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 HD Hyundai Construction Equipment distributor for those items you require.

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

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

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

BEFORE SERVICING THIS MACHINE

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

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

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

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

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

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

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

All personnel must remain alert to potential hazards.

Work within your level of training and skill.

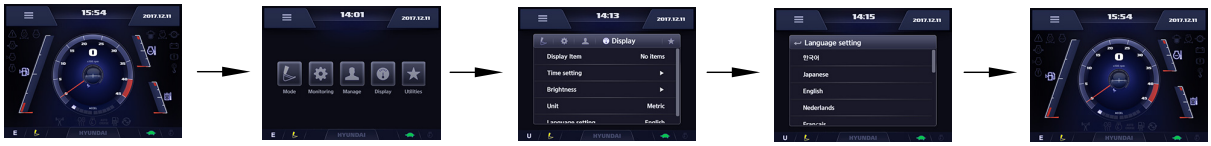
Ask your supervisor if you are uncertain about a particular task. Do not try to do too much too fast.

Use your common sense.

※ How to set the language of cluster

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

Normal type



220S0SG510A

Premium type

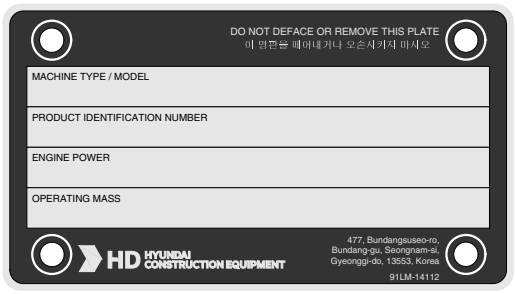
220S0SG10A

※ Please refer to the page 3-29 for the cluster.

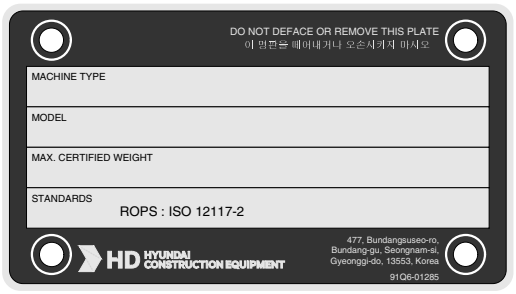
TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

Machine Serial No.	
Engine Serial No.	
Manufacturing year	
Manufacturer Address	HD Hyundai Construction Equipment Co., Ltd. 477 Bundangsuseo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do 13553, Korea
Distributor for U.S.A Address	HD Hyundai Construction Equipment Americas, Inc 6100 Atlantic Boulevard Norcross GA 30071 U.S.A
Distributor for Europe Address	HD Hyundai Construction Equipment Europe N. V. Hyundailaan 4 3980 Tessenderlo Belgium
Dealer Address	

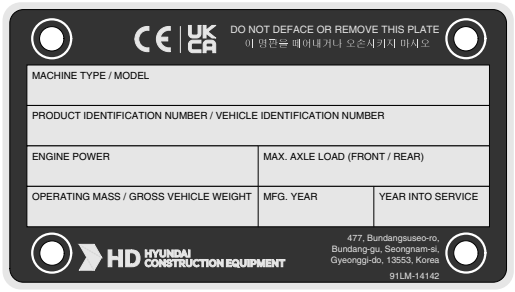
MACHINE DATA PLATE



For general

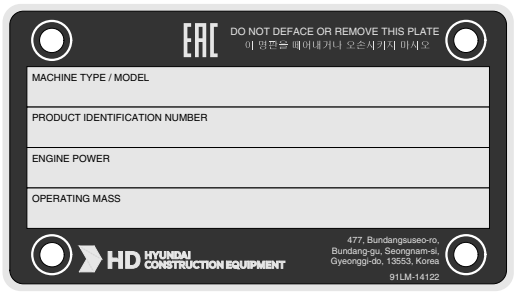


For ROPS



For EU only

For FOPS/FOG



For EAC only

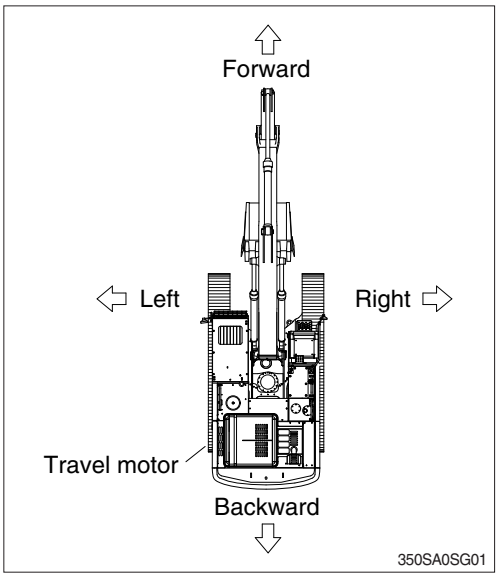
EX0MD01

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

GUIDE

1. DIRECTION

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

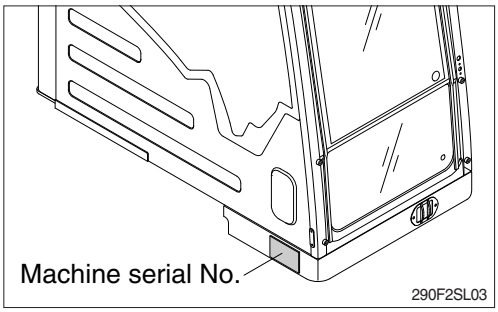


2. SERIAL NUMBER

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

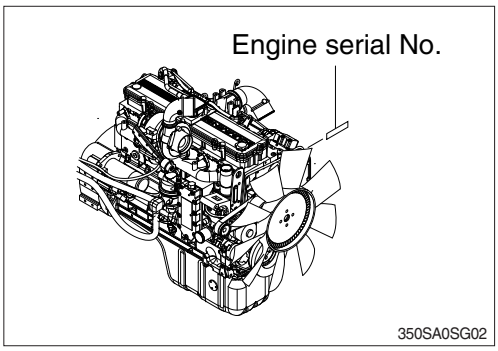
1) MACHINE SERIAL NUMBER

The numbers are located below the 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 2 (efficient working method) further details.

4. SYMBOLS

⚠ Important safety hint.

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

※ It indicates the useful information for operator.

1. CALIFORNIA PROPOSITION 65

⚠ WARNING

CALIFORNIA PROPOSITION 65

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

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

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

2. SAFETY INSTRUCTIONS

Safety Message

Intended Use

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

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

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

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

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

Safety guidelines

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

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

General Safety Information

Unauthorized modification

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

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

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

ROPS/FOPS

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

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

Fire and Explosion

Preventing fires

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

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

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

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

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

Preventing explosions

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

- Never use starting aid fluid in a low-temperature environment as it can have an adverse effect on the engine performance and may cause an explosion.
- Do not attempt to charge a frozen battery. Forcibly charging a frozen batte ry may result in an explosion.
- Use caution when handling the batteries. Never let a tool make contact with the positive battery post and the frame of the machine simultaneously.
  Sparks may be generated, resulting in an explosion.
- Only charge the battery with a charger of equal voltage. Incorrect voltage may cause overheating and explosion.
- Do not use or charge the battery if the level of electrolytes in the battery is low.
  Regularly check the electrolyte level, and refill with distilled water to the maximum level.

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

Corrective Actions Before and After a Fire

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

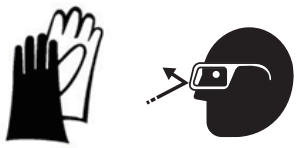
- Move the machine well away from any flammable materials (e.g., fuel, engine oil, clothes, and bits of wood) and adjacent buildings.
- If the engine is running, it may cause a persistent fire. Immediately stop the engine.
- In the event of an electric short, disconnect the batteries to eliminate the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

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

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

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

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



Information on fire extinguisher

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

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

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

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

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

Health and Safety

Personal protective equipment

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

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

List of personal protection gear

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

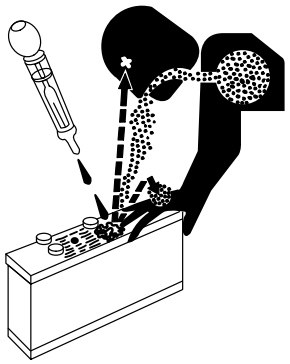
Health and safety instructions in hazardous environments

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

When handling oil

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

When handling the battery



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

When handling refrigerant

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

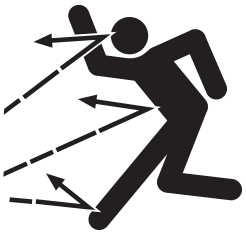
When handling coolants

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

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

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

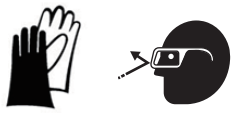
Always wear a safety helmet, protective goggles and safety shoes to prevent injury from airborne particles and thrown or falling objects. Earplugs or earmuffs may be necessary when working in a noisy place.



When working in places with a high level of noise

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

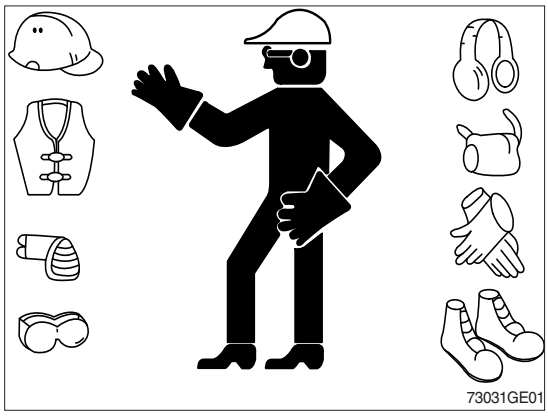
Personal protection gear for various situations

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

WEAR PROTECTIVE CLOTHING

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

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



Noise and Vibration

Information on vibration

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

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

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

Vibration also varies according to the duration of operation.

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

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

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

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

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

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

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

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

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

Instructions on mitigating vibration

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

① Use the correct size attachments for your machine.

② Maintain the machines pursuant to the manufacturer's recommendations.

③ Maintain and provide good terrain conditions.

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

④ Use a driver's seat that satisfies ISO 7096.

- Adjust the driver's seat and suspension for the weight and the size of the operator.
- Inspect the suspension and adjusting devices of the driver's seat.

⑤ Perform the following maneuvers without using excessive force :

- Steering
- Braking
- Accelerating
- Gear shifting

⑥ Move the attachments smoothly.

⑦ Keep the level of vibration minimal when working for a long time or driving for a long distance.

- Use a machine mounted with suspension system.
- Transport the machine when moving between worksites; do not drive the machine to get to another worksite.

⑨ Take the following actions for optimal operator comfort and convenience:

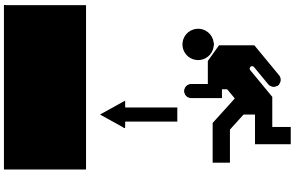
- Adjust the driver's seat adjustment device to allow a convenient posture.
- Adjust the angles of the mirrors to minimize awkward, compromised posture
- Avoid working for an excessively long time, and take regular breaks.
- Do not jump on or off the cabin.
- Minimize repeated handling of loads and lifting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

Information on noise

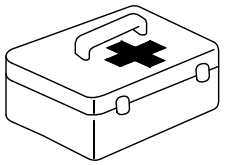
Noise level (EN 474-1:2018 and 2000/14/EC) are as follows :

- Sound pressure level (LpA)
- Sound power level (LwA)

Emergency situations



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



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

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

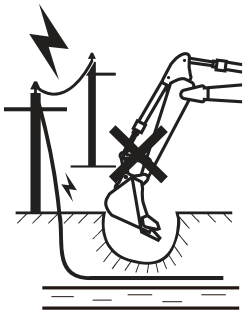
Safety Information on the Machines and Operation

Before Operating the Machine

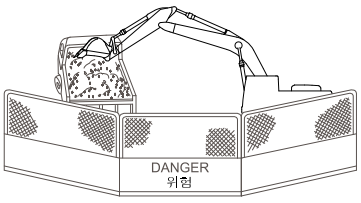
Carefully examine the following conditions and take any necessary actions to prevent risk factors before operating the machine:

Checking the worksite

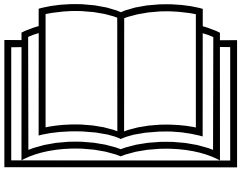
- Always be aware of weather conditions at your worksite. Fog or heavy rain may decrease visibility or render the machine inoperable. In the event of lightning, immediately put the bucket to the ground and evacuate to a safe place.
- Check the worksite for obstacles, and avoid collisions with such obstacles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



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



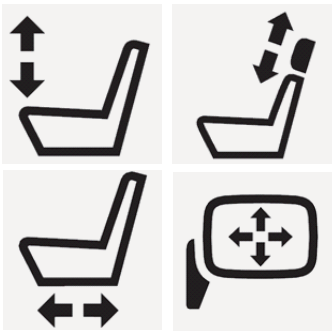
Instructions before operating the machine



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

Inspect the machine before operating the machine

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

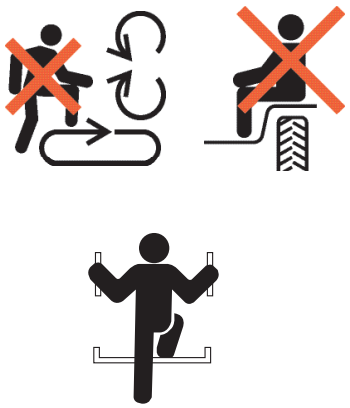


- Adjust the operator’s seat to suit the physical condition of the operator. Check the seatbelt for damage, and replace it if damaged. Do not store unnecessary objects or tools in the cabin.
- Keep clean all parts related to visibility, such as the windshield and rearview mirror. Adjust the rearview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

During Operation of the Machine

Getting on and off

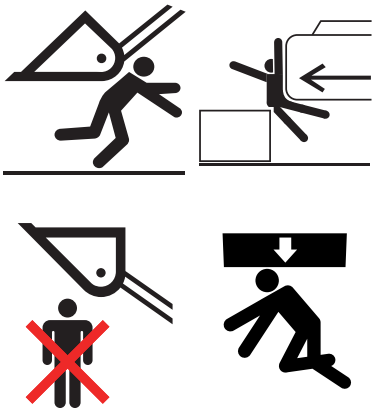
- Do not jump on or off the machine.
- Do not try to get on or off the machine while it is moving.
- Get on or off the machine using the handrail and step (or stepladder, if any). Always keep the handrail and step clean and free from mud or oil.
- Wear anti-slip shoes.
- Comply with the principle of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



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

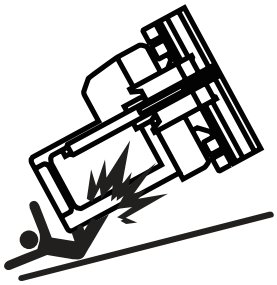
During operation

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

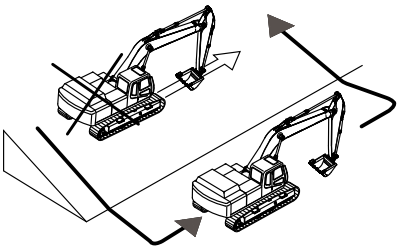


Operation on a slope

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

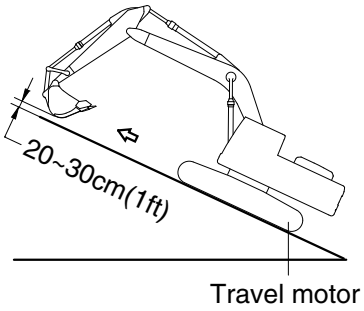


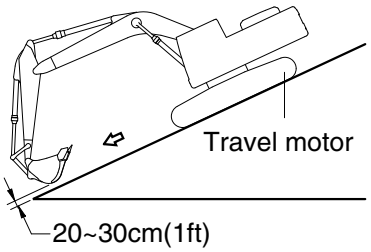
- Do not work on slopes of 10˚ or more.
- Do not exceed the maximum climbing angle of 30˚.
- If operation of the machine on a slope is unavoidable, perform the work after flattening the ground.
- When operating the machine laterally on a slope, there is a high risk of machine overturning or slipping.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



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

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



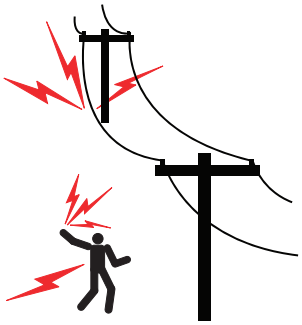


Operations to be avoided or prohibited

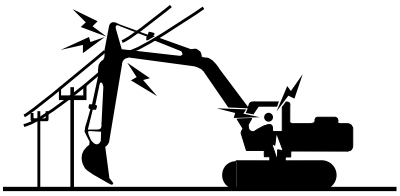
· Pay attention when operating the machine in an enclosed space as this may result in the risk of a buildup of hazardous gases.

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

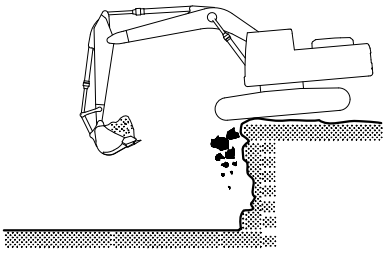
Voltage	Minimum safety distance
6.6 kV	3 m (10 ft)
33.0 kV	4 m (13 ft)
66.0 kV	5 m (16 ft)
154.0 kV	8 m (26 ft)
275.0 kV	10 m (33 ft)



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



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

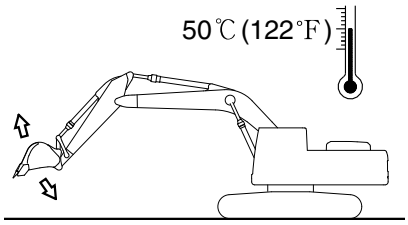


Cautions when operating in specific areas

Operating in extremely cold environments

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

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



Operating in extremely hot environments

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

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

Operating in dusty or sandy environments

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

Operating in rainy or humid environments

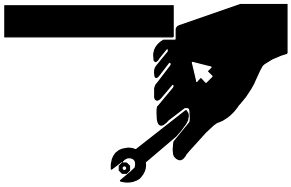
- Do not operate the machine in areas where there is heavy rainfall or thick fog.
- If operating the machine in such areas is unavoidable, perform operation after ensuring sufficient field of vision.
  - Use lighting devices such as the head lamp and working light.
  - Warn any workers within the radius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

Operating the machine in coastal areas

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

Cautions during maintenance

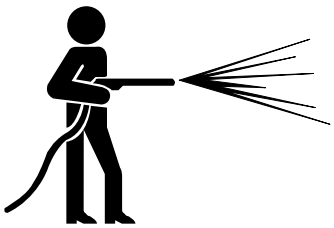
Tools



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

Inspection and servicing

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



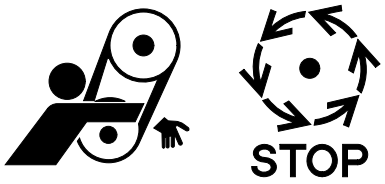
- Use proper lighting devices when operating the machine in a dark area.
- Use lighting devices that are explosion-proof when handling flammable materials such as fuel and hydraulic oil.
- Never attempt to use a direct flame such as a cigarette lighter in lieu of the lighting device.

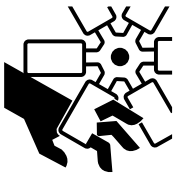
- Check the level of the cooling water after stopping and sufficiently cooling down the engine.
- Sufficiently relieve the inside pressure before opening the cooling water cap.
- The cooling system contains basic components. Use caution to prevent the skin or eyes from coming into contact with the basic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

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

Collision or cutting

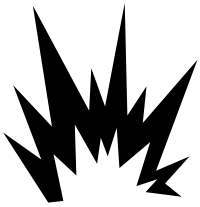
- Never perform a maintenance while the engine is running.
- Never open or remove the engine hood while the machine is in operation.
- If an inspection is required while the engine is running, two or more workers must perform the inspection.
- Keep areas in the vicinity of rotating or moving parts clean.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





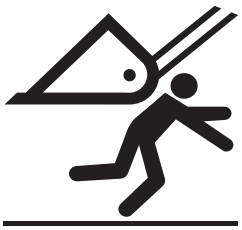
Preventing fire and explosion

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



Cautions on decoupling the attachments

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

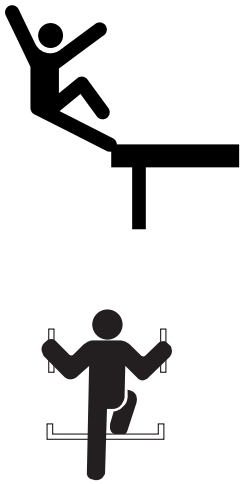


Repair by welding

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

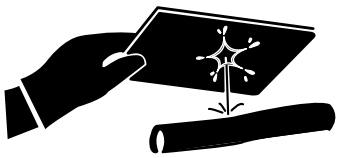
Precautions to take when working on the machine

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



Cautions when working with the high-pressure line or hose

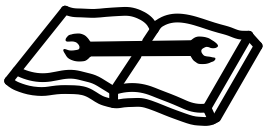
- Make sure that the internal pressure is released before replacing or checking the high-pressure line or hose.
- If the internal pressure is not released, serious injury may result.
- Take the following precautions to avoid serious injury or death:
  - Always check to make sure a working fire extinguisher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



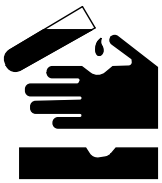
Cautions on inspecting the counterweight

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

Battery

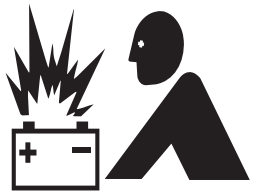


- The battery contains flammable materials.
- Never smoke in the vicinity of the battery.
- The battery electrolyte is strong acid. Pay attention to prevent the skin and eyes from coming into contact with the electrolyte.



- If the battery electrolyte accidentally comes into contact with the body or clothes, immediately wash off the electrolyte with water.
- If the battery electrolyte is frozen, do not use other devices to start the engine up.
- Always wear protective goggles and protective gloves when working on the battery.
- Always keep the switch in the 'OFF' position when working on the battery.
- Securely fasten the battery cap.
- Always disconnect the battery from the machine before charging the battery.
- Disconnect the cathode (-) first when removing the battery.
- Connect the anode (+) first when connecting the battery.
- Follow the safety procedures when jump starting or charging the battery. Improper connection of the cable may result in an explosion and serious injury.

- Use a voltmeter when inspecting the charging system.
- Regularly inspect the battery cable, and replace it if damaged.
- A battery cable with exposed wires may cause a short if it comes into contact with the grounding surface.
- A short circuit of the battery cable may cause heat from the battery current and result in a fire.



- If the wires of the ground cable are exposed between the battery and the master switch, the exposed wires make contact with the grounding surface and the current may bypass to the master switch. This may destabilize the machine operation.
  Repair or replace the part before operating the machine.

Battery disconnection switch

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

Switchboard

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

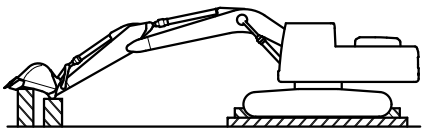
Parking and Storage

Cautions on parking

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

Cautions on storage for a long period of time

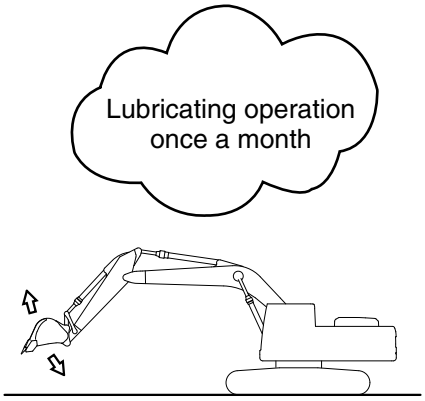
- Park the machine in accordance to any state and local laws.
- When storing the machine for a month or longer, follow these instructions to prevent deterioration of the machine performance :



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

Regular lubrication (during storage)

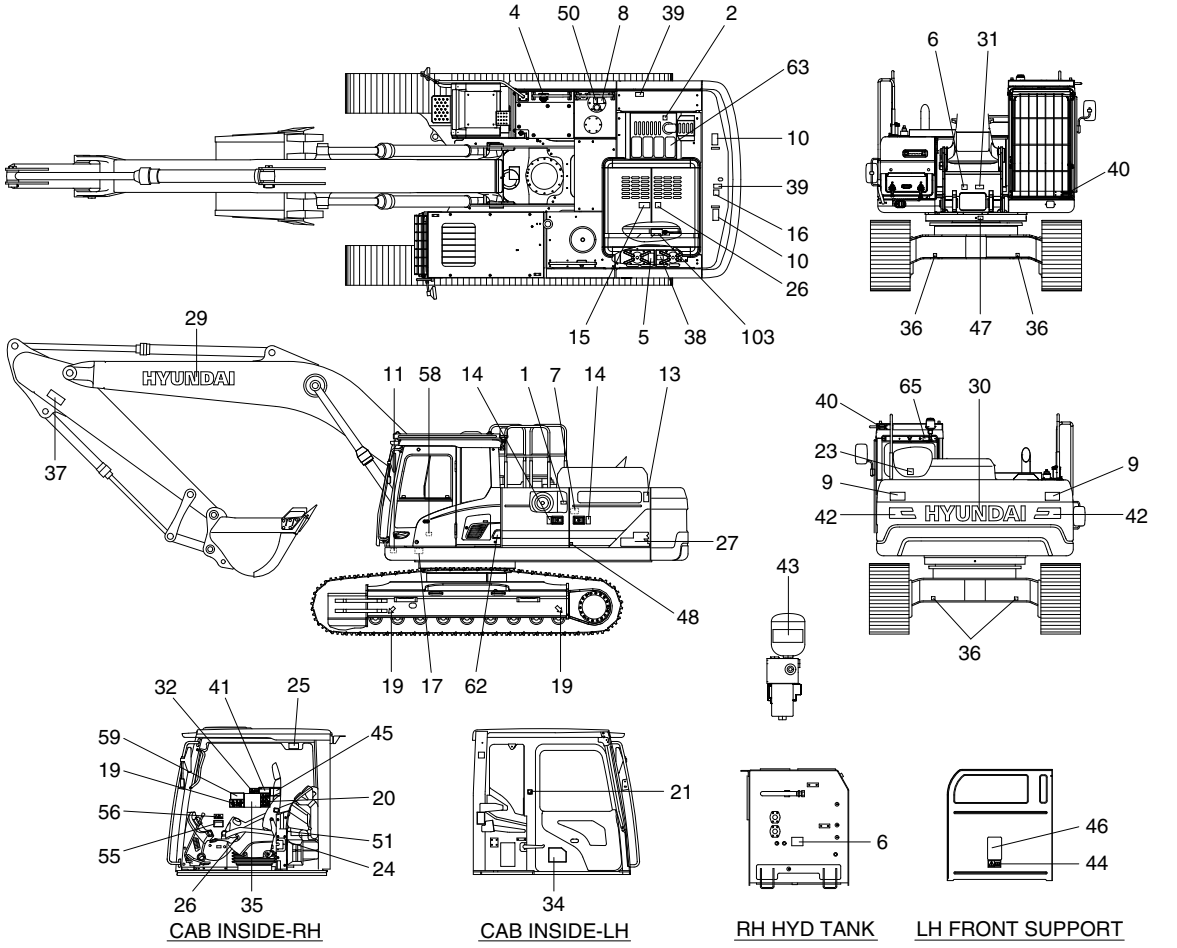
- Breaking the lubrication film on parts may cause abnormal abrasion during the next operation.
- Check the level of the engine oil and coolant when starting the engine up, and top them up if necessary.
- Thoroughly wipe off any oil from cylinder rod before operating machine as it will attract dust and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



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.



90K8-03200-00

1	Air cleaner filter	21	Hammer	42	Reflecting
2	Turbocharger cover	23	Emergency exit	43	Accumulator
3	Radiator cap	24	Air conditioner filter	44	M/control pattern change-w/o valve
4	Fueling	25	ROPS plate	45	M/control pattern change valve
5	Battery accident	26	Safety lever	46	M/control pattern change-w/valve
6	High pressure hose	27	Model name	47	Swing bearing grease
7	Hydraulic oil level	29	Trade mark (boom)	48	Battery position
8	Hydraulic oil lub	30	Trade mark (CWT)	50	Fuel shut off
9	Keep clear-rear	31	Reduction gear grease	51	MCU/ECM connector
10	Lifting eye	32	Clamp locking	55	key off caution
11	Name plate	34	Service instruction	56	RCV lever
12	Slinging ideogram	35	Lifting chart	58	Leftover fuel
13	Keep clear-side	36	Tie	59	RCV control
14	Stay fix	37	Keep clear-attach	62	Band
15	Engine hood shearing	38	Electric welding	63	Step tread
16	No step	39	Falling	64	Console logo
17	Transporting	40	ROPS FOG plate	65	Beacon lamp
19	M/control pattern	41	Caution (water separat-or, turbocharger)		
20	Ref operator's manual				

2. DESCRIPTION

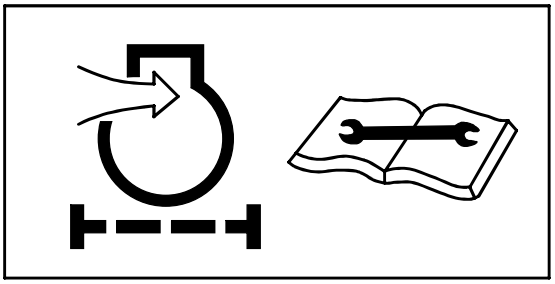
There are several specific warning labels on this machine please become familiarized with all warning labels.

Replace any safety label that is damaged, or missing. If a safety label is attached to a part that is replaced, install a safety label on the replacement part.

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

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

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



21070FW01

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

This warning label is positioned on the top side of the engine hood.

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

21070FW02

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

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

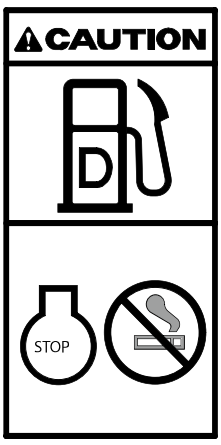
⚠ **Never open the filler cap while engine running or at high coolant temperature. Hot coolant can cause serious burns, injury or death.**

14070FW03

4) **FUELING** (item 4)

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

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



290F0FW02

5) BATTERY ACCIDENT (item 5)

This warning label is positioned on the battery cover.

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

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

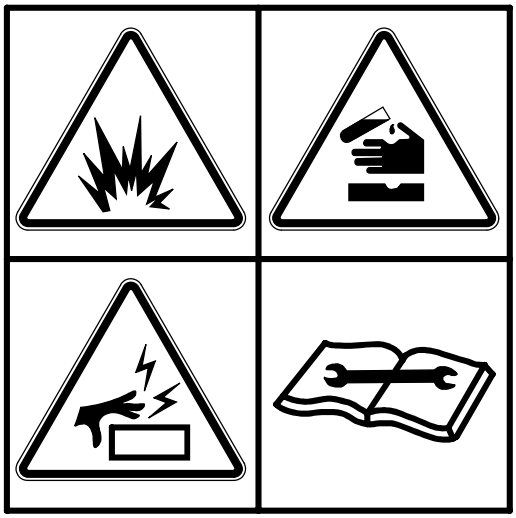
With electrolyte at proper level, less space may cause the gases to be accumulated in the battery.

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

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

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

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



36070FW05

6) HIGH PRESSURE HOSE (item 6)

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

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

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

※ See the maintenance section for details.

14070FW29

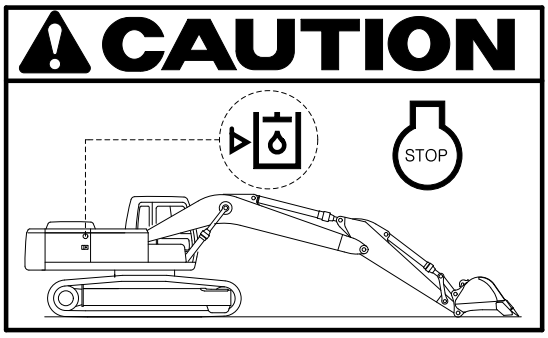
7) HYDRAULIC OIL LEVEL (item 7)

This warning label is positioned on the RH side cover.

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

※ Check oil level on the level gauge.

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



21070FW07

8) HYDRAULIC OIL LUBRICATION (item 8)

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

※ Do not mix with different brand oils.

⚠ Never open the filler cap while high temperature.

⚠ Loosen the cap slowly and release internal pressure completely.

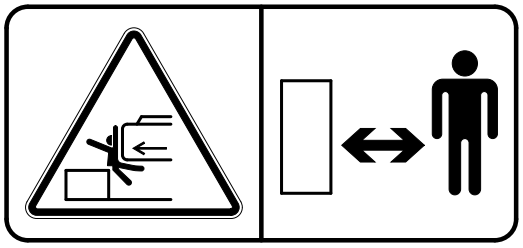
14070FW08

9) KEEP CLEAR-REAR (item 9)

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

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

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



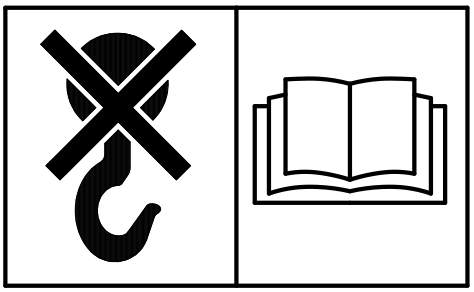
21090FW09

10) LIFTING EYE (item 10)

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

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

※ See page 5-8 for proper lifting method of the machine.



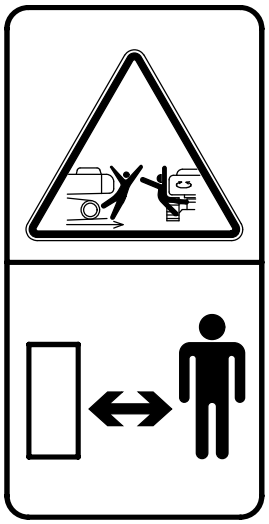
21070FW10

11) **KEEP CLEAR-SIDE** (item 13)

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

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

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



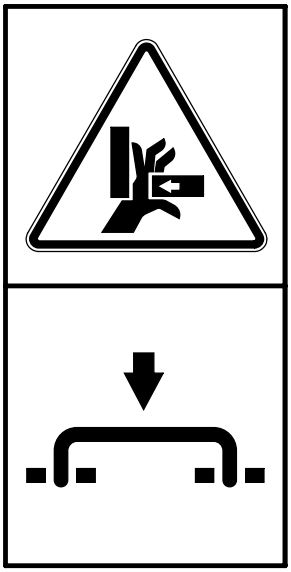
21070FW13

12) **STAY FIX** (item 14)

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

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

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



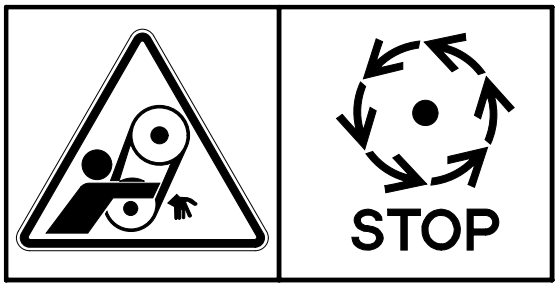
21070FW14

13) **ENGINE HOOD SHEARING** (item 15)

This warning label is positioned on the engine hood.

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

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



21070FW15

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

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

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

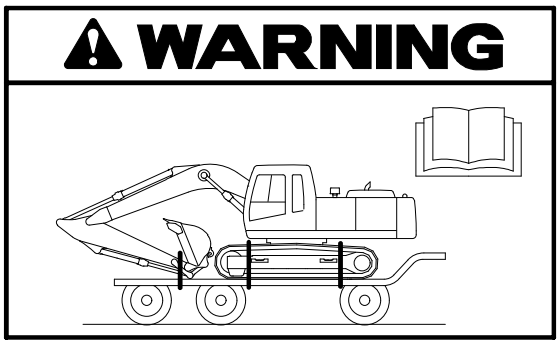
21070FW16

15) **TRANSPORTING** (item 17)

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

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

See page 5-6 for details.



14070FW17

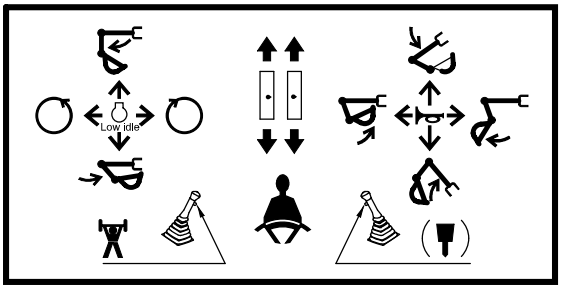
16) **MACHINE CONTROL PATTERN** (item 19)

This warning label is positioned in right side 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 2-12 for details.



91N6-07201

17) **REF OPERATOR'S MANUAL** (item 20)

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

(1) Ref operator manual

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

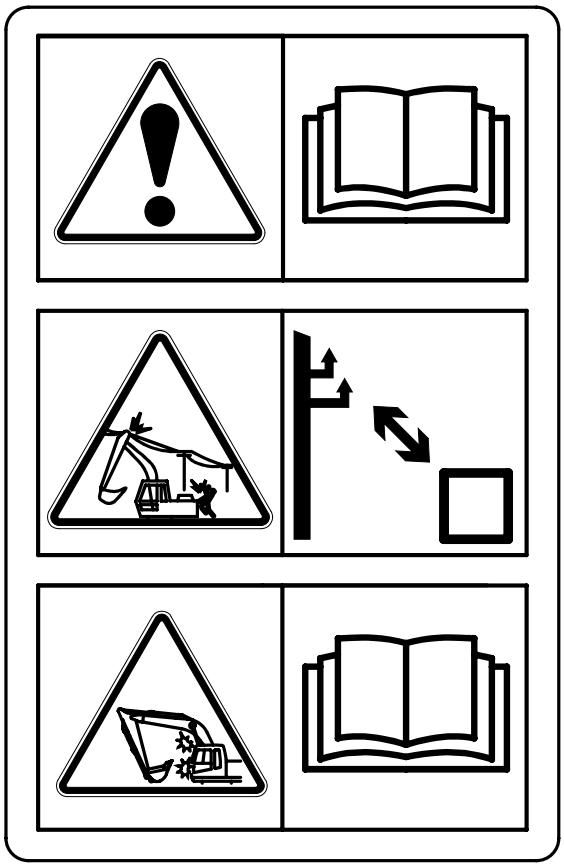
⚠ Do not operate this machine unless you have read and understand the instructions and warnings in this manual.
Failure to follow the instructions or warnings could result in injury or death.

(2) Max height

⚠ Serious injury or death can result from contact with electric lines.
An electric shock being received by merely coming into the vicinity of an electric lines, the minimum distance should be kept considering the supply voltage as page 1-21.

(3) Interference

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



2609A0SL05

18) **HAMMER** (item 21)

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

※ The window serves as an alternate exit.

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

91Q6-07280

19) **EMERGENCY EXIT** (item 23)

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

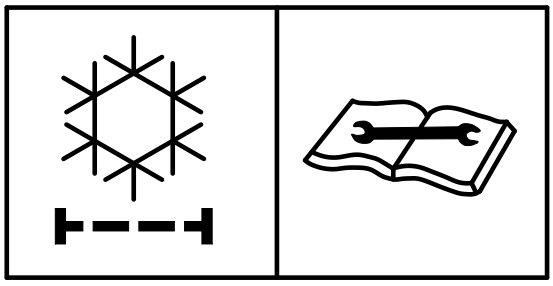
※ **The rear window serves as an alternate exit.**

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

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

This warning label is positioned on the air conditioner cover.

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

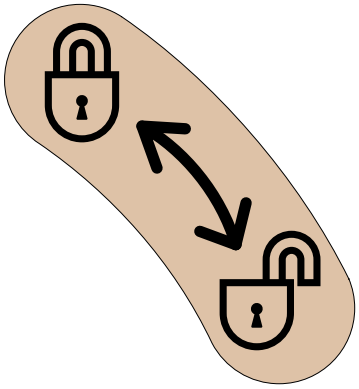


21070FW26

21) **SAFETY LEVER** (item 26)

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

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

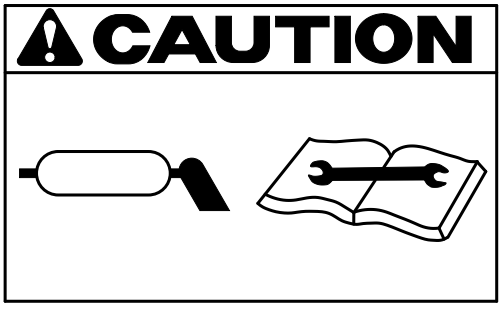


30007A1FW07A

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

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

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



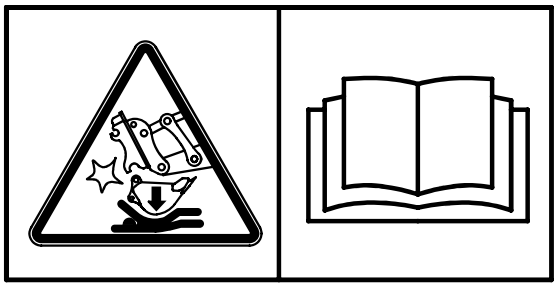
21070FW35

23) **CLAMP LOCKING** (item 32)

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

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

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



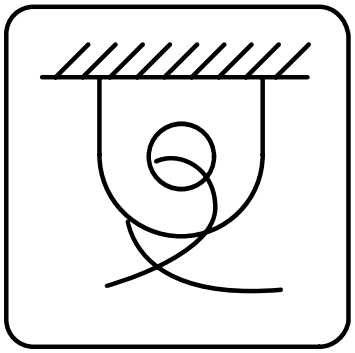
14070FW60

24) **TIE** (item 36)

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

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

⚠ **See page 2-15 for detail.**



4507A0FW02

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

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

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

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

14070FW31

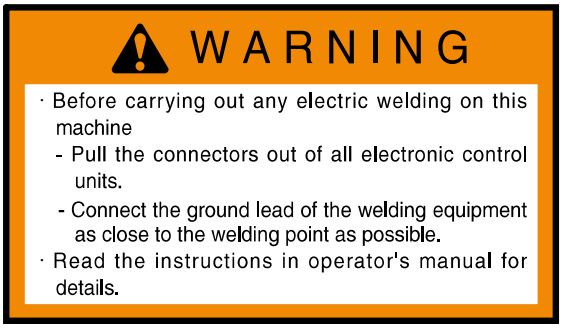
26) **ELECTRIC WELDING** (item 38)

This warning label is positioned on the battery cover.

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

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

※ **See page 4-51 for detail.**



7807AFW20

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.

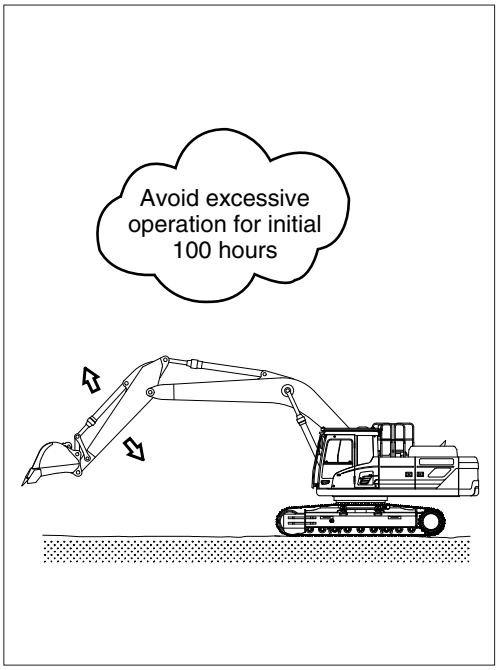
(4) Warm up the machine fully before operation.

(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	



350SA4OP01

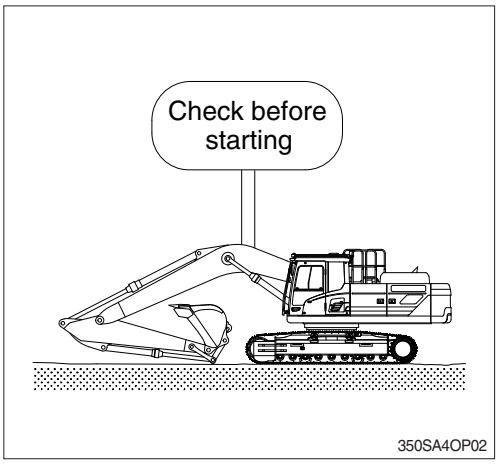
2. CHECK BEFORE STARTING THE ENGINE

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.



350SA4OP02

3. STARTING AND STOP THE ENGINE

1) CHECK INDICATOR LIGHTS

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

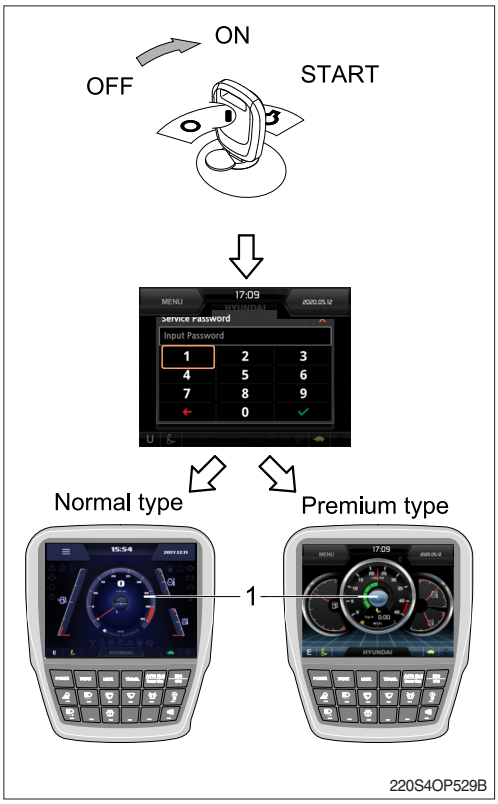
(2) Turn the starting switch to the ON position. Buzzer sounding for 4 seconds with HYUNDAI logo on cluster.

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

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

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

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



2) STARTING ENGINE IN NORMAL TEMPERATURE

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

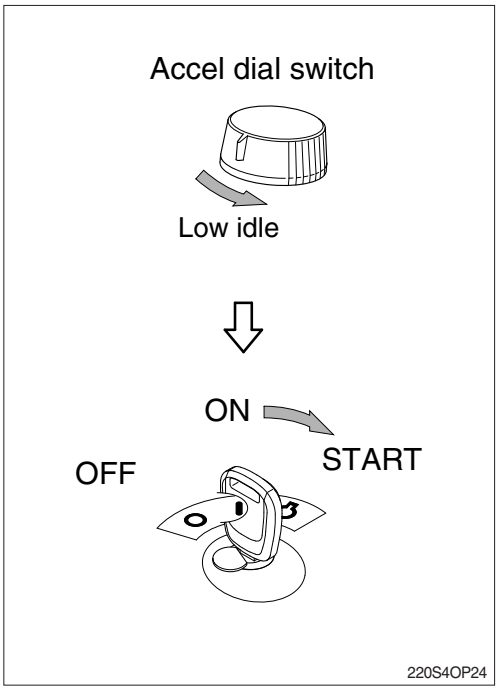
(1) Turn the accel dial switch to low idle position.

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

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

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

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



3) STARTING ENGINE IN COLD WEATHER

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

※ **Replace the engine oil and fuel referring to recommended oils at page 7-32.**

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

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

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

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

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

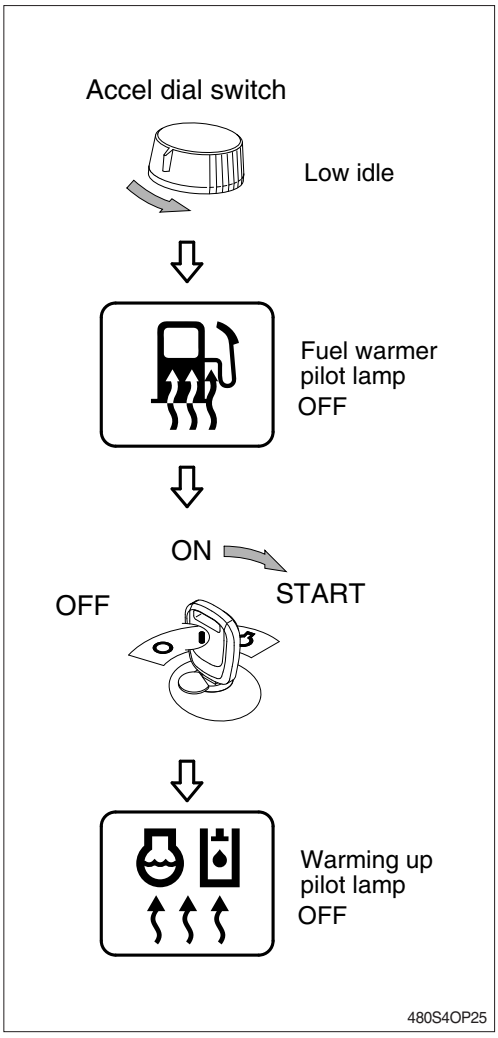
(4) Start the engine by turning the starting switch to START position after the fuel warmer pilot lamp OFF.

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

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

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

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



4) INSPECTION AFTER ENGINE START

Inspect and confirm the following after engine starts.

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

(2) Are there leakages of oil or water?

(3) Are all the warning lamps turned OFF (1-8)?
- Normal type (1~8), premium type (1~12)

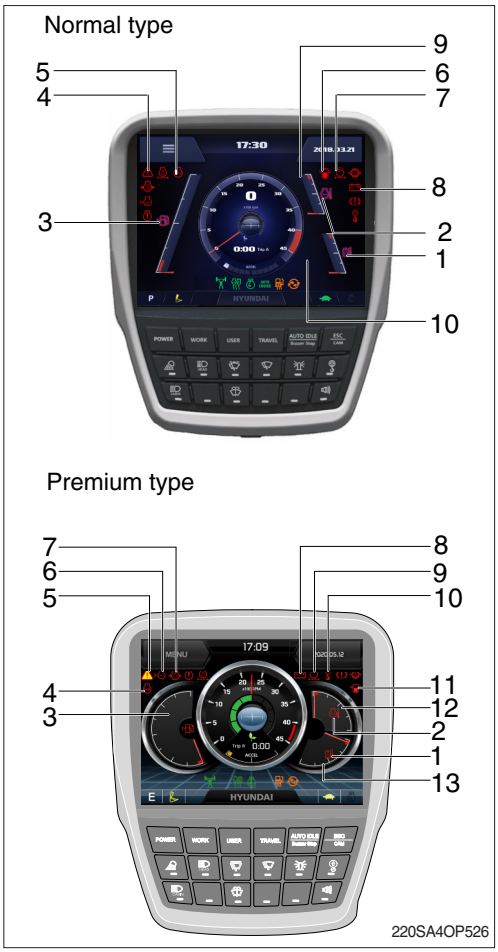
(4) Are the indicator of water temperature gauge (n/type : 9, p/type : 13) and hydraulic temperature gauge (n/type : 10, p/type : 14) in the operating range?

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

(6) Are the sound and vibration normal?

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

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



5) WARMING-UP OPERATION

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

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

(2) Speed up the engine by multimodal dial and run the engine at mid-range speed.

(3) Operate bucket lever for 5 minutes.

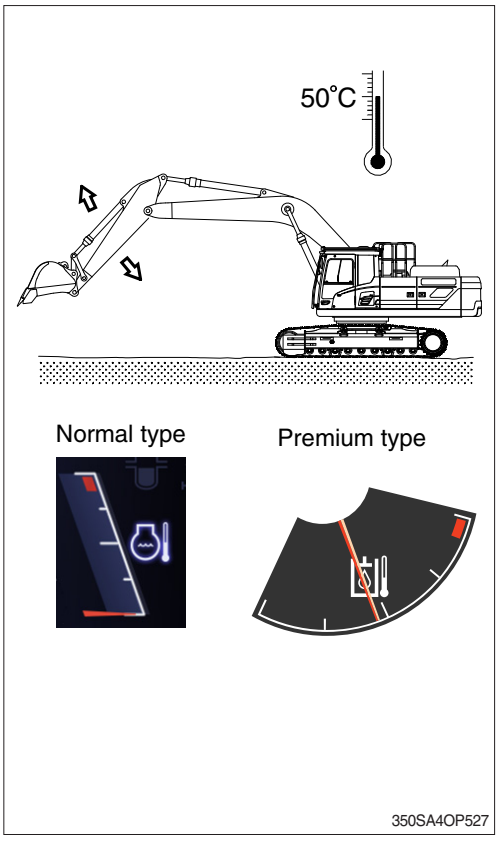
※ **Do not operate anything except bucket lever.**

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

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

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

※ **Increase the time for warming-up during winter.**



6) TO STOP THE ENGINE

※ **If the engine is abruptly stopped before it has cooled down, engine life may be greatly shortened. Consequently, do not abruptly stop the engine apart from an emergency.**

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

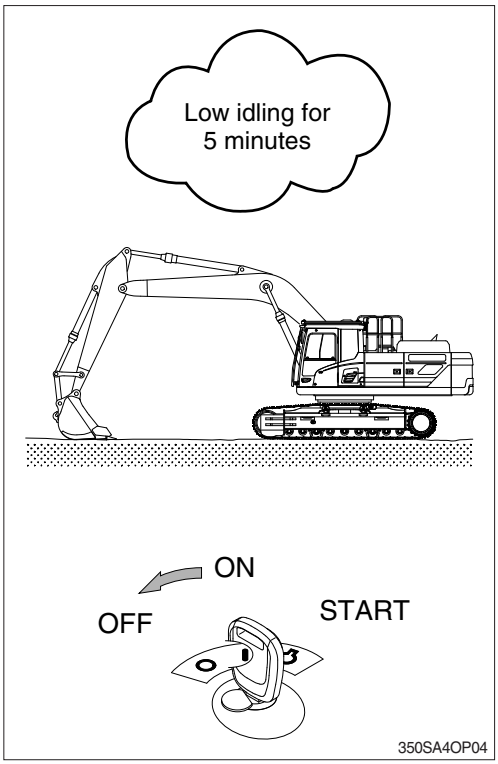
(1) Down the bucket on the ground then put all the levers in the neutral position.

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

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

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

(5) Lock the cab door.



4. MODE SELECTION SYSTEM

1) STRUCTURE OF MECHATRONICS SYSTEM

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

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

(1) Power mode

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

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

(2) Work mode

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

① General work mode (bucket)

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

② Work tool mode (breaker, crusher)

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

220S4OP31A

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

(3) User mode

① User mode is useful for setting the user preperable power quickly.

② (engine speed, power shift and idle speed) There are two methods for use of user mode.

a. In operation screen

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

Refer to page 3-13.

b. In menu

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

- Each memory mode has a initial set which are mid-range of max engine speed, power shift and auto idle speed.

220S4OP32A

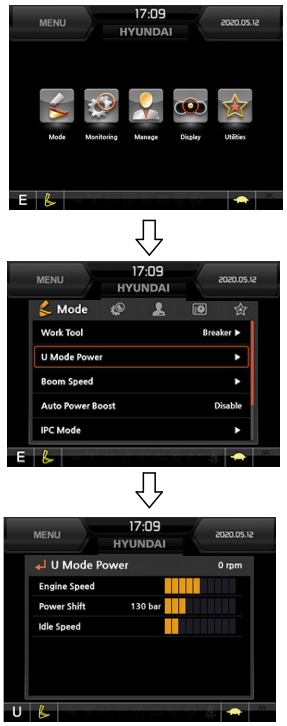
- High idle rpm, auto idle rpm and EPPR pressure can be adjusted and memorized in the U-mode.

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

· LCD segment vs parameter setting

Step (▮)	Engine speed (rpm)	Idle speed (rpm)	Power shift (bar)
1	1300	800	0
2	1400	850	3
3	1450	900	6
4	1500	950	9
5	1550	1000 (auto decel)	12
6	1600	1050	16
7	1650	1100	20
8	1700	1150	26
9	1750	1200	32
10	1800	1250	38

※One touch decel & low idle : 900 rpm



220S4OP33A

(4) Travel mode

: Low speed traveling.

: High speed traveling.

(5) Auto idle mode

Pilot lamp ON : Auto idle function is activated.

Pilot lamp OFF : Auto idle function is canceled.

(6) Monitoring system

Information of machine performance as monitored by the MCU can be displayed on the LCD. Refer to the page 3-22.

(7) Self diagnostic system

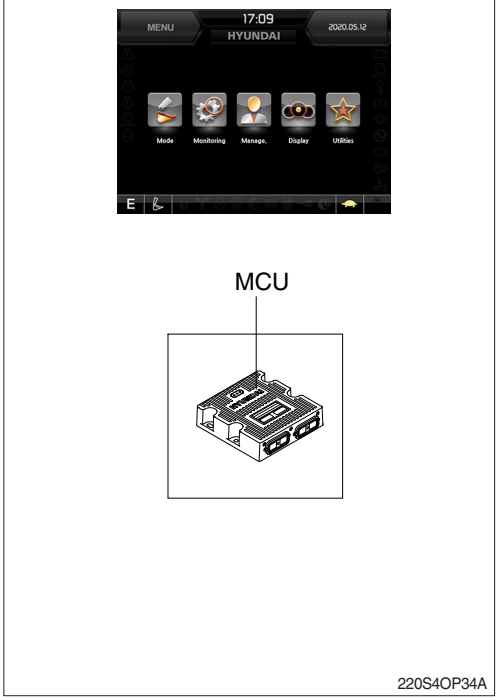
① **MCU (Machine Control Unit)**

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

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

(8) Anti-restart system

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



2) HOW TO OPERATE MODE SELECTION SYSTEM

(1) When start key switch is turned ON

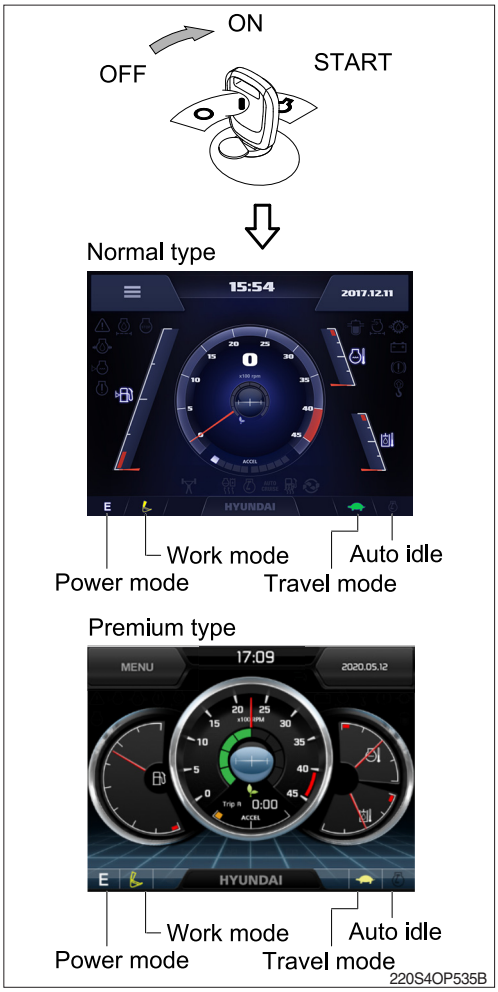
① When start key switch is turned on, the cluster turns on and buzzer sounds for 4 seconds. And then main information as gauges and engine speed are displayed on LCD.

