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FOREWORD

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

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

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

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

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

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

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

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

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

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

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

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

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

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

In such cases HD Hyundai Construction Equipment cannot assume liability for any damage.

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

EMISSION-RELATED COMPONENTS WARRANTY (USA AND CANADA ONLY)

HD Hyundai Construction Equipment shall have obligation under the EPA (Environmental Protection Agency) regulation of warranty about Emission-related components. This warranty shall exist for 3,000 hours or five years, whichever occurs first.

Naturally, this warranty does not cover to damage arising from accident, misuse or negligence, use of non-HD Hyundai Construction Equipment parts, or from alterations not authorized by HD Hyundai Construction Equipment.

※ Emission-related components according to the EPA regulation.

1. Air-induction system.
2. Fuel system.
3. Ignition system.
4. Exhaust gas recirculation systems.
5. After treatment devices.
6. Crankcase ventilation valves.
7. Sensors.
8. Electronic control units.

BEFORE SERVICING THIS MACHINE

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

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

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

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

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

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

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

All personnel must remain alert to potential hazards.

Work within your level of training and skill.

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

Use your common sense.

※ How to set the language of cluster

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



※ Please refer to the page 3-26 for the cluster.

EC REGULATION APPROVED

- Noise level (EN474-1 : 2006 and 2000/14/EC) are as followings.
LWA : 109dB (EU only)
LPA : 76dB
- The value of vibrations transmitted by the operator's seat are lower than standard value of (EN474-1 : 2006 and 2002/44/EC)



EC Declaration of Conformity (Original instruction)

This declaration of conformity is issued under the sole responsibility of manufacturer:

HD HYUNDAI CONSTRUCTION EQUIPMENT CO., LTD.

477 Bundangsuseo-ro, Bundang-gu,
Seongnam-si, Gyeonggi-do 13553, Korea

HD Hyundai Construction Equipment Europe N.V located at Hyundailaan 4, 3980 Tessenderlo, Belgium, as authorized representative in the European Community is authorized to compile the technical construction file and declares that the product:

Type: *****
Model: *****
Serial number (PIN): *****

is in conformity with the relevant provisions of the Community harmonization legislation:

2006/42/EC - Machinery directive
2014/30/EU - Electromagnetic compatibility directive
2000/14/EC - Noise emission outdoor equipment directive
2002/44/EU - Exposure of workers to vibration risks directive
their amendments, and other applicable directives.

EMC (2014/30/EU)

Certificate number: *****
Date: DD/MM/YYYY
Notified body: *****

Noise levels (2000/14/EC)

Certificate number: *****
Date: DD/MM/YYYY
Conformity assessment proc.: Annex VIII Full Quality Assurance
Notified body: *****

Measured sound power level: nnn.n dB(A)
Guaranteed sound power level: nnn.n dB(A)

Engine information

Manufacturer : *****
Engine model name: *****
Type-approval number: *****
Stage (Regulation) : STAGE ** (**/**/**)
Gross Power (SAE J1995): ***kW / ****rpm
Net Power (SAE J1349): ***kW / ****rpm

Harmonized standards, other technical standards and specifications applied:

EN 474-1:2006+A*:**** (EMM - Safety - Part 1); EN 474-3:2006+A*:**** (EMM - Safety - Part 3); EN ISO 3471:2008 (EMM - ROPS: Lateral/Vertical/Longitudinal loads); EN ISO 3449:2008 (EMM - FOPS: Level II cabin); ISO 2631-1:1997 & ISO 2631-1:1997/Amd1 :2010 (Whole-body vibration); EN ISO 5349-1:2001 & EN ISO 5349-2:2001 & EN ISO 5349-2:2001/A1:2015 (Hand-arm vibration)

Managing Director
Place, date of issue: Tessenderlo Belgium, DD MM YYYY

1) : This standard does not apply to more than 50 ton machines.

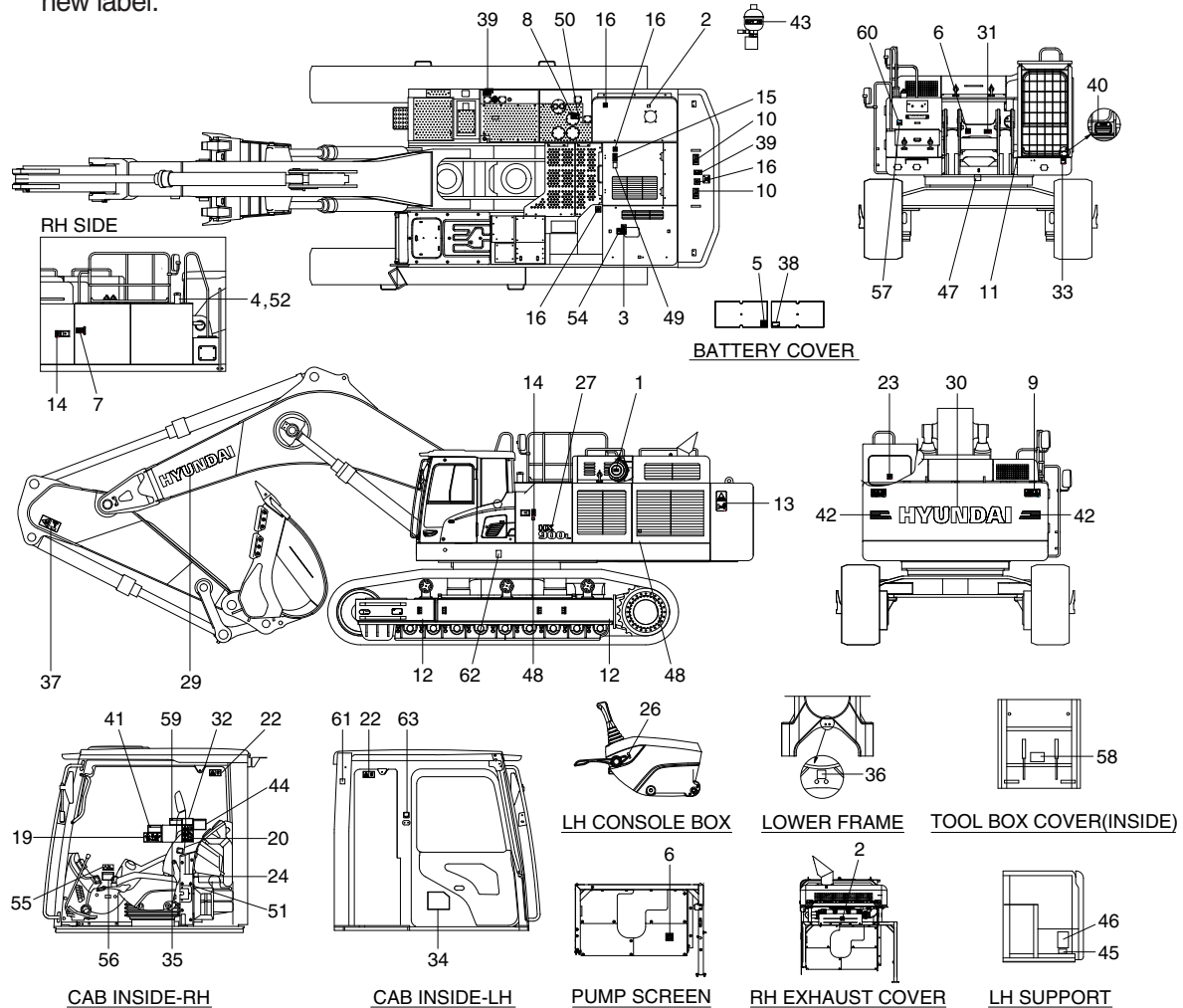
TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR
--

Machine Serial No.	
Engine Serial No.	
Manufacturing year	
Manufacturer Address	HD Hyundai Construction Equipment 12th Fl., Hyundai Bldg. 75, Yulgok-ro, Jongno-gu, Seoul 03058, Korea
Distributor for U.S.A Address	HD Hyundai Construction Equipment Americas, Inc. 6100 Atlantic Boulevard Norcross GA 30071 U.S.A
Distributor for Europe Address	HD Hyundai Construction Equipment Europe N. V. Hyundailaan 4 3980 Tessenderlo Belgium
Dealer Address	

SAFETY LABELS

1. LOCATION

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



900F0SL01

1 Air cleaner filter	24 Air conditioner filter	45 M/control pattern change-w/o valve
2 Turbocharger cover	26 Safety knob	46 M/control pattern change-w/valve
3 Radiator cap	27 Model name	47 Swing bearing grease
4 Fueling	29 Trade mark (boom)	48 Battery position
5 Battery accident	30 Trade mark (CWT)	49 Lubrication oil
6 High pressure hose	31 Reduction gear grease	50 Fuel shut off
7 Hydraulic oil level	32 Clamp locking	51 MCU/ECM connector
8 Hydraulic oil lub	33 Noise level LWA	52 Ultra low sulfur diesel
9 Keep clear-rear	34 Service instruction	54 Surge tank
10 Lifting eye	35 Lifting chart	55 Key off caution
11 Name plate	36 Tie	56 RCV lever
12 Sliding ideogram	37 Keep clear-boom/arm	57 Diesel exhaust fluid
13 Keep clear-side	38 Electric welding	58 Air compressor
14 Stay fix	39 Falling	59 Air compressor cab
15 Engine hood shearing	40 FOPS FOG plate	60 DEF/AdBlue® tank fill-up
16 No step	41 Caution	61 Fire extinguisher
19 M/control pattern	(water separator, turbocharger)	62 Emergency switch
20 Ref operator's manual	42 Reflecting	63 Hammer
22 Safety front window	43 Accumulator	
23 Safety rear window	44 M/control pattern change valve	

2. DESCRIPTION

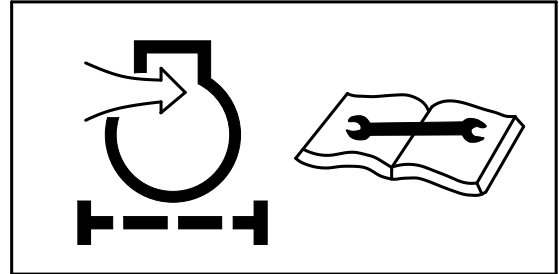
There are several specific warning labels on this machine please become familiarized with all warning labels.

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

1) AIR CLEANER FILTER (item 1)

This warning label is positioned on the 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 right top side of the engine hood and RH exhaust cover.

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



21070FW02

3) RADIATOR CAP (item 3)

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

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

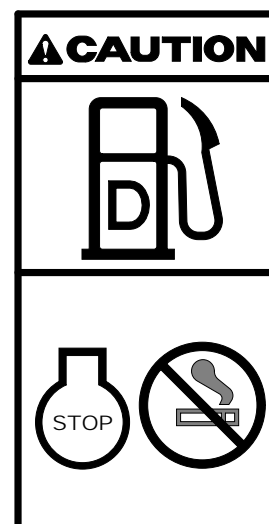


14070FW03

4) FUELING (item 4)

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

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



290F0FW02

5) BATTERY ACCIDENT (item 5)

This warning label is positioned on the battery cover.

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

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

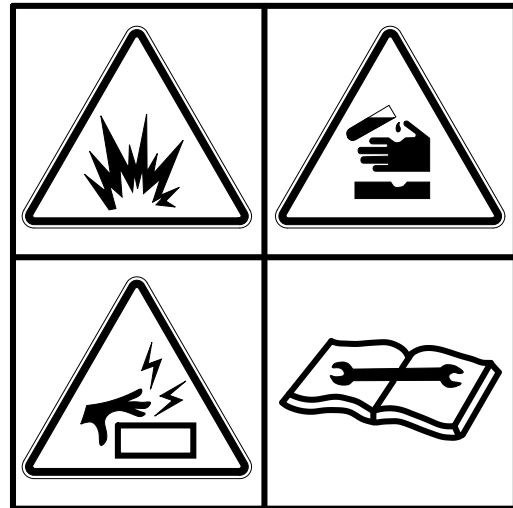
With electrolyte at proper level, less space may cause the gases to be accumulated in the battery.

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

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

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

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



36070FW05

6) HIGH PRESSURE HOSE (item 6)

This warning label is positioned on the front of the upper frame and the pump screen.

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

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

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

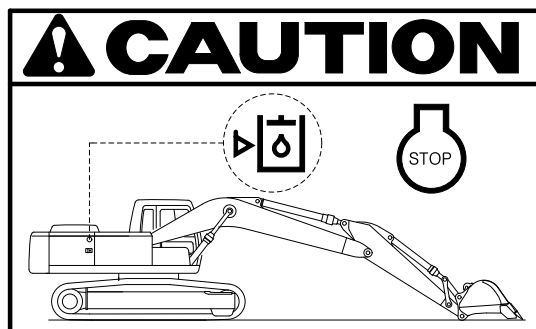


14070FW29

7) HYDRAULIC OIL LEVEL (item 7)

This warning label is positioned on the RH side cover.

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



21070FW07

8) HYDRAULIC OIL LUBRICATION (item 8)

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

- ※ Do not mix with different brand oils.
- ▲ Never open the filler cap while high temperature.
- ▲ Loosen the cap slowly and release internal pressure completely.

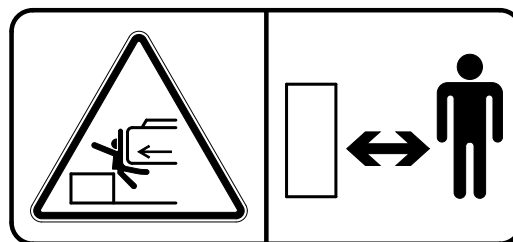


14070FW08

9) KEEP CLEAR-REAR (item 9)

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

- ▲ To prevent serious personal injury or death keep clear of machine swing radius.
- ▲ Do not deface or remove this label from the machine.

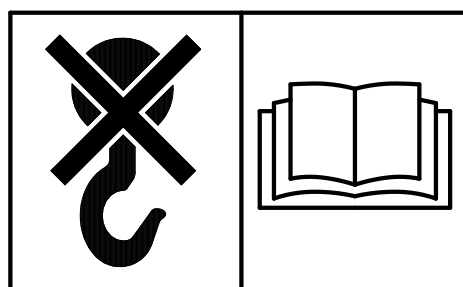


21090FW09

10) LIFTING EYE (item 10)

This warning label is positioned on the top of 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 5-1 for proper lifting method of the machine.

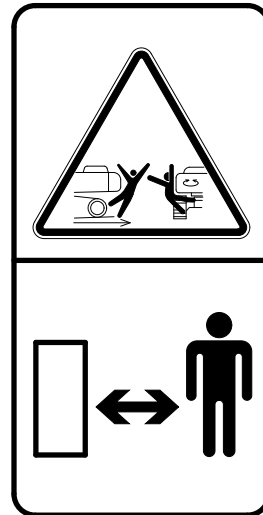


21070FW10

11) KEEP CLEAR-SIDE (item 13)

This warning label is positioned on the left and right side of the counterweight.

- ⚠ **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 left and right side cover.

- ⚠ **Be sure to support the stay when the door needs to be opened.**
- ⚠ **Be careful that the opened door may be closed by the external or natural force like strong wind.**

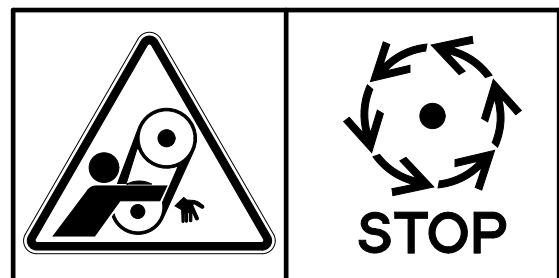


21070FW14

13) ENGINE HOOD SHEARING (item 15)

This warning label is positioned on the engine hood.

- ⚠ **Don't open the engine hood during the engine's running. Stay clear of rotating parts.**
- ⚠ **Don't touch exhaust pipe or it may cause severe burn.**

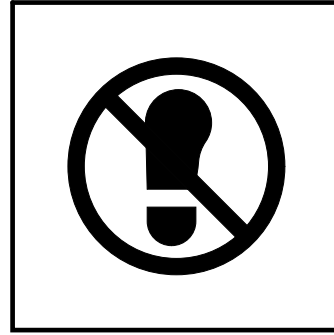


21070FW15

14) NO STEP (item 16)

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

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



21070FW16

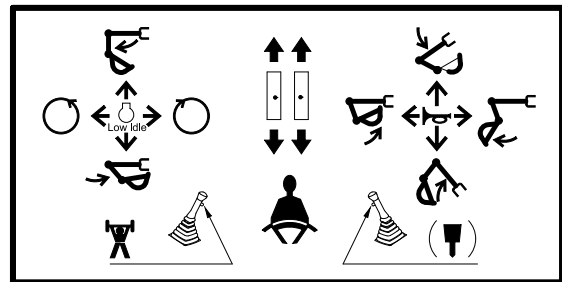
15) MACHINE CONTROL PATTERN (item 19)

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

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

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

See page 4-12 for details.



36070FW19

16) REF OPERATOR'S MANUAL (item 20)

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

(1) Ref operator manual

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

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

(2) Max height

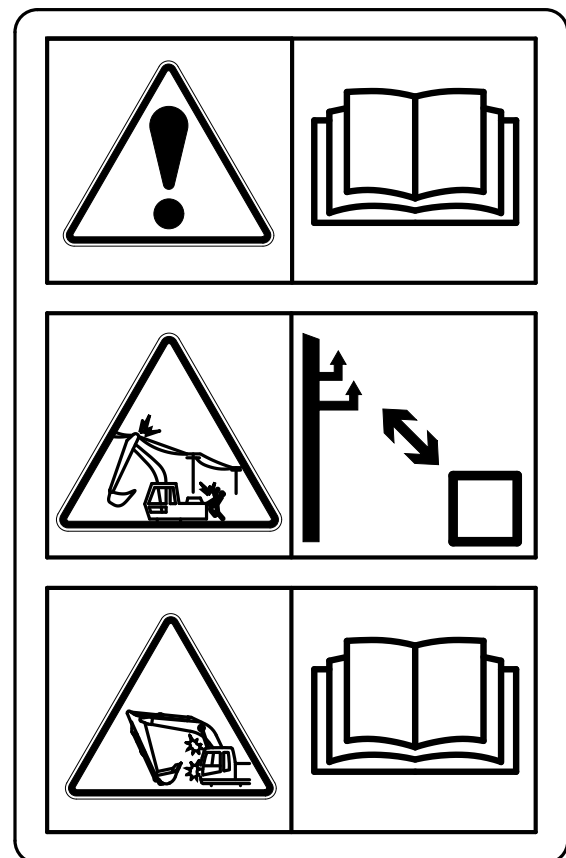
- ⚠ **Serious injury or death can result from contact with electric lines.**

An electric shock being received by merely coming into the vicinity of an electric lines, the minimum distance should be kept considering the supply voltage as page 1-16.

(3) Interference

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

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

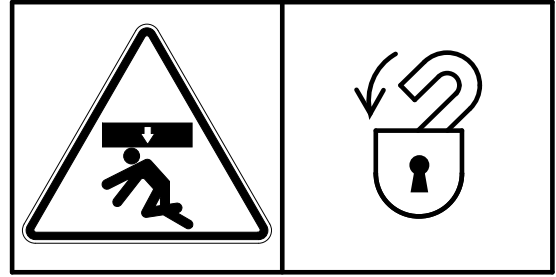


2609A0SL05

17) 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.**
- ※ **See page 3-69 for details.**



21070FW24

18) SAFETY REAR WINDOW (item 23)

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

- ※ **The rear window serves as an alternate exit.**
- ※ **To remove rear window, pull the ring and push out the glass.**

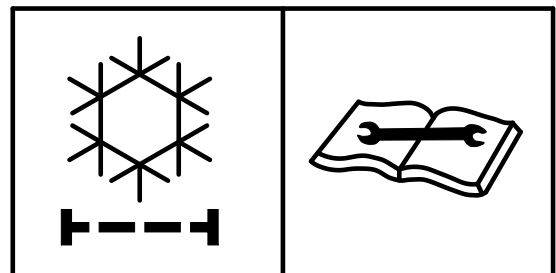


2609A0SL02

19) 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.**

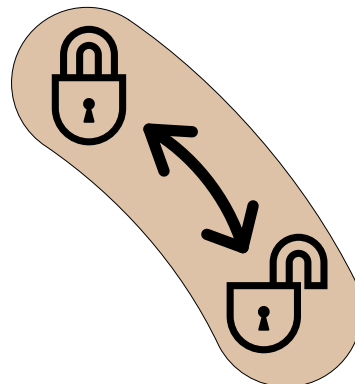


21070FW26

20) SAFETY KNOB (item 26)

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

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

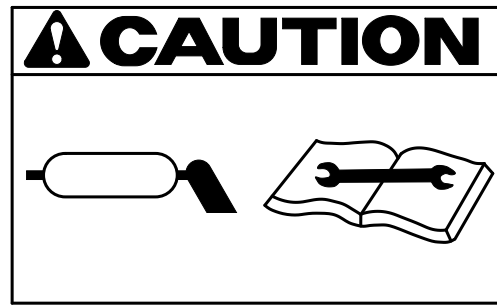


30007A1FW07A

21) 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.

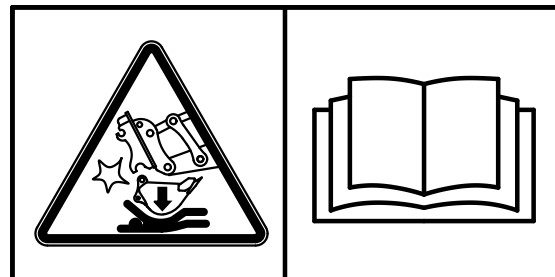


21070FW35

22) 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.**

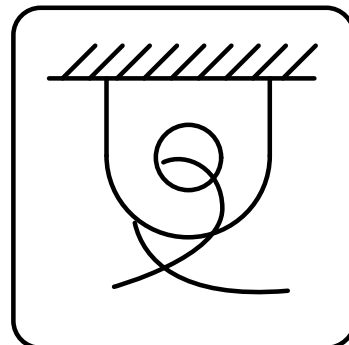


14070FW60

23) 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 4-15 for detail.**

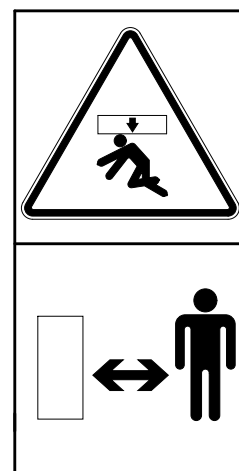


4507A0FW02

24) 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

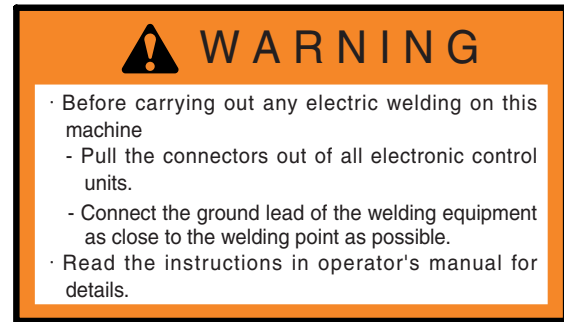
25) ELECTRIC WELDING (item 38)

This warning label is positioned on the battery cover.

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

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

※ See page 6-48 for detail.



7807AFW20

26) FALLING (item 39)

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

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

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



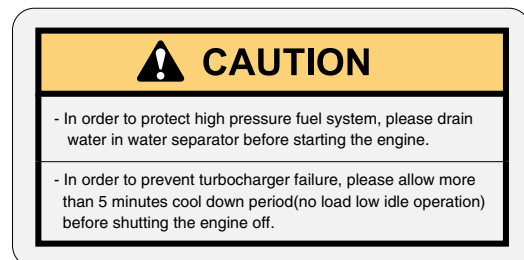
14070FW30

27) CAUTION (W/SEPARATOR, TURBOCHARGER) (item 41)

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

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

⚠ 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.



120090SL02

28) 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.



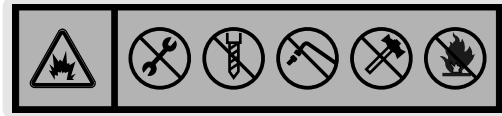
290F0FW01

29) 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 HD Hyundai Construction Equipment distributor.

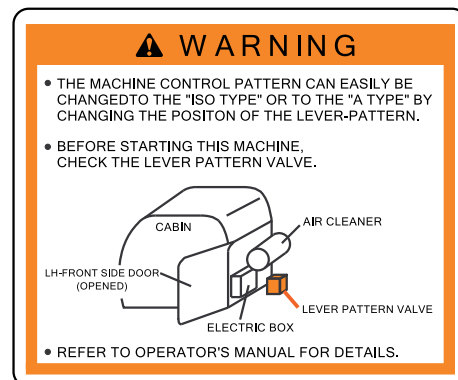


1107A0FW46

30) MACHINE CONTROL PATTERN CHANGE VALVE (item 44)

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

- ▲ The machine control pattern can easily be changed to the "ISO type" or to the "A type" by changing the position of the lever of the pattern change valve.
- ▲ Before starting this machine, check the lever pattern valve.
- ※ See page 4-27 for detail.

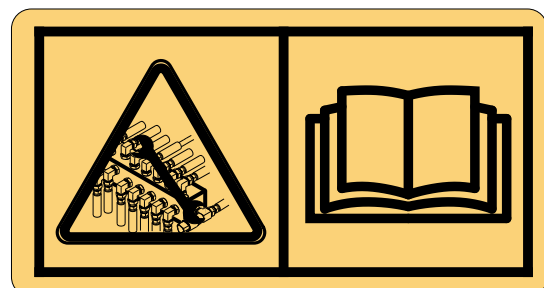


2609A0SL11

31) MACHINE CONTROL PATTERN CHANGE-W/O VALVE (item 45)

This warning label is positioned on the LH support of cowl.

- ▲ Check the machine control pattern before starting this machine.
- ※ See page 4-26 for detail.

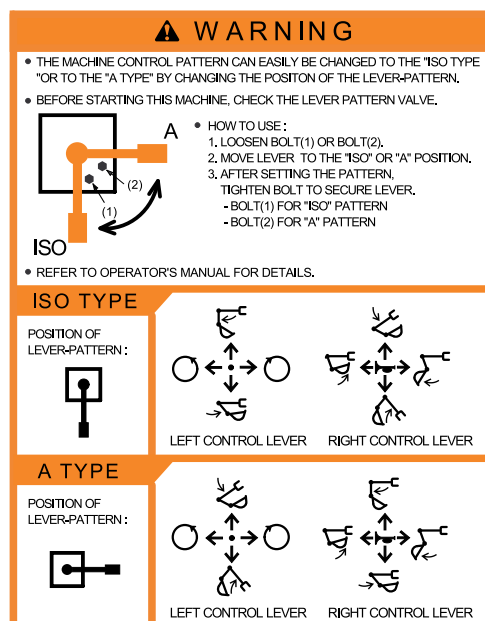


14W90FW47

32) MACHINE CONTROL PATTERN CHANGE-W/VALVE (item 46)

This warning label is positioned on the LH support of cowl.

- ▲ 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 4-27 for details.

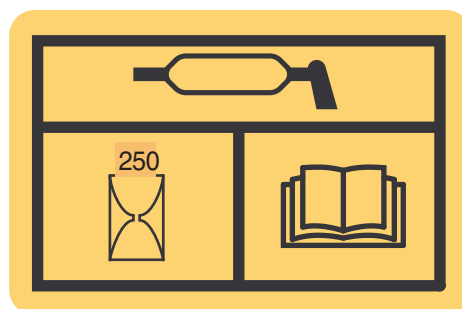


38090FW01A

33) SWING BEARING GREASE (item 47)

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

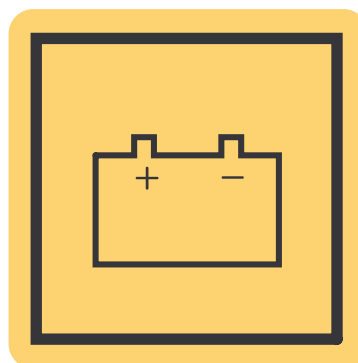
- ※ See page 6-39 for details.



38090FW02

34) BATTERY POSITION (item 48)

This warning label is positioned left inside of side cover.

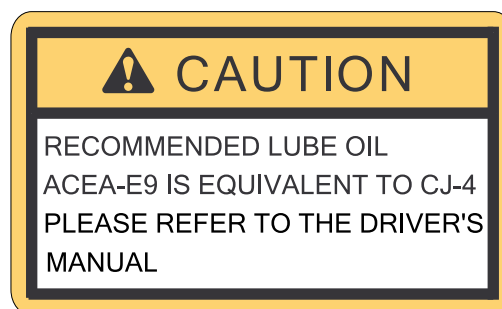


38090FW03

35) LUBRICATION OIL (item 49)

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

- ※ Recommended lubrication oil ACEA-E9 is equivalent to API CJ-4.
- ※ See page 6-10 for details.

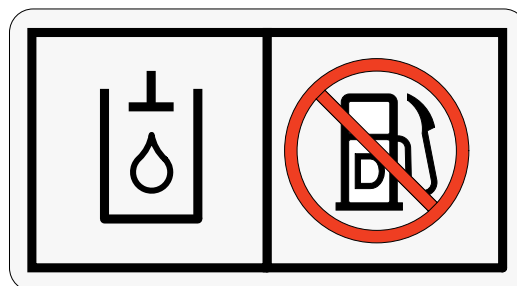


290F0SL03

36) FUEL SHUT OFF (item 50)

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

- ※ Fill only the hydraulic oil.
- ※ Do not fill the diesel fuel.
- ⚠ Relieve tank pressure with the engine off by removing the cap slowly to prevent burns from hot oil.

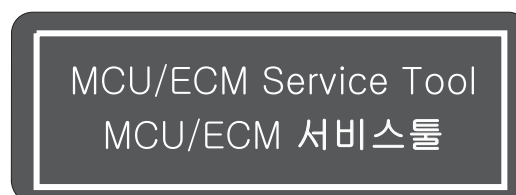


140WH90FW51

37) MCU/ECM CONNECTOR (item 51)

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 3-69 for details.

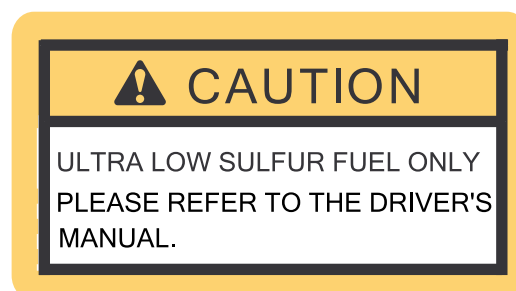


235Z90FW52

38) ULTRA LOW SULFUR DIESEL (item 52)

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

- ※ Use ultra low sulfur fuel only.
- ※ Ultra low sulfur fuel sulfur content ≤ 15 ppm



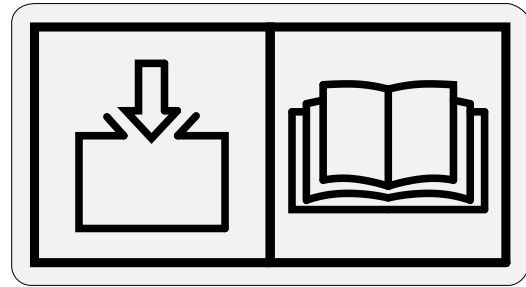
2609A0SL03

39) SURGE TANK (item 54)

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

This system must be filled slowly to prevent air locks.

- ※ Fill rate ≤ 11 lpm



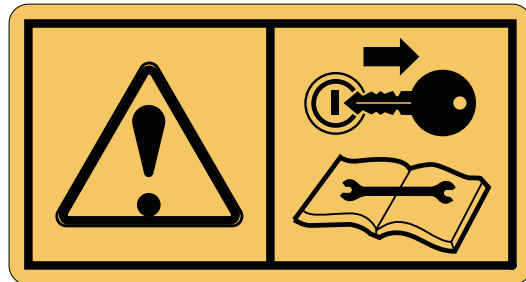
3009A0FW54

40) KEY OFF CAUTION (item 55)

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

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

Extreme care shall be taken during maintenance work.



290F0FW05

41) RCV LEVER (item 56)

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

- ※ When you work by moving the seat to the front of cab, it is possible to take place interference between cluster and RCV lever at specific position.

To prevent this interference, handle below works.

- (1) Rotate cluster.
- (2) Adjust seat position for up-and-downward using seat height adjuster knob in suspension.
- (3) Lower the console box height using knob between RH console box and seat cushion.
- (4) Push back console and seat position using seat and console box adjust knob between LH console box and seat cushion.



290F0FW04

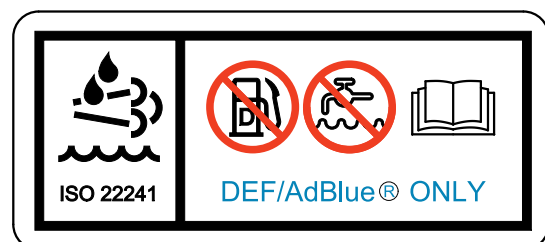
42) DIESEL EXHAUST FLUID (item 57)

This warning label is positioned on the front of DEF/AdBlue® tank.

- ※ Fill only the DEF/AdBlue® (Diesel Exhaust Fluid, standardised as ISO 22241).

Aqueous urea solution made with 32.5% high-purity urea and 67.5% deionized water.

- ※ Do not fill the diesel fuel.



290F0SL04

43) AIR COMPRESSOR (item 58)

This warning label is positioned on the inside of the tool box cover.

- ⚠ Do not touch air compressor or it may cause server burn.

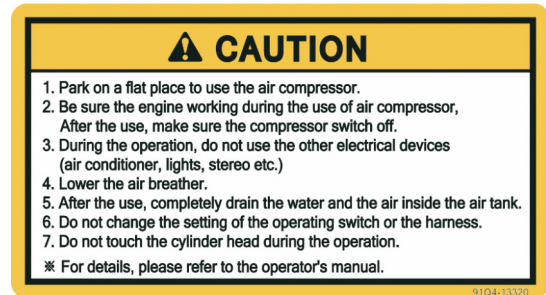


480F0SL04

44) AIR COMPRESSOR (CAB) (item 59)

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

- ※ Park on a flat place to use the air compressor.
- ※ Be sure the engine working during the use of air compressor. After the use, make sure the compressor switch off.
- ※ During the operation, do not use the other electrical devices (air conditioner, lights, stereo etc.)
- ※ Lower the air breather.
- ※ After the use, completely drain the water and the air inside the air tank.
- ※ Do not change the setting of the operating switch or the harness.
- ※ Do not touch the cylinder head during the operation.

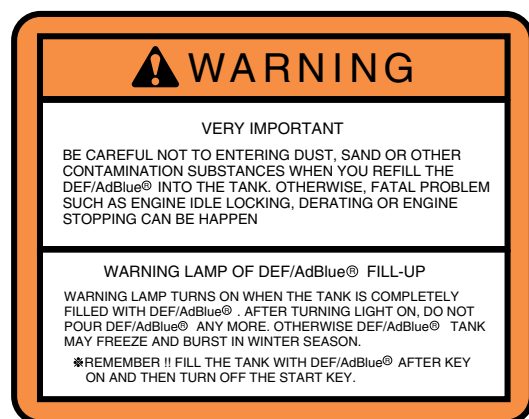


480F0SL05

45) DEF/AdBlue® TANK FILL-UP (item 60)

This warning label is positioned on the front of DEF/AdBlue® tank.

- ※ Warning lamp turns on when the tank is completely filled with DEF/AdBlue®. After turning light on, do not pour DEF/AdBlue® any more. Otherwise DEF/AdBlue® tank may freeze and burst in winter season.
- ※ Fill the tank with DEF/AdBlue® after key on and then turn off the start key.



480F0SL06

46) FIRE EXTINGUISHER (item 61)

This warning label is located on the left rear of the cab inside.

- ※ **Read and understand the instructions adhered decal on the fire extinguisher.**

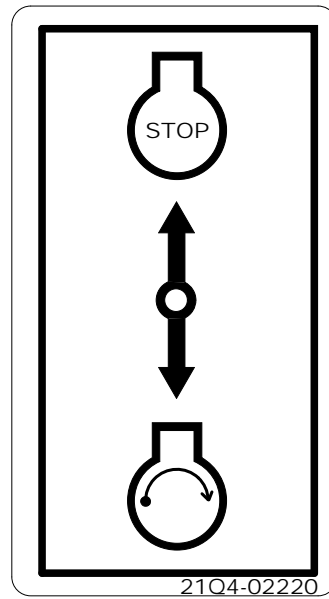


91Q6-07290

47) EMERGENCY SWITCH (item 62)

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

- ※ **This switch is used to emergency stop the engine.**
- ※ **See page 3-37 for details.**



900F0SL02

48) HAMMER (item 63)

This label is located on the left stay of the cab inside.

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



91Q6-07280

MACHINE DATA PLATE

DO NOT DEFACE OR REMOVE THIS PLATE
이 명판을 훼손하거나 오손시키지 마시오

1 MACHINE TYPE / MODEL

2 PRODUCT IDENTIFICATION NUMBER

3 ENGINE POWER

4 OPERATING MASS

HYUNDAI
CONSTRUCTION EQUIPMENT

12th Fl., Hyundai Bldg. 75, Yulgok-ro,
Jongno-gu, Seoul, 03058, Korea

91LM-14111

DO NOT DEFACE OR REMOVE THIS PLATE
이 명판을 훼손하거나 오손시키지 마시오

1 MACHINE TYPE / MODEL

2 PRODUCT IDENTIFICATION NUMBER

3 ENGINE POWER

4 OPERATING MASS

5 Mfg. YEAR

HYUNDAI
CONSTRUCTION EQUIPMENT

12th Fl., Hyundai Bldg. 75, Yulgok-ro,
Jongno-gu, Seoul, 03058, Korea

91LM-14131

FOR EU ONLY

DO NOT DEFACE OR REMOVE THIS PLATE
이 명판을 훼손하거나 오손시키지 마시오

1 MACHINE TYPE / MODEL

2 FOPS/FOG SERIAL NO.

STANDARDS

MEETS ISO 10262(LEVEL 2)

HYUNDAI
CONSTRUCTION EQUIPMENT

12th Fl., Hyundai Bldg. 75, Yulgok-ro,
Jongno-gu, Seoul, 03058, Korea

91NG-01281

FOR FOPS/FOG

DO NOT DEFACE OR REMOVE THIS PLATE
이 명판을 훼손하거나 오손시키지 마시오

1 MACHINE TYPE / MODEL

2 ROPS S/No.

6 MAX. CERTIFIED WEIGHT

STANDARDS

MEETS ISO 12117-2 : 2008

HYUNDAI
CONSTRUCTION EQUIPMENT

12th Fl., Hyundai Bldg. 75, Yulgok-ro,
Jongno-gu, Seoul, 03058, Korea

91QG-01283

ROPS

290F0FW06A

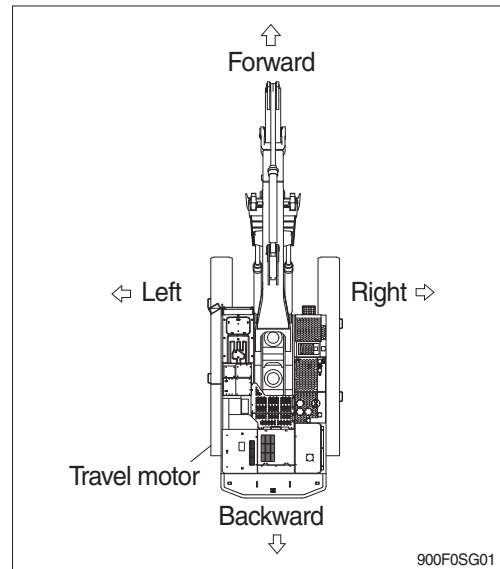
- | | | |
|------------------------|---------------------------------|----------------------------|
| 1 Machine type / model | 2 Product identification number | 3 Engine power |
| 4 Operating mass | 5 Manufacturing year | 6 Maximum certified weight |

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

GUIDE

1. DIRECTION

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

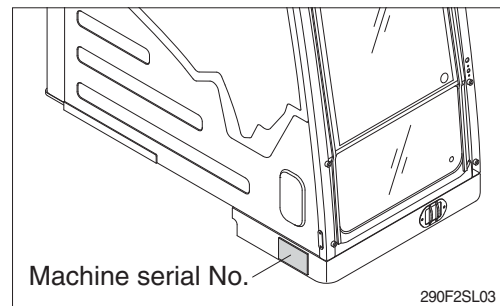


2. SERIAL NUMBER

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

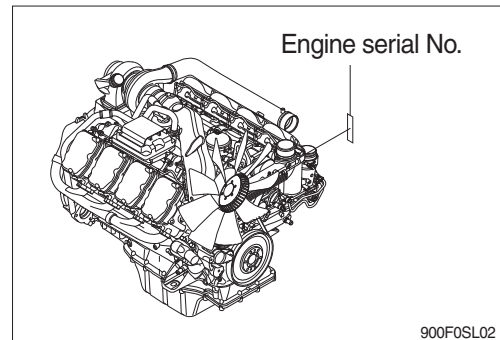
1) MACHINE SERIAL NUMBER

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



2) ENGINE SERIAL NUMBER

The numbers are located on the engine name plate.



3. INTENDED USE

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

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

※ Please refer to the section 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.

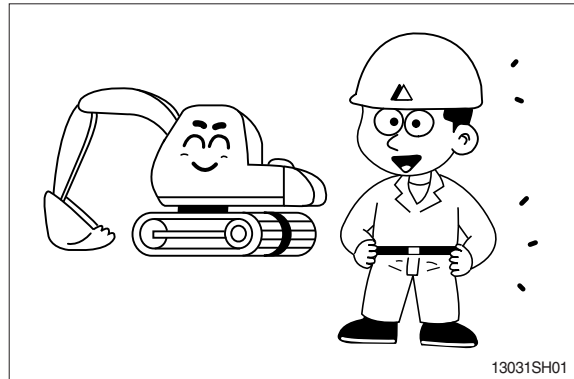
SAFETY HINTS

1. BEFORE OPERATING THE MACHINE

Think-safety first.

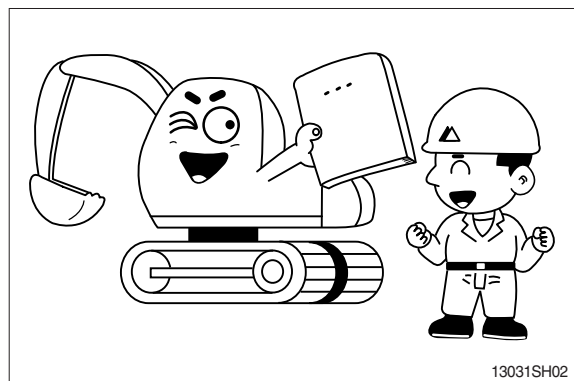
In special situation, wear protective clothing including a safety helmet, safety shoes, gloves, safety glasses and ear protection as required by the job condition.

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



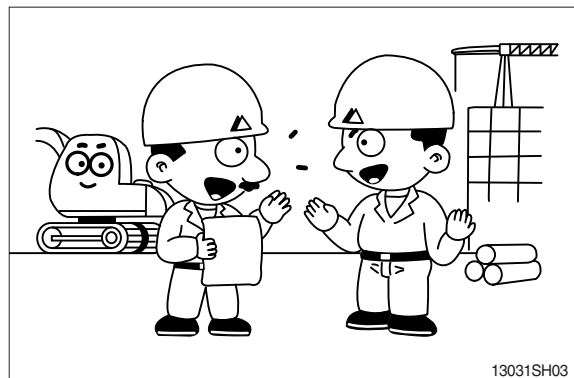
Be sure to understand thoroughly all about the operator's manual before operating the machine.

Proper care is your responsibility.

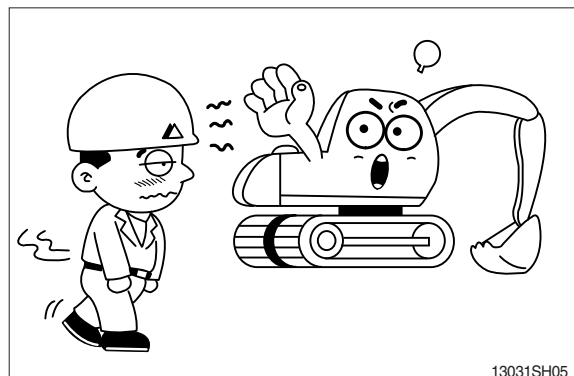


Fully understand the details and process of the construction before starting the work.

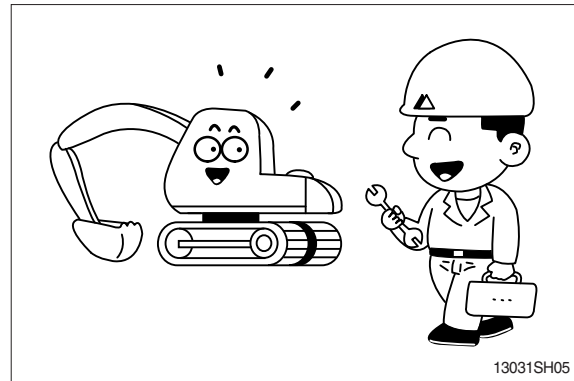
If you find anything dangerous on the job, consult with the job supervisor for the preventive measures before operating the machine.



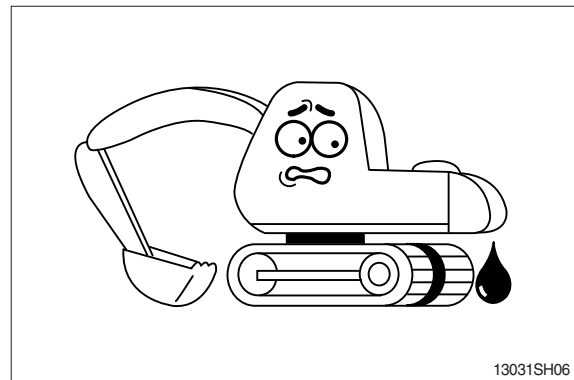
Do not operate when tired, or after drinking alcoholic beverages or any type of drugs.



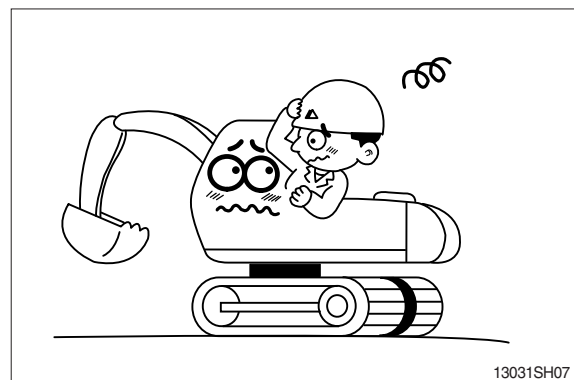
Check daily according to the operation manual.
Repair the damaged parts and tighten the loosened bolts.



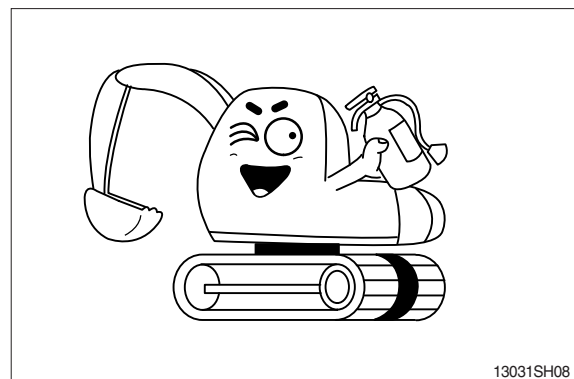
Check for leakage of engine oil, hydraulic oil, fuel and coolant.
Keep machine clean, clean machine regularly.



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.



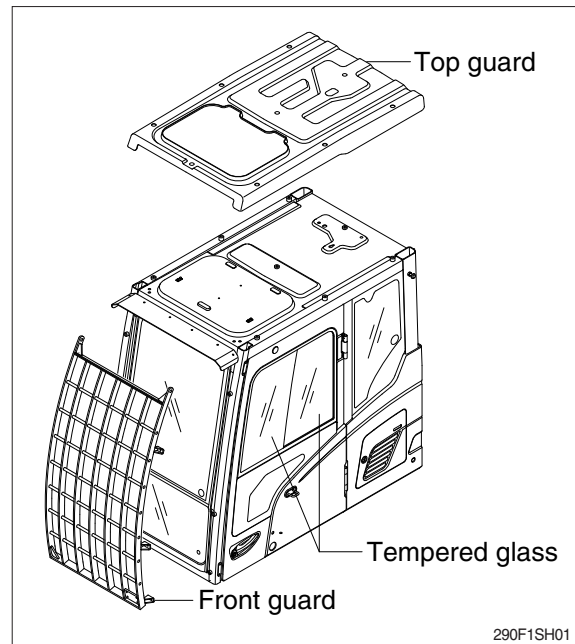
PROTECTION AGAINST FALLING OR FLYING OBJECTS

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 HD Hyundai Construction Equipment distributor.



UNAUTHORIZED MODIFICATION

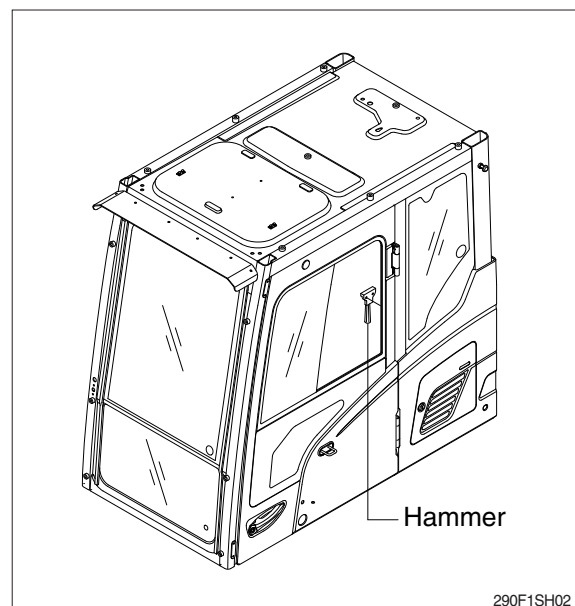
Any modification made without authorization from HD Hyundai Construction Equipment can create hazards.

Before making a modification, consult your HD Hyundai Construction Equipment distributor. HD Hyundai Construction Equipment 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.

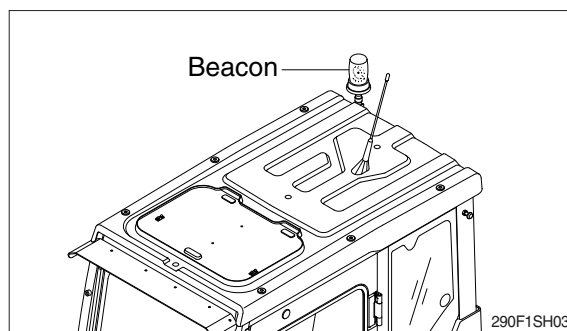
Be sure you know the phone numbers of persons you should contact in case of an emergency.



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 HD Hyundai Construction Equipment 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 HD Hyundai Construction Equipment or your HD Hyundai Construction Equipment 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 HD Hyundai Construction Equipment.

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.

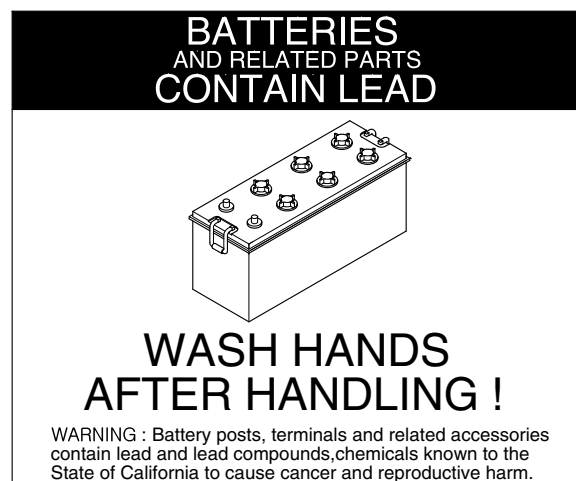
CALIFORNIA PROPOSITION 65

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.

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



3001SH02

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



3001SH03

Battery and battery cables

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



3001SH04

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

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

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

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

Never check the battery charge by placing a metal object across the terminal posts.

Use a voltmeter in order to check the battery charge.

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

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

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

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

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

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

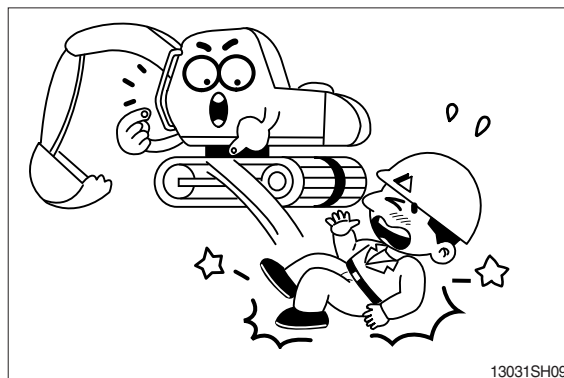
The vibration information and calculation procedure is based on "ISO/TR 25398 Mechanical Vibration- Guideline for whole body vibration exposure of operators of earthmoving equipment. The method is based on measured vibration emission under real working conditions for all machines.

