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EC Declaration of Conformity

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

certifies that the construction equipment machinery.

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

2. Manufacturer	Hyundai Construction Equipment Co. Ltd. 12th, Fl., Hyundai Bldg. 75, Yulgok-ro, Jongno-Gu, Seoul, Republic of Korea
Authorized representative : Owner of the technical file for machine production	HYUNDAI CONSTRUCTION EQUIPMENT EUROPE N.V. VOSSENDAAL 11, 2440 GEEL BELGIUM

3. Harmonized European directives :	2006/42/EC (Machinery), 97/68/EC (Exhaust Gas Emission), 2004/108/EC (Electromagnetic Compatibility), 2000/14/EC (Noise Emission)
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4. Engine Manufacturer :	*****
Engine Type :	*****
Gross Power :	*** kW / **** rpm (SAE J1995)
Net Power :	*** kW / **** rpm (SAE J1349)

5. Noise level (Noise Emission Directive 2000/14/EC)

Certificate No :	*****
Issue Date :	DD/MM/YYYY
Conformity Assesment Procedure :	*****
Notified Body Involved :	*****

Measured Sound Power Level :	** dB(A)
Guaranteed Sound Power Level :	** dB(A)

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

Standard(s) :	*****

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

FOREWORD

This manual contains a number of instructions and safety recommendations regarding driving, handling, lubrication, maintenance, inspection and adjustment of the machine.

The manual is to promote safety maintenance and enhance machine performance.

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

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

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

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

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

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

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

The procedures and precautions given in this manual apply only to intended uses of the machine.

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

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

3. Use **genuine Hyundai spare parts** for the replacement of parts.

We expressly point out that Hyundai will not accept any responsibility for defects resulting from non-genuine parts or non workmanlike repair.

In such cases Hyundai cannot assume liability for any damage.

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

BEFORE SERVICING THIS MACHINE

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

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

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

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

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

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

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

All personnel must remain alert to potential hazards.

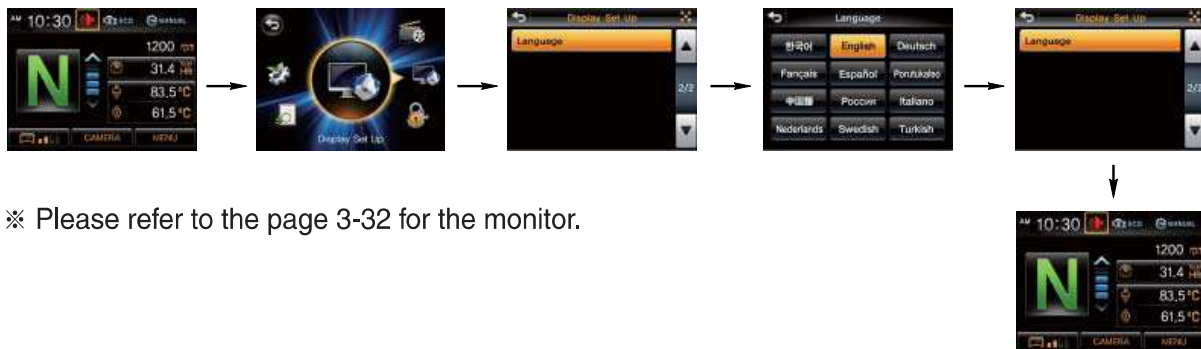
Work within your level of training and skill.

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

Use your common sense.

※ How to adjust the language of monitor

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



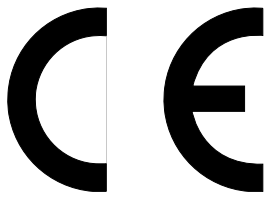
※ Please refer to the page 3-32 for the monitor.

TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR	
---	--

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

EC REGULATION APPROVED

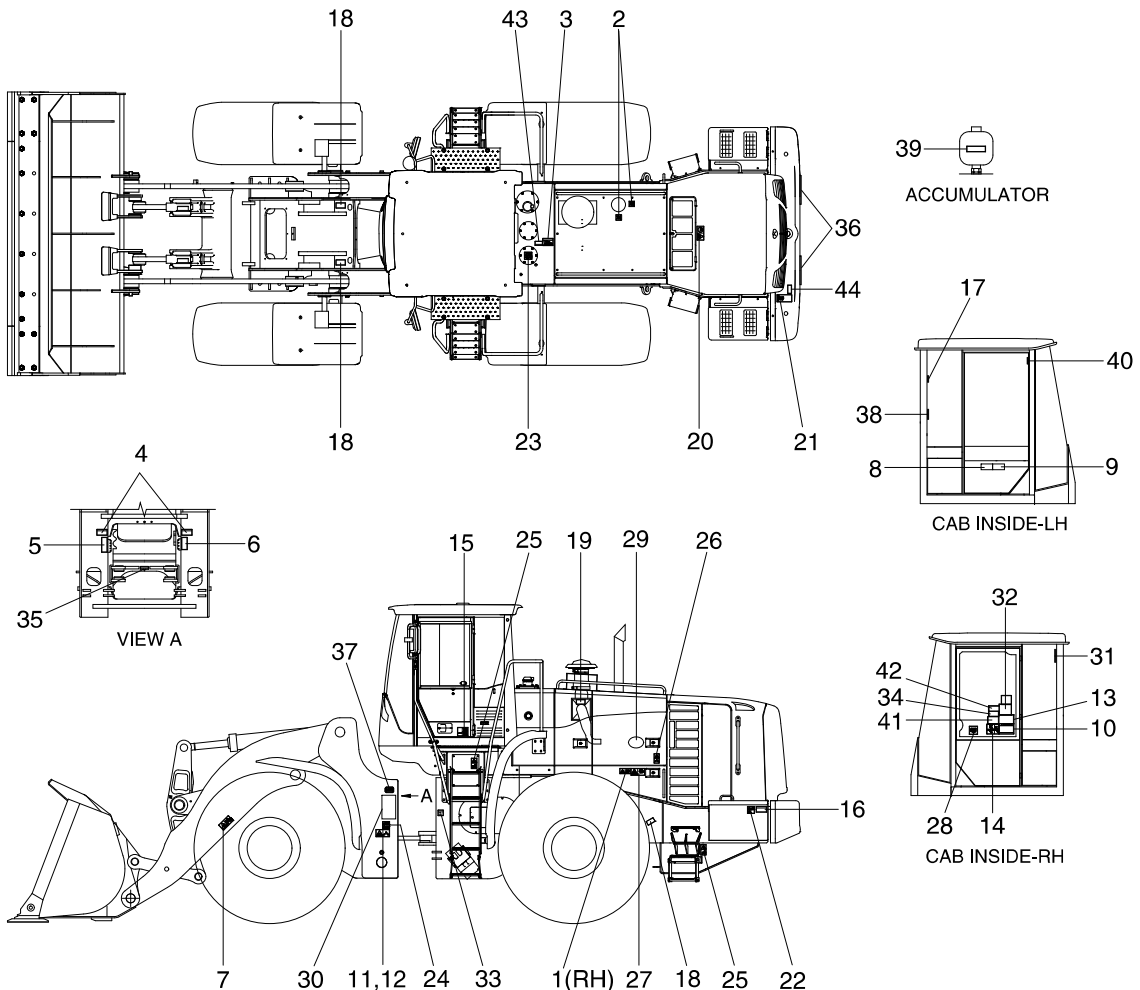
- Noise level (EN474-1 : 2006 and 2000/14/EC) are as followings.
LWA : 108 dB (EU only)
LPA : 75 dB
- The value of vibrations transmitted by the operator's seat are lower than standard value of (EN474-1 : 2006 and 2002/44/EC)



SAFETY LABELS

1. LOCATION

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



7809A0FW05

- | | | |
|---------------------------|-------------------------|-------------------------------|
| 1 Start motor | 16 Connector | 31 Fire extinguisher |
| 2 Turbocharger cover | 17 Hammer | 32 Start procedure |
| 3 Hyd oil level | 18 Lift & tie | 33 Grease (C) |
| 4 Ride control (option) | 19 Air cleaner | 34 Specification sheet |
| 5 Grease (A) | 20 Radiator cap | 35 Grease-center |
| 6 Grease (B) | 21 Fueling | 36 Keep clear/Reflect |
| 7 Bucket stopper | 22 Battery accident | 37 Name plate |
| 8 Max h/reach | 23 Hyd oil lub | 38 ROPS plate |
| 9 Roll over | 24 High pressure hose | 39 Accumulator |
| 10 ROPS cab | 25 Falling | 40 Joystick steering (option) |
| 11 Steering warning-LH | 26 Stay fix | 41 Turbocharger |
| 12 Steering warning-RH | 27 Engine door shearing | 42 Water separator |
| 13 Engine start caution | 28 Alternate exit | 43 Fuel cut off |
| 14 Control ideogram | 29 Low emission engine | 44 Ultra low sulfur diesel |
| 15 Air conditioner filter | 30 Service instruction | |

2. DESCRIPTION

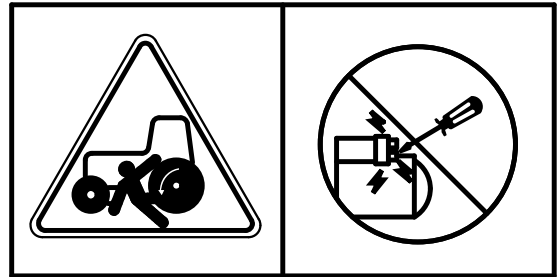
There are several specific warning labels on this machine please become familiarized with all warning labels.

Replace any safety label that is damaged, or missing.

1) START MOTOR (item 1)

This warning label is positioned on the left side of the engine side cover.

- ▲ Start the engine only from the operator's compartment. Never short across the starter terminals or across the batteries. Shorting could bypass the engine neutral start system. Shorting could also damage the electrical system.

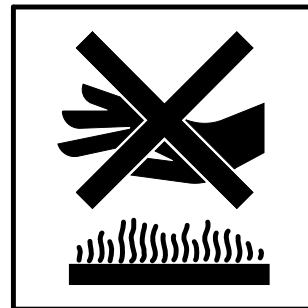


77070FW05

2) TURBOCHARGER COVER (item 2)

This warning label is positioned on the turbocharger cover.

- ▲ Do not touch turbocharger or it may cause severe burn.

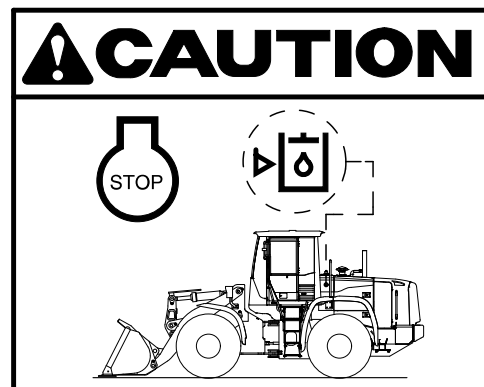


21070FW02

3) HYDRAULIC OIL LEVEL (item 3)

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

- ▲ Place the bucket on the ground whenever servicing the hydraulic system.
- ※ Check oil level on the level gauge.
- ※ Refill the recommended hydraulic oil up to specified level if necessary.



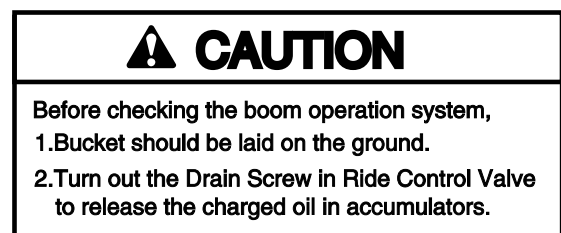
7609A0FW06

4) RIDE CONTROL (item 4)

This warning label is positioned on the front frame.

Before checking the boom operation system,

1. Bucket should be laid on the ground.
2. Turn out the drain screw in ride control valve to release the charged oil in accumulators.

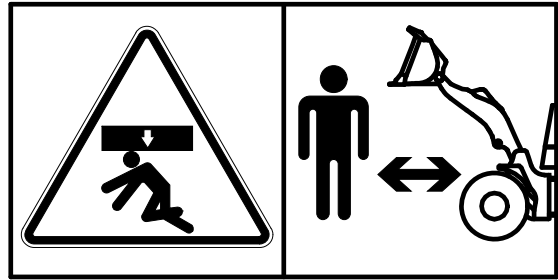


7707A0FW06

5) BUCKET STOPPER (Item 7)

This warning label is positioned on the middle of the boom.

- ⚠ When working under or around the bucket or linkage, with bucket raised, proper support must be provided for the bucket and/or the linkage.

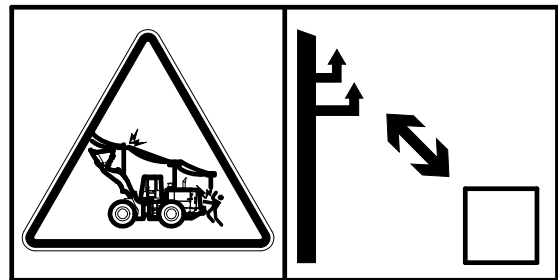


7803AFW05

6) MAX HEIGHT (item 8)

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

- ⚠ 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 1-6.

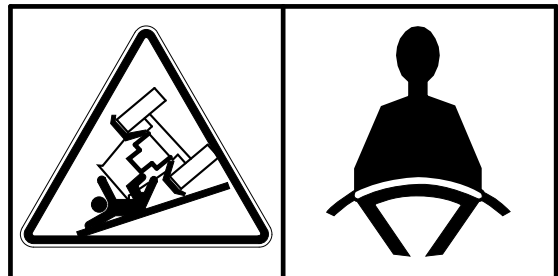


7803AFW16

7) ROLL OVER (item 9)

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

- ⚠ Structural damage, an overturn, modification, alternation, or improper repair can impair this structure's protection capability thereby voiding this certification.
- ⚠ Always use seat belt when operating your machine. Always check the condition of the seat belt and the condition of the mounting hardware before you operate the machine.

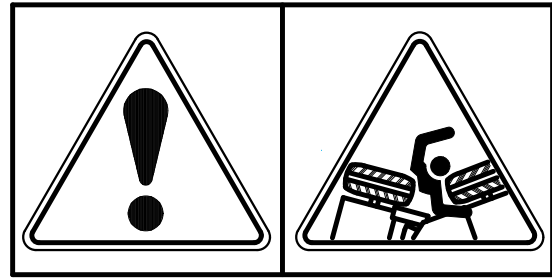


77070FW14

8) STEERING WARNING (item 11, 12)

The warning label is positioned on the both side of the front frame.

- ▲ No clearance for person in this area when machine turns.
- ▲ Severe injury or death from crushing could occur.

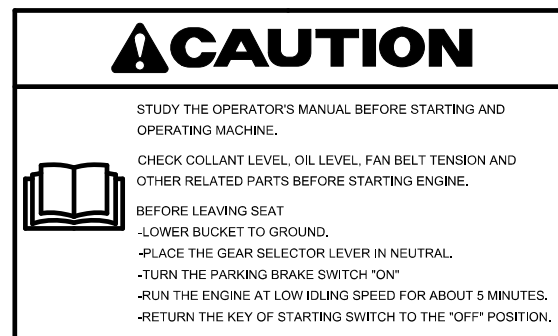


77070FW07

9) ENGINE START CAUTION (item 13)

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

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

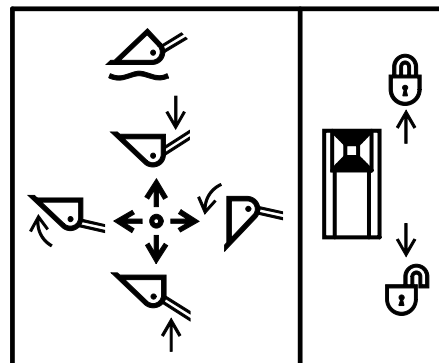


77070FW08

10) CONTROL IDEOGRAM (item 14)

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

- ▲ Confirm the operation of control lever and working device before operating the machine.
- ※ Refer to the page 4-9 for details.

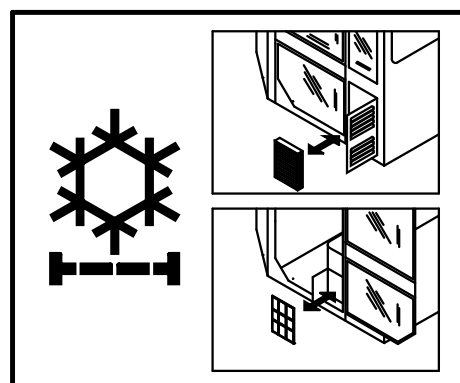


74090FW04

11) AIR CONDITIONER FILTER (item 15)

This warning label is positioned on the washer tank cover.

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



77070FW10

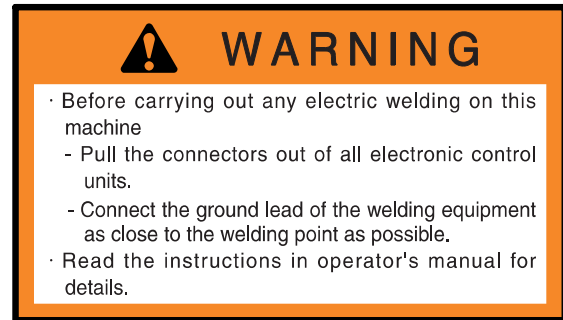
12) CONNECTOR (item 16)

This warning label is positioned on the side of the battery box.

⚠ Before carrying out any electric welding on this machine

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

※ Refer to the page 6-47 for details.



7803AFW20

13) LIFT & TIE (item 18)

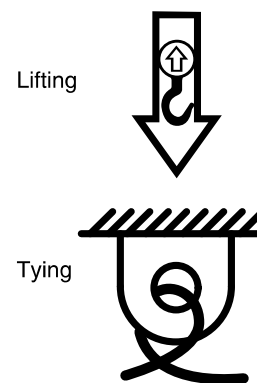
This label is positioned on the both side of the front and rear frame.

- Lifting point

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

- Tying point

In order to tie down the machine, attach the tie-downs to the tying points.

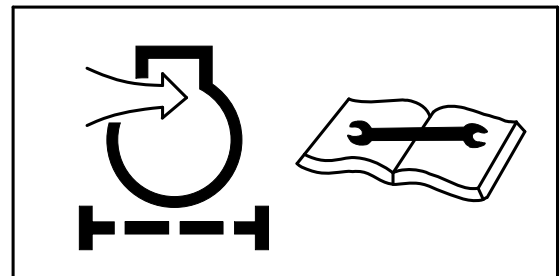


75790FW04

14) AIR CLEANER (item 19)

The warning label is positioned on the air cleaner.

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



21070FW01

15) RADIATOR CAP (item 20)

This warning label is positioned on the radiator cover.

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

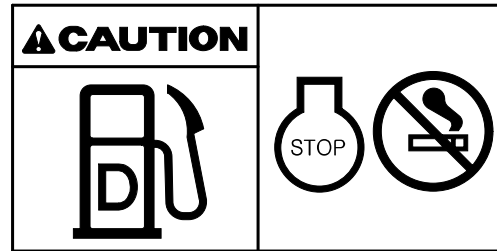


77070FW11

16) FUELING (item 21)

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

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



21070FW04

17) BATTERY ACCIDENT (item 22)

This warning label is positioned on the battery box.

- ⚠ 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.



7577A0FW05

18) HYDRAULIC OIL LUB (item 23)

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

- ※ Do not mix with different brand oils.
- ⚠ Never open the filler cap while engine running or at high coolant temperature.
- ⚠ Loosen the cap slowly and release internal pressure completely.



14070FW08

19) STAY FIX (item 26)

The warning label is positioned on the engine side door.

- ⚠ 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.

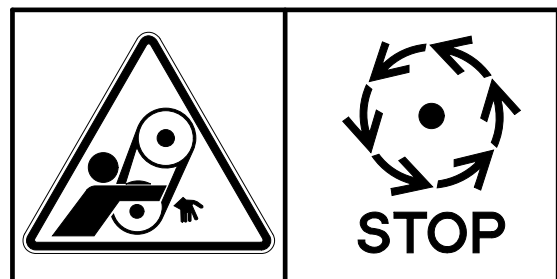


21070FW14

20) ENGINE DOOR SHEARING (item 27)

This warning label is positioned on the left side of the engine side door.

- ⚠ Don't open the engine door during the engine's running.

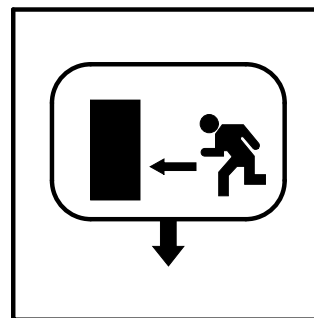


21070FW15

21) ALTERNATE EXIT (item 28)

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

- ※ The right door and rear window serve as an alternate exit.



77070FW12

22) START PROCEDURE (item 32)

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

Start Procedure

1. Start ignition on.
2. Wait up to 4 seconds for grid heater operation in summer.
(45 seconds in winter)
3. Start cranking.
4. If engine still does not start, turn the Keyswitch to OFF position.
5. Loosen fuel supply line at the outlet of pre-filter.
6. Do hand-priming repeatedly until air bubbles comes out from fuel supply line completely.
7. Tighten fuel supply line to its origin position.
8. Recranking.
9. If the engine still would not start, please contact the nearest HYUNDAI or Cummins dealers.

7609A0FW07

23) ACCUMULATOR (item 39)

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

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

- ⚠ Never make any hole in the accumulator expose it to flame or fire.
- ⚠ Do not weld anything to the accumulator. When carrying out disassembly or maintenance of the accumulator, or when disposing of the accumulator, it is necessary to release the gas from the accumulator. A special air bleed valve is necessary for this operation, so please contact your Hyundai distributor.

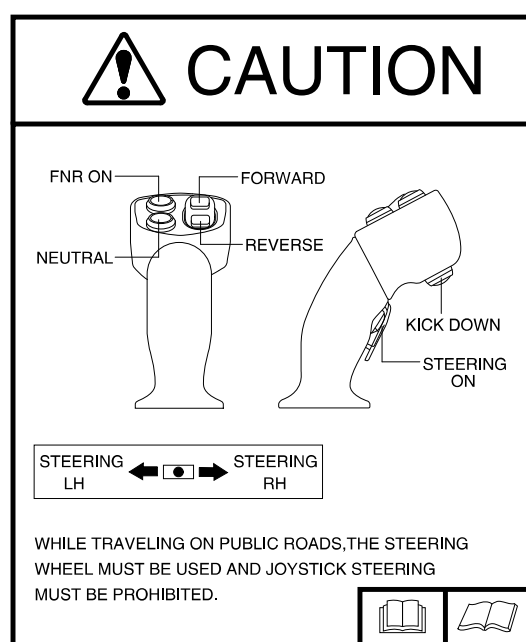


1107A0FW46

24) JOYSTICK STEERING (item 40)

This warning label is positioned on the left side of the cab.

- ※ While traveling on public roads, the steering wheel must be used and joystick steering must be prohibited.
- ※ Please refer to the page 3-47 for details.

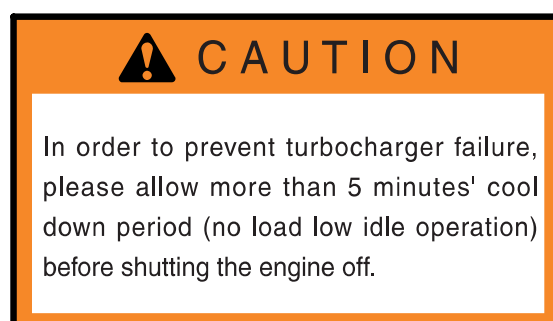


75790FW05

25) TURBOCHARGER (item 41)

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

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



7807AFW20

26) WATER SEPARATOR (item 42)

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

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

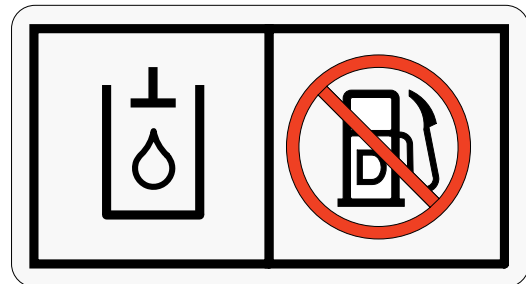


559S0FW07

27) FUEL SHUT OFF (item 43)

This warning label is positioned on the hydraulic tank.

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

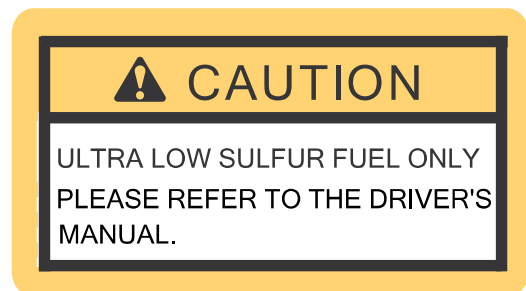


140WH90FW51

28) ULTRA LOW SULFUR DIESEL (item 44)

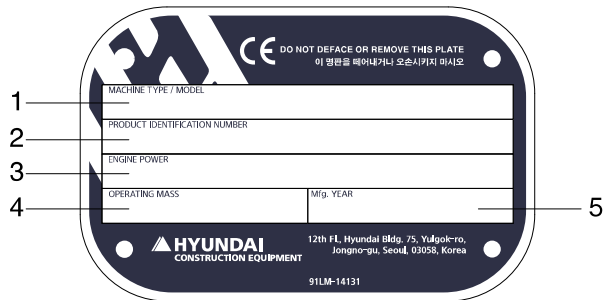
This warning label is positioned on the left side of the fuel filler neck.

- ※ **Use ultra low sulfur fuel only.**
- ※ **Ultra low sulfur fuel sulfur content ≤ 15 ppm**
- ※ **If ultra low sulfur diesel is not used, the aftertreatment diesel particulate filter can be damaged.**

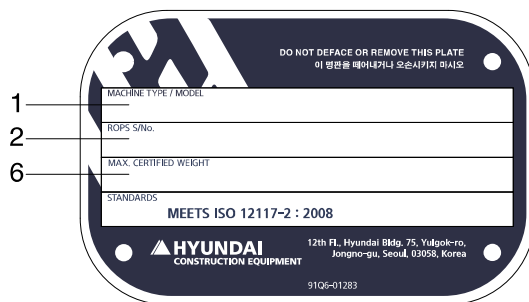


2609A0SL03

MACHINE DATA PLATE



FOR EU ONLY



ROPS

76090FW06A

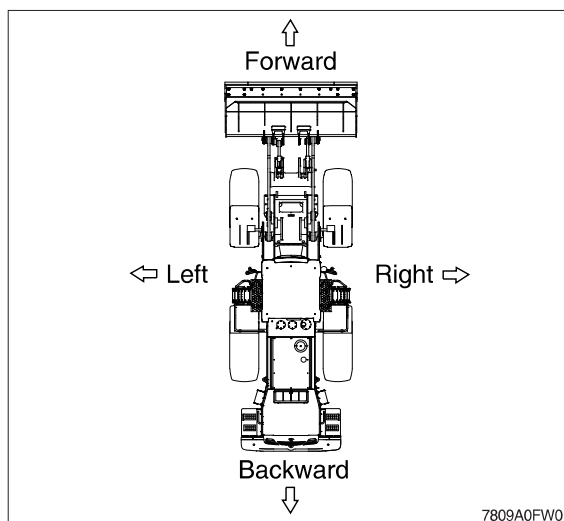
- | | | | | | |
|---|----------------------|---|-------------------------------|---|--------------------------|
| 1 | Machine type / model | 2 | Product identification number | 3 | Engine power |
| 4 | Operating mass | 5 | Manufacturing year | 6 | Maximum certified weight |

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

GUIDE

1. DIRECTION

The direction of this manual indicate forward, backward, right and left, when machine is on the traveling direction.

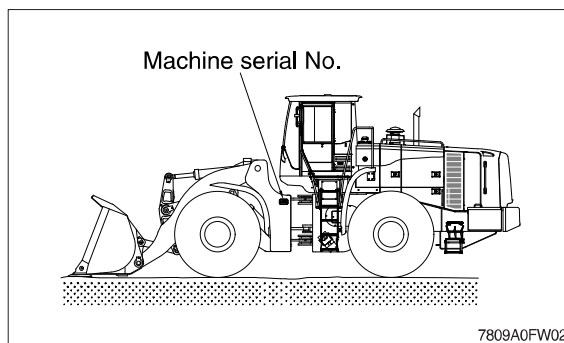


2. SERIAL NUMBER

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

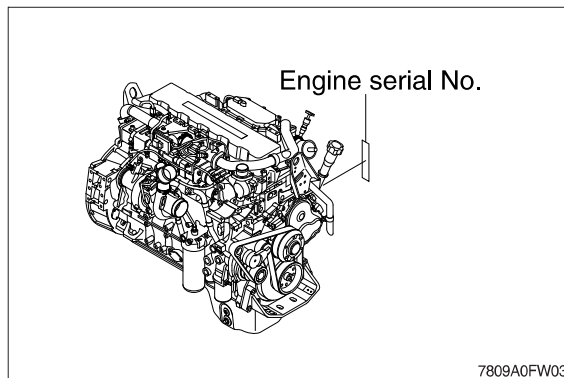
1) MACHINE SERIAL NUMBER

The numbers are located on the left side of the rear frame.



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.

- Excavating work
- Leveling work
- Loading work
- Transporting work

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

4. SYMBOLS

▲ Important safety hint.

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

※ It indicates the useful information for operator.

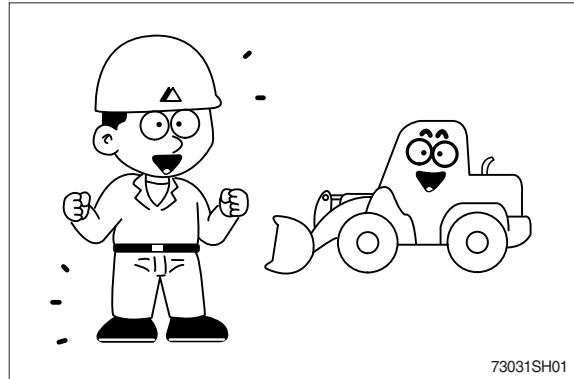
1. SAFETY HINTS

1. BEFORE OPERATING THE MACHINE

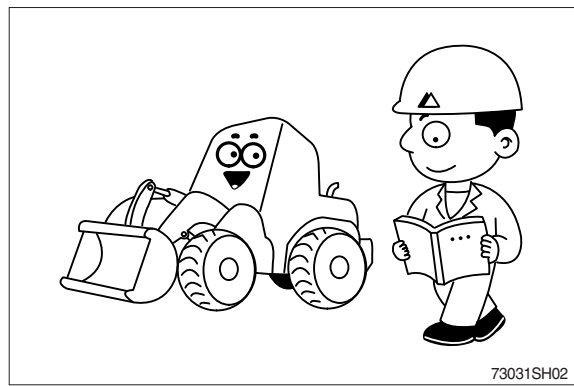
Think-safety first.

In special situation, wear protective clothing including a safety helmet, safety shoes, gloves, safety glasses and ear protection as required by the job condition.

Almost every accident are caused by disregarding the simple and fundamental safety hints.

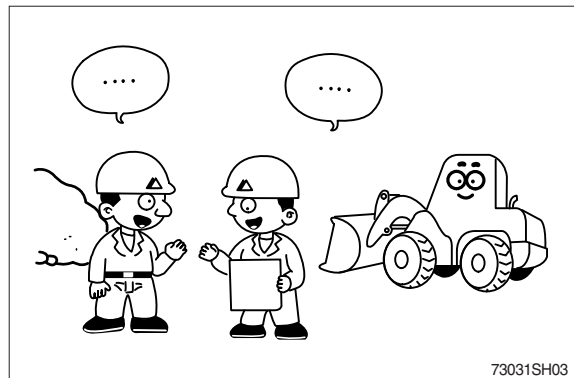


Be sure to understand thoroughly the operator's manual before operating the machine.

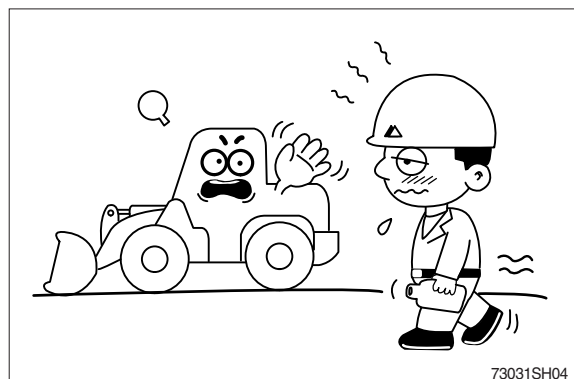


Fully understand the details and process of the construction before starting the work.

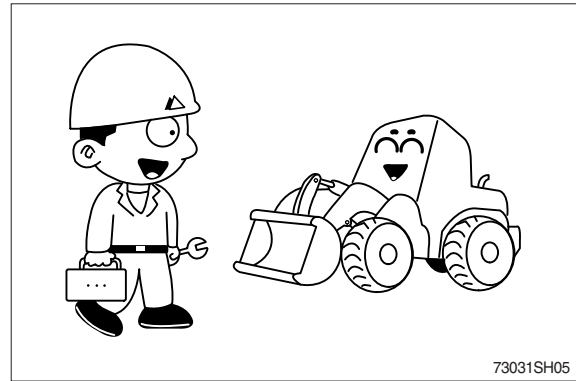
If you find anything dangerous on the job, consult with the job supervisor for preventive measures before operating the machine.



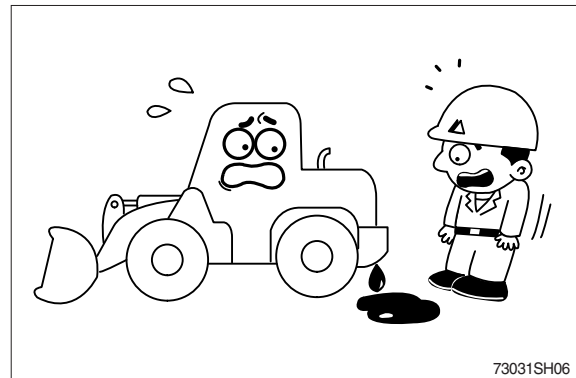
Do not operate when tired, or after drinking. Alcoholic beverages, or any type of drugs.



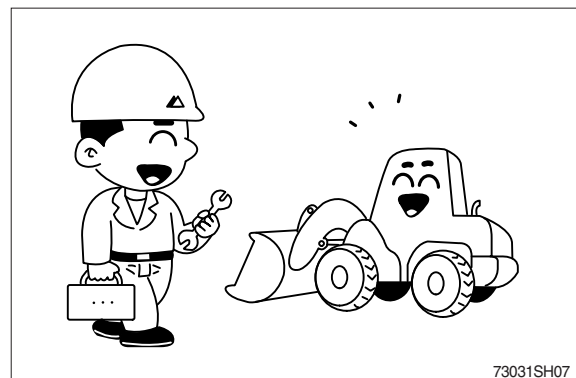
Check daily according to the operator's manual.
Repair the damaged parts and tighten the loosened bolts.



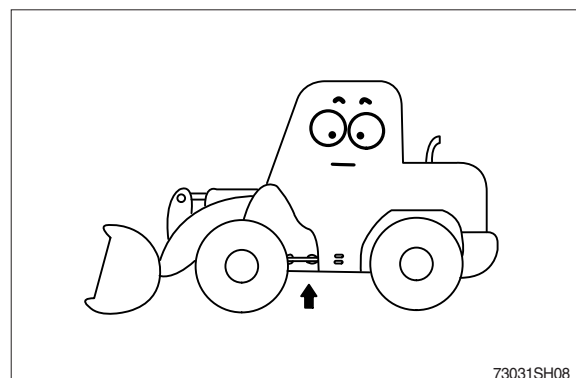
Check for leakage of engine oil, hydraulic oil,
fuel and coolant.



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



Make sure safety lock pin is removed before
operating the machine.



PRECAUTIONS FOR ATTACHMENTS

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

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

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

SAFETY RULES

Only trained and authorized personnel can operate and maintain the machine.

Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.

When working with another operator or a person on worksite traffic duty, be sure all personnel understand all hand signals that are to be used.

SAFETY FEATURES

Be sure all guards and covers are in their proper position. Have guards and covers repaired if damaged.

Use safety features such as the safety lock lever and seat belts properly.

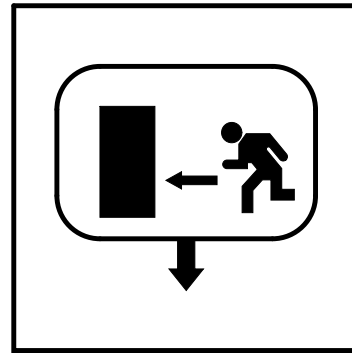
Never remove any safety features. Always keep them in good operating condition.

Improper use of safety features could result in serious bodily injury or death.

SECONDARY CAB EXIT

The door on the right side of the cab, also serves as a secondary exit.

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



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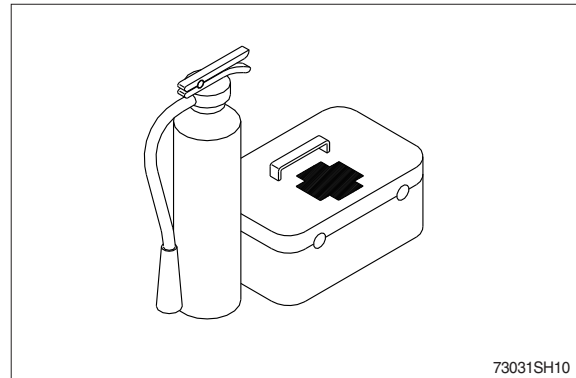
FIRE EXTINGUISHER AND FIRST AID KIT

Be sure fire extinguishers have been provided and know how to use them.

Provide a first aid kit at the storage point.

Know what to do in the event of a fire.

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



73031SH10

UNAUTHORIZED MODIFICATION

Any modification made without authorization from Hyundai can create hazards.

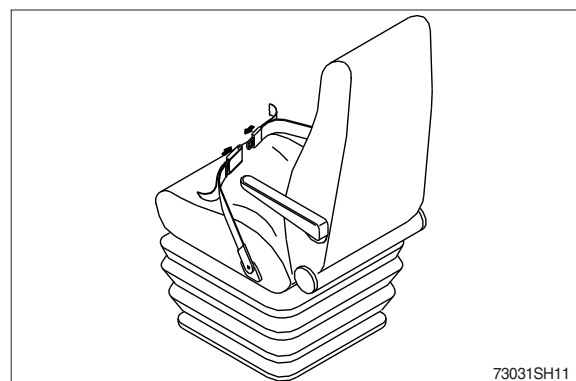
Before making a modification, consult your Hyundai distributor. Hyundai will not be responsible for any injury or damage caused by any unauthorized modification.

SEAT BELT

Check the condition of the seat belt and mounting hardware before operating the machine.

If the seat belt and mounting hardware are worn or damage, replace the seat belt and mounting hardware. Make sure that the mounting bolts are tight.

Always use seat belts when operating your machine.



73031SH11

FIRE PREVENTION AND EXPLOSION PREVENTION

Regeneration

The exhaust gas temperatures during regeneration will be elevated. Follow proper fire prevention instructions and use the disable regeneration function when appropriate.

General

All fuels, most lubricants, and some coolant mixtures are flammable.

To minimize the risk of fire or explosion, the following actions are recommended.

Always perform a Walk-Around Inspection, which may help you identify a fire hazard.

Do not operate a machine when a fire hazard exists. Contact your dealer for service.



3001SH01

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

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

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

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

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

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

Do not operate the machine near any flame.

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

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

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

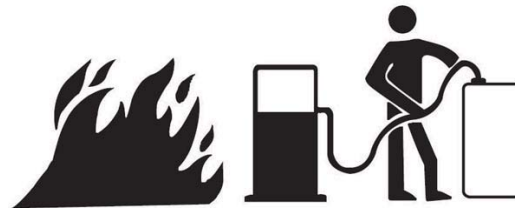
Inspect all lines and hoses for wear or deterioration. Replace damaged lines and hoses. The lines and the hoses should have adequate support and secure clamps. Tighten all connections to the recommended torque. Damage to the protective cover or insulation may provide fuel for fires.

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



3001SH02

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



3001SH03

Battery and battery cables

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



3001SH04

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

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

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

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

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

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

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

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

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

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

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

Wiring

Check electrical wires daily. If any of the following conditions exist, replace parts before you operate the machine.

- Fraying
- Signs of abrasion or wear
- Cracking
- Discoloration
- Cuts on insulation
- Other damage

Make sure that all clamps, guards, clips, and straps are reinstalled correctly. This action will help to prevent vibration, rubbing against other parts, and excessive heat during machine operation.

Attaching electrical wiring to hoses and tubes that contain flammable fluids or combustible fluids should be avoided.

Consult your Hyundai dealer for repair or for replacement parts.

Keep wiring and electrical connections free of debris.

Lines, Tubes, and Hoses

Do not bend high-pressure lines. Do not strike high-pressure lines. Do not install any lines that are bent or damaged. Use the appropriate backup wrenches in order to tighten all connections to the recommended torque.

Check lines, tubes, and hoses carefully. Wear Personal Protection Equipment (PPE) in order to check for leaks. Always use a board or cardboard when you check for a leak. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

Replace the affected parts if any of the following conditions are present :

- End fittings are damaged or leaking.
- Outer coverings are chafed or cut.
- Wires are exposed.
- Outer coverings are swelling or ballooning.
- Flexible parts of the hoses are kinked.
- Outer covers have exposed embedded armoring.
- End fittings are displaced.

Make sure that all clamps, guards, and heat shields are installed correctly. During machine operation, this action will help to prevent vibration, rubbing against other parts, excessive heat, and failure of lines, tubes, and hoses.

Do not operate a machine when a fire hazard exists. Repair any lines that are corroded, loose, or damaged. Leaks may provide fuel for fires. Consult your Hyundai dealer for repair or for replacement parts.

Ether

Ether (if equipped) is commonly used in cold weather applications. Ether is flammable and poisonous.

Do not spray ether manually into an engine if the machine is equipped with a thermal starting aid for cold weather starting.

Use ether in ventilated areas. Do not smoke while you are replacing an ether cylinder or while you are using an ether spray.

Do not store ether cylinders in living areas or in the operator compartment of a machine. Do not store ether cylinders in direct sunlight or in temperatures above 49°C(120.2 °F). Keep ether cylinders away from unauthorized personnel.

Fire Extinguisher

As an additional safety measure, keep a fire extinguisher on the machine.

Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher regularly. Follow the recommendations on the instruction plate.

Consider installation of an aftermarket Fire Suppression System, if the application and working conditions warrant the installation.

Fire Safety

- ※ **Locate secondary exits and how to use the secondary exits before you operate the machine.**
- ※ **Locate fire extinguishers and how to use a fire extinguisher before you operate the machine.**

If you find that you are involved in a machine fire, your safety and that of others on site is the top priority. The following actions should only be performed if the actions do not present a danger or risk to you and any nearby people. At all times you should assess the risk of personal injury and move away to a safe distance as soon as you feel unsafe.

Move the machine away from nearby combustible material such as fuel/oil stations, structures, trash, mulch and timber.

Lower any implements and turn off the engine as soon as possible. If you leave the engine running, the engine will continue to feed a fire. The fire will be fed from away damaged hoses that are attached to the engine or pumps.

If possible, turn the battery disconnect switch to the OFF position. Disconnecting the battery will remove the ignition source in the event of an electrical short. Disconnecting the battery will eliminate a second ignition source if electrical wiring is damaged by the fire, resulting in a short circuit.

Notify emergency personnel of the fire and your location.

If your machine is equipped with a fire suppression system, follow the manufacturers procedure for activating the system.

- ※ **Fire suppression systems need to be regularly inspected by qualified personnel. You must be trained to operate the fire suppression system.**

Use the on-board fire extinguisher and use the following procedure :

1. Pull the pin.
2. Aim the extinguisher or nozzle at the base of the fire.
3. Squeeze the handle and release the extinguishing agent.
4. Sweep the extinguisher from side to side across the base of the fire until the fire is out.

Remember, if you are unable to do anything else, shut off the machine before exiting. By shutting off the machine, fuels will not continue to be pumped into the fire.

If the fire grows out of control, be aware of the following risks :

- Tires on wheeled machines pose a risk of explosion as tires burn. Hot shrapnel and debris can be thrown great distances in an explosion.
- Tanks, accumulators, hoses, and fittings can rupture in a fire, spraying fuels and shrapnel over a large area.

Remember that nearby all of the fluids on the machine are flammable, including coolant and oils. Additionally, plastics, rubbers, fabrics, and resins in fiberglass panels are also flammable.

Fire extinguisher Location

Make sure that a fire extinguisher is available. Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher. Obey the recommendations on the instruction plate.

Mount the fire extinguisher in the accepted location per local regulations.

If your machine is equipped with a ROPS structure, strap the mounting plate to the ROPS in order to mount the fire extinguisher. If the weight of the fire extinguisher exceeds 4.5 kg (10 lb), mount the fire extinguisher near the bottom of the ROPS. Do not mount the fire extinguisher at the upper one-third area on the ROPS.

Do not weld the ROPS structure in order to install the fire extinguisher. Also, do not drill holes in the ROPS structure in order to mount the fire extinguisher on the ROPS.

Consult your Hyundai dealer for the proper procedure for mounting the fire extinguisher.

THE EUROPEAN UNION PHYSICAL AGENTS (VIBRATION) DIRECTIVE 2002/44/EC

Vibration Data for Earth-moving Machines

Information Concerning Hand/Arm Vibration Level

When the machine is operated according to the intended use, the hand/arm vibration of this machine is below 2.5 m/s^2 .

Information Concerning Whole Body Vibration Level

The highest root mean square value of weighted acceleration to which the whole body is subjected, is less than 0.5 m/s^2 .

This section provides vibration data and a method for estimating the vibration level for earth moving machines.

Vibration levels are influenced by many different parameters. Many items are listed below.

- Operator training, behavior, mode and stress
- Job site organization, preparation, environment, weather and material
- Machine type, quality of the seat, quality of the suspension system, attachments and condition of the equipment

It is not possible to get precise vibration levels for this machine. The expected vibration levels can be estimated with the information in below Table in order to calculate the daily vibration exposure. A simple evaluation of the machine application can be used.

Estimate the vibration levels for the three vibration directions. For typical operating conditions, use the average vibration levels as the estimated level. With an experienced operator and smooth terrain, subtract the Scenario Factors from the average vibration level. For aggressive operations and severe terrain, add the Scenario Factors to the average vibration level in order to obtain the estimated vibration level.

※ All vibration levels are in meter per second squared.

ISO Reference Table A – Equivalent vibration levels of whole body vibration emission for earthmoving equipment.

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

ISO Reference Table A – Equivalent vibration levels of whole body vibration emission for earthmoving equipment.

Machine family	Machine kind	Typical operating condition	Vibration Levels			Scenario Factors		
			X axis	Y axis	Z axis	X axis	Y axis	Z axis
Loader	skid steer loader (tracks)	V-shaped motion	1.21	1.00	0.82	0.30	0.84	0.32
	Wheel backhoe loader	Excavating	0.28	0.26	0.20	0.09	0.16	0.06
	Wheel loader	Load and carry motion	0.84	0.81	0.52	0.23	0.20	0.14
		Mining application	1.27	0.97	0.81	0.47	0.31	0.47
		Transfer movement	0.76	0.91	0.49	0.33	0.35	0.17
		V-shape motion	0.99	0.84	0.54	0.29	0.32	0.14

※ Refer to “ISO/TR 25398 Mechanical Vibration-Guideline for the assessment of exposure to whole body vibration of ride on operated earthmoving machines” for more information about vibration. This publication uses data that is measured by international institutes, organizations and manufacturers. This document provides information about the whole body exposure of operators of earthmoving equipment.

Guidelines for Reducing Vibration Levels on Earthmoving Equipment

Properly adjust machines. Properly maintain machines. Operate machines smoothly. Maintain the conditions of the terrain. The following guidelines can help reduce the whole body vibration level :

1. Use the right type and size of machine, equipment, and attachments.
2. Maintain machines according to the manufacturer's recommendations.
 - a. Tire pressures
 - b. Brake and steering systems
 - c. Controls, hydraulic system and linkages
3. Keep the terrain in good condition.
 - a. Remove any large rocks or obstacles.
 - b. Fill any ditches and holes.
 - c. Provide machines and schedule time in order to maintain the conditions of the terrain.
4. Use a seat that meets "ISO 7096". Keep the seat maintained and adjusted.
 - a. Adjust the seat and suspension for the weight and the size of the operator.
 - b. Inspect and maintain the seat suspension and adjustment mechanisms.
5. Perform the following operations smoothly.
 - a. Steer
 - b. Brake
 - c. Accelerate
 - d. Shift the gears.
6. Move the attachments smoothly.
7. Adjust the machine speed and the route in order to minimize the vibration level.
 - a. Drive around obstacles and rough terrain.
 - b. Slow down when it is necessary to go over rough terrain.
8. Minimize vibrations for a long work cycle or a long travel distance.
 - a. Use machines that are equipped with suspension systems.
 - b. Use the ride control system on machines.
 - c. If no ride control system is available, reduce speed in order to prevent bounce.
 - d. Haul the machines between workplaces.
9. Less operator comfort may be caused by other risk factors. The following guidelines can be effective in order to provide better operator comfort:
 - a. Adjust the seat and adjust the controls in order to achieve good posture.
 - b. Adjust the mirrors in order to minimize twisted posture.
 - c. Provide breaks in order to reduce long periods of sitting.
 - d. Avoid jumping from the cab
 - e. Minimize repeated handling of loads and lifting of loads.
 - f. Minimize any shocks and impacts during sports and leisure activities.

Sources

The vibration information and calculation procedure is based on "ISO/TR 25398 Mechanical Vibration- Guideline for whole body vibration exposure of operators of earthmoving equipment. The method is based on measured vibration emission under real working conditions for all machines.

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

MODIFICATIONS

Modifications to the machine, including use of unauthorized accessories and spare parts, may affect the machine's condition and its ability to function as it was designed. No changes of any kind may be performed without first obtaining written approval from Hyundai. Hyundai reserves the right to refuse all warranty claims that have resulted due to or can be attributed to unauthorized modifications.

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

The person who performs unauthorized modifications assumes all responsibility for consequences that arise due to the modification or can be attributed to the modification, including damage to the machine.

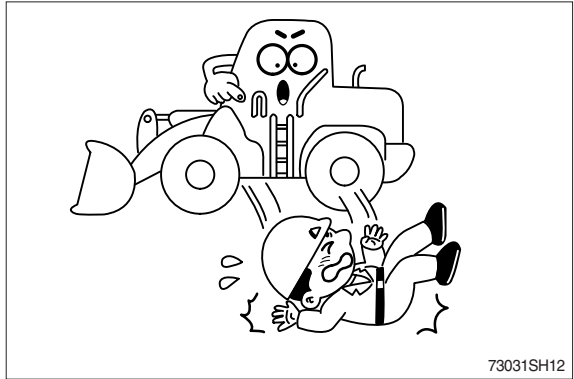
Modifications may be considered to be officially approved, if at least one of the following conditions has been met :

1. The attachment, the accessory, or the spare part has been made or distributed by Hyundai and has been installed according to approved methods described in a publication available from Hyundai; or
2. The modification has been approved in writing by the Engineering Department at each product company within Hyundai.

2. DURING OPERATING THE MACHINE

Use the handle and footstep when getting on or off the machine.

Do not jump on or off the machine.

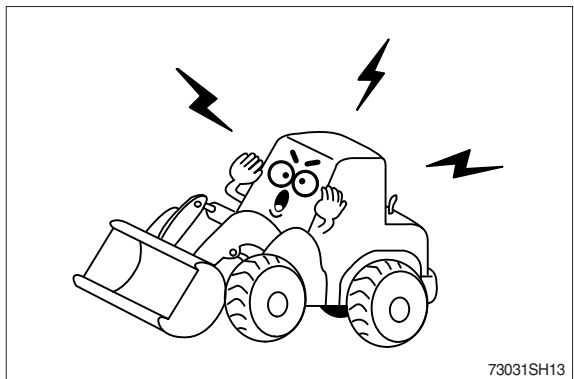


Sound the horn to warn nearby personnel before operating the machine.

KEEP RIDERS OFF MACHINE

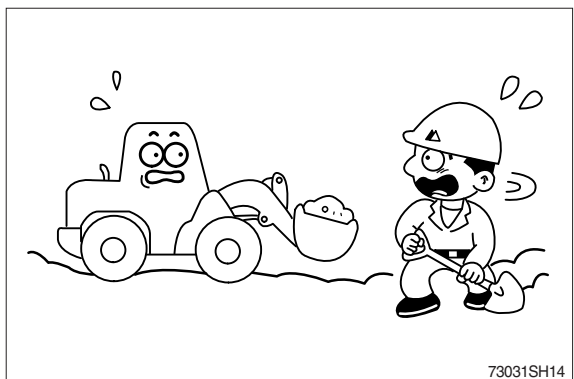
Riders on a machine are subject to injury such as being struck objects and being thrown off the machine.

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

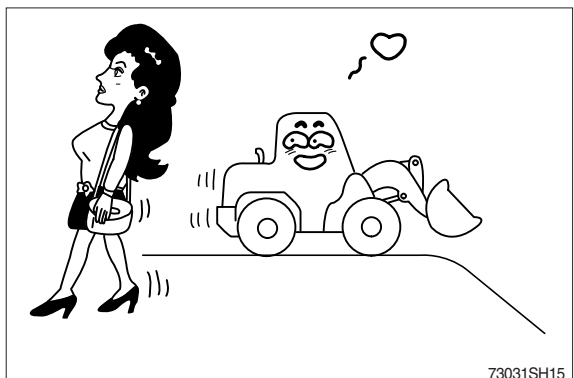


Operate carefully to make sure all personnel or obstacles are clear within the working range of the machine.

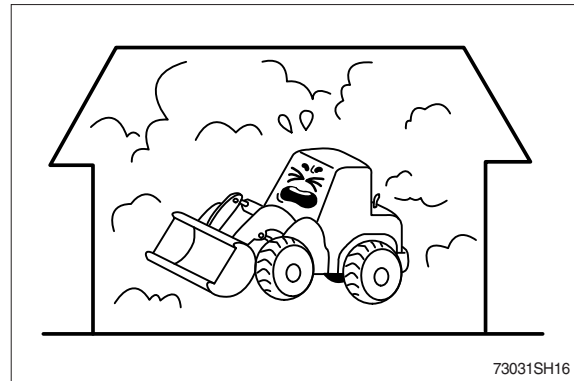
Place safety guards if necessary.



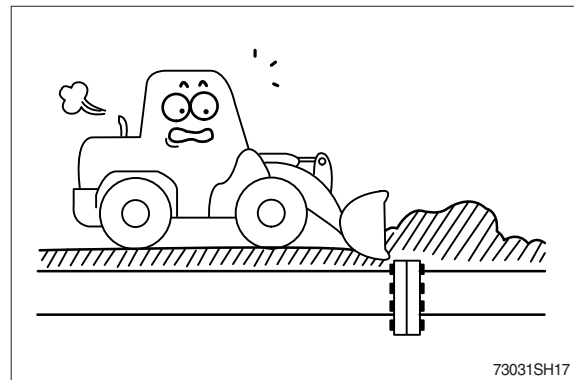
When using the work equipment, pay attention to jobsite.



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

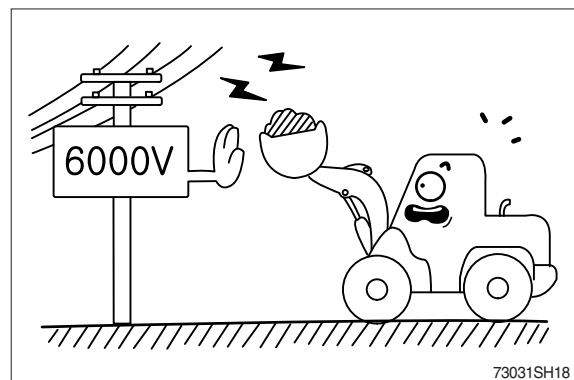


Check the locations of underground gas pipes or water line and secure the safety before operation.

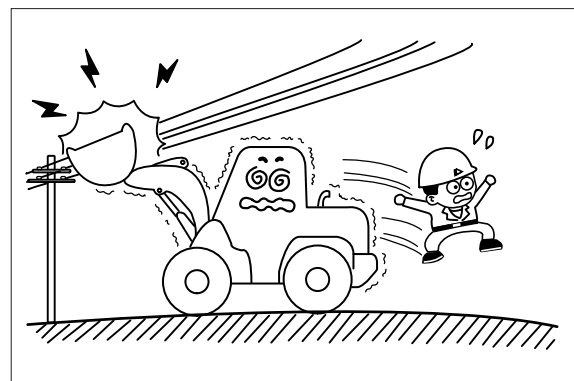


The operating near the electrical lines is very dangerous. Operate within safe working range permitted as below.

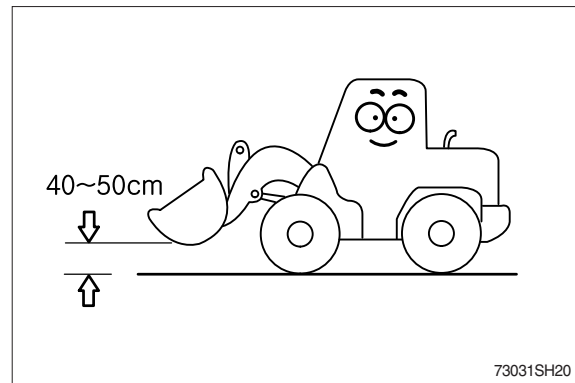
Supply voltage	Min safe separation
6.6 kV	3 m (10 ft)
33.0 kV	4 m (13 ft)
66.0 kV	5 m (16 ft)
154.0 kV	8 m (26 ft)
275.0 kV	10 m (33 ft)



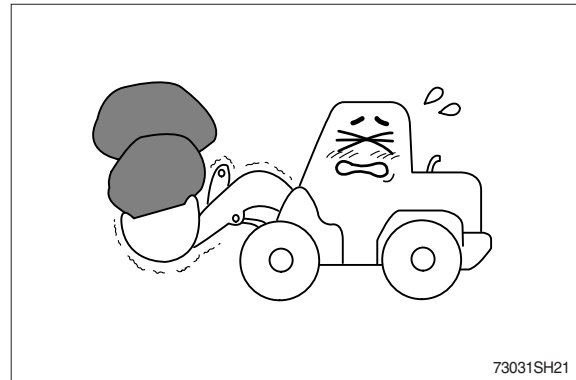
If the machine touches the electric power lines, keep sitting on the operator's seat and make sure the personnel on the ground not to touch the machine until turning off the electric current. Jump off the machine, do not contact the machine when you need to get off.



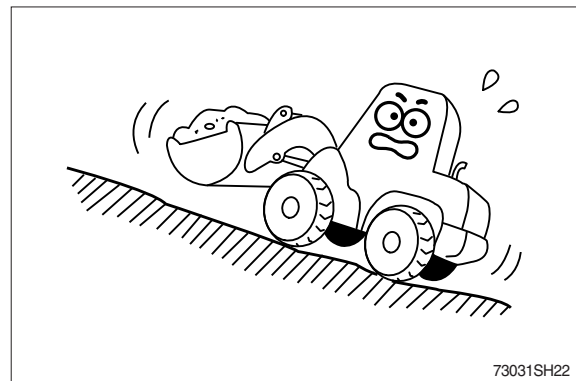
While traveling on public roads, lift the bucket 40~50 cm above the ground. Do not drive with the bucket loaded.