② Initial default mode settings are displayed in the cluster.

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

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

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



(2) After engine start

① When the engine is started, rpm display indicates low idle, 900 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 1200 rpm automatically to warm up the machine.

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

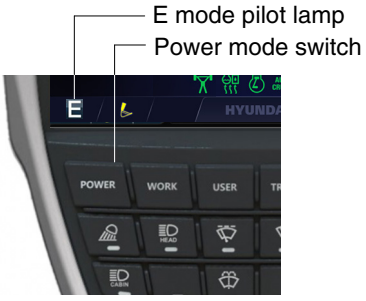
3) SELECTION OF POWER MODE

(1) E mode

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

Engine rpm	Effect
1450	Variable power control in proportion to lever stroke (improvement in fuel efficiency) ※ Same power as S mode in full lever operation.

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

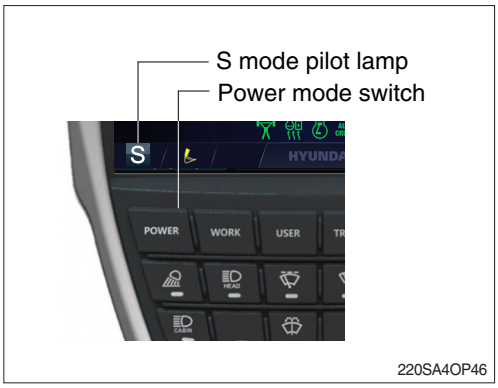


(2) S mode

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

Engine rpm	Effect
1550	Standard power

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

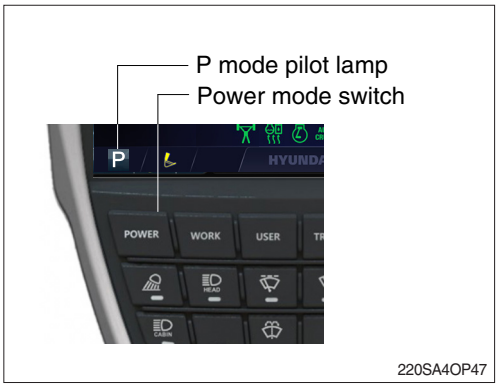


(3) P mode

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

Engine rpm	Effect
1650	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

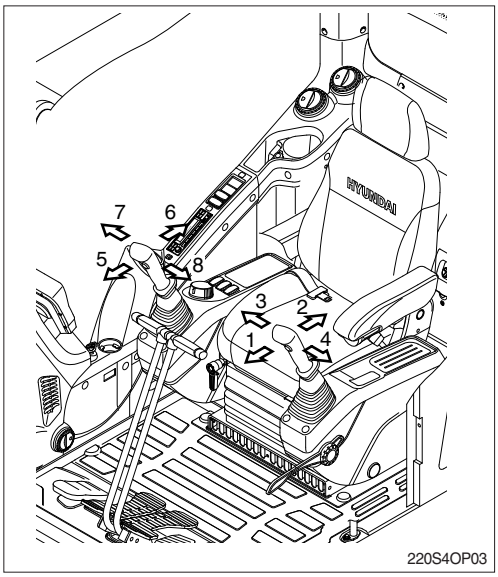
※ Confirm the operation of control lever and working device.

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.

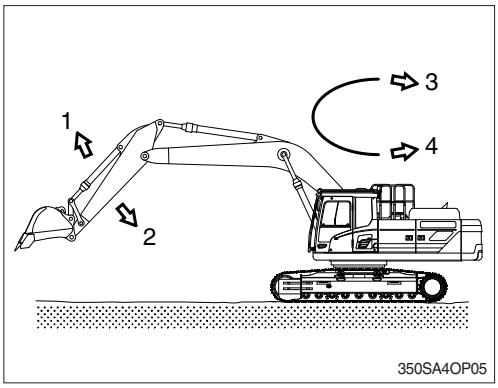
※ When operating swing, consider the swing distance by inertia.



220S4OP03

※ Left control lever

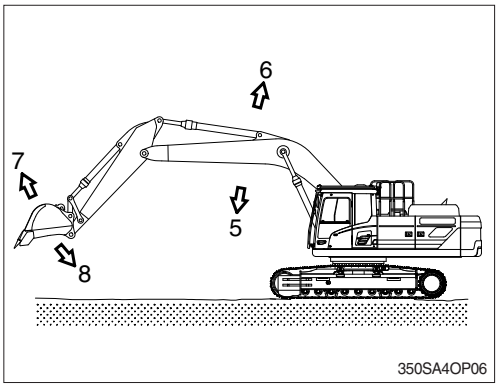
1 Arm roll-out
2 Arm roll-in
3 Swing right
4 Swing left



350SA4OP05

※ Right control lever

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



350SA4OP06

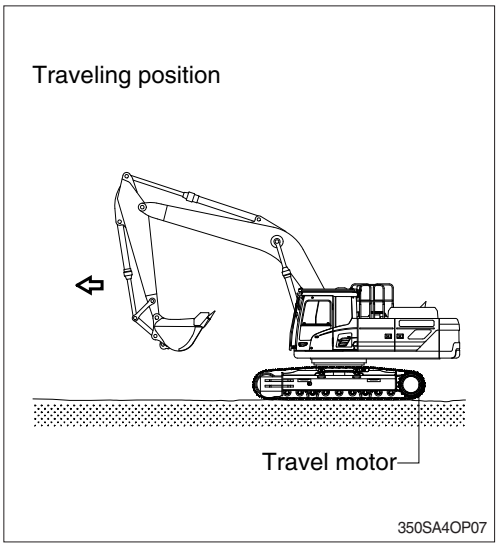
6. TRAVELING OF THE MACHINE

1) BASIC OPERATION

(1) Traveling position

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

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



(2) Traveling operation

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

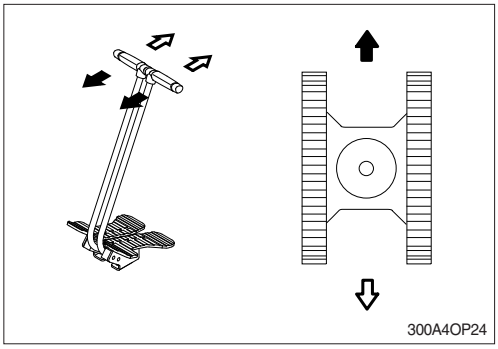
※ **Do not travel continuously for a long time.**

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

(3) Forward and backward traveling

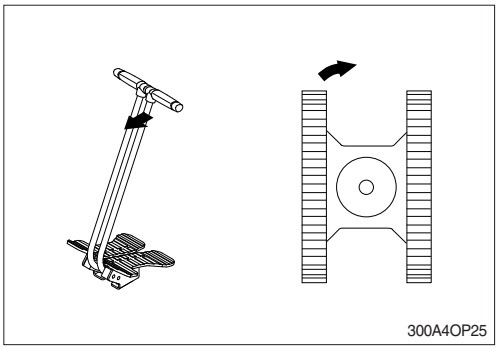
When the left and right travel lever or pedal are pushed at the same time, the machine will travel forward or backward.

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



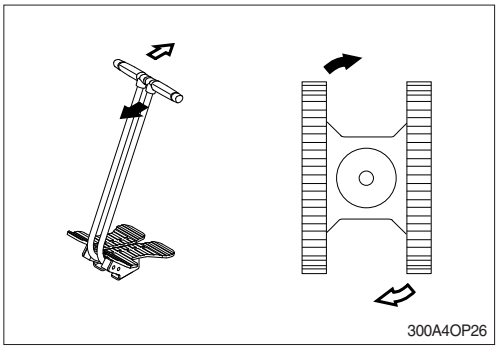
(4) Pivot turning

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



(5) Counter rotation

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



2) TRAVELING ON A SLOPE

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

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

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

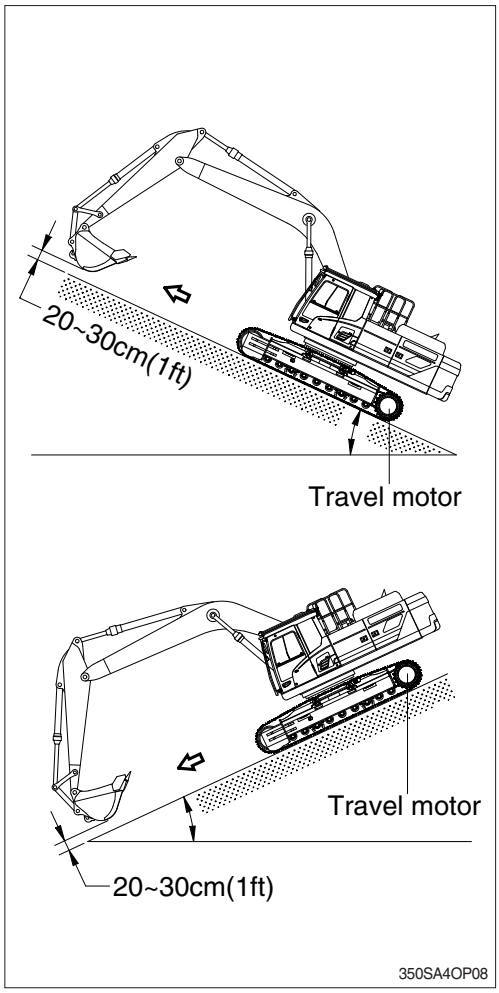
(4) When parking on a slope, use the bucket as a brake and place blocks behind the tracks to prevent sliding.

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

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

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

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



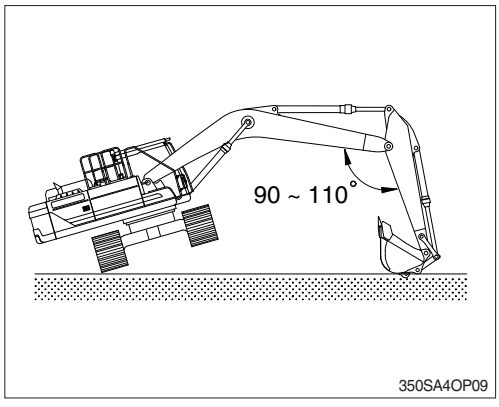
3) TRAVELING ON SOFT GROUND

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

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

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

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



4) TOWING THE MACHINE

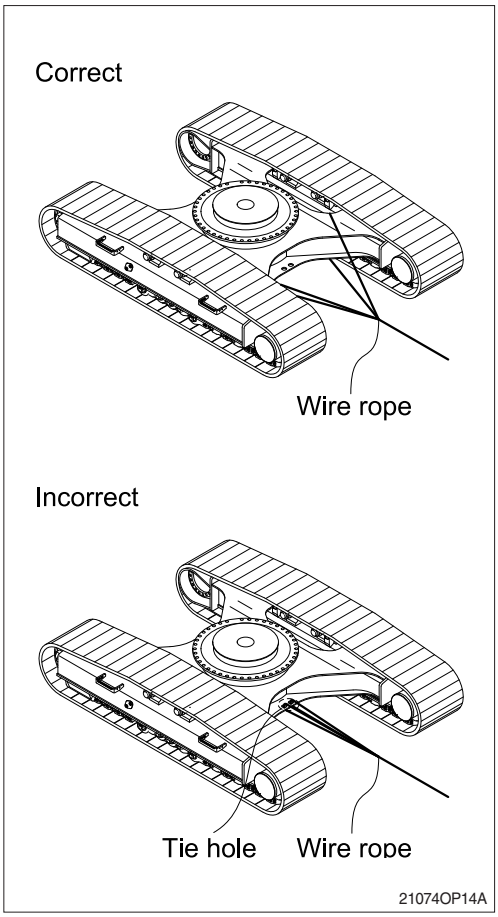
Tow the machine as follows when it can not move on it's own.

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

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

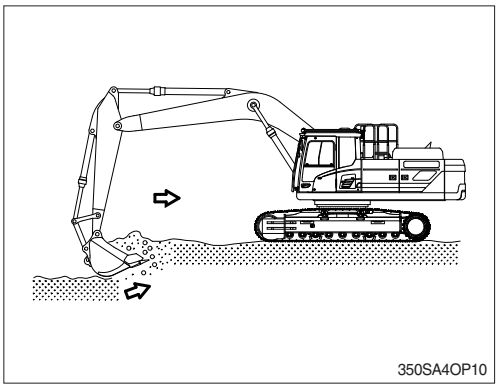
※ **Never tow the machine using only the tie hole, because this may break.**

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

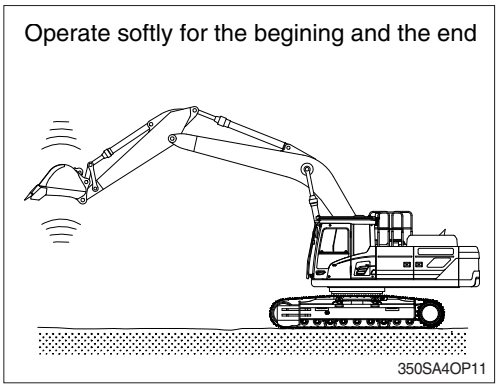


7. EFFICIENT WORKING METHOD

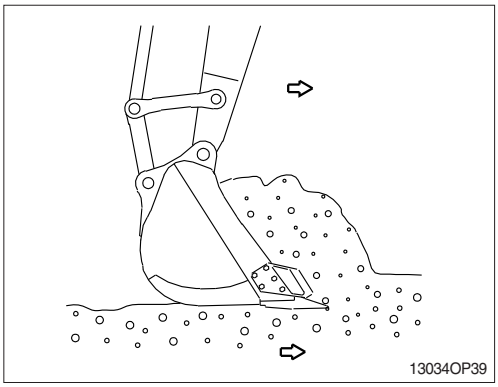
1) Do the digging work by arm.
   Use the pulling force of arm for digging and use together with the digging force of the bucket if necessary.



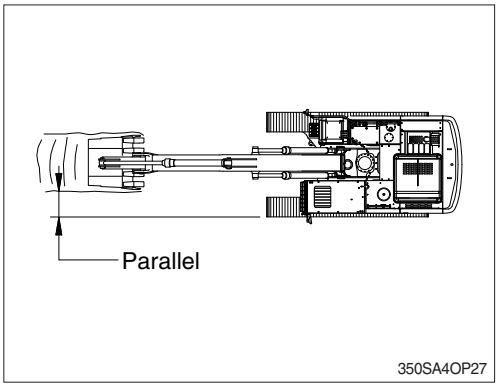
2) When lowering and raising the boom operate softly for the beginning and the end.
   In particularly, sudden stops while lowering the boom may cause damage to the machine.



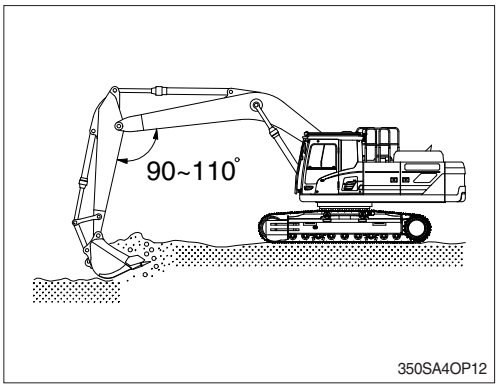
3) The digging resistance and wearing of tooth can be reduced by putting the end of bucket tooth to the digging direction.



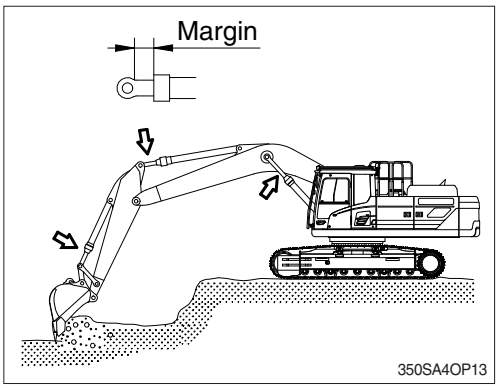
4) Set the tracks parallel to the line of the ditch to be excavated when digging ditch. Do not swing while digging.



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

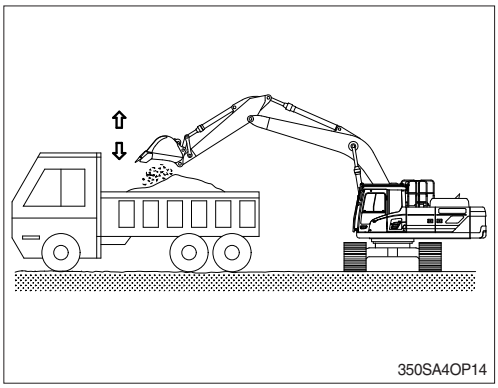


6) Operate leaving a small safety margin of cylinder stroke to prevent damage of cylinder when working with the machine.

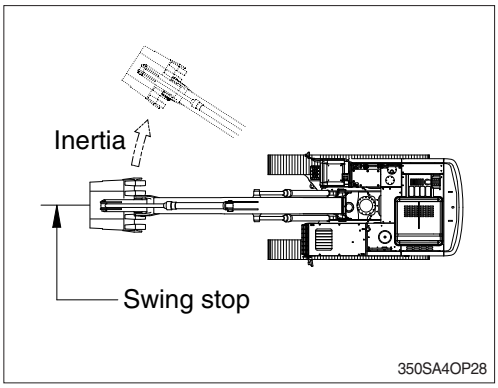


7) Keep the bucket to the dumping position and the arm horizontal when dumping the soil from the bucket.
Operate bucket lever 2 or 3 times when hard to dump.

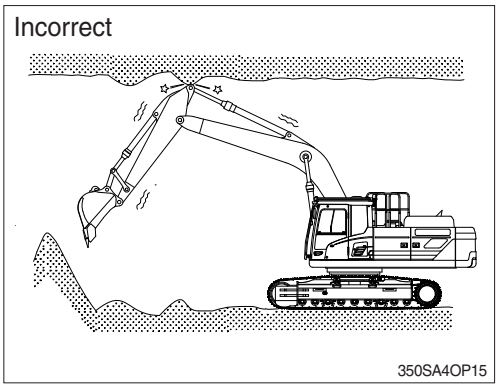
※ **Do not use the impact of bucket tooth when dumping.**



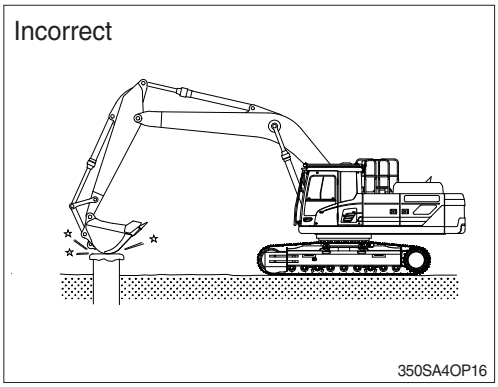
8) Operate stop of swing considering the swing slip distance is created by inertia after neutralizing the swing lever.



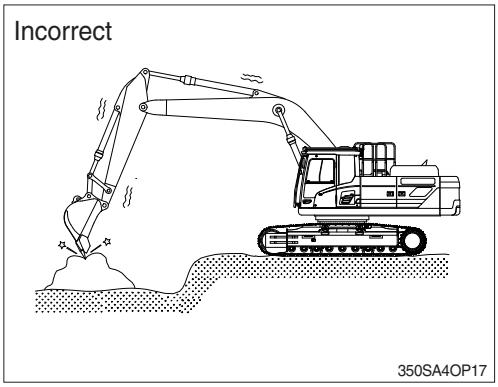
9) If the excavation is in an underground location or in a building, make sure that there is adequate overhead clearance and that there is adequate ventilation.



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

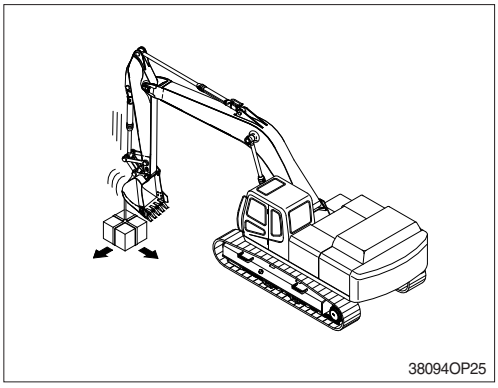
Operation exceeding machine performance may result in accident or failure.

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 HD Hyundai Construction Equipment 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.

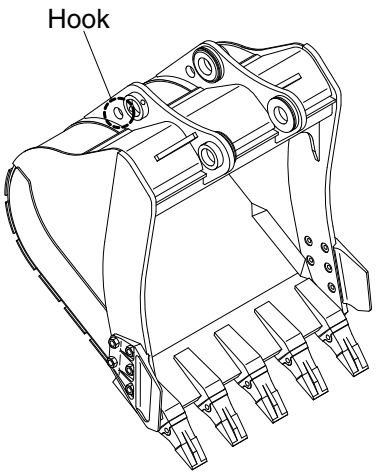
When performing lifting operation, never raise or lower a person.

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.



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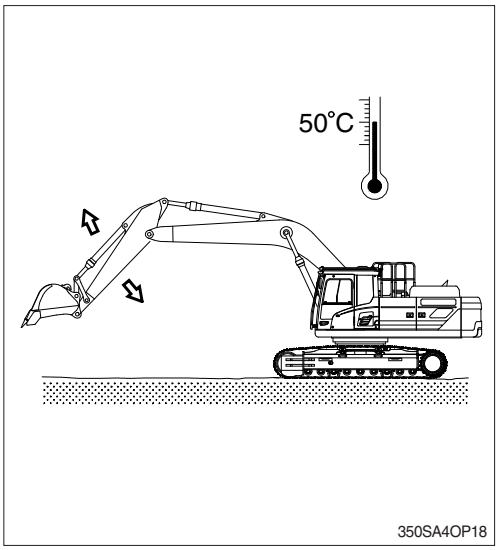
8. OPERATION IN THE SPECIAL WORK SITES

1) OPERATION THE MACHINE IN A COLD WEATHER



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

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

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

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

(5) Always keep the battery completely charged.

※ **Discharged batteries will freeze more easily than fully charged.**

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

2) OPERATION IN SANDY OR DUSTY WORK SITES

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

※ **Replace the inner and outer element after 4 times of cleaning.**

(2) Inspect radiator, oil cooler and condenser frequently, and keep cooling fins clean.

(3) Prevent sand or dust from getting into fuel tank and hydraulic tank during refilling.

(4) Prevent sand or dust from penetrating into hydraulic circuit by tightly closing breather cap of hydraulic oil tank. Replace hydraulic oil filter and air breather element frequently. Also, replace the fuel filter frequently.

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

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

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

3) SEA SHORE OPERATION

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

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

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

4) OPERATION IN MUD, WATER OR RAIN WORK SITES

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

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

(3) Perform all daily lubrication and service.

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

5) OPERATION IN ROCKY WORK SITES

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

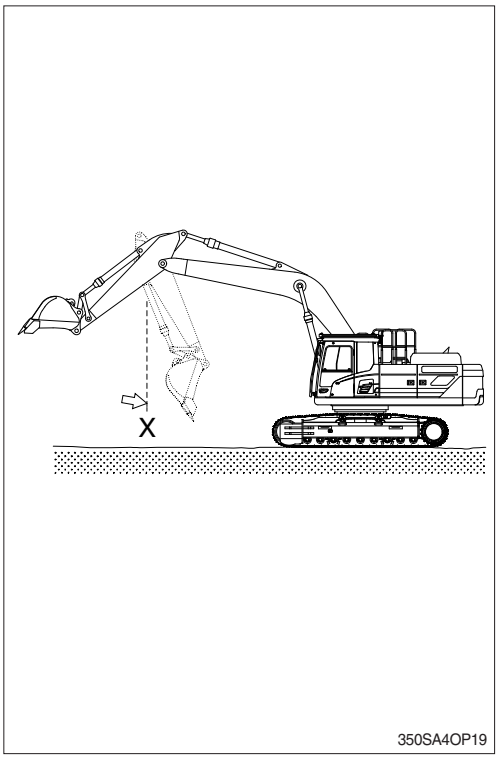
(2) Loosen the track tension a little when working in such areas.

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

9. NORMAL OPERATION OF EXCAVATOR

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

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



10. ATTACHMENT LOWERING (when engine is stopped)

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

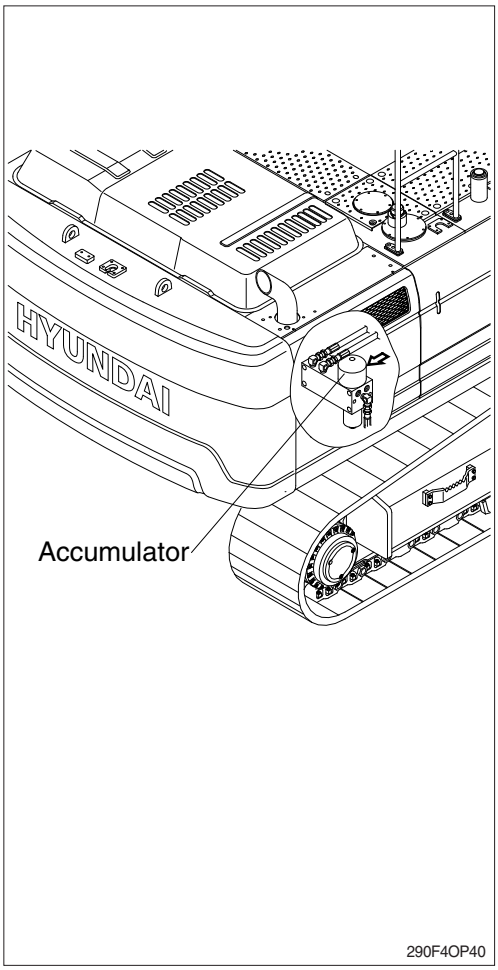
⚠ **Be sure no one is under or near the attachment before lowering the boom.**

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

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

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

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



11. STORAGE

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

1) BEFORE STORAGE

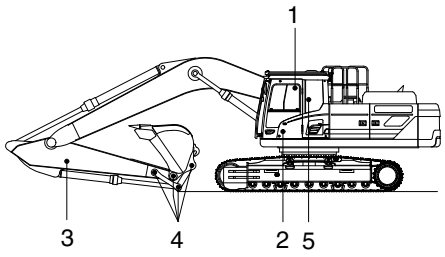
(1) Cleaning the machine

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

(2) Lubrication position of each part

Change all oil.

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



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

350SA4OP20

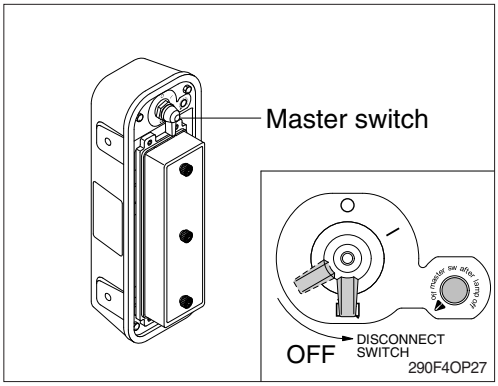
(3) Master switch

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

⚠ Off the master switch after lamp off.

⚠ It may cause severe failure of aftertreatment device.

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



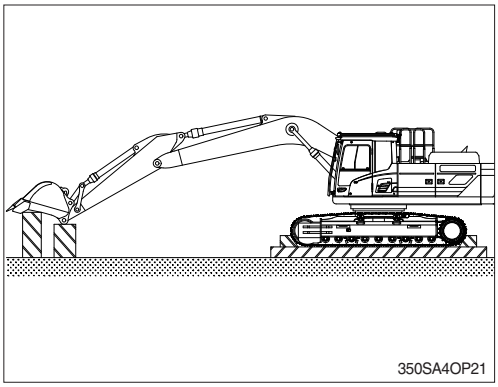
290F4OP27

(5) Prevention of dust and moisture

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

※ Cover exposed part of piston rod of cylinder.

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



350SA4OP21

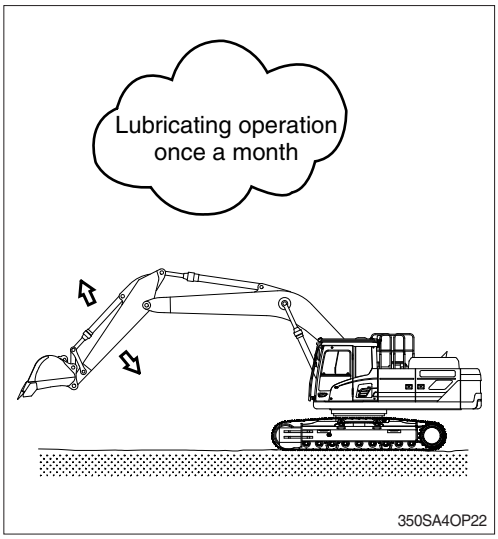
2) DURING STORAGE

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.

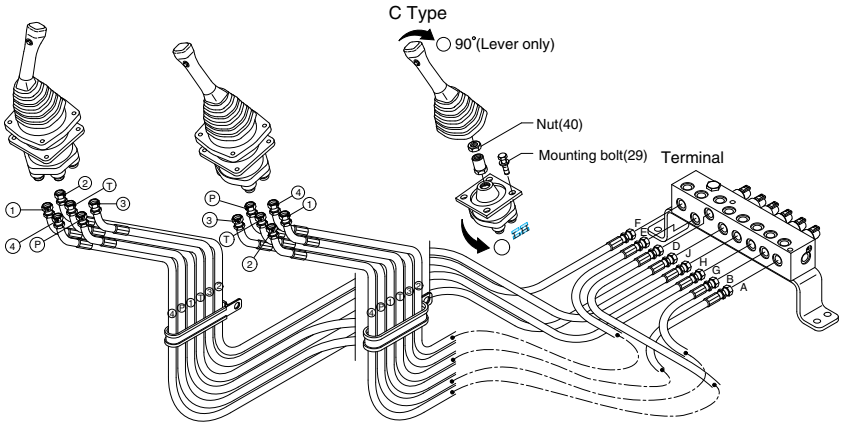
※ **Remove the drain port plug and drain the water until the gear oil comes out and then tighten the drain plug.**

※ **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 HD Hyundai Construction Equipment dealer for service.**

12. RCV LEVER OPERATING PATTERN

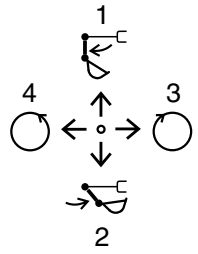
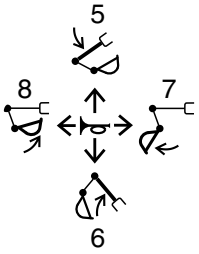
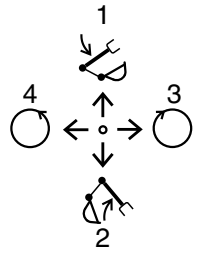
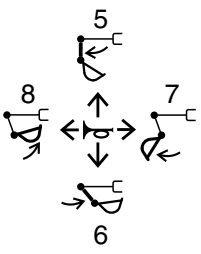
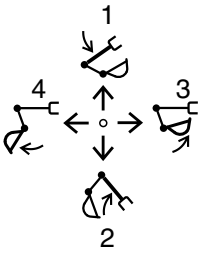
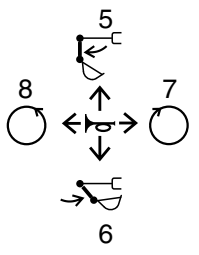
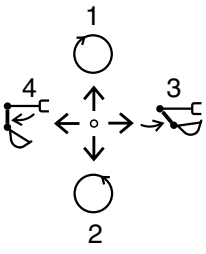
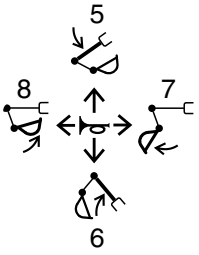
1) PATTERN CHANGE VALVE NOT INSTALL (standard)



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

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

350SA4OP41

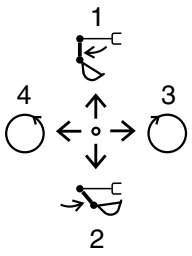
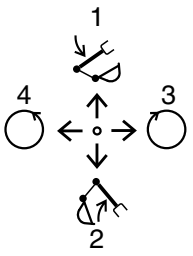
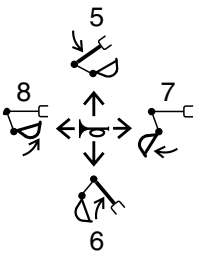
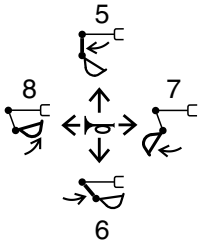
Pattern	Operation		Control function		Hose connection (port)		
	Left RCV lever	Right RCV lever			RCV lever	Change of Terminal block	
						From	To
ISO Type HD Hyundai Construction Equipment			Left	1Arm out	②	D	-
				2Arm in	④	E	-
				3Swing right	③	B	-
				4Swing left	①	A	-
			Right	5Boom lower	④	J	-
				6Boom raise	②	H	-
				7Bucket out	①	G	-
				8Bucket in	③	F	-
A Type			Left	1Boom lower	②	D	J
				2Boom raise	④	E	H
				3Swing right	③	B	-
				4Swing left	①	A	-
			Right	5Arm out	④	J	D
				6Arm in	②	H	E
				7Bucket out	①	G	-
				8Bucket in	③	F	-
B Type			Left	1Boom lower	②	D	J
				2Boom raise	④	E	H
				3Bucket in	③	B	F
				4Bucket out	①	A	G
			Right	5Arm out	④	J	D
				6Arm in	②	H	E
				7Swing right	①	G	B
				8Swing left	③	F	A
C Type			Left	① Loosen the RCV lever mounting bolt (40) and rotates lever assy 90˚ counterclockwise; then install. ② To put lever in correct position, disassemble nut (29) and rotates only lever 90˚ clockwise.			
			Right	Same as ISO type			

2) PATTERN CHANGE VALVE INSTALL (option)

(1) 2-pattern change type

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

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

Operation	ISO type	A type
Left RCV lever		
Right RCV lever		

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

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

② Change of operating pattern

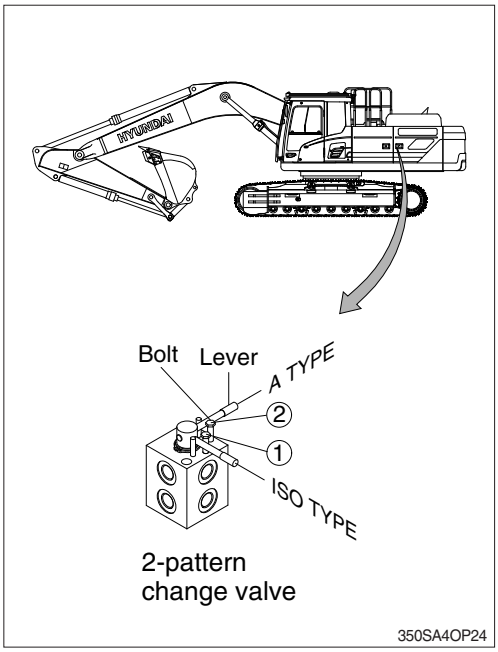
a. Loosen bolt.

b. Move lever to the "ISO" or "A" position.

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

· Position ① for "ISO" pattern.

· Position ② for "A" pattern.



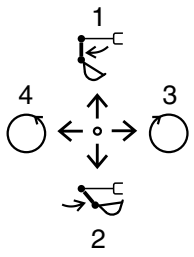
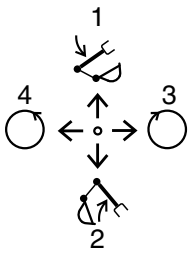
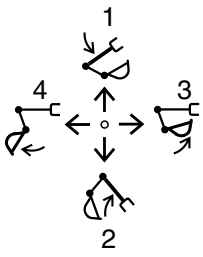
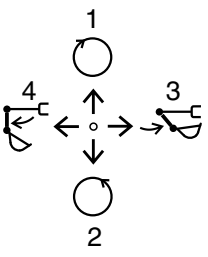
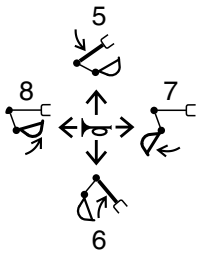
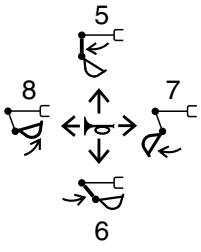
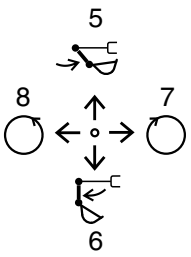
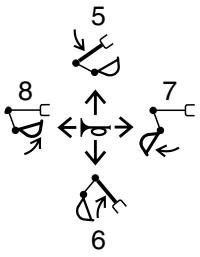
2-pattern change valve

350SA4OP24

(2) 4-pattern change type

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

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

Operation	ISO type	A type	B type	C type
Left RCV lever				
Right RCV lever				

① The machine control pattern can be easily changed from the "ISO type" to "A type", "B type" or "C type" by changing the position of the lever position.

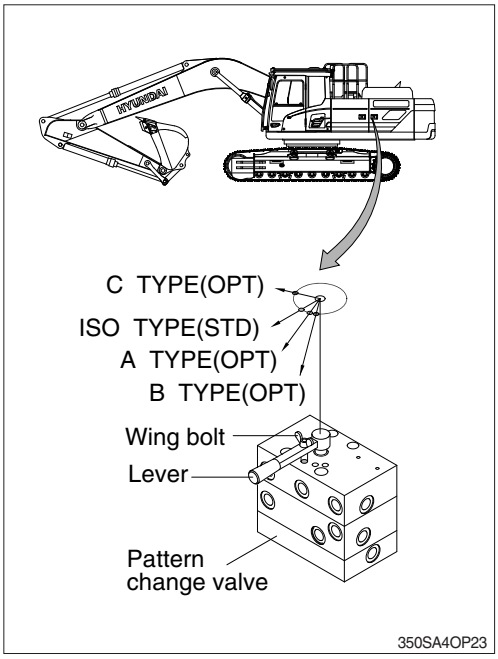
⚠ **Before starting the machine, check the lever position of pattern change valve and actual operating of attachment.**

② **Change of operating pattern**

a. Loosen the wing bolt.

b. Move lever from the "ISO" type to "A", "B" or "C" type position.

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



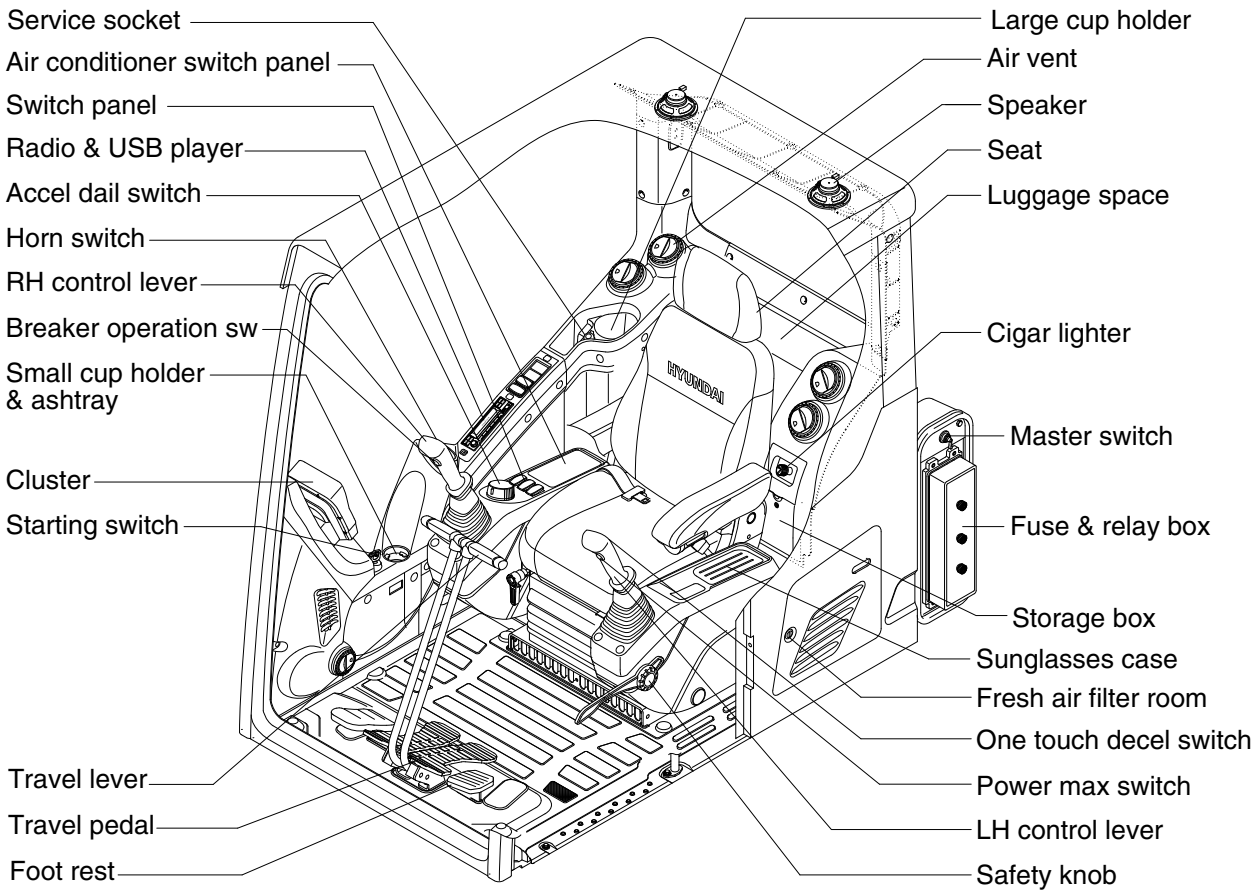
1. CAB DEVICES

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.



220S3CD31

2. CLUSTER

1) STRUCTURE

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

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

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

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

Normal type

235SA3CD501

Premium type

220S3CD01B

※ **The warning lamp pops up and/or blinks and the buzzer sounds when the machine has a problem. The warning lamp blinks until the problem is cleared. Refer to page 3-6 for details.**

2) GAUGE

(1) Operation screen

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

Normal type

235SA3CD551

Premium type

Default

Option

220S3CD151A

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

※ Operation screen type can be set by the screen type menu of the display (premium type). Refer to page 3-29 for details.

(2) RPM / Speed gauge

Normal type

Premium type

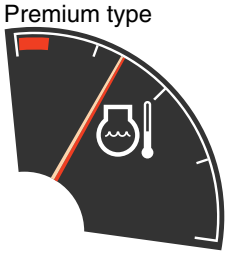
235SA3CD549

① This display the engine speed.

(3) Engine coolant temperature gauge

Normal type

Premium type



220S3CD553

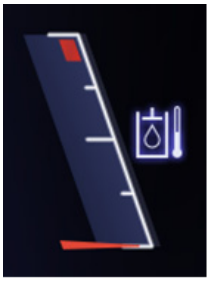
① This gauge indicates the temperature of coolant.
- White range : 40-113˚C (104-235˚F)
- Red range : Above 113˚C (235˚F)

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

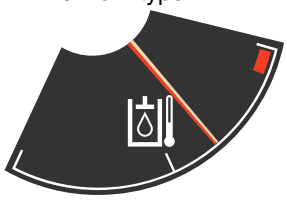
※ If the gauge indicates the red range or lamp blinks in red even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

(4) Hydraulic oil temperature gauge

Normal type



Premium type



220S3CD554

① This gauge indicates the temperature of hydraulic oil.
- White range : 40-100˚C (104-212˚F)
- Red range : Above 100˚C (212˚F)

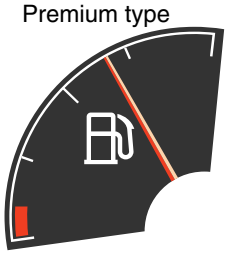
② If the indicator is in the red range or lamp pops up and the buzzer sounds reduce the load on the system. If the gauge stays in the red range, stop the machine and check the cause of the problem.

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

(5) Fuel level gauge

Normal type

Premium type



220S3CD555

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

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

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

(6) Tripmeter display

290F3CD56

① This displays the engine the tripmeter.

※ **Refer to page 3-31 for details.**

(7) Eco gauge

290F3CD58

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

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

③ The color of Eco gauge indicates operation status.

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

(8) Accel dial gauge

290F3CD59

① This gauge indicates the level of accel dial.

3) WARNING LAMPS

Normal type

400SA3CD503

Premium type

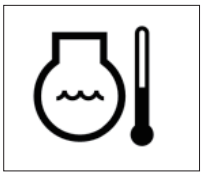
400SA3CD03

※ Warning lamps and buzzer

Warnings	When error happened	Lamps and buzzer
All warning lamps except below	Warning lamp pops up on the center of the LCD and the buzzer sounds	· The pop-up warning lamp moves to the original position and blinks, and the buzzer stops when ; - the buzzer stop switch AUTO IDLE Buzzer Stop is pushed - the lamp of the LCD is touched
COMM ERROR	Warning lamp pops up on the center of the LCD and the buzzer sounds	· Cluster displays this pop-up when it has communication error with MCU. · If communication with MCU become normal state, it will disappear automatically.
	Warning lamp pops up on the center of the LCD and the buzzer sounds	**※ Refer to page 3-7 for details.**

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

(1) Engine coolant temperature warning lamp



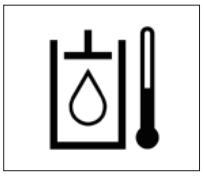
290F3CD61

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

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

③ Check the cooling system when the lamps keep blink.

(2) Hydraulic oil temperature warning lamp



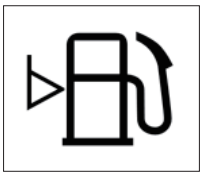
290F3CD62

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

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

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

(3) Fuel level warning lamp



290F3CD63

① This warning lamp pops up and the buzzer sounds when the level of fuel is below 69 ℓ (18.2 U.S. gal).

② Fill the fuel immediately when the lamp blinks.

(4) Emergency warning lamp

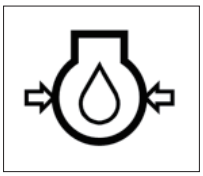
290F3CD64

① This warning lamp pops up and the buzzer sounds when each of the below warnings is happened.
- Engine coolant overheating (over 113˚C)
- Hydraulic oil overheating (over 105˚C)
- MCU input voltage abnormal
- Cluster communication data error
- Engine ECM communication data error

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

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

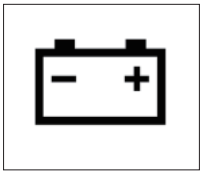
(5) Engine oil pressure warning lamp



290F3CD65

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

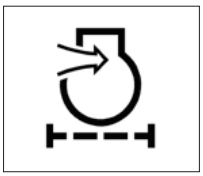
(6) Battery charging warning lamp



290F3CD67

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

(7) Air cleaner warning lamp



290F3CD68

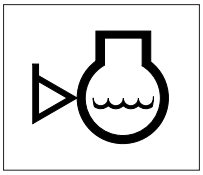
① This warning lamp pops up and the buzzer sounds when the filter of air cleaner is clogged.
② Check the filter and clean or replace it.

(8) Overload warning lamp (opt)

290F3CD69

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

(9) Coolant level warning lamp



760F3CD58

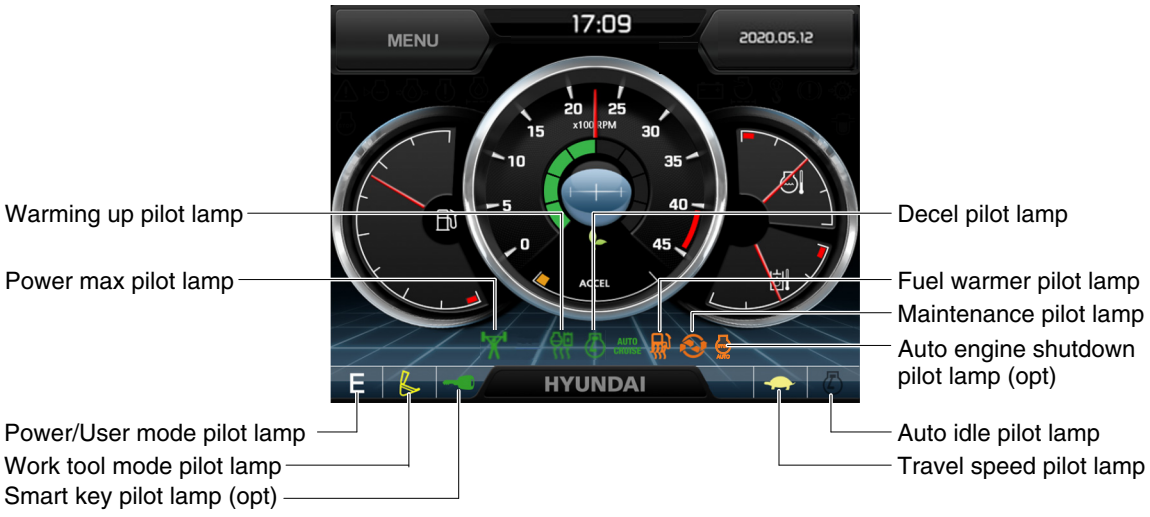
① This warning lamp indicates lack of coolant.
② Check and refill coolant.

4) PILOT LAMPS

Normal type

235SA3CD574

Premium type



220S3CD74B

(1) Mode pilot lamps

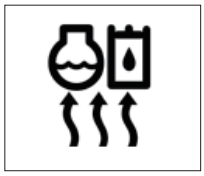
No	Mode	Pilot lamp	Selected mode
1	Power mode	P	Heavy duty power work mode
		S	Standard power mode
		E	Economy power mode
2	User mode	U	User preferable power mode
3	Work tool mode		General operation - IPC speed mode
			General operation - IPC balance mode
			General operation - IPC efficiency mode
	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

(2) Power max pilot lamp

290F3CD78

① The lamp will be ON when pushing power max switch on the LH RCV lever.
② The power max function is operated maximum 8 seconds.
※ **Refer to page 3-35 for power max function.**

(3) Warming up pilot lamp



290F3CD80

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

(4) Decel pilot lamp

290F3CD81

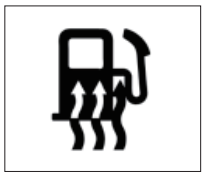
① Operating one touch decel switch on the RCV lever makes the lamp ON.

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

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

※ **Refer to page 3-35.**

(5) Fuel warmer pilot lamp



290F3CD82

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

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

(6) Maintenance pilot lamp

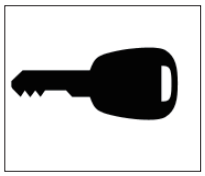
290F3CD83

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

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

※ **Refer to page 3-24.**

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



290F3CD214

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

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

※ **Refer to page 3-25.**

(8) Auto engine shutdown pilot lamp (premium type, opt)

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

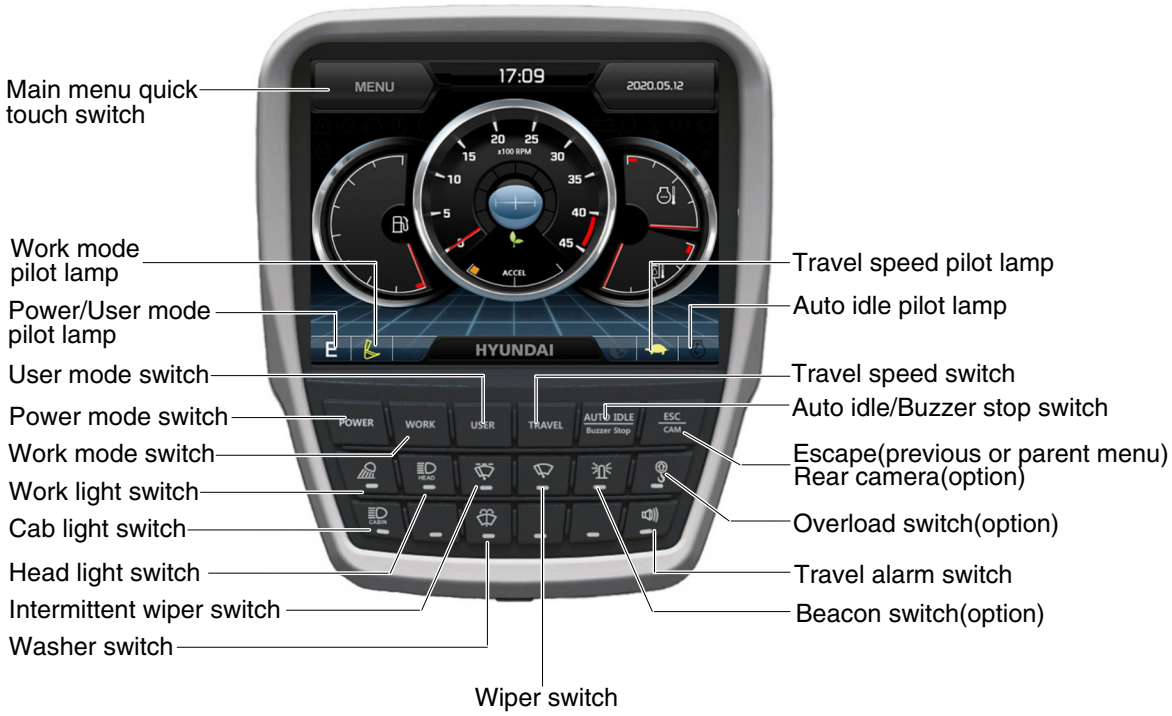
※ **Refer to page 3-21.**

5) SWITCHES

Normal type

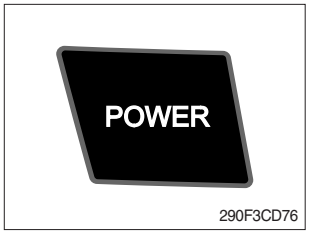
235SA3CD586

Premium type



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

(1) Power mode switch



① This switch is to select the machine power mode and selected power mode pilot lamp is displayed on the pilot lamp position.
- P : Heavy duty power work.
- S : Standard power work.
- E : Economy power work.

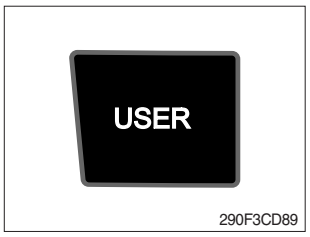
② The pilot lamp changes E → S → P → E in order.

(2) Work mode switch

① This switch is to select the machine work mode, which shifts from general operation mode to optional attachment operation mode.
- : General operation mode
- : Breaker operation mode (if equipped)
- : Crusher operation mode (if equipped)
- Not installed : Breaker or crusher is not installed.

※ Refer to the page 2-7 for details.

(3) User mode switch



① This switch is used to select between user mode and general power mode.
- U : User mode
- P/S/E : General power mode

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

(4) Travel speed switch

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

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

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

(5) Auto idle/ buzzer stop switch

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

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

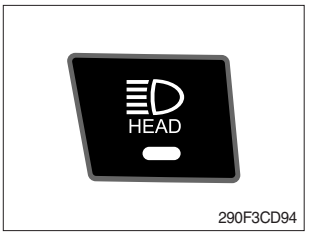
(6) Escape/Camera switch

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

(7) Work light switch

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

(8) Head light switch



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

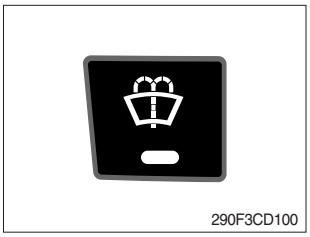
(9) Intermittent wiper switch

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

(10) Wiper switch

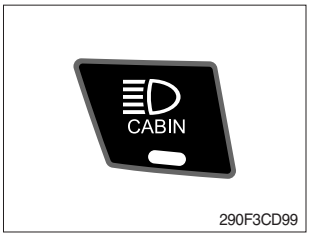
① This switch is used to operate the window wiper.
② Note that the wiper will self-park when switched off.
③ The pilot lamp is turned ON when operating the switch.
※ If the wiper does not operate with the switch in ON position, turn the switch OFF immediately. Check the cause. If the switch remains ON,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

(11) Washer switch



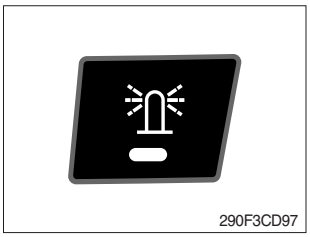
① The washer liquid is sprayed and the wiper is operated only while pressing this switch.
② The pilot lamp is turned ON when operating the switch.

(12) Cab light switch



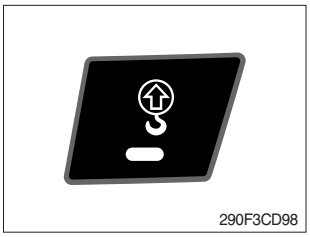
① This switch turns ON the cab light on the cab.
② The pilot lamp is turned ON when operating the switch.

