CONTENTS

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.

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

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

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

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

BEFORE SERVICING THIS MACHINE

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

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

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

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

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

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

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

All personnel must remain alert to potential hazards.

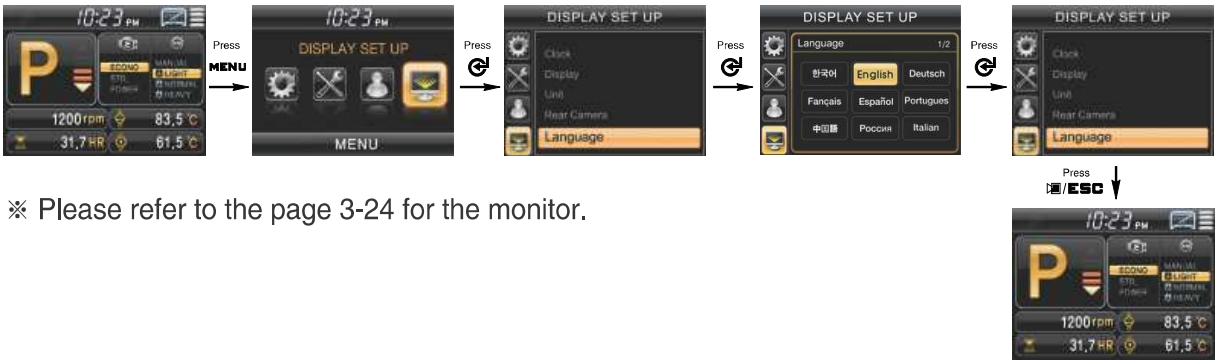
Work within your level of training and skill.

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

Use your common sense.

※ How to adjust the language of monitor

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



※ Please refer to the page 3-24 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 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 : HYUNDAI CONSTRUCTION EQUIPMENT EUROPE N.V.
   Owner of the technical file for machine production : VOSSENDAAL 11, 2440 GEEL BELGIUM

3. Harmonized European directives : 2006/42/EC (Machinery), 97/68/EC (Exhaust Gas Emission), 2004/108/EC (Electromagnetic Compatibility), 200/14/EC (Noise Emission)

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) : *******

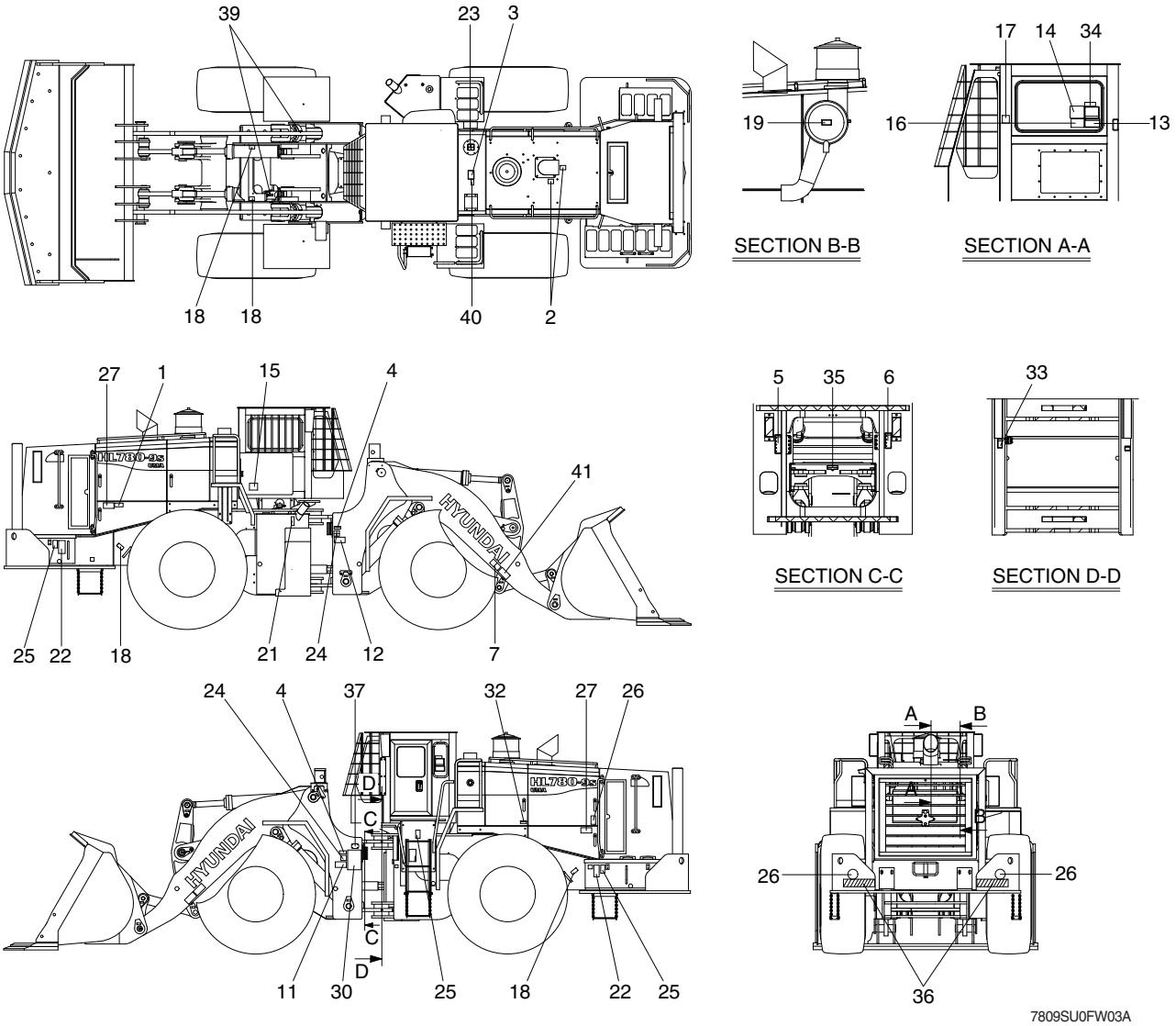
7. Remarks

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

SAFETY LABELS

1. LOCATION

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



1	Start motor	15	Air conditioner filter	27	Engine door shearing
2	Turbocharger cover	16	Specification sheet	30	Service instruction
3	Hyd oil level	17	Hammer	32	Turbocharger
4	Ride control (option)	18	Lift & tie	33	Grease (C)
5	Grease (A)	19	Air cleaner	34	Water separator
6	Grease (B)	21	Fueling	35	Grease-center
7	Bucket stopper	22	Battery accident	36	Keep clear/Reflect
11	Steering warning-LH	23	Hyd oil lub	37	Name plate
12	Steering warning-RH	24	High pressure hose	39	Accumulator
13	Engine start caution	25	Falling	40	Fuel shut off
14	Control ideogram	26	Reflector	41	Quick coupler

2. DESCRIPTION

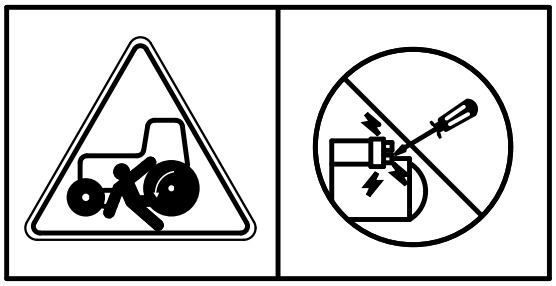
There are several specific warning labels on this machine please become familiarized with all warning labels.

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.

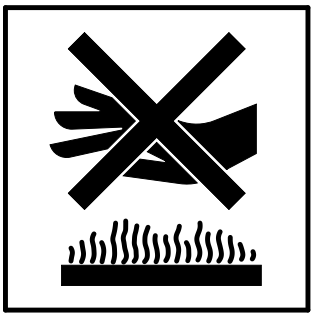


77070FW05

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

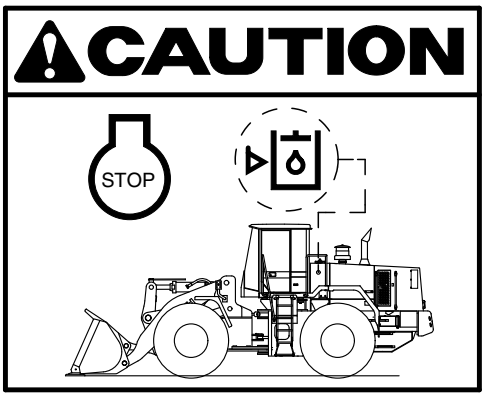
3) HYDRAULIC OIL LEVEL (item 3)

This warning label is positioned on the top of the 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.



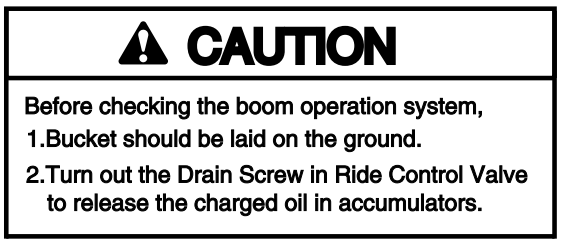
77070FW06

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.

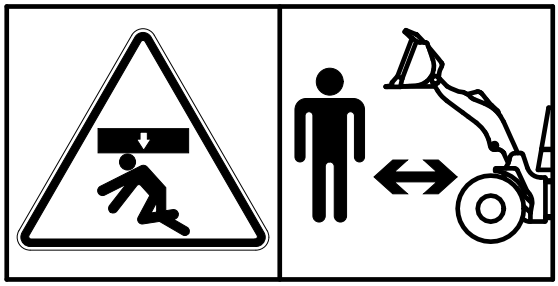


7707A0FW06

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.**



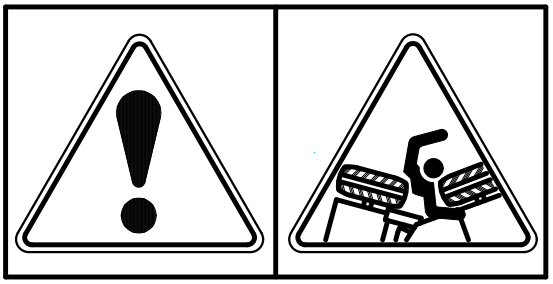
7803AFW05

6) **STEERING WARNING** (item 11, 12)

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

⚠ **No clearance for person in this area when machine turns.**

⚠ **Severe injury or death from crushing could occur.**

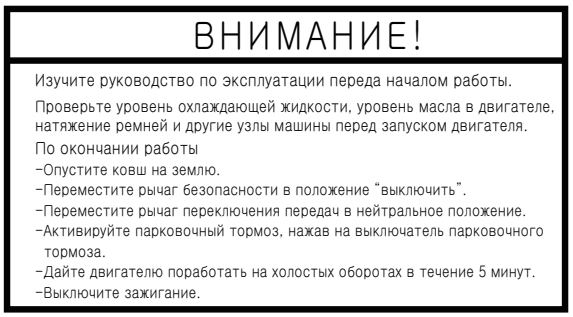


77070FW07

7) **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.**



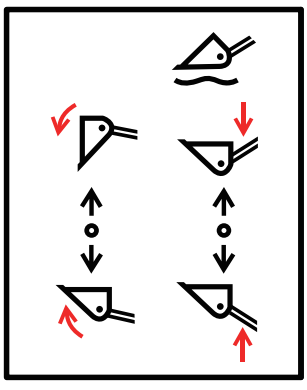
7809SUM0FW08

8) **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.**

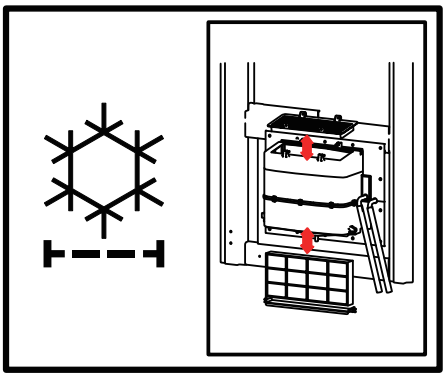


77070FW09

9) **AIR CONDITIONER FILTER** (item 15)

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

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



760F0FW10

10) **LIFT & TIE** (item 18)

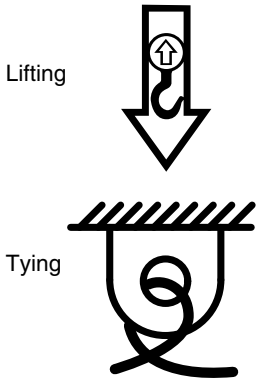
This label is positioned on the both side of the front and rear frame.

- **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.

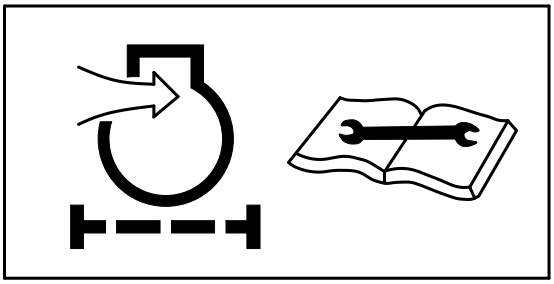


75790FW04

11) **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.**

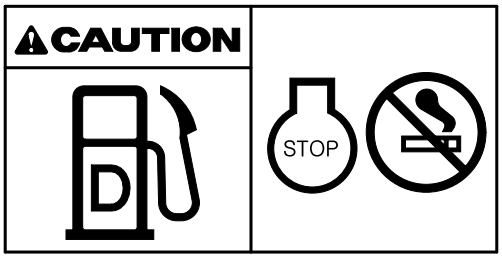


21070FW01

12) **FUELING** (item 21)

This warning label is positioned on the fuel tank.

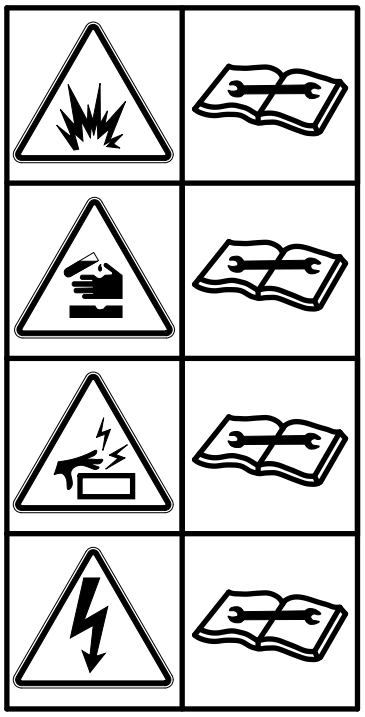
⚠ **Stop the engine when refueling. All lights or flames shall be kept at a safe distance while refueling.**



21070FW04

13) **BATTERY ACCIDENT** (item 22)

This warning label is positioned on the battery box.



7579A0FW30

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

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

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

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

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

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

14) **HYDRAULIC OIL LUB** (item 23)

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

14070FW08

※ 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.

15) **HIGH PRESSURE HOSE** (item 24)

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

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

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

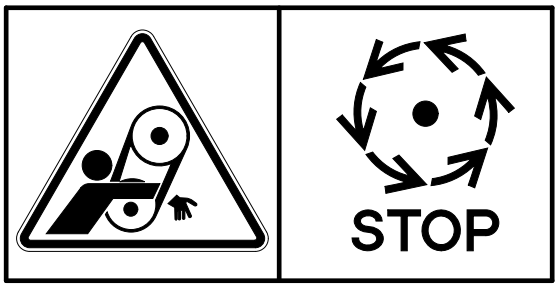
※ **See the maintenance section for details.**

14070FW29

16) **ENGINE DOOR SHEARING** (item 27)

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

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

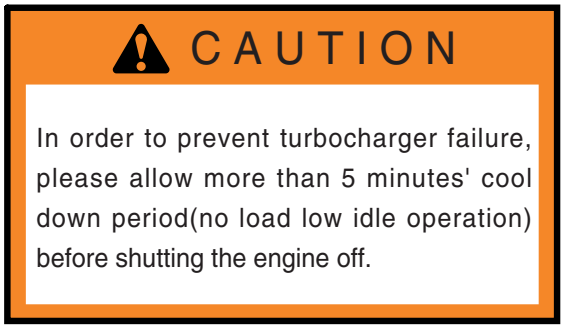


21070FW15

17) **TURBOCHARGER** (item 32)

This warning label is positioned on the left side cover.

⚠ **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.**

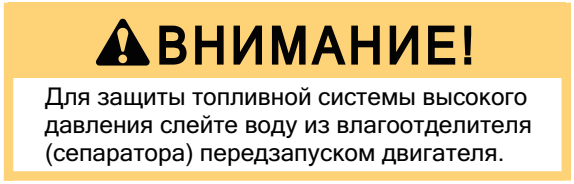


7807AFW20

18) **WATER SEPARATOR** (item 34)

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.**



7809SUM0FW06

19) **ACCUMULATOR** (item 39)

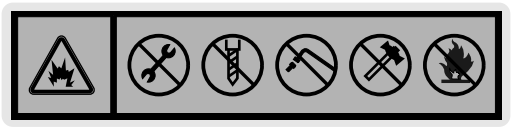
This warning label is positioned on the accumulator of the solenoid valve.

※ **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.**



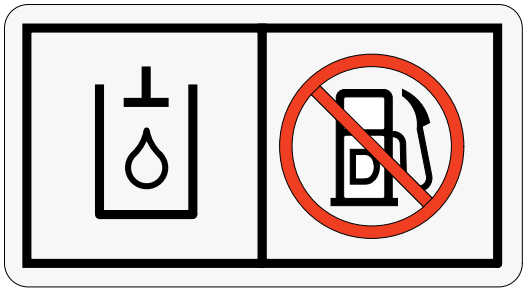
1107A0FW46

20) **FUEL SHUT OFF** (item 40)

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

※ **Fill only the hydraulic oil.**

※ **Do not fill the diesel fuel.**



140WH90FW51

21) **QUICK COUPLER** (item 41)

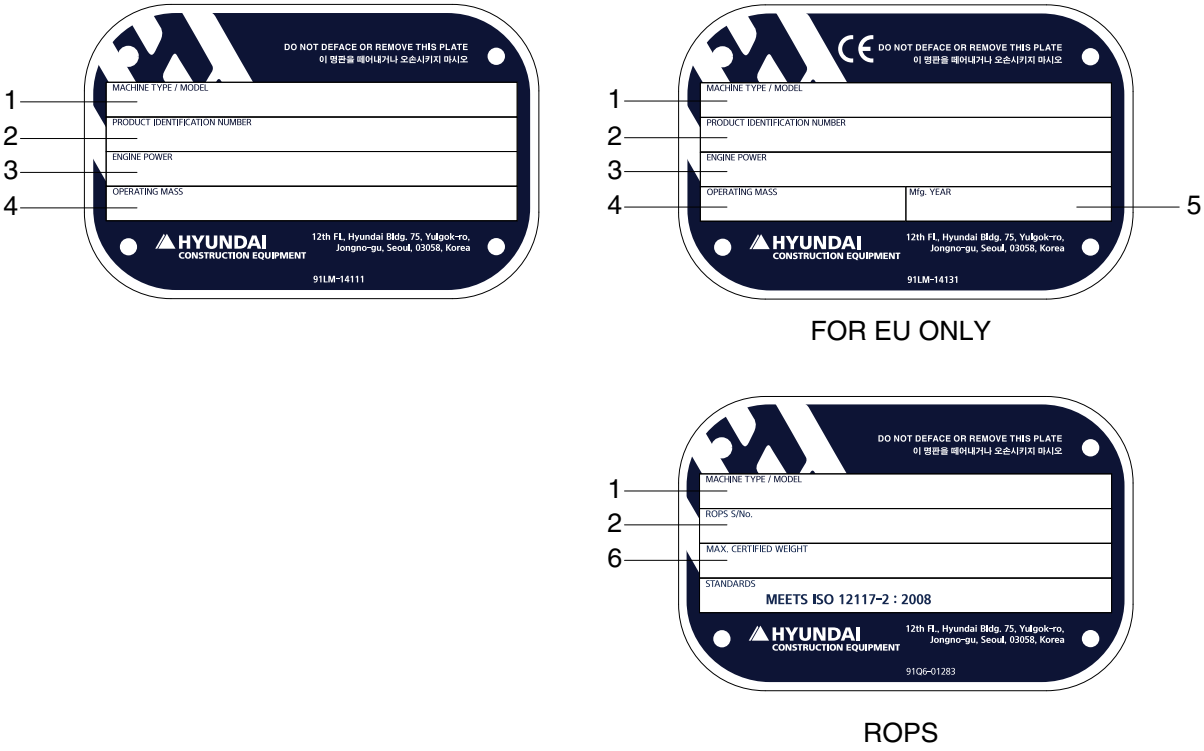
This warning label is positioned on the middle of the boom.

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

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

757TM9A0FW30

MACHINE DATA PLATE



76090FW06A

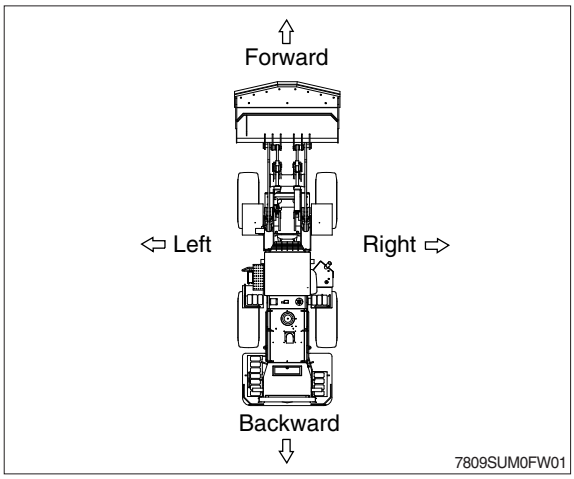
1	Machine type / model	2	Product identification number	3	Engine power
4	Operating mass	5	Manufacturing year	6	Maximum certified weight

※ The product identification 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 product identification 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.

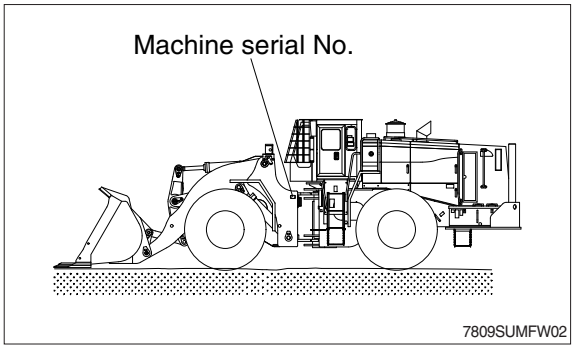


2. SERIAL NUMBER

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

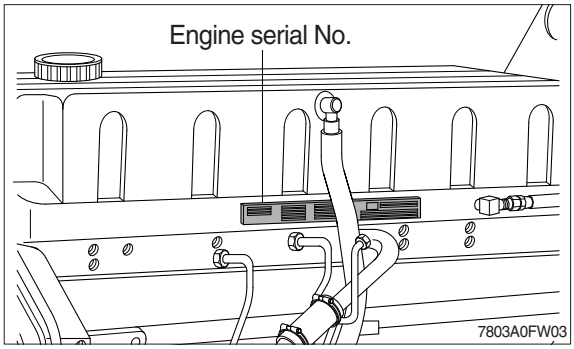
1) MACHINE SERIAL NUMBER

The numbers are located on the left side of the front 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

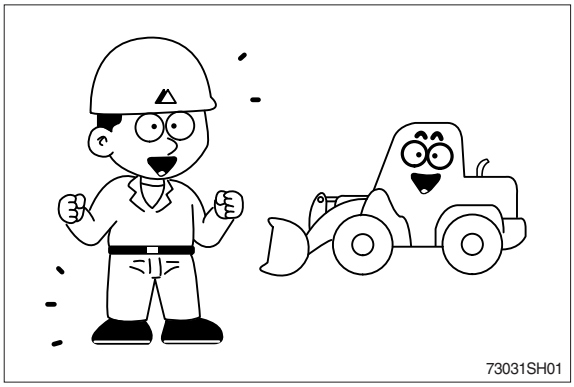
⚠ Important safety hint.

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

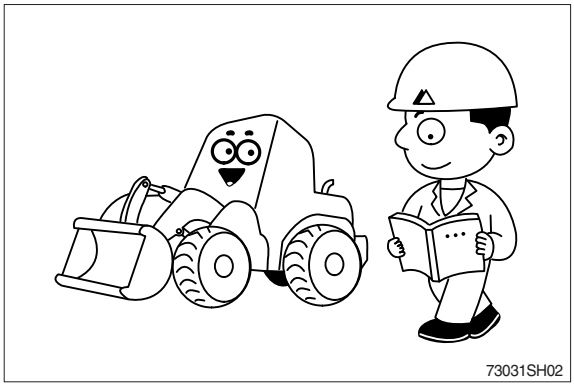
※ It indicates the useful information for operator.

1. BEFORE OPERATING THE MACHINE

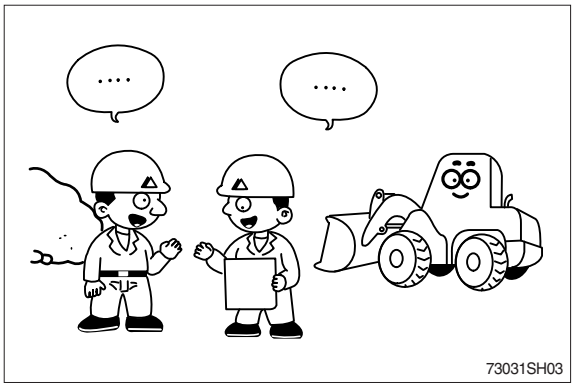
Think-safety first.
In special situation, wear protective clothing including a safety helmet, safety shoes, gloves, safety glasses and ear protection as required by the job condition.
Almost every accident are caused by disregarding the simple and fundamental safety hints.


73031SH01

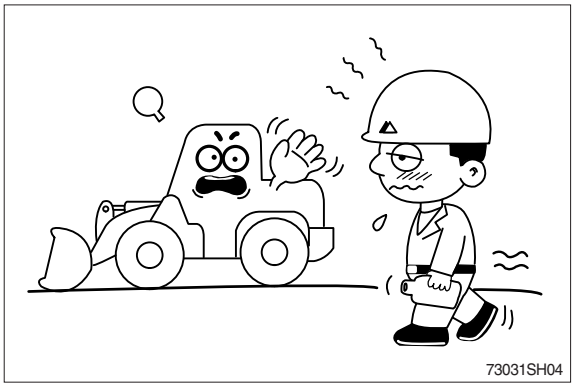
Be sure to understand thoroughly the operator's manual before operating the machine.


73031SH02

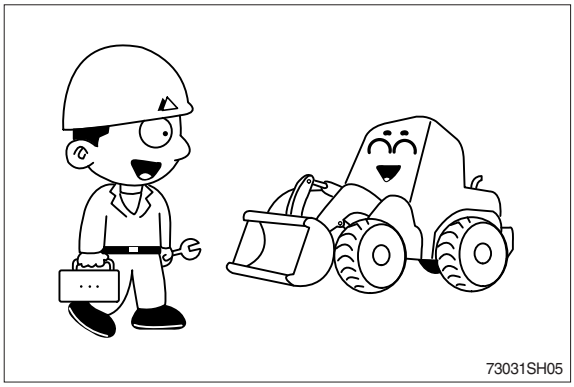
Fully understand the details and process of the construction before starting the work.
If you find anything dangerous on the job, consult with the job supervisor for preventive measures before operating the machine.


73031SH03

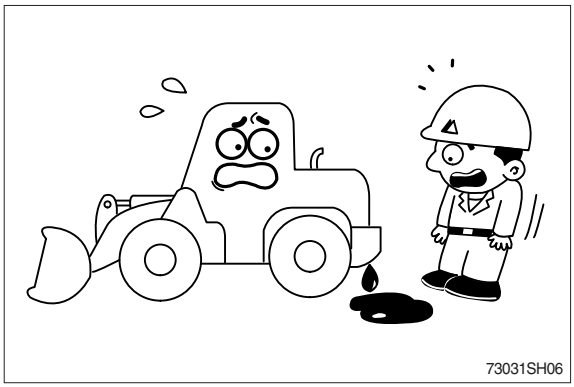
Do not operate when tired, or after drinking.
Alcoholic beverages, or any type of drugs.


73031SH04

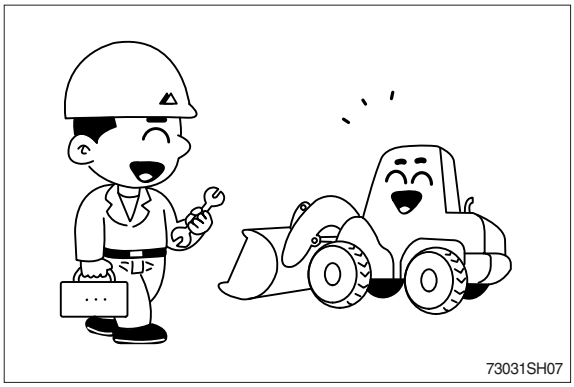
Check daily according to the operator's manual. Repair the damaged parts and tighten the loosened bolts.



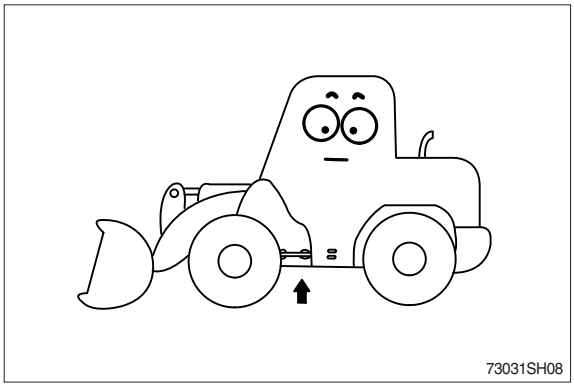
Check for leakage of engine oil, hydraulic oil, fuel and coolant.



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 authorize 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

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

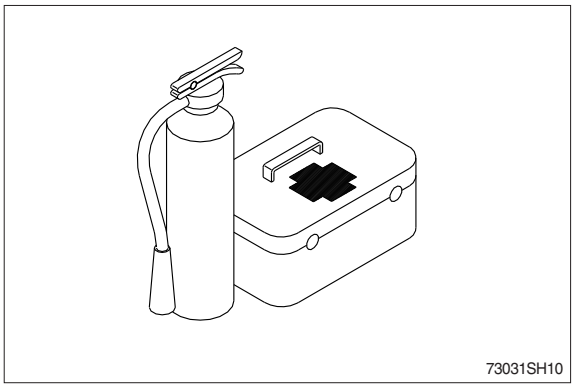
FIRE EXTINGUISHER AND FIRST AID KIT

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.



UNAUTHORIZED MODIFICATION

Any modification made without authorization from Hyundai can create hazards.

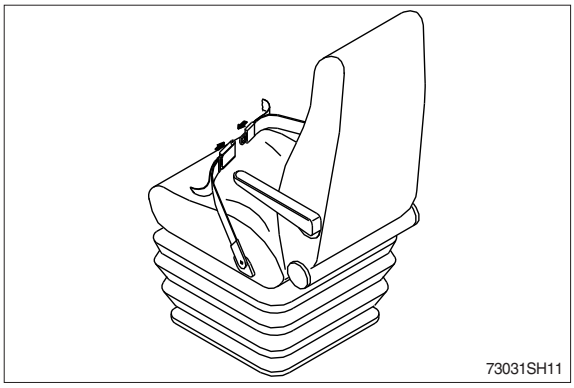
Before making a modification, consult your Hyundai distributor. Hyundai will not be responsible for any injury or damage caused by any unauthorized modification.

SEAT BELT

Check the condition of the seat belt and mounting hardware before operating the machine. If the seat belt mounting hardware is worn or damage, replace the seat belt mounting hardware. Make sure that the mounting bolts are tight.

Replace the seat belt at least once every three years regardless of appearance.

Always use seat belts when operating your machine.



FIRE PREVENTION AND EXPLOSION PREVENTION

Regeneration

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

General

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

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

Always perform a Walk-Around Inspection, which may help you identify a fire hazard.
Do not operate a machine when a fire hazard exists. Contact your dealer for service.

3001SH01

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

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

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

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

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

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

Do not operate the machine near any flame.

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

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

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

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

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

3001SH02

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

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

3001SH03

Battery and battery cables

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

3001SH04

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

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

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

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

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

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

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

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

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

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

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

Wiring

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

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

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

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

Consult your Hyundai dealer for repair or for replacement parts.

Keep wiring and electrical connections free of debris.

Lines, Tubes, and Hoses

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

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

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

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

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

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

Ether

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

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

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

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

Fire Extinguisher

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

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

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

Fire Safety

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

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

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

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

Notify emergency personnel of the fire and your location.

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

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

Use the on-board fire extinguisher and use the following procedure :
1. Pull the pin.
2. Aim the extinguisher or nozzle at the base of the fire.
3. Squeeze the handle and release the extinguishing agent.
4. Sweep the extinguisher from side to side across the base of the fire until the fire is out.

Remember, if you are unable to do anything else, shut off the machine before exiting. By shutting off the machine, fuels will not continue to be pumped into the fire.
If the fire grows out of control, be aware of the following risks :
- Tires on wheeled machines pose a risk of explosion as tires burn. Hot shrapnel and debris can be thrown great distances in an explosion.
- Tanks, accumulators, hoses, and fittings can rupture in a fire, spraying fuels and shrapnel over a large area.

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

Fire extinguisher Location

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

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

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

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

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

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

Vibration Data for Earth-moving Machines

Information Concerning Hand/Arm Vibration Level

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

Information Concerning Whole Body Vibration Level

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

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

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

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

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

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

※ **All vibration levels are in meter per second squared.**

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

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

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

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

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

Guidelines for Reducing Vibration Levels on Earthmoving Equipment

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

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

Sources

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

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

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.

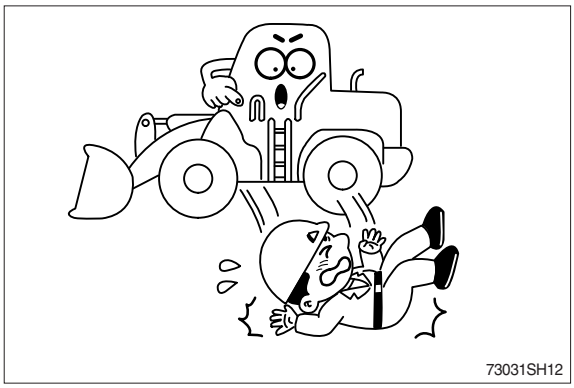
The person who performs unauthorized modifications assumes all responsibility for consequences that arise due to the modification or can be attributed to the modification, including damage to the machine.

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.

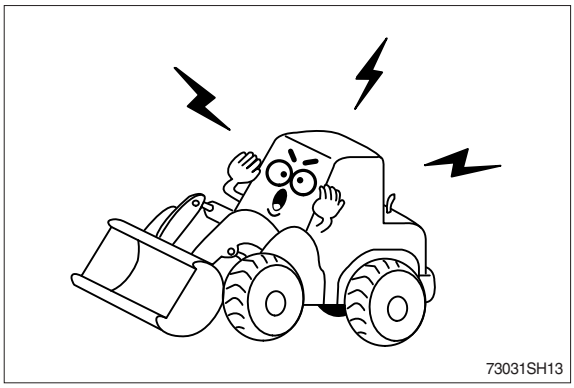


Sound the horn to warn nearby personnel before operating the machine.

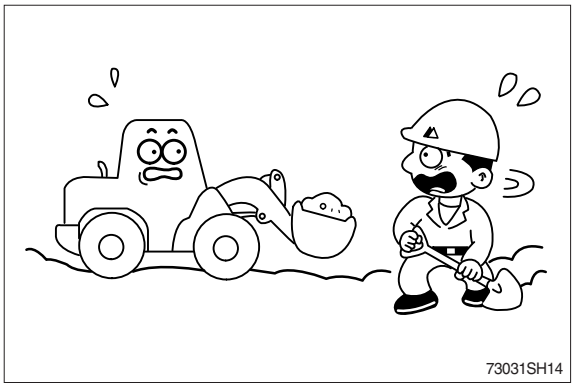
KEEP RIDERS OFF MACHINE

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

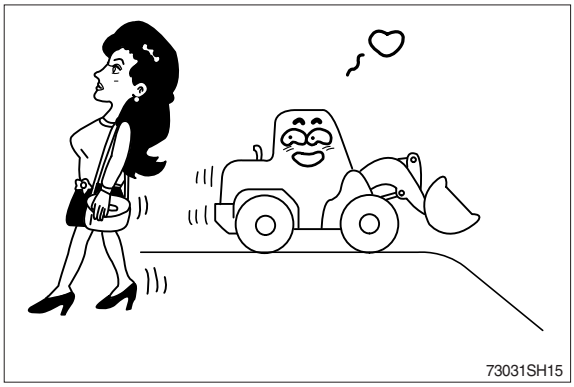
Only allow the operator on the machine. Keep riders off.



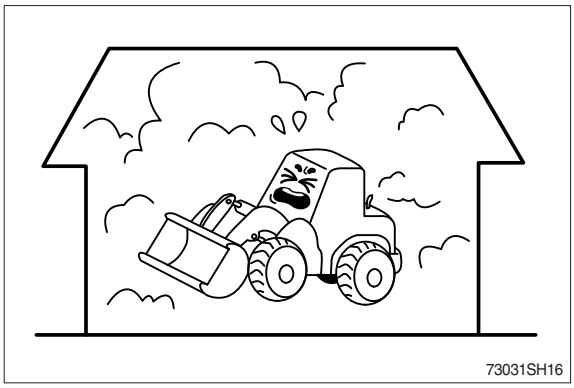
Operate carefully to make sure all personnel or obstacles are clear within the working range of the machine.
Place safety guards if necessary.



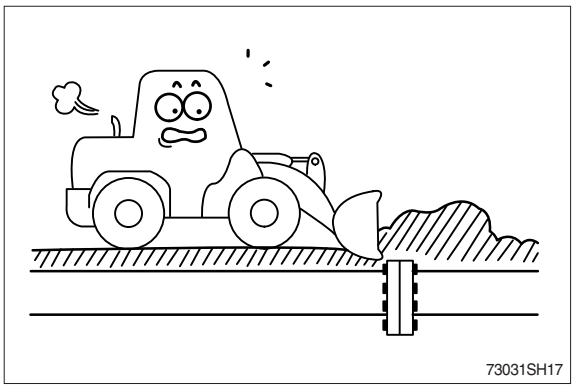
When using the work equipment, pay attention to jobsite.



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

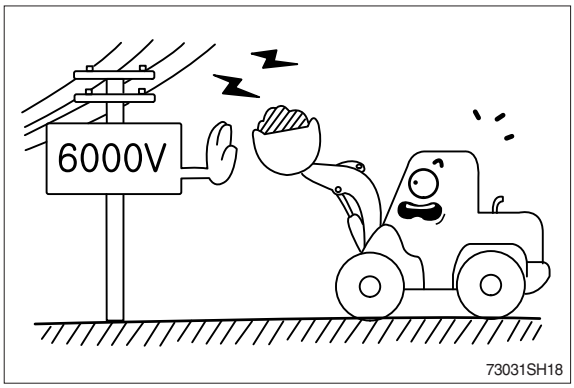


Check the locations of underground gas pipes or water line and secure the safety before operation.

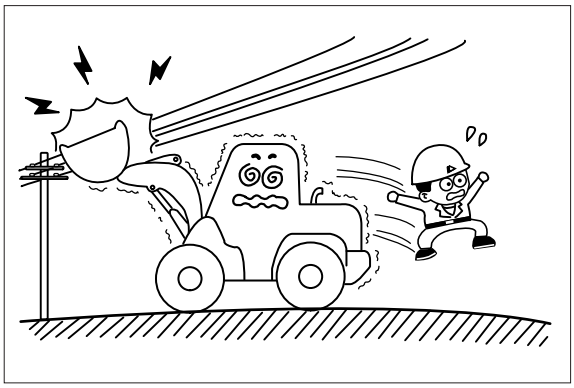


The operating near the electrical lines is very dangerous. Operate within safe working range permitted as below.

