CONTENTS

Foreword ····· 0-1
Before servicing this machine ····· 0-2
EC regulation approved ····· 0-3
Table to enter S/No and distribution ····· 0-4
Safety labels ····· 0-5
Machine data plate ····· 0-18
Guide (direction, S/No, symbol) ····· 0-19

SAFETY HINTS

1. Before operating the machine ····· 1-1
2. During operating the machine ····· 1-16
3. During maintenance ····· 1-23
4. Parking ····· 1-26

SPECIFICATIONS

1. Major components ····· 2-1
2. Specifications ····· 2-2
3. Working range ····· 2-8
4. Weight ····· 2-15
5. Lifting capacities ····· 2-17
6. Bucket selection guide ····· 2-22
7. Undercarriage ····· 2-26
8. Specification for major components ····· 2-30
9. Recommended oils ····· 2-34

CONTROL DEVICES

1. Cab devices ····· 3-1
2. Cluster ····· 3-2
3. Switches ····· 3-23
4. Levers and pedals ····· 3-27
5. Air conditioner and heater ····· 3-29
6. Others ····· 3-36

OPERATION

1. Suggestion for new machine ····· 4-1
2. Check before starting the engine ····· 4-2
3. Starting and stop the engine ····· 4-3
4. Mode selection system ····· 4-6
5. Operation of the working device ····· 4-11
6. Traveling of the machine ····· 4-12
7. Efficient working method ····· 4-15
8. Operation in the special work sites ····· 4-19
9. Normal operation of excavator ····· 4-21
10. Attachment lowering ····· 4-22
11. Storage ····· 4-23
12. RCV lever operating pattern ····· 4-25
13. Switching hydraulic attachment circuit ····· 4-27

TRANSPORTATION

1. Preparation for transportation ····· 5-1
2. Dimension and weight ····· 5-2
3. Loading the machine ····· 5-8
4. Fixing the machine ····· 5-10
5. Loading and unloading by crane ····· 5-11
6. Disassemble for transportation ····· 5-12
7. Adjustable track gauge (R520LC-9 only) ··· 5-15

MAINTENANCE

1. Instruction ····· 6-1
2. Tightening torque ····· 6-6
3. Fuel, coolant and lubricants ····· 6-10
4. Maintenance check list ····· 6-12
5. Maintenance chart ····· 6-17
6. Service instruction ····· 6-19
7. Electrical system ····· 6-41
8. Air conditioner and heater ····· 6-44

TROUBLESHOOTING GUIDE

1. Engine ····· 7-1
2. Electrical system ····· 7-2
3. Others ····· 7-3

HYDRAULIC BREAKER AND QUICK CLAMP

1. Selecting hydraulic breaker ····· 8-1
2. Circuit configuration ····· 8-2
3. Maintenance ····· 8-3
4. Precaution while operating the breaker ····· 8-4
5. Quick clamp ····· 8-6

OTHERS

1. Semi auto grease lubrication system ····· 9-1

INDEX ····· 10-1

FOREWORD

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

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

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

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

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

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

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

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

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

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.

EC REGULATION APPROVED

- Noise level (EN474-1 : 2006 and 2000/14/EC) are as followings.

  L_{WA} : 106 dB (EU only)

  L_{PA} : 74 dB (R480LC-9)

  75 dB (R520LC-9)

- The value of vibrations transmitted by the operator's seat are lower than standard value of (EN474-1 : 2006 and 2002/44/EC)

CE

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 :

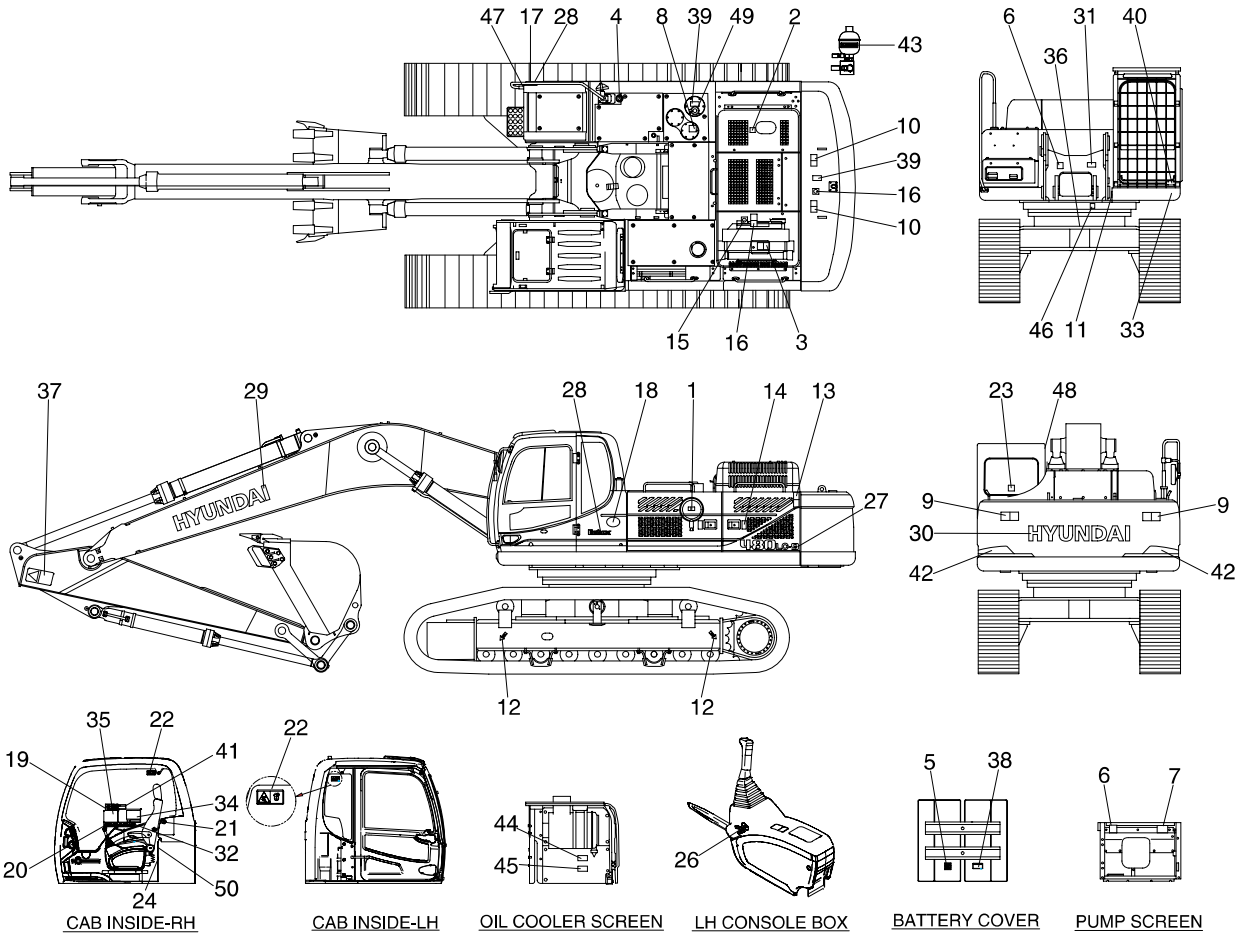
TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

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

SAFETY LABELS

1. LOCATION

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



1	Air cleaner filter	18	Low emission engine	36	Tie
2	Turbocharger cover	19	Control ideogram	37	Keep clear-Boom/arm
3	Radiator cap	20	Ref operator manual-Cab RH pillar	38	ECU connector
4	Fueling	21	Hammer	39	Falling
5	Battery accident	22	Safety front window	40	FOPS FOG plate
6	High pressure hose	23	Alternate exit	41	Turbocharger
7	Hydraulic oil level	24	Air conditioner filter	42	Reflecting
8	Hydraulic oil lub	26	Safety lever	43	Accumulator
9	Keep clear-rear	27	Model name	44	RCV lever pattern
10	Lifting eye	28	Logo (ROBEX)	45	Machine control pattern
11	Name plate	29	Trade mark (boom)	46	Swing grease
12	Slinging ideogram	30	Trade mark (CWT)	47	Battery position
13	Keep clear-side	31	Reduction gear grease	48	Beacon lamp
14	Stay fix	32	Locking-clamp	49	Fuel shut off
15	Shearing-engine hood	33	Noise level LWA	50	MCU/ECM connector
16	No step	34	Service instruction		
17	Transporting	35	Lifting chart		

2. DESCRIPTION

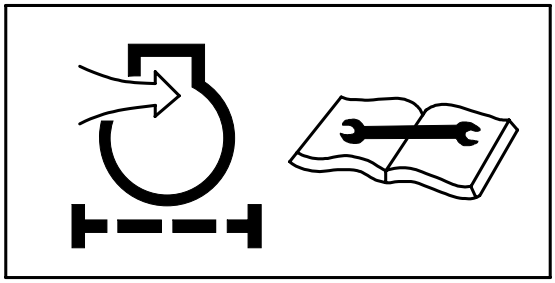
There are several specific warning labels on this machine please become familiarized with all warning labels.

Replace any safety label that is damaged, or missing.

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

This warning label is positioned on the air cleaner cover.

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

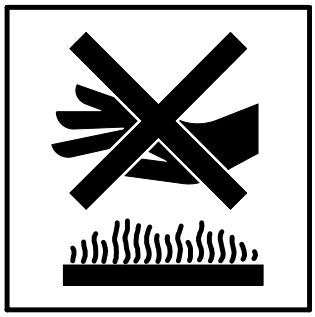


21070FW01

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) **RADIATOR CAP** (item 3)

This warning label is positioned on the radiator.

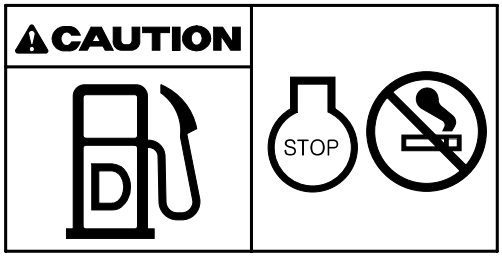
⚠ **Never open the filler cap while engine running or at high coolant temperature.**

14070FW03

4) **FUELING** (item 4)

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

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



21070FW04

5) BATTERY ACCIDENT (item 5)

This warning label is positioned on the battery cover.

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

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

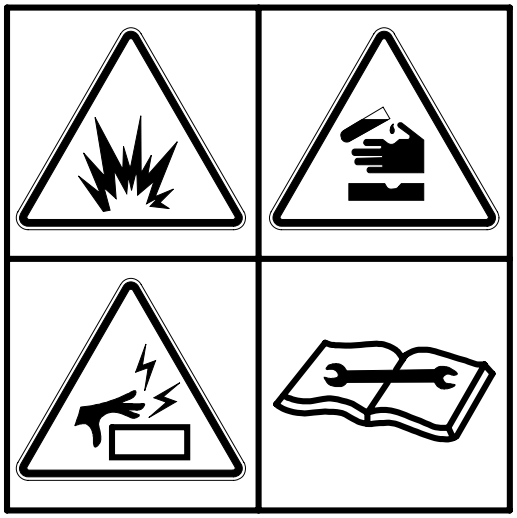
With electrolyte at proper level, less space may cause the gases to be accumulated in the battery.

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

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

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

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



36070FW05

6) HIGH PRESSURE HOSE (item 6)

This warning label is positioned on the screen plate.

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

※ Study the service manual before service job.

14070FW29

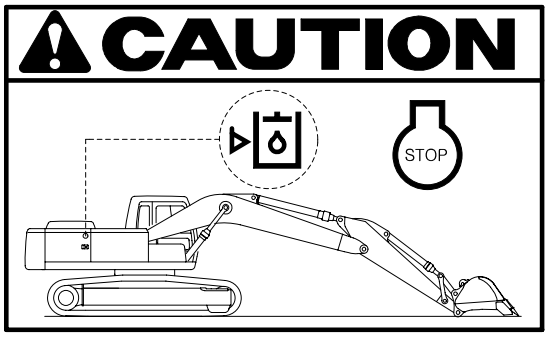
7) HYDRAULIC OIL LEVEL (item 7)

This warning label is positioned on the screen plate.

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

※ Check oil level on the level gauge.

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



21070FW07

8) HYDRAULIC OIL LUBRICATION (item 8)

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

※ Do not mix with different brand oils.

⚠ Never open the filler cap while high temperature.

⚠ Loosen the cap slowly and release internal pressure completely.

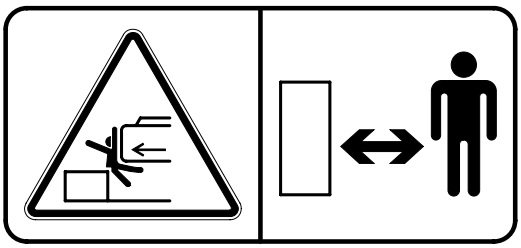
14070FW08

9) KEEP CLEAR (item 9)

This warning label is positioned on the rear of counterweight.

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

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



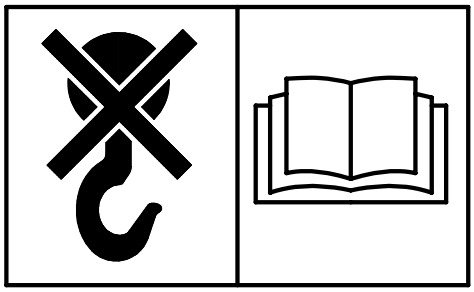
21090FW09

10) LIFTING EYE (item 10)

This warning label is positioned on the counterweight.

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

※ See page 5-9 for proper lifting method of the machine.



21070FW10

11) SIDE KEEP CLEAR (item 13)

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

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

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

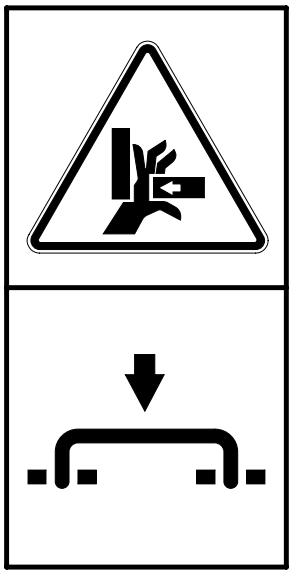
21070FW13

12) STAY FIX (item 14)

This warning label is positioned on the side cover.

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

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



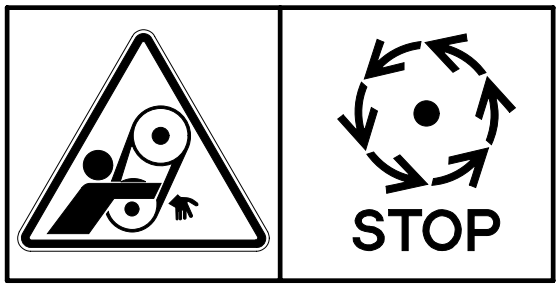
21070FW14

13) SHEARING-ENGINE HOOD (item 15)

This warning label is positioned on the engine hood.

⚠ Don't open the engine hood during the engine's running.

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



21070FW15

14) NO STEP (item 16)

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

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

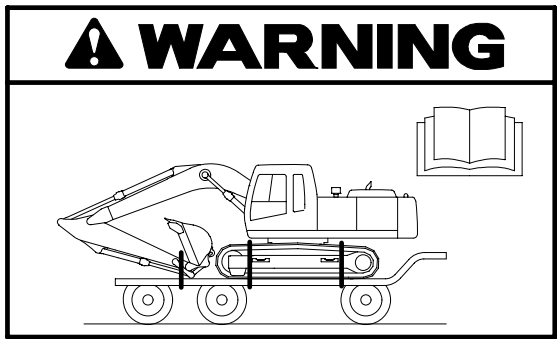
21070FW16

15) TRANSPORTING (item 17)

This warning label is positioned right side of upper frame.

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

See page 5-10 for details.



14070FW17

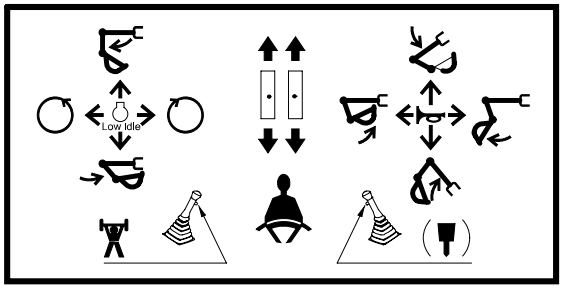
16) CONTROL IDEOGRAM (item 19)

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

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

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

See page 4-11 for details.

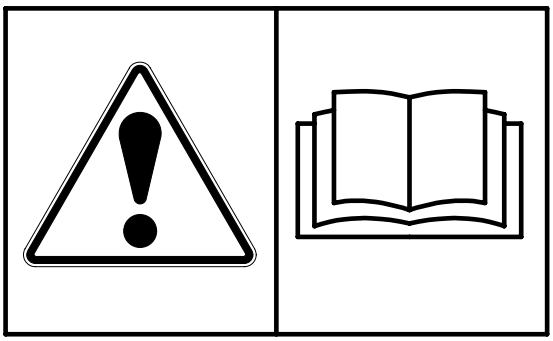


36070FW19

17) REF OPERATOR MANUAL (item 20)

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

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



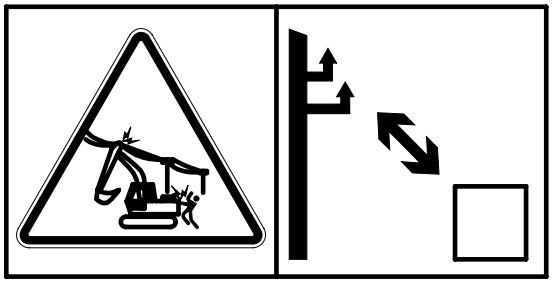
21070FW22

18) **MAX HEIGHT** (item 20)

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

⚠ **Serious injury or death can result from contact with electric lines.**

An electric shock being received by merely coming into the vicinity of an electric lines, the minimum distance should be kept considering the supply voltage as page 1-7.



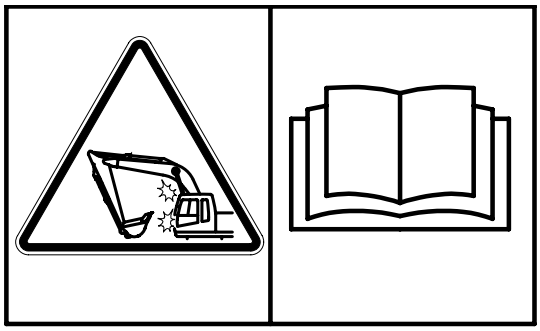
21070FW23

19) **INTERFERENCE** (item 20)

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

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

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

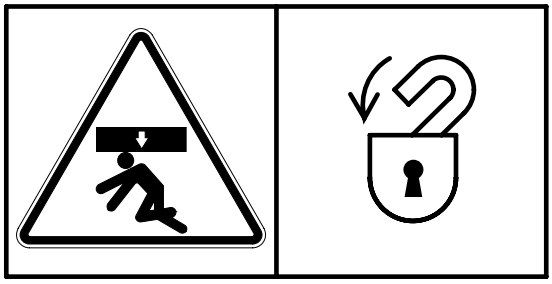


29090FW01

20) **SAFETY FRONT WINDOW** (item 22)

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

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



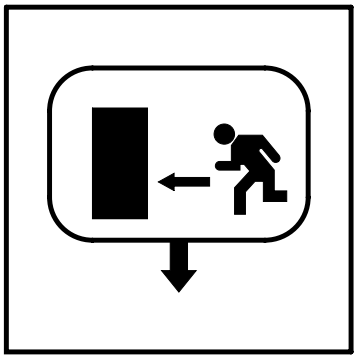
21070FW24

21) **ALTERNATE EXIT** (item 23)

This warning label is positioned on the inside of rear window.

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

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

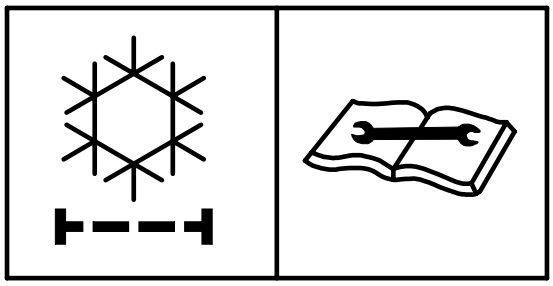


21070FW25

22) AIR CONDITIONER FILTER (item 24)

This warning label is positioned on the air conditioner cover.

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

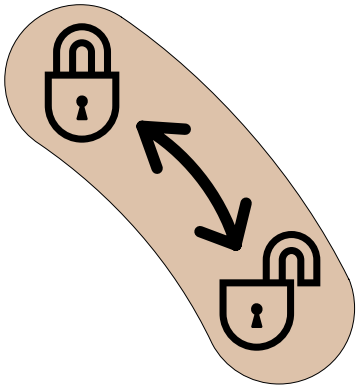


21070FW26

23) SAFETY LEVER (item 26)

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

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

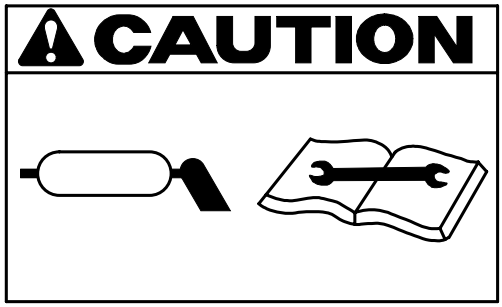


30007A1FW07A

24) REDUCTION GEAR GREASE (item 31)

This warning label is positioned in the front of upper frame.

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



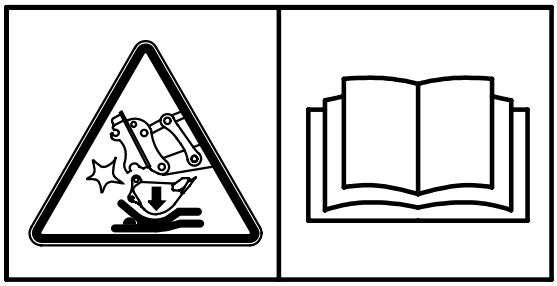
21070FW35

25) CLAMP-LOCKING (item 32)

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

⚠ Serious injury or death can result from dropping bucket.

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



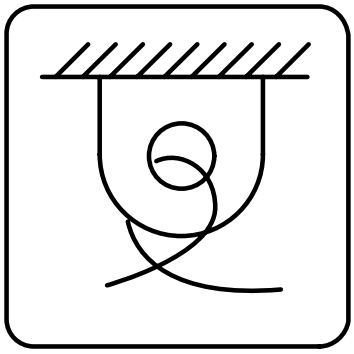
14070FW60

26) **TIE** (item 36)

This warning label is positioned on the lower frame.

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

⚠ **See page 4-14 for detail.**



4507A0FW02

27) **KEEP CLEAR-BOOM/ARM** (item 37)

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

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

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

14070FW31

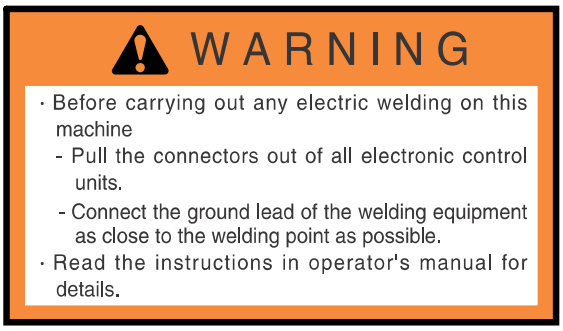
28) **ECU CONNECTOR** (item 38)

This warning label is positioned on the battery cover.

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

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

※ **See page 6-43 for detail.**



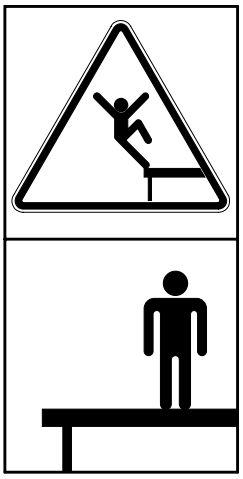
7807AFW20

29) **FALLING** (item 39)

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

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

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

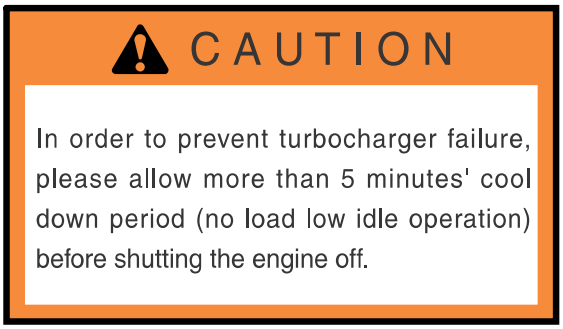


14070FW30

30) **TURBOCHARGER** (item 41)

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

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



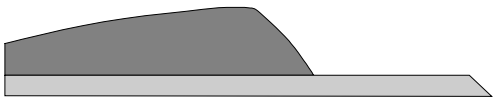
7807AFW20

31) **REFLECTING** (item 42)

This warning label is positioned on the rear of counterweight.

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

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



21090FW70

32) ACCUMULATOR (item 43)

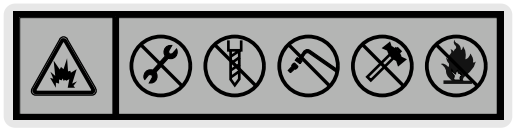
This warning label is positioned on the accumulator of the solenoid valve.

※ 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

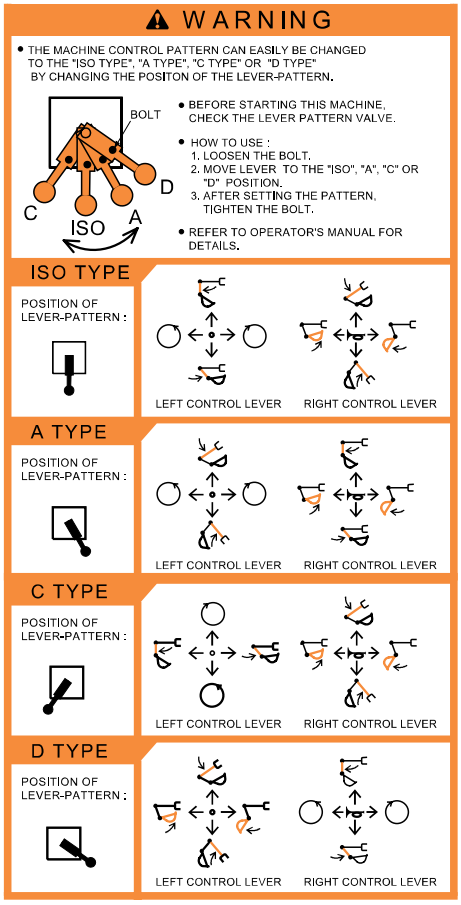
33) RCV lever pattern (item 44)

This warning label is positioned on the LH support.

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

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

※ See page 4-11 for details.



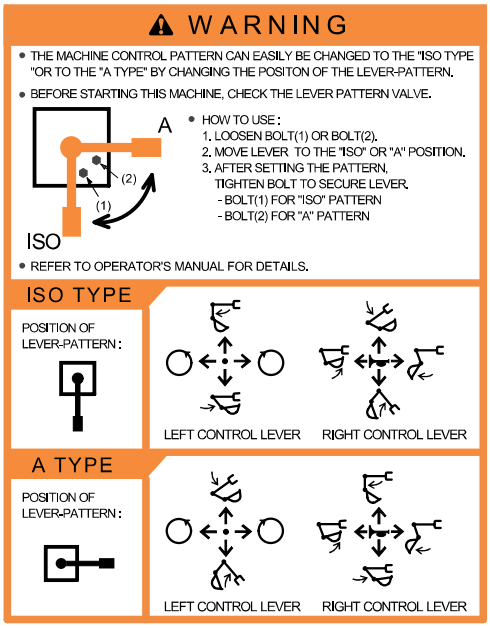
21090FW21

34) **Machine control pattern** (item 45)

This warning label is positioned on the oil cooler screen.

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

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

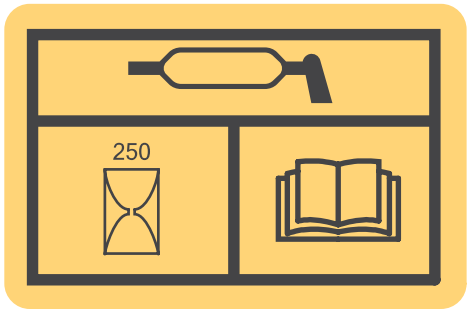


38090FW01A

35) **Swing grease** (item 46)

This warning label is positioned in the front of swing ring gear.

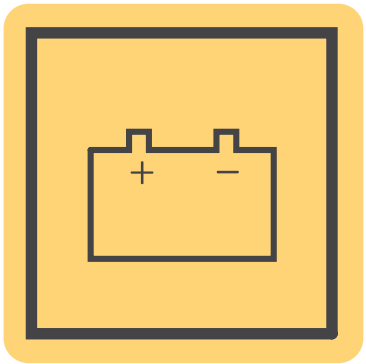
※ **See page 6-34 for details.**



38090FW04

36) **Battery position** (item 47)

This warning label is positioned right side of tool box.



38090FW03

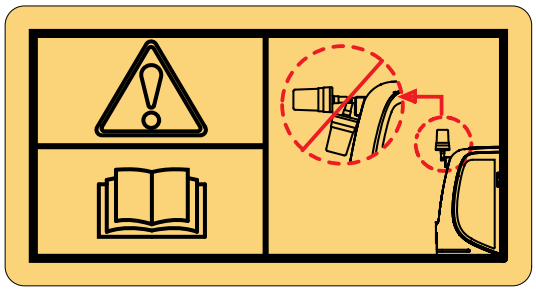
37) **BEACON LAMP** (item 48)

This warning label is positioned on the center outside of the cabin.

※ **Make sure the beacon lamp maintains a vertical position.**

A horizontal position can result in a decrease in life time of the lamp due to the infiltration of foreign substances such as dust or water.

※ **While the machine transfer, the beacon lamp is easy to break. In that case, change the position of the lamp to the horizontal.**



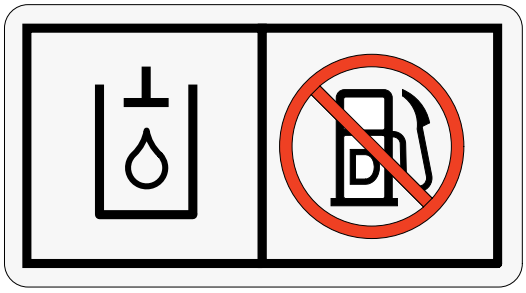
140Z90FW49

38) **FUEL SHUT OFF** (item 49)

This warning label is positioned on the left side of the hydraulic tank.

※ **Fill only the hydraulic oil.**

※ **Do not fill the diesel fuel.**



140WH90FW51

39) **MCU/ECM CONNECTOR** (item 50)

This warning label is positioned on the low cover of the air conditioner in the cab.

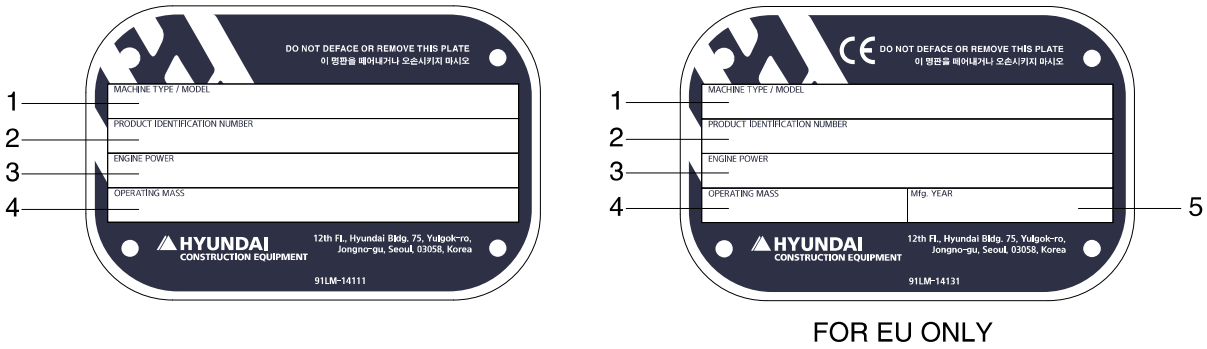
※ **MCU communicates the machine data with Laptop computer through RS232 service socket.**

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

※ **See page 3-48 for details.**

235Z90FW52

MACHINE DATA PLATE



FOR EU ONLY

21090FW10

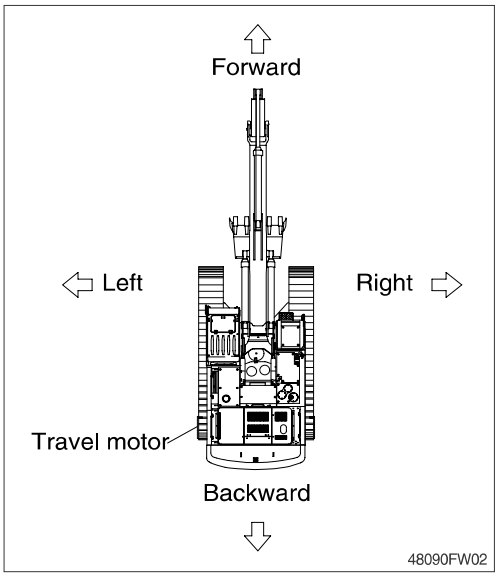
1 Machine type / model 2 Product identification number 3 Engine power
4 Operating mass 5 Manufacturing year

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

GUIDE

1. DIRECTION

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

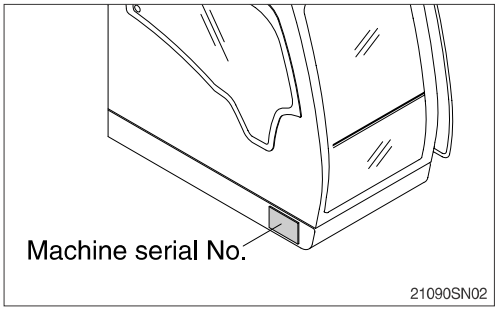


2. SERIAL NUMBER

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

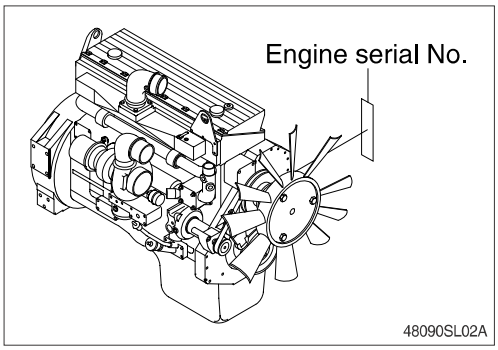
1) MACHINE SERIAL NUMBER

The numbers are located below the right window of the operator's cab.



2) ENGINE SERIAL NUMBER

The numbers are located on the engine name plate.



3. INTENDED USE

This machine is designed to be used mainly for the following work.

- Digging work
- Loading work
- Smoothing work
- Ditching work

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

4. SYMBOLS

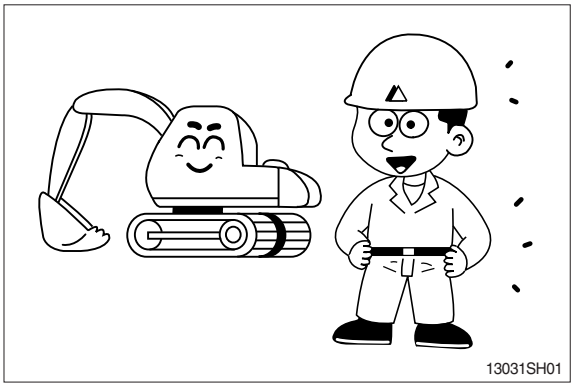
⚠ Important safety hint.

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

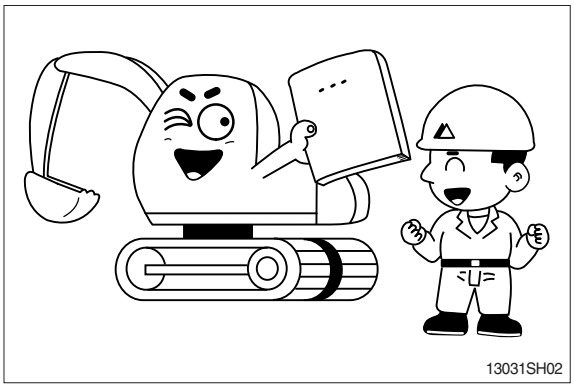
※ It indicates the useful information for operator.

1. BEFORE OPERATING THE MACHINE

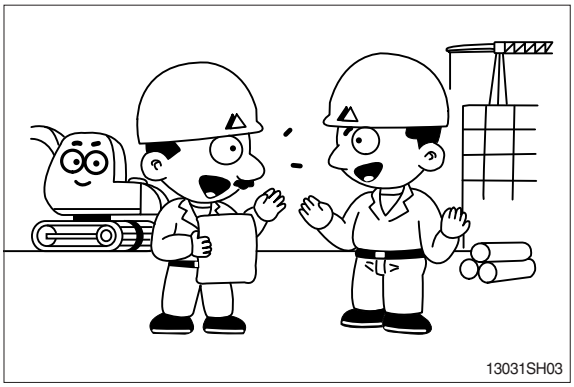
Think-safety first.
In special situation, wear protective clothing including a safety helmet, safety shoes, gloves, safety glasses and ear protection as required by the job condition.
Almost every accident is caused by disregarding the simple and fundamental safety hints.



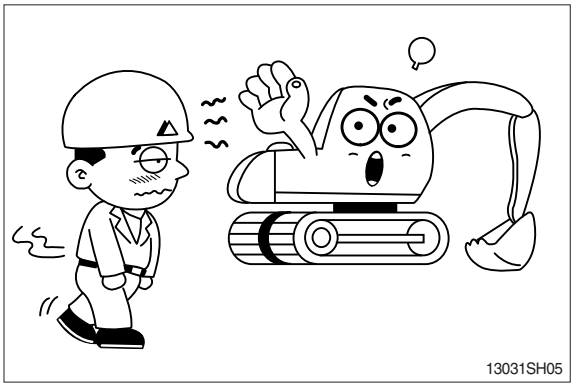
Be sure to understand thoroughly all about the operator's manual before operating the machine.
Proper care is your responsibility.



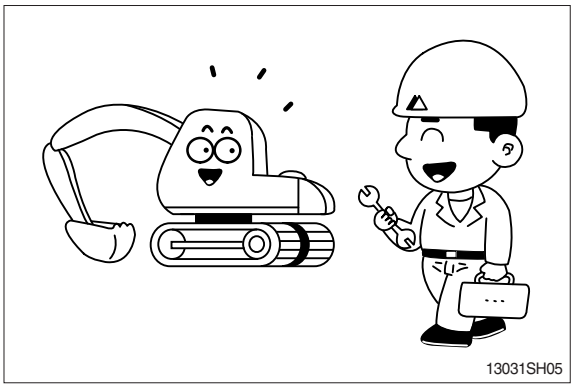
Fully understand the details and process of the construction before starting the work.
If you find anything dangerous on the job, consult with the job supervisor for the preventive measures before operating the machine.



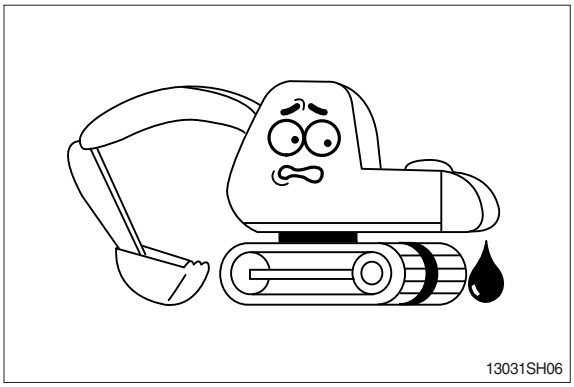
Do not operate when tired, or after drinking alcoholic beverages or any type of drugs.



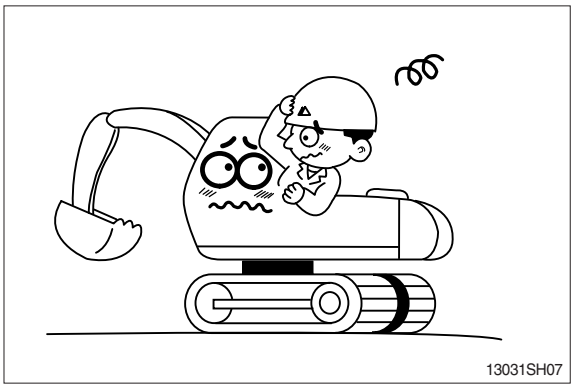
Check daily according to the operation manual.
Repair the damaged parts and tighten the loosened bolts.



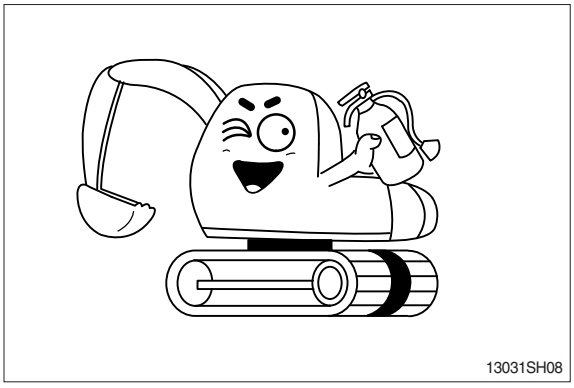
Check for leakage of engine oil, hydraulic oil, fuel and coolant.
Keep machine clean, clean machine regularly.



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



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

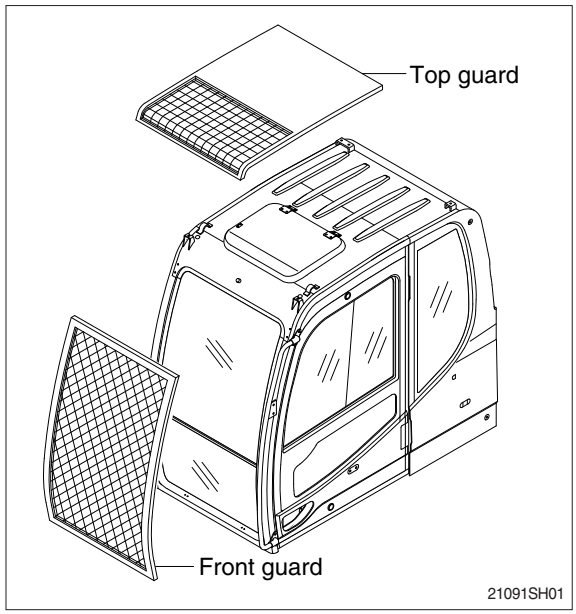


PROTECTION AGAINST FALLING OR FLYING OBJECTS

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

Be sure to close the front window before commencing work.

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



UNAUTHORIZED MODIFICATION

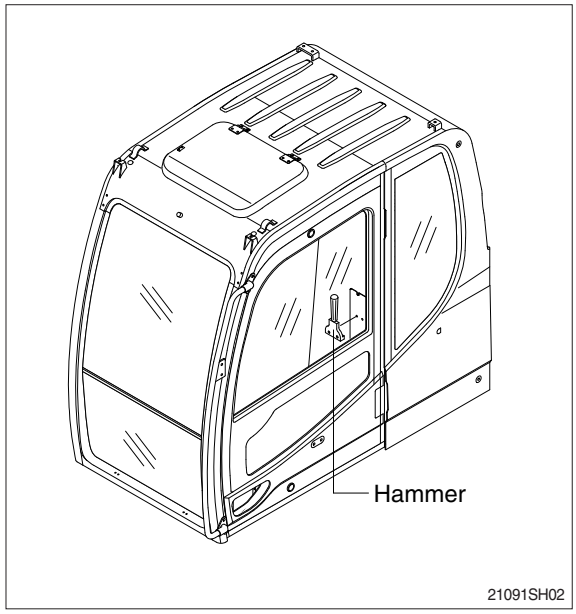
Any modification made without authorization from Hyundai can create hazards.

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

PREPARE FOR EMERGENCY

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

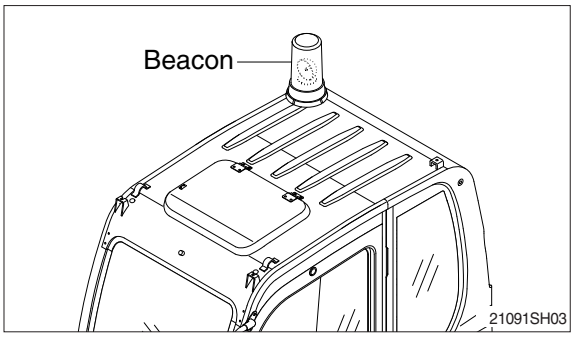
Be sure you know the phone numbers of persons you should contact in case of an emergency.



ROTATING BEACON

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

Please contact your Hyundai distributor to install it.



PRECAUTIONS FOR ATTACHMENTS

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

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

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

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

SAFETY RULES

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

SAFETY FEATURES

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

MACHINE CONTROL PATTERN

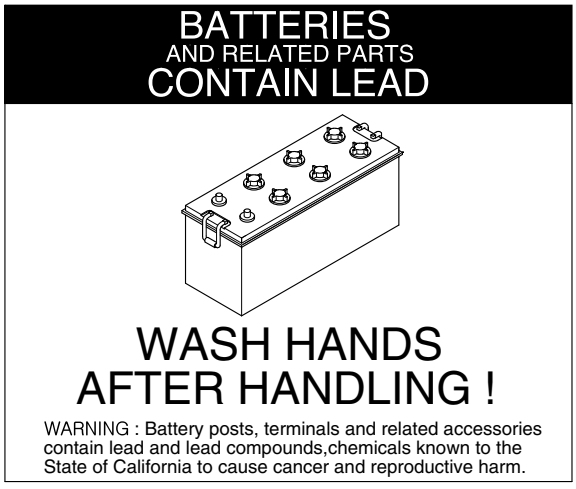
Check machine control pattern for conformance to pattern on label in cab.
If not, change label to match pattern before operating machine.
Failure to do so could result in injury.

CALIFORNIA PROPOSITION 65

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

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

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



13031SH55

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

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

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.

SAFETY FEATURES

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

MACHINE CONTROL PATTERN

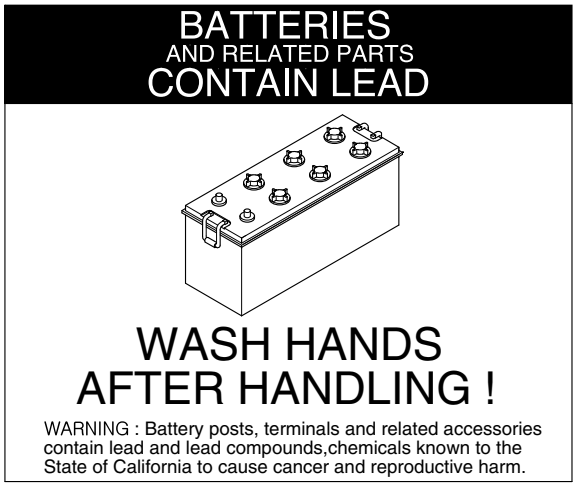
Check machine control pattern for conformance to pattern on label in cab.
If not, change label to match pattern before operating machine.
Failure to do so could result in injury.

CALIFORNIA PROPOSITION 65

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

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

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



13031SH55

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

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

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.

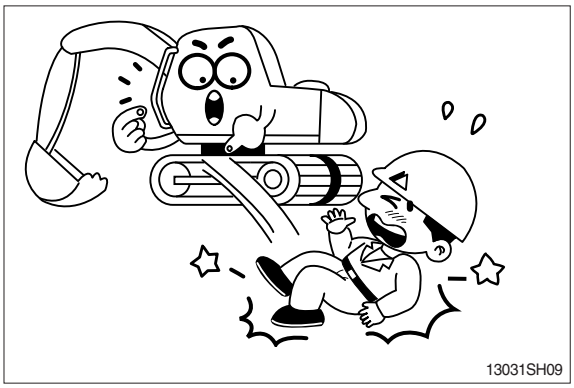
Sources

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.

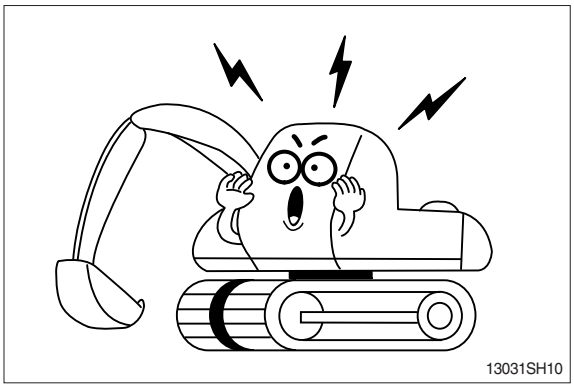
You should check the original directive. This document summarizes part of the content of the applicable law. This document is not meant to substitute the original sources. Other parts of these documents are based on information from the United Kingdom Health and Safety Executive.

2. DURING OPERATING THE MACHINE

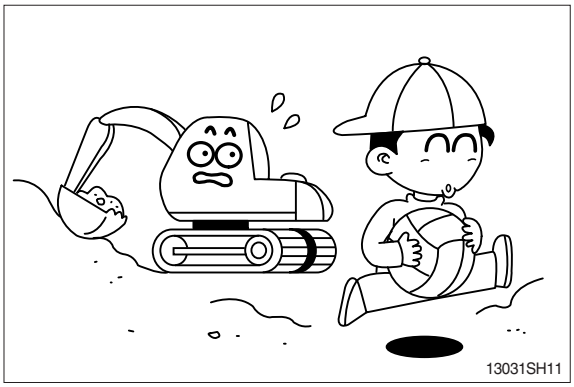
Use the handle and footstep when getting on or off the machine.
Do not jump on or off the machine.



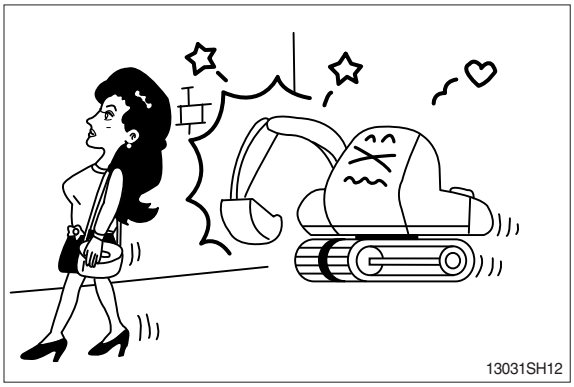
Sound the horn to warn nearby personnel before operating the machine.
Remove all the obstacles like frost on the window before operating the machine for the good visibility.



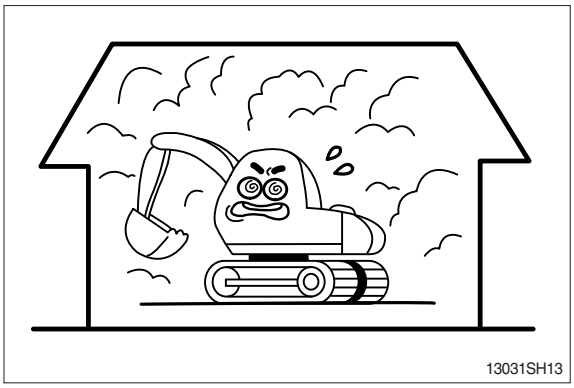
Operate carefully to make sure all personnel or obstacles are clear within the working range of the machine.
Place safety guards if necessary.



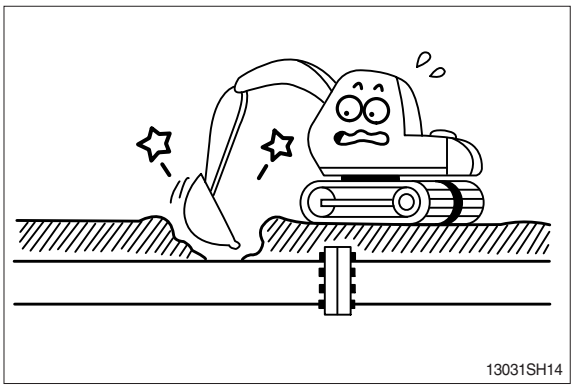
When using the work equipment, pay attention to job site.



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

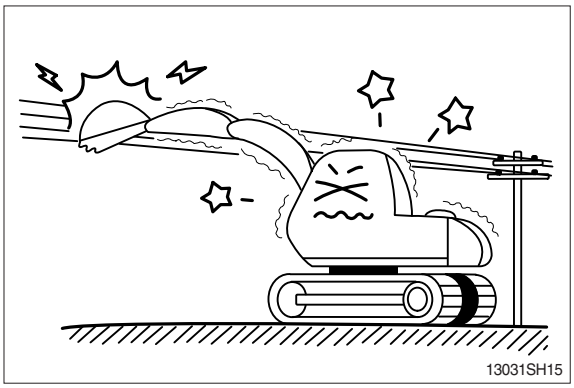


Check the locations of underground gas pipes or water line and secure the safety before operation.

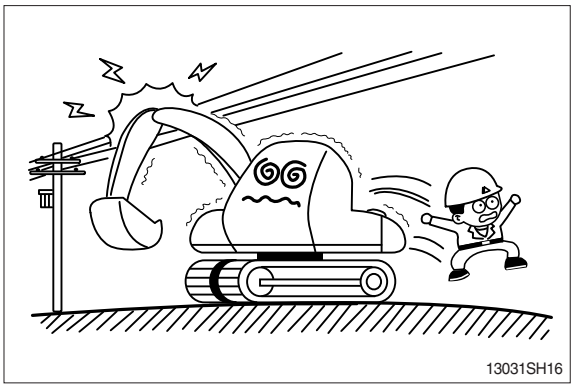


The operating near the electrical lines is very dangerous.
Operate within safe working range permitted as below.

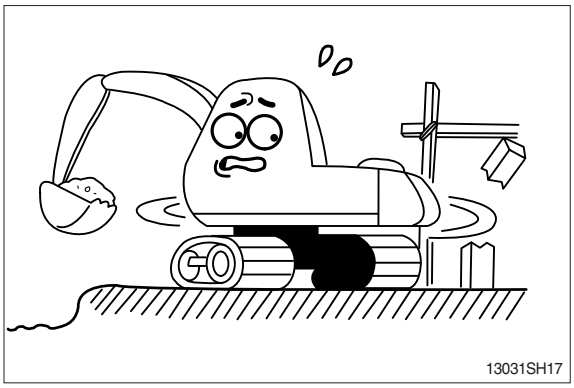
Supply voltage	Min safe separation
6.6 kV	3m (10 ft)
33.0 kV	4m (13 ft)
66.0 kV	5m (16 ft)
154.0 kV	8m (26 ft)
275.0 kV	10m (33 ft)



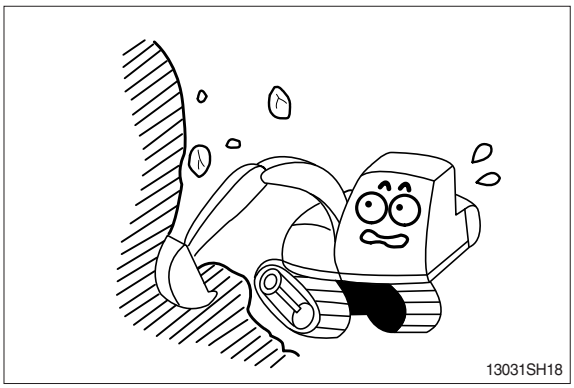
If the machine touches the electric power lines, keep sitting on the operator's seat and make sure the personnel on the ground not to touch the machine until turning off the electric current. Jump off the machine without contacting the machine when you need to get off.



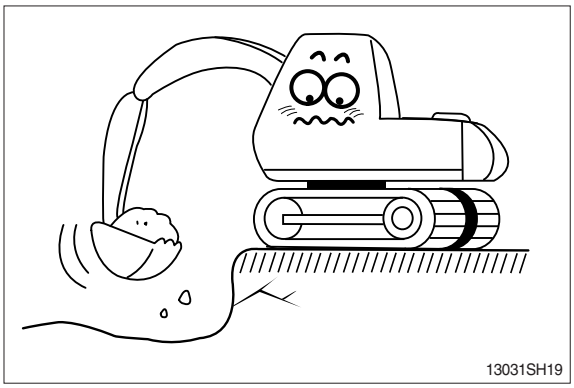
Watch out for obstacles.
Be particularly careful to check the machine clearance during the swing.



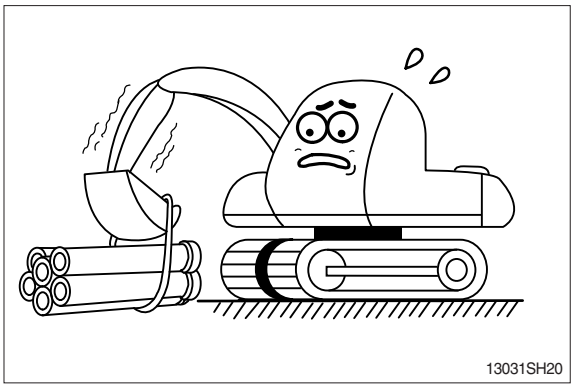
When using the machine as breaker or working in a place where stones may fall down, cab roof guard and head guard should be provided for proper protection.



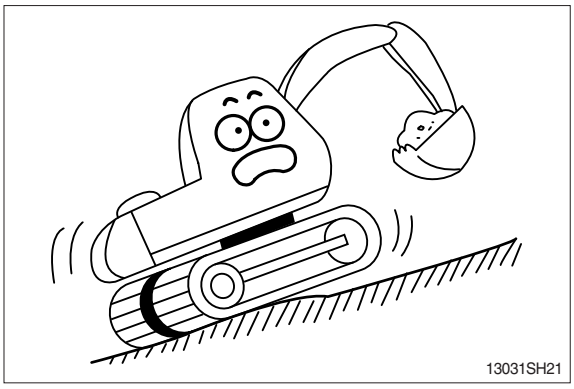
Avoid operating on a cliff or soft ground as there is danger of rolling over.
Make sure to get off easily as keeping the track at a right angle and putting the travel motor into the backward position when working on a cliff or soft ground inevitably.



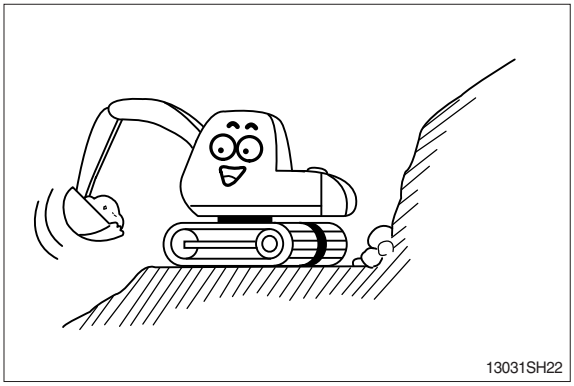
Operate for the lifting work considering the capacity of machine, weight and width of the load.
Be careful not to lift exceeding the machine capacity as it can be the cause of machine damage and safety accident.



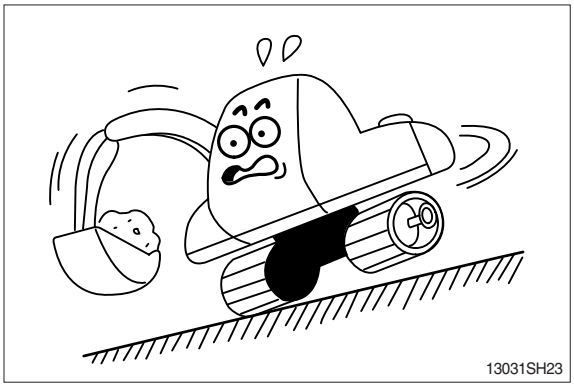
The operation on a slope is dangerous.
Avoid operating the machine on a slope of over 10 degree.



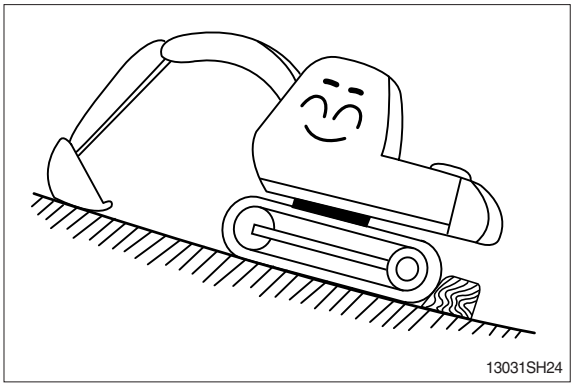
Operate the machine after making ground flat when operation is required on a slope.



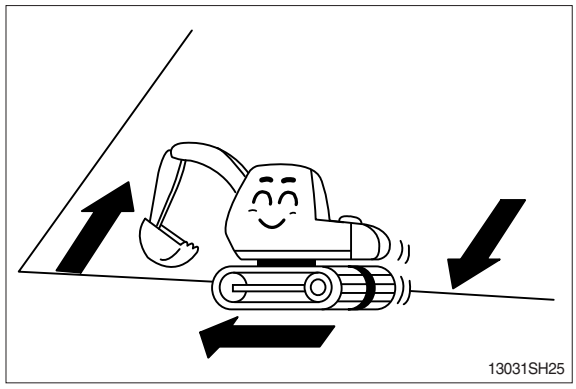
The swing on the slope can be danger of rolling over.
Do not operate to swing the machine with the bucket loaded on a slope since the machine may lose its balance under such an instance.



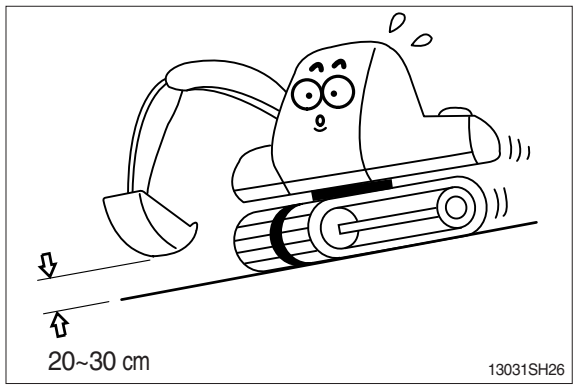
Avoid parking and stopping on a slope.
Lower the bucket to the ground and block the track when parking.



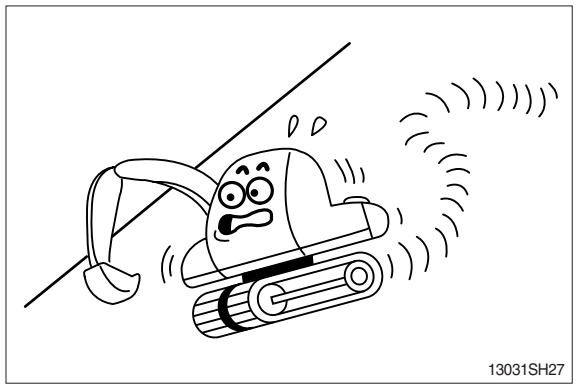
Avoid traveling in a cross direction on a slope as it can cause the danger of rolling over and sliding.



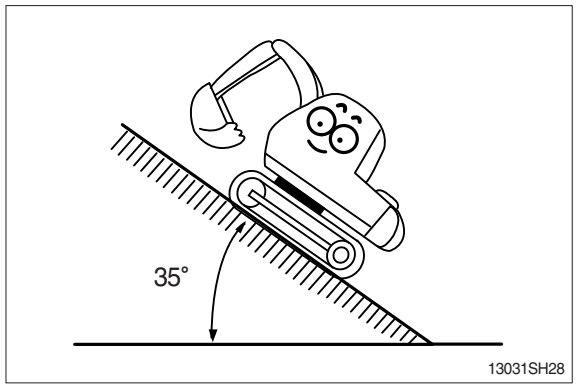
Traveling on a slope is dangerous.
Be sure to operate slowly when traveling down a slope and maintain the bucket at a height of 20~30 ㎝ (1 ft) above the ground so that it can be used as brake in an emergency.



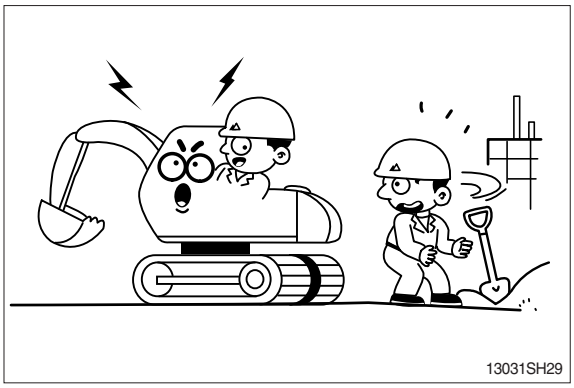
Steering of the machine while traveling on a slope is dangerous.
When an inevitable turning of direction is required, turn on the flat and solid ground.



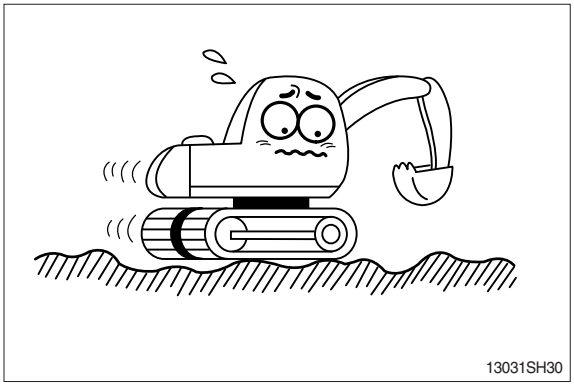
The engine angularity limits are 35 degree.
Do not operate by more than the engine limits in any case.



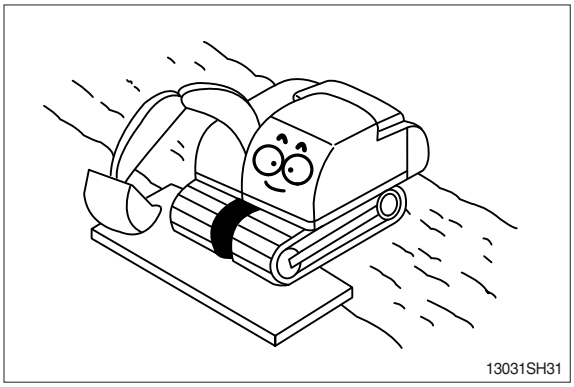
Before traveling the machine, sound the horn to warn nearby personnel.
Operate forward and backward correctly with confirming the location of the travel motor.



