CONTENTS

FOREWORD

This manual contains a number of instructions and safety recommendations regarding driving, handling, lubrication, maintenance, inspection and adjustment of the excavator.
The manual is to promote safety maintenance and enhance machine performance.

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

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

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

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

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

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

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

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

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

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

3. Use genuine Hyundai spare parts for the replacement of parts.
   We expressly point out that Hyundai will not accept any responsibility for defects resulting from non-genuine parts or non workmanlike repair.
   In such cases Hyundai cannot assume liability for any damage.

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

BEFORE SERVICING THIS MACHINE

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

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

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

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

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

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

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

All personnel must remain alert to potential hazards.

Work within your level of training and skill.

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

Use your common sense.

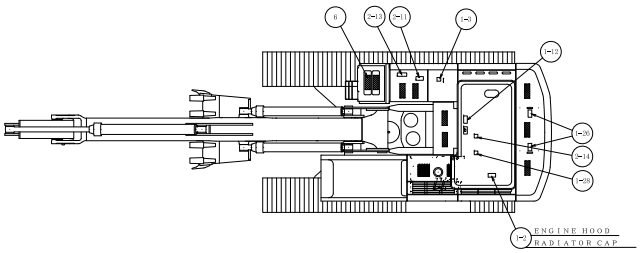
TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

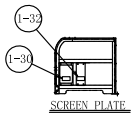
Machine Serial No.	
Engine Serial No.	
Manufacturing year	
Manufacturer Address	Hyundai Construction Equipment co., Ltd. 12th, Fl., Hyundai Bldg. 75, Yulgok-ro, Jongno-Gu, Seoul, 03058, Korea
Distributor for U.S.A Address	Hyundai Construction Equipment U.S.A, Inc 6100 Atlantic Boulevard Norcross GA 30071 U.S.A
Distributor for Europe Address	Hyundai Construction Equipment Europe N. V. Vossendal 11 2240 Geel Belgium
Dealer Address	

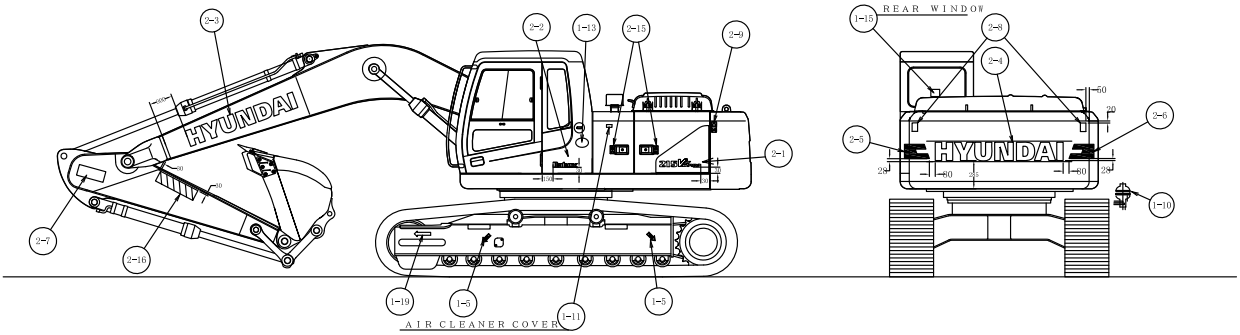
SAFETY LABELS

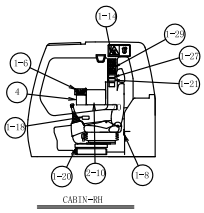
1. LOCATION

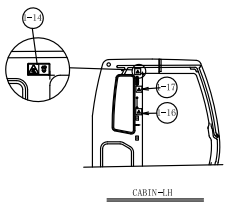
Always keep these labels clean. If they are lost or damage, attach them again or replace them with a new label.

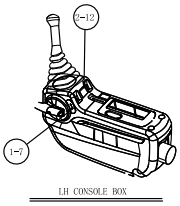


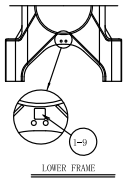


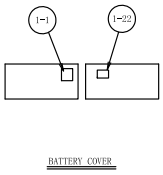


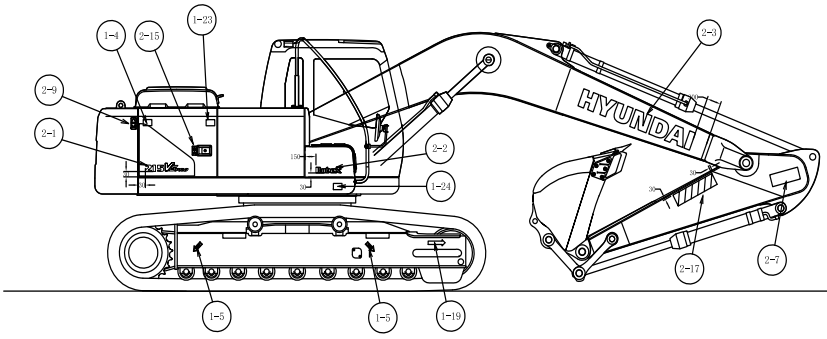


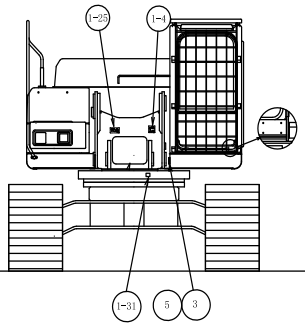












NO	NAME	AMOUNT	
6	STEP TREAD	9	
5	NAME PLATE	1	
4	DECAL-LIFTING CHART	1	
3	RIVET	4	

NO	NAME	AMOUNT	
2-17	DECAL-REFLECTOR/RH	1	
2-16	DECAL-REFLECTOR/LH	1	
2-15	DECAL-STAY FIX	3	
2-14	DECAL-NO STEP	1	
2-13	DECAL-FALLING	1	
2-12	DECAL-MCU/ECU CONNECTOR	1	
2-11	DECAL-FUELING-CHINA	1	
2-10	DECAL-SERVICE INSTRUCTION	1	
2-9	DECAL-KEEP CLEAR/SIDE	2	
2-8	DECAL-KEEP CLEAR/REAR	2	
2-7	DECAL-KEEP CLEAR/ATTACH	2	
2-6	DECAL-REFLECTING-RH	1	
2-5	DECAL-REFLECTING-LH	1	
2-4	DECAL-HYUNDAI LOGO	1	
2-3	DECAL-HYUNDAI LOGO	2	
2-2	DECAL-LOGO-ROBEX	2	
2-1	DECAL-MODEL NAME	2	
2	DECAL KIT(B)-CHINA		

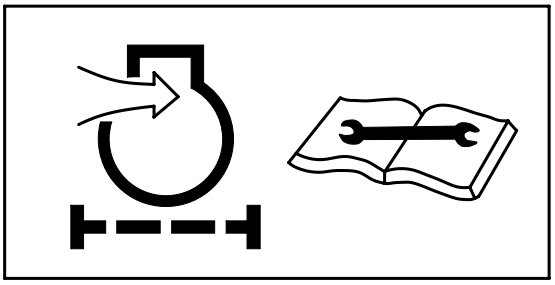
NO	NAME	AMOUNT	
1-32	DECAL-FUSE CAUTION	1	
1-31	DECAL-SWING BEARING	1	
1-30	DECAL-RCV/LEVER PATTERN	1	
1-29	DECAL-CABIN RH PILLAR(LC)	1	
1-28	DECAL-SHEARING	1	
1-27	DECAL-WATER SEPARATOR	1	
1-26	DECAL-LIFTING EYE	2	
1-25	DECAL-R/GEAR GREASE	1	
1-24	DECAL-TRANSPORTING	1	
1-23	DECAL-HYD. OIL LEVEL	1	
1-22	DECAL-ECU CONNECTOR	1	
1-21	DECAL-TURBOCHARGER	1	
1-20	DECAL-SAFETY SEAT	1	
1-19	DECAL-DIRECTION	2	
1-18	DECAL-CAUTION KEY OFF	1	
1-17	DECAL-FIRE EXTINGUISHER	1	
1-16	DECAL-HAMMER	1	
1-15	DECAL-SAFETY RR WINDOW	1	
1-14	DECAL-SAFETY FR/WINDOW	2	
1-13	DECAL-LOW EMISSION ENG	1	
1-12	DECAL-TURBO COVER	1	
1-11	DECAL-AIR CLEANER	1	
1-10	DECAL-ACCUMULATER	1	
1-9	DECAL-TIE	2	
1-8	DECAL-AIRCON FILTER	1	
1-7	DECAL-SAFETY LEVER	1	
1-6	DECAL-CONTROL IDEOGRAM	1	
1-5	DECAL-SLINGING IDEOGRAM	4	
1-4	DECAL-H/PRESSURE HOSE	2	
1-3	DECAL-HYD. OIL LUB.	1	
1-2	DECAL-RADIATOR	1	
1-1	DECAL-BATT. ACCIDENT	1	
1	DECAL KIT(A)-CHINA		

2. DESCRIPTION

There are several specific warning labels on this machine please become familiarized with all warning labels.
Replace any safety label that is damaged, or missing. If a safety label is attached to a part that is replaced, install a safety label on the replacement part.

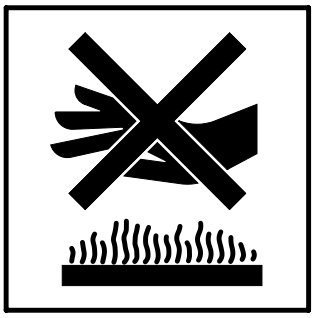
1) AIR CLEANER FILTER (item 1-11)
This warning label is positioned on the air cleaner cover.

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



2) TURBOCHARGER COVER (item 1-12)
This warning label is positioned on the engine hood.

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



3) RADIATOR CAP (item 1-2)
This warning label is positioned on the radiator.

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

4) FUELING (item 2-11)
This warning label is positioned on the right side of fuel filler neck.

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

5) BATTERY ACCIDENT (item 1-1)
This warning label is positioned on the battery cover.

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

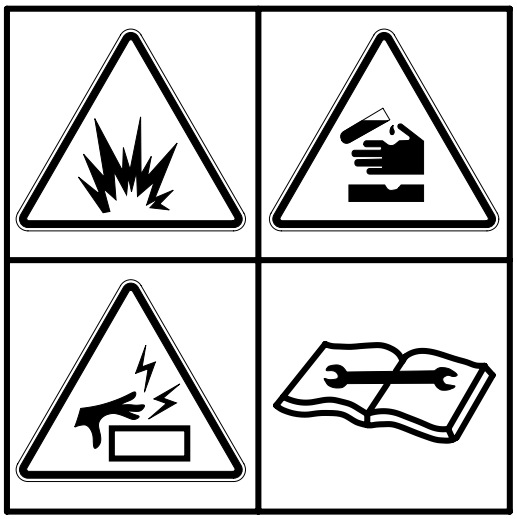
※ Maintain the electrolyte at the recommended level. Add distilled water to the battery only when starting up, never when shutting down.
With electrolyte at proper level, less space may cause the gases to be accumulated in the battery.

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

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

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

⚠ For safety from electric shock, do not battery terminal with a wet hand.



6) HIGH PRESSURE HOSE (item 1-4)
This warning label is positioned on the front of the upper frame and the rear side of the hydraulic tank.

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

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

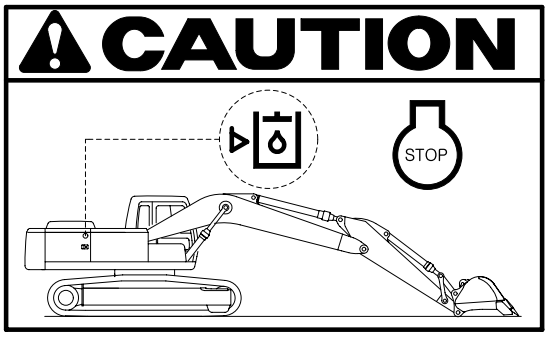
※ See the maintenance section for details.

7) HYDRAULIC OIL LEVEL (item 1-23)
This warning label is positioned on the rear side of the hydraulic tank.

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

※ Check oil level on the level gauge.

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



8) HYDRAULIC OIL LUBRICATION (item 1-3)
This warning label is positioned on the top of the hydraulic tank.

※ Do not mix with different brand oils.

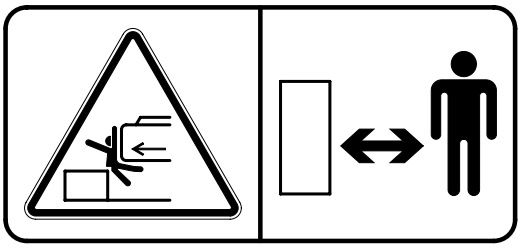
⚠ Never open the filler cap while high temperature.

⚠ Loosen the cap slowly and release internal pressure completely.

9) KEEP CLEAR-REAR (item 2-8)
This warning label is positioned on the rear of counterweight.

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

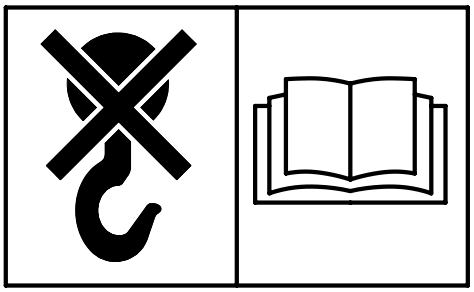
⚠ Do not deface of remove this label from the machine.



10) LIFTING EYE (item 1-26)
This warning label is positioned on the counterweight.

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

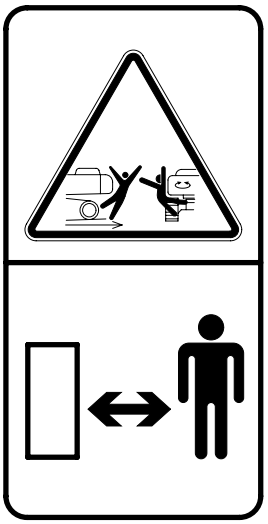
※ See page 5-7 for proper lifting method of the machine.



11) KEEP CLEAR-SIDE (item 2-9)
This warning label is positioned on the both side of counterweight.

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

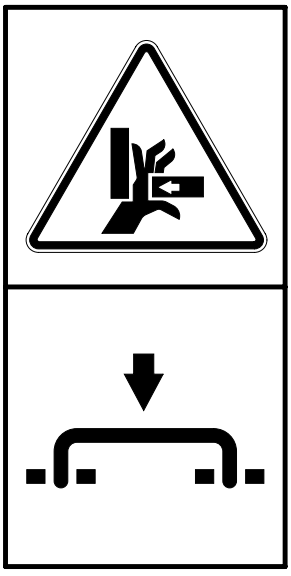
⚠ Do not deface or remove this label from the machine.



12) STAY FIX (item 2-15)
This warning label is positioned on the both side of the side cover.

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

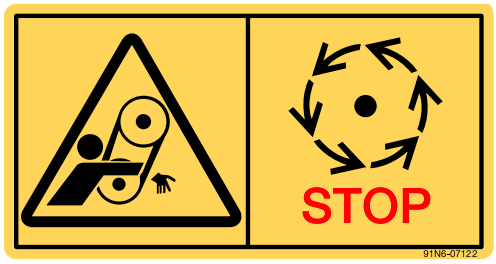
⚠ Be careful that the opened door may be closed by the external or natural force like strong wind.



13) ENGINE HOOD SHEARING (item 1-28)
This warning label is positioned on the engine hood.

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

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

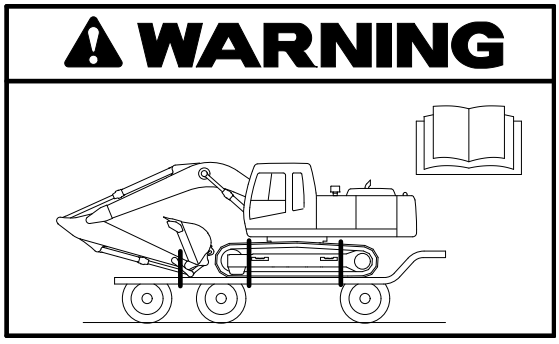


14) NO STEP (item 2-14)
This warning label is positioned on the engine hood.

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

15) TRANSPORTING (item 1-24)
This warning label is positioned on the front right side of upper frame.

⚠ Study the operator's manual before transporting the machine, if provided and tie down arm and track to the carrier with lashing wire.
See page 5-6 for details.



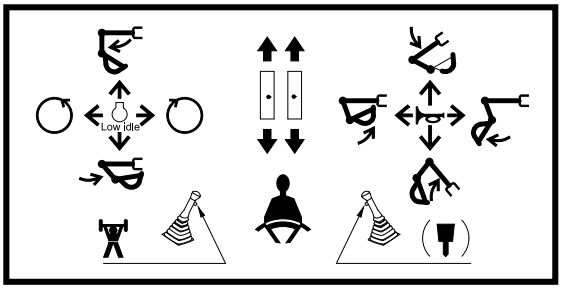
16) CONTROL IDEOGRAM (item 1-6)

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

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

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

See page 4-12 for details



17) REFLECTING (item 2-5,2-6)

This warning label is positioned on the rear side of counterweight.

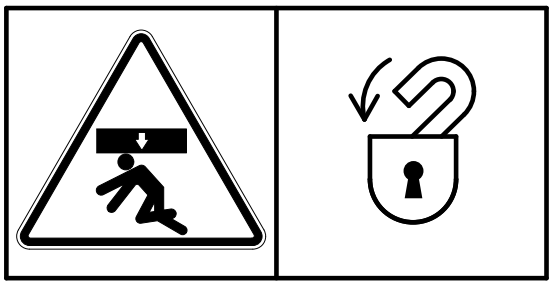
⚠ **To prevent serious personal injury or death keep clear of machine swing radius.**

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

18) SAFETY FRONT WINDOW (item 1-14)

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

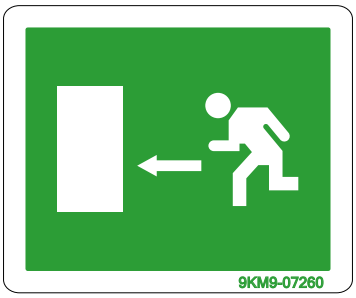
⚠ Be careful that the front window may be promptly closed.



19) **SAFETY REAR WINDOW** (item 1-15)
This warning label is positioned on the rear window of the cab.

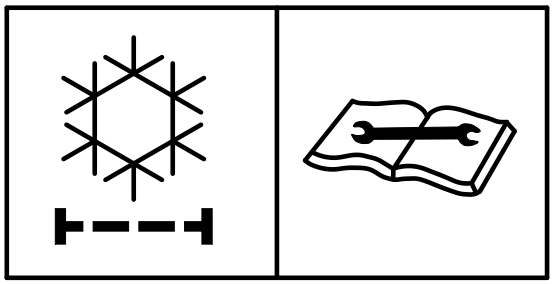
※ **The rear window serves as an alternate exit.**

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



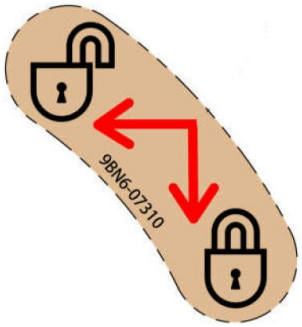
20) **AIR CONDITIONER FILTER** (item 1-8)
This warning label is positioned on the air conditioner cover.

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



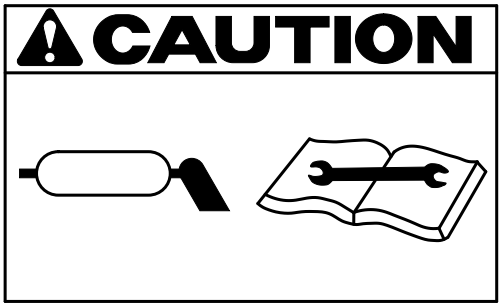
21) **SAFETY KNOB** (item 1-7)
This warning label is positioned on the cover of the safety knob.

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



22) **REDUCTION GEAR GREASE** (item 1-25)
This warning label is positioned on the front of upper frame.

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

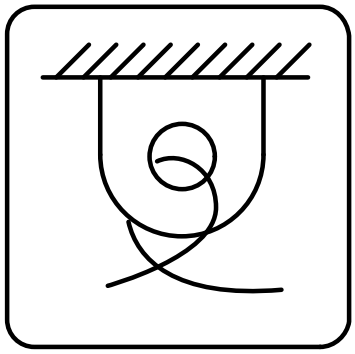


23) TIE (item 1-9)

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

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

⚠ **see page 4-15 for detall**



24) KEEP CLEAR-ATTACH (item 2-7)

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

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

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

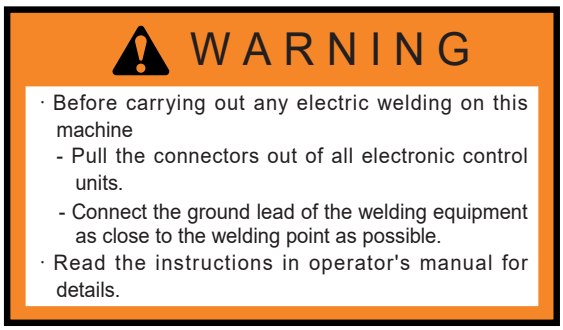
25) ECU CONNECTOR (item 1-22)

This warning label is positioned on the battery cover.

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

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

※ See page 6-43 for detail.

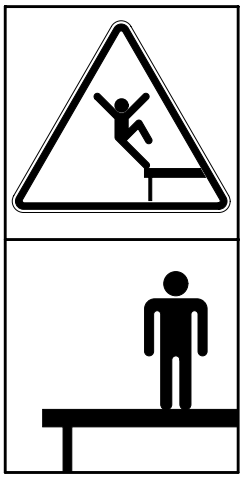


26) FALLING (item 2-13)

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

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

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

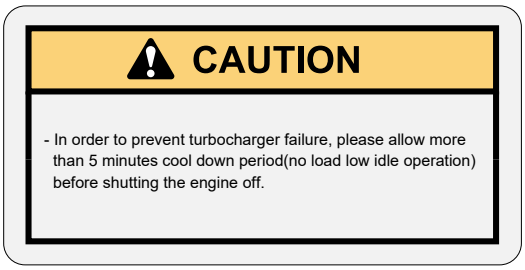


27) CAUTION (TURBOCHARGER)(item 1-21)

On both sides of the

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

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

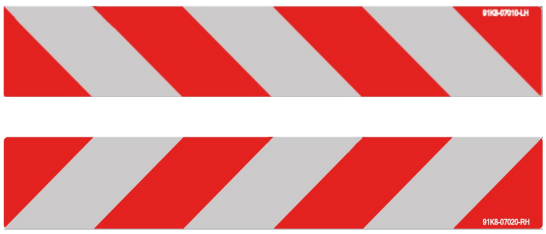


28) REFLECTING (item 2-16,2-17)

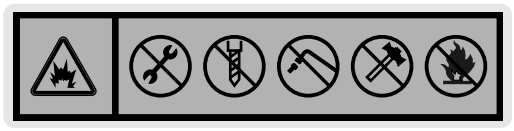
This warning label is positioned on both sides of the arm.

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

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



29) ACCUMULATOR (item 1-10)



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

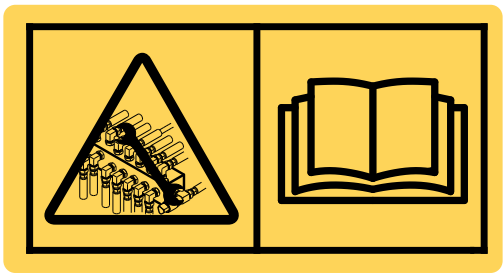
※ The accumulator is filled with high-pressure nitrogen gas, and it is extremely dangerous if it is handled in the wrong way. Always observe the following precautions.

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

⚠ Do not weld anything to the accumulator.

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

30) RCV LEVER PATTERN (item 1-30)



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

Check the machine control pattern for conformance to pattern on this label. If

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

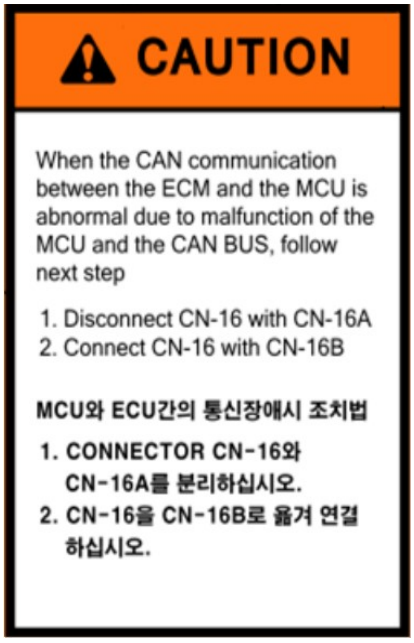
Failure to do so could result in injury or death

※ **see page 4-26 for detail**

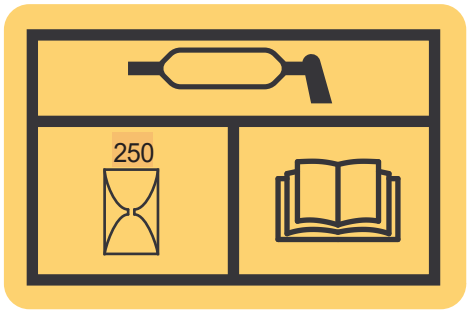
31) FUSE CAUTION (item 1-32)

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

⚠ **Disconnect CN-16 with CN-16A**
Connect CN-16 with CN-16B
※ **see page 3-39 for detail**



32) SWING BEARING GREASE (item 1-31)
This warning label is positioned in the front of swing ring gear.



33) HAMMER (item 1-16)
This tag is located in the cockpit right center by the window.
※ **In case of emergency, use escape hammer to break this window for escape.**

34) FIRE EXTINGUISHER (item 1-17)

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

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

35) MCU/ECM CONNECTOR (item 2-12)

This warning label is positioned on the electric box.

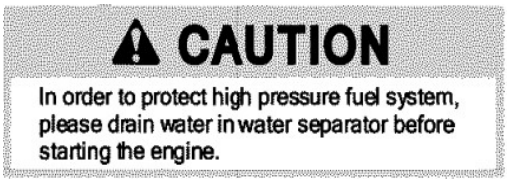
※ MCU communicates the machine data with Laptop computer through RS232 service socket.

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

※ See page 3-34 for details.

36) WATER SEPARATOR (item 1-27)

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

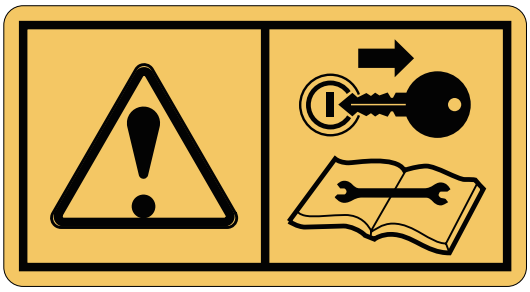


37) KEY OFF CAUTION (item 1-18)

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

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

Extreme care shall be taken during maintenance work.



MACHINE DATA PLATE

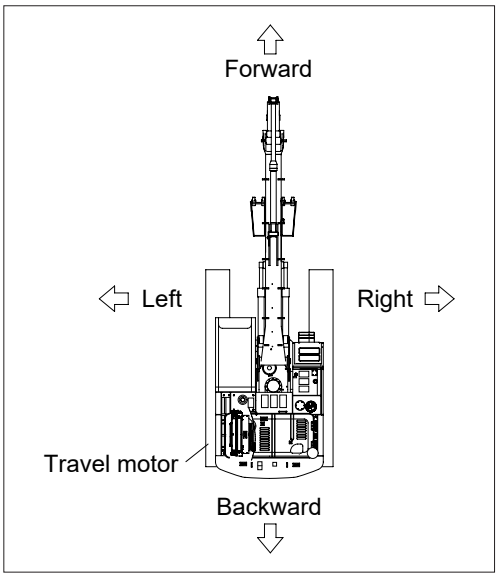
1 Machine type / model 2 Product identification number 3 Engine power
4 Operating mass

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

GUIDE

1. DIRECTION

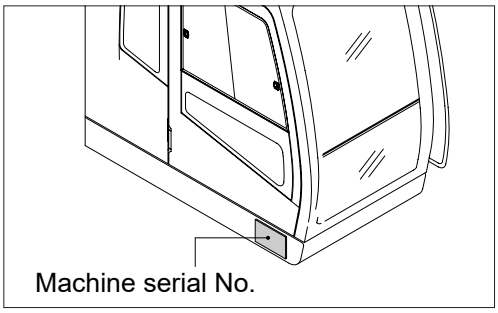
The direction of this manual indicate forward, backward, right and left on the standard of operator when the travel motor is in the rear and machine is on the traveling direction.



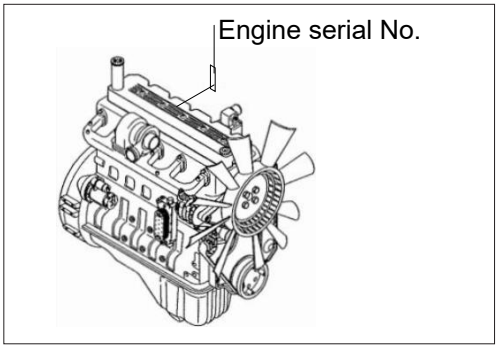
2. SERIAL NUMBER

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

1) MACHINE SERIAL NUMBER
The numbers are located below the right window of the operator's cab.



2) ENGINE SERIAL NUMBER
The numbers are located on the engine name plate.



3. INTENDED USE

This machine is designed to be used mainly for the following work.
- Digging work
- Loading work
- Smoothing work
- Ditching work

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

4. SYMBOLS

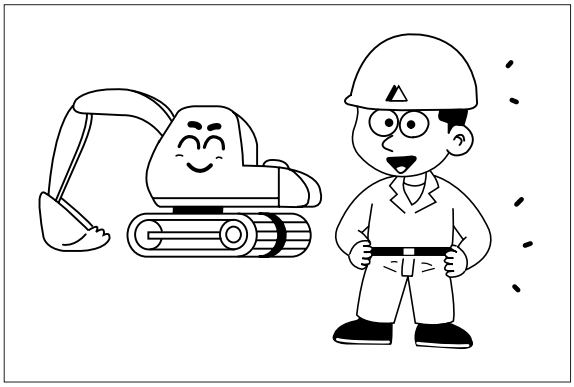
⚠ Important safety hint.

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

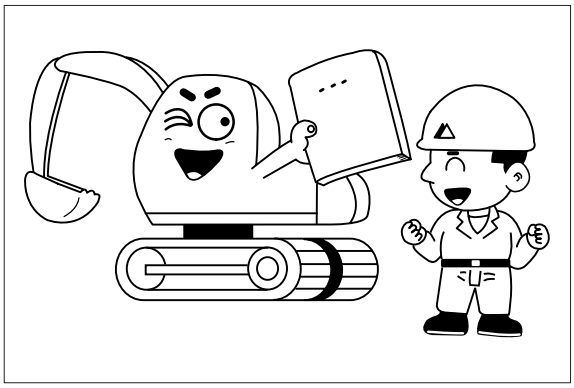
※ It indicates the useful information for operator.

1. BEFORE OPERATING THE MACHINE

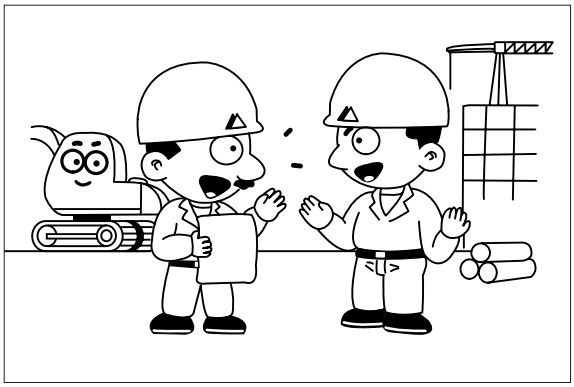
Think-safety first.
In special situation, wear protective clothing including a safety helmet, safety shoes, gloves, safety glasses and ear protection as required by the job condition.
Almost every accident is caused by disregarding the simple and fundamental safety hints.



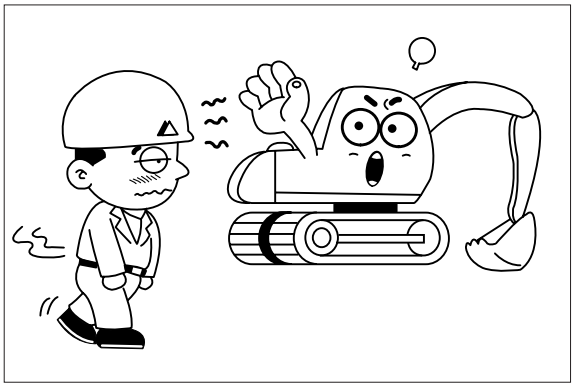
Be sure to understand thoroughly all about the operator's manual before operating the machine.
Proper care is your responsibility.



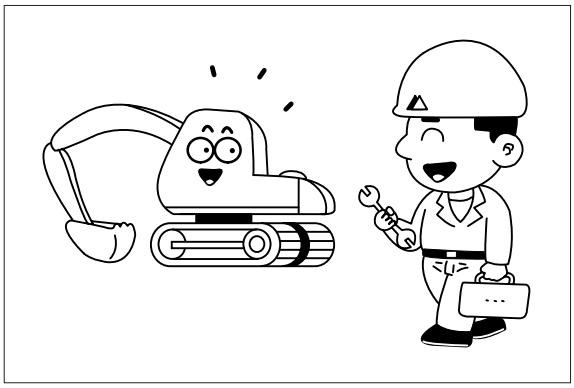
Fully understand the details and process of the construction before starting the work.
If you find anything dangerous on the job, consult with the job supervisor for the preventive measures before operating the machine.



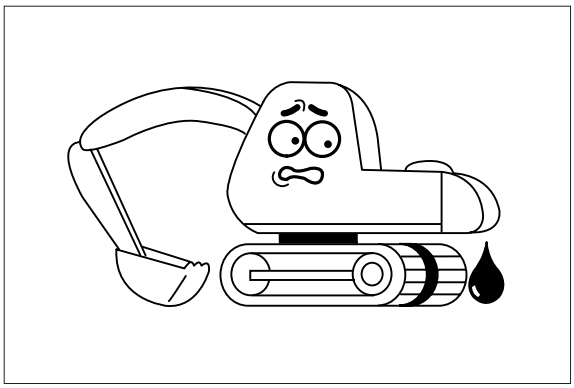
Do not operate when tired, or after drinking alcoholic beverages or any type of drugs.



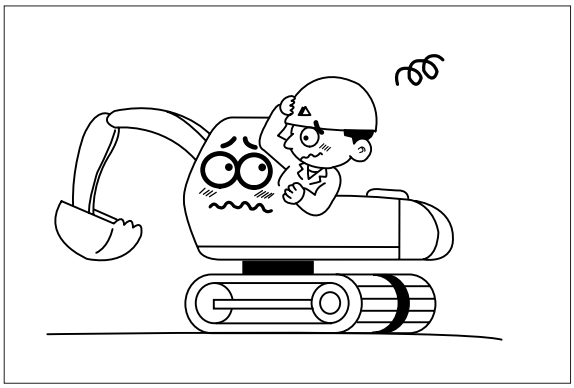
Check daily according to the operation manual.
Repair the damaged parts and tighten the loosened bolts.



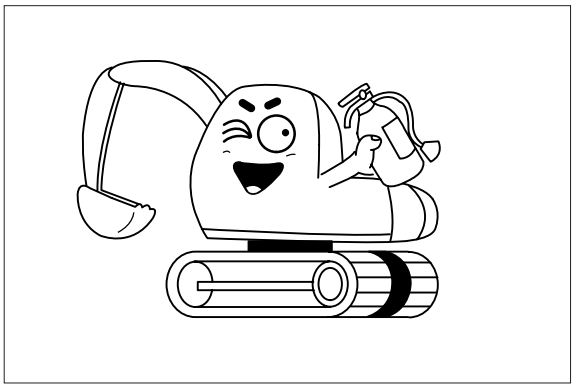
Check for leakage of engine oil, hydraulic oil, fuel and coolant.
Keep machine clean, clean machine regularly.



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



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

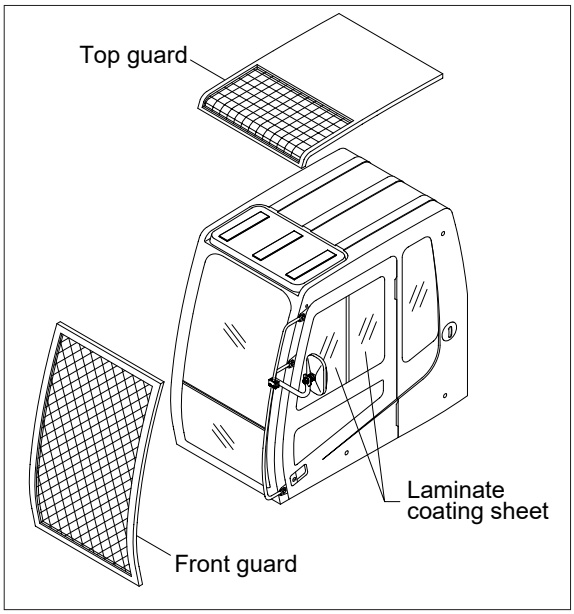


PROTECTION AGAINST FALLING OR FLYING OBJECTS

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

Be sure to close the front window before commencing work.

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



UNAUTHORIZED MODIFICATION

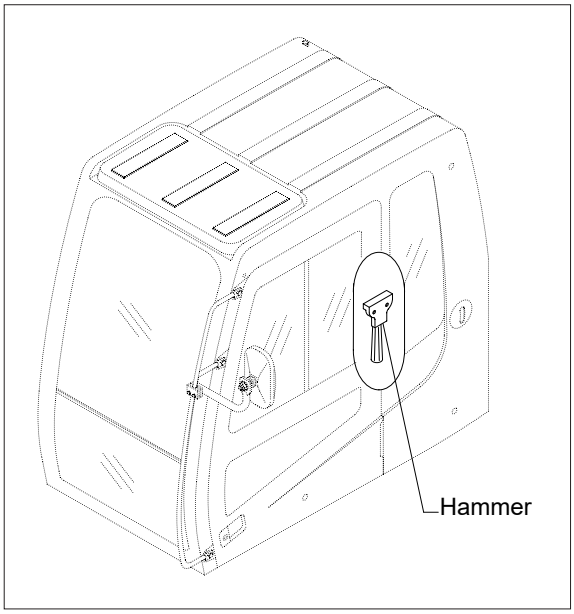
Any modification made without authorization from Hyundai can create hazards.

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

PREPARE FOR EMERGENCY

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

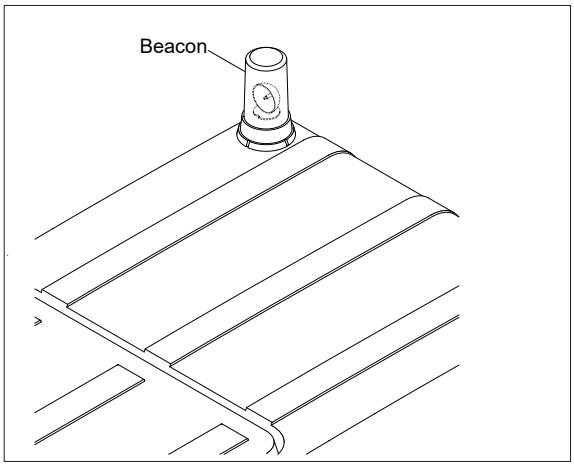
Be sure you know the phone numbers of persons you should contact in case of an emergency.



ROTATING BEACON

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

Please contact your Hyundai distributor to install it.



PRECAUTIONS FOR ATTACHMENTS

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

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

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

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

SAFETY RULES

Only trained and authorized personnel can operate and maintain the machine.
Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
When working with another operator or a person on worksite traffic duty, be sure all personnel understand all hand signals that are to be used.

SAFETY FEATURES

Be sure all guards and covers are in their proper position. Have guards and covers repaired if damaged.
Use safety features such as safety lock and seat belts properly.
Never remove any safety features. Always keep them in good operating condition.
Improper use of safety features could result in serious bodily injury or death.

MACHINE CONTROL PATTERN

Check machine control pattern for conformance to pattern on label in cab.
If not, change label to match pattern before operating machine.
Failure to do so could result in injury.

CALIFORNIA PROPOSITION 65

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

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

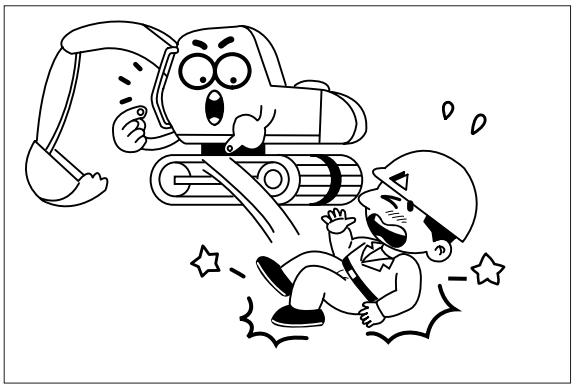
Battery posts, terminals and related accessories contain lead and lead compounds.
WASH HANDS AFTER HANDLING

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

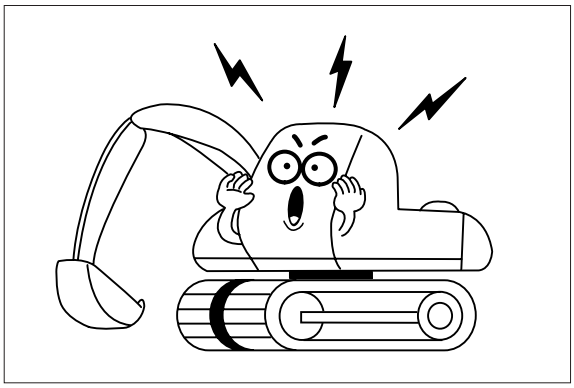
⚠ The wrong loading method can result in serious bodily injury or death.

2. DURING OPERATING THE MACHINE

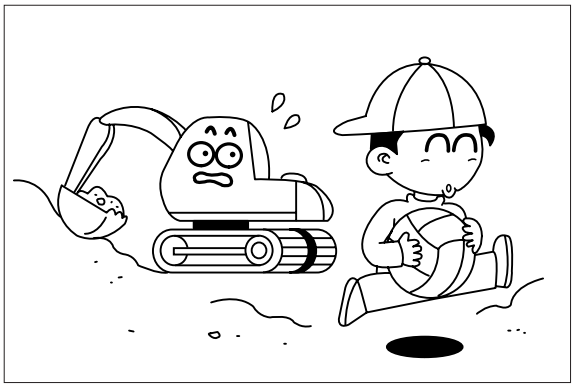
Use the handle and footstep when getting on or off the machine.
Do not jump on or off the machine.



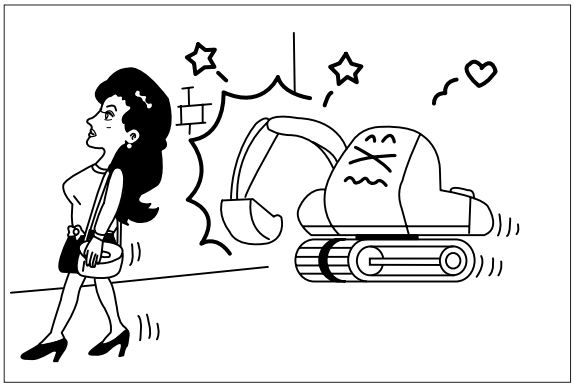
Sound the horn to warn nearby personnel before operating the machine.
Remove all the obstacles like frost on the window before operating the machine for the good visibility.



