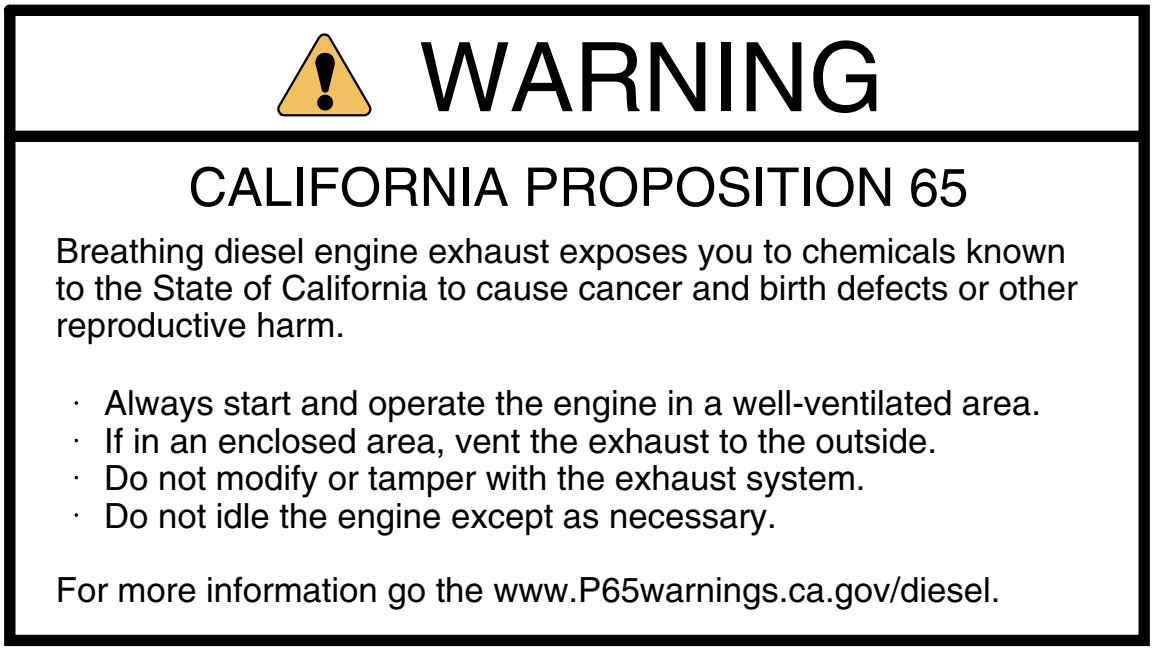

91K4-07310-EN

⚠ **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 informat ion go to www.P65warnings.ca.gov/diesel.**

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FOREWORD

This manual contains a number of instructions and safety recommendations regarding driving, handling, lubrication, maintenance, inspection and adjustment of the excavator.
This manual provides important instructions regarding the excavator, including important safety warnings and instructions for proper operation and maintenance of the excavator.

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

If you sell the machine, you must provide this manual with the excavator.

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 HD Hyundai Construction Equipment distributor for those items you require.

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

   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. Never operate the machine without the proper covers and guards in place.

2. Inspect the jobsite and follow the safety recommendations in chapter 1, Safety hints before operating the machine.

3. Use genuine HD Hyundai Construction Equipment spare parts for the replacement of parts.
   HD Hyundai Construction Equipment will not accept any responsibility for defects resulting from non-genuine parts or non workmanlike repair.
   In such cases HD Hyundai Construction Equipment 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 HD Hyundai Construction Equipment or your HD Hyundai Construction Equipment distributor for the latest available information for your machine or for questions regarding information in this manual.

EMISSION-RELATED COMPONENTS WARRANTY (USA AND CANADA ONLY)

This machine complies with all applicable Environmental Protection Agency (EPA) regulations for warranties for emission-related components. The term of this warranty is 3,000 hours or five years, whichever occurs first.

This warranty does not cover damage arising from accident, misuse or negligence, use of non-HD Hyundai Construction Equipment parts, or alterations not authorized by HD Hyundai Construction Equipment.

※ Emission-related components according to the EPA regulation.

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

BEFORE SERVICING THIS MACHINE

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

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

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

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

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

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

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

All personnel must remain alert to potential hazards.

Work within your level of training and skill.

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

Use your common sense.

EC REGULATION APPROVED

· Noise level (Directive 2000/14/EC) is as following.
  - LwA(Guaranteed) : 93 dB

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

CE

EC Declaration of Conformity

(Original instruction)

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

HD HYUNDAI CONSTRUCTION EQUIPMENT CO., LTD.

477, Bundangsuseo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea

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

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

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

2006/42/EC - Machinery directive

2014/30/EU - Electromagnetic compatibility directive

2000/14/EC - Noise emission outdoor equipment directive

2002/44/EU - Exposure of workers to vibration risks directive

their amendments, and other applicable directives.

EMC (2014/30/EU)

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

Noise levels (2000/14/EC)

Certificate number:	**********
Date:	DD/MM/YYYY
Conformity assessment proc.:	Annex VIII Full Quality Assurance
Notified body:	**********
	**********
Measured sound power level:	nnn.n dB(A)
Guaranteed sound power level:	nnn.n dB(A)

Engine information

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

Harmonized standards, other technical standards and specifications applied:

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

****

Managing Director

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

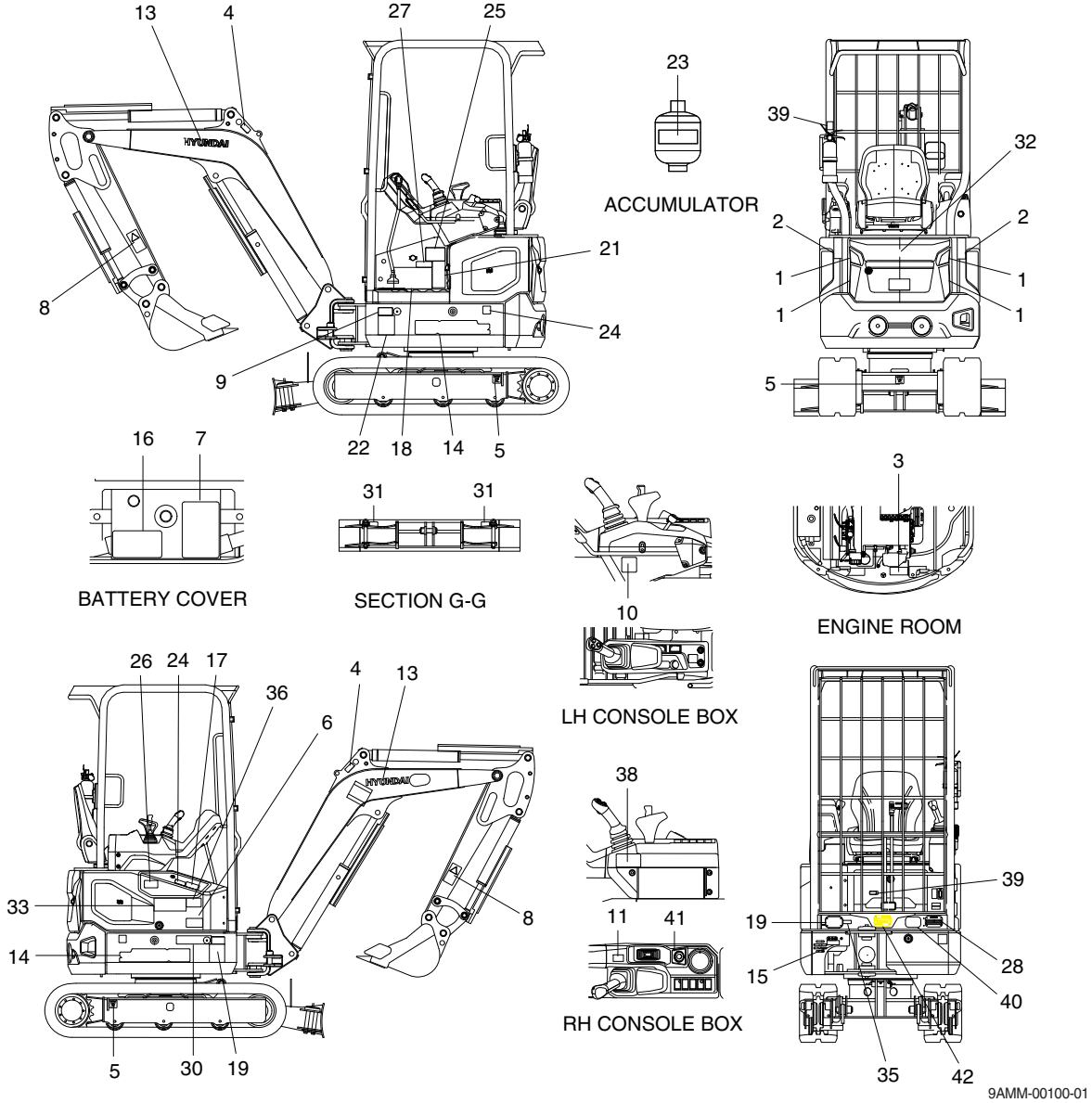
TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

Machine Serial No.	
Engine Serial No.	
Manufacturing year	
Manufacturer Address	HD Hyundai Construction Equipment Co., Ltd. 477, Bundangsuseo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
Distributor for U.S.A Address	HD Hyundai Construction Equipment Americas, Inc 6100 Atlantic Boulevard Norcross GA 30071 U.S.A
Distributor for Europe Address	HD Hyundai Construction Equipment Europe N. V. Hyundailaan 4 3980 Tessenderlo Belgium
Dealer Address	

SAFETY LABELS

1. LOCATION

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



1	Reflecting	15	Grease	29	ROPS plate
2	Keep clear (side)	16	Electric welding	30	General caution (frame)
3	Engine room caution	17	Fueling	31	Lifting point/tie down
4	Lifting point	18	Service instruction	32	Hyundai logo (engine hood)
5	Tie	19	Noise level	33	Bio oil
6	High pressure	20	Lifting chart kit	34	Ultra low sulfur diesel
7	Battery accident	21	General caution (canopy)	35	EMC
8	Keep clear (attach)	22	Pattern change	36	California 65 caution
9	Change way	23	Accumulator	37	ECU/MCU connector
10	Console tilting	24	Battery position	38	Caution key
11	Dozer control ideogram	25	Control ideogram	39	Fire extinguisher
12	Engine control ideogram	26	Fuel shut-off	40	Exemption plate
13	Hyundai logo (boom)	27	Water separator	41	Key box
14	Model name	28	Name plate	42	FOG plate

2. DESCRIPTION

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

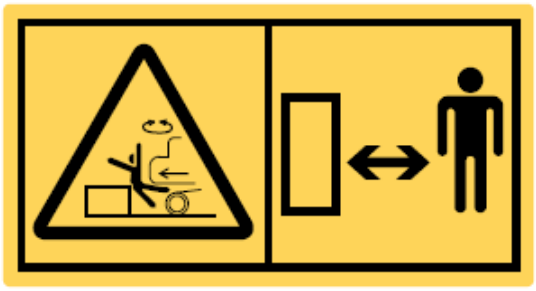
Replace any safety label that is damaged, or missing.

1) **KEEP CLEAR (SIDE)** (item 2)

This 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.**



94MS-07010

2) **ENGINE ROOM CAUTION** (item 3)

This label is positioned inside engine room.

⚠ **Do not open the engine hood while the engine is running.**

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

※ **Study the service manual before service job.**

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

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

⚠ **Relieve all pressure before disconnecting any hydraulic, coolant or fuel lines etc.**

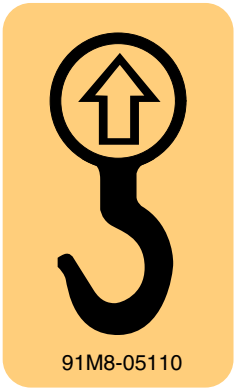
⚠ **Study the operator's manual before starting and operating machine.**

9BMM-07110

3) **LIFTING POINT** (item 4)

This label is positioned on the both sides of the boom.

※ **In order to lift the machine, attach the lifting devices to the lifting points.**



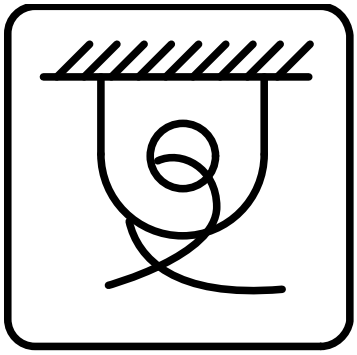
91M8-05110-00

4) **TIE** (item 5)

This label is positioned on the LH, RH and rear sides of the lower frame.

※ **Never tow the machine using tie down eyelet as it may break resulting in personal injury or death.**

※ **See page 4-10 for detail.**



91N6-05120

5) **HIGH PRESSURE** (item 6)

This label is positioned on the RH side cover.

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

⚠ **Relieve all pressure before disconnecting any hydraulic, coolant or fuel lines etc.**

※ **See the maintenance section for details.**

94K8-01110

6) BATTERY ACCIDENT (item 7)

This label is positioned on the battery cover.

⚠ Electrolyte containing sulfuric acid can cause severe burns. Avoid allowing contact with the skin, eyes or clothes. In the event of accident flush with sufficient water and contact a physician immediately.

Failure to comply may result in serious injury or death.

※ 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 allow any open flames or excessive heat near or when checking the battery.

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

⚠ To prevent electric shock, do not touch battery terminal with wet hands.

94MT-02120

7) KEEP CLEAR (ATTACH) (item 8)

This label is positioned on both sides of the arm.

⚠ Serious injury or death can result from a falling attachment

⚠ To prevent serious injury or death, do not walk near, under implements or attachments.

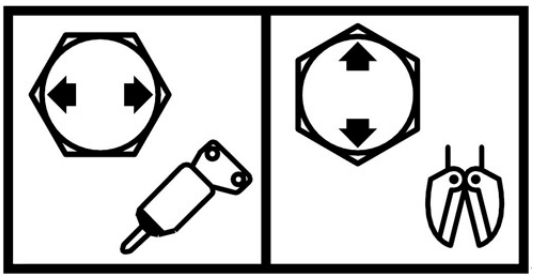
This applies when machine is in use, the implements are suspended in air or while the machine is being worked on.

91MJ-06112

8) **CHANGE WAY** (item 9)

This label is positioned on the LH frame cover.

※ **See page 4-27 for details.**



97MJ-03110

9) **CONSOLE TILTING** (item 10)

This label is positioned on the left side of the LH console box.

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

91M8-07300-00

10) **DOZER CONTROL IDEOGRAM** (item 11)

This label is positioned on the top side of the RH console box.

※ **See page 4-7 for details.**

※ **Guidlines for using the general dozer blade.**

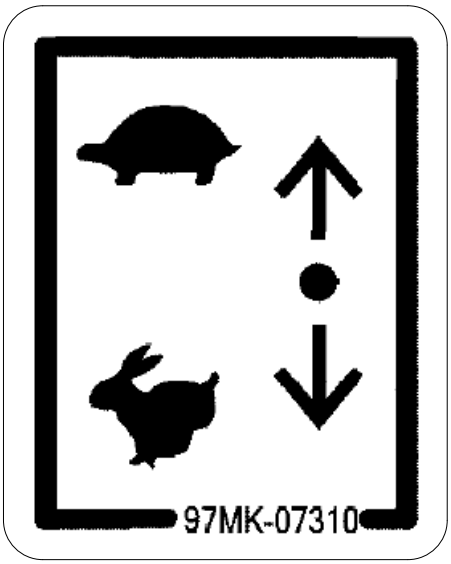
- **Be careful not to apply an excessive load when using a blade.**
- **Avoid impacts and loads on the bottom due to machine modification or excessive working conditions.**
- **Check the BLADE UP status before traveling the machine.**
- **Avoid any collision with the upper working device and the blade.**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

91M9-07391

11) **ENGINE CONTROL IDEOGRAM** (item 12)

This label is positioned on the top side of the LH console box.

※ **See page 3-12 for details.**



97MK-07310

12) **ELECTRIC WELDING** (item 16)

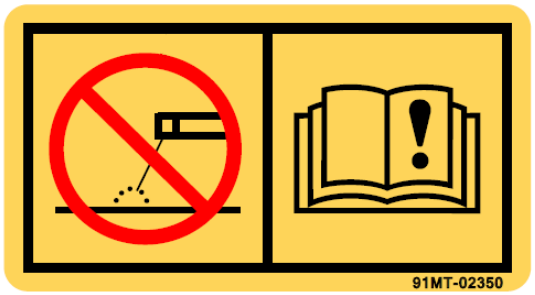
This label is positioned on the battery cover.

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

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

※ **Be sure to remove paint where ground will be applied to ensure proper grounding of welder. Once welding is complete, clean and repaint area.**

※ **See page 6-36 for detail.**



91MT-02350

13) **FUELING** (item 17)

This label is positioned on the RH side cover.

⚠ **Stop the engine when refueling. Any lights or flames must be kept at a safe distance while refueling.**

※ **Use ultra low sulfur fuel only.**

※ **Ultra low sulfur fuel**
sulfur content ≤ 10 ppm

91MT-01130

14) GENERAL CAUTION (CANOPY) (item 21)

This label is positioned on the inner cover of the hydraulic oil tank.

⚠ Serious injury or death can result from contact with electric lines.
It is possible to receive shock by merely coming into the vicinity of electric lines, the minimum distance based on supply voltage should never be exceeded.
Refer to page 1-17.

⚠ Serious injury or death can result from dropping bucket.

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

⚠ Be careful to operate machine equipped with quick coupler or extensions.

⚠ Bucket may hit canopy or boom, boom cylinders when it reached vicinity of them.

91M9-07243

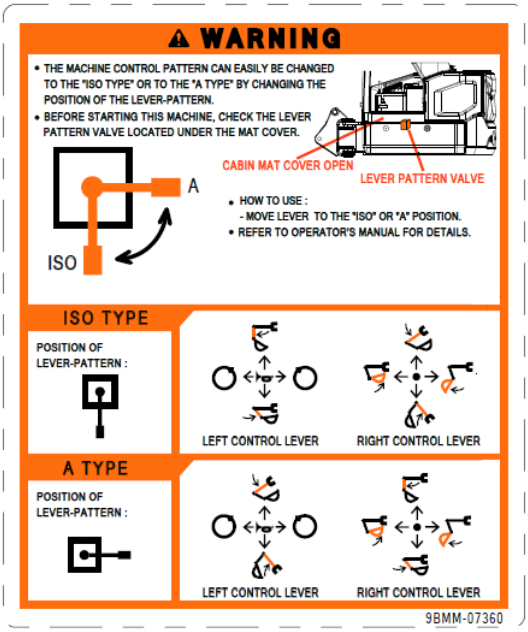
15) PATTERN CHANGE (item 22)

This label is positioned on the LH frame cover.

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

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

※ See page 4-21 for details.



9BMM-07360

16) **ACCUMULATOR** (item 23)

This 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 holes in the accumulator or expose it to open flame or fire.**

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

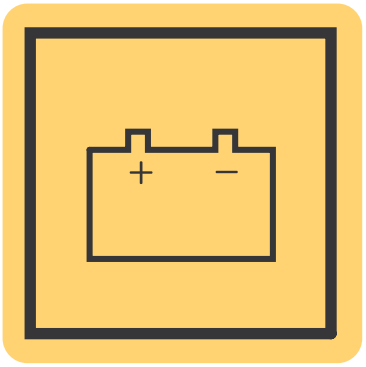
※ **When carrying out disassembly or maintenance of the accumulator, or when disposing of the accumulator. It is necessary to release the gas from the accumulator. A special air bleed valve is necessary for this operation, so please contact your HD Hyundai Construction Equipment distributor.**

91N6-03201

17) **BATTERY POSITION** (item 24)

This label is positioned on the LH frame cover.

※ **See page 6-34 for the battery handling.**



38090FW03

18) **CONTROL IDEOGRAM** (item 25)

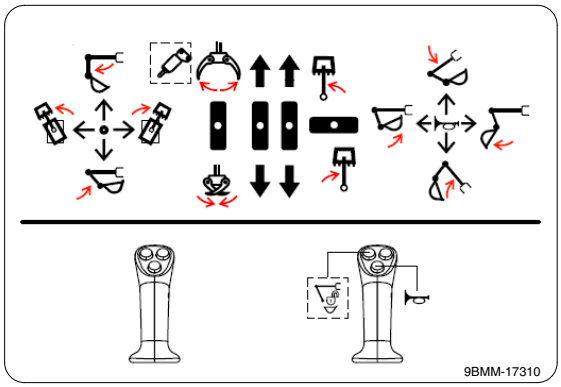
This label is positioned on the inner cover of the hydraulic oil tank.

⚠ **Always ensure the label matches the control pattern. If it does not, replace label with appropriate control pattern label.**

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

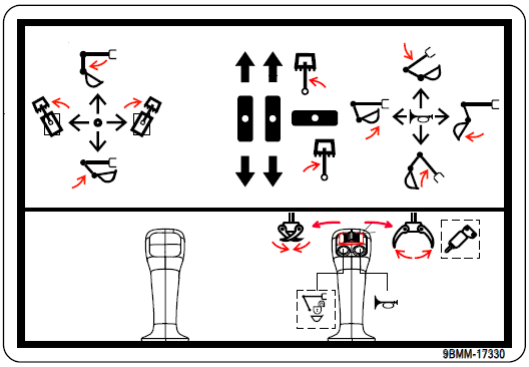
※ **See page 4-7 for details.**

Without proportional



9BMM-17310

With proportional

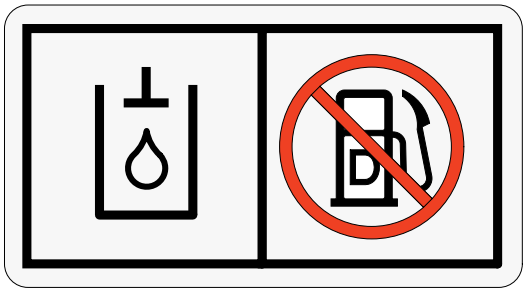


9BMM-17330

19) **FUEL SHUT-OFF** (item 26)

This label is positioned on the RH side cover.

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



140WH90FW51

20) **WATER SEPARATOR** (item 27)

This label is positioned on the inner cover of the hydraulic oil tank.

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

91Q4-07180

21) **GENERAL CAUTION (FRAME)** (item 30)
This warning label is positioned on the RH side cover.

⚠ **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 5-4 for details.**

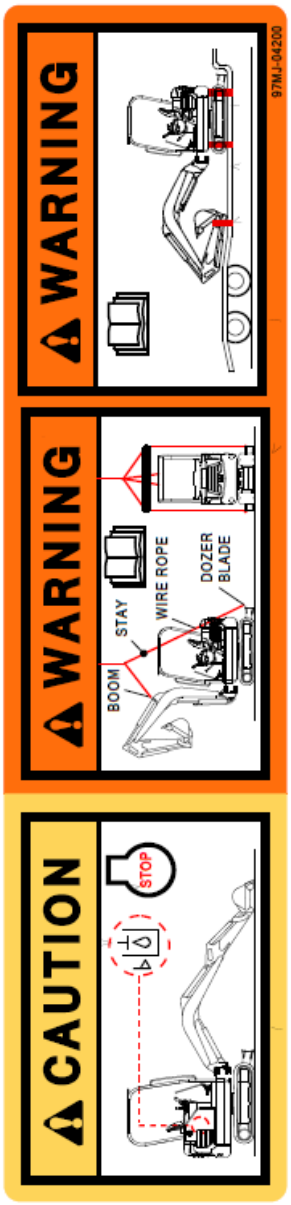
⚠ **Make sure wire rope is proper size and keep correct hoisting method.**

※ **See page 5-5 for details.**

⚠ **Place the bucket on the ground whenever servicing the hydraulic system.**

※ **Check oil level on the level gauge.**

※ **Refill the recommended hydraulic oil up to specified level if necessary.**

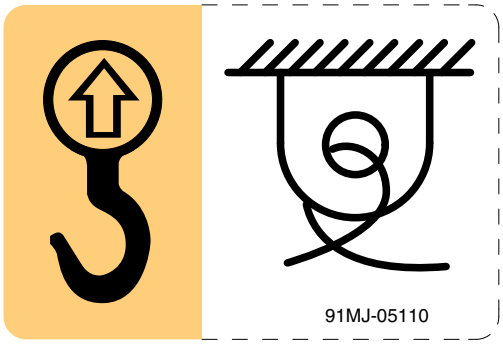


97MJ-04200

22) **LIFTING POINT/TIE DOWN** (item 31)

This label is positioned on the LH and RH sides of the dozer blade.

- **Lifting point**
  In order to lift the machine, attach the lifting devices to the lifting points.
- **Tie down**
  In order to tie down the machine, attach the tie-downs to the tying points.



91MJ-05110-00

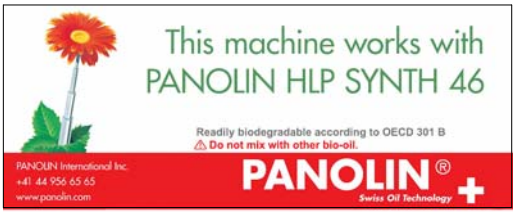
23) **BIO OIL** (item 33)

This label is positioned on the RH side cover.

※ **This machine works with PANOLIN HLP SYNTH 46.**

※ **Readily biodegradable according to OECD 301 B.**

△ **Do not mix with other bio-oil.**



94MJ-99110

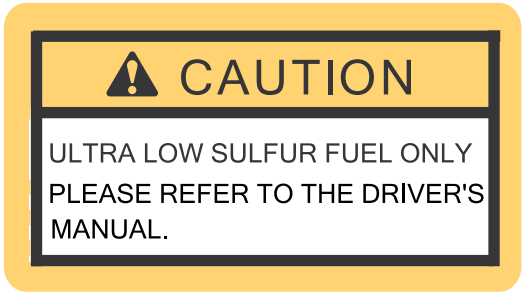
24) **ULTRA LOW SULFUR DIESEL** (item 34)

This label is positioned on the RH side cover.

※ **Use ultra low sulfur fuel only.**

※ **Ultra low sulfur fuel**
sulfur content ≤ 10 ppm

※ **If ultra low sulfur diesel is not used, the aftertreatment diesel particulate filter can be damaged.**



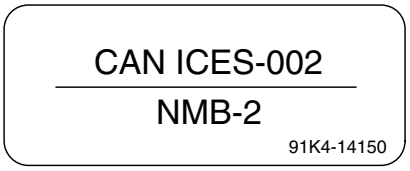
2609A0SL03

25) **EMC** (item 35)

This label is positioned on the front side of the upper frame.

※ **This machine complies with the EMC directive ICES-002.**

※ **EMC : ElectroMagntic Compatibility**



91K4-14150

26) CALIFORNIA 65 (item 36)

This warning label is positioned on the RH side cover.

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

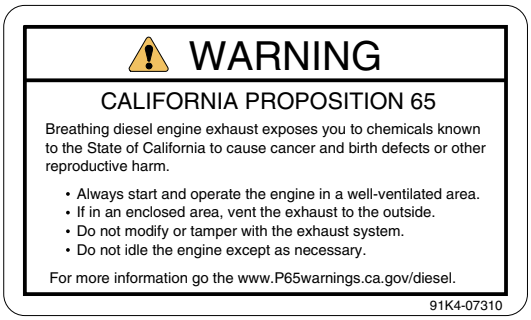
(1) Always start and operate the engine in a well-ventilated area.

(2) If in an enclosed area, vent the exhaust to the outside.

(3) Do not modify or tamper with the exhaust system.

(4) Do not idle the engine except as necessary.

※ **For more informat ion go to www. P65warnings.ca.gov/diesel.**



91K4-07310

27) MCU/ECU CONNECTOR (item 37)

This label is positioned on the storage box cover.

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

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

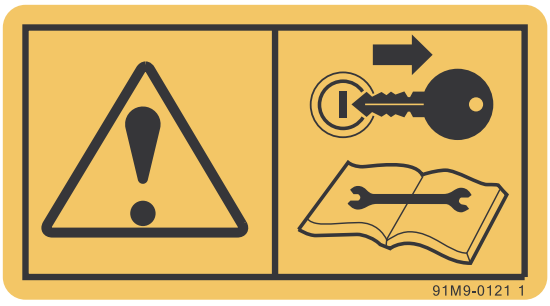
91Q4-15860

28) CAUTION KEY (item 38)

This label is positioned on the left side of the RH console box.

⚠ **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.**



91M9-01211-00

29) **FIRE EXTINGUISHER** (item 39)

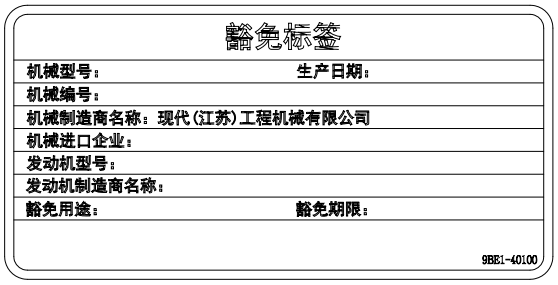
This label is located on the rear side of the canopy outside.

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

91Q6-07290

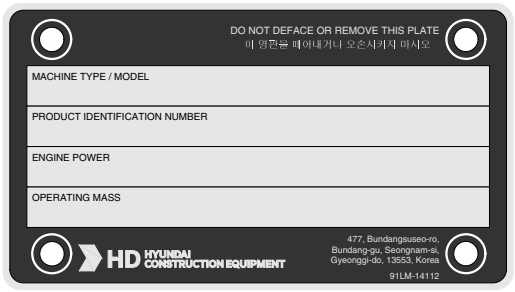
30) **EXEMPTION PLATE** (item 40)

This label is positioned on the front lower side of outside the cab.



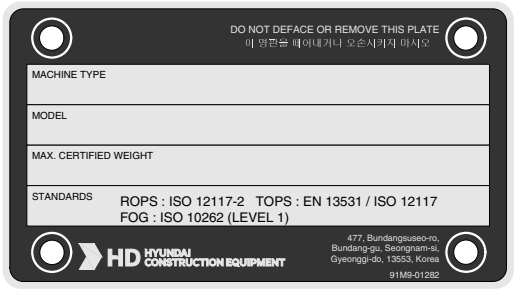
9BE1-40100

MACHINE DATA PLATE



For general

For EU only



For ROPS

For FOG

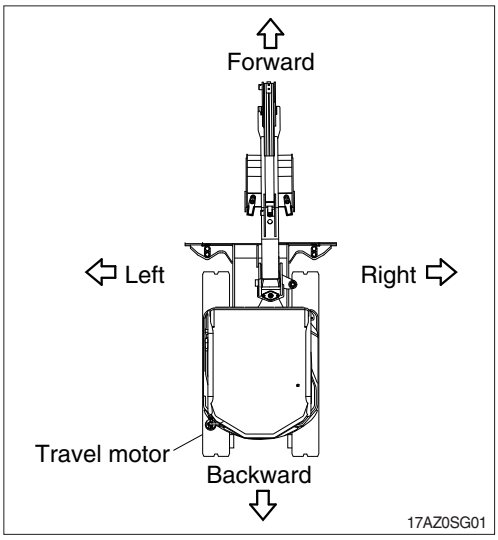
35AZ0MD01

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

GUIDE

1. DIRECTION

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

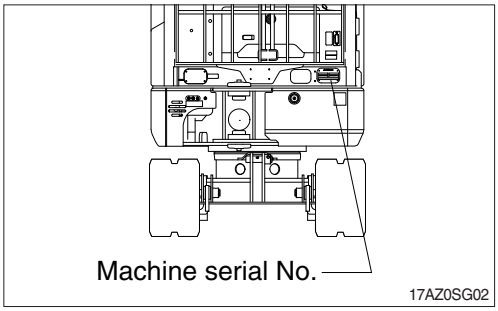


2. SERIAL NUMBER

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

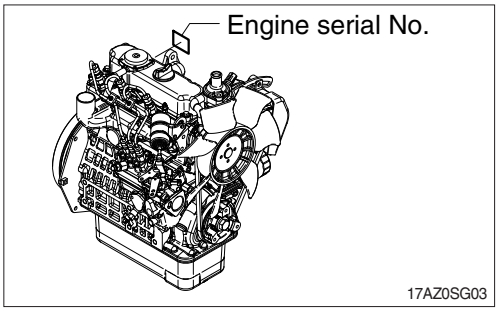
1) MACHINE SERIAL NUMBER

The numbers are located front of the canopy.



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.

1. 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.

2. SAFETY INSTRUCTIONS

Safety Message

Intended Use

Machines should be operated in accordance with the procedures described in the operator manual.
The products described in the operator manual are designed and manufactured mainly for the following purposes:

- Excavation work
- Loading work
- Leveling work
- Drainage work
- Lifting work
- Demolition work

Do not operate the machine for any purpose other than those stated above or in areas where potential hazards have been identified. Make sure that you comply strictly with all safety instructions at all times. Please contact HD Hyundai Construction Equipment Co., Ltd. or your local dealer for more information.

HD Hyundai Construction Equipment strictly prohibits the use or operation of the machine in any of the following circumstances:

- Operation by an unskilled worker
- Lifting a worker up
- Transporting flammable or dangerous materials
- Driving down or extracting piles with the bucket
- Towing damaged vehicles

Safety guidelines

Most safety accidents related to the operation, maintenance/ inspection, and repair of the machine result from a failure to comply with the safety instructions or to take adequate preventive measures. Safety accidents can be prevented by eliminating potentially hazardous situations. The operator should attend all mandatory training courses on the operation of the machine, and fully understand how to use the tools.

Improper operation, refueling, inspection or repair of this machine may cause serious injury or death.
Do not attempt to operate, refuel, inspect or repair this machine before reading and understanding the product information on such tasks.
This manual describes preventive measures and warnings about the product.
Failure to comply with the warnings about potential risks may result in serious injury or death.

General Safety Information

Unauthorized modification

Any attempt to modify the machine, including the use of unauthorized accessories or spare parts, may have adverse effects on the conditions of the machine and its ability to function as it was designed.
Do not attempt to modify the machine in any way without advanced written consent of the company.
Unauthorized modification will void the manufacturer's warranty.

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

The user is responsible for all damages and liabilities resulting from unauthorized modifications.
The attachment, the accessory, or the spare part has been made or distributed by HD Hyundai Construction Equipment and has been installed according to approved methods described in a publication available from HD Hyundai Construction Equipment.
Any modification must be approved by the company in writing.

ROPS/FOPS

The cabin is designed to provide sufficient space to minimize impacts pursuant to ISO 12117-2 of Rollover Protective Structures (ROPS). If any additional devices are installed that exceed the Max. certified weight indicated on ROPS name plate, the ROPS certification may be nullified. The protective structure of the cabin should be replaced immediately if it is permanently deformed or damaged.

Machines operated in areas where there is a risk of objects falling onto the cabin are fitted with a Falling Object Protective Structure (FOPS) pursuant to ISO 10262.

Fire and Explosion

Preventing fires

The following actions should be taken to minimize the risk of fire:

- Do a visual inspection before operating the machine to check for any risk of fire.
- Do not operate the machine if there is a risk of fire.
- Be sure to identify the primary exit and alternative exit of the machine, and fully understand how to use the exits in the event of a fire.
- Do not perform any welding or drilling work on the engine cover.
- Keep the engine compartment free from the build-up of flammable materials such as dead leaves, small branches, paper, and other types of trash.
- Keep the covers of the major parts of the machine closed. Make sure that the covers operate normally in order to be able to use firefighting equipment in the event of a fire.

- Be careful when handling fuel. Fuel is a highly flammable.
- Always stop the engine when refueling the machine.
- Refuel outdoors.
- Remove any build-up of flammable materials from the machine.
- Do not operate the machine near a flame.

- All fuels and most lubricant and coolant mixtures are flammable materials, so special care should be exercised when handling such materials to prevent fire and explosion.
- Keep all fuels and lubricant in adequate containers.
- Never smoke in the area where refueling is taking place or in the space for handling battery electrolytes and other flammable materials.
- Oil leaked to a hot surface or electronic component may cause a fire.
- Do not operate the machine if there is an oil leak. Repair the source of the oil leak, and wipe clean any leaked oil before operating the machine.
- Always clean all electrical lines, connectors, and clamps, and check whether they are securely connected on a regular basis.
- If any electrical wire or connector is loose or damaged, repair it immediately.

- Do not weld, cut or use a cutting torch through any tubes or lines in which flammable flows. Check all tubes and lines for signs of abrasion or deterioration and replace if damaged.
- Dust or particles generated when repairing the non-metallic hood or fender are flammable or explosive. Repair such parts in a well ventilated area well away from flames or sparks, and be sure to wear suitable PPE (Personal Protective Equipment).

Preventing explosions

The following actions should be taken to minimize the risk of explosion:

- Never use starting aid fluid in a low-temperature environment as it can have an adverse effect on the engine performance and may cause an explosion.
- Do not attempt to charge a frozen battery. Forcibly charging a frozen batte ry may result in an explosion.
- Use caution when handling the batteries. Never let a tool make contact with the positive battery post and the frame of the machine simultaneously.
  Sparks may be generated, resulting in an explosion.

- Only charge the battery with a charger of equal voltage. Incorrect voltage may cause overheating and explosion.
- Do not use or charge the battery if the level of electrolytes in the battery is low.
  Regularly check the electrolyte level, and refill with distilled water to the maximum level.

- Do not attempt to start the engine using an unsuitable booster cable as it may result in an explosion and serious injury or death.
  Only use the booster cable to start the engine in a well ventilated open space. Starting the engine with a booster cable may generate flammable gas.
- When hydraulic equipment and piping are overheated, flammable gas or airborne particles may explode. Protect and insulate such parts to prevent overheating.

Corrective Actions Before and After a Fire

In the event of a fire in the machine, the top priority should be the safety of the operator and workers in the work area. In the event of a fire at a level that does not endanger the operator or workers, the following actions should be taken:

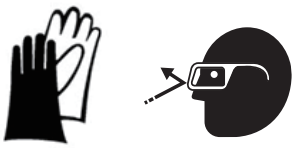
- Move the machine well away from any flammable materials (e.g., fuel, engine oil, clothes, and bits of wood) and adjacent buildings.
- If the engine is running, it may cause a persistent fire. Immediately stop the engine.
- In the event of an electric short, disconnect the batteries to eliminate the main ignition source.
  In the event of an electricity leak resulting from damage to the power wiring caused by fire, disconnect the batteries to eliminate the secondary ignition source.

If a fire becomes too large to control, assess the following risks:

- The tank, accumulator, hose and fitting may burst into flames, splashing fuel and scattering particles throughout the surrounding area.

If you have to handle a machine that has been damaged by fire or one that is exposed to excessively high heat after extinguishing a fire, take the following precautions:

- Wear thick protective gloves and protective goggles.
- Never touch any materials left after combustion with your bare hands.
- Avoid contact with melted polymer materials (e.g., plastics).



Information on fire extinguisher

Fire extinguishers (if equipped) should be kept in a fully operable condition, and be inspected by a qualified person on a regular basis. Workers should complete a training course on the use of fire extinguishers in advance.

Use fire extinguishers in accordance with the following procedures, if required:

① Pull the safety pin of the fire extinguisher first.
② Extend the nozzle, and stand toward the fire.
③ Aim the nozzle at the flames, and firmly press the top and bottom handles.
④ Stand in a downwind position, and evenly spray the foam over the flames.

If the weight of the fire extinguisher exceeds 4.5 kg, mount the extinguisher in a location near the bottom of the cabin. Do not mount the fire extinguisher at a level higher than one third of the height of the cabin.

Do not weld or drill ROPS to mount a fire extinguisher. Contact your dealer or distributor for more information about the correct mounting of fire extinguishers.

Health and Safety

Personal protective equipment

The wearing of personal protective gear is mandatory for protecting the human body from hazardous chemicals and hazardous environments.

The wearing of personal protective gear is a means of preventing injury, and should not interfere with the performance of jobs. It is designed to protect the human body from hazardous environments and hazardous materials, and should be kept in an easily accessible place.

List of personal protection gear

Name	Symbol	Remarks
Safety helmet		Protects the head from falling objects, and reduces risks when falling down.
Dust mask		Air-purifying dust mask should not be worn in workplaces with an oxygen concentration of less than 18%.
Gas mask		Prevents the inhalation of mist, airborne particles, or protects against the spray of hazardous chemicals.
Welding helmet		Blocks airborne dust and slag, and shields the face from bright light during welding.
Protective clothing		Blocks dust, mist and hazardous chemicals, and protects against burns.
Protective gloves		Electric insulation gloves: Should be worn when working in areas with a high risk of electric shock. Chemical protective gloves: Should be worn when working in areas where there is a risk of contact with hazardous chemicals including materials leaked from batteries.
Protective goggles		Protects the eyes from dust, particles and airborne materials in work areas.
Earplugs and earmuffs		Wear earplug and earmuffs separately or in combination depending on the level and duration of noise.
Safety shoes		Protects the feet from falling objects, impacts, and sharp objects.

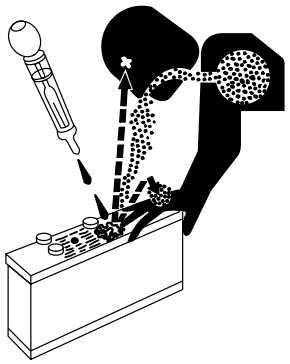
Health and safety instructions in hazardous environments

Comply with the following instructions during operation and maintenance of the machine.

When handling oil

Failure to wear personal protection may result in burns caused by contact with a high-temperature liquid. Make sure you wear protective goggles, protective gloves and protective clothing when handling oils such as hydraulic oils and engine oil.
If the eyes come into contact with oil, wash them with a sufficient quantity of water for 15 minutes or longer. If the skin comes into contact with oil, take off contaminated clothes and shoes, and wash the skin with soap and water for 15 minutes or longer.

When handling the battery



If battery electrolyte leaks while handling the battery, the sulfuric acid contained in the electrolyte may cause burns.
The lead components in battery electrolyte are toxic, so be sure to wear protective gloves and protective clothing.
Always wash your hands after handling the battery.
If a part of your body not protected by personal protective equipment comes into direct contact with battery electrolyte, immediately wash the affected part with flowing water for 20 minutes or more, and then see a doctor without delay.
If you accidentally swallow battery electrolyte, drink water, do not forcibly induce vomiting, and immediately seek medical help.

When handling refrigerant

Always wear protective goggles, protective gloves and other personal protective equipment when handling refrigerant to prevent direct contact of the skin with the refrigerant.
Wear protective gloves made of materials that are resistant to chemicals (such as neoprene and butyl rubber).
Never smoke when handing refrigerant.
If refrigerant comes into direct contact with the skin, wash the skin with warm water immediately.

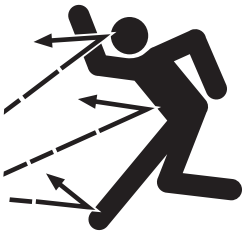
When handling coolants

Do not remove the radiator cap after operation of the machine until the engine has cooled and the pressure has dropped to a safe level. Failure to comply may result in serious burns.

Coolant contains toxic and combustible ethylene glycol, and should be handled in a cool, well-ventilated place only when wearing protective goggles, protective gloves, protective clothing, and a gas mask.
Avoid inhaling airborne particles or spray from coolant. If the substances make contact with skin or eyes, immediately wash the skin and eye with flowing water for 20 minutes or longer.

When working in a place subject to airborne particles and falling objects,

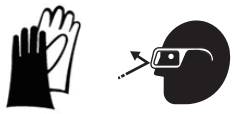
Always wear a safety helmet, protective goggles and safety shoes to prevent injury from airborne particles and thrown or falling objects. Earplugs or earmuffs may be necessary when working in a noisy place.



When working in places with a high level of noise

When the operator is exposed to the noise exceeding 90 dB (A) for 8 hours or longer, wear earplugs or earmuffs.

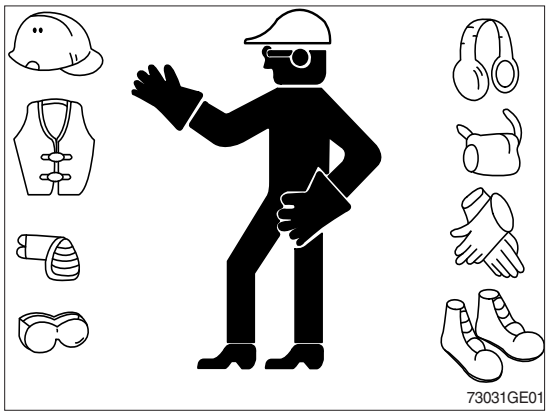
Personal protection gear for various situations

Situation	Symbol
Oil handling	
Battery handling	
Refrigerant handling	
Coolant handling	
Repair by welding	
Working in areas subject to airborne particles and falling objects	
Working in places with a high level of noise	
Handling machines damaged by fire or exposed to excessively high temperature	

WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.

- Do not wear loose clothing and accessories. Secure long hair. These items can snag on controls or on other parts of equipment.
- Do not wear oily clothes. They are highly flammable.
- Wear a hard hat, safety shoes, safety goggles, mask, leather gloves, earplugs and other protective equipment, as required.
- While working on machine, never use inadequate tools. They could break or slip, or they may not adequately perform intended.



Noise and Vibration

Information on vibration

This part describes the vibration data of the machine, and methods of calculating the vibration level.

The vibration level of the machine varies according to any of the following conditions:

- Driving habits of the operator
- Quality of seat and suspension
- Type of machine, attachments, and conditions of machine
- Conditions of work site, working environment, ground surface conditions, and weather

Vibration also varies according to the duration of operation.

Physical Agents Directive 2002/44/EC defines the exposure action value as 0.5 m/s^2, and the exposure limit value as 1.15 m/s^2. If the predicted value is near the exposure action value or exposure limit value, the predicted value should be assumed to exceed the two latter values, and necessary action should be taken.

Vibration levels are as followings.