(13) Beacon switch (opt)



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

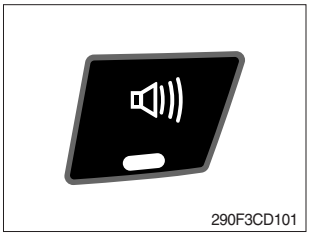
(14) Overload switch (opt)



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

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

(15) Travel alarm switch



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

(16) Main menu quick touch switch

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

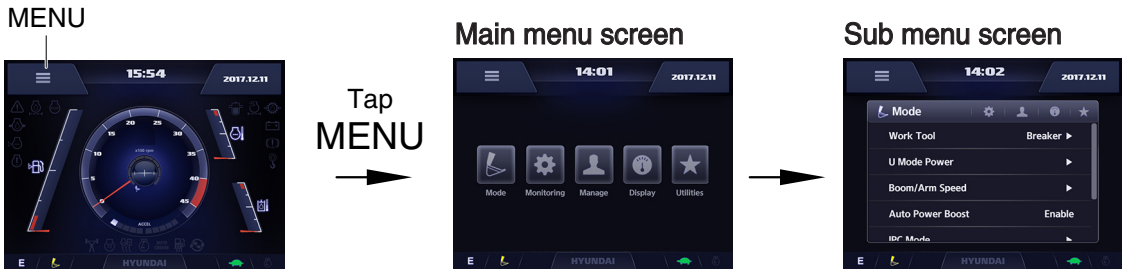
※ **Refer to the page 3-18.**

6) MAIN MENU

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

Normal type

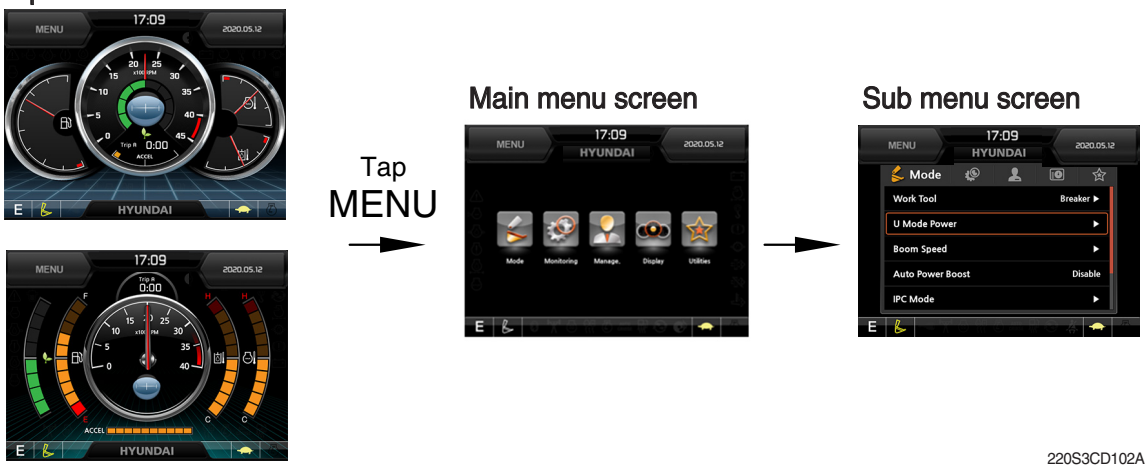
Operation screen



235SA3CD502

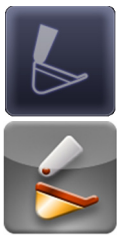
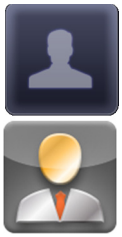
Premium type

Operation screen



220S3CD102A

(1) Structure

No	Main menu	Sub menu	Description
1	 Mode 220S3CD103	Work tool U mode power Boom/Arm speed Auto power boost IPC mode Auto engine shutdown (opt) Initial mode Emergency mode	Breaker, Crusher, Not installed User mode only Boom speed Enable, Disable Speed mode, Balance mode, Efficiency mode One time, Always, Disable Key on initial mode / initial work mode Switch function
2	 Monitoring 220S3CD104	Active fault Logged fault Delete logged fault Monitoring	MCU, AAVM (opt) MCU, AAVM (opt) All logged fault delete, Initialization canceled Machine information, Switch status, Output status,
3	 Management 220S3CD105	Fuel rate information Maintenance information Machine security Machine information Contact Service menu Clinometer Update	General record, Hourly, Daily, Mode record Replacement, Change interval oils and filters ESL mode setting, Password change Model, MCU, Monitor RMCU, Relay drive unit, AAVM (opt) A/S phone number, A/S phone number change Power shift, Operating hour, Breaker mode pump acting, EPPR current level, Overload pressure Clinometer setting Cluster, ETC device
4	 Display 220S3CD106	Display item Clock Brightness Unit setup Language selection Screen type★	Engine speed, Tripmeter A, Tripmeter B, Tripmeter C Clock Manual, Auto Temperature, Pressure, Flow, Distance, Date format Korean, English, Chinese, ETC A type, B type
5	 Utilities 220S3CD107	Tripmeter Camera setting AUX Manual	3 kinds (A, B, C) Number of active, Display order, AAVM (opt)★

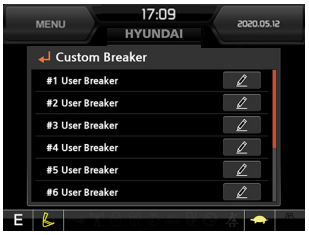
★ : premium type

(2) Mode setup

※ Illustrations are based on the premium type cluster.

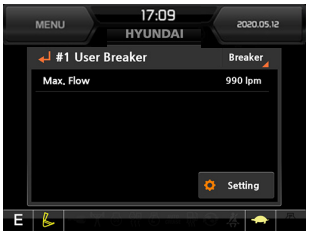
① Work tool

220S3CD108A



220S3CD253A

A



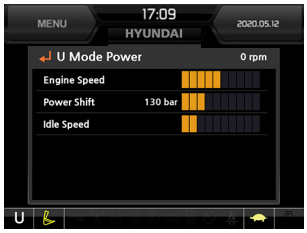
220S3CD254A

B

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

② U mode power

220S3CD111A



220S3CD112A

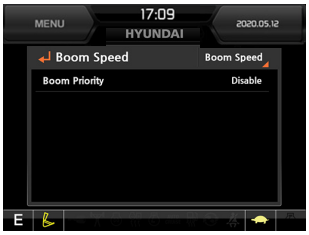
· Engine high idle rpm, auto idle rpm and pump torque (power shift) can be modulated and memorized separately in U-mode.
· U-mode can be activated by user mode switch.

Step (▮)	Engine speed (rpm)	Idle speed (rpm)	Power shift (bar)
1	1300	800	0
2	1400	850	3
3	1450	900	6
4	1500	950	9
5	1550	1000 (auto decel)	12
6	1600	1050	16
7	1650	1100	20
8	1700	1150	26
9	1750	1200	32
10	1800	1250	38

※One touch decel & low idle : 900 rpm

③ Boom speed

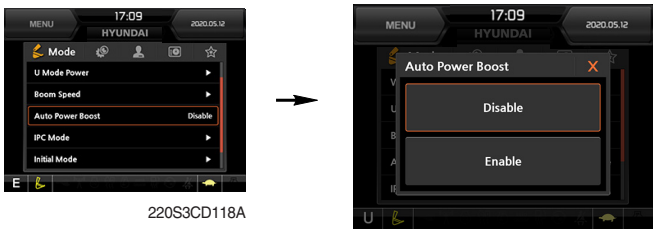
220S3CD113A



220S3CD115A

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

④ Auto power boost

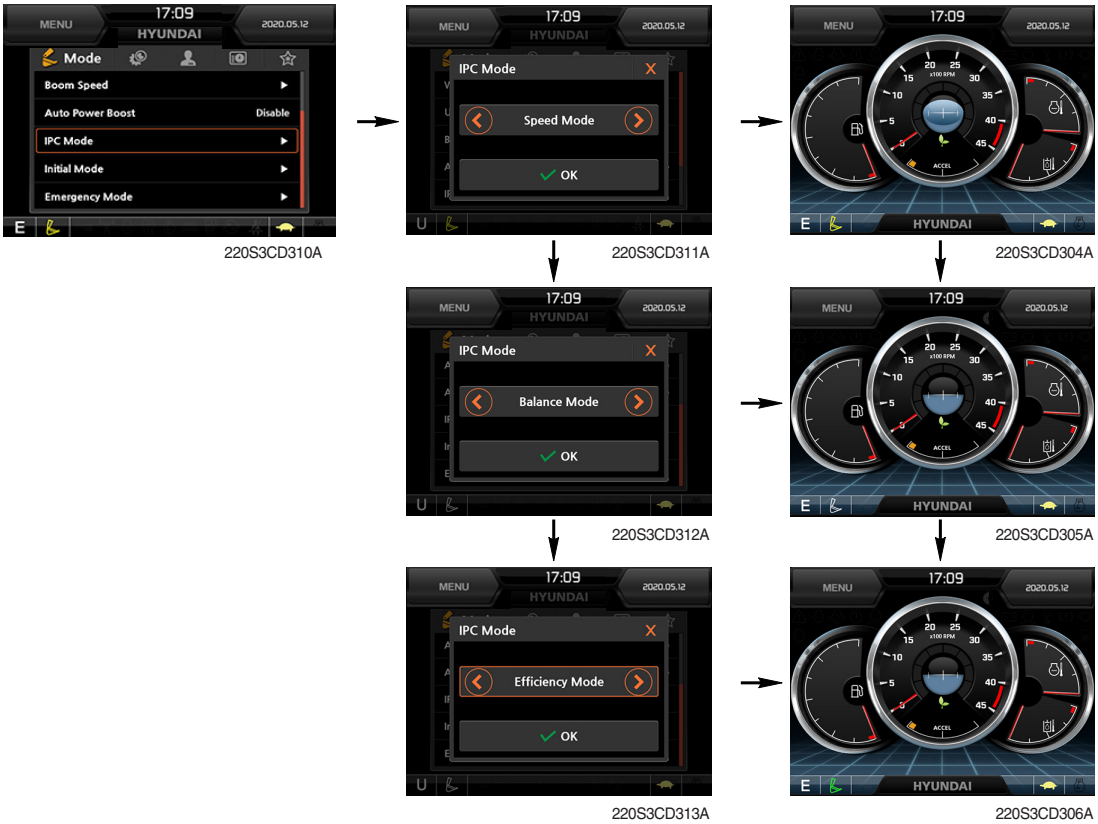


220S3CD118A

220S3CD117A

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

⑤ IPC mode



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

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

⑥ Automatic engine shutdown (option)

220S3CD91A

220S3CD92A

220S3CD93A

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

⑦ Initial mode

220S3CD122A

220S3CD119A

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

Key on initial work mode
  - Not installed
  - Last setting
  - Work mode

⑧ Emergency mode

220S3CD248A

220S3CD249A

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

(3) Monitoring

① Active fault

220S3CD120A

220S3CD125A

· The active faults of the MCU can be checked by this menu.

② Logged fault

220S3CD128A

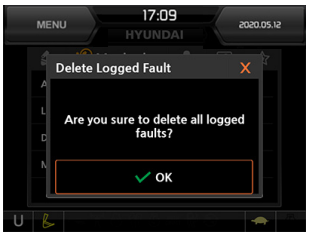
220S3CD124A

· The logged faults of the MCU can be checked by this menu.

③ Delete logged fault

220S3CD134A

220S3CD126A

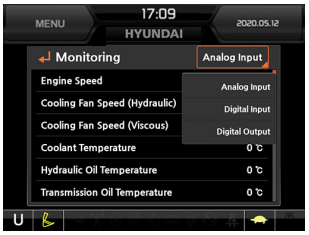


220S3CD127A

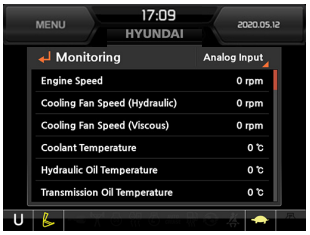
· The logged faults of the MCU can be deleted by this menu.

④ Monitoring

220S3CD172A



220S3CD188A



220S3CD189A

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

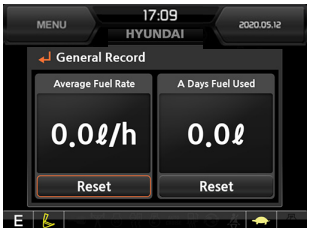
(4) Management

① Fuel rate information

220S3CD14A

220S3CD15A

A



220S3CD16A

B

220S3CD17A

C

220S3CD18A

D

220S3CD19A

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

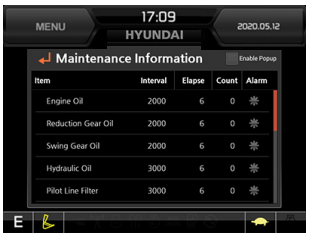
· **Hourly record (B)**
  - Hourly fuel rates for past 12 hours (service meter time).
  - No record during key-off time.
  - One step shift to the right for every one hour.
  - Automatic deletion for 12 hours earlier data.
  - All hourly records deletion by "Reset".

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

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

② Maintenance information

220S3CD131A



220S3CD132A

220S3CD133A

- Alarm lamp (●) is ON when oil or filter needs to be changed or replaced.
- Replacement : The elapsed time will be reset to zero (0).
- Change interval : The change or replace interval can be changed in the unit of 30 hours.

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

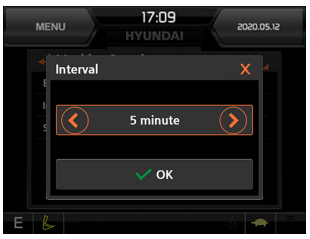
③ Machine security

220S3CD190A

220S3CD135A

220S3CD136A

220S3CD137A



220S3CD138A

· **ESL mode setting**

- ESL : Engine Starting Limit
- ESL mode is desingned to be a theft deterrent or will prevent the unauthorized operation of the machine.
- When you Enable the ESL mode, the password will be required when the starting switch is turned to the on position.
- **Machine security**

  Disable : ESL function is disabled and password is not required to start engine.

  Enable (always) : The password is required whenever the operator starts engine.
- **Interval** : The password is required when the operator starts engine first. But the operator can restart the engine within the interval time without inputting the password. The interval time can be set to a maximum 4 hours.

  ※**Default password : 00000 + ✔**

  ※**Password length : (5~10 digits) + ✔**
- **Smart key** (option) : Refer to next page.

· **Password change**

- The password is 5~10 digits.

220S3CD190A

220S3CD140A

220S3CD135A

Enter the current password

220S3CD142A

Enter the new password

220S3CD143A

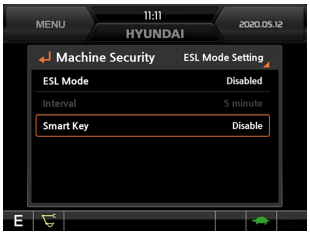
Enter the new password again

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

- Smart key

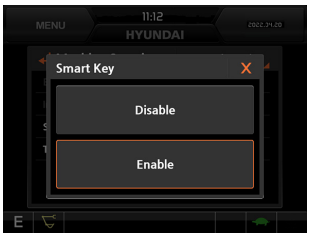
220S3CD190A

220S3CD135A



235F3CD001

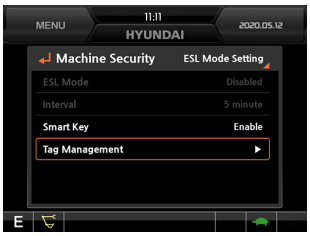
- Smart key is registered when equipped with optional smart key. If smart key is not inside of the cabin, authentication process fails and the password is needed.
- Tag management menu is activated when the Smart key menu is Enabled.
  You can register and delete the tags.



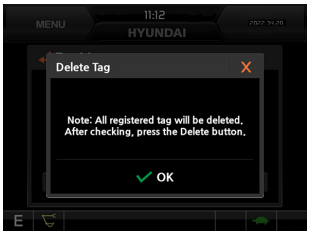
235F3CD002

- Tag management

- When registering a tag : Only the tag you want to register must be in the cabin.
- When deleting a tag : All registered tags are deleted.

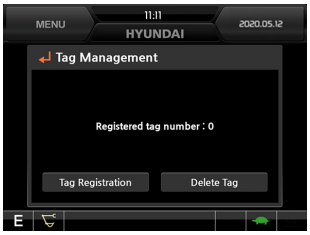


235F3CD003



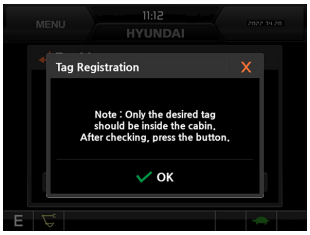
235F3CD006

Deleting



235F3CD004

Registering

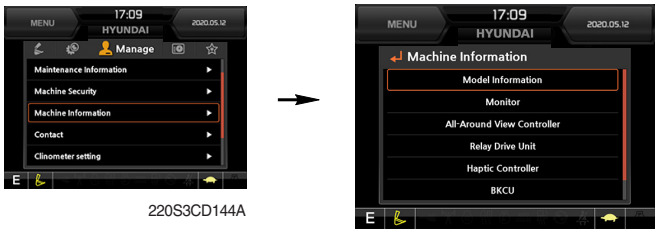


235F3CD005

※ Engine Starting Condition

Case	ESL Mode	Smart Key	Condition
1	Disable	Disable	- With registered tag : Engine can be started without password input. - Without registered tag : Engine can be started without password input.
2	Disable	Enable	If Smart Key is enabled, ESL Mode is automatically enabled. This Case 2 work the same as the Case 4.
3	Enable	Disable	- With registered tag : Engine can be started with password input. - Without registered tag : Engine can be started with password input.
4	Enable	Enable	- With registered tag : Engine can be started without password input. - Without registered tag : Engine can be started with password input.

④Machine Information



220S3CD144A

220S3CD145A

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

⑤ Contact (A/S phone number)

220S3CD146A

220S3CD147A

220S3CD148A

Enter the new A/S phone number

⑥ Service menu

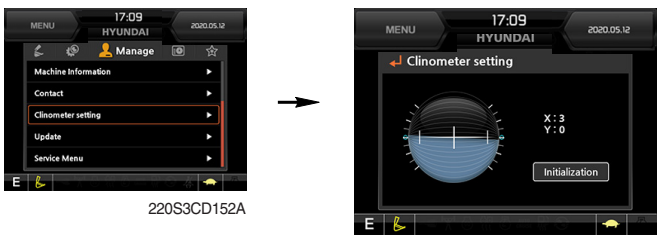
220S3CD149A

220S3CD150B

220S3CD251A

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

⑦ Clinometer



220S3CD152A

220S3CD153A

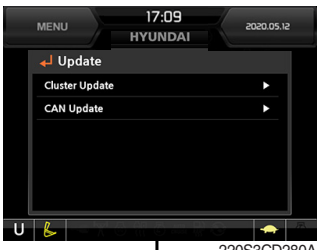
· When the machine is on the flatland, if tap the "initialization", the values of X, Y reset "0".
· You can confirm tilt of machine in cluster's operating screen.

⑧ Update (cluster & ETC devices)

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

220S3CD67A

220S3CD135A



220S3CD280A

220S3CD290A

220S3CD281A

220S3CD291A

220S3CD282A

220S3CD299A

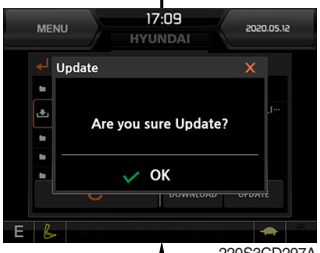
220S3CD292A

220S3CD283A

220S3CD298A

220S3CD293A

220S3CD284A



220S3CD297A

220S3CD294A

220S3CD285A

220S3CD296A

220S3CD295A

(5) Display

① Display item

220S3CD154A

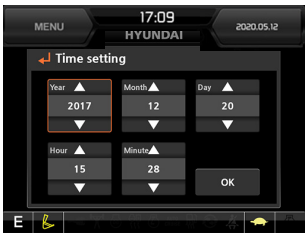
220S3CD155A

220S3CD156A

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

② Clock

220S3CD157A



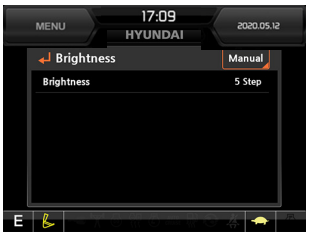
220S3CD158A

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

③ Brightness

220S3CD159A

220S3CD160A



220S3CD139A

220S3CD141A

220S3CD191A

220S3CD192A

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

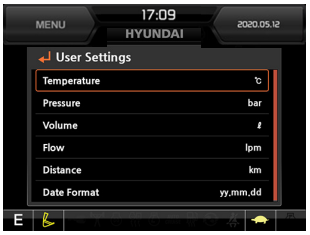
④ Unit

220S3CD161A

220S3CD182A

220S3CD183A

220S3CD186A



220S3CD162A

220F3CD193A

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

⑤ Language

220S3CD163A

220S3CD164A

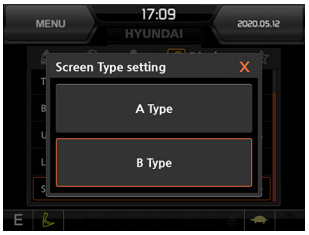
- User can select preferable language and all displays are changed the selected language.

⑥ Screen type (premium type)

220S3CD165A

A Type (Default) 220S3CD166A

220S3CD156A

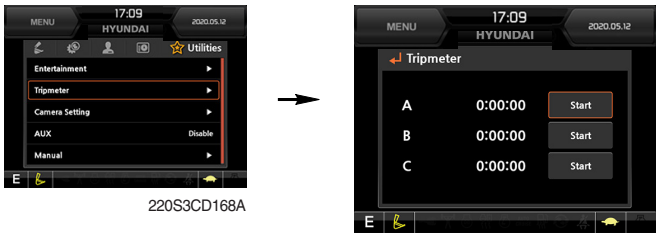


B Type (Option) 220S3CD174A

220S3CD167A

(6) Utilites

① Tripmeter



220S3CD168A

220S3CD169A

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

② Camera setting

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

220S3CD225A

220S3CD255A

220S3CD256A

- In the operation screen, rear camera screen show up when ESC/CAM button is pushed.

220S3CD222A

290F3CD221

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

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

220S3CD244A

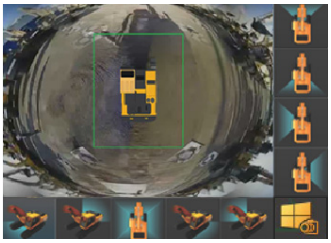
- **Escape switch**

· Activates AAVM mode from the beginning if AAVM is installed.

· While in the AAVM mode, select the ESC switch to return to the home screen.

220S3CD156A

Home screen



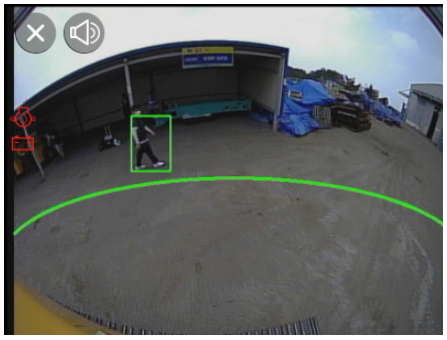
AAVM mode

235SA3CD222A

- **Buzzer stop switch**

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

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



220A3CD246

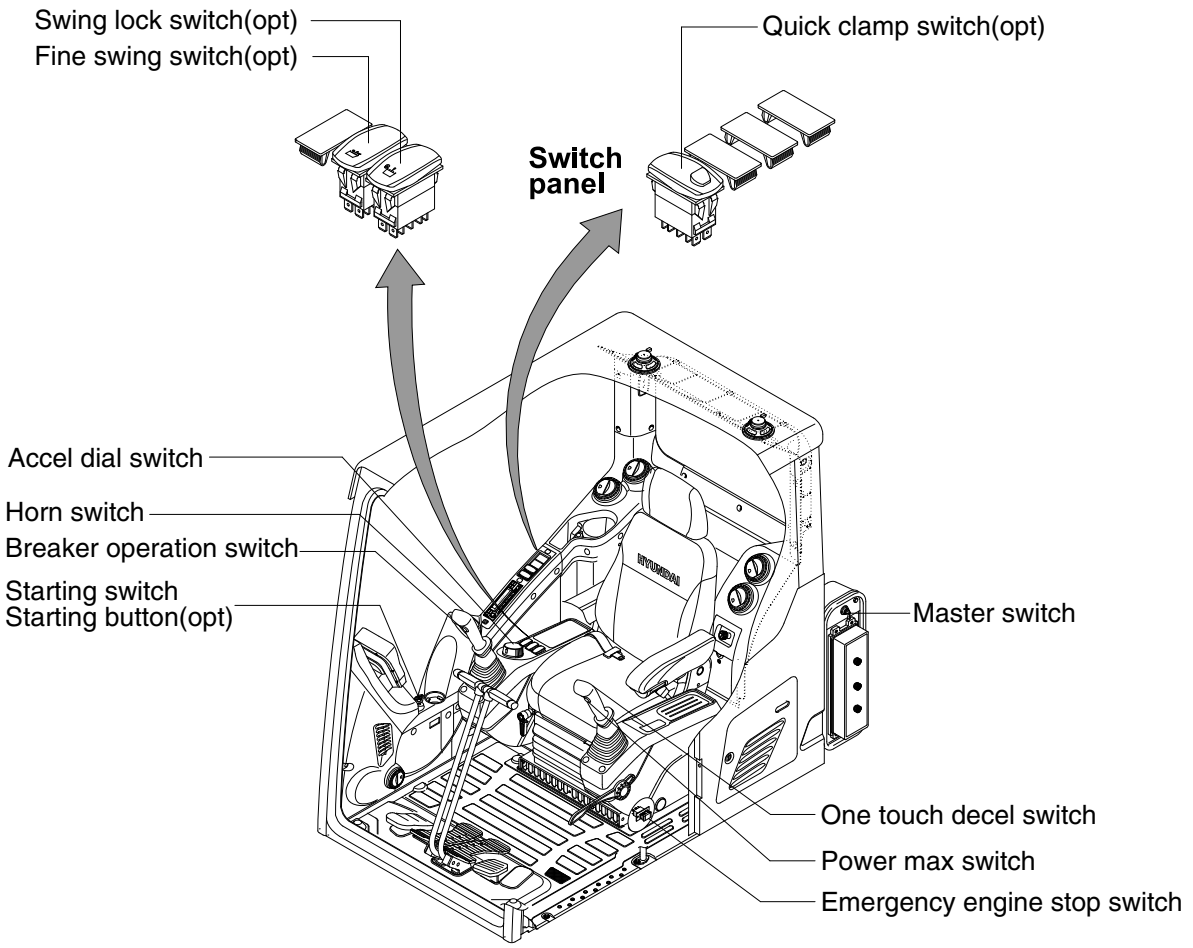
· When a worker/pedestrian reaches the green line, which is an external danger area equipped on the cluster, warning buzzer sounds and it displays a green rectangular box recognizing the worker/pedestrian.
Stop work immediately. Stop the buzzer by pressing the buzzer stop switch. Then resume work after you confi rm that the area is safe and clear of workers/objects.

220A3CD247

· When a worker/pedestrian reaches the red line, which is an external danger area equipped on the cluster, warning buzzer sounds and it displays a red rectangular box recognizing the worker/pedestrian.
Stop work immediately. Stop the buzzer by pressing the buzzer stop switch. Then resume work after you confirm that the area is safe and clear of workers/objects.

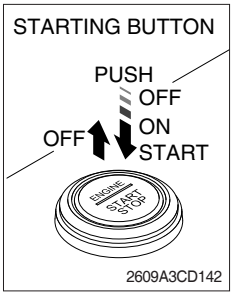
⚠ Failure to comply may result in serious injury or death.

※ In AAVM mode, a touch screen of the LCD is available only.



300SA3CD32

1) STARTING SWITCH & STARTING BUTTON (OPT)



Starting button with smart key tag (opt)

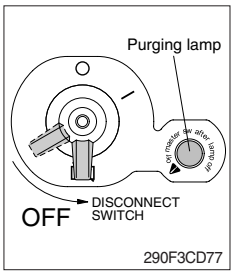
(1) There are three positions, OFF, ON and START.
- ◯ (OFF) : None of electrical circuits activate.
- | (ON) : All the systems of machine operate.
- (START) : Use when starting the engine. Release key immediately after starting.

※ If you turn ON the starting switch in cold weather, the fuel warmer 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.

※ Starting switch contoller tries engine starting at least 3 seconds even if switch is released after driver's start trial (key switch : start position / starting button : long push) to prevent short-time cranking (which can not starting engine). If no-start conditions (unlock safety knob) are resolved (lock safety knob) during the 3 seconds of engine starting attempt, engine can be started.

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

2) MASTER SWITCH



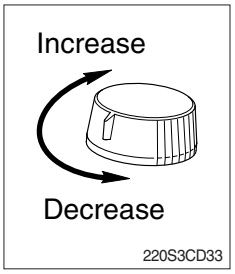
(1) This switch is used to shut off the entire electrical system.

(2) I : The battery remains connected to the electrical system.
O : The battery is disconnected to the electrical system.

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

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

3) ACCEL DIAL SWITCH

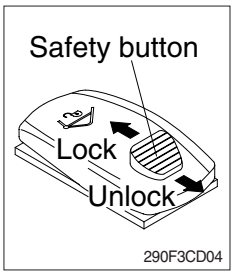


(1) There are 10 dial setting.

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

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

4) QUICK CLAMP SWITCH (option)



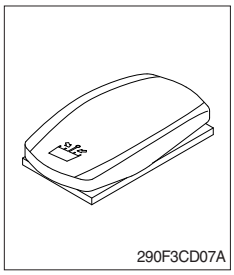
(1) This switch is used to engage or disengage the moving hook on quick clamp.

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

5) SWING LOCK SWITCH (option)

(1) When the switch is pressed ON position, the swing parking brake is locked and swing control is not available by shut off the swing pilot pressure to the swing spool.

6) FINE SWING SWITCH (option)

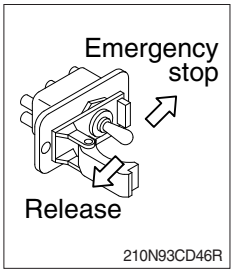


(1) When the switch is pressed ON position, the swing parking brake is released.

(2) Swing control improves during deceleration of a swing because the swing is allowed the drift instead of stopping abruptly.

⚠ If the machine is operating on a slope with the switch on position, swing motion may become uncontollable which could result in property damage, personal injury or death. Do not use on position when the machine is operating on a slope.

7) EMERGENCY ENGINE STOP SWITCH

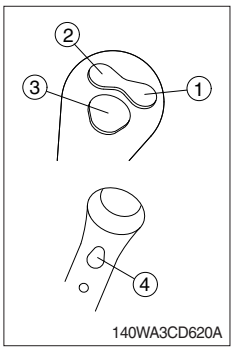


(1) This switch is used to emergency stop the engine.

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

9) LH RCV LEVER SWITCH

(1) Button type



The switches on the LH RCV lever is function as below.

① None

② None

③ One touch decel switch

a. This switch is used to actuate the deceleration function quickly.

b. The engine speed is increased to previous setting value by pressing the switch again or operating state (working/travel).

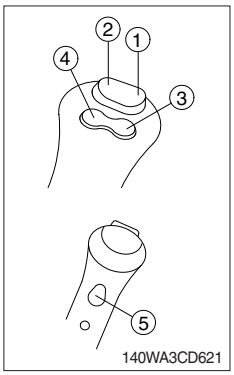
④ Power max switch

a. This switch activates power max function.
When this switch is pressed and held, hydraulic power of work equipment will be increased to approx 110 percent for a period of 8 seconds.

b. After 8 seconds, function is cancelled automatically even if the switch remains pressed.

※ Do not use for craning purposes.

(2) Proportional type (option)



The switches on the LH RCV lever is function as below.

① CW rotating switch

When this switch is pressed, the clockwise rotating will operate.

② CCW rotating switch

When this switch is pressed, the counterclockwise rotating will operate.

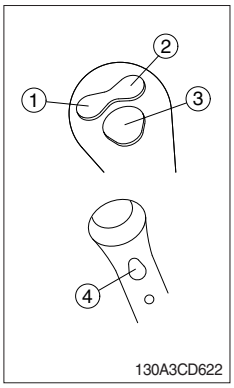
③ One touch decel switch : Refer to (1)-③ above.

④ None.

⑤ Power max switch : Refer to (1)-④ above.

10) RH RCV LEVER SWITCH

(1) Button type



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

① None

② None

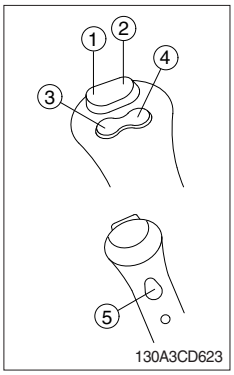
③ Horn switch

When this switch is pressed, the horn will sound.

④ Breaker switch

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

(2) Proportional type (option)



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

① 2-way clamp switch

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

② 2-way release switch

When this switch is pressed, the release or breaker will operate when the crusher operation mode or breaker operation mode is selected.

③ Quick clamp switch

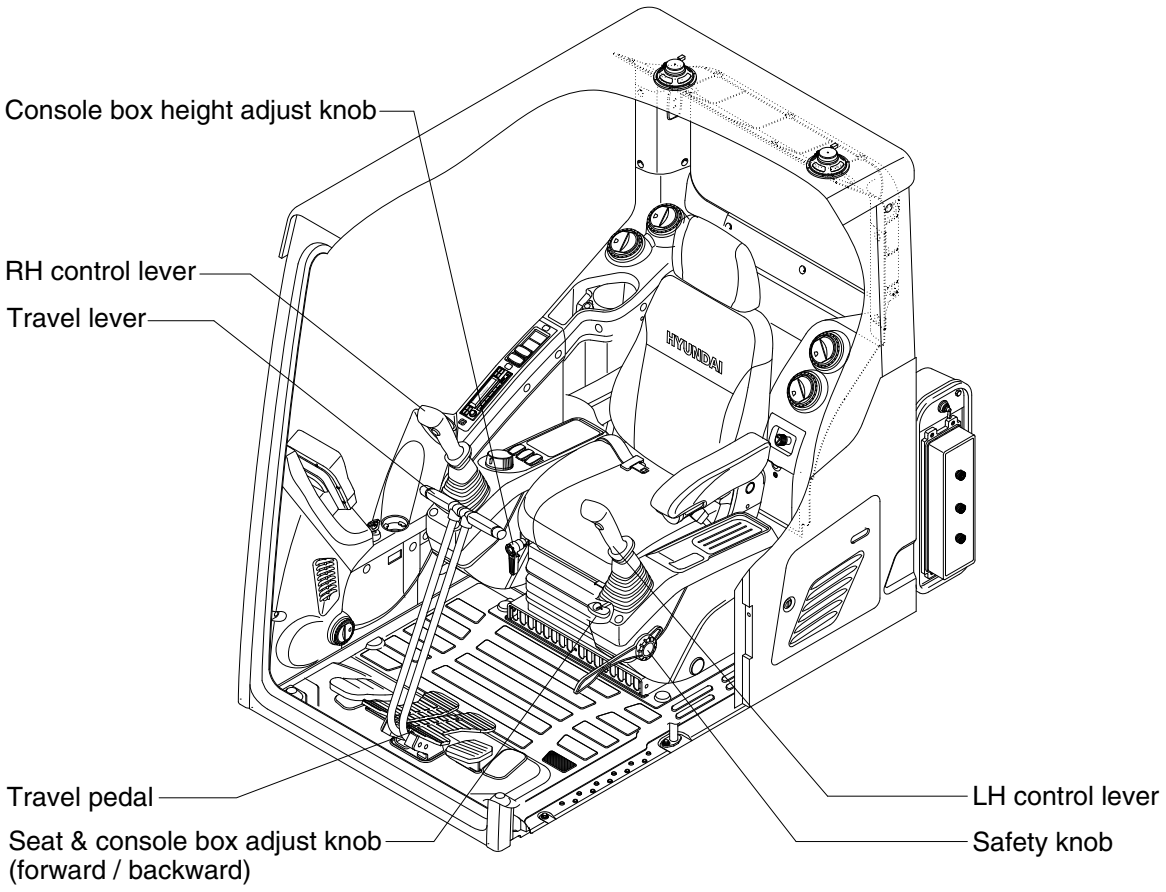
This switch is used to engage or disengage the moving hook on quick clamp.

Refer to the page 8-6.

④ Horn switch : Refer to (1)-③ previous page.

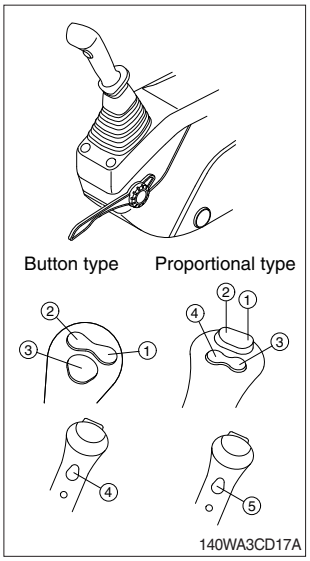
⑤ Breaker switch : Refer to (1)-④ previous page.

4. LEVERS AND PEDALS



220S3CD36

1) LH CONTROL LEVER



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

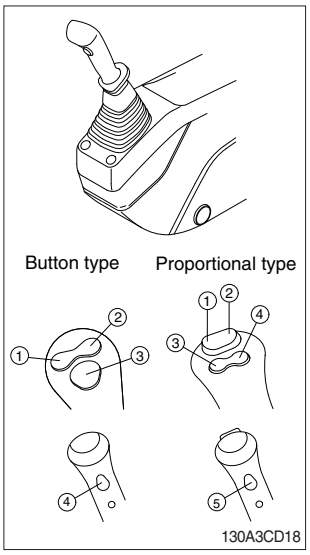
※ Refer to operation of working device in chapter 2 for details.

(2) The switch functions are as below.

No.	Button type	Proportional type (opt)
①	N.A	Rotating-CW
②	N.A	Rotating-CCW
③	One touch decel	One touch decel
④	Power max	N.A
⑤	-	Power max

※ Refer to page 3-35 for the details of the switch function.

2) RH CONTROL LEVER



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

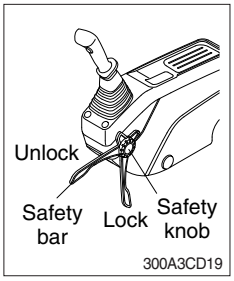
※ Refer to operation of working device in chapter 2 for details.

(2) The switch functions are as below.

No.	Button type	Proportional type (opt)
①	N.A	2-way clamp
②	N.A	2-way release
③	Horn	N.A
④	Breaker	Horn
⑤	-	Breaker

※ Refer to page 3-36 for the details of the switch function.

3) SAFETY KNOB



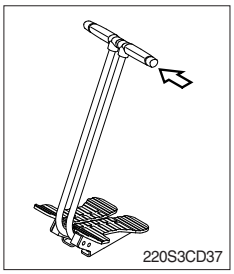
(1) All control levers and pedals are disabled from operation by locating the safety knob to the LOCK position as shown.

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

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

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

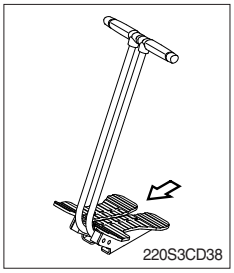
4) TRAVEL LEVER



(1) This lever is mounted on travel pedal and used for traveling by hand. The operation principle is same as the travel pedal.

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

5) TRAVEL PEDAL

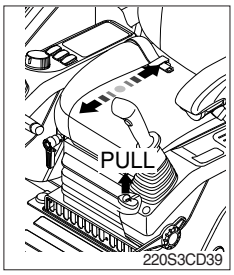


(1) This pedal is used to move the machine forward or backward.

(2) If left side pedal is pressed, left track will move.
If right side pedal is pressed, right track will move.

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

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



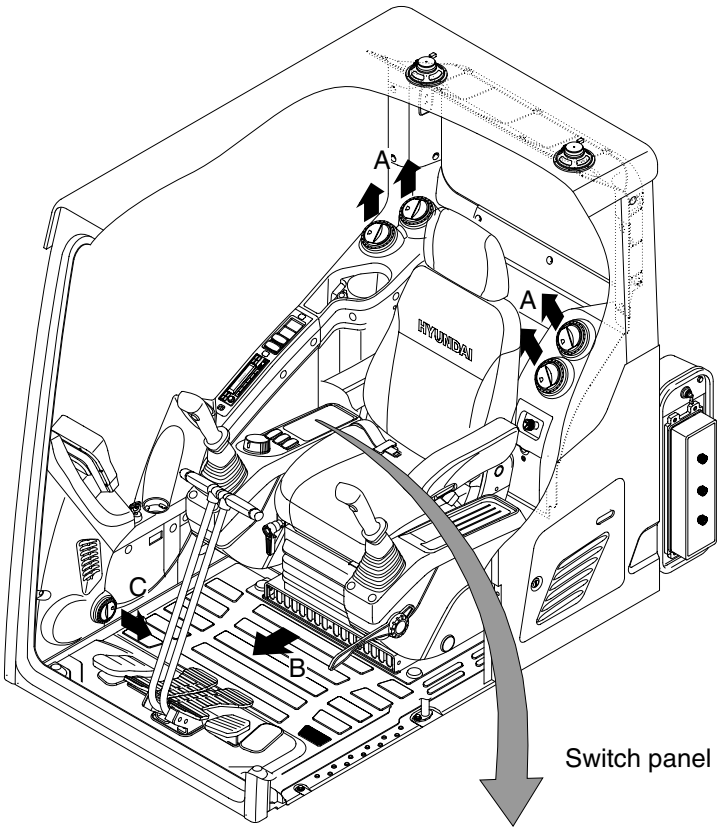
(1) This knob is used to move the seat and console box to fit the contours of the operator's body.

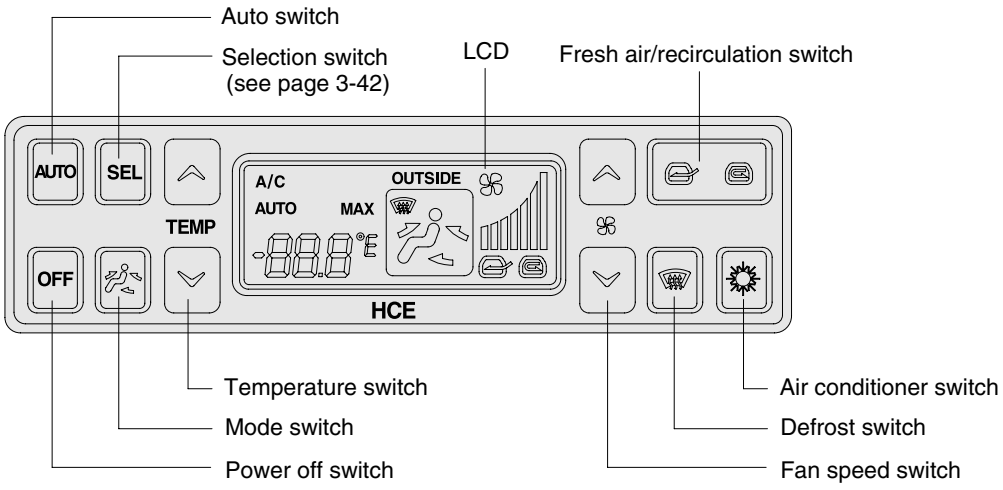
(2) Pull the knob to adjust forward or backward over 150 mm (5.9").

5. AIR CONDITIONER AND HEATER

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

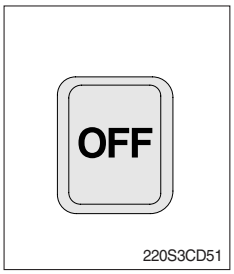
· **Location of air flow ducts**





220S3CD49

1) POWER OFF SWITCH

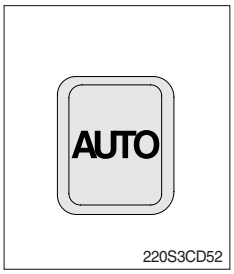


(1) This switch makes the system and the LCD OFF.
Just before the power OFF, set values are stored.

(2) Default setting values

Function	Air conditioner	In/outlet	LCD	Temperature	Mode
Value	OFF	Inlet	OFF	Previous sw OFF	Previous sw OFF

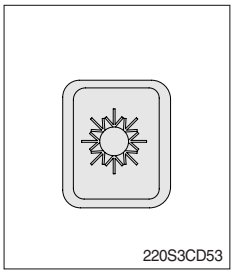
2) AUTO SWITCH



(1) Turn the starting switch to ON position, LCD lights ON.
Auto air conditioner and heater system automatically keeps the optimum condition in accordance with operator's temperature configuration sensing ambient and cabin inside temperature.

(2) This switch can restart system after system OFF.

3) AIR CONDITIONER SWITCH

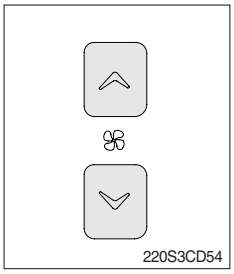


(1) This switch turns the compressor ON/OFF.

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

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

4) FAN SPEED SWITCH

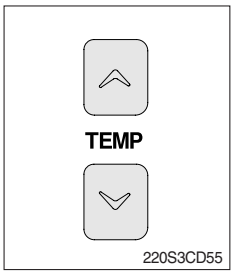


(1) Fan speed is controlled automatically by setted temperature.

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

(3) This switch makes the system ON.

5) TEMPERATURE CONTROL SWITCH



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

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

(3) The max cool or the max warm position operates as following table.

Temperature	Compressor	Fan speed	In/Outlet	Mode
Max cool	ON	Max (Hi)	Recirculation	Vent
Max warm	OFF	Auto (Hi)	Fresh	Foot

(4) Temperature unit can be changed between celsius (˚C) and fahrenheit (˚F)

① Default status (˚C)

② Push Up/Down temperature control switch simultaneously more than 5 second displayed temperature unit change (˚C → ˚F)

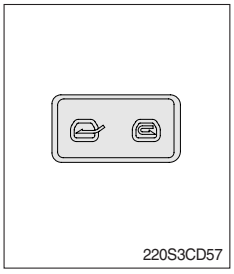
6) MODE SWITCH

(1) Operating this switch, it beeps and displays symbol of each mode in order.

Vent → B/L → Foot → Mix → Vent

Mode switch		Vent	B/L	Foot	Mix
Outlet	A	●	●		
	B		●	●	●
	C				●

7) FRESH AIR/RECIRCULATION SWITCH



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

① Fresh air ( )

Inhaling air from the outside.

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

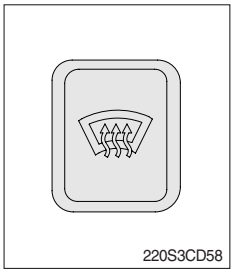
② Air recirculation ( )

It recycles the heated or cooled air to increase the energy efficiency.

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

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

8) DEFROST SWITCH

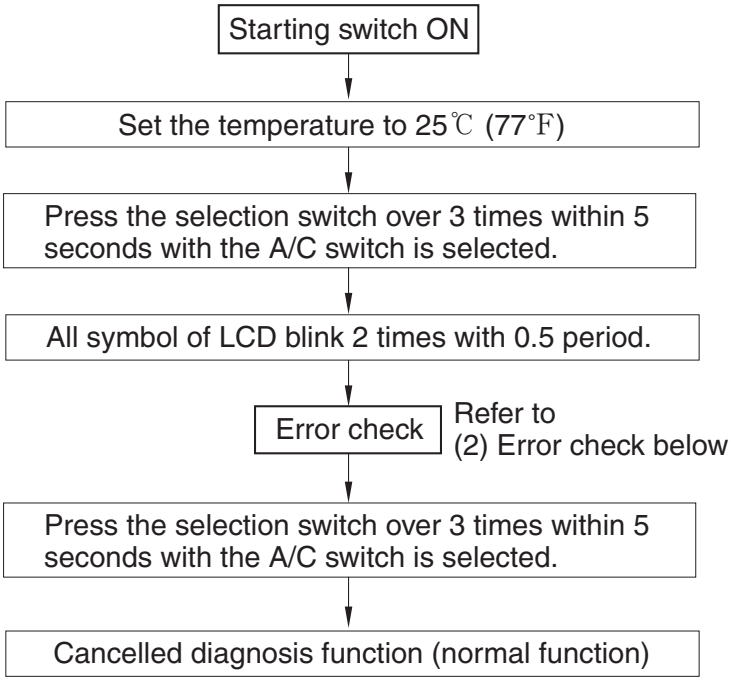


(1) This switch makes the defrost mode operating.

(2) When defroster mode operating, fresh air/recirculation switch turns to fresh air mode and air conditioner switch turns ON.

9) SELF DIAGNOSIS FUNCTION

(1) Procedure



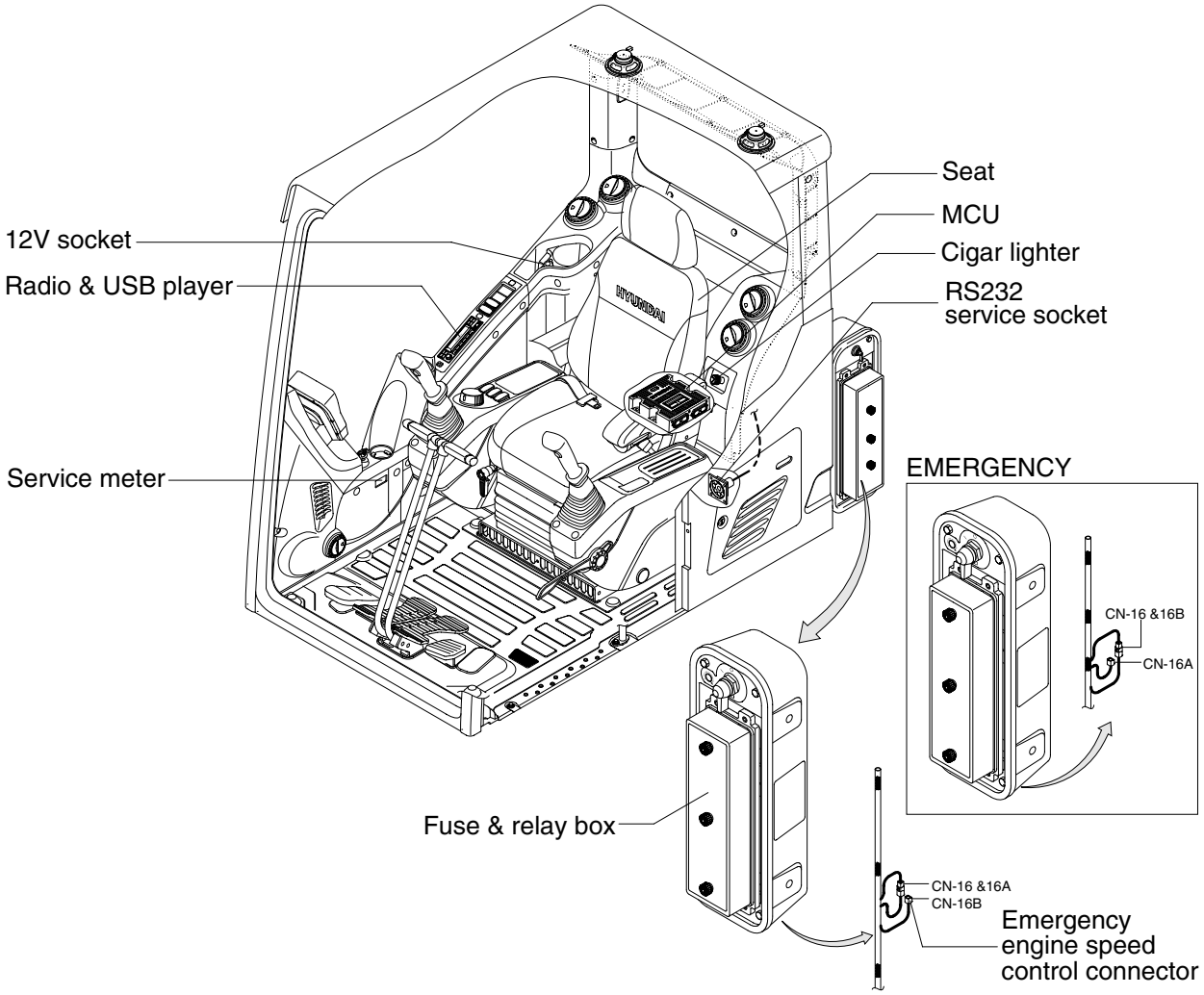
220S3CD59

(2) Error check

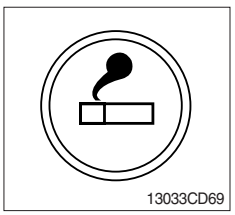
- If normal, display E0.
- The corresponding error code flickers on the setup temperature display panel, the other symbol will turn OFF.
- Error code flickers every 0.5 second.
- If error code is more than two, each code flickers 2 times in sequence.
- Up and down the error codes by prossing the temperature control switch.
- Error code

Error code	Description	Error code	Description
E0	Normal	E5	Duct sensor short
E1	Incar sensor short	E6	Duct sensor open
E2	Incar sensor open	E11	DPS open
E3	Ambient sensor short	E12	Mode actuator fail
E4	Ambient sensor open	E13	Mix actuator fail

6. OTHERS



1) CIGAR LIGHTER



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

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

※ **Service socket**

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

2) RADIO AND USB PLAYER

■BASIC FUNCTIONS

75793CD62-2

■FRONT PANEL PRESENTATION

1 SEL ····· Audio selection button

····· Audio selection knob

2 ····· Power and volume button

3 MODE ····· Mode button
(select RADIO / USB / AUX)

4 ····· UP / DOWN tuning button

5 1 ····· Preset memory button 1
DISP ····· ID3 v2 display

6 2 ····· Preset memory button 2
SCN ····· File scan

7 3 ····· Preset memory button 3
RPT ····· Repeat play selector

8 4 ····· Preset memory button 4
RDM ····· Random play selector

9 5 ····· Preset memory button 5
D- ····· Directory down

10 6 ····· Preset memory button 6
D+ ····· Directory up

11 ····· Aux function

12 BSM ····· Preset scan (PS)
Best station memory (BSM)

13 MUTE ····· Audio mute button

14 AM/FM ····· AM / FM button (radio)

15 ····· Send

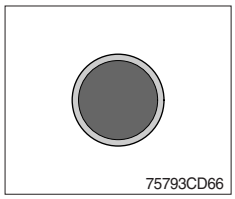
16 ····· End

17 MIC ····· MIC (microphone)

18 AUX ····· Aux connector

■GENERAL

(1) Power and volume button



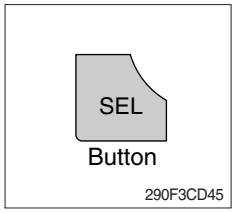
① **Power ON/OFF button**

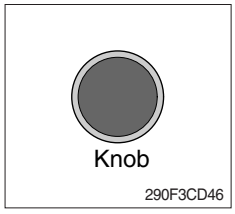
Press power button to turn the unit ON or OFF shortly.
When the power is ON, the previous mode (last memory) will appear.

② **Volume up / down control**

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

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





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

BASS → TREBLE → BAL → LOUD → EQ → BASS

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

② **Bass control**

To adjust the bass level, first select the bass mode by pressing the SEL button until BASS indication appears on the LCD display. Within 5 seconds of choosing the bass mode, turn selection knob right / left to adjust the bass level as desired.
The bass level will be shown on the LCD display from a minimum of BASS –10 to a maximum of BASS +10.
The display will automatically return to the normal indication in 5 seconds after the last adjustment or when another function is activated.

③ **Treble control**

To adjust the treble level, first select the treble mode by pressing the SEL button until TREBLE indication appears on the LCD display. Within 5 seconds of choosing the treble mode, turn selection knob right / left to adjust the treble level as desired.
The treble level will be shown on the LCD display from a minimum of TREBLE -10 to a maximum of TREBLE +10.
The display will automatically return to the normal indication in 5 seconds after the last adjustment or when another function is activated.

④ **Balance control**

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

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

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

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

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

⑤ **Loud control**

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

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

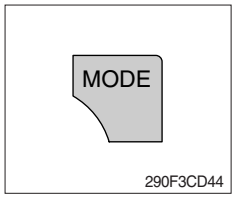
To select the loudness feature, press SEL button until LOUD ON or LOUD OFF is displayed, then turn selection knob left or right to activate or deactivate loudness.

⑥ **Equalizer (EQ)**

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

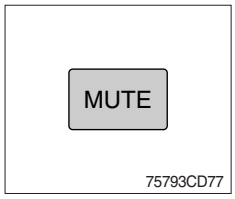
To select the desired curve, first select the EQ mode by pressing SEL button until the "EQ OFF" indication appears on the display panel. Within 5 seconds of choosing the EQ mode, turn selection knob to select an equalizer curve as desired.

(3) Mode button



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

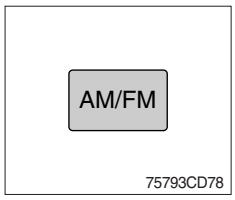
(4) Audio mute button



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

■RADIO

(1) AM / FM / LW band selector

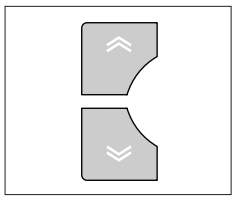


① Each time this button is pressed, the radio button is changed.
Each time this button is pressed, LCD displays each band as follows :

FM1 → FM2 → FM3 → AM → LW → FM1

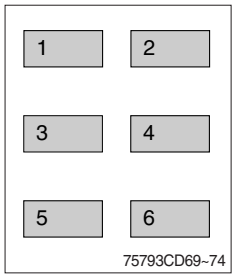
※ LW band is only available for Europe.

(2) Up / down tuning



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

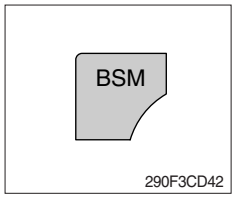
(3) Station pre-set button



① Pressing these buttons shortly will recall your favorite pre-set radio stations.
To store your favorite stations into any of the 6 pre-set memories in each band (AM/FM/LW), use the following procedure :

a. Turn the radio ON and select the desired band.
b. Select the first station to be pre-set using the manual up/ down or automatic seek tuning control button.
c. Press the chosen pre-set button to store your selected station into and continue to hold it in. The beep sound will be momentarily heard and the pre-set number will apear on the LCD display indicating that the station is now set into that pre-set memory position and can be recalled at any time, by pressing that pre-set button.

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



① **Pre-set scan (PS)**

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

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

② **Best station memory (BSM)**

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

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

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

■USB PLAYER

75793CD81-1

(1) USB function

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

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

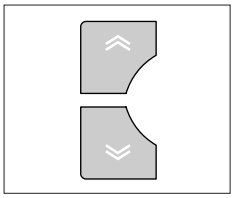
※ If there are no files on USB device, playback will revert back to the previous mode after displaying “NO FILE”.

(2) AUX function

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

② Change AUX mode by pressing MODE button.
If audio file of Audio device is playing, you can listen to music through speaker.

(3) File selection & cue / review button



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① **File selection function**

This button is used to select file up / down.

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

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

② **Cue / review functions**

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

Press and hold the cue button ⩓ to advance rapidly in the forward direction or the review button ⩔ to advance rapidly in the backward direction.

(4) MP3 directory / file searching

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

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

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

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

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

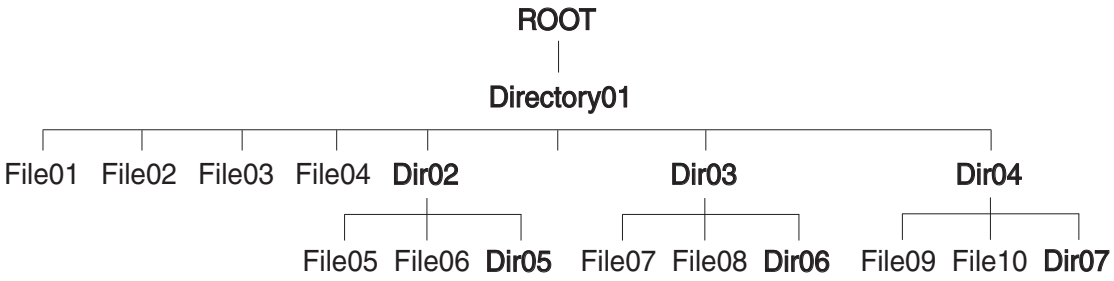
· Method 2 : ROOT→Dir01→Dir02→Dir05→Dir03→Dir06→Dir04→Dir07→ROOT

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

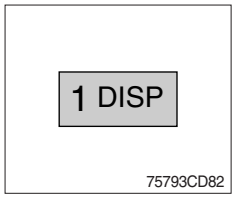
For instance, the file search changes in Dir01 as follows.

File01 → File02 → File03 → File04 → File01

※ MP3 directory / file configuration



(5) ID3 v2 display

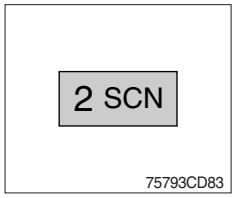


① Disp button is used to change the display information.
While playing an MP3 file, you can change the file information shown on the LCD display.
Each time you press DISP (display), the display changes to show the following.

※ If the MP3 disc does not have any ID3 information, the display will show NO ID3 on LCD display.

