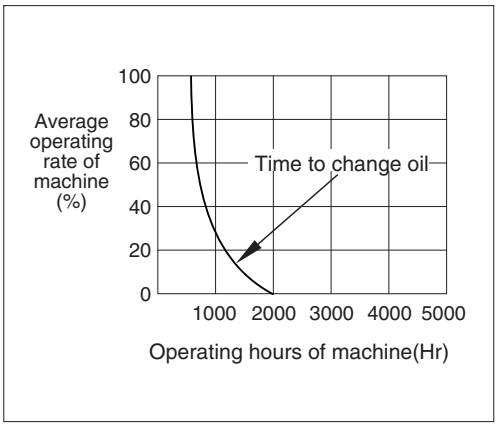
★1 : Conventional hydraulic oil

● **Replace following filter same time**

- Hydraulic return filter : 1 EA
- Pilot line filter : 1 EA
- Drain filter cartridge : 1 EA

Hyd oil change guide for hydraulic breaker

Hyd oil change guide for hydraulic breaker

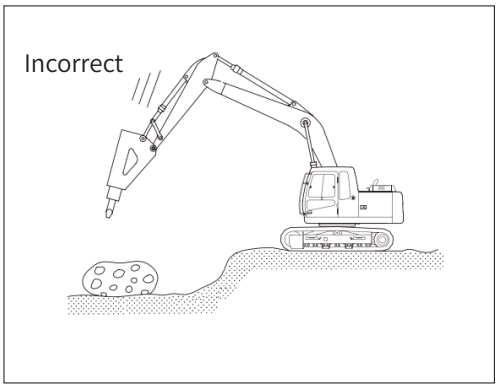


4. PRECAUTIONS WHILE OPERATING THE BREAKER

1) DO NOT BREAK ROCK WHILE LOWERING

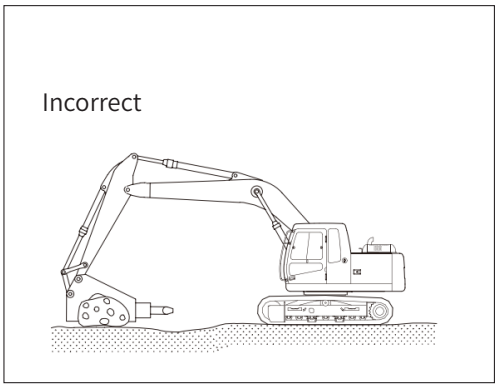
As the breaker is heavy in comparison with bucket, it must be operated slowly.

If breaker is rapidly pushed down, working device may be damaged.



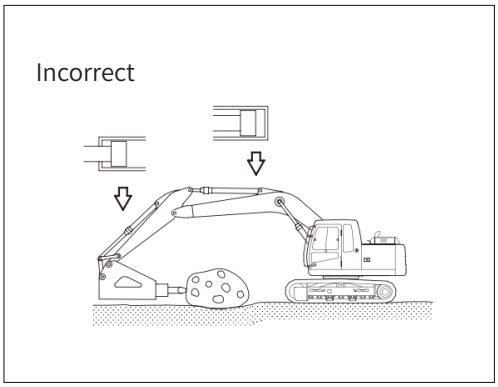
2) DO NOT USE BREAKER TO CARRY BROKEN STONE OR ROCK BY SWING OPERATING

This may damage the operation device and swing system.



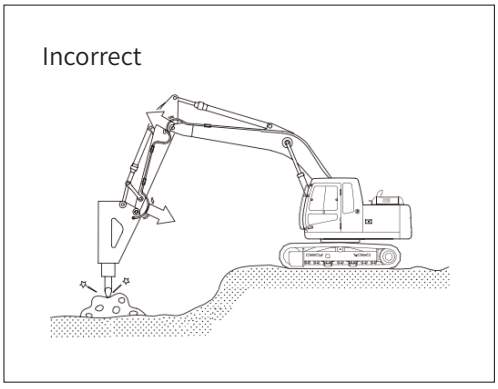
3) OPERATE BREAKER WITH A GAP IN EXCESS OF 100 mm (4 inches) FROM THE END OF THE STROKE TIP

If breaker is operated with the end tip, the cylinder may be damaged.