- Whole body : $\leq$ 0.5 m/s^2 or $\leq$ 1.15 m/s^2 (Uncertainty K 0.07 m/s^2)

※ **Although the level of whole body vibration exceeds exposure action value, is less than the exposure limit value.**

- Hand/arm : $\leq$ 2.5 m/s^2 (Uncertainty K 0.21 m/s^2)

In regards to the actions taken according to the vibrations, refer to the following table:

Daily vibration exposure (A(8))	Vibration exposure range	Actions to be taken
$A(8) \leq 0.5\ m/s^2$	Exposure action value or lower	When approaching the exposure activity value, reasonable measures should be taken to minimize exposure to vibration. The relevant information and opportunities for training on vibration reduction should be provided to the operator.
$0.5\ m/s^2 < A(8) \leq 1.15\ m/s^2$	Exceeding the exposure action value, but not exceeding the exposure limit value	It is required to execute certain measures for reducing exposure to and risks of vibration to the minimum. The health of an operator who has been exposed to excessive vibration should be examined.
$1.15\ m/s^2 < A(8)$	Exceeding the exposure limit value:	Immediate action is required to reduce the vibration exposure level to below the exposure limit value.

※ **For futher information, please contatct your local HD Hyundai Construction Equipment dealer.**

The vibration level can be predicted based on the information in the following table which is used to calculate the daily level of vibration exposure.

Predict the vibration level in the three vibration directions of axes X, Y, and Z. The mean vibration level should be used under normal operation conditions. Scenario factors from mean vibration level based on operation by skilled operator and on smooth terrain are excluded. Scenario factors are included to obtain the mean vibration level based on aggressive operation and severe terrain to assess the expected vibration level.

※ All vibration values are indicated in m/s^2.

ISO Reference table - Vibration level equivalent to whole body vibration emission of the excavator (Unit : m/s^2)

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

Instructions on mitigating vibration

Machines should be correctly adjusted and maintained to ensure smooth operation. The terrain conditions should be observed. The following instructions will help reduce the whole body vibration level:

① Use the correct size attachments for your machine.
② Maintain the machines pursuant to the manufacturer's recommendations.

③ Maintain and provide good terrain conditions.
- Remove any large rocks or obstacles.
- Fill gutters or holes.
- Adjust speed and driving path as needed for the conditions.

④ Use a driver's seat that satisfies ISO 7096.
- Adjust the driver's seat and suspension for the weight and the size of the operator.
- Inspect the suspension and adjusting devices of the driver's seat.

⑤ Perform the following maneuvers without using excessive force :
- Steering
- Braking
- Accelerating
- Gear shifting

⑥ Move the attachments smoothly.
⑦ Keep the level of vibration minimal when working for a long time or driving for a long distance.
- Use a machine mounted with suspension system.
- Transport the machine when moving between worksites; do not drive the machine to get to another worksite.

⑨ Take the following actions for optimal operator comfort and convenience:
- Adjust the driver's seat adjustment device to allow a convenient posture.
- Adjust the angles of the mirrors to minimize awkward, compromised posture
- Avoid working for an excessively long time, and take regular breaks.
- Do not jump on or off the cabin.
- Minimize repeated handling of loads and lifting of loads.
- The vibration information and calculation procedures are based on <ISO/TR 25398> has been defined according to the emission of vibrations measured under the actual working conditions of the machines.

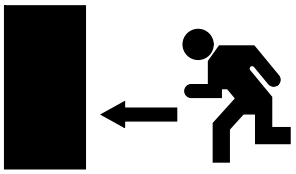
Information on noise

Noise level (Directive 2000/14/EC) is as following.

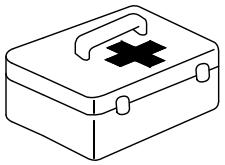
· LwA(Guaranteed) : 93 dB (Uncertainty K 1.0 dB(A))

Emergency situations

In the event of an emergency situation, use the emergency hammer installed inside the cabin to break the windshield of the cabin, and carefully escape from the cabin. The emergency hammer should always be kept inside the cabin for emergencies, and should not be removed or used for other purposes. If the emergency hammer is lost, replace it immediately.



Keep a first-aid kit inside the cabin or in another place at the worksite for safety accidents.



Keep contact information (e.g., phone number) to request help with an emergency situation or injury.

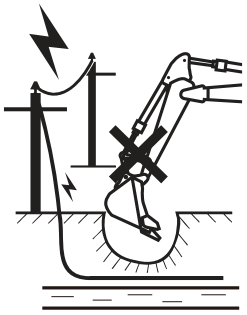
Safety Information on the Machines and Operation

Before Operating the Machine

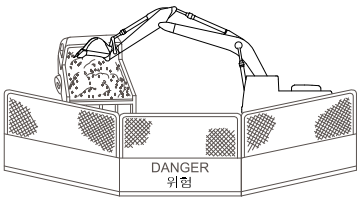
Carefully examine the following conditions and take any necessary actions to prevent risk factors before operating the machine:

Checking the worksite

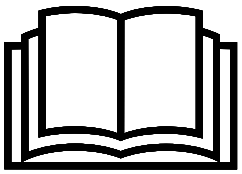
- Always be aware of weather conditions at your worksite. Fog or heavy rain may decrease visibility or render the machine inoperable. In the event of lightning, immediately put the bucket to the ground and evacuate to a safe place.
- Check the worksite for obstacles, and avoid collisions with such obstacles during operation. Check the surroundings of the machine for any obstacles that may hinder operation.
- Check the worksite for buried waterlines, telecommunication cables, power cables and oil pipelines in advance, and avoid damaging them.
- If the terrain of the worksite is too rough for normal operation of the machine, flatten the terrain before operating the machine. Make sure that the ground of the worksite is not soft as it may cause hazards during operation.



- If the worksite is a marshy place (e.g., shallow river, large or small lake, swamp, etc), check the conditions and the depth of marshy areas and the flow rate before driving or operating the machine. Do not operate the machine underwater.
- When operating the machine 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 upper rollers.
- Do not operate the machine on cliffs or at the end of a road on soft ground as the machine may overturn. If operation of the machine on such terrain is unavoidable, keep the track perpendicular to the end, place the driving motor at the rear to facilitate escape from the machine in the event of an emergency situation.
- When operating the machine in areas with pedestrian or vehicle traffic, or in a zone in the vicinity of such an area, appoint workers exclusively responsible for controlling the traffic, or install fences or blocking wall to separate the worksite from the traffic area. Prevent unauthorized workers or machines from accessing the worksite.



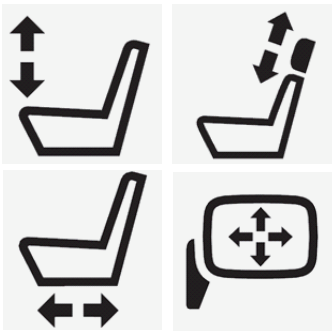
Instructions before operating the machine



- The machine shall be operated by authorized and skilled operators only.
- The operator should wear clothes and personal protection gear that are appropriate for the work environment.
- Do not operate the machine while under the influence of alcohol or drugs or while experiencing extreme fatigue or other conditions that may affect your awareness of your surroundings or your reaction time.
- The operator should read and fully understand the operator's manual before operating the machine.
- The operator should fully understand the details and procedures of the work to be performed.
- Do not perform work when a hazard is anticipated or encountered. Remove the hazard before beginning work. Failure to comply may result in serious injury or death.

Inspect the machine before operating the machine

- Check the machine for abnormal noise, vibration or heat, and for the leakage of engine oil, hydraulic oil, fuel or refrigerant.
- Remove any foreign substances from the engine and the battery. The buildup of such substances may cause a fire.
- Do not operate a machine until any necessary repairs are completed.
- Do not operate the machine until all regular inspection and service recommended in the operator's manual have been executed.

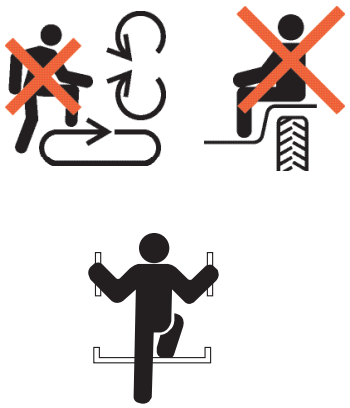


- Adjust the operator’s seat to suit the physical condition of the operator. Check the seatbelt for damage, and replace it if damaged. Do not store unnecessary objects or tools in the cabin.
- Keep clean all parts related to visibility, such as the windshield and rearview mirror. Adjust the rearview mirror to ensure that the operator’s field of vision is clear.
- Check the acoustic alarms (e.g., the horn and warning signal when driving backward or moving) for normal operation.

During Operation of the Machine

Getting on and off

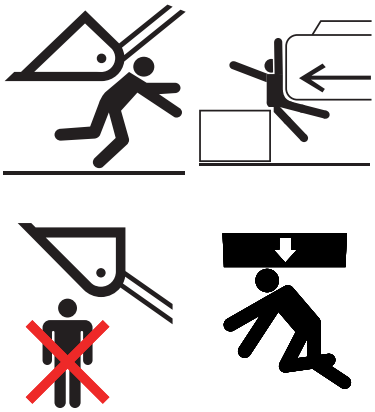
- Do not jump on or off the machine.
- Do not try to get on or off the machine while it is moving.
- Get on or off the machine using the handrail and step (or stepladder, if any). Always keep the handrail and step clean and free from mud or oil.
- Wear anti-slip shoes.
- Comply with the principle of three-point contact* by contacting the machine with either both hands and one foot or vice versa when getting on or off the machine.
- Do not sit on any part of the machine not intended for sitting.



※ **Three-point contact means making contact with the machine with both hands and one foot, or with one hand and both feet.**

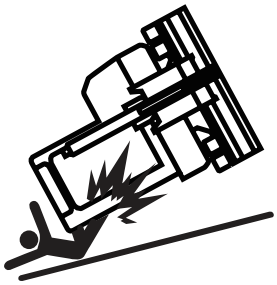
During operation

- The operator should start the engine only after sitting on the operator's seat. Make sure that all levers are shifted to the neutral position before starting the engine.
- Pay close to any obstacles when operating the machine, particularly when turning or moving backward, to prevent collision. Failure to comply may result in serious injury or death.
- Do not exceed the recommended size and weight of an object when lifting a load. Do not lift a heavy object with slings by suspending the slings on the tooth of the bucket.
- Do not allow anyone to stand under the bucket.

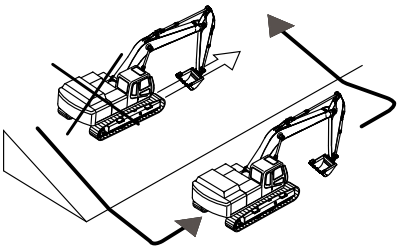


Operation on a slope

When operating the machine on a slope, failure to comply with these instructions could result in the machine tipping over, which may lead to serious injury or death.

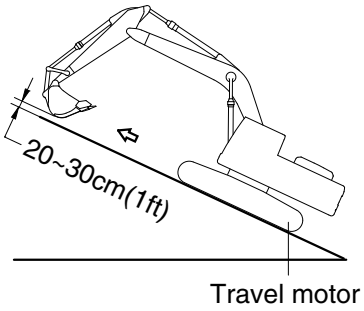


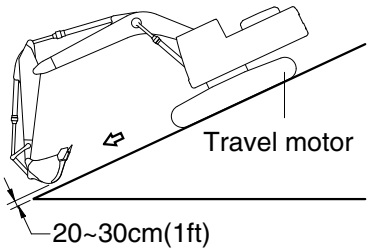
- Do not work on slopes of 10˚ or more.
- Do not exceed the maximum climbing angle of 30˚.
- If operation of the machine on a slope is unavoidable, perform the work after flattening the ground.
- When operating the machine laterally on a slope, there is a high risk of machine overturning or slipping. Do not operate the machine in such conditions.



- Do not operate the machine on a slope covered with wet grass or a thick layer of dead leaves, as the machine may slip.
- Do not park or stop the machine on a slope.
  If parking or stopping the machine on a slope is unavoidable, bring the bucket down to the ground, and support the wheels with wheel chocks.

- When traveling up a slope, operate the machine at a slow speed with the attachment extended forward to keep the machine balanced, and with the bucket raised at least 20 ~30 cm (1 ft) from the ground.
- When traveling down a slope, reduce the engine speed with the travel lever kept in the vicinity of the neutral position. Keep the bucket 20~30 cm (1 ft) above the ground, and use the bucket as a brake in an emergency situation.
- If the engine suddenly stalls, immediately bring the bucket to the ground.
- If the fuel gauge reaches the red zone while operating the machine, immediately refill with fuel. (If the machine operates on a slope under these conditions, air may be introduced into the engine, causing it to stall suddenly.)



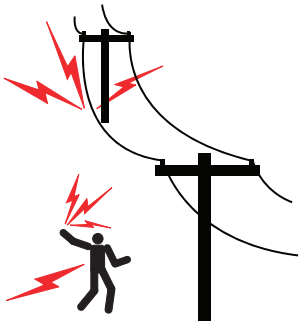


Operations to be avoided or prohibited

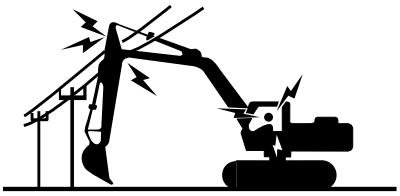
· Pay attention when operating the machine in an enclosed space as this may result in the risk of a buildup of hazardous gases.

· If the machine is operated in the vicinity of a high-voltage line, there is a risk of death or serious injury.
· Be aware of the height and working radius of the machine, and maintain the minimum safety distance.

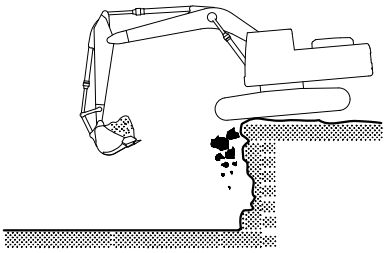
Voltage	Minimum safety distance
6.6 kV	3 m (10 ft)
33.0 kV	4 m (13 ft)
66.0 kV	5 m (16 ft)
154.0 kV	8 m (26 ft)
275.0 kV	10 m (33 ft)



· In the event of contact with a high-voltage line, keep sitting on the operator's seat until the electric current has been shut down.
· Warn any workers on the ground in the vicinity of the machine not to make contact with the machine.
· If leaving the machine is unavoidable, jump down to a place free from any contact with the machine.



· Avoid operating the machine on soft ground, a slope or cliff as there is a risk that it may overturn. Pay special attention when it is raining as the rainfall may soften the ground.
· When operating or driving the machine in water, check the floor conditions, depth of water and flow rate, and make sure that the top roller and axle housing are not immersed in water.
· Do not operate the machine under adverse weather conditions caused by overcast skies, snow and rainfall.
· Do not turn or travel with the machine when the bucket is stuck in the ground.

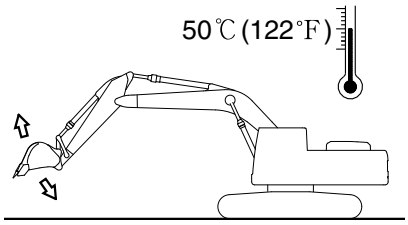


Cautions when operating in specific areas

Operating in extremely cold environments

· Do not attempt to start, stop or turn the machine suddenly as this may cause it to slip. There is potential for the machine to slip.
· Snow-covered or frozen ground may be slippery and dangerous.
· Idle operation of the machine may be required to elevate the engine temperature during startup.
· An impact resulting from a sudden movement of the boom or the attachments at an extremely low temperature may cause serious damage to the machine.
· The working cycle or loading weight might be reduced to lower than those under normal conditions.
· Follow these instructions when operation in cold environments:

- Warm up the engine for 3~4 seconds when starting up the engine.
- Always fully charge the battery. A discharged battery will freeze earlier than a fully charged battery.
- Use engine oil and fuel that are appropriate for the temperature.
- Keep the fuel tank full.
- Remove any moisture from the fuel tank, and change the fuel filter regularly.
- If the fuel filter is frozen, the flow of fuel may be blocked.
- Pour the proper volume of antifreeze into the coolant.
- Wait until the various parts of the machine reach the operating temperature after starting the engine.
- Make sure that every controller and function of the machine operates normally.
- Remove any dirt, snow and ice from the machine after completing the operation.



Operating in extremely hot environments

· Continuous operation of the machine for a long period of time may cause the machine to overheat. Pay special attention to prevent overheating of parts such as the engine and the hydraulic system. Stop the machine and take a break if necessary.

Check the following conditions frequently:
- Check the level of the coolant in the radiator.
- Check the radiator grill for clogging by any debris, and remove them, if any.
- Check the level of the battery electrolyte.
- If the battery will not be used for a long period of time, store it in a cool place.
- Check the hydraulic system for oil leakage.
- Check the lubrication oil on the respective parts, and lubricate as needed.
- If the paint coating of any parts has been effaced or damaged, coat the parts with paints or treat them with an anti-rust additive.
- Do not park the machine under direct light for a long period of time.
- When parking or storing the machine outdoors, use the proper cover to protect the machine from sunlight and dust.

Operating in dusty or sandy environments

- Check the radiator grill for clogging by any debris, and remove any debris.
- Check the fuel system, and protect it from dust or sand when refueling.
- Inspect the air cleaner regularly, and replace it if necessary.
- If the gauge lamp on the dashboard lights up and the buzzer sounds at the same time, clean or replace the air cleaner.
- Frequently check consumables such as hydraulic oil and lubrication oil, and change them if necessary. Protect against the introduction of dust or sand when changing the consumables.
- Check the air-conditioner and the heater filters regularly, and clean or replace them if necessary.
- When parking or storing the machine outdoors, use the proper cover to protect the machine from dust and sand.

Operating in rainy or humid environments

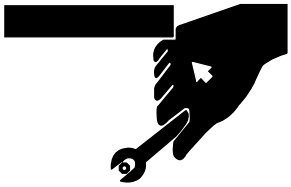
- Do not operate the machine in areas where there is heavy rainfall or thick fog.
- If operating the machine in such areas is unavoidable, perform operation after ensuring sufficient field of vision.
  - Use lighting devices such as the head lamp and working light.
  - Warn any workers within the radius of operation of the machine.
- Pay attention when operating the machine on smooth ground as there is a risk of it overturning.
- If the paint coating on any parts has been effaced or damaged, coat the parts with paint or treat them with an anti-rust additive.

Operating the machine in coastal areas

- Special care should be taken when operating the machine in coastal areas as exposed parts may be corroded easily.
- If the paint coating on any parts has been effaced or damaged, coat the parts with paint or treat them with an anti-rust additive.
- Perform inspection and maintenance of the parts promptly.

Cautions during maintenance

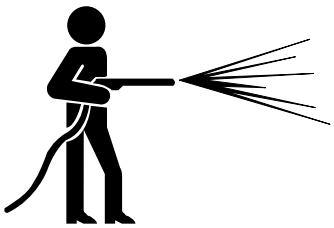
Tools



- Use the correct tools for each type of work.
- Using improper tools may damage the machine and its parts.
- Using deteriorated or damaged tools may result in bodily injury.

Inspection and servicing

- Prevent access to the machine by all unauthorized workers.
- Prior to inspection, park the machine in a flat area and attach a 'Under Inspection' sign.
- Clean the machine before inspection or maintenance.
  - When performing inspection or maintenance on a dirty machine, it may be difficult to diagnosis or detect the cause of a problem with the machine.
  - Dust or dirt accumulated on the machine may cause a worker to slip or fall.
  - Wear protective goggles and protective clothes when cleaning the machine using a compressed water.
  - Do not spray water directly on sensors or electric connectors (sensors or electrical connection units, etc.). If water gets into the electrical system, it can cause operational problems.



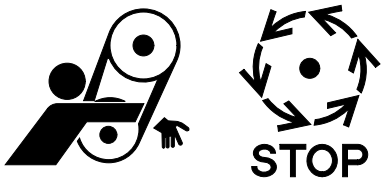
- Use proper lighting devices when operating the machine in a dark area.
- Use lighting devices that are explosion-proof when handling flammable materials such as fuel and hydraulic oil.
- Never attempt to use a direct flame such as a cigarette lighter in lieu of the lighting device.

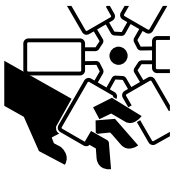
- Check the level of the cooling water after stopping and sufficiently cooling down the engine.
- Sufficiently relieve the inside pressure before opening the cooling water cap.
- The cooling system contains basic components. Use caution to prevent the skin or eyes from coming into contact with the basic materials.

- Exercise special care to protect the body from contact with hot fluid or parts.
- Replace the filters only after shutting off and sufficiently cooling down the engine.
- Slowly remove the operating oil filter plug to relieve the inside pressure.
- Relieve the pressure from the hydraulic system before disconnecting any lines and fittings.

Collision or cutting

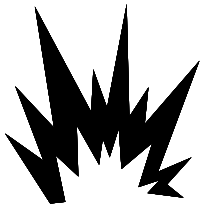
- Never perform a maintenance while the engine is running.
- Never open or remove the engine hood while the machine is in operation.
- If an inspection is required while the engine is running, two or more workers must perform the inspection.
- Keep areas in the vicinity of rotating or moving parts clean.
- Keep articles in the vicinity of the fan clean.
  - Wear safety gloves when handling the wire cables.
  - Wear protective goggles and protective clothes





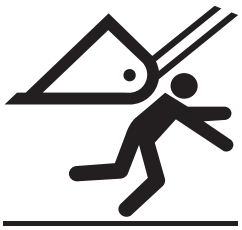
Preventing fire and explosion

- Use caution when handling fuels, lubrication oils, and coolant mixtures to prevent fire and explosion. Failure to comply may result in serious injury or death.
- Oil that leaks on to a hot surface or electronic components may cause a fire.
- Keep all fuels and lubrication oils in adequate containers.
- Do not smoke while refueling or while adding any fluids to the machine. Do not smoke near the fuel tank at anytime.
- Do not smoke in a space where battery electrolyte and other flammable materials are handled.
- Always keep all electrical lines, connectors, and clamps clean, and check whether they are securely connected on a regular basis.
- If any electrical wire or connector is loose or damaged, repair it immediately.
- Do not weld or cut with gas cutter pipes or tubes that contains flammable fluids.



Cautions on decoupling the attachments

- Do not allow unauthorized workers to access the machine.
- Place the machine in a safe position.
- Install safety fences around the machine.

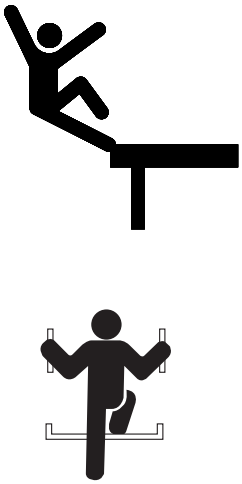


Repair by welding

- Only weld in an area where adequate facilities for welding are available.
- Welding work may be subject to risks of gas leak, flame and electric shock.
  Welding should be performed only by a qualified welder.
- Take the following precautions when welding to avoid serious injury or death:
  - Separate and remove the battery to prevent battery explosion.
  - Perform direct heating in a place free from the risk of explosion.
  - Cover parts such as rubber hoses subject to damage by welding with flame-resistant materials.
  - Wear a welding helmet, protective clothes, protective gloves, and safety shoes.
  - Perform welding work in a well-ventilated place.
  - Remove all inflammable materials from areas in the vicinity of welding work.
  - Provide fire extinguishers.

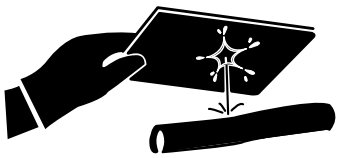
Precautions to take when working on the machine

- There is a risk of falling when working on the machine.
- Keep the area around the workers' feet clean and tidy.
- Do not spill oil or grease.
- Do not leave tools lying on the floor.
- Be careful on the floor when moving.
- Never jump from the machine.
- When getting off the machine, use the step or handrail and get off the machine while keeping to the principle of three-point contact.
- Wear protective clothes if necessary.
- Do not perform maintenance work in an area where no anti-slipping pads have been installed.
- Replace anti-slipping pads and step treads with new ones if they have deteriorated or no longer function.



Cautions when working with the high-pressure line or hose

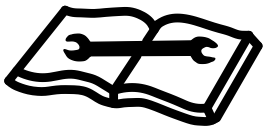
- Make sure that the internal pressure is released before replacing or checking the high-pressure line or hose.
- If the internal pressure is not released, serious injury may result.
- Take the following precautions to avoid serious injury or death:
  - Always check to make sure a working fire extinguisher is nearby
  - Leaked oil may penetrate the skin or cause serious injury.
  - Never check for oil leaks with your bare hands.
  - Check an oil leak using a wooden plate or cardboard.
  - Never bend or hit the high-pressure line hard.
  - Do not install a bent or damaged line or hose.
  - Make sure that all of the clamps and protective devices are properly installed.
- Check the pipes and hoses regularly and replace any damaged parts if necessary.

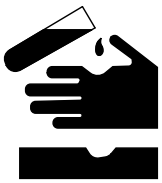


Cautions on inspecting the counterweight

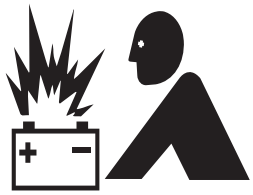
- Failure to comply with these instructions may lead to serious injury or death.
- Never stand beneath the counterweight when installing or removing it.
- Make sure the condition of the lifting device is rated for the weight being lifted.
- Make sure lifting device is in good working order and free of damage or defects.

Battery





- The battery contains flammable materials.
- Never smoke in the vicinity of the battery.
- The battery electrolyte is strong acid. Pay attention to prevent the skin and eyes from coming into contact with the electrolyte.
- If the battery electrolyte accidentally comes into contact with the body or clothes, immediately wash off the electrolyte with water.
- If the battery electrolyte is frozen, do not use other devices to start the engine up.
- Always wear protective goggles and protective gloves when working on the battery.
- Always keep the switch in the 'OFF' position when working on the battery.
- Securely fasten the battery cap.
- Always disconnect the battery from the machine before charging the battery.
- Disconnect the cathode (-) first when removing the battery.
- Connect the anode (+) first when connecting the battery.
- Follow the safety procedures when jump starting or charging the battery. Improper connection of the cable may result in an explosion and serious injury.
- Use a voltmeter when inspecting the charging system.
- Regularly inspect the battery cable, and replace it if damaged.
- A battery cable with exposed wires may cause a short if it comes into contact with the grounding surface.
- A short circuit of the battery cable may cause heat from the battery current and result in a fire.
- If the wires of the ground cable are exposed between the battery and the master switch, the exposed wires make contact with the grounding surface and the current may bypass to the master switch. This may destabilize the machine operation.
  Repair or replace the part before operating the machine.



Battery disconnection switch

- Do not turn off the battery disconnect switch while engine is running. There is a risk of damaging electrical system.
- The battery disconnect switch can be found under the left-hand door of the machine.
- Make sure to turn off the battery disconnect switch when welding or servicing electrical systems, and before clocking out.

Switchboard

- The relay and fuse can be found on the switchboard at the rear of the cab.
- Do not use the fuse that has a higher amperage than indicated on the decal. There is a risk of damaging electric circuits or catching fire.

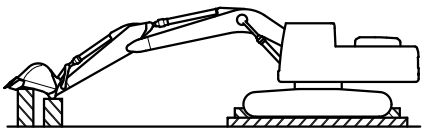
Parking and Storage

Cautions on parking

- Park the machine on flat ground.
- If parking the machine on a slope is unavoidable, use wheel chocks to prevent the machine from moving.
- Bring the bucket down and make firm contact with ground.
- Make sure that all of the switches are turned to the 'OFF' position.
- Do not turn off battery disconnect until led lamp at the disconnect goes off.
- Make sure that all of the controllers are turned to the neutral position.
- Stop the engine, and withdraw the ignition key.
- Close and lock the windshield, door and all covers.
- Install fences around the machine when parking it on a public road, and put up a warning sign.

Cautions on storage for a long period of time

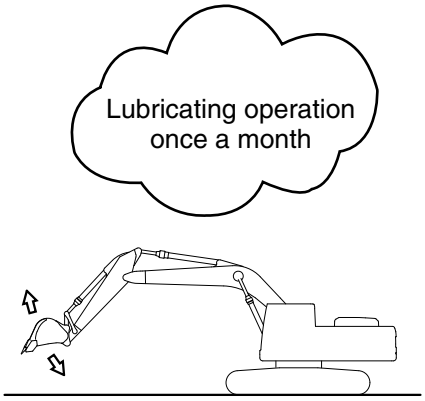
- Park the machine in accordance to any state and local laws.
- When storing the machine for a month or longer, follow these instructions to prevent deterioration of the machine performance :



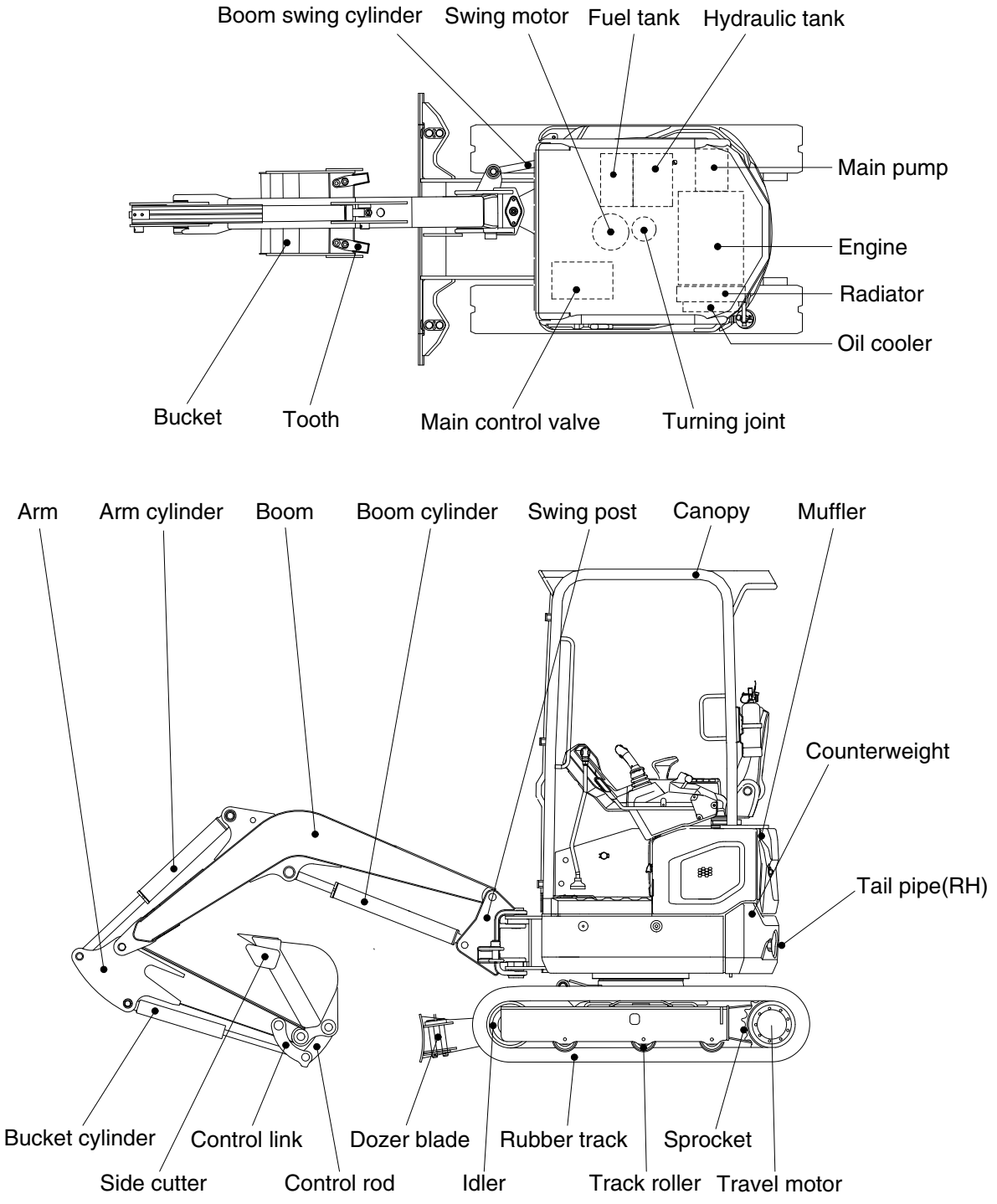
  - Thoroughly clean the machine before storing.
  - Inject sufficient lubrication oil and grease into the injection ports.
  - If any of the machines fluids are low top them off. If any fluids are close to or in need of changing, do so before storing.
  - Oils and coolant may deteriorate during storage based on the length of storage. Please take this into consideration before using the machine.
  - The density of the oil may drop during storage.
  - Apply an anti-rust additive to the exposed area of the piston rod of the cylinder in areas where it is likely to rust quickly.
  - Keep the master switch mounted in the power box (or the toolbox on the left of the rear frame of the machine) turned 'OFF'.
  - Keep the machine in a dry indoor environment.
    If storing the machine outdoors is unavoidable, store it on a wooden pallet.
  - Keep all cylinders collapse so that the cylinder rods are not exposed.
  - Bring the attachments right down to the ground, and keep the tracks immobile by placing wheel chocks.

Regular lubrication (during storage)

- Breaking the lubrication film on parts may cause abnormal abrasion during the next operation.
- Check the level of the engine oil and coolant when starting the engine up, and top them up if necessary.
- Thoroughly wipe off any oil from cylinder rod before operating machine as it will attract dust and debris.
- Start up the engine once a month, perform all functions. Operate machine utilizing all functions for a minimum of 15 minutes. Apply lubrication oil to every part.
- Fully charge and store the battery.
- If storing the excavator for longer than 6 months, disconnect the battery negative (-) terminal.



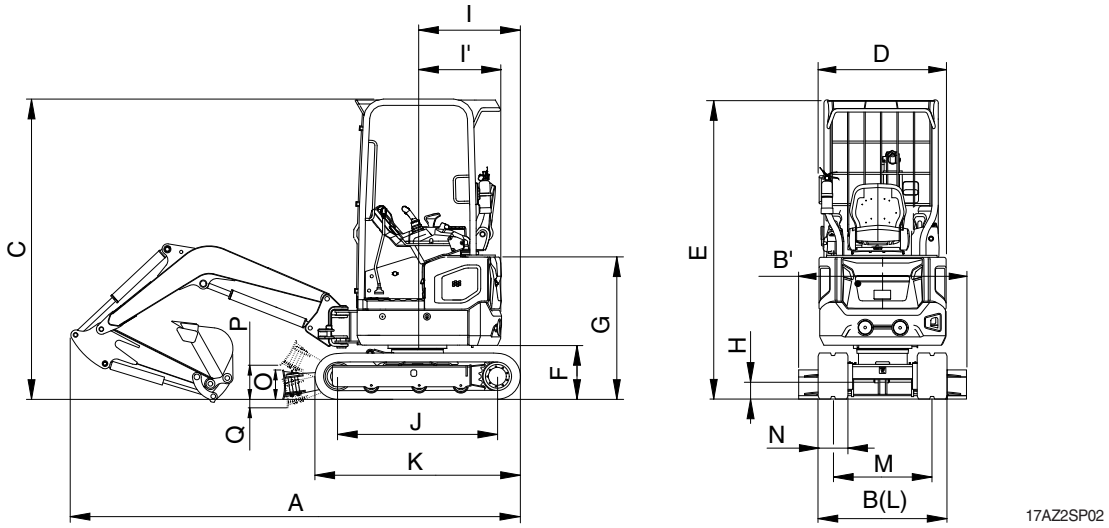
1. MAJOR COMPONENTS



17AZ2SP01

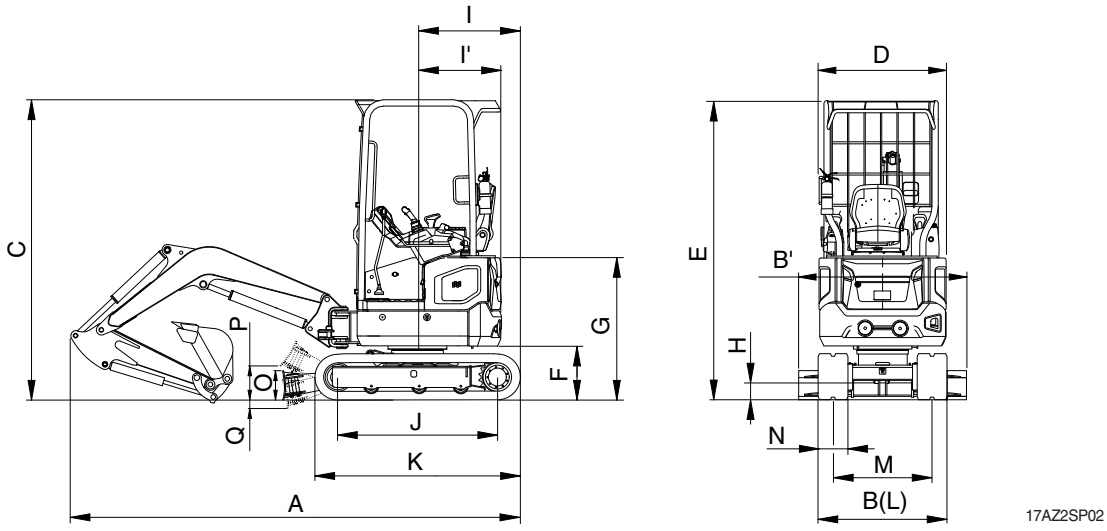
2. SPECIFICATIONS

1) 1.75 m (5' 9") MONO BOOM, 1.03 m (3' 5") ARM, 180 kg CWT



Description		Unit	Specification
Operating weight (canopy)		kg (lb)	1850 (4080)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	0.04 (0.052)
Overall length	A	mm (ft-in)	3531 (11' 6")
Overall width (extension crawler)	B		994~1290 (3' 3"~4' 3")
Overall width (dozer blade)	B'		1294 (4' 3")
Overall height	C		2320 (7' 7")
Overall width of upperstructure	D		980 (3' 3")
Overall height of canopy	E		2320 (7' 7")
Ground clearance of counterweight	F		415 (1' 4")
Overall height of engine hood	G		1095 (3' 7")
Minimum ground clearance	H		150 (0' 6")
Rear-end distance	I		645 (2' 1")
Rear-end swing radius	I'		645 (2' 1")
Distance between tumblers	J		1230 (4' 0")
Undercarriage length	K		1580 (5' 2")
Undercarriage width (extension crawler)	L		994~1290 (3' 3"~4' 3")
Track gauge (extension crawler)	M		764~1060 (2' 6"~3' 6")
Track shoe width, standard	N		230 (0' 9")
Height of blade	O		225 (0' 9")
Ground clearance of blade up	P		183 (0' 7")
Depth of blade down	Q		222 (0' 9")
Travel speed (low/high)		km/hr (mph)	2.21/4.09 (1.37/2.54)
Swing speed		rpm	9.16
Gradeability		Degree (%)	35 (70)
Ground pressure 230 mm rubber shoe (canopy)		kgf/cm^2 (psi)	0.31 (4.38)
Max traction force		kg (lb)	1420 (3130)

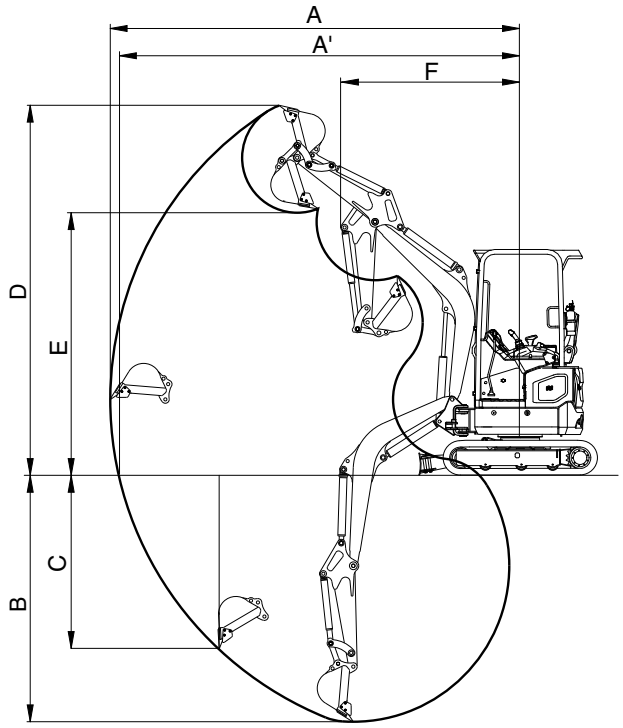
2) 1.75 m (5' 9") MONO BOOM, 1.23 m (4' 0") LONG ARM, 260 kg ADD CWT



Description		Unit	Specification
Operating weight (canopy)		kg (lb)	1980 (4370)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	0.04 (0.052)
Overall length	A	mm (ft-in)	3528 (11' 6")
Overall width (extension crawler)	B		994~1290 (3' 3"~4' 3")
Overall width (dozer blade)	B'		1294 (4' 3")
Overall height	C		2320 (7' 7")
Overall width of upperstructure	D		980 (3' 3")
Overall height of canopy	E		2320 (7' 7")
Ground clearance of counterweight	F		415 (1' 4")
Overall height of engine hood	G		1095 (3' 7")
Minimum ground clearance	H		150 (0' 6")
Rear-end distance	I		720 (2' 4")
Rear-end swing radius	I'		720 (2' 4")
Distance between tumblers	J		1230 (4' 0")
Undercarriage length	K		1580 (5' 2")
Undercarriage width (extension crawler)	L		994~1290 (3' 3"~4' 3")
Track gauge (extension crawler)	M		764~1060 (2' 6"~3' 6")
Track shoe width, standard	N		230 (0' 9")
Height of blade	O		225 (0' 9")
Ground clearance of blade up	P		183 (0' 7")
Depth of blade down	Q		222 (0' 9")
Travel speed (low/high)		km/hr (mph)	2.21/4.09 (1.37/2.54)
Swing speed		rpm	9.16
Gradeability		Degree (%)	35 (70)
Ground pressure 230 mm rubber shoe (canopy)		kgf/cm^2 (psi)	0.33 (4.68)
Max traction force		kg (lb)	1420 (3130)

3. WORKING RANGE

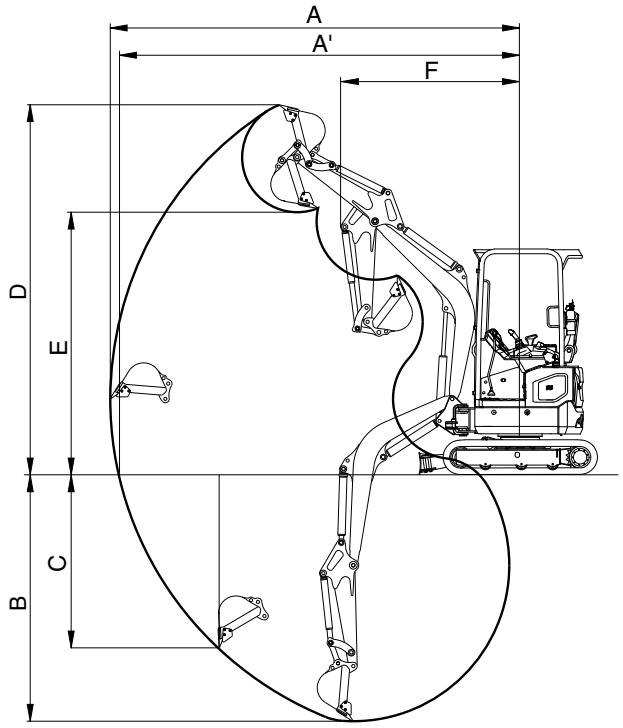
1) 1.75 m (5' 9") MONO BOOM WITH 180 KG COUNTERWEIGHT



17AZ2SP05

Description		1.03 m (3' 5") Arm
Max digging reach	A	3910 mm (12' 10")
Max digging reach on ground	A'	3820 mm (12' 6")
Max digging depth	B	2240 mm (7' 4")
Max digging depth (8 ft level)	B'	1600 mm (5' 3")
Max vertical wall digging depth	C	1750 mm (5' 9")
Max digging height	D	3730 mm (12' 3")
Max dumping height	E	2670 mm (8' 9")
Min swing radius	F	1580 mm (5' 2")
Boom swing radius (left/right)		55°/59°
Bucket digging force	SAE	14 kN
		1436 kgf
		3167 lbf
	ISO	16 kN
		1664 kgf
		3668 lbf
Arm crowd force	SAE	9 kN
		899 kgf
		1981 lbf
	ISO	9 kN
		933 kgf
		2057 lbf

2) 1.75 m (5' 9") MONO BOOM WITH 260 KG COUNTERWEIGHT



17AZ2SP05

Description		1.23 m (4' 0") Long arm
Max digging reach	A	4100 mm (13' 5")
Max digging reach on ground	A'	4010 mm (13' 2")
Max digging depth	B	2440 mm (8' 0")
Max digging depth (8 ft level)	B'	1880 mm (6' 2")
Max vertical wall digging depth	C	1940 mm (6' 4")
Max digging height	D	3870 mm (12' 8")
Max dumping height	E	2810 mm (9' 3")
Min swing radius	F	1645 mm (5' 5")
Boom swing radius (left/right)		55°/59°
Bucket digging force	SAE	14 kN
		1436 kgf
		3167 lbf
	ISO	16 kN
		1664 kgf
		3668 lbf
Arm crowd force	SAE	8 kN
		796 kgf
		1754 lbf
	ISO	8 kN
		822 kgf
		1812 lbf

4. WEIGHT

Item	kg	lb
Upperstructure assembly		
· Main frame weld assembly	201	443
· Engine assembly (including DFP)	75	165
· Main pump assembly	13	29
· Main control valve assembly	14	31
· Swing motor assembly	23	51
· Hydraulic oil tank wa	16	35
· Fuel tank wa	5	10
· Counterweight	180	397
· Counterweight-add	260	573
· Cab assembly	190	419
Lower chassis assembly		
· Track frame weld assembly	206	454
· Dozer blade assembly	63	139
· Swing bearing	19	42
· Travel motor assembly	36	79
· Turning joint	14	31
· Sprocket	4	10
· Track recoil spring	11	24
· Idler	14	32
· Lower roller	5	10
· Track-chain assembly-rubber	71	157
Front attachment assembly		
· Boom assembly-1.75 m	72	159
· Arm assembly-1.03 m	37	83
· Arm assembly-1.03 m thumb bracket	40	88
· Arm assembly-1.23 m	47	104
· Arm assembly-1.23 m thumb bracket	49	109
· Bucket assembly	41	90
· Boom cylinder assembly	16	36
· Arm cylinder assembly	16	34
· Bucket cylinder assembly	12	25
· Swing cylinder assembly	10	22
· Cylinder assy-dozer	11	24
· Extension cylinder	7	15
· Bucket control linkage total	12	27

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

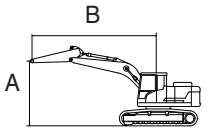
※ Refer to transportation for actual weight information and specifications for operating weight.