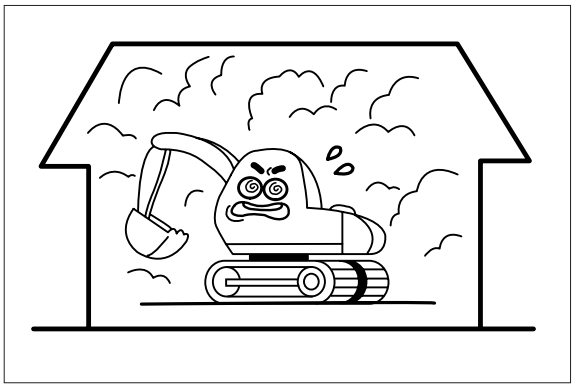
Operate carefully to make sure all personnel or obstacles are clear within the working range of the machine.
Place safety guards if necessary.



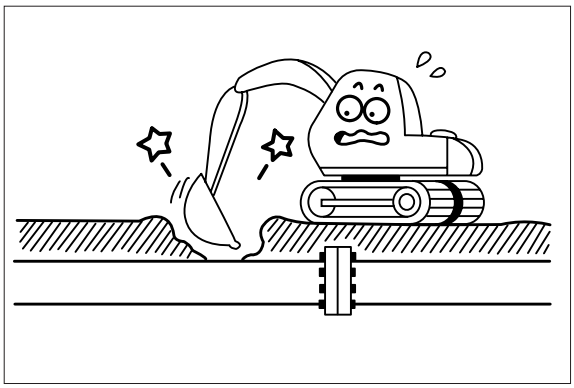
When using the work equipment, pay attention to job site.



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

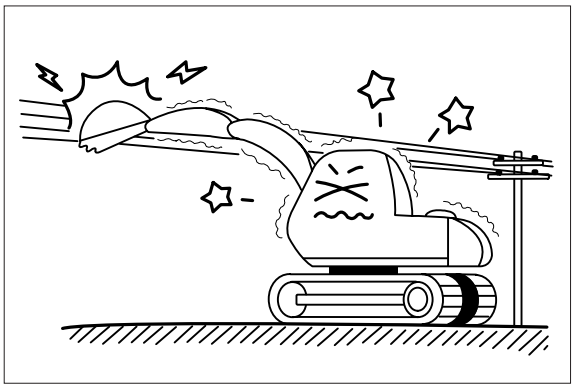


Check the locations of underground gas pipes or water line and secure the safety before operation.

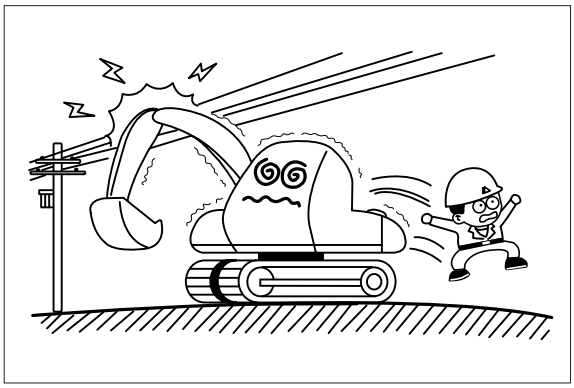


The operating near the electrical lines is very dangerous.
Operate within safe working range permitted as below.

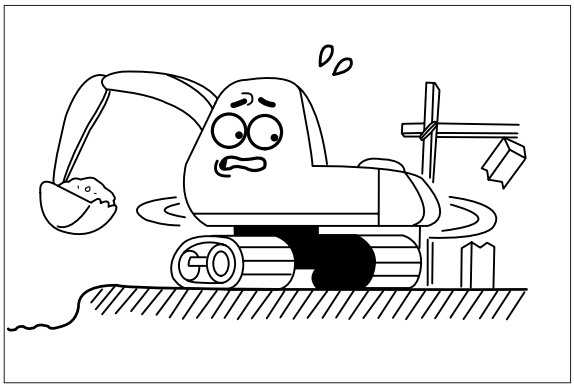
Supply voltage	Min safe separation
6.6 kV	3m (10 ft)
33.0 kV	4m (13 ft)
66.0 kV	5m (16 ft)
154.0 kV	8m (26 ft)
275.0 kV	10m (33 ft)



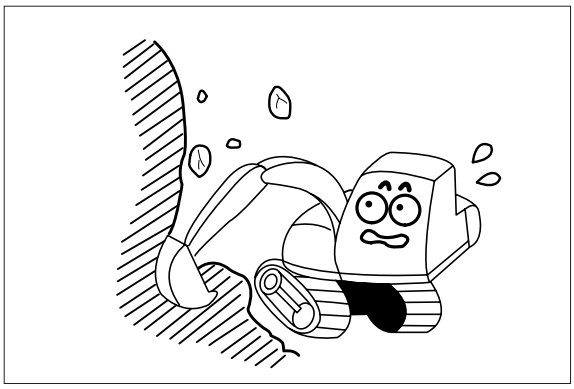
If the machine touches the electric power lines, keep sitting on the operator's seat and make sure the personnel on the ground not to touch the machine until turning off the electric current. Jump off the machine without contacting the machine when you need to get off.



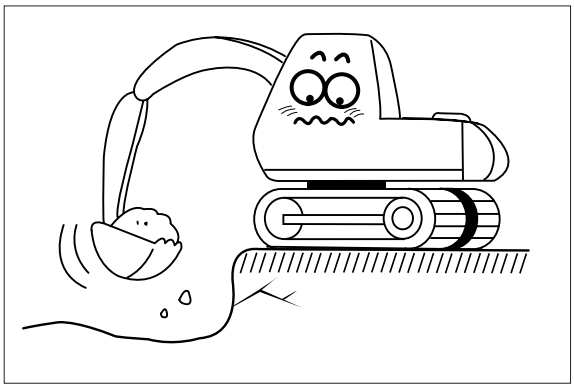
Watch out for obstacles.
Be particularly careful to check the machine clearance during the swing.



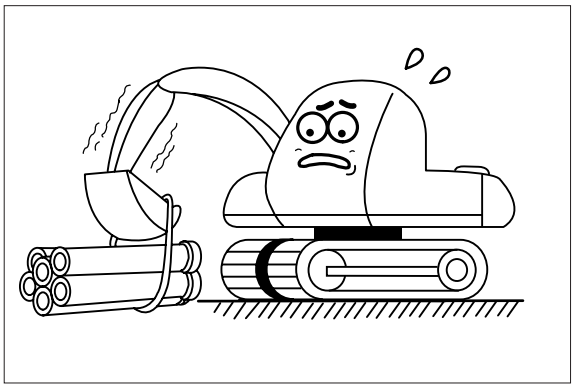
When using the machine as breaker or working in a place where stones may fall down, cab roof guard and head guard should be provided for proper protection.



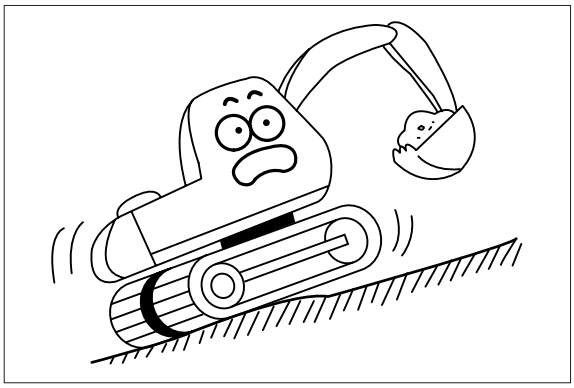
Avoid operating on a cliff or soft ground as there is danger of rolling over.
Make sure to get off easily as keeping the track at a right angle and putting the travel motor into the backward position when working on a cliff or soft ground inevitably.



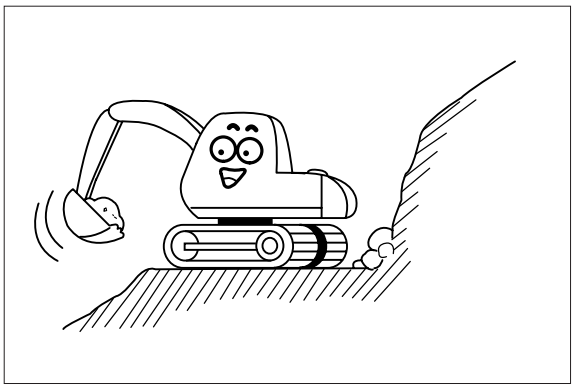
Operate for the lifting work considering the capacity of machine, weight and width of the load.
Be careful not to lift exceeding the machine capacity as it can be the cause of machine damage and safety accident.



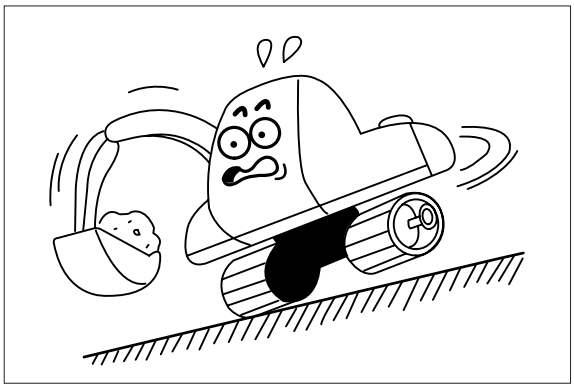
The operation on a slope is dangerous.
Avoid operating the machine on a slope of over 10 degree.



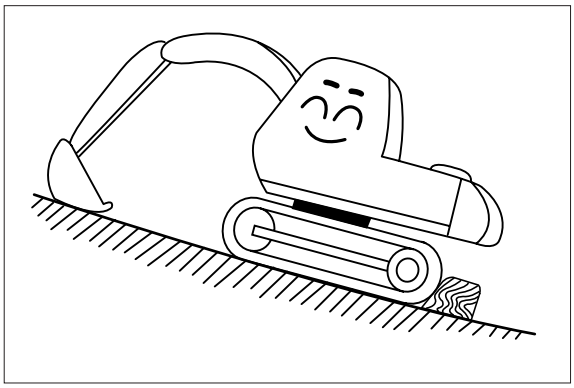
Operate the machine after making ground flat when operation is required on a slope.



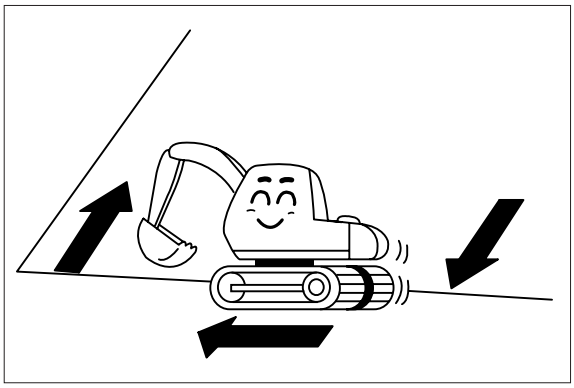
The swing on the slope can be danger of rolling over.
Do not operate to swing the machine with the bucket loaded on a slope since the machine may lose its balance under such an instance.



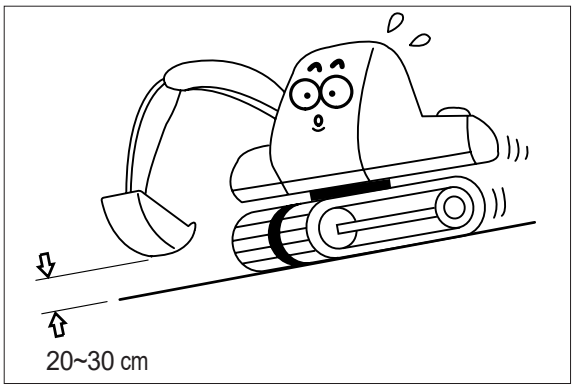
Avoid parking and stopping on a slope.
Lower the bucket to the ground and block the track when parking.



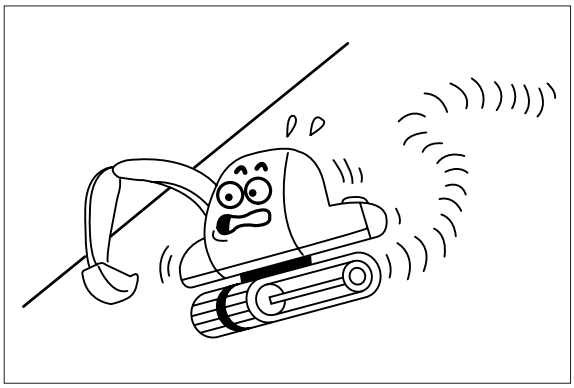
Avoid traveling in a cross direction on a slope as it can cause the danger of rolling over and sliding.



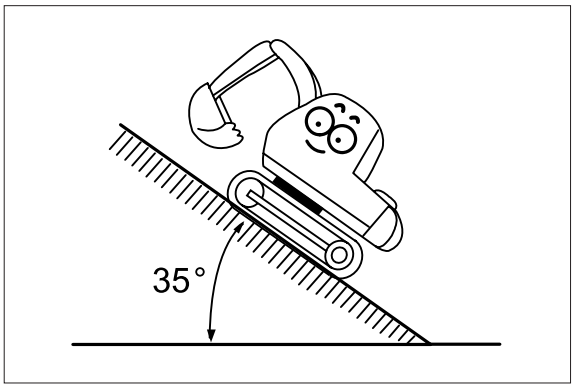
Traveling on a slope is dangerous.
Be sure to operate slowly when traveling down a slope and maintain the bucket at a height of 20~30 ㎝ (1 ft) above the ground so that it can be used as brake in an emergency.



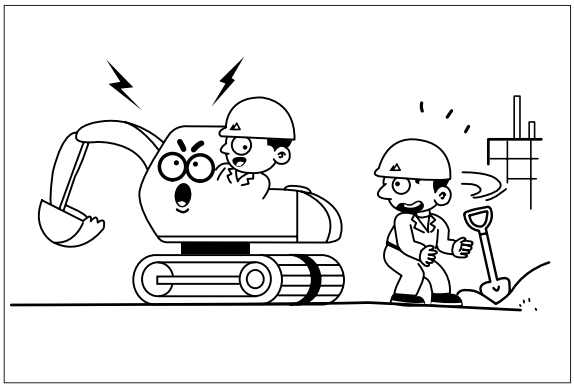
Steering of the machine while traveling on a slope is dangerous.
When an inevitable turning of direction is required, turn on the flat and solid ground.



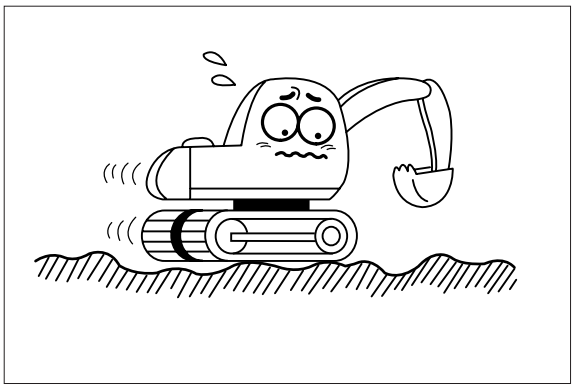
The engine angularity limits are 35 degree.
Do not operate by more than the engine limits in any case.



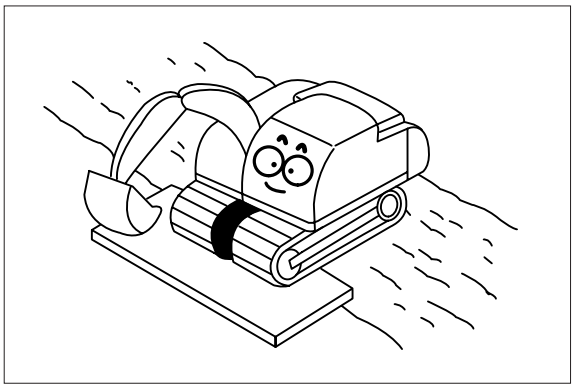
Before traveling the machine, sound the horn to warn nearby personnel.
Operate forward and backward correctly with confirming the location of the travel motor.



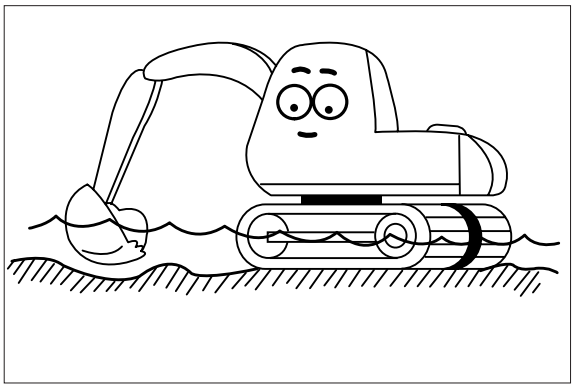
Slow down when traveling through obstacles or uneven ground.



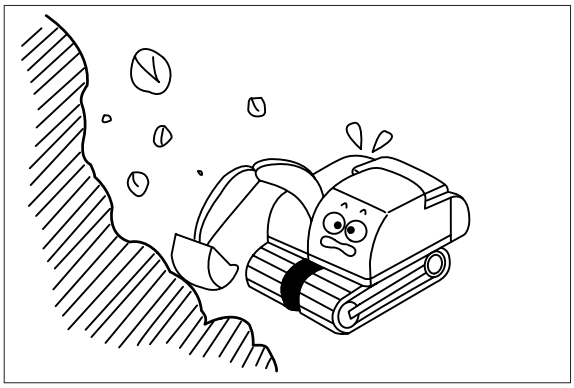
When working on soft ground, place mats or wood boards on the ground to prevent the machine sinking.



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



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



MOUNTING AND DISMOUNTING

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

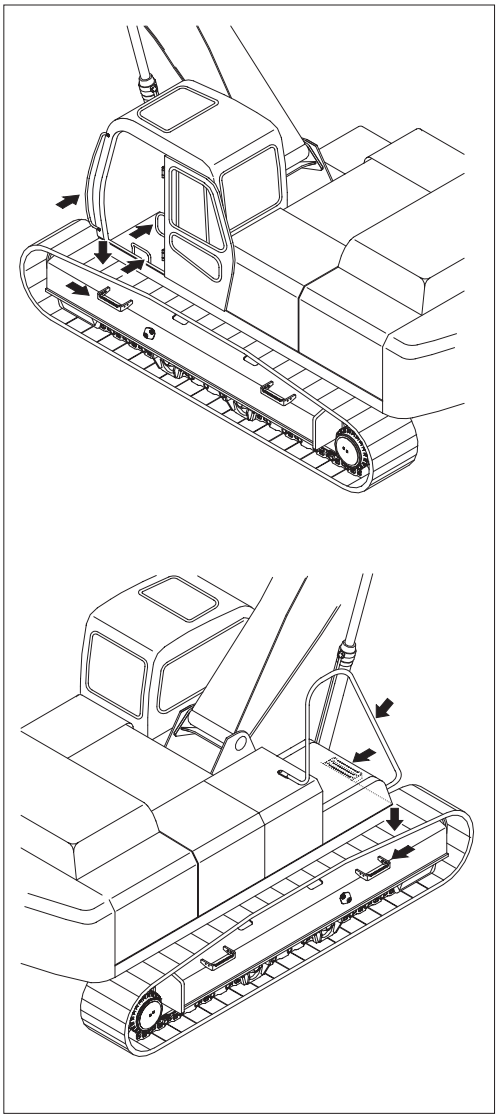
When mounting or dismounting, always face the machine and use the handrails, machine or track frame steps, and track shoes. Additional track frame step can be fitted for wider optional shoe. In this case please contact your Hyundai distributor.

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

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

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

If grasping the door handrail when mounting or dismounting or moving on the track, open and lock the door securely in the open position. Otherwise, the door may move suddenly, causing you to lose balance and fall.



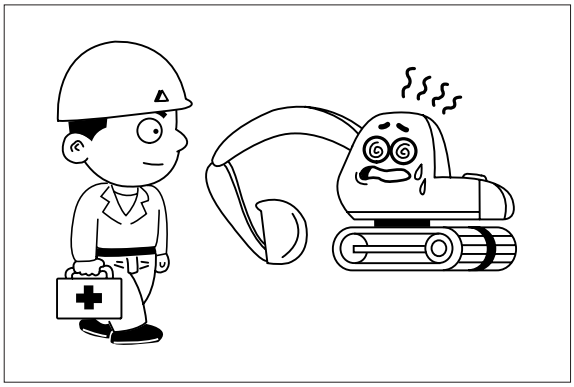
KEEP RIDERS OFF MACHINE

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

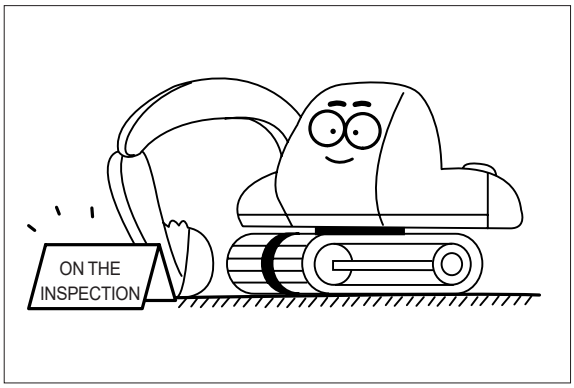
Only allow the operator on the machine. Keep riders off.

3. DURING MAINTENANCE

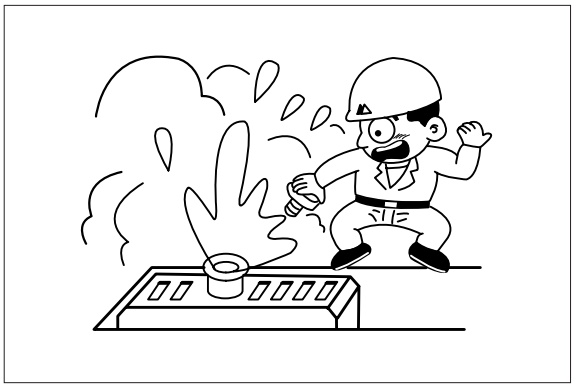
Stop the engine immediately when the trouble of the machine is found.
Inspect immediately the cause of trouble such as vibration, overheating and trouble in the cluster then repair.



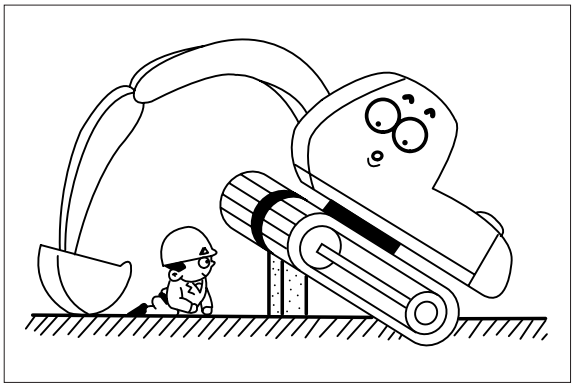
Park on a flat place and stop the engine for inspecting and repairing. Properly TAG machine is not operational. (remove start key)
Extreme care shall be taken during maintenance work. Parts may require additional safe guard.



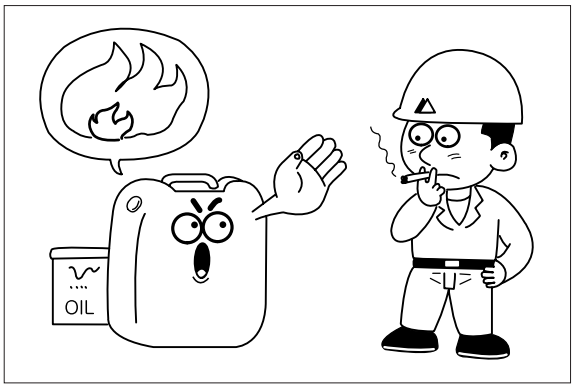
Do not remove the radiator cap from hot engine.
Open the cap after the engine cools, below 50 °C (122 °F) to prevent personal injury from heated coolant spray or steam.



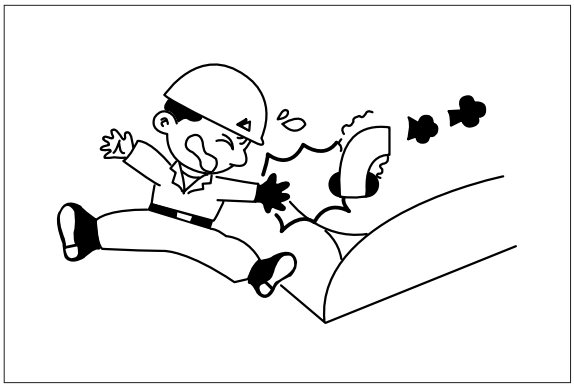
Do not work below the machine.
Be sure to work with proper safety supports.
Do not depend on the hydraulic cylinders to hold up the equipment and attachment.



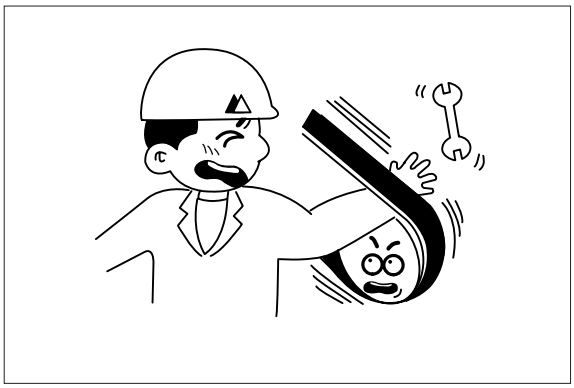
There is the danger of fire in fuel and oil.
Store in cool and dry area, away from any open flames.



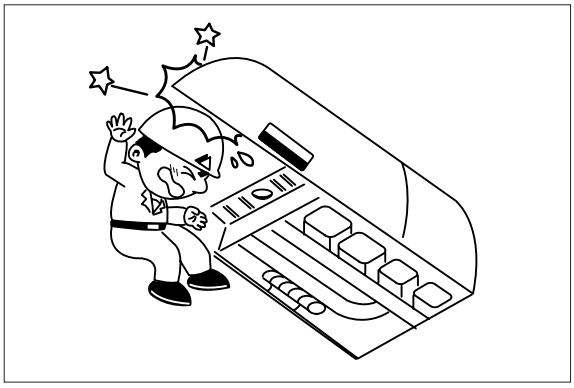
Do not touch exhaust pipe, or may cause severe burn.



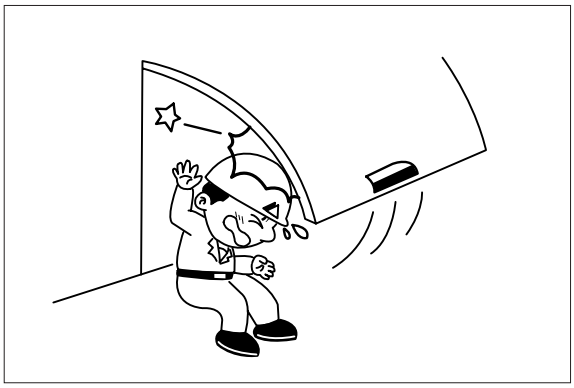
Do not open the engine hood and covers while the engine is running.



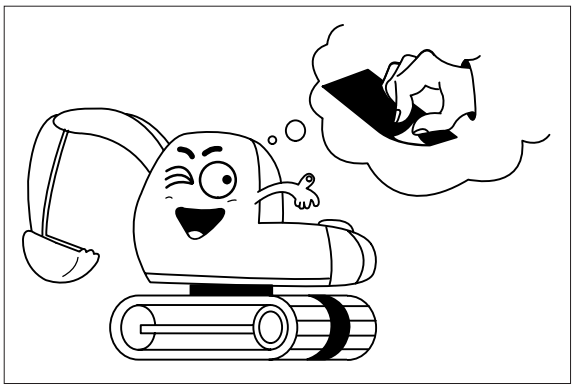
Be careful of not hitting the edges when you service engine.



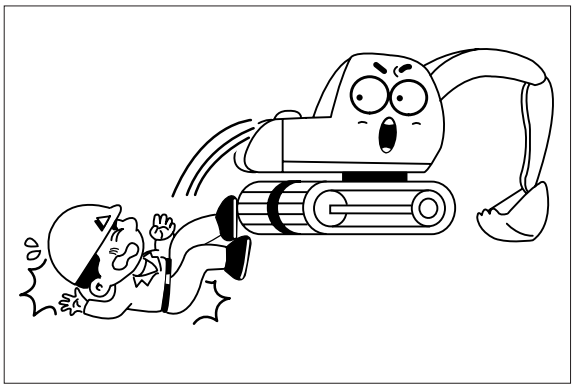
Be careful that the front window may be promptly closed.
Be sure to support stay, when the side door needs to be opened.
Be careful that the open side door may closed by the external or natural force like strong wind.



The antislip protection should be replaced if they have become worn or have been printed over.
Be sure to free of oil, water and grease etc.

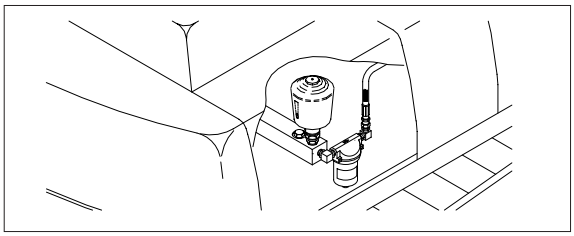


Be careful of not touching slip, fall down etc., when you work at the upper frame to service engine and/or other component.



HIGH PRESSURE GAS

Contain high pressure gas.
To avoid explosion and personal injury, do not expose to fire, do not weld, do not drill.
Relieve pressure before discharging.

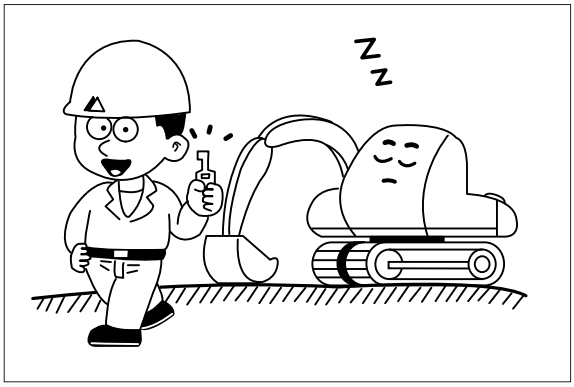


LIFT EYES CAN FAIL

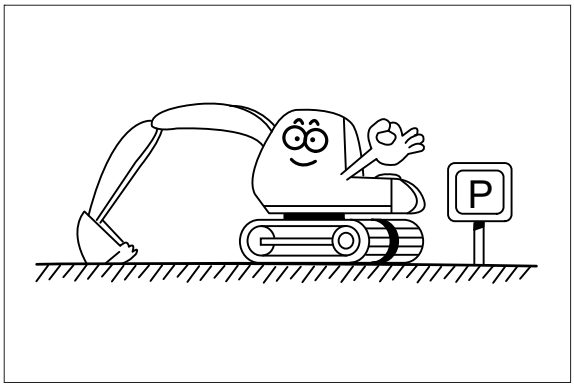
Lift eyes or tank can fail when lifting tank containing fluids resulting in possible personal injury.
Drain tank of all fluids before lifting.

4. PARKING

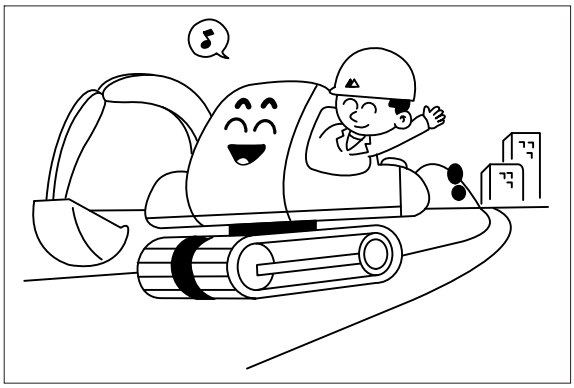
When leaving the machine after parking, lower the bucket to the ground completely and put the safety knob at the LOCK position then remove the key.
Lock the cab door.



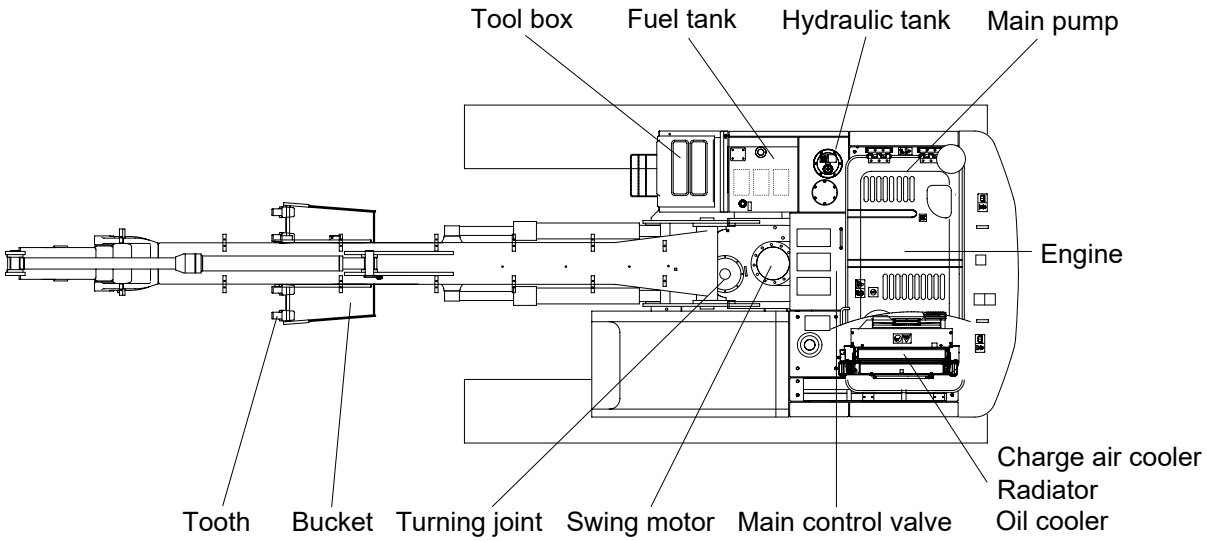
Park the machine in the flat and safe place.

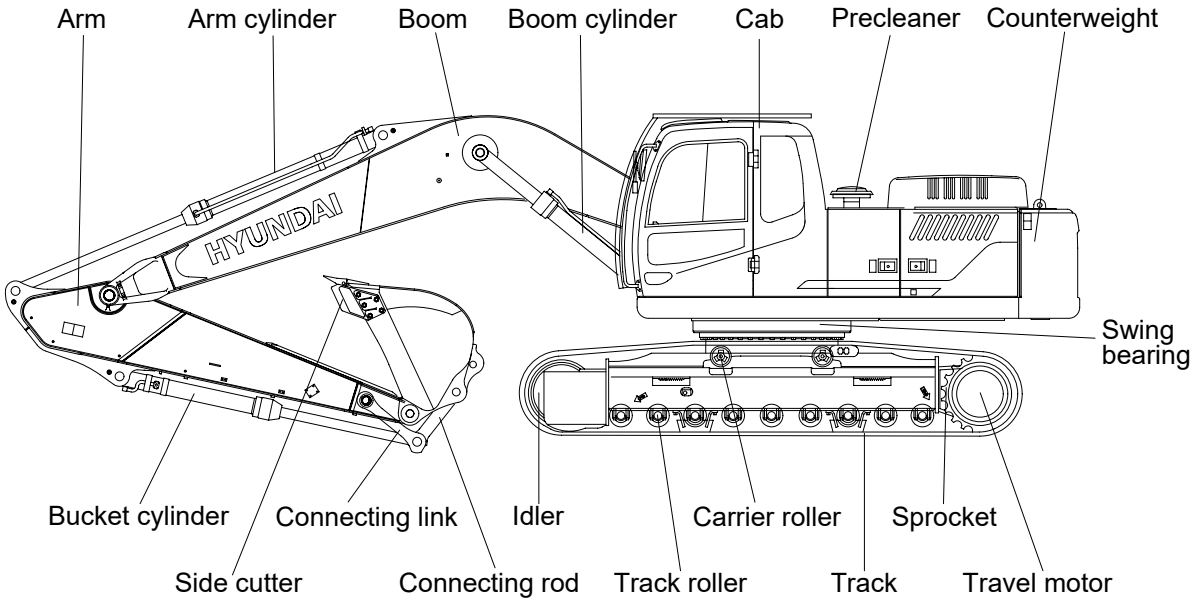


Hope you can work easily and safely observing safety rules.
For safe operation, observe all safety rules.

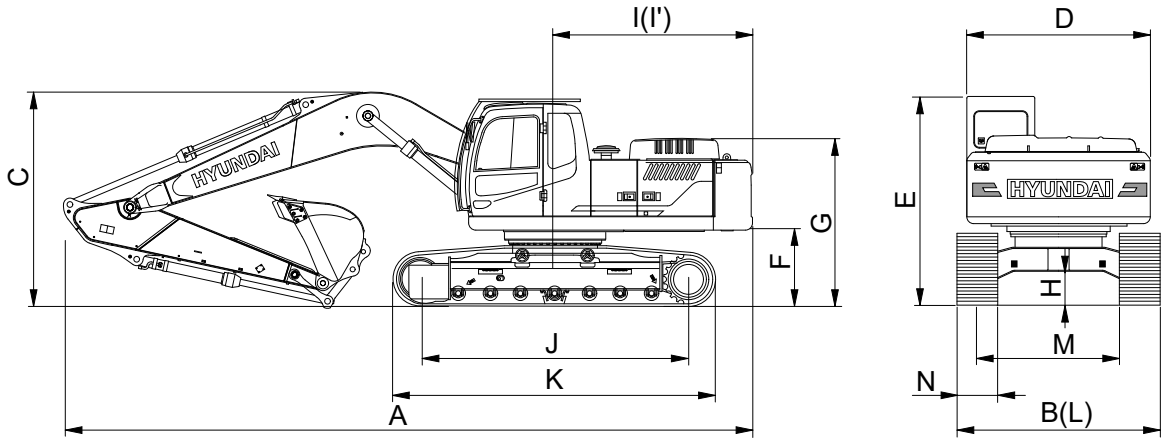


1. MAJOR COMPONENT



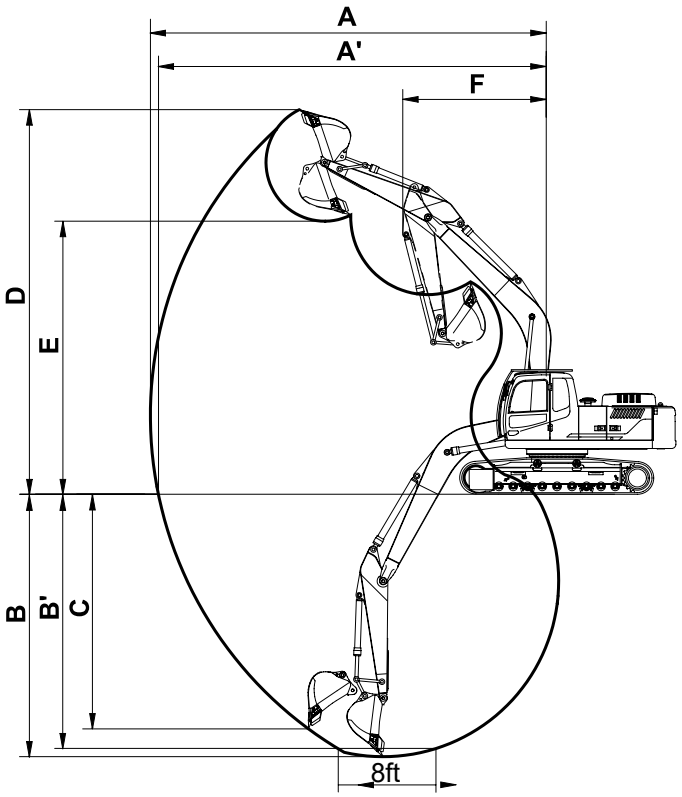


2. SPECIFICATIONS



Description		Unit	Specifi cation
Operating weight		kg	20900
Bucket capacity (SAE heaped), standard		m^3	1.00
Overall length	A	mm	9560
Overall width	B		2800
Overall height of boom	C		3030
Superstructure width	D		2740
Overall height of cab	E		3000
Ground clearance of counterweight	F		1060
Overall height of engine hood	G		2390
Overall height of handrail	G'		2975
Minimum ground clearance	H		480
Rear-end distance	I		2890
Rear-end swing radius	I'		2830
Distance between tumblers	J		3360
Undercarriage length	K		4165
Undercarriage width	L		2800
Track gauge	M		2200
Track shoe width, standard	N		600
Travel speed (low/high)		km/hr	3.5/5.7
Swing speed		rpm	11.4
Gradeability		Degree (%)	35 (70)
Ground pressure		kgf/cm^2	0.47
Max traction force		kg	20200

3. WORKING RANGE AND DIGGING FORCE



Description	m (ft-in)	Boom	5.68 (18' 8")
		Arm	2.92 (9' 7")
Max digging reach	mm (ft-in)	A	9940mm
Max digging reach on ground		A'	9780mm
Max digging depth		B	6490mm
Max digging depth (8 ft level)		B'	6315mm
Max vertical wall digging depth		C	5860mm
Max digging height		D	10000mm
Max dumping height		E	7150mm
Min swing radius		F	3250mm
Bucket digging force	kgf	SAE	13300kgf
	kgf	ISO	15400kgf
Arm digging force	kgf	SAE	10400kgf
	kgf	ISO	12200kgf

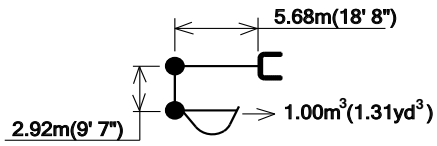
4. WEIGHT

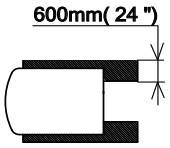
Item	R215VS PRO	
	kg	lb
Upperstructure assembly	9140	20150
Main frame weld assembly	1654	3650
Engine assembly	522	1200
Main pump assembly	122	270
Main control valve assembly	140	310
Swing motor assembly	250	550
Hydraulic oil tank assembly	226	500
Fuel tank assembly	186	410
Counterweight	3800	8380
Cab assembly	310	680
Lower chassis assembly	7550	16650
Track frame weld assembly	2370	5200
Swing bearing	260	570
Travel motor assembly	305	670
Turning joint	53	120
Track recoil spring	130	290
Idler	138	300
Carrier roller	21	46
Track roller	38	84
Track-chain assembly (600 mm standard triple grouser shoe)	1319	2900
Front attachment assembly (5.68 m boom, 2.92 m arm, 1.00 m^3 SAE heaped bucket)	4200	9260
5.68 m boom assembly	1535	3390
2.92 m arm assembly	750	1650
1.00 m^3 SAE heaped bucket	833	1840
Boom cylinder assembly	180	390
Arm cylinder assembly	260	570
Bucket cylinder assembly	170	370
Bucket control link assembly	174	380

5. LIFTING CAPACITIES

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outrigger	
R215VS PRO	MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		5680	2920	3800	600	-	-	-	-	-

ROBEX 215VS PRO





		1.5m(5 ft)		3.0m(10 ft)		4.5m(15 ft)		6.0m(20 ft)		7.5m(25 ft)				
														m(ft)
7.5m	kg											*2250	*2250	6.45
24.6 ft	lb											***4960**	***4960**	**(21.2)**
6.0m	kg									*2270	*2270	*2100	*2100	7.54
19.7 ft	lb									***5000**	***5000**	***4630**	***4630**	**(24.7)**
4.5m	kg							*3980	3900	*3780	2520	*2100	2060	8.21
14.8 ft	lb							***8770**	**8600**	***8330**	**5560**	***4630**	**4540**	**(27.0)**
3.0m	kg			*9880	*9880	*6140	5820	*4800	3600	3970	2380	*2200	1790	8.57
9.8 ft	lb			***21780**	***21780**	***13540**	**12830**	***10580**	**7940**	**8750**	**5250**	***4850**	**3950**	**(28.1)**
1.5m	kg			*6860	*6860	*7910	5180	5530	3290	3800	2230	*2420	1680	8.65
4.9 ft	lb			***15120**	***15120**	***17440**	**11420**	**12190**	**7250**	**8380**	**4920**	***5340**	**3700**	**(28.4)**
0.0m	kg			*7770	*7770	8480	4790	5270	3060	3660	2100	*2810	1690	8.47
0.0 ft	lb			***17130**	***17130**	**18700**	**10560**	**11620**	**6750**	**8070**	**4630**	***6190**	**3730**	**(27.8)**
-1.5m	kg	*7000	*7000	*10950	9230	8310	4640	5140	2940	3600	2040	3260	1840	7.99
-4.9 ft	lb	***15430**	***15430**	***24140**	**20350**	**18320**	**10230**	**11330**	**6480**	**7940**	**4500**	**7190**	**4060**	**(26.2)**
-3.0m	kg	*10520	*10520	*13780	9420	8350	4670	5150	2950			3900	2240	7.17
-9.8 ft	lb	***23190**	***23190**	***30380**	**20770**	**18410**	**10300**	**11350**	**6500**			**8600**	**4940**	**(23.5)**
-4.5m	kg			*11640	9800	*7960	4870					5540	3230	5.86
-14.8 ft	lb			***25660**	**21610**	***17550**	**10740**					**12210**	**7120**	**(19.2)**

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

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

6. BUCKET SELECTION GUIDE

General bucket

STD 1.00 m^3 SAE Heaped OPD 0.92 m^3 SAE Heaped

Type	Capacity		Width	Weight	Tooth	MONO
						Recommendation
	SAE Heaped	CECE heaped	Without side cutter			5.68 m (18' 8") Boom
	m^3	m^3	mm	kg	EA	
General bucket	1.00m^3	0.86 m^3	1315 mm	833kg	5	
	0.92m^3	0.80 m^3	1178 mm	828kg	5	

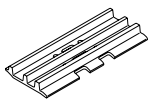
※ Applicable for materials with density of 2000 kg/m^3 (3370 lb/yd^3) or less

7. UNDERCARRIAGE

1) TRACKS

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

2) TYPES OF SHOES

Model	Shapes		Triple grouser			
						
R215VS PRO	Shoe width	mm	600	-	-	-
	Operating weight	kg	20900	-	-	-
	Ground pressure	kgf/cm^2	0.47	-	-	-
	Overall width	mm	2800	-	-	-

3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item		Quantity
Carrier rollers		2 EA
Track shoes	R215VSPRO	7 EA
		46 EA

4) SELECTION OF TRACK SHOE

Suitable track shoes should be selected according to operating conditions.