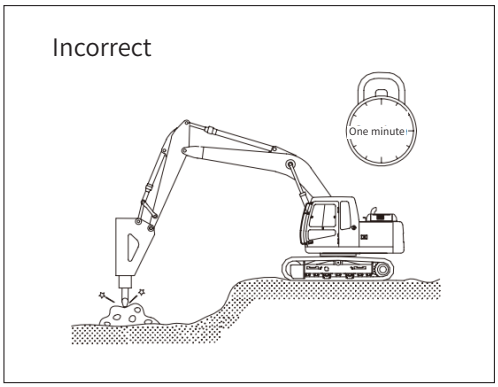
4) IF THE HYDRAULIC HOSES VIBRATE EXCESSIVELY

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

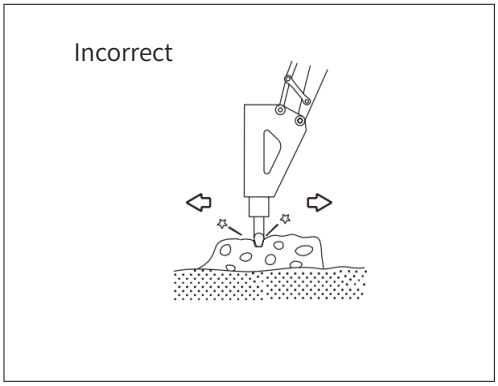
This will increase the temperature of the oil, and cause problem in the accumulator and seals.



6) DO NOT MOVE MACHINE OR BREAKER WHILE STRIKING

Do not move hammer while striking.

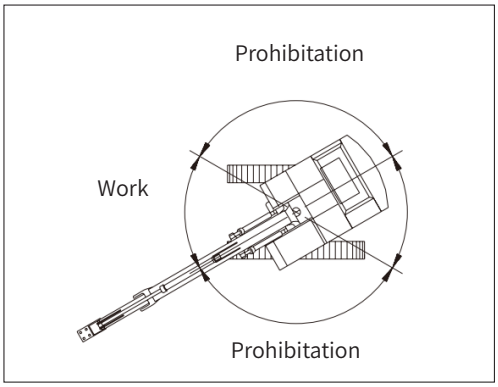
This will cause damage to the working device and the swing system.



7) DO NOT WORK WHILE SWING STATE

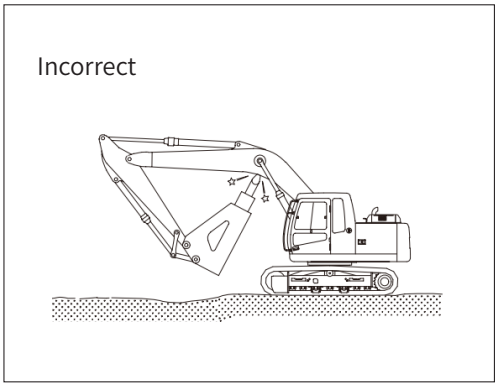
Do not work while swing position of superstructure.

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.

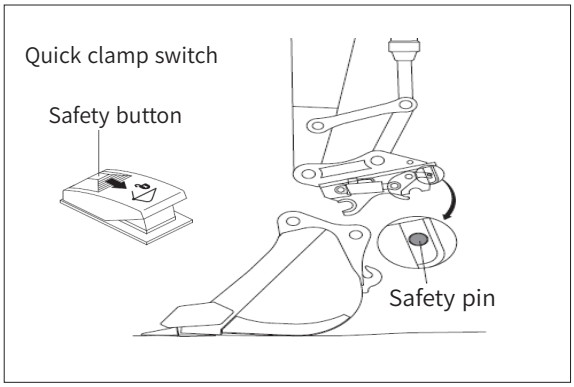


5. QUICK CLAMP(OPTION)

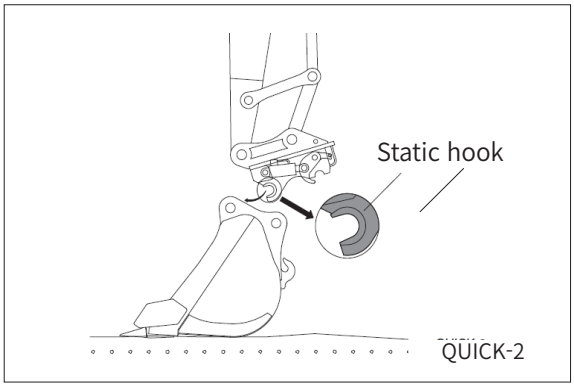
1) FIXING BUCKET WITH QUICK CLAMP

(1) Before fixing bucket, remove safety pin of the moving hook.