5. LIFTING CAPACITIES

1) STANDARD COUNTERWEIGHT (180 kg)

Model	Type	Boom	Arm	Counterweight	Rubber shoe	Wheel	Dozer		Outtriger	
HX17A Z	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		1750	1030	180	230	-	Up	-	-	-

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



Load point height (A)		Load radius (B)						At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		Capacity		Reach
										m (ft)
3.0 m (9.8 ft)	kg	*390	*390					*410	*410	2.18
	lb	*860	*860					*900	*900	(7.2)
2.5 m (8.2 ft)	kg			*370	360			320	300	2.74
	lb			*820	790			710	660	(9.0)
2.0 m (6.6 ft)	kg	*380	*380	370	350	270	260	260	250	3.07
	lb	*840	*840	820	770	600	570	570	550	(10.1)
1.5 m (4.9 ft)	kg	*510	490	360	340	270	260	230	220	3.27
	lb	*1120	1080	790	750	600	570	510	490	(10.7)
1.0 m (3.3 ft)	kg	490	460	350	330	260	250	220	210	3.36
	lb	1080	1010	770	730	570	550	490	460	(11.0)
0.5 m (1.6 ft)	kg	470	440	340	320	260	250	220	210	3.36
	lb	1040	970	750	710	570	550	490	460	(11.0)
Ground Line	kg	460	430	330	310	250	240	230	220	3.26
	lb	1010	950	730	680	550	530	510	490	(10.7)
-0.5 m (-1.6 ft)	kg	450	420	330	310	250	240	250	240	3.05
	lb	990	930	730	680	550	530	550	530	(10.0)
-1.0 m (-3.3 ft)	kg	460	430	330	310			300	280	2.70
	lb	1010	950	730	680			660	620	(8.9)
-1.5 m (-4.9 ft)	kg	470	440					*430	410	2.11
	lb	1040	970					*950	900	(6.9)

Note 1. Lifting capacity are based on ISO 10567.
2. Lifting capacity of the HX series does not exceed 75% of tipping load with the machine on firm, level ground or 87% of full hydraulic capacity.
3. The lift-point is bucket pivot mounting pin on the arm (without bucket mass).
4. *Indicates load limited by hydraulic capacity.

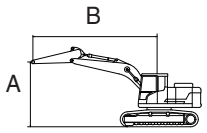
※ Lifting capacities are based upon a standard machine conditions.
Lifting capacities will vary with different work tools, ground conditions and attachments.
The difference between the weight of a work tool attachment must be subtracted.
Consult with your local HD Hyundai Construction Equipment dealer regarding the lifting capacities for specific work tools and attachments.

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

⚠ Failure to comply to the rated load can cause serious injury, death, or property damage. Make adjustments to the rated load as necessary for non-standard configurations.

Model	Type	Boom	Arm	Counterweight	Rubber shoe	Wheel	Dozer		Outtriger	
HX17A Z	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		1750	1030	180	230	-	Down	-	-	-

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



Load point height (A)		Load radius (B)						At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		Capacity		Reach
										m (ft)
3.0 m (9.8 ft)	kg	*390	*390					*410	*410	2.18
	lb	*860	*860					*900	*900	(7.2)
2.5 m (8.2 ft)	kg			*370	*370			*350	330	2.74
	lb			*820	*820			*770	730	(9.0)
2.0 m (6.6 ft)	kg	*380	*380	*380	380	*390	280	*330	270	3.07
	lb	*840	*840	*840	840	*860	620	*730	600	(10.1)
1.5 m (4.9 ft)	kg	*510	*510	*440	370	*400	280	*330	240	3.27
	lb	*1120	*1120	*970	820	*880	620	*730	530	(10.7)
1.0 m (3.3 ft)	kg	*690	500	*520	360	*440	270	*340	230	3.36
	lb	*1520	1100	*1150	790	*970	600	*750	510	(11.0)
0.5 m (1.6 ft)	kg	*830	480	*590	340	*470	260	*370	220	3.36
	lb	*1830	1060	*1300	750	*1040	570	*820	490	(11.0)
Ground Line	kg	*880	460	*630	340	*490	260	*410	230	3.26
	lb	*1940	1010	*1390	750	*1080	570	*900	510	(10.7)
-0.5 m (-1.6 ft)	kg	*850	460	*620	330	*460	260	*440	250	3.05
	lb	*1870	1010	*1370	730	*1010	570	*970	550	(10.0)
-1.0 m (-3.3 ft)	kg	*740	470	*530	340			*450	300	2.70
	lb	*1630	1040	*1170	750			*990	660	(8.9)
-1.5 m (-4.9 ft)	kg	*480	480					*430	*430	2.11
	lb	*1060	1060					*950	*950	(6.9)

Note 1. Lifting capacity are based on ISO 10567.
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3. The lift-point is bucket pivot mounting pin on the arm (without bucket mass).
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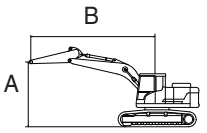
⚠ Failure to comply to the rated load can cause serious injury, death, or property damage. Make adjustments to the rated load as necessary for non-standard configurations.

Model	Type	Boom	Arm	Counterweight	Rubber shoe	Wheel	Dozer		Outtriger	
HX17A Z	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		1750	1230	180	230	-	Up	-	-	-

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



Load point height (A)		Load radius (B)								At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		Capacity		Reach
												m (ft)
3.0 m (9.8 ft)	kg									*320	*320	2.50
	lb									*710	*710	(8.2)
2.5 m (8.2 ft)	kg			*310	*310					280	260	2.98
	lb			*680	*680					620	570	(9.8)
2.0 m (6.6 ft)	kg			*330	*330	280	260			230	220	3.28
	lb			*730	*730	620	570			510	490	(10.8)
1.5 m (4.9 ft)	kg	*420	*420	360	350	270	260			210	200	3.47
	lb	*930	*930	790	770	600	570			460	440	(11.4)
1.0 m (3.3 ft)	kg	500	470	350	330	260	250	210	200	200	190	3.55
	lb	1100	1040	770	730	570	550	460	440	440	420	(11.7)
0.5 m (1.6 ft)	kg	470	440	340	320	260	240	200	190	200	190	3.55
	lb	1040	970	750	710	570	530	440	420	440	420	(11.6)
Ground Line	kg	450	420	320	310	250	240			200	190	3.45
	lb	990	930	710	680	550	530			440	420	(11.3)
-0.5 m (-1.6 ft)	kg	440	420	320	300	250	230			220	210	3.26
	lb	970	930	710	660	550	510			490	460	(10.7)
-1.0 m (-3.3 ft)	kg	450	420	320	300					250	240	2.95
	lb	990	930	710	660					550	530	(9.7)
-1.5 m (-4.9 ft)	kg	460	430							340	320	2.44
	lb	1010	950							750	710	(8.0)

Note 1. Lifting capacity are based on ISO 10567.
2. Lifting capacity of the HX series does not exceed 75% of tipping load with the machine on firm, level ground or 87% of full hydraulic capacity.
3. The lift-point is bucket pivot mounting pin on the arm (without bucket mass).
4. *Indicates load limited by hydraulic capacity.

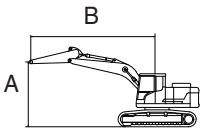
※ Lifting capacities are based upon a standard machine conditions.
Lifting capacities will vary with different work tools, ground conditions and attachments.
The difference between the weight of a work tool attachment must be subtracted.
Consult with your local HD Hyundai Construction Equipment dealer regarding the lifting capacities for specific work tools and attachments.

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

⚠ Failure to comply to the rated load can cause serious injury, death, or property damage. Make adjustments to the rated load as necessary for non-standard configurations.

Model	Type	Boom	Arm	Counterweight	Rubber shoe	Wheel	Dozer		Outtriger	
HX17A Z	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		1750	1230	180	230	-	Down	-	-	-

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



Load point height (A)		Load radius (B)								At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		Capacity		Reach
												m (ft)
3.0 m (9.8 ft)	kg									*320	*320	2.50
	lb									*710	*710	(8.2)
2.5 m (8.2 ft)	kg			*310	*310					*280	*280	2.98
	lb			*680	*680					*620	*620	(9.8)
2.0 m (6.6 ft)	kg			*330	*330	*340	280			*270	240	3.28
	lb			*730	*730	*750	620			*600	530	(10.8)
1.5 m (4.9 ft)	kg	*420	*420	*390	370	*370	280			*270	220	3.47
	lb	*930	*930	*860	820	*820	620			*600	490	(11.4)
1.0 m (3.3 ft)	kg	*600	500	*470	360	*410	270	*350	210	*270	210	3.55
	lb	*1320	1100	*1040	790	*900	600	*770	460	*600	460	(11.7)
0.5 m (1.6 ft)	kg	*770	480	*550	340	*450	260	*370	210	*290	200	3.55
	lb	*1700	1060	*1210	750	*990	570	*820	460	*640	440	(11.6)
Ground Line	kg	*860	460	*610	330	*480	260			*330	210	3.45
	lb	*1900	1010	*1340	730	*1060	570			*730	460	(11.3)
-0.5 m (-1.6 ft)	kg	*860	450	*620	330	*470	250			*390	230	3.26
	lb	*1900	990	*1370	730	*1040	550			*860	510	(10.7)
-1.0 m (-3.3 ft)	kg	*790	450	*570	330					*420	260	2.95
	lb	*1740	990	*1260	730					*930	570	(9.7)
-1.5 m (-4.9 ft)	kg	*610	460							*420	350	2.44
	lb	*1340	1010							*930	770	(8.0)

Note 1. Lifting capacity are based on ISO 10567.
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3. The lift-point is bucket pivot mounting pin on the arm (without bucket mass).
4. *Indicates load limited by hydraulic capacity.

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Lifting capacities will vary with different work tools, ground conditions and attachments.
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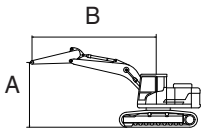
⚠ Failure to comply to the rated load can cause serious injury, death, or property damage. Make adjustments to the rated load as necessary for non-standard configurations.

2) ADD COUNTERWEIGHT (260 kg)

Model	Type	Boom	Arm	Counterweight	Rubber shoe	Wheel	Dozer		Outtriger	
		Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
HX17A Z	CANOPY	1750	1230	260	230	-	Up	-	-	-

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



Load point height (A)		Load radius (B)								At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		Capacity		Reach
												m (ft)
3.0 m (9.8 ft)	kg									*320	*320	2.50
	lb									*710	*710	(8.2)
2.5 m (8.2 ft)	kg			*310	*310					*280	*280	2.98
	lb			*680	*680					*620	*620	(9.8)
2.0 m (6.6 ft)	kg			*330	*330	310	290			260	250	3.28
	lb			*730	*730	680	640			570	550	(10.8)
1.5 m (4.9 ft)	kg	*420	*420	*390	380	300	290			240	230	3.47
	lb	*930	*930	*860	840	660	640			530	510	(11.4)
1.0 m (3.3 ft)	kg	550	520	390	370	300	280	230	220	230	220	3.55
	lb	1210	1150	860	820	660	620	510	490	510	490	(11.7)
0.5 m (1.6 ft)	kg	520	490	380	350	290	270	230	220	220	210	3.55
	lb	1150	1080	840	770	640	600	510	490	490	460	(11.6)
Ground Line	kg	510	470	360	340	280	270			230	220	3.45
	lb	1120	1040	790	750	620	600			510	490	(11.3)
-0.5 m (-1.6 ft)	kg	500	470	360	340	280	260			250	240	3.26
	lb	1100	1040	790	750	620	570			550	530	(10.7)
-1.0 m (-3.3 ft)	kg	500	470	360	340					290	270	2.95
	lb	1100	1040	790	750					640	600	(9.7)
-1.5 m (-4.9 ft)	kg	510	480							380	360	2.44
	lb	1120	1060							840	790	(8.0)

Note 1. Lifting capacity are based on ISO 10567.
2. Lifting capacity of the HX series does not exceed 75% of tipping load with the machine on firm, level ground or 87% of full hydraulic capacity.
3. The lift-point is bucket pivot mounting pin on the arm (without bucket mass).
4. *Indicates load limited by hydraulic capacity.

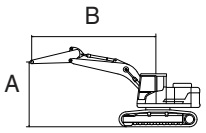
※ Lifting capacities are based upon a standard machine conditions.
Lifting capacities will vary with different work tools, ground conditions and attachments.
The difference between the weight of a work tool attachment must be subtracted.
Consult with your local HD Hyundai Construction Equipment dealer regarding the lifting capacities for specific work tools and attachments.

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

⚠ Failure to comply to the rated load can cause serious injury, death, or property damage. Make adjustments to the rated load as necessary for non-standard configurations.

Model	Type	Boom	Arm	Counterweight	Rubber shoe	Wheel	Dozer		Outtriger	
HX17A Z	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		1750	1230	260	230	-	Down	-	-	-

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



Load point height (A)		Load radius (B)								At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		3.5 m (11.5 ft)		Capacity		Reach
												m (ft)
3.0 m (9.8 ft)	kg									*320	*320	2.50
	lb									*710	*710	(8.2)
2.5 m (8.2 ft)	kg			*310	*310					*280	*280	2.98
	lb			*680	*680					*620	*620	(9.8)
2.0 m (6.6 ft)	kg			*330	*330	*340	310			*270	*270	3.28
	lb			*730	*730	*750	680			*600	*600	(10.8)
1.5 m (4.9 ft)	kg	*420	*420	*390	*390	*370	310			*270	240	3.47
	lb	*930	*930	*860	*860	*820	680			*600	530	(11.4)
1.0 m (3.3 ft)	kg	*600	560	*470	400	*410	300	*350	240	*270	230	3.55
	lb	*1320	1230	*1040	880	*900	660	*770	530	*600	510	(11.7)
0.5 m (1.6 ft)	kg	*770	530	*550	380	*450	290	*370	230	*290	230	3.55
	lb	*1700	1170	*1210	840	*990	640	*820	510	*640	510	(11.6)
Ground Line	kg	*860	510	*610	370	*480	290			*330	230	3.45
	lb	*1900	1120	*1340	820	*1060	640			*730	510	(11.3)
-0.5 m (-1.6 ft)	kg	*860	510	*620	370	*470	280			*390	250	3.26
	lb	*1900	1120	*1370	820	*1040	620			*860	550	(10.7)
-1.0 m (-3.3 ft)	kg	*790	510	*570	370					*420	290	2.95
	lb	*1740	1120	*1260	820					*930	640	(9.7)
-1.5 m (-4.9 ft)	kg	*610	520							*420	390	2.44
	lb	*1340	1150							*930	860	(8.0)

Note 1. Lifting capacity are based on ISO 10567.
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3. The lift-point is bucket pivot mounting pin on the arm (without bucket mass).
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Lifting capacities will vary with different work tools, ground conditions and attachments.
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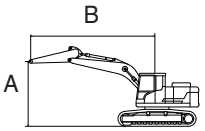
Consult with your local HD Hyundai Construction Equipment dealer regarding the lifting capacities for specific work tools and attachments.

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

⚠ Failure to comply to the rated load can cause serious injury, death, or property damage. Make adjustments to the rated load as necessary for non-standard configurations.

Model	Type	Boom	Arm	Counterweight	Rubber shoe	Wheel	Dozer		Outtriger	
HX17A Z	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		1750	1030	260	230	-	Up	-	-	-

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



Load point height (A)		Load radius (B)						At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		Capacity		Reach
										m (ft)
3.0 m (9.8 ft)	kg	*390	*390					*410	*410	2.18
	lb	*860	*860					*900	*900	(7.2)
2.5 m (8.2 ft)	kg			*370	*370			*350	340	2.74
	lb			*820	*820			*770	750	(9.0)
2.0 m (6.6 ft)	kg	*380	*380	*380	*380	310	290	290	280	3.07
	lb	*840	*840	*840	*840	680	640	640	620	(10.1)
1.5 m (4.9 ft)	kg	*510	*510	400	380	300	290	260	250	3.27
	lb	*1120	*1120	880	840	660	640	570	550	(10.7)
1.0 m (3.3 ft)	kg	550	510	390	370	300	280	250	240	3.36
	lb	1210	1120	860	820	660	620	550	530	(11.0)
0.5 m (1.6 ft)	kg	520	490	380	360	290	280	250	230	3.36
	lb	1150	1080	840	790	640	620	550	510	(11.0)
Ground Line	kg	510	480	370	350	290	270	250	240	3.26
	lb	1120	1060	820	770	640	600	550	530	(10.7)
-0.5 m (-1.6 ft)	kg	510	480	370	350	280	270	280	260	3.05
	lb	1120	1060	820	770	620	600	620	570	(10.0)
-1.0 m (-3.3 ft)	kg	510	480	370	350			330	320	2.70
	lb	1120	1060	820	770			730	710	(8.9)
-1.5 m (-4.9 ft)	kg	*480	*480					*430	*430	2.11
	lb	*1060	*1060					*950	*950	(6.9)

Note 1. Lifting capacity are based on ISO 10567.
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3. The lift-point is bucket pivot mounting pin on the arm (without bucket mass).
4. *Indicates load limited by hydraulic capacity.

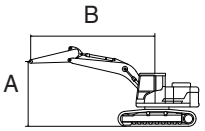
※ Lifting capacities are based upon a standard machine conditions.
Lifting capacities will vary with different work tools, ground conditions and attachments.
The difference between the weight of a work tool attachment must be subtracted.
Consult with your local HD Hyundai Construction Equipment dealer regarding the lifting capacities for specific work tools and attachments.

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

⚠ Failure to comply to the rated load can cause serious injury, death, or property damage. Make adjustments to the rated load as necessary for non-standard configurations.

Model	Type	Boom	Arm	Counterweight	Rubber shoe	Wheel	Dozer		Outtriger	
HX17A Z	Canopy	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		1750	1030	260	230	-	Down	-	-	-

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



Load point height (A)		Load radius (B)						At max. reach		
		2.0 m (6.6 ft)		2.5 m (8.2 ft)		3.0 m (9.8 ft)		Capacity		Reach
										m (ft)
3.0 m (9.8 ft)	kg	*390	*390					*410	*410	2.18
	lb	*860	*860					*900	*900	(7.2)
2.5 m (8.2 ft)	kg			*370	*370			*350	*350	2.74
	lb			*820	*820			*770	*770	(9.0)
2.0 m (6.6 ft)	kg	*380	*380	*380	*380	*390	310	*330	300	3.07
	lb	*840	*840	*840	*840	*860	680	*730	660	(10.1)
1.5 m (4.9 ft)	kg	*510	*510	*440	410	*400	310	*330	270	3.27
	lb	*1120	*1120	*970	900	*880	680	*730	600	(10.7)
1.0 m (3.3 ft)	kg	*690	550	*520	400	*440	300	*340	250	3.36
	lb	*1520	1210	*1150	880	*970	660	*750	550	(11.0)
0.5 m (1.6 ft)	kg	*830	530	*590	380	*470	300	*370	250	3.36
	lb	*1830	1170	*1300	840	*1040	660	*820	550	(11.0)
Ground Line	kg	*880	520	*630	380	*490	290	*410	260	3.26
	lb	*1940	1150	*1390	840	*1080	640	*900	570	(10.7)
-0.5 m (-1.6 ft)	kg	*850	510	*620	370	*460	290	*440	280	3.05
	lb	*1870	1120	*1370	820	*1010	640	*970	620	(10.0)
-1.0 m (-3.3 ft)	kg	*740	520	*530	380			*450	340	2.70
	lb	*1630	1150	*1170	840			*990	750	(8.9)
-1.5 m (-4.9 ft)	kg	*480	*480					*430	*430	2.11
	lb	*1060	*1060					*950	*950	(6.9)

Note 1. Lifting capacity are based on ISO 10567.
2. Lifting capacity of the HX series does not exceed 75% of tipping load with the machine on firm, level ground or 87% of full hydraulic capacity.
3. The lift-point is bucket pivot mounting pin on the arm (without bucket mass).
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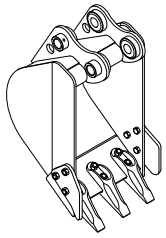
※ Please be aware of the local regulations and instructions for lifting operations.

⚠ Failure to comply to the rated load can cause serious injury, death, or property damage. Make adjustments to the rated load as necessary for non-standard configurations.

6. BUCKET SELECTION GUIDE



0.040 m³
SAE heaped bucket

Capacity		Width		Weight	Tooth (EA)	Recommendation	
						1750 m (5' 9") boom	
SAE heaped	CECE heaped	Without side cutter	With side cutter			1.03 m (3' 5") arm	1.23 m (4' 0") arm
0.040 m³ (0.052 yd³)	0.035 m³ (0.046 yd³)	382 mm (15.0")	422 mm (16.6")	41 kg (90 lb)	3	●	●

● Applicable for materials with density of 2100 kg/m³ (3500 lb/yd³) or less

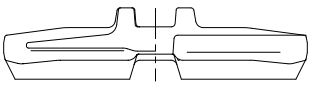
※ These recommendations are for general conditions and average use.
Work tools and ground conditions have effects on machine performance.
Select an optimum combination according to the working conditions and the type of work that is being done.
Consult with your local HD Hyundai Construction Equipment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

2) TYPES OF SHOES

Model	Shapes		Rubber track
			
HX17A Z	Shoe width	mm (in)	230 (10")
	Operating weight	kg (lb)	1850 (4080)
	Ground pressure	kgf/cm^2 (psi)	0.31 (4.38)
	Overall width	mm (ft-in)	994~1290 (3' 3"~4' 3")

3) 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

Model	Track shoe	Specification	Category
HX17A Z	T/chain-rubber for rail interlocking (230 ㎜)	Standard	A

Table 2

Category	Applications	Precautions
A	Rocky ground, river beds, normal soil	· Travel at low speed on rough ground with large obstacles such as boulders or fallen trees 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 ground (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	Kubota D902-E4B
Type	Vertical, water cooled 4-cycle, IDI diesel engine
Cooling method	Water cooling
Number of cylinders and arrangement	3 cylinders, in-line
Firing order	1-2-3
Combustion chamber type	Spherical type
Cylinder bore × stroke	72 × 73.6mm (2.83" × 2.90)
Piston displacement	898 cc (54.8 cu in)
Compression ratio	24:1 : 1
Rated gross horse power	16.2 hp (12.1 kW) at 2400 rpm
Rated net horse power	16.0 hp (11.9 kW) at 2400 rpm
Max. power	16.2 hp (12.1 kW) at 2400 rpm
Maximum torque at 1900 rpm	5.57 kgf · m (40.3 lbf · ft)
Engine oil quantity	3.7 ℓ (1.0 U.S. gal)
Dry weight	75 kg (165 lb)
Starting motor	12V-1.2 kW
Alternator	12V-40 A

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 7.5 cc/rev
Maximum pressure	210 kgf/cm² (2990 psi)
Rated oil flow	2 × 17.3 ℓ/min (2 × 4.6 U.S. gpm / 2 × 3.8 U.K. gpm)
Rated speed	2300 rpm

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	4.5/2.7 cc/rev
Maximum pressure	190/35 kgf/cm^2 (2702/498 psi)
Rated oil flow	10.4/6.2 ℓ /min (2.7/1.6 U.S. gpm / 2.3/1.4 U.K. gpm)

4) MAIN CONTROL VALVE

Item	Specification
Type	Sectional, 9 spools
Operating method	Hydraulic pilot system
Main relief valve pressure	210 kgf/cm^2 (2990 psi)
Overload relief valve pressure	230 kgf/cm^2 (3272 psi)
2-way (breaker piping) flow rate	27.7 ℓ /min (7.3 U.S. gpm / 6.1 U.K. gpm)

5) SWING MOTOR

Item	Specification
Type	Fixed displacement axial piston motor
Capacity	18.1 cc/rev
Relief pressure	165 kgf/cm^2 (2350 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	69.7 kgf · m (504 lbf · ft)
Brake release pressure	20~50 kgf/cm^2 (284~711 psi)
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Two fixed displacement axial piston motor
Capacity	12.4/6.2 cc/rev
Relief pressure	210 kgf/cm^2 (2990 psi)
Reduction gear type	2-stage planetary

7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	Ø60× Ø40× 476 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	Ø60× Ø40× 393 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	Ø55× Ø35× 345 mm
	Cushion	-
Boom swing cylinder	Bore dia × Rod dia × Stroke	Ø55× Ø30× 355 mm
	Cushion	-
Dozer cylinder	Bore dia × Rod dia × Stroke	Ø65× Ø30× 93 mm
	Cushion	-
Dozer cylinder (DPC)	Bore dia × Rod dia × Stroke	Ø65× Ø30× 93 mm
	Cushion	-
Extension cylinder	Bore dia × Rod dia × Stroke	Ø50× Ø25× 300 mm
	Cushion	-

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

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

9. RECOMMENDED OILS

HD Hyundai Construction Equipment 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 HD Hyundai Construction Equipment and, therefore, will meet the highest safety and quality requirements.

We recommend that you use only HD Hyundai Construction Equipment genuine lubricating oils and grease officially approved by HD Hyundai Construction Equipment.

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	3.7 (1.0)	★0W-40 SAE 5W-30 SAE 10W SAE 15W-40
Final drive	Gear oil	0.3×2 (0.1×2)	★SAE 75W-90 SAE 80W-90
Hydraulic tank	Hydraulic oil	Tank: 12.1 (3.2)	★ISO VG 15 ISO VG 32 ISO VG 46, HBHO VG 46 ★3 ISO VG 68
Fuel tank	Diesel fuel★1	19.5 (5.2)	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and soft water★2	5.4 (1.4)	Ethylene glycol base permanent type (50 : 50) ★Ethylene glycol base permanent type (60 : 40)

※ **Using any lubricating oils other than HD Hyundai Construction Equipment genuine products may lead to a deterioration of performance and cause damage to major components.**

※ **Do not mix HD Hyundai Construction Equipment genuine oil with any other lubricating oil as it may result in damage to the systems of major components.**

※ **For HD Hyundai Construction Equipment genuine lubricating oils and grease for use in regions with extremely low temperatures, please contact your local HD Hyundai Construction Equipment dealer.**

SAE : Society of Automotive Engineers
API : American Petroleum Institute
ISO : International Organization for Standardization
NLGI : National Lubricating Grease Institute
ASTM : American Society of Testing and Material

★ : Cold region
Russia, CIS, Mongolia
★1 : Ultra low sulfur diesel
- sulfur content ≤ 10 ppm
★2 : Soft water
City water or distilled water
★3 : HD Hyundai Construction Equipment Bio Hydraulic Oil

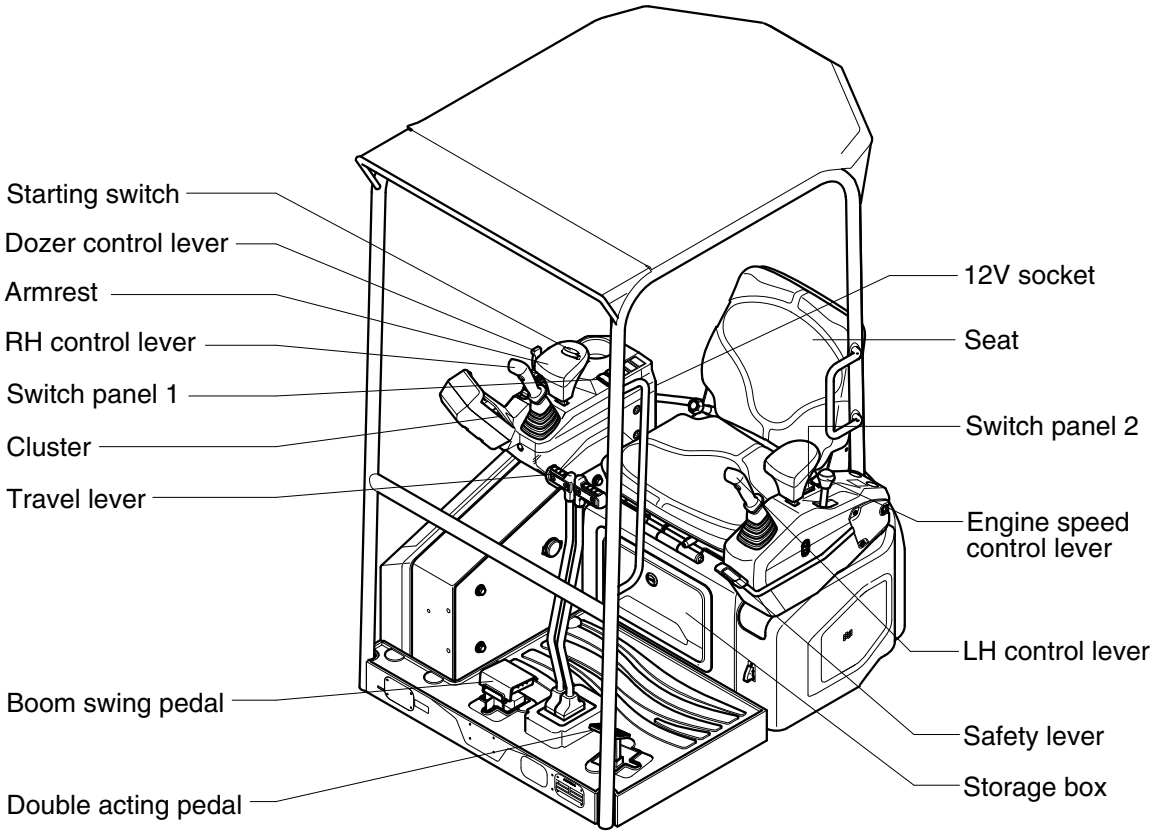
1. CAB DEVICES

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.



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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.
The LCD is to display for monitoring, manage and display set with the switches.

※ **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.**

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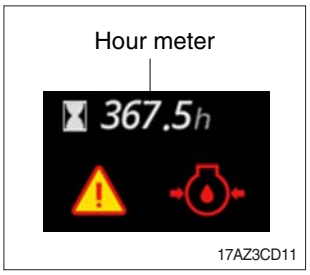
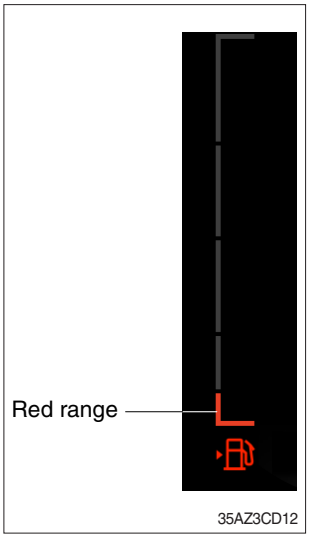
2) GAUGES AND DISPLAYS

(1) Hour meter



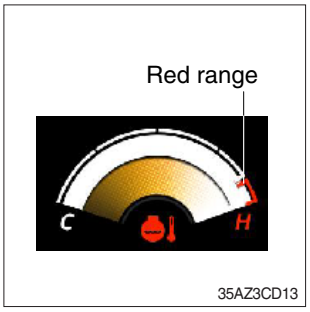
① This meter shows the total operation hours of the machine.
② Always ensure the operating condition of the meter during the machine operation.
Inspect and service the machine based on hours as indicated in chapter 6, maintenance.

(2) Fuel gauge



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

(3) Engine coolant temperature gauge



① This indicates the temperature of coolant.
· Red range : Above 105°C (221°F)
② When the red range pointed or warning lamp ON, engine do not abruptly stop but run it at medium speed to allow it to cool gradually, then stop it.
Check the radiator and engine.
※ If the engine is stopped without cooled down running, the temperature of engine parts will rise suddenly, this could cause severe engine trouble.
※ If the gauge indicates the red range or warning lamp ON in red even though the machine is in the normal condition range, check the electric device as this can be caused by poor connection of sensor.

(4) Engine rpm gauge

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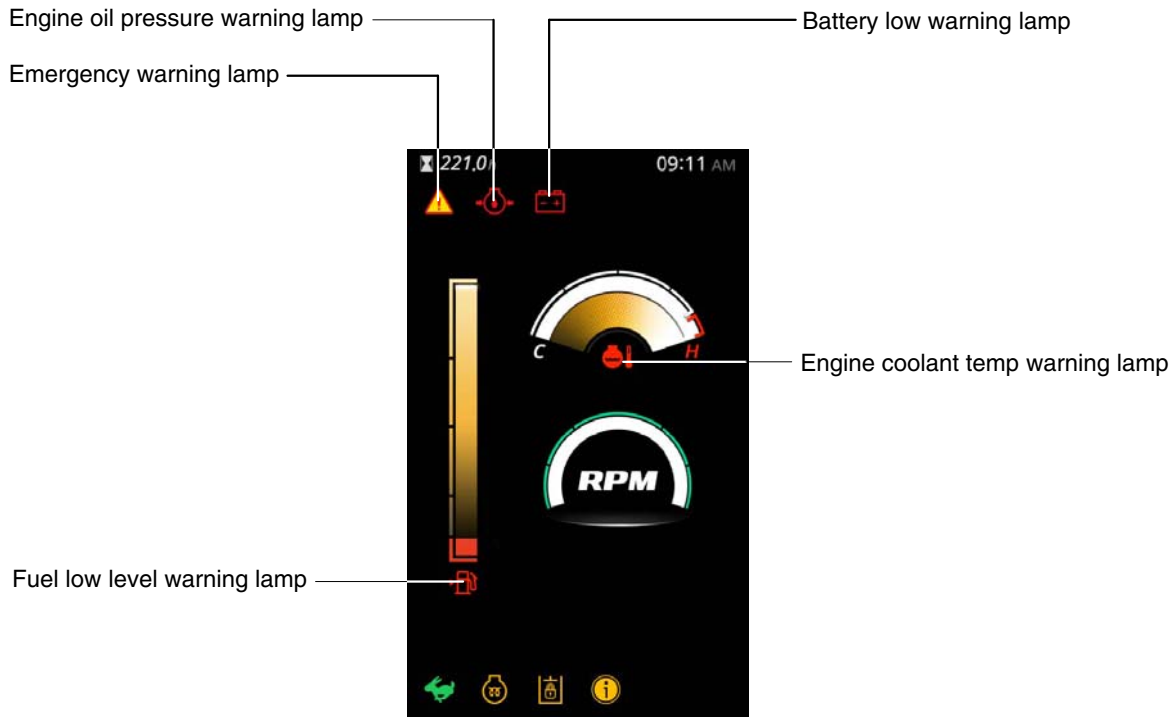
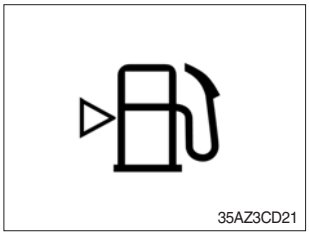
① This gauge indicates the engine speed.

3) WARNING LAMPS



17AZ3CD20

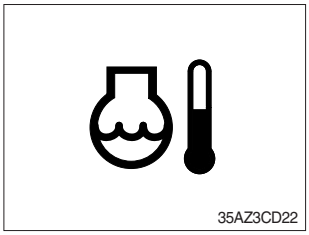
(1) Fuel low level warning lamp



35AZ3CD21

① This lamp lights up and buzzer sounds when the level of fuel is below 7 ℓ (1.8 U.S. gal).
② Fill the fuel immediately when the lamp ON.

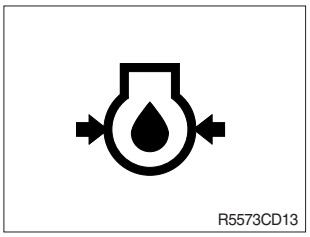
(2) Engine coolant temperature warning lamp



35AZ3CD22

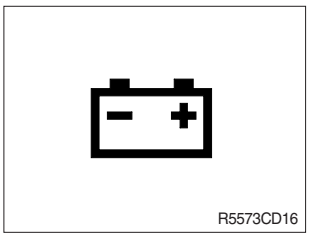
① This lamp lights up and buzzer sounds when the temperature of coolant is over the normal temperature 105°C (221°F).
② Check the cooling system when the lamp ON.

(3) Engine oil pressure low warning lamp



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

(4) Battery low warning lamp



① This lamp lights up and buzzer sounds when the starting switch is ON, it is turned OFF after starting the engine.
② Check the battery charging circuit when this lamp does not turn off, or turns on or blinks during engine operation.

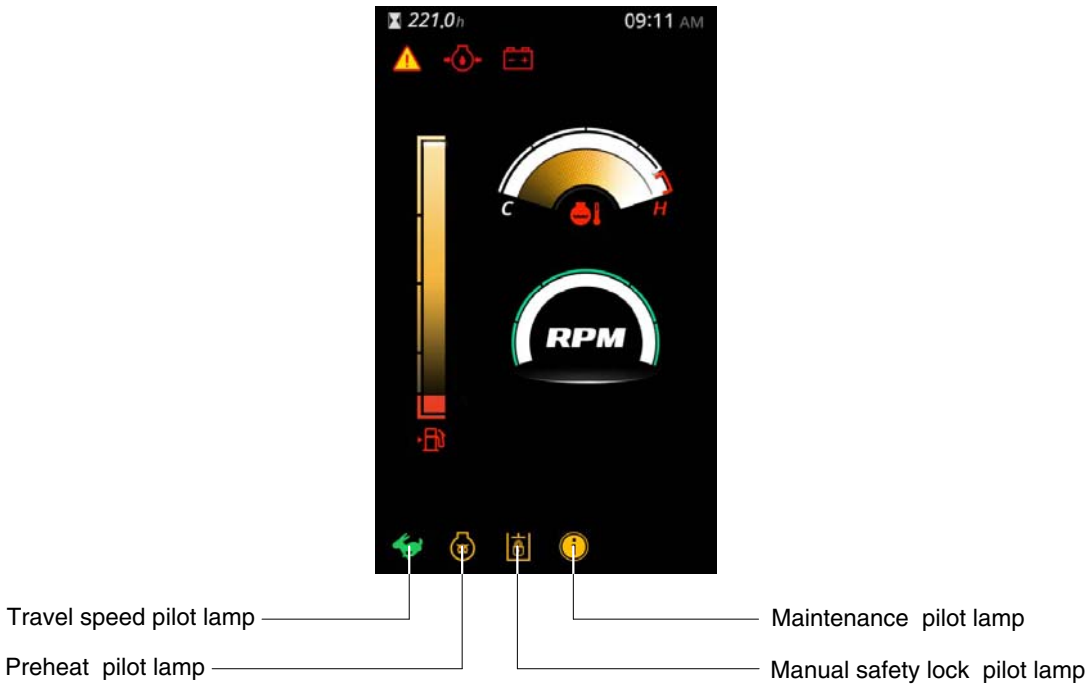
(5) Emergency warning lamp

① This lamp pops up and the buzzer sounds when each of the below warnings occurs.
- Engine coolant temperature high warning lamp ON

※ The pop-up warning lamp moves to the original position and lights up when the buzzer stop switch is pushed or pop-up is touched. The buzzer will stop.
This is same as following warning lamps.

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

4) PILOT LAMP

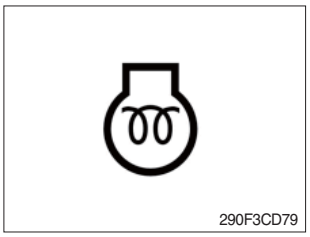


17AZ3CD30

(1) Travel mode pilot lamp

No	Mode	Pilot lamp	Selected mode
1	Travel mode		Low speed traveling High speed traveling

(2) Preheat pilot lamp



① Turning the start key switch to the ON position starts preheating in cold weather.
② Start the engine after this lamp goes OFF.
※ **Refer to page 4-4 for details.**

(3) Maintenance pilot lamp

① This lamp lights up when consumable parts are in need of replacement. It means that the change or replacement interval of parts is 30 hours from the required change interval.
② Check the message in maintenance information of main menu. Also, this lamp lights up for 3 minutes when the start switch is switched to the ON position.

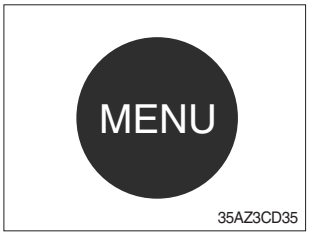
(4) Manual safety lock pilot lamp

① This lamp lights up when the safety lever is set to the LOCK position.
※ **Refer to page 3-27 for the safety lever.**

5) SWITCHES

Sound short beep when each button is pressed.

(1) Menu button



① Go into the menu screen.

※ **Please refer to page 3-10.**

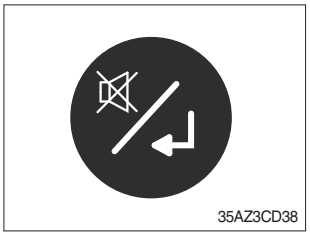
(2) Left/up/(+)

① Move left in sub menu.
② Move up in menu list
③ Increase input value in menu

(3) Right/down/(-) button

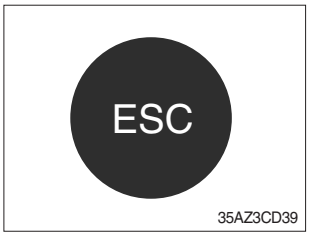
① Move right in sub menu.
② Move down in menu list
③ Decrease input value in menu

(4) Enter and buzzer stop button



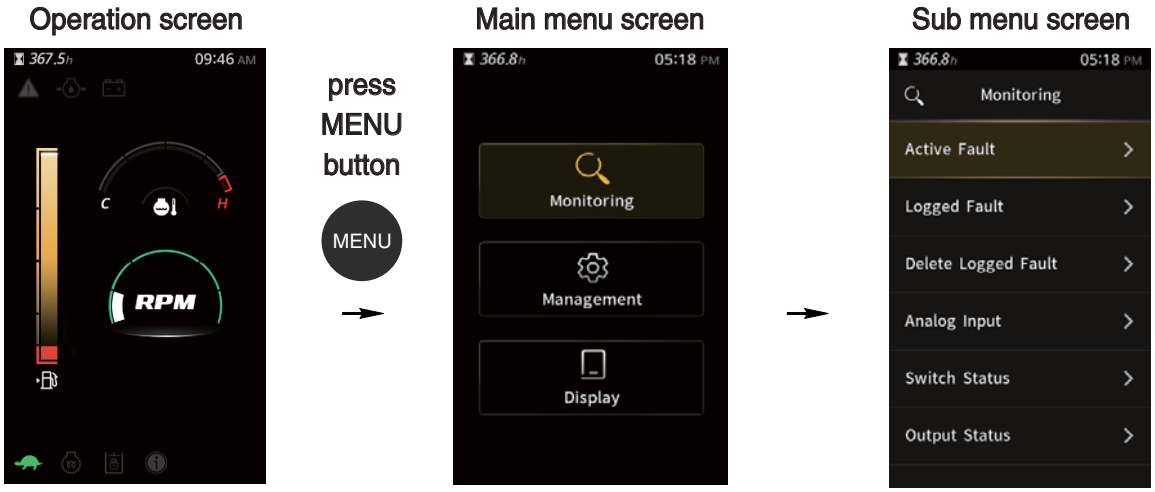
① Select menu (enter).
② Stop buzzer sound when press this button immediately.

(5) ESC



① Escape in the menu.

6) MAIN MENU



17AZ3CD100 17AZ3CD106 17AZ3CD110

※ Please refer to the switches, page 3-9 for selection and change of menus and input values.

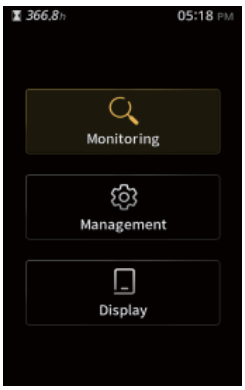
※ In the operation screen, press the menu button to access the sub-menu screen.

(1) Structure

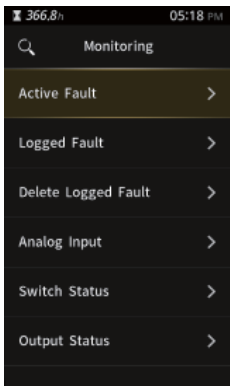
No	Main menu	Sub menu	Description
1	 Monitoring 17AZ3CD103	Active fault Logged fault Delete logged fault Analog input Switch status Output status	Active fault Logged fault Delete logged fault Coolant temp., Battery volt, Engine speed Safety lever, Quick coupler 1, Quick coupler 2, Travel speed Quick coupler solenoid, Start limit relay, Buzzer
2	 Manage 35AZ3CD104	Operating hours Maintenance ESL mode Change password Machine information A/S phone number	A day's operating hours Elapse, Interval, Replacement etc. Disabled, Enable (Always), Enable (Interval) Change password Machine, Engine, Cluster A/S phone number, A/S phone number change
3	 Display set 17AZ3CD105	Clock adjust Brightness Unit Language	12 hours, 24 hours Manual, Auto Temperature Korean, English, Turkish, etc (total 12 languages)

(2) Monitoring

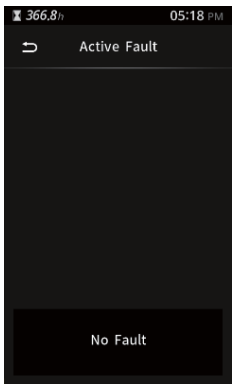
① Active fault



17AZ3CD106

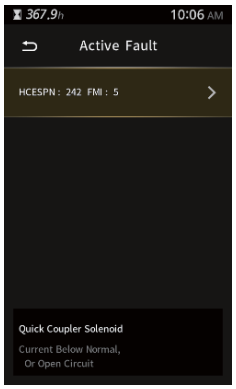


17AZ3CD110



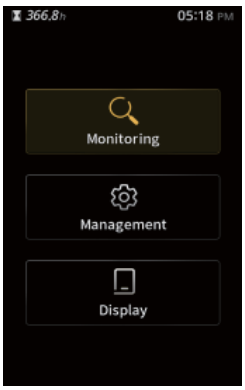
17AZ3CD111

- The active fault of the machine and engine can be checked by this menu.

