WARNING

CALIFORNIA PROPOSITION 65

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

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go the www.P65warnings.ca.gov/diesel.

91K4-07310-EN

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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.

   Some illustrations in this manual show details or attachments that can be different from your machine. Covers and guards might have been removed for illustrative purposes.

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.

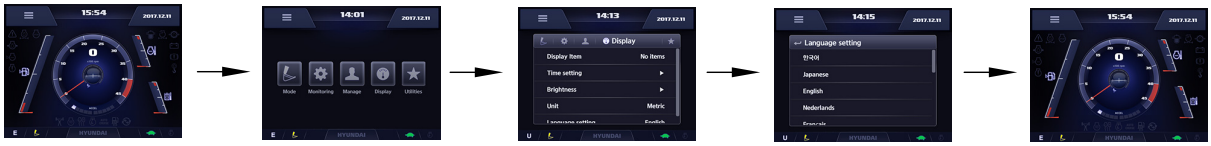
Ask your supervisor if you are uncertain about a particular task. Do not try to do too much too fast.

Use your common sense.

※ How to set the language of cluster

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

Normal type



Premium type

220S0SG510

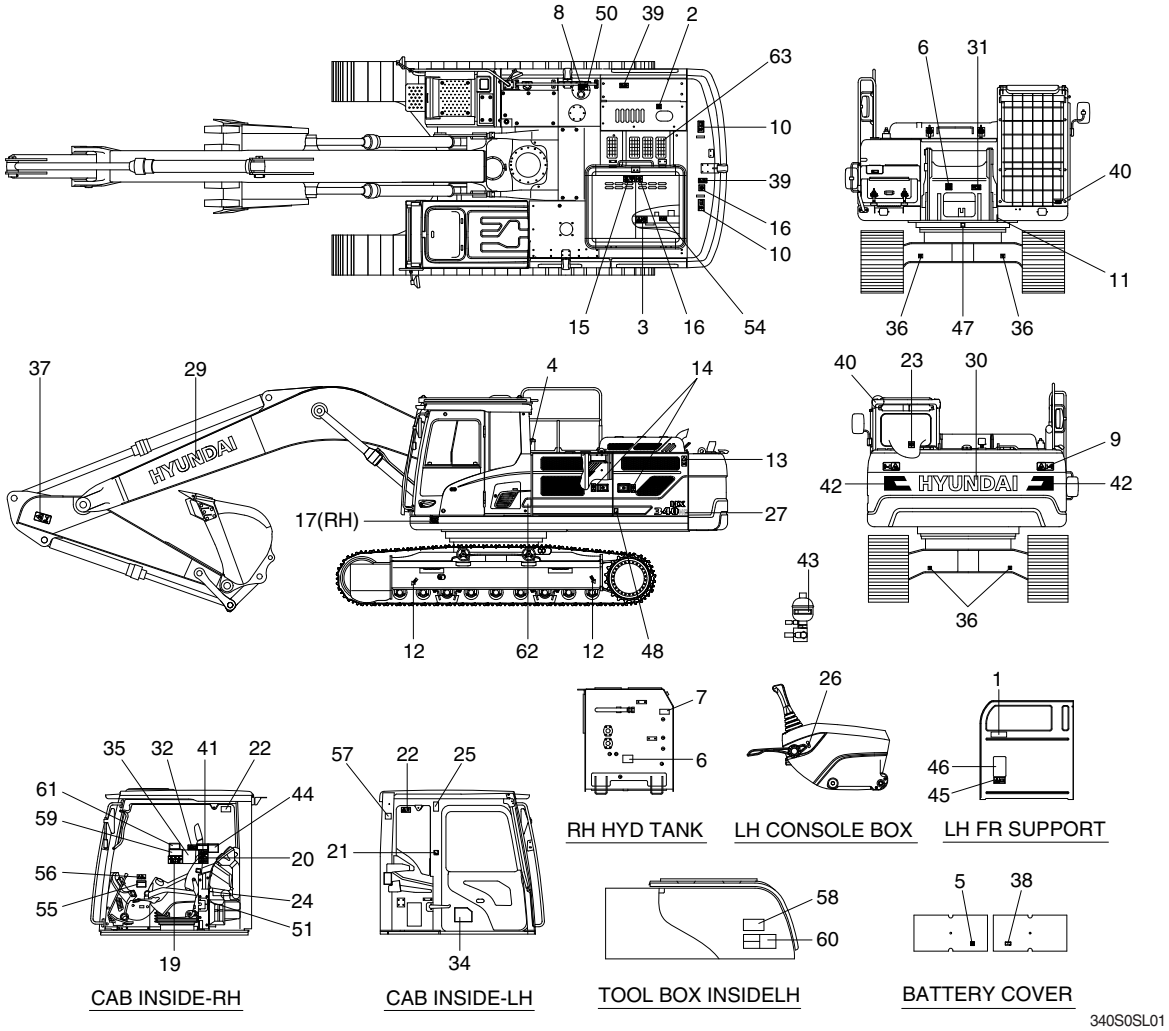
220S0SG10A

※ Please refer to the page 3-17 for the cluster.

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.



340S0SL01

1	Air cleaner filter	21	Hammer	41	Caution (water separator, turbocharger)
2	Turbocharger cover	22	Safety front window		
3	Radiator cap	23	Safety rear window	42	Reflecting
4	Fueling	24	Air conditioner filter	43	Accumulator
5	Battery accident	25	ROPS plate	47	Swing bearing grease
6	High pressure hose	26	Safety knob	48	Battery position
7	Hydraulic oil level	27	Model name	50	Fuel shut off
8	Hydraulic oil lub	29	Trade mark (boom)	51	MCU/ECM connector
9	Keep clear-rear	30	Trade mark (CWT)	54	Surge tank
10	Lifting eye	31	Reduction gear grease	55	Key off caution
11	Name plate	32	Clamp locking	56	RCV lever
12	Slinging ideogram	34	Service instruction	57	Fire extinguisher
13	Keep clear-side	35	Lifting chart	58	Leftover fuel
14	Stay fix	36	Tie	59	RCV control
15	Engine hood shearing	37	Keep clear-attach	60	Air compressor
16	No step	38	Electric welding	61	Air compressor - cab
17	Transporting	39	Falling	62	Band
19	M/control pattern	40	FOPS FOG plate	63	Step tread
20	Ref operator's manual				

2. DESCRIPTION

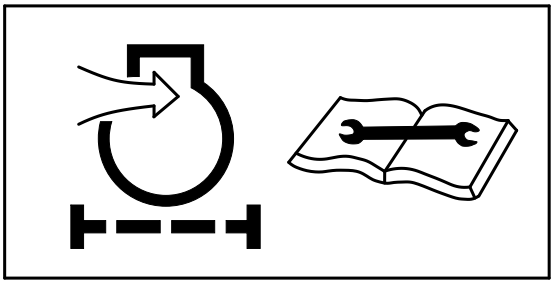
There are several specific warning labels on this machine please become familiarized with all warning labels.

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) **AIR CLEANER FILTER** (item 1)

This warning label is positioned on the left side of the front support.

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



21070FW01

2) **TURBOCHARGER COVER** (item 2)

This warning label is positioned on the pump hood.

⚠ **Do not touch turbocharger or it may cause severe burn. When the engine is running or immediately after engine shut down.**

21070FW02

3) **RADIATOR CAP** (item 3)

This warning label is positioned on the radiator.

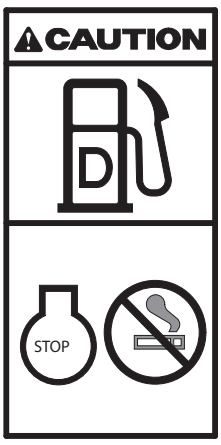
⚠ **Never open the filler cap while engine running or at high coolant temperature. Hot coolant can cause serious burns, injury or death.**

14070FW03

4) **FUELING** (item 4)

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.**



290F0FW02

5) BATTERY ACCIDENT (item 5)

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.

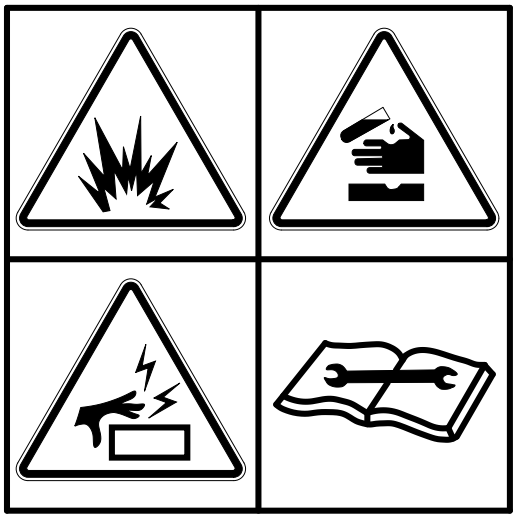
With electrolyte at proper level, less space may cause the gases to be accumulated in the battery.

⚠ 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.



36070FW05

6) HIGH PRESSURE HOSE (item 6)

This warning label is positioned on the front of the upper frame and the right side of the hydraulic tank.

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

⚠ Avoid the hazard by relieving pressure before disconnecting hydraulic lines or other lines.

※ See the maintenance section for details.

14070FW29

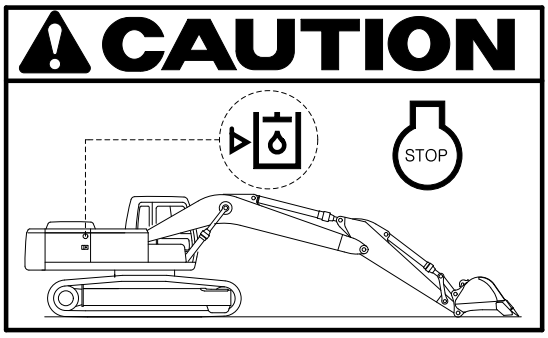
7) HYDRAULIC OIL LEVEL (item 7)

This warning label is positioned on the right side of the hydraulic tank.

⚠ 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.



21070FW07

8) HYDRAULIC OIL LUBRICATION (item 8)

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.

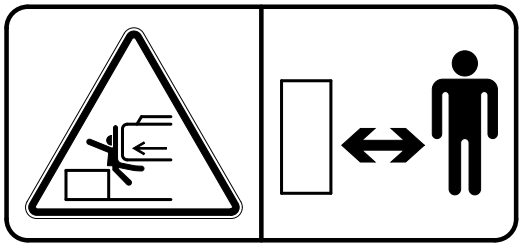
14070FW08

9) KEEP CLEAR-REAR (item 9)

This warning label is positioned on the rear side 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.



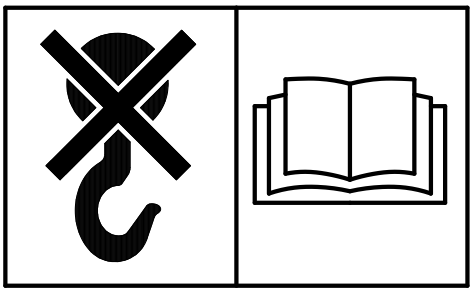
21090FW09

10) LIFTING EYE (item 10)

This warning label is positioned on the top side of 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.

※ See page 5-7 for proper lifting method of the machine.



21070FW10

11) KEEP CLEAR-SIDE (item 13)

This warning label is positioned on the LH and RH 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.

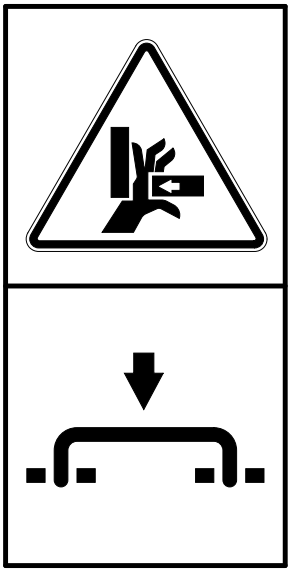
21070FW13

12) STAY FIX (item 14)

This warning label is positioned on the LH and RH 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.



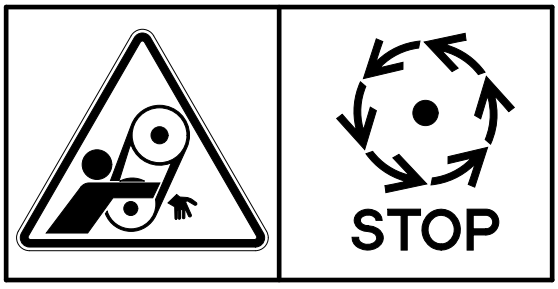
21070FW14

13) ENGINE HOOD SHEARING (item 15)

This warning label is positioned on the engine hood.

⚠ Don't open the engine hood during the engine's running. Stay clear of rotating parts.

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



21070FW15

14) **NO STEP** (item 16)

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

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

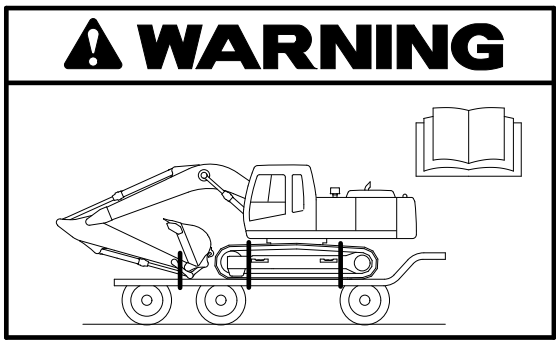
21070FW16

15) **TRANSPORTING** (item 17)

This warning label is positioned on the front 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.



14070FW17

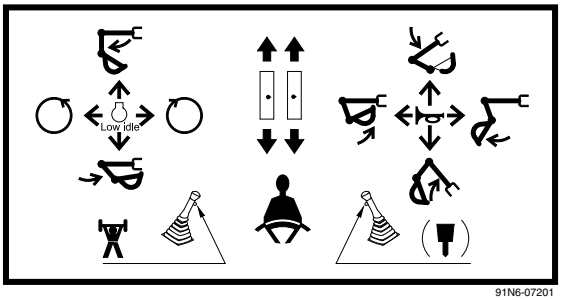
16) **MACHINE CONTROL PATTERN** (item 19)

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

⚠ **Check the machine control pattern for conformance to pattern on this label. If not, change label to match pattern before operating machine.**

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

See page 4-12 for details.



91N6-07201

91N6-07201

17) REF OPERATOR'S MANUAL (item 20)

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

(1) Ref operator manual

⚠ Study the operator's manual before starting and operating machine.

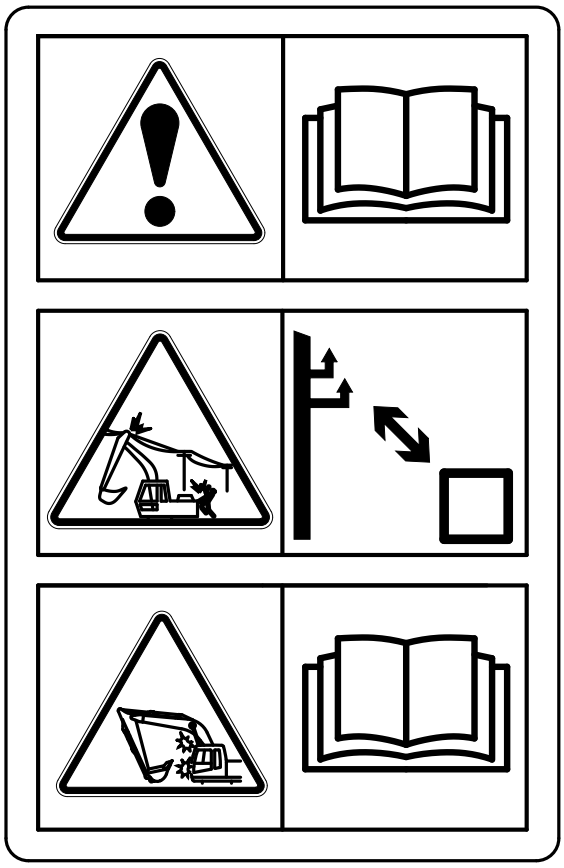
⚠ Do not operate this machine unless you have read and understand the instructions and warnings in this manual.
Failure to follow the instructions or warnings could result in injury or death.

(2) Max height

⚠ Serious injury or death can result from contact with electric lines.
An electric shock being received by merely coming into the vicinity of an electric lines, the minimum distance should be kept considering the supply voltage as page 1-16.

(3) Interference

⚠ Be careful to operate machine equipped with quick clamp or extensions.
Bucket may hit cab or boom, boom cylinders when it reached vicinity of them.



2609A0SL05

18) HAMMER (item 21)

This label is located on the right center stay of the cabin inside.

※ The window serves as an alternate exit.

※ In emergency, break out the window using the hammer and escape from the cabin.

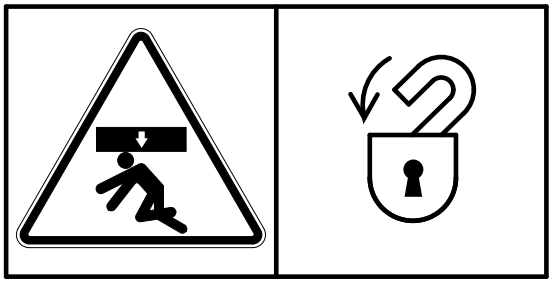
91Q6-07280

19) SAFETY FRONT WINDOW (item 22)

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

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

※ See page 3-60 for details.



21070FW24

20) **SAFETY REAR WINDOW** (item 23)

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

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

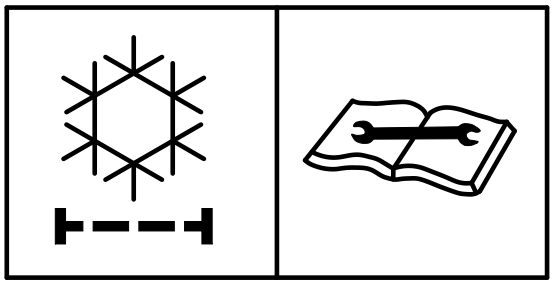
※ **To remove rear window, pull the ring and push out the glass.**

2609A0SL02

21) **AIR CONDITIONER FILTER** (item 24)

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.**

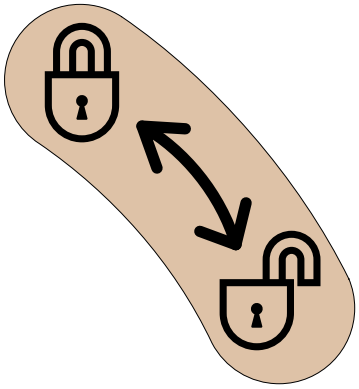


21070FW26

22) **SAFETY KNOB** (item 26)

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

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

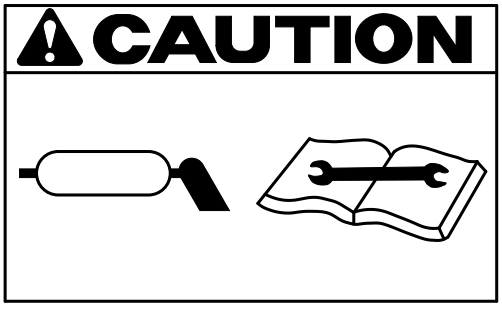


30007A1FW07A

23) **REDUCTION GEAR GREASE** (item 31)

This warning label is positioned on the front side 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.



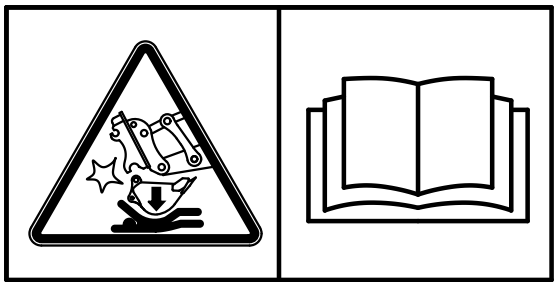
21070FW35

24) **CLAMP LOCKING** (item 32)

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

⚠ **Serious injury or death can result from dropping bucket.**

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



14070FW60

25) **TIE** (item 36)

This warning label is positioned on the front and rear side of the lower frame.

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

⚠ **See page 4-15 for detail.**

4507A0FW02

26) **KEEP CLEAR-ATTACH** (item 37)

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.**

14070FW31

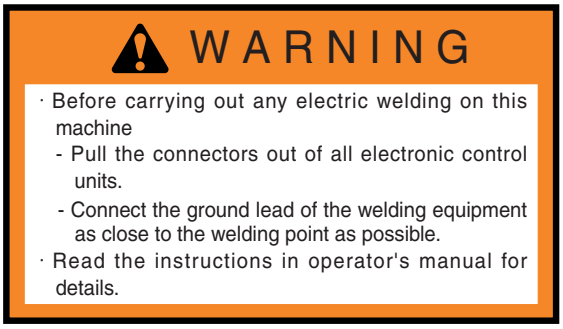
27) **ELECTRIC WELDING** (item 38)

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.

※ **See page 6-46 for detail.**



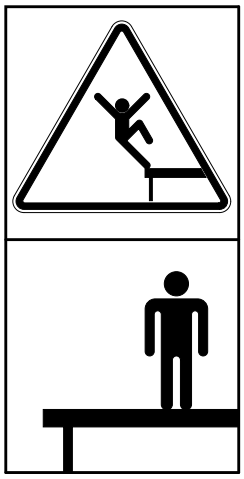
7807AFW20

28) **FALLING** (item 39)

This warning label is positioned on the top of the pump hood and counterweight.

⚠ **Falling is one of the major cause of personal injury.**

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



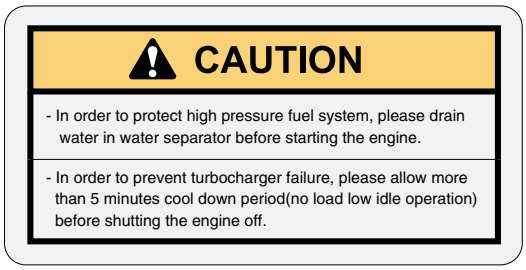
14070FW30

29) **CAUTION (W/SEPARATOR, TURBOCHARGER)** (item 41)

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

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

⚠ **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.**



120090SL02

30) **REFLECTING** (item 42)

This warning label is positioned on the rear side 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.**

290F0FW01

31) **ACCUMULATOR** (item 43)

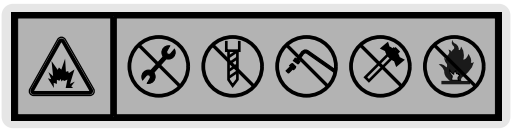
This warning label is positioned on the accumulator of the solenoid valve.

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

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

⚠ **Do not weld anything to the accumulator.**

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

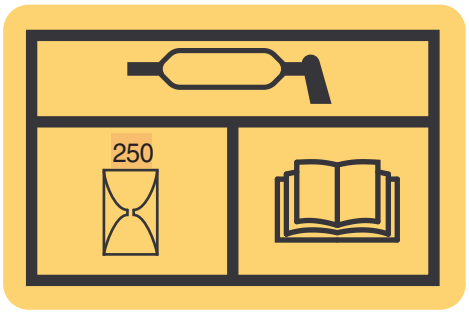


1107A0FW46

32) **SWING BEARING GREASE** (item 47)

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

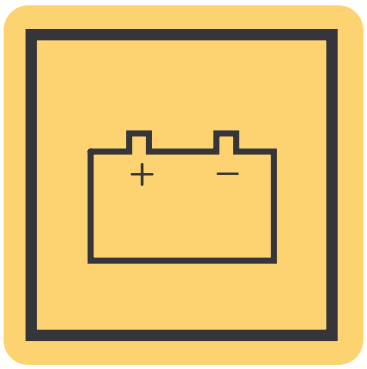
※ **See page 6-37 for details.**



38090FW02

33) **BATTERY POSITION** (item 48)

This warning label is positioned on the left side cover.



38090FW03

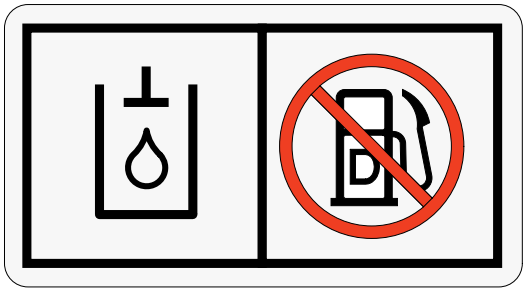
34) **FUEL SHUT OFF** (item 50)

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

※ **Fill only the hydraulic oil.**

※ **Do not fill the diesel fuel.**

⚠ **Relieve tank pressure with the engine off by removing the cap slowly to prevent burns from hot oil.**



140WH90FW51

35) **MCU/ECM CONNECTOR** (item 51)

This warning label is positioned on the low cover of the air conditioner in the cab.

※ **MCU communicates the machine data with Laptop computer through RS232 service socket.**

※ **ECM communicates the engine data with cummins INSITE tool adapter through J1939 service socket.**

※ **See page 3-60 for details.**

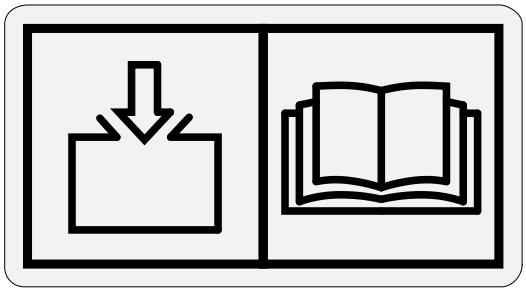
235Z90FW52

36) **SURGE TANK** (item 54)

This warning label is positioned on the top of the radiator.

This system must be filled slowly to prevent air locks.

※ **Fill rate ≤ 11 lpm**



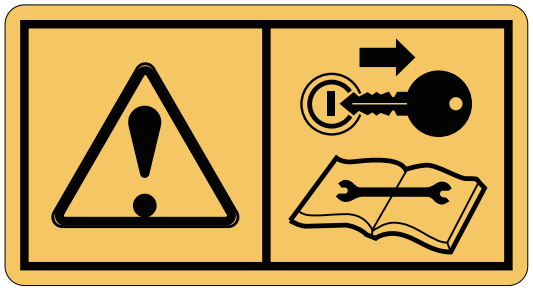
3009A0FW54

37) **KEY OFF CAUTION** (item 55)

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.



290F0FW05

38) **RCV LEVER** (item 56)

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

※ **When you work by moving the seat to the front of cab, it is possible to take place interference between cluster and RCV lever at specific position.**

To prevent this interference, handle below works.

(1) Rotate cluster.

(2) Adjust seat position for up-and-downward using seat height adjuster knob in suspension.

(3) Lower the console box height using knob between RH console box and seat cushion.

(4) Push back console and seat position using seat and console box adjust knob between LH console box and seat cushion.

290F0FW04

39) **FIRE EXTINGUISHER** (item 57)

This label is located on the left rear stay of the cabin inside.

※ **Read and understand the instructions adhered decal on the fire extinguisher.**

91Q6-07290

40) **LEFTOVER FUEL** (item 58)

This warning label is positioned on the inner left side of tool box.

⚠ **Do not fuel a machine near open flames or sparks.**

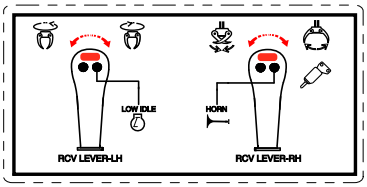
⚠ **Properly clean areas of spillage.**

91K4-02700

41) **RCV CONTROL** (item 59)

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

※ **Read and understand the operation of the RCV lever.**



330F0SL05

42) **AIR COMPRESSOR** (item 60)

This warning label is positioned on the inner left side of tool box.

⚠ **Do not touch air compressor or it may cause server burn.**

91Q4-13301

43) **AIR COMPRESSSOR -CAB** (item 61)

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

※ **Park on a flat place to use the air compressor.**

※ **Be sure the engine working during the use of air compressor. After the use, make sure the compressor switch off.**

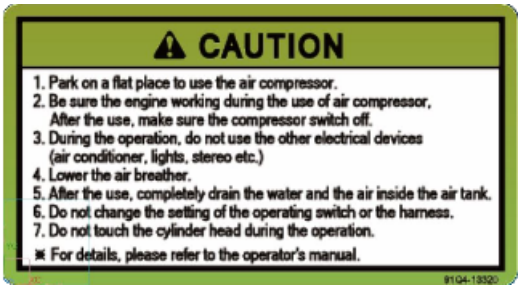
※ **During the operation, do not use the other electrical devices (air conditioner, lights, stereo etc.)**

※ **Lower the air breather.**

※ **After the use, completely drain the water and the air inside the air tank.**

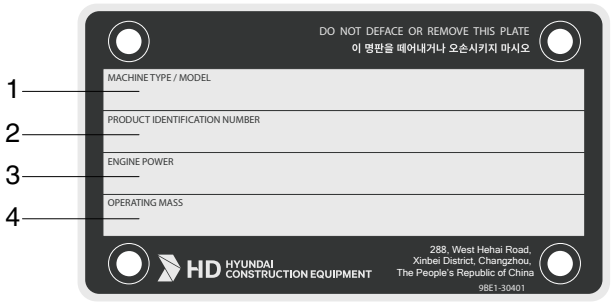
※ **Do not change the setting of the operating switch or the harness.**

⚠ **Do not touch the cylinder head during the operation.**

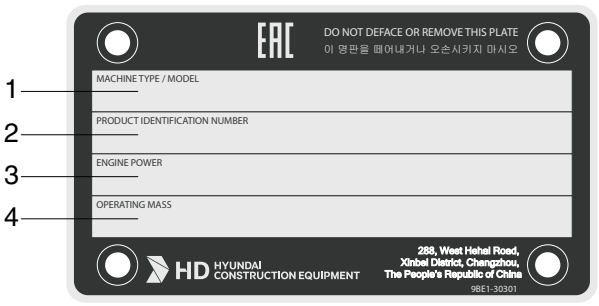


91Q4-13320

MACHINE DATA PLATE

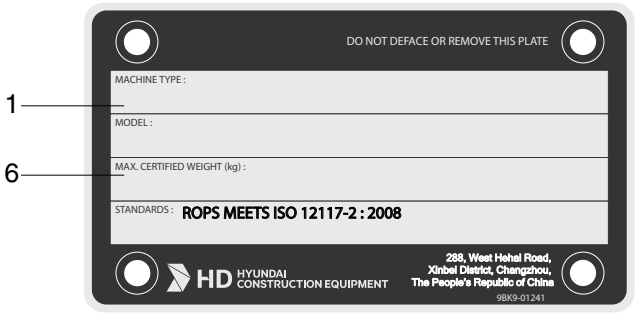


For general



For RUSSIA,KAZAKHSTAN, BELARUS

For FOPS/FOG



For ROPS

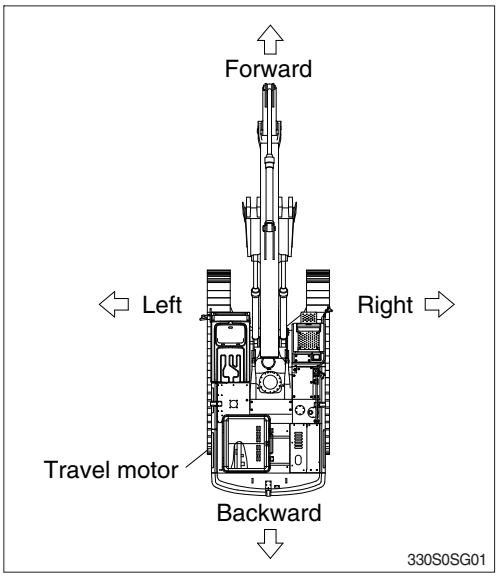
1	Machine type / model	2	Product identification number	3	Engine power
4	Operating mass	5	Manufacturing year	6	Maximum certified weight

※ 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.

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.

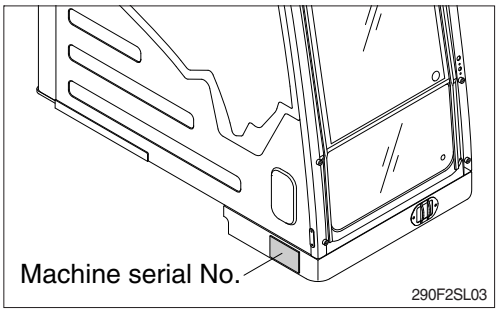


2. SERIAL NUMBER

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

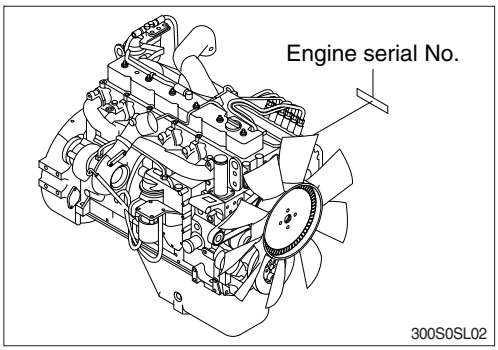
1) MACHINE SERIAL NUMBER

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

※ Please refer to the section 4 (efficient working method) further details.

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.

CALIFORNIA PROPOSITION 65

⚠ WARNING

CALIFORNIA PROPOSITION 65

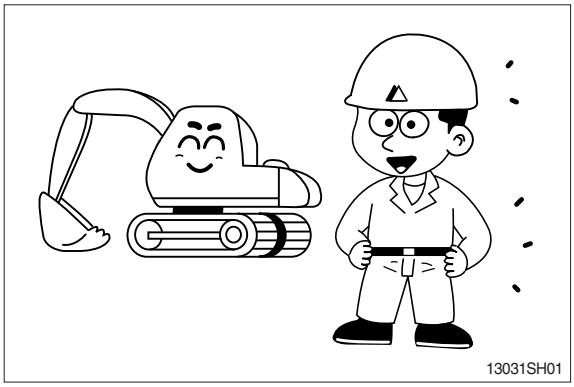
Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

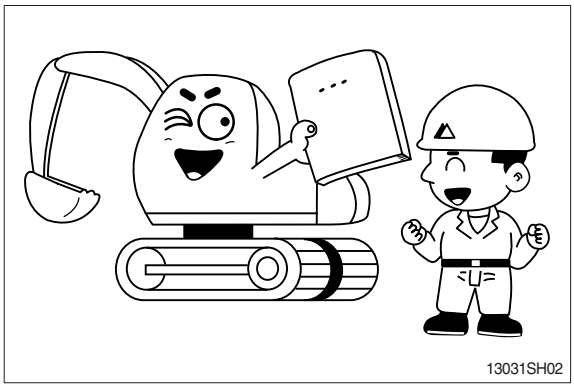
For more information go to www.P65warnings.ca.gov/diesel.

1. BEFORE OPERATING THE MACHINE

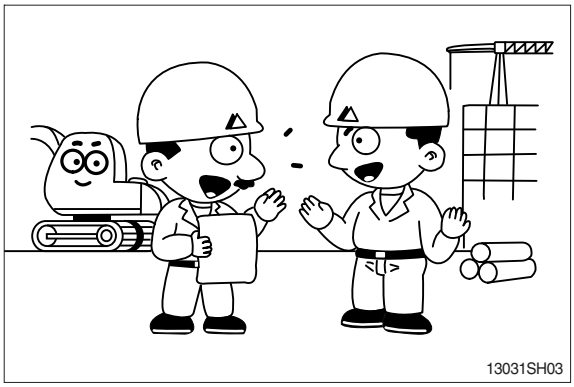
Think-safety first.
In special situation, wear protective clothing including a safety helmet, safety shoes, gloves, safety glasses and ear protection as required by the job condition.
Almost every accident is caused by disregarding the simple and fundamental safety hints.



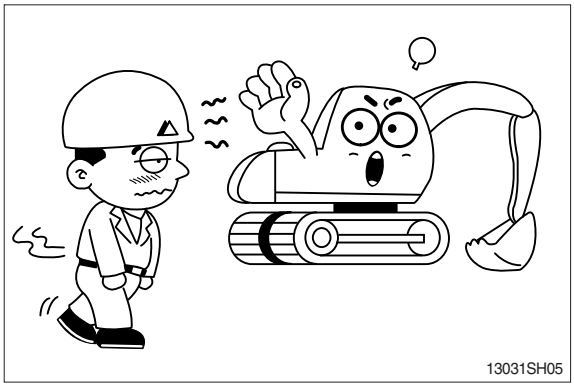
Be sure to understand thoroughly all about the operator's manual before operating the machine.
Proper care is your responsibility.



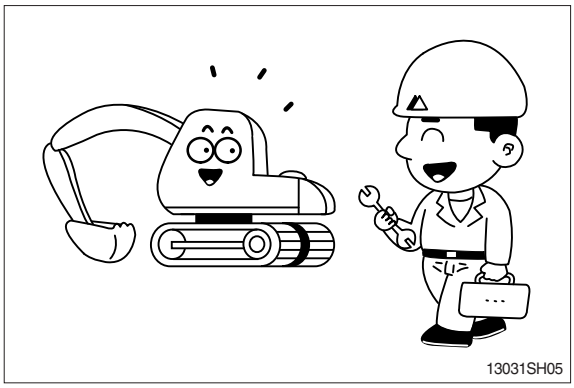
Fully understand the details and process of the construction before starting the work.
If you find anything dangerous on the job, consult with the job supervisor for the preventive measures before operating the machine.



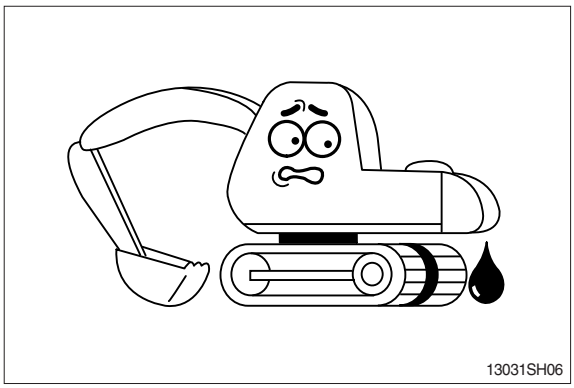
Do not operate when tired, or after drinking alcoholic beverages or any type of drugs.



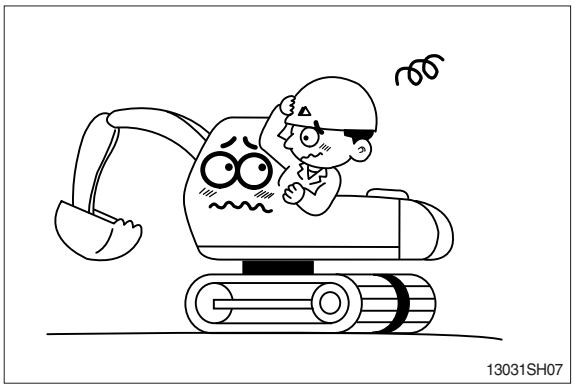
Check daily according to the operation manual.
Repair the damaged parts and tighten the loosened bolts.



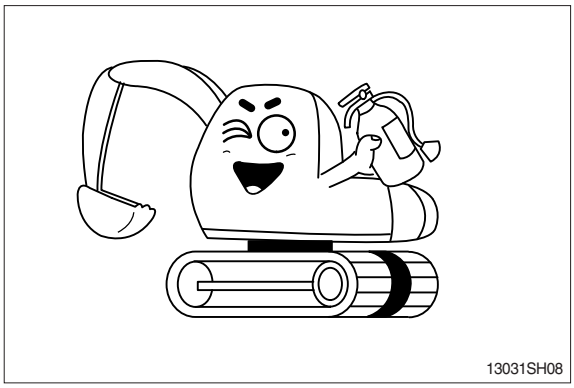
Check for leakage of engine oil, hydraulic oil, fuel and coolant.
Keep machine clean, clean machine regularly.



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.

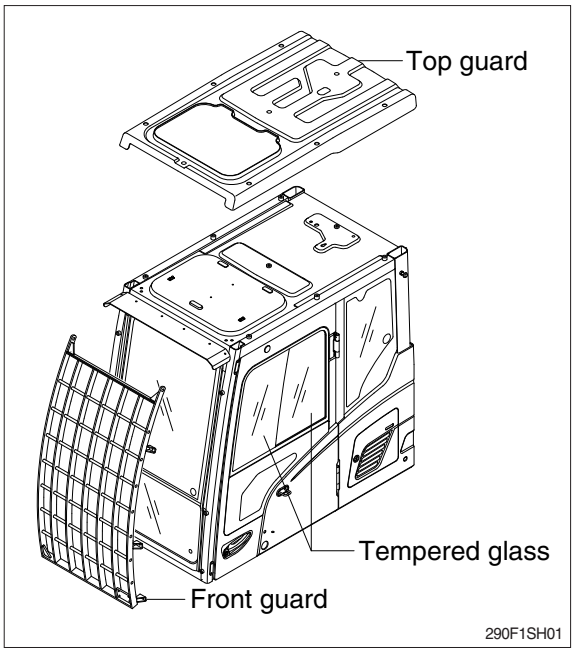


PROTECTION AGAINST FALLING OR FLYING OBJECTS

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.



UNAUTHORIZED MODIFICATION

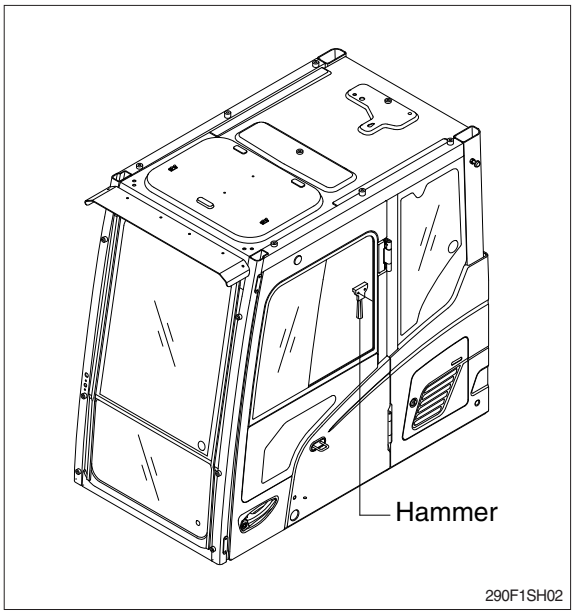
Any modification made without authorization from Hyundai can create hazards.

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.

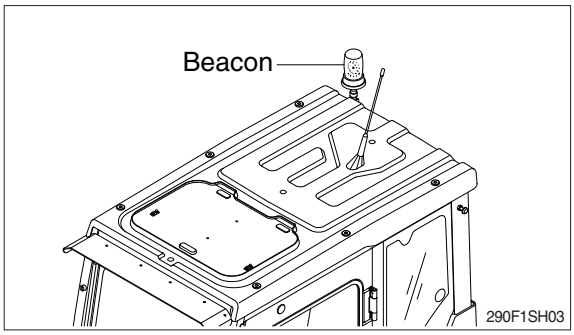
Be sure you know the phone numbers of persons you should contact in case of an emergency.



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.

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.

3001SH01

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

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

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

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

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

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

Do not operate the machine near any flame.

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

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

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

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

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

3001SH02

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

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

3001SH03

Battery and battery cables

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

3001SH04

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

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

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

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

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

Daily inspect battery cables that are in areas that are visible. Inspect cables, clips, straps, and other restraint for damage. Replace any damaged parts. Check for signs of the following, which can occur over time due to use and environmental factors :

- Fraying
- Abrasion
- Cracking
- Discoloration
- Cuts on the insulation of the cable
- Fouling
- Corroded terminals, damaged terminals, and loose terminals

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

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

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

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

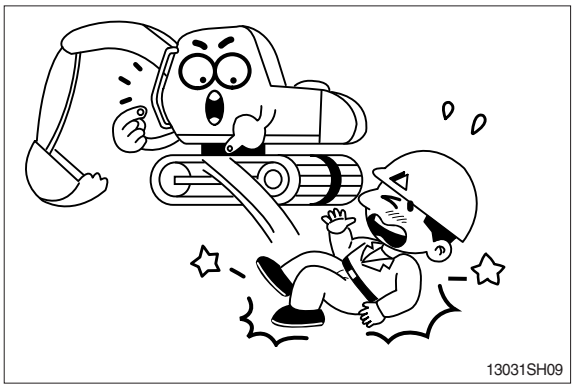
Sources

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.

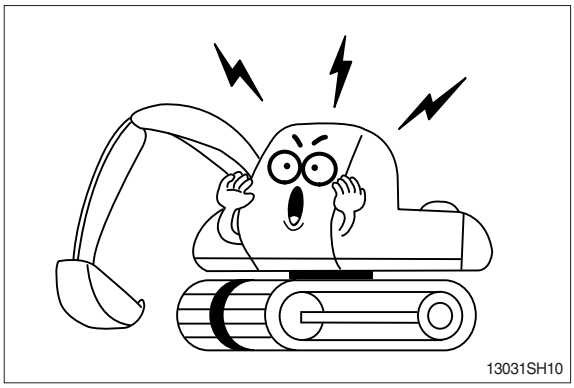
You should check the original directive. This document summarizes part of the content of the applicable law. This document is not meant to substitute the original sources. Other parts of these documents are based on information from the United Kingdom Health and Safety Executive.

2. DURING OPERATING THE MACHINE

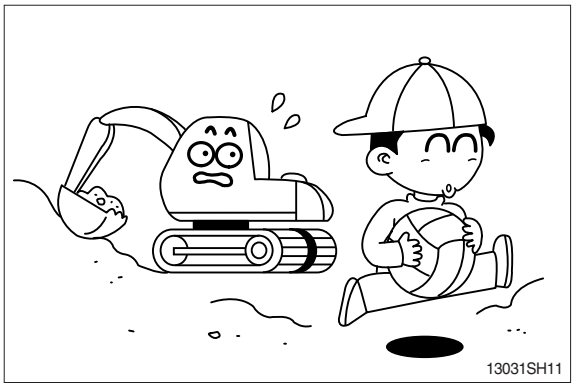
Use the handle and footstep when getting on or off the machine.
Do not jump on or off the machine.



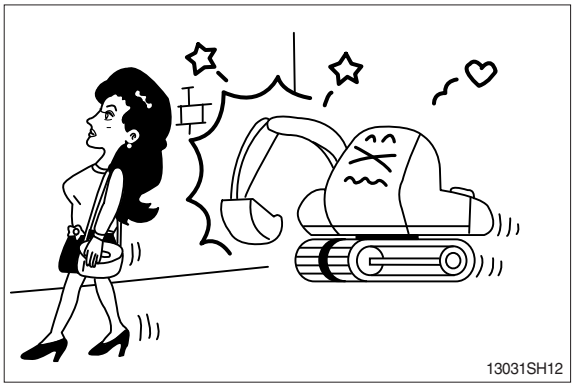
Sound the horn to warn nearby personnel before operating the machine.
Remove all the obstacles like frost on the window before operating the machine for the good visibility.



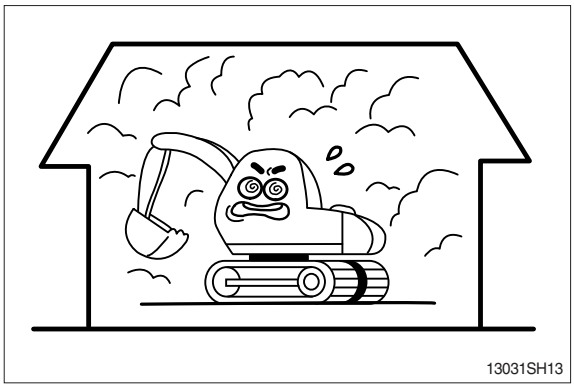
Operate carefully to make sure all personnel or obstacles are clear within the working range of the machine.
Place safety guards if necessary.



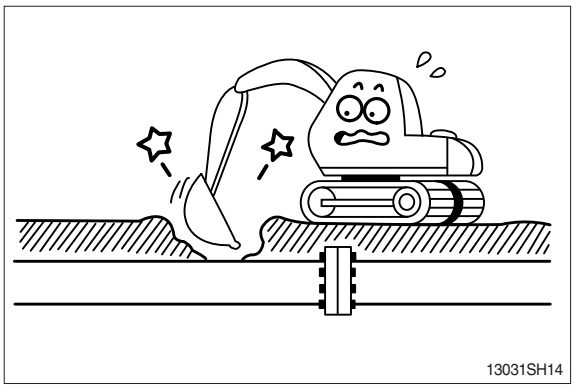
When using the work equipment, pay attention to job site.



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

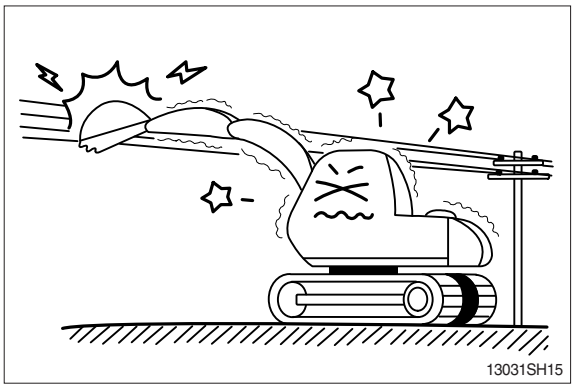


Check the locations of underground gas pipes or water line and secure the safety before operation.

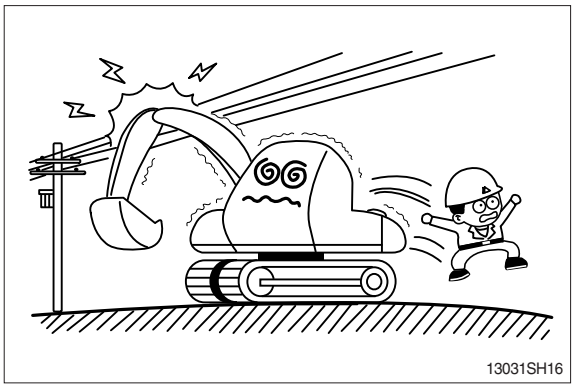


The operating near the electrical lines is very dangerous.
Operate within safe working range permitted as below.