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

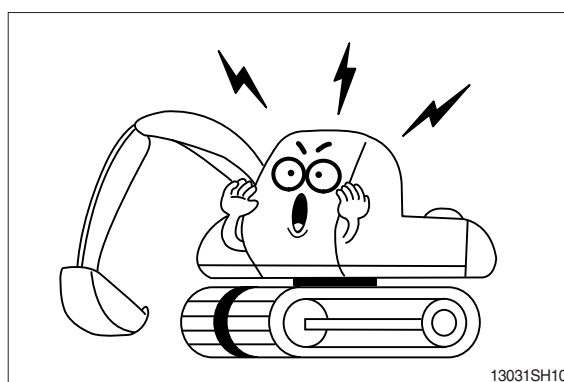
Use the handle and footstep when getting on or off the machine.

Do not jump on or off the machine.



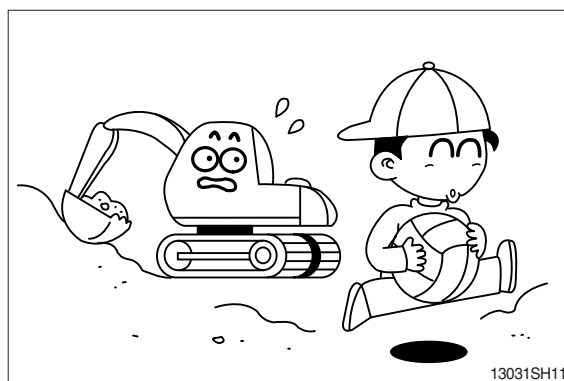
Sound the horn to warn nearby personnel before operating the machine.

Remove all the obstacles like frost on the window before operating the machine for the good visibility.

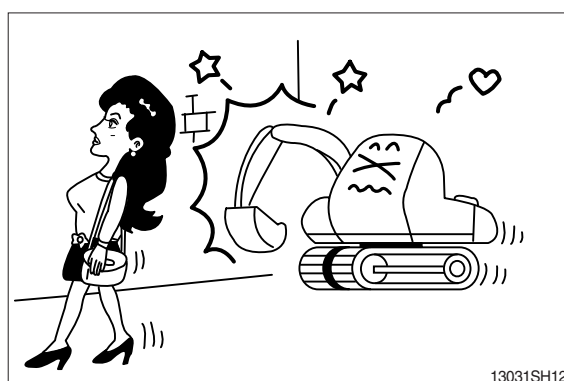


Operate carefully to make sure all personnel or obstacles are clear within the working range of the machine.

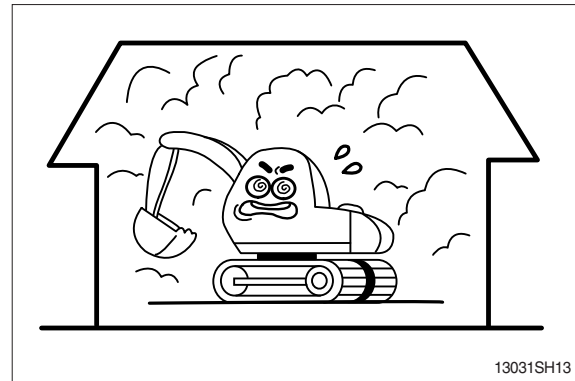
Place safety guards if necessary.



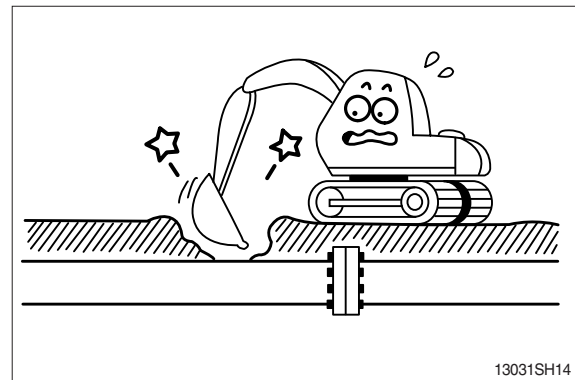
When using the work equipment, pay attention to job site.



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

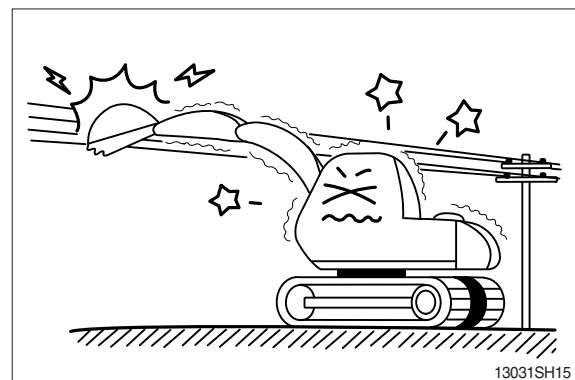


Check the locations of underground gas pipes or water line and secure the safety before operation.

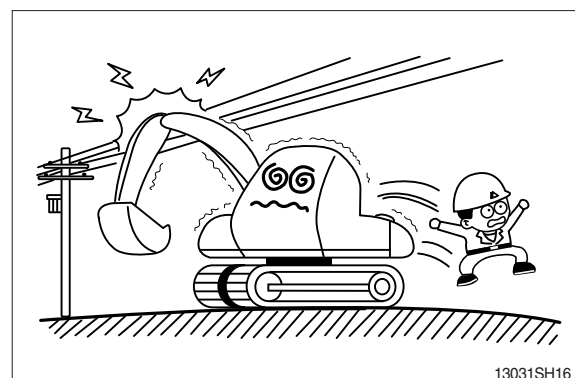


The operating near the electrical lines is very dangerous.
Operate within safe working range permitted as below.

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)

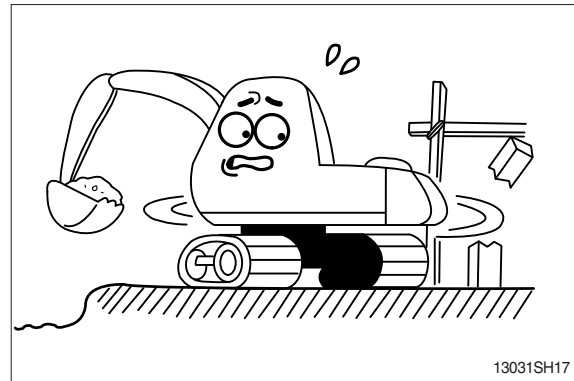


If the machine touches the electric power lines, keep sitting on the operator's seat and make sure the personnel on the ground not to touch the machine until turning off the electric current. Jump off the machine without contacting the machine when you need to get off.

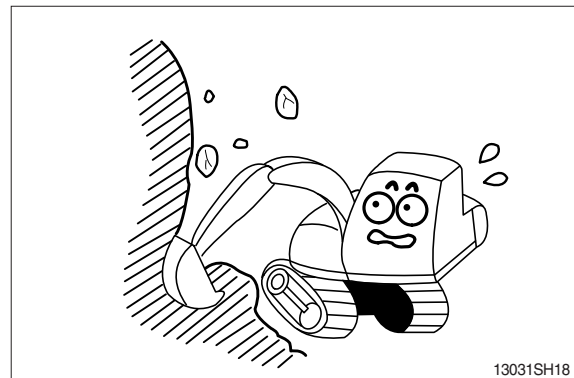


Watch out for obstacles.

Be particularly careful to check the machine clearance during the swing.

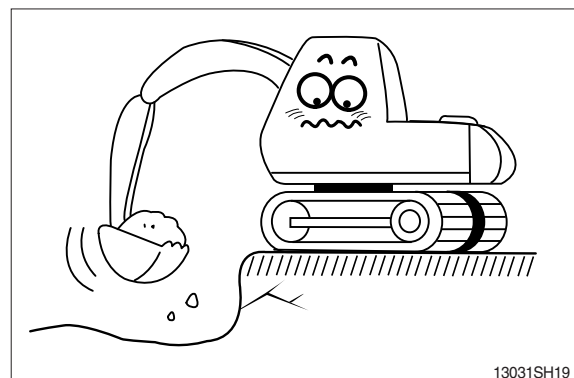


When using the machine as breaker or working in a place where stones may fall down, cab roof guard and head guard should be provided for proper protection.



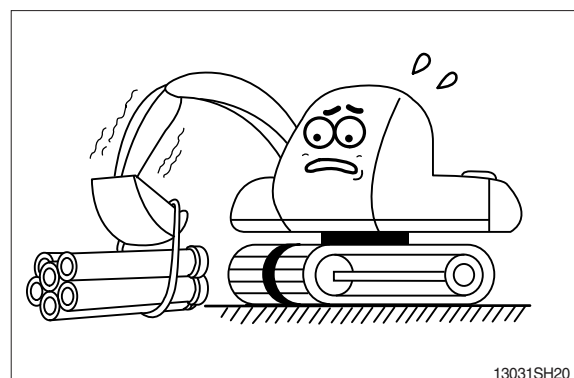
Avoid operating on a cliff or soft ground as there is danger of rolling over.

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.

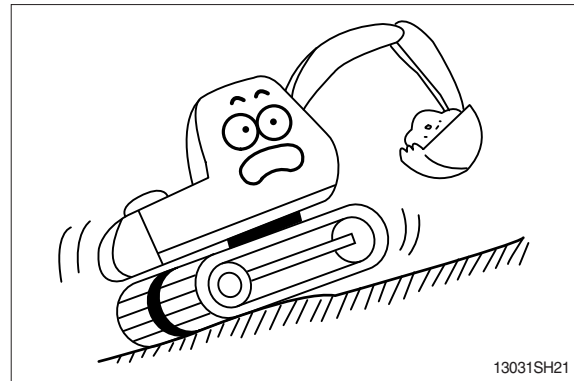


Operate for the lifting work considering the capacity of machine, weight and width of the load.

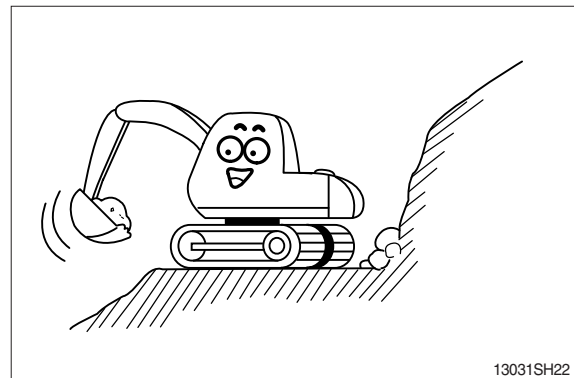
Be careful not to lift exceeding the machine capacity as it can be the cause of machine damage and safety accident.



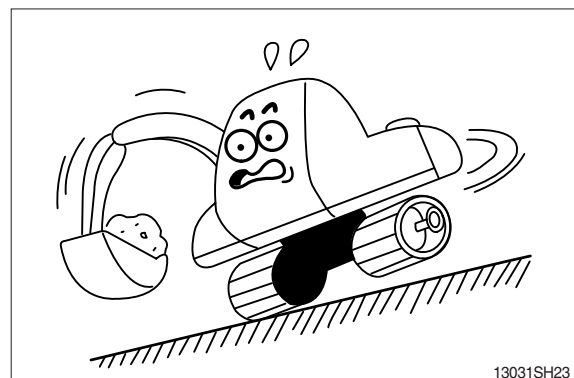
The operation on a slope is dangerous.
Avoid operating the machine on a slope of over 10 degree.



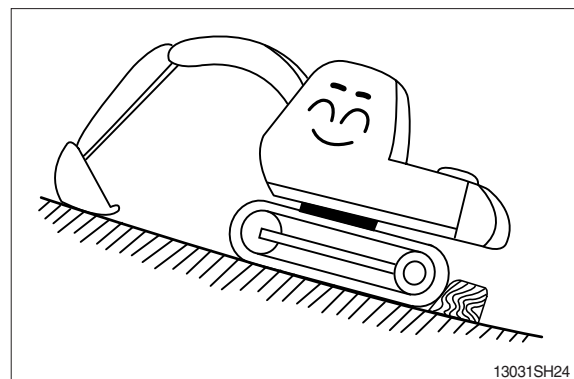
Operate the machine after making ground flat when operation is required on a slope.



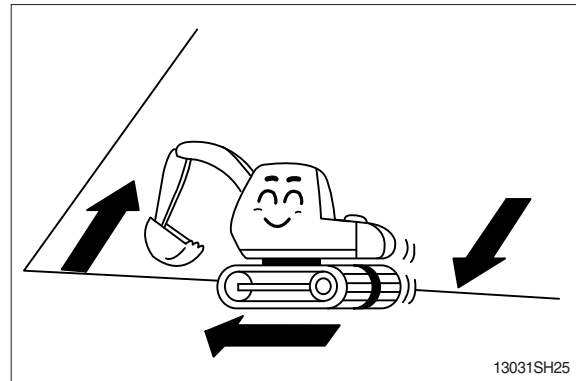
The swing on the slope can be danger of rolling over.
Do not operate to swing the machine with the bucket loaded on a slope since the machine may lose its balance under such an instance.



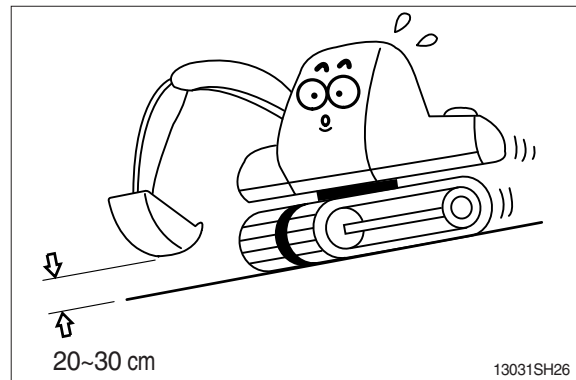
Avoid parking and stopping on a slope.
Lower the bucket to the ground and block the track when parking.



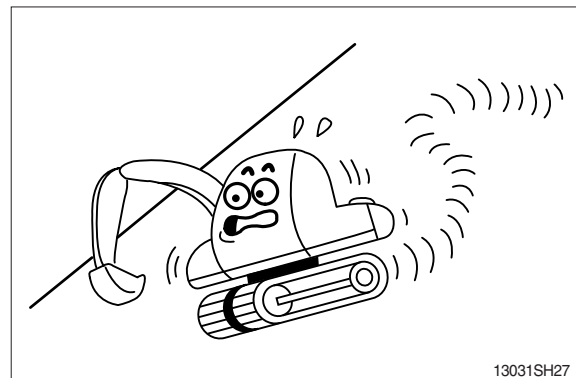
Avoid traveling in a cross direction on a slope as it can cause the danger of rolling over and sliding.



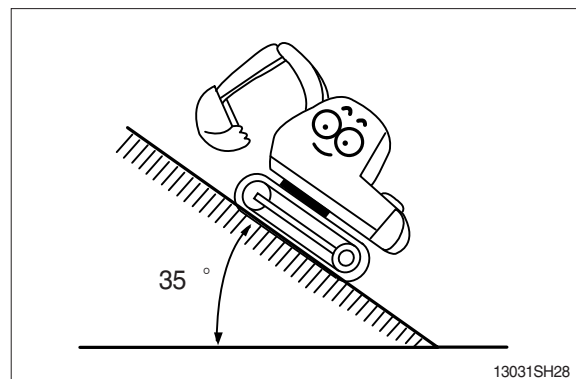
Traveling on a slope is dangerous.
Be sure to operate slowly when traveling down a slope and maintain the bucket at a height of 20~30 cm (1 ft) above the ground so that it can be used as brake in an emergency.



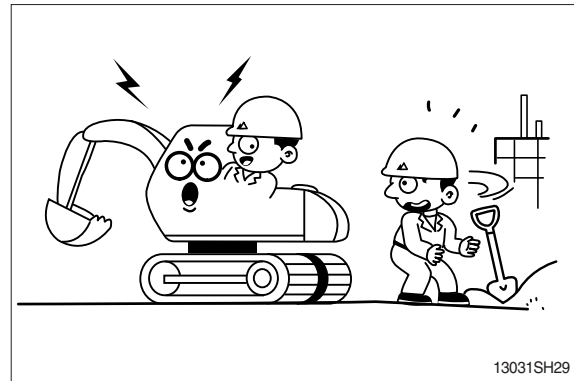
Steering of the machine while traveling on a slope is dangerous.
When an inevitable turning of direction is required, turn on the flat and solid ground.



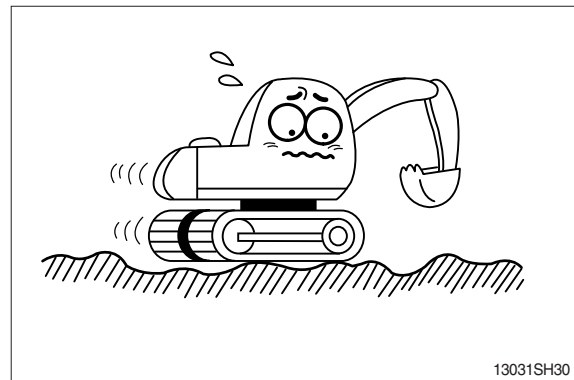
The engine angularity limits are 35 degree.
Do not operate by more than the engine limits in any case.



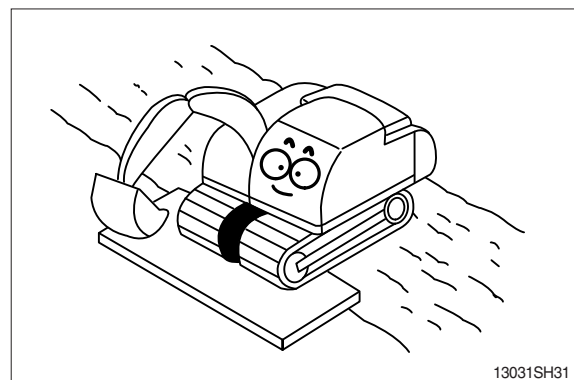
Before traveling the machine, sound the horn to warn nearby personnel.
Operate forward and backward correctly with confirming the location of the travel motor.



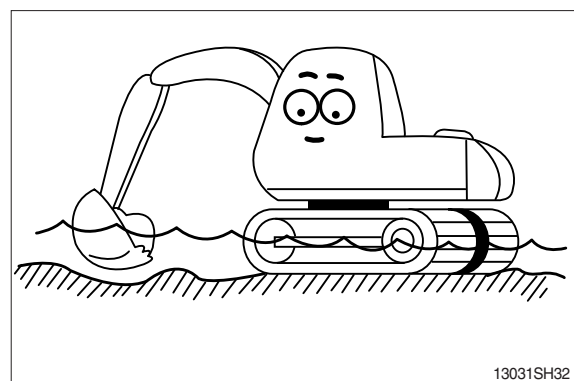
Slow down when traveling through obstacles or uneven ground.



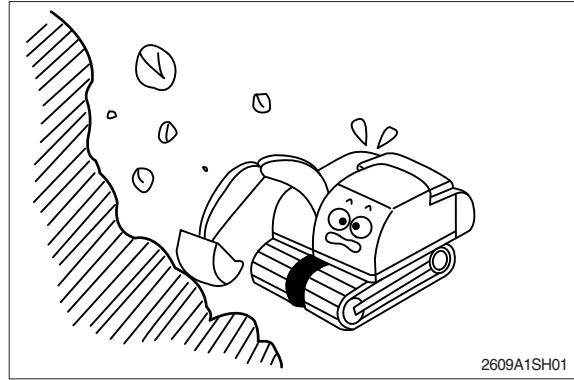
When working on soft ground, place mats or wood boards on the ground to prevent the machine sinking.



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



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



MOUNTING AND DISMOUNTING

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

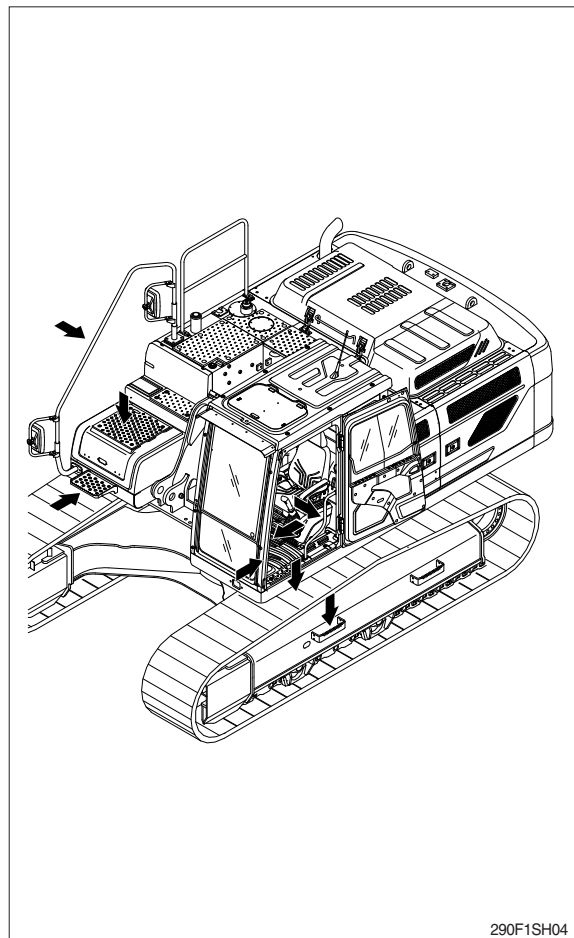
When mounting or dismounting, always face the machine and use the handrails, machine or track frame steps, and track shoes. Additional track frame step can be fitted for wider optional shoe. In this case please contact your HD Hyundai Construction Equipment distributor.

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.

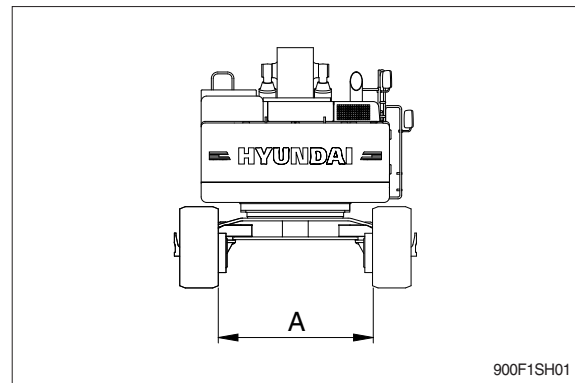


KEEP RIDERS OFF MACHINE

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.

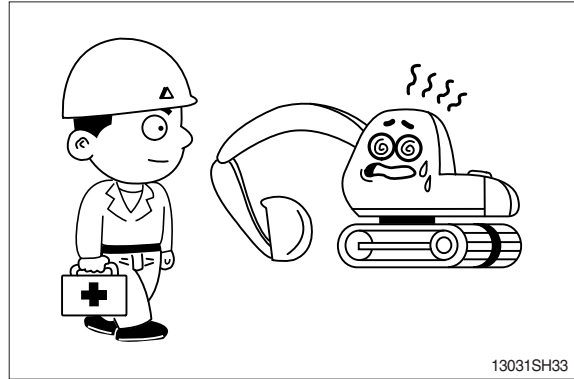
Never swing the upper structure when the track distance (A) is reduced since it can cause damage of machine such as track and auto grease system.



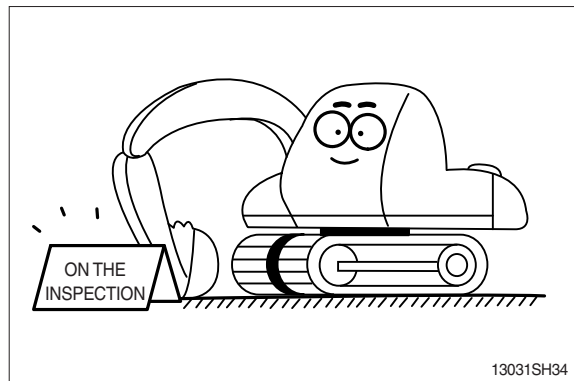
3. DURING MAINTENANCE

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

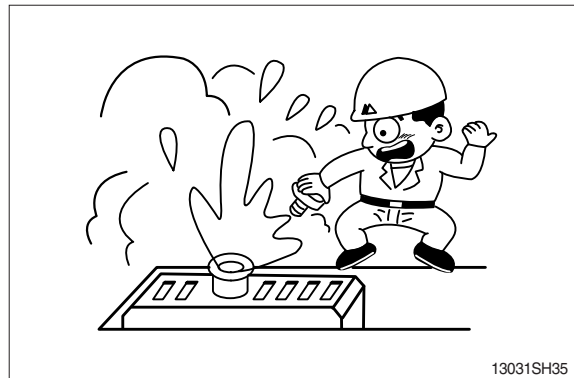
Inspect immediately the cause of trouble such as vibration, overheating and trouble in the cluster then repair.



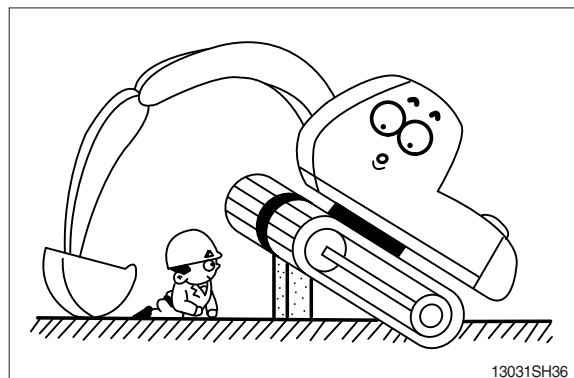
Park on a flat place and stop the engine for inspecting and repairing. Properly TAG machine is not operational. (remove start key)
Extreme care shall be taken during maintenance work. Parts may require additional safe guard.



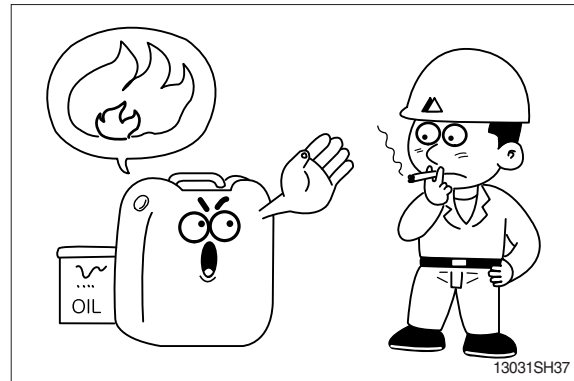
Do not remove the radiator cap from hot engine.
Open the cap after the engine cools, below 50 °C (122 °F) to prevent personal injury from heated coolant spray or steam.



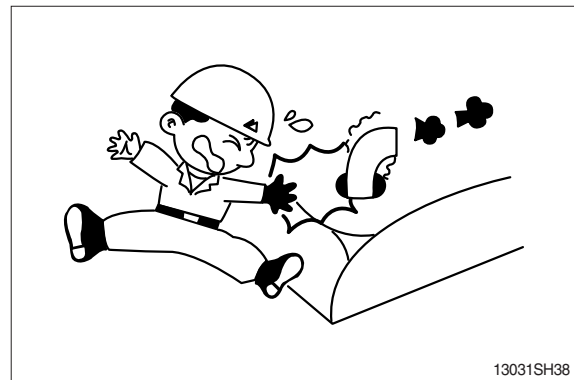
Do not work below the machine.
Be sure to work with proper safety supports.
Do not depend on the hydraulic cylinders to hold up the equipment and attachment.



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



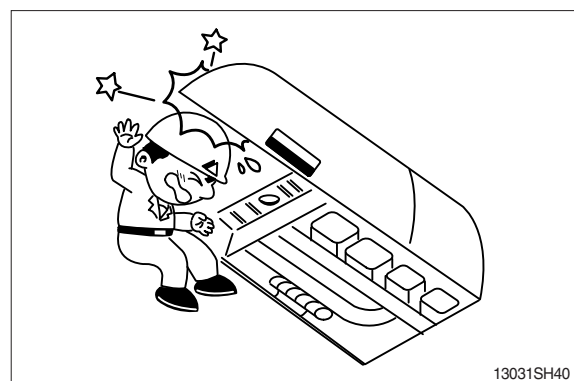
Do not touch exhaust pipe, or may cause severe burn.



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



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



Be careful that the front window may be promptly closed.

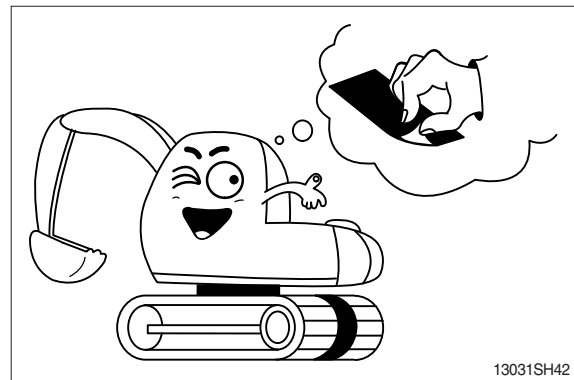
Be sure to support stay, when the side door needs to be opened.

Be careful that the open side door may closed by the external or natural force like strong wind.

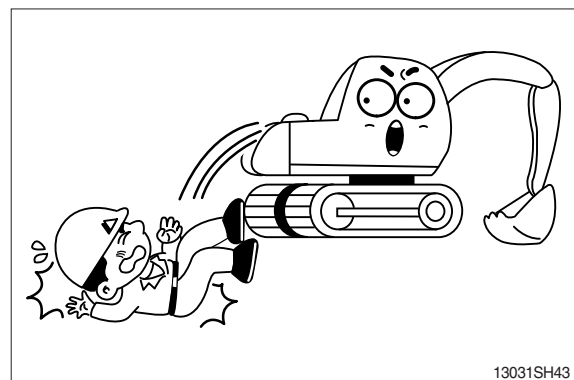


The antislip protection should be replaced if they have become worn or have been printed over.

Be sure to free of oil, water and grease etc.



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

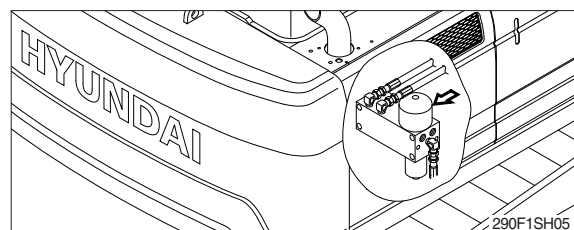


HIGH PRESSURE GAS

Contain high pressure gas.

To avoid explosion and personal injury, do not expose to fire, do not weld, do not drill.

Relieve pressure before discharging.



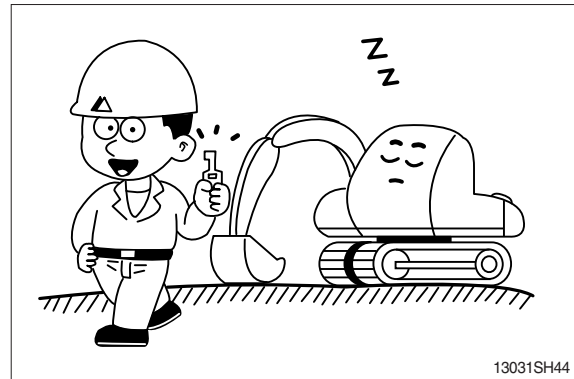
LIFT EYES CAN FAIL

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

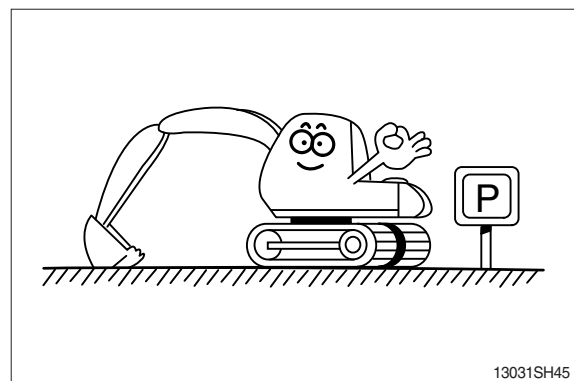
Drain tank of all fluids before lifting.

4. PARKING

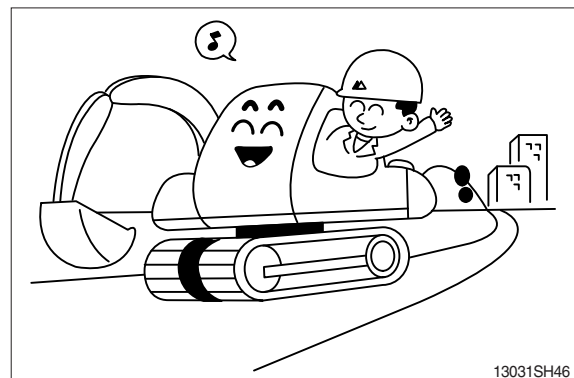
When leaving the machine after parking, lower the bucket to the ground completely and put the safety knob at the LOCK position then remove the key.
Lock the cab door.



Park the machine in the flat and safe place.

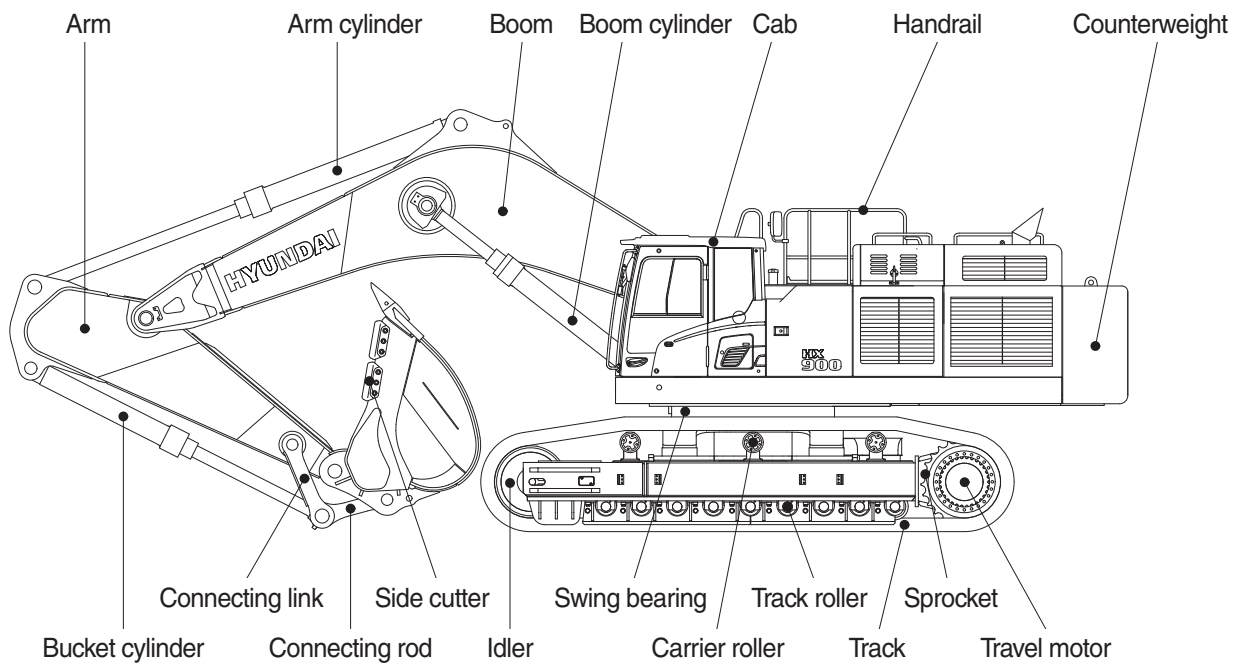
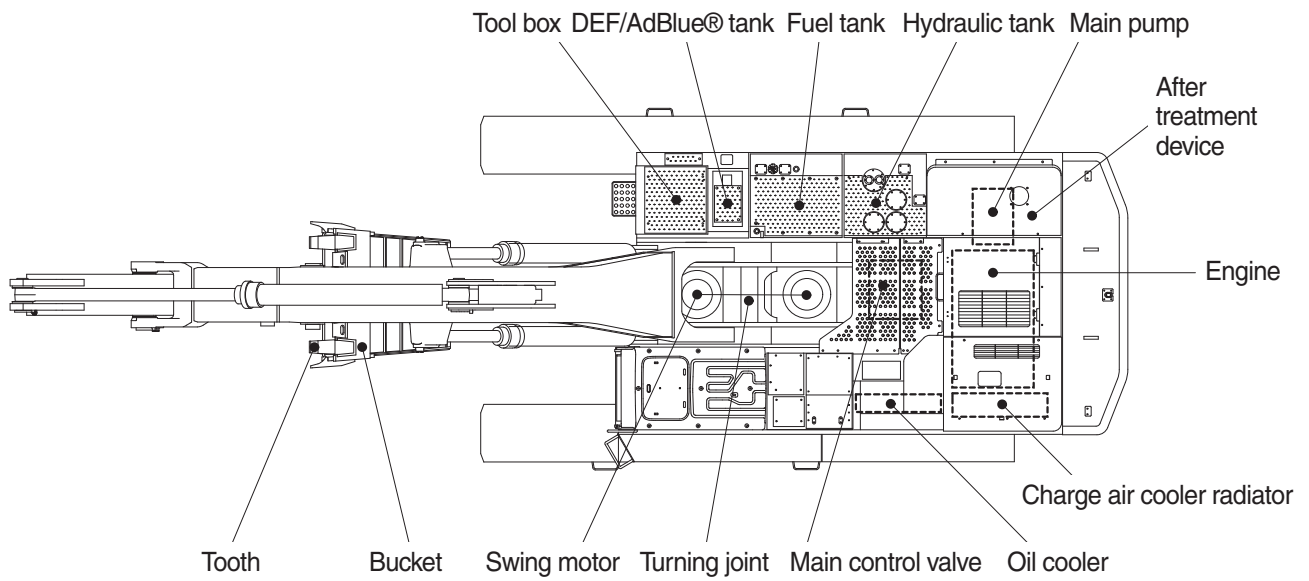


Hope you can work easily and safely observing safety rules.
For safe operation, observe all safety rules.



SPECIFICATIONS

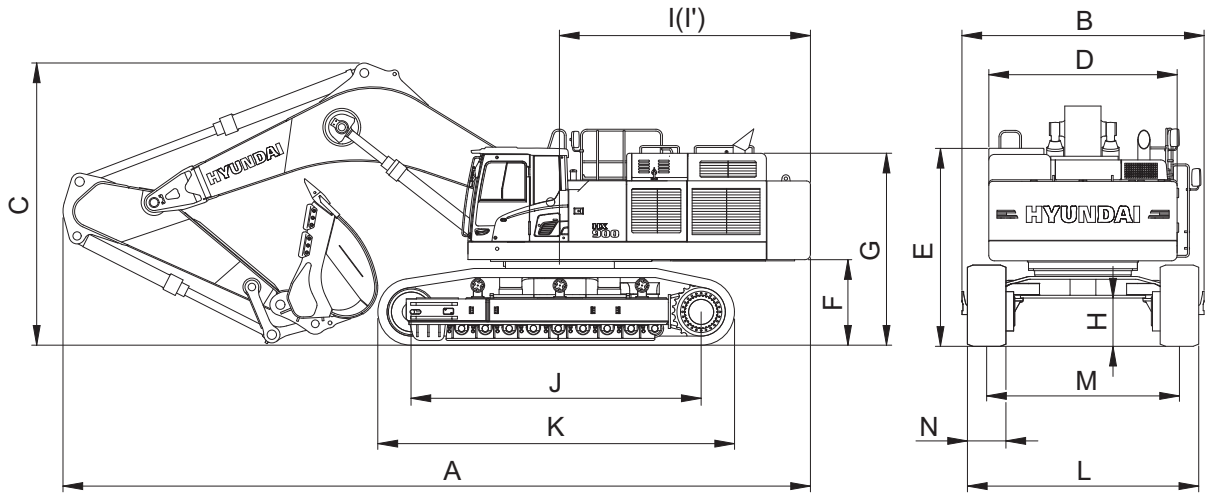
1. MAJOR COMPONENT



900F2SP01

2. SPECIFICATIONS

1) 7.20 m (23' 7") BOOM, 2.95 m (9' 8") ARM

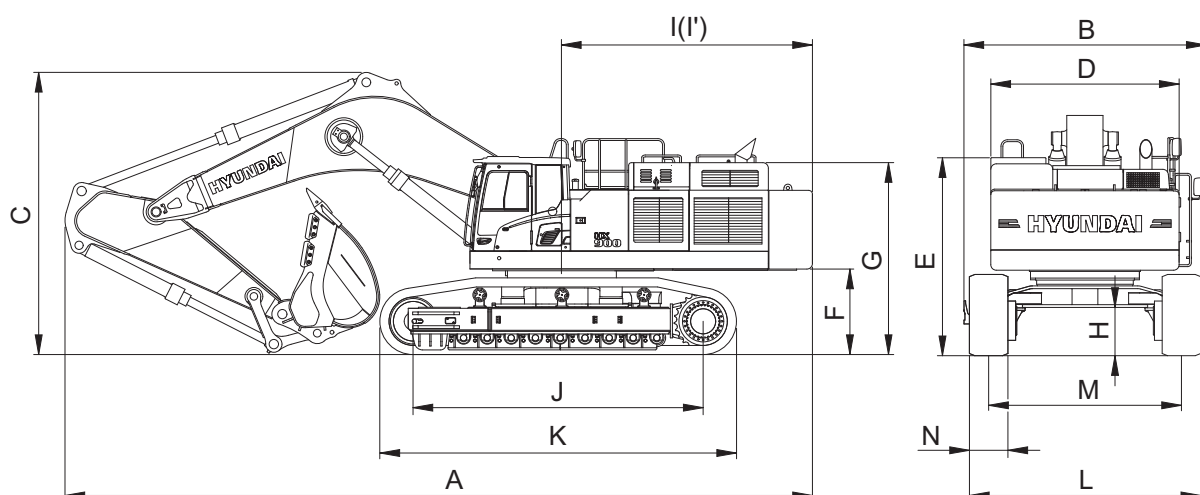


900F2SP03

Description		Unit	Specification
Operating weight		kg (lb)	88800 (195770) <89400 (197090)>
Bucket capacity (SAE heaped), standard		m ³ (yd ³)	4.85 (6.34)
Overall length	A	mm (ft-in)	13580 (44' 7")
Overall width, with 700 mm shoe	B		3775/4495 (12' 5"/14' 9")
Overall height	C		5380 (17' 8")
Superstructure width	D		3420 (11' 3")
Overall height of cab	E		3620 (11' 11") <4630 (15' 2")>
Ground clearance of counterweight	F		1615 (5' 4")
Engine cover height	G		3500 (11' 6")
Minimum ground clearance	H		925 (3' 0")
Rear-end distance	I		4550 (14' 11")
Rear-end swing radius	I'		4645 (15' 3")
Distance between tumblers	J		5130 (16' 10")
Undercarriage length	K		6445 (21' 2")
Undercarriage width	L		4200 (13' 9")
Track gauge	M		3500 (11' 6")
Track shoe width, standard	N		700 (28")
Travel speed (low/high)		km/hr (mph)	2.4/3.5 (1.5/2.2)
Swing speed		rpm	6.2
Gradeability		Degree (%)	35 (70)
Ground pressure (700 mm shoe)		kgf/cm ² (psi)	1.14 (16.3)
Max traction force		kg (lb)	66800 (147270)

< > : Cabin riser

2) 8.20 m (26' 11") BOOM, 3.60 m (11' 10") ARM



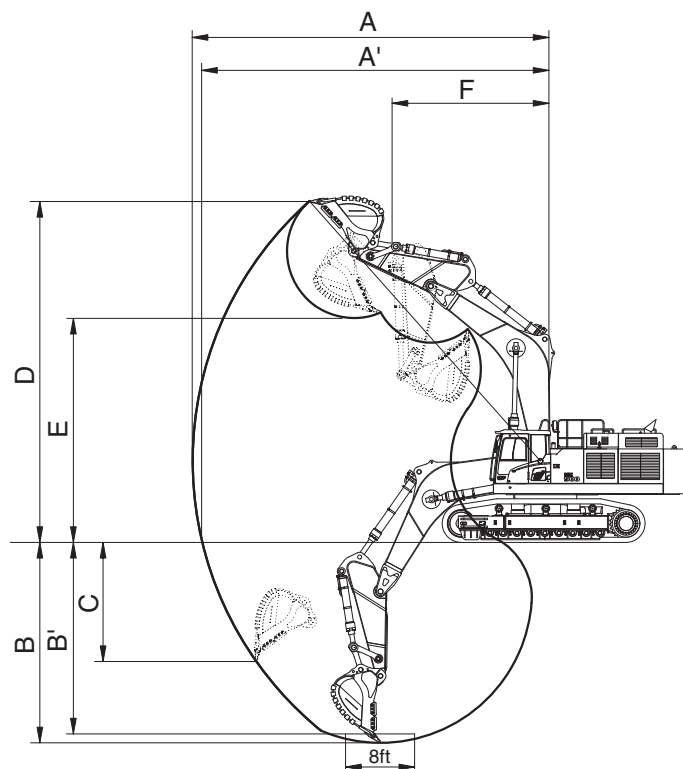
900F2SP03

Description		Unit	Specification
Operating weight		kg (lb)	88900 (195990) <89500 (197310)>
Bucket capacity (SAE heaped), standard		m ³ (yd ³)	3.6 (4.71)
Overall length	A	mm (ft-in)	14380 (47' 2")
Overall width, with 700 mm shoe	B		3775/4495 (12' 5"/14' 9")
Overall height	C		5180 (17' 0")
Superstructure width	D		3420 (11' 3")
Overall height of cab	E		3620 (11' 11") <4630 (15' 2")>
Ground clearance of counterweight	F		1615 (5' 4")
Engine cover height	G		3500 (11' 6")
Minimum ground clearance	H		925 (3' 0")
Rear-end distance	I		4550 (14' 11")
Rear-end swing radius	I'		4645 (15' 3")
Distance between tumblers	J		5130 (16' 10")
Undercarriage length	K		6445 (21' 2")
Undercarriage width	L		4200 (13' 9")
Track gauge	M		3500 (11' 6")
Track shoe width, standard	N		700 (28")
Travel speed (low/high)		km/hr (mph)	2.4/3.5 (1.5/2.2)
Swing speed		rpm	6.2
Gradeability		Degree (%)	35 (70)
Ground pressure (700 mm shoe)		kgf/cm ² (psi)	1.14 (16.3)
Max traction force		kg (lb)	66800 (147270)

< > : Cabin riser

3. WORKING RANGE

1) 7.20 m (23' 7") BOOM

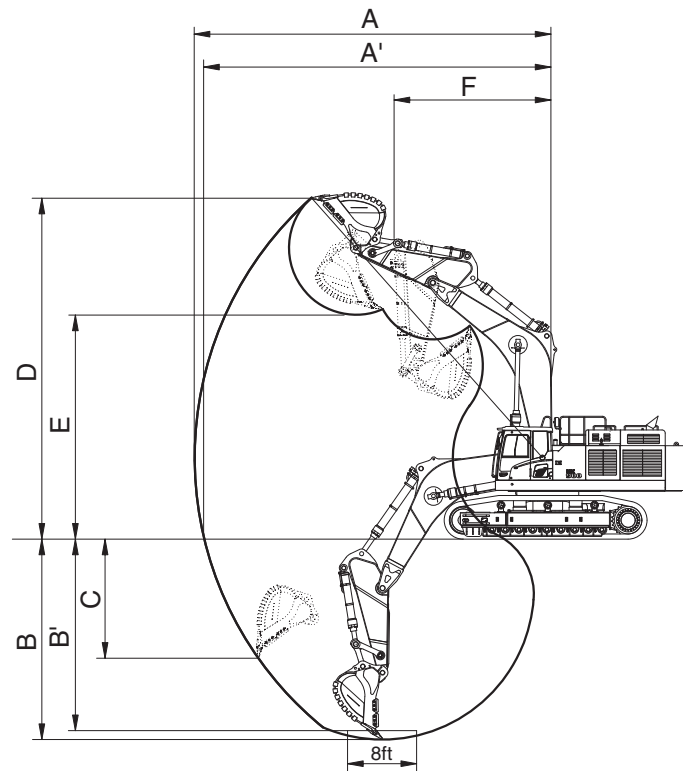


900F2SP04

Description		2.95 m (9' 8") Arm
Max digging reach	A	12300 mm (40' 4")
Max digging reach on ground	A'	12020 mm (39' 5")
Max digging depth	B	7230 mm (23' 9")
Max digging depth (8ft level)	B'	7090 mm (23' 3")
Max vertical wall digging depth	C	4370 mm (14' 4")
Max digging height	D	11910 mm (39' 1")
Max dumping height	E	7800 mm (25' 7")
Min swing radius	F	5100 mm (16' 9")
Bucket digging force	SAE	385.4 [420.4] kN
		39300 [42870] kgf
		86640 [94510] lbf
	ISO	439.3 [479.3] kN
		44800 [48870] kgf
		98770 [107740] lbf
Arm crowd force	SAE	372.7 [406.5] kN
		38000 [41450] kgf
		83780 [91380] lbf
	ISO	387.4 [422.6] kN
		39500 [43090] kgf
		87080 [95000] lbf

[] : Power boost

2) 8.20 m (26' 11") BOOM



900F2SP05

Description		2.95 m (9' 8") Arm	3.60 m (11' 10") Arm	4.40 m (14' 5") Arm
Max digging reach	A	13360 mm (43' 10")	13920 mm (45' 8")	14670 mm (48' 2")
Max digging reach on ground	A'	13090 mm (42' 11")	13670 mm (44' 10")	14430 mm (47' 4")
Max digging depth	B	8160 mm (26' 9")	8810 mm (28' 11")	9610 mm (31' 6")
Max digging depth (8ft level)	B'	8020 mm (26' 4")	8680 mm (28' 6")	9500 mm (31' 2")
Max vertical wall digging depth	C	5250 mm (17' 3")	6000 mm (19' 8")	6670 mm (21' 11")
Max digging height	D	12630 mm (41' 5")	12780 mm (41' 11")	13190 mm (43' 3")
Max dumping height	E	8490 mm (27' 10")	8690 mm (28' 6")	9030 mm (29' 8")
Min swing radius	F	5930 mm (19' 5")	5970 mm (19' 7")	5970 mm (19' 7")
Bucket digging force	SAE	385.4 [420.4] kN	334.4 [364.8] kN	334.4 kN
		39300 [42870] kgf	34100 [37200] kgf	34100 kgf
		86640 [94510] lbf	75180 [82010] lbf	75180 lbf
	ISO	439.3 [479.3] kN	381.5 [416.2] kN	381.5 kN
		44800 [48870] kgf	38900 [42440] kgf	38900 kgf
		98770 [107740] lbf	85760 [93560] lbf	85760 lbf
Arm crowd force	SAE	372.7 [406.5] kN	307.9 [335.9] kN	266.7 kN
		38000 [41450] kgf	31400 [34250] kgf	27200 kgf
		83780 [91380] lbf	69230 [75510] lbf	59970 lbf
	ISO	387.4 [422.6] kN	319.7 [348.7] kN	274.6 kN
		39500 [43090] kgf	32600 [35560] kgf	28000 kgf
		87080 [95000] lbf	71870 [78400] lbf	61730 lbf

[] : Power boost

4. WEIGHT

Item	HX900 L	
	kg	lb
Upperstructure assembly	30630	67530
Main frame weld assembly	7548	16640
Engine assembly	1490	3280
Main pump assembly	300	660
Main control valve assembly	424	930
Swing motor assembly	548	1210
Hydraulic oil tank assembly	706	1556
Fuel tank assembly	600	1323
Counterweight	13600	29980
Cab assembly	490	1080
Cab riser assy	600	1320
Lower chassis assembly	34790	76700
Track frame weld assembly	12809	28240
Swing bearing	1304	2875
Travel motor assembly	935	2060
Turning joint	75	165
Track recoil spring and tension body	742	1636
Idler	567	1250
Sprocket	240	530
Carrier roller	75	165
Track roller	199	439
Track-chain assembly (700 mm standard triple grouser shoe)	5038	11110
Front attachment assembly (7.20 m boom, 2.95 m arm, 4.85 m³ SAE heaped bucket)	23380	51540
7.20 m boom assembly	7650	16870
8.20 m boom assembly	8220	18120
2.95 m arm assembly	3430	7560
3.60 m arm assembly	3770	8310
3.60 m³ SAE heaped bucket	4620	10190
4.85 m³ SAE heaped bucket	5420	11950
Boom cylinder assembly	862	1906
Arm cylinder assembly	1087	2400
Bucket cylinder assembly	754	1662
Bucket control linkage total	480	1060

5. LIFTING CAPACITIES

Unit : mm

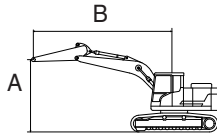
Model	Boom	Boom	Arm	Counterweight	Shoe	Dozer		Outrigger	
	Type	Length	Length	Weight (kg)	Width	Front	Rear	Front	Rear
HX900 L	Mono	7200	2950	13600	700	-	-	-	-
















: Rating over-front



: Rating over-side or 360 degree



Lift-point height (A)		Lift-point radius (B)										At max. reach		
		3.0m (9.8ft)		4.5m (14.8ft)		6.0m (19.7ft)		7.5m (24.6ft)		9.0m (29.5ft)		Capacity		Reach
														
9.0 m	kg							*22440	*22440			*20960	*20960	7.63
29.5 ft	lb							*49470	*49470			*46210	*46210	(25.0)
7.5 m	kg							*23970	*23970			*20020	19150	8.68
24.6 ft	lb							*52840	*52840			*44140	42220	(28.5)
6.0 m	kg			*38200	*38200	*29660	*29660	*24980	23980	*22110	17750	*19840	16520	9.38
19.7 ft	lb			*84220	*84220	*65390	*65390	*55070	52870	*48740	39130	*43740	36420	(30.8)
4.5 m	kg					*32700	32410	*26400	22960	*22560	17270	*20240	15040	9.79
14.8 ft	lb					*72090	71450	*58200	50620	*49740	38070	*44620	33160	(32.1)
3.0 m	kg					*35050	30510	*27590	21940	*22980	16720	*20640	14300	9.96
9.8 ft	lb					*77270	67260	*60830	48370	*50660	36860	*45500	31530	(32.7)
1.5 m	kg					*35620	29250	*28010	21130	*22900	16250	*20260	14160	9.90
4.9 ft	lb					*78530	64490	*61750	46580	*50490	35830	*44670	31220	(32.5)
0.0 m	kg					*34230	28650	*27230	20640	*21890	15960	*19740	14610	9.60
0.0 ft	lb					*75460	63160	*60030	45500	*48260	35190	*43520	32210	(31.5)
-1.5 m	kg			*37480	*37480	*31020	28520	*24890	20490	*19060	15960	*18860	15870	9.04
-4.9 ft	lb			*82630	*82630	*68390	62880	*54870	45170	*42020	35190	*41580	34990	(29.7)
-3.0 m	kg			*30370	*30370	*25700	*25700	*20210	*20210			*17140	*17140	8.17
-9.8 ft	lb			*66950	*66950	*56660	*56660	*44560	*44560			*37790	*37790	(26.8)
-4.5 m	kg			*19940	*19940	*16840	*16840					*13310	*13310	6.86
-14.8 ft	lb			*43960	*43960	*37130	*37130					*29340	*29340	(22.5)

※ 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 lift-point is bucket pivot mounting pin on the arm (without bucket mass).
4. *indicates load limited by hydraulic capacity.