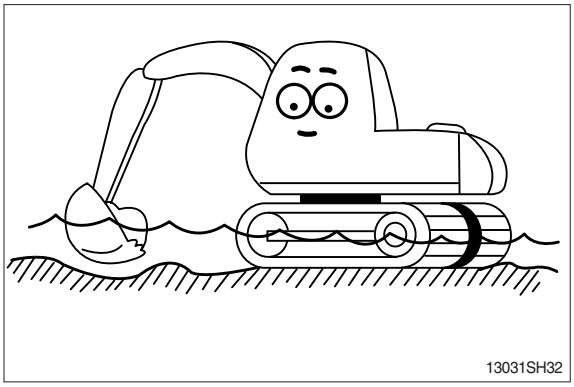
Slow down when traveling through obstacles or uneven ground.



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



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



MOUNTING AND DISMOUNTING

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

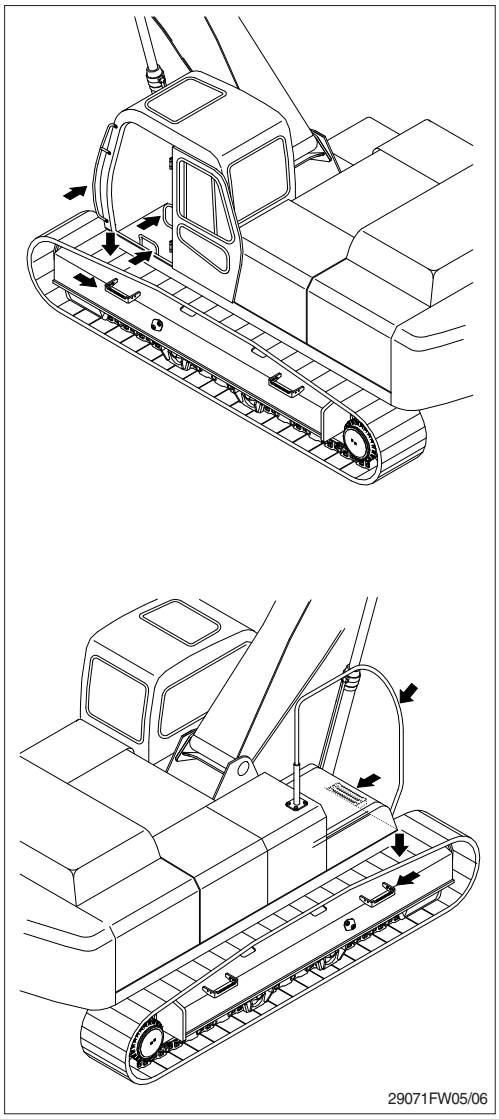
When mounting or dismounting, always face the machine and use the handrails, machine or track frame steps, and track shoes. Additional track frame step can be fitted for wider optional shoe. In this case please contact your Hyundai distributor.

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

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

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

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



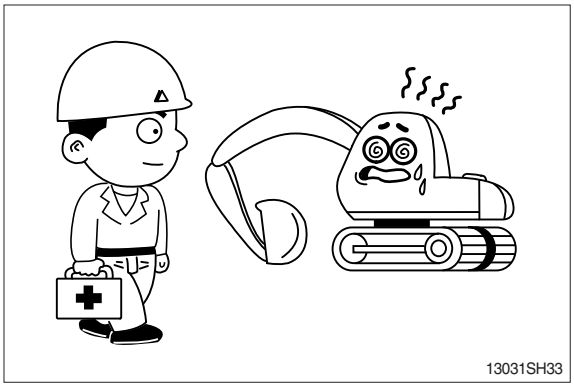
KEEP RIDERS OFF MACHINE

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

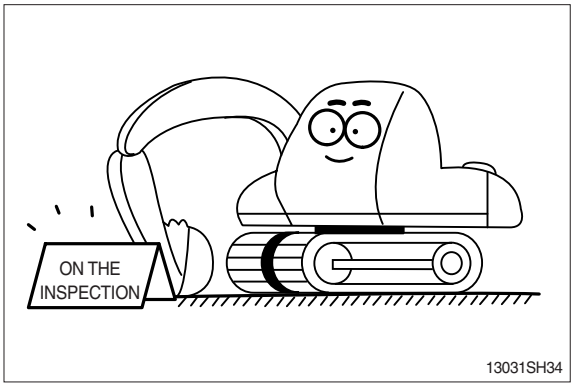
Only allow the operator on the machine. Keep riders off.

3. DURING MAINTENANCE

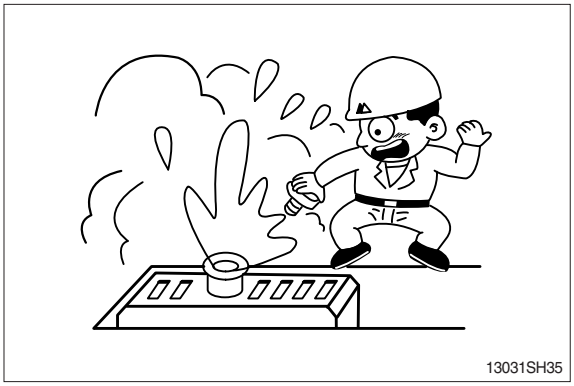
Stop the engine immediately when the trouble of the machine is found.
Inspect immediately the cause of trouble such as vibration, overheating and trouble in the cluster then repair.



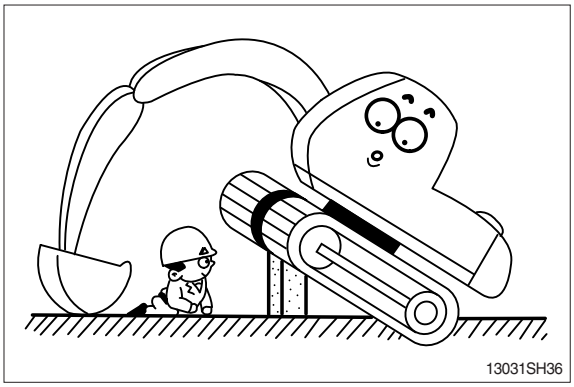
Park on a flat place and stop the engine for inspecting and repairing. Properly TAG machine is not operational. (remove start key)
Extreme care shall be taken during maintenance work. Parts may require additional safe guard.



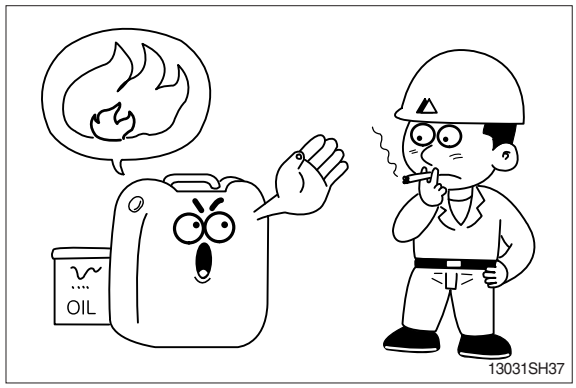
Do not remove the radiator cap from hot engine.
Open the cap after the engine cools, below 50 °C (122 °F) to prevent personal injury from heated coolant spray or steam.



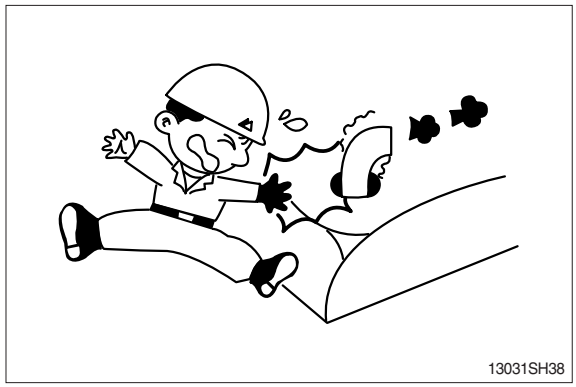
Do not work below the machine.
Be sure to work with proper safety supports.
Do not depend on the hydraulic cylinders to hold up the equipment and attachment.



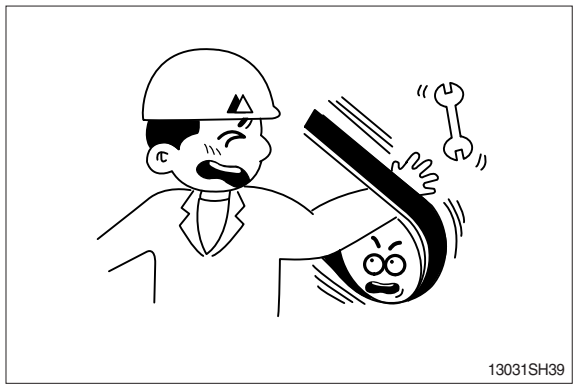
There is the danger of fire in fuel and oil.
Store in cool and dry area, away from any open flames.



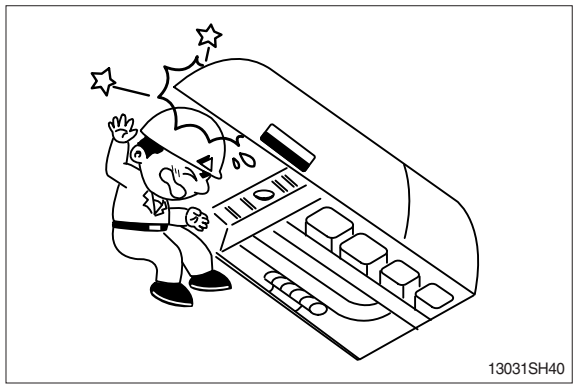
Do not touch exhaust pipe, or may cause severe burn.



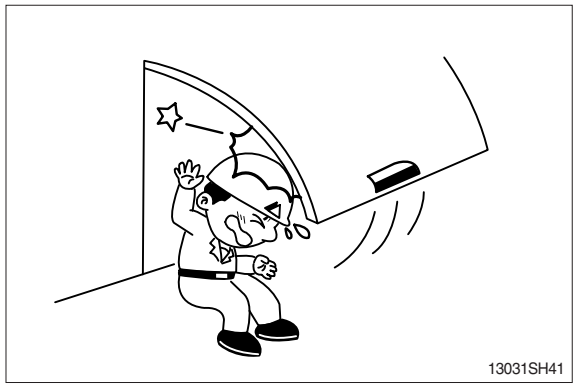
Do not open the engine hood and covers while the engine is running.



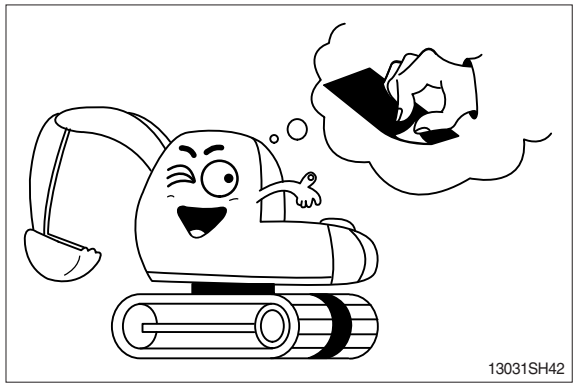
Be careful of not hitting the edges when you service engine.



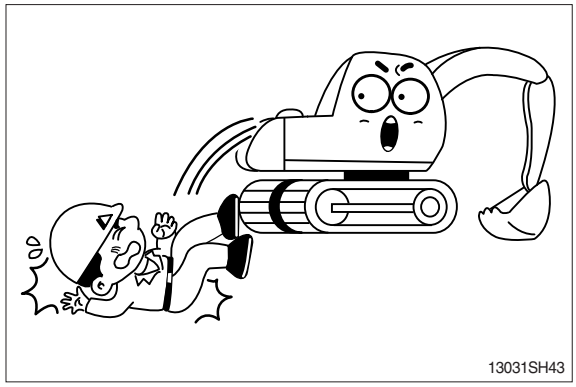
Be careful that the front window may be promptly closed.
Be sure to support stay, when the side door needs to be opened.
Be careful that the open side door may closed by the external or natural force like strong wind.


13031SH41

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


13031SH42

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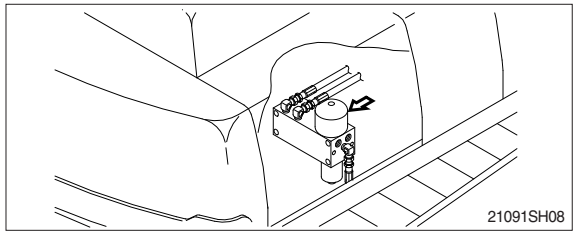
HIGH PRESSURE GAS

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

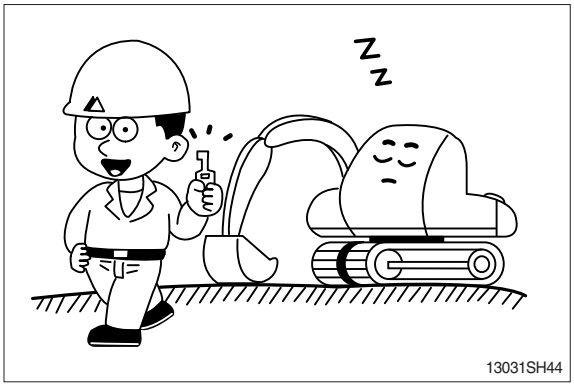

21091SH08

LIFT EYES CAN FAIL

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

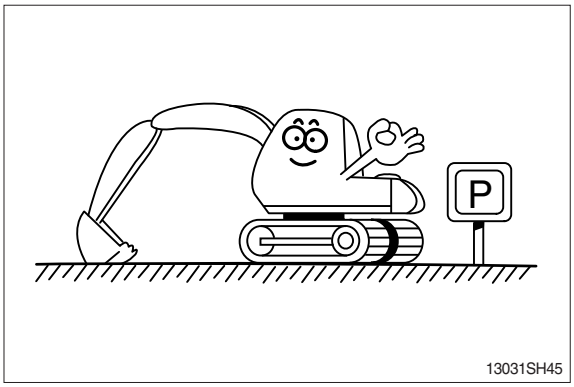
4. PARKING

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



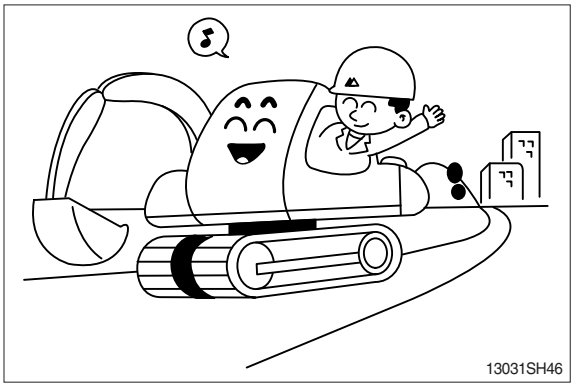
13031SH44

Park the machine in the flat and safe place.

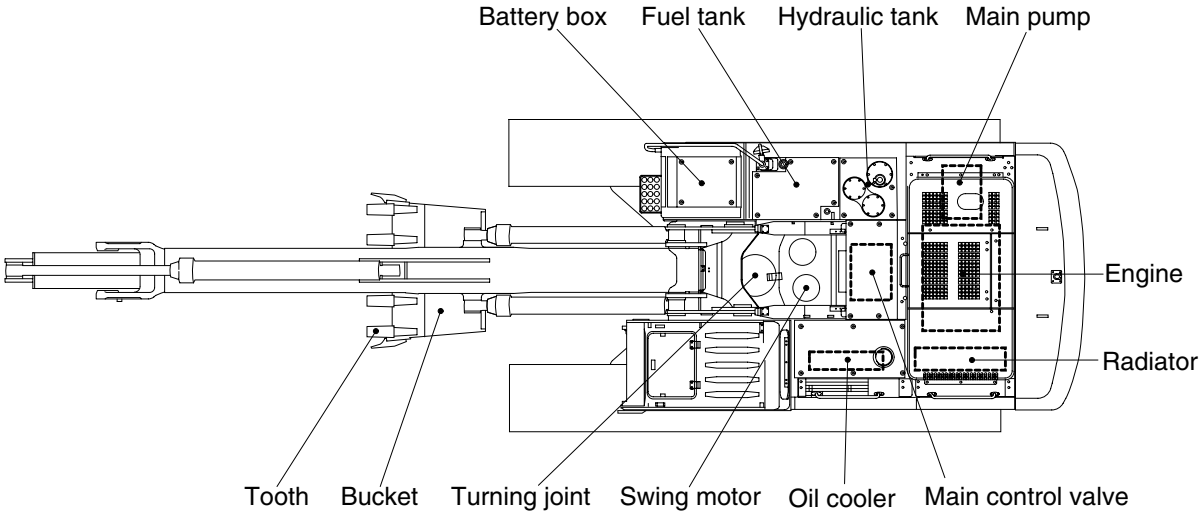


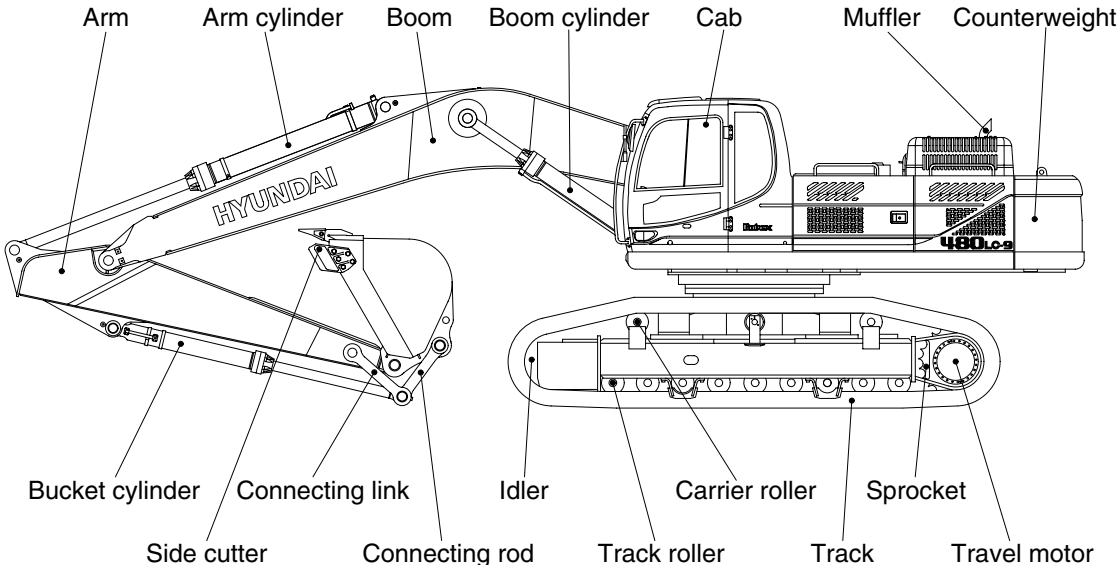
13031SH45

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


13031SH46

1. MAJOR COMPONENT



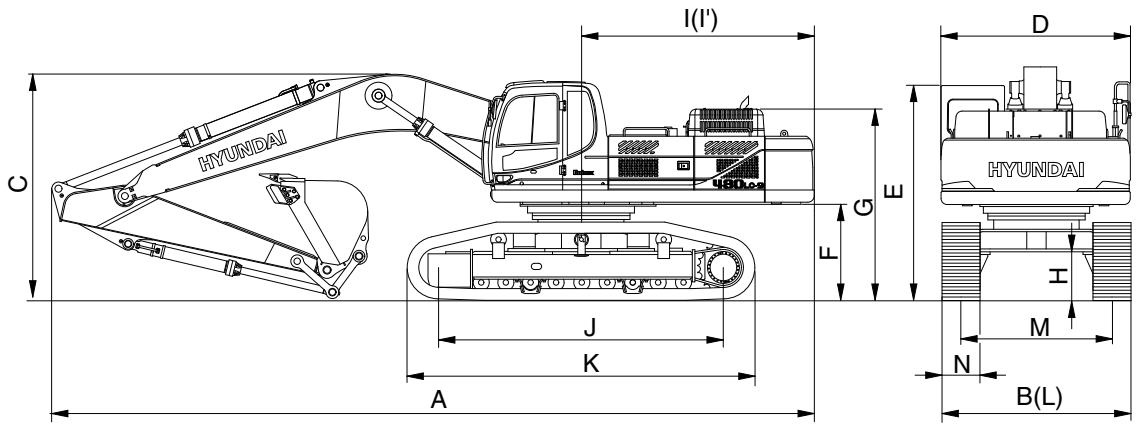


48092SP01

2. SPECIFICATIONS

1) ROBEX 480LC-9

· 7.06 m (23' 2") BOOM, 3.38 m (11' 1") ARM

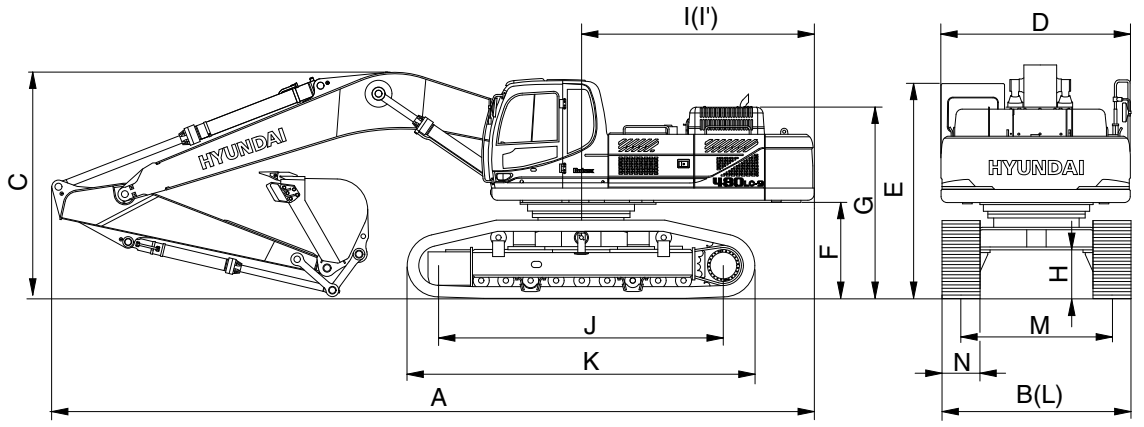


48092SP02

Description		Unit	Specification
Operating weight		kg (lb)	48100 (106040)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.15 (2.81)
Overall length	A	mm (ft-in)	12060 (39' 7")
Overall width, with 600 mm shoe	B		3340 (10' 11")
Overall height	C		3730 (12' 3")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3190 (10' 6")
Ground clearance of counterweight	F		1295 (4' 3")
Engine cover height	G		2770 (9' 1")
Minimum ground clearance	H		555 (1' 10")
Rear-end distance	I		3695 (12' 1")
Rear-end swing radius	I'		3750 (12' 4")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5462 (17' 11")
Undercarriage width	L		3340 (10' 11")
Track gauge	M		2740 (9' 0")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.2/5.0 (2.0/3.1)
Swing speed		rpm	9.0
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.83 (11.80)
Max traction force		kg (lb)	38500 (84800)

2) ROBEX 480-9

· 7.06 m (23' 2") BOOM, 3.38 m (11' 1") ARM

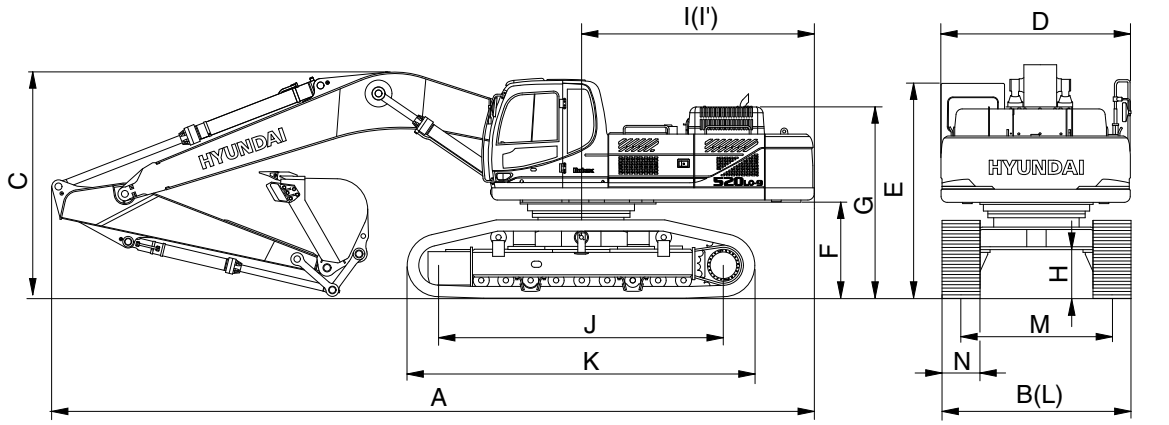


48092SP02

Description		Unit	Specification
Operating weight		kg (lb)	46900 (103400)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.15 (2.81)
Overall length	A	mm (ft-in)	12060 (39' 7")
Overall width, with 600 mm shoe	B		3340 (10' 11")
Overall height	C		3730 (12' 3")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3190 (10' 6")
Ground clearance of counterweight	F		1295 (4' 3")
Engine cover height	G		2770 (9' 1")
Minimum ground clearance	H		555 (1' 10")
Rear-end distance	I		3695 (12' 1")
Rear-end swing radius	I'		3750 (12' 4")
Distance between tumblers	J		4040 (13' 3")
Undercarriage length	K		5032 (16' 6")
Undercarriage width	L		3340 (10' 11")
Track gauge	M		2740 (9' 0")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.2/5.0 (2.0/3.1)
Swing speed		rpm	9.0
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.89 (12.66)
Max traction force		kg (lb)	38500 (84800)

3) ROBEX 520LC-9

· 7.06 m (23' 2") BOOM, 3.38 m (11' 1") ARM

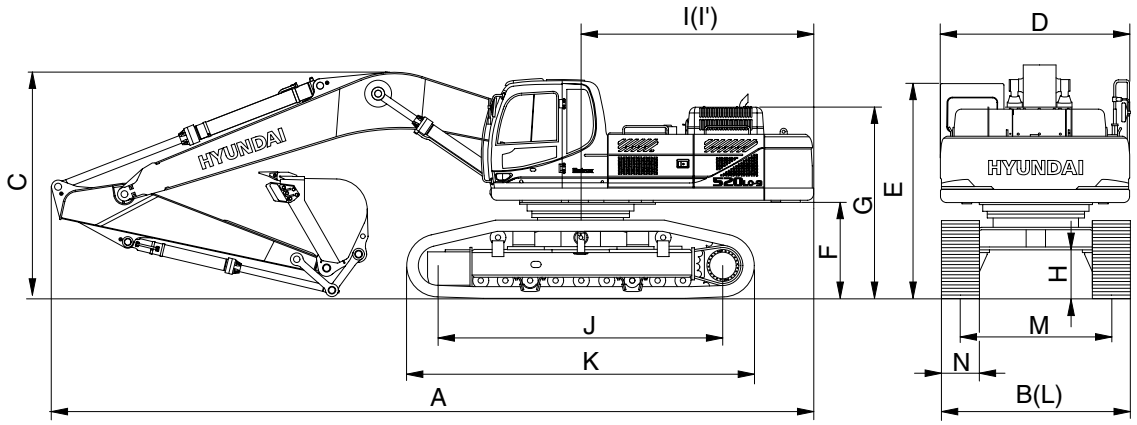


48092SP03

Description		Unit	Specification
Operating weight		kg (lb)	51000 (112440)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.15 (2.81)
Overall length	A	mm (ft-in)	12060 (39' 7")
Overall width, with 600 mm shoe (transport position / working position)	B		2990/3540 (9' 10"/11' 7")
Overall height	C		3850 (12' 8")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3400 (11' 2")
Ground clearance of counterweight	F		1500 (4' 11")
Engine cover height	G		2980 (9' 9")
Minimum ground clearance	H		770 (2' 6")
Rear-end distance	I		3695 (12' 1")
Rear-end swing radius	I'		3750 (12' 4")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5460 (17' 11")
Undercarriage width (transport position / working position)	L		2980/3540 (9' 9"/11' 7")
Track gauge (transport position / working position)	M		2380/2940 (7' 10"/9' 8")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.2/5.0 (2.0/3.3)
Swing speed		rpm	9.0
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.88 (12.51)
Max traction force		kg (lb)	38500 (84880)

4) ROBEX 520LC-9

· 6.55 m (21' 6") BOOM, 2.4 m (7' 10") ARM

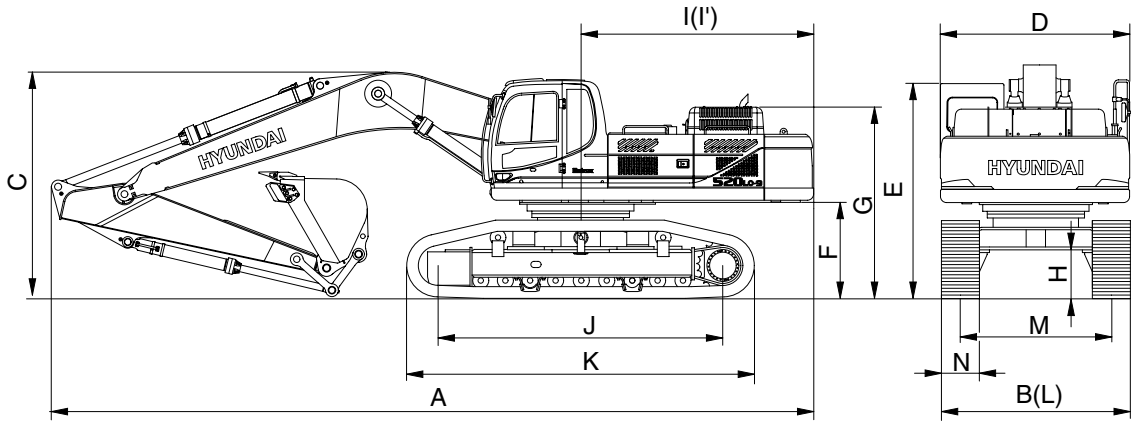


48092SP03

Description		Unit	Specification
Operating weight		kg (lb)	50820 (112040)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.15 (2.81)
Overall length	A	mm (ft-in)	11780 (38' 8")
Overall width, with 600 mm shoe (transport position / working position)	B		2980/3540 (9' 9"/11' 7")
Overall height	C		4100 (13' 5")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3400 (11' 2")
Ground clearance of counterweight	F		1500 (4' 11")
Engine cover height	G		2980 (9' 9")
Minimum ground clearance	H		770 (2' 6")
Rear-end distance	I		3695 (12' 1")
Rear-end swing radius	I'		3750 (12' 4")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5460 (17' 11")
Undercarriage width (transport position / working position)	L		2980/3540 (9' 9"/11' 7")
Track gauge (transport position / working position)	M		2380/2940 (7' 10"/9' 8")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.2/5.0 (2.0/3.1)
Swing speed		rpm	9.0
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.88 (12.51)
Max traction force		kg (lb)	38500 (84800)

5) ROBEX 520LC-9

· 9.00 m (29' 6") BOOM, 5.85 m (19' 2") ARM



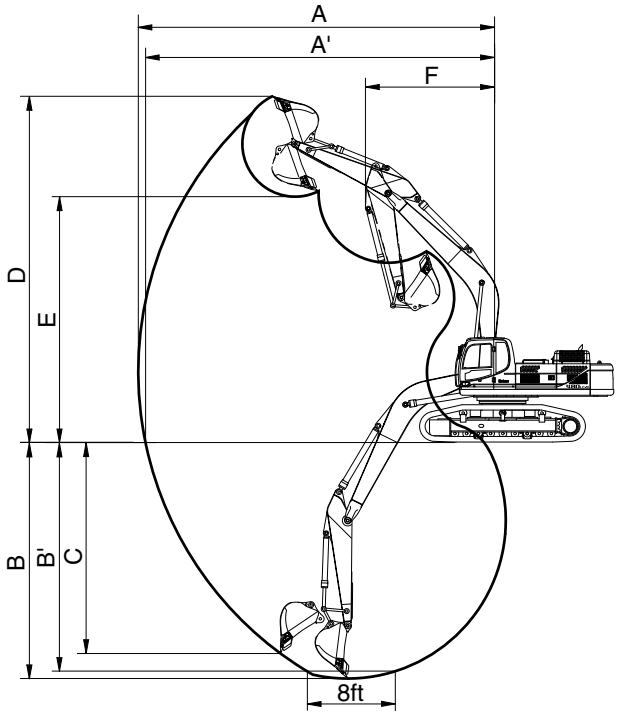
48092SP03

Description		Unit	Specification
Operating weight		kg (lb)	52410 (115540)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.15 (2.81)
Overall length	A	mm (ft-in)	13800 (45' 3")
Overall width, with 600 mm shoe (transport position / working position)	B		2980/3540 (9' 9"/11' 7")
Overall height	C		5190 (17' 0")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3400 (11' 2")
Ground clearance of counterweight	F		1500 (4' 11")
Engine cover height	G		2980 (9' 9")
Minimum ground clearance	H		770 (2' 6")
Rear-end distance	I		3695 (12' 1")
Rear-end swing radius	I'		3750 (12' 4")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5460 (17' 11")
Undercarriage width (transport position / working position)	L		2980/3540 (9' 9"/11' 7")
Track gauge (transport position / working position)	M		2380/2940 (7' 10"/9' 8")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.2/5.0 (2.0/3.1)
Swing speed		rpm	9.0
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.91 (12.94)
Max traction force		kg (lb)	38500 (84800)

3. WORKING RANGE

1) ROBEX 480LC-9

· 7.06 m (23' 2") BOOM



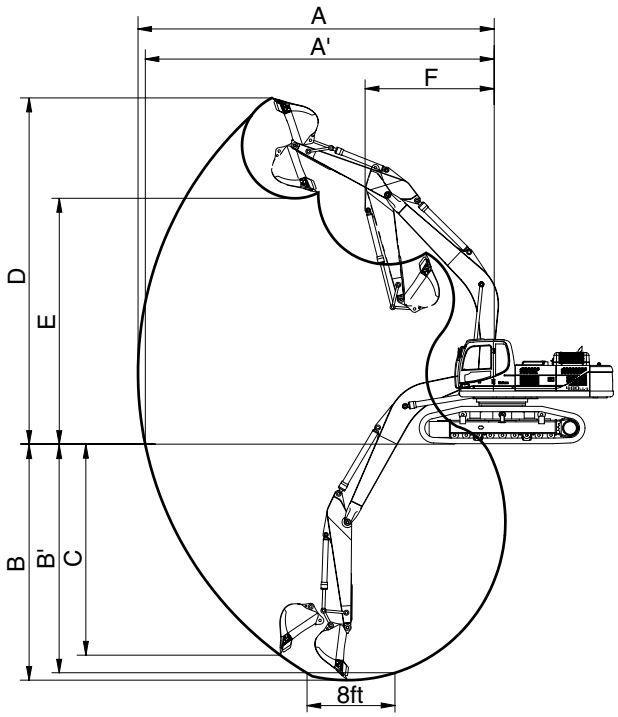
48092SP04

Description		2.40 m (7' 10") Arm	2.90 m (9' 6") Arm	3.38 m (11' 1") Arm	4.00 m (13' 1") Arm
Max digging reach	A	11160 mm (36' 7")	11550 mm (37'11")	12100 mm (39' 8")	12660 mm (41' 6")
Max digging reach on ground	A'	10940 mm (35'11")	11340 mm (37' 2")	11900 mm (39' 1")	12470 mm (40'11")
Max digging depth	B	6830 mm (22' 5")	7330 mm (24' 1")	7810 mm (25' 7")	8430 mm (27' 9")
Max digging depth (8ft level)	B'	6670 mm (21'11")	7190 mm (23' 7")	7670 mm (25' 2")	8320 mm (27' 4")
Max vertical wall digging depth	C	5960 mm (19' 7")	5930 mm (19' 5")	6590 mm (21' 7")	7170 mm (23' 6")
Max digging height	D	10560 mm (34' 8")	10530 mm (34' 7")	10980 mm (36' 0")	11210 mm (36' 9")
Max dumping height	E	7110 mm (23' 4")	7180 mm (23' 7")	7620 mm (25' 0")	7830 mm (25' 8")
Min swing radius	F	5090 mm (16' 8")	4910 mm (16' 1")	4780 mm (15' 8")	4910 mm (16' 1")
Bucket digging force	SAE	216.7 [236.4] kN	219.7 [239.6] kN	220.7 [240.7] kN	222.6 [242.9] kN
		22100 [24110] kgf	22400 [24440] kgf	22500 [24550] kgf	22700 [24760] kgf
		48720 [53150] lbf	49380 [53870] lbf	49600 [54110] lbf	50040 [54590] lbf
	ISO	251.1 [273.9] kN	254.0 [277.1] kN	255.0 [278.2] kN	256.9 [280.3] kN
		25600 [27930] kgf	25900 [28250] kgf	26000 [28360] kgf	26200 [28580] kgf
		56440 [61570] lbf	57100 [62290] lbf	57320 [62530] lbf	57760 [63010] lbf
Arm crowd force	SAE	276.6 [301.7] kN	224.6 [245.0] kN	191.2 [208.6] kN	170.6 [186.2] kN
		28200 [30760] kgf	22900 [24980] kgf	19500 [21270] kgf	17400 [18980] kgf
		62170 [67820] lbf	50490 [55080] lbf	42990 [46900] lbf	38360 [41850] lbf
	ISO	290.3 [316.7] kN	234.4 [255.7] kN	199.1 [217.2] kN	176.5 [192.6] kN
		29600 [32290] kgf	23900 [26070] kgf	20300 [22150] kgf	18000 [19640] kgf
		65260 [71190] lbf	52690 [57480] lbf	44750 [48820] lbf	39680 [43290] lbf

[ ] : Power boost

2) ROBEX 480LC-9

· 6.55 m (21' 6") BOOM



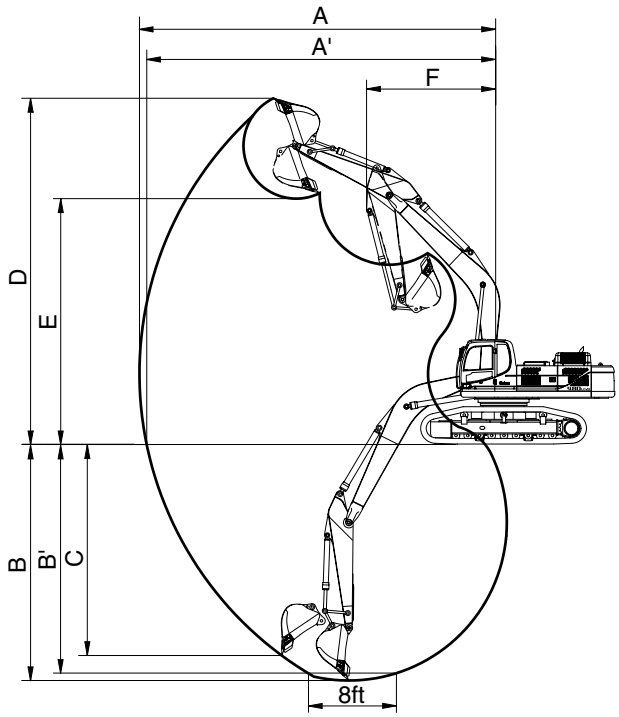
48092SP04

Description		2.40 m (7' 10") Arm
Max digging reach	A	10610 mm (34'10")
Max digging reach on ground	A'	10370 mm (34' 0")
Max digging depth	B	6370 mm (20'11")
Max digging depth (8ft level)	B'	6190 mm (20' 4")
Max vertical wall digging depth	C	5400 mm (17' 9")
Max digging height	D	10170 mm (33' 4")
Max dumping height	E	6750 mm (22' 2")
Min swing radius	F	4620 mm (15' 2")
Bucket digging force	SAE	216.7 [236.4] kN
		22100 [24110] kgf
		48720 [53150] lbf
	ISO	251.1 [273.9] kN
		25600 [27930] kgf
		56440 [61570] lbf
Arm crowd force	SAE	276.6 [301.7] kN
		28200 [30760] kgf
		62170 [67820] lbf
	ISO	290.3 [316.7] kN
		29600 [32290] kgf
		65260 [71190] lbf

[ ] : Power boost

3) ROBEX 480LC-9

· 9.00 m (29' 6") BOOM

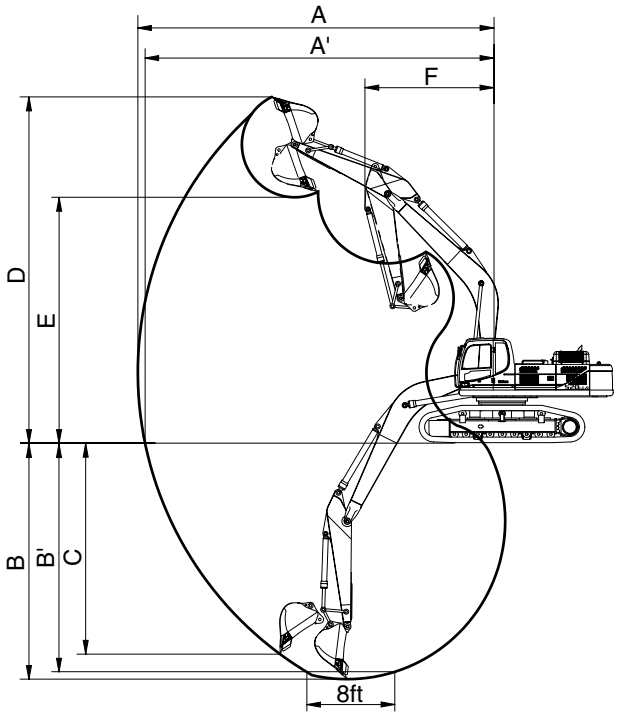


48092SP04

Description		5.85 m (19' 2") Arm
Max digging reach	A	16350 mm (53' 8")
Max digging reach on ground	A'	16200 mm (53' 2")
Max digging depth	B	11560 mm (37'11")
Max digging depth (8ft level)	B'	11460 mm (37' 7")
Max vertical wall digging depth	C	10320 mm (33'10")
Max digging height	D	13840 mm (45' 5")
Max dumping height	E	10440 mm (34' 3")
Min swing radius	F	5940 mm (19' 6")
Bucket digging force	SAE	189.3 kN
		19300 kgf
		42550 lbf
	ISO	217.7 kN
		22200 kgf
		48940 lbf
Arm crowd force	SAE	107.9 kN
		11000 kgf
		24250 lbf
	ISO	110.3 kN
		11250 kgf
		24800 lbf

4) ROBEX 520LC-9

· 7.06 m (23' 2") BOOM



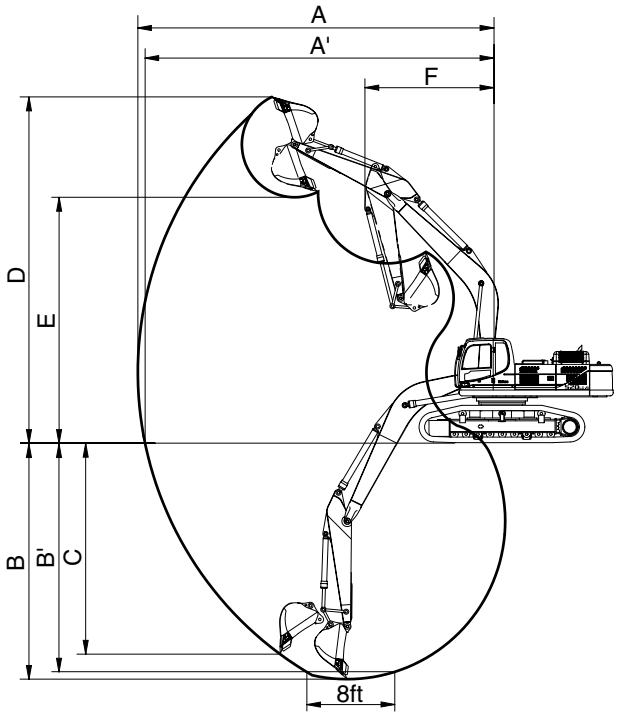
48092SP05

Description		2.40 m (7' 10") Arm	2.90 m (9' 6") Arm	3.38 m (11' 1") Arm	4.00 m (13' 1") Arm
Max digging reach	A	11140 mm (36' 7")	11530 mm (37'10")	12080 mm (39' 8")	12640 mm (41' 6")
Max digging reach on ground	A'	10890 mm (35' 9")	11290 mm (37' 0")	11840 mm (38'10")	12420 mm (40' 9")
Max digging depth	B	6610 mm (21' 8")	7110 mm (23' 4")	7590 mm (24'11")	8210 mm (26'11")
Max digging depth (8ft level)	B'	6430 mm (21' 1")	6940 mm (22' 9")	7440 mm (24' 5")	8080 mm (26' 6")
Max vertical wall digging depth	C	4880 mm (16' 0")	4780 mm (15' 8")	5470 mm (17'11")	5980 mm (19' 7")
Max digging height	D	10640 mm (34'11")	10610 mm (34'10")	11080 mm (36' 4")	11290 mm (37' 0")
Max dumping height	E	7290 mm (23'11")	7350 mm (24' 1")	7760 mm (25' 6")	7980 mm (26' 2")
Min swing radius	F	5110 mm (16' 9")	4910 mm (16' 1")	4830 mm (15'10")	4910 mm (16' 1")
Bucket digging force	SAE	247.1 [269.6] kN	251.1[273.9] kN	253.0 [276.0] kN	253.0 [276.0] kN
		25200 [27490] kgf	25600 [27930] kgf	25800 [28150] kgf	25800 [28150] kgf
		55560 [60610] lbf	56440 [61570] lbf	56880 [62050] lbf	56880 [62050] lbf
	ISO	286.4 [312.4] kN	290.3 [316.7] kN	292.2 [318.8] kN	292.2 [318.8] kN
		29200 [31850] kgf	29600 [32290] kgf	29800 [32510] kgf	29800 [32510] kgf
		64370 [70220] lbf	65260 [71190] lbf	65700 [71670] lbf	65700 [71670] lbf
Arm crowd force	SAE	278.5 [303.8] kN	225.6 [246.1] kN	192.2 [209.7] kN	171.6 [187.2] kN
		28400 [30980] kgf	23000 [25090] kgf	19600 [21380] kgf	17500 [19090] kgf
		62610 [68300] lbf	50710 [55320] lbf	43210 [47140] lbf	38580 [42090] lbf
	ISO	291.3 [317.7] kN	235.4 [256.8] kN	200.1 [218.2] kN	177.5 [193.6] kN
		29700 [32400] kgf	24000 [26180] kgf	20400 [22250] kgf	18100 [19750] kgf
		65480 [71430] lbf	52910 [57720] lbf	44970 [49060] lbf	39900 [43530] lbf

[ ] : Power boost

5) ROBEX 520LC-9

· 6.55 m (21' 6") BOOM



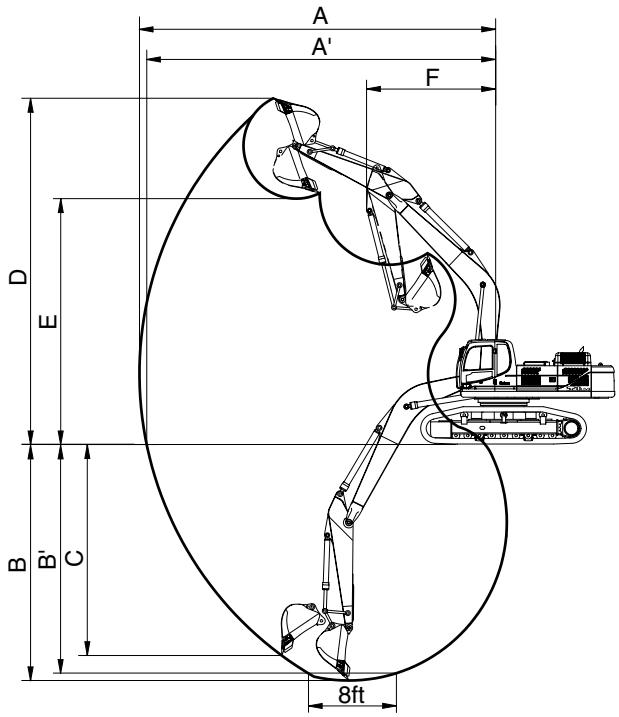
48092SP05

Description		2.40 m (7' 10") Arm
Max digging reach	A	10590 mm (34' 9")
Max digging reach on ground	A'	10320 mm (33'10")
Max digging depth	B	6130 mm (20' 1")
Max digging depth (8ft level)	B'	5950 mm (19' 6")
Max vertical wall digging depth	C	4390 mm (14' 5")
Max digging height	D	10260 mm (33' 8")
Max dumping height	E	6920 mm (22' 8")
Min swing radius	F	4650 mm (15' 3")
Bucket digging force	SAE	247.1 [269.6] kN
		25200 [27490] kgf
		55560 [60610] lbf
	ISO	286.4 [312.4] kN
		29200 [31850] kgf
		64370 [70220] lbf
Arm crowd force	SAE	278.5 [303.8] kN
		28400 [30980] kgf
		62610 [68300] lbf
	ISO	291.3 [317.7] kN
		29700 [32400] kgf
		65480 [71430] lbf

[ ] : Power boost

6) ROBEX 520LC-9

· 9.00 m (29' 6") BOOM



48092SP05

Description		5.85 m (19' 2") Arm
Max digging reach	A	16280 mm (53' 5")
Max digging reach on ground	A'	16100 mm (52'10")
Max digging depth	B	11380 mm (37' 4")
Max digging depth (8ft level)	B'	11280 mm (37' 0")
Max vertical wall digging depth	C	10070 mm (33' 0")
Max digging height	D	13930 mm (45' 8")
Max dumping height	E	10530 mm (34' 7")
Min swing radius	F	5940 mm (19' 6")
Bucket digging force	SAE	212.8 kN
		21700 kgf
		47840 lbf
	ISO	251.1 kN
		25600 kgf
		56440 lbf
Arm crowd force	SAE	107.9 kN
		11000 kgf
		24250 lbf
	ISO	110.8 kN
		11300 kgf
		24910 lbf

4. WEIGHT

1) ROBEX 480LC-9

Item		R480LC-9		R480-9	
		kg	lb	kg	lb
Upperstructure assembly		20000	44090	←	←
Main frame weld assembly		4430	9770	←	←
Engine assembly		940	2070	←	←
Main pump assembly		190	420	←	←
Main control valve assembly		420	930	←	←
Swing motor assembly		230	510	←	←
Hydraulic oil tank assembly		450	990	←	←
Fuel tank assembly		270	600	←	←
Counterweight	7.06 m boom	9200	20280	←	←
	9.0 m boom	10700	23590	←	←
Cab assembly		490	1080	←	←
Lower chassis assembly		19000	41890	17800	39240
Track frame weld assembly		7060	15570	6600	14550
Swing bearing		720	1590	←	←
Travel motor assembly		440	970	←	←
Turning joint		50	110	←	←
Track recoil spring		310	680	←	←
Idler		250	550	←	←
Carrier roller		40	90	←	←
Track roller		80	180	←	←
Track-chain assembly (600 mm standard triple grouser shoe)		2700	5950	2500	5510
Front attachment assembly (7.06 m boom, 3.38 m arm, 2.15 m^3 SAE heaped bucket)		9100	20060	←	←
7.06 m boom assembly		3260	7190	←	←
6.55 m boom assembly		3180	7010	←	←
9.0 m boom assembly		4050	8930	←	←
3.38 m arm assembly		1630	3590	←	←
2.15 m^3 SAE heaped bucket		1740	3840	←	←
Boom cylinder assembly		830	1830	←	←
Arm cylinder assembly		630	1390	←	←
Bucket cylinder assembly		300	660	←	←
Bucket control rod assembly		155	340	←	←

2) ROBEX 520LC-9

Item		R520LC-9	
		kg	lb
Upperstructure assembly		17630	38870
Main frame weld assembly		4430	9770
Engine assembly		940	2070
Main pump assembly		190	420
Main control valve assembly		420	930
Swing motor assembly		230	510
Hydraulic oil tank assembly		450	990
Fuel tank assembly		270	600
Counterweight	7.06 m boom	10200	22500
	9.0 m boom	10700	23590
Cab assembly		490	1080
Lower chassis assembly		24100	53130
Lower track frame		2130	4700
Center frame support		8070	17790
Swing bearing		720	1590
Travel motor assembly		440	970
Turning joint		50	110
Track recoil spring		310	680
Idler		250	550
Carrier roller		40	90
Track roller		80	180
Track-chain assembly (600 mm standard triple grouser shoe)		2700	5850
Front attachment assembly (7.06 m boom, 3.38 m arm, 2.15 m^3 SAE heaped bucket)		9270	20440
7.06 m boom assembly		3260	7190
6.55 m boom assembly		3180	7010
9.0 m boom assembly		4060	8950
3.38 m arm assembly		1610	3550
2.15 m^3 SAE heaped bucket		1740	3840
Boom cylinder assembly		830	1830
Arm cylinder assembly		630	1390
Bucket cylinder assembly		380	840
Bucket control rod assembly		180	400

5. LIFTING CAPACITIES

1) ROBEX 480LC-9

(1) 6.55 m (21' 6") boom, 2.40 m (7' 10") arm equipped with 2.15 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 9200 kg (20280 lb) counterweight.

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

Load point height		Load radius								At max. reach		
		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		7.5 m (25.0 ft)		Capacity		Reach
												m (ft)
6.0 m (20.0 ft)	kg					*12480	*12480	*11020	9310	*9470	6570	9.15
	lb					*27510	*27510	*24290	20530	*20880	14480	(30.0)
4.5 m (15.0 ft)	kg			*18440	*18440	*13960	13040	*11650	9010	*9440	5790	9.65
	lb			*40650	*40650	*30780	28750	*25680	19860	*20810	12760	(31.7)
3.0 m (10.0 ft)	kg					*15580	12220	*12420	8610	*9470	5410	9.86
	lb					*34350	26940	*27380	18980	*20880	11930	(32.3)
1.5 m (5.0 ft)	kg					*16700	11550	*13000	8240	*9510	5340	9.80
	lb					*36820	25460	*28660	18170	*20970	11770	(32.2)
Ground Line	kg			*22790	17330	*16900	11170	*13090	8000	*9480	5590	9.47
	lb			*50240	38210	*37260	24630	*28860	17640	*20900	12320	(31.1)
-1.5 m (-5.0 ft)	kg	*25320	*25320	*20990	17370	*16060	11060	*12360	7920	*9240	6280	8.83
	lb	*55820	*55820	*46270	38290	*35410	24380	*27250	17460	*20370	13850	(29.0)
-3.0 m (-10.0 ft)	kg	*21780	*21780	*17910	17670	*13920	11190			*8390	7800	7.79
	lb	*48020	*48020	*39480	38960	*30690	24670			*18500	17200	(25.6)
-4.5 m (-15.0 ft)	kg			*12770	*12770							
	lb			*28150	*28150							

Note 1. Lifting capacity are based on SAE J1097 and ISO 10567.

2. Lifting capacity of the ROBEX series does not exceed 75% of tipping load with the machine on firm, level ground or 87% of full hydraulic capacity.

3. The load point is a hook located on the back of the bucket.

4. *indicates load limited by hydraulic capacity.

(2) 7.06 m (23' 2") boom, 3.38 m (11' 1") arm equipped with 2.15 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 9200 kg (20280 lb) counterweight.

Load point height		Load radius										At max. reach		
		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		7.5 m (25.0 ft)		9.0 m (30.0 ft)		Capacity		Reach
														m (ft)
6.0 m (20.0 ft)	kg							*9220	*9220	*8240	6740	*7490	4800	10.75
	lb							*20330	*20330	*18170	14860	*16510	10580	(35.3)
4.5 m (15.0 ft)	kg					*12140	*12140	*10130	9050	*8910	6530	*7530	4320	11.17
	lb					*26760	*26760	*22330	19950	*19640	14400	*16600	9520	(36.6)
3.0 m (10.0 ft)	kg			*19830	18930	*14060	12170	*11170	8540	*9450	6260	7470	4070	11.35
	lb			*43720	41730	*31000	26830	*24630	18830	*20830	13800	16470	8970	(37.2)
1.5 m (5.0 ft)	kg			*22320	17460	*15610	11360	*12080	8080	*9940	5990	7420	4010	11.30
	lb			*49210	38490	*34410	25040	*26630	17810	*21910	13210	16360	8840	(37.1)
Ground Line	kg			*22800	16860	*16390	10850	*12610	7730	*10190	5790	7670	4140	11.02
	lb			*50270	37170	*36130	23920	*27800	17040	*22470	12760	16910	9130	(36.2)
-1.5 m (-5.0 ft)	kg	*18070	*18070	*21950	16730	*16290	10610	*12600	7550	*10010	5680	*7770	4500	10.49
	lb	*39840	*39840	*48390	36880	*35910	23390	*27780	16640	*22070	12520	*17130	9920	(34.4)
-3.0 m (-10.0 ft)	kg	*24350	*24350	*20080	16870	*15280	10610	*11850	7530			*7590	5240	9.66
	lb	*53680	*53680	*44270	37190	*33690	23390	*26120	16600			*16730	11550	(31.7)
-4.5 m (-15.0 ft)	kg	*22100	*22100	*16990	*16990	*13120	10820	*9890	7710			*6910	6720	8.43
	lb	*48720	*48720	*37460	*37460	*28920	23850	*21800	17000			*15230	14820	(27.7)
-6.0 m (-20.0 ft)	kg			*11930	*11930	*8900	*8900							
	lb			*26300	*26300	*19620	*19620							

(3) 9.0 m (29' 6") boom, 5.85 m (19' 2") arm equipped with 1.38 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 10700 kg (23590 lb) counterweight.

Load point height		Load radius												At max. reach		
		3.0 m (10.0 ft)		5.0 m (15.0 ft)		7.0 m (25.0 ft)		9.0 m (30.0 ft)		11.0 m (35.0 ft)		13.0 m (45.0 ft)		Capacity		Reach
																m (ft)
10.0 m (35.0 ft)	kg													*4310	3590	13.54
	lb													*9500	7910	(44.4)
8.0 m (25.0 ft)	kg											*2660	*2660	*4240	2910	14.55
	lb											*5860	*5860	*9350	6420	(47.7)
6.0 m (20.0 ft)	kg									*5190	*5190	*4250	3640	*4230	2490	15.20
	lb									*11440	*11440	*9370	8020	*9330	5490	(49.9)
4.0 m (15.0 ft)	kg							*6800	*6800	*5710	4950	*4990	3450	*4270	2240	15.55
	lb							*14990	*14990	*12590	10910	*11000	7610	*9410	4940	(51.0)
2.0 m (5.0 ft)	kg			*16010	16000	*10420	9730	*7780	6520	*6260	4560	*5280	3230	*4320	2110	15.61
	lb			*35300	35270	*22970	21450	*17150	14370	*13800	10050	*11640	7120	*9520	4650	(51.2)
Ground Line	kg			*16790	14290	*11730	8750	*8570	5940	*6720	4210	*5510	3020	*4390	2110	15.38
	lb			*37020	31500	*25860	19290	*18890	13100	*14820	9280	*12150	6660	*9680	4650	(50.5)
-2.0 m (-5.0 ft)	kg	*10920	*10920	*17330	13650	*12300	8170	*9000	5540	*6970	3950	*5550	2880	*4450	2250	14.87
	lb	*24070	*24070	*38210	30090	*27120	18010	*19840	12210	*15370	8710	*12240	6350	*9810	4960	(48.8)
-4.0 m (-15.0 ft)	kg	*14070	*14070	*17370	13550	*12100	7950	*8940	5340	*6850	3820	*4730	2830	*4450	2560	14.02
	lb	*31020	*31020	*38290	29870	*26680	17530	*19710	11770	*15100	8420	*10430	6240	*9810	5640	(46.0)
-6.0 m (-20.0 ft)	kg	*17730	*17730	*15490	13780	*11110	7980	*8260	5340	*6160	3850			*4320	3160	12.76
	lb	*39090	*39090	*34150	30380	*24490	17590	*18210	11770	*13580	8490			*9520	6970	(41.9)
-8.0 m (-25.0 ft)	kg	*17880	*17880	*12400	*12400	*9090	8270	*6620	5560					*3820	*3820	10.94
	lb	*39420	*39420	*27340	*27340	*20040	18230	*14590	12260					*8420	*8420	(35.9)
-10.0 m (-35.0 ft)	kg					*5220	*5220									
	lb					*11510	*11510									

2) ROBEX 520LC-9

(1) 6.55 m (21' 6") boom, 2.40 m (7' 10") arm equipped with 2.15 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 10200 kg (22490 lb) counterweight.

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

Load point height		Load radius								At max. reach		
		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		7.5 m (25.0 ft)		Capacity		Reach
												m (ft)
7.5 m (25.0 ft)	kg									*9680	9450	8.27
	lb									*21340	20830	(27.1)
6.0 m (20.0 ft)	kg					*12520	*12520	*10940	10930	*9510	7850	9.07
	lb					*27600	*27600	*24120	24100	*20970	17310	(29.8)
4.5 m (15.0 ft)	kg			*18820	*18820	*14060	*14060	*11610	10610	*9480	7010	9.53
	lb			*41490	*41490	*31000	*31000	*25600	23390	*20900	15450	(31.3)
3.0 m (10.0 ft)	kg					*15650	14440	*12390	10200	*9510	6620	9.71
	lb					*34500	31830	*27320	22490	*20970	14590	(31.9)
1.5 m (5.0 ft)	kg					*16660	13790	*12920	9840	*9540	6600	9.62
	lb					*36730	30400	*28480	21690	*21030	14550	(31.6)
Ground Line	kg			*22490	21060	*16730	13430	*12920	9610	*9500	6960	9.26
	lb			*49580	46430	*36880	29610	*28480	21190	*20940	15340	(30.4)
-1.5 m (-5.0 ft)	kg	*25000	*25000	*20550	*20550	*15740	13350	*12050	9550	*9220	7870	8.59
	lb	*55120	*55120	*45300	*45300	*34700	29430	*26570	21050	*20330	17350	(28.2)
-3.0 m (-10.0 ft)	kg	*20980	*20980	*17260	*17260	*13380	*13380			*8260	*8260	7.49
	lb	*46250	*46250	*38050	*38050	*29500	*29500			*18210	*18210	(24.6)
-4.5 m (-15.0 ft)	kg			*11720	*11720							
	lb			*25840	*25840							

Note 1. Lifting capacity are based on SAE J1097 and ISO 10567.

2. Lifting capacity of the ROBEX series does not exceed 75% of tipping load with the machine on firm, level ground or 87% of full hydraulic capacity.

3. The load point is a hook located on the back of the bucket.

4. *indicates load limited by hydraulic capacity.

(2) 7.06 m (23' 2") boom, 3.38 m (11' 1") arm equipped with 2.15 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 10200 kg (22490 lb) counterweight.

Load point height		Load radius										At max. reach		
		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		7.5 m (25.0 ft)		9.0 m (30.0 ft)		Capacity		Reach
														m (ft)
7.5 m (25.0 ft)	kg											*7510	6700	10.00
	lb											*16560	14770	(32.8)
6.0 m (20.0 ft)	kg							*9190	*9190	*8380	7980	*7470	5810	10.66
	lb							*20260	*20260	*18470	17590	*16470	12810	(35.0)
4.5 m (15.0 ft)	kg			*16290	*16290	*12260	*12260	*10120	*10120	*8830	7750	*7510	5290	11.05
	lb			*35910	*35910	*27030	*27030	*22310	*22310	*19470	17090	*16560	11660	(36.3)
3.0 m (10.0 ft)	kg			*20110	*20110	*14150	*14150	*11160	10110	*9380	7470	*7590	5040	11.20
	lb			*44330	*44330	*31200	*31200	*24600	22290	*20680	16470	*16730	11110	(36.7)
1.5 m (5.0 ft)	kg			*22300	21040	*15600	13560	*12020	9640	*9840	7200	*7680	5000	11.13
	lb			*49160	46390	*34390	29890	*26500	21250	*21690	15870	*16930	11020	(36.5)
Ground Line	kg			*22570	20490	*16260	13060	*12490	9310	*10050	7000	*7750	5190	10.82
	lb			*49760	45170	*35850	28790	*27540	20530	*22160	15430	*17090	11440	(35.5)
-1.5 m (-5.0 ft)	kg	*19050	*19050	*21590	20400	*16040	12850	*12390	9130	*9790	6900	*7740	5670	10.26
	lb	*42000	*42000	*47600	44970	*35360	28330	*27320	20130	*21580	15210	*17060	12500	(33.7)
-3.0 m (-10.0 ft)	kg	*25420	*25420	*19580	*19580	*14900	12870	*11510	9130			*7520	6620	9.40
	lb	*56040	*56040	*43170	*43170	*32850	28370	*25380	20130			*16580	14590	(30.8)
-4.5 m (-15.0 ft)	kg	*21120	*21120	*16290	*16290	*12560	*12560	*9330	*9330			*6750	*6750	8.11
	lb	*46560	*46560	*35910	*35910	*27690	*27690	*20570	*20570			*14880	*14880	(26.6)
-6.0 m (-20.0 ft)	kg			*10870	*10870									
	lb			*23960	*23960									

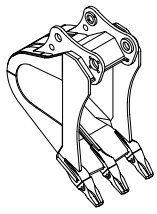
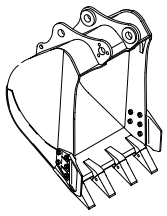
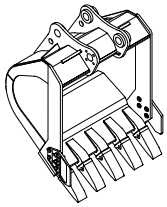
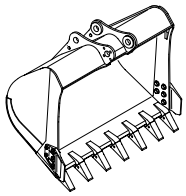
(3) 9.0 m (29' 6") boom, 5.85 m (19' 2") arm equipped with 1.38 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 10700 kg (23590 lb) counterweight.