Method of selecting shoes

Confirm the category from the list of applications in table 2, then use table 1 to select the shoe. Wide shoes (categories B and C) have limitations on applications. Before using wide shoes, check the precautions, then investigate and study the operating conditions to confirm if these shoes are suitable.

Select the narrowest shoe possible to meet the required flotation and ground pressure.

Application of wider shoes than recommendations will cause unexpected problem such as bending of shoes, crack of link, breakage of pin, loosening of shoe bolts and the other various problems.

※ Table 1

Track shoe	Specification	Category
600 mm triple grouser	Standard	A
700 mm triple grouser	-	B
800 mm triple grouser	-	C

※ 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	CUMMNS QSB7
Type	4-cycle, turbocharged, charge air cooled, mechanical controlled diesel engine
Cooling method	Water cooled
Number of cylinders and arrangement	6 cylinders, in-line
Firing order	1-5-3-6-2-4
Combustion chamber type	Direct injection type
Cylinder bore×stroke	107 x 124 mm
Piston displacement	6700cc
Compression ratio	17.3 : 1
Rated gross horse power (SAE J1995)	167Hp(125kw)/2050rpm
Maximum torque at 1300 rpm	67kgf.m/1200 rpm
Engine oil quantity	25.4L
Dry weight	556 kg
High idling speed	1950 ±50 rpm
Low idling speed	850± 50rpm
Rated fuel consumption	163.2g/KW.hr(2050rpm)
Starting motor	Remy (24V-7.8KW)
Alternator	DencoRemy(24V-90A)
Battery	2×12V×120Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 117 cc/rev
Maximum pressure	350 kgf/cm^2
Rated oil flow	2 × 222 ℓ/min
Rated speed	1900rpm

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	15 cc/rev
Maximum pressure	40 kgf/cm^2
Rated oil flow	28.5 ℓ /min

4) MAIN CONTROL VALVE

Item	Specification
Type	9 spools mono-block
Operating method	Hydraulic pilot system
Main relief valve pressure	350 kgf/cm^2

5) SWING MOTOR

Item	Specification
Type	Two fixed displacement axial piston motor
Capacity	142.8 cc/rev
Relief pressure	250 kgf/cm^2
Braking system	Automatic, spring applied hydraulic released
Braking torque	1183 kgf/cm^2
Brake release pressure	20.9 kgf/cm^2
Reduction gear type	2 - stage planetary
Swing speed	83.36 rpm

6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	350 kgf/cm^2 (4978 psi)
Reduction gear type	2-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	15.2 kgf/cm^2
Braking torque	2878 kgf · m

7) REMOTE CONTROL VALVE

Item		Specification
Type		Pressure reducing type
Operating pressure	Minimum	6.5 kgf/cm^2 (92 psi)
	Maximum	26 kgf/cm^2 (370 psi)
Single operation stroke	Lever	61 mm (2.4 in)
	Pedal	123 mm (4.84 in)

8) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	Ø120 × Ø85 × 1290 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	Ø140 × Ø95 × 1510 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	Ø120 × Ø80 × 1055 mm
	Cushion	Extend only

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

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

9) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
R215VSPRO	Standard	600 mm (24")	0.47 kgf/cm^2 (6.81 psi)	46	2800 mm (9' 2")

10) BUCKET

Item		Capacity		Tooth quantity	Width	
		SAE heaped	CECE heaped		Without side cutter	With side cutter
R215VS PRO	STD	1.00 m^3	0.86 m^3	5	1315 mm	1410 mm
	OPT	0.92 m^3	0.80 m^3	5	1178 mm	1275 mm

9. RECOMMENDED OILS

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

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

Service point	Kind of fluid	Capacity ℓ	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 ★2	25.4	★SAE 0W-40 ★SAE 0W-30 SAE 5W-30 SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	6.2	★SAE 75W-90
Final drive		4.5×2	SAE 85W-140
Hydraulic tank	Hydraulic oil	Tank : 180 System : 270	★ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	340	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and soft water★1	35	Ethylene glycol base permanent type (50 : 50) ★Ethylene glycol base permanent type (60 : 40)

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

★ : Cold region
Russia, CIS, Mongolia
★1 : Soft water
City water or distilled water
★2 : Meets or exceeds
API CI-4 grade

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

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

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

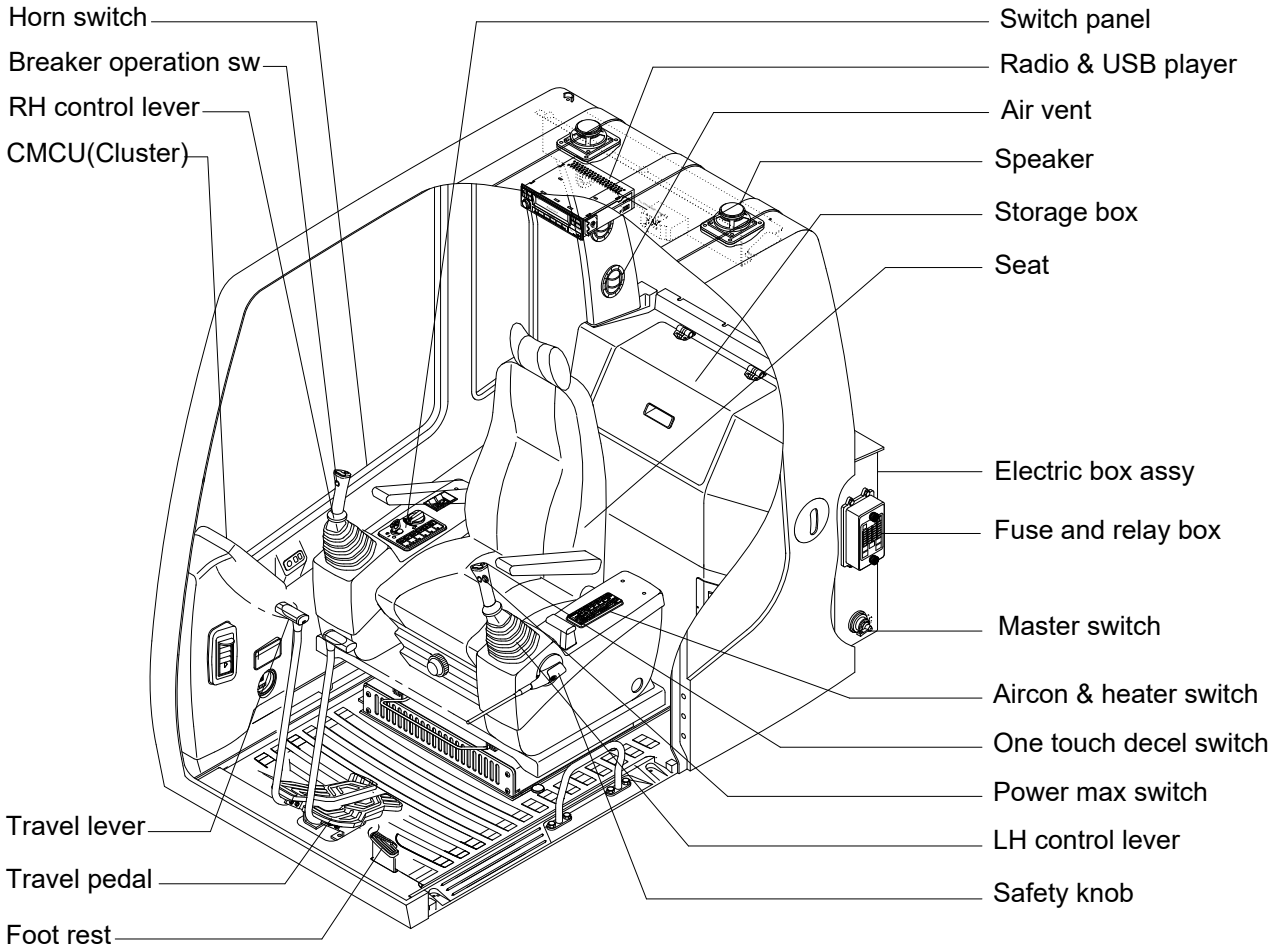
1. CAB DEVICES

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

2) ELECTRONIC MONITOR SYSTEM

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

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



2. CLUSTER(CMCU)

1) MONITOR PANEL

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

- LCD : Indicate operating status of the machine.
- Warning lamp : Indicate abnormality of the machine(Red).
- Pilot lamp : Indicate operating status of the machine(Amber).

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

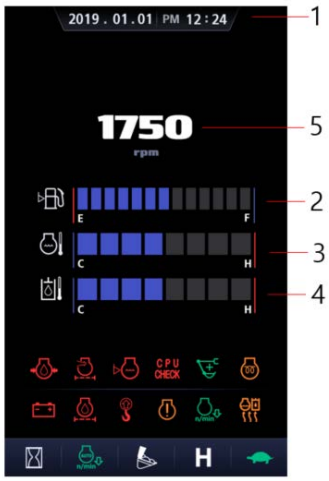
※ When the monitor provides a warning immediately check the problem, and perform the required action.

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

2) LCD main operation display

Default screen (A Type)

Option screen(B Ttype)

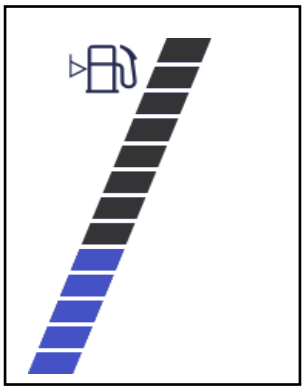


1 Time display
2 Fuellevel guage
3 Engine coolant temperature gauge
4 Hydraulic temerature gauge
5 Engine speed(rpm)

(1) Time display

① This displays the current time

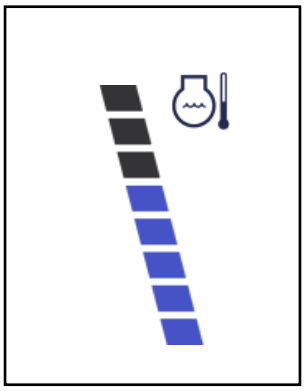
(2) Fuel level guage



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

② Fill the fuel when the 1st step or fuel icon blinks in red.

(3) Engine coolant temperature gauge



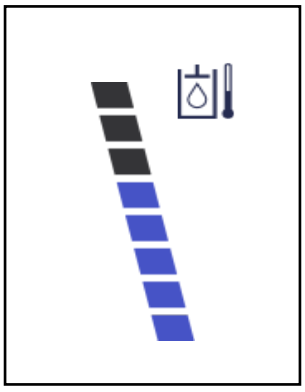
① This gauge indicates the temperature of coolant in 9 step guage

- 0 step: Below 30°C (86°F)
- 1 ~ 7step: 30–104°C (86–219°F)
- 8 step:Above 104°C (219°F)

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

※ If the engine is shut down without sufficient cooling, the temperature of the engine will rise sharply, this can lead to problems with parts inside the engine.

(4) Hydraulic temerature gauge



① This gauge indicates the temperature of hydraulic oil in 9 step guage

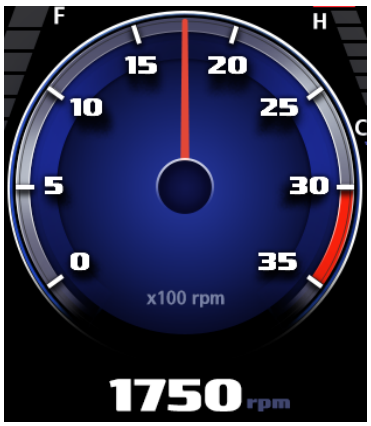
- 0 step: Below 30°C (86°F)
- 1 ~ 7step: 30–104°C (86–219°F)
- 8 step: Above 104°C (219°F)

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

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

④ When the gauge of 8th steps illuminates,reduce the load on the system. If the gauge stays in the8 steps, stop the machine and check the cause of the problem.

(5) Engine speed(rpm)

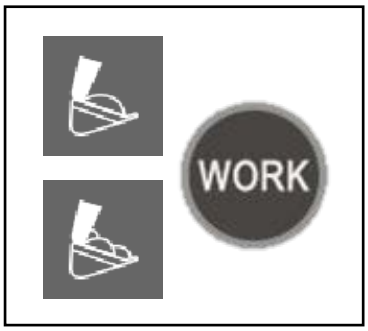


① This displays the round speed of engine

3) Operation screen

※ When the Powermode/workmode/usermode and each other switchare selected,the pilot lamps are displayed on the LCD.

(1) Work Mode Switch



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

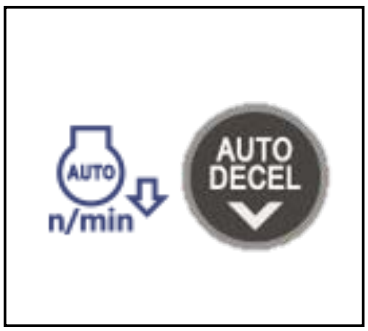
: General operation mode

: Heavy duty work mode

(2) User Mode Switch

This Switch select User Mode

(3) Auto Decel Switch

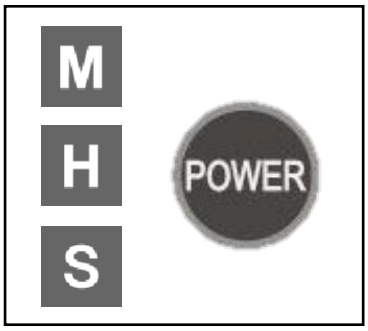


This switch is used to activate or cancel the auto idle function when all levers and pedals are in a nautral position,automatically reduces engine speed and saves fuel .

· Pilot lamp ON : Auto idle function is activated.

· Pilot lamp OFF : Auto idle function is cancelled.

(4) Power Mode Switch



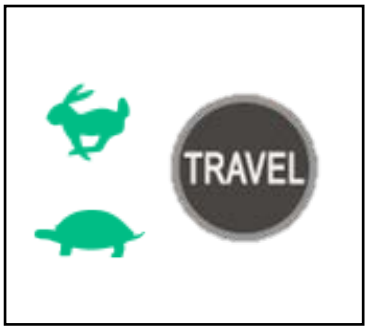
This switch is to select the machine power mode,and select power mode pilot lamp is display on the position.

· M : Max mode

· H : Heavy duty power work

· S : Standard power work mode

(5) **Travel Speed Switch**



① This switch is used to select the travel speed alternatively.

· : High speed

· : Low speed

(6) Buzzer Stop Switch

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

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

(7) Menu Switch

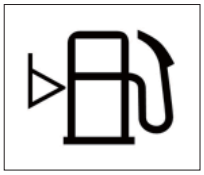
This switch used to select the main menu and subordinate menu on the LCD

(8) ESC 开关

This switch used to return to the previous menu or previous menu on the LCD

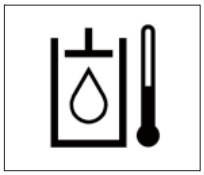
4) WARNING AND PILOT LAMPS

(1) Fuel level warning lamp



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

(2) Hydraulic oil temperature warning lamp

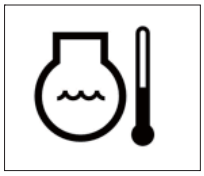


① The lamp is ON and the buzzer sounds when the hydraulic oil temperature is over the reference temperature (105°C).

② When this lamp is ON, check the oil cooling system.

③ Check the oil cooler and radiator.

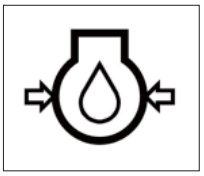
(3) Engine coolant temperature warning lamp



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

② Check the cooling water level if this warning lamp is ON.

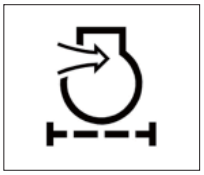
(4) Engine oil pressure warning lamp



① This warning lamp pops up and the buzzer sounds when the engine oil pressure is low.

② If the lamp blinks, shut OFF the engine immediately. Check oil level.

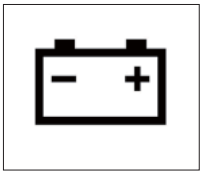
(5) Air cleaner warning lamp



① This warning lamp pops up and the buzzer sounds when the filter of air cleaner is clogged.

② Check the filter and clean or replace it.

(6) Battery charging warning lamp



① This warning lamp pops up and the buzzer sounds when the battery charging voltage is low.

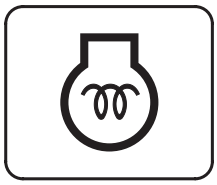
② Check the battery charging circuit when this lamp blinks.

(7) Check engine warning lamp

① This warning lamp pops up and the buzzer sounds when the communication between MCU and engine ECM on the engine is abnormal, or if the cluster received specific fault code from engine ECM.

② Check the communication line between them.
If the communication line is OK, then check the fault codes on the cluster.

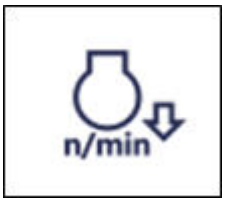
(8) Preheat pilot lamp



①Turning the start key switch ON position starts preheating in cold weather.

② Start the engine as this lamp is OFF.

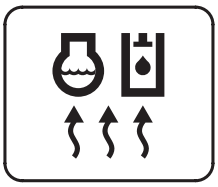
(9) AutoDecel lamp



① Pilot lamp ON : Auto idle function is activated.

② Pilot lamp OFF : Auto idle function is cancelled.

(10) Warming up pilot lamp



① This lamp is turned ON when the coolant temperature is below 30°C (86°F).

② The automatic warming up is cancelled when the engine coolant temperature is above 30°C, or when 10 minutes have passed since starting.

4) LCD

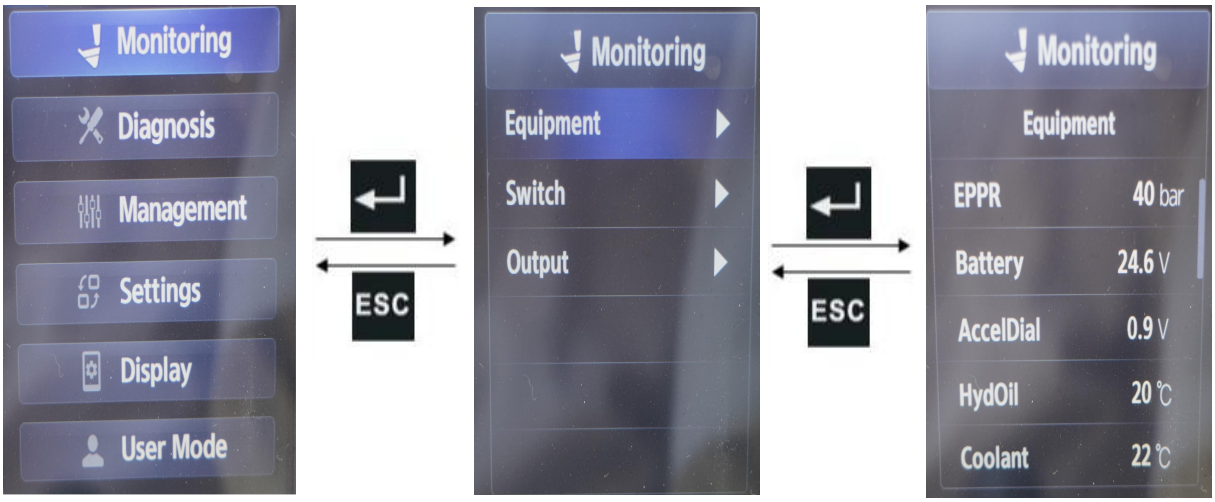
(1) Main function

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

(2) **Menu description**

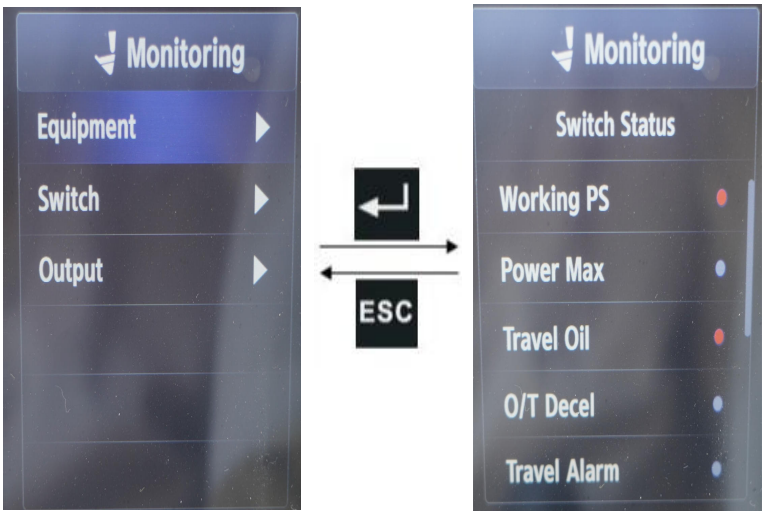
1. **Monitoring**

① Equipment



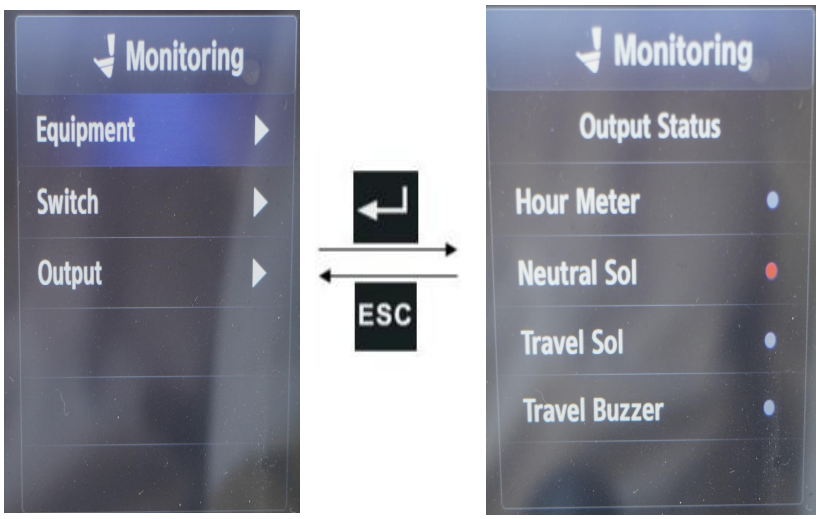
- Equipment status information.

② Switch



- Switch status information.

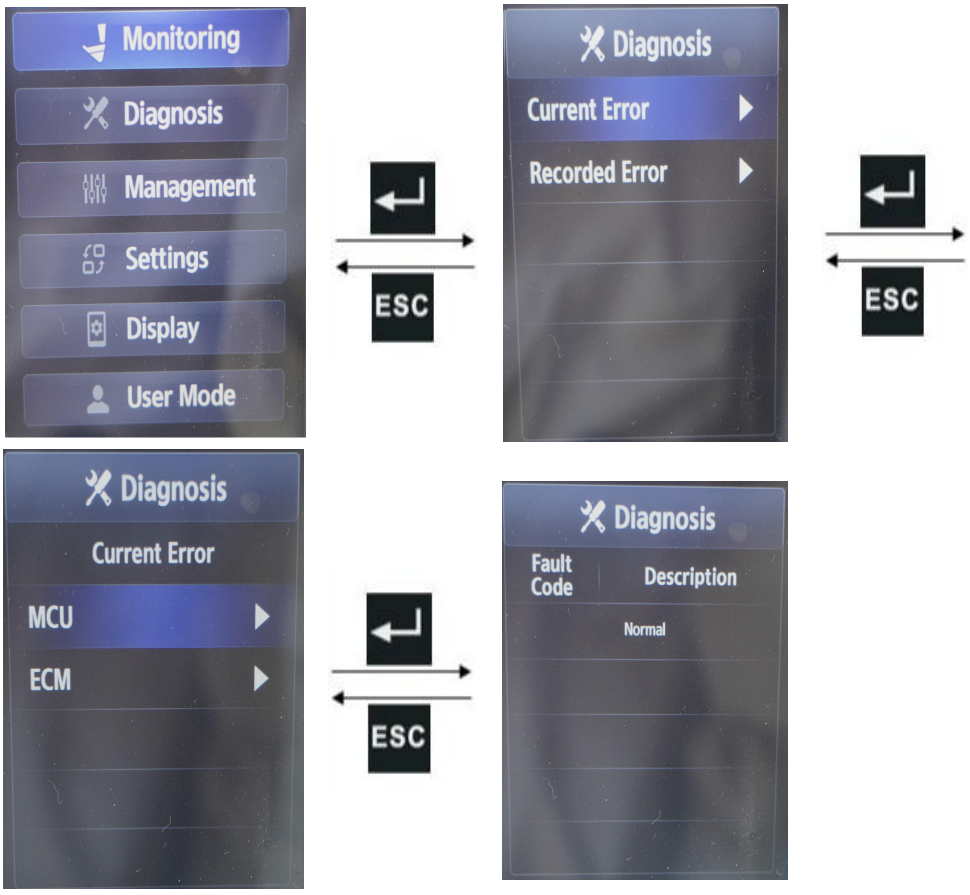
③ Output



- Output status information.

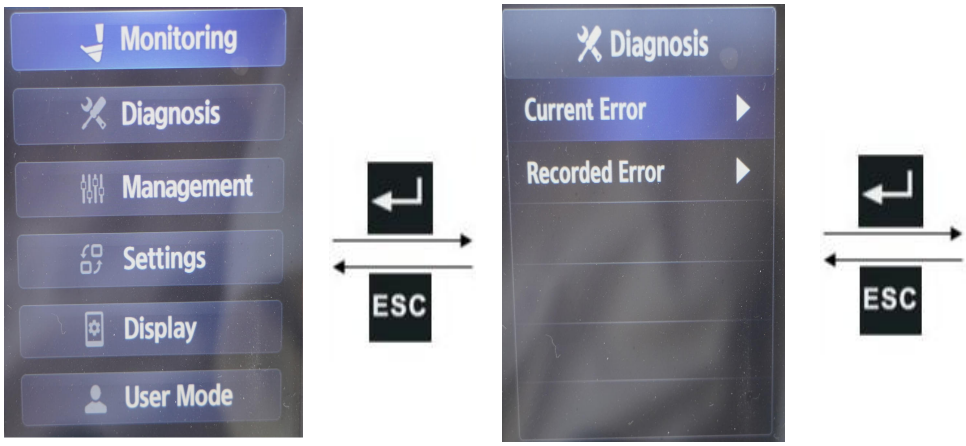
2. **Diagnosis**

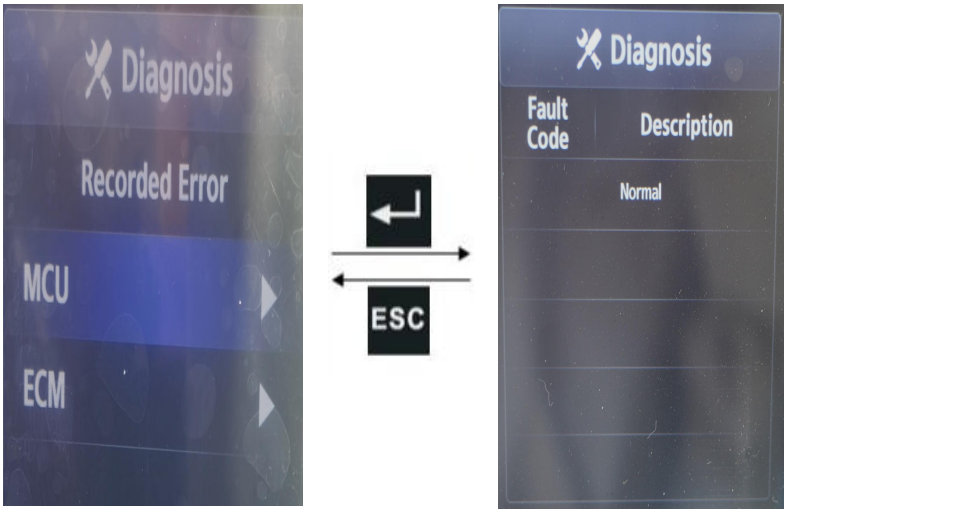
① Current Error



- You can check for current MCU or engine ECM failures.

② Recorded Error





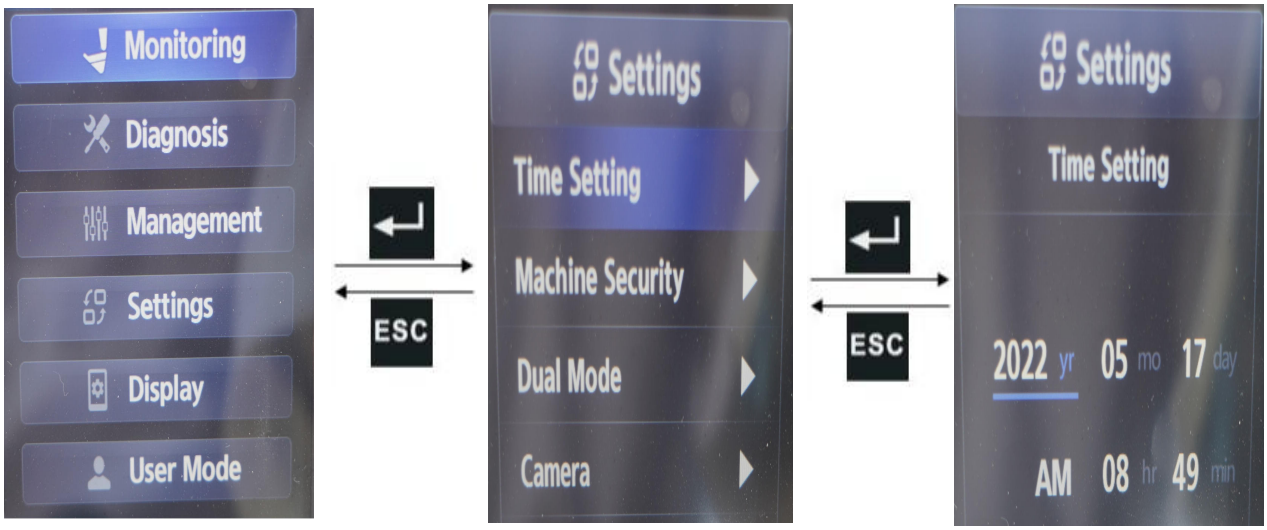
- You can check past MCU or engine ECM failures.

3. **Management**

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

4. **Settings**

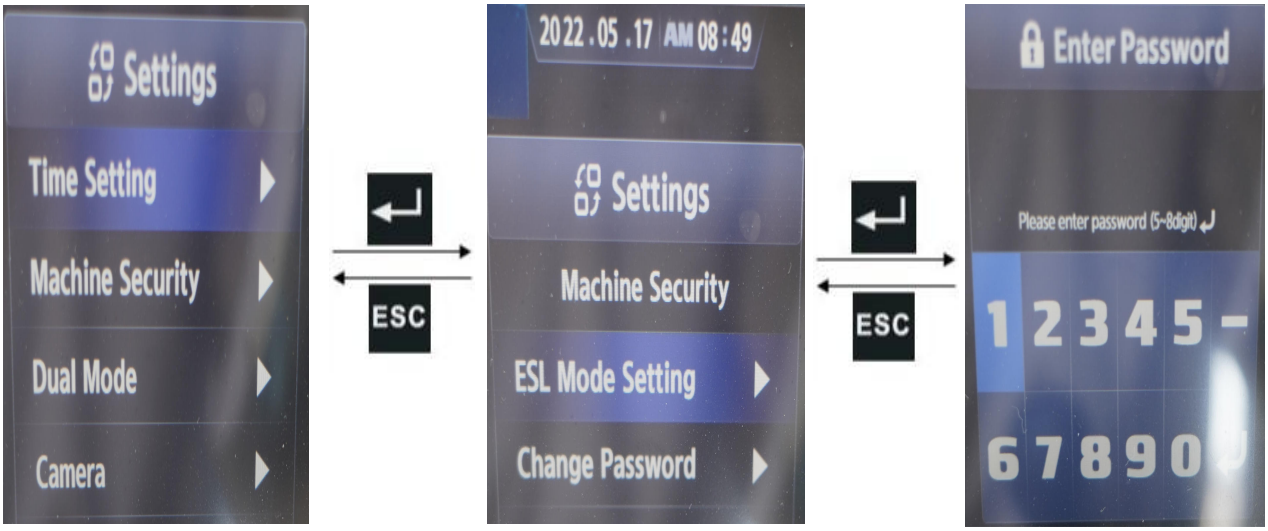
① Time Setting



- Year, month, day, hour, minute.

② Machine Security

a. **Set startup limits**

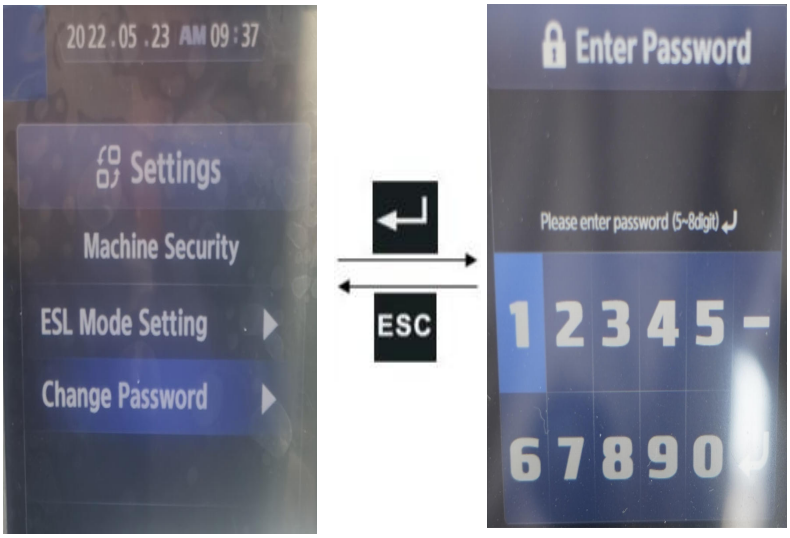


- Features to prevent theft and unauthorized device startup.

If you continue to select the start limit setting, ask for a password when the start switch is ON. :

- Disable setting does not use the function.
- When setting 'continue operation', the driver will ask for a password when starting the engine.
- The password is required when the driver starts the engine for the first time when the action is set after the specified time. No password is required for a restart during a cycle time. The maximum period can be set to 7 days.

b. **Change password**

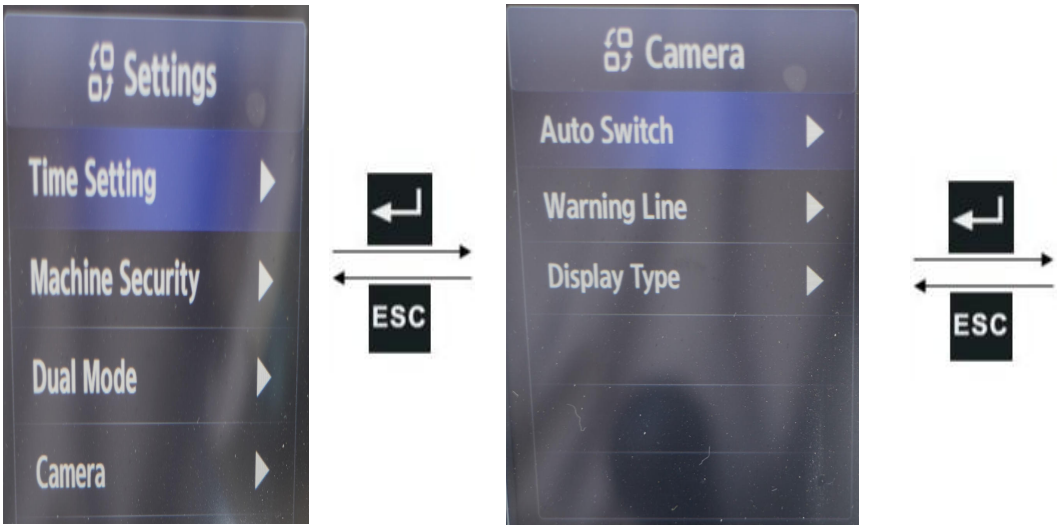


- The password is 5 to 8 digits. Enter the password and press ↵
- The initial password is 00000.

③ Dual Mode

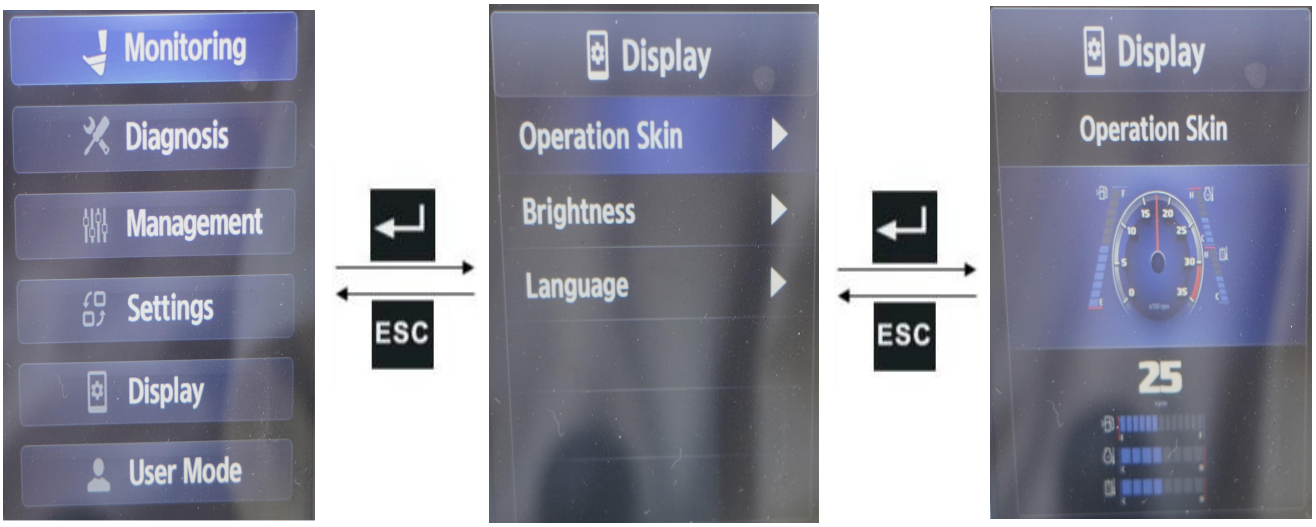
- You can change the mode of the device.

④ Camera



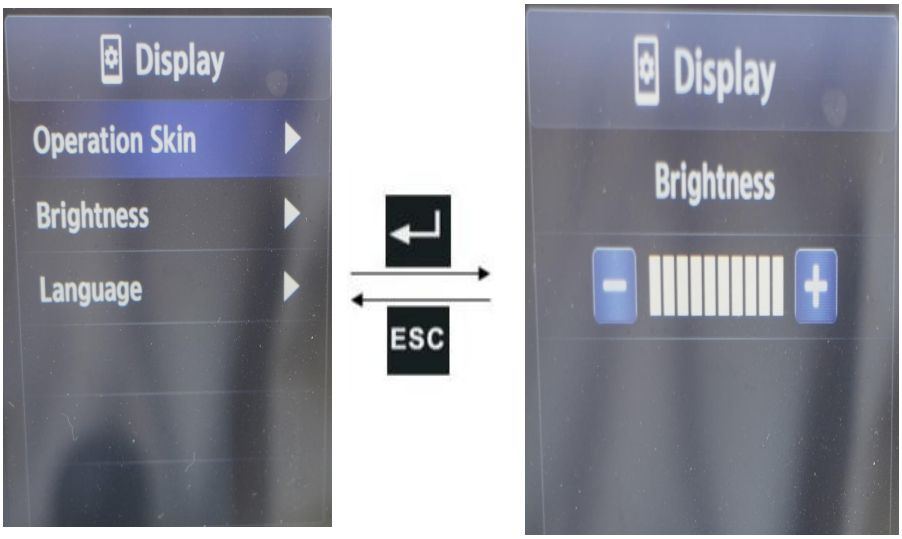
5. **Display**

① Operation Skin



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

② Brighteness



- You can set the screen brightness.

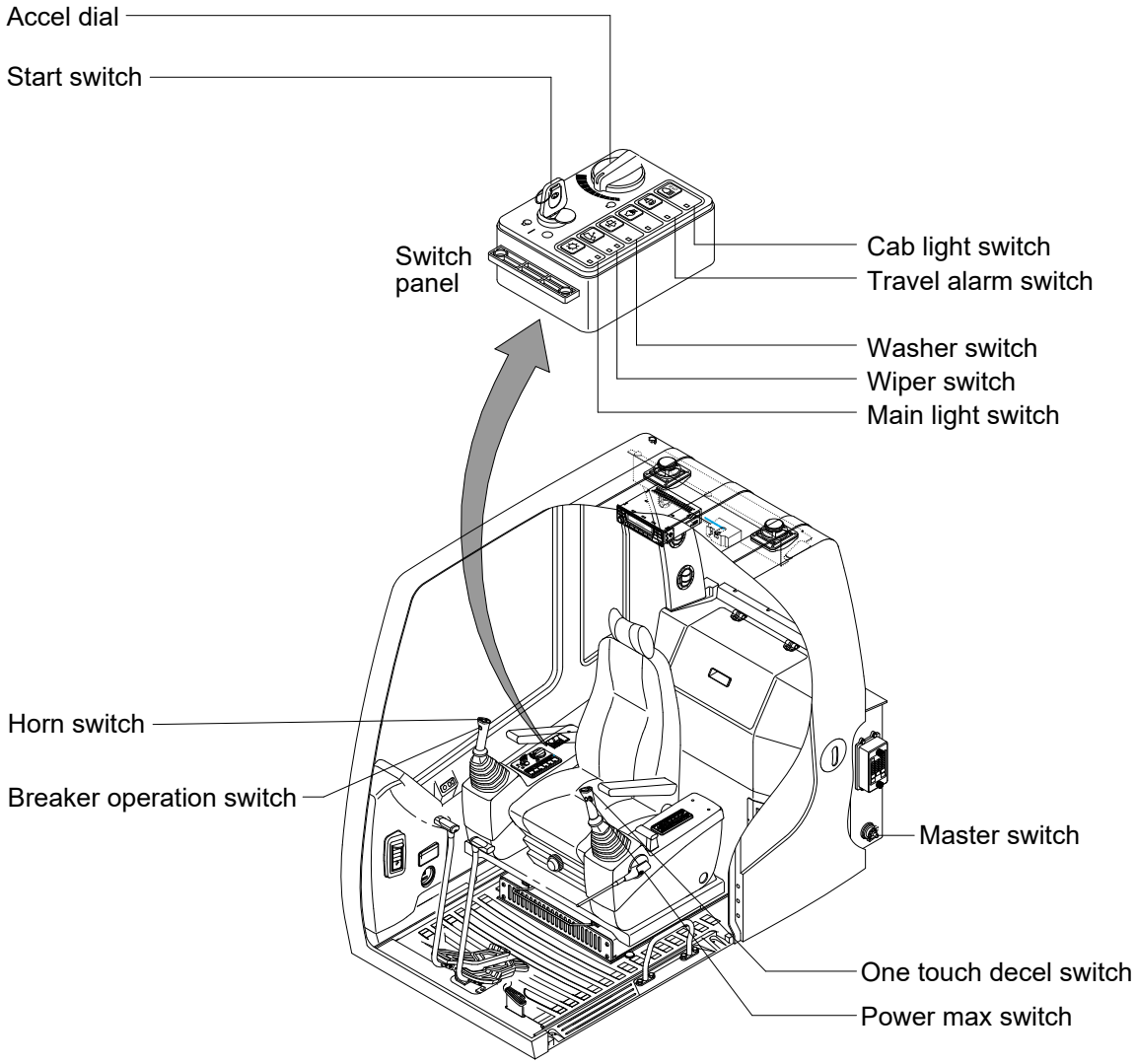
③ Language

- You can select the language you want to use and all tags will be changed to the chosen language.