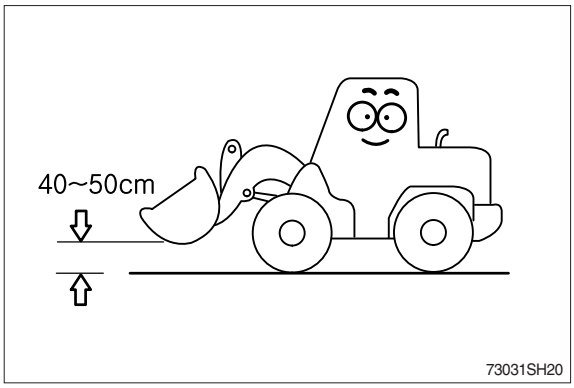
Supply voltage	Min safe separation
6.6 kV	3 m (10 ft)
33.0 kV	4 m (13 ft)
66.0 kV	5 m (16 ft)
154.0 kV	8 m (26 ft)
275.0 kV	10 m (33 ft)



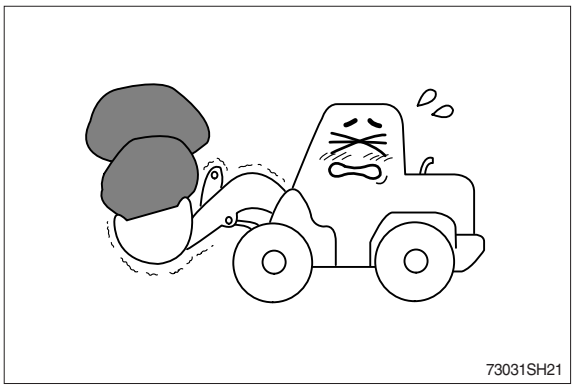
If the machine touches the electric power lines, keep sitting on the operator's seat and make sure the personnel on the ground not to touch the machine until turning off the electric current. Jump off the machine, do not contact the machine when you need to get off.



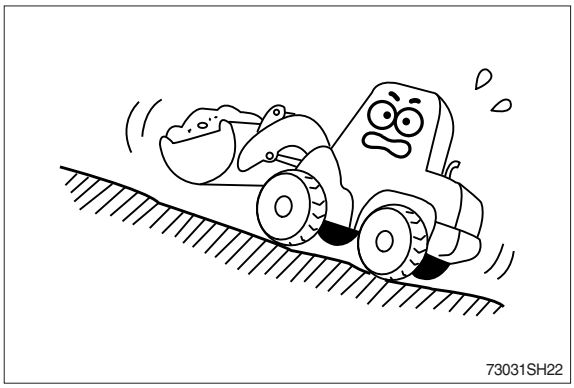
While traveling on public roads, lift the bucket 40~50 ㎝ above the ground. Do not drive with the bucket loaded.



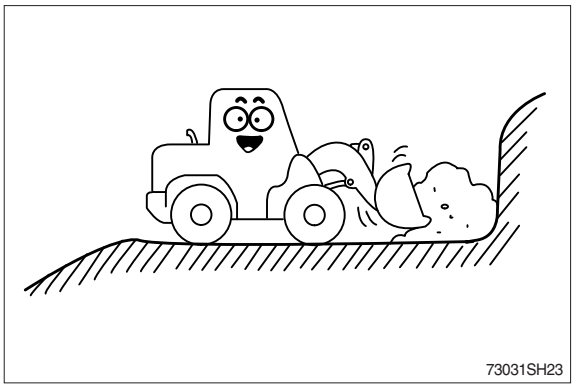
When the bucket is loaded, avoid sudden swinging or starting. Overloading is dangerous. Make sure the load does not exceed the permissible level.



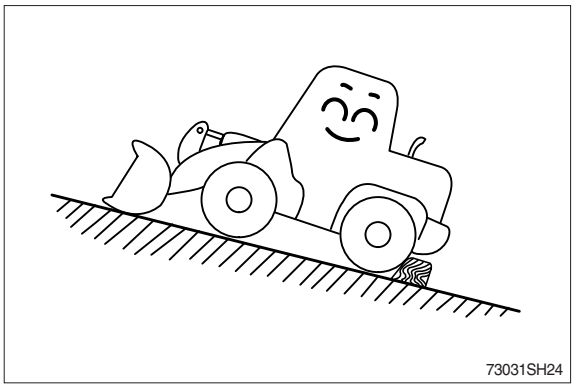
The operation on a slope is dangerous.
Avoid operating the machine on a slope of over 10 degree.



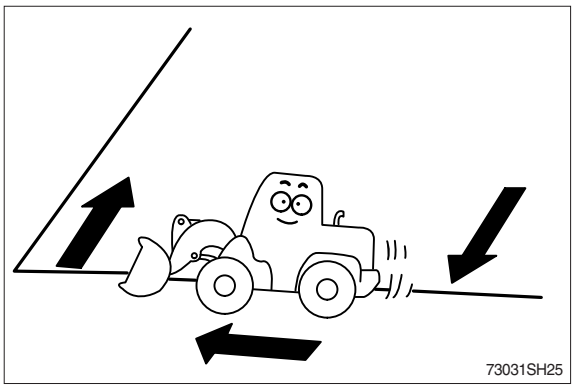
Operate the machine after making ground flat when operation is required on a slope.



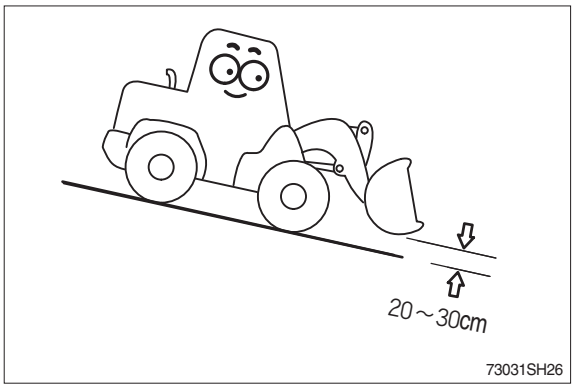
Avoid parking and stopping on a slope.
Lower the bucket to the ground and block the tire when parking.



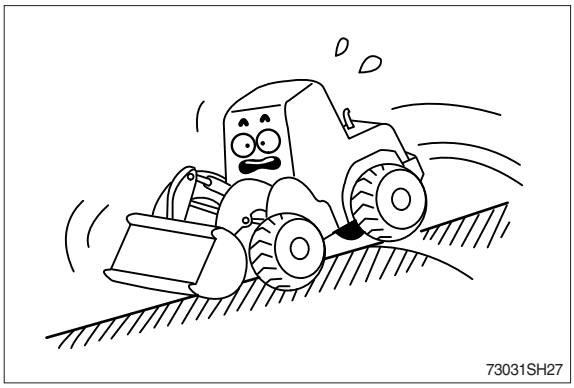
Avoid traveling in a cross direction on a slope as it can cause the danger of rolling over and sliding.



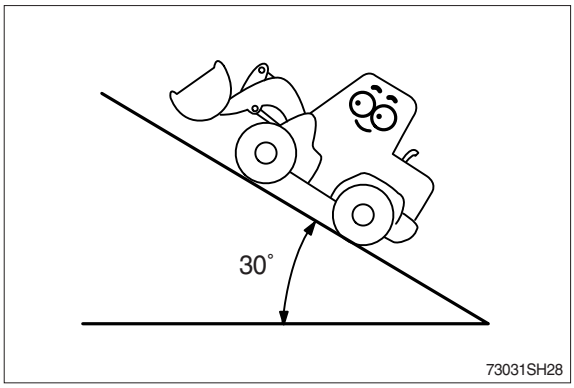
Traveling on the slope is dangerous.
Be sure to operate slowly when driving down a slope and maintain the bucket at a height of 20~30 ㎝ (1 ㎝) above the ground so that it can be used as brake in an emergency.



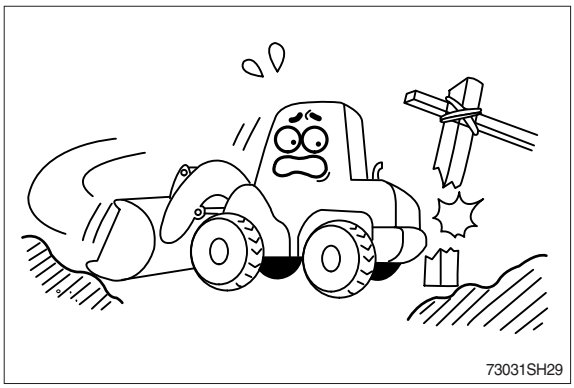
Steering of the machine while traveling on a slope is dangerous.
When an inevitable turning of direction is required, turn on the flat and solid ground.



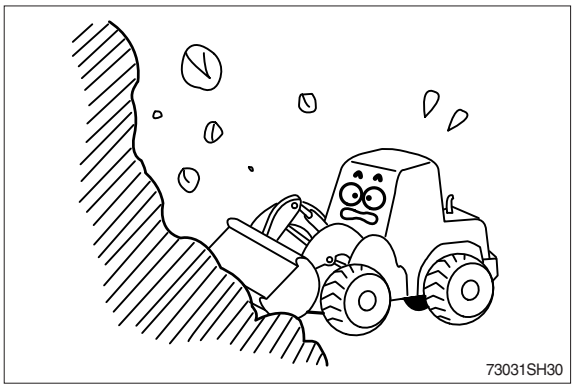
The engine angularity limits are 30˚.
Do not operate by more than the engine limits in any case.



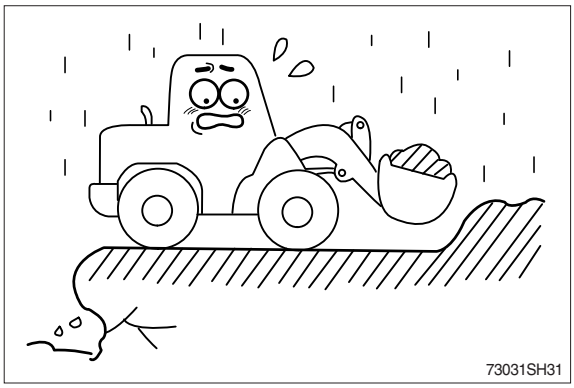
Watch out for obstacles. Be particularly careful to check the machine clearance during steering.



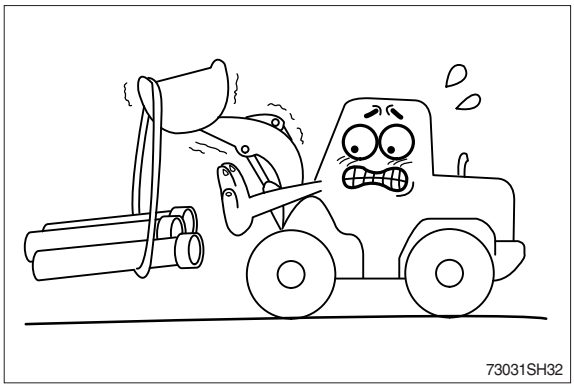
Always operate machine with proper ROPS/ FOPS installed. (option)
Do not attempt to repair a rollover protective structure (ROPS) after an accident.
Repaired structures do not provide the original structure and protection.
Test and approved as a protective CAB according to ROPS and FOPS standard.
Meets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



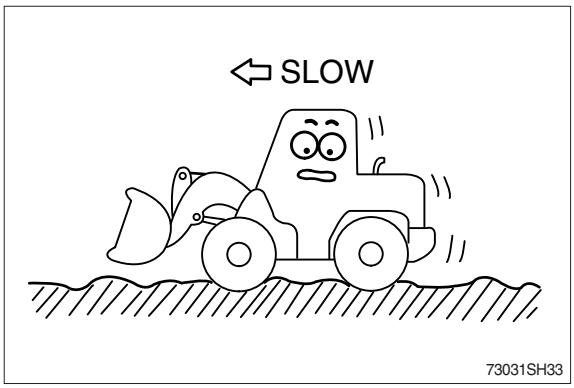
Avoid operating on a cliff, or soft ground as there is danger of rolling over.
Take necessary precautions when working after rain, or blasting because the ground may not be firm enough.



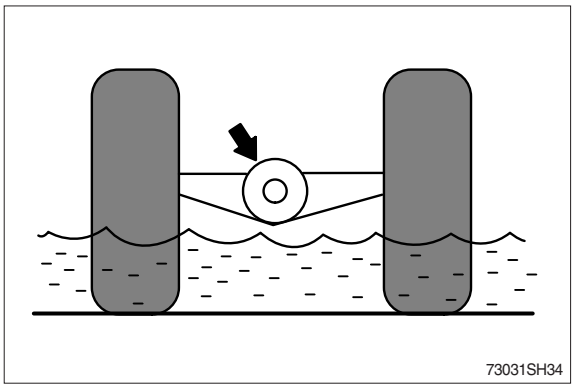
This machine is intended to be used only for excavation and loading. Do not use this for pulling up materials. Unlike a crane, this machine is not equipped with devices needed to pull up things.



Slow down when traveling through obstacles or uneven ground.

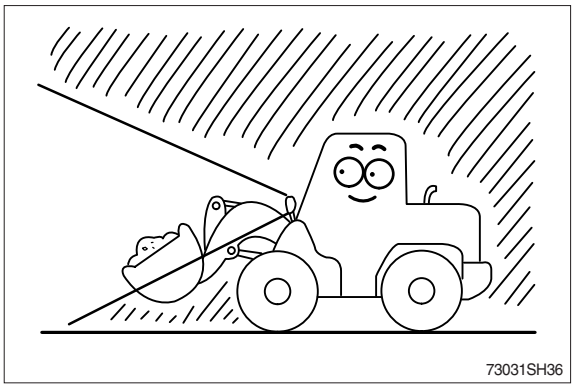


When operating in water or when crossing shallows, check the bed soil condition and depth and flow speed of water, then proceed taking care that water is not above axle housing.

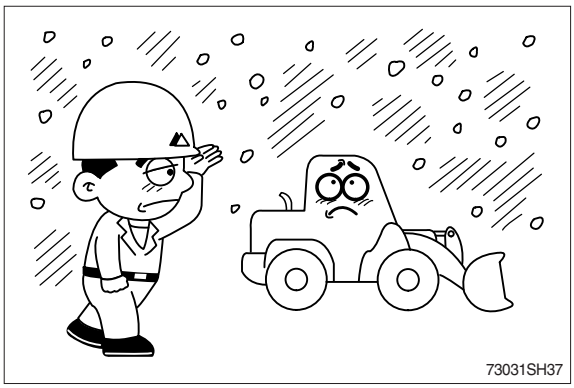


Never allow anyone near the center articulation pivot.
If the machine turned, they could be crushed.

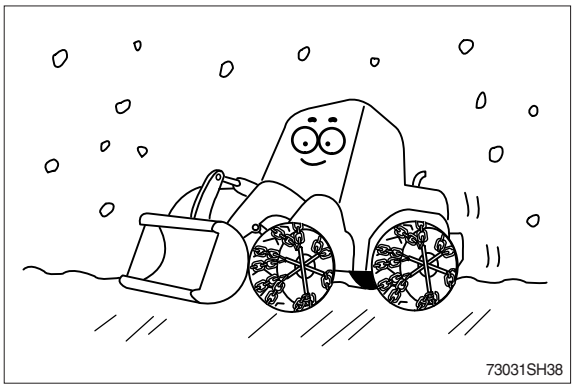
Use lights at night or in dark areas.



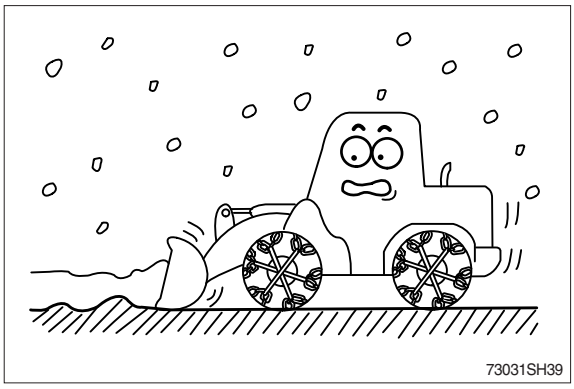
Be careful in the condition of bad clearance of sight caused by cloud, snow or rain.



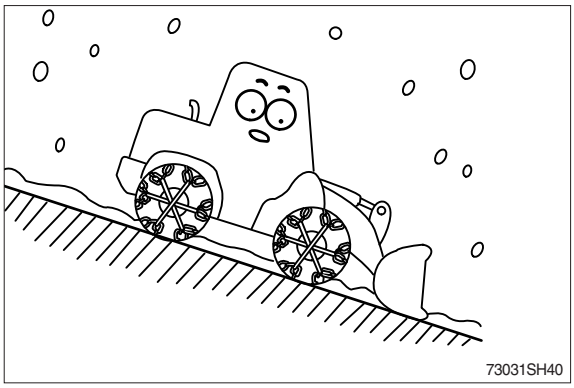
Put the chains on the tires when moving or working on the snowed and frozen road, and avoid doing sudden start, stop and swing.



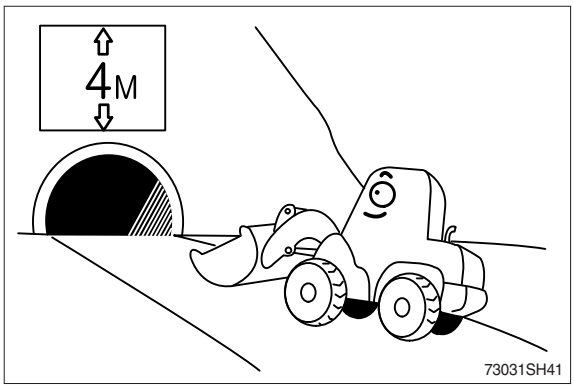
When machine is used for snow removal, be alert for hidden objects.



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

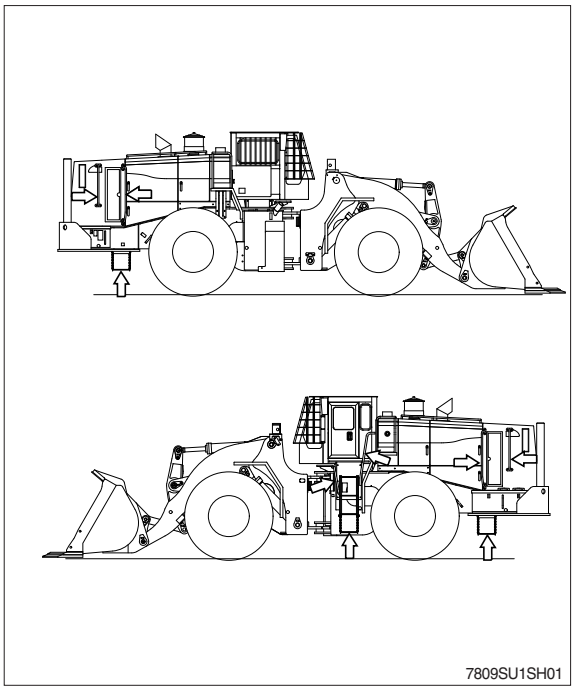
Never jump on or off the machine. Never get on or off a moving machine.

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 your 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.



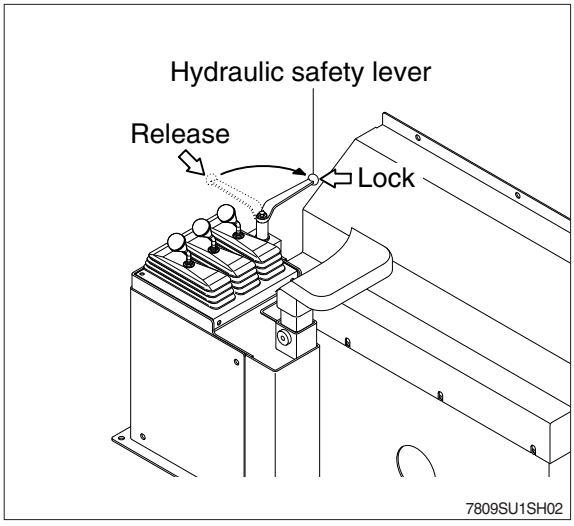
When carrying out inspection and maintenance with the mud guarder opened, pay attention to avoid the injury or damage by the mud guarder.

ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT

When standing up from the operator's seat, always put the hydraulic safety lever in the **LOCK** 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.

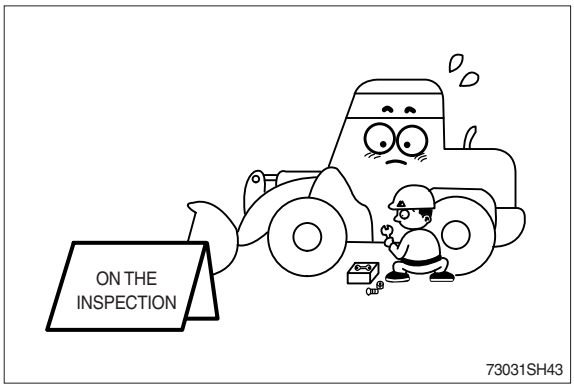
When leaving the machine, lower the work equipment to the ground, put the hydraulic safety lever in the **LOCK** position, then stop the engine and use the key to lock all the equipment. Always take the key with you.

※ **Refer to the page 3-32 for details.**

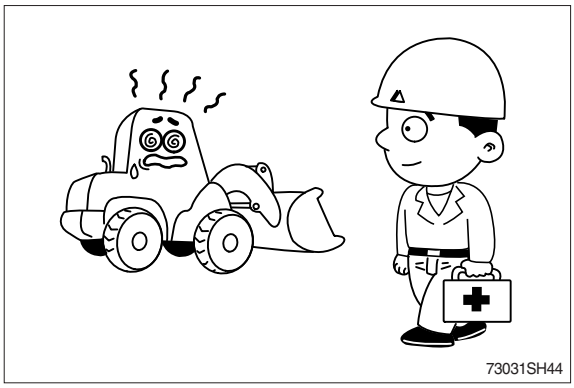


3. DURING MAINTENANCE

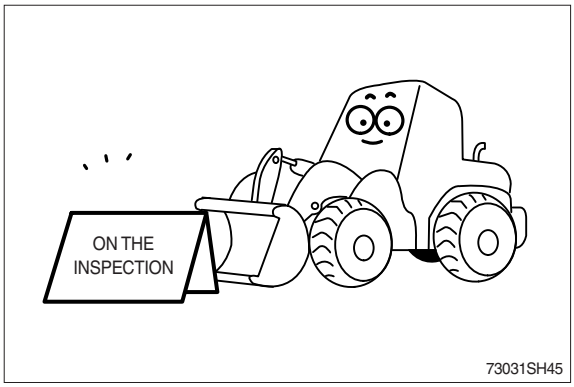
During maintenance do not allow any unauthorized person to stand near the machine. Also, be careful of people in the vicinity.



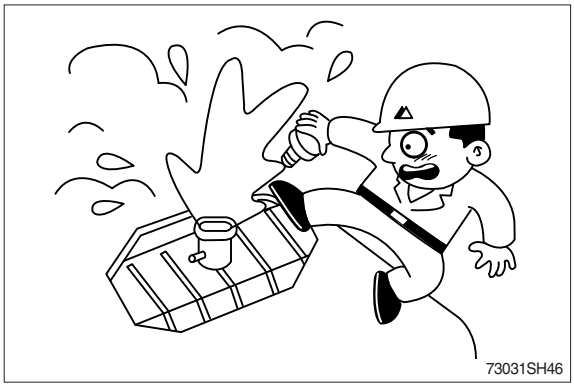
Stop the engine immediately when the trouble of the machine is found.
Inspect immediately the cause of trouble such as vibration, overheating and trouble in the cluster then repair.



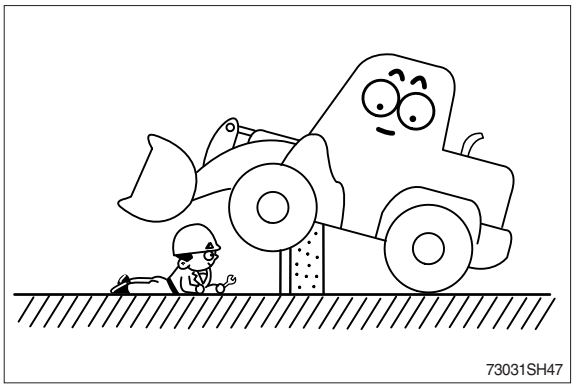
Park on a flat place for inspecting and repairing and properly TAG machine is not operational. (remove start key)
Extreme care shall be taken during maintenance work.
Parts may require additional safe guarding.



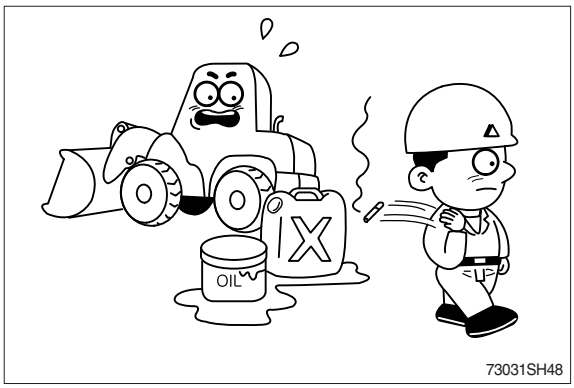
Do not remove the radiator cap from hot engine. Open the cap after the engine is cool, below 50˚C (112˚F) to prevent personal injury from heated coolant spray or steam.



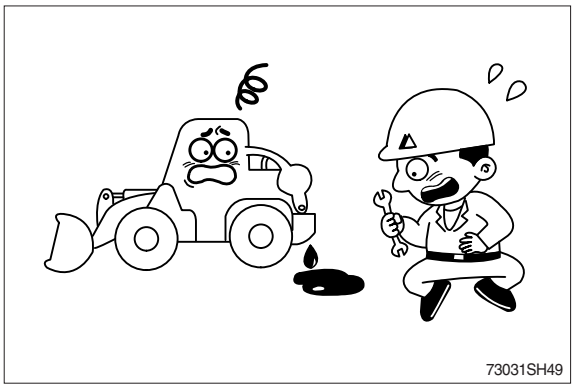
Do not work below the machine.
When working under of around the bucket or linkage, with the bucket raised, proper support must be provided for the bucket and / or the linkage.



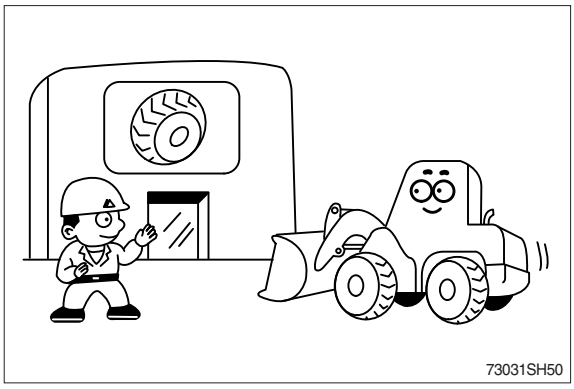
There is the danger of fire in fuel and oil.
Store in cool dry area, away from any open flames.
Do not refuel the machine while smoking or when near open flame or sparks.
Always stop engine before refueling machine.



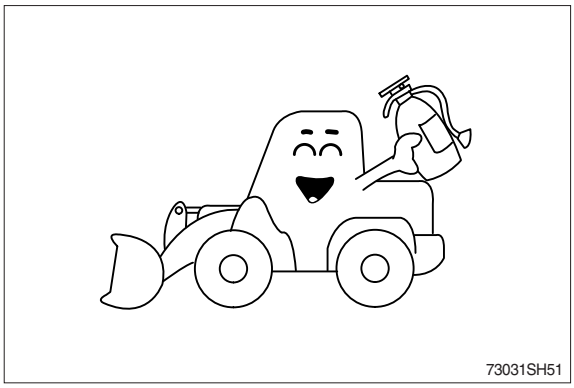
Spilled grease and oil are dangerous to safety.
Keep your machine always clean and dry.



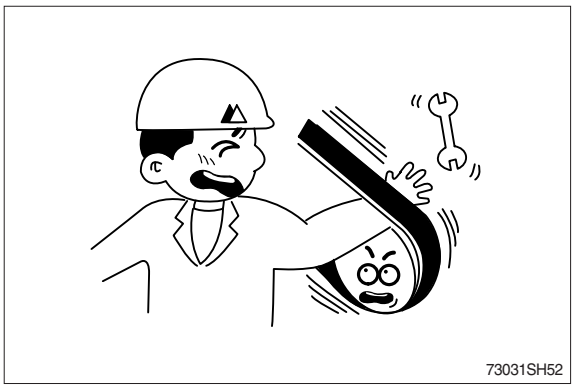
Disassembly, reassembly and repair of tire requires special skills and equipment.
Contact a tire repair shop.



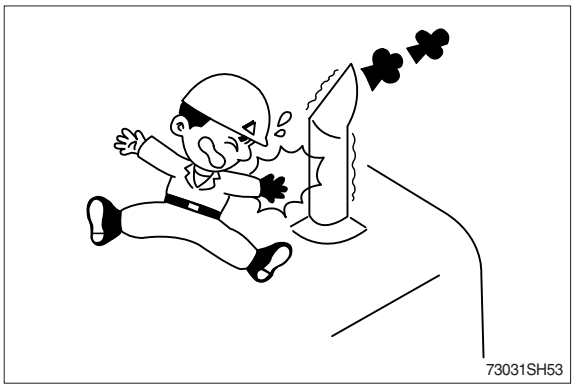
Be prepared if a fire starts.
Keep a fire extinguisher handy and emergency numbers for a fire department near your telephone.



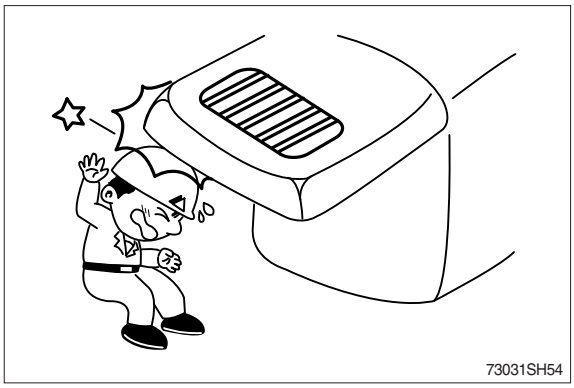
When servicing and checking engine compartment at the side door opened, be careful head against door.
Do not open the side door while engine is running.



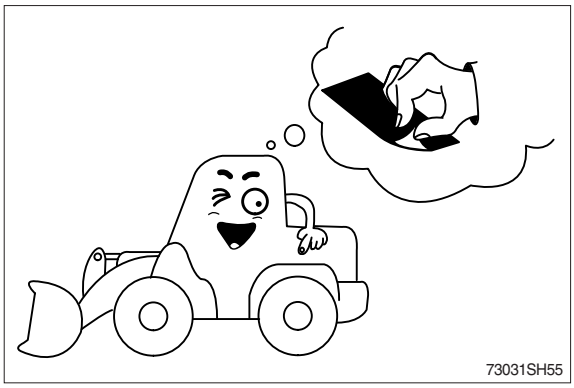
Do not touch exhaust pipe, or it may cause severe burn.



Be sure to support stay, when the side door needs to be opened.
Be careful the external or natural force like strong wind.



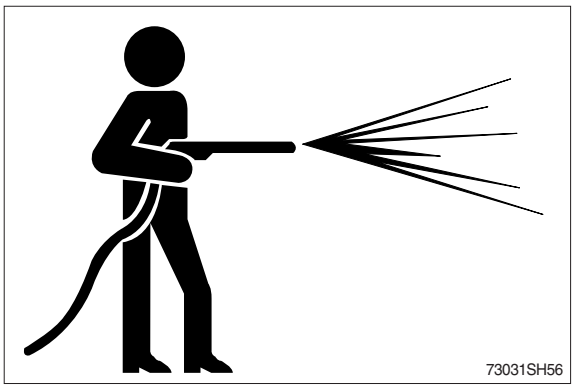
The anti-slip protection should be replaced if they have become worn or have been printed over.



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.

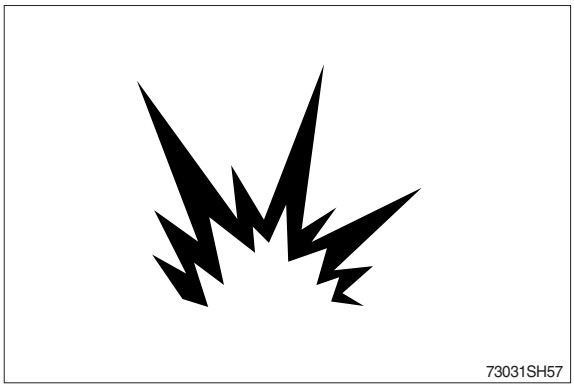
If water gets into the electrical system, there is danger that the machine may not move or may move unexpectedly.
Do not use water or steam to clean the sensors, connectors, or the inside of the operator's compartment.



HANDLING TIRES

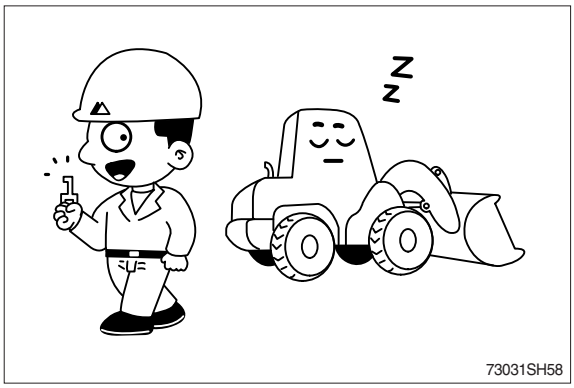
If tires are not used under the specified condition, they may overheat and burst or be cut and burst by sharp stones on rough road surfaces. This may lead to serious injury or damage.
To maintain safety, always keep to the suitable conditions : See page 6-30, 31.

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

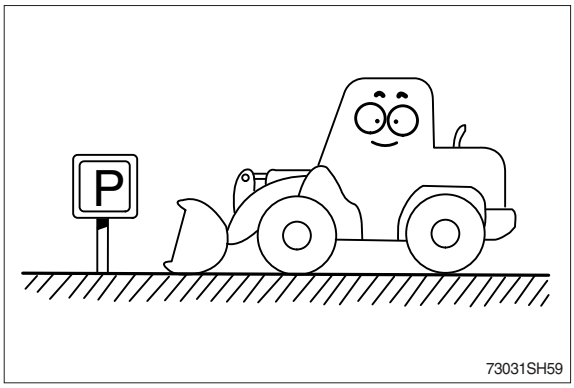


4. PARKING

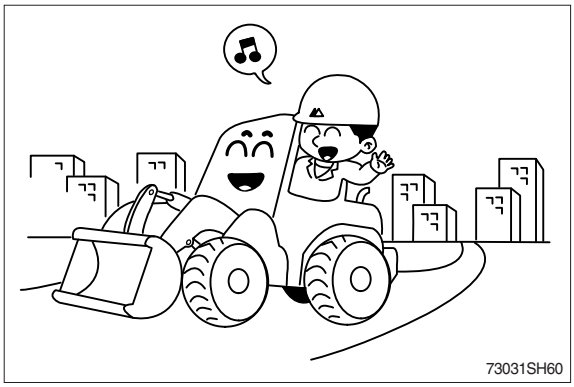
When leaving the machine lower the bucket to the ground completely and put the safety lever at parking position then remove the key.
Lock the cab door.



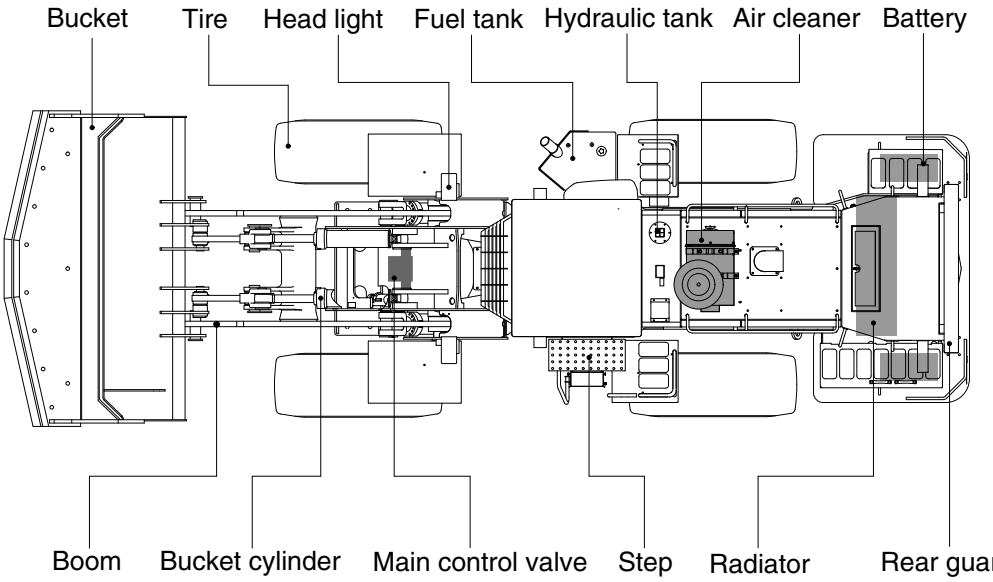
Park the machine in the flat and safe place.

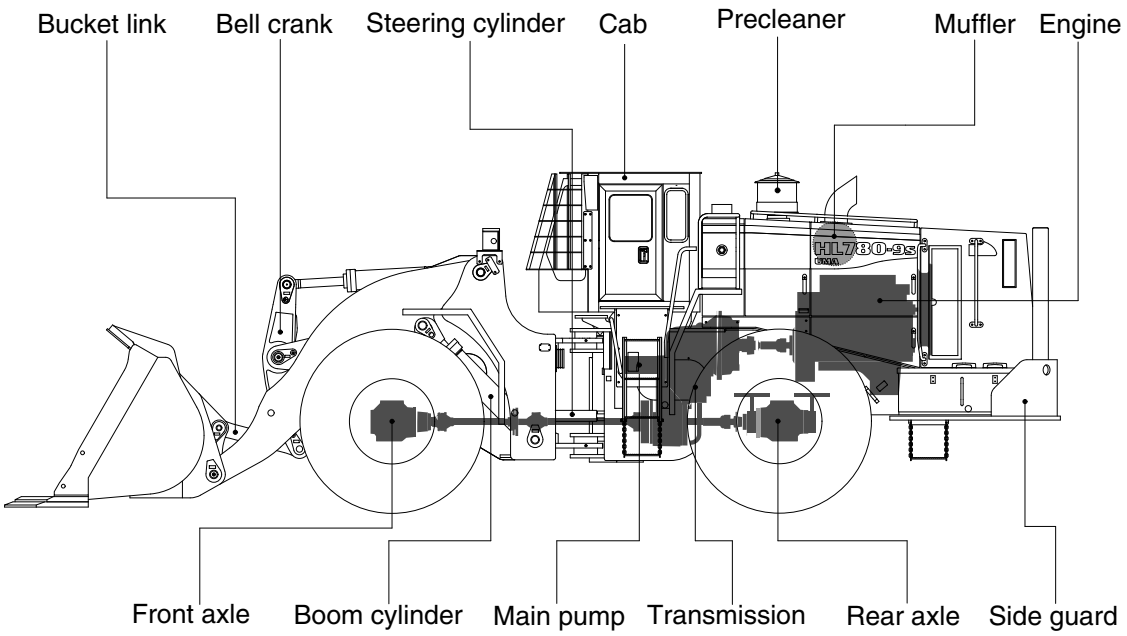


Hope you can work easily and safely observing safety rules.
For safe operation, observe all safety rules.