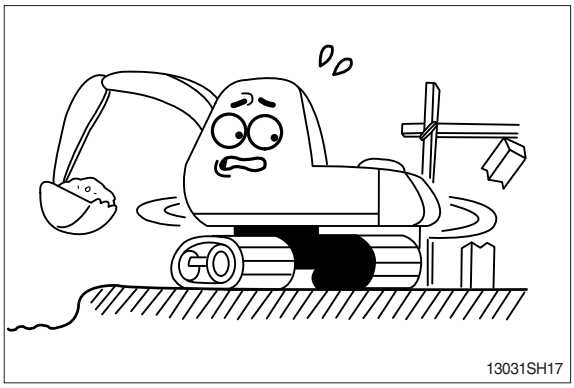
Supply voltage	Min safe separation
6.6 kV	3m (10 ft)
33.0 kV	4m (13 ft)
66.0 kV	5m (16 ft)
154.0 kV	8m (26 ft)
275.0 kV	10m (33 ft)



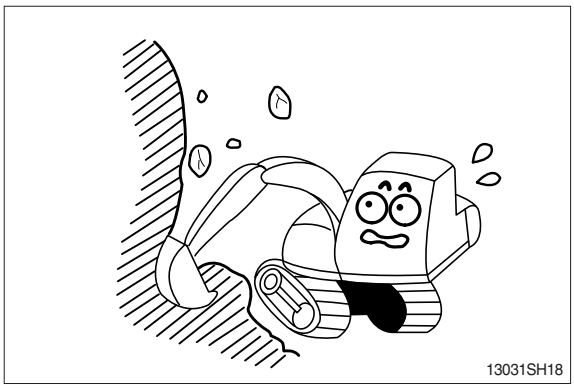
If the machine touches the electric power lines, keep sitting on the operator's seat and make sure the personnel on the ground not to touch the machine until turning off the electric current. Jump off the machine without contacting the machine when you need to get off.



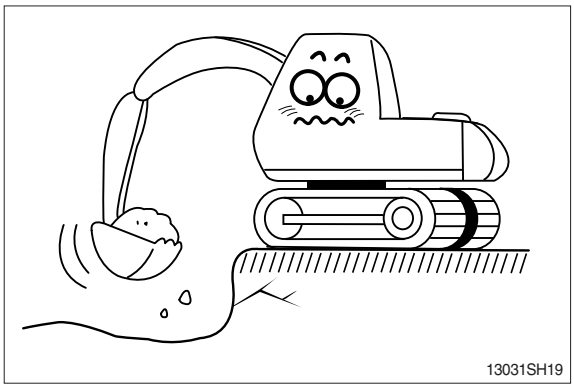
Watch out for obstacles.
Be particularly careful to check the machine clearance during the swing.



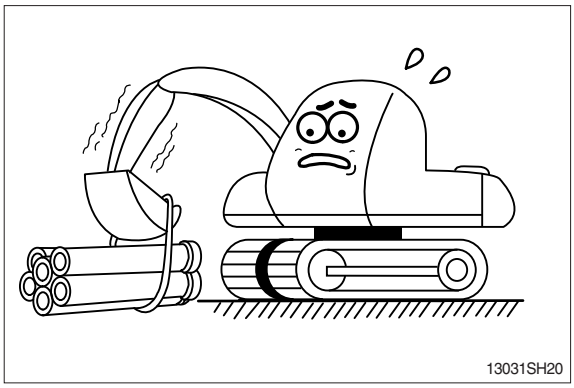
When using the machine as breaker or working in a place where stones may fall down, cab roof guard and head guard should be provided for proper protection.



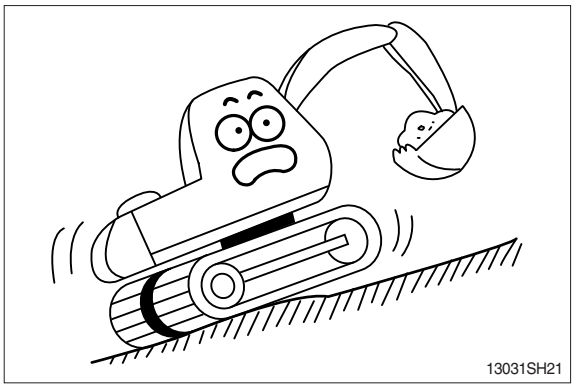
Avoid operating on a cliff or soft ground as there is danger of rolling over.
Make sure to get off easily as keeping the track at a right angle and putting the travel motor into the backward position when working on a cliff or soft ground inevitably.



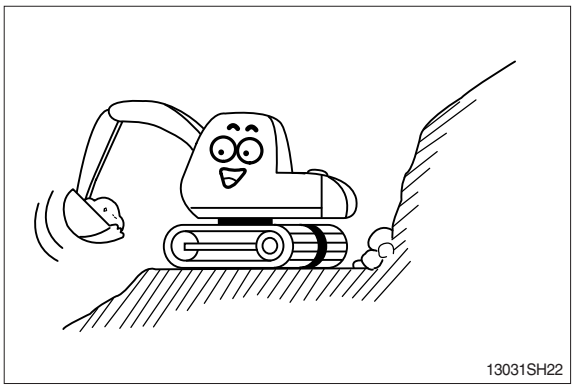
Operate for the lifting work considering the capacity of machine, weight and width of the load.
Be careful not to lift exceeding the machine capacity as it can be the cause of machine damage and safety accident.



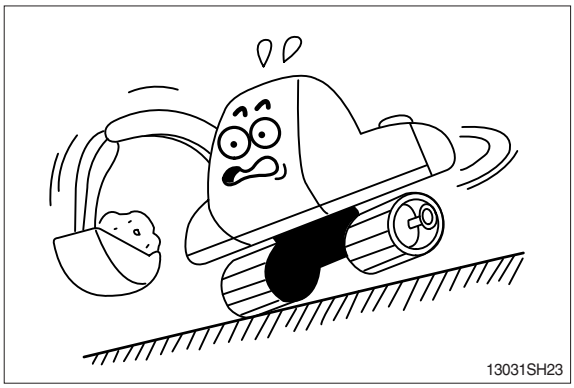
The operation on a slope is dangerous.
Avoid operating the machine on a slope of over 10 degree.



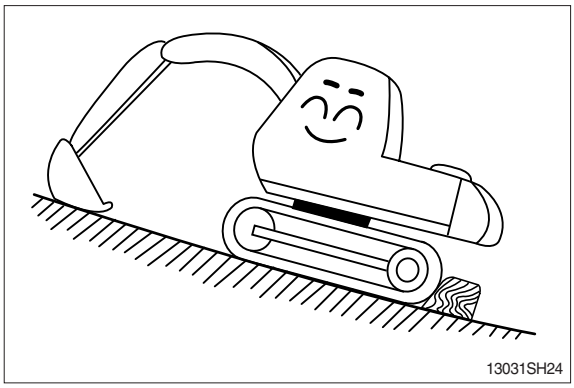
Operate the machine after making ground flat when operation is required on a slope.



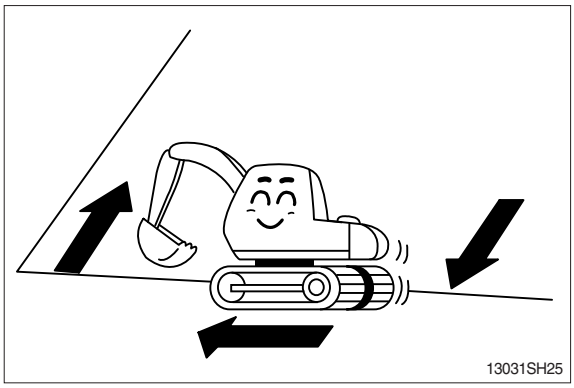
The swing on the slope can be danger of rolling over.
Do not operate to swing the machine with the bucket loaded on a slope since the machine may lose its balance under such an instance.



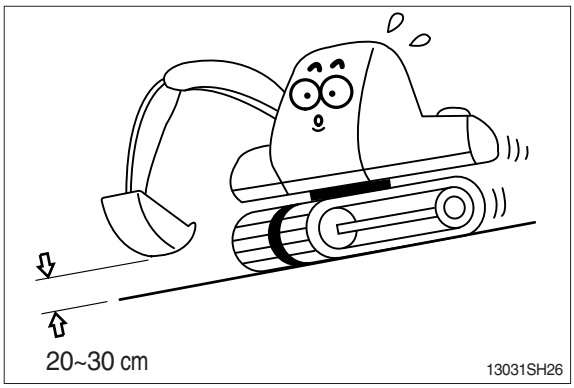
Avoid parking and stopping on a slope.
Lower the bucket to the ground and block the track when parking.



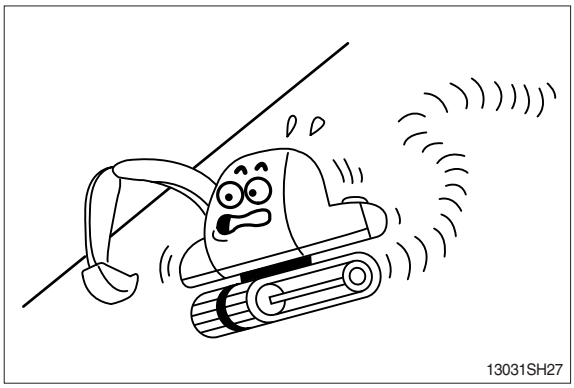
Avoid traveling in a cross direction on a slope as it can cause the danger of rolling over and sliding.



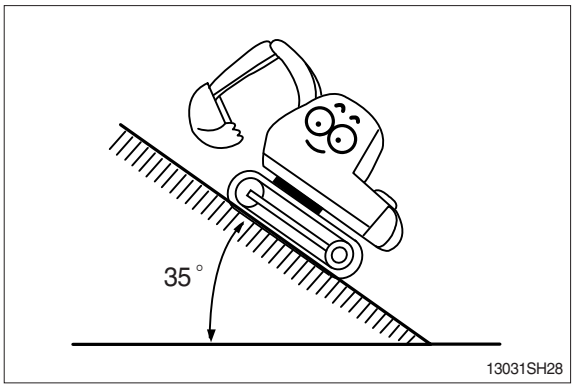
Traveling on a slope is dangerous.
Be sure to operate slowly when traveling down a slope and maintain the bucket at a height of 20~30 ㎝ (1 ft) above the ground so that it can be used as brake in an emergency.



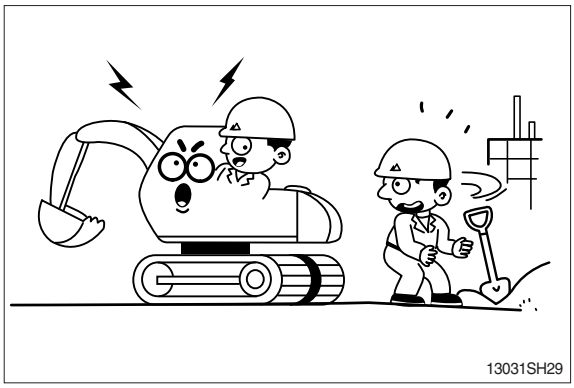
Steering of the machine while traveling on a slope is dangerous.
When an inevitable turning of direction is required, turn on the flat and solid ground.



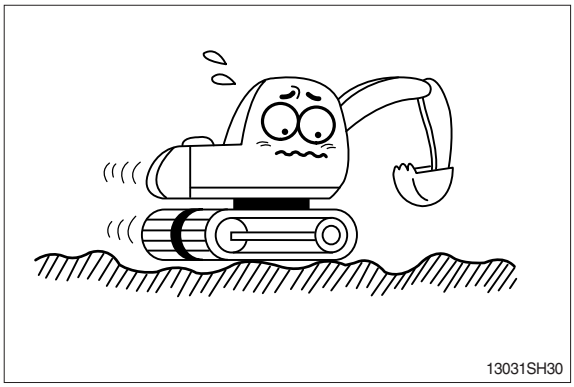
The engine angularity limits are 35 degree.
Do not operate by more than the engine limits in any case.



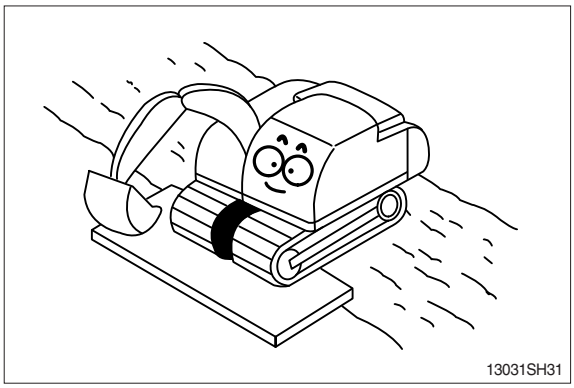
Before traveling the machine, sound the horn to warn nearby personnel.
Operate forward and backward correctly with confirming the location of the travel motor.



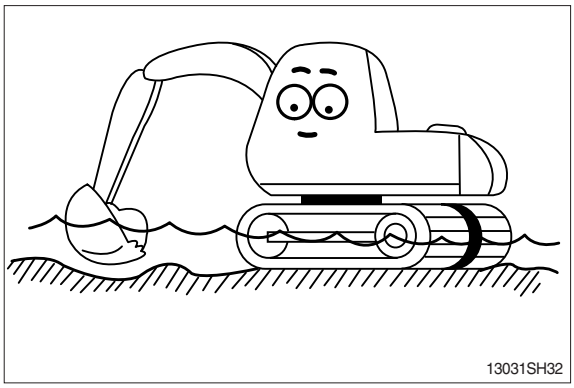
Slow down when traveling through obstacles or uneven ground.



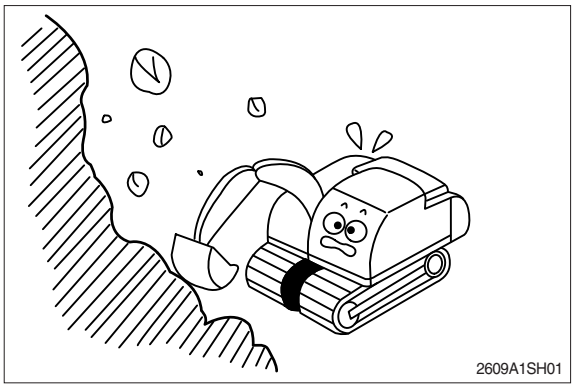
When working on soft ground, place mats or wood boards on the ground to prevent the machine sinking.



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


2609A1SH01

MOUNTING AND DISMOUNTING

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

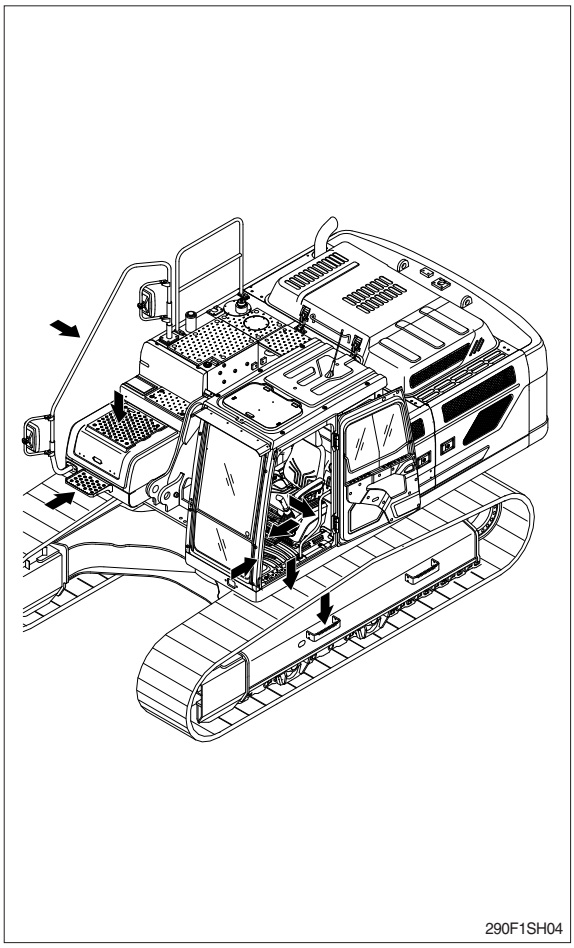
When mounting or dismounting, always face the machine and use the handrails, machine or track frame steps, and track shoes. Additional track frame step can be fitted for wider optional shoe. In this case please contact your Hyundai distributor.

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.


290F1SH04

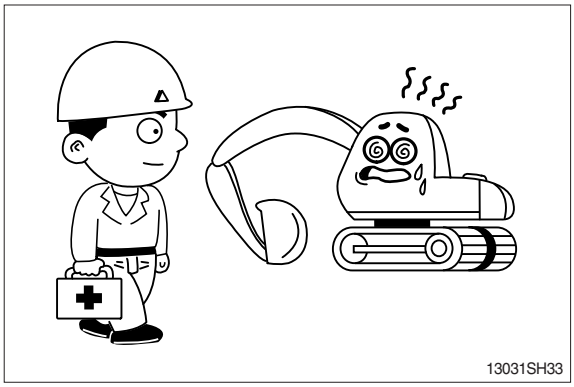
KEEP RIDERS OFF MACHINE

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

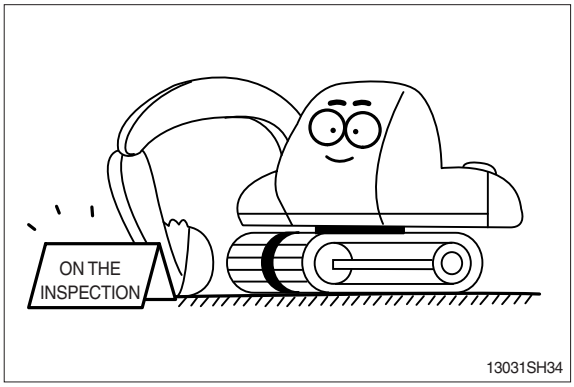
Only allow the operator on the machine. Keep riders off.

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.

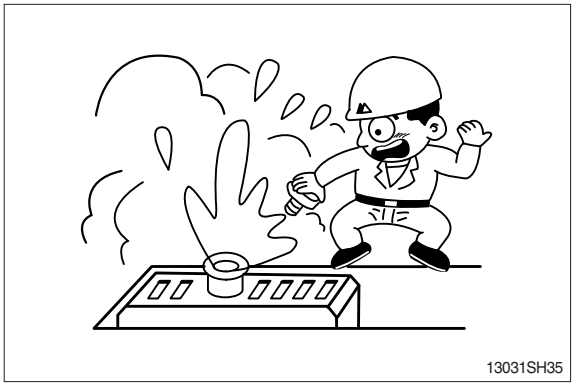

13031SH33

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.

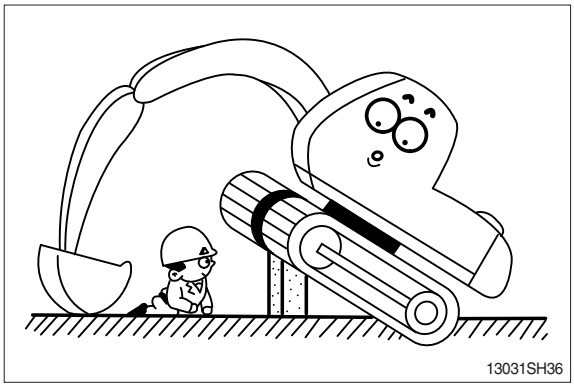


13031SH34

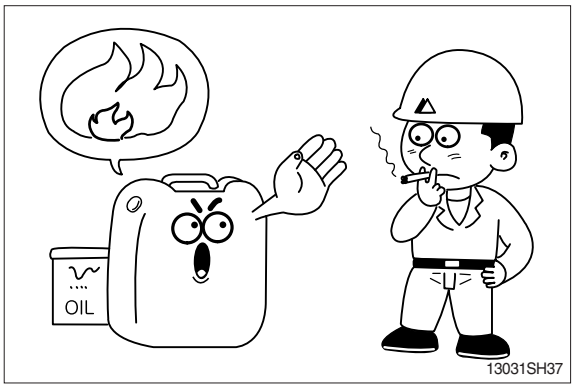
Do not remove the radiator cap from hot engine.
Open the cap after the engine cools, below 50 °C (122 °F) to prevent personal injury from heated coolant spray or steam.


13031SH35

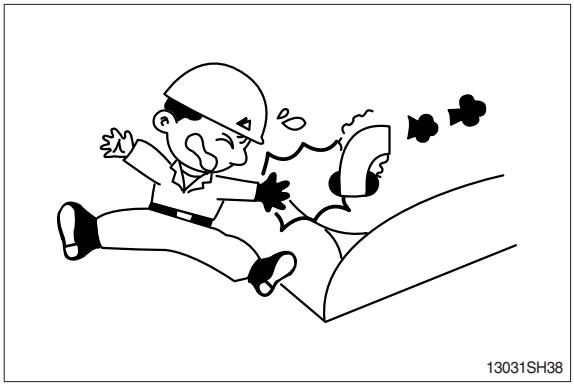
Do not work below the machine.
Be sure to work with proper safety supports.
Do not depend on the hydraulic cylinders to hold up the equipment and attachment.


13031SH36

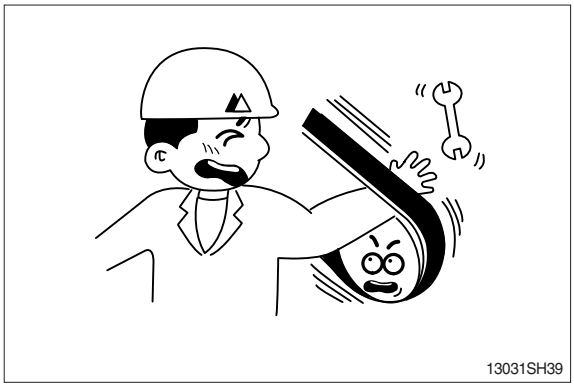
There is the danger of fire in fuel and oil.
Store in cool and dry area, away from any open flames.



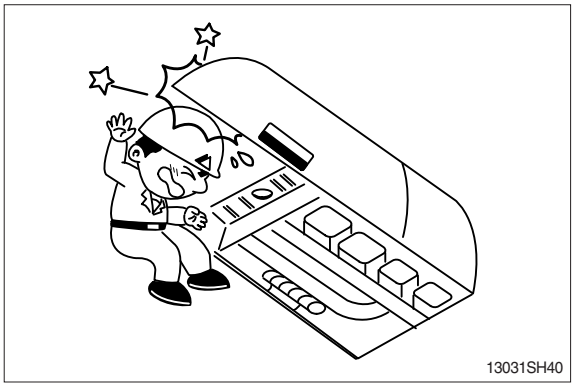
Do not touch exhaust pipe, or may cause severe burn.



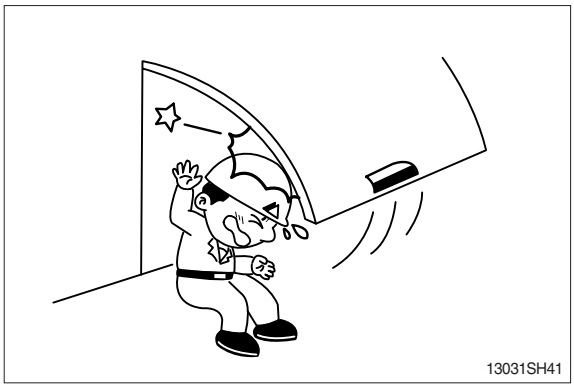
Do not open the engine hood and covers while the engine is running.



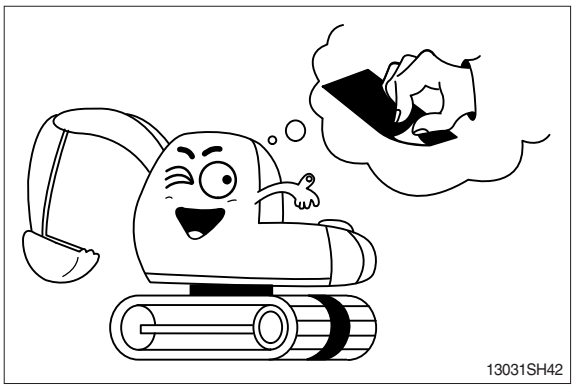
Be careful of not hitting the edges when you service engine.



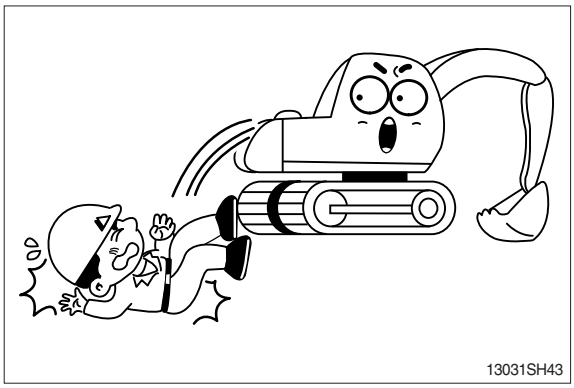
Be careful that the front window may be promptly closed.
Be sure to support stay, when the side door needs to be opened.
Be careful that the open side door may closed by the external or natural force like strong wind.


13031SH41

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.

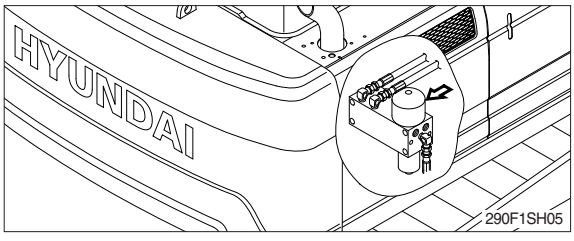

13031SH42

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


13031SH43

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.



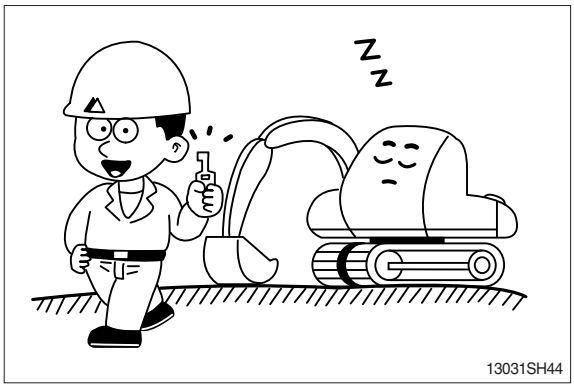
290F1SH05

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.

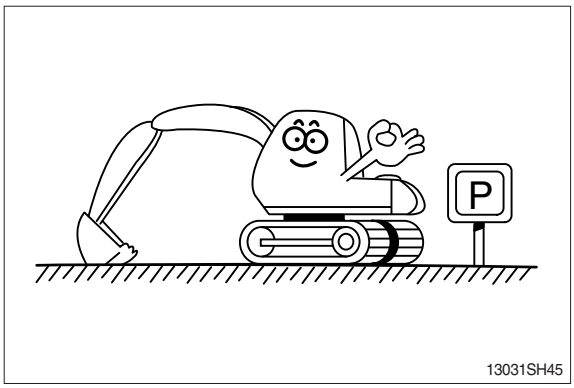
4. PARKING

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



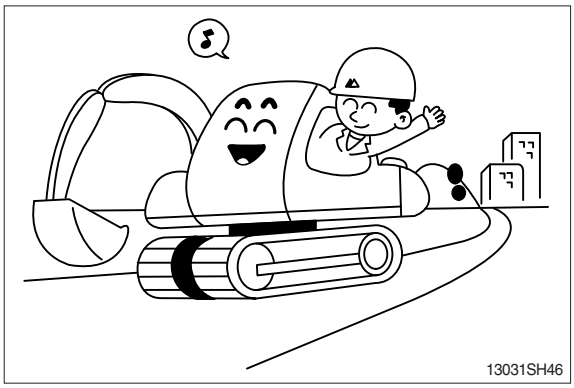
13031SH44

Park the machine in the flat and safe place.

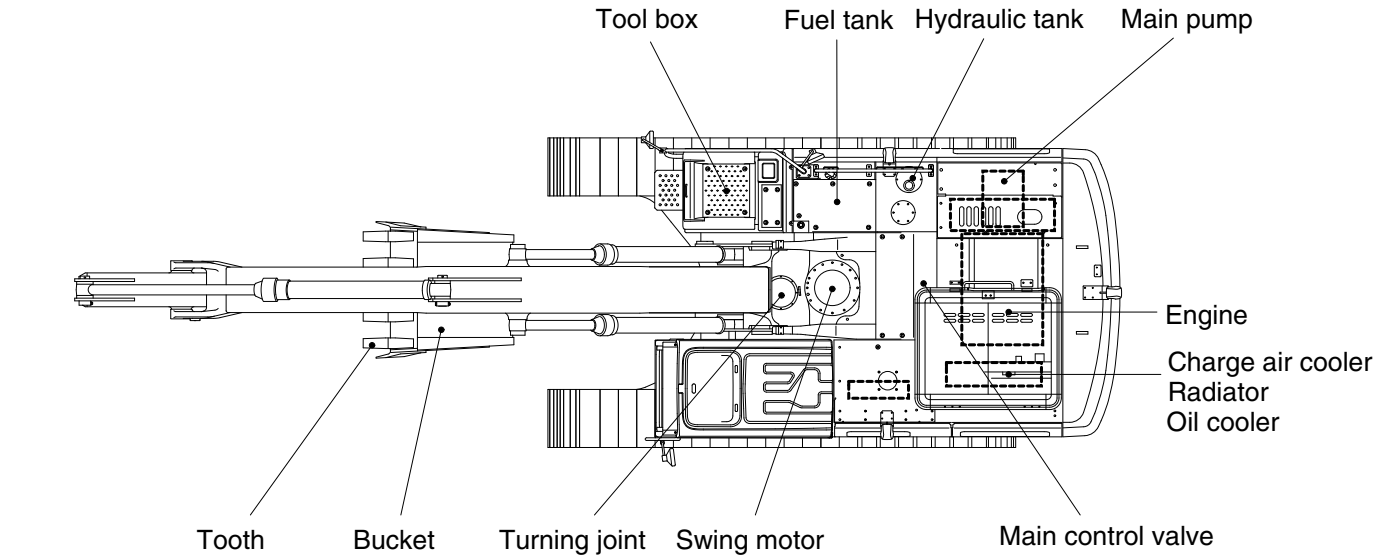


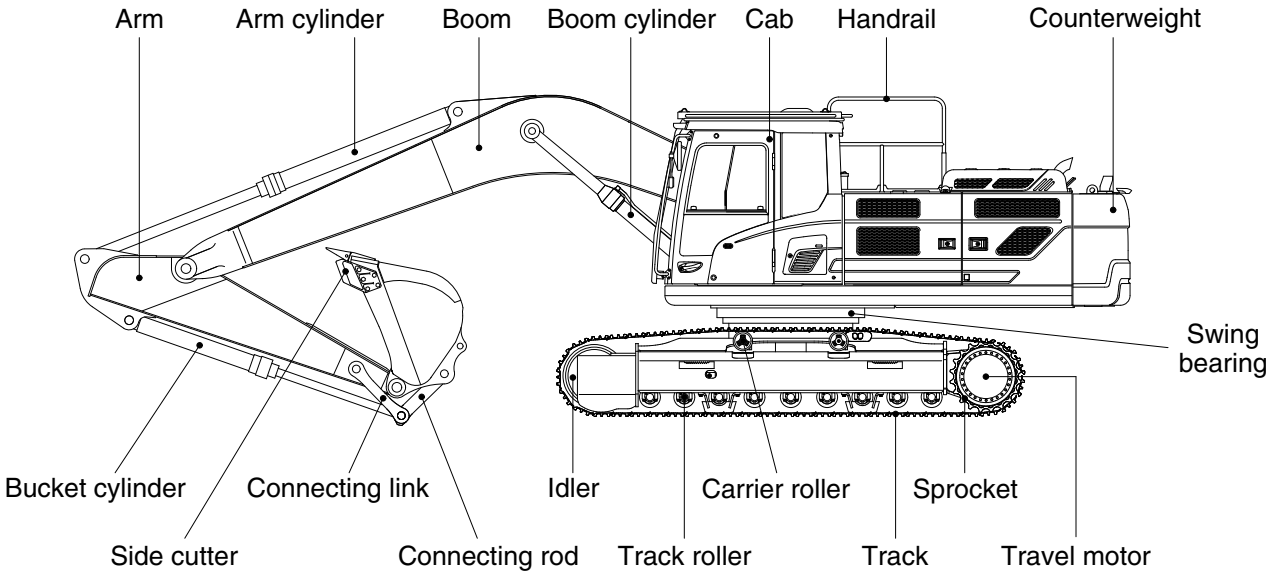
13031SH45

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


13031SH46

1. MAJOR COMPONENT



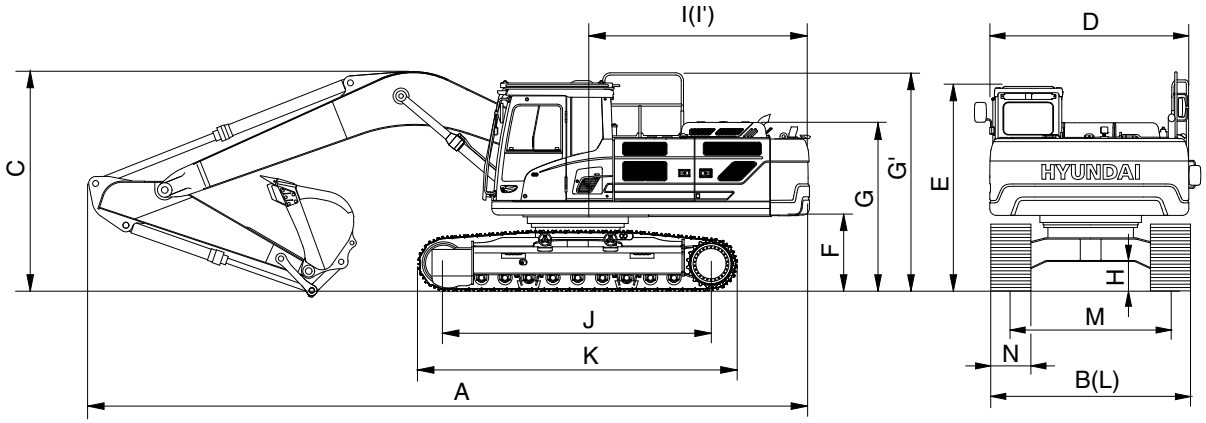


340S2SP01

2. SPECIFICATIONS

1) HX340HD

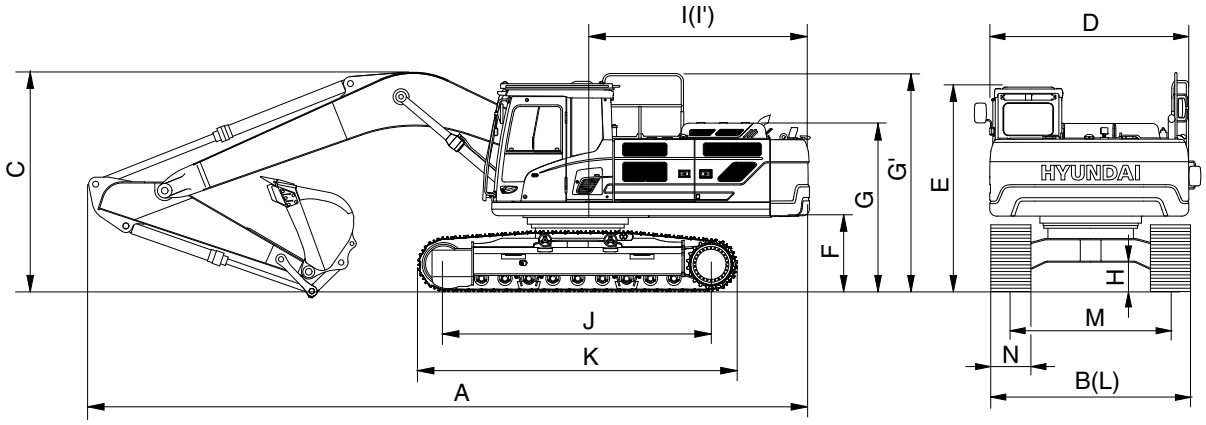
(1) 6.45 m (21' 2") boom and 3.20 m (10' 6") arm



330S2SP02

Description		Unit	Specification
Operating weight		kg (lb)	33000 (72750)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	1.74 (2.28)
Overall length	A	mm (ft-in)	11220 (36' 10")
Overall width, with 600 mm shoe	B		3280 (10' 9")
Overall height of boom	C		3360 (11' 0")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3145 (10' 4")
Ground clearance of counterweight	F		1200 (3' 11")
Overall height of engine hood	G		2672 (8' 9")
Overall height of handrail	G'		3350 (11' 0")
Minimum ground clearance	H		500 (1' 8")
Rear-end distance	I		3510 (11' 6")
Rear-end swing radius	I'		3570 (11' 9")
Distance between tumblers	J		4030 (13' 3")
Undercarriage length	K		4940 (16' 2")
Undercarriage width	L		3280 (10' 9")
Track gauge	M		2680 (8' 10")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.6/6.4 (2.11/3.98)
Swing speed		rpm	11.2
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2(psi)	0.64 (9.03)
Max traction force		kg (lb)	29500 (65030)

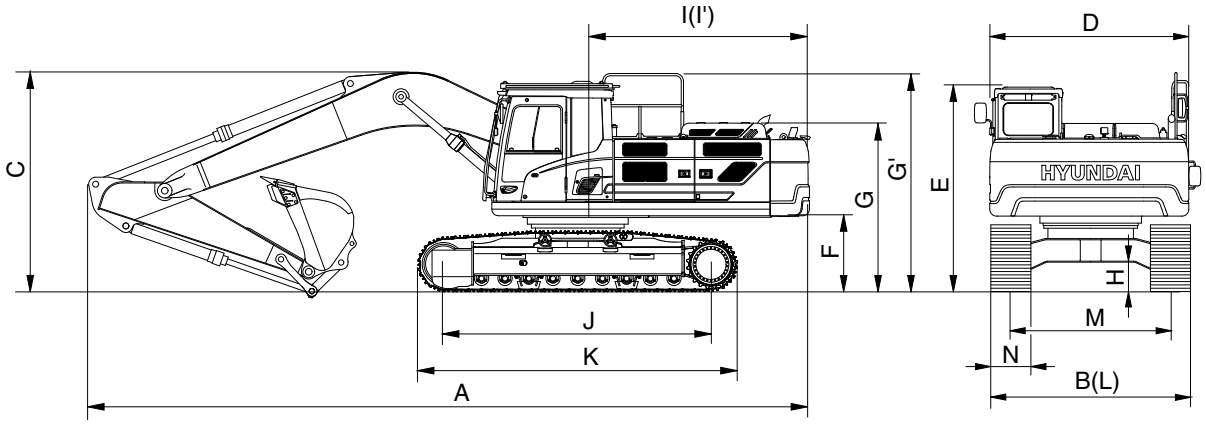
(2) 6.15 m (20' 2") boom and 2.2 m (7' 3") arm



330S2SP02

Description		Unit	Specification
Operating weight		kg (lb)	32806 (72325)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	1.44 (1.88)
Overall length	A	mm (ft-in)	11170 (36' 8")
Overall width, with 600 mm shoe	B		3280 (10' 9")
Overall height of boom	C		3680 (12' 1")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3145 (10' 4")
Ground clearance of counterweight	F		1200 (3' 11")
Overall height of engine hood	G		2672 (8' 9")
Overall height of handrail	G'		3350 (11' 0")
Minimum ground clearance	H		500 (1' 8")
Rear-end distance	I		3510 (11' 6")
Rear-end swing radius	I'		3570 (11' 9")
Distance between tumblers	J		4030 (13' 3")
Undercarriage length	K		4940 (16' 2")
Undercarriage width	L		3280 (10' 9")
Track gauge	M		2680 (8' 10")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.6/6.4 (2.11/3.98)
Swing speed		rpm	11.2
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2(psi)	0.64 (9.03)
Max traction force		kg (lb)	29500 (65030)

(2) 6.15 m (20' 2") boom and 2.5 m (8' 2") arm

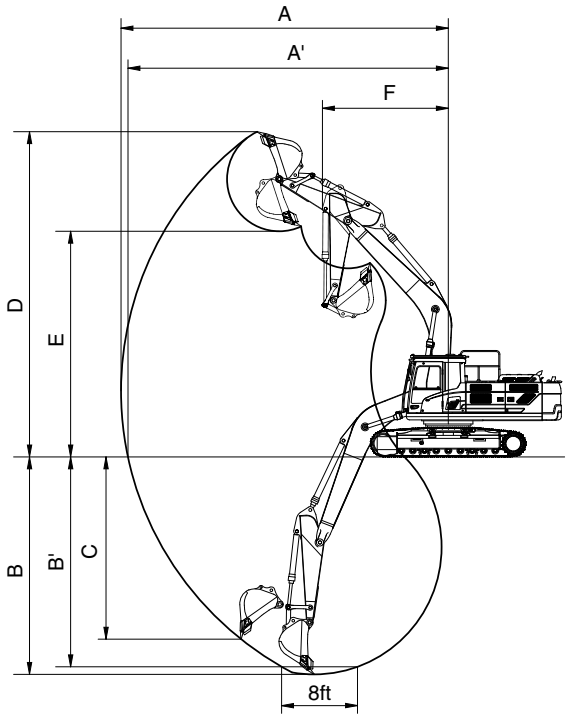


330S2SP02

Description		Unit	Specification
Operating weight		kg (lb)	33000 (72750)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.30(3.01)
Overall length	A	mm (ft-in)	11040(36' 3")
Overall width, with 600 mm shoe	B		3280 (10' 9")
Overall height of boom	C		3600 (11' 10")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3145 (10' 4")
Ground clearance of counterweight	F		1200 (3' 11")
Overall height of engine hood	G		2672 (8' 9")
Overall height of handrail	G'		3350 (11' 0")
Minimum ground clearance	H		500 (1' 8")
Rear-end distance	I		3510 (11' 6")
Rear-end swing radius	I'		3570 (11' 9")
Distance between tumblers	J		4030 (13' 3")
Undercarriage length	K		4940 (16' 2")
Undercarriage width	L		3280 (10' 9")
Track gauge	M		2680 (8' 10")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.6/6.4 (2.11/3.98)
Swing speed		rpm	11.2
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2(psi)	0.64 (9.03)
Max traction force		kg (lb)	29500 (65030)

3. WORKING RANGE

1) HX340HD HEAVY DUTY BUCKET



Description	m (ft-in)	Boom	6.15 (20' 2")		6.45 (21' 2")		
		Arm	2.20 (7' 3")	2.50 (8' 2")	2.20 (7' 3")	2.50 (8' 2")	3.20 (10' 6")
Max digging reach	mm (ft-in)	A	10020 (32'10")	10190 (33' 5")	10330 (33'11")	10500 (34' 5")	11150 (36' 7")
Max digging reach on ground		A'	9810 (32' 2")	9980 (32' 9")	10120 (33' 2")	10290 (33' 9")	10950 (35'11")
Max digging depth		B	6150 (20' 2")	6450 (21' 2")	6360 (20'10")	6660 (21'10")	7360 (24' 2")
Max digging depth (8ft level)		B'	5950 (19' 6")	6230 (20' 5")	6170 (20' 3")	6450 (21' 2")	7200 (23' 7")
Max vertical wall digging depth		C	5700 (18' 8")	5420 (17' 9")	5970 (19' 7")	5660 (18' 7")	6330 (20' 9")
Max digging height		D	9980 (32' 9")	9760 (32' 0")	10260 (33' 8")	10050 (33' 0")	10360 (34' 0")
Max dumping height		E	6790 (22' 3")	6670 (21'11")	7060 (23' 2")	6950 (22'10")	7260 (23'10")
Min swing radius		F	4450 (14' 7")	4290 (14' 1")	4630 (15' 2")	4440 (14' 7")	4360 (14' 4")
Bucket digging force	kN	SAE	200.1 [217.2]	187.3 [203.4]	200.1 [217.2]	187.3 [203.4]	188.3 [204.5]
	kgf		20400 [22150]	19100 [20740]	20400 [22150]	19100 [20740]	19200 [20850]
	lbf		44970 [48830]	42110 [45720]	44970 [48830]	42110 [45720]	42330 [45970]
	kN	ISO	230.5 [250.2]	215.7 [234.3]	230.5 [250.2]	215.7 [234.3]	216.7 [235.3]
	kgf		23500 [25510]	22000 [23890]	23500 [25510]	22000 [23890]	22100 [23990]
	lbf		51810 [56240]	48500 [52670]	51810 [56240]	48500 [52670]	48720 [52890]
Arm digging force	kN	SAE	220.7 [239.6]	198.1 [215.1]	220.7 [239.6]	198.1 [215.1]	140.2 [152.3]
	kgf		22500 [24430]	20200 [21930]	22500 [24430]	20200 [21930]	14300 [15530]
	lbf		49600 [53860]	44530 [48350]	49600 [53860]	44530 [48350]	31530 [34240]
	kN	ISO	231.4 [251.3]	207.9 [225.8]	231.4 [251.3]	207.9 [225.8]	145.1 [157.6]
	kgf		23600 [25620]	21200 [23020]	23600 [25620]	21200 [23020]	14800 [16070]
	lbf		52030 [56480]	46740 [50750]	52030 [56480]	46740 [50750]	32630 [35430]

[ ] : Power boost

4. WEIGHT

1) HX340HD

Item	HX340HD	
	kg	lb
Upperstructure assembly	15420	33995
Main frame weld assembly	3910	8620
Engine assembly	604	1332
Main pump assembly	201	443
Main control valve assembly	220	485
Swing motor assembly	370	820
Hydraulic oil tank assembly	300	661
Fuel tank assembly	350	772
Counterweight	6000	13230
Cab assembly	422	930
Radiator assy	230	510
Oil cooler assy	80	180
Lower chassis assembly	11500	25350
Track frame weld assembly	3970	8750
Swing bearing	470	1040
Travel motor assembly	440	970
Turning joint	54	119
Tension cylinder	225	496
Idler	250	551
Sprocket	83	183
Carrier roller	35	77
Track roller	56	123
Track-chain assembly (600 mm standard triple grouser shoe)	1880	4145
6.15 m boom assembly	2806	6186
6.45 m boom assembly	2885	6360
3.2 m arm assembly	1170	2580
2.5 m arm assembly	1064	2346
1.44 m^3 SAE heaped bucket	1460	3219
2.30 m^3 SAE heaped bucket	1907	4204
Boom cylinder assembly	305	670
Arm cylinder assembly	380	840
Bucket cylinder assembly	265	580
Bucket control linkage assembly	370	820

※ This information is different with operating and transportation weight because it is not including harness, pipe, oil, fuel so on.

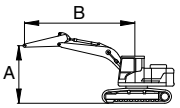
※ Refer to Transportation for actual weight information and Specifications for operating weight.