6. **User Mode**

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

3. SWITCHES



1) STARTING SWITCH

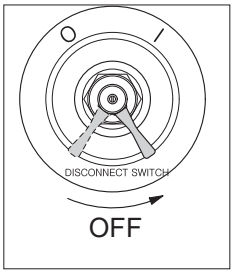
(1) There are three positions, OFF, ON and START.

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

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

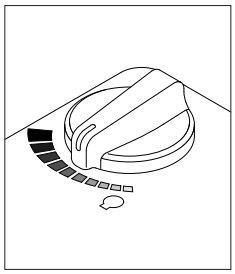
※ Key must be in the ON position with engine running maintain electrical and hydraulic function and prevent serious machine damage.

2) MASTER SWITCH



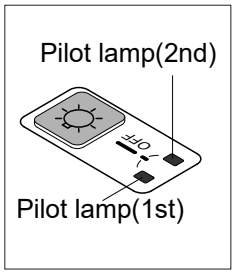
(1) This switch is used to shut off the entire electrical system.
(2) I : The battery remains connected to the electrical system.
O : The battery is disconnected to the electrical system.
※ **Never turn the master switch to O (OFF) with the engine running. Engine and electrical system damage could result.**

(3) ACCEL DIAL SWITCH



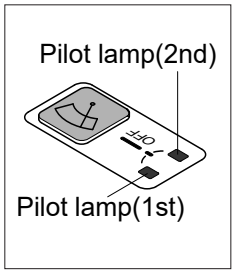
(1) There are 10 dial setting.
Setting 1 is low idle (Turtle) and setting 10 is high idle (Rabbit).
· By rotating the accel dial to right : Engine speed increases
· By rotating the accel dial to left : Engine speed decreases

(4) MAIN LIGHT SWITCH



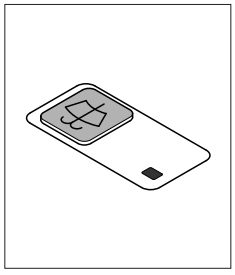
(1) This switch used to operate the head light and work light.
· Press the switch once to head light comes ON.
· Press the switch once more to work light comes ON.
· Press the switch again, return to a first step position.
· Press the switch more than one second to turn off lights.

(5) WIPER SWITCH



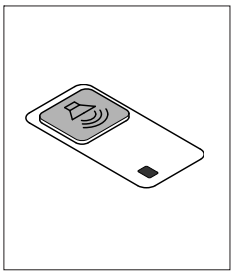
(1) This switch used to operate wiper.
· Press the switch once to intermittently operate wiper.
· Press the switch once more to operate wiper low speed.
· Press the switch again return to a first step position.
· Press the switch more than one second to turn off wiper.

(6) WASHER SWITCH



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

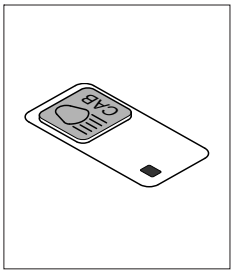
7) TRAVEL ALARM SWITCH



(1) This switch is to activate travel alarm function surrounding when the machine travels.

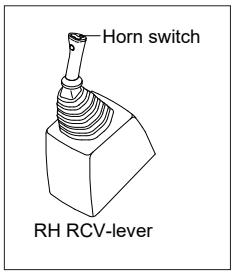
- ON : The travel alarm function is activated.
- OFF : The travel alarm function is not activated.

8) CAB LIGHT SWITCH (OPTION)



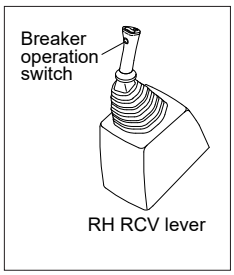
(1) This switch turns ON the cab light on the cab.

9) HORN SWITCH



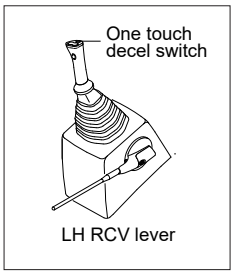
(1) This switch is at the top of right side control lever. On pressing, the horn sounds.

10) BREAKER OPERATION SWITCH



(1) On pressing this switch, the breaker operates only when the breaker selection switch on the switch panel is selected.

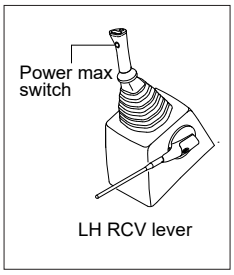
11) ONE TOUCH DECEL SWITCH



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

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

12) POWER MAX SWITCH

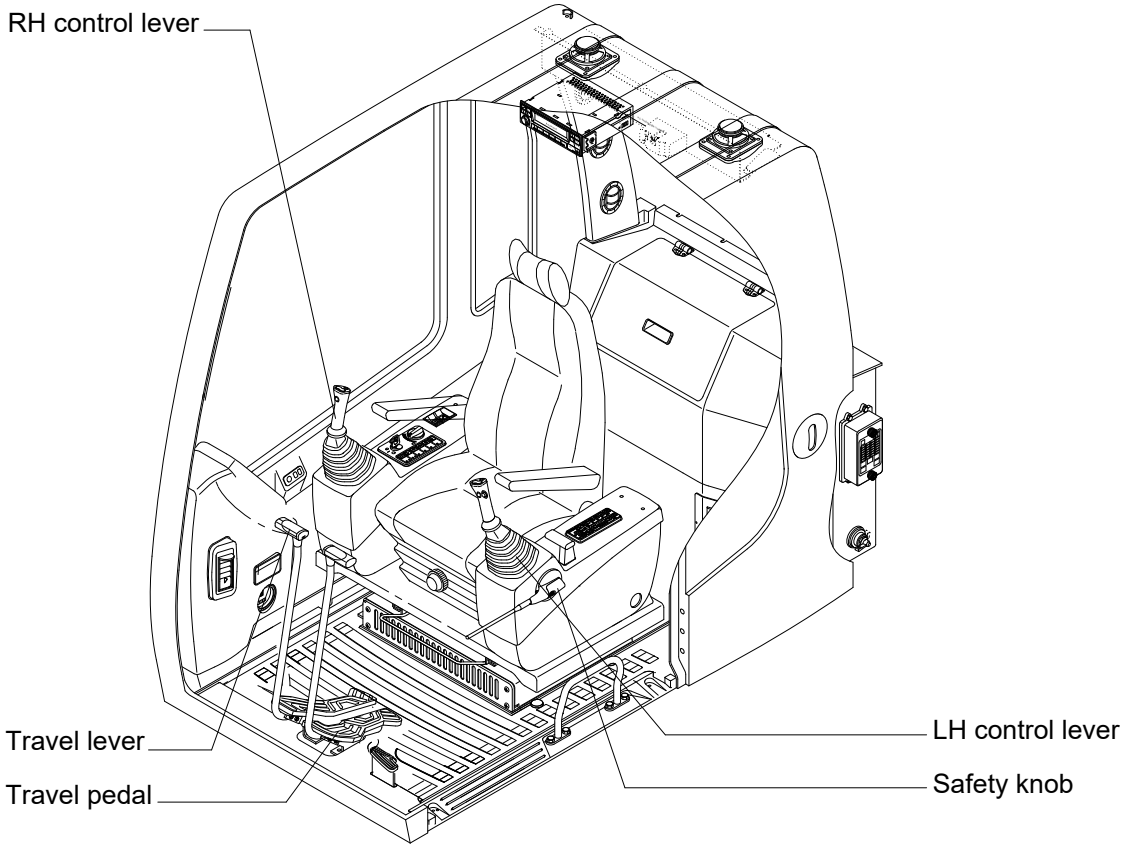


(1) This switch activate power max function.
When this switch is kept pressed, hydraulic power of work equipment will increased approx 110 percent during 8 seconds.

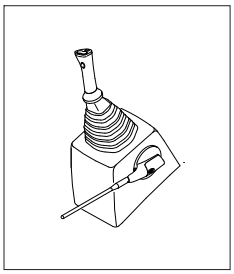
(2) After 8 seconds, function is cancelled automatically even switch is keep pressed.

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

4. LEVERS AND PEDALS

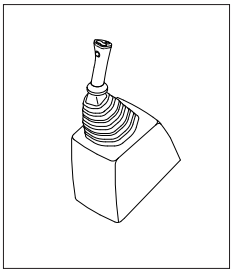


1) LH CONTROL LEVER



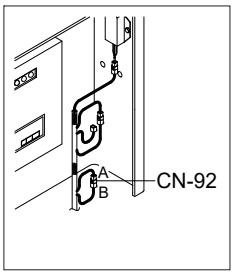
(1) This joystick is used to control the swing and the arm.
(2) Refer to operation of working device in chapter 4 for details.

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.

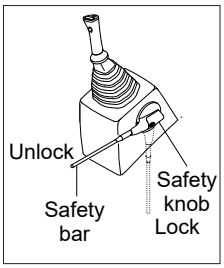
3) EMERGENCY ENGINE STARTING CONNECTOR



(1) If the MCU is removed, the engine does not start.
(2) Before starting the engine, connect the connector CN-92 A with B.

※ **Do not connect these connectors when the MCU is not removed.**

4) SAFETY KNOB



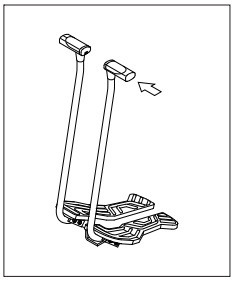
(1) All control levers and pedals are disabled from operation by locating the safety knob to the LOCK position as shown.

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

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

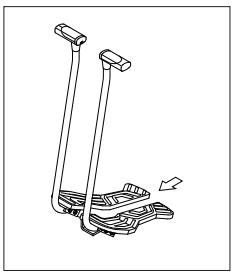
※ **Do not use the safety bar for handle when getting on or off the machine.**

5) TRAVEL LEVER



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

6) TRAVEL PEDAL

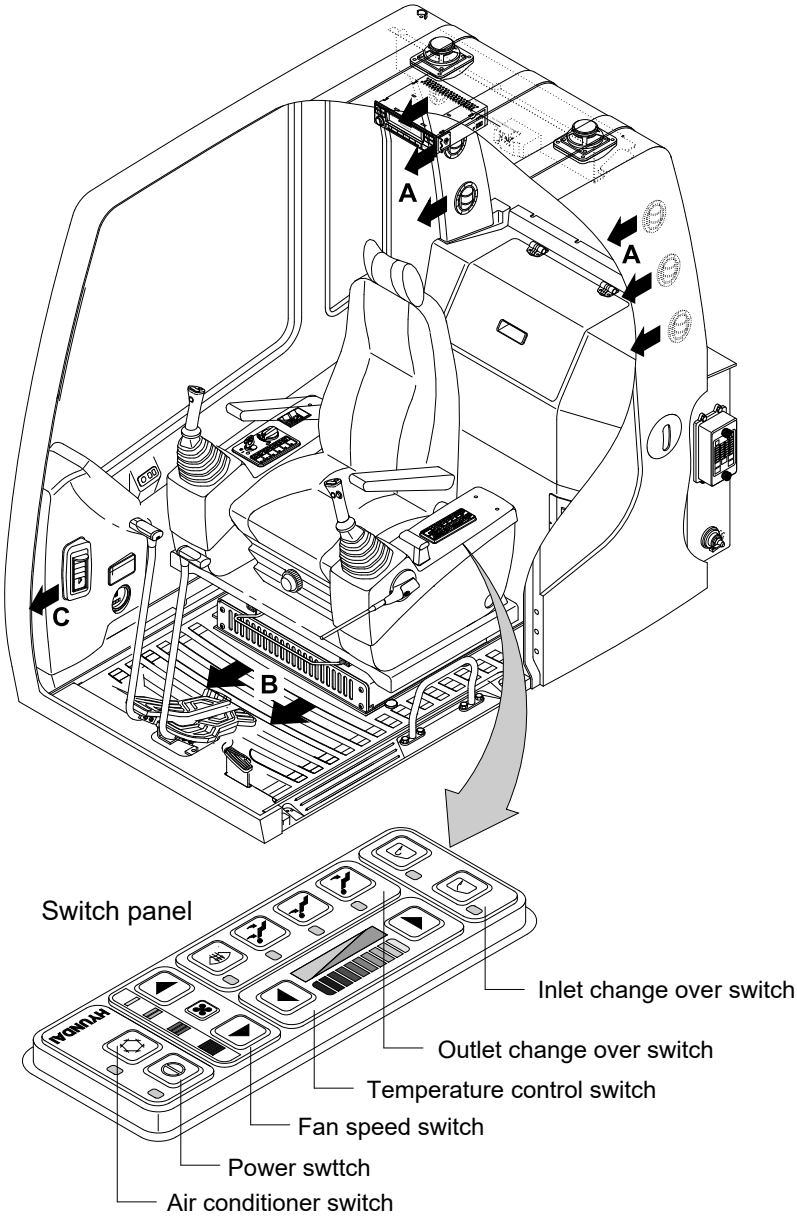


(1) This pedal is used to move the machine forward or backward.
(2) If left side pedal is pressed, left track will move.
If right side pedal is pressed, right track will move.
(3) Refer to **traveling of machine** in chapter 4 for details.

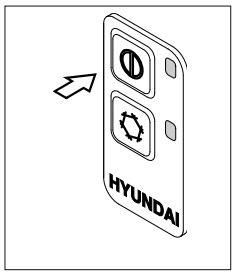
5. AIR CONDITIONER AND HEATER

Air conditioner and heater are equipped for pleasant operation against outside temperature and defrost on window glass.

· Location of air flow ducts



1) POWER SWITCH

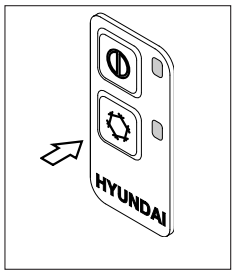


(1) This switch makes the system and the LED simultaneously ON or OFF.

※ Default setting values

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

2) AIR CONDITIONER SWITCH(Compressor switch)

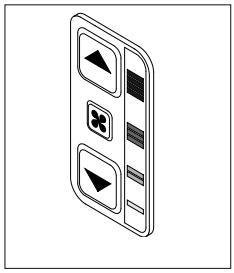


(1) Operating this switch turns the compressor and the LED simultaneously on or off.

(2) In accordance with the evaporator temperature, compressor turns on or off automatically without changing LED stare.

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

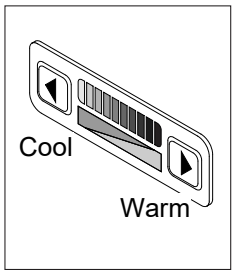
3) FAN SPEED SWITCH



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

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

4) TEMPERATURE CONTROL SWITCH



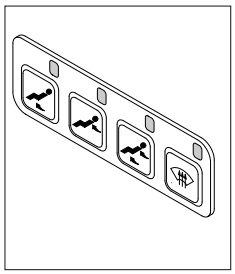
(1) There are 9 steps to control temperature from max cool to max warm controlled up and down by 1 step.

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

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

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

5) OUTLET CHANGE OVER SWITCH



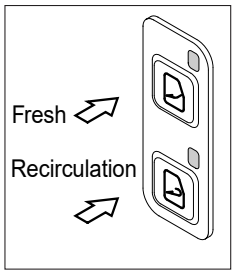
(1) There are four steps of air flow.

Switch position		Mode			
					
Outlet	A		○	○	
	B	○		○	○
	C				○

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

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

6) INLET CHANGE OVER SWITCH



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

① Fresh
Inhaling air from the outside to pressurize cab inside.

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

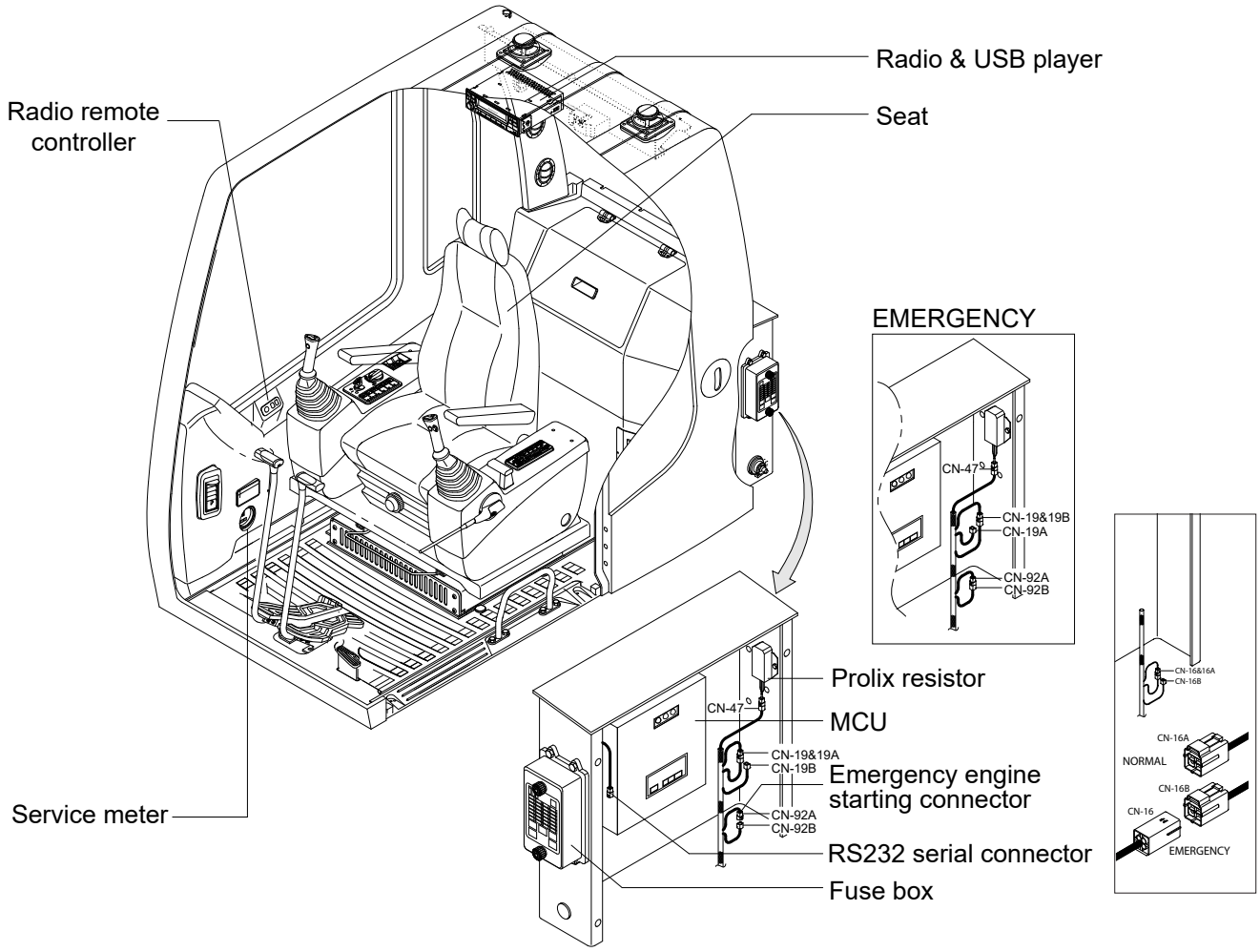
② Recirculation
It recycles the heated or cooled air to increase the energy efficiency.
Change air occasionally when using recirculation for a long time.

※ Check out the recirculation filter periodically to keep a good

※ efficiency.

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

6. OTHERS

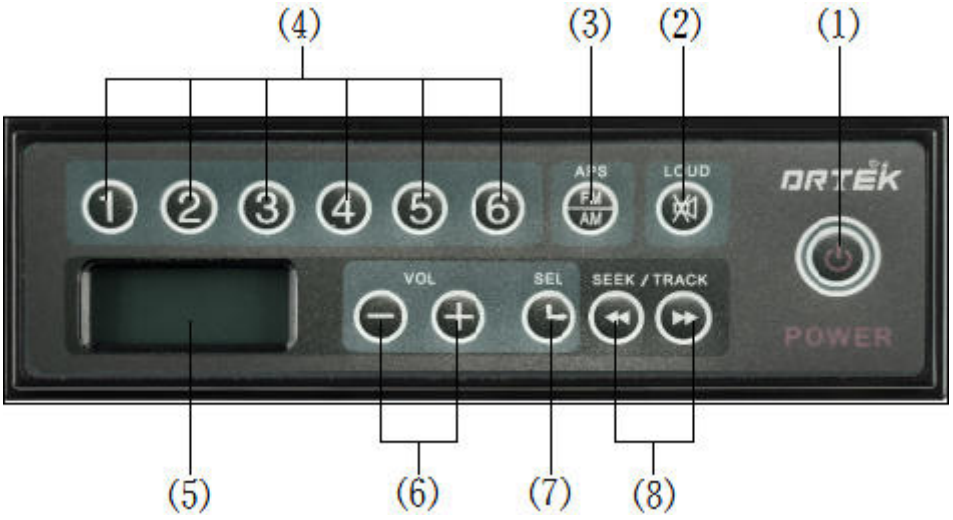

Radio & USB player
Seat
Radio remote controller
Service meter
EMERGENCY
CN-47
CN-19&19B
CN-19A
CN-92A
CN-92B
Prolix resistor
MCU
Emergency engine starting connector
RS232 serial connector
Fuse box
CN-16&16A
CN-16B
CN-16A
NORMAL
CN-16B
CN-16
EMERGENCY

1) RADIO AND USB PLAYER

◆FM / AM digital tuning radio function
◆It can be set up to work in Europe, Australia, the United States and Russia
◆24 storage stations (12 FM, 12 AM))
◆Automatic station search, manual station search, automatic station storage and memory station storage functions
◆Power off memory storage station (optional)
◆Beep key tone function

◆Mute function, loud and other loudness functions
◆Electronic volume, tre, BAS, BAL functions
◆Clock function (no clock can be selected)
◆Aux auxiliary input function (optional)
◆LCD display

Panel



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

FUNCTION KEYS

（1） Power

◇ Short press this key to start up, and long press this key to shut down in the power on state.

（2） Mut/Loudness

◇Short press, mute on / off

◇Long press, loudness on / off

（3） APS/Band

◇Short press to switch the band between FM1 / FM2 / AM1 / AM2

◇Long press to automatically search stations from the low end of the frequency in the current band, and the searched stations are stored in the preset stations in turn

（4） Memory radio

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

（5） / Radio search

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

（6） Sound effect / clock setting

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

◇When the clock is displayed, press and hold this key to enter the clock adjustment.

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

（7） VOL+/-

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

OPERATIONS

1、RADIO

BAND

Short press the < APS > key to switch between bands FM1 / FM2 / AM1 / AM2.

AUTO SEEK

Short press the ◄◄/►► key to search the station forward / backward. If a station is found, the search will stop and play.

MANUAL SEEK

Press and hold the ◂◂ / ▸▸ key to enter the manual station search state. Press and hold the key, the frequency will jump forward / backward quickly. When you release the key, the frequency will stop jumping. At this time, you can still press the ◂◂ / ▸▸ key briefly to adjust the frequency. If the key is not pressed within 2 seconds, the last searched station will be played.

AUTO PRESET STORES

Long press the < APS > key to automatically search stations from the lowest frequency in the current band, and the searched stations are successively stored in the preset stations.

PLAY PRESET STATIONS

Short press one of the number keys 1, 2, 3, 4, 5 and 6 to select the corresponding preset radio station.

STORE CURRENT AUDITION STATION

During playback, long press one of the number keys 1, 2, 3, 4, 5 and 6 to store the current listening frequency into the corresponding preset radio station.

2、SOUND EFFECTS

Softly touch <SEL> to change VOL -> BAS -> TRE -> BAL 。
Volume：When LCD show “VOL”then press <VOL＋/－> to adjust。
Bass ：When LCD show“BAS”then press <VOL＋/－> to adjust。
Treble ：When LCD show“TRE”then press <VOL＋/－> to adjust。
Balance：When LCD show“BAL”then press <VOL＋/－> to adjust。

3、CLOCK

ADJUST CLOCK

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

SPECIFICATIONS

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

Area	Band	Frequency range	Step
Europe	FM	87.5~108MHz	50KHz
	AM	522~1620KHz	9KHz
Australia	FM	87.5~108MHz	100KHz
	AM	522~1710KHz	9KHz
America	FM	87.5~108MHz	100KHz
	AM	530~1620KHz	10KHz
Russia	FM1	65.0~74.0MHz	30KHz
	FM2	87.5~108MHz	50KHz
	AM	522~1620KHz	9KHz

Radio operating area settings
Setting conditions: set in standby mode (bat on ACC on power off)
Setup process：

Set the key operation sequence of the radio working area		Area
	No. key ①	Europe
	No. key ②	Australia
	No. key ③	America
	No. key ④	Russia
The region setting operation must be completed within 5 seconds from pressing the FM / am key		

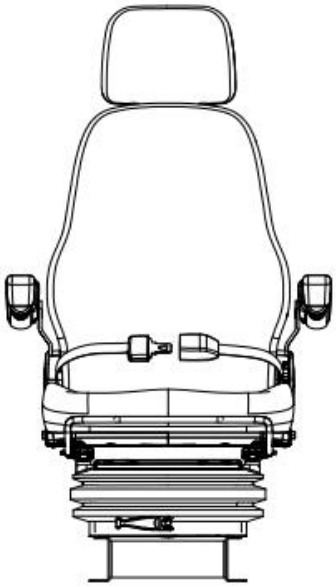
After the above settings are completed, press the power key to start the radio and enter the set area for operation.
Note: if there are any improvement measures for the machine, the technical specifications and design will be changed. This change is not prompted in advance.

Attention:

★ To avoid traffic accidents, please put the volume in an appropriate position.
★ In case of hot or cold weather, please keep the machine in the car. The ideal
★ temperature can ensure the good performance of the machine.
The machine is easy to be damaged after being drenched with water. When you want to wash the car, please be careful not to spray water on the machine.
★ When the machine works at high power output for a long time, the temperature of its casing may increase to about 70 ℃. Although it is not a defect, it is best not to touch the casing.
★ The company will provide warranty for non-human damage to the machine. Non professional maintenance personnel of the company shall not disassemble the machine for adjustment and maintenance without authorization, otherwise the company will not provide warranty.

2) SEAT

1) Technical characteristics



1、Maximum suspension stroke of vibration reduction is 90mm.

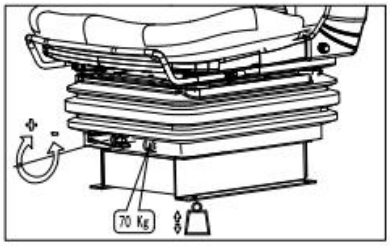
2、Stepless adjustment according to the body weight between 50-130kg.

3、The adjustable range of backrest Angle is 136.5°.

4、the adjustable range of front and rear seats is 165mm.

5、Seat headrest height adjustment 120mm.

2) Shock absorber weight adjustment instructions

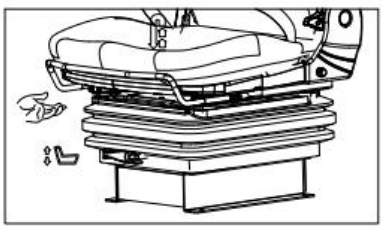


1、rotating weight adjustment handle.

2、clockwise (+) rotating the handle increases the weight adjustment scale value, counterclockwise rotating the handle decreases the weight adjustment scale value.

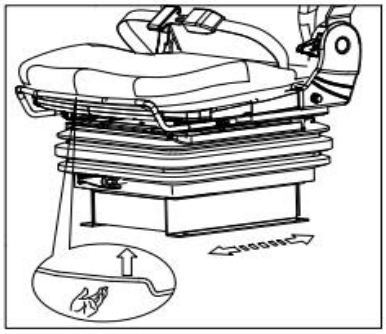
3、After reaching the personal comfortable weight scale release the weight adjustment handle.

3) Seat height adjustment instructions



1、Seat height adjustment is divided into three settings, the lowest position is one setting.

2、fixed the seat, slowly lift the seat up, hear the click sound, reach the second setting; Continue to lift, hear the click again, reach the third setting continue to lift the seat to the sound highest position, release, seat automatically back to first setting.

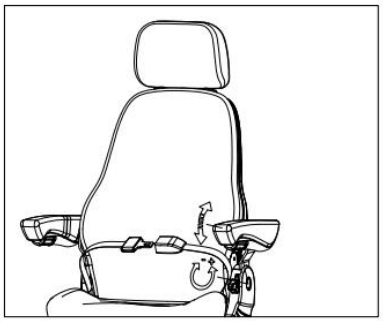


4) Seat front and rear adjustment instructions

1、Move the seat slideway to adjust the handle.

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

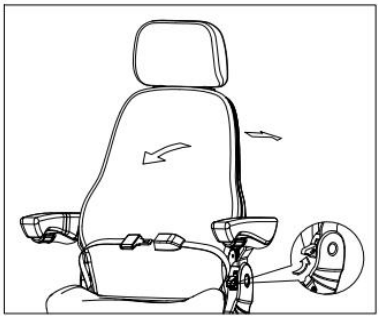
3、After adjusting to a proper position, release the adjusting handle of the guide rail.



5) Handrail adjustment instructions

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

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

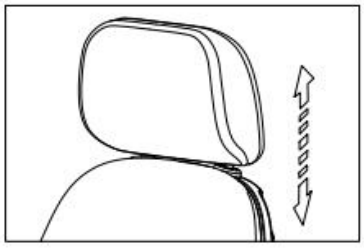


6) Backrest Angle adjustment instructions

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

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

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



7) Seat headrest adjustment instructions

1、To raise, hand directly hold the headrest up.

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

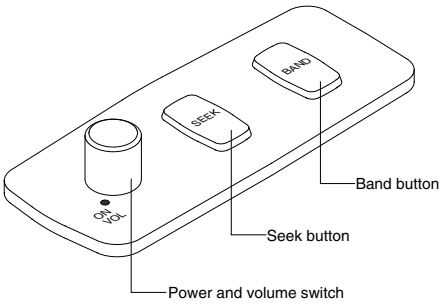
8) Matters needing attention

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

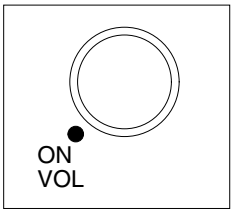
2、 After adjustment, the return position of each handle should be in place to ensure reliable locking mechanism.

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

3) RADIO REMOTE CONTROLLER



(1) Power and volume switch

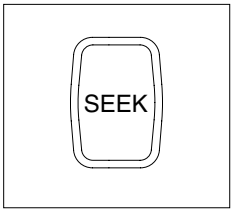


① This switch is turned to right, power will be turned ON and the sound is increased.

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

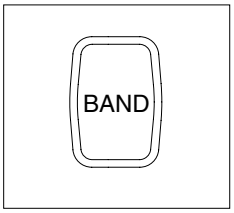
※ **This switch does not operate when turning ON the cassette radio power.**

(2) Seek button



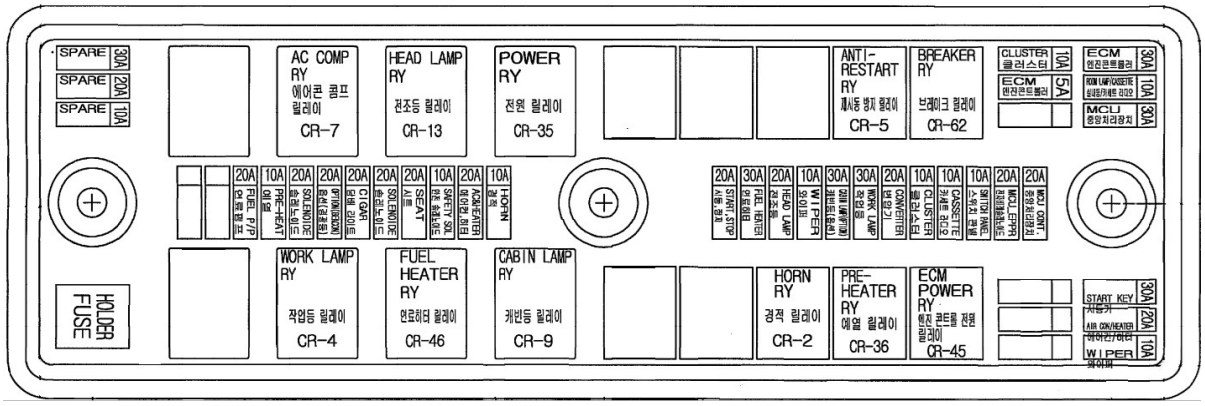
① If this seek button is pressed, the radio automatically stops at the next frequency of broadcasting for your listening.

(3) Band button



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

4) FUSE BOX



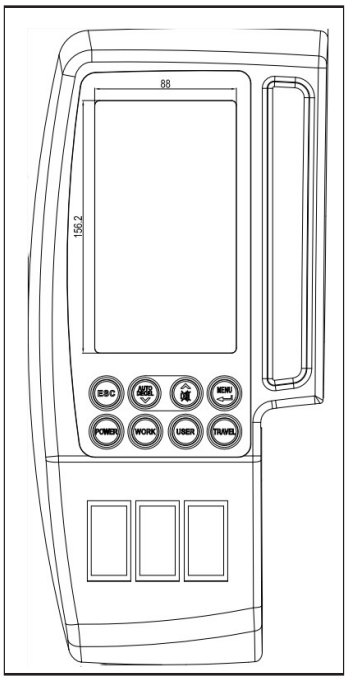
(1) The fuses protect the electrical parts and wiring from burning out.

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

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

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

5) CMCU(cluster&machine control unit integration)

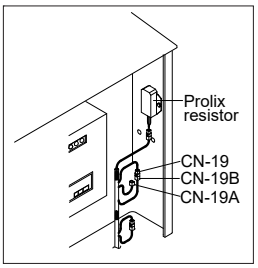


(1) Cluster and MCU integrated configuration, with all MCU functions.

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

※ **Refer to the page 3-2 for cluster function.**

6) PROLIX RESISTOR



(1) This resistor is used to continuous working in case of malfunction of the MCU.

※ Never connect connector CN-19 with connector CN-19B when MCU is in normal operation.

· Normal : CN-19 connect with connector CN-19A

· Emergency : CN-19 connect with connector CN-19B

7) SERVICE METER

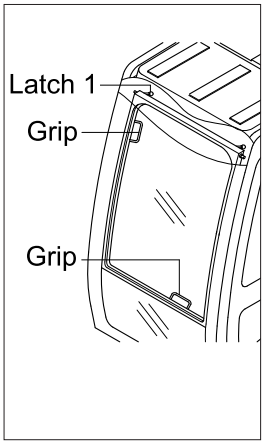
(1) This meter shows the total operation hours of the machine.

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

8) USB接口

(1) Connect other auxiliary equipment as required

9) UPPER WINDSHIELD



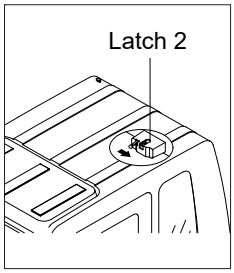
(1) Perform the following procedure in order to open the upper windshield.

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

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

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

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

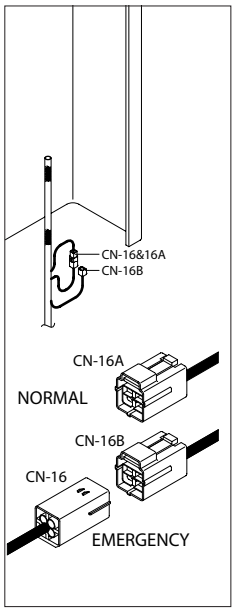


(2) Perform the following procedure in order to close the upper windshield.

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

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

10) EMERGENCY ENGINE SPEED CONTROL CONNECTOR



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

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

1. SUGGESTION FOR NEW MACHINE

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

2) Operate according to below three steps and avoid excessive operation for the initial 100 hours.

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

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

3) Be careful during the initial 100 hours operation

(1) Check daily for the level and leakage of coolant, engine oil, hydraulic oil and fuel.

(2) Check regularly the lubrication and fill grease daily all lubrication points.

(3) Tighten bolts.

(4) Warm up the machine fully before operation.

(5) Check the gauges occasionally during the operation.

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

4) Replace followings after initial 250 hours of operation

Checking items	Hours
Engine oil	250
Engine oil filter element	
Fuel filter	
Prefilter	
Hydraulic oil return filter element	
Hydraulic oil tank drain filter cartridge	
Line filter element	
Swing reduction gear oil	
Travel reduction gear oil	

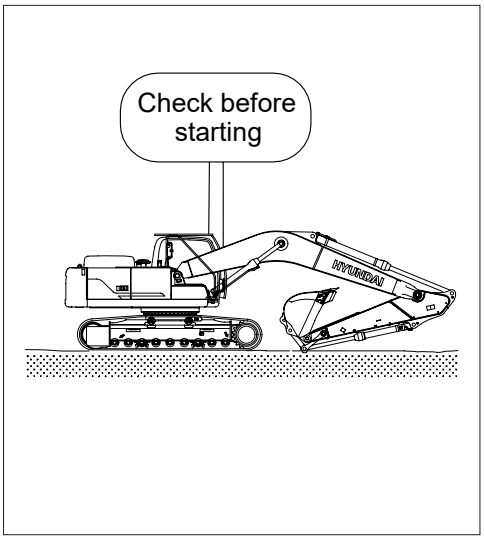
2. CHECK BEFORE STARTING THE ENGINE

1) Look around the machine and under the machine to check for loosen nut or bolts, collection of dirt, or leakage of oil, fuel or coolant and check the condition of the work equipment and hydraulic system. Check also loosen wiring, and collection of dust at places which reach high temperature.

※ Refer to the daily check on the chapter 6, maintenance.

2) Adjust seat to fit the contours of the operator's body for the pleasant operation.

3) Adjust the rear view mirror.



3. STARTING AND STOP THE ENGINE

1) CHECK INDICATOR LIGHTS

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

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

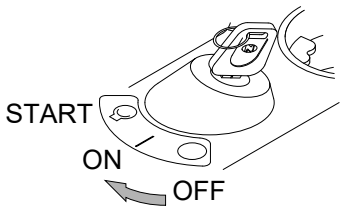
① If all the lamps light ON and buzzer sounding for 2 seconds.

② After lamp check「1.00」, the version of cluster program, is displayed on 「LCD(3)」 for 5 seconds and the cluster returns to default.

③ 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)



2) STARTING ENGINE IN NORMAL TEMPERATURE

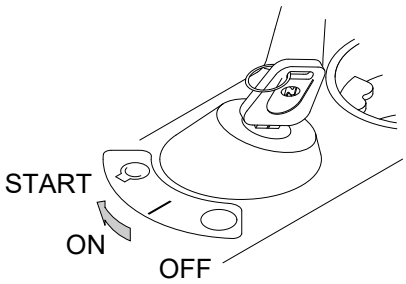
※ Sound the horn to warn the surroundings after checking if personnel or obstacles are in the area.

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

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

※ Do not hold the starting switch in the START position for longer than 20 seconds

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



3) STARTING ENGINE IN COLD WEATHER

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

※ **Replace the engine oil and fuel referring to recommended oils at page 2-12**

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

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

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

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

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

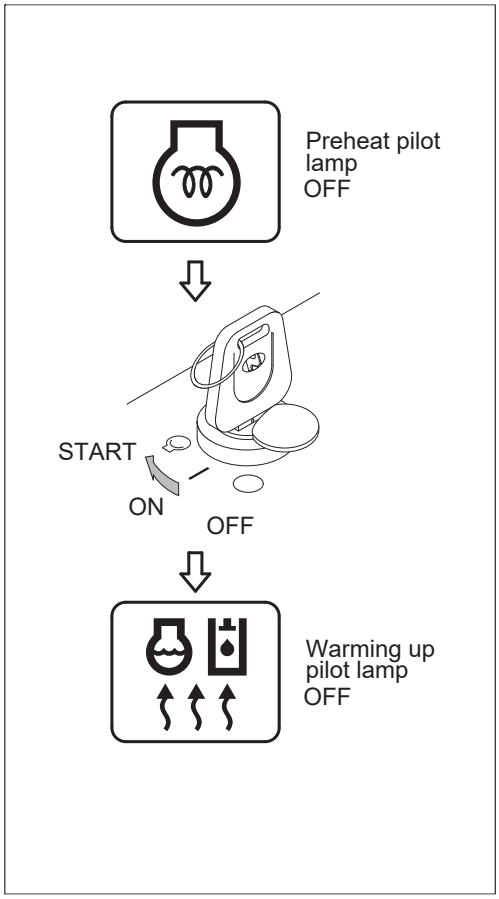
(4) Wait for five minutes to warm up the engine after the preheating pilot lamp off, and than turn the starting switch to the START position to start the engine.

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

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

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

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



4) INSPECTION AFTER ENGINE START

Inspect and confirm the following after engine starts.

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

(2) Are there leakages of oil or water?

(3) Are all the warning lamps turned OFF

(4) Are the indicator of water temperature gauge and hydraulic temperature gauge in the green zone?

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

(6) Are the sound and vibration normal?

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

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

5) WARMING-UP OPERATION

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

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

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

(3) Operate bucket lever for 5 minutes.

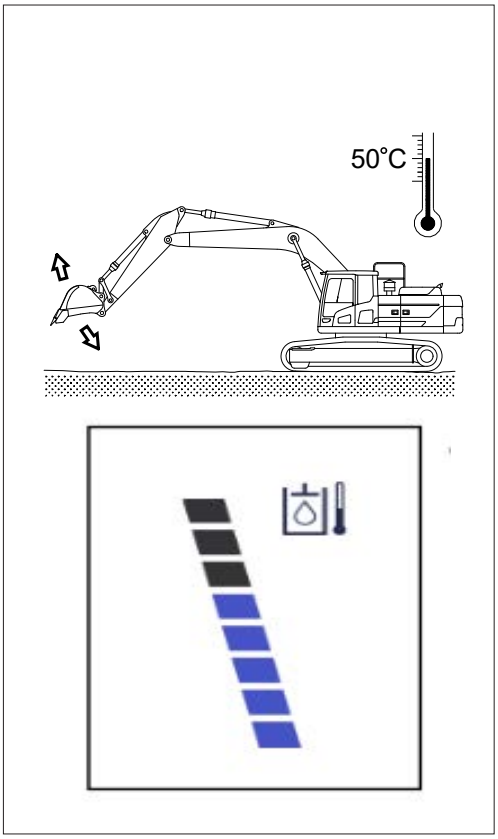
※ **Do not operate anything except bucket lever.**

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

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

(5) This warming-up operation will be completed by operation of all cylinders several times, and operation of swing and traveling.