Directory name / file name (normal mode)
↓
Album name / performer / title
↓
File number / elapsed time
↓
Directory name / file name (normal mode)

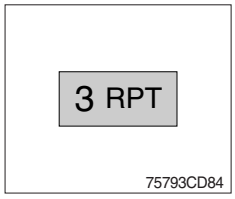
(6) File scan (SCN)



① During USB play, press SCN button to play the first 10 seconds of each file on the whole file on the USB (SCN mark will appear on the LCD display).
When a desired file is reached, press the SCN button again to cancel the function.
The unit will then play the selected file.

※ In case of playing MP3 file, when the SCN (scan) button is pressed and held for longer than 2 seconds, the SCN mark will blink on the LCD display and all files in the selected directory will be introduced until the file scan mode is cancelled by pressing the SCN button again or by activating the random or repeat functions.

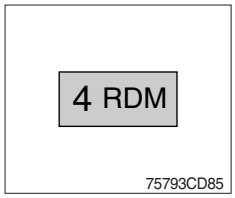
(7) Repeat play selector (RPT)



① During USB play, press RPT button to play the selected file repeatedly (RPT will appear on the LCD display).
Play of the file will continue to repeat until this button is pressed again and the RPT disappears from the LCD display.

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

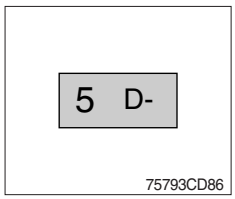
(8) Random play selector (RDM)



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

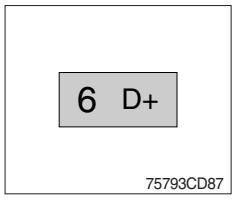
※ In case of MP3 file, when the random button is pressed and held longer than 2 seconds, the RDM mark will blink on the LCD display and play all files in directory randomly until the directory random mode is cancelled by pressing the random button again or by activating the scan or repeat functions (RDM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

(9) Directory down



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

(10) Directory up



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

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

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

■BLUETOOTH

(1) Introduce

The bluetooth radio supports bluetooth wireless technology. Bluetooth technology provides a wireless link between a bluetooth mobile phone or bluetooth music player and the HD hyundai Construction Equipment bluetooth radio.

The bluetooth radio features a hands-free system so that you may talk on the telephone without taking your eyes off the road or your hands off the wheel. A microphone built into the front of the radio receives your voice and the calling party can be heard through the speakers.

Additionally, a bluetooth music player can be wirelessly connected to be the bluetooth radio and playback music tracks in high quality sound through the speakers. Many bluetooth mobile phones include a music player and can provide both hands-free calling and music playback.

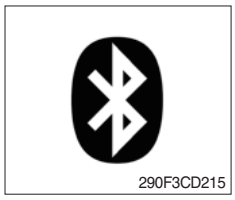
Check your mobile phone owner's manual for details.

※ When the starting switch is in the ON position, the bluetooth radio is on standby to connect with your mobile phone even if the radio is switched off. The machine battery may therefore become drained if the ignition switch remains in the ON position for an extended period of time.

※ Bluetooth technology uses low power radio transmission to connect to your bluetooth mobile phone or bluetooth music player. As radio signal strength reduces over distance, the quality of sound performance during phone calls and music playback may become poor if the distance between the radio and device widens. It is recommended that the mobile phone or music player is kept inside the cab for best results.

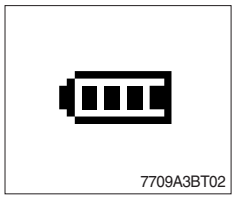
※ As a bluetooth wireless connection can extend to 10 meters, your bluetooth device may automatically connect to the bluetooth radio even if the device is not in the machine.

※ The bluetooth radio uses the latest digital noise & echo suppression system to provide the best sound clarity with little or no distortion, but in some conditions there may be some echo and noise experienced. It is recommended to keep the car windows closed during hands-free calls for best results.


290F3CD215

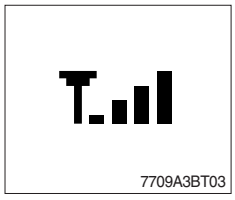
① Bluetooth indicator

The bluetooth logo is displayed when a bluetooth device is connected, and not displayed, when no bluetooth device is connected. If the bluetooth mobile phone is connected but the connection is not of satisfactory quality, the bluetooth logo is not displayed.


7709A3BT02

② Battery strength indicator

This is an indication of your mobile phone battery condition. If your mobile phone is unable to transmit battery condition level, the indicator is not displayed.


7709A3BT03

③ Single level indicator

This is an indication of the mobile phone network signal strength in your current location. If your mobile phone is not able to transmit signal level, the indicator is not displayed.

(2) Bluetooth function

① Pairing a bluetooth mobile phone or music player

A bluetooth connection must first be established between your bluetooth mobile phone or bluetooth music player and the bluetooth radio. The first step to connecting the bluetooth radio and bluetooth device is to introduce or "Pair" the bluetooth radio and bluetooth device together.

It is recommended that you have the instruction manual for your bluetooth mobile phone or music player with you during the pairing process described below to understand how to set your device to pair with the bluetooth radio.

※ It is recommended that all other bluetooth devices other than mobile phones are switched off during the registration or pairing process.

a. Connection method

a) Press SEND button for 2 seconds in any mode, **PAIRING** appears on the bluetooth radio display.
b) Browse your mobile phone or music player menu to find the **SETTINGS** or **CONNECTIVITY** section to find the bluetooth connection section.
c) Find the command that may be called search for bluetooth device or discovery mode so that your bluetooth device can locate all the bluetooth devices within range that may be connected.
d) After the search is complete, **HHI AUDIO** should appear on your mobile phone or music player screen.
e) Select **CONNECT** or **SELECT** on your mobile phone or music player.
f) The mobile phone or music player should now prompt you top enter a PIN code. Enter 0000 into your bluetooth device and select OK.
g) The mobile phone or music player should confirm that it has established a new paired connection with the bluetooth radio.
h) The connecting process is now complete.
i) If the connecting process is successful, the bluetooth logo appears on the radio display and paired phone name (e.g. Samsung or LG) and **CONNECTED** appear on the display for 2 seconds.
j) Your bluetooth device is now ready for use with the bluetooth radio.
k) If the pairing failed, **FAIL** appears on the bluetooth radio display.

※ (a) The bluetooth radio allows a maximum of 6 bluetooth devices to be paired.
(b) Bluetooth technology only allows one phone to be connected to your bluetooth radio at one time.
(c) If a bluetooth music player is to be connected together with a mobile phone, refer to the page 3-56, PLAYING MUSIC USING BLUETOOTH AUDIO.
(d) Bluetooth connection with a mobile phone is normally established using the Hands-Free Profile (HFP). However, in some cases, the connection may use Head Set Profile (HSP) and some functions may not be available.
(e) As each mobile phone or music player brand and model has a different menu structure and control names, you may need to refer to the user manual of your bluetooth device for the correct procedure to connect to another bluetooth device.
(f) Once the bluetooth pairing is complete, automatic connection between mobile phone and the bluetooth radio is possible whenever the starting switch is switched ON.
The mobile phone must be set to automatically connect to the bluetooth radio to allow this automatic connection.

(g) The bluetooth radio will give connection priority to the last connected mobile phone.
(h) It is recommended that all other bluetooth devices other than mobile phones are switched off during the registration or pairing process.

② Disconnecting a bluetooth device

If you need to disconnect your bluetooth mobile phone or music player with the bluetooth radio, follow the steps below.

a. Press END button for 2 seconds in any mode.
b. When the bluetooth connection is lost, bluetooth logo disappears and the previously connected device name (e.g. Samsung or LG) and **DISCONNECTED** appear on the display.

③ Select a bluetooth device

The bluetooth radio can pair up to 6 bluetooth devices. A previously paired mobile phone or music player can be selected for connection using the method described below. Refer to the table 2-1 for examples.

Preset No.	Bluetooth device name (for example)
1	Samsung
2	LG
3	Apple
4	Motorola
5	EMPTY
6	EMPTY

Table 2-1

a. Press SEND button, to select **BLUETOOTH** mode.
b. Press SEL button. **SELECT PHONE** will appear on the display.
c. Turn selection knob, until **SELECT PHONE** is displayed.
d. When **SELECT PHONE** appears on the display, press SEL button.
e. Press the preset button to display the name of the bluetooth device name of the mobile phones or music players previously paired. You may also turn selection knob to display the paired devices.

· Each time you turn or selection knob, the LCD displays as follows :

SAMSUNG → LG → APPLE → MOTOROLA → BACK → SAMSUNG

f. If the bluetooth mobile phone name is Samsung as in the example of table 2-1, then **Samsung** appears on the display. When preset button [1] is pressed or selection knob is turned 1 click to the right.
g. Once the name of the bluetooth device you wish to connect is displayed, in this example **Samsung**, press SEL button to have the Samsung device connected.
h. If the connection is successful, the bluetooth logo appears on the display and paired phone name **Samsung** and **CONNECTED** appears on the display for 2 seconds.

④ Deleting a previously paired bluetooth device

If you no longer need to use a paired bluetooth device with the bluetooth radio, it can be deleted. It is from the registration assignment for another mobile phone.
Refer to the example of paired devices shown table 2-1.

a. Press SEND button, to select **BLUETOOTH** mode.
b. Press SEL button and **SELECT PHONE** appears on the display.
c. Turn selection knob, until **DELETE PHONE** is displayed.
d. When **DELETE PHONE** appears on the display, press SEL button.
e. Press the preset button to display the name of the bluetooth device name of the mobile phones or music players previously paired. You may also turn selection knob to display the paired devices.
f. Once the name of the bluetooth device you wish to delete is displayed, in this example **Samsung**, press SEL button to have the Samsung device deleted.
g. The display will then show **DELETE NO** or if selection knob is turned, **DELETE OK** on the display.
h. To confirm your wish to delete the selected device, when **DELETE OK** appears on the display press SEL button.
i. If the bluetooth device being deleted (in this example) was connected, the display will show previous paired phone name “Samsung” and DISCONNECTED.
j. In the example above, the number of paired devices is now reduced to 3, leaving 3 vacant memory locations for additional devices. Table 2-2 shows the example.

Preset No.	Bluetooth device name (for example)
1	LG
2	Apple
3	Motorola
4	EMPTY
5	EMPTY
6	EMPTY

Table 2-2

⑤ Basic telephone operation

a. Using the bluetooth radio for hands-free calls

a) When an INCOMING call arrives at the bluetooth radio via your connected bluetooth mobile phone, **INCOMING CALL** appears on the display for 3 seconds then the calling telephone number is shown.
b) Press SEND button to answer the INCOMING call. **HANDSFREE** appears on the display.
c) To end the call, press END button and the call will end and **END CALL** is displayed.
d) If you wish to reject an INCOMING call, press END button.
e) To make an OUTGOING call use the keypad of the connected bluetooth mobile phone to enter a number and press the **OFF-HOOK** (SEND) button on your mobile phone.
f) **OUTGOING CALL** is displayed on the bluetooth radio and the call continues in hands-free mode.
g) The call can be ended by pressing END button the **ON-HOOK** (END) button of the connected mobile phone.
※ Some mobile phones may not reject an INCOMING call using the action of d) above. In this case, press the **ON-HOOK** button on the connected mobile phone to reject.

b. Last call number redials

Select **BLUETOOTH** mode by pressing SEND button. To making a call to the last dialed number, press SEND button again. **OUTGOING CALL** appears on the radio display for 1 second.

※ Some mobile phones may require an additional press of SEND button to start the last number redial call.

c. Switching to private (headset) mode during a call

During an INCOMING or OUTGOING call started in hands-free mode, it is possible to switch to the private call mode using the mobile phone handset to speak and to hear the calling party in private.

a) Press SEND button during the conversation ; **PRIVATE** appears on the display.

b) To switch back to hands-free mode using the bluetooth radio, press SEND button again during the private conversation ; **HANDSFREE** is shown on the display and hands-free call operation continues.

※ The above switching function may cause disconnection of the bluetooth link between the bluetooth radio and some mobile phones.
If SEND button is pressed during the private conversation, the bluetooth connection will return automatically.

(3) Funtion of bluetooth audio player

① Playing music using bluetooth audio

The bluetooth radio supports the bluetooth profile Audio Advanced Distribution Profile (A2DP). If your mobile phone or music player supports this profile then it is possible to listen to music tracks located on your bluetooth device through the bluetooth radio and speakers.
Additionally, the bluetooth radio supports the Audio Video Remote Control Profile (AVRCP).
If your bluetooth mobile phone or music player supports this profile then it is possible to advance to the next track or replay previous tracks on using the buttons on the front of the bluetooth radio your machine.

a. Press MODE button until **BT AUDIO** is displayed.

b. When **BT AUDIO** appears on the display, select the music player feature on your bluetooth device. And then bluetooth device play automatically to begin playback.

c. To pauses the bluetooth audio playback, press SEL button for 2 seconds. Press the knob again for 2 seconds to resume playback.

d. Press buttons (⩓,⩔) advance to the next or previous music track.

※ (a) Check your bluetooth device owner's manual for details of how to play music tracks via an external bluetooth audio system such as the bluetooth radio.
(b) Some bluetooth mobile phones cannot play music at all or may play music tracks in low-quality audio through the bluetooth radio.
(c) Some mobile phones require additional pairing to allow bluetooth audio playback.
(d) Information about songs (ID3) (e.g. the elapsed playing time, song titles, song index, etc.) playing using bluetooth audio profile cannot be displayed on this bluetooth radio.

② Connecting a bluetooth music player and mobile phone simultaneously

It is possible to connect a bluetooth mobile phone and a separate bluetooth music player to the bluetooth radio at the same time. Phone calls can be sent and received using the hands-free feature while music is playing using the bluetooth audio feature.

(4) Bluetooth setting

① Setting the automatic call answer feature

If this function is selected, the bluetooth radio automatically answers all INCOMING calls.
This feature enhances safety as the driver does not need to take their hands from the steering wheel to accept an INCOMING call.
Note that this feature cannot be set at different settings for each of the paired mobile phones.

a. Press SEND button to select BLUETOOTH mode.
b. Turn selection knob until **SETTINGS** is displayed.
c. Press SEL button until **AUTO ANSWERING** is displayed.
d. Press SEL button and turn selection knob. The LCD then displays as follows :

ANSWER OFF → ANSWER 5 SEC → ANSWER 10 SEC → RETURN → ANSWER OFF

- ANSWER OFF = Automatic answer function is not active.
- ANSWER 5 SEC = Automatic answers all INCOMING calls after a 5 second delay.
- ANSWER 10 SEC = Automatic answers all INCOMING calls after a 10 second delay.
- RETURN = Return to previous menu.

e. After making your selection, press SEL button to store the selection.
f. **SETTINGS** is then displayed for adjustment if required.
g. If you do not wish to adjust any further bluetooth settings, press END button to return to the last selected mode.

② Setting calling voice volume

This function is to set the level of the mobile phone's calling voice volume to be heard through the bluetooth radio and speakers.

a. Follow steps a. to c. of above setting below ①.
b. When **VOICE VOLUME** appears on the display, press SEL button to display the current level of the calling voice. Turn selection knob right or left to adjust the calling voice volume as desired. This is the level the calling voice volume will be set to each time the bluetooth radio is used after the stating switch is turned off and then on again.
c. After making your selection, press SEL button to store the selection.
d. **SETTINGS** is then displayed for adjustment if required.
e. If you do not wish to adjust any further bluetooth settings, press END button to return to the last selected mode.

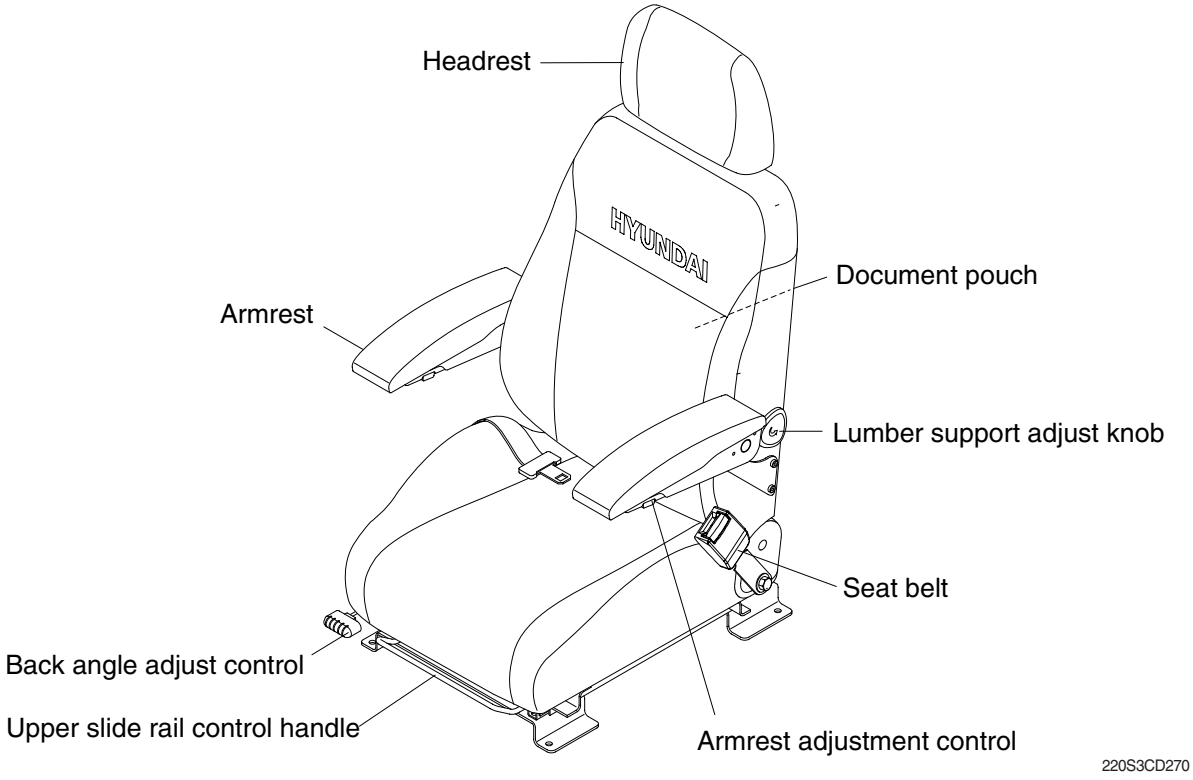
③ Setting the ring volume

This function is to set the level of the mobile phones ring tone volume to be heard through the bluetooth radio and speakers.

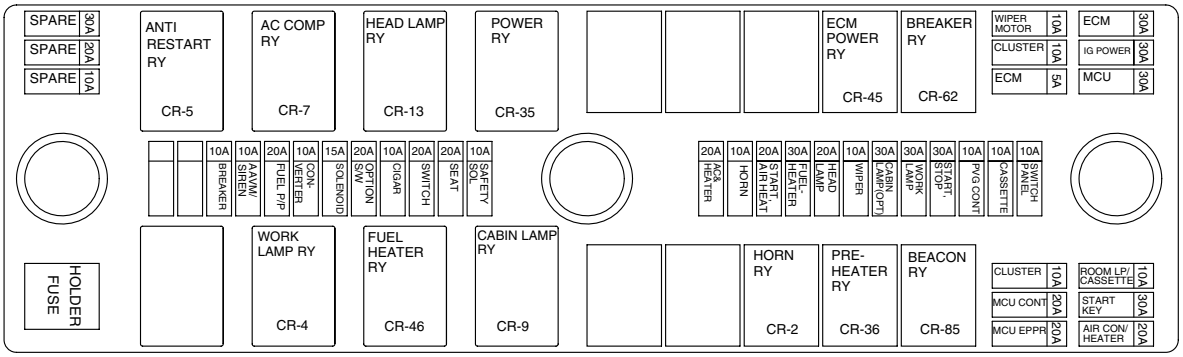
a. After making your selection, press SEL button to store the selection.
b. When **RING VOLUME** appears on the display, press the SEL button to display the current level of the ring tone. Turn selection knob right or left to adjust the ring tone volume as desired. This is the level the ringer volume will be set to each time the bluetooth radio is used after the starting switch is turned off and then on again.
c. After making your selection, press SEL button to store the selection.
d. The press END button to return to the last selected mode.

3) SEAT

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



4) FUSE & RELAY BOX



350SA3FS01

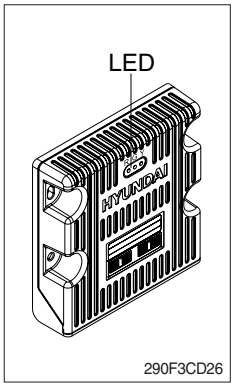
(1) The fuses protect the electrical parts and wiring from burning out.

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

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

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

5) MCU



290F3CD26

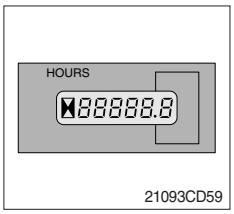
(1) To match the pump absorption torque with the engine torque, MCU varies EPPR valve output pressure, which control pump discharge amount whenever feedbacked engine speed drops under the reference rpm of each mode set.

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

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

G : green, R : red, Y : yellow

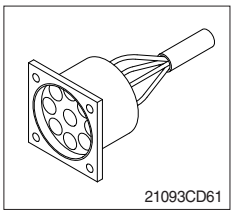
6) SERVICE METER



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

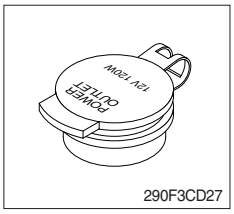
(2) Always ensure the operating condition of the meter during the machine operation. Inspect and service the machine based on hours as indicated in chapter 6, maintenance.

7) RS232 SERVICE SOCKET CONNECTOR



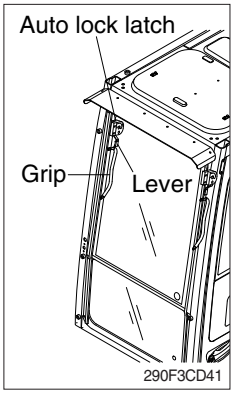
(1) MCU communicates the machine data with Laptop computer through the RS232 service socket.

8) 12V SOCKET



(1) Utilize the power of 12 V as your need and do not exceed power of 12 V, 30 W.

9) UPPER WINDSHIELD

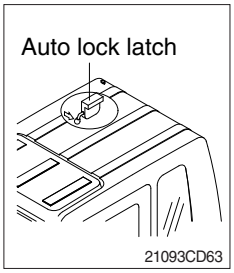


(1) Perform the following procedure in order to open the upper windshield.

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

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

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

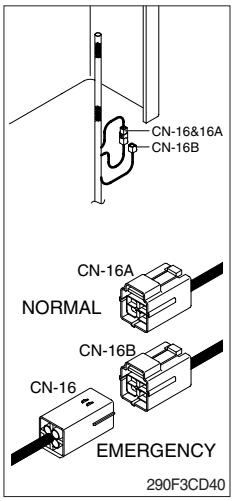


(2) Perform the following procedure in order to close the upper windshield.

① Pull the lever of the auto lock latch in order to release the auto lock latch.

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

10) EMERGENCY ENGINE SPEED CONTROL CONNECTOR



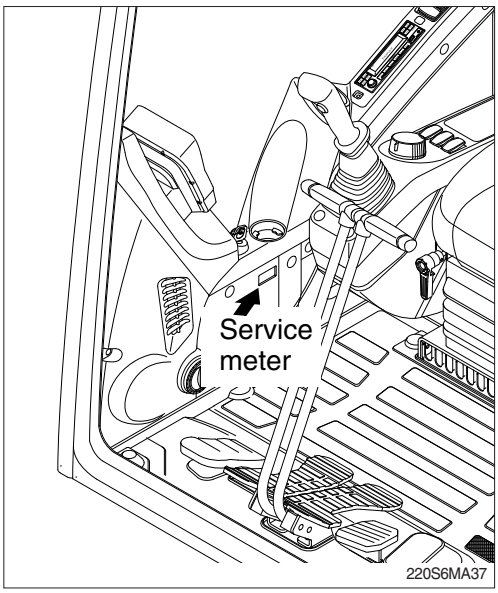
(1) When the CAN communication between the ECM and the MCU is abnormal due to malfunction, change the CN-16 connection from CN-16A to CN-16B and then control the engine speed by rotating the multimodal module of the jog dial module.

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

※ Make repair as soon as possible.

1. INSTRUCTION

1) INTERVAL OF MAINTENANCE



(1) You may inspect and service the machine by the period as described at page 4-10 based on hour meter at control panel.

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

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

2) PRECAUTION

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

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

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

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

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

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

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

(5) Ask to your local dealer or HD Hyundai Construction Equipment 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.

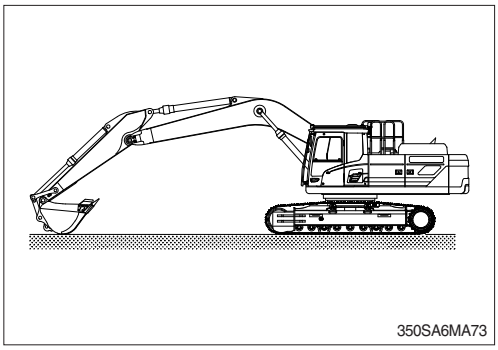
(9) For more detail information of maintenance, please contact local HD Hyundai Construction Equipment dealer.

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

4) RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM

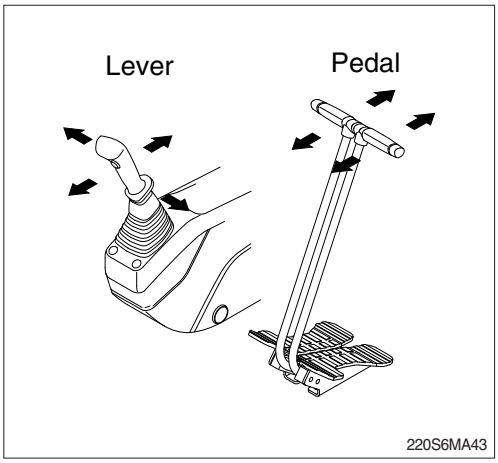
※ **Spouting of oil can cause the accident when loosening the cap or hose right after the operating of machine as the machine or oil is on the high pressure on the condition.**
Be sure to relieve the pressure in the system before repairing hydraulic system.

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

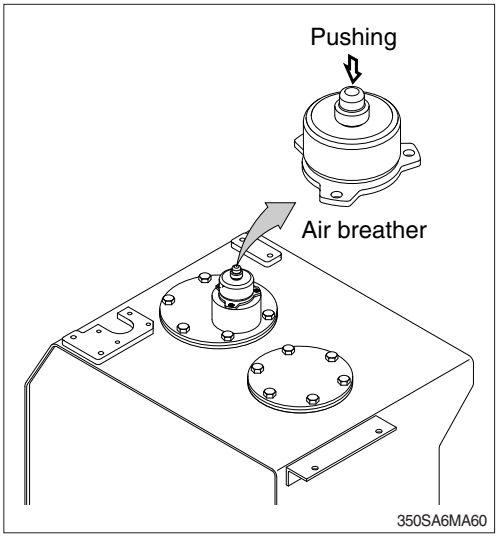


(2) Set the safety knob completely in the UNLOCK position, operate the control levers and pedals fully to the front, rear, left and right, to release the pressure in the hydraulic circuit.

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



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



5) PRECAUTION WHEN INSTALLING HYDRAULIC HOSES OR PIPES

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

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

(3) Use genuine parts.

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

(5) Keep the specified tighten torque.

6) PERIODICAL REPLACEMENT OF SAFETY PARTS

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

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

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

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

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

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

2. TIGHTENING TORQUE

Use following table for unspecified torque.

1) BOLT AND NUT

(1) Coarse thread

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

(2) Fine thread

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

2) PIPE AND HOSE (FLARE type)

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

3) PIPE AND HOSE (ORFS type)

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

4) FITTING

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

5) TIGHTENING TORQUE OF MAJOR COMPONENT

No.	Descriptions		Bolt size	Torque	
				kgf · m	lbf · ft
1	Engine	Engine mounting bolt (engine-bracket)	M12 × 1.75	11.5 ± 1.0	83.2 ± 7.2
2		Engine mounting bolt (bracket-frame, FR)	M24 × 3.0	90 ± 9.0	651 ± 65.1
3		Engine mounting bolt (bracket-frame, RR)	M24 × 3.0	90 ± 9.0	651 ± 65.1
4		Radiator mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
5		Coupling mounting socket bolt	M18 × 2.5	46.5 ±2.5	336 ±18.1
6		Fuel tank mounting bolt	M20 × 2.5	57.8 ± 5.8	418 ± 42.0
7	Hydraulic system	Main pump housing mounting bolt	M10 × 1.5	6.5 ± 0.7	47 ± 5.1
8		Main pump mounting socket bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
9		Main control valve mounting nut	M12 × 1.75	12.2 ± 1.3	88.2 ± 9.4
10		Hydraulic oil tank mounting bolt	M20 × 2.5	57.9 ± 5.8	419 ± 42
11		Turning joint mounting bolt, nut	M12 × 1.75	12.3 ± 1.3	89.0 ± 9.4
12	Power train system	Swing motor mounting bolt	M20 × 2.5	57.9 ± 5.8	419 ± 42
13		Swing bearing upper part mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
14		Swing bearing lower part mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
15		Travel motor mounting bolt	M24 × 3.0	84 ± 8.0	608 ± 57.9
16		Sprocket mounting bolt	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
17	Under carriage	Upper roller mounting bolt, nut (STD)	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
18		Upper roller mounting bolt, nut (H/WALKER)	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
19		Lower roller mounting bolt	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
20		Track tension cylinder mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
21		Track shoe mounting bolt, nut	M22 × 1.5	78 ± 8.0	564 ± 57.9
22		Track guard mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
23		Travel motor cover mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
24	Others	Counterweight mounting bolt	M36 × 3.0	337 ± 33	2440 ± 239
25		Cab mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
26		Operator's seat mounting bolt	M 8 × 1.25	4.05 ± 0.8	29.3 ± 5.8
27		Under cover mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7

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

3. FUEL, COOLANT AND LUBRICANTS

1) NEW MACHINE

New machine used and filled with following lubricants.

Description	Specification
Engine oil (API CH-4)	SAE 15W-40, ★SAE 5W-40
Hydraulic oil	HD Hyundai Construction Equipment genuine long life (ISO VG 32, VG 46, VG 68) Conventional hydraulic oil (ISO VG 15★)
Swing and travel reduction gear	SAE 80W-90 (GL-4/GL-5)
Grease	Lithium base grease NLGI No. 2
Fuel	ASTM D975-No. 2
Coolant (DCA4)	ASTM D6210 Mixture of 50% ethylene glycol base antifreeze and 50% water. Mixture of 60% ethylene glycol base antifreeze and 40% water.★

SAE : Society of Automotive Engineers
API : American Petroleum Institute
ISO : International Organization for Standardization
NLGI : National Lubricating Grease Institute
ASTM : American Society of Testing and Material
DCA4 : Brand name of Chemical Additive
manufactured by the Cummins Fleetguard Co

★Cold region
Russia, CIS, Mongolia

※ **Refer to page 7-32 for further information of recommended oils.**

4. MAINTENANCE CHECK LIST

1) DAILY SERVICE BEFORE STARTING

Check items	Service	Page
Visual check		
· Cooling fan	Check	4-29
· Air intake piping	Check	4-28
· Air cleaner dust ejection valve	Drain	4-31
· Crankcase breather tube	Check, Replace	-
Engine oil level	Check, Add	4-19
Coolant level	Check, Add	4-22
Fan belt tension and damage	Check, Adjust	4-29
Fuel tank	Check, Refill	6-31
Prefilter (water)	Check, Drain	6-32
Hydraulic oil level	Check, Add	6-41
Attachment pin and bushing ★	Lubricate	6-50
· 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		
Control panel & pilot lamp	Check, Clean	4-51

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

2) EVERY 50 HOURS SERVICE

Check items	Service	Page
Fuel tank (water, sediment)	Drain	4-31
Swing reduction gear oil	Check, Add	4-43
Track tension	Check, Adjust	4-46
Attachment pin and bushing	Lubricate	4-50
· 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 · Upper roller mounting bolts · Lower roller 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 · Track guard mounting bolts · Hydraulic pump mounting bolts · Under cover mounting bolts	Check, Tight	4-8

4) EVERY 200 HOURS SERVICE

Check items	Service	Page
Hydraulic oil return filter ★	Replace	4-42
Hydraulic oil pilot line filter element ★	Replace	4-43
Hydraulic oil drain filter cartridge ★	Replace	4-42

★ Replace 3 filters for continuous hydraulic breaker operation only.

5) INITIAL 250 HOURS SERVICE

Check items	Service	Page
Engine oil	Change	4-19
Engine oil filter	Replace	4-19
Prefilter (element)	Replace	4-32
Fuel filter element	Replace	4-33
Hydraulic oil pilot line filter element	Replace	4-43
Hydraulic oil return filter	Replace	4-42
Hydraulic oil drain filter cartridge	Replace	4-42
Swing reduction gear oil	Change	4-43
Travel reduction gear oil	Change	4-44

6) EVERY 250 HOURS SERVICE

Check items	Service	Page
Charge air piping	Check	4-28
Charge air cooler	Check	4-28
Battery (voltage), battery cable and connections	Check, Clean	4-51
Swing bearing grease	Check, Add	4-43
Bolts & nuts	Check, Tight	4-8
· 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		
· Track guard mounting bolts		
· Upper roller mounting bolts		
· Lower roller mounting bolts		
· Hydraulic pump mounting bolts		
· Under cover mounting bolts		
Attachment pin and bushing	Lubricate	4-50
· 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		

7) EVERY 500 HOURS SERVICE

Check items	Service	Page
Engine oil *	Change	4-19
Engine oil filter *	Replace	4-19
Radiator, cooler fin and charge air cooler	Check, Clean	4-28
Air cleaner element (primary) *1	Check, Clean	4-31
Prefilter element	Replace	4-32
Fuel filter element	Replace	4-33
Coolant filter	Replace	4-51
Aircon & heater filter (fresh air & recirulation)	Replace	4-54

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

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

8) EVERY 1000 HOURS SERVICE

Check items	Service	Page
Drive belt, cooling fan hub	Check, Replace	4-29
Cooling fan belt tensioner	Check, Replace	4-30
Hydraulic tank air breather element	Replace	4-42
Hydraulic oil return filter	Replace	4-42
Hydraulic oil drain filter cartridge	Replace	4-42
Hydraulic oil pilot line filter	Replace	4-43
Swing reduction gear oil	Change	4-43
Travel motor reduction gear oil	Change	4-44
Swing gear and pinion grease	Change	4-44

9) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Engine cleaning	Clean	4-34
Vibration damper (rubber)	Check, Replace	4-35
Vibration damper (viscous)	Check, Replace	4-35
Coolant, cooling system and antifreeze★2	Change, Flush	4-22, 25, 26, 27
Air cleaner element (primary, safety)★1	Replace	4-31
Hydraulic oil★2	Change	4-41
Hydraulic tank suction strainer	Check, Clean	4-41
RCV lever	Check, Lubricate	4-45
Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-

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

★2 Conventional

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

10) EVERY 5000 HOURS SERVICE

Check items	Service	Page
Overhead set (shop inspection)	Adjust	4-36, 37, 38
Hydraulic oil★3	Change	4-40

★3 HD Hyundai Construction Equipment genuine long life

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

11) EVERY 6000 HOURS SERVICE

Check items	Service	Page
Coolant, cooling system and antifreeze★3	Change, Flush	4-22, 25, 26, 27

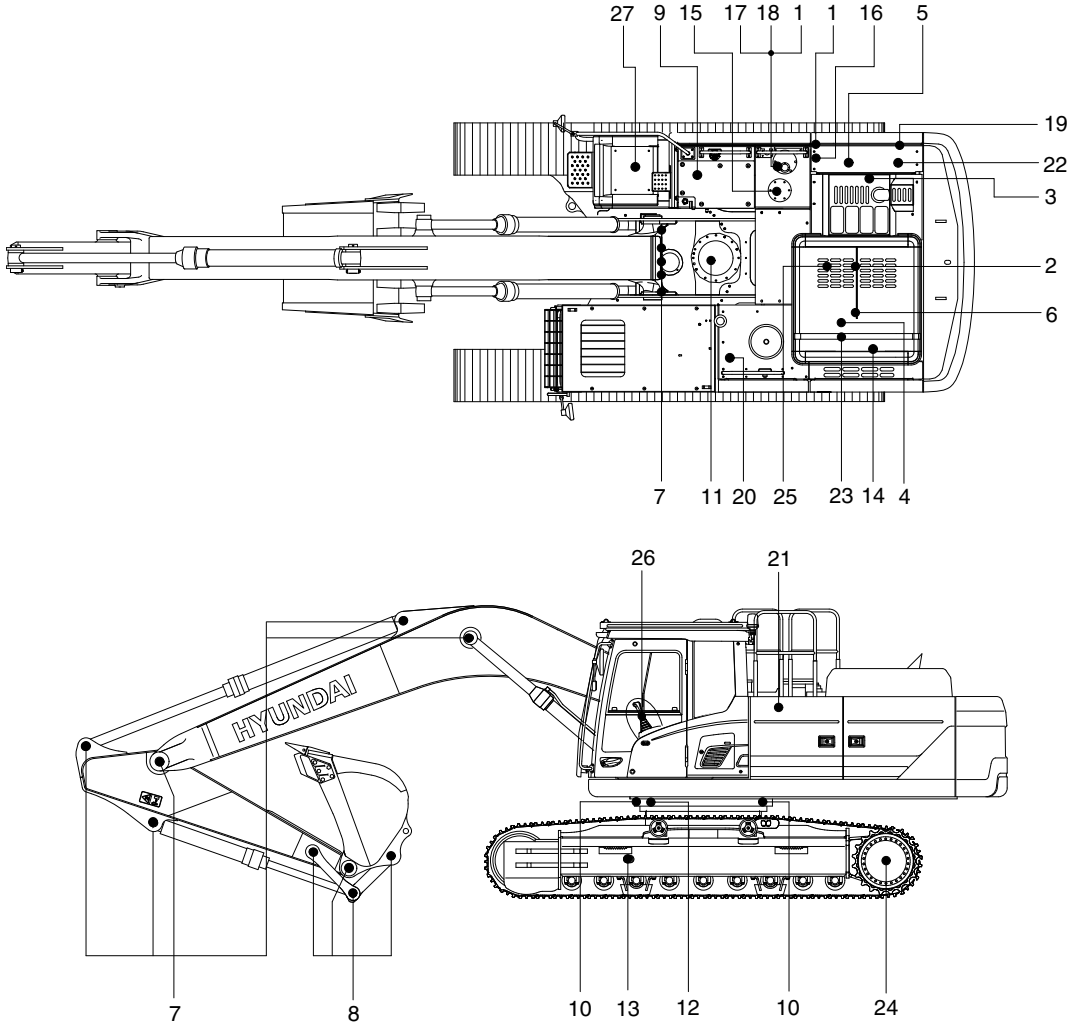
★3 HD Hyundai Construction Equipment genuine long life

12) WHEN REQUIRED

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

Check items	Service	Page
Engine lubrication system		
· Engine oil	Change	4-19
· Engine oil filter	Replace	4-19
Engine cooling system		
· Coolant	Add or Change	4-22, 25, 26, 27
· Radiator	Clean or Flush	4-22, 25, 26, 27
· Charge air cooler	Check, Replace	4-28
· Coolant filter	Replace	4-21
Fuel system		
· Fuel tank	Drain or Clean	4-31
· Prefilter (water, element)	Drain or Replace	4-32
· Fuel filter element	Replace	4-33
· Fuel filler pump filter	Clean, Replace	4-39
Engine air system		
· Air cleaner element (primary)	Replace	4-31
· Air cleaner element (safety)	Replace	4-31
Hydraulic system		
· Hydraulic oil	Add or Change	4-40
· Suction strainer	Clean	4-40
· Return filter	Replace	4-42
· Drain line filter	Replace	4-42
· Air breather element	Replace	4-42
· Pilot line filter	Replace	4-43
· RCV lever	Lubricate	4-45
Undercarriage		
· Track tension	Check, Adjust	4-46
Bucket		
· Linkage	Adjust	4-49
· Bucket assy	Replace	4-47
· Tooth	Replace	4-48
· Side cutter	Replace	4-48
Air conditioner and heater		
· Fresh air filter	Replace	4-54
· Recirculation filter	Clean, Replace	4-54

5. MAINTENANCE CHART



Caution

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

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ (U.S.gal)	Service points No.
10 Hours or daily	1	Hydraulic oil level	Check, Add	HO	210 (55.5)	1
	2	Engine oil level	Check, Add	EO	35 (9.2)	1
	4	Radiator coolant	Check, Add	C	25 (6.6)	1
	5	Prefilter (water)	Check, Drain	-	-	1
	6	Fan belt tension and damage	Check, Adjust	-	-	1
	7	★Attachment pin & bushing	Check, Lubricate	PGL	-	11
	9	Fuel tank	Check, Refill	DF	600 (159)	1

★ For initial 100 hours.

※ Oil symbol

Please refer to the recommended lubricants for specification.

DF : Diesel fuel GO : Gear oil HO : Hydraulic oil DEF : DEF/AdBlue®

C : Coolant PGL : Grease EO : Engine oil

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ (U.S.gal)	Service points No.
50 Hours or weekly	8	Bucket linkage pins	Check, Lubricate	PGL	-	6
	9	Fuel tank (water, sediment)	Check, Drain	-	-	1
	11	Swing reduction gear oil	Check, Add	GO	11 (2.9)	1
	13	Track tension	Check, Adjust	PGL	-	2
250 Hours	4	Charge air cooler and piping	Check	-	-	1
	4	Cooling fan	Check	-	-	1
	7	Attachment pins & bushings	Check, Lubricate	PGL	-	11
	10	Swing bearing grease	Check, Add	PGL	-	2
	14	Battery (voltage), battery cable and connections	Check, Replace	-	-	1
Initial 250 Hours	2	Engine oil	Change	EO	35 (9.2)	1
	3	Engine oil filter	Replace	-	-	1
	5	Prefilter (element)	Replace	-	-	1
	11	Swing reduction gear oil	Change	GO	11.0 (2.9)	1
	15	Hydraulic oil return filter	Replace	-	-	1
	16	Hydraulic oil drain filter cartridge	Replace	-	-	1
	19	Hydraulic oil pilot line filter element	Replace	-	-	1
	22	Fuel filter element	Replace	-	-	1
	24	Travel reduction gear case oil	Change	GO	7.8 (2.1)	2
	25	Coolant filter	Replace	-	-	1
500 Hours	2	Engine oil	Change	EO	35 (9.2)	1
	3	Engine oil filter	Replace	-	-	1
	5	Prefilter (element)	Replace	-	-	1
	20	Aircon & heater filter (fresh air & recirculation)	Replace	-	-	2
	21	Air cleaner element (primary)	Check, Clean	-	-	1
	22	Fuel filter element	Replace	-	-	1
	23	Radiator, oil cooler, charge air cooler	Check, Clean	-	-	3
	25	Coolant filter	Replace	-	-	1
1000 Hours	6	Drive belt, cooling fan hub	Check, Replace	-	-	2
	6	Cooling fan belt tensioner	Check, Replace	-	-	1
	11	Swing reduction gear oil	Change	GO	11.0 (2.9)	1
	12	Swing gear and pinion grease	Change	PGL	11.4 kg (25.1 lb)	1
	15	Hydraulic oil return filter	Replace	-	-	1
	16	Hydraulic oil drain filter cartridge	Replace	-	-	1
	17	Hydraulic oil air breather element	Replace	-	-	1
	19	Hydraulic oil pilot line filter	Replace	-	-	1
	24	Travel reduction gear oil	Change	GO	7.8 (2.1)	2
2000 Hours	1	Hydraulic oil★1	Change	HO	210 (55.5)	1
	2	Engine cleaning	Clean	-	-	1
	2	Vibration damper (rubber)	Check, Replace	-	-	4
	2	Vibration damper (viscous)	Check, Replace	-	-	4
	4	Coolant, cooling system and antifreeze★1	Change	C	25 (6.6)	1
	18	Hydraulic oil suction strainer	Check, Clean	-	-	1
	21	Air cleaner element (primary, safety)	Replace	-	-	2
	26	RCV lever	Check, Lubricate	PGL	-	2
	-	Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-	-	-

★1 Conventional ★2 HD Hyundai Construction Equipment genuine long life

※ Oil symbol

Please refer to the recommended lubricants for specification.

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

PGL : Grease EO : Engine oil

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ (U.S.gal)	Service points No.
5000 Hours	1	Hydraulic oil★2	Change	HO	210 (55.5)	1
	2	Overhead set (shop inspection)	Adjust	-	-	1
6000 Hours	4	Coolant, cooling system and antifreeze★2	Change	C	25 (6.6)	1
As required	20	Aircon & heater fresh filter	Replace	-	-	1
	20	Aircon & heater recirculation filter	Clean, Replace	-	-	1
	21	Air cleaner element (primary)	Clean, Replace	-	-	1
	21	Air cleaner element (safety)	Replace	-	-	1
	27	Fuel filler pump filter	Clean, Replace	-	-	1

★1 Conventional ★2 HD Hyundai Construction Equipment genuine long life

※ Oil symbol

Please refer to the recommended lubricants for specification.

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

PGL : Grease EO : Engine oil

1) CHECK ENGINE OIL LEVEL

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

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

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

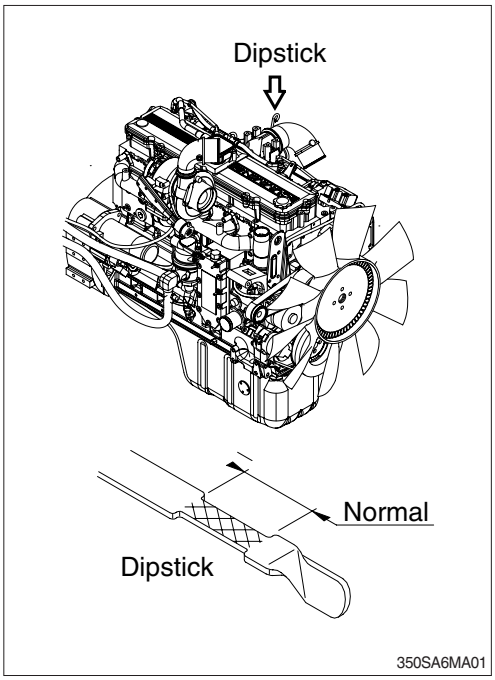
(3) If oil level is LOW, add oil and then check again.

※ **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.**

※ **Keep all parts clean from contaminants. Contaminants may cause rapid wear and shortened component life.**



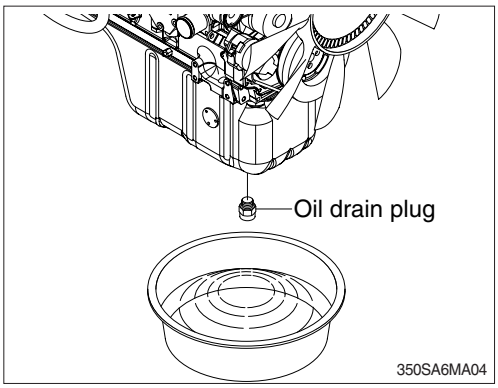
2) REPLACEMENT OF ENGINE OIL AND OIL FILTER

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

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

※ **A drain pan with a capacity of 40 liters (10.6 U.S. gallons) will be adequate.**

※ **Disposal of the waste oil in accordance with local regulations.be adequate.**

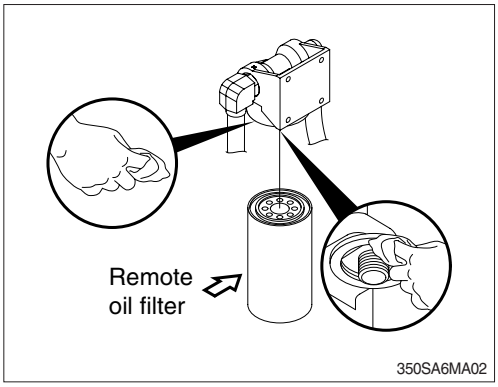


(3) Clean the area around the lubricating oil filter head.

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

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

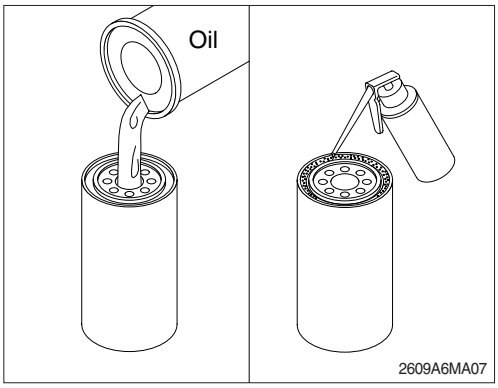
※ **The O-ring can stick on the filter head. Be sure it is removed before installing the new filter.**



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

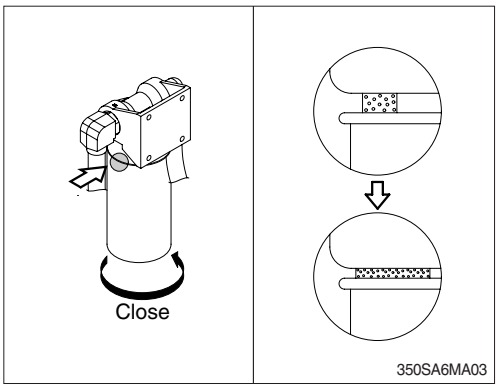
※ **Fill the filters with clean lubricating oil.**

※ **Be careful the no debris is poured into the filter. If using an oil supply with a metallic or plastic seal under the cap, be careful to peel the seal back. Punching the seal with a knife or sharp object can create debris in the oil container.**



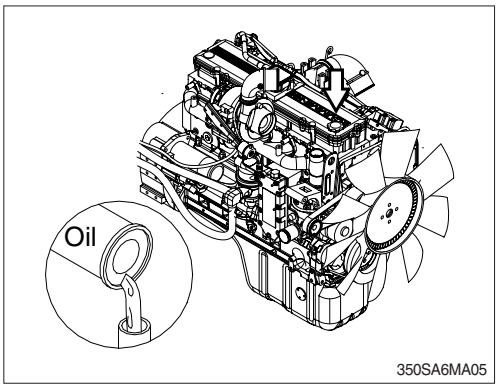
(7) Install the filter to the filter head.
Tighten the filter until the gasket contacts the filter head surface.
Tighten 3/4 to 1 turn after the gasket makes contact with the filter head.

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

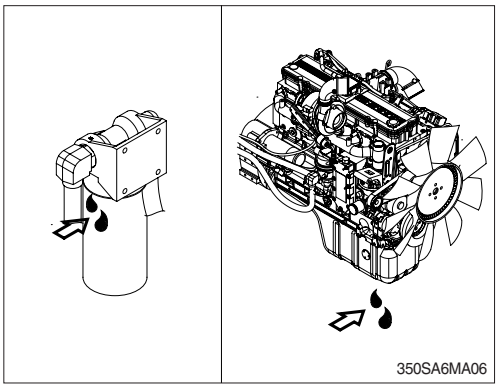


(8) Clean and check the lubricating oil drain plug threads and sealing surface.
Install the lubricating oil pan drain plug.

(9) Fill the engine with clean oil to the proper level.
· Quantity : 35 ℓ (9.2 U.S.gallons)



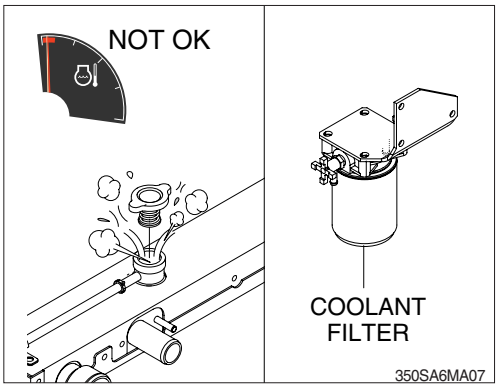
(10) Operate the engine at low idle and inspect for leaks at the filters and the drain plug.
Shut the engine off and check the oil level with the dipstick. Allow 15 minutes for oil to drain down before checking.



3) COOLANT FILTER

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

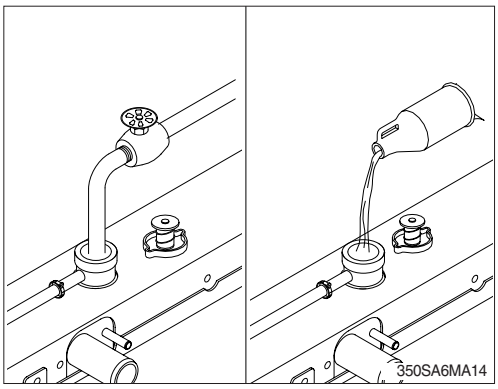
(1) Remove the radiator cap.



(2) Turn the valve to the OFF position.

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

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



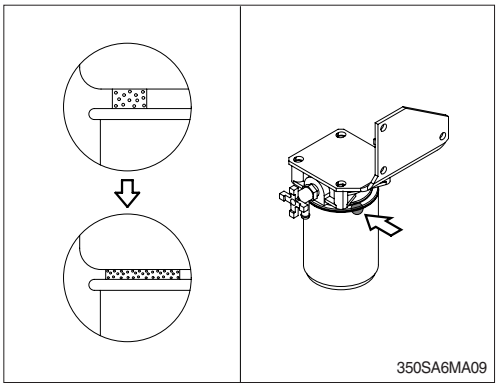
(4) Apply a thin film of clean engine oil to the gasket sealing surface before installing the new filter.

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

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

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

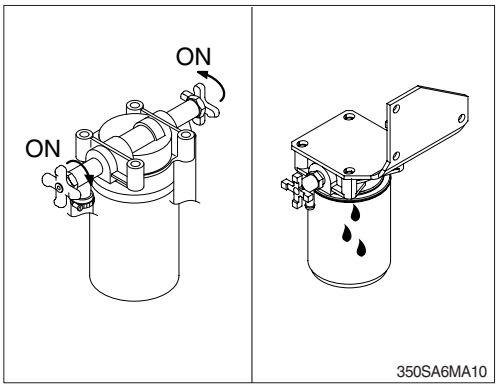
※ **Mechanical over tightening can distort the filter threads or damage the filter head.**



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

(8) Operate the engine and check for leaks.

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



4) CHECK COOLANT

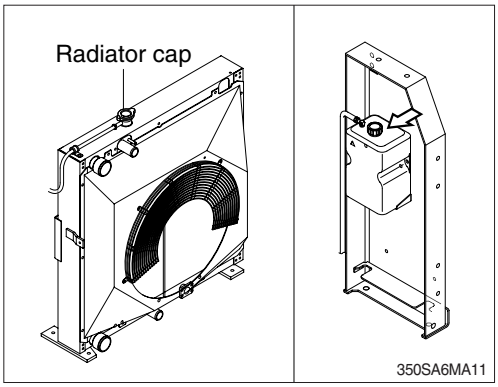
(1) Check if the level of coolant in reservoir tank is between FULL and LOW.

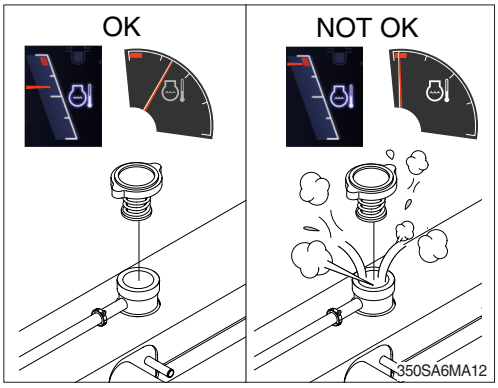
(2) Add the mixture of antifreeze and water after removing the cap of the reservoir tank if coolant is not sufficient.

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

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

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





5) COOLANT TEST STRIPS INSTRUCTIONS

(1) Pre-test instruction

Recommended testing frequency - at every coolant filter change interval.

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

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

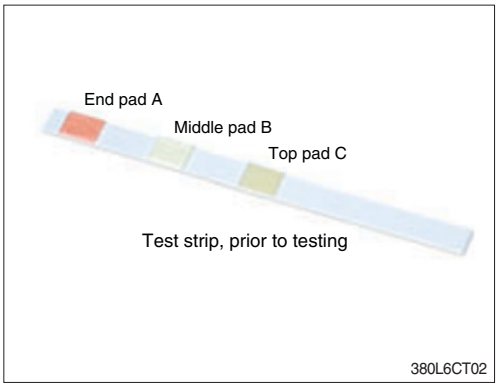
③ Record and track results.

380L6CT01

(2) Test instruction

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

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



380L6CT02

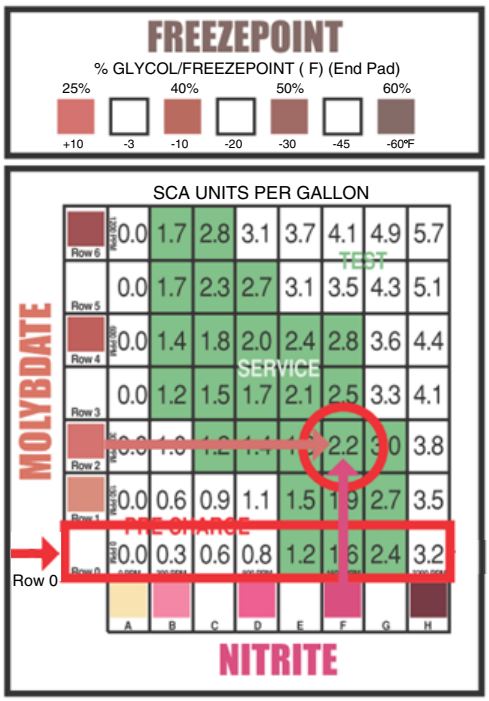
③ 45 seconds after dipping strip, compare results to color chart and record in the following order:

for DCA4:

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

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

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



380L6CT03

(3) Maintenance actions based on results

① Above normal

ABOVE NORMAL - Do not replace the coolant filter or add DCA4 liquid until additive concentration falls below 3 units per gallon.

- Test at every subsequent coolant filter change interval.

② Normal

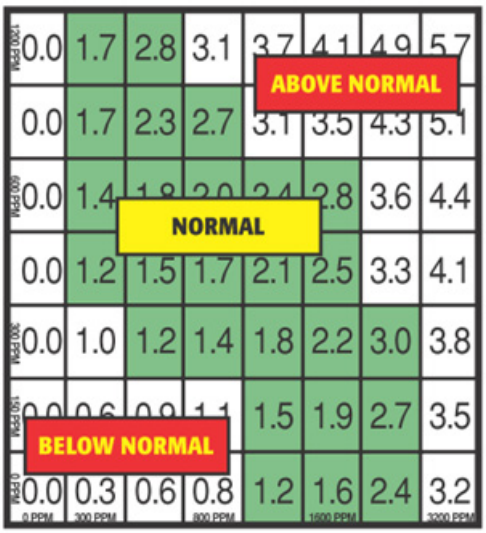
NORMAL - Continue to replace the coolant filter at your normal interval.