5. LIFTING CAPACITIES

Unit : mm

Model	Boom	Boom	Arm	Counterweight	Shoe	Dozer		Outrigger	
	Type	Length	Length	Weight (kg)	Width	Front	Rear	Front	Rear
HX340HD	Heavy duty	6450	3200	6000	600	-	-	-	-

· : Rating over-front · : Rating over-side or 360 degree

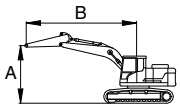


Lift point height m (ft)		Lift-point radius										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		Capacity		Reach
														m (ft)
7.5 m (24.6 ft)	kg							*6,830	6,780			*5,610	*5,610	7.74
	lb							*15,060	14,950			*12,370	*12,370	(25.4)
6.0 m (19.7 ft)	kg							*7,800	6,710			*5,430	5,240	8.62
	lb							*17,200	14,790			*11,970	11,550	(28.3)
4.5 m (14.8 ft)	kg			*11,900	*11,900	*9,580	9,230	*8,430	6,490	*6,660	4,770	*5,450	4,620	9.17
	lb			*26,230	*26,230	*21,120	20,350	*18,580	14,310	*14,680	10,520	*12,020	10,190	(30.1)
3.0 m (9.8 ft)	kg			*15,380	13,200	*11,230	8,650	*9,280	6,200	7,070	4,650	*5,650	4,290	9.44
	lb			*33,910	29,100	*24,760	19,070	*20,460	13,670	15,590	10,250	*12,460	9,460	(31.0)
1.5 m (4.9 ft)	kg			*17,450	12,250	*12,700	8,140	9,130	5,920	6,920	4,510	*6,050	4,170	9.47
	lb			*38,470	27,010	*28,000	17,950	20,130	13,050	15,260	9,940	*13,340	9,190	(31.1)
0.0 m (0.0 ft)	kg			*17,260	11,850	12,510	7,820	8,910	5,720	6,810	4,410	6,540	4,240	9.25
	lb			*38,050	26,120	27,580	17,240	19,640	12,610	15,010	9,720	14,420	9,350	(30.4)
-1.5 m (-4.9 ft)	kg	*10,800	*10,800	*18,640	11,780	12,360	7,680	8,810	5,630			7,050	4,560	8.77
	lb	*23,810	*23,810	*41,090	25,970	27,250	16,930	19,420	12,410			15,540	10,050	(28.8)
-3.0 m (-9.8 ft)	kg	*17,460	*17,460	*17,440	11,910	12,400	7,720	8,860	5,680			8,140	5,250	7.98
	lb	*38,490	*38,490	*38,450	26,260	27,340	17,020	19,530	12,520			17,950	11,570	(26.2)
-4.5m (-14.8 ft)	kg	*20,250	*20,250	*14,950	12,240	*11,230	7,960					*9,440	6,790	6.76
	lb	*44,640	*44,640	*32,960	26,980	*24,760	17,550					*20,810	14,970	(22.2)

Unit : mm

Model	Boom Type	Boom Length	Arm Length	Counterweight Weight (kg)	Shoe Width	Dozer Front	Dozer Rear	Outrigger Front	Outrigger Rear
HX340HD	Heavy duty	6450	3200	6600	600	-	-	-	-

· : Rating over-front · : Rating over-side or 360 degree

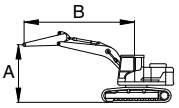


Lift point height m (ft)		Lift-point radius 3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		At max. reach Capacity		Reach
														m (ft)
7.5 m	kg							*6830	*6,830			*5,610	*5,610	7.74
(24.6 ft)	lb							*15060	*15,060			*12,370	*12,370	(25.4)
6.0 m	kg							*7800	7,060			*5,430	*5,430	8.62
(19.7 ft)	lb							*17200	15,560			*11,970	*11,970	(28.3)
4.5 m	kg			*11,900	*11,900	*9,580	*9,580	*8430	6,830	*6,660	5,050	*5,450	4,880	9.17
(14.8 ft)	lb			*26,230	*26,230	*21,120	*21,120	*18580	15,060	*14,680	11130	*12,020	10,760	(30.1)
3.0 m	kg			*15,380	13,880	*11,230	9,100	*9280	6,540	7,400	4,920	*5,650	4,550	9.44
(9.8 ft)	lb			*33,910	30,600	*24,760	20,060	*20460	14,420	16,310	10,850	*12,460	10,030	(31.0)
1.5 m	kg			*17,450	12,920	*12,700	8,590	9550	6,260	7,250	4,790	*6,050	4,430	9.47
(4.9 ft)	lb			*38,470	28,480	*28,000	18,940	21050	13,800	15,980	10,560	*13,340	9,770	(31.1)
0.0 m	kg			*17,260	12,530	13,090	8,270	9330	6,060	7,140	4,690	*6,720	4,510	9.25
(0.0 ft)	lb			*38,050	27,620	28,860	18,230	20570	13,360	15,740	10,340	*14,820	9,940	(30.4)
-1.5 m	kg	*10,800	*10,800	*18,640	12,460	12,940	8,140	9230	5,970			7,390	4,840	8.77
(-4.9 ft)	lb	*23,810	*23,810	*41,090	27,470	28,530	17,950	20350	13,160			16,290	10,670	(28.8)
-3.0 m	kg	*17,460	*17,460	*17,440	12,580	12,990	8,180	9280	6,020			8,530	5,560	7.98
(-9.8 ft)	lb	*38,490	*38,490	*38,450	27,730	28,640	18,030	20460	13,270			18,810	12,260	(26.2)
-4.5m	kg	*20,250	*20,250	*14,950	12,910	*11,230	8,410					*9,440	7,180	6.76
(-14.8 ft)	lb	*44,640	*44,640	*32,960	28,460	*24,760	18,540					*20,810	15,830	(22.2)

Unit : mm

Model	Boom	Boom	Arm	Counterweight	Shoe	Dozer		Outrigger	
	Type	Length	Length	Weight (kg)	Width	Front	Rear	Front	Rear
HX340HD	Heavy duty	6150	2200	6600	600	-	-	-	-

· : Rating over-front · : Rating over-side or 360 degree

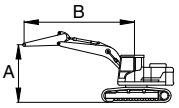


Load point height		Load radius								At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		Capacity		Reach
												m (ft)
7.5m	kg					*9650	*9650			*9790	9210	6.31
24.6ft	lb					*21270	*21270			*21580	20300	(20.7)
6.0m	kg					*9850	*9850			*9550	7070	7.36
19.7ft	lb					*21720	*21720			*21050	15590	(24.2)
4.5m	kg					*10990	9530	*9690	6760	9060	6080	8.00
14.8ft	lb					*24230	21010	*21360	14900	19970	13400	(26.2)
3.0m	kg					*12440	9040	9850	6550	8390	5600	8.31
9.8ft	lb					*27430	19930	21720	14440	18500	12350	(27.3)
1.5m	kg					13510	8650	9630	6350	8220	5460	8.34
4.9ft	lb					29780	19070	21230	14000	18120	12040	(27.4)
0.0m	kg					13270	8450	9510	6230	8530	5640	8.10
0.0ft	lb					29260	18630	20970	13730	18810	12430	(26.6)
-1.5m	kg			*18180	12900	13250	8430	9540	6270	9480	6230	7.54
-4.9ft	lb			*40080	28440	29210	18580	21030	13820	20900	13730	(24.7)
-3.0m	kg	*20780	*20780	*16060	13140	*12120	8610			*10470	7620	6.59
-9.8ft	lb	*45810	*45810	*35410	28970	*26720	18980			*23080	16800	(21.6)

Unit : mm

Model	Boom	Boom	Arm	Counterweight	Shoe	Dozer		Outrigger	
	Type	Length	Length	Weight (kg)	Width	Front	Rear	Front	Rear
HX340HD	Heavy duty	6150	2500	6600	600	-	-	-	-

· : Rating over-front · : Rating over-side or 360 degree

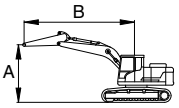


Load point height		Load radius								At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		Capacity		Reach
												m (ft)
7.5m	kg					*9030	*9030			*9160	8800	6.53
24.6ft	lb					*19910	*19910			*20190	19400	(21.4)
6.0m	kg					*9380	*9380	*9020	6920	*9030	6840	7.55
19.7ft	lb					*20680	*20680	*19890	15260	*19910	15080	(24.8)
4.5m	kg			*13270	*13270	*10570	9600	*9340	6790	8780	5890	8.17
14.8ft	lb			*29260	*29260	*23300	21160	*20590	14970	19360	12990	(26.8)
3.0m	kg					*12080	9080	9870	6560	8140	5430	8.48
9.8ft	lb					*26630	20020	21760	14460	17950	11970	(27.8)
1.5m	kg					*13360	8660	9620	6330	7970	5280	8.51
4.9ft	lb					*29450	19090	21210	13960	17570	11640	(27.9)
0.0m	kg			*19170	12750	13240	8420	9470	6190	8230	5430	8.27
0.0ft	lb			*42260	28110	29190	18560	20880	13650	18140	11970	(27.1)
-1.5m	kg	*15260	*15260	*18450	12780	13180	8360	9450	6180	9080	5960	7.72
-4.9ft	lb	*33640	*33640	*40680	28180	29060	18430	20830	13620	20020	13140	(25.3)
-3.0m	kg	*22130	*22130	*16600	12990	*12550	8490			*10580	7190	6.81
-9.8ft	lb	*48790	*48790	*36600	28640	*27670	18720			*23320	15850	(22.3)
-4.5m	kg			*12670	*12670					*10370	*10370	5.31
-14.8ft	lb			*27930	*27930					*22860	*22860	(17.4)

Unit : mm

Model	Boom	Boom	Arm	Counterweight	Shoe	Dozer		Outrigger	
	Type	Length	Length	Weight (kg)	Width	Front	Rear	Front	Rear
HX340HD	Heavy duty	6450	2200	6600	600	-	-	-	-

· : Rating over-front · : Rating over-side or 360 degree

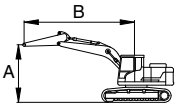


Load point height		Load radius								At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		Capacity		Reach
												m (ft)
7.5m	kg					*9180	*9180			*9300	8290	6.71
24.6ft	lb					*20240	*20240			*20500	18280	(22.0)
6.0m	kg					*9660	*9660	*9060	6840	*9090	6510	7.71
19.7ft	lb					*21300	*21300	*19970	15080	*20040	14350	(25.3)
4.5m	kg					*10910	9380	*9420	6680	8440	5640	8.32
14.8ft	lb					*24050	20680	*20770	14730	18610	12430	(27.3)
3.0m	kg					*12390	8850	9740	6440	7850	5220	8.62
9.8ft	lb					*27320	19510	21470	14200	17310	11510	(28.3)
1.5m	kg					13290	8460	9500	6220	7700	5090	8.65
4.9ft	lb					29300	18650	20940	13710	16980	11220	(28.4)
0.0m	kg					13070	8260	9360	6100	7960	5240	8.41
0.0ft	lb					28810	18210	20640	13450	17550	11550	(27.6)
-1.5m	kg			*17750	12670	13050	8250	9370	6100	8770	5750	7.88
-4.9ft	lb			*39130	27930	28770	18190	20660	13450	19330	12680	(25.8)
-3.0m	kg	*19890	*19890	*15830	12910	*12210	8410			*9890	6910	6.98
-9.8ft	lb	*43850	*43850	*34900	28460	*26920	18540			*21800	15230	(22.9)
-4.5m	kg			*12030	*12030					*9280	*9280	5.54
-14.8ft	lb			*26520	*26520					*20460	*20460	(18.2)

Unit : mm

Model	Boom	Boom	Arm	Counterweight	Shoe	Dozer		Outrigger	
	Type	Length	Length	Weight (kg)	Width	Front	Rear	Front	Rear
HX340HD	Heavy duty	6450	2500	6600	600	-	-	-	-

· : Rating over-front · : Rating over-side or 360 degree



Load point height		Load radius								At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		Capacity		Reach
												m (ft)
7.5m	kg									*8730	7950	6.93
24.6ft	lb									*19250	17530	(22.7)
6.0m	kg					*9230	*9230	*8630	6900	*8620	6300	7.90
19.7ft	lb					*20350	*20350	*19030	15210	*19000	13890	(25.9)
4.5m	kg			*13590	*13590	*10510	9450	*9110	6710	8190	5480	8.49
14.8ft	lb			*29960	*29960	*23170	20830	*20080	14790	18060	12080	(27.9)
3.0m	kg					*12030	8900	9750	6450	7620	5060	8.79
9.8ft	lb					*26520	19620	21500	14220	16800	11160	(28.8)
1.5m	kg					*13260	8460	9490	6210	7460	4930	8.82
4.9ft	lb					*29230	18650	20920	13690	16450	10870	(28.9)
0.0m	kg			*17240	12480	13030	8220	9320	6060	7690	5050	8.58
0.0ft	lb			*38010	27510	28730	18120	20550	13360	16950	11130	(28.2)
-1.5m	kg			*18050	12540	12980	8180	9290	6030	8410	5500	8.06
-4.9ft	lb			*39790	27650	28620	18030	20480	13290	18540	12130	(26.4)
-3.0m	kg	*21280	*21280	*16340	12750	*12540	8300			*9960	6530	7.19
-9.8ft	lb	*46910	*46910	*36020	28110	*27650	18300			*21960	14400	(23.6)
-4.5m	kg			*13020	*13020					*9810	9120	5.80
-14.8ft	lb			*28700	*28700					*21630	20110	(19.0)

6. BUCKET SELECTION GUIDE

General bucket

Heavy duty
(without side cutter)

Rock heavy duty

Type	Capacity		Width	Weight	Tooth	Recommendation				
	SAE Heaped	CECE heaped	Without side cutter			6.15 m (20' 2") Boom		6.45 m (21' 2") Boom (HD)		
	m^3 (yd^3)	m^3 (yd^3)	mm (in)	kg (lb)	EA	2.20 m (7' 3') Arm	2.50 m (8' 2') Arm	2.20 m (7' 3') Arm	2.50 m (8' 2') Arm	3.20 m (8' 2') Arm
General bucket	1.44 (1.88)	1.25 (1.63)	1,380 (54.3")	1,150 (2,540)	5	●	●	●	●	●
	1.74 (2.28)	1.50 (1.96)	1,620 (63.8")	1,260 (2,780)	6	●	●	◐	◐	■
	2.10 (2.75)	1.80 (2.35)	1,910 (75.2")	1,640 (3,620)	6	■	■	■	■	▲
Heavy duty	1.90 (2.49)	1.65 (2.16)	1,600 (63.0")	1,780 (3,920)	5	◐	◐	■	■	▲
	2.30 (3.01)	2.02 (2.64)	1,750 (68.9")	1,915 (4,220)	5	■	▲	▲	▲	X
Rock heavy duty	1.44 (1.88)	1.25 (1.63)	1,470 (57.9")	1,600 (3,530)	5	●	●	●	●	◐
	1.60 (2.09)	1.39 (1.82)	1,585 (62.4")	1,680 (3,700)	5	●	●	◐	◐	■
	1.73 (2.26)	1.50 (1.96)	1,710 (67.3")	1,750 (3,860)	5	◐	◐	◐	◐	■
	1.83 (2.39)	1.59 (2.08)	1,765 (69.5")	1,850 (4,080)	5	◐	◐	■	■	▲
	1.90 (2.49)	1.65 (2.16)	1,600 (63.0")	1,980 (4,370)	5	◐	■	■	■	▲

●	Applicable for materials with density of 2100 kg/m (3500 lb/yd) or less
◐	Applicable for materials with density of 1800 kg/m^3 (3000 lb/yd^3) or less
■	Applicable for materials with density of 1500 kg/m^3 (2500 lb/yd^3) or less
▲	Applicable for materials with density of 1200 kg/m^3 (2000 lb/yd^3) or less
X	Not recommended
-	Not available

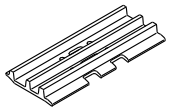
※ These recommendations are for general conditions and average use.
Work tools and ground conditions have effects on machine performance.
Select an optimum combination according to the working conditions and the type of work that is being done.
Consult with your local HD Hyundai Construction Equipment dealer for information on selecting the correct boom−arm−bucket combination.

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		
					
HX340HD	Shoe width	mm (in)	600 (24)	700 (28)	800 (32)
	Operating weight	kg (lb)	33000 (72750)	33570 (74010)	33950 (74850)
	Ground pressure	kgf/cm^2 (psi)	0.64 (9.03)	0.55 (7.88)	0.49 (6.97)
	Overall width	mm (ft-in)	3280 (10' 9")	3380 (11' 1")	3480 (11' 5")

3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	2EA
Track rollers	9EA
Track shoes	48EA

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
600 mm triple grouser	Standard	A
700 mm triple grouser	Option	B
800 mm triple grouser	Option	C

※ Table 2

Category	Applications	Applications
A	Rocky ground, river beds, normal soil	· Travel at low speed on rough ground with large obstacles such as boulders or fallen trees or a wide range of general civil engineering work
B	Normal soil, soft ground	· These shoes cannot be used on rough ground with large obstacles such as boulders or fallen trees · Travel at high speed only on flat ground · Travel slowly at low speed if it is impossible to avoid going over obstacles
C	Extremely soft gound (swampy ground)	· Use the shoes only in the conditions that the machine sinks and it is impossible to use the shoes of category A or B · These shoes cannot be used on rough ground with large obstacles such as boulders or fallen trees · Travel at high speed only on flat ground · Travel slowly at low speed if it is impossible to avoid going over obstacles

8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	HD Hyundai Construction Equipment / HM8.3
Type	4-cycle, turbocharged, charger air cooled, mechanical controlled diesel engine
Cooling method	Water cooled
Number of cylinders and arrangement	6 cylinders, in-line
Firing order	1-5-3-6-2-4
Combustion chamber type	Direct injection type
Cylinder bore × stroke	114 × 135 mm (4.49" × 5.31")
Piston displacement	8.3 ℓ (506 cu in)
Compression ratio	18 : 1
Gross power	260 Hp (194 kW) at 2200 rpm
Net power	255 Hp (190 kW) at 2200 rpm
Max. power	261 Hp (195 kW) at 2200 rpm
Maximum torque	1150 N·m (848 lbf·ft) at 1300 rpm
Engine oil quantity	26.5 ℓ (7.0 U.S. gal)
Wet weight	604 kg (1332 lb)
Starting motor	24 V-7.5 kW
Alternator	24 V-90A

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 175 cc/rev
Rated oil flow	2 × 306 ℓ/min (80.8 U.S. gpm / 67.3 U.K. gpm)
Rated speed	1750 rpm

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	15cc/rev
Maximum pressure	40 kgf/cm^2 (570 psi)
Rated oil flow	26.3 ℓ /min (6.9 U.S. gpm/5.8 U.K. gpm)

4) MAIN CONTROL VALVE

Item	Specification
Type	10 spools
Operating method	Hydraulic pilot system
Main relief valve pressure	350 kgf/cm^2 (4980 psi) [380 kgf/cm^2 (5400 psi)]
Overload relief valve pressure	400 kgf/cm^2 (5690 psi)

[ ]: Power boost

5) SWING MOTOR

Item	Specification
Type	Axial piston motor
Capacity	156.9 cc/rev
Relief pressure	300 kgf/cm^2 (4270 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	84.4 kgf · m (610 lbf · ft)
Brake release pressure	36.5 kgf/cm^2 (519 psi)
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	350 kgf/cm^2 (4980 psi)
Capacity (max / min)	282.6/156.9 cc/rev
Reduction gear type	2-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	17 kgf/cm^2 (242 psi)
Braking torque	134 kgf · m (969 lbf · ft)

7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	Ø150 × Ø105 × 1480 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	Ø160 × Ø110 × 1685 mm Ø170 × Ø115 × 1685 mm (Heavy duty boom only)
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	Ø140 × Ø100 × 1285 mm Ø145 × Ø105 × 1285 mm (2.2 m arm only)
	Cushion	Extend only

※ 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
HX340HD	Standard	☆ 600 mm (24")	0.64 kgf/cm² (9.03 psi)	48	3280 mm (10' 9")
	Option	☆ 700 mm (28")	0.55 kgf/cm² (7.88 psi)	48	3380 mm (11' 1")
		☆ 800 mm (32")	0.49 kgf/cm² (6.97 psi)	48	3480 mm (11' 5")

☆ : Triple grouser

9. RECOMMENDED OILS

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

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

Service point	Kind of fluid	Capacity ℓ (U.S. gal)	Ambient temperature °C(°F)
			-50 (-58) -30 (-22) -20 (-4) -10 (14) 0 (32) 10 (50) 20 (68) 30 (86) 40 (104)
Engine oil pan	Engine oil★1	26.5 (7.0)	★SAE 0W-40 ★SAE 0W-30 SAE 5W-30 SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	11 (2.91)	★SAE 75W-90
Final drive		7.8×2 (2.1×2)	SAE 80W-90
Hydraulic tank	Hydraulic oil★3	Tank : 210 (55.5) System : 414 (109.4)	ISO VG 32 ISO VG 46, HBHO VG 46★3 ISO VG 68
Fuel tank	Diesel fuel	600 (158.5)	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and soft water★2	27 (7.1)	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 : Meet or exceeds API CH-4 grade
★2 : Soft water
City water or distilled water
★3 : Hyundai Bio Hydraulic Oil

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

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

※ Do not use any engine oil other than that specified above.

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

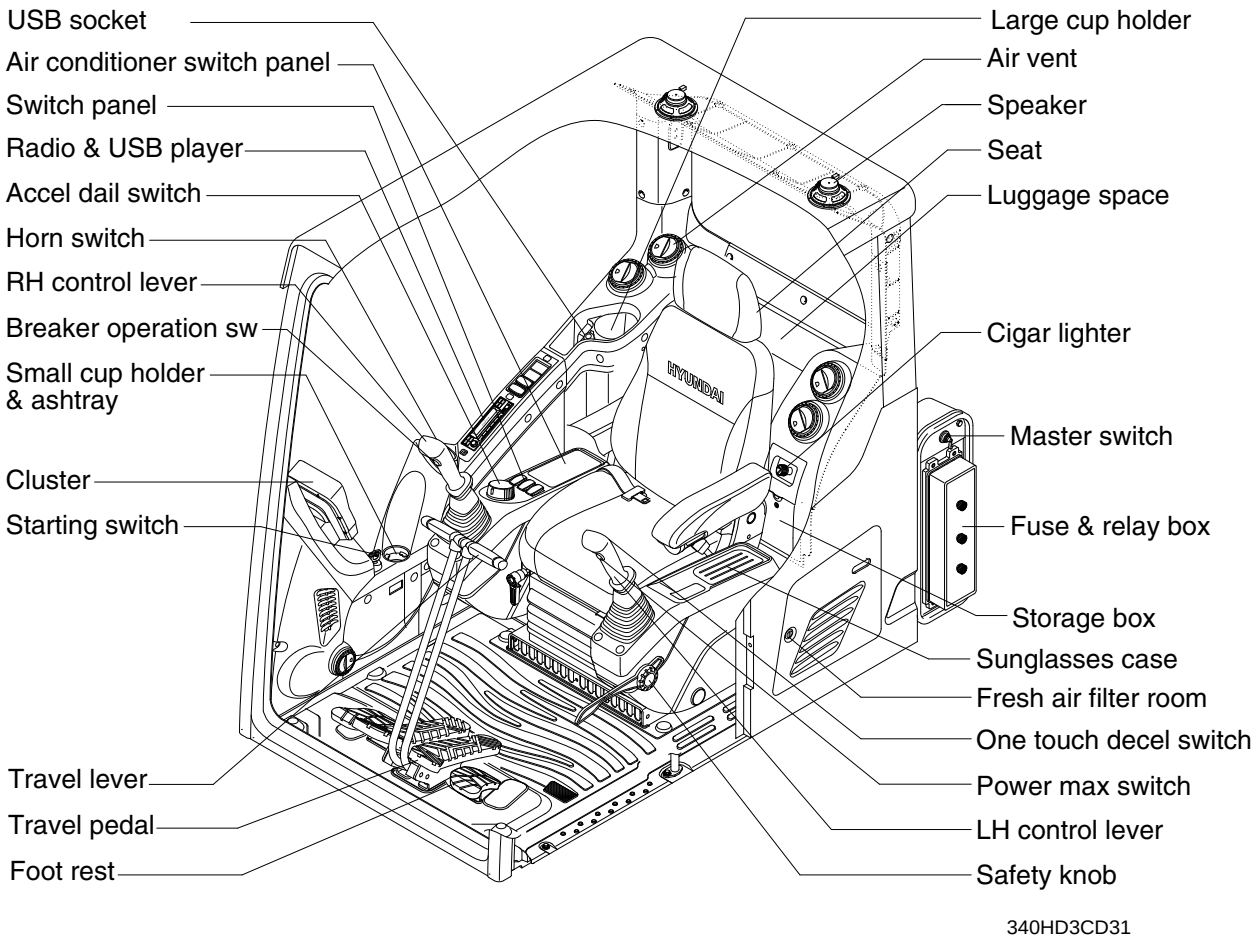
1. CAB DEVICES

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.



340HD3CD31

2. CLUSTER

1) STRUCTURE

The cluster consists of LCD and switches as shown below. The LCD is to warn the operator in case of abnormal machine operation or conditions for the appropriate operation and inspection. Also, The LCD is to set and display for modes, monitoring and utilities with the switches.

The switches or touch screen are to set the machine operation modes.

※ **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.**

Normal type

220S3CD501B

Premium type

220S3CD01C

※ **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. Refer to page 3-6 for details.**

2) GAUGE

(1) Operation screen

When you first turn starting switch ON, the operation screen will appear.

Normal type

220S3CD551B

Premium type

Default

Option

220S3CD151A

1	RPM / Speed gauge	5	Tripmeter display
2	Engine coolant temperature gauge	6	Eco guage
3	Hydraulic oil temperature gauge	7	Accel dial gauge
4	Fuel level gauge		

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

(2) RPM / Speed gauge

Normal type

① This display the engine speed.

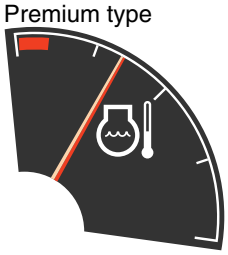
Premium type

290F3CD549

(3) Engine coolant temperature gauge

Normal type

Premium type



220S3CD553

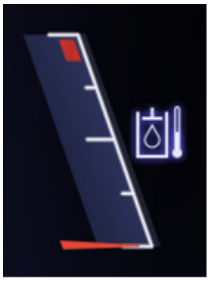
① This gauge indicates the temperature of coolant.
- White range : 40-104˚C (104-219˚F)
- Red range : Above 104˚C (219˚F)

② If the indicator is in the red range or lamp pops up and the buzzer sounds turn OFF the engine and check the engine cooling system.

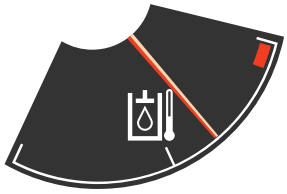
※ If the gauge indicates the red range or lamp blinks in red even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

(4) Hydraulic oil temperature gauge

Normal type



Premium type



220S3CD554

① This gauge indicates the temperature of hydraulic oil.
- White range : 40-105˚C(104-221˚F)
- Red range : Above 105˚C(221˚F)

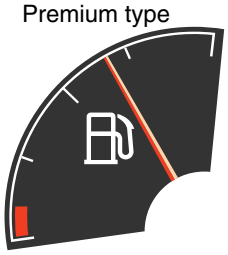
② If the indicator is in the red range or lamp pops up and the buzzer sounds reduce the load on the system. If the gauge stays in the red range, stop the machine and check the cause of the problem.

※ If the gauge indicates the red range or lamp blinks in red even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

(5) Fuel level gauge

Normal type

Premium type



220S3CD555

① This gauge indicates the amount of fuel in the fuel tank.

② Fill the fuel when the red range, or lamp pops up and the buzzer sounds.

※ If the gauge indicates the red range or lamp blinks in red even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

(6) Tripmeter display

290F3CD56

① This displays the engine the tripmeter.

(7) Eco gauge

290F3CD58

① This gauge indicates the fuel consumption rate and machine load status. So that operators can be careful with fuel economy.

② The fuel consumption rate or machine load is higher, the number of segment is increased.

③ The color of Eco gauge indicates operation status.

- White : Idle operation
- Green : Economy operation
- Yellow : Non-economy operation at a medium level.
- Red : Non-economy operation at a high level.

(8) Accel dial gauge

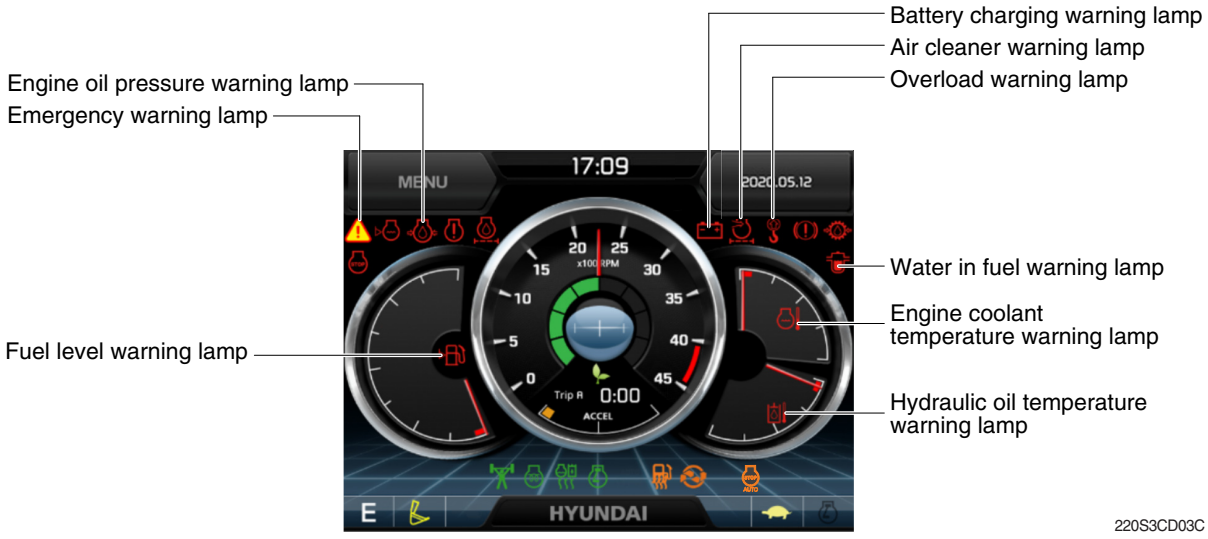
290F3CD59

① This gauge indicates the level of accel dial.

3) WARNING LAMPS

Normal type

Premium type

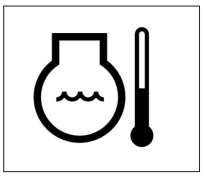


※ Warning lamps and buzzer

Warnings	When error happened	Lamps and buzzer
All warning lamps except below	Warning lamp pops up on the center of the LCD and the buzzer sounds	· The pop-up warning lamp moves to the original position and blinks, and the buzzer stops when ; - the buzzer stop switch AUTO IDLE Buzzer Stop is pushed - the lamp of the LCD is touched
	Warning lamp pops up on the center of the LCD and the buzzer sounds	**※ Refer to page 3-7 for details.**

※ Refer to page 3-13 for the buzzer stop switch AUTO IDLE Buzzer Stop .

(1) Engine coolant temperature warning lamp



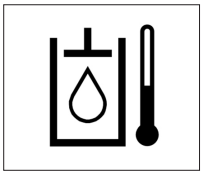
290F3CD61

① Engine coolant temperature warning is indicated two steps.
- 100˚C over : The lamp pops up and the buzzer sounds.
- 104˚C over : The lamp pops up and the buzzer sounds.

② The pop-up , lamps move to the original position and blinks when the buzzer stop switch AUTO IDLE Buzzer Stop is pushed. And the buzzer stops and , lamps keep blink.

③ Check the cooling system when the lamps keep blink.

(2) Hydraulic oil temperature warning lamp



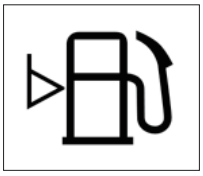
290F3CD62

① Hydraulic oil temperature warning is indicated two steps.
- 100˚C over : The lamp pops up and the buzzer sounds.
- 105˚C over : The lamp pops up and the buzzer sounds.

② The pop-up , lamps move to the original position and blinks when the buzzer stop switch AUTO IDLE Buzzer Stop is pushed. And the buzzer stops and , lamps keep blink.

③ Check the hydraulic oil level and hydraulic oil cooling system.

(3) Fuel level warning lamp



290F3CD63

① This warning lamp pops up and the buzzer sounds when the level of fuel is below 55 ℓ (14.5 U.S. gal).

② Fill the fuel immediately when the lamp blinks.

(4) Emergency warning lamp

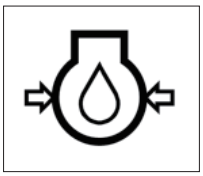
290F3CD64

① This warning lamp pops up and the buzzer sounds when each of the below warnings is happened.
- Engine coolant overheating (over 104˚C)
- Hydraulic oil overheating (over 105˚C)
- MCU input voltage abnormal
- Cluster communication data error

※ The pop-up warning lamp moves to the original position and blinks when the buzzer stop switch AUTO IDLE Buzzer Stop is pushed. And the buzzer stops.

② When this warning lamp blinks, machine must be checked and serviced immediately.

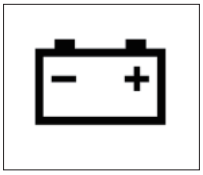
(5) Engine oil pressure warning lamp



290F3CD65

① This warning lamp pops up and the buzzer sounds when the engine oil pressure is low.
② If the lamp blinks, shut OFF the engine immediately. Check oil level.

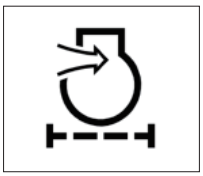
(6) Battery charging warning lamp



290F3CD67

① This warning lamp pops up and the buzzer sounds when the battery charging voltage is low.
② Check the battery charging circuit when this lamp blinks.

(7) Air cleaner warning lamp



290F3CD68

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

(8) Overload warning lamp (opt)

290F3CD69

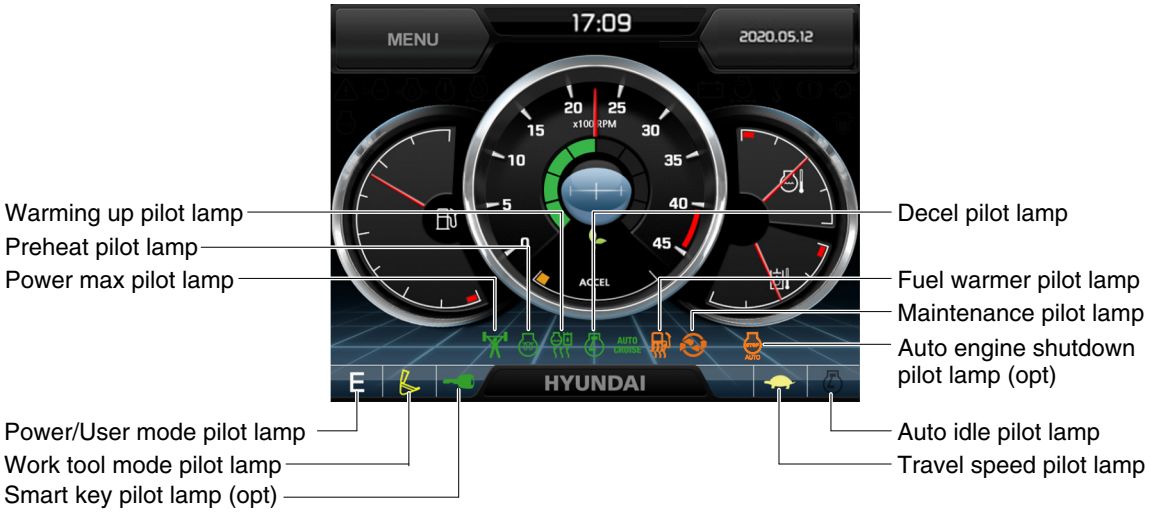
① When the machine is overload, the overload warning lamp pops up and the buzzer sounds during the overload switch is ON. (if equipped)
② Reduce the machine load.

4) PILOT LAMPS

Normal type

220S3CD574B

Premium type



220S3CD74C

(1) Mode pilot lamps

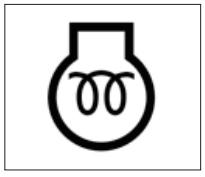
No	Mode	Pilot lamp	Selected mode
1	Power mode	P	Heavy duty power work mode
		S	Standard power mode
		E	Economy power mode
2	User mode	U	User preferable power mode
3	Work tool mode		General operation - IPC speed mode
			General operation - IPC balance mode
			General operation - IPC efficiency mode
			Breaker operation mode
			Crusher operation mode
4	Travel mode		Low speed traveling
			High speed traveling
5	Auto idle mode		Auto idle

(2) Power max pilot lamp

290F3CD78

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.
※ **Refer to page 3-35 for power max function.**

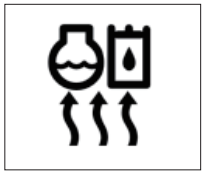
(3) Preheat pilot lamp



290F3CD79

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

(4) Warming up pilot lamp



290F3CD80

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

290F3CD81

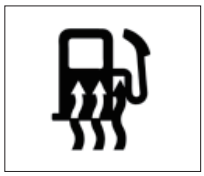
① Operating one touch decel switch on the RCV lever makes the lamp ON.

② Also, the lamp will be ON and engine speed will be lowered automatically to save fuel consumption when all levers and pedals are at neutral position, and the auto idle function is selected.

※ **One touch decel is not available when the auto idle pilot lamp is turned ON.**

※ **Refer to page 3-35.**

(6) Fuel warmer pilot lamp



290F3CD82

① This lamp is turned ON when the coolant temperature is below 10˚C (50˚F) or the hydraulic oil temperature 20˚C (68˚F).

② The automatic fuel warming is cancelled when the engine coolant temperature is above 60˚C, and the hydraulic oil temperature is above 45˚C since the start switch was ON position.

(7) Maintenance pilot lamp

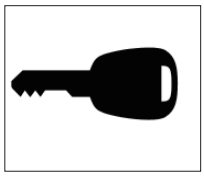
290F3CD83

① This lamp will be ON when the consuming parts are needed to change or replace. It means that the change or replacement interval of the consuming parts remains below 30 hours.

② Check the message in maintenance information of main menu. Also, this lamp lights ON for 3 minutes when the start switch is ON position.

※ **Refer to page 3-24.**

(8) Smart key pilot lamp (premium type, opt)



290F3CD214

① This lamp is ON when the engine is started by the start button.

② This lamp is red when the a authentication fails, green when succeeds.

※ **Refer to page 3-25.**

(9) Auto engine shutdown pilot lamp (opt)

220A3CD202A

① This lamp is turned ON when the auto engine shutdown is activated.

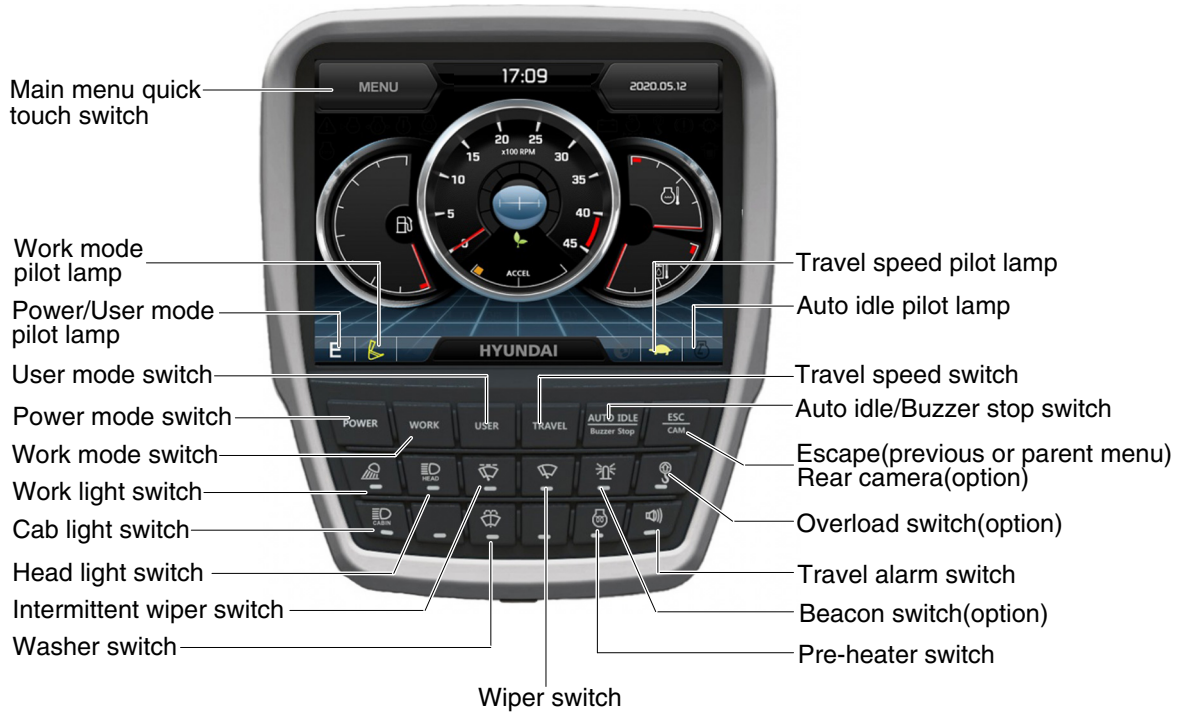
※ **Refer to page 3-21.**

5) SWITCHES

Normal type

220S3CD586

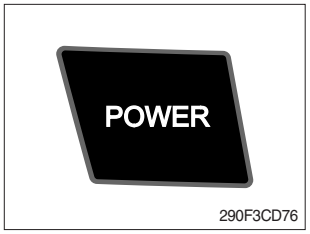
Premium type



220S3CD86B

※ When some of the switches are selected, the pilot lamps are displayed on the LCD. Refer to page 3-9 for details.

(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.
- P : Heavy duty power work.
- S : Standard power work.
- E : Economy power work.

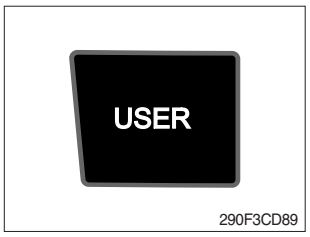
② The pilot lamp changes E → S → P → E in order.

(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
- : Breaker operation mode (if equipped)
- : Crusher operation mode (if equipped)
- Not installed : Breaker or crusher is not installed.

※ **Refer to page 4-7 for details.**

(3) User mode switch



① This switch is used to memorize the current machine operating status in the MCU and activate the memorized user mode.
- Memory : Push more than 2 seconds.
- Action : Push within 2 seconds.
- Cancel : Push this switch once more within 2 seconds.

② Refer to page 3-19 for another set of user mode.

(4) Travel speed switch

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

※ **Do not change the setting of the travel speed switch. Machine stability may be adversely affected.**

⚠ **Personal injury can result from sudden changes in machine stability.**

(5) Auto idle/ buzzer stop switch

① This switch is used to activate or cancel the auto idle function.
- Pilot lamp ON : Auto idle function is activated.
- Pilot lamp OFF : Auto idle function is cancelled.

② The buzzer sounds when the machine has a problem.
In this case, push this switch and buzzer stops, but the warning lamp blinks until the problem is cleared.

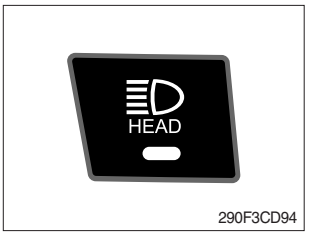
(6) Escape/Camera switch

① This switch is used to return to the previous menu or parent menu.
② In the operation screen, pushing this switch will display the view of the camera on the machine (if equipped).
Please refer to page 3-31 for the camera.
③ If the camera is not installed, this switch is used only ESC function.

(7) Work light switch

① This switch is used to operate the work light.
② The pilot lamp is turned ON when operating the switch.

(8) Head light switch



① This switch is used to operate the head light.
② The pilot lamp is turned ON when operating the switch.

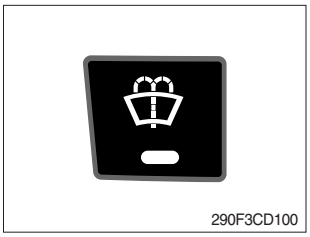
(9) Intermittent wiper switch

① This switch is used to wipe operates intermittently.
② The pilot lamp is turned ON when operating the switch.

(10) Wiper switch

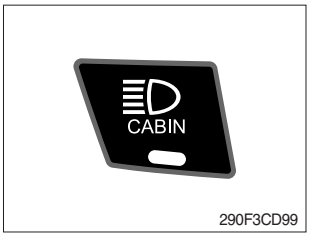
① This switch is used to operate the window wiper.
② Note that the wiper will self-park when switched off.
③ The pilot lamp is turned ON when operating the switch.
※ If the wiper does not operate with the switch in ON position, turn the switch OFF immediately. Check the cause. If the switch remains ON, motor failure can result.

(11) Washer switch



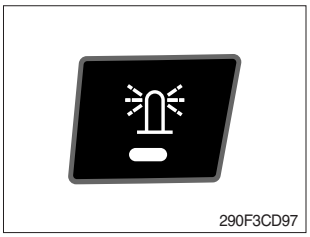
① The washer liquid is sprayed and the wiper is operated only while pressing this switch.
② The pilot lamp is turned ON when operating the switch.

(12) Cab light switch



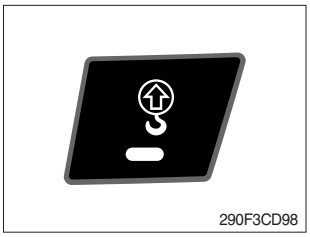
① This switch turns ON the cab light on the cab.
② The pilot lamp is turned ON when operating the switch.

(13) Beacon switch (option)



① This switch turns ON the rotary light on the cab.
② The pilot lamp is turned ON when operating the switch.

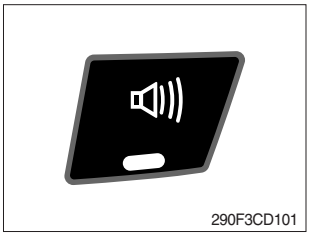
(14) Overload switch (option)



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

⚠ Overloading the machine could impact the machines stability which could result in tipover hazard. A tipover hazard could result in serious injury or death. Always activate the overload warning device before you handle or lift objects.

(15) Travel alarm switch



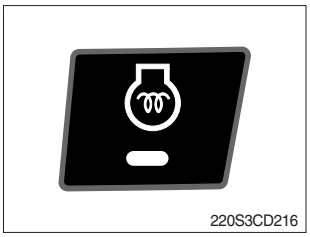
① This switch is to activate travel alarm function surrounding when the machine travels to forward and backward.
② On pressing this switch, the alarm operates only when the machine is traveling.
③ The pilot lamp is turned ON when operating the switch.

(16) Main menu quick touch switch

① This switch is to activate the main menu in the cluster.

※ Refer to page 3-18.

(17) Pre-heater switch



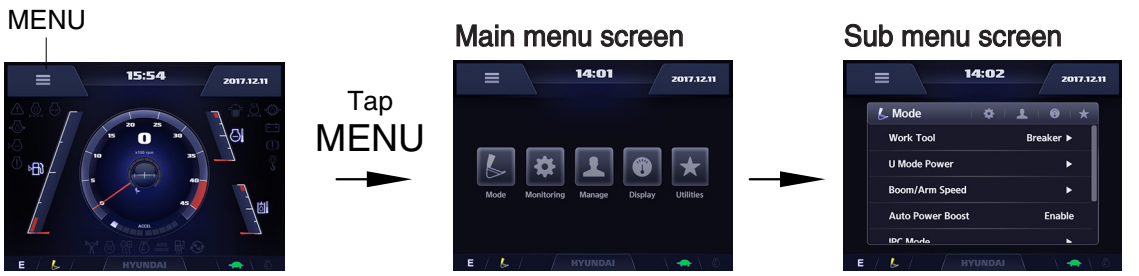
① Turning the smart key switch on position starts preheating in cold weather.

6) MAIN MENU

※ On the operation screen, tap MENU to access the main menu screen.
On the sub menu screen, you can tap the menu bar to access functions or applications.

Normal type

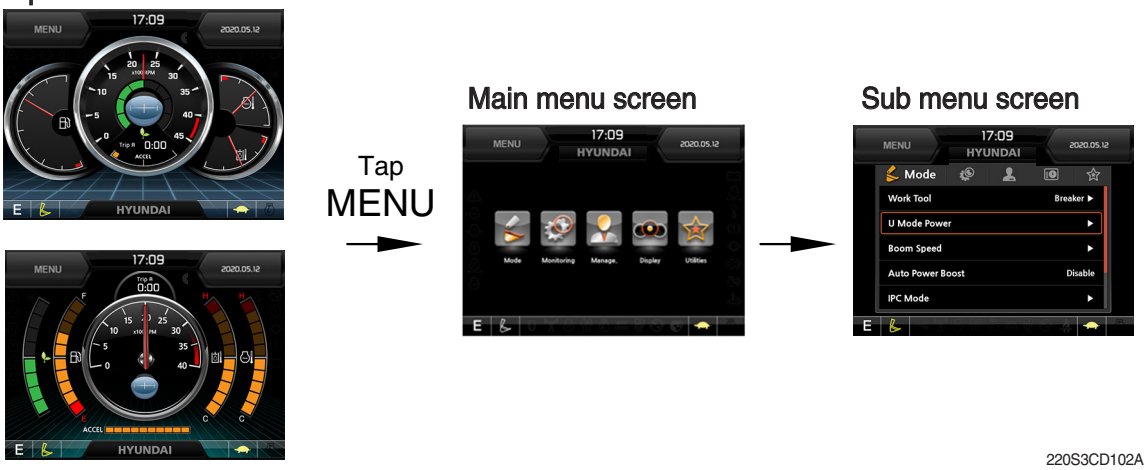
Operation screen



220S3CD502

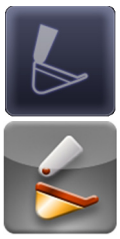
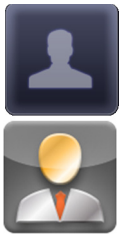
Premium type

Operation screen



220S3CD102A

(1) Structure

No	Main menu	Sub menu	Description
1	 Mode 290S3CD103	Work tool U mode power Boom/Arm speed Auto power boost IPC mode Auto engine shutdown (option) Initial mode Emergency mode	Breaker, Crusher, Not installed User mode only Boom speed Enable, Disable Speed mode, Balance mode, Efficiency mode One time, Always, Disable Key on initial mode, Accel initial mode / step Switch function
2	 Monitoring 290S3CD104	Active fault Logged fault Delete logged fault Monitoring	MCU, ★AAVM (option) MCU, ★AAVM (option) All logged fault delete, Initialization canceled Machine information, Switch status, Output status,
3	 Management 290S3CD105	Fuel rate information Maintenance information Machine security Machine information Contact Service menu Clinometer Update	General record, Hourly, Daily, Mode record Replacement, Change interval oils and filters ESL mode setting, Password change Model, MCU, Monitor, RMCU, Relay drive unit, ★AAVM (option) A/S phone number, A/S phone number change Power shift, Operating hour, Breaker mode pump acting, EPPR current level, Overload pressure Clinometer setting Cluster, ETC device
4	 Display 290S3CD106	Display item Clock Brightness Unit setup Language selection ★Screen type	Engine speed, Tripmeter A, Tripmeter B, Tripmeter C Clock Manual, Auto Temperature, Pressure, Flow, Distance, Date format Korean, English, ETC A type, B type
5	 Utilities 290S3CD107	Tripmeter Camera setting AUX Manual	3 kinds (A, B, C) Camera setting, Auto mode (travel)

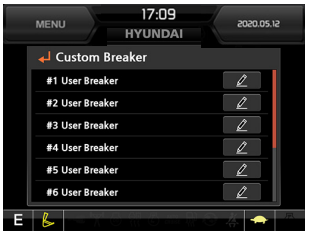
★ : premium type

(2) Mode setup

※ Illustrations are based on the premium type cluster.

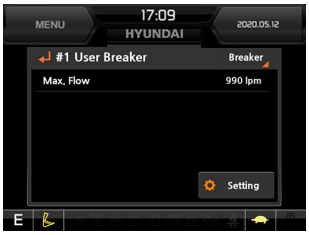
① Work tool

220S3CD108A



220S3CD253A

A



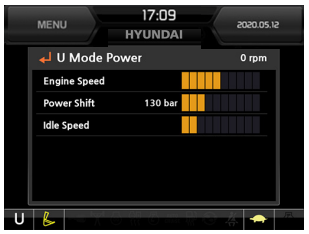
220S3CD254A

B

· Select on installed optional attachment
  - A : It can set the user's attachment.
    It is available in setting #1~#10.
  - B : Max flow - Set the maximum flow for the attachment.
    Relief pressure - Set the relief pressure.

② U mode power

220S3CD111A



220S3CD112A

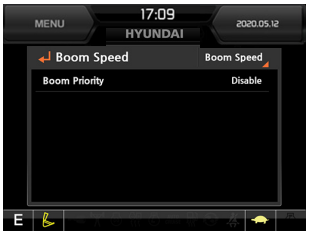
· Engine high idle rpm, auto idle rpm and pump torque (power shift) can be modulated and memorized separately in U-mode.
· U-mode can be activated by user mode switch.