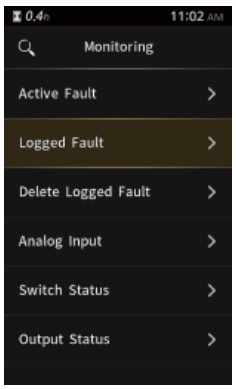


17AZ3CD112

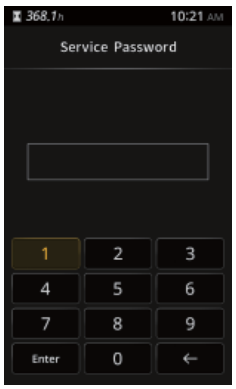
② Logged fault



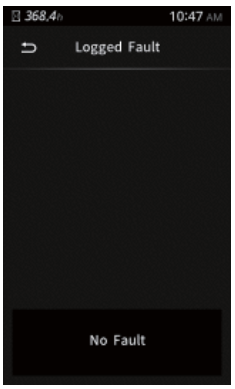
17AZ3CD106



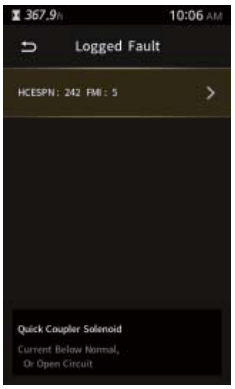
17AZ3CD113



17AZ3CD114



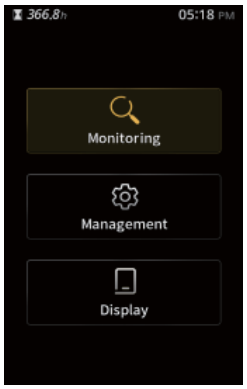
17AZ3CD115



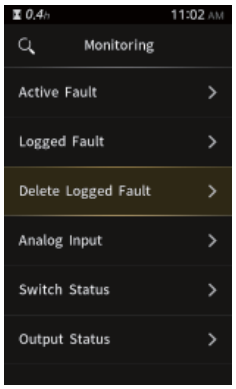
17AZ3CD116

- The logged fault of the machine and engine can be checked by this menu.
- This menu can be used only HCE service man.

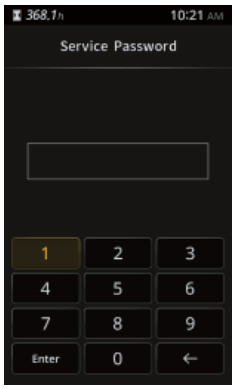
③ Delete logged fault



17AZ3CD106

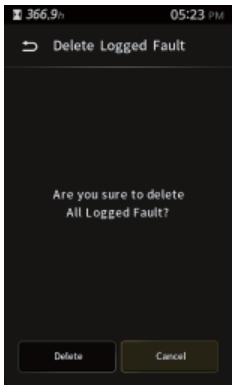


17AZ3CD117

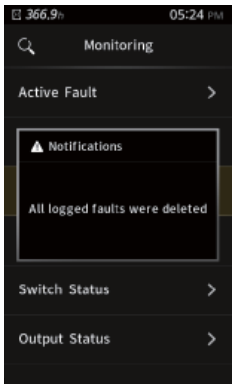


17AZ3CD118

- The logged fault of the machine and engine can be deleted by this menu.
  (It is possible under the engine stop conditions)



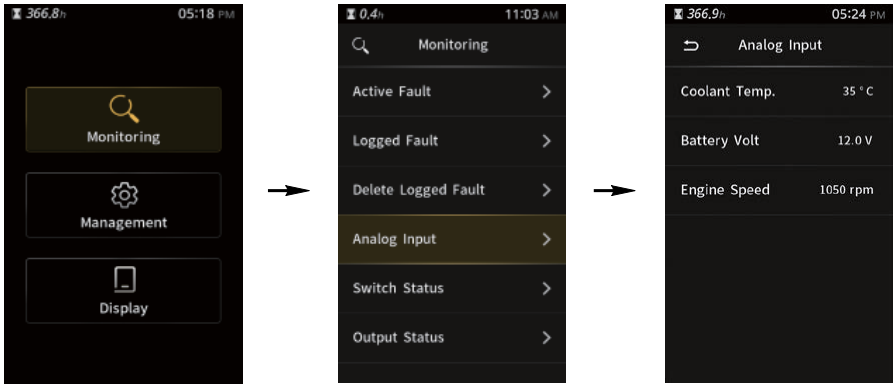
17AZ3CD119



17AZ3CD120

17AZ3CD121

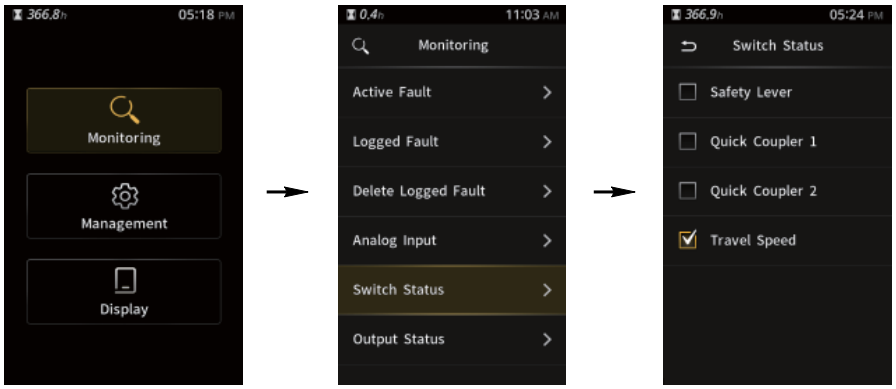
④ Analog input



17AZ3CD106 17AZ3CD122 17AZ3CD123

- The machine status such as the engine speed, coolant temperature, battery voltage can be checked by this menu.

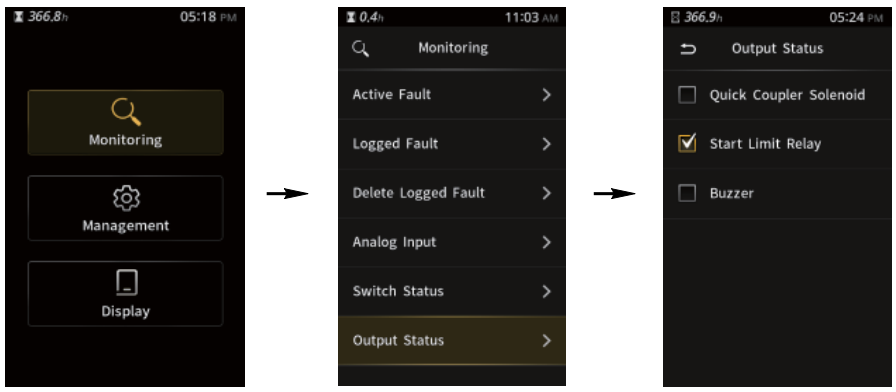
⑤ Switch status



17AZ3CD106 17AZ3CD124 17AZ3CD125

- The switch input status can be checked by this menu.

⑥ Output status

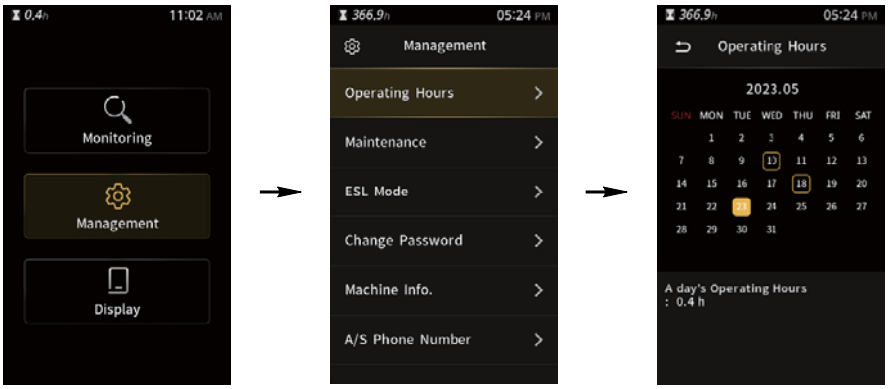


17AZ3CD106 17AZ3CD126 17AZ3CD127

- The output status can be confirmed by this menu.

(3) Manage

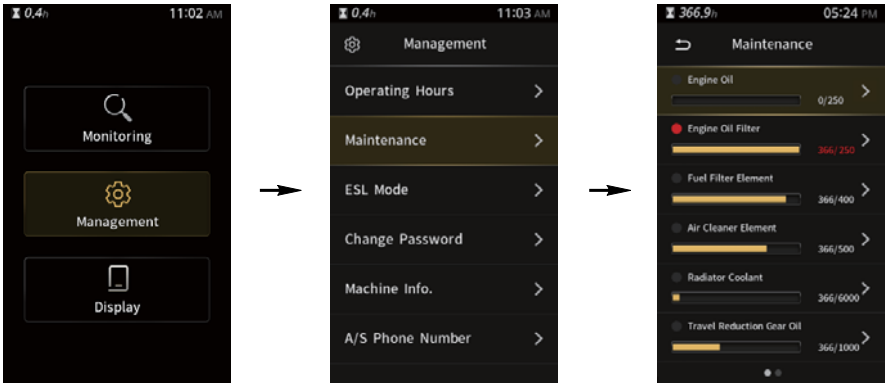
① Operating hours



17AZ3CD107 17AZ3CD130 17AZ3CD131

- You can check the operating hours by this menu.

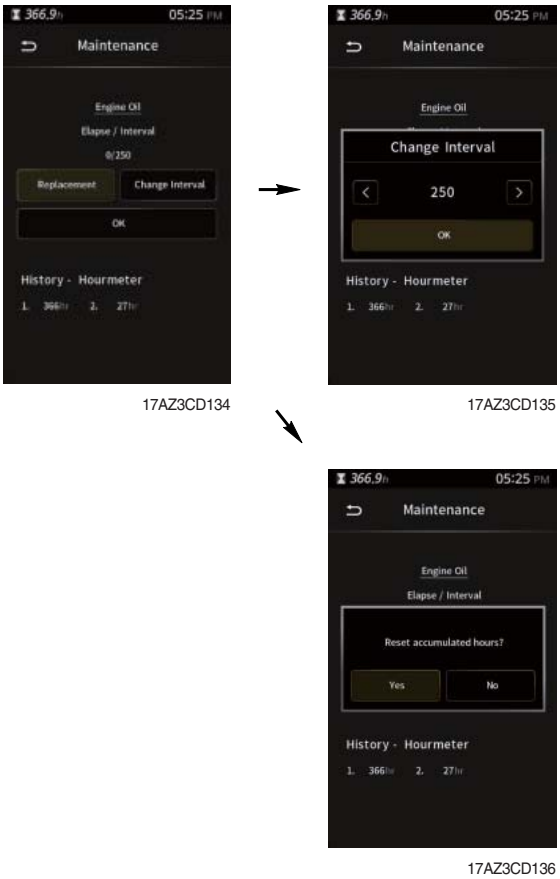
② Maintenance



17AZ3CD107 17AZ3CD132 17AZ3CD133

- Elapse : Maintenance elapsed time.
- Interval : The change intervals can be changed in hour increments of 50.
- History-Hourmeter : Display elapsed time.
- Replacement : The elapsed time will be reset to zero (0).

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

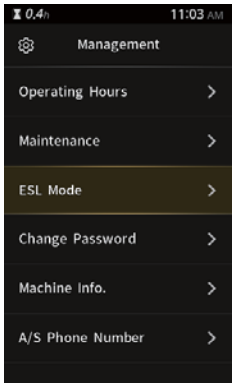


17AZ3CD134 17AZ3CD135

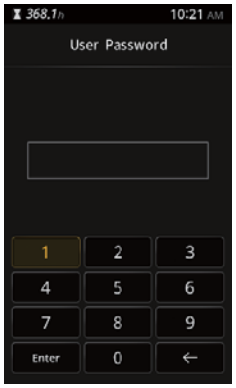
17AZ3CD136

③ ESL mode

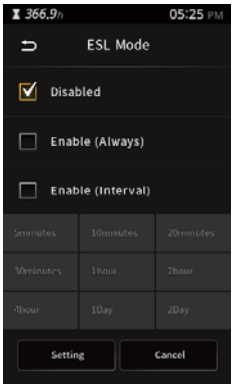
17AZ3CD107



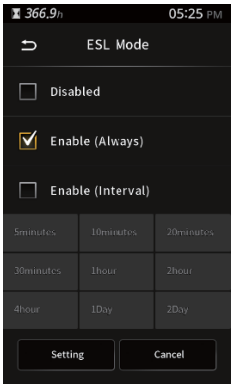
17AZ3CD137



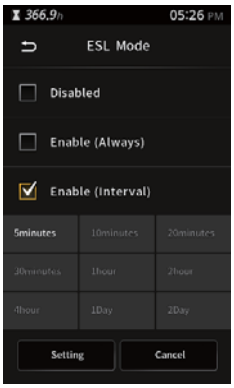
17AZ3CD138



17AZ3CD139



17AZ3CD140



17AZ3CD141

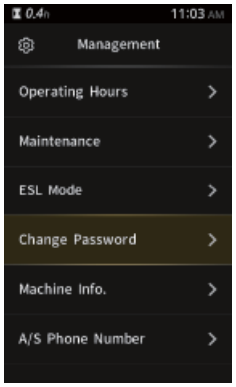
ESL mode setting

- ESL mode is designed to be a theft deterrent or will prevent the unauthorized operation of the machine.
- When you Enable the ESL mode, the password will be required when the starting switch is turned to the on position.
- Machine security
  - Disable : ESL function is disabled and password is not required to start engine.
  - Enable (Always) : The password is required whenever the operator starts engine.
  - Enable (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 to a maximum 2 days.

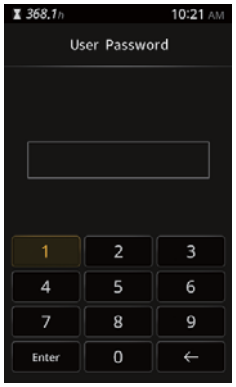
※ **ESL : Engine Starting Limit**

④ Change password

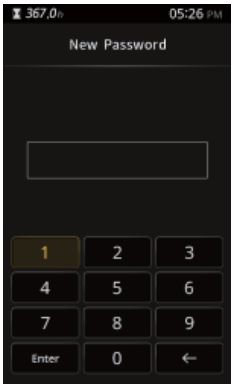
17AZ3CD107



17AZ3CD142



17AZ3CD143

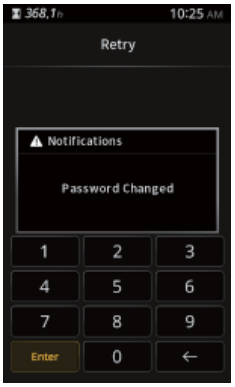


17AZ3CD144

- The password is 5~10 digits.

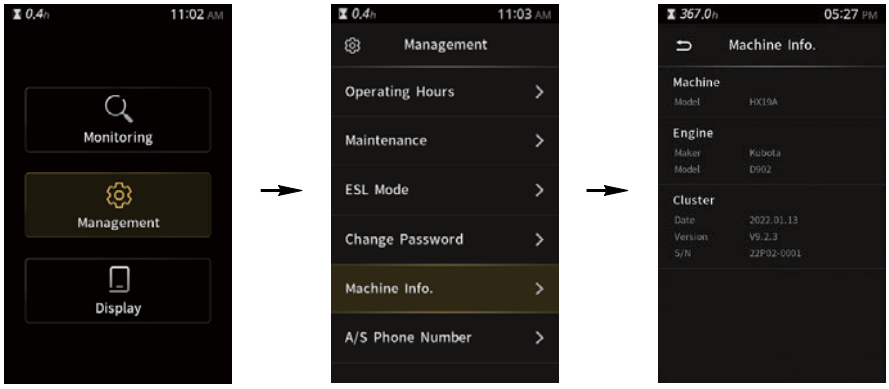
※ **Before first use, please set user password and owner password in advance for machine security.**

17AZ3CD145



17AZ3CD146

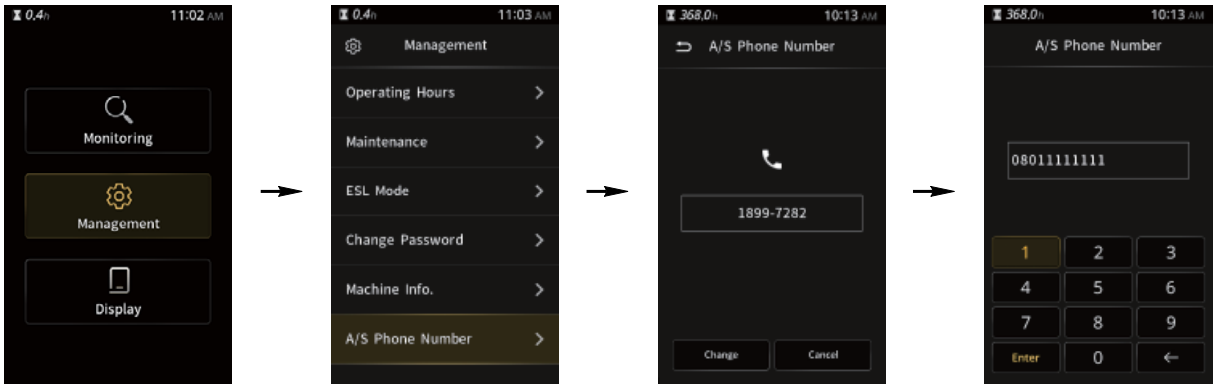
⑤ Machine information



17AZ3CD107 17AZ3CD147 17AZ3CD148

- This can confirm the identification of the machine, engine and cluster.

⑥ A/S phone number



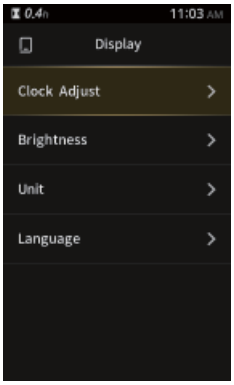
17AZ3CD107 17AZ3CD149 17AZ3CD150 17AZ3CD151

- The A/S phone number can be checked and changed.

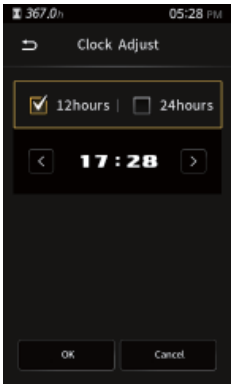
(4) Display set

① Clock adjust

17AZ3CD108



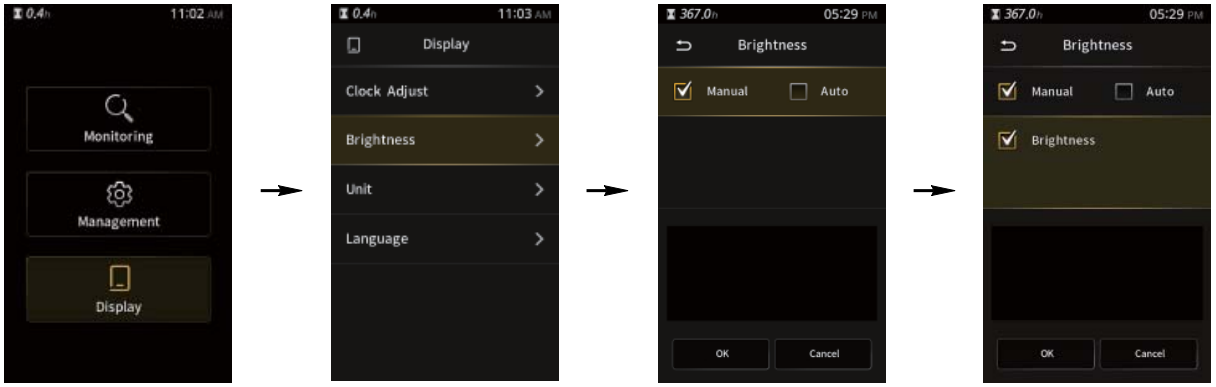
17AZ3CD160



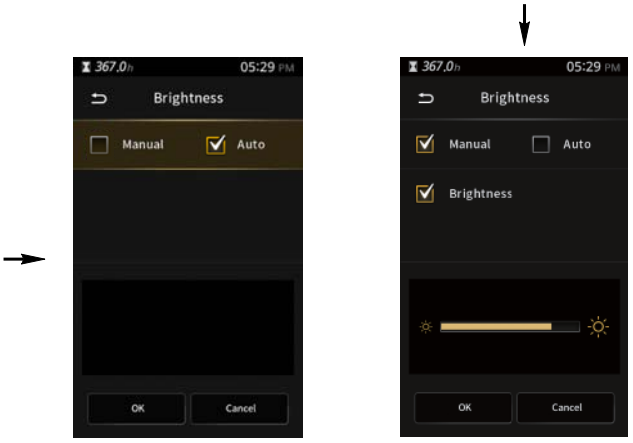
17AZ3CD161

- Set the time (12 hours or 24 hours)

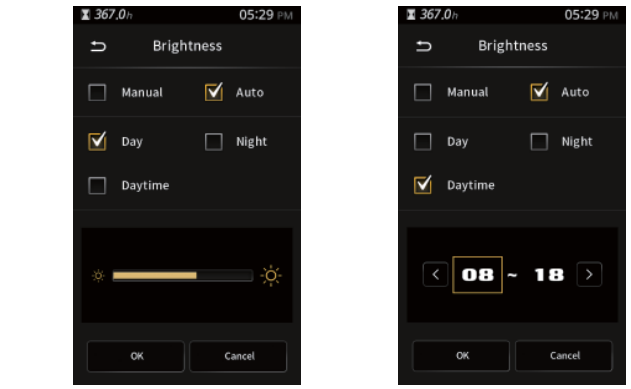
② Brightness



17AZ3CD108 17AZ3CD162 17AZ3CD163 17AZ3CD164



17AZ3CD166 17AZ3CD165



17AZ3CD167 17AZ3CD168

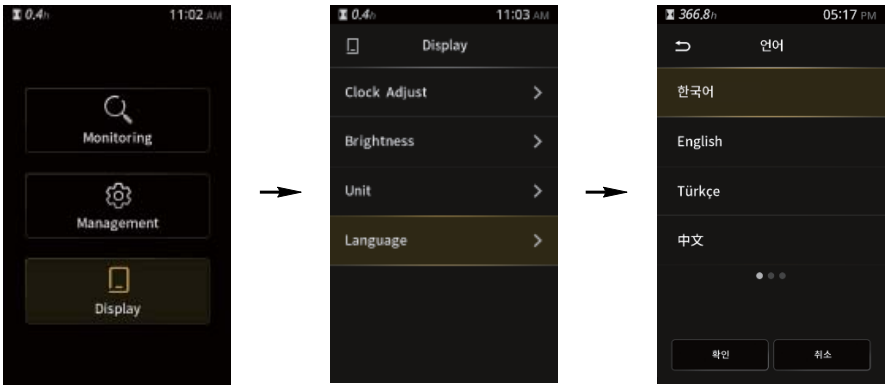
- Manual : Manual setting for LCD brightness.
- Automatic : Automatic control of LCD brightness as set level of Day/Night.
- Setting day time : Set the time for daylight.
  (in figure, black area represents night time while orange shows day time)

③ Unit

17AZ3CD108 17AZ3CD169 17AZ3CD170

- Temperature : °C ↔ °F

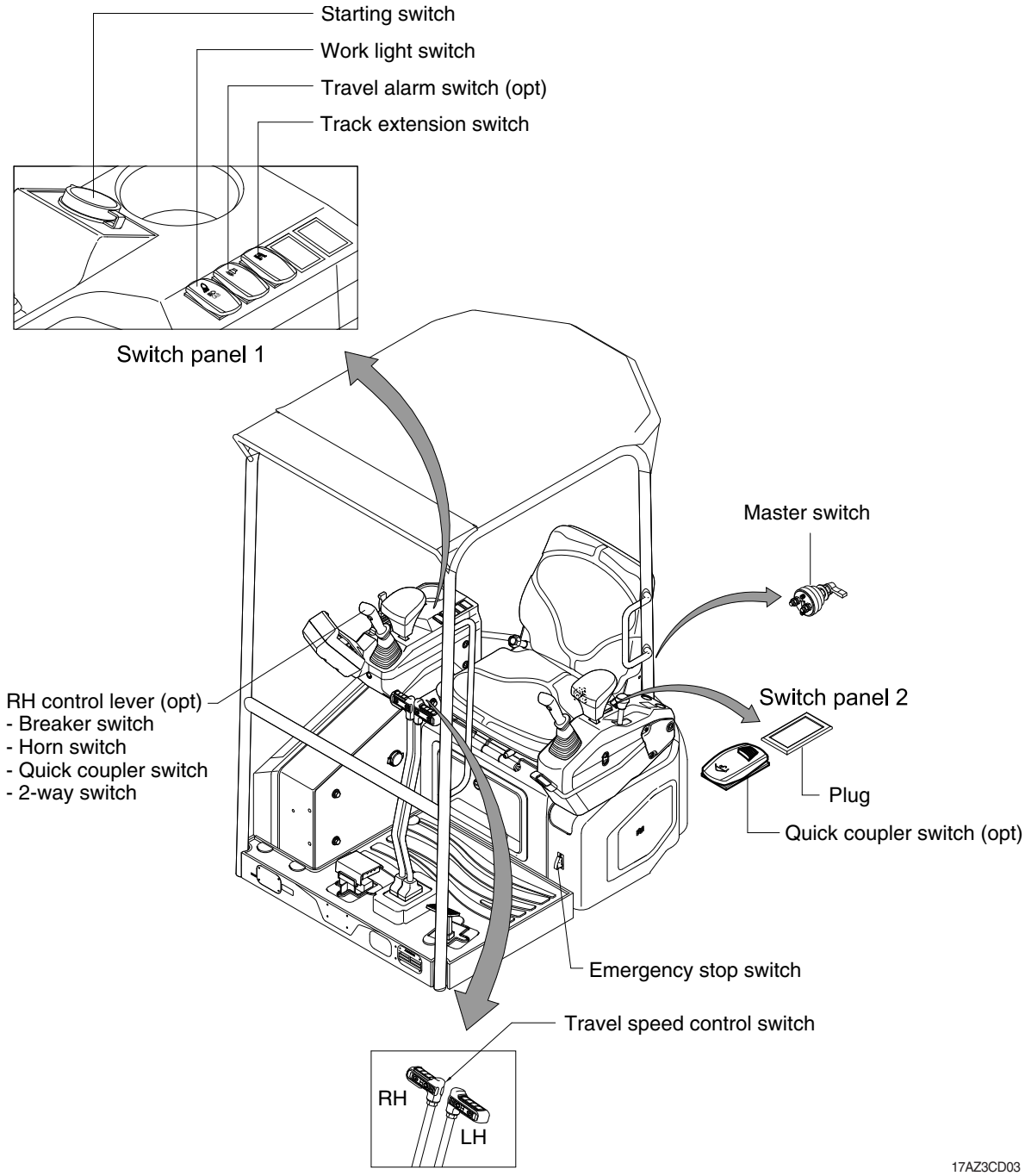
④ Language



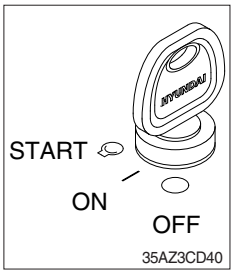
17AZ3CD108 17AZ3CD171 17AZ3CD172

- User can select preferable language and all displays are changed to the selected language (한국어, English, Turkish, etc ; total 12 languages).

3. SWITCHES



1) STARTING SWITCH



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

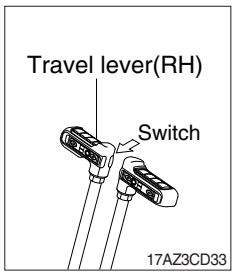
- ◯ (OFF) : None of electrical circuits activate.
- | (ON) : All the systems of machine operate.
- ⍥ (START) : Use when starting the engine. Release key immediately after starting.

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

2) WORK LIGHT SWITCH

(1) This switch use to operates the switch illumination lamp and work light by two step.
- First step : Light switch illumination lamp comes ON.
- Second step : Work light comes ON.

3) TRAVEL SPEED CONTROL SWITCH



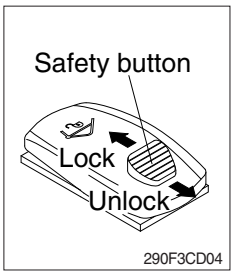
(1) This switch is to control the travel speed which is changed to high speed by pressing the switch and low speed by pressing it again.
(2) The travel speed pilot lamp lights ON on the cluster.

4) TRAVEL ALARM SWITCH (option)

(1) This switch is the signal to alarm surroundings when the machine travels to forward and backward.

(2) On pressing this switch, the alarm operates only when the machine is traveling.

5) QUICK COUPLER SWITCH (option)



(1) This switch is used to engage or disengage the moving hook on quick coupler.

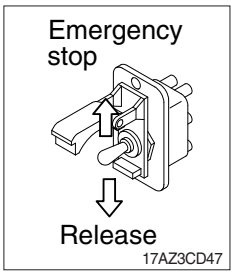
※ **Refer to the page 8-6 for details.**

6) TRACK EXTENSION SWITCH

(1) This switch is used to select the track operation.

※ **Refer to the page for 3-27 details.**

7) EMERGENCY STOP SWITCH



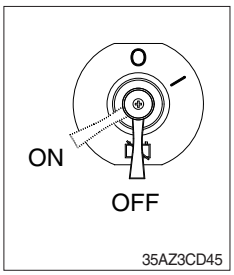
(1) This switch is used to emergency stop the engine.

(2) When the users control the emergency switch, the switch should not be maintained on "EMERGENCY STOP" position more than 10 seconds in order to avoid its failure.

(3) The users remind that it should be turned back to original "RELEASE" position within 10 seconds.

※ Be sure to keep the emergency switch on the release position when restart the engine.

8) MASTER SWITCH

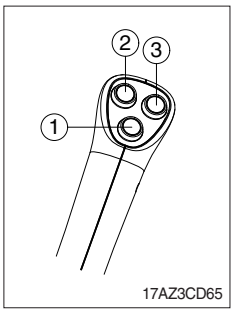


(1) This switch is used to shut off the entire electrical system.
I : The battery remains connected to the electrical system.
O : The battery is disconnected to the electrical system.

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

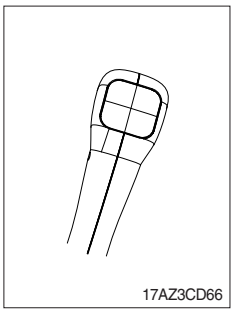
9) LH RCV LEVER SWITCH

(1) Without proportional type



The switches on the LH RCV lever are function as below.
① None
② None
③ None

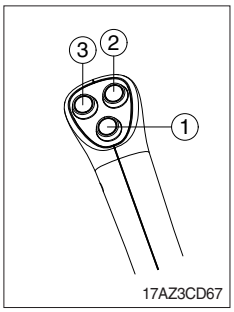
(2) With proportional type (option)



There is no switch on the LH RCV lever.

10) RH RCV LEVER SWITCH

(1) Without proportional type



The switches on the RH RCV lever are function as below.

① **Horn switch**

When this switch is pressed, the horn will sound.

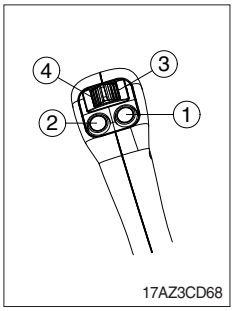
② None

③ **Quick coupler switch**

This switch is used to engage or disengage the moving hook on quick coupler.

※ **Refer to page 8-10.**

(2) With proportional type (option)



The switches on the RH RCV lever are function as below.

① **Horn switch**

When this switch is pressed, the horn will sound.

② **Quick coupler switch**

This switch is used to engage or disengage the moving hook on quick coupler.

※ **Refer to page 8-10.**

③ **Breaker switch (One way flow)**

When this switch is pressed, the breaker will only operate when the breaker operation mode is selected.

※ **Refer to page 4-27.**

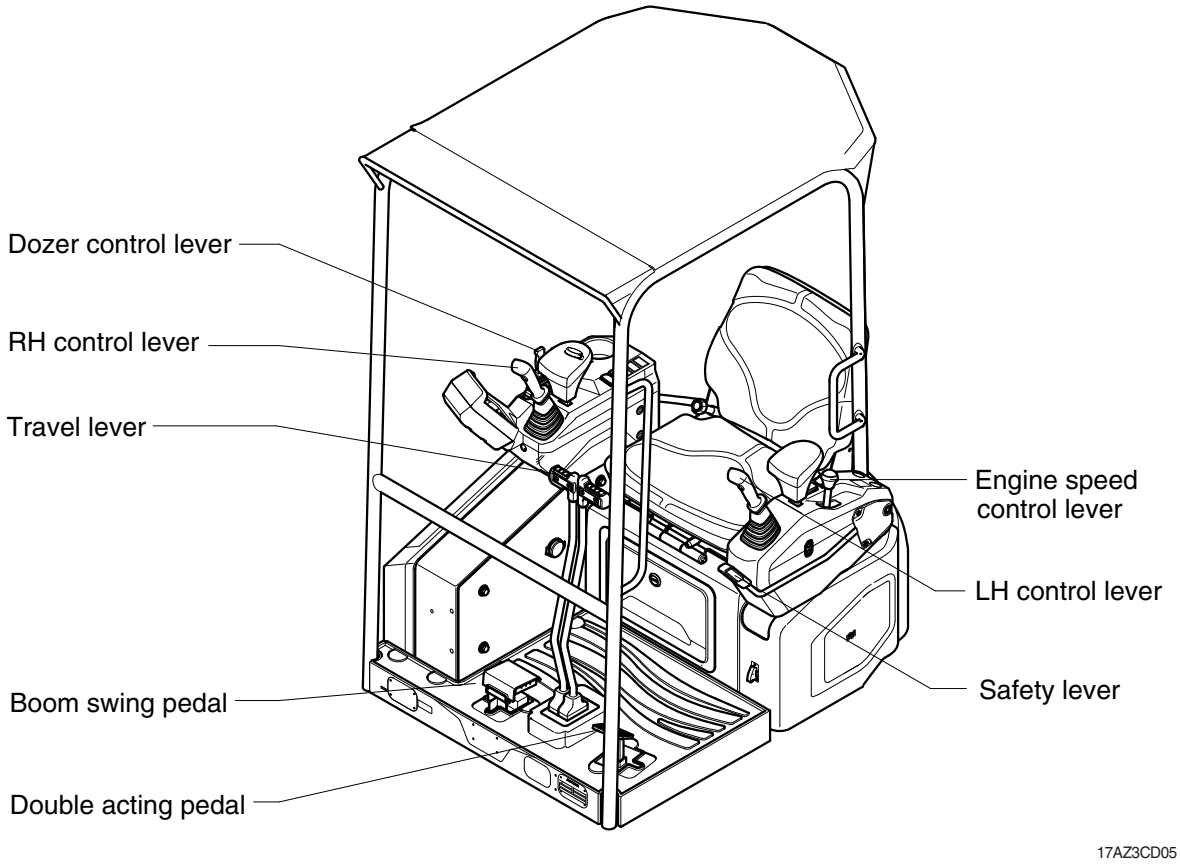
③ **2-way release switch (Two way flow)**

This switch is used to release for the shear.

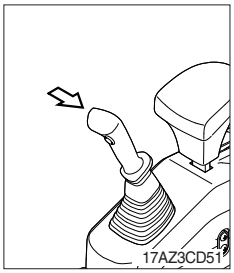
④ **2-way clamp switch (Two way flow)**

This switch is used to clamp for the shear.

4. LEVERS AND PEDALS



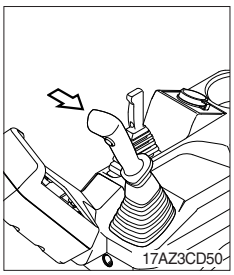
1) LH CONTROL LEVER



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

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

2) RH CONTROL LEVER



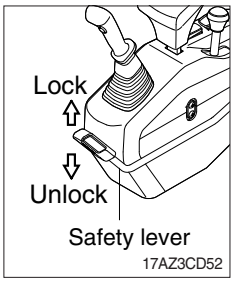
(1) This joystick is used to control the boom and the bucket.

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

(3) The breaker switch, horn switch, quick coupler switch and 2-way switch are installed on the control lever.

※ Refer to page 3-25 for details of the switch function.

3) SAFETY LEVER



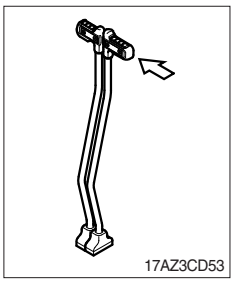
(1) All control levers are disabled from operation by locating the lever to lock position as shown.

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

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

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

4) TRAVEL LEVER

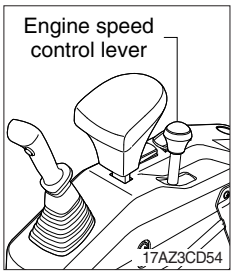


(1) This lever is used to move the machine forward or backward.

(2) If left side lever is pushed or pulled, left track will move.
If right side lever is pushed or pulled, right track will move.

(3) Refer to traveling of machine in chapter 4 for details.

5) ENGINE SPEED CONTROL LEVER

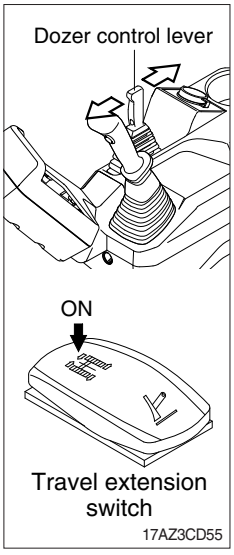


(1) This lever is used to increase or decrease the rotation speed of engine.

(2) Move the lever backward to increase engine RPM. Move the lever forward to decrease engine RPM.

(3) When stopping the engine, move the engine speed control lever forward completely and turn key OFF.

6) DOZER CONTROL LEVER



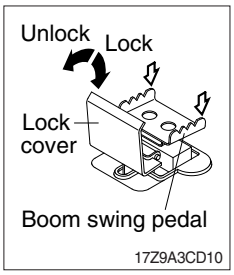
(1) This lever is used to operate the dozer blade or crawler.

(2) Travel extension switch : OFF
The lever is pushed forward, the dozer blade will be going down.
The lever is pulled back, the dozer blade will be going up.

(3) Travel extension switch : ON
The lever is pushed forward, the track extend out the maximum length.
The lever is pulled back, the track retract to the minimum one.

※ **Refer to the page 3-23 for the travel extension switch.**

7) BOOM SWING PEDAL

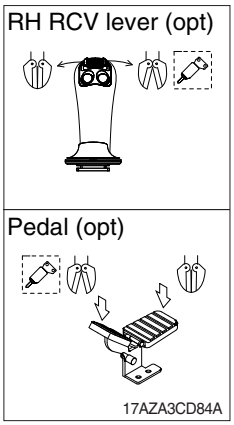


(1) This pedal is used to swing the boom to the right or left direction.

(2) Move the lock cover to unlock position by foot.

(3) The pedal is pressed to left side, boom will swing to the left direction. The pedal is pressed to right side, boom will swing to the right direction.

8) DOUBLE ACTING SWITCH AND PEDAL (option)



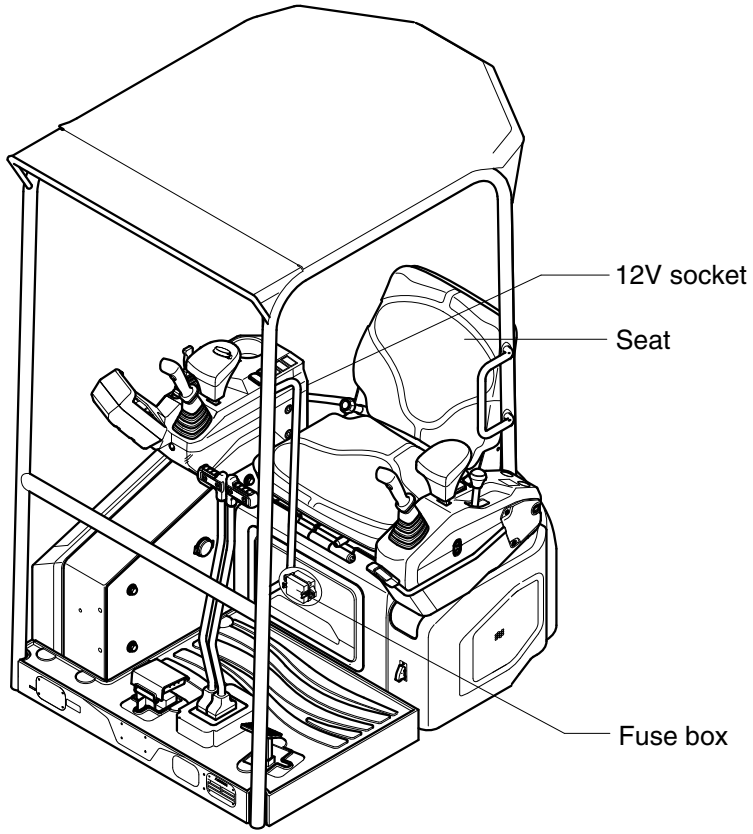
(1) This switch or pedal is used to operate the breaker or shear if equipped.

※ **This switch applies to single or double action hydraulic attachment circuit.**

※ **This pedal applies to single or double action hydraulic attachment circuit.**

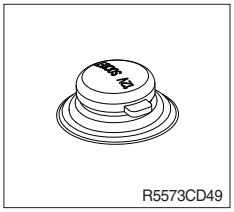
※ **Refer to page 4-27.**

5. OTHERS



17AZ3CD06

1) 12V SOCKET (option)

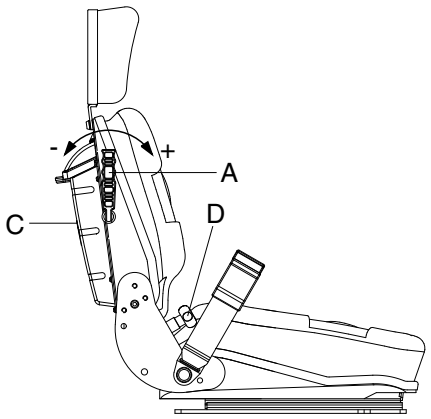


R5573CD49

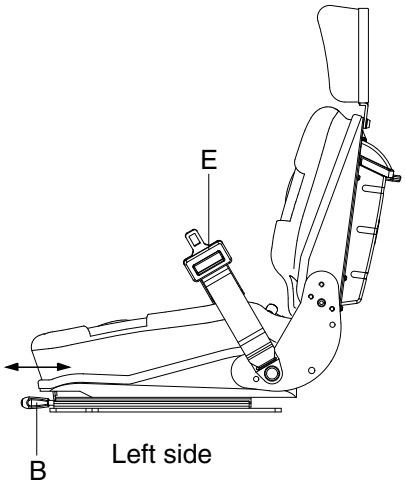
(1) Utilize the power of 12V as your need and do not exceed power of 12V, 120W.

2) SEAT

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



Right side



Left side

17Z9A3CD70

(1) Weight adjustment (A)

※ Make the adjustment while the operator is seated, so that the seat is loaded.

Mechanical suspension incorporated in the seatback

Turn the lever situated on the right side of the seatback. Correct adjustment is reached when the seat height is taken to half the travel stroke of the suspension.

(2) Longitudinal adjustment (B)

Move the adjustment lever on the left guide of the seat to unlock the guides.

When adjustment is completed, ensure that the lever "clicks" and locks the guides. Check that the seat does not move longitudinally.

(3) Document holder pocket (C)

Rigid pocket with upper cover open the pocket by lifting the cover upwards.

(4) Inclination of the seatback (D)

For tilting back seats, press the lever on the lower right near the seat to free the seatback. With your back resting against the seatback, move the seatback to the desired position, release the lever and accompany it up to the first perceptible click. Then check that the seatback is locked.

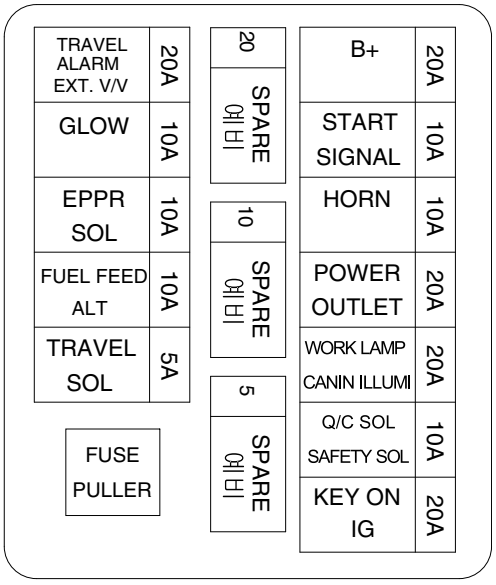
(5) Safety belt (E)

Static safety belt adjust the length based on the operator's abdominal size while he is resting against the seatback and keeping the safety belt adherent to the lower part of the abdomen on the thigh side. While keeping the tang perpendicular to the belt, shorten if by pulling part (free end) and lengthen if by pulling part.