③ Below normal

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

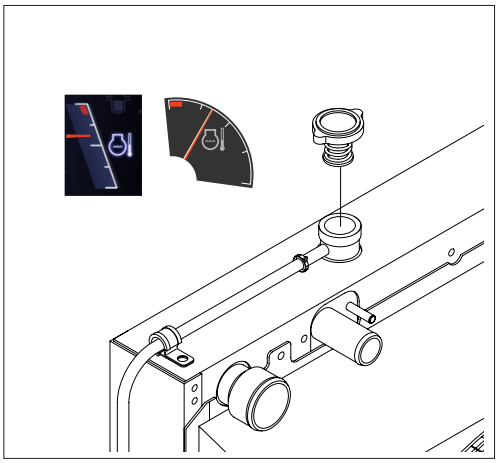
- Replace the coolant filter and add 40 cc of additive per each 1 liter of coolant.

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



380L6CT04

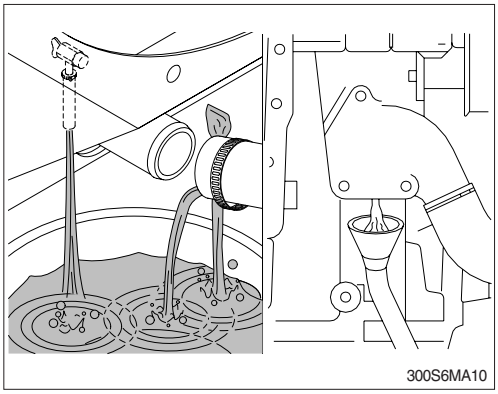
6) FLUSHING AND REFILLING OF RADIATOR


350SA6MA13

(1) Change coolant

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

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


300S6MA10

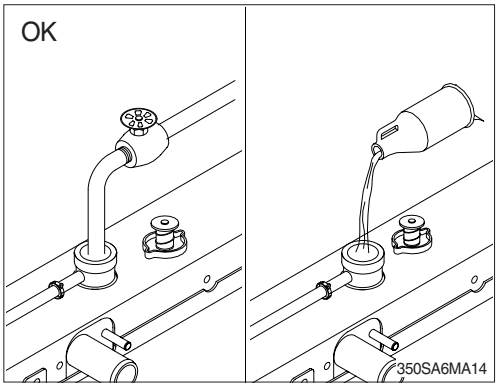
⚠ **Wait until the temperature is below 50 ˚C (122 ˚F) before removing the coolant system pressure cap.**
Failure to do so can cause personal injury from heated coolant spray.
Drain the cooling system by opening the drain valve on the radiator and opening the drain valve on the bottom of the engine oil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

(2) Flushing of cooling system

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

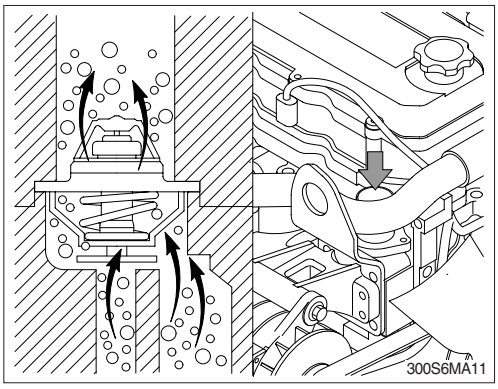
※ **Use 0.5kg (1.0 pound) of sodium carbonate for every 23 liters (6.0 U.S. gallons) of water.**

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

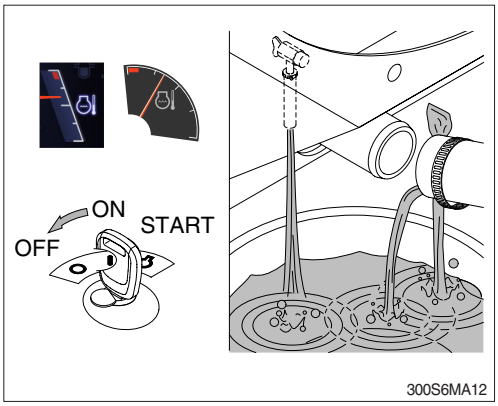


350SA6MA14

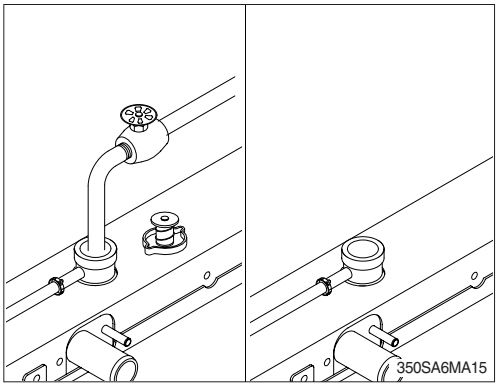
※ **During filling, air must be vented from the engine coolant passages.**
The system must be filled slowly to prevent air locks or serious engine damage can result. Wait 2 to 3 minutes to allow air to be vented, then add mixture to bring the level to the top.



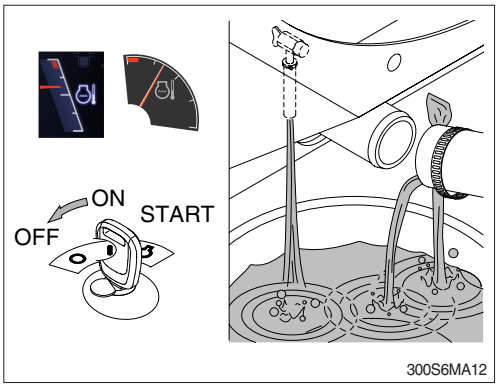
② Operate the engine for 5 minutes with the coolant temperature above 80˚C (176˚F) .
Shut the engine off, and drain the cooling system.



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



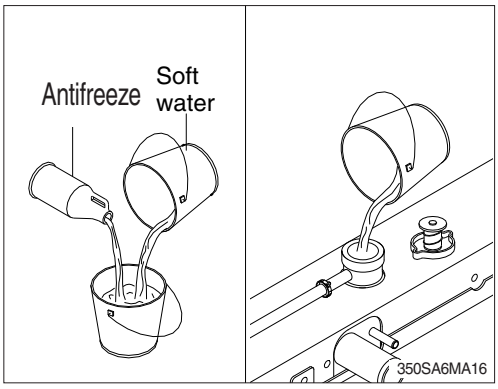
④ Operate the engine for 5 minutes with the coolant temperature above 80˚C (176˚F) .
Shut the engine off, and drain the cooling system.
※ **If the water being drained is still dirty, the system must be flushed again until the water is clean.**



(3) Cooling system filling

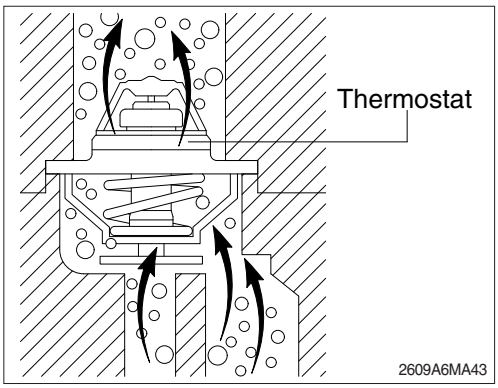
① Use a mixture of 50 percent soft water and 50 percent ethylene glycol antifreeze to fill the cooling system. Refer to the page 7-32.
Coolant capacity (engine only) : 10 ℓ (2.6 U.S. gallons)

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

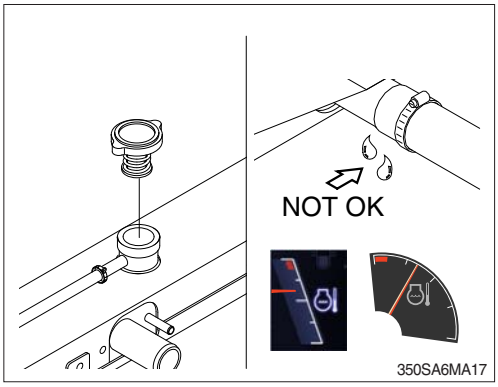


② The system has a maximum fill rate of 19 liters (5.0 U.S. gallons) per minute.
Do not exceed this fill rate.

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



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



7) CLEAN RADIATOR AND OIL COOLER

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

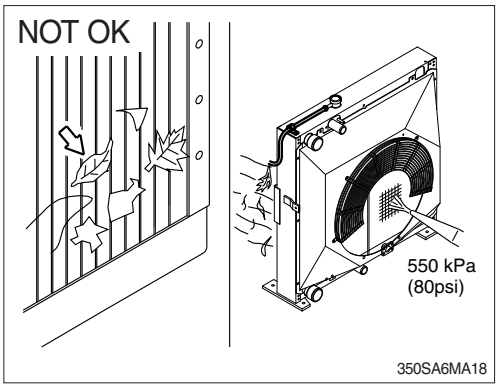
(1) Visually inspect the radiator for clogged radiator fins.

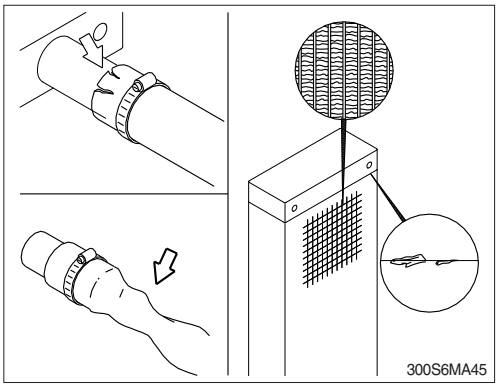
(2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.

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

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

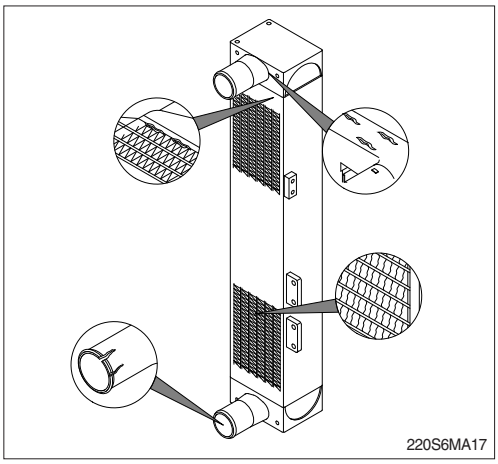
(4) Visually inspect the radiator for core leaks.





8) CHECK CHARGE AIR COOLER

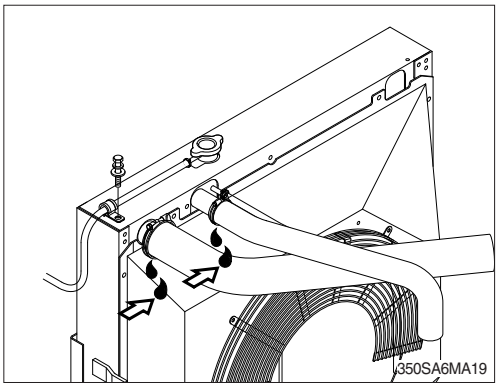
Inspect the charge air cooler for dirt and debris blocking the fins. Check for cracks, holes, or other damage. If damage is found, please contact HD Hyundai Construction Equipment distributor.



9) CHARGE AIR PIPING

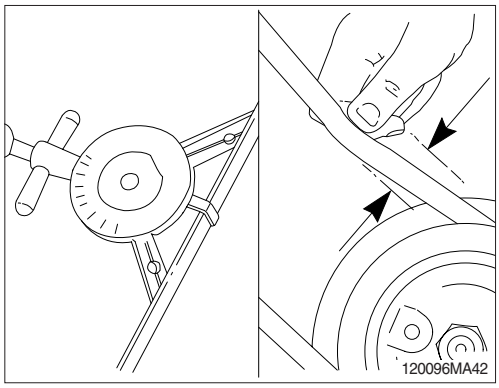
(1) Inspect the charge air piping and hoses for leaks, holes, cracks, or loose connections.

(2) Tighten the hose clamps if necessary.

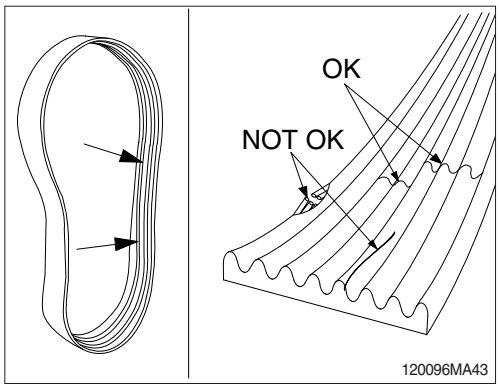


10) FAN BELT

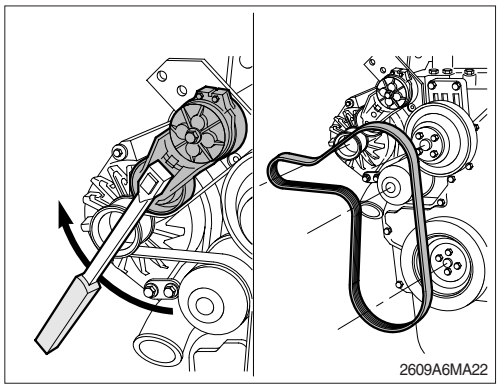
(1) An deflection method can be used to check belt tension by applying 11.3 kgf (25 lbf) force between the pulleys on V-belts. If the deflection is more than one belt thickness per foot of pulley center distance, the belt tension must be adjusted.



(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 idle and drive pulleys for wear or cracks.

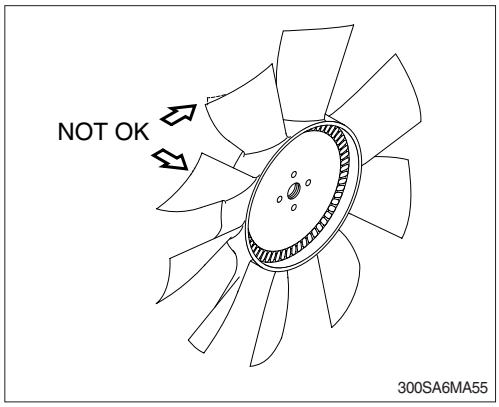


11) INSPECTION OF COOLING FAN

⚠ **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.**

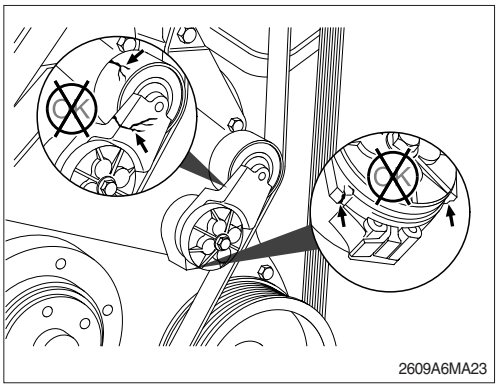
※ **Rotate the crankshaft by using the engine bearing gear.**

※ **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.

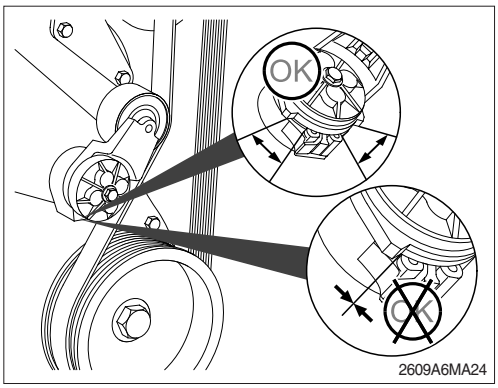


12) FAN BELT TENSIONER

(1) With the engine stopped, check the tensioner arm, pulley, and stops for cracks. If any cracks are found, the tensioner must be replaced.

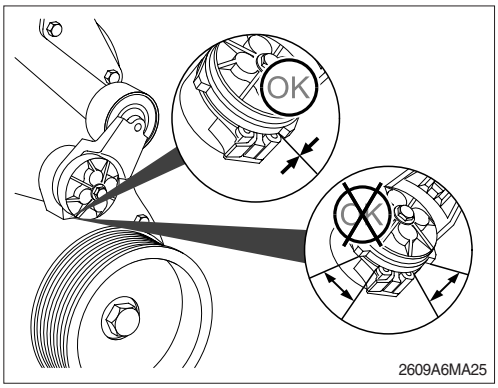


(2) With the belt installed, verify that neither tensioner arm stop is in contact with the spring case stop.
After replacing the belt, if the tensioner arm stops are still in contact with the spring case stop, replace the tensioner.

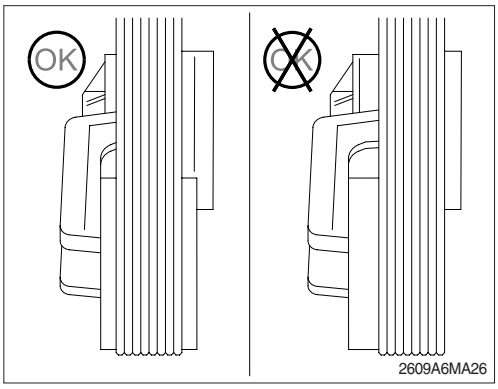


(3) With the belt removed, verify that the tensioner arm stop is in contact with the spring case stop.
If these two are not touching, the tensioner must be replaced.

※ **After replacing the belt, if the tensioner arm stop is still in contact with the spring case stop, the tensioner must be replace.**



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



13) CLEANING OF AIR CLEANER

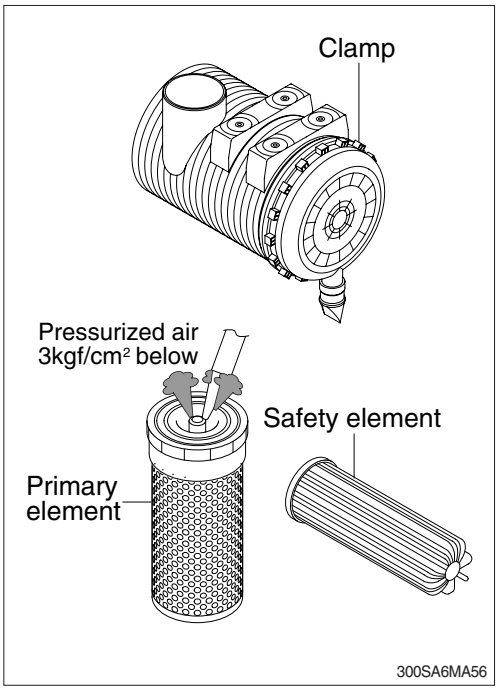
(1) Primary element

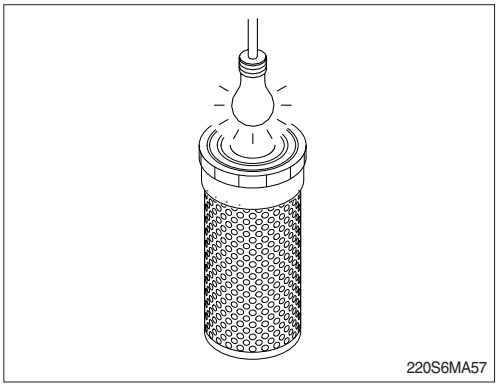
① Loosen the clamps and remove the element.
② Clean the inside of the body.
③ Clean the element with pressurized air.
· Remove the dust inside of the element by the pressurized air (below 3 kgf/cm², 40 psi) forward and backward equally.
④ Inspect for cracks or damage of element by putting a light bulb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





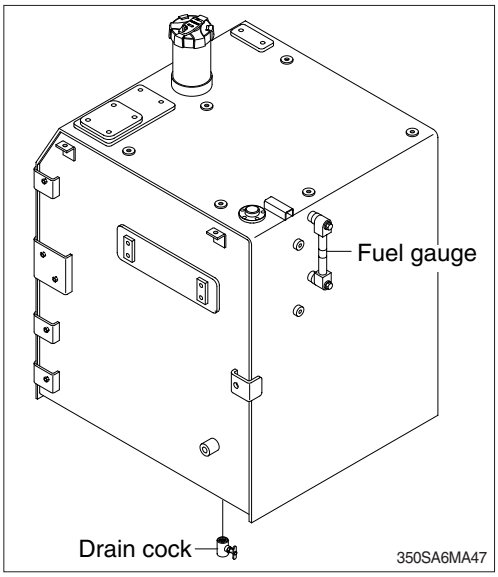
14) FUEL TANK

(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.



15) PREFILTER

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

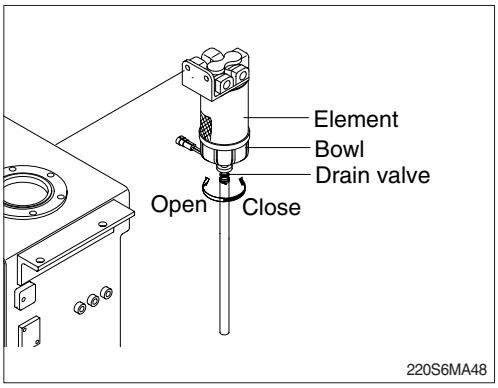
(1) Drain water

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.**



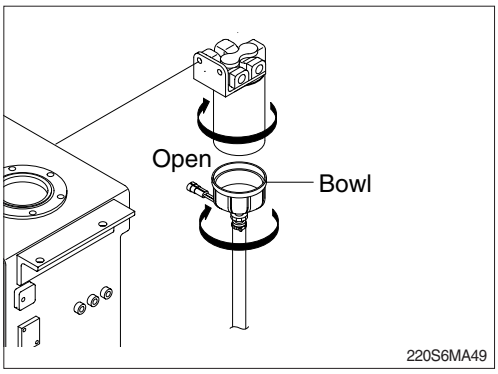
(2) Replace element

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.

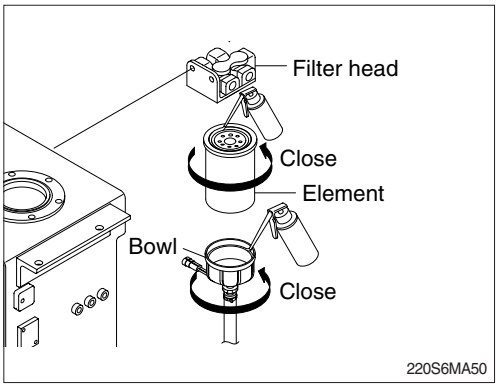


④ Lubricate new bowl seal with clean fuel or motor oil and place in bowl gland.

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.

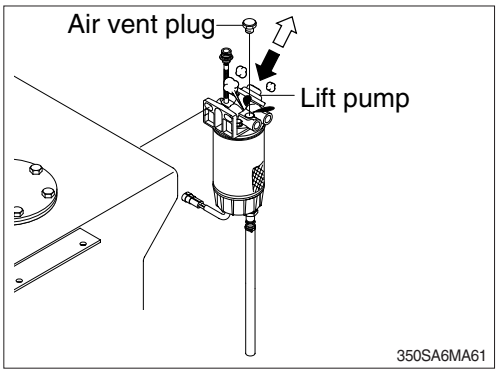


(3) Air bleeding

① Do hand-priming the lift pump repeatedly until air bubbles comes out from air vent hole completely.

② Tighten the air vent plug to its origin position.

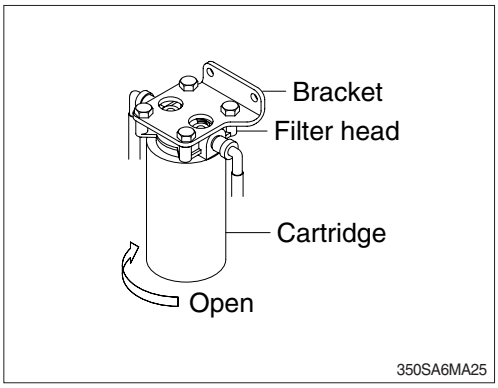
⚠ **The fuel pump, high-pressure fuel lines, and fuel rail contain very high-pressure fuel. Do not loosen any fittings while the engine is running. Personal injury and property damage can result. Wait at least 10 minutes after shutting down the engine before loosening any fittings in the high-pressure fuel system to allow pressure to do decrease to a lower level.**



16) REPLACEMENT OF FUEL FILTER

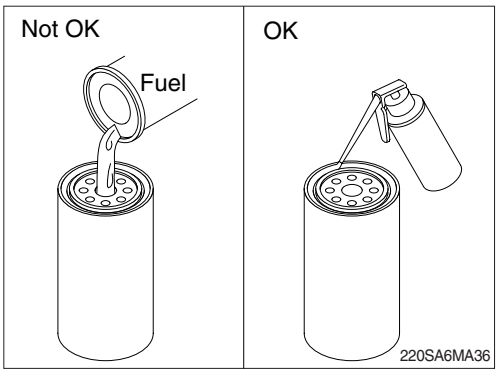
(1) Clean the area around the filter head, remove the filter with a fuel filter wrench and clean the O-ring surface.

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



(2) Lubricate the O-ring of fuel filter with clean engine oil.

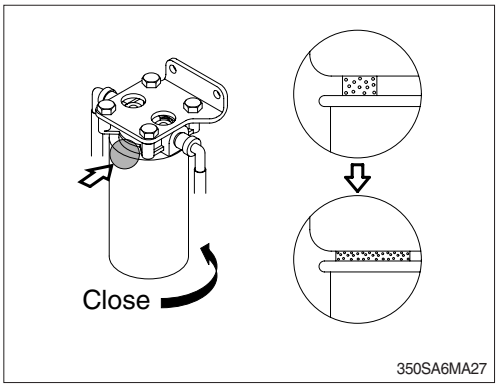
※ **Do not pre-fill fuel in the new fuel filter. The system must be primed after the fuel filter is installed. Pre-filling the fuel filter can result in debris entering the fuel system and anmaging fuel system components.**



(3) Install the filter on the filter head.

※ **Tighten the filter until the gasket contacts the filter head surface and tighten the filter an additional 3/4 turn more after contacts the filter head.**

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

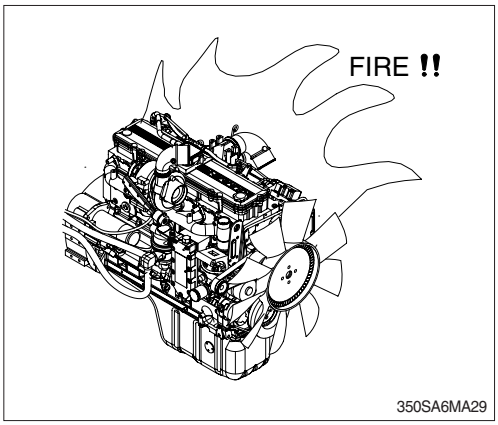


※ **Cycle the starting switch and allow the lift pump to run. The lift pump will run for 30 seconds. Afterwards, turn the starting switch off and back on again allowing the lift pump to run again.**

※ **Allow the lift pump to run for three or four 30-second cycles before attempting to start the engine.**

17) 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.



18) ENGINE CLEANING

⚠ When using a steam cleaner, wear safety glasses or a face shield, as well as protective clothing. Hot steam can cause serious personal injury.

※ Turn OFF the master switch mounted electric box.

※ Steam ingress into electrical components can cause damage.

(1) Steam is the recommended method of cleaning a dirty engine or a piece of equipment.

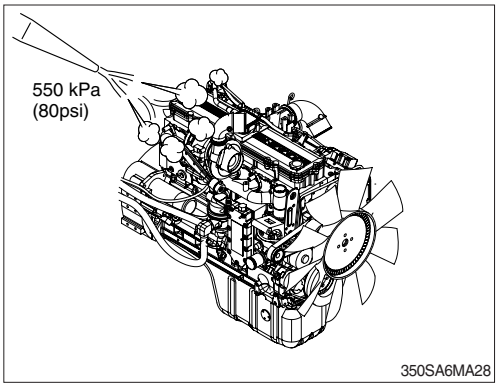
(2) Protect all electrical components, openings, and wiring from the full force of the cleaner spray nozzle.

(3) Components to protect include, but are not limited to the following:

- Electrical components and connectors
- Wiring harnesses
- Belts and hoses
- Bearings (ball or taper roller)

△ Soap, solvent, or water ingress into air intake system can cause engine damage.

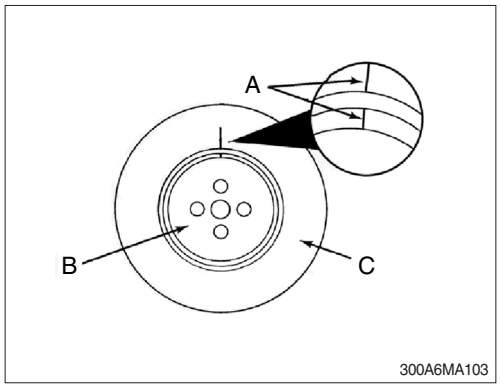
△ Do not directly spray or allow soap, solvent, or water to enter any passages, ports, or cowlings that lead to the engine air intake system.



19) VIBRATION DAMPER

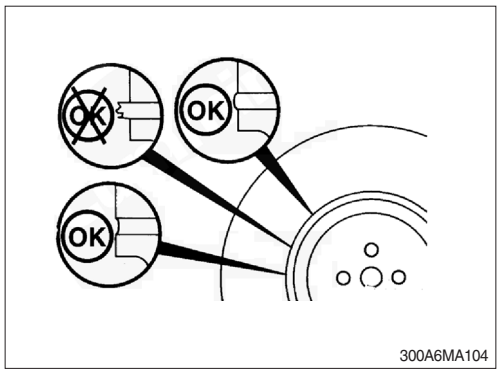
(1) Rubber

① Check the index lines (A) in the vibration damper hub (B) and the inertia member (C). If the lines are more than 1.59 mm (1/16 in) out of alignment, replace the vibration damper.



② Inspect the rubber member for deterioration. If pieces of rubber are missing or if the elastic member is more than 3.18 mm (1/8 in) below the metal surface, replace the damper.

③ Look for forward movement of the damper ring on the hub. Replace the vibration damper if any movement is detected.

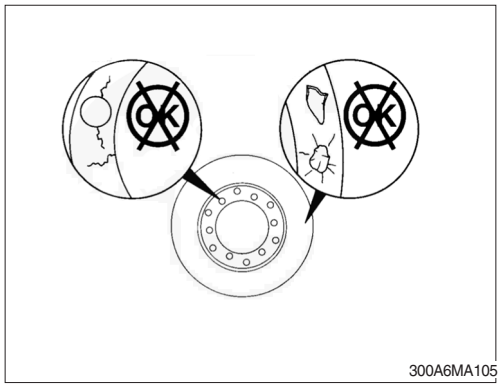


(2) Viscous

※ The silicone fluid in the vibration damper will become solid after extended service and will make the damper inoperative. An inoperative vibration damper can cause major engine or drivetrain failures.

① Check the vibration damper for evidence of fluid loss, dents, and wobble. Inspect the vibration damper thickness for any deformation or raising of the damper cover plate.

② If any of these conditions are identified, contact your local Cummins authorized repair location to replace the vibration damper.movement is detected.



20) OVERHEAD SET ADJUSTMENT

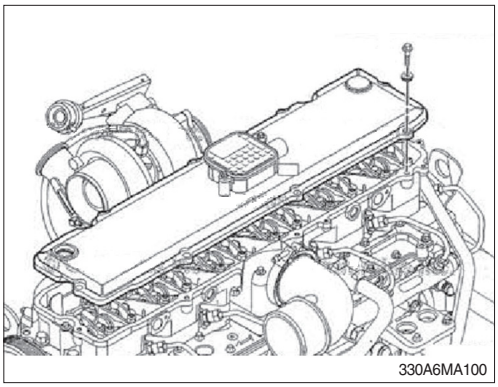
※ **This procedures are perform the repair shop.**

※ **Service tools**

- Cummins barring tool, p/no. 3824591
- Feeler gauge

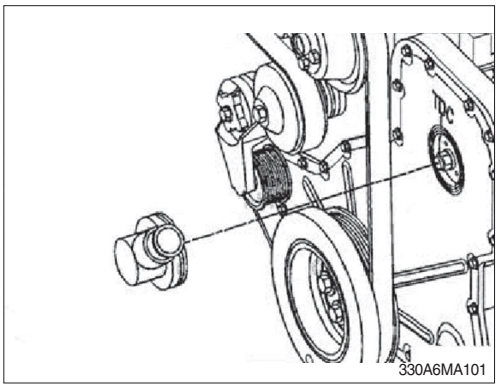
(1) Remove the capscrews.

(2) Remove the rocker lever cover and gasket, refer to engine maintenance manual.



330A6MA100

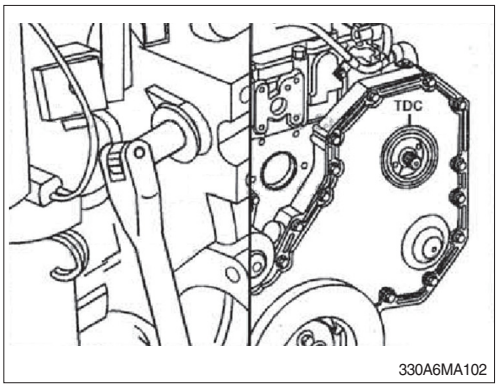
(3) Remove the plastic fuel pump drive cover located on the front of the engine.



330A6MA101

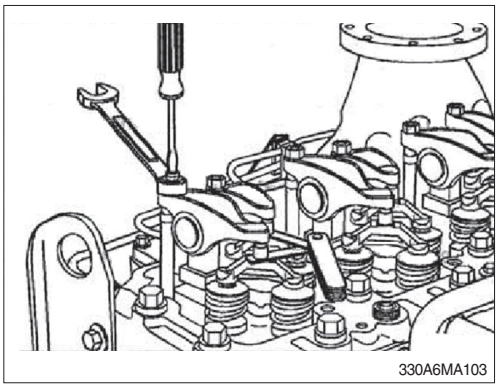
※ **Engine coolant temperature should be less than 60 ℃ (140 °F).**

(4) Using the barring tool, rotate the crankshaft to align the top dead center marks on the gear cover and the fuel pump gear.



330A6MA102

(5) With the engine in this position, lash can be checked on the following rocker arms : 1I, 1E, 2I, 3E, 4I and 5E.

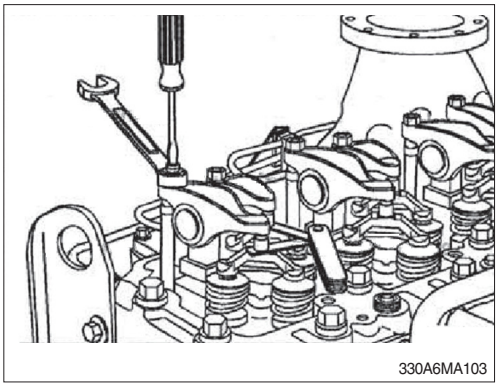

330A6MA103

Lash check limits

Item		mm	inch
Intake	Min	0.152	0.006
	Max	0.559	0.022
Exhaust	Min	0.381	0.015
	Max	0.813	0.032

※ Lash checks are performed as part of a trouble-shooting procedure, and resetting is not requires suring checks as long as the lash measure-ments are within the above limits.

(6) Measure lash by inserting a feeler gauge between the crosshead and the rocker lever ball insert and socket while lifting up on the end of the rocker arm. If the lash measurement is out of specifications, loosen the locknut and adjust-ment the lash to nominal specifications.


330A6MA103

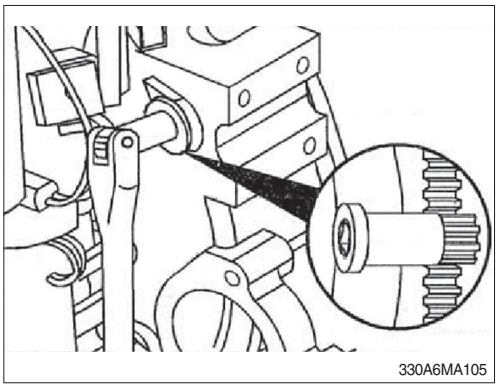
Lash reset specifications

Item		mm	inch
Intake	Nominal	0.305	0.012
Exhaust	Nominal	0.559	0.022

※ Lash resets are only required at the interval specified in the maintenance schedule when lash is measured and found out of specification, or when engine repairs cause removal of the rocker arms and/or loosening of the adjusting screw.

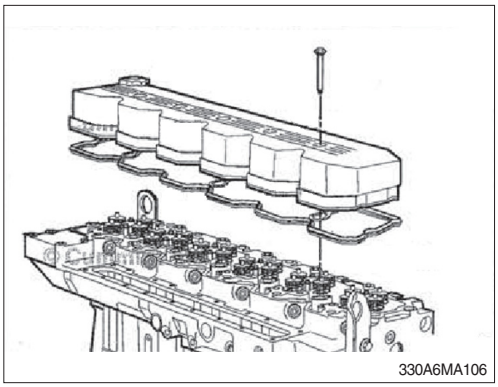
(7) Tighten the locknut and measure again.
Tightening torque : 2.4 kgf·m (18 lbf·ft)

(8) Using the barring tool, rotate the crankshaft 360 degrees and measure lash for rocker arms 2E, 3I, 4E, 5I, 6I and 6E. Reset the lash if out of specification.

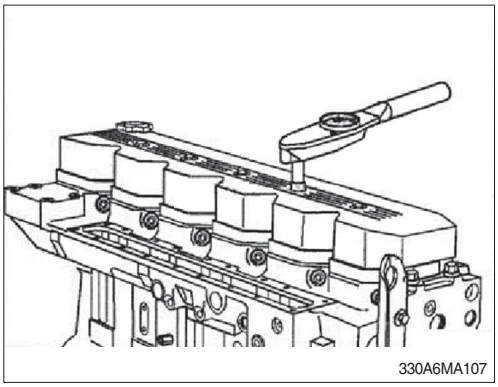

330A6MA105

(9) Place the gasket on the cylinder head. Be sure the gasket is properly aligned around the cylinder head capscrews.

(10) Install the rocker lever and capscrews.


330A6MA106

(11) Tighten the capscrews.
Tightening torque : 1.2 kgf·m (8.9 lbf·ft)


330A6MA107

21) FUEL FILLER PUMP FILTER

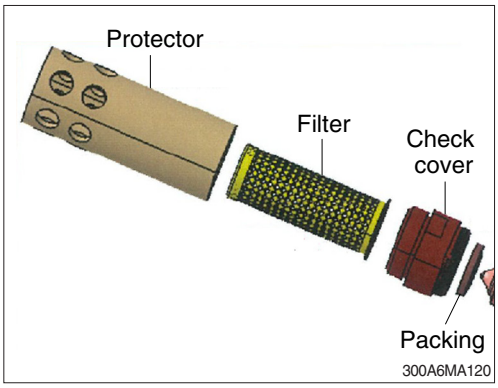
Cleaning the filter periodically as followings.

(1) Clean the filter when it is required by visual inspection.

(2) Replace the filter when it is permanently damaged.

※ Clean with fuel or air blow, water should not be mixed.

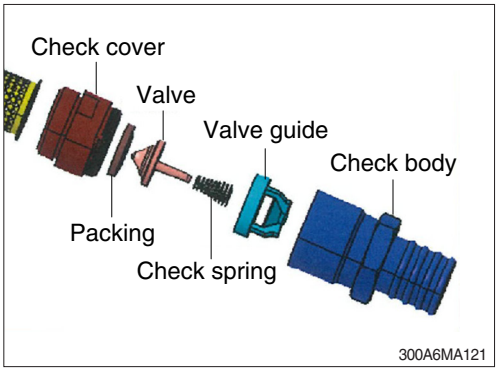
※ The structure can be loosen by hand.



(3) Check valve

① The check valve keeps equipped conditions on the hose ordinarily except maintenance.

② Remove the contamination or replace the check valve when the foreign material is caught.

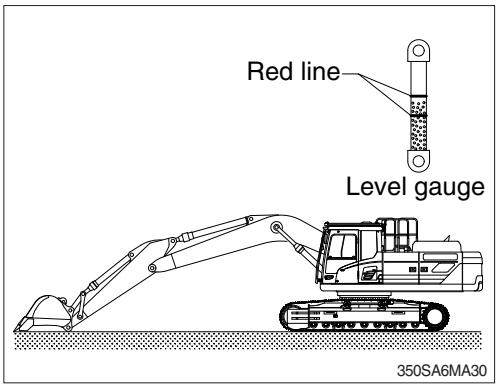


22) HYDRAULIC OIL CHECK

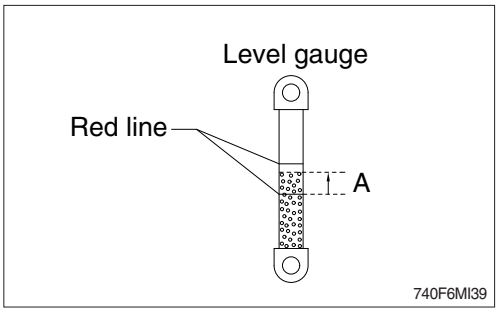
(1) Position the machine as shown in the illustration on the right. Please stop the engine and wait for about 5 minutes.

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

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



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



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

※ Add the hydraulic oil, if necessary.

23) FILLING HYDRAULIC OIL

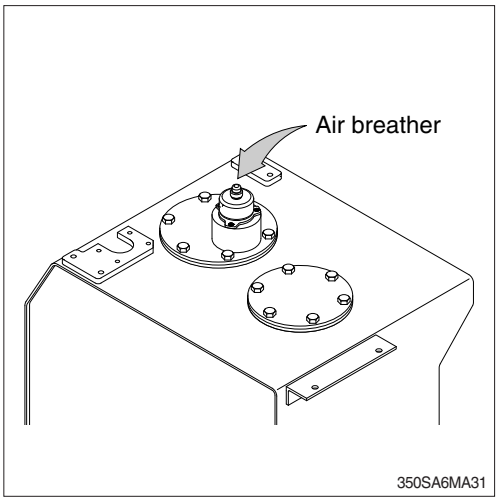
(1) Stop the engine to the position of level check.

(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.

(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.



24) 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.

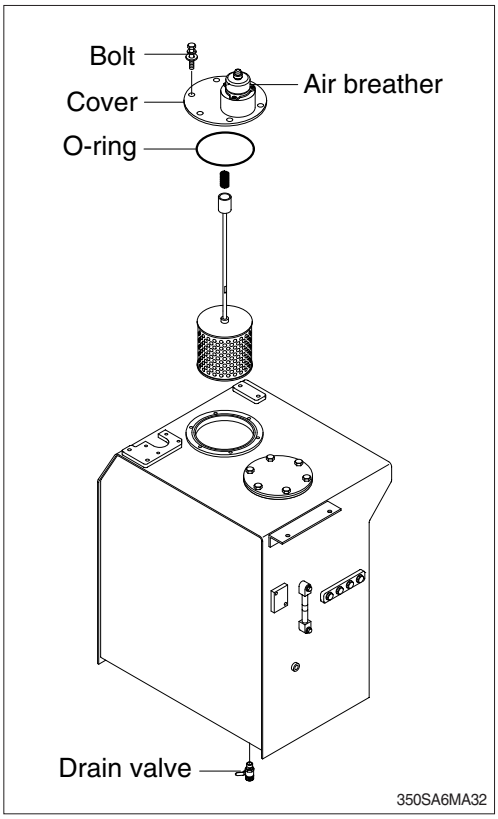
(5) To drain the oil open the drain valve at the bottom of the oil tank.

(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.



25) CLEAN SUCTION STRAINER

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

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

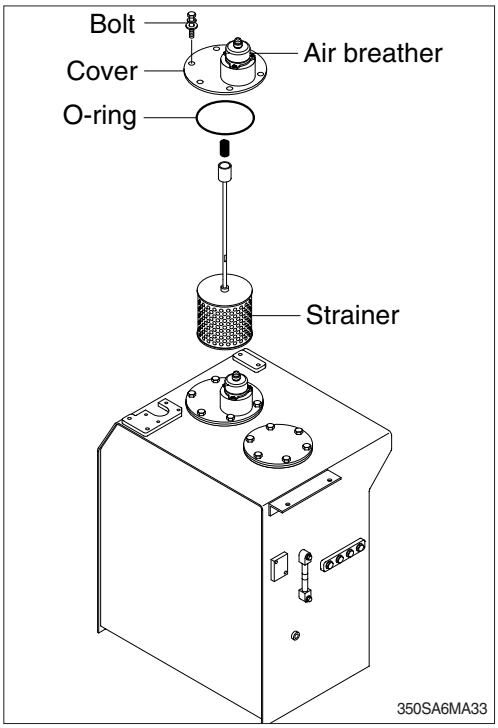
(2) Pull out the strainer in the tank.

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

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

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

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



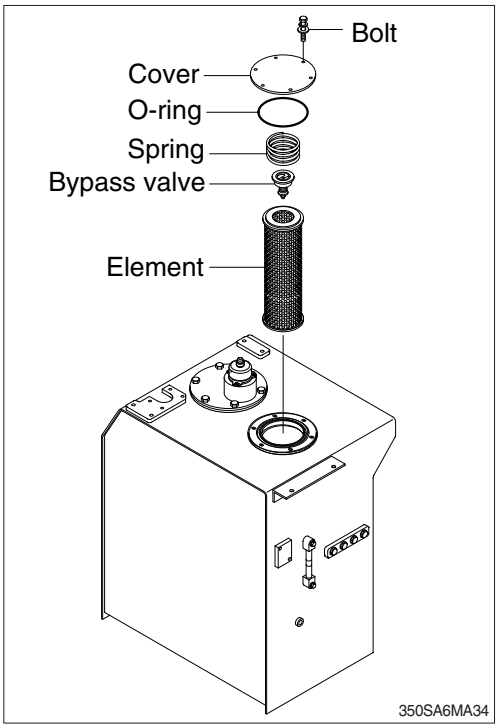
26) REPLACEMENT OF RETURN FILTER

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

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

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

(3) Replace the element with new one.



27) REPLACEMENT OF ELEMENT IN HYDRAULIC TANK BREATHER

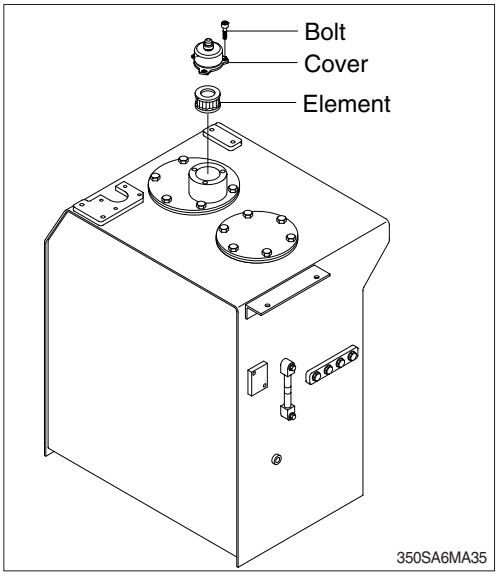
(1) Relieve the pressure in the tank by pushing the top of the air breather.

(2) Loosen the bolt and remove the cover.

(3) Pull out the filter element.

(4) Replace the filter element new one.

(5) Reassemble by reverse order of disassembly.
· Tightening torque : 0.8~1.0 kgf · m
(5.9~7.4 lbf · ft)

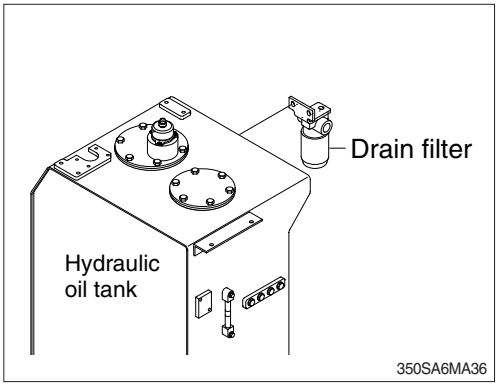


28) REPLACE OF DRAIN FILTER CARTRIDGE

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

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

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



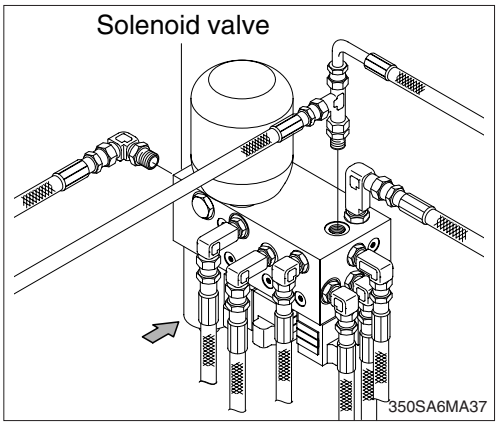
29) REPLACE OF PILOT LINE FILTER

(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.**

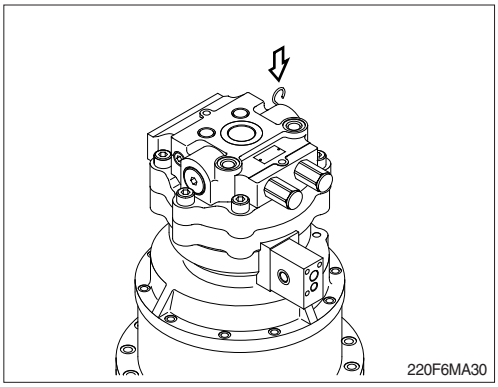


30) CHECK THE SWING REDUCTION GEAR OIL

(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.



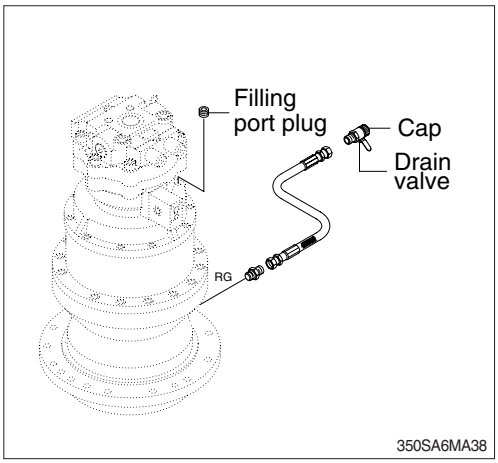
31) CHANGE SWING REDUCTION GEAR OIL

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

(2) Prepare a proper container.

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

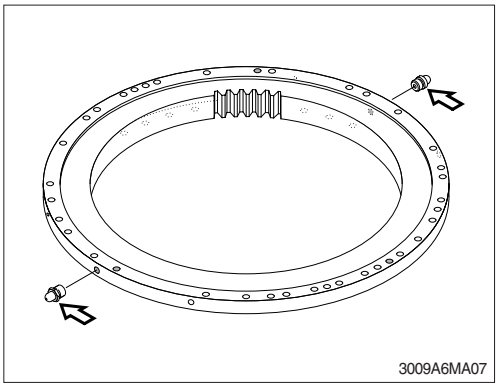
(4) Clean around the valve and close the drain valve and cap.
Fill proper amount of recommended oil.
· Amount of oil : 11.0 ℓ (2.9 U.S.gal)



32) LUBRICATE SWING BEARING

(1) Grease at 2 fitting.

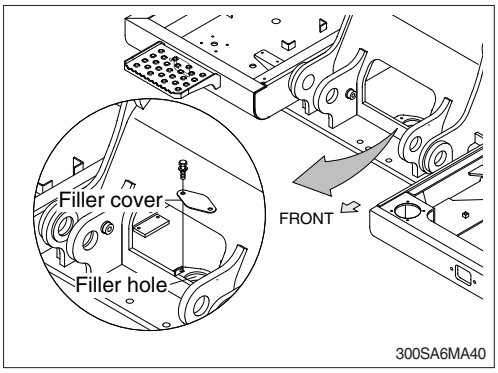
※ **Lubricate every 250 hours.**



33) SWING GEAR AND PINION

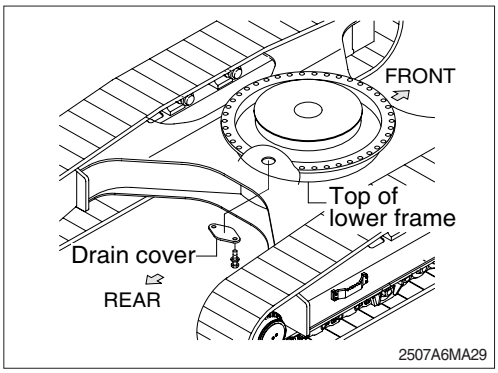
(1) Drain old grease

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



(2) Refill new grease

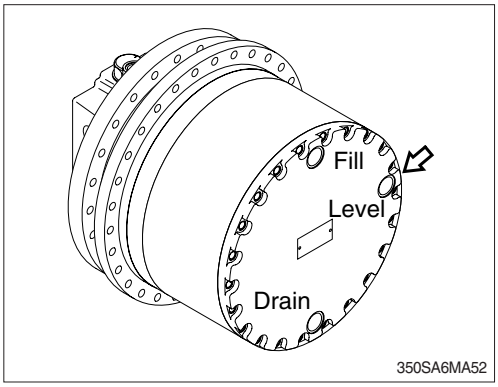
① Install drain cover.
② Fill with new grease.
③ Install filler cover.
· Capacity : 11.4 kg (25.1 lb)



34) 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.



35) CHANGE OF THE TRAVEL REDUCTION GEAR OIL

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

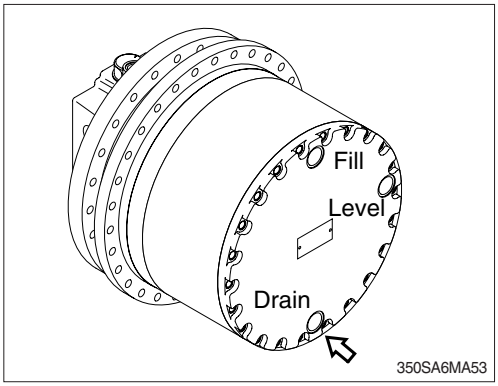
(2) Stop when the position of the drain plug is down.

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

(4) Drain the oil to adequate container.

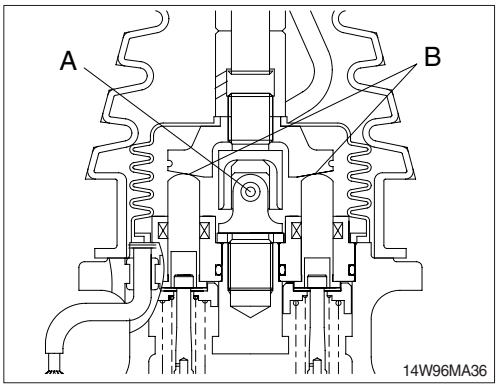
(5) Tighten the drain plug and fill specified amount of oil at filling port.
· Amount of oil : 7.8 ℓ (2.1 U.S.gal)

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



36) LUBRICATE RCV LEVER

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



37) ADJUSTMENT OF TRACK TENSION

(Machine Serial No. : -#0144)

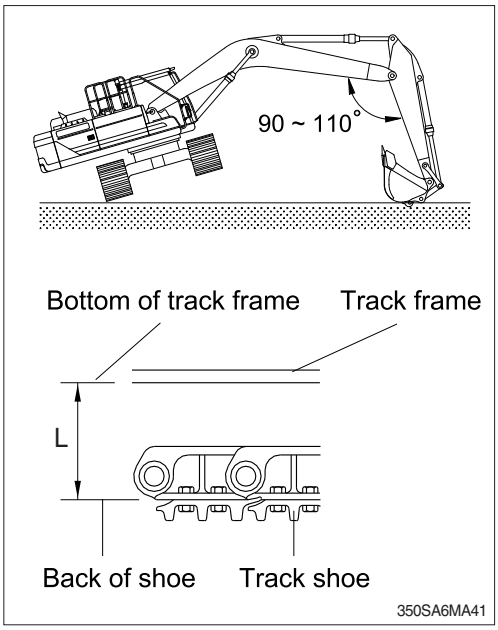
※ It is important to adjust the tension of track properly to extend the lifetime of track and traveling device.

※ 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.

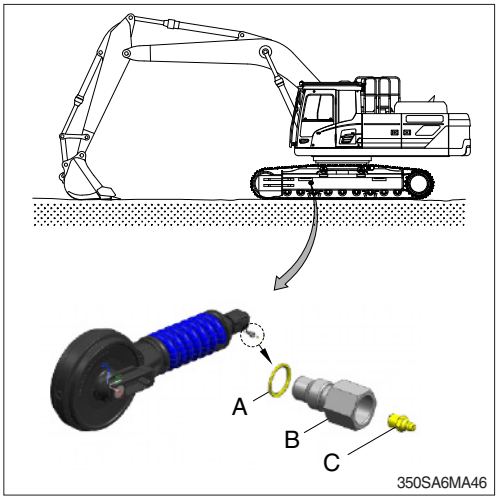
※ Remove mud with rotating the track before measuring.



(3) If the tension is tight, loosen the valve (B) gradually to drain the grease, but not more than one turn.
If the tension is loose, fill the grease through grease nipple (C) using a grease gun.

(4) When the proper track sag is obtained, close grease valve (B) but do not tighten excessively as the fitting may be damaged.
· Valve tightening torque : 13 kgf·m (94 lb·ft)

Length (L)	
360~390 mm	14.2~15.4"



※ Remove the mud and sand cleanly on the assembly face in order to prevent damage to seal (A) before assembling grease valve (B).
If seal (A) is damaged, replace with a new one and assemble it.

⚠ Personal injury or death can result from grease under pressure.
Keep face, hands and body away from the nipple and valve.

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

※ When the grease does not drained smoothly, move the machine to the forward and backward a short distance 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.

37) ADJUSTMENT OF TRACK TENSION

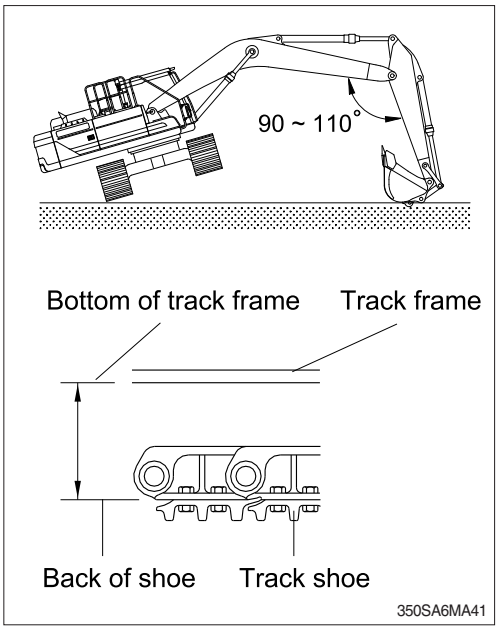
(Machine Serial No. : #0145-)

⚠ Serious injury or death can result from grease under pressure. Keep face, hands and body away from the fitting valve.

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

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

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

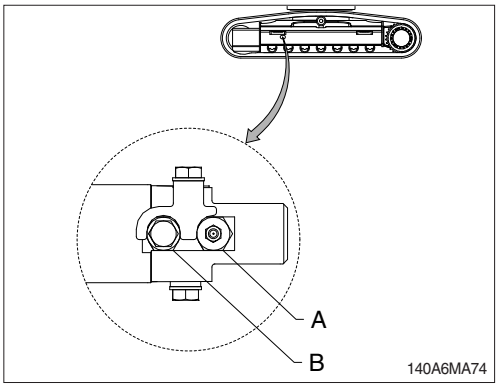


(2) Measure the distance between bottom of track frame on track center and back of shoe.

※ Remove mud by rotating the track before measuring.

Length (L)	
360~390 mm	14.2~15.4"

(3) The track tension can be adjusted using the grease fitting valve (A) and handle screws (B) located in the center of each side frame. When you fill the grease fittings with grease, it increases the length of the adjustable cylinders. As the adjustable cylinders become longer, pressure builds up in the tension springs, causing them to expand beyond the track idlers.