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



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 particularly if the engine has overheated, do not abruptly stop it but run it at medium speed to allow it to cool gradually, then stop it.**

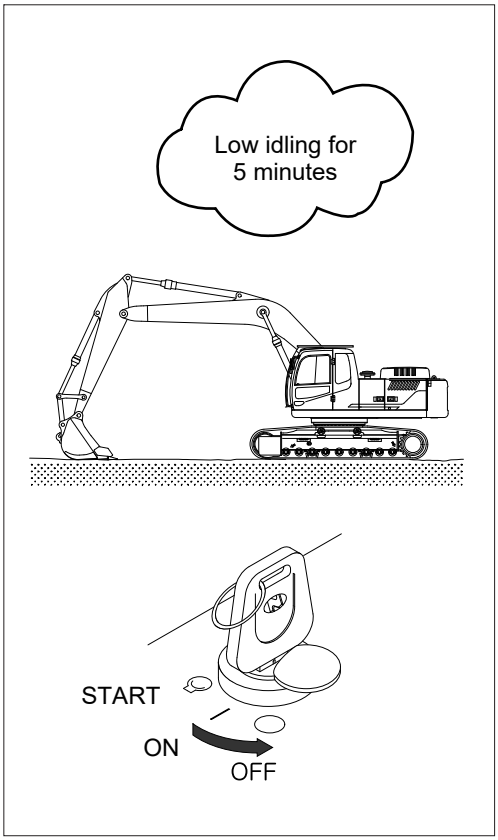
(1) Down the bucket on the ground then put all the levers in the neutral position.

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

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

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

(5) Lock the cab door.



4. MODE SELECTION SYSTEM

1) STRUCTURE OF CAPO SYSTEM

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

(1) Work mode

3 work modes can be selected for the optimal work speed of the machine operation.

① Heavy duty work mode

The boom priority solenoid is activated to make the boom operation speed faster.

② General work mode

When key switch is turned ON, this mode is selected automatically and swing operation speed is faster than heavy duty work mode.

③ Breaker operation mode

It sets the pump flow to the optimal operation of breaker by activating the max flow cut-off solenoid.

(2) Power mode

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

· H mode : High power

· S mode : Standard power

· M mode: Maximum power

(3) User mode

· U : You can change the engine and pump power and memorize it for your preference.

(4) How to modulate the memory set

① Each memory mode has a initial set which are mid-range of max engine speed, auto decel rpm, and EPPR valve input current.

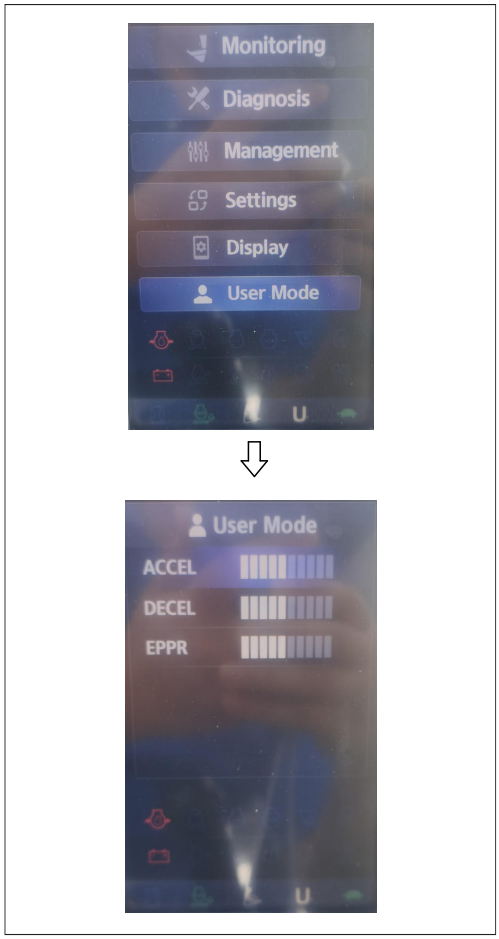
1 Power mode
2 Work mode
3 User mode
4 Travel mode
5 Auto decel mode

② High idle rpm, auto decel rpm, EPPR pressure can be modulated and memorized separately in the U-mode.

※ **Refer to the page 3-19 for set of user mode.**

· LCD segment vs parameter setting

Segment (▮)	ACCEL (rpm)	DECEL (rpm)	EPPR (bar)
1	1300	750	38
2	1400	800	32
3	1500	850	26
4	1600	900	20
5	1700	950	16
6	1800	1000	12
7	1850	1050	9
8	1900	1100	6
9	1950	1150	3
10	2000	1200	0



※ One touch decel:850rpm

(5) Travel mode

: Low speed traveling.

: High speed traveling.

(6) Auto idle mode

Lamp ON : Auto idle mode

Lamp OFF: Cancel Auto idle mode

(7) Monitoring system

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

(8) Self diagnostic system

① CMCU

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

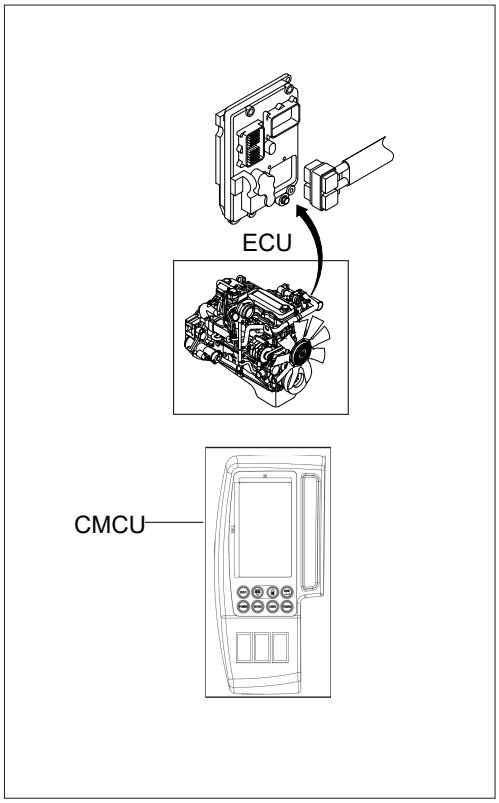
② Engine controller (ECU)

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

※ Consult Hyundai or Huyndai dealer for details.

(9) Anti-restart system

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



2) HOW TO OPERATE MODE SELECTION SYSTEM

(1) When start key is turned ON

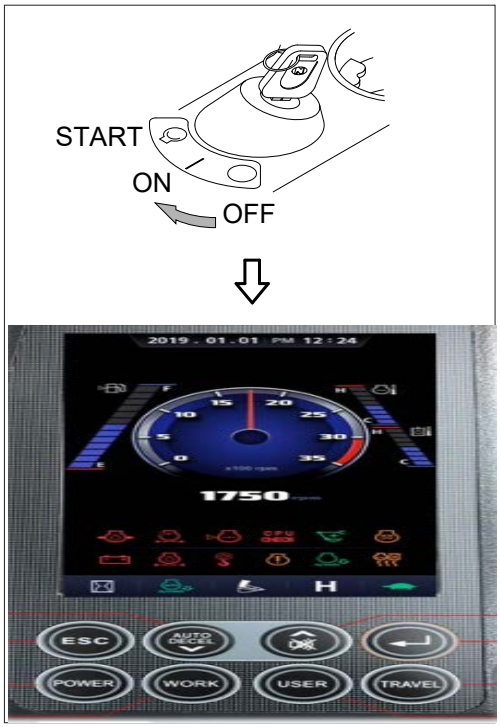
① When start key switch is turned on, the cluster turns on and buzzer sounds for 4 seconds. And then main information as gauges and engine speed are displayed on LCD.

② Initial default mode settings are displayed in the cluster.

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

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

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



(2) After engine start

① When the engine is started, rpm display indicates low idle, 850±50 rpm.

② If coolant temperature is below 30˚C, the warming up pilot lamp lights ON and after 4 seconds the engine speed increases to 1000±100 rpm automatically to warm up the machine.

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

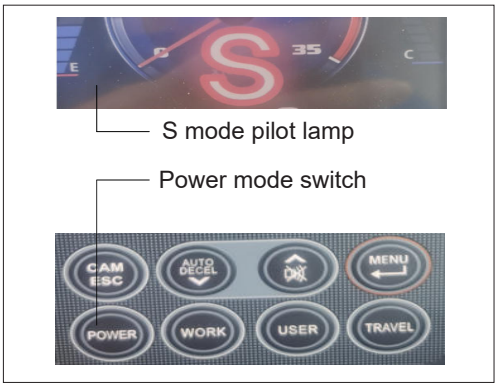
3) SELECTION OF POWER MODE

(1) S mode

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

Engine rpm	Effect
1700 ± 50	Same power as non mode type machine.

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

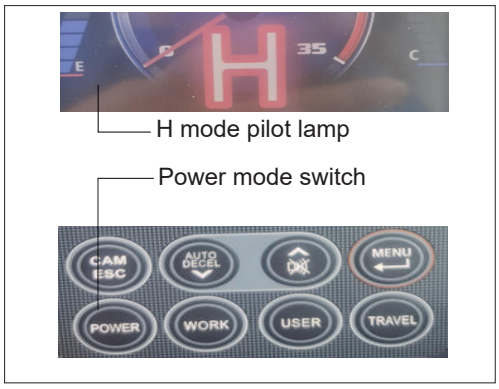


(2) H mode

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

Engine rpm	Effect
1800 ± 50	std. power

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

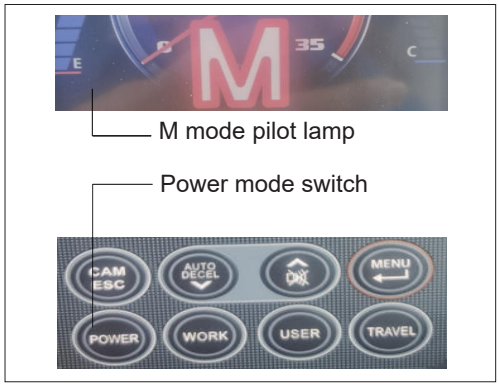


(3) M mode

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

Engine rpm	Effect
1900 ± 50	Approximately 120 % of power and speed available than S mode.

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



5. OPERATION OF THE WORKING DEVICE

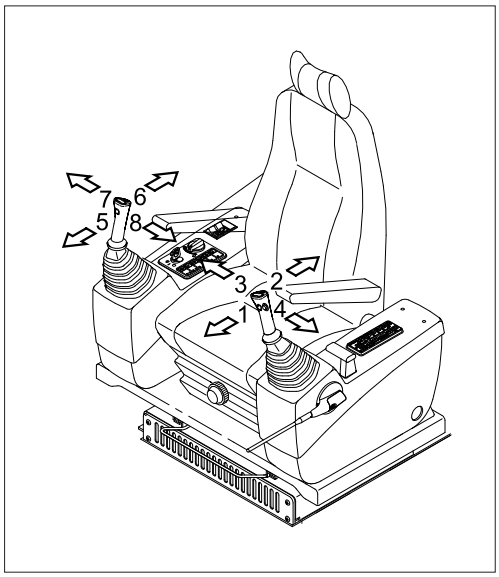
※ Confirm the operation of control lever and working device.

1) Left control lever controls arm and swing.

2) Right control lever controls boom and bucket.

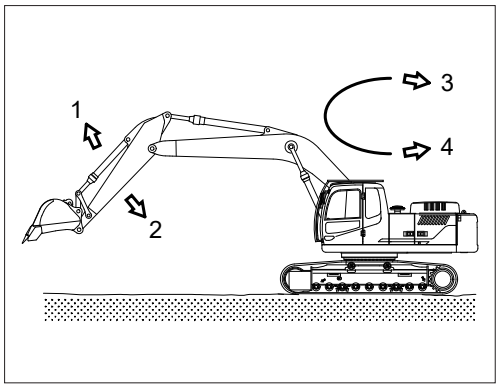
3) When you release the control lever, control lever returns to neutral position automatically.

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



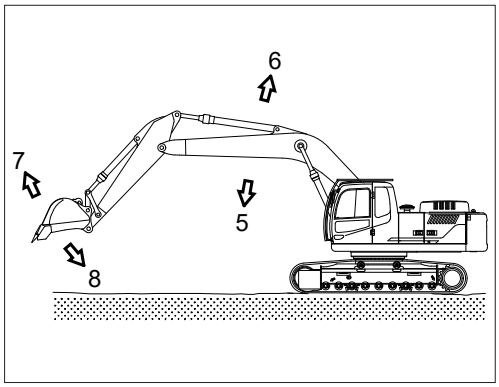
※ Left control lever

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



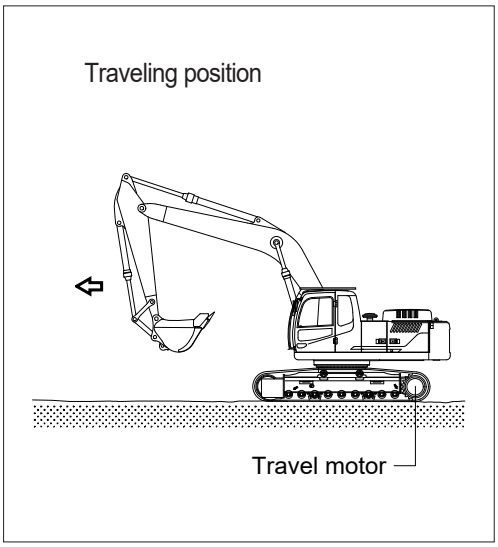
※ Right control lever

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



6. TRAVELING OF THE MACHINE

1) BASIC OPERATION



(1) Traveling position

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

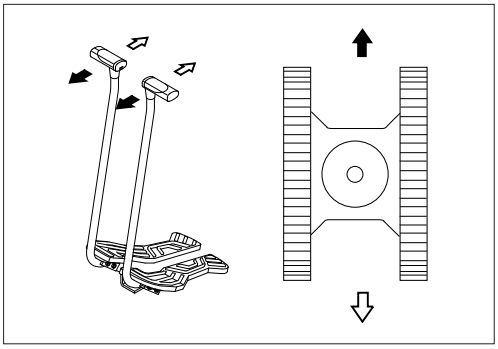
⚠ Be careful as the traveling direction will be reversed when the whole machine is swinged 180 degree.

(2) Traveling operation

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

※ Do not travel continuously for a long time.

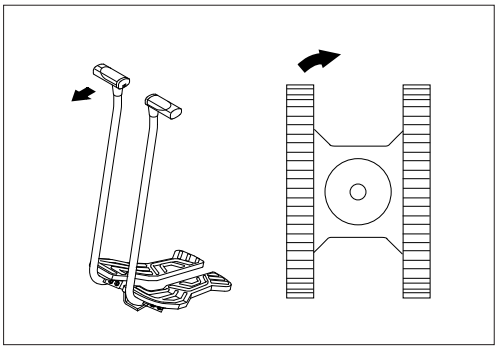
※ Reduce the engine speed and travel at a low speed when traveling on uneven ground.



(3) Forward and backward traveling

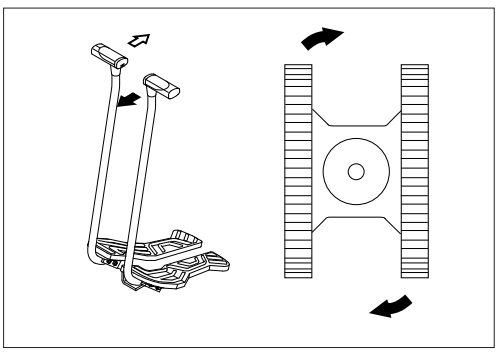
When the left and right travel lever or pedal are pushed at the same time, the machine will travel forward or backward.

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



(4) Pivot turning

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



(5) Counter rotation

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

2) TRAVELING ON A SLOPE

(1) Make sure that the travel lever is properly maneuvered by confirming the travel motor is in the right location.

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

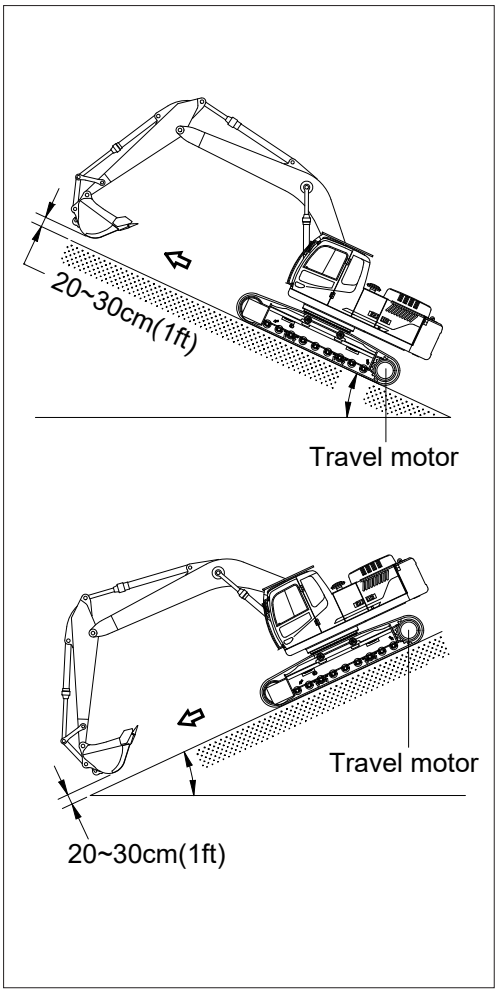
(3) If the machine starts to slide or loses stability, lower the bucket immediately and brake the machine.

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

※ Machine cannot travel effectively on a slope when the oil temperature is low. Do the warming-up operation when it is going to travel on a slope.

⚠ Be careful when working on slopes. It may cause the machine to lose its balance and turn over.

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



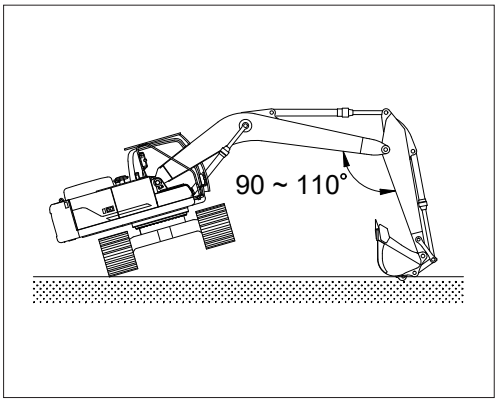
3) TRAVELING ON SOFT GROUND

※ If possible, avoid to operate on soft ground.

(1) Move forward as far as machine can move.

(2) Take care not to go beyond the depth where towing is impossible on soft ground.

(3) When driving becomes impossible, lower bucket and use boom and arm to pull the machine. Operate boom, arm, and travel lever at the same time to avoid the machine sinking.



4) TOWING THE MACHINE

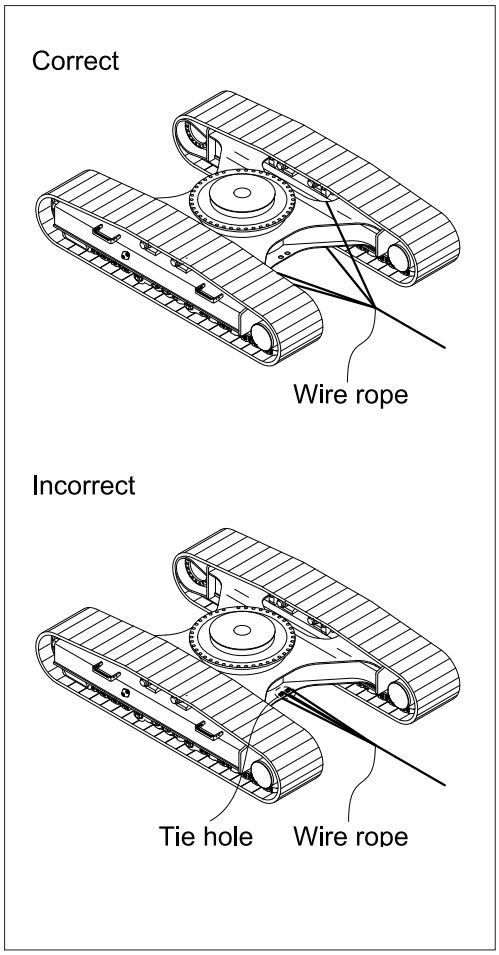
Tow the machine as follows when it can not move on it's own.

(1) Tow the machine by other machine after hook the wire rope to the frame as shown in picture at right.

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

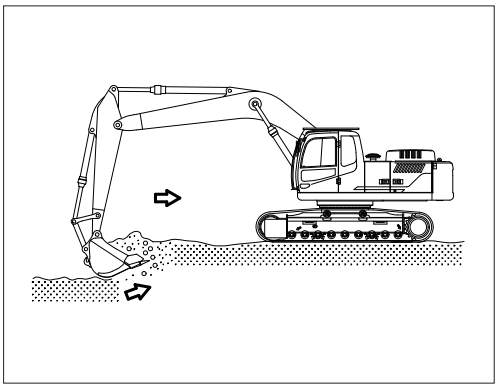
※ Never tow the machine using only the tie hole, because this may break.

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

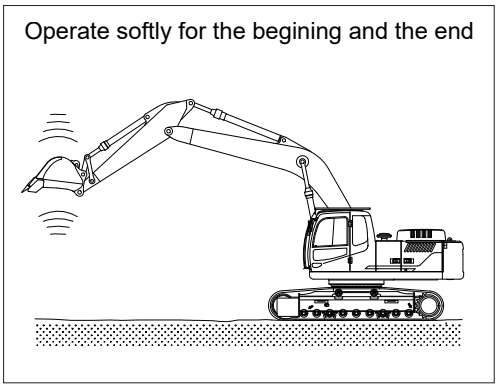


7. EFFICIENT WORKING METHOD

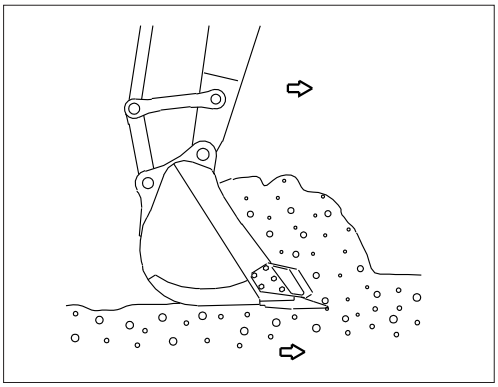
1) Do the digging work by arm.
   Use the pulling force of arm for digging and use together with the digging force of the bucket if necessary.



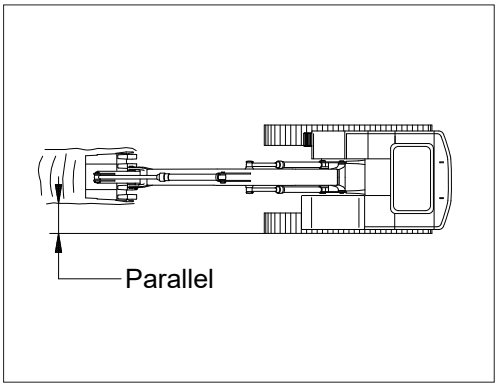
2) When lowering and raising the boom operate softly for the beginning and the end.
   In particularly, sudden stops while lowering the boom may cause damage to the machine.



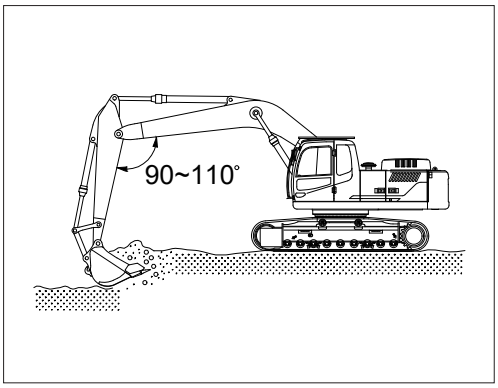
3) The digging resistance and wearing of tooth can be reduced by putting the end of bucket tooth to the digging direction.



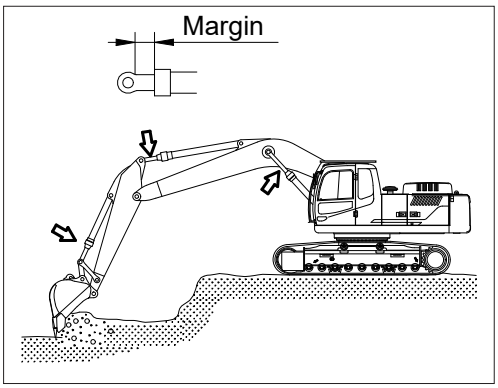
4) Set the tracks parallel to the line of the ditch to be excavated when digging ditch. Do not swing while digging.



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

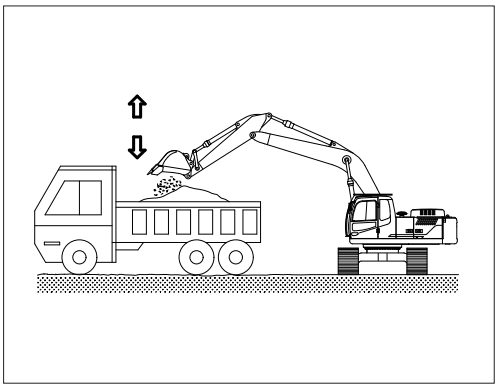


6) Operate leaving a small safety margin of cylinder stroke to prevent damage of cylinder when working with the machine.

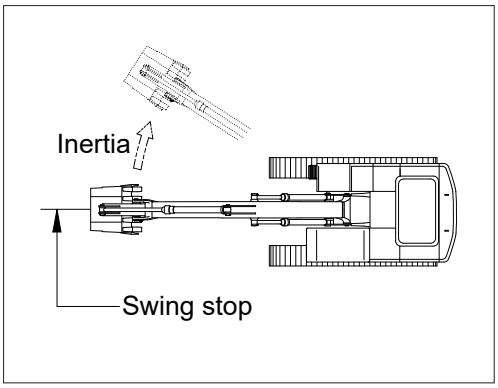


7) Keep the bucket to the dumping position and the arm horizontal when dumping the soil from the bucket.
Operate bucket lever 2 or 3 times when hard to dump.

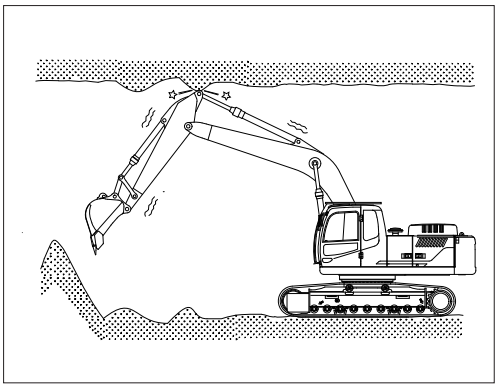
※ Do not use the impact of bucket tooth when dumping.



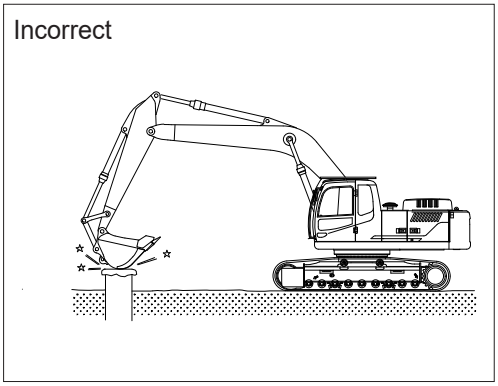
8) Operate stop of swing considering the swing slip distance is created by inertia after neutralizing the swing lever.



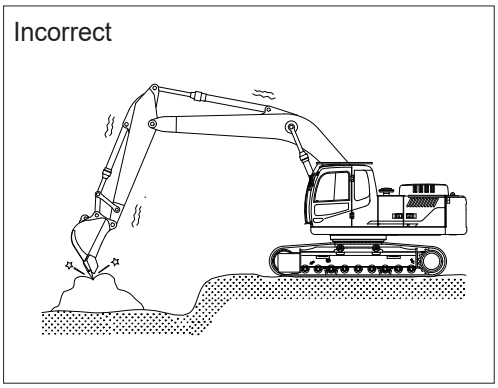
9) If the excavation is in an underground location or in a building, make sure that there is adequate overhead clearance and that there is adequate ventilation.



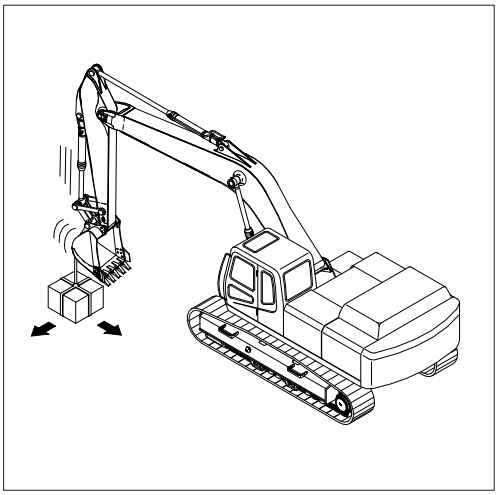
10) Do not use the dropping force of the work equipment for digging.
The machine can be damaged by the impact.



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



12) NEVER CARRY OUT EXCESSIVE OPERATIONS
Operation exceeding machine performance may result in accident or failure.
Carry out lifting operation within specified load limit.
Never carry out operations which may damage the machine such as overload or over-impact-load.
Never travel while carrying a load.
In case you need installing over load warning device for object handling procedure, please contact Hyundai distributor.



13) BUCKET WITH HOOK

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

The following operations are prohibited.

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

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

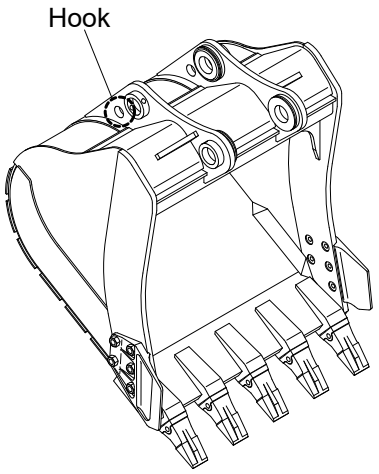
When performing lifting operation, never raise or lower a person.

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

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

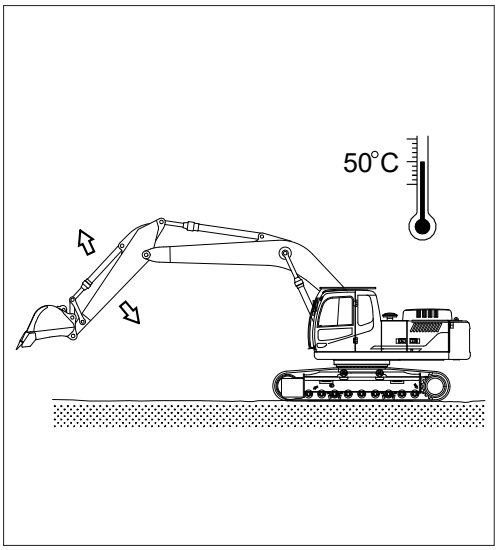
- Execute operating methods and procedures under his direction.
- Select a person responsible for signaling. Operate only on signals given by such person.

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



8. OPERATION IN THE SPECIAL WORK SITES

1) OPERATION THE MACHINE IN A COLD WEATHER



(1) Use proper engine oil and fuel for the weather.

(2) Fill the required amount of antifreeze in the coolant.

(3) Refer to the starting engine in cold weather. Start the engine and extend the warming up operation.

(4) Be sure to open the heater cock when using the heater.

(5) Always keep the battery completely charged.

※ Discharged batteries will freeze more easily than fully charged.

(6) Clean the machine and park on the wood plates.

2) OPERATION IN SANDY OR DUSTY WORK SITES

(1) Inspect air cleaner element frequently. Clean or replace element more frequently, if warning lamp comes ON and buzzer sounds simultaneously, regardless of inspection period.

※ Replace the inner and outer element after 6 times of cleaning.

(2) Inspect radiator 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 frequently.

(5) Keep all lubricated part, such as pins and bushings, clean at all times.

(6) If the air conditioner and heater filters clogged, the heating or cooling capacity will drop. Clean or replace the filter element more frequently.

※ Clean electrical components, especially the starting motor and alternator to avoid accumulation of dust.

3) SEA SHORE OPERATION

(1) Prevent ingress of salt by securely tightening plugs, cocks and bolts of each part.

(2) Wash machine after operation to remove salt residue.
Pay special attention to electrical parts, and hydraulic cylinders and track tension cylinder to prevent corrosion.

(3) Inspection and lubrication must be carried out more frequently.
Supply sufficient grease to replace all old grease in bearings which have been submerged in water for a long time.

4) OPERATION IN MUD, WATER OR RAIN WORK SITES

(1) Perform a walk around inspection to check for any loose fittings, obvious damage to the machine or any fluid leakage.

(2) After completing operations, clean mud, rocks or debris from the machine. Inspect for damage, cracked welds or loosened parts.

(3) Perform all daily lubrication and service.

(4) If the operations were in salt water or other corrosive materials, make sure to flush the affected equipment with fresh water.

5) OPERATION IN ROCKY WORK SITES

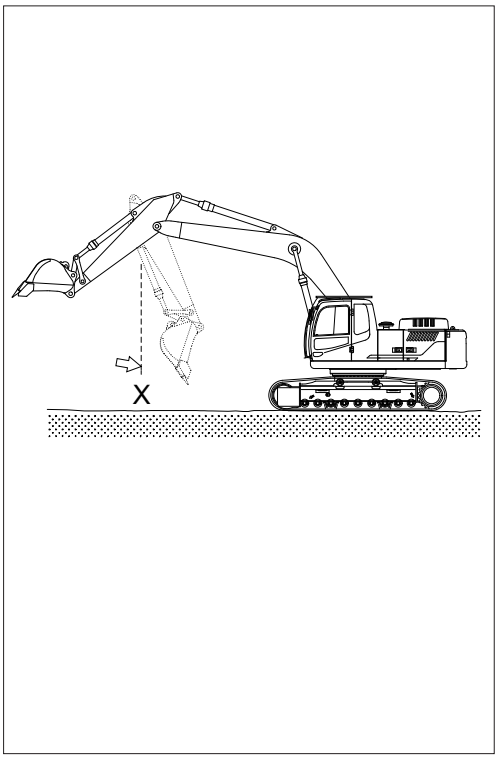
(1) Check for damage to the undercarriage and for looseness, flaws, wear and damage in bolts and nut.

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

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

9. NORMAL OPERATION OF EXCAVATOR

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



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

10. ATTACHMENT LOWERING (when engine is stopped)

1) On machines equipped with an accumulator, for a short time (within 2 minute) after the engine is stopped, the attachment will lower under its own weight when the attachment control lever is shifted to lower. This happens only when the start-ing switch is on and the safety knob is the in the unlock position. After the engine is stopped, set the safety knob to the lock position.

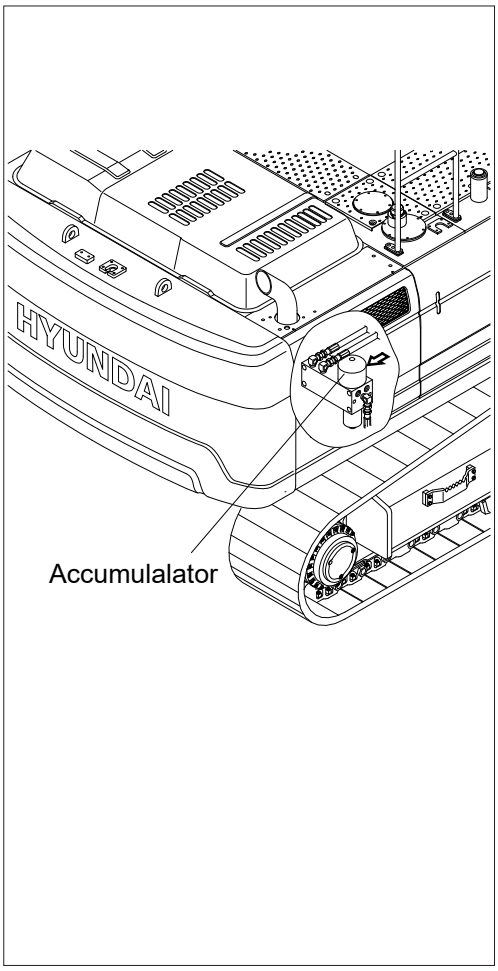
⚠ **Be sure no one is under or near the attachment before lowering the boom.**

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

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

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

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



11. STORAGE

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

1) BEFORE STORAGE

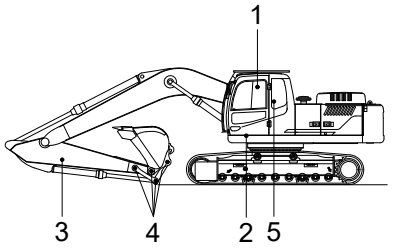
(1) Cleaning the machine

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

(2) Lubrication position of each part

Change all oil.

※ Be particularly careful when you reuse the machine.
As oil can be diluted during storage.
Apply an anticorrosive lubricant on the exposed part of piston rod of cylinder and in places where the machine rusts easily.



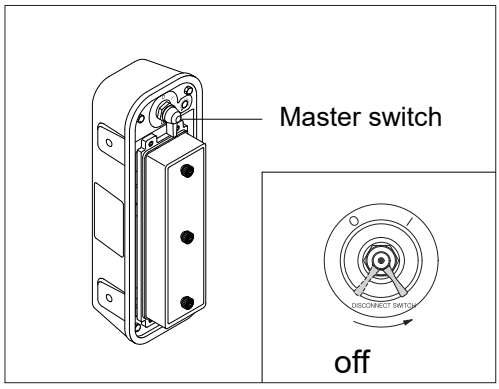
1 Lubricating manifold at boom (5EA)
2 Boom cylinder pin (2EA)
3 Lubricating manifold at arm (3EA)
4 Arm and bucket (7EA)
5 Boom rear bearing center (1EA)

Master switch

(3) Master switch

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

⚠ Off the master switch after lamp off.

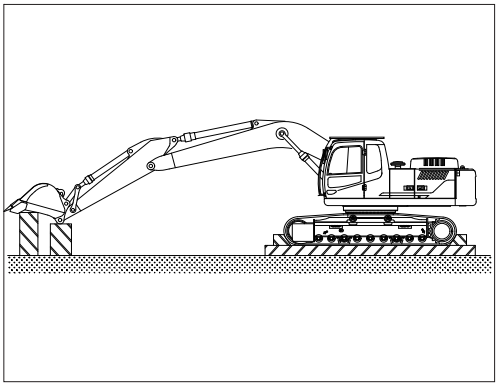


(4) Be sure to mix anticorrosive antifreezing solution in the radiator.

(5) Prevention of dust and moisture

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

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



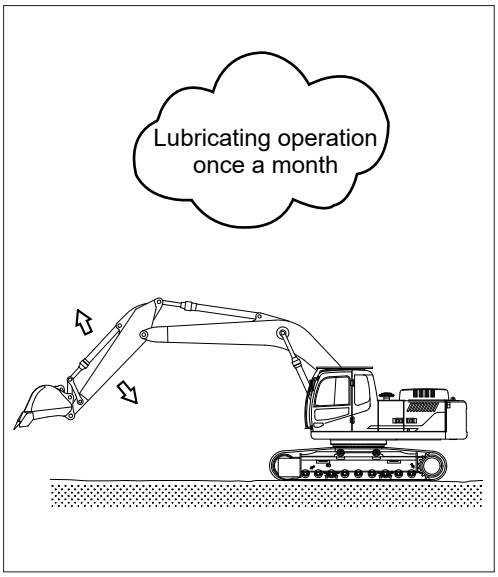
2) DURING STORAGE

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

※ Check the level of engine oil and coolant and fill if required when starting engine.

※ Clean the anticorrosive on the piston rod of cylinder

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



※ BATTERY

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

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

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

3) AFTER STORAGE

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

(1) Wipe off the anticorrosive lubricant on the hydraulic piston rod.

(2) Completely fill fuel tank, lubricate and add oil.

(3) When storage period is 6 months over

If the machine stock period is over 6 months, carry out the following procedure.

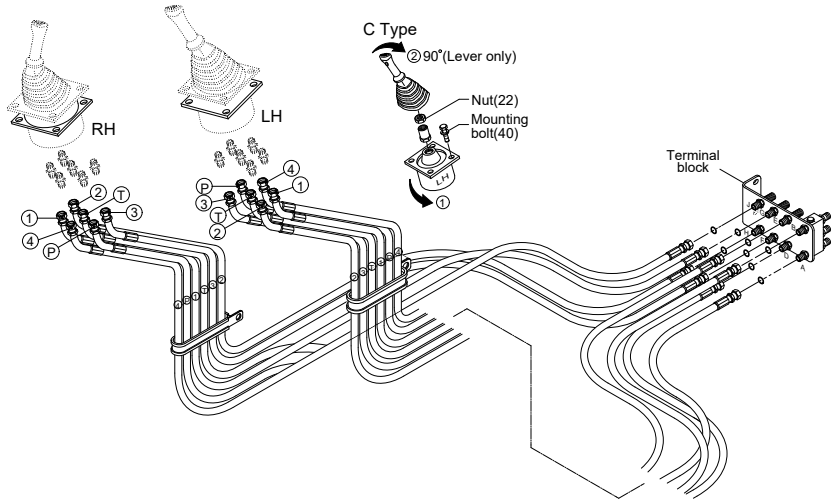
This procedure is to drain condensation water for the swing reduction gear durability.

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

※ Refer to the service instruction, section 6 for the drain plug location

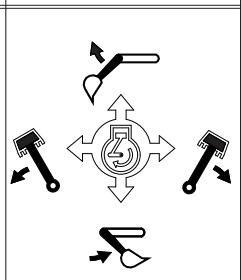
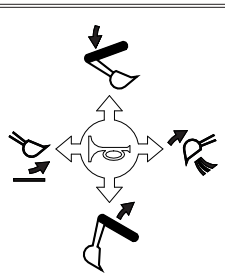
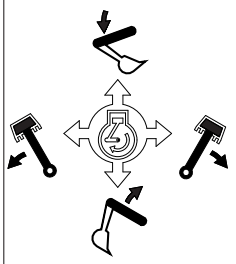
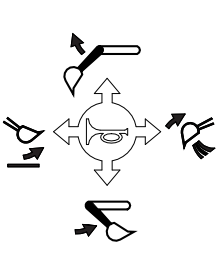
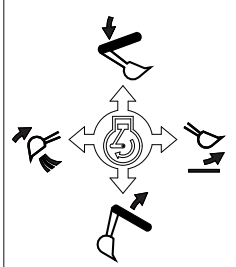
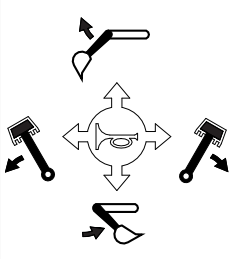
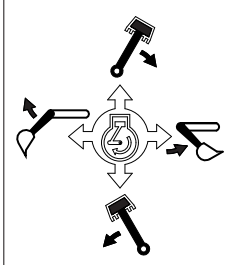
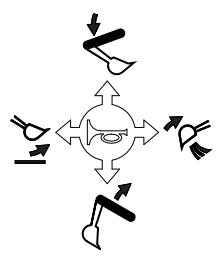
※ If the machine is stored without carrying out the monthly lubricating operation, consult your Hyundai dealer for service.