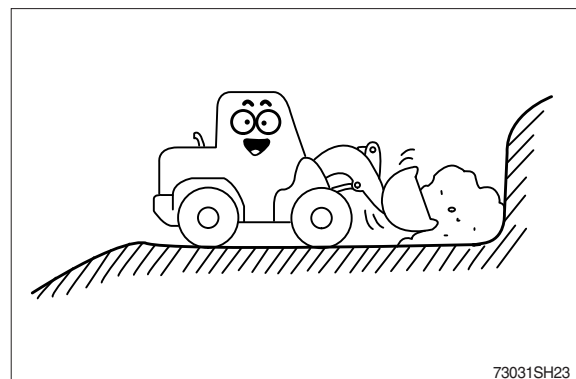
When the bucket is loaded, avoid sudden swinging or starting. Overloading is dangerous. Make sure the load does not exceed the permissible level.



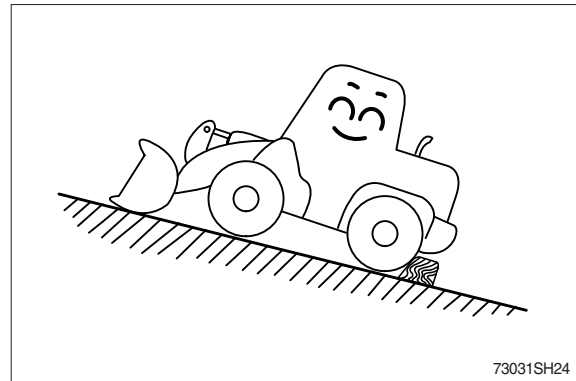
The operation on a slope is dangerous. Avoid operating the machine on a slope of over 10 degree.



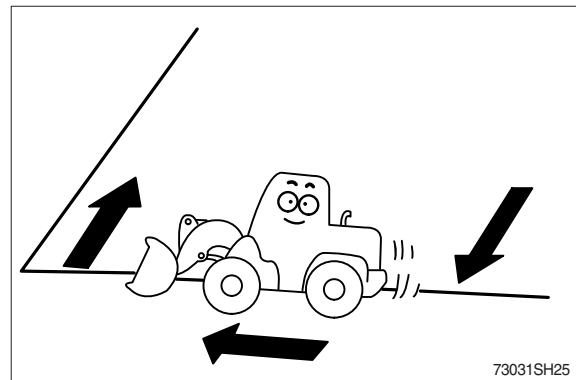
Operate the machine after making ground flat when operation is required on a slope.



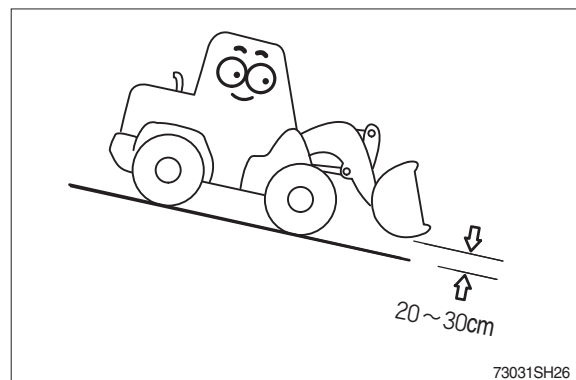
Avoid parking and stopping on a slope.
Lower the bucket to the ground and block the tire when parking.



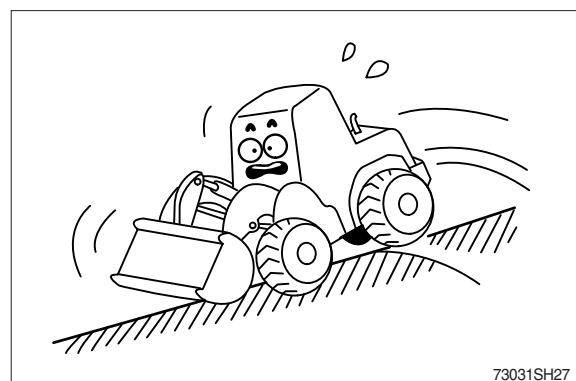
Avoid traveling in a cross direction on a slope as it can cause the danger of rolling over and sliding.



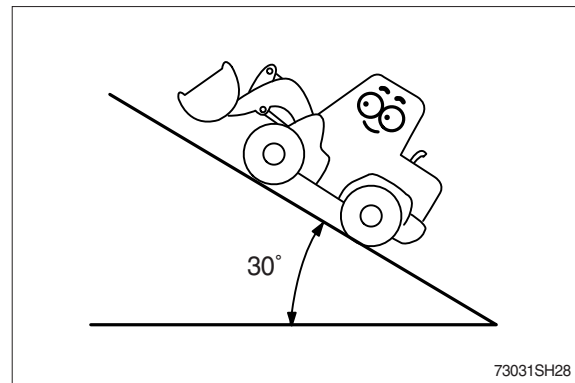
Traveling on the slope is dangerous.
Be sure to operate slowly when driving down a slope and maintain the bucket at a height of 20~30 cm (1 ft) above the ground so that it can be used as brake in an emergency.



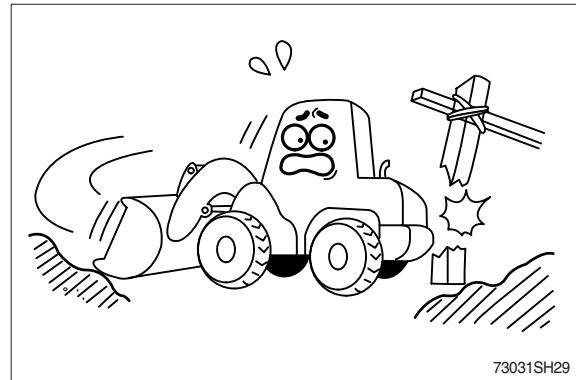
Steering of the machine while traveling on a slope is dangerous.
When an inevitable turning of direction is required, turn on the flat and solid ground.



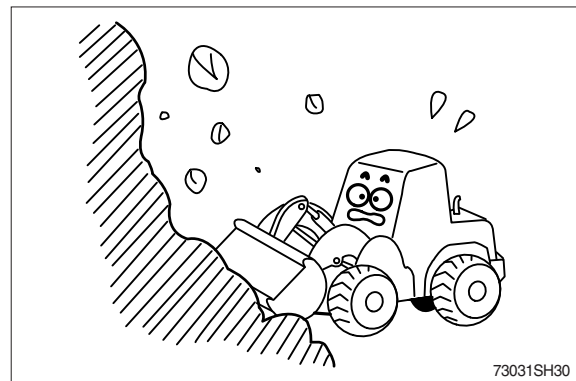
The engine angularity limits are 30°.
Do not operate by more than the engine limits in any case.



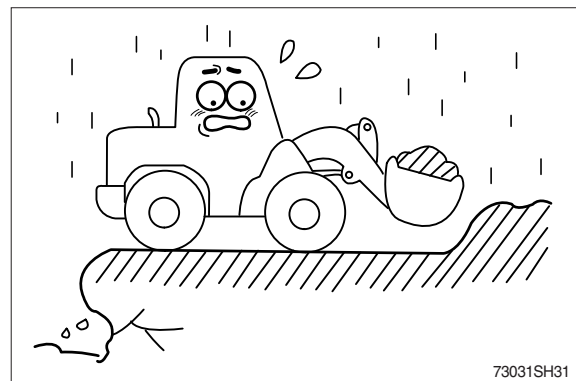
Watch out for obstacles. Be particularly careful to check the machine clearance during steering.



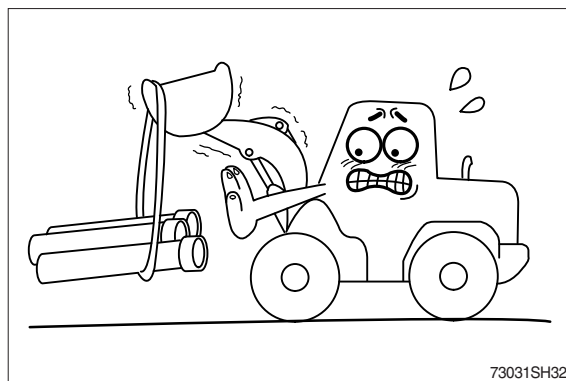
Always operate machine with proper ROPS/
FOPS installed.
Do not attempt to repair a rollover protective
structure (ROPS) after an accident.
Repaired structures do not provide the original
structure and protection.
Test and approved as a protective CAB accord-
ing to ROPS and FOPS standard.
Meets : ISO 3471 / 3449 / 3164
SAE J1040 / J231 / J397



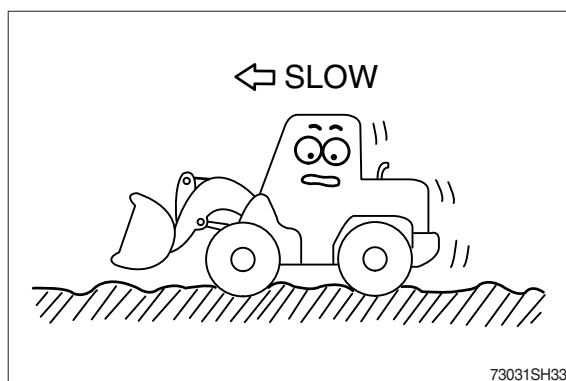
Avoid operating on a cliff, or soft ground as
there is danger of rolling over.
Take necessary precautions when working after
rain, or blasting because the ground may not be
firm enough.



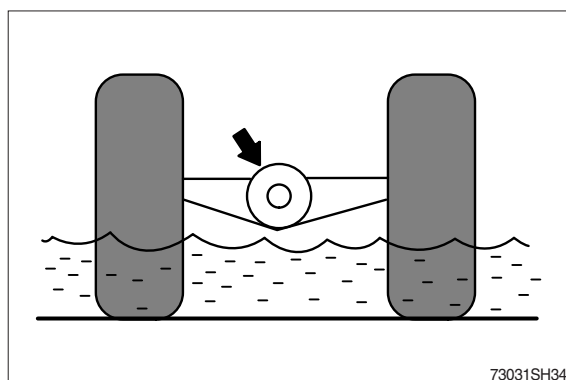
This machine is intended to be used only for excavation and loading. Do not use this for pulling up materials. Unlike a crane, this machine is not equipped with devices needed to pull up things.



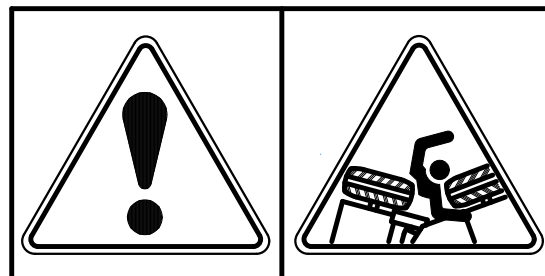
Slow down when traveling through obstacles or uneven ground.



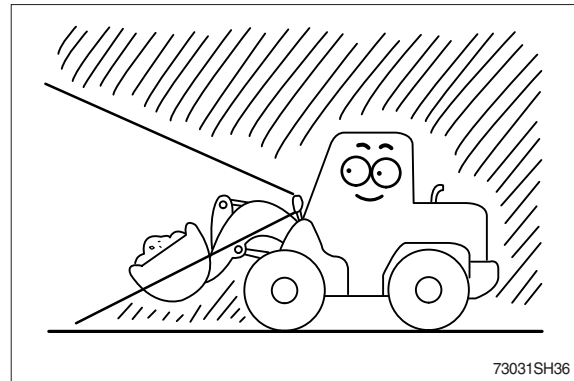
When operating in water or when crossing shallows, check the bed soil condition and depth and flow speed of water, then proceed taking care that water is not above axle housing.



Never allow anyone near the center articulation pivot.
If the machine turned, they could be crushed.



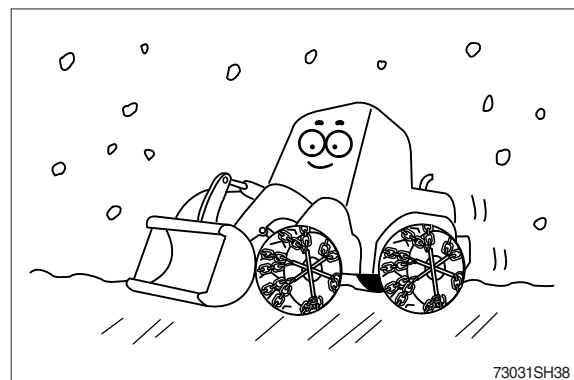
Use lights at night or in dark areas.



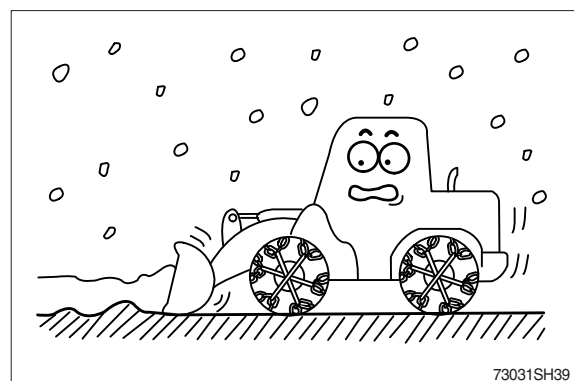
Be careful in the condition of bad clearance of sight caused by cloud, snow or rain.



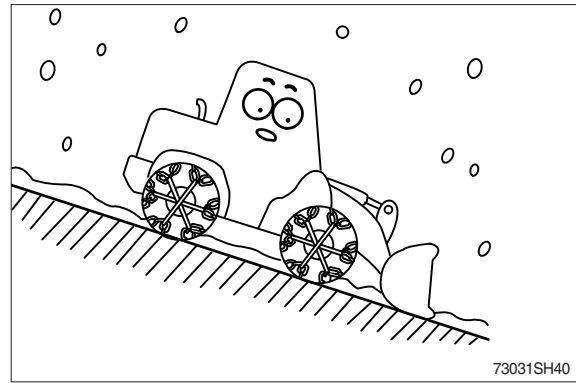
Put the chains on the tires when moving or working on the snowed and frozen road, and avoid doing sudden start, stop and swing.



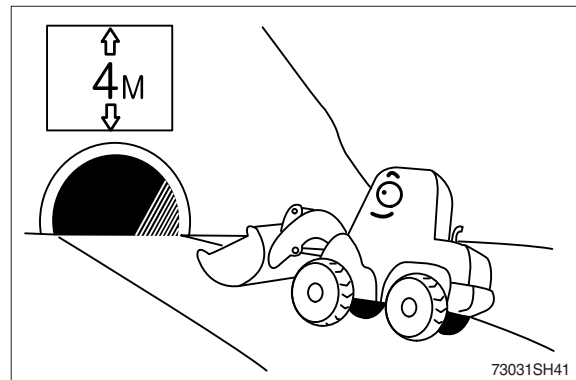
When machine is used for snow removal, be alert for hidden objects.



Be careful when traveling on icy surface.
Keep bucket low to ground.



Be careful when driving under a height limited place, for instance, a tunnel, an overpass, and an overhead cable.



MOUNTING AND DISMOUNTING

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

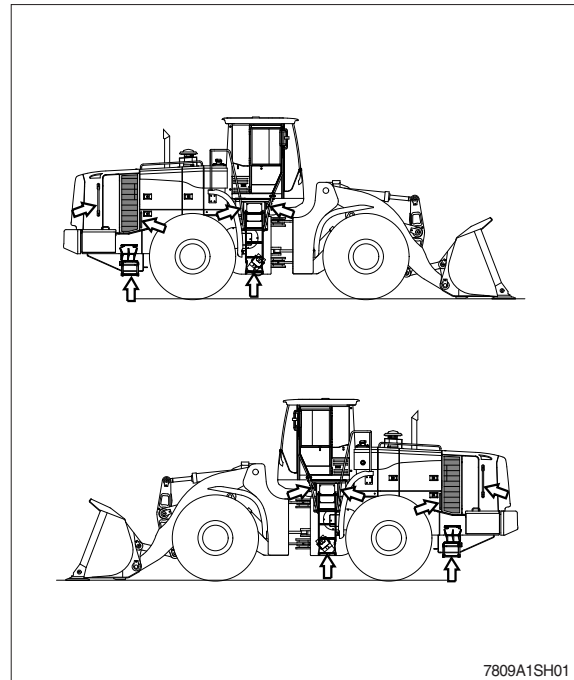
When getting on or off the machine, face the machine and use the handhold and steps.

Never hold any control levers when getting on or off the machine.

Always maintain three-point contact with the handholds and steps to ensure that you support yourself.

If there is any oil, grease, or mud on the handholds, steps or nonslip tapes, wipe it off immediately. Inspect, and as necessary, repair or replace the damaged parts and tighten any loose bolts.

When carrying out inspection and maintenance with the mud guarder opened, pay attention to avoid the injury or damage by the mud guarder.



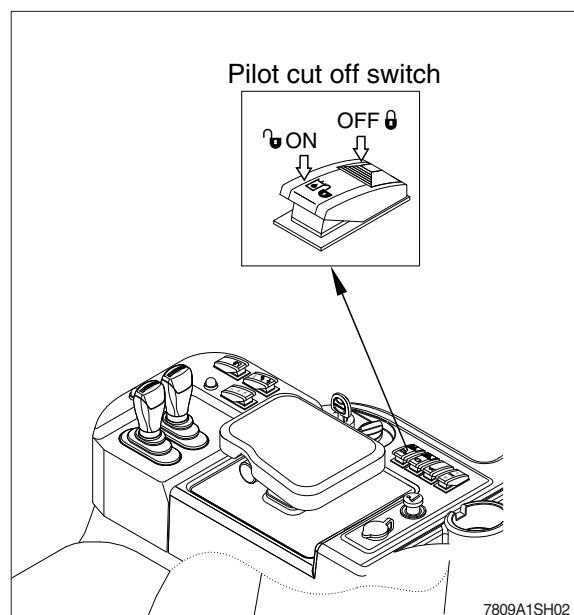
7809A1SH01

ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT

When standing up from the operator's seat, always place the pilot cut off switch to the **OFF** position. If you accidentally touch the RCV lever when they are not locked, the work equipment may suddenly move and cause serious injury or damage.

When leaving the machine, lower the work equipment to the ground, set the pilot cut off switch to the **OFF** position, then stop the engine and use the key to lock all the equipment. Always take the key with you.

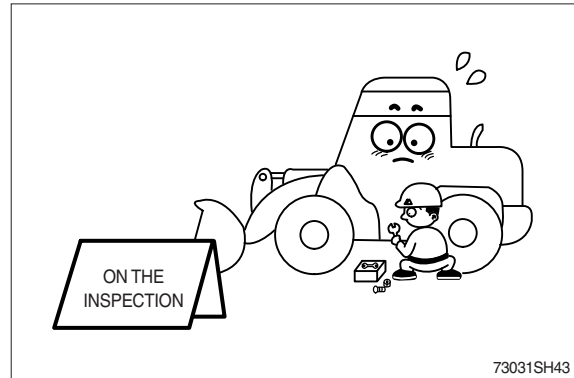
※ Refer to the page 3-36 for details.



7809A1SH02

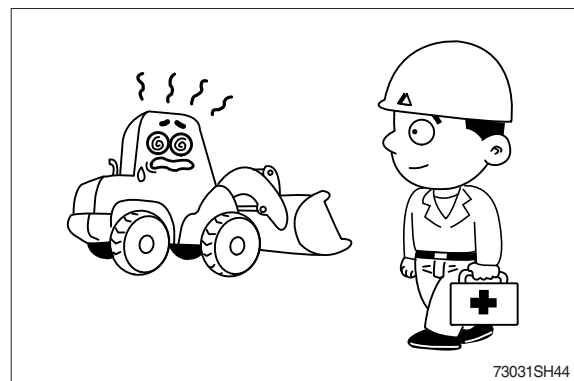
3. DURING MAINTENANCE

During maintenance do not allow any unauthorized person to stand near the machine. Also, be careful of people in the vicinity.



Stop the engine immediately when the trouble of the machine is found.

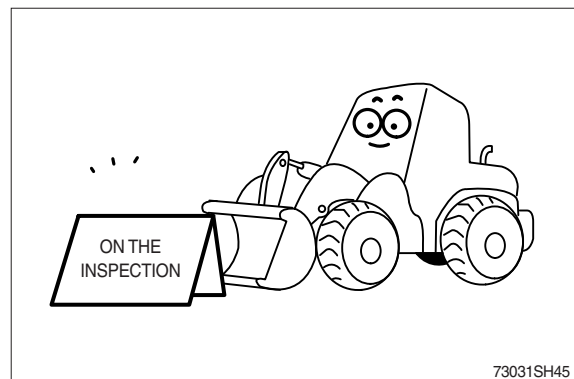
Inspect immediately the cause of trouble such as vibration, overheating and trouble in the cluster then repair.



Park on a flat place for inspecting and repairing and properly TAG machine is not operational. (remove start key)

Extreme care shall be taken during maintenance work.

Parts may require additional safe guarding.

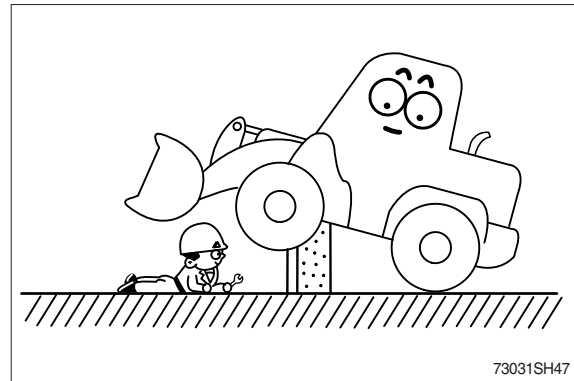


Do not remove the radiator cap from hot engine. Open the cap after the engine is cool, below 50°C (112°F) to prevent personal injury from heated coolant spray or steam.



Do not work below the machine.

When working under or around the bucket or linkage, with the bucket raised, proper support must be provided for the bucket and / or the linkage.

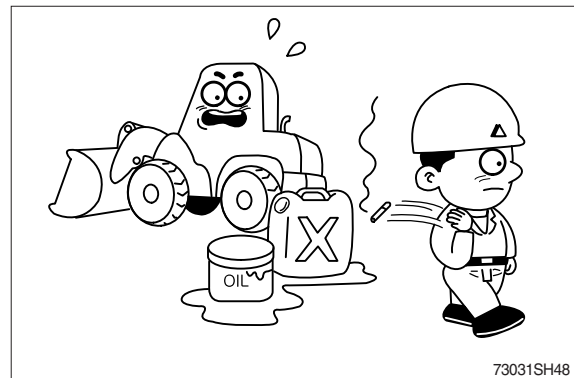


There is the danger of fire in fuel and oil.

Store in cool dry area, away from any open flames.

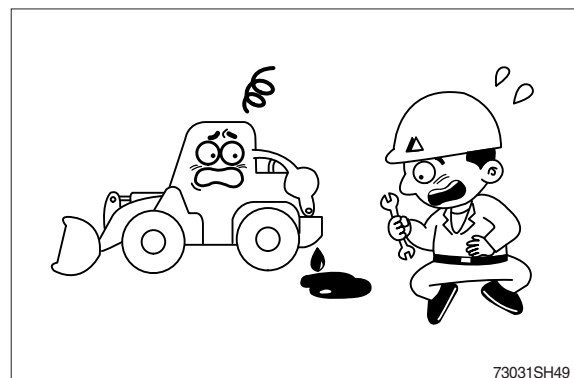
Do not refuel the machine while smoking or when near open flame or sparks.

Always stop engine before refueling machine.



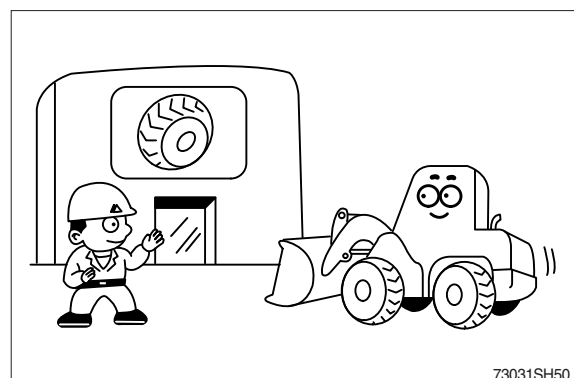
Spilled grease and oil are dangerous to safety.

Keep your machine always clean and dry.



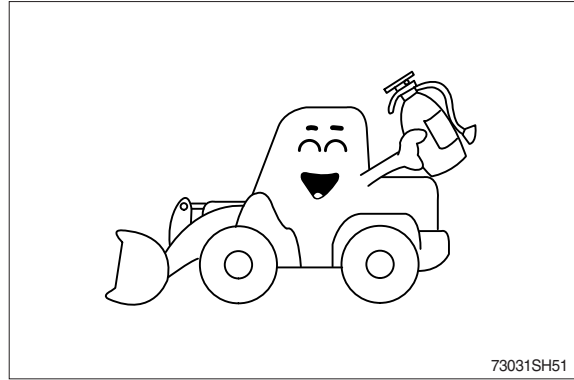
Disassembly, reassembly and repair of tire requires special skills and equipment.

Contact a tire repair shop.



Be prepared if a fire starts.

Keep a fire extinguisher handy and emergency numbers for a fire department near your telephone.

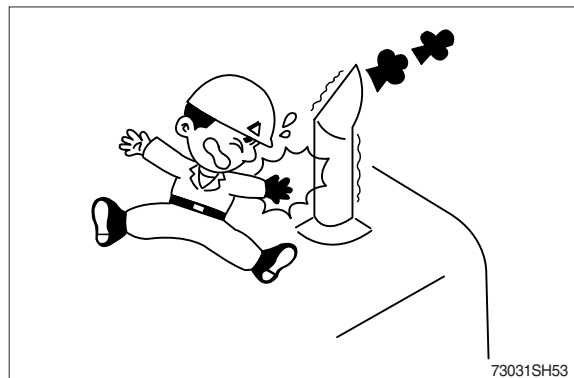


When servicing and checking engine compartment at the side door opened, be careful head against door.

Do not open the side door while engine is running.

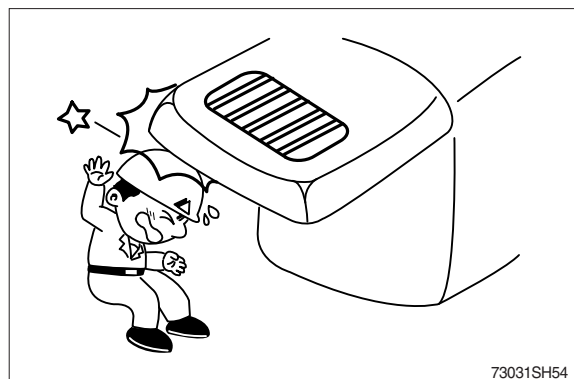


Do not touch exhaust pipe, or it may cause severe burn.

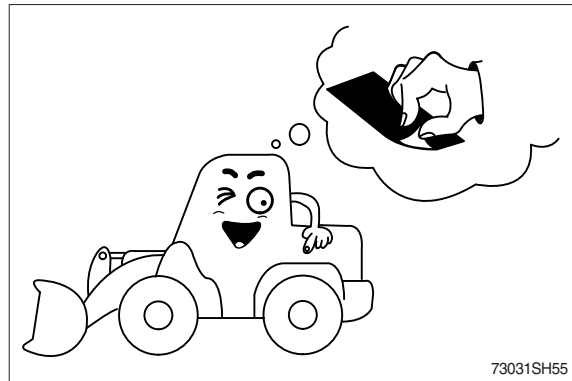


Be sure to support stay, when the side door needs to be opened.

Be careful the external or natural force like strong wind.



The anti-slip protection should be replaced if they have become worn or have been printed over.



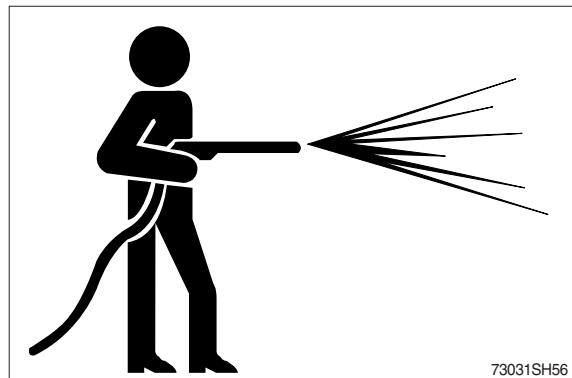
KEEP THE MACHINE CLEAN

Spilled oil or grease, or scattered tools or broken pieces are dangerous because they may cause you to slip or trip.

Always keep your machine clean and tidy.

If water gets into the electrical system, there is danger that the machine may not move or may move unexpectedly.

Do not use water or steam to clean the sensors, connectors, or the inside of the operator's compartment.

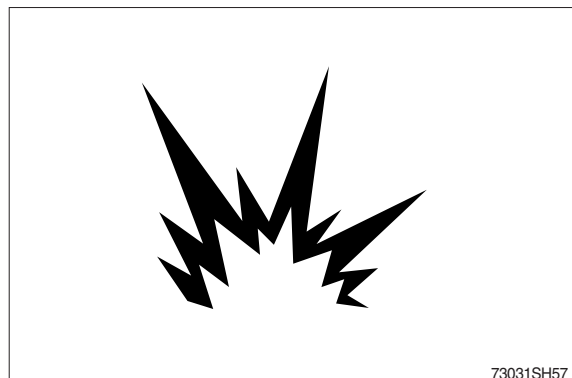


HANDLING TIRES

If tires are not used under the specified condition, they may overheat and burst or be cut and burst by sharp stones on rough road surfaces. This may lead to serious injury or damage.

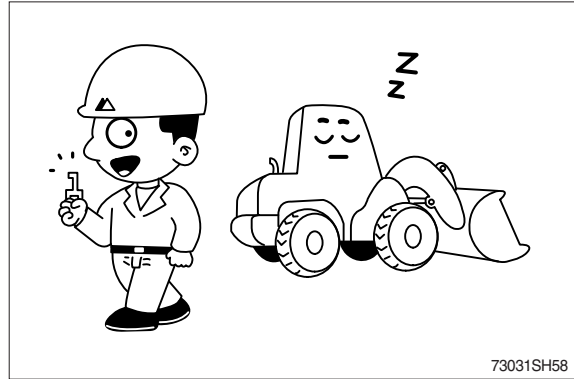
To maintain safety, always keep to the suitable conditions : See page 6-34, 35.

▲ Disassembly, reassembly, replacement and repair of tire requires special skills and equipment. Contact a tire repair shop.

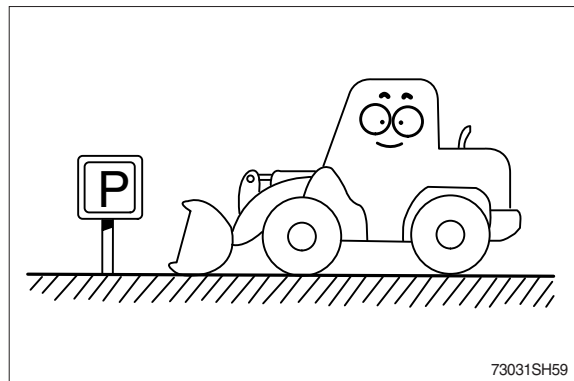


4. PARKING

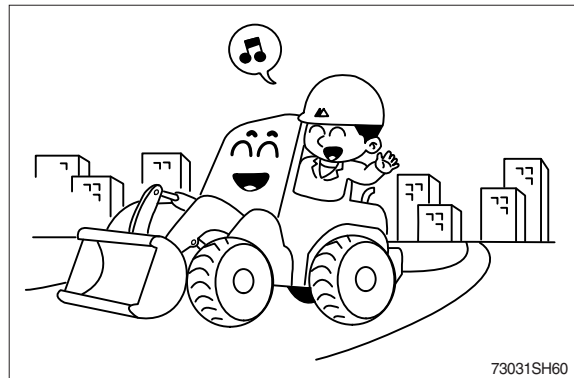
When leaving the machine lower the bucket to the ground completely and put the safety lever at parking position then remove the key.
Lock the cab door.



Park the machine in the flat and safe place.

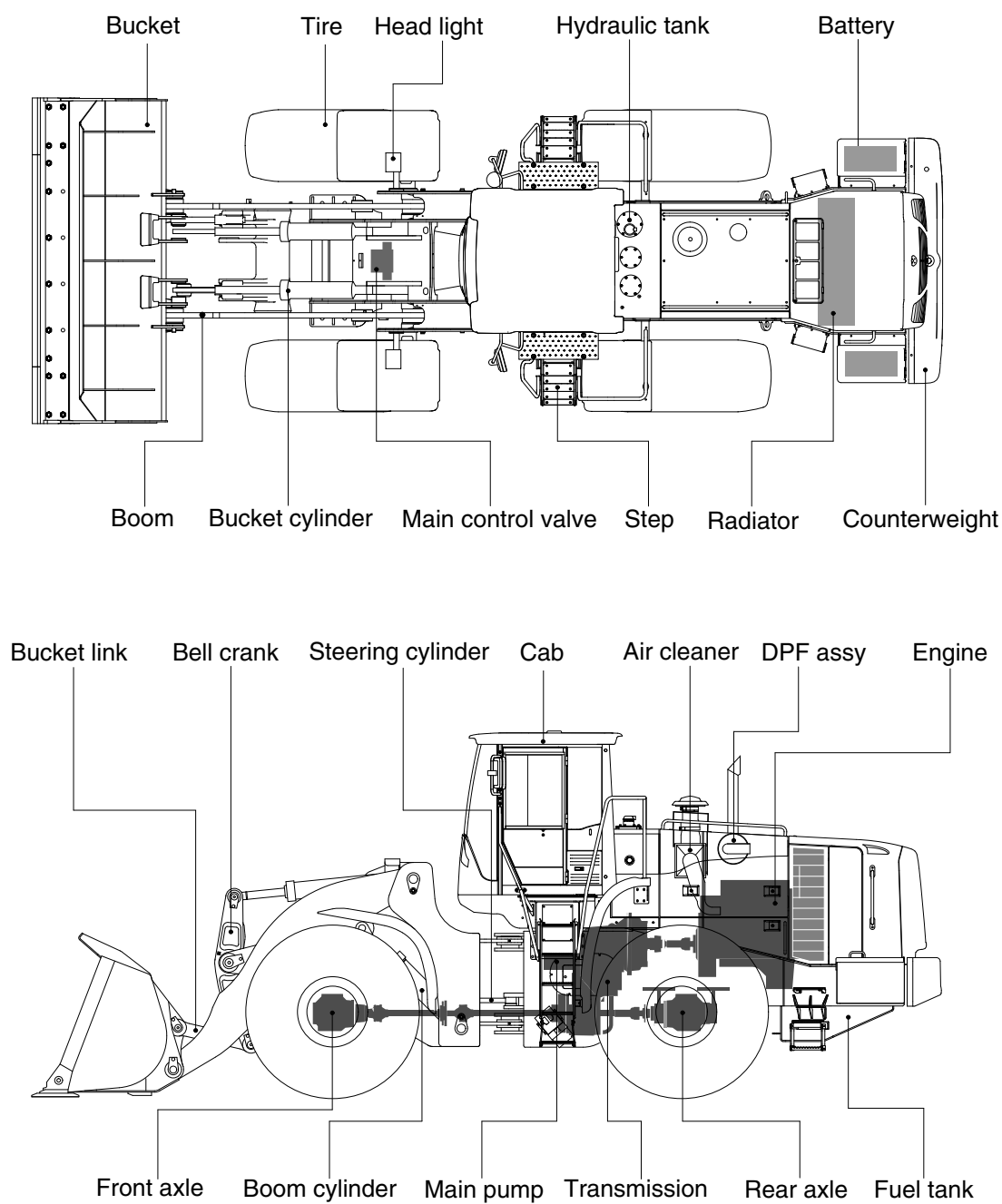


Hope you can work easily and safely observing safety rules.
For safe operation, observe all safety rules.



2. SPECIFICATIONS

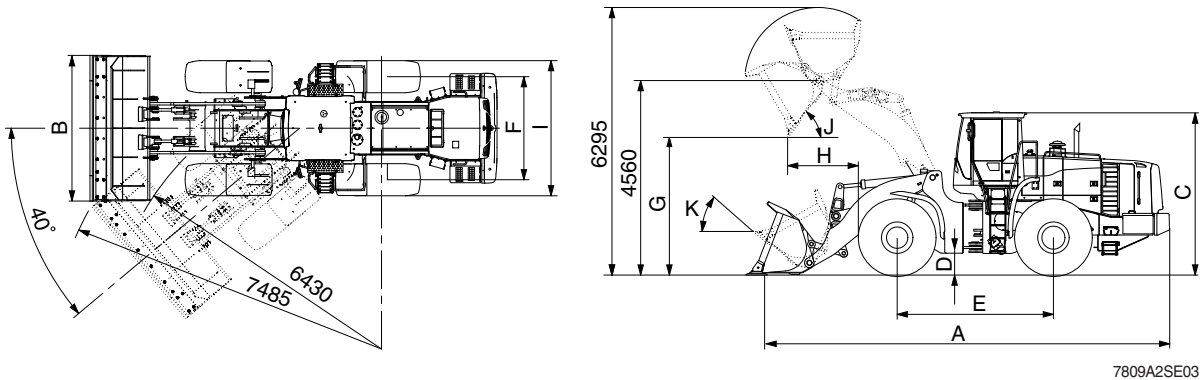
1. MAJOR COMPONENTS



7809A2SE01

2. SPECIFICATIONS

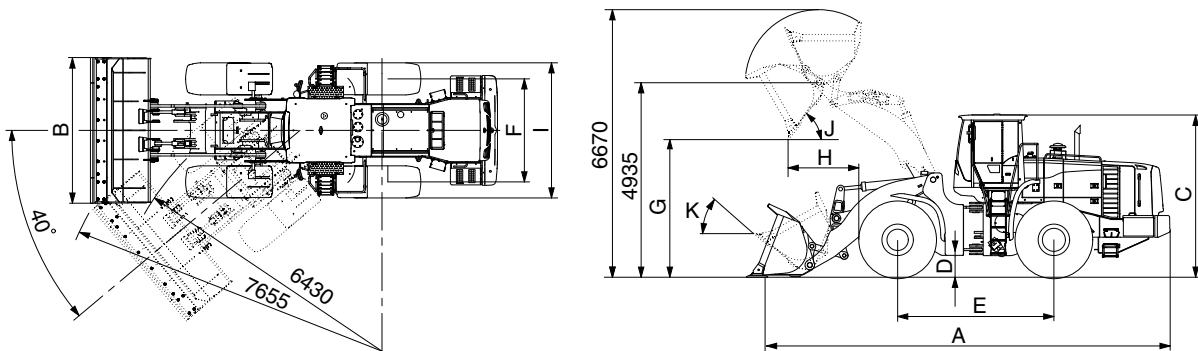
1) WITH BOLT-ON CUTTING EDGE TYPE BUCKET (HL780-9A)



7809A2SE03

Description			Unit	Specification
Operating weight			kg (lb)	30300 (66800)
Bucket capacity	Struck		m³ (yd³)	4.6 (6.0)
	Heaped			5.4 (7.1)
Overall length	A		mm (ft-in)	9630 (31' 7")
Overall width	B			3450 (11' 4")
Overall height	C			3865 (12' 8")
Ground clearance	D			495 (1' 7")
Wheelbase	E			3700 (12' 2")
Tread	F			2440 (8' 0")
Dump clearance at 45°	G			3300 (10' 10")
Dump reach (full lift)	H			1430 (4' 8")
Width over tires	I			3220 (10' 7")
Dump angle	J			degree (°)
Roll back angle (carry position)	K		48	
Cycle time	Lift (with load)		sec	6.1
	Dump (with load)			1.4
	Lower (empty)			4.1
Maximum travel speed			km/hr (mph)	36.0 (22.4)
Braking distance			m (ft-in)	12 (39' 4")
Minimum turning radius (center of outside tire)				6.43 (21' 1")
Gradeability			degree (°)	30
Breakeout force			kg (lb)	23750 (52360)
Travel speed	Forward	First gear	km/hr (mph)	6.1 (3.8)
		Second gear		11.4 (7.1)
		Third gear		17.9 (11.1)
		Fourth gear		36.0 (22.4)
	Reverse	First gear		6.1 (3.8)
		Second gear		11.4 (7.1)
		Third gear		24.8 (15.4)

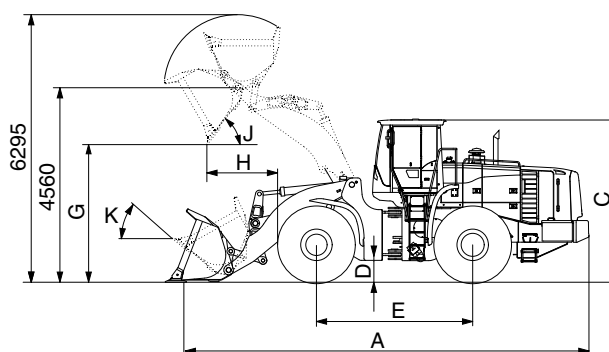
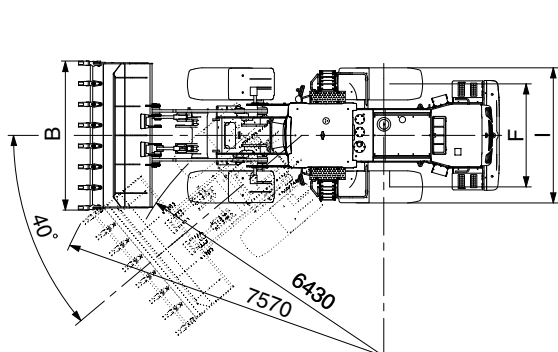
WITH BOLT-ON CUTTING EDGE TYPE BUCKET (HL780XTD-9A)



7809A2SE03-1

Description			Unit	Specification
Operating weight			kg (lb)	31100 (68560)
Bucket capacity	Struck		m³ (yd³)	4.6 (6.0)
	Heaped			5.4 (7.1)
Overall length	A		mm (ft-in)	10060 (33' 0")
Overall width	B			3450 (11' 4")
Overall height	C			3865 (12' 8")
Ground clearance	D			485 (1' 7")
Wheelbase	E			3700 (12' 2")
Tread	F			2440 (8' 0")
Dump clearance at 45°	G			3670 (12' 0")
Dump reach (full lift)	H			1480 (4' 10")
Width over tires	I			3220 (10' 7")
Dump angle	J			degree (°)
Roll back angle (carry position)	K		49	
Cycle time	Lift (with load)		sec	6.1
	Dump (with load)			1.4
	Lower (empty)			4.1
Maximum travel speed			km/hr (mph)	36.0 (22.4)
Braking distance			m (ft-in)	12 (39' 4")
Minimum turning radius (center of outside tire)				6.43 (21' 1")
Gradeability			degree (°)	30
Brokeout force			kg (lb)	23130 (50990)
Travel speed	Forward	First gear	km/hr (mph)	6.1 (3.8)
		Second gear		11.4 (7.1)
		Third gear		17.9 (11.1)
		Fourth gear		36.0 (22.4)
	Reverse	First gear		6.1 (3.8)
		Second gear		11.4 (7.1)
		Third gear		24.8 (15.4)

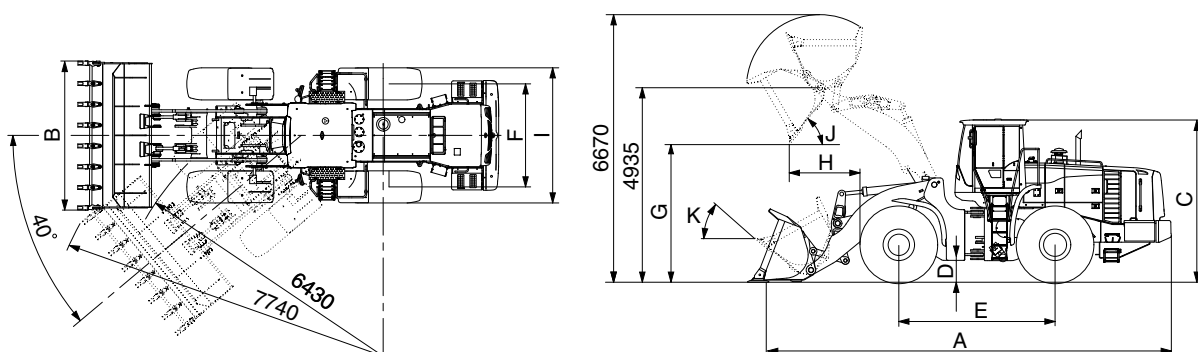
2) WITH TOOTH TYPE BUCKET (HL780-9A)



7809A2SE04

Description			Unit	Specification
Operating weight			kg (lb)	30300 (66800)
Bucket capacity	Struck		m³ (yd³)	4.4 (5.8)
	Heaped			5.2 (6.8)
Overall length	A		mm (ft-in)	9820 (32' 3")
Overall width	B			3500 (11' 6")
Overall height	C			3865 (12' 8")
Ground clearance	D			495 (1' 7")
Wheelbase	E			3700 (12' 2")
Tread	F			2440 (8' 0")
Dump clearance at 45°	G			3145 (10' 4")
Dump reach (full lift)	H			1560 (5' 1")
Width over tires	I			3220 (10' 7")
Dump angle	J			degree (°)
Roll back angle (carry position)	K		48	
Cycle time	Lift (with load)		sec	6.1
	Dump (with load)			1.4
	Lower (empty)			4.1
Maximum travel speed			km/hr (mph)	36.0 (22.4)
Braking distance			m (ft-in)	12 (39' 4")
Minimum turning radius (center of outside tire)				6.43 (21' 1")
Gradeability			degree (°)	30
Brokeout force			kg (lb)	25280 (55730)
Travel speed	Forward	First gear	km/hr (mph)	6.1 (3.8)
		Second gear		11.4 (7.1)
		Third gear		17.9 (11.1)
		Fourth gear		36.0 (22.4)
	Reverse	First gear		6.1 (3.8)
		Second gear		11.4 (7.1)
		Third gear		24.8 (15.4)

WITH TOOTH TYPE BUCKET (HL780XTD-9A)



7809A2SE04-1

Description			Unit	Specification
Operating weight			kg (lb)	31100 (68560)
Bucket capacity	Struck		m³ (yd³)	4.4 (5.8)
	Heaped			5.2 (6.8)
Overall length	A		mm (ft-in)	10250 (33' 8")
Overall width	B			3500 (11' 6")
Overall height	C			3865 (12' 8")
Ground clearance	D			495 (1' 7")
Wheelbase	E			3700 (12' 2")
Tread	F			2440 (8' 0")
Dump clearance at 45°	G			3520 (11' 7")
Dump reach (full lift)	H			1600 (5' 3")
Width over tires	I			3220 (10' 7")
Dump angle	J			degree (°)
Roll back angle (carry position)	K		49	
Cycle time	Lift (with load)		sec	6.1
	Dump (with load)			1.4
	Lower (empty)			4.1
Maximum travel speed			km/hr (mph)	36.0 (22.4)
Braking distance			m (ft-in)	12 (39' 4")
Minimum turning radius (center of outside tire)				6.43 (21' 1")
Gradeability			degree (°)	30
Brokeout force			kg (lb)	24630 (54300)
Travel speed	Forward	First gear	km/hr (mph)	6.1 (3.8)
		Second gear		11.4 (7.1)
		Third gear		17.9 (11.1)
		Fourth gear		36.0 (22.4)
	Reverse	First gear		6.1 (3.8)
		Second gear		11.4 (7.1)
		Third gear		24.8 (15.4)

3. WEIGHT

Item		kg	lb
Front frame assembly		2695	5940
Rear frame assembly		3282	7240
Front fender (LH & RH)		48	106
Counterweight (HL780-9A)		1200	2650
Additional counterweight (3EA, HL780XTD-9A)		550	1210
Cab assembly		1050	2320
Engine assembly		1269	2800
Transmission assembly		835	1840
Drive shaft (front)		25	55
Drive shaft (center)		62	137
Drive shaft (rear)		30	66
Drive shaft (upper)		13	29
Front axle (include differential)		1814	4000
Rear axle (include differential)		1820	4010
Tire (29.5-25, 22PR, L3)		430	948
Hydraulic tank assembly		280	617
Fuel tank assembly		485	1070
Main pump		45	99
Steering pump		45	99
Fan & brake pump assembly		12	26
Main control valve (2/3 spool)		88/104	194/229
Flow amplifier		29	64
Boom assembly	HL780-9A	2050	4520
	HL780XTD-9A	2260	4980
Bell crank assembly		282	620
Bucket link		60	132
5.4 m³ bucket, with bolt on cutting edge		2750	6060
5.2 m³ bucket, with tooth		2585	2430
Boom cylinder assembly (2EA)		290	639
Bucket cylinder assembly (2EA)		130	287
Steering cylinder assembly (2EA)		60	132
Seat		40	88
Battery		55	121

4. SPECIFICATION FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Cummins QSX 11.9
Type	4-cycle turbocharged, charge air cooled diesel engine
Control type	Electronic control
Cooling method	Water cooling
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	130 × 150 mm (5.12" × 5.91")
Piston displacement	11900 cc (726 cu in)
Compression ratio	16.6
Rated gross horse power	360 ps at 2000 rpm
Maximum gross torque at 1400 rpm	173 kgf · m (1250 lbf · ft)
Engine oil quantity	43 l (11.4 U.S. gal)
Wet weight	1269 kg (2797 lb)
High idling speed	2030 ± 50 rpm
Low idling speed	800 ± 25 rpm
Rated fuel consumption	162 g/ps-hr
Starting motor	Delco Remy 39MT HO (24 V-7.5 kW)
Alternator	Delco Remy 28SI (24 V-80 Amp)
Battery	2 × 12V × 220Ah

2) STEERING PUMP / MAIN PUMP

Item	Specification	
	Steering pump	Main pump
Type	Variable piston pump	
Capacity	110 cc/rev	100 cc/rev
Maximum operating pressure	280 kgf/cm ² (3980 psi)	
Rated oil quantity	220 l /min (58.1 U.S.gpm)	200 l /min (52.8 U.S.gpm)
Rated speed	2000 rpm	

3) FAN & BRAKE PUMP

Item	Specification
Type	Piston pump
Capacity	45 cc/rev
Maximum operating pressure	250 kgf/cm ² (3560 psi)
Rated oil quantity	90 l /min (23.8 U.S.gpm)
Rated speed	2000 rpm

4) MAIN CONTROL VALVE

Item	Specification
Type	2 spool
Operating method	Hydraulic pilot assist
Main relief valve pressure	280 kgf/cm ² (3980 psi)
Overload relief valve pressure	340 kgf/cm ² (4840 psi)
Overload relief valve pressure (dump)	310 kgf/cm ² (4410 psi)

5) REMOTE CONTROL VALVE

Item		Specification
Type		Pressure reducing type
Operating	Minimum	5 kgf/cm ² (71 psi)
	Maximum	30 kgf/cm ² (427 psi)
Single operation angle	degree	17

6) CYLINDER

Item		Specification
Boom cylinder		Bore dia × Rod dia × Stroke ø 180 × ø 105 × 863 mm
Bucket cylinder	HL780-9A	Bore dia × Rod dia × Stroke ø 140 × ø 75 × 575 mm
	HL780XTD-9A	Bore dia × Rod dia × Stroke ø 140 × ø 75 × 570 mm
Steering cylinder		Bore dia × Rod dia × Stroke ø 105 × ø 55 × 480 mm

7) DYNAMIC POWER TRANSMISSION DEVICES

Item			Specification
4-speed transmission (std)	Model		ZF 4WG 310
	Type	Converter	Single-stage, double-phase
		Transmission	Full-automatic power shift
	Converter stall ratio		2.51 : 1
	Gear shift		Forward fourth gear, reverse third gear
	Control		Electrical single lever type, kick-down system Automatic kick down from 2nd to 1st gear FNR switch on joystick lever (option)
	Pump rated flow		135 ℓ /min (35.7 U.S.gpm) at 2000 rpm
	Travel speed		See the page 2-2.
5-speed transmission (opt)	Model		ZF 5WG 310
	Type	Converter	Single-stage, double-phase (with lock up clutch)
		Transmission	Full-automatic power shift
	Converter stall ratio		2.51 : 1
	Gear shift		Forward fifth gear, reverse third gear
	Control		Electrical single lever type, kick-down system Automatic kick down from 2nd to 1st gear FNR switch on joystick lever (option)
	Pump rated flow		135 ℓ /min (35.7 U.S.gpm) at 2000 rpm
	Travel speed	Forward 1/2/3/4/5	6.1 / 11.8 / 18.3 / 26.6 / 41.0 km/hr
		Reverse 1/2/3	6.1 / 11.8 / 26.6 km/hr
Axle	Drive devices		4-wheel drive
	Front		Front fixed location
	Rear		Oscillation $\pm 13^\circ$ of center pin-loaded
Wheels	Tires		29.5-25, 22PR (L3)
Brakes	Travel		Four-wheel, wet-disc type, full hydraulic
	Parking		Spring applied, hydraulic released brake on T/M
Steering	Type		Full hydraulic, articulated
	Steering angle		40° to both right and left angle, respectively

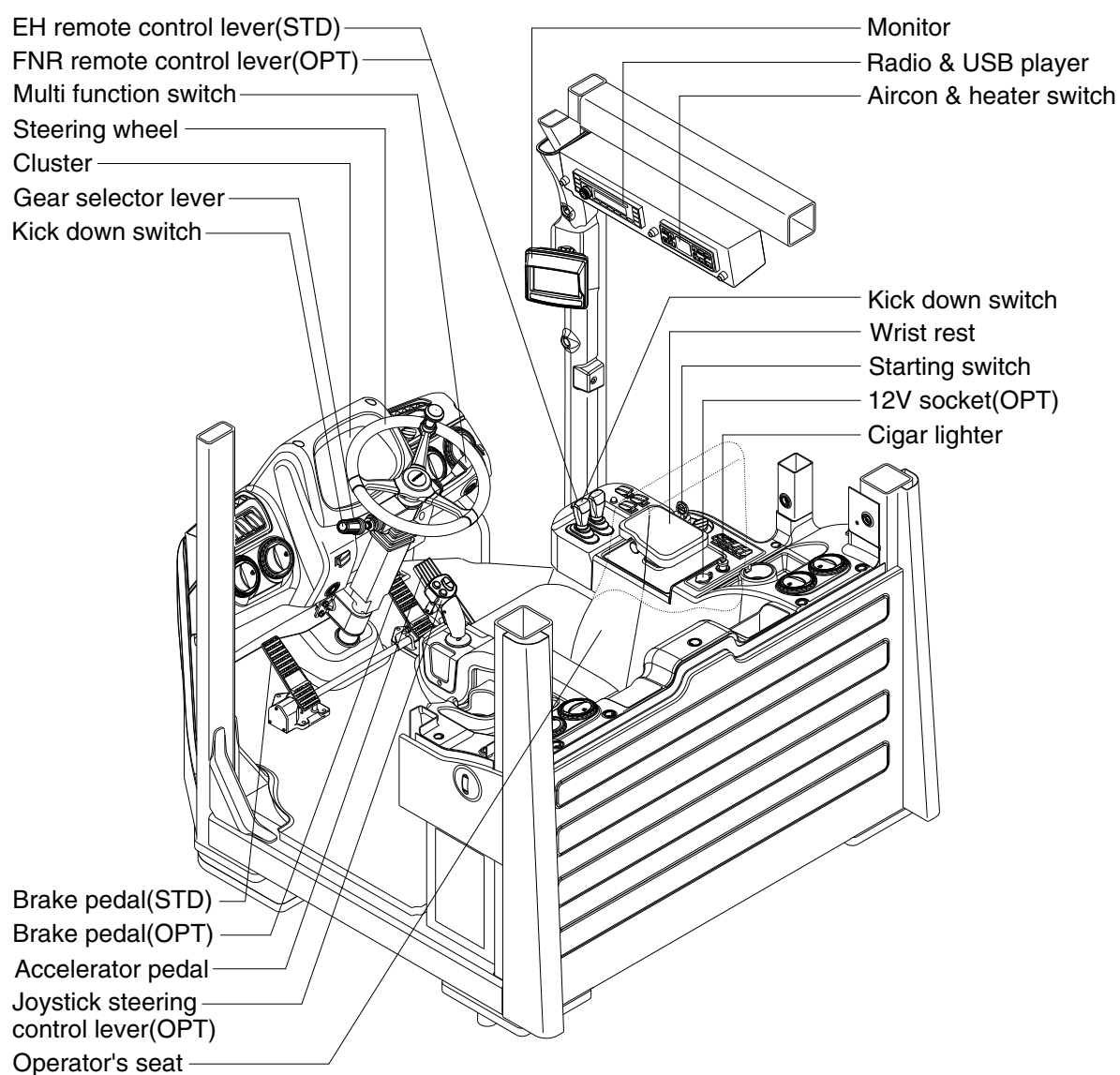
3. CONTROL DEVICES

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.



7809A3CD01

2. CLUSTER

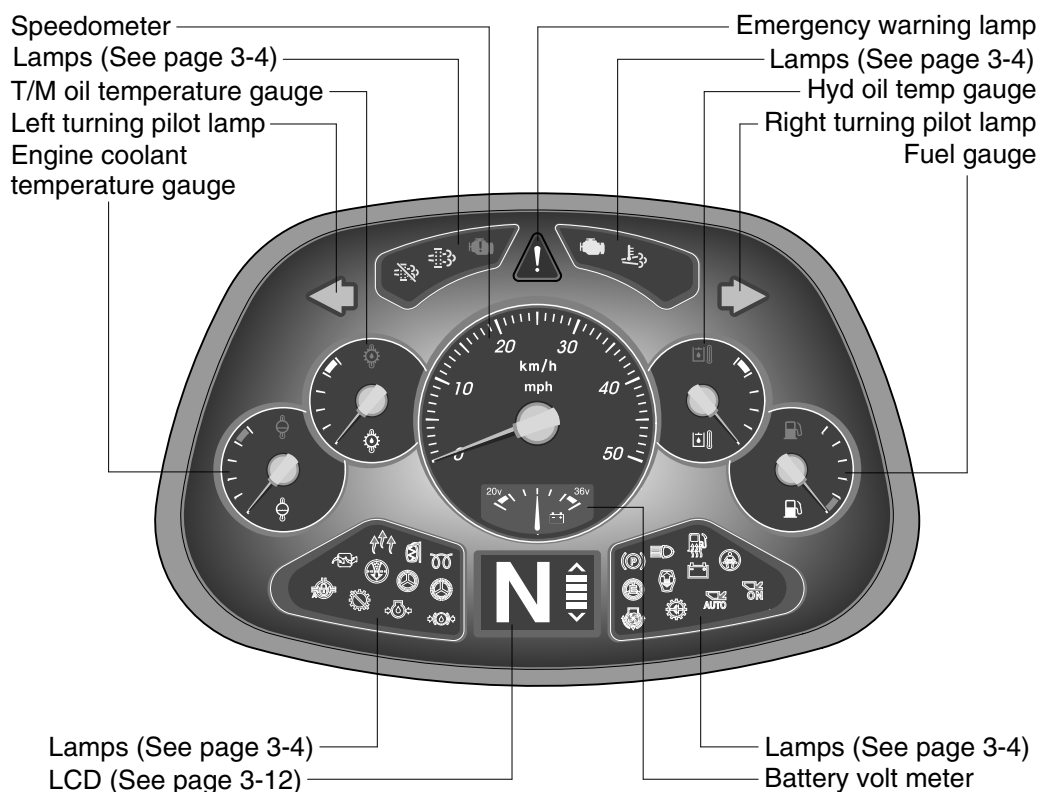
1) STRUCTURE

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

- Gauges : Indicate operating status of the machine.
- Warning lamps : Indicate abnormality of the machine.
- Pilot lamps : Indicate operating status of the machine.
- LCD : Indicates selected the driving speed and direction.