1. MAJOR COMPONENTS

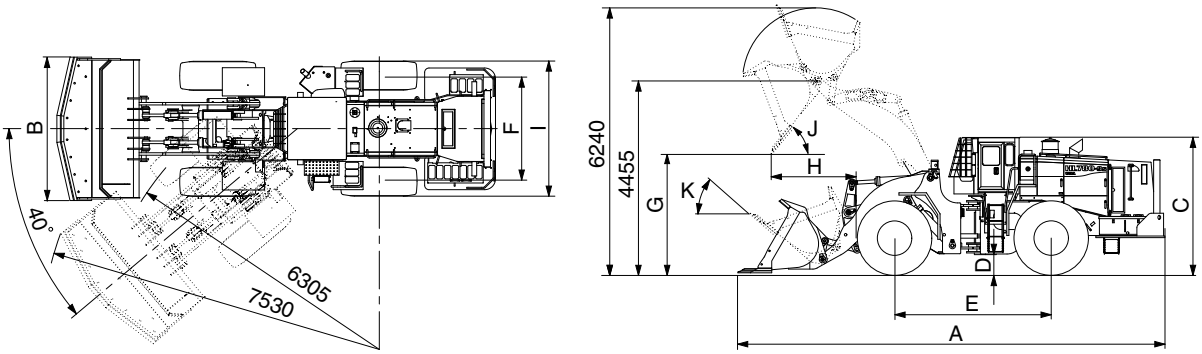




7809SU2SE01A

2. SPECIFICATIONS

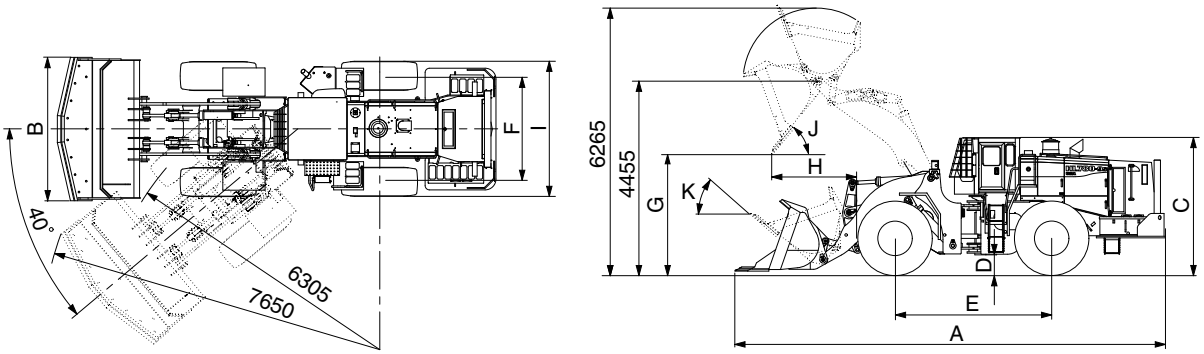
1) WITH BOLT-ON CUTTING EDGE TYPE BUCKET (machine serial No. : ~#0014)



7809SU2SE03

Description			Unit	Specification
Operating weight			kg (lb)	32800 (72310)
Bucket capacity		Struck	m^3 (yd^3)	4.7 (6.1)
		Heaped		5.4 (7.1)
Overall length		A	mm (ft-in)	10290 (33' 9")
Overall width		B		3300 (10' 9")
Overall height		C		3200 (10' 5")
Ground clearance		D		445 (1' 5")
Wheelbase		E		3700 (12' 2")
Tread		F		2440 (8' 0")
Dump clearance at 45˚		G		2680 (8' 10")
Dump reach (full lift)		H		1885 (6' 2")
Width over tires		I		3110 (10' 2")
Dump angle		J	degree (˚)	47
Roll back angle (carry position)		K		46
Cycle time		Lift (with load)	sec	6.5
		Dump (with load)		1.3
		Lower (empty)		3.1
Maximum travel speed			km/hr (mph)	34.5 (21.4)
Braking distance			m (ft-in)	9.8 (32' 1")
Minimum turning radius (center of outside tire)				6.43 (21' 1")
Gradeability			degree (˚)	30
Brakeout force			kg (lb)	15400 (33950)
Travel speed	Forward	First gear	km/hr (mph)	5.9 (3.6)
		Second gear		11.0 (6.8)
		Third gear		17.2 (10.7)
		Fourth gear		34.5 (21.4)
	Reverse	First gear		5.9 (3.6)
		Second gear		11.0 (6.8)
		Third gear		23.8 (14.8)

WITH BOLT-ON CUTTING EDGE TYPE BUCKET (machine serial No. : #0015~)



7809SU2SE03A

Description			Unit	Specification
Operating weight			kg (lb)	32800 (72310)
Bucket capacity		Struck	m^3 (yd^3)	4.8 (6.2)
		Heaped		5.4 (7.1)
Overall length		A	mm (ft-in)	10250 (33' 8")
Overall width		B		3500 (11' 6")
Overall height		C		3200 (10' 5")
Ground clearance		D		445 (1' 5")
Wheelbase		E		3700 (12' 2")
Tread		F		2440 (8' 0")
Dump clearance at 45˚		G		2715 (8' 11")
Dump reach (full lift)		H		1920 (6' 4")
Width over tires		I		3110 (10' 2")
Dump angle		J	degree (˚)	47
Roll back angle (carry position)		K		46
Cycle time		Lift (with load)	sec	6.5
		Dump (with load)		1.3
		Lower (empty)		3.1
Maximum travel speed			km/hr (mph)	34.5 (21.4)
Braking distance			m (ft-in)	9.8 (32' 1")
Minimum turning radius (center of outside tire)				6.43 (21' 1")
Gradeability			degree (˚)	30
Brakeout force			kg (lb)	15530 (34240)
Travel speed	Forward	First gear	km/hr (mph)	5.9 (3.6)
		Second gear		11.0 (6.8)
		Third gear		17.2 (10.7)
		Fourth gear		34.5 (21.4)
	Reverse	First gear		5.9 (3.6)
		Second gear		11.0 (6.8)
		Third gear		23.8 (14.8)

3. WEIGHT

Item	kg	lb
Front frame assembly	2708	5970
Rear frame assembly	3605	7950
Front fender (LH & RH)	48	106
Side & Rear Guard	3170	6990
Cab assembly	780	1720
Engine assembly	984	2170
Transmission assembly	780	1720
Drive shaft (front)	25	55
Drive shaft (center)	48	106
Drive shaft (rear)	30	66
Drive shaft (upper)	14	31
Front axle (include differential)	1814	4000
Rear axle (include differential)	1814	4000
Tire (26.5 R25, ★★, L3)	425	937
Hydraulic tank assembly	270	595
Fuel tank assembly	404	890
Main Pump (+ Brake Pump)	34.1	75.2
Steering Pump (+ Fan Pump)	43.4	95.7
Main control valve (2 / 3 spool)	95 / 115	209 / 254
Flow amplifier	29	64
Boom assembly	1990	4390
Bell crank assembly (2EA)	282 × 2 (~#0014) 315 × 2 (#0015~)	620 × 2 (~#0014) 695 × 2 (#0015~)
Bucket link (2EA)	60 × 2	130 × 2
5.4 m^3 SNR Bucket	3810 (~#0014) 3460 (#0015~)	8400 (~#0014) 7630 (#0015~)
Boom cylinder assembly (2EA)	290	639
Bucket cylinder assembly (2EA)	130	287
Steering cylinder assembly (2EA)	60	132
Seat	40	88
Battery (2EA)	55 × 2	120 × 2

4. SPECIFICATION FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Cummins QSM 11
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	125 × 147 mm (4.92" × 5.79")
Piston displacement	10800 cc (659 cu in)
Compression ratio	16.3 : 1
Rated gross horse power	353 ps at 2000 rpm
Maximum gross torque at 1400 rpm	171 kgf · m (1235 lbf · ft)
Engine oil quantity	38 ℓ (10 U.S. gal)
Wet weight	984 kg (2170 lb)
High idling speed	2130 ± 50 rpm
Low idling speed	800 ± 50 rpm
Rated fuel consumption	218 g/kw·hr
Starting motor	Delco Remy 39MT (24 V)
Alternator	Delco Remy 24SI (24 V - 100 Amp)
Battery	2 × 12V × 220Ah

2) MAIN PUMP (+ BRAKE PUMP)

Item	Specification	
	Main pump	Brake pump
Type	Fixed displacement double gear pump	
Capacity	121.8 cc/rev	16.9 cc/rev
Maximum operating pressure	210 kgf/cm^2 (2990 psi)	150 kgf/cm^2 (2130 psi)
Rated oil quantity	220 ℓ /min (58.1 U.S.gpm)	30 ℓ /min (7.9 U.S.gpm)
Rated speed	2000 rpm	

3) STEERING PUMP (+ FAN PUMP)

Item	Specification	
	Steering	Fan pump
Type	Fixed displacement double gear pump	
Capacity	134.0 cc/rev	26.7 cc/rev
Maximum operating pressure	210 kgf/cm^2 (2990 psi)	140 kgf/cm^2 (1990 psi)
Rated oil quantity	241.3 ℓ /min (63.7 U.S.gpm)	48.0 ℓ /min (12.7 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	210 kgf/cm^2 (2990 psi)
Overload relief valve pressure	240 kgf/cm^2 (3140 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 200 × ø 110 × 863 mm
Bucket cylinder	Bore dia × Rod dia × Stroke	ø 160 × ø 80 × 580 mm
Steering cylinder	Bore dia × Rod dia × Stroke	ø 110 × ø 55 × 480 mm

7) DYNAMIC POWER TRANSMISSION DEVICES

Item			Specification
Transmission	Model		ZF 4WG310
	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		105 ℓ /min (27.7 U.S.gpm) at 2000 rpm
Axle	Drive devices		4-wheel drive
	Front		Front fixed location
	Rear		Oscillation ±13˚ of center pin-loaded
Wheels	Tires		26.5 R25, ★★, L3
Brakes	Travel		Four-wheel, wet-disc type, full hydraulic
	Parking		Spring applied, hydraulic released brake
Steering	Type		Full hydraulic, articulated
	Steering angle		40˚ to both right and left angle, respectively

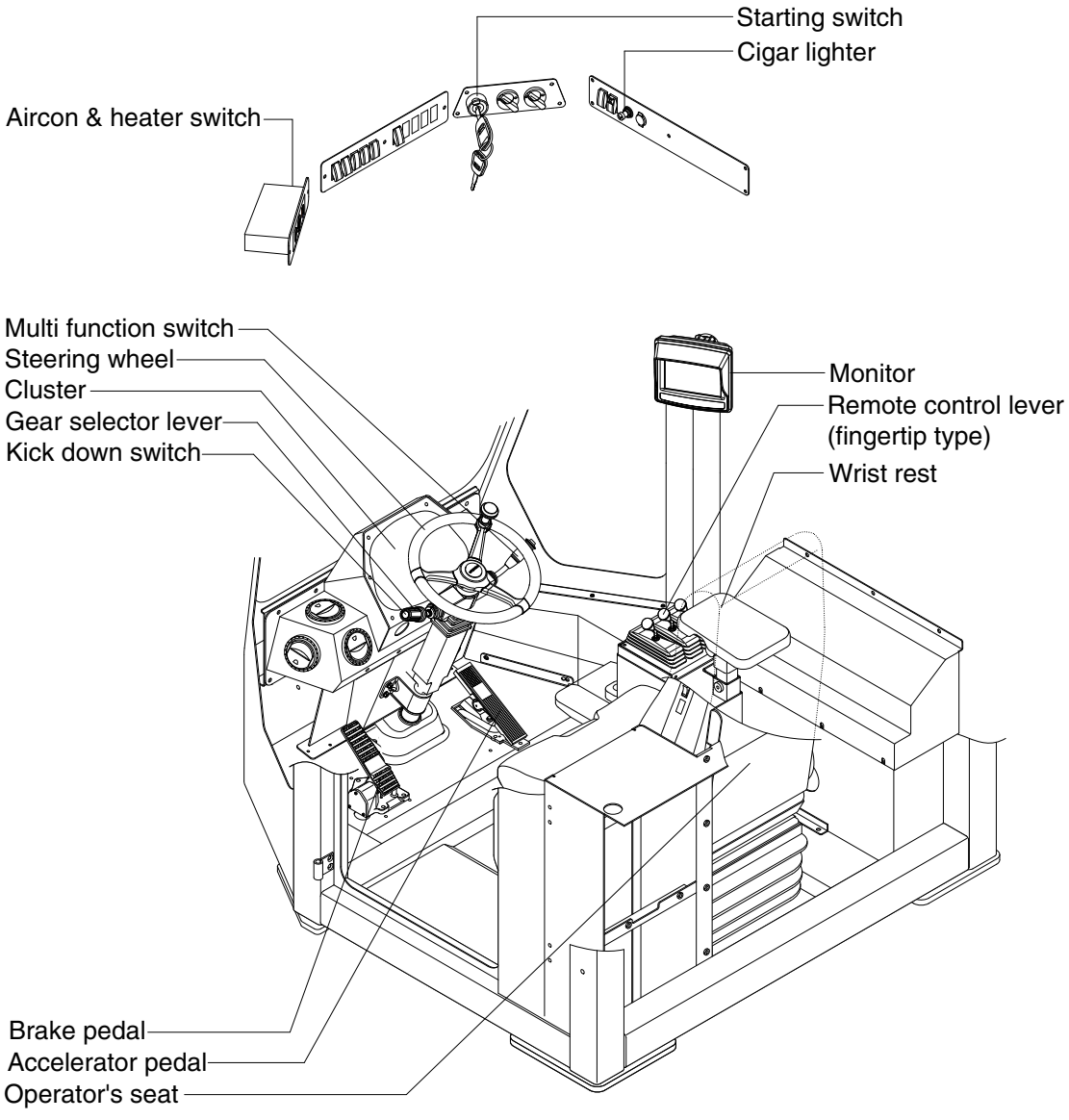
1. CAB DEVICES

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.



7809SU3CD01A

2. CLUSTER

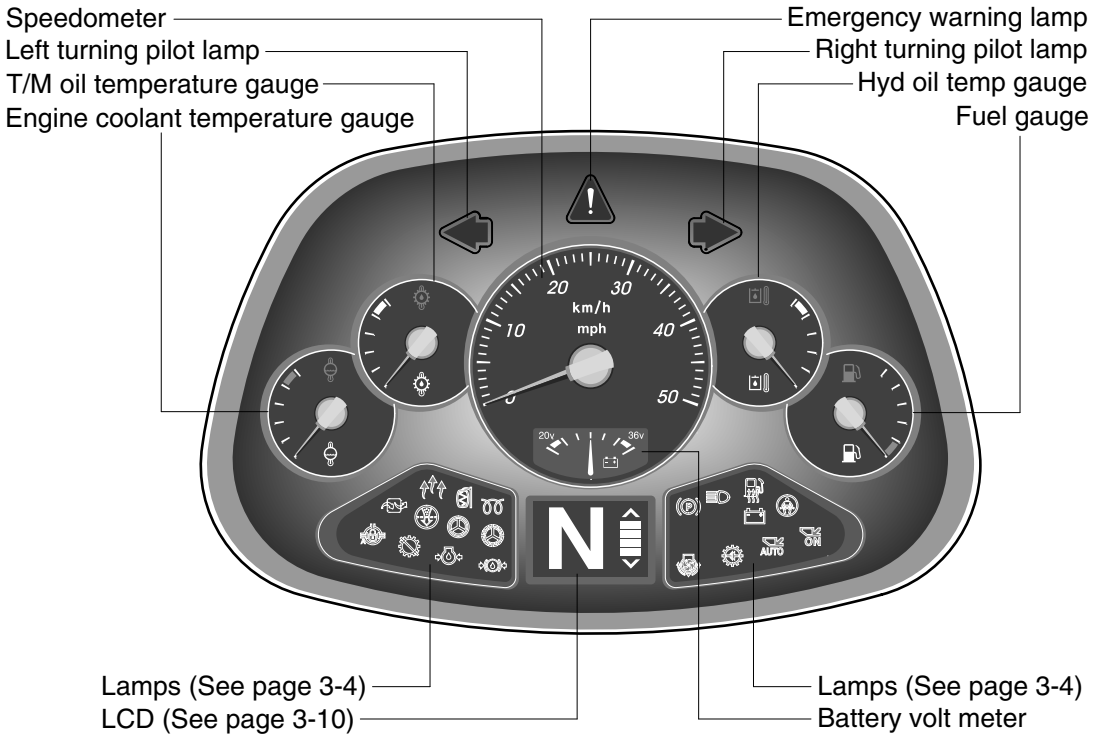
1) STRUCTURE

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.

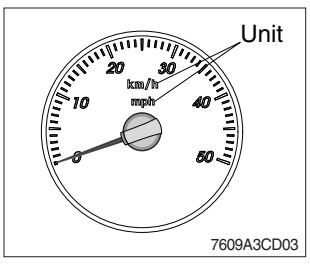
※ When the cluster provides a warning immediately check the problem, and perform the required action.



7809S3CD02A

2) GAUGE

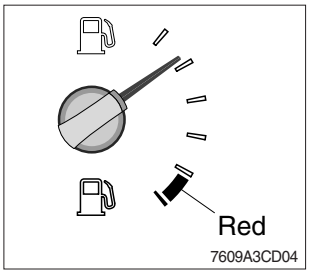
(1) Speedometer



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 3-23.

(2) Fuel gauge

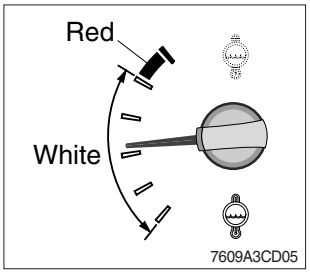


① This gauge indicates the amount of fuel in the fuel tank.

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.

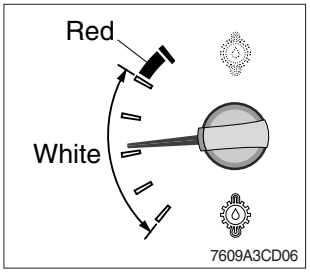
(3) Engine coolant temperature gauge



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.

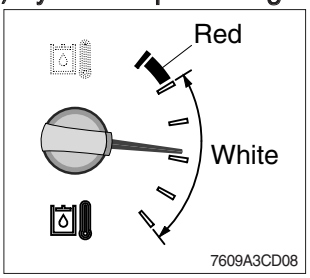
(4) Transmission oil temperature gauge



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

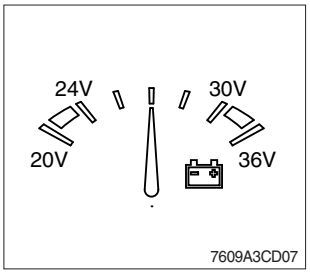


① This gauge indicates the temperature of hydraulic oil.
- White range : 40~105˚C (104~221˚F)
- Red range : Above 105˚C (221˚F)

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.

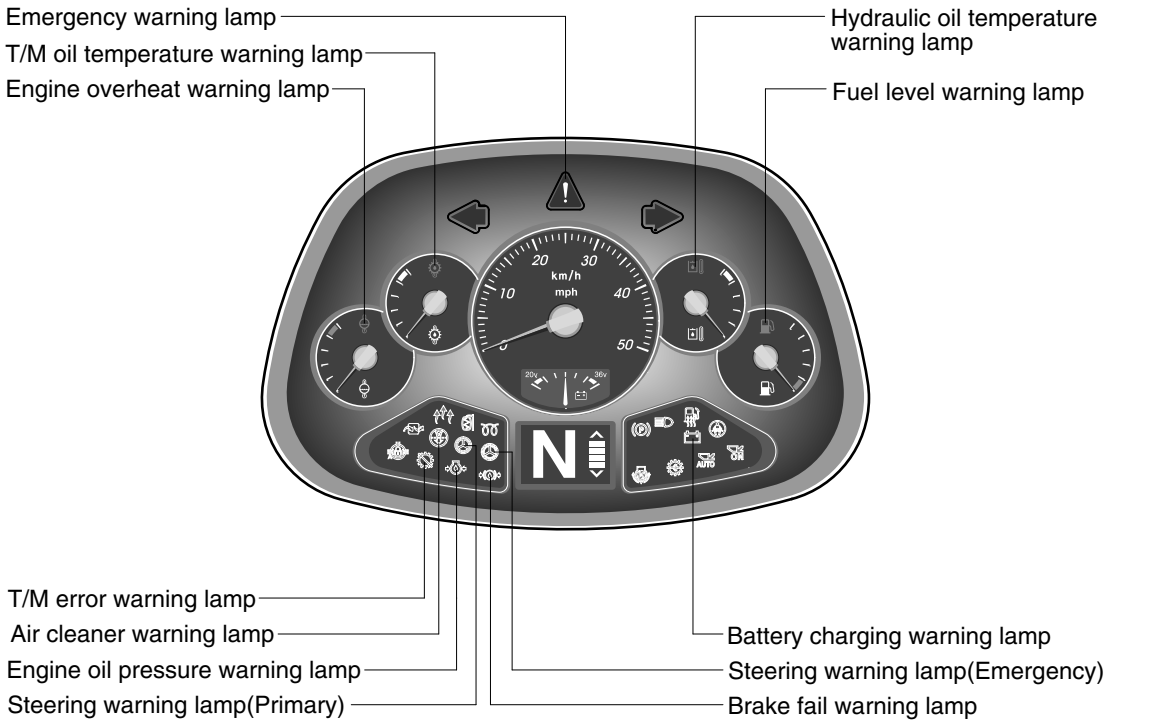
(6) Battery volt meter



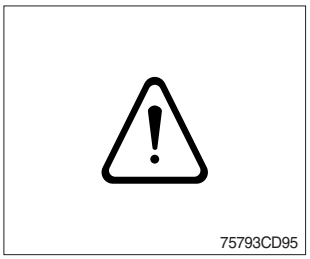
① This gauge indicates the voltage in the charging system when the engine is running.

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



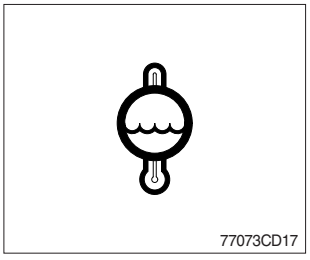
(1) Emergency warning lamp



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.

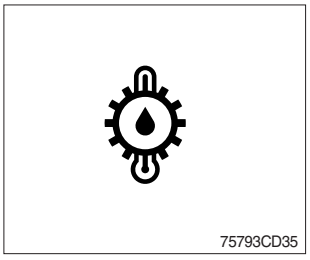
(2) Engine overheat warning lamp



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.

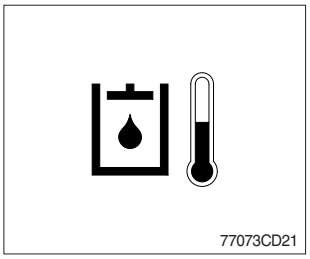
(3) Transmission oil temperature warning lamp



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

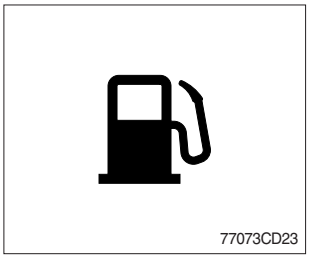


① This warning lamp operates and the buzzer sounds when the temperature of hydraulic oil is over 105˚C (221˚F).

② Check the hydraulic oil level when the lamp is turned ON.

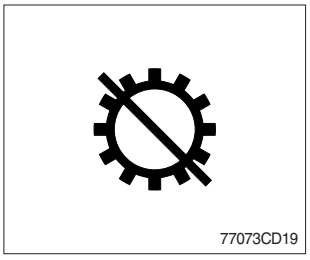
③ Check for debris between oil cooler and radiator.

(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

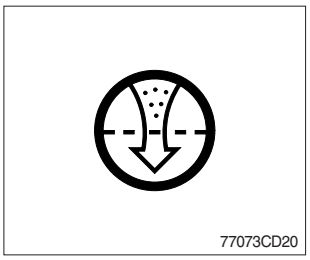


① This lamp lights ON and the LCD display show the error codes when an error occurs in the transmission.

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.

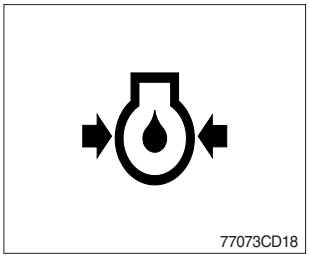
(7) Air cleaner warning lamp



① This lamp lights ON when the filter of air cleaner is clogged.

② Check the filter and clean or replace it when the lamp is ON.

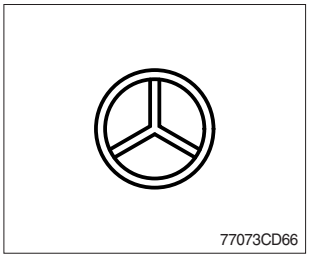
(8) Engine oil pressure warning lamp



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.

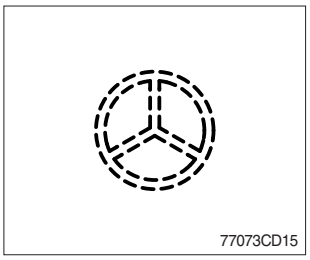
(9) Steering warning lamp



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.**



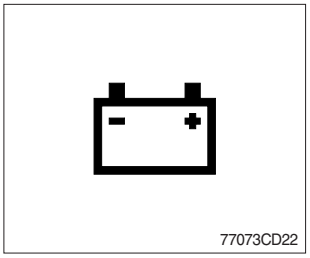
② **Emergency**

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 3-28.**

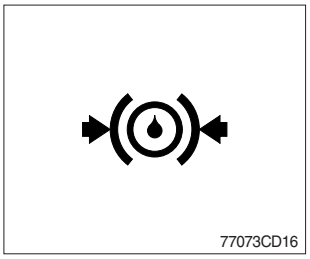
(10) Battery charging warning lamp



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

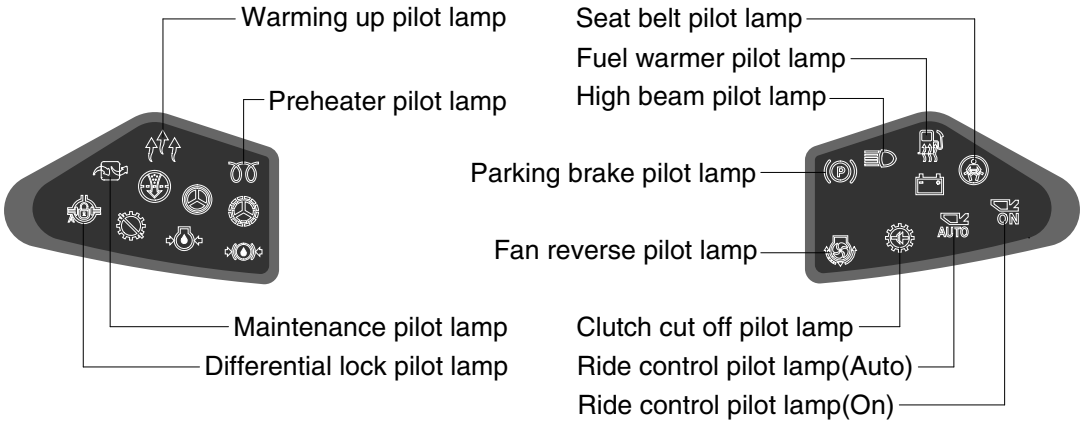


① The lamp lights ON when the oil pressure of service brake drops below the normal range.

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

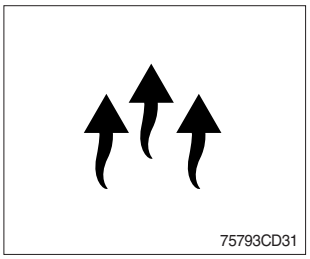
※ **Do not operate until any problems are corrected.**

4) PILOT LAMPS



7809SU3CD10

(1) Warming up pilot lamp



75793CD31

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

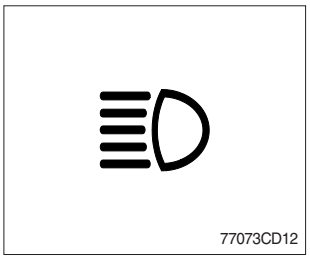
② The automatic warming up is cancelled when the engine coolant temperature is above 30˚C, or when 10 minutes have passed since starting the engine.

(2) Seat belt pilot lamp

75793CD17

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

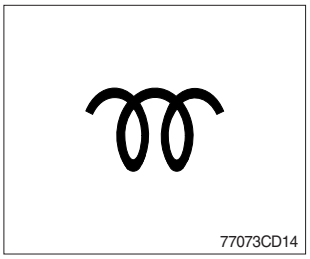
(3) High beam pilot lamp



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.

(4) Preheat pilot lamp

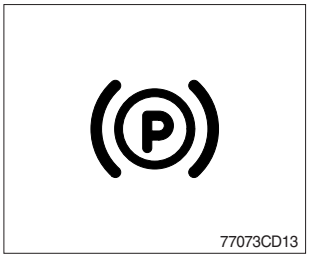


① This lamp lights ON when start switch is turned clockwise to the ON position. Light will turn off after approximately 5~45 seconds, depending on engine temperature, indicating that preheating is completed.

② When the lamp goes out the operator should start cranking the engine.

※ **Refer to page 4-5.**

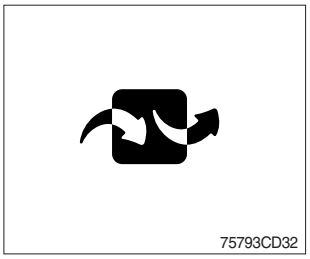
(5) Parking brake pilot lamp



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

※ **Check the lamp is OFF before driving.**

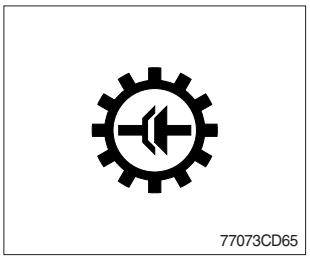
(6) Maintenance pilot lamp



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.

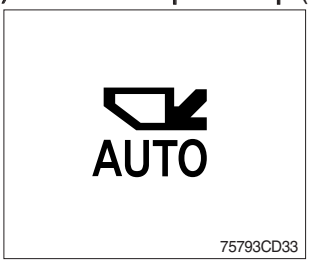
(7) Clutch cut off pilot lamp



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

※ **Refer to page 3-28.**

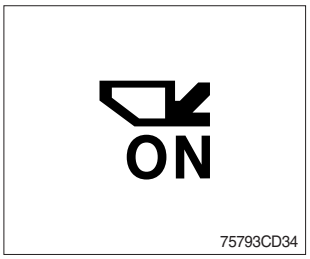
(8) Ride control pilot lamp (option)



① Auto ride control

This lamp lights ON when push in the bottom of the ride control switch (auto position).

※ **Refer to page 3-27.**

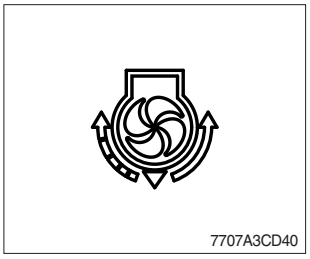


② Manual ride control

This lamp lights ON when push in the top of the ride control switch (manual position)

※ **Refer to page 3-27.**

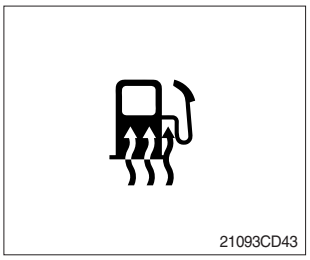
(9) Fan reverse pilot lamp



① This lamp lights ON when the fan control switch is pressed.

※ **Refer to page 3-27.**

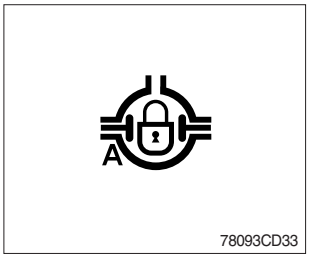
(10) Fuel warmer pilot lamp



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).

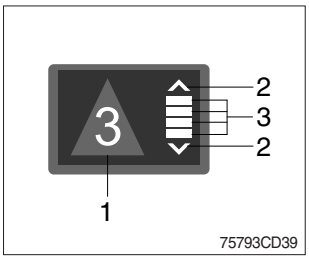
② The automatic fuel warming is cancelled when the engine coolant temperature is above 60˚C and the hydraulic oil temperature is above 45˚C since the start switch was ON position.

(11) Differential lock pilot lamp



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

5) LCD

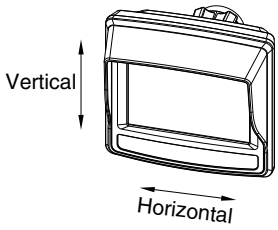


(1) The LCD can be used with the gear selector.
It indicates speed and driving direction.

No	Symbol	Meaning	Remark
1	△, ▽, □	Actual gear display	Forward, reverse, neutral
	1, 2, 3, 4		Actual gear
	P		Parking brake mode active
2	^ , v	Forward, reverse	Automatic mode
3	≡	Gear range display	Automatic mode

3. MONITOR

· The monitor is adjustable.
- Vertical : 14˚
- Horizontal : 30˚



76093CD23

1) BUTTONS

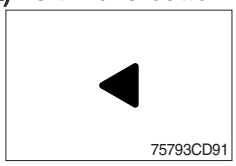
(1) Menu button

75793CD90

① Main display to main menu, main menu to main display.

② AEB cancel button in AEB setting.

(2) Left move button



75793CD91

① Move in menu (left, up).

(3) Camera / ESC button

75793CD92

① Enter rear camera mode in main display.

② Cancel button except in main display (move previous menu).

(4) Right move / Buzzer stop button

75793CD93

① Move in menu (right, down).

② Buzzer stop.

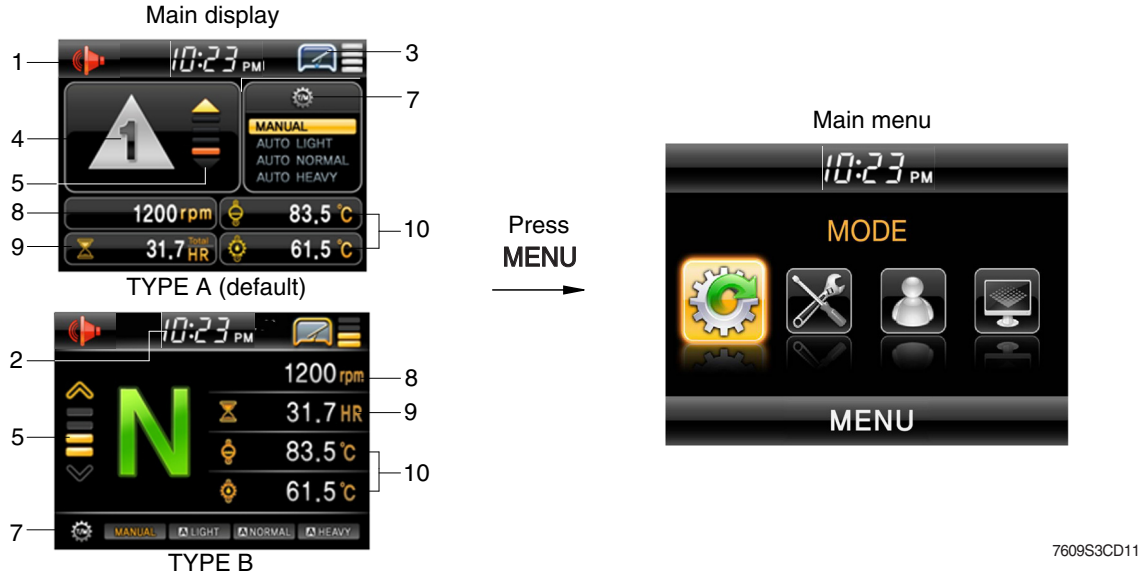
(5) Enter button

75793CD94

① Select menu (enter).

② AEB cancel button in AEB setting.

2) MAIN MENU



1	Buzzer	4	Actual gear	8	Engine rpm
2	Clock	5	Select gear	9	Hour meter, odometer
3	Wiper speed	7	Transmission mode	10	Monitoring

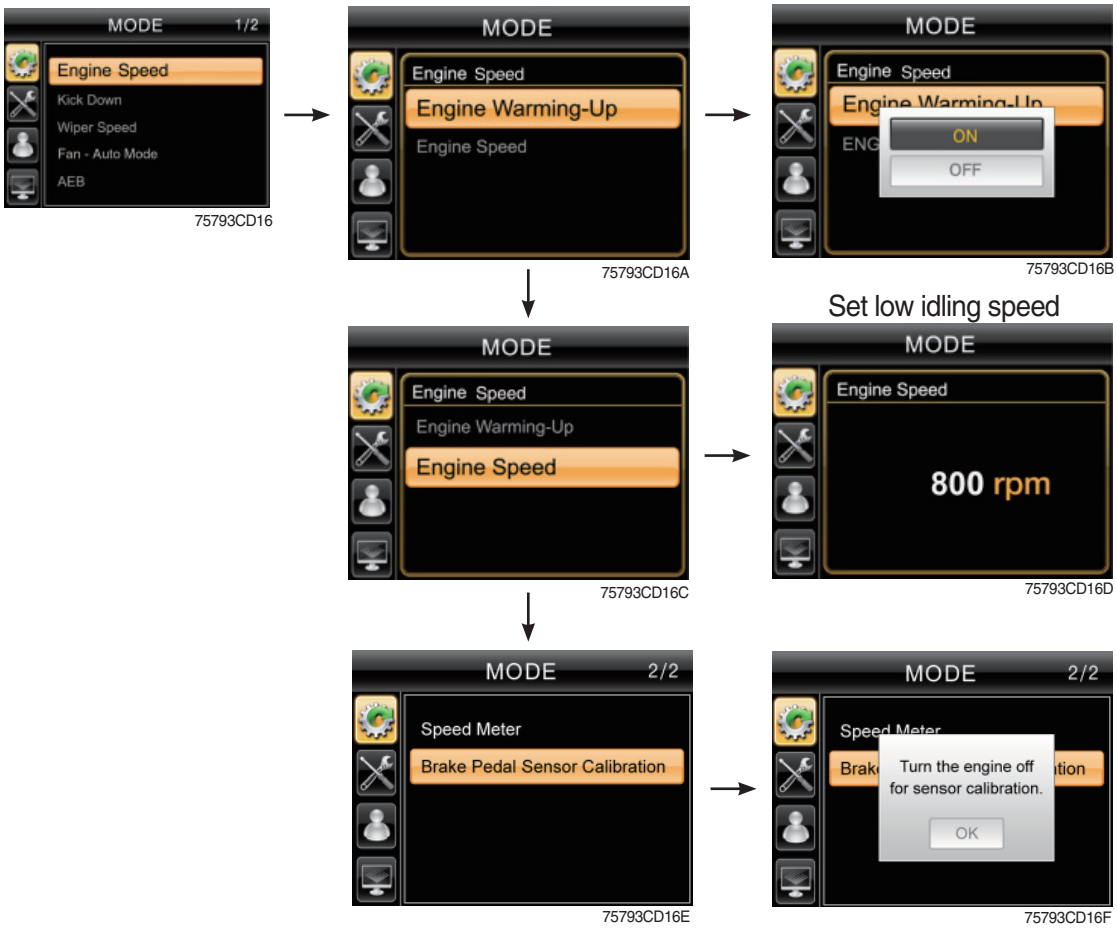
※ **Display type can be changed by operator. See page 3-23.**

(1) Structure

No	Main menu	Sub menu	Description
1	 MODE 75793CD12	Engine speed Brake pedal sensor cal Kick down Wiper speed Fan-auto mode AEB Speed meter	Engine warming up, Engine speed Brake pedal sensor calibration Mode 1 (down/up), Mode 2 (down only) 4 steps Interval and time setting AEB setting Pulse setting
2	 MONITORING 75793CD13	Fault code Machine monitoring Monitoring history	Active, Logged fault (Machine, ECU, TCU) Hyd temp, Battery, Coolant temp T/M oil temp Hour meter, ODO meter
3	 MANAGEMENT 75793CD14	Machine security Maintenance Machine information Service contact Service menu	ESL system setting, Change password Replacement, Change interval (oils and filters) Version, Status Service contact Software download
4	 DISPLAY SET UP 75793CD13	Clock Display Unit Rear camera Language	Clock Brightness setting (Manual/Automatic) Type display (A or B type) Temp (˚F/˚C), Distance (km/mile), Pressure (bar, Mpa, kgf/m², psi) Reverse mode, Active camera, Display order 12 languages

(2) Mode

① Engine speed



· **Brake pedal sensor calibration**

- Turn the engine OFF and turn the starting switch ON position.
- Press OK button, then calibration will be started.
- When display " IP ⇧ " on main display, press slowly the brake pedal completely.
- Release the brake pedal when display " IP ⇩ " on main display.
- For cancel, press MENU button.