Step (▮)	Engine speed (rpm)	Idle speed (rpm)	Power shift (bar)
1	1400	1000	0
2	1500	1050 (auto decel)	3
3	1550	1100	6
4	1650	1150	9
5	1700	1200	12
6	1750	1250	16
7	1800	1300	20
8	1850	1350	26
9	1900	1400	32
10	1950	1450	38

※One touch decel & low idle : 1000 rpm

③ Boom speed

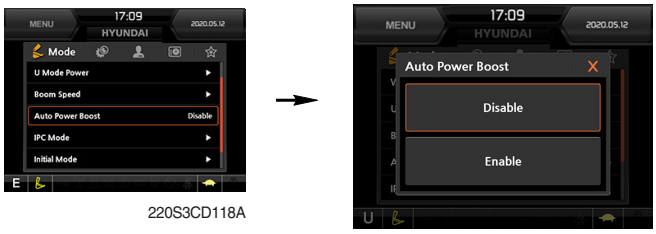
220S3CD113A



220S3CD115A

· **Boom speed**
  - Boom priority function can be activated or cancelled
    Enable - Boom up speed is automatically adjusted as working conditions by the MCU.
    Disable - Normal operation

④ Auto power boost

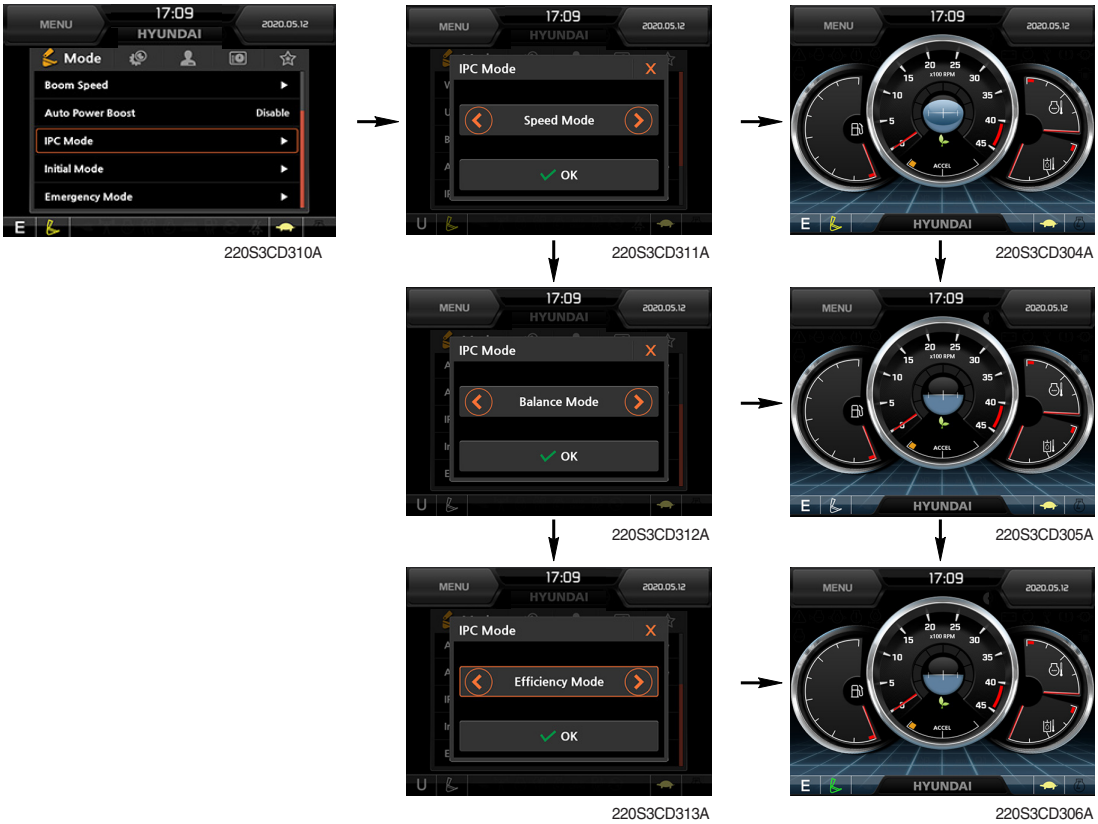


220S3CD118A

220S3CD117A

· The power boost function can be activated or cancelled.
Enable - The digging power is automatically increased as working conditions by the MCU.
It is operated max 8 seconds.
Disable - Not operated.

⑤ IPC mode



220S3CD310A
220S3CD311A
220S3CD304A
220S3CD312A
220S3CD305A
220S3CD313A
220S3CD306A

· The IPC mode can be selected by this menu.
- Speed mode
- Balance mode (default)
- Efficiency mode

· This mode is applied only general operation mode of the work tool mode.

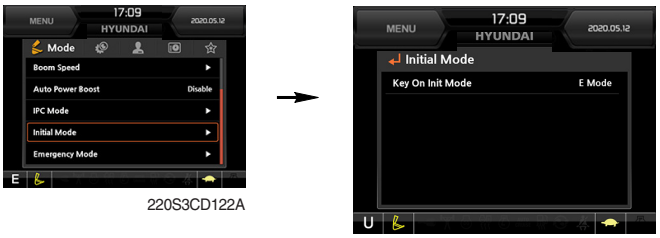
※ Please update the cluster programs if this mode is not displayed in the mode setup menu. Refer to page 3-27.

⑥ Automatic engine shutdown (option)

220S3CD91A 220S3CD92A 220S3CD93A

· The automatic engine shutdown function can be set by this menu.
  - One time
  - Always
  - Disable
  - Wait time setting : Max 40 minutes, min 2 minutes

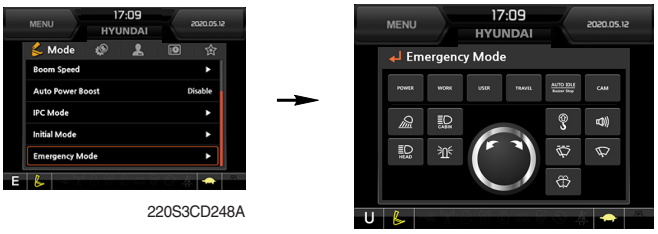
⑦ Initial mode



220S3CD122A 220S3CD119A

· **Key on initial mode**
  - Selected the power mode is activated when the engine is started.

⑧ Emergency mode



220S3CD248A 220S3CD249A

· This mode can be used when the switches are abnormal on the cluster.
· The cluster switches will be selected by touched each icon.

(3) Monitoring

① Active fault

220S3CD120A

220S3CD125A

· The active faults of the MCU and AAVM (option) can be checked by this menu.

② Logged fault

220S3CD128A

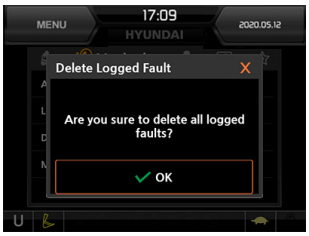
220S3CD124A

· The logged faults of the MCU and AAVM (option) can be checked by this menu.

③ Delete logged fault

220S3CD134A

220S3CD126A

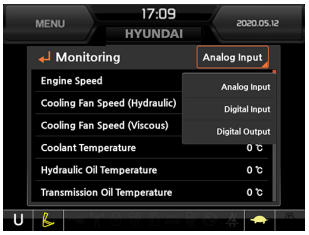


220S3CD127A

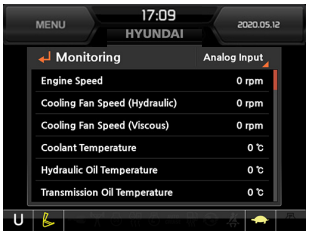
· The logged faults of the MCU and AAVM (option) can be deleted by this menu.

④ Monitoring

220S3CD172A



220S3CD188A



220S3CD189A

· The machine status such as the engine rpm, oil temperature, voltage and pressure etc. can be checked by this menu (Analog input).
· The switch status or output status can be confirmed by this menu (Digital input & Digital output).
· The activated switch or output pilot lamps ● are light ON.

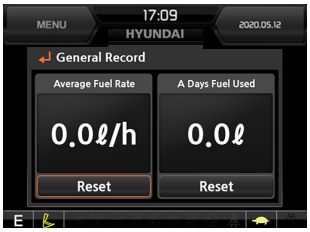
(4) Management

① Fuel rate information

220S3CD14A

220S3CD15A

A



220S3CD16A

B

220S3CD17A

C

220S3CD18A

D

220S3CD19A

· **General record (A)**
  - Average fuel rate (left) (from "Reset" to now)
    Fuel consumption devided by engine run time (service meter time).
  - A days fuel used (right)
    Fuel consumption from 24:00 (or "Reset" time) to now (MCU real time).

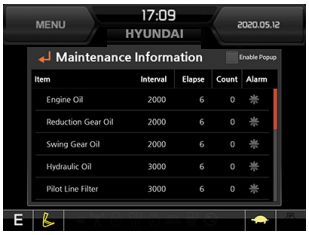
· **Hourly record (B)**
  - Hourly fuel rates for past 12 hours (service meter time).
  - No record during key-off time.
  - One step shift to the right for every one hour.
  - Automatic deletion for 12 hours earlier data.
  - All hourly records deletion by "Reset".

· **Daily record (C)**
  - Daily fuel consumption for past seven days (MCU real time).
  - No record during key-off time.
  - One step shift to the right at 24:00 for every day.
  - Automatic deletion for 7 days earlier data.
  - All daily records deletion by "Reset".

· **Mode record (D)**
  - Average fuel rate for each power mode/accel dial (at least 7) from "Reset" to now.
  - No record during idle.
  - All mode records deletion by "Reset".

② Maintenance information

220S3CD131A



220S3CD132A

220S3CD133A

- Alarm lamp (●) is ON when oil or filter needs to be changed or replaced.
- Replacement : The elapsed time will be reset to zero (0).
- Change interval : The change or replace interval can be changed in the unit of 50 hours.

※ **Refer to Maintenance chart for further information of maintenance interval.**

③ Machine security

220S3CD190A

220S3CD135A

220S3CD136A

· **ESL mode setting**

- 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.
- **Machine security**

  Disable : Not used ESL function

  Enable (always) : The password is required whenever the operator starts engine.
- **Interval** : The password is required when the operator starts engine first. But the operator can restart the engine within the interval time without inputting the password.

  The interval time can be set maximum 4 hours.

※**Default password : 00000**+☑

※**Password length : (5~10 digit)**+☑

220S3CD137A

220S3CD138A

- **Smart key** (premium type, opt) : Smart key is registered when equipped with optional smart key. If smart key is not inside of the cabin, authentication process fails and the password entering is needed.

· **Password change**

- The password is 5~10 digits.

220S3CD190A

220S3CD140A

220S3CD135A

Enter the current password

220S3CD142A

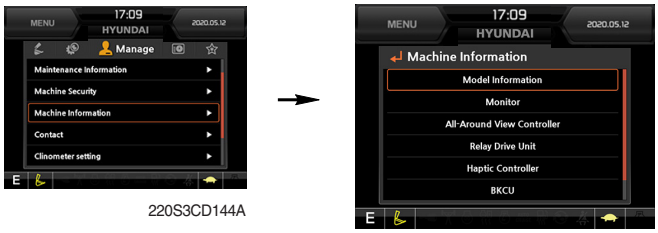
Enter the new password

220S3CD143A

Enter the new password again

※ **Before first use, please set user password and owner password in advance for machine security.**

④Machine Information



220S3CD144A

220S3CD145A

· This can confirm the identification of the model information (ECU), MCU, monitor, switch controller, RMCU, relay driver unit, AAVM (opt).

⑤ Contact (A/S phone number)

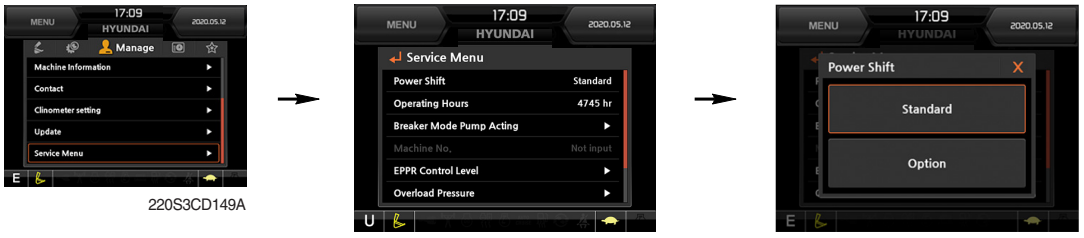
220S3CD146A

220S3CD147A

220S3CD148A

Enter the new A/S phone number

⑥ Service menu



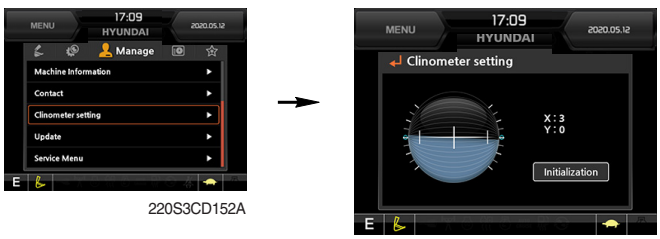
220S3CD149A

220S3CD150A

220S3CD251A

· Power shift (standard/option) : Power shift pressure can be set by option menu.
· Operating hours : Operating hours since the machine line out can be checked by this menu.
· Breaker mode pump acting (1 pump/2 pump)
· EPPR current level (attach flow EPPR 1 & 2)
· Overload pressure : 100 ~ 350 bar

⑦ Clinometer



220S3CD152A

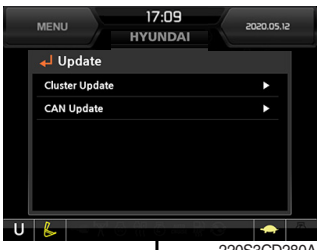
220S3CD153A

· When the machine is on the flatland, if tap the "initialization", the values of X, Y reset "0".
· You can confirm tilt of machine in cluster's operating screen.

⑧ Update (cluster & ETC devices)

220S3CD67A

220S3CD135A



220S3CD280A

- ETC devices and cluster can be updated through CAN 2 network.
- Insert USB memory stick which includes program files, start download.

220S3CD290A

220S3CD281A

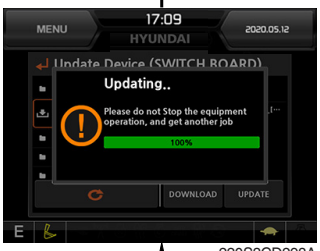
220S3CD291A

220S3CD282A

220S3CD299A

220S3CD292A

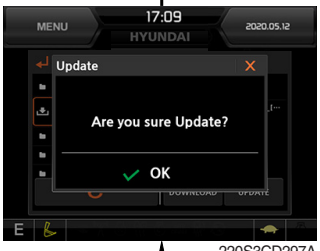
220S3CD283A



220S3CD298A

220S3CD293A

220S3CD284A



220S3CD297A

220S3CD294A

220S3CD285A

220S3CD296A

220S3CD295A

(5) Display

① Display item

220S3CD154A

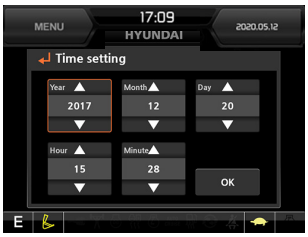
220S3CD155A

220S3CD156A

- The center display type of the LCD can be selected by this menu.
- The engine speed or each of the tripmeter (A,B,C) is displayed on the center display.

② Clock

220S3CD157A



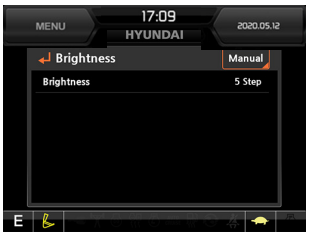
220S3CD158A

- The first line's three spots "**/**/****" represent Year/Month/Day each.
- The second line shows the current time. (0:00~23:59)

③ Brightness

220S3CD159A

220S3CD160A



220S3CD139A

220S3CD141A

220S3CD191A

220S3CD192A

- If "Auto" is chosen, brightness for day and night can be differently set up. Also by using the bar in lower side, users can define which time interval belongs to day and night.
  (in bar figure, white area represents night time while orange shows day time)

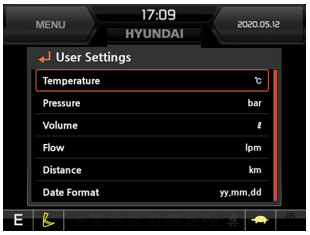
④ Unit

220S3CD161A

220S3CD182A

220S3CD183A

220S3CD186A



220S3CD162A

220F3CD193A

- Temperature : ˚C ↔ ˚F
- Pressure : bar ↔ MPa ↔ kgf/cm^2
- Volume : ℓ ↔ gal
- Flow : lpm ↔ gpm
- Distance : km ↔ mile
- Date format : yy/mm/dd ↔ mm/dd/yy ↔ dd-mm-yy

⑤ Language

220S3CD163A

220S3CD164A

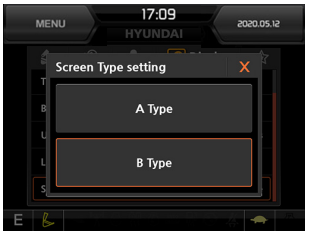
- User can select preferable language and all displays are changed the selected language.

⑥ Screen type (premium type)

220S3CD165A

A Type (Default) 220S3CD166A

220S3CD156A



B Type (Option) 220S3CD174A

220S3CD167A

(6) Utilites

① Tripmeter

220S3CD168A

220S3CD169A

- Maximum 3 kinds of tripmeters can be used at the same time.
- Each tripmeter can be turned on by choosing "Start" while it also can be turned off by choosing "Stop".
- If the tripmeter icon is activated in the operation screen, it can be controlled directly there.

② Camera setting

- If the rear camera is not installed on the machine, set disable.
- If the rear camera installed on the machine, set enable.

220S3CD225A

220S3CD255B

220S3CD256A

- Auto Mode (Travel) : Enable
  The cluster will automatically show camera view while machine is traveling.
- In the operation screen, rear camera screen shows up when ESC/CAM switch is pushed.

220S3CD222A

290F3CD221

③ AAVM (Advanced Around View Monitoring, premium type, opt)

· The AAVM buttons of the cluster consist of ESC/CAM and AUTO IDLE/Buzzer stop.

220S3CD244A

- **Escape button**

· It will enter into the AAVM mode from the beginning screen if the AAVM is installed.

· While in the AAVM mode, select the ESC button to return to the beginning screen.

220S3CD156A

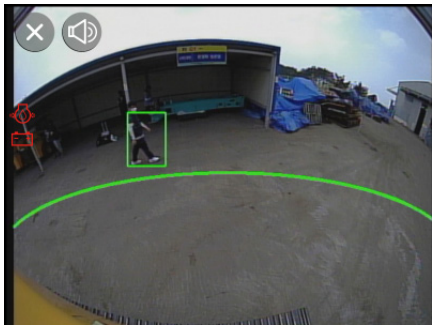
The beginning screen

AAVM mode 235SA3CD222A

- **Buzzer stop button**

· In AAVM mode, it detects surrounding pedestrians or objects and the warning buzzer sounds.

· User can turn OFF the warning sound by pressing buzzer stop button.



220A3CD246

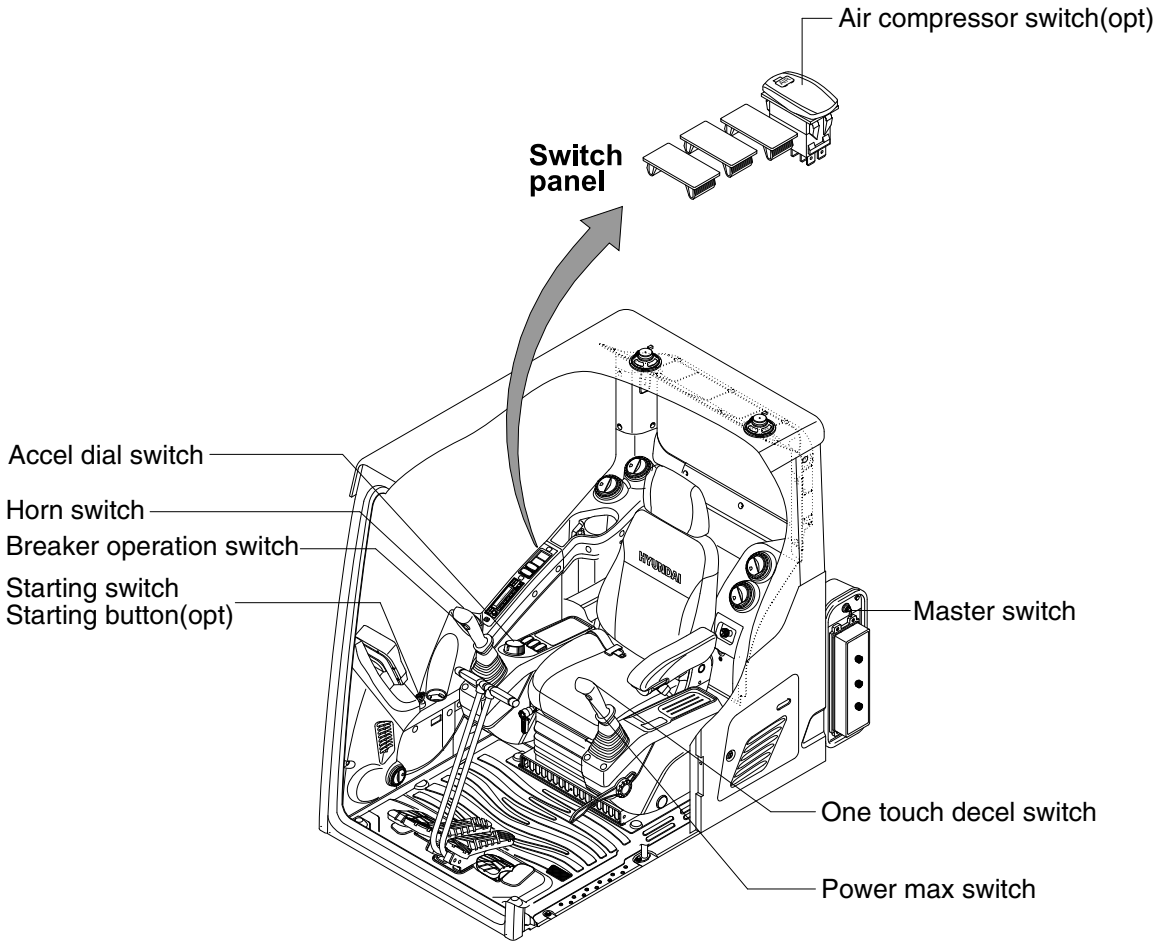
· When the worker or pedestrian go to the green line, an external danger area of equipping on the cluster screen, the warning buzzer sounds and it displays the green rectangular box for the recognition of the worker and pedestrian.
At this time, the operator should stop work immediately, and stop the buzzer by pressing the buzzer stop button. And then, please work after you check whether the danger factors are solved.

220A3CD247

· When the worker or pedestrian go inside of red line, an internal danger area of equipping on the cluster screen, the warning buzzer sounds and it displays the red rectangular box for the recognition of the worker and pedestrian.
At this time, the operator should stop work immediately, and stop the buzzer by pressing the buzzer stop button. And then, please work after you check whether the danger factors are solved.

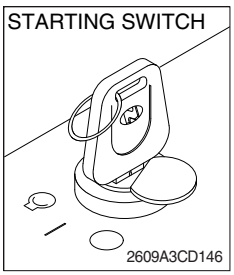
※ In AAVM mode, a touch screen of the LCD is available only. The multimodal dial of the haptic controller is not available.

3. SWITCHES



340HD3CD32

1) STARTING SWITCH & STARTING BUTTON (OPT)

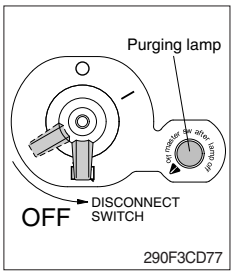


(1) There are three positions, OFF, ON and START.
- ◯(OFF) : None of electrical circuits activate.
- | (ON) : All the systems of machine operate.
- ◯(START) : Use when starting the engine.
  Release key immediately after starting.

※ **If you turn ON the starting switch in cold weather, the fuel warmer** (if equipped) **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



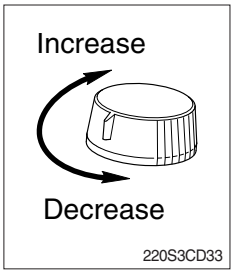
(1) This switch is used to shut off the entire electrical system.

(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.**

※ **Off the master switch after purging lamp OFF.**

3) ACCEL DIAL SWITCH



(1) There are 10 dial setting.

(2) Setting 1 is low idle and setting 10 is high idle.

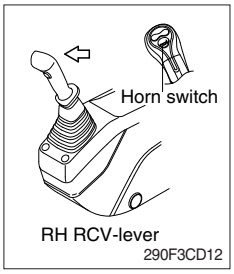
- By rotating the accel dial to right : Engine speed increases.
- By rotating the accel dial to left : Engine speed decreases.

4) AIR COMPRESSOR SWITCH (option)

(1) This switch is used to activate the air compressor.

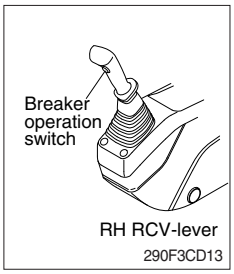
(2) The indicator lamp is turned on when operating the switch.

5) HORN SWITCH



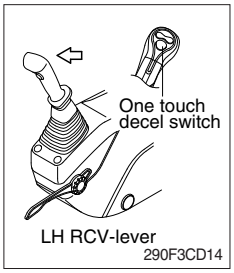
(1) This switch is at the top of right side control lever.
On pressing, the horn sounds.

6) BREAKER OPERATION SWITCH



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

7) ONE TOUCH DECEL SWITCH

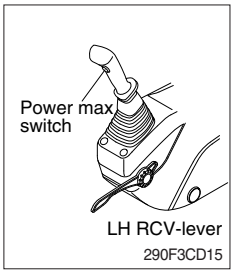


(1) This switch is used to actuate the deceleration function quickly.

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

(3) One touch decel function is available only when the auto idle pilot lamp is turned OFF.

8) POWER MAX SWITCH

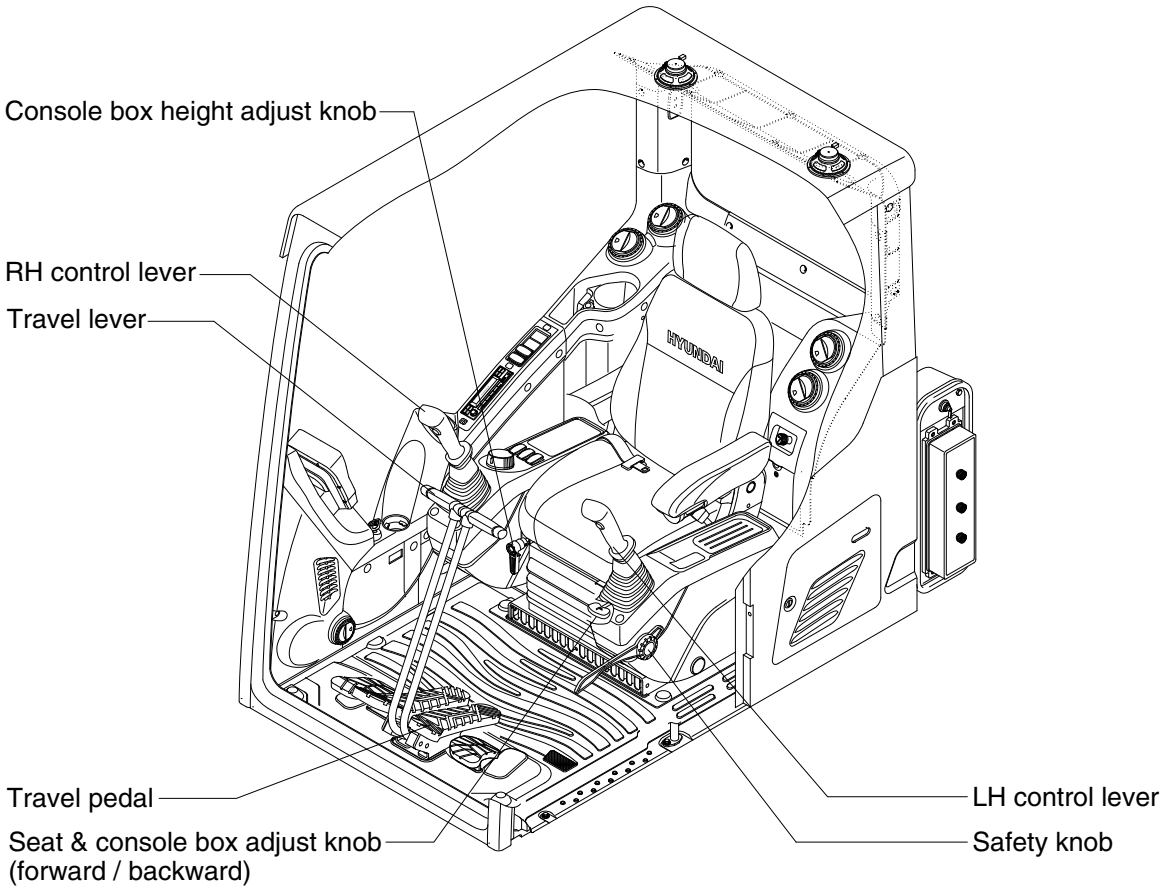


(1) This switch activate power max function.
When this switch is kept pressed, hydraulic power of work equipment will be increased to approx 110 percent during 8 seconds.

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

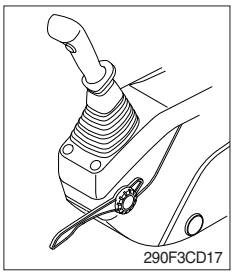
※ **Do not use for craning purposes.**

4. LEVERS AND PEDALS



300S3CD36

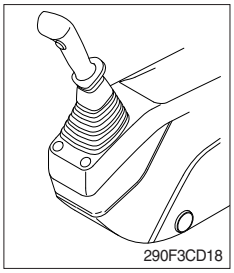
1) LH CONTROL LEVER


290F3CD17

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

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

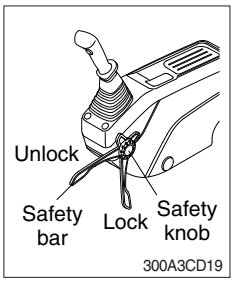
2) RH CONTROL LEVER


290F3CD18

(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 KNOB



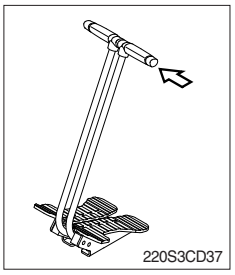
(1) All control levers and pedals are disabled from operation by locating the safety knob to the LOCK position as shown.

※ **Be sure to turn the safety knob to the LOCK position when entering or leaving the operators seat/cabin.**

(2) The machine is operational by turning the safety knob to the UNLOCK position.

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

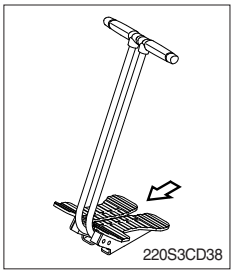
4) TRAVEL LEVER



(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

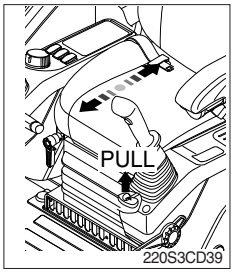


(1) This pedal is used to move the machine forward or backward.

(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.

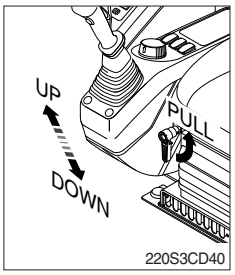
6) SEAT AND CONSOLE BOX ADJUST KNOB (forward/backward)



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

(2) Pull the knob to adjust forward or backward over 150 mm (5.9").

7) CONSOLE BOX (CONTROL LEVER) HEIGHT ADJUST KNOB



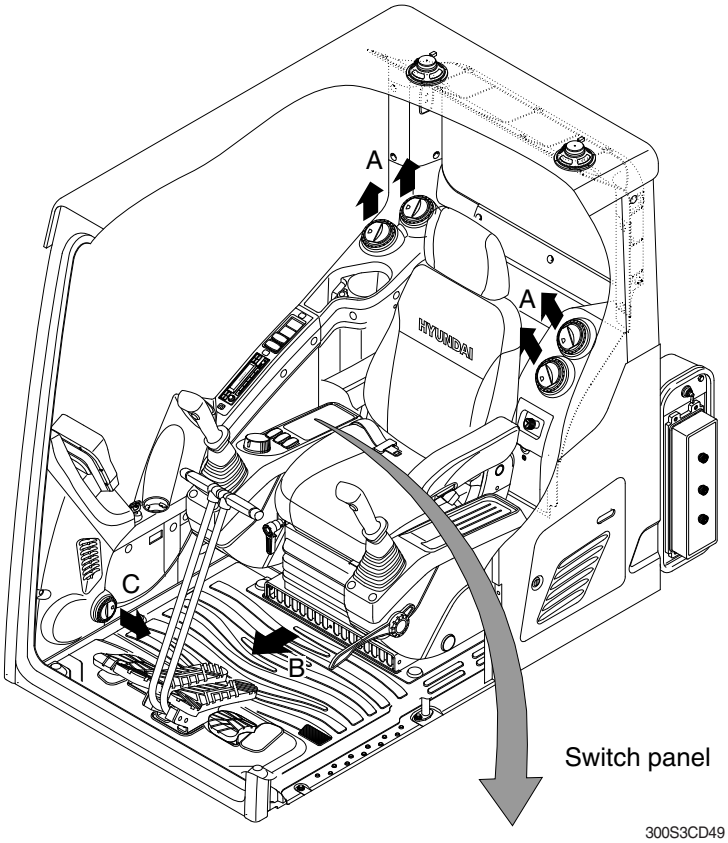
(1) This knob is used to move the LH and RH control levers to fit the contours of the operator's body.

(2) The control levers can be moved upward and downward over 80 mm (2.4").

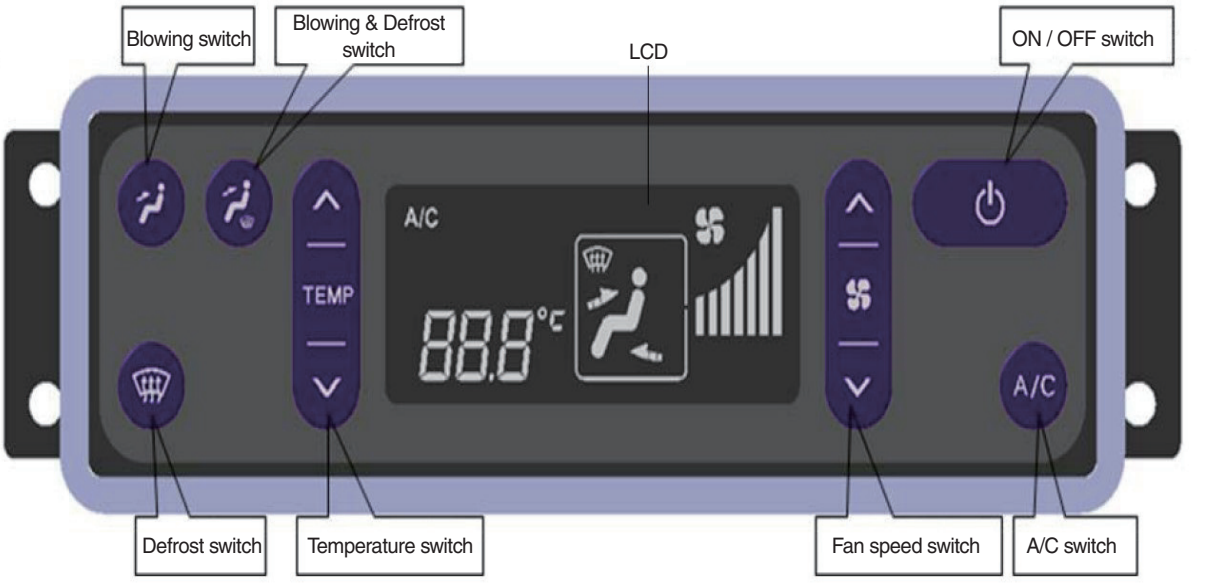
5. AIR CONDITIONER AND HEATER

Full auto air conditioner and heater system automatically keeps the optimum condition in accordance with operator's temperature configuration sensing ambient and cabin inside temperature.

· **Location of air flow ducts**



300S3CD49



340HD3CD49-1

1) POWER OFF SWITCH

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

2) AIR CONDITIONER SWITCH

(1) This switch turns the compressor ON/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) The wind speed step can show the LCD.

(2) This switch controls fan speed manually.
- There are 5 steps (OFF, 1 ~ 4 speed) to control fan speed.
- The maximum step or the minimum step beeps 5 times.

(3) This switch makes the system ON.

4) TEMPERATURE CONTROL SWITCH

220S3CD55

(1) Setting temperature indication (17~32˚C, scale : 0.5˚C)

(2) The highest setting temperature is 32˚C , the lowest temperature 17˚C.

(3) Each ▼ or ▲ operation set temperature change range of 0.5˚C.

(4) Control the electric water valve according to the set temperature.

(5) The power switch can deactivate this function.

5) BLOWING SWITCH


220S3CD56

(1) This swtich indicator light is on.

(2) This switch perform the blowing function.

(3) Blow and defrost switch, defrost switch, power switch can deactivate this function.

6) BLOWING AND DEFROST SWITCH


220S3CD57

(1) This swtich indicator light is on.

(2) This switch perform the blowing and defrost function.

(3) Blowing switch, defrost switch, power switch can deactivate this function.

7) DEFROST SWITCH


220S3CD58

(1) This swtich indicator light is on.

(2) This switch perform the defrost function.

(3) Blowing switch, blowing and deforst switch, power switch can deactivate this function.

8) OTHERS FUNCTIONS

The unit of temperature marker is changed.

(1) The user can choose to change the temperature unit marked on the display screen. Press TEMP UP/DOWN for more than 3 seconds at the same time, can achieve ℃ → ℉ to convert.

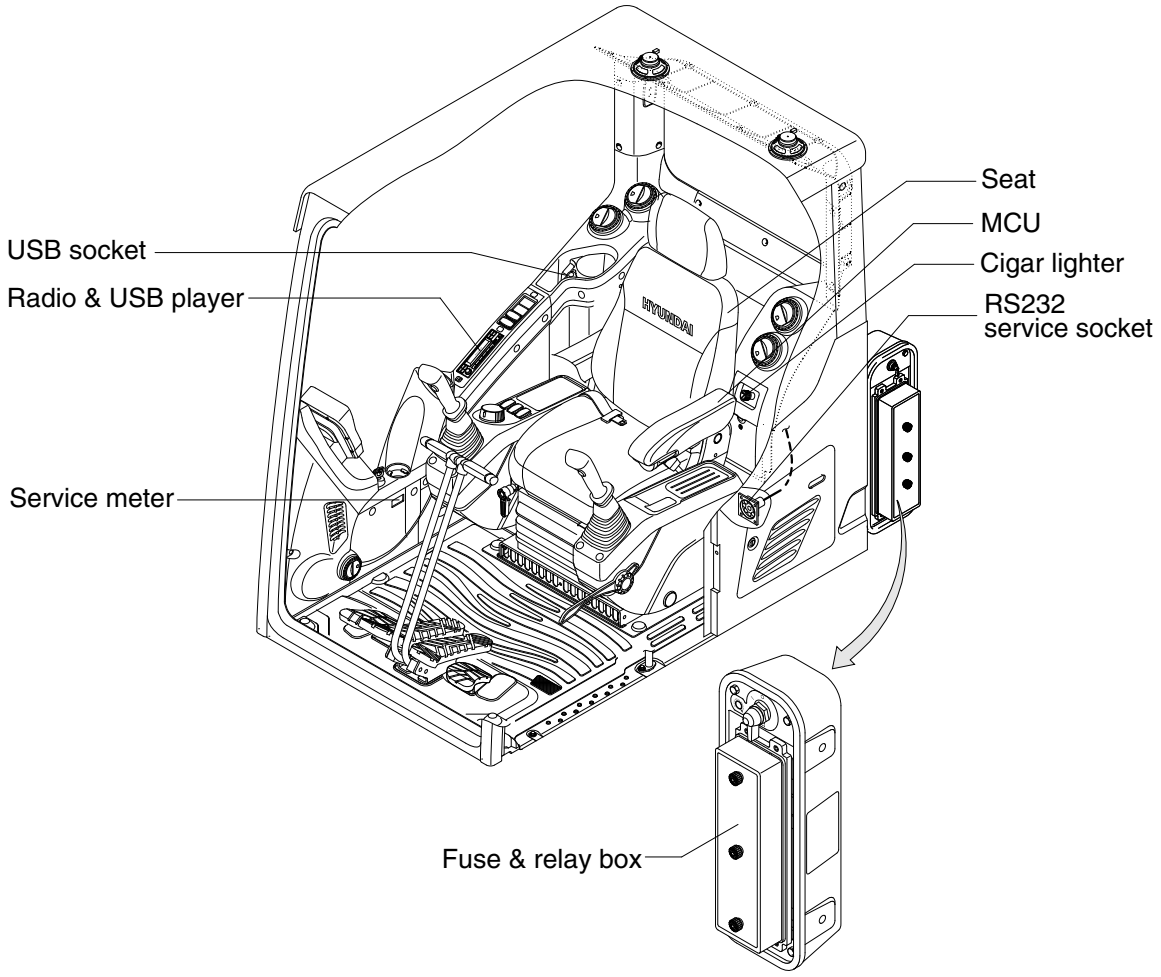
(2) Change the display temperature to ℃ or ℉.

℃	℉
17.0	61
17.5	62
18.0	63
18.5	64
19.0	65
19.5	66
20.0	67
20.5	68
21.0	69
21.5	70
22.0	71

℃	℉
22.5	72
23.0	73
23.5	74
24.0	75
24.5	76
25.0	77
25.5	78
26.0	79
26.5	80
27.0	81
27.5	82

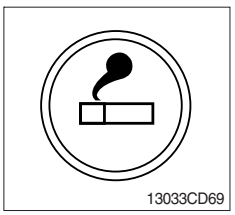
℃	℉
28.0	83
28.5	84
29.0	85
29.5	86
30.0	87
30.5	88
31.0	89
31.5	90
32.0	91

6. OTHERS



340HD3CD41

1) CIGAR LIGHTER



(1) This can be used when the engine starting switch is ON.

(2) The lighter can be used when it springs out in a short while after being pressed down.

※ **Service socket**

Use cigar lighter socket when you need emergency power.
Do not use the lighter exceeding 24 V, 100 W.

2) RADIO AND USB PLAYER

(1) The device supports the function of charging mobile phone with USB data cable.

※ **It is not advisable to charge for a long time, and the battery may be damaged because there is no battery saturation detection function during charging.**

340HD3CD100

(2) Turn the knob counterclockwise to reduce the current volume and turn the button clockwise to increase the current volume.

(3) Function for radio

Td-650 is a knob-type car audio system, including FM, AM tuning radio, Bluetooth, MP3 (USB/SD) clock sound adjustment, external audio input, loudness and other functions.

- System configuration: digital tuned radio, USB/SD-MP3 player, electronic clock display.
- Radio function: support FM (87.5~108MHz), AM (522~1620KHz), can store 24 stations.
- AUX function: Supports the play of MP3 files in U disk or SD card, and supports the input of audio from mobile phone and MP3.
- Sound function: support POP/ROCK/Classic/Flat sound.
- Bluetooth function: Support bluetooth phone connection and bluetooth music playback function.

(4) Radio button

① PWR : switch machine
② BND : band rotation
③ LOU : loudness control, hang up the phone
④ 1/▶/II, 2/INT, 3/RPT, 4/RDM, 5/D-DN, 6/D-LP: radio/storage keys, MP3 player keys
⑤ AS/PS : automatic presets of radio/songs
⑥ MOD : mode selection
⑦ ∧ ∨ : manual/automatic search radio button; select previous/Next song button, fast forward/fast back button.
⑧ MOD : short press to switch from USB/SD to FM, then short press to switch FM1/FM2/FM3 long press to automatically search and save.
⑨ CLK : clock display and settings

(5) Radio operation

① Basic setting

- Mode switch : Press "PWR" to make the product in working state. Press the "MOD" button to loop through each mode in turn. If the USB flash drive is connected, the product directly enters the next mode. This productconsists of RADIO mode, BT PLAY mode, USB moad and AUX IN mode.

· Radio Settings: Press the "PWR" button, and then press the "BND" button to select the desired band from FM1, FM2, FM3, AM1 and AM2. Short press the "∧" button or "∨" button to start automatic radio search. Long press the "∧" button or "∨" button for more than 2S to manually search the radio station. Long press the "AS/PS" button for more than 2S to automatically preset the radio. Long press any of the "1" to "6" buttons for more than 2S, and the current radio will be preset.

② MP3 (USB/SD/MMC) play

· In the radio working mode, after inserting the USB flash drive /SD, it will automatically switch to the USB flash drive /SD playback mode.

- Press the button to play the previous/next song in USB /SD. Long press the button to rewind/forward the current song.
- When the USB flash drive /SD is played, the corresponding USB flash drive /SD icon blinks.

· In MP3 playing mode

- Playing mode : play/pause control keys, browse, repeat, random, -10/+10 song selection

1/▶/II	Play/pause control	4/RDM	Random/All
2/INT	Preview play/scan play	5/D-DN	Tune number minus 10 tune selection control key
3/RPT	Repeat/All	6/D-LP	Tune number plus 10 tune slection control key

- Turn the knob counterclockwise to reduce the current volume and turn the button clockwise to increase the current volume.

③ Clock setting

· Operation in radio /MP3 playing mode

- Short press MUTE/CLK to switch the MUTE switch
- Long press the key to display the clock, and then long press the key again to adjust the hour value byturning the knob against/clockwise after beating for hours, and long press the key again to adjust the value of minutes by turning the knob against/clockwise after beating for minutes. 5 consecutive beats will automatically quit the clockwise setting.

※ The clock will continue to cycle when the BAT power is off after the setting

④ Sound settings

· Operation in radio /MP3 mode

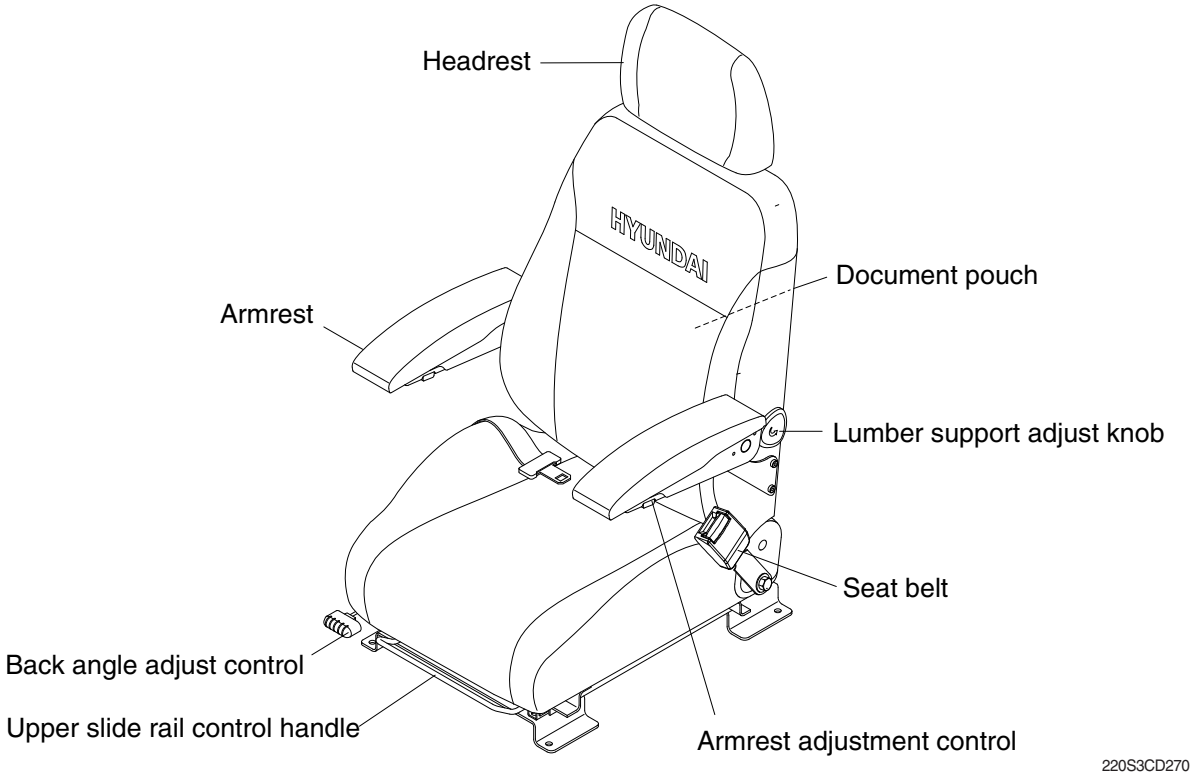
- Short press the knob, successively appear BS O/TE O/BL O/EQOF
- Appear BS O display (Bass), reverse/clockwise turn the button to select the low value.
- Appear TE O display (Treble), Turn the reverse/clockwise button to select the high tone.
- Turn the reverse/clockwise button to select the balance value of left and right speakers value of the BL O display (Balance).
- Turn the reverse/clockwise button only after the appearance of the EQOF display. Will produce the JAZZ/POP/ROCK/CLASSIC/FLAT/EQOF sound, will not be able to manually during the electronic sound bass and treble values.

⑤ The bluetooth settings

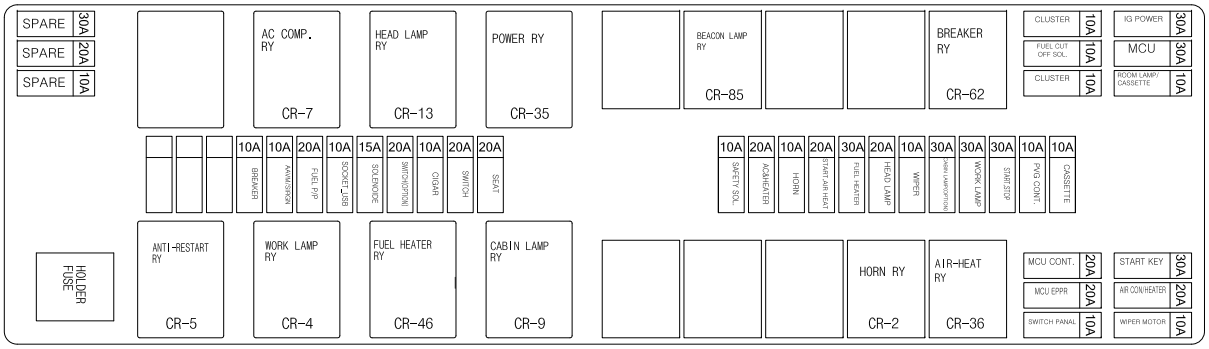
Open the bluetooth of the mobile phone and search for the new "device" function. When the system gets signal contact with the mobile phone, it will prompt whether the mobile phone is connected to the device. Select "Yes" to start the connection. After the connection is successful. "■"is displayed on the LCD screen of the system, indicating that the connection is successful. If you are not in BT PLAY mode after bluetooth pairing, press the "MOD" button to switch to BT PLAY mode.

3) 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.



4) FUSE & RELAY BOX



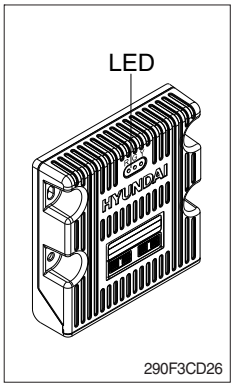
(1) The fuses protect the electrical parts and wiring from burning out.

(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) MCU



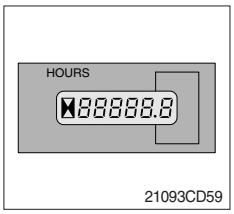
(1) To match the pump absorption torque with the engine torque, MCU varies EPPR valve output pressure, which control pump discharge amount whenever feedbacked engine speed drops under the reference rpm of each mode set.