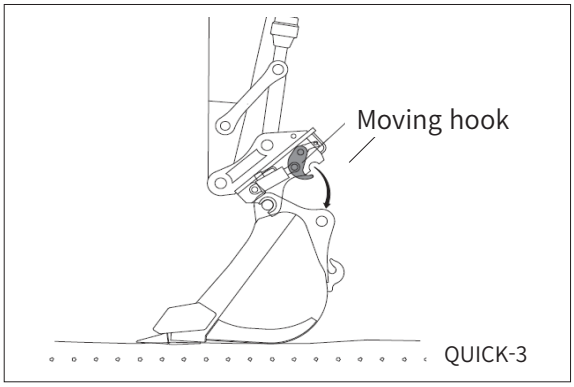
(2) Pulling safety button, press the quick clamp switch to unlock position. Then, the moving hook is placed on release position.



(3) Aligning the arm and bucket, insert static hook of quick clamp to the bucket pin.

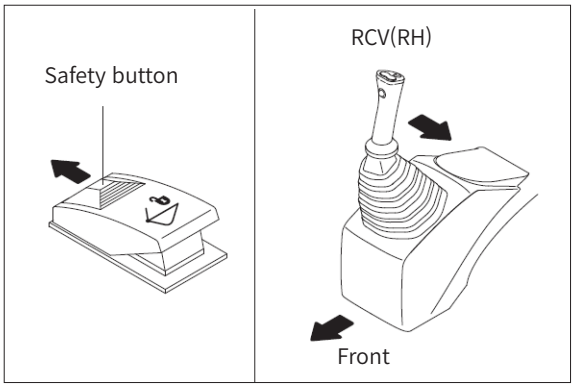


(4) Operate RCV lever to bucket-in position. Then, the moving hook is coupled with the bucket link pin.
Make sure that the moving hook is completely contacted with bucket link pin.

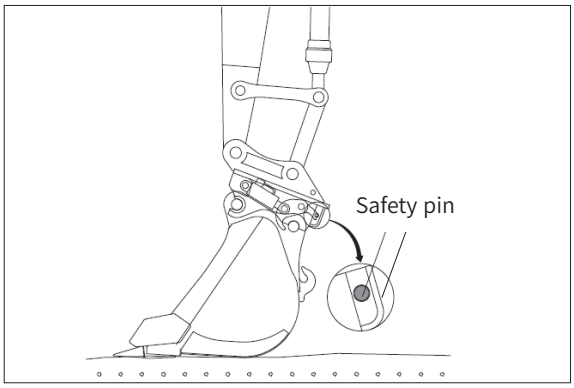


(5) Push safety button to lock position.
Operate RCV lever to bucket-in position.

※ **Be sure to check connection status between bucket pins and hooks of quick clamp.**



(6) After checking the connection status between bucket pins and hooks of quick clamp, **insert safety pin of moving hook to lock position.**

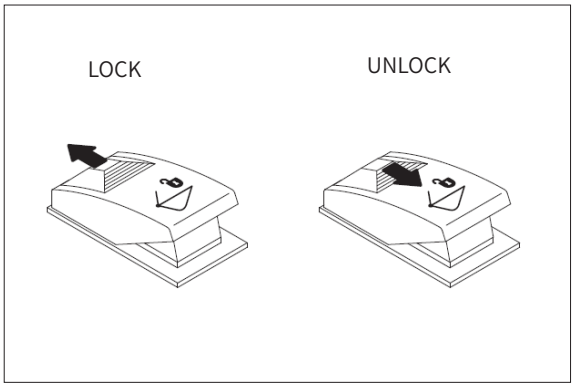


2) REMOVE BUCKET FROM QUICK CLAMP

Removing procedure is reverse of fixing.

3) PRECAUTION OF USING QUICK CLAMP

⚠ **When operating the machine with quick clamp, confirm that the quick clamp switch is lock position and safety pin of moving hook is inserted.**
Operating the machine with quick clamp 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 clamp. 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.