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

⚠ Fail to wear a seat belt during the machine operation may result in serious injury or death in the event of an accident or machine overturn.

3) FUSE BOX



17AZ3CD60

(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.

※ **When replacing a fuse or relay, always use one of the same capacity.**

⚠ **Before replacing a fuse or relay, be sure to turn OFF the starting switch.**

1. INSTRUCTION FOR NEW MACHINE

1) It takes about 100 operation hours to enhance its designed performance.

2) Operate according to the 3 steps below 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 performance of machine and shorten the life of the machine.

3) Be careful during the initial 100 hours operation

(1) Check daily for the level and leakage of fluids.

(2) Check greasing points on a regular basis and grease all points as needed. Refer to greasing chart located on the machine.

(3) Check over all hose connections, bolts, nuts and screws, on a daily basis.

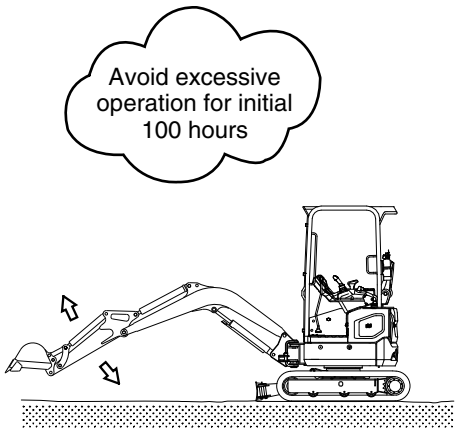
(4) Warm up the machine fully before operating.

(5) Check all gauges occasionally during the operation.

(6) Check if the machine is operating normally during operation.

4) After the initial 250 hours of operation replace or change the following:

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



17AZ4OP01

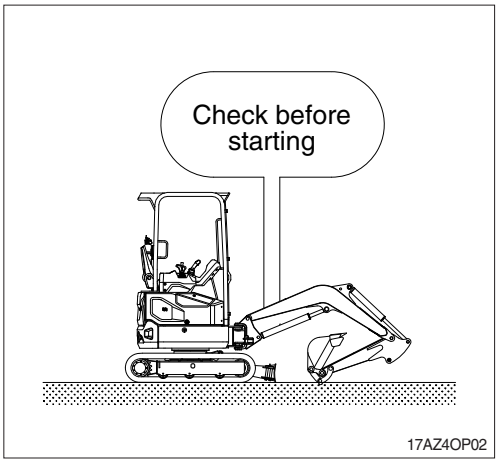
2. CHECK BEFORE STARTING THE ENGINE

1) Look around and under the machine to check:
   - Check for loose nuts, bolts or wiring
   - Collection of dirt
   - Collection of dust at places which reach high temperature
   - Leakage of oil, fuel or coolant
   - Condition of the work equipment and hydraulic system.

※ Refer to section, Maintenance check list in chapter 6.

2) Adjust operator seat to best fit the operator.

3) Adjust all mirrors to best fit the operator.



3. STARTING AND STOPPING THE ENGINE

1) CHECK INDICATOR LIGHTS

(1) Confirm all operating levers are on the neutral position.

(2) Turn the starting switch to the ON position, and check following.

① If all the lamps light ON and buzzer sounding for 6 seconds.

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

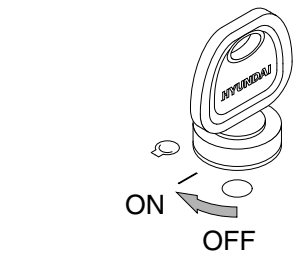
· Engine oil pressure warning lamp (1)

· Battery charging warning lamp (2)

※ If the ESL mode is set to the Enable (always) mode, enter the password to start engine.

※ If the incorrect password in entered a total of 5 times, you must wait 30 minutes before trying again.

※ Refer to the page 3-16 for ESL mode setting.



17AZ4OP04

2) STARTING ENGINE IN NORMAL

⚠ Check if any obstacles or people are in the working area. Sound the horn to warn anyone in the vicinity that you are starting the engine.

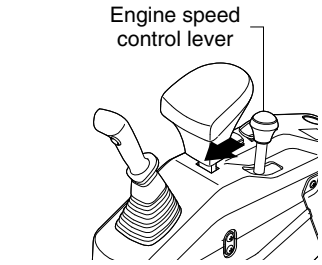
(1) Move the engine speed control lever forward completely.

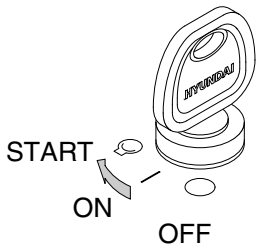
(2) Turn the starting switch to START position to start the engine.

△ 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.





17AZ4OP05

3) STARTING ENGINE IN COLD WEATHER

※ By following below steps, you will be able to improve startability and fuel consumption in cold weather.

⚠ Always check for obstacles in the area and sound horn before starting the engine.

※ Check engine oil and fuel and replace as necessary. See page 2-21.

※ Top off coolant as needed.

※ When you turn ON starting switch, the fuel warmer automatically heats the fuel as needed by sensing coolant temperature.

(1) Confirm all levers are in the neutral position.

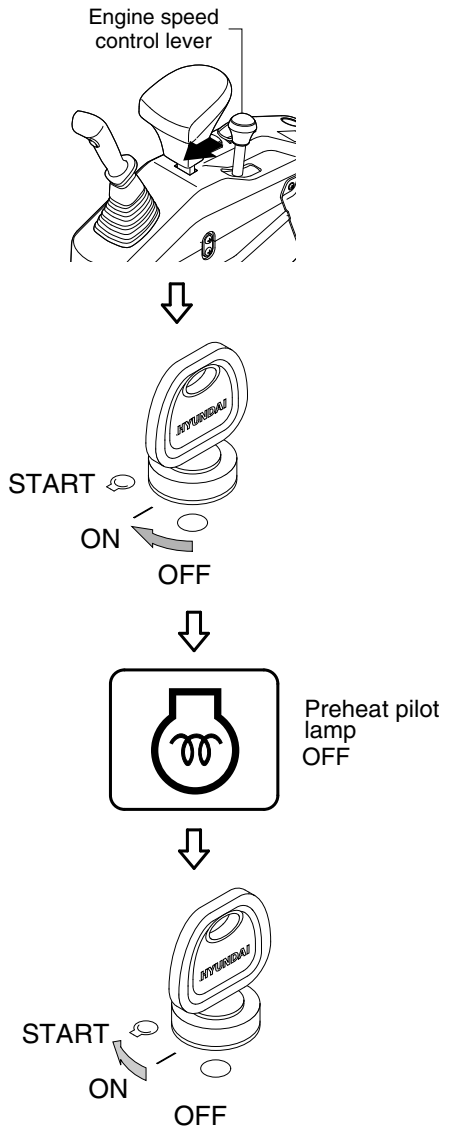
(2) Move the engine speed control lever forward completely.

(3) Turn the starting switch to the ON position, and wait the preheat pilot lamp turns off.

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

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

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



4) INSPECTION AFTER ENGINE START

Inspect and confirm the following after engine starts.

(1) Is the oil level gauge of hydraulic tank in the normal operation range?

(2) Is there any leakage of oil or water?

(3) Are any warning lamps (2) ON?

(4) Are indicators for coolant temperature gauge (1) in the normal operating range?

(5) Is the engine sound and the color of exhaust gas normal?

(6) Are the sound and vibration normal?

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

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

17AZ4OP07

5) WARMING-UP OPERATION

※ **The most suitable temperature for the hydraulic oil is about 50 °C (122 °F).**
If the hydraulic oil temperature drops below 25 °C (77 °F), sudden operation can damage the hydraulic system. So temperature must be raised to at least 25 °C (77 °F) before starting work.

(1) Run the engine at low idling for 5 minutes.

(2) Speed up the idling and run the engine at mid-range speed.

(3) Operate bucket lever for 5 minutes.

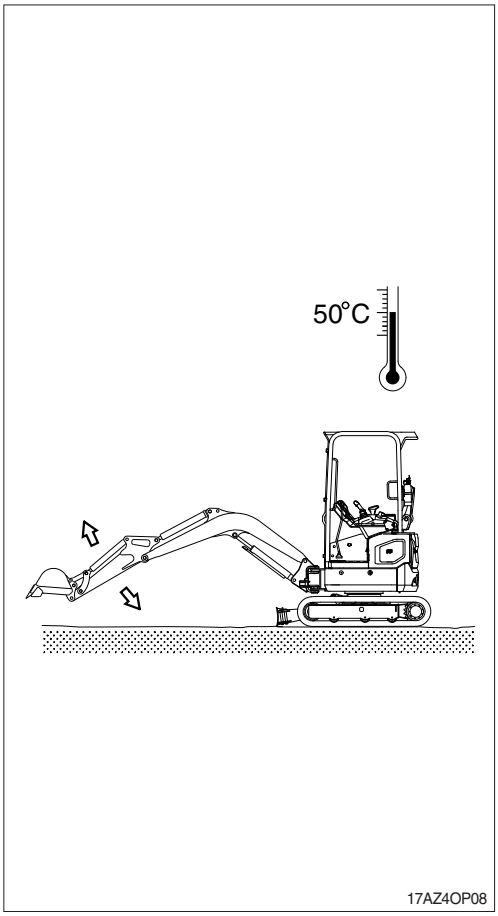
※ **Do not operate anything except bucket lever.**

(4) Run the engine at the high speed and operate the bucket lever and arm lever for 5-10 minutes.

※ **Operate only the bucket lever and arm lever.**

(5) Finally this warming-up process will be completed by operating all cylinders several times along with the operation of swing and traveling.

※ **Increase the warming-up operation during winter.**



17AZ4OP08

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 low speed to allow it to cool gradually, then stop the engine.**

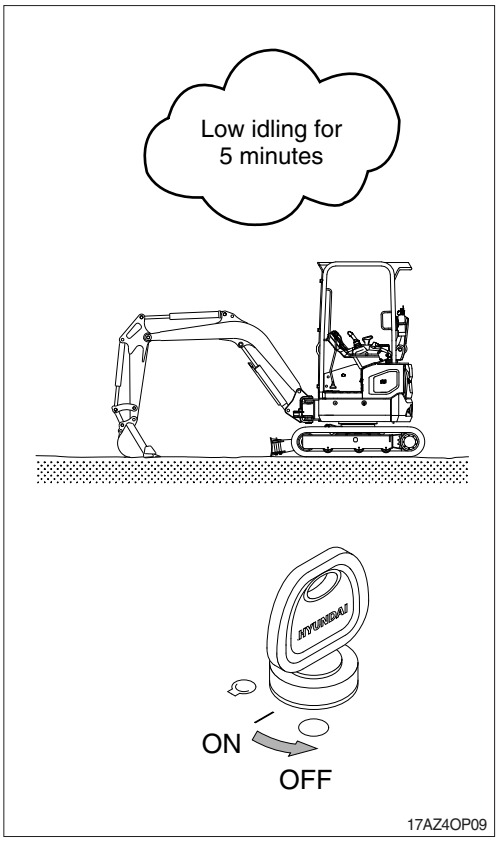
(1) Lower the bucket to the ground then put all the levers in the neutral position.

(2) Run the engine at low idling speed for about 5 minutes.

(3) Return the key of starting switch to the OFF position.

(4) Remove the key to prevent other people using the machine and lock the safety lever.

(5) Lock the cab door.



4. OPERATION OF WORKING DEVICE

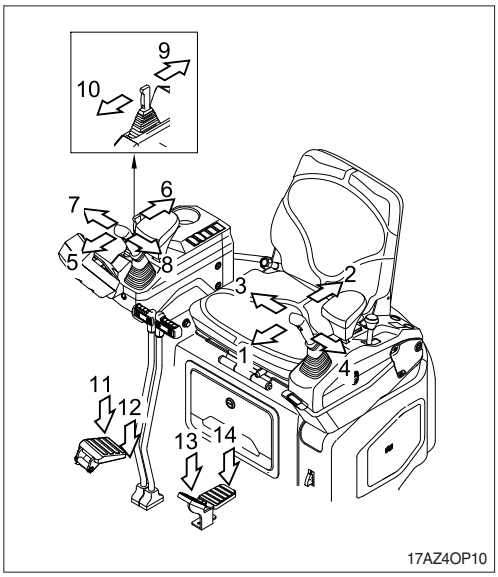
※ Confirm the operation of control lever and working device.

1) Left control lever controls arm and swing.

2) Right control lever controls boom and bucket.

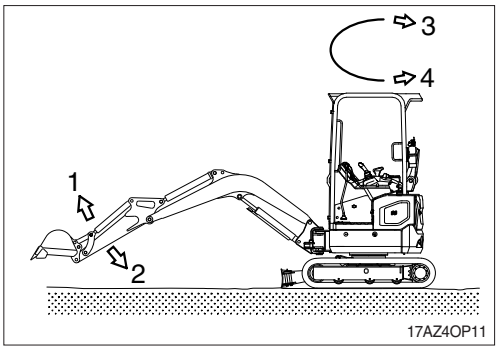
3) When you release the control lever, control lever returns to neutral position automatically.

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



※ Left control lever

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

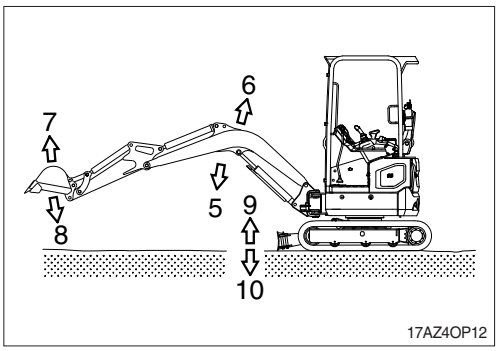


※ Right control lever

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

※ Dozer control lever

9 Dozer blade up
10 Dozer blade down

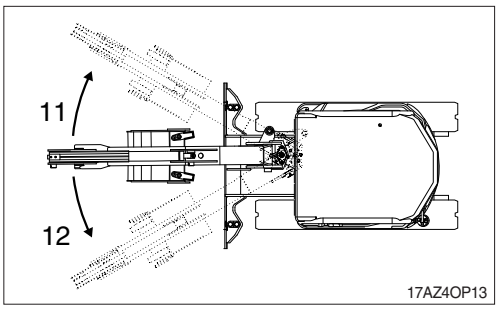


※ Boom swing pedal

11 Boom swing right
12 Boom swing left

※ Option control pedal

13, 14 Refer to optional attachment



5. TRAVELING OF THE MACHINE

1) BASIC OPERATION

(1) Traveling position

The travel motor is in the rear and the working device is forward.

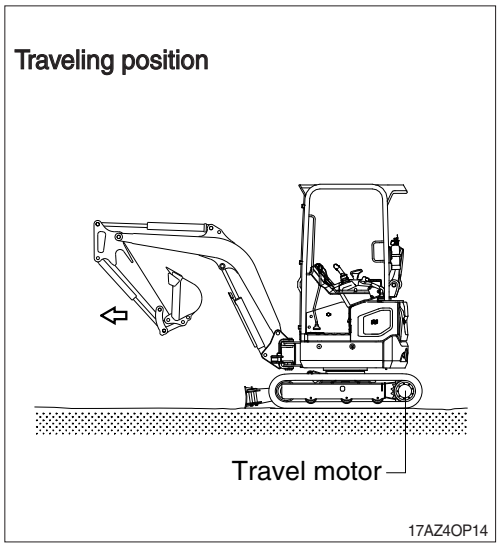
⚠ Be careful as the traveling direction will be the opposite when the machine is rotated 180°.

(2) Traveling operation

It is possible to travel by either travel lever.

※ Do not travel continuously for a long time.

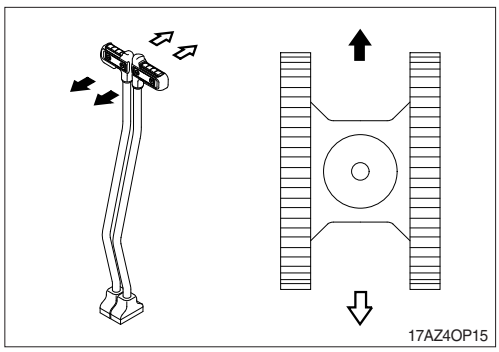
※ Reduce the engine speed and travel at a low speed when traveling on uneven ground.



(3) Forward and backward traveling

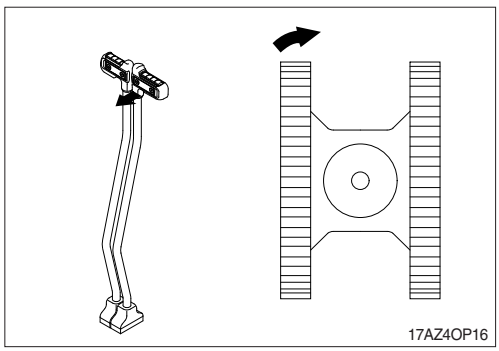
When the left and right travel levers are pushed at the same time, the machine will travel forward or backward depending on your selection.

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



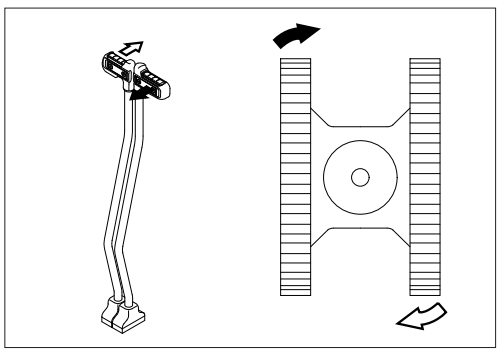
(4) Pivot turning

Operating only one side of lever makes the change of direction possible by moving only one track.



(5) Counter rotation

It is to rotate the undercarriage (only) while not advancing the machine forward or backward. This is accomplished by moving the travel levers in the opposite direction of each other.



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) Maintain the bucket 20 to 30 cm (1 ft) from the ground so that it can be used as a brake in the event of an emergency.

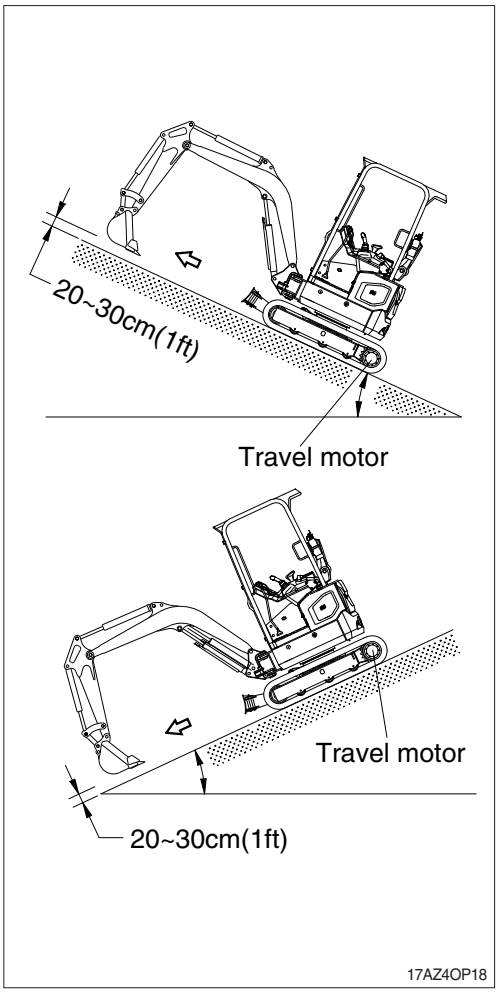
(3) If the machine starts to slide or loses stability, lower the bucket immediately as it will help slow or stop the machine.

(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. Serious injury or death could occur.

⚠ Be sure to keep the travel speed switch on the LOW while traveling on a slope.



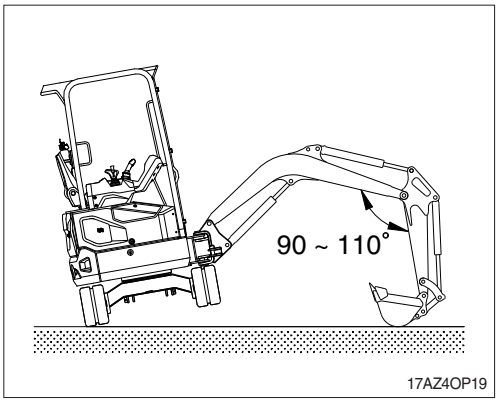
3) TRAVELING ON SOFT GROUND

※ If possible, avoid operating 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

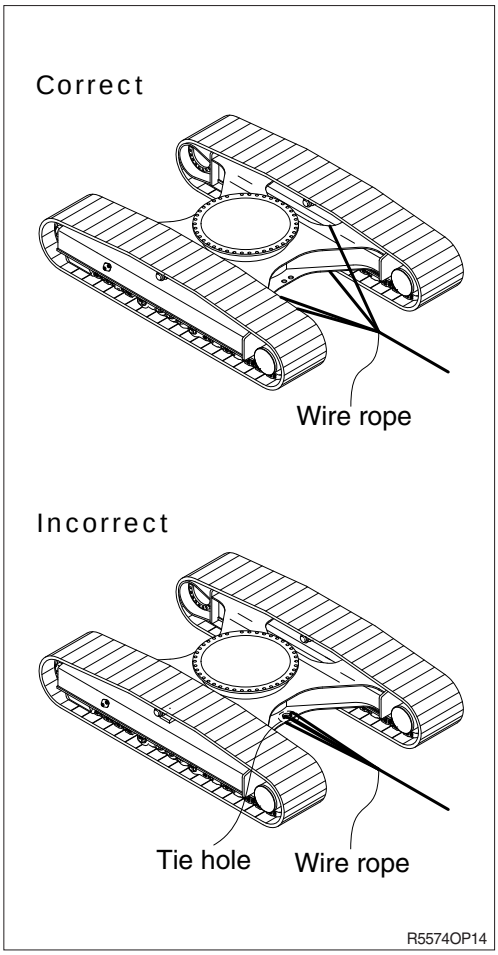
Tow the machine as follows when it can not move on its own.

(1) Tow the machine after hooking the wire rope to the frame as shown in the upper right illustration.

(2) Hook the wire rope to the frame and put a support under each part of wire rope to prevent damage.

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

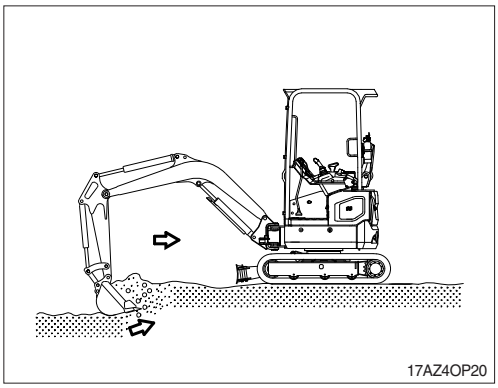
⚠ Make sure no personnel are standing close to the tow rope as serious injury or death could occur if it breaks.



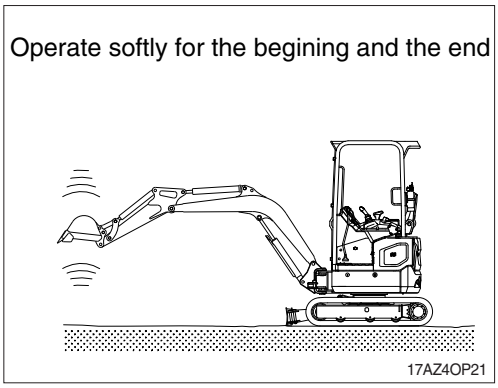
6. EFFICIENT WORKING METHOD

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

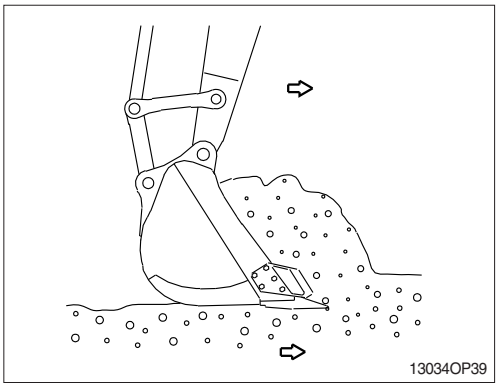
※ **Consult the local regulations and instructions when using the dozer blade for additional machine stability. For the installation of a dozer cylinder safety valve, please contact your HD Hyundai Construction Equipment dealer.**



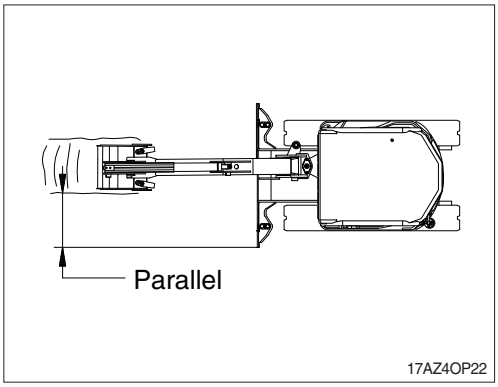
2) When lowering and raising the boom operate softly for the beginning and the end.
   In particularly, sudden stops while lowering the boom may cause damage to the machine.



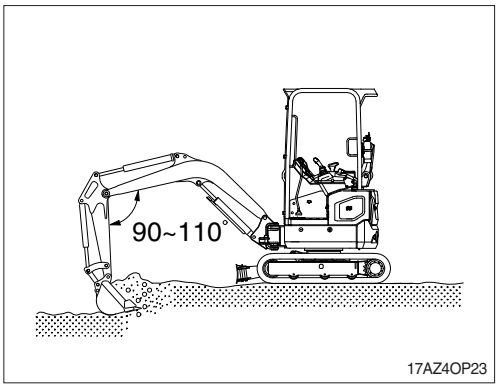
3) The digging resistance and wearing of tooth can be reduced by putting the end of bucket tooth to the digging direction.



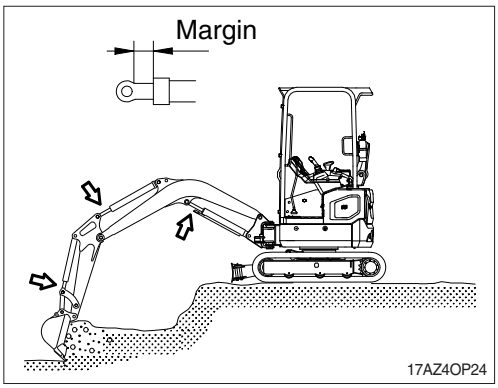
4) Set the tracks parallel to the line of the ditch to be excavated when digging ditch. Do not swing while digging.



5) Dig slowly while keeping the angle of boom and arm at a 90-110° when maximum digging force is required.

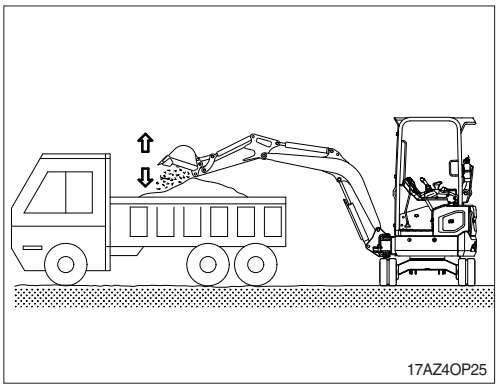


6) Leave a small margin of cylinder stroke to prevent damage of cylinder when working with the machine.

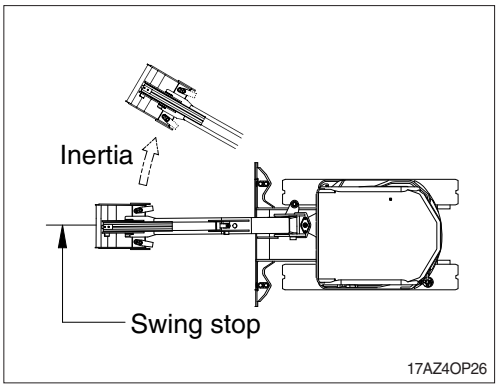


7) Keep the bucket to the dumping position and the arm horizontal when dumping the soil from the bucket.
Operate bucket lever 2 or 3 times when hard to dump.

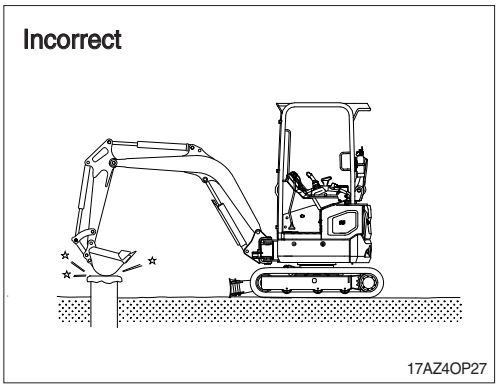
※ **Do not use the impact of bucket tooth when dumping.**



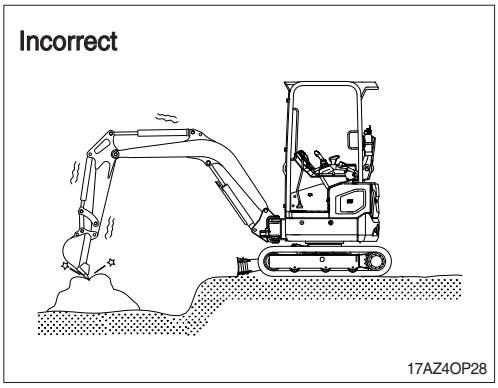
8) Operate stop of swing considering the swing slip distance is created by inertia after neutralizing the swing lever.



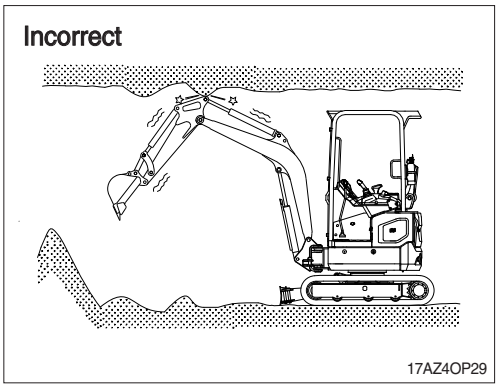
9) Do not use the dropping force of the work equipment for digging.
The machine can be damaged by the impact.



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



11) 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.

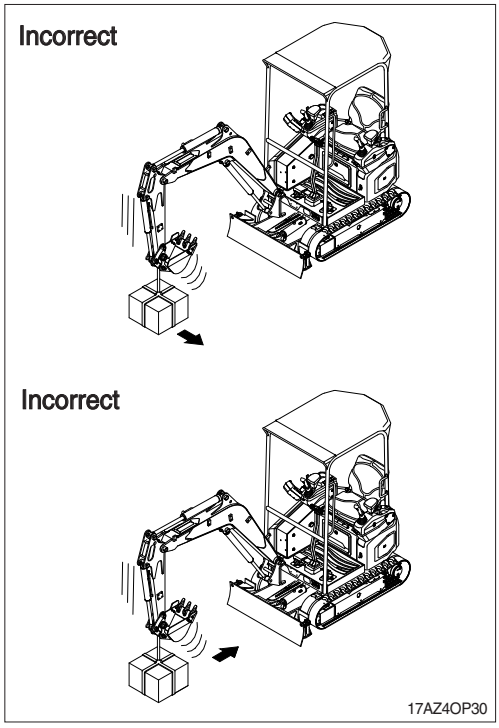


12) NEVER CARRY OUT EXCESSIVE OPERATIONS

Operation exceeding machine performance may result in accident or failure causing serious injury or death.

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

Never travel while carrying a load.



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

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

*** : Please contact your HD Hyundai Construction Equipment dealer for installation.**

13) BUCKET WITH HOOK

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

The following operations are prohibited.

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

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

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

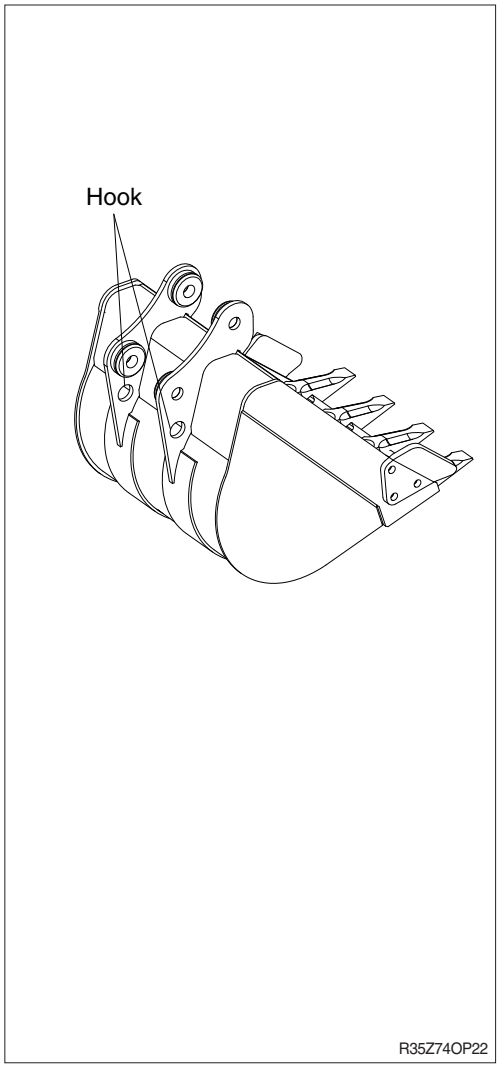
Due to the possible danger of the load falling or of collision with the load, no persons shall be allowed in the working area.

Before performing lifting operation, designate an operation supervisor.

Always execute operation according to their instructions.

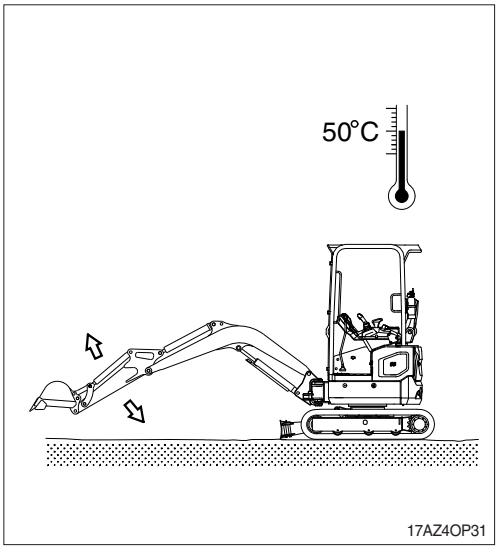
- Execute operating methods and procedures under their direction.
- Select a person responsible for signaling. Operate only on signals given by such person.

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



7. OPERATION IN THE SPECIAL WORK SITES

1) OPERATING 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 lights up 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 parts, such as pins and bushings, clean at all times.

(6) If the air conditioner and heater filters clog, 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, 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 nuts.

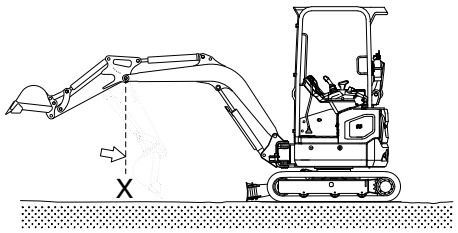
(2) Loosen the track tension slightly when working in such areas.

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

8. NORMAL OPERATION OF EXCAVATOR

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

1) When rolling in the arm, the roll-in movement stops momentary at point **X** in the picture shown, then recovers speed again after passing point **X**. This is because movement by the arm weight is faster than the speed of oil flow into the cylinder.
2) When lowering the boom, you 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 swinging or stopped, a noise near the swing motor may be heard. The noise is generated when the brake valve relieves.



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9. ATTACHMENT LOWERING (When engine is stopped)

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

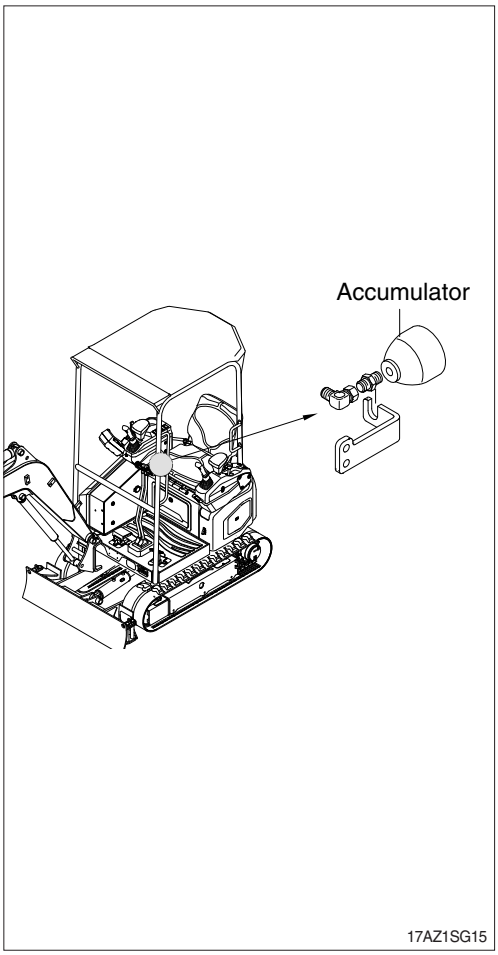
⚠ **Be sure no one is under or near the attachment before lowering the boom. Failure to comply could result in serious injury or death.**

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 flames 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 HD Hyundai Construction Equipment distributor.**



10. STORAGE

When storing the machine for longer than 1 month, follow these procedures:

1) BEFORE STORAGE

(1) Cleaning the machine

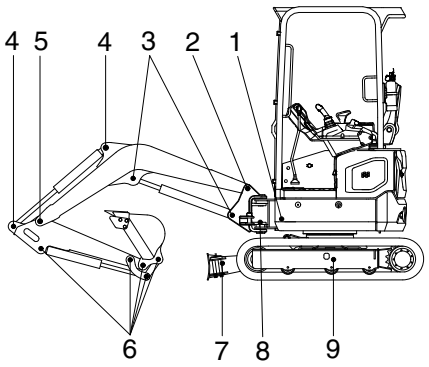
Clean the machine. Check and adjust tracks. Grease each lubrication part.

(2) Lubrication position of each part

Change all oil.

※ Be particularly careful when you reuse the machine. As oil can be diluted during storage. 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 (3EA)
2 Boom connection pin (2EA)
3 Boom cylinder pin (2EA)
4 Arm cylinder pin (2EA)
5 Boom and arm connection pin (1EA)
6 Arm and bucket (5EA)
7 Dozer blade and cylinder (4EA)
8 Boom swing post and cylinder (4EA)
9 Extension cylinder pin (2EA)

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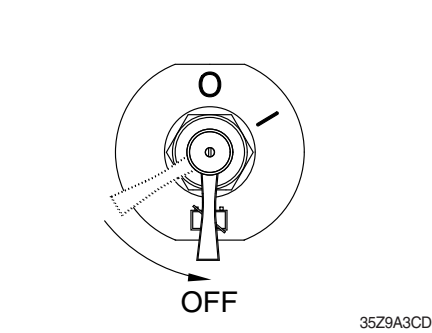
(3) Master switch

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

⚠ Turn OFF the master switch after the lamp goes OFF.

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



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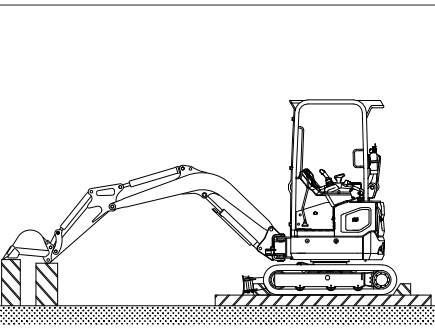
(5) Prevention of dust and moisture

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

※ Cover exposed part of piston rod on cylinder.

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



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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.**

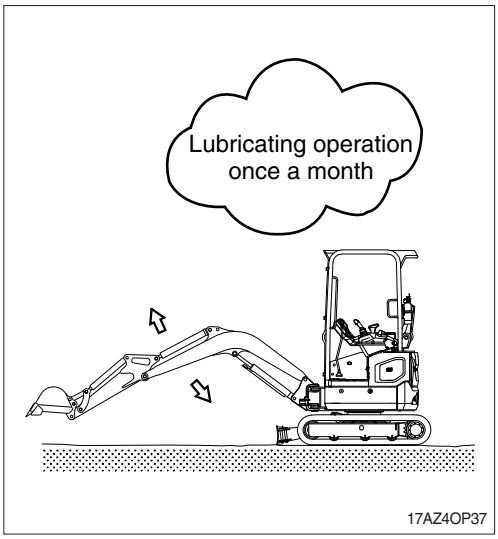
※ **Operate the machine such as traveling, swing and work equipment operation to make sure enough lubrication of all functional components.**

※ **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 12.54V.

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 over 6 months.**

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.**

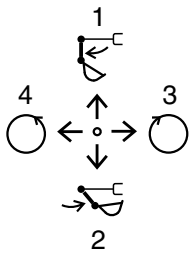
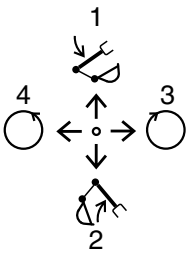
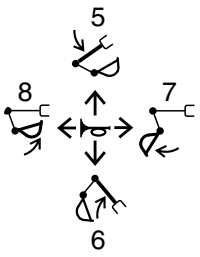
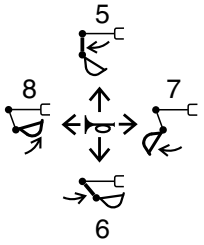
※ **If the machine is stored without carrying out the monthly lubricating operation, consult your HD Hyundai Construction Equipment dealer for service.**

11. RCV LEVER OPERATING PATTERN

1) PATTERN CHANGE VALVE INSTALL (option)

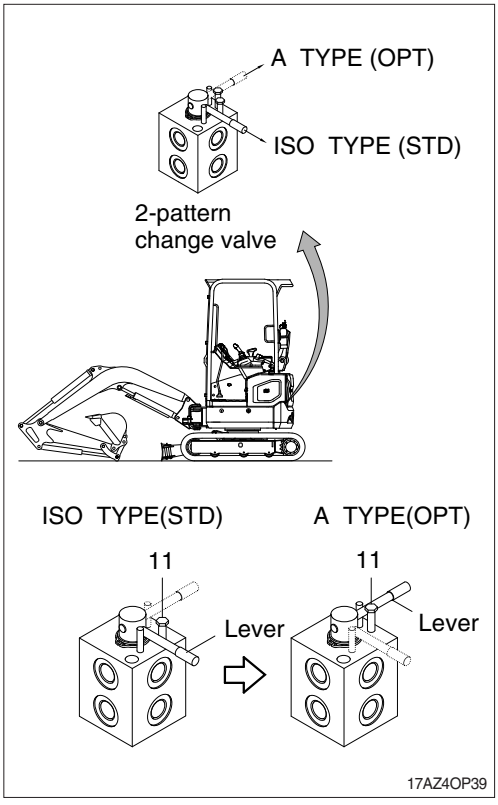
※ If the machine is equipped with the pattern change valve, the machine operation pattern can be easily changed.

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

Operation	ISO type	A type
Left RCV lever		
Right RCV lever		

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

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



(2) Change of operating pattern

① Loosen the bolt (11).

② Move lever from the "ISO type" to "A type" position.

③ After the lever is set, tighten the bolt in order to secure the lever.

12. HANDLING THE RUBBER TRACKS

1) USING THE RUBBER TRACKS PROPERLY

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

Comparison table of rubber and steel tracks

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

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

2) WARRANTY FOR RUBBER TRACKS

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

3) PROHIBITIONS FOR USING THE RUBBER TRACKS

(1) Do not operate or turn on surfaces of terrains that have sharp stones, a hard, uneven rock base, or that expose the tracks to steel rods, scrap iron, or edges of iron plates. Failure to observe these prohibitions may damage the rubber tracks.

(2) Do not operate the machine on a stony surface like a riverbed. Doing this may damage the rubber tracks by catching gravel in the tracks or may cause the tracks to come off. Forcibly pushing obstacles will also shorten the life of the rubber tracks.

(3) Prevent the rubber tracks from getting exposed to oil, fuel or chemical solvents. If they are exposed, immediately wipe them. Also, do not travel on roads which have oily surfaces.

(4) When storing the rubber tracks for a long time period (more than three months), avoid placing them in a place subject to direct exposure to sunlight or rain.

(5) Do not operate the machine when the tracks will be exposed to heat, (i.e., near an open-air fire, on a steel plate that has been exposed to the blazing sun, or on a hot asphalt road.)

(6) Never run on one rubber track while the other is held above the ground with the implement. Doing this may damage the rubber track or cause it to come off.

4) PRECAUTIONS FOR USING THE RUBBER TRACKS

Observe the following precautions when operating the machine :

(1) Never spin-turn on concrete or asphalt roads.

(2) Do not change course suddenly. Doing this will cause the rubber track to wear early or be damaged.

(3) Do not turn the machine across a large level gap while traveling . Remember that running over a level gap at a right angle will prevent the track from coming off.

(4) Slowly lower the machine after it has been lifted above the ground with the implement.

(5) It is not recommended that the machine be used to handle any materials that become oily after being crushed (e.g., soybeans, corn, rapeseed oil seeds, etc.). After unavoidably using the machine to handle such materials, clean the tracks with water.

(6) It is not recommended that the machine be used to handle materials such as salt, ammonium sulfate, potassium chloride, potassium sulfate, or superbiphosphate of lime. Handling these materials may affect the core metal adversely. After using the machine to handle such materials, clean the tracks with water.

(7) Do not operate the machine at the seashore. Doing this may affect the core metal adversely due to the salt content.

(8) If a rubber track is cracked, it could be easily damaged when exposed to salt, sugar, wheat, or soybeans. Be sure to repair any cracks in the rubber track to prevent rubber chips from getting into the materials being handled.

(9) Do not allow the rubber track to rub aginst a concrete wall.

(10) The rubber tracks are prone to slip on snow or on a frozen road. Be careful of skidding when traveling or operating on a slope in cold weather.