※ 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.

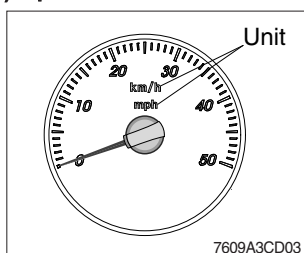
※ When the cluster provides a warning immediately check the problem, and perform the required action.



7609A3CD02

2) GAUGE

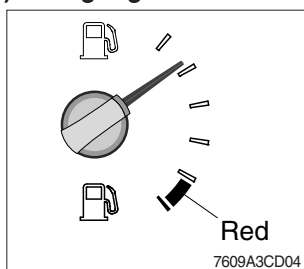
(1) Speedometer




① The speedometer displays the speed of machine in mph and km/h.

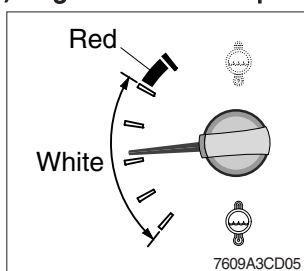
※ The unit (km/h or mph) can be set by the display set up menu of the monitor and selected unit is displayed.
Refer to page 3-32.


(2) Fuel gauge



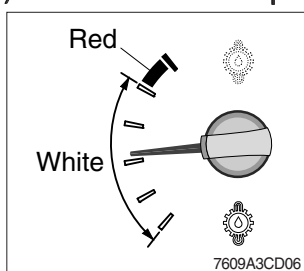
- ① This gauge indicates the amount of fuel in the fuel tank.
 - ② Fill the fuel when the indicator moves red range or  lamp blinks in red, refuel as soon as possible to avoid running out of fuel.
- ※ If the gauge indicates below red range even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.


(3) Engine coolant temperature gauge



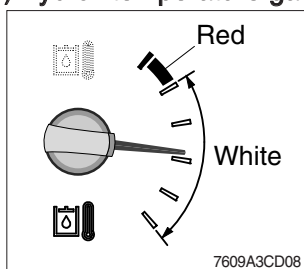
- ① This gauge indicates the temperature of coolant.
 - White range : 40~104°C (104~219°F)
 - Red range : Above 104°C (219°F)
- ② If the indicator is in the red range or  lamp blinks in red, turn OFF the engine and check the radiator and engine.


(4) Transmission oil temperature gauge



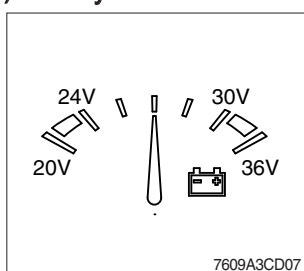
- ① This gauge indicates the temperature of transmission oil.
 - White range : 40~107°C (104~225°F)
 - Red range : Above 107°C (225°F)
- ② If the indicator is in the red range or  lamp blinks in red, it means the transmission is overheated. Be careful that the indicator does not move into the red range.

(5) Hyd oil temperature gauge



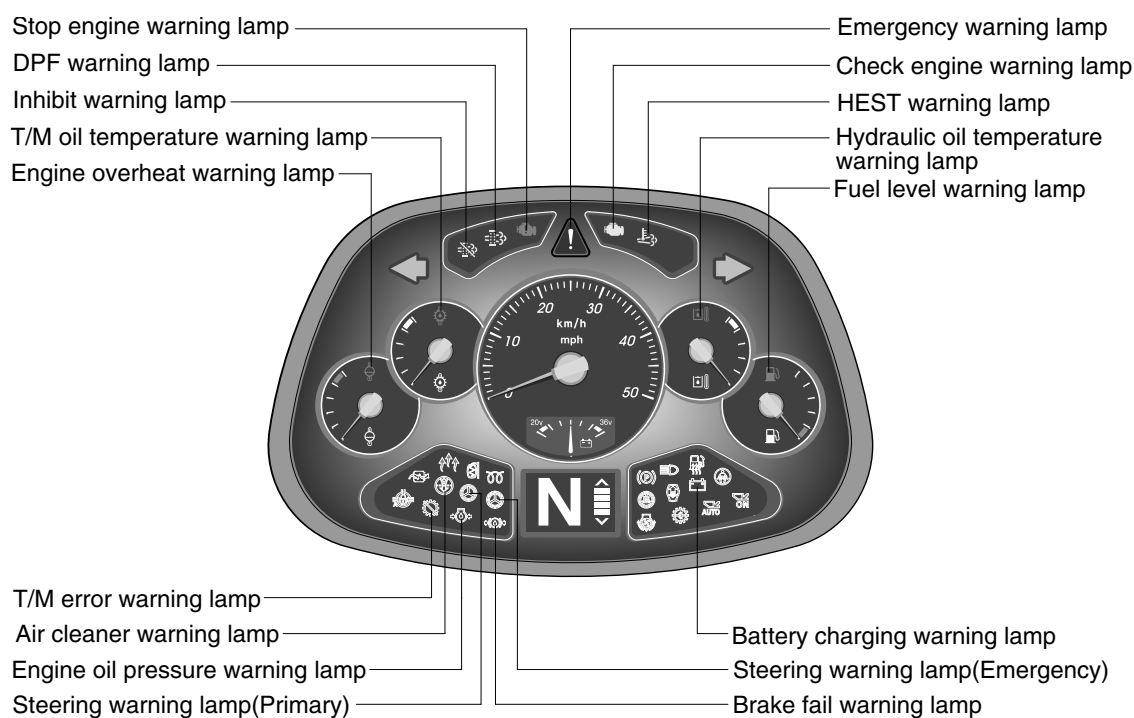
- ① This gauge indicates the temperature of hydraulic oil.
 - White range : 40~105°C (104~221°F)
 - Red range : Above 105°C (221°F)
- ② If the indicator is in the red range or  lamp blinks in red, reduce the load on the system.
- ③ If the gauge stays in the red range, stop the machine and check the cause of the problem.

(6) Battery volt meter



- ① This gauge indicates the voltage in the charging system when the engine is running.
- ② If the indicator is below 24V, it means that the electricity is being discharged. If the indicator is above 30V, an unusually high voltage may damage the alternator. Check the charging system in both cases.

3) WARNING LAMPS



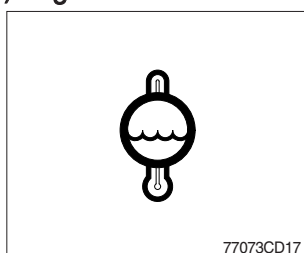
7609A3CD09

(1) Emergency warning lamp



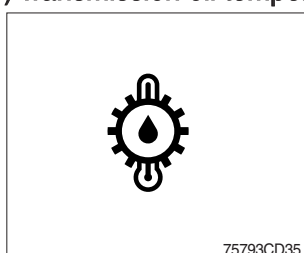
- ① This warning lamp blinks and the buzzer sounds when communication error occur between monitor and MCU.
- ② When this warning lamp blinks, machine must be checked and service immediately.

(2) Engine overheat warning lamp



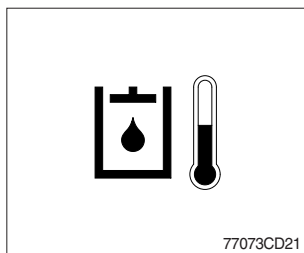
- ① This lamp is turned ON when the temperature of coolant is over the normal temperature (106°C, 223°F).
- ② Check the cooling system when the lamp is ON.

(3) Transmission oil temperature warning lamp



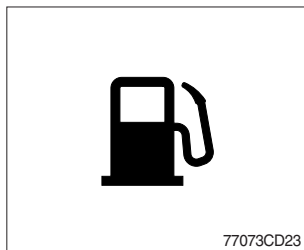
- ① This lamp informs the operator that transmission oil is above the specified temperature.
- ② When this lamp lights up during operation, stop the engine and check the machine.

(4) Hydraulic oil temperature warning lamp



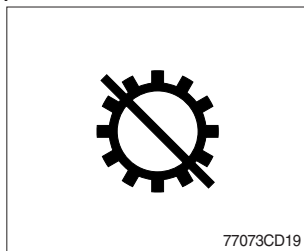
- ① This warning lamp operates and the buzzer sounds when the temperature of hydraulic oil is over 105°C (221°F).
- ② Check the hydraulic oil level when the lamp is turned ON.
- ③ Check for debris between oil cooler and radiator.

(5) Fuel level warning lamp



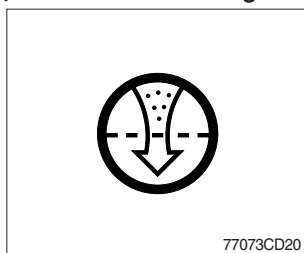
- ① This warning lamp lights ON when the fuel level is low. Refuel the machine as soon as possible.

(6) Transmission error warning lamp



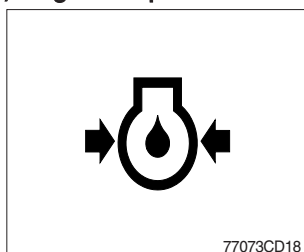
- ① This lamp lights ON and the LCD display show the error codes when an error occurs in the transmission.
 - ② Immediately pull the machine to a convenient stop. Stop the engine. Investigate the cause.
- ※ **Consult a HYUNDAI dealer to investigate the cause.**
- ※ **Do not operate until the cause has been corrected.**

(7) Air cleaner warning lamp



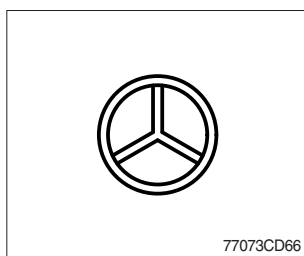
- ① This lamp lights ON when the filter of air cleaner is clogged.
 - ② When the air cleaner warning lamp is ON, clean the primary elements.
- ※ **Replace the primary elements after 4 times cleanings.**
- ※ **The safety elements should be replaced at the time the primary elements are replaced.**

(8) Engine oil pressure warning lamp



- ① This lamp is comes ON after starting the engine because of the low engine oil pressure.
- ② If the lamp comes ON during engine operation, shut OFF engine immediately. Check engine oil level.

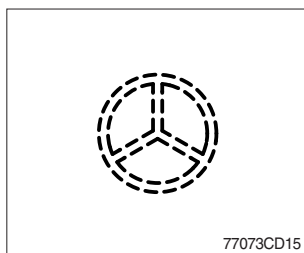
(9) Steering warning lamp



① Primary

This lamp indicates that the primary steering has failed. When the indicator comes on and the action alarm sounds, steer the machine immediately to a convenient location and stop the machine. Stop the engine and investigate the cause.

※ **Do not operate the machine until the cause has been corrected.**



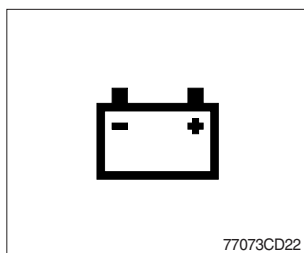
② Emergency

This lamp indicates the emergency steering system is active.

※ **Immediately pull the machine to a convenient stop and stop the engine.**

※ **The emergency steering system can be manually tested. Refer to page 3-38.**

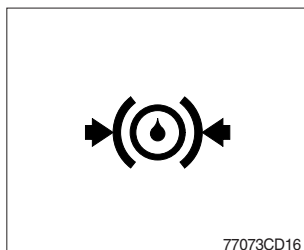
(10) Battery charging warning lamp



① This lamp is ON when key ON, it is turned OFF after starting the engine.

② Check the battery charging circuit when this lamp comes ON, during engine operation.

(11) Brake fail warning lamp

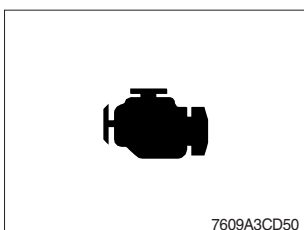


① The lamp lights ON when the oil pressure of service brake drops below the normal range.

② When the lamp is ON, stop the engine and check for its cause.

※ **Do not operate until any problems are corrected.**

(12) Check engine warning lamp



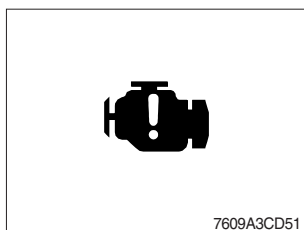
① This lamp lights ON and the buzzer sounds when the communication between MCU and engine ECM on the engine is abnormal, or if the cluster received any fault code from engine ECM.

② Check the communication line between them.

If the communication line is OK, then check the fault codes on the cluster.

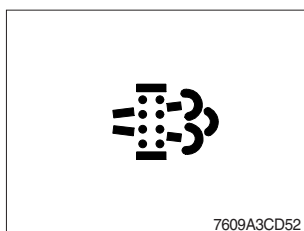
③ Also, this lamp lights ON when the level of DPF soot is high.

(13) Stop engine warning lamp






- ① If the lamp lights ON and the buzzer sounds, stop the engine immediately and check the engine.
 - ② Check the fault codes on the monitor.
- ※ **Please contact your Hyundai service center or local dealer.**

(14) DPF (Diesel particulate filter) warning lamp

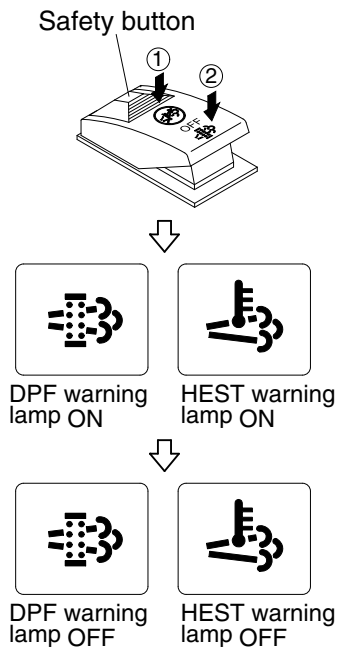


- ① This warning lamp lights ON or blinks when the regeneration is needed as table below.
- ※ **Consequences of delaying regeneration**
- Poor performance caused by increasing exhaust gas pressure.
 - Higher fuel consumption
 - Shorter filter lifetime

Condition	Warning lamp				Remedy
	DPF 		Check engine 	Stop engine 	
	Automatic regeneration (unfunction)	Automatic regeneration (function)			
Normal	Off	Off	Off	Off	· Automatic regeneration
Soot low	On	Off	Off	Off	· Automatic or manual regeneration · When automatic regeneration start function DPF lamp automatically switched off
Soot midium	Blink	Off	Off	Off	· Initiate a manual regeneration as following page (When automatic regeneration did not work) · Engine power may be reduced automatically (soot medium)
Soot high	Blink	Off	On	Off	· Automatic regeneration did not work · Initiate a manual regeneration · Engine power and speed will be reduced automatically
Stop	Off	Off	Off	On	· Stop the engine immediatary. · Please contact your Hyundai service center or local dealer.

* Automatic regeneration start function depends on inside temperature of aftertreatment device.

※ Manual regeneration method of DPF



2609A3CD143

※ Manual regeneration applies if the machine is in a fireproof area and there is no plan to turn off the machine during the regeneration.

① Stop and park the machine.

② Pull the safety button and push the switch to position ② to initiate the manual regeneration of DPF.

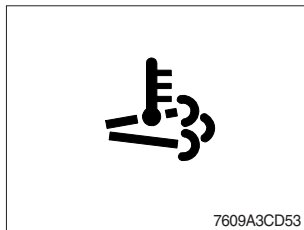
※ Refer to the page 3-40 for the switch operation.

※ The engine speed may increase to 950~1050 rpm and DPF regeneration begins and it will take approximately 20~30 minutes.

③ The DPF and HEST warning lamp will light ON during the regeneration function is operating.

④ The DPF and/or HEST warning lamp will light OFF when the regeneration function is completed.

(15) HEST (High exhaust system temperature) warning lamp



① This warning lamp indicates, when illuminated, that exhaust temperatures are high due to regeneration of the DPF.

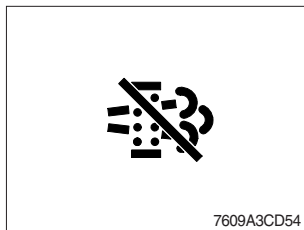
② The lamp will also illuminate during a manual regeneration.

③ When this lamp is illuminated, be sure the exhaust pipe outlet is not directed at any surface or material that can melt, burn, or explode.

⚠ When this lamp is illuminated, the exhaust gas temperature could reach 800°C [1500°F], which is hot enough to ignite or melt common materials, and to burn people.

※ The lamp does not signify the need for any kind of equipment or engine service; It merely alerts the equipment operator to high exhaust temperatures. It will be common for the lamp to illuminate on and off during normal equipment operation as the engine completes regeneration.

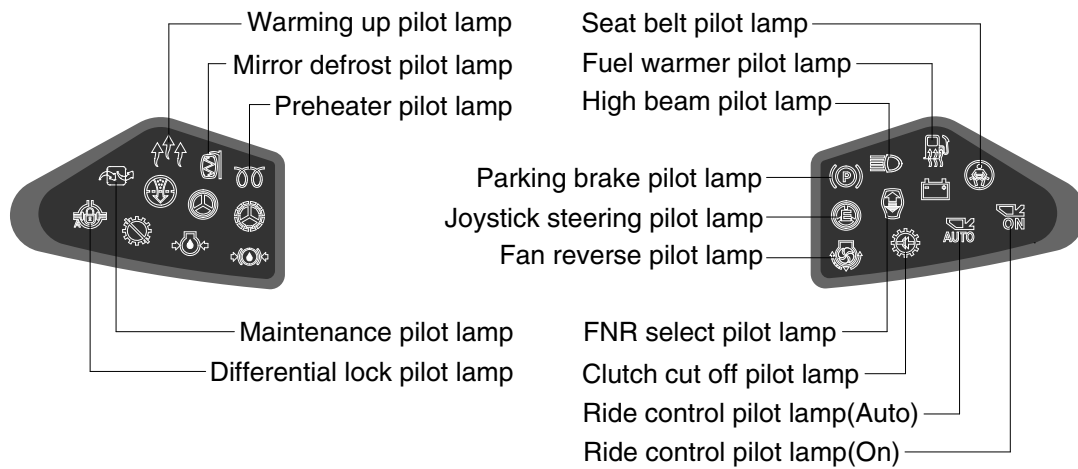
(16) DPF regeneration inhibit warning lamp



① This warning lamp indicates, when illuminated, the DPF switch is pushed inhibit position, therefore automatic and manual regeneration can not occur.

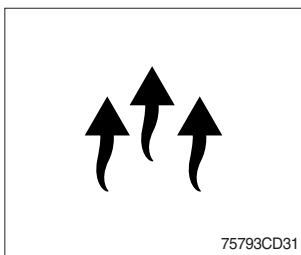
※ Refer to the page 3-40 for the DPF switch.

4) PILOT LAMPS



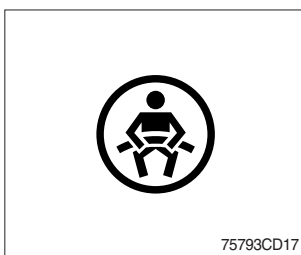
7609A3CD10

(1) Warming up pilot lamp



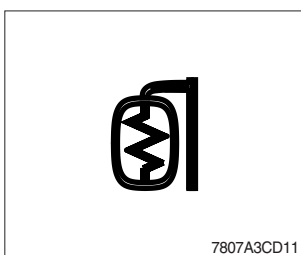
- ① This lamp is turned ON when the coolant temperature is below 30°C (86°F).
- ② The automatic warming up is cancelled when the engine coolant temperature is above 30°C, or when 10 minutes have passed since starting the engine.

(2) Seat belt pilot lamp



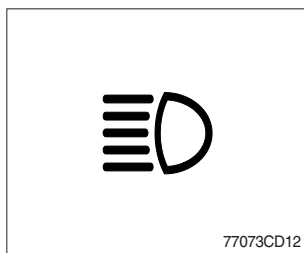
- ① This lamp lights ON for the first five seconds after starting the engine.

(3) Mirror defrost pilot lamp



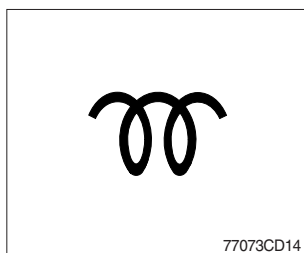
- ① This lamp comes ON when mirror defrost switch is pressed.
- ※ Refer to page 3-37 for details.

(4) High beam pilot lamp



- ① This lamp works when the illuminating direction is upward.
- ② This lamp comes ON when the dimmer switch is operated, e.g., when passing another vehicle.

(5) Preheat pilot lamp



- ① This lamp lights ON when start switch is turned clockwise to the ON position. Light will turn off after approximately 5~45 seconds, depending on engine temperature, indicating that preheating is completed.
- ② When the lamp goes out the operator should start cranking the engine.

※ Refer to page 4-5.

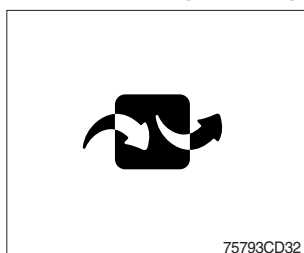
(6) Parking brake pilot lamp



- ① When the parking brake is actuated, the lamp lights ON.

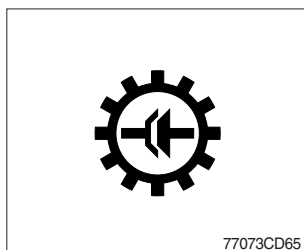
※ Check the lamp is OFF before driving.

(7) Maintenance pilot lamp



- 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 the monitor menu. Also, this lamp lights ON for 3 minutes when the start switch is ON position.

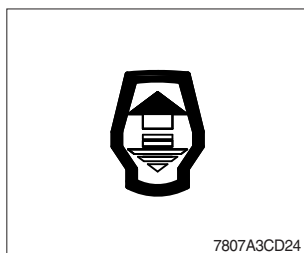
(8) Clutch cut off pilot lamp



- ① This lamp lights ON when clutch cut off mode switch is positioned L, M, H.

※ Refer to page 3-40.

(9) FNR select pilot lamp (option)



- ① The lamp comes ON when FNR select button on the optional FNR remote control lever is pressed.
- ※ Refer to page 3-45.

(10) Joystick steering pilot lamp (option)



- ① This lamp lights ON when joystick steering is activated. It is then possible to steer the machine and select gears from the armrest to the left of the operator's seat.
- ※ Refer to page 3-47.

(11) Ride control pilot lamp (option)



- ① **Auto ride control**
This lamp lights ON when push in the bottom of the ride control switch (auto position).
- ※ Refer to page 3-38.



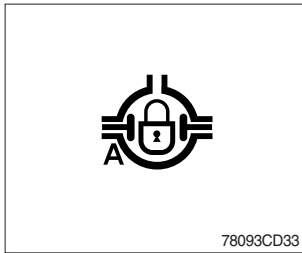
- ② **Manual ride control**
This lamp lights ON when push in the top of the ride control switch (manual position)
- ※ Refer to page 3-38.

(12) Fan reverse pilot lamp



- ① This lamp lights ON when the fan control switch is pressed.
- ※ Refer to page 3-37.

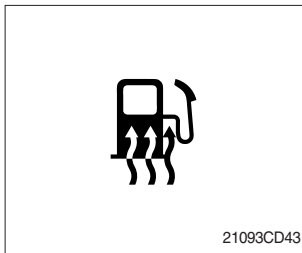
(13) Differential lock pilot lamp



- ① This lamp lights ON when the differential lock function is operating.

※ Refer to page 3-39.

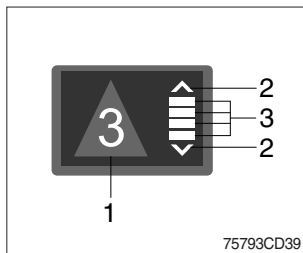
(14) Fuel warmer pilot lamp



- 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.

5) LCD



- (1) The LCD can be used with the gear selector.

It indicates speed and driving direction.

No	Symbol	Meaning	Remark
1	△, ▽, □	Actual gear display	Forward, reverse, neutral
	1, 2, 3, 4, 5		Actual gear
	P		Parking brake mode active
2	▲, ▼	Forward, reverse	Automatic mode
3	■	Gear range display	Automatic mode

3. MONITOR (5.7 inch touch screen)

- The monitor is adjustable.
 - Vertical : 14°
 - Horizontal : 30°



7609A3CD23

1) BUTTONS

(1) Menu button



- ① Main display to main menu, main menu to main display.
- ② AEB cancel or finish button in AEB.

(2) Left move button



- ① Move in menu (left, up).
- ② Decrease input value.

(3) Camera / ESC button



- ① Enter rear camera mode in main display.
- ② For other menu, this is used for cancellation (move to previous menu).
- ③ AEB cancel or finish button in AEB.

(4) Right move / Buzzer stop button



- ① Move in menu (right, down).
- ② Stop buzzer sound when sound is on.
- ③ Increase input value.

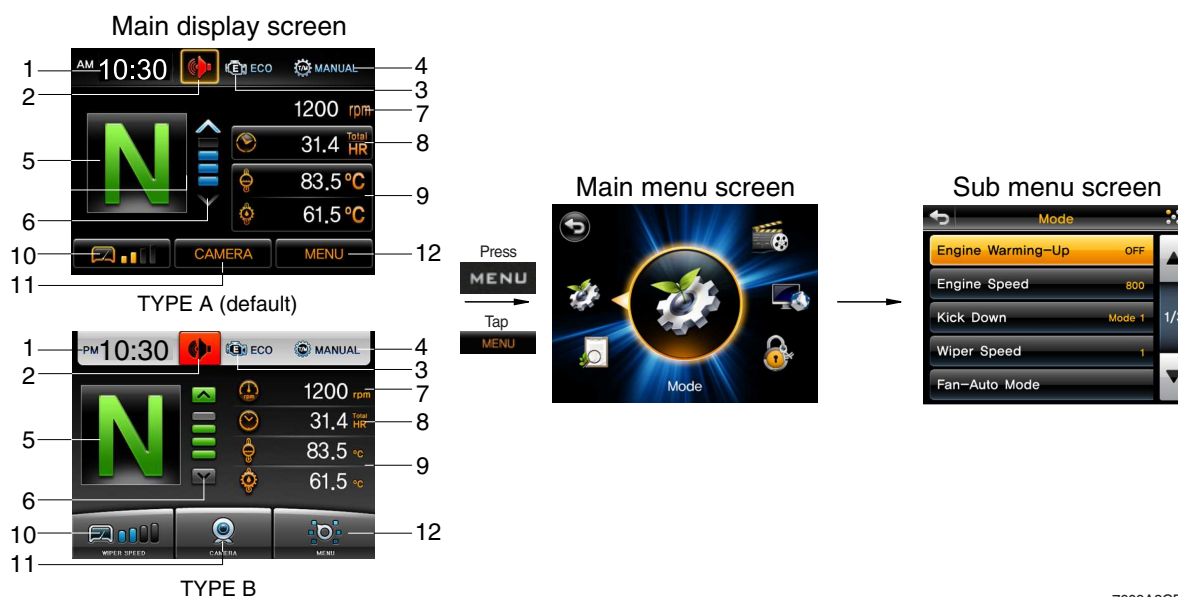
(5) Enter button



- ① Select menu (enter).
- ② AEB cancel or finish button in AEB.

2) MAIN MENU

- ※ You can select or set the menu by the select switch or touch screen.
- ※ Please refer to button, page 3-13 for selection and change of menu and input value.
- ※ Display type can be changed by operator. See page 3-32.



7609A3CD11

1 Clock	5 Actual gear	9 Machine monitoring
2 Buzzer	6 Select gear	10 Wiper speed
3 Engine mode	7 Engine rpm	11 Camera screen
4 Transmission mode	8 Hour meter, odometer	12 Menu

(1) Pop up and stop buzzer sound

- ① In main display, you can check the data and setup what you want by touching wiper speed, hour/ODO meter and monitoring window area.
- ② Pop up window will be closed in 3 seconds after touching the window or by pressing outside area of popup window.



7609A3CD55

- ③ When the buzzer sound is ON, the red icon will be activated. If you want to stop buzzer sound, just touch the icon.



7609A3CD59

(2) Warning

- ① Warning sign will be shown when the temperature of hydraulic oil, cooling water and transmission oil is not normal state (red icon will be shown at center of display and then move to assigned area).
- ② Case of warning sign
 - Above 105°C of hydraulic oil temperature
 - Above 104°C of cooling water temperature
 - Above 107°C of T/M oil temperature



7609A3M56






(3) Communication error

- ① MCU could not communicate with monitor over 10 seconds, error message will be show on the screen.



7609A3M57

3) MAIN & SUB MENU STRUCTURE

No	Main menu	Sub menu	Description
1	 <p>Mode</p> <p>7609A3CD12</p>	Engine warming up Engine speed Kick down Wiper speed Fan-auto mode AEB Speed meter setting Boom/bucket angle Boom pressure Brake pedal sensor calibration Bucket priority Auxiliary max flow level setting	Engine warming up Engine speed Mode 1 (down/up), Mode 2 (down only) 4 steps Interval and time setting AEB setting Pulse setting Boom/bucket angle calibration Boom pressure calibration Brake pedal sensor calibration Bucket priority function ON/OFF Set the auxiliary max flow level
2	 <p>Monitoring</p> <p>7609A3CD13</p>	Fault code Machine monitoring Monitoring history	Machine, Active/logged fault, ECU, TCU, SCU, EHC Hyd temp, Battery, Engine coolant temp T/M oil temp, Weighing system Hour meter, ODO meter
3	 <p>Management</p> <p>7609A3CD14</p>	ESL system setting Maintenance Machine information Service contact Touch calibration Service menu	Machine security, Change password, Manage the smart key usage Replacement, Change cycle (oils and filters) Version, Machine information Check and change of contact information Calibrating the touch screen S/W update, Manage the smart key tag
4	 <p>Display set up</p> <p>7609A3CD15</p>	Clock Brightness setting Display type Unit Rear camera Language	Clock Brightness setting (Manual/Automatic/Day time set) Type A, Type B Temp (°F/°C), Speed (km/h, mph), Weight (ton, lb), Pressure (bar, Mpa, kgf/m², psi) Reverse mode, Active camera, Display order 12 languages
5	 <p>Multimedia</p> <p>7609A3CD16</p>	Audio player Video player	Play MP3, OGG, WMV Play AVI, WMV

(1) Function of sub menu icons

1 Previous step button (same as ESC function)

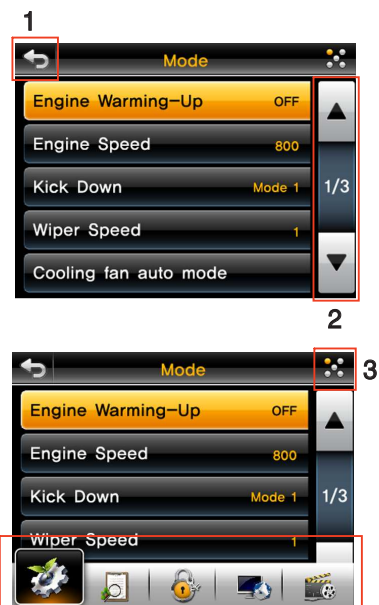
- Move to previous screen.
- Close pop up screen.

2 Scroll

- Display present page/total page.
- Move to page by using up / down arrow button.

3 Move to main menu

- Main menu icon is shown at the below of screen.
- You can choose the main menu directly.



7609A3CD30/31

(2) Mode

① Engine warming up



- Setting engine warming-up ON/OFF

② Engine speed



- Setting engine low idle rpm

③ Kick down



- Mode 1 (down/up) : Press kick down switch once, shift down and press switch again, shift up.
- Mode 2 (down only) : Press kick down switch every time, shift to lower gear respectively.

※ Refer to page 3-42.

④ Wiper speed



- Setting wipe speed 1 to 4.

⑤ Fan-auto mode



- In auto position, select reverse interval or reverse time.
- Set reverse interval (30~300 min) or reverse time (30~300 sec).

※ Default : Interval (60 min), time (120 sec)






※ Refer to page 3-37, fan control switch.

※ Using button

- To change the value, press ◀ or ▶/↻.
- To change the position (hour, minute), press ⌚.

⑥ AEB





- AEB mode controls the disk clearance of the transmission, automatically.
- To start AEB setting, press AEB bar (or ) for 3 seconds.
- To cancel AEB setting, press **MENU**, /ESC or .
- If "OK" in actual gear window, press **MENU**, /ESC or  to complete AEB setting.
- **Display during AEB mode**

Symbol	Meaning
ST	Start AEB
K1~K4, KV, KR	Calibrating clutch K1~K4, KV or KR respectively
OK*	Calibration for all clutches finished
Spanner and Kx*	Kx couldn't be calibrated, AEB finished
△E	Engine speed too low - Raise engine speed
▽E	Engine speed too high - Lower engine speed
△T	Transmission oil temperature too low - Heat up transmission
▽T	Transmission oil temperature too high - Cool down transmission
FO*	Output speed not zero
FN*	Shift lever not in neutral position
FP*	Parking brake not applied

* : Transmission stays in neutral, you have to restart the TCU (starting switch off/on).

⑦ Speed meter setting



- Press speed meter setting bar (or ) for 3 seconds.
- ※ **Only for the service person. Do not adjust arbitrary.**
- ※ **Using button**
- To change the pulse value, press ◀ or ▶/⌂.
- To change the position, press .

⑧ Boom / bucket angle




7609A3M21



7609A3M21A

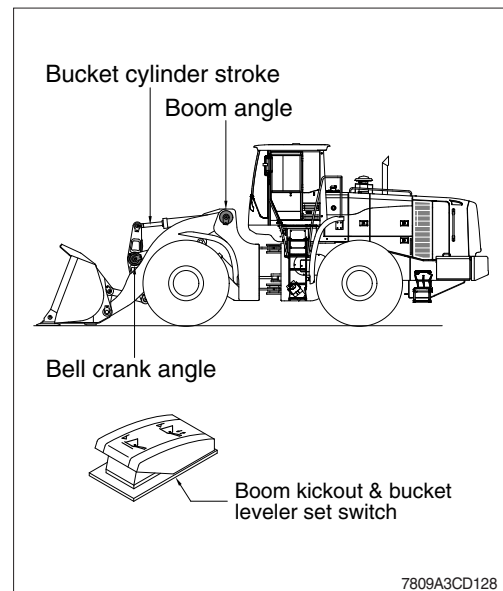
- Press NEXT button after following the instruction at each step.
- If correction is right, NEXT button will be activated, then go to next stage.
- After following each step correctly, the message "Calibration is done" will be shown. Press OK button, then process be ended.

※ Using button

- Using  instead of NEXT, OK button.






· Boom / Bucket angle calibration

- MCU get sensing signal from boom angle and bell crank angle and calculate bucket cylinder stroke and boom link position angle from ground real time basis.
 - Boom angle position and bucket cylinder stroke is set by boom kickout & bucket leveler set switch in cab.
 - Individual setting position is done by lever (detent, release operation).
 - Angle sensor calibration is basically carried out before delivery of the machine.
- When angle sensor is replaced or actual value is different compared to setting value, this function can be done.



7809A3CD128

- The calibration must be carried out as follows :

- ① Lower the boom at maximum low position and press NEXT button or  (bucket must be max tilting position).
- ② Raise boom at maximum high position and press NEXT button (or ).
- ③ Position boom at -5° and press NEXT button (or ).
- ④ Retract bucket cylinder length (to minimum position) at -5° boom position and press NEXT button (or ).
- ⑤ Extend bucket cylinder length (to maximum position) at -5° boom position and press NEXT button (or ).
- ⑥ In case above steps are carried normally, "Calibration is done" message is shown. Then angle sensor calibration is finished.

※ **Boom down / boom up / bucket position setting** : Refer to page 4-22.

⑨ Boom-pressure



7609A3M21C



7609A3M21D


Display A

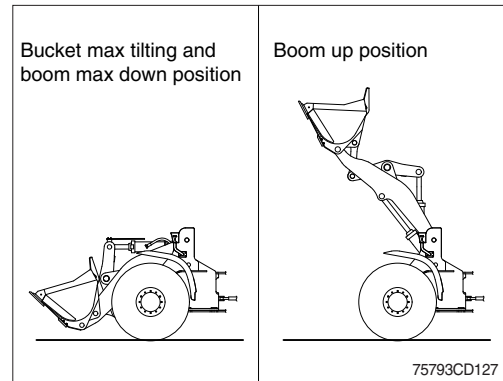
- Press START button after following the instruction.
- After a few minutes, "Calibration fail" or "Calibration success" message will be shown. Press OK button then process be ended.

※ Using button

- Using  instead of NEXT, confirm button.

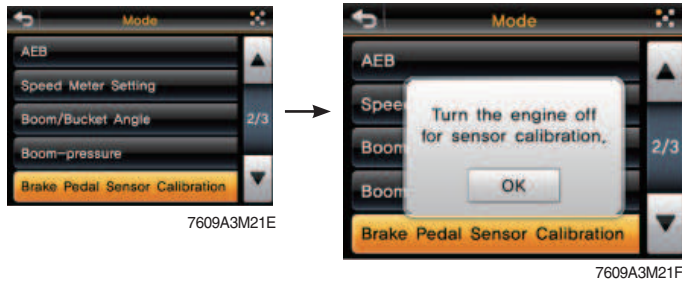
· Boom pressure calibration

- It is used when bucket weight is changed or measured weight is inaccurate.
- The calibration must be carried out as follows :
 - ① Increase hydraulic temperature (about 30~60°C).
 - ② Select "Boom-pressure".
 - ③ Roll-in the bucket at maximum range and lower the boom at minimum height.
 - ④ Press START button.
 - ⑤ Raise boom to maximum position. Boom up must be finished before stepping advance in "display A".
 - ⑥ If it show "Calibration success" message in a moment, press OK button (or .



- ※ **Raise hydraulic temperature enough when checking work load / boom pressure sensor calibration (recommendation : about 30 ~ 60°C).**
- ※ **Check if pressure sensor or angle sensor is in normal condition for accurate work load algorism or pressure sensor calibration [pressure sensors at boom cylinder head area and rod area, boom angle sensor (CD-80), bell crank angle sensor (CD-81)].**
- ※ **Sensor error message during pressure sensor calibration : sensor need to be checked.**

⑩ Brake pedal sensor calibration



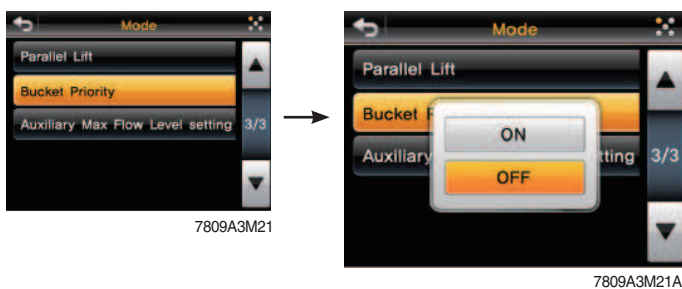
- Turn the engine OFF and turn the starting switch ON position.
- Press OK button, then calibration will be started.
- For cancel, press MENU button in main display.
- When it is finish (OK in actual gear window), press MENU button in main display.

※ Using button

- For cancel or finish, press **MENU**, **ESC** or **⏮**.

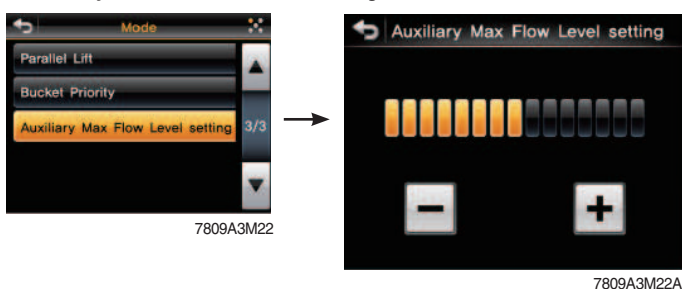
※ When replacing the brake pedal or sensor, **brake pedal sensor calibration must be started.**

⑪ Bucket priority



- Bucket priority function is to be more convenient for operator to load materials.
Bucket-in (rollback) operation takes priority over the boom-up (raise) operation in case of using both operations at the same time.
- Set the bucket priority function ON/OFF.

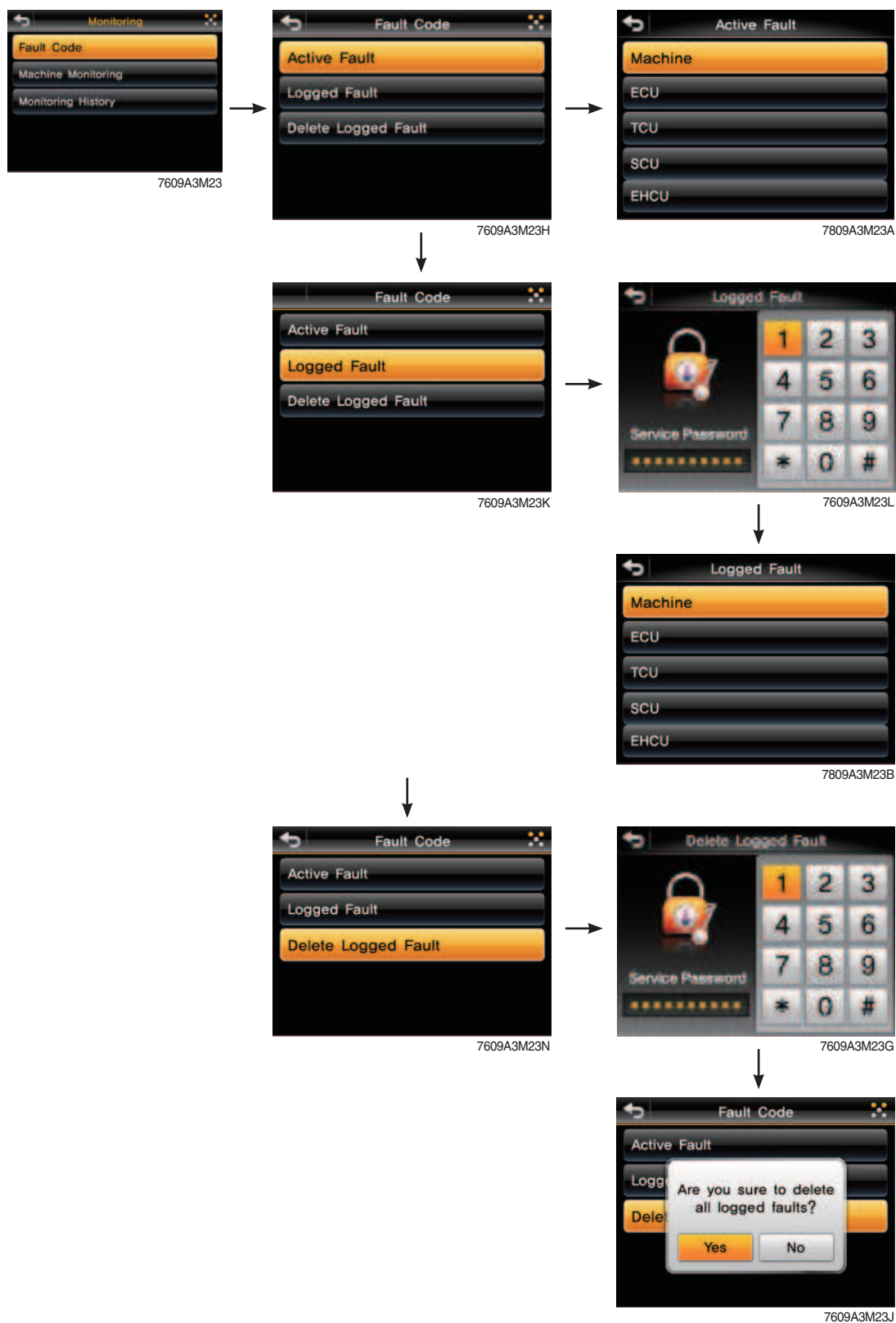
⑫ Auxiliary max flow level setting



- Auxiliary attachment flow can be easily adjusted and controlled.
- Set the oil flow level from 0 to 15 level by using +/- button.

(3) Monitoring

① Fault code



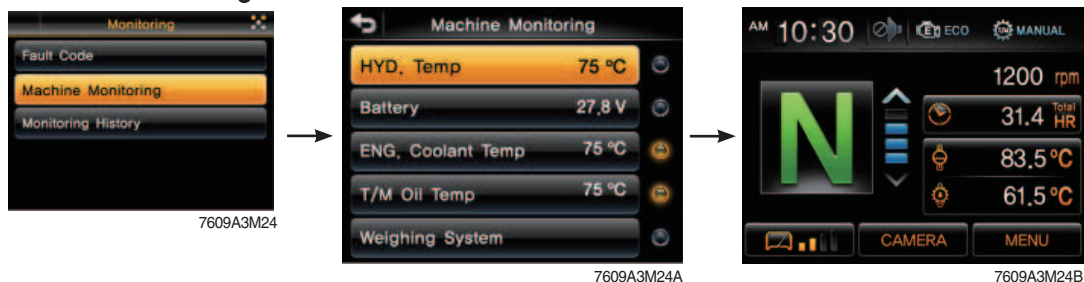
· Monitor the fault code of the Machine/ECU/TCU/SCU/EHCU.


※ Not define will be indicated in case of that there's no fault.

※ EHCU : Electro Hydraulic Control Unit

※ SCU (opt) : Only for SCU (Steering Control Unit) equipped machine.

② Machine monitoring



- Monitor the status of the machine.
- To display the item in main display, select the item by touch bar (or ) .
- The right icon shows selected status (ON/OFF).

※ Priority in the main display

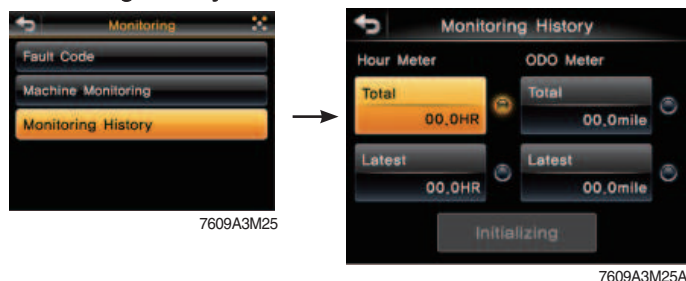



The example of the weighing system

- The priority of the weighing system is the highest.
- If the weighing system is selected, the other items are not available.
- To display the other items, the weighing system should not be selected.

※ **Weighing system** : see page 3-25.

③ Monitoring history

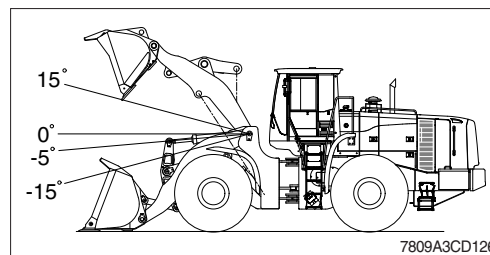


- **Hour meter / ODO meter**
- **Total**
 - Total working hour/total distance (this item cannot be initialized).
- **Latest**
 - Working hour/distance after reset.
 - If you select **Initializing**, working hour/distance start zero.
- To display the item in main display, select the item by touch bar (or ) .
- The right icon shows selected status (ON/OFF).

※ Weighing system

■ Principle

- The weight indication in bucket is calculated by measuring boom position and boom pressure.
 - ① The weight is '0.0 ton' when the boom is placed at below -15° .
 - ② The weight is indicated when the boom is placed at the range $(-5^{\circ} \rightarrow 15^{\circ})$.
 - ③ The weight is calculated when the boom is placed at above -5° and boom is lowered below -15° after dumping operation.
- In order to recheck weight, go to the ② after changing boom position (below -15°).
- Dump operation : It is checked by bucket cylinder's stroke change (below 250 mm).



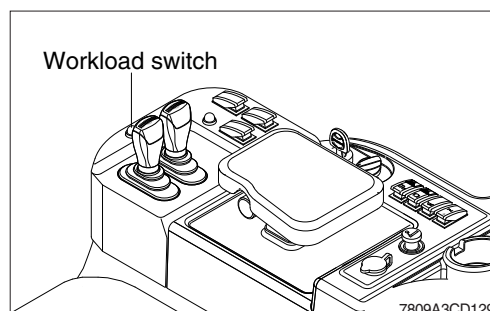
■ Monitor display

- When pressing work load switch less than 2 seconds, the weight is shown sequence basis.
(main display 1 → 2 → 3 → 4 → 1)



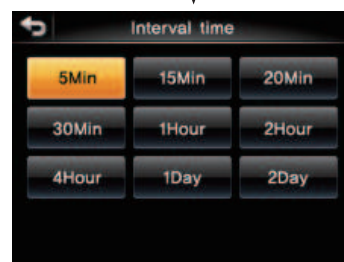
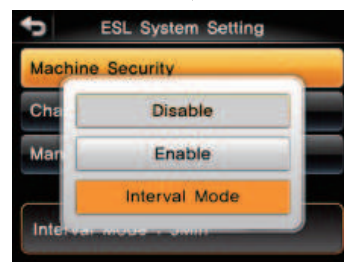
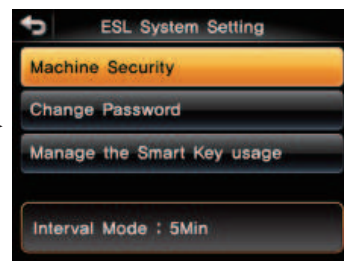
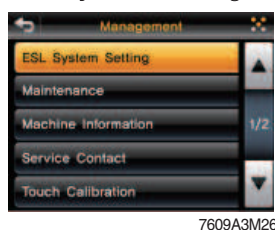
	Work weight (today)
	Work weight (previous day)
	Total weight accumulated in memory A, B, C individually regardless of date
	Current weight

- Default accumulated value at memory A, B, C when pressing workload switch more than 2 seconds (default : 0.0 ton).



(4) Management

① ESL system setting



· Machine security

- ESL : Engine Starting Limit
- ESL mode is designed to be a theft deterrent or will prevent the unauthorized operation of the machine.
- If the ESL mode was selected Enable, the password will be required when the start switch is turned ON.

- Disable : Not used ESL function

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

Interval mode : The password is required when the operator start engine first. But the operator can restart the engine within the interval time without inputting the password.

The interval time can be set maximum 2 days.

· Interval time

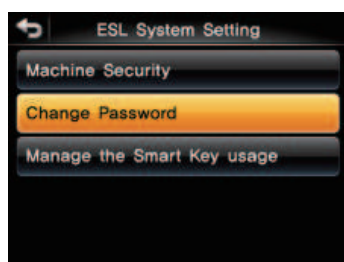
- If set interval time to 5 minutes, ESL system is activated after 5 minutes.

Therefore, the password does not need to restart engine within 5 minutes.

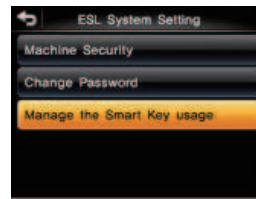
※ Default password : 00000 *

· Change password

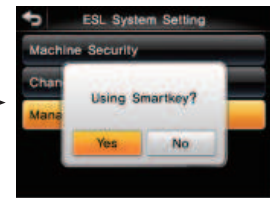
- Input 5 to 10 digits and press *.



- **Manage to smart key usage (opt)**
 - Set the using or not of smart key.
 - If you using smart key, ESL function always be activated.



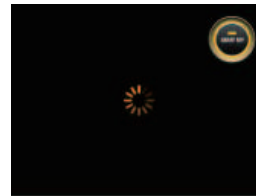
7609A3M26G



7609A3M26H

※ Using smart key

- Smart key icon (yellow) is on the screen.
- **Verification success**
Smart key icon color is changed to green, then changed to main display.
- **Verification failure**
Smart key icon color is changed to red, then changed to password input screen.



7609A3M50



7609A3M50B



7609A3M50A

Verification success



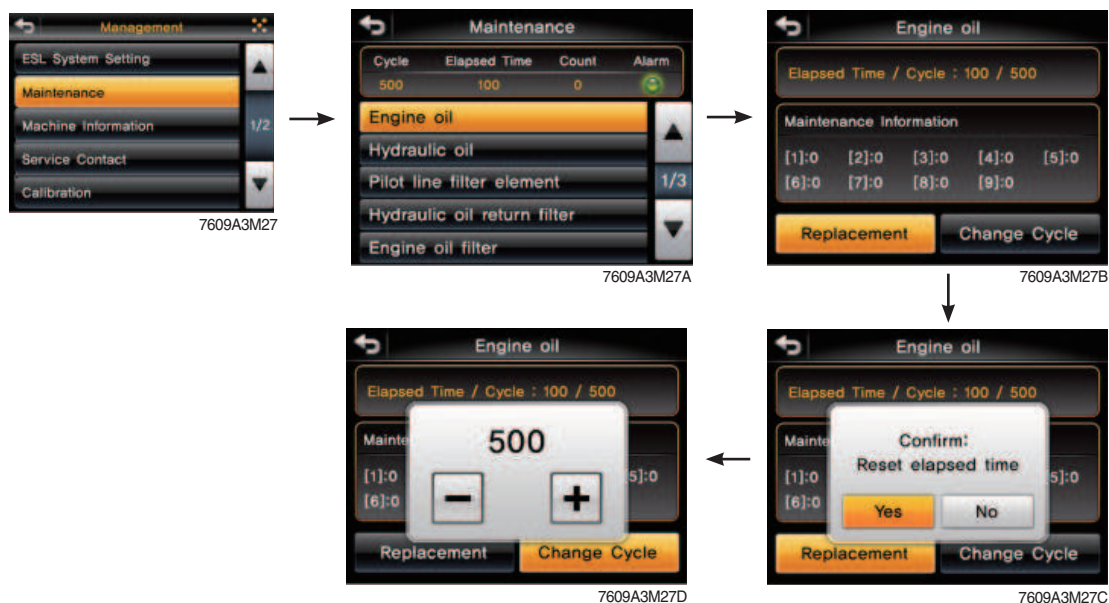
7609A3M50B



7609A3M50C

Verification failure

② Maintenance



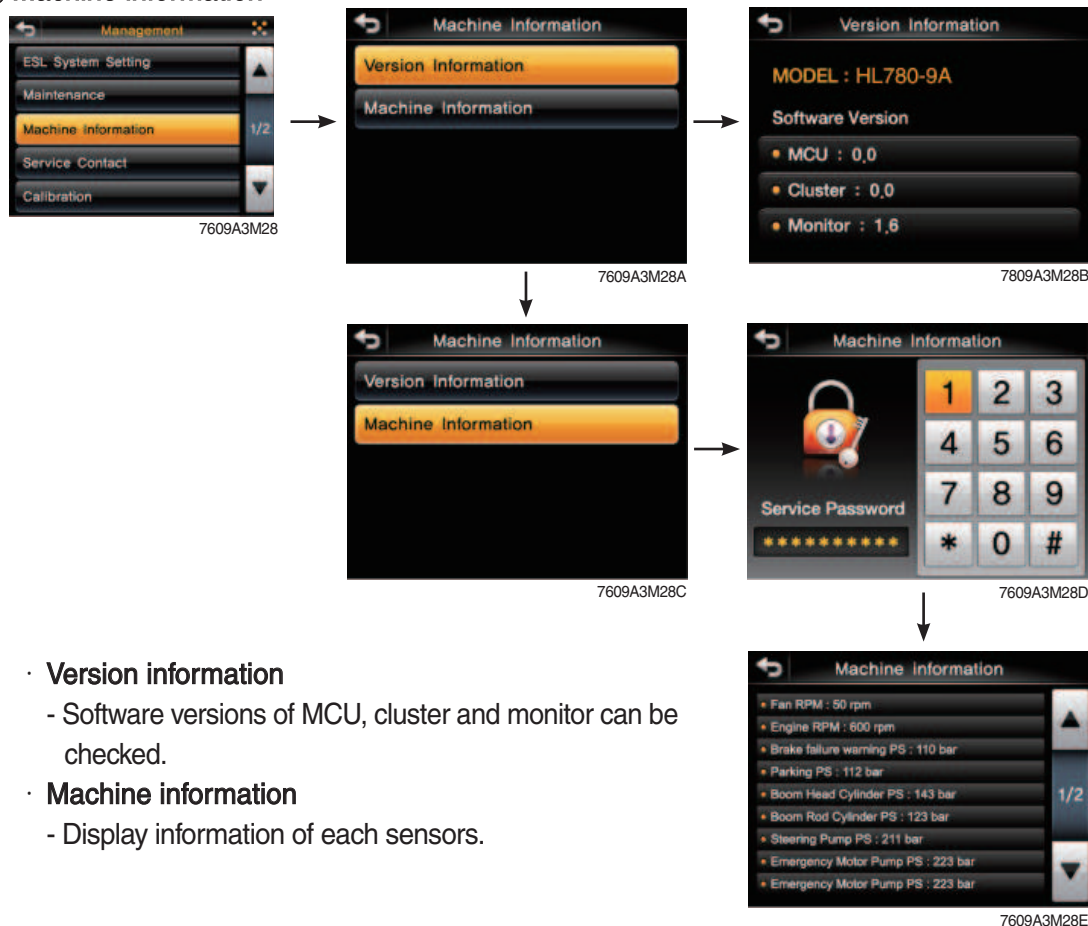
- Alarm : Warning
- Replacement : The elapsed time will be reset to zero.
- Change cycle : The change or replace cycle can be changed in the unit of 50 hours.
- To change cycle, press +/- button (◀ or ▶/⏏).
- Change or replace interval**

No	Item	Interval
1	Engine oil	500
2	Hydraulic oil	★ ¹ 2000 ★ ² 5000
3	Pilot line filter element	1000
4	Hydraulic oil return filter	1000
5	Engine oil filter	500
6	Fuel filter element	500
7	Fuel pre-filter	500
8	Hydraulic tank air breather	250
9	Radiator coolant	2000
10	Transmission oil and filter	1000
11	Axle oil (front and rear)	1500
12	Aircon & heater outer filter	1000
13	Air cleaner element (safety)	4000
14	Air cleaner element (primary)	4000
15	Crankcase ventilation filter	2000

★¹ : Conventional hydraulic oil

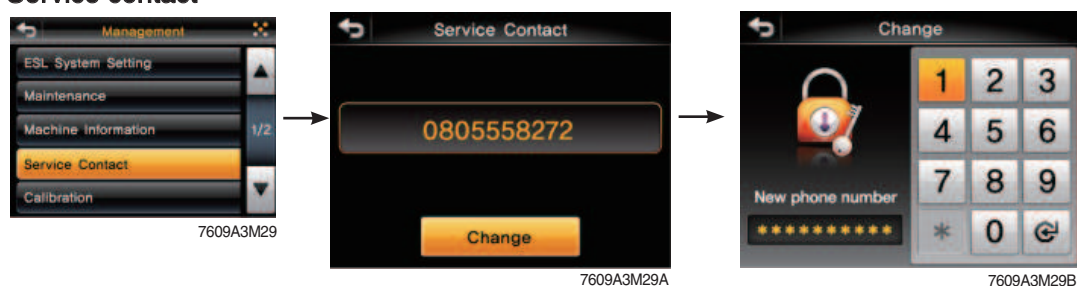
★² : Hyundai genuine long life hydraulic oil

③ Machine information



- **Version information**
 - Software versions of MCU, cluster and monitor can be checked.
- **Machine information**
 - Display information of each sensors.