(4) If the tracks and adjustment devices expand to the point where there is insufficient deflection or space between parts, turn the handle screw clockwise once or twice to release some of the grease. Once the track tension is suitable, tighten the handle screw in the counterclockwise direction.

· Valve tightening torque : 7±1 kgf·m (5.2±0.7 lb·ft)

※ Check the tension again after rotating the track 3~4 times.

⚠ After draining, if the handle screw can not be turned counterclockwise, the grease will continue to drain. Moreover, excessive counterclockwise turning may damage the screw's stopper. Rotate the handle screw by no more than one or two turns.

38) REPLACEMENT OF BUCKET

△ **When knocking the pin in with a hammer, metal particles may fly and cause serious injury, particularly if they get into your eyes. When carrying out this operation, always wear goggles, helmet, gloves, and other protective equipment.**

※ **When the bucket is removed, place it in a stable condition.**

※ **When performing joint work, make sure signals to each other and work carefully for safety's sake.**

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

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

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

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

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

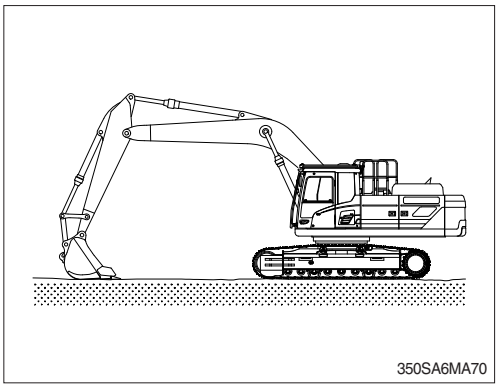
※ **After remove the pins, make sure that they do not become contaminated with sand or mud and that the seals of bushing on both sides do not become damaged.**

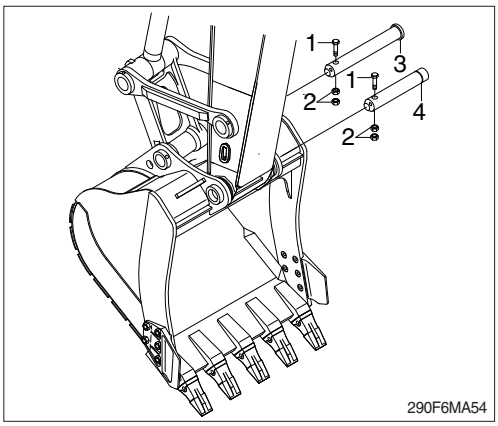
(4) Align the arm with holes (A) and the link with holes (B), then coat with grease and install pins (3, 4)

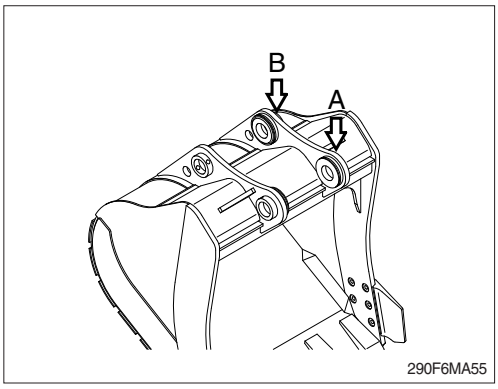
※ **When installing the bucket, the O-rings are easily damaged, so fit the O-rings on the boss of the bucket as shown in the picture.**
After knocking the pin, move the O-ring down to the regular groove.

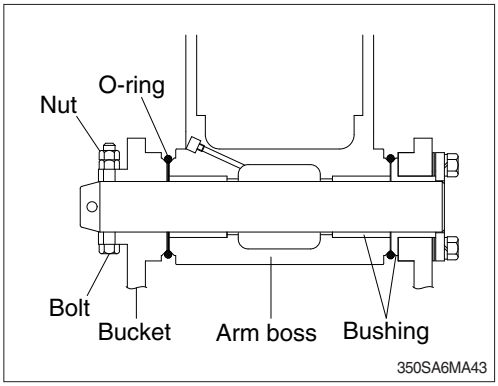
(5) Install the stopper bolt (1) and nuts (2) for each pin, then grease the pin.

· Tightening torque : 57.9±8.7 kgf · m
(419±62.9 lbf · ft)







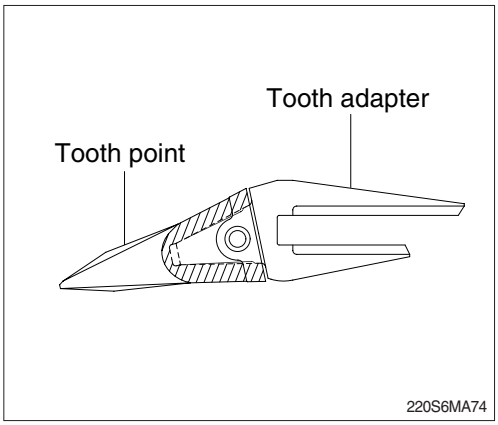


39) REPLACEMENT OF BUCKET TOOTH

(1) Timing of replacement

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

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



(2) Instructions for replacement

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

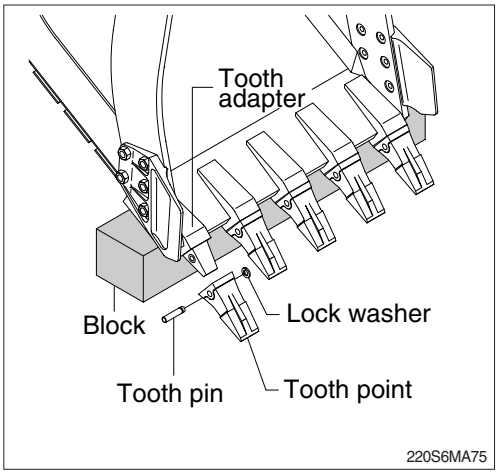
② Remove dust and mud from surface of tooth adapter by using knife.

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

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

⚠ Personal injury can result from bucket falling.

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



40) 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).

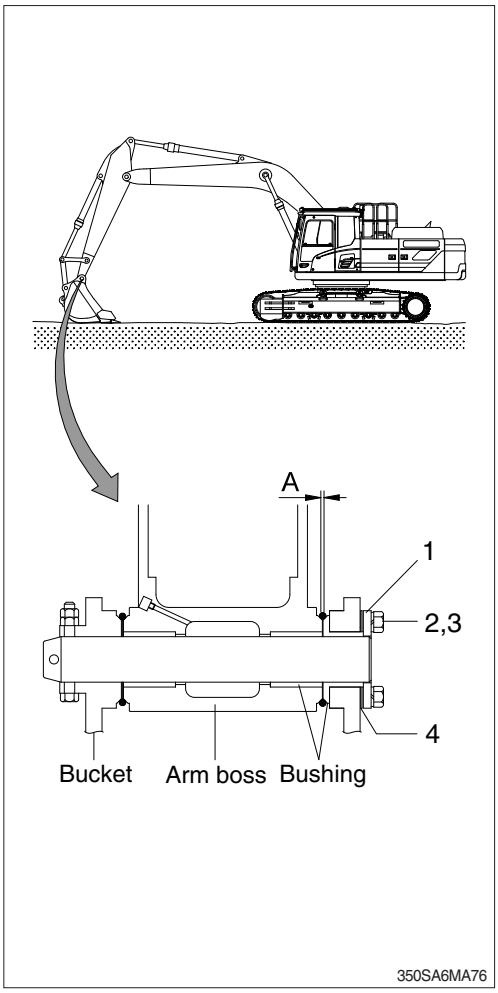
② Remove the shim equivalent value with measuring value.

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.

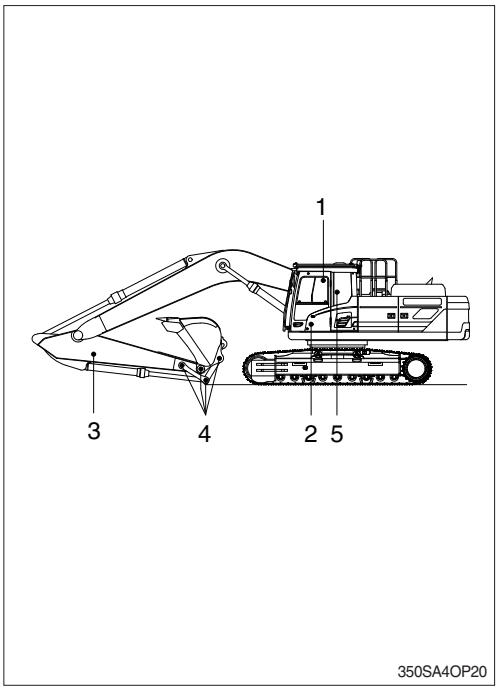


41) LUBRICATE PIN AND BUSHING

(1) Lubricate to each pin of working device

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

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

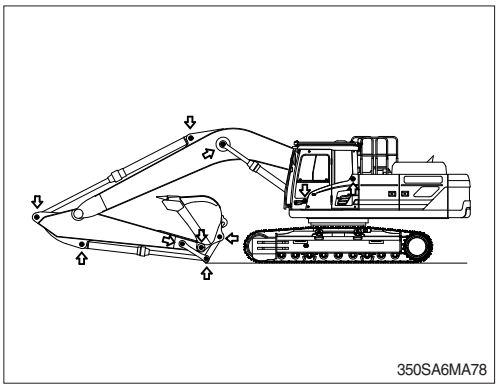


※ Shorten lubricating interval when working in water or dusty places.

★ Not required : If necessary, lubricate the grease.

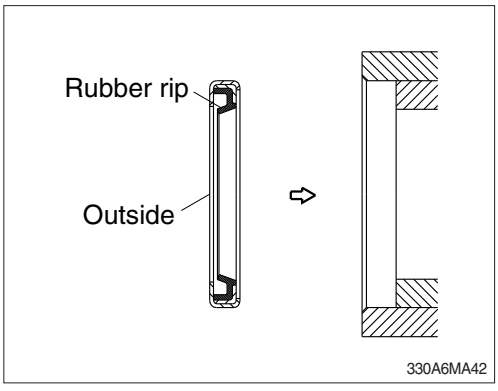
(2) Dust seals are mounted on the rotating part of working device to extend the lubricating interval.

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



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

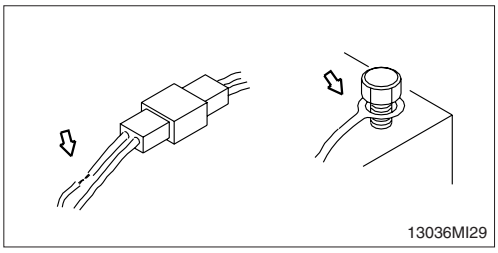
※ Assemble the seal same direction with picture and use with plastic hammer when replace.



7. ELECTRICAL SYSTEM

1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



2) BATTERY

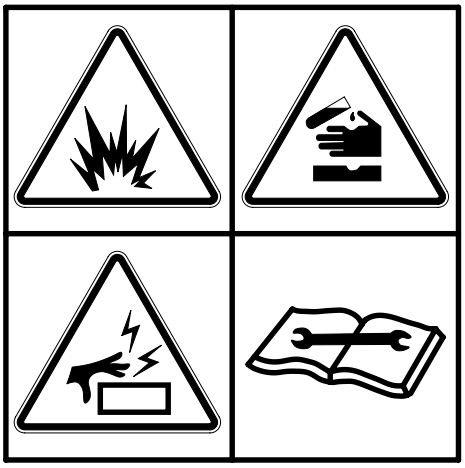
(1) Clean

① Wash the terminal with hot water if it is contaminated, and apply grease to the terminals after washing.

⚠ Battery gas can explode. Keep sparks and flames away from batteries.

⚠ Always wear protective glasses when working with batteries.

⚠ Do not stain clothes or skin with electrolyte as it is acid.
Be careful not to get the electrolyte in eyes.
Wash with clean water and go to the doctor if it enters the eyes.



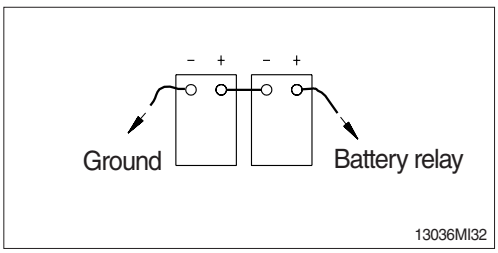
(2) Recycle

Never discard a battery.
Always return used batteries to one of the following locations.

- A battery supplier
- An authorized battery collection facility
- Recycling facility

(3) Method of removing the battery cable

Remove the cable from the ground connection first (⊖ terminal side) and reconnect it last when reassembling.



3) STARTING THE ENGINE WITH A BOOSTER CABLE

Keep following order when you are going to start engine using booster cable.

(1) Connection of booster cable

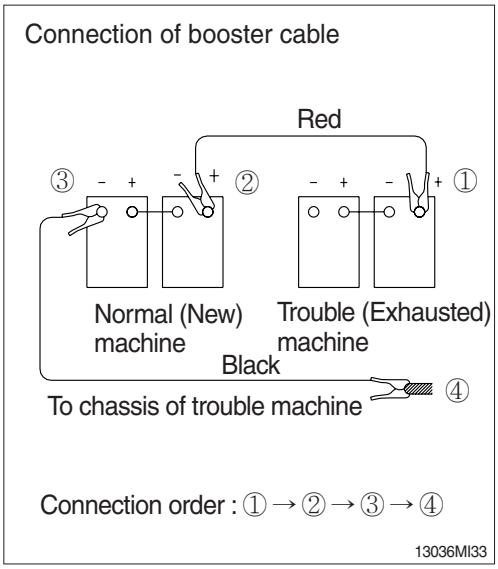
※ Use the same capacity of battery for starting.

① Make sure that the starting switches of the normal machine and trouble machine are both at the OFF position.

② Connect the red terminal of booster cable to the battery (+) terminal between exhausted and new battery.

③ Connect the black terminal of the booster cable between new battery (-) terminal and chassis of trouble machine.

※ Keep firmly all connection, the spark will be caused when connecting finally.

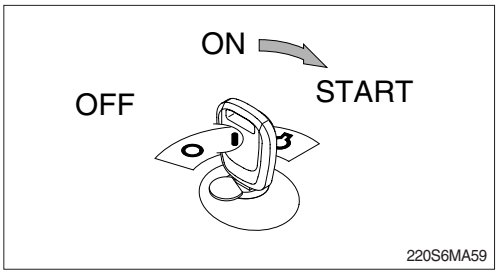


(2) Starting the engine

① Starting the engine of the normal machine and keep it to run at high idle.

② Start engine of the trouble machine with starting switch.

③ If you can not start it by one time, restart the engine after 2 minutes.



(3) Taking off the booster cable

① Take off the booster cable (black).

② Take off the booster cable (red) connected to the (+) terminal.

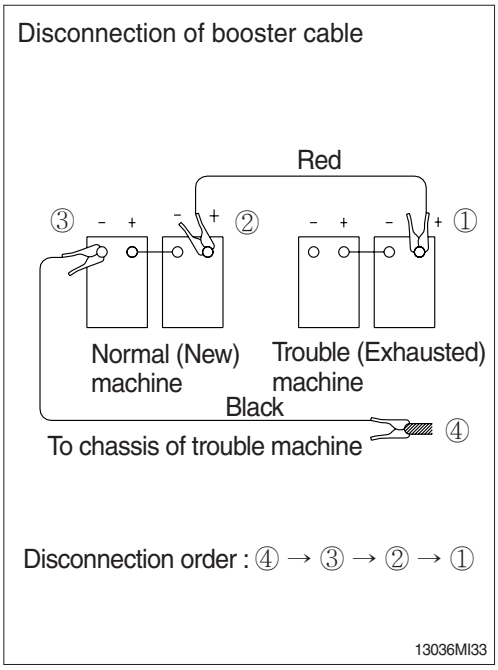
③ Run engine with high idle until charging the exhausted battery by alternator, fully.

⚠ Explosive gas is generated while using the battery or charging it. Keep away flame and be careful not to cause the spark.

※ Charge the battery in the well ventilated place.

※ Place the machine on the earth or concrete. Avoid charging the machine on the steel plate.

※ Do not connect (+) terminal and (-) terminal when connecting booster cable because it will be shorted.



4) WELDING REPAIR

Before start to welding, follow the below procedure.

① Shut off the engine and remove the starting switch.

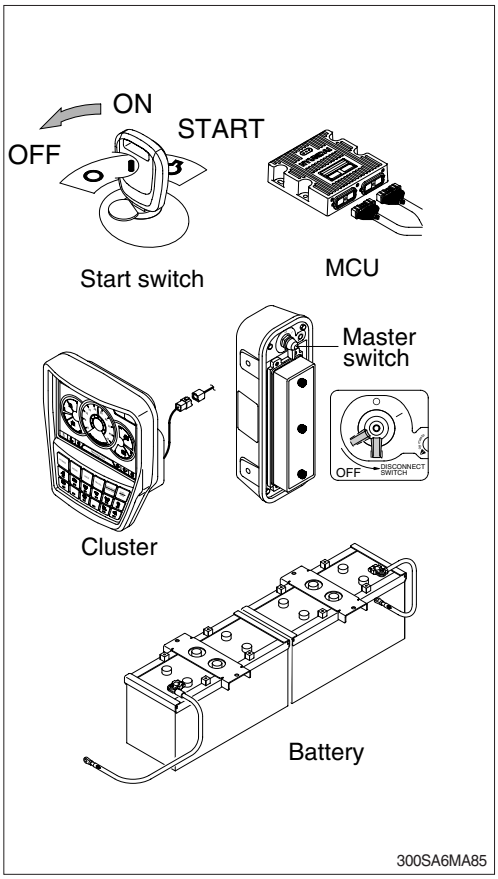
② Disconnect ground cable from battery by master switch.

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

④ Connect the earth (ground) lead of the welding equipment as close to the welding point as possible.

※ Do not weld or flame cut on pipes or tubes that contain flammable fluids. Clean them thoroughly with nonflammable solvent before welding or flame cutting on them.

⚠ Do not attempt to welding work before carry out the above.
If not, it will caused serious damage at electric system.



5) BATTERY CABLE AND CONNECTIONS

⚠ Batteries can emit explosive gases. To reduce the possibility of personal injury, always ventilate the compartment before servicing the batteries.

(1) Remove and inspect the battery cables and connections for cracks or corrosion.

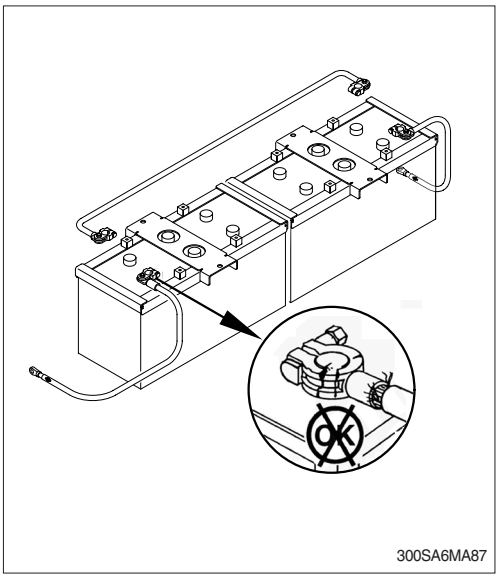
(2) Replace broken terminals, connectors, or cables.

(3) If the connections are corroded, use a battery brush or wire brush to clean the connections until shiny.

(4) Make sure all debris is removed from the connecting surfaces.

(5) Install the cables and tighten the battery connections.

(6) Coat the terminals with grease to prevent corrosion.

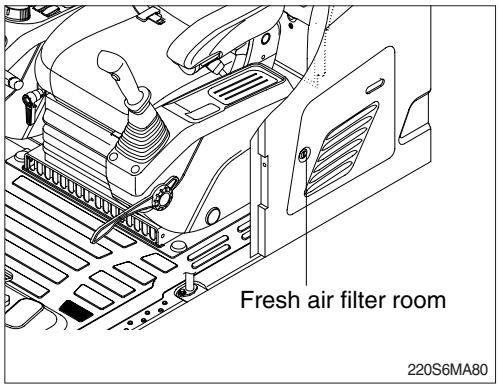


8. AIR CONDITIONER AND HEATER

1) CLEAN AND REPLACE OF FRESH AIR FILTER

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

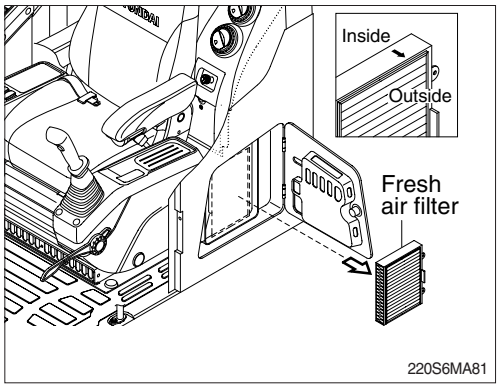
(1) Open the fresh air filter room.



(2) Remove the fresh air filter.

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

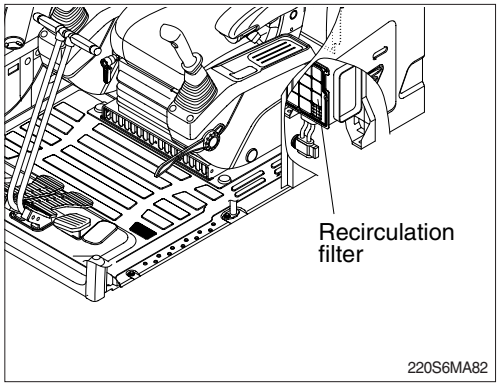
(3) If filter is damaged or badly contaminated, use a new filter.



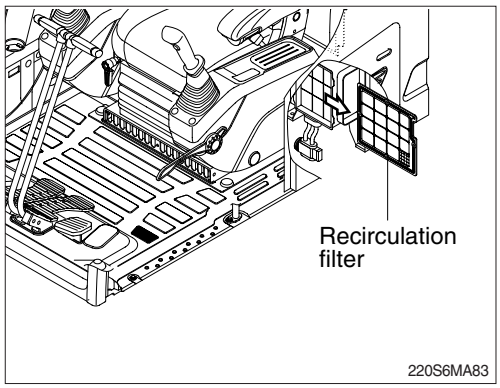
2) CLEAN AND REPLACE OF RECIRCULATION FILTER

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

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

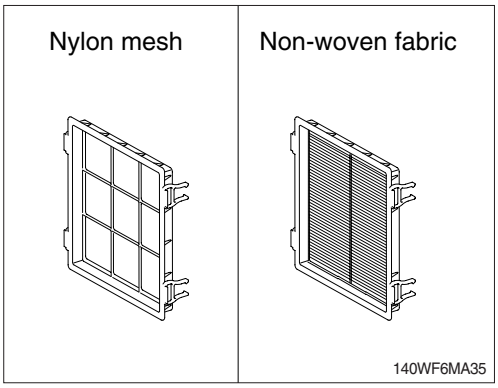


(2) Remove recirculation filter.



(3) Check the recirculation filter type.

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

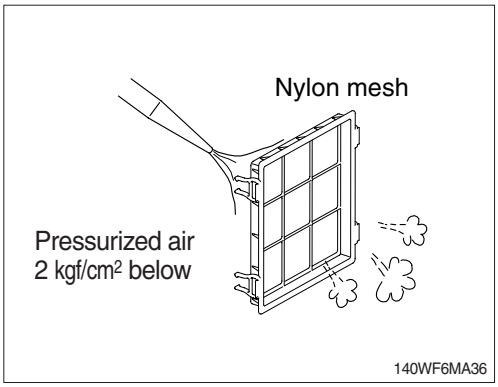


(5) Clean the recirculation filter using a pressurized air (below 2 kgf/cm², 28 psi) or washing with water.

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

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

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



3) PRECAUTIONS FOR USING AIR CONDITIONER

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

(2) Be careful not to overcool the cab.

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

(4) When cooling, change air occasionally.

4) CHECK DURING SEASON

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

5) CHECK DURING OFF-SEASON

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

6) REFRIGERANT

(1) Equipment contains fluorinated greenhouse gas.

Model	Type	Quantity	GWP : 1430
HX350LT3	HFC-134a	0.75 kg (1.65 lb)	CO_2 eq : 1.07t

※ GWP

Global warming potential (GWP) is a measure of how much heat a gas traps in the atmosphere relative to that of carbon dioxide (CO2). GWP is calculated in terms of the 100-year warming potential of 1 kg of a greenhouse gas relative to 1 kg of CO2.

(2) Environmental precautions

The air conditioning system of the machine is filled with HFC-134a refrigerant at the factory.
HFC-134a refrigerant is a flourinated greenhouse gas and contributes to global warming.
Do not release refrigerant into the environment.

(3) Safety precautions

Work on the air conditioning system must only be performed by a qualified service technician.
Do not attempt to preform work on the air conditioning system.
Wear safety goggles, chemical resistant gloves and appropriate personal protective equipment to protect bare skin when there is a risk of contact with refrigerant.

(4) Action in case of exposure

① Eye contact / Limited skin contact
Rinse with warm water and apply a light bandage. Seek medical attention immediately.

② Extensive skin contact
Rinse with warm water and carefully heat the area with warm water or warm clothing.
Seek medical attention immediately.

③ Inhalation
Leave the area and find fresh air. Seek medical attention immediately.

1. PREPARATION FOR TRANSPORTATION

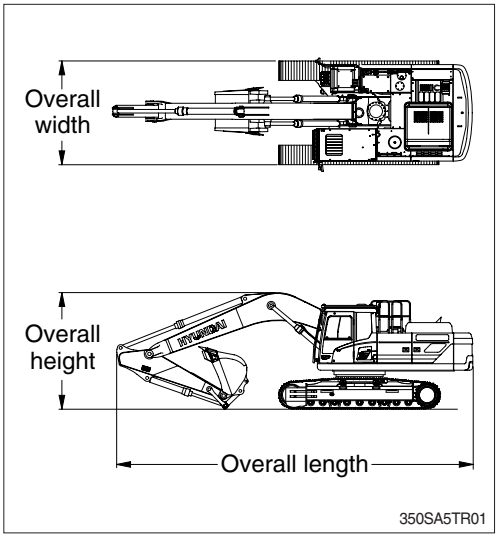
1) When transporting the machine, observe the various road rules, road transportation vehicle laws and vehicle limit ordinances, etc.

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.

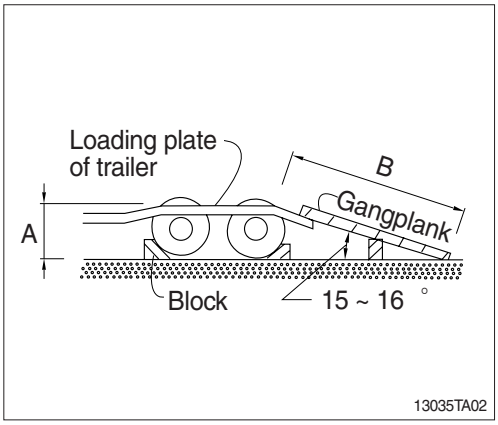
4) Get the permission from the related authority if necessary.

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



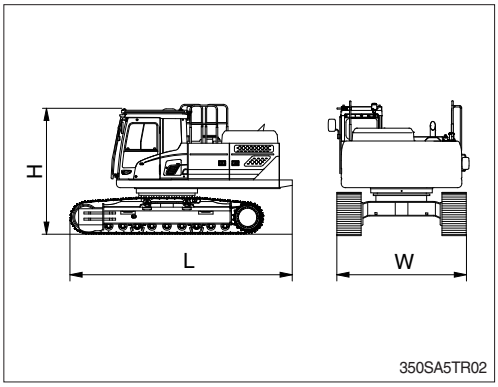
2. DIMENSION AND WEIGHT

1) HX350LT3

(1) Base machine

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	5780 (19' 0")
H	Height	mm (ft-in)	3160 (10' 4")
W	Width	mm (ft-in)	3280 (10' 9")
Wt	Weight	kg (lb)	19720 (43384)

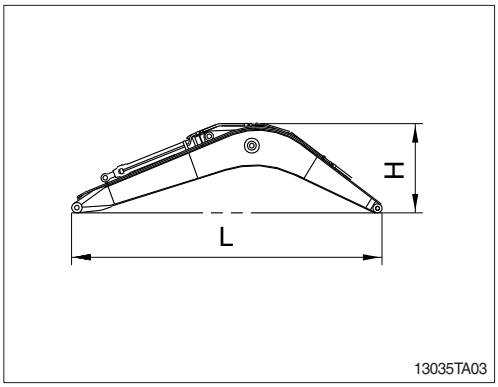
※ With 600 mm (24") triple grouser shoes and 6000 kg (13230 lb) counterweight.



(2) Boom assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	6670 (21' 11")
H	Height	mm (ft-in)	1720 (5' 8")
W	Width	mm (ft-in)	785 (2' 7")
Wt	Weight	kg (lb)	3060 (6750)

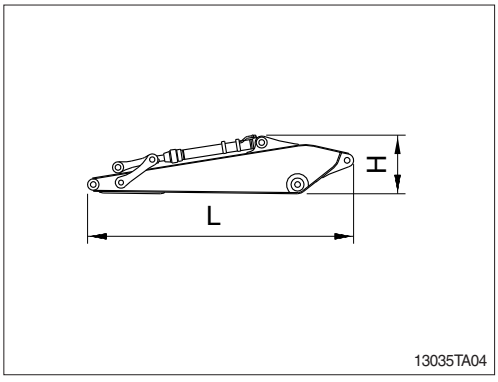
※ 6.45 m (21' 2") boom with arm cylinder (included piping and pins).



(3) Arm assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	4340 (14' 3")
H	Height	mm (ft-in)	955 (3' 2")
W	Width	mm (ft-in)	435 (1' 5")
Wt	Weight	kg (lb)	1810 (3990)

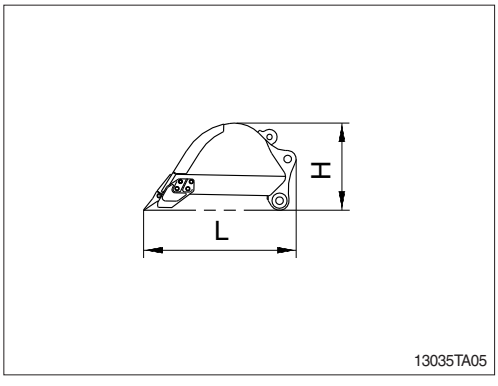
※ 3.20 m (10' 6") arm with bucket cylinder (included linkage and pins).



(4) Bucket assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1850 (6' 1")
H	Height	mm (ft-in)	1210 (4' 0")
W	Width	mm (ft-in)	1505 (4' 11")
Wt	Weight	kg (lb)	1230 (2710)

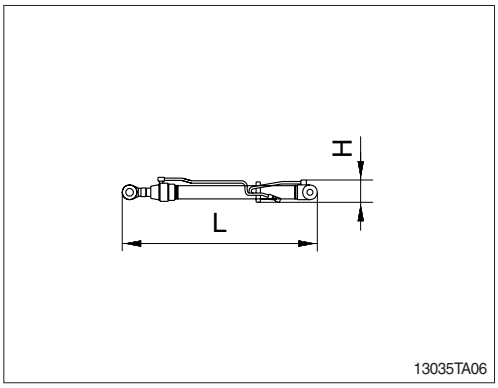
※ 1.44 m^3 (1.88 yd^3) SAE heaped bucket (included tooth and side cutters).



(5) Boom cylinder

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2350 (7' 7")
H	Height	mm (ft-in)	275 (0' 11")
W	Width	mm (ft-in)	420 (1' 5")
Wt	Weight	kg (lb)	560 (1235)

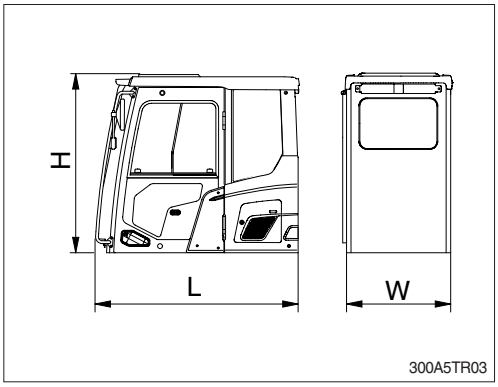
※ Included piping.



(6) Cab assembly

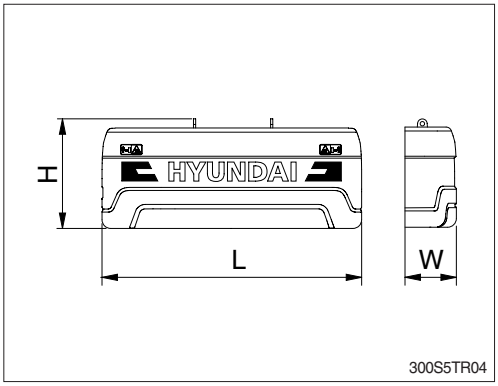
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1950 (6' 5") [2070 (6' 10")]
H	Height	mm (ft-in)	1780 (5' 10") [1822 (6' 0")]
W	Width	mm (ft-in)	1104 (3' 7") [1126 (3' 8")]
Wt	Weight	kg (lb)	495.3 (1092) [650.2 (1433)]

[ ] : with FOG GUARD



(7) Counterweight

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2980 (9' 10")
H	Height	mm (ft-in)	1255 (4' 2")
W	Width	mm (ft-in)	590 (1' 11")
Wt	Weight	kg (lb)	6000 (13230)

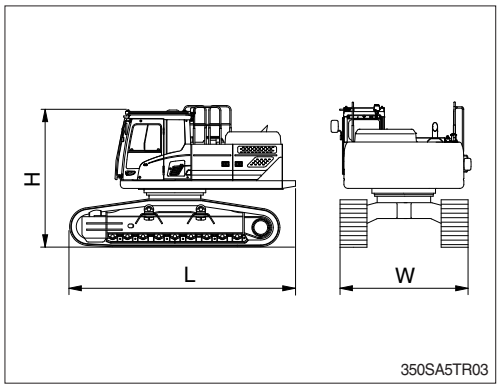


2) HX350LT3 HW

(1) Base machine

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	5780 (19' 0")
H	Height	mm (ft-in)	3460 (11' 4")
W	Width	mm (ft-in)	3570 (11' 9")
Wt	Weight	kg (lb)	23150 (50930)

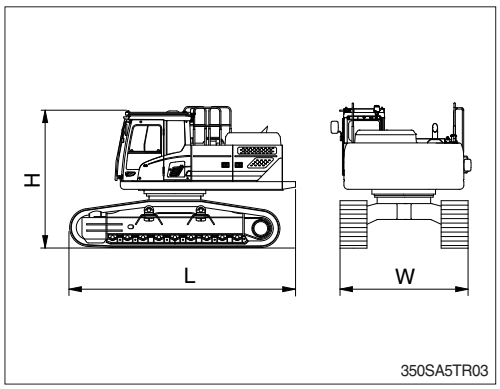
※ With 700 mm (28") double grouser shoes and 6000 kg (13230 lb) counterweight.



(2) Base machine

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	5780 (19' 0")
H	Height	mm (ft-in)	3460 (11' 4")
W	Width	mm (ft-in)	3470 (11' 5")
Wt	Weight	kg (lb)	21590 (47600)

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

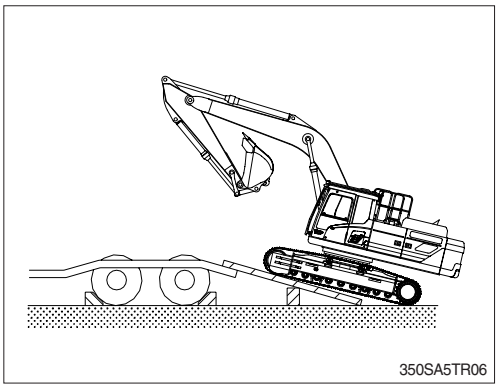


3. LOADING THE MACHINE

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

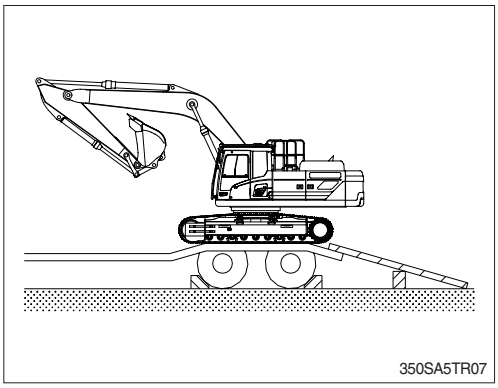
2) Use the gangplank with sufficient length, width, thickness and gradient.

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

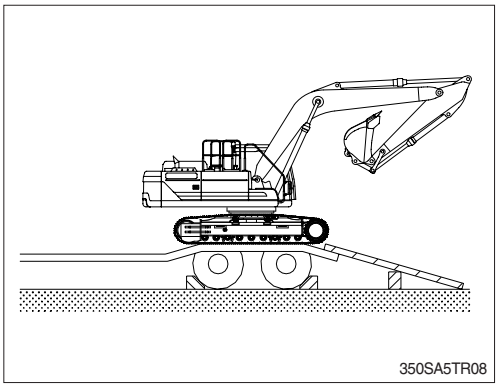

350SA5TR06

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.


350SA5TR07

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


350SA5TR08

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

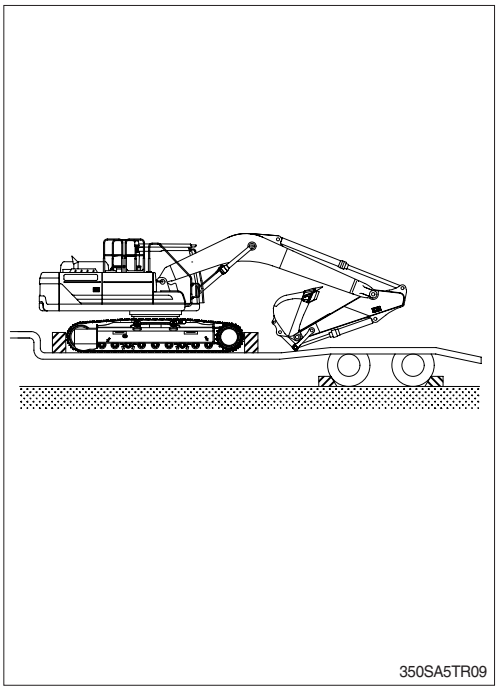
※ **Place rectangular timber under the bucket cylinder to prevent the damage of it during transportation.**

⚠ **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.**

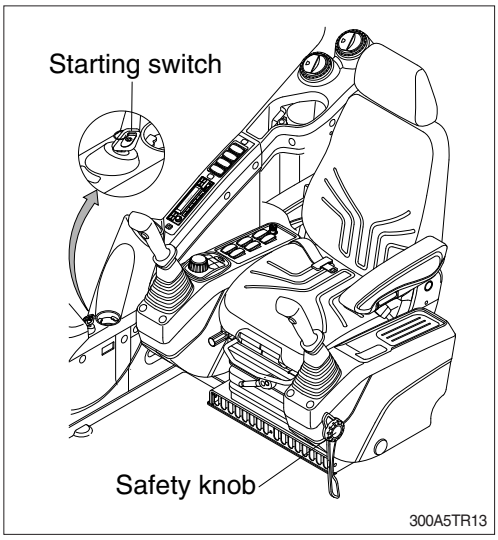


4. FIXING THE MACHINE

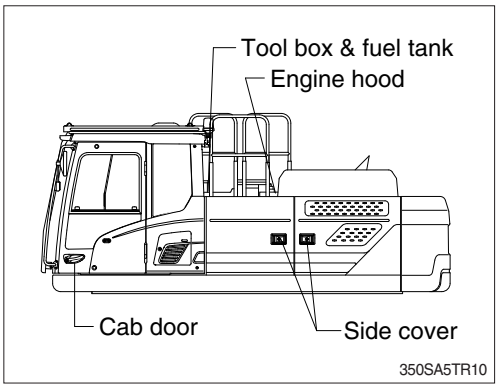
1) Lower down the working device on the loading plate of trailer.

2) Keep the safety knob on the LOCK position.

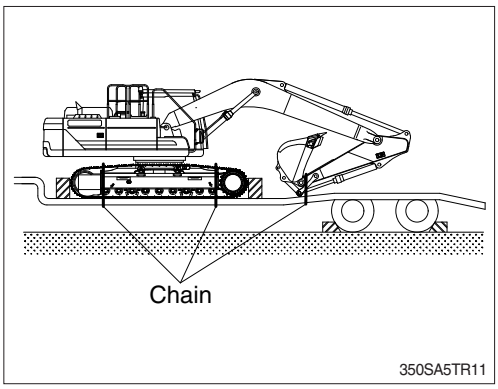
3) Turn OFF all the switches and remove the key.



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

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

1) Check the weight, length, width and height of the machine referring to the chapter 7, Specification when you are going to hoist the machine.

2) Use approved lifting device and ensure distance between lifting device and machine to avoid contact between the two.

※ **Remove any parts (footboard, etc) that may be damaged by contact with the lifting device before lifting.**

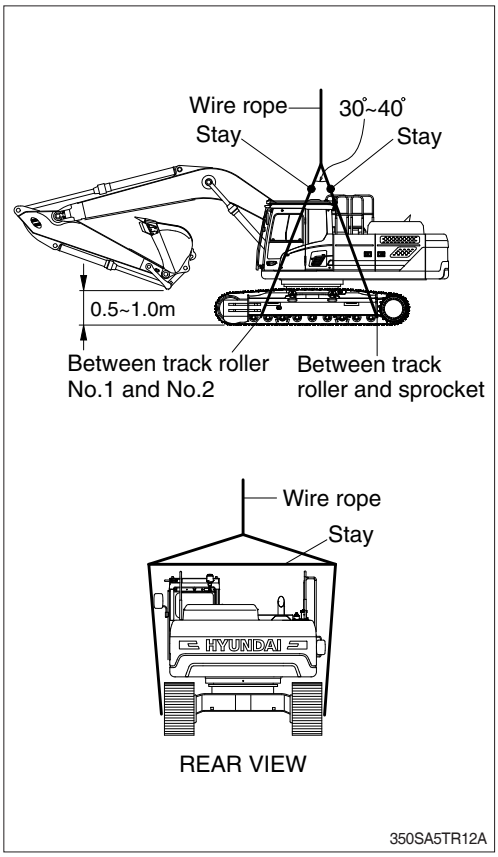
3) Place rubber plates at lifting points to avoid any damage to the machine.

4) Place crane in the proper place.

5) Install approved lifting device as shown in the illustration.

6) Use stay between the wire rope and the machine to prevent damage to the rope or machine.
set the lifting angle of the wire rope to 30° ~ 40°.

7) After the machine comes off the ground, check the hook condition and the lifting posture, and then lift slowly.



⚠ **Ensure that lifting device is free form any damage and is approved for the weight being lifted and supported.**

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

⚠ **Do not load abruptly.**

⚠ **Keep area clear of any and all personel.**

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.	Refer to the pages 3-33 and 2-4.
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.	

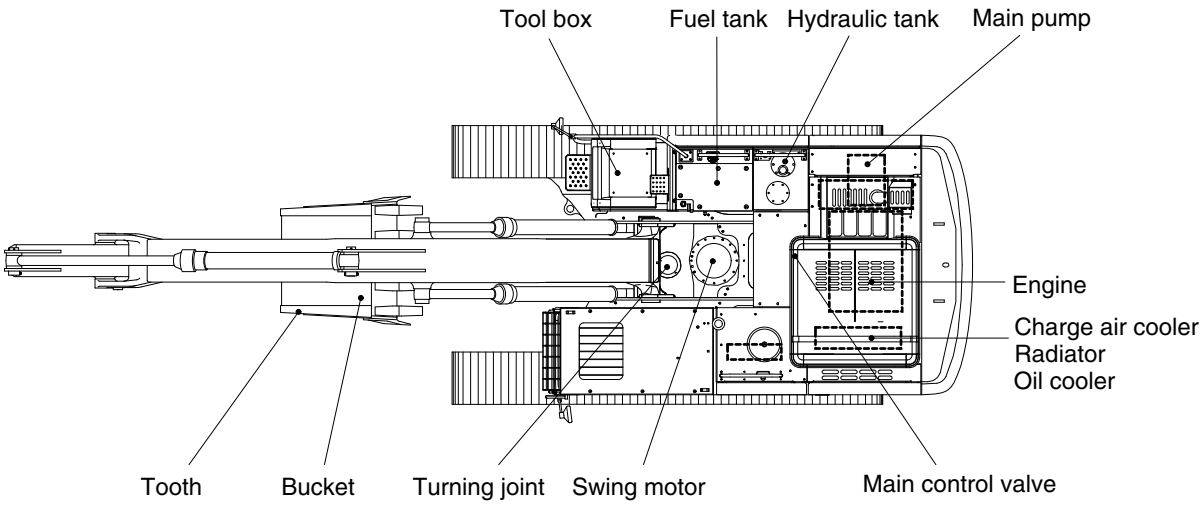
2. ELECTRICAL SYSTEM

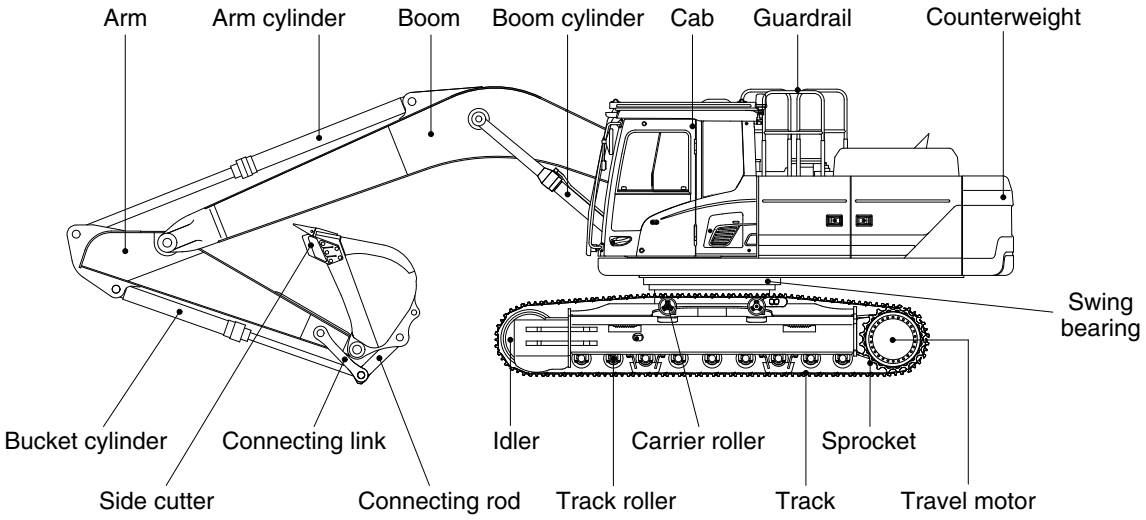
Trouble	Service	Remark
Lamp does not glow brightly even when engine runs at high speed. Lamp flickers while engine runs.	· Check for loose terminals and open-circuit wiring. · Adjust belt tension.	
Battery charging lamp does not go out even when engine runs at high speed.	· Check the alternator. · Check 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. MAJOR COMPONENT

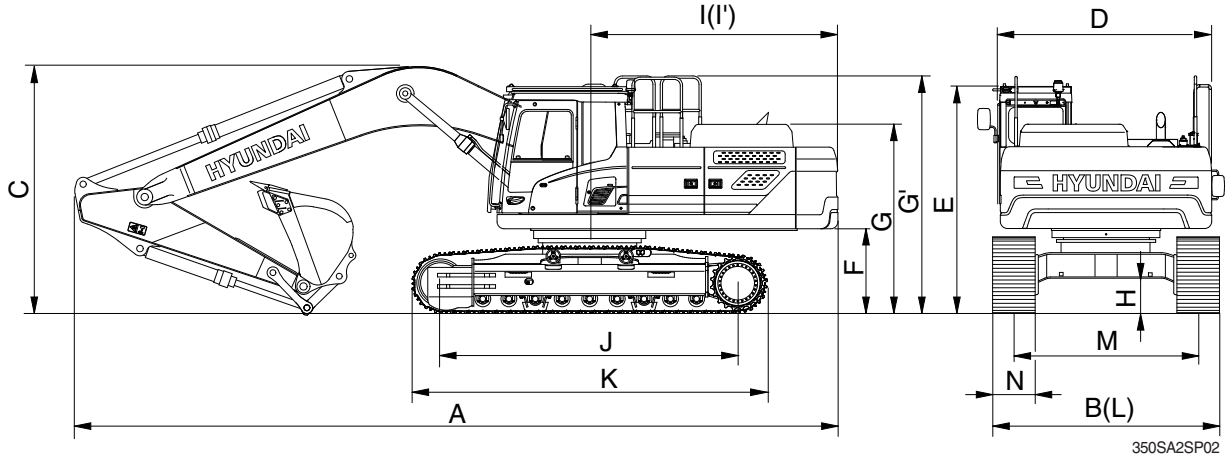




350SA2SP01A

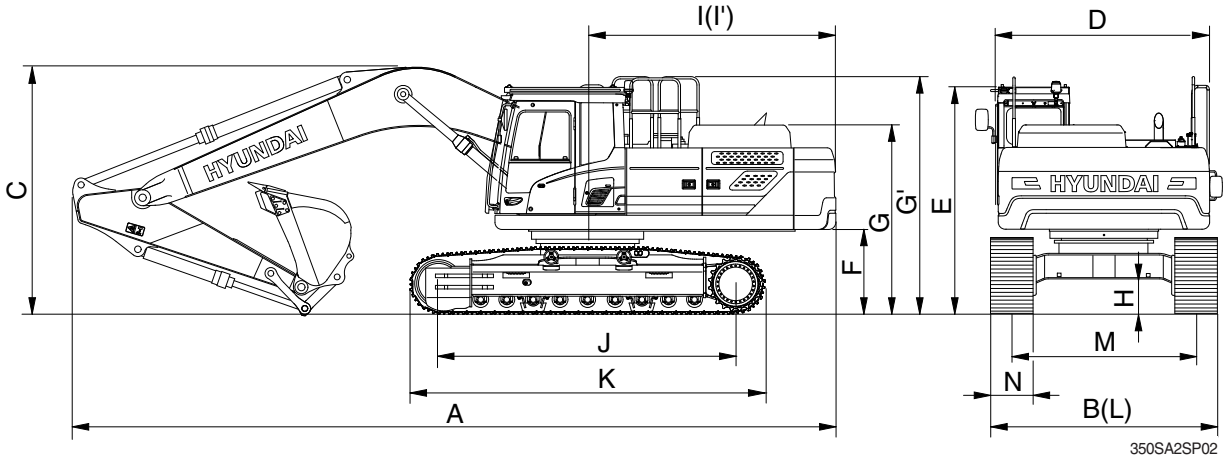
2. SPECIFICATIONS

1) HX350LT3, 6.45m (21' 2") BOOM



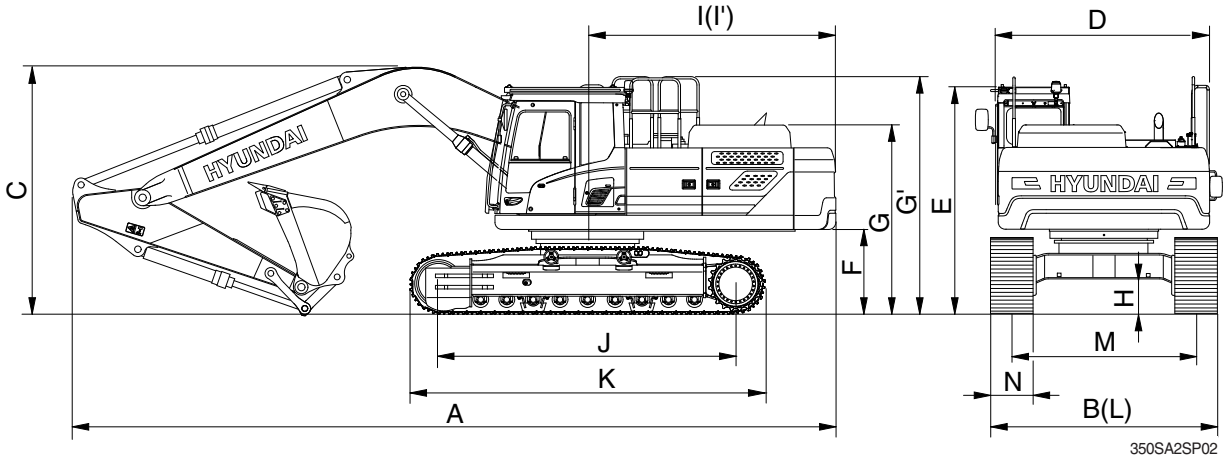
Description		Unit		Specification			
		m (ft-in)	Boom	6.45 (21' 2")			
			Arm	3.20 (10' 6")	2.20 (7' 3")	2.50 (8' 2")	4.05 (13' 3")
		mm (in)	Shoe	600 (24)			
Operating weight		kg (lb)		33680 (74096)	33460 (73612)	33570 (73854)	33900 (74580)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)		1.44 (1.88)	1.44 (1.88)	1.44 (1.88)	1.44 (1.88)
Overall length	A	mm (ft-in)		11220 (36' 10")	11460 (37' 7")	11340 (37' 2")	11200 (36' 9")
Overall width	B			3280 (10' 9")	3280 (10' 9")	3280 (10' 9")	3280 (10' 9")
Overall height of boom	C			3360 (11' 0")	3630 (11' 11")	3540 (11' 7")	3880 (12' 9")
Superstructure width	D			2980 (9' 9")	2980 (9' 9")	2980 (9' 9")	2980 (9' 9")
Overall height of cab	E			3145 (10' 4")	3145 (10' 4")	3145 (10' 4")	3145 (10' 4")
Ground clearance of counterweight	F			1200 (3' 11")	1200 (3' 11")	1200 (3' 11")	1200 (3' 11")
Overall height of engine hood	G			2690 (8' 10")	2690 (8' 10")	2690 (8' 10")	2690 (8' 10")
Overall height of guardrail	G'			3350 (11' 0")	3350 (11' 0")	3350 (11' 0")	3350 (11' 0")
Minimum ground clearance	H			500 (1' 8")	500 (1' 8")	500 (1' 8")	500 (1' 8")
Rear-end distance	I			3505 (11' 6")	3505 (11' 6")	3505 (11' 6")	3505 (11' 6")
Rear-end swing radius	I'			3570 (11' 9")	3570 (11' 9")	3570 (11' 9")	3570 (11' 9")
Distance between tumblers	J			4030 (13' 3")	4030 (13' 3")	4030 (13' 3")	4030 (13' 3")
Undercarriage length	K			4940 (16' 2")	4940 (16' 2")	4940 (16' 2")	4940 (16' 2")
Undercarriage width	L			3280 (10' 9")	3280 (10' 9")	3280 (10' 9")	3280 (10' 9")
Track gauge	M			2680 (8' 10")	2680 (8' 10")	2680 (8' 10")	2680 (8' 10")
Track shoe width, standard	N			600 (24")	600 (24")	600 (24")	600 (24")
Travel speed (low/high)		km/hr (mph)		3.5/6.4			
Swing speed		rpm		10.2			
Gradeability		Degree (%)		35 (70)			
Ground pressure		kgf/cm^2 (psi)		0.65 (9.22)	0.64 (9.16)	0.65 (9.19)	0.65 (9.28)
Max traction force		kg (lb)		27404 (60415)			

2) HX350LT3, 6.15m (20' 2") HD SHORT BOOM



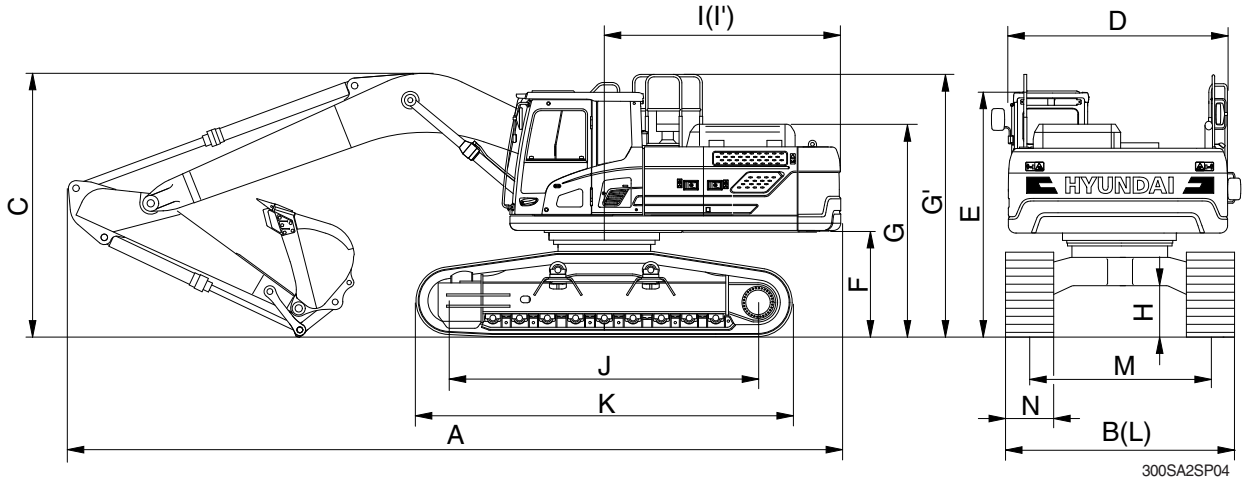
Description		Unit		Specification	
		m (ft-in)	Boom	6.15 (20' 2")	
			Arm	2.20 (7' 3")	2.50 (8' 2")
		mm (in)	Shoe	600 (24)	
Operating weight		kg (lb)		33410 (73502)	33520 (73744)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)		1.44 (1.88)	1.44 (1.88)
Overall length	A	mm (ft-in)		11230 (36' 3")	11080 (36' 4")
Overall width	B			3280 (10' 9")	3280 (10' 9")
Overall height of boom	C			3720 (12' 2")	3620 (11' 11")
Superstructure width	D			2960 (9' 9")	2960 (9' 9")
Overall height of cab	E			3145 (10' 4")	3145 (10' 4")
Ground clearance of counterweight	F			1200 (3' 11")	1200 (3' 11")
Overall height of engine hood	G			2690 (8' 10")	2690 (8' 10")
Overall height of guardrail	G'			3350 (11' 0")	3350 (11' 0")
Minimum ground clearance	H			500 (1' 8")	500 (1' 8")
Rear-end distance	I			3505 (11' 6")	3505 (11' 6")
Rear-end swing radius	I'			3570 (11' 9")	3570 (11' 9")
Distance between tumblers	J			4030 (13' 3")	4030 (13' 3")
Undercarriage length	K			4940 (16' 2")	4940 (16' 2")
Undercarriage width	L			3280 (10' 9")	3280 (10' 9")
Track gauge	M			2680 (8' 10")	2680 (8' 10")
Track shoe width, standard	N			600 (24")	600 (24")
Travel speed (low/high)		km/hr (mph)		3.5/6.4	
Swing speed		rpm		10.2	
Gradeability		Degree (%)		35 (70)	
Ground pressure		kgf/cm^2 (psi)		0.64 (9.15)	0.65 (9.18)
Max traction force		kg (lb)		27404 (60415)	