※ Lifting capacities are based upon a standard machine conditions.

Lifting capacities will vary with different work tools, ground conditions and attachments.

The difference between the weight of a work tool attachment must be subtracted.

Consult your HD Hyundai Construction Equipment dealer regarding the lifting capacities for specific work tools and attachments.

▲ Failure to comply to the rated load can cause possible personal injury or property damage.

Make adjustments to the rated load as necessary for non-standard configurations.

Unit : mm

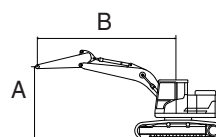
Model	Boom	Boom	Arm	Counterweight	Shoe	Dozer		Outrigger	
	Type	Length	Length	Weight (kg)	Width	Front	Rear	Front	Rear
HX900 L	Mono	8200	2950	13600	700	-	-	-	-



: Rating over-front



: Rating over-side or 360 degree



Lift-point height (A)		Lift-point radius (B)														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)		10.5 m (34.0 ft)		12.0 m (39.0 ft)		Capacity		Reach
																		m (ft)
10.5 m	kg							*21570	*21570							*21500	*21500	7.67
34.4 ft	lb							*47550	*47550							*47400	*47400	(25.2)
9.0 m	kg															*19770	18110	8.98
29.5 ft	lb															*43590	39930	(29.5)
7.5 m	kg							*21980	*21980	*19660	17890					*18850	15090	9.89
24.6 ft	lb							*48460	*48460	*43340	39440					*41560	33270	(32.4)
6.0 m	kg					*28820	*28820	*23450	23140	*20270	17330					*18290	13330	10.50
19.7 ft	lb					*63540	*63540	*51700	51010	*44690	38210					*40320	29390	(34.4)
4.5 m	kg							*25090	21870	*21060	16630	*18440	13030			*17920	12280	10.87
14.8 ft	lb							*55310	48220	*46430	36660	*40650	28730			*39510	27070	(35.7)
3.0 m	kg							*26350	20720	*21720	15950	*18600	12660			*17650	11730	11.02
9.8 ft	lb							*58090	45680	*47880	35160	*41010	27910			*38910	25860	(36.2)
1.5 m	kg							*26780	19910	*21950	15400	*18450	12350			*17400	11600	10.96
4.9 ft	lb							*59040	43890	*48390	33950	*40680	27230			*38360	25570	(36.0)
0.0 m	kg							*26210	19460	*21510	15060	*17640	12180			*17070	11880	10.70
0.0 ft	lb							*57780	42900	*47420	33200	*38890	26850			*37630	26190	(35.1)
-1.5 m	kg					*29630	27100	*24560	19330	*20120	14960					*16540	12690	10.20
-4.9 ft	lb					*65320	59750	*54150	42620	*44360	32980					*36460	27980	(33.5)
-3.0 m	kg			*28720	*28720	*25840	*25840	*21630	19500	*17200	15150					*15550	14290	9.44
-9.8 ft	lb			*63320	*63320	*56970	*56970	*47690	42990	*37920	33400					*34280	31500	(31.0)
-4.5 m	kg			*22220	*22220	*20270	*20270	*16600	*16600							*13570	*13570	8.33
-14.8 ft	lb			*48990	*48990	*44690	*44690	*36600	*36600							*29920	*29920	(27.3)
-6.0 m	kg																	
-19.7 ft	lb																	

Unit : mm

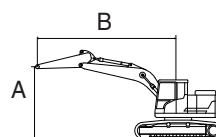
Model	Boom	Boom	Arm	Counterweight	Shoe	Dozer		Outrigger	
	Type	Length	Length	Weight (kg)	Width	Front	Rear	Front	Rear
HX900 L	Mono	8200	3600	13600	700	-	-	-	-





















: Rating over-front



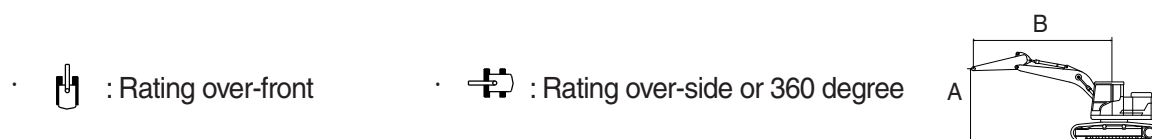
: Rating over-side or 360 degree



















Lift-point height (A)		Lift-point radius (B)														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)		10.5 m (34.0 ft)		12.0 m (39.0 ft)		Capacity		Reach		
																				m (ft)
10.5 m 34.4 ft	kg lb																	*14300 *31530	*14300 *31530	8.47 (27.8)
9.0 m 29.5 ft	kg lb									*17910 *39480	*17910 *39480							*13440 *29630	*13440 *29630	9.67 (31.7)
7.5 m 24.6 ft	kg lb									*18750 *41340	18280 40300	*13220 *29150	*13220 *29150					*13070 *28810	*13070 *28810	10.51 (34.5)
6.0 m 19.7 ft	kg lb					*27270 *60120	*27270 *60120	*22480 *49560	*22480 *49560	*19540 *43080	17690 39000	*17600 *38800	13630 30050					*13040 *28750	12320 27160	11.09 (36.4)
4.5m 14.8 ft	kg lb					*30770 *67840	*30770 *67840	*24320 *53620	22430 49450	*20510 *45220	16960 37390	*18000 *39680	13240 29190					*13300 *29320	11420 25180	11.44 (37.5)
3.0 m 9.8 ft	kg lb					*33410 *73660	29230 64440	*25890 *57080	21200 46740	*21390 *47160	16230 35780	*18380 *40520	12820 28260					*13850 *30530	10930 24100	11.59 (38.0)
1.5 m 4.9 ft	kg lb					*34260 *75530	27890 61490	*26730 *58930	20260 44670	*21890 *48260	15610 34410	*18500 *40790	12440 27430					*14740 *32500	10790 23790	11.53 (37.8)
0.0 m 0.0 ft	kg lb					*33450 *73740	27280 60140	*26620 *58690	19660 43340	*21790 *48040	15180 33470	*18130 *39970	12180 26850					*16110 *35520	11000 24250	11.28 (37.0)
-1.5 m -4.9 ft	kg lb			*23630 *52100	*23630 *52100	*31380 *69180	27120 59790	*25470 *56150	19400 42770	*20860 *45990	14960 32980	*16900 *37260	12090 26650					*15970 *35210	11640 25660	10.81 (35.5)
-3.0 m -9.8 ft	kg lb	*24830 *54740	*24830 *54740	*33260 *73330	*33260 *73330	*28120 *61990	27280 60140	*23140 *51010	19430 42840	*18760 *41360	15000 33070							*15350 *33840	12900 28440	10.09 (33.1)
-4.5 m -14.8ft	kg lb			*26990 *59500	*26990 *59500	*23290 *51350	*23290 *51350	*19160 *42240	*19160 *42240	*14380 *31700	*14380 *31700							*14080 *31040	*14080 *31040	9.07 (29.8)
-6.0m -19.7ft	kg lb					*15890 *35030	*15890 *35030	*11750 *25900	*11750 *25900									*11240 *24780	*11240 *24780	7.62 (25.0)

Unit : mm

Model	Boom	Boom	Arm	Counterweight	Shoe	Dozer		Outrigger	
	Type	Length	Length	Weight (kg)	Width	Front	Rear	Front	Rear
HX900 L	Mono	8200	4400	16500	700	-	-	-	-

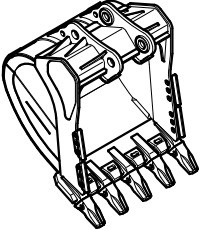
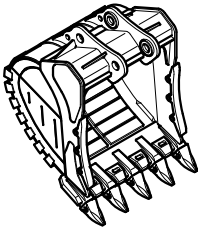
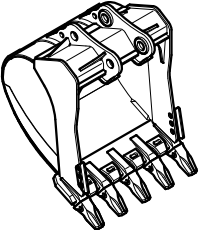
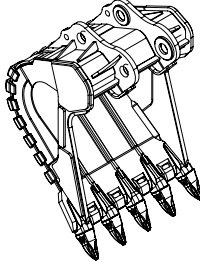


Lift-point height (A)		Lift-point radius (B)																At max. reach		
		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0ft)		7.5 m (25.0 ft)		9.0 m (30.0 ft)		10.5 m (34.0 ft)		12.0 m (39.0 ft)		Capacity		Reach		
																		m (ft)		
10.5m	kg																	*14300	*14300	8.47
34.4ft	lb																	*31530	*31530	(27.8)
9.0m	kg									*17910	*17910							*13440	*13440	9.67
29.5ft	lb									*39480	*39480							*29630	*29630	(31.7)
7.5m	kg									*18750	18280	*13220	*13220					*13070	*13070	10.51
24.6ft	lb									*41340	40300	*29150	*29150					*28810	*28810	(34.5)
6.0m	kg					*27270	*27270	*22480	*22480	*19540	17690	*17600	13630					*13040	12320	11.09
19.7ft	lb					*60120	*60120	*49560	*49560	*43080	39000	*38800	30050					*28750	27160	(36.4)
4.5m	kg					*30770	*30770	*24320	22430	*20510	16960	*18000	13240					*13300	11420	11.44
14.8ft	lb					*67840	*67840	*53620	49450	*45220	37390	*39680	29190					*29320	25180	(37.5)
3.0m	kg					*33410	29230	*25890	21200	*21390	16230	*18380	12820					*13850	10930	11.59
9.8ft	lb					*73660	64440	*57080	46740	*47160	35780	*40520	28260					*30530	24100	(38.0)
1.5m	kg					*34260	27890	*26730	20260	*21890	15610	*18500	12440					*14740	10790	11.53
4.9ft	lb					*75530	61490	*58930	44670	*48260	34410	*40790	27430					*32500	23790	(37.8)
0.0m	kg					*33450	27280	*26620	19660	*21790	15180	*18130	12180					*16110	11000	11.28
0.0ft	lb					*73740	60140	*58690	43340	*48040	33470	*39970	26850					*35520	24250	(37.0)
-1.5m	kg			*23630	*23630	*31380	27120	*25470	19400	*20860	14960	*16900	12090					*15970	11640	10.81
-4.9ft	lb			*52100	*52100	*69180	59790	*56150	42770	*45990	32980	*37260	26650					*35210	25660	(35.5)
-3.0m	kg	*24830	*24830	*33260	*33260	*28120	27280	*23140	19430	*18760	15000							*15350	12900	10.09
-9.8ft	lb	*54740	*54740	*73330	*73330	*61990	60140	*51010	42840	*41360	33070							*33840	28440	(33.1)
-4.5m	kg			*26990	*26990	*23290	*23290	*19160	*19160	*14380	*14380							*14080	*14080	9.07
-14.8ft	lb			*59500	*59500	*51350	*51350	*42240	*42240	*31700	*31700							*31040	*31040	(29.8)
-6.0m	kg					*15890	*15890	*11750	*11750									*11240	*11240	7.62
-19.7ft	lb					*35030	*35030	*25900	*25900									*24780	*24780	(25.0)





6. BUCKET SELECTION GUIDE

1) HX900 L

(1) HEAVY DUTY AND ROCK-HEAVY DUTY BUCKET

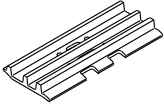
			
◇ Heavy duty	◆ Rock-heavy duty	◆ Light-heavy duty	★ Rock-special heavy duty (Cubic marble handling)

Capacity		Width	Weight	Tooth	Recommendation			
					7.2 m (23' 7") boom	8.2 m (26' 11") boom		
					2.95 m (9' 8") arm	2.95 m (9' 8") arm	3.6 m (11' 10") arm	4.4 m (14' 5") arm
◇ 3.70 m³ (4.84 yd³)	3.30 m³ (4.32 yd³)	1845 mm (72.6")	4370 kg (9630 lb)	4 EA	●	◐	■	■
◇ 4.25 m³ (5.56 yd³)	3.75 m³ (4.90 yd³)	2045 mm (80.5")	4730 kg (10430 lb)	5 EA	●	■	▲	▲
◇ 4.85 m³ (6.34 yd³)	4.25 m³ (5.56 yd³)	2245mm (88.4")	5000 kg (11020 lb)	5 EA	◐	▲	▲	▲
◇ 5.40 m³ (7.06 yd³)	4.75 m³ (6.21 yd³)	2445mm (96.3")	5275 kg (11630 lb)	5 EA	■			
◇ 5.80 m³ (7.59 yd³)	5.05 m³ (6.61 yd³)	2585mm (101.8")	5555 kg (12250 lb)	6 EA	▲			
◆ 3.70 m³ (4.84 yd³)	3.30 m³ (4.32 yd³)	1845mm (72.6")	4850 kg (10690 lb)	4 EA	●	◐	■	■
◆ 4.25 m³ (5.56 yd³)	3.75 m³ (4.90 yd³)	2045mm (80.5")	5235 kg (11540 lb)	5 EA	◐	■	▲	▲
◆ 4.85 m³ (6.34 yd³)	4.25 m³ (5.56 yd³)	2245mm (88.4")	5530 kg (12190 lb)	5 EA	■	▲		
◆ 5.40 m³ (7.06 yd³)	4.75 m³ (6.21 yd³)	2445mm (96.3")	5830 kg (12850 lb)	5 EA	■			
◆ 4.25 m³ (5.56 yd³)	3.75 m³ (4.90 yd³)	2045mm (80.5")	4150 kg (9150 lb)	5 EA	●	■	■	■
★ 3.60 m³ (4.71 yd³)	3.10 m³ (4.05 yd³)	1920mm (75.6")	4600 kg (10140 lb)	5 EA	●	◐	■	■

-  Applicable for materials with density of 1200 kg/m³ (2000 lb/yd³) or less
-  Applicable for materials with density of 1500 kg/m³ (2500 lb/yd³) or less
-  Applicable for materials with density of 1800 kg/m³ (3000 lb/yd³) or less
-  Applicable for materials with density of 2100 kg/m³ (3500 lb/yd³) or less

7. UNDERCARRIAGE

1) TRACKS

Model	Shapes		Double grouser		
					
HX900 L	Shoe width	mm (in)	700 (28)	800 (32)	900 (36)
	Operating weight	kg (lb)	88900 (195990)	89720 (197800)	90540 (199610)
	Ground pressure	kgf/cm ² (psi)	1.14 (16.3)	1.01 (14.4)	0.91 (12.9)
	Overall width	mm (in)	4200 (13' 9")	4300 (14' 1")	4400 (14' 5")

2) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	3 EA
Track rollers	9 EA
Track shoes	52 EA

3) 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
700 mm triple grouser	Option	A
800 mm triple grouser	Option	B
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 ground (swampy ground)	· Use the shoes only in the conditions that the machine sinks and it is impossible to use the shoes of category A or B · These shoes cannot be used on rough ground with large obstacles such as boulders or fallen trees · Travel at high speed only on flat ground · Travel slowly at low speed if it is impossible to avoid going over obstacles

8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Scania DC16 084A
Type	Eco-friendly, 4-cycle turbocharged charger air cooled diesel engine
Cooling method	Water cooling
Number of cylinders and arrangement	8 cylinders
Firing order	1-5-4-2-6-3-7-8
Combustion chamber type	Direct injection type
Cylinder bore × stroke	130 × 154 mm (5.12" × 6.1")
Piston displacement	16400 cc (1000 cu in)
Compression ratio	17.4 : 1
Rated horse power	641 Hp at 2100 rpm (478 kW at 2100 rpm)
Maximum torque	321 kgf · m (2322 lbf · ft) at 1350 rpm
Engine oil quantity	49 ℓ (12.9 U.S. gal)
Dry weight	1490 kg (3280 lb)
Low idling speed	850 ± 100 rpm
High idling speed	1750 ± 50 rpm
Rated fuel consumption	155 g/Hp · hr at 1800 rpm
Starting motor	24V-7kW
Alternator	24V-100A
Battery	4 × 12V × 160Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement axial piston pumps
Capacity	2 × 280 cc/rev
Maximum pressure	330 kgf/cm ² (4690 psi) [360 kgf/cm ² (5120 psi)]
Rated oil flow	2 × 504 ℓ /min (133.1 U.S. gpm / 110.9 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
Type	9 spools
Operating method	Hydraulic pilot system
Main relief valve pressure	330 kgf/cm ² (4690 psi) [360 kgf/cm ² (5120 psi)]
Port relief valve pressure	380 kgf/cm ² (5400 psi)

[] : Power boost

5) SWING MOTOR

Item	Specification
Type	Fixed displacement axial piston motor
Capacity	250cc/rev
Relief pressure	300 kgf/cm ² (3360 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	165.2 kgf · m (1195 lbf · ft) over
Brake release pressure	33.7~50 kgf/cm ² (479~711 psi)
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Axial piston motor
Relief pressure	350 kgf/cm ² (4980 psi)
Capacity (max / min)	337.2/228.6 cc/rev
Reduction gear type	3-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	18 kgf/cm ² (256 psi) below
Braking torque	114 kgf · m (825 lbf · ft) over

7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	Ø215 × Ø150 × 1935 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	Ø225 × Ø160 × 2290 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	Ø215 × Ø150 × 1593 mm
	Cushion	Extend only

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

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

8) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
HX900 L	Standard	★700 mm (28")	1.14 kgf/cm ² (16.3 psi)	52	4200 mm (13' 9")
	Option	★800 mm (32")	1.01 kgf/cm ² (14.4 psi)	52	4300 mm (14' 1")
		★900 mm (36")	0.91 kgf/cm ² (12.9 psi)	52	4400 mm (14' 5")

★ : Double grouser

9) BUCKET

Item	Capacity		Tooth quantity	Width
	SAE heaped	CECE heaped		
HX900 L	◇3.70 m ³ (4.84 yd ³)	3.30 m ³ (4.32 yd ³)	4	1845 mm (72.6")
	◇4.25 m ³ (5.56 yd ³)	3.75 m ³ (4.90 yd ³)	5	2045 mm (80.5")
	◇4.85 m ³ (6.34 yd ³)	4.25 m ³ (5.56 yd ³)	5	2245mm (88.4")
	◇5.40 m ³ (7.06 yd ³)	4.75 m ³ (6.21 yd ³)	5	2445mm (96.3")
	◇5.80 m ³ (7.59 yd ³)	5.05 m ³ (6.61 yd ³)	6	2585mm (101.8")
	◆3.70 m ³ (4.84 yd ³)	3.30 m ³ (4.32 yd ³)	4	1845mm (72.6")
	◆4.25 m ³ (5.56 yd ³)	3.75 m ³ (4.90 yd ³)	5	2045mm (80.5")
	◆4.85 m ³ (6.34 yd ³)	4.25 m ³ (5.56 yd ³)	5	2245mm (88.4")
	◆5.40 m ³ (7.06 yd ³)	4.75 m ³ (6.21 yd ³)	5	2445mm (96.3")
	◆4.25 m ³ (5.56 yd ³)	3.75 m ³ (4.90 yd ³)	5	2045mm (80.5")
	★3.60 m ³ (4.71 yd ³)	3.10 m ³ (4.05 yd ³)	5	1920mm (75.6")

◇ : Heavy duty

◆ : Rock-heavy duty

◆ : Light-heavy duty

★ : Rock-special heavy duty (Cubic marble handling)

9. RECOMMENDED OILS

HD Hyundai Construction Equipment genuine lubricating oils have been developed to offer the best performance and service life for your equipment. These oils have been tested according to the specifications of HD Hyundai Construction Equipment and, therefore, will meet the highest safety and quality requirements. We recommend that you use only HD Hyundai Construction Equipment genuine lubricating oils and grease officially approved by HD Hyundai Construction Equipment.

Service point	Kind of fluid	Capacity ℓ (U.S. gal)	Ambient temperature °C (°F)								
			-50 (-58)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)
Engine oil pan	Engine oil	49 (12.9)	★SAE 5W-40								
								SAE 30			
				SAE 10W							
			SAE 10W-30								
				SAE 15W-40							
DEF/AdBlue® tank	Mixture of urea and deionized water	69 (18.2)	ISO 22241, High-purity urea + deionized water (32.5:67.5)								
Swing drive	Gear oil	14×2 (3.7×2)	★SAE 85W-140 (GL-4)								
Final drive		20×2 (5.3×2)			SAE 80W-90 (GL-5)						
Hydraulic tank	Hydraulic oil	Tank : 450 (119)	★ISO VG 15								
			ISO VG 32								
		System : 940 (248)			ISO VG 46, HBHO VG 46 ★ ³						
					ISO VG 68						
Fuel tank	Diesel fuel★ ¹	1110 (293)	★ASTM D975 NO.1								
						ASTM D975 NO.2					
Track roller	Gear oil	1.56 (0.41)	★SAE 75W-90								
Carrier roller		0.6 (0.16)					SAE 85W-140				
Idler		1.1 (0.29)									
Fitting (grease nipple)	Grease	As required	★NLGI NO.1								
						NLGI NO.2					
Radiator (reservoir tank)	Mixture of antifreeze and soft water★ ²	70 (18.5)	Ethylene glycol base permanent type (50 : 50)								
			★Ethylene glycol base permanent type (60 : 40)								

SAE : Society of Automotive Engineers

API : American Petroleum Institute

ISO : International Organization for Standardization

NLGI : National Lubricating Grease Institute

ASTM : American Society of Testing and Material

DEF : Diesel Exhaust Fluid, DEF compatible with AdBlue®

★ : Cold region (Russia, CIS, Mongolia)

★¹ : Ultra low sulfur diesel
- sulfur content ≤ 15 ppm

★² : Soft water
City water or distilled water

★³ : HD Hyundai Construction Equipment
Bio Hydraulic Oil

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

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

※ Do not use any engine oil other than that specified above, as it may clog the diesel particulate filter(DPF).

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

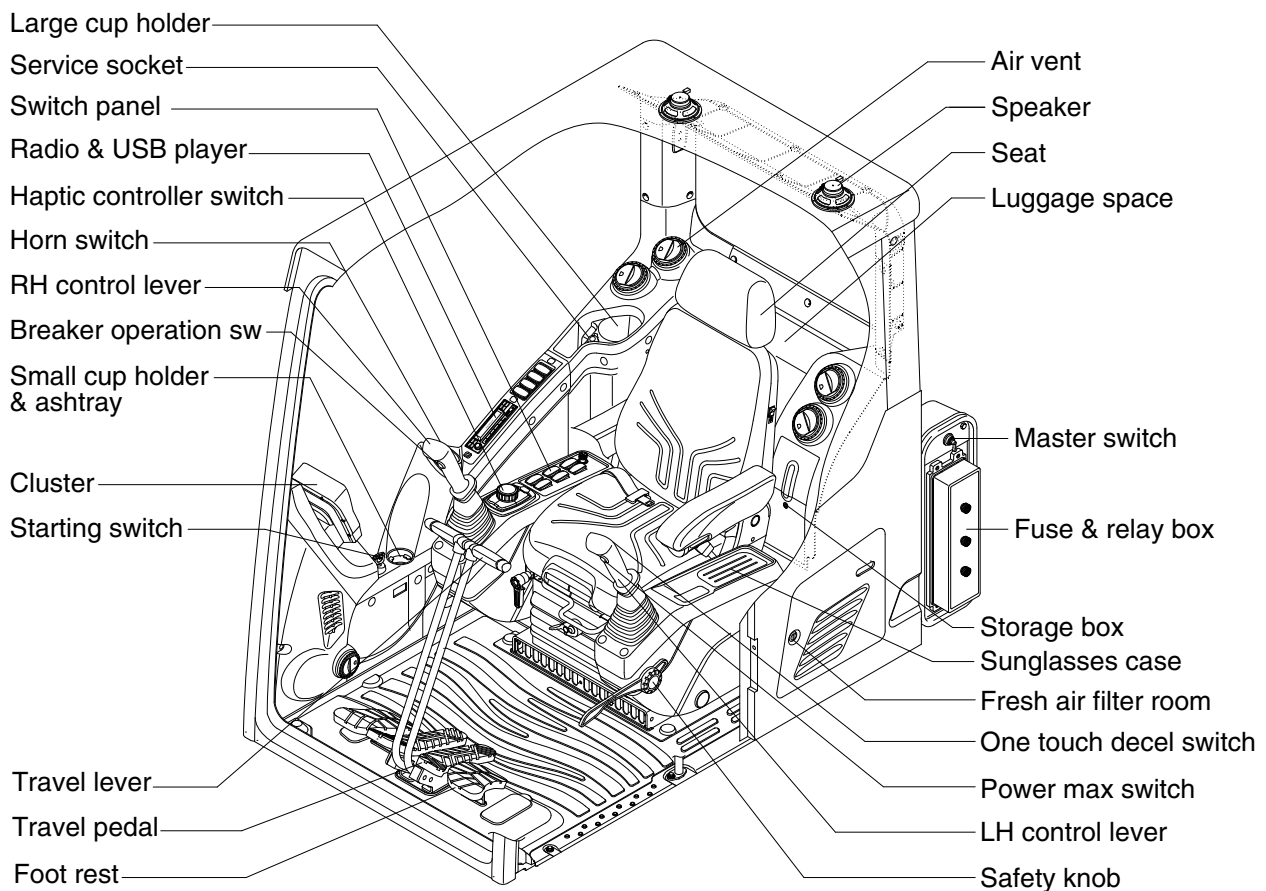
CONTROL DEVICES

1. CAB DEVICES

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

2) ELECTRONIC MONITOR SYSTEM

- (1) The centralized electronic monitor system allows the status and conditions of the machine to be monitored at a glance.
- (2) It is equipped with a safety warning system for early detection of machine malfunction.



290F3CD01

2. CLUSTER

1) STRUCTURE

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

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

- ※ The cluster installed on this machine does not entirely guarantee the condition of the machine. Daily inspection should be performed according to chapter 6, Maintenance.
- ※ When the cluster provides a warning immediately check the problem, and perform the required action.



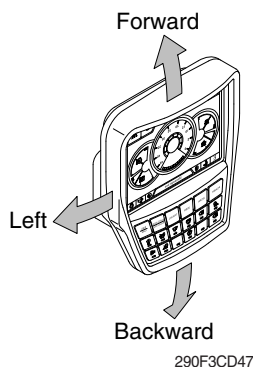
480F3CD50A

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

The warning lamp blinks until the problem is cleared. Refer to page 3-6 for details.

- ※ This cluster is adjustable.

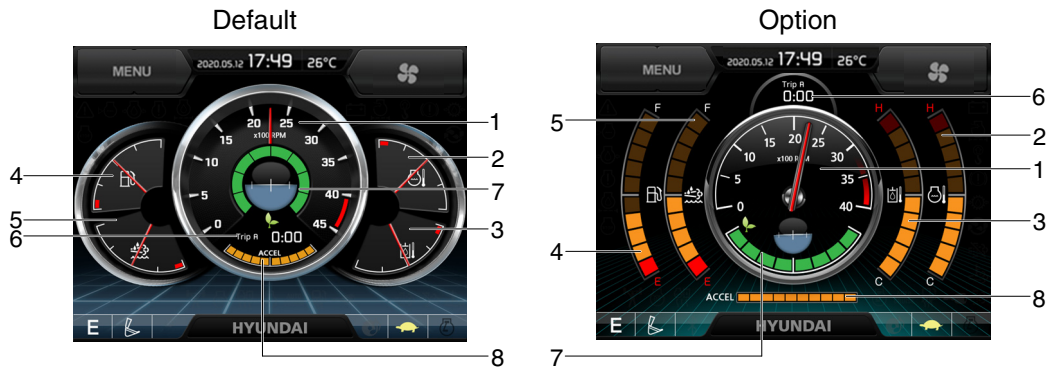
- Vertical (forward/backward) : each 15°
- Horizontal (left only) : 8°



2) GAUGE

(1) Operation screen

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



290F3CD51A

- | | |
|------------------------------------|---------------------------|
| 1 RPM / Speed gauge | 5 DEF/AdBlue® level gauge |
| 2 Engine coolant temperature gauge | 6 Tripmeter display |
| 3 Hydraulic oil temperature gauge | 7 Eco guage |
| 4 Fuel level gauge | 8 Accel dial gauge |

※ Operation screen type can be set by the screen type menu of the display.

Refer to page 3-26 for details.

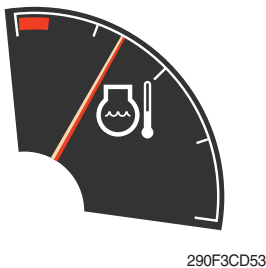
(2) RPM / Speed gauge



290F3CD49

① This display the engine speed.


(3) Engine coolant temperature gauge




290F3CD53

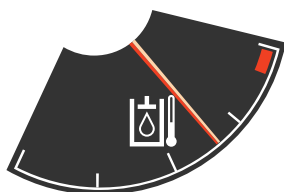
① This gauge indicates the temperature of coolant.

- 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 pops up and the buzzer sounds turn OFF the engine and check the engine cooling system.

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

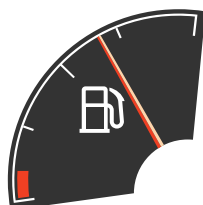
(4) Hydraulic oil temperature gauge





290F3CD54

- 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 pops up and the buzzer sounds reduce the load on the system. If the gauge stays in the red range, stop the machine and check the cause of the problem.
- ※ If the gauge indicates the red range or  lamp blinks in red even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

(5) Fuel level gauge





290F3CD55

- ① This gauge indicates the amount of fuel in the fuel tank.
- ② Fill the fuel when the red range, or  lamp pops up and the buzzer sounds.
- ※ If the gauge indicates the red range or  lamp blinks in red even though the machine is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.

(6) DEF/AdBlue® Level gauge



290F3CD57

- ① This gauge indicates the amount of liquid in the DEF/AdBlue® tank.
- ② Fill the DEF/AdBlue® when the red range, or  lamp pops up and the buzzer sounds.
- ③ Do not pour DEF/AdBlue® any more when the DEF/AdBlue® fill up warning lamp lights ON.
- ※ Refer to page 3-10.
- ※ 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.

(7) Tripmeter display



290F3CD56

- ① This displays the engine the tripmeter.
- ※ Refer to page 3-28 for details.

(8) Eco gauge



290F3CD58

- ① This gauge indicates the fuel consumption rate and machine load status. So that operators can be careful with fuel economy.
- ② The fuel consumption rate or machine load is higher, the number of segment is increased.
- ③ The color of Eco gauge indicates operation status.
 - White : Idle operation
 - Green : Economy operation
 - Yellow : Non-economy operation at a medium level.
 - Red : Non-economy operation at a high level.

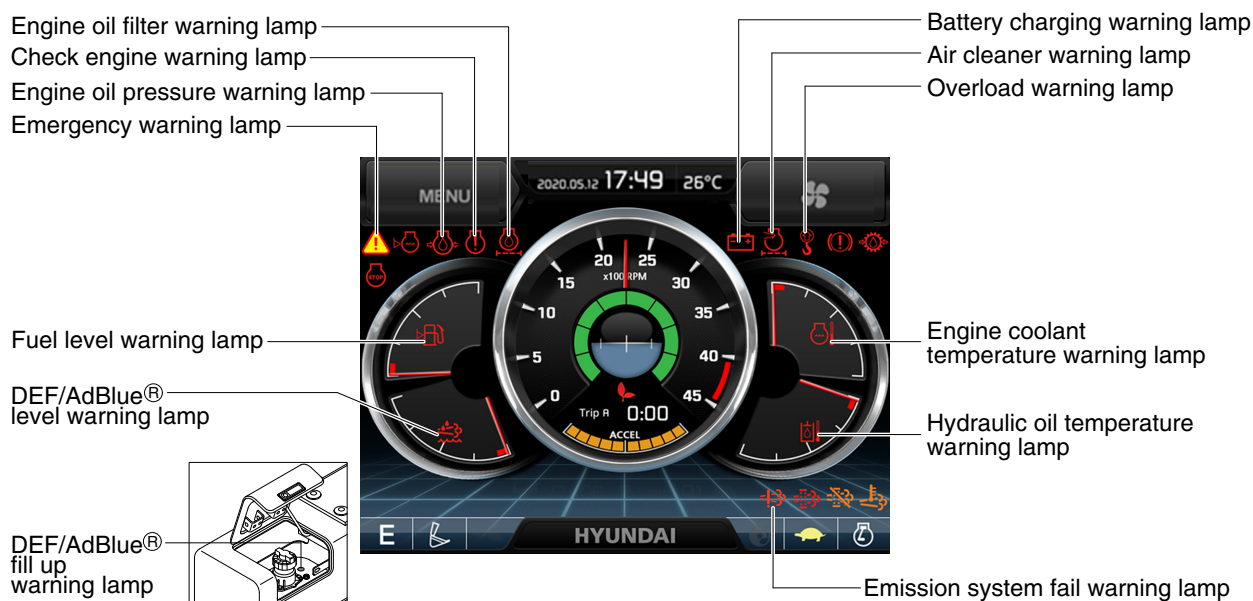
(9) Accel dial gauge



290F3CD59

- ① This gauge indicates the level of accel dial.

3) WARNING LAMPS



480F3CD60A

※ Warning lamps and buzzer








Warnings	When error happened	Lamps and buzzer
All warning lamps except below	Warning lamp pops up on the center of the LCD and the buzzer sounds	<ul style="list-style-type: none"> The pop-up warning lamp moves to the original position and blinks, and the buzzer stops when ; - the buzzer stop switch AUTO IDLE Buzzer Stop is pushed - the knob of the haptic controller is pushed - the lamp of the LCD is touched
	Warning lamp pops up on the center of the LCD and the buzzer sounds	<ul style="list-style-type: none"> The pop-up warning lamp moves to the original position and light ON or blinks, and the buzzer stops when ; - the buzzer stop switch AUTO IDLE Buzzer Stop is pushed - the knob of the haptic controller is pushed - the lamp of the LCD is touched <p>※ Refer to page 3-10 for details.</p>
	Warning lamp pops up on the center of the LCD and the buzzer sounds	<p>※ Refer to page 3-7 for details.</p>

※ Refer to page 3-15 for the buzzer stop switch **AUTO IDLE Buzzer Stop** and page 3-57 for the haptic controller.

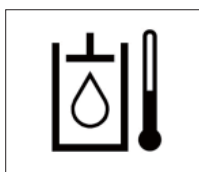
(1) Engine coolant temperature warning lamp










290F3CD61

- ① Engine coolant temperature warning is indicated two steps.
 - 103°C over : The  lamp pops up and the buzzer sounds.
 - 107°C over : The  lamp pops up and the buzzer sounds.
- ② The pop-up ,  lamps move to the original position and blinks when the buzzer stop switch  is pushed. And the buzzer stops and ,  lamps keep blink.
- ③ Check the cooling system when the lamps keep blink.

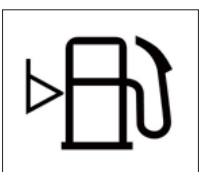
(2) Hydraulic oil temperature warning lamp



290F3CD62

- ① Hydraulic oil temperature warning is indicated two steps.
 - 100°C over : The  lamp pops up and the buzzer sounds.
 - 105°C over : The  lamp pops up and the buzzer sounds.
- ② The pop-up ,  lamps move to the original position and blinks when the buzzer stop switch  is pushed. And the buzzer stops and ,  lamps keep blink.
- ③ Check the hydraulic oil level and hydraulic oil cooling system.

(3) Fuel level warning lamp




290F3CD63

- ① This warning lamp pops up and the buzzer sounds when the level of fuel is below 210 ℓ (55.5 U.S. gal).
- ② Fill the fuel immediately when the lamp blinks.

(4) Emergency warning lamp



290F3CD64

- ① This warning lamp pops up and the buzzer sounds when each of the below warnings is happened.
 - Engine coolant overheating (over 107°C)
 - Hydraulic oil overheating (over 105°C)
 - MCU input voltage abnormal
 - Cluster communication data error
 - Engine ECM communication data error
- ※ The pop-up warning lamp moves to the original position and blinks when the buzzer stop switch  is pushed. And the buzzer stops.
- ② When this warning lamp blinks, machine must be checked and serviced immediately.

(5) Engine oil pressure warning lamp



290F3CD65

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

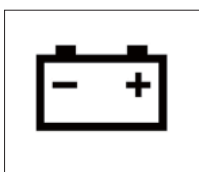
(6) Check engine warning lamp



290F3CD66

- ① This warning lamp pops up and the buzzer sounds when the communication between MCU and engine ECM on the engine is abnormal, or if the cluster received specific fault code from engine ECM.
- ② Check the communication line between them.
If the communication line is OK, then check the fault codes on the cluster.

(7) Battery charging warning lamp



290F3CD67

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

(8) Air cleaner warning lamp



290F3CD68

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

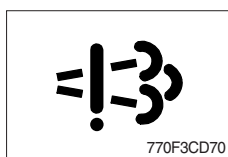
(9) Overload warning lamp (opt)



290F3CD69

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

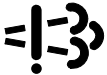
(10) Emission system fail warning lamp



① This warning lamp lights ON if there are faults on the SCR system.

※ In the case of some faults, the torque is reduced.

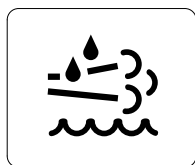
※ Please contact your HD Hyundai Construction Equipment service center or local dealer.

Warning lamp		Torque reduction
	Time	
On	Fault detected	-
Blink	After 30 minutes	· Torque is reduced by 1% per minute to 70% of the highest torque.
Blink rapidly	After 4 hours	· Torque is reduced by to 0% (low idling) within 2~10 minutes.

※ Once the fault has been remedied and the engine control unit has received an indication that it is working, torque returns to the normal level.


※ If a new fault occurs within 40 hours of operation since the first fault, the warning lamp will come ON. After 30 minutes of operation, the warning lamp will blink rapidly and torque will be reduced to 0% (low idling) within 30 minutes.

(11) DEF/AdBlue® level warning lamp

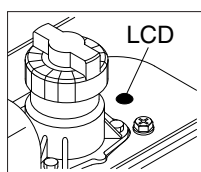


290F3CD257

- ① This warning lamp indicates when ON or blinking, that the DEF/AdBlue® level is low as table below.
- ※ It is recommended that the DEF/AdBlue® tank be filled completely full of the DEF/AdBlue® in order to correct any fault conditions.
- ※ The engine resumes normal torque after DEF/AdBlue® has been filled to a level of at least 20%.

Warning lamp		Description
	DEF/AdBlue® level	
On	20%	<ul style="list-style-type: none"> · The DEF/AdBlue® level has fallen below the initial warning level (20%).
Blink	10%	<ul style="list-style-type: none"> · The DEF/AdBlue® level has fallen below the critical warning level (10%). · Torque is reduced by 1% per minute to 70% of the highest torque.
Blink rapidly	0%	<ul style="list-style-type: none"> · This is happened when 30 minutes elapsed with empty conditions (0%) of the DEF/AdBlue® tank. · Torque is reduced by to 0% (low idling) within 2~10 minutes.

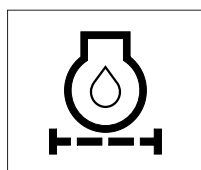
(12) DEF/AdBlue® fill up warning lamp



290F3CD272

- ① This lamp lights ON when the DEF/AdBlue® tank is completely filled with DEF/AdBlue®.
- ※ Fill the tank with the DEF/AdBlue® after start switch ON and then turn OFF the start switch.
- ※ Do not pour DEF/AdBlue® any more when this lamp lights ON. Otherwise DEF/AdBlue® tank may freeze and burst in winter season.

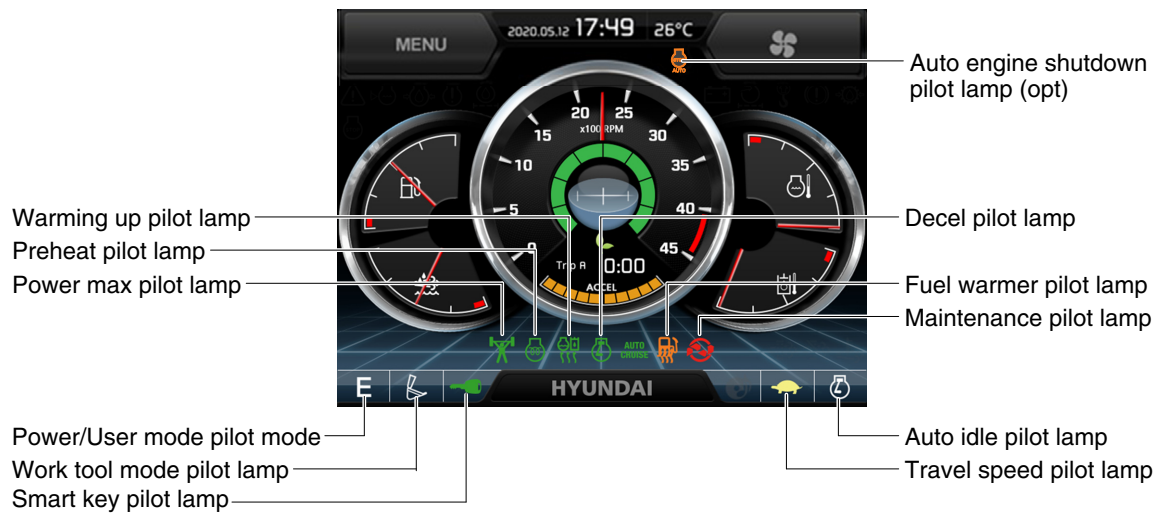
(13) Engine oil filter warning lamp



300A3CD306

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

4) PILOT LAMPS



290F3CD74A

(1) Mode pilot lamps

No	Mode	Pilot lamp	Selected mode
1	Power mode		Heavy duty power work mode
			Standard power mode
			Economy power mode
2	User mode		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

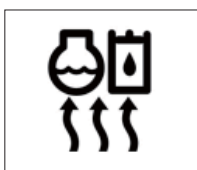
(2) Power max pilot lamp



290F3CD78

- ① The lamp will be ON when pushing power max switch on the LH RCV lever.
 - ② The power max function is operated maximum 8 seconds.
- ※ Refer to the page 3-37 for power max function.

(3) Warming up pilot lamp



290F3CD80

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

(4) Decel pilot lamp



290F3CD81

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

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

※ **Refer to the page 3-36.**

(5) Fuel warmer pilot lamp



290F3CD82

- ① This lamp is turned ON when the coolant temperature is below 10°C (50°F) or the hydraulic oil temperature 20°C (68°F).
- ② The automatic fuel warming is cancelled when the engine coolant temperature is above 60°C, and the hydraulic oil temperature is above 45°C since the start switch was ON position.

(6) Maintenance pilot lamp

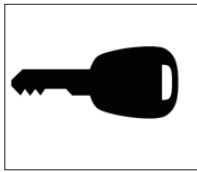


290F3CD83

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

※ **Refer to the page 3-22-1.**

(7) Smart key pilot lamp (opt)



290F3CD214

- ① This lamp is ON when the engine is started by the start button.
 - ② This lamp is red when the authentication fails, green when succeeds.
- ※ **Refer to the page 3-23.**

(8) Auto engine shutdown pilot lamp (opt)



220A3CD202A

- ① This lamp is turned ON when the auto engine shutdown is activated
- ※ **Refer to the page 3-20.**

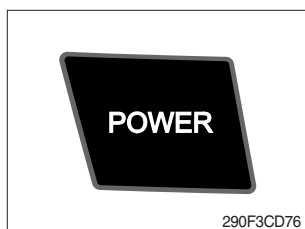
5) SWITCHES



290F3CD86A

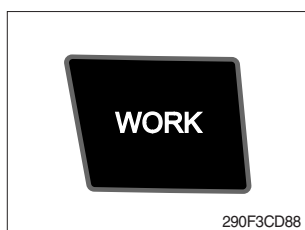
※ When some of the switches are selected, the pilot lamps are displayed on the LCD. Refer to the page 3-11 for details.




(1) Power mode switch



- ① This switch is to select the machine power mode and selected power mode pilot lamp is displayed on the pilot lamp position.
 - P : Heavy duty power work.
 - S : Standard power work.
 - E : Economy power work.
- ② The pilot lamp changes E → S → P → E in order.

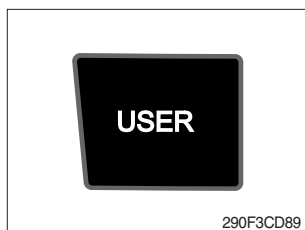
(2) Work mode switch



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

※ Refer to the page 4-7 for details.



(3) User mode switch



- ① This switch is used to memorize the current machine operating status in the MCU and activate the memorized user mode.
 - Memory : Automatically saved after key OFF.
 - Action : Push this switch.
 - Cancel : Push this switch once more.
- ② Refer to the page 3-19 for another set of user mode.

(4) Travel speed switch



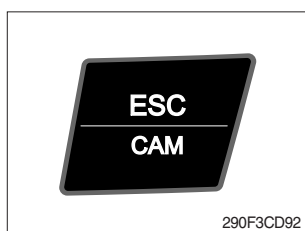
- ① This switch is used to select the travel speed alternatively.
 -  : Low speed
 -  : High speed
- ※ Do not change the setting of the travel speed switch.
Machine stability may be adversely affected.
- ⚠ Personal injury can result from sudden changes in machine stability.

(5) Auto idle/ buzzer stop switch



- ① This switch is used to activate or cancel the auto idle function.
 - Pilot lamp ON : Auto idle function is activated.
 - Pilot lamp OFF : Auto idle function is cancelled.
- ② The buzzer sounds when the machine has a problem.
In this case, push this switch and buzzer stops, but the warning lamp blinks until the problem is cleared.

(6) Escape/Camera switch



- ① This switch is used to return to the previous menu or parent menu.
- ② In the operation screen, pushing this switch will display the view of the camera on the machine (if equipped).
Please refer to page 3-28 for the camera.
- ③ If the camera is not installed, this switch is used only ESC function.

(7) Work light switch



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

(8) Head light switch



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

(9) Intermittent wiper switch



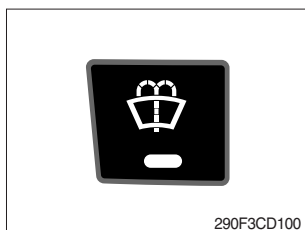
- ① This switch is used to wipe operates intermittently.
- ② The pilot lamp is turned ON when operating the switch.

(10) Wiper switch



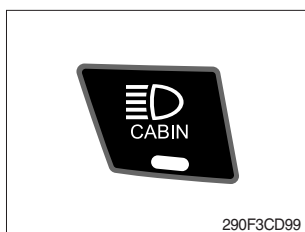
- ① This switch is used to operate the window wiper.
- ② Note that the wiper will self-park when switched off.
- ③ The pilot lamp is turned ON when operating the switch.
- ※ If the wiper does not operate with the switch in ON position, turn the switch OFF immediately. Check the cause. If the switch remains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

(11) Washer switch



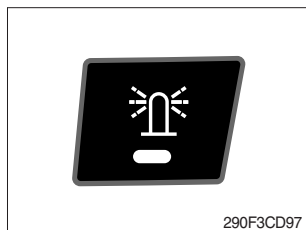
- ① The washer liquid is sprayed and the wiper is operated only while pressing this switch.
- ② The pilot lamp is turned ON when operating the switch.

(12) Cab light switch



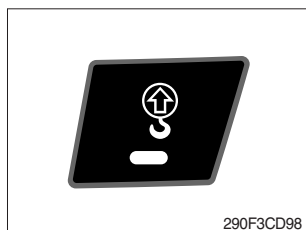
- ① This switch turns ON the cab light on the cab.
- ② The pilot lamp is turned ON when operating the switch.

(13) Beacon switch (opt)



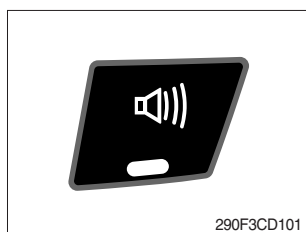
- ① This switch turns ON the rotary light on the cab.
- ② The pilot lamp is turned ON when operating the switch.

(14) Overload switch (opt)



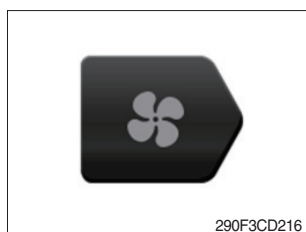
- ① When this switch turned ON, buzzer makes sound and overload warning lamp comes ON in case that the machine is overload.
 - ② When it turned OFF, buzzer stops and warning lamp goes out.
- ▲ Overloading the machine could impact the machines stability which could result in tipover hazard. A tipover hazard could result in serious injury or death. Always activate the overload warning device before you handle or lift objects.**

(15) Travel alarm switch



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

(16) Air conditioner quick touch switch



- ① This switch used to select air conditioner control mode.
※ Refer to the page 3-30.

(17) Main menu quick touch switch



- ① This switch is to activate the main menu in the cluster.
※ Refer to the page 3-18.

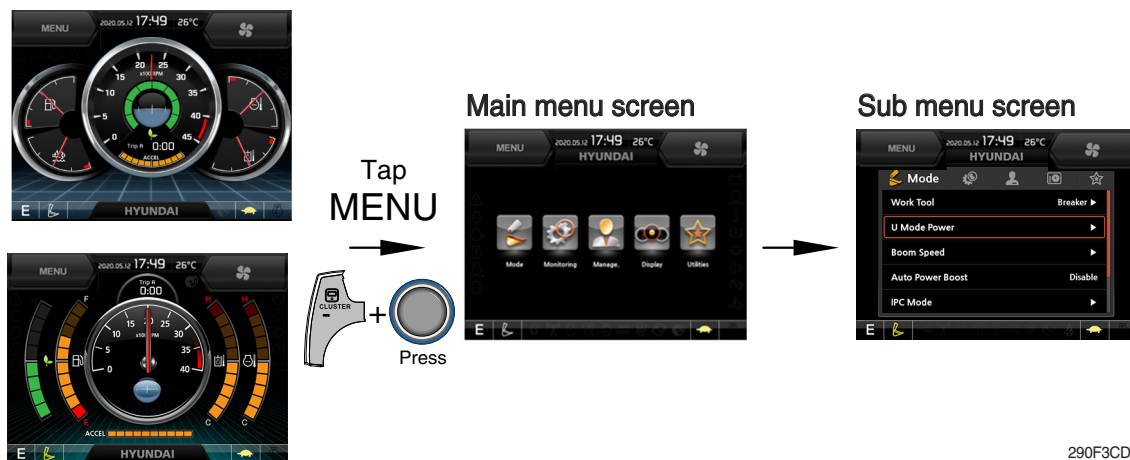
6) MAIN MENU

※ You can select or set the menu by the haptic controller or touch screen.

On the operation screen, tap MENU to access the main menu screen.

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






· Operation screen



290F3CD102A

※ Please refer to the haptic controller, page 3-57 for selection and change of menu and input value.