④ Service contact



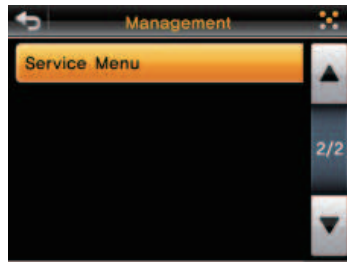
- The phone number of the service man can be checked and changed.

⑤ Touch calibration

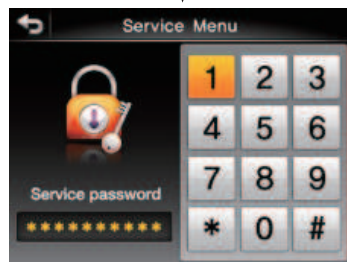


- Calibration for coordinate of touch screen.
- Touch the + sign on the screen by turns, then "Completed" message will be shown.
- After process, the view is changed to the main menu by automatically.

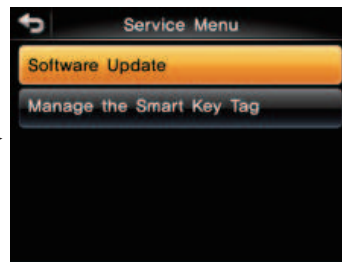
⑥ Service menu



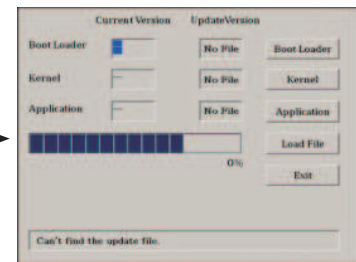
7609A3M30



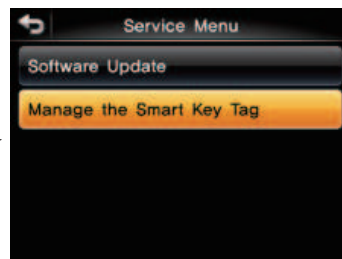
7609A3M30A



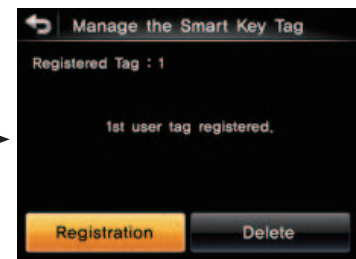
7609A3M30B



7609A3M30F



7609A3M30D

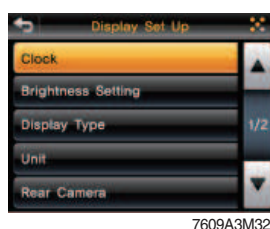


7609A3M30E

- **Software update**
 - Update file in USB memory.
- **Manage the smart key tag.**
 - Register or delete user tag.
 - When delete user tag, all user tag will be deleted.
 - Display the number of registered user tag.

(5) Display set up

① Clock

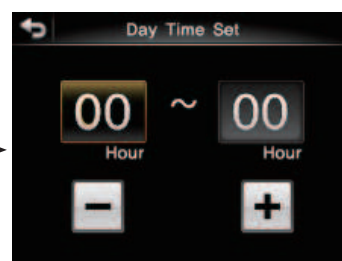
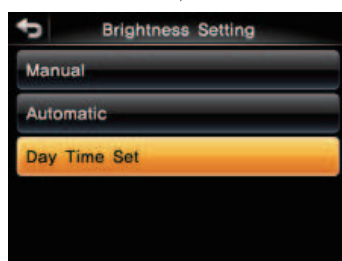
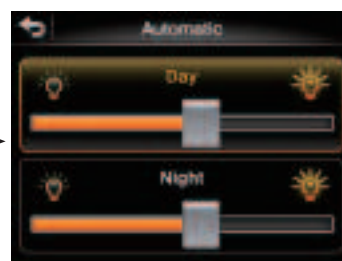
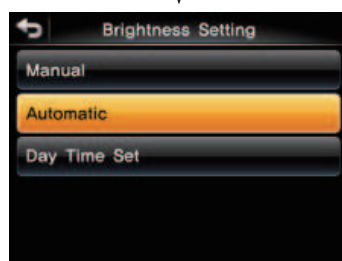
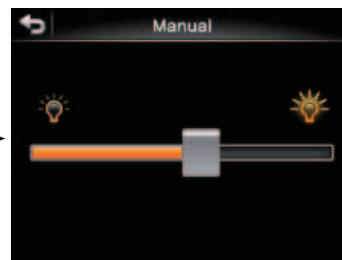
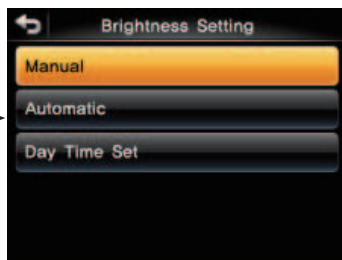
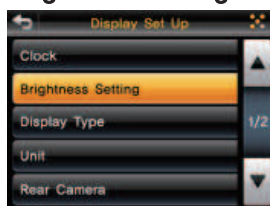


- Select number of digit, then input value using +/- button.

※ Using button

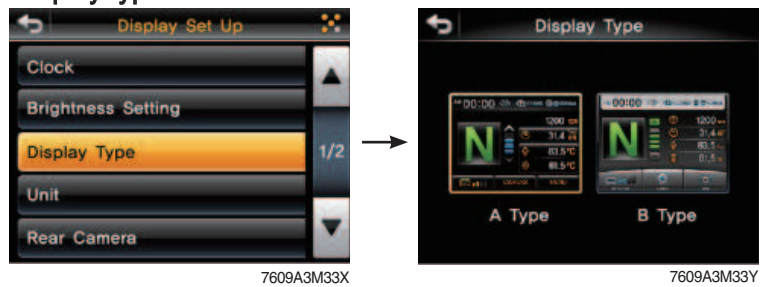
Change digit by ◀ or ▶/⌂, input next digit by Ⓞ.

② Brightness setting

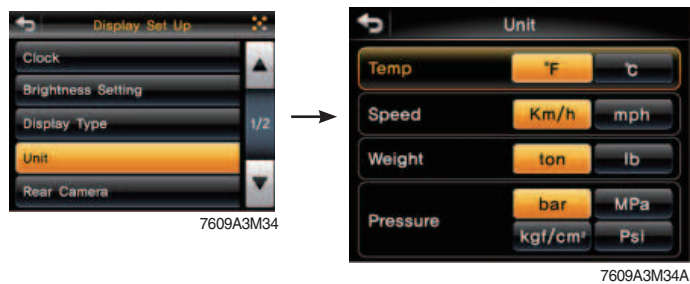


- **Manual**
 - Manual setting for LCD brightness.
- **Automatic**
 - Automatic control of LCD brightness as set level of day/night.
- **Setting day time**
 - Set the time for daylight.
 - If you set the time for daylight, the rest time will be night.
- ※ **Using button**
 - Changing brightness by ◀ or ▶/⌂, input data by Ⓞ.

③ Display type



④ Unit



- Temperature : °C ↔ °F
- Speed : km/h ↔ mph
- Weight : ton ↔ lb
- Pressure : bar ↔ Mpa ↔ kgf/m² ↔ psi

※ Using button

- Move to other item by .

⑤ Rear camera



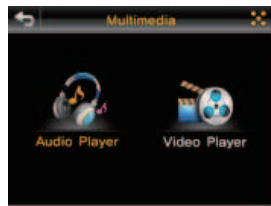
- **Reverse mode**
 - If transmission engages the reverse gear (R1~R3), the camera mode is displayed automatically in main display.
- **Active camera**
 - Three cameras can be installed on the machine.
- **Display order**
 - Set the channel sequence of each camera.
- If the camera was not equipped, this menu is not useful.
- In main display, if the **ESC** button is pushed, the first ordered display camera will be viewed.

⑥ Language



- User can select preferable language and all display are changed the selected language.
- 18 multi-language available.

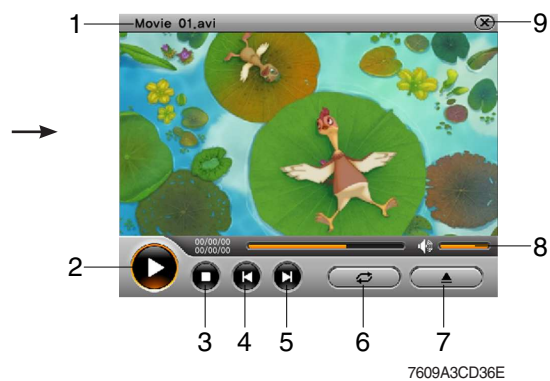
(6) Multimedia



7609A3M36C



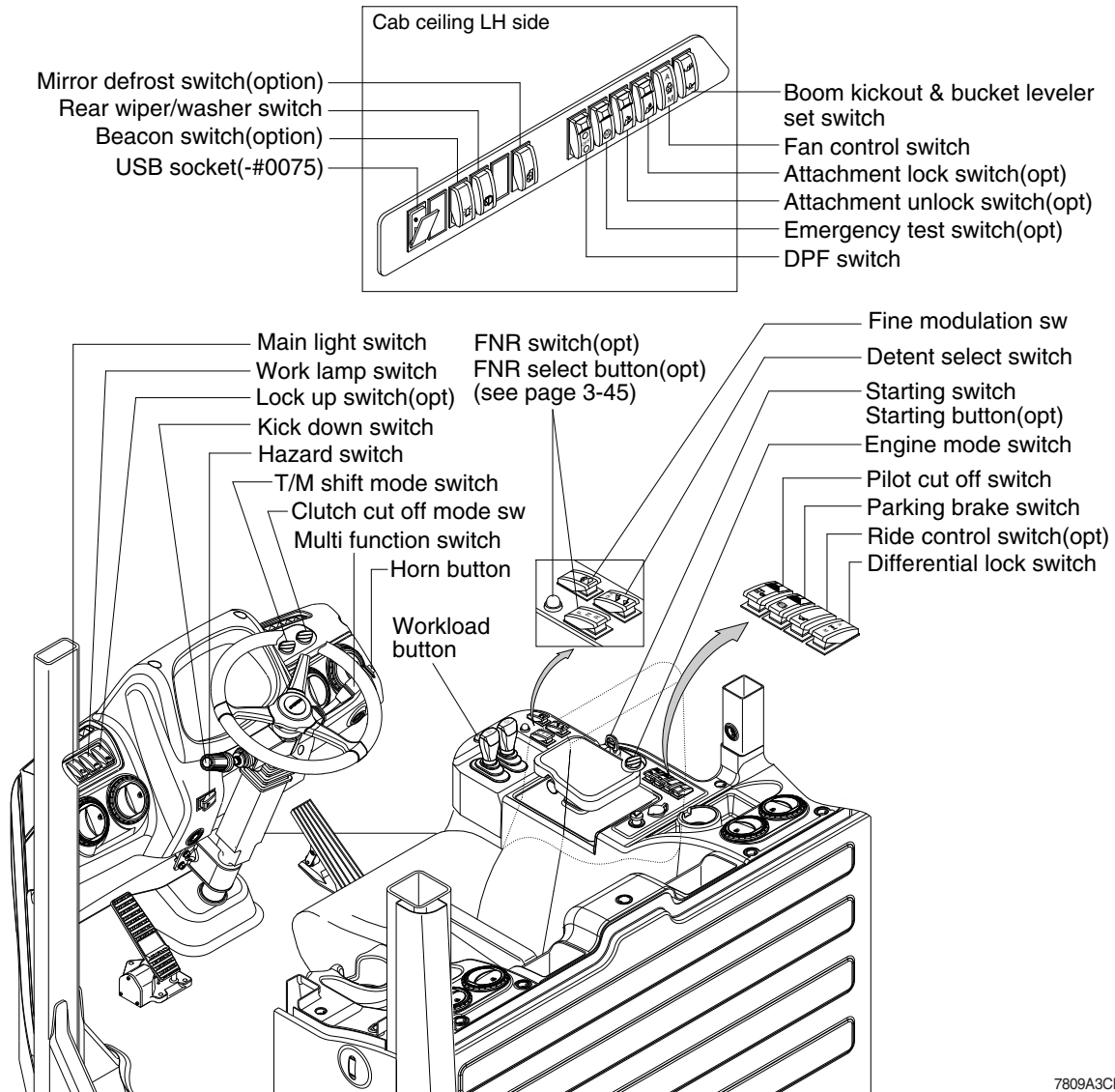
7609A3CD36D



7609A3CD36E

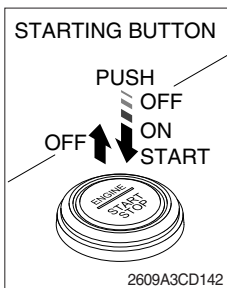
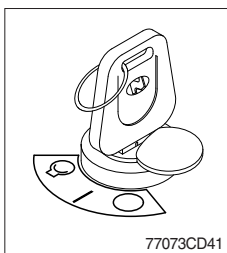
- | | | | |
|---|-----------------------|---|------------------------|
| 1 | File name of playing | 6 | Repeat |
| 2 | Play | 7 | Open file (USB memory) |
| 3 | Stop | 8 | Volume |
| 4 | Previous song (movie) | 9 | Close player |
| 5 | Next song (movie) | | |

4. SWITCHES



7809A3CD29

1) STARTING SWITCH & STARTING BUTTON (OPT)



Starting button with smart key tag (opt)

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

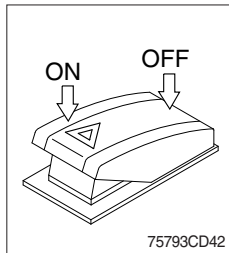
- ○ (OFF) : None of electrical circuits activate.
- | (ON) : All the systems of machine operate.
- ⦿ (START) : Use when starting the engine.

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.

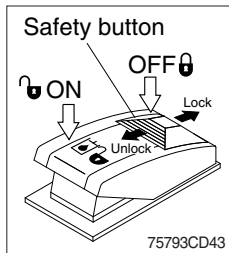
※ Key must be in the ON position with engine running maintain electrical and hydraulic function and prevent serious machine damage.

2) HAZARD SWITCH



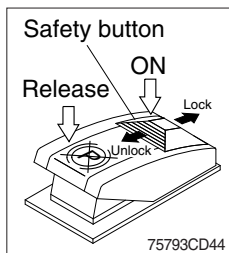
- (1) Use for parking, or loading the machine.
 - (2) Both turn signal lights will flash simultaneously.
- ※ If the switch is left ON for a long time, the battery may be discharged.

3) PILOT CUT OFF SWITCH



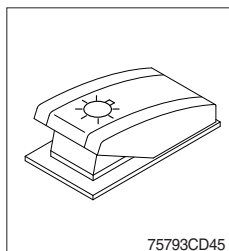
- (1) When the switch is pressed to OFF position, the hydraulic pilot line will be cut off, so the work equipment will not operate.
 - (2) Press the ON position in order to unlock the hydraulic pilot line.
- ※ This switch can be set to ON or OFF position only when the safety button is pulled to the unlock position.

4) PARKING BRAKE SWITCH



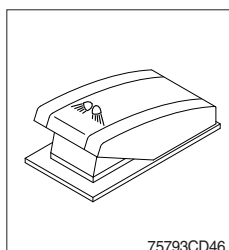
- (1) When the switch is pressed to ON position, the parking brake will start to operate and the cluster warning lamp will come ON.
 - (2) Press the release position in order to disengage the parking brake.
- ※ When operating the gear selector lever, be sure to release the parking brake. If the machine is operated with the parking brake engaged, the brake will overheat and may cause the brake system to go out of order.
- ※ This switch can be set to ON or Release position only when the safety button is pulled to the unlock position.

5) MAIN LIGHT SWITCH



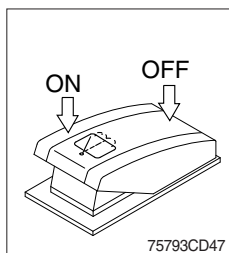
- (1) This switch is used to operate the clearance lamp and head light by two steps.
 - **First step** : Clearance lamp and cluster illumination lamp come ON. Also, all indicator lamp of switches come ON.
 - **Second step** : Head light comes ON.

6) WORK LAMP SWITCH



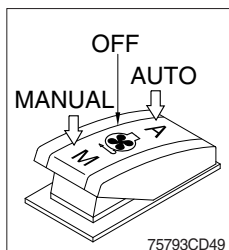
- (1) This switch is used to operate the front and rear work lamps by two steps.
 - **First step** : Front work lamp located on the cab comes ON.
 - **Second step** : Rear work lamp located on the cowl comes ON.

7) REAR WIPER AND WASHER SWITCH



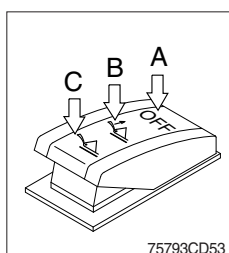
- (1) The switch use to operates the rear wiper and washer by two step.
 - **First step** : The rear wiper operates.
 - **Second step** : The washer liquid is sprayed and the rear wiper is operated only while pressing. If release the switch, return to the first step position.

8) FAN CONTROL SWITCH



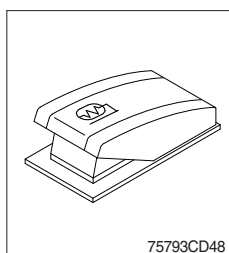
- (1) This switch use to control the cooling fan.
- (2) This switch has three positions.
 - **AUTO** : The fan automatically work in reverse according to set up interval and time.
※ **Refer to page 3-18.**
 - **OFF** : Only forward rotation is possible.
 - **MANUAL** : The fan rotates reverse only while pressing this position. If release the switch, return to the OFF position.
- (3) On pressing the switch, the indicator lamp is turned ON.

9) DETENT SELECT SWITCH



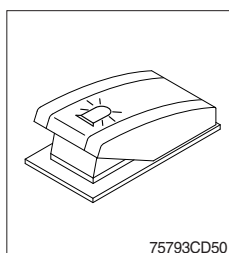
- (1) This switch is used to select the detent functions.
- (2) This switch has three positions.
 - **A** : Detent functions are not operated.
 - **B** : Only boom detent function is operated.
 - **C** : Boom and bucket detent functions are operated.

10) MIRROR DEFROST SWITCH (option)



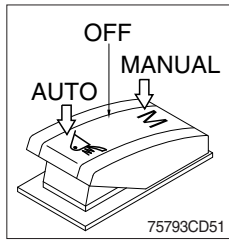
- (1) If the mirror defrost switch is pressed in condition of key ON, it operates for 15 minutes. After 15 minutes, the defrost function stops automatically.
- (2) One more pressing the switch in operation also stops defrost function.
- (3) On pressing the switch, the indicator lamp is turned ON.

11) BEACON SWITCH (option)



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

12) RIDE CONTROL SWITCH (option)



(1) AUTO

Press in the bottom of the ride control switch in order to turn on the automatic ride control. The automatic ride control automatically turns on when the travel speed exceeds a preset speed of approximately 7 km/h. The automatic ride control automatically shuts off during low speed travel (below 7 km/h).

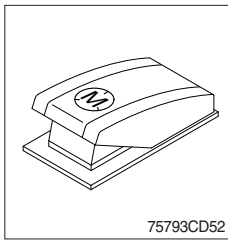
(2) MANUAL

Press in the top of the ride control switch in order to turn on the system for ride control regardless speed. The ride control will smooth the ride of the machine during travel.

(3) OFF

Press the ride control switch to the middle position in order to turn off the system for the ride control.

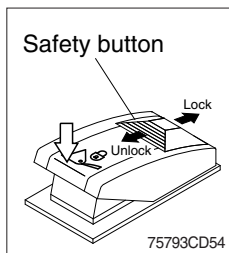
13) EMERGENCY TEST SWITCH (option)



(1) The emergency steering system can be manually tested. Push the switch in order to determine if the emergency steering and the emergency steering lamp are functional.

(2) When the switch is pressed, the emergency steering pump motor will run. The emergency steering lamp will light. If the emergency steering lamp does not light, do not operate the machine.

14) ATTACHMENT LOCK SWITCH (option)



(1) Press this switch in order to engage the quick coupler pins.

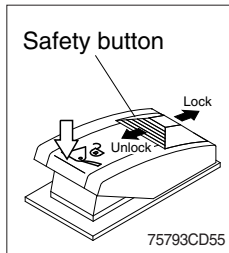
(2) If this switch is pressed for 5 seconds, the quick coupler pins move in the engaged position. If the switch is released, the quick coupler pins will remain in the engaged position.

※ **This switch can be pressed only when the safety button is pulled to the unlock position.**

※ **Check for engagement as followings.**

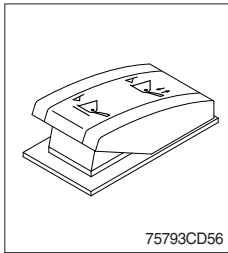
- ① Put down pressure on the attachment.
- ② Back up the machine and make sure that there is no movement between the quick coupler and attachment.

15) ATTACHMENT UNLOCK SWITCH (option)



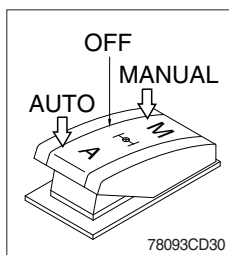
- (1) Press this switch in order to disengage the quick coupler pins.
 - (2) If this switch is pressed for 5 seconds, the quick coupler pins move in the disengaged position.
If the switch is released, the quick coupler pins will remain in the disengaged position.
- ※ **This switch can be pressed only when the safety button is pulled to the unlock position.**

16) BOOM KICK OUT AND BUCKET LEVELER SET SWITCH



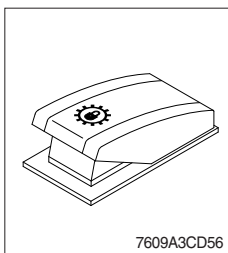
- (1) Press this switch in order to set the boom kickout and bucket leverer.
- ※ **Refer to page 4-22.**

17) DIFFERENTIAL LOCK SWITCH



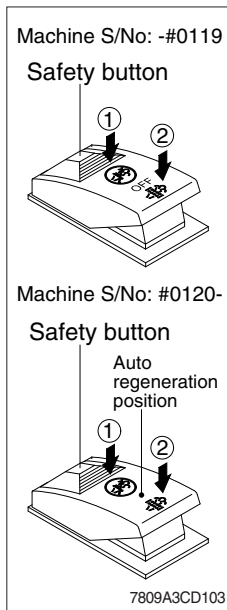
- (1) This switch is used to apply differential lock.
The differential lock gives equal power to both rear wheels and is used in conditions when traction is poor.
 - (2) **Manual mode**
Press the **M** of the switch for the manual mode of the differential lock function. You press the switch, the differential lock will engage immediately and differential lock pilot lamp lights ON.
 - (3) **Auto mode**
Press the **A** of the switch for auto mode of the differential lock function. If you press the switch, the axle differential lock will automatically engage when the differential function is used.
- ※ **While the axle differential lock function is operating, the differential lock pilot lamp lights ON.**
- ※ **Refer to page 3-12.**

18) LOCK UP SWITCH (option)



- (1) If you press the switch, the lock-up clutch on the torque converter will automatically activate according to load.
- (2) **Lock-up clutch**
To prevent power loss in the torque converter, the pump rotor and turbine rotor on the torque converter lock together through a direct lock-up clutch.

19) DPF (diesel particulate filter) SWITCH



(1) This switch is used to select the regeneration function of the DPF.

(2) Inhibit position (①)

- ① The inhibit position disallows any automatic or manual regeneration of the DPF.
- ② This may be used by operator to prevent regeneration when the machine is operating in a hazardous environment is concerned about high temperature.
- ③ It is strongly recommended that the this position is only activated when high temperatures may cause a hazardous condition.

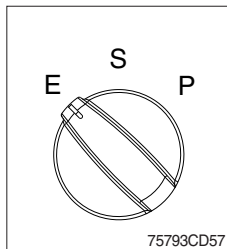
(3) OFF position (auto regeneration position)

This position will initiate a automatic regeneration of the DPF.

(4) Manual regeneration position (②)

- ① This position will only initiate a manual regeneration of the DPF when the machine is in non-mission condition, engine must run at low idle speed and DPF soot levels are high enough to allow regeneration.
- ② HEST lamp will be illuminated during the entire regeneration.
- ※ Refer to the page 3-8 for details.
- ※ This switch can be move to the manual regeneration position (②) only when the safety button is pulled to backward.
- ※ Also, this switch return to the OFF position when released the manual regeneration position (②).

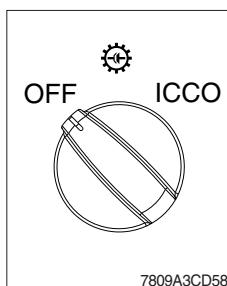
20) ENGINE MODE SWITCH



(1) The operator can adjust the machine's performance with this dial switch.

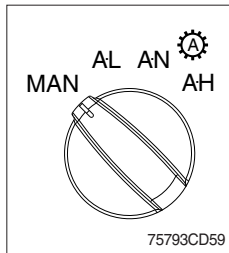
- P (Power) : Maximum power output for hard digging operation or hill climb.
- S (Standard) : General digging and loading operation.
- E (Econo) : Maximum fuel efficiency for general loading.

21) CLUTCH CUT OFF MODE SWITCH



- OFF position : The clutch cut off function is disable.
- ICCO position : It will cut off the clutch when brake operation.

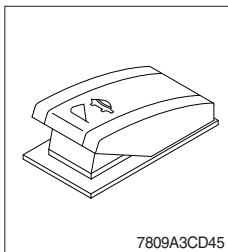
22) TRANSMISSION SHIFT MODE SWITCH



(1) Four modes are available for operator's preference and job condition.

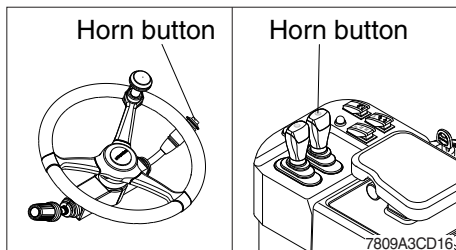
- MAN (Manual) : Machine is operated by selected gear on lever.
- AL (Auto Light) : Automatic shifting point is fast for long-distance transportation and fuel efficiency.
- AN (Auto Normal) : Automatic shifting point is normal without automatic kick-down to 1st gear for general digging and loading operation.
- AH (Auto Heavy) : Automatic shifting point is normal with automatic kick-down to 1st gear for more powerful operation.

23) FINE MODULATION SWITCH



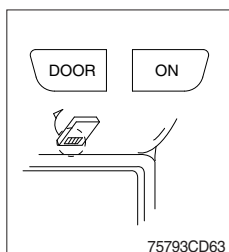
(1) If you press the switch, remote control lever provide the operator with precise control of the work equipment (bucket and boom cylinders can be controlled precisely).

24) HORN BUTTON



(1) If you press the button on the top of the multi-function switch or EH remote control lever, the horn will sound.

25) CAB LAMP SWITCH



(1) This switch turns ON the cab room lamp.

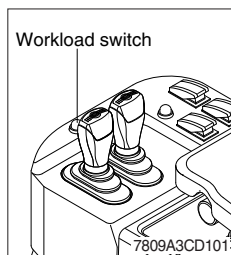
① DOOR

The lamp comes ON when the door is opened.
When the door is closed the lamp is OFF.

② ON

This switch is used to turn the lamp ON or OFF.

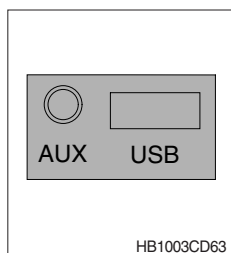
26) WORKLOAD SWITCH



(1) Press the workload switch in order to set "Total" display at zero.

※ See page 3-25, weighing system.

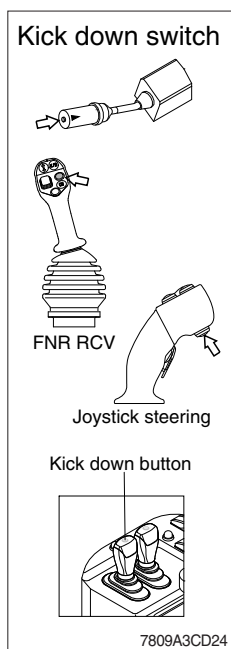
27) USB SOCKET (machine serial No. : -#0075)



(1) MP3 files are played when a USB device is connected to the USB port.

(2) In addition, the AUX port enables headphone and other devices.

28) KICK DOWN SWITCH



(1) Manual mode

It is effective 2nd speed to 1st speed only and recover to 2nd speed quickly when push the switch one more time.

(2) Automatic mode

① Mode 1 (down/up)

It shifts down quickly from current gear to one step lower speed by pushing the switch and recover to current speed quickly when push the switch one more time.

② Mode 2 (down)

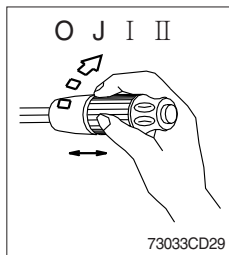
It shifts down from current gear to one step lower speed when push the switch every time.

The kick down function is released in only 1st speed.

※ Refer to page 3-18 for the kick down setting.

※ The normal autoshift function continues after the kick down switch is released.

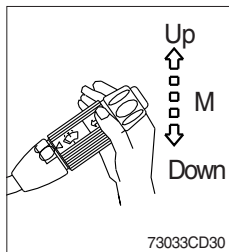
29) MULTI FUNCTION SWITCH



(1) Front wiper and washer switch

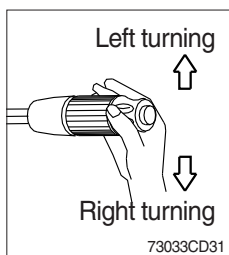
- ① When the switch is in J position, the wiper moves intermittently.
- ② When placed in I or II position, the wiper moves continuously.
- ③ If you push the grip of the lever, washer liquid will be sprayed and the wiper will be activated 2-3 times.

※ Check the quantity of washer liquid in the tank. If the level of the washer liquid is LOW, add the washer liquid (in cold, winter days) or water. The capacity of the tank is 1 liter.



(2) Dimmer switch

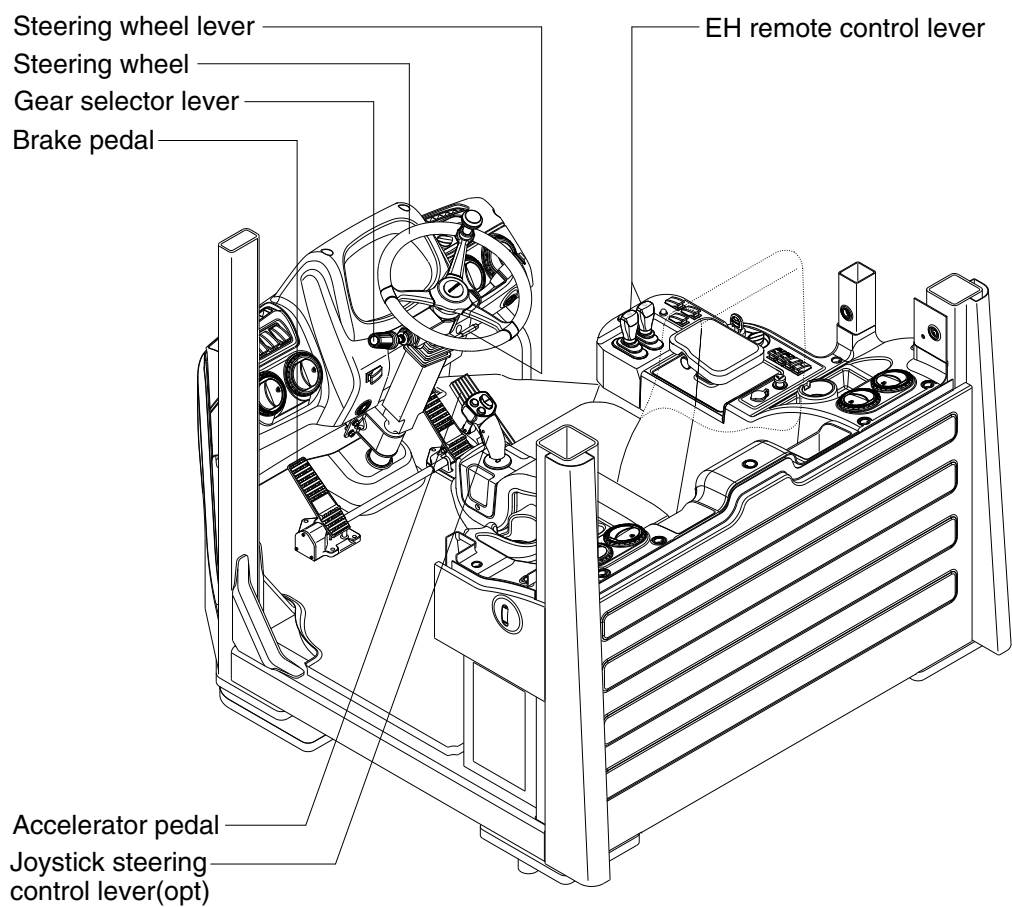
- ① This switch is used to turn the head lights direction.
- ② Switch positions
 - Up : To flash for passing
 - Middle : Head lights low beam ON
 - Down : Head lights high beam ON
- ③ If you release the switch when it's in up position, the switch will return to middle.



(3) Turning switch

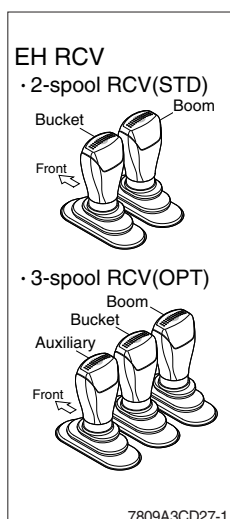
- ① This switch is used to warn or signal the turning direction of the machine to other vehicles or equipment.
- ② Push the lever up for turning left, pull the lever down for turning right.

5. CONTROL DEVICE



7809A3CD28-1

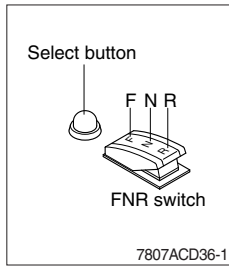
1) REMOTE CONTROL LEVER



7809A3CD27-1

- (1) These joystick are used to control the boom and the bucket.
- (2) Refer to operation of working device in chapter 4 at page 4-9.

2) FNR SELECT BUTTON AND SWITCH



(1) This switch is used for forward and backward drive.

※ **Gear range can be selected by gear selector lever.**

(2) Select button

① If the select button is pressed, the indication lamp on the cluster will be ON and this FNR switch will start to operate.

※ **When the engine is running, the machine is on standstill(0 speed), parking brake is released, gear selector lever is in the neutral position, you can use this function after pressing the select button.**

(3) FNR switch

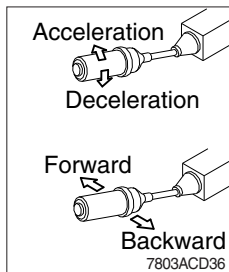
- F : Forward drive
- N : Neutral
- R : Reverse drive

① If the upper side of this switch is pushed, the machine moves forward.

② If the down side of this switch is pushed, the machine moves backward.

③ This function is automatically released when the engine is stopped, parking brake is ON or gear selector lever is out of neutral.

3) GEAR SELECTOR LEVER

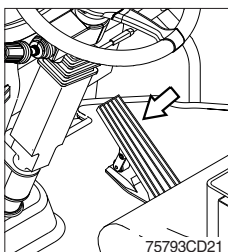


(1) This lever is used for gear selection, forward 4 stages and reverse 3 stages.

(2) If you push the gear selector lever, the machine moves forward, but if pull the gear selector lever, the machine moves backward.

(3) If you turn the gear selector lever forward, the machine increases the speed, but if you turn the gear selector lever backward, the machine reduces the speed.

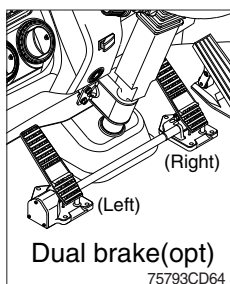
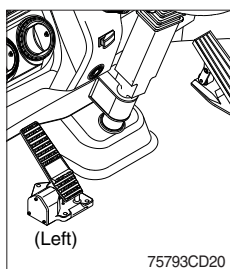
4) ACCELERATOR PEDAL



(1) This pedal controls the engine speed. The engine speed will increase in proportion to the degree of force applied to this pedal.

(2) Unless this pedal is pressed, the machine will run at low idling.

5) BRAKE PEDAL



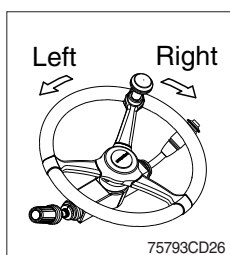
(1) Left brake pedal (service brake + clutch cut off function)

- ① If the pedal is pushed down, this will generate braking force and bring the machine to a stop.
- ② If the power train operation is to be cut off, set the clutch cut off mode switch to ON (L, M, H) and press the pedal.
- ⚠ **Even if the brake is applied while clutch cut off mode switch is OFF, power train will not cut off.**
- ※ **Do not operate the machine with foot the brake pedal unnecessarily, or bring premature wear of brake disc.**
- ③ Clutch cut off function : Refer to page 3-40.

(2) Right brake pedal (service brake function only)

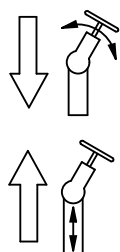
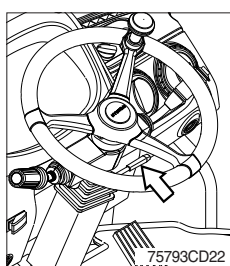
This pedal functions as service brake only.

6) STEERING WHEEL



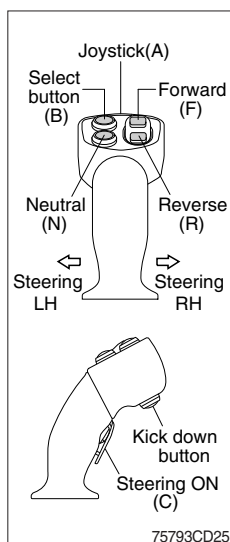
- (1) Two multi-motion cylinders in the center of the machine will operate the steering function.
- (2) If the steering wheel is turned to left, the machine will move to the left and turn it to the right, the machine will move to the right.

7) STEERING WHEEL LEVER



- (1) By pulling down the lever, the wheel is adjustable to tilt.
 - Tilting : 40°
- (2) By pulling up the lever, the wheel is adjustable to telescope.
 - Telescoping : 80 mm

8) JOYSTICK STEERING CONTROL LEVER (option)



(1) The system has the following functions concentrated to a collapsible arm rest : steering, forward / reverse selection and kickdown function.

(2) This means that during normal loading work, the operator does not need to touch the steering wheel.

(3) The joystick steering pilot lamp on the cluster will be ON when the lever steering is activated.

▲ As a safety precaution, the joystick steering is functioned while pressing the steering ON button (C).

▲ When operating on a public road, the steering wheel should always be used and the joystick steering be disconnected. Also when operating at high speeds (above 20 km/h) on a work site, always use the steering wheel.

(4) Joystick (A)

① Activate the lever-controlled steering by pushing in the steering ON button (C).

The steering wheel works as usual, even if the joystick steering is activated.

② The joystick steering pilot lamp  on the cluster will be ON when the steering ON button (C) is pushed.

(5) Forward/reverse selection button

F : Forward drive

N : Neutral


R : Reverse drive

① To be able to operate the forward / reverse selection and kick-down button the system must first be activated using select button (B).

※ The ordinary gear selector control should be in neutral.

② When this function is engaged, it is possible to operate the forward -reverse selection. If the ordinary gear selector control is activated at the same time as the joystick steering is activated, the ordinary gear selector control overrides any selection made by the joystick steering.

To reactivate the joystick steering, the ordinary gear selector control must first be moved to neutral and the system again be activated.

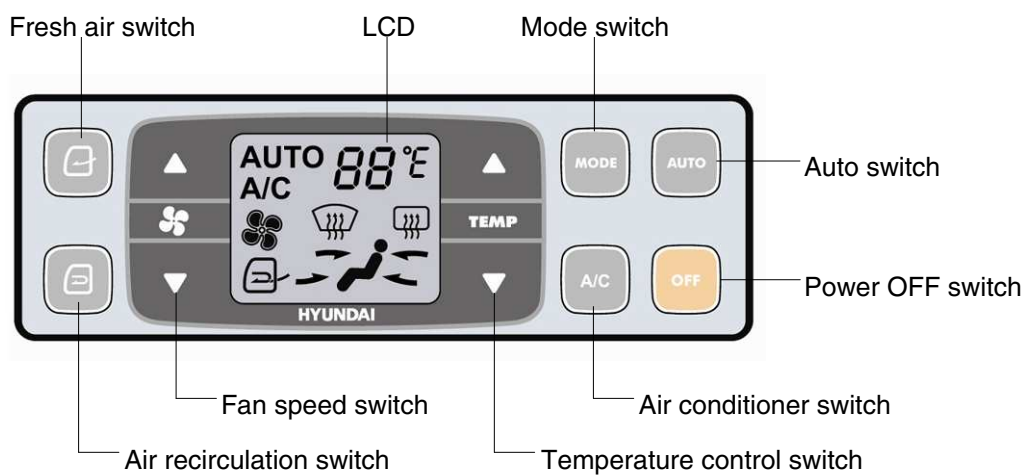
③ The FNR select pilot lamp  on the cluster will be ON when the forward / reverse selection is activated.

(6) Kick-down button : Refer to page 3-42.

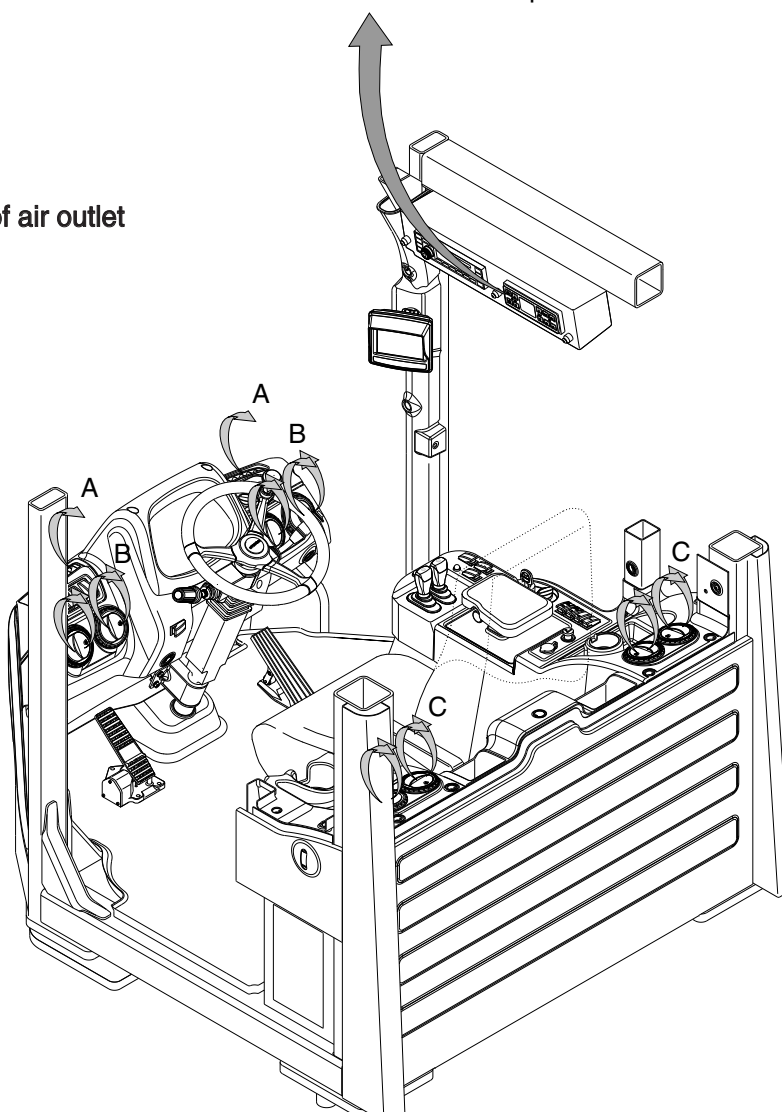
6. AIR CONDITIONER AND HEATER

■ FULL AUTO AIR CONDITIONER AND HEATER

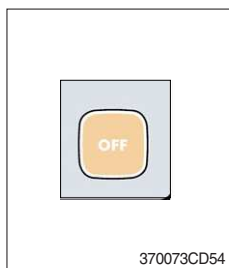
Full auto air conditioner and heater system automatically keeps the optimum condition in accordance with operator's temperature configuration sensing ambient and cabin inside temperature.



· Location of air outlet



1) POWER OFF SWITCH

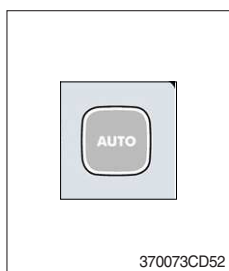


- (1) This switch makes the system and the LCD OFF.
Just before the power OFF, set values are stored.

(2) Default setting values

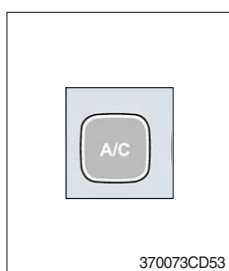
Function	Air conditioner	In/outlet	LCD	Temperature	Mode
Value	OFF	Inlet	OFF	Previous sw OFF	Previous sw OFF

2) AUTO SWITCH



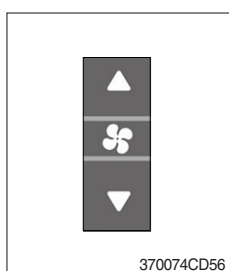
- (1) Turn the starting switch to ON position, LCD lights ON.
Auto air conditioner and heater system automatically keeps the optimum condition in accordance with operator's temperature configuration sensing ambient and cabin inside temperature.
- (2) This switch can restart system after system OFF.

3) AIR CONDITIONER SWITCH (compressor switch)



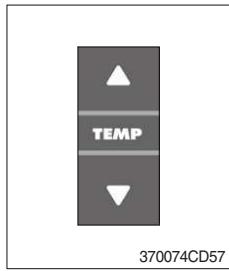
- (1) This switch turns the compressor and the LCD ON.
- (2) In accordance with the temperature sensed by duct (evaporator) sensor, compressor turns ON or OFF automatically.
- ※ **Air conditioner operates to remove vapor and drains water through a drain hose. Water can be sprayed into the cab in case 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 set temperature.
- (2) This switch controls fan speed manually.
- There are 8 up/down steps 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

- ① Type A : 17~32°C, scale : 1°C
- ② Type B : Lo, 18~31°C, Hi, scale : 1°C

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

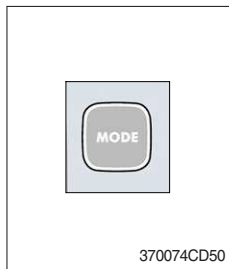
(3) The max cool or the max warm position operates as following table.

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



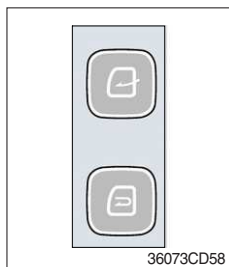
(1) Operating this switch, it beeps and displays symbol of each mode in order. (Human → Human/Rear → Human/Def → Def/Rear)

Mode switch		Human	Human/Rear	Human/Def	Def/Rear
Outlet	A			●	●
	B	●	●	●	
	C		●		●

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

(3) When this switch ON, the system operates with previous configuration.

7) FRESH AIR/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** ()

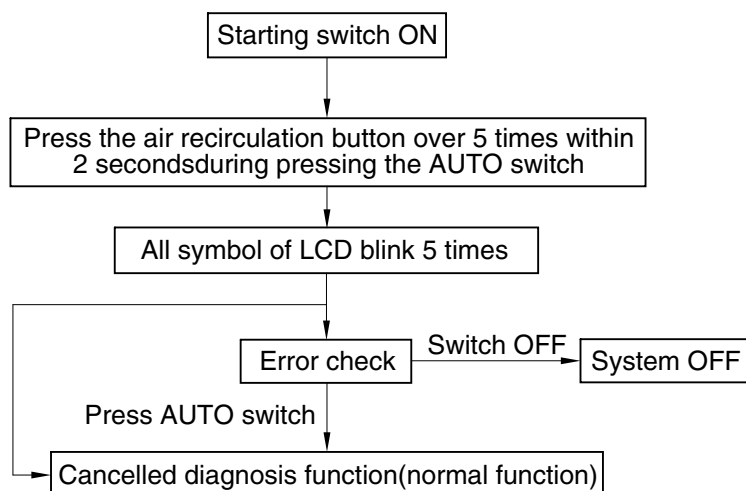
It recycles the heated or cooled air to increase the energy efficiency.

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

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

8) SELF DIAGNOSIS FUNCTION

(1) Procedure



3607A3CD69

(2) Error check

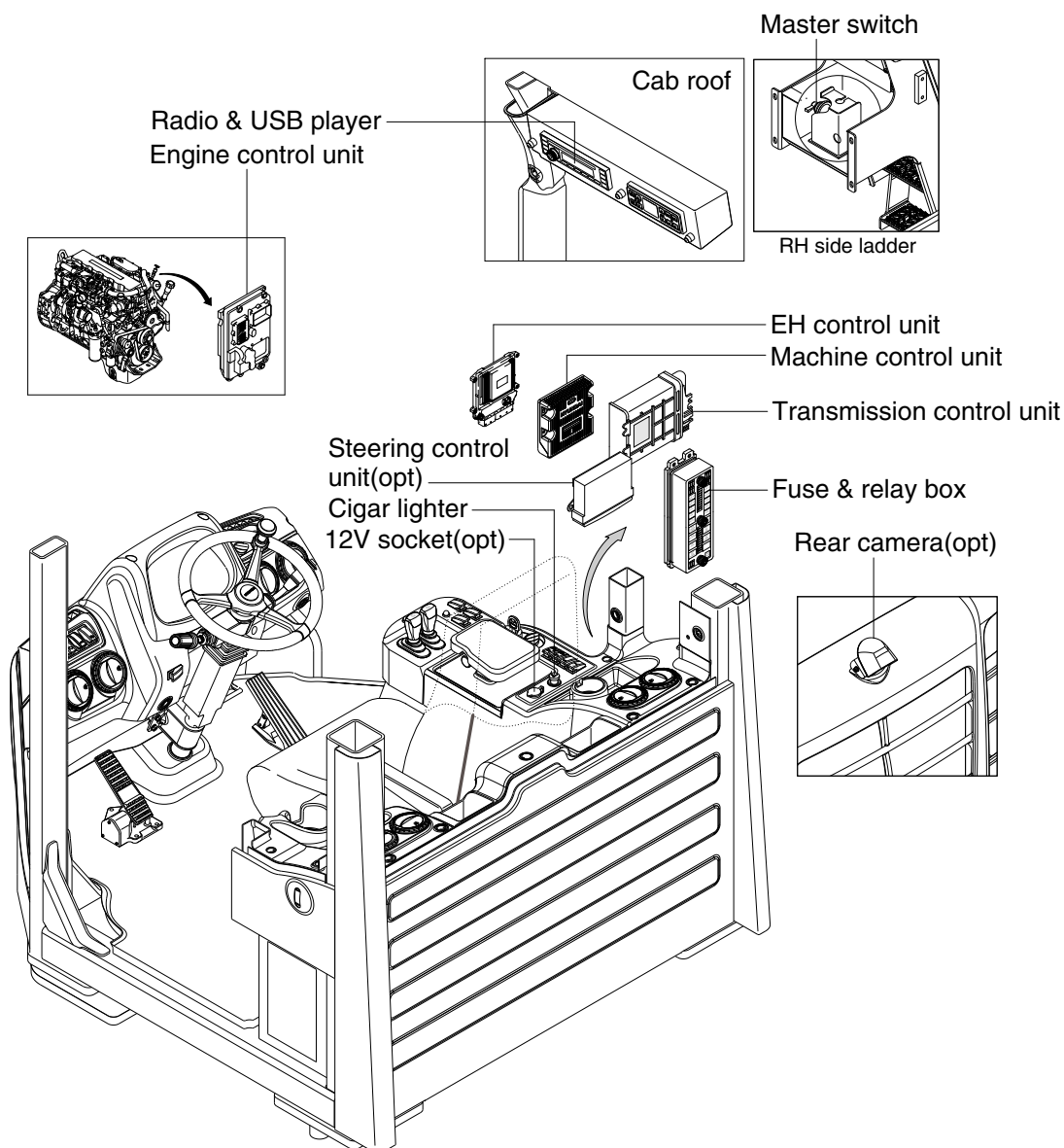
- The corresponding error code flickers on the setup temperature display panel, the other symbol will turn OFF.
- Error code flickers every 0.5 second.
- If error code is more than two, each code flickers 2 times in sequence.
- Error code

Error code	Description	Error code	Description
11	Cabin inside sensor	16	Mode actuator 1
12	Ambient sensor	17	Mode actuator 2
14	Duct (evaporator) sensor	18	Intake actuator
15	Temp actuator	-	-

(3) Fail safe function

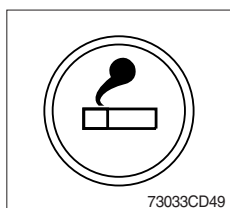
Error description	Fail safe function
Cabin inside sensor (11)	25°C alternate value control
Ambient sensor (12)	20°C alternate value control
Duct (evaporator) sensor (14)	1°C alternate value control
Temp actuator (15)	If opening amount is 0 %, the alternate value is 0 %
	If not, the alternate value is 100 %
Mode actuator 1, 2 (16, 17)	The alternate value is Vent

7. OTHERS



7809A3CD38

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

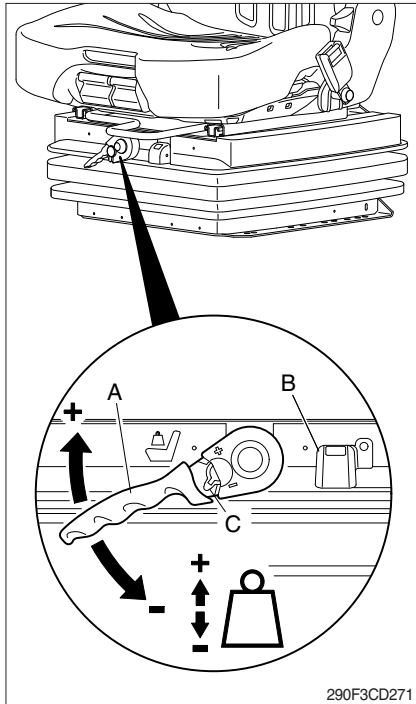
Use cigar lighter socket when you need emergency power.
Do not use the lighter exceeding 24 V, 100 W.

2) 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.

- ▲ Always check the condition of the seat belt and mounting hardware before operating the machine.
- ▲ Fail to wear a seat belt during the machine operation may result in serious injury or death in the event of an accident or machine overturn.

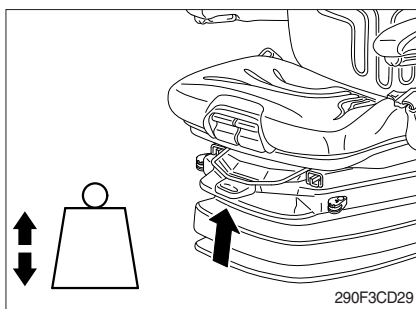
(1) Weight and height adjustment



With socket wrench (A) :

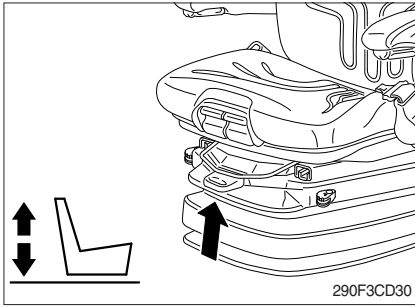
- ① The seat has to be adjusted for the operator's weight and height by tilting the handle (+) up or down (-) with the operator not sitting on the seat.
- ② The rotational direction is reversed by toggling the ratchet with the switch (C).
- ③ The operator's weight and the seat height are adjusted correctly when the green marking is completely visible in the indicator window (B) for weight and height.
- ④ The height can be adjusted individually as long as the green marking is visible.

Weight adjustment (AIR SUSPENSION, OPT)



- ① The seat should be adjusted for the operator's weight by briefly pulling the actuator lever of the automatic weight and height adjuster (arrow) with the machine at a standstill and the operator's sitting on the seat.
The operator must sit absolutely still during adjustment.
- ※ Before adjusting the weight, adjust shock absorbers to the position "soft".
 - ※ To prevent damage to the health, the setting for the operator's weight must be checked and adjusted before the machine is operated.

Height adjustment (AIR SUSPENSION, OPT)

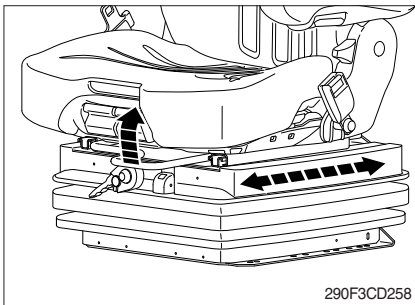


- ① The seat height can be set pneumatically and is continuously adjustable.
- ② The seat height can be altered by pulling or pressing the actuator lever fully out or in (arrow). If the adjustment reaches the top or bottom endstop, the height is adjusted automatically in order to guarantee a minimum spring travel.

※ **Before adjusting the weight, adjust shock absorbers to the position "soft".**

※ **In order to avoid damage, do not operate compressor for more than 1 minute.**

(2) Fore/after adjustment



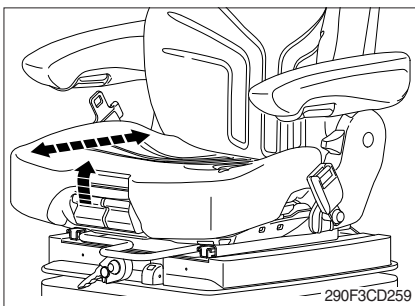
- ① The fore/after adjustment is released by lifting the locking lever.

⚠ **Do not operate the locking lever while operating.**

※ **After the adjustment, the locking lever must latch into the desired position with an audible click. It should not be possible to move the operator's seat into another position when it is locked.**

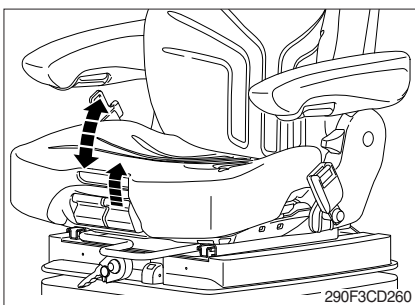
※ **Do not lift the locking lever with your leg or calf.**

(3) Seat depth adjustment



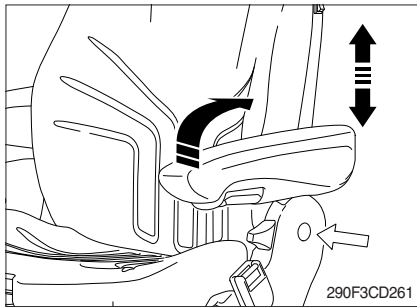
- ① The depth of the seat pan can be individually adjusted.
- ② To adjust the depth of the seat cushion, pull the right handle upwards. By moving the seat pan backwards or forwards the desired seating position can be reached.

(4) Seat pan angle adjustment



- ① The angle of the seat pan can be individually adjusted.
- ② To adjust the angle of the seat pan, pull the left handle upwards. By exerting pressure on or off the front or rear part of the seat pan it can be moved to the desired angle position.