(2) Three LED lamps on the MCU display as below.

LED lamp	Trouble	Service
G is turned ON	Normal	-
G and R are turned ON	Trouble on MCU	· Change the MCU
G and Y are turned ON	Trouble on serial communication line	· Check if serial communication lines between controller and cluster are disconnected
Three LED are turned OFF	Trouble on MCU power	· Check if the input power wire (24 V, GND) of controller is disconnected · Check the fuse

G : green, R : red, Y : yellow

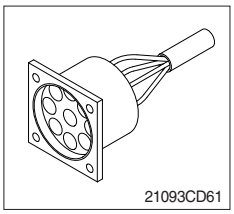
6) SERVICE METER



(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.

7) RS232 SERVICE SOCKET CONNECTOR

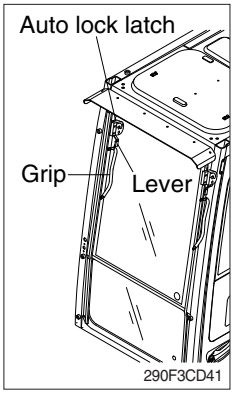


(1) MCU communicates the machine data with Laptop computer through the RS232 service socket.

8) 12V SOCKET

(1) Connect other accessory devices as required.

9) UPPER WINDSHIELD

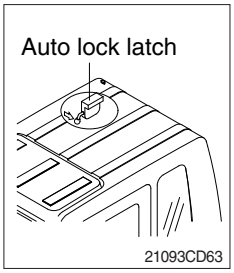


(1) Perform the following procedure in order to open the upper windshield.

① Pull both levers with hold both grips that are located at the top of the windshield frame and push the windshield upward.

② Hold both grips and back into the lock position until auto lock latch is engaged, then release the grips.

⚠ 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 Pull the lever of the auto lock latch in order to release the auto lock latch.

② Reverse above step ① and ② 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.

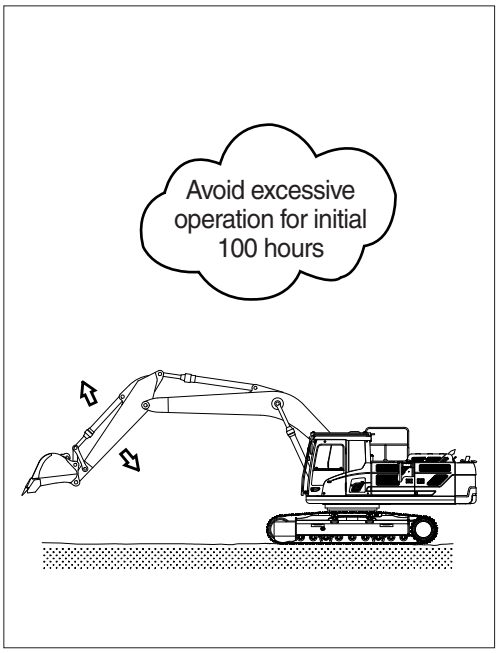
(4) Warm up the machine fully before operation.

(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	
Prefilter	
Hydraulic oil return filter element	
Hydraulic oil drain filter cartridge	
Hydraulic oil pilot line filter element	
Swing reduction gear oil	
Travel reduction gear oil	



330S4OP01

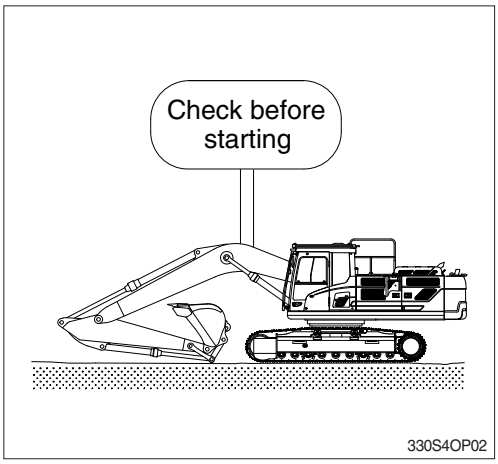
2. CHECK BEFORE STARTING THE ENGINE

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.



330S4OP02

3. STARTING AND STOP THE ENGINE

1) CHECK INDICATOR LIGHTS

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

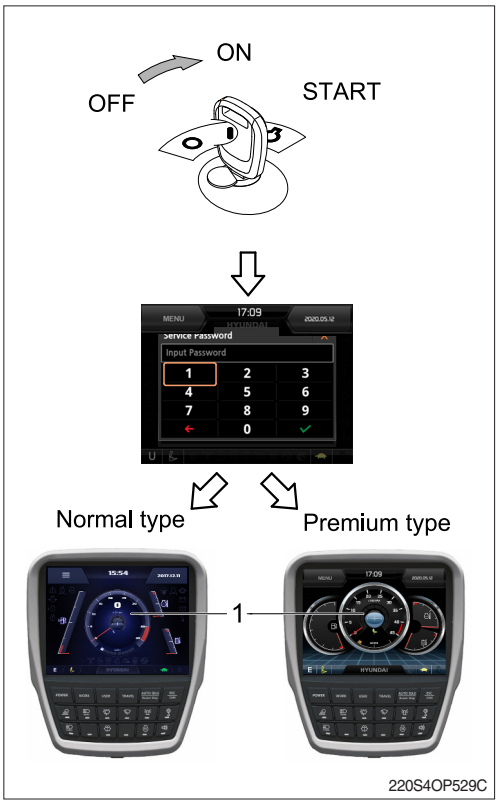
(2) Turn the starting switch to the ON position. Buzzer sounding for 4 seconds with HYUNDAI logo on cluster.

※ **If the ESL mode is set to the enable, enter the password to start engine.**

※ **If the password has failed 5 times, please wait 30 minutes before re-attempting to enter the password.**

※ **Refer to page 3-25 for ESL mode.**

(3) After initialization of cluster, the operating screen is displayed on LCD (1).
Also, self-diagnostic function is carried out.



2) STARTING ENGINE IN NORMAL TEMPERATURE

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

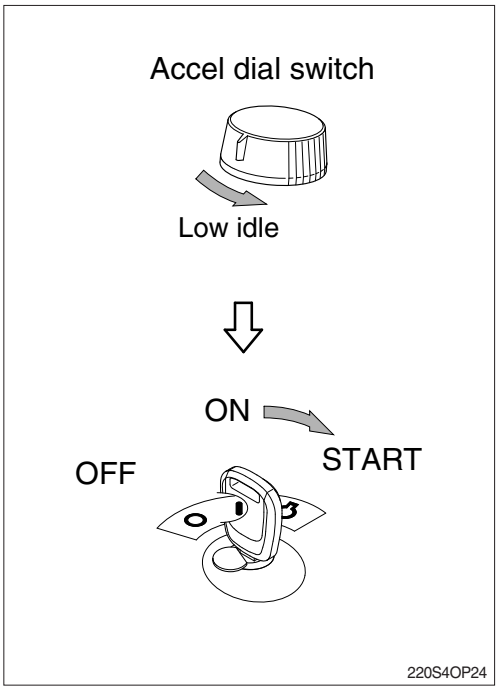
(1) Turn the accel dial switch to low idle position.

(2) 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.**

(3) 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 2-19.**

※ **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.

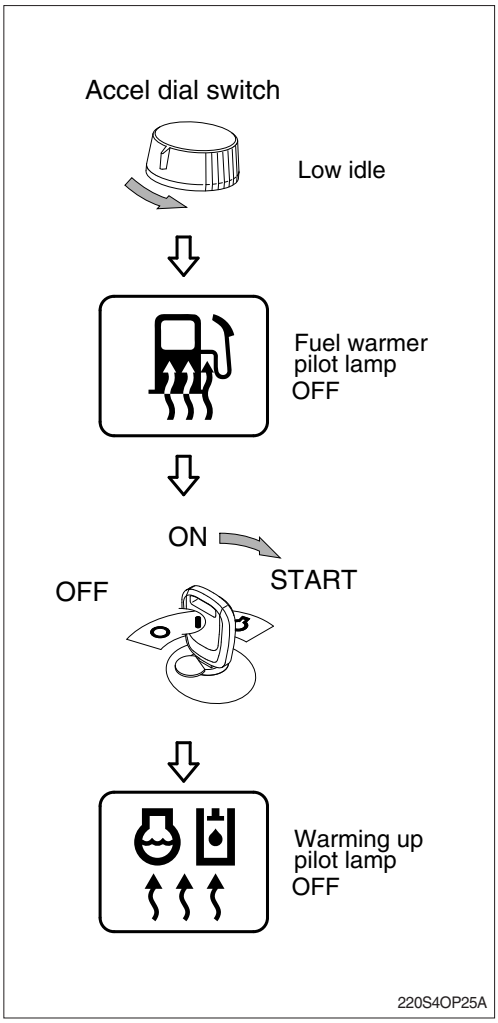
(4) Start the engine by turning the starting switch to START position after the fuel warmer pilot lamp OFF.

※ **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 (1-8)?
- Normal type (1~8), premium type (1~12)

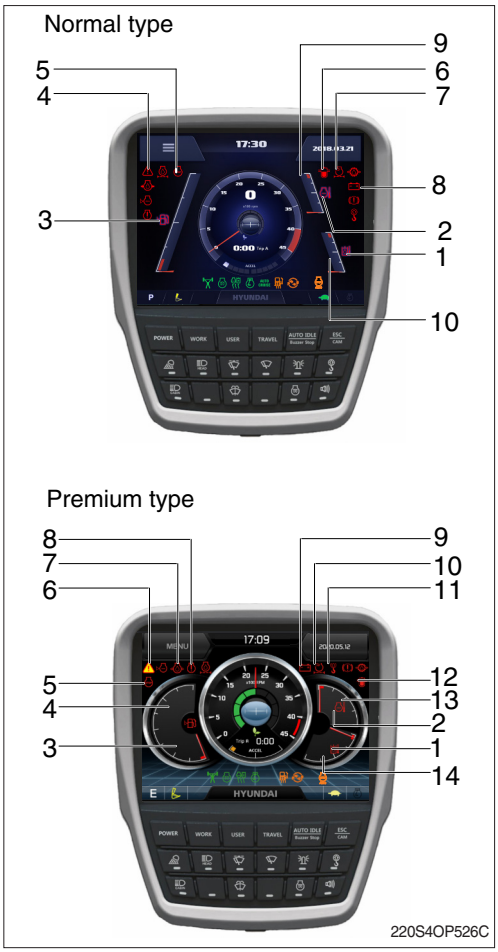
(4) Are the indicator of water temperature gauge (n/type : 9, p/type : 13) and hydraulic temperature gauge (n/type : 10, p/type : 14) in the operating range?

(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 multimodal dial and run the engine at mid-range speed.

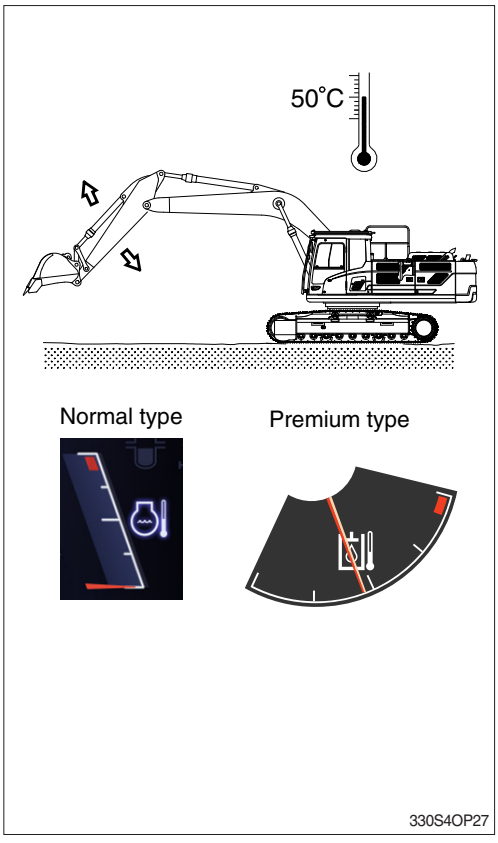
(3) Operate bucket lever for 5 minutes.

※ **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.



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.**

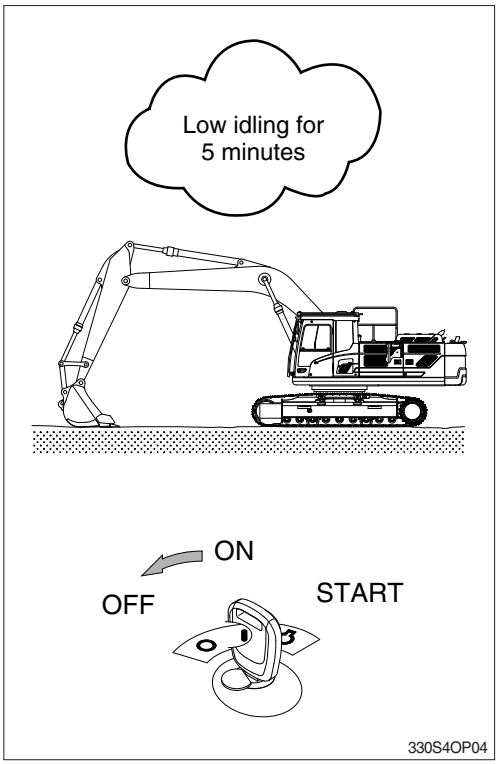
(1) Down the bucket on the ground then put all the levers in the neutral position.

(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 the safety knob.

(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.

- P mode : Heavy duty power
- S mode : Standard power
- E mode : Economy power

(2) Work mode

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

① General work mode (bucket)

When key switch is turned ON, this mode is selected automatically.

② Work tool mode (breaker, crusher)

It controls the pump flow and system pressure for the optimal operation of breaker or crusher.

220S4OP31B

1	Power mode switch
2	Work mode switch
3	User mode switch
4	Travel mode switch
5	Auto idle mode switch
6	LCD

(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.

Refer to page 3-13.

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.

220S4OP32B

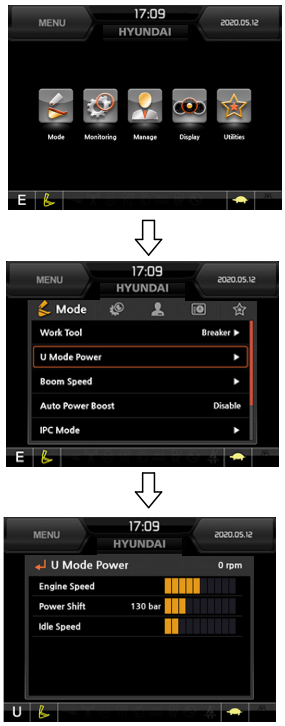
- High idle rpm, auto idle rpm and EPPR pressure can be adjusted and memorized in the U-mode.

※ **Refer to the page 3-19 for setting the user mode (available on U mode only).**

· LCD segment vs parameter setting

Step (▮)	Engine speed (rpm)	Idle speed (rpm)	Power shift (bar)
1	1400	1000	0
2	1500	1050 (auto decel)	3
3	1550	1100	6
4	1650	1150	9
5	1700	1200	12
6	1750	1250	16
7	1800	1300	20
8	1850	1350	26
9	1900	1400	32
10	1950	1450	38

※One touch decel & low idle : 1000 rpm



220S4OP33A

(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. Refer to the page 3-22.

(7) Self diagnostic system

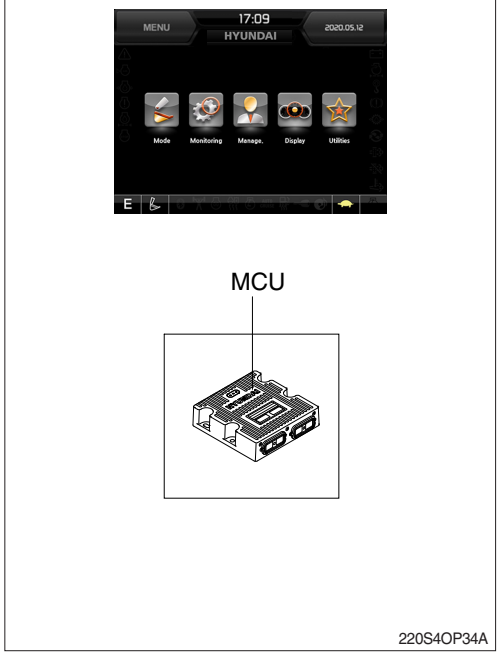
① **MCU (Machine Control Unit)**

The MCU diagnoses machine status and problems and displays fault code in the cluster (fault code detected by MCU is composed of HCESPN and FMI).

※ **Refer to the page 3-22 for LCD display.**

(8) Anti-restart system

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



220S4OP34A

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 displayed in the cluster.

Mode		Status
Power mode	E	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.

220S4OP535B

(2) After engine start

① When the engine is started, rpm display indicates low idle, 1000 rpm.

② If coolant temperature is below 30˚C, the warming up pilot lamp lights ON and after 4 seconds the engine speed increases to 1100 rpm automatically to warm up the machine.

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

220S4OP536B

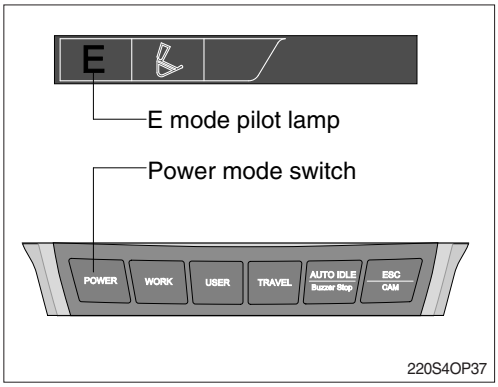
3) SELECTION OF POWER MODE

(1) E mode

The multimodal dial is set 10 and the auto idle mode is canceled.

Engine rpm	Effect
1750	Variable power control in proportion to lever stroke (improvement in fuel efficiency) ※ Same power as S mode in full lever operation.

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



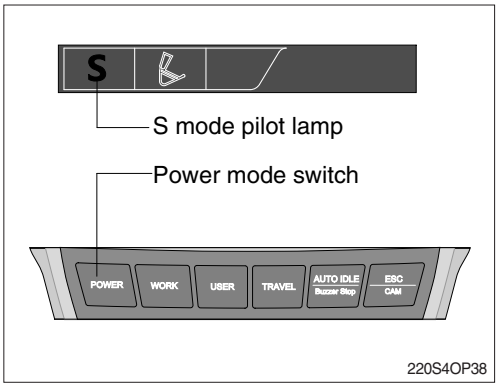
220S4OP37

(2) S mode

The multimodal dial is set 10 and the auto idle mode is canceled.

Engine rpm	Effect
1850	Standard power

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



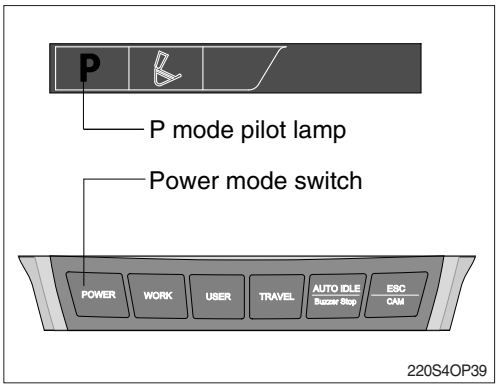
220S4OP38

(3) P mode

The multimodal dial is set 10 and the auto idle mode is canceled.

Engine rpm	Effect
1950	Approximately 120 % of power and speed available than S mode.

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



5. OPERATION OF THE WORKING DEVICE

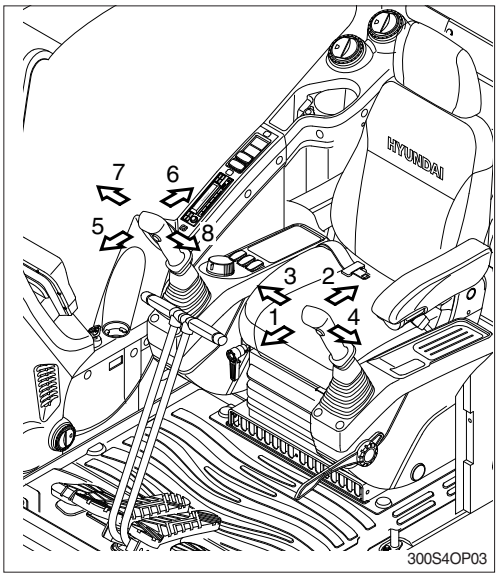
※ Confirm the operation of control lever and working device.

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.

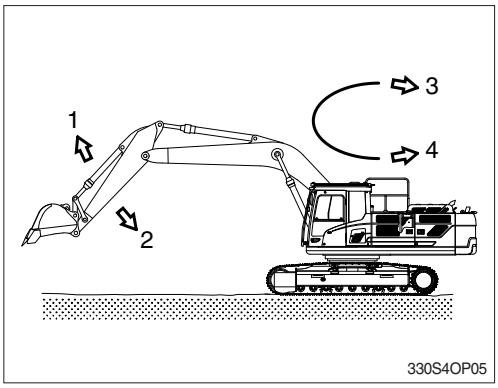
※ When operating swing, consider the swing distance by inertia.



300S4OP03

※ Left control lever

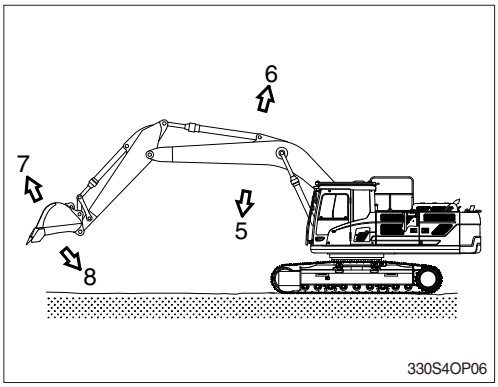
1 Arm roll-out
2 Arm roll-in
3 Swing right
4 Swing left



330S4OP05

※ Right control lever

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



330S4OP06

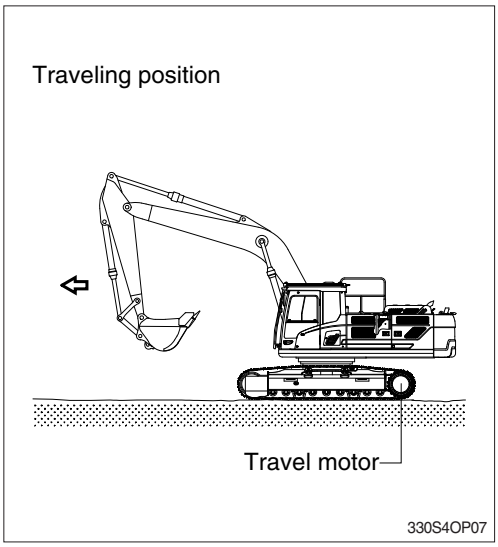
6. TRAVELING OF THE MACHINE

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.

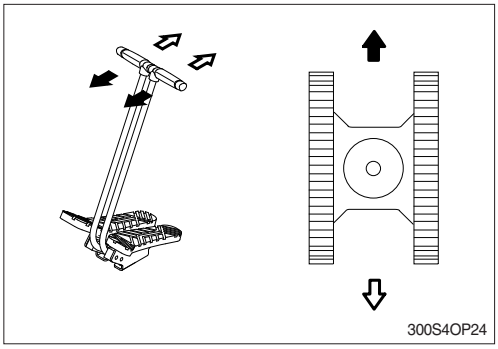
※ **Do not travel continuously for a long time.**

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

(3) Forward and backward traveling

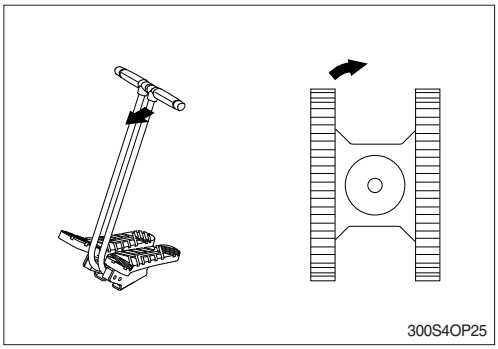
When the left and right travel lever or pedal are pushed at the same time, the machine will travel forward or backward.

※ **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.**



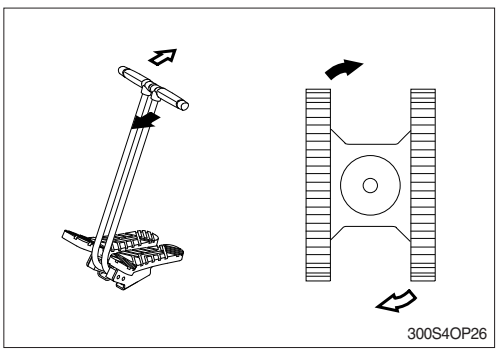
(4) Pivot turning

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.

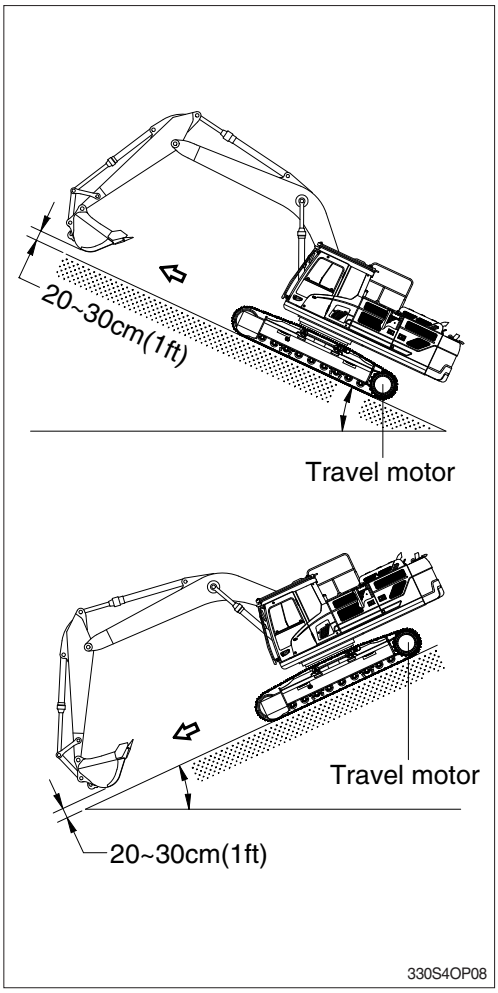
(4) When parking on a slope, use the bucket as a brake and place blocks behind the tracks to prevent sliding.

※ **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.**

⚠ **Be sure to keep the swing lock/fine switch on the LOCK while traveling on a slope (if equipped).**



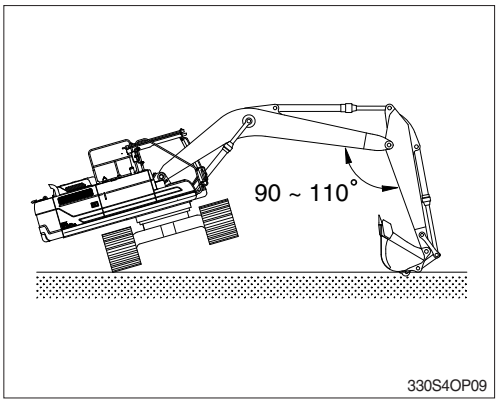
3) TRAVELING ON SOFT GROUND

※ **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

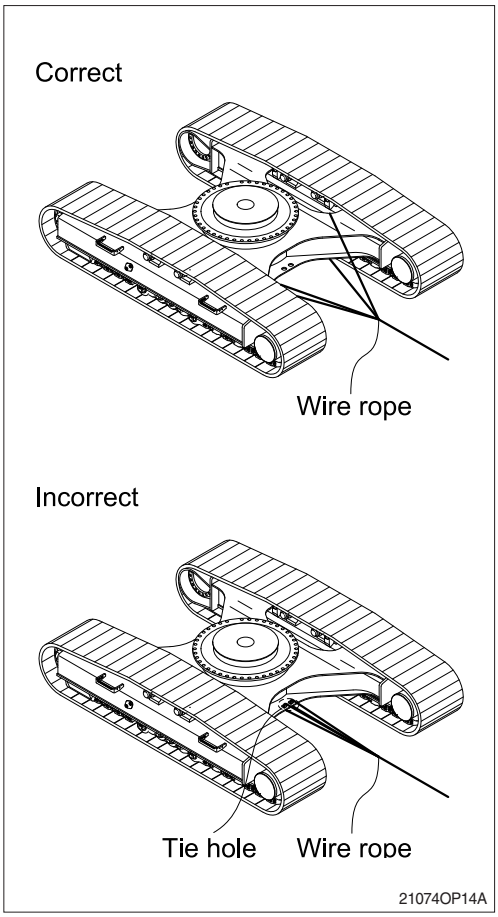
Tow the machine as follows when it can not move on it's own.

(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.

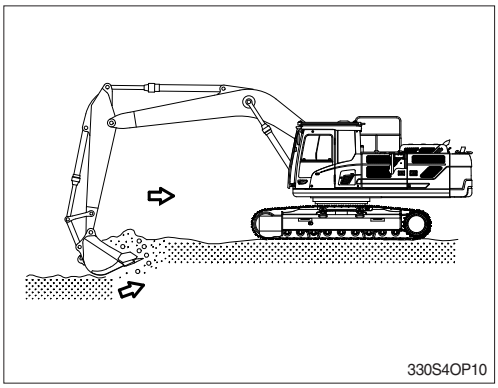
※ **Never tow the machine using only the tie hole, because this may break.**

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

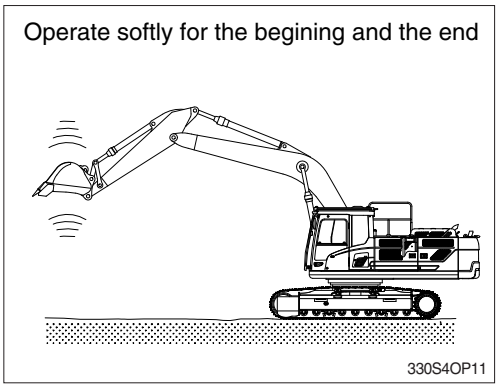


7. EFFICIENT WORKING METHOD

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.

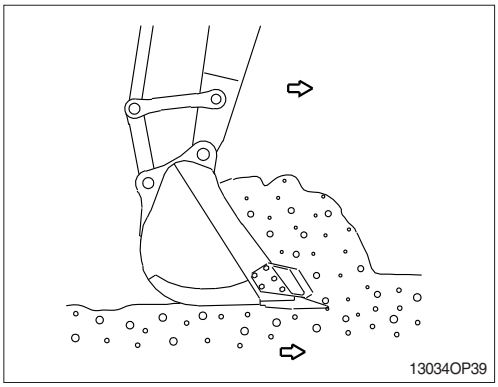

330S4OP10

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.

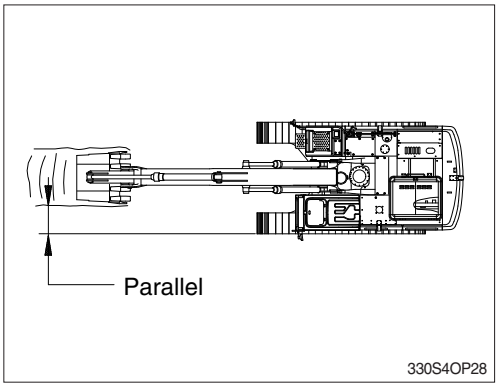


330S4OP11

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

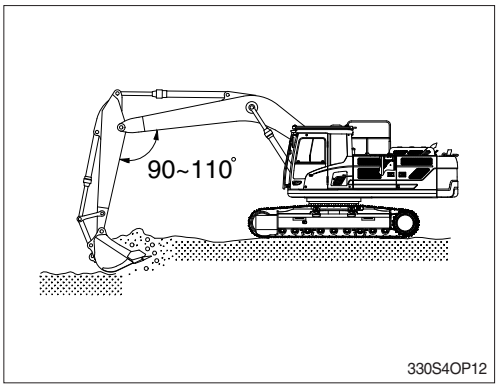

13034OP39

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

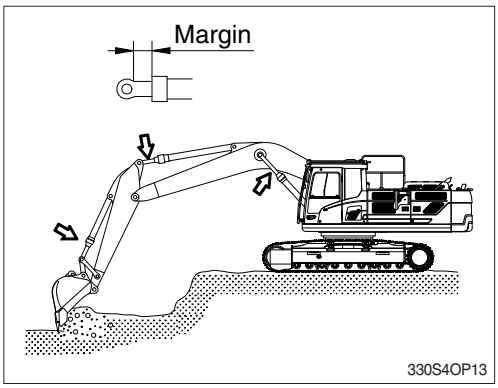


330S4OP28

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

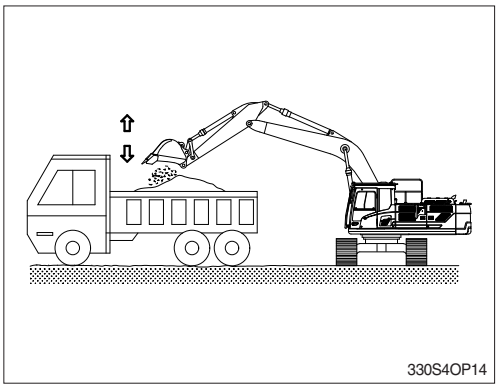


6) Operate leaving a small safety margin of cylinder stroke to prevent damage of cylinder when working with the machine.

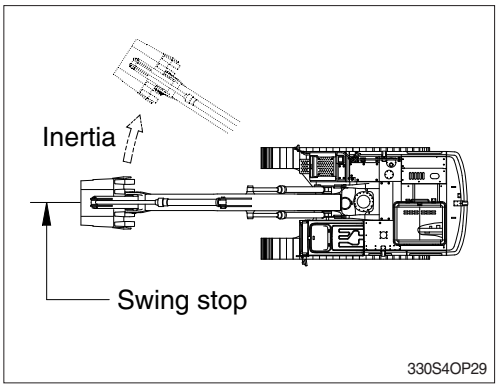


7) Keep the bucket to the dumping position and the arm horizontal when dumping the soil from the bucket.
   Operate bucket lever 2 or 3 times when hard to dump.

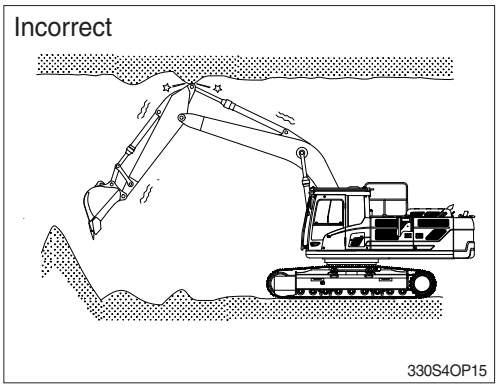
※ **Do not use the impact of bucket tooth when dumping.**



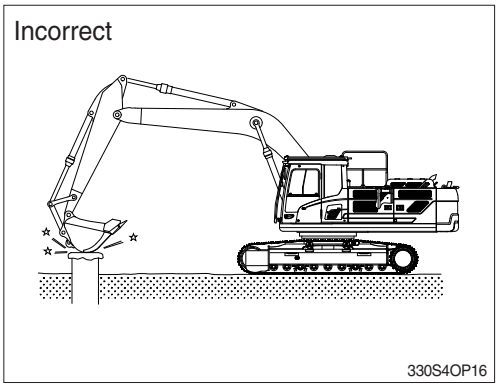
8) Operate stop of swing considering the swing slip distance is created by inertia after neutralizing the swing lever.



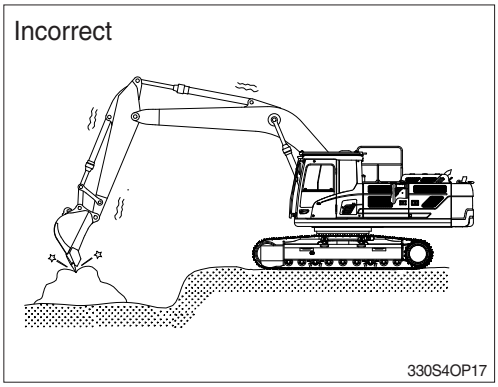
9) If the excavation is in an underground location or in a building, make sure that there is adequate overhead clearance and that there is adequate ventilation.



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



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



12) NEVER CARRY OUT EXCESSIVE OPERATIONS

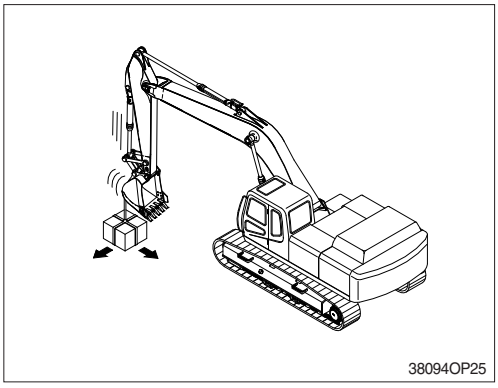
Operation exceeding machine performance may result in accident or failure.

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.



12) BUCKET WITH HOOK

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

The following operations are prohibited.

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

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

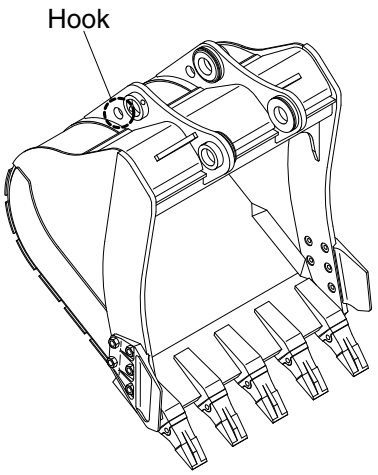
When performing lifting operation, never raise or lower a person.

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

Before performing lifting operation, designate an operation supervisor.
Always execute operation according to his instructions.

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

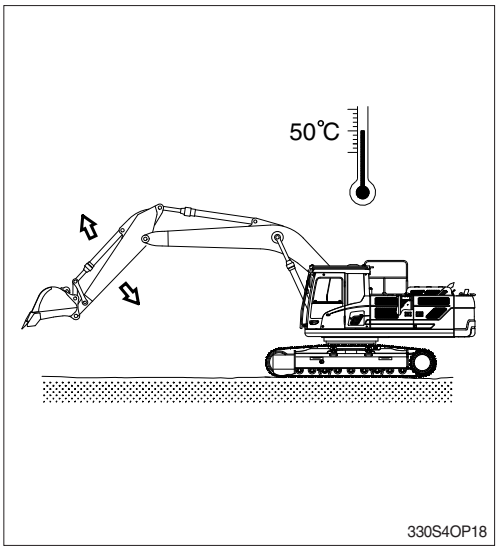
Never leave the operator's seat while lifting a load.



290F4OP42

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.

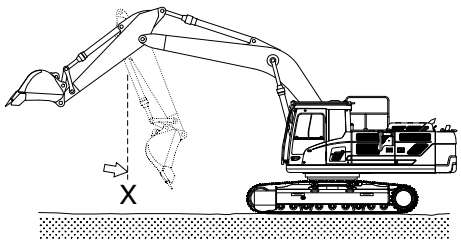
(2) Loosen the track tension a little when working in such areas.

(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.



330S4OP19

10. ATTACHMENT LOWERING (when engine is stopped)

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

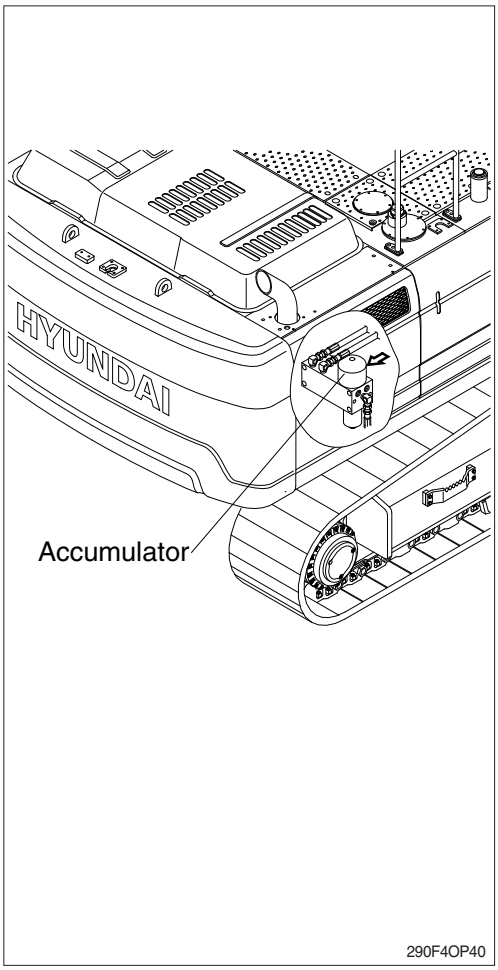
⚠ **Be sure no one is under or near the attachment before lowering the boom.**

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

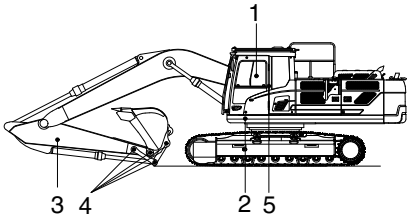
(1) Cleaning the machine

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 at boom (5EA)
2 Boom cylinder pin (2EA)
3 Lubricating manifold at arm (3EA)
4 Arm and bucket (6EA)
5 Boom rear bearing center (1EA)

330S4OP20

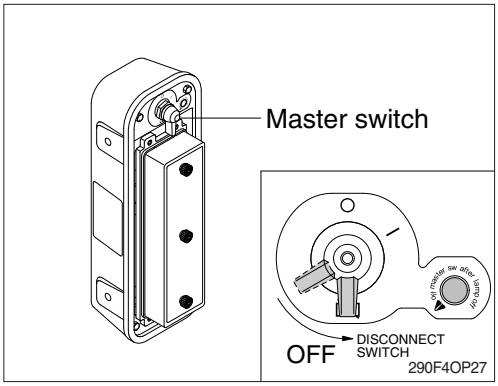
(3) Master switch

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

⚠ Off the master switch after lamp off.

⚠ It may cause severe failure of aftertreatment device.

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



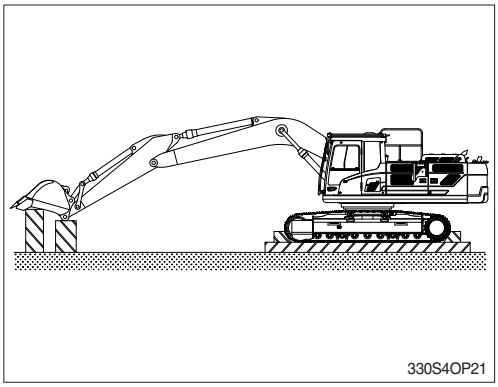
290F4OP27

(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.

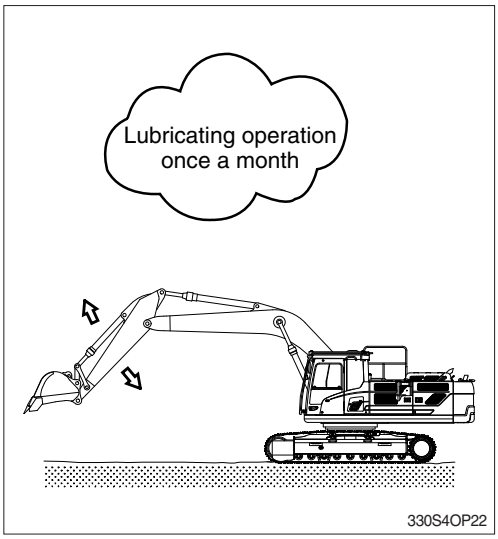
※ Lower the bucket to the ground and set a support under track.



330S4OP21

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.

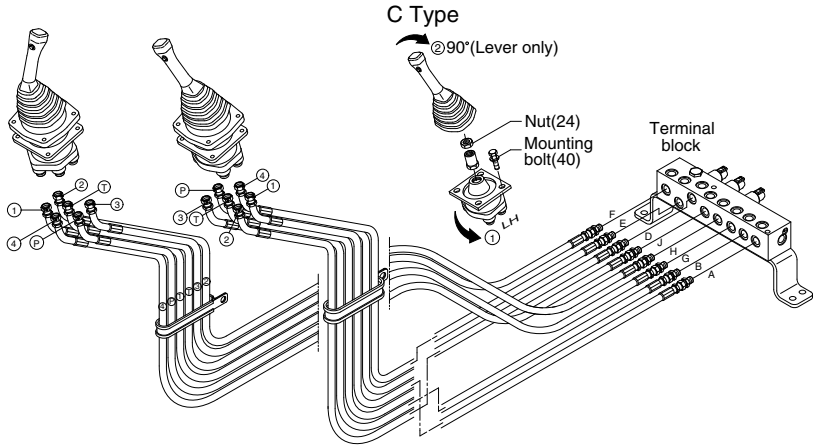
※ Remove the drain port plug and drain the water until the gear oil comes out and then tighten the drain plug.

※ 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

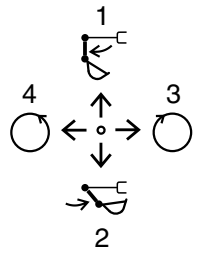
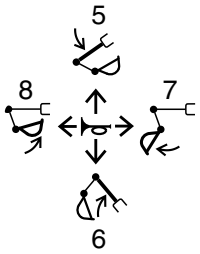
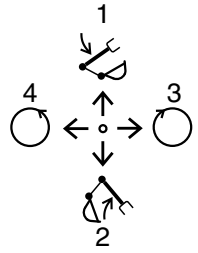
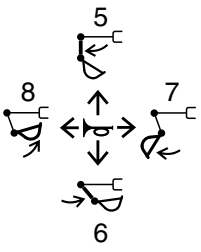
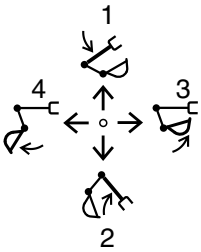
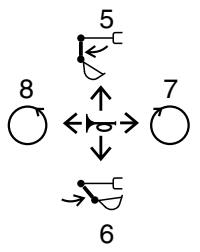
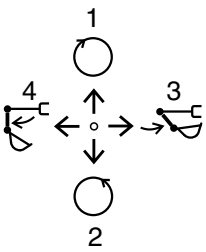
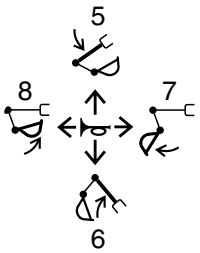
1) PATTERN CHANGE VALVE NOT INSTALL



※ 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).

330S4OP41

Pattern	Operation		Control function		Hose connection (port)		
	Left RCV lever	Right RCV lever			RCV lever	Change of Terminal block	
						From	To
ISO Type Hyundai			Left	1Arm out	②	D	-
				2Arm in	④	E	-
				3Swing right	③	B	-
				4Swing left	①	A	-
			Right	5Boom lower	④	J	-
				6Boom raise	②	H	-
				7Bucket out	①	G	-
				8Bucket in	③	F	-
A Type			Left	1Boom lower	②	D	J
				2Boom raise	④	E	H
				3Swing right	③	B	-
				4Swing left	①	A	-
			Right	5Arm out	④	J	D
				6Arm in	②	H	E
				7Bucket out	①	G	-
				8Bucket in	③	F	-
B Type			Left	1Boom lower	②	D	J
				2Boom raise	④	E	H
				3Bucket in	③	B	F
				4Bucket out	①	A	G
			Right	5Arm out	④	J	D
				6Arm in	②	H	E
				7Swing right	①	G	B
				8Swing left	③	F	A
C Type			Left	① Loosen the RCV lever mounting bolt (40) and rotates lever assy 90˚ counterclockwise; then install. ② To put lever in correct position, disassemble nut (24) and rotates only lever 90˚ clockwise.			
			Right	Same as ISO type			

1. PREPARATION FOR TRANSPORTATION

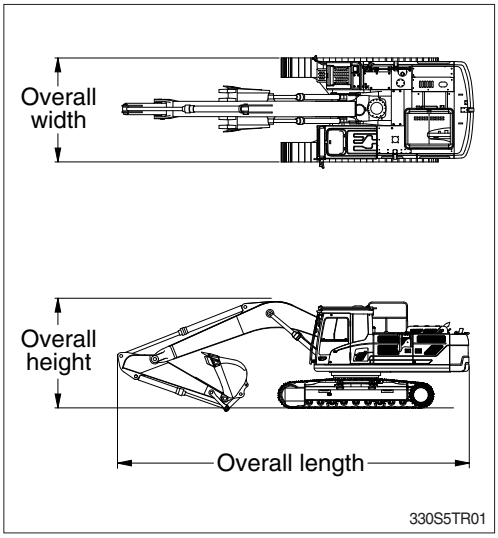
1) When transporting the machine, observe the various road rules, road transportation vehicle laws and vehicle limit ordinances, etc.

2) Select proper trailer after confirming the weight and dimension from 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.

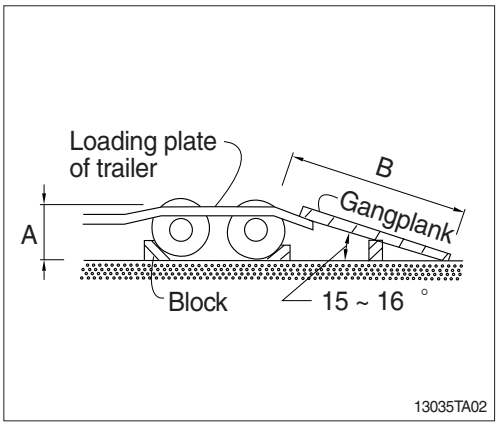
4) Get the permission from the related authority if necessary.

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



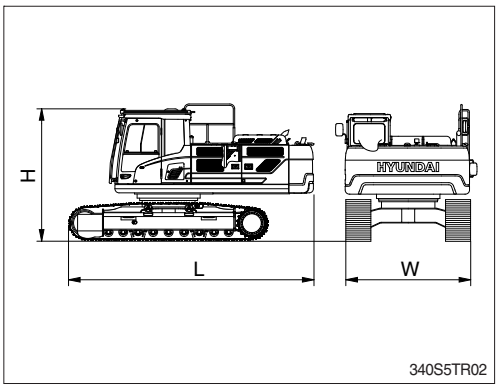
2. DIMENSION AND WEIGHT

1) HX340HD

(1) Base machine

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	5975 (19' 7")
H	Height	mm (ft-in)	3145 (10' 4")
W	Width	mm (ft-in)	3280 (10' 9")
Wt	Weight	kg (lb)	26785 (59051)

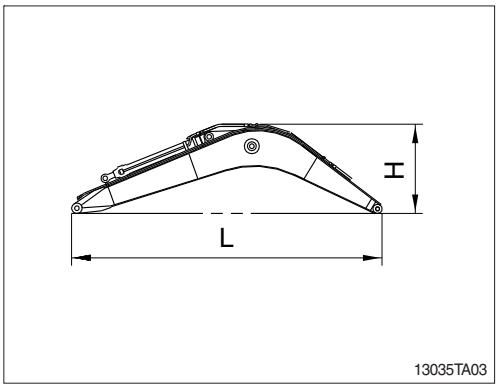
※ With 600 mm (24") triple grouser shoes and 6000 kg (13230 lb) counterweight.