※ When the brake pedal or sensor is replaced, **brake pedal sensor calibration must be performed.**

② Kick down

75793CD17 75793CD17A

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

※ **Refer to page 3-30.**

③ Wiper speed

75793CD18 75793CD18A

- Setting wipe speed 1 to 4.

④ Fan-auto mode

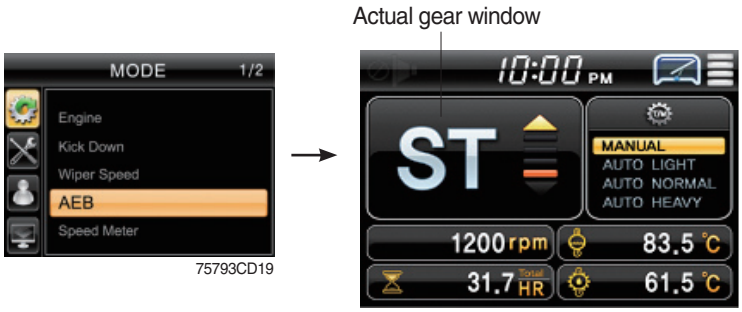
75793CD110 75793CD111 75793CD112

- 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 3-27, fan control switch.

⑤ AEB



75793CD19

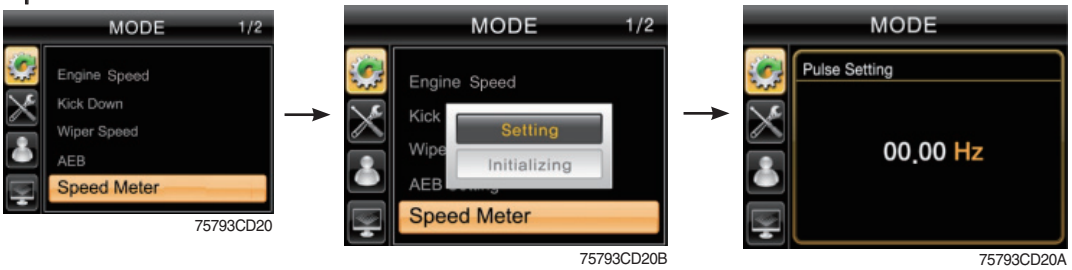
7609S3CD19A

- AEB mode controls the disk clearance of the transmission, automatically.
- To start AEB setting, press ↵ and hold 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 (ignition off/on).

⑥ Speed meter



75793CD20

75793CD20B

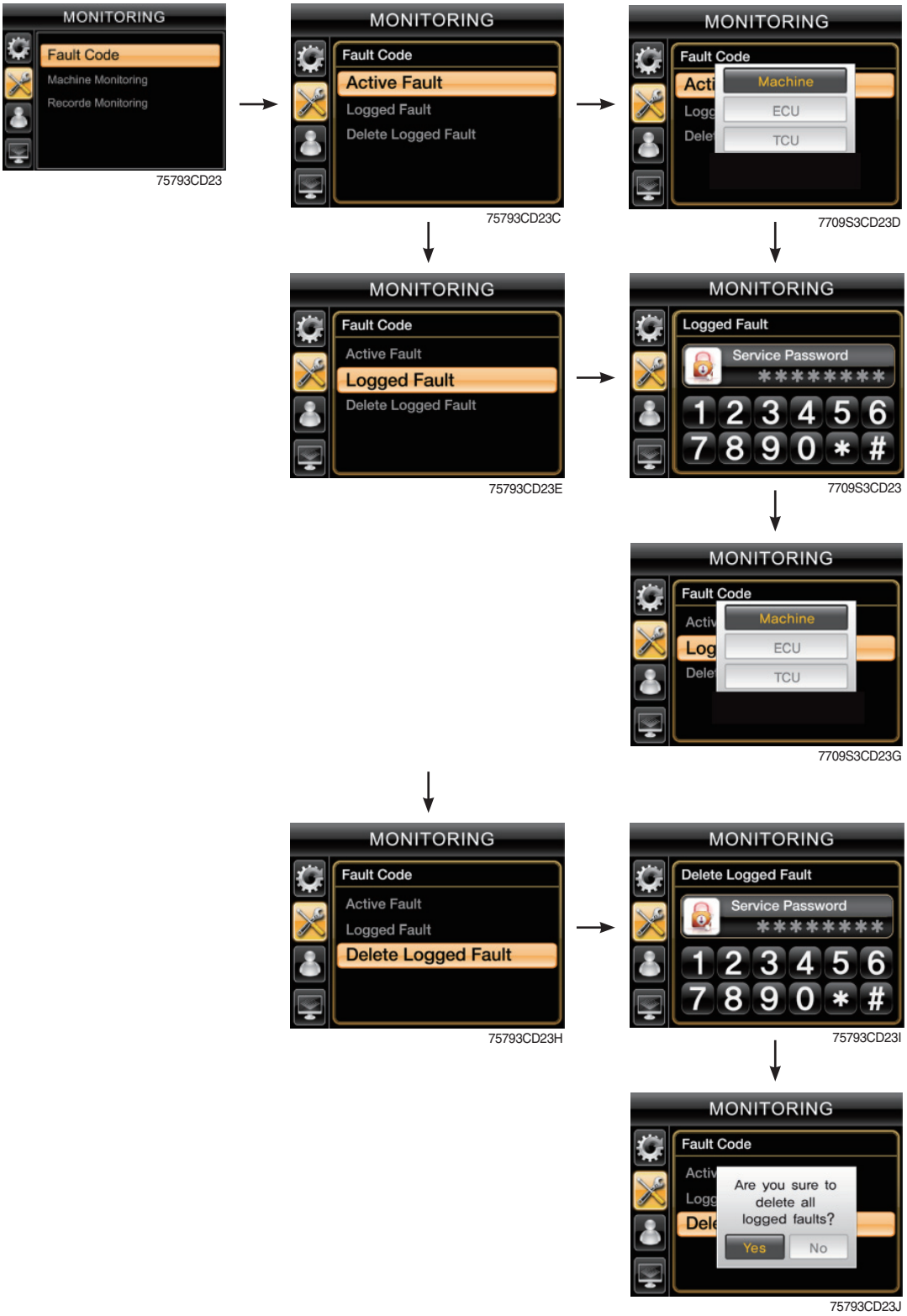
75793CD20A

- Press ↵ and hold for 3 seconds.
- To change the pulse value, press◀ or ▶/🔇 .
- To change the position, press↵ .

※ Only for the serviceperson.

(3) Monitoring

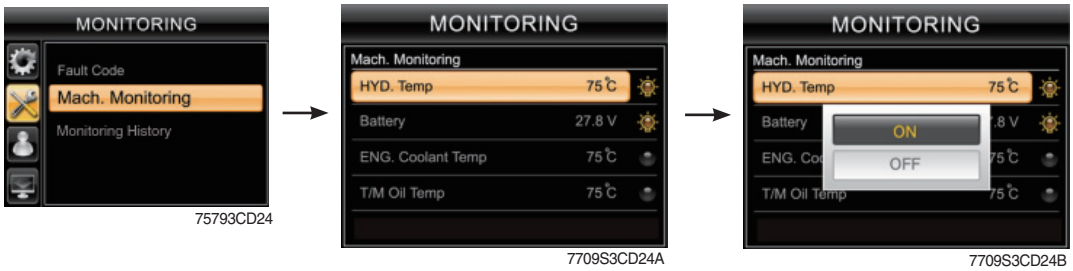
① Fault code



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

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

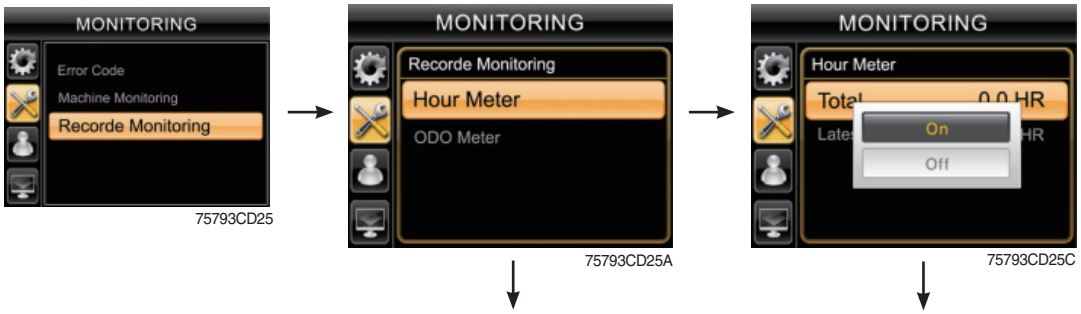
② Machine monitoring



75793CD24 7709S3CD24A 7709S3CD24B

- Monitor the status of the machine.
- To check the item in main display, choose it and press ↵ .
- The right icon shows ON/OFF status.

③ Record monitoring



75793CD25 75793CD25A 75793CD25C

75793CD25D

- **Hour meter**
  - **Total** : total hour meter
    To show the item in the main display, select "ON" and press ↵ (this item could not reset).
  - **Latest** : the latest hour meter after reset.
    To show the item in the main display, select "ON" and press ↵.
    To reset the latest hour meter, select "initializing" and press ↵.

75793CD25F 75793CD25H

75793CD25J

- **ODO meter**
  - **Total** : total ODO meter
    To show the item in the main display, select "ON" and press ↵ (this item could not reset).
  - **Latest** : the latest ODO meter after reset.
    To show the item in the main display, select "ON" and press ↵.
    To reset the latest odometer, select "initializing" and press ↵.

(4) Management

① Machine security

75793CD26 75793CD26A 75793CD26B 75793CD26C 75793CD26D

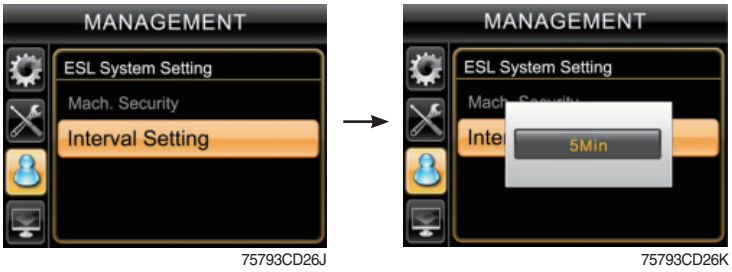
· **ESL system setting**

- 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.

※ **Default password : 00000***

· Interval setting

- If set interval setting to 5 minutes, ESL system is activated after 5 minutes.
  Therefore, the password does not need to restart engine within 5 minutes.



75793CD26J 75793CD26K

· **Change password**

- Input 5 to 10 digits and press *.

75793CD26G

75793CD26H

Enter the current password.

75793CD26L

Enter the new password.

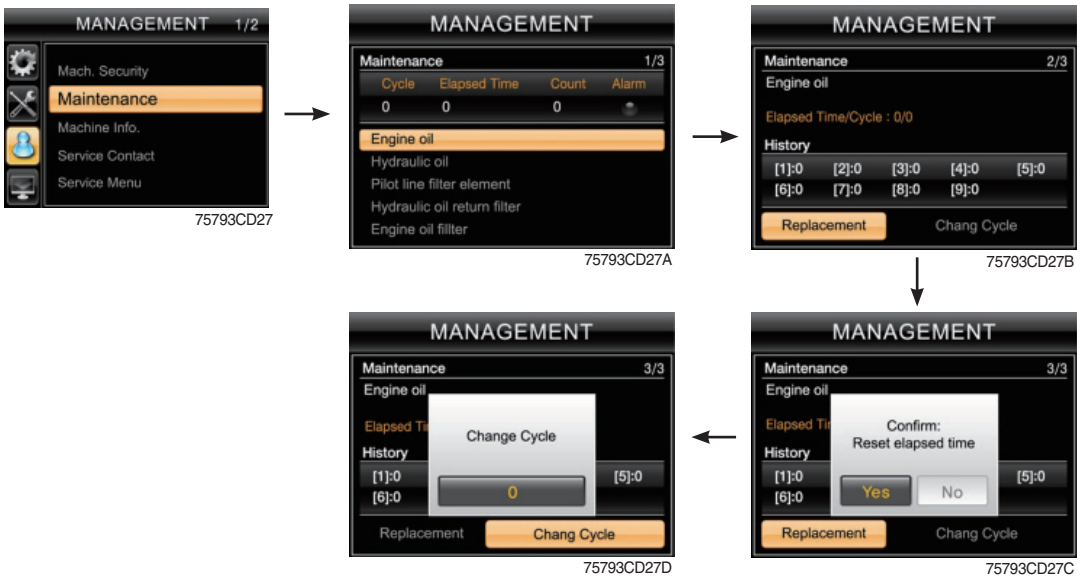
75793CD26M

Enter the new password again.

75793CD26N

The new password is stored in the MCU.

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 ◀ or ▶/🔇.
- **Change or replace interval**

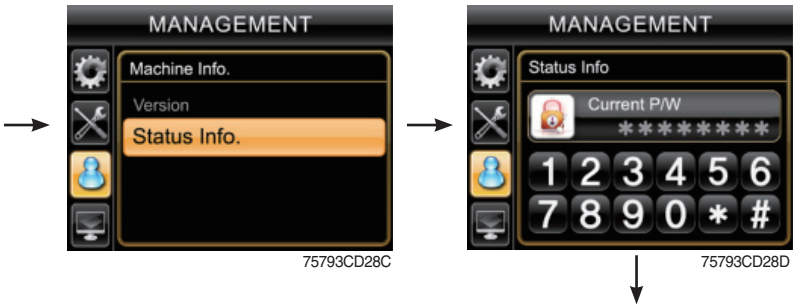
No	Item	Interval
1	Engine oil	250
2	Hydraulic oil	★1 2000 ★2 5000
3	Pilot line filter element	250
4	Hydraulic oil return filter	250
5	Engine oil filter	250
6	Fuel filter element	500
7	Fuel pre-filter	500
8	Coolant filter	500
9	Hydraulic tank air breather	250
10	Radiator coolant	2000
11	Transmission oil and filter	1000
12	Axle oil (front and rear)	1500

★1 : Conventional hydraulic oil

★2 : Hyundai genuine long life hydraulic oil

③ Machine information

75793CD28 75793CD28A 7809S3CD28B

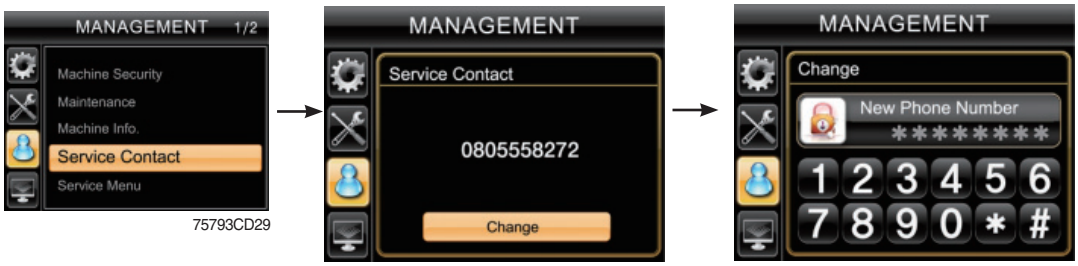


75793CD28C 75793CD28D

75793CD28E

- **Version**
  - Software versions of MCU, cluster and monitor can be checked.
- **Status info**
  - The machine status can be checked.

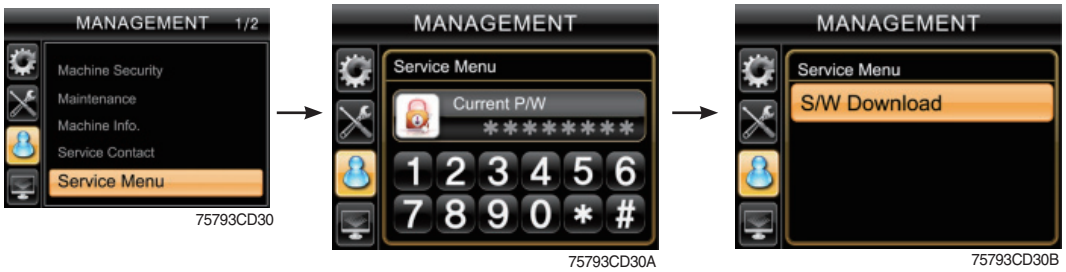
④ Service contact



75793CD29 75793CD29A 75793CD29B

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

⑤ Service menu

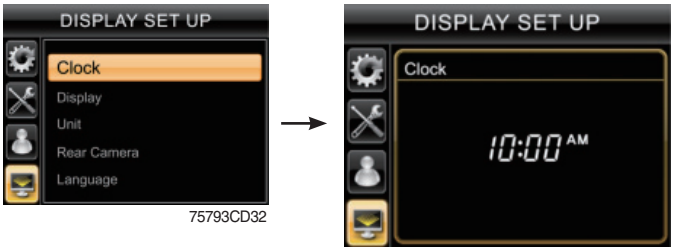


75793CD30 75793CD30A 75793CD30B

- The software of monitor can be downloaded.

(5) DISPLAY SET UP

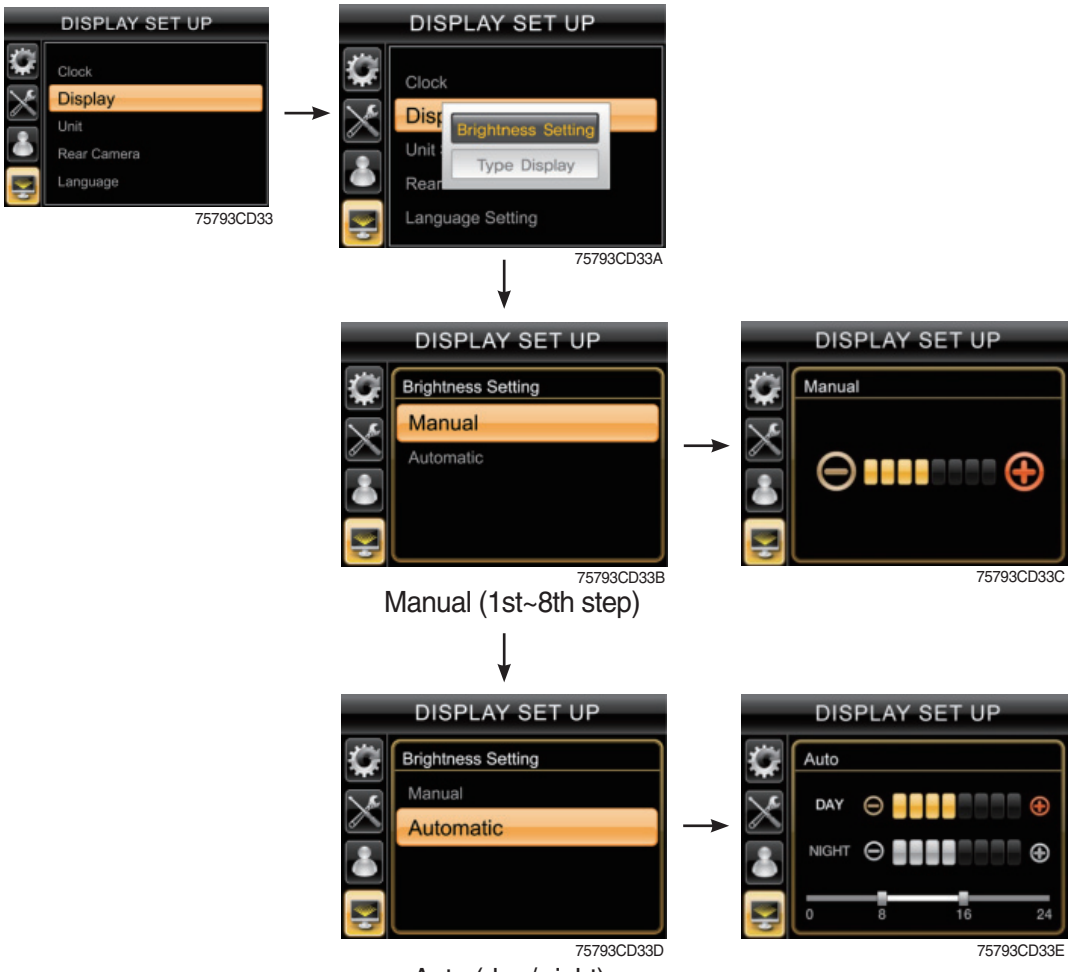
① Clock



- To set time, press ◀ or ▶/🔇 .
- To move position, press ↵ .

② Display

- **Brightness setting**



Auto (day/night)

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

· Display type

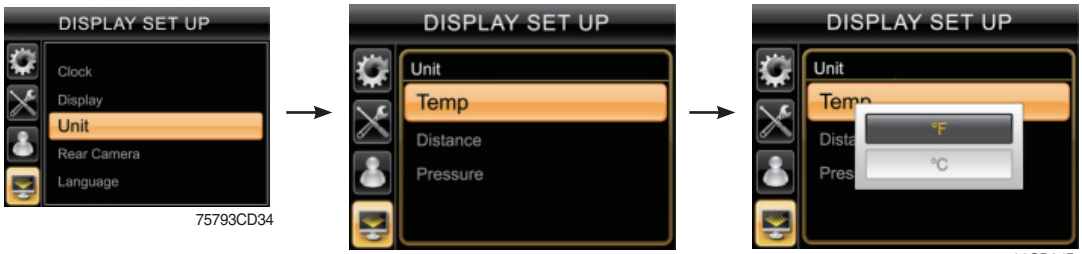
75793CD33F 75793CD33G 7609S3CD40

A type

7609S3CD33

B type

③ Unit



75793CD34 75793CD34A 75793CD34B

· Temperature : ˚C ↔ ˚F
· Distance : km ↔ mile
· Pressure : bar ↔ Mpa ↔ kgf/m^2 ↔ psi

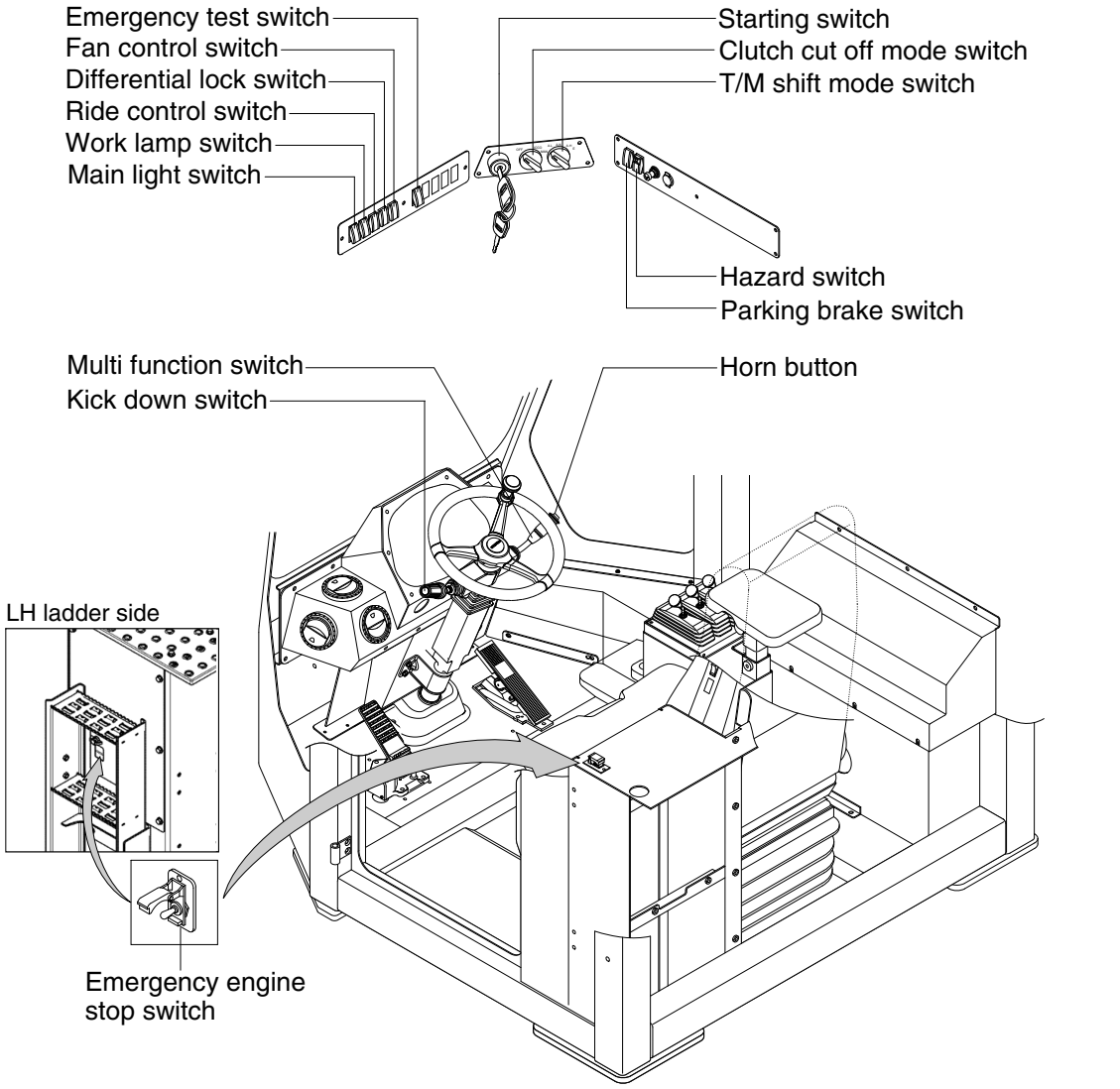
④ Rear camera

- **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.
  - The display order can be set by this menu.
- 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.

⑤ Language

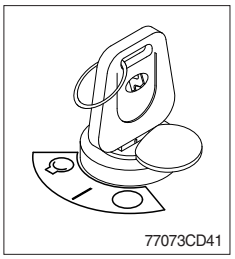
- User can select preferable language and all display are changed the selected language.
- In the main menu, if the three buttons (◀ + ▶/☼ + ↵) are pushed at the same time, the language selection display will be viewed.

4. SWITCHES



7809SU3CD29

1) STARTING SWITCH



77073CD41

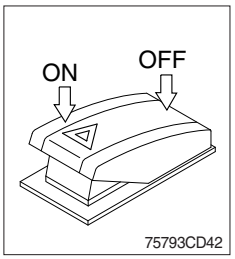
(1) There are three positions, OFF, ON and START.

- ◯ (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) PARKING BRAKE SWITCH

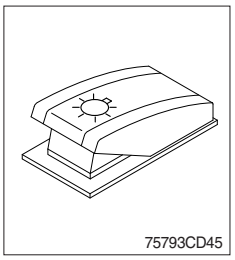
(1) When the switch is pressed to ON position, the parking brake will start to operate and the cluster warning lamp will comes ON.

(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.**

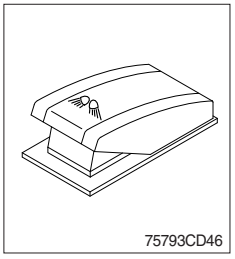
4) MAIN LIGHT SWITCH



(1) This switch use to operates the clearance lamp and head light by two step.

- **First step** : Clearance lamp and cluster illumination lamp comes ON. Also, all indicator lamp of switches come ON.
- **Second step** : Head light comes ON.

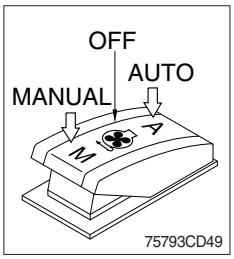
5) WORK LAMP SWITCH



(1) This switch use to operates the front and rear work lamps by two step.

- **First step** : Front work lamp located on the cab comes ON.
- **Second step** : Rear work lamp located on the cowl comes ON.

6) FAN CONTROL SWITCH



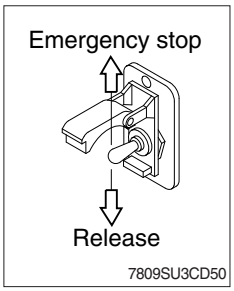
(1) This switch use to control the cooling fan.

(2) This switch has three positions.

- **AUTO** : The fan automatically work in reverse according to set up interval and time.
  ※ **Refer to page 3-14.**
- **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.

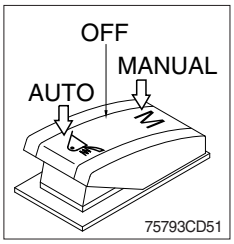
7) EMERGENCY ENGINE STOP SWITCH



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

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

8) 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).

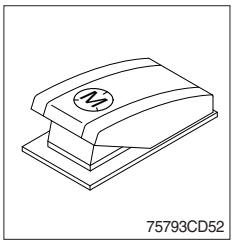
(2) MANUAL

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.

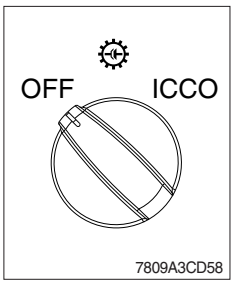
9) EMERGENCY TEST SWITCH (option)



(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.

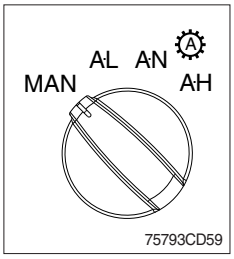
(2) When the switch is pressed, the emergency steering pump motor will run. The emergency steering lamp will light. If the emergency steering lamp does not light, do not operate the machine.

10) 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.

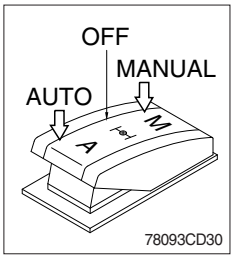
11) TRANSMISSION SHIFT MODE SWITCH



(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.

12) DIFFERENTIAL LOCK SWITCH (option)



(1) This switch is used to apply differential lock.
The differential lock gives equal power to both front wheels and is used in conditions when traction is poor.

(2) Manual mode

Press the top 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.
Manual mode is temporarily engaged as long as the operator pushes the switch. When the switch is released, differential lock function is disengaged and switch returns to OFF position.

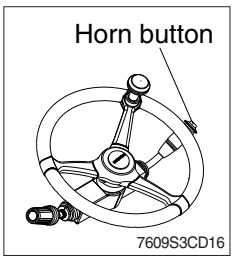
(3) Auto mode

Press the bottom 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.**

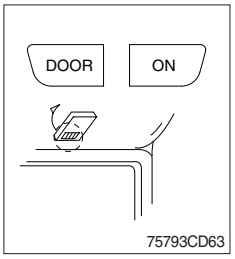
※ **Refer to page 3-9.**

13) HORN BUTTON



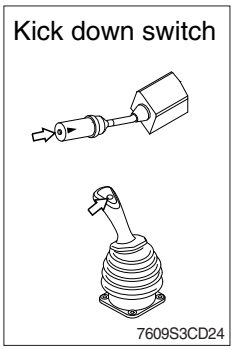
(1) If you press the button on the top of the multifunction switch, the horn will sound.

14) CAB LAMP SWITCH



(1) This switch turns ON the cab room lamp.
① This switch is used to turn the lamp ON or OFF.

15) 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)

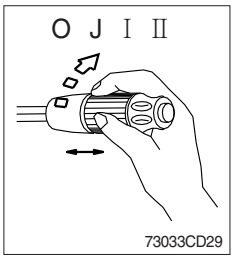
It shifts down from current gear to one step lower speed when push the switch every time.

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

※ **Refer to page 3-14 for the kick down setting.**

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

16) MULTI FUNCTION SWITCH



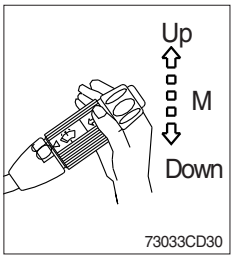
(1) Front wiper and washer switch

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.**



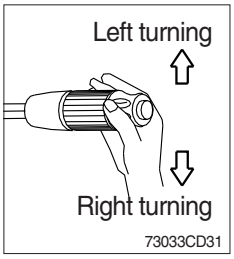
(2) Dimmer switch

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.

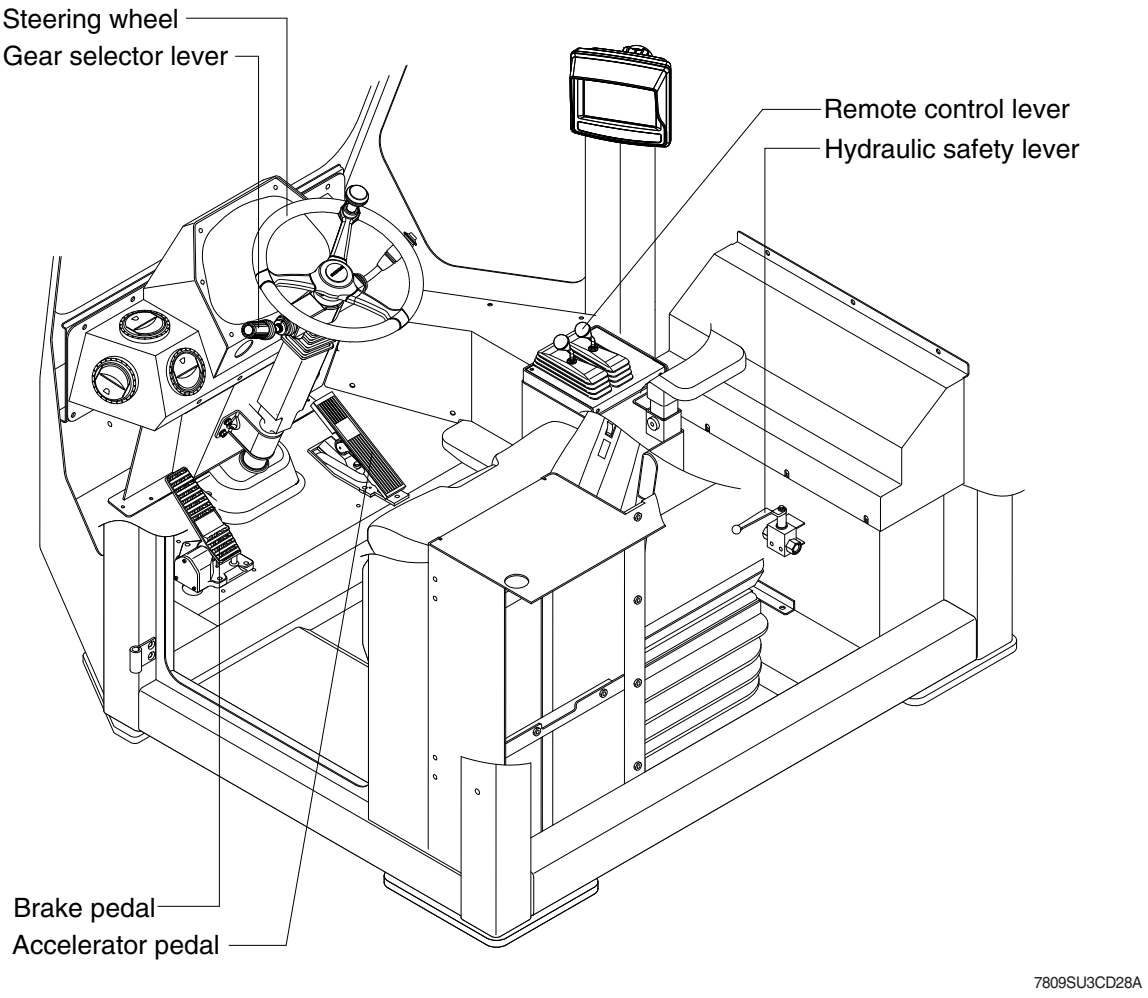


(3) Turning switch

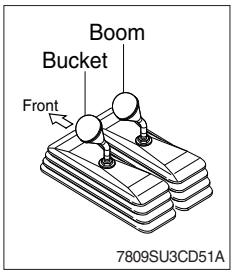
① This switch is used to warn or signal the turning direction of the machine to other vehicles or equipment.

② Push the lever up for turning left, pull the lever down for turning right.

5. CONTROL DEVICE



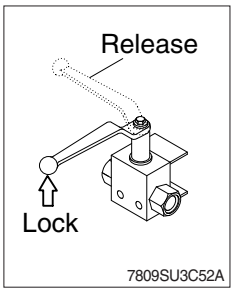
1) REMOTE CONTROL LEVER (fingertip type)



(1) These joystick are used to control the boom and the bucket.

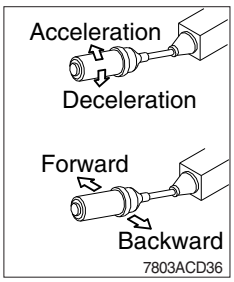
(2) Refer to operation of working device in chapter 4 at page 4-9.

2) HYDRAULIC SAFETY LEVER



(1) When the lever is turned to Lock position, the hydraulic pilot line will be cut off, so the work equipment will not operated.

3) GEAR SELECTOR LEVER

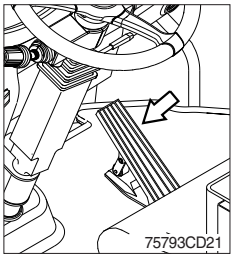


(1) This lever is used for gear selection, forward 4 stages and reverse 3 stages.

(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.

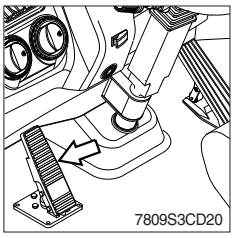
4) ACCELERATOR PEDAL



(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 (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.

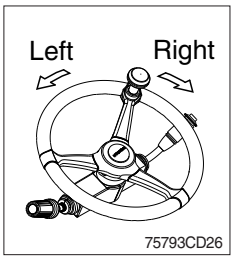
(2) If the power train operation is to be cut off, set the clutch cut off mode switch to ON (L, M, H) and press the pedal.

⚠ 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 3-28.

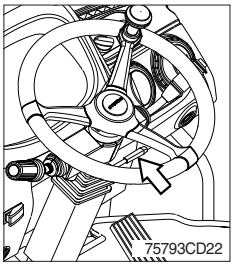
6) STEERING WHEEL

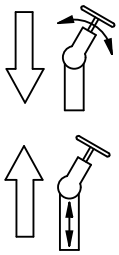


(1) Two multi-motion cylinders in the center of the machine will operate the steering function.