(5) Armrest (LH)



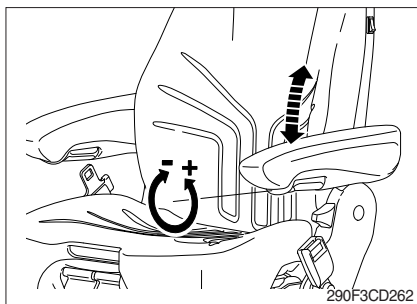
- ① The armrests can be folded up if required and the height can be individually adjusted.
- ② To adjust the armrest for height, separate the round cap (see arrow) from the cover and loosen the hexagon nut (size 13 mm) behind it adjust the armrests to the desired position (5 steps) and tighten the nut again (25 Nm). Replace the cap onto the nut.

Armrest (LH, RH)



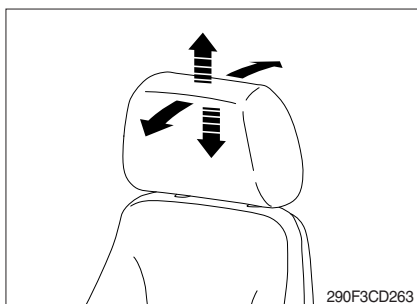
1. Tilt lever 
Pull up and hold to tilt armrest maximum 70 degrees.
2. Adjust lever 
Pull up, hold and slide forward or rearward or up or down.

(6) Armrest adjustment



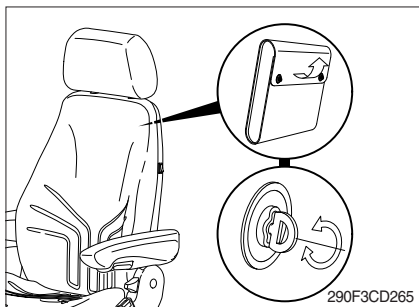
- ① The inclination of the armrest can be modified by turning the adjustment knob.
- ② When turning the knob to the outside (+), the front part of the armrest will be lifted; when turning the knob to the inside (-), it will be lowered.

(7) Headrest



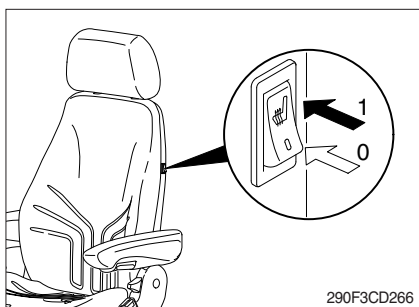
- ① The headrest can be individually adjusted for height by pulling it upward over the various increments up the end stop.
- ② By pushing forwards or rearwards the angle of the headrest can be adjusted individually.
- ③ To remove the headrest, pull it over the end stop.

(8) Document box



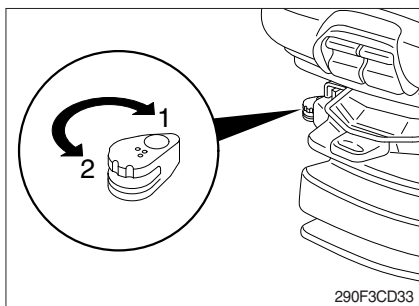
- ① The document box is placed on the rear side of the backrest.
- ② To open the document box, first twist the turn lock closures 90° to the left or the right and then fold the cover of the document box upwards.

(9) Seat heater switch



- ① The seat heater can be turned on/off by pressing the switch.

(10) Absorber

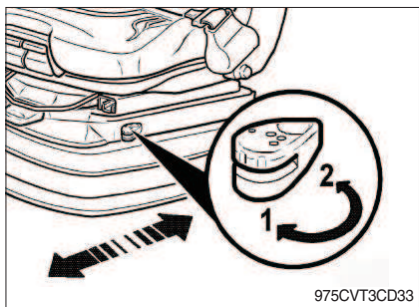


- ① The absorber setting of the seat can be varied to suit the on and off-road working conditions. The cushioning effect can be individually adjusted for this purpose.

Turn the lever to the desired position and release.

- 1 Soft
- 2 Hard

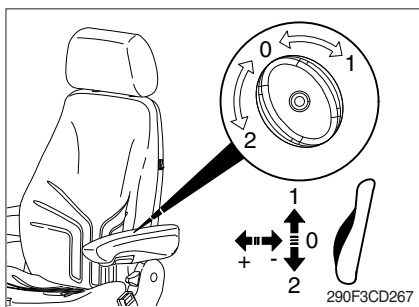
(11) Fore/aft isolator



- ① It is useful to activate the fore/aft isolator. This means that shock impacts in the driving direction can be better absorbed by the seat.

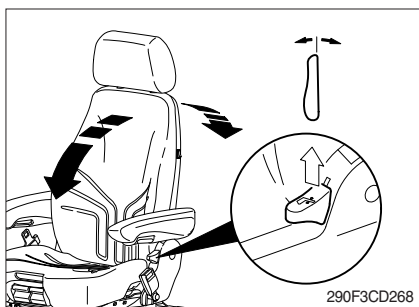
- 1 Fore/aft isolator off
- 2 Fore/aft isolator on

(12) Lumbar support



- ① By turning the adjustment knob to the left (2) or right (1), both the height and curvature of the backrest cushion can be individually adjusted.
- ② This increases both the seating comfort and the performance of the operator.

(13) Backrest adjustment



- ① Pull up the locking lever to release the backrest catch. When releasing the backrest, do not load the backrest by pressing against it.
 - ② By exerting pressure on or off the front or rear part of the seat pan it can be moved to the desired position. Release the locking lever to lock the backrest.
- ※ **It should not be possible to move the backrest into another position after it has been locked.**

(14) Maintenance

Dirt can impair the function of the seat, so make sure you keep your seat clean.

Upholstery does not need to be removed from the seat frame for cleaning.

▲ **Take care with the backrest - it may jerk forward and cause injury. When cleaning the backrest cushion, the backrest must be held in place when operating the backrest lever.**

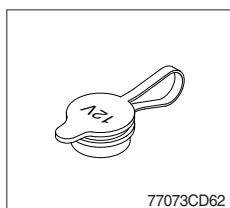
※ **Do not clean the seat with a pressure washer.**

During cleaning, the upholstery must not be soaked through.

Use standard commercially available upholstery or plastics cleaning agent.

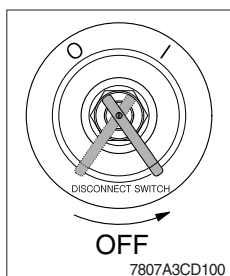
Test first for compatibility on a small, concealed area.

3) 12V SOCKET (option)



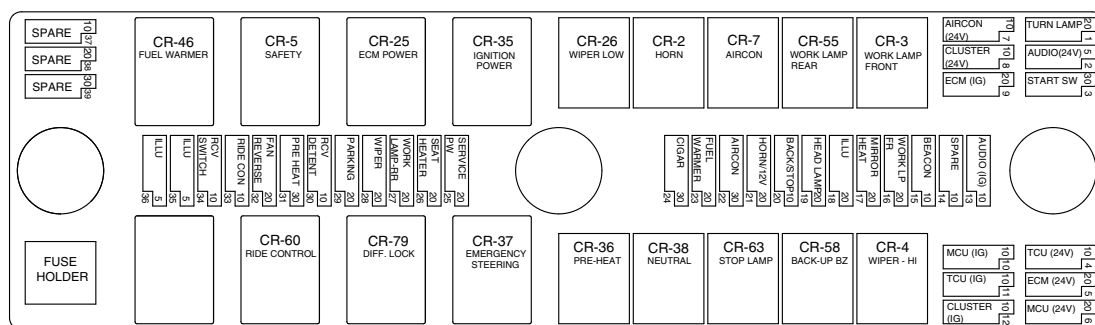
- (1) Utilize the power of 12 V as your need and do not exceed power of 12 V, 30 W.

4) 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.**

5) FUSE & RELAY BOX



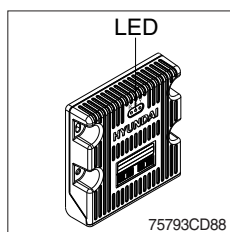
75793CD107

- (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.

6) MACHINE CONTROL UNIT (MCU)



75793CD88

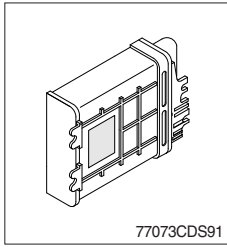
- (1) It consists of electronic parts and controls all lamps and buzzers on cluster in accordance with signals transmitted from the switches, the ECM, TCU, the engine and the hydraulic pressure sensors.

- (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 (24V, GND) of controller is disconnected · Check the fuse

G : green, R : red, Y : yellow

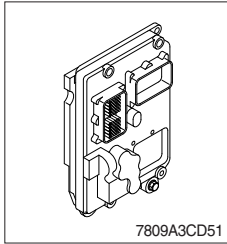
7) TRANSMISSION CONTROL UNIT (TCU)



(1) The control unit is shifting the required speeds fully-automatically under consideration of the following criteria.

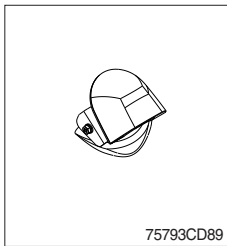
- Gear selector lever position
- Driving speed
- Load level

8) ENGINE CONTROL MODULE (ECM)



(1) The engine control module (ECM) is the control center of the engine system.

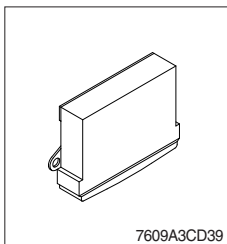
9) REAR CAMERA (option)



(1) The rear camera is available as a option.

※ Refer to page 3-33.

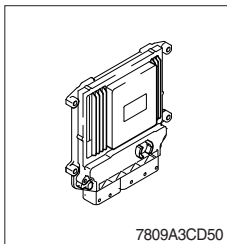
10) STEERING CONTROL UNIT (SCU, option)



(1) The steering control unit (SCU) is the control center of the joystick steering system.

※ Refer to page 3-47.

11) ELECTRO CONTROL UNIT (EHCU)



(1) The electro hydraulic control unit (EHCU) is the control center of the electro hydraulic remote control lever.

12) RADIO AND USB PLAYER (+BLUETOOTH)

■Type A

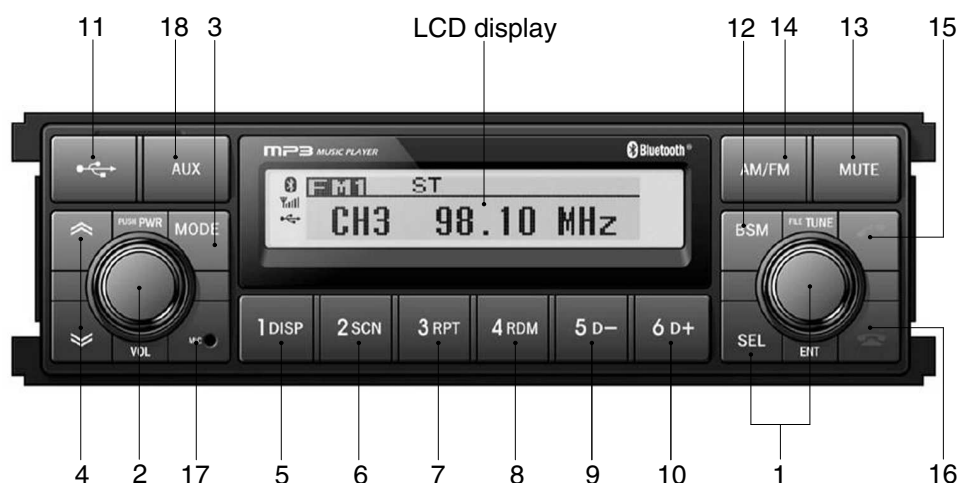


75793CD62-1

■FRONT PANEL PRESENTATION

- | | | | | | |
|---|--|---|----|--|--|
| 1 | | Sound function selection button (audio selection) | 10 | | Preset memory button 6 D+ Directory up |
| 2 | | Power and volume button | 11 | | Aux function |
| 3 | | Mode button (select RADIO / USB / AUX) | 12 | | Preset scan (PS) Best station memory (BSM) |
| 4 | | UP / DOWN tuning button | 13 | | Audio mute button |
| 5 | | Preset memory button 1 DISP ID3 v2 display | 14 | | AM / FM button (radio) |
| 6 | | Preset memory button 2 SCN File scan | 15 | | Send |
| 7 | | Preset memory button 3 RPT Repeat play selector | 16 | | End |
| 8 | | Preset memory button 4 RDM Random play selector | 17 | | MIC (microphone) |
| 9 | | Preset memory button 5 D- Directory down | | | |

■Type B



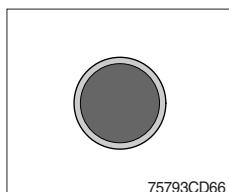
75793CD62-2

■FRONT PANEL PRESENTATION

- | | | | | | |
|---|--|--|----|--|---|
| 1 | | Audio selection button | 10 | | Preset memory button 6 |
| | | Audio selection knob | | | Directory up |
| 2 | | Power and volume button | 11 | | Aux function |
| 3 | | Mode button
(select RADIO / USB / AUX) | 12 | | Preset scan (PS)
Best station memory (BSM) |
| 4 | | UP / DOWN tuning button | 13 | | Audio mute button |
| 5 | | Preset memory button 1
DISP ID3 v2 display | 14 | | AM / FM button (radio) |
| 6 | | Preset memory button 2
SCN File scan | 15 | | Send |
| 7 | | Preset memory button 3
RPT Repeat play selector | 16 | | End |
| 8 | | Preset memory button 4
RDM Random play selector | 17 | | MIC (microphone) |
| 9 | | Preset memory button 5
D- Directory down | 18 | | Aux connector |

■GENERAL

(1) Power and volume button



① Power ON/OFF button

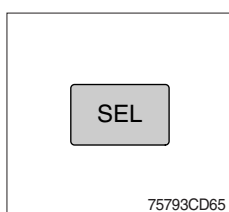
Press power button to turn the unit ON or OFF shortly.

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 (audio selection)



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

·Type A

BASS → TREBLE → BAL → BEEP → LOUD → EQ → VOLUME



·Type B

BASS → TREBLE → BAL → LOUD → EQ



※ 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 power button (type A) or selection knob (type B) 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 power button (type A) or selection knob (type B) 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 power button (type A) or selection knob (type B) 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 Beep control (type A only)

To adjust the beep mode, first select the beep mode by pressing the select button  until BEEP indication appears on the LCD display.

The beep mode will be shown on the LCD display from BEEP 2ND, BEEP OFF and BEEP ON by turning power button right / left.

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

Select BEEP ON when you wish to hear the BEEP sound whenever any function button is pressed.

Select BEEP 2ND when you wish to hear the BEEP sound whenever any tuner pre-set button and/or tune seek buttons are pressed for more than 3 seconds.

⑥ 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.

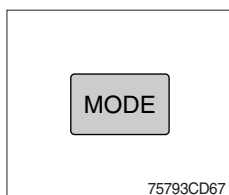
To select the loudness feature, press SEL button until LOUD ON or LOUD OFF is displayed, then turn power button (type A) or selection knob (type B) left or right to activate or deactivate loudness.

⑦ Equalizer (EQ)

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

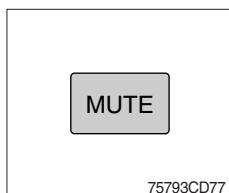
To select the desired curve, first select the EQ mode by pressing SEL button until the "EQ OFF" indication appears on the display panel. Within 5 seconds of choosing the EQ mode, turn power and volume button (type A) or selection knob (type B) to select an equalizer curve as desired.

(3) Mode button



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

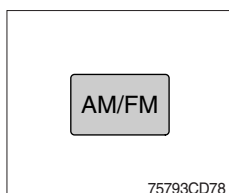
(4) Audio mute button



- 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

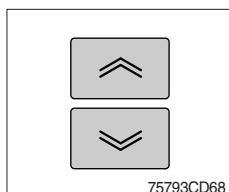




- ① Each time this button is pressed, the radio button is changed.
Each time this button is pressed, LCD displays each band as follows :

FM1 → FM2 → FM3 → AM → LW

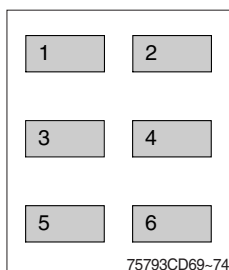
※ LW band is only available for Europe.

(2) Up / down tuning



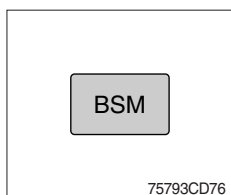
- ① To automatically select a radio station, momentarily press the up tune seek button  or down tune seek button  for less than 3 seconds to search for the closest radio station.
To manually select a radio station, press the up tuning & down tuning button for longer than 3 seconds.
The radio frequency 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 appear 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

(1) USB function

There are two ways to play mp3 files in a USB device : using USB socket in the cab and the USB / AUX cable connected to the front side of the player.

· Use of USB socket

- ① Connect a USB device, which saves mp3 files, to USB socket in the cabin.
- ② If a USB device has not been connected, MP3 files are automatically played when you insert it into the USB port.
- ③ If a USB device has connected, MP3 files are played when you press mode for USB.

· Use of USB / AUX cable (option)

· Type A



- ① Connect the USB/AUX cable to the player in order to play MP3 files in a USB device.
- ② If a USB device has not been connected, MP3 files are automatically played when you insert it into the cable.
- ③ If a USB device has connected, MP3 files are played when you press mode for USB.

·Type B



75793CD81-1

① **USB function**

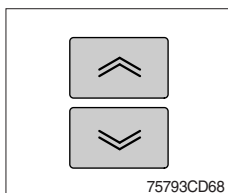
- a. Connect a USB device if you want to listen to MP3 file in a USB device.
- b. It will automatically play MP3 file in the USB device and the LCD display will show “READING USB”.

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

② **AUX function**

- a. If you want to listen to music of a external audio device, connect a external audio device through AUX cable.
- b. Change AUX mode by pressing MODE button.
If audio file of Audio device is playing, you can listen to music through speaker.

(2) **File selection & cue / review button**



75793CD68

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.

(3) 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 power button (type A) or selection knob (type B) 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



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



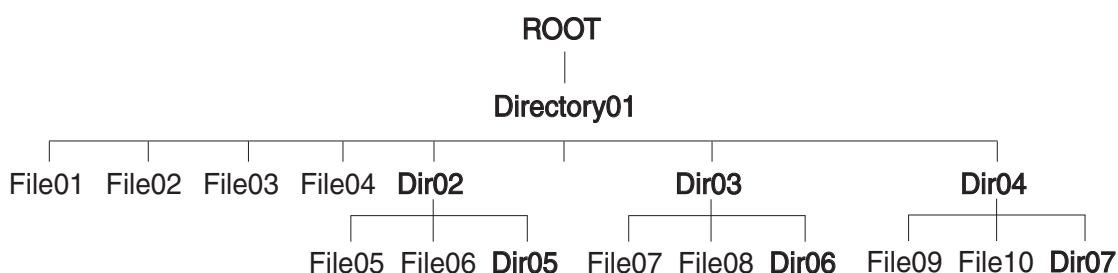
If you want to search the file in the located directory, turn right / left the power button (type A) or selection knob (type B) consecutively. Press the button when you find the wanted file. The unit will then play the selected file.

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

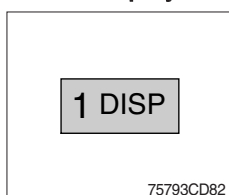
File01 → File02 → File03 → File04



※ MP3 directory / file configuration



(4) ID3 v2 display

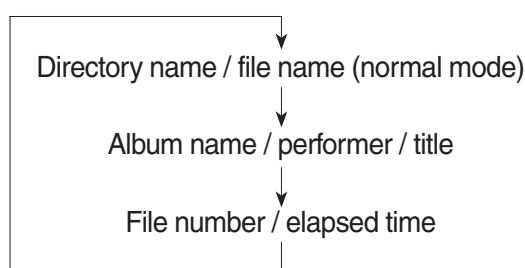


- ① Disp button is used to change the display information.

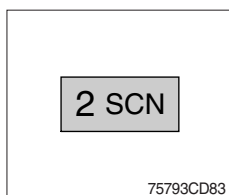
While playing an MP3 file, you can change the file information shown on the LCD display.

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.



(5) File scan (SCN)



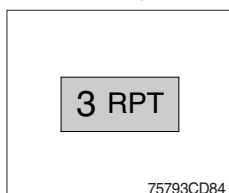
- ① During USB play, press SCN button to play the first 10 seconds of each file on the whole file on the USB (SCN mark will appear on the LCD display).

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.

(6) Repeat play selector (RPT)

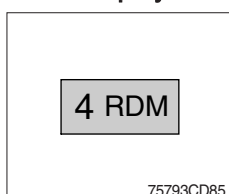


- ① During USB play, press RPT button to play the selected file repeatedly (RPT will appear on the LCD display).

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).

(7) Random play selector (RDM)

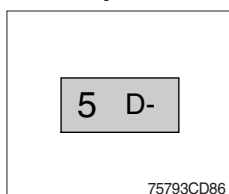


- ① During USB play, press RDM button to play the files on the USB in a random shuffled order (RDM will appear on the LCD display). The file select function will also select file in the random order instead of the normal process.

The random play mode can be cancelled by this button again.

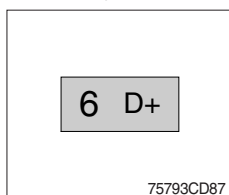
- ※ In case of MP3 file, when the random button is pressed and held longer than 2 seconds, the RDM mark will blink on the LCD display and play all files in directory randomly until the directory random mode is cancelled by pressing the random button again or by activating the scan or repeat functions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

(8) Directory down



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

(9) Directory up



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

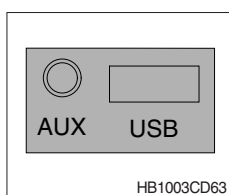
※ If the MP3 file does not have a directory, the unit play MP3 at 10-file intervals.

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

■AUX PLAYER

(1) Aux function

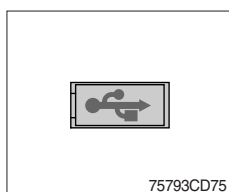
- Use of USB socket (machine serial No. : -#0075)



① If you want to listen to music of a external audio device, connect a external audio device into the USB port.

② Press mode button to change a current mode for AUX. If audio file of audio device is playing, you can listen to music through speaker.

- Use of USB/AUX cable (option)



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

② Press mode button to change a current mode for AUX. If audio file of audio device is playing, you can listen to music through speaker.

■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 hyundai 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.

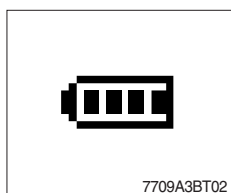
Check your mobile phone owner's manual for details.

- ※ 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.



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.



② Battery strength indicator

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



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, **HFI 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 to 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 3-69, 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 power button (type A) or selection knob (type B), 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 power button (type A) or selection knob (type B) to display the paired devices.
 - Each time you turn power button (type A) or selection knob (type B), the LCD displays as follows :

SAMSUNG → LG → APPLE → MOTOROLA → BACK


- 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  is pressed or power button (type A) or selection knob (type B) 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 power button (type A) or selection knob (type B), 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 power button (type A) or selection knob (type B) 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 knob power button (type A) or selection knob (type B) 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) Function 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 power button (type A) or selection knob (type B) until **SETTINGS** is displayed.
- c. Press SEL button until **AUTO ANSWERING** is displayed.
- d. Press SEL button and turn power button (type A) or selection knob (type B). The LCD then displays as follows :

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



- 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 power button (type A) or selection knob (type B) 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 power button (type A) or selection knob (type B) 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.

4. OPERATION

1. SUGGESTION FOR NEW MACHINE

- 1) It takes about 100 operation hours to enhance its designed performance.
- 2) Operate according to below three steps and avoid excessive operation for the initial 100 hours.

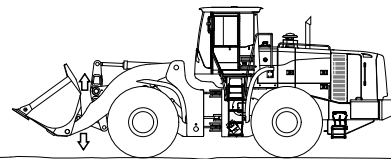
Service meter	Load
Until 10 hours	About 60%
Until 100 hours	About 80%
After 100 hours	100%

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

- 3) Be careful during the initial 100 hours operation.
 - (1) Check daily for the level and leakage of coolant, engine oil, hydraulic oil and fuel.
 - (2) Check regularly the lubrication and fill. Grease daily all lubrication points.
 - (3) Tighten bolts.
 - (4) Warm up the machine fully before operation.
 - (5) Check the gauges during operation.
 - (6) Check if the machine is operating normally during operation.
- 4) Replace followings after initial operation hours.

Checking items	Hours
Engine oil and filter	250
Fuel filter element	
Fuel pre-filter	
Transmission oil and filter	
Axle oil (front and rear)	
Hydraulic oil return filter	
Pilot line filter element	

Avoid excessive operation for initial 100 hours



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2. CHECK BEFORE STARTING THE ENGINE

- 1) Make sure that the steering frame lock bar is stored in the unlocked position.

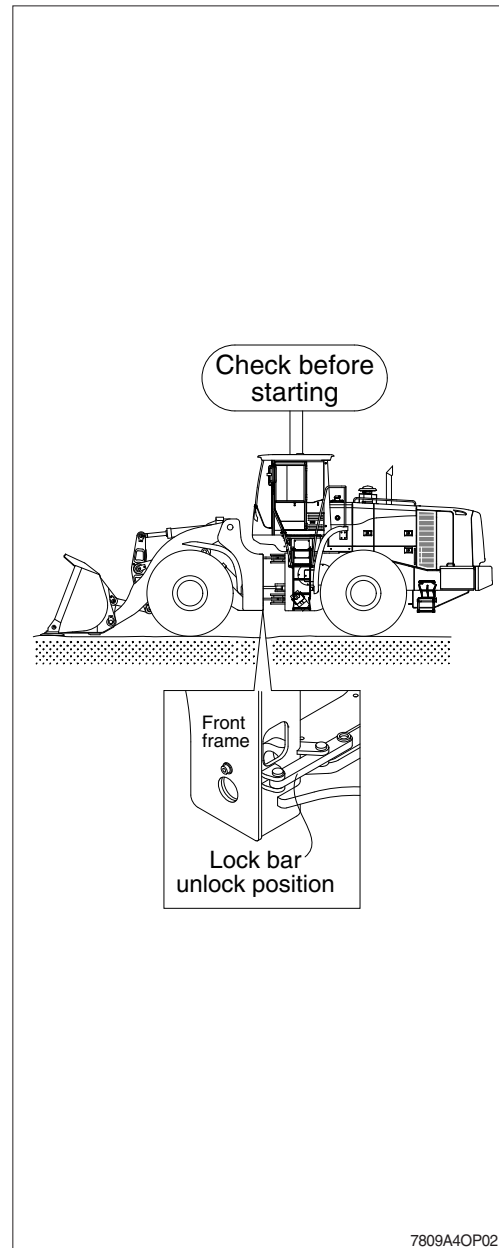
▲ The steering frame lock bar must be removed in order to steer the machine.

- 2) Look around the machine and under the machine to check for loose 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 loose wiring, and collection of dust at places which reach high temperature.

※ **Refer to the daily check on the chapter 6, Maintenance.**

- 3) Adjust seat to fit the contours of the operator's body for the pleasant operation.
- 4) Make sure that the machine is equipped with a lighting system that is adequate for the job conditions. Ensure that all lights are in proper working condition.
- 5) Adjust the rear view mirror.
- 6) Make sure that there are no personnel in the area before you start the engine. Make sure that there are no personnel in area before you move the machine. Make sure that there are no personnel on the machine, underneath the machine, or around the machine.

▲ If a warning tag is attached to the starting switch or to the controls, do not start the engine. Also, do not move any controls.



3. STARTING AND STOPPING THE ENGINE

1) CHECK INDICATOR LIGHTS

- (1) Check if the parking brake switch is ON.
- (2) Check if the gear selector lever is in neutral position.
- (3) Check if the pilot cut off switch is OFF.

- (4) Turn the key to the ON position, and check followings.

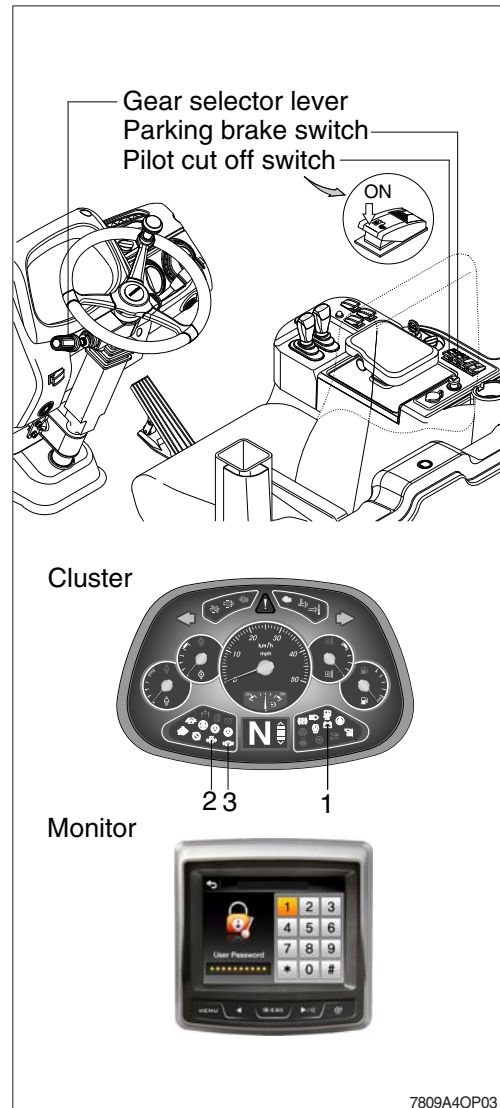
· Cluster

- ① If all the lamps light ON after sounding buzzer for 3 seconds.
 - ※ If the lamps do not light or the buzzer is not sounded, check disconnection of wire.
- ② Only below lamps will light ON and all the other light will be turn OFF after 3 seconds.
 - Charging warning lamp (1)
 - Engine oil pressure warning lamp (2)
 - Brake fail warning lamp (3)

· Monitor

- ① The buzzer sounds for 3 seconds with HYUNDAI logo on monitor.
- ② If the ESL mode is set to the enable, enter the password to start engine.
- ③ 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 system setting.



2) STARTING ENGINE IN NORMAL TEMPERATURE

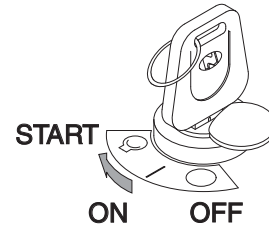
※ **Sound the horn to warn the surroundings after checking if personnel or obstacles are in the area.**

- (1) Check if the parking brake is locked (with the parking switch ON).
- (2) Check if the gear selector lever is in the neutral position.
- (3) Check if the pilot cut off switch is locked (with the switch OFF)
- (4) Turn the starting switch to START position to start the engine.

※ **Do not crank the engine for more than 20 seconds. 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 instantly after the engine starts to avoid possible damage to the starting motor.

※ **Refer to the START PROCEDURE on the page 0-12.**



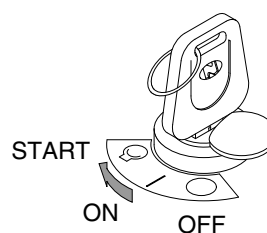
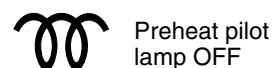
77074OP04

3) STARTING ENGINE IN A COLD WEATHER

- ※ Sound horn to warn surroundings after checking if there are obstacles in the area.
- ※ Replace the engine oil, coolant and fuel referring to recommended oils at page 6-9.
- ※ 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 the parking brake is locked (with the parking switch ON).
 - (2) Check if the gear selector lever is in the neutral position.
 - (3) Check if the pilot cut off switch is locked (with the switch OFF)
 - (4) Turn the starting switch to ON position, and wait 1~2 minutes. More time may take according to ambient temperature.
 - (5) Start the engine by turning the starting switch to START position after the preheater pilot lamp and 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.

- (6) Release starting switch immediately after starting engine. The starting switch will automatically return to the ON position.
- ※ After engine started, the preheating function is actuated to reduce the white smoke.
 - ※ Before the warming-up operation is completed, do not operate the equipment.
 - ※ Operate machine at less than normal loads and at slow idle speed, right after engine warming-up.
 - ※ Run the engine for 10~15 minutes at low idle when the ambient temperature is below -15°C.



7609A4OP05

4) INSPECTION AFTER ENGINE START

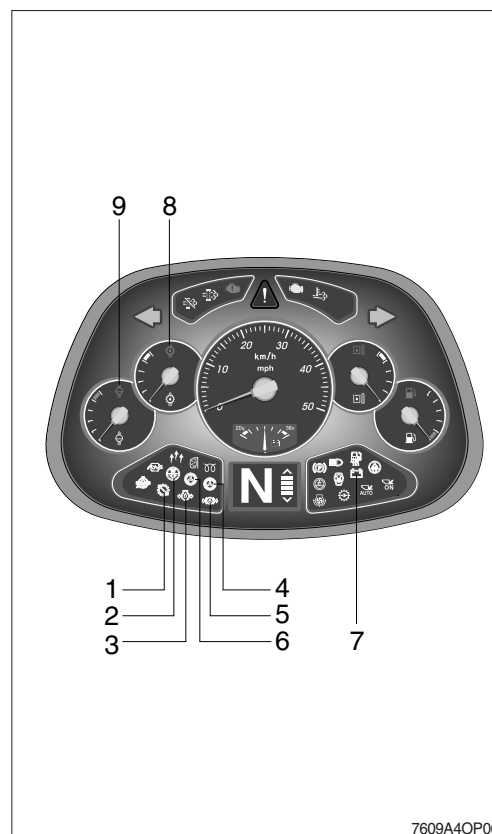
Inspect and confirm the following after engine starts.

- (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 (1-7) OFF?
- (4) Check the following after warming up operation.

- ① Is the indicator of water temperature gauge (8) in the operating range?
- ② Is the indicator of transmission oil temperature gauge (9) in the operating range?
- ③ Is the engine sound and the color of exhaust gas normal?
- ④ Are the sound and vibration normal?

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

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



7609A4OP06

5) TRANSMISSION COLD STARTING

- (1) At an oil temperature in the shifting circuit $< -12^{\circ}\text{C}$, the transmission must be warmed-up for some minutes.
- (2) This must be carried out in neutral with an increased engine speed.
- (3) Until this oil temperature is reached, the electronics remains in neutral, and the symbol of the cold start phase will be indicated on the display.
· Indication on the display : * *
- (4) After the indication on the display is extinguished, the full driving program can be utilized out of NEUTRAL.

※ **Transmission warning**



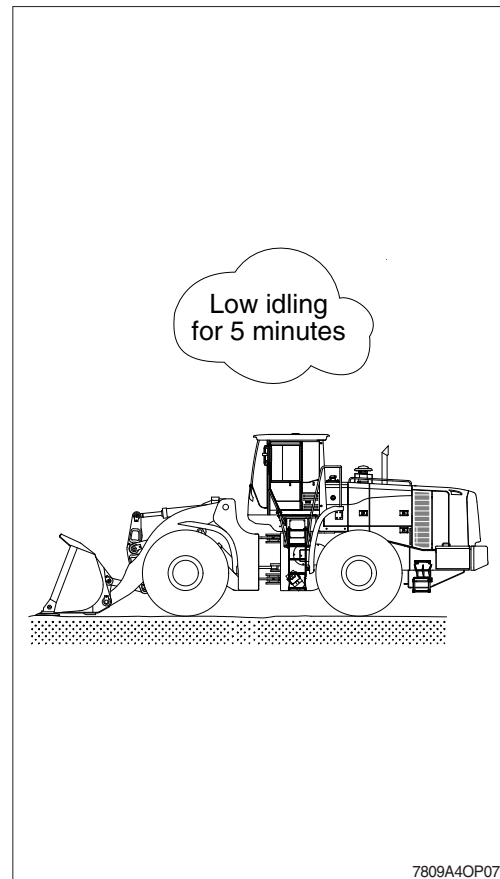
7609A4OP15

Symbol	Meaning	Remarks
LF, LR	Limp home gear	-
* *	Oil temperature too low, no gear available	Warm up engine/transmission
WS	Warning sump temperature	Alternate between WS and actual gear / direction while driving, in neutral only displayed WS if no fault is detected ※ Cool down transmission
WT	Warning torque converter temperature	Alternate between WS and actual gear / direction while driving, in neutral only displayed WS if no fault is detected ※ Cool down transmission

6) TO STOP THE ENGINE

- ※ If the engine is abruptly stopped before it has cooled down, engine life may be greatly shortened. Consequently, do not abruptly stop the engine apart from an emergency.
- ※ In particularly if the engine has overheated, do not abruptly stop it but run it at medium speed to allow it to cool gradually, then stop it.

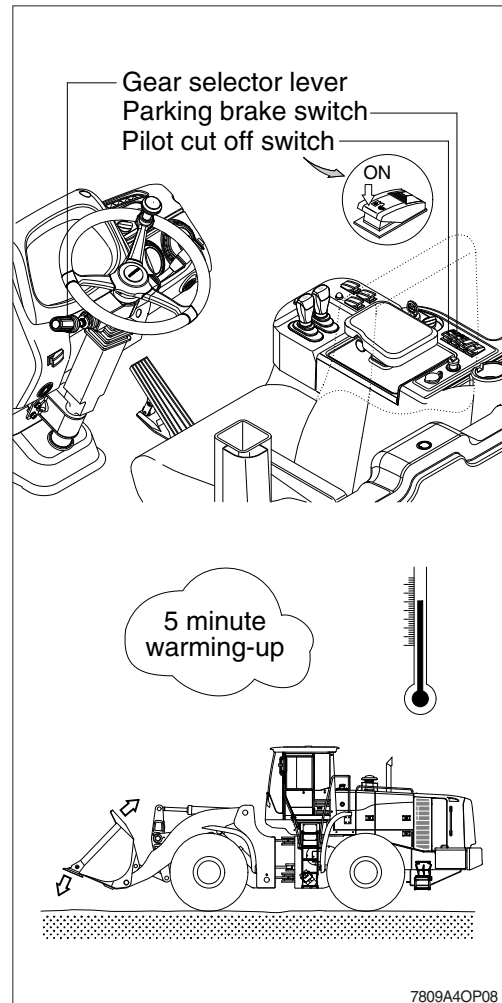
- (1) Place the gear selector lever in neutral.
- (2) Push the parking brake switch to the ON position.
- (3) Run the engine for five minutes at low idle with no load.
- (4) Return the key of starting switch to the OFF position.
- (5) Remove the key to prevent other people using the machine.
- (6) Push the pilot cut off switch to the OFF position.
- (7) Lock the cab door.



4. WARMING-UP OPERATION

※ The most suitable temperature for the hydraulic oil is about 50°C (112°F). It can cause serious trouble in the hydraulic system by sudden operation when the hydraulic oil temperature is below 25°C (77°F). The temperature must be raised to at least 25°C (77°F) before starting work.

- 1) Run the engine at low idling for 5 minutes.
 - 2) Speed up the idling and run the engine at mid-range speed.
 - 3) Push the pilot cut off switch to the ON position.
 - 4) Lift the boom slightly and extend the bucket cylinder to the stroke end to relieve hydraulic pressure.
- ※ **Do not leave hydraulic pressure relieved for more than 30 seconds.**
- 5) Shorten the bucket cylinder to the stroke end to relieve hydraulic pressure.
- ※ **Do not leave hydraulic pressure relieved for more than 30 seconds.**
- 6) Repeat the procedure 4) - 5) several times until warm-up operation is completed.



5. OPERATION OF THE WORKING DEVICE

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

- 1) Control lever operates the boom and the bucket.
- 2) When you release the control lever, control lever returns to neutral position automatically.
- 3) When the control lever operates to the position of boom float, boom kick out and bucket leveler ; these function is completed, then the control lever returns to the neutral position.

※ **Control lever**



Boom lower (1)

Push the control lever forward in order to lower the boom.



Boom raise (2)

Pull the control lever backward in order to raise the boom.



Bucket roll back (3)

Move the control lever backward (or toward the left) in order to tilt the bucket backward.



Bucket dump (4)

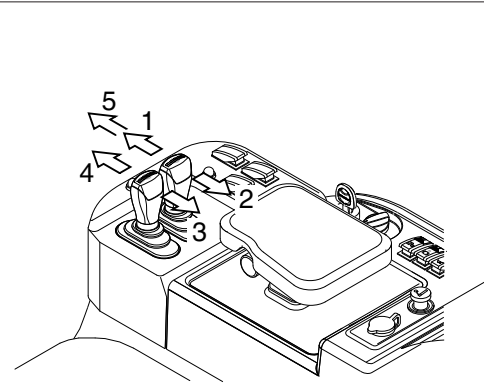
Move the control lever forward (or toward the right) in order to dump a load from the bucket.



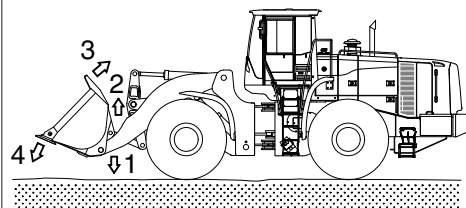
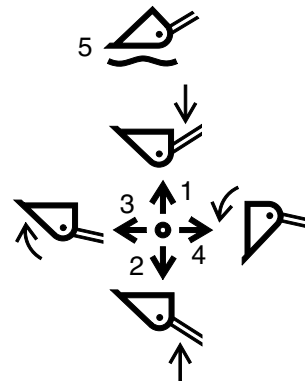
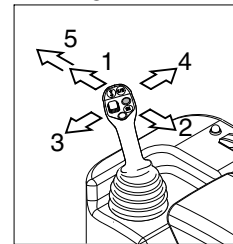
Boom float (5)

Push the control lever forward into the detent.

The boom will lower to the ground. The boom will float along the contour of the ground.



FNR RCV



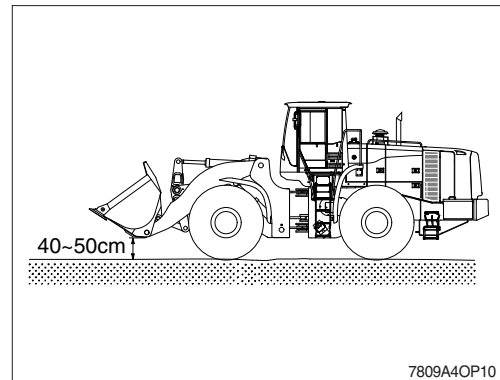
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6. TRAVELING OF THE MACHINE

1) BASIC OPERATION

(1) Traveling posture

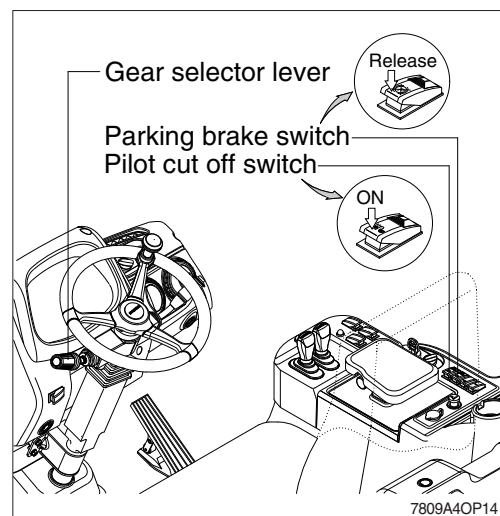
Lift the boom so that the bucket is placed 40-50cm above the ground.



(2) Traveling operation

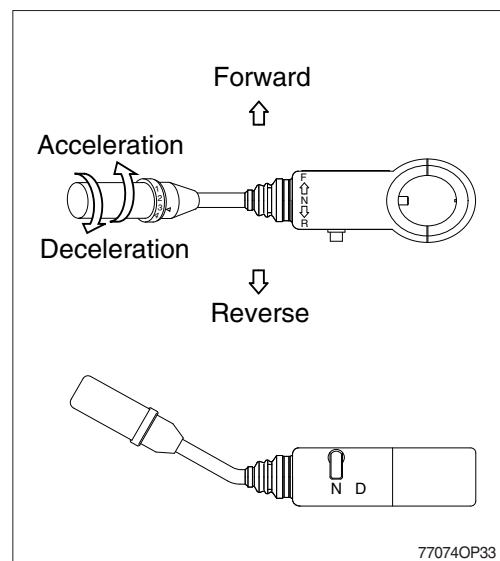
When warm-up operation is completed after the engine is started, move the machine according to the following procedure.

- ① Push the pilot cut off switch to the ON position.
- ② Release the parking brake.
- ③ Put the gear selector lever in the 1st stage of forward or backward direction and press gently the accelerator pedal to move the machine.



(3) Changing direction and speed

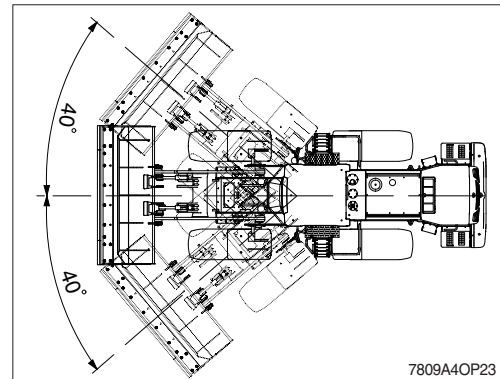
- ① The gear selector is designed for the mounting on the left side of the steering column.
- ② The positions (speeds) 1 to 4 are selected by a rotary motion, the driving direction Forward (F)-Neutral (N)-Reverse (R) by tilting the gear selector lever.
- ③ A neutral lock is installed as protection against inadvertent drive off.
 - Position N - Gear selector lever blocked in this position
 - Position D - Driving
- ④ When doing digging or dumping work, run the machine in the 1st or 2nd speed.



- ※ When traveling at high speed, do not abruptly decelerate by using the transmission lever, to slow down instead press the brake pedal.
- ※ When changing direction, check beforehand there is no obstacle in the direction you will be headed.
- ※ Avoid changing direction at high speed.

(4) Turning the machine

- ① Turn the machine by moving the steering wheel into the desired direction.
 - ② You can turn the machine to the left or right by 40 degree.
- ※ Do not turn the machine abruptly when traveling at high speed and avoid turn on a slope.
- ▲ Steering does not function with engine OFF.

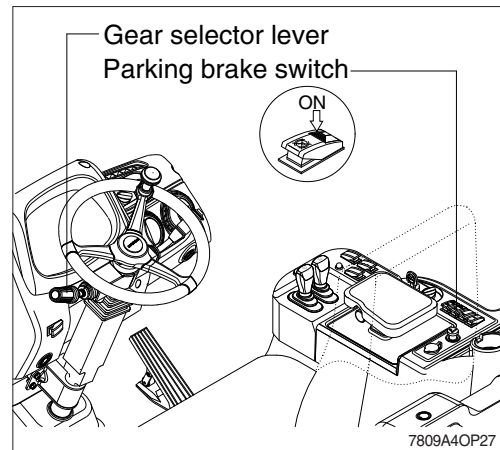


(5) Precautions when driving

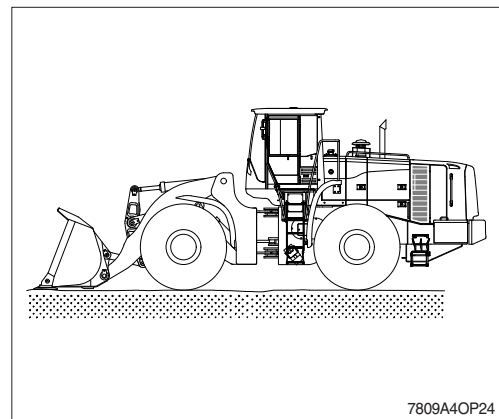
- ① If the monitor warning lamp lights up, put the gear selector lever in the neutral position and stop the machine. Stop the engine after running it at low idling. Then resolve any problems regarding operation of the machine.
- ② When operating the machine, if the load is lightened rapidly, the speed of the machine will increase. So, be careful.
- ③ When the machine travels on uneven ground, keep the machine traveling at low speed.

(6) Stopping the machine

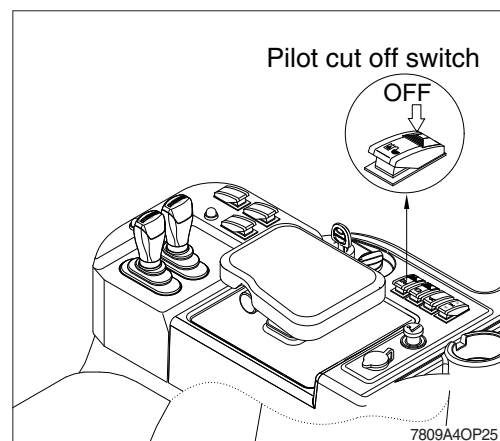
- ① Press the brake pedal to stop the machine.
- ② Put the gear selector lever in the neutral position.
- ③ Push the parking brake switch to the ON position.



- ④ Lower the bucket to the ground.



- ⑤ Push the pilot cut off switch to the OFF position.
- ※ When parking on a slope, block the tires.



(7) Stopping engine

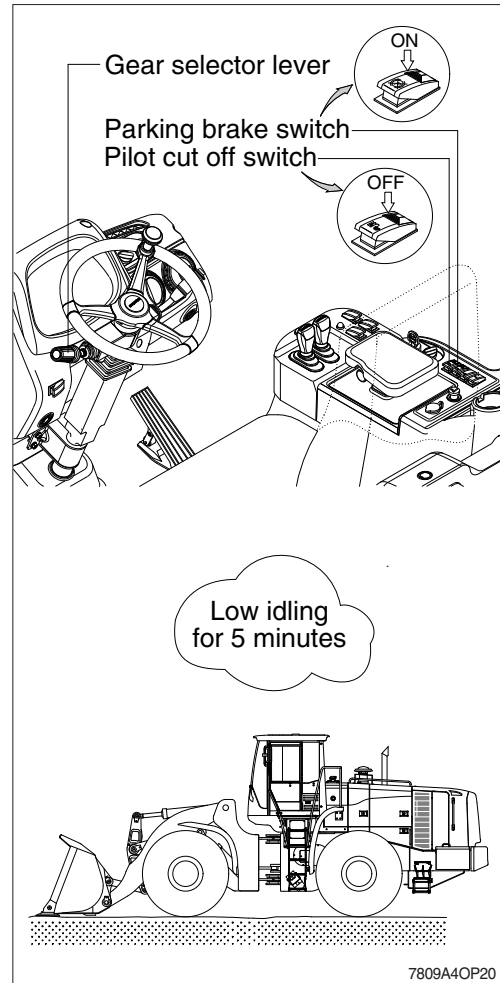
※ If the engine is abruptly stopped before it has cooled down, its service life may be shortened. Avoid sudden stop except an emergency.

※ When the engine is overheated, do not stop immediately. Run the engine at a mid range speed to allow it to cool down, then stop it.

- ① Check if the parking brake switch is ON.
- ② Check if the gear selector lever is in the neutral position.
- ③ Check if the pilot cut off switch is OFF.
- ④ Run the engine at low speed without operating the equipment for about 5 minutes.
Turn the starting key to the OFF position and remove the key.

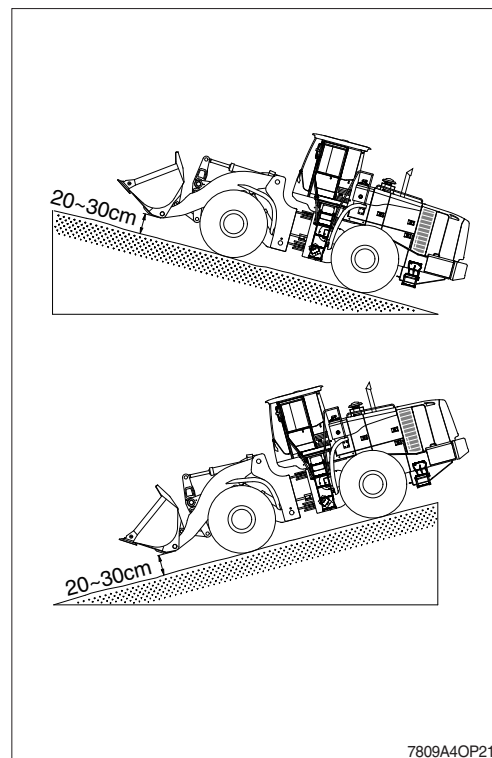
(8) Checks after the engine stopped

- ① Check the leakage of oil and water, the work equipment and the exterior of the machine.
- ② Refill the fuel tank.
- ③ Remove any debris inside of the engine room and attached to the machine.



2) TRAVELING ON A SLOPE

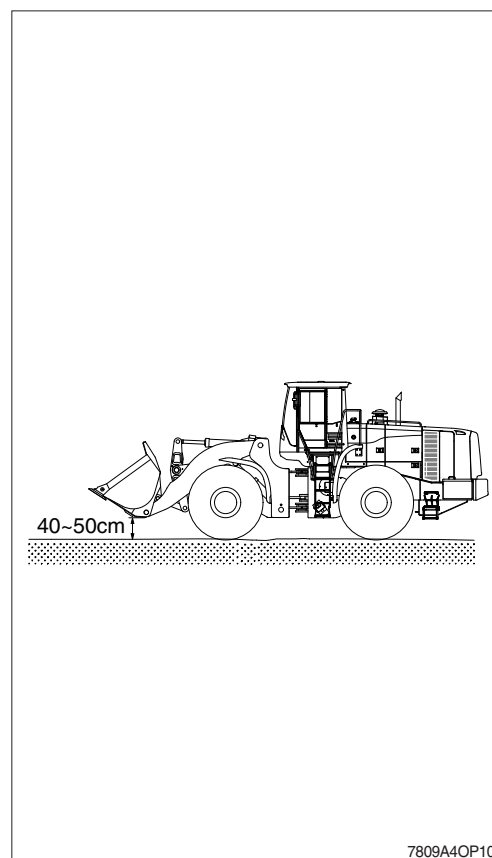
- (1) Never travel down a slope in neutral.
 - (2) Lower the bucket 20-30 cm (1 ft) to the ground so that it can be used as a brake in an emergency.
 - (3) If the machine starts to slide or loses stability, lower the bucket immediately and brake the machine.
 - (4) When parking on a slope, use the bucket as a brake and place blocks behind the tires 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.**



7. EFFICIENT WORKING METHOD

1) GENERAL

- (1) Lift the bucket about 40-50 cm (2 ft) above the ground to ensure safety and to gain a good range of view.
- (2) Clear the jobsite and level the ground.
- (3) Be careful that excessive force is not applied to the bucket.
- (4) When handling hard materials, use bucket teeth or bolt on cutting edge.
- (5) When doing dumping work, put the control lever in the DUMP position, then return it to a former state. Repeat this procedure until the work is finished.
- (6) Position the machine with its back against the wind so that dust does not get into the engine.
- (7) Check if the proper bucket is used for the work.
If the capacity of the bucket exceeds that of the machine, the machine's service life may be shortened.

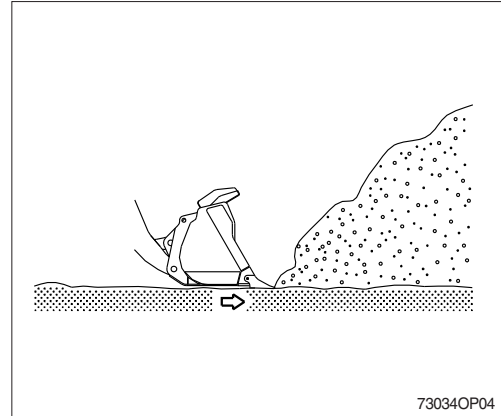


2) EXCAVATION WORK

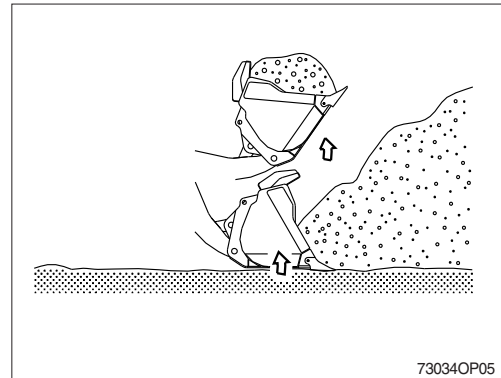
(1) Shovel work

As the machine loads on the bucket with traveling, tires may start to slip because of heavy load. Then lift the bucket slightly to reduce load.

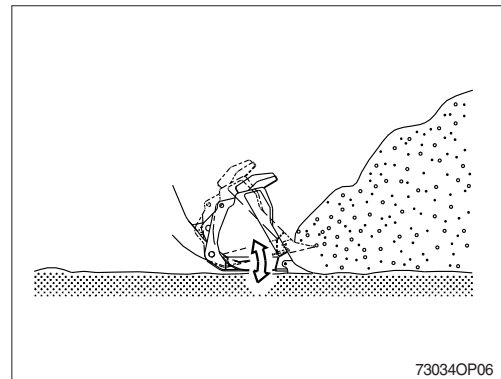
- ① Keep the bucket shovel parallel to the ground (If the bucket is pushed in a non-horizontal position, power may be reduced, and the bucket cannot dig deeply into the heap of soil).



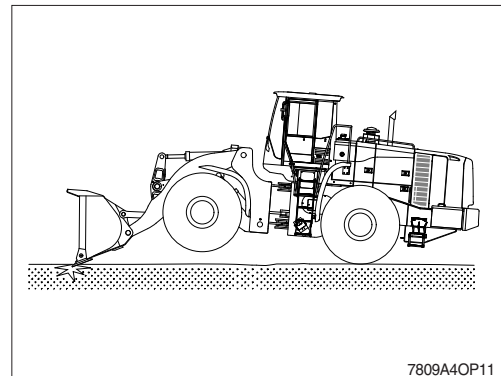
- ② When the bucket is sufficiently deep into the pile, advance the machine with the control lever pulled down. And by placing the control lever in the bucket roll-back position, fill the bucket with soil.



- ③ When it is difficult to dig into the soil, move the bucket control lever forward and backward to move the bucket teeth up and down.



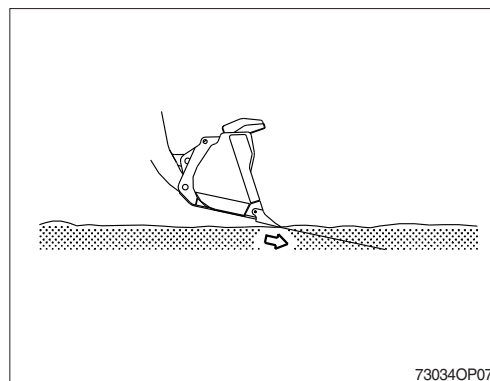
- ※ If the machine operates with its front tires lifted, its driving force will deteriorate and excessive force will be applied to the rear tires. Avoid operating in that posture.



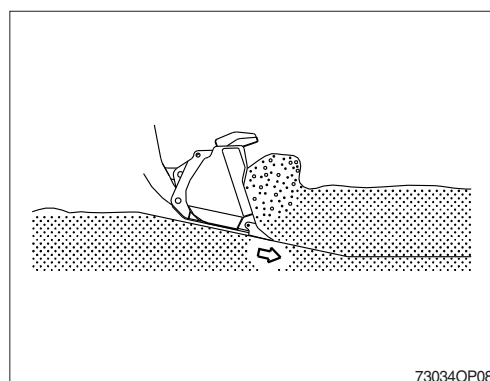
(2) Excavation on level ground

Advance the machine with the bucket lowered slightly and make sure that the bucket is evenly loaded on both sides.

- ① Lower the bucket edge slightly.