Load point height		Load radius												At max. reach		
		3.0 m (10.0 ft)		5.0 m (15.0 ft)		7.0 m (25.0 ft)		9.0 m (30.0 ft)		11.0 m (35.0 ft)		13.0 m (45.0 ft)		Capacity		Reach
																m (ft)
10.0 m (35.0 ft)	kg													*4210	3970	13.66
	lb													*9280	8750	(44.8)
8.0 m (25.0 ft)	kg									*4750	*4750	*2800	*2800	*4140	3270	14.63
	lb									*10470	*10470	*6170	*6170	*9130	7210	(48.0)
6.0 m (20.0 ft)	kg									*5130	*5130	*4310	4110	*4130	2840	15.25
	lb									*11310	*11310	*9500	9060	*9110	6260	(50.0)
4.0 m (15.0 ft)	kg					*8700	*8700	*6790	*6790	*5650	5520	*4910	3900	*4170	2580	15.57
	lb					*19180	*19180	*14970	*14970	*12460	12170	*10820	8600	*9190	5690	(51.1)
2.0 m (5.0 ft)	kg			*16120	*16120	*10440	*10440	*7740	7260	*6190	5110	*5190	3670	*4230	2470	15.60
	lb			*35540	*35540	*23020	*23020	*17060	16010	*13650	11270	*11440	8090	*9330	5450	(51.2)
Ground Line	kg			*16710	16170	*11660	9800	*8490	6670	*6630	4760	*5400	3460	*4290	2490	15.35
	lb			*36840	35650	*25710	21610	*18720	14700	*14620	10490	*11900	7630	*9460	5490	(50.4)
-2.0 m (-5.0 ft)	kg	*11290	*11290	*17600	15570	*12130	9250	*8870	6270	*6840	4500	*5410	3320	*4340	2660	14.80
	lb	*24890	*24890	*38800	34330	*26740	20390	*19550	13820	*15080	9920	*11930	7320	*9570	5860	(48.6)
-4.0 m (-15.0 ft)	kg	*14480	*14480	*16990	15500	*11860	9040	*8750	6090	*6680	4380	*4170	3290	*4330	3030	13.91
	lb	*31920	*31920	*37460	34170	*26150	19930	*19290	13430	*14730	9660	*9190	7250	*9550	6680	(45.6)
-6.0 m (-20.0 ft)	kg	*18200	*18200	*15010	*15010	*10780	9100	*8000	6110	*5900	4430			*4180	3740	12.60
	lb	*40120	*40120	*33090	*33090	*23770	20060	*17640	13470	*13010	9770			*9220	8250	(41.3)
-8.0 m (-25.0 ft)	kg	*16860	*16860	*11770	*11770	*8630	*8630	*6210	*6210					*3610	*3610	10.71
	lb	*37170	*37170	*25950	*25950	*19030	*19030	*13690	*13690					*7960	*7960	(35.1)

6. BUCKET SELECTION GUIDE

1) ROBEX 480LC-9

(1) GENERAL BUCKET

			
1.00 m³ SAE heaped bucket	1.38 m³ SAE heaped bucket	1.84 m³ SAE 2.15 m³ SAE heaped bucket	2.79 m³ SAE 3.03 m³ SAE heaped bucket

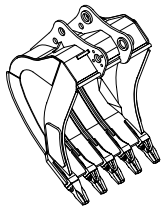
Capacity		Width		Weight	Recommendation					
					7.06 m (23' 2") boom				6.55 m (21' 5") boom	9.0 m (29' 6") boom
SAE heaped	CECE heaped	Without side cutter	With side cutter		2.4 m arm (7' 10")	2.9 m arm (9' 6")	3.38 m arm (11' 1")	4.0 m arm (13' 1")	2.4 m arm (7' 10")	5.85 m arm (19' 2")
1.00 m³ (1.31 yd³)	0.90 m³ (1.17 yd³)	915 mm (36.0")	1065 mm (41.9")	1220 kg (2690 lb)						
1.38 m³ (1.80 yd³)	1.25 m³ (1.63 yd³)	1100 mm (43.3")	1250 mm (49.2")	1420 kg (3130 lb)						
1.84 m³ (2.41 yd³)	1.65 m³ (2.16 yd³)	1140 mm (44.9")	1290 mm (50.8")	1520 kg (3350 lb)						
2.15 m³ (2.81 yd³)	1.92 m³ (2.51 yd³)	1415 mm (55.7")	1565 mm (61.6")	1740 kg (3840 lb)						
2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	1760 mm (69.3")	1910 mm (75.2")	1960 kg (4320 lb)						
3.03 m³ (3.96 yd³)	2.67 m³ (3.49 yd³)	1890 mm (74.4")	2040 mm (80.3")	2090 kg (4610 lb)						

Applicable for materials with density of 2000 kg/m³ (3370 lb/yd³) or less

Applicable for materials with density of 1600 kg/m³ (2700 lb/yd³) or less

Applicable for materials with density of 1100 kg/m³ (1850 lb/yd³) or less

(2) ROCK-HEAVY DUTY BUCKET



⊙2.20 m³ SAE
⊙2.43 m³ SAE
heaped bucket

Capacity		Width		Weight	Recommendation				
					7.06 m (23' 2") boom				6.55 m (21' 5") boom
SAE heaped	CECE heaped	Without side cutter	With side cutter		2.4 m arm (7' 10")	2.9 m arm (9' 6")	3.38 m arm (11' 1")	4.0 m arm (13' 1")	2.4 m arm (7' 10")
⊙2.20 m³ (2.88 yd³)	1.80 m³ (2.35 yd³)	1840 mm (72.4")	-	2295 kg (5060 lb)					
⊙2.43 m³ (3.18 yd³)	2.10 m³ (2.75 yd³)	1885 mm (74.2")	-	2335 kg (5150 lb)					

⊙ : Rock-heavy duty bucket

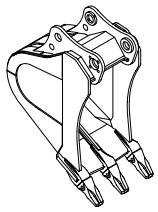
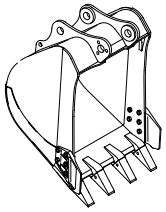
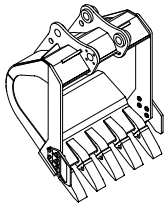
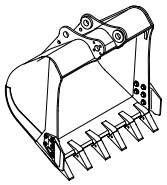
Applicable for materials with density of 2000 kg/m³ (3370 lb/yd³) or less

Applicable for materials with density of 1600 kg/m³ (2700 lb/yd³) or less

Applicable for materials with density of 1100 kg/m³ (1850 lb/yd³) or less

2) ROBEX 520LC-9

(1) GENERAL BUCKET

			
★1.00 m³ SAE heaped bucket	★1.38 m³ SAE 1.65 m³ SAE heaped bucket	2.15 m³ SAE 2.79 m³ SAE heaped bucket	3.03 m³ SAE heaped bucket

Capacity		Width		Weight	Recommendation					
					7.06 m (23' 2") boom				6.55 m (21' 6") boom	9.0 m (29' 6") boom
SAE heaped	CECE heaped	Without side cutter	With side cutter		2.4 m arm (7' 10")	2.9 m arm (9' 6")	3.38 m arm (11' 1")	4.0 m arm (13' 1")	2.4 m arm (7' 10")	5.85 m arm (19' 2")
1.65 m³ (2.16 yd³)	1.48 m³ (1.94 yd³)	1140 mm (44.9")	1290 mm (50.8")	1520 kg (3350 lb)						
2.15 m³ (2.81 yd³)	1.92 m³ (2.51 yd³)	1415 mm (55.7")	1565 mm (61.6")	1740 kg (3840 lb)						
2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	1760 mm (69.3")	1910 mm (75.2")	1960 kg (4320 lb)						
3.03 m³ (3.96 yd³)	2.67 m³ (3.49 yd³)	1890 mm (74.4")	2040 mm (80.3")	2090 kg (4610 lb)						
★1.00 m³ (1.31 yd³)	0.90 m³ (1.17 yd³)	915 mm (36.0")	1065 mm (41.9")	1220 kg (2690 lb)						
★1.38 m³ (1.80 yd³)	1.25 m³ (1.63 yd³)	1100 mm (43.3")	1250 mm (49.2")	1420 kg (3130 lb)						

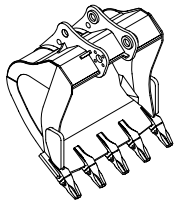
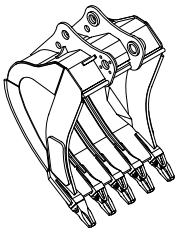
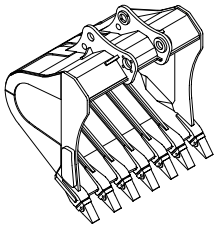
★ : 5.85 m arm only

Applicable for materials with density of 2000 kg/m³ (3370 lb/yd³) or less

Applicable for materials with density of 1600 kg/m³ (2700 lb/yd³) or less

Applicable for materials with density of 1100 kg/m³ (1850 lb/yd³) or less

(2) HEAVY DUTY AND ROCK-HEAVY DUTY BUCKET

		
◈2.20 m³ SAE heaped bucket	⊙1.80 m³ SAE heaped bucket	⊙3.20 m³ SAE heaped bucket

Capacity		Width		Weight	Recommendation				
					7.06 m (23' 2") boom				6.55 m (21' 6") boom
SAE heaped	CECE heaped	Without side cutter	With side cutter		2.4 m arm (7' 10")	2.9 m arm (9' 6")	3.38 m arm (11' 1")	4.0 m arm (13' 1")	2.4 m arm (7' 10")
◈2.20 m³ (2.88 yd³)	1.80 m³ (2.35 yd³)	1840 mm (72.4")	-	2170 kg (4780 lb)					
⊙1.80 m³ (2.35 yd³)	1.50 m³ (1.96 yd³)	1560 mm (61.4")	-	2110 kg (4650 lb)					
⊙3.20 m³ (4.19 yd³)	2.80 m³ (3.66 yd³)	2095 mm (82.5")	-	2900 kg (6390 lb)					

◈ : Heavy duty bucket

⊙ : Rock-heavy duty bucket

Applicable for materials with density of 2000 kg/m³ (3370 lb/yd³) or less

Applicable for materials with density of 1600 kg/m³ (2700 lb/yd³) or less

Applicable for materials with density of 1100 kg/m³ (1850 lb/yd³) or less

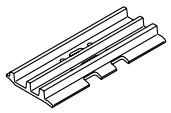
7. UNDERCARRIAGE

1) ROBEX 480LC-9

(1) TRACKS

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

(2) TYPES OF SHOES

Model	Shapes		Triple grouser 				
R480-9	Shoe width	mm (in)	600 (24)	700 (28)	750 (30)	800 (32)	900 (36)
	Operating weight	kg (lb)	46900 (103400)	47440 (104590)	47710 (105180)	47980 (105780)	48520 (106970)
	Ground pressure	kgf/cm^2 (psi)	0.89 (12.66)	0.77 (10.95)	0.73 (10.38)	0.68 (9.67)	0.61 (8.67)
	Overall width	mm (ft-in)	3340 (10' 11")	3440 (11' 3")	3490 (11' 5")	3540 (11' 7")	3640 (11' 11")
R480LC-9	Shoe width	mm (in)	600 (24)	700 (28)	750 (30)	800 (32)	900 (36)
	Operating weight	kg (lb)	48100 (106040)	48640 (107230)	48910 (107830)	49180 (108420)	49720 (109610)
	Ground pressure	kgf/cm^2 (psi)	0.83 (11.80)	0.72 (10.24)	0.68 (9.67)	0.64 (9.10)	0.57 (8.11)
	Overall width	mm (ft-in)	3340 (10' 11")	3440 (11' 3")	3490 (11' 5")	3540 (11' 7")	3640 (11' 11")

(3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	2 EA
Track rollers	9 EA
Track shoes	53 EA

(4) SELECTION OF TRACK SHOE

Suitable track shoes should be selected according to operating conditions.

Method of selecting shoes

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

Select the narrowest shoe possible to meet the required flotation and ground pressure. Application of wider shoes than recommendations will cause unexpected problem such as bending of shoes, crack of link, breakage of pin, loosening of shoe bolts and the other various problems.

※ **Table 1**

Track shoe	Specification	Category
600 mm triple grouser	Standard	A
700 mm triple grouser	Option	B
750 mm triple grouser	Option	B
800 mm triple grouser	Option	C
900 mm triple grouser	Option	C

※ **Table 2**

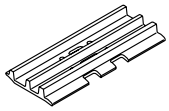
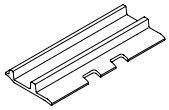
Category	Applications	Applications
A	Rocky ground, river beds, normal soil	· Travel at low speed on rough ground with large obstacles such as boulders or fallen trees
B	Normal soil, soft ground	· These shoes cannot be used on rough ground with large obstacles such as boulders or fallen trees · Travel at high speed only on flat ground · Travel slowly at low speed if it is impossible to avoid going over obstacles
C	Extremely soft gound (swampy ground)	· Use the shoes only in the conditions that the machine sinks and it is impossible to use the shoes of category A or B · These shoes cannot be used on rough ground with large obstacles such as boulders or fallen trees · Travel at high speed only on flat ground · Travel slowly at low speed if it is impossible to avoid going over obstacles

2) ROBEX 520LC-9

(1) TRACKS

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

(2) TYPES OF SHOES

Model	Shapes		Triple grouser				Double grouser	
								
R520LC-9	Shoe width	mm (in)	600 (24)	700 (28)	750 (30)	800 (32)	600 (24)	700 (28)
	Operating weight	kg (lb)	51000 (112430)	51540 (113630)	51810 (114220)	52080 (114820)	51000 (112430)	51540 (113630)
	Ground pressure	kgf/cm² (psi)	0.88 (12.51)	0.76 (10.81)	0.72 (10.24)	0.67 (9.53)	0.88 (12.51)	0.76 (10.81)
	Overall width	mm (ft-in)	3540 (11' 7")	3640 (11' 11")	3690 (12' 1")	3740 (12' 3")	3540 (11' 7")	3640 (11' 11")

(3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	3 EA
Track rollers	9 EA
Track shoes	53 EA

(4) SELECTION OF TRACK SHOE

Suitable track shoes should be selected according to operating conditions.

Method of selecting shoes

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

Select the narrowest shoe possible to meet the required flotation and ground pressure. Application of wider shoes than recommendations will cause unexpected problem such as bending of shoes, crack of link, breakage of pin, loosening of shoe bolts and the other various problems.

※ **Table 1**

Track shoe	Specification	Category
600 mm triple grouser	Standard	A
600 mm double grouser	Option	A
700 mm triple grouser, double grouser	Option	B
750 mm triple grouser	Option	B
800 mm triple grouser	Option	C

※ **Table 2**

Category	Applications	Applications
A	Rocky ground, river beds, normal soil	· Travel at low speed on rough ground with large obstacles such as boulders or fallen trees
B	Normal soil, soft ground	· These shoes cannot be used on rough ground with large obstacles such as boulders or fallen trees · Travel at high speed only on flat ground · Travel slowly at low speed if it is impossible to avoid going over obstacles
C	Extremely soft gound (swampy ground)	· Use the shoes only in the conditions that the machine sinks and it is impossible to use the shoes of category A or B · These shoes cannot be used on rough ground with large obstacles such as boulders or fallen trees · Travel at high speed only on flat ground · Travel slowly at low speed if it is impossible to avoid going over obstacles

8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Cummins QSM 11
Type	4-cycle turbocharged charger air cooled diesel engine
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 × 147.1 mm (4.92" × 5.79")
Piston displacement	10800 cc (659 cu in)
Compression ratio	16.3 : 1
Rated gross horse power (SAE J1995)	357 hp at 1900 rpm (266 kW at 1900 rpm)
Maximum torque	171 kgf · m (1236 lbf · ft) at 1400 rpm
Engine oil quantity	37.85 ℓ (10 U.S. gal)
Dry weight	942 kg (2077 lb)
Low idling speed	1900 ± 50 rpm
High idling speed	950 + 50 rpm
Rated fuel consumption	161.8 g/Hp · hr at 1900 rpm
Starting motor	Delco Remy 42MT (24V-7.2 kW)
Alternator	Delco Remy 24V-70A
Battery	2 × 12V × 200Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 200 cc/rev
Maximum pressure	330 kgf/cm^2 (4690 psi) [360 kgf/cm^2 (5120 psi)]
Rated oil flow	2 × 360 ℓ /min (95.1 U.S. gpm / 79.2 U.K. gpm)
Rated speed	1800 rpm

[ ]: Power boost

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	15 cc/rev
Maximum pressure	40 kgf/cm^2 (570 psi)
Rated oil flow	27 ℓ /min (7.1 U.S. gpm/5.9 U.K. gpm)

4) MAIN CONTROL VALVE

Item		Specification	
		R480/520LC-9	R480/520LC-9 Long reach
Type		9 spools	
Operating method		Hydraulic pilot system	
Main relief valve pressure		330 kgf/cm^2 (4690 psi) [360 kgf/cm^2 (5120 psi)]	330 kgf/cm^2 (4690 psi) [Not applied power boost]
Port relief valve pressure	Boom	380 kgf/cm^2 (5400 psi)	380 kgf/cm^2 (5400 psi)
	Arm	380 kgf/cm^2 (5400 psi)	280 kgf/cm^2 (3980 psi)
	Bucket	380 kgf/cm^2 (5400 psi)	280 kgf/cm^2 (3980 psi)

[ ]: Power boost

5) SWING MOTOR

Item	Specification
Type	Fixed displacement axial piston motor
Capacity	151 cc/rev
Relief pressure	285 kgf/cm^2 (4050 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	59 kgf · m (427 lbf · ft)
Brake release pressure	33~50 kgf/cm^2 (470~711 psi)
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	300 kgf/cm^2 (4690 psi)
Capacity (max / min)	160/100 cc/rev
Reduction gear type	3-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	17~50 kgf/cm^2 (242~711 psi)
Braking torque	103 kgf · m (745 lbf · ft)

7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	ø 170 × ø 115 × 1570 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	ø 190 × ø 130 × 1820 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	ø 160 × ø 110 × 1370 mm (R480LC-9) ø 160 × ø 115 × 1370 mm (R520LC-9)
	Cushion	Extend only

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

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

8) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
R480-9	Standard	600 mm (24")	10.89 kgf/cm^2 (12.66 psi)	48	3340 mm (10' 11")
	Option	700 mm (28")	0.77 kgf/cm^2 (10.95 psi)	48	3440 mm (11' 3")
		750 mm (30")	0.73 kgf/cm^2 (10.38 psi)	48	3490 mm (11' 5")
		800 mm (32")	0.68 kgf/cm^2 (9.67 psi)	48	3540 mm (11' 7")
		900 mm (36")	0.61 kgf/cm^2 (8.67 psi)	48	3640 mm (11' 11")
R480LC-9	Standard	600 mm (24")	0.83 kgf/cm^2 (11.80 psi)	53	3340 mm (10' 11")
	Option	700 mm (28")	0.72 kgf/cm^2 (10.24 psi)	53	3440 mm (11' 3")
		750 mm (30")	0.68 kgf/cm^2 (9.67 psi)	53	3490 mm (11' 5")
		800 mm (32")	0.64 kgf/cm^2 (9.10 psi)	53	3540 mm (11' 7")
		900 mm (36")	0.57 kgf/cm^2 (8.11 psi)	53	3640 mm (11' 11")
R520LC-9	Standard	★600 mm (24")	0.88 kgf/cm^2 (12.51 psi)	53	3540 mm (11' 7")
	Option	★700 mm (28")	0.76 kgf/cm^2 (10.81 psi)	53	3640 mm (11' 11")
		★750 mm (30")	0.72 kgf/cm^2 (10.24 psi)	53	3690 mm (12' 1")
		★800 mm (32")	0.67 kgf/cm^2 (9.53 psi)	53	3740 mm (12' 3")
		※600 mm (24")	0.88 kgf/cm^2 (12.51 psi)	53	3540 mm (11' 7")
		※700 mm (28")	0.76 kgf/cm^2 (10.81 psi)	53	3640 mm (11' 11")

★ : Triple grouser

※ : Double grouser

9) BUCKET

Item		Capacity		Tooth quantity	Width	
		SAE heaped	CECE heaped		Without side cutter	With side cutter
R480LC-9	Standard	2.15 m³ (2.81 yd³)	1.92 m³ (2.51 yd³)	5	1415 mm (55.7")	1565 mm (61.6")
	Option	1.00 m³ (1.31 yd³)	0.90 m³ (1.17 yd³)	3	915 mm (36.0")	1065 mm (47.6")
		1.38 m³ (1.80 yd³)	1.25 m³ (1.63 yd³)	4	1100 mm (43.3")	1250 mm (49.2")
		1.84 m³ (2.41 yd³)	1.65 m³ (2.16 yd³)	5	1140 mm (44.9")	1290 mm (50.8")
		◎2.20 m³ (2.88 yd³)	1.80 m³ (2.35 yd³)	5	1840 mm (72.4")	-
		◎2.43 m³ (3.18 yd³)	2.10 m³ (2.75 yd³)	5	1885 mm (74.2")	-
		2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	7	1760 mm (69.3")	1910 mm (75.2")
		3.03 m³ (3.96 yd³)	2.67 m³ (3.49 yd³)	7	1890 mm (74.4")	2040 mm (80.3")
R520LC-9	Standard	2.15 m³ (2.81 yd³)	1.92 m³ (2.51 yd³)	5	1415 mm (55.7")	1565 mm (61.6")
		1.65 m³ (2.16 yd³)	1.48 m³ (1.94 yd³)	5	1140 mm (44.9")	1290 mm (50.8")
		2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	5	1760 mm (69.3")	1910 mm (75.2")
		3.03 m³ (3.96 yd³)	2.67 m³ (3.49 yd³)	6	1890 mm (74.4")	2040 mm (80.3")
		★1.00 m³ (1.31 yd³)	0.90 m³ (1.17 yd³)	3	915 mm (36.0")	1065 mm (47.6")
		★1.38 m³ (1.80 yd³)	1.25 m³ (1.63 yd³)	5	1100 mm (43.3")	1250 mm (49.2")
		◈2.20 m³ (2.88 yd³)	1.80 m³ (2.35 yd³)	5	1840 mm (71.3")	-
		◎1.80 m³ (2.35 yd³)	1.50 m³ (1.96 yd³)	5	1560 mm (61.4")	-
		◎3.20 m³ (4.19 yd³)	2.80 m³ (3.66 yd³)	7	2095 mm (82.5")	-

★ : 5.85 m arm only
◈ : Heavy duty bucket
◎ : Rock - heavy duty bucket

9. RECOMMENDED OILS

Use only oils listed below. Do not mix different brand oil.
Please use HYUNDAI genuine oil and grease.

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)	★SAE 5W-40 SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	5.0×2 (1.3×2)	★SAE 75W-90
Final drive	Gear oil	Type 1, 2 6.0×2 (1.6×2)	★SAE 75W-90
Final drive	Gear oil	Type 3 12.0×2 (3.2×2)	SAE 80W-90
Hydraulic tank	Hydraulic oil	Tank: 262 (69.2) System: 380 (100)	★ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	621 (164)	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and soft water★1	50 (13.2)	Ethylene glycol base permanent type (50 : 50) ★Ethylene glycol base permanent type (60 : 40)

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

★ : Cold region
Russia, CIS, Mongolia

★1 : Soft water
City water or distilled water

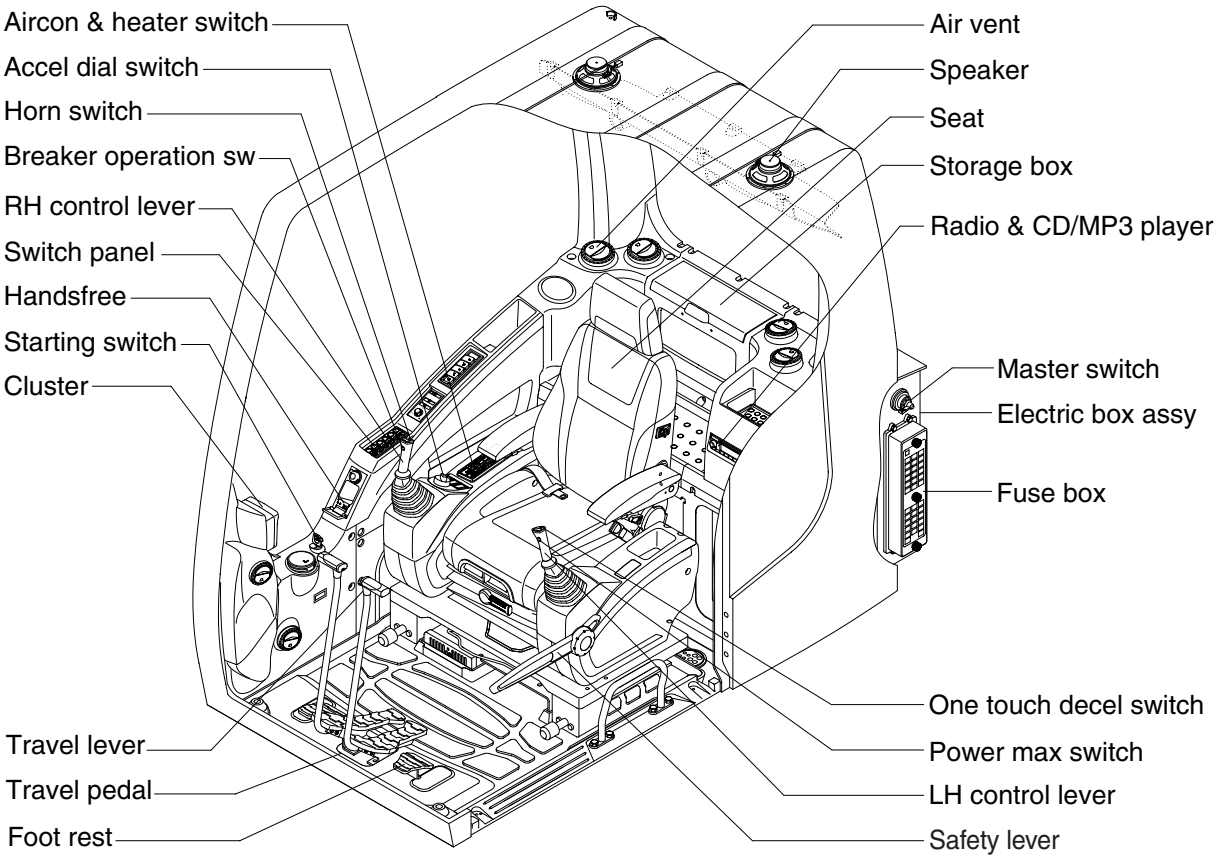
1. CAB DEVICES

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.



32093CD01

2. CLUSTER

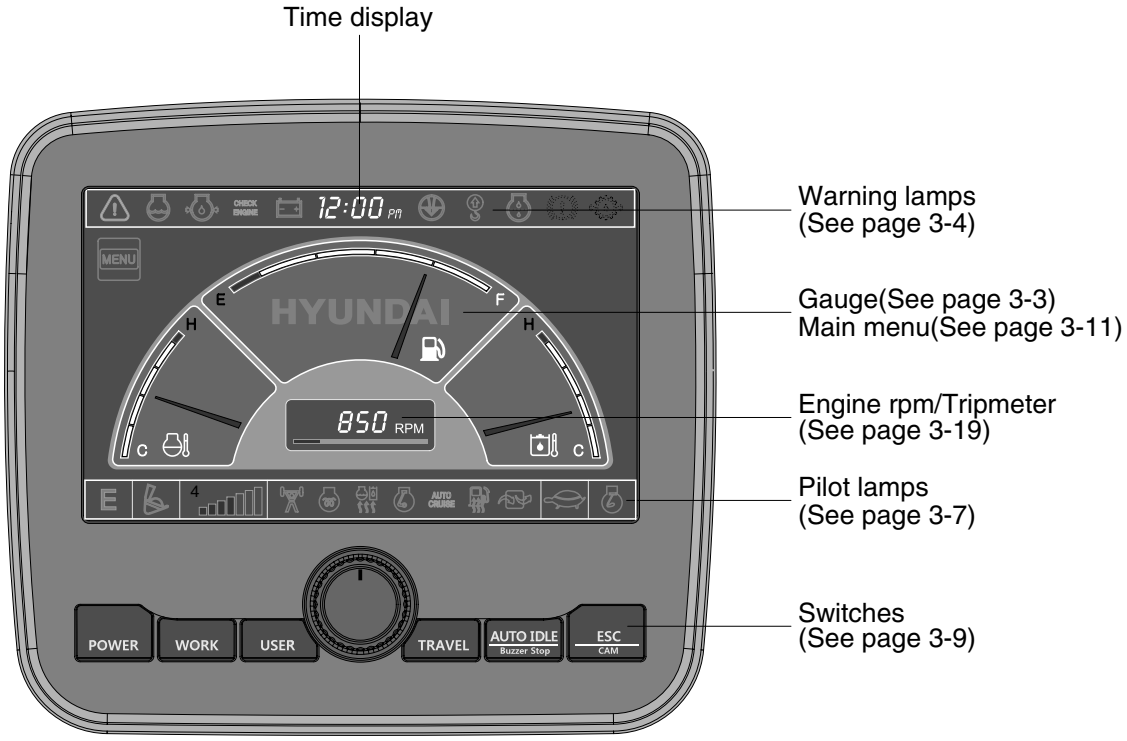
1) STRUCTURE

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

The switches are to set the machine operation modes.

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

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



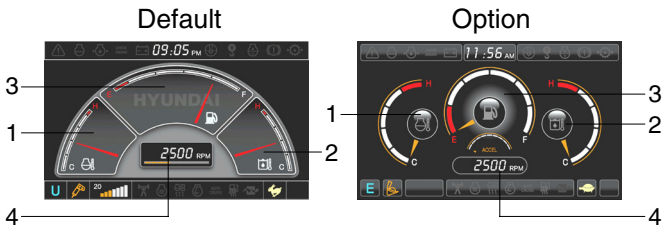
21093CD07

※ **The warning lamp pops up and/or blinks and the buzzer sounds when the machine has a problem.**

The warning lamp blinks until the problem is cleared. Refer to page 3-4 for details.

2) GAUGE

(1) Operation screen

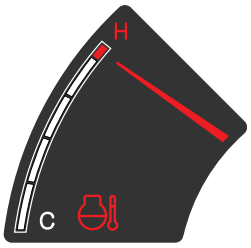


21093CD07A

1 Engine coolant temperature gauge
2 Hydraulic oil temperature gauge
3 Fuel level gauge
4 RPM / Tripmeter display

※ **Operation screen type can be set by the screen type menu of the display. Refer to page 3-21 for details.**

(2) Engine coolant temperature gauge



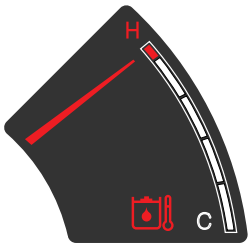
21093CD07G

① This gauge indicates the temperature of coolant.
- 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, turn OFF the engine and check the engine cooling system.

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

(3) Hydraulic oil temperature gauge



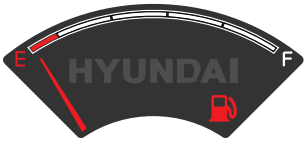
21093CD07E

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 is red, reduce the load on the system. If the gauge stays in the red range, stop the machine and check the cause of the problem.

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

(4) Fuel level gauge



21093CD07F

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

② Fill the fuel when the red range, or lamp blinks in red.

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

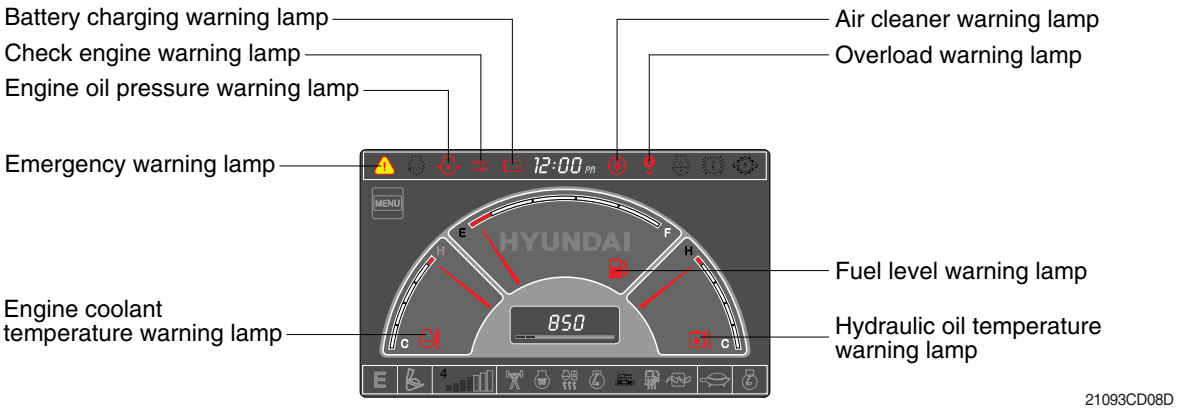
(5) RPM / Tripmeter display

21093CD02D

① This displays the engine rpm or the tripmeter.

※ **Refer to page 3-19 for details.**

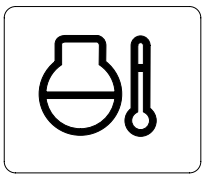
3) WARNING LAMPS



21093CD08D

※ **Each warning lamp on the top of the LCD pops up on the center of LCD and the buzzer sounds when the each warning is happened. The pop-up warning lamp moves to the original position and blinks when the select switch is pushed. And the buzzer stops.**
Refer to page 3-10 for the select switch.

(1) Engine coolant temperature



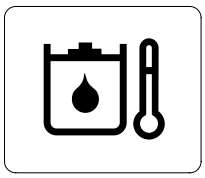
21093CD08A

① Engine coolant temperature warning is indicated two steps.
- 103˚C over : The lamp blinks.
- 107˚C over : The lamp pops up on the center of LCD and the buzzer sounds.

② The pop-up lamp moves to the original position and blinks when the select switch is pushed. Also, the buzzer stops and lamp keeps blink.

③ Check the cooling system when the lamp keeps ON.

(2) Hydraulic oil temperature



21093CD08C

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

② The pop-up lamp moves to the original position and blinks when the select switch is pushed. Also, the buzzer stops and lamp keeps blink.

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

(3) Fuel level

21093CD08B

① This warning lamp blinks and the buzzer sounds when the level of fuel is below 61 ℓ (16.1 U.S. gal).

② Fill the fuel immediately when the lamp blinks.

(4) Emergency warning lamp

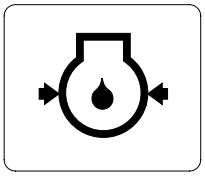
21093CD30

① This lamp pops up and the buzzer sounds when each of the below warnings is happened.
- Engine coolant overheating (over 107˚C)
- Hydraulic oil overheating (over 105˚C)
- Pump EPPR circuit abnormal or open
- Attachment flow EPPR circuit abnormal or open
- MCU input voltage abnormal
- Accel dial circuit abnormal or open
- Cluster communication data error
- Engine ECM communication data error

※ **The pop-up warning lamp moves to the original position and blinks when the select switch is pushed. Also the buzzer stops. This is same as following warning lamps.**

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

(5) Engine oil pressure warning lamp

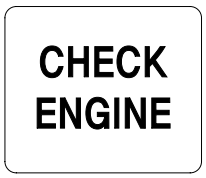


21093CD32

① This lamp blinks when the engine oil pressure is low.

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

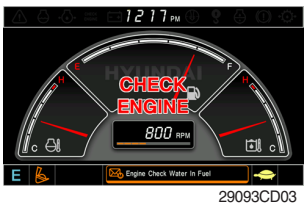
(6) Check engine warning lamp



21093CD33

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

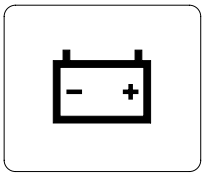
② Check the communication line between them.
If the communication line is OK, then check the fault codes on the cluster.



29093CD03

③ This lamp blinks when "Engine check water in fuel" is displayed in the message box then check water separator.

(7) Battery charging warning lamp

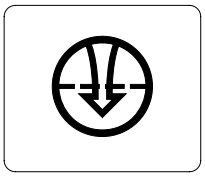


21093CD34

① This lamp blinks when the battery charging voltage is low.

② Check the battery charging circuit when this lamp blinks.

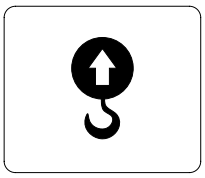
(8) Air cleaner warning lamp



21093CD35

① This lamp blinks when the filter of air cleaner is clogged.
② Check the filter and clean or replace it.

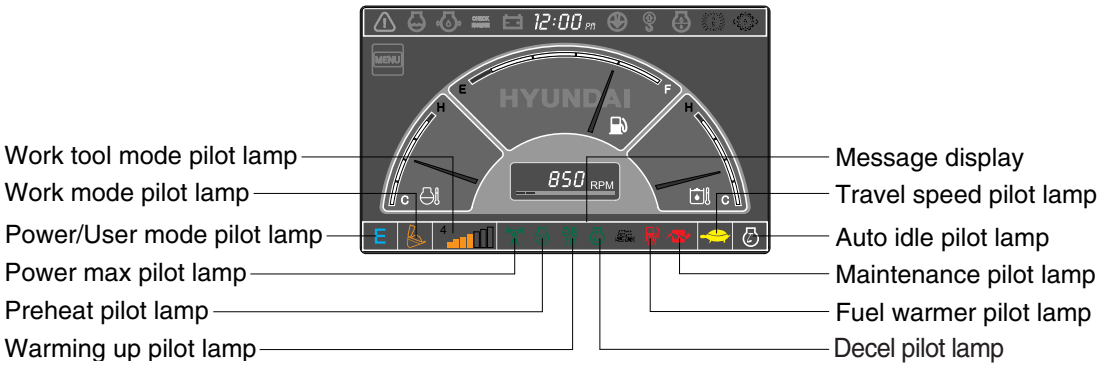
(9) Overload warning lamp (opt)



21093CD36

① When the machine is overload, the overload warning lamp blinks during the overload switch is ON. (if equipped)
② Reduce the machine load.

4) PILOT LAMPS



21093CD09

(1) Mode pilot lamps

No	Mode	Pilot lamp	Selected mode
1	Power mode	P	Heavy duty power work mode
		S	Standard power mode
		E	Economy power mode
2	User mode	U	User preferable power mode
3	Work mode		General operation mode
			Breaker operation mode
			Crusher operation mode
4	Travel mode		Low speed traveling
			High speed traveling
5	Auto idle mode		Auto idle
6	Work tool mode	4	Oil flow level of breaker or crusher mode
7	Message display	M	"Setting is completed" display after selection

(2) Power max pilot lamp

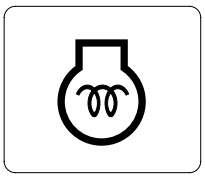
21093CD38

① The lamp will be ON when pushing power max switch on the LH RCV lever.

② The power max function is operated maximum 8 seconds.

※ **Refer to the page 3-26 for power max function.**

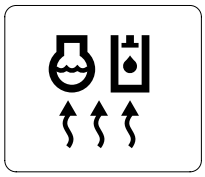
(3) Preheat pilot lamp



21093CD39

① Turning the start key switch ON position starts preheating in cold weather.
② Start the engine after this lamp is OFF.

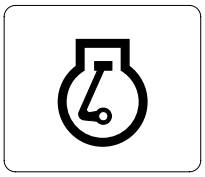
(4) Warming up pilot lamp



21093CD40

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.

(5) Decel pilot lamp

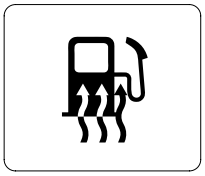


21093CD41

① Operating one touch decel switch on the RCV lever makes the lamp ON.
② Also, the lamp will be ON and engine speed will be lowered automatically to save fuel consumption when all levers and pedals are at neutral position, and the auto idle function is selected.

※ **One touch decel is not available when the auto idle pilot lamp is turned ON.**
※ **Refer to the page 3-26.**

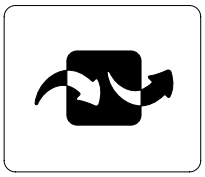
(6) Fuel warmer pilot lamp



21093CD43

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, or the hydraulic oil temperature is above 45˚C since the start switch was ON position.

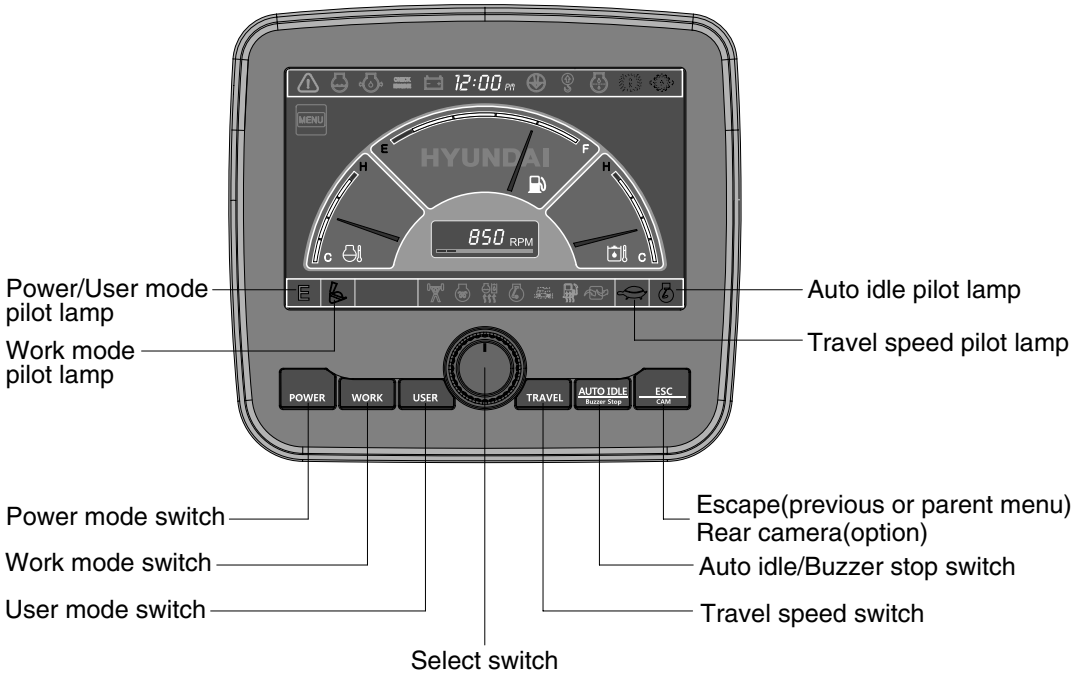
(7) Maintenance pilot lamp



21093CD44

① This lamp will be ON when the consuming parts are needed to change or replace. It means that the change or replacement interval of the consuming parts remains below 30 hours.
② Check the message in maintenance information of main menu. Also, this lamp lights ON for 3 minutes when the start switch is ON position.

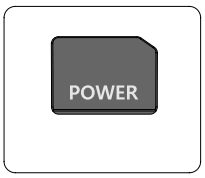
5) SWITCHES



21093CD45

※ **When the switches are selected, the pilot lamps are displayed on the LCD. Refer to the page 3-7 for details.**

(1) Power mode switch

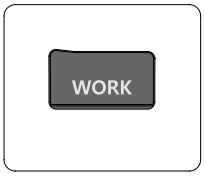


21093CD45A

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

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

(2) Work mode switch

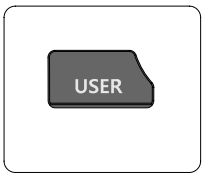


21093CD45C

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

※ **Refer to the page 4-6 for details.**

(3) User mode switch

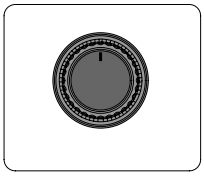


21093CD45D

① This switch is used to memorize the current machine operating status in the MCU and activate the memorized user mode.
- Memory : Push more than 2 seconds.
- Action : Push within 2 seconds.
- Cancel : Push this switch once more within 2 seconds.

② Refer to the page 3-12 for another set of user mode.

(4) Select switch



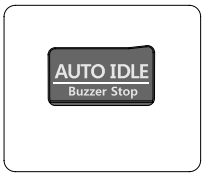
21093CD45E

① This switch is used to select or change the menu and input value.

② Knob push
- Long (over 2 sec) : Return to the operation screen
- Medium (0.5~2 sec) : Return to the previous screen
- Short (below 0.5 sec) : Select menu

③ Knob rotation
This knob changes menu and input value.
- Right turning : Down direction / Increase input value
- Left turning : Up direction / Decreased input value

(5) Auto idle/ buzzer stop switch

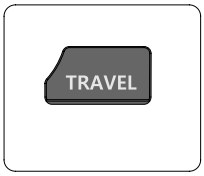


21093CD45F

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

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

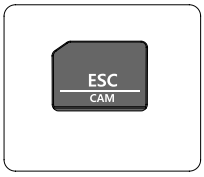
(6) Travel speed control switch



21093CD45G

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

(7) Escape/Camera switch



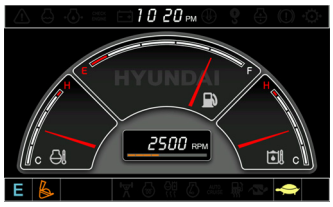
21093CD45H

① This switch is used to return to the previous menu or parent menu.

② In the operation screen, pushing this switch will display the view of the camera on the machine (if equipped).
Please refer to page 3-22 for the camera.

③ If the camera is not installed, this switch is used only ESC function.

6) MAIN MENU



21093CD64

21093CD64A

Press

21093CD64B

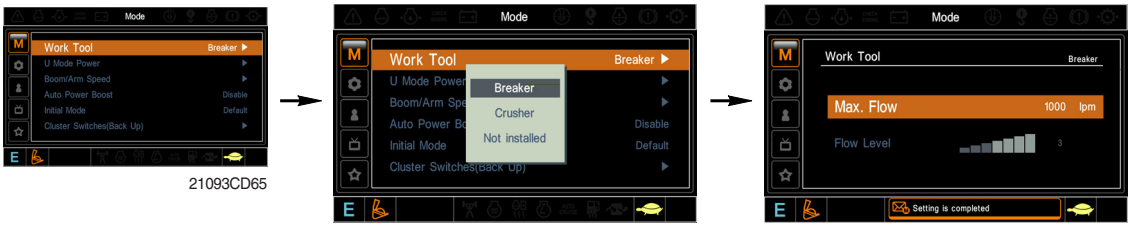
※ **Please refer to select switch, page 3-10 for selection and change of menu and input value.**

(1) Structure

No	Main menu	Sub menu	Description
1	M Mode 21093CD64D	Work tool U mode power Boom/Arm speed Auto power boost Initial mode Cluster switch (back up)	Breaker, Crusher, Not installed User mode only Boom speed, Arm speed Enable, Disable Default, U mode Switch function
2	Monitoring 21093CD64E	Active fault Logged fault Delete logged fault Monitoring (analog) Monitoring (digital) Operating hours	MCU, Engine ECM MCU, Engine ECM All logged fault delete, Initialization canceled Machine information Switch status, Output status Operating hours for each mode
3	Management 21093CD64F	Maintenance information Machine security Machine Information A/S phone number Service menu	Replacement, Change interval oils and filters ESL mode setting, Password change Cluster, MCU, Engine, Machine A/S phone number, A/S phone number change Power shift, Hourmeter start, Replacement history, Update
4	Display 21093CD64G	Display item Clock Brightness Unit Language Screen type	Engine speed, Tripmeter A, Tripmeter B, Tripmeter C Clock Manual, Auto Temperature, Pressure, Flow, Date format Korean, English, Chinese A type, B type
5	Utilities 21093CD64H	Tripmeter DMB Entertainment Camera setting Message box	3 kinds (A, B, C) DMB select, DAB select, Channel scan, Exit Play MP4, codec. Basic direction, Display switching, Full screen Record for fault, attachment etc.

(2) Mode setup

① Work tool



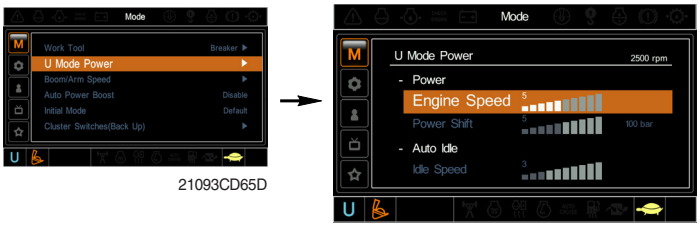
21093CD65 21093CD65A 21093CD65B

A B

- A : Select one installed optional attachment.
- B : Max flow - Set the maximum flow for the attachment.
  Flow level - Reduce the operating flow from maximum flow.
  Breaker - Max 7 steps, Reduced 10 lpm each step.
  Crusher - Max 4 steps, Reduced 20 lpm each step.

※ **The flow level is displayed with the work mode pilot lamp.**

② U mode power

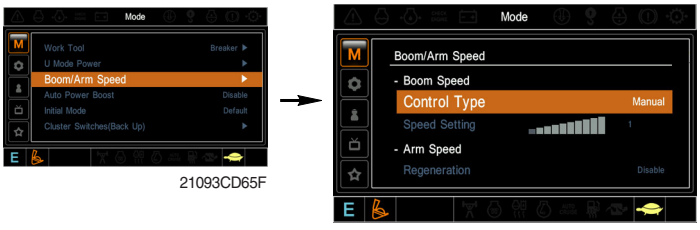


21093CD65D 21093CD65E

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

Step (▮)	Engine speed (rpm)	Idle speed (rpm)	Power shift (bar)
1	1450	700	0
2	1500	750	3
3	1550	800	6
4	1600	850	9
5	1650	900	12
6	1700	One touch decel low idle (950)	16
7	1750	Auto decel rpm (1000)	20
8	1800	1050	26
9	1850	1100	32
10	1900	1150	38

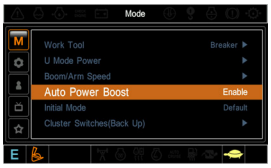
③ Boom/Arm speed



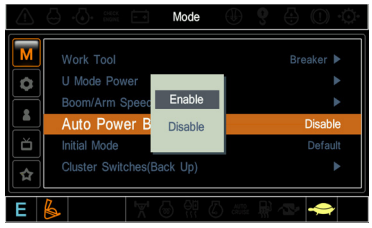
21093CD65F 21093CD65G

- **Boom speed**
  - Control type
    Manual - Boom up speed is fixed as set steps.
    Auto - Boom up speed is automatically adjusted as working conditions by the MCU.
  - Speed setting - Boom up speed is increased as much as activated steps.
- **Arm speed**
  - Regeneration - Arm regeneration function can be activated or cancelled.
    Enable - Arm in speed is up.
    Disable - Fine operation.

④ Auto power boost



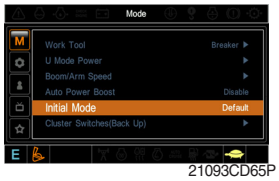
21093CD65L



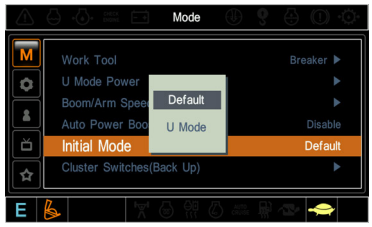
21093CD65M

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

⑤ Initial mode



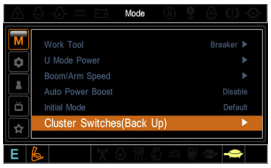
21093CD65P



21093CD65Q

- Default - The initial power mode is set E mode when the engine is started.
- U mode - The initial power mode is set U mode when the engine is started.

⑥ Cluster switch (back up)



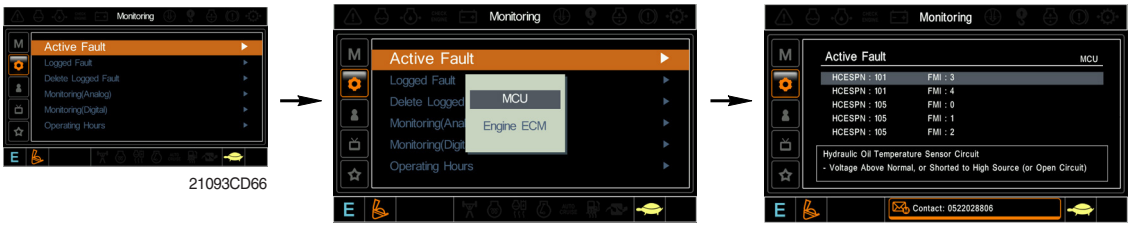
21093CD65S

21093CD65T

- The cluster switch can be selected and changed by this menu when the switches are abnormal on the cluster.
- In order to exit "Cluster switch" mode, please put the cursor on the ESC/CAM switch by turning the select switch and push the select switch.
- In "Cluster switch", other switches except "Select switch" do not work.

(3) Monitoring

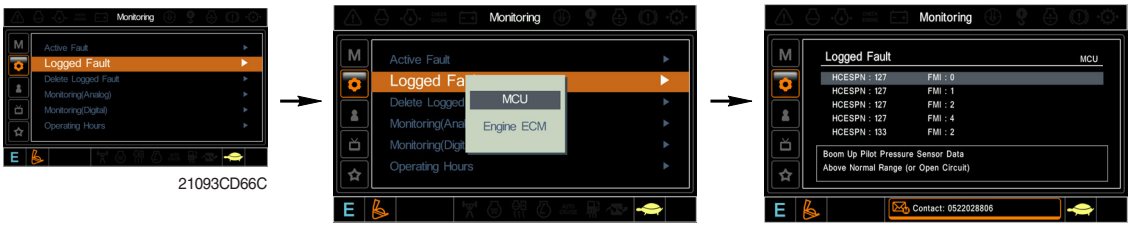
① Active fault



21093CD66 21093CD66A 21093CD66B

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

② Logged fault



21093CD66C 21093CD66D 21093CD66E

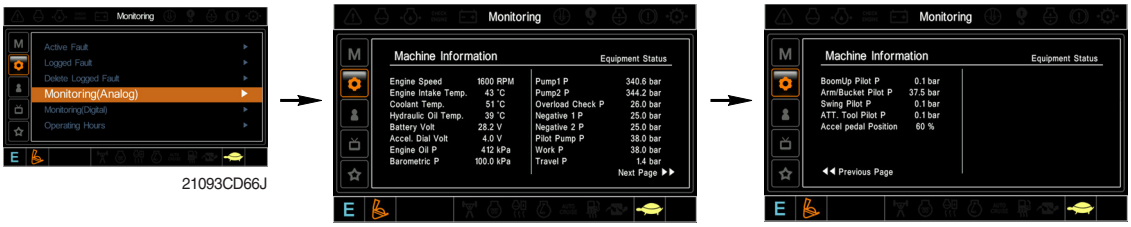
· The logged faults of the MCU or engine ECM can be checked by this menu.

③ Delete logged fault

21093CD66F 21093CD66G 21093CD66H

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

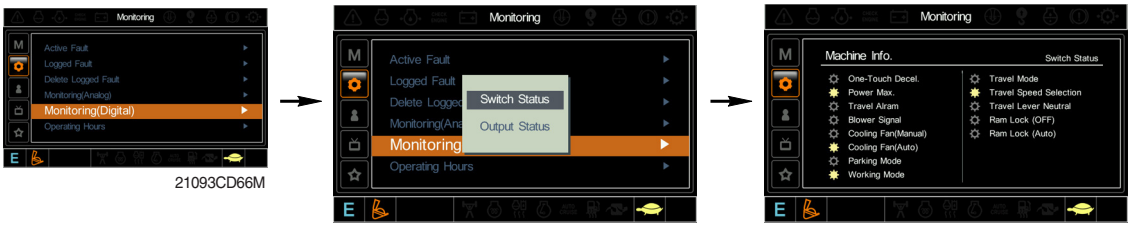
④ Monitoring(Analog)



21093CD66J 21093CD66K 21093CD66L

· The machine status such as the engine rpm, oil temperature, voltage and pressure etc. can be checked by this menu.

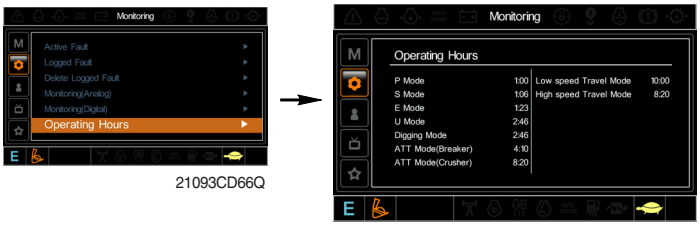
⑤ **Monitoring** (digital)



21093CD66M 21093CD66N 21093CD66P

· The switch status or output status can be confirmed by this menu.
· The activated switch or output pilot lamps ☼ are light ON.

⑥ **Operating hours**



21093CD66Q 21093CD66R

· The operating hour of each mode can be confirmed by this menu.

(4) Management

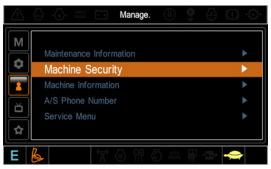
① Maintenance information

21093CD67 21093CD67A 21093CD67Q 21093CD67R 21093CD67S 21093CD67T

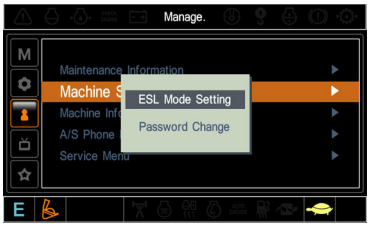
- Alarm(☼ ✹ ✹) : Gray ☼ - Normal
  Yellow ✹ - First warning
  Red ✹ - Second warning
- Replacement : The elapsed time will be reset to zero (0).
- Change interval : The change or replace interval can be changed in the unit of 50 hours.
- OK : Return to the item list screen.
- **Change or replace interval**

No	Item	Interval
1	Engine oil	500
2	Final gear oil	1000
3	Swing gear oil	1000
4	Hydraulic oil	5000
5	Pilot line filter	1000
6	Drain filter	1000
7	Hydraulic oil return filter	1000
8	Engine oil filter	500
9	Fuel filter	500
10	Pre-filter	500
11	Hydraulic tank breather	250
12	Air cleaner (inner)	500
13	Radiator coolant	2000
14	Swing gear pinion grease	1000

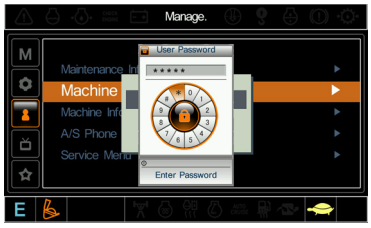
② Machine security



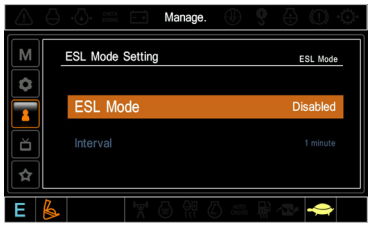
21093CD67C



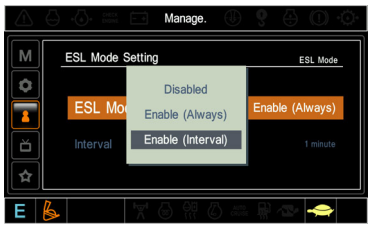
21093CD67D



21093CD67E



21093CD67EE



21093CD67H

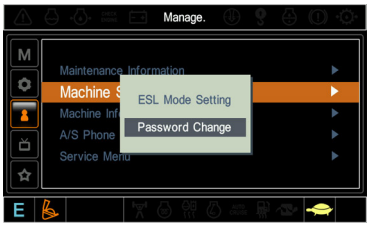
· **ESL mode**

- 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 (always) : The password is required whenever the operator start engine.

  Enable (interval) : The password is required when the operator start engine first. But the operator restarts the engine within the interval time, the password is not required.

  The interval time can be set maximum 4 hours.

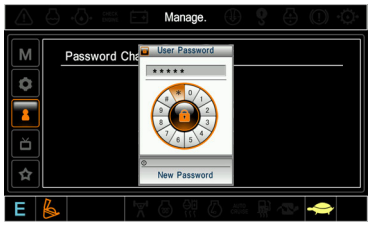


21093CD67U

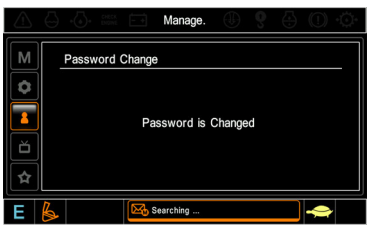
Enter the current password 21093CD67V

· **Password change**

- The password is 5~10 digits.



Enter the new password 21093CD67VV



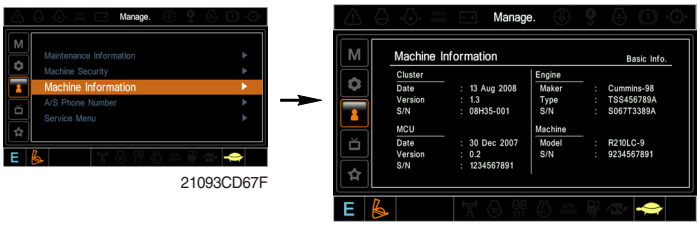
21093CD67X

The new password is stored in the MCU.

21093CD67XX

Enter the new password again

③ Machine Information



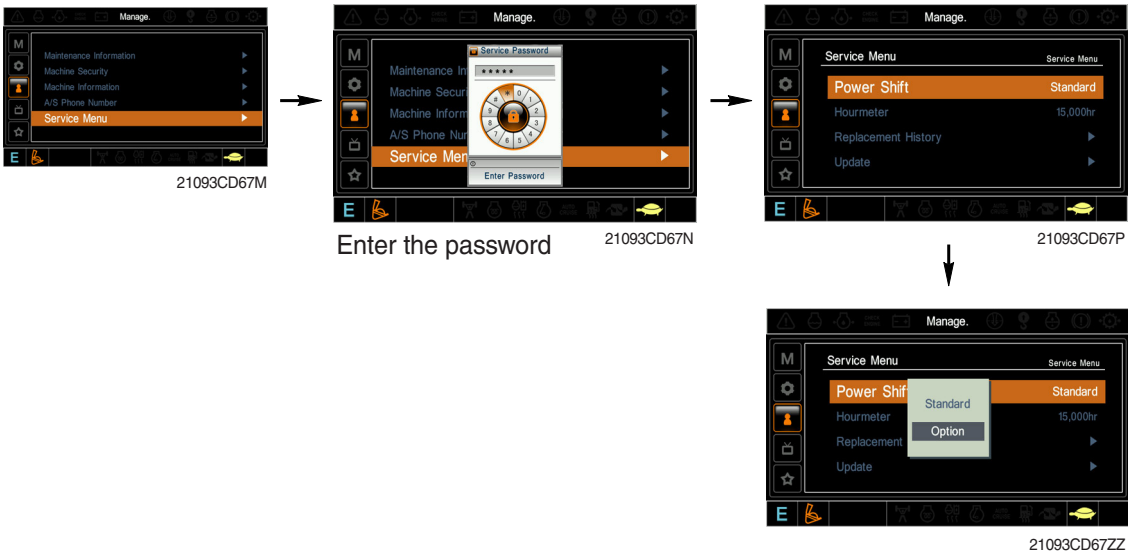
21093CD67F 21093CD67G

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

④ A/S phone number

21093CD67J 21093CD67K 21093CD67L 21093CD67Z 21093CD67Y

⑤ Service menu

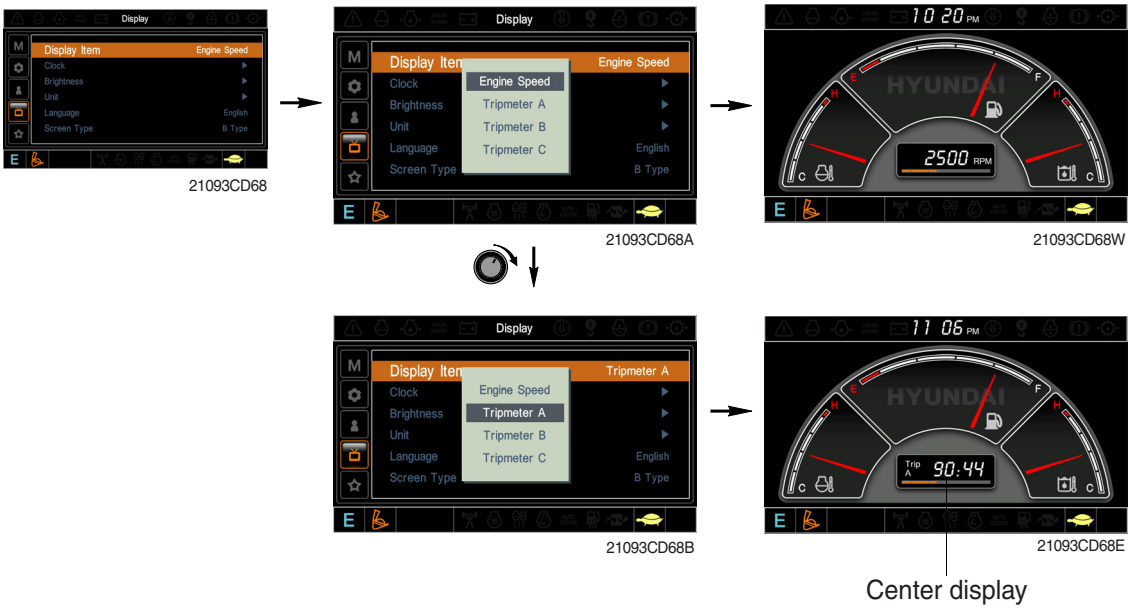


21093CD67M Enter the password 21093CD67N 21093CD67P 21093CD67ZZ

· Power shift (standard/option) : Power shift pressure can be set by option menu.
· Hourmeter start : Operating hours since the machine line out can be checked by this menu.
· Replacement history : Replacement history of the MCU and cluster can be checked by this menu.
· Update : Firm ware can be upgraded by this menu. (the USB port is located under the cluster)

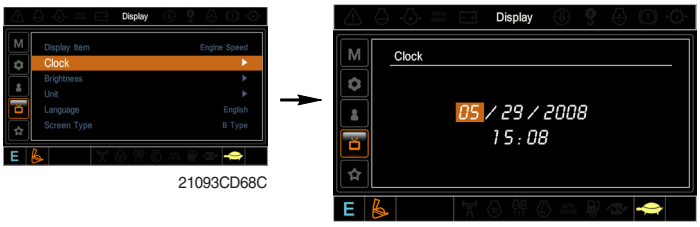
(5) Display

① Display item



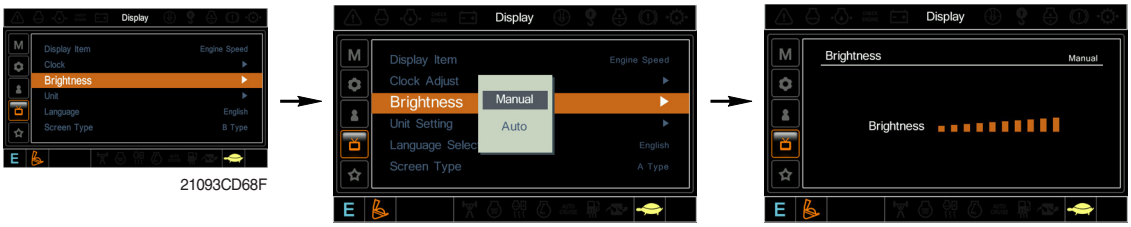
- The center display type of the LCD can be selected by this menu.
- The engine speed or each of the tripmeter (A,B,C) is displayed on the center display.