(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





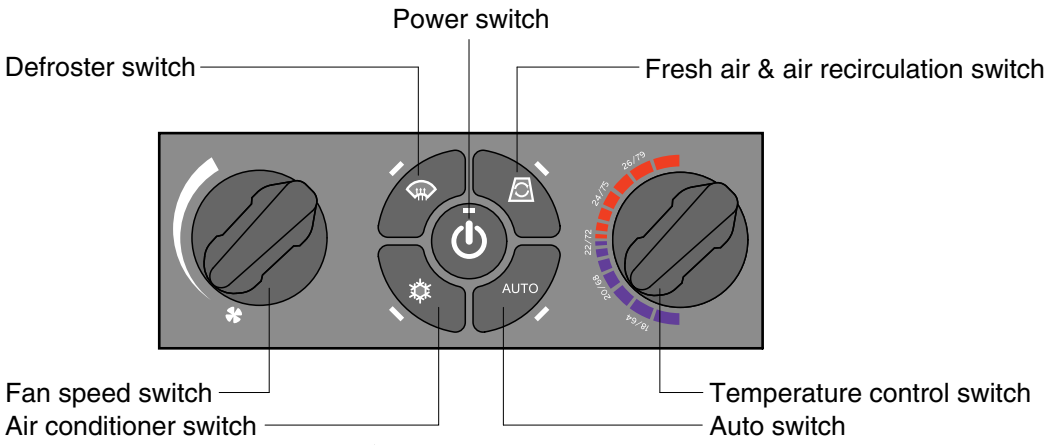
(1) By pulling down the lever, the wheel is adjustable to tilt.
· Tilting : 40˚

(2) By pulling up the lever, the wheel is adjustable to telescope.
· Telescoping : 80 mm

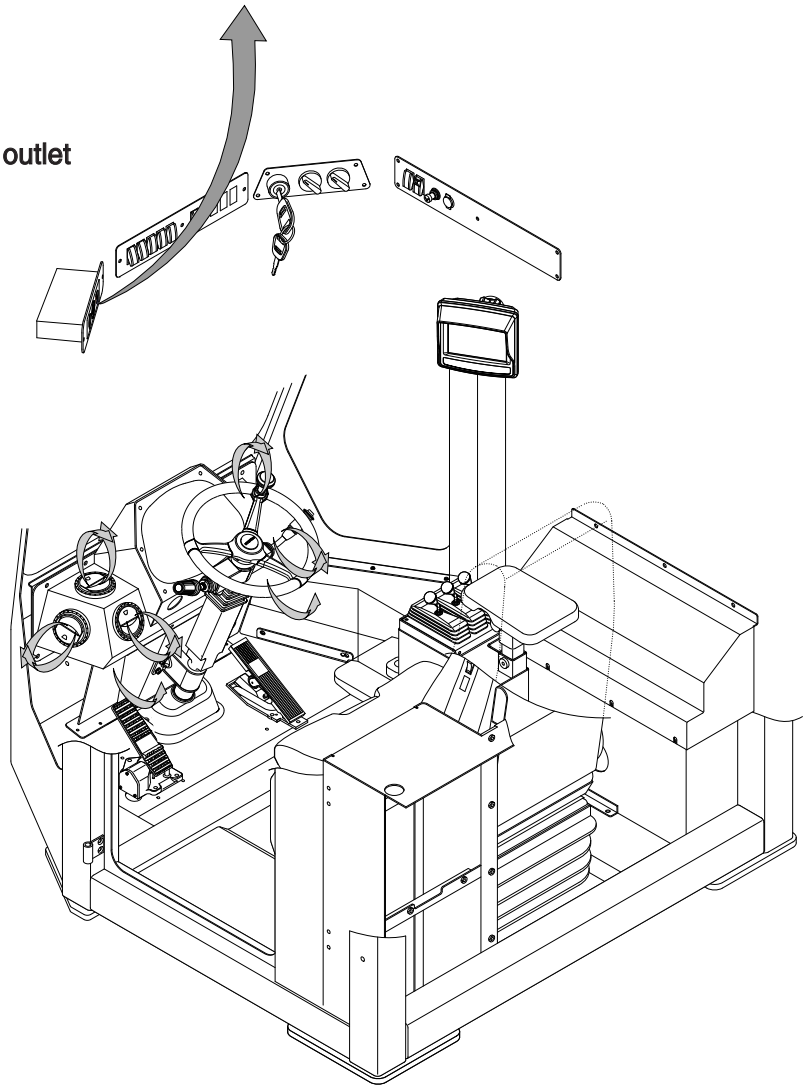
6. AIR CONDITIONER AND HEATER

■ 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.

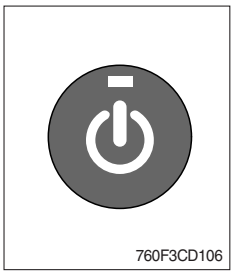


· Location of air outlet



7809SU3CD37A

1) POWER SWITCH



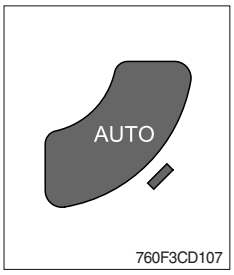
(1) This switch makes the system ON or OFF.
Just before the power OFF, set values are stored.

(2) Default setting values

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

※ **The green pilot lamp is turned ON.**

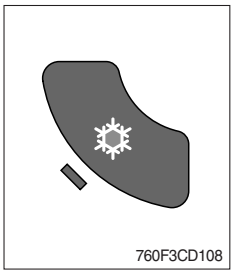
2) AUTO SWITCH



(1) This switch sets the air conditioner and heater system to automatic temperature control.
Auto air conditioner and heater system automatically keeps the optimum condition in accordance with operator's temperature configuration sensing ambient and cabin inside temperature.

※ **The green pilot lamp is turned ON.**

3) AIR CONDITIONER SWITCH (compressor switch)



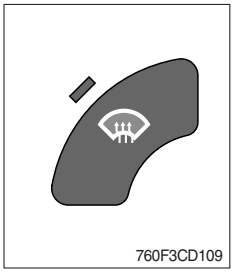
(1) This switch turns the compressor for the air conditioning.

(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.

※ **The green pilot lamp is turned ON.**

4) DEFROSTER SWITCH



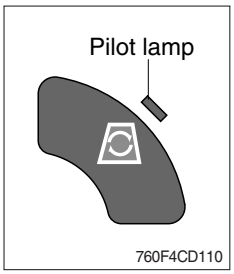
(1) Defroster and ventilation nozzles at window open and directed toward the windows.

(2) Default setting values

Function	Air conditioner	In/outlet	Blower
Value	ON	Outlet	Max for 15 minutes

※ **The green pilot lamp is turned ON.**

5) FRESH AIR/AIR RECIRCULATION SWITCH



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

① **Fresh air (pilot lamp OFF)**

Inhaling air from the outside.

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

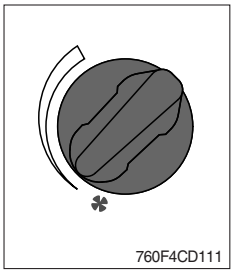
② **Air recirculation (pilot lamp ON)**

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

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

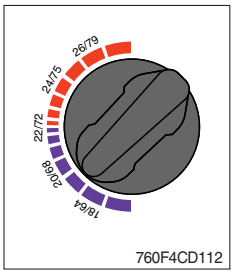
※ **Check out the recirculation filter periodically to keep a good efficiency.**

6) FAN SPEED KNOB



(1) This knob controls fan speed manually.
There are 9 steps to control fan speed.

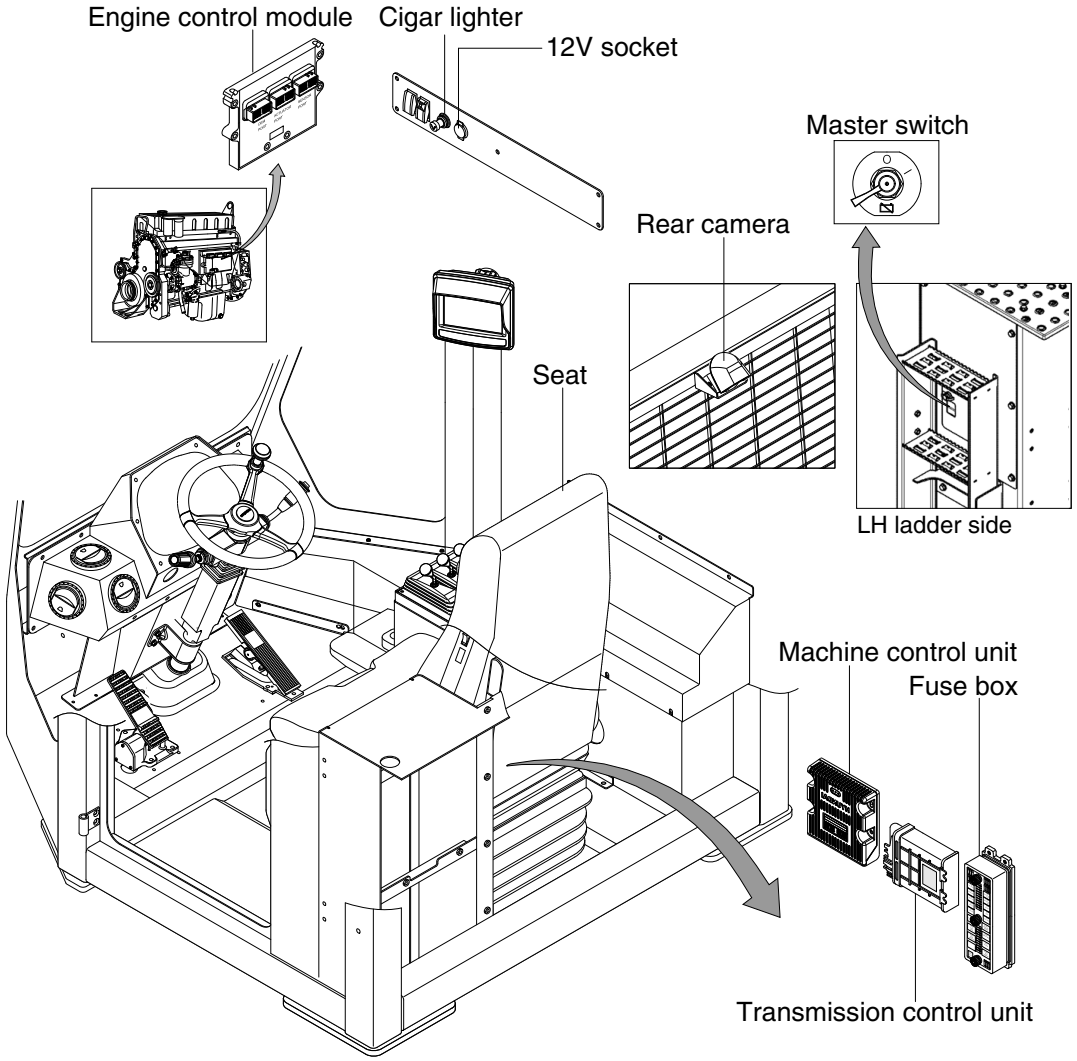
7) TEMPERATURE CONTROL KNOB



(1) This knob controls the position of the water valve when the air conditioner switch is ON or OFF.

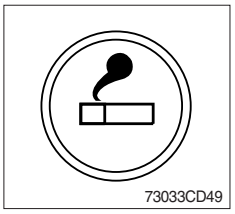
(2) When the AUTO switch is ON, the temperature control knob determines the desired cab temperature. The temperature range is 18˚C (64˚F) in the full cold position and 26˚C (79˚F) in the full hot position.

7. OTHERS



7809SU3CD38

1) CIGAR LIGHTER



73033CD49

(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.

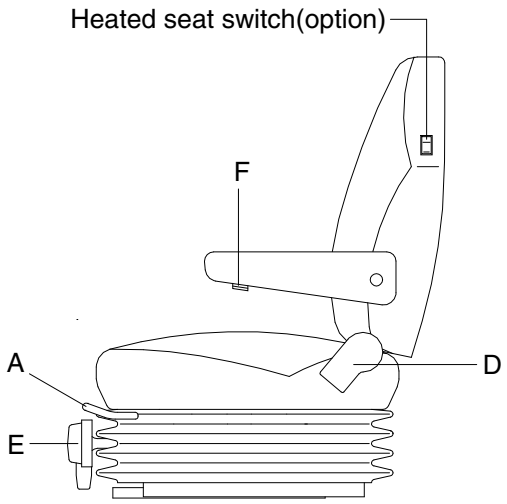
※ Service socket

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.



75793CD102

(1) Forward/Backward adjustment

① Pull lever A to adjust seat forward or backward.

② The seat can be moved forward and backward over 210 mm (8 in) in 21 steps.

(2) Reclining adjustment

Pull lever D to adjust seat back rest.

(3) Arm rest adjustment

This can be adjusted by turning the handle F to right and left.

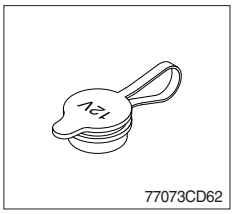
(4) Weight adjustment (E)

Adjusting handle to the operator's weight.

(5) Heated seat switch (option)

Press this switch in order to heat the seat.

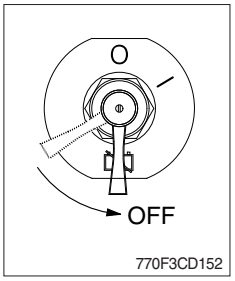
3) 12V SOCKET (option)



77073CD62

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

4) MASTER SWITCH



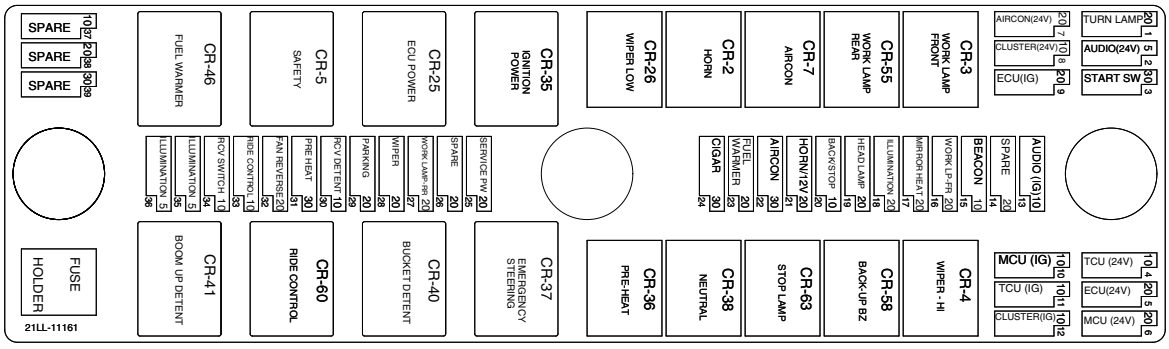
770F3CD152

(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 BOX



7809SU3CD107

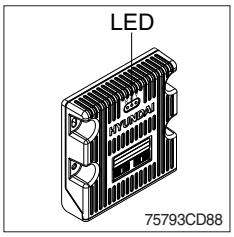
(1) The fuses protect the electrical parts and wiring from burning out.

(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)



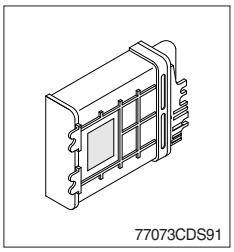
(1) It consists of electronic parts and controls all lamps and buzzers on cluster in accordance with signals transmitted from the switches, the MCU, TCU, the engine and the hydraulic pressure sensors.

(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

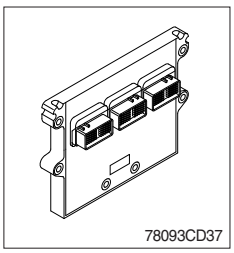
7) TRANSMISSION CONTROL UNIT (TCU)


77073CDS91

(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 UNIT (ECU)


78093CD37

(1) The engine control unit (ECU) is the control center of the engine system.

9) REAR CAMERA (option)


75793CD89

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

※ **Refer to page 3-24.**

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.

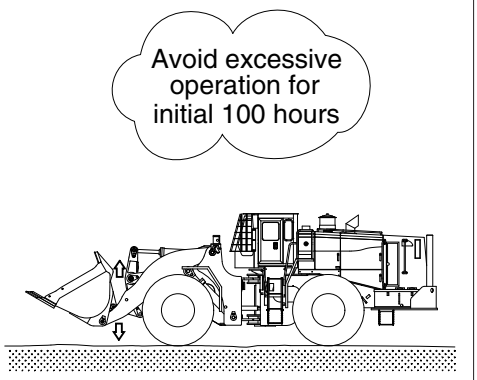
(4) Warm up the machine fully before operation.

(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 element	
Transmission oil and filter	
Axle oil (front and rear)	
Hydraulic oil return filter	
Pilot line filter element	



7809SU4OP01

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.**

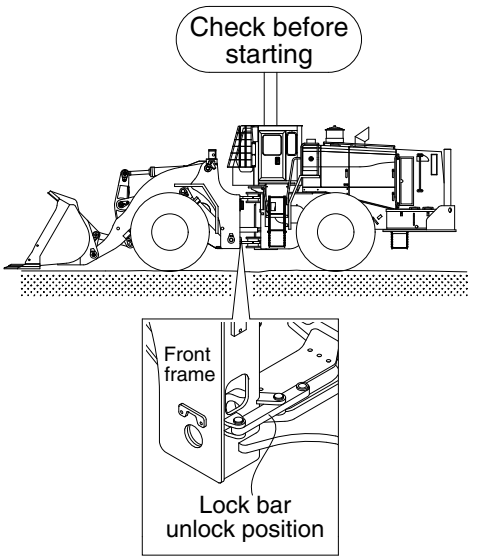
3) Adjust seat to fit the contours of the operator's body for the pleasant operation.

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.**



7809SU4OP02

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 hydraulic safety lever is in the lock position.

(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.

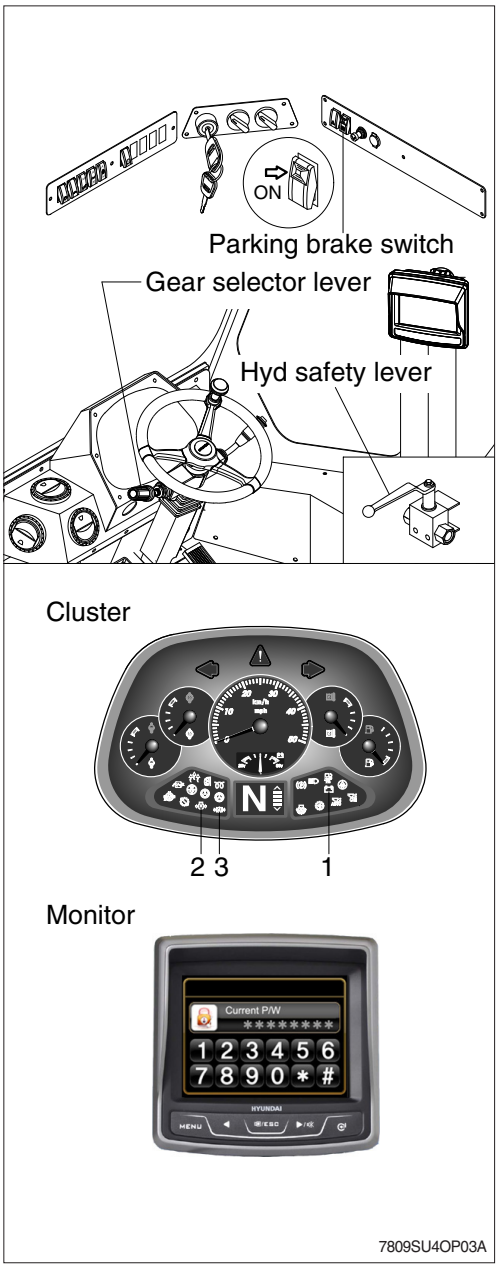
- Charging warning lamp (1)
- Engine oil pressure warning lamp (2)
- Brake fail warning lamp (3)

· **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.



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).

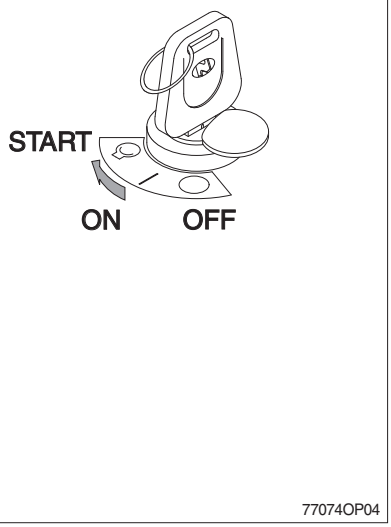
(2) Check if the gear selector lever is in the neutral position.

(3) Check if hydraulic safety lever is in the lock position.

(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.



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 hydraulic safety lever is in the lock position.

(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.

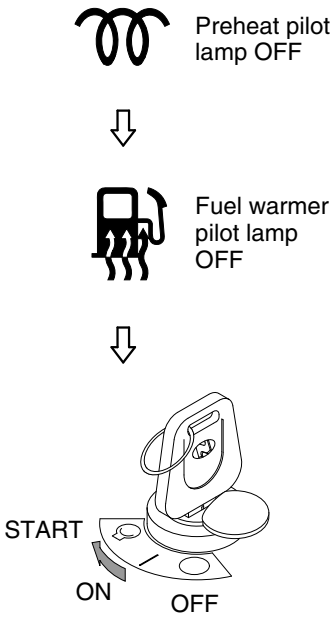
(6) Release starting switch immediately after starting engine. The starting switch will automatically return to the ON position.

※ 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?

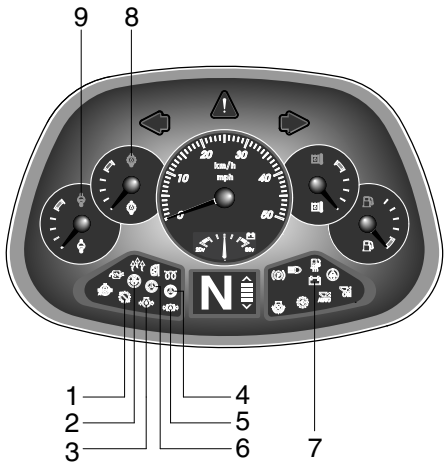
② Is the indicator of transmission oil temperature gauge (9) in the operating range?

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.**



7809S4OP06

5) TRANSMISSION COLD STARTING

(1) At an oil temperature in the shifting circuit < -12˚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.


7809S4OP15

※ **Transmission warning**

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.

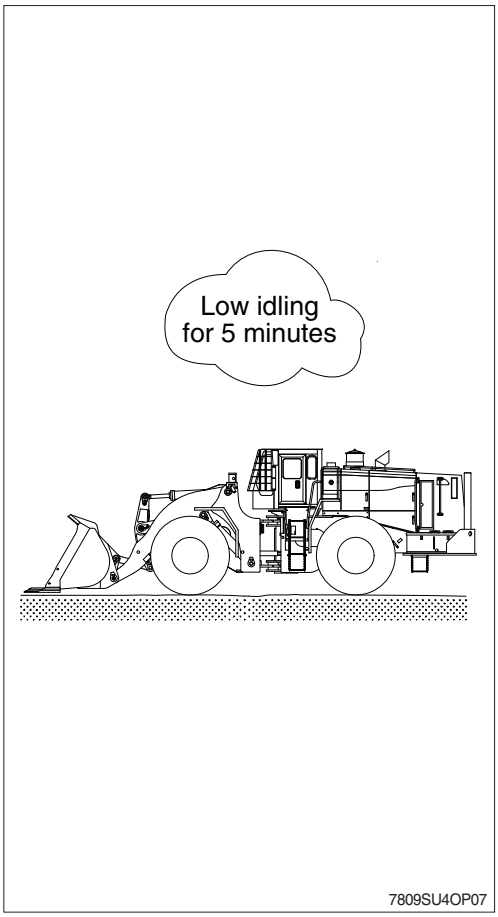
(3) Run the engine for five minutes at low idle with no load.

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

(5) Remove the key to prevent other people using the machine.

(6) Turn the hydraulic safety lever in the lock 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) Release the hydraulic safety lever.

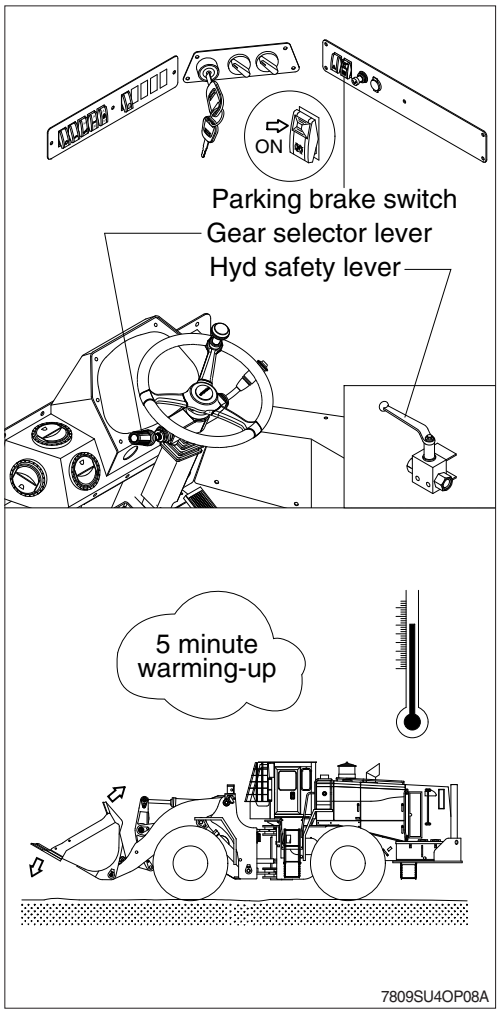
4) Lift the boom slightly and extend the bucket cylinder to the stroke end to relieve hydraulic pressure.

※ 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.



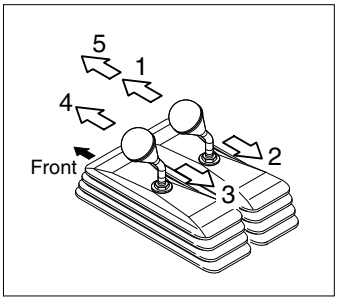
5. OPERATION OF THE WORKING DEVICE

※ 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 toward the left in order to tilt the bucket backward.

Bucket dump (4)

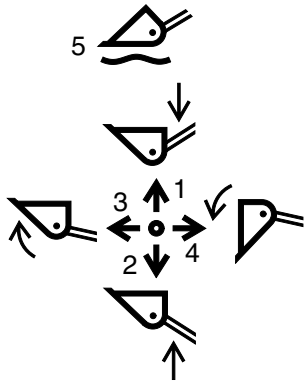
Move the control lever toward the right in order to dump a load from the bucket.

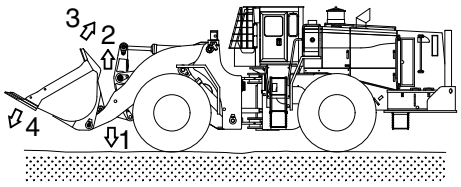
Boom float (5)

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.





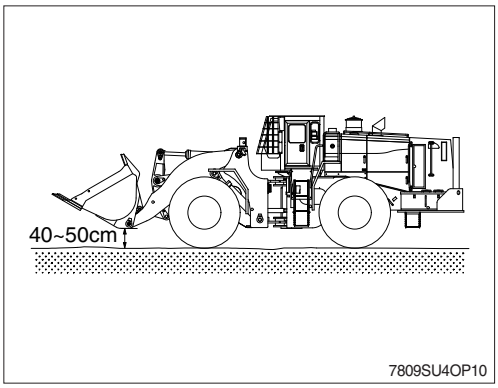
7809SU4OP09A

6. TRAVELING OF THE MACHINE

1) BASIC OPERATION

(1) Traveling posture

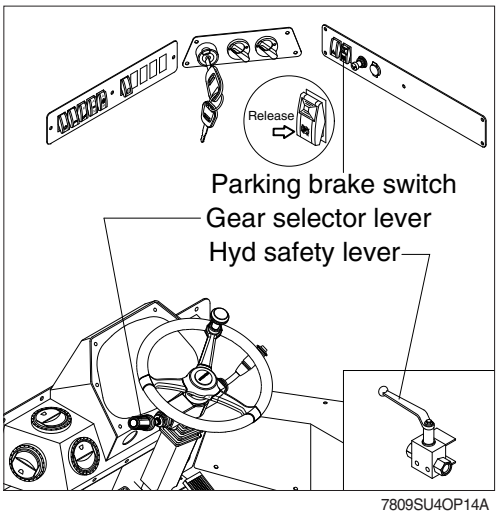
Lift the boom so that the bucket is placed 40-50㎝ above the ground.



(2) Traveling operation

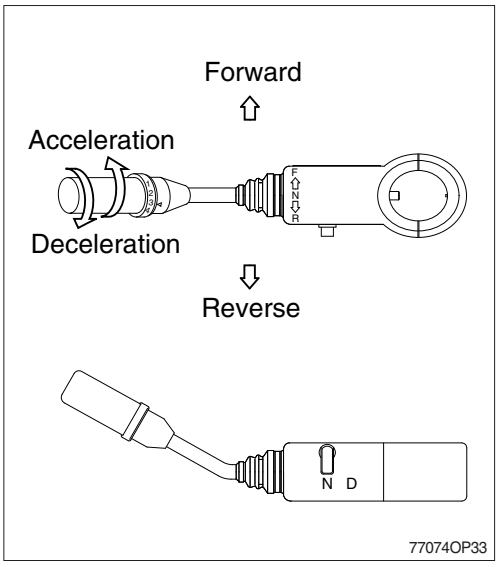
When warm-up operation is completed after the engine is started, move the machine according to the following procedure.

① Release the hydraulic safety lever.
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.

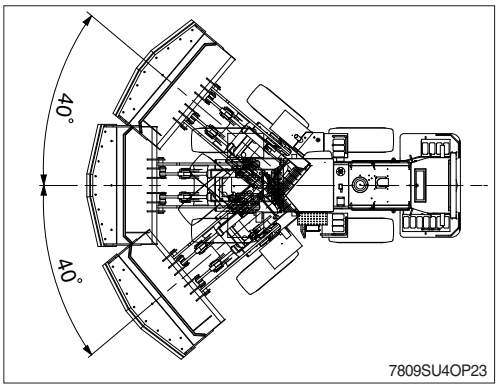
(4) Turning the machine

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 lighten rapidly, the speed of the machine will increase. So, be careful.

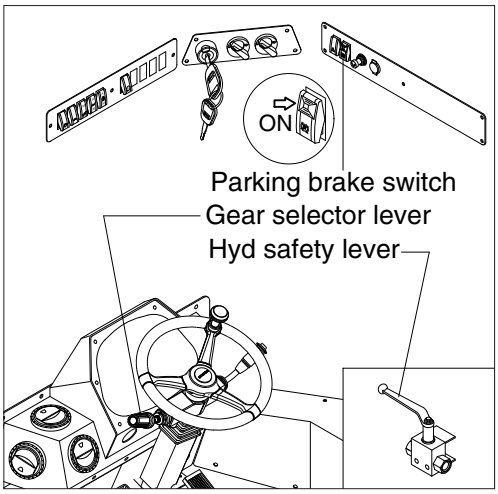
③ When the machine travels on uneven ground, keep the machine traveling at low speed.

(6) Stopping the machine

① Press the brake pedal to stop the machine.

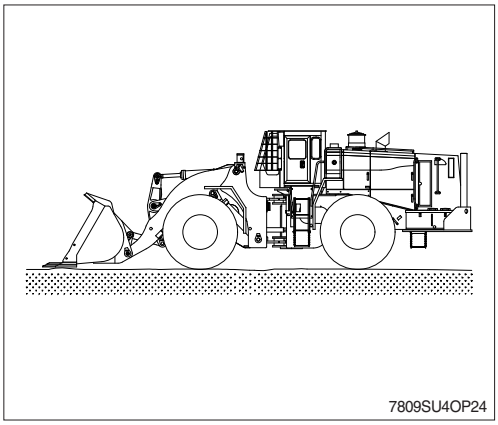
② Put the gear selector lever in the neutral position.

③ Push the parking brake switch to the ON position.



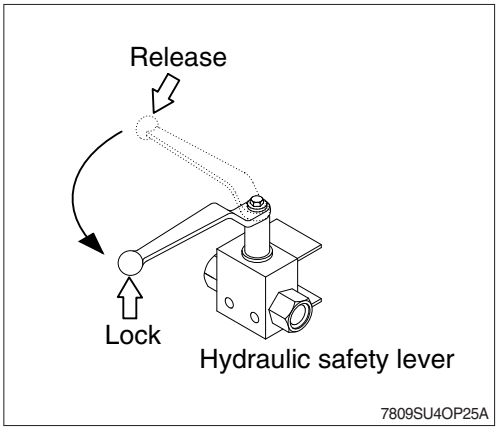
7809SU4OP27A

④ Lower the bucket to the ground.


7809SU4OP24

⑤ Put the hydraulic safety lever in the lock position.

※ **When parking on a slope, block the tires.**



7809SU4OP25A

(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 hydraulic safety lever is in the lock position.

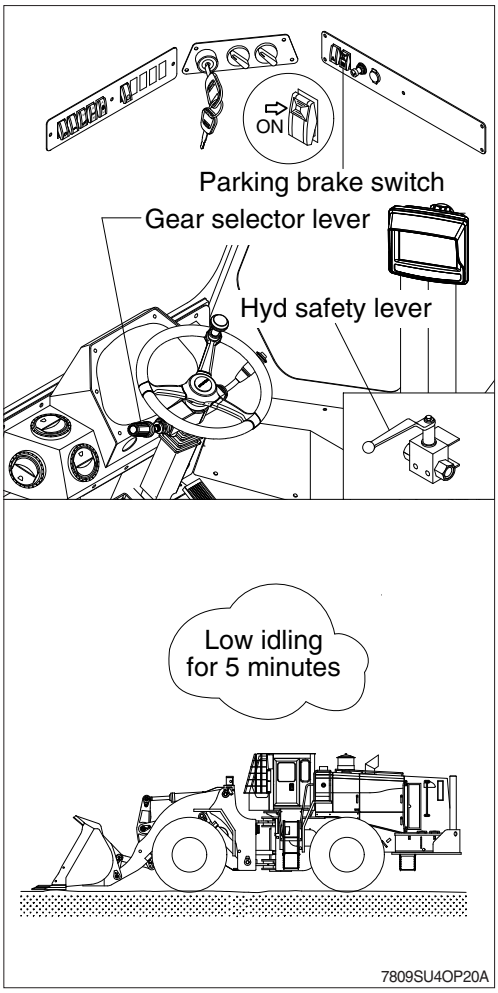
④ Run the engine at low speed without operating the equipment for about 5 minutes.
Turn the starting key to the OFF position and remove the key.

(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.

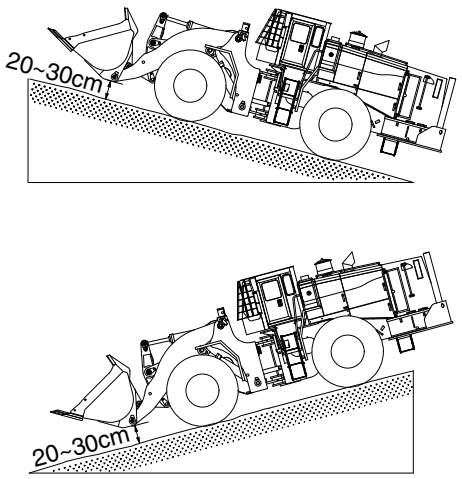
(2) Lower the bucket 20-30 ㎝ (1 ft) to the ground so that it can be used as a brake in an emergency.

(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.



7809SU4OP21

7. EFFICIENT WORKING METHOD

1) GENERAL

(1) Lift the bucket about 40-50 ㎝ (2 ft) above the ground to ensure safety and to gain a good range of view.

(2) Clear the jobsite and level the ground.

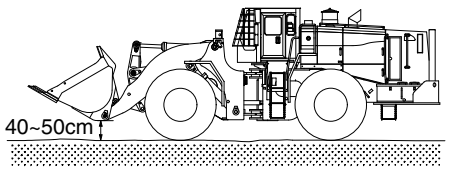
(3) Be careful that excessive force is not applied to the bucket.

(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.



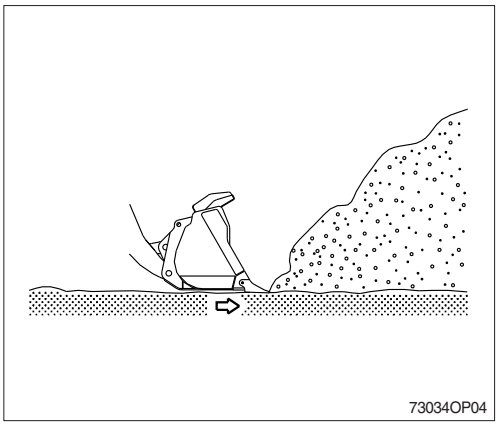
7809SU4OP10

2) EXCAVATION WORK

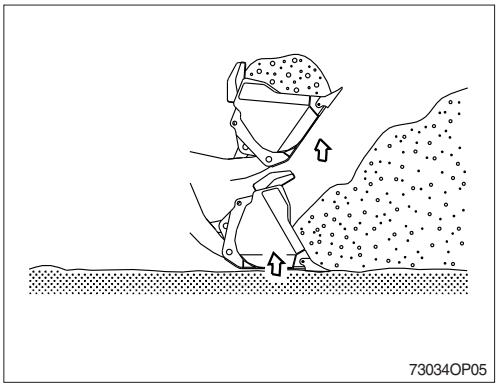
(1) Shovel work

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.

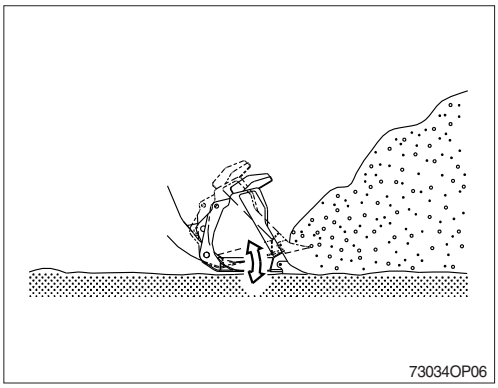
① Keep the bucket shovel parallel to the ground (If the bucket is pushed in a non-horizontal position, power may be reduced, and the bucket cannot dig deeply into the heap of soil).



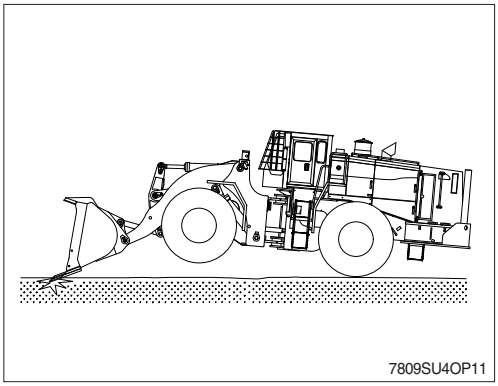
② When the bucket is sufficiently deep into the pile, advance the machine with the control lever pulled down. And by placing the control lever in the bucket roll-back position, fill the bucket with soil.



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.



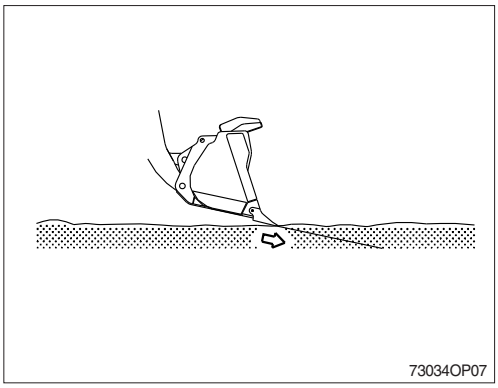
※ If the machine operates with its front tires lifted, its driving force will deteriorate and excessive force will be applied to the rear tires. Avoid operating in that posture.