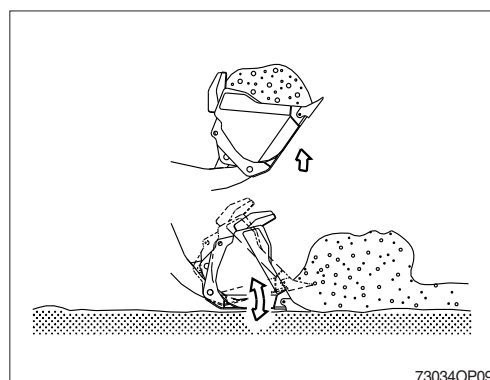


- ② Advance the machine and lift the bucket using the bucket control lever to dig out the soil.



- ③ Advance the machine while controlling the depth of digging with the control lever.

- ※ **Do not press the bucket heavily into the ground.** It may damage its driving force.
- ※ **Use the bucket suitable to the working condition.**
- ※ **When excavating, prevent the excavation force from applying only one side of the bucket.**



3) LEVELING

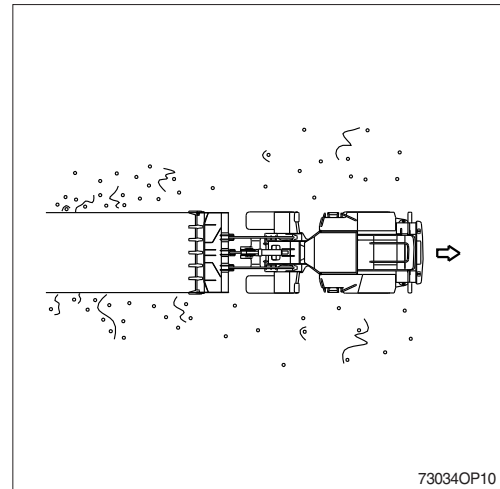
(1) Load the bucket with soil and dump gradually the soil while driving backward.

(2) After dumping the soil, move backward with the bucket lowered to the ground to level the ground.

Load the bucket with soil and place the bucket in (3) the horizontal position.

Then put the control lever in the BOOM FLOAT position and move backward.

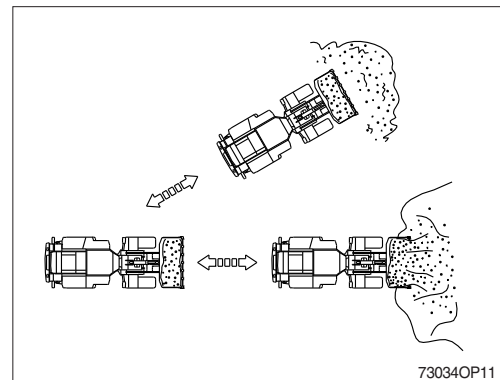
※ **Make sure that the machine moves always backward when doing leveling work.**



4) TRANSPORTATION

※ **Make sure that the traveling path is always cleared.**

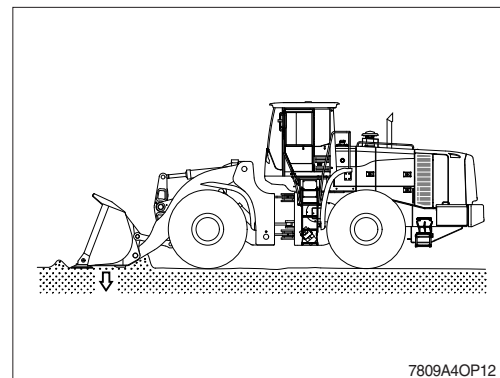
※ **When transporting material, lift the bucket 40-50 cm above the ground.**



5) COMPACTION

When operating, keep the bottom of the bucket horizontal to the ground.

※ **Do not work with the bucket set in the DUMP position.**

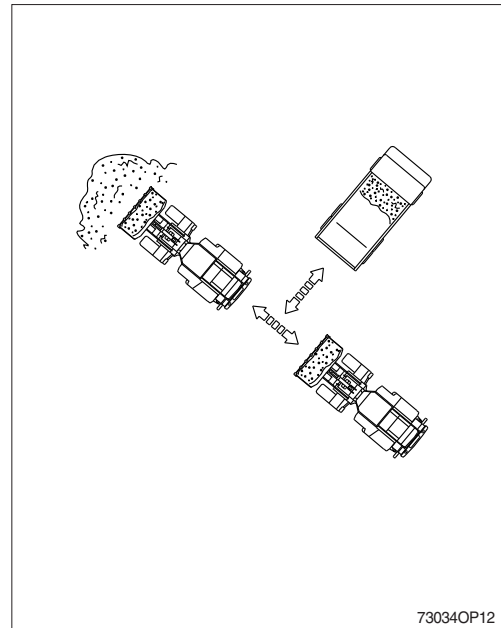


6) LOADING

Maximum efficiency can be attained by carrying out work in such a way that the swinging angle and the traveling distance are kept as small and short as possible in accordance with the terrain.

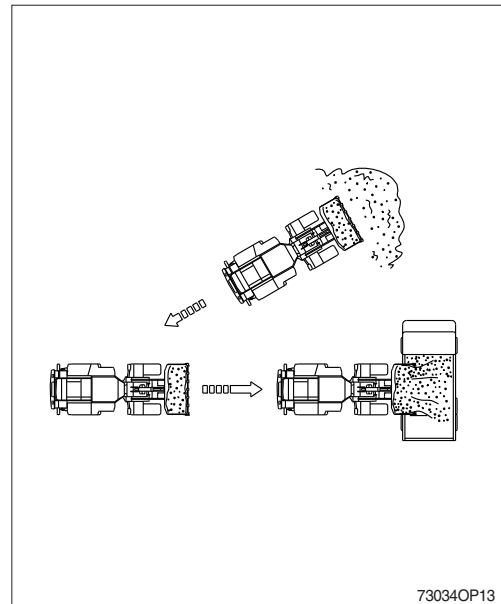
(1) I method

- ① After digging out the soil, move backward and position the dump truck between the heap of soil and the machine to load the soil into the truck.
 - ② This is the fastest and most efficient way to load material.
- ※ **The ground of the jobsite should be always level and do not swing or step on a brake pedal abruptly with the boom raised.**

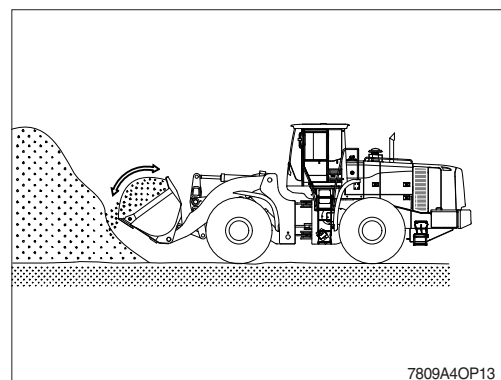


(2) V method

- ① Park the truck at an angle of 60 degrees toward the machine. After digging out, drive backward and position the machine at a right angle with the truck and load the truck with the soil.
- ② Position the machine so that the soil can be dumped in the center of the truck.
If the length of the truck is more than double the width of the bucket, perform the dumping work from forward to backward.
- ③ Move the control lever to the right and dump the bucket.
- ④ Shake the bucket to throw off the soil stuck inside. Move the bucket control lever to the left and right and attach the bucket to the stopper.



- ⑤ Shake the bucket before setting it to the DUMP position so that loaded materials are evenly distributed inside the bucket. This will prevent materials from slipping back when the bucket is placed in the DUMP position.



8. ADJUSTMENT OF THE WORK EQUIPMENT

The bucket can be adjusted to a height desired by using the boom kick-out device.

- ▲ Park the machine on level ground and block the tires to prevent sudden movement of the machine.
- ▲ Press the parking brake switch.
- ▲ Fix the front and rear frames by using the safety lock bar.
- ▲ Do not work underneath the work equipment.

1) ADJUSTMENT OF THE BOOM KICKOUT

(1) Lift kickout position

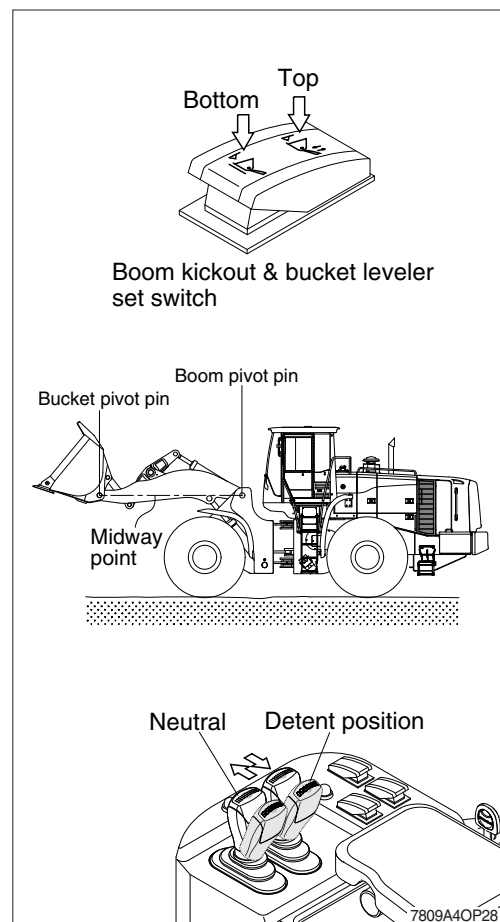
To set the lift kickout, raise the bucket to the desired position above the midway point. Then depress the top of switch for 2~3 seconds. The boom will return to the programmed position when the raise detent is activated and the boom is below the kickout position.

(2) Lower kickout position

To set the lower kickout, lower the bucket to the desired position below the midway point. Then depress the top of switch for 2~3 seconds. The boom will return to the programmed position when the float detent is activated and the boom is at least a foot above the kickout position.

(3) Bucket leveler position

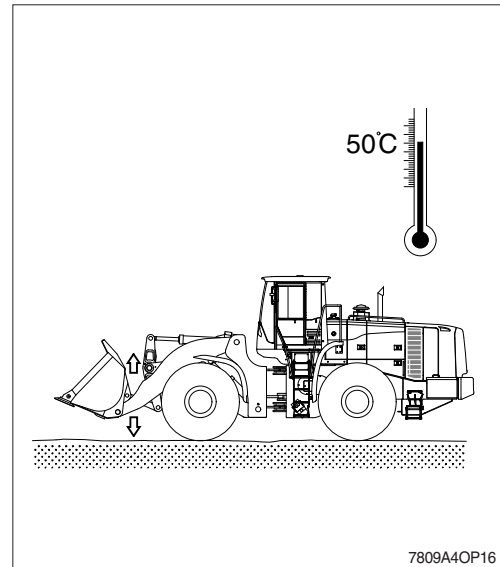
To set the bucket leveler, roll back the bucket to the desired position. Then depress the bottom of switch for 2~3 seconds. The bucket will return to the programmed position when the roll back detent is activated and the bucket is below the leveler position.



9. OPERATION IN THE SPECIAL WORK SITES

1) OPERATION THE MACHINE 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.
- (2) Inspect radiator frequently, and keep cooling fins clean.
- (3) Prevent sand or dust from getting into fuel tank and hydraulic tank during refilling.
- (4) Prevent sand or dust from penetrating into hydraulic circuit by tightly closing breather cap of hydraulic oil tank. Replace hydraulic oil filter frequently.
- (5) Keep all lubricated part, such as pins and bushings, clean at all times.
- (6) If the air conditioner and heater filters clogged, the heating or cooling capacity will drop. Clean or replace the filters more frequently.

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 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.

10. 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) CLEANING THE MACHINE

Clean the machine.

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.

3) MASTER SWITCH

Turn OFF the master switch and store the machine.

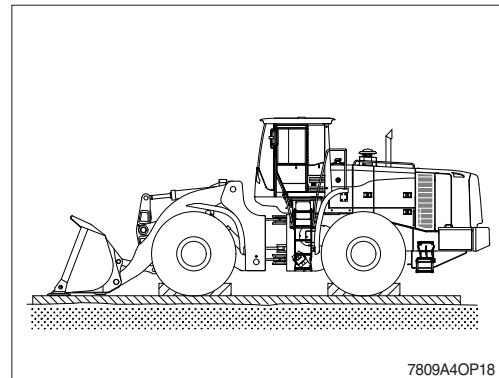
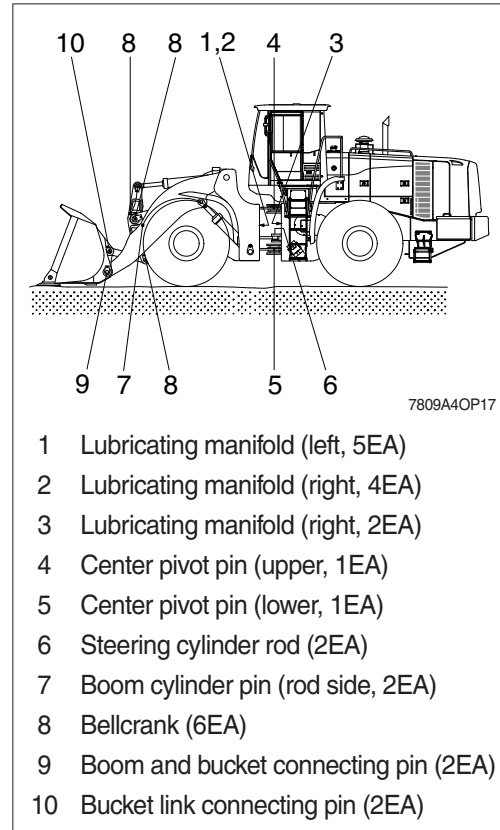
4) Be sure to mix anticorrosive antifreezing solution in the radiator.

5) PREVENTION OF DUST AND MOISTURE

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

※ Cover exposed part of piston rod of cylinder.

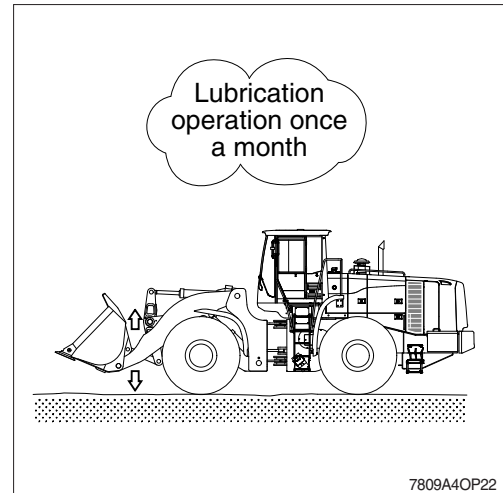
※ Lower the bucket to the ground and set a support under tires.



6) DURING STORAGE

Start engine and move the machine and working 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, turning, 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.

11. REGENERATION SYSTEM

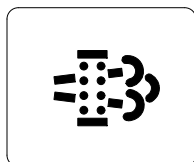
Regeneration

Particulate matter (mainly soot) filtered in DPF (diesel particulate filter) occurs poor performance caused by increasing exhaust gas pressure, incinerating process to convert from accumulated soot to ash is required. This process named regeneration.

The type of regeneration composes of automatic regeneration (active, auto-play by exhaust gas heat) and manual regeneration (passive play by the artificial aid).

- ▲ **Regeneration generates hot exhaust and causes hot exhaust system components.**
- ▲ **Exhaust system components get very hot and can cause risk for fire.**
- ▲ **Do not touch the surface of the DPF muffler during or up to 30 minutes after operation.**
- ▲ **Do not perform regeneration in a flammable environment.**

(1) DPF(diesel particulate filter) warning lamp

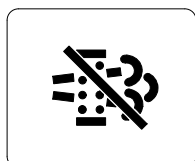


2609A3CD19

This warning lamp will light ON or blink when regeneration is needed.

- ※ **Refer to the page 3-7 for details.**
- ※ **The machine must be in a fireproof area during the entire regeneration process.**

(2) DPF regeneration inhibit warning lamp

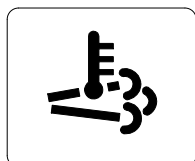


2609A3CD20

This warning lamp will light ON when the DPF switch is pushed inhibit position.

- ※ **Refer to the page 3-8 for details.**

(3) HEST(high exhaust system temperature) warning lamp

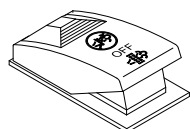


2609A3CD21

This warning lamp will light ON when the exhaust temperatures are high due to regeneration of the DPF.

- ※ **Refer to the page 3-8 for details.**

(4) DPF switch



2609A4OP16

This switch is used to select the regeneration function of the DPF.

- ※ **Refer to the page 3-40 for details.**
- ※ **Manual regeneration : refer to the page 3-8 for details.**

(5) DPF cleaning

Every 5000 hours.

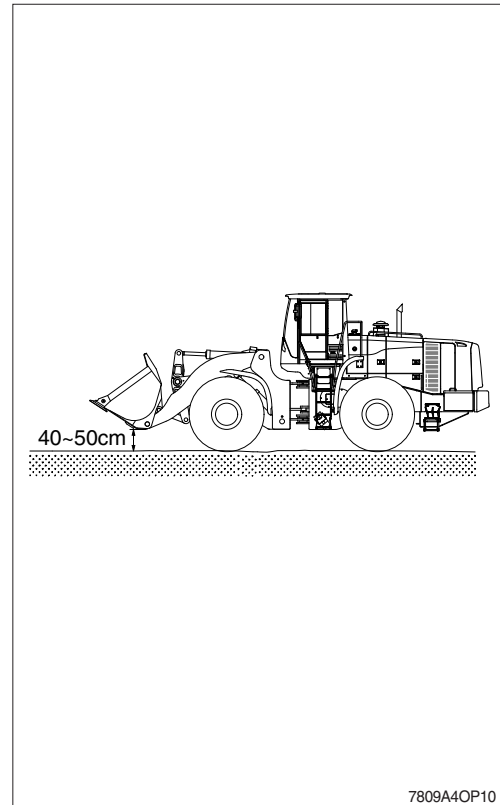
- ※ **Refer to the page 6-25 for details.**

5. TRANSPORTATION

1. ROAD TRAVELING

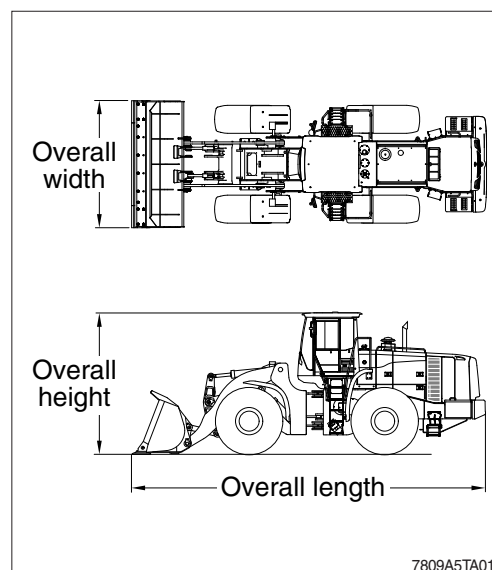
If it is necessary to travel on a road, observe the followings.

- 1) Comply with regulations regarding this machine for the sake of safety.
- 2) Perform daily inspection before starting the machine.
- 3) Check the air pressure of tires and traveling speed limitations.
 - Air pressure : See page 6-34.
 - Maximum speed : 36.0 km/hr (22.4 mph)
- 4) When traveling for a long distance, stop every hour or every 40 km (25 mile) to allow tires and other components to cool down and check any abnormality.
- 5) Drive with the bucket empty.
- 6) Travel at a mid-range speed and be careful to drive within the limited speed when driving on a public road.



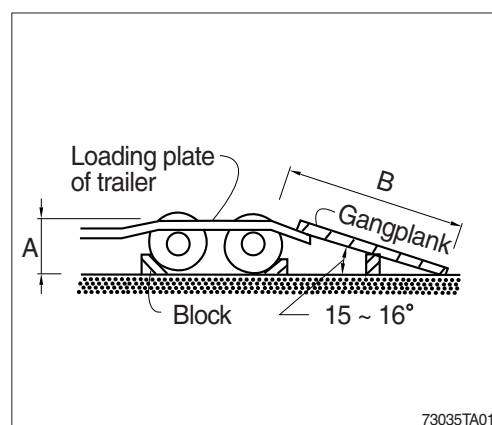
2. PREPARATION FOR TRANSPORTATION

- 1) When transporting the machine, observe the various road rules, road transportation vehicle laws and vehicle limit ordinances, etc.
- 2) Make sure the cooling system has proper anti-freeze if moving machine to a cold climate.
- 3) Select proper trailer after confirming the weight and dimension from the page 2-2~2-5.
- 4) Check the whole route such as the road width, the height of bridge and limit of weight and etc., which will be passed.
- 5) Get the permission from the related authority if necessary.



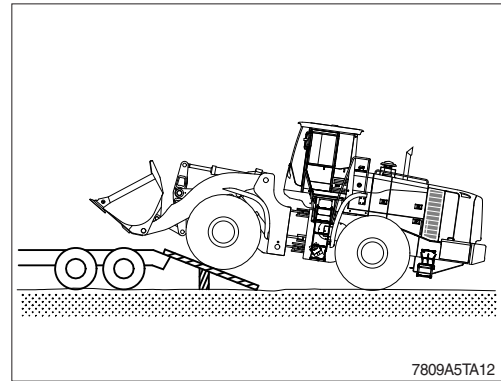
- 6) Prepare gangplank for safe loading referring to the below table and illustration.

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

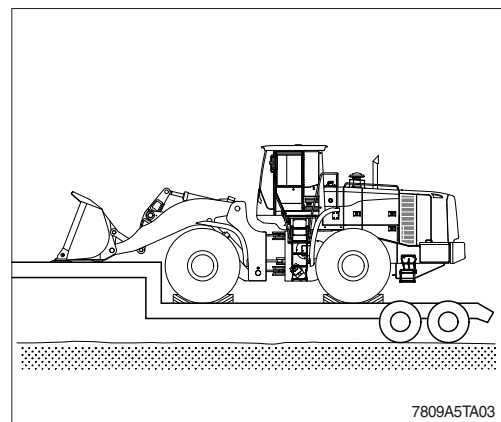


3. LOADING THE MACHINE

- 1) Load and unload the machine on a flat ground.
- 2) Use the gangplank with sufficient length, width, thickness and gradient.
- 3) Move slowly and carefully when the machine is on the gangplank.
Do not change the direction of the machine while it is on the gangplank.

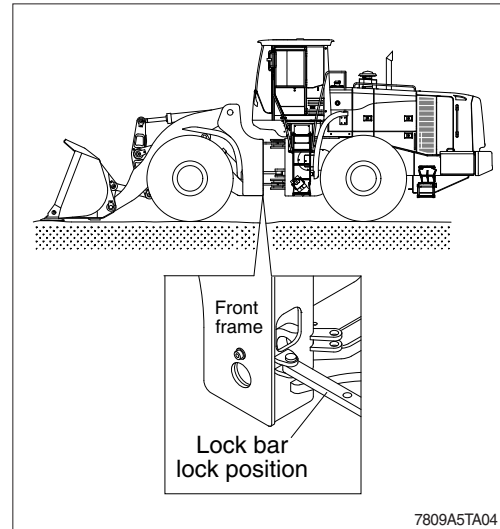


- 4) Do the following after loading the machine to the trailer.
 - (1) Lower the working equipment gently after the location is determined.
 - ※ Place rectangular timber under the bucket cylinder to prevent the damage of it during transportation.
 - ▲ Do not operate any other device when loading.
 - ▲ Balance the load.

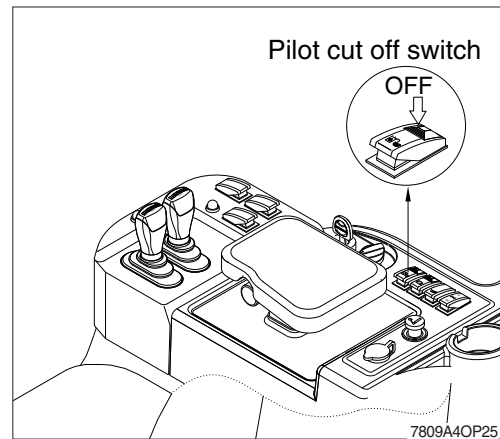


4. FIXING THE MACHINE

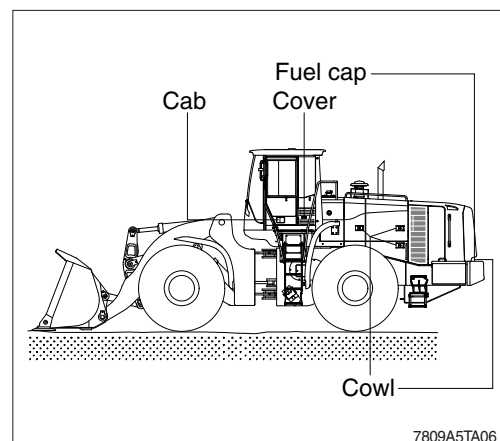
- 1) Fix front and rear frame by linking safety lock bar.
- 2) Push the parking brake switch.



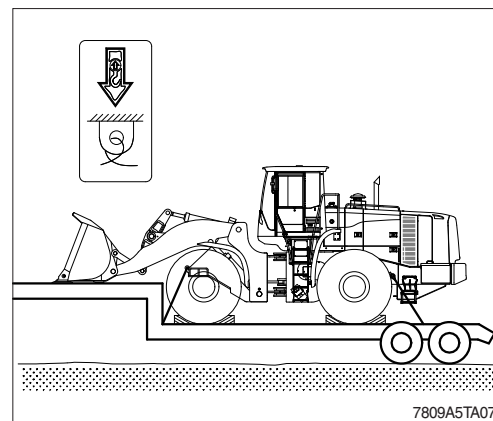
- 3) Push the pilot cut off switch to the OFF position to prevent the hydraulic system from operating.
- 4) Stop the engine, turn the starting switch off and remove the key.



- 5) Secure all locks.

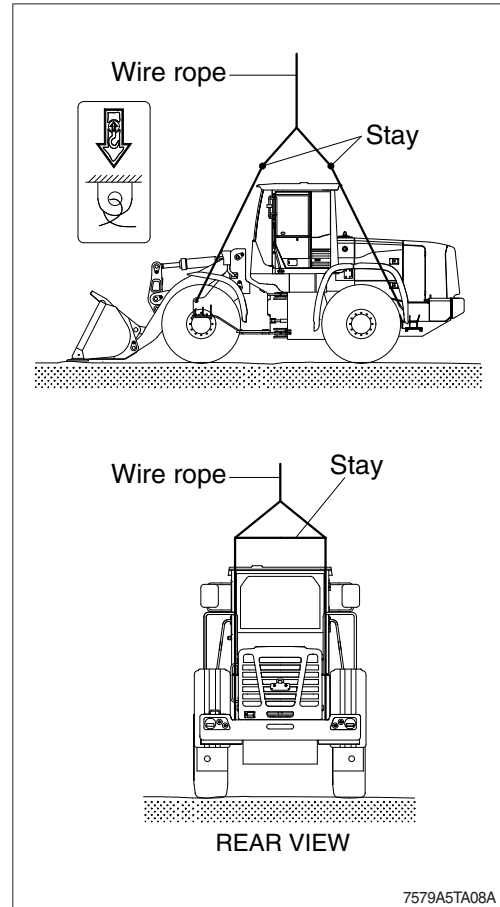


- 6) Block the tires and fix firmly with wire rope or chain to prevent the machine from moving during transportation.



5. LOADING AND UNLOADING BY CRANE

- 1) Check the weight, length, width and height of the machine referring to chapter 2, Specification when you are going to hoist the machine.
 - 2) Use long wire rope and stay to keep the distance with the machine as it should avoid to touch with the machine.
 - 3) Put a rubber plate contact with wire rope and machine to prevent damage.
 - 4) Place crane on the proper place.
 - 5) Install the wire rope and stay like the illustration.
- ▲ Make sure wire rope is proper size.
 - ▲ Place the safety lock bar and pilot cut off switch to the OFF position to prevent the machine moving when hoisting the machine.
 - ▲ The wrong hoisting method or installation of wire rope can cause damage to the machine.
 - ▲ Do not load abruptly.
 - ▲ Keep area clear of personnel.
 - ▲ Attach two wire ropes to the rear of the machine.
 - ▲ Attach two wire ropes to the front of the machine.
 - ▲ Connect the four wire ropes.



6. TOWING THE MACHINE

▲ Personal injury or death could result when towing a disabled machine incorrectly.

▲ Block the machine to prevent movement before releasing the brakes. The machine can roll free if it is not blocked.

Except for an emergency, do not tow this machine. If it is inevitable to tow this machine, observe the following.

1) GENERAL

(1) Parking brake cylinder of the machine is operated by the spring force and released by hydraulic pressure.

If the engine does not operate, the brake will be operated to stop the machine.

(2) When the machine is towed move it for a repair to nearby place at the speed less than 2 km/hr (1.2 mph). Transport it on a trailer, if it has to be moved for a long distance.

(3) When the steering device and the brake of the machine to be towed can not be operated, transport by trailer.

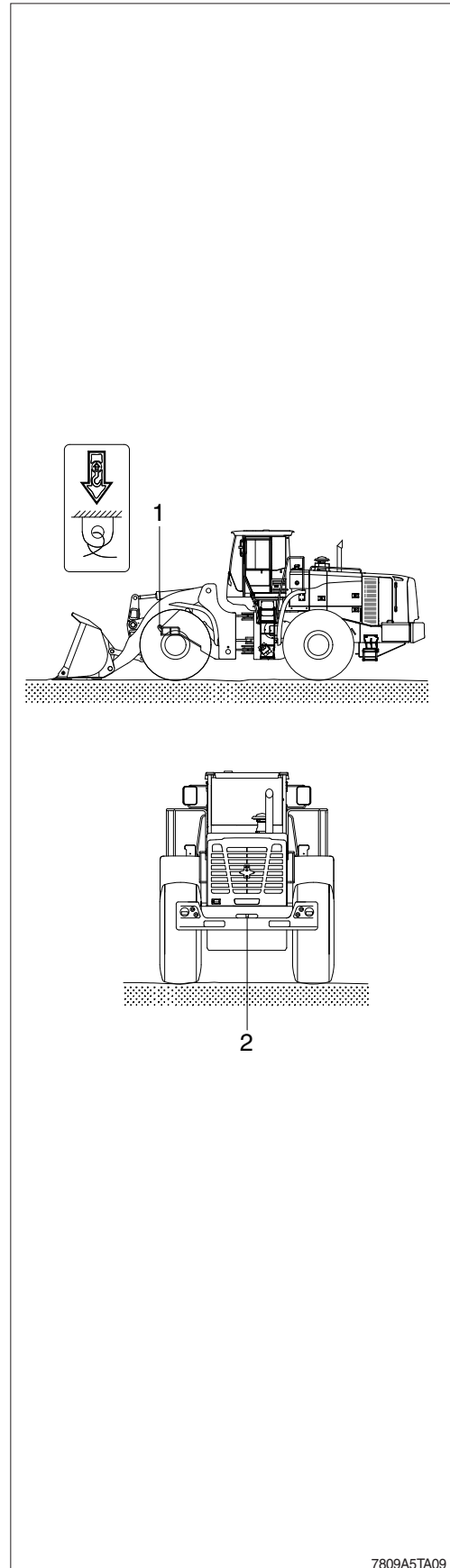
▲ Be careful when towing.

▲ Be careful that the brake will not work if there is any disorder in the braking system.

(4) When you tow the machine from the front, attach the tow line to the tow eyes on the front frame (1).

When you tow the machine from the rear, use the tow rear eyes provided for lift & tie (2).

(5) Do not use a chain for pulling a disabled machine. A chain link can break. This may cause personal injury. Use a wire rope cable with ends that have loops or rings. Place an observer in a safe position in order to watch the pulling procedure. The observer can stop the procedure, if necessary. The procedure should be stopped if the cable starts to break. Also, stop the procedure if the cable starts to unravel. Stop pulling whenever the towing machine moves without moving the towed machine.



7809A5TA09

- (6) Keep the tow line angle to a minimum. Do not exceed a 30 degree angle from the straight ahead position.
 - (7) Quick machine movement could overload the tow line or the tow bar. This could cause the tow line or the tow bar to break. Gradual, steady machine movement will be more effective.
 - (8) Normally, the towing machine should be as large as the disabled machine. Make sure that the towing machine has enough brake capacity, enough weight, and enough power. The towing machine must be able to control both machines for the grade that is involved and for the distance that is involved.
 - (9) You must provide sufficient control and sufficient braking when you are moving a disabled machine downhill. This may require a larger towing machine or additional machines that are connected to the rear of the disabled machine. This will prevent the machine from rolling away out of control.
 - (10) All situation requirements cannot be listed. Minimal towing machine capacity is required on smooth, level surfaces. On inclines or on surfaces in poor condition, maximum towing machine capacity is required.
 - (11) When any towed machine is loaded, this machine must be equipped with a brake system that is operable from the operator compartment.
- ※ **Consult your HYUNDAI dealer for the equipment that is necessary for towing a disabled machine.**

2) WHEN THE ENGINE WORKS

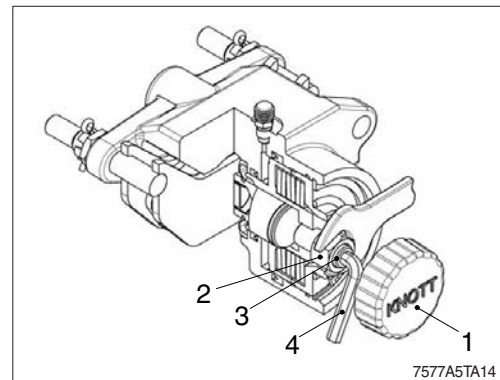
- (1) When the transmission system or steering wheel is workable and the engine is running, the machine can be towed only for a short distance.
For example, pull the machine out of mud or pull the machine to side of the road.
- (2) The operator of the towed machine should turn the steering wheel into the direction in which the machine is towed.

3) WHEN THE ENGINE DOES NOT WORK

When towing the machine with the engine stopped, do it in the following order.

- (1) The transmission oil does not lubricate the system, so remove the front and rear drive shafts.
- (2) Loosen the steering cylinder as the steering operation is not workable.
Even if the brake is in good condition, the brakes can only be used a limited number of times.
There is no change in the operating force for the brake pedal, but the braking force is reduced each time the pedal is depressed.
- (3) The parking brake is activated by spring and released by hydraulic pressure. If the engine does not work, the brake will be activated.

- ① Release the screw cap (1) and unscrew.
- ② Release the lock nut (2) and turn the adjusting screw (3) with socket wrench (4) manually counter-clockwise until the brake disc is free.



- (4) Connect firmly between the traction machine and the towed machine.
Position each traction machine at the front and rear of the machine to be towed.

1. INSTRUCTIONS

1) INTERVAL OF MAINTENANCE

- (1) You may inspect and service the machine by the period as described at page 6-10 based on service meter of monitor.
- (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 250 hours, carry out all the maintenance 「each 250 hours, each 100 hours and daily service」 at the same time.



2) PRECAUTION

- (1) Start maintenance after you have the full knowledge of machine.
- (2) The cluster and monitor installed on this machine do not entirely guarantee the condition of the machine.
Daily inspection should be performed according to chapter 6, Maintenance.
- (3) Engine and hydraulic components have been preset in the factory.
Do not allow unauthorized personnel to reset them.
- (4) Ask to your local dealer or Hyundai for maintenance advise if unknown.
- (5) Drain the used oil and coolant in a container and handle according to the method of handling for industrial waste to meet with regulations of each province or country.

3) PROPER MAINTENANCE

(1) Replace and repair of parts

It is required to replace the wearable and consumable parts such as bucket tooth, cutting edge, 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 by opening of breather when repairing the hydraulic system.

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

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

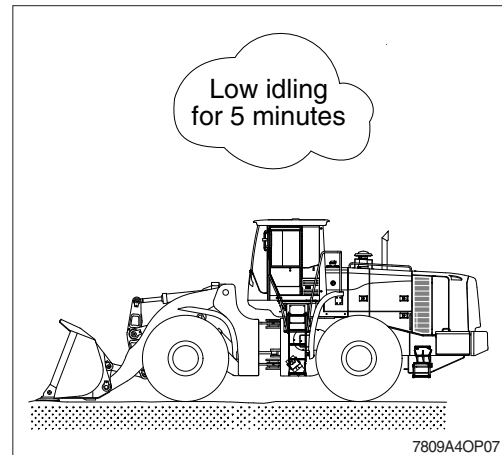
※ **Be sure to start the maintenance after fully understand the chapter 1, Safety hints.**

4) RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM

※ Spouting of oil can cause the accident when loosening the cap or hose right after the operating of the 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.

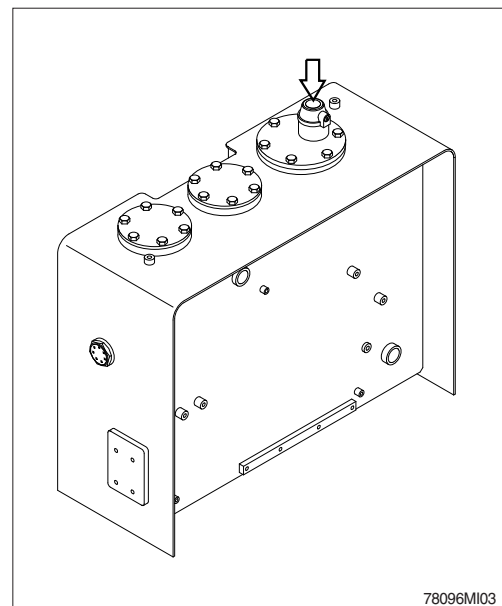
- (1) Place the machine in parking position, and stop the engine.



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

※ Due to high pressure inside the tank, cover maybe blown up.

Take caution before removing cover.



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) These are the parts which the operator can not judge the remained lifetime of them by visual inspection.
- (2) Repair or replace if an abnormality of these parts is found even before the recommended replacement interval.

Periodical replacement of safety parts	Interval
Fuel hose (engine-tank)	Every 2 years
Hose of steering system	
Packing, seal and O-ring of steering cylinder	
Hose of brake system	
Piston seal and packing of boom, bucket cylinder	

- ※ 1. **Replace the O-ring and gasket at the same time when replace the hose.**
- ※ 2. **Replace clamp at the same time if the hose clamp is cracked when checking and replacing the hose.**

2. TIGHTENING TORQUE

Use following table for unspecified torque.

1) BOLT AND NUT

(1) Coarse thread

Bolt size	8T		10T	
	kg · m	lb · ft	kg · m	lb · ft
M 6 × 1.0	0.85 ~ 1.25	6.15 ~ 9.04	1.14 ~ 1.74	8.2 ~ 12.6
M 8 × 1.25	2.0 ~ 3.0	14.5 ~ 21.7	2.73 ~ 4.12	19.5 ~ 29.8
M10 × 1.5	4.0 ~ 6.0	28.9 ~ 43.4	5.5 ~ 8.3	39.8 ~ 60
M12 × 1.75	7.4 ~ 11.2	53.5 ~ 79.5	9.8 ~ 15.8	71 ~ 114
M14 × 2.0	12.2 ~ 16.6	88.2 ~ 120	16.7 ~ 22.5	121 ~ 167
M16 × 2.0	18.6 ~ 25.2	135 ~ 182	25.2 ~ 34.2	182 ~ 247
M18 × 2.5	25.8 ~ 35.0	187 ~ 253	35.1 ~ 47.5	254 ~ 343
M20 × 2.5	36.2 ~ 49.0	262 ~ 354	49.2 ~ 66.6	356 ~ 482
M22 × 2.5	48.3 ~ 63.3	350 ~ 457	65.8 ~ 98.0	476 ~ 709
M24 × 3.0	62.5 ~ 84.5	452 ~ 611	85.0 ~ 115	615 ~ 832
M30 × 3.0	124 ~ 168	898 ~ 1214	169 ~ 229	1223 ~ 1655
M36 × 4.0	174 ~ 236	1261 ~ 1703	250 ~ 310	1808 ~ 2242

(2) Fine thread

Bolt size	8T		10T	
	kg · m	lb · ft	kg · m	lb · ft
M 8 × 1.0	2.17 ~ 3.37	15.7 ~ 24.3	3.04 ~ 4.44	22.0 ~ 32.0
M10 × 1.25	4.46 ~ 6.66	32.3 ~ 48.2	5.93 ~ 8.93	42.9 ~ 64.6
M12 × 1.25	7.78 ~ 11.58	76.3 ~ 83.7	10.6 ~ 16.0	76.6 ~ 115
M14 × 1.5	13.3 ~ 18.1	96.2 ~ 130	17.9 ~ 24.1	130 ~ 174
M16 × 1.5	19.9 ~ 26.9	144 ~ 194	26.6 ~ 36.0	193 ~ 260
M18 × 1.5	28.6 ~ 43.6	207 ~ 315	38.4 ~ 52.0	278 ~ 376
M20 × 1.5	40.0 ~ 54.0	289 ~ 390	53.4 ~ 72.2	386 ~ 522
M22 × 1.5	52.7 ~ 71.3	381 ~ 515	70.7 ~ 95.7	512 ~ 692
M24 × 2.0	67.9 ~ 91.9	491 ~ 664	90.9 ~ 123	658 ~ 890
M30 × 2.0	137 ~ 185	990 ~ 1338	182 ~ 248	1314 ~ 1795
M36 × 3.0	192 ~ 260	1389 ~ 1879	262 ~ 354	1893 ~ 2561

2) PIPE AND HOSE (FLARE type)

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

3) PIPE AND HOSE (ORFS type)

Thread size	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, nut (rubber, 4EA)	M24×3.0	100 ± 15.0	723 ± 108
2		Engine mounling bolt (bracket, 8EA)	3/4-10UNC	19.4 ± 3.0	140 ± 21.7
3		Engine mounting bolt (bracket, 2EA)	M20×2.5	57.9 ± 8.7	419 ± 62.9
4		Engine mounting bolt (flywheel housing)	7/16-14UNC	4.6 ± 0.7	33.3 ± 5.1
5		Radiator mounting bolt	M16×2.0	27.9 ± 4.5	215 ± 32.5
6		Fuel tank mounting bolt, nut	M16×2.0	29.7 ± 4.5	215 ± 32.5
7	Hydraulic system	Main pump housing mounting bolt	M14×2.0	19.6 ± 2.9	142 ± 21.0
8		Fan & brake pump housing mounting bolt	M14×2.0	19.6 ± 2.9	142 ± 21.0
9		Steering pump housing mounting bolt	M14×2.0	19.6 ± 2.9	142 ± 21.0
10		Main control valve mounting bolt	M12×1.75	12.8 ± 3.0	92.6 ± 21.7
11		Steering unit mounting bolt	M10×1.5	6.9 ± 1.4	49.9 ± 10.1
12		Flow amplifier mounting bolt	M10×1.5	6.9 ± 1.4	49.9 ± 10.1
13		Brake valve mounting bolt	M8×1.25	2.5 ± 0.5	18.1 ± 3.6
14		Cut-off valve mounting bolt	M10×1.5	6.9 ± 1.4	50 ± 10.1
15		Remote control block (for EH RCV)	M8×1.25	2.5 ± 0.5	18.1 ± 3.6
16		Stop valve	M10×1.5	6.9 ± 1.4	50 ± 10.1
17		Safety valve	M10×1.5	6.9 ± 1.4	50 ± 10.1
18		Hydraulic oil tank mounting bolt	M20×2.5	57.9 ± 8.7	419 ± 62.9
19	Power train system	Transmission bolt, nut (rubber, 4EA)	M24×3.0	100 ± 15.0	723 ± 108
20		Transmission bolt (bracket, converter side)	M16×2.0	18.4 ± 2.0	133 ± 14.5
21		Front axle mounting bolt, nut	M36×3.0	270 ± 30	1950 ± 217
22		Rear axle support mounting bolt, nut	M36×3.0	270 ± 30	1950 ± 217
23		Tire mounting nut	M22×1.5	79 ± 2.5	571 ± 18
24		Drive shaft joint mounting bolt, nut	M20×2.5	57.9 ± 8.7	419 ± 62.9
25	Others	Counterweight mounting bolt	M30×2.0	199 ± 30	1439 ± 217
26		Counterweight mounting bolt	M24×3.0	100 ± 15	723 ± 108
27		Operator's seat mounting bolt	M8×1.25	3.4 ± 0.8	24.6 ± 5
28		ROPS Cab mounting bolt (4EA)	M30×3.5	199 ± 29.9	1440 ± 216
29		ROPS Cab mounting bolt (4EA)	M16×2.0	29.7 ± 4.5	215 ± 32.5

3. SPECIFICATION OF FUEL, COOLANT AND LUBRICANTS

1) NEW MACHINE

New machine used and filled with following lubricants.

Description	Specification
Engine oil	SAE 15W-40 (API CJ-4)
Hydraulic oil	Hyundai genuine long life hydraulic oil (ISO VG46, VG68 only) Conventional hydraulic oil (ISO VG15)
Transmission oil	SAE 15W-40
Axle oil	★ Refer to below list
Grease	Lithium base grease NLGI No. 2
Fuel	ASTM D975-No. 2, ★ ¹ Ultra low sulfur diesel
Coolant (DCA4)	ASTM D6210 Mixture of 50% ethylene glycol base antifreeze and 50% 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

★ Recommended oil list

- BP TERRAC SUPER TRANSMISSION 10W-30

- CASTROL AGRI TRANS PLUS 10W-30

- MOBILFLUID 426

- SHELL DONAX TD 10W-30

- TOTAL DYNATRANS MPV

★¹ Ultra low sulfur diesel

- sulfur content ≤ 15 ppm

2) RECOMMENDED LUBRICANTS

Use only oils listed below or equivalent.

Do not mix different brand oil.

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)
Engine oil pan	Engine oil	43 (11.4)	★ ² SAE 5W-40							
			SAE 30							
			SAE 10W							
			SAE 10W-30							
			SAE 15W-40							
Transmission	Engine oil	43 (11.4)	SAE 10W-30							
			SAE 15W-40							
Axle★ ⁴	UTTO	Front : 58 (15.3) Rear : 58 (15.3)	★Refer to below list							
Hydraulic tank	Hydraulic oil	Tank: 234 (61.8)	★ ² ISO VG 15							
		System: 344 (90.9)	ISO VG 46							
			ISO VG 68							
Fuel tank	Diesel fuel★ ¹	430 (113.6)	★ ² ASTM D975 NO.1					ASTM D975 NO.2		
Fitting (grease nipple)	Grease	As required	★ ² NLGI NO.1							
			NLGI NO.2							
Radiator (reservoir tank)	Mixture of antifreeze and soft water★ ³	67 (17.7)	Ethylene glycol base permanent type (50 : 50)							
			★ ² 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

UTTO : Universal Tractor Transmission Oil

★¹ Ultra low sulfur diesel

- sulfur content ≤ 15 ppm

★² Cold region

Russia, CIS, Mongolia

★ Recommended oil list

- BP TERRAC SUPER TRANSMISSION 10W-30

- CASTROL AGRI TRANS PLUS 10W-30

- MOBILFLUID 426

- SHELL DONAX TD 10W-30

- TOTAL DYNATRANS MPV

★³ Soft water

City water or distilled water

★⁴ If the machine is equipped with axle oil cooler, refer to page 6-40.

4. MAINTENANCE CHECK LIST

Scheduled maintenance is the normal maintenance necessary to provide proper and efficient machine operation. To protect your investment and prolong the service life of your machine, follow the scheduled maintenance list below.

1) EVERY 10 HOURS SERVICE

Check items	Service	Page
Hydraulic oil level	Check, Add	6-31
Engine oil level	Check, Add	6-15
Radiator coolant level	Check, Add	6-17
Fan belt tension & damage	Check	6-21, 22
Fuel prefilter element	Check, Clean	6-29

2) EVERY 50 HOURS SERVICE

Check items	Service	Page
Attachment pins	Lubricate	6-43
Tire (air)	Check, Add	6-34
Drive shaft (flange bearing)	Lubricate	6-41
Drive shaft (center, rear, upper)	Lubricate	6-41
Steering cylinder pins	Lubricate	6-41
Rear axle pivot	Lubricate	6-41

3) INITIAL 250 HOURS SERVICE

Check items	Service	Page
Engine oil	Change	6-15, 16, 17
Engine oil filter	Replace	6-15, 16, 17
Fuel filter element	Replace	6-24
Fuel prefilter element	Replace	6-29
Transmission oil	Change	6-37, 38
Transmission oil filter	Replace	6-37, 38
Front axle oil	Change	6-40
Rear axle oil	Change	6-40
Hydraulic oil return filter	Replace	6-32
Pilot line filter element	Replace	6-33

4) EVERY 250 HOURS SERVICE

Check items	Service	Page
Fuel tank (water, sediment)	Drain	6-24
Hydraulic tank air breather element	Replace	6-32
Wheel nuts	Check, Tight	6-34, 35
Battery (voltage)	Check	6-45, 46
Air conditioner and heater outer filter	Check, Clean	6-48

5) EVERY 500 HOURS SERVICE

Check items	Service	Page
Engine oil	Change	6-15, 16, 17
Engine oil filter	Replace	6-15, 16, 17
Radiator, oil cooler, charge air cooler	Check, Clean	6-20
Coolant test (DCA4 concentration)	Test, Add	6-20-1, 2
Fuel filter element	Replace	6-24
Coolant filter (corrosion resistor)	Replace	6-26
Fuel prefilter element	Replace	6-29

6) EVERY 1000 HOURS SERVICE

Check items	Service	Page
Air cleaner element (primary)	Check, Clean	6-23
Hydraulic oil return filter	Replace	6-32
Pilot line filter element	Replace	6-32
Transmission oil	Change	6-37, 38
Transmission oil filter	Replace	6-37, 38
Center pivot pin	Lubricate	6-41
Aircon and heater outer filter	Replace	6-48

7) EVERY 1500 HOURS SERVICE

Check items	Service	Page
Front axle oil	Change	6-40
Rear axle oil	Change	6-40

8) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Hydraulic oil *1	Change	6-31
Radiator coolant	Change	6-17, 18, 19, 20
Hydraulic oil suction strainer	Check, Clean	6-32
Crankcase ventilation filter	Replace	6-30
Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-

*1 Conventional hydraulic oil

9) EVERY 5000 HOURS SERVICE

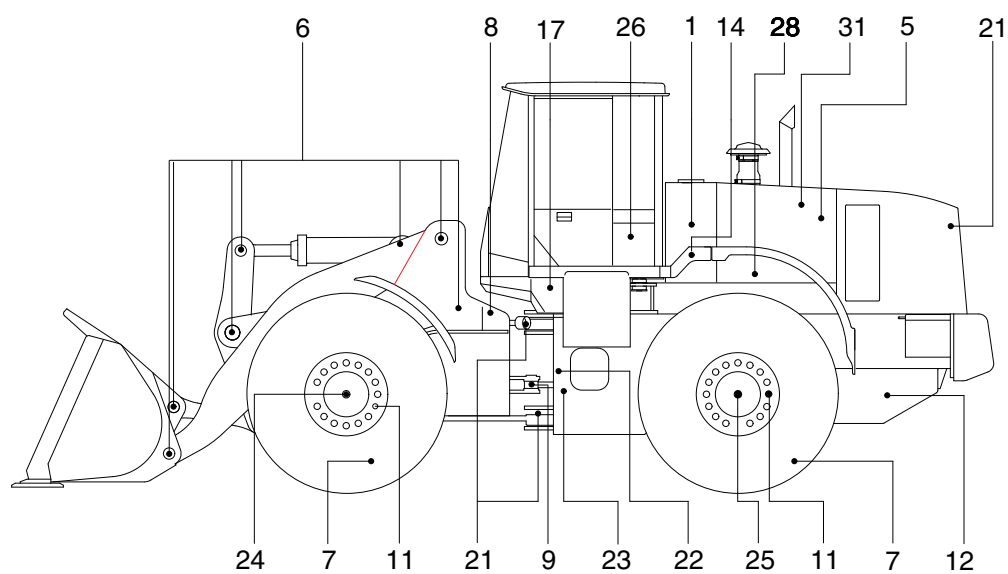
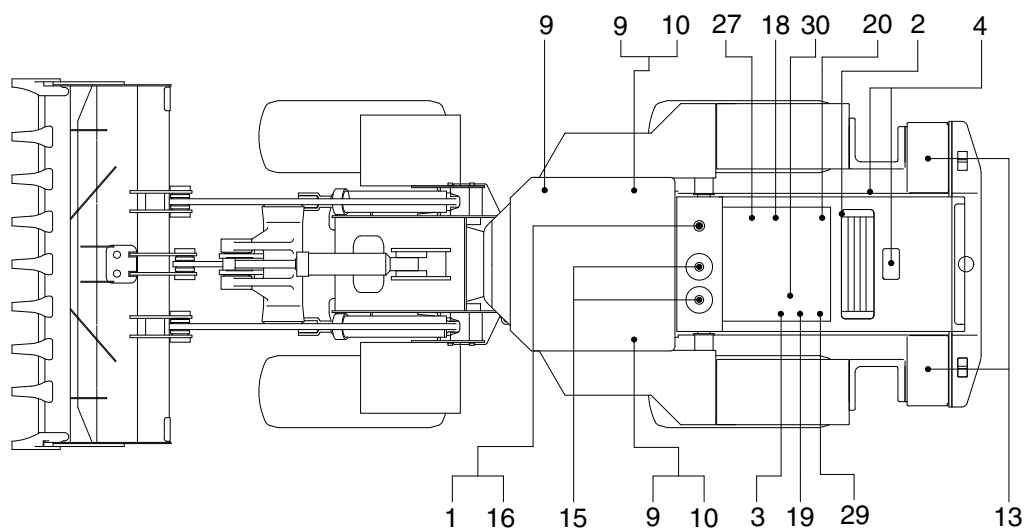
Check items	Service	Page
Hydraulic oil *2	Change	6-31

*2 Hyundai genuine long life hydraulic oil

10) WHEN REQUIRED

Check items	Service	Page
Air cleaner element		
• Safety	Replace	6-23
• Primary	Check, Clean, Replace	6-23
Air conditioner and heater		
• Inner filter	Replace	6-48
• Outer filter	Check, Clean, Replace	6-48

5. MAINTENANCE CHART



7809A6M110

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.
4. For other details, refer to the service manual.

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	234 (61.8)	1
	2	Engine oil level	Check, Add	EO	43 (14.1)	1
	4	Radiator coolant level	Check, Add	C	67 (17.7)	1
	5	Fan belt tension & damage	Check, Adjust	-	-	2
	29	Fuel prefilter element	Check, Clean	-	-	1
50 Hours or weekly	6	Attachment pins	Lubricate	PGL	-	18
	7	Tire (air)	Check, Add	-	-	4
	8	Drive shaft (flange bearing)	Lubricate	PGL	-	2
	9	Steering cylinder pin	Lubricate	PGL	-	4
	10	Rear axle pivot	Lubricate	PGL	-	2
	28	Drive shaft (center, rear, upper)	Lubricate	PGL	-	3
250 Hours	11	Wheel nuts	Check, Tight	-	-	92
	12	Fuel tank (water, sediment)	Drain	-	430 (113.6)	1
	13	Battery (voltage)	Check, Add	-	-	2
	16	Hydraulic tank air breather element	Replace	-	-	1
	26	Air conditioner and heater outer filter	Check, Clean	-	-	1
500 Hours	2	Engine oil	Change	EO	43 (11.4)	1
	3	Engine oil filter	Replace	-	-	1
	18	Fuel filter element	Replace	-	-	2
	19	Coolant filter (corrosion resistor)	Replace	-	-	1
	19	Coolant test (DCA4 concentration)	Test, Add	DCA4	-	1
	20	Radiator, oil cooler, charge air cooler	Clean	-	-	3
	29	Fuel prefilter element	Replace	-	-	1
1000 Hours	15	Hydraulic oil return filter	Replace	-	-	2
	17	Pilot line filter element	Replace	-	-	1
	21	Center pivot pin	Lubricate	PGL	-	2
	22	Transmission oil	Change	EO	43 (11.4)	1
	23	Transmission oil filter	Replace	-	-	2
	26	Air conditioner and heater outer filter	Replace	-	-	1
	27	Air cleaner element (primary)	Clean	-	-	2
1500 Hours	24	Axle oil (front)	Change	UTTO	58 (15.3)	3
	25	Axle oil (rear)	Change	UTTO	58 (15.3)	3
2000 Hours	1	Hydraulic oil * ¹	Change	HO	234 (61.8)	1
	4	Radiator coolant	Change	C	67 (17.7)	1
	14	Hydraulic oil suction strainer	Check, Clean	-	-	1
	-	Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-	-	-
5000 Hours	1	Hydraulic oil * ²	Change	HO	234 (61.8)	1
When required	26	Air conditioner and heater inner filter	Replace	-	-	1
		Air conditioner and heater outer filter	Clean, Replace	-	-	1
	27	Air cleaner element (safety)	Replace	-	-	2
		Air cleaner element (primary)	Clean, Replace	-	-	2

*1 Conventional hydraulic oil *2 Hyundai genuine long life hydraulic oil

※ **Oil symbol**

Refer the recommended lubricants for specification.

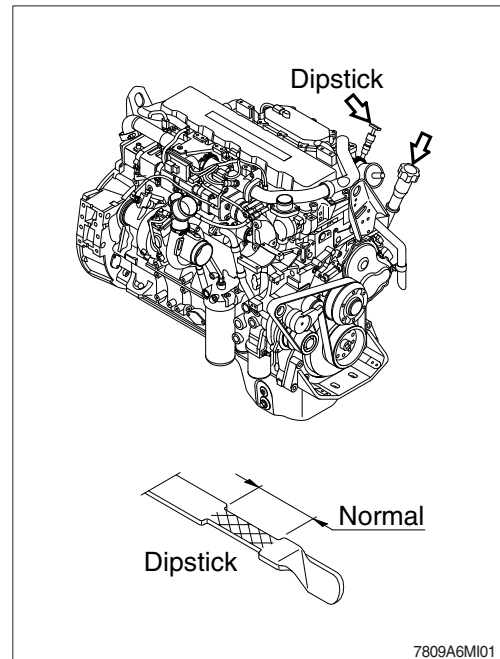
- EO : Engine oil
- HO : Hydraulic oil
- GO : Gear oil
- PGL : Grease
- C : Coolant
- UTTO : Refer to the page 6-9.

6. SERVICE INSTRUCTION

1) CHECK ENGINE OIL LEVEL

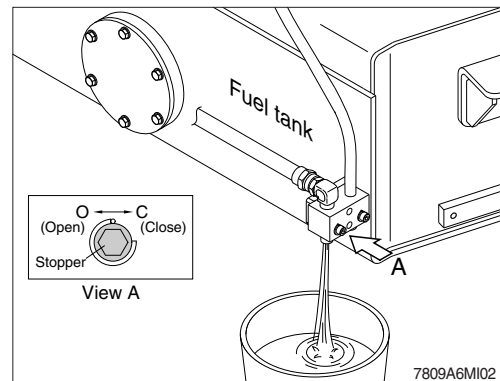
Check the oil level with the machine on a flat ground before starting engine.

- (1) Pull out the dipstick and wipe with a clean cloth.
 - (2) Check the oil level by inserting the dipstick completely into the hole and pulling out again.
 - (3) If oil level is LOW, add oil and then check again.
- ※ If the oil is contaminated or diluted, change the oil regardless of the regular change interval.
 - ※ Check oil level after engine has been stopped for 15 minutes.
 - ▲ Do not operate unless the oil level is in the normal range.