(11) Operating the machine in extremely cold weather will deteriorate the rubber tracks, shortening their life.

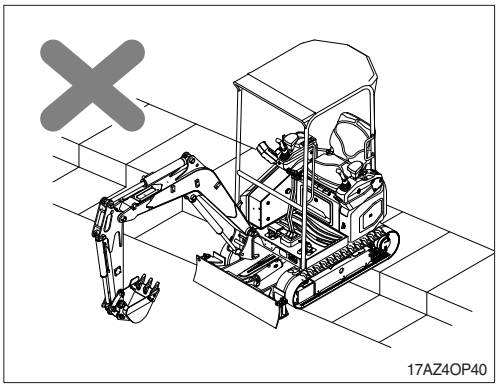
(12) Use the rubber tracks between -25°C to +55°C (-13°F to +131°F) because of the physical characteristics of rubber.

(13) Be careful not to damage the rubber tracks with the bucket while operating the machine.

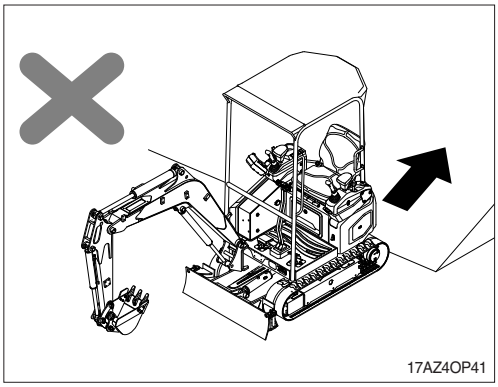
5) BE CAREFUL NOT TO COME OFF THE RUBBER TRACKS

Keep the tracks in appropriate tension to prevent them from coming off.
If the tension is too low, the rubber tracks may come off under the following conditions.
Even if the tension is adequate, take care when operating the tracks under these conditions.
Some illustrations in this section can be different from your machine.

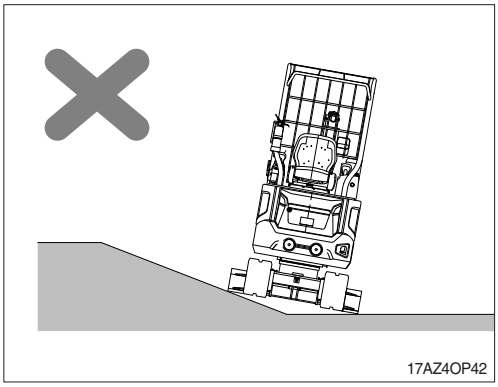
(1) Do not steer the machine at an angle other than 90 degrees across a large level gap created by a curbstone or a rock [approximately more than 20 cm (8")]. Run over a level gap at a right angle only to prevent the tracks from coming off.


17AZ4OP40

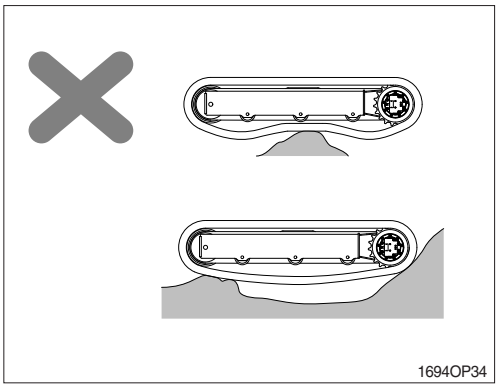
(2) Do not steer the machine across a boundary between the flat ground and a slope, while moving backwards. If such travel is not avoidable, slow down the speed.


17AZ4OP41

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

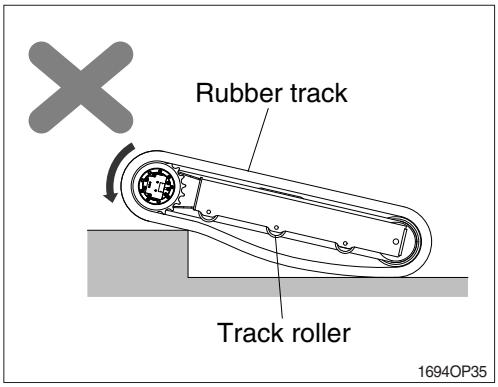

17AZ4OP42

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


1694OP34

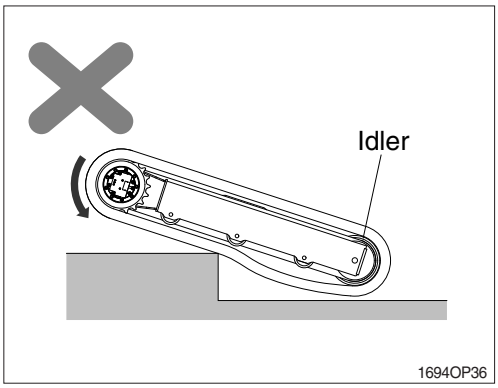
HOW THE RUBBER TRACKS COME OFF

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



1694OP35

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

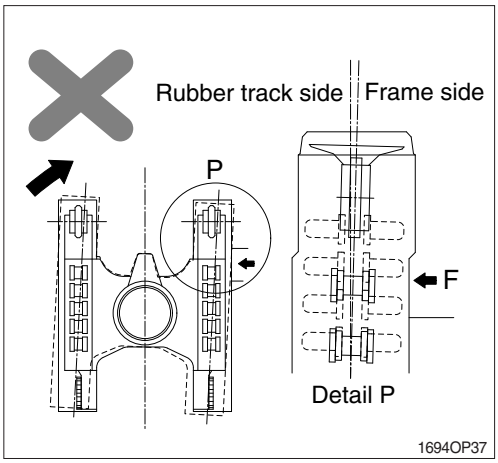


1694OP36

(7) Other situations to be avoided.

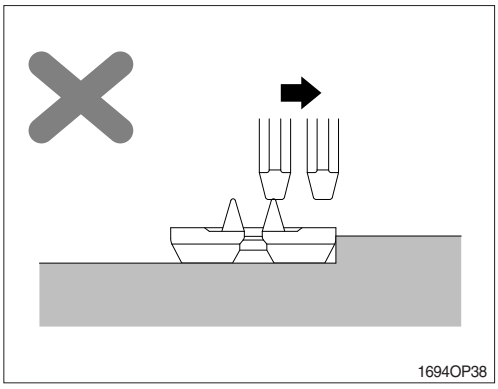
① When the machine changes the travel direction while the rubber tracks are blocked sideways by an obstacle or the like.

② When the idler and the track rollers are misaligned from the core metal, due to rubber track misalignment.

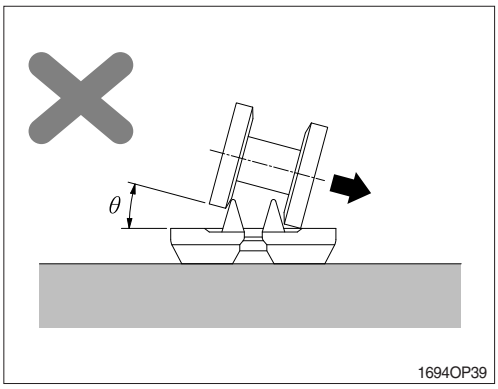


1694OP37

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



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

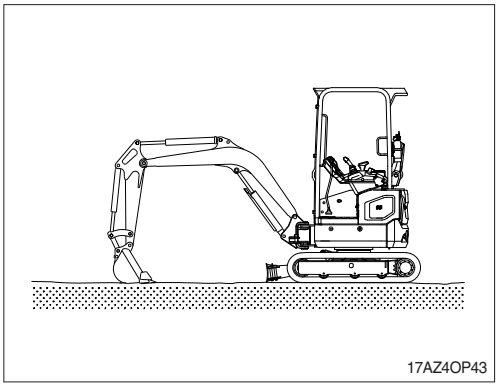


13. SWITCHING HYDRAULIC ATTACHMENT CIRCUIT

1) The combined hydraulic attachment circuit is capable of providing single action or double action.

2) The position of 3 way valve selects the single action hydraulic attachment circuit or the double action hydraulic attachment circuit.

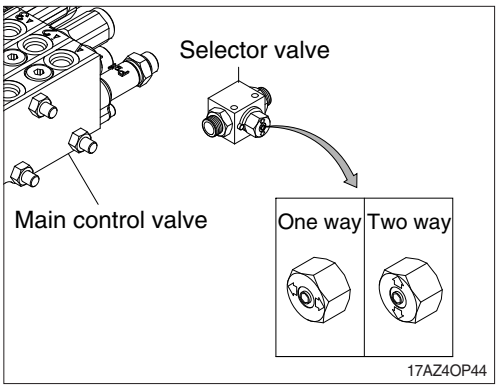
3) Before you change the flow mode of hydraulic attachment circuit, place the machine in the servicing position as shown. Stop the engine.



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

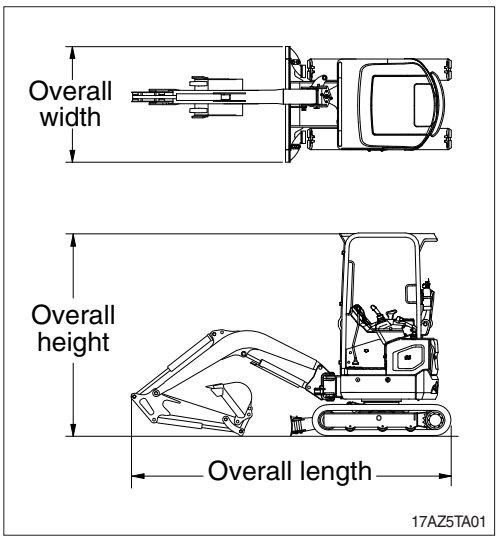
(1) One way flow (hydraulic breaker)
Turn the arrow to the horizontal position.

(2) Two way flow (shear)
Turn the arrow to the vertical position.



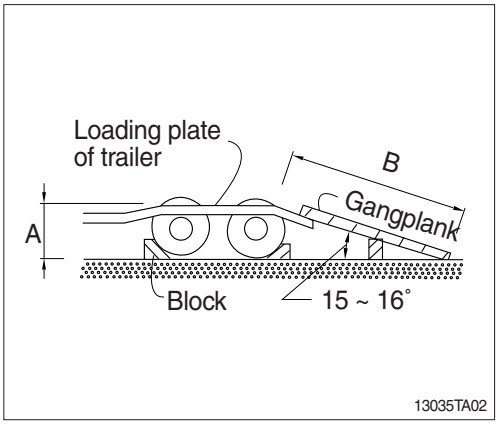
1. PREPARATION FOR TRANSPORTATION

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 etc., which will be passed.
4) Get 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

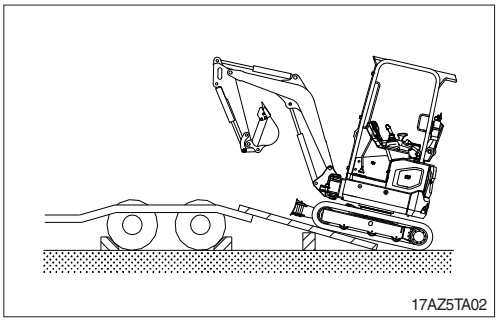


2. LOADING THE MACHINE

⚠ **Make sure that the swing lock pin is inserted before transporting to prevent the machine from accidental swinging.** (if equipped)

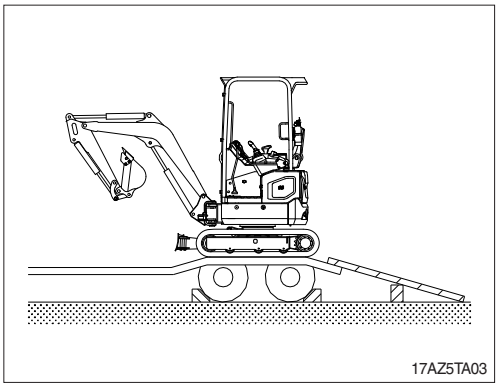
1) Load and unload the machine on flat ground.

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

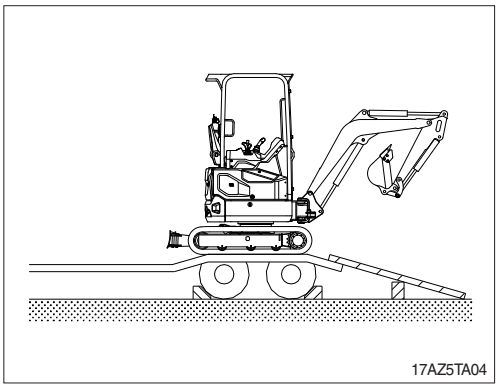

17AZ5TA02

3) 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.
Keep the travel motor in the rear when loading and in the front when unloading.


17AZ5TA03

(2) Rotate the upper part of machine 180 degree then move to the proper location.


17AZ5TA04

(3) Lower the working equipment gently.

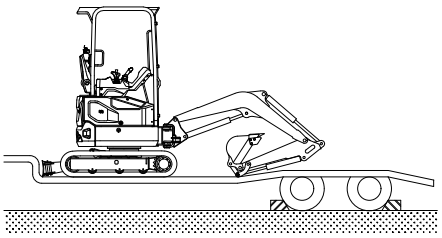
※ Place rectangular timber under the bucket cylinder to prevent the damage of it during transportation.

⚠ 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 as it will be very dangerous.

⚠ Do not operate any other device when loading.

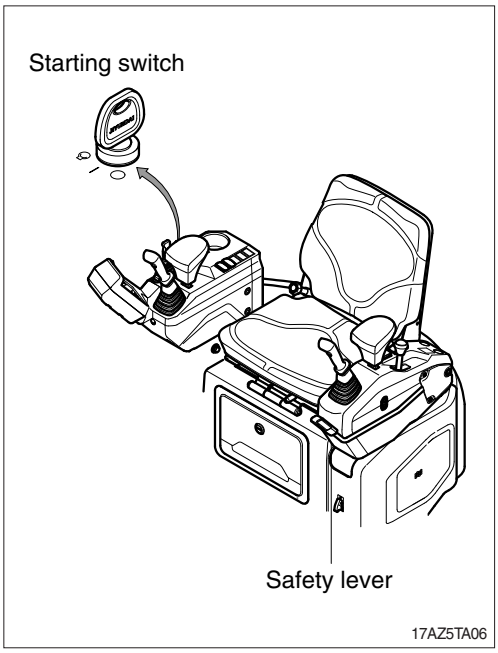
⚠ Be careful as to the boundaries of loading plate or trailer as the balance of machine will abruptly change.



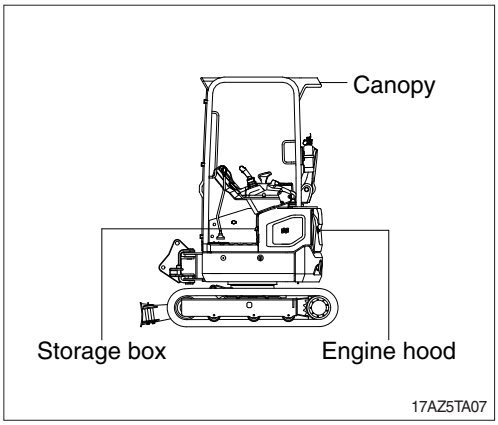
17AZ5TA05

3. FIXING THE MACHINE

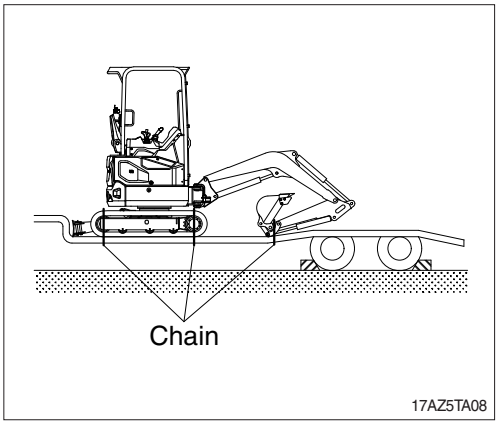
1) Lower down the working device on the loading plate of trailer.
2) Keep the safety lever in the **LOCK** position.
3) Turn **OFF** all the switches and remove the key.



4) Secure all locks.



5) Place timbers behind the tracks, secure the machine to trailer with chains or straps which are in good condition and approved for the weight which they will be securing, to prevent the machine from moving in any direction.

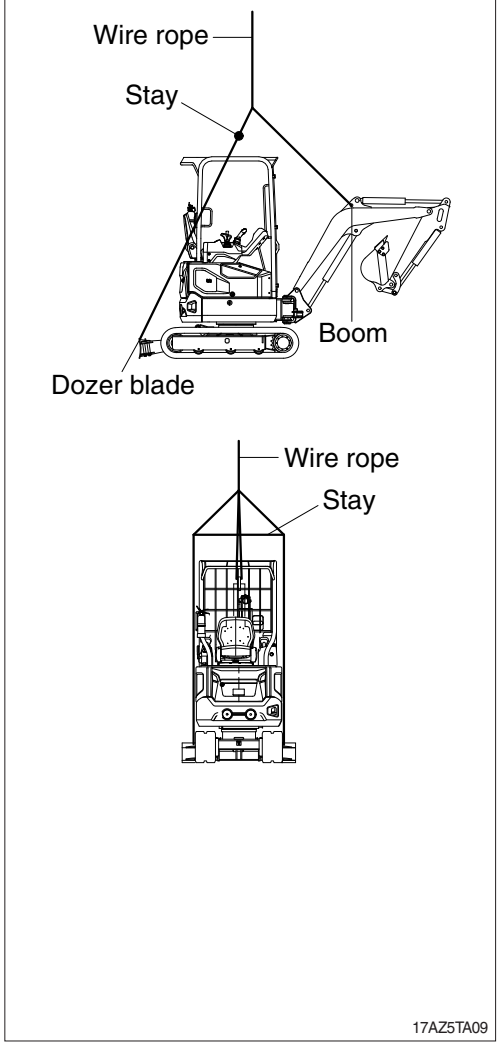


4. LOADING AND UNLOADING BY CRANE

⚠ The wrong hoisting method or installation of lifting device can cause serious injury, death, or damage to the machine.

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 approved lifting device and ensure distance between lifting device and machine to avoid contact between the two.
3) Place rubber plates at lifting points to avoid any damage to the machine.
4) Place crane in the proper place.
5) Install approved lifting device as shown in the illustration.
6) The maximum angle of the front wire rope must not exceed 60° and the angle of the rear wire rope 45°.

※ If there is no stay, keep the angle of the rear wire rope below 15° to avoid interference with the machine.



⚠ Make sure wire rope is proper size.

⚠ Place the safety lever to LOCK position to prevent the machine from 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 any and all personnel.

⚠ Maintain center of gravity and balance when lifting.

⚠ Never lift the machine with a person in the cab or on the machine.

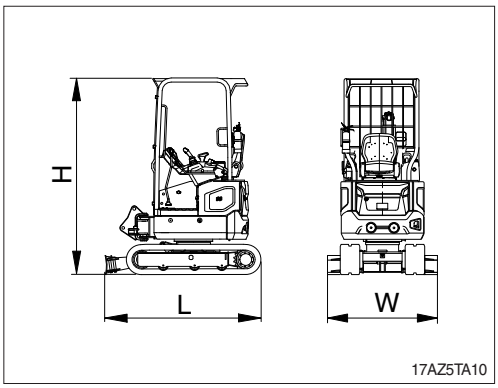
5. DIMENSION AND WEIGHT

1) BASE MACHINE

(1) Rubber track

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1825 (6' 0")
H	Height	mm (ft-in)	2320 (7' 7")
W	Width [extension]	mm (ft-in)	995 (3' 3") [1295 (4' 3")]
Wt	Weight	kg (lb)	1610 (3550)

※ With 230 mm (9") rubber shoes and 180 kg (400 lb) counterweight.



(2) Rubber track

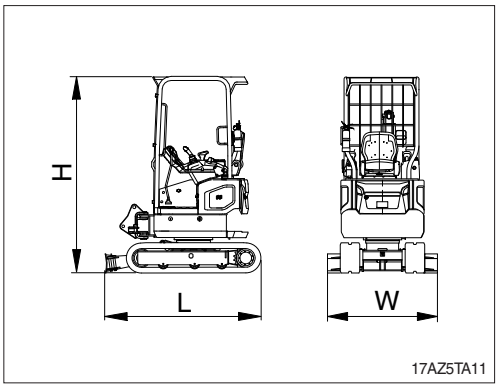
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1825 (6' 0")
H	Height	mm (ft-in)	2320 (7' 7")
W	Width [extension]	mm (ft-in)	995 (3' 3") [1295 (4' 3")]
Wt	Weight	kg (lb)	1695 (3740)

※ With 230 mm (9") rubber shoes and 260 kg (570 lb) add counterweight.

(3) Rubber track

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1825 (6' 0")
H	Height	mm (ft-in)	2320 (7' 7")
W	Width [extension]	mm (ft-in)	995 (3' 3") [1295 (4' 3")]
Wt	Weight	kg (lb)	1430 (3150)

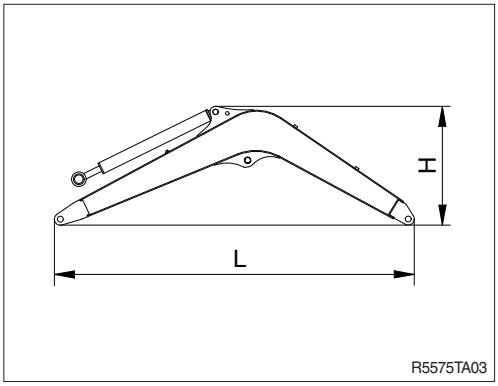
※ With 230 mm (9") rubber shoes and without counterweight.



2) BOOM ASSEMBLY

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1828 (6' 0")
H	Height	mm (ft-in)	662 (2' 2")
W	Width	mm (ft-in)	227 (0' 9")
Wt	Weight	kg (lb)	105 (230)

※ 1.75 mm (5' 9") boom with arm cylinder (including piping and pins).

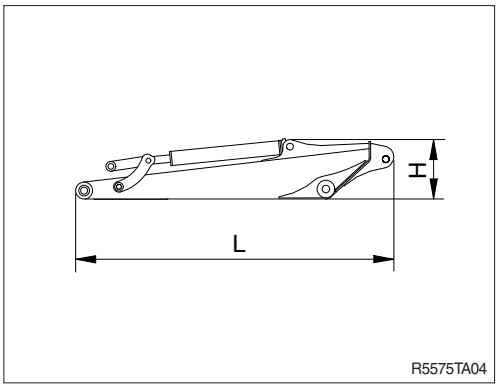


3) ARM ASSEMBLY

(1) Arm assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1297 (4' 3")
H	Height	mm (ft-in)	322 (1' 1")
W	Width	mm (ft-in)	209 (0' 8")
Wt	Weight	kg (lb)	68 (150)

※ 1.03 m (3' 5") arm with bucket cylinder (including linkage and pins).



(2) Long arm cylinder

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1497 (4' 11")
H	Height	mm (ft-in)	335 (1' 1")
W	Width	mm (ft-in)	209 (0' 8")
Wt	Weight	kg (lb)	78 (170)

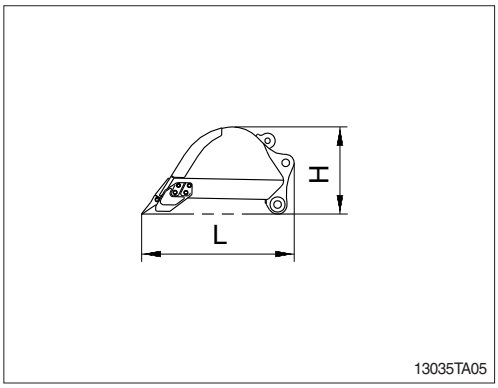
※ 1.23 m (4' 0") long arm with bucket cylinder (including linkage and pins).

4) BUCKET ASSEMBLY

(1) Bucket assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	567 (1' 10")
H	Height	mm (ft-in)	410 (1' 4")
W	Width	mm (ft-in)	422 (1' 5")
Wt	Weight	kg (lb)	41 (90)

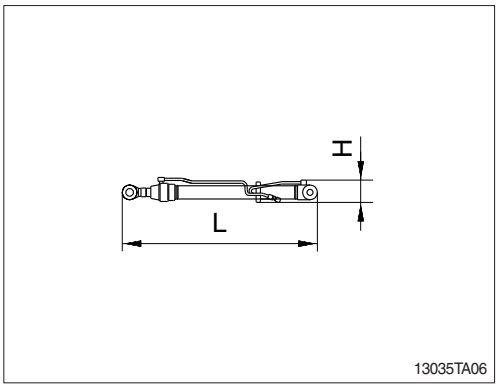
※ 0.04 m^3 (0.052 yd^3) SAE heaped bucket (including tooth and side cutters).



5) BOOM CYLINDER

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	823 (2' 8")
H	Height	mm (ft-in)	105 (0' 4")
W	Width	mm (ft-in)	147 (0' 6")
Wt	Weight	kg (lb)	16.4 (40)

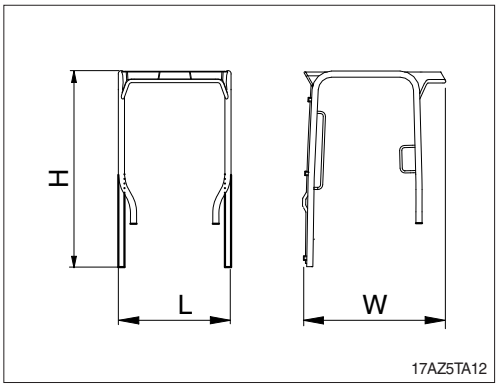
※ including piping.



6) CAB ASSEMBLY

(1) Canopy assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1084 (3' 7")
H	Height	mm (ft-in)	1658 (5' 5")
W	Width	mm (ft-in)	964 (3' 2")
Wt	Weight	kg (lb)	170 (370)

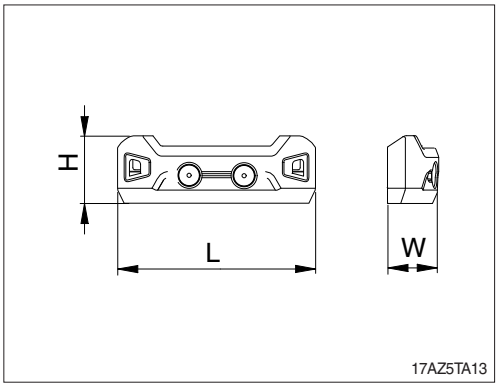


7) COUNTERWEIGHT

(1) Counterweight

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	967 (3' 2")
H	Height	mm (ft-in)	331 (1' 1")
W	Width	mm (ft-in)	265 (0' 10")
Wt	Weight	kg (lb)	180 (400)

※ 180 kg (400 lb) counterweight



(2) Counterweight

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	967 (3' 2")
H	Height	mm (ft-in)	331 (1' 1")
W	Width	mm (ft-in)	340 (1' 1")
Wt	Weight	kg (lb)	260 (570)

※ 260 kg (570 lb) counterweight

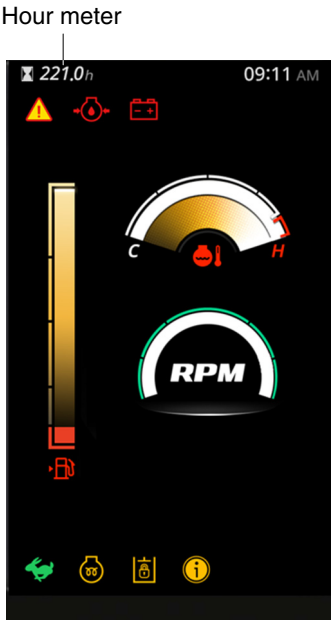
1. INSTRUCTION

1) INTERVAL OF MAINTENANCE

(1) You may inspect and service the machine by the period as described at page 6-9 based on hour meter at cluster.

(2) Shorten the interval of inspect and service depending on site condition. (Such as dusty area, quarry, sea shore and etc.)

(3) Practice the entire related details at the same time when the service interval is doubled.
For example, in case of 100hours, carry out all the maintenance 「Each 100hours, each 50 hours and daily service」 at the same time.



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2) PRECAUTION

(1) Start to maintenance after you have the full knowledge of machine.

(2) The monitor installed on this machine does not entirely guarantee the condition of the machine. Daily inspection should be performed according to clause 4, maintenance check list.

(3) Engine and hydraulic components have been preset in the factory.
Do not allow unauthorized personnel to reset them.

(4) Ask to your local dealer or HD Hyundai Construction Equipment for the maintenance advice if unknown.

(5) Drain the used oil and coolant in a container and handle according to the method of handling for industrial waste to meet with regulations of each province or country.

3) PROPER MAINTENANCE

(1) Replace and repair of parts
It is required to replace the wearable and consumable parts such as bucket tooth, side cutter, filter and etc., regularly.
Replace damaged or worn parts at proper time to keep the performance of machine.

(2) Use genuine parts.

(3) Use the recommended oil.

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

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

(6) Do not repair anything while operating the engine.
Stop the engine when you fill the oil.

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

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

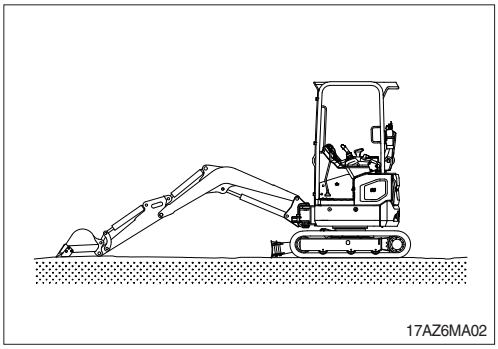
(9) For more detail information of maintenance, please contact local HD Hyundai Construction Equipment dealer.

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

4) RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM

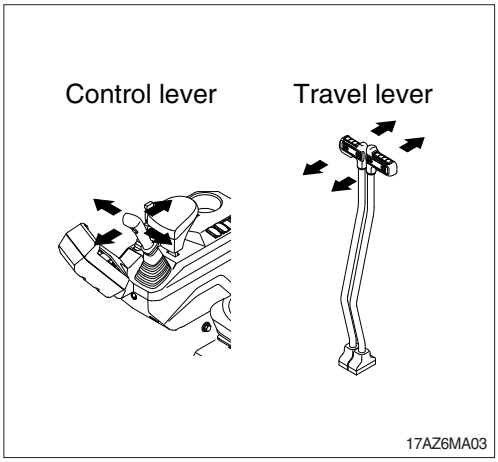
※ **Spouting of oil can cause the accident when loosening the cap or hose right after the operating of machine as the machine or oil is on the high pressure on the condition.**
Be sure to relieve the pressure in the system before repairing hydraulic system.

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



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

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



5) PRECAUTION WHEN INSTALLING HYDRAULIC HOSES OR PIPES

(1) Be particularly careful that the joint of hose, pipe and functioning item are not damaged.
Avoid contamination.

(2) Assemble after cleaning the hose, pipe and joint of functioning item.

(3) Use genuine parts.

(4) Do not assemble the hose in the condition of twisted or sharp radius.

(5) Keep the specified tighten torque.

6) PERIODICAL REPLACEMENT OF SAFETY PARTS

(1) It is desirable to do periodic maintenance the machine for using the machine safely for a long time.
However, recommend to replace regularly the parts related safety not only safety but maintain satisfied performance.

(2) These parts can cause the disaster of life and material as the quality changes by passing time and it is worn, diluted, and gets fatigued by using repeatedly.
These are the parts which the operator can not judge the remained lifetime of them by visual inspection.

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

<table>
<tr><th colspan="3">Periodical replacement of safety parts</th><th>Interval</th></tr>
<tr><td colspan="2">Engine</td><td>Fuel hose (tank-engine)</td><td>Every 2 years</td></tr>
<tr><td rowspan="7">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="4">Working device</td><td>Boom cylinder line hose</td><td rowspan="4">Every 2 years</td></tr>
<tr><td>Arm cylinder line hose</td></tr>
<tr><td>Bucket cylinder line hose</td></tr>
<tr><td>Dozer cylinder line hose</td></tr>
<tr><td colspan="2"></td><td>Boom swing cylinder line hose</td><td></td></tr>
<tr><td colspan="2"></td><td>Extension cylinder line hose</td><td></td></tr>
</table>

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

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

2. TIGHTENING TORQUE

Use following table for unspecified torque.

1) BOLT AND NUT

(1) Coarse thread

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

(2) Fine thread

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

2) PIPE AND HOSE (FLARE type)

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

3) PIPE AND HOSE (ORFS type)

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

4) FITTING

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

5) TIGHTENING TORQUE OF MAJOR COMPONENT

No.	Descriptions		Bolt size	Torque	
				kgf · m	lbf · ft
1	Engine	Engine mounting bolt (engine-bracket)	M10 × 1.25	5.35±0.35	38.7±2.5
2		Engine mounting bolt (bracket-frame)	M12 × 1.75	13.0±1.0	94.0±7.2
3		Radiator mounting bolt, nut	M12 × 1.75	12.8±3.0	92.6±21.7
4		Coupling mounting bolt	M10 × 1.5	5.2±0.3	37.6±2.2
5		Flywheel housing bolt, nut	M 8 × 1.25	2.6±0.2	18.8±0.4
6	Hydraulic system	Main pump mounting bolt	M12 × 1.75	14.7±2.2	106±15.9
7		Main control valve mounting bolt	M 8 × 1.25	3.4±0.7	24.6±5.1
8		RCV lever mounting bolt	M 6 × 1.0	1.44±0.3	10.4±2.2
9		Fuel tank mounting bolt	M10 × 1.5	6.9±1.4	50±10.1
10		Hydraulic oil tank mounting bolt	M10 × 1.5	6.9±1.4	50±10.1
11		Turning joint mounting bolt, nut	M10 × 1.5	6.9±1.4	50±10.1
12	Power train system	Swing motor mounting bolt	M12 × 1.75	12.8±3.0	92.6±21.7
13		Swing bearing upper mounting bolt	M12 × 1.75	12.8±3.0	92.6±21.7
14		Swing bearing lower mounting bolt	M12 × 1.75	12.8±3.0	92.6±21.7
15		Travel motor mounting bolt	M10 × 1.5	6.9±1.4	50±10.1
16		Sprocket mounting bolt	M10 × 1.5	6.9±0.7	50±5.1
17	Under carriage	Track roller mounting bolt	M12 × 1.75	12.3±1.2	89±8.7
18	Others	Counterweight mounting bolt	M14 × 2.0	19.6±2.7	142±19.5
19		Additional counterweight mounting bolt	M24 × 3.0	100±15	723±108
20		Canopy mounting bolt, nut	M12 × 1.75	12.8±3.0	92.6±21.7
21		Operator's seat mounting bolt	M 8 × 1.25	3.4±0.7	24.6±5.1

3. FUEL, COOLANT AND LUBRICANTS

1) NEW MACHINE

New machine used and filled with following lubricants.

Description	Specification
Engine oil	SAE 15W-40 (API CI-4)
Hydraulic oil	HD Hyundai Construction Equipment genuine long life (ISO VG 32, VG 46, VG 68) Conventional (ISO VG 15, ★: Cold region) HD Hyundai Construction Equipment Bio Hydraulic Oil (HBHO, ISO VG 46)
Travel reduction gear	SAE 85W-140 (API GL-5)
Grease	Lithium base grease NLGI No. 2
Fuel	ASTM D975-No. 2, ★1: Ultra low sulfur diesel
Coolant	Mixture of 50% ethylene glycol base antifreeze and 50% water. 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

★1 : Ultra low sulfur diesel
- sulfur content ≤ 10 ppm

4. MAINTENANCE CHECK LIST

1) DAILY SERVICE BEFORE STARTING

Check items	Service	Page
Visual check		
Fuel tank	Check, Refill	6-23
Hydraulic oil level	Check, Add	6-25
Engine oil level	Check, Add	6-16
Radiator coolant level	Check, Add	6-18
Control panel & pilot lamp	Check, Clean	6-34
Water separator	Check, Drain	6-24
Fan belt tension and damage	Check, Adjust	6-21
★ Attachment pins	Lubricate	6-33
· Boom cylinder head and rod		
· Boom connecting		
· Arm cylinder head and rod		
· Boom + Arm connecting		
· Bucket cylinder head		

★ Lubricate every 10 hours or daily for initial 50 hours.

2) EVERY 50 HOURS SERVICE

Check items	Service	Page
Fuel tank (water, sediment)	Drain	6-23
Track tension	Check, Adjust	6-30
Extension cylinder	Lubricate	6-33
Swing gear and pinion	Lubricate	6-28
Bucket linkage and blade pin	Lubricate	6-33
· Bucket cylinder rod		
· Arm + Bucket connecting		
· Arm + Link, Bucket control		
· Bucket control rod		
· Boom swing post + Upper frame connecting		
· Boom swing cylinder head and rod		
· Dozer blade + Lower frame connecting		
· Dozer blade cylinder head and rod		

3) INITIAL 50 HOURS SERVICE

Check items	Service	Page
Boom swing cylinder	Lubricate	6-28
Bolts and nuts	Check, Tight	6-7
· Sprocket mounting bolts		
· Travel motor mounting bolts		
· Swing motor mounting bolts		
· Swing bearing mounting bolts		
· Engine mounting bolts		
· Counterweight mounting bolts		
· Turning joint locating bolts		
· Track shoe mounting bolts and nuts		
· Hydraulic pump mounting bolts		

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

4) EVERY 200 HOURS SERVICE

Check items	Service	Page
★ Hydraulic oil return filter	Replace	6-27

★ Replace the filter for continuous hydraulic breaker operation only.

5) INITIAL 250 HOURS SERVICE

Check items	Service	Page
Fuel filter element	Replace	6-23
Travel reduction gear oil	Change	6-29
Hydraulic oil return filter	Replace	6-27

6) EVERY 250 HOURS SERVICE

Check items	Service	Page
★Engine oil	Change	6-16, 17
★Engine oil filter	Replace	6-16, 17
Battery (voltage)	Check	6-34
Swing bearing grease	Lubricate	6-28
Boom swing cylinder	Lubricate	6-28
Bolts and nuts	Check, Tight	6-7
· Sprocket mounting bolts		
· Travel motor mounting bolts		
· Swing motor mounting bolts		
· Swing bearing mounting bolts		
· Engine mounting bolts		
· Counterweight mounting bolts		
· Turning joint locating bolts		
· Track shoe mounting bolts and nuts		
· Hydraulic pump mounting bolts		
Attachment pins	Lubricate	6-33
· Boom cylinder head and rod		
· Boom connecting		
· Arm cylinder head and rod		
· Boom + Arm connecting		
· Bucket cylinder head		

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

7) EVERY 400 HOURS SERVICE

Check items	Service	Page
Fuel filter element	Replace	6-23
Water separator	Clean	6-24

8) EVERY 500 HOURS SERVICE

Check items	Service	Page
Fan belt	Replace	6-21
Radiator and cooler fin	Check, Clean	6-21
☆Air cleaner element (primary)	Clean	6-22

☆ Clean the element only after 500 hours operation.
Replace primary element and safety element after 4 times cleanings of primary element.

9) EVERY 1000 HOURS SERVICE

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

10) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Radiator coolant★1	Change	6-18, 19, 20
Air cleaner element	Replace	6-22
Hydraulic oil★1	Change	6-26
HBHO ★2	Change	6-26
Hydraulic oil suction strainer	Check, Clean	6-27
Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-

★1 Conventional

★2 If do not want to change HBHO (HD Hyundai Construction Equipment Bio Hydraulic Oil, ISO VG 46) every 2000 hours, contact HD Hyundai Construction Equipment dealer and ask about SAMPLING.

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

11) EVERY 5000 HOURS SERVICE

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

★3 HD Hyundai Construction Equipment genuine long life

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

12) EVERY 6000 HOURS SERVICE

Check items	Service	Page
Radiator coolant★3	Change	6-18, 19, 20

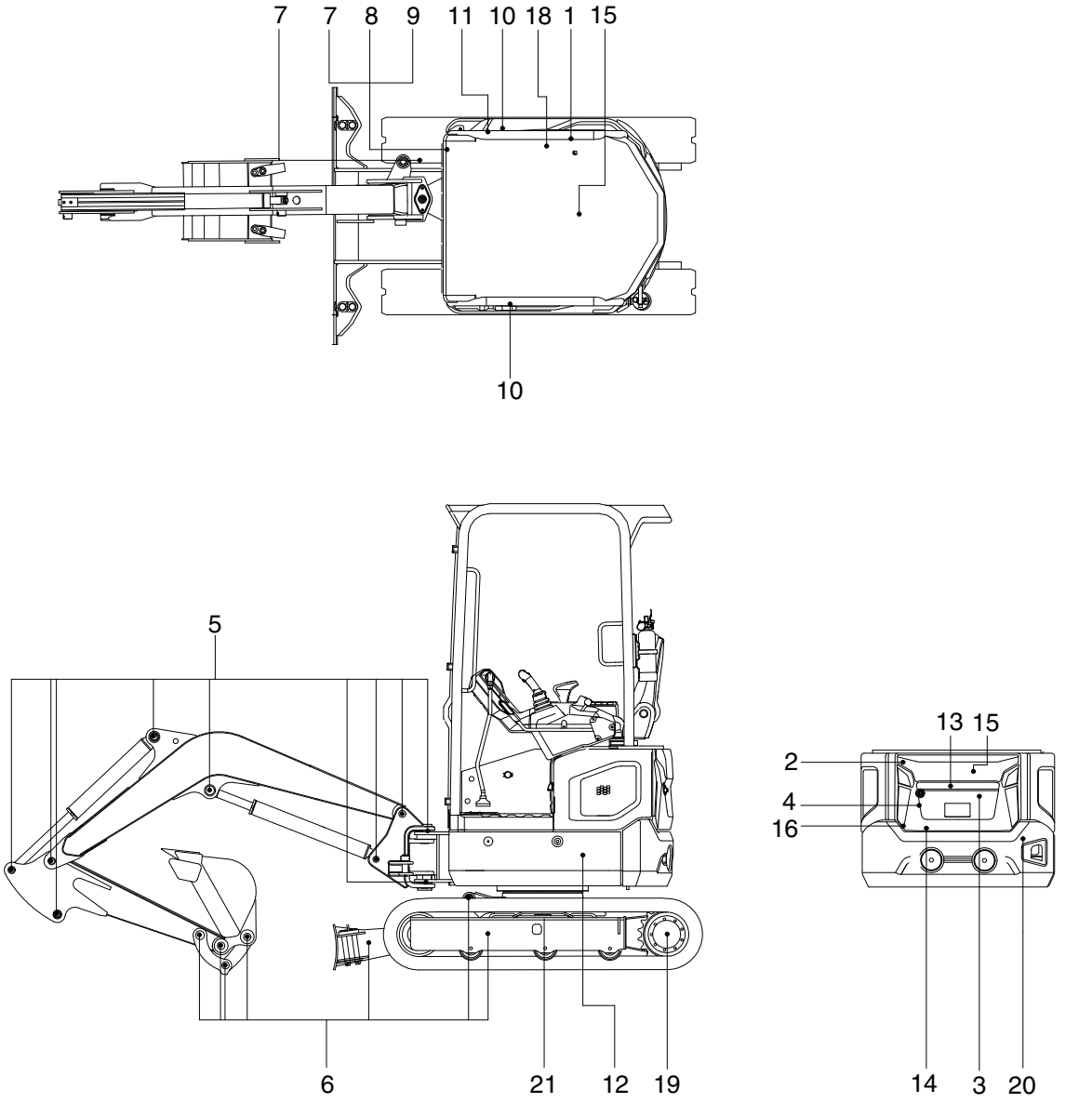
★3 HD Hyundai Construction Equipment genuine long life

13) WHEN REQUIRED

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

Check items	Service	Page
Fuel system		
· Fuel tank (water, sediment)	Drain or Clean	6-23
· Water separator	Drain or Replace	6-24
· Fuel filter element	Replace	6-23
Engine lubrication system		
· Engine oil	Change	6-16, 17
· Engine oil filter	Replace	6-16, 17
Engine cooling system		
· Radiator coolant	Add or Change	6-18, 19, 20
· Radiator and cooler	Clean or Flush	6-18, 19, 20
Engine air system		
· Air cleaner element (primary)	Clean or Replace	6-22
· Air cleaner element (safety)	Replace	6-22
Hydraulic system		
· Hydraulic oil	Add or Change	6-25, 26
· Hydraulic oil return filter	Replace	6-27
· Hydraulic oil suction strainer	Clean	6-27
Undercarriage		
· Track tension	Check, Adjust	6-30
Bucket		
· Tooth	Replace	6-32
· Side cutter	Replace	6-31
· Linkage	Adjust	6-31
· Bucket assy	Replace	6-31

5. MAINTENANCE CHART



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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 do not allow any open flames near the machine.
4. The service intervals in this sign cannot be fit for rough work condition.
5. Do not open the cap or drain plug while hot temperature of fluid to prevent unexpected spouting.