12. RCV LEVER OPERATING PATTERN



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

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

Pattern	Operation		Control function		Hose connection (port)		
	Left RCV lever	Right RCV lever			RCV lever	Change of Terminal block	
						From	To
ISO Type			Left	Arm out	②	D	-
				Arm in	④	E	-
				Swing right	③	B	-
				Swing left	①	A	-
			Right	Boom lower	④	J	-
				Boom raise	②	H	-
				Bucket out	①	G	-
Hyundai				Bucket in	③	F	-
A Type			Left	Boom lower	②	D	J
				Boom raise	④	E	H
				Swing right	③	B	-
				Swing left	①	A	-
			Right	Arm out	④	J	D
				Arm in	②	H	E
				Bucket out	①	G	-
				Bucket in	③	F	-
B Type			Left	Boom lower	②	D	J
				Boom raise	④	E	H
				Bucket in	③	B	F
				Bucket out	①	A	G
			Right	Arm out	④	J	D
				Arm in	②	H	E
				Swing right	①	G	B
				Swing left	③	F	A
C Type			Left	① Loosen the RCV lever mounting bolt (40) and rotates lever assy 90° counterclockwise; then install. ② To put lever in correct position, disassemble nut (22) and rotates only lever 90° clockwise.			
			Right	Same as ISO type			

1. PREPARATION FOR TRANSPORTATION

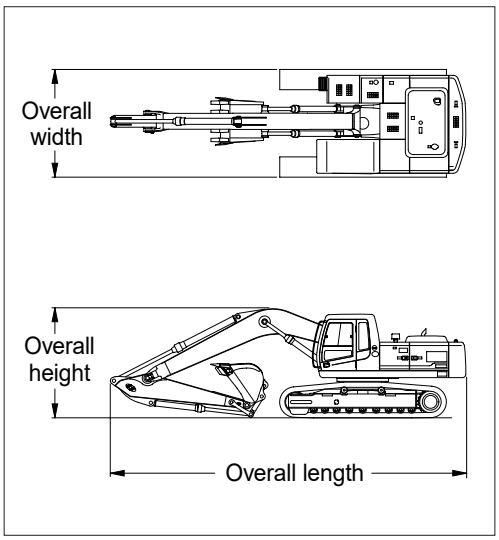
1) When transporting the machine, observe the various road rules, road transportation vehicle laws and vehicle limit ordinances, etc.

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

3) Check the whole route such as the road width, the height of bridge and limit of weight and etc., which will be passed.

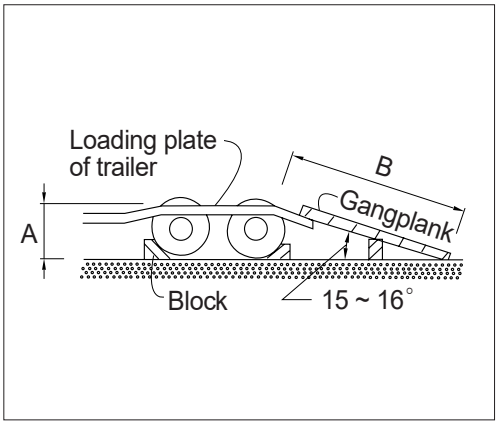
4) Get the permission from the related authority if necessary.

5) Prepare suitable capacity of trailer to support the machine.



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

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

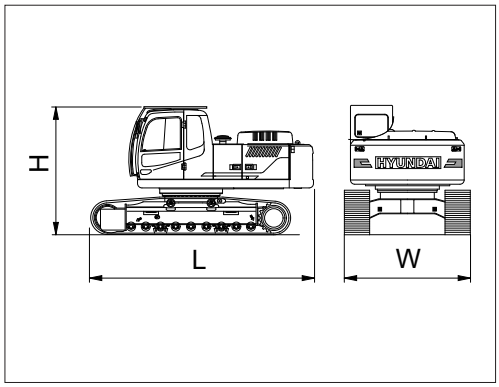


2. DIMENSION AND WEIGHT

1) BASE MACHINE

Mark	Description	Unit	Specification
L	Length	mm	4850
H	Height	mm	3000
W	Width	mm	2800
Wt	Weight	kg	16690

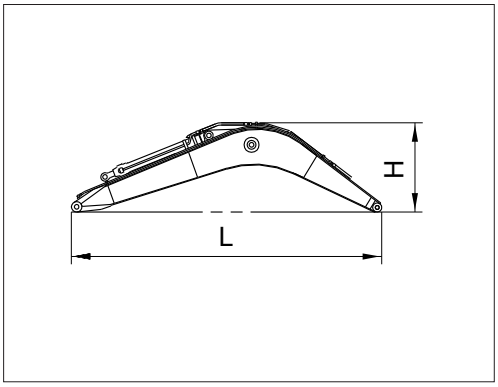
※ With 600 mm **triple guouser shoes**



2) BOOM ASSEMBLY

Mark	Description	Unit	Specification
L	Length	mm	5870
H	Height	mm	1550
W	Width	mm	694
Wt	Weight	kg	1845

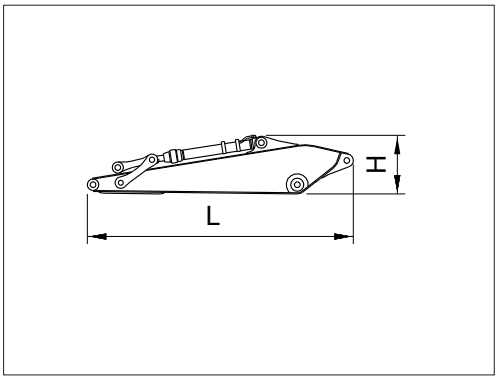
※ 5.68 m (18' 8") boom with arm cylinder (included piping and pins).



3) ARM ASSEMBLY

Mark	Description	Unit	Specification
L	Length	mm	3910
H	Height	mm	870
W	Width	mm	350
Wt	Weight	kg	1120

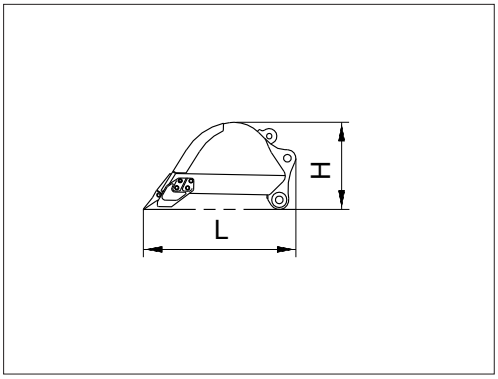
※ 2.92 m (9' 7") arm with bucket cylinder (included linkage and pins).



4) BUCKET ASSEMBLY

Mark	Description	Unit	Specification
L	Length	mm	1560
H	Height	mm	880
W	Width	mm	1410
Wt	Weight	kg	833

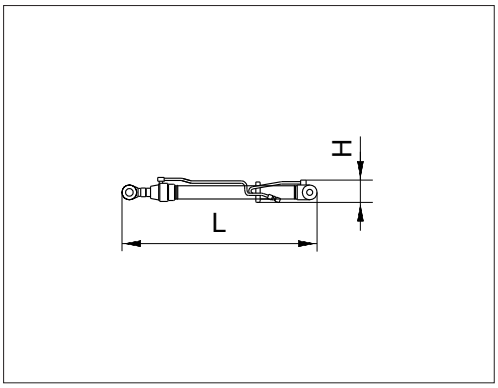
※ 1.00 m³) SAE heaped bucket (Included tooth and side cutters).



5) BOOM CYLINDER

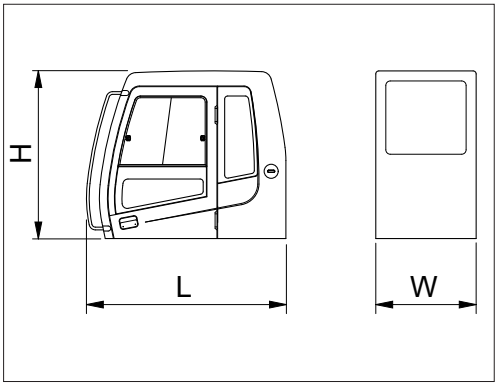
Mark	Description	Unit	Specification
L	Length	mm	1960
H	Height	mm	230
W	Width	mm	330
Wt	Weight	kg	180

※ **Included piping.**



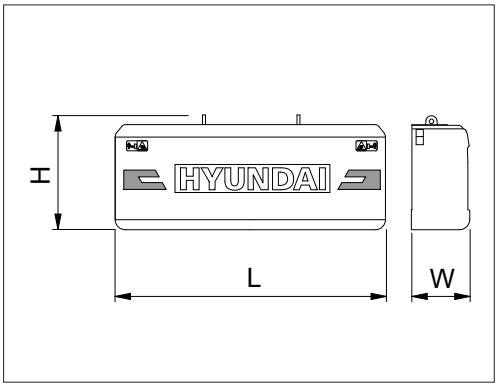
6) CAB ASSEMBLY

Mark	Description	Unit	Specification
L	Length	mm	1940
H	Height	mm	1686
W	Width	mm	1016
Wt	Weight	kg	310



7) COUNTERWEIGHT

Mark	Description	Unit	Specification
L	Length	mm	2700
H	Height	mm	1050
W	Width	mm	560
Wt	Weight	kg	3800

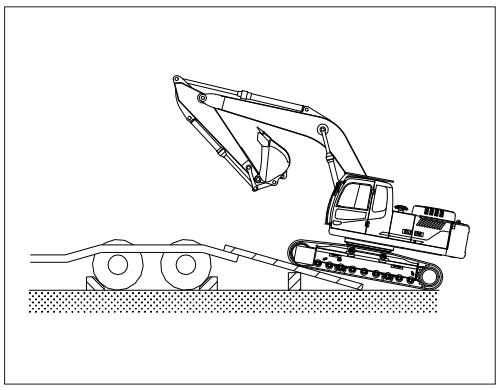


3. LOADING THE MACHINE

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

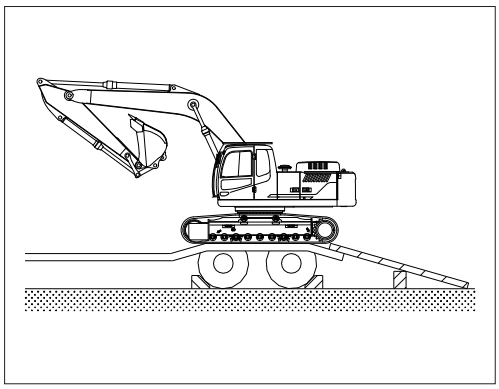
2) Use the gangplank with sufficient length, width, thickness and gradient.

3) Place the swing lock switch to the LOCK position (if equipped) before fixing the machine at the bed of trailer and confirm if the machine parallels the bed of trailer.
Keep the travel motor in the rear when loading and in the front when unloading.

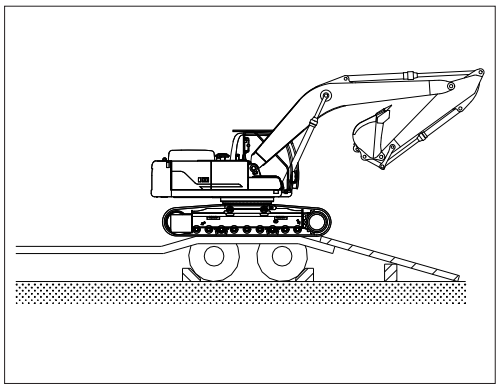


4) Do the following after loading the machine to the trailer.

(1) Stop loading when the machine is located horizontally with the rear wheel of trailer.



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



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

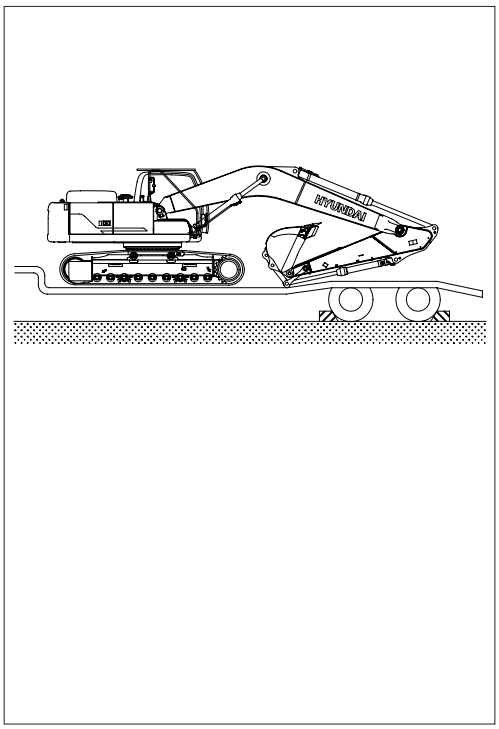
※ Place rectangular timber under the bucket cylinder to prevent the damage of it during transportation.

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

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

⚠ Do not operate any other device when loading.

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

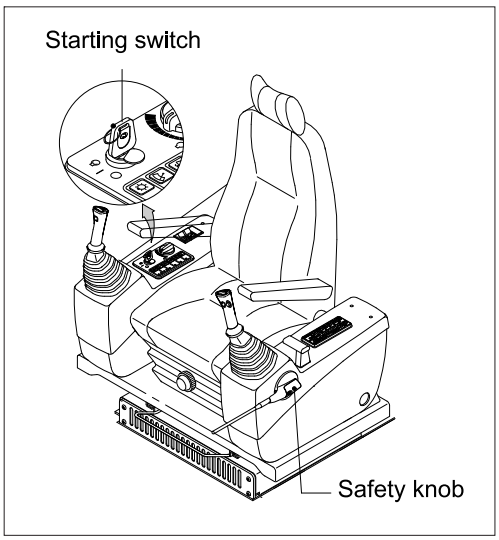


4. FIXING THE MACHINE

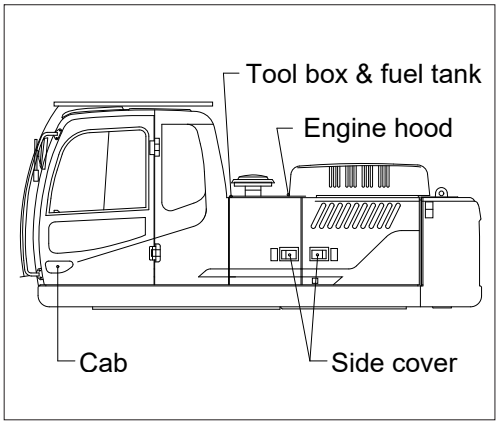
1) Lower down the working device on the loading plate of trailer.

2) Keep the safety knob on the LOCK position.

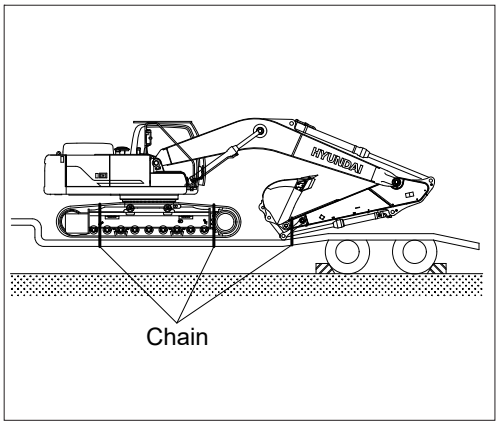
3) Turn OFF all the switches and remove the key.



4) Secure all locks.



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



5. LOADING AND UNLOADING BY CRANE

1) Check the weight, length, width and height of the machine referring to the chapter 2, specification when you are going to hoist the machine.
2) Use long wire rope and stay to keep the distance with the machine as it should avoid touching with the machine.
3) Put a rubber plate contact with wire rope and machine to prevent damage.
4) Place crane on the proper place.
5) Install the wire rope and stay like the illustration.

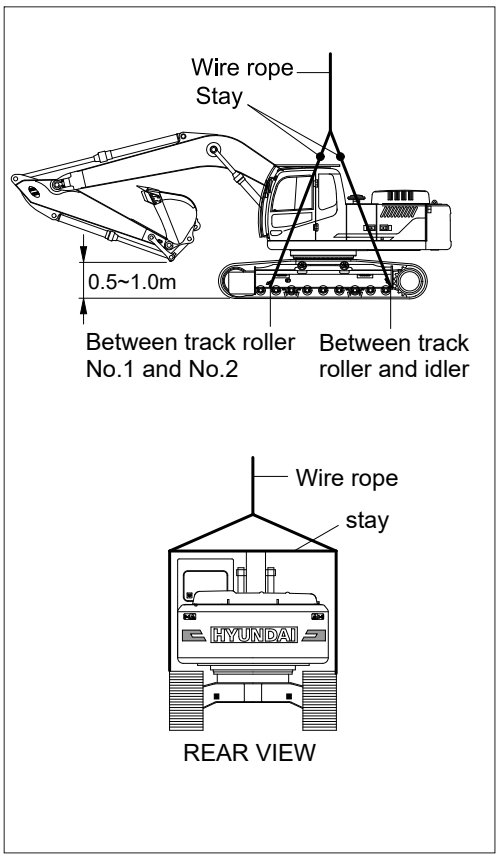
⚠ **Make sure wire rope is proper size.**

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

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

⚠ **Do not load abruptly.**

⚠ **Keep area clear of personnel.**



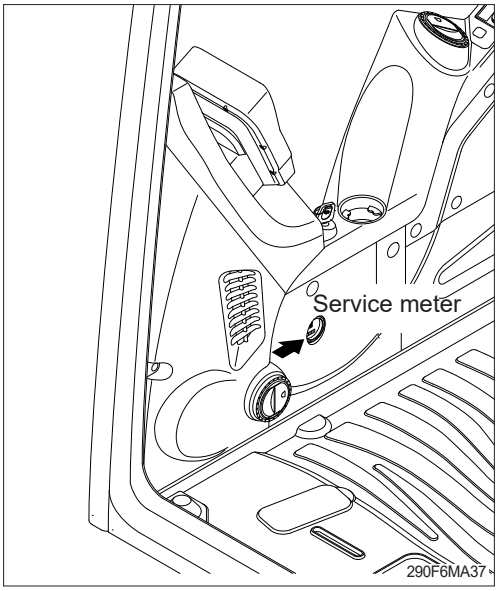
1. INSTRUCTION

1) INTERVAL OF MAINTENANCE

(1) You may inspect and service the machine by the period as described at page 6-11 based on hour meter at control panel.

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

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



2) PRECAUTION

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

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

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

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

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

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

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

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

3) PROPER MAINTENANCE

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

(2) Use genuine parts.

(3) Use the recommended oil.

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

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

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

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

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

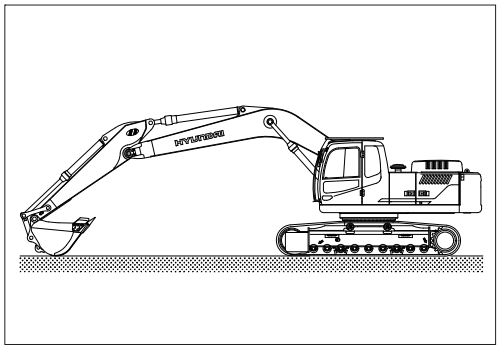
(9) For more detail information of maintenance, please contact local Hyundai dealer.

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

4) RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM

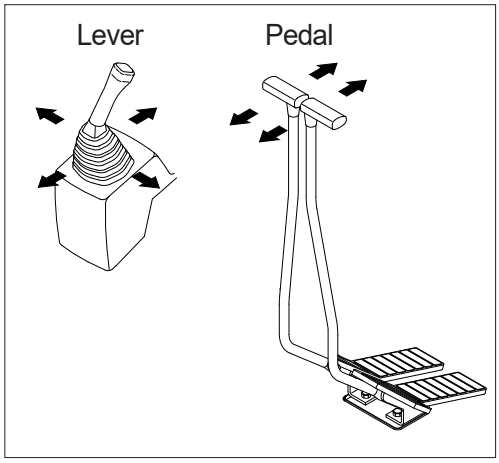
※ **Spouting of oil can cause the accident when loosening the cap or hose right after the operating of machine as the machine or oil is on the high pressure on the condition.**
Be sure to relieve the pressure in the system before repairing hydraulic system.

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

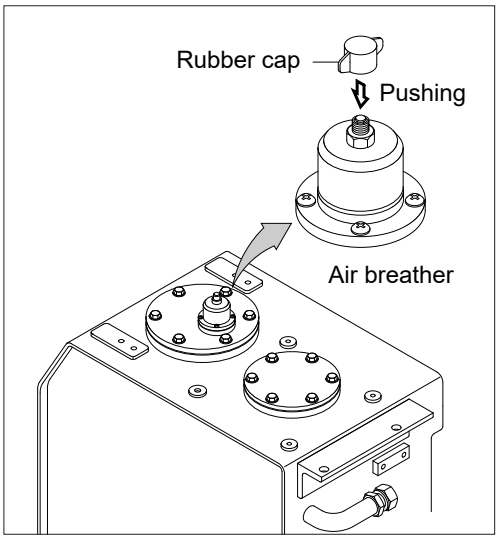


(2) Set the safety knob completely in the UNLOCK position, operate the control levers and pedals fully to the front, rear, left and right, to release the pressure in the hydraulic circuit.

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



(3) Relieve the pressure in the tank by pushing the rubber cap of the air breather.



5) PRECAUTION WHEN INSTALLING HYDRAULIC HOSES OR PIPES

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

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

(3) Use genuine parts.

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

(5) Keep the specified tighten torque.

6) PERIODICAL REPLACEMENT OF SAFETY PARTS

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

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

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

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

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

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

2. TIGHTENING TORQUE

Use following table for unspecified torque.

1) BOLT AND NUT

(1) Coarse thread

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

(2) Fine thread

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

2) PIPE AND HOSE (FLARE TYPE)

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

3) PIPE AND HOSE (ORFS TYPE)

Thread size (PF)	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 (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

4) TIGHTENING TORQUE OF MAJOR COMPONENT

No.	Descriptions		Bolt size	Torque	
				kgf · m	lbf · ft
1	Engine	Engine mounting bolt (engine-bracket)	M12 × 1.75	11.45 ± 1.0	82.8 ± 7.2
2		Engine mounting bolt (bracket-frame, FR)	M20 × 2.5	52.1 ± 5.0	377 ± 36.2
3		Engine mounting bolt (bracket-frame, RR)	M24 × 3.0	90.0 ± 9.0	651 ± 65.1
4		Radiator mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
5		Coupling mounting socket bolt	M20 × 2.5	59.7 ± 8.7	419 ± 62.9
6		Main pump housing mounting bolt	M10 × 1.5	4.8 ± 0.3	34.7 ± 2.2
7	Hydraulic system	Main pump mounting socket bolt	M20 × 2.5	42 ± 4.5	304 ± 32.5
8		Main control valve mounting nut	M12 × 1.75	12.2 ± 1.3	88.2 ± 9.4
9		Fuel tank mounting bolt	M20 × 2.5	45 ± 5.1	325 ± 36.9
10		Hydraulic oil tank mounting bolt	M20 × 2.5	45 ± 5.1	325 ± 36.9
11		Turning joint mounting bolt, nut	M12 × 1.75	12 ± 1.3	86.8 ± 9.4
12	Power train system	Swing motor mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
		Swing bearing upper part mounting bolt	M20 × 2.5	57.8 ± 6.4	418 ± 46.3
13		Swing bearing lower part mounting bolt	M20 × 2.5	57.8 ± 6.4	418 ± 46.3
14		Travel motor mounting bolt	M16 × 2.0	23 ± 2.5	166 ± 18.1
15		Sprocket mounting bolt	M16 × 2.0	26 ± 4.0	188 ± 28.9
16	Under carriage	Carrier roller mounting bolt, nut	M16 × 2.0	29.7 ± 4.4	215 ± 31.8
17		Track roller mounting bolt	M20 × 2.5	54.7 ± 5.0	396 ± 36.2
18		Track tension cylinder mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
19		Track shoe mounting bolt, nut	M20 × 1.5	78 ± 8.0	564 ± 57.9
20		Track guard mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
21	Others	Counter weight mounting bolt	M36 × 3.0	308 ± 46	2228 ± 333
22		Cab mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
23		Operator's seat mounting bolt	M8 × 1.25	4.05 ± 0.8	29.3 ± 5.8

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

3. FUEL, COOLANT AND LUBRICANTS

1) NEW MACHINE

New machine used and filled with following lubricants.

Description	Specification
Engine oil (API CI-4)	SAE 15W-40, ★SAE 5W-40
Hydraulic oil	Hyundai genuine long life hydraulic oil (ISO VG32, VG 46, VG 68) Conventional hydraulic oil (ISO VG 15★)
Swing and travel reduction gear oil	SAE 85W-140 (API GL-5) ★SAE 75W-90
Grease	Lithium base grease NLGI No. 2
Fuel	ASTM D975-No. 2
Coolant	Mixture of 50% ethylene glycol base antifreeze and 50% water. Mixture of 60% ethylene glycol base antifreeze and 40% water.★

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

★ Cold region
Russia, CIS, Mongolia

2) RECOMMENDED OILS

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

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

Service point	Kind of fluid	Capacity ℓ	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 ★2	25.4	★SAE 0W-40 ★SAE 0W-30 SAE 5W-30 SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	6.2	★SAE 75W-90
Final drive		4.5×2	SAE 85W-140
Hydraulic tank	Hydraulic oil	Tank : 180 System : 270	★ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	340	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and soft water★1	35	Ethylene glycol base permanent type (50 : 50) ★Ethylene glycol base permanent type (60 : 40)

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

★ : Cold region
Russia, CIS, Mongolia
★1 : Soft water
City water or distilled water
★2 : Meets or exceeds
API CI-4 grade

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

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

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

4. MAINTENANCE CHECK LIST

1) DAILY SERVICE BEFORE STARTING

Check items	Service	Page
Visual check		
Fuel tank	Check, Refill	6-26
Hydraulic oil level	Check, Add	6-31
Engine oil level	Check, Add	6-18
Coolant level	Check, Add	6-20
Control panel & pilot lamp	Check, Clean	6-41
Prefilter (water)	Check, Drain	6-27
Fan belt tension and damage	Check	6-24, 25
Attachment pin and bushing ★	Lubricate	6-40
· Boom cylinder tube end		
· Boom foot		
· Boom cylinder rod end		
· Arm cylinder tube end		
· Arm cylinder rod end		
· Boom + Arm connecting		
· Bucket cylinder tube end		

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

2) EVERY 50 HOURS SERVICE

Check items	Service	Page
Fuel tank (water, sediment)	Drain	6-26
Track tension	Check, Adjust	6-36
Swing reduction gear oil	Check, Add	6-34
Attachment pin and bushing	Lubricate	6-40
· Bucket cylinder rod end		
· Bucket + Arm connecting		
· Bucket control link + Arm		
· Bucket control rod		

3) INITIAL 50 HOURS SERVICE

Check items	Service	Page
Bolts & Nuts · Sprocket mounting bolts · Travel motor mounting bolts · Swing motor mounting bolts · Swing bearing mounting bolts · Engine mounting bolts · Counterweight mounting bolts · Turning joint locating bolts · Track shoe mounting bolts and nuts · Carrier roller mounting bolts · Track roller mounting bolts · Hydraulic pump mounting bolts	Check, Tight	6-8

4) EVERY 200 HOURS SERVICE

Check items	Service	Page
Return filter ★	Replace	6-32
Pilot line filter ★	Replace	6-33
Drain filter cartridge ★	Replace	6-33

★ Replace 3 filters for continuous hydraulic breaker operation only.

5) INITIAL 250 HOURS SERVICE

Check items	Service	Page
Engine oil	Change	6-18, 19
Engine oil filter	Replace	6-18, 19
Prefilter (element)	Replace	6-27
Fuel filter element	Replace	6-28
Pilot line filter element	Replace	6-33
Hydraulic oil return filter	Replace	6-32
Drain filter cartridge	Replace	6-33
Swing reduction gear oil	Change	6-34
Travel reduction gear oil	Change	6-35

6) EVERY 250 HOURS SERVICE

Check items	Service	Page
Engine oil *	Change	6-18, 19
Engine oil filter *	Replace	6-18, 19
Battery (voltage)	Check, Clean	6-41
Swing bearing grease	Check, Add	6-34
Bolts & Nuts	Check, Tight	6-8
· Sprocket mounting bolts		
· Travel motor mounting bolts		
· Swing motor mounting bolts		
· Swing bearing mounting bolts		
· Engine mounting bolts		
· Counterweight mounting bolts		
· Turning joint locating bolts		
· Track shoe mounting bolts and nuts		
· Carrier roller mounting bolts		
· Track roller mounting bolts		
· Hydraulic pump mounting bolts		
Attachment pin and bushing	Lubricate	6-40
· Boom cylinder tube end		
· Boom foot		
· Boom cylinder rod end		
· Arm cylinder tube end		
· Arm cylinder rod end		
· Boom + Arm connecting		
· Bucket cylinder tube end		
Aircon & heater filter (fresh air)	Clean	6-44

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

7) EVERY 500 HOURS SERVICE

Check items	Service	Page
Engine oil *	Change	6-18, 19
Engine oil filter *	Replace	6-18, 19
Radiator, cooler fin and charge air cooler	Check, Clean	6-23
Fuel filter element	Replace	6-28
Prefilter	Replace	6-27
Aircon & heater filter (fresh air)	Clean	6-44
Air cleaner element (primary) *1	Check, clean	6-26

* **API CI-4 (Change oil and filter every 250 hours when using API CH-4.)**

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

8) EVERY 1000 HOURS SERVICE

Check items	Service	Page
Hydraulic tank air breather element	Replace	6-33
Travel motor reduction gear oil	Change	6-35
Swing reduction gear oil	Change	6-34
Grease in swing gear and pinion	Change	6-35
Hydraulic oil return filter	Replace	6-32
Drain filter cartridge	Replace	6-33
Pilot line filter	Replace	6-33

9) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Coolant	Change	6-20, 21, 22, 23
Air cleaner element (primary, safety) ★1	Replace	6-26
Hydraulic oil ★2	Change	6-31-1
Hydraulic tank suction strainer	Check, Clean	6-32
RCV lever	Check, Lubricate	6-36
Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-

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

★2 Conventional hydraulic oil

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

10) EVERY 5000 HOURS SERVICE

Check items	Service	Page
Hydraulic oil ★3	Change	6-31-1

★3 Hyundai genuine long life hydraulic oil

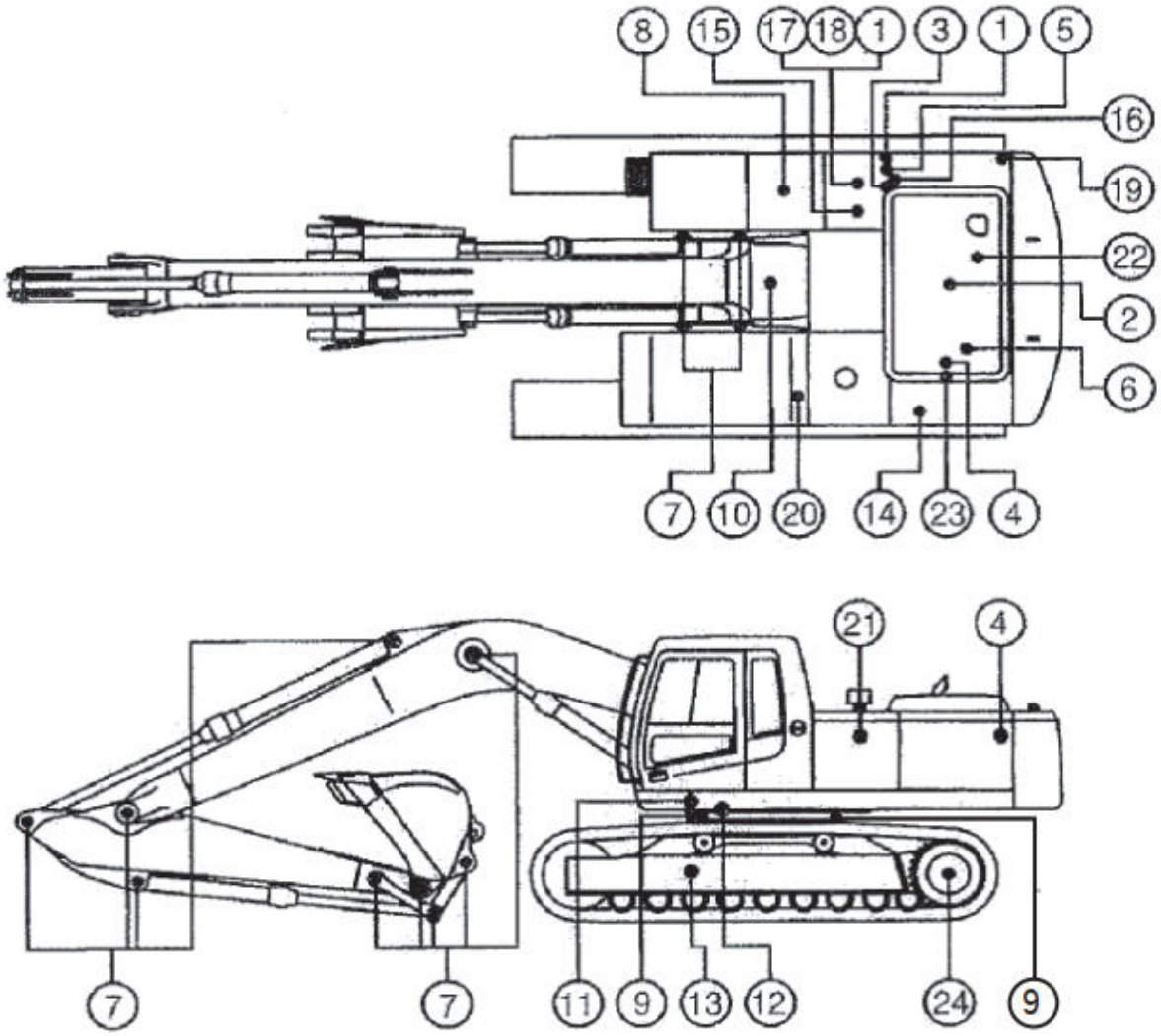
★3 **Change oil every 1000 hours of continuous hydraulic breaker operation.**

11) WHEN REQUIRED

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

Check items	Service	Page
Fuel system		
· Fuel tank	Drain or Clean	6-26
· Prefilter (water, element)	Drain or Replace	6-27
· Fuel filter element	Replace	6-28
Engine lubrication system		
· Engine oil	Change	6-18, 19
· Engine oil filter	Replace	6-18, 19
Engine cooling system		
· Coolant	Add or Change	6-20, 21, 22, 23
· Radiator	Clean or Flush	6-20, 21, 22, 23
· Charge air cooler	Check, Clean	6-23
Engine air system		
· Air cleaner element (primary)	Clean or Replace	6-26
· Air cleaner element (safety)	Replace	6-26
Hydraulic system		
· Hydraulic oil	Add or Change	6-31, 31-1
· Return filter	Replace	6-32
· Drain line filter	Replace	6-33
· Pilot line filter	Replace	6-33
· Element of breather	Replace	6-33
· Suction strainer	Clean	6-32
· RCV lever	Lubricate	6-36
Undercarriage		
· Track tension	Check, Adjust	6-36
Bucket		
· Tooth	Replace	6-38
· Side cutter	Replace	6-38
· Linkage	Adjust	6-37
· Bucket assy	Replace	6-37
Air conditioner and heater		
· Fresh air filter	Replace	6-44
· Recirculation filter	Clean, Replace	6-44, 45

5. MAINTENANCE CHART



Caution

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

NO.	DESCRIPTION	INITIAL CHECK (HOURS)			REGULAR CHECK (HOURS)						WHEN REQUIRED	OIL	CAPACITY	POINT
		50	250	500	10	50	250	500	1000	2000				
1	HYDRAULIC OIL				◆					■		HO	180L	1
2	ENGINE OIL		■		◆			■				EO	25.4L	1
3	ENGINE OIL FILTER		■					■						1
4	RADIATOR COOLANT				◆					■		C	35L	1
5	PREFILTER(WATER, ELEMENT)		■		★			■						2
6	FAN BELT TENSION & DAMAGE				●									1
7	ATTACHMENT PINS	◆					◆					PGL		17
8	FUEL TANK (WATER, SEDIMENT)					★								1
9	SWING BEARING						◆					PGL		2
10	SWING REDUCTION GEAR OIL		■			▲			■			GO	6.2L	1
11	SWING REDUCTION GEAR GREASE		▲						■			PGL	1.5kg	1
12	SWING GEAR & PINION								■			PGL	17.6L(15.8kg)	1
13	TRACK TENSION					◆						PGL		2
14	BATTERY (VOLTAGE)						▲							1
15	HYDRAULIC OIL RETURN FILTER		■						■					1
16	HYD. TANK DRAIN FILTER CATRIDGE		■						■					1
17	HYD. TANK AIR BREATHER ELEMENT								■					1
18	HYDRAULIC OIL SUCTION STRAINER									●				1
19	PILOT LINE FILTER		■						■					1
20	AIR CON. & HEATER OUTER FILTER						●				■			1
	AIR CON. & HEATER INNER FILTER										●■			1
21	AIR CLEANER ELEMENT (SAFETY)							●			■			1
	AIR CLEANER ELEMENT (PRIMARY)										■			1
22	FUEL FILTER ELEMENT		■					■						1
23	RADIATOR, OIL COOLER,CAAC							●						3
24	TRAVEL REDUCTION GEAR OIL			■					■			GO	4.5L	2

※ 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.

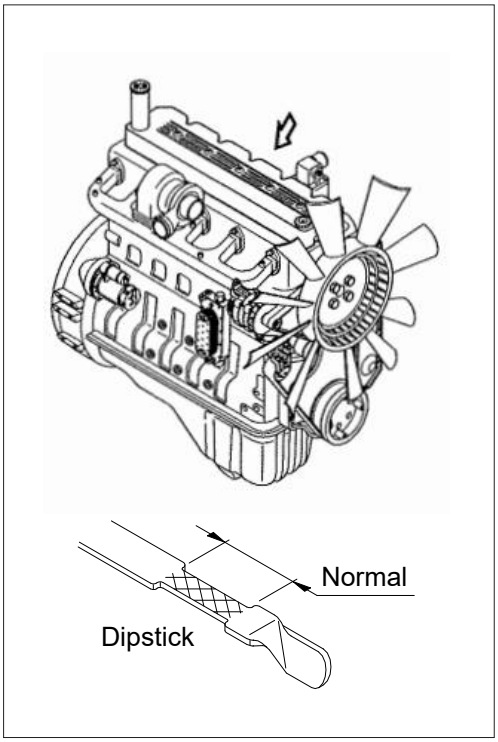
(2) Check the oil level by inserting the dipstick completely into the hole and pulling out again.

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

※ If the oil is contaminated or diluted, change the oil regardless of the regular change interval.

※ Check oil level after engine has been stopped for 15 minutes.

⚠ Do not operate unless the oil level is in the normal range.



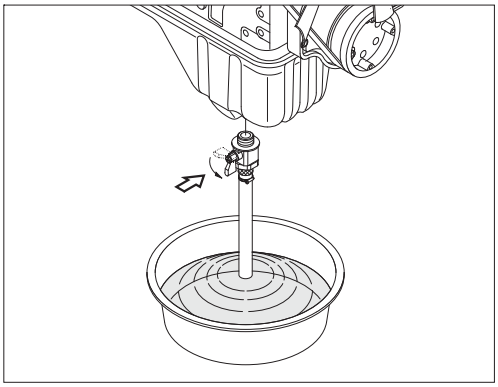
2) REPLACEMENT OF ENGINE OIL AND OIL FILTER

(1) Warm up the engine until the water temperature reaches 60°C (140°F).

(2) Shut off the engine.

(3) Remove the oil drain plug.

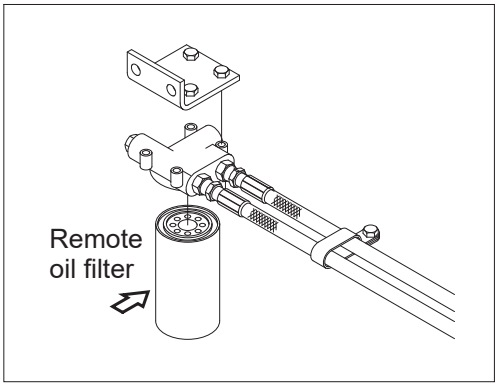
※ A drain pan with a capacity of 24 liters (6.3 U.S. gallons) will be adequate.



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

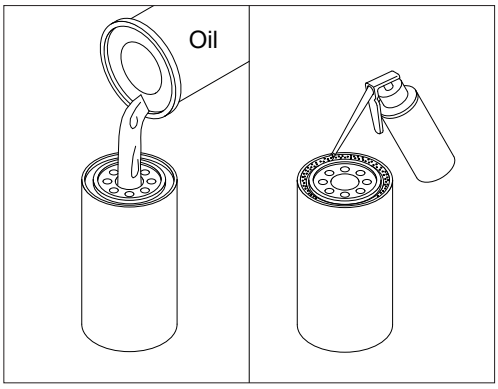
· Wrench size : 90 ~ 95 mm (3.5~3.8 in)

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



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

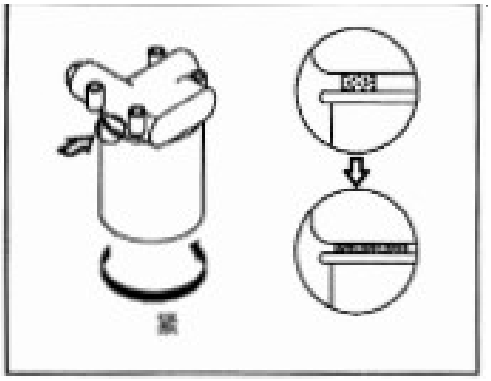
※ **Fill the filters with clean lubricating oil before installation.**



(5) Install the filter to the filter head.

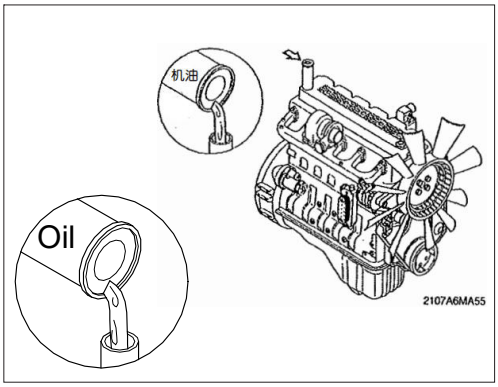
※ **Mechanical over-tightening may distort the threads or damage the filter element seal.**

· Install the filter as specified by the filter manufacturer.

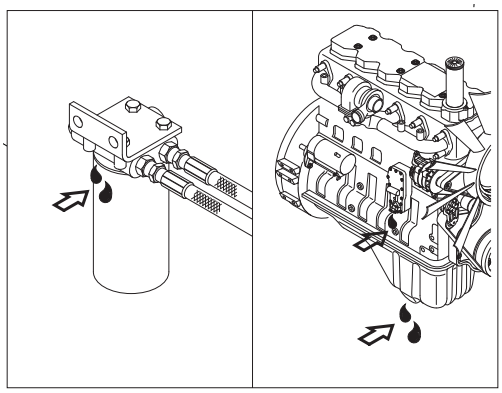


(6) Fill the engine with clean oil to the proper level.

· Quantity : 25.4 ℓ



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



3) CHECK COOLANT

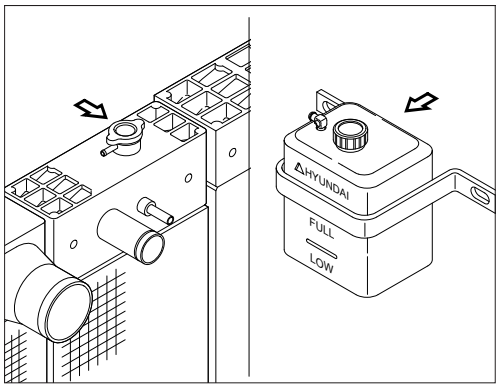
(1) Check if the level of coolant in reservoir tank is between FULL and LOW.

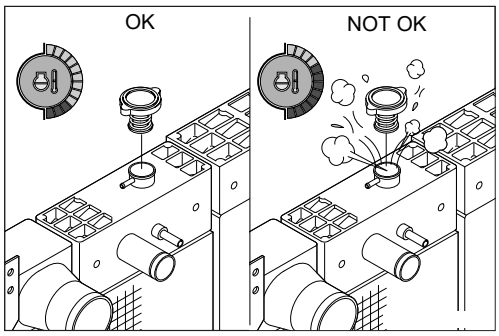
(2) Add the mixture of antifreeze and water after removing the cap of the reservoir tank if coolant is not sufficient.