(1) Structure

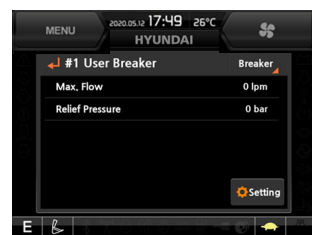
No	Main menu	Sub menu	Description
1	 Mode 290F3CD103	Work tool U mode power Auto power boost Auto engine shutdown (option) Initial mode Emergency mode	Breaker, Crusher, Not installed User mode only Enable, Disable One time, Always, Disable Key on initial mode, Accel initial mode / step Switch function
2	 Monitoring 290F3CD104	Active fault Logged fault Delete logged fault Monitoring	MCU, Engine ECM, Air conditioner, AAVM (option) MCU, Engine ECM, Air conditioner, AAVM (option) All logged fault delete, Initialization canceled Machine information, Switch status, Output status
3	 Management 290F3CD105	Fuel rate information Maintenance information Machine security Machine information Contact Service menu Clinometer Update	General record, Hourly, Daily, Mode record Replacement, Change interval oils and filters ESL mode setting, Password change Model, MCU, Monitor, Haptic / switch controller, RMCU, Relay drive unit, FATC, AAVM (option) A/S phone number, A/S phone number change Power shift, Operating hour, IPC mode, Breaker mode pump acting, EPPR current level, Overload pressure Clinometer setting Cluster, ETC device
4	 Display 290F3CD106	Display item Clock Brightness Unit setup Language selection Screen type	Engine speed, Tripmeter A, Tripmeter B, Tripmeter C Clock Manual, Auto Temperature, Pressure, Flow, Distance, Date format Korean, English, Chinese, ETC A type, B type
5	 Utilities 290F3CD107	Tripmeter Camera	3 kinds (A, B, C) Camera on/off, AAVM (option)

(2) Mode setup

① Work tool



A



B

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

② U mode power



290F3CD112A

- 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	800	0
2	1500	850	3
3	1600	900	6
4	1700	950	9
5	1750	1000 (auto decel)	12
6	1800	1050	16
7	1850	1100	20
8	1900	1150	26
9	1950	1180	32
10	2000	1200	38

※ One touch decel & low idle : 850 rpm

③ Auto power boost



290F3CD117A

- 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.

④ Automatic engine shutdown (option)



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

⑤ Initial mode



- **Key on initial mode**
 - Selected the power mode is activated when the engine is started.
- **Accel initial mode**
 - Last setting value
 - User setting value
- **Accel initial step**
 - 0~9 step

⑥ Emergency mode



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

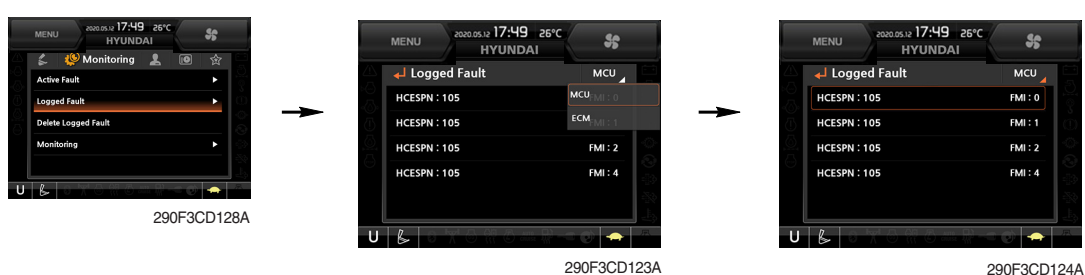
(3) Monitoring

① Active fault



- The active faults of the MCU, engine ECM, air conditioner or AAVM (option) can be checked by this menu.

② Logged fault



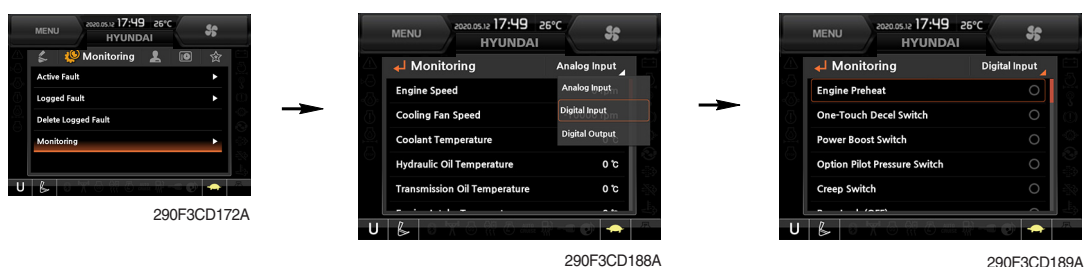
- The logged faults of the MCU, engine ECM, air conditioner or AAVM (option) can be checked by this menu.

③ Delete logged fault



- The logged faults of the MCU, engine ECM, air conditioner or AAVM (option) can be deleted by this menu.

④ Monitoring



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

(4) Management

① Fuel rate information



A



B



C



D



210WF3CD16

· General record (A)

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

· Hourly record (B)

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

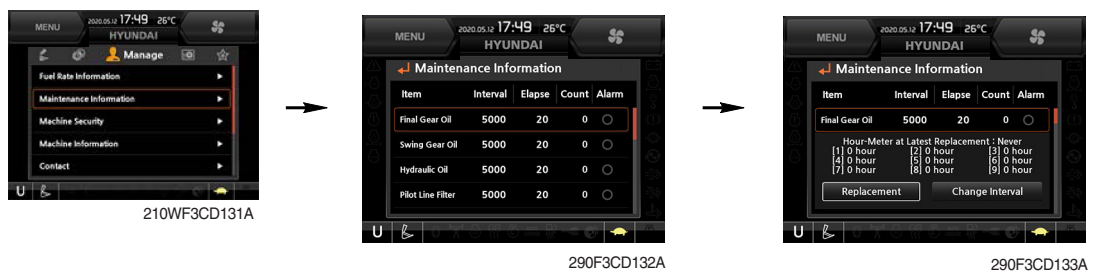
· Daily record (C)

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

· Mode record (D)

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

② Maintenance information



- Alarm lamp (●) is ON when oil or filter needs to be changed or replaced.
 - Replacement : The elapsed time will be reset to zero (0).
 - Change interval : The change or replace interval can be changed in the unit of 50 hours.
- ※ Refer to the maintenance chart for further information of maintenance interval.

③ Machine security



· ESL mode setting

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

- Machine security

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

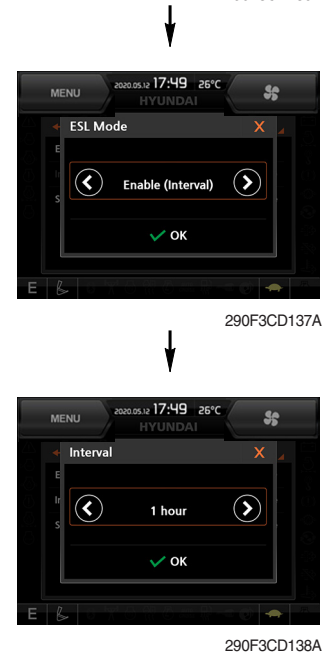
Enable (always) : The password is required whenever the operator starts engine.

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

※ Default password : 00000 +

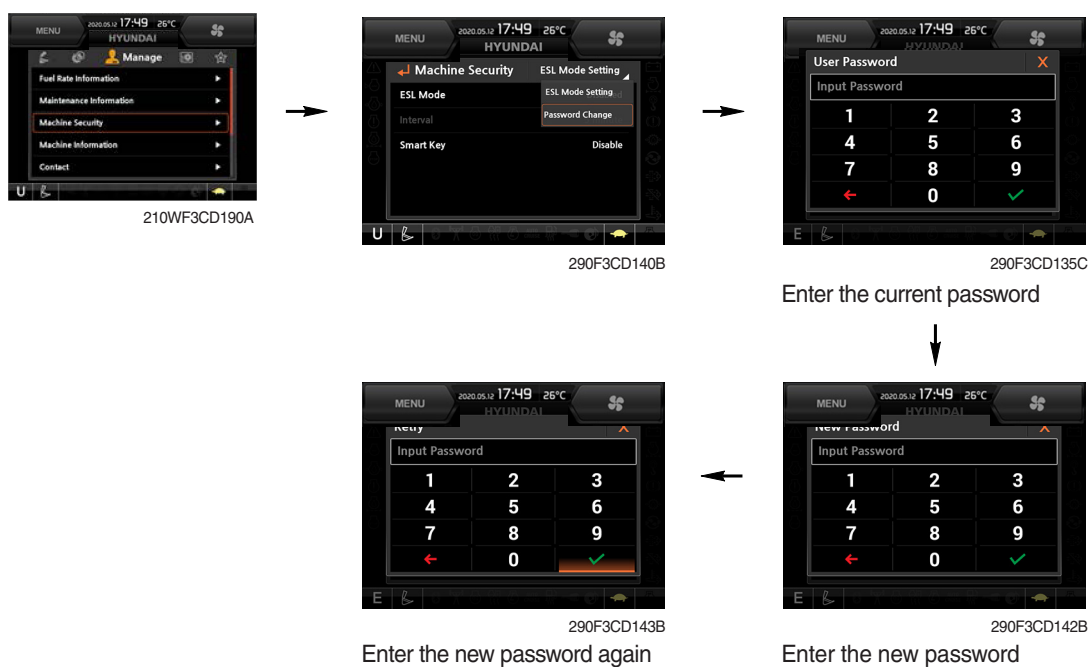
※ Password length : (5~10 digits) +

- Smart key (option) : Refer to next page.



· Password change

- The password is 5~10 digits.



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

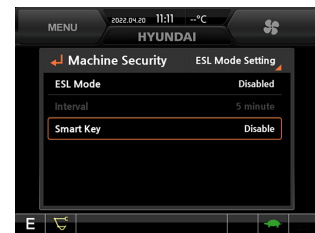
- Smart key



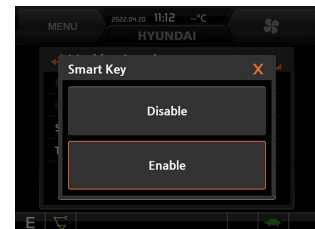
210WF3CD190A



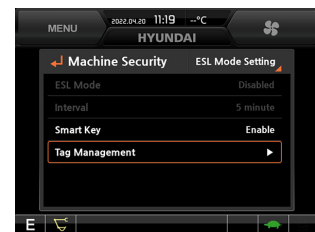
290F3CD135C



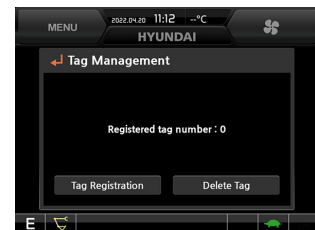
290F3CD001



290F3CD002

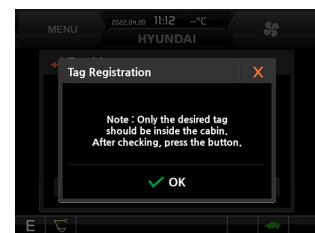


290F3CD003



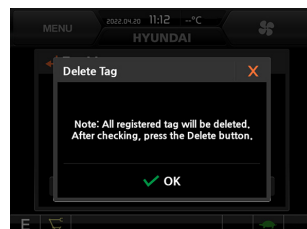
290F3CD004

Registering



290F3CD005

Deleting



290F3CD006

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

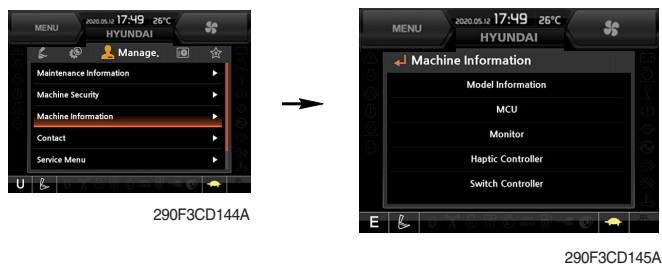
- Tag management

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

※ Engine Starting Condition

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

④ Machine Information



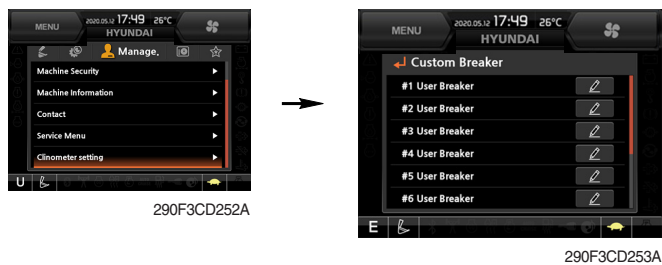
- This can confirm the identification of the model information (ECU), MCU, monitor, haptic controller, switch controller, RMCU, relay driver unit, FATC (air conditioner controller), AAVM (opt).

⑤ Contact (A/S phone number)



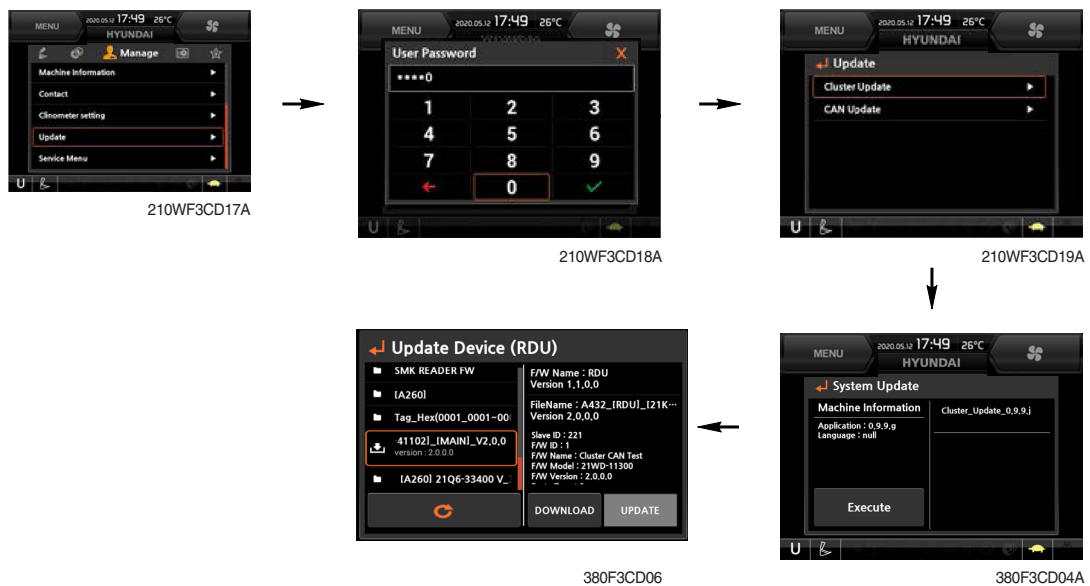
Enter the new A/S phone number

⑥ Clinometer



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

⑦ Update (cluster & ETC devices)



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

⑧ Service menu



- Power shift (standard/option) : Power shift pressure can be set by option menu.
- Operating hours : Operating hours since the machine line out can be checked by this menu.
- IPC mode : IPC mode 1, IPC mode 2, Not used.
- Breaker mode pump acting (1 pump/2 pump)
- EPPR current level (attach flow EPPR 1 & 2, boom priority EPPR, attach relief pressure EPPR 1 & 2)
- Overload pressure : 100 ~ 350 bar

(5) Display

① Display item



290F3CD154A



290F3CD155A



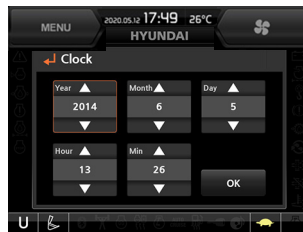
290F3CD156A

- 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



290F3CD157A



290F3CD158A

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

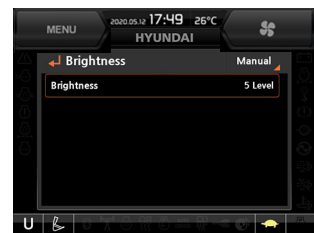
③ Brightness



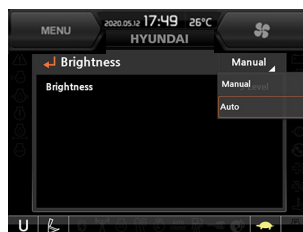
290F3CD159A



290F3CD160A



290F3CD139A



290F3CD141A



290F3CD191A



290F3CD192

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

④ Unit



290F3CD161A



210WF3CD162A



290F3CD193A

- Temperature : °C ↔ °F
- Pressure : bar ↔ MPa ↔ kgf/cm²
- Volume : ℓ ↔ gal
- Flow : lpm ↔ gpm
- Distance : km ↔ mile
- Date format : yy/mm/dd ↔ mm/dd/yy ↔ dd-mm-yy

⑤ Language



290F3CD163A



290F3CD164A

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

⑥ Screen type



290F3CD165A



A Type (Default) 290F3CD166A



290F3CD156B



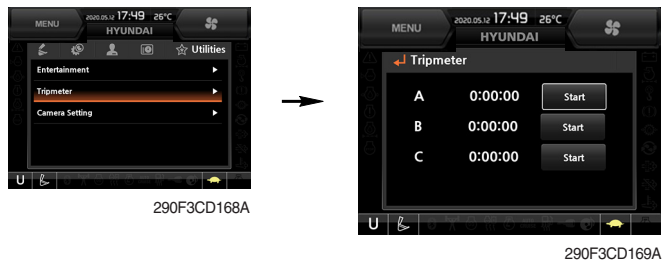
B Type (Option) 290F3CD194A



290F3CD167B

(6) Utilities

① Tripmeter



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

② Camera setting

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



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



④ AAVM (All Around View Monitoring, option)

- The AAVM buttons of the cluster consist of ESC/CAM and AUTO IDLE/Buzzer stop.

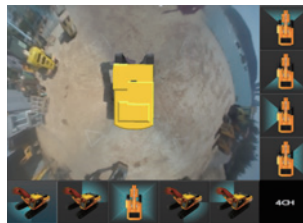


- Escape button

- It will enter into the AAVM mode from the beginning screen if the AAVM is installed.
- While in the AAVM mode, select the ESC button to return to the beginning screen.



The beginning screen



AAVM mode

- Buzzer stop button

- In AAVM mode, it detects surrounding pedestrians or objects and the warning buzzer sounds.
- User can turn OFF the warning sound by pressing buzzer stop button.



- When the worker or pedestrian go to the green line (radius 5 m), an external danger area of equipping on the cluster screen, the warning buzzer sounds and it displays the blue rectangular box for the recognition of the worker and pedestrian. At this time, the operator should stop work immediately, and stop the buzzer by pressing the buzzer stop button. And then, please work after you check whether the danger factors are solved.



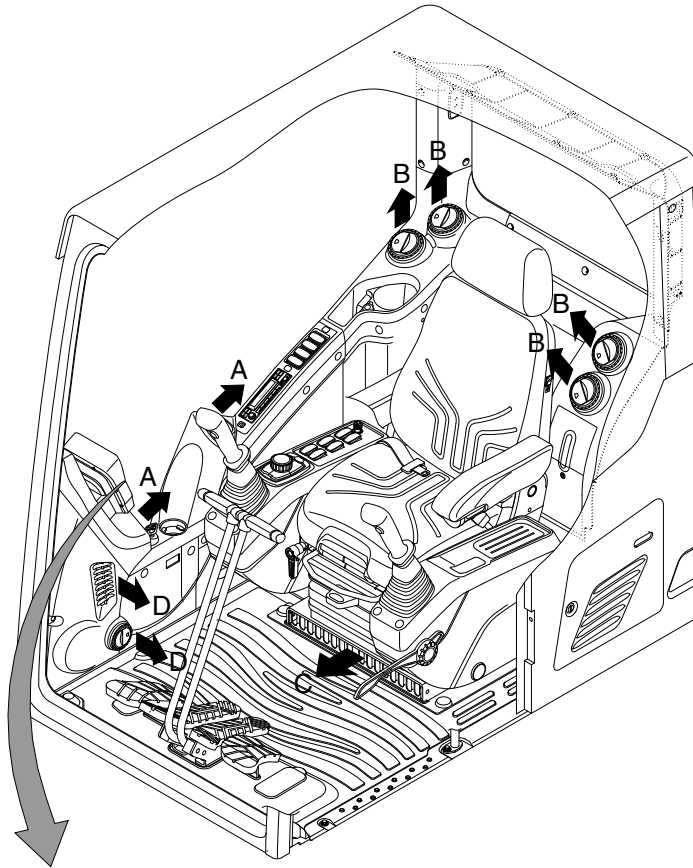
- When the worker or pedestrian go inside of red line (radius 3 m), an internal danger area of equipping on the cluster screen, the warning buzzer sounds and it displays the red rectangular box for the recognition of the worker and pedestrian. At this time, the operator should stop work immediately, and stop the buzzer by pressing the buzzer stop button. And then, please work after you check whether the danger factors are solved.

※ In AAVM mode, a touch screen of the LCD is available only. The multimodal dial of the haptic controller is not available.

7) AIR CONDITIONER AND HEATER

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

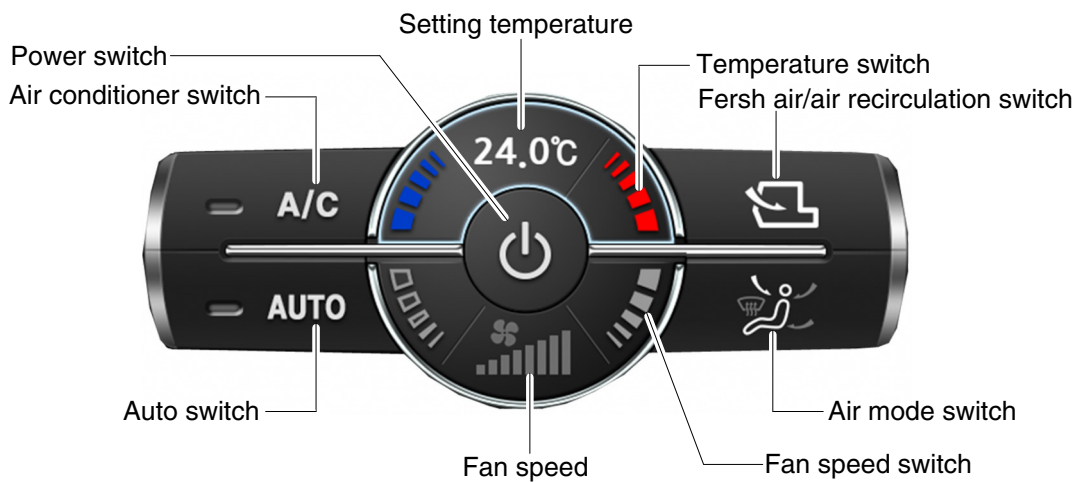
· Location of air flow ducts



Cluster LCD



Cluster :  or
Haptic controller : 



※ Haptic controller : Refer to page 3-57.

290F3CD201A

(1) Power switch



- ① This switch makes the system ON/OFF.
Just before the power OFF, set values are stored.
- ② Default setting values

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

(2) Air conditioner switch



- ① This switch turns the compressor ON/OFF.
- ※ **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.

(3) Auto switch



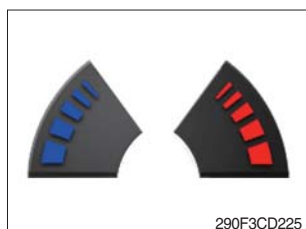
- ① Auto air conditioner and heater system automatically keeps the optimum condition in accordance with operator's temperature configuration sensing ambient and cabin inside temperature.

(4) Setting temperature



- ① Display the temperature setting out.

(5) Temperature switch

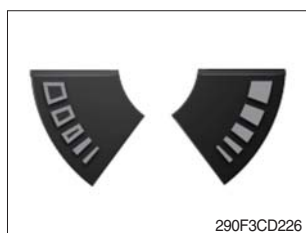


- ① Setting temperature indication
· Lo (17°C), 17.5~31.5°C, Hi (32°C)
- ② Max cool and max warm beeps 5 times.
- ③ The max cool or the max warm position operates as following table.

Temperature	Compressor	Fan speed	In/outlet	Mode
Max cool	ON	Hi (8 step)	Recirculation	Face
Max warm	OFF	Hi (7 step)	Fresh	Def/Foot

- ④ Temperature unit can be changed between celsius (°C) and fahrenheit (°F)
 - a. Default status (°C)
 - b. Push Up/Down temperature switch simultaneously more than 5 second displayed temperature unit change (°C → °F)

(6) Fan speed switch



- ① Fan speed is controlled automatically by set temperature.
- ② This switch controls fan speed manually.
 - There are 8 up/down steps to control fan speed.
 - The maximum step or the minimum step beeps 5 times.

(7) Fan speed



- ① Steps 1 through 8 to display the amount of wind.

(8) Fresh air/air recirculation switch



- ① It is possible to change the air-inlet method.
 - a. **Fresh air** (🌬️)
Inhaling air from the outside.
 - b. **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 fresh air filter and the recirculation filter periodically to keep a good efficiency.**

(9) Air mode switch



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

Mode switch		Face	Face/Rear	Face/Rear/Foot	Foot	Def/Foot
		👤	👤	👤	👤	👤
Outlet	A	●	●	●		
	B		●	●		
	C			●	●	●
	D					●

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

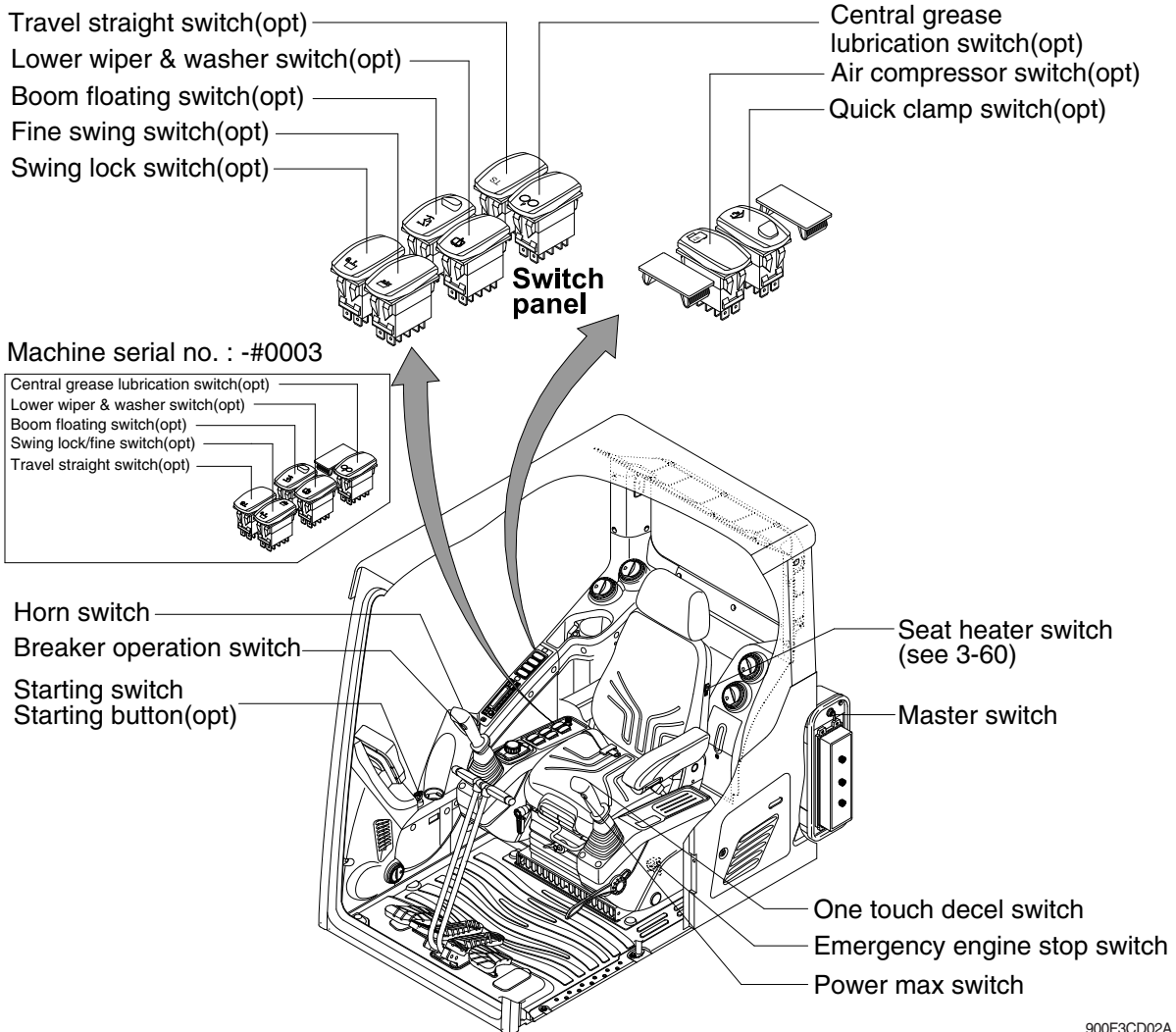
8) SELF DIAGNOSIS FUNCTION

(1) Diagnostic methods : Diagnostic information window, select

(2) Diagnostic indication (Displays fault)

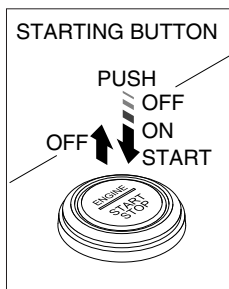
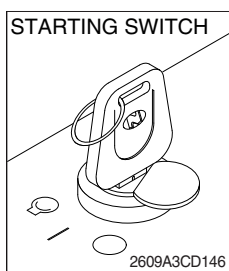
Fault code	Description	Fail safe function
F01	Ambient temperature sensor open	20°C alternate value control
F02	Ambient temperature sensor short	
F03	Cab inside temperature sensor open	25°C alternate value control
F04	Cab inside temperature sensor short	
F05	Evaporate temperature sensor open	0°C alternate value control
F06	Evaporate temperature sensor short	
F07	Null	-
F08	Null	-
F09	Mode 1 actuator open/short	The alternate value is face
F10	Mode 1 actuator drive circuit malfunction	If not, the alternate value is Def/Foot
F11	Intake actuator open/short	The alternate value is air recirculation
F12	Intake actuator drive circuit malfunction	The alternate fresh air
F13	Temperature actuator open/short	If opening amount is 0 %, the alternate value is 0 %
F14	Temperature actuator drive circuit malfunction	If not, the alternate value is 100 %
F15	Null	-
F16	Null	-

3. SWITCHES



900F3CD02A

1) STARTING SWITCH & STARTING BUTTON (OPT)



Starting button with smart key tag (opt)

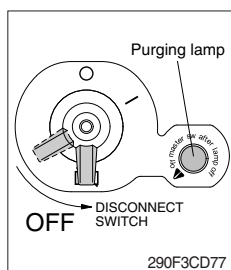
(1) There are three positions, OFF, ON and START.

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

Release key immediately after starting.

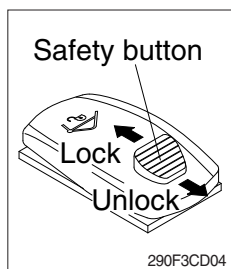
- ※ If you turn ON the starting switch in cold weather, the fuel warmer is automatically operated to heat the fuel by sensing the coolant temperature. Start the engine in 1~2 minutes after turning ON the starting switch. More time may take according to ambient temperature.
- ※ Starting switch controller tries engine starting at least 3 seconds even if switch is released after driver's start trial (key switch : start position / starting button : long push) to prevent short-time cranking (which can not starting engine). If no-start conditions (unlock safety knob) are resolved (lock safety knob) during the 3 seconds of engine starting attempt, engine can be started.
- ※ Key must be in the ON position with engine running to maintain electrical and hydraulic function and prevent serious machine damage.

2) MASTER SWITCH



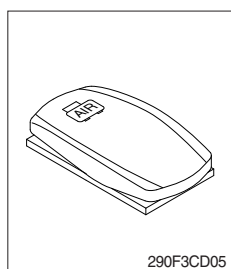
- (1) This switch is used to shut off the entire electrical system.
- (2) I : The battery remains connected to the electrical system.
O : The battery is disconnected to the electrical system.
- ※ **Never turn the master switch to O (OFF) with the engine running. Engine and electrical system damage could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

3) QUICK CLAMP SWITCH (option)



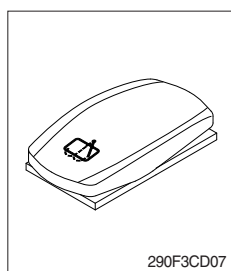
- (1) This switch is used to engage or disengage the moving hook on quick clamp.
- ※ **Refer to the page 8-6 for details.**

4) AIR COMPRESSOR SWITCH (option)



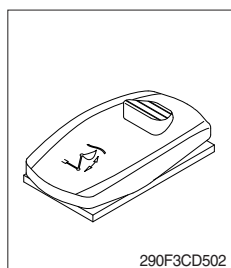
- (1) This switch is used to activate the air compressor.
- (2) The indicator lamp is turned on when operating the switch.

5) LOWER WIPER AND WASHER SWITCH (option)



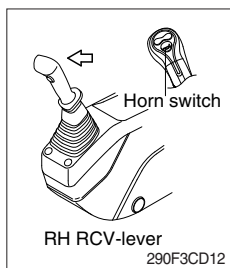
- (1) The washer liquid is sprayed and the wiper is operated only while pressing this switch.
- (2) The pilot lamp is turned ON when operating the switch.

6) BOOM FLOATING SWITCH (option)



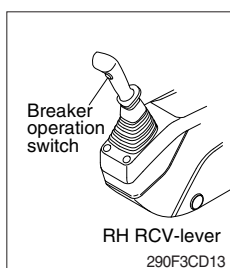
- (1) This mode is used to smooth boom operation.
- (2) Rod and head of boom cylinder are connected to the tank at the same time. So boom can be moved by the ground shape though only arm operation.

7) HORN SWITCH



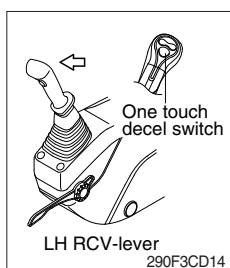
- (1) This switch is at the top of right side control lever.
On pressing, the horn sounds.

8) BREAKER OPERATION SWITCH



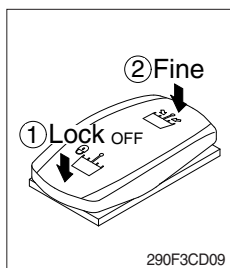
- (1) On pressing this switch, the breaker operates only when the breaker operation mode is selected.

9) 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.

10) SWING LOCK / FINE SWITCH (option, -#0003)



(1) OFF position

Normal operation.

(2) Lock position (①)

In this position, the swing parking brake is locked and swing control is not available by shut off the swing pilot pressure to the swing spool.

(3) Fine position (②)

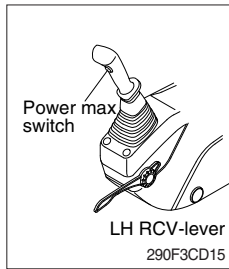
① In this position, the swing parking brake is released.

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

▲ If the machine is operating on a slope with the switch in this position, swing motion may become uncontrollable which could result in property damage, personal injury or death.

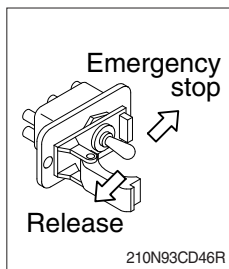
Do not use this position when the machine is operating on a slope.

10) POWER MAX SWITCH



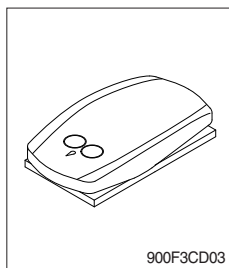
- (1) This switch activate power max function.
When this switch is kept pressed, hydraulic power of work equipment will be increased to approx 110 percent during 8 seconds.
 - (2) After 8 seconds, function is cancelled automatically even the switch keeps pressed.
- ※ **Do not use for craning purposes.**

11) EMERGENCY ENGINE STOP SWITCH



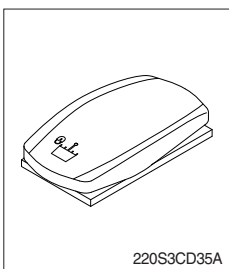
- (1) This switch is used to emergency stop the engine.
- ※ **Be sure to keep the emergency switch on the release position when restart the engine.**

12) CENTRAL GREASE LUBRICATION SWITCH (option)



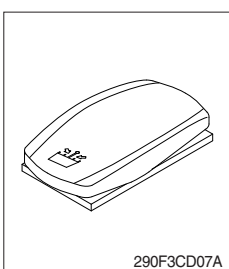
- (1) This switch use to operate the central grease lubrication system manually.
 - (2) Pushing the switch, the central grease lubrication system is operated for 16 minutes once.
- ※ **Refer to the page 8-8 for details.**

13) SWING LOCK SWITCH (option, #0004-)



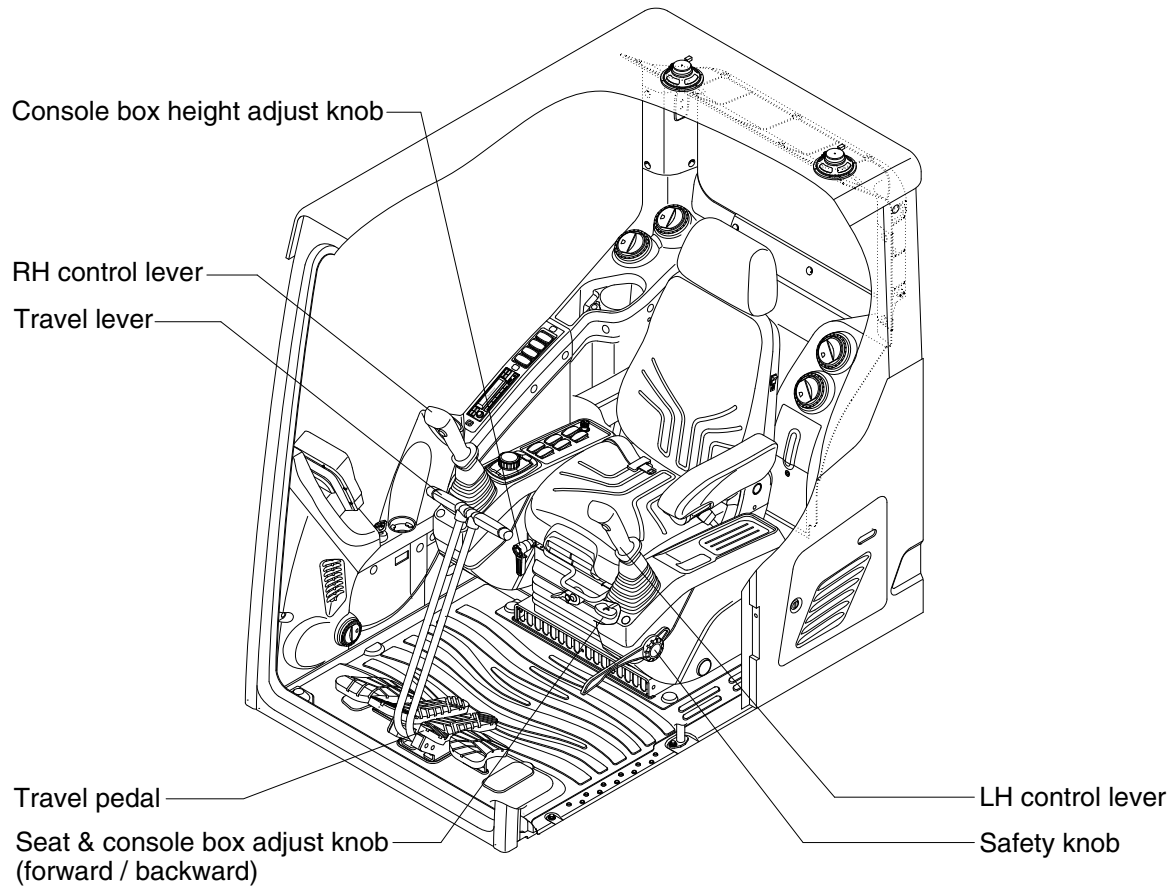
- (1) When the switch is pressed ON position, the swing parking brake is locked and swing control is not available by shut off the swing pilot pressure to the swing spool.

14) FINE SWING SWITCH (option, #0004-)



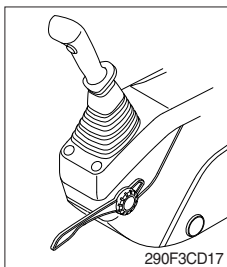
- (1) When the switch is pressed ON position, the swing parking brake is released.
 - (2) Swing control improves during deceleration of a swing because the swing is allowed the drift instead of stopping abruptly.
- ▲ **If the machine is operating on a slope with the switch in this position, swing motion may become uncontrollable which could result in property damage, personal injury or death. Do not use this position when the machine is operating on a slope.**

4. LEVERS AND PEDALS



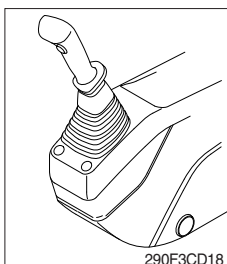
290F3CD16

1) LH CONTROL LEVER



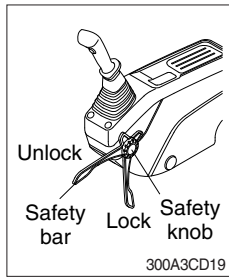
- (1) This joystick is used to control the swing and the arm.
- (2) Refer to operation of working device in chapter 4 for details.

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 KNOB



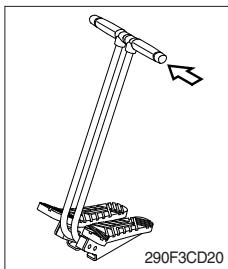
(1) All control levers and pedals are disabled from operation by locating the safety knob to the LOCK position as shown.

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

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

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

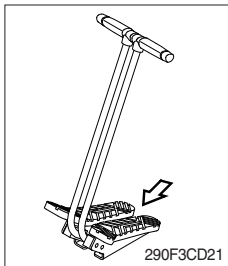
4) TRAVEL LEVER



(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

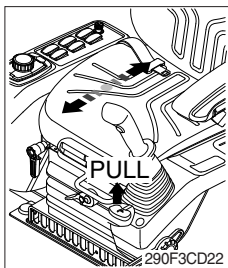


(1) This pedal is used to move the machine forward or backward.

(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.

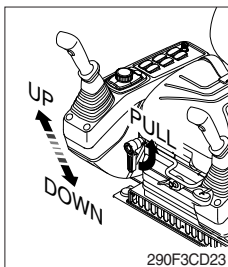
6) SEAT AND CONSOLE BOX ADJUST KNOB (forward/backward)



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

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

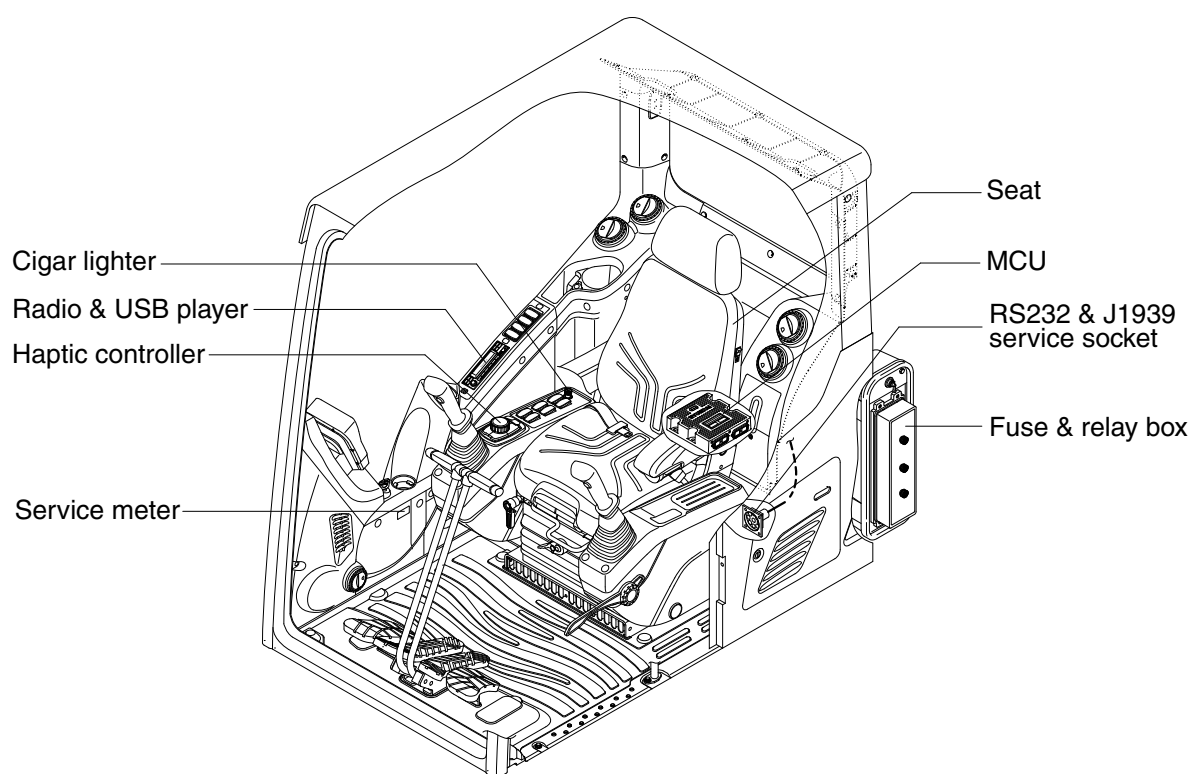
7) CONSOLE BOX (CONTROL LEVER) HEIGHT ADJUST KNOB



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

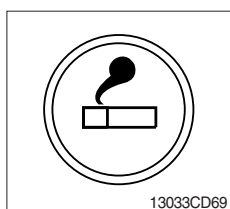
(2) The control levers can be moved upward and downward over 80 mm (3.1").

5. OTHERS



480F3CD24

1) CIGAR LIGHTER




















- (1) This can be used when the engine starting switch is ON.
 - (2) The lighter can be used when it springs out in a short while after being pressed down.
- ※ **Service socket**
Use cigar lighter socket when you need emergency power.
Do not use the lighter exceeding 24 V, 100 W.

RADIO AND USB PLAYER (WITH BLUETOOTH)



9403CD100

■ FRONT PANEL PRESENTATION

















- | | |
|---|---|
| <p>1  Power ON/OFF,
Volume UP/DOWN button</p> <p>2  Manual UP/DOWN Tuning,
File search, SEL button</p> <p>3  Mode button,
Audio mute button</p> <p>4  Call & Pair button</p> <p>5  Call end button</p> <p>6  Station preset 1
DIS Display button</p> <p>7  Station preset 2</p> <p>8  Station preset 3
RPT Repeat play button</p> <p>9  Station preset 4
RDM Random play button</p> | <p>10  Station preset 5
DIR- Directory down button</p> <p>11  Station preset 6
DIR+ Directory up button</p> <p>12  Scan play button (SCAN)
Best station memory (BSM) button</p> <p>13  Auto tune up, Seek up button</p> <p>14  Auto tune down, Track down button</p> <p>15  USB connector</p> <p>16  AUX IN Jack</p> <p>17  MIC hole</p> |
|---|---|

RADIO AND USB PLAYER (WITHOUT BLUETOOTH)



9403CD101

■ FRONT PANEL PRESENTATION

- | | |
|--|---|
| <p>1  Power ON/OFF,
Volume UP/DOWN button</p> <p>2  Manual UP/DOWN Tuning,
File search, SEL button</p> <p>3  Mode button,
Audio mute button</p> <p>4  Radio seek up button</p> <p>5  Radio seek down button</p> <p>6  Station preset 1
DIS Display button</p> <p>7  Station preset 2</p> <p>8  Station preset 3
RPT Repeat play button</p> <p>9  Station preset 4
RDM Random play button</p> | <p>10  Station preset 5
DIR- Directory down button</p> <p>11  Station preset 6
DIR+ Directory up button</p> <p>12  Scan play button (SCAN)
Best station memory (BSM) button</p> <p>13  Track up button</p> <p>14  Track down button</p> <p>15  USB connector</p> <p>16  AUX IN Jack</p> |
|--|---|

■ 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



- 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



- 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.



(3) MP3 directory / File searching



- 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.

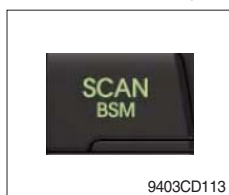
(4) Directory Up / Down button



- 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

- 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.
 - Display up to 32 characters in the LCD display.
 - No support any of MULTI-CAED Reader.
 - 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.

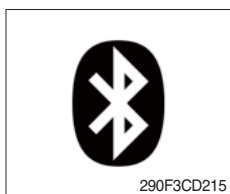
To get the best results when connecting the portable media to the audio system, follow these steps :

- 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)

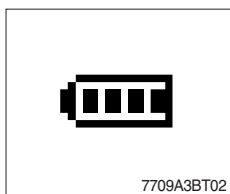
1) Using a bluetooth wireless connection

- (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.



- (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.



- (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.



- (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

3) HAPTIC CONTROLLER

The haptic controller consists of buttons, multimodal dial and USB port.



290F3CD173

(1) Cluster button



290F3CD174

- ① When you push this button, haptic controller execute cluster interlocked mode.
- ② In cluster interlocked mode, if you push the cluster button, the haptic controller return to previous mode.
- ③ Cluster interlocked mode ON : Blue lamp is turn ON
Cluster interlocked mode OFF : Blue lamp is turn OFF

(2) Air conditioner button



290F3CD175

- ① When you push this button, air conditioner system is operated.
- ② Determines whether to perform a cooling function of air conditioner.
 - Blue lamp ON : Air conditioner operation
 - Amber lamp ON : Fan only

(3) Set button



290F3CD176

- ① When you push this button, the haptic controller executes air conditioner mode and displays air conditioner control mode in cluster.
- ② Air conditioner control mode will be disappear when you push SET button again within 10 seconds or when you do not touch anything more than 10 seconds.

(4) OFF button



290F3CD177

- ① Only while air conditioner system is operating you can use this button.
- ② This button is only for air conditioner system off.

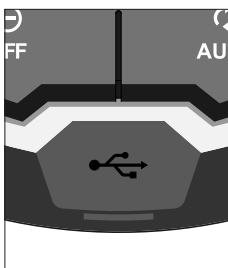
(5) Auto button



290F3CD178

- ① This button controls air conditioner ON/OFF.
- ※ Refer to the page 3-31 for the auto switch of the air conditioner.

(6) USB port



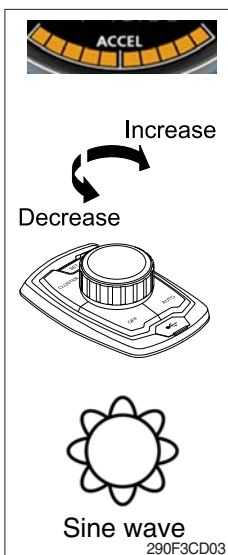
290F3CD179

- ① This port updates firmware using a dedicated cable.
- ② Haptic controller has built-in charging circuit supply max 500 mA current.

(7) Multimodal dial

- Cluster interlocked mode OFF

① Acceleration mode

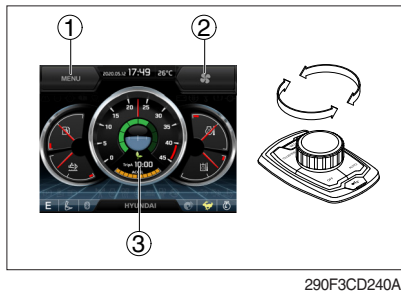


290F3CD03

- There are 10 dial setting.
- Setting 1 is low idle and setting 10 is high idle.
 - By rotating the dial to right : Engine speed increases
 - By rotating the dial to left : Engine speed decreases
- Dial operating pattern is sine wave torque.

- Cluster interlocked mode ON

① Cluster main menu

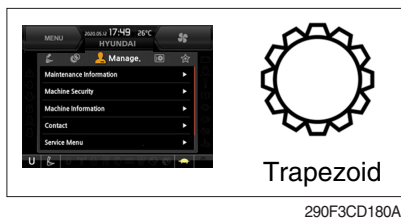


- You can select the quick menu by rotating the dial as below.



- CW rotation : move to right direction
- CCW rotation : move to left direction

② Cluster menu move

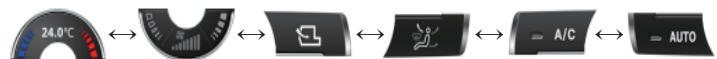


- You can move up and down of the cluster sub menu.
- Dial operating pattern is continuous rotation trapezoid torque.

③ Air conditioner menu



- You can move the menu of the air conditioner control mode.



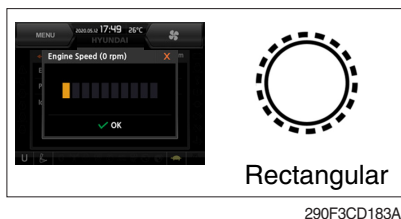
- Dial operating pattern is mixed type trapezoid torque.

④ Slide choice menu



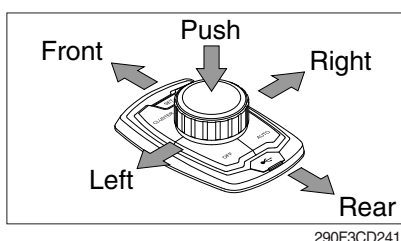
- You can increase or decrease the slide choice bar.
- Dial operating pattern is repeat dot interval torque.

⑤ Level choice menu



- You can increase or decrease the level choice bar.
- Dial operating pattern is integrate rectangular torque.