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	12.1 (3.2)	1
	2	Radiator coolant	Check, Add	C	5.4 (1.42)	1
	3	Water separator	Drain	-	-	1
	4	Fan belt tension and damage	Check, Adjust	-	-	1
	13	Engine oil level	Check, Add	EO	3.7 (1.0)	1
Initial 50 Hours	7	Boom swing cylinder	Lubricate	-	-	2
50 Hours or weekly	6	Bucket linkage & blade pins	Lubricate	PGL	-	9
	9	Swing ring gear and pinion	Lubricate	PGL	-	1
	10	Track tension	Check, Adjust	PGL	-	2
	11	Fuel tank (water, sediment)	Drain	-	-	1
	21	Extension cylinder	Lubricate	PGL	-	2
Initial 250 Hours	15	Fuel filter element	Replace	-	-	1
	18	Hydraulic oil return filter	Replace	-	-	1
	19	Travel reduction gear oil	Replace	-	1.1 (0.29)	1
250 Hours	5	Attachment pins	Lubricate	PGL	-	9
	7	Boom swing cylinder	Lubricate	PGL	-	1
	8	Swing bearing	Lubricate	PGL	-	1
	12	Battery (voltage)	Check, Clean	-	-	1
	13	Engine oil	Change	EO	3.7 (1.0)	1
	14	Engine oil filter	Replace	-	-	1
400 Hours	3	Water separator	Clean	-	-	1
	15	Fuel filter element	Replace	-	-	1
500 Hours	4	Fan belt	Replace	-	-	1
	16	Radiator and cooler fin	Check, Clean	-	-	2
	17	Air cleaner element (primary)	Clean	-	-	1
1000 Hours	18	Hydraulic oil return filter	Replace	-	-	1
	19	Travel reduction gear oil	Change	GO	0.33 (0.09)	2
2000 Hours	1	Hydraulic oil★1	Change	HO	12.1 (3.2)	1
	1	Hydraulic oil (HBHO★2)	Change	HO	12.1 (3.2)	1
	2	Radiator coolant★1	Change	C	5.4 (1.42)	1
	17	Air cleaner element	Replace	-	-	1
	20	Hydraulic oil suction strainer	Check, Clean	-	-	1
	-	Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-	-	-
5000 Hours	1	Hydraulic oil★3	Change	HO	12.1 (3.2)	1
6000 Hours	2	Radiator coolant★3	Change	C	5.4 (1.42)	1
As required	17	Air cleaner element (primary & safety)	Clean, Replace	-	-	2

★1 Conventional ★2 HD Hyundai construction Equipment Bio Hydraulic Oil

★3 HD Hyundai construction Equipment genuine long life

※ Oil symbol

Please refer to the recommended lubricants for specification.

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

C : Coolant PGL : Grease EO : Engine oil

1) CHECK ENGINE OIL LEVEL

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

(1) Pull out the dipstick and wipe with a clean cloth.

(2) Check the oil level by inserting the dipstick completely into the hole and pulling out again.
Check to see that the oil level lies between the upper line and lower line.

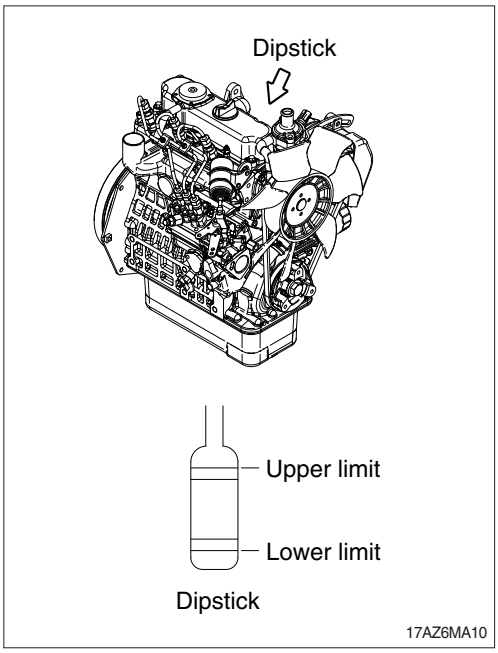
(3) If oil level is LOW, add oil and then check again.

※ **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.**

△ **When you use an oil of different brand or viscosity from the previous, drain the remaining oil. Do not mix 2 different types of oil.**



2) REPLACEMENT OF ENGINE OIL AND OIL FILTER

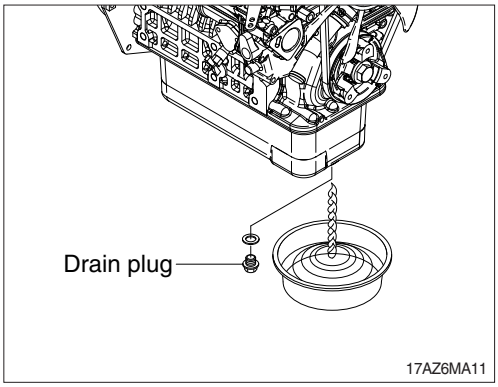
⚠ **To avoid personal injury or death :**

- Be sure to stop the engine before changing the engine oil filter.
- Allow engine to cool down sufficiently, oil can be hot and cause burns.

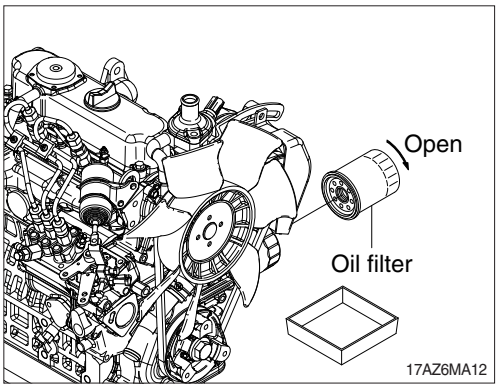
(1) Remove the drain plug and drain all the old oil.

※ **A drain pan with a capacity of 5.0 liters (1.3 U.S. gallons) will be adequate.**

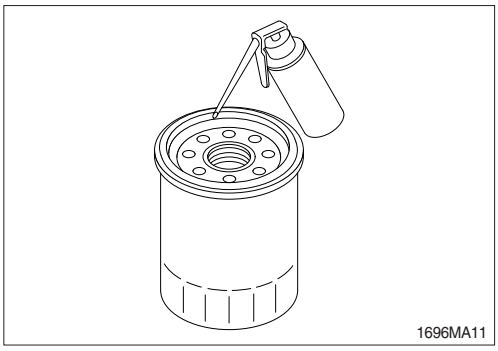
※ **Dispose of the waste oil in accordance with local regulations.**



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



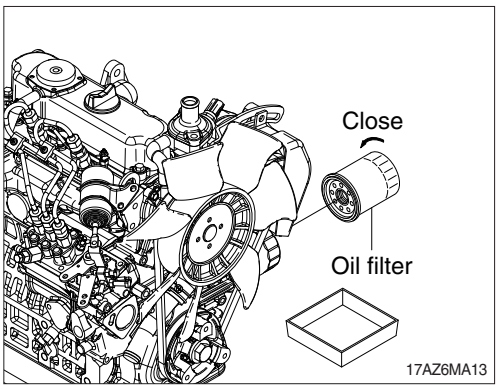
(3) Apply a light film of lubricating oil to the gasket sealing surface before installing the filters.



(4) To install the filter, screw it in by hand.

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

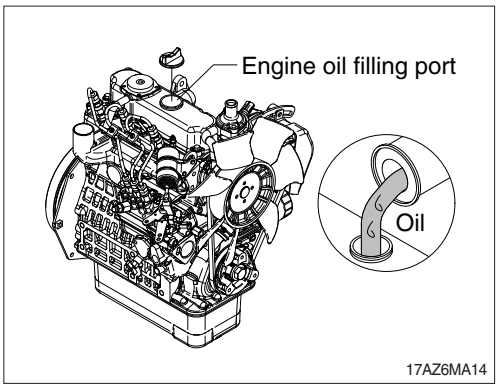
· Install the filter as specified by the filter manufacturer.



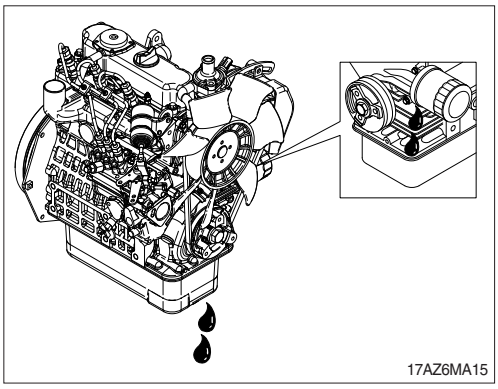
(5) Clean and check the lubricating oil drain plug threads and sealing surface.
Install the lubricating oil pan drain plug.

(6) Fill the engine with clean oil up to the upper line of the dipstick.

· Quantity : 3.7 ℓ (1.0 U.S.gallons)



(7) Operate the engine at low idle and inspect for leaks at the filters and the drain plug.
Shut the engine off and check the oil level with the dipstick.
Allow 5 minutes for oil to drain down before checking.



3) CHECK COOLANT

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

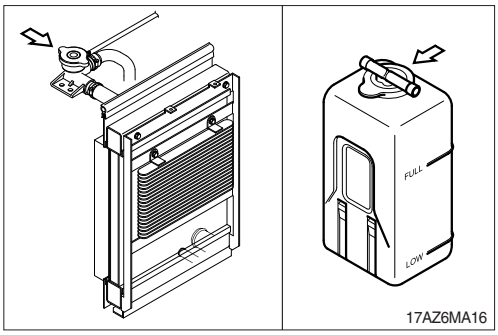
(2) Add the mixture of antifreeze and water after removing the cap of the reservoir tank if coolant is not sufficient.

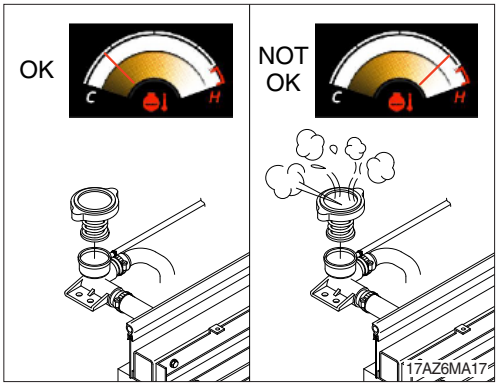
(3) Be sure to add the coolant by opening the cap of radiator when coolant level is below LOW.

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

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

※ **Do not add cold coolant to a hot engine ; engine castings can be damaged. Allow the engine to cool to below 50°C (120°F) before adding coolant.**



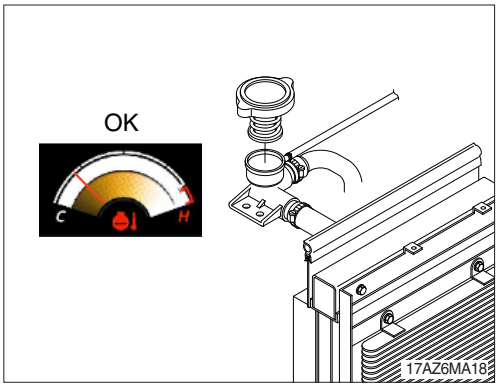


4) FLUSHING AND REFILLING OF RADIATOR

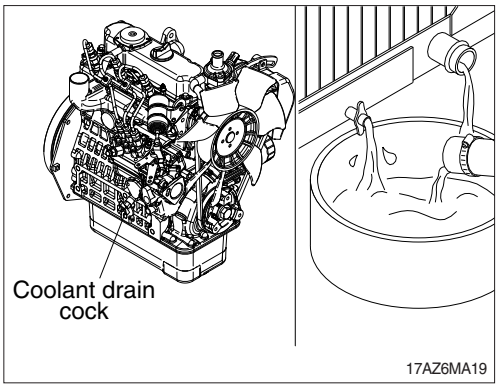
(1) Change coolant

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

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



⚠ **Wait until the temperature is below 50°C (122°F) before removing the coolant system pressure cap.**
Failure to do so can cause personal injury from heated coolant spray.
Drain the cooling system by opening the drain valve on the radiator and opening the drain cock on the engine. A drain pan with a capacity of 10 liters (2.6 U.S.gallons) will be adequate in most applications.

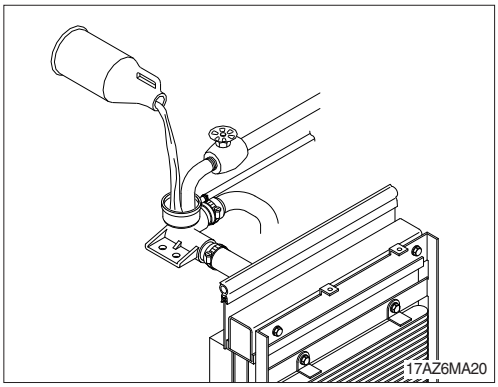


(2) Flushing of cooling system

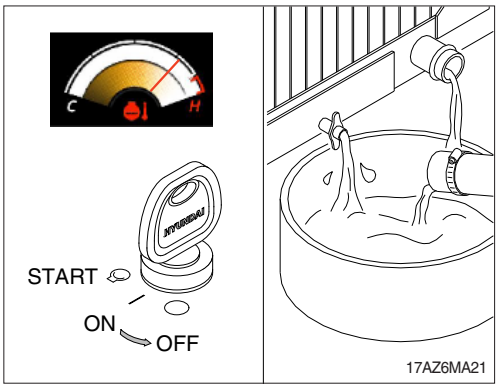
① Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).

※ **Use 0.5 kg (1.0 pound) of sodium carbonate for every 23 liters (6.0 U.S. gallons) of water.**

※ **Do not install the radiator cap.**
The engine is to be operated without the cap for this process.



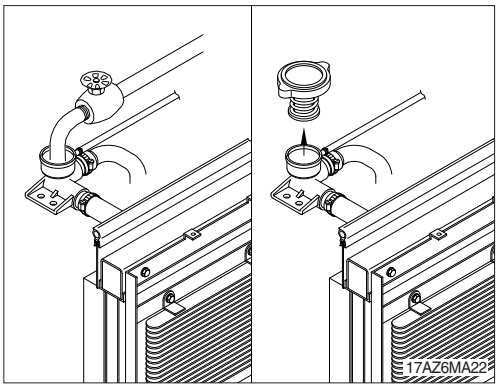
② Operate the engine for 5 minutes with the coolant temperature above 80°C(176°F).
Shut the engine off, and drain the cooling system.



③ Fill the cooling system with clean water.

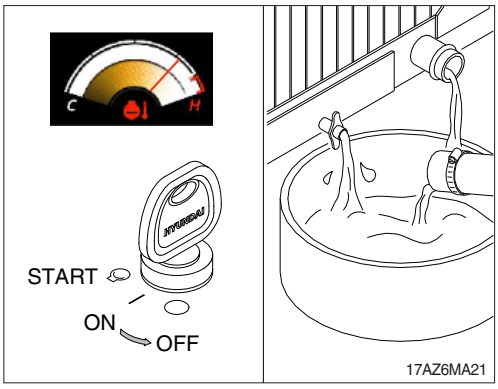
※ **Be sure to vent the engine and aftercooler for complete filling.**

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



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

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

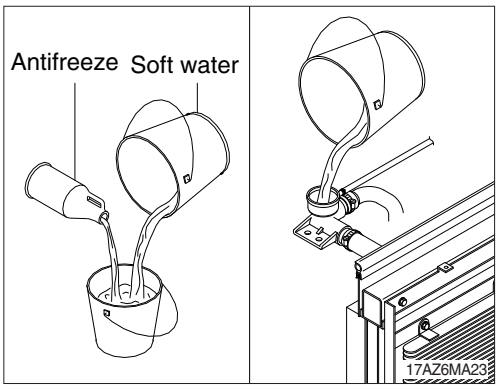


(3) Cooling system filling

① Use a mixture of 50 percent soft water and 50 percent ethylene glycol antifreeze to fill the cooling system. Refer to page 2-21.

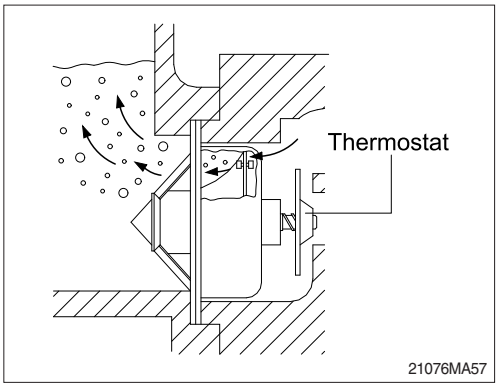
※ **Use the correct amount of DCA4 corrosion inhibitor to protect the cooling system.**

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

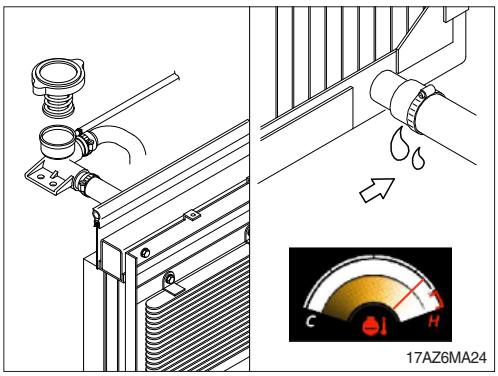


② The system has a maximum fill rate of 14 liters (3.5 U.S. gallons) per minute.
Do not exceed this fill rate.

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



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

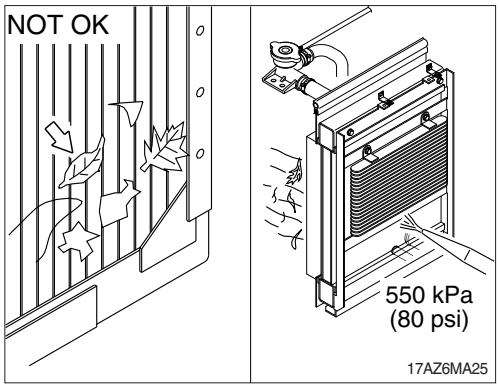


5) CLEAN RADIATOR AND OIL COOLER

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

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

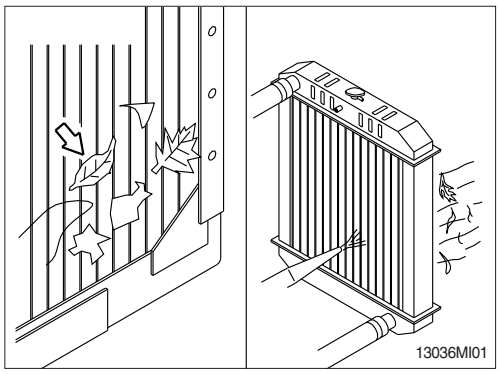
(2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.
Blow the air in the opposite direction of the fan air flow.



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

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

(4) Visually inspect the radiator for core and gasket leaks.

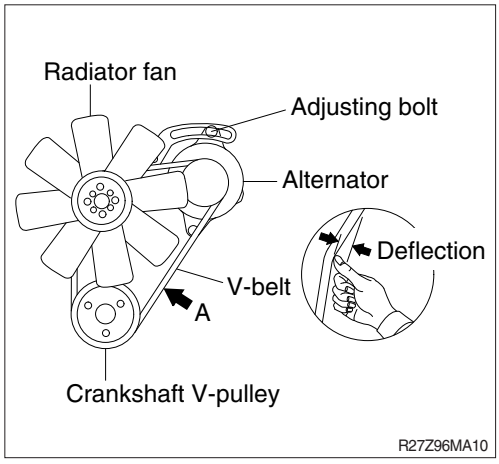


6) FAN BELT TENSION

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

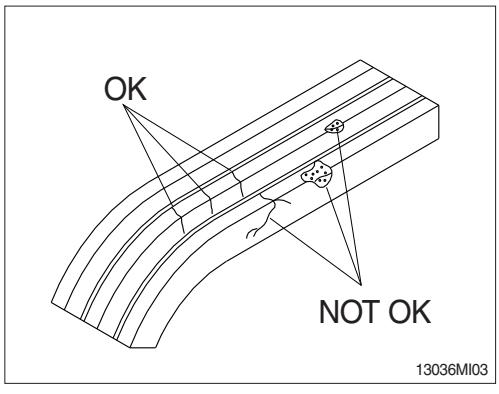
Item	Standard value
V-belt tension Belt deflection when pressed with a force of approx. 10 kgf·m (72.3 lbf·ft)	7.0 ~ 9.0 mm 0.28 ~ 0.31 in

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



(3) Inspect the drive for damage.

※ **Replace fan belt if it is damaged.**

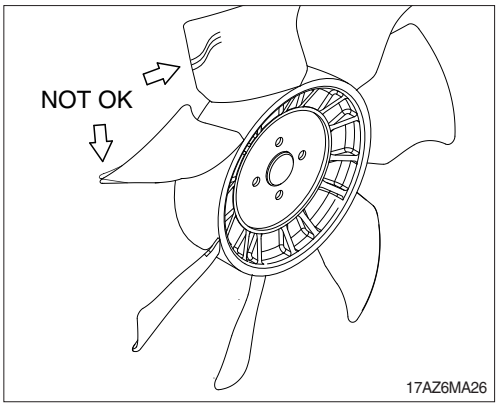


7) INSPECTION OF COOLING FAN

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

※ Rotate the crankshaft by using the engine barring gear.

※ A visual inspection of the cooling fan is required daily.
Check for cracks, loose rivets, and bent or loose blades.
Check the fan to make sure it is securely mounted. Tighten the capscrews if necessary.
Replace any fan that is damaged.

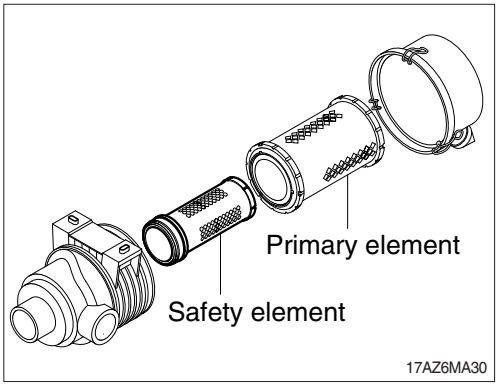


8) CLEANING OF AIR CLEANER ELEMENT

(1) Primary element

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

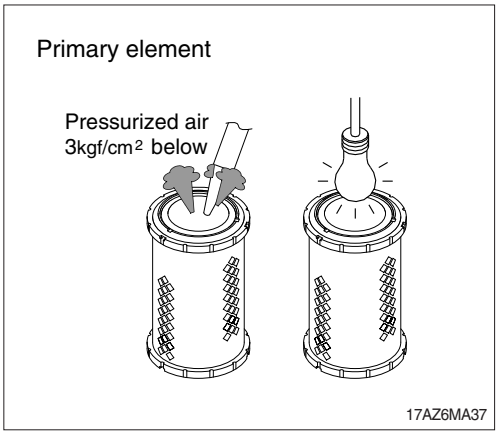
※ Replace the primary element after 4 cleanings.



(2) Safety element

※ Replace the safety element only when the primary element is cleaned 4 times.

※ Always replace the safety element. Never attempt to reuse the safety element by cleaning the element.



9) FUEL TANK

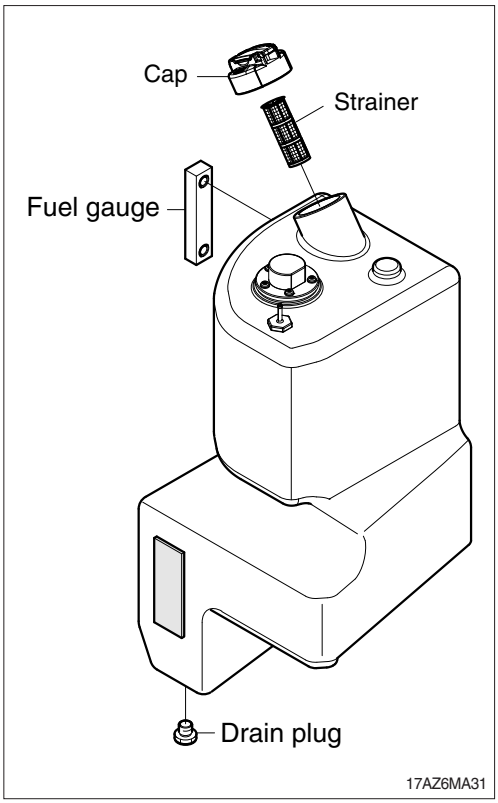
(1) Fill fuel tank fully to minimize water condensation and check the fuel gauge level before starting the machine.

(2) Drain the water and sediment in the fuel tank by opening the drain plug.

※ **Be sure to LOCK the cap of fuel tank.**

※ **Remove the strainer of the fuel tank and clean it if contaminated.**

⚠ **Stop the engine when refueling.**
All lights and flames shall be kept at a safe distance while refueling.



10) REPLACING THE FUEL FILTER ELEMENT

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

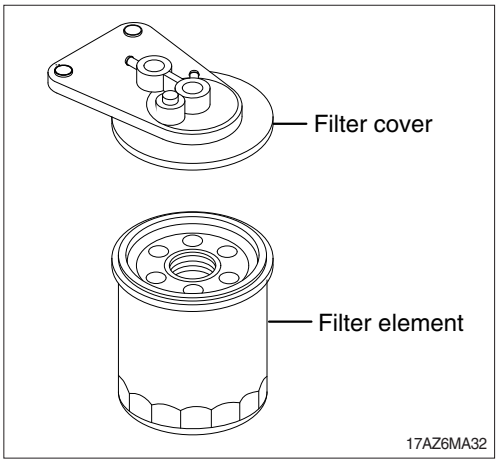
(1) Remove the used filter with filter wrench.

(2) Apply a thin film of fuel to the surface of new filter gasket before screwing on.

(3) Then tighten enough by hand.

(4) Loosen the air vent plug to let the air out.

(5) Start engine and check for fuel leakage.



11) REPLACING THE WATER SEPARATOR

(1) Close the fuel valve (1).

(2) Unscrew the screw ring (4) and remove the filter cup (3), and rinse the inside with kerosene.

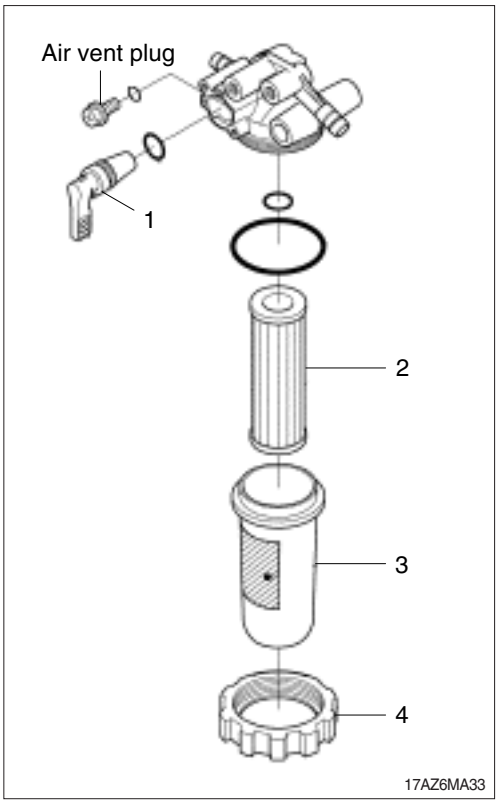
(3) Replace the element (2) with a new one.

(4) Reassemble the water separator, keeping out dust and dirt.

※ **Clean element (2) every 100 hours.**

※ **Be sure to clean the filter cup (3) periodically.**

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



12) BLEEDING THE FUEL SYSTEM

(1) Fill the tank with fuel and open the water separator lever (1).

(2) Loosen the air vent plug (2) a few turns.

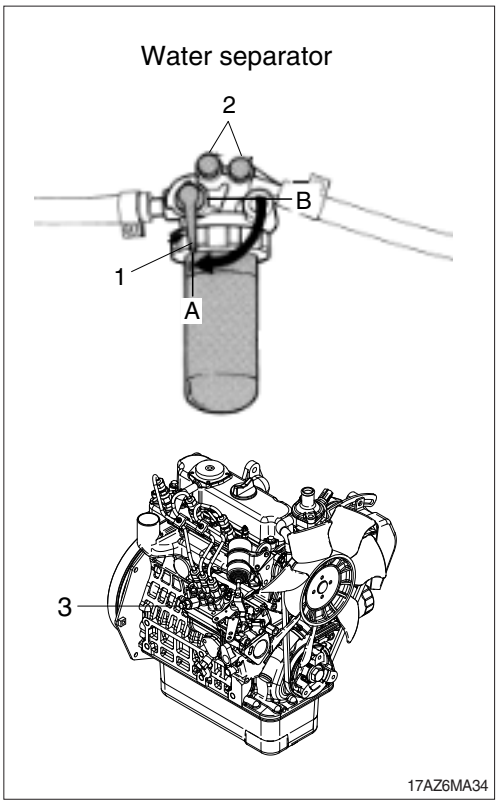
(3) Screw back the plug when bubbles do not come up any more.

(4) Open the air vent plug (3) on top of the fuel injection pump.

(5) Retighten the plug when bubbles do not come up any more.

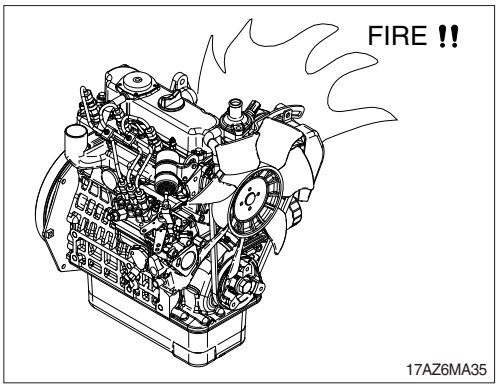
※ **Always keep the air vent plug on the fuel injection pump closed except when air is vented, or it may cause the engine to stop.**

※ **Air bleeding of the fuel system is required if ;**
- **A after the fuel filter and pipes have been detached and refitted**
- **A after the fuel tank has become empty**
- **A before the engine is to be used after a long storage**



13) LEAKAGE OF FUEL

⚠ Use care when cleaning the fuel hose, injection pump, fuel filter and other connections as the leakage from these parts can cause fire.

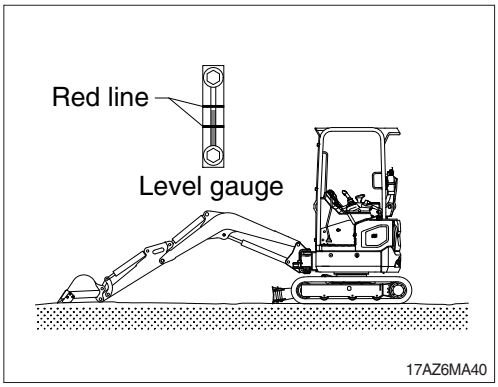


14) HYDRAULIC OIL CHECK

(1) Position the machine as shown in the illustration on the right. Please stop the engine and wait for about 5 minutes.

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

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



15) FILLING HYDRAULIC OIL

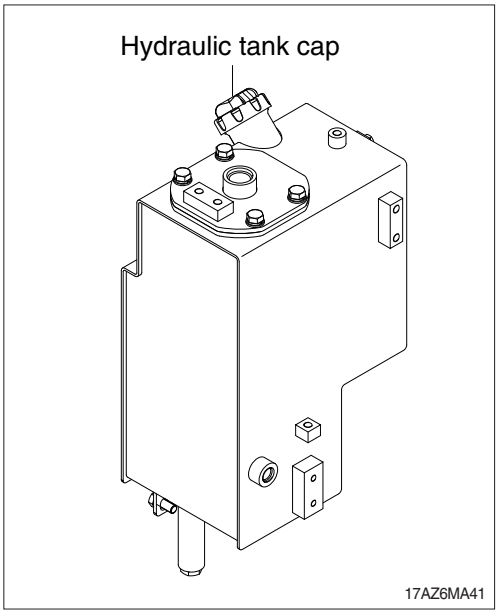
(1) Position the machine like the hydraulic oil check. Then stop engine.

(2) Loosen the Hydraulic tank cap.

(3) Fill the oil to the specified level.

(4) Start engine after filling and operate the work equipment several times.

(5) Check the oil level at the level check position after engine stops.



16) CHANGE HYDRAULIC OIL

(1) Position the machine like the hydraulic oil check. Then stop engine.

(2) Remove the bolt (1) and return filter cover (2).
· Tightening torque : 3.4±0.7 kgf·m
(24.6±5.1 lbf·ft)

(3) Prepare a suitable container with a capacity of 20 ℓ (5.3 U.S. gal).

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

(5) Close the drain plug and fill proper amount of recommended oil.

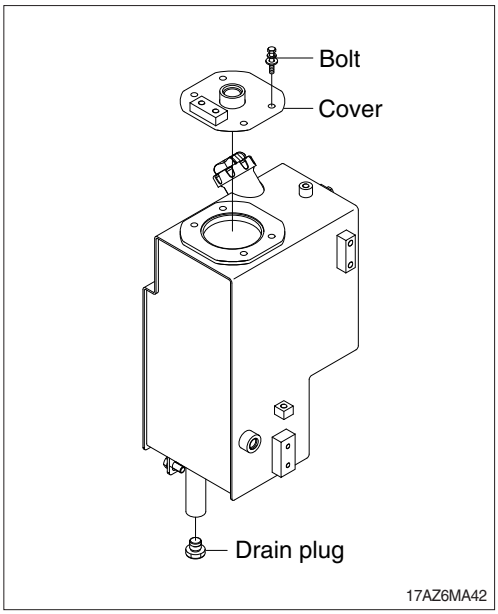
(6) Assemble with reverse order of disassembly.

(7) To bleed air from hydraulic pump loosen the air breather at top of hydraulic pump assembly.

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

※ Incase of injecting HBHO (HD Hyundai Construction Equipment Bio Hydraulic Oil) to machines that have formerly used different hydraulic oil, the proportion of residual oil must not exceed 2 %

※ Do not mix any other Bio oil, use only HBHO as bio oil.
If changing to Bio oil, contact HD Hyundai Construction Equipment dealer.



17) CLEAN SUCTION STRAINER

Clean suction stainer as follows.

(1) Remove the bolt (1) and suction cover (2)
· Tightening torque : 3.4±0.7 kgf · m
(24.6±5.1 lbf · ft)

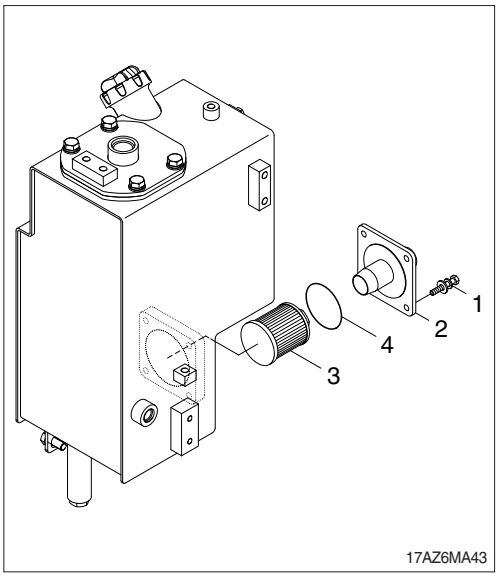
(2) Remove the suction strainer (3) from suction cover (2)

(3) Wash the suction strainer with gasoline or cleaning oil (mineral spirits).

(4) Replace the suction strainer if it is damaged.

(5) Assemble with reverse order of disassembly.

※ **Be sure to install a new O-ring (4).**



18) REPLACEMENT OF RETURN FILTER

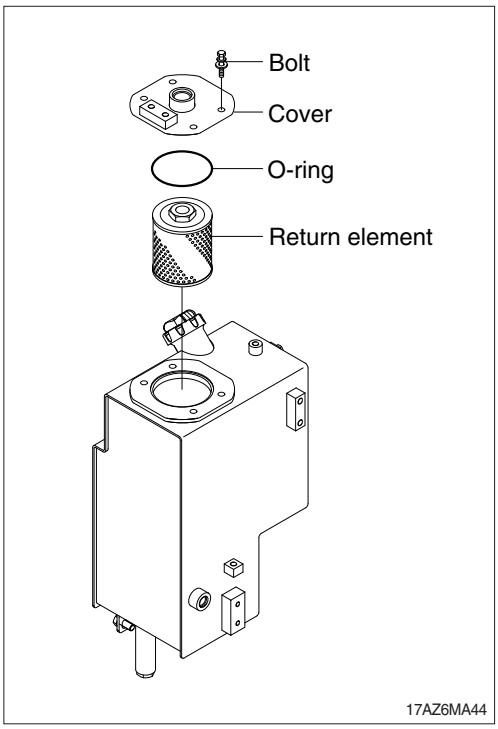
Replace return filter as follows.

(1) Remove the cover.

(2) Remove the return filter in the tank.

(3) Replace the element with new one.

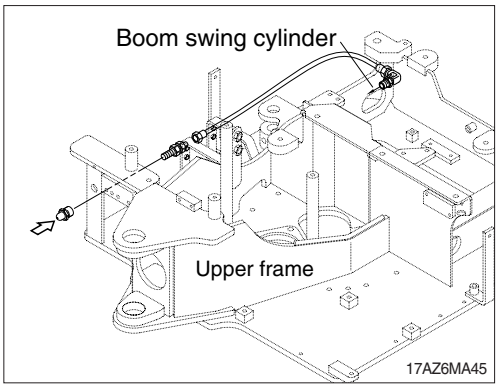
(4) Reassemble by reverse order of disassembly.
· Tightening torque : 3.4±0.7 kgf · m
(24.6±5.1 lbf · ft)



19) LUBRICATE BOOM SWING CYLINDER

(1) Grease at fitting.

※ **Lubricate every 250 hours.**

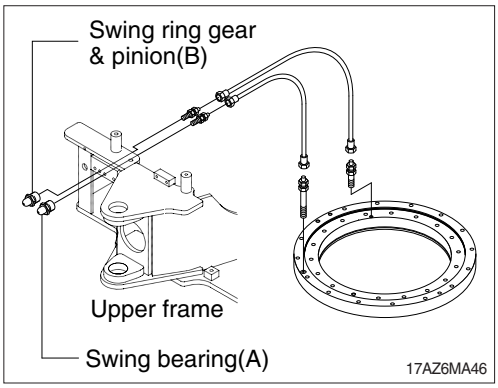


20) LUBRICATE SWING BEARING AND SWING RING GEAR & PINION

(1) Grease at 2 fitting.

A : Lubricate every 250 hours.

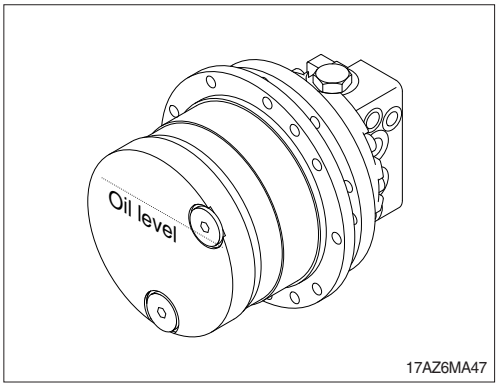
B : Lubricate every 50 hours.



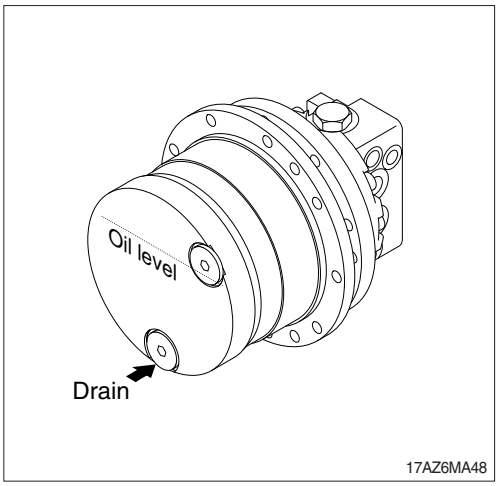
21) CHECK THE TRAVEL REDUCTION GEAR OIL

(1) Position the travel motor as shown in the illustration and make sure the machine is on 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.



22) CHANGE OF THE TRAVEL REDUCTION GEAR OIL



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

(2) Position the travel motor as shown in the illustration and make sure the machine is on flat ground.

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

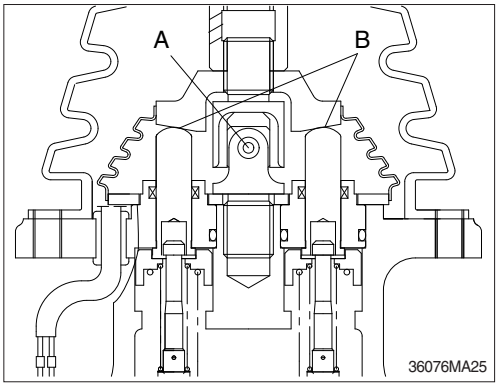
(4) Drain the oil to adequate container.

(5) Tighten the drain plug and fill specified amount of oil at filling port.
- Amount of oil : 0.33 ℓ (0.09 U.S.gal)

(6) Tighten the level plug and travel slowly to check if there is any leakage of oil.
- Tightening torque : 4.0±0.5 kgf·m
  (28.9±3.6 lbf·ft)

23) LUBRICATE RCV LEVER

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



24) ADJUSTMENT OF TRACK TENSION

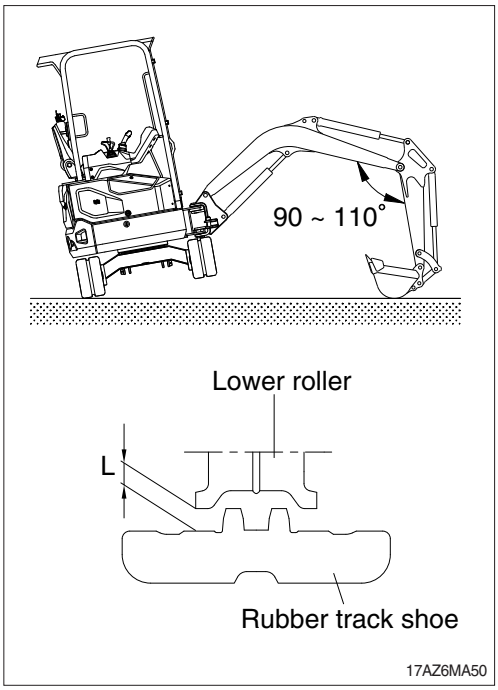
※ It is important to adjust the tension of track properly to extend the life of track and traveling components.

※ The wear of pins and bushings on the undercarriage will vary with the working conditions and soil properties.
It is thus necessary to continually inspect the track tension so as to maintain the standard tension on it.

(1) Raise the chassis with the boom and arm as shown in the illustration.

(2) Measure the distance between bottom of lower roller and track of shoe.

※ Remove mud by rotating the track before measuring.



(3) If the tension is tight, drain the grease in the grease nipple and if the tension is loose, charge the grease.

⚠ Personal injury or death can result from grease under pressure.

⚠ When loosening the grease nipple, do not loosen more than one turn as there is a danger of a spring coming out of the nipple because of the high pressure inside.

※ When the grease does not drained smoothly, move the machine to forward and backward a short distance.
If the track tension is loose even after the grease is charged to the maximum, change the pins and bushings as they are worn excessively.

Rubber track

Length (L)	
5~10 ㎜	0.2~0.4"

25) 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 to signal clearly to each other and work carefully to avoid serious injury.**

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

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

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

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

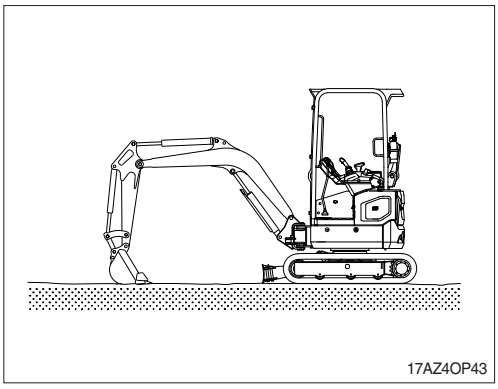
※ **If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.**

※ **After removing the pins, make sure that they do not become contaminated with sand or mud and that the seals of bushings 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 hitting 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.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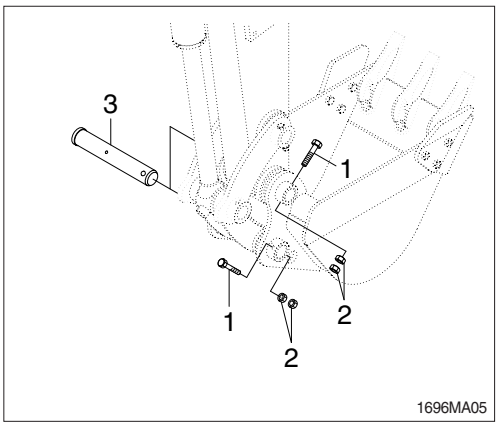

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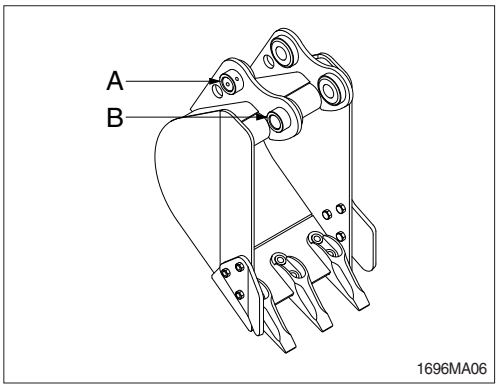

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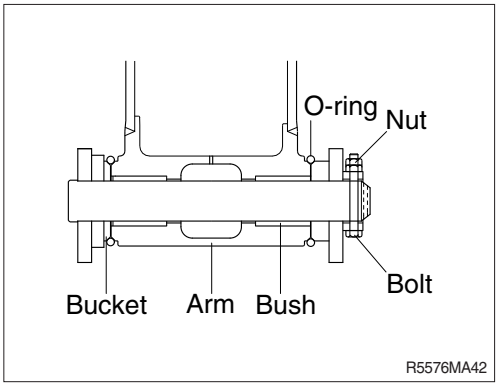

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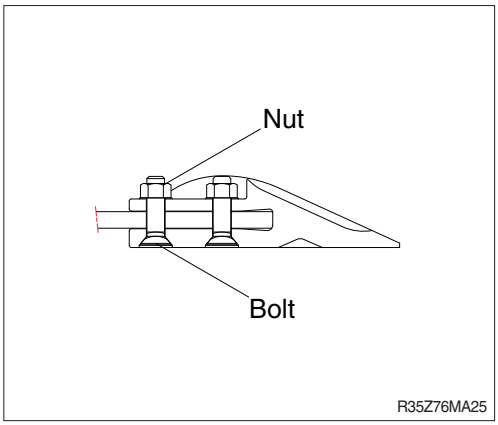
26) REPLACEMENT OF BUCKET TOOTH

(1) Loosen the bolts and nuts.
(2) Remove dust and mud from surface of bucket by using knife.
(3) Fit news tooth to bucket.
(4) Fasten bolts and nuts.

⚠ Personal injury can result from bucket falling.
⚠ Block the bucket before changing tooth tips or side cutters.