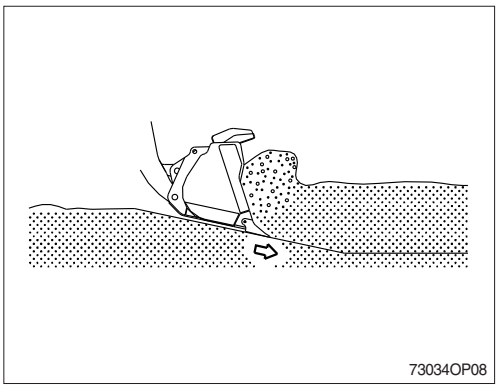
(2) Excavation on level ground

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.

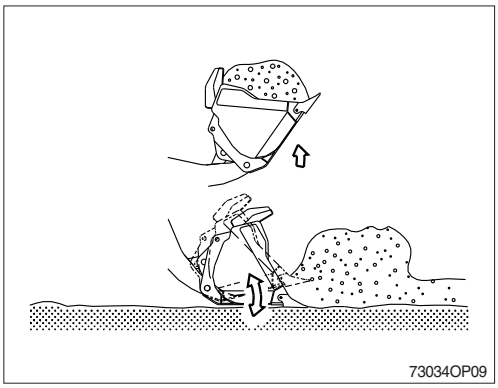


③ Advance the machine while controlling the depth of digging with the control lever.

※ 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.



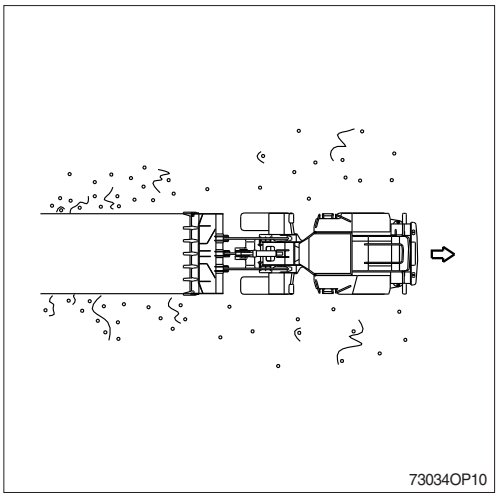
3) LEVELING

(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.

(3) Load the bucket with soil and place the bucket in the horizontal position.
Then put the control lever in the BOOM FLOAT position and move backward.

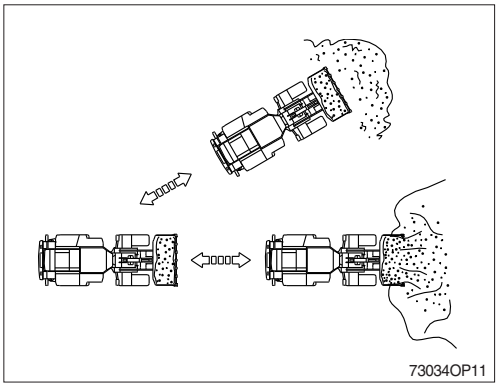
※ Make sure that the machine moves always backward when doing leveling work.



4) TRANSPORTATION

※ Make sure that the traveling path is always cleared.

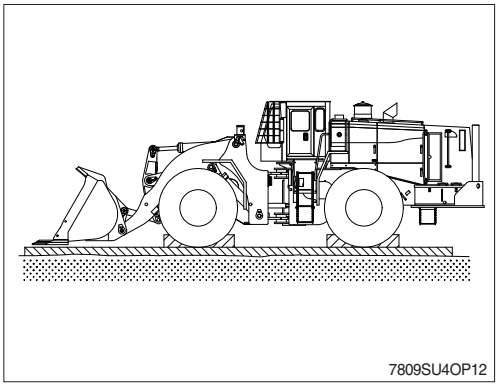
※ When transportating material, lift the bucket 40-50 ㎝ above the ground.



5) COMPACTION

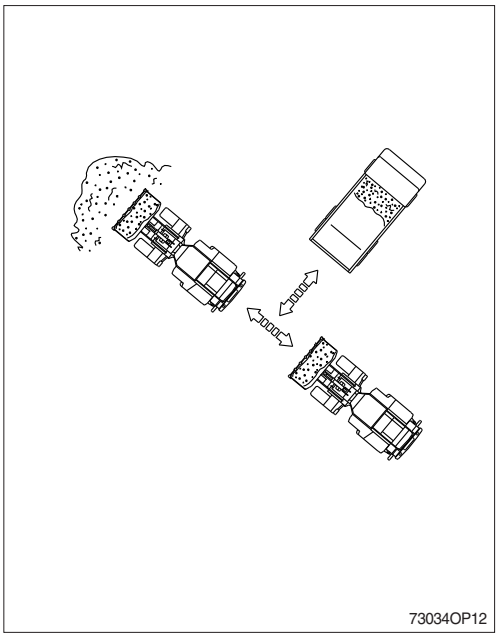
When operating, keep the bottom of the bucket horizontal to the ground.

※ 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.


73034OP12

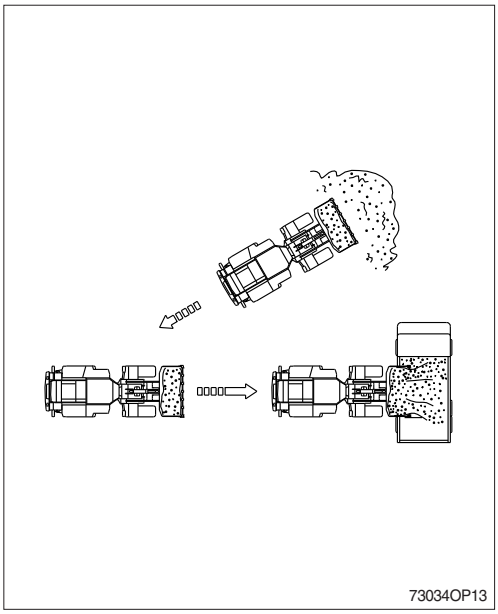
(1) I method

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


73034OP13

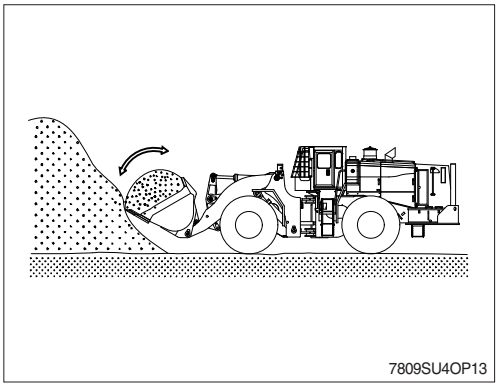
① Park the truck at an angle of 60 degrees toward the machine. After digging out, drive backward and position the machine at a right angle with the truck and load the truck with the soil.

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.

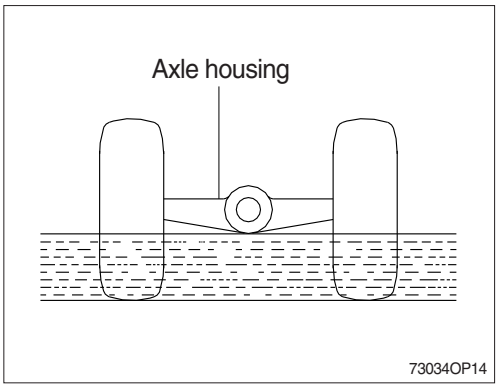

7809SU4OP13

7) PRECAUTIONS DURING OPERATION

(1) Permissible water level

① Do not work in water or damp ground deeper than the permissible depth (Up to lower part of the axle housing).

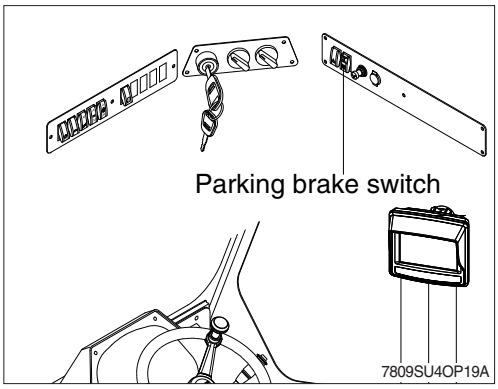
② After the work is completed, grease parts which has been immersed in water.



(2) When the brake does not operate

① If the machine does not stop even though the brake pedal is applied, use the parking brake.

※ After using the parking brake as an emergency brake, ask Hyundai dealer to check complete brake system.



(3) Precautions when driving on a slope

① When turn on a slope, lower the work equipment to lower its center of gravity.
Avoid turn on a slope if possible.

② **When traveling down a slope**

a. If the main brake is used to often when traveling down a slope, it may be overheated and damaged. So put the transmission lever in the low speed position and use the engine as a brake.

b. If there is a mismatch of speed, torque converter oil temperature may be overheated. Set the speed in 1st speed position to allow the temperature to drop.

c. When the gauge does not move into the green range at the 1st speed, stop the machine and put it in neutral. Run the engine at a mid range speed until the gauge moves into the green range.

③ **When the engine stops**

If the engine stops on a slope, press the parking brake switch immediately and lower the work equipment to stop the machine.

(4) Precautions when traveling

Do not travel a long distance at high speed. It may overheat tires and cause premature damage. If it is necessary to travel a long distance at high speed, observe the following.

① Comply with the regulations concerning this machine to ensure safety.

② Do the pre-inspection before starting off.

③ As the optimum air pressure of tire and optimum driving speed is different according to the kinds of tires and road conditions, consult Hyundai dealer or tire distributor.

④ Check the air pressure of tire before driving.

⑤ After 1 hour driving, stop for 30 minutes to check any abnormality of tires and other parts, and level of oil and coolant.

⑥ Travel with the bucket empty.

8. 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.

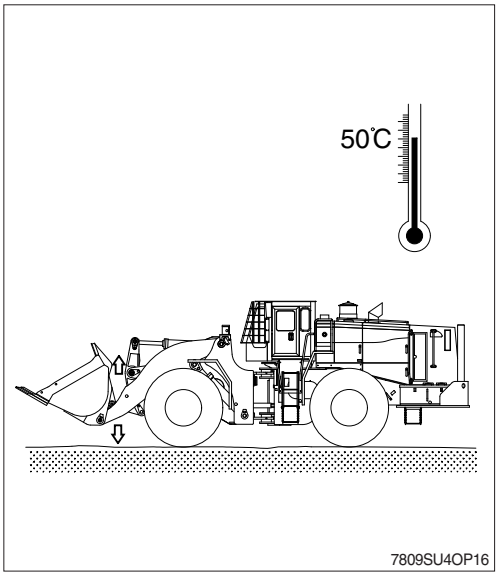
(3) Refer to the starting engine in cold weather. Start the engine and extend the warming-up operation.

(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.

9. 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.

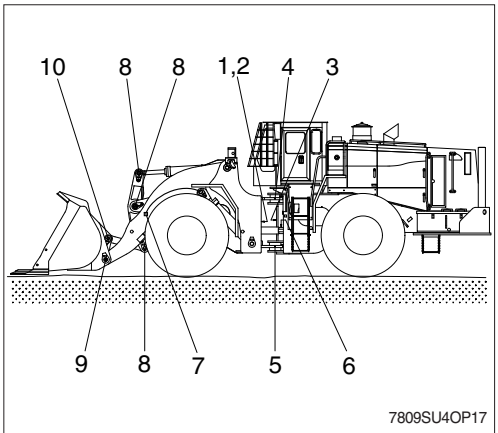
As oil can be diluted during storage.

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.



7809SU4OP17

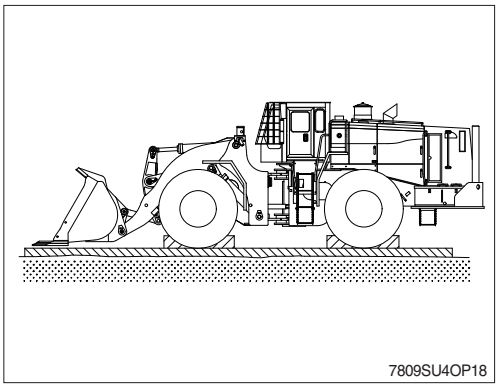
1 Lubricating manifold (left, 5EA)
2 Lubricating manifold (right, 4EA)
3 Lubricating manifold (right, 2EA)
4 Center pivot pin (upper, 1EA)
5 Center pivot pin (lower, 1EA)
6 Steering cylinder pin (2EA)
7 Boom cylinder pin (rod side, 2EA)
8 Bellcrank (6EA)
9 Boom and bucket connecting pin (2EA)
10 Bucket link connecting pin (2EA)

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.



7809SU4OP18

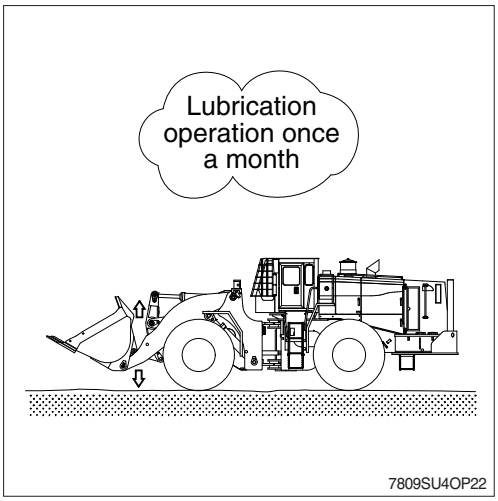
6) DURING STORAGE

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.

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.

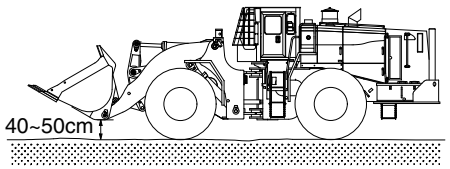
2) Perform daily inspection before starting the machine.

3) Check the air pressure of tires and traveling speed limitations.
   - Air pressure : 6.5 kgf/cm^2 (94 psi)
   - Maximum speed : 34.5 km/hr (21.4 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.

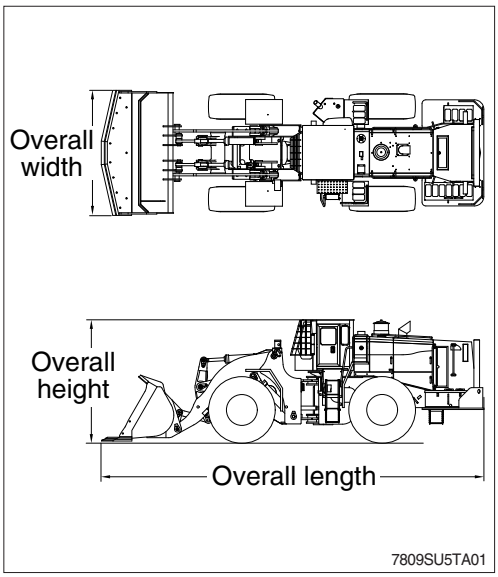
6) Travel at a mid-range speed and be careful to drive within the limited speed when driving on a public road.



7809SU4OP10

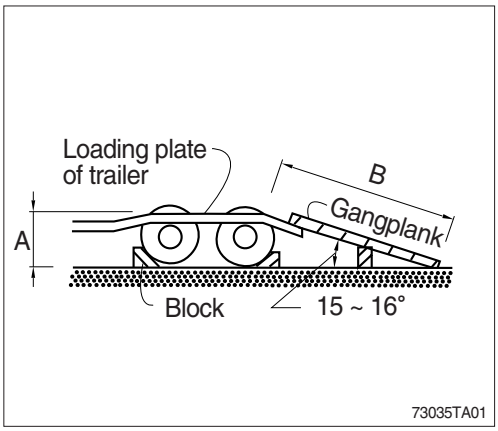
2. PREPARATION FOR TRANSPORTATION

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 antifreeze if moving machine to a cold climate.
3) Select proper trailer after confirming the weight and dimension from the page 2-2.
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

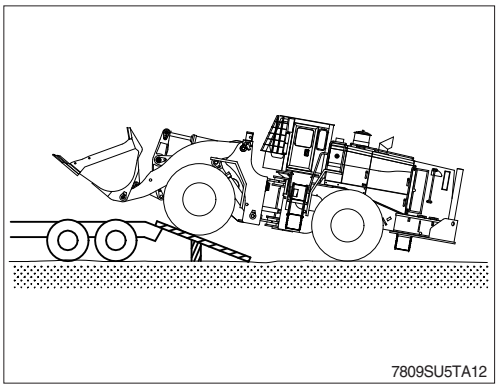


3. LOADING THE MACHINE

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.


7809SU5TA12

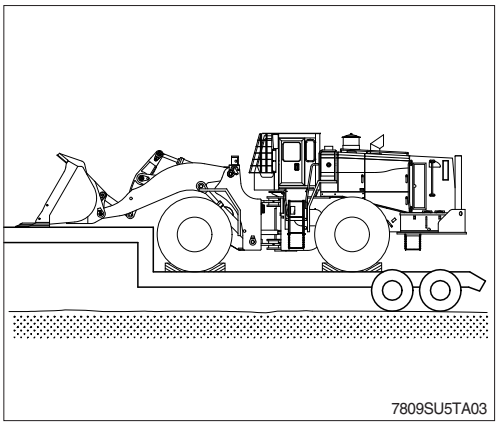
4) Do the following after loading the machine to the trailer.

(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.**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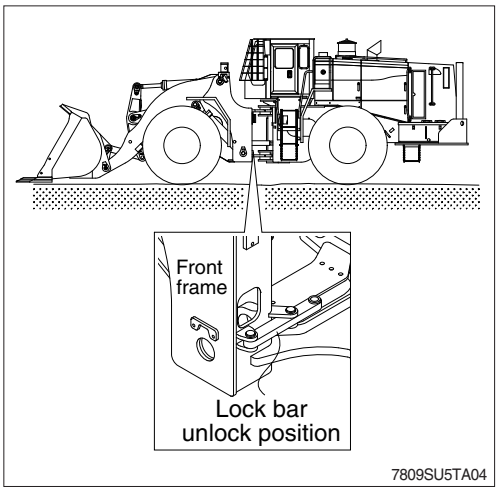
4. FIXING THE MACHINE

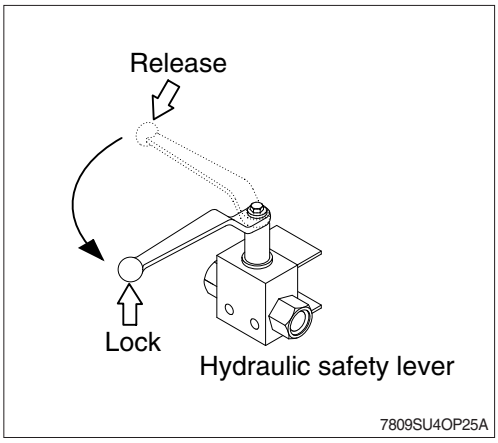
1) Fix front and rear frame by linking safety lock bar.

2) Push the parking brake switch.

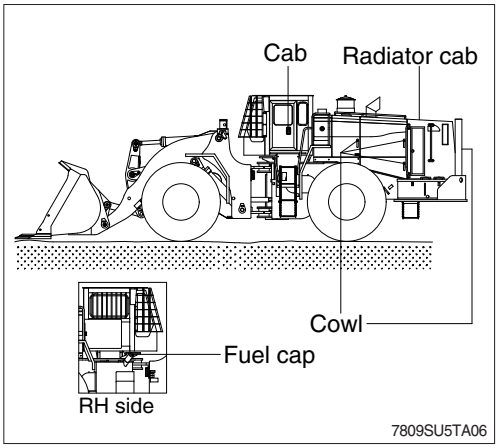


3) Put the hydraulic safety lever in the lock position to prevent the hydraulic system from operating.

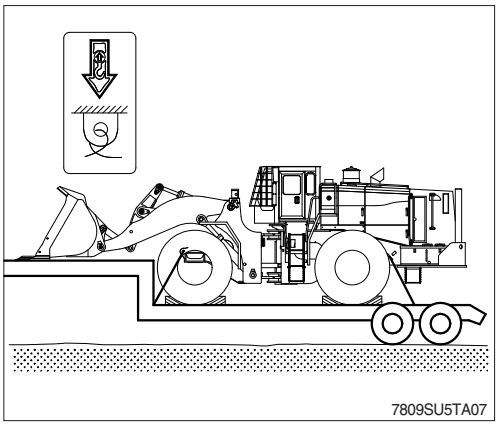
4) Stop the engine, turn the starting switch off and remove the key.



5) Secure all locks.



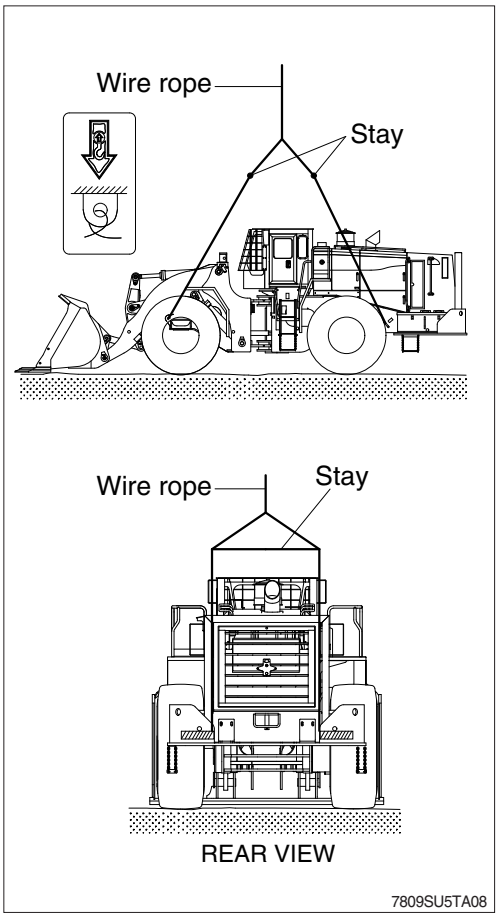
6) Block the tires and fix firmly with wire rope or chain to prevent the machine from moving during transportation.



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 hydraulic safety lever to LOCK position to prevent the machine moving when hoisting the machine.**
⚠ **The wrong hoisting method or installation of wire rope can cause damage to the machine.**
⚠ **Do not load abruptly.**
⚠ **Keep area clear of personnel.**



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.

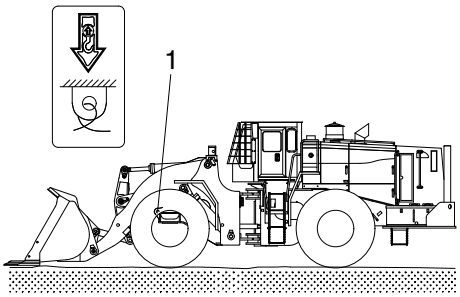
(3) When the steering device and the brake of the machine to be towed can not be operated, transport by trailer.

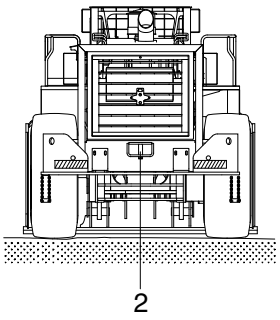
⚠ **Be careful when towing.**

⚠ **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.





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(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.

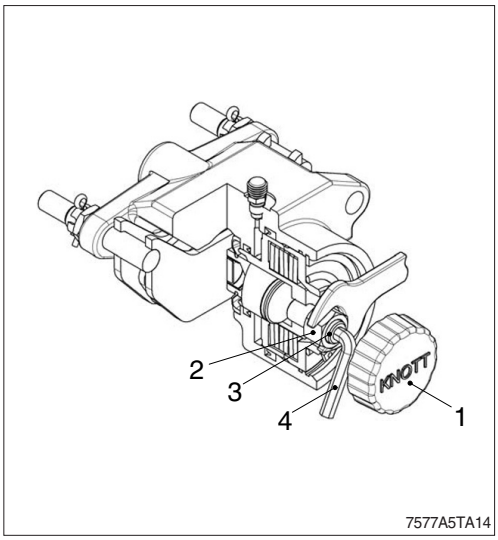
(1) The transmission oil does not lubricate the system, so remove the front and rear drive shafts.

(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 reduce 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) in a counter-clockwise direction and unscrew it.
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.

⚠ In this condition the machine has no parking brake facility and thus must be protected from rolling away by different means. The brake must be adjusted before recommissioning.



(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.

7609S6MI14

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.

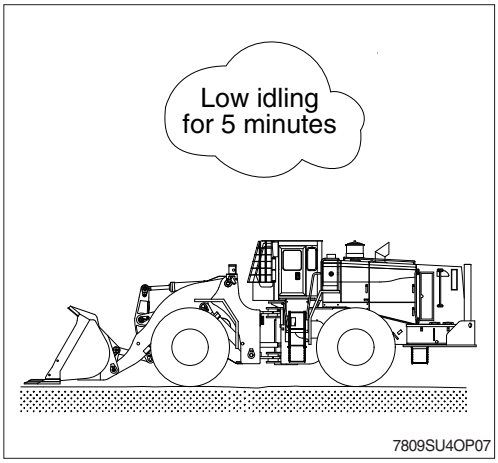
(9) For more detail information of maintenance, please contact local Hyundai dealer.

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

4) RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM

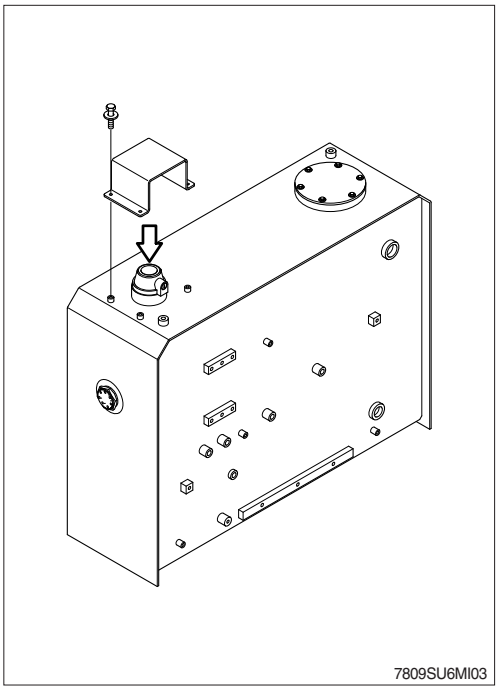
※ **Spouting of oil can cause the accident when loosening the cap or hose right after the operating of the machine as the machine or oil is on the high pressure on the condition.**
Be sure to relieve the pressure in the system before repairing hydraulic system.

(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 (flywheel housing, 14EA)	M10×1.5	3.06 ± 0.5	22.1 ± 3.6
3		Engine mounling bolt (coupling, 8EA)	1/2-13UNC	12.3 ± 2.5	89.0 ± 18.1
4		Engine mounting bolt (gear housing, 6EA)	M10×1.5	6.63 ± 1.0	48.0 ± 7.2
5		Radiator mounting bolt	M16×2.0	29.7 ± 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	M16×2.0	29.7 ± 4.5	215 ± 32.5
8		Steering pump housing mounting bolt	M16×2.0	29.7 ± 4.5	215 ± 32.5
9		Main control valve mounting bolt	M12×1.75	12.8 ± 3.0	92.6 ± 21.7
10		Steering unit mounting bolt	M10×1.5	6.9 ± 1.4	49.9 ± 10.1
11		Flow amplifier mounting bolt	M10×1.5	6.9 ± 1.4	49.9 ± 10.1
12		Brake valve mounting bolt	M8×1.25	2.5 ± 0.5	18.1 ± 3.6
13		Cut-off valve mounting bolt	M12×1.75	12.3 ± 2.0	89.0 ± 14
14		Remote control lever mounting bolt	M6×1.0	1.1 ± 0.2	8.0 ± 1.4
15		Safety valve	M8×1.25	2.5 ± 0.5	18.1 ± 3.6
16		Hydraulic oil tank mounting bolt	M20×2.5	57.9 ± 8.7	419 ± 62.9
17	Power train system	Transmission mounting bolt, nut (rubber, 4EA)	M24×3.0	100 ± 15.0	723 ± 108
18		Transmission mounting bolt (bracket, 8EA)	M20×2.5	56.1 ± 8.4	406 ± 60.8
19		Transmission bolt (bracket, converter side)	M16×2.0	28.6 ± 4.3	207 ± 31.1
20		Front axle mounting bolt, nut	M36×3.0	270 ± 30	1950 ± 217
21		Rear axle support mounting bolt, nut	M36×3.0	270 ± 30	1950 ± 217
22		Tire mounting nut	M22×1.5	79.0 ± 2.5	571 ± 18
23		Drive shaft joint mounting bolt (front, center, rear)	1/2-20UNF	15.0 ± 2.0	108 ± 14.5
24		Drive shaft joint mounting bolt (upper)	1/2-20UNF	15.0 ± 2.0	108 ± 14.5
25	Others	Operator's seat mounting bolt	M8×1.25	1.9 ± 0.8	13.7 ± 5.0
26		Cab mounting bolt (4EA)	M27×2.0	70.0 ± 10.0	506 ± 72.3

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 CH-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
Coolant	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

★ 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

2) RECOMMENDED LUBRICANTS

Use only oils listed below.

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) 40 (104)
Engine oil pan	Engine oil	38 (10.0)	★1SAE 5W-40 SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
Transmission	Engine oil	50 (13.2)	SAE 10W-30 SAE 15W-40
Axle	UTTO	Front : 63 (16.6) Rear : 61 (16.1)	★Refer to below list
Hydraulic tank	Hydraulic oil	Tank: 242 (63.9) System: 336 (88.8)	★1ISO VG 15 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	320 (84.5)	★1ASTM D975 NO.1 ASTM D975 NO.2
Fitting (grease nipple)	Grease	As required	★1 NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and soft water★2	45 (11.9)	Ethylene glycol base permanent type (50 : 50) ★1 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

★ 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 Cold region
Russia, CIS, Mongolia

★2 Soft water
City water or distilled water

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	6-27
Engine oil level	Check, Add	6-15
Radiator coolant level	Check, Add	6-17
Fan belt tension & damage	Check	6-21, 22
Fuel pre-filter element (water)	Drain	6-26

2) EVERY 50 HOURS SERVICE

Check items	Service	Page
Attachment pins	Lubricate	6-38
Tire (air)	Check, Add	6-30
Drive shaft (flange bearing)	Lubricate	6-37
Drive shaft (front, center, rear, upper)	Lubricate	6-37
Steering cylinder pins	Lubricate	6-37
Rear axle pivot	Lubricate	6-37
Fuel tank (water, sediment)	Drain	6-23

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 pre-filter element	Replace	6-26
Transmission oil	Change	6-33, 34
Transmission oil filter	Replace	6-33, 34
Front axle oil	Change	6-35, 36
Rear axle oil	Change	6-35, 36
Hydraulic oil return filter	Replace	6-28
Pilot line filter element	Replace	6-29

4) EVERY 250 HOURS SERVICE

Check items	Service	Page
Engine oil	Change	6-15, 16, 17
Engine oil filter	Replace	6-15, 16, 17
Wheel nuts	Check, Tight	6-31, 32
Battery (voltage)	Check	6-41, 42
Brake line filter (strainer)	Check, Clean	6-29
Pilot line filter	Replace	6-29
Hydraulic oil return filter (-#0022)	Replace	6-28
Air conditioner and heater outer filter	Check, Clean	6-43

5) EVERY 500 HOURS SERVICE

Check items	Service	Page
Fuel filter element	Replace	6-24
Fuel pre-filter element	Replace	6-26
Coolant filter (corrosion resistor)	Replace	6-25
Radiator, oil cooler, change air cooler	Check, Clean	6-20
Air cleaner element (primary)	Clean	6-23

6) EVERY 1000 HOURS SERVICE

Check items	Service	Page
Hydraulic oil return filter (#0023-)	Replace	6-28
Hydraulic tank air breather element	Replace	6-28
Center pivot pin	Lubricate	6-37
Transmission oil	Change	6-33, 34
Transmission oil filter	Replace	6-33, 34
Aircon and heater outer filter	Replace	6-43

7) EVERY 1500 HOURS SERVICE

Check items	Service	Page
Front axle oil	Change	6-35, 36
Rear axle oil	Change	6-35, 36

8) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Hydraulic oil *1	Change	6-27
Radiator coolant	Change	6-17, 18, 19, 20
RCV lever	Lubricate	6-29
Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-

*1 Conventional hydraulic oil

9) EVERY 5000 HOURS SERVICE

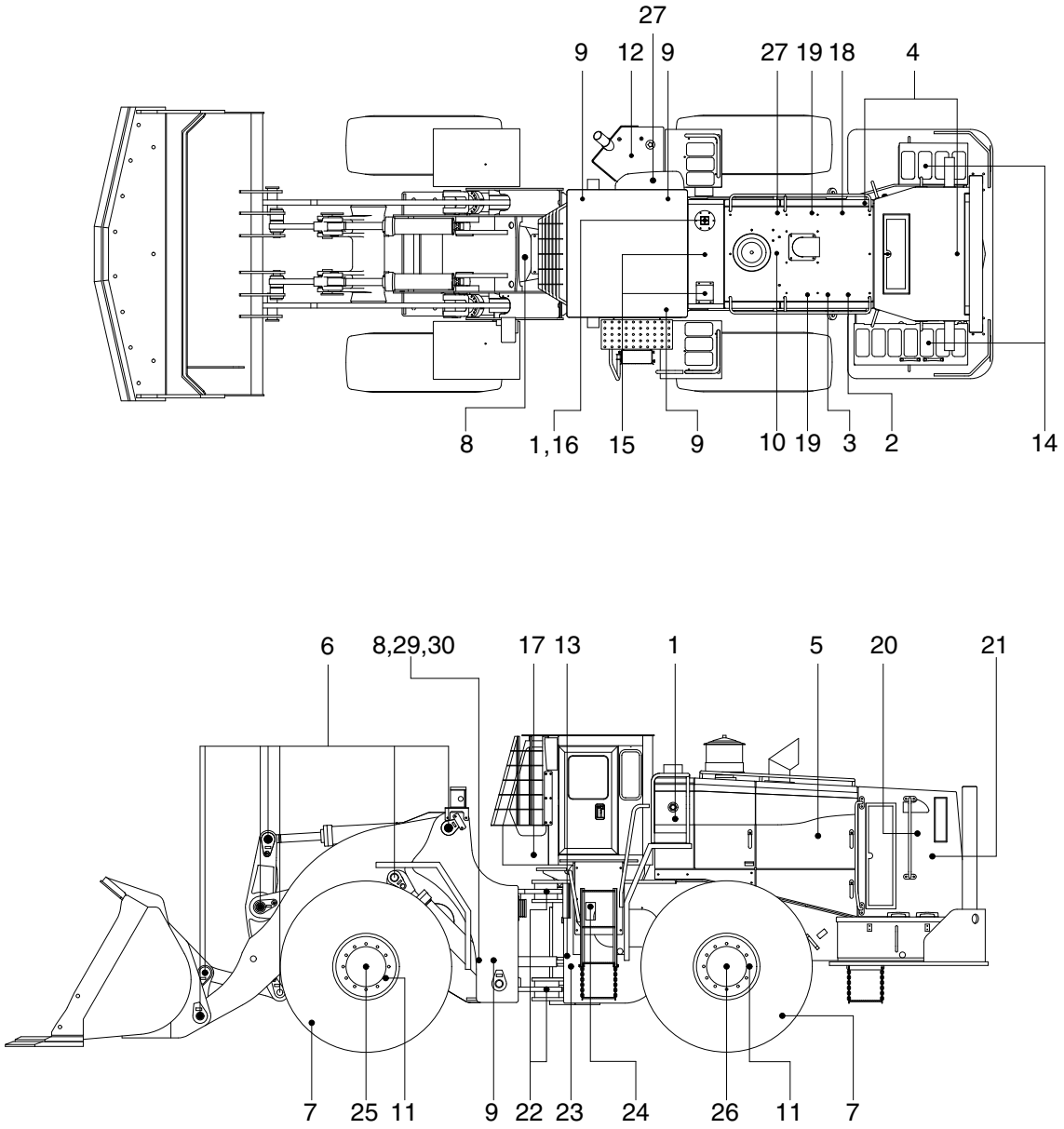
Check items	Service	Page
Hydraulic oil *2	Change	6-27

*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	Check, Clean, Replace	6-43
· Outer filter	Clean, Replace	6-43

5. MAINTENANCE CHART



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Caution

1. Service intervals are based on the hour meter reading.
2. The number of each item shows the lubrication point on the machine.
3. Stop engine while filling oil, and 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	242 (63.9)	1
	2	Engine oil level	Check, Add	EO	38 (10.0)	1
	4	Radiator coolant level	Check, Add	C	45 (11.9)	1
	5	Fan belt tension & damage	Check, Adjust	-	-	2
	19	Fuel pre-filter element (water)	Drain	-	-	1
50 Hours or weekly	6	Attachment pins	Lubricate	PGL	-	18
	7	Tire (air)	Check, Add	-	-	4
	8	Drive shaft (flange bearing)	Lubricate	PGL	-	1
	9	Steering cylinder pin	Lubricate	PGL	-	4
	10	Rear axle pivot	Lubricate	PGL	-	2
	12	Fuel tank (water, sediment)	Drain	-	320 (84.5)	1
	29	Drive shaft sleeve yoke	Lubricate	PGL	-	4
	30	Drive shaft journal bearing	Lubricate	PGL	-	4
250 Hours	2	Engine oil	Change	EO	38 (10.0)	1
	3	Engine oil filter	Replace	-	-	1
	11	Wheel nuts	Check, Tight	-	-	92
	13	Brake line filter (strainer)	Check, Clean	-	-	1
	14	Battery (voltage)	Check, Add	-	-	2
	15	Hydraulic oil return filter (-#0022)	Replace	-	-	1
	17	Pilot line filter element	Replace	-	-	1
	26	Air conditioner & heater inner, outer filter	Check, Clean	-	-	2
500 Hours	18	Fuel filter element	Replace	-	-	2
	19	Fuel pre-filter element	Replace	-	-	2
	20	Coolant filter (corrosion resistor)	Replace	-	-	1
	21	Radiator, oil cooler, charge air cooler	Clean	-	-	3
	28	Air cleaner element (primary)	Clean	-	-	1
1000 Hours	15	Hydraulic oil return filter (#0023-)	Replace	-	-	1
	16	Hydraulic tank air breather element	Replace	-	-	1
	22	Center pivot pin	Lubricate	PGL	-	2
	23	Transmission oil	Change	EO	50 (13.2)	1
	24	Transmission oil filter	Replace	-	-	2
	27	Air conditioner and heater outer filter	Replace	-	-	1
1500 Hours	25	Axle oil (front)	Change	UTTO	63 (16.6)	3
	26	Axle oil (rear)	Change	UTTO	61 (16.1)	3
2000 Hours	1	Hydraulic oil *1	Change	HO	242 (63.9)	1
	4	Radiator coolant	Change	C	45 (11.9)	1
	-	RCV lever	Lubricate	PGL	-	3
	-	Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-	-	-
5000 Hours	1	Hydraulic oil *2	Change	HO	242 (63.9)	1
When required	27	Air conditioner & heater inner, outer filter	Clean, Replace	-	-	2
	28	Air cleaner element (safety and 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 · PGL : Grease

· GO : Gear oil · 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.

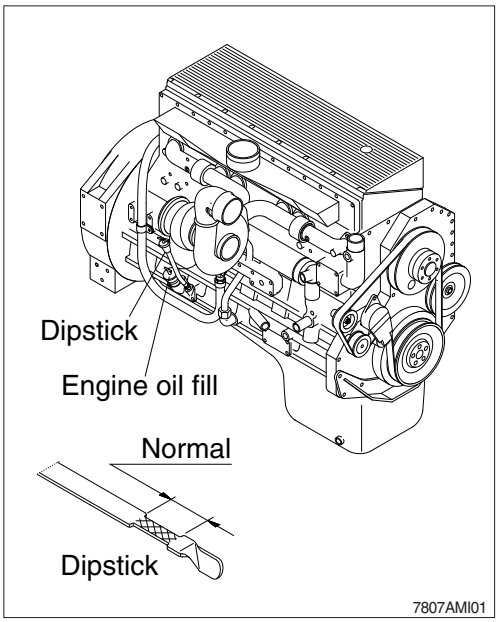
(2) Check the oil level by inserting the dipstick completely into the hole and pulling out again.