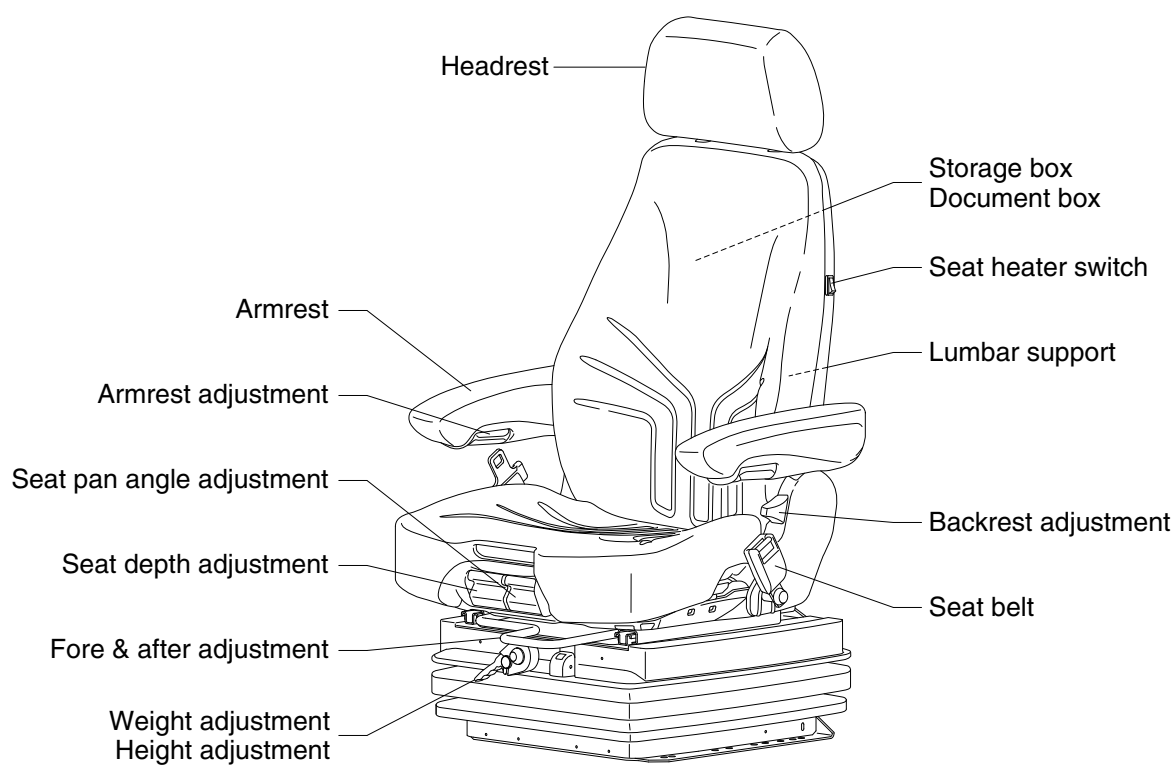
⑥ Push button



- **Push** : Select the current menu or the pop-up warning lamp move to the original position when warning lamp is happened.
- **Left** : ESC
- **Right** : CAM
- **Front** : Cluster main menu
- **Rear** : Return to acceleration mode

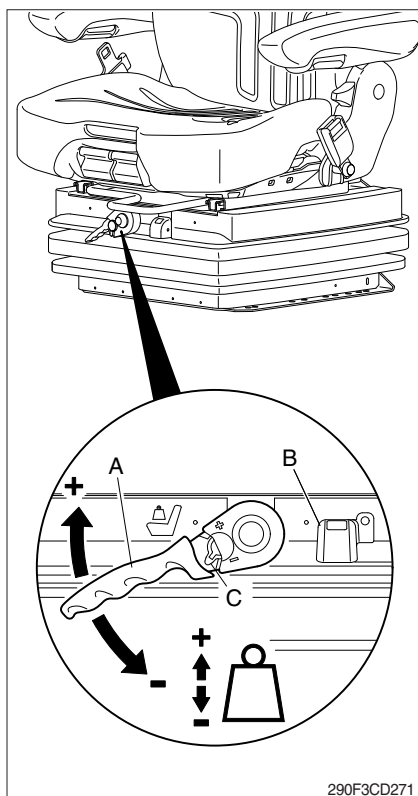
4) SEAT (SUSPENSION, STD)

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.



290F3CD270

(1) Weight and height adjustment

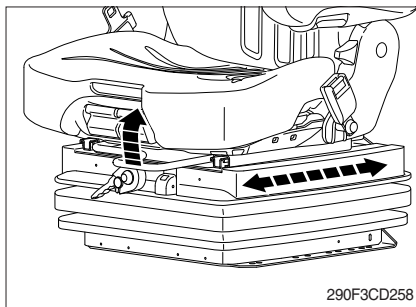


290F3CD271

With socket wrench (A) :

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

(2) Fore/after adjustment

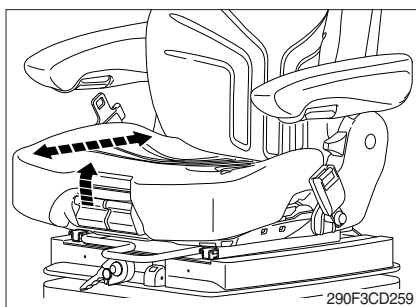


- ① The fore/after adjustment is released by lifting the locking lever.

⚠ Do not operate the locking lever while operating.

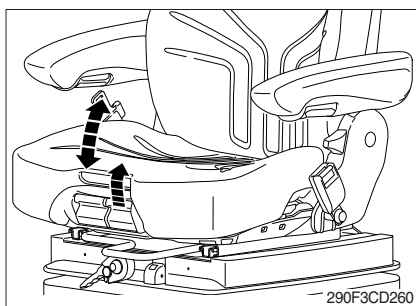
- ※ After the adjustment, the locking lever must latch into the desired position with an audible click. It should not be possible to move the operator's seat into another position when it is locked.
- ※ Do not lift the locking lever with your leg or calf.

(3) Seat depth adjustment



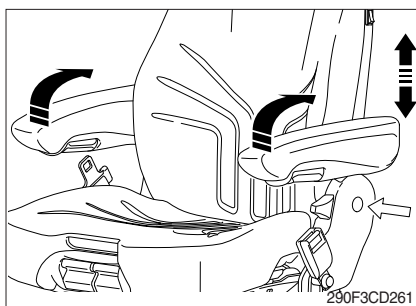
- ① The depth of the seat pan can be individually adjusted.
- ② To adjust the depth of the seat cushion, pull the right handle upwards. By moving the seat pan backwards or forwards the desired seating position can be reached.

(4) Seat pan angle adjustment



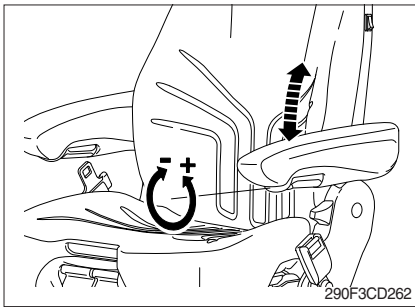
- ① The angle of the seat pan can be individually adjusted.
- ② To adjust the angle of the seat pan, pull the left handle upwards. By exerting pressure on or off the front or rear part of the seat pan it can be moved to the desired angle position.

(5) Armrests



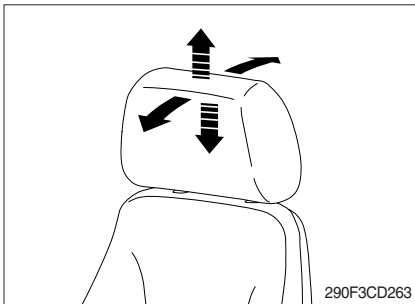
- ① The armrests can be folded up if required and the height can be individually adjusted.
- ② To adjust the armrest for height, separate the round cap (see arrow) from the cover and loosen the hexagon nut (size 13 mm) behind it adjust the armrests to the desired position (5 steps) and tighten the nut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

(6) Armrest adjustment



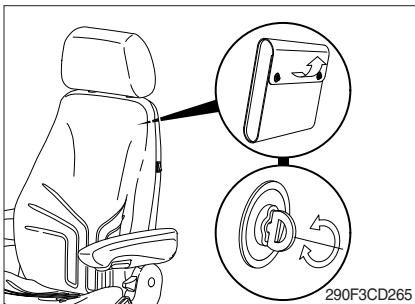
- ① The inclination of the armrest can be modified by turning the adjustment knob.
- ② When turning the knob to the outside (+), the front part of the armrest will be lifted; when turning the knob to the inside (-), it will be lowered.

(7) Headrest



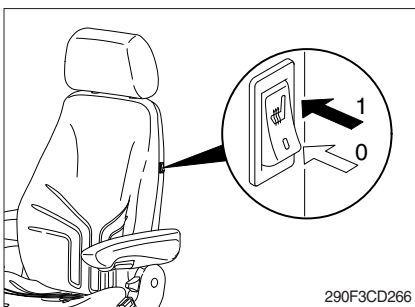
- ① The headrest can be individually adjusted for height by pulling it upward over the various increments up the end stop.
- ② By pushing forwards or rearwards the angle of the headrest can be adjusted individually.
- ③ To remove the headrest, pull it over the end stop.

(8) Document box



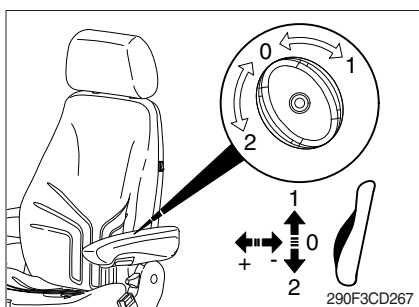
- ① The document box is placed on the rear side of the backrest.
- ② To open the document box, first twist the turn lock closures 90° to the left or the right and then fold the cover of the document box upwards.

(9) Seat heater switch



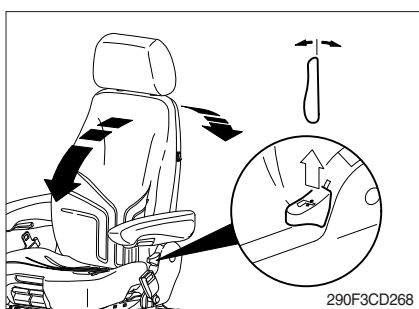
- ① The seat heater can be turned on/off by pressing the switch.

(10) Lumbar support



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

(11) Backrest adjustment



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

(12) Maintenance



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

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

▲ Take care with the backrest - it may jerk forward and cause injury.

When cleaning the backrest cushion, the backrest must be held in place when operating the backrest lever.

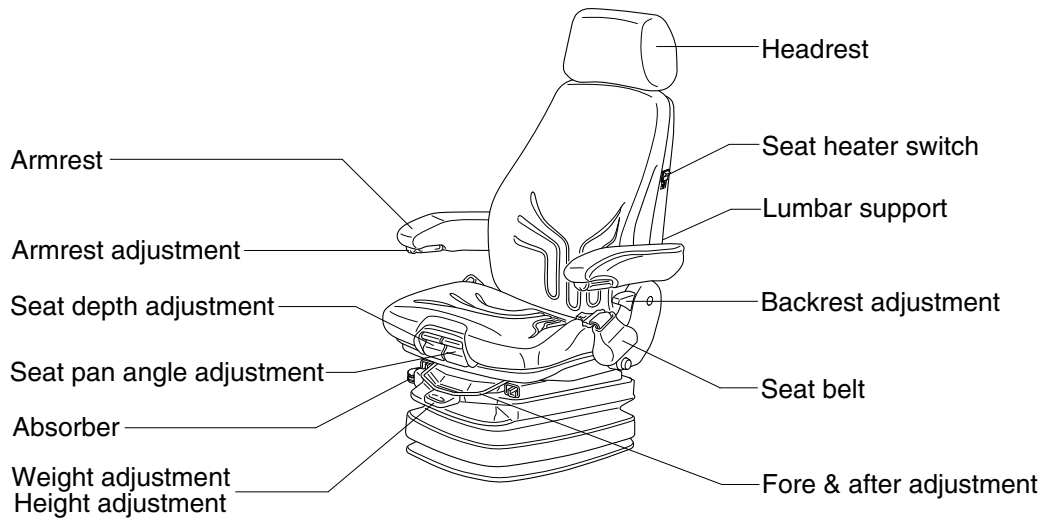
※ **Do not clean the seat with a pressure washer.**

During cleaning, the upholstery must not be soaked through.

Use standard commercially available upholstery or plastics cleaning agent. Test first for compatibility on a small, concealed area.

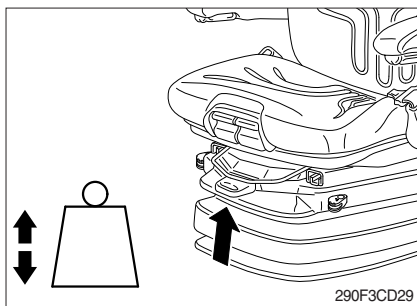
5) SEAT (AIR SUSPENSION, OPTION)

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.



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(1) Weight adjustment

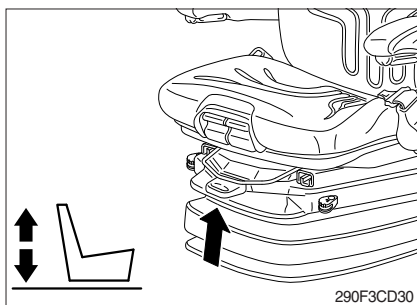


- ① The seat should be adjusted for the operator's weight by briefly pulling the actuator lever of the automatic weight and height adjuster (arrow) with the machine at a standstill and the operator's sitting on the seat.

The operator must sit absolutely still during adjustment.

- ※ **Before adjusting the weight, adjust shock absorbers to the position "soft".**
- ※ **To prevent damage to the health, the setting for the operator's weight must be checked and adjusted before the machine is operated.**

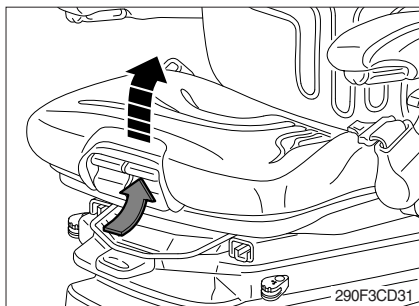
(2) Height adjustment



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

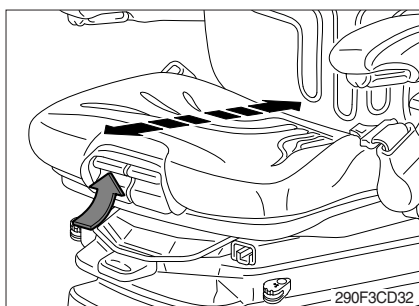
- ※ **Before adjusting the weight, adjust shock absorbers to the position "soft".**
- ※ **In order to avoid damage, do not operate compressor for more than 1 minute.**

(3) Seat pan angle adjustment



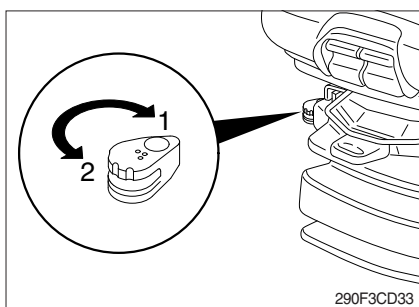
- ① The angle of the seat pan can be individually adjusted.
- ② To adjust the angle of the seat pan, lift the LH handle (see arrow). By exerting pressure on or off the seat pan it can be moved to the desired angle position.

(4) Seat depth adjustment



- ① The depth of the seat pan can be individually adjusted.
- ② To adjust the depth of the seat cushion, lift the RH handle (see arrow). By moving the seat cushion backwards or forwards the desired seating position can be reached.

(5) Absorber

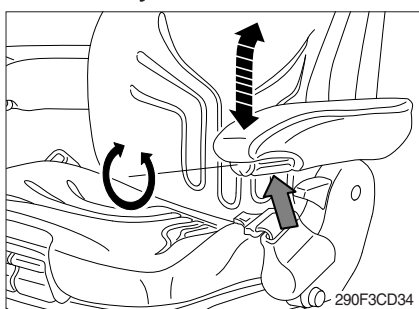


- ① The absorber setting of the seat can be varied to suit the on and off-road working conditions. The cushioning effect can be individually adjusted for this purpose.

Turn the lever to the desired position and release.

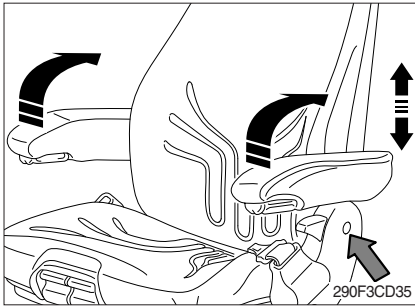
- 1 Soft
- 2 Hard

(6) Armrest adjustment



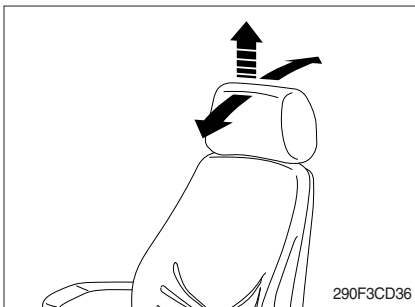
- ① The inclination of the armrests can be modified by turning the adjustment knob (arrow).

(7) Armrests



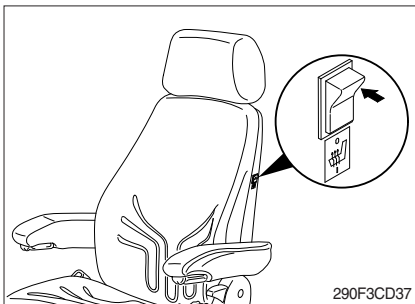
- ① The armrests can be folded up if required and the height individually adjusted.
- ② To adjust the armrests for height, separate the round cap (see arrow) from the cover, loosen the hexagon nut (size 13 mm), adjust the armrest to the desired position and tighten the nut again. Press the previously separated cap cover back onto the nut.

(8) Headrest



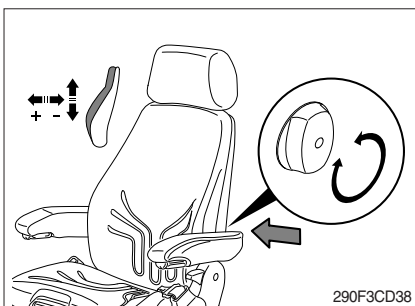
- ① The headrest can be individually adjusted for height by pulling it upward over the various increments up the end stop.
- ② By pushing forward or rearward the angle of the headrest can be adjusted individually.
- ③ To remove the headrest, pull it over the end stop.

(9) Seat heater switch



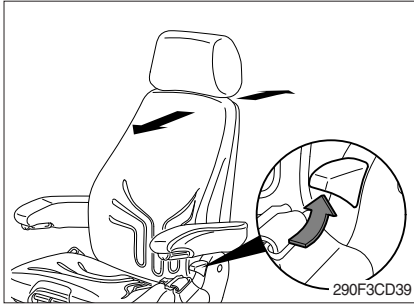
- ① The seat heater is turned on by pressing the switch.

(10) Lumbar support



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

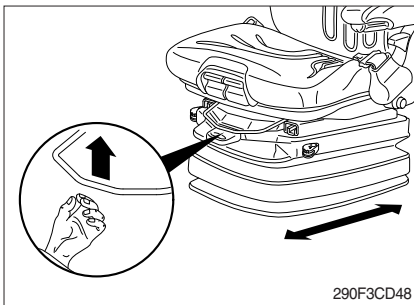
(11) Backrest adjustment



① The backrest is adjusted using the locking lever (arrow).

※ The locking lever must latch into the desired position. It should not be possible to move the backrest into another position when it is locked.

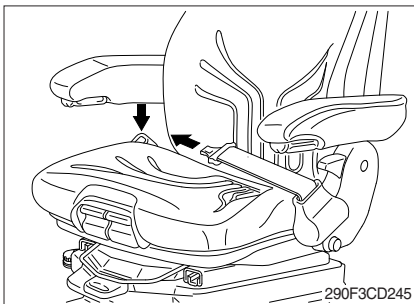
(12) Fore & after adjustment



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

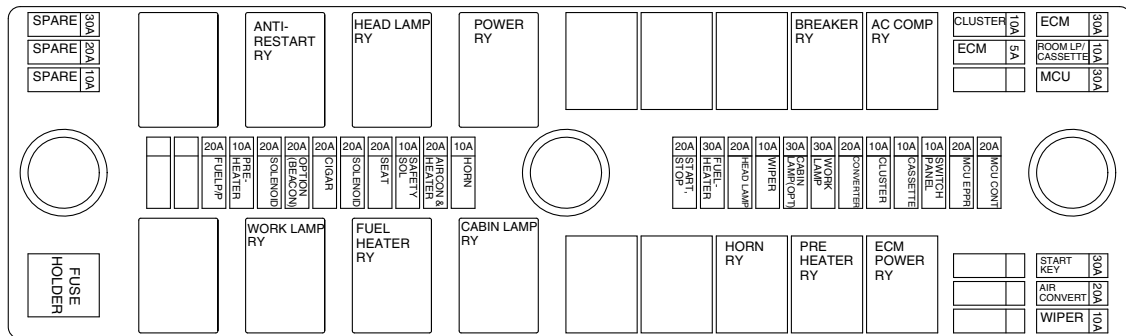
※ The locking lever must latch into the desired position. It should not be possible to move the operator seat into another position when it is locked.

(13) Seat belt



⚠ Fail to wear a seat belt during machine operation may result in serious injury or death in the event of an accident or machine overturn.

6) FUSE & RELAY BOX



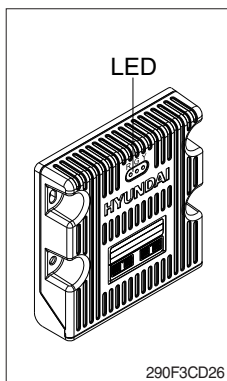
290F3CD25

- (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



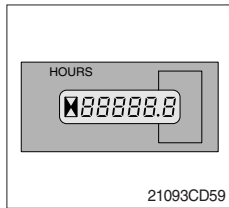
290F3CD26

- (1) To match the pump absorption torque with the engine torque, MCU varies EPPR valve output pressure, which control pump discharge amount whenever feedbacked engine speed drops under the reference rpm of each mode set.
- (2) Three LED lamps on the MCU display as below.

LED lamp	Trouble	Service
G is turned ON	Normal	-
G and R are turned ON	Trouble on MCU	<ul style="list-style-type: none"> • Change the MCU
G and Y are turned ON	Trouble on serial communication line	<ul style="list-style-type: none"> • Check if serial communication lines between controller and cluster are disconnected
Three LED are turned OFF	Trouble on MCU power	<ul style="list-style-type: none"> • Check if the input power wire (24 V, GND) of controller is disconnected • Check the fuse

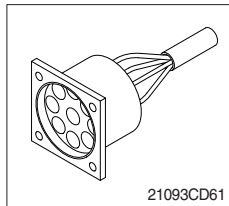
G : green, R : red, Y : yellow

8) SERVICE METER



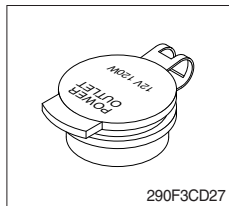
- (1) This meter shows the total operation hours of the machine.
- (2) Always ensure the operating condition of the meter during the machine operation. Inspect and service the machine based on hours as indicated in chapter 6, maintenance.

9) MCU/ECM CONNECTOR



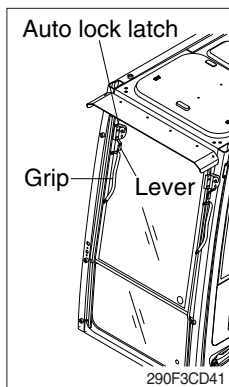
- (1) MCU communicates the machine data with Laptop computer through the connector.
- (2) ECM communicates the engine data with Scania diagnostic tool through the connector.
 - ① ECM fault code check
 - ② ECM program change
 - ③ Engine data monitoring & test

10) SERVICE SOCKET (12V)



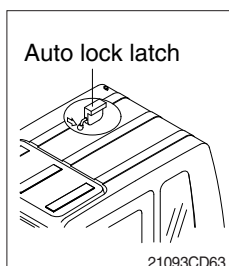
- (1) Utilize the power of 12 V as your need and do not exceed power of 12 V, 30 W.

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 grips.

⚠ When working, without having locked the windshield by the auto lock (by pushing the windshield to the rear until 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 %

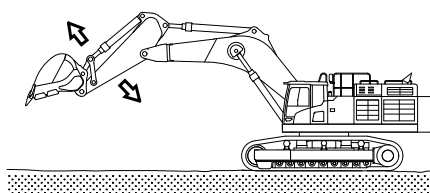
※ **Excessive operation may deteriorate the potential performance of machine and shorten lifetime of the machine.**

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

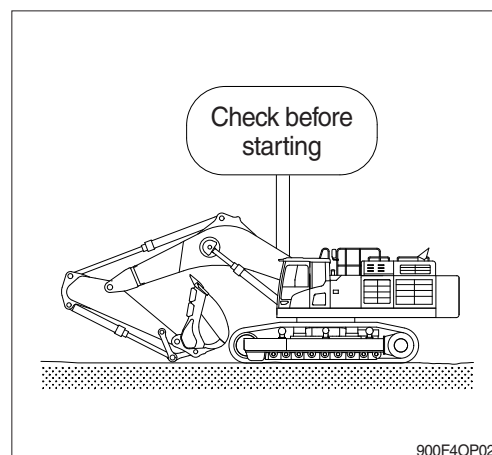
Checking items	Hours
Engine oil	250
Engine oil filter element	
Fuel return filter element	
Fuel main filter element	
Pilot line filter element	
Hydraulic oil return filter element	
Hydraulic oil tank drain filter cartridge	
Swing reduction gear oil	
Swing reduction gear grease	
Travel reduction gear oil	



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2. CHECK BEFORE STARTING THE ENGINE

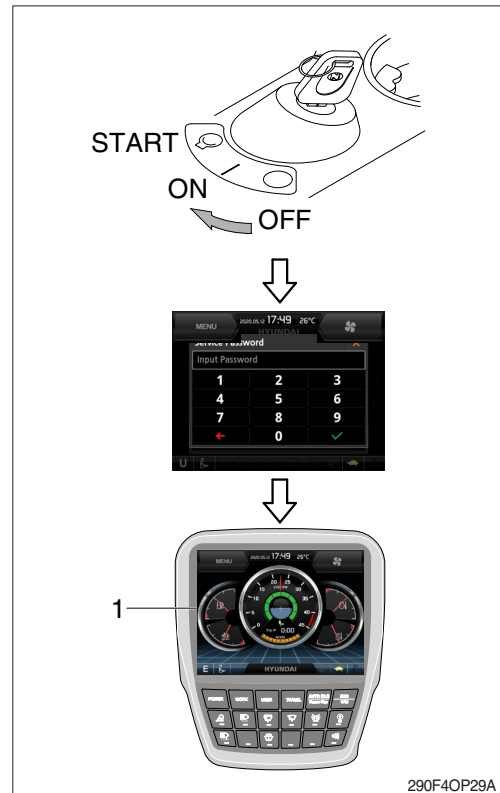
- 1) Look around the machine and under the machine to check for loosen nut or bolts, collection of dirt, or leakage of oil, fuel or coolant and check the condition of the work equipment and hydraulic system. Check also loosen wiring, and collection of dust at places which reach high temperature.
※ **Refer to the daily check on the chapter 6, maintenance.**
- 2) Adjust seat to fit the contours of the operator's body for the pleasant operation.
- 3) Adjust the rear view mirror.



3. STARTING AND STOP THE ENGINE

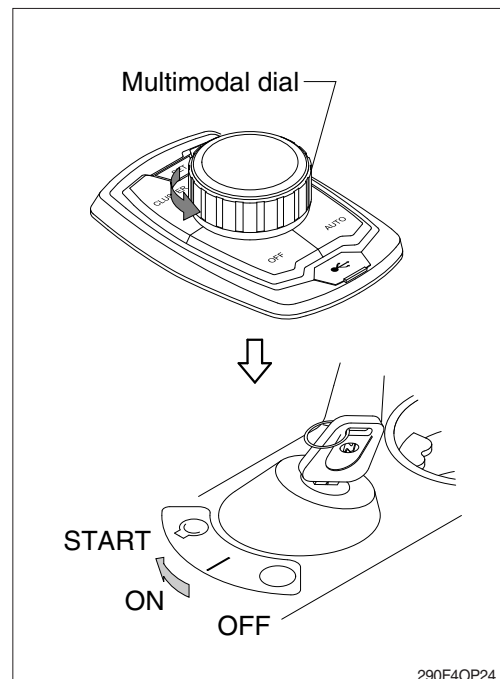
1) CHECK INDICATOR LIGHTS

- (1) Check if all the operating levers are in the neutral position.
- (2) Turn the starting switch to the ON position.
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 3-23 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

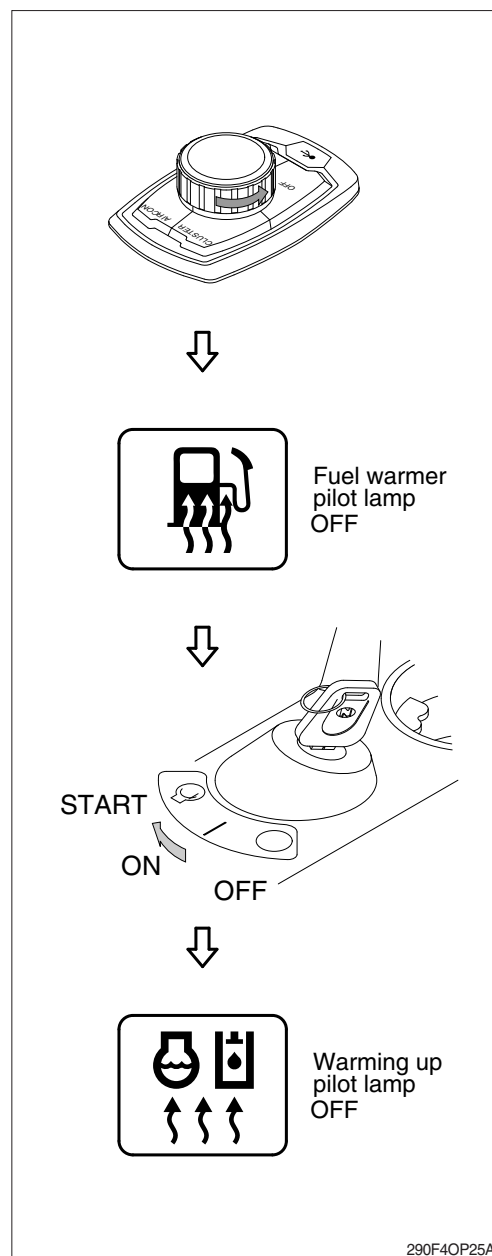
- ※ Sound the horn to warn the surroundings after checking if personnel or obstacles are in the area.
- (1) Turn the multimodal dial to low idle position.
 - (2) Turn the starting switch to START position to start the engine.
 - ※ Do not hold the starting switch in the START position for longer than 20 seconds.
The start system may be seriously damaged.
 - ※ If the engine does not start, allow the stator 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 2-44.
- ※ 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 multimodal dial to low idle position.
- (3) Turn the starting switch to the ON position, and wait 1~2 minutes. More time may take according to ambient temperature.
- (4) Start the engine by turning the starting switch to START position after the fuel warmer pilot lamp OFF.
- ※ If the engine does not start, allow the starter to cool for about 2 minutes before attempting to start the engine again.
- (5) Release the starting switch immediately after starting engine.
- (6) If the temperature of the coolant is lower than 30°C the warming up automatically starts.
- ※ Do not operate the working devices, or convert the operation mode into other mode during the warming up.



4) INSPECTION AFTER ENGINE START

Inspect and confirm the following after engine starts.

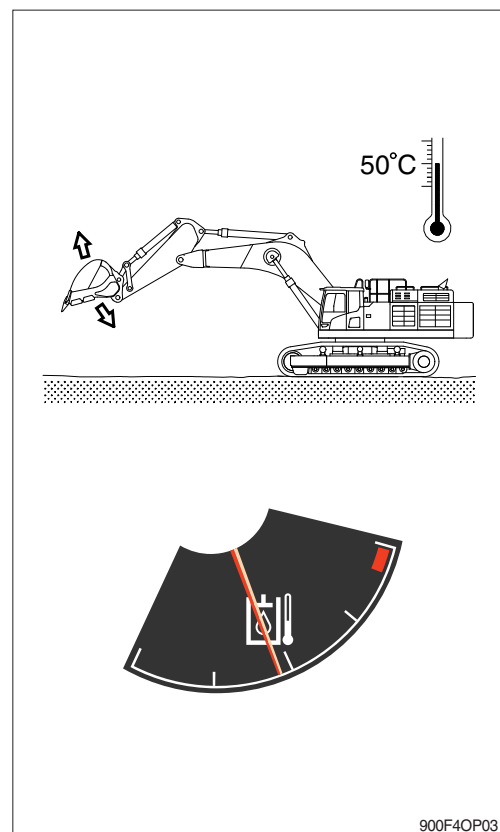
- (1) Is the level gauge of hydraulic oil tank in the normal level?
 - (2) Are there leakages of oil or water?
 - (3) Are all the warning lamps turned OFF (1-12)?
The seat belt reminder warning lamp (15) pops up and the buzzer sounds until fasten the seat belt.
 - (4) Are the indicator of water temperature gauge (13) and hydraulic temperature gauge (14) in the operating range?
 - (5) Are the engine sound and the color of exhaust gas normal?
 - (6) Are the sound and vibration normal?
- ※ **Do not increase engine speed quickly after starting, it can damage engine or turbocharger.**
 - ※ **If there are problems in the cluster, stop the engine immediately and correct problems as required.**



5) WARMING-UP OPERATION

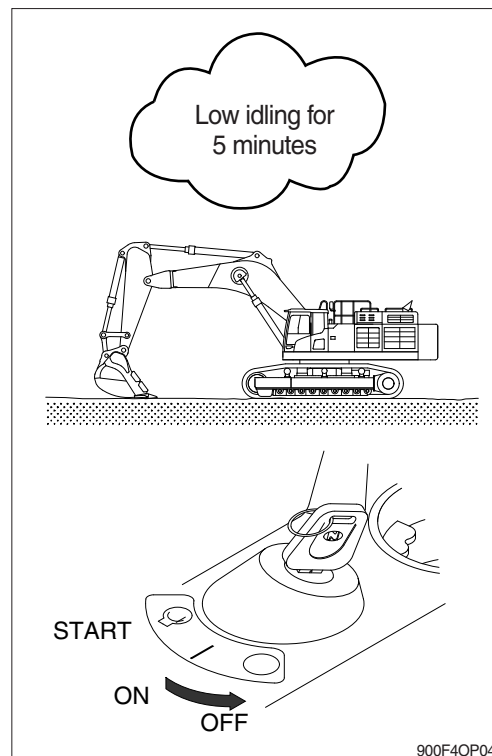
- ※ **The most suitable temperature for the hydraulic oil is about 50°C (122°F).**
It can cause serious trouble in the hydraulic system by sudden operation when the hydraulic oil temperature is below 25°C (77°F).
Then temperature must be raised to at least 25°C (77°F) before starting work.

- (1) Run the engine at low idle speed for 5 minutes.
- (2) Speed up the engine by multimodal dial and run the engine at mid-range speed.
- (3) Operate bucket lever for 5 minutes.
※ **Do not operate anything except bucket lever.**
- (4) Run the engine at the high speed and operate the bucket lever and arm lever for 5-10 minutes.
※ **Operate only the bucket lever and arm lever.**
- (5) This warming-up operation will be completed by operation of all cylinders several times, and operation of swing and traveling.



6) TO STOP THE ENGINE

- ※ If the engine is abruptly stopped before it has cooled down, engine life may be greatly shortened. Consequently, do not abruptly stop the engine apart from an emergency.
 - ※ In particular, if the engine has overheated, do not abruptly stop it but run it at medium speed to allow it to cool gradually, then stop it.
- (1) Down the bucket on the ground then put all the levers in the neutral position.
 - (2) Run the engine at low idle speed for about 5 minutes.
 - (3) Return the key of starting switch to the OFF position.
 - (4) Remove the key to prevent other people using the machine and the safety knob.
 - (5) Lock the cab door.



4. MODE SELECTION SYSTEM

1) STRUCTURE OF MECHATRONICS SYSTEM

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

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

(1) Power mode

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

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

(2) Work mode

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

① General work mode (bucket)

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

② Work tool mode (breaker, crusher)

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

(3) User mode

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

(engine speed, power shift and idle speed)

② There are two methods for use of user mode.

a. In operation screen

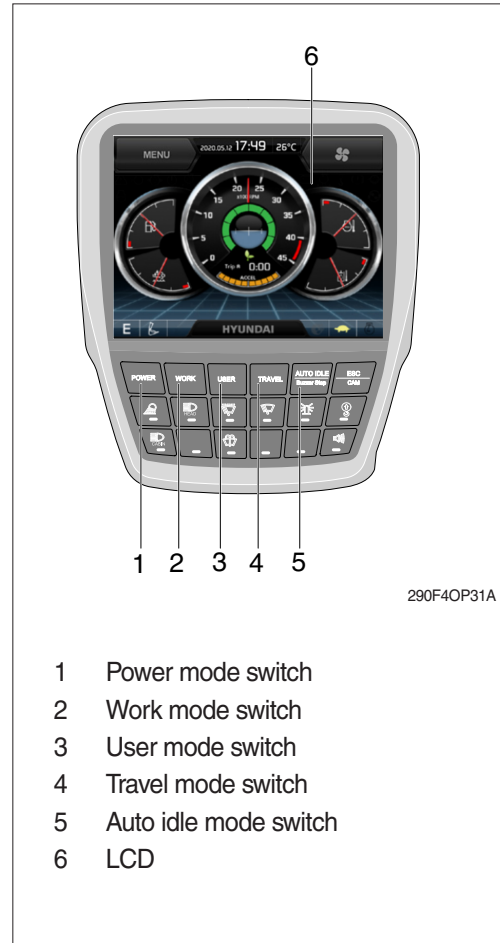
User mode switch is used to memorize the current machine operating status and activate the memorized user mode.

Refer to page 3-15.

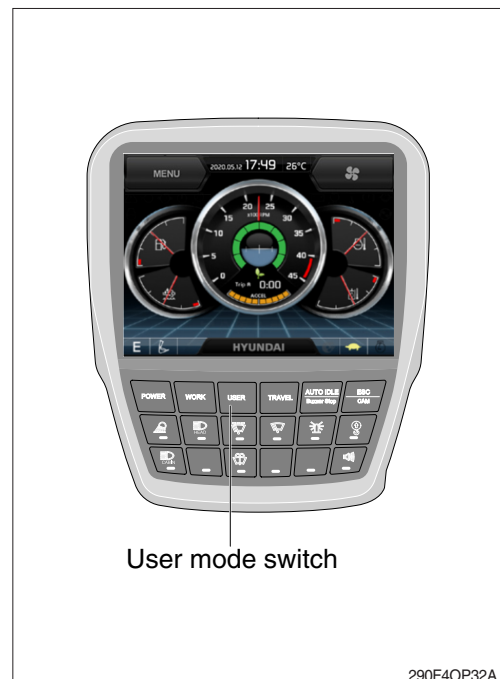
b. In menu

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.



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



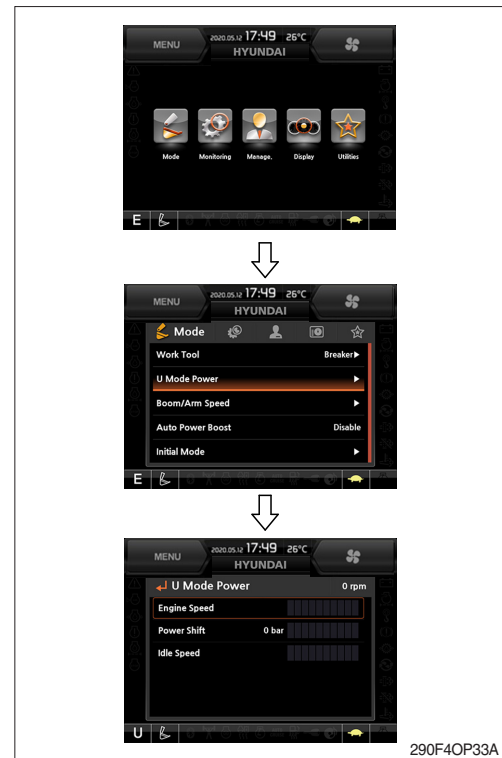
- High idle rpm, auto idle rpm and EPPR pressure can be adjusted and memorized in the U-mode.

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



- LCD segment vs parameter setting

Step ()	Engine speed (rpm)	Idle speed (rpm)	Power shift (bar)
1	1450	800	0
2	1500	850	3
3	1600	900	6
4	1700	950	9
5	1750	1000 (auto decel)	12
6	1800	1050	16
7	1850	1100	20
8	1900	1150	26
9	1950	1180	32
10	2000	1200	38

※ One touch decel & low idle : 850 rpm



(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 3-21.

(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).

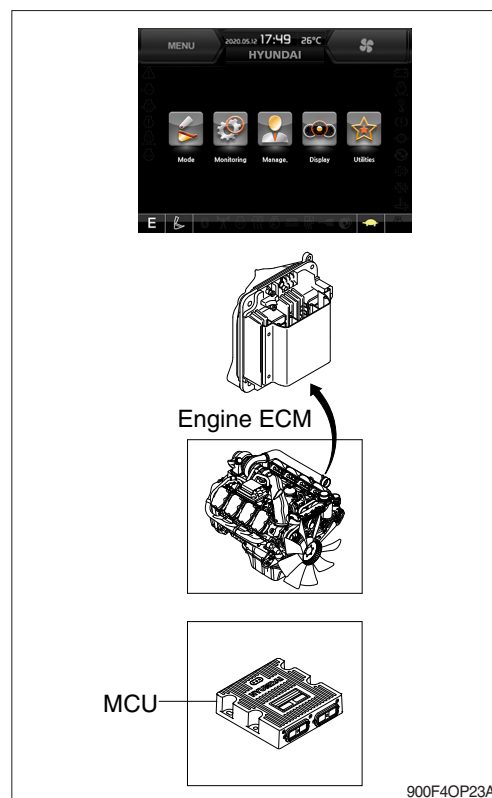
② Engine ECM (Electronic Control Module)

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 3-21 for LCD display.

(8) Anti-restart system

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



2) HOW TO OPERATE MODE SELECTION SYSTEM

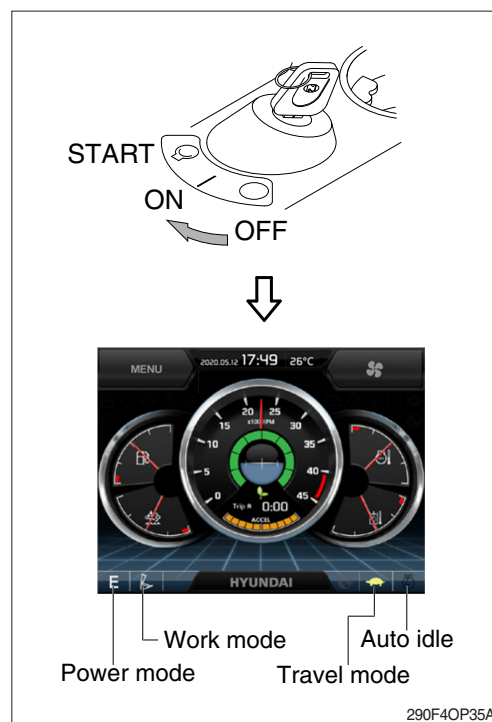
(1) When start key switch is turned ON

- ① When start key switch is turned on, the cluster turns on and buzzer sounds for 4 seconds. And then main information as gauges and engine speed are displayed on LCD.
- ② Initial default mode settings are displayed in the cluster.

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

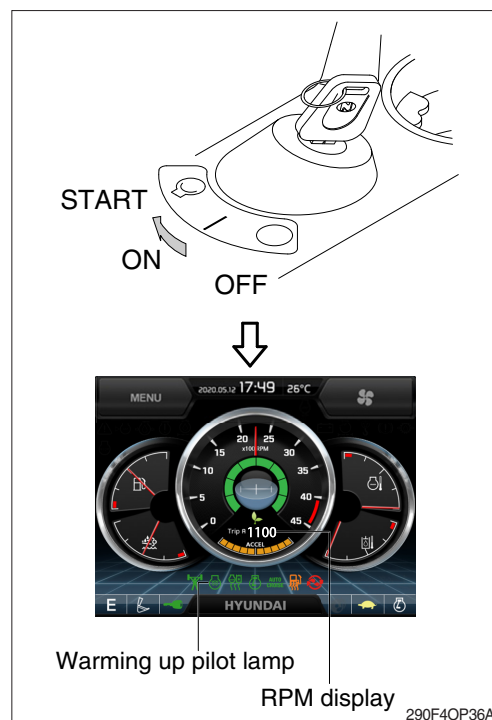
※ These setting can be changed at U mode.

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



(2) After engine start

- ① When the engine is started, rpm display indicates low idle, 850 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 rpm automatically to warm up the machine.
 - After 2-3 minutes, you can select any mode depending on job requirement.



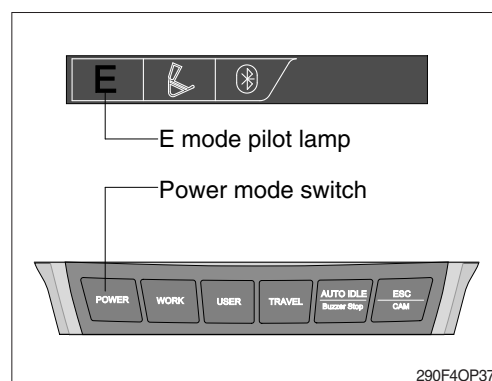
3) SELECTION OF POWER MODE

(1) E mode

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

Engine rpm	Effect
1550	Variable power control in proportion to lever stroke (improvement in fuel efficiency) ※ Same power as S mode in full lever operation.

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

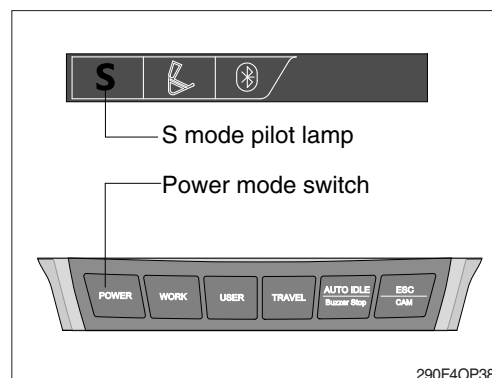


(2) S mode

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

Engine rpm	Effect
1650	Standard power

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

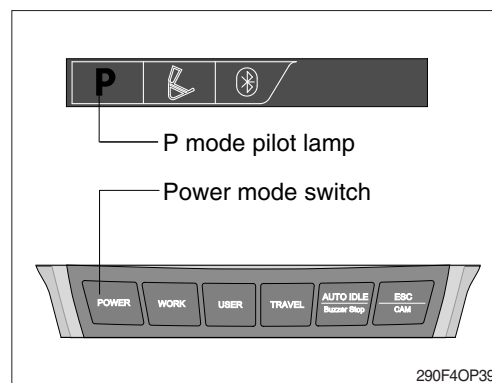


(3) P mode

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

Engine rpm	Effect
1750	Approximately 120 % of power and speed available than S mode.

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

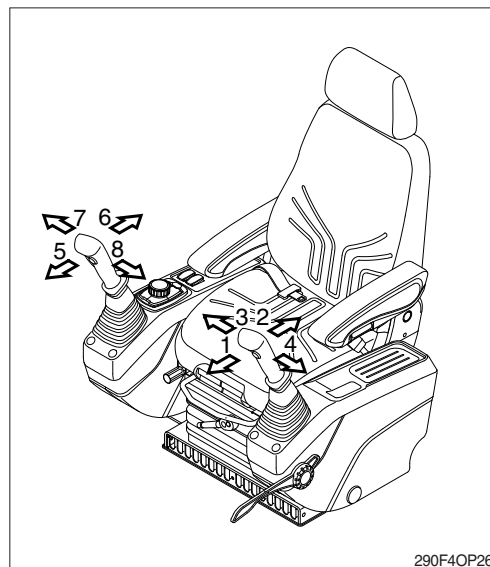


5. OPERATION OF THE WORKING DEVICE

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

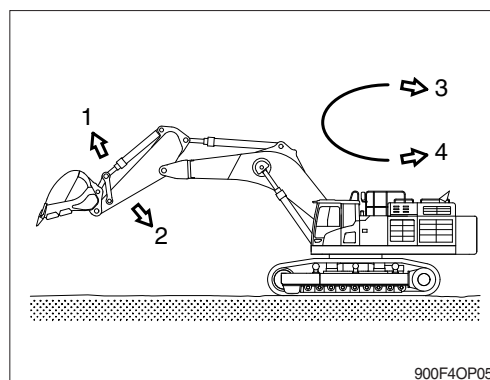
- 1) Left control lever controls arm and swing.
- 2) Right control lever controls boom and bucket.
- 3) When you release the control lever, control lever returns to neutral position automatically.

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



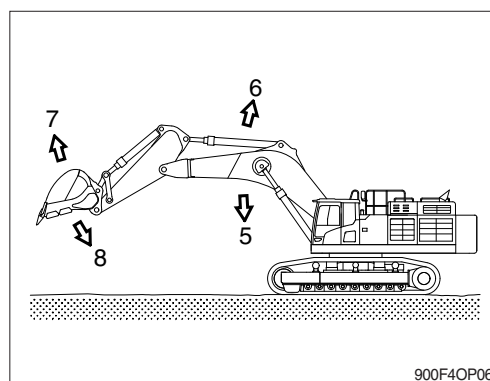
※ **Left control lever**

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



※ **Right control lever**

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



6. TRAVELING OF THE MACHINE

1) BASIC OPERATION

(1) Traveling position

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

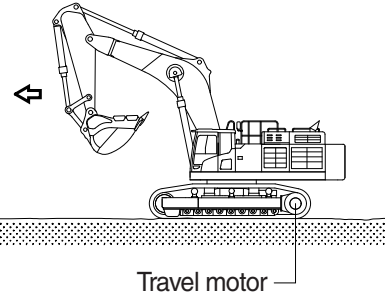
- ▲ **Be careful as the traveling direction will be reversed when the whole machine is swung 180 degree.**

(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.**

Traveling position

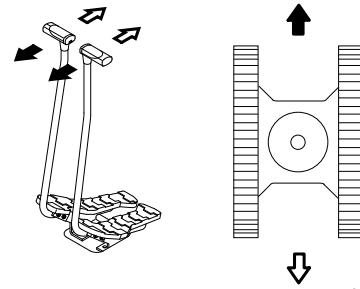


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(3) Forward and backward traveling

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

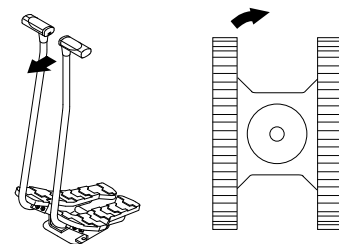
- ※ **The speed can be controlled by the operation stroke of lever or pedal and change of direction will be controlled by difference of the left and right stroke.**



21094OP24

(4) Pivot turning

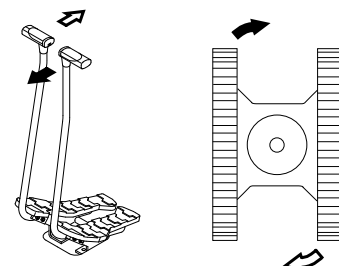
Operating only one side of lever or pedal make the change of direction possible by moving only one track.



21094OP25

(5) Counter rotation

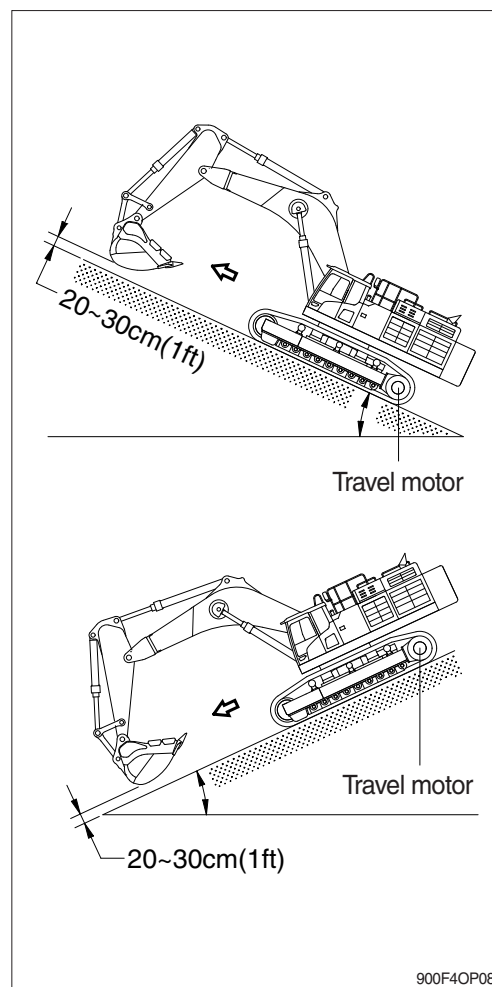
It is to change the direction at the original place by moving the right and left track. Both side of lever or pedal are operated to the other way at the same time.