(2) Boom assembly

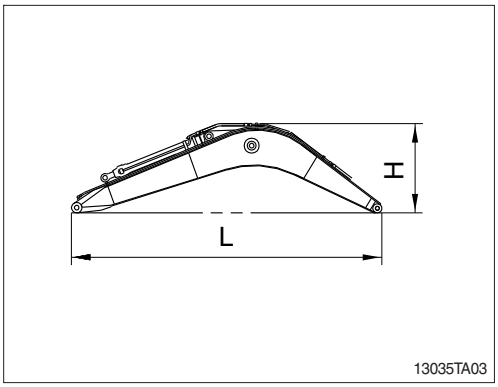
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	6670 (21'11")
H	Height	mm (ft-in)	1720 (5' 8")
W	Width	mm (ft-in)	785 (2' 7")
Wt	Weight	kg (lb)	2940 (6482)

※ 6.45 m (21' 2") boom with arm cylinder (included piping and pins).



Mark	Description	Unit	Specification
L	Length	mm (ft-in)	6375(20'92"
H	Height	mm (ft-in)	1628(5'34")
W	Width	mm (ft-in)	779(2'56")
Wt	Weight	kg (lb)	2806(6186)

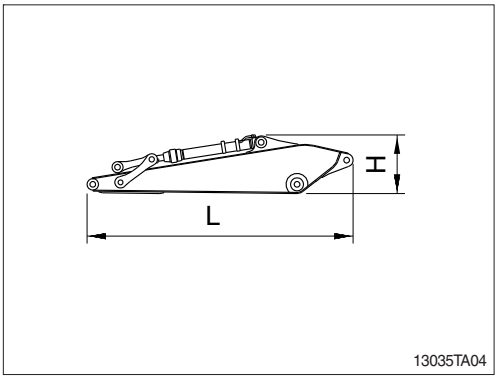
※ 6.15 m(20'2") boom with arm cylinder (included piping and pins).



(3) Arm assembly

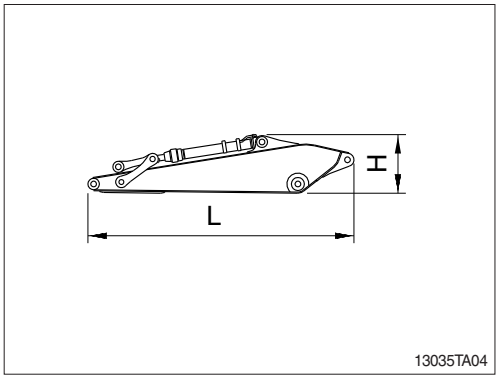
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	4340 (14' 3")
H	Height	mm (ft-in)	955 (3' 2")
W	Width	mm (ft-in)	435 (1' 5")
Wt	Weight	kg (lb)	1435 (3163)

※ 3.2 m (10' 6") arm with bucket cylinder (included linkage and pins).



Mark	Description	Unit	Specification
L	Length	mm (ft-in)	3674(12'05")
H	Height	mm (ft-in)	1097(3'6")
W	Width	mm (ft-in)	440(1'44")
Wt	Weight	kg (lb)	1064(2346)

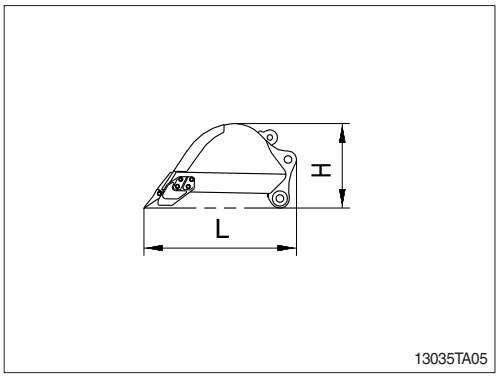
※ 2.5m (8'2")arm with bucket cylinder(included linkage and pins).



(4) Bucket assembly

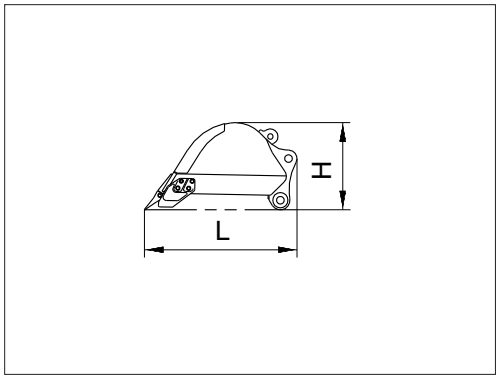
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1840 (6' 0")
H	Height	mm (ft-in)	1120 (3' 8")
W	Width	mm (ft-in)	1535 (5' 0")
Wt	Weight	kg (lb)	1230 (2710)

※ 1.44 m^3 (1.88 yd^3) SAE heaped bucket (included tooth and side cutters).



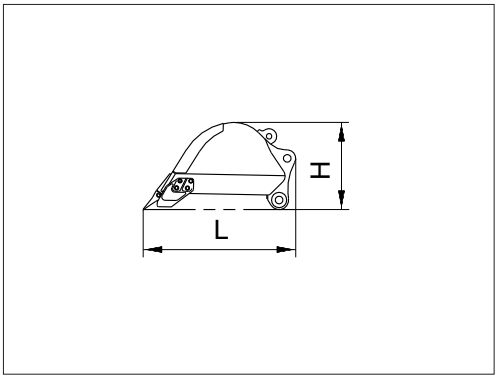
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1839 (6' 0")
H	Height	mm (ft-in)	1130 (3' 8")
W	Width	mm (ft-in)	1735 (5' 8")
Wt	Weight	kg (lb)	1284 (2832)

※ 1.74 m^3 (2.28 yd^3) SAE heaped bucket (included tooth and side cutters).



Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1892(6'2")
H	Height	mm (ft-in)	1536(5'0"
W	Width	mm (ft-in)	1810(5'9")
Wt	Weight	kg (lb)	1907(4204)

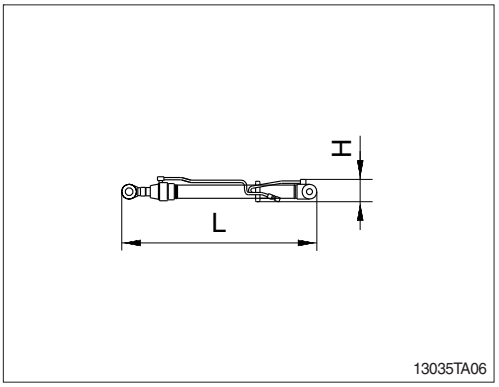
※ **2.30m³(3.0 yd³) SAE heaped bucket (included tooth and side cutters).**



(5) Boom cylinder

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1960 (6' 5")
H	Height	mm (ft-in)	230 (0' 9")
W	Width	mm (ft-in)	330 (1' 1")
Wt	Weight	kg (lb)	305 (672)

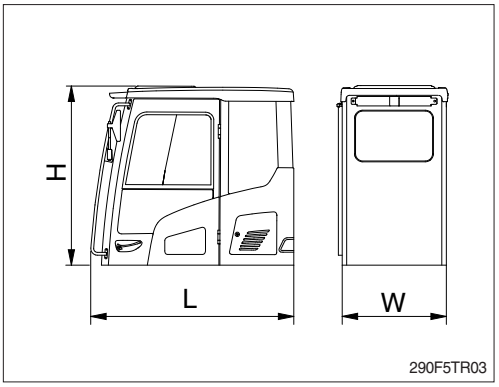
※ **Included piping.**



(6) Cab assembly

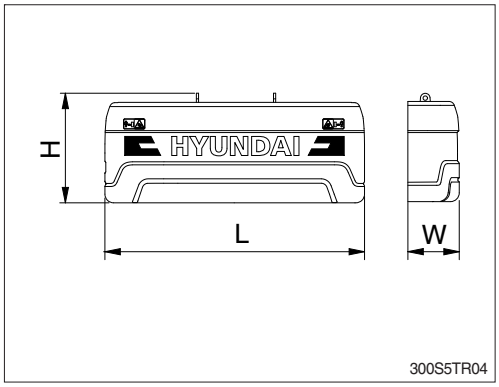
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1950 (6' 5") [2070 (6' 10")]
H	Height	mm (ft-in)	1780 (5' 10") [1822 (6' 0")]
W	Width	mm (ft-in)	1104 (3' 7") [1126 (3' 8")]
Wt	Weight	kg (lb)	421.8 (930) [650.2 (1433)]

[ ] : with FOG GUARD



(7) Counterweight

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2980 (9' 9")
H	Height	mm (ft-in)	1250 (4' 1")
W	Width	mm (ft-in)	590 (1' 11")
Wt	Weight	kg (lb)	6000 (13230)

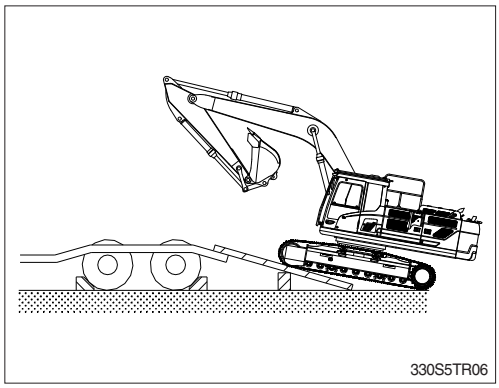


3. LOADING THE MACHINE

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

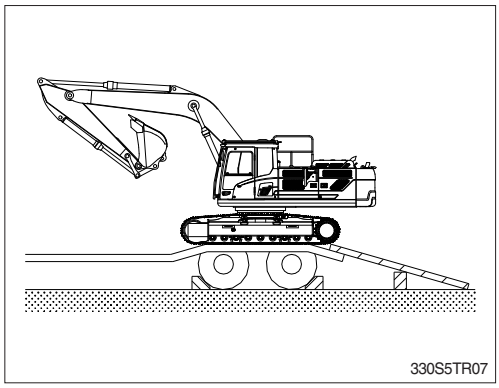
2) Use the gangplank with sufficient length, width, thickness and gradient.

3) Place the swing lock/fine switch 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.

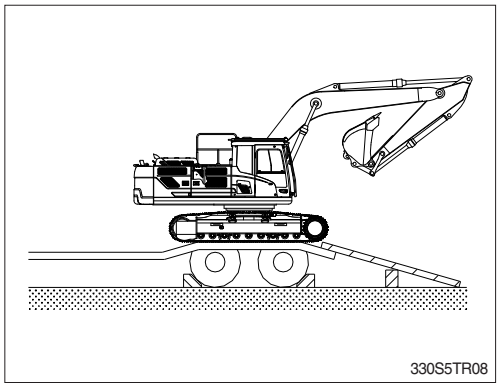

330S5TR06

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.


330S5TR07

(2) Place the swing lock/fine switch to the LOCK position (if equipped) after the swing the machine 180 degree.


330S5TR08

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

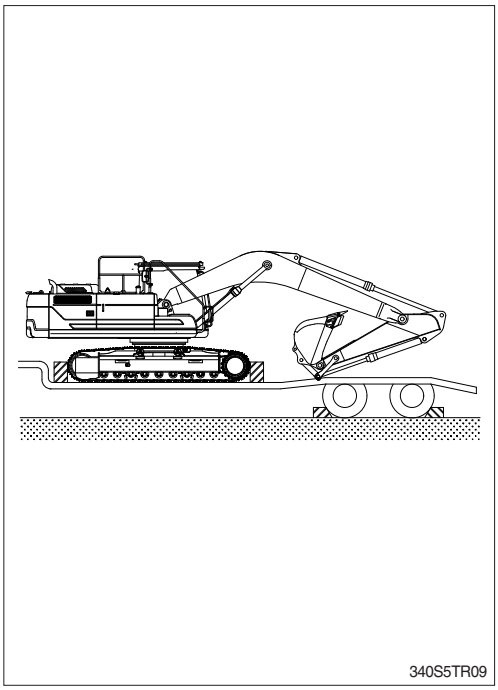
※ **Place rectangular timber under the bucket cylinder to prevent the damage of it during transportation.**

⚠ **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.**

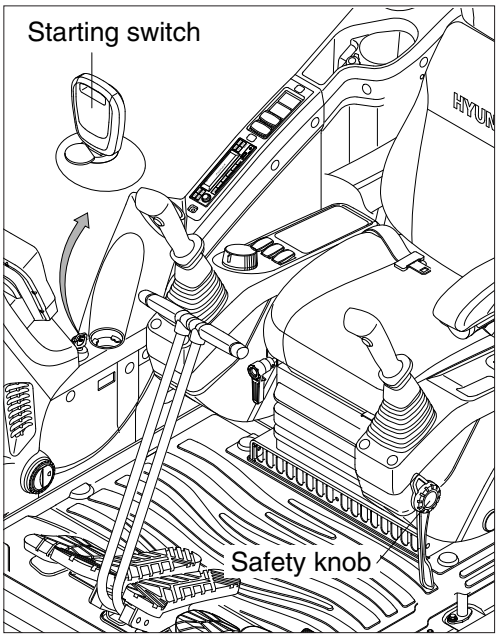


4. FIXING THE MACHINE

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

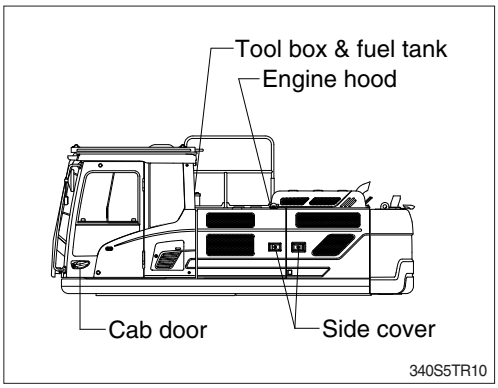
2) Keep the safety knob on the LOCK position.

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



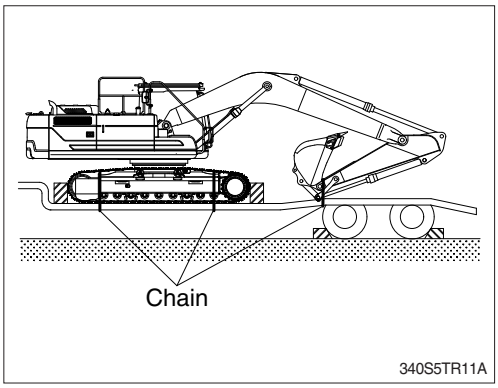
300S5TR13

4) Secure all locks.



340S5TR10

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



340S5TR11A

5. LOADING AND UNLOADING BY CRANE

1) Check the weight, length, width and height of the machine referring to 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.

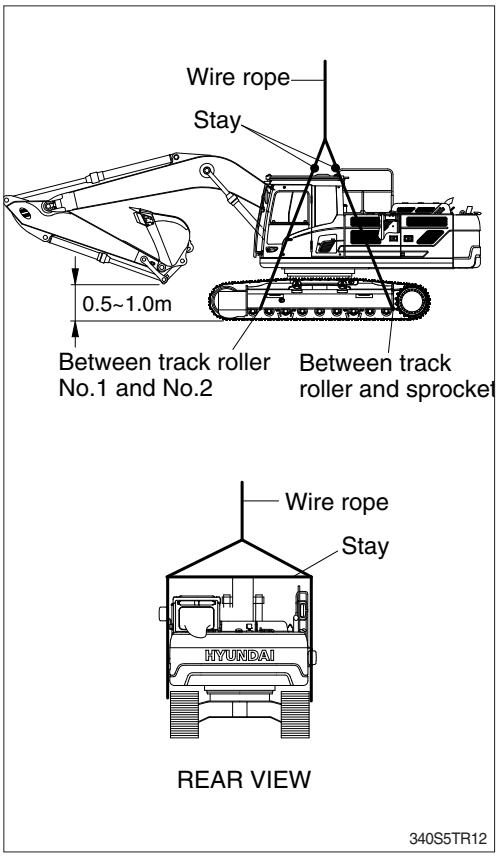
⚠ **Make sure wire rope is proper size.**

⚠ **Place the safety knob 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.**

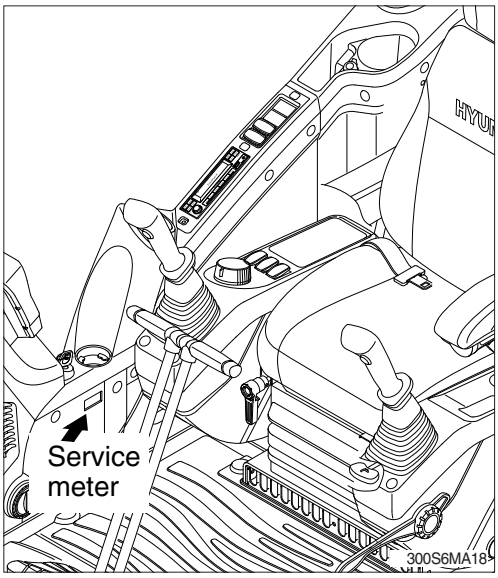
⚠ **Do not load abruptly.**

⚠ **Keep area clear of personnel.**



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) 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.

⚠ Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

△ Accumulated grease and oil on the machine is a fire hazard. Remove this debris with steam cleaning or high pressure water, at least every 1000 hours.

△ Inspect the engine compartment for any trash build up. Remove any trash build up from the engine compartment.

(5) Ask to your local dealer or Hyundai for the maintenance advice if unknown.

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.

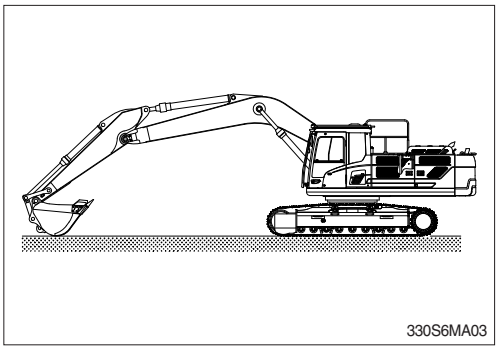
(9) For more detail information of maintenance, please contact local Hyundai dealer.

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

4) RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM

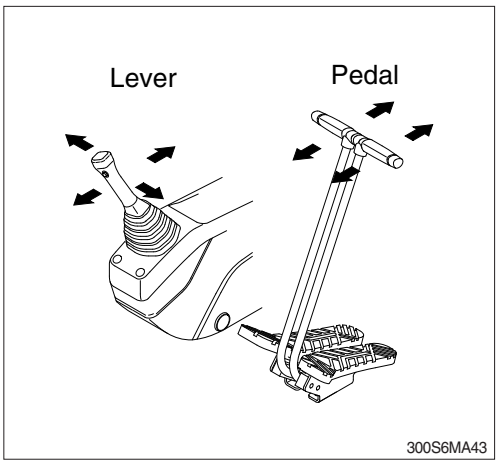
※ **Spouting of oil can cause the accident when loosening the cap or hose right after the operating of machine as the machine or oil is on the high pressure on the condition.**
Be sure to relieve the pressure in the system before repairing hydraulic system.

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

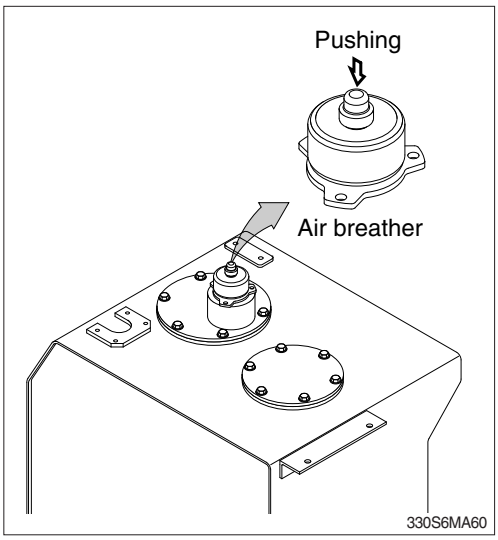


(2) Set the safety knob completely in the UNLOCK position, operate the control levers and pedals fully to the front, rear, left and right, to release the pressure in the hydraulic circuit.

※ **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) 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	8.8T		10.9T		12.9T	
	kgf · m	lbf · ft	kgf · m	lbf · ft	kgf · m	lbf · ft
M 6×1.0	0.8 ~ 1.2	5.8 ~ 8.6	1.2 ~ 1.8	8.7 ~ 13.0	1.5 ~ 2.1	10.9 ~ 15.1
M 8×1.25	2.0 ~ 3.0	14.5 ~ 21.6	2.8 ~ 4.2	20.3 ~ 30.4	3.4 ~ 5.0	24.6 ~ 36.1
M10×1.5	4.0 ~ 6.0	29.0 ~ 43.3	5.6 ~ 8.4	40.5 ~ 60.8	6.8 ~ 10.0	49.2 ~ 72.3
M12×1.75	6.8 ~ 10.2	50.0 ~ 73.7	9.6 ~ 14.4	69.5 ~ 104	12.3 ~ 16.5	89.0 ~ 119
M14×2.0	10.9 ~ 16.3	78.9 ~ 117	16.3 ~ 21.9	118 ~ 158	19.5 ~ 26.3	141 ~ 190
M16×2.0	17.9 ~ 24.1	130 ~ 174	25.1 ~ 33.9	182 ~ 245	30.2 ~ 40.8	141 ~ 295
M18×2.5	24.8 ~ 33.4	180 ~ 241	34.8 ~ 47.0	252 ~ 340	41.8 ~ 56.4	302 ~ 407
M20×2.5	34.9 ~ 47.1	253 ~ 340	49.1 ~ 66.3	355 ~ 479	58.9 ~ 79.5	426 ~ 575
M22×2.5	46.8 ~ 63.2	339 ~ 457	65.8 ~ 88.8	476 ~ 642	78.9 ~ 106	570 ~ 766
M24×3.0	60.2 ~ 81.4	436 ~ 588	84.6 ~ 114	612 ~ 824	102 ~ 137	738 ~ 991
M30×3.5	120 ~161	868 ~ 1164	168 ~ 227	1216 ~ 1641	202 ~ 272	1461 ~ 1967

(2) Fine thread

Bolt size	8.8T		10.9T		12.9T	
	kgf · m	lbf · ft	kgf · m	lbf · ft	kgf · m	lbf · ft
M 8×1.0	2.1 ~ 3.1	15.2 ~ 22.4	3.0 ~ 4.4	21.7 ~ 31.8	3.6 ~ 5.4	26.1 ~ 39.0
M10×1.25	4.2 ~ 6.2	30.4 ~ 44.9	5.9 ~ 8.7	42.7 ~ 62.9	7.0 ~ 10.4	50.1 ~ 75.2
M12×1.25	7.3 ~ 10.9	52.8 ~ 78.8	10.3 ~ 15.3	74.5 ~ 110	13.1 ~ 17.7	94.8 ~ 128
M14×1.5	12.4 ~ 16.6	89.7 ~ 120	17.4 ~ 23.4	126 ~ 169	20.8 ~ 28.0	151 ~ 202
M16×1.5	18.7 ~ 25.3	136 ~ 182	26.3 ~ 35.5	191 ~ 256	31.6 ~ 42.6	229 ~ 308
M18×1.5	27.1 ~ 36.5	196 ~ 264	38.0 ~ 51.4	275 ~ 371	45.7 ~ 61.7	331 ~ 446
M20×1.5	37.7 ~ 50.9	273 ~ 368	53.1 ~ 71.7	384 ~ 518	63.6 ~ 86.0	460 ~ 622
M22×1.5	51.2 ~ 69.2	370 ~ 500	72.0 ~ 97.2	521 ~ 703	86.4 ~ 116	625 ~ 839
M24×2.0	64.1 ~ 86.5	464 ~ 625	90.1 ~ 121	652 ~ 875	108 ~ 146	782 ~ 1056
M30×2.0	129 ~ 174	933 ~ 1258	181 ~ 245	1310 ~ 1772	217 ~ 294	1570 ~ 2126

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)	M12 × 1.75	11.5 ± 1.0	83.2 ± 7.2
2		Engine mounting bolt (bracket-frame, FR)	M24 × 3.0	90 ± 9.0	651 ± 65.1
3		Engine mounting bolt (bracket-frame, RR)	M24 × 3.0	90 ± 9.0	651 ± 65.1
4		Radiator mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
5		Coupling mounting socket bolt	M18 × 2.5	46.5 ±2.5	336 ±18.1
6		Fuel tank mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
7	Hydraulic system	Main pump housing mounting bolt	M10 × 1.5	6.5 ± 0.7	47 ± 5.1
8		Main pump mounting socket bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
9		Main control valve mounting nut	M12 × 1.75	12.3 ± 1.3	89.0 ± 9.4
10		Hydraulic oil tank mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
11		Turning joint mounting bolt, nut	M12 × 1.75	12.3 ± 1.3	89.0 ± 9.4
12	Power train system	Swing motor mounting bolt	M20 × 2.5	57.9 ± 5.8	419 ± 42
13		Swing bearing upper part mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
14		Swing bearing lower part mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
15		Travel motor mounting bolt	M24 × 3.0	84 ± 8.0	608 ± 57.9
16		Sprocket mounting bolt	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
17	Under carriage	Carrier roller mounting bolt, nut	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
18		Track roller mounting bolt	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
19		Track tension cylinder mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
20		Track shoe mounting bolt, nut	M22 × 1.5	78 ± 8.0	564 ± 57.9
21		Track guard mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
22	Others	Counterweight mounting bolt	M36 × 3.0	337 ± 33	2440 ± 239
23		Cab mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
24		Operator's seat mounting bolt	M 8 × 1.25	4.05 ± 0.8	29.3 ± 5.8

※ 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 (API CH-4)	SAE 15W-40, ★SAE 5W-40
Hydraulic oil	Hyundai genuine long life hydraulic oil (ISO VG 32, VG 46, VG 68) Conventional hydraulic oil (ISO VG 15★)
Swing and travel reduction gear oil	SAE 80W-90 (GL-4/GL-5)
Grease	Lithium base grease NLGI No. 2
Fuel	ASTM D975-No. 2, Ultra low sulfur diesel
Coolant	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

★Cold region
Russia, CIS, Mongolia

2) RECOMMENDED OILS

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

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

Service point	Kind of fluid	Capacity ℓ (U.S. gal)	Ambient temperature ˚C(˚F) -50 (-58) -30 (-22) -20 (-4) -10 (14) 0 (32) 10 (50) 20 (68) 30 (86) 40 (104)
Engine oil pan	Engine oil★1	26.5 (7.0)	★SAE 0W-40 ★SAE 0W-30 SAE 5W-30 SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	11 (2.91)	★SAE 75W-90
Final drive	Gear oil	7.8×2 (2.1×2)	SAE 80W-90
Hydraulic tank	Hydraulic oil★3	Tank : 210 (55.5) System : 414 (109.4)	★ISO VG 15 ISO VG 32 ISO VG 46, HBHO VG 46★3 ISO VG 68
Fuel tank	Diesel fuel	600 (158.5)	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and soft water★2	27 (7.1)	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 : Meet or exceeds API CH-4 grade
★2 : Soft water
City water or distilled water
★3 : Hyundai Bio Hydraulic Oil

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

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

※ Do not use any engine oil other than that specified above.

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

4. MAINTENANCE CHECK LIST

1) DAILY SERVICE BEFORE STARTING

Check items	Service	Page
Visual check		
Fuel tank	Check, Refill	6-27
Hydraulic oil level	Check, Add	6-34
Engine oil level	Check, Add	6-18
Coolant level	Check, Add	6-20
Control panel & pilot lamp	Check, Clean	6-44
Prefilter (water)	Check, Drain	6-31
Fan belt tension and damage	Check, Adjust	6-24, 25, 26
Attachment pin and bushing ★	Lubricate	6-43
· 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	6-27
Track tension	Check, Adjust	6-39
Swing reduction gear oil	Check, Add	6-37
Attachment pin and bushing	Lubricate	6-43
· Bucket cylinder rod end		
· Bucket + Arm connecting		
· Bucket control link + Arm		
· Bucket control rod		

3) INITIAL 50 HOURS SERVICE

Check items	Service	Page
Bolts & Nuts · 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 · Carrier roller mounting bolts · Track roller mounting bolts · Hydraulic pump mounting bolts	Check, Tight	6-8

4) EVERY 200 HOURS SERVICE

Check items	Service	Page
Return filter ★	Replace	6-36
Pilot line filter element ★	Replace	6-37
Drain filter cartridge ★	Replace	6-36

★ 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
Prefilter (element)	Replace	6-31
Fuel filter element	Replace	6-28
Pilot line filter element	Replace	6-37
Hydraulic oil return filter	Replace	6-36
Drain filter cartridge	Replace	6-36
Swing reduction gear oil	Change	6-37
Travel reduction gear oil	Change	6-38

6) EVERY 250 HOURS SERVICE

Check items	Service	Page
★ Engine oil	Change	6-18, 19
★ Engine oil filter	Replace	6-18, 19
★ Fuel filter element	Replace	6-28
★ Prefilter	Replace	6-31
Battery (voltage)	Check, Clean	6-44
Swing bearing grease	Check, Add	6-37
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		
· Carrier roller mounting bolts		
· Track roller mounting bolts		
· Hydraulic pump mounting bolts		
Attachment pin and bushing	Lubricate	6-43
· 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		

★ When using a biodiesel fuel

7) EVERY 500 HOURS SERVICE

Check items	Service	Page
Engine oil *	Change	6-18, 19
Engine oil filter *	Replace	6-18, 19
Radiator, cooler fin and charge air cooler	Check, Clean	6-23
Fuel filter element	Replace	6-28
Prefilter	Replace	6-31
Aircon & heater filter (fresh air)	Clean	6-47
Air cleaner element (primary) *1	Check, Clean	6-27
Coolant filter	Replace	6-32
Air compressor air filter (option)	Check, Clean	6-43-1

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

***1 When working in dusty environments, more frequent cleaning is highly recommended.**

8) EVERY 1000 HOURS SERVICE

Check items	Service	Page
Hydraulic tank air breather element	Replace	6-36
Travel motor reduction gear oil	Change	6-38
Swing reduction gear oil	Change	6-37
Grease in swing gear and pinion	Change	6-38
Hydraulic oil return filter	Replace	6-36
Drain filter cartridge	Replace	6-36
Pilot line filter element	Replace	6-37

9) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Coolant	Change	6-20, 21, 22, 23
Air cleaner element (primary, safety) *1	Replace	6-27
Hydraulic oil *2 (opt)	Change	6-34
Hydraulic tank suction strainer	Check, Clean	6-35
RCV lever	Check, Lubricate	6-39
Air compressor air filter (option)	Replace	6-43-1
Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-

*1 When working in dusty environments, more frequent replacing is highly recommended.

*2 Conventional hydraulic oil

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

10) EVERY 5000 HOURS SERVICE

Check items	Service	Page
Hydraulic oil *3 (std)	Change	6-35

*3 Hyundai genuine long life hydraulic oil

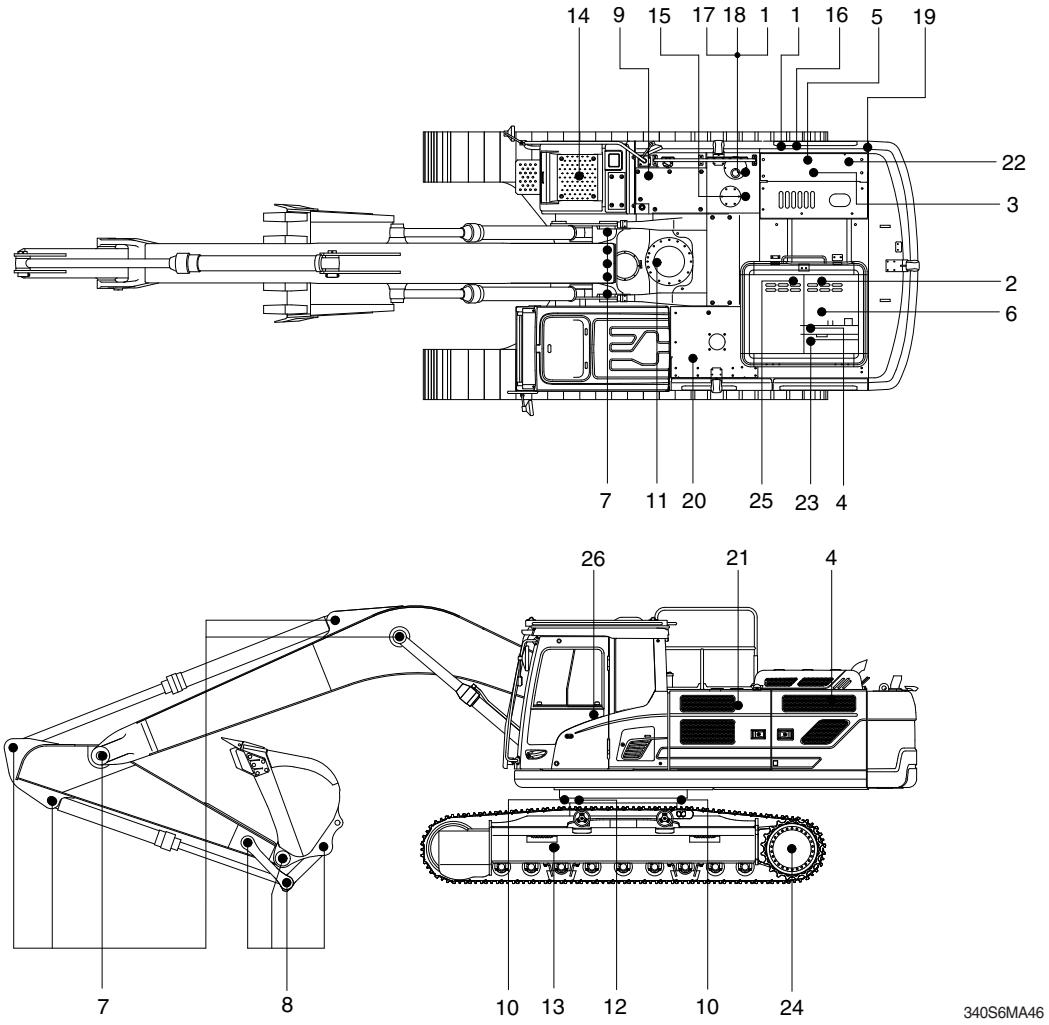
***3 Change oil every 1000 hours of continuous hydraulic breaker operation.**

11) WHEN REQUIRED

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

Check items	Service	Page
Fuel system		
· Fuel tank	Drain or Clean	6-27
· Prefilter (water, element)	Drain or Replace	6-31
· Fuel filter element	Replace	6-28
Engine lubrication system		
· Engine oil	Change	6-18, 19
· Engine oil filter	Replace	6-18, 19
Engine cooling system		
· Coolant	Add or Change	6-20, 21, 22, 23
· Radiator	Clean or Flush	6-20, 21, 22, 23
· Charge air cooler	Check	6-23
Engine air system		
· Air cleaner element (primary)	Clean or Replace	6-27
· Air cleaner element (safety)	Replace	6-27
Hydraulic system		
· Hydraulic oil	Add or Change	6-34, 35
· Return filter	Replace	6-36
· Drain line filter	Replace	6-36
· Pilot line filter	Replace	6-37
· Element of breather	Replace	6-36
· Suction strainer	Clean	6-35
· RCV lever	Lubricate	6-39
Undercarriage		
· Track tension	Check, Adjust	6-39
Bucket		
· Tooth	Replace	6-41
· Side cutter	Replace	6-41
· Linkage	Adjust	6-40
· Bucket assy	Replace	6-40
Air conditioner and heater		
· Fresh air filter	Replace	6-47
· Recirculation filter	Clean, Replace	6-47, 48
Other		
· Air compressor air filter (opt)	Clean or Replace	6-43-1

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	210 (55.5)	1
	2	Engine oil level	Check, Add	EO	26.5 (7.0)	1
	4	Radiator coolant	Check, Add	C	27 (7.1)	1
	5	Prefilter (water)	Check, Drain	-	-	1
	6	Fan belt tension and damage	Check, Adjust	-	-	1
	7	★Attachment pin & bushing	Check, Lubricate	PGL		11
	9	Fuel tank	Check, Refill	DF	600 (158.5)	1
50 Hours or weekly	8	Bucket linkage pins	Check, Lubricate	PGL	-	6
	9	Fuel tank (water, sediment)	Check, Drain	-	-	1
	11	Swing reduction gear oil	Check, Add	GO	11 (2.9)	1
	13	Track tension	Check, Adjust	PGL	-	2

★ For initial 100 hours.

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ (U.S.gal)	Service points No.
250 Hours	2	Engine oil★3	Change	EO	26.5 (7.0)	1
	3	Engine oil filter★3	Replace	-	-	1
	5	Prefilter (element)★3	Replace	-	-	1
	7	Attachment pins & bushings	Check, Lubricate	PGL	-	11
	10	Swing bearing grease	Check, Add	PGL	-	2
	14	Battery (voltage)	Check, Clean	-	-	1
	20	Aircon & heater filter (fresh air)	Clean	-	-	1
	22	Fuel filter element★3	Replace	-	-	1
Initial 250 Hours	2	Engine oil	Change	EO	26.5 (7.0)	1
	3	Engine oil filter	Replace	-	-	1
	5	Prefilter (element)	Replace	-	-	1
	11	Swing reduction gear oil	Change	GO	11 (2.9)	1
	15	Hydraulic oil return filter	Replace	-	-	1
	16	Drain filter cartridge	Replace	-	-	1
	19	Pilot line filter element	Replace	-	-	1
	22	Fuel filter element	Replace	-	-	1
	24	Travel reduction gear oil	Change	GO	7.8 (2.1)	2
500 Hours	2	Engine oil	Change	EO	26.5 (7.0)	1
	3	Engine oil filter	Replace	-	-	1
	5	Prefilter (element)	Replace	-	-	1
	20	Aircon & heater filter (fresh air & recirculation)	Replace	-	-	2
	21	Air cleaner element (primary)	Check, Clean	-	-	1
	22	Fuel filter element	Replace	-	-	1
	23	Radiator, oil cooler, charge air cooler	Check, Clean	-	-	3
	25	Coolant filter	Replace	-	-	1
	27	Air compressor air filter (option)	Check, Clean	-	-	1
1000 Hours	11	Swing reduction gear oil	Change	GO	11 (2.9)	1
	12	Swing gear and pinion grease	Change	PGL	11.4 kg (25.1 lb)	1
	15	Hydraulic oil return filter	Replace	-	-	1
	16	Drain filter cartridge	Replace	-	-	1
	17	Air breather element	Replace	-	-	1
	19	Pilot line filter	Replace	-	-	1
	24	Travel reduction gear oil	Change	GO	7.8 (2.1)	2
2000 Hours	1	Hydraulic oil ★1 (opt)	Change	HO	210 (55.5)	1
	4	Radiator coolant	Change	C	27 (7.1)	1
	18	Hydraulic oil suction strainer	Check, Clean	-	-	1
	21	Air cleaner element (primary, safety)	Replace	-	-	2
	26	RCV lever	Check, Lubricate	PGL	-	2
	27	Air compressor air filter (option)	Replace	-	-	1
	-	Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-	-	-
5000 Hours	1	Hydraulic oil ★2 (std)	Change	HO	210 (55.5)	1

★1 Conventional ★2 HD Hyundai Construction Equipment genuine long life ★3 When using a biodesel fuel

※ Oil symbol

Please refer to the recommended lubricants for specification.

DF : Diesel fuel GO : Gear oil HO : Hydraulic oil C : Coolant

PGL : Grease EO : Engine oil

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ (U.S.gal)	Service points No.
As required	20	Aircon & heater fresh filter	Replace	-	-	1
	20	Aircon & heater recirculation filter	Replace	-	-	1
	21	Air cleaner element (primary)	Clean, Replace	-	-	1
	21	Air cleaner element (safety)	Replace	-	-	1
	27	Air compressor air filter (option)	Clean, Replace	-	-	1

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.

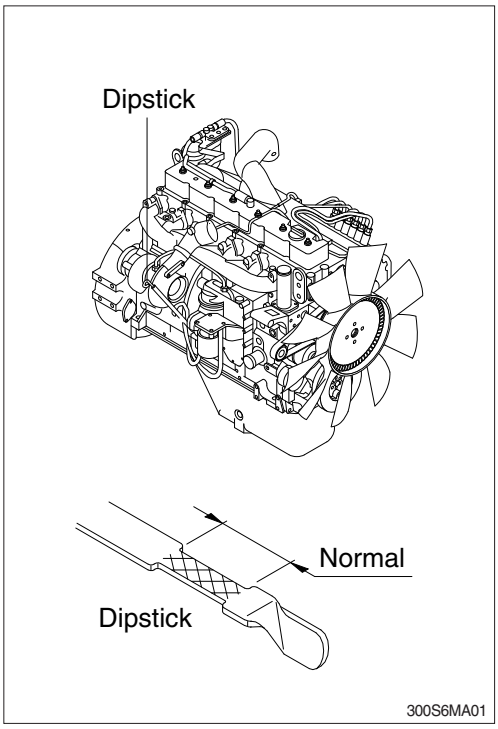
(2) Check the oil level by inserting the dipstick completely into the hole and pulling out again.

(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.**

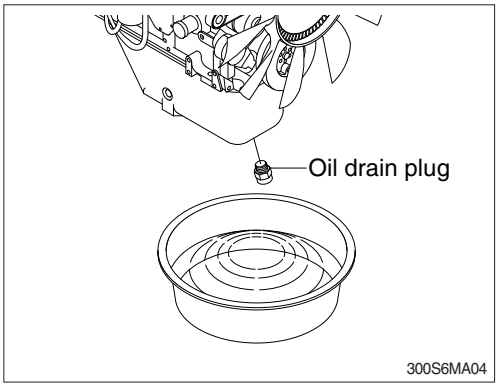


2) REPLACEMENT OF ENGINE OIL AND OIL FILTER

(1) Operate the engine until the coolant temperature reaches 60˚C (140˚F). Shut off the engine.

(2) Remove the oil drain plug. Drain the oil immediately to be sure all the oil and suspended contaminants are removed from the engine.

※ **A drain pan with a capacity of 30 liters (7.9 U.S. gallons) will be adequate.**

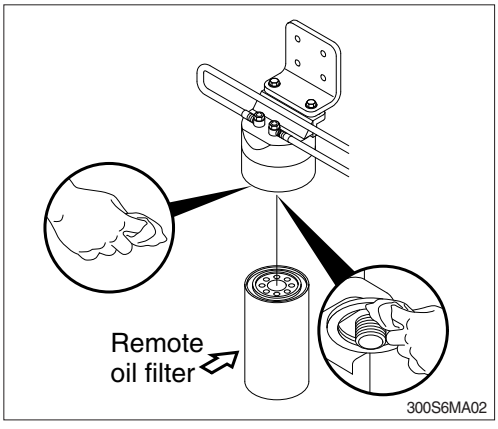


(3) Clean the area around the lubricating oil filter head.

(4) Use oil filter wrench to remove the oil filter.

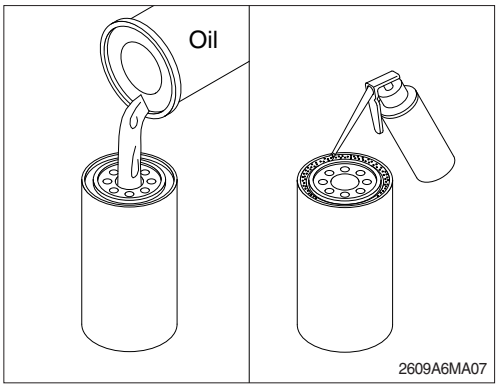
(5) Clean the gasket surface of oil filter head.

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



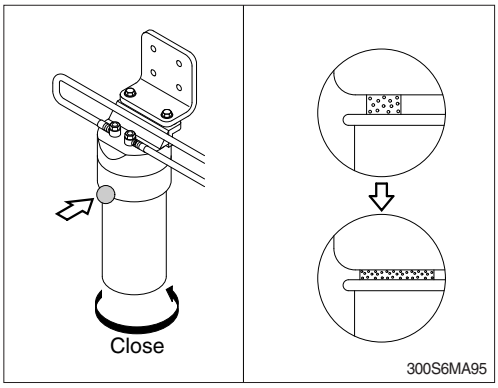
(6) Apply a light film of lubricating oil to the gasket sealing surface before installing the filters.

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



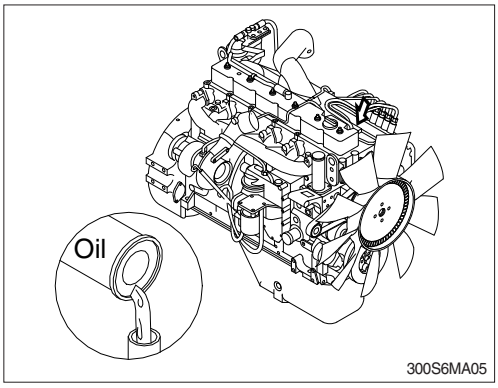
(7) Install the filter to the filter head.
Tighten the filter until the gasket contacts the filter head surface.
Tighten 3/4 to 1 turn after the gasket makes contact with the filter head.

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

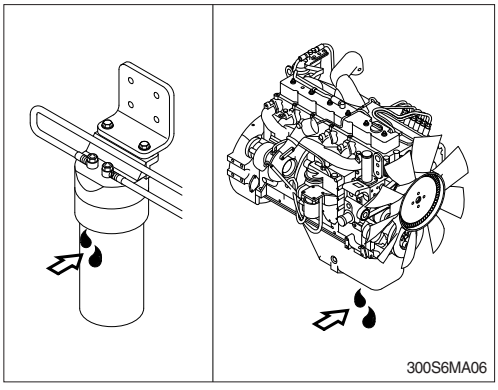


(8) Clean and check the lubricating oil drain plug threads and sealing surface.
Install the lubricating oil pan drain plug.

(9) Fill the engine with clean oil to the proper level.
· Quantity : 26.5 ℓ (7.0 U.S.gallons)



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



3) CHECK COOLANT

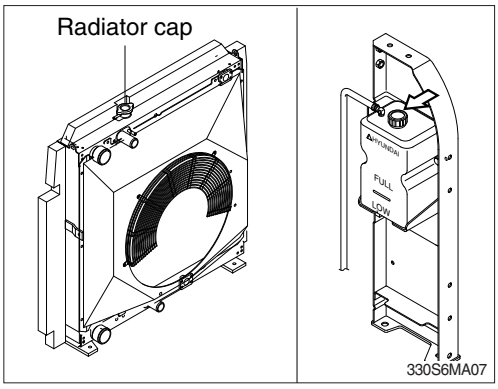
(1) Check if the level of coolant in reservoir tank is between FULL and LOW.

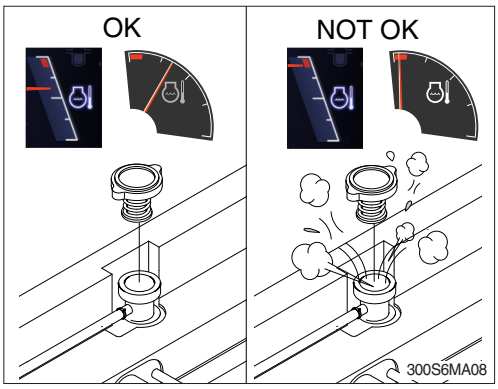
(2) Add the mixture of antifreeze and water after removing the cap of the reservoir tank if coolant is not sufficient.

(3) Be sure to use the reservoir empty, add the coolant by opening the cap of radiator.

(4) Replace gasket of radiator cap when it is damaged.

⚠ **Hot coolant can spray out if surge tank cap is removed while engine is hot. Remove the cap after the engine has cooled down.**



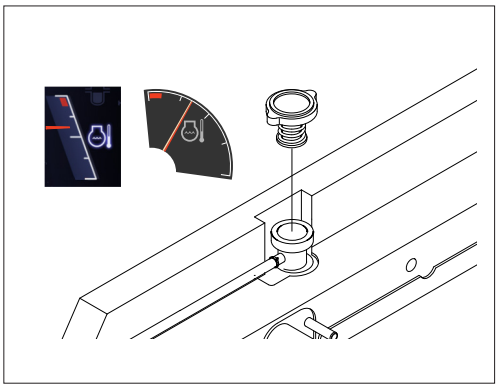


4) FLUSHING AND REFILLING OF RADIATOR

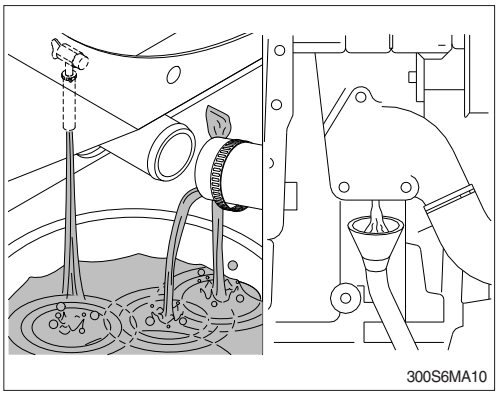
(1) Change coolant

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

※ Protect the environment : Handling and disposal of used antifreeze can be subject to federal, state, and local law regulation.
Use authorized waste disposal facilities, including civic amenity sites and garages providing authorized facilities for the receipt of used antifreeze.
If in doubt, contact your local authorities for guidance as to proper handling of used antifreeze.



⚠ **Wait until the temperature is below 50 ˚C (122 ˚F) before removing the coolant system pressure cap.**
Failure to do so can cause personal injury from heated coolant spray.
Drain the cooling system by opening the drain valve on the radiator and opening the drain valve on the bottom of the engine oil cooler housing.
A drain pan with a capacity of 40 liters (10.6 U.S. gallons) will be adequate.