(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.**



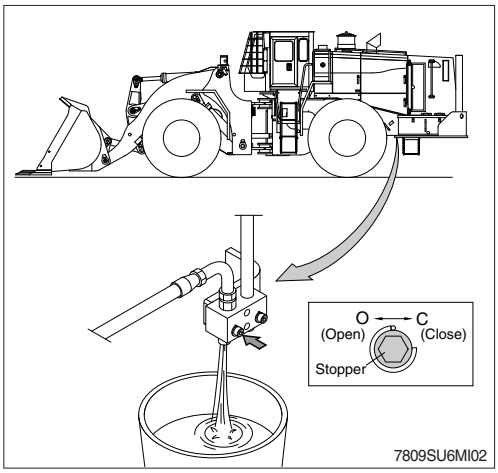
2) REPLACEMENT OF ENGINE OIL AND OIL FILTER

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

(2) Turn the stopper to open position and allow the oil to drain.

- Wrench size : 10 mm

※ **A drain pan with a capacity of 40 liters (10.6 U.S.gallons)will be adequate.**

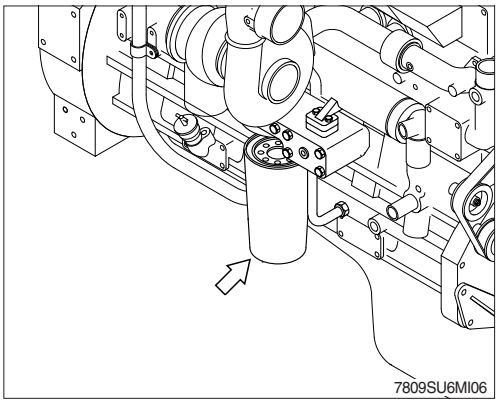


(3) Clean the area around the oil filter head.

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

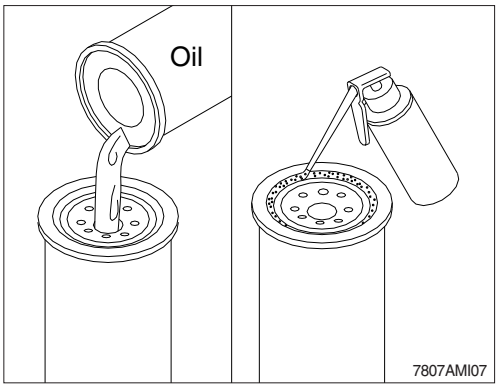
(5) Clean the gasket surface of oil filter head.

※ **The O-ring can stick on the filter head; make sure it is removed.**



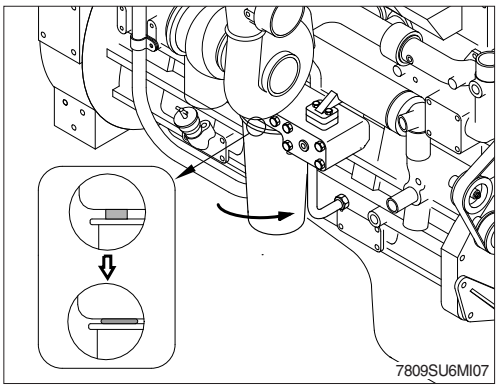
(6) Apply a light film of lubricating oil to the gasket sealing surface before installing the filter.

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

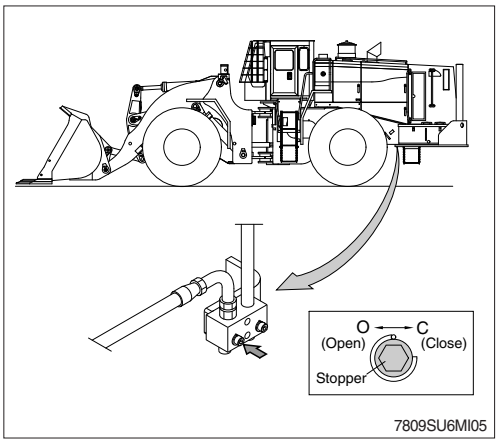


(7) Install the filler to the filter head.

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

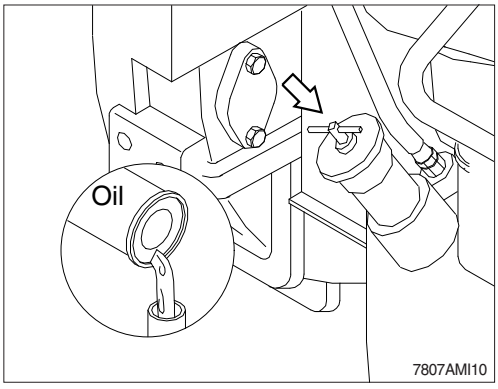


(8) Turn the stopper to the close position.



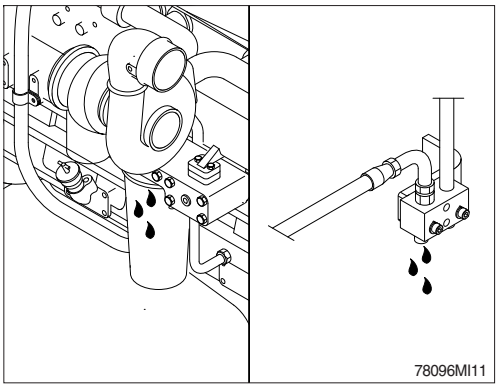
(9) Fill the engine with clean oil to the proper level.

· Quantity : 38 ℓ (10 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 dip-stick. Allow 15 minutes for oil to drain down before checking.

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



3) CHECK COOLANT LEVEL

(1) Check the coolant level at the sight gauge.

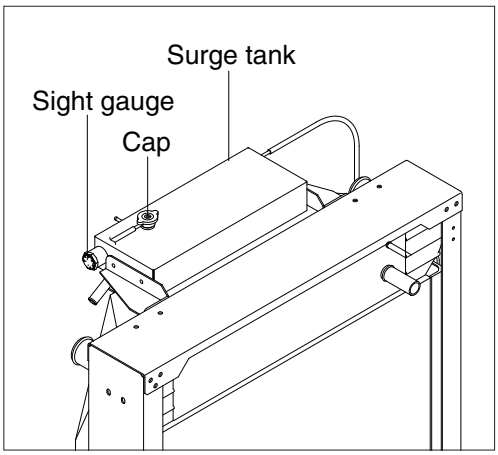
(2) Add the mixture of antifreeze and water after removing the cap of the surge tank if coolant is not sufficient.

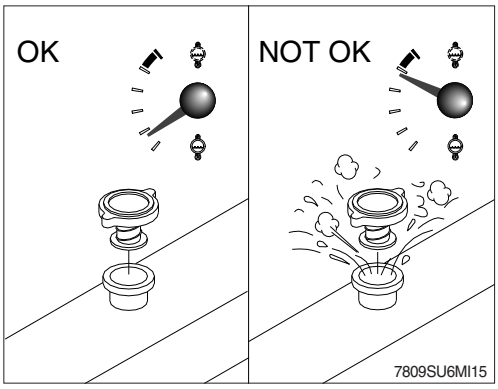
(3) The sight gauge should indicate the middle position.

(4) Replace gasket of surge tank cap when it is damage.

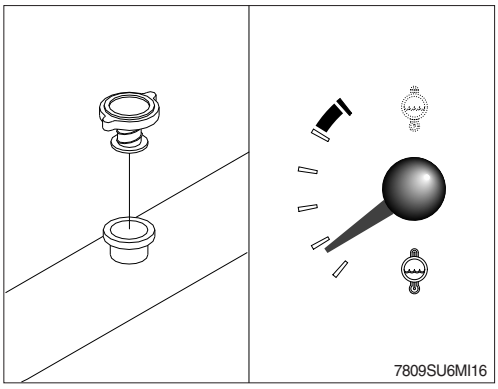
⚠ **Do not remove the surge tank cap from a hot engine. Wait until the coolant temperature is below 50˚C (120˚F) before removing the cap. Heated coolant spray or steam can cause personal injury.**

※ **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

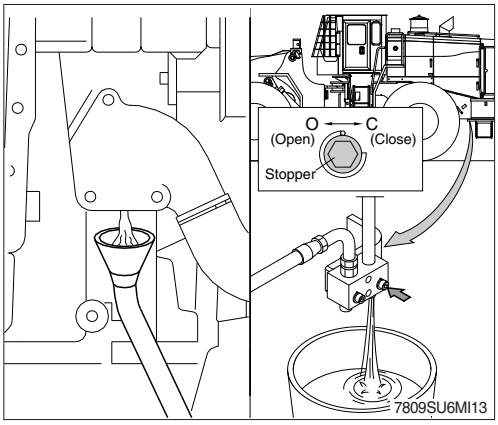


(1) Change coolant

⚠ 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 handing of used antifreeze.

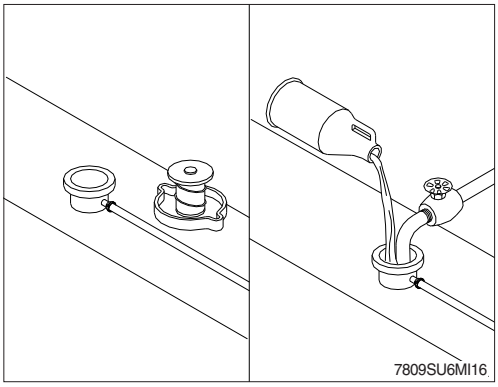
⚠ Wait until the temperature is below 50˚C (120˚F) before removing the coolant system radiator cap. Failure to do so can cause personal injury from heated coolant spray.
Drain the cooling system by turning the stopper to the open position.
A drain pan with a capacity of 50 liters (13.2 U. S.gallons) will be adequate in most applications.



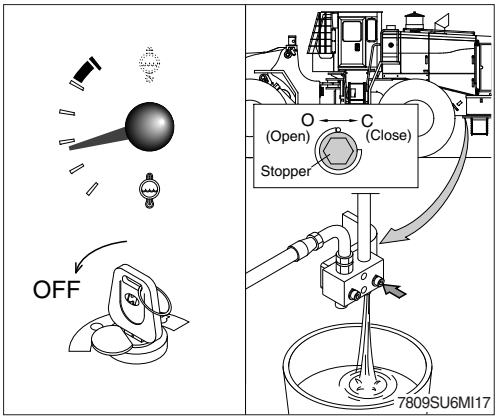
(2) Flushing of cooling system

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 cap. The engine is to be operated without the cap for this process.



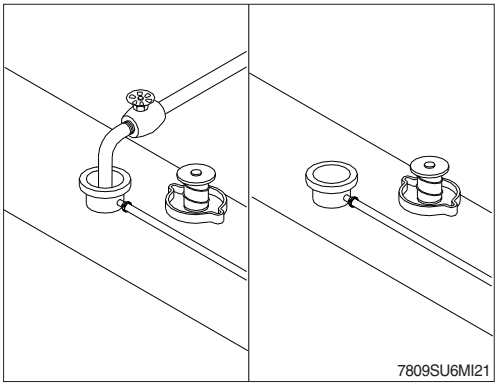
② Operate the engine for 5 minutes with the coolant temperature above 80˚C (176˚F).
Shut the engine off, and drain the cooling system.



③ Fill the cooling system with clean water.

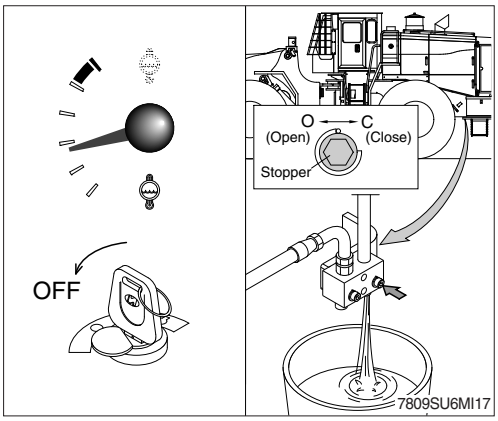
※ **Be sure to vent the engine and aftercooler for complete filling.**

※ **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.**

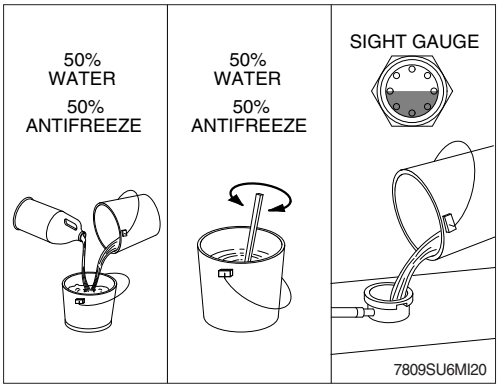


(3) Cooling system filling

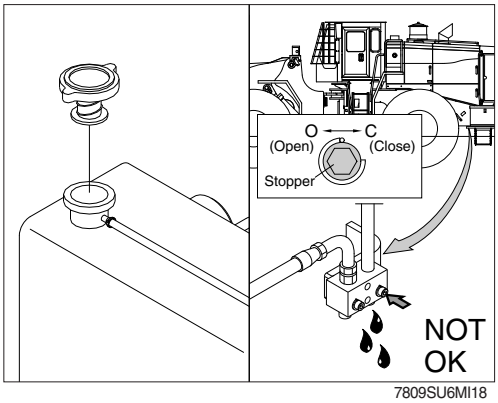
① Use a mixture of 50 percent soft water and 50 percent ethylene glycol antifreeze to fill the coling system. Refer to the page 6-9.

※ **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.

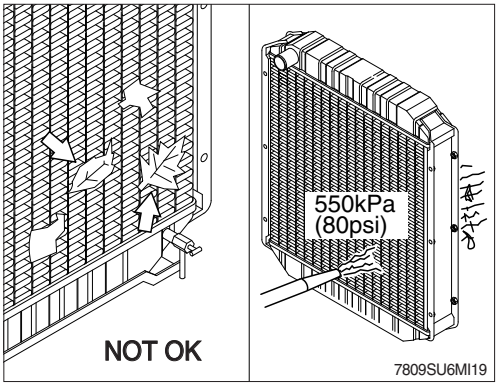


5) CLEAN RADIATOR AND OIL COOLER

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.

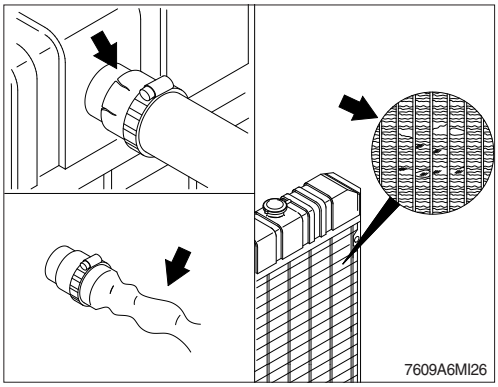
(2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.
Blow the air in the opposite direction of the fan air flow.



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

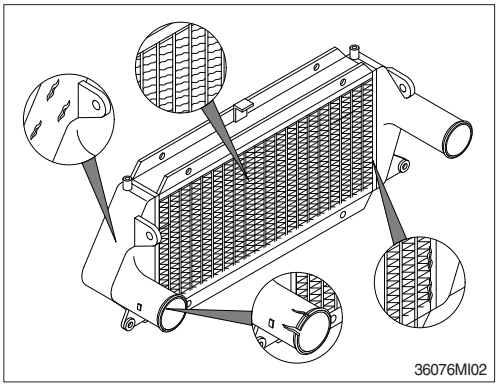
※ **If the radiator must be replaced due to bent or broken fins which can cause the engine to overheat, refer to the manufacturer's replacement procedures.**

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



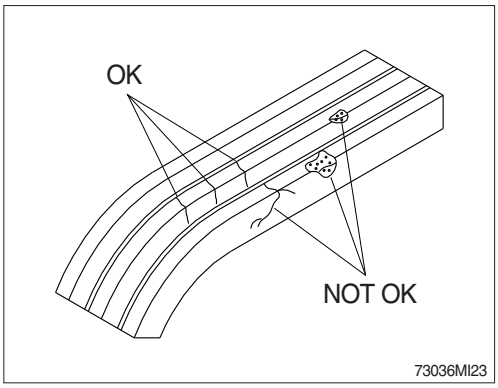
6) CHECK CHARGE AIR COOLER

(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 hyndai distributor.



7) DRIVE BELT

(1) Inspect the belts daily. Check the belts for intersecting cracks. Transverse (across the belt width) cracks are acceptable.
Longitudinal (direction of belt length) cracks that intersect the transverse cracks are not acceptable. Replace a belt if is frayed or has pieces of material missing.

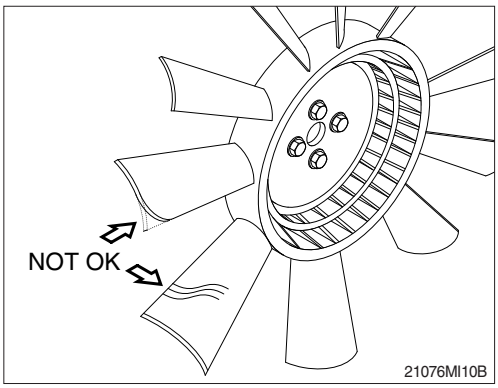


8) INSPECTION OF COOLING FAN

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

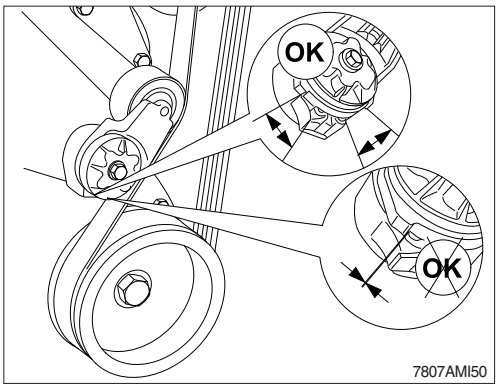
※ **Rotate the crankshaft by using the engine barring gear.**

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

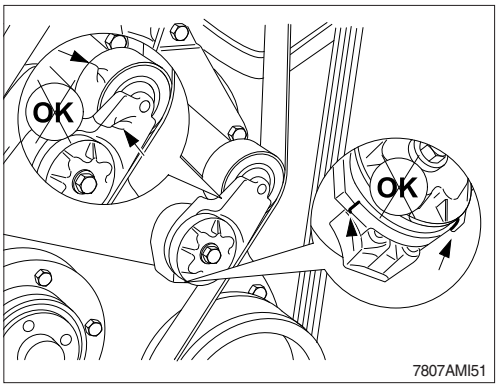


9) BELT TENSIONER, AUTOMATIC ADJUSTMENT

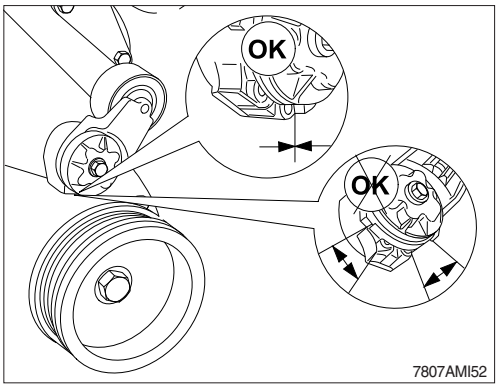
(1) Every 1000hours, or 1 year, whichever occurs first, inspect the automatic belt tensioner.
With the engine turned off, check that neither the top nor bottom tensioner arm stop is touching the cast boss on the tensioner body. If either of the stops is touching a boss, the alternator belt must be replaced.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



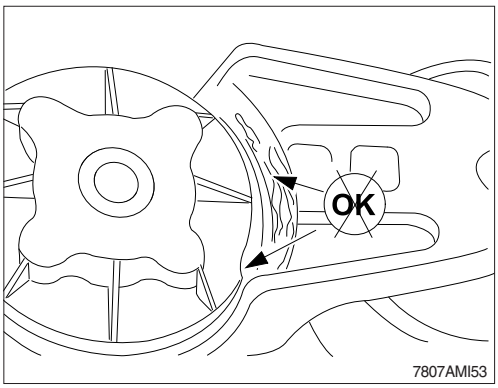
(2) Check the tensioner pulley and body for cracks.
If any cracks are noticed, the tensioner must be replaced. Refer to a Cummins Authorized Repair facility. Check the tensioner for dirt buildup.
If this condition exists, the tensioner must be removed and steam-cleaned.



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



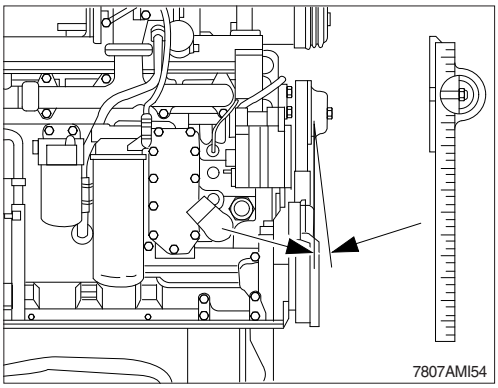
(4) Inspect the tensioner for evidence of the pivoting tensioner arm contacting the stationary circular base. If there is evidence of thess two areas touching, the pivot tube bushing has failed and the tensioner must be replaced.



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

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

(6) Install the belt.



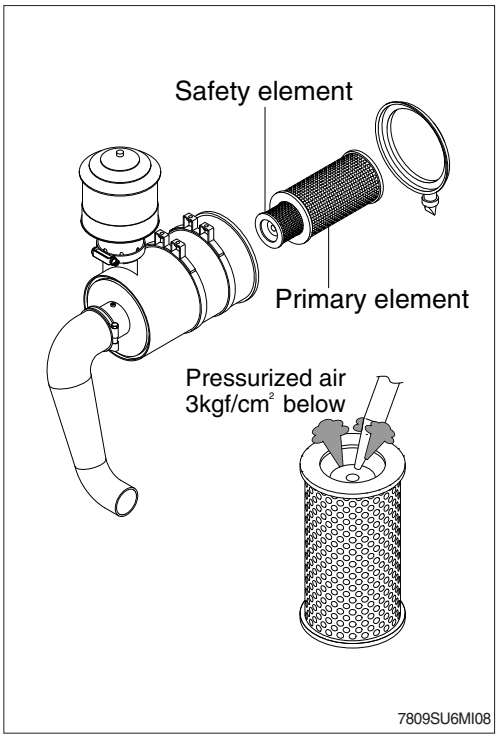
10) CLEANING OF AIR CLEANER

(1) Primary element

① Loosen the wing nut and remove the element.
② Clean the inside of the body.
③ Clean the element with pressurized air.
- Remove the dust inside of the element by the pressurized air (below 3kgf/cm², 40 psi) forward and backward equally.

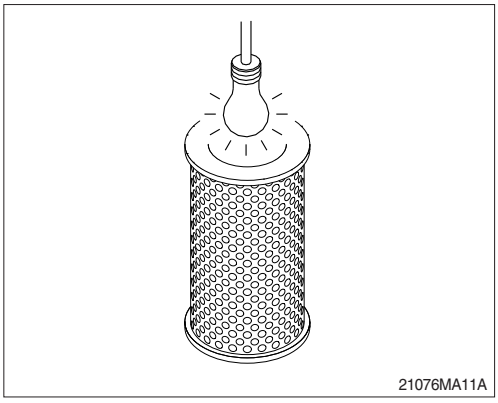
④ Inspect for cracks or damage of element by putting a light bulb inside of the element.
⑤ Insert element and tighten wing nut.

※ **When the air cleaner warning lamp is ON, clean the primary element.**
※ **The primary element should be replaced if the warning lamp is ON after installation of a clean primary element, or if the exhaust smoke is still black.**
※ **Replace the primary element after 4 times cleanings.**



(2) Safety element

※ **The safety element should be replaced at the time the primary element is replaced.**
※ **Always replace the safety element.**
Never attempt to reuse the safety element by cleaning the element.

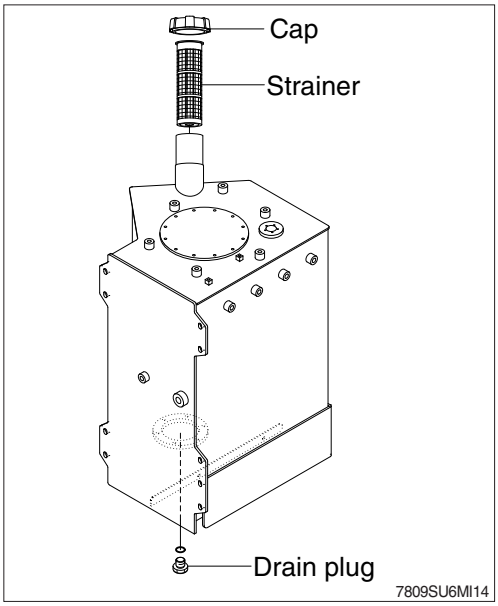


11) FUEL TANK

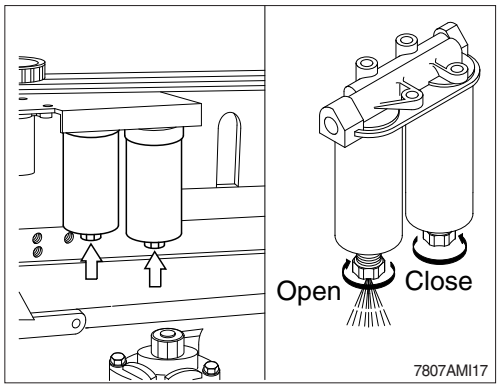
(1) Fill fuel fully when system the operation to minimize water condensation, and check it with fuel gauge before starting the machine.

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

※ **Be sure to LOCK the cap of fuel tank.**
※ **Remove the strainer of the fuel tank and clean it if contaminated.**
Stop the engine when refueling.
⚠ **All lights and flames shall be kept at a safe distance while refueling.**



12) FUEL WATER SEPARATOR



※ **Drain the fuel water separator into a container, and dispose of contents in accordance with local environmental regulations.**

(1) Drain the water and sediment from the separator daily. Shut off the engine.

(2) Use your hand to open the drain valve.

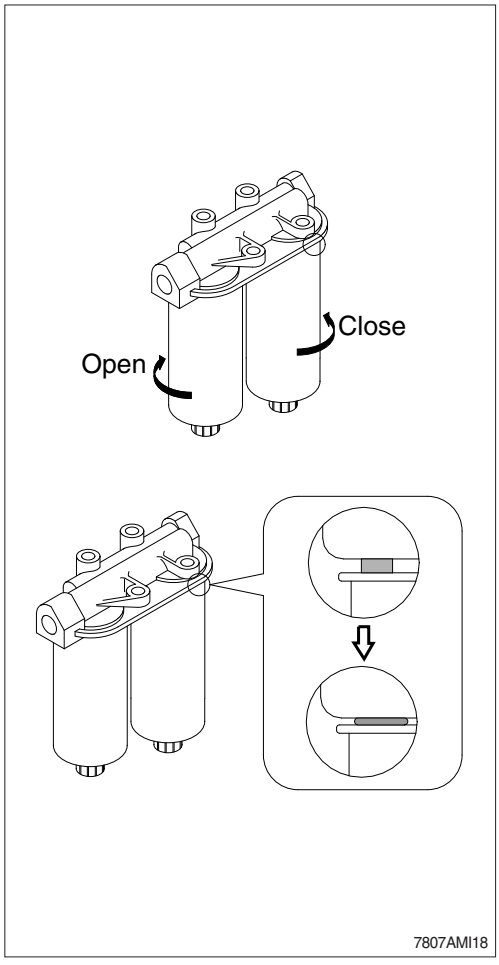
(3) Turn the valve counterclockwise approximately 3 1/2 turns until the valve drops down 25.4 mm (1 inch) and draining occurs.

(4) Drain the filter sump until clear fuel is visible.

※ **When closing the drain, do not overtighten the valve. Overtightening can damage the threads.**

(5) To close the valve, lift the valve and turn clockwise until it is hand-tight.

13) REPLACEMENT OF FUEL FILTER



(1) Clean the area around the fuel filter and fuel filter head.

(2) Remove the fuel filter with filter wrench.

(3) Replace the sealing ring.

(4) Lubricate the fuel filter gasket with clean engine oil.

(5) Fill the new filter with clean diesel fuel.

(6) Install the filter on the filter head.
Turn the filter until the gasket contacts the filter head surface.

(7) Tighten the filter, by hand, an additional 1/2 to 3/4 of a turn after gasket contacts the filter head surface.

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

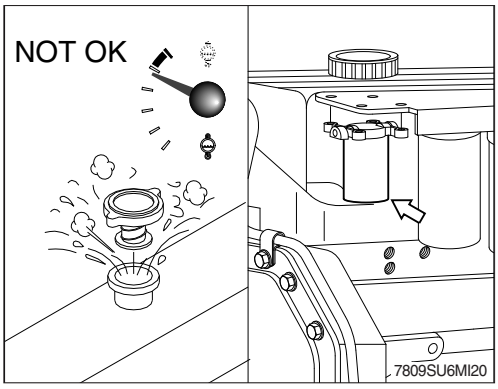
※ **Mechanical overtightening of filter can distort the threads and damage the fuel filter seal.**

※ **Check for fuel leakage after the engine starts.**

14) COOLANT FILTER (CORROSION RESISTOR)

⚠ **Do not remove the radiator 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**

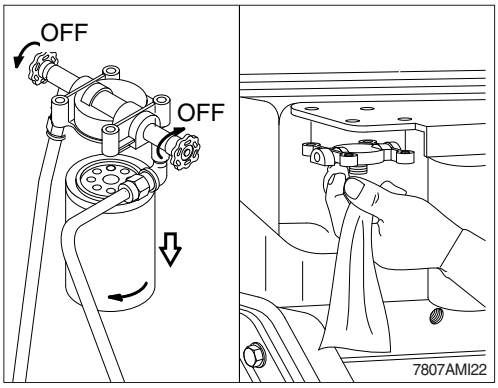
(1) Remove the radiator cap.



(2) Turn the valve to the OFF position.

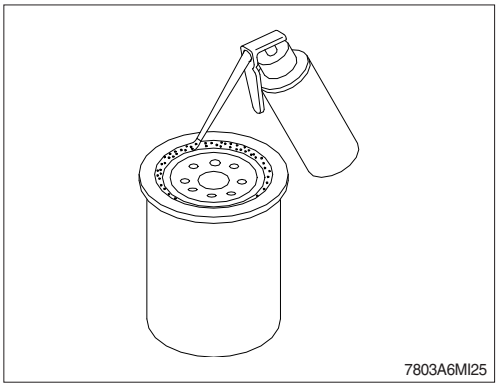
(3) Remove and discard the filter.
Clean the coolant filter head gasket's surface.

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



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

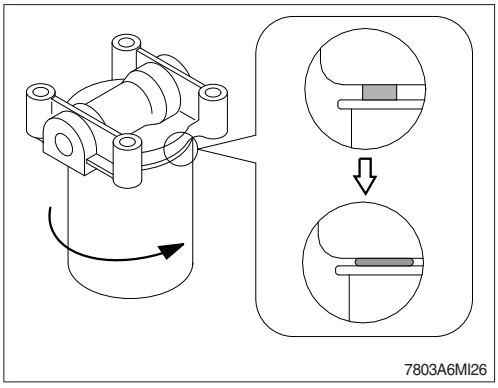
※ **If the filter canister is damaged in any way, do not use it. Dents or scrapes can lead to a rupture or premature failure of the filter.**



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

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

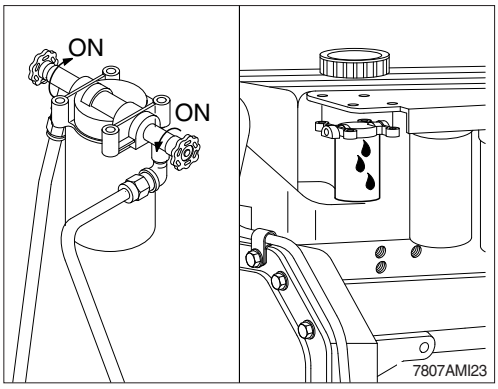
※ **Mechanical over tightening can distort the filter threads or damage the filter head.**



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

(8) Operate the engine and check for leaks.

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



15) FUEL PRE-FILTER

※ 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 / bowl from filter head.

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

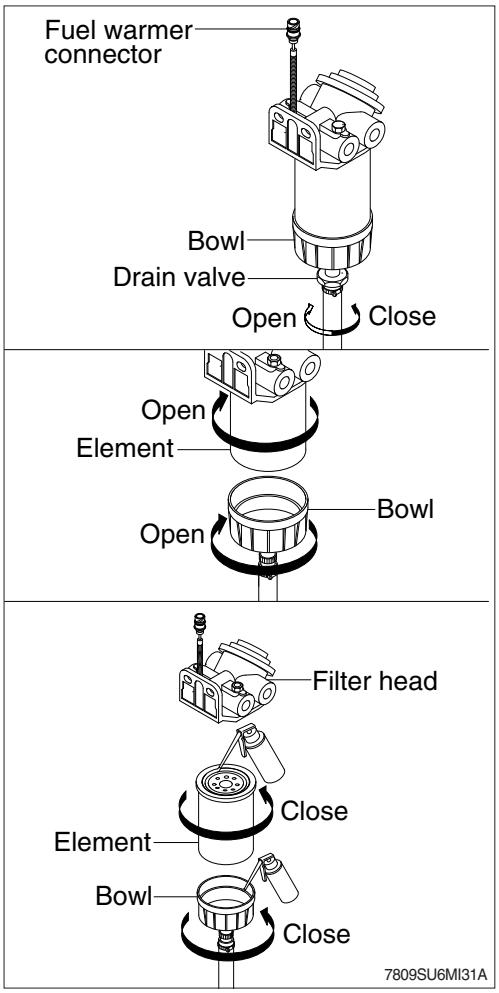
③ Separate element from bowl. Clean bowl and seal gland.

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

⑤ Attach bowl to new element firmly by hand.

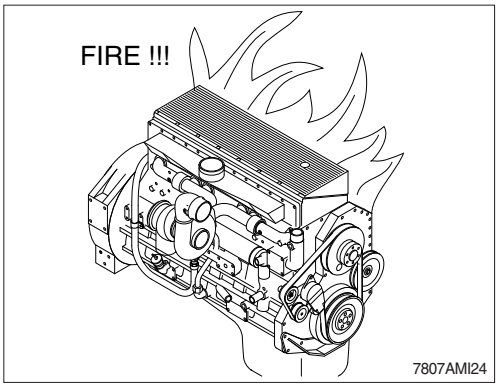
⑥ Lubricate new element seal and place in element top gland.

⑦ Attach the element and bowl to the head.



16) LEAKAGE OF FUEL

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



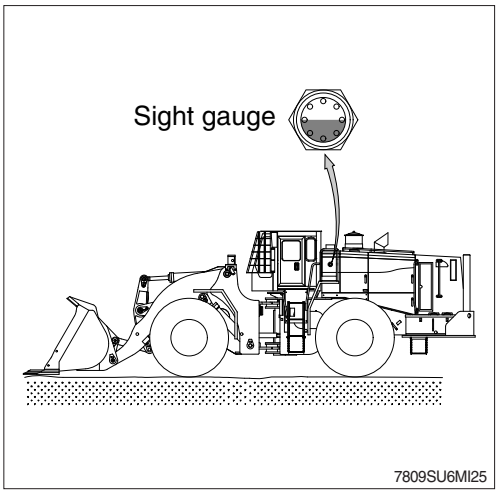
17) HYDRAULIC OIL CHECK

(1) 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 hydranlic oil tank.

(3) The sight gauge should indicate the middle position.

※ **Add hydraulic oil, if necessary.**



18) FILLING HYDRAULIC OIL

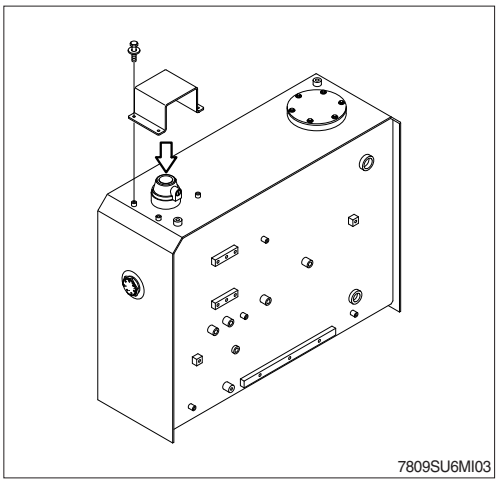
(1) Stop the engine to the position of level check.

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

(3) 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.



19) 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 pushing the top of the breather.

(3) Prepare a suitable container.

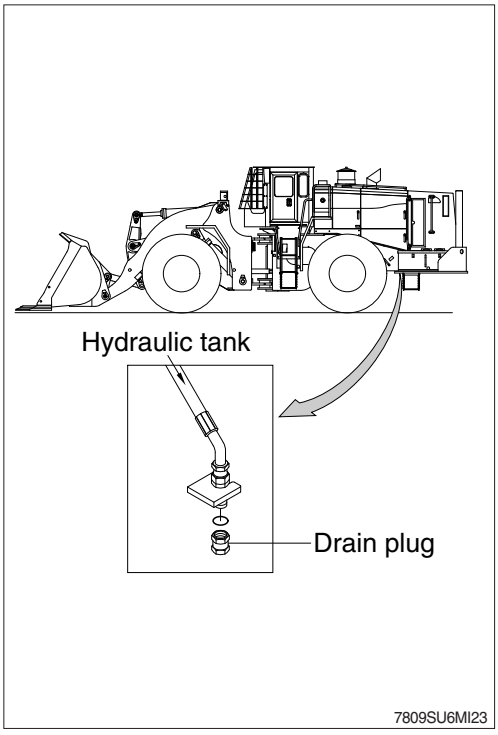
(4) To drain the oil loosen the drain plug at the fuel tank block. Tighten the drain plug.

(5) Fill proper amount of recommended oil.

(6) Put the breather in the right position.

(7) 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.**



20) CLEANING AND REPLACING RETURN FILTER

Clean and replace the return filter in the following manner.

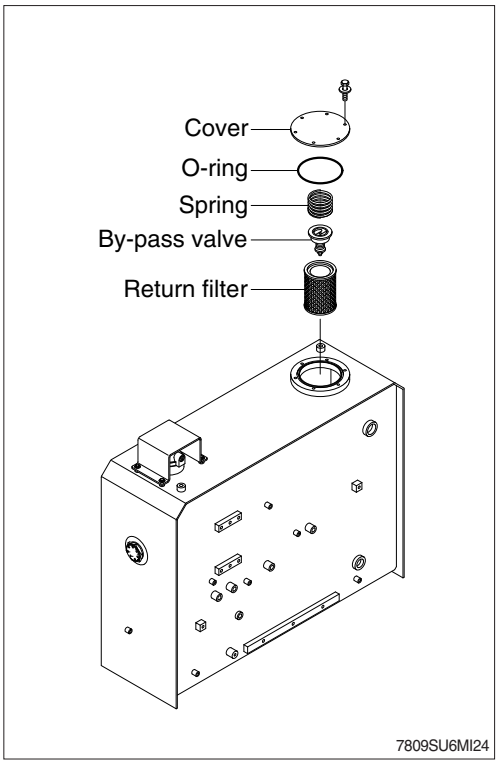
(1) Remove the cover.

(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±1.4 kgf · m (50±10 lbf · ft)



21) REPLACEMENT OF ELEMENT IN HYDRAULIC TANK BREATHER

(1) Relive the pressure by pushing the top of the breather.