21094OP26

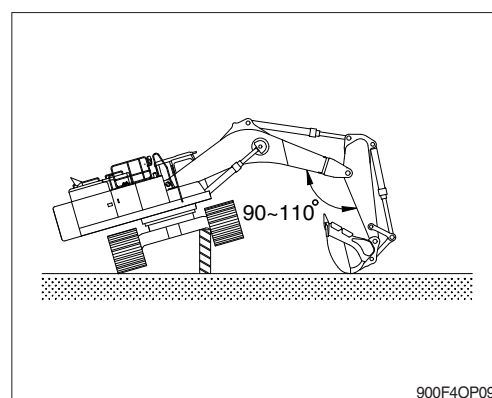
2) TRAVELING ON A SLOPE

- (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 cm (1 ft) to the ground so that it can be used as a brake in an emergency.
 - (3) If the machine starts to slide or loses stability, lower the bucket immediately and brake the machine.
 - (4) When parking on a slope, use the bucket as a brake and place blocks behind the tracks to prevent sliding.
- ※ **Machine cannot travel effectively on a slope when the oil temperature is low. Do the warming-up operation when it is going to travel on a slope.**
- ▲ **Be careful when working on slopes. It may cause the machine to lose its balance and turn over.**
- ▲ **Be sure to keep the travel speed switch on the LOW (turtle mark) while traveling on a slope.**
- ▲ **Be sure to keep the swing lock/fine switch on the LOCK while traveling on a slope (if equipped).**



3) TRAVELING ON SOFT GROUND

- ※ **If possible, avoid to operate on soft ground.**
- (1) Move forward as far as machine can move.
 - (2) Take care not to go beyond the depth where towing is impossible on soft ground.
 - (3) When driving becomes impossible, lower bucket and use boom and arm to pull the machine. Operate boom, arm, and travel lever at the same time to avoid the machine sinking.



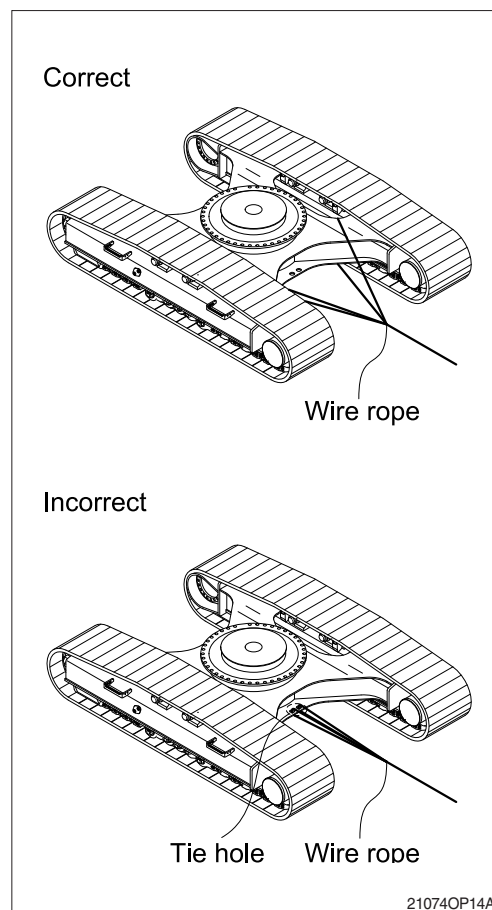
4) TOWING THE MACHINE

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

- (1) Tow the machine by other machine after hook the wire rope to the frame as shown in picture at right.
- (2) Hook the wire rope to the frame and put a support under each part of wire rope to prevent damage.

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

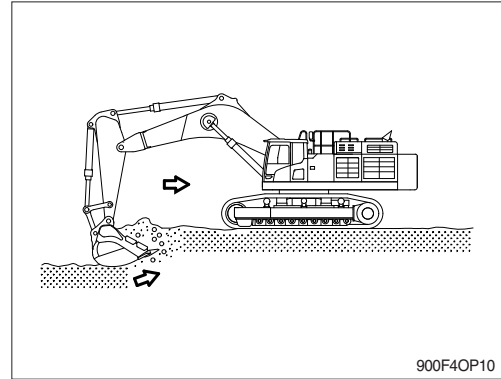
▲ **Make sure no personnel are standing close to the tow rope.**



7. EFFICIENT WORKING METHOD

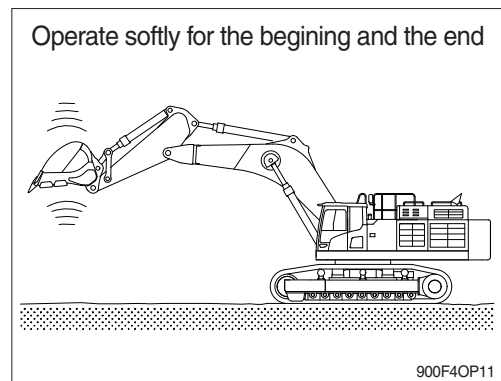
- 1) Do the digging work by arm.

Use the pulling force of arm for digging and use together with the digging force of the bucket if necessary.

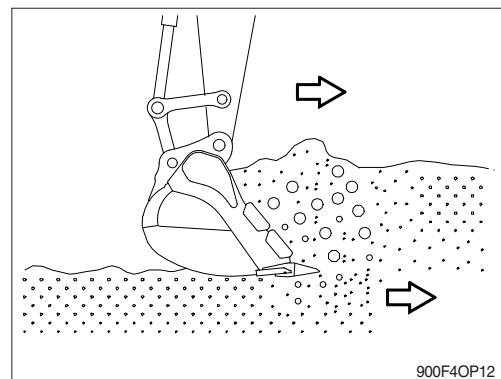


- 2) When lowering and raising the boom operate softly for the beginning and the end.

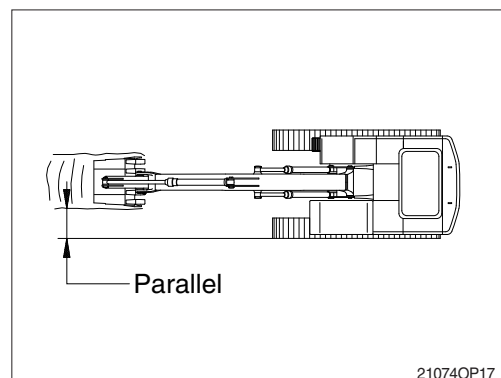
In particularly, sudden stops while lowering the boom may cause damage to the machine.



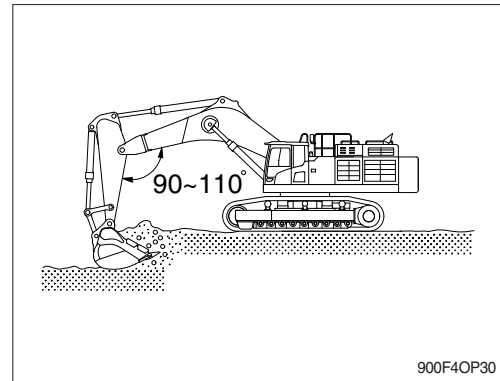
- 3) The digging resistance and wearing of tooth can be reduced by putting the end of bucket tooth to the digging direction.



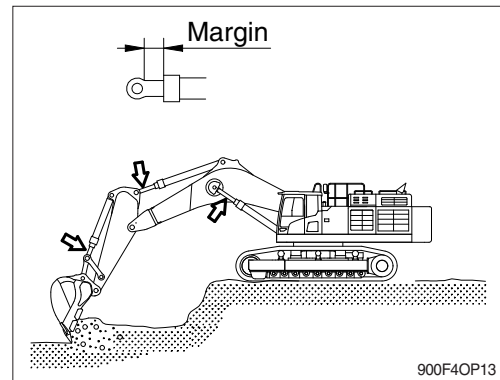
- 4) Set the tracks parallel to the line of the ditch to be excavated when digging ditch. Do not swing while digging.



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

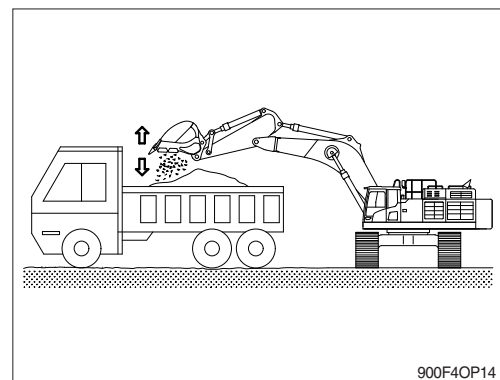


- 6) Operate leaving a small safety margin of cylinder stroke to prevent damage of cylinder when working with the machine.

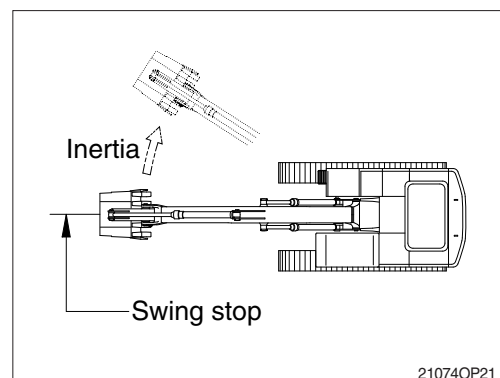


- 7) Keep the bucket to the dumping position and the arm horizontal when dumping the soil from the bucket.
Operate bucket lever 2 or 3 times when hard to dump.

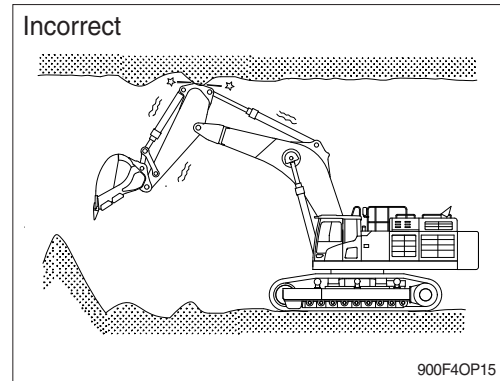
※ Do not use the impact of bucket tooth when dumping.



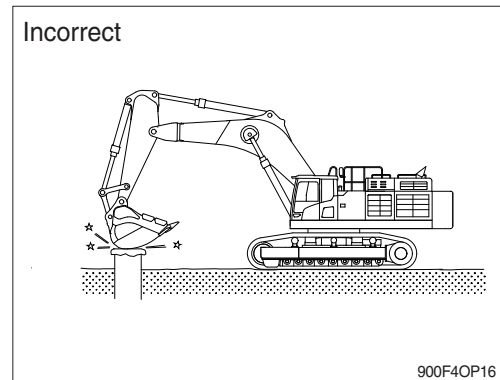
- 8) Operate stop of swing considering the swing slip distance is created by inertia after neutralizing the swing lever.



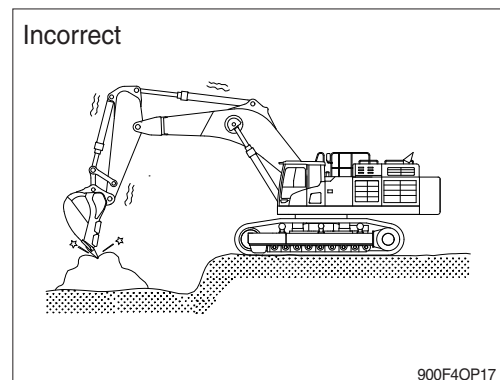
- 9) If the excavation is in an underground location or in a building, make sure that there is adequate overhead clearance and that there is adequate ventilation.



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



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



12) NEVER CARRY OUT EXCESSIVE OPERATIONS

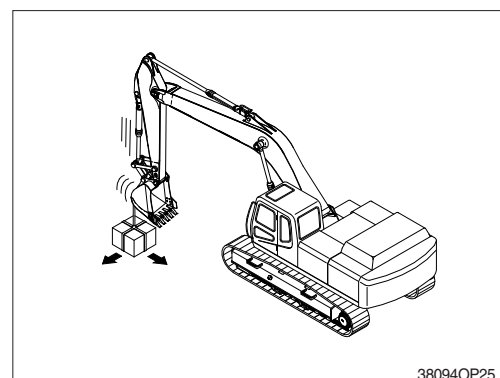
Operation exceeding machine performance may result in accident or failure.

Carry out lifting operation within specified load limit.

Never carry out operations which may damage the machine such as overload or over-impact-load.

Never travel while carrying a load.

In case you need installing over load warning device for object handling procedure, please contact HD Hyundai Construction Equipment distributor.



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.

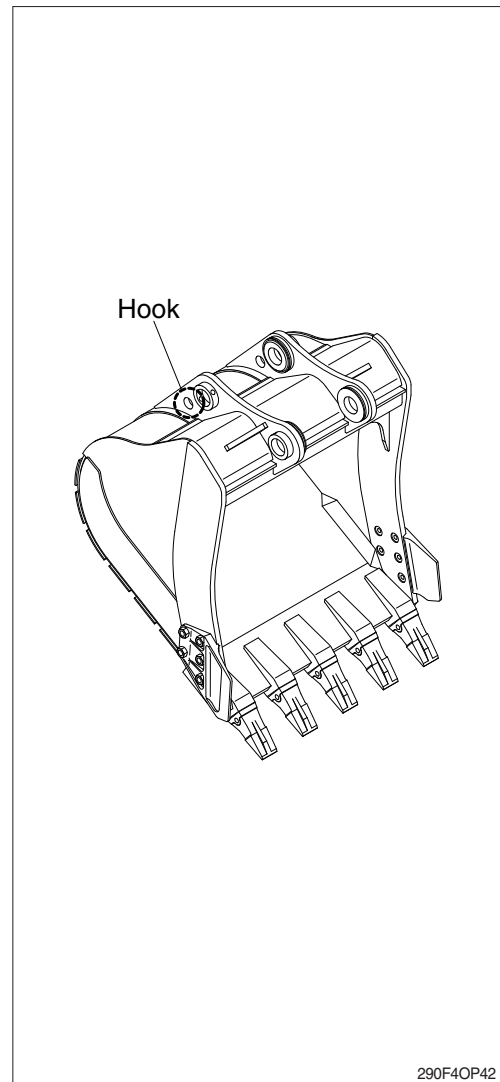
Due to the possible danger of the load falling or of collision with the load, no persons shall be allowed in the working area.

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.

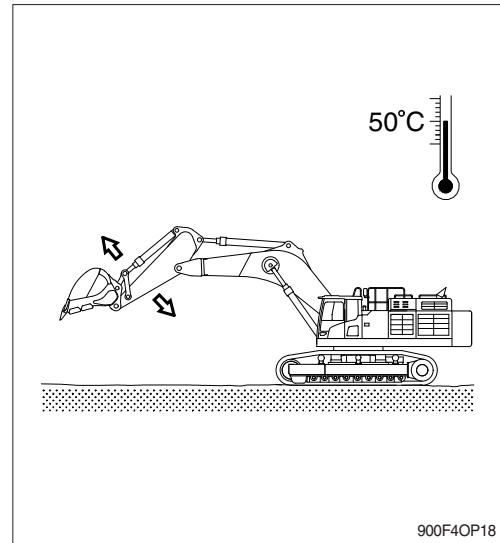
Never leave the operator's seat while lifting a load.



8. OPERATION IN THE SPECIAL WORK SITES

1) OPERATION THE MACHINE IN A COLD WEATHER

- (1) Use proper engine oil and fuel for the weather.
- (2) Fill the required amount of antifreeze in the coolant.
- (3) Refer to the starting engine in cold weather.
Start the engine and extend the warming up operation.
- (4) Be sure to open the heater cock when using the heater.
- (5) Always keep the battery completely charged.
※ **Discharged batteries will freeze more easily than fully charged.**
- (6) Clean the machine and park on the wood plates.



2) OPERATION IN SANDY OR DUSTY WORK SITES

- (1) Inspect air cleaner element frequently. Clean or replace element more frequently, if warning lamp comes ON and buzzer sounds simultaneously, regardless of inspection period.
※ **Replace the inner and outer element after 4 times of cleaning.**
- (2) Inspect radiator, oil cooler and condenser frequently, and keep cooling fins clean.
- (3) Prevent sand or dust from getting into fuel tank and hydraulic tank during refilling.
- (4) Prevent sand or dust from penetrating into hydraulic circuit by tightly closing breather cap of hydraulic oil tank. Replace hydraulic oil filter and air breather element frequently. Also, replace the fuel filter frequently.
- (5) Keep all lubricated part, such as pins and bushings, clean at all times.
- (6) If the air conditioner and heater filters clogged, the heating or cooling capacity will drop. Clean or replace the filter element more frequently.
- (7) Clean electrical components, especially the starting motor and alternator to avoid accumulation of dust.

3) SEA SHORE OPERATION

- (1) Prevent ingress of salt by securely tightening plugs, cocks and bolts of each part.
- (2) Wash machine after operation to remove salt residue.
Pay special attention to electrical parts, and hydraulic cylinders and track tension cylinder to prevent corrosion.
- (3) Inspection and lubrication must be carried out more frequently.
Supply sufficient grease to replace all old grease in bearings which have been submerged in water for a long time.

4) OPERATION IN MUD, WATER OR RAIN WORK SITES

- (1) Perform a walk around inspection to check for any loose fittings, obvious damage to the machine or any fluid leakage.
- (2) After completing operations, clean mud, rocks or debris from the machine. Inspect for damage, cracked welds or loosened parts.
- (3) Perform all daily lubrication and service.
- (4) If the operations were in salt water or other corrosive materials, make sure to flush the affected equipment with fresh water.

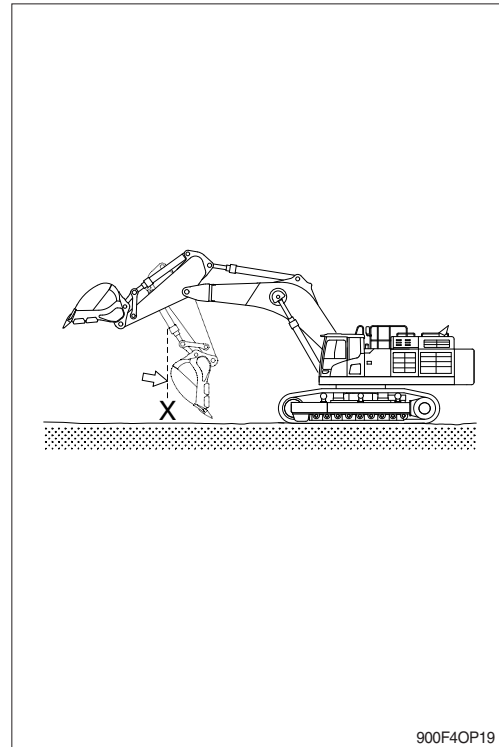
5) OPERATION IN ROCKY WORK SITES

- (1) Check for damage to the undercarriage and for looseness, flaws, wear and damage in bolts and nut.
- (2) Loosen the track tension a little when working in such areas.
- (3) Do not turn the undercarriage directly over the sharp edge rock.

9. NORMAL OPERATION OF EXCAVATOR

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

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



10. ATTACHMENT LOWERING (when engine is stopped)

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

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

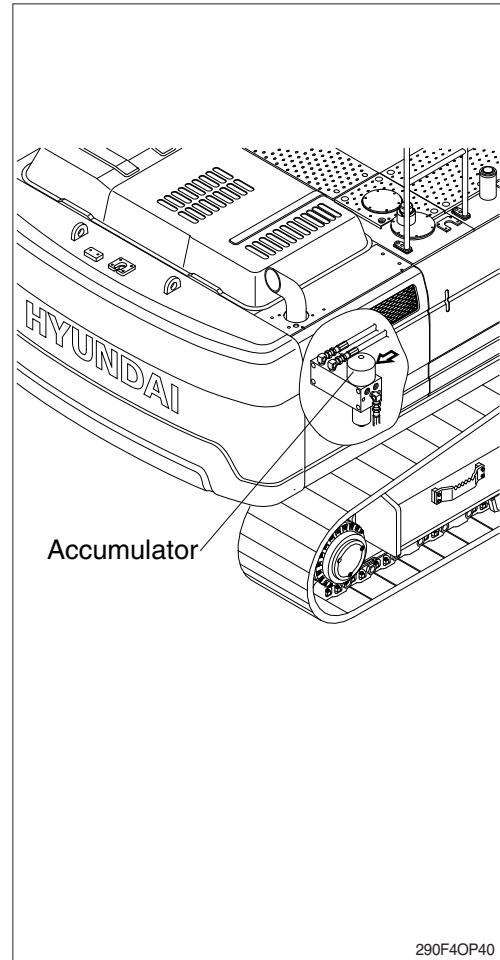
- 2) The accumulator is filled with high-pressure nitrogen gas, and it is extremely dangerous if it is handled in the wrong way. Always observe the following precautions.

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

▲ Do not weld anything to the accumulator.

- ※ When carrying out disassembly or maintenance of the accumulator, or when disposing of the accumulator, it is necessary to release the gas from the accumulator.

A special air bleed valve is necessary for this operation, so please contact your HD Hyundai Construction Equipment distributor.



11. STORAGE

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

1) BEFORE STORAGE

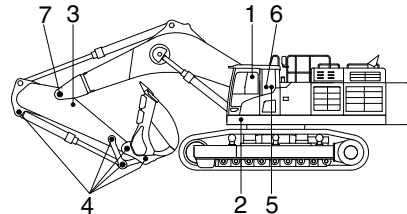
(1) Cleaning the machine

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

(2) Lubrication position of each part

Change all oil.

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



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

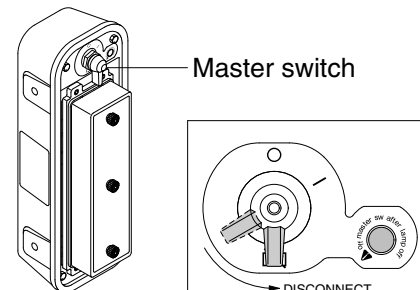
900F4OP20

(3) Master switch

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

- ※ **Off the master switch after lamp off.**
It may cause severe failure of aftertreatment device.

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

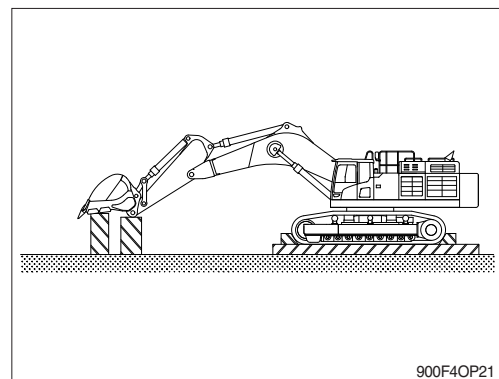


290F4OP27

(5) Prevention of dust and moisture

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

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

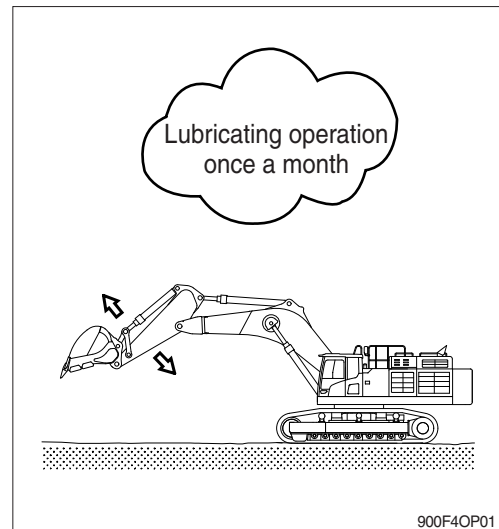


900F4OP21

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.



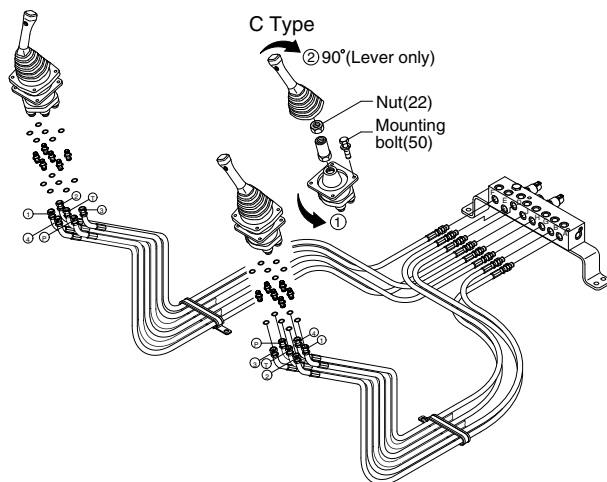
3) AFTER STORAGE

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

- (1) Wipe off the anticorrosive lubricant on the hydraulic piston rod.
- (2) Completely fill fuel tank, lubricate and add oil.
- (3) **When storage period is 6 months over**
If the machine stock period is over 6 months, carry out the following procedure.
This procedure is to drain condensation water for the **swing reduction gear** durability.
 - ※ Remove the drain port plug and drain the water until the gear oil comes out and then tighten the drain plug.
 - ※ Refer to the service instruction, section 6 for the drain plug location.
 - ※ If the machine is stored without carrying out the monthly lubricating operation, consult your HD Hyundai Construction Equipment dealer for service.

12. RCV LEVER OPERATING PATTERN

1) PATTERN CHANGE VALVE NOT INSTALL (standard)



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

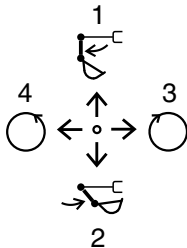
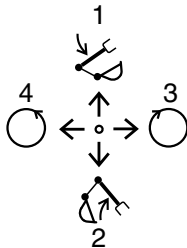
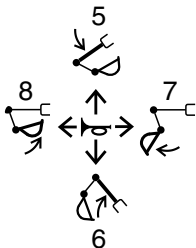
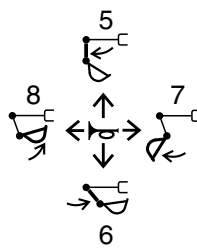
※ The hose modification works must be carried out between RCV lever and terminal block (Not between terminal block and MCV).

900F4OP41

Pattern	Operation		Control function	Hose connection (port)			
	Left RCV lever	Right RCV lever		RCV lever	Change of Terminal block		
					From	To	
ISO Type			Left	1 Arm out	②	D	-
HD Hyundai Construction Equipment				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 (50) 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.

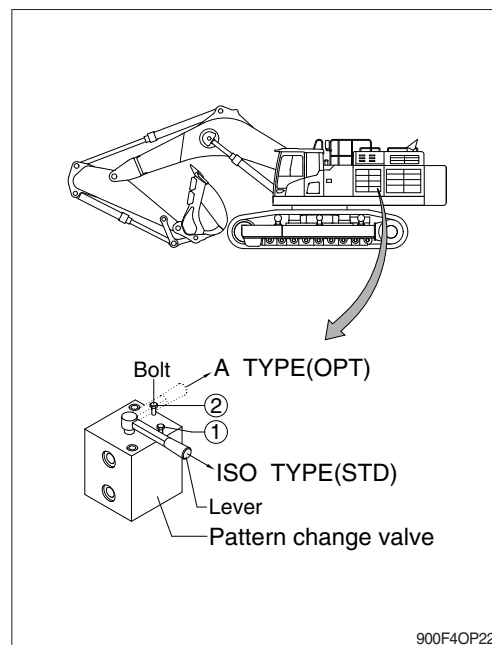
Operation	ISO type	A type
Left RCV lever		
Right RCV lever		

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

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

(2) Change of operating pattern

- ① Loosen bolt.
- ② Move lever to the "ISO" or "A" position.
- ③ After the lever is set, tighten the bolt in order to secure the lever.
 - Position ① for "ISO" pattern.
 - Position ② for "A" pattern.



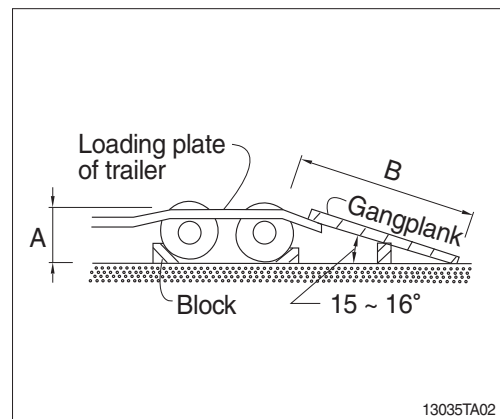
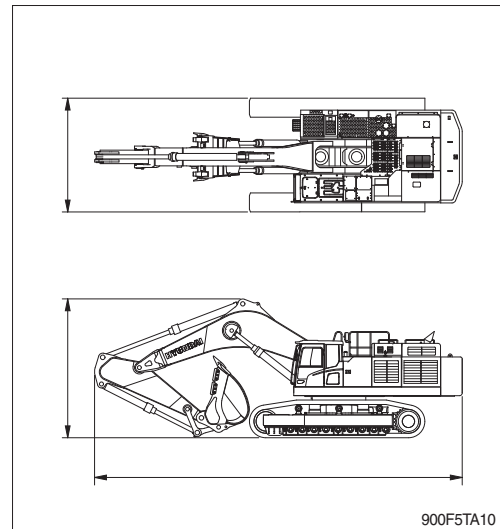
900F4OP22

TRANSPORTATION

1. PREPARATION FOR TRANSPORTATION

- 1) When transporting the machine, observe the various road rules, road transportation vehicle laws and vehicle limit ordinances, etc.
- 2) Select proper trailer after confirming the weight and dimension from the chapter 2, specification.
- 3) Check the whole route such as the road width, the height of bridge and limit of weight and etc., which will be passed.
- 4) Get the permission from the related authority if necessary.
- 5) Prepare suitable capacity of trailer to support the machine.
- 6) Prepare gangplank for safe loading referring to the below table and illustration.

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



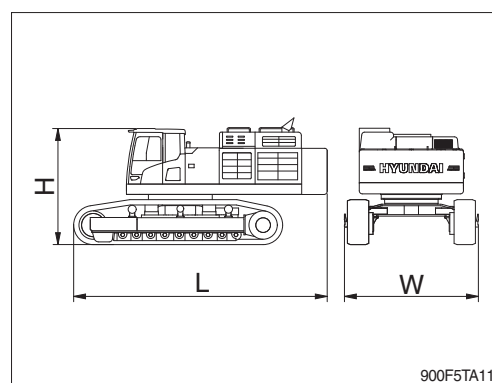
2. DIMENSION AND WEIGHT

1) BASE MACHINE 1

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	7550 (24' 9")
H	Height	mm (ft-in)	3620 (11' 11")
W	Width	mm (ft-in)	3775 (12' 5")
Wt	Weight	kg (lb)	65420 (144230)

※ With 700 mm (28") double grouser shoes.

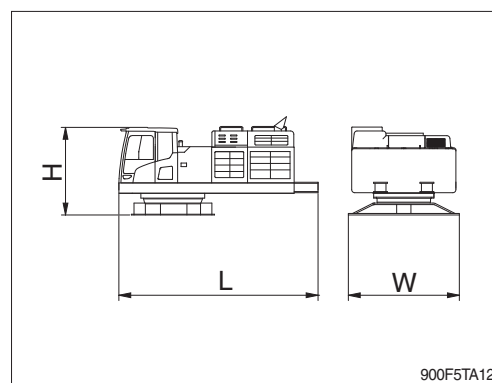
※ Remove catwalk for transport.



900F5TA11

2) BASE MACHINE 2

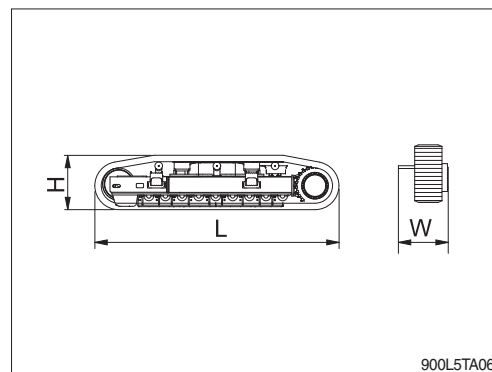
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	5950 (19' 6")
H	Height	mm (ft-in)	2750 (9' 0")
W	Width	mm (ft-in)	3420 (11' 3")
Wt	Weight	kg (lb)	24800 (54670)



900F5TA12

3) TRACK FRAME

Dimension mm (ft-in)				Weight
Shoe	L	H	W	kg (lb)
700 (24")	6435 (21' 1")	1480 (4' 10")	1160 (3' 10")	13370 (29480)
800 (32")	6435 (21' 1")	1480 (4' 10")	1160 (3' 10")	13780 (30380)
900 (35")	6435 (21' 1")	1480 (4' 10")	1210 (4' 0")	14190 (31280)

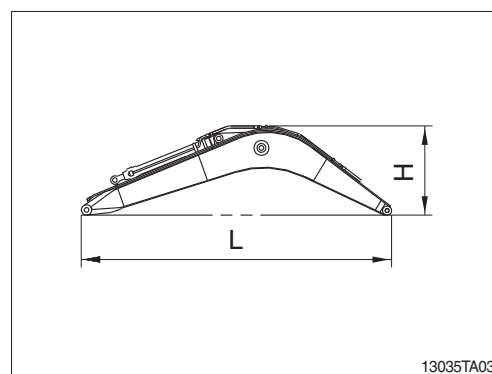


900L5TA06

4) BOOM ASSEMBLY

Dimension mm (ft-in)				Weight
Boom	L	H	W	kg (lb)
7200 (23' 7")	7565 (24' 10")	2745 (9' 0")	1340 (4' 5")	8810 (19420)
8200 (26' 11")	8565 (28' 1")	2580 (8' 6")	1340 (4' 5")	9420 (20770)

※ Includes arm cylinder, piping and pin

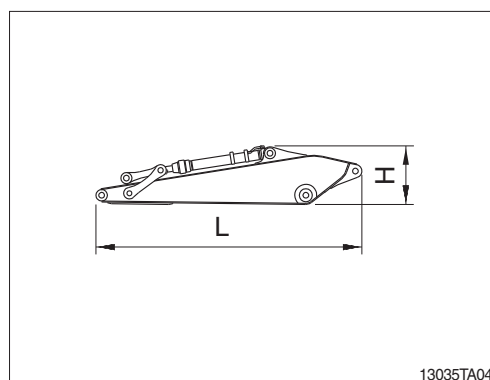


13035TA03

5) ARM ASSEMBLY

Dimension mm (ft-in)				Weight
Arm	L	H	W	kg (lb)
2950 (9' 8")	4490 (14' 9")	1780 (5' 10")	730 (2' 5")	4950 (10910)
3600 (11' 10")	5135 (16' 10")	1600 (5' 3")	730 (2' 5")	4990 (11000)
4400 (14' 5")	5930 (19' 5")	1590 (5' 3")	730 (2' 5")	5140 (11330)

※ Includes bucket cylinder, linkage and pin



6) BUCKET ASSEMBLY

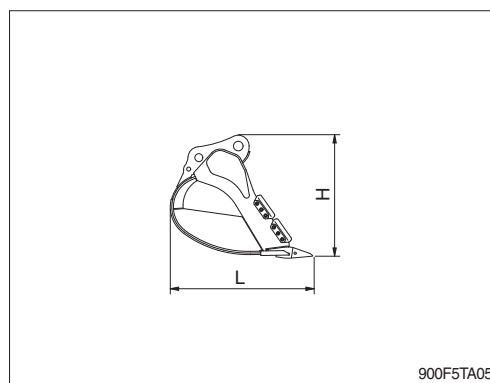
Dimension mm (ft-in)				Weight
Capacity	L	H	W	kg (lb)
◇ 3.70 m³ (4.84 yd³)	2570 (8' 5")	2090 (6' 10")	1845 (6' 1")	4370 (9630)
◇ 4.25 m³ (5.56 yd³)	2570 (8' 5")	2090 (6' 10")	2045 (6' 9")	4730 (10430)
◇ 4.85 m³ (6.34 yd³)	2570 (8' 5")	2090 (6' 10")	2245 (7' 4")	5000 (11020)
◇ 5.40 m³ (7.06 yd³)	2570 (8' 5")	2090 (6' 10")	2445 (8' 0")	5275 (11630)
◇ 5.80 m³ (7.59 yd³)	2570 (8' 5")	2090 (6' 10")	2585 (8' 6")	5555 (12250)
◆ 3.70 m³ (4.84 yd³)	2545 (8' 4")	2150 (7' 1")	1845 (6' 1")	4850 (10690)
◆ 4.25 m³ (5.56 yd³)	2545 (8' 4")	2150 (7' 1")	2045 (6' 9")	5235 (11540)
◆ 4.85 m³ (6.34 yd³)	2545 (8' 4")	2150 (7' 1")	2245 (7' 4")	5530 (12190)
◆ 5.40 m³ (7.06 yd³)	2545 (8' 4")	2150 (7' 1")	2445 (8' 0")	5830 (12850)
◆ 4.25 m³ (5.56 yd³)	2570 (8' 5")	2090 (6' 10")	2045 (6' 9")	4150 (9150)
★ 3.60 m³ (4.71 yd³)	2485 (8' 2")	2040 (6' 8")	1920 (6' 4")	4600 (10140)

◇ : Heavy duty

◆ : Rock-heavy duty

◆ : Light-heavy duty

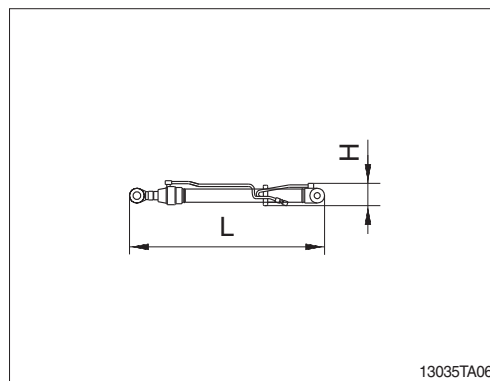
★ : Rock-special heavy duty (Cubic marble handling)



7) BOOM CYLINDER

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	3185 (10' 5")
H	Height	mm (ft-in)	350 (1' 2")
W	Width	mm (ft-in)	550 (1' 10")
Wt (1EA)	Weight	kg (lb)	860 (1900)

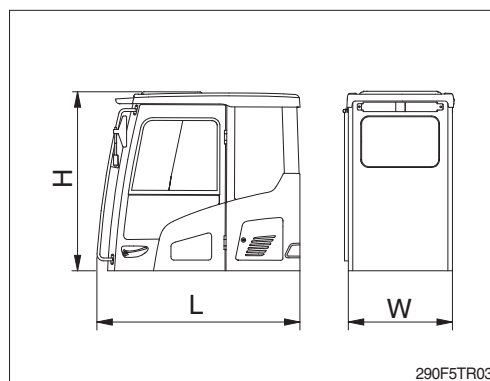
※ Included piping.



8) CAB ASSEMBLY

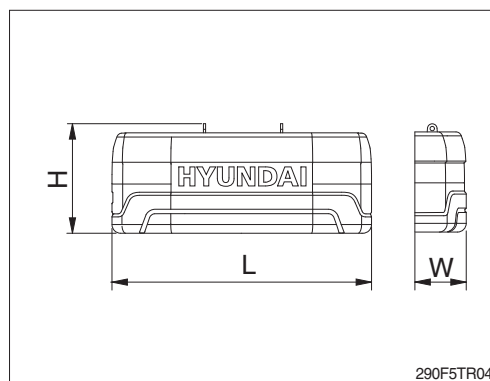
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1950 (6' 5") [2070 (6' 10")]
H	Height	mm (ft-in)	1780 (5' 10") [1822 (6')]
W	Width	mm (ft-in)	1104 (3' 7") [1126 (3' 8")]
Wt	Weight	kg (lb)	486.8 (1073) [641.7 (1415)]

[] : with FOG GUARD



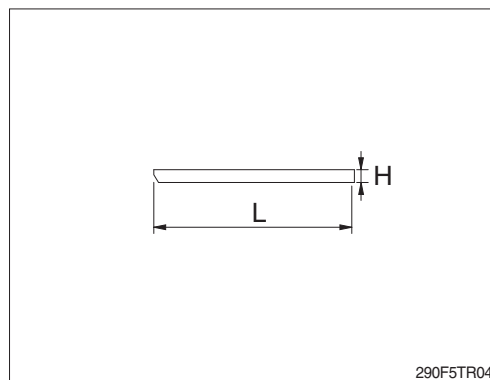
9) COUNTERWEIGHT

	Dimension mm (ft-in)			Weight
	L	H	W	kg (lb)
STD	3420 (11' 3")	1540 (5' 1")	790 (2' 7")	13600 (29980)
OPT	3420 (11' 3")	1540 (5' 1")	790 (2' 7")	16500 (36380)



10) CATWALK

Arm	Dimension mm (ft-in)			Weight
	L	H	W	kg (lb)
LH Front, Rear	1475 (4' 10")	50 (2")	480 (1' 7")	30 (66)
LH Middle	1970 (6' 6")	50 (2")	480 (1' 7")	45 (99)
RH Front (2 EA)	1200 (3' 11")	50 (2")	480 (1' 7")	30 (66)



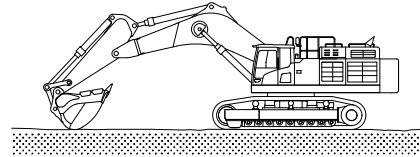
3. DISASSEMBLE FOR TRANSPORTATION

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) Turn the safety knob to the LOCK position to lock the system securely.
※ **Refer to the page 3-39 for details.**
- (6) Turn the engine start switch to ON position.
Do not start the engine.
- (7) Turn the safety knob to the UNLOCK position, Move the left and right operating levers, respectively to the full extension in all directions to remove internal pressure from the hydraulic circuits. And then turn the safety knob to the LOCK position.
- (8) Turn the start 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.**



900F5TA13

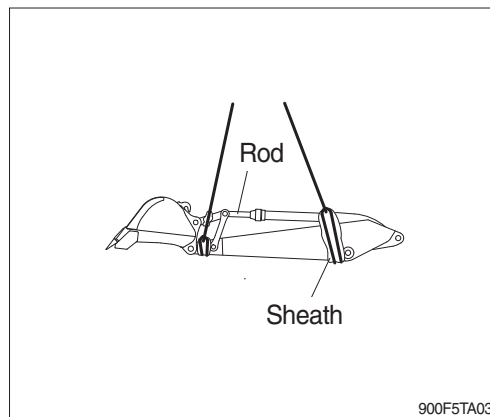
2) DISASSEMBLING ATTACHMENT

※ 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.

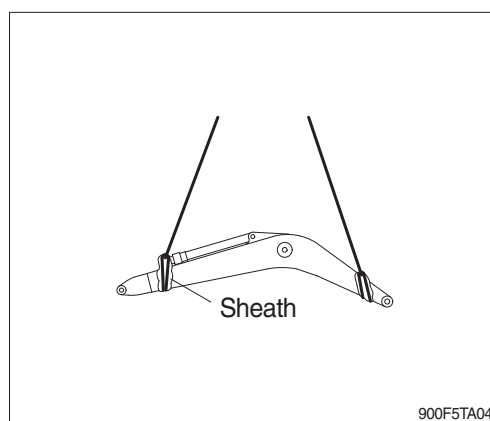
Protect piston rod and the cylinder tube.



(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.



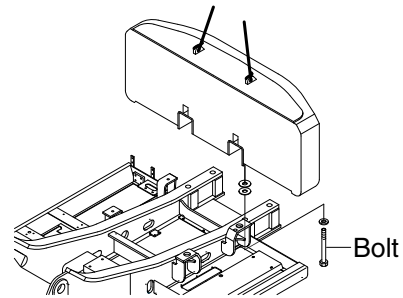
3) COUNTERWEIGHT REMOVAL AND INSTALLATION

(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 Turn the safety knob to the LOCK position to lock the system securely.
※ Refer to the page 3-39 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.

(2) Counterweight installation

- ① Carry out installation in the reverse order to removal.
·Tightening torque : $390 \pm 40 \text{ kgf} \cdot \text{m}$
($2820 \pm 290 \text{ lbf} \cdot \text{ft}$)
- ▲ Turn the safety knob to the LOCK position to lock the system securely, See the safety knob on page 3-39. 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.



50075TA10

4) DISCONNECTING UPPER AND LOWER STRUCTURE

(1) Disconnect the upper and lower structure for transporting if needed.

- ① Check the weight, length, width and height of the machine referring to the "dimension and weight" when you are going to disconnect.
- ② Disassemble and hoist the machine on the firm and level ground.
- ③ Turn the safety knob to the LOCK position to lock the system securely.
- ④ Stop the engine and check the safety of the machine around and then lock the door of the cab, front window and engine hood.
- ⑤ Loosen the upper bolts of the swing bearing to disconnect the upper and lower structure.
- ⑥ Prepare the hoist cables and slings with sufficient strength for the machine weight and connect them to exact point as figures.
- ⑦ In case of the upper structure, connect the wire rope to the lifting eye of the upper frame and mounting hole of counterweight rear side.
- ⑧ In case of the lower frame, connect the wire rope to between track roller No. 1 and No.2 and between track roller and idler.
- ⑨ Use stay between the wire rope and the machine to prevent damage to the rope or machine.
Set the lifting angle of the wire rope to $30^{\circ} \sim 40^{\circ}$.
- ※ Remove any parts (footboard, etc) that may be damaged by contact with the lifting device damaged before lifting.
- ⑩ After the machine comes off the ground, check the hook condition and the lifting posture, and then lift slowly.

▲ Do not disconnect and hoist the machine with personal in the cab or on the machine.

▲ Use the hoist cables and slings with sufficient strength and without damage and deterioration.

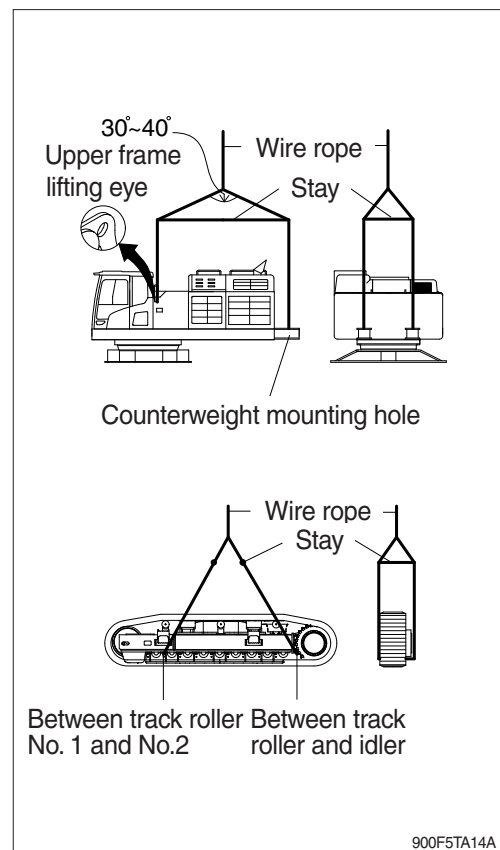
Place the safety knob to LOCK position to prevent the machine moving when hoisting the machine.

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

▲ Do not load to the wire rope abruptly.

▲ Keep clear of personnel under or around hoisting machine.

▲ Make sure the hoisting devices are proper situations and conditions.



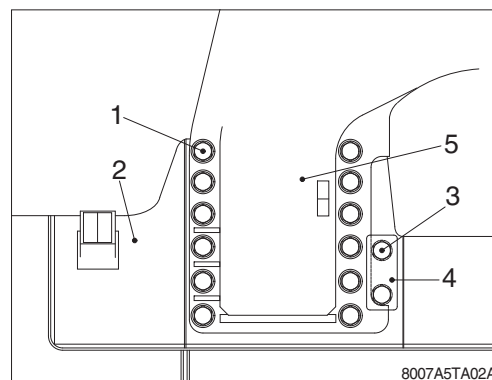
4. ADJUSTABLE TRACK GAUGE

1) LOWER TRACK RETRACTION

⚠ Do not retract the track gauge except transporting purpose.

- (1) Remove 12 bolts (1), and spacers from lower track (2) to the retracted.

※ **Do not loosen two bolts (3) on guide (4).**

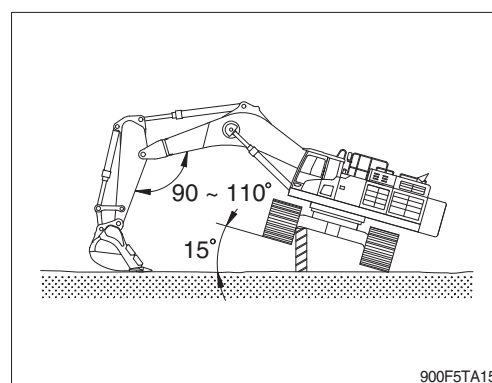


- (2) Turn superstructure so that it is perpendicular to lower track to be retracted. Raise lower track to approximately 15degree from ground using a jack. Lower track should slide by its own weight and hit against the stop.

※ **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°.

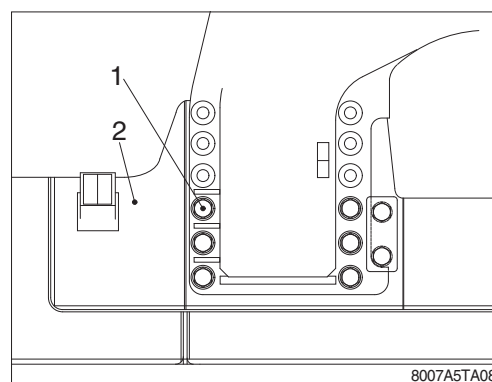
Never set it at an angle less than 90°.



- (3) After lower track (2) has slid into place, lower superstructure to ground. Align the bolts holes and install 6 spacers and bolts (1).

※ **Tighten bolts to 280 ± 30 kgf · m (2020 ± 220 lbf · ft)**

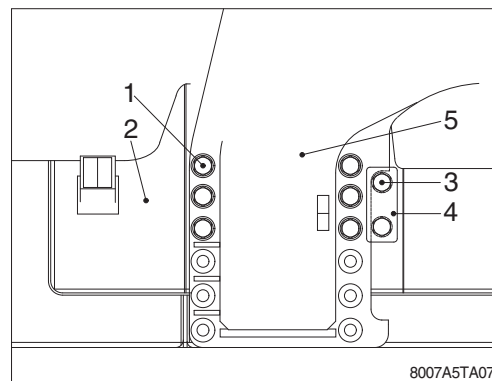
※ **Repeat procedure at opposite side center frame support.**



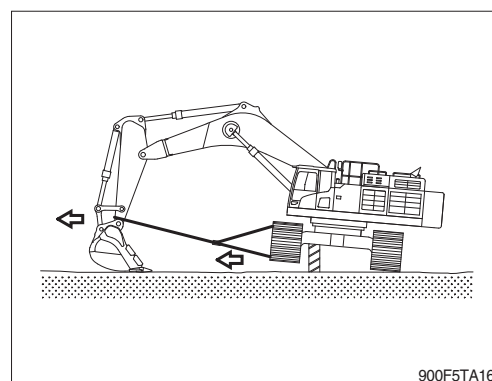
2) FRAME EXTENSION

- (1) Remove 6 bolts (1), and spacers from lower track (2) to be extended.

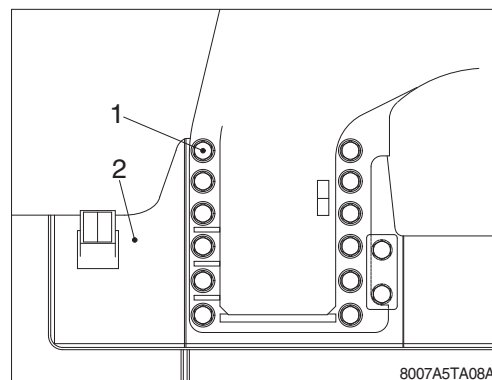
※ **Do not loosen two bolts (3) on guide (4).**



- (2) Turn superstructure so that it is perpendicular to lower track to be extended.
- (3) Attach one end of cable on arm and the other end on lower track.
- (4) Raise lower track slightly with jack and block.
- (5) Extend arm gradually to side frame out until it hits stop.
- (6) After lower track has slid into place, lower superstructure to ground.
Remove cable.



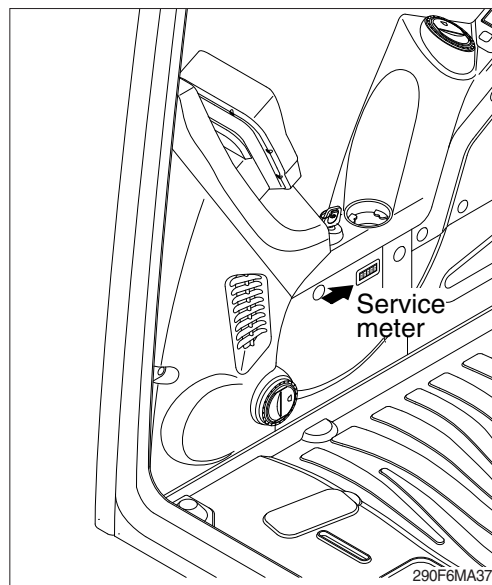
- (7) Install 12 spacers and bolts (1).
※ **Tighten bolts to $280 \pm 30 \text{ kgf} \cdot \text{m}$ ($2020 \pm 220 \text{ lbf} \cdot \text{ft}$)**
※ **Repeat procedure at opposite side center frame support.**



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) Drain the used oil and coolant in a container and handle according to the method of handling for industrial waste to meet with regulations of each province or country.
- ▲ **Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.**
- △ **Accumulated grease and oil on the machine is a fire hazard. Remove this debris with steam cleaning or high pressure water, at least every 1000 hours.**
- △ **Inspect the engine compartment for any trash build up. Remove any trash build up from the engine compartment.**
- (5) Ask to your local dealer or HD Hyundai Construction Equipment for the maintenance advice if unknown.

3) PROPER MAINTENANCE

(1) Replace and repair of parts

It is required to replace the wearable and consumable parts such as bucket tooth, side cutter, filter and etc., regularly.

Replace damaged or worn parts at proper time to keep the performance of machine.

(2) Use genuine parts.

(3) Use the recommended oil.