3) HX350LT3, 6.45m (21' 2") HD BOOM

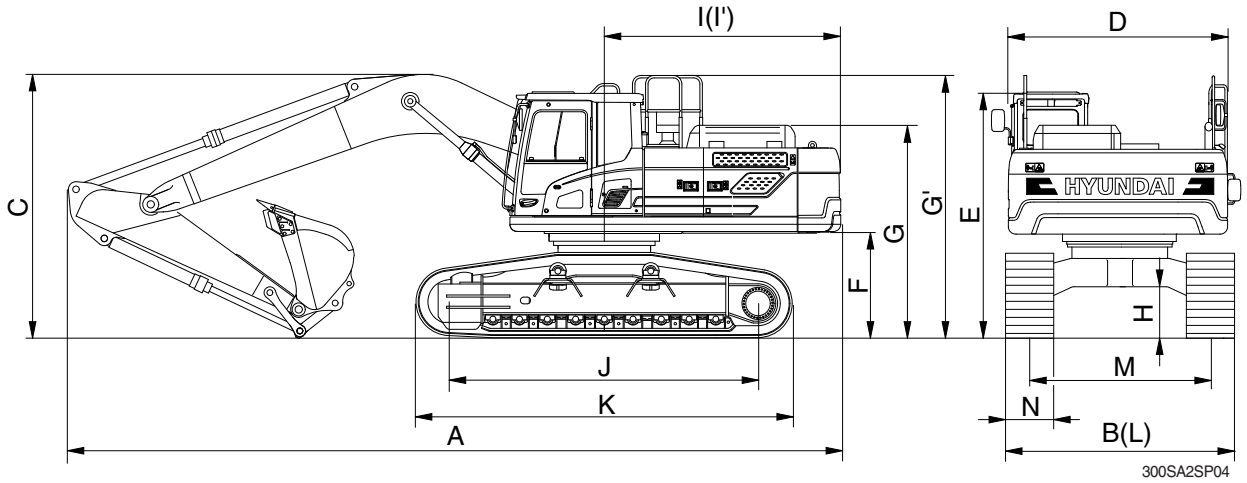


Description		Unit		Specification			
		m (ft-in)	Boom	6.45 (21' 2")			
			Arm	3.20 (10' 6")	2.20 (7' 3")	2.50 (8' 2")	4.05 (13' 3")
		mm (in)	Shoe	600 (24)			
Operating weight		kg (lb)		33680 (74096)	33460 (73612)	33570 (73854)	33900 (74580)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)		1.44 (1.88)	1.44 (1.88)	1.44 (1.88)	1.44 (1.88)
Overall length	A	mm (ft-in)		11220 (36' 10")	11530 (37' 10")	11390 (37' 4")	11210 (36' 9")
Overall width	B			3280 (10' 9")	3280 (10' 9")	3280 (10' 9")	3280 (10' 9")
Overall height of boom	C			3420 (11' 3")	3680 (12' 1")	3580 (11' 9")	3900 (12' 1")
Superstructure width	D			2980 (9' 9")	2980 (9' 9")	2980 (9' 9")	2980 (9' 9")
Overall height of cab	E			3145 (10' 4")	3145 (10' 4")	3145 (10' 4")	3145 (10' 4")
Ground clearance of counterweight	F			1200 (3' 11")	1200 (3' 11")	1200 (3' 11")	1200 (3' 11")
Overall height of engine hood	G			2690 (8' 10")	2690 (8' 10")	2690 (8' 10")	2690 (8' 10")
Overall height of guardrail	G'			3350 (11' 0")	3350 (11' 0")	3350 (11' 0")	3350 (11' 0")
Minimum ground clearance	H			500 (1' 8")	500 (1' 8")	500 (1' 8")	500 (1' 8")
Rear-end distance	I			3505 (11' 6")	3505 (11' 6")	3505 (11' 6")	3505 (11' 6")
Rear-end swing radius	I'			3570 (11' 9")	3570 (11' 9")	3570 (11' 9")	3570 (11' 9")
Distance between tumblers	J			4030 (13' 3")	4030 (13' 3")	4030 (13' 3")	4030 (13' 3")
Undercarriage length	K			4940 (16' 2")	4940 (16' 2")	4940 (16' 2")	4940 (16' 2")
Undercarriage width	L			3280 (10' 9")	3280 (10' 9")	3280 (10' 9")	3280 (10' 9")
Track gauge	M			2680 (8' 10")	2680 (8' 10")	2680 (8' 10")	2680 (8' 10")
Track shoe width, standard	N			600 (24")	600 (24")	600 (24")	600 (24")
Travel speed (low/high)		km/hr (mph)		3.5/6.4			
Swing speed		rpm		10.2			
Gradeability		Degree (%)		35 (70)			
Ground pressure		kgf/cm^2 (psi)		0.65 (9.22)	0.64 (9.16)	0.65 (9.19)	0.65 (9.28)
Max traction force		kg (lb)		27404 (60415)			

4) HX350LT3 HW, 6.45 m (21' 2") BOOM

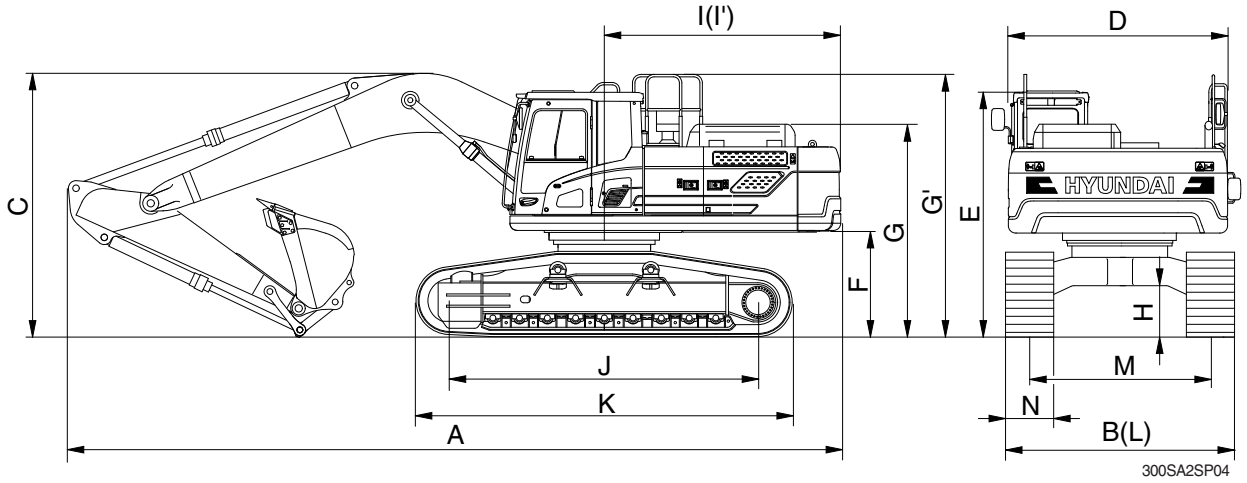


Description		Unit		Specification			
		m (ft-in)	Boom	6.45 (21' 2")			
			Arm	3.20 (10' 6")	2.20 (7' 3")	2.50 (8' 2")	4.05 (13' 3")
		mm (in)	Shoe	700 (28")			
Operating weight		kg (lb)		37100 (81620)	36890 (81158)	37000 (81400)	37330 (82126)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)		1.44 (1.88)	1.44 (1.88)	1.44 (1.88)	1.44 (1.88)
Overall length	A	mm (ft-in)		11150 (36' 7")	11460 (37' 7")	11340 (37' 2")	11240 (36' 11")
Overall width	B			3570 (11' 9")	3570 (11' 9")	3570 (11' 9")	3570 (11' 9")
Overall height of boom	C			3360 (11' 0")	3740 (12' 3")	3760 (12' 4")	3810 (12' 6")
Superstructure width	D			2980 (9' 9")	2980 (9' 9")	2980 (9' 9")	2980 (9' 9")
Overall height of cab	E			3480 (11' 5")	3480 (11' 5")	3480 (11' 5")	3480 (11' 5")
Ground clearance of counterweight	F			1535 (5' 0")	1535 (5' 0")	1535 (5' 0")	1535 (5' 0")
Overall height of engine hood	G			2990 (9' 10")	2990 (9' 10")	2990 (9' 10")	2990 (9' 10")
Overall height of guardrail	G'			3650 (12' 0")	3650 (12' 0")	3650 (12' 0")	3650 (12' 0")
Minimum ground clearance	H			800 (2' 7")	800 (2' 7")	800 (2' 7")	800 (2' 7")
Rear-end distance	I			3505 (11' 6")	3505 (11' 6")	3505 (11' 6")	3505 (11' 6")
Rear-end swing radius	I'			3570 (11' 9")	3570 (11' 9")	3570 (11' 9")	3570 (11' 9")
Distance between tumblers	J			4100 (13' 5")	4100 (13' 5")	4100 (13' 5")	4100 (13' 5")
Undercarriage length	K			5010 (16' 5")	5010 (16' 5")	5010 (16' 5")	5010 (16' 5")
Undercarriage width	L			3570 (11' 9")	3570 (11' 9")	3570 (11' 9")	3570 (11' 9")
Track gauge	M			2870 (9' 5")	2870 (9' 5")	2870 (9' 5")	2870 (9' 5")
Track shoe width, standard	N			700 (28")	700 (28")	700 (28")	700 (28")
Travel speed (low/high)		km/hr (mph)		3.5/6.4			
Swing speed		rpm		10.2			
Gradeability		Degree (%)		35 (70)			
Ground pressure		kgf/cm^2 (psi)		0.61 (8.69)	0.64 (8.64)	0.61 (8.66)	0.62 (8.86)
Max traction force		kg (lb)		27404 (60415)			



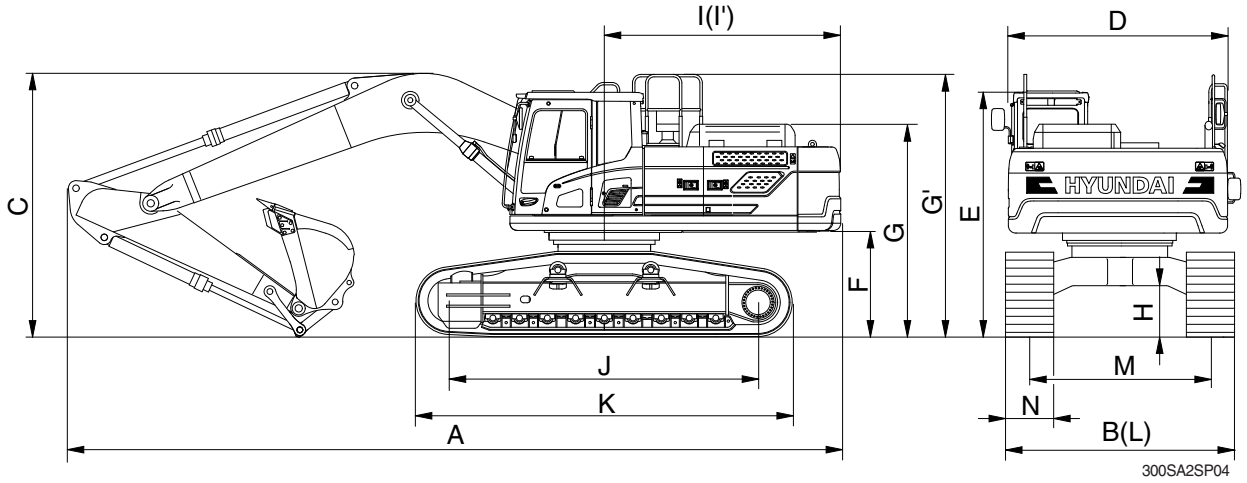
Description		Unit		Specification			
		m (ft-in)	Boom	6.45 (21' 2")			
			Arm	3.20 (10' 6")	2.20 (7' 3")	2.50 (8' 2")	4.05 (13' 3")
		mm (in)	Shoe	600 (24")			
Operating weight		kg (lb)		35540 (78350)	35330 (77890)	35440 (78130)	35770 (78860)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)		1.44 (1.88)	1.44 (1.88)	1.44 (1.88)	1.44 (1.88)
Overall length	A	mm (ft-in)		11150 (36' 7")	11460 (37' 7")	11340 (37' 2")	11240 (36' 10")
Overall width	B			3470 (11' 5")	3470 (11' 5")	3470 (11' 5")	3470 (11' 5")
Overall height of boom	C			3360 (11' 0")	3740 (12' 3")	3760 (12' 4")	3810 (12' 6")
Superstructure width	D			2980 (9' 9")	2980 (9' 9")	2980 (9' 9")	2980 (9' 9")
Overall height of cab	E			3480 (11' 5")	3480 (11' 5")	3480 (11' 5")	3480 (11' 5")
Ground clearance of counterweight	F			1535 (5' 0")	1535 (5' 0")	1535 (5' 0")	1535 (5' 0")
Overall height of engine hood	G			2990 (9' 10")	2990 (9' 10")	2990 (9' 10")	2990 (9' 10")
Overall height of guardrail	G'			3650 (12' 0")	3650 (12' 0")	3650 (12' 0")	3650 (12' 0")
Minimum ground clearance	H			800 (2' 7")	800 (2' 7")	800 (2' 7")	800 (2' 7")
Rear-end distance	I			3505 (11' 6")	3505 (11' 6")	3505 (11' 6")	3505 (11' 6")
Rear-end swing radius	I'			3570 (11' 9")	3570 (11' 9")	3570 (11' 9")	3570 (11' 9")
Distance between tumblers	J			4030 (13' 3")	4030 (13' 3")	4030 (13' 3")	4030 (13' 3")
Undercarriage length	K			4940 (16' 2")	4940 (16' 2")	4940 (16' 2")	4940 (16' 2")
Undercarriage width	L			3470 (11' 5")	3470 (11' 5")	3470 (11' 5")	3470 (11' 5")
Track gauge	M			2870 (9' 5")	2870 (9' 5")	2870 (9' 5")	2870 (9' 5")
Track shoe width, standard	N			600 (24")	600 (24")	600 (24")	600 (24")
Travel speed (low/high)		km/hr (mph)		3.5/6.4			
Swing speed		rpm		10.2			
Gradeability		Degree (%)		35 (70)			
Ground pressure		kgf/cm^2 (psi)		0.68 (9.73)	0.68 (9.67)	0.68 (9.70)	0.69 (9.80)
Max traction force		kg (lb)		27404 (60415)			

5) HX350LT3 HW, 6.15m (20' 2") HD SHORT BOOM

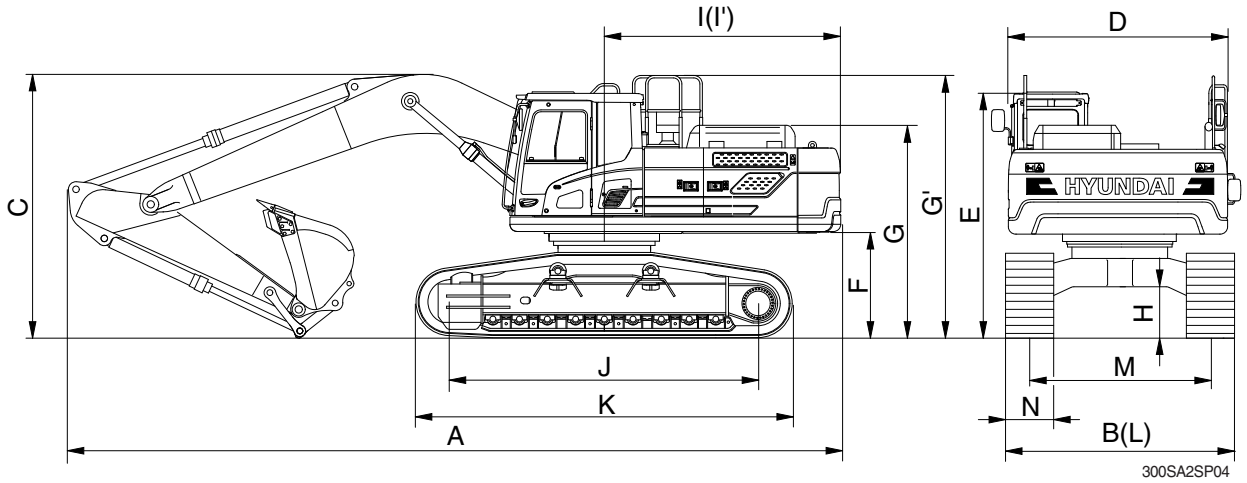


Description		Unit		Specification			
		m (ft-in)	Boom	6.15 (20' 2")			
			Arm	2.20 (7' 3")		2.50 (8' 2")	
		mm (in)	Shoe	700 (28")	600 (24")	700 (28")	600 (24")
Operating weight		kg (lb)		36840 (81048)	35280 (77780)	36950 (81290)	35390 (78022)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)		1.44 (1.88)	1.44 (1.88)	1.44 (1.88)	1.44 (1.88)
Overall length	A	mm (ft-in)		11230 (36' 10")	11230 (36' 10")	11020 (36' 2")	11020 (36' 2")
Overall width	B			3570 (11' 9")	3470 (11' 5")	3570 (11' 9")	3470 (11' 5")
Overall height of boom	C			3820 (12' 6")	3820 (12' 6")	3690 (12' 1")	3690 (12' 1")
Superstructure width	D			2980 (9' 9")	2980 (9' 9")	2980 (9' 9")	2980 (9' 9")
Overall height of cab	E			3480 (11' 5")	3480 (11' 5")	3480 (11' 5")	3480 (11' 5")
Ground clearance of counterweight	F			1200 (3' 11")	1200 (3' 11")	1200 (3' 11")	1200 (3' 11")
Overall height of engine hood	G			2990 (9' 10")	2990 (9' 10")	2990 (9' 10")	2990 (9' 10")
Overall height of guardrail	G'			3650 (12' 0")	3650 (12' 0")	3650 (12' 0")	3650 (12' 0")
Minimum ground clearance	H			800 (2' 7")	800 (2' 7")	800 (2' 7")	800 (2' 7")
Rear-end distance	I			3505 (11' 6")	3505 (11' 6")	3505 (11' 6")	3505 (11' 6")
Rear-end swing radius	I'			3570 (11' 9")	3570 (11' 9")	3570 (11' 9")	3570 (11' 9")
Distance between tumblers	J			4100 (13' 5")	4030 (13' 3")	4100 (13' 5")	4030 (13' 3")
Undercarriage length	K			5010 (16' 5")	4940 (16' 2")	5010 (16' 5")	4940 (16' 2")
Undercarriage width	L			3570 (11' 9")	3470 (11' 5")	3570 (11' 9")	3470 (11' 5")
Track gauge	M			2870 (9' 5")	2870 (9' 5")	2870 (9' 5")	2870 (9' 5")
Track shoe width, standard	N			700 (28")	600 (24")	700 (28")	600 (24")
Travel speed (low/high)		km/hr (mph)		3.5/6.4	3.5/6.4	3.5/6.4	3.5/6.4
Swing speed		rpm		10.2	10.2	10.2	10.2
Gradeability		Degree (%)		35 (70)	35 (70)	35 (70)	35 (70)
Ground pressure		kgf/cm^2 (psi)		0.61 (8.62)	0.68 (9.66)	0.61 (8.69)	0.68 (9.73)
Max traction force		kg (lb)		27404 (60415)	27404 (60415)	27404 (60415)	27404 (60415)

6) HX350LT3 HW, 6.45 m (21' 2") HD BOOM



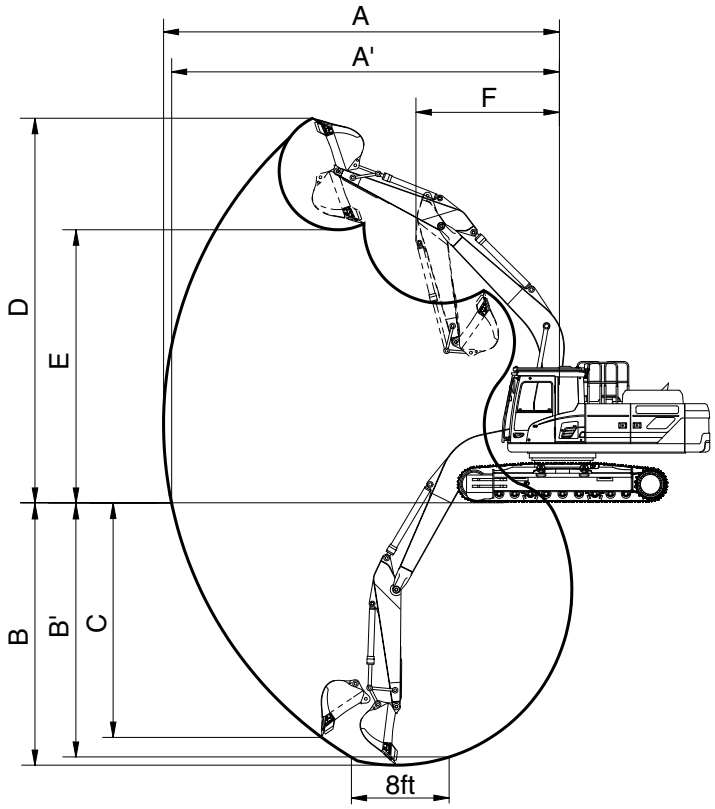
Description		Unit		Specification			
		m (ft-in)	Boom	6.45 (21' 2")			
			Arm	3.20 (10' 6")	2.20 (7' 3")	2.50 (8' 2")	4.05 (13' 3")
		mm (in)	Shoe	700 (28")			
Operating weight		kg (lb)		37100 (81620)	36890 (81158)	37000 (81400)	37330 (82126)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)		1.44 (1.88)	1.44 (1.88)	1.44 (1.88)	1.44 (1.88)
Overall length	A	mm (ft-in)		11150 (36' 7")	11530 (37' 10")	11340 (37' 2")	11230 (36' 10")
Overall width	B			3570 (11' 9")	3570 (11' 9")	3570 (11' 9")	3570 (11' 9")
Overall height of boom	C			3540 (11' 4")	3780 (12' 5")	3650 (12' 0")	3840 (12' 7")
Superstructure width	D			2980 (9' 9")	2980 (9' 9")	2980 (9' 9")	2980 (9' 9")
Overall height of cab	E			3480 (11' 5")	3480 (11' 5")	3480 (11' 5")	3480 (11' 5")
Ground clearance of counterweight	F			1535 (5' 0")	1535 (5' 0")	1535 (5' 0")	1535 (5' 0")
Overall height of engine hood	G			2990 (9' 10")	2990 (9' 10")	2990 (9' 10")	2990 (9' 10")
Overall height of guardrail	G'			3650 (12' 0")	3650 (12' 0")	3650 (12' 0")	3650 (12' 0")
Minimum ground clearance	H			800 (2' 7")	800 (2' 7")	800 (2' 7")	800 (2' 7")
Rear-end distance	I			3505 (11' 6")	3505 (11' 6")	3505 (11' 6")	3505 (11' 6")
Rear-end swing radius	I'			3570 (11' 9")	3570 (11' 9")	3570 (11' 9")	3570 (11' 9")
Distance between tumblers	J			4100 (13' 5")	4100 (13' 5")	4100 (13' 5")	4100 (13' 5")
Undercarriage length	K			5010 (16' 5")	5010 (16' 5")	5010 (16' 5")	5010 (16' 5")
Undercarriage width	L			3570 (11' 9")	3570 (11' 9")	3570 (11' 9")	3570 (11' 9")
Track gauge	M			2870 (9' 5")	2870 (9' 5")	2870 (9' 5")	2870 (9' 5")
Track shoe width, standard	N			700 (28")	700 (28")	700 (28")	700 (28")
Travel speed (low/high)		km/hr (mph)		3.5/6.4			
Swing speed		rpm		10.2			
Gradeability		Degree (%)		35 (70)			
Ground pressure		kgf/cm^2 (psi)		0.61 (8.69)	0.61 (8.64)	0.61 (8.66)	0.62 (8.86)
Max traction force		kg (lb)		27404 (60415)			



Description		Unit		Specification			
		m (ft-in)	Boom	6.45 (21' 2")			
			Arm	3.20 (10' 6")	2.20 (7' 3")	2.50 (8' 2")	4.05 (13' 3")
		mm (in)	Shoe	600 (24")			
Operating weight		kg (lb)		35540 (78350)	35330 (77890)	35440 (78130)	35770 (78860)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)		1.44 (1.88)	1.44 (1.88)	1.44 (1.88)	1.44 (1.88)
Overall length	A	mm (ft-in)		11150 (36' 7")	11530 (37' 10")	11340 (37' 2")	11230 (36' 10")
Overall width	B			3470 (11' 5")	3470 (11' 5")	3470 (11' 5")	3470 (11' 5")
Overall height of boom	C			3450 (11' 4")	3780 (12' 5")	3650 (12' 0")	3840 (12' 7")
Superstructure width	D			2980 (9' 9")	2980 (9' 9")	2980 (9' 9")	2980 (9' 9")
Overall height of cab	E			3480 (11' 5")	3480 (11' 5")	3480 (11' 5")	3480 (11' 5")
Ground clearance of counterweight	F			1535 (5' 0")	1535 (5' 0")	1535 (5' 0")	1535 (5' 0")
Overall height of engine hood	G			2990 (9' 10")	2990 (9' 10")	2990 (9' 10")	2990 (9' 10")
Overall height of guardrail	G'			3650 (12' 0")	3650 (12' 0")	3650 (12' 0")	3650 (12' 0")
Minimum ground clearance	H			800 (2' 7")	800 (2' 7")	800 (2' 7")	800 (2' 7")
Rear-end distance	I			3505 (11' 6")	3505 (11' 6")	3505 (11' 6")	3505 (11' 6")
Rear-end swing radius	I'			3570 (11' 9")	3570 (11' 9")	3570 (11' 9")	3570 (11' 9")
Distance between tumblers	J			4030 (13' 3")	4030 (13' 3")	4030 (13' 3")	4030 (13' 3")
Undercarriage length	K			4940 (16' 2")	4940 (16' 2")	4940 (16' 2")	4940 (16' 2")
Undercarriage width	L			3470 (11' 5")	3470 (11' 5")	3470 (11' 5")	3470 (11' 5")
Track gauge	M			2870 (9' 5")	2870 (9' 5")	2870 (9' 5")	2870 (9' 5")
Track shoe width, standard	N			600 (24")	600 (24")	600 (24")	600 (24")
Travel speed (low/high)		km/hr (mph)		3.5/6.4			
Swing speed		rpm		10.2			
Gradeability		Degree (%)		35 (70)			
Ground pressure		kgf/cm^2 (psi)		0.68 (9.73)	0.68 (9.67)	0.68 (9.70)	0.69 (9.80)
Max traction force		kg (lb)		27404 (60415)			

3. WORKING RANGE AND DIGGING FORCE

1) HX350LT3, 6.45m (21' 2") BOOM

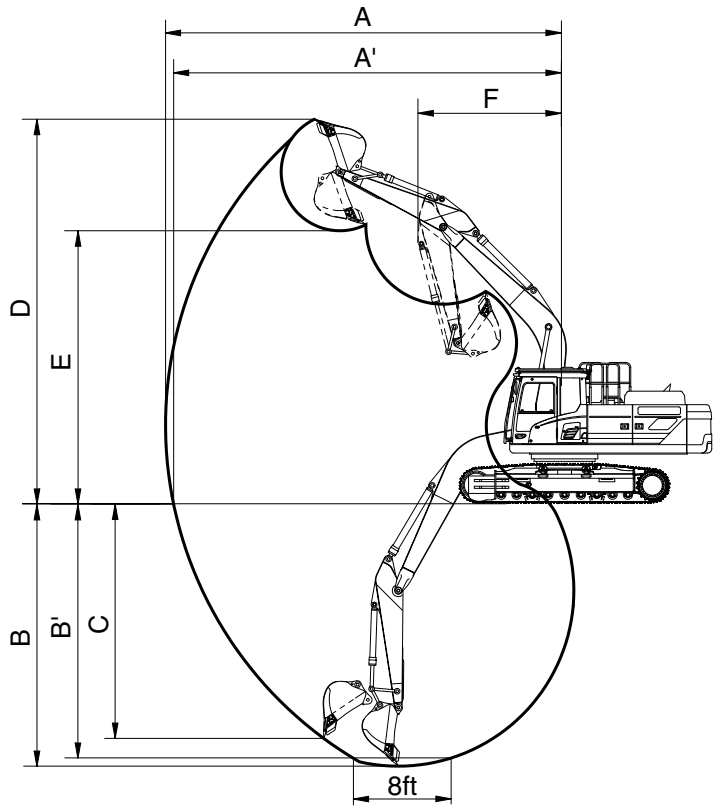


350SA2SP10

Description	m (ft-in)	Boom	6.45 (21' 2")		
		Arm	3.20 (10' 6")	2.5 (8' 2")	4.05 (13' 3")
Max digging reach	mm (ft-in)	A	11150 (36' 7")	10500 (34' 5")	11950 (39' 2")
Max digging reach on ground		A'	10950 (35'11")	10290 (33' 9")	11770 (38' 7")
Max digging depth		B	7360 (24' 2")	6660 (21'10")	8210 (26'11")
Max digging depth (8 ft level)		B'	7200 (23' 7")	6450 (21' 2")	8080 (26' 6")
Max vertical wall digging depth		C	6330 (20' 9")	5660 (18' 7")	7240 (23' 9")
Max digging height		D	10360 (34' 0")	10050 (33' 0")	10780 (35' 4")
Max dumping height		E	7260 (23' 10")	6950 (22' 10")	7670 (25' 2")
Min swing radius		F	4360 (14' 4")	4440 (14' 7")	4290 (14' 1")
Bucket digging force	kN	SAE	188.3 [204.5]	187.3 [203.4]	189.3 [205.5]
	kgf		19200 [20850]	19100 [20740]	19300 [20950]
	lbf		42330 [45970]	42110 [45720]	42550 [46190]
	kN	ISO	216.7 [235.3]	215.7 [234.3]	217.7 [236.3]
	kgf		22100 [23990]	22000 [23890]	22200 [24100]
	lbf		48720 [52890]	48500 [52670]	48940 [53130]
Arm digging force	kN	SAE	140.2 [152.3]	175.5 [190.5]	118.7 [128.9]
	kgf		14300 [15530]	17900 [19430]	12100 [13140]
	lbf		31530 [34240]	39460 [42840]	26680 [28970]
	kN	ISO	145.1 [157.6]	184.4 [200.2]	123.6 [134.2]
	kgf		14800 [16070]	18800 [20410]	12600 [13680]
	lbf		32630 [35430]	41450 [45000]	27780 [30160]

[ ] : Power boost

2) HX350LT3, 6.15m (20' 2") HD SHORT BOOM

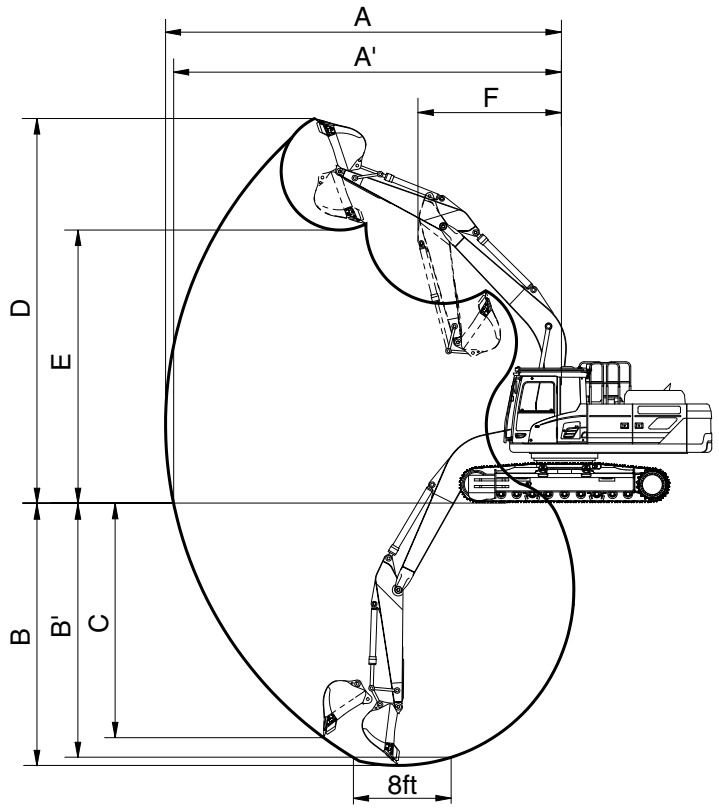


350SA2SP10

Description	m (ft-in)	Boom	6.15 (20' 2")	
		Arm	2.20 (7' 3")	2.50 (8' 2")
Max digging reach	mm (ft-in)	A	10020 (32' 10")	10190 (33' 5")
Max digging reach on ground		A'	9810 (32' 2")	9980 (32' 9")
Max digging depth		B	6150 (20' 2")	6450 (21' 2")
Max digging depth (8 ft level)		B'	5950 (19' 6")	6230 (20' 5")
Max vertical wall digging depth		C	5700 (18' 8")	5420 (17' 9")
Max digging height		D	9980 (32' 9")	9760 (32' 0")
Max dumping height		E	6790 (22' 3")	6670 (21' 11")
Min swing radius		F	4450 (14' 7")	4290 (14' 1")
Bucket digging force	kN	SAE	200.1 [217.2]	187.3 [203.4]
	kgf		20400 [22150]	19100 [20740]
	lbf		44970 [48830]	42110 [45720]
	kN	ISO	230.5 [250.2]	215.7 [234.3]
	kgf		23500 [25510]	22000 [23890]
	lbf		51810 [56240]	48500 [52670]
Arm digging force	kN	SAE	220.7 [239.6]	198.1 [215.1]
	kgf		22500 [24430]	20200 [21930]
	lbf		49600 [53860]	44530 [48350]
	kN	ISO	231.4 [251.3]	207.9 [225.8]
	kgf		23600 [25620]	21200 [23020]
	lbf		52030 [56480]	46740 [50750]

[ ] : Power boost

3) HX350LT3, 6.45m (21' 2") HD BOOM

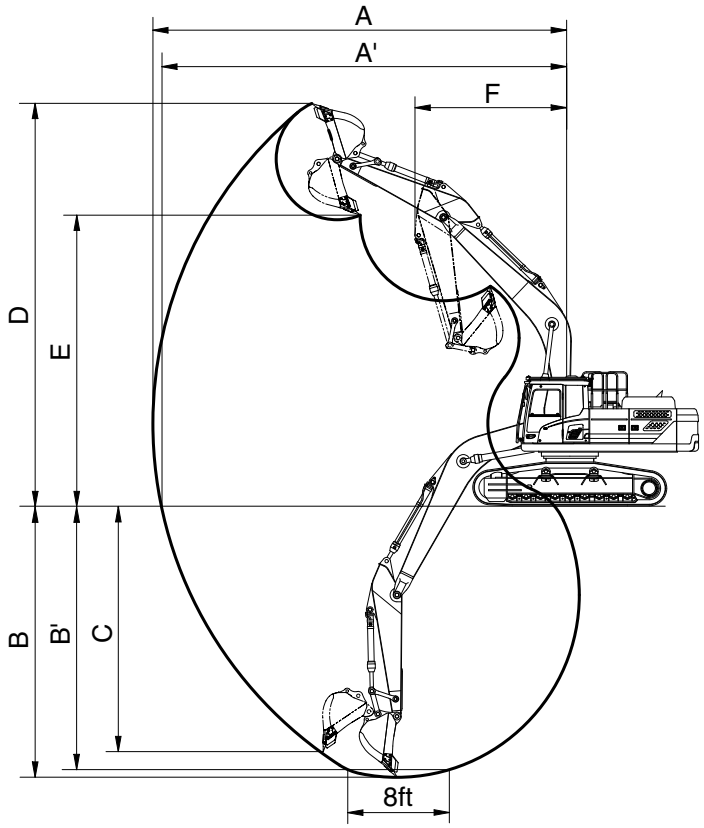


350SA2SP10

Description	m (ft-in)	Boom	6.45 (21' 2")	
		Arm	2.20 (7' 3")	2.50 (8' 2")
Max digging reach	mm (ft-in)	A	10300 (33' 11")	10500 (34' 5")
Max digging reach on ground		A'	10120 (33' 2")	10290 (33' 9")
Max digging depth		B	6360 (20' 10")	6660 (21' 10")
Max digging depth (8 ft level)		B'	6170 (20' 3")	6450 (21' 2")
Max vertical wall digging depth		C	5970 (19' 7")	5660 (18' 7")
Max digging height		D	10260 (33' 8")	10050 (33' 0")
Max dumping height		E	7060 (23' 2")	6950 (22' 10")
Min swing radius		F	4630 (15' 2")	4440 (14' 7")
Bucket digging force	kN	SAE	200.1 [217.2]	187.3 [203.4]
	kgf		20400 [22150]	19100 [20740]
	lbf		44970 [48830]	42110 [45720]
	kN	ISO	230.5 [250.2]	215.7 [234.3]
	kgf		23500 [25510]	22000 [23890]
	lbf		51810 [56240]	48500 [52670]
Arm digging force	kN	SAE	220.7 [239.6]	198.1 [215.1]
	kgf		22500 [24430]	20200 [21930]
	lbf		49600 [53860]	44530 [48350]
	kN	ISO	231.4 [251.3]	207.9 [225.8]
	kgf		23600 [25620]	21200 [23020]
	lbf		52030 [56480]	46740 [50750]

[ ] : Power boost

4) HX350LT3 HW, 6.45m (21' 2") BOOM

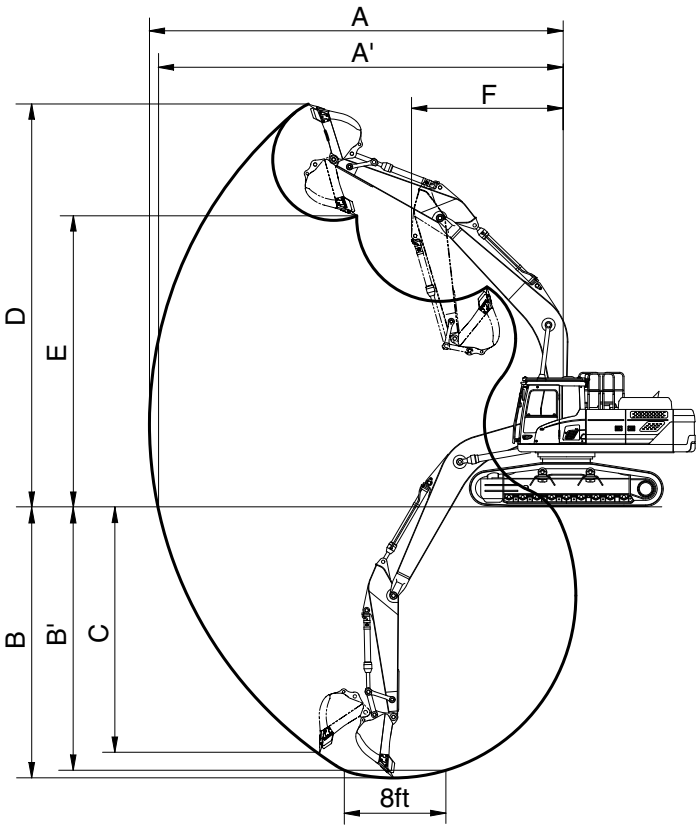


350SA2SP13

Description	m (ft-in)	Boom	6.45 (21' 2")		
		Arm	3.20 (10' 6")	2.50 (8' 2")	4.05 (13' 3")
Max digging reach	mm (ft-in)	A	11150 (36' 7")	10500 (34' 5")	11950 (39' 2")
Max digging reach on ground		A'	10890 (35' 9")	10220 (33' 6")	11710 (38' 5")
Max digging depth		B	7060 (23' 2")	6360 (20' 10")	7910 (25' 11")
Max digging depth (8 ft level)		B'	6890 (22' 7")	6140 (20' 2")	7780 (25' 6")
Max vertical wall digging depth		C	6030 (19' 9")	5350 (17' 7")	6940 (22' 9")
Max digging height		D	10670 (35' 0")	10350 (33' 11")	11090 (36' 5")
Max dumping height		E	7570 (24' 10")	7260 (23' 10")	7970 (26' 2")
Min swing radius		F	4360 (14' 4")	4440 (14' 7")	4290 (14' 1")
Bucket digging force	kN	SAE	188.3 [204.5]	187.3 [203.4]	189.3 [205.5]
	kgf		19200 [20850]	19100 [20740]	19300 [20950]
	lbf		42330 [45970]	42110 [45720]	42550 [46190]
	kN	ISO	216.7 [235.3]	215.7 [234.3]	217.7 [236.3]
	kgf		22100 [23990]	22000 [23890]	22200 [24100]
	lbf		48720 [52890]	48500 [52670]	48940 [53130]
Arm digging force	kN	SAE	140.2 [152.3]	175.5 [190.5]	118.7 [128.9]
	kgf		14300 [15530]	17900 [19430]	12100 [13140]
	lbf		31530 [34240]	39460 [42840]	26680 [28970]
	kN	ISO	145.1 [157.6]	184.4 [200.2]	123.6 [134.2]
	kgf		14800 [16070]	18800 [20410]	12600 [13680]
	lbf		32630 [35430]	41450 [45000]	27780 [30160]

[ ] : Power boost

5) HX350LT3 HW, 6.15m (20' 2") HD SHORT BOOM

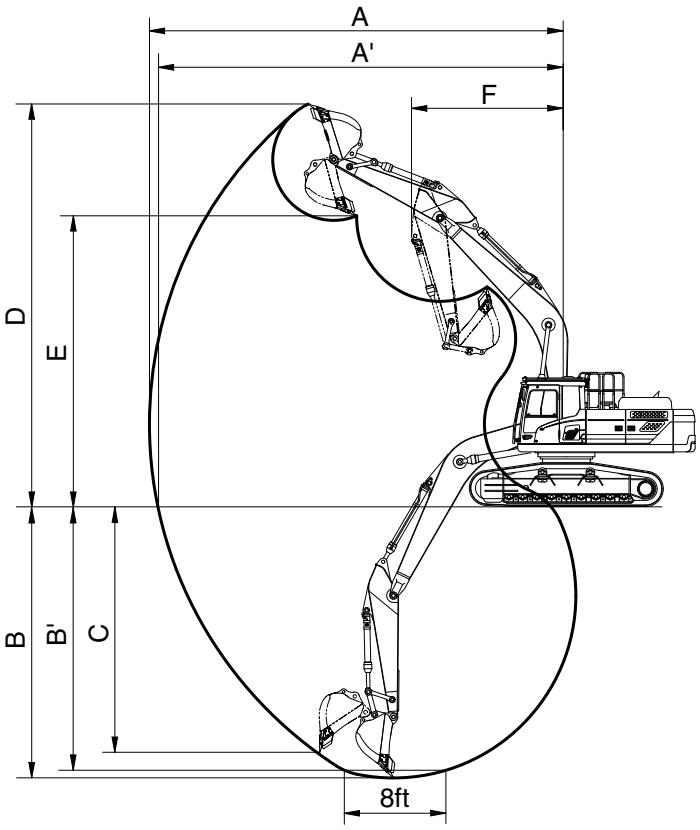


350SA2SP13

Description	m (ft-in)	Boom	6.15 (20' 2")	
		Arm	2.20 (7' 3")	2.50 (8' 2")
Max digging reach	mm (ft-in)	A	10020 (32' 10")	10190 (33' 5")
Max digging reach on ground		A'	9740 (31' 11")	9910 (32' 6")
Max digging depth		B	5850 (19' 2")	6150 (20' 2")
Max digging depth (8 ft level)		B'	5650 (18' 6")	5920 (19' 5")
Max vertical wall digging depth		C	5400 (17' 9")	5110 (16' 9")
Max digging height		D	10280 (33' 9")	10070 (33' 0")
Max dumping height		E	7100 (23' 4")	6980 (22' 11")
Min swing radius		F	4450 (14' 7")	4290 (14' 1")
Bucket digging force	kN	SAE	200.1 [217.2]	187.3 [203.4]
	kgf		20400 [22150]	19100 [20740]
	lbf		44970 [48830]	42110 [45720]
	kN	ISO	230.5 [250.2]	215.7 [234.3]
	kgf		23500 [25510]	22000 [23890]
	lbf		51810 [56240]	48500 [52670]
Arm digging force	kN	SAE	220.7 [239.6]	198.1 [215.1]
	kgf		22500 [24430]	20200 [21930]
	lbf		49600 [53860]	44530 [48350]
	kN	ISO	231.4 [251.3]	207.9 [225.8]
	kgf		23600 [25620]	21200 [23020]
	lbf		52030 [56480]	46740 [50750]

[ ] : Power boost

6) HX350LT3 HW, 6.45m (21' 2") HD BOOM



350SA2SP13

Description	m (ft-in)	Boom	6.45 (21' 2")	
		Arm	2.20 (7' 3")	2.50 (8' 2")
Max digging reach	mm (ft-in)	A	10330 (33' 11")	10500 (34' 5")
Max digging reach on ground		A'	10050 (33' 0")	10220 (33' 6")
Max digging depth		B	6060 (19' 11")	6360 (20' 10")
Max digging depth (8 ft level)		B'	5860 (19' 3")	6140 (20' 2")
Max vertical wall digging depth		C	5660 (18' 7")	5350 (17' 7")
Max digging height		D	10560 (34' 8")	10350 (33' 11")
Max dumping height		E	7370 (24' 2")	7260 (23' 10")
Min swing radius		F	4630 (15' 2")	4440 (14' 7")
Bucket digging force	kN	SAE	200.1 [217.2]	187.3 [203.4]
	kgf		20400 [22150]	19100 [20740]
	lbf		44970 [48830]	42110 [45720]
	kN	ISO	230.5 [250.2]	215.7 [234.3]
	kgf		23500 [25510]	22000 [23890]
	lbf		51810 [56240]	48500 [52670]
Arm digging force	kN	SAE	220.7 [239.6]	198.1 [215.1]
	kgf		22500 [24430]	20200 [21930]
	lbf		49600 [53860]	44530 [48350]
	kN	ISO	231.4 [251.3]	207.9 [225.8]
	kgf		23600 [25620]	21200 [23020]
	lbf		52030 [56480]	46740 [50750]

[ ] : Power boost

4. WEIGHT

Item	HX350LT3		HX350LT3 HW	
	kg	lb	kg	lb
Upperstructure assembly				
· Main frame weld assembly	2,839	6,259	2,839	6,259
· Engine assembly	590	1,301	590	1,301
· Aftertreatment assy	40	88	40	88
· Main pump assembly	181	399	181	399
· Main control valve assembly	220	485	220	485
· Swing motor assembly	345	761	345	761
· Hydraulic oil tank WA	205	451	205	451
· Fuel tank WA	235	518	235	518
· Counterweight	6,000	13,230	7,000	15,432
· Cab assembly	570	1,257	570	1,257
Lower chassis assembly				
· Track frame weld assembly	3,875	8,543	3,875	8,543
· Swing bearing	468	1,030	468	1,030
· Travel motor assembly (2EA)	886	1,954	886	1,954
· Turning joint	54	117	54	117
· Sprocket (2EA)	141	310	166 / ★141	370 / ★310
· Track recoil spring (2EA)	450	990	450	990
· Idler (2EA)	499	1,100	499	1,100
· Upper roller (4EA)	139	310	227 / ★216	500 / ★476
· Lower roller (18EA)	973	2140	1020 / ★973	2249 / ★2140
· Track-chain assembly (600 mm triple grouser shoe) (2EA)	3,759	8,290	3,759	8,290
· Track-chain assembly (700 mm triple grouser shoe) (2EA)	4,327	9,540	-	-
· Track-chain assembly (700 mm double grouser shoe) (2EA)	-	-	5,237	11,550
· Track-chain assembly (800 mm triple grouser shoe) (2EA)	4,706	10,380	-	-
Front attachment assembly				
· 6.45 m boom assembly	2,400	5,291	2,400	5,291
· 6.15 m boom assembly	3,150	6,944	3,150	6,944
· 3.20 m arm assembly	1,070	2,359	1,070	2,359
· 1.44 m³ SAE heaped bucket	1,130	2,491	1,130	2,491
· Boom cylinder assembly (2EA)	540	1,190	540	1,190
· Arm cylinder assembly	360	793	360	793
· Bucket cylinder assembly	220	485	140	308
· Bucket control linkage total	280	617	130	287

★ : 600 mm triple grouser shoe

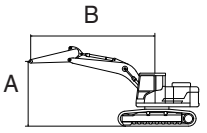
※ This information is different with operating and transportation weight because it is not including harness, pipe, oil, fuel so on.

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

5. LIFTING CAPACITIES

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3	MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6450	3200	6600	600	-	-	-	-	-

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



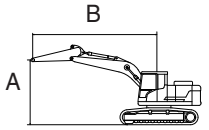
Lift-point height (A)		Lift-point radius (B)										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		Capacity		Reach
														m (ft)
7.5 m (24.6 ft)	kg							*6830	*6830			*5610	*5610	7.74
	lb							*15060	*15060			*12370	*12370	(25.4)
6.0 m (19.7 ft)	kg							*7860	7170			*5430	*5430	8.62
	lb							*17330	15810			*11970	*11970	(28.3)
4.5 m (14.8 ft)	kg			*11980	*11980	*9650	*9650	*8500	6960	*6660	5170	*5450	5010	9.17
	lb			*26410	*26410	*21270	*21270	*18740	15340	*14680	11400	*12020	11050	(30.1)
3.0 m (9.8 ft)	kg			*15520	14140	*11340	9280	*9380	6680	7540	5050	*5650	4670	9.44
	lb			*34220	31170	*25000	20460	*20680	14730	16620	11130	*12460	10300	(31.0)
1.5 m (4.9 ft)	kg			*17440	13250	*12840	8810	9730	6420	7400	4930	*6050	4560	9.47
	lb			*38450	29210	*28310	19420	21450	14150	16310	10870	*13340	10050	(31.1)
0.0 m (0.0 ft)	kg			*17250	12890	13360	8510	9530	6240	7300	4840	*6720	4650	9.25
	lb			*38030	28420	29450	18760	21010	13760	16090	10670	*14820	10250	(30.4)
-1.5 m (-4.9 ft)	kg	*10800	*10800	*18880	12830	13220	8390	9440	6160			7560	4990	8.77
	lb	*23810	*23810	*41620	28290	29150	18500	20810	13580			16670	11000	(28.8)
-3.0 m (-9.8 ft)	kg	*17460	*17460	*17670	12960	13270	8430	9490	6210			8710	5740	7.98
	lb	*38490	*38490	*38960	28570	29260	18580	20920	13690			19200	12650	(26.2)
-4.5 m (-14.8 ft)	kg	*20570	*20570	*15170	13270	*11400	8650					*9590	7380	6.76
	lb	*45350	*45350	*33440	29260	*25130	19070					*21140	16270	(22.2)

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 HD Hyundai Construction Equipment 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.

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3	MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6450	2500	6600	600	-	-	-	-	-

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



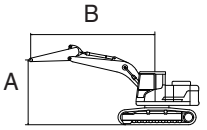
Lift-point height (A)		Lift-point radius (B)								At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		Capacity		Reach
												m (ft)
7.5 m (24.6 ft)	kg									*8810	8080	6.93
	lb									*19420	17810	(22.7)
6.0 m (19.7 ft)	kg					*9310	*9310	*8720	7040	*8720	6440	7.90
	lb					*20530	*20530	*19220	15520	*19220	14200	(25.9)
4.5 m (14.8 ft)	kg			*13720	*13720	*10620	9620	*9210	6860	8350	5620	8.49
	lb			*30250	*30250	*23410	21210	*20300	15120	18410	12390	(27.9)
3.0 m (9.8 ft)	kg					*12180	9110	9940	6620	7780	5210	8.79
	lb					*26850	20080	21910	14590	17150	11490	(28.8)
1.5 m (4.9 ft)	kg					*13440	8710	9690	6400	7640	5090	8.82
	lb					*29630	19200	21360	14110	16840	11220	(28.9)
0.0 m (0.0 ft)	kg			*15200	12900	13340	8500	9540	6260	7870	5220	8.58
	lb			*33510	28440	29410	18740	21030	13800	17350	11510	(28.2)
-1.5 m (-4.9 ft)	kg			*18330	12960	13290	8460	9520	6240	8610	5690	8.06
	lb			*40410	28570	29300	18650	20990	13760	18980	12540	(26.4)
-3.0 m (-9.8 ft)	kg	*21480	*21480	*16620	13160	*12740	8570			*10120	6740	7.19
	lb	*47360	*47360	*36640	29010	*28090	18890			*22310	14860	(23.6)
-4.5 m (-14.8 ft)	kg			*13270	*13270					*10000	9380	5.80
	lb			*29260	*29260					*22050	20680	(19.0)

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

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

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3	MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6450	4050	6600	600	-	-	-	-	-

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



Lift-point height (A)		Lift-point radius (B)												At max. reach		
		1.5 m (4.9 ft)		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		Capacity		Reach
																m (ft)
9.0 m (29.5 ft)	kg									*4710	*4710			*4520	*4520	7.55
	lb									*10380	*10380			*9960	*9960	(24.8)
7.5 m (24.6 ft)	kg													*4190	*4190	8.72
	lb													*9240	*9240	(28.6)
6.0 m (19.7 ft)	kg									*6800	*6800	*5820	5330	*4060	*4060	9.50
	lb									*14990	*14990	*12830	11750	*8950	*8950	(31.2)
4.5 m (14.8 ft)	kg									*7540	7050	*7120	5220	*4070	*4070	10.00
	lb									*16620	15540	*15700	11510	*8970	*8970	(32.8)
3.0 m (9.8 ft)	kg					*13310	*13310	*10100	9460	*8520	6740	7550	5050	*4200	4060	10.25
	lb					*29340	*29340	*22270	20860	*18780	14860	16640	11130	*9260	8950	(33.6)
1.5 m (4.9 ft)	kg					*16530	13520	*11840	8890	*9510	6420	7370	4880	*4450	3960	10.28
	lb					*36440	29810	*26100	19600	*20970	14150	16250	10760	*9810	8730	(33.7)
0.0 m (0.0 ft)	kg			*6350	*6350	*18370	12870	*13120	8480	9470	6180	7220	4740	*4880	4010	10.08
	lb			*14000	*14000	*40500	28370	*28920	18700	20880	13620	15920	10450	*10760	8840	(33.1)
-1.5 m (-4.9 ft)	kg	*6460	*6460	*9880	*9880	*18900	12620	13100	8250	9310	6030	7130	4670	*5560	4250	9.64
	lb	*14240	*14240	*21780	*21780	*41670	27820	28880	18190	20530	13290	15720	10300	*12260	9370	(31.6)
-3.0 m (-9.8 ft)	kg	*10370	*10370	*14450	*14450	*18360	12630	13040	8210	9270	5990			*6720	4750	8.92
	lb	*22860	*22860	*31860	*31860	*40480	27840	28750	18100	20440	13210			*14820	10470	(29.3)
-4.5 m (-14.8 ft)	kg	*15020	*15020	*20810	*20810	*16690	12840	*12520	8320	9410	6120			*8750	5770	7.86
	lb	*33110	*33110	*45880	*45880	*36800	28310	*27600	18340	20750	13490			*19290	12720	(25.8)
-6.0 m (-19.7 ft)	kg			*18370	*18370	*13250	*13250	*9520	8690					*8860	8220	6.26
	lb			*40500	*40500	*29210	*29210	*20990	19160					*19530	18120	(20.5)

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.

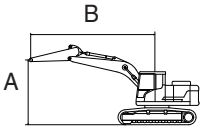
3. The Lift-point is bucket pivot mounting pin on the arm (without bucket mass).

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 HD Hyundai Construction Equipment 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.

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3	HD MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6150	2200	6600	600	-	-	-	-	-

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



Lift-point height (A)		Lift-point radius (B)										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		Capacity		Reach
														m (ft)
7.5 m (24.6 ft)	kg					*9650	*9650			*9790	9330	6.31	*5610	7.74
	lb					*21270	*21270			*21580	20570	(20.7)	*12370	(25.4)
6.0 m (19.7 ft)	kg					*9850	*9850			*9550	7170	7.36	*5430	8.62
	lb					*21720	*21720			*21050	15810	(24.2)	*11970	(28.3)
4.5 m (14.8 ft)	kg					*10990	9660	*9700	6860	9180	6170	8.00	5010	9.17
	lb					*24230	21300	*21380	15120	20240	13600	(26.2)	11050	(30.1)
3.0 m (9.8 ft)	kg					*12450	9170	9980	6650	8500	5690	8.31	4670	9.44
	lb					*27450	20220	22000	14660	18740	12540	(27.3)	10300	(31.0)
1.5 m (4.9 ft)	kg					*13630	8790	9770	6450	8340	5550	8.34	4560	9.47
	lb					*30050	19380	21540	14220	18390	12240	(27.4)	10050	(31.1)
0.0 m (0.0 ft)	kg					13460	8590	9640	6340	8650	5730	8.10	4650	9.25
	lb					29670	18940	21250	13980	19070	12630	(26.6)	10250	(30.4)
-1.5 m (-4.9 ft)	kg			*18190	13100	13440	8560	9680	6370	9610	6330	7.54	4990	8.77
	lb			*40100	28880	29630	18870	21340	14040	21190	13960	(24.7)	11000	(28.8)
-3.0 m (-9.8 ft)	kg	*20790	*20790	*16070	13340	*12130	8740			*10470	7740	6.59	5740	7.98
	lb	*45830	*45830	*35430	29410	*26740	19270			*23080	17060	(21.6)	12650	(26.2)
-4.5 m (-14.8 ft)	kg	*20570	*20570	*15170	13270	*11400	8650					*9590	7380	6.76
	lb	*45350	*45350	*33440	29260	*25130	19070					*21140	16270	(22.2)

Note 1. Lifting capacity are based on ISO 10567.

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3. The Lift-point is bucket pivot mounting pin on the arm (without bucket mass).

4. *Indicates load limited by hydraulic capacity.

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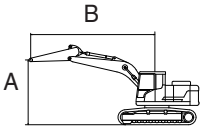
Make adjustments to the rated load as necessory for non-standard configurations.

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3	HD MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6150	2500	6600	600	-	-	-	-	-

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



Lift-point height (A)		Lift-point radius (B)										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		Capacity		Reach
														m (ft)
7.5 m (24.6 ft)	kg lb					*9030 *19910	*9030 *19910			*9160 *20190	8910 19640	6.53 (21.4)	*5610 *12370	7.74 (25.4)
6.0 m (19.7 ft)	kg lb					*9380 *20680	*9380 *20680	*9030 *19910	7020 15480	*9040 *19930	6940 15300	7.55 (24.8)	*5430 *11970	8.62 (28.3)
4.5 m (14.8 ft)	kg lb			*13270 *29260	*13270 *29260	*10570 *23300	9730 21450	*9350 *20610	6890 15190	8900 19620	5980 13180	8.17 (26.8)	5010 11050	9.17 (30.1)
3.0 m (9.8 ft)	kg lb					*12080 *26630	9220 20330	10000 22050	6660 14680	8250 18190	5520 12170	8.48 (27.8)	4670 10300	9.44 (31.0)
1.5 m (4.9 ft)	kg lb					*13370 *29480	8790 19380	9760 21520	6440 14200	8080 17810	5370 11840	8.51 (27.9)	4560 10050	9.47 (31.1)
0.0 m (0.0 ft)	kg lb			*19180 *42280	12960 28570	13430 29610	8550 18850	9600 21160	6300 13890	8350 18410	5520 12170	8.27 (27.1)	4650 10250	9.25 (30.4)
-1.5 m (-4.9 ft)	kg lb	*15260 *33640	*15260 *33640	*18460 *40700	12980 28620	13370 29480	8500 18740	9590 21140	6280 13850	9210 20300	6060 13360	7.72 (25.3)	4990 11000	8.77 (28.8)
-3.0 m (-9.8 ft)	kg lb	*22150 *48830	*22150 *48830	*16610 *36620	13200 29100	*12560 *27690	8630 19030			*10590 *23350	7310 16120	6.81 (22.3)	5740 12650	7.98 (26.2)
-4.5 m (-14.8 ft)	kg lb			*12680 *27950	*12680 *27950					*10380 *22880	*10380 *22880	5.31 (17.4)	7380 16270	6.76 (22.2)

Note 1. Lifting capacity are based on ISO 10567.