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

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

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



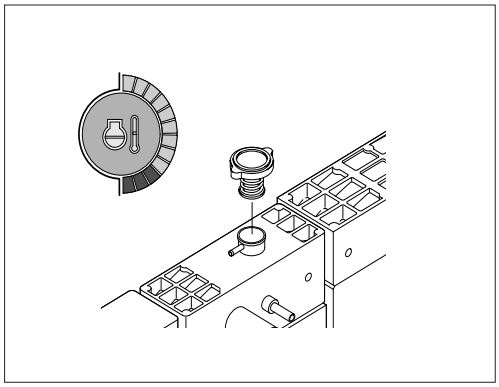


4) FLUSHING AND REFILLING OF RADIATOR

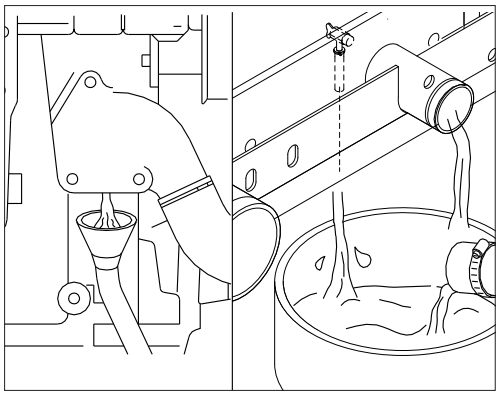
(1) Change coolant

⚠ Avoid prolonged and repeated skin contact with used antifreeze. Such prolonged repeated contact can cause skin disorders or other bodily injury

※ Avoid excessive contact-wash thoroughly after contact.
Keep out of reach of children.
Protect the environment : Handling and disposal of used antifreeze can be subject to federal, state, and local law regulation.
Use authorized waste disposal facilities, including civic amenity sites and garages pro-viding authorized facilities for the receipt of used antifreeze.
If in doubt, contact your local authorities for guidance as to proper handling of used anti-freeze.



⚠ Wait until the temperature is below 50 ˚C (120 ˚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 removing the plug in the bottom of the water inlet. A drain pan with a capacity of 40 liters (10 U.S. gallons) will be adequate in most applications.

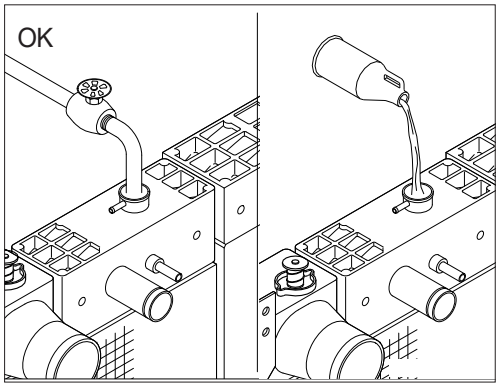


(2) Flushing of cooling system

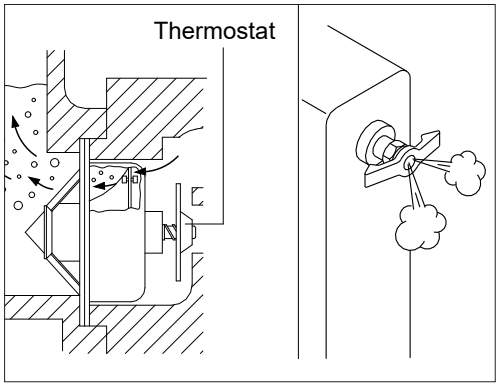
① Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).

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

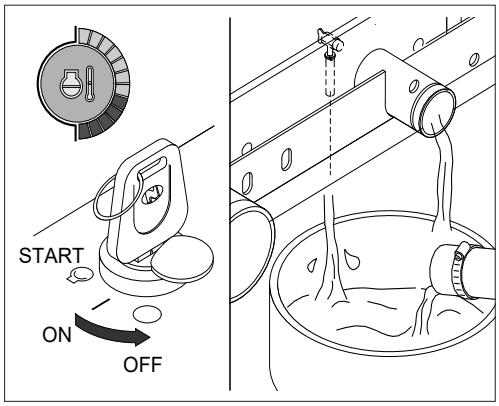
※ Do not install the radiator cap. The engine is to be operated without the cap for this process.



※ During filling, air must be vented from the engine coolant passages. Open the engine venting petcock.
The system must be filled slowly to prevent air locks. Wait 2 to 3 minutes to allow air to be vented, then add mixture to bring the level to the top.



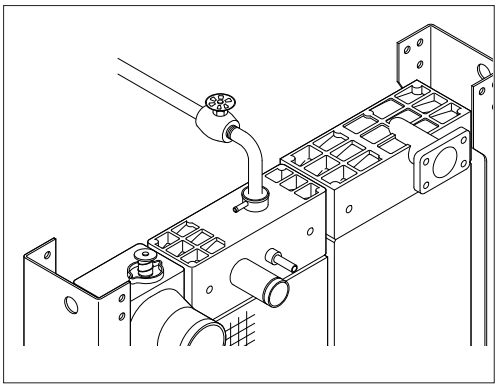
② Operate the engine for 5 minutes with the coolant temperature above 80 ˚C (176 ˚F).
Shut the engine off, and drain the cooling system.



③ Fill the cooling system with clean water.

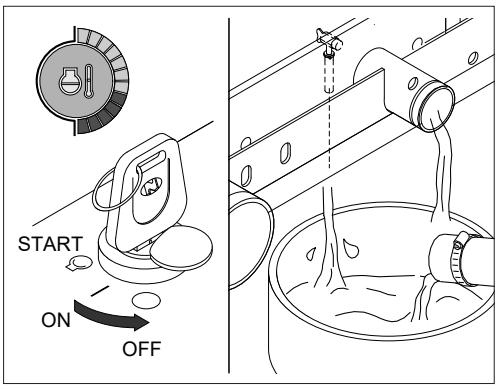
※ Be sure to vent the engine and aftercooler for complete filling.

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



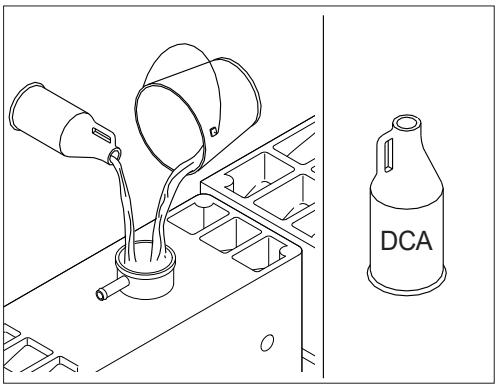
④ Operate the engine for 5 minutes with the coolant temperature above 80 ˚C (176 ˚F). Shut the engine off, and drain the cooling system.

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



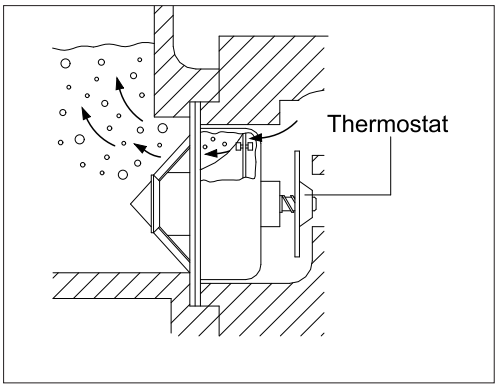
(3) Cooling system filling

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

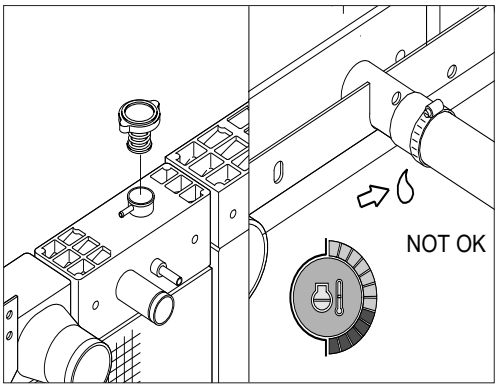


② The system has a maximum fill rate of 14 liters (3.5 U.S. gallons) per minute.
Do not exceed this fill rate.

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



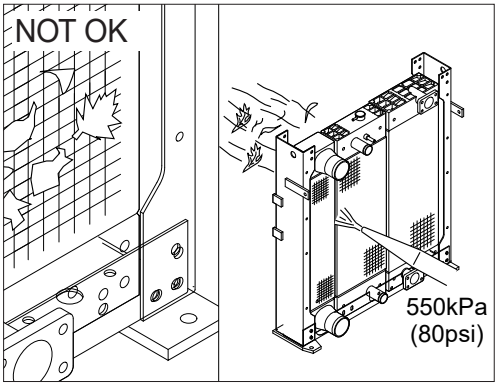
③ Install the pressure cap. Operate the engine until it reaches a temperature 80 °C (176 °F), and check for coolant leaks.
Check the coolant level again to make sure the system is full of coolant.



5) CLEAN RADIATOR AND OIL COOLER
Check, and if necessary, clean and dry outside of radiator and oil cooler. After working in a dusty place, clean radiator more frequently.

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

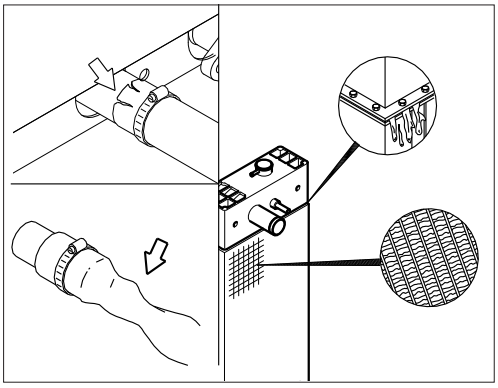
(2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.
Blow the air in the opposite direction of the fan air flow.



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

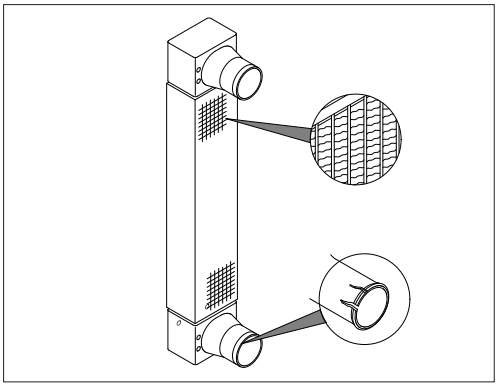
※ If the radiator must be replaced due to bent or broken fins which can cause the engine to overheat, refer to the manufacturer's replacement procedures.

(4) Visually inspect the radiator for core leaks.



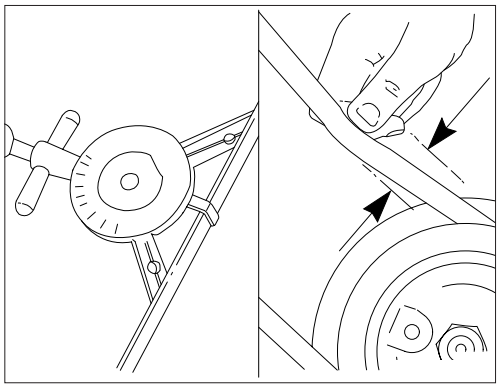
6) CHECK CHARGE AIR COOLER

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



7) FAN BELT

(1) An deflection method can be used to check belt tension by applying 11.3 kgf (25 lbf) force between the pulleys on V-belts. If the deflection is more than one belt thickness per foot of pulley center distance, the belt tension must be adjusted.

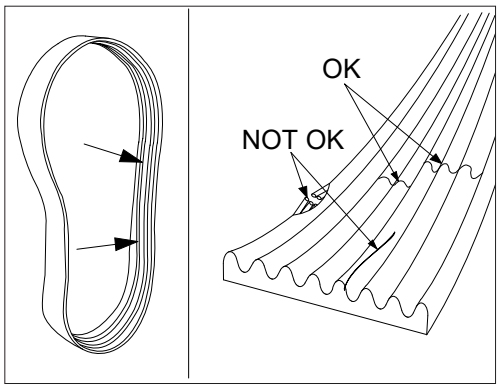


(2) Inspect the fan belt for damage.

① Transverse (across the belt) cracks are acceptable.

② Longitudinal (direction of belt ribs) cracks that intersect with transverse cracks are not accept able.

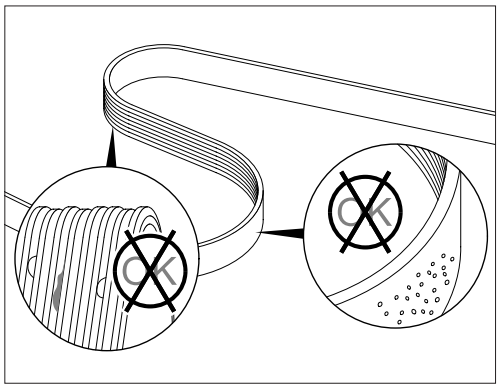
Replace the belt if it is frayed or has pieces of material missing.



③ Inspect the belt

- Embedded debris
- Uneven/excessive rib wear
- Exposed belt cords
- Glazing (high heat)

※ If any of the above conditions are pressnt, the belt is unacceptable for reuse and must be replaced.



8) INSPECTION OF COOLING FAN

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

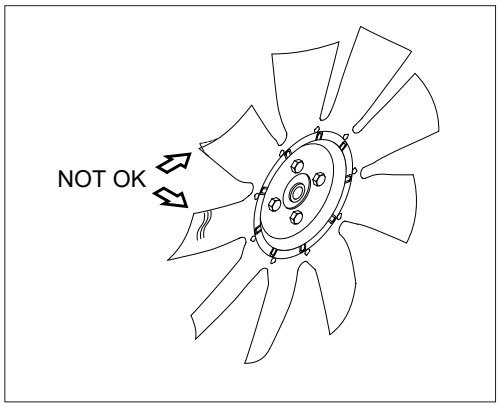
※ Rotate the crankshaft by using the engine bearing gear.

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

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

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

Replace any fan that is damaged.



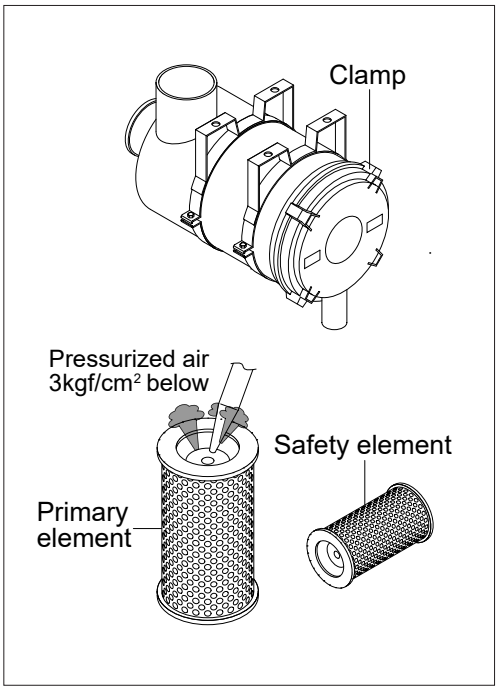
10) CLEANING OF AIR CLEANER

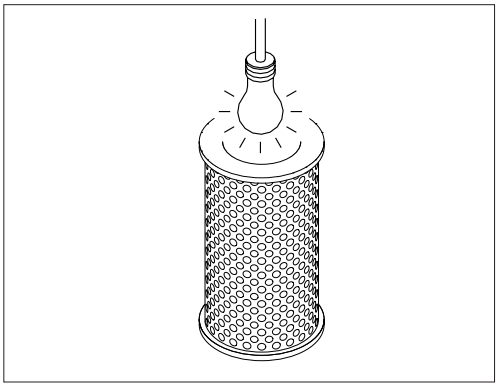
(1) Primary element

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

(2) Safety element

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





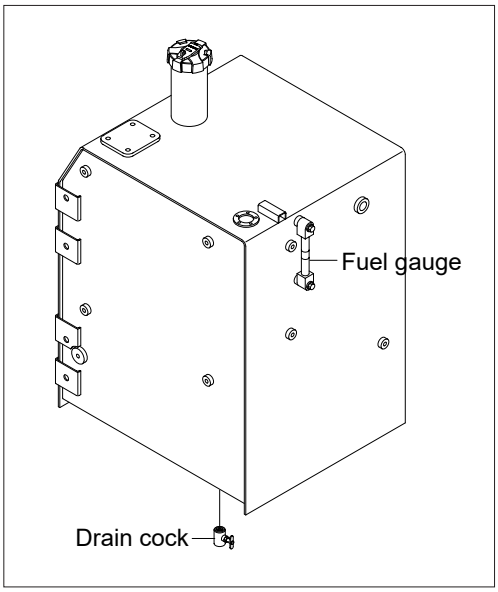
11) FUEL TANK

(1) Fill fuel fully when system the operation to minimize water condensation, and check it with fuel gauge before starting the machine.

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

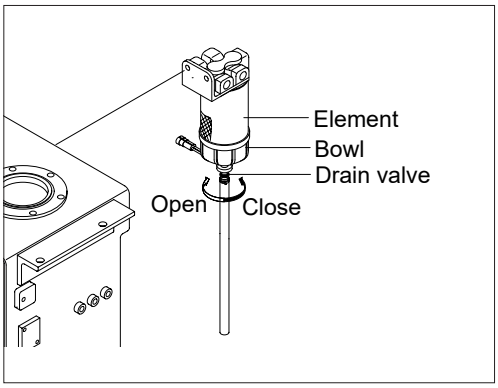
※ Be sure to LOCK the cap of fuel tank.
※ Remove the strainer of the fuel tank and clean it if contaminated.

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



12) PREFILTER

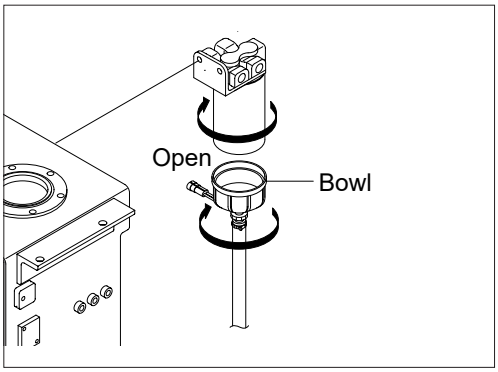
※ Inspect or drain the collection bowl of water daily and replace the element every 500 hours.



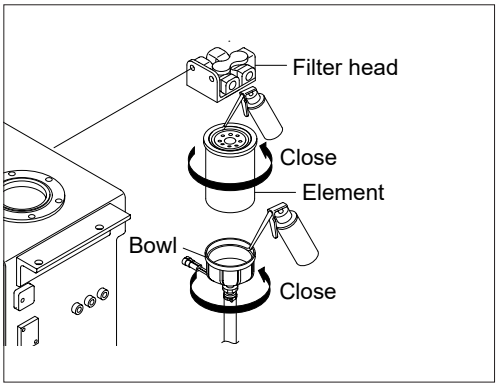
(1) Drain water

① Open bowl drain valve to evacuate water.
② Close drain valve.
※ **Don't tighten up a drain valve so strong.**
※ **Please inspect and drain water frequently for remain water volume to be less than 1/3 volume of a collection bowl.**

(2) Replace element



① Drain the unit of fuel. Follow "Drain water" instructions above.
② Remove element and bowl from filter head.
※ **The bowl is reusable, do not damage or discard.**
③ Separate element from bowl. Clean bowl and seal gland.

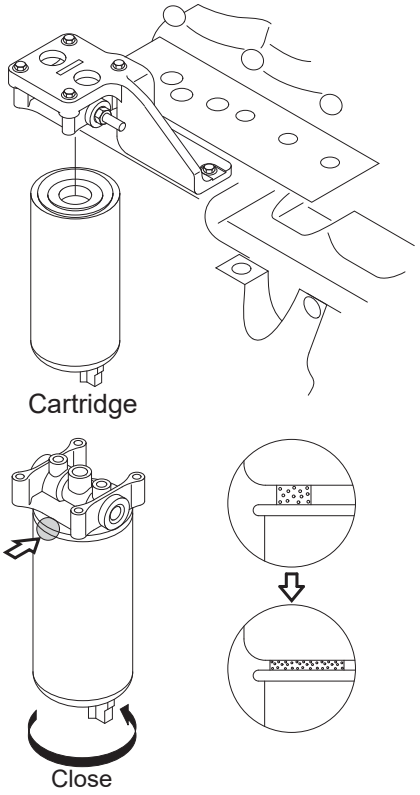


④ Lubricate new bowl seal with clean fuel or motor oil and place in bowl gland.
⑤ Attach bowl to new element firmly by hand.
⑥ Lubricate new element seal and place in element top gland.
⑦ Attach the element and bowl to the head.

13) REPLACEMENT OF FUEL FILTER

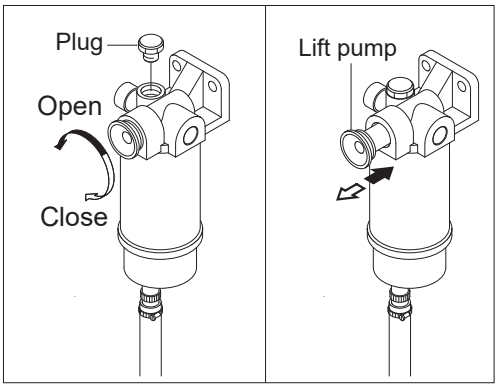
(1) Clean the area around the filter head, remove the filter and clean the gasket surface.
Wrench size : 90~95 mm (3.5~3.8 in)
(2) Replace the seal.
(3) Fully fill clean diesel fuel in the new filter. Apply
(4) engine oil on the gasket of filter when mounting, and tighten 1/2 to 3/4 turn more after the gasket touches the filter head.
(5) Relieve the air after mounting.

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



14) BLEEDING THE FUEL SYSTEM

(1) Controlled venting is provided at the injection pump through the fuel drain manifold. Small amounts of air introduced by changing the fuel filters or fuel injection pump supply line will be vented automatically, if the fuel filter is changed in accordance with the instructions.



※ **Manual bleeding is required if :**

- **The fuel filter is not filled prior to installation.**
- **Fuel injection pump is replaced.**
- **High pressure fuel line connections are loosened or fuel lines replaced.**
- **Initial engine start up or start up after an extended period of no engine operation.**
- **Machine fuel tank has been run until empty.**

(2) Venting the low pressure lines and fuel filter

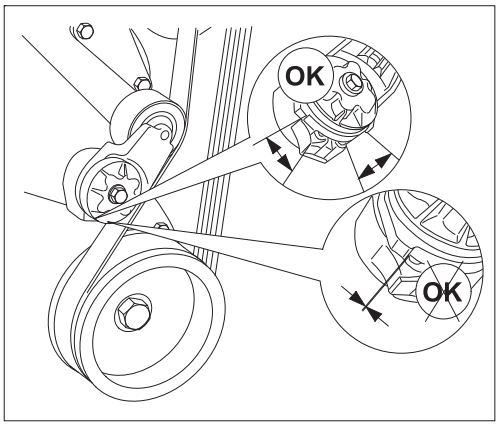
① Open the bleed screw.
· Wrench size : 17 mm

② Operate the hand lever until the fuel flowing from the fitting is free of air.
Tighten the bleed screw.
· Torque : 0.9 kgf · m (6.6 lbf · ft)

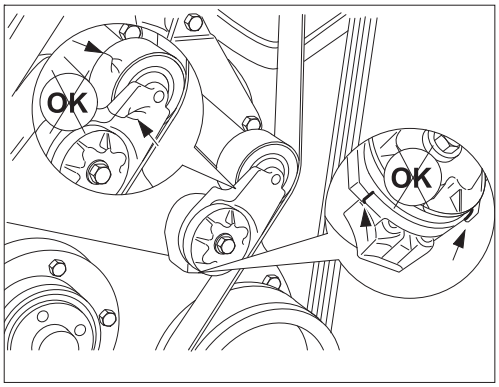
③ Operate the engine and check for leaks.

14) BELT TENSIONER, AUTOMATIC ADJUSTMENT

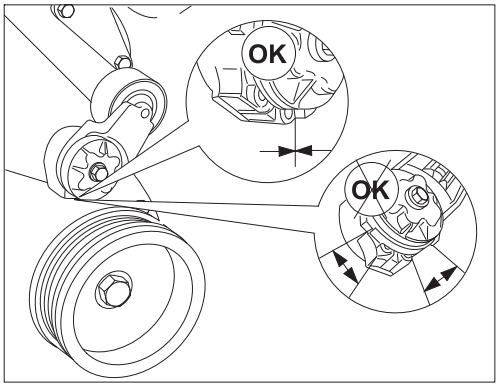
(1) Every 1000hours, or 1 year, whichever occurs first, inspect the automatic belt tensioner.
With the engine turned off, check that neither the top nor bottom tensioner arm stop is touching the cast boss on the tensioner body. If either of the stops is touching a boss, the alternator belt must be replaced.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



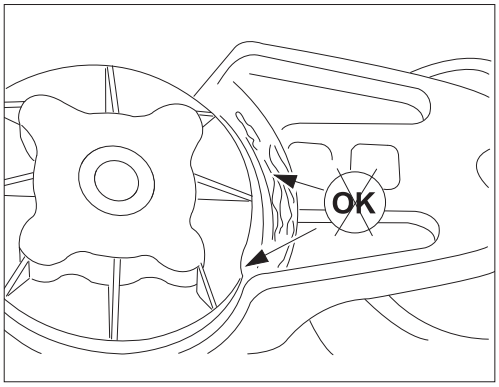
(2) Check the tensioner pulley and body for cracks. If any cracks are noticed, the tensioner must be replaced. Refer to a Cummins Authorized Repair facility. Check the tensioner for dirt build-up. If this condition exists, the tensioner must be removed and steam-cleaned.



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



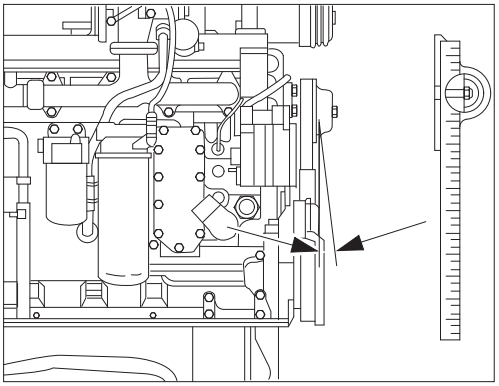
(4) Inspect the tensioner for evidence of the pivoting tensioner arm contacting the stationary circular base. If there is evidence of these two areas touching, the pivot tube bushing has failed and the tensioner must be replaced.



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

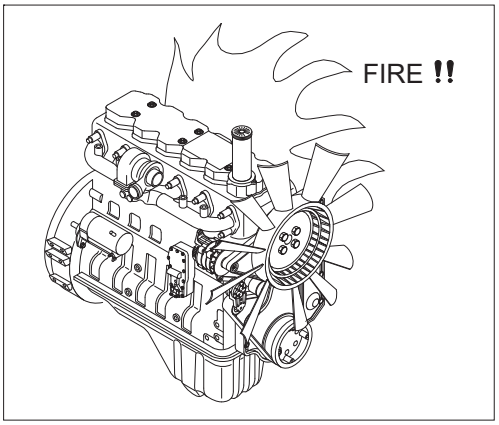
※ **Maximum pulley misalignment is three degrees. This measurement can be taken with a straightedge and an inclinometer.**

(6) Install the belt.



15) LEAKAGE OF FUEL

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

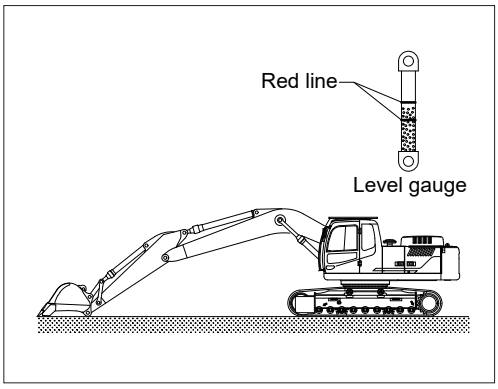


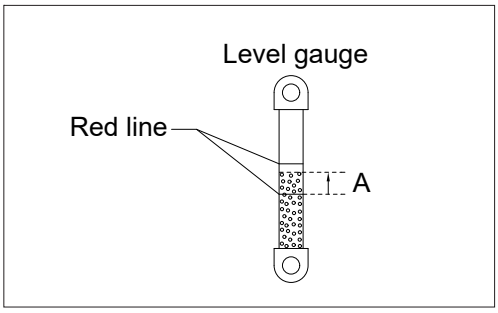
16) HYDRAULIC OIL CHECK

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

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

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





17) FILLING HYDRAULIC OIL

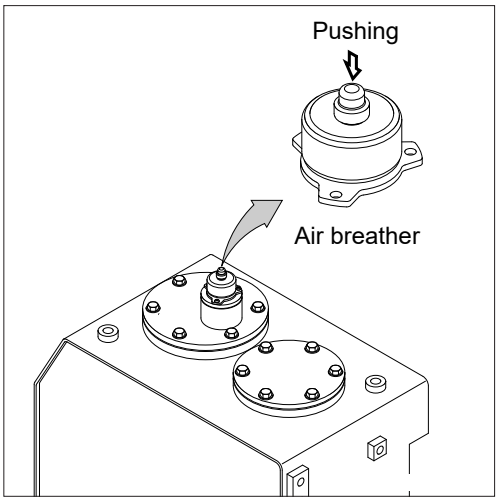
(1) Stop the engine to the position of level check.

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

(3) Remove the breather on the top of oil tank and fill the oil to the specified level.
· Tightening torque : 4.05±0.8 kgf · m
(29.3±5.8 lbf · ft)

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

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



18) CHANGE HYDRAULIC OIL

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

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

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

(4) Prepare a suitable container.

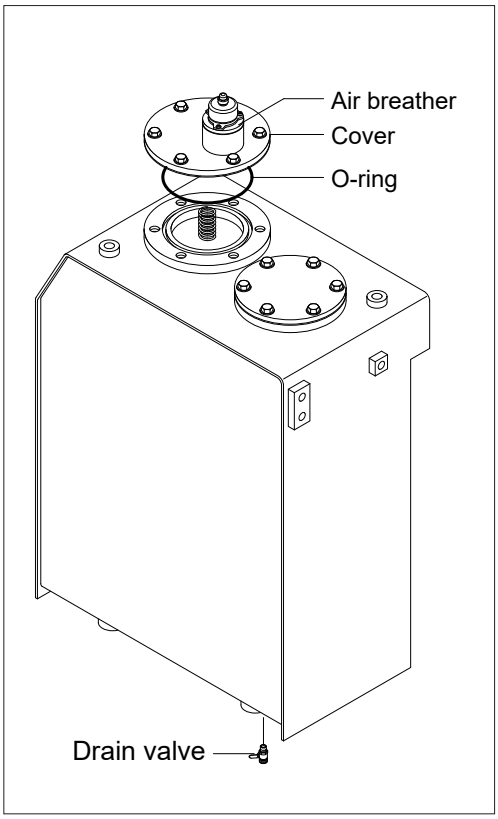
(5) To drain the oil open the drain valve at the bottom of the oil tank.

(6) Fill proper amount of recommended oil.

(7) Put the breather in the right position.

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

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



19) CLEAN SUCTION STRAINER

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

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

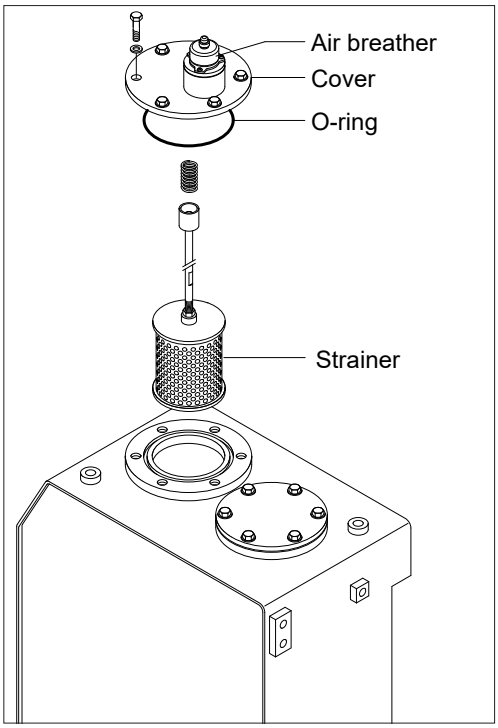
(2) Pull out the strainer in the tank.

(3) Wash the foreign material on the suction strainer with gasoline or cleaning oil.

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

(5) Assemble with reverse order of disassembly. Be sure to install a new O-ring and reinsert in the oil tank.

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



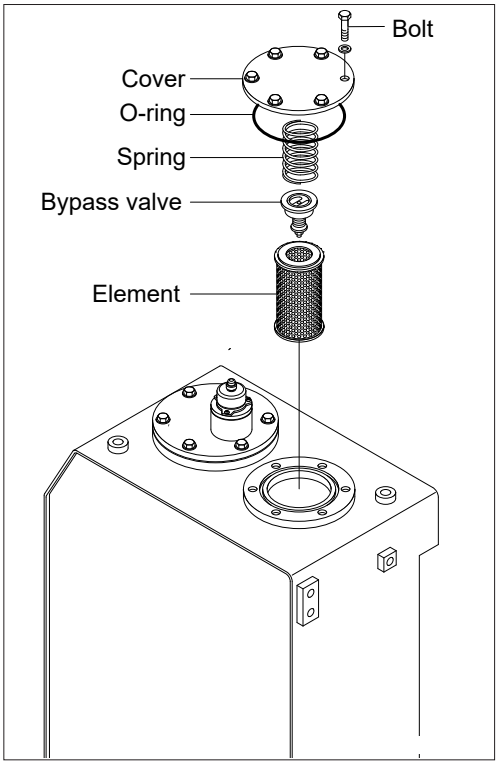
20) REPLACEMENT OF RETURN FILTER

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

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

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

(3) Replace the element with a new one.



21) REPLACEMENT OF ELEMENT IN HYDRAULIC TANK BREATHER

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

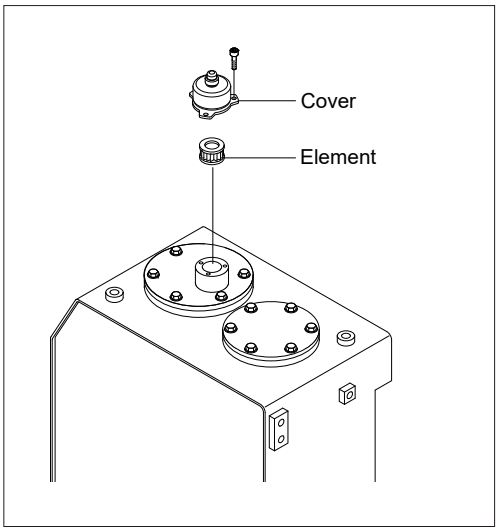
(2) Loosen the bolt and remove the cover.

(3) Pull out the filter element.

(4) Replace the filter element new one.

(5) Apply oil on the O-ring and reassemble by reverse order of disassembly.

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

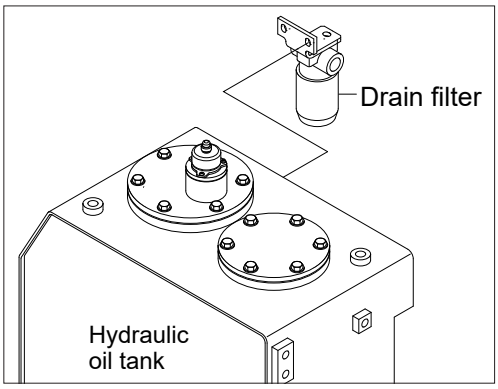


22) REPLACE OF DRAIN FILTER CARTRIDGE

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

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

※ **Change cartridge after initial 50 hours of operation. Thereafter, change cartridge every 250 hours.**



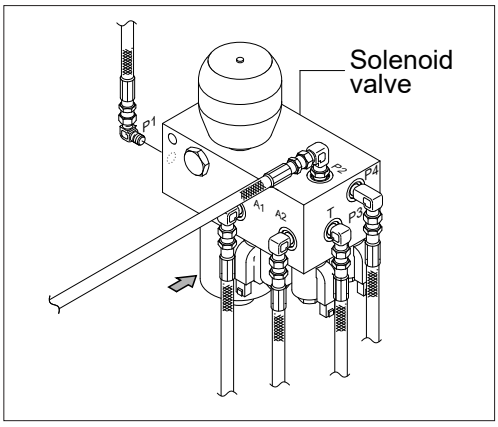
23) REPLACE OF PILOT LINE FILTER

(1) Loosen the nut positioned on the filter body.

(2) Pull out the filter element and clean filter housing.

(3) Install the new element and tighten using specified torque.

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

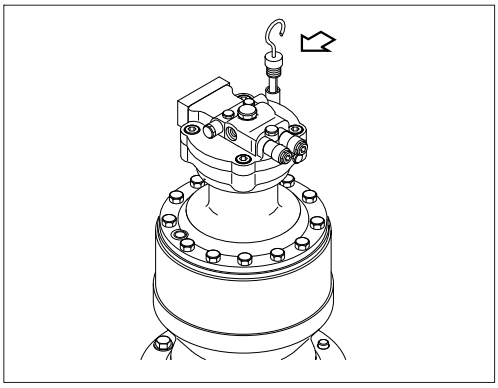


24) CHECK THE SWING REDUCTION GEAR OIL

(1) Pull out the dipstick and clean it.

(2) Insert it again.

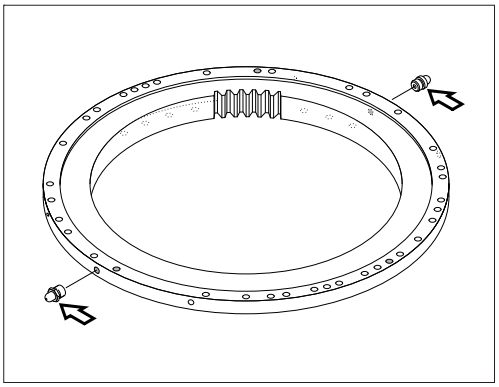
(3) Pull out one more time to check the oil level and fill the oil if the level is not sufficient.



25) LUBRICATE SWING BEARING

(1) Grease at 2 fitting.

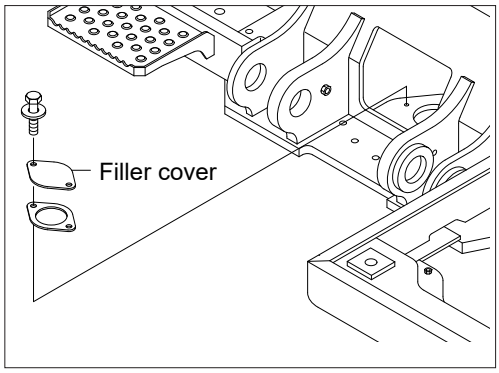
※ **Lubricate every 250 hours.**



26) SWING GEAR AND PINION

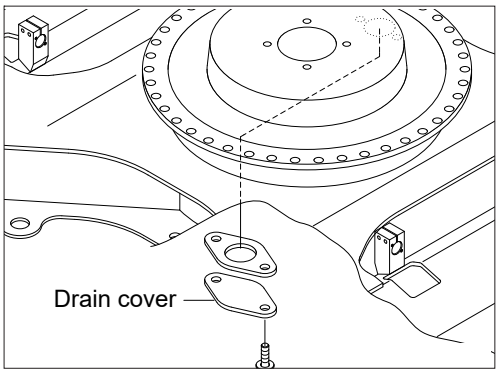
(1) Drain old grease

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



(2) Refill new grease

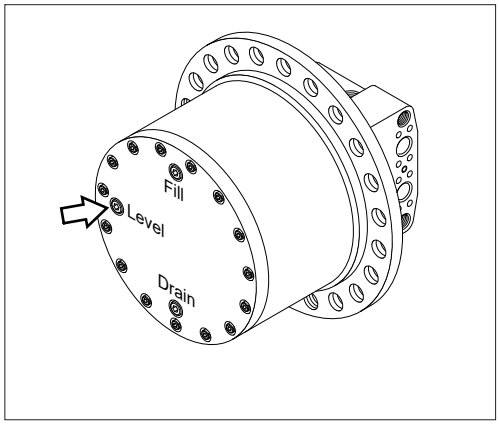
① Install drain cover.
② Fill with new grease.
③ Install filler cover.
· Capacity : 17.6L(15.8 kg)



27) CHECK THE TRAVEL REDUCTION GEAR OIL

(1) Operate the machine to the position of drain plug down to the flat ground.

(2) Loosen the level plug and check the oil level. If the level is at the hole of the plug, it is normal. Fill the oil if it is not sufficient.



28) CHANGE OF THE TRAVEL REDUCTION GEAR OIL

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

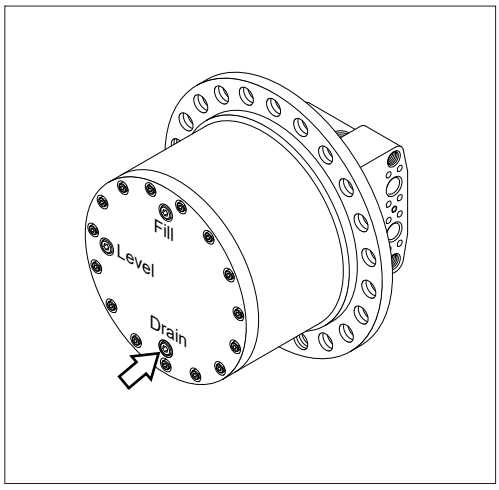
(2) Stop when the position of the drain plug is down.

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

(4) Drain the oil to adequate container.

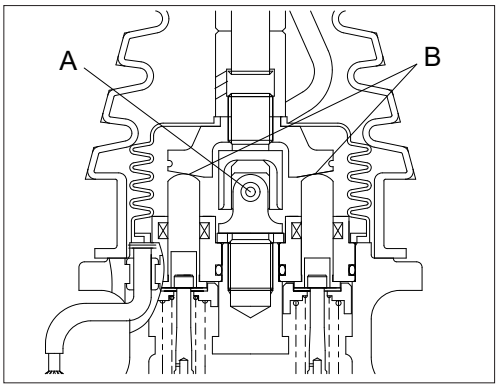
(5) Tighten the drain plug and fill specified amount of oil at filling port.

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



29) LUBRICATE RCV LEVER

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



30) ADJUSTMENT OF TRACK TENSION

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

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

(1) Raise the chassis with the boom and arm.

(2) Measure the distance between bottom of track frame on track center and back of shoe.

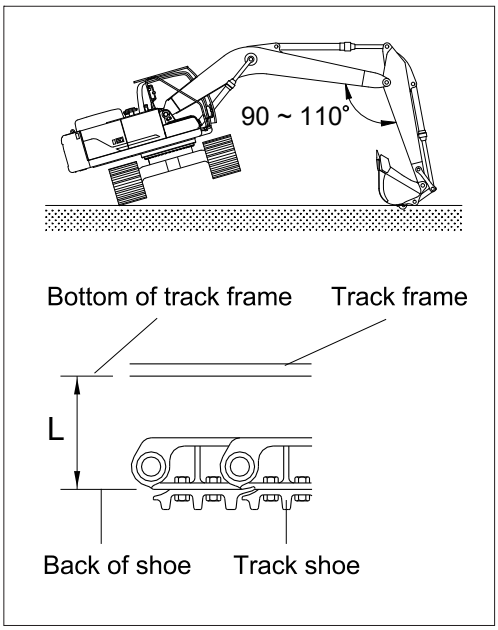
※ **Remove mud with rotating the track before measuring.**

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

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

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

※ **When the grease is drained, move the track to the forward and backward slightly.**
If the track tension is loose even after the grease is charged to the maximum, change the pins and bushings as there are worn seriously.