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

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

(6) Do not repair anything while operating the engine.

Stop the engine when you fill the oil.

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

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

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

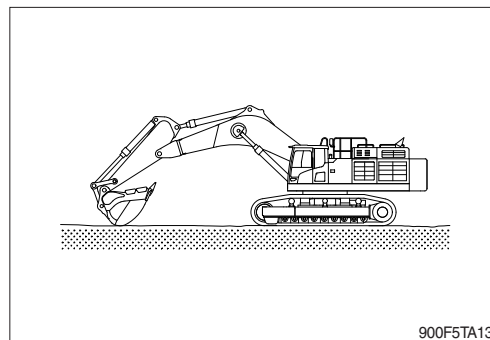
※ **Be sure to start the maintenance after fully understand the chapter 1, safety hints.**

4) RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM

- ※ Spouting of oil can cause the accident when loosening the cap or hose right after the operating of machine as the machine or oil is on the high pressure on the condition.

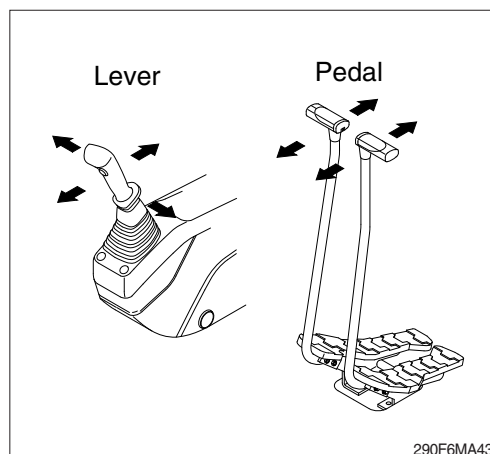
Be sure to relieve the pressure in the system before repairing hydraulic system.

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

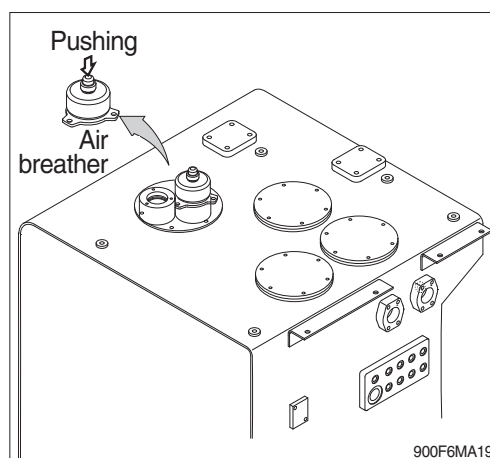


- (2) Set the safety knob completely in the UNLOCK position, operate the control levers and pedals fully to the front, rear, left and right, to release the pressure in the hydraulic circuit.

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



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



5) PRECAUTION WHEN INSTALLING HYDRAULIC HOSES OR PIPES

- (1) Be particularly careful that the joint of hose, pipe and functioning item are not damaged.
Avoid contamination.
- (2) Assemble after cleaning the hose, pipe and joint of functioning item.
- (3) Use genuine parts.
- (4) Do not assemble the hose in the condition of twisted or sharp radius.
- (5) Keep the specified tighten torque.

6) PERIODICAL REPLACEMENT OF SAFETY PARTS

- (1) It is desirable to do periodic maintenance the machine for using the machine safely for a long time.

However, recommend to replace regularly the parts related safety not only safety but maintain satisfied performance.

- (2) These parts can cause the disaster of life and material as the quality changes by passing time and it is worn, diluted, and gets fatigued by using repeatedly.

These are the parts which the operator can not judge the remained lifetime of them by visual inspection.

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

Periodical replacement of safety parts			Interval
Engine		Fuel hose (tank-engine)	Every 2 years
		Heater hose (heater-engine)	
Hydraulic system	Main circuit	Pump suction hose	Every 2 years
		Pump delivery hose	
		Swing hose	
	Working device	Boom cylinder line hose	Every 2 years
		Arm cylinder line hose	
		Bucket cylinder line hose	

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

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

2. TIGHTENING TORQUE

Use following table for unspecified torque.

1) BOLT AND NUT

(1) Coarse thread

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

(2) Fine thread

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

2) PIPE AND HOSE (FLARE type)

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

3) PIPE AND HOSE (ORFS type)

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

4) FITTING

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

5) TIGHTENING TORQUE OF MAJOR COMPONENT

No.	Descriptions		Bolt size	Torque	
				kgf · m	lbf · ft
1	Engine	Engine mounting bolt (FR, engine-bracket)	M24 × 3.0	90 ± 9.0	650 ± 65.1
2		Engine mounting bolt (RR, engine-bracket)	M14 × 2.0	18 ± 1.8	130 ± 13.0
3		Engine mounting bolt (bracket-frame)	M24 × 3.0	90 ± 9.0	651 ± 65.1
4		Radiator mounting bolt	M10 × 1.5	55 ± 5.0	398 ± 36.1
5		Coupling mounting socket bolt	M24 × 3.0	87.5 ± 2.5	633 ± 108
6		Fuel tank mounting bolt	M20 × 2.5	58 ± 6.0	420 ± 43.4
7	Hydraulic system	Main pump housing mounting bolt	M10 × 1.5	6.7 ± 1.0	48.4 ± 7.2
8		Main pump mounting bolt	M24 × 3.0	80 ± 8.0	579 ± 57.9
9		Main control valve mounting nut	M20 × 2.5	69.5 ± 10.5	503 ± 76
10		Hydraulic oil tank mounting bolt	M20 × 2.5	58 ± 6.0	420 ± 43.4
11		Turning joint mounting bolt, nut	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
12	Power train system	Swing motor mounting bolt	M24 × 3.0	120 ± 18	868 ± 130
13		Swing bearing upper part mounting bolt	M30 × 3.0	199 ± 20	1439 ± 145
14		Swing bearing lower part mounting bolt	M30 × 3.0	199 ± 20	1439 ± 145
15		Travel motor mounting bolt	M30 × 3.5	199 ± 30	1439 ± 217
16		Sprocket mounting bolt	M30 × 3.5	199 ± 20	1439 ± 144.7
17	Under carriage	Carrier roller mounting bolt, nut	M20 × 2.5	57.9 ± 6.0	419 ± 62.9
18		Track roller mounting bolt	M27 × 3.0	135 ± 13	977 ± 94
19		Track tension cylinder mounting bolt	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
20		Track shoe mounting bolt, nut	1 1/8"-12UNF	196 ± 15	1418 ± 108.5
21		Track guard mounting bolt	M27 × 3.0	135 ± 15	977 ± 109
22	Others	Counterweight mounting bolt	M42 × 3.0	390 ± 40	2821 ± 289
23		Center frame support and lower track mtg bolt	M36 × 3.0	280 ± 30	2025 ± 21.7
24		Cab mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
25		Operator's seat mounting bolt	M8 × 1.25	4.05 ± 0.8	293 ± 5.8

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

3. FUEL, COOLANT AND LUBRICANTS

1) NEW MACHINE

New machine used and filled with following lubricants.

Description	Specification
Engine oil (API CJ-4, ACEA-E9)	SAE 15W-40, ★SAE 5W-40
DEF/AdBlue®	ISO 22241 (32.5% high-purity urea and 67.5% deionized water)
Hydraulic oil	HD Hyundai Construction Equipment genuine long life (ISO VG 32, VG 46, VG 68) Conventional hydraulic oil (ISO VG 15★) HD Hyundai Construction Equipment Bio Hydraulic Oil (HBHO, ISO VG 46)
Swing and travel reduction gear	SAE 85W-140 (API GL-5)
Grease	Lithium base grease NLGI No. 2
Fuel	ASTM D975-No. 2, Ultra low sulfur diesel
Coolant	Mixture of 50% ethylene glycol base antifreeze and 50% water. Mixture of 60% ethylene glycol base antifreeze and 40% water. ★

SAE : Society of Automotive Engineers

API : American Petroleum Institute

ISO : International Organization for Standardization

NLGI : National Lubricating Grease Institute

ASTM : American Society of Testing and Material

DEF : Diesel Exhaust Fluid

DEF compatible with AdBlue®

Ultra low sulfur diesel

- sulfur content \leq 15 ppm

★ Cold region

Russia, CIS, Mongolia

2) RECOMMENDED OILS

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

We recommend that you use only HD Hyundai Construction Equipment genuine lubricating oils and grease officially approved by HD Hyundai Construction Equipment.

Service point	Kind of fluid	Capacity ℓ (U.S. gal)	Ambient temperature °C (°F)									
			-50 (-58)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)	
Engine oil pan	Engine oil	49 (12.9)	★SAE 5W-40									
								SAE 30				
					SAE 10W							
				SAE 10W-30								
				SAE 15W-40								
DEF/AdBlue® tank	Mixture of urea and deionized water	69 (18.2)	ISO 22241, High-purity urea + deionized water (32.5:67.5)									
Swing drive	Gear oil	14×2 (3.7×2)	★SAE 85W-140 (GL-4)									
Final drive		20×2 (5.3×2)			SAE 80W-90 (GL-5)							
Hydraulic tank	Hydraulic oil	Tank : 450 (119)	★ISO VG 15									
				ISO VG 32								
		System : 940 (248)			ISO VG 46, HBHO VG 46★ ³							
					ISO VG 68							
Fuel tank	Diesel fuel★ ¹	1110 (293)	★ASTM D975 NO.1									
						ASTM D975 NO.2						
Track roller	Gear oil	1.56 (0.41)	★SAE 75W-90									
Carrier roller		0.6 (0.16)			SAE 85W-140							
Idler		1.1 (0.29)										
Fitting (grease nipple)	Grease	As required	★NLGI NO.1									
						NLGI NO.2						
Radiator (reservoir tank)	Mixture of antifreeze and soft water★ ²	70 (18.5)	Ethylene glycol base permanent type (50 : 50)									
			★Ethylene glycol base permanent type (60 : 40)									

SAE : Society of Automotive Engineers

API : American Petroleum Institute

ISO : International Organization for Standardization

NLGI : National Lubricating Grease Institute

ASTM : American Society of Testing and Material

DEF : Diesel Exhaust Fluid DEF compatible with AdBlue®

★ : Cold region (Russia, CIS, Mongolia)

★¹ : Ultra low sulfur diesel
- sulfur content ≤ 15 ppm

★² : Soft water
City water or distilled water

★³ : HD Hyundai Construction Equipment
Bio Hydraulic Oil

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

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

※ Do not use any engine oil other than that specified above, as it may clog the diesel particulate filter(DPF).

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

4. MAINTENANCE CHECK LIST

1) DAILY SERVICE BEFORE STARTING

Check items	Service	Page
Visual check		
Fuel tank	Check, Refill	6-30
Hydraulic oil level	Check, Add	6-36, 36-1
Engine oil level	Check, Add	6-19
Coolant level	Check, Add	6-24
Control panel & pilot lamp	Check, Clean	6-46
Fuel return filter element	Check, Clean	6-30
Fan belt tension and damage	Check, Adjust	6-27, 28, 29
DEF/AdBlue® tank	Check, Add	6-35
★ Attachment pin and bushing	Lubricate	6-45
· Boom cylinder tube end		
· Boom foot		
· Boom cylinder rod end		
· Arm cylinder tube end		
· Arm cylinder rod end		
· Boom + Arm connecting		
· Bucket cylinder tube end		

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

2) EVERY 50 HOURS SERVICE

Check items	Service	Page
Fuel tank (water, sediment)	Check, Drain	6-30
Track tension	Check, Adjust	6-41
Swing reduction gear oil	Check, Add	6-39
Attachment pin and bushing	Lubricate	6-45
· Bucket cylinder rod end		
· Bucket + Arm connecting		
· Bucket control link + Arm		
· Bucket control rod		

3) INITIAL 50 HOURS SERVICE

Check items	Service	Page
Bolts and Nuts <ul style="list-style-type: none">· 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	6-38
★ Pilot line filter	Replace	6-39
★ Drain filter cartridge	Replace	6-38

★ **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 element	Replace	6-23
Fuel return filter element	Replace	6-30
Fuel main filter element	Replace	6-31, 32, 33
Pilot line filter element	Replace	6-39
Hydraulic oil return filter element	Replace	6-38
Drain filter cartridge	Replace	6-38
Swing reduction gear oil	Change	6-39
Swing reduction gear grease	Check, Add	6-39
Travel reduction gear case	Change	6-40

6) EVERY 250 HOURS SERVICE

Check items	Service	Page
Battery (voltage)	Check, Clean	6-46
Swing bearing grease	Lubricate	6-39
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		
Attachment pin and bushing	Lubricate	6-45
· Boom cylinder tube end		
· Boom foot		
· Boom cylinder rod end		
· Arm cylinder tube end		
· Arm cylinder rod end		
· Boom + Arm connecting		
· Bucket cylinder tube end		

7) EVERY 500 HOURS SERVICE

Check items	Service	Page
★ Engine oil	Change	6-19, 20
★ Engine oil filter	Replace	6-23
Radiator, cooler fin and charge air cooler	Check, Clean	6-26, 27
Oil cooler	Check, Clean	6-26
Air cleaner element (primary) ★ ¹	Check, Clean	6-30
Air conditioner and heater fresh and recirculation filter	Replace	6-49, 50
Centrifugal oil cleaner (O-ring)	Clean (Replace)	6-20, 21, 22, 23
Air compressor air filter (option)	Check, Clean	6-45-1

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

8) EVERY 1000 HOURS SERVICE

Check items	Service	Page
Fuel return filter element	Replace	6-30
Air cleaner element (primary) ^{★1}	Check, Clean	6-30
Travel motor reduction gear oil	Change	6-40
Swing reduction gear oil	Change	6-39
Swing reduction gear grease	Check, Add	6-39
Grease in swing gear and pinion	Change	6-40
Hydraulic oil return filter	Replace	6-38
Drain filter cartridge	Replace	6-38
Pilot line filter	Replace	6-39
Air breather element	Replace	6-38
Fuel main filter element	Replace	6-31, 32, 33
Fuel prefilter element	Replace	6-31, 32, 33
DEF/AdBlue® supply module filter	Replace	6-35, 36
DEF/AdBlue® tank ventilation filter	Clean	6-35

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

9) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Coolant	Change	6-24, 25, 26
Hydraulic oil ^{★2}	Change	6-37
HBHO ^{★3}	Change	6-37
Hydraulic tank suction strainer	Check, Clean	6-37
RCV lever	Check, Lubricate	6-41
Air compressor air filter (option)	Replace	6-45-1
Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-

★2 Conventional hydraulic oil

★3 If do not want to change HBHO (HD Hyundai Construction Equipment Bio Hydraulic Oil, ISO VG 46) every 2000 hours, contact HD Hyundai Construction Equipment dealer and ask about SAMPLING.

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

10) EVERY 4000 HOURS SERVICE

Check items	Service	Page
Air cleaner element (primary, safety) ^{★4}	Replace	6-30
Fuel tank breather	Replace	6-34

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

11) EVERY 5000 HOURS SERVICE

Check items	Service	Page
Hydraulic oil ^{★5}	Change	6-37

^{★5} HD Hyundai Construction Equipment genuine long life

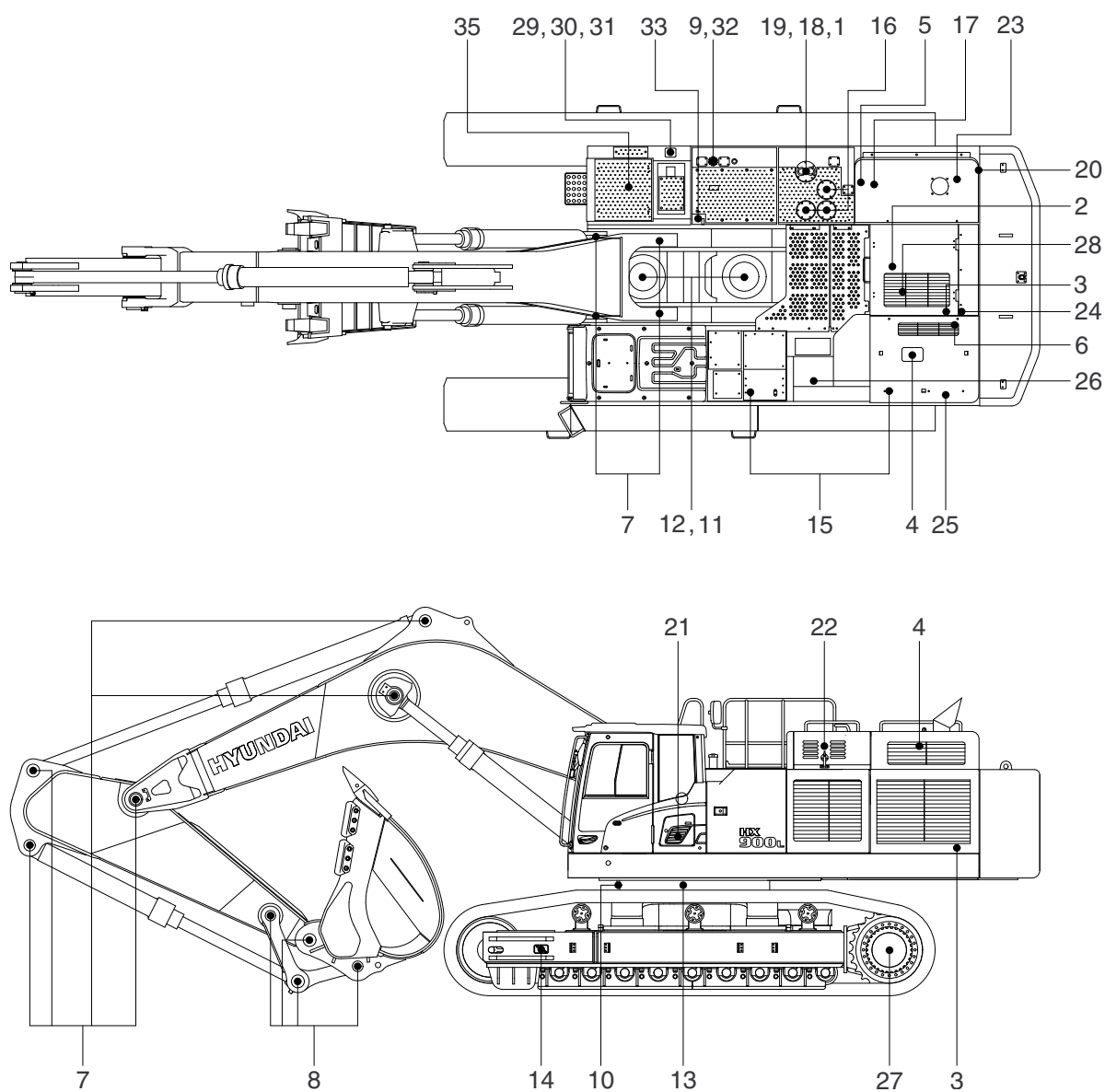
※Change oil every 1000 hours of continuous hydraulic breaker operation.

12) WHEN REQUIRED

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

Check items	Service	Page
Fuel system		
· Fuel tank	Drain or Clean	6-30
· Fuel return filter element	Clean or Replace	6-30
· Fuel main filter element	Replace	6-31, 32, 33
Engine lubrication system		
· Engine oil	Change	6-19, 20
· Engine oil filter element	Replace	6-23
· Centrifugal oil cleaner (O-ring)	Clean (Replace)	6-20, 21, 22, 23
Engine cooling system		
· Coolant	Add or Change	6-24, 25, 26
· Radiator	Clean or Flush	6-24, 25, 26
· Charge air cooler	Check	6-27
Engine air system		
· Air cleaner element (primary)	Clean or Replace	6-30
· Air cleaner element (safety)	Replace	6-30
Hydraulic system		
· Hydraulic oil	Add or Change	6-36-1, 37
· Return filter	Replace	6-38
· Drain filter cartridge	Replace	6-38
· Pilot line filter	Replace	6-39
· Element of breather	Replace	6-38
· Suction strainer	Clean	6-37
· RCV lever	Lubricate	6-41
Undercarriage		
· Track tension	Check, Adjust	6-41
Bucket		
· Tooth	Replace	6-43
· Side cutter	Replace	6-43
· Linkage	Adjust	6-42
· Bucket assy	Replace	6-42
Air conditioner and heater		
· Fresh air filter	Clean, Replace	6-49
· Recirculation filter	Clean	6-50
Other		
· DEF/AdBlue® tank ventilation filter	Clean	6-35
· DEF/AdBlue® supply module filter	Replace	6-35, 36
· Air compressor air filter (option)	Clean or Replace	6-45-1

5. MAINTENANCE CHART



900F6MA46A

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	450 (119)	1
	2	Engine oil level	Check, Add	EO	49 (12.9)	1
	4	Radiator coolant	Check, Add	C	70 (18.5)	1
	5	Fuel return filter element	Check, Clean	-	-	1
	6	Fan belt tension and damage	Check, Adjust	-	-	1
	9	Fuel tank	Check, Refill	DF	1110 (293)	1
	30	DEF/AdBlue® tank	Check, Add	DEF	69 (18.2)	1
50 Hours or weekly	8	Bucket linkage pins	Check, Add	PGL	-	8
	9	Fuel tank (water, sediment)	Check, Drain	-	1110 (293)	1
	11	Swing reduction gear oil	Check, Add	GO	9.0 (2.4)	2
	13	Track tension	Check, Adjust	PGL	-	2
250 Hours	7	Attachment pins & bushing	Check, Add	PGL	-	11
	10	Swing bearing grease	Check, Add	PGL	-	4
	14	Battery (voltage)	Check, Clean	-	-	1
Initial 250 Hours	2	Engine oil	Change	EO	49 (12.9)	1
	3	Engine oil filter	Replace	-	-	1
	5	Fuel return filter element	Replace	-	-	1
	11	Swing reduction gear oil	Change	GO	14 (3.7)	2
	12	Swing reduction gear grease	Check, Add	PGL	9 (2.4)	2
	16	Hydraulic oil return filter	Replace	-	-	2
	17	Drain filter cartridge	Replace	-	-	1
	20	Pilot line filter element	Replace	-	-	1
	24	Fuel main filter element	Replace	-	-	1
500 Hours	27	Travel reduction gear case	Change	GO	20 (5.3)	2
	2	Engine oil	Change	EO	49 (12.9)	1
	3	Engine oil filter	Replace	-	-	1
	21	Aircon and heater fresh air filter	Replace	-	-	1
	25	Radiator, oil cooler, charge air cooler	Check, Clean	-	-	2
	26	Oil cooler	Check, Clean	-	-	1
	28	Centrifugal oil cleaner (O-ring)	Clean (Replace)	-	-	1
	35	Air compressor air filter (option)	Check, Clean	-	-	1
1000 Hours	5	Fuel return filter element	Replace	-	-	1
	11	Swing reduction gear oil	Change	GO	14 (3.7)	2
	12	Swing reduction gear grease	Check, Add	PGL	9.0 (2.4)	2
	13	Swing gear and pinion grease	Change	PGL	17.3 kg (38.1 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
	22	Air cleaner element (primary)	Check, Clean	-	-	1
	23	Fuel prefilter element	Replace	-	-	1
	24	Fuel main filter element	Replace	-	-	1
	27	Travel reduction gear case	Change	GO	20 (5.3)	2
	29	DEF/AdBlue® supply module filter	Replace	-	-	1
	33	DEF/AdBlue® tank ventilation filter	Clean	-	-	1

※ Oil symbol

Please refer to the recommended lubricants for specification.

DF : Diesel fuel

GO : Gear oil

HO : Hydraulic oil

DEF : DEF/AdBlue®

C : Coolant

PGL : Grease

EO : Engine oil

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ (U.S.gal)	Service points No.
2000 Hours	1	Hydraulic oil ^{*1}	Change	HO	450 (119)	1
	1	Hydraulic oil (HBHO ^{*2})	Change	-	450 (119)	1
	4	Radiator coolant	Change	C	70 (18.5)	1
	19	Hydraulic oil suction strainer	Check, Clean	-	-	1
	34	RCV lever	Check, Lubricate	PGL	-	2
	35	Air compressor air filter (option)	Replace	-	-	1
	-	Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-	-	-
4000 Hours	22	Air cleaner element (primary, safety)	Replace	-	-	2
	32	Fuel tank breather filter	Replace	-	-	1
5000 Hours	1	Hydraulic oil ^{*3}	Change	HO	450 (119)	1
As required	21	Aircon & heater fresh, recirculation filter	Replace	-	-	2
	22	Air cleaner element (primary)	Clean, Replace	-	-	1
	22	Air cleaner element (safety)	Replace	-	-	1
	28	Centrifugal oil cleaner (O-ring)	Clean (Replace)	-	-	1
	35	Air compressor air filter (option)	Clean, Replace	-	-	1

^{*1} Conventional hydraulic oil

^{*2} HD Hyundai Construction Equipment Bio Hydraulic Oil

^{*3} HD Hyundai Construction Equipment genuine long life

※ Oil symbol

Please refer to the recommended lubricants for specification.

DF : Diesel fuel

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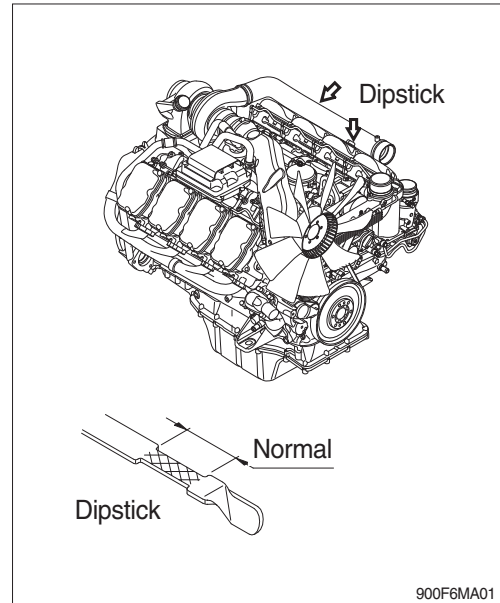
EO : Engine oil

6. SERVICE INSTRUCTION

1) CHECK ENGINE OIL LEVEL

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

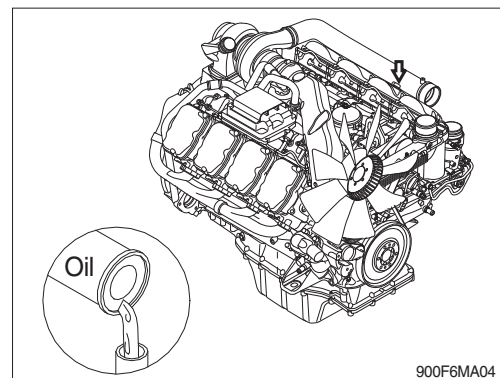
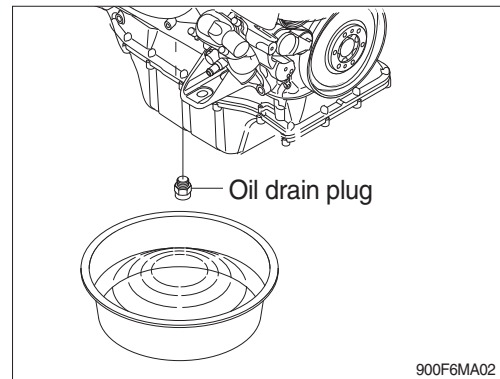
- (1) Pull out the dipstick and wipe with a clean cloth.
 - (2) Check the oil level by inserting the dipstick completely into the hole and pulling out again.
 - (3) If oil level is LOW, add oil and then check again.
- ※ **If the oil is contaminated or diluted, change the oil regardless of the regular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



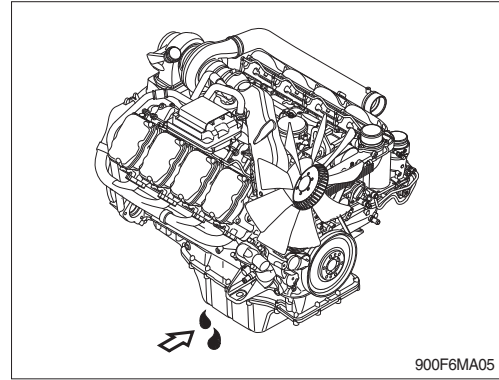
2) REPLACEMENT OF ENGINE OIL

- ※ **Renew the oil filter and clean the centrifugal oil cleaner when changing oil.**

- (1) Operate the engine until the coolant temperature reaches 60°C (140°F). Shut off the engine.
 - (2) Remove the oil drain plug. Drain the oil immediately to be sure all the oil and suspended contaminants are removed from the engine.
- ※ **A drain pan with a capacity of 55 liters (14.5 U.S. gallons) will be adequate.**
- (3) Clean and check the lubricating oil drain plug threads and sealing surface.
Install the lubricating oil pan magnet drain plug.
 - (4) Fill the engine with clean oil to the proper level.
 - Quantity : 49 ℓ (12.9 U.S.gallons)



- (5) 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.



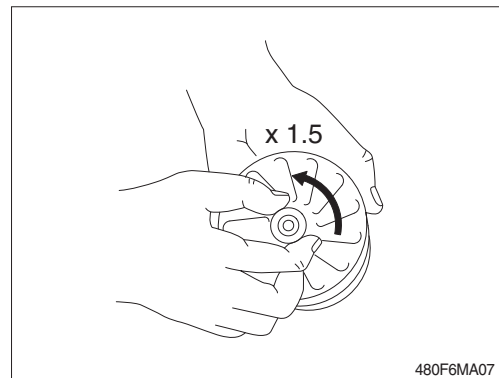
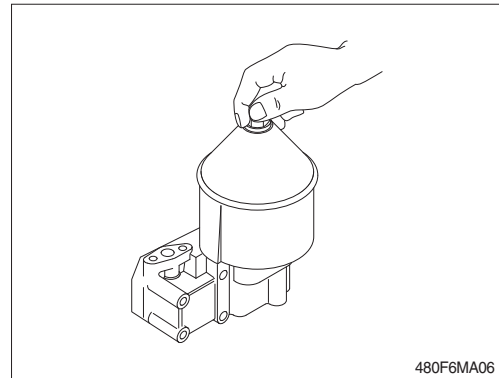
3) CLEANING THE CENTRIFUGAL OIL CLEANER

- ※ When cleaning the centrifugal oil cleaner there will be some dirt deposits in the rotor cover. If this is the case, this indicates that the rotor is working. If it is not working, the cause must be established immediately.

If the dirt deposit exceeds 28 mm at the recommended intervals, the rotor cover should be cleaned more often.

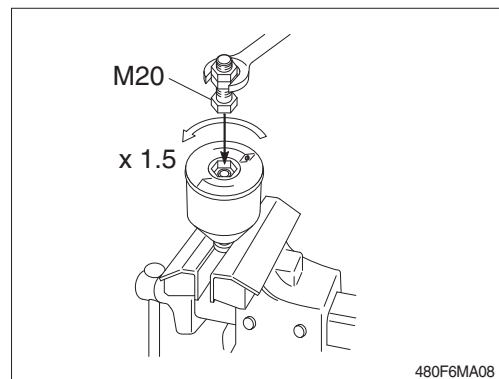
- ▲ The oil may be hot. Carefully remove the cover from the centrifugal oil cleaner.

- (1) Clean the outside of the cover.
Unscrew the nut and remove the cover.
- (2) Drain the oil from the rotor.
- (3) Lift out the rotor.
Wipe off the outside of the rotor.
Unscrew the rotor cover nut about one and a half turns.

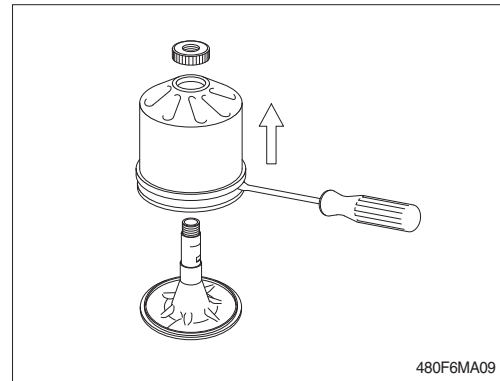


- (4) If the rotor nut is jammed, turn the rotor upside down and fasten the nut in a vice.
Turn the rotor approximately one and a half turns anticlockwise by hand or use an M20 screw as illustrated.

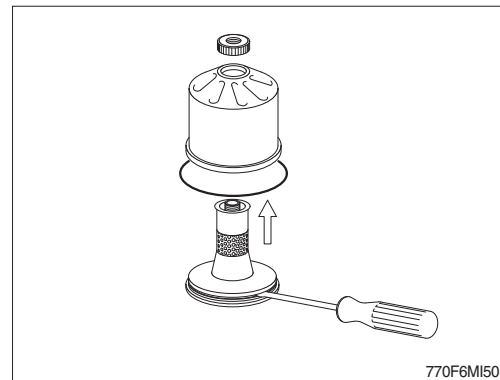
- ※ The rotor must not be put in a vice. This may cause damage resulting in rotor imbalance.



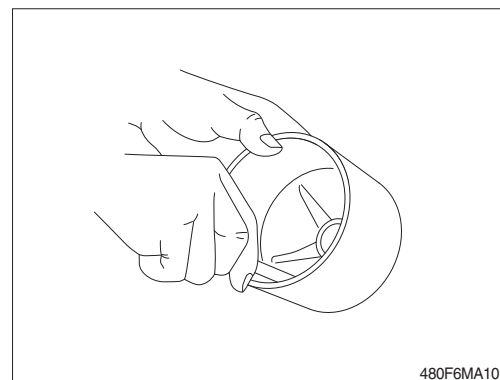
- (5) Remove the rotor cover by holding the rotor in both hands and tapping the rotor nut against the table. Never strike the rotor directly as this may damage its bearings.



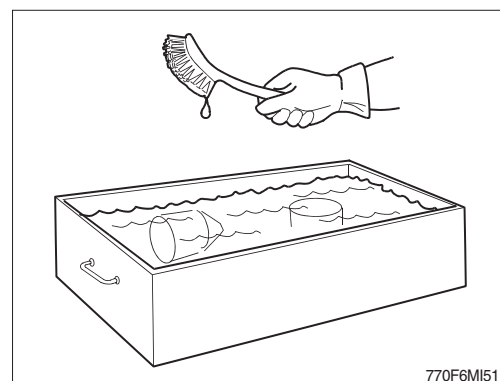
- (6) Remove the strainer from the rotor cover. If the strainer is stuck, insert a screwdriver between the rotor cover and strainer and carefully prise them apart.



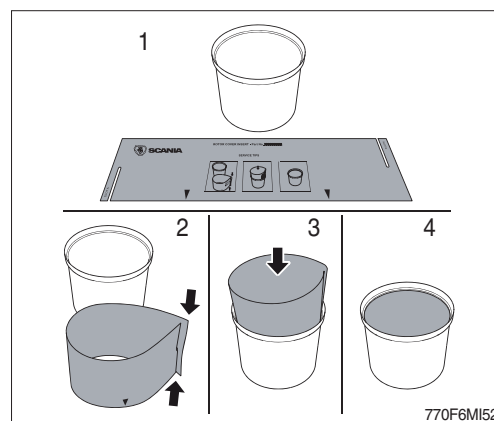
- (7) Remove the paper insert and scrape away any remaining dirt deposits inside the rotor cover. If the deposits are thicker than 28 mm (1.1"), the centrifugal oil cleaner must be cleaned more often.



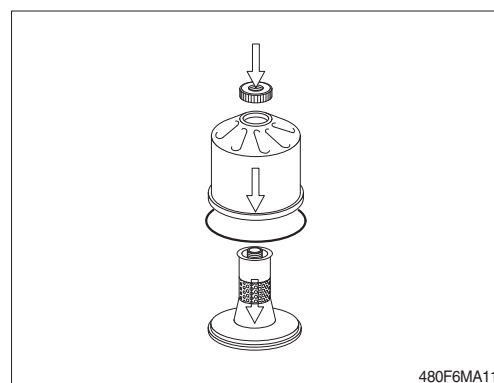
- (8) Wash the parts.
- (9) Inspect the 2 nozzles on the rotor. Ensure that they are not blocked or damaged. Renew any damaged nozzles.
- (10) Check that the bearings are undamaged.



- (11) Fit a new paper insert on the inside of the rotor cover.

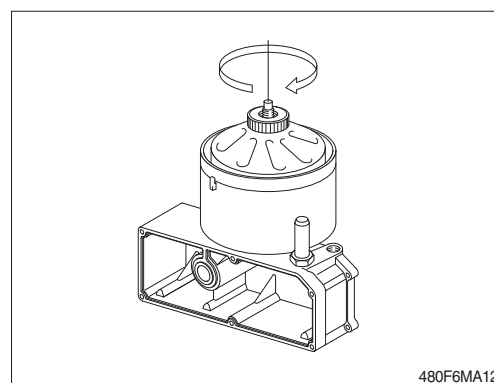


- (12) Fit the strainer onto the rotor.
- (13) Fit a new O-ring by sliding it over the strainer.
- (14) Refit the rotor cover. Make sure that the O-ring is seated correctly on the inside.
- (15) Screw the rotor nut back on by hand.
- (16) Check that the shaft is not loose. Secure with thread-locking fluid 561 200 if it is loose.
First clean thoroughly using a suitable solvent.
Tighten the rotor shaft using socket wrench 99 520. Tightening torque 2.75 kgf · m (20 lbf · ft).

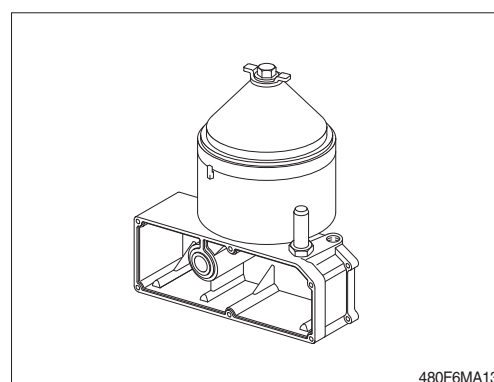


※ **Take care not to damage the rotor shaft.**

- (17) Refit the rotor and screw it by hand to make sure it rotates easily.



- (18) Renew the O-ring on the centrifugal oil cleaner housing cover.
- Tighten torque : 1.53 kgf · m (11 lbf · ft).

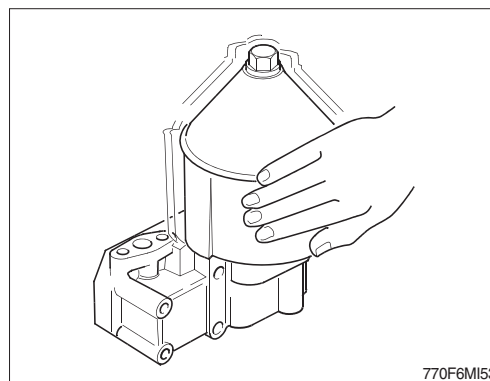


(19) Operational testing

Operational testing need only be carried out if it is suspected that the centrifugal oil cleaner is not working properly. For example, if there is an abnormally small amount of deposit in the centrifugal oil cleaner in relation to the distance driven.

The rotor rotates very fast and should continue to turn when the engine has stopped.

- ① Run the engine until it is warm.
- ② Stop the engine and listen for noise coming from the rotor. Use your hand to feel if the filter housing is vibrating.
- ③ If the filter housing is not vibrating, dismantle and check the centrifugal oil cleaner.

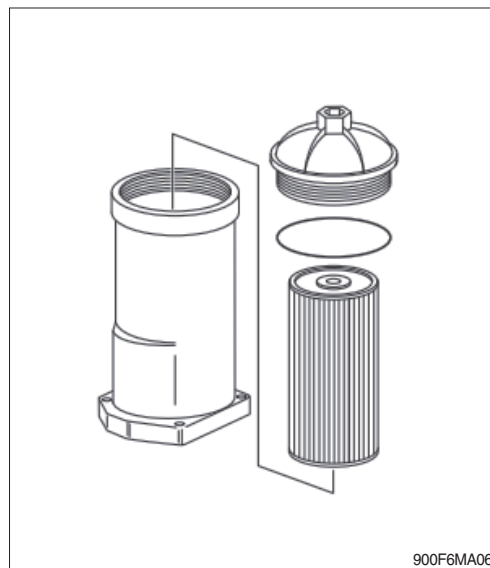


4) REPLACEMENT OF ENGINE OIL FILTER

- ※ Clean the centrifugal oil cleaner when renewing the oil filter.

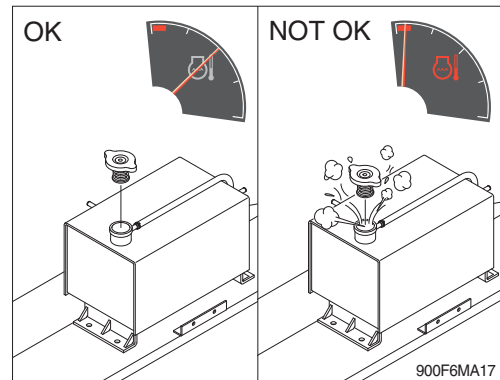
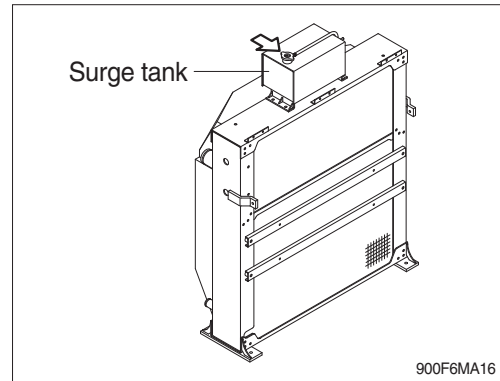
Otherwise, the oil filter will be blocked and resistance in the filter will increase. If this happens, an overflow valve in the filter retainer opens and lets the oil pass without being filtered.

- (1) Unscrew the filter cover with a closed tool with hexagon driver, 36 mm socket.
- ※ Do not use an adjustable spanner or other open tool as there is risk of damaging the filter cover.
- (2) Lift out the filter housing cover with filter element. The filter housing will drain automatically once the filter has been removed.
- (3) Fit the new O-ring to the cover. Lubricate the O-ring with a engine oil.
- (4) Fit the new filter and tighten the filter cover to 2.54 kgf · m (18.4 lbf · ft).



5) CHECK COOLANT

- (1) Check if the level of coolant in reservoir tank is between FULL and LOW.
 - (2) Add the mixture of antifreeze and water after removing the cap of the reservoir tank if coolant is not sufficient.
 - (3) Be sure to use the reservoir empty, add the coolant by opening the cap of surge tank.
 - (4) Replace gasket of surge tank cap when it is damaged.
- ▲ Hot coolant can spray out if surge tank cap is removed while engine is hot. Remove the cap after the engine has cooled down.**

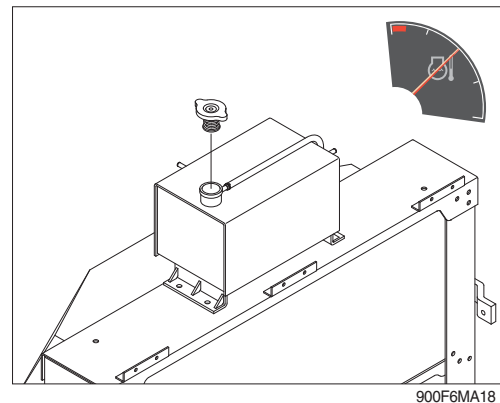


6) FLUSHING AND REFILLING OF RADIATOR

(1) Change coolant

- ▲ Avoid prolonged and repeated skin contact with used antifreeze. Such prolonged repeated contact can cause skin disorders or other bodily injury.**
Avoid excessive contact-wash thoroughly after contact.
Keep out of reach of children.

- ※ Protect the environment : Handling and disposal of used antifreeze can be subject to federal, state, and local law regulation. Use authorized waste disposal facilities, including civic amenity sites and garages providing authorized facilities for the receipt of used antifreeze.
- If in doubt, contact your local authorities for guidance as to proper handling of used antifreeze.

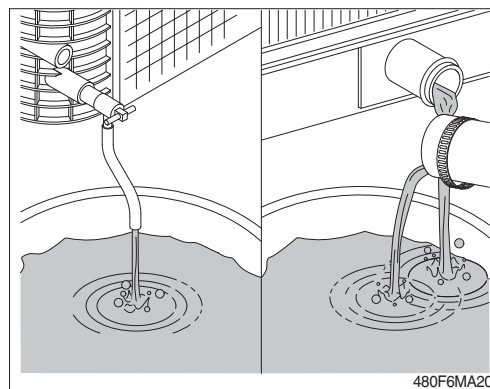


- ▲ Wait until the temperature is below 50 °C (122 °F) before removing the coolant system pressure cap.**

Failure to do so can cause personal injury from heated coolant spray.

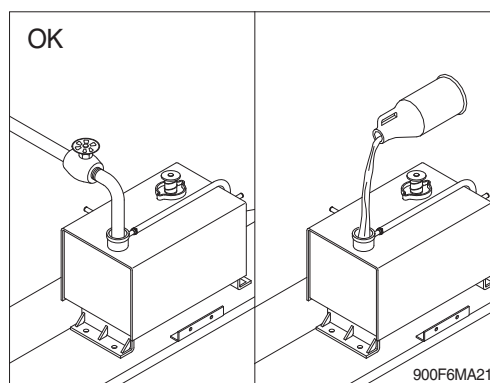
Drain the cooling system by opening the drain valve on the radiator and opening the drain valve on the bottom of the engine cylinder block.

A drain pan with a capacity of 80 liters (21 U.S. gallons) will be adequate.

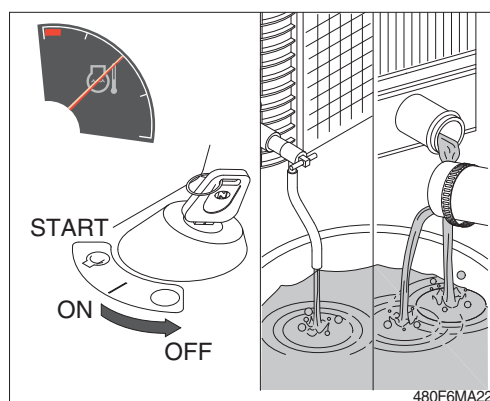


(2) Flushing of cooling system

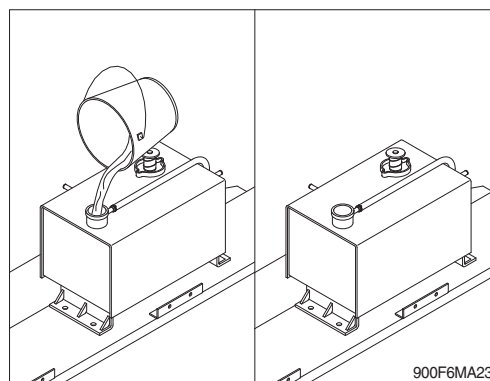
- ① Remove the thermostats.
- ② Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).
 - ※ Use 0.5kg (1.0 pound) of sodium carbonate for every 23 liters (6.0 U.S. gallons) of water.
 - ※ Do not install the surge tank cap. The engine is to be operated without the cap for this process.



- ③ Operate the engine for 5 minutes with the coolant temperature above 80°C (176°F) .
Shut the engine off, and drain the cooling system.

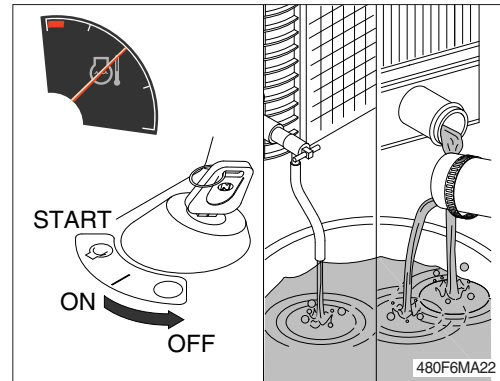


- ④ Fill the cooling system with clean water.
 - ※ Be sure to vent the engine and aftercooler for complete filling.
 - ※ Do not install the surge tank cap or the new coolant filter.



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

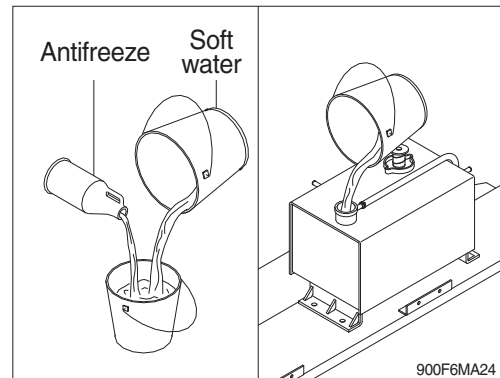
※ If the water being drained is still dirty, the system must be flushed again until the water is clean.



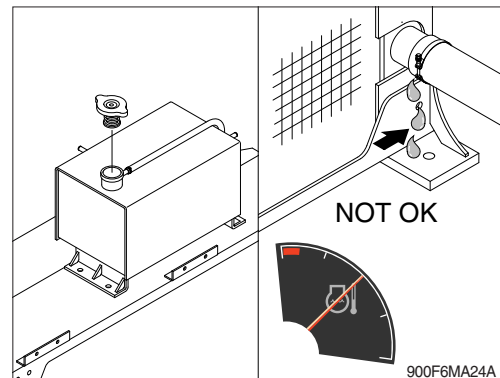
(3) Cooling system filling

- 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.

※ Do not use hard water such as river water or well water.



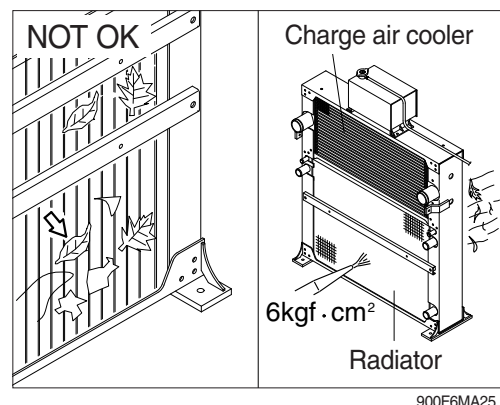
- ② Refit the thermostats.
- ③ Install the pressure cap. Operate the engine until it reaches a temperature 80°C (176°F), and check for coolant leaks. Check the coolant level again to make sure the system is full of coolant.



7) CLEAN RADIATOR AND OIL COOLER

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

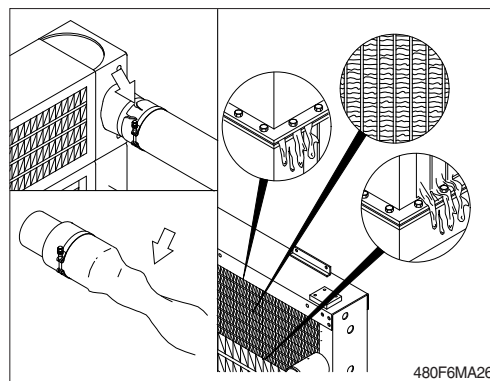
- (1) Visually inspect the radiator for clogged radiator fins.
- (2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins. Blow the air in the opposite direction of the fan air flow.



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

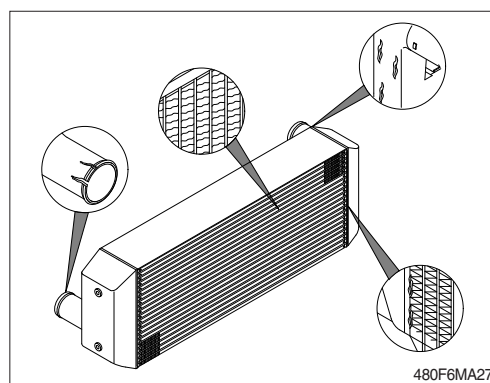
※ If the radiator must be replaced due to bent or broken fins which can cause the engine to overheat, refer to the manufacturer's replacement procedures.

(4) Visually inspect the radiator for core leaks.



8) CHECK CHARGE AIR COOLER

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

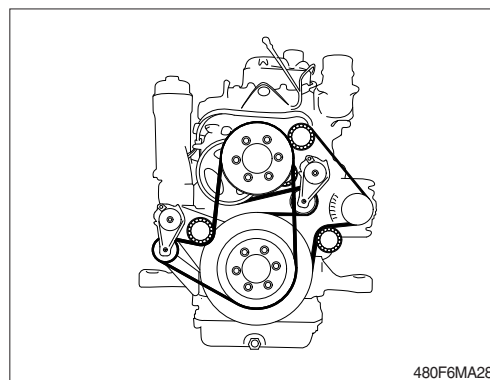


9) FAN BELT

※ Refit the drive belt with the same direction of rotation as it had before removal.

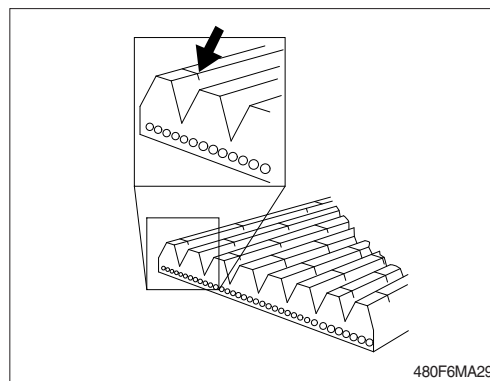
(1) Check the drive belt thoroughly, particularly at the idler rollers.

※ The noise is considered to be normal and will disappear within 50~100 operating hours.