② Clock



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

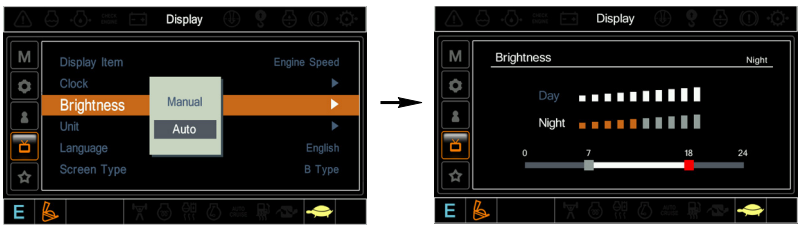
③ Brightness



21093CD68F

Manual (1st~10th step) 21093CD68G

21093CD68H



Auto (day/night) 21093CD68J

21093CD68K

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

④ Unit

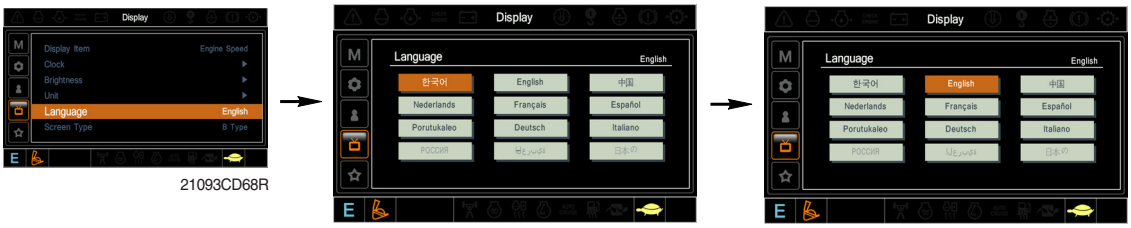
21093CD68L

21093CD68M

21093CD68N

- Temperature : ˚C ↔ ˚F
- Pressure : bar ↔ MPa ↔ kgf/cm²
- Flow : lpm ↔ gpm
- Date format : yy/mm/dd ↔ mm/dd/yy ↔ dd-Mar-yy

⑤ Language



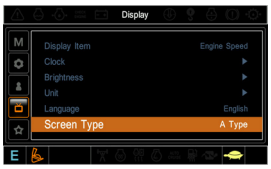
21093CD68R

21093CD68S

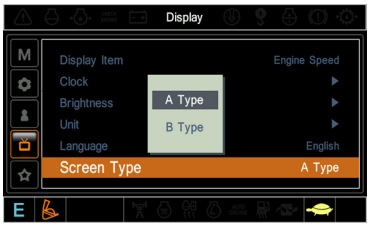
21093CD68T

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

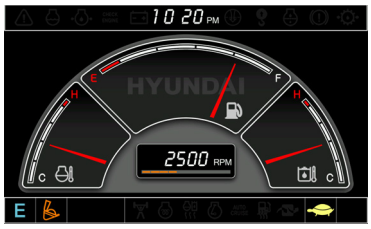
⑥ Screen type



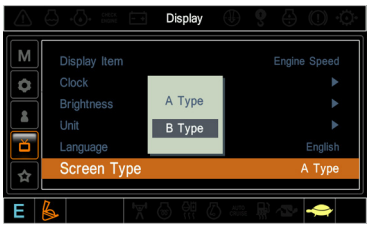
21093CD68U



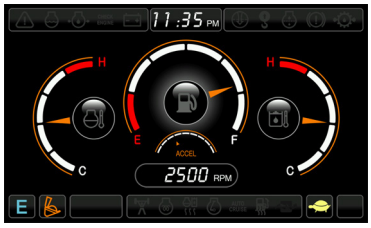
A Type 21093CD68V



Standard 21093CD68W



B Type 21093CD68X

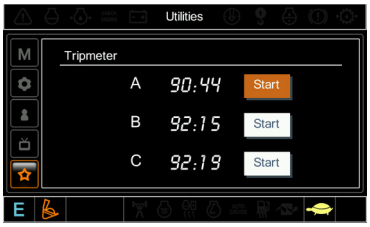


Option 21093CD68Y

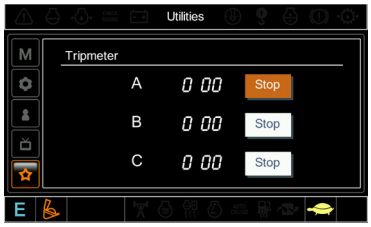
(6) Utilities

① Tripmeter

21093CD69



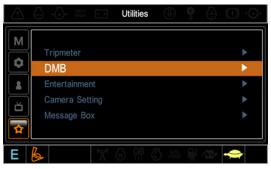
21093CD69A



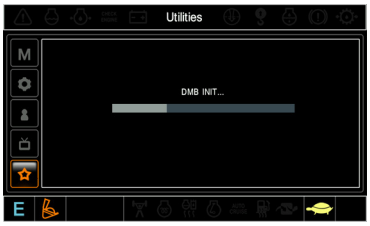
21093CD69B

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

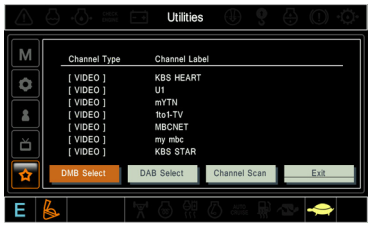
② DMB



21093CD69C



21093CD69D



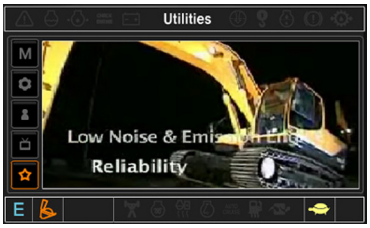
21093CD69E

- DMB select : TV channel can be selected by this menu.
- DAB select : Audio channel can be selected by this menu.
- Channel scan : This menu can be used other region for TV/Audio.
- Exit : Exit DMB menu

③ Entertainment

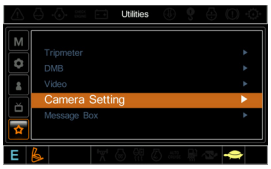
· Play MP4 or codec file of external hard disk through USB port.
· The USB port is located under the cluster.

21093CD69F

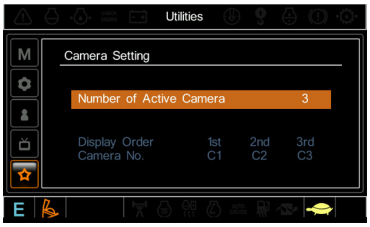


21093CD69G

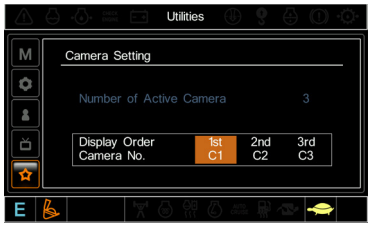
④ Camera setting



21093CD69J



21093CD69K



21093CD69L

· Three cameras can be installed on the machine.
· The display order can be set by this menu.

21093CD69M

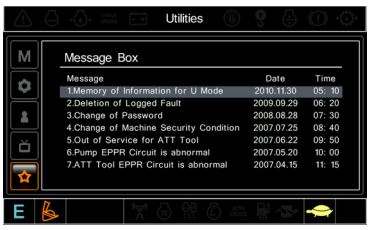
21093CD69N

· If the camera was not equipped, this menu is not useful.
· In the operation screen, if the ESC/CAM switch is pushed, the first ordered display camera will be viewed.
· Turnning the select switch in clockwise direction, the next ordered will be shown and in counter-clockwise direction, the previously ordered will be shown.
· Push the select switch, the displayed screen will be enlargement.

⑤ Message box

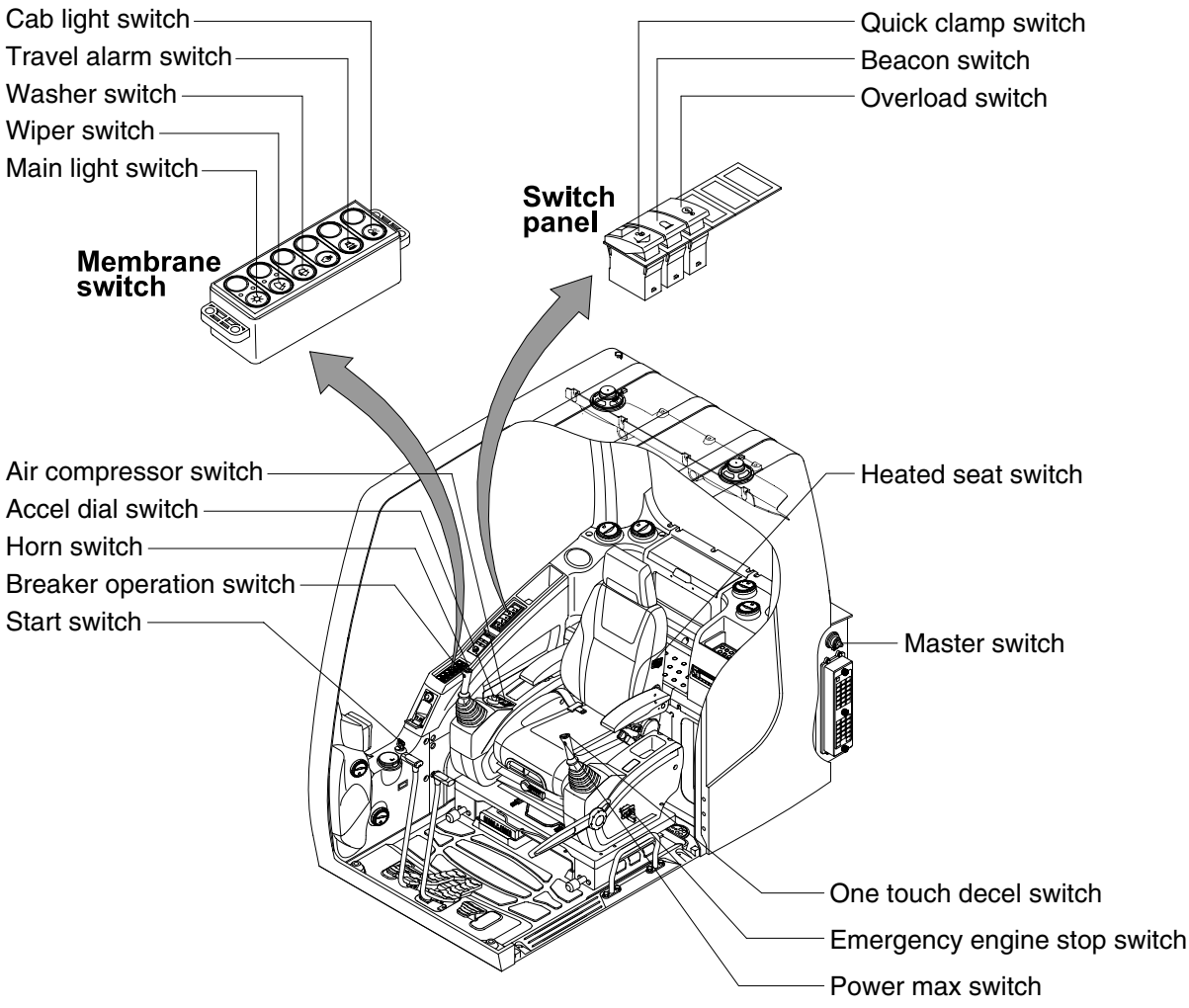
· **The history of the machine operating status can be checked by this menu.**

21093CD69Q

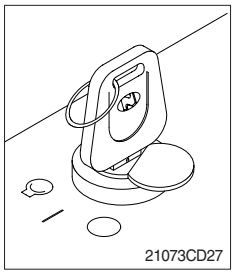


21093CD69R

3. SWITCHES



1) STARTING SWITCH

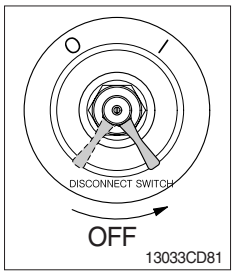


(1) There are three positions, OFF, ON and START.
- ◯ (OFF) : None of electrical circuits activate.
- | (ON) : All the systems of machine operate.
- ◯ (START) : Use when starting the engine.
  Release key immediately after starting.

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

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

2) MASTER SWITCH

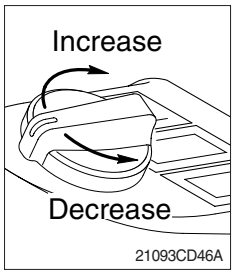


(1) This switch is used to shut off the entire electrical system.

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

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

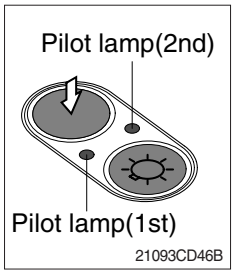
3) ACCEL DIAL SWITCH



(1) There are 10 dial setting.

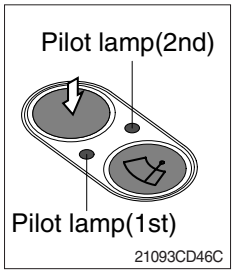
(2) Setting 1 is low idle and setting 10 is high idle.
- By rotating the accel dial to right : Engine speed increases
- By rotating the accel dial to left : Engine speed decreases

4) MAIN LIGHT SWITCH



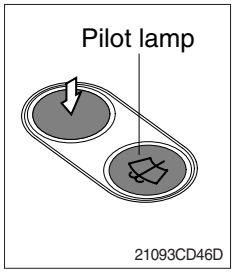
(1) This switch used to operate the head light and work light.
- Press the switch once, the head light comes ON and the 1st pilot lamp ON.
- Press the switch once more, the work light comes ON and the 2nd pilot lamp ON.
- Press the switch again, return to a first step position.
- Press the switch more than one second to turn off lights.

5) WIPER SWITCH



(1) This switch used to operate wiper.
- Press the switch once the wiper operates intermittently and the 1st pilot lamp comes ON.
- Press the switch once more, the wiper operates low speed and the 2nd pilot lamp comes ON.
- Press the switch again return to a first step position.
- Press the switch more than one second to turn off wiper.

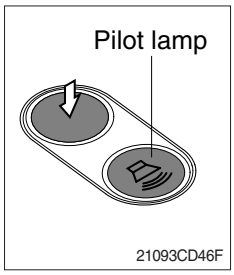
6) WASHER SWITCH



(1) The washer liquid is sprayed and the wiper is operated only while pressing this switch.

(2) The pilot lamp is turned ON when operating this switch.

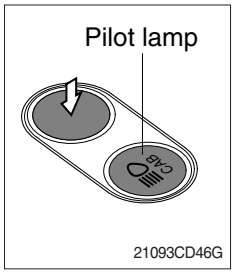
7) TRAVEL ALARM SWITCH



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

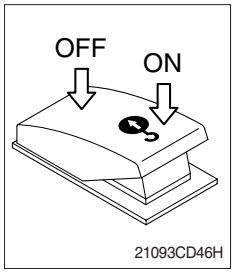
(2) On pressing this switch, the alarm operates only when the machine is traveling.

8) CAB LIGHT SWITCH (option)



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

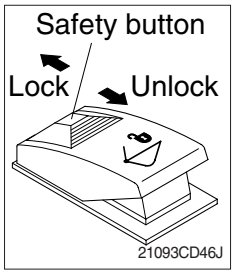
9) OVERLOAD SWITCH (option)



(1) When this switch turned ON, buzzer makes sound and overload warning lamp comes ON in case that the machine is overload.

(2) When it turned OFF, buzzer stops and warning lamp goes out.

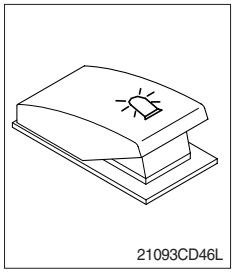
10) QUICK CLAMP SWITCH (option)



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

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

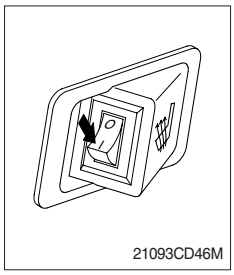
11) BEACON SWITCH (option)



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

(2) The indicator lamp is turned ON when operating this switch.

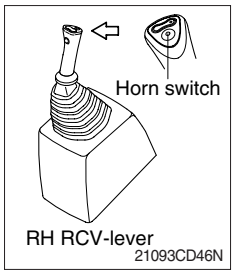
12) HEATED SEAT SWITCH (option)



(1) This switch is used to heat the seat.
- Heater ON : 10±3.5˚C
- Heater OFF : 20±3˚C

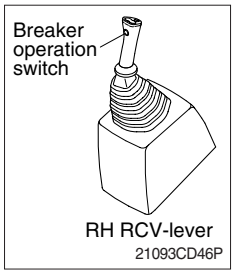
(2) On pressing the switch, the indicator lamp is turned ON.

13) HORN SWITCH



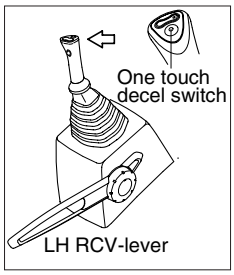
(1) This switch is at the top of right side control lever.
On pressing, the horn sounds.

14) BREAKER OPERATION SWITCH



(1) On pressing this switch, the breaker operates only when the breaker operation mode is selected.

15) ONE TOUCH DECEL SWITCH

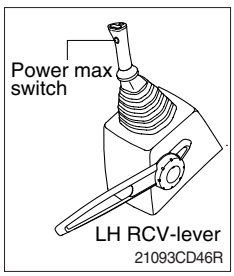


(1) This switch is used to actuate the deceleration function quickly.

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

(3) One touch decel function is available only when the auto idle pilot lamp is turned OFF.

16) POWER MAX SWITCH

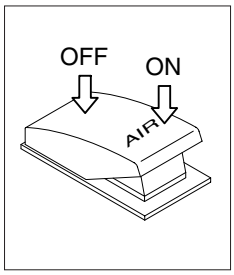


(1) This switch activate power max function.
When this switch is kept pressed, hydraulic power of work equipment will be increased to approx 110 percent during 8 seconds.

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

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

17) AIR COMPRESSOR SWITCH (option)

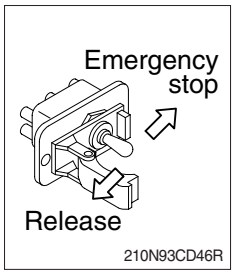


17W93CD46N

(1) This switch is used to activate the air compressor.

(2) The indicator lamp is turned on when operating this switch.

18) EMERGENCY ENGINE STOP SWITCH

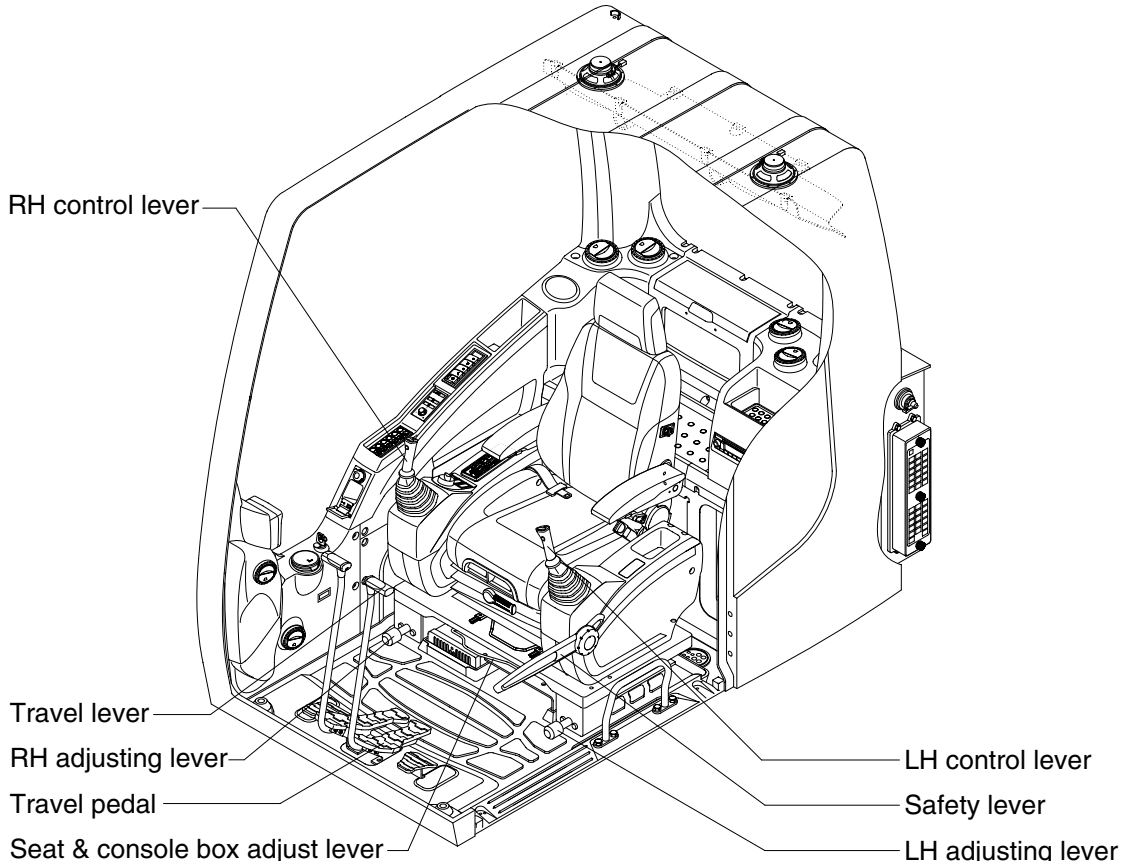


210N93CD46R

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

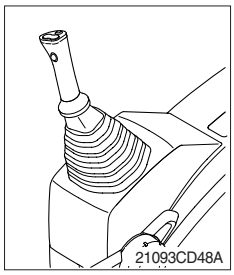
※ **Be sure to keep the emergency switch on the release position when restart the engine.**

4. LEVERS AND PEDALS



32093CD02

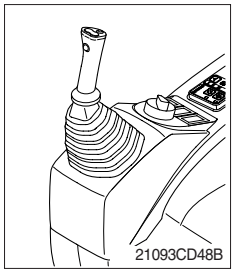
1) LH CONTROL LEVER



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

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

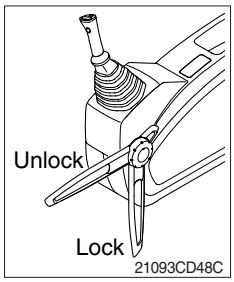
2) RH CONTROL LEVER



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

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

3) SAFETY LEVER



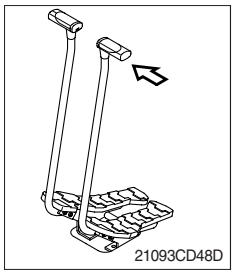
(1) All control levers and pedals are disabled from operation by locating the lever to lock position as shown.

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

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

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

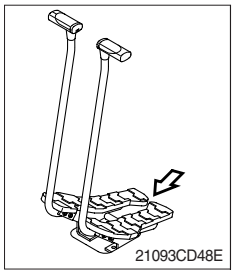
4) TRAVEL LEVER



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

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

5) TRAVEL PEDAL

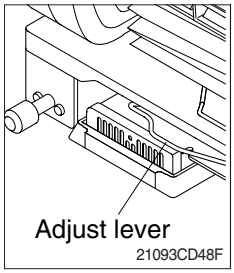


(1) This pedal is used to move the machine forward or backward.

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

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

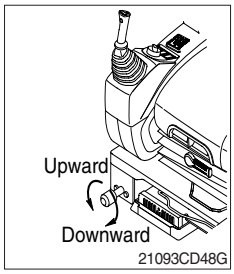
6) SEAT AND CONSOLE BOX ADJUST LEVER



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

(2) Pull the lever to adjust forward or backward over 170㎜(6.7").

7) ADJUSTING LEVER



(1) This lever is used to move the LH and RH control lever to fit the contours of the operator's body.

(2) The control lever can be moved upward and downward over 30 ㎜ (1.2").

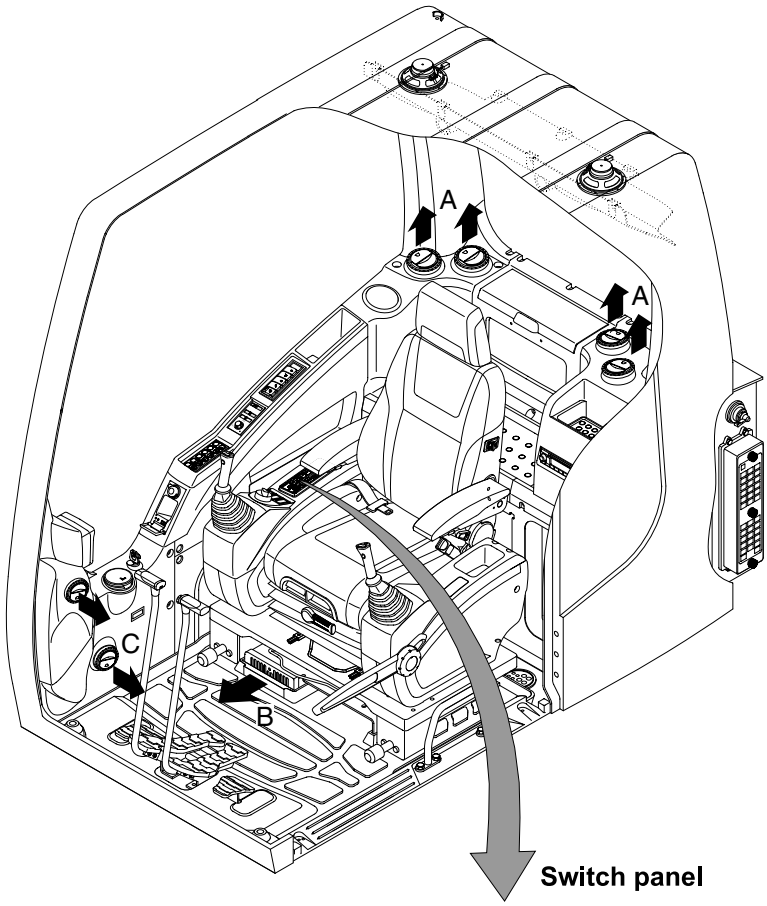
5. AIR CONDITIONER AND HEATER

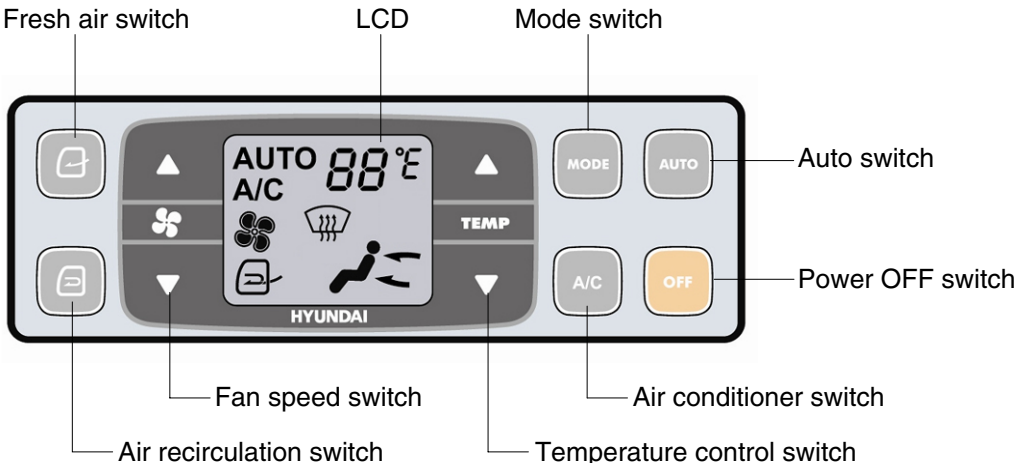
■ **FULL AUTO AIR CONDITIONER AND HEATER** (standard)

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.

※ **Refer to the page 3-33 for semi auto air conditioner and heater.**

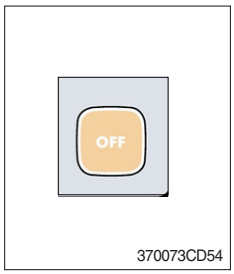
· **Location of air flow ducts**





21093CD49

1) POWER OFF SWITCH

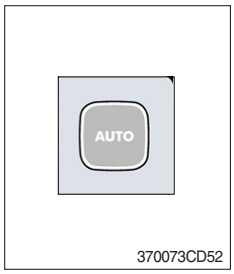


(1) This switch makes the system and the LED OFF.
Just before the power OFF, set values are stored.

(2) Default setting values

Function	Air conditioner	c	LCD	Temperature	Mode
Value	OFF	Inlet	OFF	Previous sw OFF	Previous sw OFF

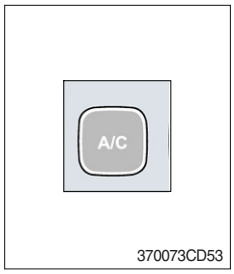
2) AUTO SWITCH



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

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

3) AIR CONDITIONER SWITCH (compressor switch)

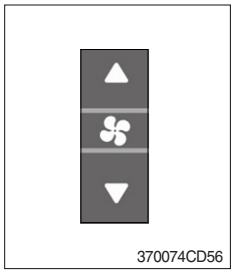


(1) This switch turns the compressor and the LCD ON.

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

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

4) FAN SPEED SWITCH

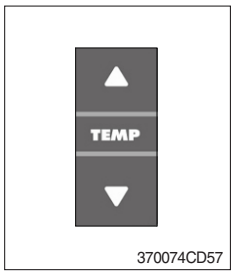


(1) Fan speed is controlled automatically by setted temperature.

(2) This switch controls fan speed manually.
- There are 8 up/down steps to control fan speed.
- The maximum step or the minimum step beeps 5 times.

(3) This switch makes the system ON.

5) TEMPERATURE CONTROL SWITCH



(1) Setting temperature indication
① Type A : 17~32˚C, scale : 1˚C
② Type B : Lo, 18~31˚C, Hi, scale : 1˚C

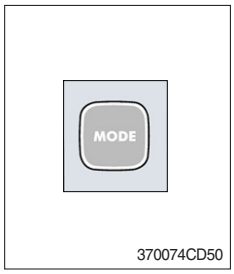
(2) Max cool and max warm beeps 5 times.

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

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

(4) Temperature unit can be changed between celsius (˚C) and fahrenheit (˚F)
① Default status (˚C)
② Push Up/Down temperature control switch simultaneously more than 5 second displayed temperature unit change (˚C → ˚F)

6) MODE SWITCH



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

· A type : Vent → Vent/Foot → Foot → Foot/Def → Vent

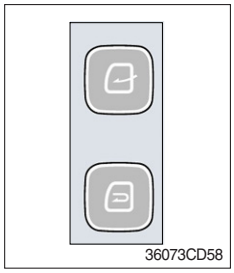
Mode switch		Vent	Vent/Foot	Foot	Foot/Def
					
Outlet	A	●	●		
	B		●	●	●
	C				●

· B type : Vent → Vent/Foot → Def/Foot → Def/Vent → Def/Vent/Foot

Mode switch		Vent	Vent/Foot	Def/Foot	Def/Vent	Def/Vent/Foot
						
Outlet	A	●	●		●	●
	B		●	●		●
	C			●	●	●

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

7) FRESH AIR/AIR RECIRCULATION SWITCH



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

① Fresh air ( )

Inhaling air from the outside.

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

② Air recirculation ( )

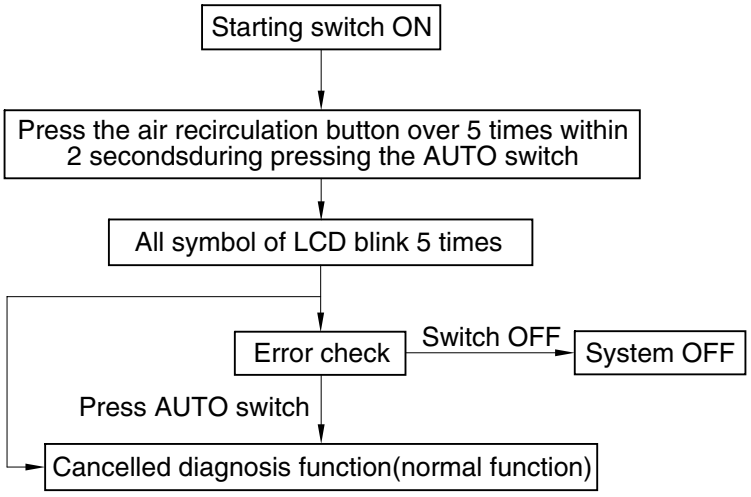
It recycles the heated or cooled air to increase the energy efficiency.

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

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

8) SELF DIAGNOSIS FUNCTION

(1) Procedure



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(2) Error check

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

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

(3) Fail safe function

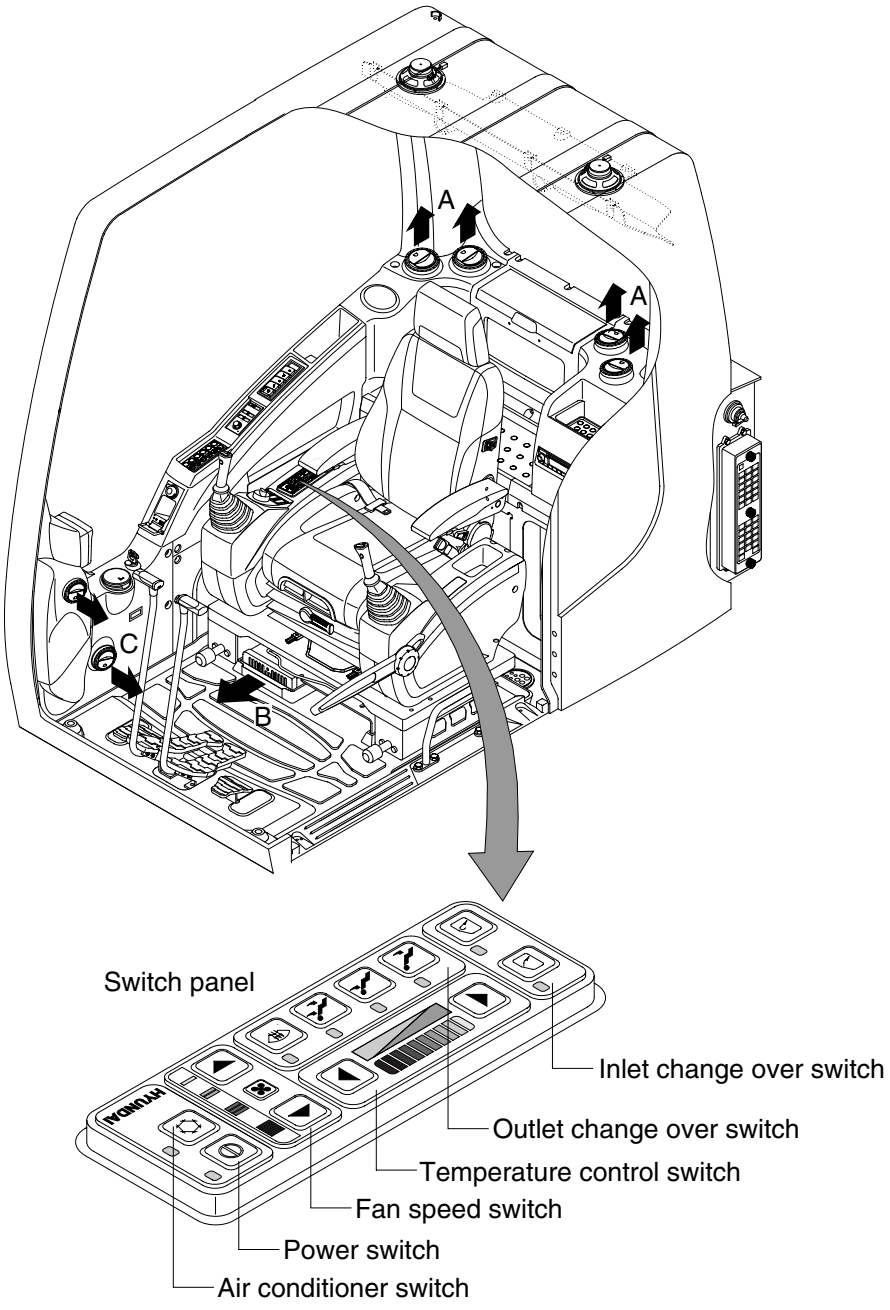
Error description	Fail safe function
Cabin inside sensor (11)	25˚C alternate value control
Ambient sensor (12)	20˚C alternate value control
Duct (evaporator) sensor (14)	1˚C alternate value control
Temp actuator (15)	If opening amount is 0 %, the alternate value is 0 %
	If not, the alternate value is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

■ **SEMI AUTO AIR CONDITIONER AND HEATER** (option)

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

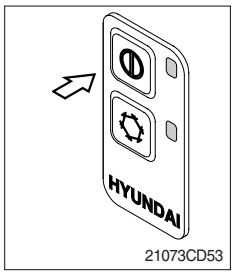
※ **Refer to the page 3-29 for full auto air conditioner and heater.**

· **Location of air flow ducts**



21093CD53

1) POWER SWITCH

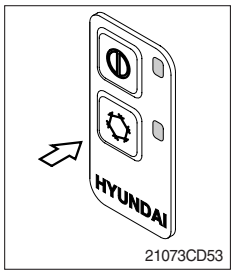


(1) This switch makes the system and the LED simultaneously ON or OFF.

(2) Default setting values

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

2) AIR CONDITIONER SWITCH (compressor switch)

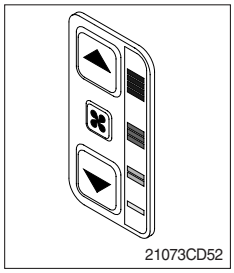


(1) Operating this switch turns the compressor and the LED simultaneously ON or OFF.

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

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

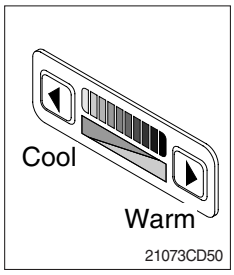
3) FAN SPEED SWITCH



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

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

4) TEMPERATURE CONTROL SWITCH



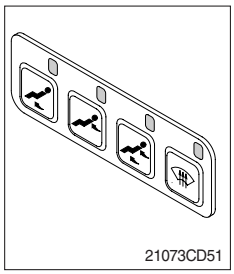
(1) There are 9 steps to control temperature from max cool to max warm controlled up and down by 1 step.

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

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

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

5) OUTLET CHANGE OVER SWITCH



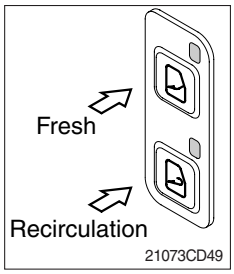
(1) There are four steps of air flow.

Switch position		Mode			
Outlet	A		●	●	
	B	●		●	●
	C				●

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

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

6) INLET CHANGE OVER SWITCH



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

① **Fresh**

Inhaling air from the outside to pressurize cab inside.

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

② **Recirculation**

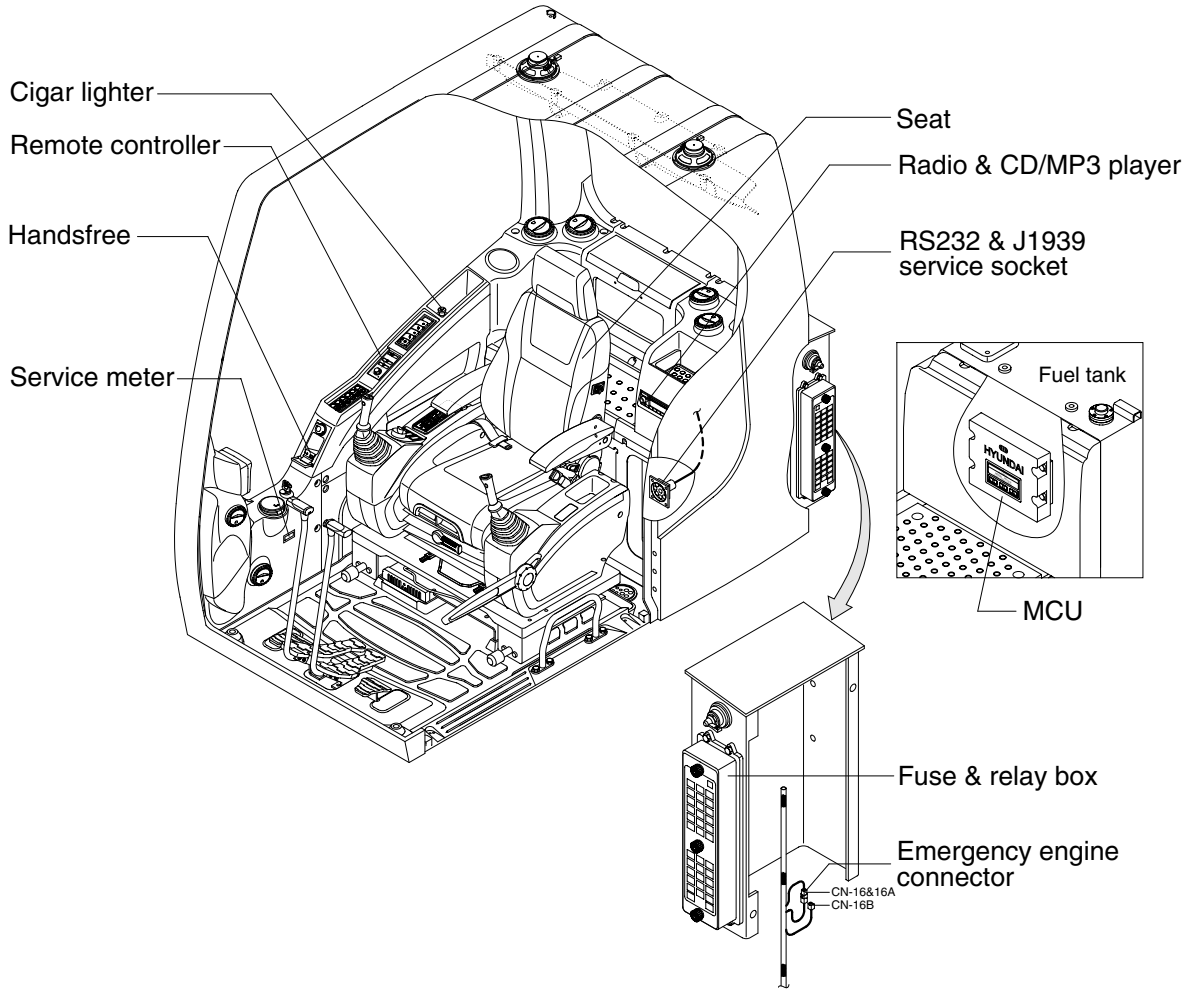
It recycles the heated or cooled air to increase the energy efficiency.

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

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

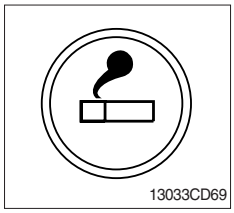
(2) Recirculation function operates when the system is OFF but it can be changed whenever needed.

6. OTHERS



32093CD03

1) CIGAR LIGHTER



13033CD69

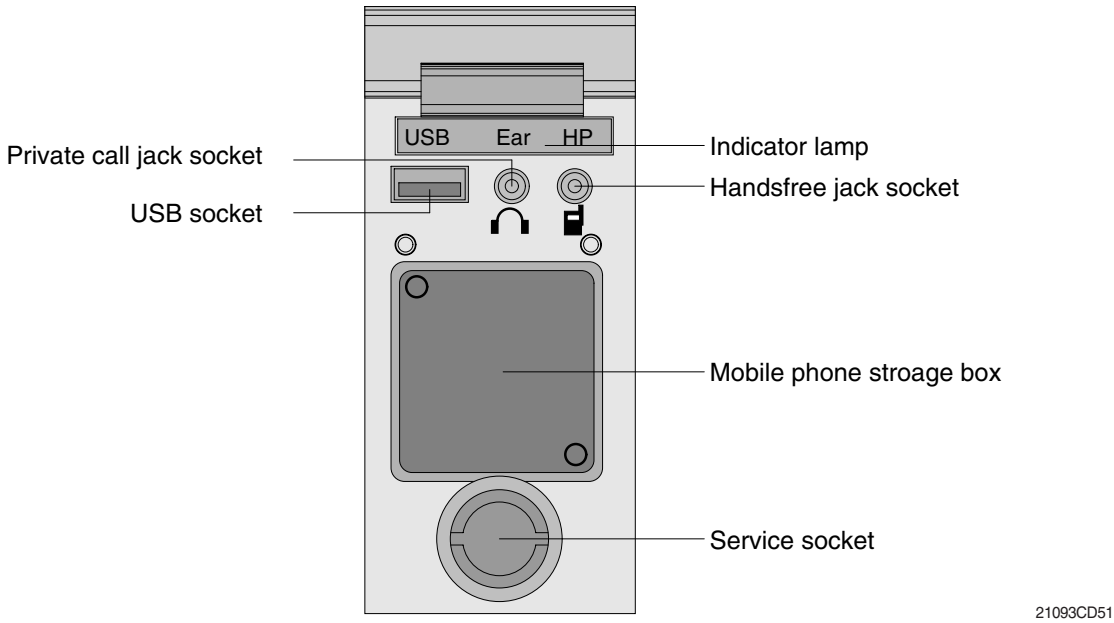
(1) This can be used when the engine starting switch is ON.

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

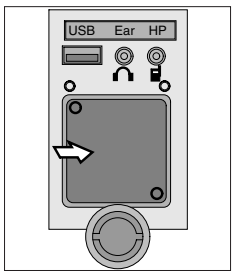
※ **Service socket**
Use cigar lighter socket when you need emergency power.
Do not use the lighter exceeding 24V, 100W.

2) HANDSFREE

Allow you to dial a call or to have a conversation without holding your handset. Use the remote controller when making and answering a calls or ring off.

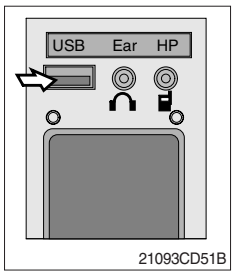


(1) Mobile phone storage box



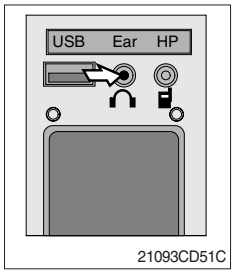
① Mobile phone can be stored when call by handsfree.

(2) USB socket



① This socket is used to charging the mobile phone.

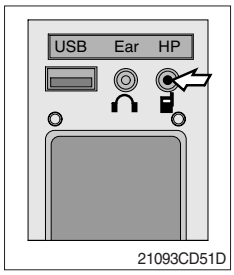
(3) Private call jack socket



① This can be used protect you privacy calling by using ear phone.

② The mobile phone must be connected handsfree jack socket.

(4) Handsfree jack socket

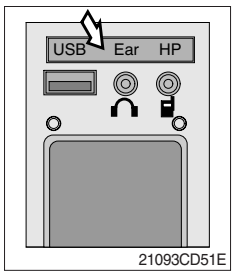


① Connect the jack cable when call by handsfree.

② Use the special adapter when jack cable is not interchangeable.

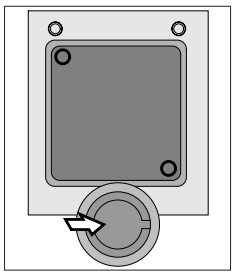
③ Check the jack type of mobile phone before use.

(5) Indicator lamp



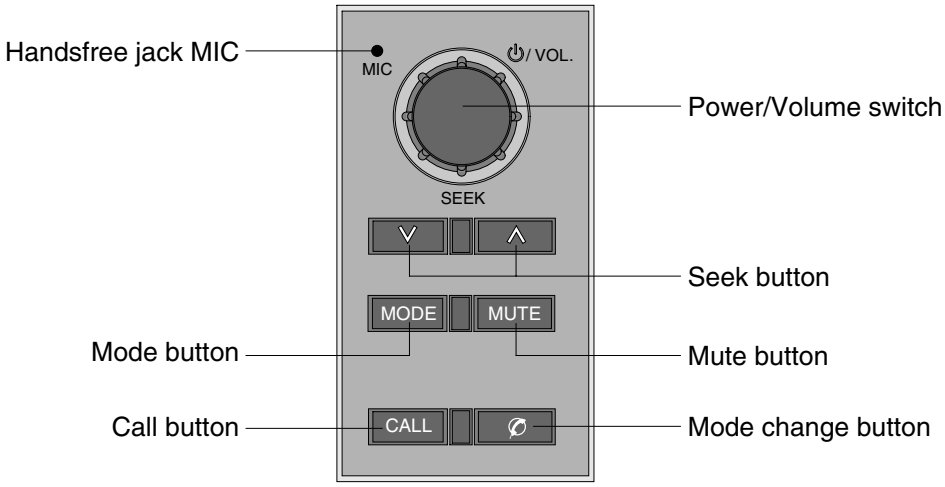
① This lamp is turned ON when the handsfree mode selected.

(6) Service socket



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

3) REMOTE CONTROLLER



21093CD52

(1) Power and volume switch

21093CD52A

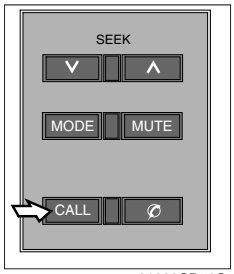
① This switch is used to turn the audio or handsfree ON or OFF.
② This switch is turned to right, the handsfree volume is increased over 7 steps.
③ If it is turned to left, volume will be decreased.
※ **This switch adjust the audio volume when selected audio mode.**

(2) Mode change button

21093CD52B

① This button is to select the handsfree mode or audio mode.
- Lamp ON : Handsfree mode ("TEL MUTE" displayed ON audio LCD)
- Lamp OFF : Audio mode

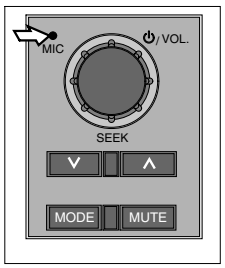
(3) Call button



21093CD52C

① This button is used answer a call, last number redial, ring off.
② For calling, press the button over 0.5sec within 3 seconds until the beep sounds.
※ **This can be used when the starting switch is ON.**

(4) Handsfree MIC



21093CD52D

① This MIC transfers user voice to receiver of the call when making a call by handsfree.

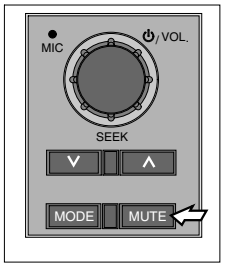
(5) Seek button

21093CD52E

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

② Press ^ to turn a station of a higher frequency or v to a lower frequency.

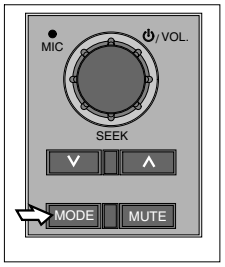
(6) Mute button



21093CD52G

① Short press this button to mute or cancel the mute (silence) while broadcasting.

(7) Mode button



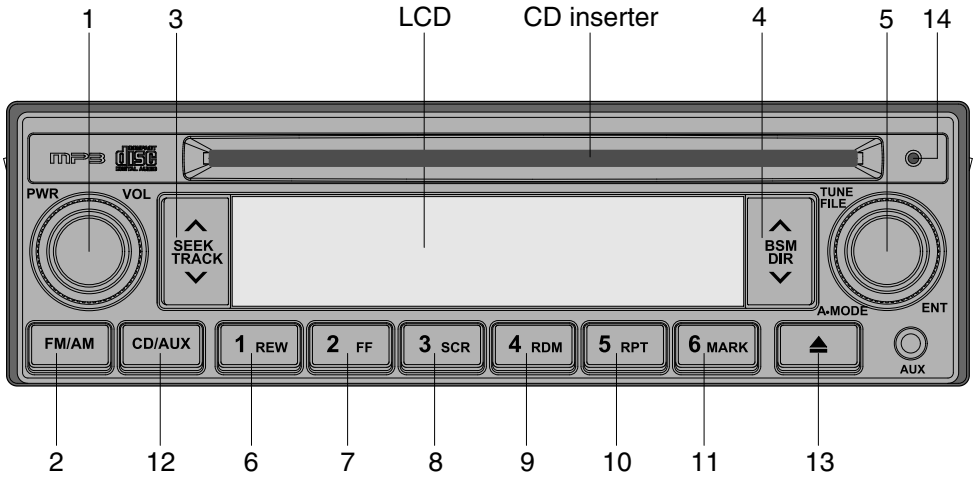
21093CD52F

① Press the mode button to select the desired mode.

② FM1 → FM2 → AM → CD → MP3 → FM1

※ **The LCD displayed each mode.**

4) RADIO AND CD/MP3 PLAYER : MACHINE SERIAL NO.: -#0038



21093CD70

■ FRONT PANEL PRESENTATION

1 ····· Power and volume switch
PWR ····· Press to power on/off
VOL ····· Turn right/left to adjust the volume

2 FM/AM ····· AM/FM button (radio)

3 SEEK TRACK ····· Seek mode (radio)
Auto search up/down
····· Track mode (CD)
Short press : Next/previous track
Long press : Fast forward or rewind
Memory file search up/down (MP3)

4 BSM DIR ····· BSM mode (radio)
6 best station automatic memory
····· DIR mode (MP3)
Select the desired folder (MP3)
Long press : Fast forward or rewind

5 ····· Manual frequency search (radio)
Turn right/left to adjust the frequency
FILE ····· Search for desired file (CD/MP3)
Turn right/left to adjust the track no
A · MODE ··· Select bass/middle/treble (radio)
ENT ····· Select the desired track (CD/MP3)

6 1 ····· Preset memory button 1
REW ····· Fast rewind (CD)

7 2 ····· Preset memory button 2
FF ····· Fast forward (CD)

8 3 ····· Preset memory button 3
SCR ····· Scroll button (CD-MP3)

9 4 ····· Preset memory button 4
RDM ····· CD random playback on/off

10 5 ····· Preset memory button 5
RPT ····· CD repeat track on/off

11 6 ····· Preset memory button 6
MARK ····· Long press : MP3 file memory/deletion
Short press : Memory file playback

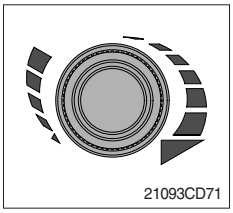
12 CD/AUX ····· CD playback button
Press to CD insert

13 ⏏ ····· Disc eject (CD)

14 ····· CD indicator lamp

■ RADIO

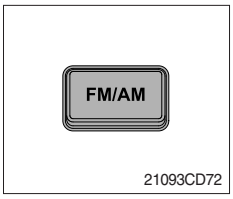
(1) Power and volume switch



① **Power ON/OFF**
This switch is used to turn the audio ON or OFF.

② **Volume**
This switch turned to right or left, the sound is increased or decreased.

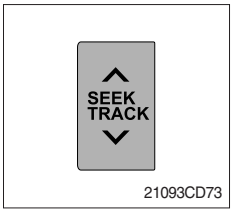
(2) FM/AM button



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

② The bands are changed in the following order.
FM1 → FM2 → AM → FM1

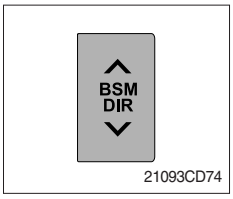
(3) Seek button



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

② Press ^ to turn a station of a higher frequency or v to a lower frequency.

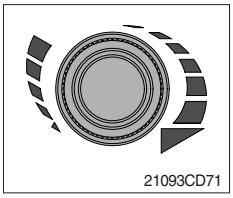
(4) BSM (best station memory) button



① You can automatically memory 6 strongest FM stations on the FM BSM band or 6 strongest AM stations on the AM BSM band.

- Press BSM to active best station memory.
- The set gives a beep and then mutes.
- When it has finished, you heard a beep followed by the station memoried on preset 1.
- Sometimes it may not be possible to find 6 stations.

(5) Manual tuning/audio mode button

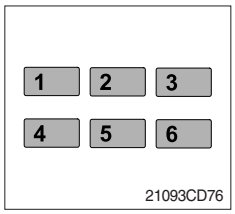


① It is possible to change manual tuning while broadcasting.
- Turned to right or left, the frequency is increased or decreased.

② **Audio mode** (Bass/Middle/Treble)
- Press this button to select desired audio mode.
- Adjust the settings with the volume button right/left.
  - BASS : Press the button once
  - MIDDLE : Press the button twice
  - TREBLE : Press the button three times

③ If it is pressed four times, BALANCE will be selected.
- Turned to clockwise, the LH speaker volume is decreased and counterclockwise, the RH speaker volume is decreased.

(6) Preset memory button



① Manually storing stations in a preset

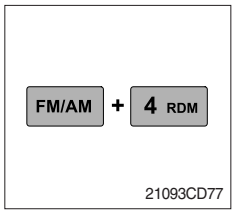
Six stations per band can be stored and recalled using the preset keys (1 to 6).

- Tune in to the desired station.
- Press the desired preset key (1 to 6) for more than 0.8 seconds to store the current tuned station.

② Recalling a preset

Press the desired preset key (1 to 6) to recall the stored station.

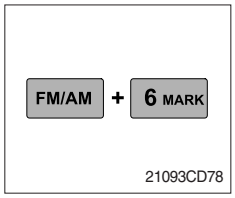
(7) Frequency band setting



① America : Press FM/AM and 4 RDM button at the same time. "nA" will be displayed on the LCD for one second.

AM : Frequency changes in 10kHz between 530 to 1710kHz.

FM : Frequency changes in 0.2MHz between 87.7 to 107.9MHz.

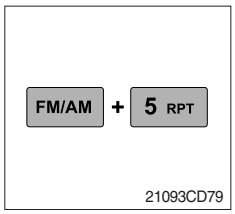


① EUROPE : Press FM/AM and 6 MARK button at the same time. "Eu" will be displayed on the LCD for one second.

LW : Frequency changes in 9kHz between 153 to 279kHz.

MW : Frequency changes in 9kHz between 531 to 1620kHz.

FM : Frequency changes in 0.05MHz between 87.5 to 108.0MHz.



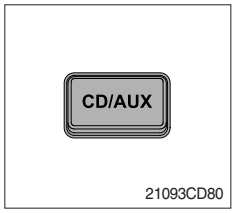
① General : Press FM/AM and 5 RPT button at the same time. "inT" will be displayed on the LCD for one second.

AM : Frequency changes in 9kHz between 531 to 1602kHz.

FM : Frequency changes in 0.1MHz between 87.5 to 108.0MHz.

■ CD/MP3 PLAYER

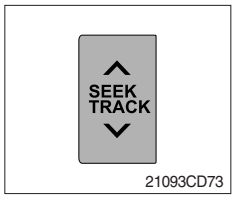
(1) CD playback button



① It is possible to change CD playback during broadcasting.

② If there was no CD on audio, "NO DISC" displays on LCD during 5 seconds.

(2) Track button



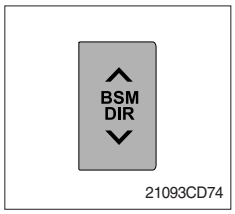
① CD player

- Short press : Select the next/previous track
- Long press : Select the fast forward or rewind

② MP3 player

- Memory file search up/down

(3) DiR mode button (MP3)

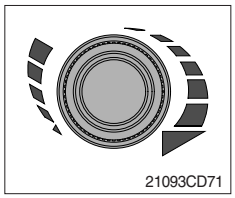


① You can find the desired mp3 folder up/down.

② If you find desired folder, press the file search button to playback the first file in the folder.

※ **If a file is not selected until 5 seconds after search folder, the function will be terminated.**

(4) File search button

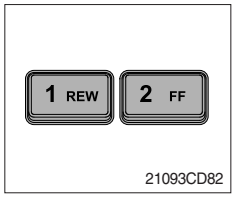


① It is possible to search the desired CD track or mp3 file.

- Turned to clockwise, the CD track or mp3 file number is increased.
  If it is turned to counterclockwise, CD track or mp3 file number is decreased.

※ **If a file or track is not selected until 5 seconds, function will be terminated.**

(5) Fast rewind/Fast forward button (CD)

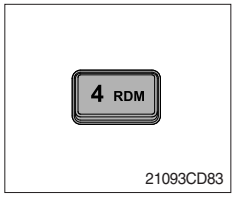


① Continually press these button to quickly move rewind or forward through the disc.

※ **The CD player sound level is lower while press this button.**

② Normal playback resumes when you release the button.

(6) Random track button (CD)

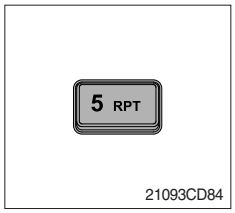


① Press this button to activate random track playback.

※ **The LCD displays "RDM".**

② It is canceled press one more this button.

(7) Repeat track button (CD)

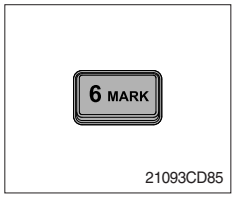


① Press this button to activate repeat current track playback.

※ **The LCD displays "RPT".**

② It is canceled press one more this button.

(8) Mark button (MP3)



① Memory

· Press over 0.8 second, the current file memorized with a beep (max 100 tune memory).

※ **The LCD displays "M" and "Marked number" for 3 seconds.**

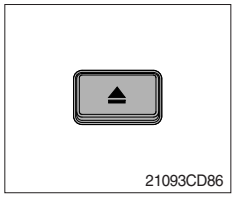
② Memory file playback

· Press within 0.8 second, the marked file playback.

③ Deletion

· Press over 0.8 second, the marked file will be deleted with a beep.

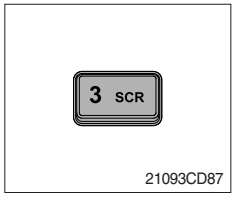
(9) CD EJECT BUTTON



① Press this button to eject the disc.

※ **If there is no disc in the audio, the LCD displays "NO disc" for 5 seconds.**

(10) SCR BUTTON (MP3)



① This button to confirm the long file name on LCD.

RADIO AND USB / MP3 PLAYER

: MACHINE SERIAL NO.: ROBEX 480LC-9 #0039-#0240, ROBEX 520LC-9 #0039-#0207

75793CD62

■ FRONT PANEL PRESENTATION

1 [SEL] ····· Sound function selection button (audio selection)

2 ····· Power and volume button

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

4 ····· UP / DOWN tuning button

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

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

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

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

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

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

11 ····· Aux function

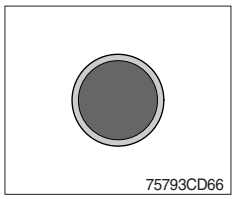
12 [BSM] ····· Preset scan (PS)
Best station memory (BSM)

13 [MUTE] ····· Audio mute button

14 [AM/FM] ····· AM / FM button (radio)

■ GENERAL

(1) Power and volume button



① Power ON/OFF button

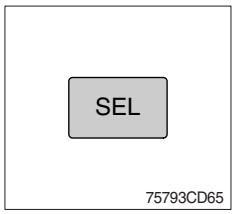
Press power button to turn the unit ON or OFF shortly.

When the power is ON, the previous mode (last memory) will appear.

② Volume up / down control

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

(2) Sound function selection button (audio selection)



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

BASS → TREBLE → BAL → BEEP → LOUD → VOLUME

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

② Bass control

To adjust the bass level, first select the bass mode by pressing the select button SEL until BASS indication appears on the LCD display. Within 5 seconds of choosing the bass mode, turn power button right / left to adjust the bass level as desired.

The bass level will be shown on the LCD display from a minimum of BASS –10 to a maximum of BASS +10.

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

③ Treble control

To adjust the treble level, first select the treble mode by pressing the select button SEL until TREBLE indication appears on the LCD display. Within 5 seconds of choosing the treble mode, turn power button right / left to adjust the treble level as desired.

The treble level will be shown on the LCD display from a minimum of TREBLE -10 to a maximum of TREBLE +10.

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

④ Balance control

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

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

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

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

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

⑤ Beep control

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

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

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

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

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

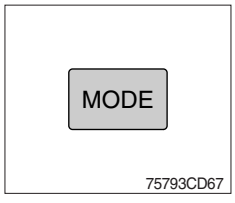
⑥ Loud control

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

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

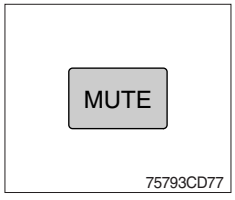
To select the loudness feature, press select button SEL until LOUD ON or LOUD OFF is displayed, then turn power button left or right to activate or deactivate loudness.

(3) Mode button



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

(4) Audio mute button

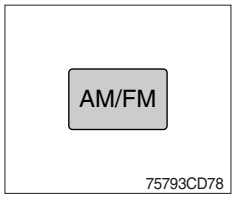


① Press mute button momentarily to mute volume and MUTE mark will blink on the LCD display.

Press the button again to return to the mode in use before the mute mode was activated.

■ RADIO

(1) AM / FM / LW band selector

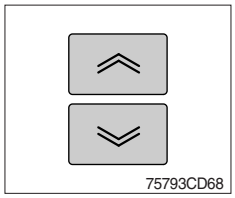


① Each time this button is pressed, the radio button is changed.
Each time this button is pressed, LCD displays each band as follows :

FM1 → FM2 → FM3 → AM → LW

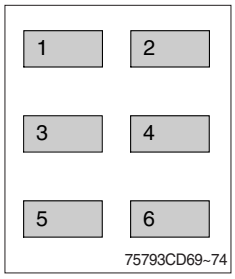
※ LW band is only available for Europe.

(2) Up / down tuning



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

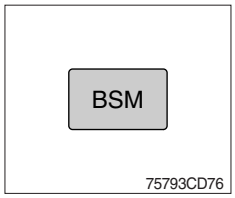
(3) Station pre-set button



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

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

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



① **Pre-set scan (PS)**

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

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

② **Best station memory (BSM)**

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

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

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

■ USB PLAYER

(1) USB function

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

· **Use of USB socket**

① Connect a USB device, which saves mp3 files, to USB socket in the cabin.

② If a USB device has not been connected, MP3 files are automatically played when you insert it into the USB port.

③ If a USB device has connected, MP3 files are played when you press mode for USB.

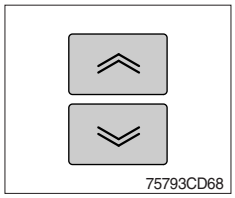
· **Use of USB/AUX cable** (option)

① Connect the USB/AUX cable to the player in order to play MP3 files in a USB device.

② If a USB device has not been connected, MP3 files are automatically played when you insert it into the cable.

③ If a USB device has connected, MP3 files are played when you press mode for USB.

(2) File selection & cue / review button



① File selection function

This button is used to select file up / down. Each time the forward file select ⩓ is pressed, file number is increased.

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

② Cue / review functions

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

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

(3) MP3 directory / file searching

① The power button is used to select a particular directory and file.

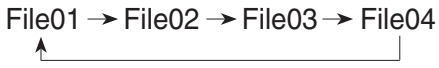
Press and hold for more than 3 seconds while playing MP3 file.