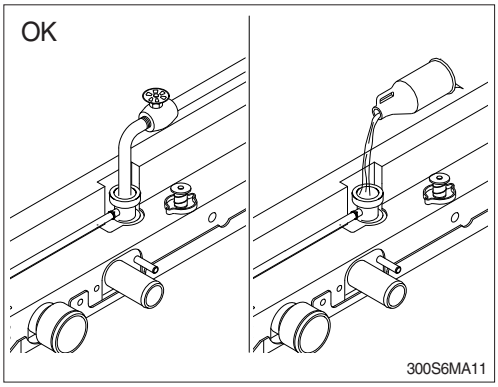

300S6MA10

(2) Flushing of cooling system

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

※ **Use 0.5kg (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.**



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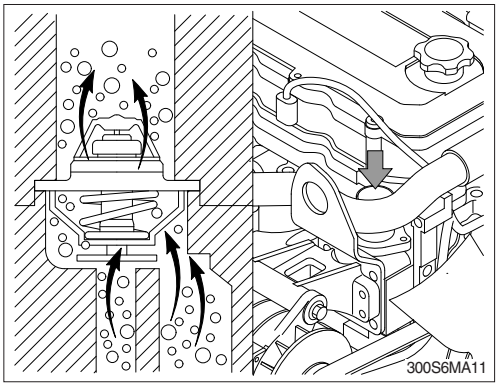
※ **During filling, air must be vented from the engine coolant passages.**
The system must be filled slowly to prevent air locks or serious engine damage can result. Wait 2 to 3 minutes to allow air to be vented, then add mixture to bring the level to the top.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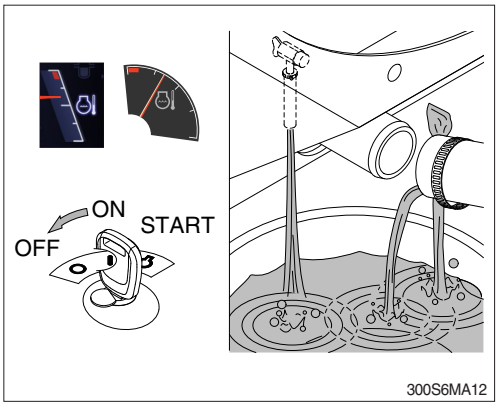
② Operate the engine for 5 minutes with the coolant temperature above 80˚C (176˚F) .
Shut the engine off, and drain the cooling system.

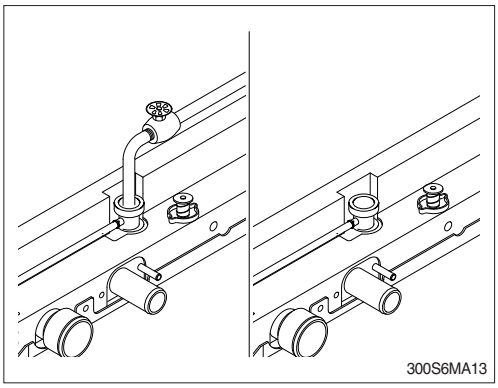


300S6MA12

③ Fill the cooling system with clean water.

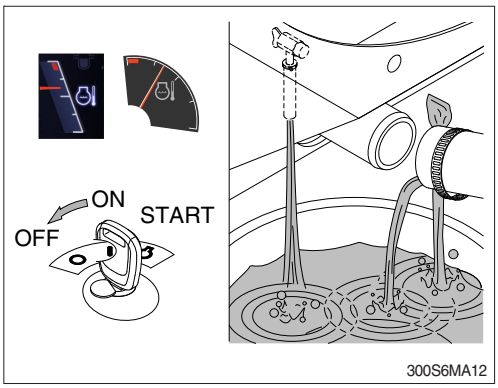
※ **Be sure to vent the engine and aftercooler for complete filling.**

※ **Do not install the surge tank cap or the new coolant filter.**



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

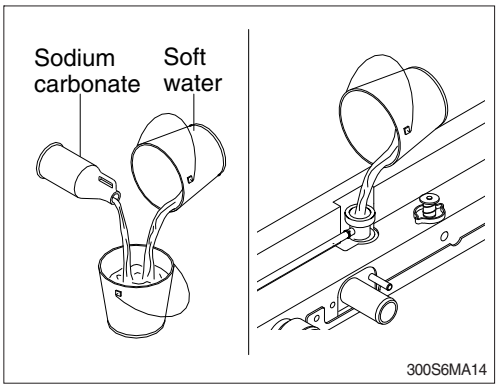
※ **If the water being drained is still dirty, the system must be flushed again until the water is clean.**



(3) Cooling system filling

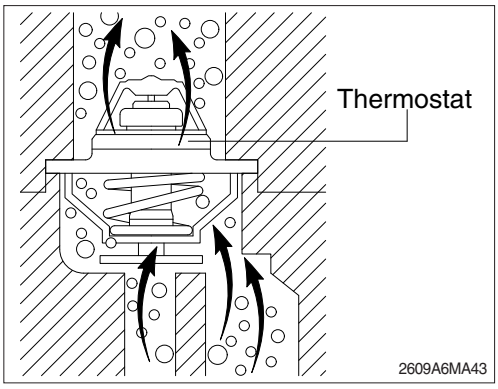
① Use a mixture of 50 percent soft water and 50 percent ethylene glycol antifreeze to fill the cooling system. Refer to the page 6-10.
Coolant capacity (engine only) : 10 ℓ (2.6 U.S. gallons)

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

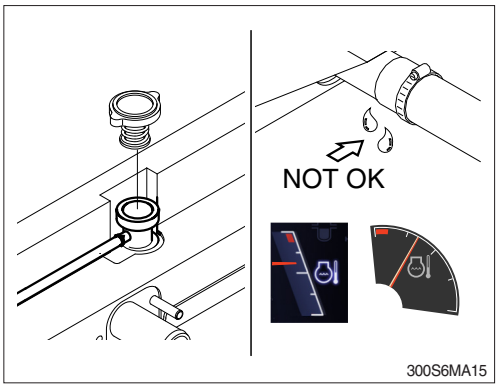


② The system has a maximum fill rate of 19 liters (5.0 U.S. gallons) per minute.
Do not exceed this fill rate.

※ **The system must be filled slowly to prevent air locks.**
During filling, air must be vented from the engine coolant passage.



③ Install the pressure cap. Operate the engine until it reaches a temperature 80˚C (176˚F), and check for coolant leaks.
Check the coolant level again to make sure the system is full of coolant.



5) CLEAN RADIATOR AND OIL COOLER

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

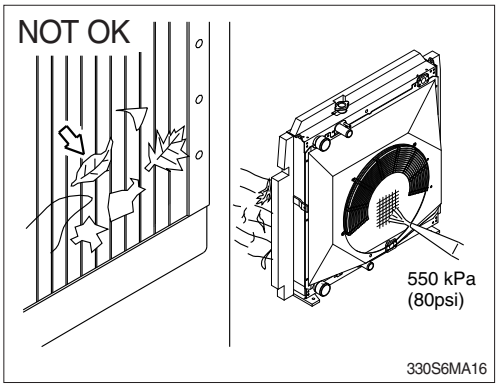
(1) Visually inspect the radiator for clogged radiator fins.

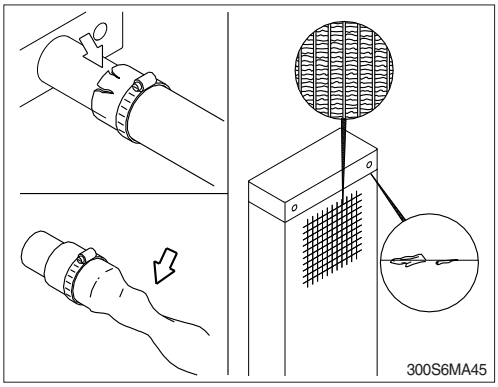
(2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.

(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.**

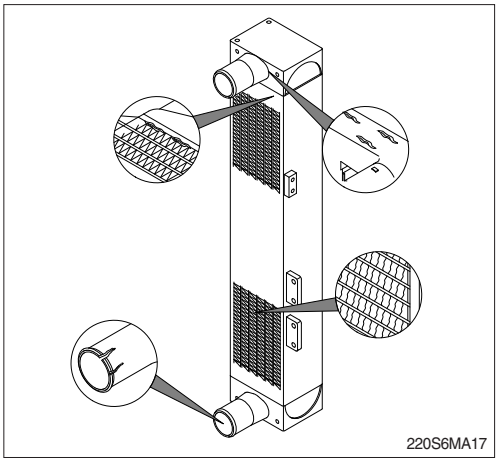
(4) Visually inspect the radiator for core leaks.





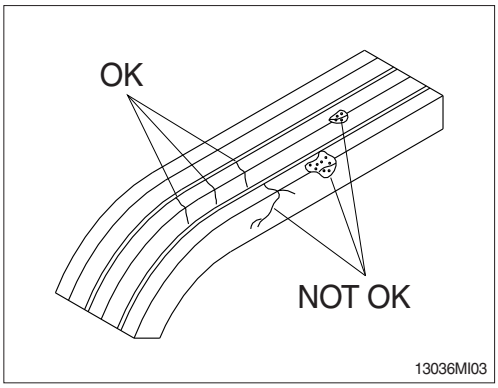
6) CHECK CHARGE AIR COOLER

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.

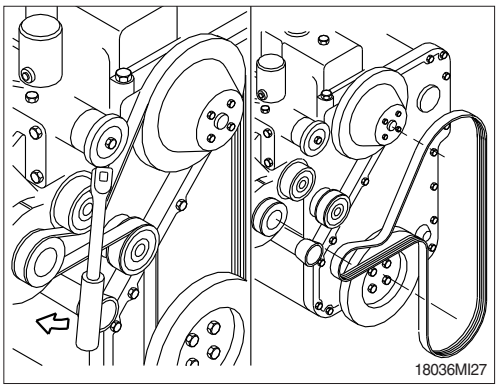


7) FAN BELT TENSION

(1) Inspect the drive for damage.



(2) Inspect the drive belt and fan hub.

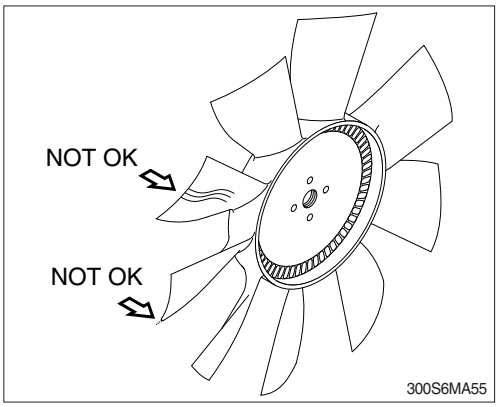


8) INSPECTION OF COOLING FAN

⚠ 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.

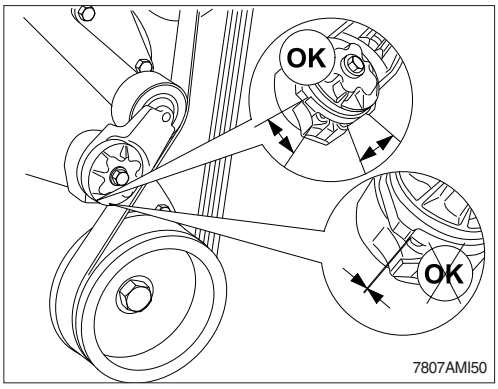
※ Rotate the crankshaft by using the engine barring gear.

※ 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.

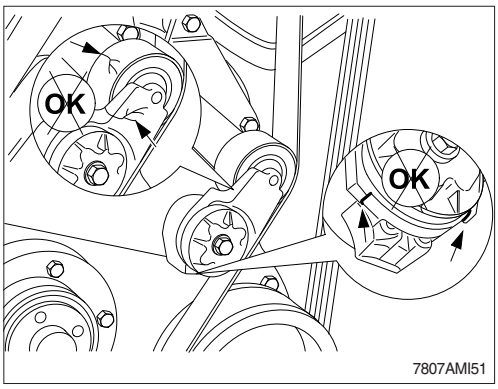


9) BELT TENSIONER, AUTOMATIC Adjustment

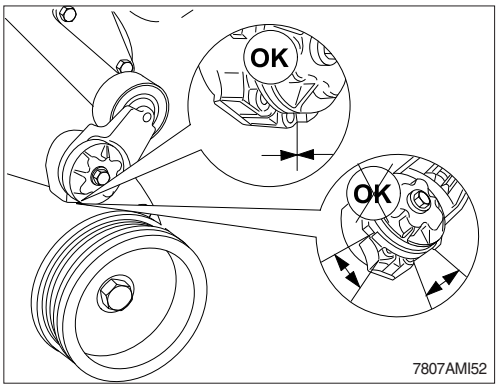
(1) Every 1000hours, or 1 year, whichever occurs first, inspect the automatic belt tensioner.
With the engine turned off, check that neither the top nor bottom tensioner arm stop is touching the cast boss on the tensioner body. If either of the stops is touching a boss, the alternator belt must be replaced.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



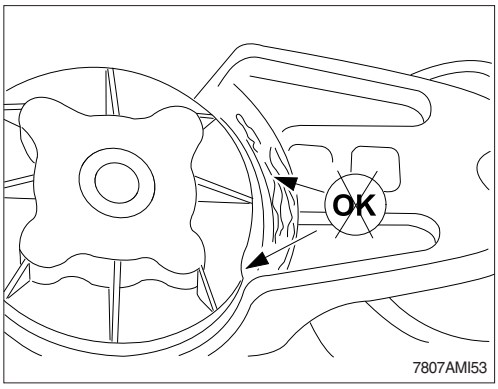
(2) Check the tensioner pulley and body for cracks. If any cracks are noticed, the tensioner must be replaced. Refer to a Cummins Authorized Repair facility. Check the tensioner for dirt buildup. If this condition exists, the tensioner must be removed and steam-cleaned.



(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.



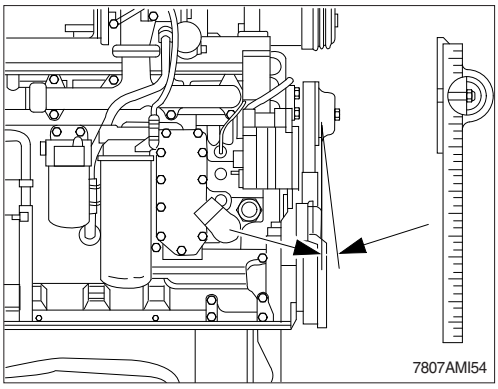
(4) Inspect the tensioner for evidence of the pivoting tensioner arm contacting the stationary circular base. If there is evidence of thess two areas touching, the pivot tube bushing has failed and the tensioner must be replaced.



(5) A worn tensioner that has play in it or a belt that "walks" off its pulley possibly indicates pulley misalignment.

※ **Maximum pulley mislignment is three degrees. This measurement can be taken with a straightedge and an inclinometer.**

(6) Install the belt.



10) CLEANING OF AIR CLEANER

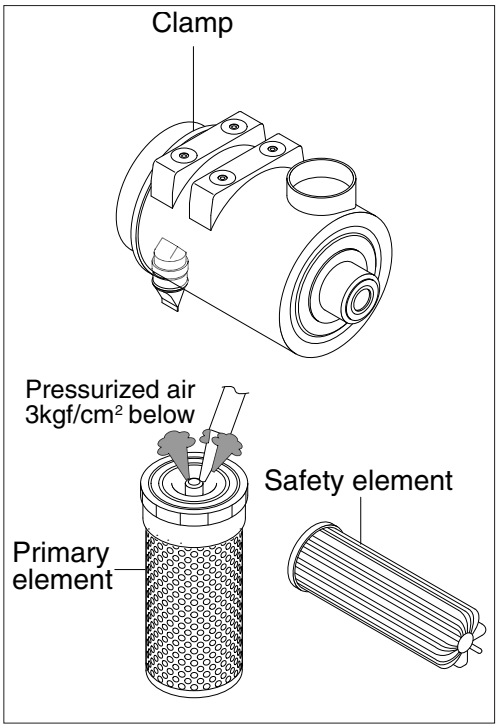
(1) Primary element

① Loosen the clamps 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.**



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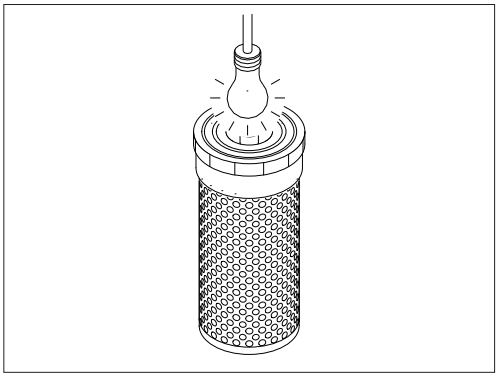
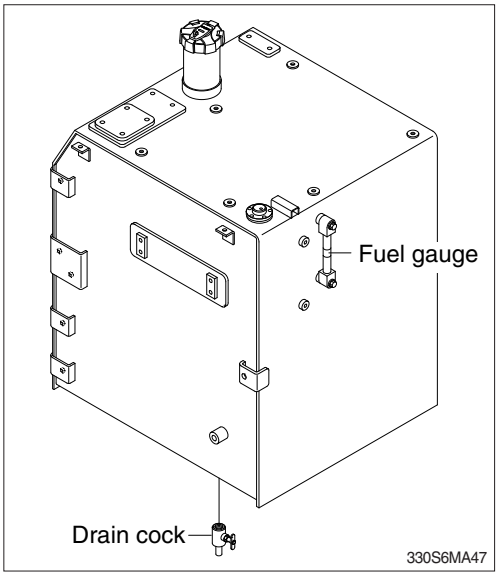

300S6MA23

11) 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.



330S6MA47

12) REPLACEMENT OF FUEL FILTER

(1) Clean around the filter head, remove the filter and clean the gasket surface.
· Wrench size : 90~95 mm (3.5~3.8 in)

(2) Replace the O-ring.

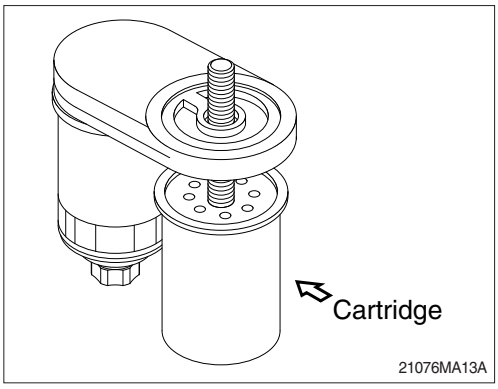
(3) Fully fill fuel in the new filter.

(4) 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.

(5) Relieve the air after mounting.

※ **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.**



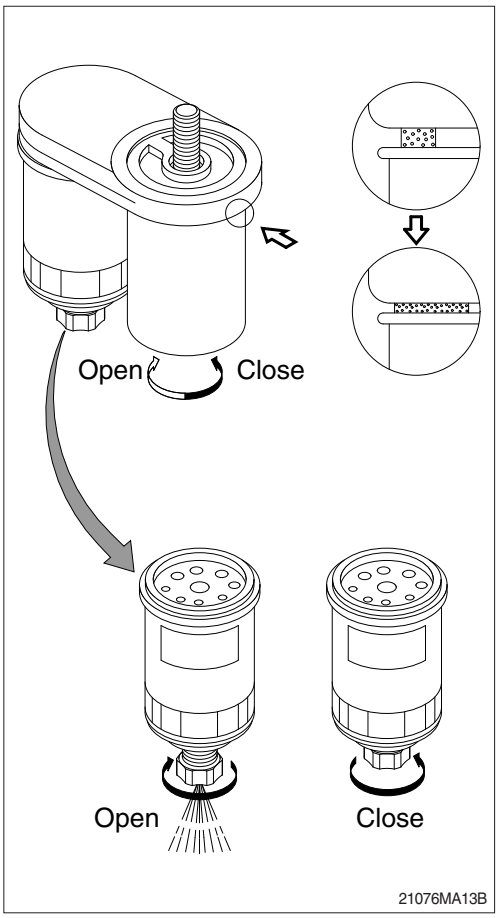
FUEL WATER SEPARATOR

- Drain the water and sediment from the separator daily.
- Shut off the engine.
- Use your hand to open the drain valve.
- Turn the valve counterclockwise 4 complete turns until the valve drops down 1".
- Drain the filter sump of water until clear fuel is visible.

※ **Do not overtighten the valve.**
Overtightening can damage the threads.

- Push the valve up and turn the valve clockwise to close the drain valve.

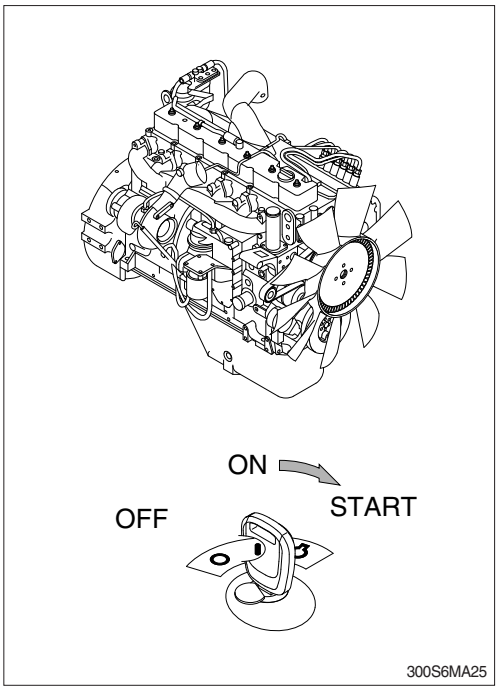
※ **If more then 2 ozs is drained, refilling of the filter is required to prevent hard starting. Refer to low pressure lines and fuel filter venting clause 13)-(2).**



13) BLEEDING THE FUEL SYSTEM

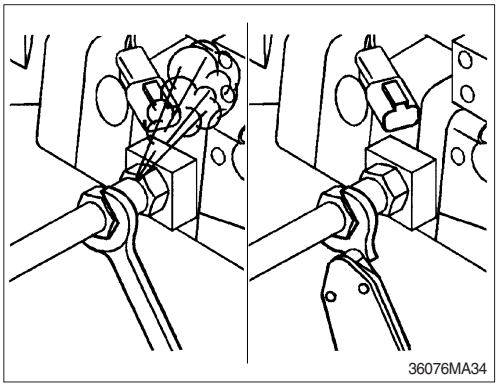
(1) Air in fuel

① The air bleed fitting on the fuel system creates a self bleeding system during replacement of the supply side components. High pressure fuel line removal and replacement will not require external bleeding to start the engine. The fuel pump will create high fuel pressure during cranking and purge the air in the high pressure side through the injectors.

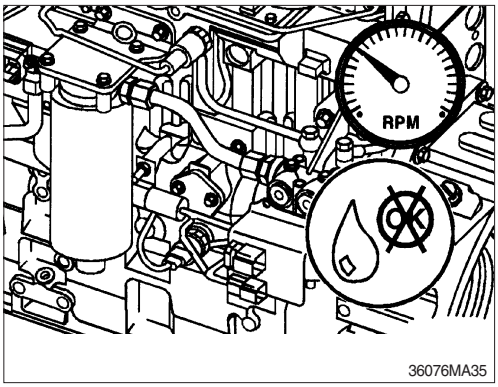


※ If an excessive amount of air has entered the system, the system will need to be bled.

② Loosen the fuel supply line at the pump. Run the electric fuel lift pump until the air has been bled. When all the air has been bled, tighten the fitting.

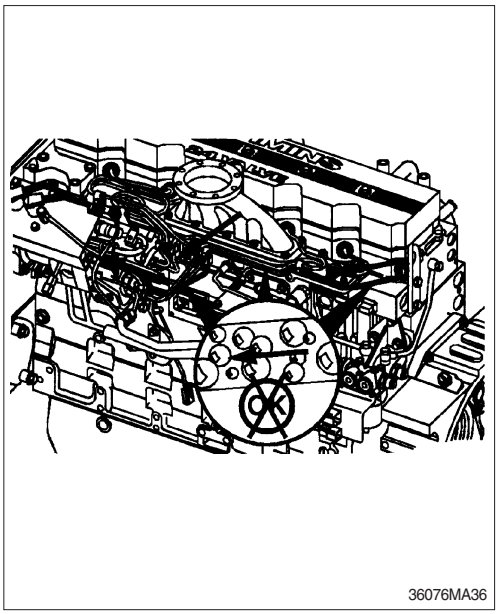


③ Supply line leaks from the lift pump to the fuel pump can be located by operating the lift pump or keyswitch cycling, to build pressure in the fuel lines. Inspect all lines and connections, as well as the fuel filter assembly, for an external fuel leak.



④ A stuck open injector can also blow combustion gas back into the pump and cause air to be present in the overflow.
If the engine seems to be misfiring or running rough, break all the injector supply lines loose at the pump end. Crank the engine and observe the lines. If combustion gas seems to be blowing back through the line, the injector is stuck open.

※ **Use two wrenches when loosening the lines at the fuel pump, one to hold the delivery valve and one to loosen the line.**
- Wrench size : 19 mm
- Tightening torque : 2.45 kgf·m (18 lbf·ft)



36076MA36

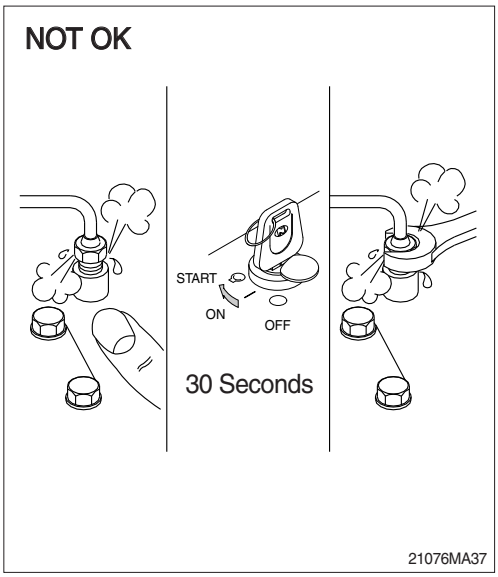
(2) Venting the high pressure lines

⚠ **The pressure of the fuel in the line is sufficient to penetrate the skin and cause serious bodily harm.**

① Loosen the fittings at the cylinder head and crank the engine to allow entrapped air to bleed from the line. Tighten the fittings.
- Wrench size :19mm
- Torque : 3.9 kgf·m (28 lbf·ft)

② Start the engine and vent one line at a time until the engine runs smoothly.

⚠ **Do not bleed a hot engine as this can cause fuel to spill onto a hot exhaust manifold, creating a danger of fire.**



21076MA37

14) PREFILTER

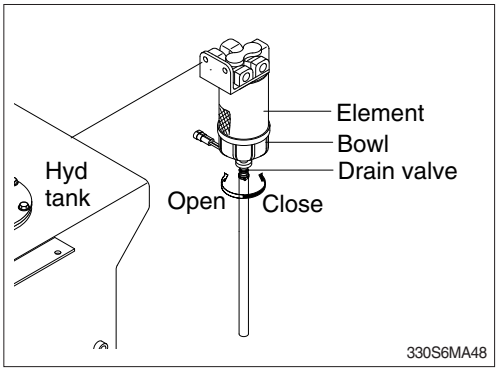
※ **Inspect or drain the collection bowl of water daily and replace the element every 500 hours.**

(1) Drain water

① Open bowl drain valve to evacuate water.

② Close drain valve.

※ **Don't tighten up a drain valve so strong. Please inspect and drain water frequently for remain water volume to be less than 1/3 volume of a collection bowl.**



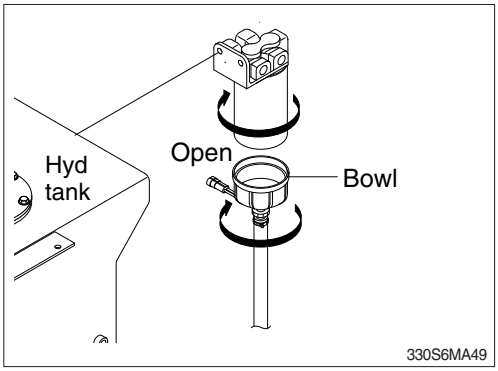
(2) Replace element

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

② Remove element and bowl from filter head.

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

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

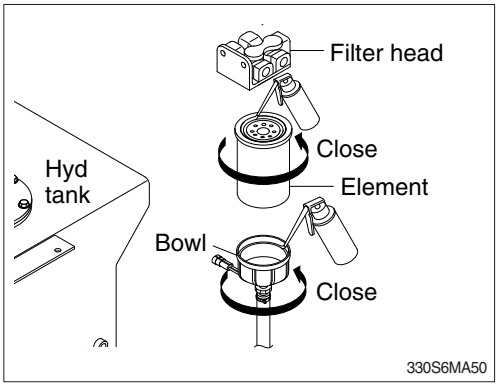


④ Lubricate new bowl seal with clean fuel or motor oil and place in bowl gland.

⑤ Attach bowl to new element firmly by hand.

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

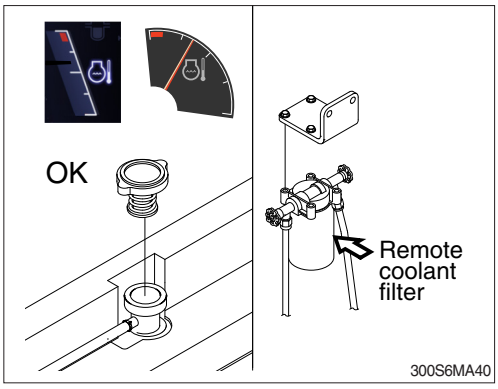
⑦ Attach the element and bowl to the head.



16) COOLANT FILTER

⚠ **Do not remove the radiator cap from a hot engine. Wait until the coolant temperature is below 50˚C (120˚C) before removing the radiator cap. Heated coolant spray or steam can cause personal injury**

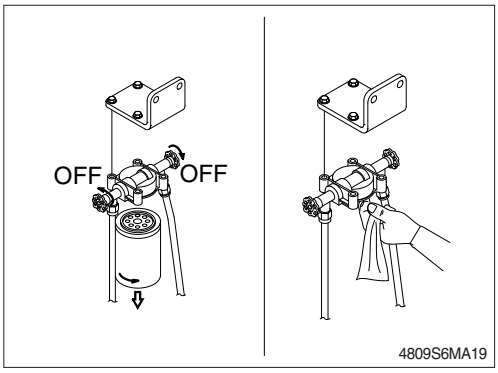
(1) Remove the radiator cap.



(2) Turn the valve to the OFF position.

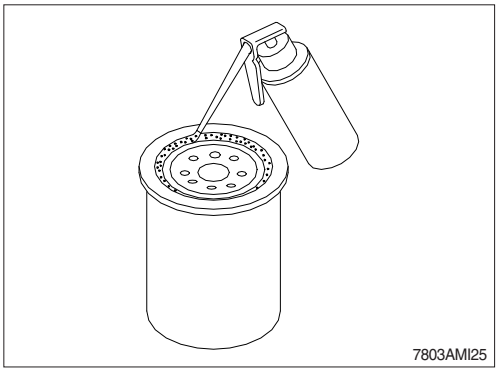
(3) Remove and discard the filter.
Clean the coolant filter head gasket's surface.

⚠ **A small amount of coolant can leak when servicing the filter with the shutoff valve in the OFF position. To avoid personal injury, avoid contact with hot coolant.**



(4) Apply a thin film of clean engine oil to the gasket sealing surface before installing a new filter.

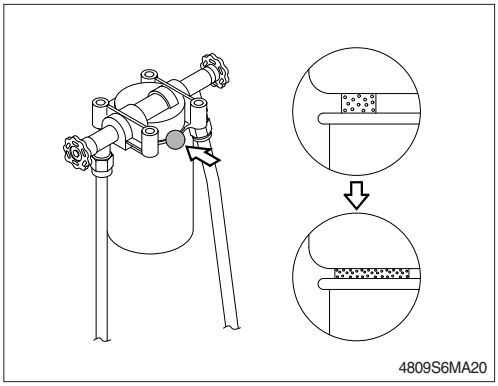
※ **If the filter canister is damaged in any way, do not use it. Dents or scrapes can lead to a rupture or premature failure of the filter.**



(5) Install a new filter on the filter head.
Tighten the filter until the gasket contacts the filter head surface.

(6) Tighten the filter an additional 1/2 to 3/4 of a turn.

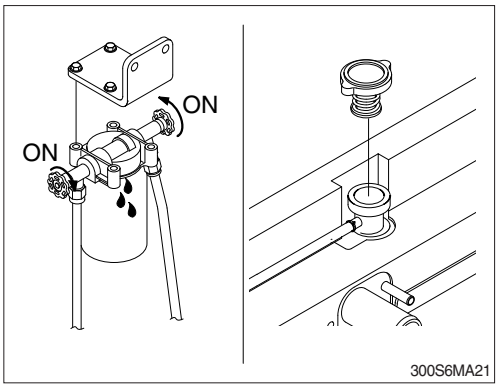
※ **Mechanical over tightening can distort the filter threads or damage the filter head.**



(7) Turn the valve to the ON position, and install the radiator cap.

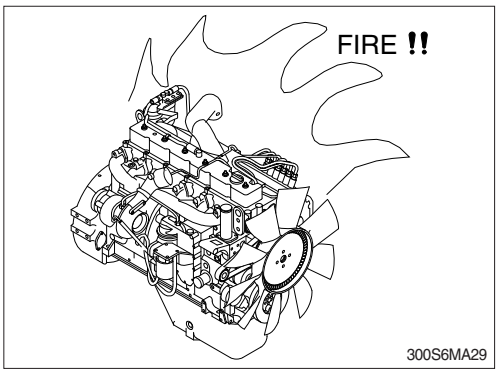
(8) Operate the engine and check for leaks.

※ **The valve must be in the ON position to prevent engine damage.**



16) 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.**



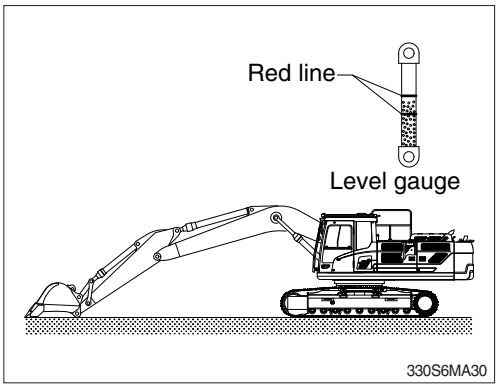
17) HYDRAULIC OIL CHECK

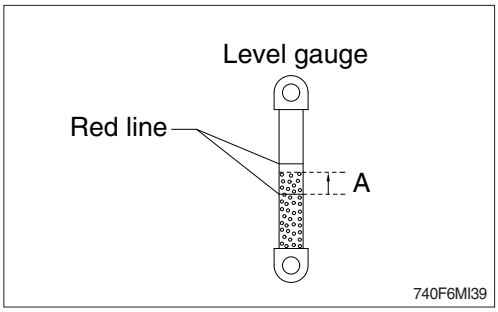
(1) Position the machine as shown in the illustration on the right. Then stop engine.

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

(3) The oil level is normal if the oil is between the red lines. The oil level depends on the temperature of the hydraulic oil. Refer to the height (A) in the below table to check the level gauge.

Temperature		Height A	
℃	°F	mm	inch
0	32	15	0.6
10	50	25	1.0
20	68	30	1.2
30	86	35	1.4
40	104	40	1.6





※ Refer to page 3-22 for checking the temperature of the hydraulic oil.

※ Add the hydraulic oil, if necessary.

18) FILLING HYDRAULIC OIL

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

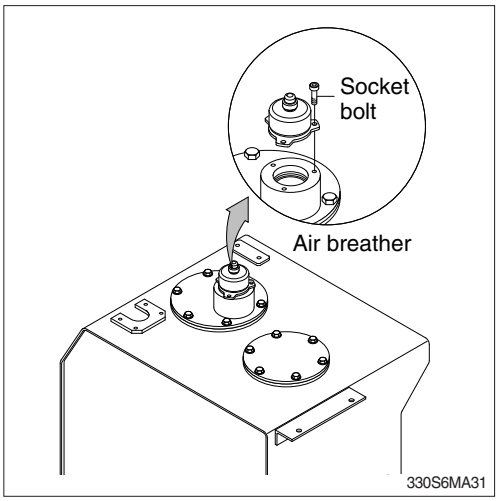
(2) Relieve the pressure in the tank by pushing the top of the air breather.

(3) Loosen the socket bolts and remove the air breather on the top of oil tank and fill the oil to the specified level.

· Tightening torque : 4.05±0.8 kgf · m
(29.3±5.8 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.

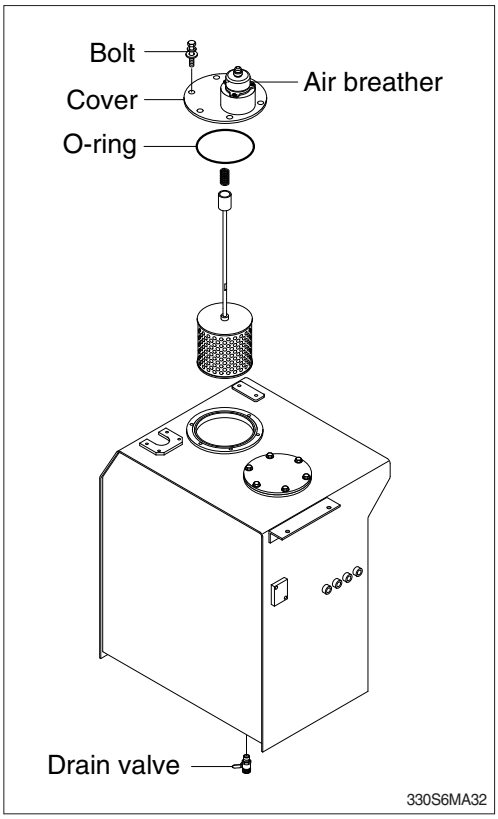
(5) To drain the oil open the drain valve at the bottom of the oil tank.

(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.
- Tightening torque : 6.9±1.4 kgf · m (50±10 lbf · ft)

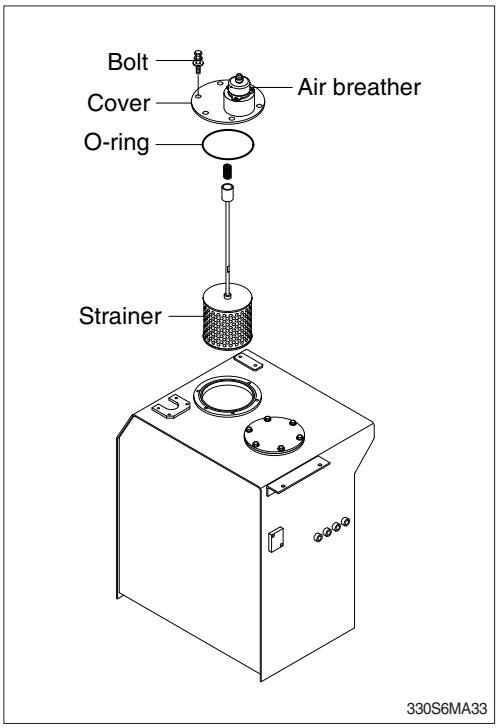
(2) Pull out the strainer in the tank.

(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.



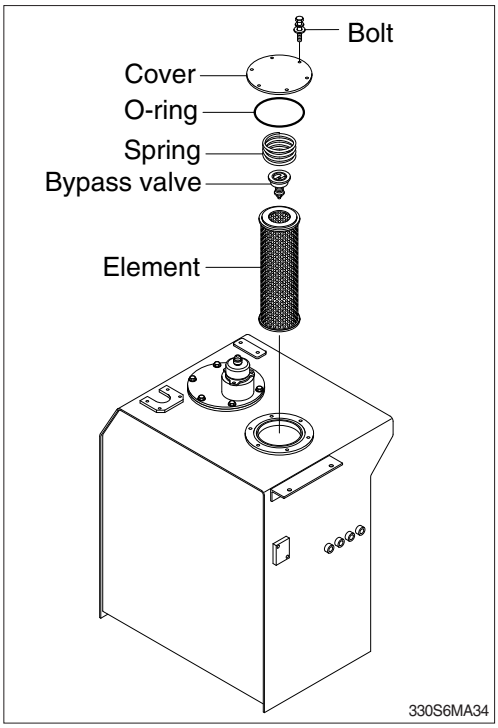
21) REPLACEMENT OF RETURN FILTER

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

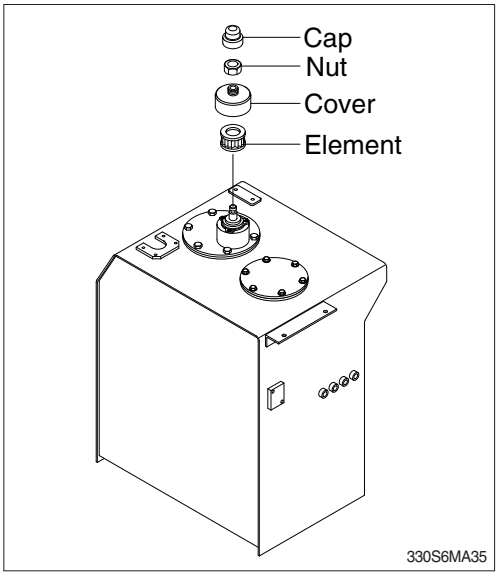
(1) Relieve the pressure in the tank by pushing the top of the air breather.

(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 : 0.8~1.0 kgf · m
(5.9~7.4 lbf · ft)

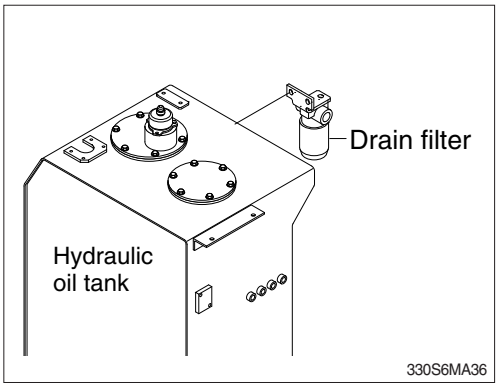


23) REPLACE OF DRAIN FILTER CARTRIDGE

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.



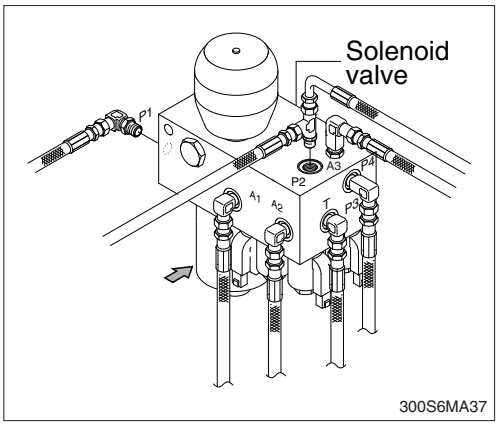
24) REPLACE OF PILOT LINE FILTER

(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.

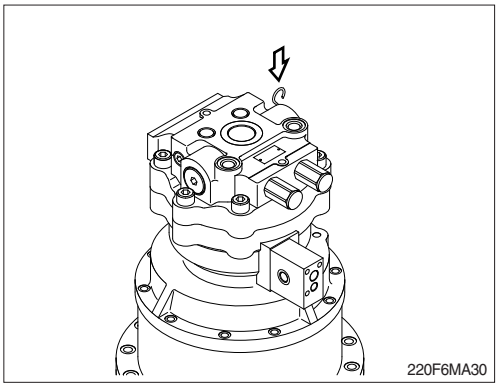


25) CHECK THE SWING REDUCTION GEAR OIL

(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.



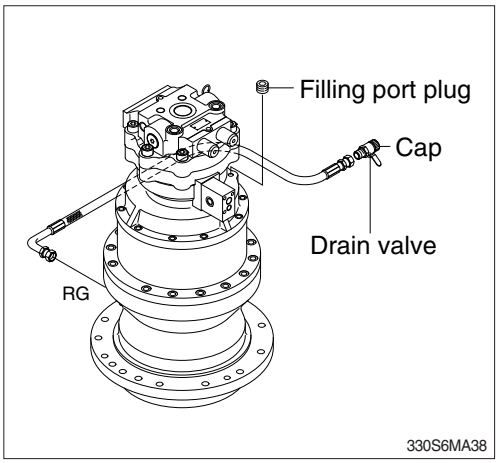
26) CHANGE SWING REDUCTION GEAR OIL

(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.

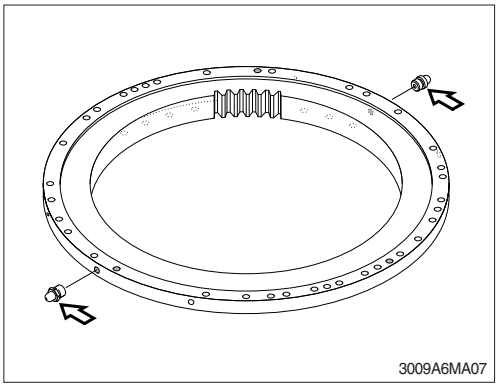
(4) Clean around the valve and close the drain valve and cap.
Fill proper amount of recommended oil.
· Amount of oil : 6.2 ℓ (1.6 U.S.gal)



27) LUBRICATE SWING BEARING

(1) Grease at 2 fitting.

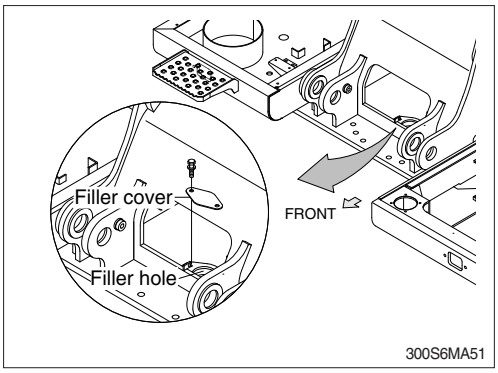
※ Lubricate every 250 hours..



28) SWING GEAR AND PINION

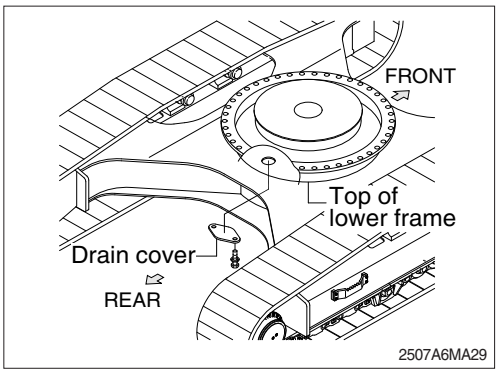
(1) Drain old grease

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

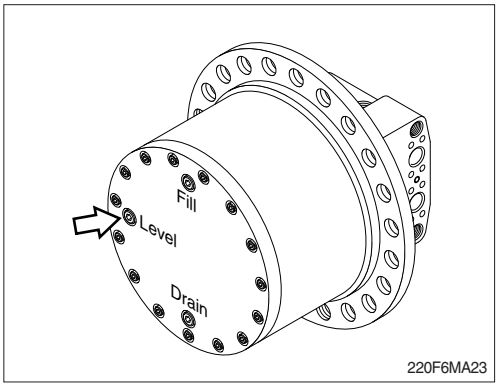
① Install drain cover.
② Fill with new grease.
③ Install filler cover.
· Capacity : 11.4 kg (25.1 lb)



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 : 7.8 ℓ (2.1 U.S.gal)



30) CHANGE OF THE TRAVEL REDUCTION GEAR OIL

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

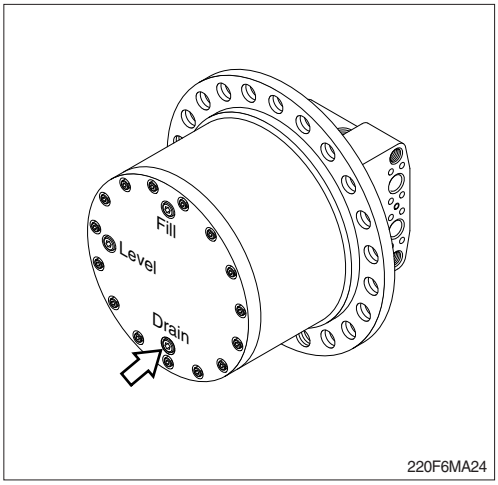
(2) Stop when the position of the drain plug is down.

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

(4) Drain the oil to adequate container.

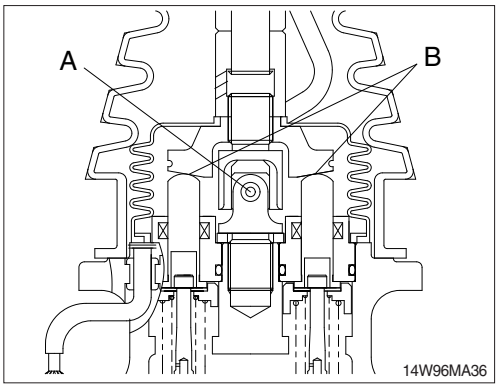
(5) Tighten the drain plug and fill specified amount of oil at filling port.

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



31) LUBRICATE RCV LEVER

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



32) 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 under-carriage 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.

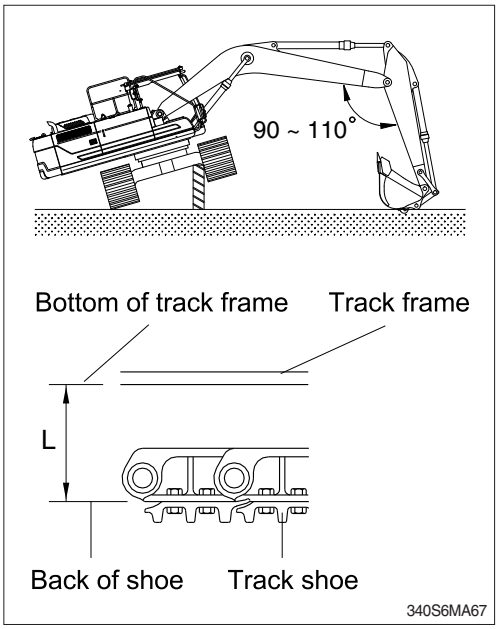
※ Remove mud with rotating the track before measuring.

(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.



Length (L)	
360~390 ㎜	14.2~15.5"

33) 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 knob 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.**

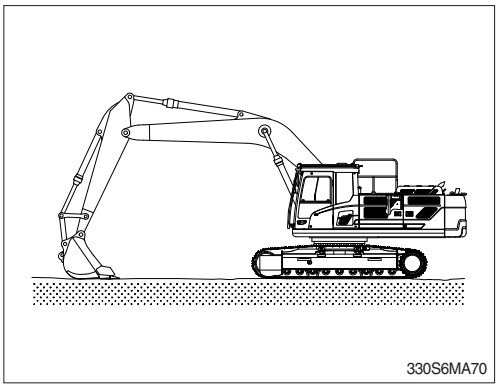
※ **After remove the pins, make sure that they do not become contaminated with sand or mud and that the seals of bushing on both sides do not become damaged.**

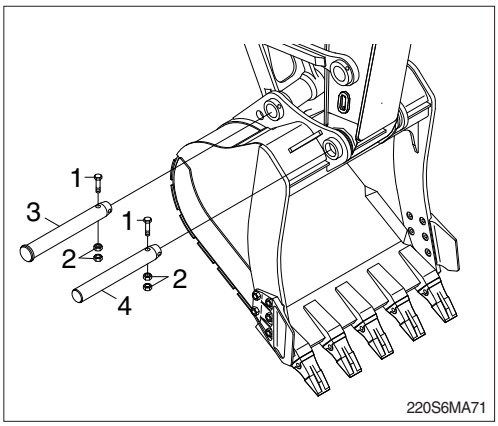
(4) Align the arm with holes (A) and the link with holes (B), then coat with grease and install pins (3, 4)

※ **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.