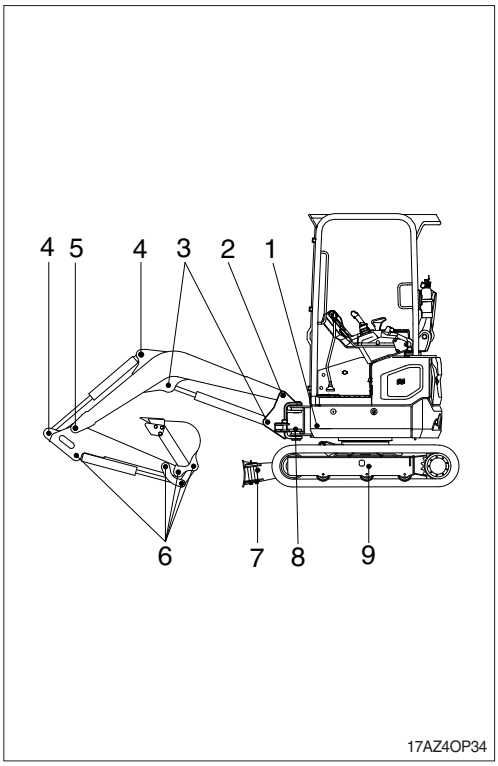


27) LUBRICATE PIN AND BUSHING

(1) Lubricate to each pin of working device

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

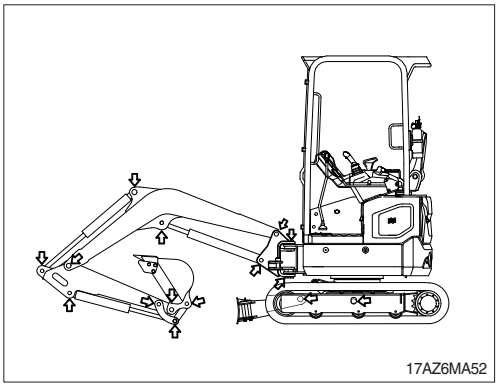
No.	Description	Qty
1	Lubrication manifold at upper frame	3
2	Boom connection pin	2
3	Boom cylinder (head and rod side)	2
4	Arm cylinder pin (head and rod side)	2
5	Boom and arm connection pin	1
6	Bucket cylinder pin (head and rod)	2
	Bucket link (control rod)	1
	Arm and bucket connection pin	1
	Arm and control link connection pin	1
7	Dozer connection pin	2
	Dozer cylinder pin	2
8	Boom swing post	3
	Boom swing cylinder	2
9	Extension cylinder pin	2



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

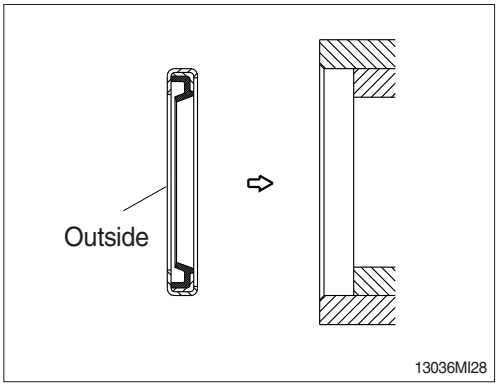
(2) Dust seals are mounted on the rotating part of working device to extend the lubricating interval.

※ **Mount the lip so it is facing outside when replacing dust seals.**



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

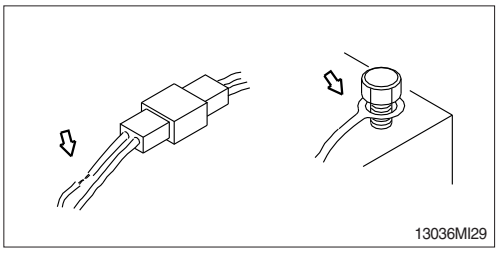
※ **Install seal in the same manner as shown in the illustration. Use a plastic hammer to lightly and evenly tap the seal into place.**



7. ELECTRICAL SYSTEM

1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



2) BATTERY

(1) Clean

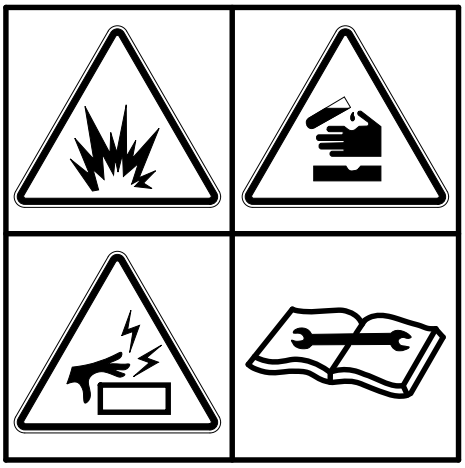
① Wash the terminal with hot water if it is contaminated, and apply grease to the terminals after washing.

⚠ 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. If eyes are affected, flush with clean water or eye solution and seek immediate medical attention.



(2) Recycle

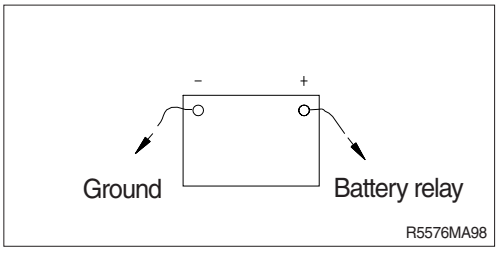
Never discard a battery.

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 (⊖ terminal side) and reconnect it last when reassembling.



3) STARTING THE ENGINE WITH A BOOSTER CABLE

Follow these procedures when starting.

(1) Connection of booster cable

※ Use the same capacity of battery for starting.

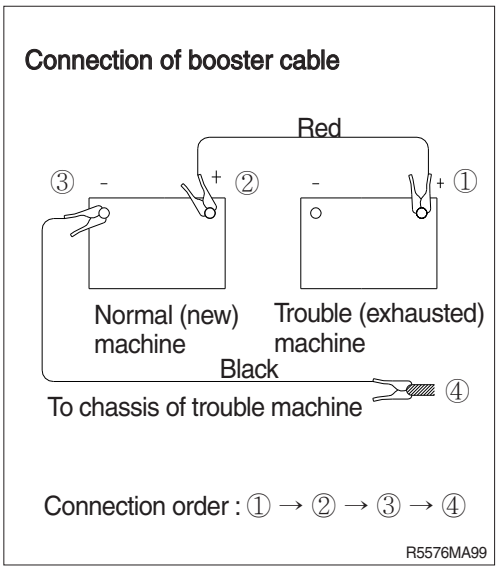
① Make sure that the starting switches of the normal machine and trouble machine are both in the OFF position.

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.

※ Make and maintain a firm connection.

※ Sparks will occur slightly when making the final connection.

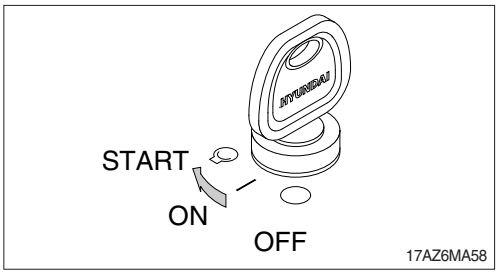


(2) Starting the engine

① Start the engine of the normal machine and keep it running at high idle.

② Start engine of the troubled machine with starting switch.

③ If you can not start it with the first attempt, try again 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.

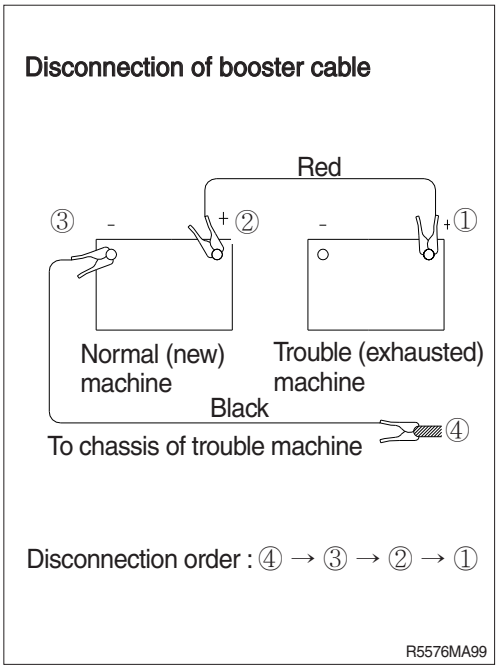
③ Run engine at high idle until charging of the exhausted battery is complete.

⚠ Explosive gas is generated while using the battery or charging it. Keep any flames away and be careful not to cause a spark.

※ Charge the battery in a well ventilated area.

※ Place the machine on the earth or concrete. Avoid charging the machine on any steel or steel plates.

※ Do not connect (+) terminal and (-) terminal when connecting booster cable because it will be shorted.



4) WELDING REPAIR

Before welding, follow the below procedure.

(1) Shut off the engine and remove the starting switch.

(2) Disconnect ground cable from battery by master switch.

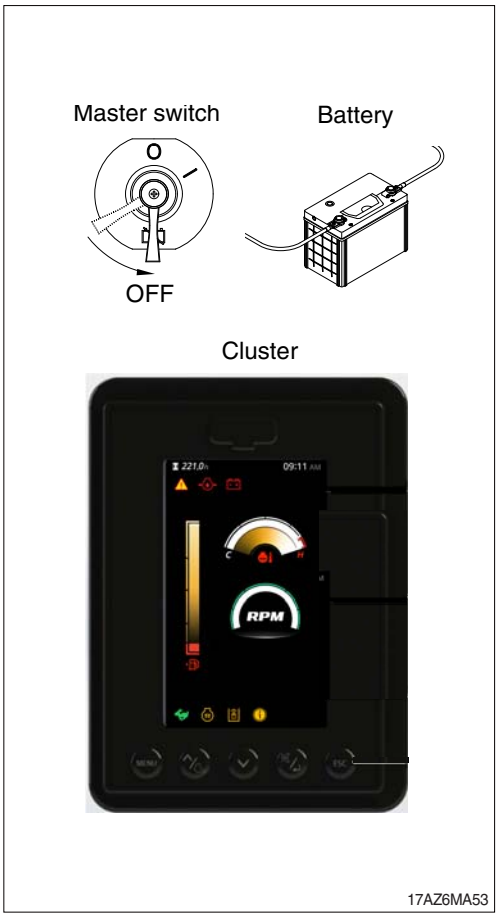
(3) Before carrying out any electric welding on the machine, the battery cables should be disconnected and the connectors pulled out of the cluster etc.

(4) Connect the earth (ground) lead of the welding equipment as close to the welding point as possible.

※ Remove all paint to ensure a solid ground is achieved.

※ Do not weld or use cutting torch 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 weld before carrying out the above.
If not, it will cause serious damage to electric system.



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5) BATTERY CABLE AND CONNECTIONS

⚠ Batteries can emit explosive gases. To reduce the possibility of personal injury, always ventilate the compartment before servicing the batteries.

(1) Remove and inspect the battery cables and connections for cracks or corrosion.

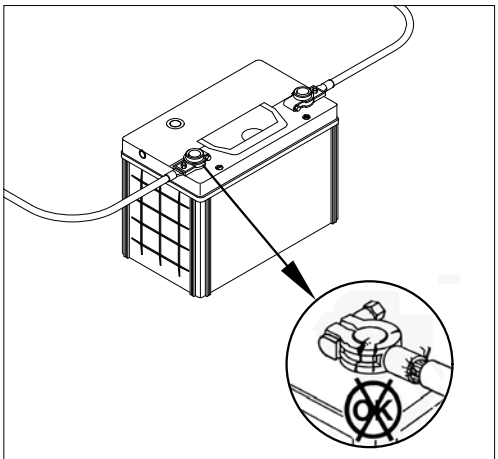
(2) Replace broken terminals, connectors, or cables.

(3) If the connections are corroded, use a battery brush or wire brush to clean the connections.

(4) Make sure all debris are removed from the connecting surfaces.

(5) Install the cables and tighten the battery connections.

(6) Coat the terminals with grease to prevent corrosion.



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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.	
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 START.	· 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 oil pressure lamp does not light up when engine is stationary (when the starting switch is in ON position.)	· Check the cluster. · 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 cluster. · Check and repair the wiring.	

3. OTHERS

Trouble	Service	Remark
Track slip out of place. Excessive wear of the sprocket.	· Adjust tension of track.	
Bucket either rises slowly or not at all.	· Add oil to specified level.	
Slow speed of travel, swing, boom, arm and bucket.	· Add oil to specified level.	
Unusual noise emitted from pump.	· Clean the hydraulic tank strainer.	
Excessive oil temperature rise of hydraulic oil.	· Clean the oil cooler. · Adjust fan belt tension. · Add oil to specified level.	

HYDRAULIC BREAKER AND QUICK COUPLER

1. SELECTING HYDRAULIC BREAKER

※ **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.

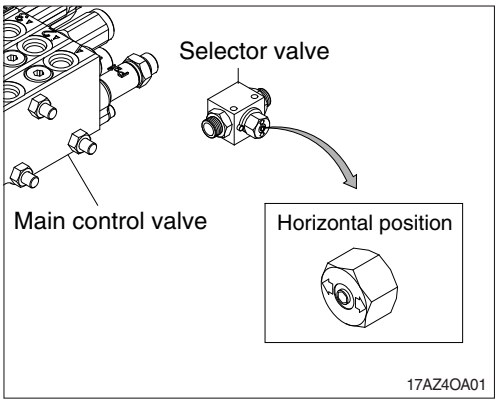
3) When apply a breaker to the machine, consult your local dealer of HD Hyundai Construction Equipment for further explanation.

2. CIRCUIT CONFIGURATION

1) As for breaker oil pressure line, use extra spool of main control valve.
2) Set proper breaker pressure on load relief valve.
3) The pressure of the HX17A Z system is 210 kgf/cm^2 (2990 psi).
4) The accumulator should be used to the breaker charging and return line.
   If the accumulator is not used, it will be damage as the input wave is delivered.

※ Keep the pressure pulsation of pump below 60 kgf/cm^2 (850 psi) by installing the accumulator.

5) Use the spanner to turn the arrow of the selector valve to the horizontal position to operate breaker.



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 HD Hyundai Construction Equipment 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.

(4) Replace when the breaker work is used for short time according to the standard of right graph.

2) RELEASE THE PRESSURE IN BREAKER CIRCUIT

When breaker operating is finished, stop engine and push pedal or switch for breaker to release pressure in breaker circuit.

If pressure still remains, the lifetime of the diaphragm in the accumulator will be shortened.

3) Be careful to prevent contamination by dust, sand and etc.

If such pollution become mixed into the oil, the pump moving parts will wear abnormally, shorten lifetime and become damaged.

4) When operating breaker, bolts and nuts of main equipment may be loosened by vibration. So, it must be inspected periodically.

Service interval

unit : hours

Attachment	Operating rate	Hydraulic oil	Filter element
Breaker	100 %	600★1	200
		1000★2	

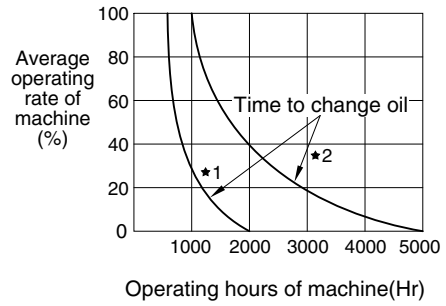
★1 : Conventional hydraulic oil

★2 : HD Hyundai Construction Equipment genuine long life hydraulic oil

● **Replace following filter at same time**

· Hydraulic oil return filter : 1 EA

Hyd oil change guide for hydraulic breaker



★1 : Conventional hydraulic oil

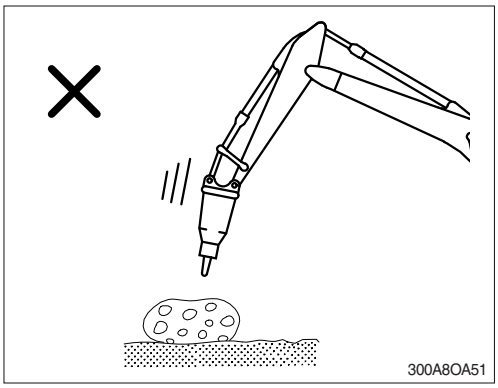
★2 : HD Hyundai Construction Equipment genuine long life hydraulic oil

4. PRECAUTIONS WHILE OPERATING THE BREAKER

DO NOT BREAK ROCK WHILE LOWERING

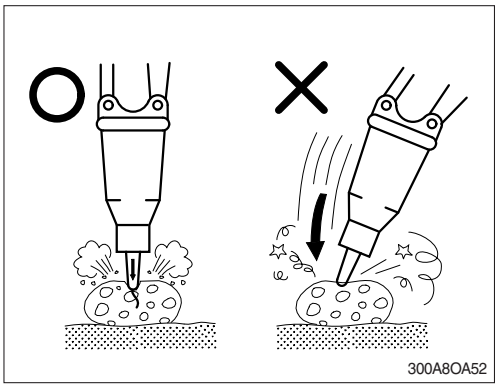
As the breaker is heavy in comparison with bucket, it must be operated slowly.

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



DIRECTION OF THRUST

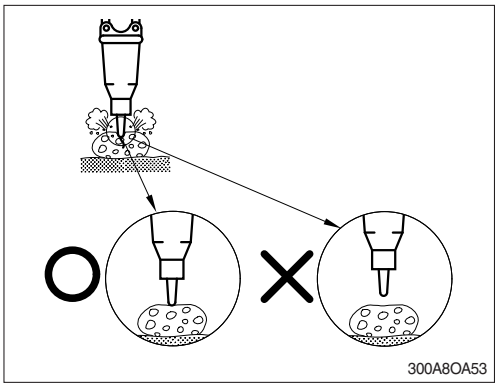
Apply a thrust in a straight line with the tool. Place the tool on a rock with the hammering side as vertically as possible. If the hammering side is oblique, the tool may slip during hammering, causing the chisel and piston to break, or seized. When breaking, select the point of a rock on which hammering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



PROPER THRUST

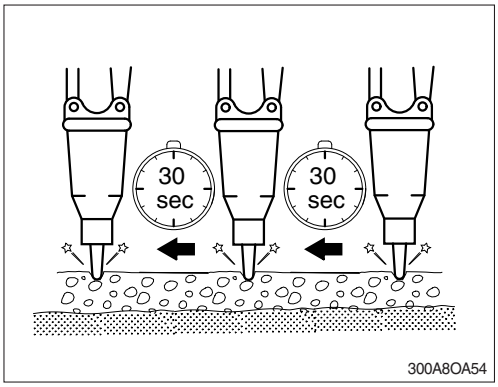
To break effectively, a proper thrust force must be applied to the breaker. If thrust is too low, impact energy of the piston may not be sufficient to break rocks.

Breaking force is transferred to the breaker body, arm and boom resulting in damage of those parts.



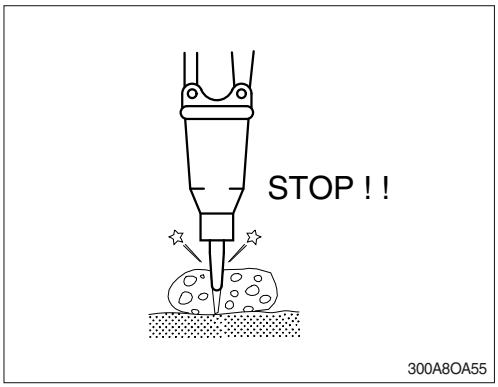
Move the impact point from the edge to the interior. Never try to break off a too large block, if the object has not broken within 30 seconds. The object should be broken up piece by piece in small blocks. Large distance steps will not improve working results.

Operating the breaker longer than 30 seconds may cause damage to the breaker.



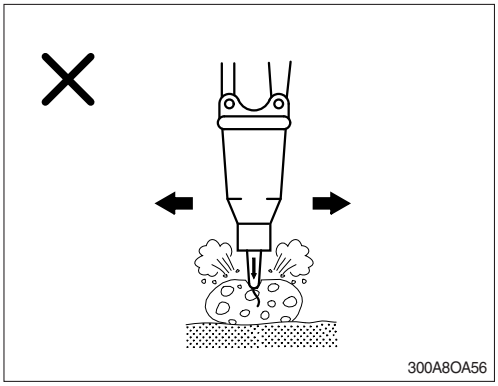
BLANKS THRUST

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.



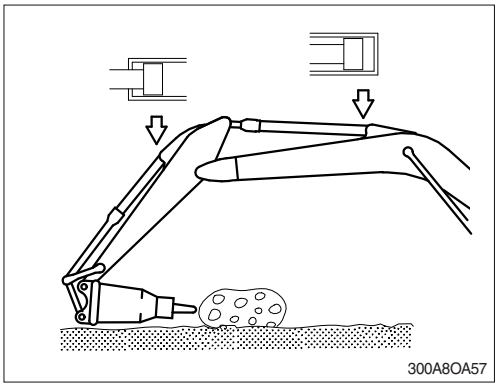
DO NOT MOVE MACHINE OR BREAKER WHILE STRIKING

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



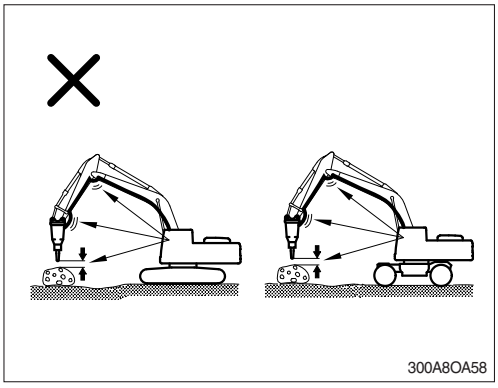
OPERATE BREAKER WITH A GAP IN EXCESS OF 100 mm (4 inches) FROM THE END OF THE STROKE TIP

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



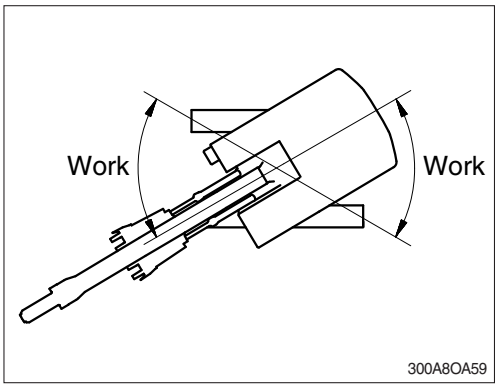
STOP THE OPERATION IMMEDIATELY IF HOSES VIBRATE EXCESSIVELY

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.

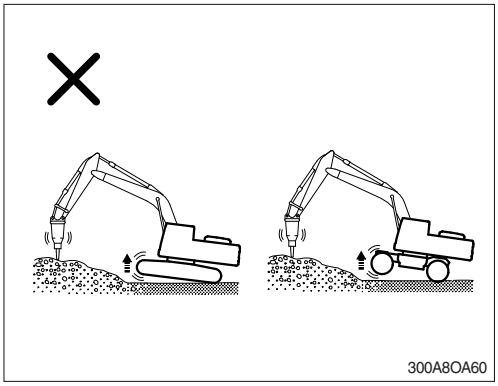


DO NOT WORK WHILE IN A SWING STATE

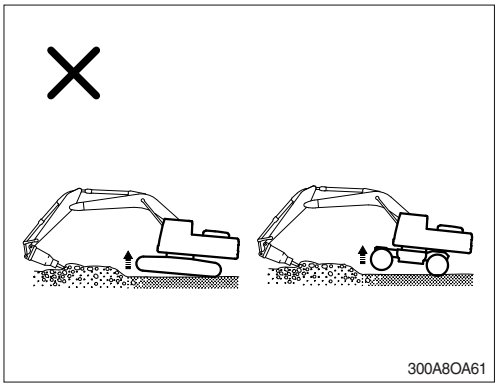
Do not work while swinging the upper structure. It cause oil leakage of the bend in the track shoe and rollers.



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.

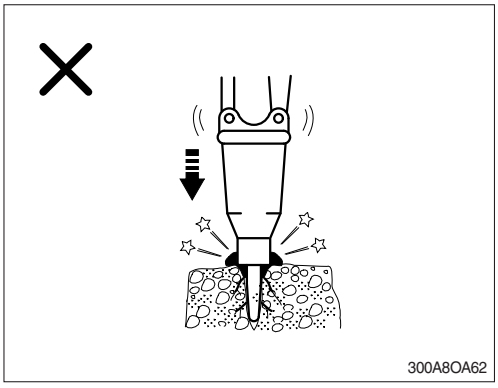


Do not extend the bucket cylinder fully and thrusting to raise the machine off the ground.



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.



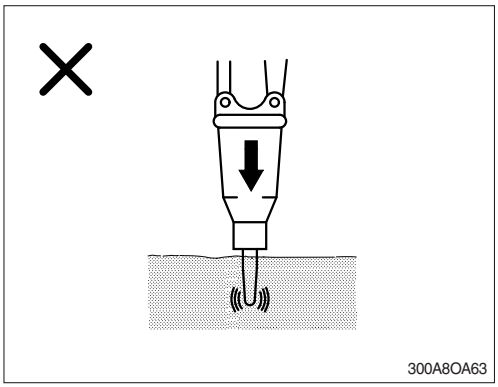
NEVER DRIVE THE CHISEL INTO THE GROUND

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.

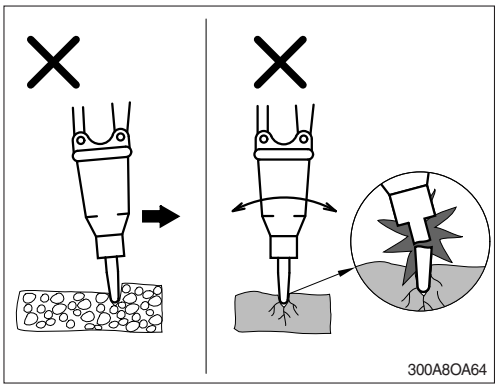


NEVER USE AS A LEVER

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

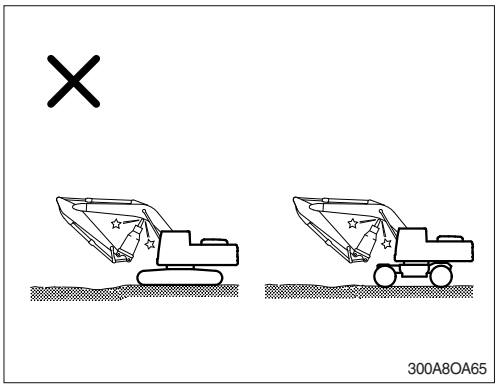
Under any circumstances, operating in this way is not permitted.

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

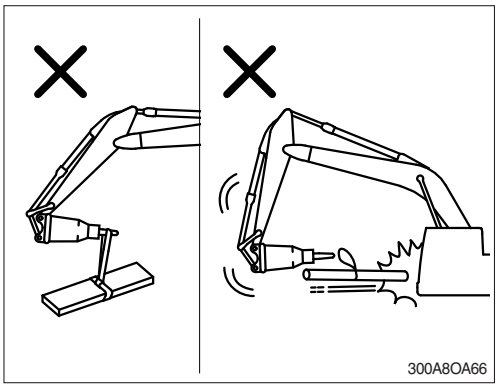
Be aware of clearance between breaker tip and the underside of boom as shown.



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.

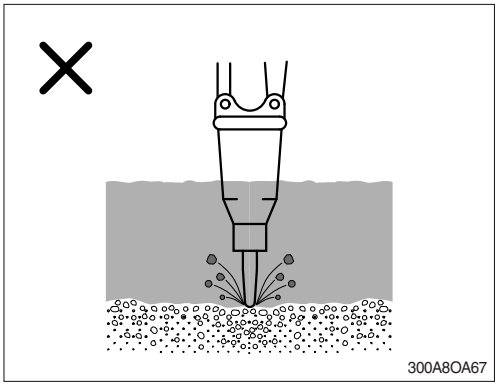


NEVER USE THE HYDRAULIC BREAKER UNDER WATER

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.

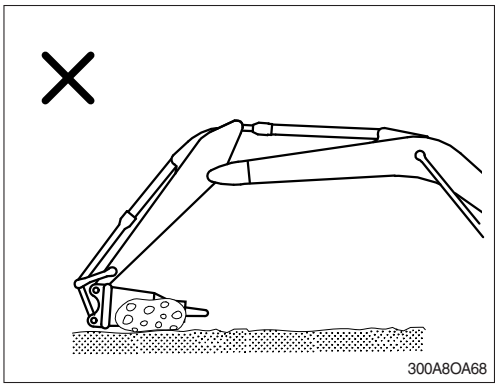
To operate the breaker under water, compressed air must be supplied into the breaker, into the impact chamber of the front-head, prior to use.

Consult your HD Hyundai Construction Equipment 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.

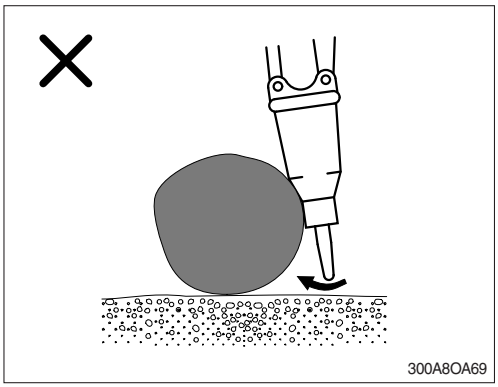


NEVER USE THE CHISEL OR HYDRAULIC BREAKER TO MOVE ROCKS OR OTHER OBJUCTS

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.



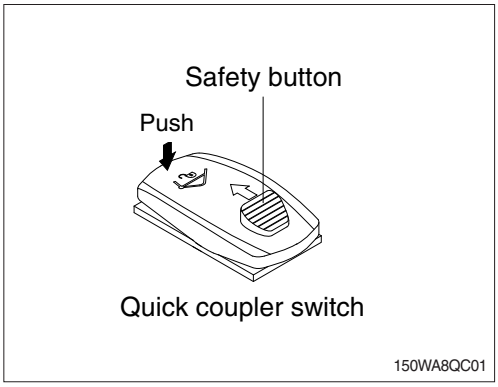
5. QUICK COUPLER

1) FIXING BUCKET WITH QUICK COUPLER

(1) Park the excavator and attachment on firm and level ground.

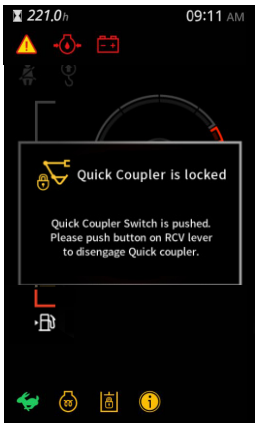
(2) After checking the safe environment conditions for installing/removing the quick coupler, perform the disengagement process.

(3) To unlock the quick coupler switch, press the safety button forward and press the switch.



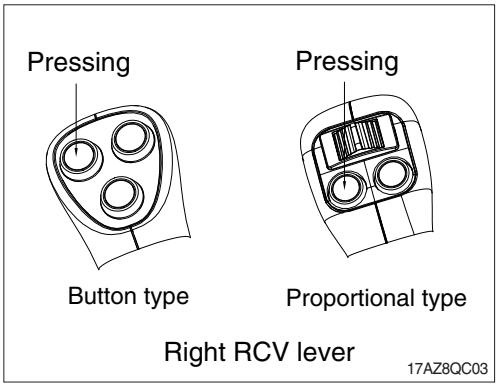
(4) Quick coupler symbols and warning messages appear on the cluster screen, and warning buzzers sound.

※ **The warning buzzer continues to operate up to step (12).**

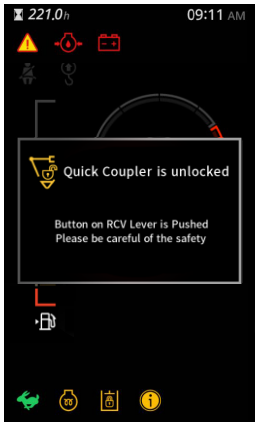


17AZ8QC02

(5) To unlock the quick coupler, press the quick coupler button on the right RCV lever.
To maintain the unlock status of the quick coupler the operator must maintain pressing the coupler button.

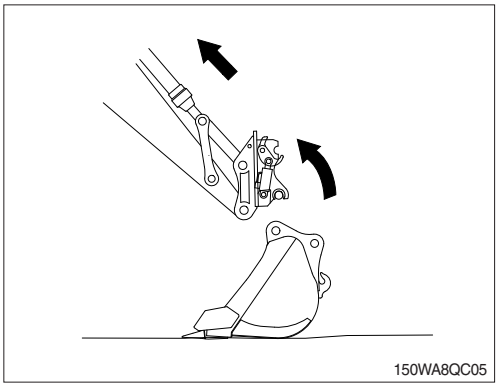


(6) The warning message in the cluster screen is changed, and the quick coupler lock is released.



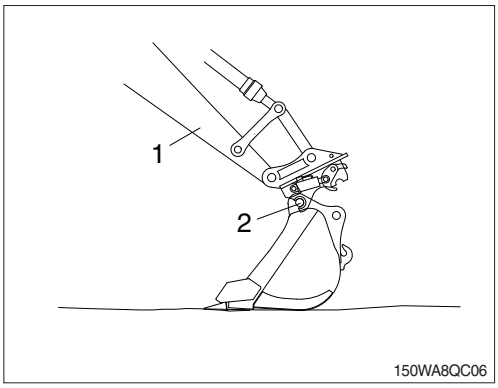
17AZ8QC04

(7) Retract the bucket cylinder. Align the quick coupler with attachment mounting pins or interface.



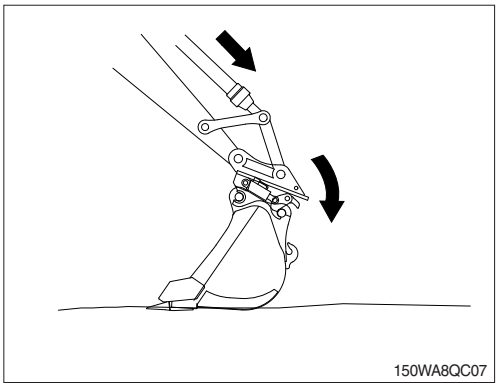
150WA8QC05

(8) Move the arm (1) and raise it until hook engages the upper pin (2) or interface of attachment.



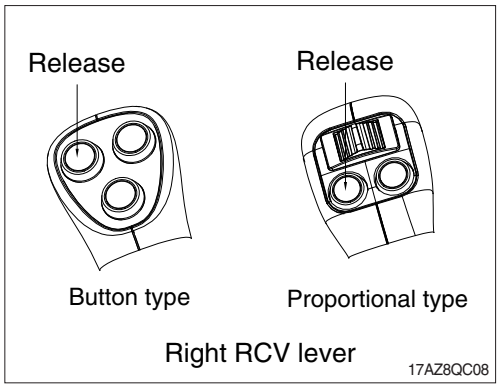
150WA8QC06

(9) With the bucket crowded, engage the quick coupler to the lower attachment pin or interface.



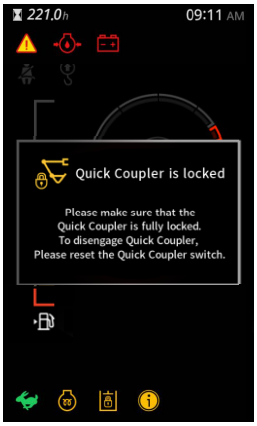
150WA8QC07

(10) To engage the quick coupler, release the quick coupler button on the right RCV lever.



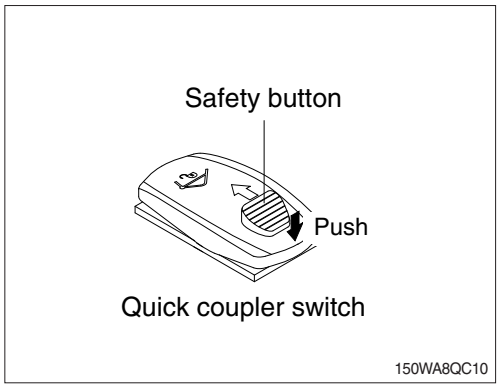
(11) The warning message in the cluster screen is changed, and the quick coupler lock is engaged.

※ **After changing warning message, the quick coupler will be locked even if the operator presses the quick coupler button of the right RCV lever again. To unlock the quick coupler again the operator must repeat from the process (3).**

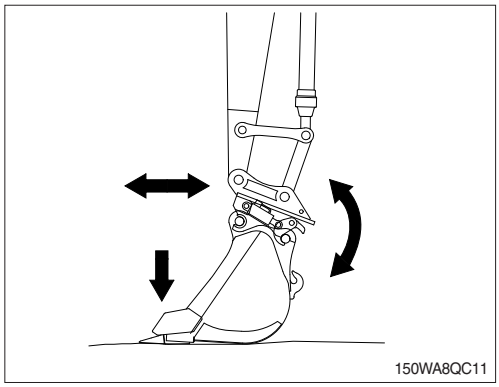


17AZ8QC09

(12) To confirm the engagement of the quick coupler, release the safety button to its original position.
- The buzzer will stop activating.
- The warning message will disappear.

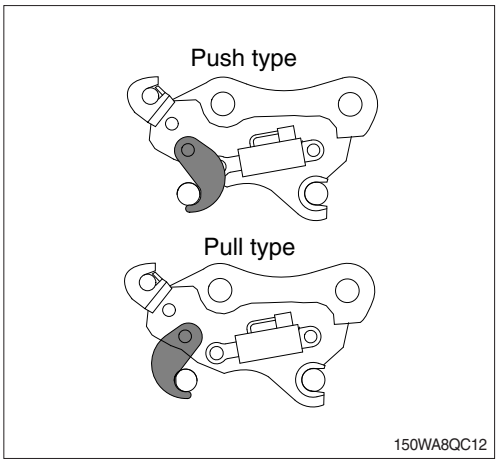


(13) Shake the attachment vigorously and lower the boom to the ground and apply down pressure to the quick coupler and attachment to check that attachment is fully engaged and locked to the quick coupler.



(14) Visually check that quick coupler is fully engaged and locked before operating the machine and attachment.

※ **If the button of the RCV is released during the operation, the operator must repeat again from the process (3) to unlock the quick coupler.**

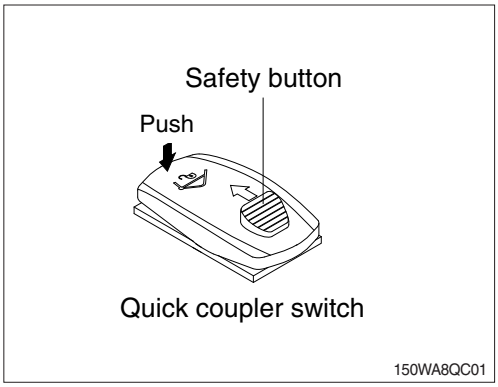


2) REMOVE BUCKET FROM QUICK COUPLER

(1) Park the excavator and attachment on firm and level ground.

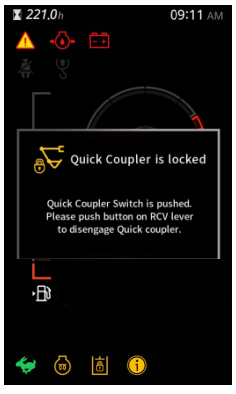
(2) After checking the safe environment conditions for installing/removing the quick coupler, perform the disengagement process.

(3) To unlock the quick coupler switch, press the safety button forward and press the switch.



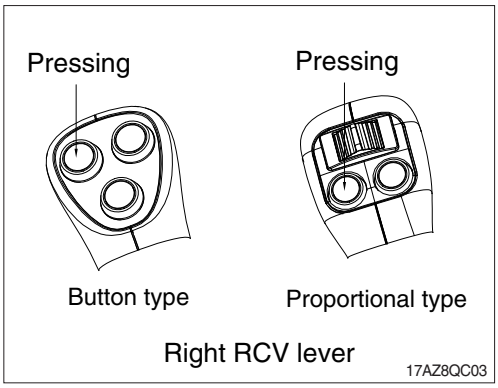
(4) Quick coupler symbols and warning messages appear on the cluster screen, and warning buzzers sound.

※ **The warning buzzer continues to operate up to step (11).**

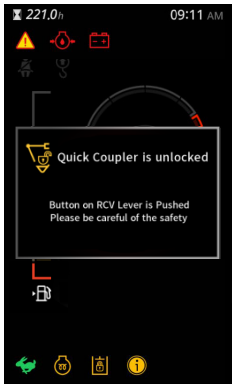


17AZ8QC02

(5) To unlock the quick coupler, press the quick coupler button on the right RCV lever.
To maintain the unlock status of the quick coupler the operator must maintain pressing the coupler button.

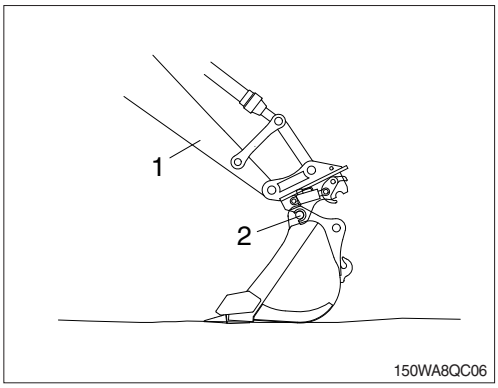


(6) The warning message in the cluster screen is changed, and the quick coupler lock is released.

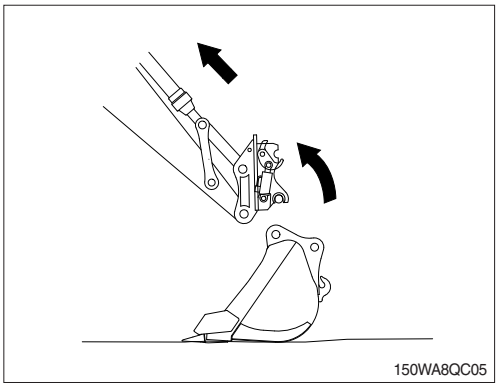


17AZ8QC04

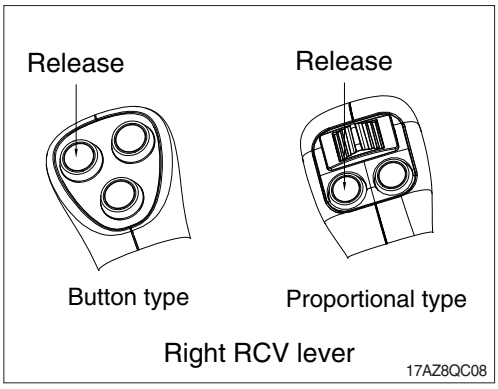
(7) Move the arm (1) and raise it until hook disengages the upper pin (2).



(8) Retract the bucket cylinder.

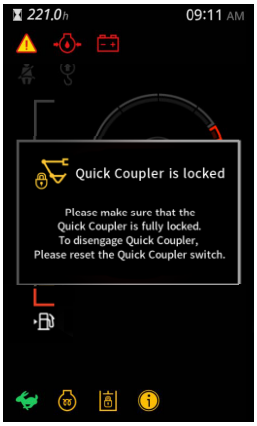


(9) To lock the quick coupler, release the quick coupler button on the right RCV lever.



(10) The warning message in the cluster screen is changed, and the quick coupler lock is engaged.

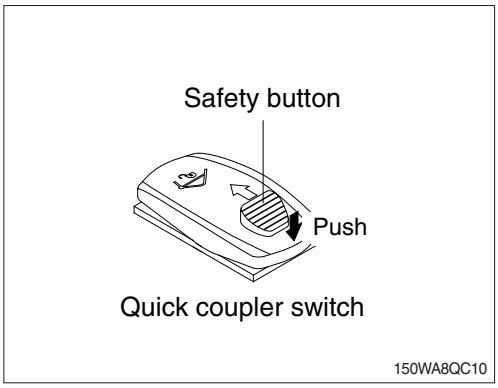
※ **After changing warning message, the quick coupler will be locked even if the operator presses the quick coupler button of the right RCV lever again.**



17AZ8QC09

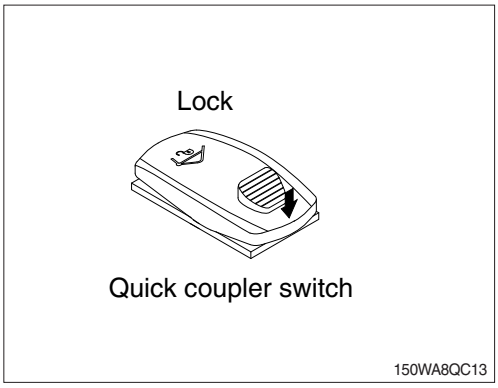
(11) To confirm the disengagement of the quick coupler, release the safety button to its original position.

- The buzzer will stop activating.
- The warning message will disappear.

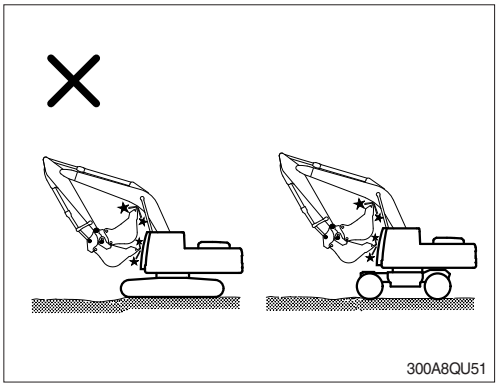


3) PRECAUTION OF USING QUICK COUPLER

⚠ When operating the machine with quick coupler, confirm that the quick coupler switch is in the LOCK position.
Operating the machine with quick coupler switch unlocked can cause the bucket to drop off and could result in personal injury, death, machine damage or property damage.



⚠ Be careful of the operating the machine which is equipped with quick coupler.
The bucket may hit cab, boom and boom cylinders when it reaches the vicinity of them as shown in the illustration.
HD Hyundai Construction Equipment will not be responsible for any injury, death or damage in the event that the quick coupler and attachment are not install-ed correctly.



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