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

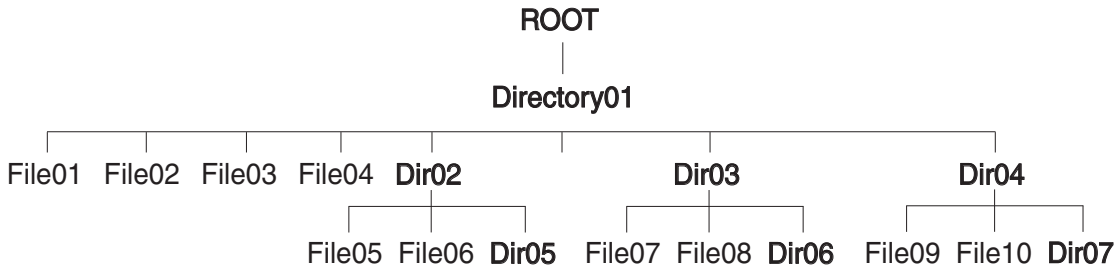
For example, the directory search generally changes in two methods depending on the order of writing as follows.

- Method 1 : ROOT→Dir01→Dir02→Dir03→Dir04→Dir05→Dir06→Dir07
- Method 2 : ROOT→Dir01→Dir02→Dir05→Dir03→Dir06→Dir04→Dir07

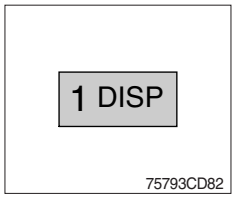
If you want to search the file in the located directory, turn right / left the power button consecutively. Press the button when you find the wanted file. The unit will then play the selected file. For instance, the file search changes in Dir01 as follows.



※ MP3 direction / file configuration

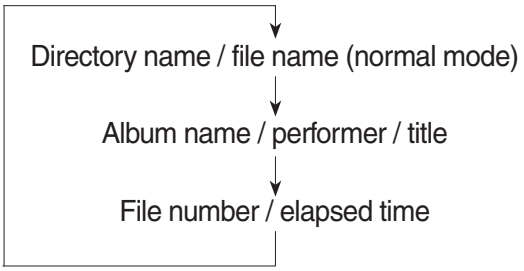


(4) ID3 v2 display

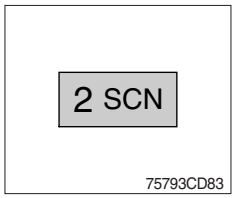


① Disp button is used to change the display information.
While playing an MP3 file, you can change the file information shown on the LCD display.
Each time you press DISP (display), the display changes to show the following.

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



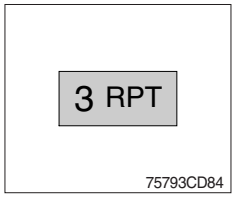
(5) File scan (SCN)



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

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

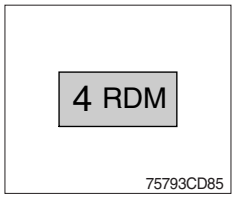
(6) Repeat play selector (RPT)



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

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

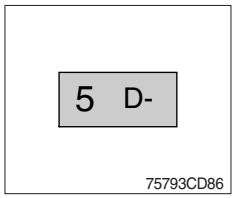
(7) Random play selector (RDM)



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

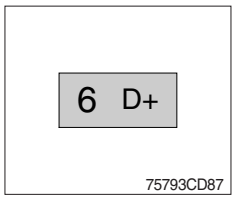
※ In case of MP3 file, when the random button is pressed and held longer than 2 seconds, the RDM mark will blink on the LCD display and play all files in directory randomly until the directory random mode is cancelled by pressing the random button again or by activating the scan or repeat functions (RDM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

(8) Directory down



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

(9) Directory up



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

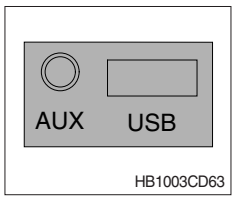
※ If the MP3 file does not have a directory, the unit play MP3 at 10-file intervals.

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

■ AUX PLAYER

(1) Aux function

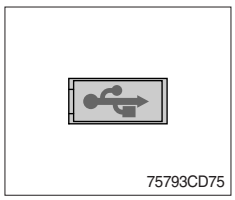
· **Use of USB socket**



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

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

· **Use of USB/AUX cable** (option)



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

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

RADIO AND USB PLAYER (WITH BLUETOOTH)

: MACHINE SERIAL NO.: ROBEX 480LC-9 #0241-, ROBEX 520LC-9 #0208-

9403CD100

■ FRONT PANEL PRESENTATION

1 ····· Power ON/OFF, Volume UP/DOWN button

2 ····· Manual UP/DOWN Tuning, File search, SEL button

3 ····· Mode button, Audio mute button

4 ····· Call & Pair button

5 ····· Call end button

6 ····· Station preset 1
DIS ····· Display button

7 ····· Station preset 2

8 ····· Station preset 3
RPT ····· Repeat play button

9 ····· Station preset 4
RDM ····· Random play button

10 ····· Station preset 5
DIR- ····· Directory down button

11 ····· Station preset 6
DIR+ ····· Directory up button

12 ····· Scan play button (SCAN)
Best station memory (BSM) button

13 ····· Auto tune up, Seek up button

14 ····· Auto tune down, Track down button

15 ····· USB connector

16 ····· AUX IN Jack

17 ····· MIC hole

RADIO AND USB PLAYER (WITHOUT BLUETOOTH)

: MACHINE SERIAL NO.: ROBEX 480LC-9 #0241-, ROBEX 520LC-9 #0208-

9403CD101

■ FRONT PANEL PRESENTATION

1 ····· Power ON/OFF, Volume UP/DOWN button

2 ····· Manual UP/DOWN Tuning, File search, SEL button

3 ····· Mode button, Audio mute button

4 ····· Radio seek up button

5 ····· Radio seek down button

6 ····· Station preset 1

DIS ····· Display button

7 ····· Station preset 2

8 ····· Station preset 3

RPT ····· Repeat play button

9 ····· Station preset 4

RDM ····· Random play button

10 ····· Station preset 5

DIR- ····· Directory down button

11 ····· Station preset 6

DIR+ ····· Directory up button

12 ····· Scan play button (SCAN)

Best station memory (BSM) button

13 ····· Track up button

14 ····· Track down button

15 ····· USB connector

16 ····· AUX IN Jack

■ GENERAL

(1) Power and volume button

① Power ON / OFF button

Press power button (1) to turn the unit on or off.

② Volume UP/DOWN control knob

Turn VOL knob (1) right to increase the volume level.
Turn VOL knob (1) left to decrease the volume.
After 5 seconds the display will return to the previous display mode.

③ Initial volume level set up

I-VOL is the volume level the unit will play at when next turned on. To adjust the I-VOL level, press and hold VOL button (1) for longer than 2 seconds. The current volume level displays on the display panel.
Then turn button (1) right or left to set the volume level as the I-VOL level.

④ Clock ON/OFF control

The CLOCK was default at off status. To turn CLOCK ON, press and hold VOL button (1) for longer than 2 seconds to display I-VOL, then short press VOL again, turn VOL knob while CLOCK OFF display, then the CLOCK ON will be displayed.

※ **Due to time tolerance, the clock display on the Audio unit might have little difference.**

⑤ Clock adjustment

With CLOCK ON selected, press VOL knob again after CLOCK ON display, the hour will blink, turn VOL knob right or left to adjust hour.
Simply press VOL again, the minute will blink, turn VOL knob to adjust minute. Then press VOL again to confirm the clock once finished.

(2) Menu Selection

① This button can adjust the sound effect and other things.
Each time you press this button (2), LCD displays as follows :

BAS → TREB → BAL L=R → FAD F=R → EQ → LOUD ON → BEEP 2ND

On each setting, the level can be controlled by turning TUNE knob (2). When the last adjustment is made, after 5 seconds, the display will automatically return to the previous display mode.

② Bass control

To adjust the bass tone level, first select the bass mode by pressing SEL button (2) repeatedly until BASS appears on the display panel. Then turn knob (2) right or left within 5 seconds to adjust the bass level as desired. The bass level will be shown on the display panel from a minimum of BASS-7 to a maximum of BASS+7.

③ Treble control

To adjust the treble tone level, first select the treble mode by pressing SEL button (2) repeatedly until TREB appears on the display panel. Then turn knob (2) right or left within 5 seconds to adjust the treble level as desired. The treble level will be shown on the display panel from a minimum of TREB -7 to a maximum of TREB +7.

④ Balance control

To adjust the left-right speaker balance, first select the balance mode by pressing SEL button (2) repeatedly until BAL indication appears on the display panel. Then turn knob (2) right or left within 5 seconds to adjust the balance as desired. The balance position will be shown by the bars on the display panel from BAL 10R (full right) to BAL 10L (full left).

⑤ Fader control

To adjust the front-rear speaker balance, first select the fader mode by pressing SEL button (2) repeatedly until FADER indication appears on the display panel. Then turn knob (2) right or left within 5 seconds to adjust the front-rear speaker level as desired. The fader position will be shown by the bars on the display panel from FAD 10F (full front) to FAD 10R (full rear).

⑥ EQ control

You can select an equalizer curve for 4 music types (CLASSIC, POP, ROCK, JAZZ). Press button (2) until EQ is displayed, then turn knob (2) right or left to select the desired equalizer curve. Each time you turn the knob, LCD displays as follows :

EQ OFF → CLASSIC → POP → ROCK → JAZZ

※ **When the EQ mode is activated, the BASS and TREBLE modes are not displayed.**

⑦ Loud control

When listening to music at low volume levels, this feature will boost the bass and treble response. This action will compensate for the reduction in bass and treble performance experienced at low volume.

To select the loudness feature, press button (2) until LOUD is displayed, then turn knob (2) right or left to activate or deactivate loudness.

⑧ Beep control

To adjust the BEEP mode, first select the BEEP mode by pressing button (2) repeatedly until BEEP indication appears on the display panel. Then turn knob (2) left or right within 5 seconds to select BEEP 2ND, BEEP OFF or BEEP ON.

- BEEP 2ND : You will only hear the beep sound when the buttons are held down for more than 2 seconds.
- BEEP OFF : You can not hear the sound beep when you press the buttons.
- BEEP ON : You can hear the beep sound each time you press the buttons.

(3) Mute control

① Press and hold MUTE button (3) for over 2 seconds to mute sound output and MUTE ON will blink on the LCD. Press the button again to cancel MUTE function and resume to normal playing mode.

(4) Mode selection

① Repeat press MODE button (3) to switch between FM1, FM2, AM, USB, AUX, BT MUSIC.

※ If there is no USB, AUX, Bluetooth Phone connected, it would not display USB, AUX, BT when you press button (3).

■ RADIO

(1) Mode button

① Repeat press MODE button to select FM1, FM2 or AM.

(2) Manual tuning button

① To manually tune to a radio station, simply turn encoder TUNE (2) left or right to increase or decrease the radio frequency.

(3) Auto tuning button

① To automatically select a radio station, simply press Seek up or Track down button.

(4) Station preset button

① In radio mode, pressing buttons (6) to (11) will recall the radio stations that are memorized. To store desired stations into any of the 6 preset memories, in either the AM or FM bands, use the following procedure :

a. Select the desired station.
b. Press and hold one of the preset buttons for more than 2 seconds to store the current station into preset memory. Six stations can be memorized on each of FM1, FM2, and AM.

(5) Preset scan (PS) / Best station memory (BSM) button

① Press BSM button (12) momentarily to scan the 6 preset stations stored in the selected band. When you hear your desired station, press it again to listen to it.
Press BSM button (12) for longer than 2 seconds to activate the Best Station Memory feature which will automatically scan and enter each station into memory.

※ **If you have already set the preset memories to your favorite stations, activating the BSM tuning feature will erase those stations and enter into the new ones. This BSM feature is most useful when travelling in a new area where you are not familiar with the local stations.**

■ USB PLAYER

(1) USB playback


9403CD110

① The unit was equipped with a front USB jack and also a rear USB Jack.
With a USB device plugged in the front USB jack, it will be detected as front USB mode. And with a USB device plugged in the rear USB jack, it will be detected as rear USB. To get to a USB mode, press MODE (3) button momentarily or insert the USB device in front or rear USB jack.

※ **If no mp3 or wma files in USB device, it will convert to the previous mode after display NO FILE.**

(2) Track Up / Down button

9403CD106

① Press SEEK up (13) or TRACK down (14) to select the next or previous track. Press and hold the buttons to advance the track rapidly in the forward or backward direction.

9403CD107

(3) MP3 directory / File searching

9403CD111

① Button (2) is used to select a particular directory and file in the device. Turn button (2) right or left to display the available directories. Press button (2) momentarily when the desired directory is displayed, then turn button (2) right or left again to display the tracks in that directory. Press button (2) to begin playback when the desired file is displayed.

(4) Directory Up / Down button

9403CD112

① During MP3/WMA playback, simply press DIR- button (10) to select the previous directory (if available in the device); simply press DIR+ button (11) to select the next directory (if available in the device).

※ **If the USB device does not contain directories, it would play MP3/WMA tracks at 10- file when you press DIR- button (10), and play MP3/WMA tracks at 10+ file when you press DIR+ (11) button.**

(5) Track Scan Play (SCAN) button

- SCAN playback : Simply press SCAN (12) button to play the first 10 seconds of each track.
- SCAN folder : Press and hold SCAN button for longer than 2 seconds to scan play the tracks in current folder.
- SCAN off : Simply press it again to cancel SCAN feature.

(6) Track Repeat Play (RPT) button

- REPEAT playback : Simply press RPT (8) button to play current track repeatedly.
- REPEAT folder : Press and hold RPT for longer than 2 seconds to repeat play the tracks in current folder.
- REPEAT off : Simply press it again to cancel REPEAT feature.

(7) Track Random Play (RDM) button

- RANDOM playback : Simply press RDM (9) button to play the tracks in the device in a random sequence.
- RANDOM folder : Press and hold RDM button for longer than 2 seconds to random play the tracks in current folder.
- RANDOM off : Simply press it again to cancel RANDOM feature.

(8) ID3 v2 (DISP)

① While a MP3 file is playing, press DISP button (6) to display ID3 information. Repeat push DISP button (6) to show directory name / file name and album name / performer / title.

※ **If the MP3 disc does not have any ID3 information, it will show NO ID3.**

* USB Information and Notice
  a. Playback FILE SYSTEM and condition allowance.
     - FAT, FAT12, FAT16 and FAT32 in the file system.
     - V1.1, V2.2 and V2.3 in the TAG (ID3) version.
  b. Display up to 32 characters in the LCD display.
  c. No support any of MULTI-CAED Reader.
  d. No high speed playback but only playing with normal full speed.

※ **DRM files in the USB may cause malfunction to playback in the radio unit.**

※ **The temperature below -10 Celsius, the audio unit with USB hook up would be affected to play well.**

■ AUX OPERATION

It is possible to connect your portable media player to the audio system for playback of the audio tracks via the cab speakers.

To get the best results when connecting the portable media to the audio system, follow these steps :

- Use a 3.5 mm stereo plug cable to connect the media player headphone socket at each end as follows.
- Adjust the portable media player to approximately 3/4 volume and start playback.
- Press the MODE button (3) on the audio unit to change into AUX mode.
- The volume and tone can now be adjusted on the audio unit to the desired level.

※ The audio quality of your media player and the audio tracks on it may not be of the same sound quality as the audio system is CD Player.

※ If the sound of the media player is too low compared with the radio or CD, increase the volume of the player.

※ If the sound of the media player is too loud and/or distorted, decrease the volume of the player.

※ When in AUX mode, only the Volume, Bass, Treble, EQ and Mode functions of the audio unit can be used.

■ **BLUETOOTH** (if equipped)

1) Using a bluetooth wireless connection

(1) Your audio unit supports bluetooth wireless technology. You can set up a wireless link with bluetooth cellular phone.

(2) Keep PAIRING the cellular phone with audio unit in a few minutes as the phone are being switched on well enough.

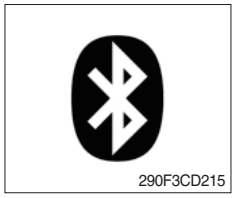
※ **Since this audio unit is on standby to connect with your cellular phone via bluetooth wireless technology, using this audio unit without running the engine can result battery drainage.**

※ **This audio unit phone call reception is on standby when ignition switch is set to ACC OFF or ON.**

※ **The line-of-sight distance between this audio unit and your cellular phone must be 10 meters or less for sending and receiving voice and data via bluetooth wireless technology. However the transmission distance may become shorter than the estimated distance depending on the environment in use.**

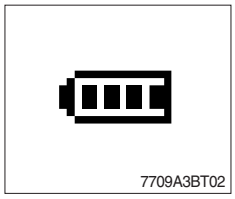
※ **Digital Noise & Echo suppression system provides the best sound clarity with little or no distortion (Echo & side tone will happen depending on cellular phone or service network).**

※ **To ensure the quality of calling, you should select a proper bluetooth VR level. This audio unit has already set with the best bluetooth VR level.**



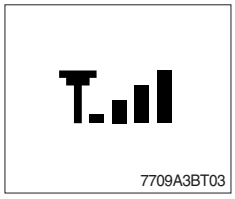
① Bluetooth icon

It will blink while establishing the bluetooth pairing.
It will light after a bluetooth device connected.



② Battery icon

It indicates the battery status of the connected bluetooth device.



③ Single strength icon

It indicates the signal strength of the connected bluetooth device.

2) Pairing in hands free modes

(1) Press and hold CALL button (4) for 2 seconds until you hear beep sound, then appears PAIR STR on the display.

(2) For the next procedure, go to cellular phone pairing mode.

(3) If it is in pairing status with audio unit and cellular phone, PAIRING will show on the display.

(4) If you want to exit pairing mode, press CALL END button (5) briefly while pairing, then it will show PAIR CLR on the display.

(5) Bluetooth Icon and PAIR OK appear on the display when pairing is successful.

3) Cellular phone pairing mode

(1) Browse your cellular phone menu and find the connectivity or bluetooth connection section.

(2) Select search for a new handsfree device function and allow the phone to find the mobile.

(3) HYUNDAI should appear on your cellular phone screen.

(4) Press connect menu among the handsfree option on your cellular phone.

(5) The cellular phone should prompt for a pin code. Insert the pin code 1234.

(6) The cellular phone should confirm that it has established a new paired connection.

(7) Close the menu. The pairing is now completed. It appears PAIR FAIL on the display for 3 seconds.

※ Each cellular phone type has distinct phone menu so you may need to refer to your manufactures instruction for the correct procedure on how to connect a new bluetooth device.

※ Please retry to the pairing instruction if HYUNDAI does not appear on the cellular phone screen.

※ Please select authorized, if there is authorized menu in the menu of bluetooth connection in your cellular phone.

※ Once the bluetooth pairing is completed between your cellular pone and this audio unit, the both units will be automatically recognized on its paring and when you turn on the key in your car even though this audio unit is turned off.

※ This audio unit can store up to 6 phones pairings. If the memory is full, the first stored paired phone will be deleted.

※ The connecting priority will be given to the last connected cellular phone.

※ If you want to change the connecting priority, try to connect this audio unit from the cellular phone.

4) Bluetooth connection and disconnection

(1) When established bluetooth connection between this audio unit and the cellular phone, bluetooth icon on the display appears and then the display shows HF/AV CONN when handsfree & AV profile connected.


9403CD118

(2) To disconnect bluetooth link
Press and hold CALL END button (4) for 2 seconds, it shows DIS CON and disappears bluetooth Icon on the display.


9403CD117

(3) To disconnect bluetooth link
Press CALL button (3) briefly, it blinks bluetooth Icon on the display while bluetooth is being connected. If the connection is completed, it appears bluetooth Icon on the display.

※ When your cellular phone battery is at low charge, the bluetooth connection may occasionally be lost. To maintain good connectivity ensure that your phone battery is adequately charged.

※ In case of failure of bluetooth pairing :
- Delete item in paired list on your phone.
- Reset both phone by power off/on and the audio unit by ACC off/on.

※ Connecting priority of handsfree profile is higher than headset profile.

※ The headset mode does not support caller ID, reject call and call Transfer.

5) Using the audio unit as a handsfree device

(1) When the audio unit is ringing, it shows CALL and follows with the phone number ********** on the display.


9403CD117/8

(2) To accept call
Press CALL button (4), it appears ANSWER CALL and follows TALKING on the display.

(3) To end call
To end call, press CALL END button (5), it appears REJECT on the display.

※ If reject call is activated in your phone, then your cellular phone does not support reject call function.

6) Audio transfer between the audio unit and phone

The audio transfer function is for switching the call from the audio unit to the cellular phone for private conversation.

(1) Press CALL button (4) briefly during conversation, it appears CALL TRANS on the display. To switch back to the audio unit, press button (4) briefly during private conversation, then it appears CALL TRANS on the display again.

※ **This function will be a cause of disconnection of bluetooth link in some nokia phones, but you do not worry just press button (4) during private conversation, then switch back to the audio unit automatically.**

※ **The quality of calling between cellular phone and audio unit is better than calling between one audio unit and another one.**

7) Last call number dialing

(1) Press CALL button (4) briefly, it appears CALL TO, then simply press CALL button once again, it would make the last call with phone number display on LCD.
If Reject call is activated in your phone, then your cellular phone does not support Reject Call function.

※ **If you are using SAMSUNG phone, then you may need to press once more send button. First press button shows phone contact list in your phone, then second press make the last call.**

8) To make a call by cellular phone

The audio transfer function is for switching the call from the audio unit to the cellular phone for private conversation.

(1) The audio unit activated automatically when you make a call by cellular phone.
(2) When you make a call processing by cellular phone, it shows CALLING on the display.
(3) When you receive a call, the phone number ******** appears on the display.

9) Using the audio unit as bluetooth music

The audio unit supports A2DP (Audio Advanced Distribution Profile) and AVRCP (Audio Video Remote Control Profile), and both profiles are available to listen music at the audio unit via cellular phone which is supporting the two profiles above.

(1) To play music, search the menu on your cellular phone as below :
i.e : Menu → File manager → Music → Option → Play via bluetooth.
It appears BT MP3 on the display.

(2) During BT MP3 playing, you could select the previous or next track by pressing SEEK up or TRACK down button on audio unit or operate via your cellular phone.

(3) To stop music, press button (5) briefly and it will automatically switch into the previous mode.

(4) To resume music playing, press the play button on your cellular phone.

※ This function maybe different depends on cellular phone. Please follow the cellular phone menu. Some kinds of phone need to pair once more for bluetooth MP3 connection.

※ This function will be caused to disconnect A2DP, AVRCP depends on cellular phone.

※ Information about songs (e.g.: the elapsed playing time, song title, song index, etc.) cannot be displayed on this audio unit.

■ RESET AND PRECAUTIONS

1) Reset function

Interfere noise or abnormal compressed files in the MP3 disc or USB instrument may cause extraordinary operation (or unit frozen/locking up). It's strongly recommended to use appropriate USB storage not cause any malfunction to the audio unit. In the unlikely event that the player fails to operate correctly, try out to reset unit by any of following two methods.

(1) press and hold 

simultaneously for about 5 seconds. (without Bluetooth)

Press and hold 


simultaneously for about 5 seconds. (with Bluetooth)

(2) Take out the fuse for the audio system in the vehicle once and then plug again.

※ It will be necessary to re-enter the radio preset memories as these will have been erased when the microprocessor was reset.
After resetting the player, ensure all functions are operation correctly.

2) Precautions

When the inside of the car is very cold and the player is used soon after switching on the heater, moisture may form on the disc or the optical parts of the player and proper playback may not be possible.

If moisture forms on the optical parts of the player, do not use the player for about one hour. The condensation will disappear naturally allowing normal operation.

(1) Operation voltage : 9~32 volts DC, negative

(2) Output power : 40 watts maximum (20 watts x 2 channels)

(3) Tuning range

Area	Band	Frequency range	Step
USA	FM	87.5~107.9 MHZ	200K
	AM	530~1710 KHZ	10K
EUROPE	FM	87.5~108.0 MHZ	50K
	AM	522~1620 KHZ	9K
ASIA	FM	87.5~108.0 MHZ	100K
	AM	531~1602 KHZ	9K
LATIN	FM	87.5~107.9 MHZ	100K
	AM	530~1710 KHZ	10K

- AREA Selection :
  - To select an area, press and hold related buttons at FM1 band for about 3 seconds.
  - USA Area: Press and hold mode + 1DIS buttons for 3 seconds
  - EUROPE Area: Press and hold mode + 2 buttons for 3 seconds
  - ASIA Area: Press and hold mode + 3RPT buttons for 3 seconds
  - LATIN Area: Press and hold mode + 4RDM buttons for 3 seconds.

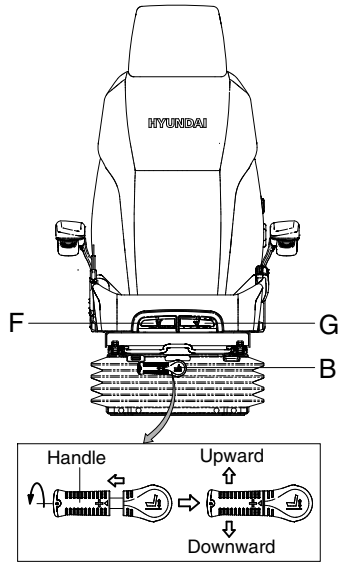
(4) USB version : USB 1.1

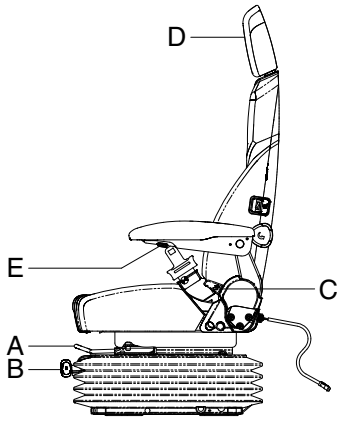
(5) Bluetooth version : V2.1

(6) Bluetooth supported profile :
- A2DP : Advanced Audio Distribution Profile
- AVRCP : Audio/Video Remote Control Profile
- HFP : Hands-Free Profile

5) 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.





21093CD55

(1) Forward/Backward adjustment (A)

① Pull lever A to adjust seat forward or backward.

② The seat can be moved forward and backward over 140 mm (5.5") in 13 steps.

(2) Height/weight adjustment (B)

① Turn the handle to adjust seat upward or downward

· Turn to clockwise, the seat is moved to upward and the weight is increased.
If it is turned to counterclockwise, the seat is moved to downward and the weight is decreased.

② **Method of changing direction** (up/down)

· First, pull the handle to outside.

· Second, rotate 180˚ and release the handle.

(3) Reclining adjustment (C)

Pull lever C to adjust seat back rest.

(4) Arm rest adjustment (E)

This can be adjusted by pushing the button E to right and left.

(5) Head rest adjustment (D)

This is adjustable vertically to fit operator's requirements over 60 mm (2.4").

(6) Seat cushion tilt adjustment (F)

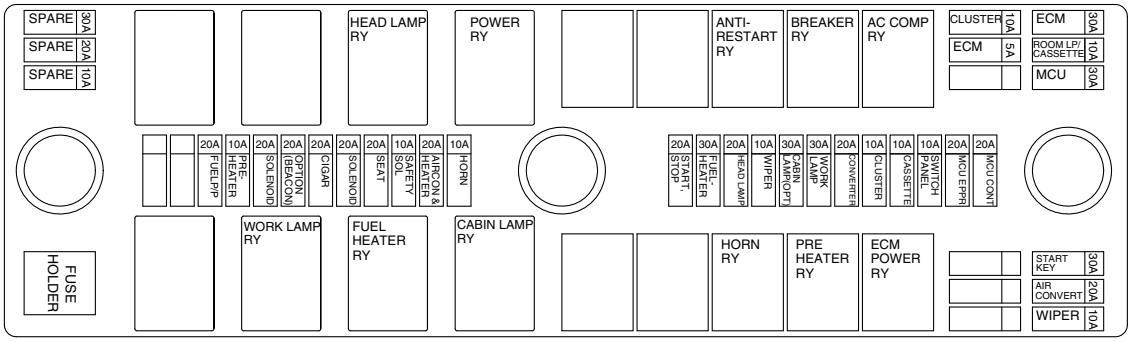
Pull lever F to adjust seat cushion tilting angle.

(7) Seat cushion length adjustment (G)

⚠ Pull lever G to adjust seat cushion forward or backward.

⚠ Always check the condition of the seat belt and mounting hardware before operating the machine. Replace the seat belt at least once every three years, regardless of appearance.

6) FUSE & RELAY BOX



21093CD56

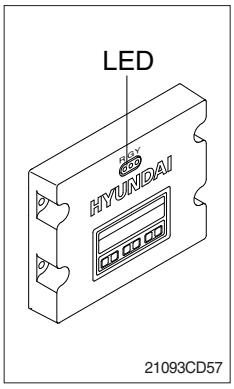
(1) The fuses protect the electrical parts and wiring from burning out.

(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.**

7) MCU



21093CD57

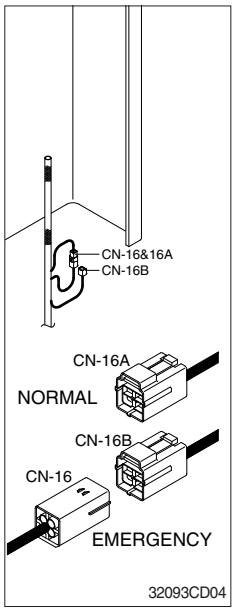
(1) To match the pump absorption torque with the engine torque, MCU varies EPPR valve output pressure, which control pump discharge amount whenever feedbacked engine speed drops under the reference rpm of each mode set.

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

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

G : green, R : red, Y : yellow

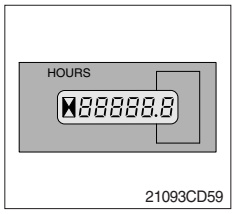
8) EMERGENCY ENGINE SPEED CONTROL CONNECTOR



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

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

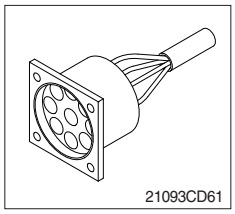
9) SERVICE METER



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

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

10) RS232 & J1939 SERVICE SOCKET



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

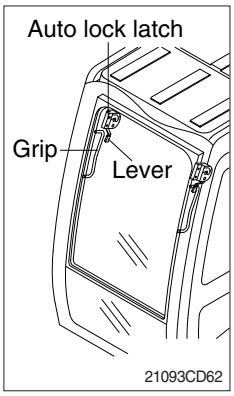
(2) ECM communicates the engine data with cummins INSITE adapter through J1939 service socket.

① ECM fault code check

② ECM program change

③ Engine data monitoring & test

11) UPPER WINDSHIELD

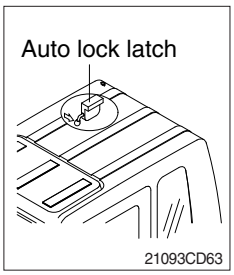


(1) Perform the following procedure in order to open the upper windshield.

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

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

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



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

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

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

1. SUGGESTION FOR NEW MACHINE

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

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

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

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

3) Be careful during the initial 100 hours operation

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

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

(3) Tighten bolts.

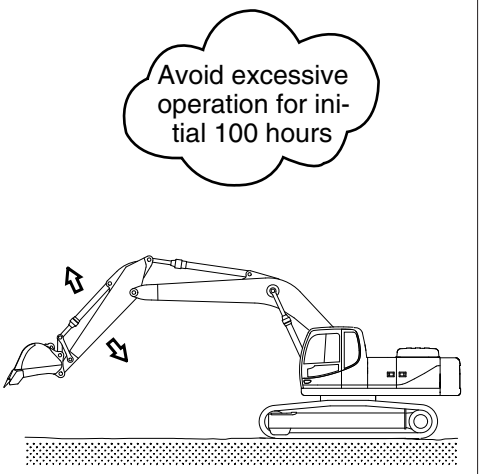
(4) Warm up the machine fully before operation.

(5) Check the gauges occasionally during the operation.

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

4) Replace followings after initial 250 hours of operation

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



38094OP01A

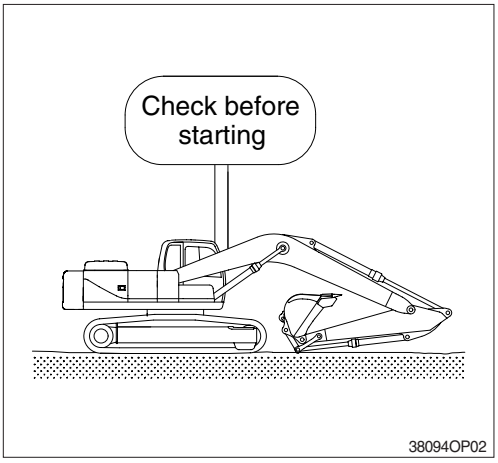
2. CHECK BEFORE STARTING THE ENGINE

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

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

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

3) Adjust the rear view mirror.



38094OP02

3. STARTING AND STOP THE ENGINE

1) CHECK INDICATOR LIGHTS

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

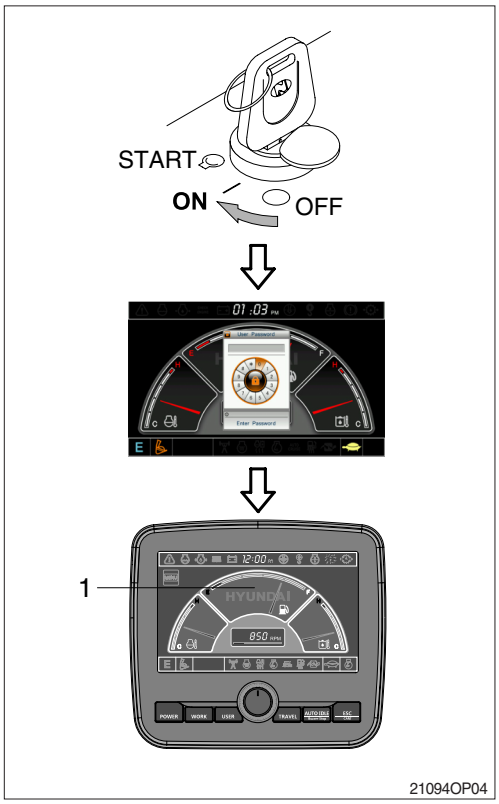
(2) Turn the starting switch to the ON position. Buzzer sounding for 4 seconds with HYUNDAI logo on cluster.

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

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

※ **Refer to page 3-17 for ESL mode.**

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



2) STARTING ENGINE IN NORMAL TEMPERATURE

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

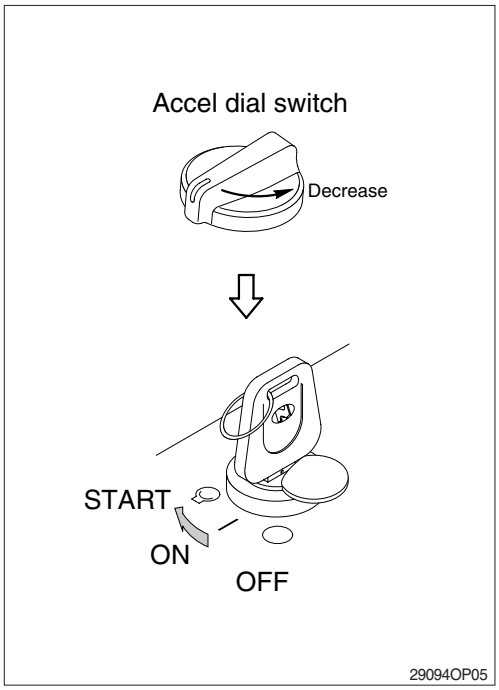
(1) Turn the accel dial switch to low idle position.

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

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

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

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



3) STARTING ENGINE IN COLD WEATHER

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

※ **Replace the engine oil and fuel referring to recommended oils at page 2-34.**

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

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

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

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

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

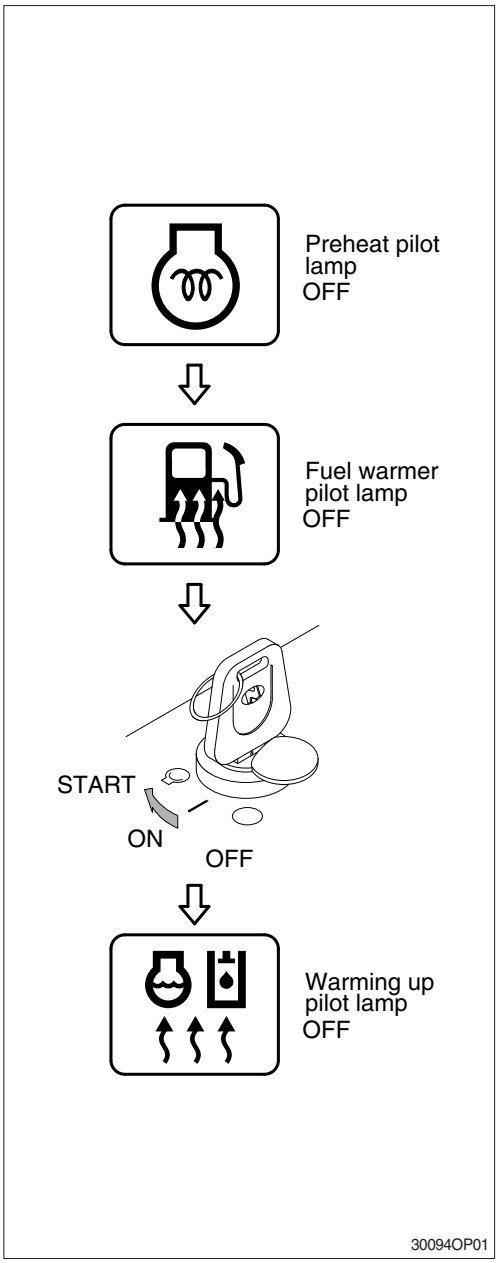
(4) Wait for five minutes to warm up the engine after the preheating pilot lamp off, and than turn the starting switch to the START position to start the engine.

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

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

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

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



4) INSPECTION AFTER ENGINE START

Inspect and confirm the following after engine starts.

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

(2) Are there leakages of oil or water?

(3) Are all the warning lamps turned OFF (1-9)?

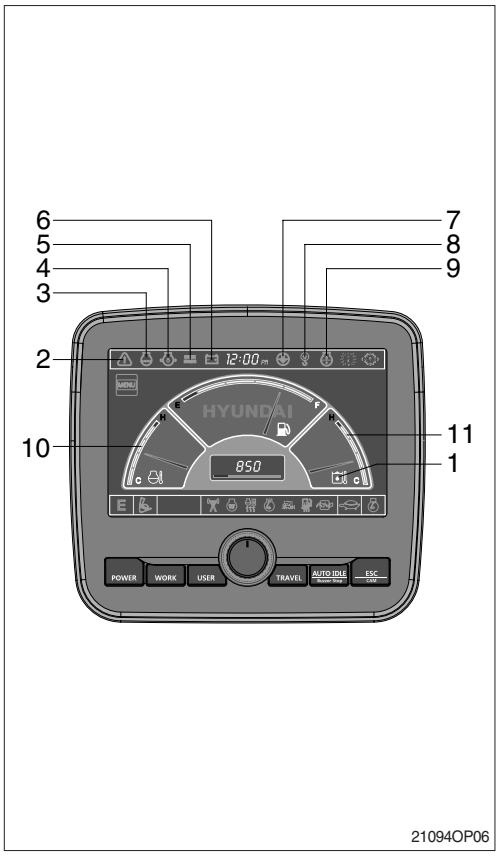
(4) Are the indicator of water temperature gauge (10) and hydraulic temperature gauge (11) in the operating range?

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

(6) Are the sound and vibration normal?

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

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



5) WARMING-UP OPERATION

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

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

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

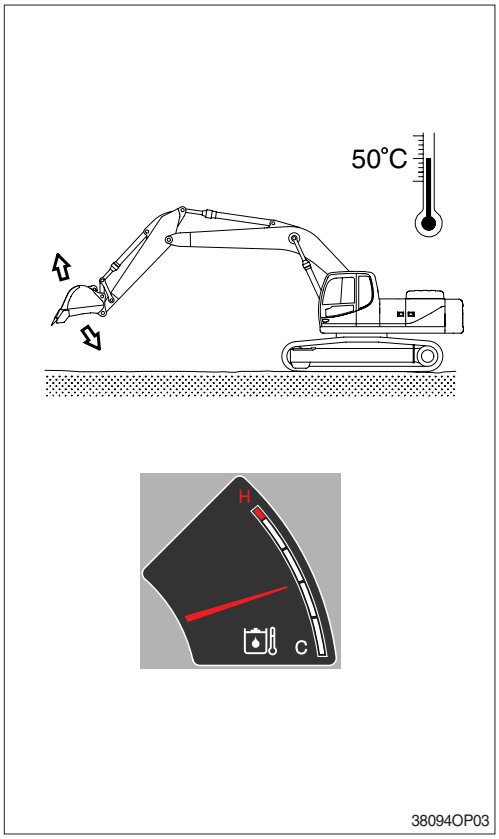
(3) Operate bucket lever for 5 minutes.

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

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

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

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



6) TO STOP THE ENGINE

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

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

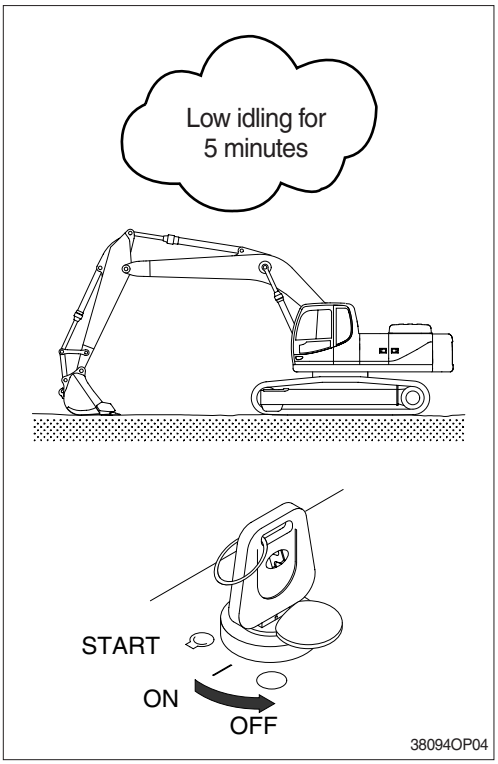
(1) Down the bucket on the ground then put all the levers in the neutral position.

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

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

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

(5) Lock the cab door.



4. MODE SELECTION SYSTEM

1) STRUCTURE OF MECHATRONICS SYSTEM

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

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

(1) Power mode

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

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

(2) Work mode

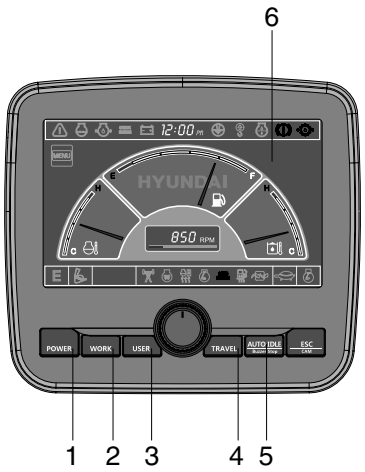
One of the two work modes can be selected for the optimal work condition of the machine operation.

① **General work mode (bucket)**

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

② **Work tool mode (breaker, crusher)**

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



21094OP10

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

(3) User mode

① User mode is useful for setting the user preperable power quickly.
(engine speed, power shift and idle speed)

② There are two methods for use of user mode.

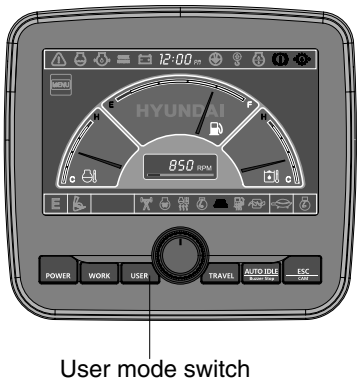
a. **In operation screen**

User mode switch is used to memorize the current machine operating status and activate the memorized user mode.
Refer to page 3-10.

b. **In menu**

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

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



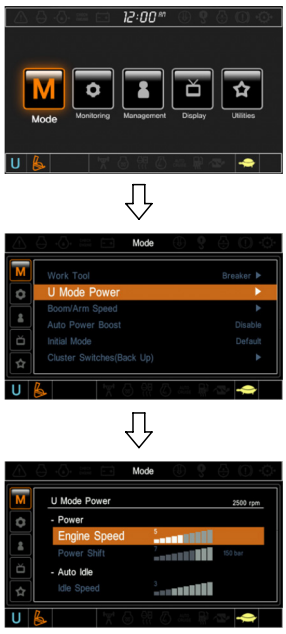
21094OP11

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

※ **Refer to the page 3-12 for setting the user mode (available on U mode only).**

· LCD segment vs parameter setting

Step (▮)	Engine speed (rpm)	Idle speed (rpm)	Power shift(bar)
1	1450	700	0
2	1500	750	3
3	1550	800	6
4	1600	850	9
5	1650	900	12
6	1700	One touch decel low idle (950)	16
7	1750	Auto decel rpm (1000)	20
8	1800	1050	26
9	1850	1100	32
10	1900	1150	38



21094OP12

(4) Travel mode

: Low speed traveling.

: High speed traveling.

(5) Auto idle mode

Pilot lamp ON : Auto idle function is activated.

Pilot lamp OFF : Auto idle function is canceled.

(6) Monitoring system

Information of machine performance as monitored by the MCU can be displayed on the LCD. Refer to the page 3-11.

(7) Self diagnostic system

① **MCU (Machine Control Unit)**

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

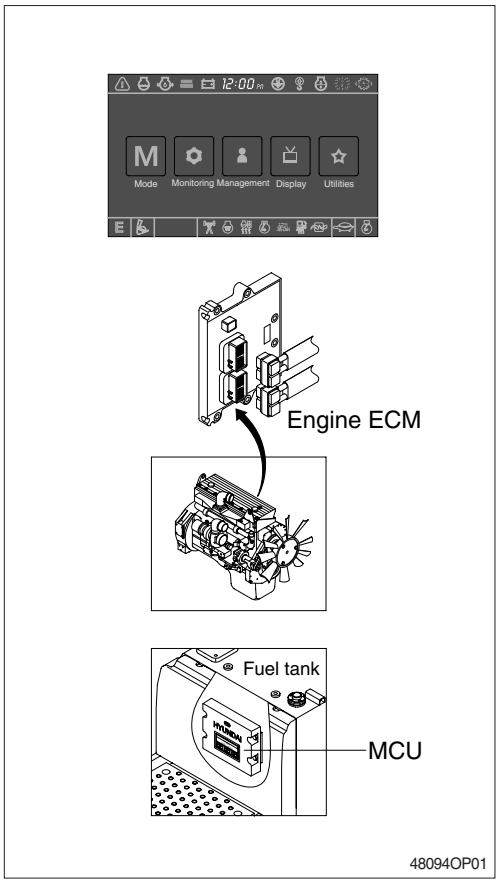
② **Engine ECM (Electronic Control Module)**

If the engine or relevant system has problem, engine ECM detects and displays on the LCD as fault codes (this code is composed of SPN and FMI).

※ **Refer to the page 3-11 for LCD display.**

(8) Anti-restart system

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



48094OP01

2) HOW TO OPERATE MODE SELECTION SYSTEM

(1) When start key switch is turned ON

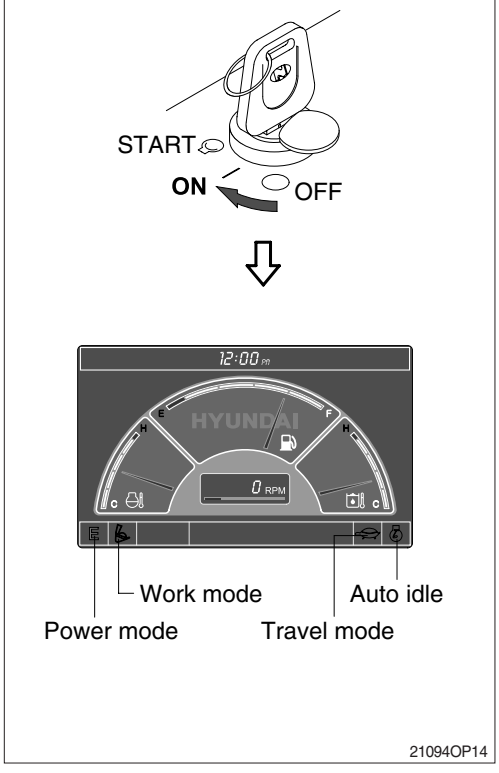
① When start key switch is turned on, the cluster turns on and buzzer sounds for 4 seconds. And then main information as gauges and engine speed are displayed on LCD.

② Initial default mode settings are displayed in the cluster.

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

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

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



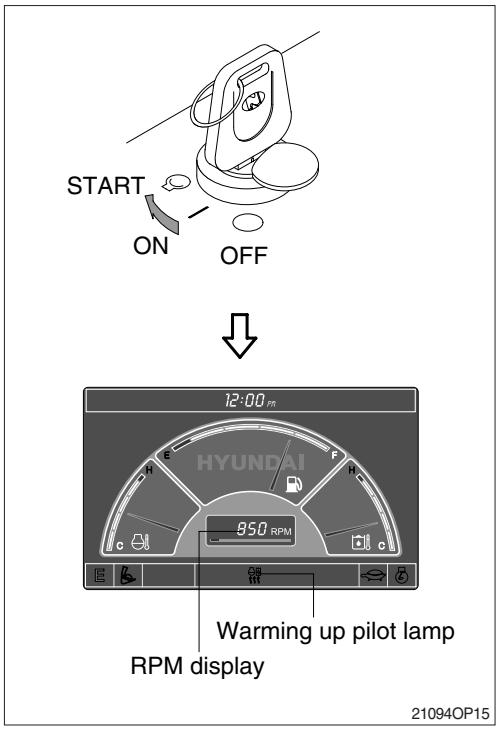
21094OP14

(2) After engine start

① When the engine is started, rpm display indicates low idle, 950±100 rpm.

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

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



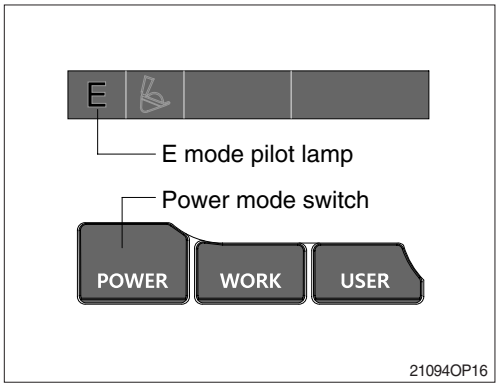
3) SELECTION OF POWER MODE

(1) E mode

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

Engine rpm	Effect
1650 ± 50	Variable power control in proportion to lever stroke (improvement in fuel efficiency) ※ Same power as S mode in full lever operation.

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

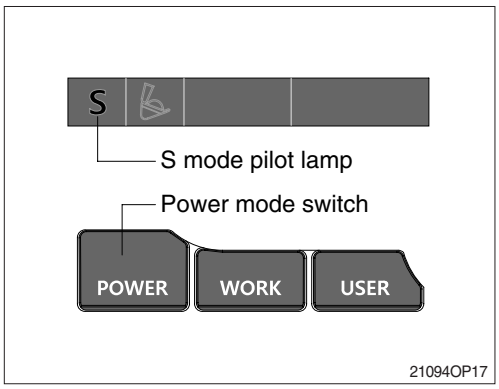


(2) S mode

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

Engine rpm	Effect
1750 ± 50	Standard power

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

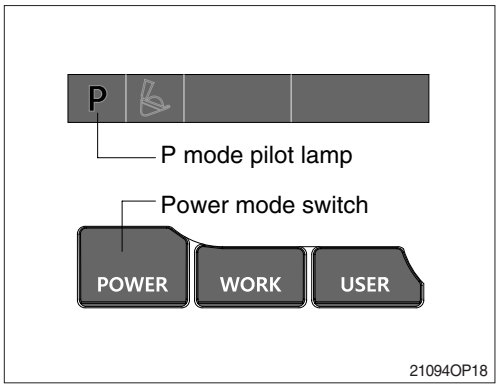


(3) P mode

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

Engine rpm	Effect
1750 ± 50	Approximately 120 % of power and speed available than S mode.

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



5. OPERATION OF THE WORKING DEVICE

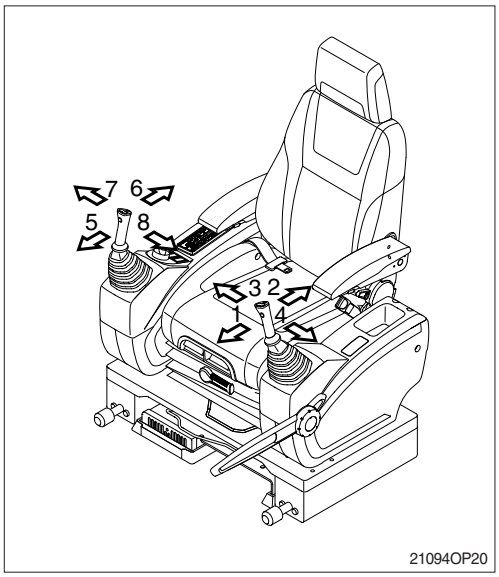
※ **Confirm the operation of control lever and working device.**

1) Left control lever controls arm and swing.

2) Right control lever controls boom and bucket.

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

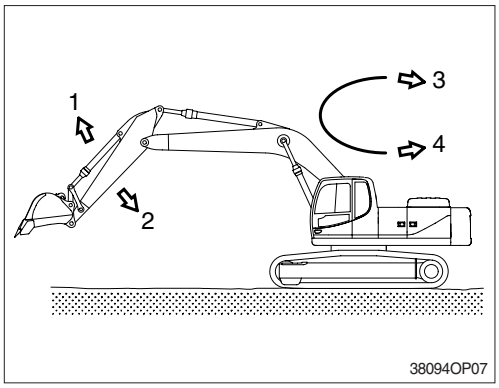
※ **When operating swing, consider the swing distance by inertia.**



21094OP20

※ **Left control lever**

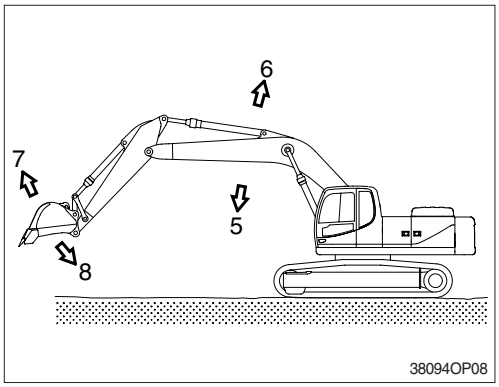
1 Arm roll-out
2 Arm roll-in
3 Swing right
4 Swing left



38094OP07

※ **Right control lever**

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



38094OP08

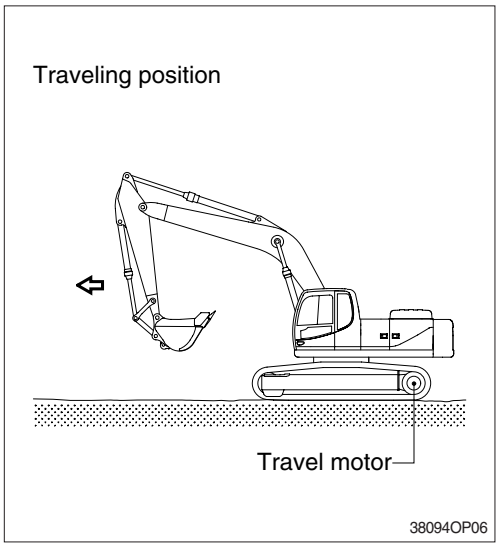
6. TRAVELING OF THE MACHINE

1) BASIC OPERATION

(1) Traveling position

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

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



(2) Traveling operation

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

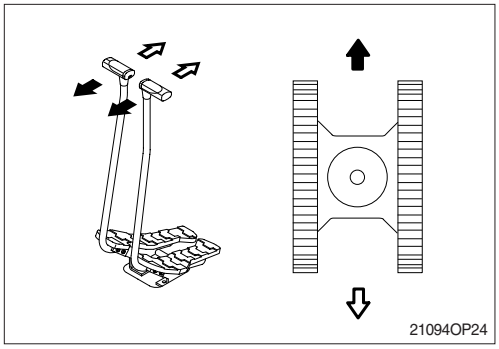
※ **Do not travel continuously for a long time.**

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

(3) Forward and backward traveling

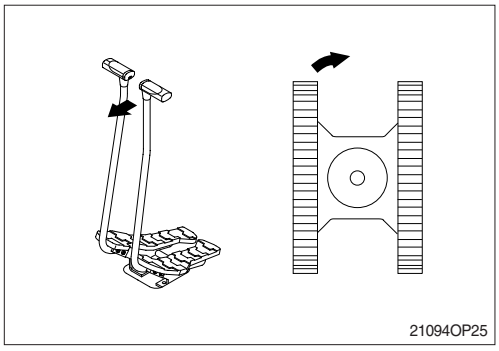
When the left and right travel lever or pedal are pushed at the same time, the machine will travel forward or backward.

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



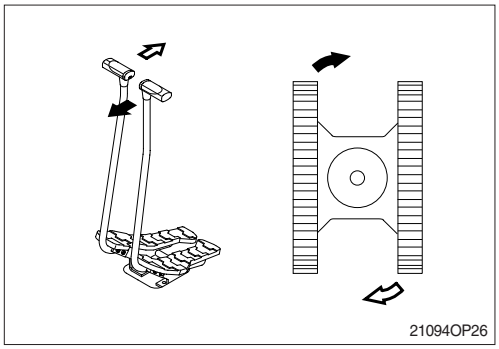
(4) Pivot turning

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



(5) Counter rotation

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



2) TRAVELING ON A SLOPE

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

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

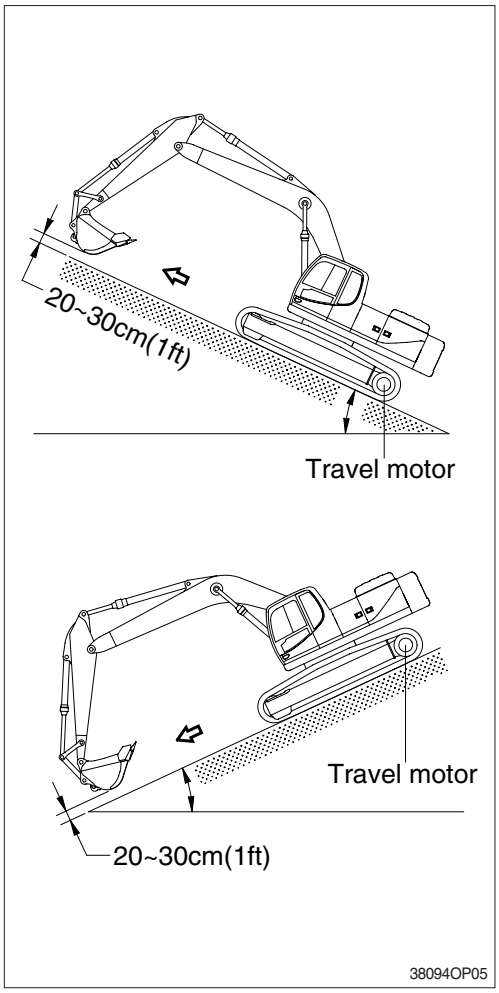
(3) If the machine starts to slide or loses stability, lower the bucket immediately and brake the machine.

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

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

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

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



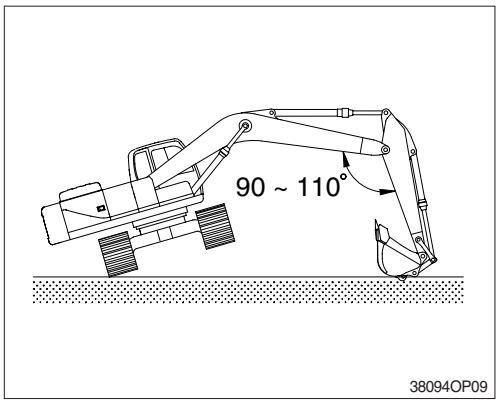
3) TRAVELING ON SOFT GROUND

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

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

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

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



4) TOWING THE MACHINE

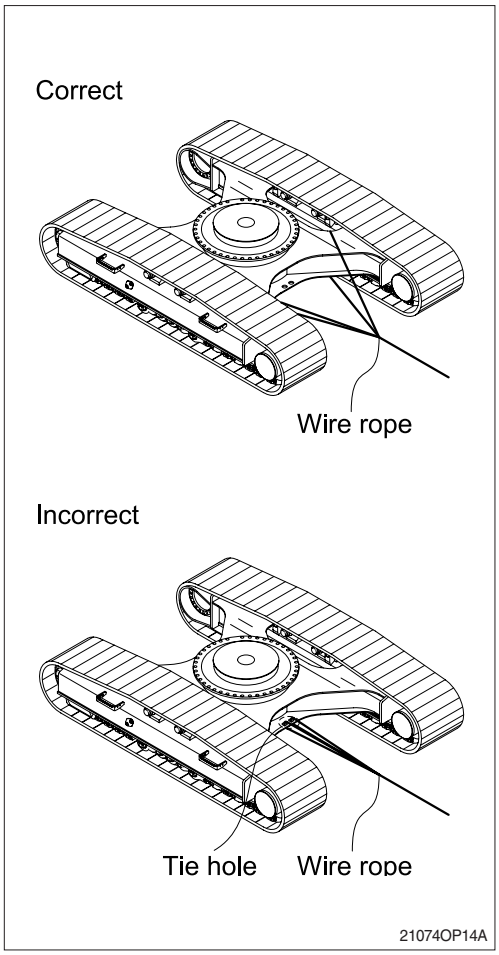
Tow the machine as follows when it can not move on it's own.

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

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

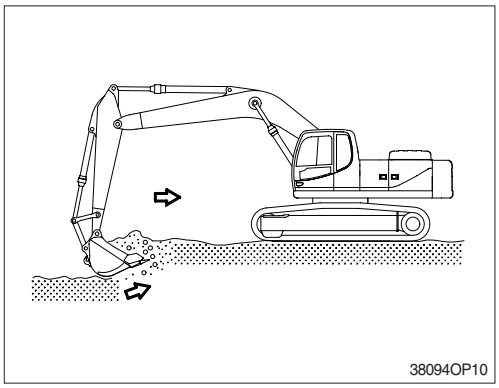
※ **Never tow the machine using only the tie hole, because this may break.**

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

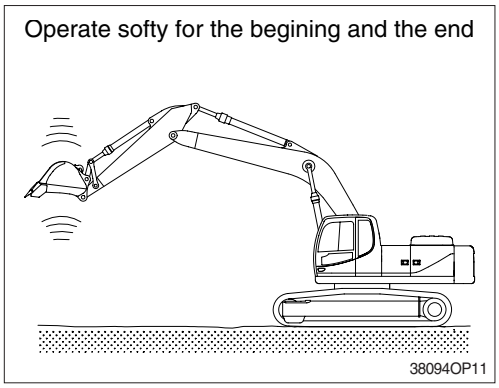


7. EFFICIENT WORKING METHOD

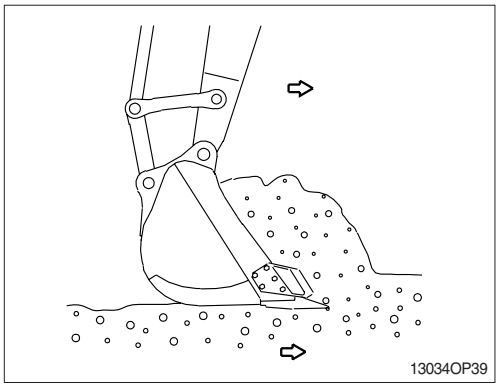
1) Do the digging work by arm.
   Use the pulling force of arm for digging and use together with the digging force of the bucket if necessary.



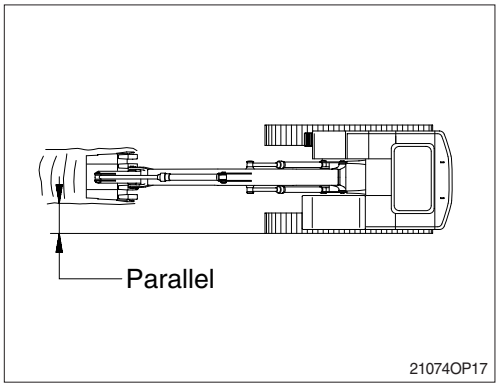
2) When lowering and raising the boom operate softly for the beginning and the end.
   In particularly, sudden stops while lowering the boom may cause damage to the machine.



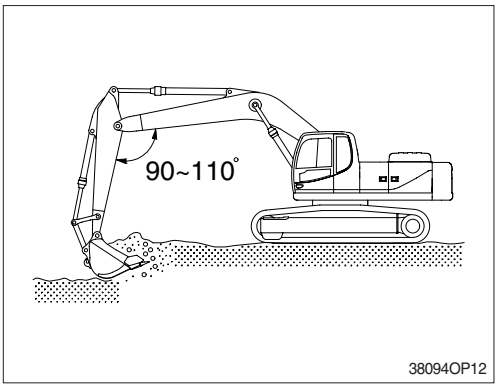
3) The digging resistance and wearing of tooth can be reduced by putting the end of bucket tooth to the digging direction.



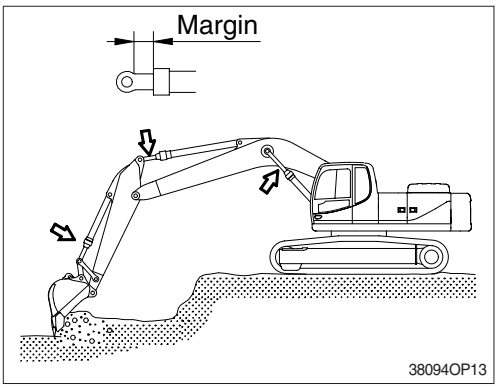
4) Set the tracks parallel to the line of the ditch to be excavated when digging ditch. Do not swing while digging.



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

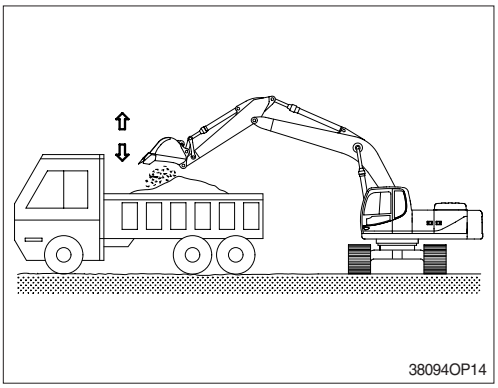


6) Operate leaving a small safety margin of cylinder stroke to prevent damage of cylinder when working with the machine.