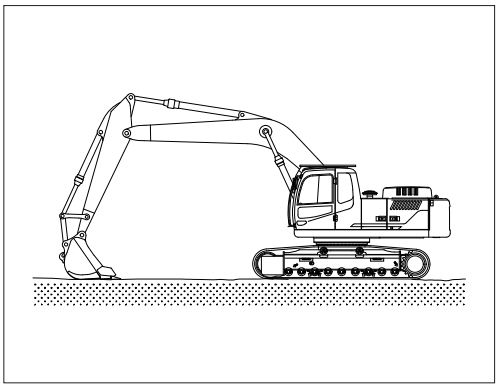
Length (L)	
general	270-300mm
damp	300-340mm
tone,sand,	340mm

31) REPLACEMENT OF BUCKET

⚠ When knocking the pin in with a hammer, metal particles may fly and cause serious injury, particularly if they get into your eyes. When carrying out this operation, always wear goggles, helmet, gloves, and other protective equipment.

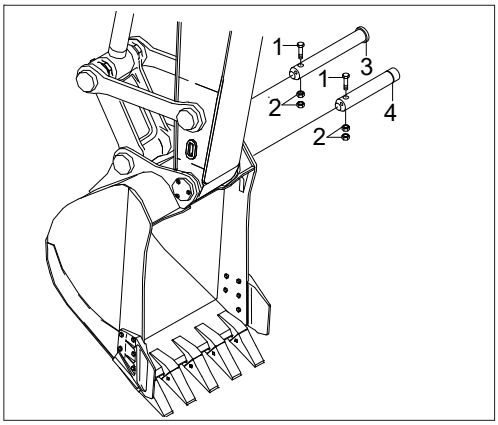
※ When the bucket is removed, place it in a stable condition.

※ When performing joint work, make sure signals to each other and work carefully for safety's sake.



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

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

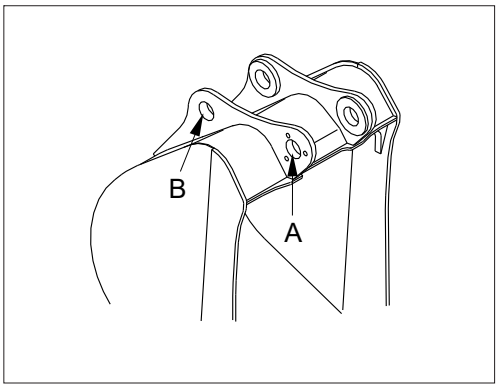


(3) Remove the stopper bolts (1) and nuts (2), then remove pins (3, 4) and remove the bucket.

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

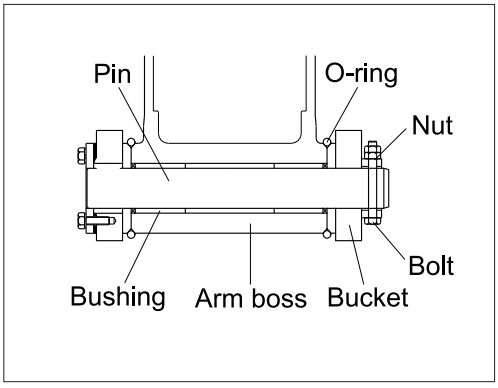
※ If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.

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



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

※ When installing the bucket, the O-rings are easily damaged, so fit the O-rings on the boss of the bucket as shown in the picture.
After knocking the pin, move the O-ring down to the regular groove.



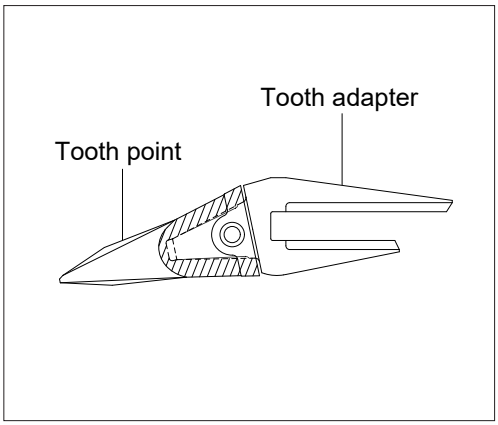
(5) Install the stopper bolt (1) and nuts (2) for each pin, then grease the pin.

32) REPLACEMENT OF BUCKET TOOTH

(1) Timing of replacement

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

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



(2) Instructions for replacement

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

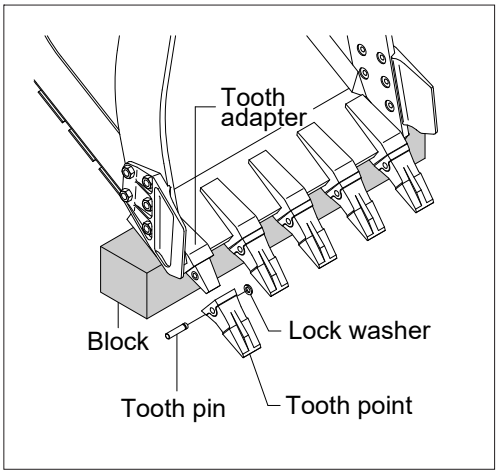
② Remove dust and mud from surface of tooth adapter by using knife.

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

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

⚠ Personal injury can result from bucket falling.

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



33) ADJUSTMENT OF BUCKET CLEARANCE

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

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

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

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

(5) Adjusting

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

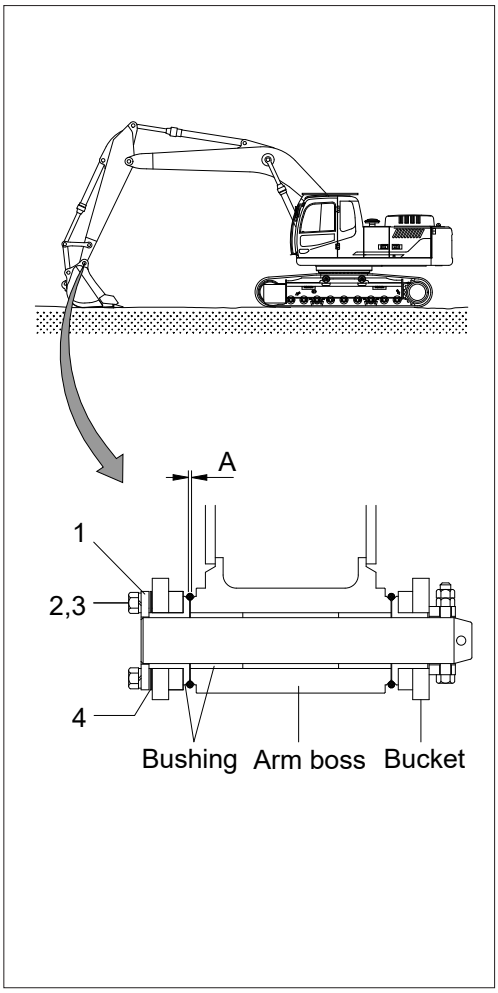
② Remove the shim equivalent value with measuring value.

③ Assemble the parts in the reverse order of removal.

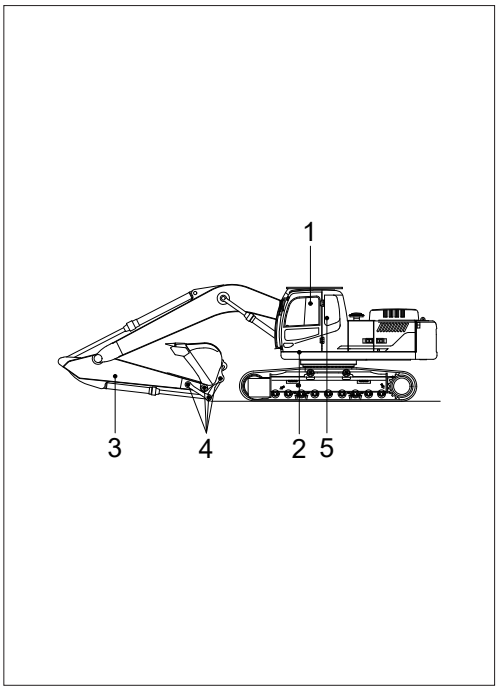
· Tightening torque : 29.6±3.2 kgf · m
(214.0±23.1 lbf · ft)

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

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



34) LUBRICATE PIN AND BUSHING



(1) Lubricate to each pin of working device

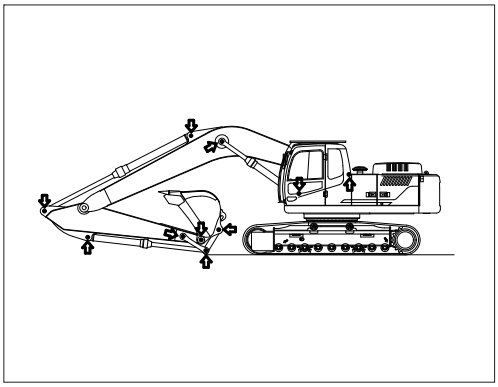
Lubricate the grease to the grease nipple according to the lubricating interval.

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

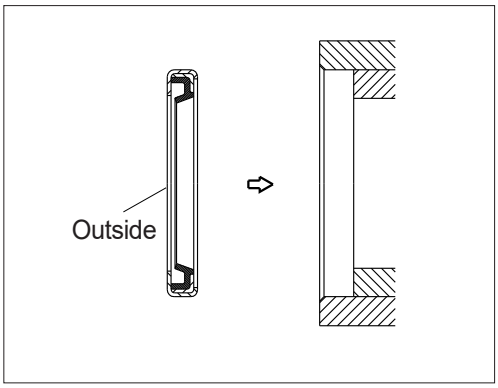
※ Shorten lubricating interval when working in water or dusty places.

★ Not required : If necessary, lubricate the grease.

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



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

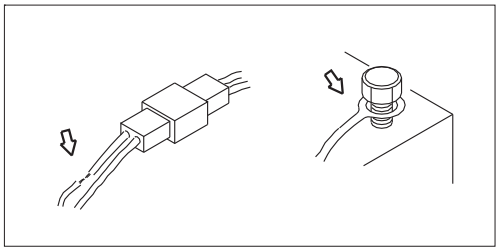


※ If it is assembled in wrong direction, it will cause fast wear of pin and bushing, and create noise and vibration during operation.

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

1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



2) BATTERY

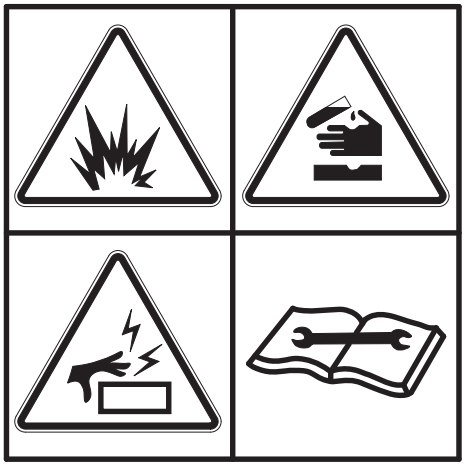
(1) Clean

① Wash the terminal with hot water if it is contaminated, and apply grease to the terminals after washing.

⚠ Battery gas can explode. Keep sparks and flames away from batteries.

⚠ Always wear protective glasses when working with batteries.

⚠ Do not stain clothes or skin with electrolyte as it is acid.
Be careful not to get the electrolyte in eyes.
Wash with clean water and go to the doctor if it enters the eyes.



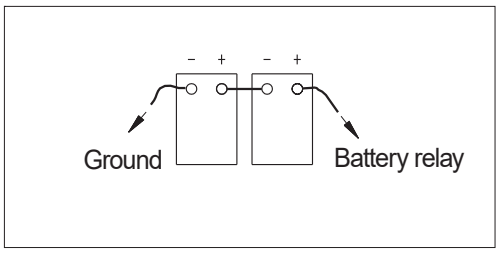
(2) Recycle

Never discard a battery.
Always return used batteries to one of the following locations.

- A battery supplier
- An authorized battery collection facility
- Recycling facility

(3) Method of removing the battery cable

Remove the cable from the ground connection first (⊖ terminal side) and reconnect it last when reassembling.



3) STARTING THE ENGINE WITH A BOOSTER CABLE

Keep following order when you are going to start engine using booster cable.

(1) Connection of booster cable

※ Use the same capacity of battery for starting.

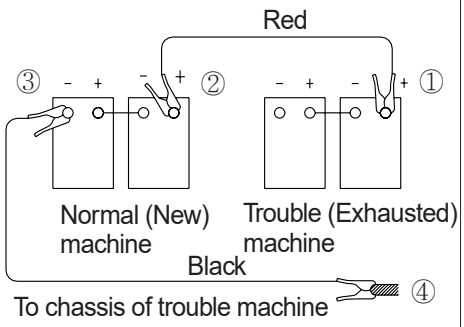
① Make sure that the starting switches of the normal machine and trouble machine are both at the OFF position.

② Connect the red terminal of booster cable to the battery (+) terminal between exhausted and new battery.

③ Connect the black terminal of the booster cable between new battery (-) terminal and chassis of trouble machine.

※ Keep firmly all connection, the spark will be caused when connecting finally.

Connection of booster cable



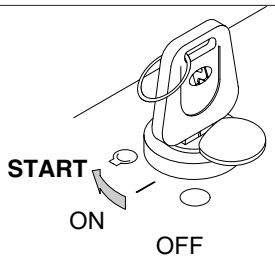
Connection order : ① → ② → ③ → ④

(2) Starting the engine

① Starting the engine of the normal machine and keep it to run at high idle.

② Start engine of the trouble machine with starting switch.

③ If you can not start it by one time, restart the engine after 2 minutes.



(3) Taking off the booster cable

① Take off the booster cable (black).

② Take off the booster cable (red) connected to the (+) terminal.

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

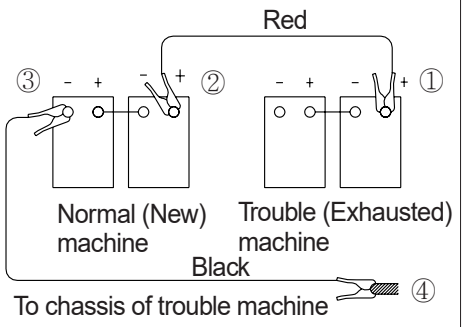
⚠ Explosive gas is generated while using the battery or charging it. Keep away flame and be careful not to cause the spark.

※ Charge the battery in the well ventilated place.

※ Place the machine on the earth or concrete. Avoid charging the machine on the steel plate.

※ Do not connect (+) terminal and (-) terminal when connecting booster cable because it will be shorted.

Disconnection of booster cable



Disconnection order : ④ → ③ → ② → ①

(4) Welding repair

Before start to welding, follow the below procedure.

① Shut off the engine and remove the starting switch.

② Disconnect ground cable from battery by master switch.

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

④ Connect the earth (ground) lead of the welding equipment as close to the welding point as possible.

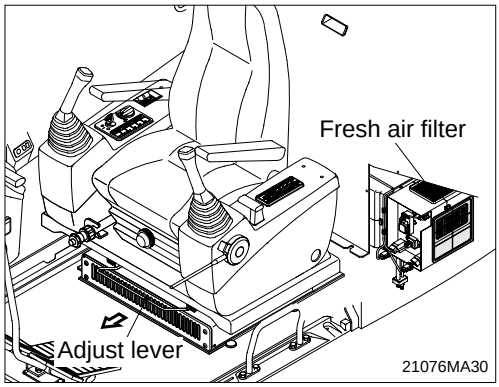
※ Do not weld or flame cut on pipes or tubes that contain flammable fluids. Clean them thoroughly with nonflammable solvent before welding or flame cutting on them.

⚠ Do not attempt to welding work before carry out the above.
If not, it will caused serious damage at electric system.

1) CLEAN AND REPLACE OF FRESH AIR FILTER

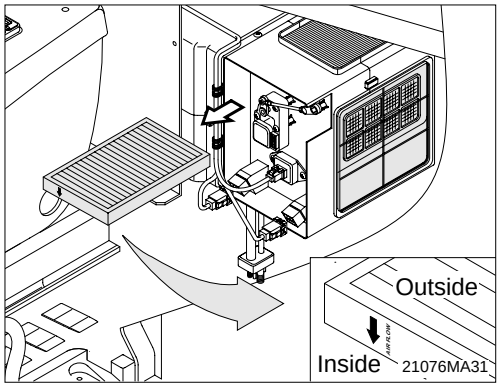
※ **Always stop the engine before servicing.**

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



(2) Remove the outer filter.

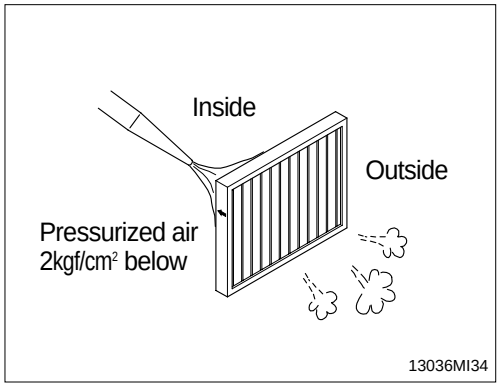
※ **When installing a filter, be careful not to change the filter direction.**



(3) Clean the filter using a pressurized air(Below 2kgf/cm², 28psi).

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

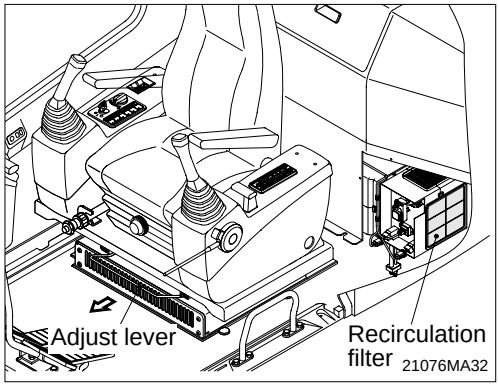
(4) Inspect the filter after cleaning. If it is damaged or badly contaminated, use a new filter.



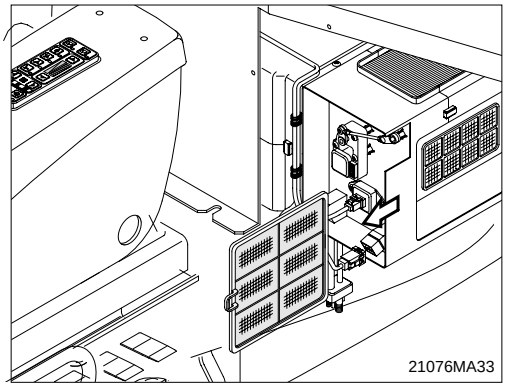
2) CLEAN AND REPLACE OF RECIRCULATION FILTER

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

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



(2) Remove recirculation filter.

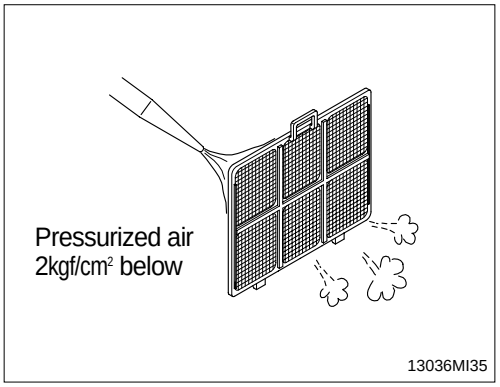


(3) Clean the recirculation filter using a pressurized air (Below 2kgf/cm², 28psi) or washing with water.

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

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

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



3) PRECAUTIONS FOR USING AIR CONDITIONER

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

(2) Be careful not to overcool the cab.

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

(4) When cooling, change air occasionally.

4) CHECK DURING SEASON

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

5) CHECK DURING OFF-SEASON

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

1. ENGINE

This guide is not intended to cover every conditions, however many of the more common possibilities are listed.

Trouble	Service	Remark
The engine oil pressure lamp lights ON when engine speed is raised after completion of warm up.	· Add the oil to the specified level. · Replace the oil filter cartridge. · Check oil leakage from the pipe or the joint. · Replace the monitor.	
Steam is emitted from the top part of the radiator (the pressure valve). Coolant level warning lamp lights ON.	· Supply the coolant and check leakage. · Adjust fan belt tension. · Wash out inside of cooling system. · Clean or repair the radiator fin. · Check the thermostat. · Tighten the radiator cap firmly or replace the packing of it. · Replace the monitor.	
The engine does not start when the starting motor is turned over.	· Add fuel. · Repair where air is leaking into fuel system. · Check the injection pump or the nozzle. · Check the valve clearance. · Check engine compression pressure. · In cold weather, check if fuel warmer system is working normal (opt).	Refer to the pages 3-13 and 4-4.
Exhaust gas is white or blue.	· Adjust to specified oil quantity. · Replace with specified fuel.	
Exhaust gas occasionally turns black.	· Clean or replace the air cleaner element. · Check the nozzle. · Check engine compression pressure. · Clean or replace the turbocharger.	
Combustion noise occasionally changes to breathing sound.	· Check the nozzle.	
Unusual combustion noise or mechanical noise.	· Check with specified fuel. · Check over-heating · Replace the muffler. · Adjust valve clearance.	

2. ELECTRICAL SYSTEM

Trouble	Service	Remark
Lamp does not glow brightly even when engine runs at high speed. Lamp flickers while engine runs.	· Check for loose terminals and open-circuit wiring. · Adjust belt tension.	
Battery charging lamp does not go out even when engine runs at high speed.	· Check the alternator. · Check and repair wiring.	
Unusual noise is emitted from the alternator.	· Check the alternator.	
Starting motor does not turn when starting switch is turned ON.	· Check and repair the wiring. · Charge the battery. · Check the starting motor. · Check the safety relay.	
The pinion of the starting motor keeps going in and out.	· Charge the battery. · Check the safety relay.	
Starting motor turns the engine sluggishly.	· Charge the battery. · Check the starting motor.	
The starting motor disengages before the engine starts up.	· Check and repair the wiring. · Charge the battery.	
The engine warming up lamp does not go ON.	· Check and repair wiring. · Check the monitor.	
The engine oil pressure lamp does not light up when engine is stationary (When the starting switch is in ON position.)	· Check the monitor. · Check the caution lamp switch.	
Battery charging lamp does not light up when the engine is stationary. (when the starting switch is in ON position.)	· Check the monitor. · Check and repair the wiring.	

3. OTHERS

Trouble	Service	Remark
Track slip out of place. Excessive wear of the sprocket.	· Adjust tension of track.	
Bucket either rises slowly or not at all.	· Add oil to specified level.	
Slow speed of travel, swing, boom, arm and bucket.	· Add oil to specified level.	
Unusual noise emitted from pump.	· Clean the hydraulic tank strainer.	
Excessive oil temperature rise of hydraulic oil.	· Clean the oil cooler. · Adjust fan belt tension. · Add oil to specified level.	

1. SELECTING HYDRAULIC BREAKER

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

1) Become familiar with the manual and select breakers suitable to machine specifications.

2) Make careful selection in consideration of oil quantity, pressure and striking force, to enable satisfied performance.

3) When apply a breaker to the machine, consult your local dealer of Hyundai for further explanation.

2. CIRCUIT CONFIGURATION

1) As for breaker oil pressure line, use extra spool of main control valve.

2) Set proper breaker pressure on load relief valve.

3) The pressure of the R215vsPRO system is 350 kgf/cm^2 (4997 psi).

4) Adjusting oil quantity

(1) Please consult the dealer for flow control mode

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

5) The accumulator should be used to the breaker charging and return line.
If the accumulator is not used, it will be damage as the input wave is delivered.

※ Keep the pressure pulsation of pump below 60 kgf/cm^2 (853 psi) by installing the accumulator.

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

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

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

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

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

11) Weld the bracket for pipe clamp to prevent damage caused by vibration.

1) MAINTENANCE OF HYDRAULIC OIL AND FILTER

(1) As machine with an hydraulic breaker provides the hydraulic oil becomes severely contaminated.

(2) So, unless frequently maintained, the machine may easily go out of order.

(3) Inspect and maintain hydraulic oil and 3 kinds of filter elements in particular, in order to prolong machine life.

2) RELEASE THE PRESSURE IN BREAKER CIRCUIT

When breaker operating is finished, stop engine and push pedal or switch for breaker to release pressure in breaker circuit.

If pressure still remains, the lifetime of the diaphragm in the accumulator will be shortened.

3) Be careful to prevent contamination by dust, sand and etc.

If such pollution become mixed into the oil, the pump moving parts will wear abnormally, shorten lifetime and become damaged.

4) When operating breaker, bolts and nuts of main equipment may be loosened by vibration. So, it must be inspected periodically.

Service interval unit : hours

Attachment	Operating rate	Hydraulic oil	Filter element
Breaker	100 %	600★1	200
		1000★2	

★1 : Conventional hydraulic oil

★2 : Hyundai genuine long life hydraulic oil

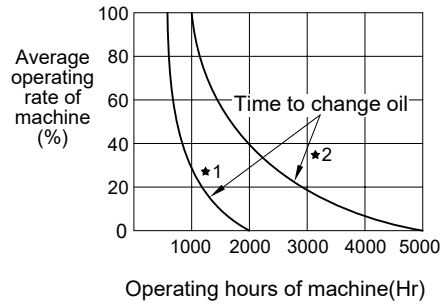
● **Replace following filter same time**

· Hydraulic return filter : 1 EA

· Pilot line filter : 1 EA

· Drain filter cartridge : 1 EA

Filter replace guide for hydraulic breaker



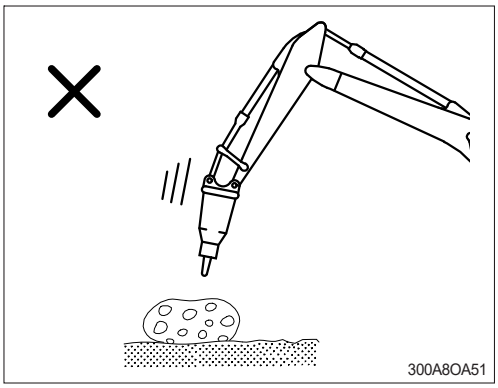
★1 : Conventional hydraulic oil

★2 : Hyundai genuine long life hydraulic oil

4. PRECAUTIONS WHILE OPERATING THE BREAKER

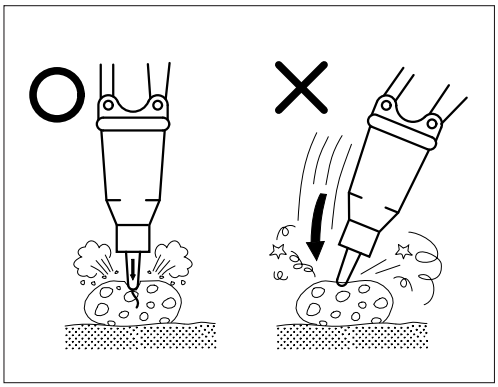
DO NOT BREAK ROCK WHILE LOWERING

As the breaker is heavy in comparison with bucket, it must be operated slowly.
If breaker is rapidly pushed down, working device may be damaged.



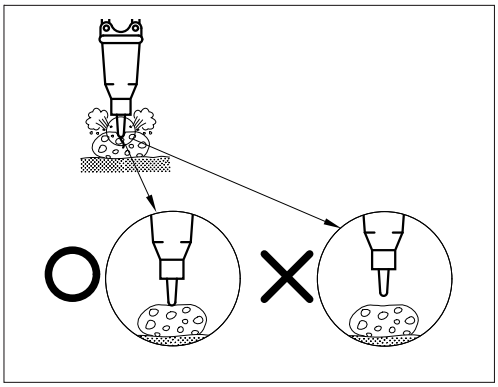
DIRECTION OF THRUST

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

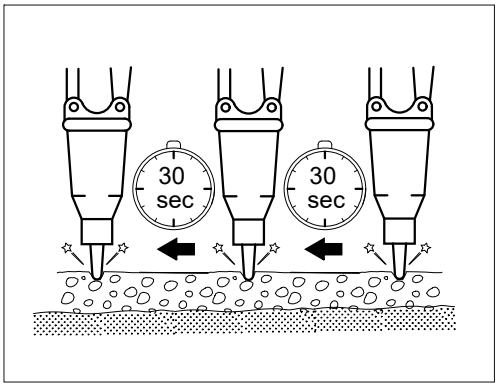


PROPER THRUST

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

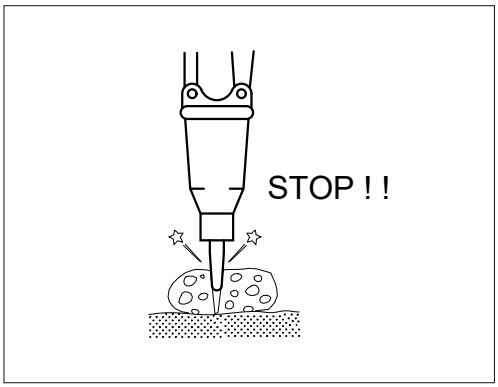


Move the impact point from the edge to the interior. Never try to break off a too large block, if the object has not broken within 30 seconds. The object should be broken up piece by piece in small blocks. Large distance steps will not improve working results.
Operating the breaker longer than 30 seconds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



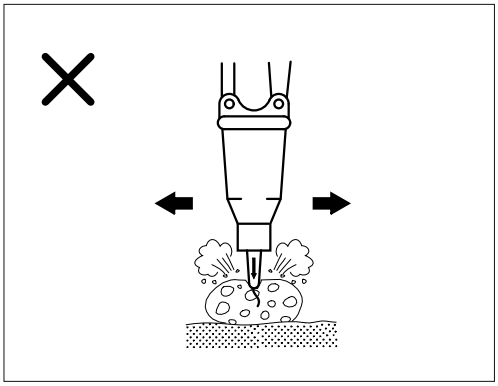
BLANKS THRUST

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



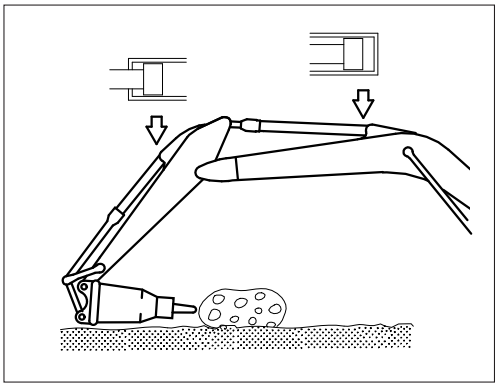
DO NOT MOVE MACHINE OR BREAKER WHILE STRIKING

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



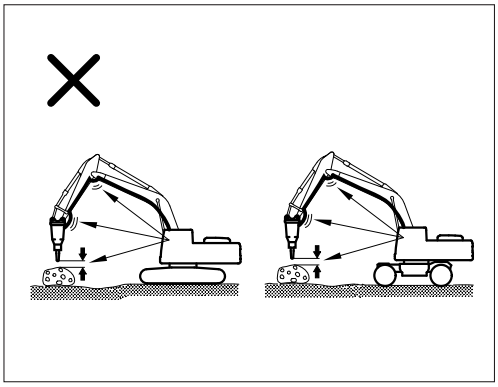
OPERATE BREAKER WITH A GAP IN EXCESS OF 100 mm (4 inches) FROM THE END OF THE STROKE TIP

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



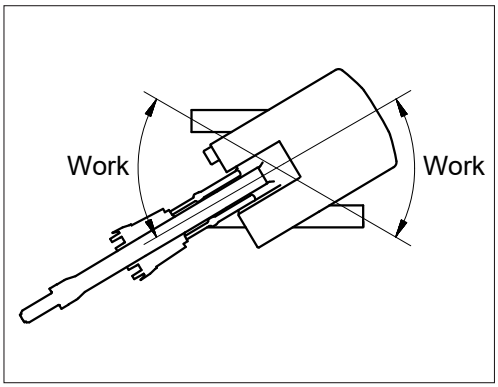
STOP THE OPERATION IMMEDIATELY IF HOSES VIBRATE EXCESSIVELY

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

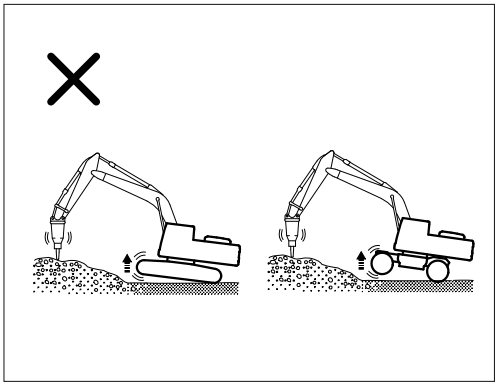


DO NOT WORK WHILE IN A SWING STATE

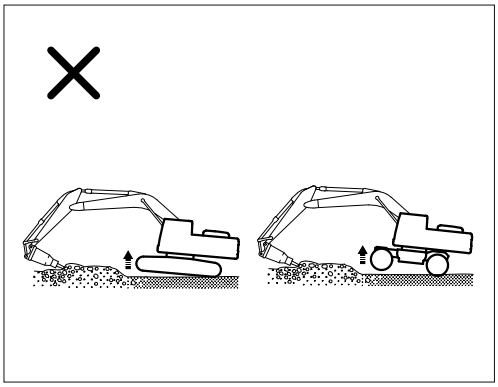
Do not work while swinging the upper structure. It cause oil leakage of the bend in the track shoe and rollers.



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

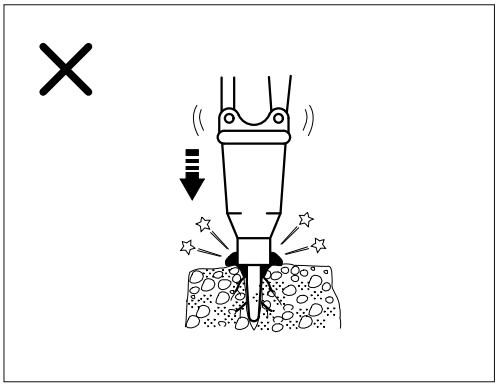


Do not extend the bucket cylinder fully and thrusting to raise the machine off the ground.



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

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



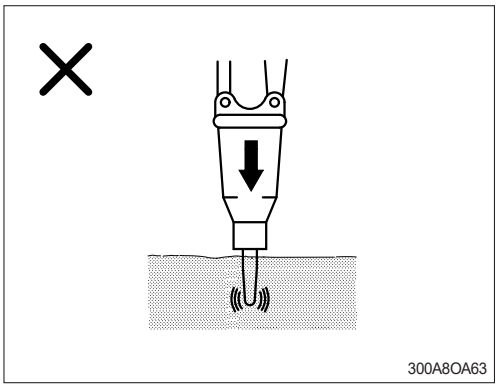
NEVER DRIVE THE CHISEL INTO THE GROUND

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

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

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

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

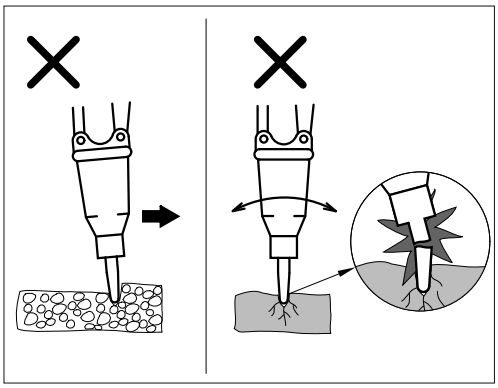


NEVER USE AS A LEVER

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

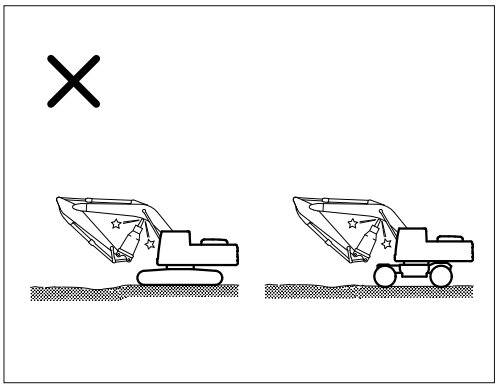
Under any circumstances, operating in this way is not permitted.

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



TAKE CARE OF CHISEL AND BOOM INTERFACE

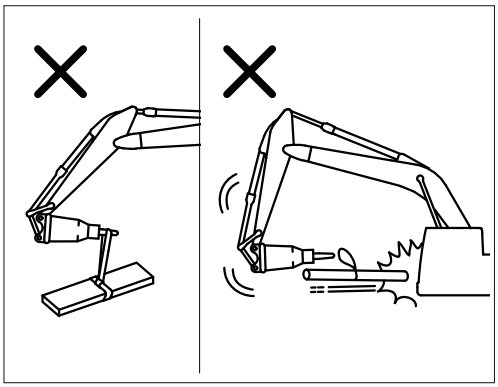
Be aware of clearance between breaker tip and the underside of boom as shown.



NEVER USE FOR LIFT OR TRANSPORT PURPOSES

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

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

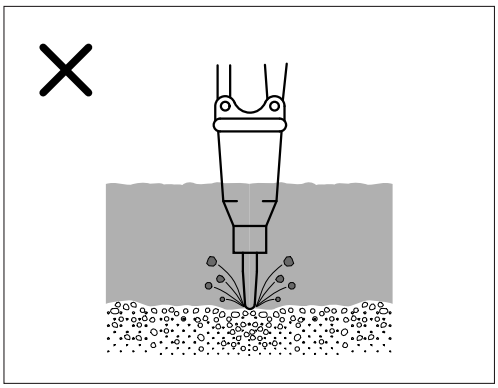


NEVER USE THE HYDRAULIC BREAKER UNDER WATER

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

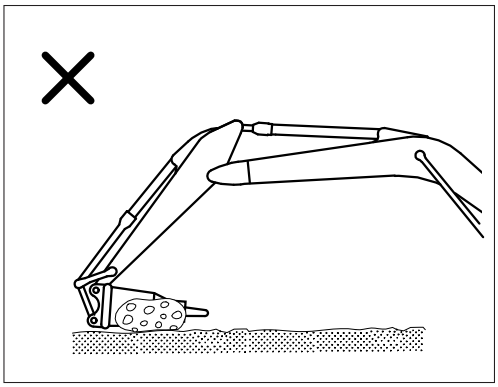
To operate the breaker under water, compressed air must be supplied into the breaker, into the impact chamber of the front-head, prior to use.

Consult your Hyundai dealer for the underwater kit.



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

This may damage the operation device and swing system.

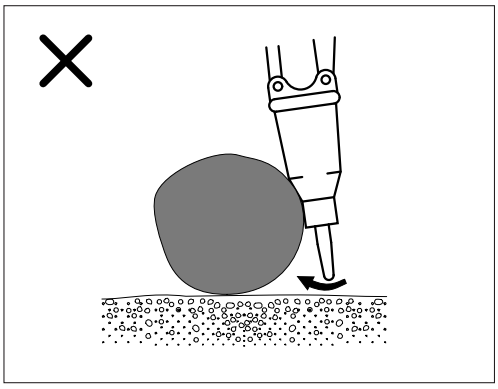


NEVER USE THE CHISEL OR HYDRAULIC BREAKER TO MOVE ROCKS OR OTHER OBJUCTS

The hydraulic breaker is not designed for this usage.

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

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

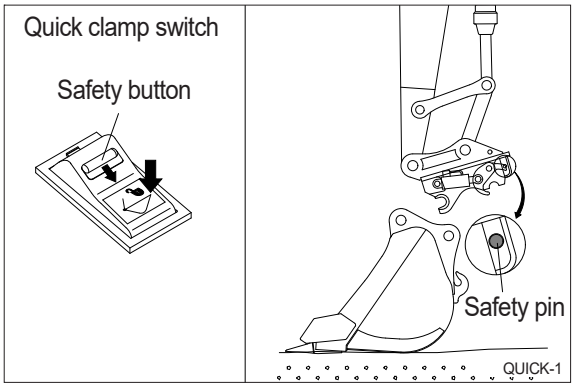


5. QUICK CLAMP(Option)

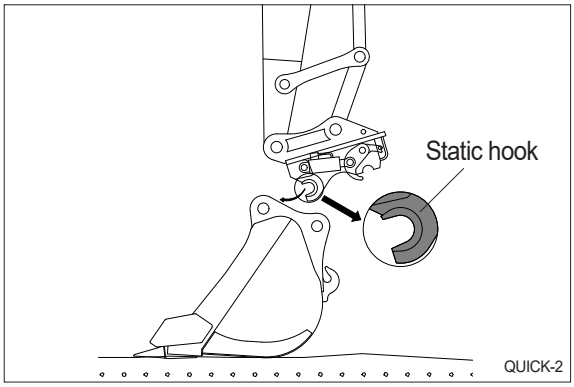
1) FIXING BUCKET WITH QUICK CLAMP

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

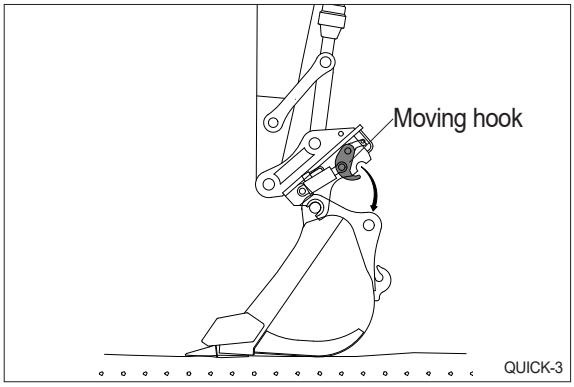
(2) Pulling safety button, press the quick clamp switch to unlock position. Then, the moving hook is placed on release position.



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

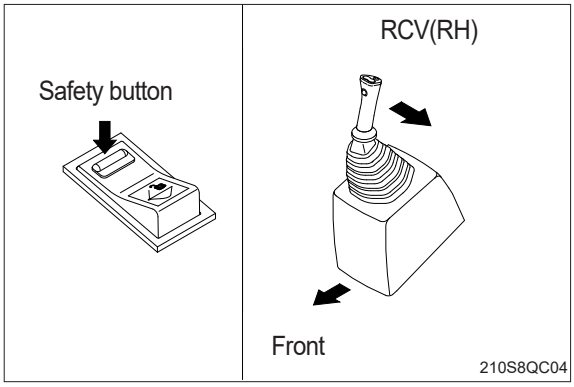


(4) Operate RCV lever to bucket-in position. Then, the moving hook is coupled with the bucket link pin.
Make sure that the moving hook is completely contacted with bucket link pin.

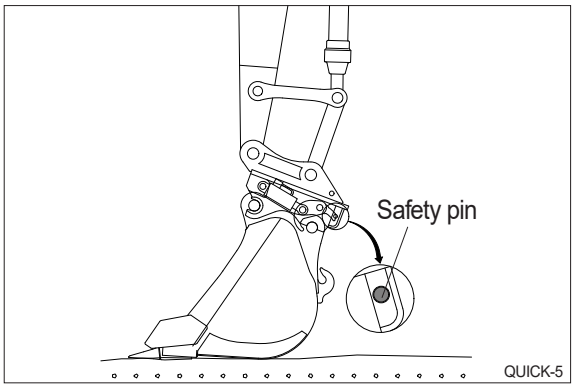


(5) Push safety button to lock position.
Operate RCV lever to bucket-in position.

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



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

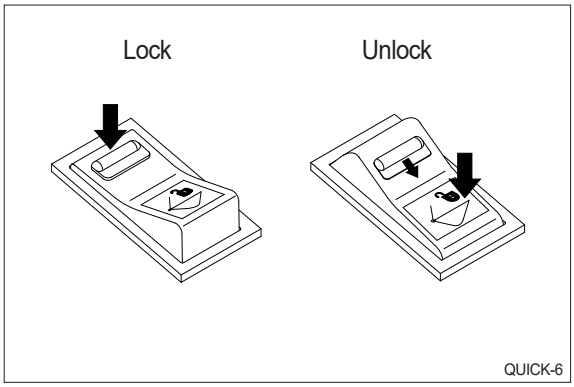


2) REMOVE BUCKET FROM QUICK CLAMP

Removing procedure is reverse of fixing.

3) PRECAUTION OF USING QUICK CLAMP

⚠ **When operating the machine with quick clamp, confirm that the quick clamp switch is lock position and safety pin of moving hook is inserted.**
Operating the machine with quick clamp switch unlocked and without safety pin of moving hook can cause the bucket to drop off and bring about the accident.



⚠ **Serious injury or death can result from this accident.**

⚠ **Be careful to operate the machine equipped with quick clamp. The bucket may hit cab, boom and boom cylinders when it reaches vicinity of them.**

※ **HYUNDAI will not be responsible for any injury or damage in case that safety pin is not installed properly.**