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Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3	HD MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6450	2200	6600	600	-	-	-	-	-

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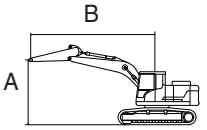

Lift-point height (A)		Lift-point radius (B)										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		Capacity		Reach
														m (ft)
7.5 m (24.6 ft)	kg					*9180	*9180			*9310	8400	6.71	*5610	7.74
	lb					*20240	*20240			*20530	18520	(22.0)	*12370	(25.4)
6.0 m (19.7 ft)	kg					*9670	*9670	*9060	6940	*9100	6610	7.71	*5430	8.62
	lb					*21320	*21320	*19970	15300	*20060	14570	(25.3)	*11970	(28.3)
4.5 m (14.8 ft)	kg					*10920	9510	*9430	6780	8560	5730	8.32	5010	9.17
	lb					*24070	20970	*20790	14950	18870	12630	(27.3)	11050	(30.1)
3.0 m (9.8 ft)	kg					*12400	8990	9870	6540	7970	5310	8.62	4670	9.44
	lb					*27340	19820	21760	14420	17570	11710	(28.3)	10300	(31.0)
1.5 m (4.9 ft)	kg					13480	8600	9640	6330	7820	5180	8.65	4560	9.47
	lb					29720	18960	21250	13960	17240	11420	(28.4)	10050	(31.1)
0.0 m (0.0 ft)	kg					13260	8410	9500	6200	8080	5330	8.41	4650	9.25
	lb					29230	18540	20940	13670	17810	11750	(27.6)	10250	(30.4)
-1.5 m (-4.9 ft)	kg			*17770	12890	13250	8390	9510	6210	8900	5850	7.88	4990	8.77
	lb			*39180	28420	29210	18500	20970	13690	19620	12900	(25.8)	11000	(28.8)
-3.0 m (-9.8 ft)	kg	*19930	*19930	*15860	13120	*12230	8550			*9900	7020	6.98	5740	7.98
	lb	*43940	*43940	*34970	28920	*26960	18850			*21830	15480	(22.9)	12650	(26.2)
-4.5 m (-14.8 ft)	kg			*12060	*12060					*9290	*9290	5.54	7380	6.76
	lb			*26590	*26590					*20480	*20480	(18.2)	16270	(22.2)

Note 1. Lifting capacity are based on ISO 10567.

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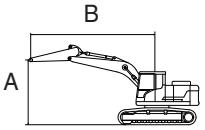
Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3	HD MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6450	2500	6600	600	-	-	-	-	-

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



Lift-point height (A)		Lift-point radius (B)										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		Capacity		Reach
														m (ft)
7.5 m (24.6 ft)	kg									*8740	8060	6.93	*5610	7.74
	lb									*19270	17770	(22.7)	*12370	(25.4)
6.0 m (19.7 ft)	kg					*9240	*9240	*8640	7000	*8630	6400	7.90	*5430	8.62
	lb					*20370	*20370	*19050	15430	*19030	14110	(25.9)	*11970	(28.3)
4.5 m (14.8 ft)	kg			*13590	*13590	*10510	9580	*9120	6810	8310	5570	8.49	5010	9.17
	lb			*29960	*29960	*23170	21120	*20110	15010	18320	12280	(27.9)	11050	(30.1)
3.0 m (9.8 ft)	kg					*12040	9030	*9850	6550	7730	5150	8.79	4670	9.44
	lb					*26540	19910	*21720	14440	17040	11350	(28.8)	10300	(31.0)
1.5 m (4.9 ft)	kg					*13280	8600	9630	6310	7580	5010	8.82	4560	9.47
	lb					*29280	18960	21230	13910	16710	11050	(28.9)	10050	(31.1)
0.0 m (0.0 ft)	kg			*17240	12700	13230	8370	9460	6160	7810	5140	8.58	4650	9.25
	lb			*38010	28000	29170	18450	20860	13580	17220	11330	(28.2)	10250	(30.4)
-1.5 m (-4.9 ft)	kg			*18080	12750	13170	8320	9440	6140	8540	5600	8.06	4990	8.77
	lb			*39860	28110	29030	18340	20810	13540	18830	12350	(26.4)	11000	(28.8)
-3.0 m (-9.8 ft)	kg	*21320	*21320	*16370	12970	*12560	8440			*9980	6650	7.19	5740	7.98
	lb	*47000	*47000	*36090	28590	*27690	18610			*22000	14660	(23.6)	12650	(26.2)
-4.5 m (-14.8 ft)	kg			*13050	*13050					*9830	9270	5.80	7380	6.76
	lb			*28770	*28770					*21670	20440	(19.0)	16270	(22.2)

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Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3 HW	MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6450	2500	6000	700	-	-	-	-	-

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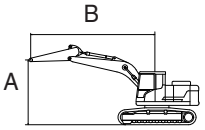

Lift-point height (A)		Lift-point radius (B)										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		Capacity		Reach
														m (ft)
7.5 m (24.6 ft)	kg									*8780	8530	7.15	*5610	7.74
	lb									*19360	18810	(23.5)	*12370	(25.4)
6.0 m (19.7 ft)	kg					*9520	*9520	*8780	7820	*8730	6970	8.04	*5430	8.62
	lb					*20990	*20990	*19360	17240	*19250	15370	(26.4)	*11970	(28.3)
4.5 m (14.8 ft)	kg			*14410	*14410	*10910	10660	*9350	7620	8630	6190	8.57	5010	9.17
	lb			*31770	*31770	*24050	23500	*20610	16800	19030	13650	(28.1)	11050	(30.1)
3.0 m (9.8 ft)	kg					*12460	10150	*10110	7370	8140	5810	8.81	4670	9.44
	lb					*27470	22380	*22290	16250	17950	12810	(28.9)	10300	(31.0)
1.5 m (4.9 ft)	kg					*13610	9770	10160	7160	8060	5730	8.79	4560	9.47
	lb					*30000	21540	22400	15790	17770	12630	(28.9)	10050	(31.1)
0.0 m (0.0 ft)	kg			*16680	14720	14010	9590	10030	7040	8400	5950	8.51	4650	9.25
	lb			*36770	32450	30890	21140	22110	15520	18520	13120	(27.9)	10250	(30.4)
-1.5 m (-4.9 ft)	kg	*12630	*12630	*18080	14800	*13740	9580	10040	7050	9310	6570	7.92	4990	8.77
	lb	*27840	*27840	*39860	32630	*30290	21120	22130	15540	20530	14480	(26.0)	11000	(28.8)
-3.0 m (-9.8 ft)	kg	*21020	*21020	*16140	15050	*12360	9740			*10150	7960	6.97	5740	7.98
	lb	*46340	*46340	*35580	33180	*27250	21470			*22380	17550	(22.9)	12650	(26.2)
-4.5 m (-14.8 ft)	kg			*12270	*12270					*9850	*9850	5.44	7380	6.76
	lb			*27050	*27050					*21720	*21720	(17.9)	16270	(22.2)

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Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3 HW	MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6450	3200	6000	700	-	-	-	-	-

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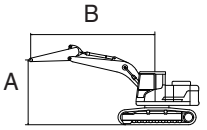

Lift-point height (A)		Lift-point radius (B)										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		Capacity		Reach
														m (ft)
9.0 m (29.5 ft)	kg lb											*6000 *13230	*6000 *13230	6.70 (22.0)
7.5 m (24.6 ft)	kg lb							*7510 *16560	*7510 *16560			*5560 *12260	*5560 *12260	7.94 (26.1)
6.0 m (19.7 ft)	kg lb							*7950 *17530	7950 17530			*5420 *11950	*5420 *11950	8.75 (28.7)
4.5 m (14.8 ft)	kg lb			*12650 *27890	*12650 *27890	*9970 *21980	*9970 *21980	*8660 *19090	7710 17000	*7170 *15810	5780 12740	*5480 *12080	*5480 *12080	9.24 (30.3)
3.0 m (9.8 ft)	kg lb			*16150 *35600	15780 34790	*11650 *25680	10310 22730	*9550 *21050	7430 16380	7910 17440	5650 12460	*5710 *12590	5220 11510	9.47 (31.1)
1.5 m (4.9 ft)	kg lb			*16720 *36860	14980 33030	*13070 *28810	9850 21720	10190 22470	7180 15830	7770 17130	5530 12190	*6150 *13560	5150 11350	9.45 (31.0)
0.0 m (0.0 ft)	kg lb			*17920 *39510	14680 32360	*13860 *30560	9590 21140	10010 22070	7010 15450	7690 16950	5450 12020	*6890 *15190	5300 11680	9.18 (30.1)
-1.5 m (-4.9 ft)	kg lb	*11970 *26390	*11970 *26390	*18720 *41270	14660 32320	13920 30690	9500 20940	9940 21910	6950 15320			8140 17950	5750 12680	8.65 (28.4)
-3.0 m (-9.8 ft)	kg lb	*18970 *41820	*18970 *41820	*17310 *38160	14820 32670	*13100 *28880	9570 21100	*10030 *22110	7040 15520			*9440 *20810	6710 14790	7.78 (25.5)
-4.5 m (-14.8 ft)	kg lb	*19520 *43030	*19520 *43030	*14460 *31880	*14460 *31880	*10740 *23680	9850 21720					*9580 *21120	8920 19670	6.46 (21.2)

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Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3 HW	MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6450	4050	6000	700	-	-	-	-	-

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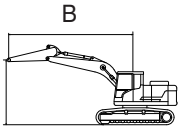


Lift-point height (A)		Lift-point radius (B)												At max. reach		
		1.5 m (4.9 ft)		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		Capacity		Reach
9.0 m (29.5 ft)	kg									*5410	*5410			*4440	*4440	7.81
	lb									*11930	*11930			*9790	*9790	(25.6)
7.5 m (24.6 ft)	kg													*4150	*4150	8.89
	lb													*9150	*9150	(29.2)
6.0 m (19.7 ft)	kg									*6920	*6920	*6120	5940	*4060	*4060	9.62
	lb									*15260	*15260	*13490	13100	*8950	*8950	(31.6)
4.5 m (14.8 ft)	kg							*8650	*8650	*7720	*7720	*7200	5820	*4090	*4090	10.07
	lb							*19070	*19070	*17020	*17020	*15870	12830	*9020	*9020	(33.0)
3.0 m (9.8 ft)	kg					*14000	*14000	*10450	*10450	*8710	7480	*7740	5650	*4240	*4240	10.27
	lb					*30860	*30860	*23040	*23040	*19200	16490	*17060	12460	*9350	*9350	(33.7)
1.5 m (4.9 ft)	kg					*17000	15200	*12130	9920	*9690	7170	7730	5480	*4520	4480	10.26
	lb					*37480	33510	*26740	21870	*21360	15810	17040	12080	*9960	9880	(33.7)
0.0 m (0.0 ft)	kg			*6950	*6950	*18570	14620	*13290	9540	9940	6940	7590	5340	*4980	4580	10.01
	lb			*15320	*15320	*40940	32230	*29300	21030	21910	15300	16730	11770	*10980	10100	(32.9)
-1.5 m (-4.9 ft)	kg	*7190	*7190	*10660	*10660	*18870	14430	13770	9350	9800	6810	7530	5280	*5730	4890	9.52
	lb	*15850	*15850	*23500	*23500	*41600	31810	30360	20610	21610	15010	16600	11640	*12630	10780	(31.2)
-3.0 m (-9.8 ft)	kg	*11190	*11190	*15500	*15500	*18140	14480	*13490	9330	9790	6800			*7040	5540	8.75
	lb	*24670	*24670	*34170	*34170	*39990	31920	*29740	20570	21580	14990			*15520	12210	(28.7)
-4.5 m (-14.8 ft)	kg	*16070	*16070	*22390	*22390	*16210	14730	*12150	9480	*9020	6970			*8800	6860	7.60
	lb	*35430	*35430	*49360	*49360	*35740	32470	*26790	20900	*19890	15370			*19400	15120	(24.9)
-6.0 m (-19.7 ft)	kg					*12230	*12230							*8800	*8800	5.85
	lb					*26960	*26960							*19400	*19400	(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.

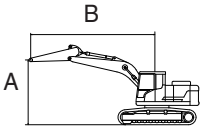
3. The Lift-point is bucket pivot mounting pin on the arm (without bucket mass).

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 HD Hyundai Construction Equipment 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.

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3 HW	HD MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6150	2200	6000	700	-	-	-	-	-

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



Lift-point height (A)		Lift-point radius (B)										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		Capacity		Reach
														m (ft)
7.5 m (24.6 ft)	kg					*9570	*9570			*9710	*9710	6.55	*5610	7.74
	lb					*21100	*21100			*21410	*21410	(21.5)	*12370	(25.4)
6.0 m (19.7 ft)	kg					*10020	*10020	*9530	7760	*9540	7730	7.51	*5430	8.62
	lb					*22090	*22090	*21010	17110	*21030	17040	(24.6)	*11970	(28.3)
4.5 m (14.8 ft)	kg					*11260	10710	*9800	7630	9460	6770	8.08	5010	9.17
	lb					*24820	23610	*21610	16820	20860	14930	(26.5)	11050	(30.1)
3.0 m (9.8 ft)	kg					*12710	10220	*10430	7410	8880	6330	8.34	4670	9.44
	lb					*28020	22530	*22990	16340	19580	13960	(27.4)	10300	(31.0)
1.5 m (4.9 ft)	kg					*13780	9860	10240	7220	8800	6250	8.32	4560	9.47
	lb					*30380	21740	22580	15920	19400	13780	(27.3)	10050	(31.1)
0.0 m (0.0 ft)	kg					*14130	9690	10140	7130	9240	6540	8.01	4650	9.25
	lb					*31150	21360	22350	15720	20370	14420	(26.3)	10250	(30.4)
-1.5 m (-4.9 ft)	kg			*17890	14960	*13590	9700			10430	7340	7.39	4990	8.77
	lb			*39440	32980	*29960	21380			22990	16180	(24.3)	11000	(28.8)
-3.0 m (-9.8 ft)	kg	*19990	*19990	*15460	15250	*11510	9940			*10430	9220	6.36	5740	7.98
	lb	*44070	*44070	*34080	33620	*25380	21910			*22990	20330	(20.9)	12650	(26.2)

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.

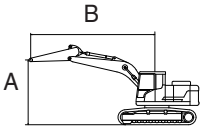
3. The Lift-point is bucket pivot mounting pin on the arm (without bucket mass).

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 HD Hyundai Construction Equipment 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.

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3 HW	HD MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6150	2500	6000	700	-	-	-	-	-

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



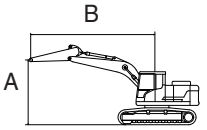
Lift-point height (A)		Lift-point radius (B)										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		9.0 m (29.5 ft)		Capacity		Reach
														m (ft)
7.5 m (24.6 ft)	kg					*9000	*9000			*9110	*9110	6.76	*5610	7.74
	lb					*19840	*19840			*20080	*20080	(22.2)	*12370	(25.4)
6.0 m (19.7 ft)	kg					*9560	*9560	*9030	7830	*9040	7480	7.70	*5430	8.62
	lb					*21080	*21080	*19910	17260	*19930	16490	(25.3)	*11970	(28.3)
4.5 m (14.8 ft)	kg			*13920	*13920	*10850	10770	*9470	7660	*9150	6570	8.25	5010	9.17
	lb			*30690	*30690	*23920	23740	*20880	16890	*20170	14480	(27.1)	11050	(30.1)
3.0 m (9.8 ft)	kg					*12370	10260	*10170	7420	8620	6140	8.51	4670	9.44
	lb					*27270	22620	*22420	16360	19000	13540	(27.9)	10300	(31.0)
1.5 m (4.9 ft)	kg					*13550	9860	10230	7210	8530	6050	8.49	4560	9.47
	lb					*29870	21740	22550	15900	18810	13340	(27.8)	10050	(31.1)
0.0 m (0.0 ft)	kg			*19120	14770	*14060	9650	10090	7080	8910	6300	8.19	4650	9.25
	lb			*42150	32560	*31000	21270	22240	15610	19640	13890	(26.9)	10250	(30.4)
-1.5 m (-4.9 ft)	kg	*17520	*17520	*18200	14840	*13710	9620	10120	7110	9970	7010	7.58	4990	8.77
	lb	*38620	*38620	*40120	32720	*30230	21210	22310	15670	21980	15450	(24.9)	11000	(28.8)
-3.0 m (-9.8 ft)	kg	*21370	*21370	*16080	15100	*12090	9810			*10610	8680	6.57	5740	7.98
	lb	*47110	*47110	*35450	33290	*26650	21630			*23390	19140	(21.6)	12650	(26.2)

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 HD Hyundai Construction Equipment 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.

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3 HW	HD MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6450	2200	6000	700	-	-	-	-	-

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



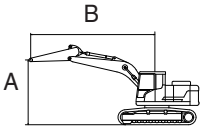
Lift-point height (A)		Lift-point radius (B)								At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		Capacity		Reach
												m (ft)
9.0 m (29.5 ft)	kg									*9860	*9860	5.47
	lb									*21740	*21740	(18.0)
7.5 m (24.6 ft)	kg					*9190	*9190			*9240	8850	6.94
	lb					*20260	*20260			*20370	19510	(22.8)
6.0 m (19.7 ft)	kg					*9860	*9860	*9080	7740	*9090	7150	7.85
	lb					*21740	*21740	*20020	17060	*20040	15760	(25.8)
4.5 m (14.8 ft)	kg					*11200	10540	*9550	7550	8840	6310	8.40
	lb					*24690	23240	*21050	16640	19490	13910	(27.6)
3.0 m (9.8 ft)	kg					*12660	10020	*10230	7300	8320	5920	8.65
	lb					*27910	22090	*22550	16090	18340	13050	(28.4)
1.5 m (4.9 ft)	kg					*13660	9660	10110	7100	8250	5850	8.63
	lb					*30120	21300	22290	15650	18190	12900	(28.3)
0.0 m (0.0 ft)	kg					13940	9510	10000	6990	8630	6090	8.33
	lb					30730	20970	22050	15410	19030	13430	(27.3)
-1.5 m (-4.9 ft)	kg			*17490	14740	*13450	9520	10040	7040	9640	6770	7.74
	lb			*38560	32500	*29650	20990	22130	15520	21250	14930	(25.4)
-3.0 m (-9.8 ft)	kg	*19290	*19290	*15330	15020	*11770	9730			*9870	8330	6.75
	lb	*42530	*42530	*33800	33110	*25950	21450			*21760	18360	(22.2)
-4.5 m (-14.8 ft)	kg			*13270	*13270					*10000	9380	5.80
	lb			*29260	*29260					*22050	20680	(19.0)

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

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

Model	Type	Boom	Arm	Counterweight	Shoe	Wheel	Dozer		Outtriger	
HX350LT3 HW	HD MONO BOOM	Length [mm]	Length [mm]	weight [kg]	width [mm]	width [mm]	Front	Rear	Front	Rear
		6450	2500	6000	700	-	-	-	-	-

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



Lift-point height (A)		Lift-point radius (B)								At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.8 ft)		6.0 m (19.7 ft)		7.5 m (24.6 ft)		Capacity		Reach
												m (ft)
7.5 m (24.6 ft)	kg									*8700	8510	7.15
	lb									*19180	18760	(23.4)
6.0 m (19.7 ft)	kg					*9440	*9440	*8690	7790	*8640	6930	8.04
	lb					*20810	*20810	*19160	17170	*19050	15280	(26.4)
4.5 m (14.8 ft)	kg			*14270	*14270	*10800	10610	*9250	7570	8580	6130	8.57
	lb			*31460	*31460	*23810	23390	*20390	16690	18920	13510	(28.1)
3.0 m (9.8 ft)	kg					*12320	10060	*9990	7310	8080	5740	8.81
	lb					*27160	22180	*22020	16120	17810	12650	(28.9)
1.5 m (4.9 ft)	kg					*13440	9660	10100	7080	8000	5660	8.79
	lb					*29630	21300	22270	15610	17640	12480	(28.8)
0.0 m (0.0 ft)	kg			*18780	14520	*13880	9460	9950	6950	8330	5870	8.51
	lb			*41400	32010	*30600	20860	21940	15320	18360	12940	(27.9)
-1.5 m (-4.9 ft)	kg	*14350	*14350	*17830	14610	*13550	9450	9960	6950	9230	6480	7.92
	lb	*31640	*31640	*39310	32210	*29870	20830	21960	15320	20350	14290	(26.0)
-3.0 m (-9.8 ft)	kg	*20680	*20680	*15900	14860	*12180	9610			*10000	7860	6.97
	lb	*45590	*45590	*35050	32760	*26850	21190			*22050	17330	(22.9)
-4.5 m (-14.8 ft)	kg			*12050	*12050					*9680	*9680	5.44
	lb			*26570	*26570					*21340	*21340	(17.9)

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

※ Lifting capacities are based upon a standard machine conditions.
Lifting capacities will vary with different work tools, ground conditions and attachments.
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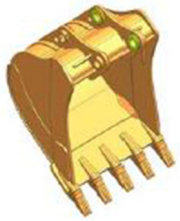
Failure to comply to the rated load can cause possible personal injury or property damage.
Make adjustments to the rated load as necessory for non-standard configurations.

6. BUCKET SELECTION GUIDE

1) HX350LT3

(1) 6000 kg counterweight

General bucket



Heavy duty
(without side cutter)

Rock heavy duty

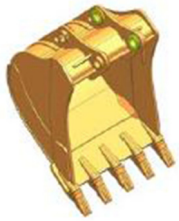
Type	Capacity		Width	Weight	Tooth	MONO						
						Recommendation mm (ft-in)						
	SAE Heaped	CECE heaped				6.15 m (20' 2") HD Short Boom		6.45 m (21' 2") Boom			6.45 m (21' 2") HD Boom	
	m^3 (yd^3)	m^3 (yd^3)	mm (in)	kg (lb)	EA	2.2 m (7' 3") Arm	2.5 m (8' 2") Arm	2.5 m (8' 2") Arm	3.2 m (10' 6") Arm	4.05 m (13' 3") Arm	2.2 m (7' 3") Arm	2.5 m (8' 2") Arm
General bucket	1.44 (1.88)	1.25 (1.63)	1,380 (54.3")	1,150 (2,540)	5	●	●	●	●	◐	●	●
	1.74 (2.28)	1.50 (1.96)	1,620 (63.8")	1,260 (2,780)	6	●	●	◐	■	▲	◐	◐
	2.10 (2.75)	1.80 (2.35)	1,910 (75.2")	1,650 (3,640)	6	■	■	■	▲	X	■	■
Heavy duty	1.44 (1.88)	1.25 (1.63)	1,470 (57.9")	1,380 (3,040)	5	●	●	●	◐	■	●	●
	1.90 (2.49)	1.65 (2.16)	1,600 (63.0")	1,780 (3,920)	5	◐	◐	■	▲	X	■	■
Rock heavy duty	1.44 (1.88)	1.25 (1.63)	1,470 (57.9")	1,470 (3,240)	5	●	●	●	◐	-	●	●
	1.60 (2.09)	1.39 (1.82)	1,585 (62.4")	1,650 (3,640)	5	●	●	◐	■	-	●	◐
	1.73 (2.26)	1.50 (1.96)	1,710 (67.3")	1,650 (3,640)	5	●	◐	◐	■	-	◐	◐

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

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

(2) 6600 kg counterweight

General bucket



Heavy duty
(without side cutter)

Rock heavy duty

Type	Capacity		Width	Weight	Tooth	MONO						
						Recommendation mm (ft-in)						
	SAE Heaped	CECE heaped				6.15 m (20' 2") HD Short Boom		6.45 m (21' 2") Boom			6.45 m (21' 2") HD Boom	
	m^3 (yd^3)	m^3 (yd^3)	mm (in)	kg (lb)	EA	2.2 m (7' 3") Arm	2.5 m (8' 2") Arm	2.5 m (8' 2") Arm	3.2 m (10' 6") Arm	4.05 m (13' 3") Arm	2.2 m (7' 3") Arm	2.5 m (8' 2") Arm
General bucket	1.44 (1.88)	1.25 (1.63)	1,380 (54.3")	1,150 (2,540)	5	●	●	●	●	◐	●	●
	1.74 (2.28)	1.50 (1.96)	1,620 (63.8")	1,260 (2,780)	6	●	●	●	◐	■	●	●
	2.10 (2.75)	1.80 (2.35)	1,910 (75.2")	1,650 (3,640)	6	◐	◐	■	▲	X	■	■
Heavy duty	1.44 (1.88)	1.25 (1.63)	1,470 (57.9")	1,380 (3,040)	5	●	●	●	●	■	●	●
	1.90 (2.49)	1.65 (2.16)	1,600 (63.0")	1,780 (3,920)	5	◐	◐	◐	■	▲	◐	◐
Rock heavy duty	1.44 (1.88)	1.25 (1.63)	1,470 (57.9")	1,470 (3,240)	5	●	●	●	●	-	●	●
	1.60 (2.09)	1.39 (1.82)	1,585 (62.4")	1,650 (3,640)	5	●	●	●	◐	-	●	●
	1.73 (2.26)	1.50 (1.96)	1,710 (67.3")	1,650 (3,640)	5	●	●	◐	■	-	◐	◐

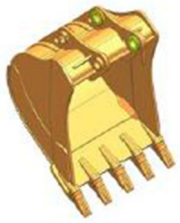
● Applicable for materials with density of 2100 kg/m^3 (3500 lb/yd^3) or less
◐ Applicable for materials with density of 1800 kg/m^3 (3000 lb/yd^3) or less
■ Applicable for materials with density of 1500 kg/m^3 (2500 lb/yd^3) or less
▲ Applicable for materials with density of 1200 kg/m^3 (2000 lb/yd^3)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

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

2) HX350LT3, HW

(1) 6000 kg counterweight

General bucket



Heavy duty
(without side cutter)

Rock heavy duty

Type	Capacity		Width	Weight	Tooth	MONO						
						Recommendation mm (ft-in)						
	SAE Heaped	CECE heaped				6.15 m (20' 2") HD Short Boom		6.45 m (21' 2") Boom			6.45 m (21' 2") HD Boom	
	m^3 (yd^3)	m^3 (yd^3)	mm (in)	kg (lb)	EA	2.2 m (7' 3") Arm	2.5 m (8' 2") Arm	2.5 m (8' 2") Arm	3.2 m (10' 6") Arm	4.05 m (13' 3") Arm	2.2 m (7' 3") Arm	2.5 m (8' 2") Arm
General bucket	1.44 (1.88)	1.25 (1.63)	1,380 (54.3")	1,150 (2,540)	5	●	●	●	●	●	●	●
	1.74 (2.28)	1.50 (1.96)	1,620 (63.8")	1,260 (2,780)	6	●	●	●	●	◐	●	●
	2.10 (2.75)	1.80 (2.35)	1,910 (75.2")	1,650 (3,640)	6	●	●	◐	■	▲	◐	◐
Heavy duty	1.44 (1.88)	1.25 (1.63)	1,470 (57.9")	1,380 (3,040)	5	●	●	●	●	●	●	●
	1.90 (2.49)	1.65 (2.16)	1,600 (63.0")	1,780 (3,920)	5	●	●	●	◐	■	●	●
Rock heavy duty	1.44 (1.88)	1.25 (1.63)	1,470 (57.9")	1,470 (3,240)	5	●	●	●	●	-	●	●
	1.60 (2.09)	1.39 (1.82)	1,585 (62.4")	1,650 (3,640)	5	●	●	●	●	-	●	●
	1.73 (2.26)	1.50 (1.96)	1,710 (67.3")	1,650 (3,640)	5	●	●	●	◐	-	●	●

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

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Consult your HD Hyundai Construction Equipment dealer for information on selecting the correct boom−arm−bucket combination.

(2) 6600 kg counterweight

General bucket

Heavy duty
(without side cutter)

Rock heavy duty

Type	Capacity		Width	Weight	Tooth	MONO						
						Recommendation mm (ft-in)						
	SAE Heaped	CECE heaped				6.15 m (20' 2") HD Short Boom		6.45 m (21' 2") Boom			6.45 m (21' 2") HD Boom	
	m^3 (yd^3)	m^3 (yd^3)	mm (in)	kg (lb)	EA	2.2 m (7' 3") Arm	2.5 m (8' 2") Arm	2.5 m (8' 2") Arm	3.2 m (10' 6") Arm	4.05 m (13' 3") Arm	2.2 m (7' 3") Arm	2.5 m (8' 2") Arm
General bucket	1.44 (1.88)	1.25 (1.63)	1,380 (54.3")	1,150 (2,540)	5	●	●	●	●	●	●	●
	1.74 (2.28)	1.50 (1.96)	1,620 (63.8")	1,260 (2,780)	6	●	●	●	●	◐	●	●
	2.10 (2.75)	1.80 (2.35)	1,910 (75.2")	1,650 (3,640)	6	●	●	●	◐	■	●	◐
Heavy duty	1.44 (1.88)	1.25 (1.63)	1,470 (57.9")	1,380 (3,040)	5	●	●	●	●	●	●	●
	1.90 (2.49)	1.65 (2.16)	1,600 (63.0")	1,780 (3,920)	5	●	●	●	◐	■	●	●
Rock heavy duty	1.44 (1.88)	1.25 (1.63)	1,470 (57.9")	1,470 (3,240)	5	●	●	●	●	-	●	●
	1.60 (2.09)	1.39 (1.82)	1,585 (62.4")	1,650 (3,640)	5	●	●	●	●	-	●	●
	1.73 (2.26)	1.50 (1.96)	1,710 (67.3")	1,650 (3,640)	5	●	●	●	●	-	●	●

● Applicable for materials with density of 2100 kg/m^3 (3500 lb/yd^3) or less
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Work tools and ground conditions have effects on machine performance.
Select an optimum combination according to the working conditions and the type of work that is being done.
Consult your HD Hyundai Construction Equipment dealer for information on selecting the correct boom−arm−bucket combination.

7. UNDERCARRIAGE

1) TYPES OF SHOES

Model	Description	Unit		Triple grouser								Double grouser	
	width	mm	(in)	600	(24)	700	(28)	800	(32)	900	(36)	700	(28)
HX350LT3	Operating weight	kg	(lb)	33680	(74096)	34260	(75372)	34650	(76230)	35040	(77088)	-	-
	Ground pressure	kgf/cm²	(psi)	0.65	(9.22)	0.57	(8.04)	0.50	(7.11)	0.45	(6.39)	-	-
	Overall width	mm	(ft-in)	3280	(10' 9")	3380	(11' 1")	3480	(11' 5")	3580	(11' 9")	-	-
	Link quantity	EA		48		48		48		48		-	
HX350LT3 HW	Operating weight	kg	(lb)	35540	(78350)	-	-	-	-	-	-	37100	(81620)
	Ground pressure	kgf/cm²	(psi)	0.68	(9.73)	-	-	-	-	-	-	0.61	8.69
	Overall width	mm	(ft-in)	3470	(11' 5")	-	-	-	-	-	-	3570	(11' 9")
	Link quantity	EA		48		-		-		-		48	

2) SELECTION OF TRACK SHOE

Suitable track shoes should be selected according to operating conditions.

Method of selecting shoes

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

Select the narrowest shoe possible to meet the required flotation and ground pressure. Application of wider shoes than recommendations will cause unexpected problem such as bending of shoes, crack of link, breakage of pin, loosening of shoe bolts and the other various problems.

Table 1

Track shoe	Specification	Category
600 mm triple grouser	Standard	A
700 mm triple grouser	Option	B
700 mm double grouser	Option	B
800 mm triple grouser	Option	C
900 mm triple grouser	Option	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	Cummins QSC 8.3
Type	4-cycle, turbocharged, charge air cooled, electronic controlled diesel engine
Cooling method	Water cooled
Number of cylinders and arrangement	6 cylinders, in-line
Firing order	1-5-3-6-2-4
Combustion chamber type	Direct injection type
Cylinder bore × stroke	114 × 135 mm (4.49" × 5.31")
Piston displacement	8.3 ℓ (506 cu in)
Compression ratio	16.5 : 1
Gross power	280 Hp (209 kW) at 2200 rpm
Net power	275 Hp (205 kW) at 2200 rpm
Maximum torque	138 kgf ·m (1000 lbf·ft) at 1500 rpm
Engine oil quantity	35 ℓ (9.2 U.S. gal)
Wet weight	723 kg (1594 lb)
Starting motor	24 V-7.8 kW
Alternator	24 V-95 A

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 175 cc/rev
Rated oil flow	2 × 306.3 ℓ/min (80.9 U.S. gpm / 67.4 U.K. gpm)
Rated speed	1750 rpm

3) GEAR PUMP

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

4) MAIN CONTROL VALVE

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

[ ] : Power boost

5) SWING MOTOR

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

6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Capacity	282.6/156.9 cc/rev
Relief pressure	350 kgf/cm^2 (4980 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	134 kgf · m (969 lbf · ft)
Brake release pressure	13.2~17.0 kgf/cm^2 (188~242 psi)
Reduction gear type	2-stage planetary

7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Stroke	Ø150 × 1480 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Stroke	Ø160 × 1685 mm Ø170 × 1685 mm (6.15 m, 6.45m HD boom only)
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Stroke	Ø140 × 1285 mm Ø145 × 1285 mm (2.20 m arm only)
	Cushion	Extend only

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

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

9. RECOMMENDED OILS

HD Hyundai Construction Equipment genuine lubricating oils have been developed to offer the best performance and service life for your equipment. These oils have been tested according to the specifications of HD Hyundai Construction Equipment and, therefore, will meet the highest safety and quality requirements.
We recommend that you use only HD Hyundai Construction Equipment genuine lubricating oils and grease officially approved by HD Hyundai Construction Equipment.

Service point	Kind of fluid	Capacity ℓ (U.S. gal)	Ambient temperature °C(°F) -50 (-58) -30 (-22) -20 (-4) -10 (14) 0 (32) 10 (50) 20 (68) 30 (86) 40 (104)
Engine oil pan	Engine oil	30 (7.9)	★SAE 5W-40 SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	11 (2.91)	★SAE 75W-90
Final drive		7.8×2 (2.1×2)	SAE 80W-90
Hydraulic tank	Hydraulic oil	Tank : 210 (55.5) System : 414 (107)	★ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	600 (159)	★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	55 (14.5)	Ethylene glycol base permanent type (50 : 50) ★Ethylene glycol base permanent type (60 : 40)

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

★ : Cold region
Russia, CIS, Mongolia

★1 : Soft water
City water or distilled water

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

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

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

1. SELECTING HYDRAULIC BREAKER

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

1) Become familiar with the manual and select breakers suitable to machine specifications.

2) Make careful selection in consideration of oil quantity, pressure and striking force, to enable satisfied performance.

3) When apply a breaker to the machine, consult your local dealer of HD Hyundai Construction Equipment for further explanation.

2. CIRCUIT CONFIGURATION

1) As for breaker oil pressure line, use extra spool of main control valve.
2) Set proper breaker pressure on load relief valve.

※ **The initial setting pressure of load relief valve for breaker is 200 bar.**

3) The pressure of the HX350LT3 system is 350 kgf/cm^2 (4980 psi).
4) The accumulator should be used to the breaker charging and return line.
   If the accumulator is not used, it will be damage as the input wave is delivered.

※ **Keep the pressure pulsation of pump below 60 kgf/cm^2 (853 psi) by installing the accumulator.**

5) Do not connect the breaker return line to the main control, but connect to the return line front of the cooler.
6) Do not connect the breaker return line to drain lines, such as of swing motor, travel motor or pump, otherwise they should be damaged.
7) One of spool of the main control valve should be connected to the tank.
8) Select the size of pipe laying considering the back pressure.
9) Shimless tube should be used for the piping. The hose and seal should be used HD Hyundai Construction Equipment genuine parts.
10) Weld the bracket for pipe clamp to prevent damage caused by vibration.

3. MAINTENANCE

1) MAINTENANCE OF HYDRAULIC OIL AND FILTER

(1) As machine with an hydraulic breaker provides the hydraulic oil becomes severely contaminated.

(2) So, unless frequently maintained, the machine may easily go out of order.

(3) Inspect and maintain hydraulic oil and 3 kinds of filter elements in particular, in order to prolong machine life.

2) RELEASE THE PRESSURE IN BREAKER CIRCUIT

When breaker operating is finished, stop engine and push pedal or switch for breaker to release pressure in breaker circuit.

If pressure still remains, the lifetime of the diaphragm in the accumulator will be shortened.

3) Be careful to prevent contamination by dust, sand and etc.

If such pollution become mixed into the oil, the pump moving parts will wear abnormally, shorten lifetime and become damaged.

4) When operating breaker, bolts and nuts of main equipment may be loosened by vibration. So, it must be inspected periodically.

Service interval

unit : hours

Attachment	Operating rate	Hydraulic oil	Filter element
Breaker	100 %	600★1	200
		1000★2	

★1 : Conventional hydraulic oil

★2 : HD Hyundai Construction Equipment genuine long life hydraulic oil

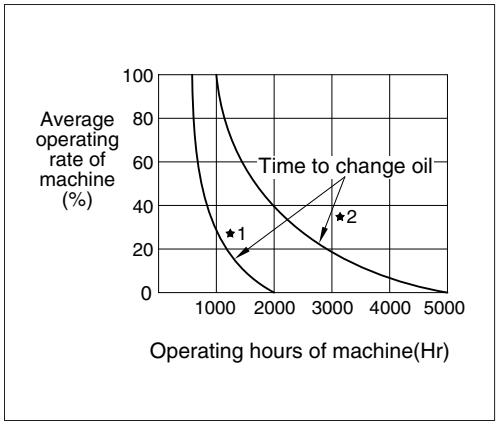
● **Replace following filter same time**

· Hydraulic return filter : 1 EA

· Pilot line filter : 1 EA

· Drain filter cartridge : 1 EA

Hyd oil change guide for hydraulic breaker



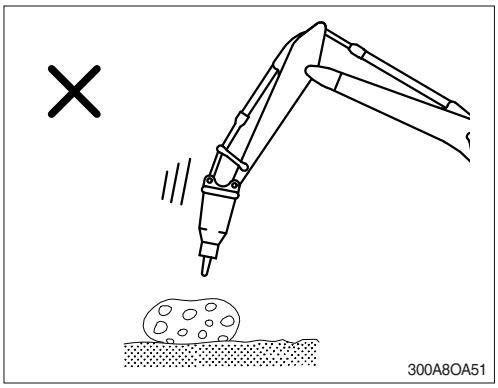
★1 : Conventional hydraulic oil

★2 : HD Hyundai Construction Equipment genuine long life hydraulic oil

4. PRECAUTIONS WHILE OPERATING THE BREAKER

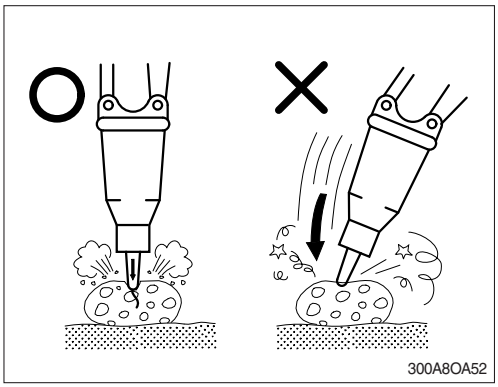
DO NOT BREAK ROCK WHILE LOWERING

As the breaker is heavy in comparison with bucket, it must be operated slowly.
If breaker is rapidly pushed down, working device may be damaged.



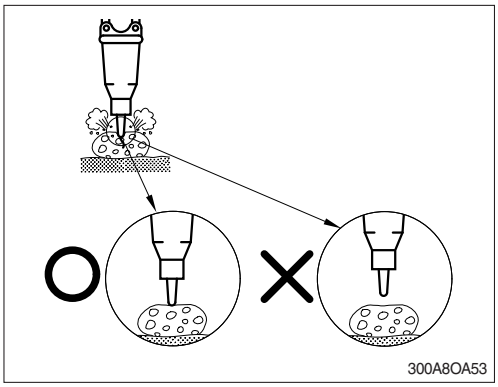
DIRECTION OF THRUST

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

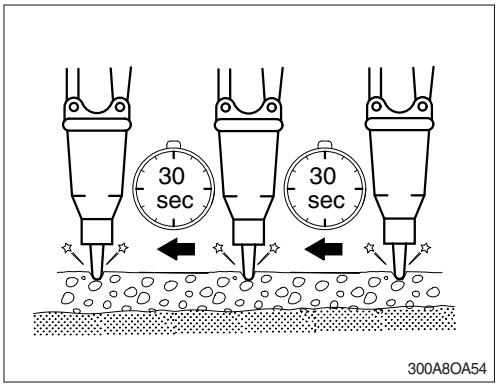


PROPER THRUST

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

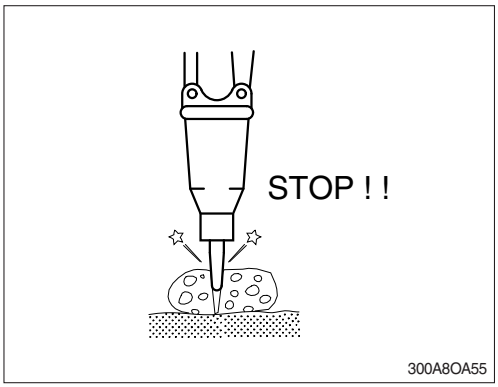


Move the impact point from the edge to the interior. Never try to break off a too large block, if the object has not broken within 30 seconds. The object should be broken up piece by piece in small blocks. Large distance steps will not improve working results.
Operating the breaker longer than 30 seconds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



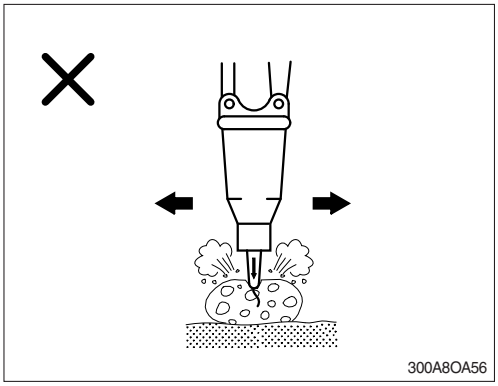
BLANKS THRUST

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



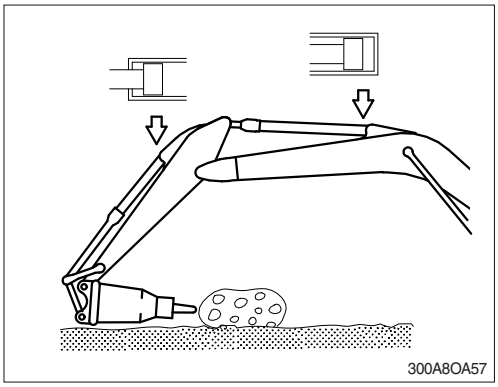
DO NOT MOVE MACHINE OR BREAKER WHILE STRIKING

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



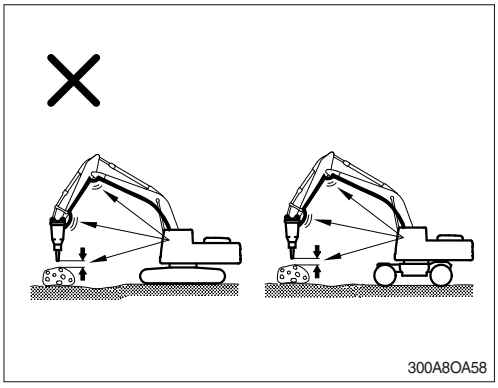
OPERATE BREAKER WITH A GAP IN EXCESS OF 100 mm (4 inches) FROM THE END OF THE STROKE TIP

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



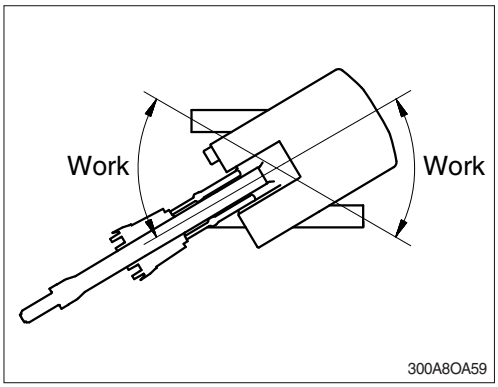
STOP THE OPERATION IMMEDIATELY IF HOSES VIBRATE EXCESSIVELY

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

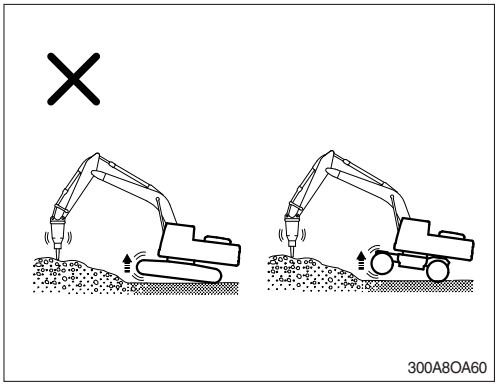


DO NOT WORK WHILE IN A SWING STATE

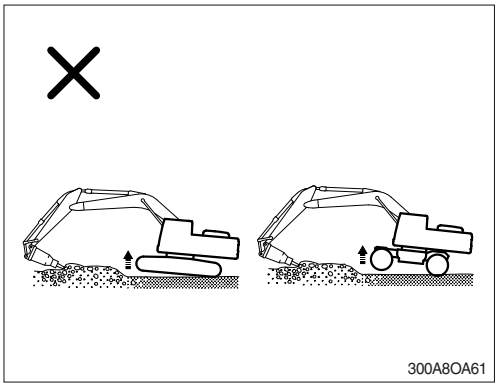
Do not work while swinging the upper structure. It cause oil leakage of the bend in the track shoe and rollers.



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

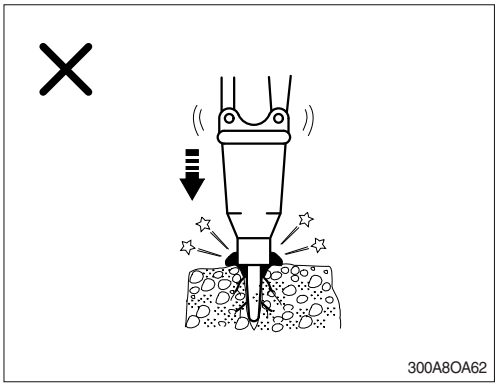


Do not extend the bucket cylinder fully and thrusting to raise the machine off the ground.



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

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



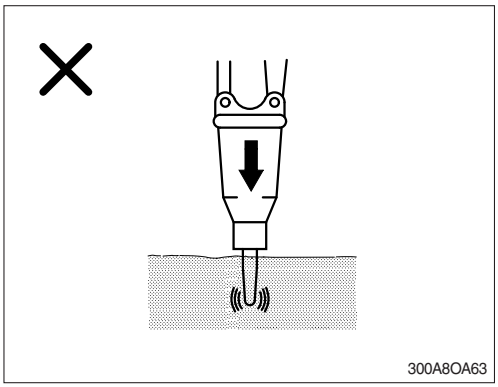
NEVER DRIVE THE CHISEL INTO THE GROUND

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

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

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

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

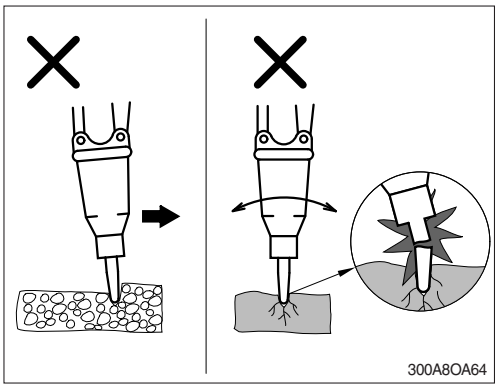


NEVER USE AS A LEVER

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

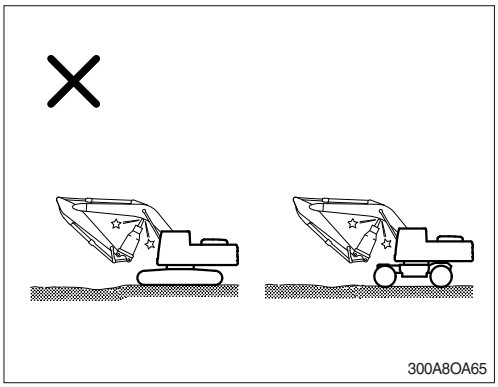
Under any circumstances, operating in this way is not permitted.

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



TAKE CARE OF CHISEL AND BOOM INTERFACE

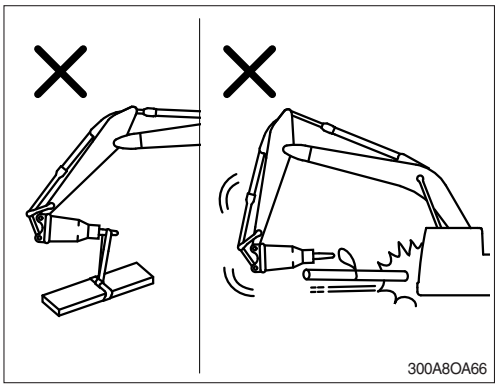
Be aware of clearance between breaker tip and the underside of boom as shown.



NEVER USE FOR LIFT OR TRANSPORT PURPOSES

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

This is dangerous and could damage the breaker or the chisel.

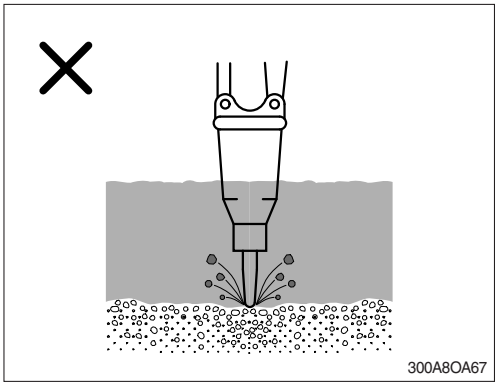


NEVER USE THE HYDRAULIC BREAKER UNDER WATER

The hydraulic breaker, as a standard assembly, never be used in or under water without prior conversion. If you use under water, water fills the impact chamber between the piston and the chisel, a strong hydraulic pressure wave is generated and will damage the seals in the breaker. And, in addition, corrosion, lack of lubrication or penetration of water could result in further damage to components of the breaker and the lower chassis.

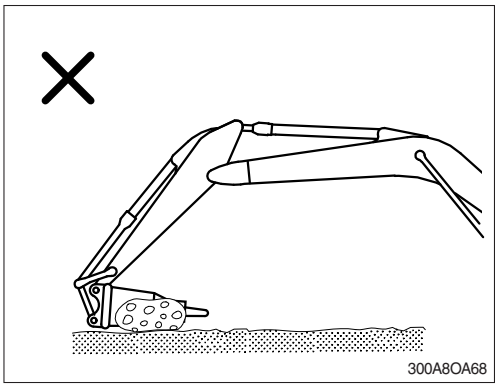
To operate the breaker under water, compressed air must be supplied into the breaker, into the impact chamber of the front-head, prior to use.

Consult your HD Hyundai Construction Equipment dealer for the underwater kit.



DO NOT USE BREAKER TO CARRY BROKEN STONE OR ROCK BY SWING OPERATING

This may damage the operation device and swing system.

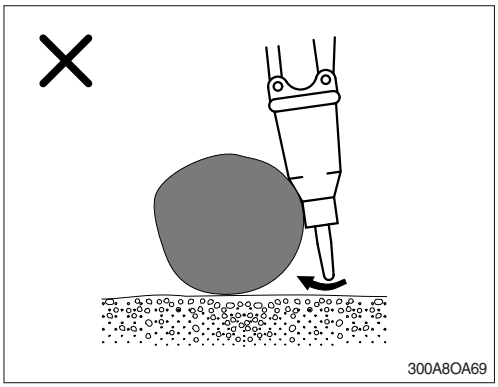


NEVER USE THE CHISEL OR HYDRAULIC BREAKER TO MOVE ROCKS OR OTHER OBJUCTS

The hydraulic breaker is not designed for this usage.

Do not use the breaker or chisel to roll, push the object or reposition the lower chassis.

This may cause damage to the breaker and the lower chassis.

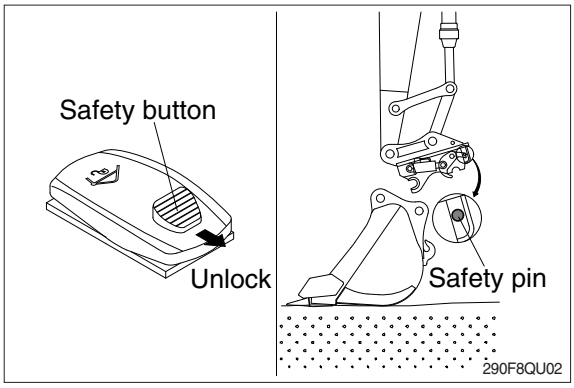


5. QUICK CLAMP

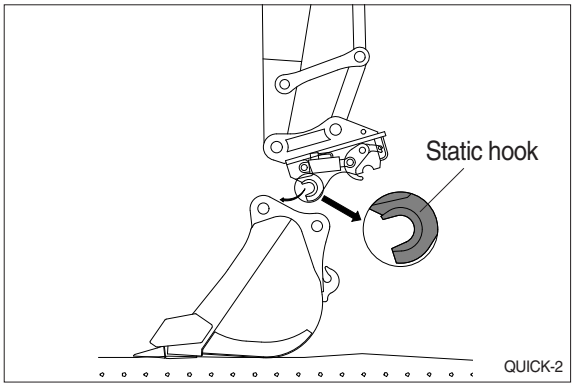
1) FIXING BUCKET WITH QUICK CLAMP

(1) Before fixing bucket, remove safety pin of the moving hook.

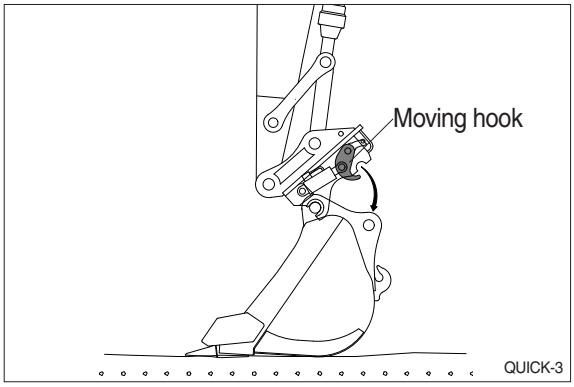
(2) Pulling safety button, press the quick clamp switch to unlock position. Then, the moving hook is placed on release position.



(3) Aligning the arm and bucket, insert static hook of quick clamp to the bucket pin.

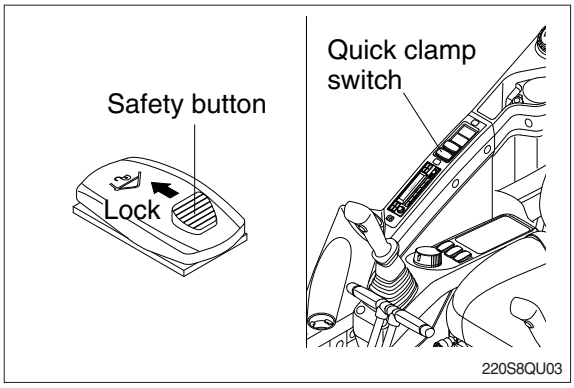


(4) Operate RCV lever to bucket-in position. Then, the moving hook is coupled with the bucket link pin.
Make sure that the moving hook is completely contacted with bucket link pin.

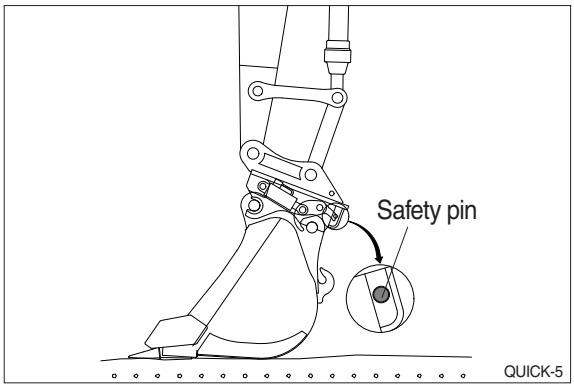


(5) Push safety button to lock position.
Operate RCV lever to bucket-in position.

※ **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.**



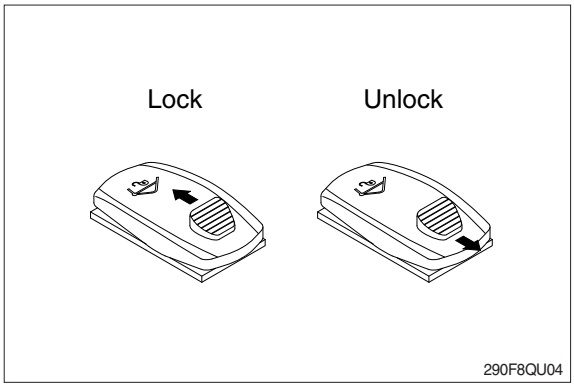
2) REMOVE BUCKET FROM QUICK CLAMP

Removing procedure is reverse of fixing.

3) PRECAUTION OF USING QUICK CLAMP

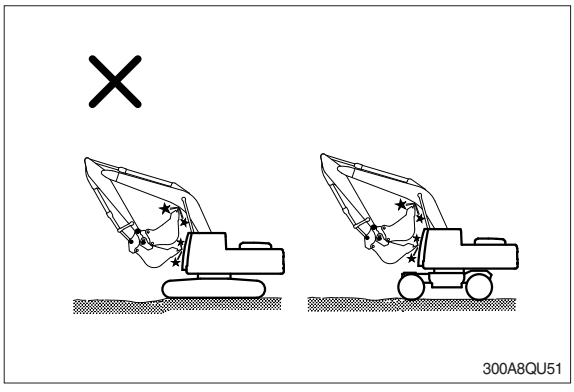
⚠ **When operating the machine with quick clamp, confirm that the quick clamp switch is lock position and safety pin of moving hook is inserted.**
Operating the machine with quick clamp switch unlocked and without safety pin of moving hook can cause the bucket to drop off and bring about the accident.

⚠ **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.**

HD Hyundai Construction Equipment will not be responsible for any injury or damage in case that safety pin is not installed properly.



INDEX

P

Q

R

S

T

U

V

W