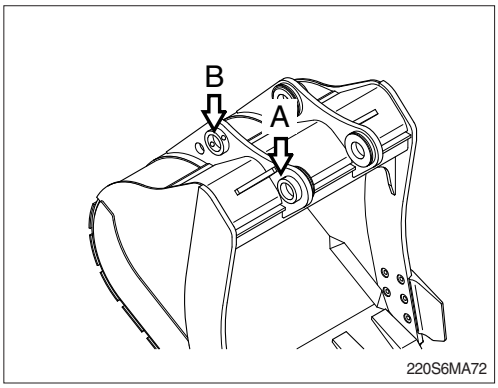
(5) Install the stopper bolt (1) and nuts (2) for each pin, then grease the pin.

· Tightening torque : 29.7±4.5 kgf · m
(215±32.5 lbf · ft)

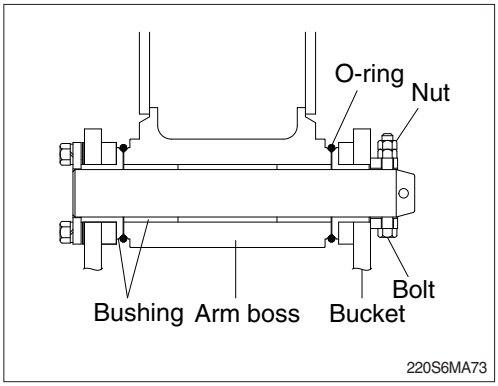

330S6MA70



220S6MA71



220S6MA72



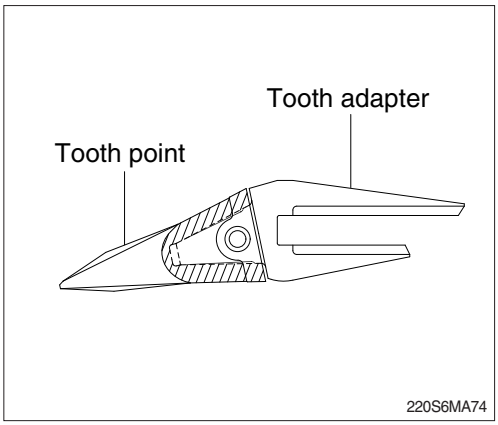
220S6MA73

34) REPLACEMENT OF BUCKET TOOTH

(1) Timing of replacement

① Check wearing condition as shown in the illustration and replace tooth point 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 lock washer.

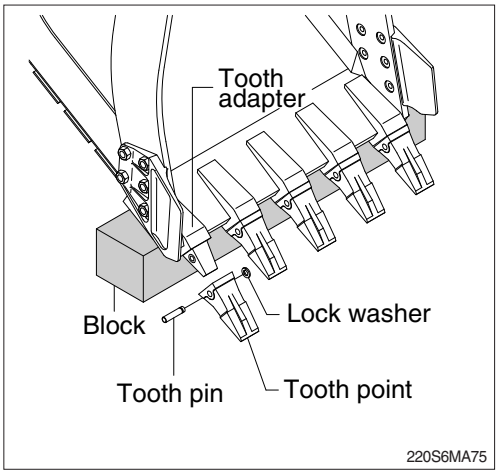
② Remove dust and mud from surface of tooth adapter by using knife.

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

④ Insert pin until lock washer is positioned at tooth point groove.

⚠ Personal injury can result from bucket falling.

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



35) ADJUSTMENT OF BUCKET CLEARANCE

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

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

(3) Lock the safety knob 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).

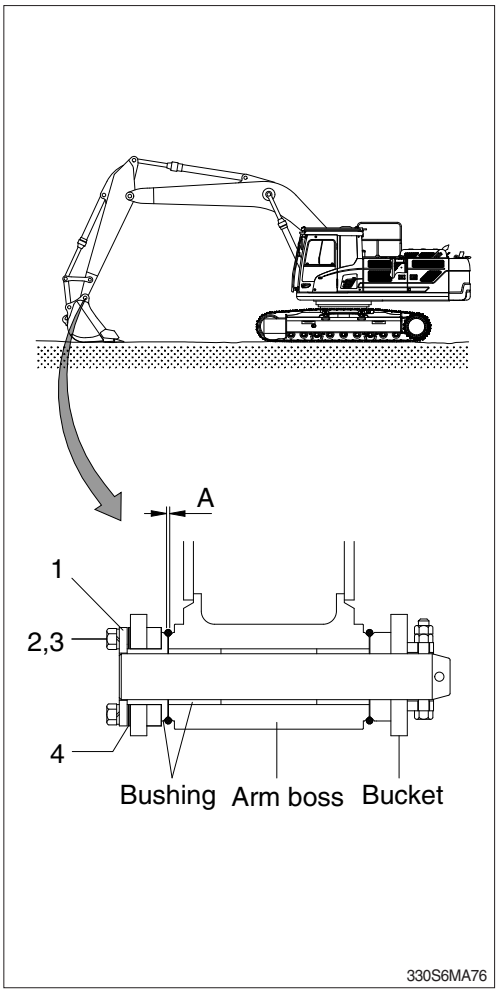
② Remove the shim equivalent value with measuring value.

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.



36) LUBRICATE PIN AND BUSHING

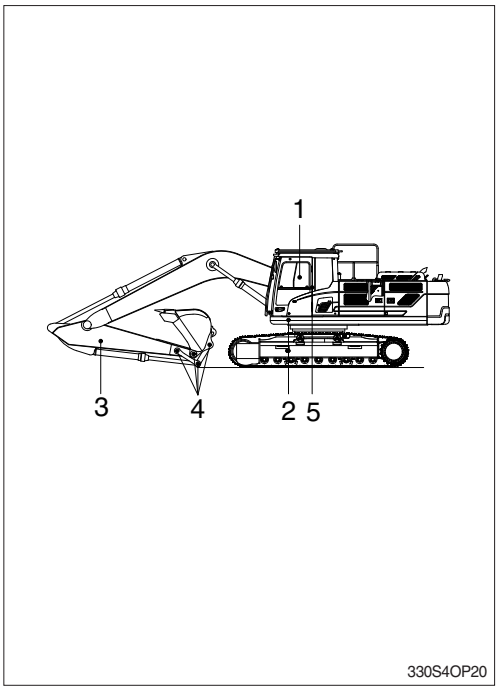
(1) Lubricate to each pin of working device

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 (head)	2
3	Lubrication manifold at arm	3
4	Bucket cylinder pin (rod)	1
	Bucket link (control rod)	2
	Arm and bucket connection pin	1
	Bucket and control rod connection pin	1
	Arm and control link connection pin	1
5	Boom rear bearing center ★	1

※ Shorten lubricating interval when working in water or dusty places.

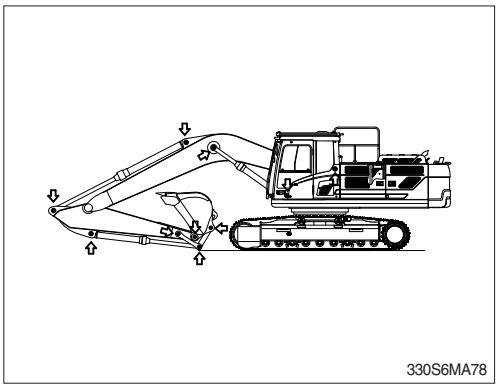
★ Not required : If necessary, lubricate the grease.



330S4OP20

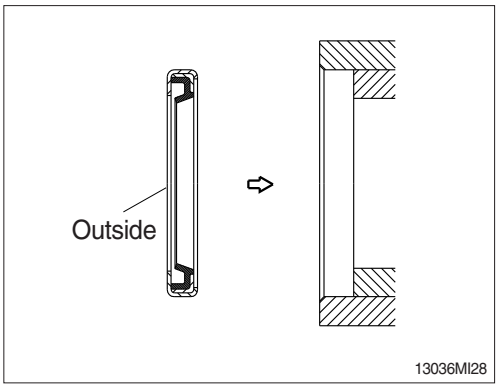
(2) Dust seals are mounted on the rotating part of working device to extend the lubricating interval.

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


330S6MA78

※ 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.



13036MI28

37) REPLACEMENT OF THE AIR COMPRESSOR'S AIR FILTER

(1) Loosen the air filter cap counterclockwise.

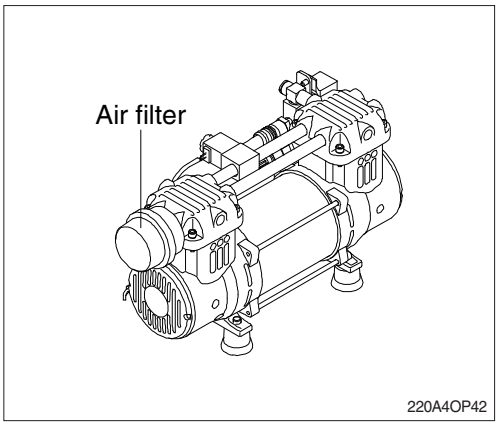
(2) Use pressurized air from the inside to the outside when cleaning the air filter.

(3) Reassemble by reverse order of disassembly.

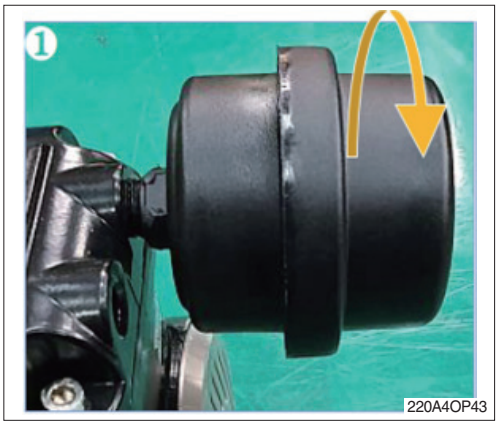
※ **Please install the air inlet in the lower direction.**

(4) If the air filter is damaged or badly contaminated, use a new filter.

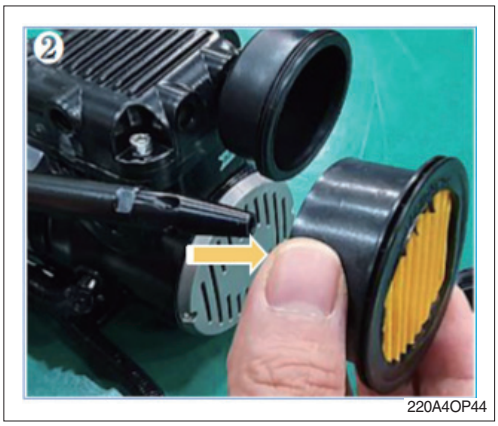
△ **If you are using the air compressor on the equipment when cleaning the air filter, the use for a long time can cause internal damage to a piston ring or a liner. Because dust or a contaminant may be inhaled through the air inlet. Please use for a short time at a clean place.**



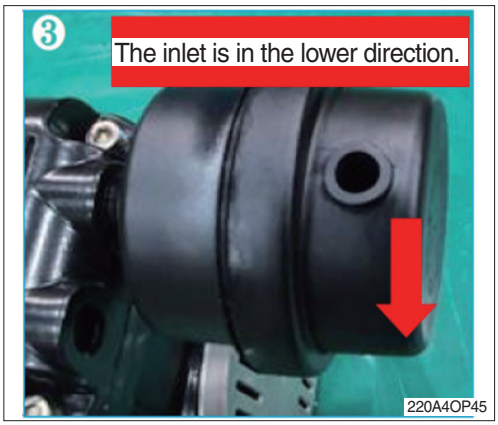
220A4OP42



220A4OP43



220A4OP44

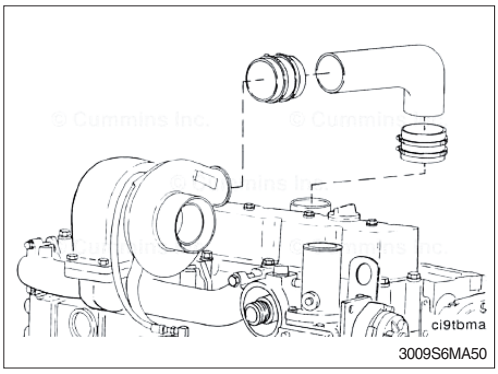


220A4OP45

38) OVERHEAD SET ADJUSTMENT

This procedures are performed at the repair shop.

(1) Remove the air crossover tube from the engine if equipped.



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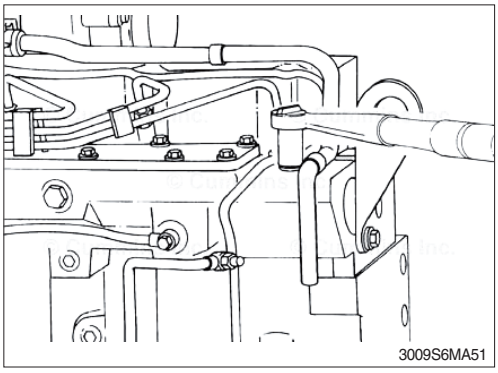
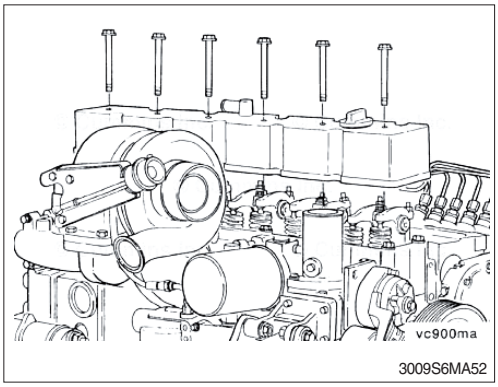
(2) Disconnect the support clamps, hose clamp and wastegate sensing line. Remove the crankcase vent tube and any other parts that would prevent removal of the valve cover.


3009S6MA51

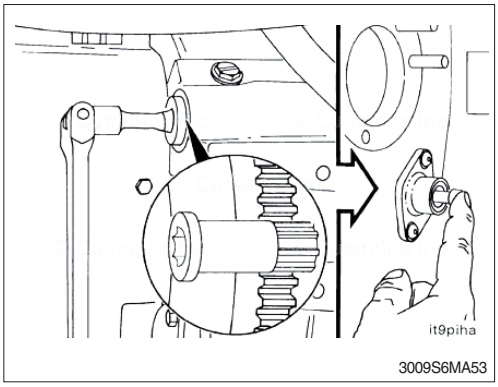
(3) Remove valve cover.



3009S6MA52

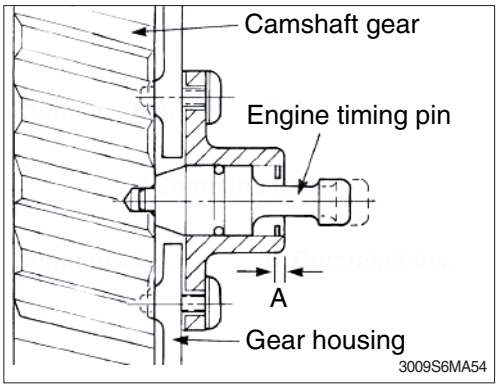
(4) Locate top dead center for cylinder number 1 by rotating the crankshaft slowly while pressing on the engine timing pin.

(5) The barring gear inserts into the flywheel housing and engages the flywheel ring gear. The engine can then be rotated by hand using a 127 mm (1/2 in) ratchet or breaker bar.

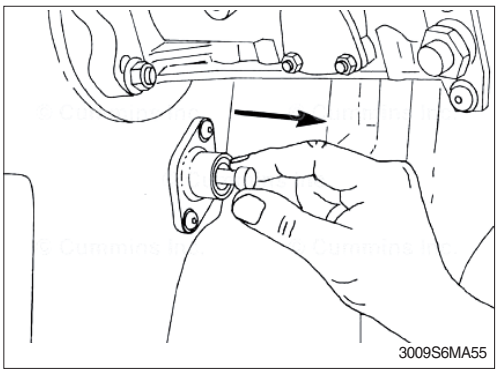


3009S6MA53

(6) When the engine timing pin center engages the hole in the camshaft gear, cylinder number 1 is at top dead center on the compression stroke.

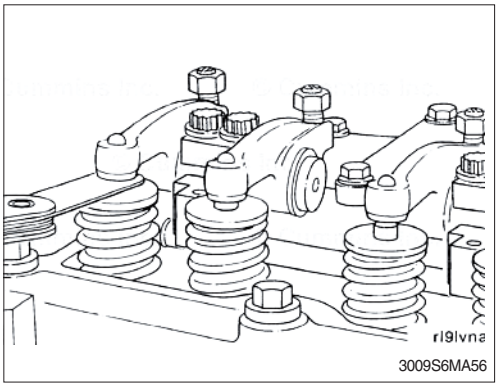


※ **Be sure to disengage the engine timing pin after locating top dead center to prevent damage to the engine timing pin.**



(7) Check/set valves with engine cold-below 60℃ (140°F).
- Intake clearance : 0.30 mm (0.012 in)
- Exhaust clearance : 0.61 mm (0.024 in)

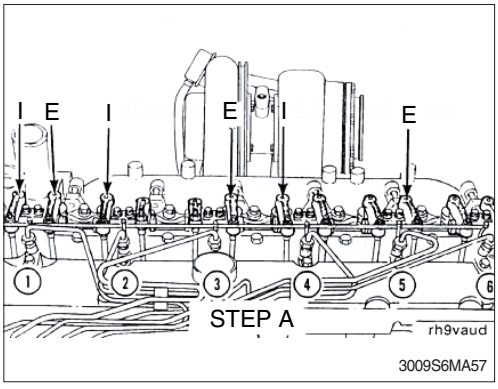
※ **The clearance is correct when some resistance is "felt" when the feeler gauge is slipped between the valve stem and the rocker lever.**



(8) Locate top dead center for cylinder number 1.

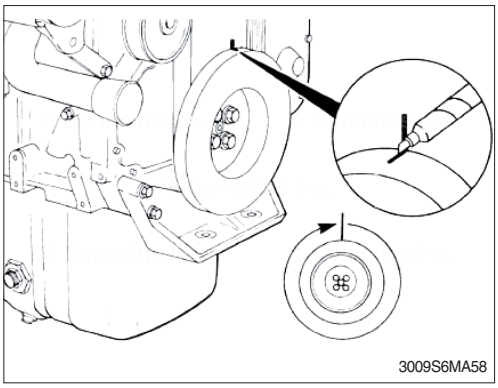
(9) Check/adjust the valves indicated for STEP A (I=intake, E=exhaust).

(10) After tightening the rocker lever locknut, check the valve clearance to make sure the valve clearance has not changed.
- Tightening torque : 2.45 kgf·m (18 lbf·ft)



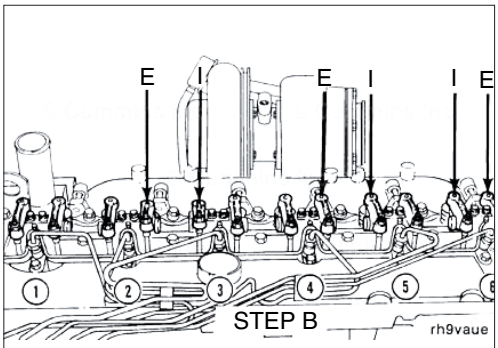
※ **Be sure the engine timing pin disengage to prevent damage to the engine timing pin.**

(11) Mark vibration damper and rotate the crankshaft 360 degrees.


3009S6MA58

(12) Set the valves indicated for STEP B.

(13) After tightening the rocker lever locknut, check the valve clearance to make sure the valve clearance has not changed.
· Tightening torque : 2.45 kgf·m (18 lbf·ft)



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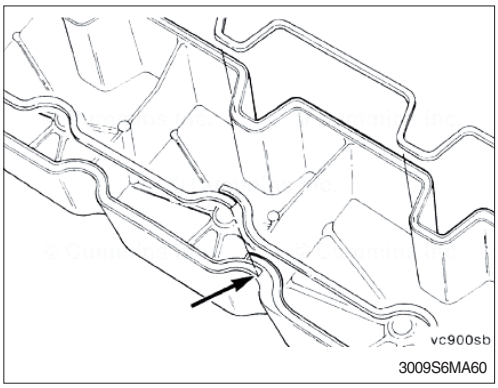
※ **If the seal is not damaged, it can be used again. If the seal is damaged, install a new seal.**

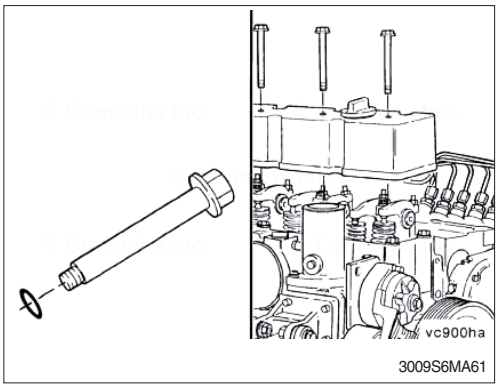
(14) Install the rubber seal into the groove in the valve cover.
Start the installation at the overlap area shown in the illustration. Do not stretch the rubber seal.
If the seal has more overlap than shown in the illustration, trim the length to provide the correct overlap.



3009S6MA60

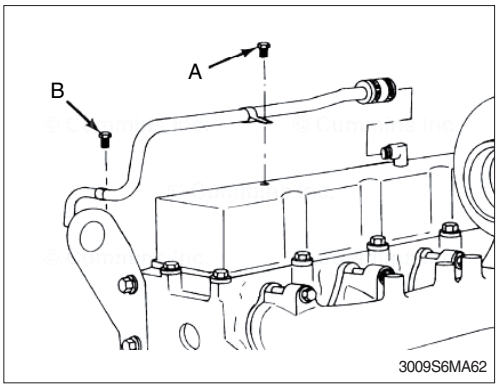
(15) Install new sealing O-rings on the capscrews.

(16) Install the valve cover and wastegate sensing tube.
· Tightening torque : 2.45 kgf·m (18 lbf·ft)

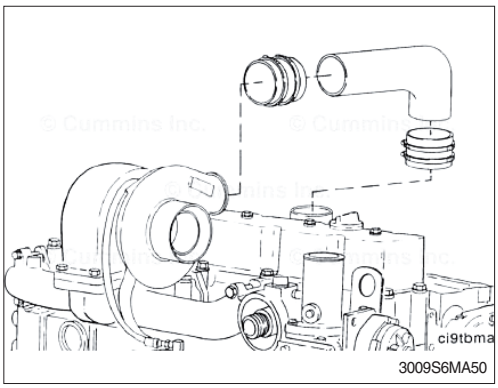


3009S6MA61

(17) Install the crankcase vent tube, and secure with the support clamps and hose clamp.
· Tightening torque
- A = 2.45 kgf·m (18 lbf·ft)
- B = 4.38 kgf·m (31.7 lbf·ft)



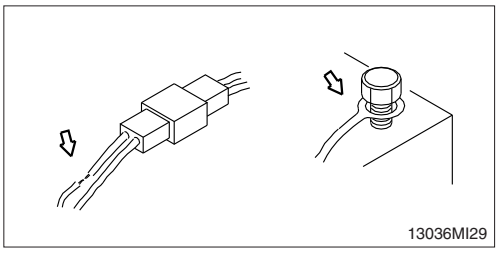
(18) Install the air crossover tube and any other parts previously removed to gain access to the valve cover.



7. ELECTRICAL SYSTEM

1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



2) BATTERY

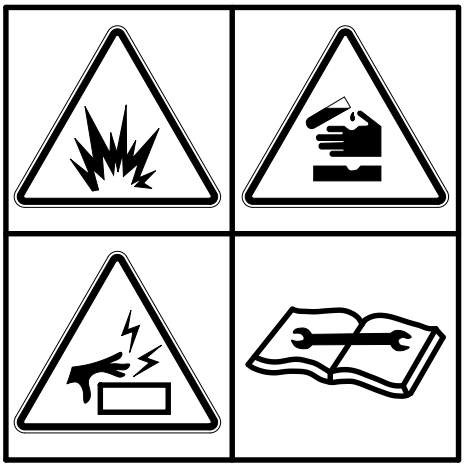
(1) Clean

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.



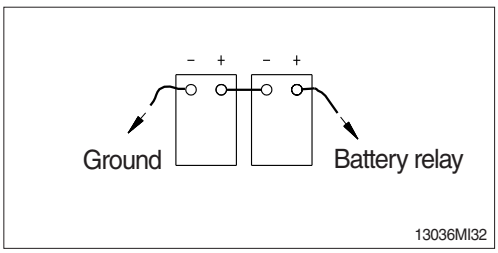
(2) Recycle

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

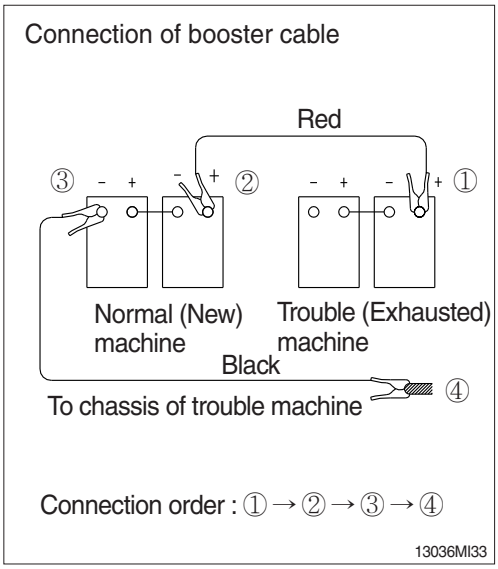
※ Use the same capacity of battery for starting.

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.

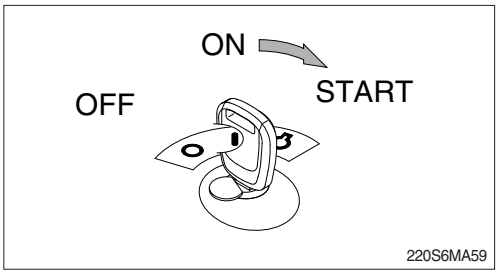


(2) Starting the engine

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.

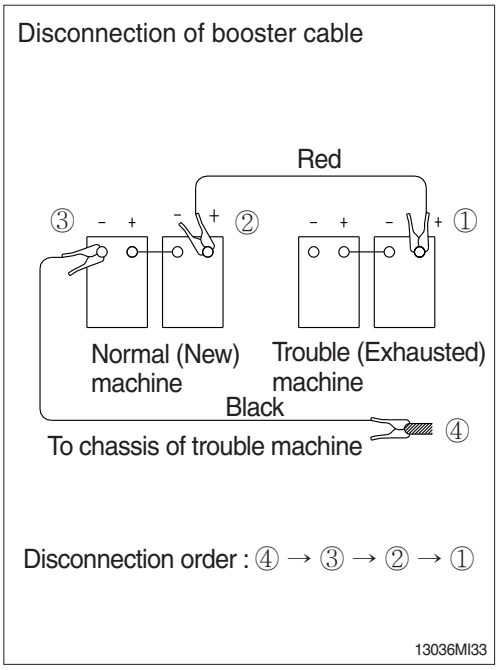
③ Run engine with high idle until charging the exhausted battery by alternator, fully.

⚠ 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.

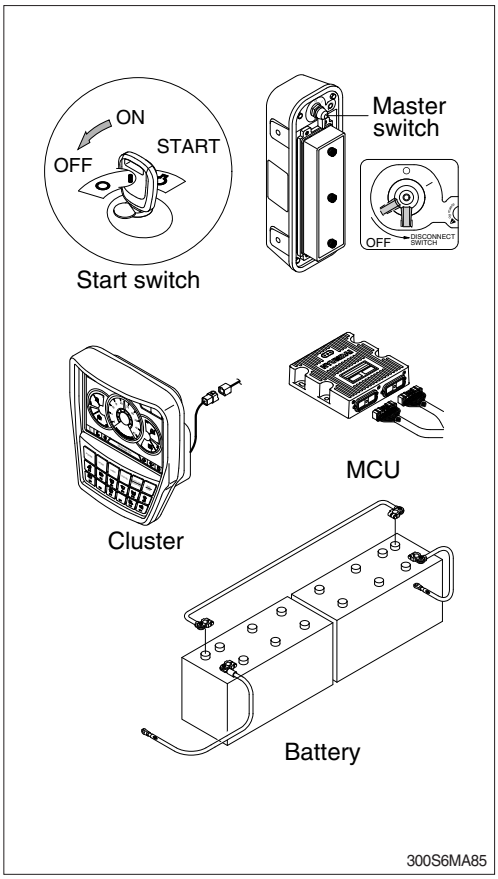
② Disconnect ground cable from battery by master switch.

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.

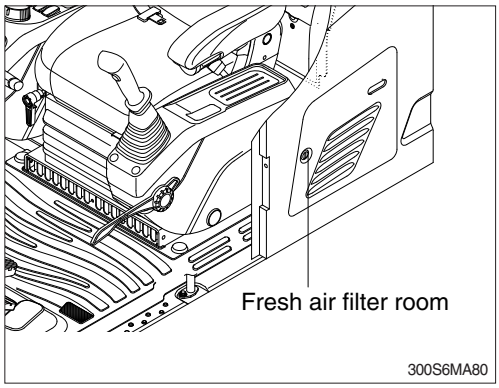


8. AIR CONDITIONER AND HEATER

1) CLEAN AND REPLACE OF FRESH AIR FILTER

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

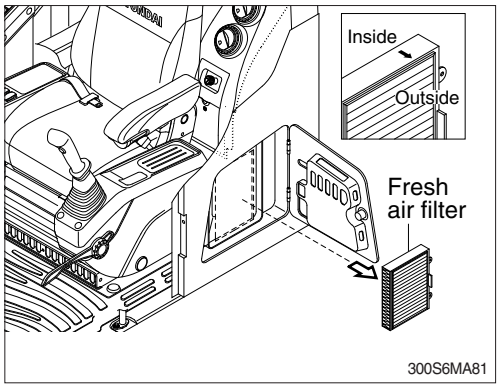
(1) Open the fresh air filter room.



(2) Remove the fresh air filter.

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

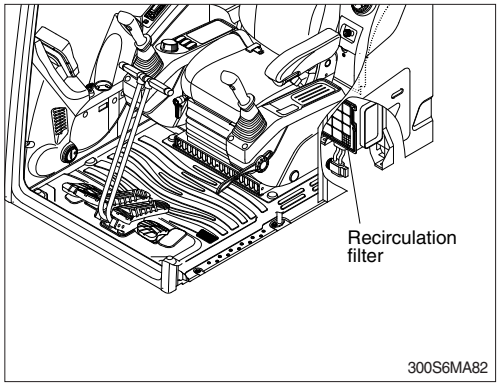
(3) If filter is damaged or badly contaminated, use a new filter.



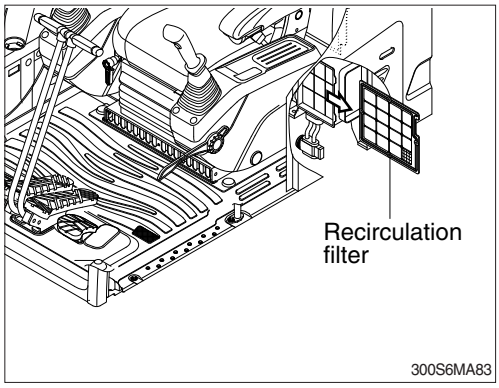
2) CLEAN AND REPLACE OF RECIRCULATION FILTER

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

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

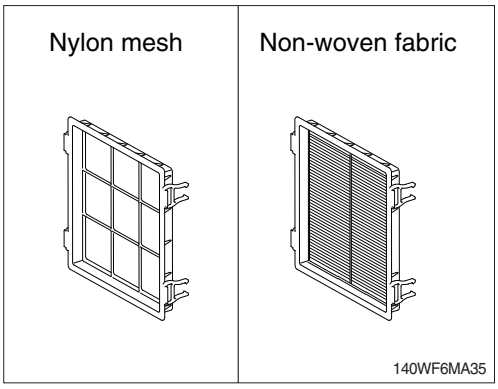


(2) Remove recirculation filter.



(3) Check the recirculation filter type.

(4) Non-woven fabric type (if equipped)
- If filter is damaged or badly contaminated, use a new filter.

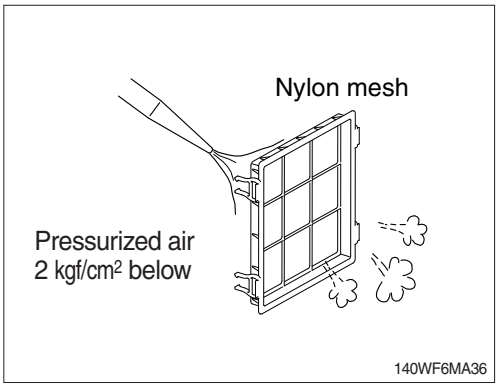


(5) Clean the recirculation filter using a pressurized air (below 2 kgf/cm², 28 psi) or washing with water.

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

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

(6) 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.(if equipped)	
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.	

1. SELECTING HYDRAULIC BREAKER

※ **Read safety hints in this manual and breaker & quick coupler manuals in website (Dealer Portal) before using breaker and quick coupler.**

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 is 210 kgf/cm².**

3) The pressure of the HX340HD system is 350 kgf/cm² (4980 psi).

4) Adjusting oil quantity

(1) Use the breaker mode from work tool of cluster. Use select switch to control the oil flow quantity.
· Setting oil quantity (220 lpm)

Flow set

· Max flow : Set the maximum flow for the attachment.

(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.

Oil quantity setting

300S3CD254A

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/cm² (853 psi) by installing the accumulator.**

6) Do not connect the breaker return line to the main control, 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 4 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
		1000★2	

★1 : Conventional hydraulic oil

★2 : Hyundai genuine long life hydraulic oil

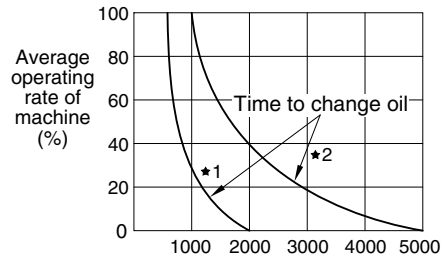
● **Replace following filter same time**

· Hydraulic return filter : 1 EA

· Pilot line filter : 1 EA

· Drain filter cartridge : 1 EA

Hyd oil change guide for hydraulic breaker



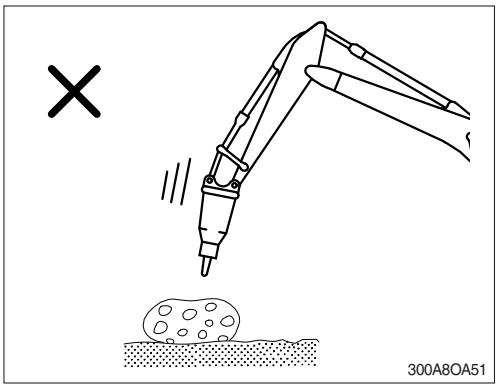
★1 : Conventional hydraulic oil

★2 : Hyundai genuine long life hydraulic oil

4. PRECAUTIONS WHILE OPERATING THE BREAKER

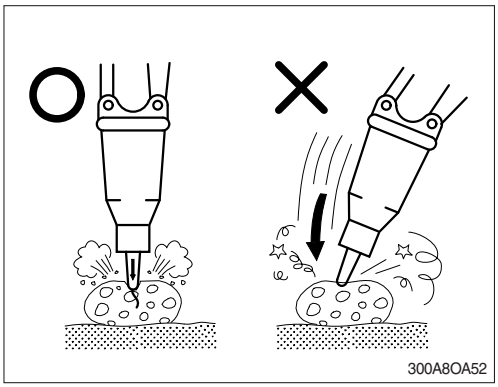
DO NOT BREAK ROCK WHILE LOWERING

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.



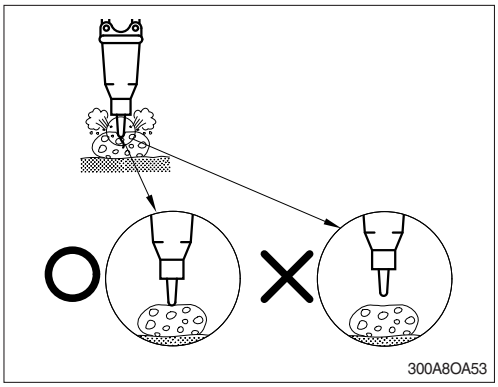
DIRECTION OF THRUST

Apply a thrust in a straight line with the tool. Place the tool on a rock with the hammering side as vertically as possible. If the hammering side is oblique, the tool may slip during hammering, causing the chisel and piston to break, or seized. When breaking, select the point of a rock on which hammering can perform stably and fully stabilize the chisel to the hammer.

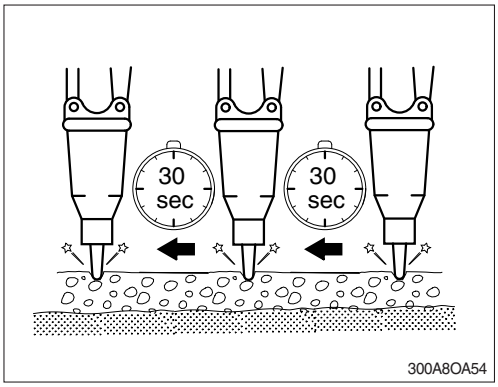


PROPER THRUST

To break effectively, a proper thrust force must be applied to the breaker. If thrust is too low, impact energy of the piston may not be sufficient to break rocks.
Breaking force is transferred to the breaker body, arm and boom resulting in damage of those parts.

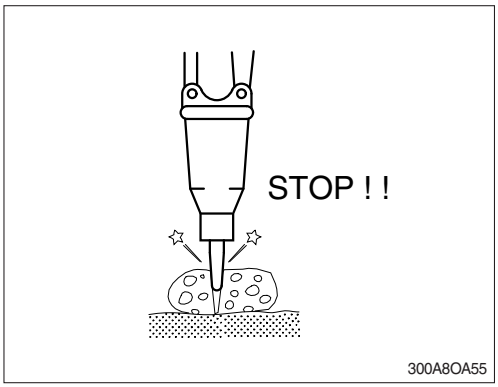


Move the impact point from the edge to the interior. Never try to break off a too large block, if the object has not broken within 30 seconds. The object should be broken up piece by piece in small blocks. Large distance steps will not improve working results.
Operating the breaker longer than 30 seconds may cause damage to the breaker.



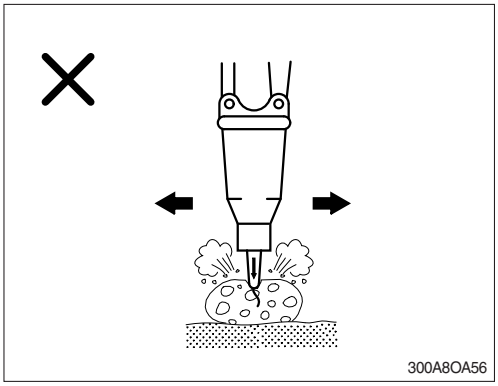
BLANKS THRUST

Blank blows, which are impact on the chisel without contact with the object, are very harmful for the breaker. Always press the chisel down onto the material before starting the breaker. And stop operation immediately as soon as the object has been broken. If operation is continued, blank blows could result in excessive wear to major components.



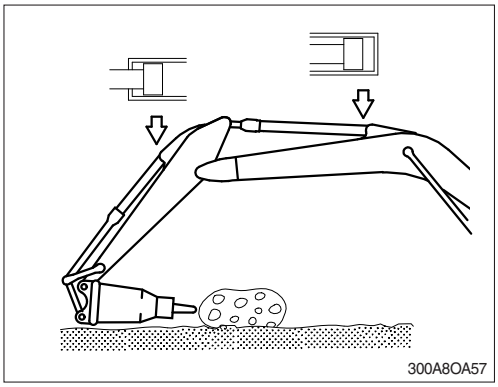
DO NOT MOVE MACHINE OR BREAKER WHILE STRIKING

Do not move hammer while striking.
This will cause damage to the working device and the swing system.



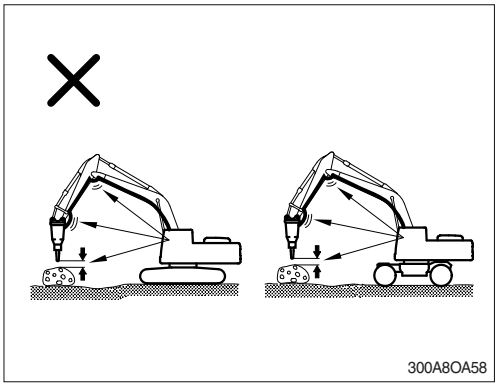
OPERATE BREAKER WITH A GAP IN EXCESS OF 100 mm (4 inches) FROM THE END OF THE STROKE TIP

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



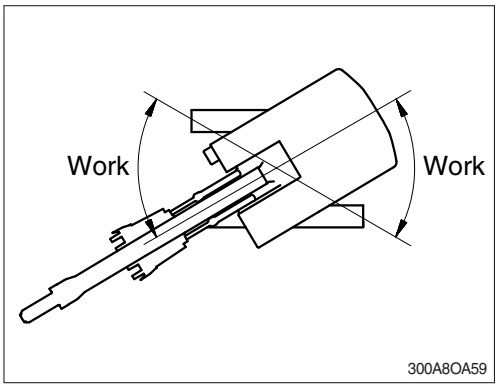
STOP THE OPERATION IMMEDIATELY IF HOSES VIBRATE EXCESSIVELY

Violent pulsations of the high / low pressure breaker hoses could indicate an accumulator fault. Check for oil leaks at the hose fitting points retightening as necessary. Should symptoms persist, contact the service shop appointed by the Hyundal dealer in your territory for repair. An excessive gap between tool and workpiece between strikes may indicate seizure of the tool in the front head. Disassemble the front head, inspect the components and repair or replace defective parts.

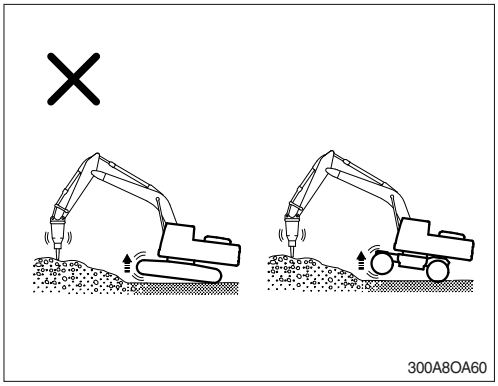


DO NOT WORK WHILE IN A SWING STATE

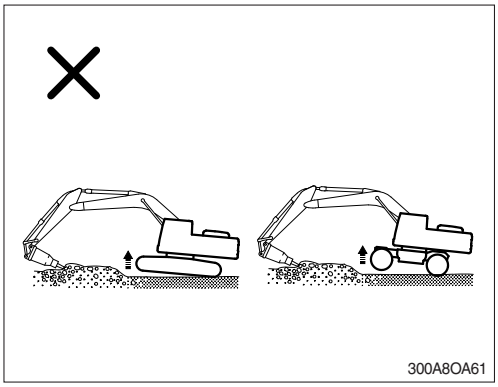
Do not work while swinging the upper structure. It cause oil leakage of the bend in the track shoe and rollers.



Conversely, if thrust is excessive or breaking is performed with boom of the lower chassis raised as shown, the machine may suddenly tip toward the movement. The breaker body may strike the broken rocks violently resulting in damage.

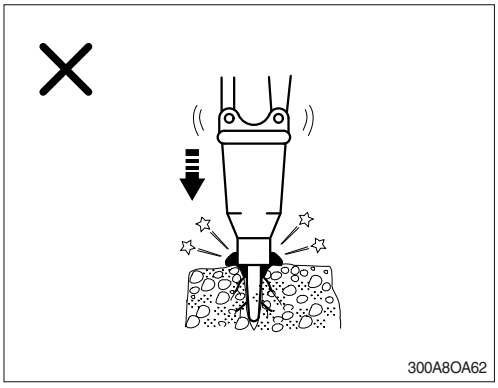


Do not extend the bucket cylinder fully and thrusting to raise the machine off the ground.



Excessive force as above may also result in vibrations being transmitted to the tracks causing damage.

Care is required to ensure adequate but not excessive force is applied to the breaker in operation.



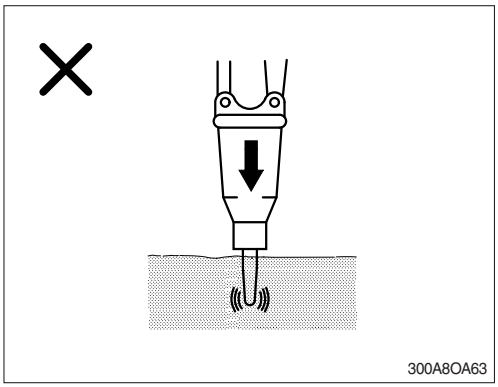
NEVER DRIVE THE CHISEL INTO THE GROUND

If the advance is too large and the chisel is not rocked to release the dust, the chisel will be driven into the material without breaking the material. This causes the chisel tip to glow red-hot and lose its hardness.

As a result, the chisel wears out more quickly. Operating in this way is not permitted.

Dust dampens impact power, when the chisel is inserted into the ground, and reduces the efficiency of the breaker. Tilt the breaker slightly backward and forward, not more than 5°, while operating so that the dust can escape.

Do not rock the breaker at angles greater than 5° or the chisel will be broken.

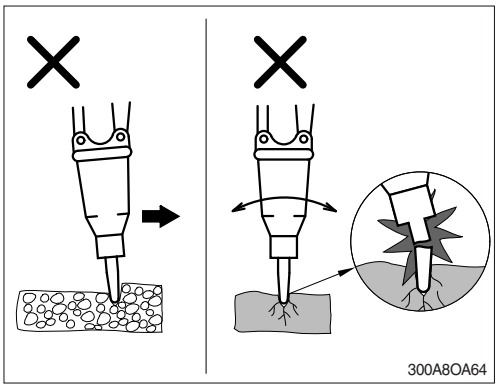


NEVER USE AS A LEVER

Do not use the chisel as a lever; e.g. crowbar, as this will cause the chisel to break.

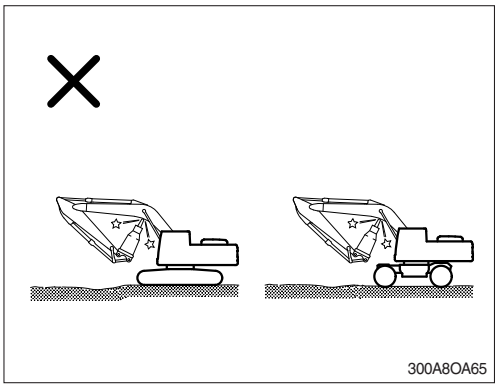
Under any circumstances, operating in this way is not permitted.

Most of bending failure of the chisel may be caused by lever action in stone that is inside hard or frozen ground. Be careful and stop operating if you feel sudden resistance under the chisel.



TAKE CARE OF CHISEL AND BOOM INTERFACE

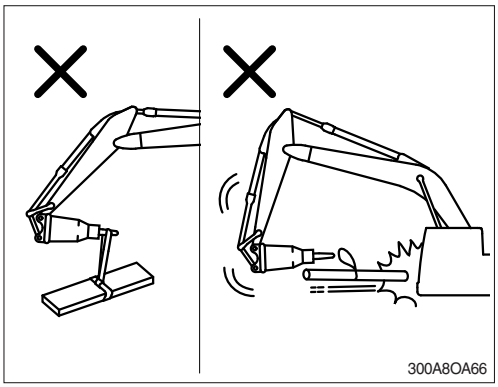
Be aware of clearance between breaker tip and the underside of boom as shown.



NEVER USE FOR LIFT OR TRANSPORT PURPOSES

The hydraulic breaker is not designed to lift or transport loads. Never use the chisel as a lifting point.

This is dangerous and could damage the breaker or the chisel.

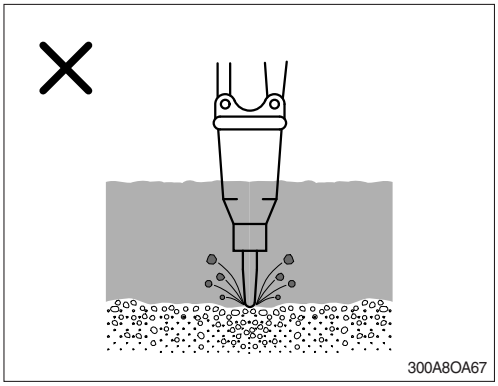


NEVER USE THE HYDRAULIC BREAKER UNDER WATER

The hydraulic breaker, as a standard assembly, never be used in or under water without prior conversion. If you use under water, water fills the impact chamber between the piston and the chisel, a strong hydraulic pressure wave is generated and will damage the seals in the breaker. And, in addition, corrosion, lack of lubrication or penetration of water could result in further damage to components of the breaker and the lower chassis.

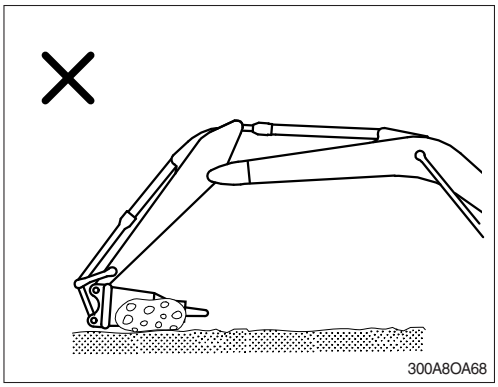
To operate the breaker under water, compressed air must be supplied into the breaker, into the impact chamber of the front-head, prior to use.

Consult your Hyundai dealer for the underwater kit.



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

This may damage the operation device and swing system.



NEVER USE THE CHISEL OR HYDRAULIC BREAKER TO MOVE ROCKS OR OTHER OBJUCTS

The hydraulic breaker is not designed for this usage.

Do not use the breaker or chisel to roll, push the object or reposition the lower chassis.

This may cause damage to the breaker and the lower chassis.