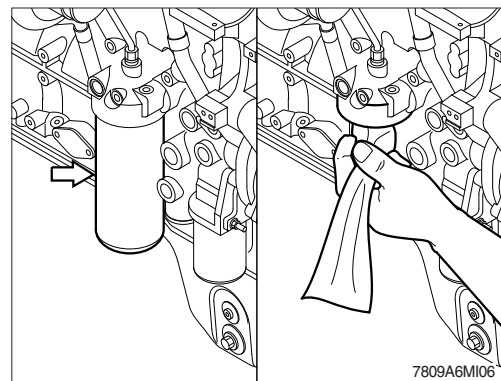


2) REPLACEMENT OF ENGINE OIL AND OIL FILTER

- (1) Operate the engine until the coolant temperature reaches 60°C (140°F). Shut off the engine.
 - (2) Turn the stopper to the open position and allow the oil to drain.
 - Wrench size : 10 mm
- ※ A drain pan with a capacity of 50 liters (13.2 U.S.gallons) will be adequate.

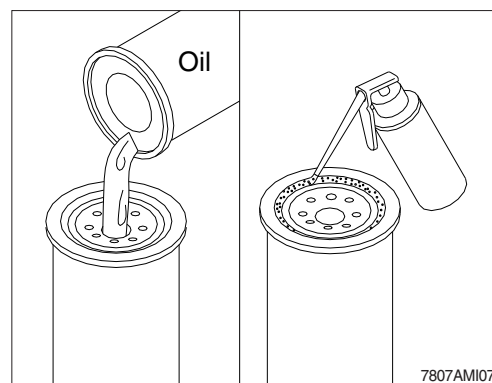


- (3) Clean the area around the oil filter head.
 - (4) Use oil filter wrench to remove the oil filter.
 - (5) Clean the gasket surface of oil filter head.
- ※ The O-ring can stick on the filter head; make sure it is removed.



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

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

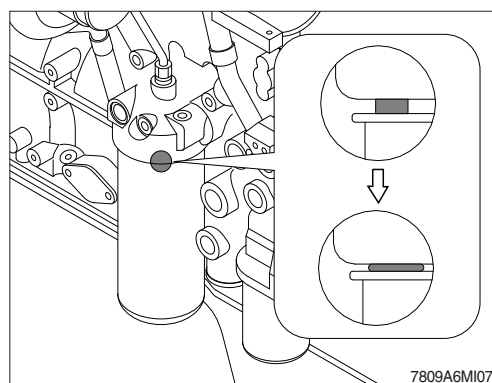


(7) Install the filter to the filter head.

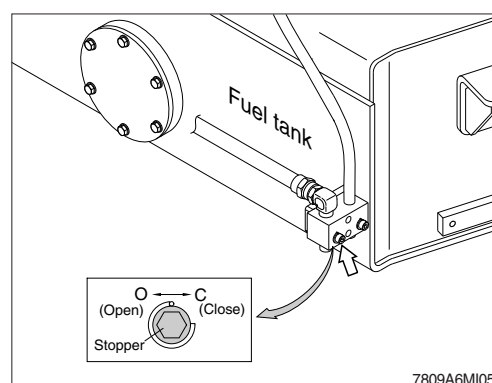
Tighten the filter until the gasket contacts the filter head surface.

Tighten 3/4 to 1 turn after gasket makes contact with the filter head.

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

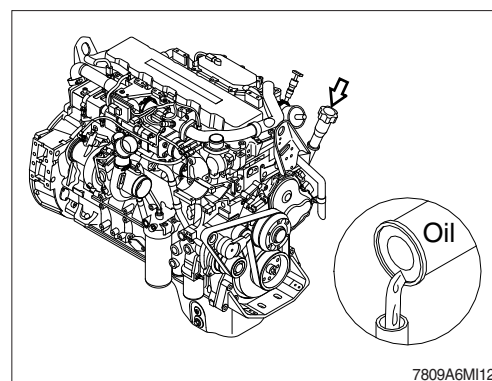


(8) Turn the stopper to the close position.



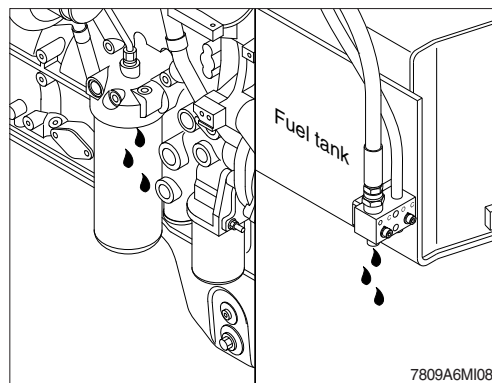
(9) Fill the engine with clean oil to the proper level.

· Quantity : 43 ℓ (11.4 U.S.gallons)



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

※ **Do not overfill the engine with oil.**

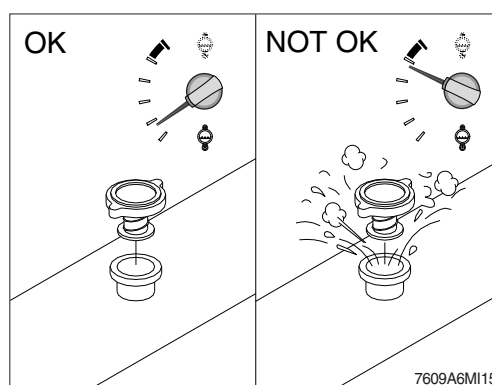
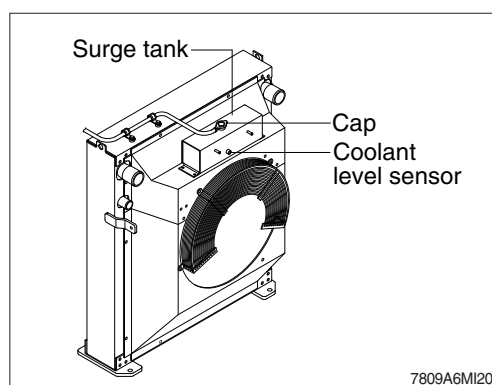


3) CHECK COOLANT LEVEL

- (1) Check the engine fault code on the monitor.
- (2) If you following fault codes exist, check the coolant level.
 - SPN : 111, FMI : 18
- Coolant level is low.
 - SPN : 111, FMI : 1
- Coolant level is the most severely low.
- (3) Add the mixture of antifreeze and water after removing the cap of the surge tank if coolant is not sufficient.
- (4) Replace gasket of surge tank cap when it is damaged.

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

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



4) FLUSHING AND REFILLING OF RADIATOR

(1) Change coolant

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

Avoid excessive contact-wash thoroughly after contact.

Keep out of reach of children.

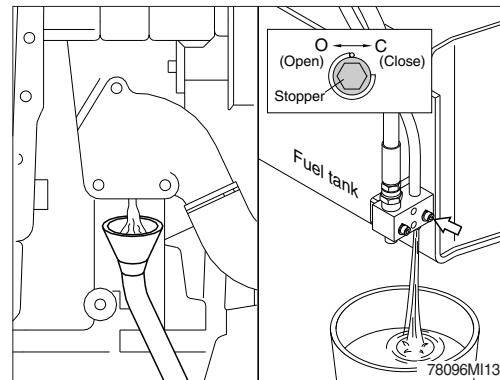
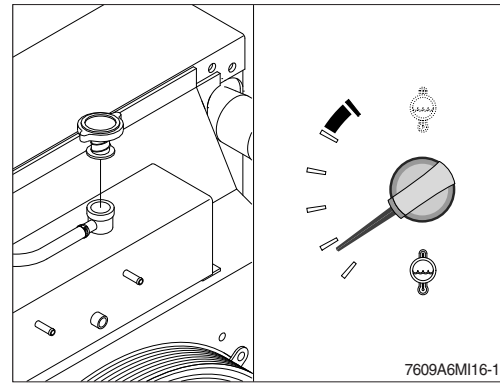
- ▲ Protect the environment : Handling and disposal of used antifreeze can be subject to federal, state, and local law regulation.

Use authorized waste disposal facilities, including civic amenity sites and garages providing authorized facilities for the receipt of used antifreeze.

If in doubt, contact your local authorities for guidance as to proper handling of used antifreeze.

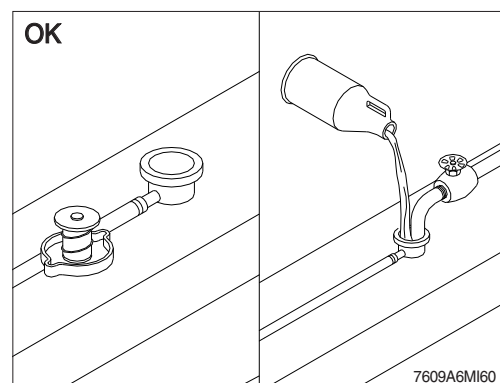
- ▲ Wait until the temperature is below 50°C (120°F) before removing the coolant system radiator cap. Failure to do so can cause personal injury from heated coolant spray. Drain the cooling system by turning the stopper to the open position.

A drain pan with a capacity of 70 liters (18.5 U.S.gallons) will be adequate in most applications.

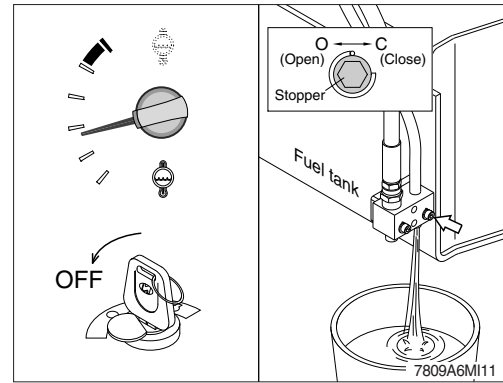


(2) Flushing of cooling system

- ① Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).
- ※ Use 0.5 kg (1.0 pound) of sodium carbonate for every 23 liters (6.0 U.S. gallons) of water.
 - ※ Do not install the radiator cap. The engine is to be operated without the cap for this process.

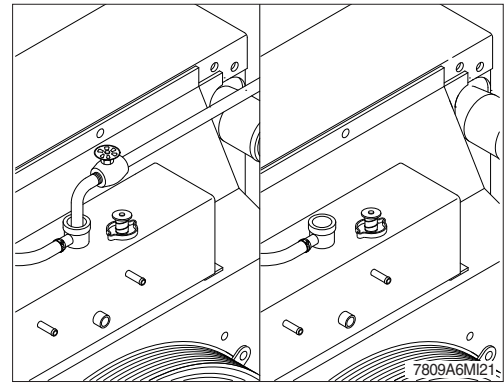


- ② Operate the engine for 5 minutes with the coolant temperature above 80°C (176°F). Shut the engine off, and drain the cooling system.



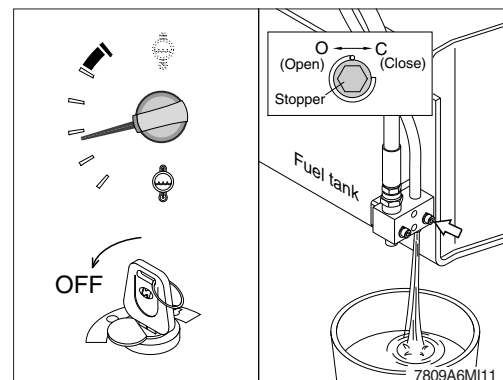
- ③ Fill the cooling system with clean water.

- ※ Be sure to vent the engine and aftercooler for complete filling.
- ※ Do not install the surge tank cap or the new coolant filter.



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

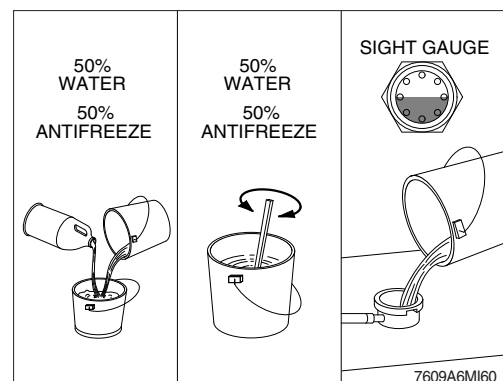
- ※ If the water being drained is still dirty, the system must be flushed again until the water is clean.



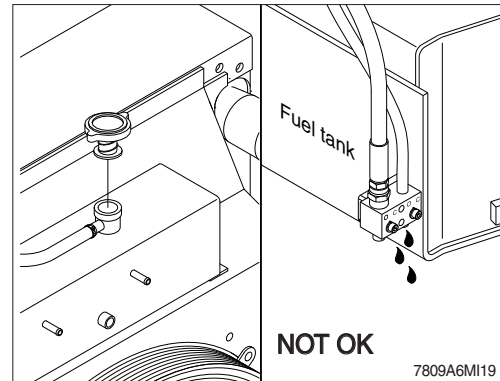
(3) Cooling system filling

- ① Use a mixture of 50 percent soft water and 50 percent ethylene glycol antifreeze to fill the cooling system. Refer to the page 6-9.

- ※ Never use water alone for coolant. This can result in damage from corrosion.
- ※ Do not use hard water such as river water or well water.



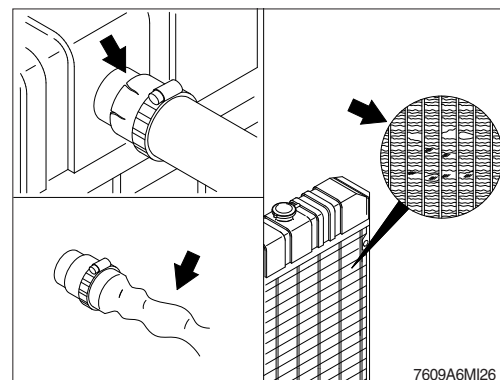
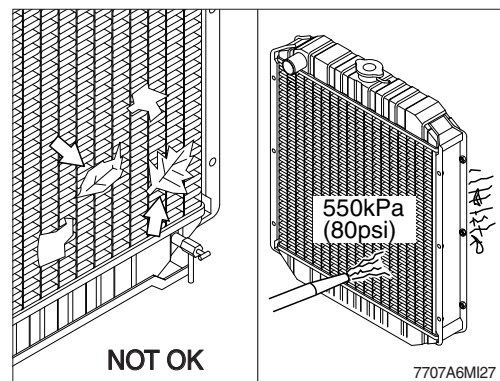
- ② Install the radiator cap. Operate the engine until it reaches a temperature 80°C (176°F), and check for coolant leaks. Check the coolant level again to make sure the system is full of coolant.



5) CLEAN RADIATOR AND OIL COOLER

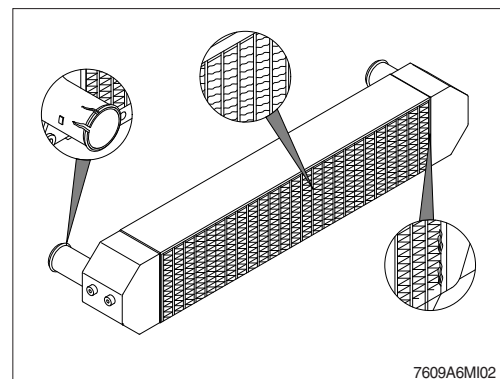
Check, and if necessary, clean and dry outside of radiator and oil cooler. After working in a dusty place, clean radiator more frequently.

- (1) Visually inspect the radiator for clogged radiator fins.
- (2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.
Blow the air in the opposite direction of the fan air flow.
- (3) Visually inspect the radiator for bent or broken fins.
※ If the radiator must be replaced due to bent or broken fins which can cause the engine to overheat, refer to the manufacturer's replacement procedures.
- (4) Visually inspect the radiator for core and gasket leaks.



6) CHECK CHARGE AIR COOLER

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

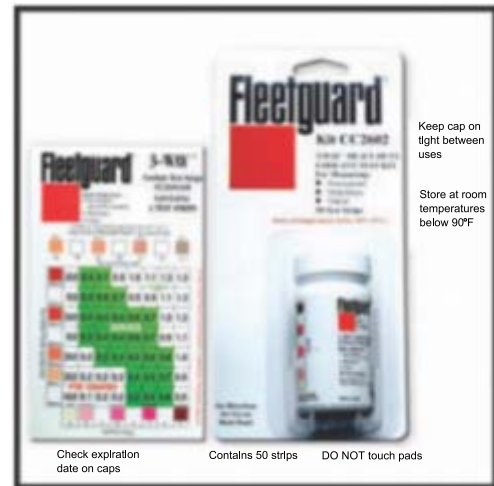


6-1) COOLANT TEST STRIPS INSTRUCTIONS

(1) Pre-test instruction

Recommended testing frequency - at every coolant filter change interval.

- ① Collect coolant sample from the radiator drain valve.
 - Do not collect from the coolant recovery or overflow system
 - Coolant must be between 10~54°C 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.

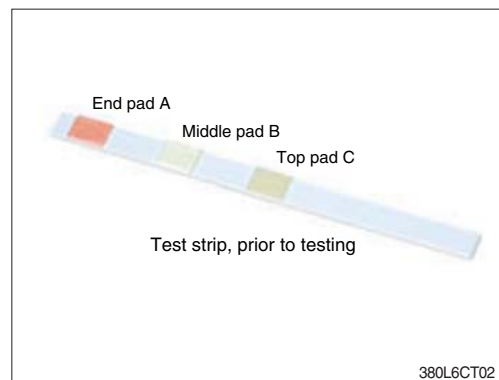


380L6CT01

(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

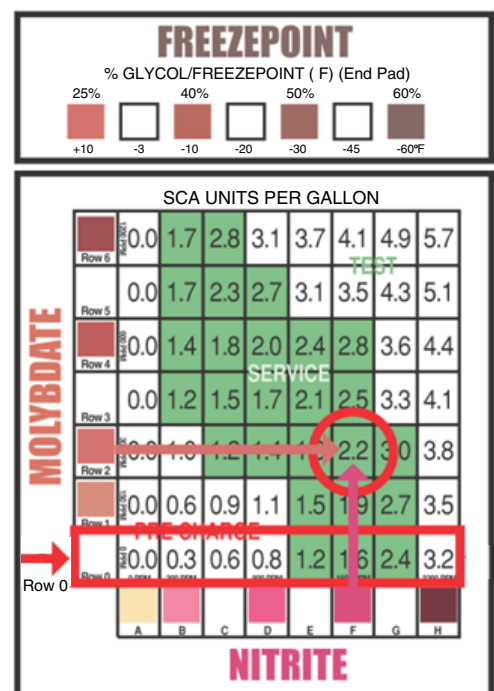
- ③ 45 seconds after dipping strip, compare results to color chart and record in the following order:

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.

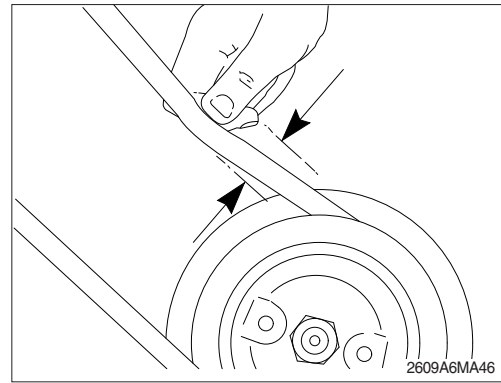
※ If you need part number of Test kit or DCA4, please see Parts Manual.

0.0	1.7	2.8	3.1	3.7	4.1	4.9	5.7
0.0	1.7	2.3	2.7	3.1	3.5	4.3	5.1
0.0	1.4	1.8	2.0	2.4	2.8	3.6	4.4
0.0	1.2	1.5	1.7	2.1	2.5	3.3	4.1
0.0	1.0	1.2	1.4	1.8	2.2	3.0	3.8
0.0	0.6	0.9	1.1	1.5	1.9	2.7	3.5
0.0	0.3	0.6	0.8	1.2	1.6	2.4	3.2

380L6CT04

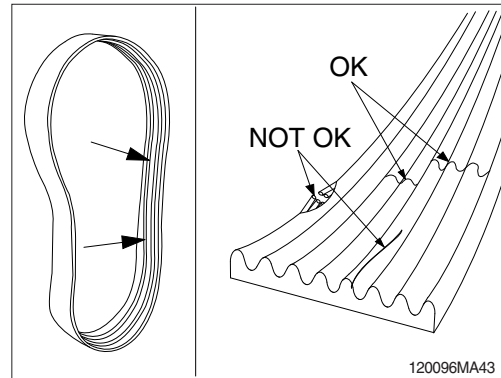
7) FAN BELT TENSION

- (1) A 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.

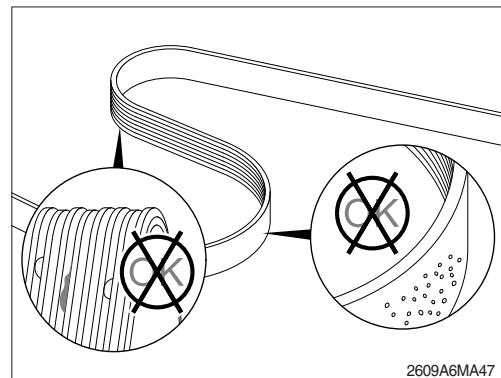


- (2) Inspect the fan belt for damage.

- ① Transverse (across the belt) cracks are acceptable.
- ② Longitudinal (direction of belt ribs) cracks that intersect with transverse cracks are not acceptable.



- ③ Inspect the belt
 - Embedded debris
 - Uneven/excessive rib wear
 - Exposed belt cords
 - Glazing (high heat)
- ※ If any of the above conditions are present, the belt is unacceptable for reuse and must be replaced.



8) INSPECTION OF COOLING FAN

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

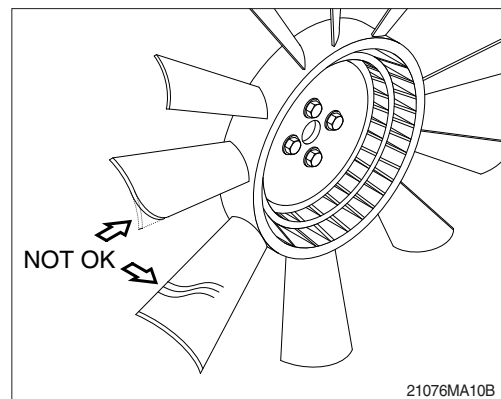
※ Rotate the crankshaft by using the engine barring gear.

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

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

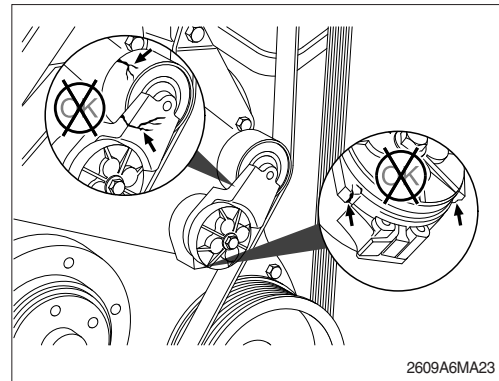
Check the fan to make sure it is securely mounted. Tighten the capscrews if necessary.

Replace any fan that is damaged.



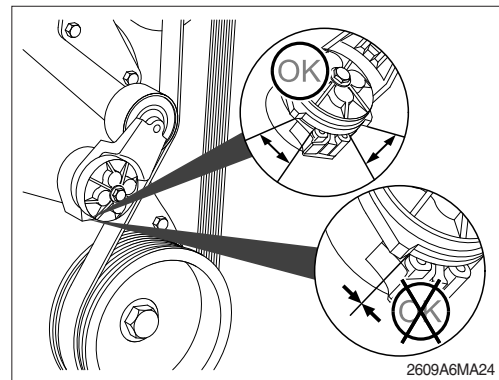
9) FAN BELT TENSIONER

- (1) With the engine stopped, check the tensioner arm, pulley, and stops for cracks. If any cracks are found, the tensioner must be replaced.



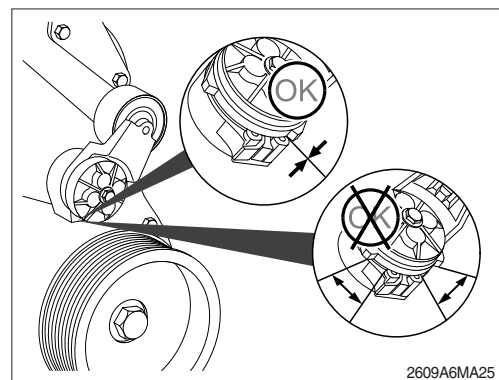
- (2) With the belt installed, verify that neither tensioner arm stop is in contact with the spring case stop.

After replacing the belt, if the tensioner arm stops are still in contact with the spring case stop, replace the tensioner.

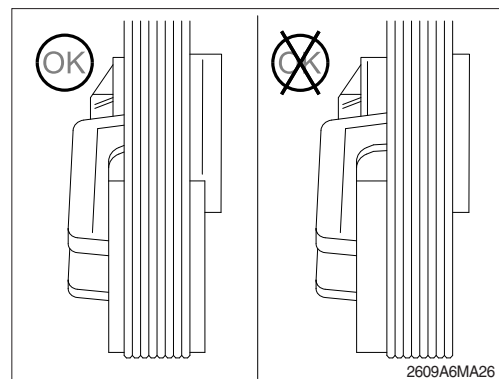


- (3) With the belt removed, verify that the tensioner arm stop is in contact with the spring case stop. If these two are not touching, the tensioner must be replaced.

※ **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.



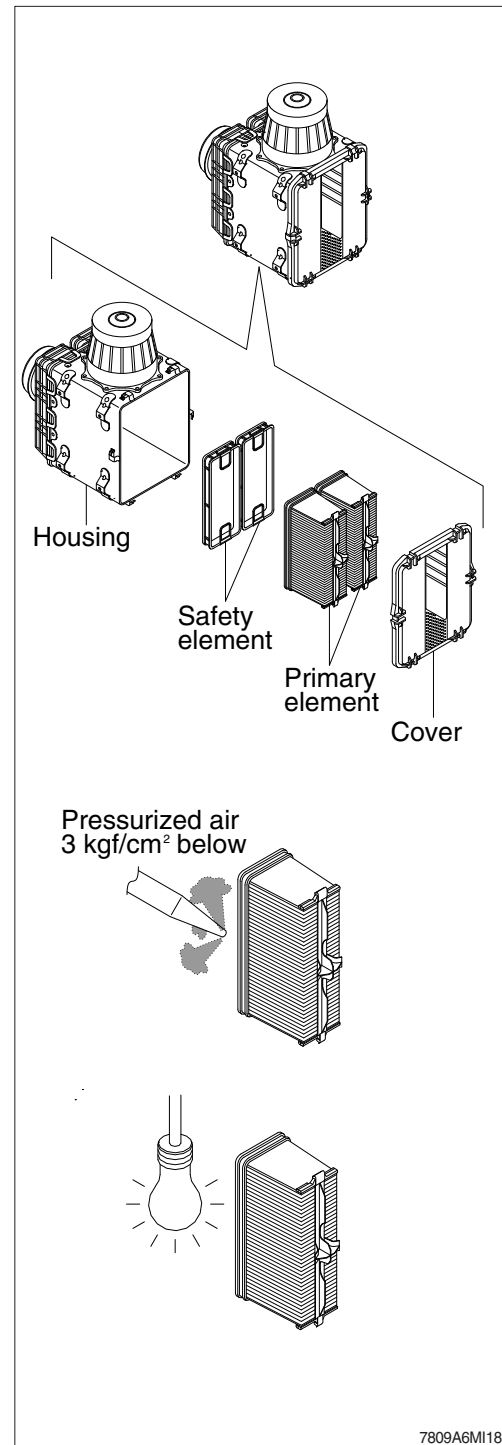
10) CLEANING OF AIR CLEANER

(1) Primary element

- ① Open the cover and remove the element.
- ② Wipe all contaminant and debris from inside the housing body.
- ③ Do not clean the filter element by striking or hitting the filter against any object to shake the debris from the filter element.
- ④ Clean the filter element with compressed air.
 - a. Remove dust from filter element by directing the compressed air into the opening of the air filter element.
 - b. Use 3 kg/cm^2 (40 psi) maximum air pressure and hold the compressed air nozzle at least 2.5 cm (1") away from the pleats while cleaning. Make sure to keep the clean side of air filter free of debris.
- ⑤ Visually inspect for damage to the filter elements and components. Use a light source to help identify any defects in the media. If any defects are observed discard the filter element and replace with a new primary filter element.
 - a. Before any type of cleaning, a visual inspection of the filter is needed. If there is any damage to the filter body, gaskets or endplates, do not clean or reuse; the filter should be discarded. Always clean filters in a clean environment, observe strict inspection procedures and repackage filters immediately after the cleaning process with appropriate materials.
 - b. Use observe proper safety precautions and dispose of waste materials in an environmentally compliant manner.
- ⑥ Re-install filter element into the air housing.
- ⑦ Replace the primary element at the fourth cleaning.

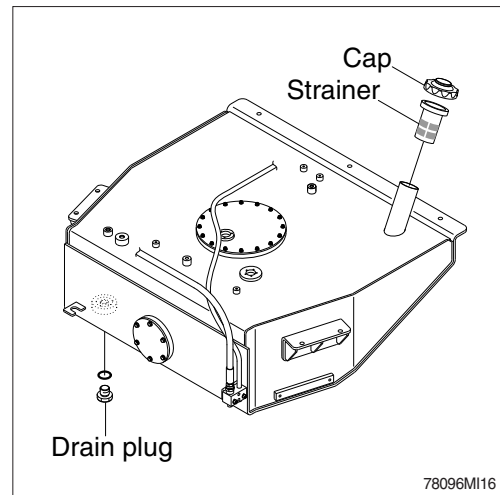
(2) Safety element

The safety filter element should never be cleaned since the safety filter is the last barrier to contaminant before it reaches engine/equipment. The useful life of the safety filter is equivalent to that of the primary air filter only if the primary filter element is being regularly cleaned. If the primary filter element is not cleaned, the safety filter should be changed at every third primary air filter change or after one year of continuous service, whichever occurs first.



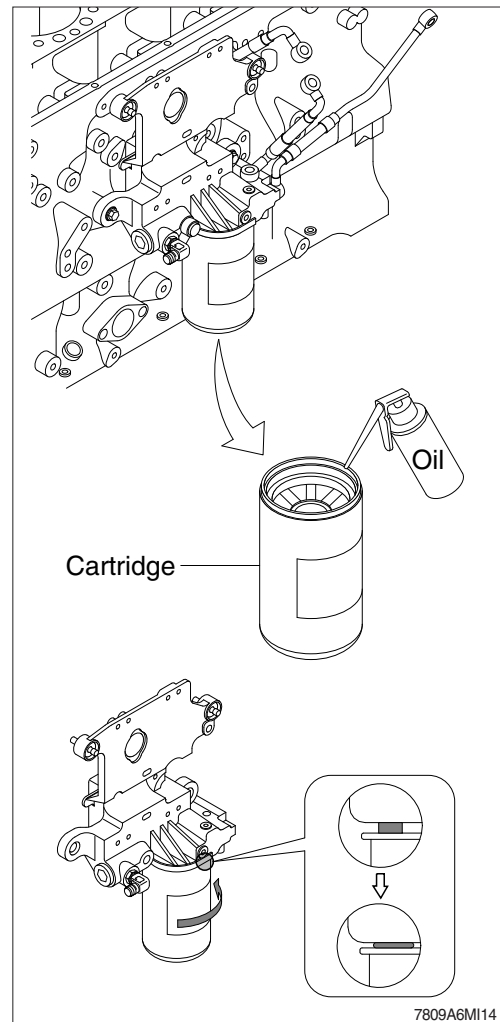
11) FUEL TANK

- (1) Fill fuel fully when system the operation to minimize water condensation, and check it with fuel gauge before starting the machine.
 - (2) Drain the water and sediment in the fuel tank by opening the drain cock.
 - ※ Be sure to LOCK the cap of fuel tank.
 - ※ Remove the strainer of the fuel tank and clean it if contaminated.
- ▲ Stop the engine when refueling.**
All lights and flames shall be kept at a safe distance while refueling.



12) REPLACEMENT OF FUEL FILTER

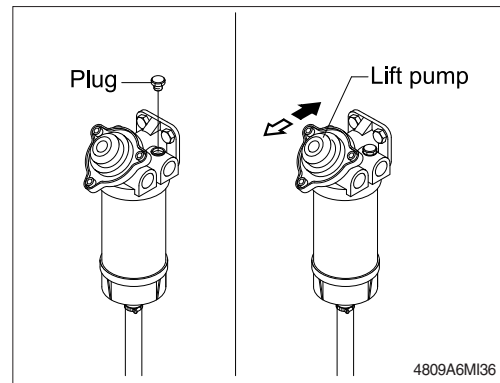
- (1) Clean around the filter head, remove the filter and clean the gasket surface.
- (2) Replace the O-ring.
 - ※ **Make sure O-ring does not stick to filter head. Remove the ring with an O-ring pick, if necessary.**
- (3) Apply engine oil on the gasket of new filter when mounting, and tighten 3/4 to 1 turn more after the gasket touches the filter head.
 - ※ **Mechanical overtightening can distort the threads as well as damage the filter element seal or filter canister.**
 - ※ **It will be necessary to fill the 10-micron water stripping (suction side) fuel filter with fuel. Do not fill the 2-micron (pressure side) fuel filter with fuel before installation; instead, prime the fuel system using the fuel lift pump.**
 - ※ **Do not pre-fill an on-engine fuel filter with fuel. The system must be primed after the fuel filter is installed. Pre filling the fuel filter can result in debris entering the fuel system and damaging fuel system components.**



13) BLEEDING THE FUEL SYSTEM

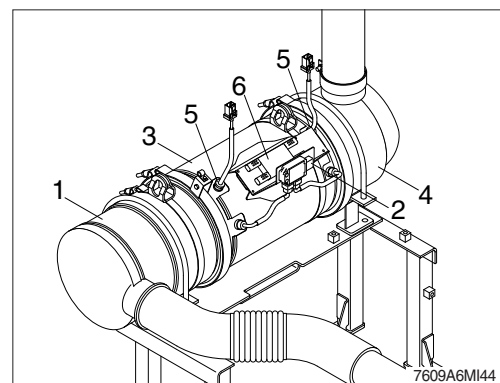
- (1) Loosen fuel supply line plug at the outlet of prefilter.
- (2) Do hand-priming the lift pump repeatedly until air bubbles comes out from fuel supply line completely.
- (3) Tighten fuel supply line to its origin position.

▲ The fuel pump, high-pressure fuel lines and fuel rail contain very high-pressure fuel. 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 decrease to a lower level.



14) AFTERTREATMENT DEVICE

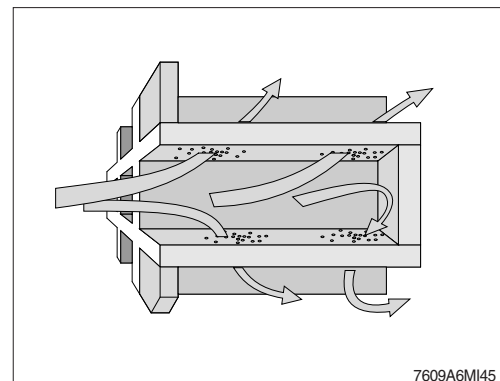
- (1) The aftertreatment system is used to reduce particulate emissions, and is composed of six main components :
 - ① Aftertreatment inlet and aftertreatment diesel oxidation catalyst.
 - ② Aftertreatment diesel particulate filter differential pressure sensor.
 - ③ Aftertreatment diesel particulate filter.
 - ④ Aftertreatment outlet.
 - ⑤ Aftertreatment exhaust gas temperature sensors.
 - ⑥ Aftertreatment diesel particulate filter temperature sensor interface module.



(2) DPF (diesel particulate filter) cleaning

The diesel particulate filter can not be cleaned for maintenance purpose using conventional tools. The diesel particulate filter needs to be cleaned and checked using an approved cleaning machine at a authorized service center.

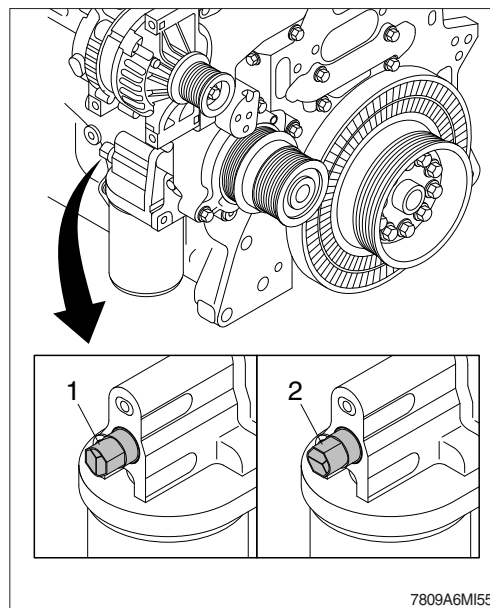
- ※ **The diesel particulate filter shall be cleaned every 5000 hours.**
- ※ **Please contact your Hyundai service center or local dealer.**



15) COOLANT FILTER (CORROSION RESISTOR)

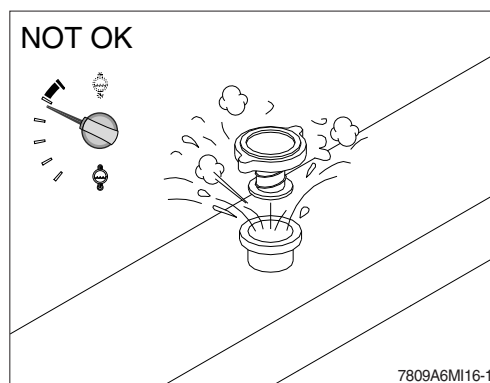
- (1) An ON/OFF valve is provided to prevent coolant leakage while changing the coolant filter.

With the valve in the ON position (1), the coolant flows to and from the coolant filter. In the OFF position (2), the coolant flow is cut off to and from the coolant filter.



- (2) Remove the surge tank cap.

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

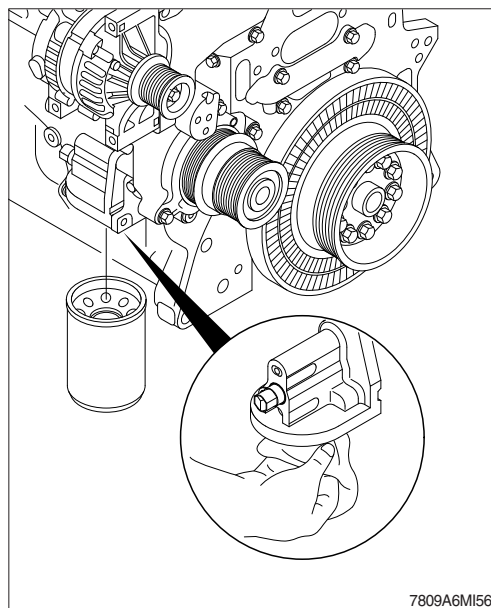


- (3) Turn the coolant ON/OFF valve to the OFF position. Do not use force to open or close the ON/OFF valve.

- (4) Remove and discard the coolant filter.

- (5) Clean the gasket surface on the filter head.

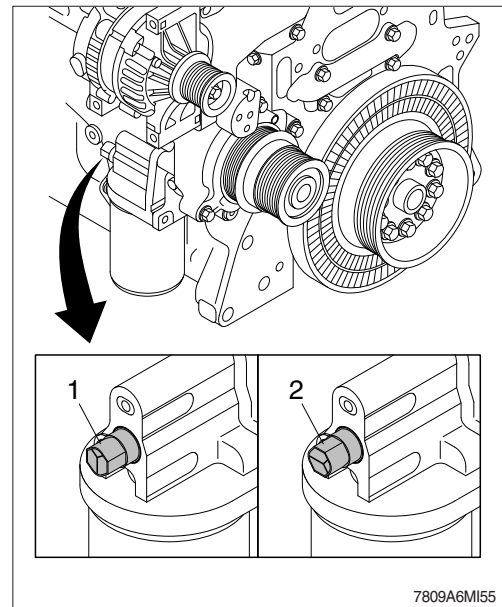
- ⚠ Coolant is toxic. Keep away from children and pets. If not reused, dispose of in accordance with local environmental regulations.**



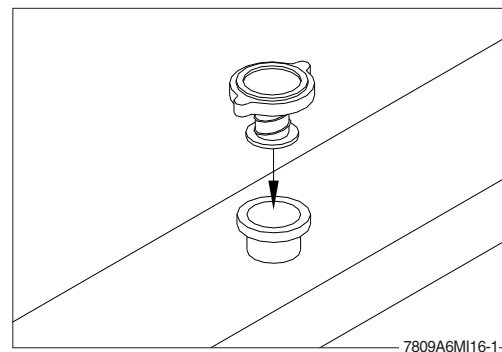
- (6) Apply a thin film of clean engine oil, or its equivalent, to the coolant filter gasket sealing surface before installing the coolant filter.



- (7) Install the coolant filter.
- (8) Tighten the coolant filter 1/2 to 3/4 of a turn after initial gasket contact.
- (9) Turn the coolant ON/OFF valve to the ON (1) position.
- ※ **Mechanical overtightening can distort the threads or damage the filter head.**



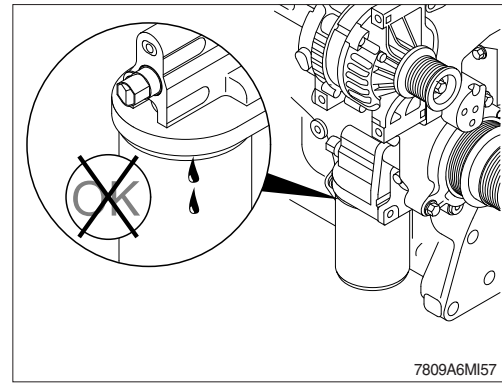
- (10) Install the surge tank cap.



(11) Operate the engine until the coolant temperature is above 82°C (180°F) and check for coolant leaks.

(12) After the air has been purged from the system, check the coolant level.

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

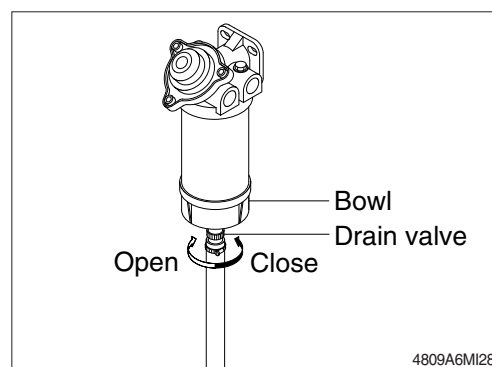


16) PREFILTER

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

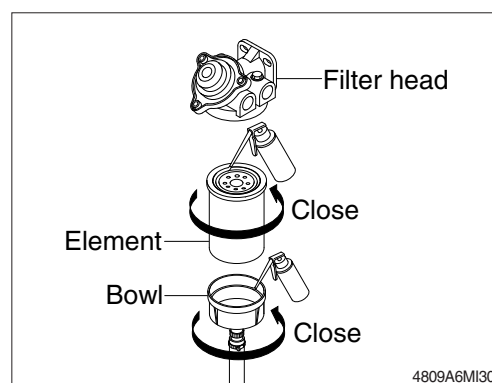
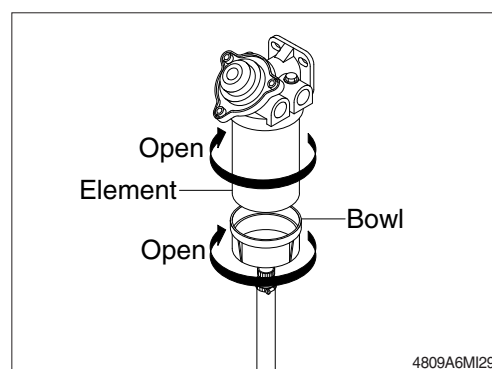
(1) Drain water

- ① Open bowl drain valve to evacuate water.
- ② Close drain valve.



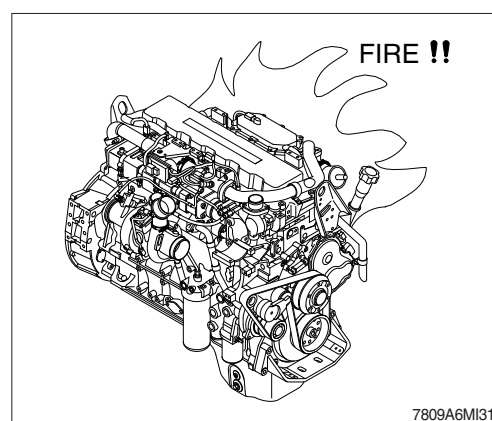
(2) Replace element

- 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.



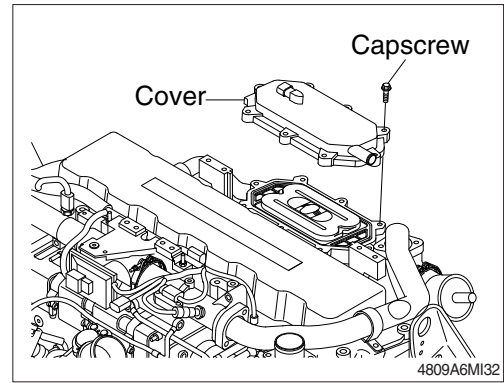
17) LEAKAGE OF FUEL

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

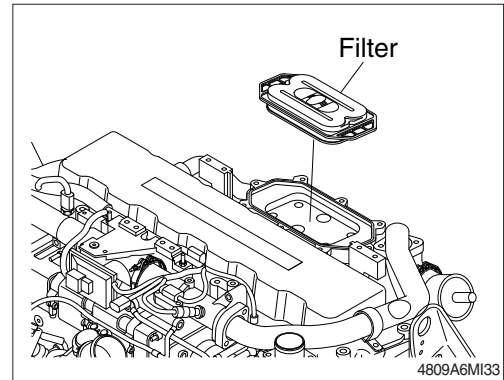


18) CRANKCASE VENTILATION FILTER

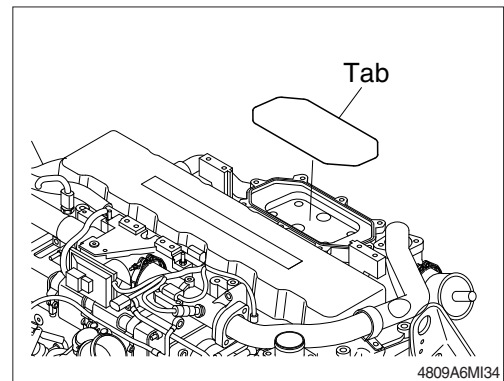
- (1) Loosen the eight cover mounting captive cap screws.
- (2) Remove the filter cover.



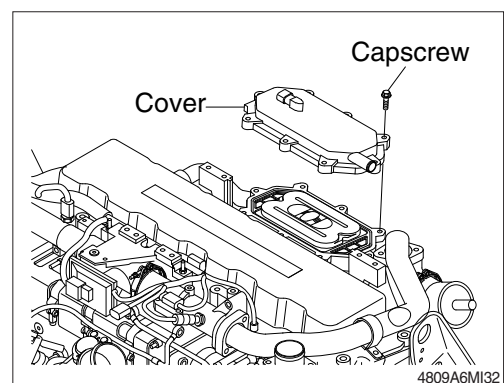
- (3) Remove and discard the crankcase ventilation filter.
- (4) Wipe out any excess dirt or oil from the inside of the cover.
- (5) Install the new crankcase ventilation filter in the breather housing.



- (6) Make sure the filter is properly seated in the housing so the seal will not be cut, crimped, or otherwise compromised when installing the filter cover.



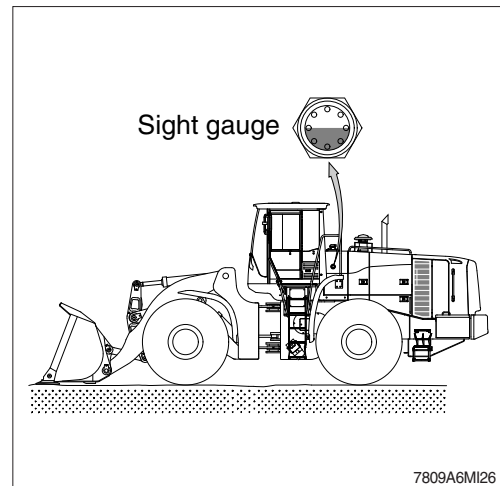
- (7) Install the crankcase ventilation cover.
- (8) Tighten the eight captive mounting capscrews.
 - Tightening torque : 0.51 kgf·m (3.69 lbf·ft)



19) HYDRAULIC OIL CHECK

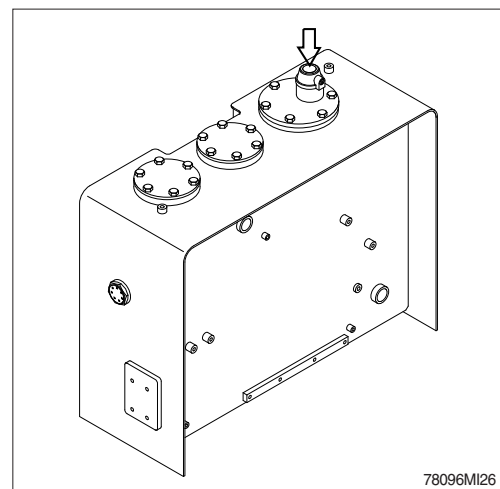
- (1) Lower the bucket on the ground at a flat location as in the illustration.
Stop the engine and then leave for about 5 minutes.
- (2) Check the oil level at the sight gauge. The sight gauge is located on the left side of the hydraulic oil tank.
- (3) The sight gauge should indicate the middle position.

※ **Add hydraulic oil, if necessary.**



20) FILLING HYDRAULIC OIL

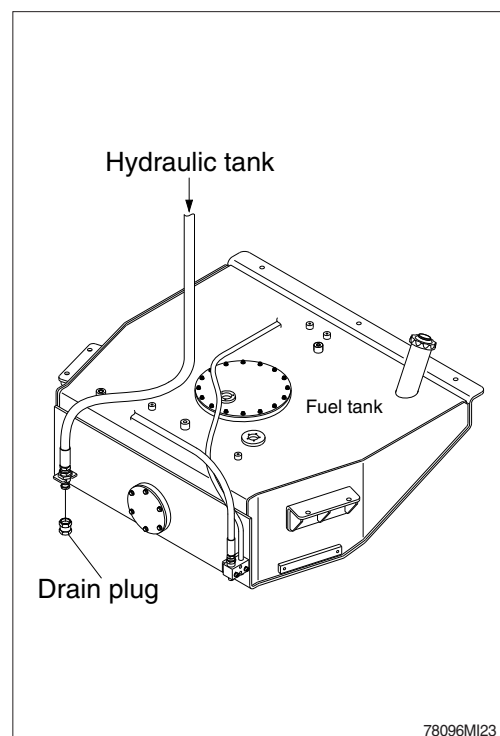
- (1) Stop the engine to the position of level check.
- (2) Relieve the pressure in the tank by pressing the top of the air breather.
- (3) Remove the breather on the top of oil tank and fill the oil to the specified level.
- (4) Start engine after filling and operate the work equipment several times.
- (5) Check the oil level at the level check position after engine stops.



21) CHANGE THE HYDRAULIC OIL

- (1) Lower the bucket on the ground extend the bucket cylinder to the maximum.
- (2) Relieve the pressure in the tank by pressing the top of the air breather.
- (3) Prepare a suitable container.
- (4) To drain the oil loosen the drain plug at the fuel tank block.
- (5) Tighten the drain plug.
- (6) Fill proper amount of recommended oil.
- (7) Put the breather in the right position.
- (8) Start engine and run continually. Release the air by full stroke of control lever.

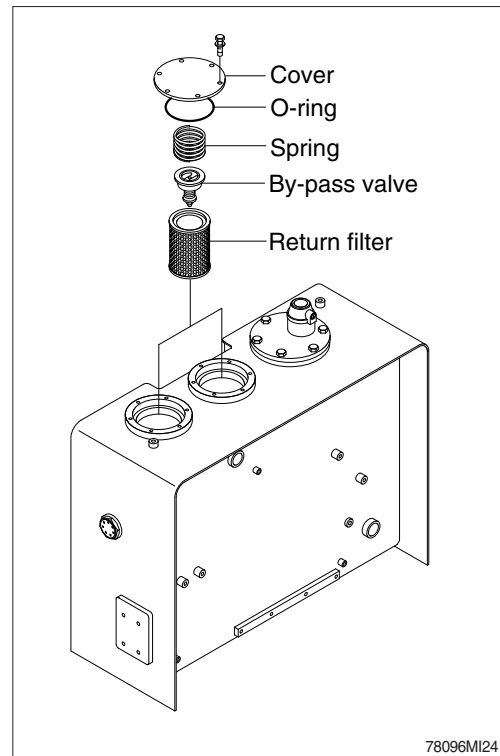
※ **The oil must be free of bubbles. If bubbles are present in the oil, air is entering the hydraulic system. Inspect the suction hoses and hose clamps.**



22) CLEANING AND REPLACING RETURN FILTER

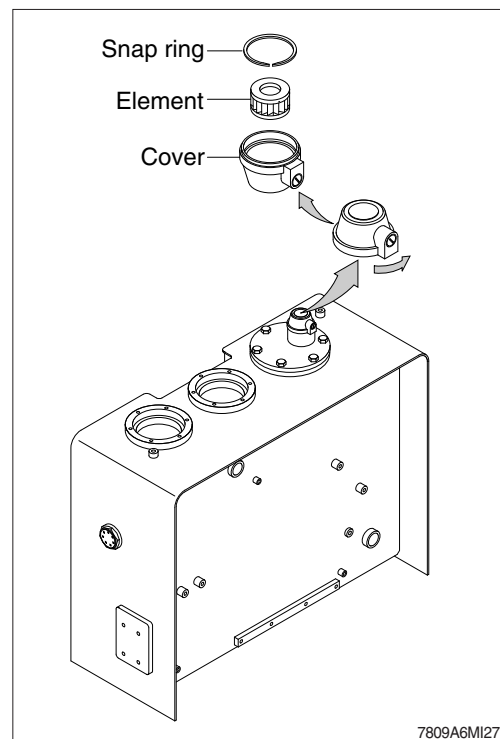
Clean and replace the return filter in the following manner.

- (1) Remove the cover.
- (2) Remove spring, by-pass valve and return filter from the tank.
- (3) Replace element with new one and assemble spring and by-pass valve after cleaning.
- (4) Install the cover on the tank.
 - Tightening torque : $6.9 \pm 1.4 \text{ kgf} \cdot \text{m}$ ($50 \pm 10 \text{ lbf} \cdot \text{ft}$)



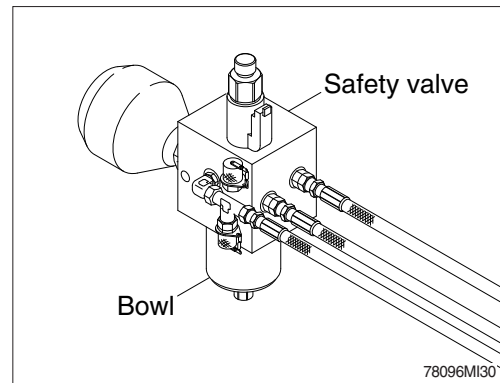
23) REPLACEMENT OF ELEMENT IN HYDRAULIC TANK BREATHER

- (1) Remove the pressure in the tank by pressing the top of the air breather.
- (2) Remove the cover.
- (3) Remove the snap ring and pull out the filter element.
- (4) Replace the filter element with new one.
- (5) Apply oil on the O-ring and reassemble by reverse order of disassembly.
 - Tightening torque : $0.7 \sim 0.9 \text{ kgf} \cdot \text{m}$ ($5 \sim 6 \text{ lbf} \cdot \text{ft}$)



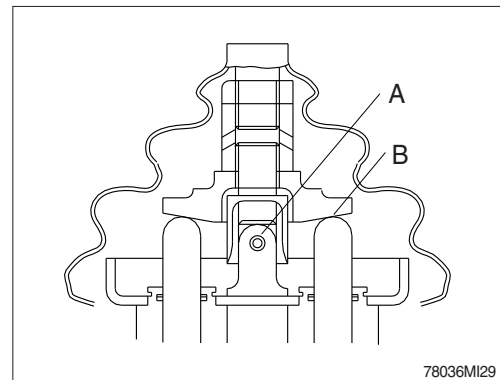
24) REPLACE OF PILOT LINE FILTER

- (1) Loosen the bowl on the safety valve.
- (2) Pull out the filter element and clean the bowl.
- (3) Install the new element and tighten the bowl using spanner.
 - Spanner size : 27 mm



25) LUBRICATE RCV LEVER

Remove bellows and grease the joint (A) and the sliding parts (B).



26) TIRE PRESSURE

- (1) Inappropriate tire pressure is a primary cause for tire damage. Insufficient tire pressure will damage internal carcass of tire. Repeated excessive bending will damage or break the carcass. Excessive pressure will also cause premature damage of tire.

- (2) Recommended tire pressure (When tire is cooled)

Size	Pressure
29.5-25, 22PR (L3)	3.5 bar (50 psi)
29.5 R25, ★(L3)	4.6 bar (65 psi)

- (3) Continuous operation will produce heat and increase pressure on tire. But such phenomenon was already taken into account when designing a tire. Do not try to remove normally increased air because tires may be crushed or overinflated.
- (4) The three major causes for excessive heat and pressure of tire are insufficient pressure, excessive load and overspeed. Avoid excessive load and overspeed in order to keep tires in good shape.

- ▲ Do not inflate tires using flammable gases or alcohol injector.

This cause explosion or personal injury.

- ▲ Inflate tires at the pressure level recommended by the manufacturer, and check periodically pressure and wear of tires.

- ▲ When replacing the inflated tire, do not stand near the tire.

- ※ Check the tire when the tire is at normal temperature and the machine is not loaded.

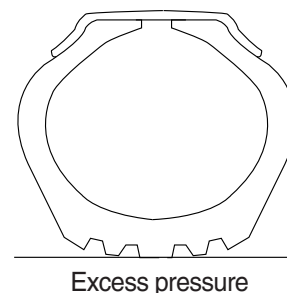
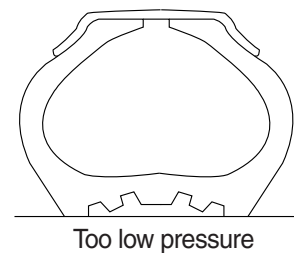
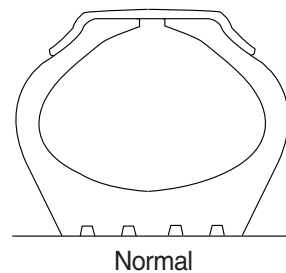
- ▲ Do not use recycled wheel parts.

- ▲ When removing lockering or inflating tire, use safety cable or chain to ensure safety.

- ※ Be sure to bleed air before removing lockering. Never inflate tires unless the lockering is assembled in its place.

- ① Avoid the followings when traveling.
- ② Rubbing tires against road bank or rack at cargo-unloading spot.
- ③ Tires slippage during working.
- ④ Abrupt starting of machine.

When oil, grease or gasoline smeared on tire, clean those. Otherwise it may cause of permanent deformation.



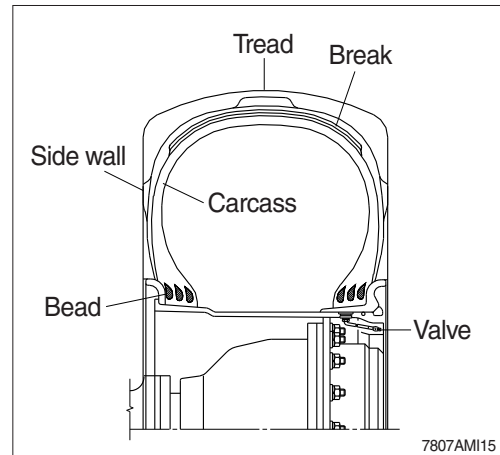
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27) REPLACEMENT OF TIRE

▲ Disassembly, reassembly, replacement and repair of tire requires special skills and equipment. Contact a tire repair shop.