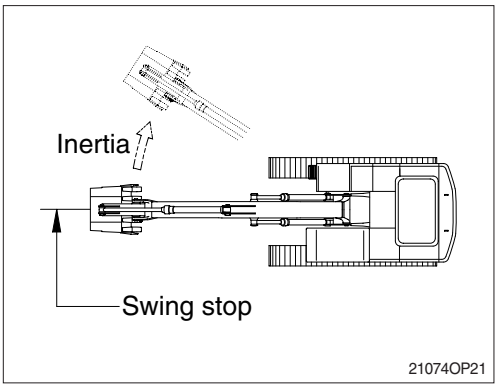


7) Keep the bucket to the dumping position and the arm horizontal when dumping the soil from the bucket.
   Operate bucket lever 2 or 3 times when hard to dump.

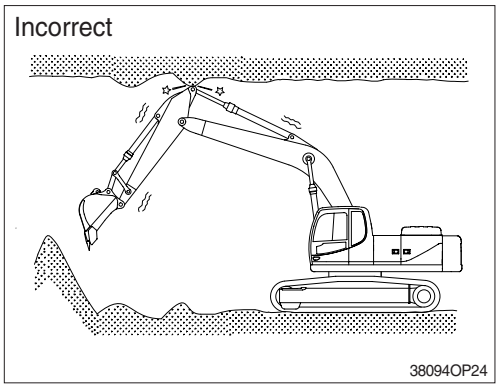
※ **Do not use the impact of bucket tooth when dumping.**



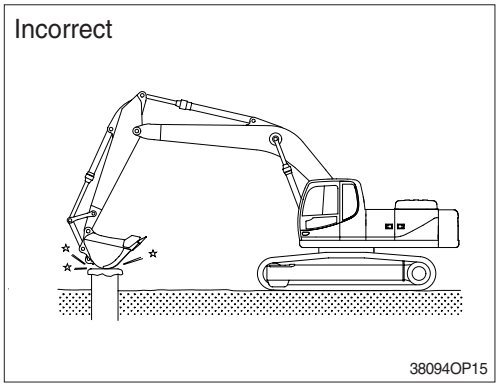
8) Operate stop of swing considering the swing slip distance is created by inertia after neutralizing the swing lever.



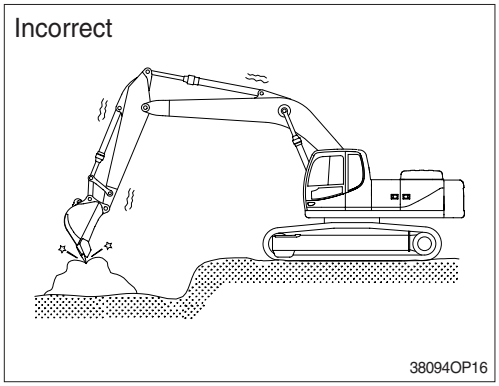
9) If the excavation is in an underground location or in a building, make sure that there is adequate overhead clearance and that there is adequate ventilation.



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



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



12) NEVER CARRY OUT EXCESSIVE OPERATIONS

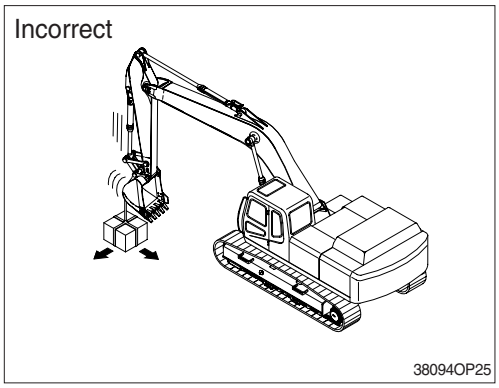
Operation exceeding machine performance may result in accident or failure.

Carry out lifting operation within specified load limit.

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

Never travel while carrying a load.

In case you need installing over load warning device for object handling procedure, please contact Hyundai distributor.



12) BUCKET WITH HOOK

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

The following operations are prohibited.

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

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

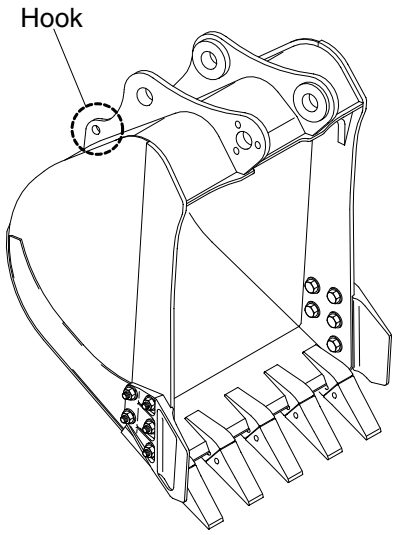
When performing lifting operation, never raise or lower a person.

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

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

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

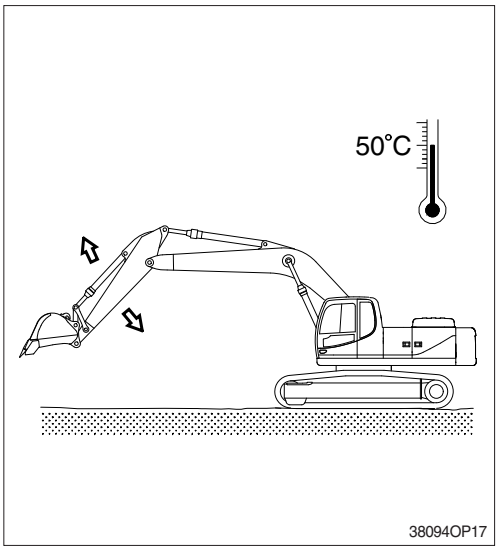
Never leave the operator's seat while lifting a load.



21074OP24

8. OPERATION IN THE SPECIAL WORK SITES

1) OPERATION THE MACHINE IN A COLD WEATHER



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

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

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

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

(5) Always keep the battery completely charged.

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

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

2) OPERATION IN SANDY OR DUSTY WORK SITES

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

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

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

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

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

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

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

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

3) SEA SHORE OPERATION

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

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

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

4) OPERATION IN MUD, WATER OR RAIN WORK SITES

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

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

(3) Perform all daily lubrication and service.

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

5) OPERATION IN ROCKY WORK SITES

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

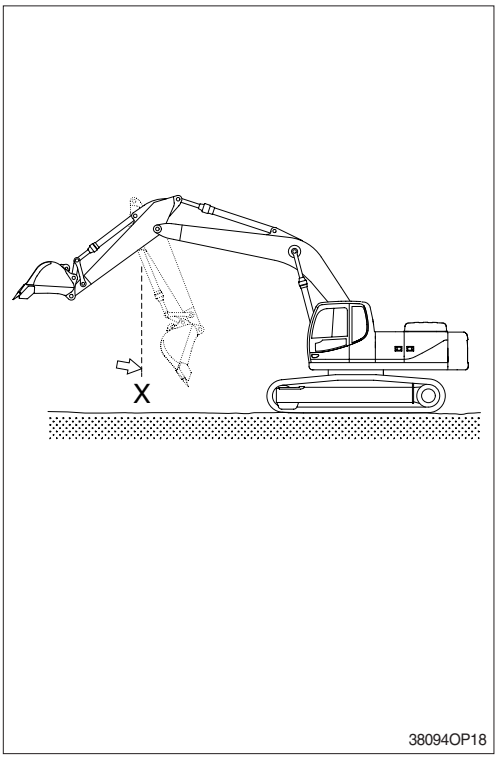
(2) Loosen the track tension a little when working in such areas.

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

9. NORMAL OPERATION OF EXCAVATOR

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

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



10. ATTACHMENT LOWERING (when engine is stopped)

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

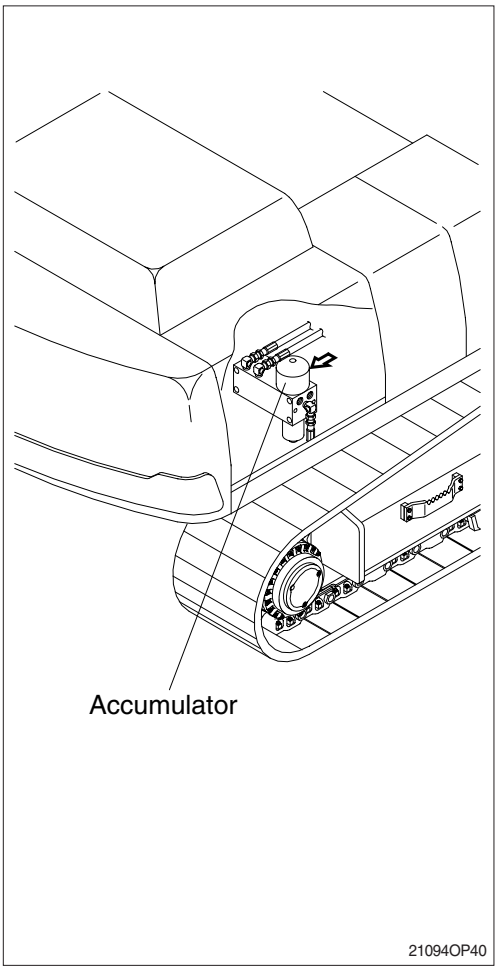
⚠ **Be sure no one is under or near the attachment before lowering the boom.**

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

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

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

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



11. STORAGE

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

1) BEFORE STORAGE

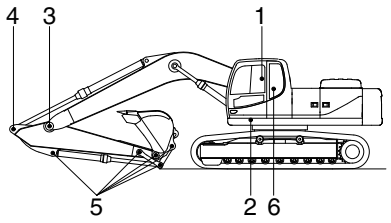
(1) Cleaning the machine

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

(2) Lubrication position of each part

Change all oil.

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



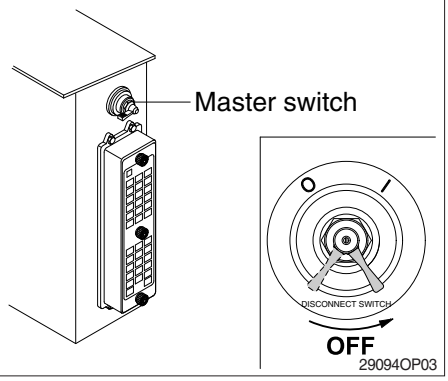
1 Lubricating manifold (5EA)
2 Boom cylinder pin (2EA)
3 Boom and arm connection pin (1EA)
4 Arm cylinder pin (rod side, 1EA)
5 Arm and bucket (6EA)
6 Boom rear bearing center (1EA)

38094OP19

(3) Master switch

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

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

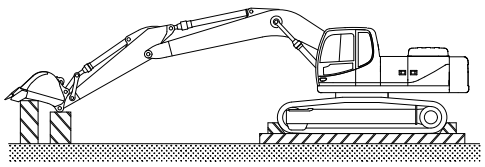


29094OP03

(5) Prevention of dust and moisture

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

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



38094OP20

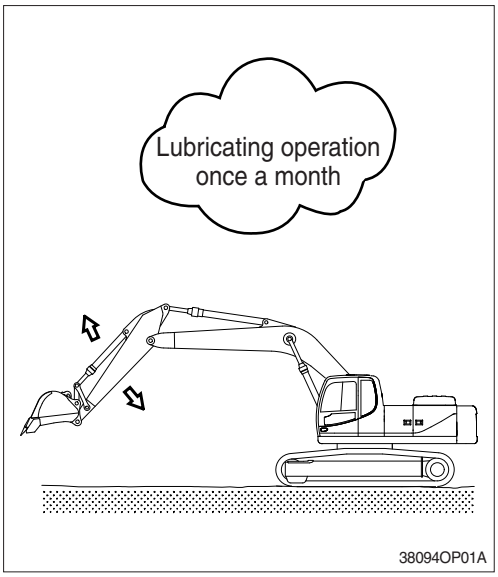
2) DURING STORAGE

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

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

※ **Clean the anticorrosive on the piston rod of cylinder.**

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



※ BATTERY

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

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

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

3) AFTER STORAGE

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

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

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

(3) **When storage period is 6 months over**

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

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

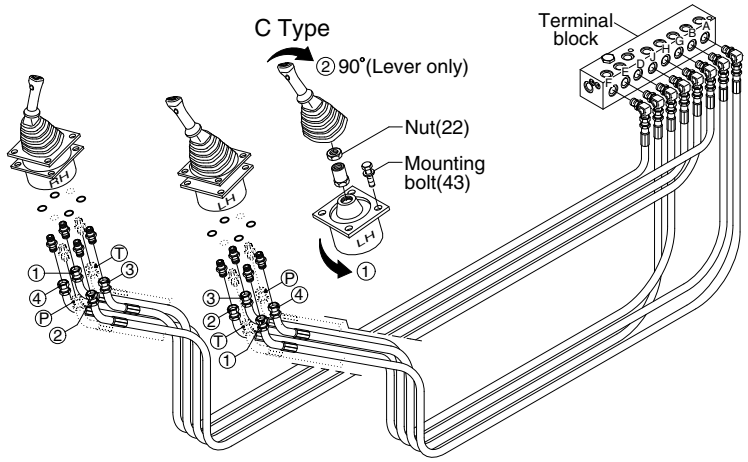
※ **Remove the drain port plug and drain the water until the gear oil comes out and then tighten the drain plug.**

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

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

12. RCV LEVER OPERATING PATTERN

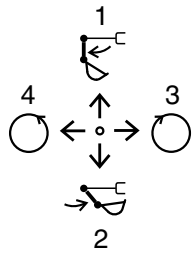
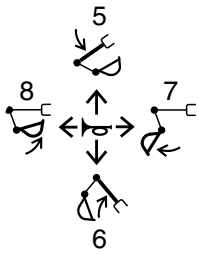
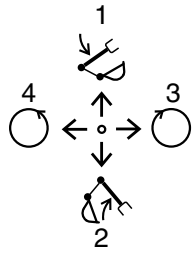
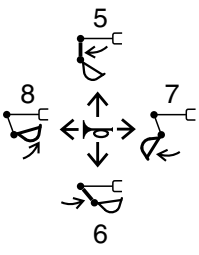
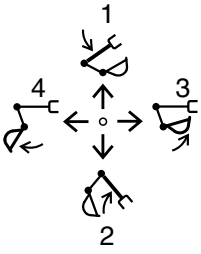
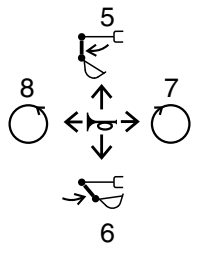
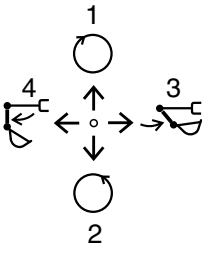
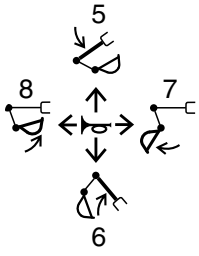
1) PATTERN CHANGE VALVE NOT INSTALL (standard)



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

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

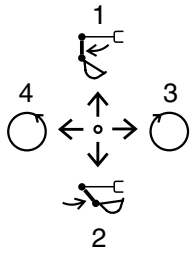
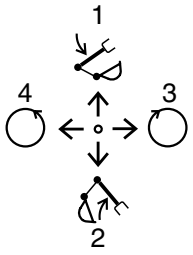
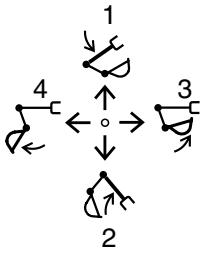
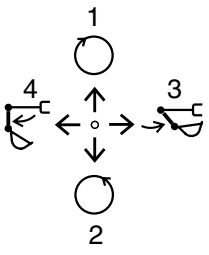
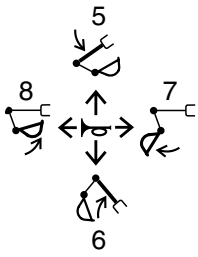
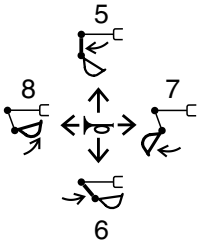
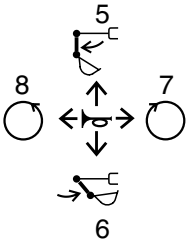
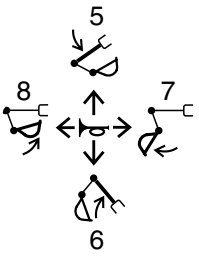
48094OP02

Pattern	Operation		Control function		Hose connection (port)		
	Left RCV lever	Right RCV lever			RCV lever	Change of Terminal block	
						From	To
ISO Type Hyundai			Left	1 Arm out	②	D	-
				2 Arm in	④	E	-
				3 Swing right	③	B	-
				4 Swing left	①	A	-
			Right	5 Boom lower	④	J	-
				6 Boom raise	②	H	-
				7 Bucket out	①	G	-
				8 Bucket in	③	F	-
A Type			Left	1 Boom lower	②	D	J
				2 Boom raise	④	E	H
				3 Swing right	③	B	-
				4 Swing left	①	A	-
			Right	5 Arm out	④	J	D
				6 Arm in	②	H	E
				7 Bucket out	①	G	-
				8 Bucket in	③	F	-
B Type			Left	1 Boom lower	②	D	J
				2 Boom raise	④	E	H
				3 Bucket in	③	B	F
				4 Bucket out	①	A	G
			Right	5 Arm out	④	J	D
				6 Arm in	②	H	E
				7 Swing right	①	G	B
				8 Swing left	③	F	A
C Type			Left	① Loosen the RCV lever mounting bolt (43) and rotates lever assy 90˚ counterclockwise; then install. ② To put lever in correct position, disassemble nut (22) and rotates only lever 90˚ clockwise.			
			Right	Same as ISO type			

2) PATTERN CHANGE VALVE INSTALL (option)

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

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

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

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

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

(2) Change of operating pattern

- A type

① Loosen the wing bolt.

② Move lever from the "ISO" type to "A", "B" or "C" type position.

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

- B type

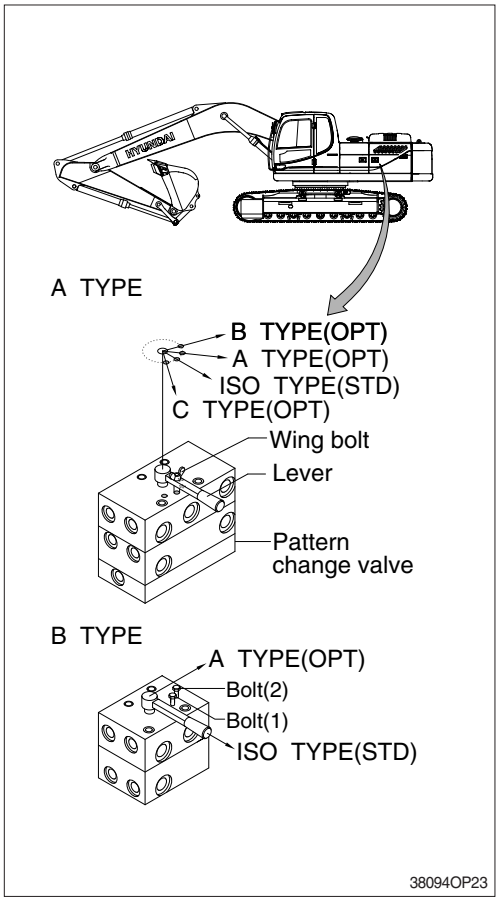
① Loosen bolt (1) or bolt (2).

② Move lever to the "ISO" or "A" position.

③ After setting to secure lever.

· Bolt (1) for "ISO" pattern

· Bolt (2) for "A" pattern

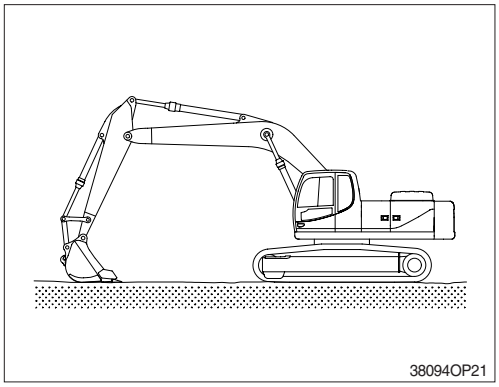


13. SWITCHING HYDRAULIC ATTACHMENT CIRCUIT

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

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

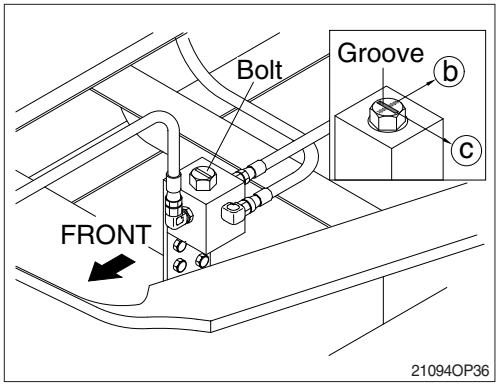
3) Before you change the flow mode of hydraulic attachment circuit, place the machine in the servicing position as shown. Stop the engine.



4) Use the spanner to turn the bolt of 3 way valve. Make sure that you turn the bolt between ⓑ and ⓒ.

(1) One way flow (hydraulic breaker)
Position the groove parallel to the piping (ⓑ).

(2) Two way flow (clamshell or shear)
Position the groove perpendicular to the piping (ⓒ).



1. PREPARATION FOR TRANSPORTATION

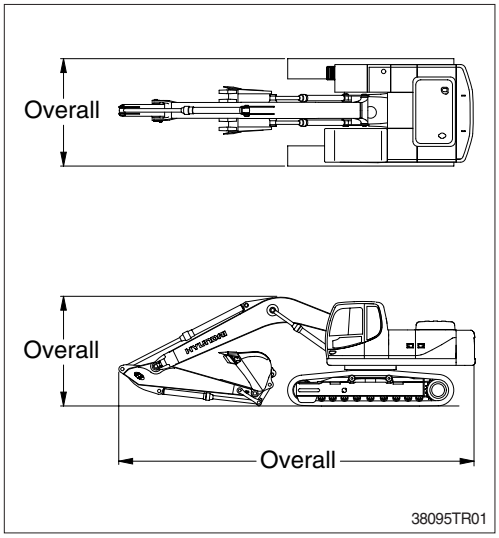
1) When transporting the machine, observe the various road rules, road transportation vehicle laws and vehicle limit ordinances, etc.

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

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

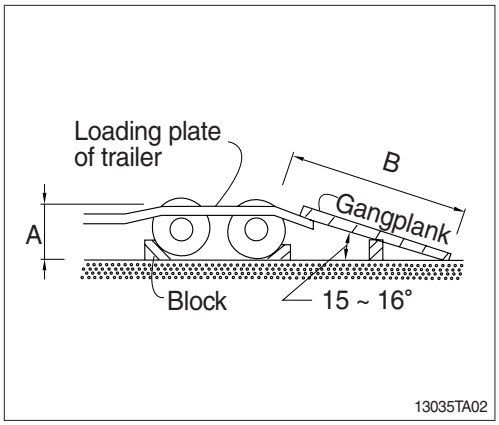
4) Get the permission from the related authority if necessary.

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



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

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



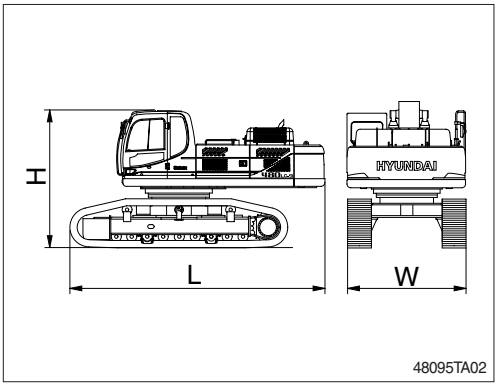
2. DIMENSION AND WEIGHT

1) R480LC-9

(1) Base machine

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	6426 (21' 1")
H	Height	mm (ft-in)	3190 (10' 6")
W	Width	mm (ft-in)	3340 (10' 11")
Wt	Weight	kg (lb)	39000 (85980)

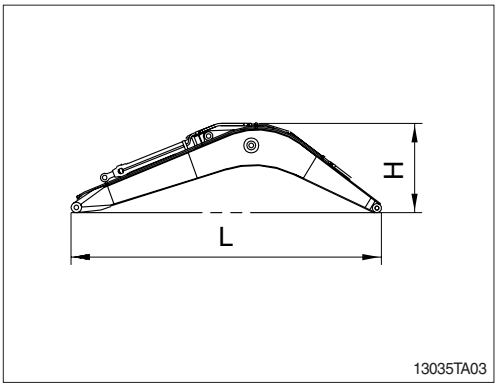
※ With 600 mm (24") triple grouser shoes and 9200 kg (20280 lb) counterweight.



(2) Boom assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	7290 (23' 11")
H	Height	mm (ft-in)	1710 (5' 7")
W	Width	mm (ft-in)	830 (2' 9")
Wt	Weight	kg (lb)	4110 (9060)

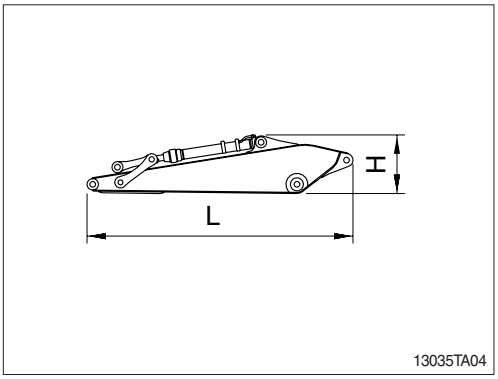
※ 7.06 m (23' 2") boom with arm cylinder (included piping and pins).



(3) Arm assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	4600 (15' 1")
H	Height	mm (ft-in)	1010 (3' 4")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	2420 (5340)

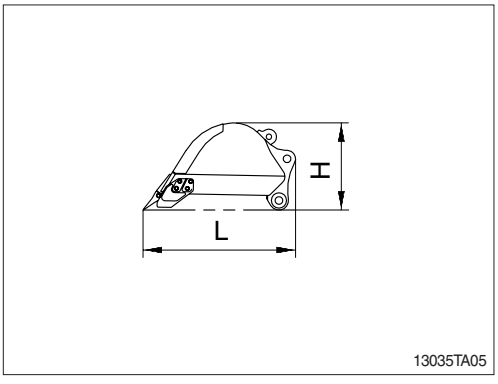
※ 3.38 m (11' 0") arm with bucket cylinder (included linkage and pins).



(4) Bucket assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2090 (6' 10")
H	Height	mm (ft-in)	1240 (4' 1")
W	Width	mm (ft-in)	1760 (5' 6")
Wt	Weight	kg (lb)	1740 (3840)

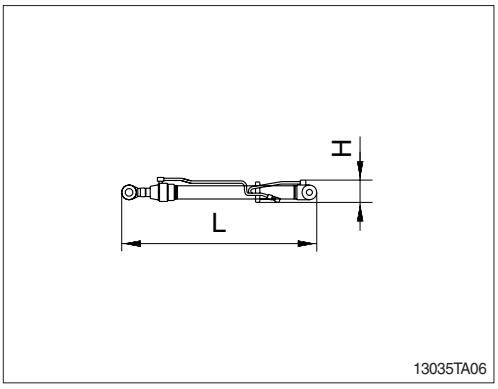
※ 2.15 m^3 (2.81 yd^3) SAE heaped bucket (included tooth and side cutters).



(5) Boom cylinder

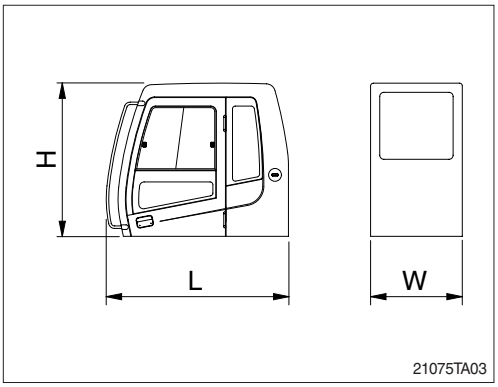
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2260 (7' 5")
H	Height	mm (ft-in)	305 (1' 0")
W	Width	mm (ft-in)	477 (1' 7")
Wt	Weight	kg (lb)	415 (910) × 2

※ Included piping.



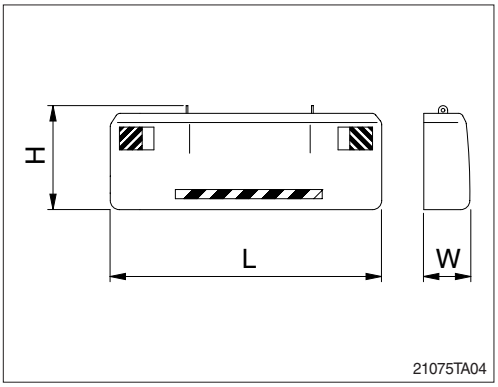
(6) Cab assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1980 (6' 5")
H	Height	mm (ft-in)	1686 (5' 6")
W	Width	mm (ft-in)	1000 (3' 3")
Wt	Weight	kg (lb)	490 (1080)



(7) Counterweight

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2980 (9' 9")
H	Height	mm (ft-in)	1148 (3' 9")
W	Width	mm (ft-in)	798 (2' 7")
Wt	Weight	kg (lb)	9200 (20280)



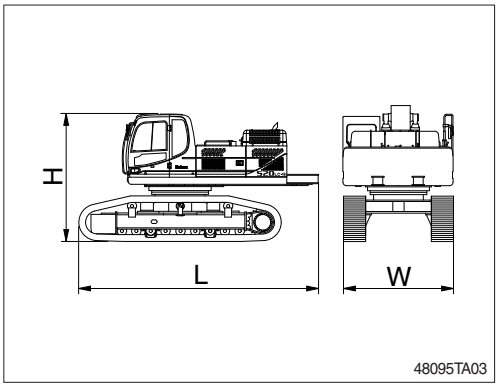
2) R520LC-9

(1) Base machine

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	6190 (20' 4")
H	Height	mm (ft-in)	3400 (11' 2")
W	Width	mm (ft-in)	2990 (9' 10")
Wt	Weight	kg (lb)	31530 (69510)

※ With 600 mm (24") triple grouser shoes.

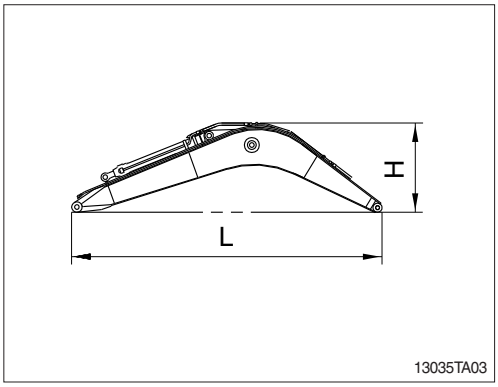
※ Remove catwalk for transport.



(2) Boom assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	7290 (23' 11")
H	Height	mm (ft-in)	1710 (5' 7")
W	Width	mm (ft-in)	830 (2' 9")
Wt	Weight	kg (lb)	4140 (9130)

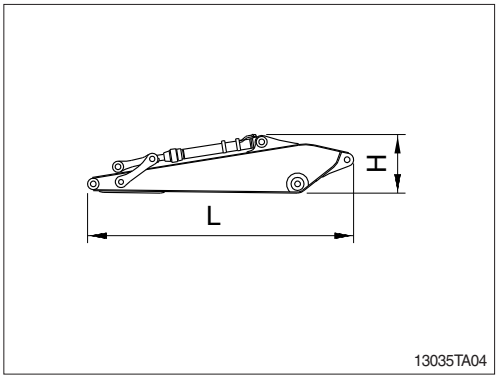
※ 7.06 m (23' 2") boom with arm cylinder (included piping and pins).



(3) Arm assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	4660 (15' 3")
H	Height	mm (ft-in)	1060 (3' 6")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	2560 (5640)

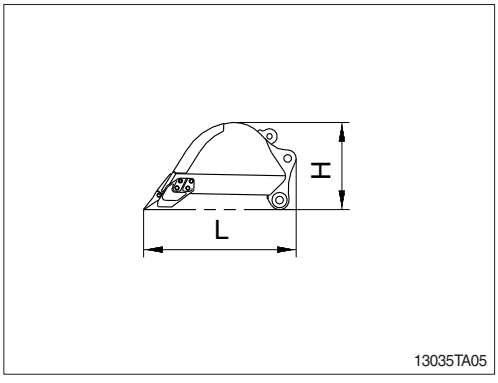
※ 3.38 m (11' 1") arm with bucket cylinder (included linkage and pins).



(4) Bucket assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2090 (6' 10")
H	Height	mm (ft-in)	1240 (4' 1")
W	Width	mm (ft-in)	1760 (5' 6")
Wt	Weight	kg (lb)	1740 (3840)

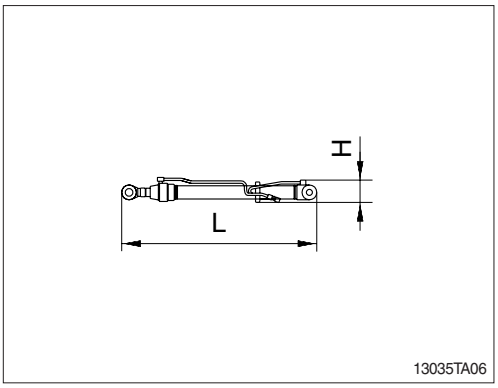
※ 2.15 m^3 (2.81 yd^3) SAE heaped bucket (included tooth and side cutters).



(5) Boom cylinder

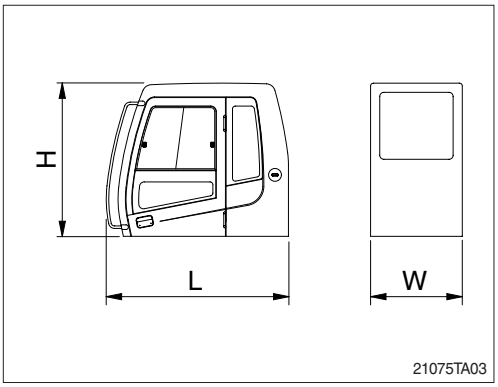
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2260 (7' 5")
H	Height	mm (ft-in)	305 (1' 0")
W	Width	mm (ft-in)	477 (1' 7")
Wt	Weight	kg (lb)	415 (910) × 2

※ Included piping.



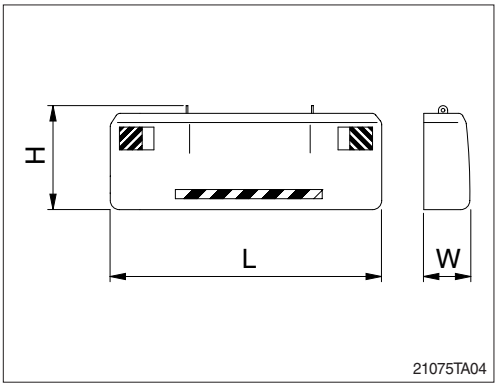
(6) Cab assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1980 (6' 5")
H	Height	mm (ft-in)	1686 (5' 6")
W	Width	mm (ft-in)	1000 (3' 3")
Wt	Weight	kg (lb)	490 (1080)



(7) Counterweight

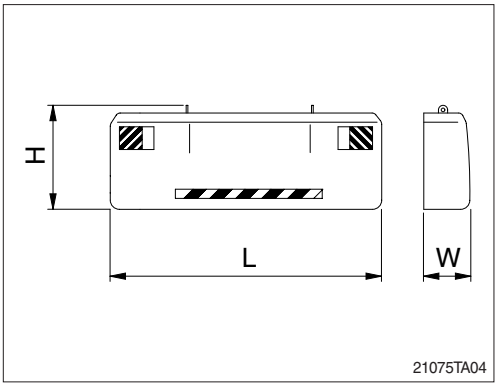
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2980 (9' 9")
H	Height	mm (ft-in)	1148 (3' 9")
W	Width	mm (ft-in)	798 (2' 7")
Wt	Weight	kg (lb)	10200 (22490)



(8) Counterweight (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2980 (9' 9")
H	Height	mm (ft-in)	1148 (3' 9")
W	Width	mm (ft-in)	798 (2' 7")
Wt	Weight	kg (lb)	10700 (23590)

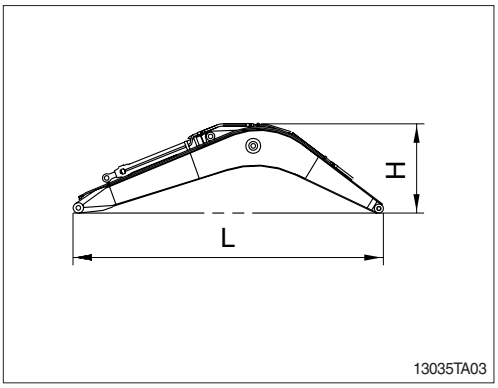
※ 9.0 m Boom, 5.85 m Arm only



(9) Boom assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	6780 (22' 3")
H	Height	mm (ft-in)	1840 (6' 0")
W	Width	mm (ft-in)	830 (2' 9")
Wt	Weight	kg (lb)	4050 (8930)

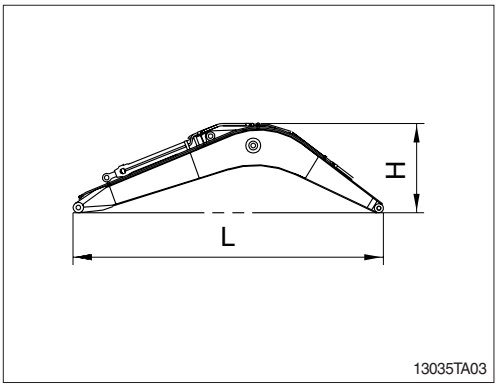
※ 6.55 m (21' 6") boom with arm cylinder (included piping and pins).



(10) Boom assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	9230 (30' 3")
H	Height	mm (ft-in)	1850 (6' 1")
W	Width	mm (ft-in)	830 (2' 9")
Wt	Weight	kg (lb)	4930 (10870)

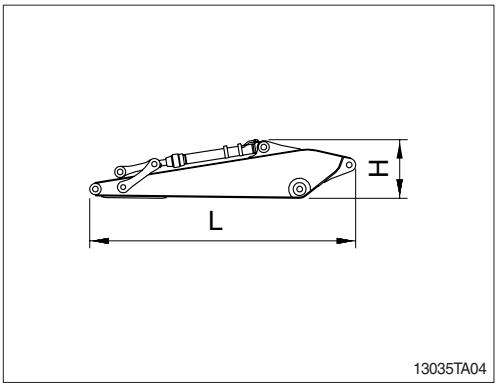
※ 9.00 m (29' 6") boom with arm cylinder (included piping and pins).



(11) Arm assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	3810 (12' 6")
H	Height	mm (ft-in)	1205 (3' 11")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	2460 (5420)

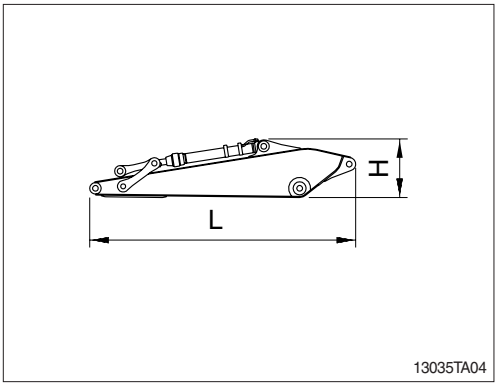
※ 2.4 m (7' 10") arm with bucket cylinder (included linkage and pins).



(12) Arm assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	7100 (23' 4")
H	Height	mm (ft-in)	1055 (3' 6")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	3130 (6900)

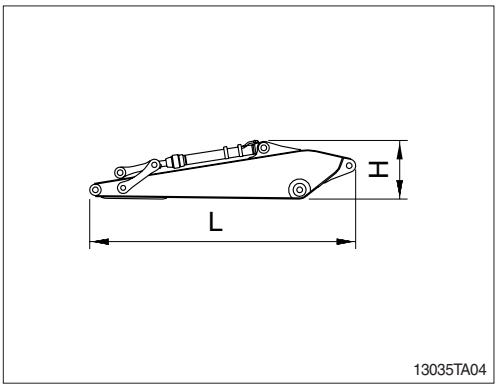
※ 5.85 m (19' 2") arm with bucket cylinder (included linkage and pins).



(13) Arm assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	8100 (26' 7")
H	Height	mm (ft-in)	1060 (3' 6")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	3440 (7580)

※ 6.85 m (22' 6") arm with bucket cylinder (included linkage and pins).

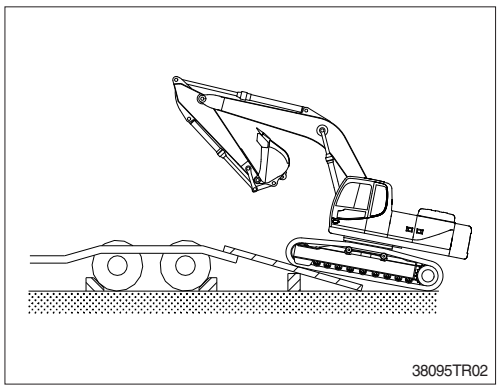


3. LOADING THE MACHINE

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

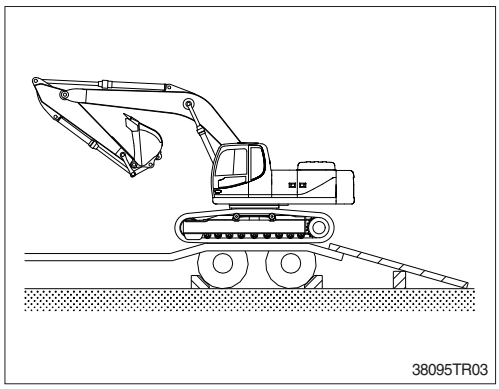
2) Use the gangplank with sufficient length, width, thickness and gradient.

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

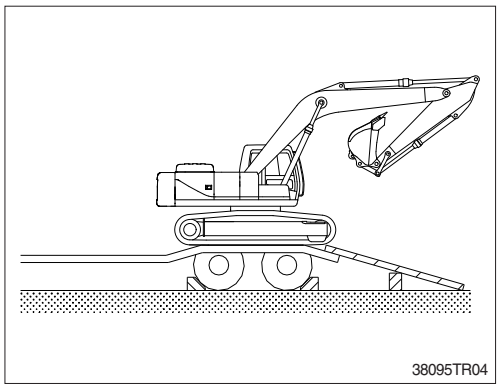

38095TR02

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

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


38095TR03

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


38095TR04

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

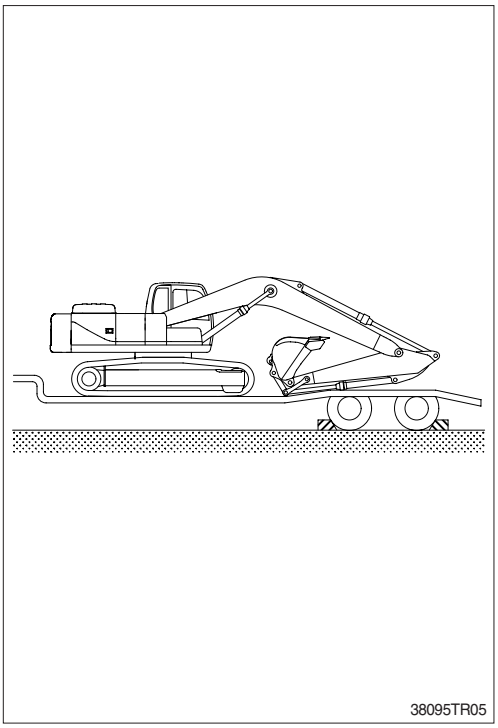
※ **Place rectangular timber under the bucket cylinder to prevent the damage of it during transportation.**

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

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

⚠ **Do not operate any other device when loading.**

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

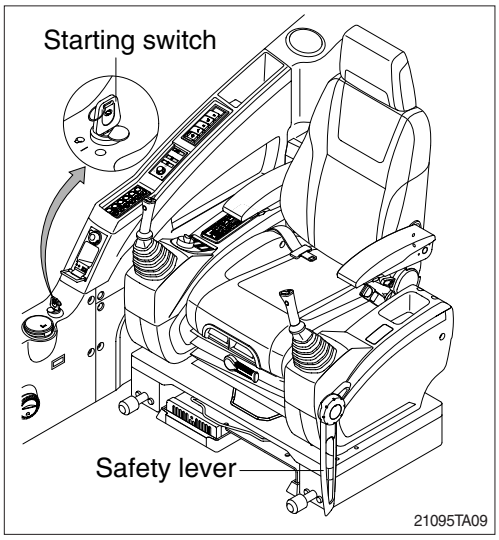


4. FIXING THE MACHINE

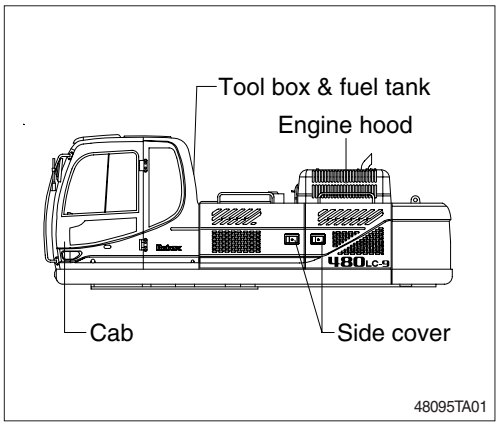
1) Lower down the working device on the loading plate of trailer.

2) Keep the safety lever on the LOCK position.

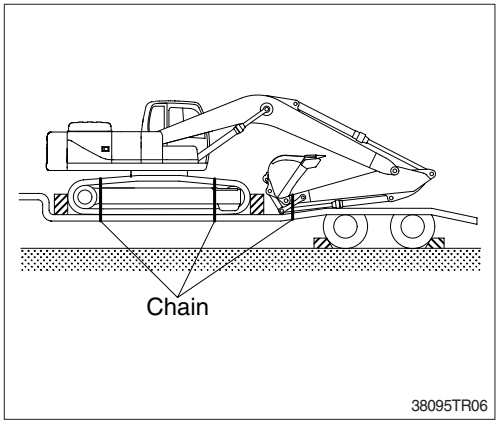
3) Turn OFF all the switches and remove the key.



4) Secure all locks.



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



5. LOADING AND UNLOADING BY CRANE

1) Check the weight, length, width and height of the machine referring to the chapter 2, specification when you are going to hoist the machine.

2) Use long wire rope and stay to keep the distance with the machine as it should avoid touching with the machine.

3) Put a rubber plate contact with wire rope and machine to prevent damage.

4) Place crane on the proper place.

5) Install the wire rope and stay like the illustration.

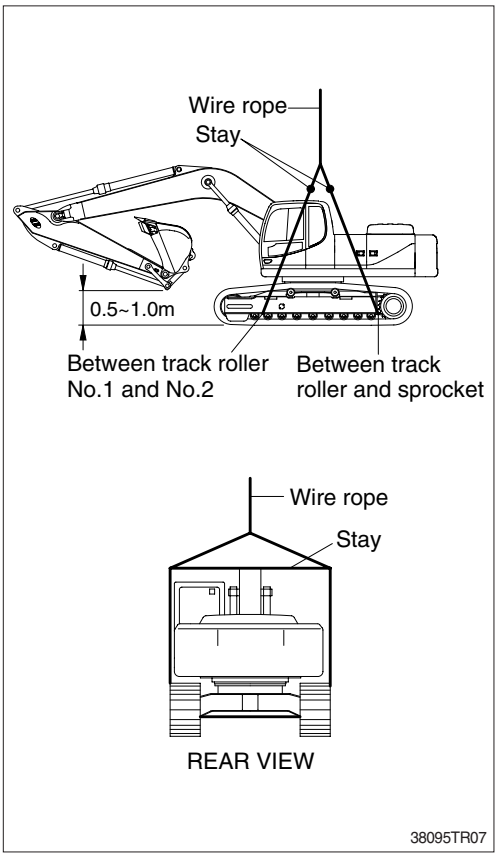
⚠ Make sure wire rope is proper size.

⚠ Place the safety 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. DISASSEMBLE FOR TRANSPORTATION

1) DISCONNECTING HYDRAULIC HOSES AND LINES

(1) Position the machine on flat, firm and level ground.

(2) Retract the bucket cylinder and arm cylinder completely.

(3) Lower the boom to the ground as shown.

(4) Stop the engine.

(5) Move the safety lever down to lock the system securely.

※ **Refer to the page 3-14 for details.**

(6) Turn the engine start switch to ON position.
Do not start the engine.

(7) Pull up the safety lever, Move the left and right operating levers, respectively to the full extension in all directions to remove internal pressure from the hydraulic circuits.

(8) Turn the star switch to OFF position.

(9) Release internal pressure in the hydraulic tank through the air breather of the hydraulic tank.

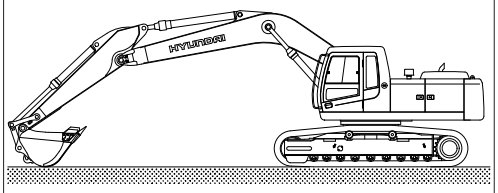
(10) Disconnect hoses and lines.

※ **Treat oil in an environmentally safe way.**

(11) Dismantle the components (boom, arm, counterweight etc.)

⚠ **Immediately after operating the machine, the hot hydraulic oil can cause severe burns to unprotected skin.**

⚠ **These may be residual hydraulic pressure can remain in the hydraulic system.**
Serious injury may result if this residual pressure is not released before any service is done on the hydraulic system.



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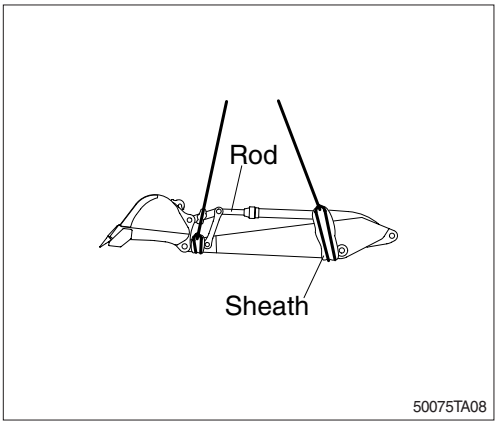
2) DISASSEMBLING ATTACHMENT

※ **Follow the disconnecting hydraulic hoses and lines procedure before disassemble the components.**

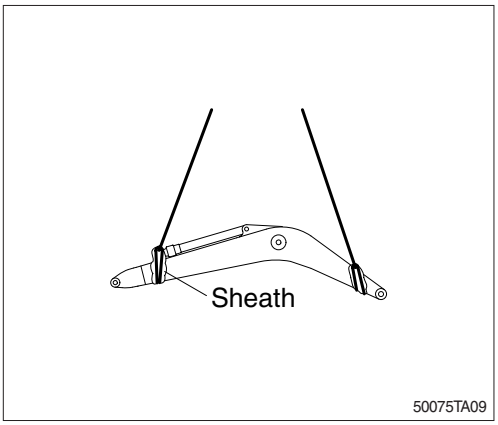
(1) Bucket and arm with bucket cylinder

Use cable sheaths to protect the lifting cable from being damaged by the edges of the arm. Protect piston rod and the cylinder tube.



(2) Boom with arm cylinder

Use cable sheaths to protect the lifting cable from being damaged by the edges of the boom. Secure piston rod of the arm cylinder to the cylinder tube.



3) COUNTERWEIGHT REMOVAL AND INSTALLATION

(1) Counterweight removal

① Position the machine on flat, firm and level ground, free from any obstruction or interference.

② Keep the service position.

③ Push down the safety locking lever securely. Move the safety lever down to lock the system securely.

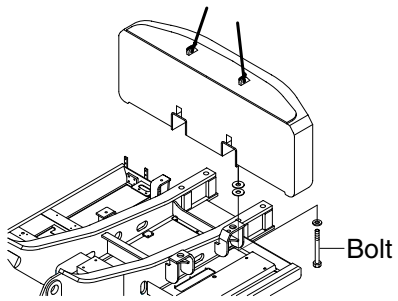
※ **Refer to the page 3-28 for details.**

④ As shown in the illustration, connect the lifting cables or slings with sufficient strength for the counterweight at the lifting eye correctly.

⑤ Disassemble four bolts.

⑥ Lift the counterweight enough.

⑦ Place the counterweight onto suitable support.



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(2) Counterweight installation

① Carry out installation in the reverse order to removal.

·Tightening torque : 390±40 kgf · m
(2820±290 lbf · ft)

⚠ Move the safety locking lever down to lock the system securely, See safety locking system on page 3-14. And attach a warning tag (do not start the engine) to the left operating lever.

⚠ Personal injury or death can occur from a counterweight falling during installation.
Do not allow personnel under or around the counterweight during installation.

⚠ Use certified cables and shackles of adequate load rating. Improper lifting can allow the load to shift and cause injury or death.

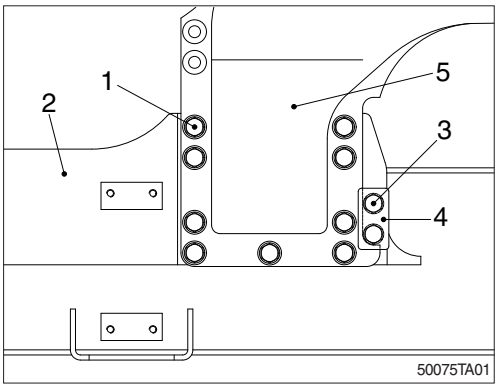
7. ADJUSTABLE TRACK GAUGE (R520LC-9 ONLY)

1) LOWER TRACK RETRACTION

⚠ Do not retract the track gauge except transporting purpose.

(1) Remove nine bolts (1), and spacers from lower track (2) to the retracted.

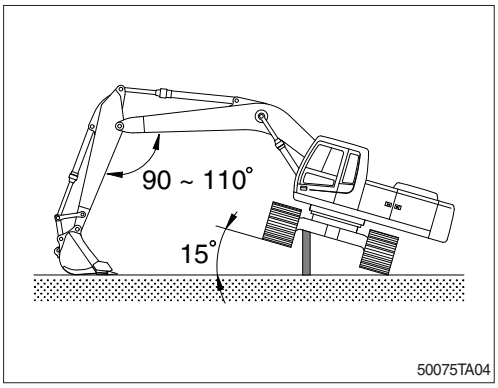
※ **Do not loosen two bolts (3) on guide (4).**



(2) Turn superstructure so that it is perpendicular to lower track to be retracted. Raise lower track to approximately 15degree from ground using a jack. Lower track should slide by its own weight and hit against the stop.

※ **If lower track does not slide in this condition, allow lower track that is not contraction ground to move back and forth slowly.**

⚠ **The arm must be set at 90~110˚.**
Never set it at an angle less than 90˚.



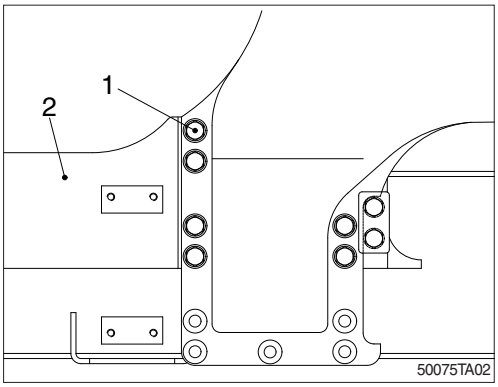
(3) After lower track (2) has slid into place, lower superstructure to ground.
Install six spacers and bolts (1).

※ **Tighten bolts to 220±20 kgf · m (1590±145 lbf · ft)**

※ **Repeat procedure at opposite side center frame support.**

(4) After the bolts for one side frame are fastened, repeat steps 1 thru 3 for opposite side frame.

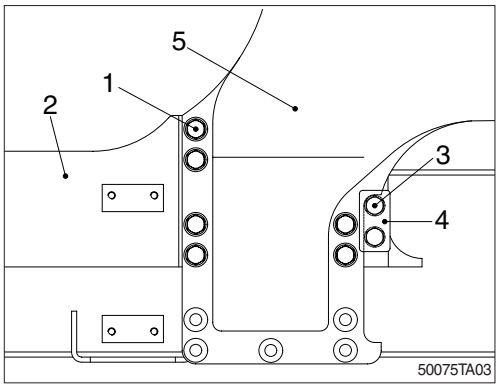
(5) Store remaining bolts, spacers with machine.



2) FRAME EXTENSION

(1) Remove six bolts (1), and spacers from lower track (2) to be extended.

※ **Do not loosen two bolts (3) on guide (4).**



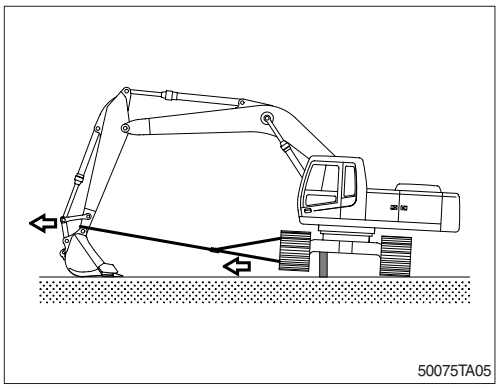
(2) Turn superstructure so that it is perpendicular to lower track to be extended.

※ **Do not attach cable on side frame step.**

(3) Attach one end of cable on arm and the other end on lower track.
Connect it with an appropriate holding device on both ends.

(4) Raise lower track slightly with jack and block. Extend arm gradually to side frame out until it hits stop.

(5) After lower track has slid into place, lower superstructure to ground.
Remove cable.

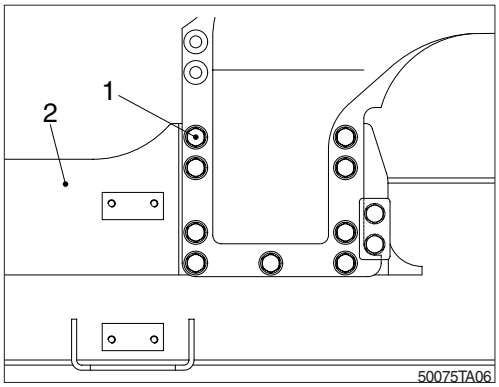


(6) Install nine spacers and bolts (2).

※ **Tighten bolts to 220±20 kgf·m (1590±145 lbf·ft)**

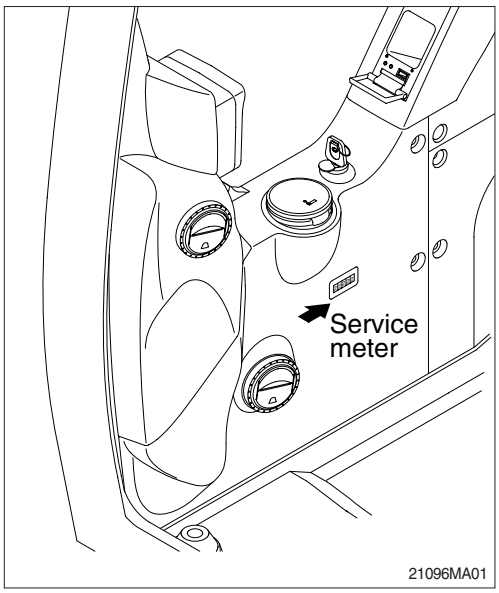
※ **Repeat procedure at opposite track frame support.**

(7) After the bolts for one side frame are fastened repeat steps 1 thru 6 for other side frame.



1. INSTRUCTION

1) INTERVAL OF MAINTENANCE



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

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

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

2) PRECAUTION

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

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

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

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

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

3) PROPER MAINTENANCE

(1) Replace and repair of parts

It is required to replace the wearable and consumable parts such as bucket tooth, side cutter, filter and etc., regularly.

Replace damaged or worn parts at proper time to keep the performance of machine.

(2) Use genuine parts.

(3) Use the recommended oil.

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

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

(6) Do not repair anything while operating the engine.

Stop the engine when you fill the oil.

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

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

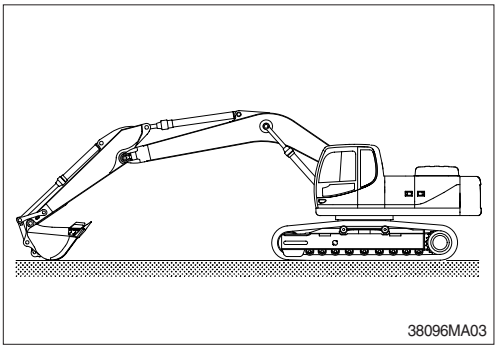
(9) For more detail information of maintenance, please contact local Hyundai dealer.

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

4) RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM

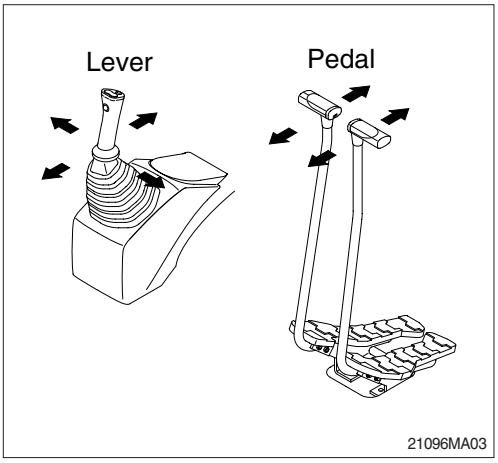
※ **Spouting of oil can cause the accident when loosening the cap or hose right after the operating of machine as the machine or oil is on the high pressure on the condition.**
Be sure to relieve the pressure in the system before repairing hydraulic system.

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

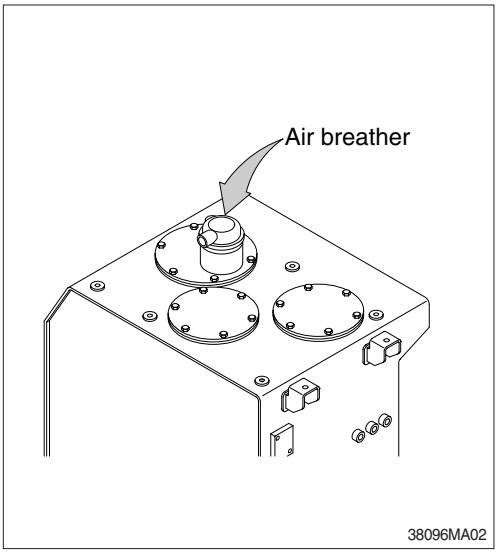


(2) Set the safety lever completely in the release position, operate the control levers and pedals fully to the front, rear, left and right, to release the pressure in the hydraulic circuit.

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



(3) Loosen the cap and relieve the pressure in the tank by pushing the top of the air breather.



5) PRECAUTION WHEN INSTALLING HYDRAULIC HOSES OR PIPES

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

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

(3) Use genuine parts.

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

(5) Keep the specified tighten torque.

6) PERIODICAL REPLACEMENT OF SAFETY PARTS

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

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

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

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

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

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

2. TIGHTENING TORQUE

Use following table for unspecified torque.

1) BOLT AND NUT

(1) Coarse thread

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

(2) Fine thread

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

2) PIPE AND HOSE (FLARE type)

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

3) PIPE AND HOSE (ORFS type)

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

4) FITTING

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

4) TIGHTENING TORQUE OF MAJOR COMPONENT

· R480LC-9

No.	Descriptions		Bolt size	Torque	
				kgf · m	lbf · ft
1	Engine	Engine mounting bolt, nut (FR, bracket)	M20 × 2.5	55 ± 5.5	398 ± 39.8
2		Engine mounting bolt, nut (RR, bracket)	M16 × 2.0	28 ± 3.0	202 ± 21.7
3		Engine mounting bolt (frame)	M22 × 2.5	69.6 ± 7.0	503 ± 50.6
4		Radiator mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
5		Coupling mounting socket bolt	M20 × 2.5	46 ± 2.0	333 ± 14.5
6		Main pump housing mounting bolt	M10 × 1.5	4.8 ± 0.3	35 ± 2.2
7	Hydraulic system	Main pump mounting bolt	M20 × 2.5	44 ± 6.6	318 ± 47.7
8		Main control valve mounting nut	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
9		Fuel tank mounting bolt	M20 × 2.5	45 ± 5.1	325 ± 36.8
10		Hydraulic oil tank mounting bolt	M20 × 2.5	45 ± 5.1	325 ± 36.8
11		Turning joint mounting bolt, nut	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
12	Power train system	Swing motor mounting bolt	M20 × 2.5	58.4 ± 6.4	422 ± 46.2
13		Swing bearing upper part mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
14		Swing bearing lower part mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
15		Travel motor mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
16		Sprocket mounting bolt (-#0201)	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
		Sprocket mounting bolt (#0202-)	M22 × 2.5	77.4 ± 7.5	560 ± 54.2
17	Under carriage	Carrier roller mounting bolt, nut	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
18		Track roller mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
19		Track tension cylinder mounting bolt	M22 × 1.5	87.2 ± 12.5	631 ± 90
20		Track shoe mounting bolt, nut	M24 × 3.0	140 ± 5.0	1012 ± 36
21		Track guard mounting bolt	M24 × 3.0	100 ± 15	723 ± 108
22	Others	Counterweight mounting bolt	M42 × 3.0	390 ± 40	2821 ± 289
23		Cab mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
24		Operator's seat mounting bolt	M 8 × 1.25	4.05 ± 0.8	29.3 ± 5.8

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

· R520LC-9

No.	Descriptions		Bolt size	Torque	
				kgf · m	lbf · ft
1	Engine	Engine mounting bolt, nut (FR, bracket)	M20 × 2.5	55 ± 5.5	398 ± 39.8
2		Engine mounting bolt, nut (RR, bracket)	M16 × 2.0	28 ± 3.0	202 ± 21.7
3		Engine mounting bolt (frame)	M22 × 2.5	69.6 ± 7.0	503 ± 50.6
4		Radiator mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
5		Coupling mounting socket bolt	M20 × 2.5	46 ± 2.0	333 ± 14.5
6		Main pump housing mounting bolt	M10 × 1.5	4.8 ± 0.3	35 ± 2.2
7	Hydraulic system	Main pump mounting bolt	M20 × 2.5	44 ± 6.6	318 ± 47.7
8		Main control valve mounting nut	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
9		Fuel tank mounting bolt	M20 × 2.5	45 ± 5.1	325 ± 36.8
10		Hydraulic oil tank mounting bolt	M20 × 2.5	45 ± 5.1	325 ± 36.8
11		Turning joint mounting bolt, nut	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
12	Power train system	Swing motor mounting bolt	M20 × 2.5	58.4 ± 6.4	422 ± 46.2
13		Swing bearing upper part mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
14		Swing bearing lower part mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
15		Travel motor mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
16		Sprocket mounting bolt (-#0178)	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
		Sprocket mounting bolt (#0179-)	M22 × 2.5	77.4 ± 7.5	560 ± 54.2
17	Under carriage	Carrier roller mounting bolt, nut	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
18		Track roller mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
19		Track tension cylinder mounting bolt	M22 × 1.5	87.2 ± 12.5	631 ± 90
20		Track shoe mounting bolt, nut	M24 × 3.0	140 ± 5.0	1012 ± 36
21		Track guard mounting bolt	M24 × 3.0	100 ± 15	723 ± 108
22		Adjustable track gauge bolt	M33 × 3.5	220 ± 20	1590 ± 145
23	Others	Counterweight mounting bolt	M42 × 3.5	390 ± 40	2821 ± 289
24		Center frame support & lower track mounting bolt	M33 × 3.5	220 ± 20	1591 ± 145
25		Cab mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
26		Operator's seat mounting bolt	M 8 × 1.25	4.05 ± 0.8	29.3 ± 5.8

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

3. FUEL, COOLANT AND LUBRICANTS

1) NEW MACHINE

New machine used and filled with following lubricants.