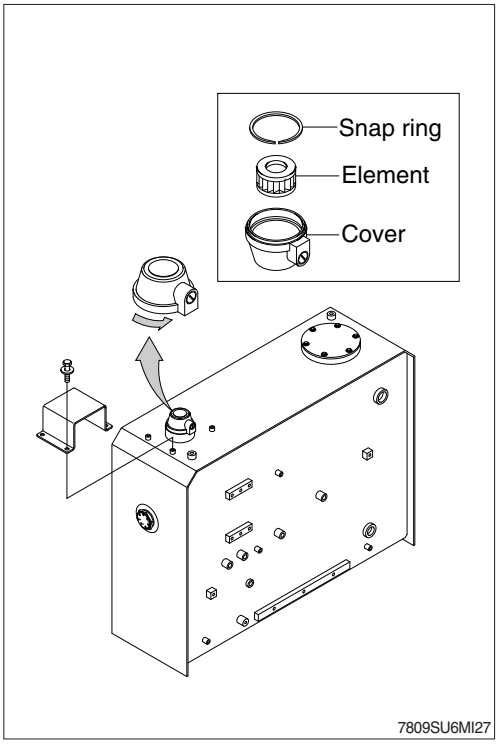
(2) Remove the cover

(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 : 0.7~0.9 kgf · m (5~6 lbf · ft)

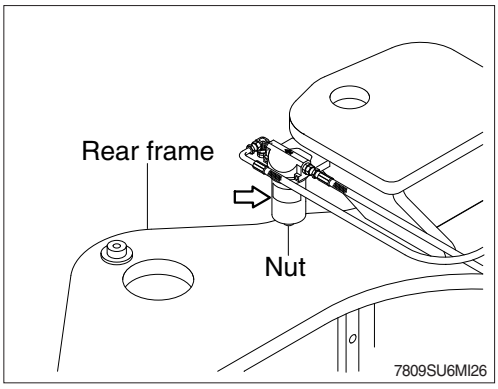


22) REPLACE OF PILOT LINE FILTER

(1) Loosen the nut positioned on the filter body.

(2) Pull out the filter element and clean filter housing.

(3) Install the new element and tighten the nut.

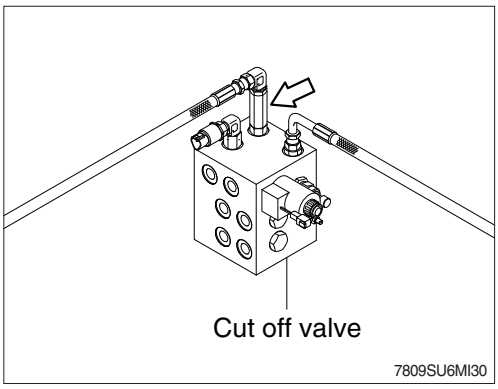


23) CLEANING OF BRAKE LINE FILTER

(1) Remove the strainer from the filter body.

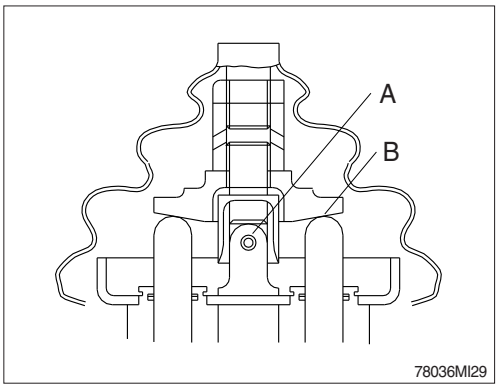
(2) Wash the strainer with cleaning oil.

(3) Install and tighten using specified torque.
· Tightening torque : 6~8 kgf · m
(43.4~57.9 lbf · ft)



24) LUBRICATE RCV LEVER

Remove bellows and grease the joint (A) and the sliding parts (B).



25) 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)

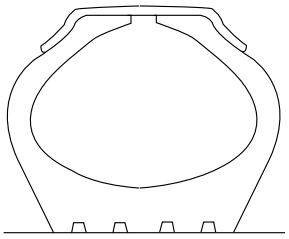
Size	Pressure
26.5 R25, ★★, L3	6.5bar (94psi)

(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.

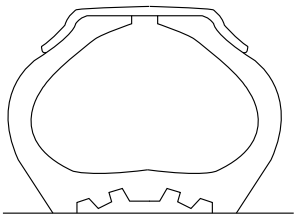
(4) The three major causes for excessive heat and pressure of tire are insufficient pressure, excessive load and overspeed. Avoid excessive load and overspeed in order to keep tires in good shape.

⚠ 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. Contact a tire repair shop.
※ 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.

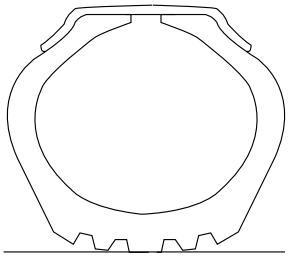
※ Avoid the followings when traveling.
① Rubbing tires against road bank or rack at cargo-unloading spot.
② Tires slippage during working.
③ Abrupt starting of machine.
④ When oil, grease or gasoline smeared on tire, clean those. Otherwise it may cause of permanent deformation.



Normal



Too low pressure



Excess pressure

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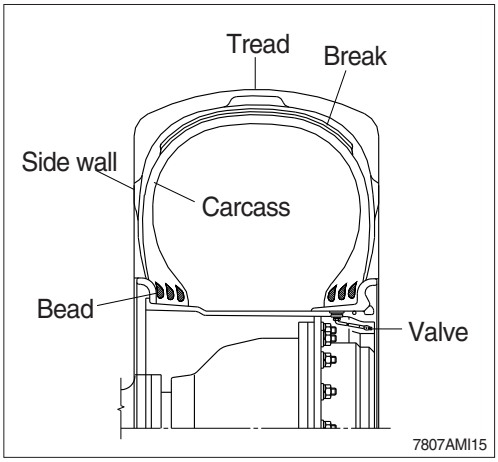
26) REPLACEMENT OF TIRE

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

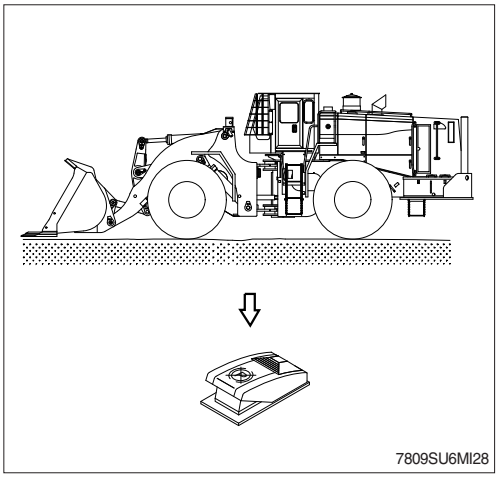
(1) Tires to be replaced

① Tires with broken or bent bead wires
② Tires exposed more than 1/4 of carcass fly.
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.

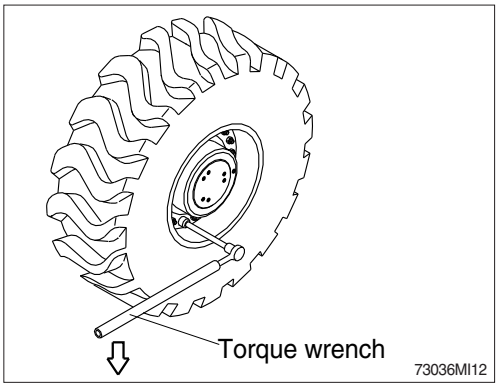


(2) Separation of tire

① After moving the machine to flat ground, lower the bucket to the ground and press the parking brake.

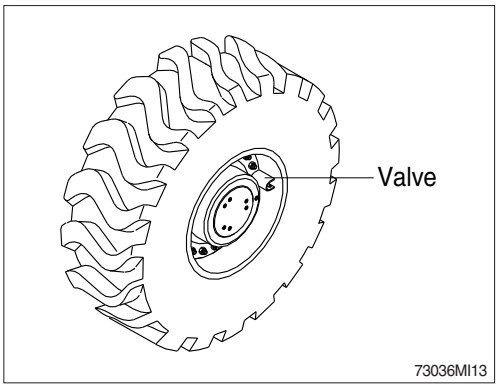


② Loosen slightly all wheel mounting.
 · Tools : Socket 32 mm
 Torque wrench
 Extension bar
③ Lift the machine with a jack.
④ Loosen all wheel mounting nuts and replace the tire.



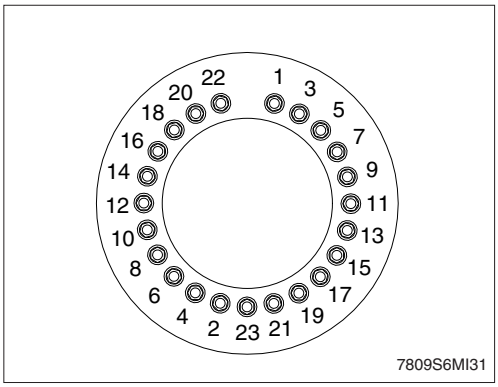
(3) Direction of tire to be installed

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±2.5 kgf · m
(571±18 lbf · ft)

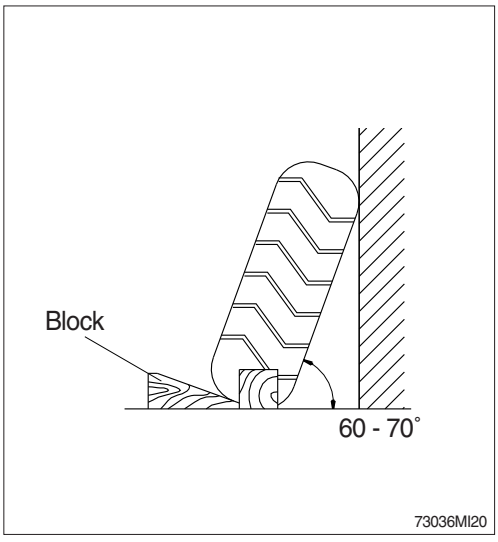


27) STORING TIRES AFTER REMOVAL

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.



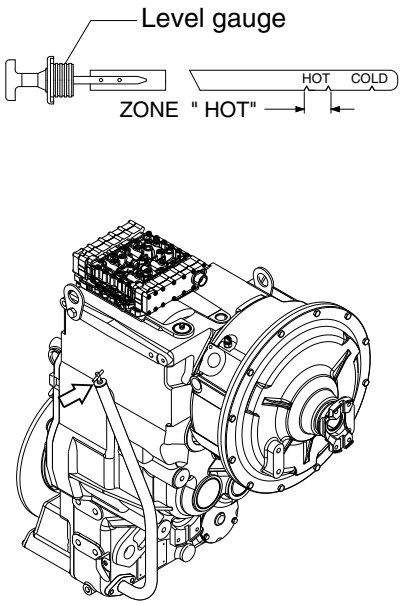
28) CHECK TRANSMISSION OIL LEVEL

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 oill 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 (abou 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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29) REPLACEMENT OF TRANSMISSION OIL AND FILTER ELEMENT

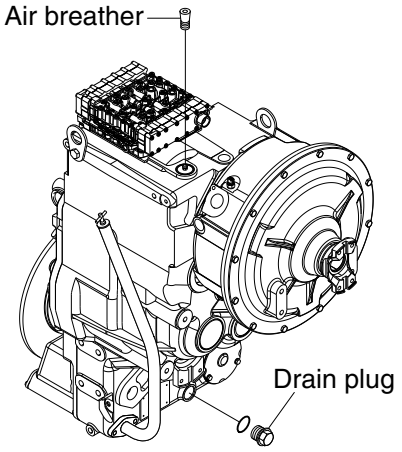
(1) Operate the machine for a few minutes in order to warm the transmission oil.

(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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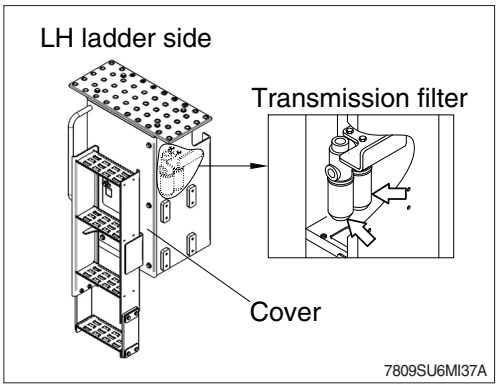
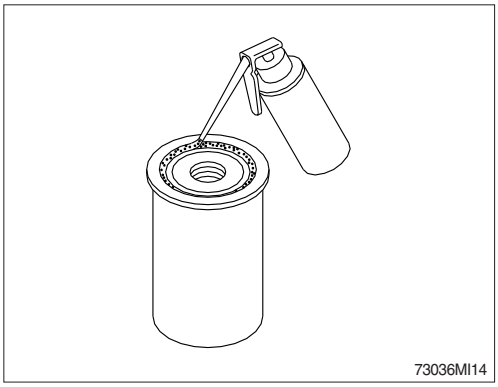
(6) Open the cover and remove the transmission oil filter cartridge.
Dispose of the used transmission oil filter cartridge properly.

(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.

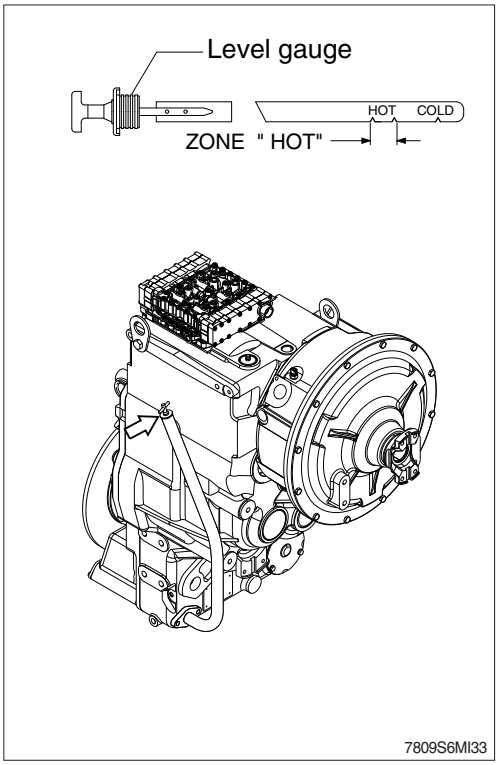
(11) Fill the oil through level gauge inlet and check if the oil is at the appropriate level.

(12) The proper oil amount is 50 liters (13.2 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.

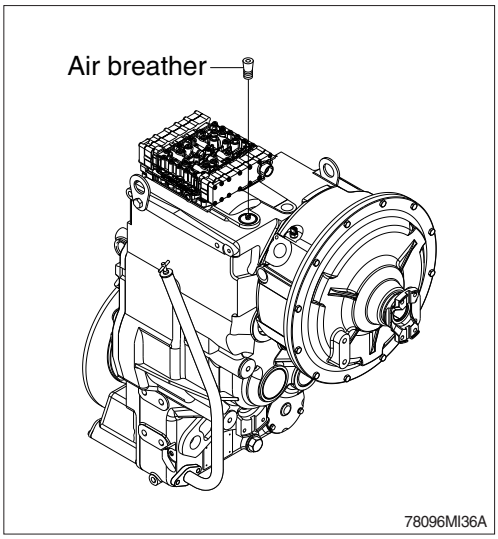
※ Prohibition to inject water to filler cap directly when you wash the machine.



30) CLEANING TRANSMISSION AIR BREATHER

(1) Remove dust or debris around the air breather.

(2) Remove the air breather and wash it with cleaning oil.



31) CHECK AND SUPPLYING AXLE OIL

(1) Move the machine to flat ground.

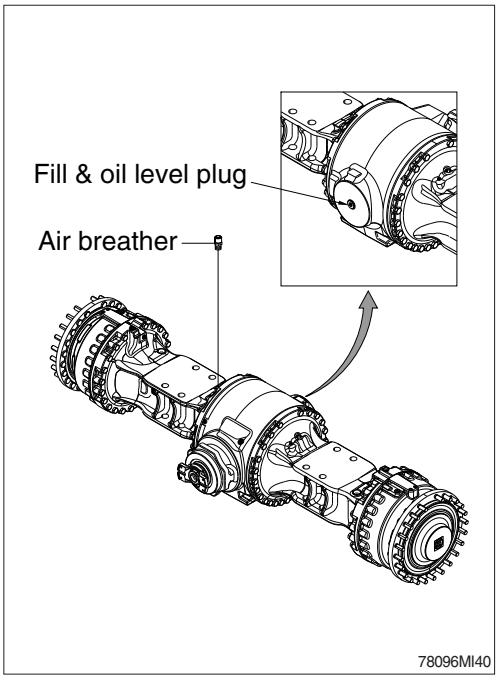
(2) Open the axle air breather to relieve internal air pressure.

(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.**



32) 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.

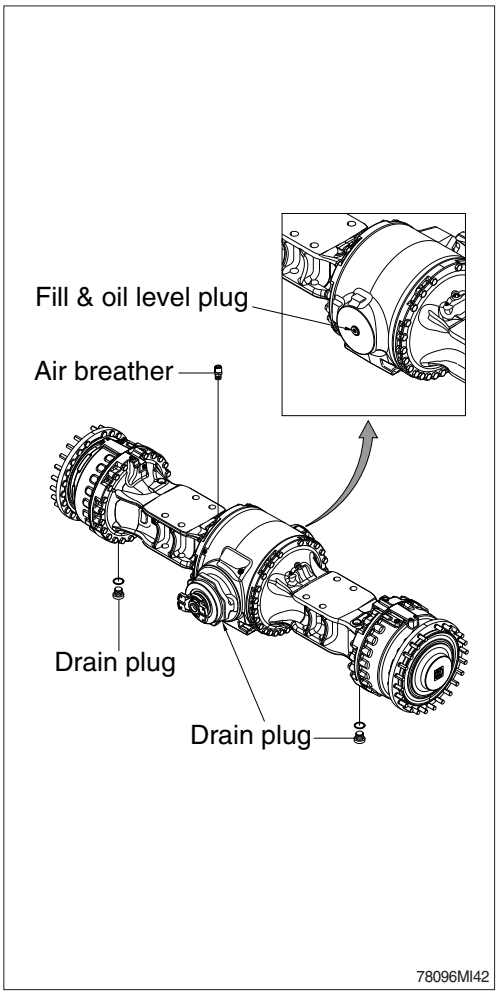
(8) Run the engine for five minutes at low idle on flat ground.

(9) Add oil to the overflow on fill & level plug.

- Oil amount
  Front axle : 63 ℓ (16.6 U.S. gal)
  Rear axle : 61 ℓ (16.1 U.S. gal)

⚠ **As the machine is hot after operation, wait until the temperature has dropped.**

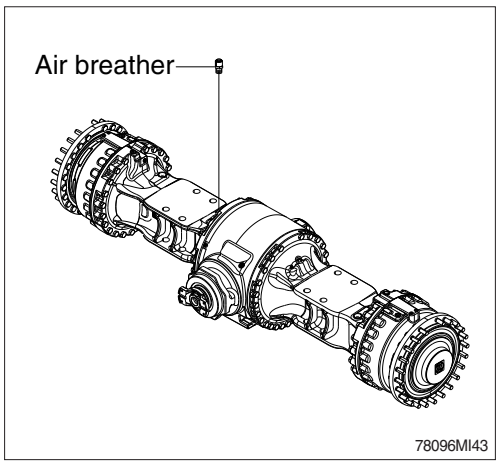
※ If a work requires frequent use of brake, replace it earlier than normal change interval.



33) CLEANING AXLE BREATHER

(1) Remove dust or debris around the breather.

(2) Remove the breather and wash it with cleaning oil.



34) LUBRICATION

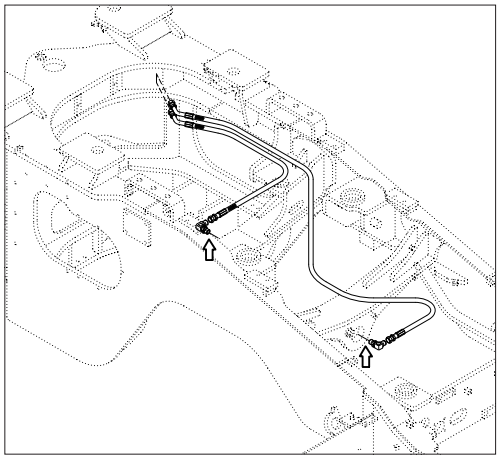
(1) Supply grease through the grease nipple, using grease gun.

(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 turn the hydraulic safety lever into the LOCK position.**

(3) Rear axle pivot : 2EA



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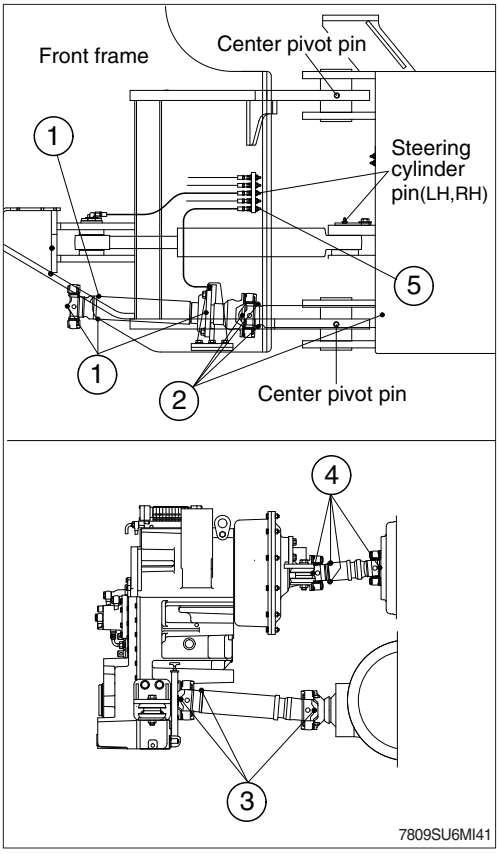
(4) Center pivot pin : 2EA

(5) Steering cylinder pin : 4EA

(6) Drive shaft

① 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) : 4EA
⑤ Center bearing : 1EA



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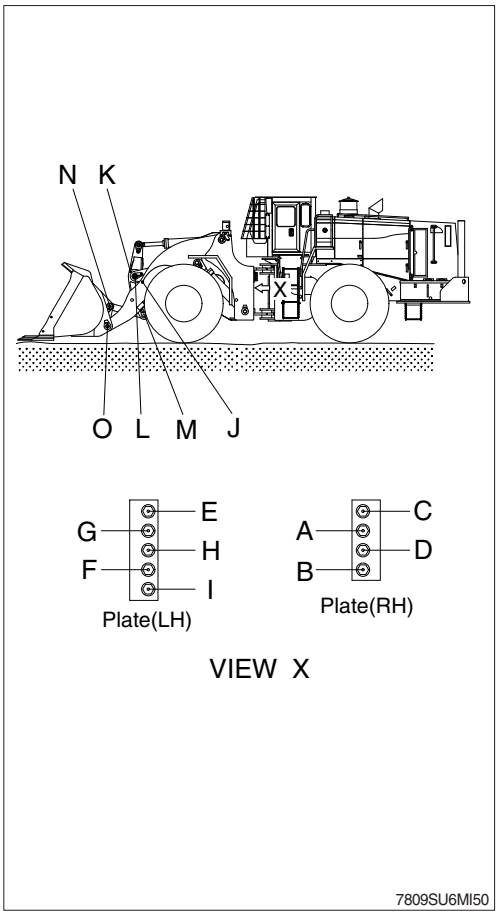
35) MAINTENANCE OF WORK EQUIPMENT

(1) Lubricate to each pin of working device.
Lubricate the grease to grease nipple in accordance with lubrication intervals.

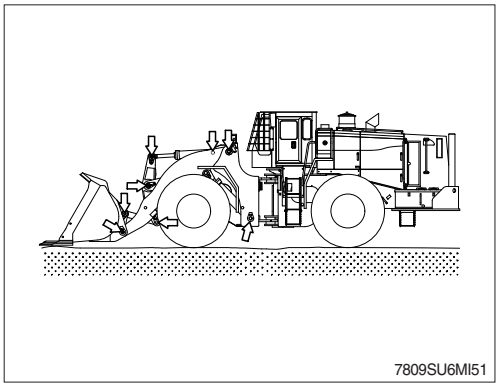
No.	Description	Qty
A	Bucket cylinder (front frame side) right pin	1
B	Boom cylinder (front frame side) right pin	1
C	Boom-front frame right connection pin	1
D	Steering cylinder (front frame side) right pin	1
E	Boom-front frame left connection pin	1
F	Boom cylinder (front frame side) left pin	1
G	Bucket 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.

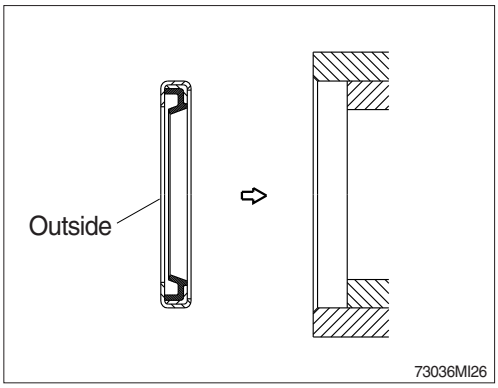


(4) Dust seal are mounted on the rotating part of working device to extend the lubricating interval.

※ **Mount the lip to be faced out side when replace the dust seal.**

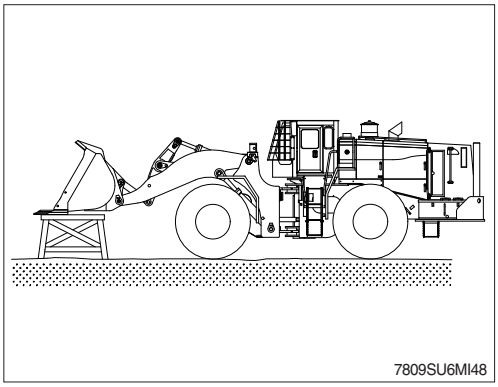
※ **If it is assembled in wrong direction, it will cause fast wear of pin and bushing, and create noise and vibration during operation.**

※ **Make sure the seals are not damaged or deformed.**



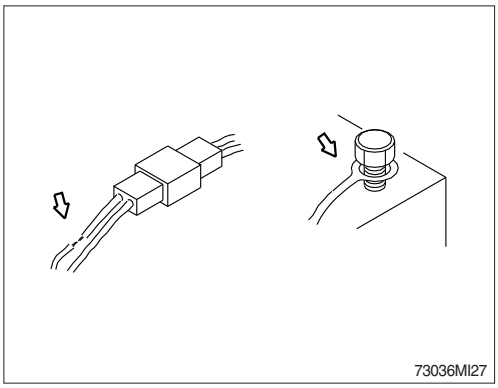
36) WORK EQUIPMENT SUPPORT

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 Lock with the hydraulic safety lever.



1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



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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.

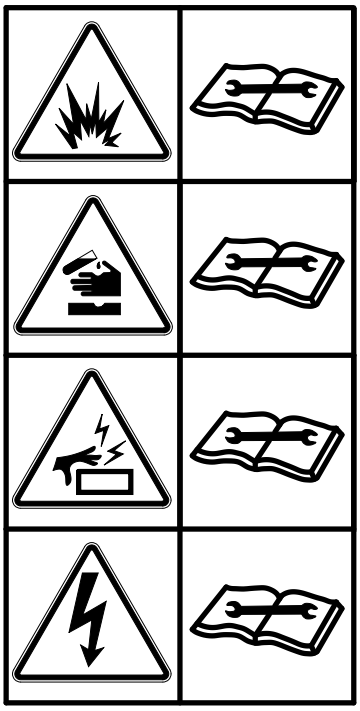
⚠ Do not stain clothes or skin with electrolyte as it is acid.
Be careful not to get the electrolyte in eyes.
Wash with clean water and go to the doctor if it enters the eyes.

⚠ 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.

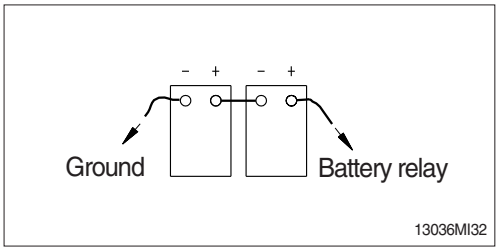
Always return used batteries to one of the following locations.

- 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 las when reassembling.

※ **Pay attention to the correct polarity.**



3) STARTING THE ENGINE WITH A BOOSTER CABLE

Keep following order when you are going to start engine using booster cable.

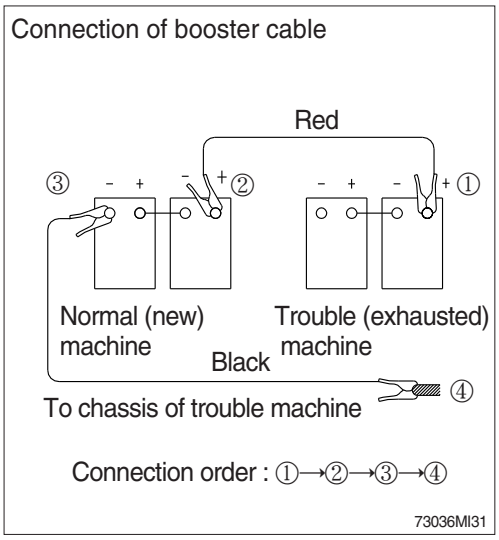
(1) Connection of booster cable

※ **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.

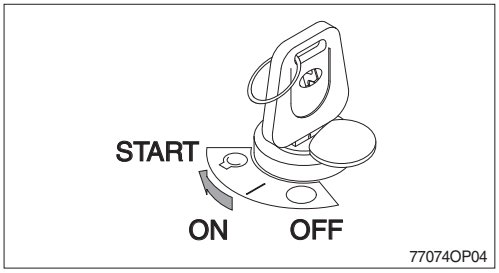
※ **Keep firmly all connection, the spark will be caused when connecting finally.**



(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.



(3) Taking off the booster cable

① Take off the booster cable (black).

② Take off the booster cable (red) connected to the (+) terminal.

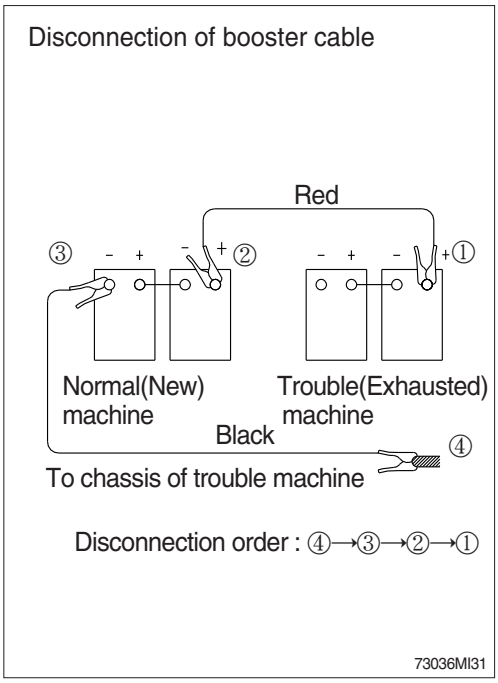
③ Run engine with high idle until charging the exhausted battery by alternator, fully.

⚠ **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.

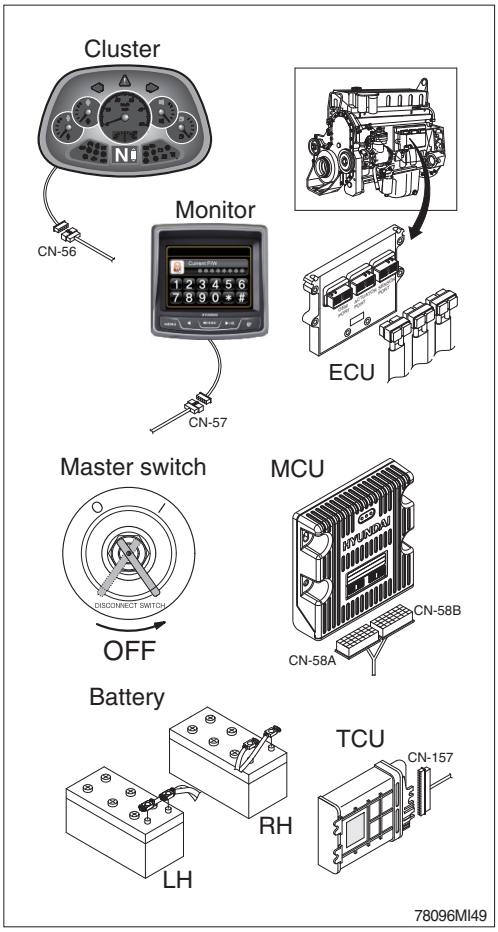
(2) Disconnect ground cable from battery by master switch.

(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, 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.



8. AIR CONDITIONER AND HEATER

1) CLEAN AND REPLACE OF INNER AND OUTER FILTER

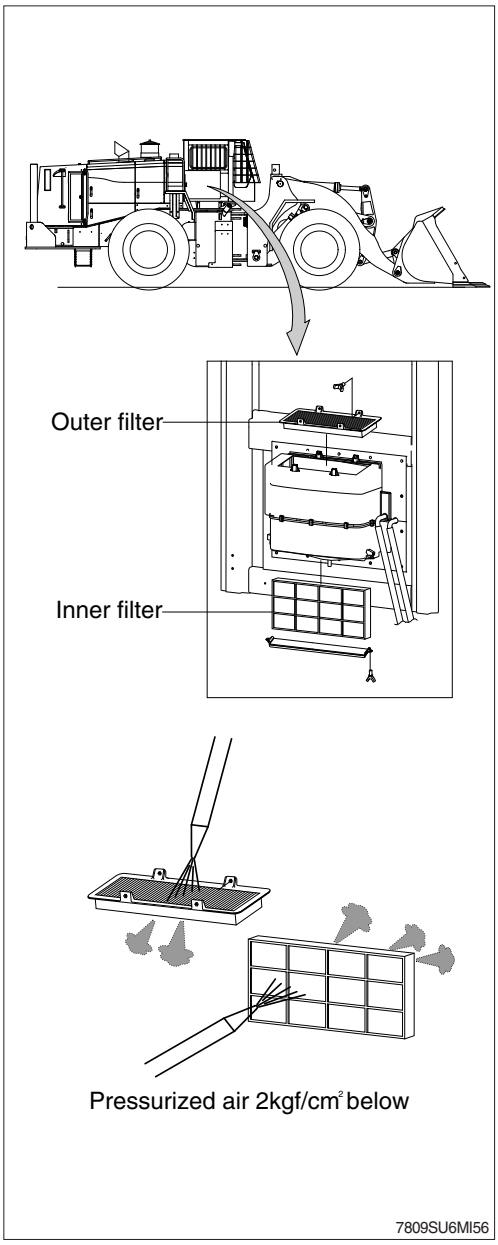
※ Always stop the engine before servicing.

(1) Open the air conditioner cover, loosen the wing bolt and remove the inner and outer filter.

(2) Clean the filter using a pressurized air (below 2 kgf/cm^2, 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) 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 (R134-a) AMOUNT : 750±50 g

(with receiver drier)

7) COMPRESSOR LUBRICANT OIL (SYNTHETIC OIL) : 265mL

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.	· 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.	· 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.	· 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.	· Adjust to specified oil quantity. · Replace with specified fuel.	
Exhaust gas occasionally turns black.	· Clean or replace the air cleaner element. · Check the nozzle. · Check engine compression pressure. · Check or replace the turbocharger.	
Combustion noise occasionally changes to breathing sound.	· Check the nozzle. · Check the injection pump.	
Unusual combustion noise or mechanical noise.	· 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.	· Check for loose terminals open-circuit wiring. · Adjust belt tension.	
Voltmeter does not fluctuate even with an increase in the engine speed.	· Check the alternator. · Inspect and repair wiring.	
Starting motor does not turn when starting switch is turned on.	· 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.	· Charge the battery. · Check the starting motor.	
Starting motor disengages before the engine starts up.	· 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).	· 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.)	· Check the lamp. · Check and repair the wiring.	

3. POWER TRAIN SYSTEM

Trouble	Service	Remark
Engine is running but machine will not move.	· 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.	· Add oil to transmission case to the specified level. · Disassemble transmission strainer and clean.	
Transmission oil overheats.	· 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.	· 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.	· Raise hydraulic oil pressure to specified level. · Add brake oil. · Bleed hydraulic oil from brake system.	
Brake drags or stay when applied.	· Clean breather and bleed air from brake system.	
Brake slips.	· Raise hydraulic oil pressure to the specified level.	
Brake does not work properly.	· Adjust linkage. · Clean brake pad. · Replace spring in hydraulic oil cylinder. · Adjust or replace brake pad.	
Steering wheel is heavy.	· 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.	· Replace leaf springs.	
Slow steering.	· Clean spool and sleeve. · Replace leaf springs.	
Impossible to turn the steering wheel into neutral position.	· Check the monitor. · Check and repair the wiring.	

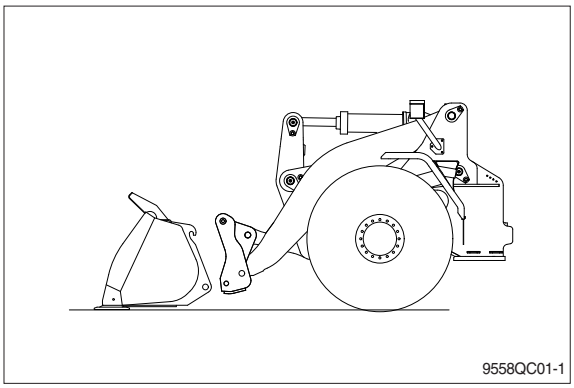
4. HYDRAULIC SYSTEM

Trouble	Service	Remark
Bucket lacks lifting power. Bucket lifting speed is slow.	· Check the hydraulic oil level and add if necessary. · Replace filter in hydraulic tank.	
Bubbles in oil.	· Replace with specified oil. · Add oil if needed.	
Oil pressure is too low.	· Bleed air from oil line. · Add oil and bleed air.	
Cylinder vibrates when operating.	· Add oil.	

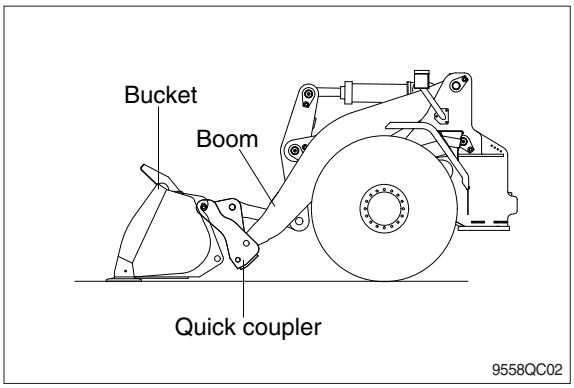
1. QUICK COUPLER

1) FIXING BUCKET WITH QUICK COUPLER

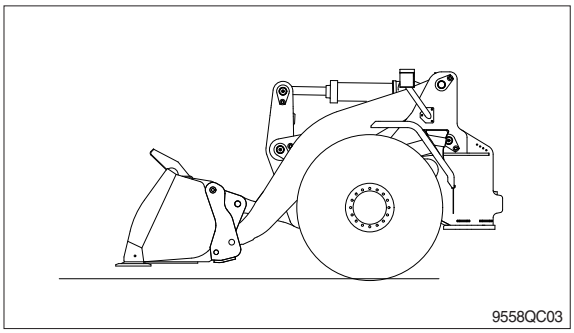
(1) Release the lock pins by pressing the attachment unlock switch.



(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.

⚠ 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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