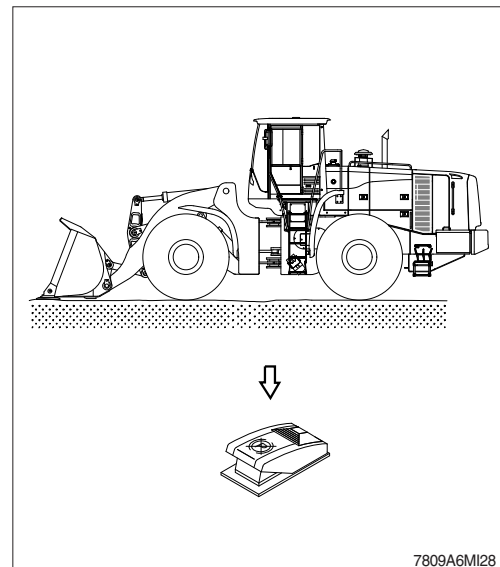
(1) Tires to be replaced

- ① Tires with broken or bent bead wires
- ② Tires exposed more than 1/4 of carcass ply.
- ③ Tires whose carcass is damaged more than 1/3 of the tire width.
- ④ Tires which show fly separation.
- ⑤ Tires which has a radial crack near the carcass.
- ⑥ Tires which are judged to be unsuitable for use because of deformation or damage.

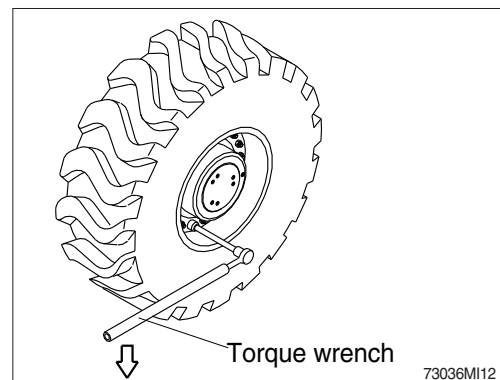


(2) Separation of tire

- ① After moving the machine to flat ground, lower the bucket to the ground and press the parking brake.

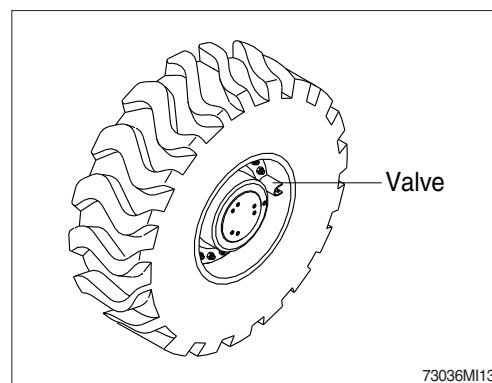


- ② Loosen slightly all wheel mounting.
 - Tools : Socket 32 mm
 - Torque wrench
 - Extension bar
- ③ Lift the machine with a jack.
- ④ Loosen all wheel mounting nuts and replace the tire.



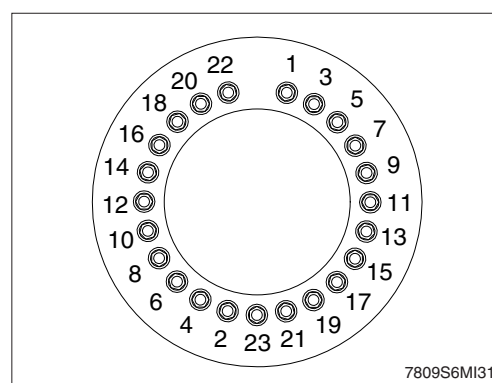
(3) Direction of tire to be installed

- ① Be careful that the valve should be facing the outside.



(4) Mounting of tire

- ① Lightly tighten nuts as shown in the illustration.
- ② Lower the jack after tire is replaced.
- ③ Tighten nuts according to the specified tighten torque.
 - Tightening torque : $79 \pm 2.5 \text{ kgf} \cdot \text{m}$
($571 \pm 18 \text{ lbf} \cdot \text{ft}$)

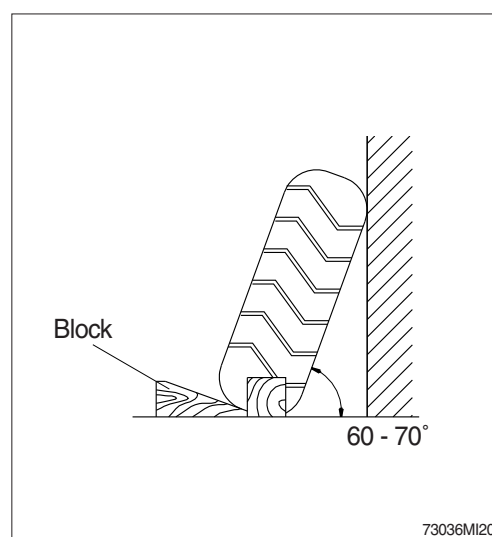


28) STORING TIRES AFTER REMOVAL

As a basic rule, store the tires in a warehouse which unauthorized persons cannot enter. If the tire are stored outside, always erect a fence around the tires and put up "No Entry" and other warning signs that even young children can understand.

Stand the tire on level ground, and block it securely so that it cannot roll or fall over.

If the tire should fall over, get out of the way quickly. The tires for construction equipment are extremely heavy, so trying to hold the tire may lead to serious injury.



29) CHECK TRANSMISSION OIL LEVEL

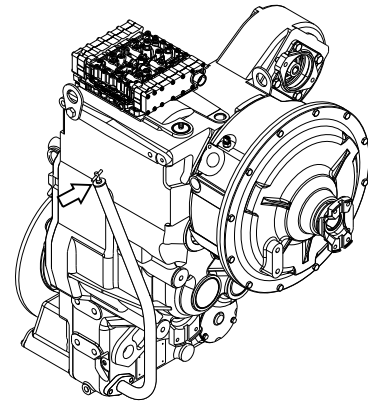
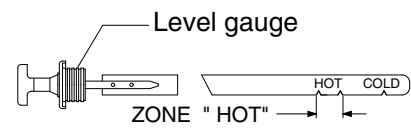
The oil level check must be carried out as follows ;

- (1) Oil level check (weekly).
- (2) Before the oil level check, transmission must have been running to warm up enough.
- (3) When the oil level is checked, machine must be on flat ground and engine must be at idling speed, transmission must be in neutral position.
- (4) Check the oil level with level gauge (dipstick).
- (5) Loosen oil level gauge by counterclock rotation, pull it out and clean it.
- (6) Insert oil level gauge slowly into oil level tube until contact is obtained, and pull it out again.

(7) Oil level

- Operating temperature (about 80~90°C)
: The oil level must be lying in zone HOT.
 - Cold phase (about 40°C)
: The oil level must be lying near cold mark.
- (8) Insert the oil level gauge again and tighten in by clockwise rotation.

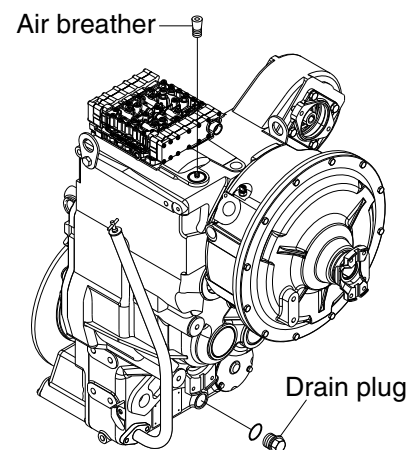
▲ When checking, press the parking brake switch and fix the front and rear frames with the safety lock bar.



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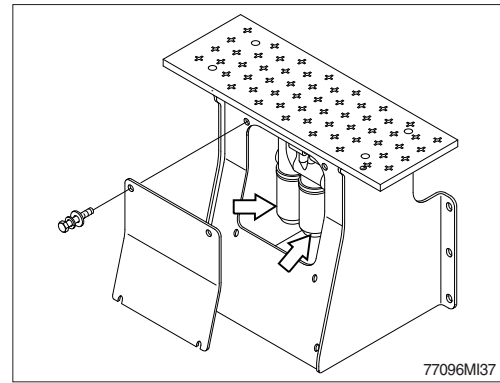
30) REPLACEMENT OF TRANSMISSION OIL AND FILTER ELEMENT

- (1) Operate the machine for a few minutes in order to warm the transmission oil.
- (2) Move the machine to flat ground. Lower the bucket to the ground and slightly apply downward force.
- (3) Press the parking brake switch and stop the engine.
- (4) Open transmission air breather to relieve internal air pressure.
- (5) Remove the transmission drain plug. Allow the transmission oil to drain into a suitable container.

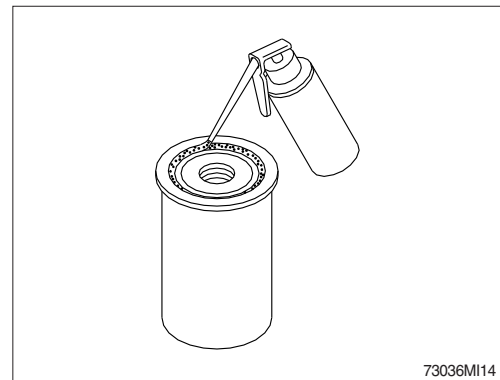


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- (6) Remove the transmission oil filter cartridge.
Dispose of the used transmission oil filter cartridge properly.
- (7) Clean the filter cartridge mounting base.
Remove any part of the filter cartridge gasket that remains on the filter cartridge mounting base.

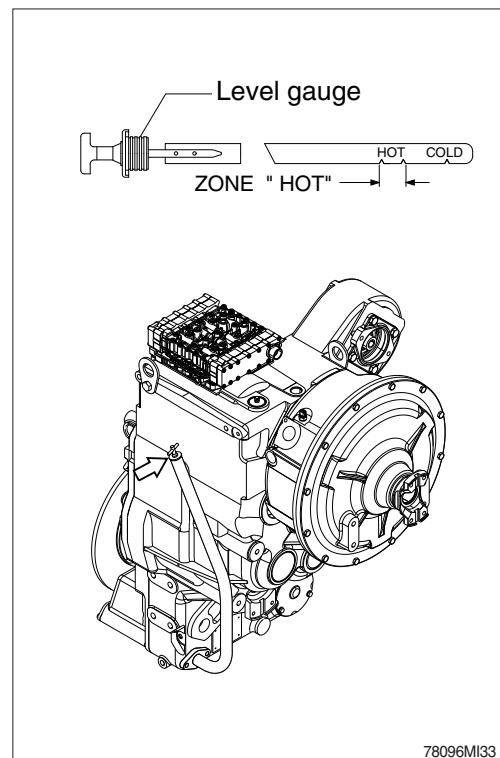


- (8) Apply a light coat of oil to the gasket of a new transmission oil filter cartridge.
- (9) Install the new transmission oil filter cartridge.
Screw the filter in until contacts with the sealing surface is obtained and tighten it now by hand about 1/3 to 1/2 turn.



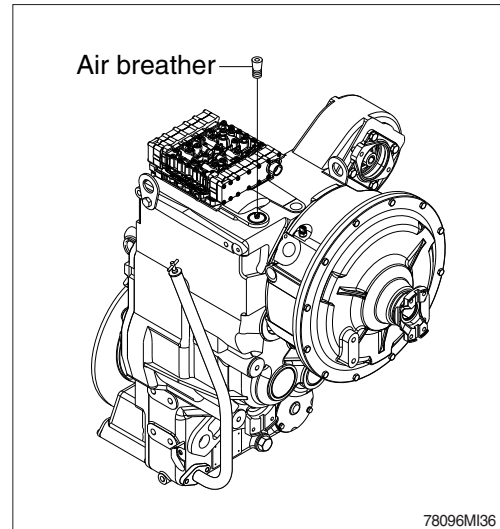
- (10) Mount the drain plug of transmission after cleaning it.
- (11) Fill the oil through level gauge inlet and check if the oil is at the appropriate level.
- (12) The proper oil amount is 43 liters (11.4 U.S. gallons)

- ⚠ **As the machine is hot after operation wait until the temperature has dropped.**
- ⚠ **It is imperative to pay attention to absolute cleanliness of oil and filter.**
Binding is in any case the marking on the oil level gauge.
- ✖ **Prohibition to inject water to filler cap directly when you wash the machine.**




31) CLEANING TRANSMISSION AIR BREATHER

- (1) Remove dust or debris around the air breather.
- (2) Remove the air breather and wash it with cleaning oil.

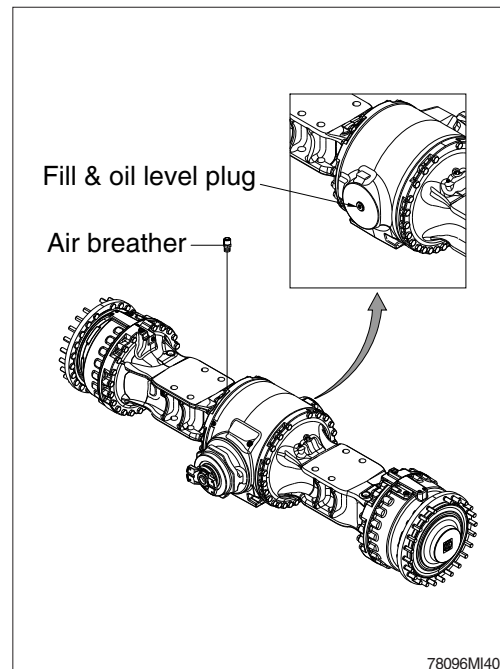


32) CHECK AND SUPPLYING AXLE OIL

- (1) Move the machine to flat ground.
 - (2) Open the axle air breather to relieve internal air pressure.
 - (3) Remove the plug and check the oil amount.
If the oil level is at the hole of the plug, it is normal.
- ※ Provide fill & level plug with O-ring and install it.

 When checking the oil level, press the parking brake switch and fix front and rear frames using the safety lock bar.

▲ As the machine is hot after operation, wait until the temperature has dropped.



33) CHANGE THE AXLE OIL

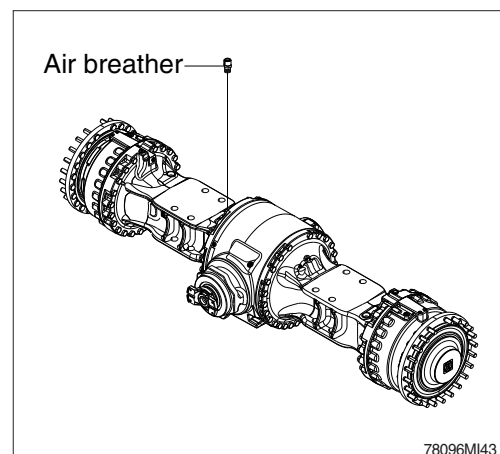
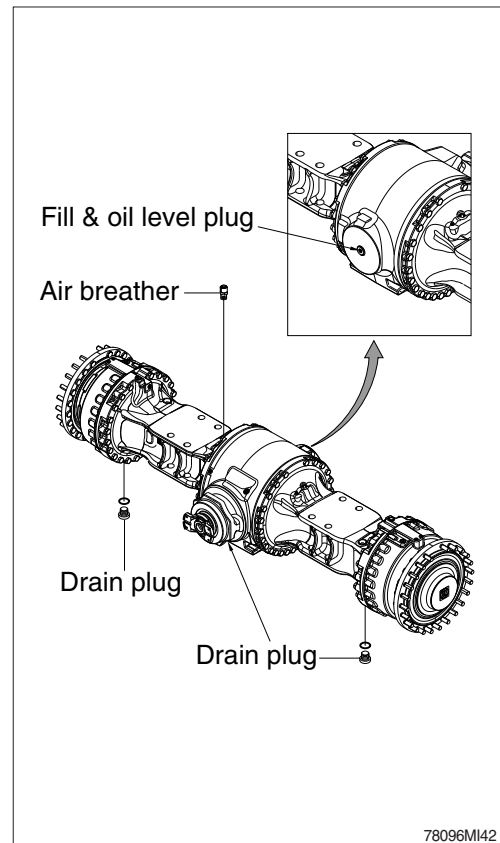
- (1) Place a case under drain plug to catch oil.
- (2) Remove the air breather to relieve internal pressure.
- (3) The basic condition for a correct oil change of the axle is horizontal plane of installation in every direction.
Place machine in a horizontal position
- (4) All plugs must be cleaned carefully before opening.
- (5) Loosen drain plugs and drain oil.
- (6) Provide drain plugs with new O-ring and install them.
- (7) Fill up oil to the overflow on fill & level plug.
 - Oil amount
 - Front axle : 58 ℓ (15.3 U.S. gal)
 - Rear axle : 58 ℓ (15.3 U.S. gal)
 - If equipped with axle oil cooler (option)
- (8) Run the engine for five minutes at low idle on flat ground.
- (9) Fill up oil to the overflow on fill & level plug at low idle and install plugs.
 - Oil amount
 - Front : 65 ℓ (axle only 58 ℓ)
 - Rear : 65 ℓ (axle only 58 ℓ)

▲ As the machine is hot after operation, wait until the temperature has dropped.

※ If a work requires frequent use of brake, replace it earlier than normal change interval.

34) CLEANING AXLE BREATHER

- (1) Remove dust or debris around the breather.
- (2) Remove the breather and wash it with cleaning oil.



35) LUBRICATION

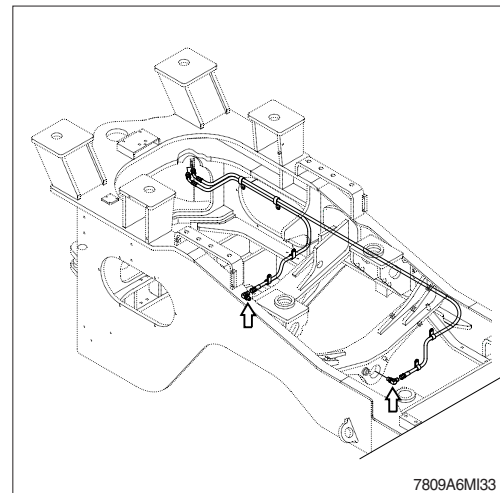
(1) Supply grease through the grease nipple, using grease gun.

(2) After lubricating, clean off spilled grease.

▲ Press the parking brake switch and fix front and rear frames using the safety lock bar.

▲ Set the work equipment in a stable position and put the pilot cut off switch in the OFF position.

(3) Rear axle pivot : 2EA



(4) Center pivot pin : 2EA

(5) Steering cylinder pin : 4EA

(6) Drive shaft

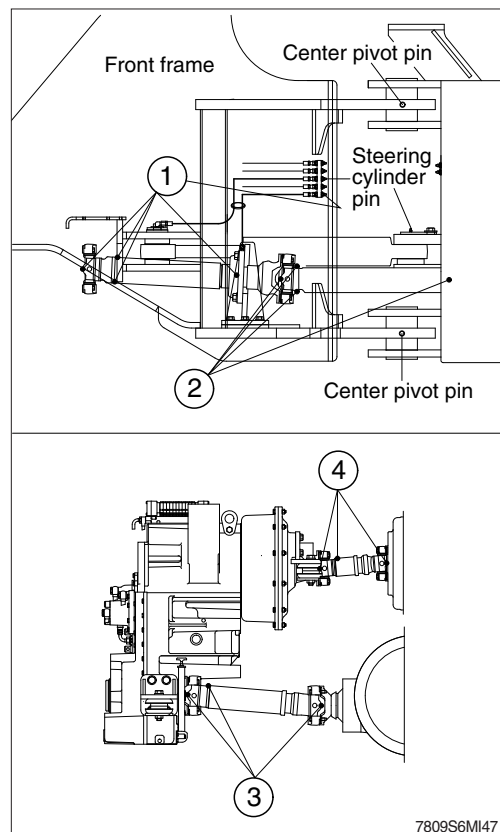
① Front (flange bearing) : 1EA

Front (journal bearing, sleeve yoke) : 4EA

② Center (journal bearing, sleeve yoke) : 4EA

③ Rear (journal bearing, sleeve yoke) : 3EA

④ Upper (journal bearing, sleeve yoke) : 3EA



36) REPLACEMENT OF BOLT ON CUTTING EDGE

(1) Replacement time

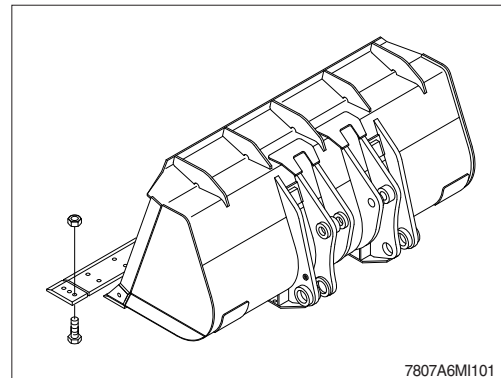
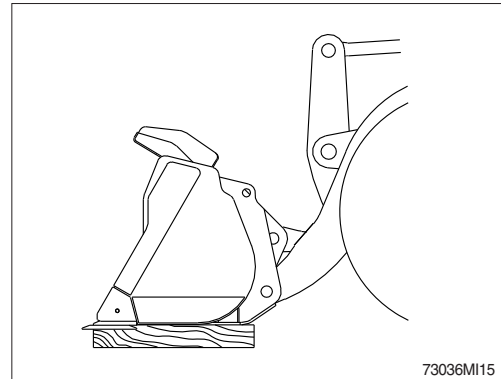
Replace the cutting edge before it has worn out to the end of bucket.

(2) Replacement method

▲ Make sure the work equipment does not move when replacing the cutting edge.

Set the work equipment in a stable position, put the pilot cut off switch in the OFF position and stop the engine.

- ① Lift the bucket to a proper height and insert blocks so that the bucket does not fall down.
- ② Loosen bolts and nuts, and remove the cutting edge.
- ③ Clean the contacted surface.
- ④ Turn the cutting edge and install on the bucket.
 - ※ **If both sides have worn out, replace it with new ones.**
 - ※ **If the contacted face of cutting edge has worn out, repair the contacted face of it.**
- ⑤ Tighten evenly bolts and nuts to remove the clearance between bucket and cutting edge.
 - Tightening torque : $275 \pm 40 \text{ kgf} \cdot \text{m}$
($1990 \pm 290 \text{ lbf} \cdot \text{ft}$)
- ⑥ After a few hours of operation, retighten bolts.



37) REPLACEMENT OF BUCKET TOOTH

(1) Replacement time

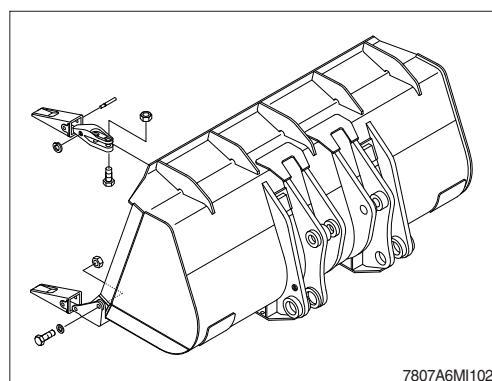
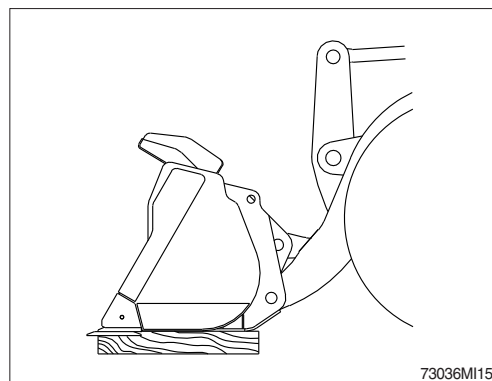
Replace the bucket tooth before it has worn out to the end of the bucket.

(2) Replacement method

▲ Make sure the work equipment does not move when replacing the bucket tooth.

Set the work equipment in a stable position, put the pilot cut off switch in the OFF position and stop the engine.

- ① Lift the bucket to a proper height and insert blocks so that the bucket does not fall down.
- ② Loosen bolts and nuts, and remove bucket tooth.
- ③ Clean the contacted surface.
- ※ If the contacted face of bucket tooth has worn out, repair the contacted face of it.
- ④ Install new bucket tooth on the bucket, and tighten bolts and nuts.
 - Tightening torque : $275 \pm 40 \text{ kgf} \cdot \text{m}$
 $(1990 \pm 290 \text{ lbf} \cdot \text{ft})$
- ⑤ After a few hours of operation, retighten bolts.



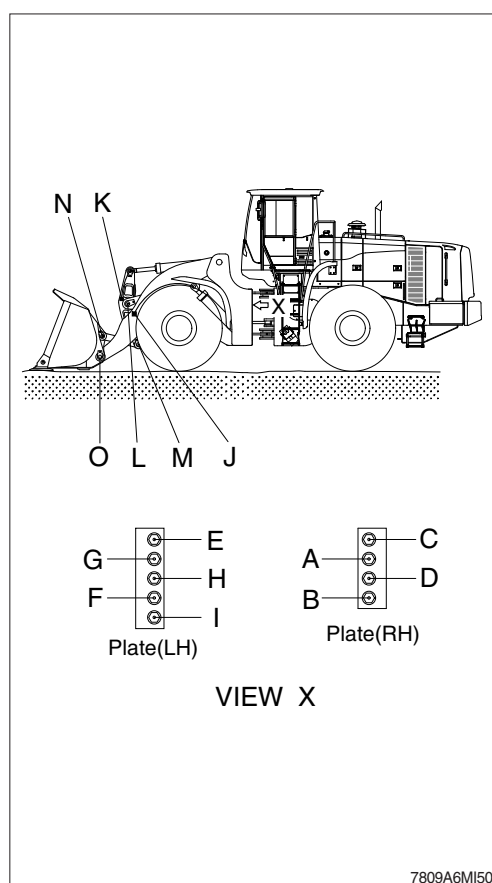
38) MAINTENANCE OF WORK EQUIPMENT

- (1) Lubricate to each pin of working device.

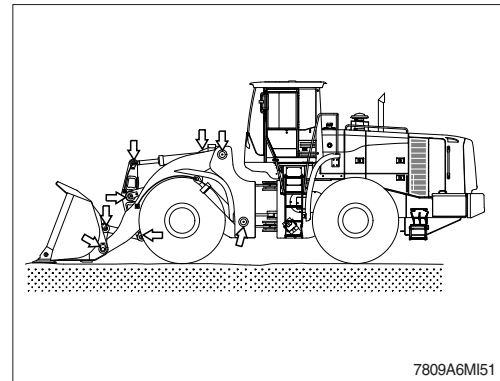
Lubricate the grease to grease nipple in accordance with lubrication intervals.

No.	Description	Qty
A	Bucket cylinder (front frame side) right pin	1
B	Boom cylinder (front frame side) right pin	1
C	Boom-front frame right connection pin	1
D	Steering cylinder (front frame side) right pin	1
E	Boom-front frame left connection pin	1
F	Boom cylinder (front frame side) left pin	1
G	Bucket cylinder (front frame side) left pin	1
H	Steering cylinder (front frame side) left pin	1
I	Drive shaft (middle) pin	1
J	Boom cylinder-boom connection pin	2
K	Bucket cylinder-bell crank connection pin	2
L	Boom-bell crank connection pin	2
M	Bell crank-bucket link connection pin	2
N	Bucket-bucket link connection pin	2
O	Bucket-boom connection pin	2

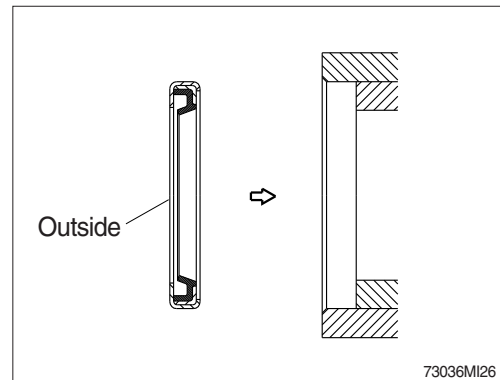
※ Shorten lubricating interval when working in the water or dusty place.



- (2) Check for wear and tear of work equipment pins and bushings.
- (3) Check for damage of boom and bell crank.

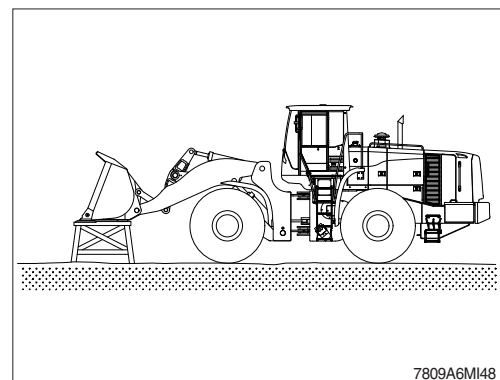


- (4) Dust seal are mounted on the rotating part of working device to extend the lubricating interval.
 - ※ **Mount the lip to be faced out side when replace the dust seal.**
 - ※ **If it is assembled in wrong direction, it will cause fast wear of pin and bushing, and create noise and vibration during operation.**
 - ※ **Make sure the seals are not damaged or deformed.**



39) WORK EQUIPMENT SUPPORT

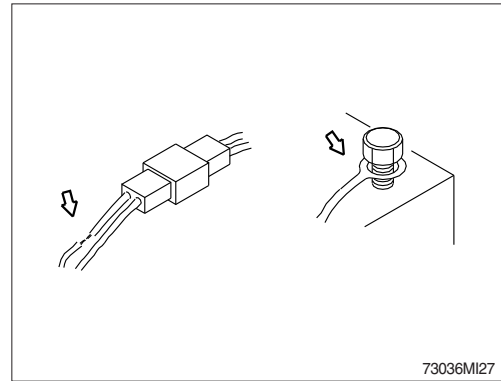
When carrying out inspection and maintenance with the equipment raised, fit a stand under the lift arm securely to prevent the work equipment from coming down. In addition, set the work equipment control levers to the Hold position and put the pilot cut off switch OFF position.



7. ELECTRICAL SYSTEM

1) WIRING, GAUGES

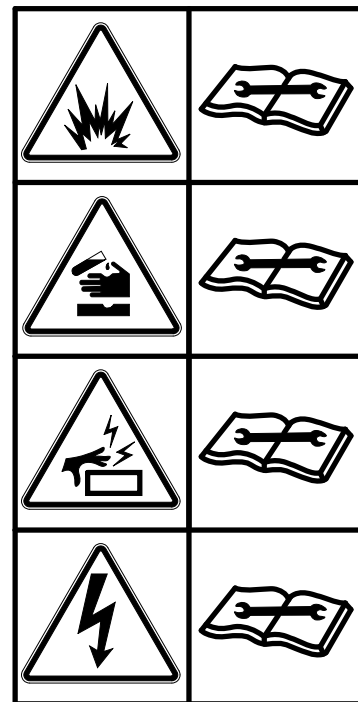
Check regularly and repair loose or malfunctioning gauges when found.



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.
- ⚠ Avoid short-circuiting the battery terminals through accidental contact with metallic objects, such as tools, across the terminals.
- ⚠ Do not store tools, bucket tooth and other flammable things in battery box. They could cause a fire.
- ⚠ Tighten the battery terminals securely.
Loosened terminals can generate sparks and lead to explosion.
- ⚠ Make sure that the battery terminal's caps always are installed.



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(2) Recycle

Never discard a battery.

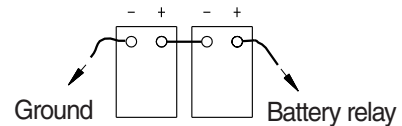
Always return used batteries to one of the following locations.

- 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.

※ Pay attention to the correct polarity.



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3) STARTING THE ENGINE WITH A BOOSTER CABLE

Keep following order when you are going to start engine using booster cable.

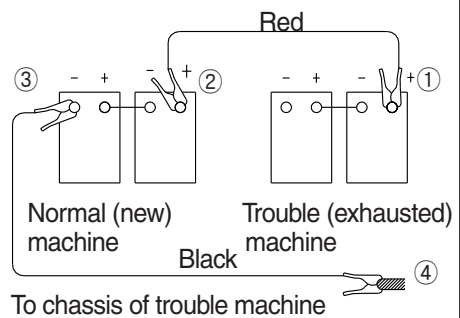
(1) Connection of booster cable

※ Use the same capacity of battery for starting

- ① Connect the red terminal of booster cable to the battery(+) terminal between exhausted and new battery.
- ② Connect the black terminal of the booster cable to the battery (-) terminal between exhausted and new battery.

※ Keep firmly all connection, the spark will be caused when connecting finally.

Connection of booster cable

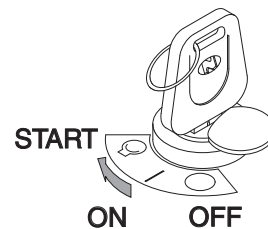


Connection order : ① → ② → ③ → ④

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(2) Starting the engine

- ① Start engine with starting key.
- ② If you can not start it by one time, restart the engine after 2 minutes.



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(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 to charge 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.

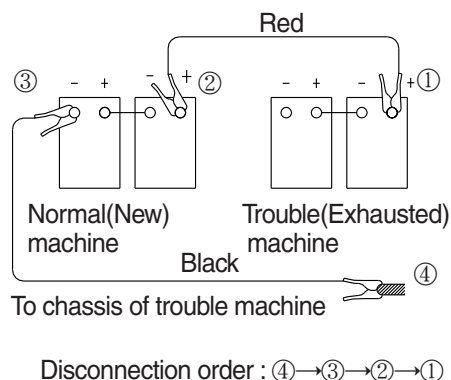
- (1) Shut off the engine and remove the starting switch.
- (2) Disconnect ground cable from battery by master switch.
- (3) Before carrying out any electric welding on the machine, the battery cables should be disconnected and the connectors pulled out of the electronic control units (MCU, TCU, ECU, EHCU, SCU, monitor, cluster etc).
- (4) Connect the earth (ground) lead of the welding equipment as close to the welding points 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.

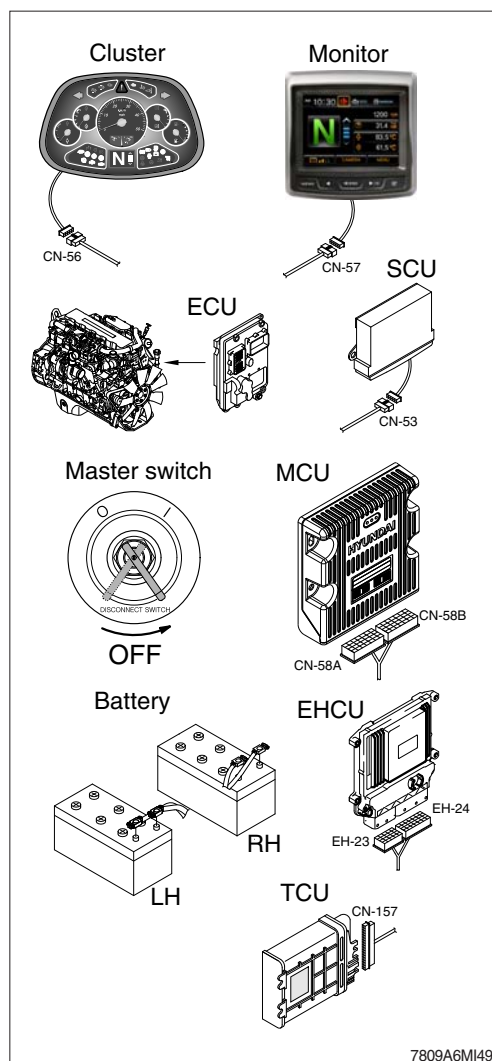
▲ Do not attempt to welding work before carry out the above.

If not, it will caused serious damage at electric system.

Disconnection of booster cable



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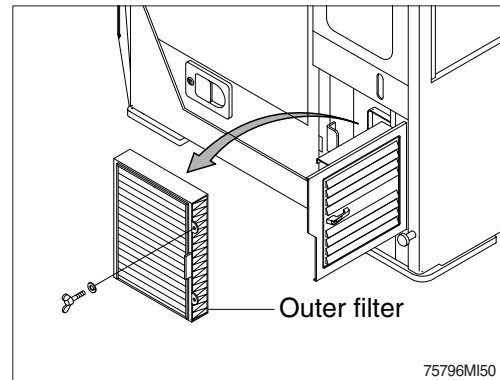
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8. AIR CONDITIONER AND HEATER

1) CLEAN AND REPLACE OF OUTER FILTER

※ Always stop the engine before servicing.

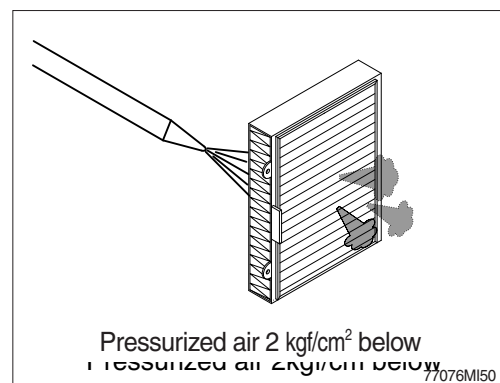
- (1) Open the door, loosen the wing bolt and remove the outer filter.



- (2) Clean the filter using a pressurized air (below 2 kgf/cm², 28 psi).

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

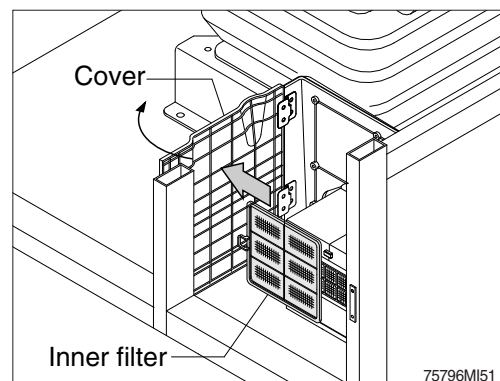
- (3) Inspect the filter after cleaning. If it is damaged or badly contaminated, use a new filter.



2) CLEAN AND REPLACE OF INNER FILTER

※ Always stop the engine before servicing.

- (1) Open the cover.
- (2) Remove the inner filter.

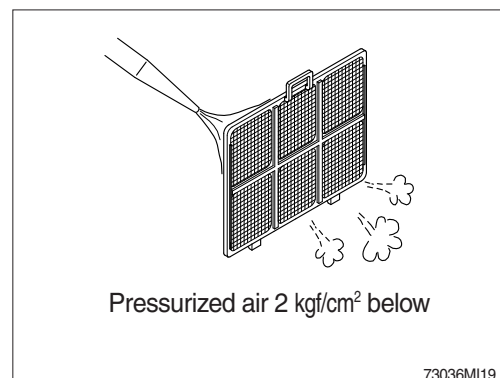


- (3) Clean the inner filter using a pressurized air (below 2 kgf/cm², 28 psi) or washing with water.

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

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

※ Dry off after washing with water.



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
HL780-9A	HFC-134a	0.8 kg (1.76 lb)	1144 CO ₂ eq.

※ 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 fluorinated 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 perform 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.

TROUBLESHOOTING GUIDE

1. ENGINE

※ This guide is not intended to cover every conditions, however many of the more common possibilities are listed.

Trouble	Service	Remark
Engine oil pressure lamp fails to go off immediately after the engine is started.	<ul style="list-style-type: none"> · Add the oil to the specified level. · Replace the oil filter. · Check oil leakage from the tube or the joint. 	
Steam is emitted from the top part of the radiator (The pressure valve). Engine coolant temperature gauge indicates red range.	<ul style="list-style-type: none"> · Supply the cooling water and check leakage. · Adjust fan belt tension. · Wash out inside of cooling system. · Clean or repair the radiator fin. · Check the thermostat. · Check the engine coolant temperature gauge. · Tighten the radiator cap firmly or replace the gasket of it. 	
Engine does not start when the starting motor is turned over.	<ul style="list-style-type: none"> · Add fuel · Repair where air is inhaled into fuel system. · Check the injection pump or the nozzle. · In cold weather, check if fuel warmer system is working normal. · Check the valve clearance. 	Refer to the pages 4-5.
Exhaust gas is white or blue.	<ul style="list-style-type: none"> · Adjust to specified oil quantity. · Replace with specified fuel. 	
Exhaust gas occasionally turns black.	<ul style="list-style-type: none"> · Clean or replace the air cleaner element. · Check the nozzle. · Check engine compression pressure. · Check or replace the turbocharger. 	
Combustion noise occasionally changes to breathing sound.	<ul style="list-style-type: none"> · Check the nozzle. · Check the injection pump. 	
Unusual combustion noise or mechanical noise.	<ul style="list-style-type: none"> · Check with specified fuel. · Check overheating. · Check the muffler. · Adjust valve clearance. 	

2. ELECTRICAL SYSTEM

Trouble	Service	Remark
Voltmeter fluctuates largely even with the engine running at a constant speed. Lamp does not glow brightly even when engine runs at high speed. Lamp flickers while engine runs.	<ul style="list-style-type: none"> · Check for loose terminals open-circuit wiring. · Adjust belt tension. 	
Voltmeter does not fluctuate even with an increase in the engine speed.	<ul style="list-style-type: none"> · Check the alternator. · Inspect and repair wiring. 	
Starting motor does not turn when starting switch is turned on.	<ul style="list-style-type: none"> · Inspect and repair the wiring. · Charge the battery. · Check starting switch. · Check battery relay switch. · Place the gear selector lever in the neutral. 	
Starting motor turns the engine sluggishly.	<ul style="list-style-type: none"> · Charge the battery. · Check the starting motor. 	
Starting motor disengages before the engine starts up.	<ul style="list-style-type: none"> · Check and repair the wiring. · Charge the battery. 	
Engine oil pressure lamp does not light up when engine is stationary (When the starting switch is in ON position).	<ul style="list-style-type: none"> · Check the lamp. · Check the oil pressure switch. 	
Charge lamp does not light up when the engine is stationary. (When the starting switch is in ON position.)	<ul style="list-style-type: none"> · Check the lamp. · Check and repair the wiring. 	

3. POWER TRAIN SYSTEM

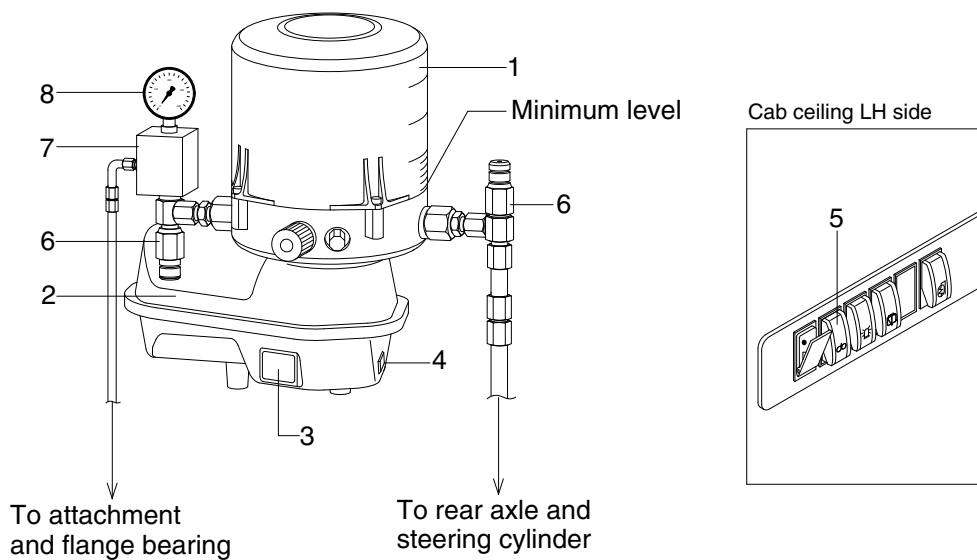
Trouble	Service	Remark
Engine is running but machine will not move.	<ul style="list-style-type: none"> · Release parking brake. · Put gear selector lever in position properly. · Add oil to transmission case to the specified level. 	
Even at full throttle, machine moves slowly and lacks power.	<ul style="list-style-type: none"> · Add oil to transmission case to the specified level. · Disassemble transmission strainer and clean. 	
Transmission oil overheats.	<ul style="list-style-type: none"> · Add oil to transmission case to the specified level or drain oil. · Use a suitable gear speed. · Reduce time using torque converter at stall speed. Check engine. 	
Abnormal noise is produced.	<ul style="list-style-type: none"> · Add oil to transmission case to the specified level. · Add oil to axle case to the specified level. 	
Brake does not work when pedal is depressed.	<ul style="list-style-type: none"> · Raise hydraulic oil pressure to specified level. · Add brake oil. · Bleed hydraulic oil from brake system. 	
Brake drags or stay when applied.	<ul style="list-style-type: none"> · Clean breather and bleed air from brake system. 	
Brake slips.	<ul style="list-style-type: none"> · Raise hydraulic oil pressure to the specified level. 	
Brake does not work properly.	<ul style="list-style-type: none"> · Adjust linkage. · Clean brake pad. · Replace spring in hydraulic oil cylinder. · Adjust or replace brake pad. 	
Steering wheel is heavy.	<ul style="list-style-type: none"> · Repair or replace the pump. · Repair, clean and reset the relief valve. · Coat a grease to connections and bearings of steering gear. · Check the mounting of the steering column. 	
Steering wheel turning by itself.	<ul style="list-style-type: none"> · Replace leaf springs. 	
Slow steering.	<ul style="list-style-type: none"> · Clean spool and sleeve. · Replace leaf springs. 	
Impossible to turn the steering wheel into neutral position.	<ul style="list-style-type: none"> · Check the monitor. · Check and repair the wiring. 	

4. HYDRAULIC SYSTEM

Trouble	Service	Remark
Bucket lacks lifting power. Bucket lifting speed is slow.	<ul style="list-style-type: none">· Check the hydraulic oil level and add if necessary.· Replace filter in hydraulic tank.	
Bubbles in oil.	<ul style="list-style-type: none">· Replace with specified oil.· Add oil if needed.	
Oil pressure is too low.	<ul style="list-style-type: none">· Bleed air from oil line.· Add oil and bleed air.	
Cylinder vibrates when operating.	<ul style="list-style-type: none">· Add oil.	

1. CENTRAL GREASE LUBRICATION SYSTEM

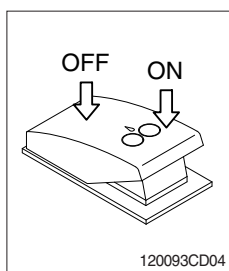
1) MAJOR COMPONENT



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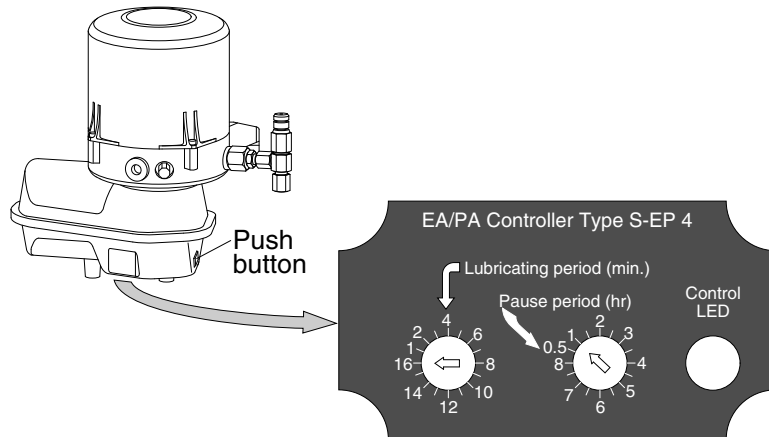
- | | |
|----------------|-------------------------------------|
| 1 Grease tank | 5 Central grease lubrication switch |
| 2 Grease pump | 6 Pump element |
| 3 Control unit | 7 Relief valve |
| 4 Push button | 8 Pressure indicator |

(1) Central grease lubrication switch



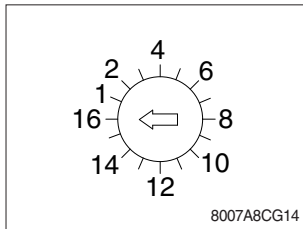
- (1) This switch is used to operate the central grease lubrication system.
- (2) When this switch turned ON, the central grease lubrication system is operated for 16 minutes once.
- (3) Please turn the switch OFF.

2) ELECTRONIC CONTROL UNIT



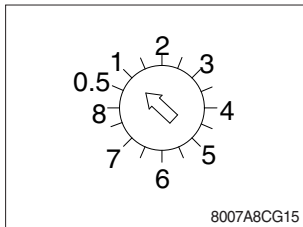
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(1) Lubricating period setting dial



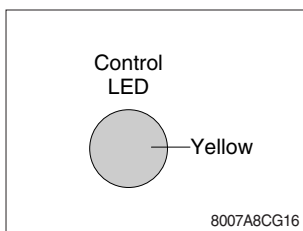
- ① This dial use to set the greasing period from 1 to 16 minutes.
- ② Default period is 16 minutes.
- ※ Use a minus(-) screw driver to change settings.

(2) Pause period setting dial



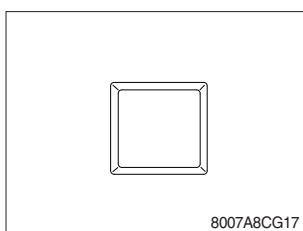
- ① This dial is use to set the pause period from 0.5 to 8 hours.
- ② Default period is one hour.

(3) Control LED



- ① This LED indicates operating status of the central grease lubrication system.
- ② Turn the starting switch ON, the LED will light up for 1.5 seconds.
- ③ During the central grease lubrication system is operated, it will blink at 0.5 second intervals.
- ④ When the lubrication system is failed, the LED is light up continuously.

3) PUSH BUTTON



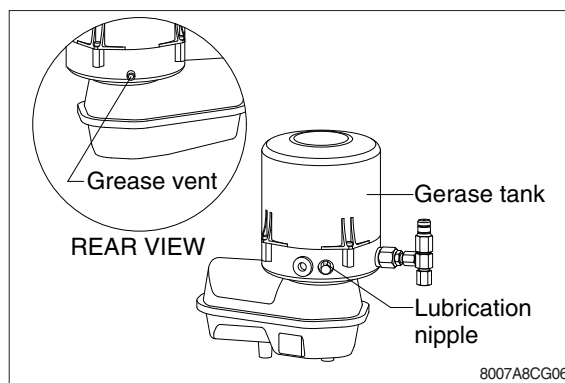
- ① This button use to operate the central grease lubrication system.
- ② Pushing the button, the central grease lubrication system is operated for 16 minutes once.

4) FILLING THE GREASE TANK

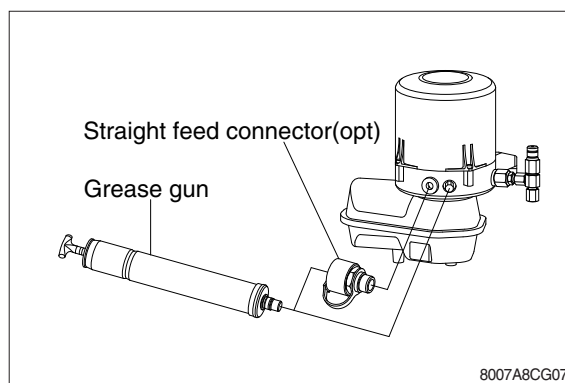
(1) Standard filling via lubrication nipple with manual or pneumatic grease gun.

※ **Lubricate the grease until it flows out to the grease vent.**

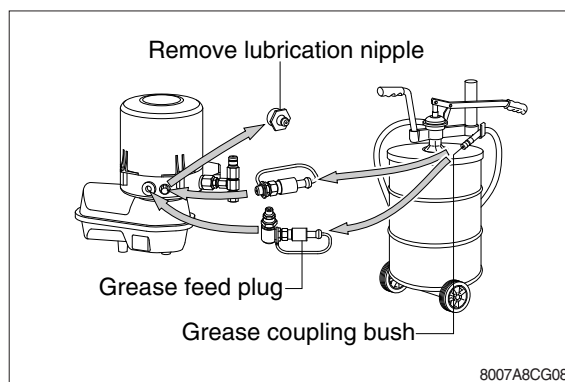
· Capacity : 4 kg (8.8 lb)



(2) Manual hand grease gun.



(3) Pneumatic grease pump (option).



5) REPAIR INSTRUCTIONS

(1) Case of system blockage

- ① A creased or clogged lubricant pipe
- ② Grease points overfilled or clogged by lubricant
- ③ Lubricant not suitable for central lubrication system
- ④ Distributor outlet closed
- ⑤ Blocked distributor

(2) Message signalling a blockage

The system pressure is exceeded (265 kgf/cm^2), a blockage may exist in the system and will be signalled by one of the followings.

- ① The pressure indicator at grease pump.
- ② The pressure indicator at secondary distributor.

(3) Repair of a distributor when blocked :

- ① Remove the main distributor from the system, noting the sequence of removal.
- ② Remove the plugscrews from the piston holes and move the pistons to and fro (don't expel them); re-insert the plug-screws.
- ③ If the main distributor is not blocked, do the secondary distributor as above mentioned.
- ④ Push the piston of the blocked distributor outside and check the drilling and the piston surface for scratches and deficiencies.
- ⑤ Renew the distributor affected by serious deficiencies.

※ **Pistons are not interchangeable for main and secondary distributor.**

※ **Deposits of hardened grease detected at pistons and drillings of distributor must be eliminated by washing and blowing. The drillings in distributor must be free of residues of grease. This should be checked by use of some thin wire.**

※ **Hardening of grease indicates that the lubricant being used is not suitable for the central grease lubrication system. Ask for advice by the supplier of the lubricant. After having checked both distributor, re-assemble the distributor complying with the sequence noted down previously. In order to preclude jamming of pistons, tighten the plug-screws to the specified tightening torque.**

· Tightening torque : $1.2 \text{ kgf}\cdot\text{m}$ ($8.7 \text{ lbf}\cdot\text{ft}$)

- ① Check the distributor for correct operation, using oil or grease.
- ② Install the distributor in the system.
- ③ Start the machine and check it for correct operating pressure (150 kgf/cm^2).

※ **The repair work has to be done under maximum cleanliness.**

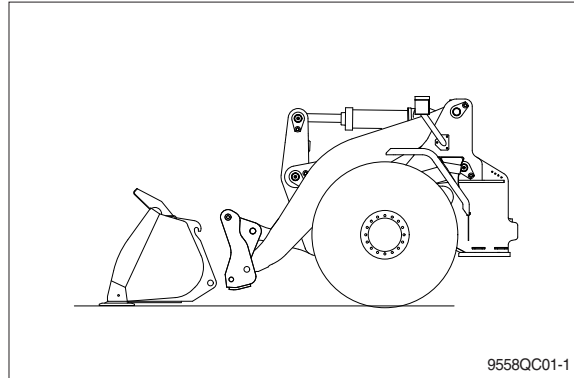
6) TROUBLESHOOTING

Category	Applications	Service
Pump does not work	Defective electronic control unit Electric cable is broken Pump is defective	Replace the control unit Renew the electric cable Replace the pump
Pump is working, but does not supply of lubrication	Air in the feed piston filling Grease level dropped below minimum level Defective pump element	Bleed the pump Refill the grease tank Replace the pump element
No grease at all points of lubrication	Pump does not work. Inoperative time is too long or period of lubrication is too short. System is blocked.	Refer to "Pump does not work". Reduce the inoperative time or increase the period of lubrication. Refer to "Excessive pressure (above 265 kgf/cm ²) of the pressure indicator".
No grease at some points of lubrication	Some pipes are burst or leakage Leakage at screwed unions	Renew the pipes Retighten or renew the screwed union
No grease at one point of lubrication	The lubrication pipe is burst or leakage Leakage at screwed unions	Renew the pipe Retighten or renew the screwed union
Reduced pump speed	High pressure in the system Low ambient temperature	Check the system / bearing points Not a defective (1 or 2 intermediate lubrication cycles may be useful)
Excessive pressure (above 265 kgf/cm ²) of the pressure indicator	Excessive pressure in the system Progressive distributor is blocked System is blocked Defective valve spring	Check the system Replace the distributor Repair clogged / seized greasing points Replace the pressure relief valve
Signal of the LED	The LED of control unit is light up continuously	Check electrical system and control unit

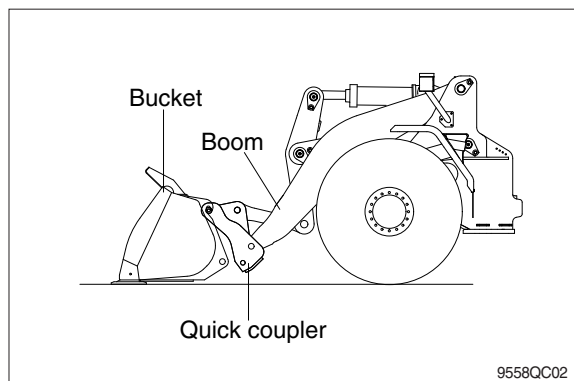
2. QUICK COUPLER

1) FIXING BUCKET WITH QUICK COUPLER

- (1) Release the lock pins by pressing the attachment unlock switch.



- (2) Tilt quick coupler forward and align the upper attaching points of the quick coupler with upper attaching points on the bucket. Raise the boom until the bucket rests in the quick coupler and tilt the quick coupler rearward until the bucket is level.

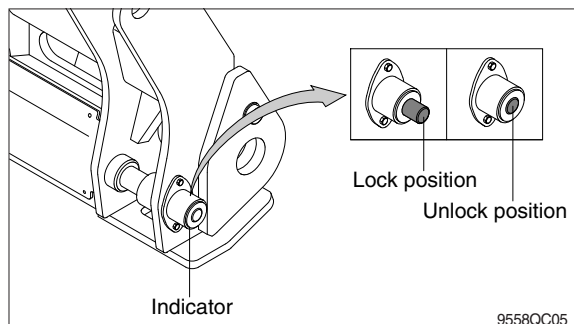
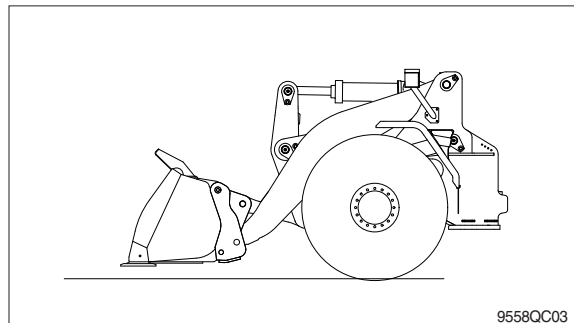


- (3) Lock the bucket with the attachment lock switch. The quick coupler pins move in the engaged position and buzzer sounds.

※ **Check for engagement as followings.**

- a. Put down pressure on the attachment.
- b. Back up the machine and make sure that there is no movement between the quick coupler and attachment.

※ **Check that the indicator is lock position.**



- ▲ Always check that the attachment is properly secured to the quick coupler by pressing the front part of the attachment against the ground.
- ▲ Never use an attachment before you have checked its mounting.
- ※ If you are uncertain if the attachment is securely locked, you must visually check that the lock pins of the quick coupler are in the lock position.

2) REMOVE BUCKET FROM QUICK COUPLER

- (1) The attachment should be in a level position on the ground.
- (2) Release the lock pins by pressing the switch.
- (3) Lower the boom so that it disengage from the attachment.
- (4) Reverse away from the attachment.

3) PRECAUTION OF USING QUICK COUPLER

- ▲ When operating the machine with quick coupler, confirm that the attachment lock switch is lock position.**

Operating the machine with attachment lock switch unlock position can cause the bucket to drop off and bring about the accident.

- ▲ Serious injury or death can result from this accident.**

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