Description	Specification
Engine oil	SAE 10W-30 (API CH-4), ★SAE 5W-40 (API CH-4)
Hydraulic oil	Hyundai genuine long life hydraulic oil (ISO VG 32, VG 46, VG 68) Conventional hydraulic oil (ISO VG 15★)
Swing and travel reduction gear	SAE 80W-90 (API GL-5)
Grease	Lithium base grease NLGI No. 2
Fuel	ASTM D975-No. 2
Coolant (DCA4)	ASTM D6210 Mixture of 50% ethylene glycol base antifreeze and 50% water. Mixture of 60% ethylene glycol base antifreeze and 40% water.★

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

Ultra low sulfur diesel
- sulfur content ≤ 15 ppm

★Cold region
Russia, CIS, Mongolia

2) RECOMMENDED OILS

Use only oils listed below. Do not mix different brand oil.
Please use HYUNDAI genuine oil and grease.

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)	★SAE 5W-40 SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	5.0×2 (1.3×2)	★SAE 75W-90
Final drive	Gear oil	Type 1, 2 6.0×2 (1.6×2)	★SAE 75W-90
Final drive	Gear oil	Type 3 12.0×2 (3.2×2)	SAE 80W-90
Hydraulic tank	Hydraulic oil	Tank: 262 (69.2) System: 380 (100)	★ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	621 (164)	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and soft water★1	50 (13.2)	Ethylene glycol base permanent type (50 : 50) ★Ethylene glycol base permanent type (60 : 40)

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

★ : Cold region
Russia, CIS, Mongolia

★1 : Soft water
City water or distilled water

4. MAINTENANCE CHECK LIST

1) DAILY SERVICE BEFORE STARTING

Check items	Service	Page
Visual check		
Engine oil level	Check, Add	6-19
Coolant level	Check, Add	6-21
Fan belt tension	Check, Adjust	6-25
Air cleaner (oil bath)	Check, Clean, Add	6-26-1, 2
Fuel tank	Check, Refill	6-27
Prefilter	Check, Clean	6-28
Hydraulic oil level	Check, Add	6-30
★ Attachment pin and bushing	Lubricate	6-40
· Boom cylinder tube end		
· Boom foot		
· Boom cylinder rod end		
· Arm cylinder tube end		
· Arm cylinder rod end		
· Boom + Arm connecting		
· Bucket cylinder tube end		
Control panel & pilot lamp	Check, Clean	6-41

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

2) EVERY 50 HOURS SERVICE

Check items	Service	Page
Fuel tank (water, sediment)	Drain	6-27
Swing reduction gear oil	Check, Add	6-33
Track tension	Check, Adjust	6-36
Bucket linkage pin	Lubricate	6-37
· Bucket cylinder rod end		
· Bucket + Arm connecting		
· Bucket control link + Arm		
· Bucket control rod		

3) INITIAL 50 HOURS SERVICE

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

4) EVERY 200 HOURS SERVICE

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

★ Replace 3 filters for continuous hydraulic breaker operation only.

5) INITIAL 250 HOURS SERVICE

Check items	Service	Page
Engine oil	Change	6-19, 20
Engine oil filter	Replace	6-19, 20
Fuel filter	Replace	6-27
Prefilter (water, element)	Replace	6-28
Hydraulic return filter	Replace	6-32
Drain filter cartridge	Replace	6-32
Pilot line filter	Replace	6-33
Swing reduction gear oil	Change	6-33
Swing reduction gear grease	Check, Add	6-33
Travel reduction gear oil	Change	6-34, 35

6) EVERY 250 HOURS SERVICE

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

7) EVERY 500 HOURS SERVICE

Check items	Service	Page
★Engine oil	Change	6-19, 20
★Engine oil filter	Replace	6-19, 20
Coolant test (DCA4 concentration)	Test, Add	6-21-1, 2
Radiator, cooler fin and charge air cooler	Check, Clean	6-24
☆Air cleaner element (primary)	Check, Clean	6-26
Fuel filter element	Replace	6-28
Prefilter	Replace	6-28
Water filter (corrosion resistor)	Replace	6-29

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

☆ Clean the primary element only after 500 hours operation or when the air cleaner warning lamp blinks. Replace primary element and safety element after 4 times cleanings of primary element.

8) EVERY 1000 HOURS SERVICE

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

9) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Coolant	Change	6-21, 22, 23
Air cleaner (oil bath)	Disassemble, Clean, Change	6-26-1, 2
Hydraulic oil ★1	Change	6-30
Hydraulic tank suction strainer	Check, Clean	6-31
Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-

★1 Conventional hydraulic oil

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

10) EVERY 5000 HOURS SERVICE

Check items	Service	Page
Hydraulic oil ★2	Change	6-30

★2 Hyundai genuine long life hydraulic oil

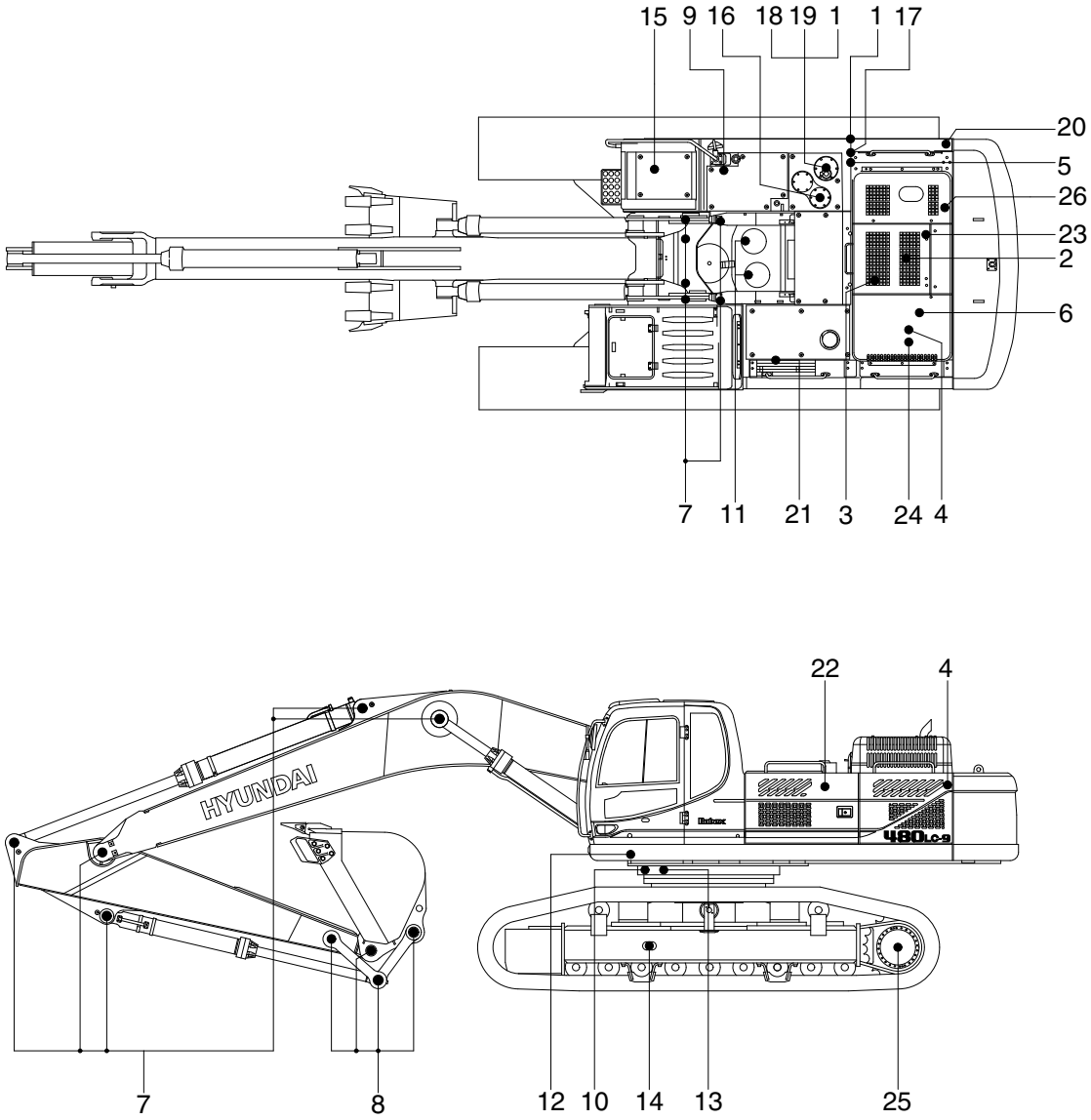
★ Change oil every 1000 hours of continuous hydraulic breaker operation.

11) WHEN REQUIRED

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

Check items	Service	Page
Engine lubrication system		
· Engine oil	Change	6-19, 20
· Engine oil filter	Replace	6-19, 20
Engine cooling system		
· Coolant	Add or Change	6-21, 22, 23, 24
· Radiator	Clean or Flush	6-21, 22, 23, 24
· Charge air cooler	Check	6-24
· Water filter (corrosion resistor)	Replace	6-29
Engine air system		
· Air cleaner element	Replace	6-26
Fuel system		
· Fuel tank	Drain or Clean	6-27
· Prefilter	Clean or Replace	6-28
· Fuel filter element	Replace	6-28
Hydraulic system		
· Hydraulic oil	Add or Change	6-30
· Suction strainer	Clean	6-31
· Element of breather	Replace	6-32
· Return filter	Replace	6-32
· Drain line filter	Replace	6-32
· Pilot line filter	Replace	6-33
Under carriage		
· Track tension	Check, Adjust	6-36
Bucket		
· Bucket assy	Replace	6-37
· Tooth	Replace	6-38
· Side cutter	Replace	6-38
· Linkage	Adjust	6-39
Air conditioner and heater		
· Fresh air filter	Clean, Replace	6-44
· Recirculation filter	Clean	6-45

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.

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	262 (69.2)	1
	2	Engine oil level	Check, Add	EO	38 (10.0)	1
	4	Radiator coolant	Check, Add	C	45 (12)	1
	5	Prefilter (water, element)	Check, Clean	-	-	1
	6	Fan belt tension and damage	Check, Adjust	-	-	1
	9	Fuel tank	Check, Refill	DF	621 (164)	1
	22	Air cleaner (oil bath)	Check, Clean, Add	EO	-	1

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ (U.S.gal)	Service points No.
50 Hours or weekly	8	Bucket linkage pin	Check, Add	PGL	-	6
	9	Fuel tank (water, sediment)	Check, Clean	-	-	1
	11	Swing reduction gear case	Check, Add	GO	5.0 (1.3)	2
	14	Track tension	Check, Adjust	PGL	-	2
250 Hours	7	Attachment pins & bushing	Check, Add	PGL	-	11
	10	Swing bearing grease	Check, Add	PGL	-	2
	15	Battery (voltage)	Check, Clean	-	-	1
	21	Aircon and heater fresh air filter	Check, Clean	-	-	1
500 Hours	2	Engine oil	Change	Change	38 (10.0)	1
	3	Engine oil filter	Replace	-	-	1
	5	Prefilter	Replace	-	-	1
	22	Air cleaner element (primary)	Check, Clean	-	-	1
	23	Fuel filter element	Replace	-	-	1
	24	Radiator, oil cooler, charge air cooler	Check, Clean	-	-	3
	26	Water filter(corrosion resistor)	Replace	-	-	1
	26	Coolant test (DCA4 concentration)	Test, Add	DCA4	-	1
1000 Hours	6	Fan belt tensioner	Check, Replace	-	-	1
	11	Swing reduction gear case (TYPE 1)	Change	GO	5.0 (1.3)	1
	11	Swing reduction gear case (TYPE 2)	Change	GO	7.0 (1.8)	1
	12	Swing reduction gear grease (TYPE 1 only)	Replace	PGL	1.2 (0.3)	1
	13	Swing gear and pinion grease	Change	PGL	14.0 kg (31 lb)	1
	16	Hydraulic oil return filter	Replace	-	-	2
	17	Drain filter cartridge	Replace	-	-	1
	18	Air breather element	Replace	-	-	1
	20	Pilot line filter element	Replace	-	-	1
	25	Travel reduction gear case (TYPE 1, 2)	Change	GO	6.0 (1.6)	2
	25	Travel reduction gear case (TYPE 3)	Change	GO	12 (3.2)	2
2000 Hours	1	Hydraulic oil ★1	Change	HO	262 (69.2)	1
	4	Radiator coolant	Change	C	45 (12)	1
	19	Hydraulic oil suction strainer	Check, Clean	-	-	1
	22	Air cleaner (oil bath)	Disassemble, Clean, Change	EO	-	1
	-	Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-	-	-
5000 Hours	1	Hydraulic oil ★2	Change	HO	262 (69.2)	1
As required	21	Aircon & heater fresh filter	Replace	-	-	1
	21	Aircon & heater recirculation filter	Clean, Replace	-	-	1
	22	Air cleaner element (primary, safety)	Replace	-	-	2

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

※ Oil symbol

Please refer to the recommended lubricants for specification.

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

C : Coolant PGL : Grease EO : Engine oil

1) CHECK ENGINE OIL LEVEL

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

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

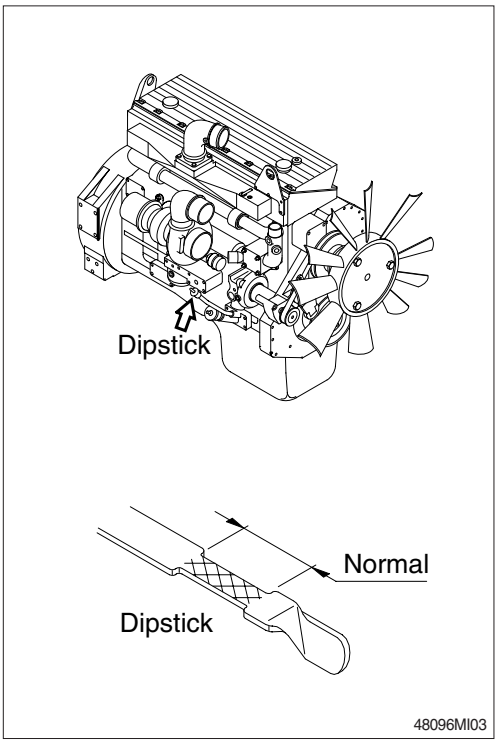
(2) Check the oil level by inserting the dipstick completely into the hole and pulling out again.

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

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

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

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

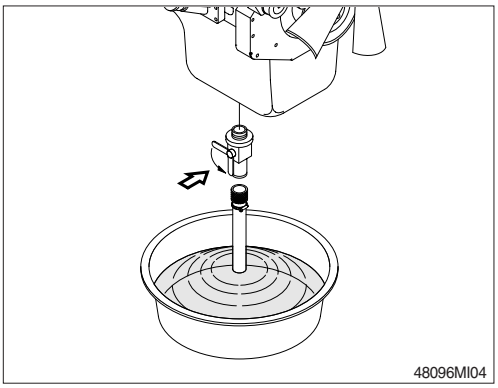


2) REPLACEMENT OF ENGINE OIL AND OIL FILTER

(1) Warm up the engine.

(2) Remove the plug and allow the oil to drain.

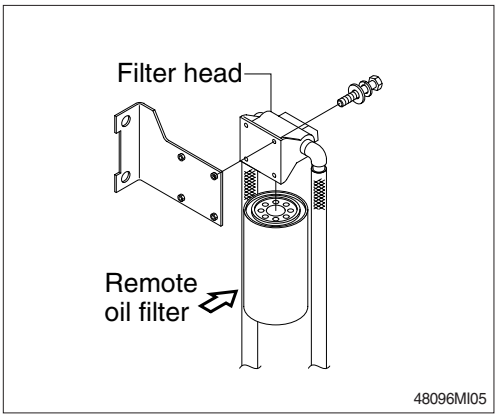
※ **A drain pan with a capacity of 40 liters (10.6 U.S. gallons) will be adequate.**



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

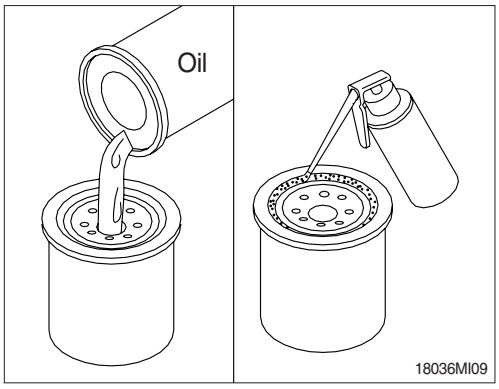
· Wrench size : 120 ㎜ (4.72 in)

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



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

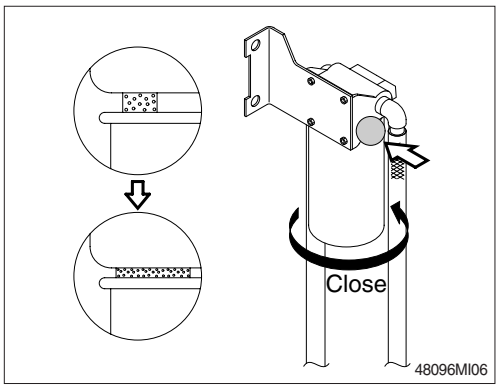
※ **Fill the filters with clean lubricating oil.**



(5) Install the filter to the filter head.

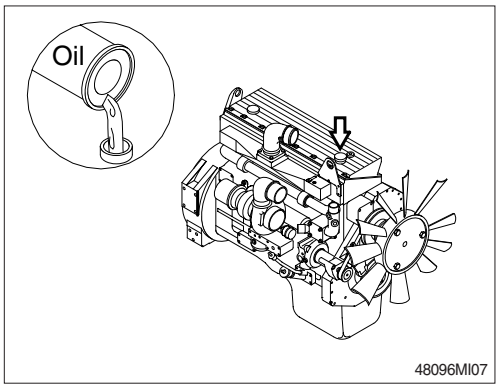
※ **Mechanical over-tightening may distort the threads or damage the filter element seal.**

· Install the filter as specified by the filter manufacturer.

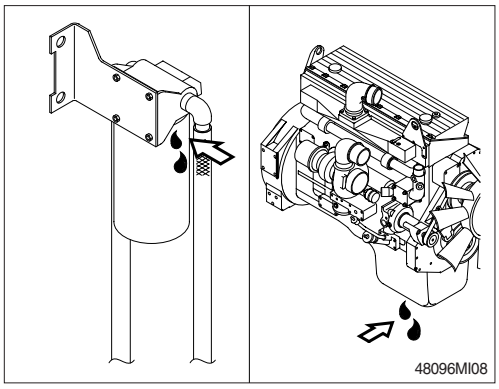


(6) Fill the engine with clean oil to the proper level.

· Quantity : 38 ℓ (10 U.S. gallons)



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



3) CHECK COOLANT

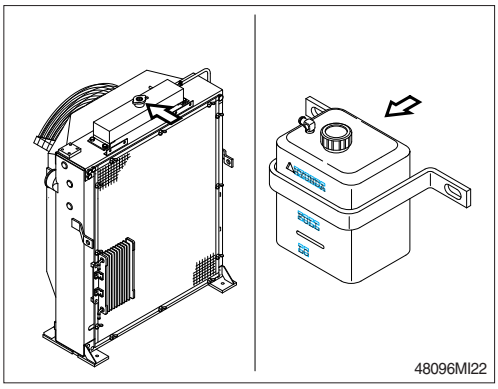
(1) Check if the level of coolant in reservoir tank is between FULL and LOW.

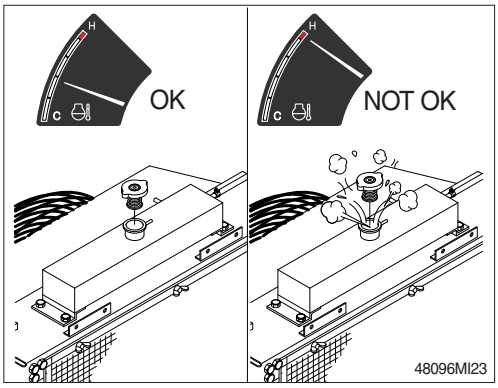
(2) Add the mixture of antifreeze and water after removing the cap of the reservoir tank if coolant is not sufficient.

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

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

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





3-1) COOLANT TEST STRIPS INSTRUCTIONS

(1) Pre-test instruction

Recommended testing frequency - at every coolant filter change interval.

① Collect coolant sample from the radiator drain valve.
- Do not collect from the coolant recovery or overflow system
- Coolant must be between 10~54℃ when tested
- Room temperature is best.

② For accurate results, test must be completed within 75 seconds.
- Follow recommended test times. Use a stopwatch.

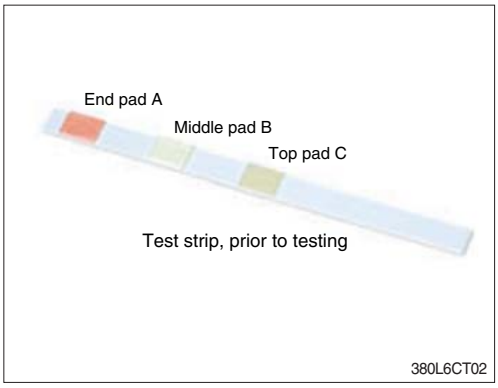
③ Record and track results.

380L6CT01

(2) Test instruction

① Remove one strip from bottle and replace cap immediately.
Do not touch the pads on the end of the strip. Discard kit if nitrite test pads of unused strips have turned brown.

② Dip strip for 1 second in coolant sample, remove, and shake strip briskly to remove excess liquid.



380L6CT02

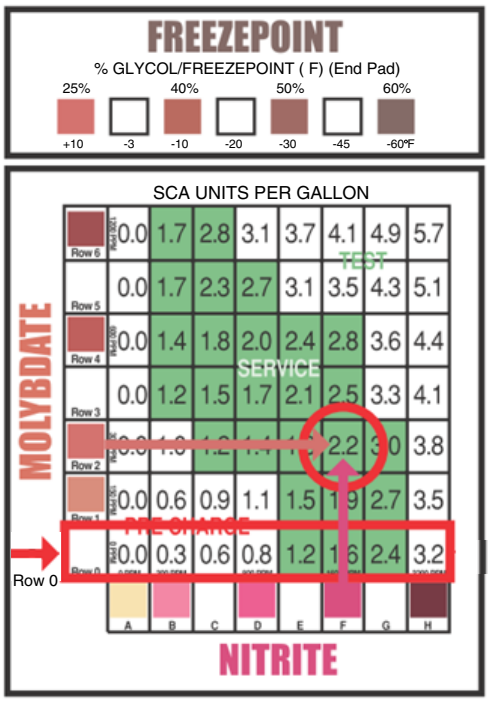
③ 45 seconds after dipping strip, compare results to color chart and record in the following order:

for DCA4:

④ All three readings must be completed no later than 75 seconds after dipping strip.

⑤ If uncertain about the color match, pick the low numbered block.
ex.) If nitrite color is not F, use column E.

⑥ Determine where the molybdate level intersect the nitrite level on the chart. The amount of SCA units per gallon in the cooling system is given where the molybdate row intersect the nitrite column.



380L6CT03

(3) Maintenance actions based on results

① Above normal

ABOVE NORMAL - Do not replace the coolant filter or add DCA4 liquid until additive concentration falls below 3 units per gallon.

- Test at every subsequent coolant filter change interval.

② Normal

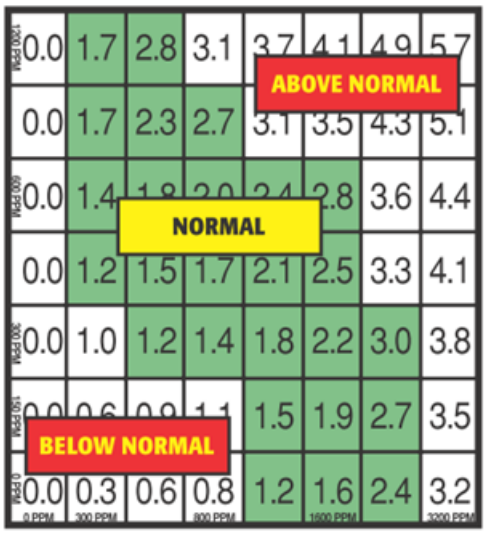
NORMAL - Continue to replace the coolant filter at your normal interval.

③ Below normal

BELOW NORMAL - Replace the coolant filter and add 1 pint of additive per each 4 gallons of coolant.

- Replace the coolant filter and add 40 cc of additive per each 1 liter of coolant.

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



380L6CT04

4) FLUSHING AND REFILLING OF RADIATOR

(1) Change coolant

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

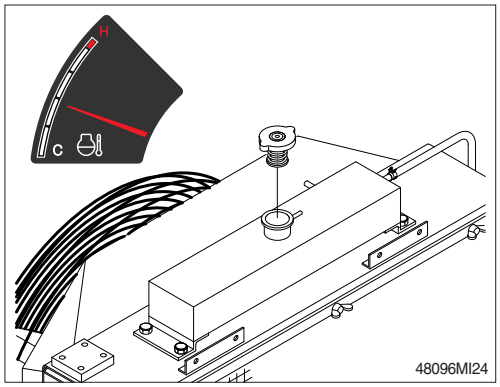
Avoid excessive contact-wash thoroughly after contact.

Keep out of reach of children.

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

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

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



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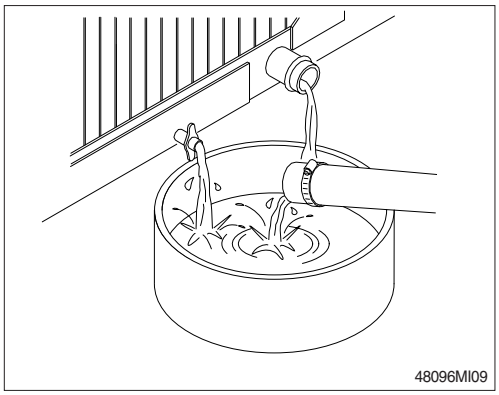
⚠ **Wait until the temperature is below 50 °C (122 °F) before removing the coolant system pressure cap.**
Failure to do so can cause personal injury from heated coolant spray.
Drain the cooling system by opening the drain valve on the radiator and removing the plug in the bottom of the water inlet. A drain pan with a capacity of 50 liters (13 U.S. gallons) will be adequate in most applications.

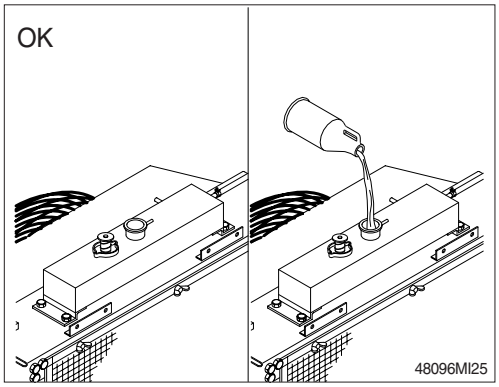


(2) Flushing of cooling system

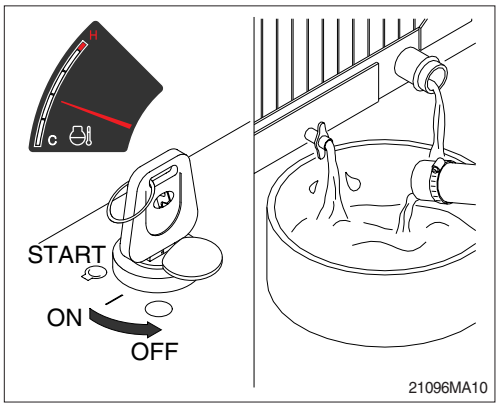
① Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).

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

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



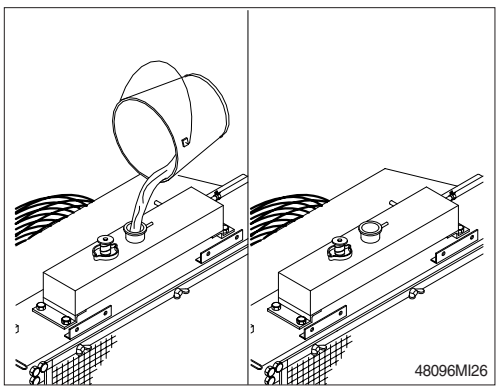
② Operate the engine for 5 minutes with the coolant temperature above 80 °C (176 °F).
Shut the engine off, and drain the cooling system.



③ Fill the cooling system with clean water.

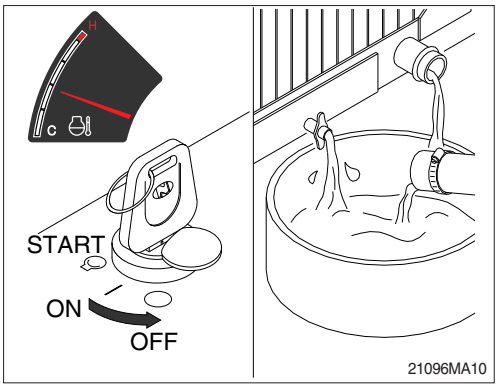
※ **Be sure to vent the engine and aftercooler for complete filling.**

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



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

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

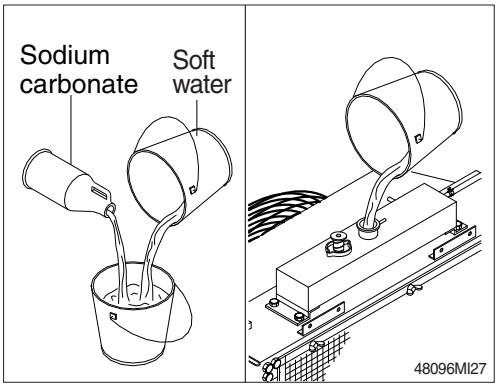


(3) Cooling system filling

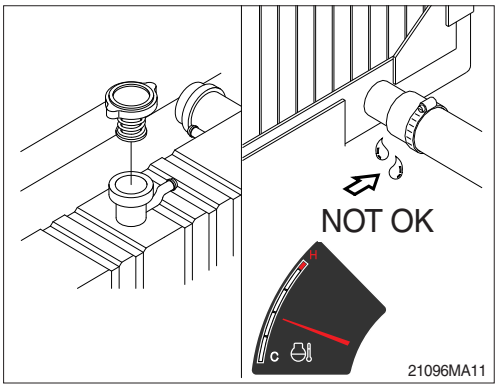
① Use a mixture of 50 percent soft water and 50 percent ethylene glycol antifreeze to fill the cooling system. Refer to the page 6-10.
Coolant capacity (engine only) : 10.4 ℓ (2.7 U.S. gallons)

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

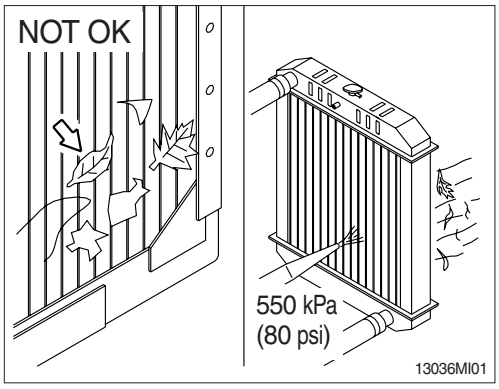


5) CLEAN RADIATOR AND OIL COOLER

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

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

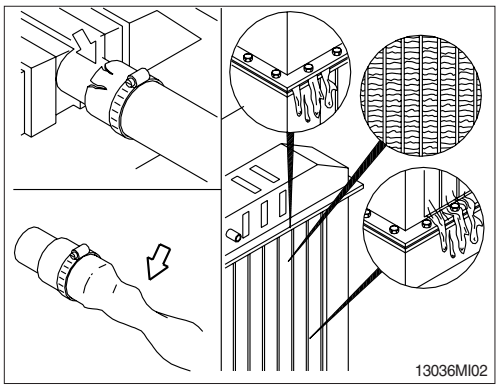
(2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.
Blow the air in the opposite direction of the fan air flow.



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

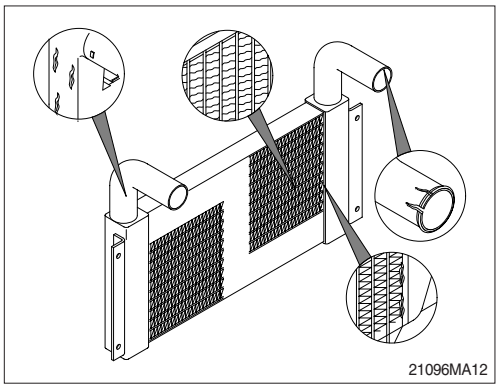
※ **If the radiator must be replaced due to bent or broken fins which can cause the engine to overheat, refer to the manufacturer's replacement procedures.**

(4) Visually inspect the radiator for core leaks.



6) CHECK CHARGE AIR COOLER

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

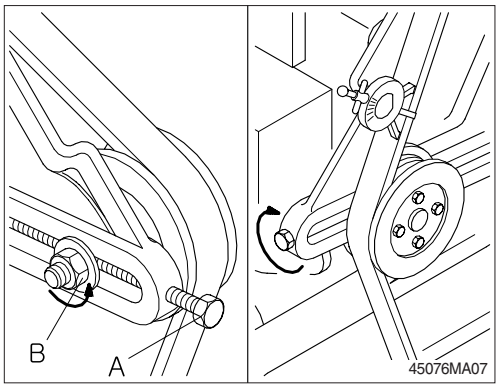


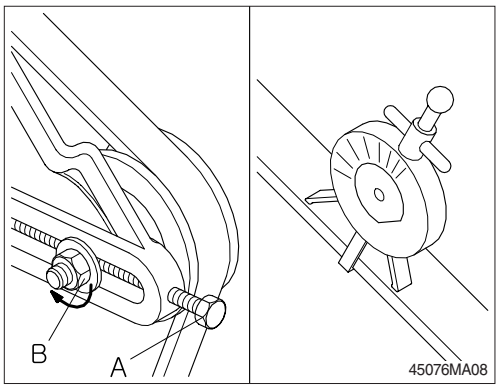
7) FAN BELT TENSION

(1) Use the belt tension gage to measure the belt tension.
Fan belt tension : 11.3 kg (25 lb)

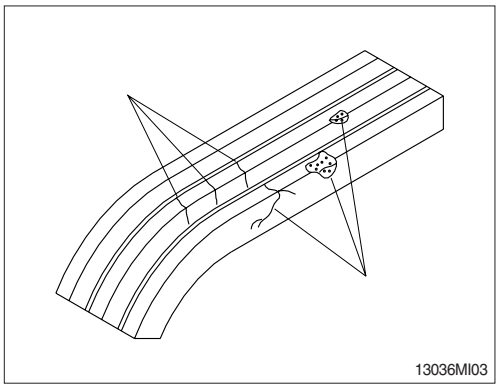
(2) Turn the idler pulley adjusting screw (A) clockwise to increase the belt tension.

(3) Tighten the idler pulley shaft lockout (B) tightening torque : 19.4 kgf · m (140 lb · ft)

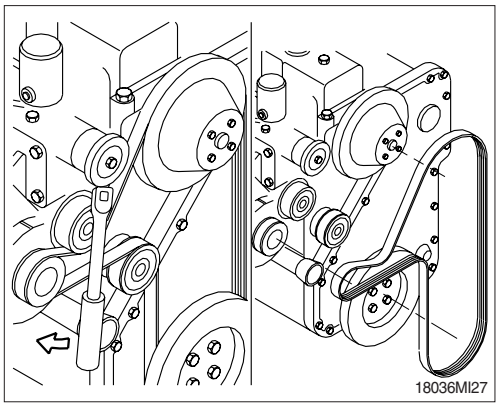




(4) Inspect the drive for damage.



(5) Inspect the drive belt, tension bearing and for hub.



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.

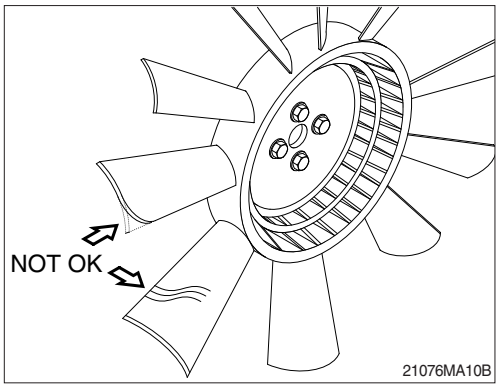
※ Rotate the crankshaft by using the engine barring gear.

※ 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) CLEANING OF AIR CLEANER

(1) Primary element

① Loosen the clamps and remove the element.

② Clean the inside of the body.

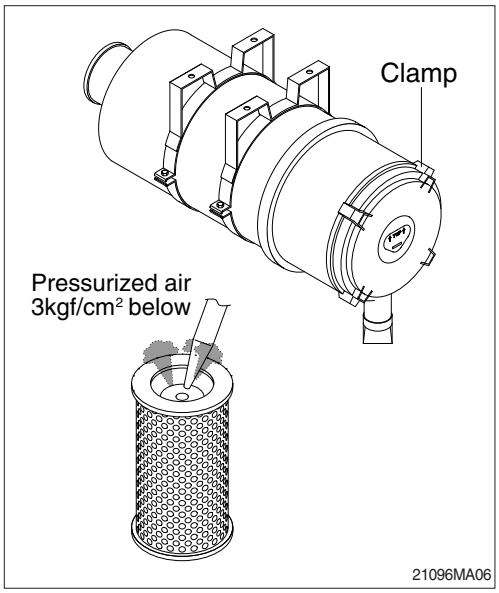
③ Clean the element with pressurized air.

- Remove the dust inside of the element by the pressurized air (below 3 kgf/cm², 40 psi) forward and backward equally.

④ Inspect for cracks or damage of element by putting a light bulb inside of the element.

⑤ Insert element and tighten clamp.

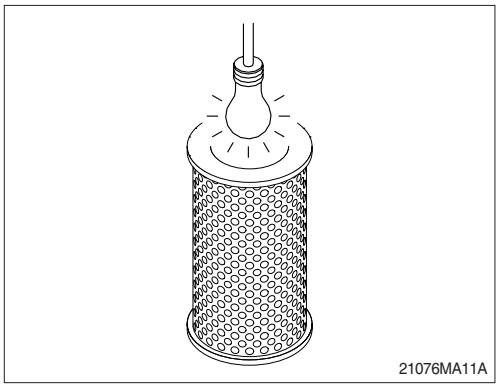
※ Replace the primary element after 4 times cleanings.



(2) Safety element

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

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



9-1) AIR CLEANER (OIL BATH)

△ **Always cover the engine intake hole while the air cleaner is being serviced.**

(1) General service

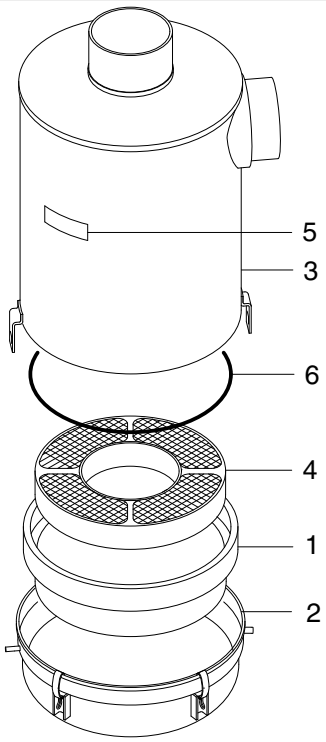
① The oil bath air cleaner should be inspected constantly for leaks and damage.

② The removable element assembly (4) should be removed the from the oil cups (1, 2) and inspected daily or at each oil cup service.
Watch all connections for mechanical tightness.

③ Be sure cleaner outlet pipe is not fractured.
If air cleaner has been dented or damaged,

④ check all connections immediately.
In case of leakage and if adjustment does not

⑤ correct the trouble, replace necessary parts or O-ring.



1 Inner cup assy
2 Outer cup assy
3 Body assy
4 Removable element
5 Marking
6 O-ring

480S6MA35

(2) Oil cup

① Service the inner oil cup (1) and outer oil cup (2) daily or when 1/2" of dirt has collected in bottom of either cup.

※ **Severe operating conditions may require several inspections daily.**

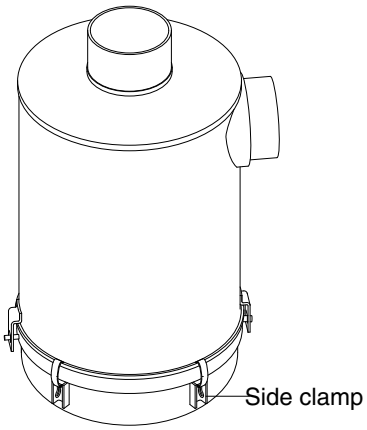
② Loosen the side clamps and removing bottom of unit and lift the removable element assembly (4) from the oil cup.

③ Pour out the oil and remove inner cup (1) from out cup (2) and remove sludge and wipe clean.

④ Reassembled inner cup (1) in outer cup (2) and refill both cups to indicated oil level.

⑤ The same oil specified for the engine crankcase is generally acceptable.

※ **Do not over fill or under fill the cup.**
Overfilling means loss of capacity and under filling means lack of efficiency.



480S6MA36

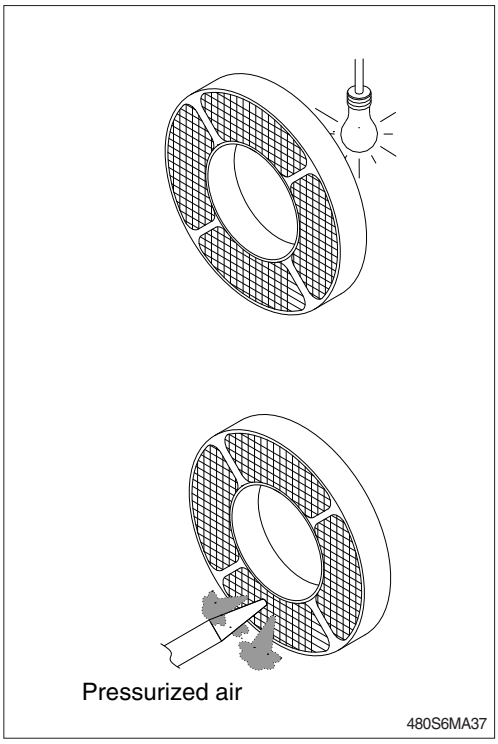
(3) Removable element

① First step in servicing removable element assembly is hold up to a strong light. An even, bright pattern of light through the wire element means if is clean.

② If removable element is even partially plugged with dirt, lint or chaff, wash thoroughly with solvent.
Then blowout with compressed air.

③ Inspect lower portion of body assembly and center tube each time oil cup is serviced. See back side for service details.

④ Reassemble removable element assembly to serviced oil cups and to air cleaner body.
Be sure the oil cup is tight to body assembly.

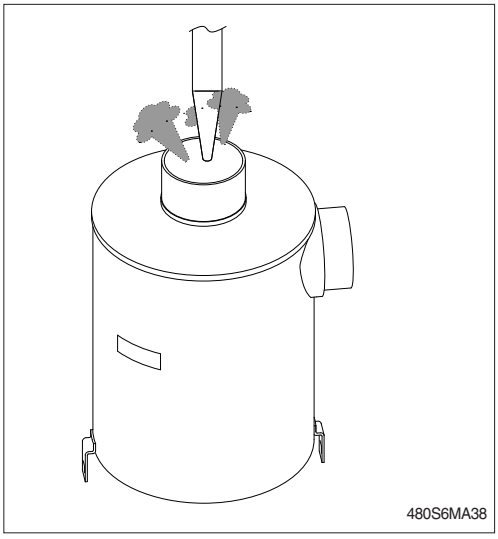


(4) Body assembly

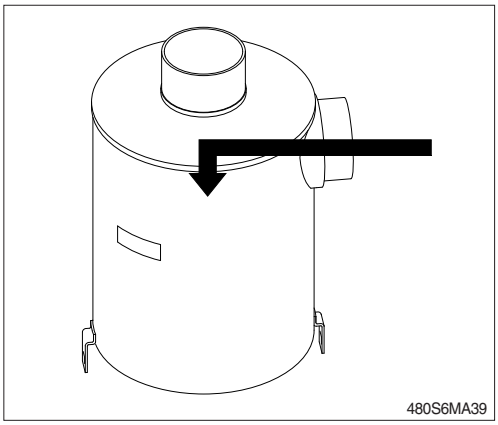
The lower portion of the body assembly should be inspected each time the air cleaner is serviced. If there is any sign of build-up or plugging, the body assembly should be removed and cleaned. At least once a year, remove the body assembly and perform the following service steps.

① Remove oil cup and removable element assembly.

② Check and clean center tube.



③ Pump solvent through the air outlet with sufficient force and volume to produce a hard, even stream out the bottom of the body assembly. Reverse flush until all foreign material is removed.



10) FUEL TANK

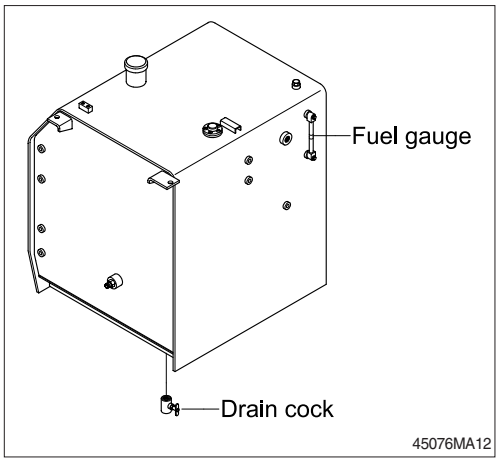
(1) Fill fuel fully when system the operation to minimize water condensation, and check it with fuel gauge before starting the machine.

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

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

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

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



11) REPLACEMENT OF FUEL FILTER

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

(2) Replace the O-ring.

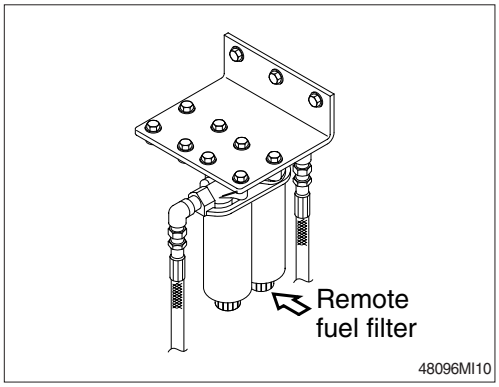
(3) Fully fill fuel in the new filter.

(4) Apply engine oil on the gasket of filter when mounting, and tighten 1/2 to 3/4 turn more after the gasket touches the filter head.

(5) Relieve the air after mounting.

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

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

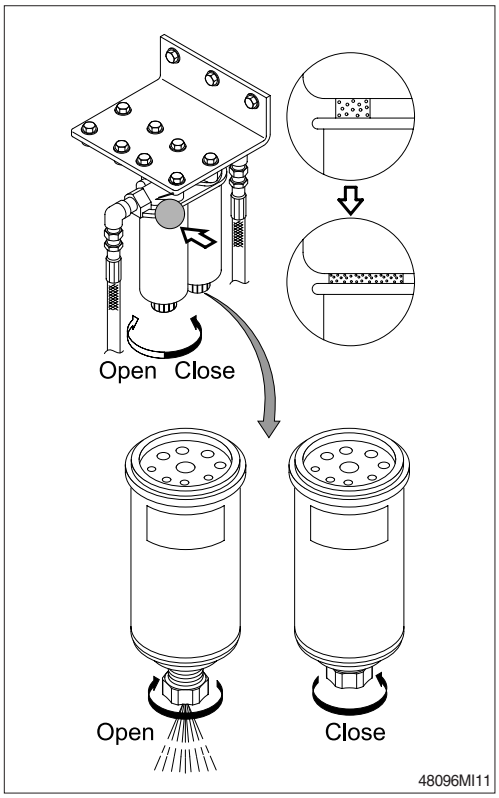


12) FUEL WATER SEPARATOR

- Drain the water and sediment from the separator daily.
- Shut off the engine.
- Use your hand to open the drain valve.
- Turn the valve counterclockwise 3-1/2 complete turns until the valve drops down 1".
- Drain the filter sump of water until clear fuel is visible.

※ **Do not overtighten the valve.**
Overtightening can damage the threads.

- Push the valve up and turn the valve clockwise to close the drain valve.

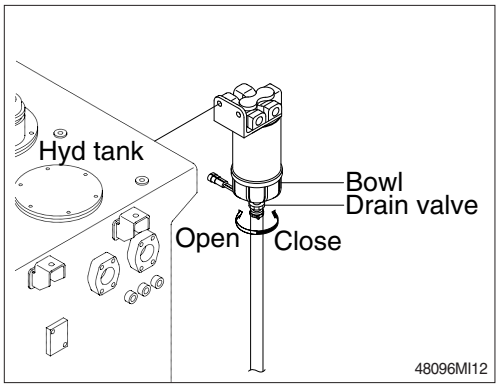


13) PREFILTER

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

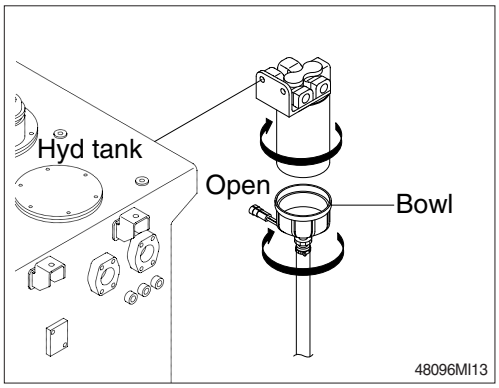
(1) Drain water

① Open bowl drain valve to evacuate water.
② Close drain valve.

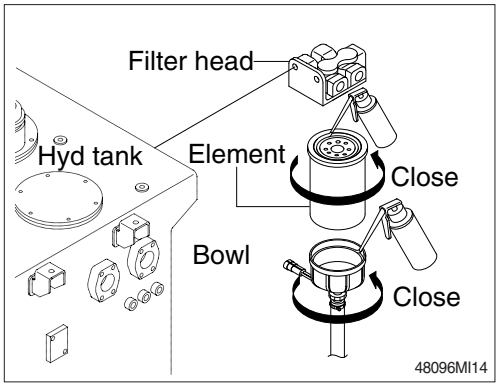


(2) Replace element

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



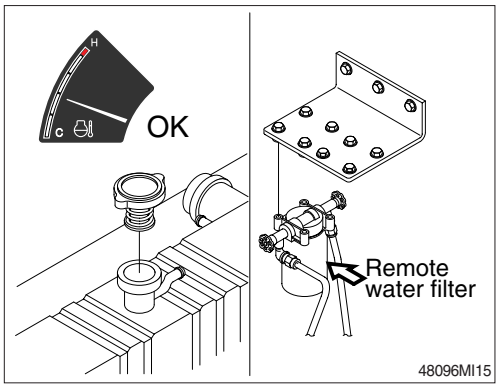
④ Lubricate new bowl seal with clean fuel or motor oil and place in bowl gland.
⑤ Attach bowl to new element firmly by hand.
⑥ Lubricate new element seal and place in element top gland.
⑦ Attach the element and bowl to the head.



14) CORROSION RESISTOR (COOLANT FILTER)

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

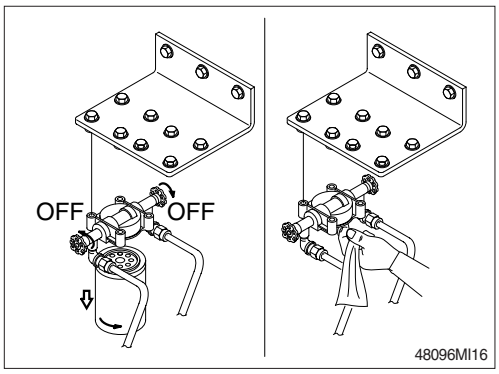
(1) Remove the radiator cap.



(2) Turn the valve to the OFF position.

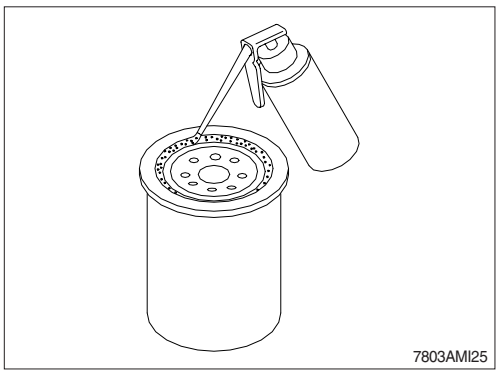
(3) Remove and discard the filter.
Clean the coolant filter head gasket's surface.

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



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

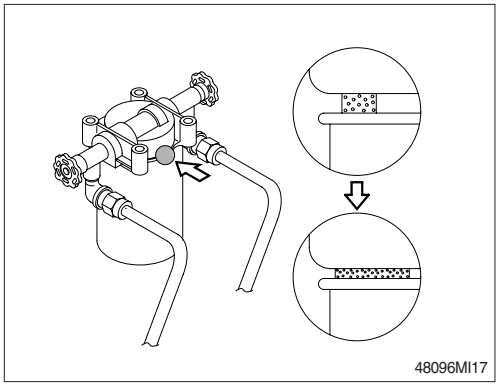
※ **If the filter canister is damaged in any way, do not use it. Dents or scrapes can lead to a rupture or premature failure of the filter.**



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

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

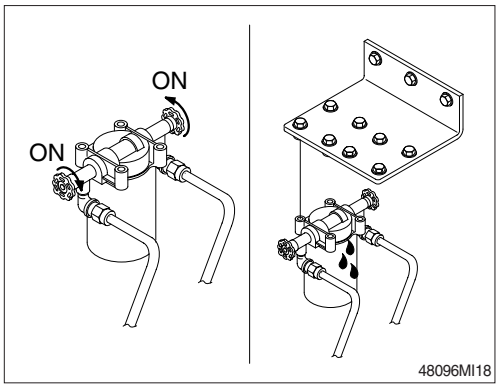
※ **Mechanical over tightening can distort the filter threads or damage the filter head.**



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

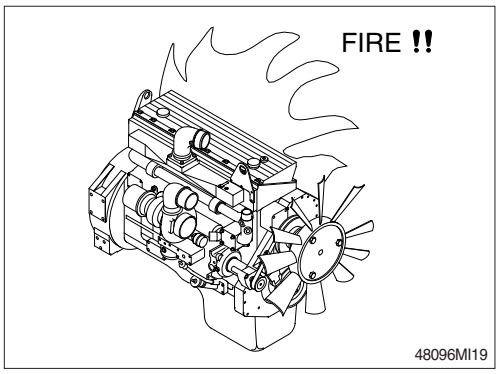
(8) Operate the engine and check for leaks.

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



15) LEAKAGE OF FUEL

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

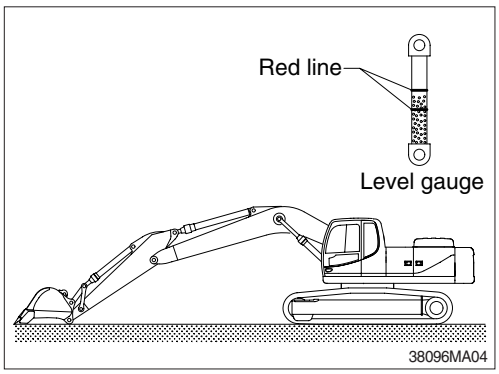


16) HYDRAULIC OIL CHECK

(1) Stop the engine after retract the arm and bucket cylinders, then lower the boom and set the bucket on the ground at a flat location as in the illustration.

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

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



17) FILLING HYDRAULIC OIL

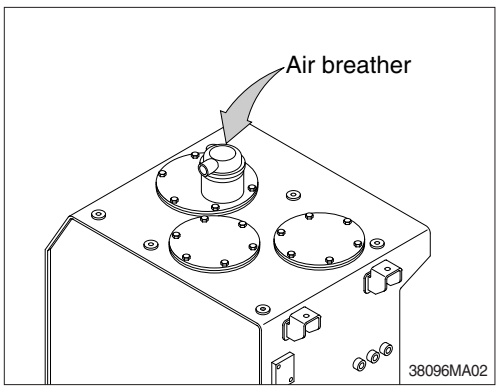
(1) Stop the engine to the position of level check.

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

(3) Remove the breather on the top of oil tank and fill the oil to the specified level.

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

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



18) CHANGE HYDRAULIC OIL

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

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

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

(4) Prepare a suitable container.

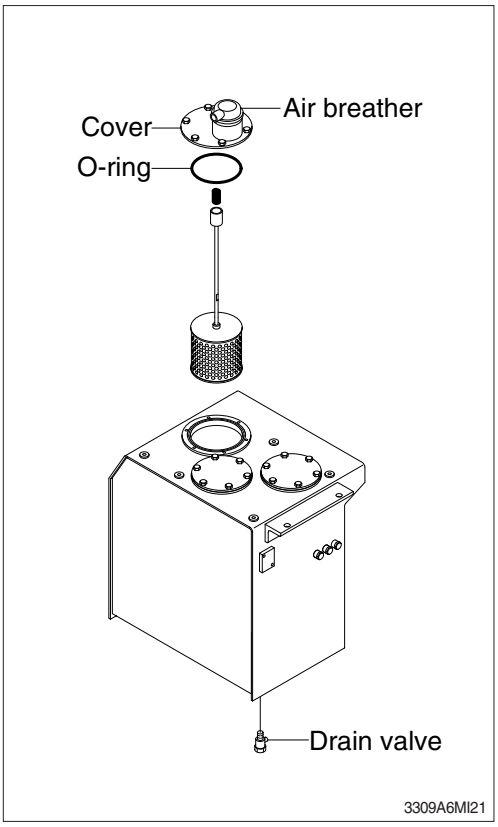
(5) To drain the oil loosen the drain plug at the bottom of the oil tank.

(6) Fill proper amount of recommended oil.

(7) Put the breather in the right position.

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

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



19) CLEAN SUCTION STRAINER

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

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

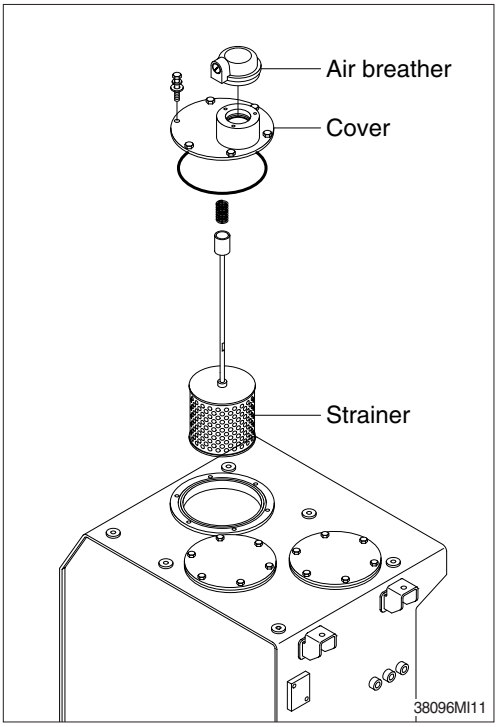
(2) Pull out the strainer in the tank.

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

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

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

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



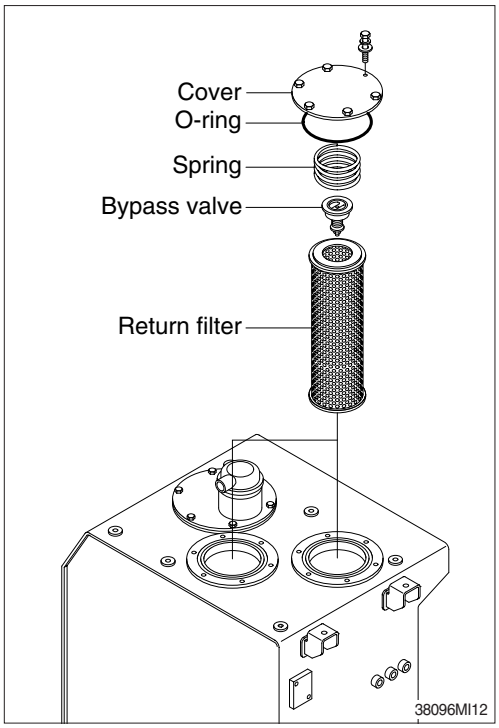
20) REPLACEMENT OF RETURN FILTER

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

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

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

(3) Replace the element with new one.



21) REPLACEMENT OF ELEMENT IN HYDRAULIC TANK BREATHER

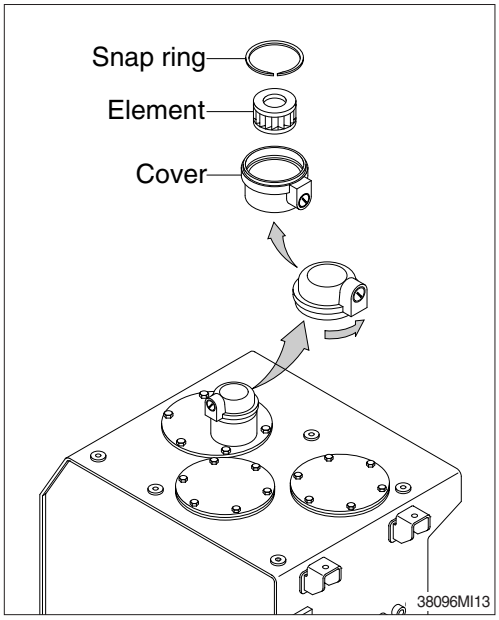
(1) Relieve the pressure in the tank by pushing the top of the air breather.

(2) Remove the cover.

(3) Remove the snap ring and pull out the filter element.

(4) Replace the filter element new one.

(5) Reassemble by reverse order of disassembly.
- Tightening torque : 0.2~0.3 kgf · m (1.4~2.1 lbf · ft)

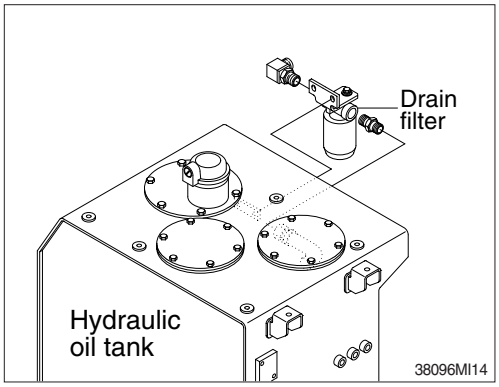


22) REPLACE OF DRAIN FILTER CARTRIDGE

Clean the dust around filter and replace with new one after removing the cartridge.

※ **Tighten about 2/3 turn more after the gasket of cartridge contacts seal side of filter body for mounting.**

※ **Change cartridge after initial 250 hours of operation. Thereafter, change cartridge every 1000 hours.**



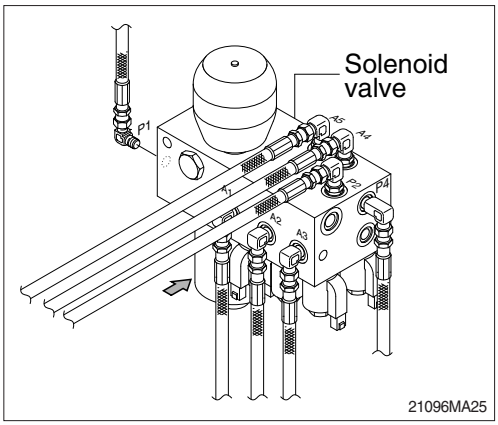
23) REPLACE OF PILOT LINE FILTER

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

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

(3) Install the new element and tighten using specified torque.

※ **Change cartridge after initial 250 hours of operation. Thereafter, change cartridge every 1000 hours.**

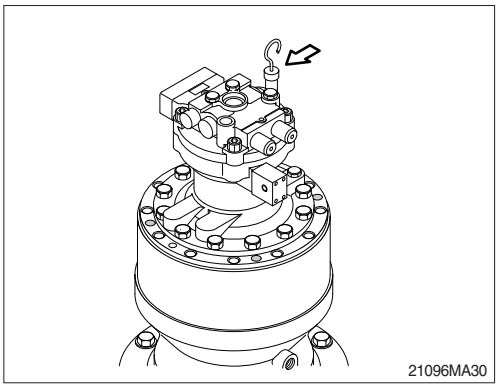


24) CHECK THE SWING REDUCTION GEAR OIL

(1) Pull out the dipstick and clean it.

(2) Insert it again.

(3) Pull out one more time to check the oil level and fill the oil if the level is not sufficient.



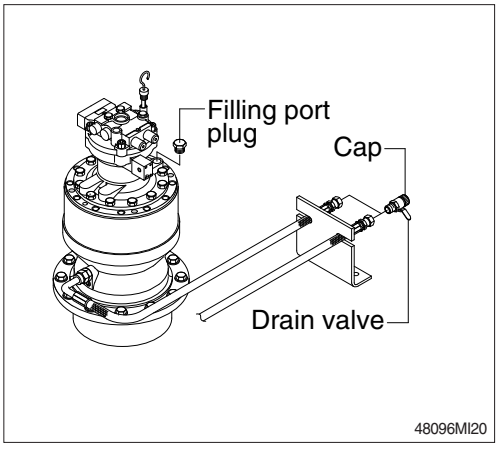
25) CHANGE SWING REDUCTION GEAR OIL

(1) Raise the temperature of oil by swinging the machine before replace the oil and park the machine on the flat ground.

(2) Prepare a proper container.

(3) Open the cap and loosen the drain valve.

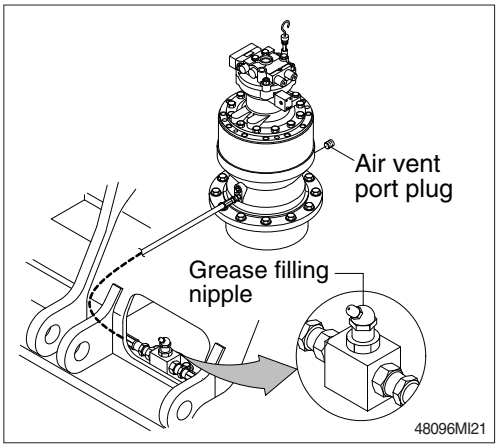
(4) Clean around the valve and close the drain valve and cap.
Fill proper amount of recommended oil.
- Amount of oil : 5.0 ℓ (1.3 U.S.gal, TYPE 1)
- Amount of oil : 7.0 ℓ (1.8 U.S.gal, TYPE 2)



26) LUBRICATE BEARING OF OUTPUT SHAFT IN REDUCTION GEAR

(1) Remove air vent plug.

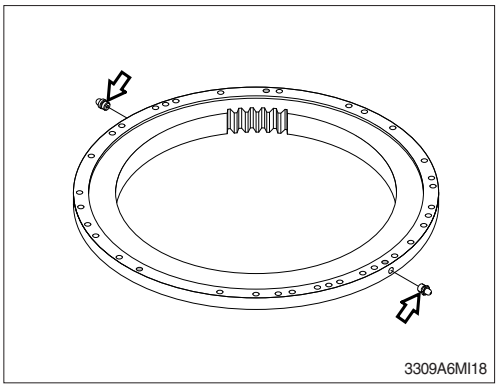
(2) Lubricate NLGI No.2 with grease gun until comes out new grease from air vent port.
- Amount of oil : 1.2 ℓ (0.3 U.S.gal)



27) LUBRICATE SWING BEARING

(1) Grease at 2 fitting.

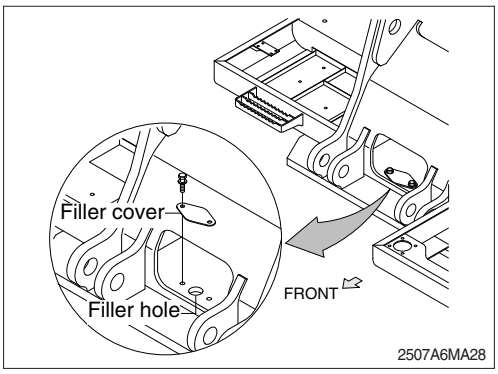
※ **Lubricate every 250 hours.**



28) SWING GEAR AND PINION

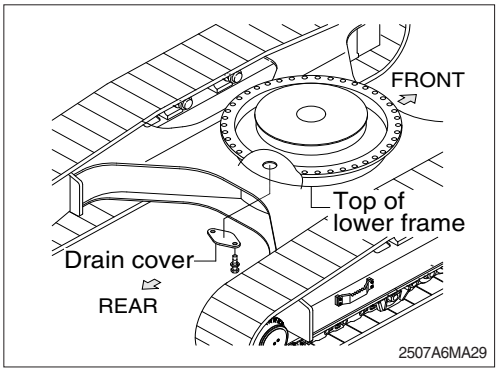
(1) Drain old grease

① Remove under cover of lower frame.
② Remove drain cover of lower frame.
③ Remove filler cover of upper frame.
④ Operate full turn (360°) of swing several times.



(2) Refill new grease

① Install drain cover.
② Fill with new grease.
③ Install filler cover.
· Capacity : 14.0 kg (31 lb)

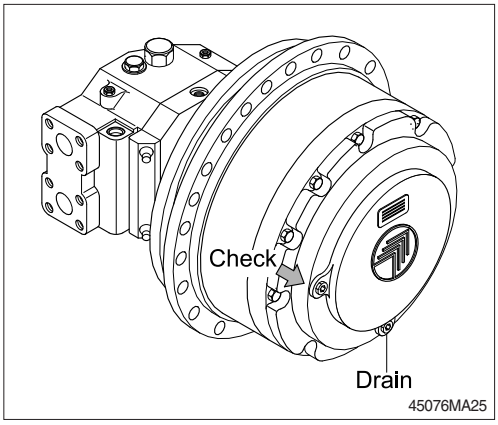


29) CHECK THE TRAVEL REDUCTION GEAR OIL

(1) Operate the machine to the position of drain plug down to the flat ground.

(2) Loosen the level plug and check the oil level.
If the level is at the hole of the plug, it is normal.
Fill the oil if it is not sufficient.

· Amount of oil : 6.0 ℓ (1.6 U.S.gal, TYPE 1, 2)
· Amount of oil : 12 ℓ (3.2 U.S.gal, TYPE 3)



30) CHANGE OF THE TRAVEL REDUCTION GEAR OIL

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

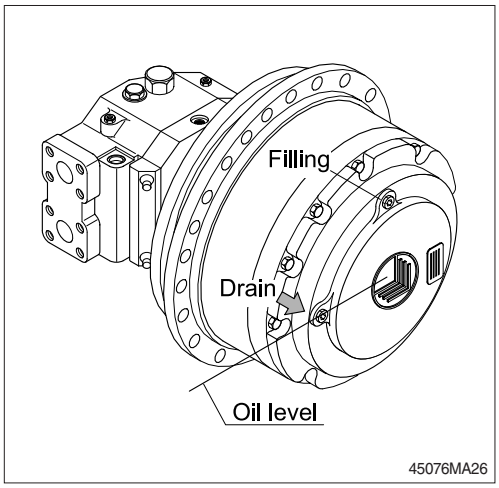
(2) Stop when the position of the drain plug is down.

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

(4) Drain the oil to adequate container.

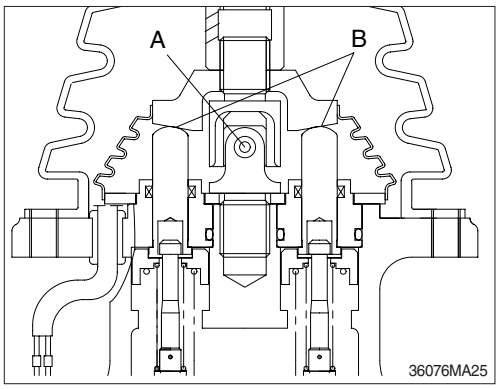
(5) Tighten the drain plug and fill specified amount of oil at filling port.

(6) Tighten the level plug and travel slowly to check if there is any leakage of oil.



31) LUBRICATE RCV LEVER

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



32) ADJUSTMENT OF TRACK TENSION

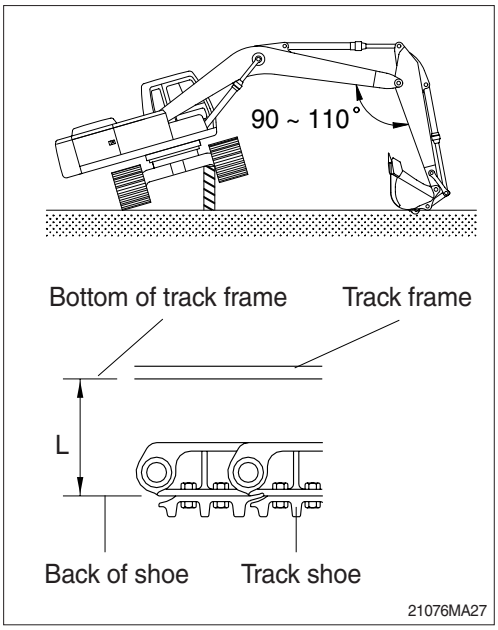
※ **It is important to adjust the tension of track properly to extend the lifetime of track and traveling device.**

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

(1) Raise the chassis with the boom and arm.

(2) Measure the distance between bottom of track frame on track center and track of shoe.

※ **Remove mud with rotating the track before measuring.**



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

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

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

※ **When the grease is drained, move the track to the forward and backward slightly.**
If the track tension is loose even after the grease is charged to the maximum, change the pins and bushings as there are worn seriously.

Working condition	Length (L)	
General	390~420 mm	15.4~16.5"
Swamp	420~460 mm	16.5~18.1"
Sand, Mud, pebbes	About 460 mm	About 18.1"

33) REPLACEMENT OF BUCKET

⚠ **When knocking the pin in with a hammer, metal particles may fly and cause serious injury, particularly if they get into your eyes. When carrying out this operation, always wear goggles, helmet, gloves, and other protective equipment.**

※ **When the bucket is removed, place it in a stable condition.**

※ **When performing joint work, make sure signals to each other and work carefully for safety's sake.**

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

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

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

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

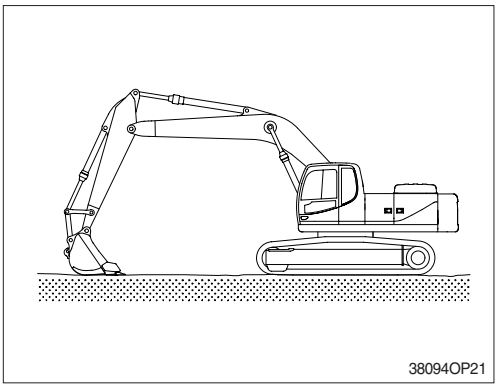
※ **If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.**

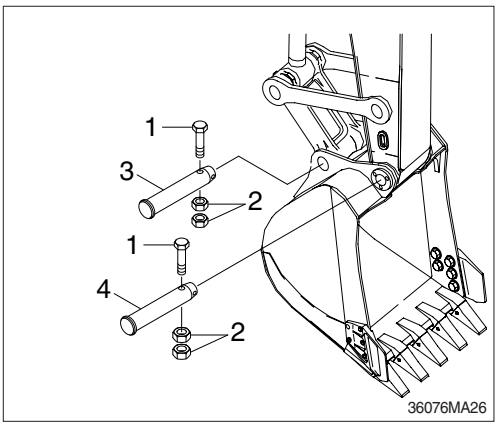
※ **After remove the pins, make sure that they do not become contaminated with sand or mud and that the seals of bushing on both sides do not become damaged.**

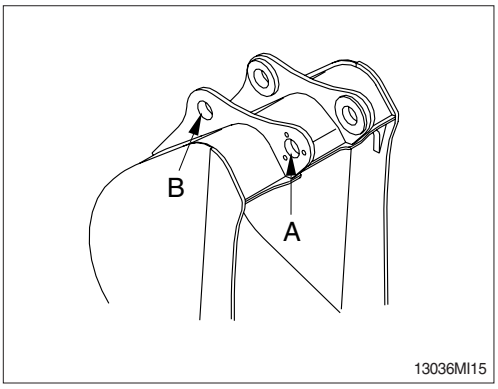
(4) Align the arm with holes (A) and the link with holes (B), then coat with grease and install pins(3, 4)

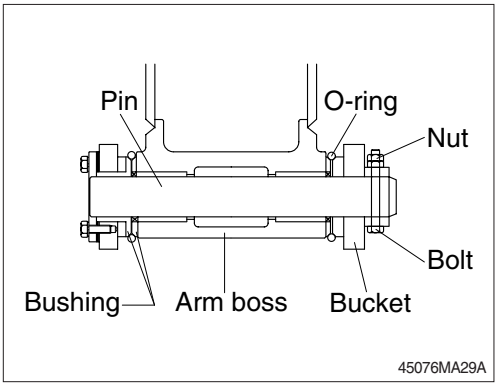
※ **When installing the bucket, the O-rings are easily damaged, so fit the O-rings on the boss of the bucket as shown in the picture. After knocking the pin, move the O-ring down to the regular groove.**

(5) Install the stopper bolt (1) and nuts (2) for each pin, then grease the pin.







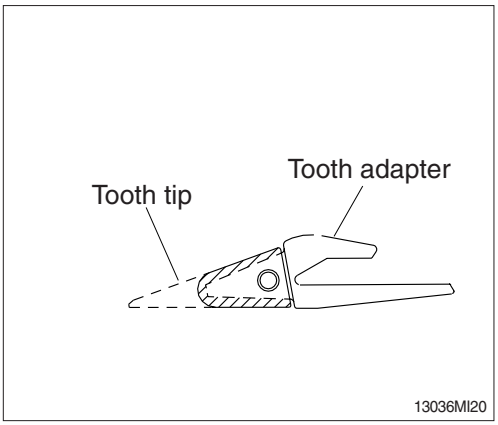


34) REPLACEMENT OF BUCKET TOOTH

(1) Timing of replacement

① Check wearing condition as shown in the illustration and replace tooth tip before adapter starts to wear.

② If excessive use, tooth adapter has worn out, replacement may become impossible.



(2) Instructions for replacement

① Pull out pin by striking pin with punch or hammer, avoiding damage to locking washer.

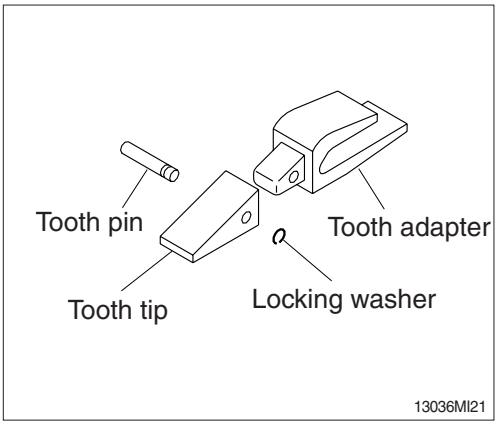
② Remove dust and mud from surface of tooth adapter by using knife.

③ Place locking washer in its proper place, and fit tooth tip to adapter.

④ Insert pin until locking washer is positioned at tooth pin groove.

⚠ Personal injury can result from bucket falling.

⚠ Block the bucket before changing tooth tips or side cutters.



35) ADJUSTMENT OF BUCKET CLEARANCE

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

(2) Swing to the left and keep the arm boss to be contact to the bucket left.

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

(4) Measure the clearance (A) between bucket and arm boss. This is the total clearance.

(5) Adjusting

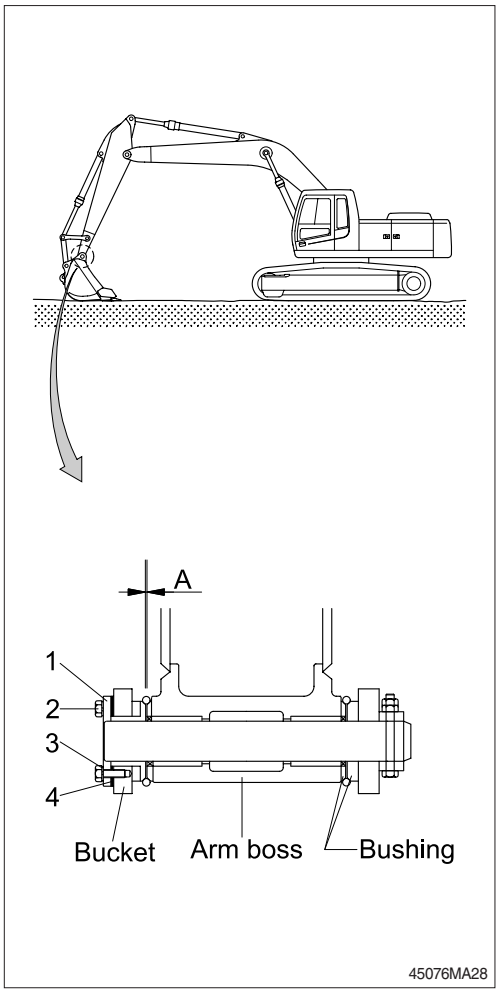
① Loosen bolt (2), and remove washer (3), plate (1) and shim (4).

② Remove the shim equivalent value with measuring value.

③ Assemble the parts in the reverse order of removal.

- Tightening torque : 29.6±3.2 kgf · m (214.0±23.1 lbf · ft)
- Normal clearance : 0.5 ~ 1.0 mm (0.02 ~ 0.04 in)

※ **If the bucket is not adjusted correctly, noise and vibration created during operation, and damaged O-ring, pin and bushing quickly.**



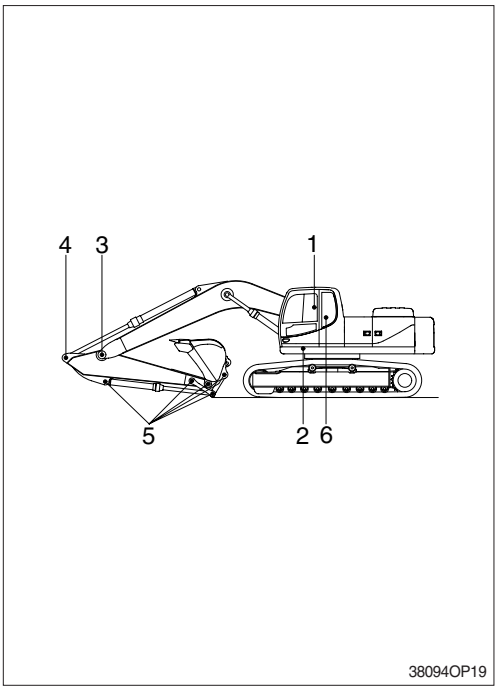
36) LUBRICATE PIN AND BUSHING

(1) Lubricate to each pin of working device

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

No.	Description	Qty
1	Lubrication manifold at boom	5
2	Boom cylinder pin	2
3	Boom and arm connection pin	1
4	Arm cylinder pin (rod side)	1
5	Bucket cylinder pin (head, rod)	2
	Bucket link (control rod)	3
	Arm and control link connection pin	1
	Arm and bucket connection pin	1
6	Boom rear bearing center	1

※ **Shorten lubricating interval when working in the water or dusty place.**



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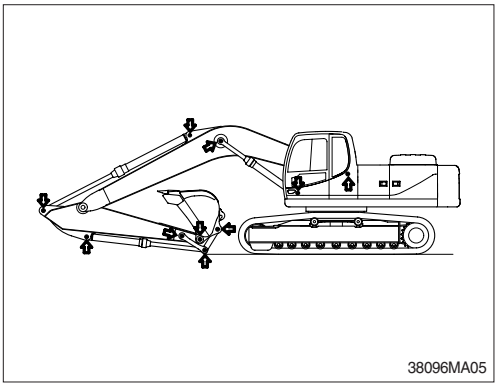
(2) Dust seals are mounted on the rotating part of working device to extend the lubricating interval.

※ **Mount the lip to be faced outside when replace the dust seal.**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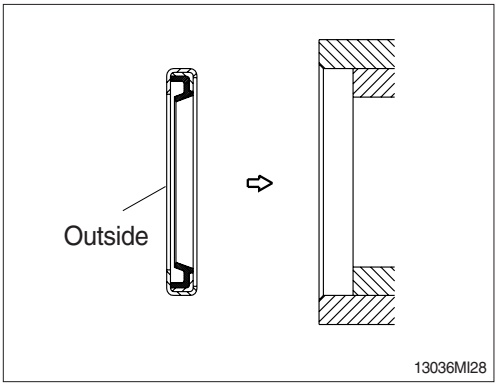
※ **If it is assembled in wrong direction, it will cause fast wear of pin and bushing, and create noise and vibration during operation.**

※ **Assemble the seal same direction with picture and use with plastic hammer when replace.**



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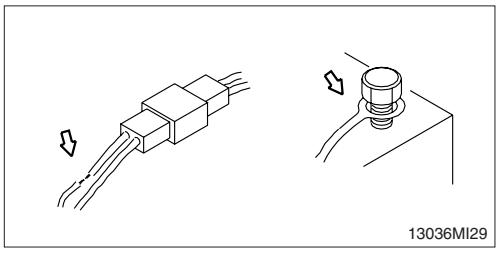
7. ELECTRICAL SYSTEM

1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



2) BATTERY

(1) Clean

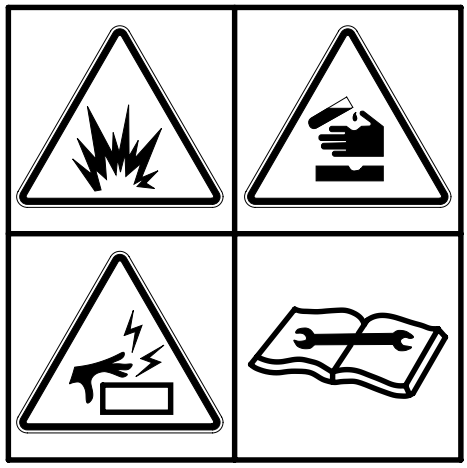
① Wash the terminal with hot water if it is contaminated, and apply grease to the terminals after washing.

⚠ Battery gas can explode. Keep sparks and flames away from batteries.

⚠ Always wear protective glasses when working with batteries.

⚠ Do not stain clothes or skin with electrolyte as it is acid.

Be careful not to get the electrolyte in eyes. Wash with clean water and go to the doctor if it enters the eyes.



(2) Recycle

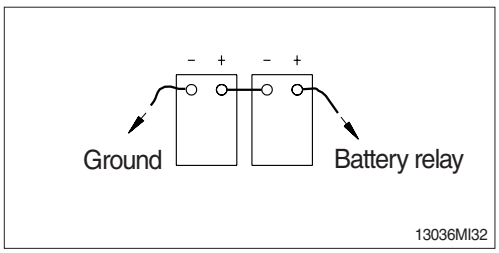
Never discard a battery.

Always return used batteries to one of the following locations.

- A battery supplier
- An authorized battery collection facility
- Recycling facility

(3) Method of removing the battery cable

Remove the cable from the ground connection first (⊖ terminal side) and reconnect it last when reassembling.



3) STARTING THE ENGINE WITH A BOOSTER CABLE

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

(1) Connection of booster cable

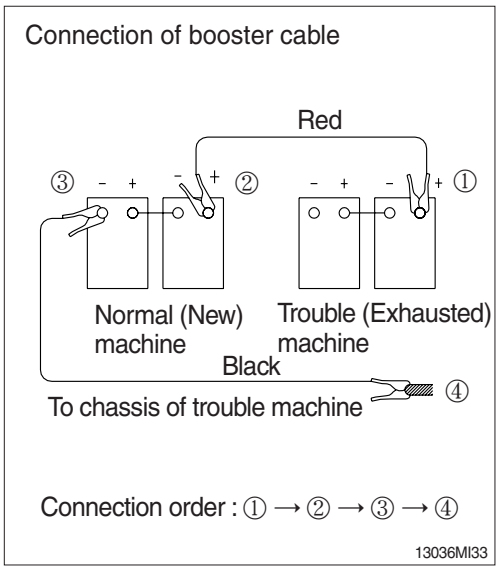
※ **Use the same capacity of battery for starting.**

① Make sure that the starting switches of the normal machine and trouble machine are both at the OFF position.

② Connect the red terminal of booster cable to the battery (+) terminal between exhausted and new battery.

③ Connect the black terminal of the booster cable between new battery (-) terminal and chassis of trouble machine.

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

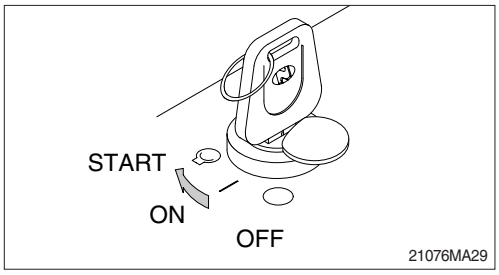


(2) Starting the engine

① Starting the engine of the normal machine and keep it to run at high idle.

② Start engine of the trouble machine with starting switch.

③ If you can not start it by one time, restart the engine after 2 minutes.



(3) Taking off the booster cable

① Take off the booster cable (black).

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

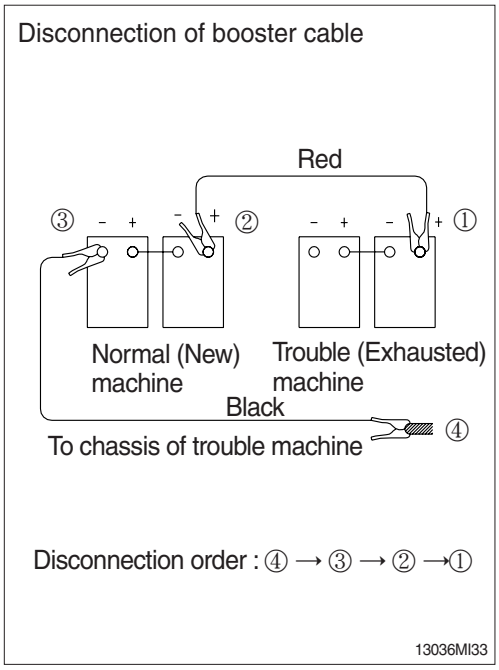
③ Run engine with high idle until charging the exhausted battery by alternator, fully.

⚠ **Explosive gas is generated while using the battery or charging it. Keep away flame and be careful not to cause the spark.**

※ **Charge the battery in the well ventilated place.**

※ **Place the machine on the earth or concrete. Avoid charging the machine on the steel plate.**

※ **Do not connect (+) terminal and (-) terminal when connecting booster cable because it will be shorted.**



(4) Welding repair

Before start to welding, follow the below procedure.

① Shut off the engine and remove the starting switch.

② Disconnect ground cable from battery by master switch.

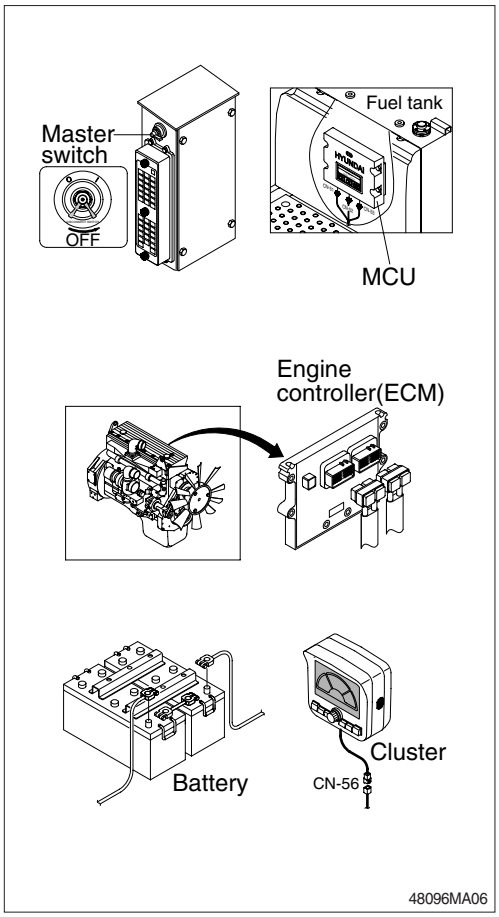
③ Before carrying out any electric welding on the machine, the battery cables should be disconnected and the connectors pulled out of the electronic control units (MCU, cluster etc).

④ Connect the earth (ground) lead of the welding equipment as close to the welding point as possible.

※ **Do not weld or flame cut on pipes or tubes that contain flammable fluids. Clean them thoroughly with nonflammable solvent before welding or flame cutting on them.**

⚠ **Do not attempt to welding work before carry out the above.**

If not, it will caused serious damage at electric system.

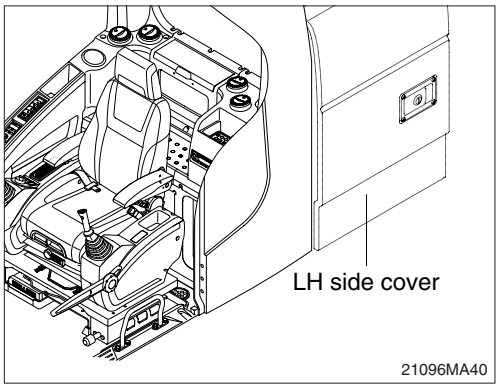


8. AIR CONDITIONER AND HEATER

1) CLEAN AND REPLACE OF FRESH AIR FILTER

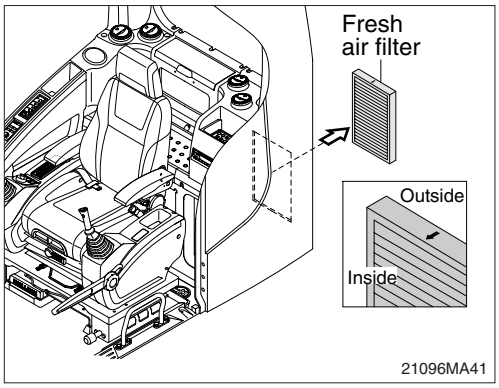
※ **Always stop the engine before servicing.**

(1) Open the LH side cover.



(2) Remove the fresh air filter.

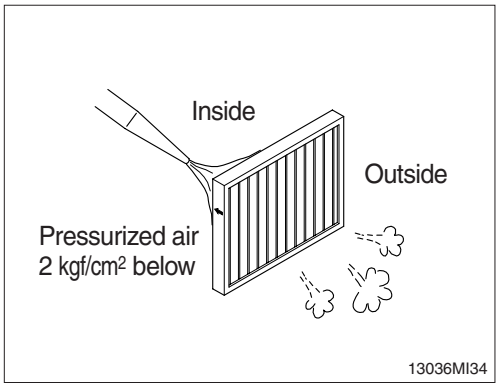
※ **When installing a filter, be careful not to change the filter direction.**



(3) Clean the filter using a pressurized air (below 2 kgf/cm², 28 psi).

△ **When using pressurized air, be sure to wear safety glasses.**

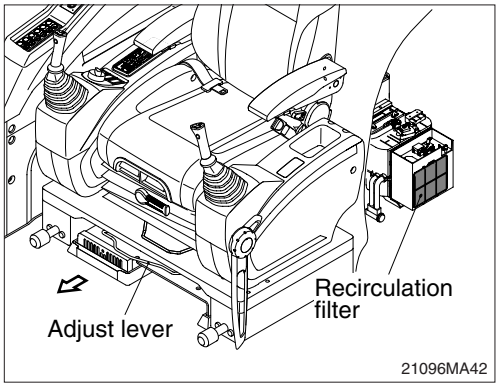
(4) **Inspect the filter after cleaning. If it is damaged or badly contaminated, use a new filter.**



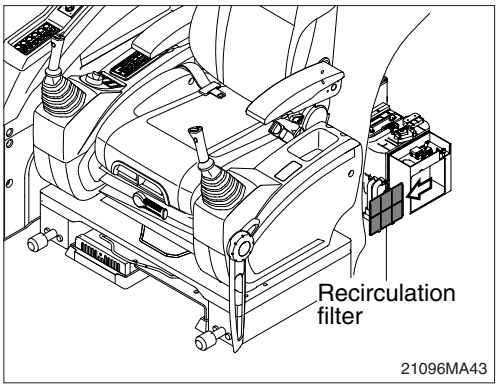
2) CLEAN AND REPLACE OF RECIRCULATION FILTER

※ **Always stop the engine before servicing.**

(1) Move seat and console box to arrow direction using the adjust lever.



(2) Remove recirculation filter.

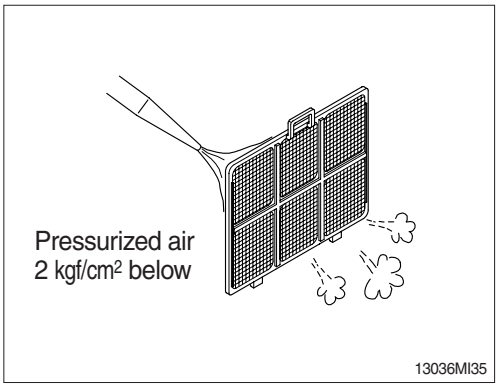


(3) Clean the recirculation filter using a pressurized air (below 2 kgf/cm², 28 psi) or washing with water.

△ **When using pressurized air, be sure to wear safety glasses.**

※ **Dry off after washing with water.**

(4) Inspect the filter after cleaning. If it is damaged or badly contaminated, use a new filter.



3) PRECAUTIONS FOR USING AIR CONDITIONER

(1) When using the air conditioner for a long time, open the window once every one hour.

(2) Be careful not to overcool the cab.

(3) The cab is properly cooled if the operator feels cool when entering there from outside (about 5˚C lower than the outside temperature).

(4) When cooling, change air occasionally.

4) CHECK DURING SEASON

Ask the service center for replenishment of refrigerant or other maintenance service so that the cooling performance is not damaged.

5) CHECK DURING OFF-SEASON

Operate the air conditioner 2 or 3 times a month (each for a few minutes) to avoid loss of oil film in the compressor.

6) Refrigerant (R134-a) amount : 850 ± 20 g

1. ENGINE

※ **This guide is not intended to cover every conditions, however many of the more common possibilities are listed.**

Trouble	Service	Remark
The engine oil pressure lamp lights ON when engine speed is raised after completion of warm up.	· Add the oil to the specified level. · Replace the oil filter cartridge. · Check oil leakage from the pipe or the joint. · Replace the monitor.	
Steam is emitted from the top part of the radiator (the pressure valve). Coolant level warning lamp lights ON.	· Supply the coolant and check leakage. · Adjust fan belt tension. · Wash out inside of cooling system. · Clean or repair the radiator fin. · Check the thermostat. · Tighten the radiator cap firmly or replace the packing of it. · Replace the monitor.	
The engine does not start when the starting motor is turned over.	· Add fuel. · Repair where air is leaking into fuel system. · Check the injection pump or the nozzle. · Check the valve clearance. · Check engine compression pressure. · In cold weather, check if fuel warmer system is working normal.	Refer to the pages 3-23 and 4-4.
Exhaust gas is white or blue.	· Adjust to specified oil quantity. · Replace with specified fuel.	
Exhaust gas occasionally turns black.	· Clean or replace the air cleaner element. · Check the nozzle. · Check engine compression pressure. · Clean or replace the turbocharger.	
Combustion noise occasionally changes to breathing sound.	· Check the nozzle.	
Unusual combustion noise or mechanical noise.	· Check with specified fuel. · Check over-heating. · Replace the muffler. · Adjust valve clearance.	

2. ELECTRICAL SYSTEM

Trouble	Service	Remark
Lamp does not glow brightly even when engine runs at high speed. Lamp flickers while engine runs.	· Check for loose terminals and open-circuit wiring. · Adjust belt tension.	
Battery charging lamp does not go out even when engine runs at high speed.	· Check the alternator. · Check and repair wiring.	
Unusual noise is emitted from the alternator.	· Check the alternator.	
Starting motor does not turn when starting switch is turned ON.	· Check and repair the wiring. · Charge the battery. · Check the starting motor. · Check the safety relay.	
The pinion of the starting motor keeps going in and out.	· Charge the battery. · Check the safety relay.	
Starting motor turns the engine sluggishly.	· Charge the battery. · Check the starting motor.	
The starting motor disengages before the engine starts up.	· Check and repair the wiring. · Charge the battery.	
The engine warming up lamp does not go ON.	· Check and repair wiring. · Check the monitor.	
The engine oil pressure lamp does not light up when engine is stationary (when the starting switch is in ON position.)	· Check the monitor. · Check the caution lamp switch.	
Battery charging lamp does not light up when the engine is stationary. (when the starting switch is in ON position.)	· Check the monitor. · Check and repair the wiring.	

3. OTHERS

Trouble	Service	Remark
Track slip out of place. Excessive wear of the sprocket.	· Adjust tension of track.	
Bucket either rises slowly or not at all.	· Add oil to specified level.	
Slow speed of travel, swing, boom, arm and bucket.	· Add oil to specified level.	
Unusual noise emitted from pump.	· Clean the hydraulic tank strainer.	
Excessive oil temperature rise of hydraulic oil.	· Clean the oil cooler. · Adjust fan belt tension. · Add oil to specified level.	

HYDRAULIC BREAKER AND QUICK CLAMP

1. SELECTING HYDRAULIC BREAKER

1) Become familiar with the manual and select breakers suitable to machine specifications.
2) Make careful selection in consideration of oil quantity, pressure and striking force, to enable satisfied performance.
3) When apply a breaker to the machine, consult your local dealer of Hyundai for further explanation.

2. CIRCUIT CONFIGURATION

1) As for breaker oil pressure line, use extra spool of main control valve.

2) Set proper breaker pressure on load relief valve.
※ The initial setting pressure of load relief valve for breaker is 230 bar.

3) The pressure of the ROBEX480/520LC-9 system is 330 kgf/cm² (4700 psi).

4) Adjusting oil quantity

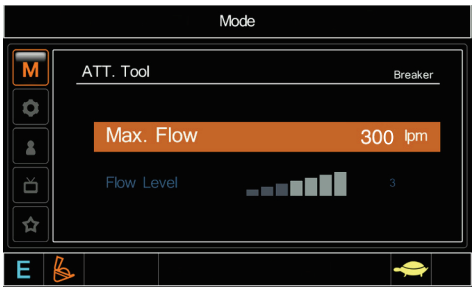
(1) Use the breaker mode from work tool of cluster. Use select switch to control the oil flow quantity.
· Setting oil quantity (300 lpm)

Flow set

· Max flow : Set the maximum flow for the attachment.
· Flow level : Reduce the operating flow from maximum flow.
- Breaker : Max 7 steps, reduced 10 lpm each step.

(2) If the quantity of hydraulic oil is not controlled properly, it causes short lifecycle of the breaker and the machine by increased breaking force and count.

Oil quantity setting



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5) The accumulator should be used to the breaker charging and return line.
If the accumulator is not used, it will be damage as the input wave is delivered.
※ **Keep the pressure pulsation of pump below 60 kgf/cm² (853 psi) by installing the accumulator.**

6) Do not connect the breaker return line to the main control, but connect to the return line front of the cooler.

7) Do not connect the breaker return line to drain lines, such as of swing motor, travel motor or pump, otherwise they should be damaged.

8) One of spool of the main control valve should be connected to the tank.

9) Select the size of pipe laying considering the back pressure.

10) Shimless tube should be used for the piping. The hose and seal should be used Hyundai genuine parts.

11) Weld the bracket for pipe clamp to prevent damage caused by vibration.

3. MAINTENANCE

1) MAINTENANCE OF HYDRAULIC OIL AND FILTER

(1) As machine with an hydraulic breaker provides the hydraulic oil becomes severely contaminated.

(2) So, unless frequently maintained, the machine may easily go out of order.

(3) Inspect and maintain hydraulic oil and 3 kinds of filter elements in particular, in order to prolong machine life.

2) RELEASE THE PRESSURE IN BREAKER CIRCUIT

When breaker operating is finished, stop engine and push pedal or switch for breaker to release pressure in breaker circuit.

If pressure still remains, the lifetime of the diaphragm in the accumulator will be shortened.

3) Be careful to prevent contamination by dust, sand and etc.

If such pollution become mixed into the oil, the pump moving parts will wear abnormally, shorten lifetime and become damaged.

4) When operating breaker, bolts and nuts of main equipment may be loosened by vibration. So, it must be inspected periodically.

Service interval unit : hours

Attachment	Operating rate	Hydraulic oil	Filter element
Breaker	100 %	600★1	200
		1000★2	

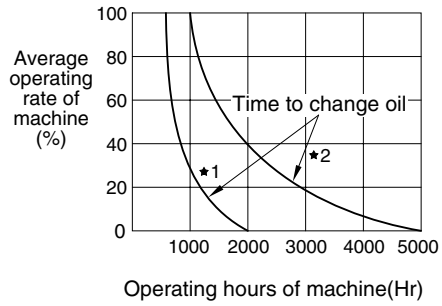
★1 : Conventional hydraulic oil

★2 : Hyundai genuine long life hydraulic oil

● **Replace following filter same time**

- Hydraulic return filter : 1 EA
- Pilot line filter : 1 EA
- Drain filter cartridge : 1 EA

Hyd oil change guide for hydraulic breaker



★1 : Conventional hydraulic oil

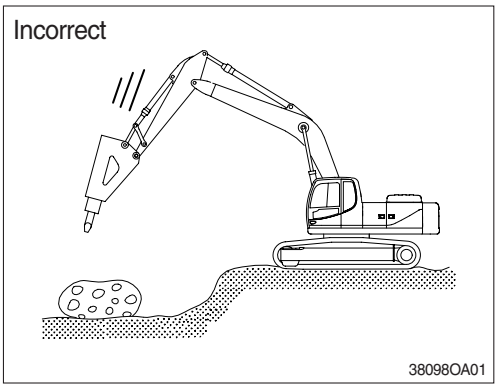
★2 : Hyundai genuine long life hydraulic oil

4. PRECAUTIONS WHILE OPERATING THE BREAKER

1) DO NOT BREAK ROCK WHILE LOWERING

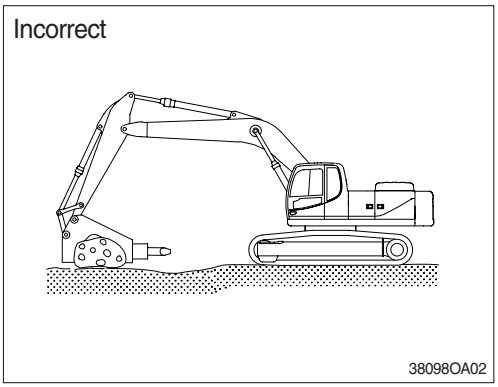
As the breaker is heavy in comparison with bucket, it must be operated slowly.

If breaker is rapidly pushed down, working device may be damaged.



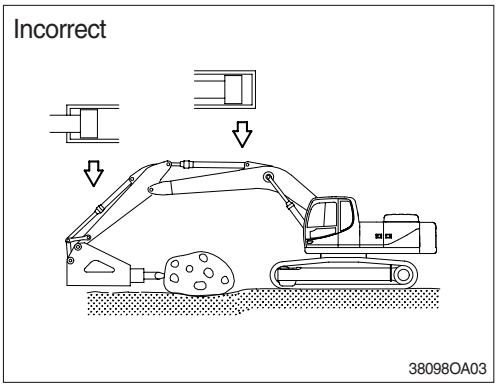
2) DO NOT USE BREAKER TO CARRY BROKEN STONE OR ROCK BY SWING OPERATING

This may damage the operation device and swing system.



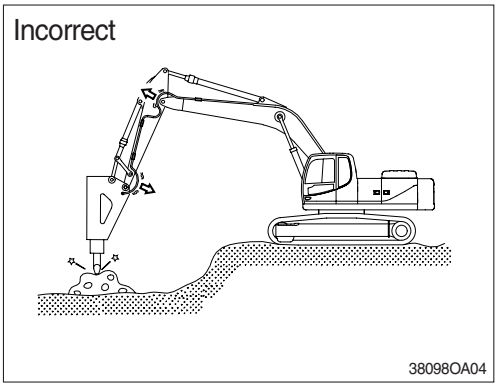
3) OPERATE BREAKER WITH A GAP IN EXCESS OF 100 mm (4 inches) FROM THE END OF THE STROKE TIP

If breaker is operated with the end tip, the cylinder may be damaged.



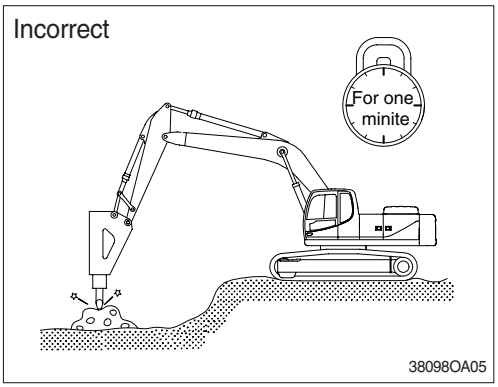
4) IF THE HYDRAULIC HOSES VIBRATE EXCESSIVELY

If the machine used in this condition continuously this will effect badly on the machine such as loosening bolt, oil leakage, damage of pump pipe and etc.



5) DO NOT CONTINUE TO WORKING OVER ONE MINUTE AT SAME POSITION OF BOOM AND ARM

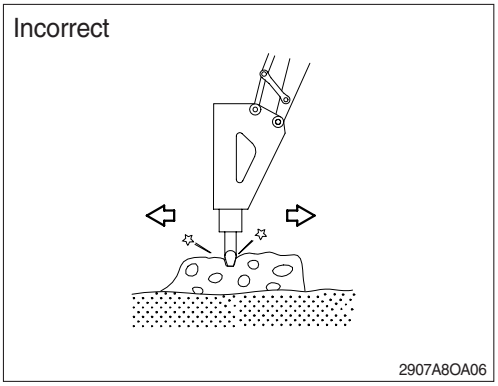
This will increase the temperature of the oil, and cause problem in the accumulator and seals.



6) DO NOT MOVE MACHINE OR BREAKER WHILE STRIKING

Do not move hammer while striking.

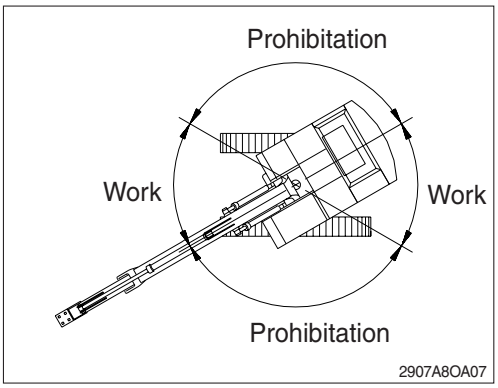
This will cause damage to the working device and the swing system.



7) DO NOT WORK WHILE SWING STATE

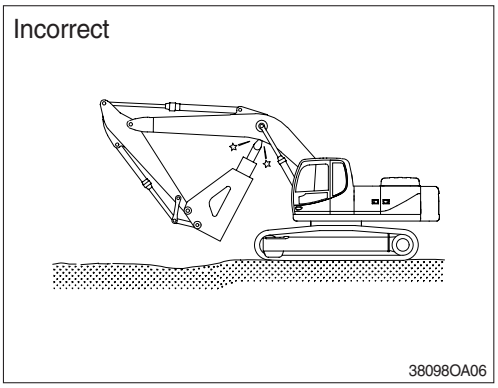
Do not work while swing position of superstructure.

It cause the band of track shoe, oil leakage of roller.



8) TAKE CARE OF CHISEL AND BOOM INTERFACE

Make sure of the arm and bucket control lever operation.

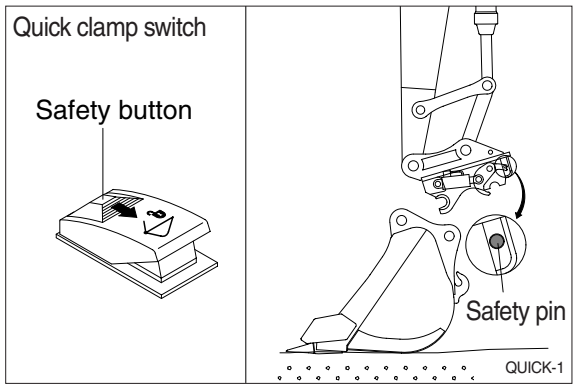


5. QUICK CLAMP

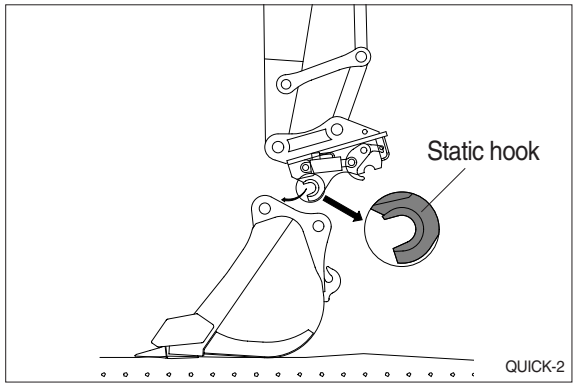
1) FIXING BUCKET WITH QUICK CLAMP

(1) Before fixing bucket, remove safety pin of the moving hook.

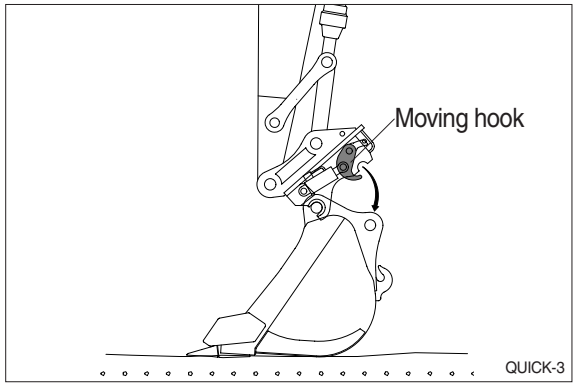
(2) Pulling safety button, press the quick clamp switch to unlock position. Then, the moving hook is placed on release position.



(3) Aligning the arm and bucket, insert static hook of quick clamp to the bucket pin.

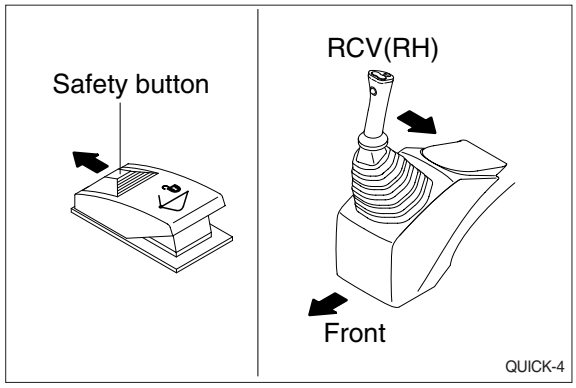


(4) Operate RCV lever to bucket-in position. Then, the moving hook is coupled with the bucket link pin.
Make sure that the moving hook is completely contacted with bucket link pin.

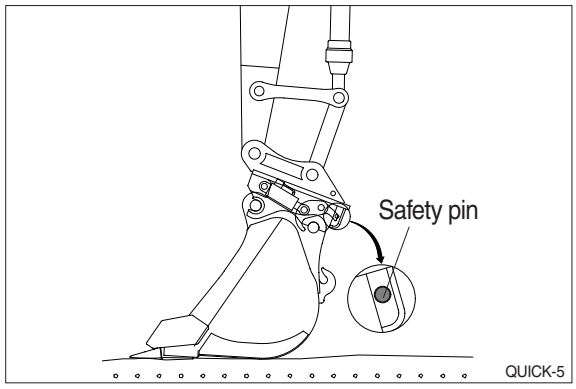


(5) Push safety button to lock position.
Operate RCV lever to bucket-in position.

※ **Be sure to check connection status between bucket pins and hooks of quick clamp.**



(6) After checking the connection status between bucket pins and hooks of quick clamp, **insert safety pin of moving hook to lock position.**

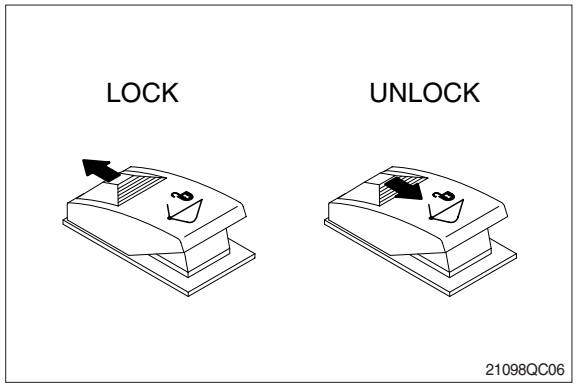


2) REMOVE BUCKET FROM QUICK CLAMP

Removing procedure is reverse of fixing.

3) PRECAUTION OF USING QUICK CLAMP

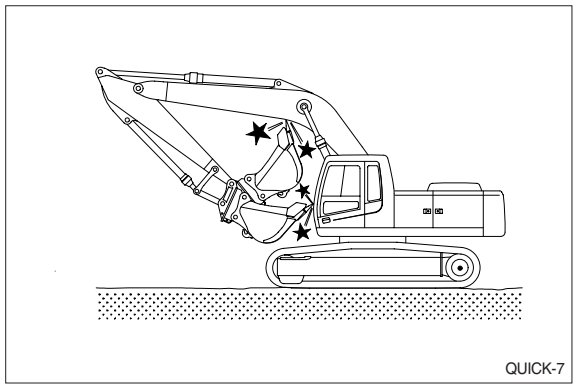
⚠ **When operating the machine with quick clamp, confirm that the quick clamp switch is lock position and safety pin of moving hook is inserted.**
Operating the machine with quick clamp switch unlocked and without safety pin of moving hook can cause the bucket to drop off and bring about the accident.



⚠ **Serious injury or death can result from this accident.**

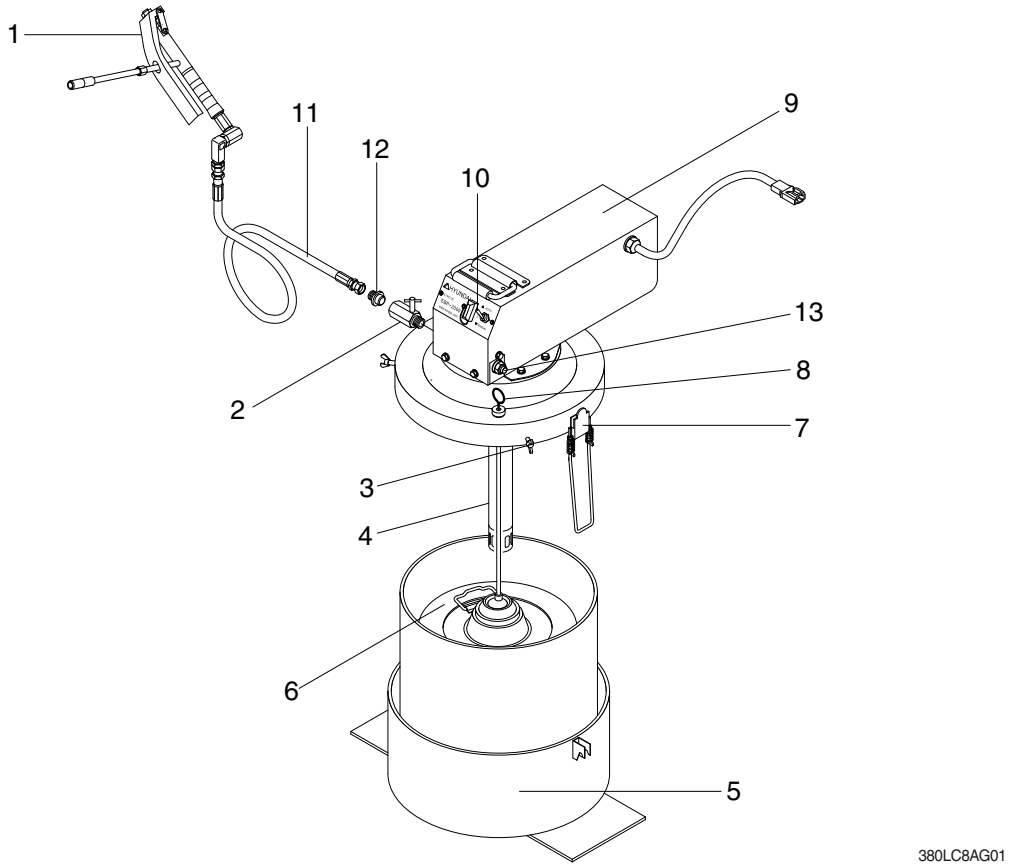
⚠ **Be careful to operate the machine equipped with quick clamp. The bucket may hit cab, boom and boom cylinders when it reaches vicinity of them.**

HYUNDAI will not be responsible for any injury or damage in case that safety pin is not installed properly.



1. SEMI AUTO GREASE LUBRICATION SYSTEM

1) MAJOR COMPONENT



1 Grease gun
2 Inline check & airvent
3 Wing bolt
4 Piston & cylinder
5 Grease can holder
6 Follower plate
7 Grease can clamp
8 Level gauge
9 Grease pump
10 Grease lubrication switch
11 Grease hose
12 Grease filter
13 Over pressure control valve

· Specifications

Item	Specification
Input power	24VDC
RPM	60
Current	15 amp
Output volume	110.0 cc/min ± 20%
Pressure	Max. 280 bar ± 20%
Operating temperature	-35˚C to 70˚C (depending on the grease type)
Weight	15 kg
Filter	1st filter ; 1.0 mm, 2nd filter ; 0.2 mm
Grease can	20 liter
Grease hose	10 meter

2) PREPARATION FOR OPERATION

(1) Instruction

※ **Place the unit on flat and stable place.**

※ **After you use the grease, please make sure to change it into new grease can. Never use it by filling the grease, for it becomes the cause of system failure.**

① Loosen the wing bolts, clamp and remove the grease pump from the grease can.

② Remove the follower plate and level gauge.

③ Change a new grease can.

④ Place the follower plate on the grease can horizontally and push it down by rubbing it to left and right with hand until the grease comes out from the packing in the middle of the follower plate.

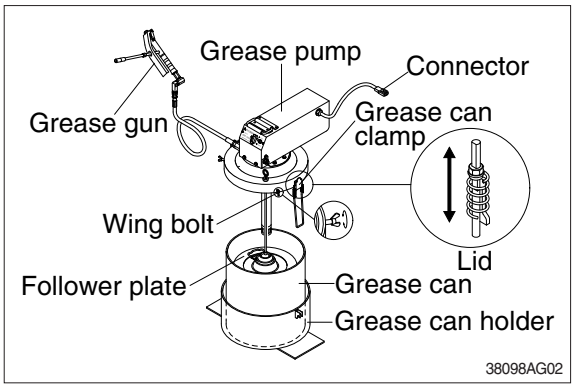
※ **Take care not to allow sand and dust to adhere on the suction tube and follower plate of the pump.**

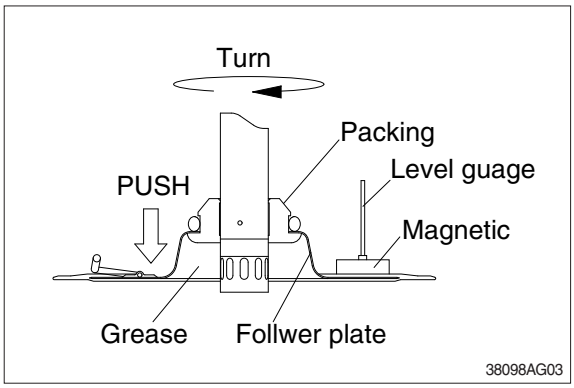
⑤ Place the magnetic of level gauge on the follower plate.

⑥ Insert the grease pump into the center of grease follower plate.

⑦ Install the clamp tight (2EA) according the height of can and tighen the wing bolt (3EA).

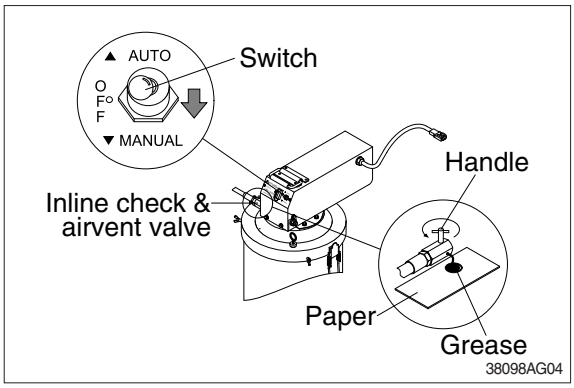
⑧ Check the power connector.





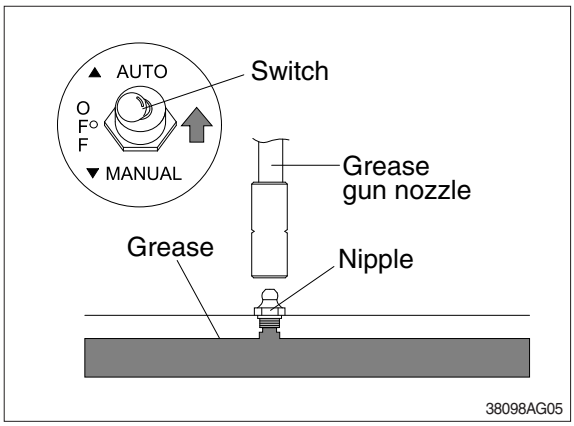
(2) Grease gun operation

① Switch on to the MANUAL.
② Open the inline check & airvent valve and operate the pump until grease will be discharged from a small hole under check valve.
③ After grease is discharged fully, close the valve handle.



④ Switch on to the AUTO, take out grease gun and hose to the point where you want to lubricate and lubricate a grease to lube point after hold grease gun handle.
⑤ Rearrange the grease gun and hose after lubricate all lube points and keep it in the tool box.
⑥ Switch OFF.

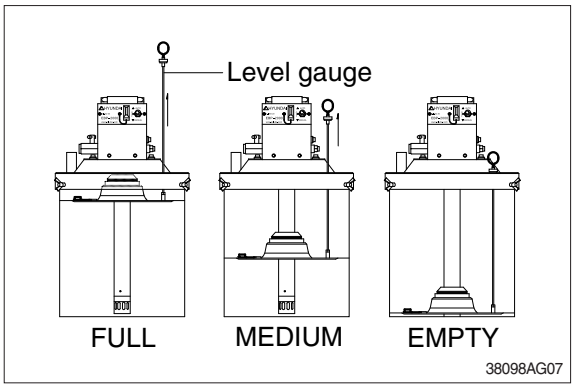
※ **It could be reducing a grease output volume after 30 minute running.**
※ **When you use pump lower than -10°C continuously, you should use a low temperature grease.**
※ **The grease mixed air is cloudy in white replace the new grease.**



(3) Grease level check

① Hold the level gauge handle and make straight line between the gauge plate attached follower plate and gauge handle.
② Check the length of the level gauge between gauge handle to the top of pump. The distance of gauge (wire rope) is indicated grease level.
③ When grease level goes down to the emply the level gauge plate will be separated from the follower plate (It is attached with magnet). Replace the new grease can.

※ **Pump will be pumping out a remaining grease for 3 minutes after the grease level indicated empty.**



3) SAFETY INSTRUCTION AND MAINTENANCE

(1) Safety instruction

① Do not use silicon grease.
② Do not operate the grease gun with the discharge port facing to another person during machine operation at any case.
③ After the end of using pump, please be sure to shut off the power of this machine to release the internal pressure.
④ When replacing any port as maintenance, please be sure to stop the power to the machine.

(2) Maintenance

① If any leakage is found, replace seals leaked and also it is required to replace them once a year.
② Check whether pump could pump the accurate grease volume or not periodically.
③ Please clean grease filter if output volume is less then 25% of stroke volume. (110 cc/min)

4) TROUBLESHOOTING

Category	Applications	Service
Pump does not work	Electric cable is broken Pump is defective	Renew the electric cable and fuse Replace the pump
Pump is working but does not supply of lubrication	Grease low level Air packed in the grease can Air packed in the lube line Defective pump element Defective cam and piston Pipes are burst or leakage Defective over pressure valve	Replace the grease can Remove air packet using with follower plate Remove air packet using inline air vent handle Replace the pump element Replace the pump piston Renew the pipes Replace the over pressure valve
Could not either pump high pressure or accurate grease volume	Defective over pressure valve Defective seal in side pump Defective pump parts	Replace the over pressure valve Replace the pump seal Replace the pump parts
Reduced pump speed	Pump and grease pipes is blocked Low ambient temperature	Check and replace the grease pipes Replace the low temperature grease
Leakage of grease at the over pressure valve	Grease filter is blocked Grease pipes is blocked	Clean grease filter Clean grease pipes

INDEX

A

Accel dial switch ····· 3-24
After engine start ····· 4-4
Air breather element ····· 6-31
Air cleaner filter ····· 6-26
Air conditioner & heater ····· 3-29
Air conditioner filter ····· 6-44
Alternate exit ····· 0-11
Attachment lowering ····· 4-22

B

Battery ····· 6-41
Before starting engine ····· 4-2
Boom lowering ····· 4-22
Bucket clearance adjustment ····· 6-39
Bucket replacement ····· 6-37
Bucket selection guide ····· 2-22
Bucket tooth replacement ····· 6-38

C

Cab air filter ····· 6-44
Cab device ····· 3-1
Changing machine control pattern ····· 4-25
Cigar lighter ····· 3-36
Cluster ····· 3-2
Coolant ····· 6-21
Cooling fan ····· 6-26
Corrosion resister ····· 6-29

D

Drain filter ····· 6-32

E

Emergency engine starting connector ····· 3-48
Engine oil filter ····· 6-19
Engine oil level ····· 6-19
Engine starting & stop ····· 4-3
Engine starting by booster ····· 6-42
Engine stop ····· 4-5

F

Fan belt ····· 6-25
Fuel filter ····· 6-27
Fuel leakage ····· 6-30
Fuel system bleeding ····· 6-27
Fuel tank ····· 6-27
Fuse & relay box ····· 3-47

G

Gauge ····· 3-3

H

Handsfree ····· 3-37
Hydraulic breaker ····· 8-1
Hydraulic oil changing ····· 6-31
Hydraulic oil filling ····· 6-30
Hydraulic oil level ····· 6-30

L

LCD ····· 3-2
Levers & pedals ····· 3-27
Lifting capacities ····· 2-17
Lubricant specification ····· 2-34

M

Maintenance check list ····· 6-12
Major component ····· 2-1
MCU (Machine Control Unit) ····· 3-47
Mode selection system ····· 4-6
Monitor panel ····· 3-2
Mounting and dismounting ····· 1-12

N

New machine operation ····· 4-1

O

Oil cooler ····· 6-24
Operating pattern ····· 4-25

P

Pattern change valve ····· 4-26
Pedals ····· 3-28
Periodical replacement parts ····· 6-5
Pilot filter ····· 6-33
Pin & bushing lubrication ····· 6-40
Prefilter ····· 6-28
Pilot lamps ····· 3-7

Q

Quick clamp ····· 8-6

R

Radiator flushing ····· 6-21
Radio & CD/MP3 player ····· 3-41
RCV lever lubricate ····· 6-35
Recommended oils ····· 2-34, 6-11

Relieving pressure ····· 6-3
Remote controller ····· 3-39
Return filter ····· 6-32
RCV lever operating pattern ····· 4-25

S

Safety hints ····· 1-1
Safety labels ····· 0-5
Safety parts ····· 6-5
Seat ····· 3-46
Seat belt ····· 3-46
Service meter ····· 3-48
Service socket ····· 3-38, 3-48
Specification for major component ····· 2-30
Specification ····· 2-2
Start switch ····· 3-23
Storage ····· 4-24
Suction strainer ····· 6-31
Swing bearing grease ····· 6-34
Swing gear & pinion grease ····· 6-34
Swing reduction gear oil ····· 6-34
Switch panel ····· 3-23
Switches ····· 3-9, 3-23

T

Torques-major component ····· 6-8
Torques-fastener ····· 6-6
Towing machine ····· 4-14
Track adjustment ····· 6-36
Track shoe selection ····· 2-27
Transportation ····· 5-1
Travel reduction gear oil ····· 6-35
Traveling machine ····· 4-12
Troubleshooting guide ····· 7-1

U

Undercarriage ····· 2-26
USB socket ····· 3-37

W

Warming up operation ····· 4-5
Warning lamps ····· 3-4
Water filter ····· 6-29
Weight ····· 2-15
Windshield ····· 3-49
Working device operation ····· 4-11
Working method ····· 4-15
Working range ····· 2-8