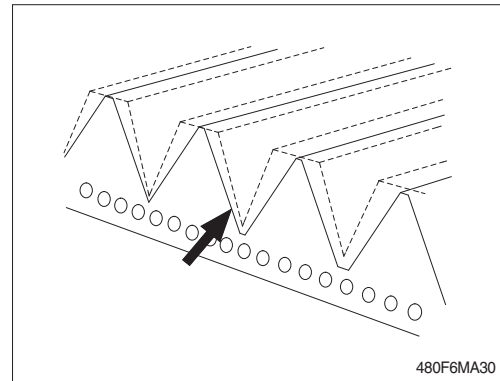
(2) Check the drive belt for cracks.

(3) The drive belt must be renewed if it has cracks.

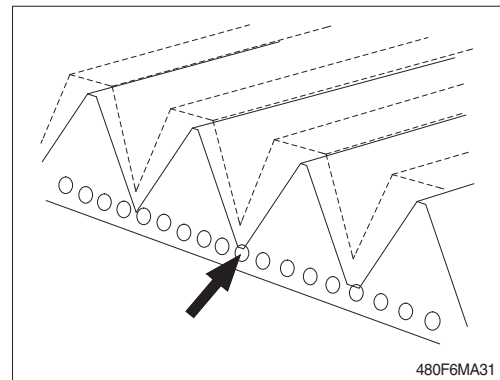


(4) Check the drive belt wear.

(5) The drive belt is starting to become worn, but can be refitted.



(6) The belt is worn down to the cord.
The drive belt must be renewed.



10) 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.

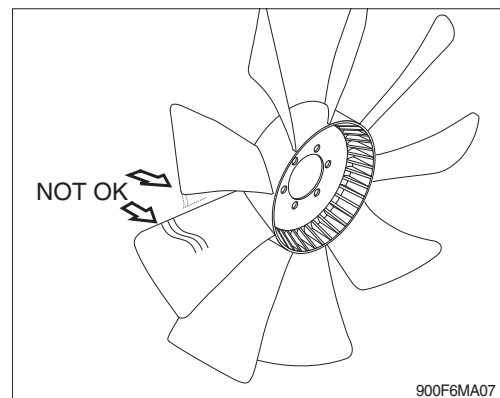
※ Rotate the crankshaft by using the engine barring gear.

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

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

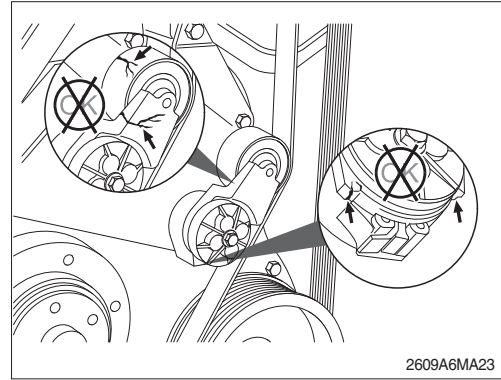
Check the fan to make sure it is securely mounted. Tighten the capscrews if necessary.

Replace any fan that is damaged.



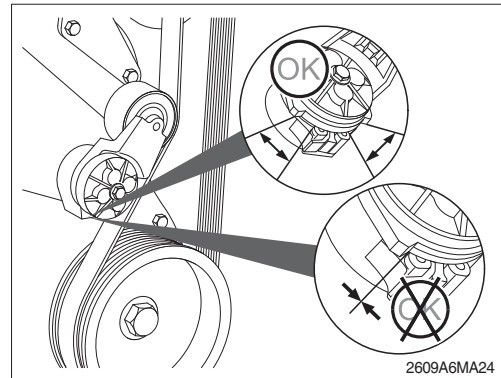
11) FAN BELT TENSIONER

- (1) With the engine stopped, check the tensioner arm, pulley, and stops for cracks. If any cracks are found, the tensioner must be replaced.



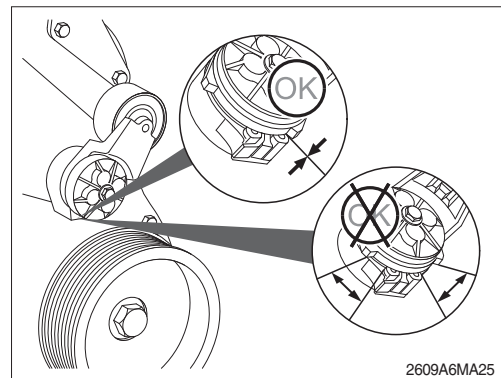
- (2) With the belt installed, verify that neither tensioner arm stop is in contact with the spring case stop.

After replacing the belt, if the tensioner arm stops are still in contact with the spring case stop, replace the tensioner.

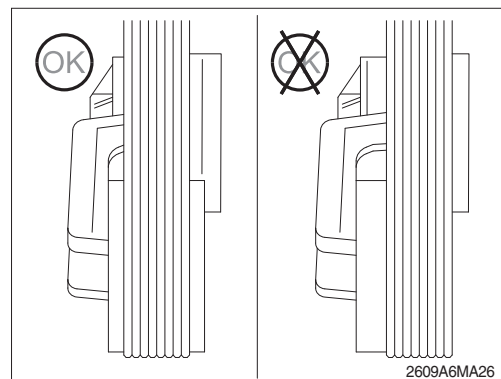


- (3) With the belt removed, verify that the tensioner arm stop is in contact with the spring case stop. If these two are not touching, the tensioner must be replaced.

※ **After replacing the belt, if the tensioner arm stop is still in contact with the spring case stop, the tensioner must be replaced.**



- (4) Check the location of the drive belt on the belt tensioner pulley. The belt should be centered on, or close to the middle of, the pulley. Misaligned belts, either too far forward or backward, can cause belt wear, belt roll-offs, or increase uneven tensioner bushing wear.



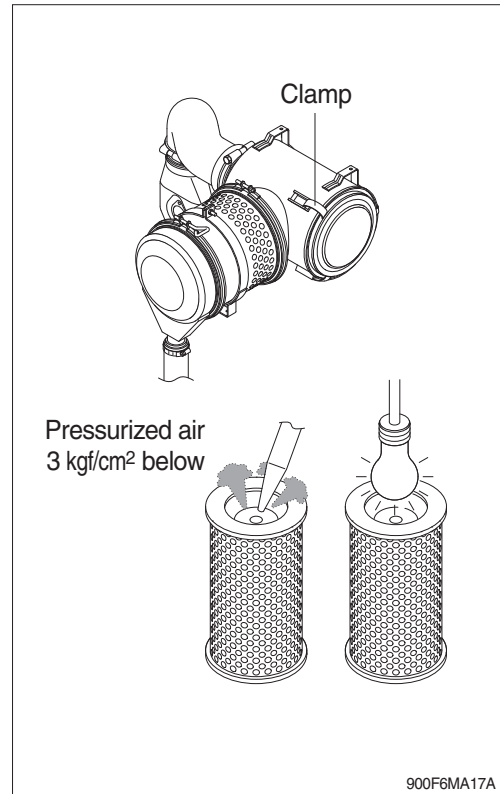
12) CLEANING OF AIR CLEANER

(1) Primary element

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

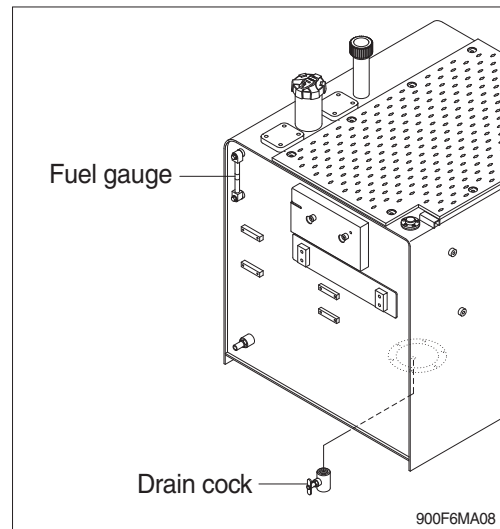
(2) Safety element

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



13) 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.

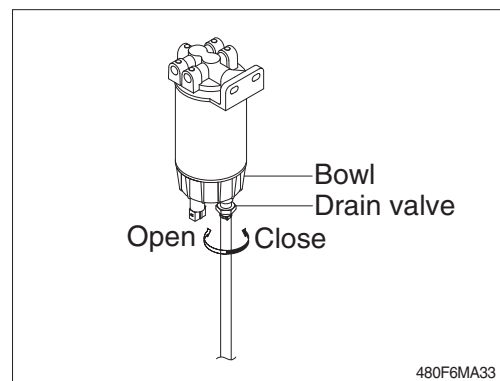


14) FUEL RETURN FILTER

- ※ Inspect or drain the collection bowl of water daily and replace the element every 1000 hours.

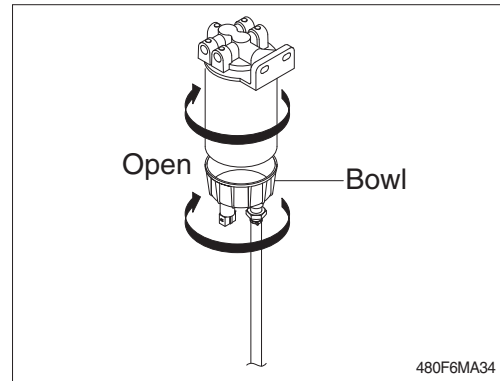
(1) Drain water

- ① Open bowl drain valve to evacuate water.
- ② Close drain valve.

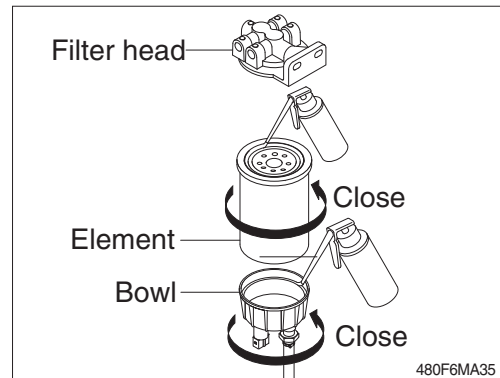


(2) Replace element

- 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.



15) REPLACEMENT OF FUEL FILTER

- ※ The fuel system is very sensitive to dirt. It is therefore important that everything is as clean as possible when work is carried out on the fuel system.

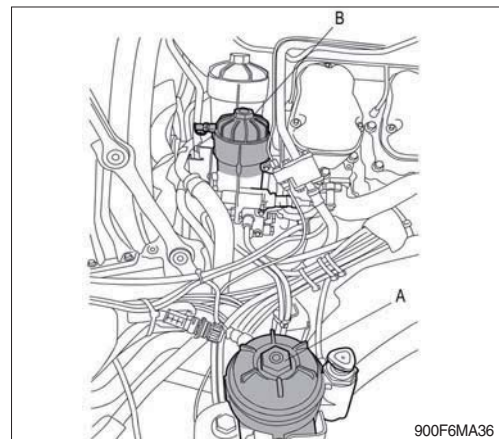
- Do not use compressed air to blow components in the fuel system clean.
- Use lint-free cloths for cleaning.
- Clean tools before use.
- Do not use worn chrome-plated tools as flakes of chrome may come off.
- Plug or tape connections on components which are removed.

- (1) Turn the fuel supply and return shut-off valve to the OFF position.
- (2) To ensure that the filter housings are drained properly, the filter covers must be removed as follows.

A - Water separating suction filter

B - Pressure filter

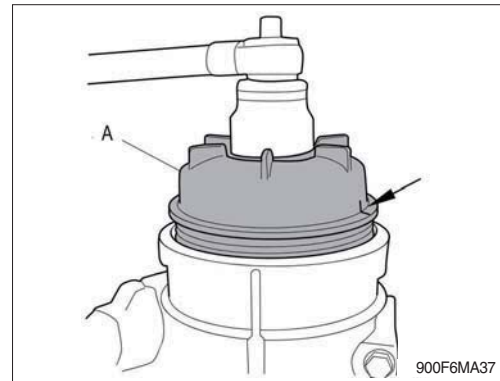
- ※ **Always start with the water separating suction filter A. Do not open the pressure filter cover B until housing for the water separating suction filter A is completely drained.**



※ **Do not use an adjustable spanner or other open tool to undo the filter covers, as this risks damaging the filter covers.**

(3) Make a mark on the water separating suction filter cover A. Unscrew the cover 3 to 4 turns, using a closed tool with hexagon driver (36 mm socket).

※ **Wait a minimum of 2 minutes to allow as much of the fuel as possible to drain out of the filter housing.**

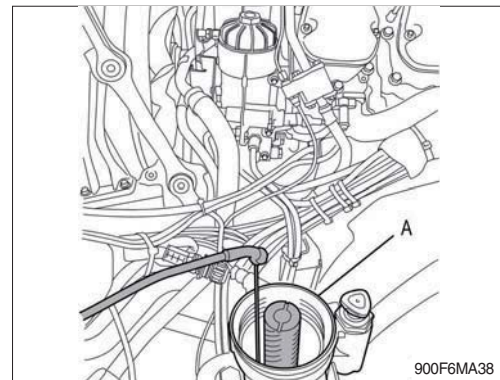


(4) Unscrew the filter cover A and lift it up slowly with the filter element.

(5) Make sure the suction tool is completely drained before starting work.

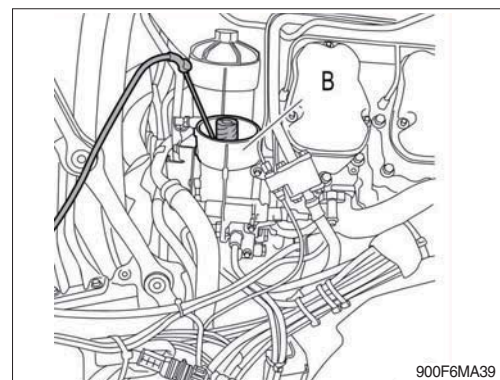
Draw out remaining fuel and any particles using suction tool or a similar tool.

(6) Keep the suction tool hose in the filter housing for the water separating suction filter A.



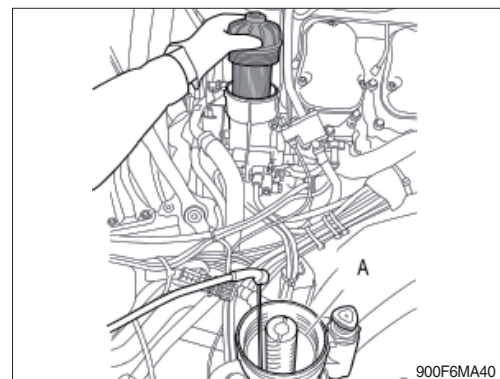
(7) Make a mark on the pressure filter cover B. Unscrew the cover 3 to 4 turns, using a closed tool with hexagon driver (36 mm socket). Draw out fuel which may drain into the water separating suction filter housing when the pressure filter is detached.

※ **Wait a minimum of 2 minutes to allow as much of the fuel as possible to drain out of the filter housing.**

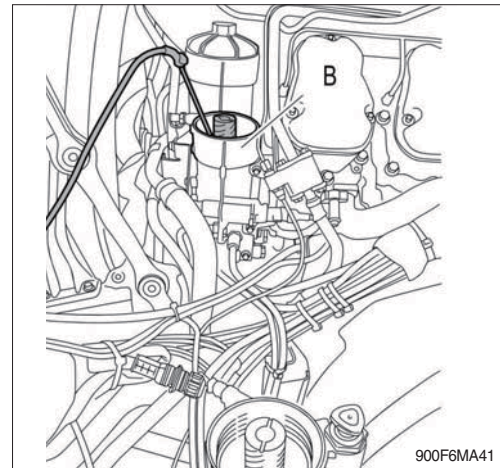


(8) Unscrew the pressure filter cover B and lift it up slowly with the filter element.

(9) Fuel from the pressure filter housing B may flow into the water separating suction filter housing A. Keep the suction tool hose in the filter housing for the water separating suction filter A until it is completely drained of fuel.

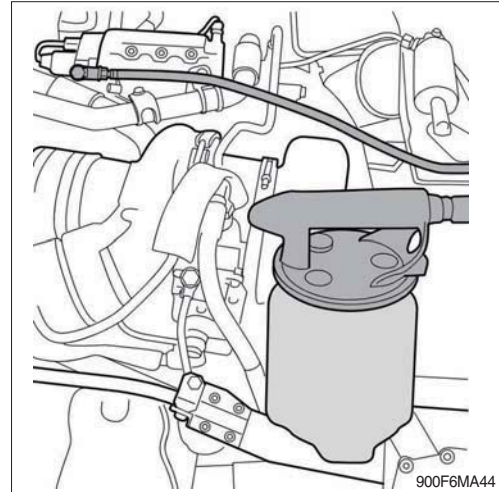


- (10) Move the suction tool to the pressure filter housing B. Draw out remaining fuel and particles.
- ※ **It is important to remove remaining fuel and particles from the filter housing to prevent fuel system contamination.**
- (11) Undo the old filter elements from the covers by carefully bending them to one side.
- (12) Unpack the new filter elements and the supplied O-rings.
- ※ **Check that there is no remaining packaging material stuck to the filters.**
- (13) Fit the new O-rings to the covers. Lubricate the O-rings with O-ring grease.
- (14) Press the filter elements into the snap fasteners on the covers.
- ※ **Fit the filter element to the filter cover before positioning it in the fuel filter housing. The filter element can otherwise be damaged.**
 - ※ **Open the bleed nipple to prevent back pressure in the filter housings when the filter elements are screwed on.**



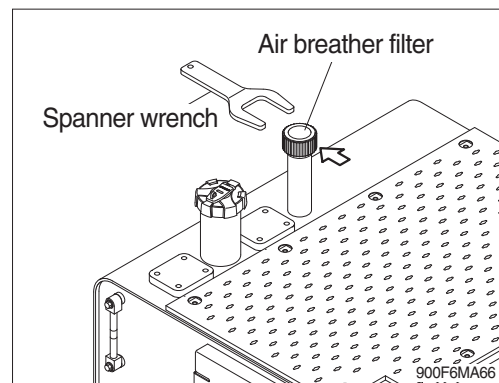
16) BLEEDING THE FUEL SYSTEM

- (1) Attach a clear plastic hose to the bleed nipple on the fuel filter housing. Place the end of the plastic hose in a container that holds at least 3 liters (0.8 US gallons).
- (2) Loosen the hand pump handle.
- (3) Open the bleed nipple.
- (4) Pump by hand until fuel comes out of the hose. This may take around 100 pump strokes. Depending on the installation, a significantly greater number of pump strokes may be required before fuel comes out.
- (5) Close the bleed nipple.
- (6) Start the engine and open the bleed nipple carefully.
- (7) Check that fuel without air bubbles comes out of the hose. Normally, about 3 liters (0.8 US gallons) of fuel must be drained before no more air bubbles come through the hose.
- (8) Close the bleed nipple, remove the hose and tighten the hand pump handle.



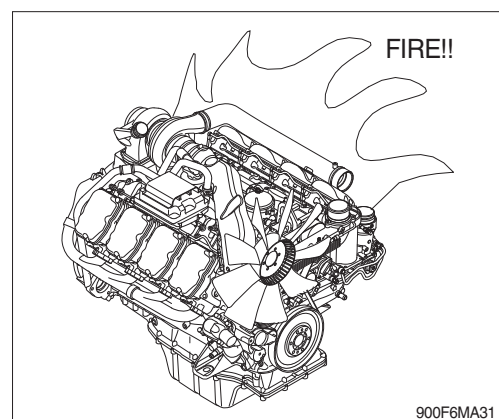
17) REPLACEMENT OF FUEL TANK AIR BREATHER FILTER

- (1) Stop the engine.
- (2) Remove the air breather filter using the special spanner wrench and dispose it in accordance with environmental regulations.
- (3) Replace the filter with new one.
 - Tightening torque : $0.95 \pm 0.1 \text{ kgf} \cdot \text{m}$
($6.9 \pm 0.7 \text{ lbf} \cdot \text{ft}$)



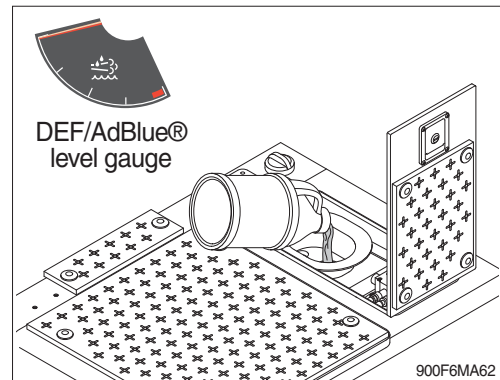
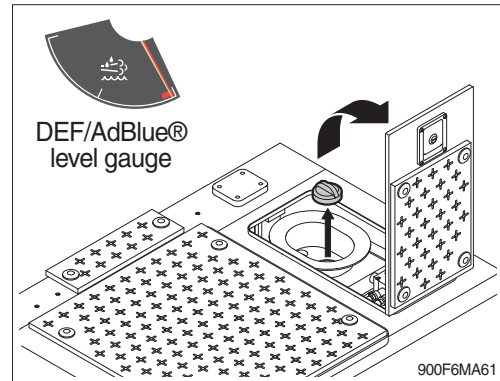
18) LEAKAGE OF FUEL

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



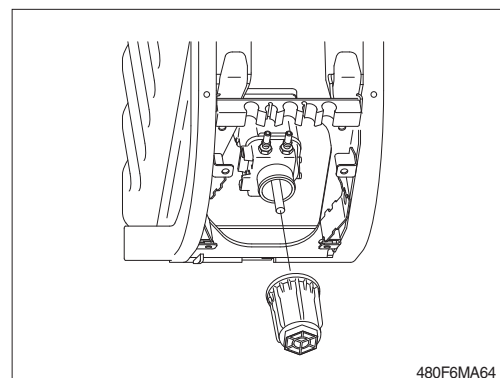
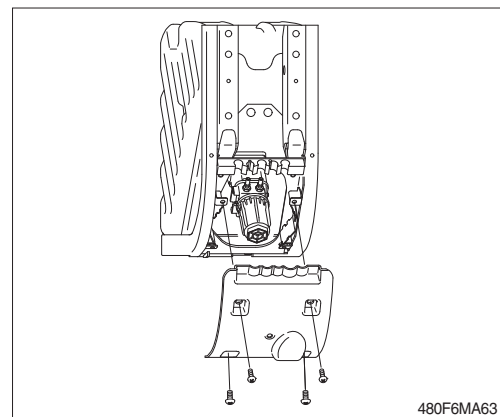
19) DEF/AdBlue® TANK

- (1) The DEF/AdBlue® tank level must be checked daily with DEF/AdBlue® level gauge.
 - (2) If the DEF/AdBlue® level is found to be below, DEF/AdBlue® must be added.
 - (3) DEF/AdBlue® fill up warning lamp turns on when tank is completely filled with DEF/AdBlue®. After turning light on, do not pour DEF/AdBlue® any more.
- ※ Fill the tank with DEF/AdBlue® after key on and then turn off the start key.
 - ※ Be careful to entering dust, sand or other contamination substance when you refill the DEF/AdBlue® into the tank. Otherwise, fatal problem such as engine idle locking, derating or engine stopping can happen.
- ▲ It is unlawful to tamper with or remove any component of the aftertreatment system. It is also unlawful to use a catalyst solution that does not meet the specifications provided or to operate the machine with no catalytic solution.



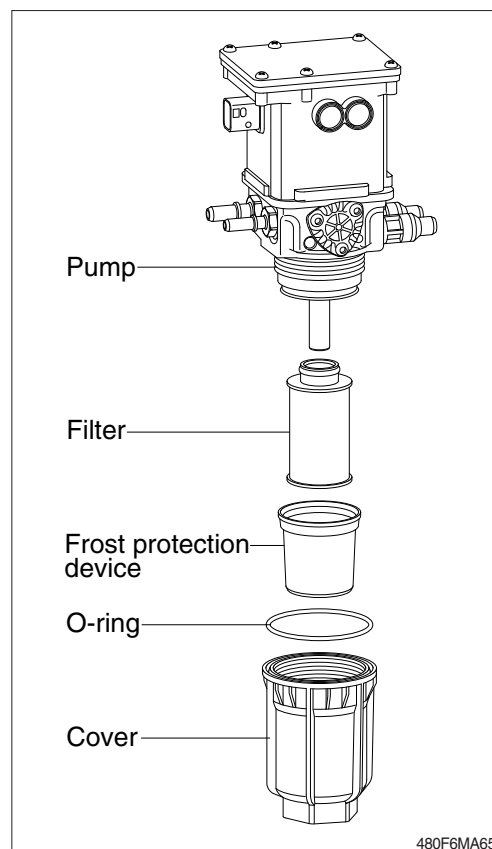
20) DEF/AdBlue® SUPPLY MODULE FILTER

- (1) Remove the cover on the rear of the DEF/AdBlue® tank.
- (2) Place a suitable container underneath.
- (3) Unscrew the filter cover. Use a 46 mm socket.
- (4) Remove the filter cover and O-ring.



- (5) Remove the frost protection device and the filter.
- (6) Wipe the pump clean.
- (7) Check that the frost protection device and valve ring are correctly fitted in the new cover.
- (8) Fit the new filter.
- (9) Fit the new frost protection device.
- (10) Lubricate the threads with the spray.
- (11) Fit the new O-ring in the new cover.
- (12) Fit the new cover.

· Tightening torque : 8.2 kgf · m (59.3 lbf · ft)



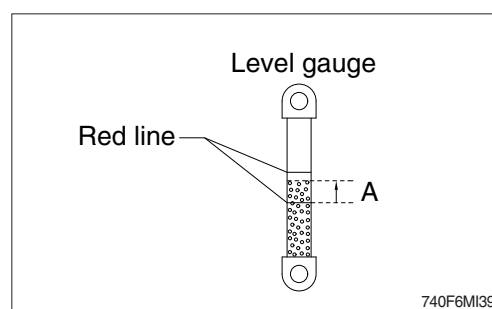
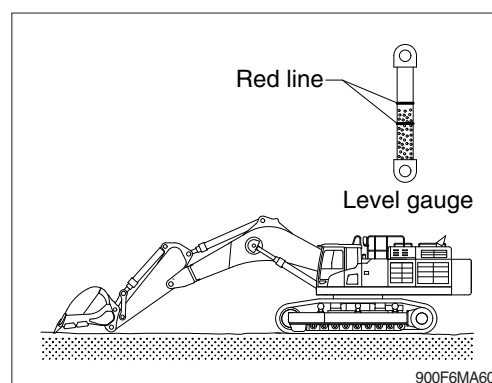
21) HYDRAULIC OIL CHECK

- (1) Position the machine as shown in the illustration on the right. Please stop the engine and wait for about 5 minutes.
- (2) Check the oil level at the level gauge of hydraulic oil tank.
- (3) The oil level is normal if the oil is between the red lines. The oil level depends on the temperature of the hydraulic oil. Refer to the height (A) in the below table to check the level gauge.

Temperature		Height A	
℃	°F	mm	inch
0	32	15	0.6
10	50	25	1.0
20	68	30	1.2
30	86	35	1.4
40	104	40	1.6

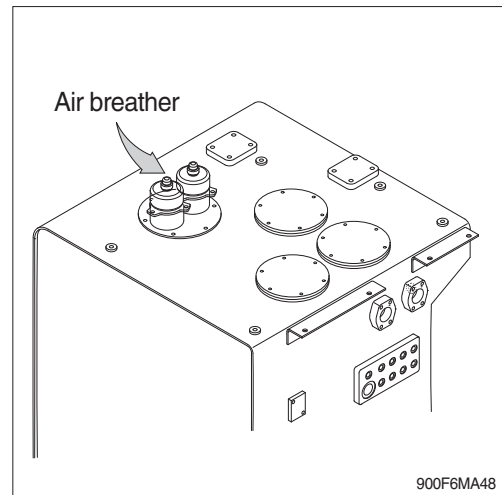
※ Refer to page 3-21 for checking the temperature of the hydraulic oil.

※ Add the hydraulic oil, if necessary.



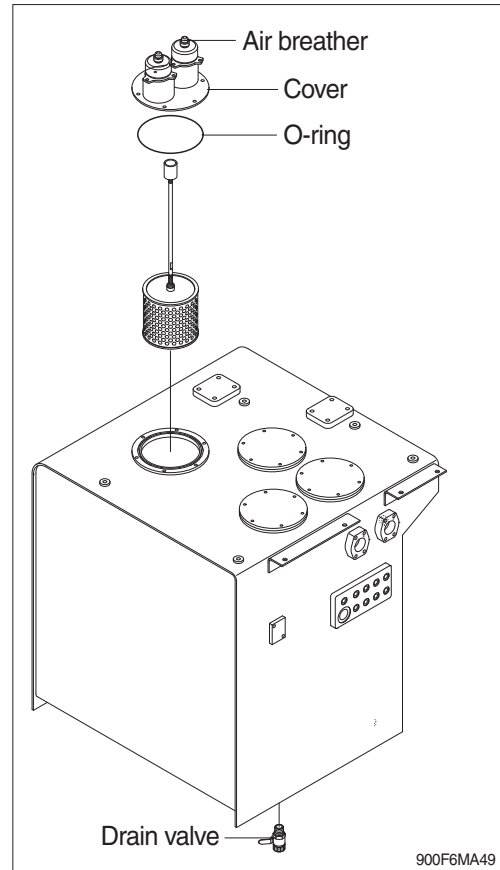
22) FILLING HYDRAULIC OIL

- (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.



23) CHANGE HYDRAULIC OIL

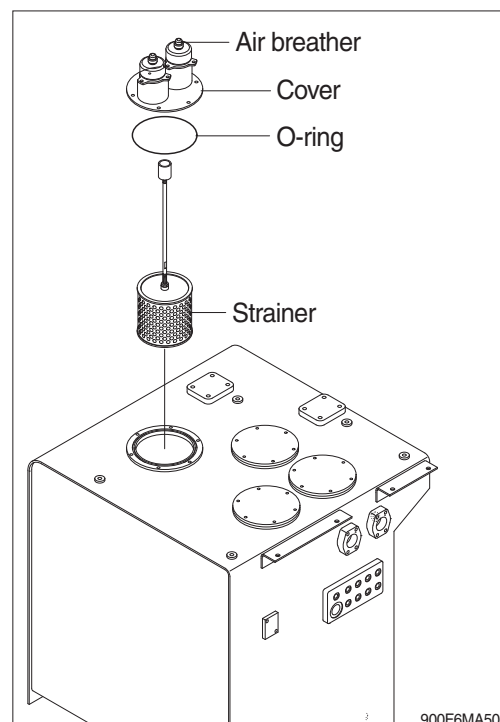
- (1) Lower the bucket on the ground pulling the arm and bucket cylinder to the maximum.
 - (2) Relieve the pressure in the tank by pushing the top of the air breather.
 - (3) Remove the cover.
 - Tightening torque : $6.9 \pm 1.4 \text{ kgf} \cdot \text{m}$
($50 \pm 10 \text{ lbf} \cdot \text{ft}$)
 - (4) Prepare a suitable container.
 - (5) To drain the oil open the drain valve at the bottom of the oil tank.
 - (6) Fill proper amount of recommended oil.
 - (7) Put the breather in the right position.
 - (8) Bleed air hydraulic pump loosen the air breather at top of hydraulic pump assembly.
 - (9) Start engine and run continually. Release the air by full stroke of each control lever.
- ※ In case of injecting HBHO (HD Hyundai Construction Equipment Bio Hydraulic Oil) to machines that have formerly used different hydraulic oil, the proportion of residual oil must not exceed 2 %.
- ※ Do not mix any other Bio oil, use only HBHO as bio oil. If changing to Bio oil, contact HD Hyundai Construction Equipment dealer.



24) CLEAN SUCTION STRAINER

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

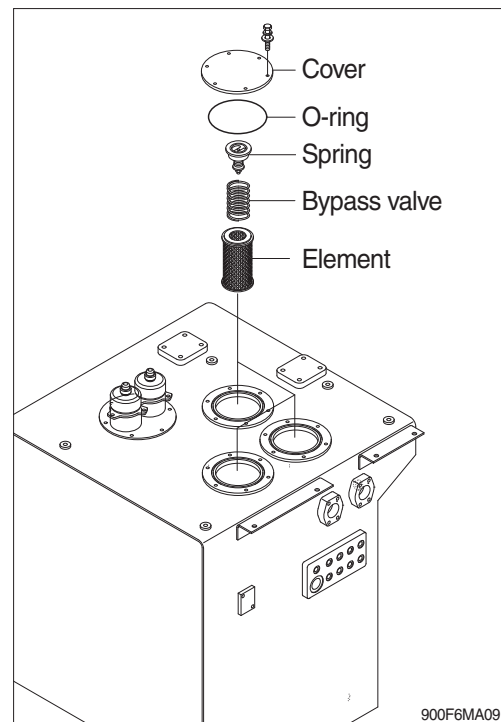
- (1) Remove the cover.
 - Tightening torque : $6.9 \pm 1.4 \text{ kgf} \cdot \text{m}$
($50 \pm 10 \text{ lbf} \cdot \text{ft}$)
 - (2) Pull out the strainer in the tank.
 - (3) Wash the foreign material on the suction strainer with gasoline or cleaning oil.
 - (4) Replace the suction strainer if it 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.



25) REPLACEMENT OF RETURN FILTER

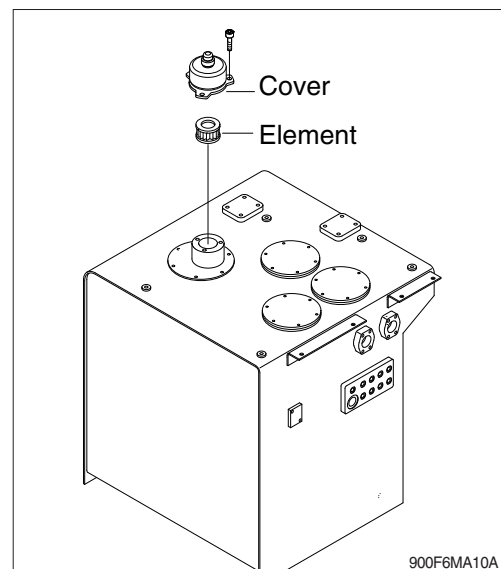
Replace as follows paying attention to the cause to be kept during the replacement.

- (1) Remove the cover.
 - Tightening torque : $6.9 \pm 1.4 \text{ kgf} \cdot \text{m}$
($50 \pm 10 \text{ lbf} \cdot \text{ft}$)
- (2) Remove the spring, by-pass valve and return filter in the tank.
- (3) Replace the element with new one.



26) REPLACEMENT OF ELEMENT IN HYDRAULIC TANK BREATHER

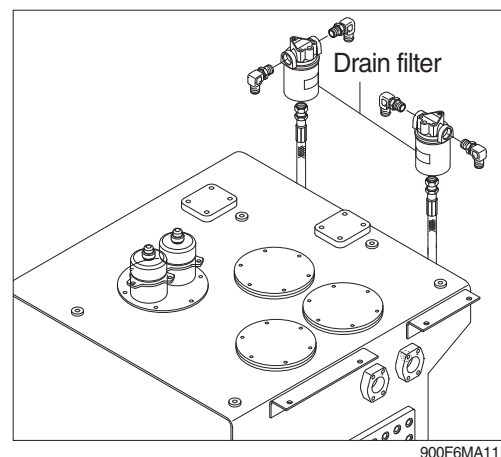
- (1) Relieve the pressure in the tank by pushing the top of the air breather.
- (2) Loosen the bolt and remove the cover.
- (3) Pull out the filter element.
- (4) Replace the filter element new one.
- (5) Reassemble by reverse order of disassembly.
 - Tightening torque : $0.8 \sim 1.0 \text{ kgf} \cdot \text{m}$
($5.9 \sim 7.4 \text{ lbf} \cdot \text{ft}$)



27) REPLACE OF DRAIN FILTER CARTRIDGE

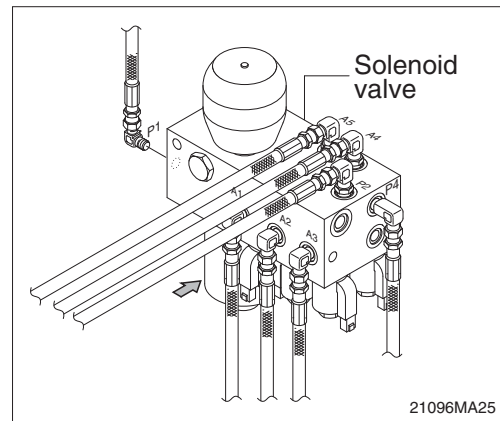
Clean the dust around filter and replace with new one after removing the cartridge.

- ※ 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.



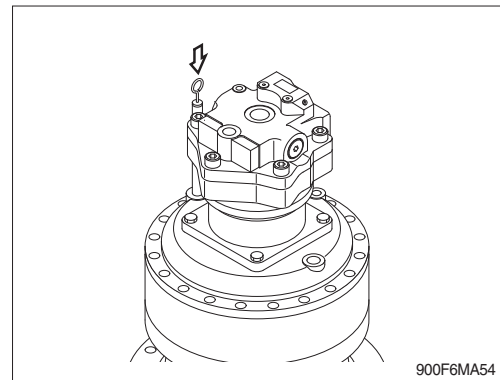
28) REPLACE OF PILOT LINE FILTER

- (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.



29) 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.

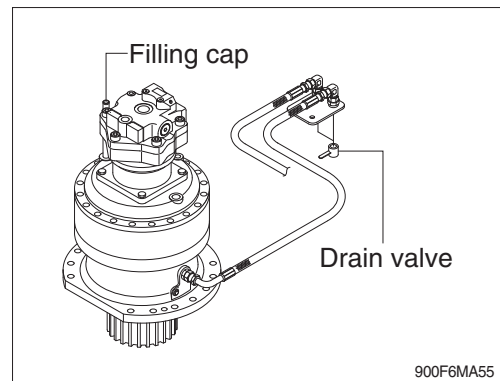


30) CHANGE SWING REDUCTION GEAR OIL

- (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.

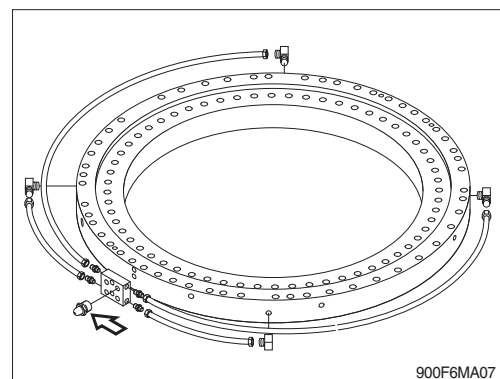
Fill proper amount of recommended oil.

- Amount of oil : 14 l (3.7 U.S.gal)



31) LUBRICATE SWING BEARING

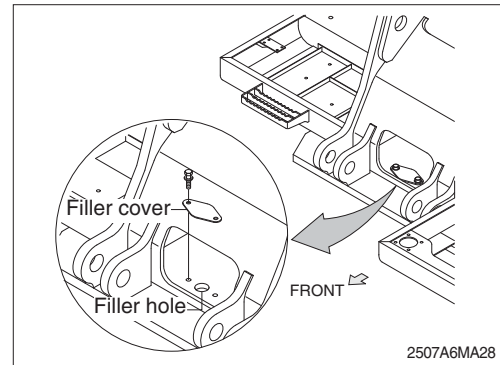
- (1) Grease at 4 fitting.
- ※ Lubricate every 250 hours.



32) SWING GEAR AND PINION

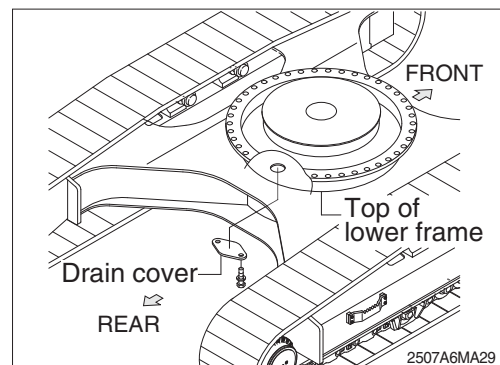
(1) Drain old grease

- ① Remove under cover of lower frame.
- ② Remove drain cover of lower frame.
- ③ Remove filler cover of upper frame.
- ④ Operate full turn (360°) of swing several times.



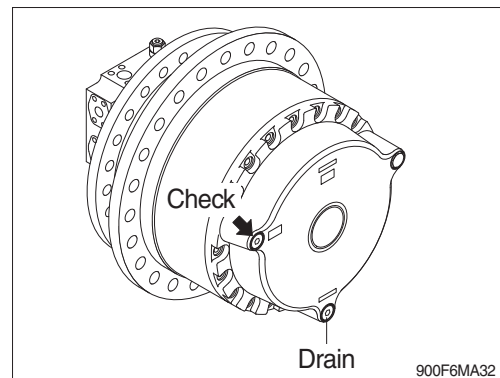
(2) Refill new grease

- ① Install drain cover.
- ② Fill with new grease.
- ③ Install filler cover.
 - Capacity : 17.3 kg (38.1 lb)



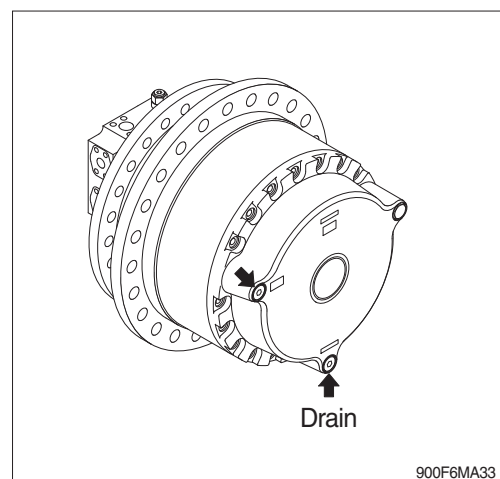
33) CHECK THE TRAVEL REDUCTION GEAR OIL

- (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 : 20 l (5.3 U.S.gal)



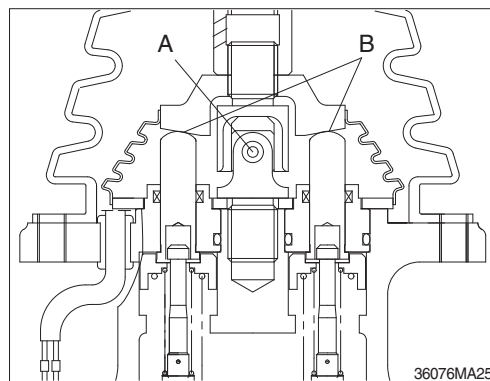
34) CHANGE OF THE TRAVEL REDUCTION GEAR OIL

- (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.



35) LUBRICATE RCV LEVER

Remove the bellows and with a grease gun grease the joint part (A) and sliding parts (B).



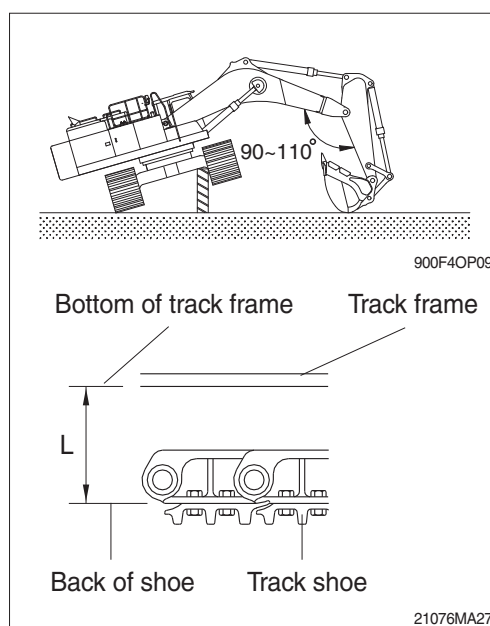
36) ADJUSTMENT OF TRACK TENSION

※ 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.

▲ Unscrew the grease nipple after release the tension by pushing the poppet only when necessarily required.

Grease leaking hole is not existing. So, while unscrew the grease nipple, grease is not leaking until the grease nipple is completely coming out. If the tension is not released in advance, the grease nipple can be suddenly popped out by pressurized grease.

※ 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	470~510 mm (18.5~20.1")

37) REPLACEMENT OF BUCKET

△ When knocking the pin in with a hammer, metal particles may fly and cause serious injury, particularly if they get into your eyes. When carrying out this operation, always wear goggles, helmet, gloves, and other protective equipment.

- ※ When the bucket is removed, place it in a stable condition.
- ※ When performing joint work, make sure signals to each other and work carefully for safety's sake.

(1) Lower the bucket on the ground as the picture shown in the right.

(2) Lock the safety knob to the LOCK position and stop the engine.

(3) Remove the stopper bolts (1) and nuts (2), then remove pins (3, 4) and remove the bucket.

※ When removing the pins, place the bucket so that it is in light contact with the ground.

※ If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.

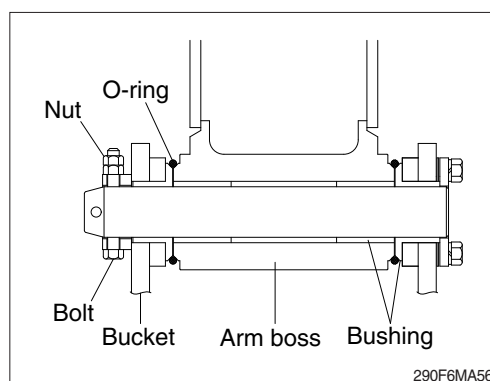
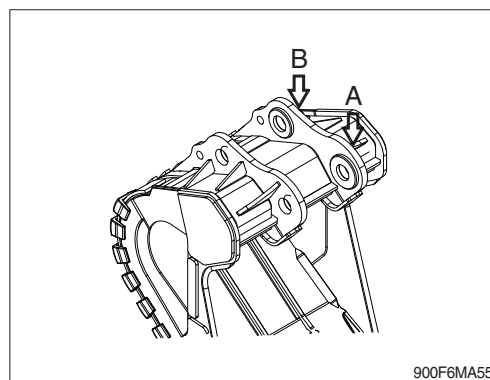
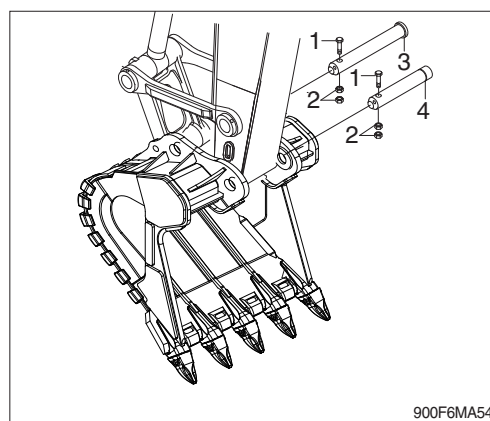
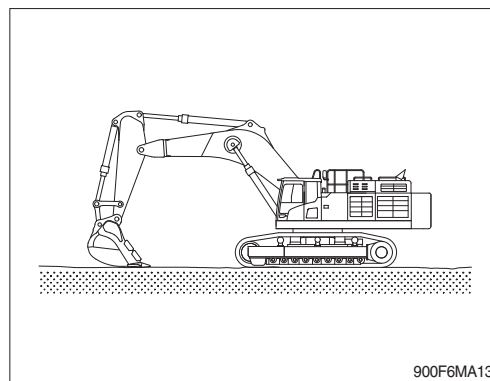
※ After remove the pins, make sure that they do not become contaminated with sand or mud and that the seals of bushing on both sides do not become damaged.

(4) Align the arm with holes (A) and the link with holes (B), then coat with grease and install pins (3, 4)

※ When installing the bucket, the O-rings are easily damaged, so fit the O-rings on the boss of the bucket as shown in the picture.

After knocking the pin, move the O-ring down to the regular groove.

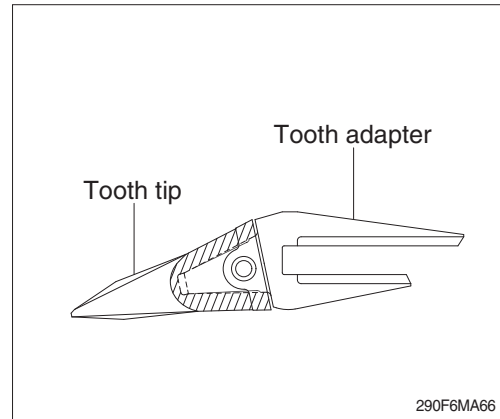
(5) Install the stopper bolt (1) and nuts (2) for each pin, then grease the pin.



38) REPLACEMENT OF BUCKET TOOTH

(1) Timing of replacement

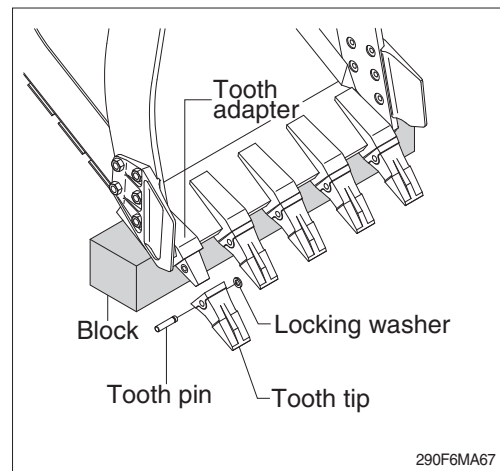
- ① Check wearing condition as shown in the illustration and replace tooth tip before adapter starts to wear.
- ② If excessive use, tooth adapter has worn out, replacement may become impossible.



(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.



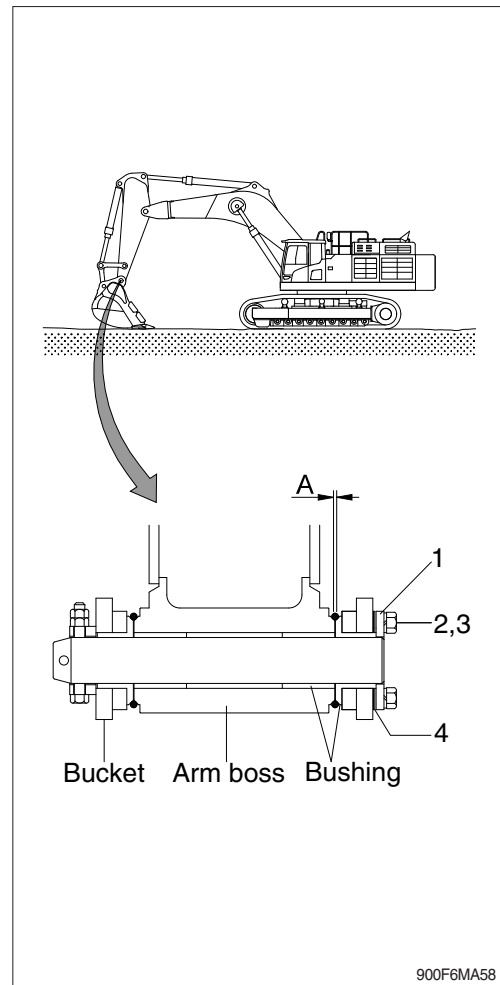
39) ADJUSTMENT OF BUCKET CLEARANCE

- (1) Lower the bucket on the ground as the picture shown in the right.
- (2) Swing to the right and keep the arm boss to be contact to the bucket left.
- (3) Lock the safety knob to the LOCK position and stop the engine.
- (4) Measure the clearance (A) between bucket and arm boss. This is the total clearance.

(5) Adjusting

- ① Loosen bolt (2), and remove washer (3), plate (1) and shim (4).
- ② Remove the shim equivalent value with measuring value.
- ③ Assemble the parts in the reverse order of removal.
 - Tightening torque : $29.6 \pm 3.2 \text{ kgf} \cdot \text{m}$
($214.0 \pm 23.1 \text{ lbf} \cdot \text{ft}$)
 - Normal clearance : $0.5 \sim 1.0 \text{ mm}$
($0.02 \sim 0.04 \text{ in}$)

※ If the bucket is not adjusted correctly, noise and vibration created during operation, and damaged O-ring, pin and bushing quickly.



40) 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	Lubrication manifold	3
4	Bucket cylinder pin (head, rod)	2
	Bucket link (control rod)	2
	Arm and control link connection pin	1
	Arm and bucket connection pin	1
5	Boom rear bearing center	1
6	Boom rear pin	2
7	Boom and arm connection pin	1

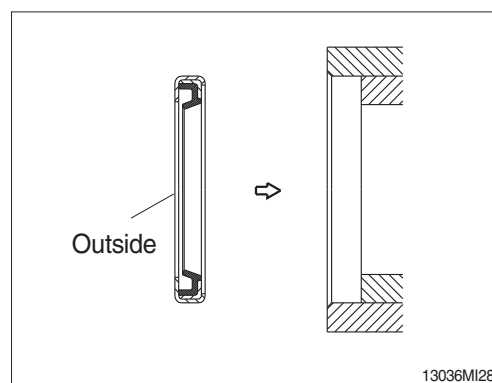
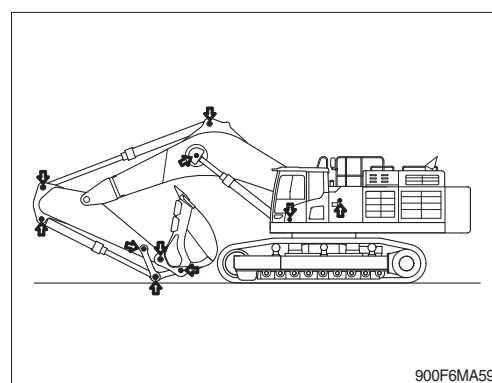
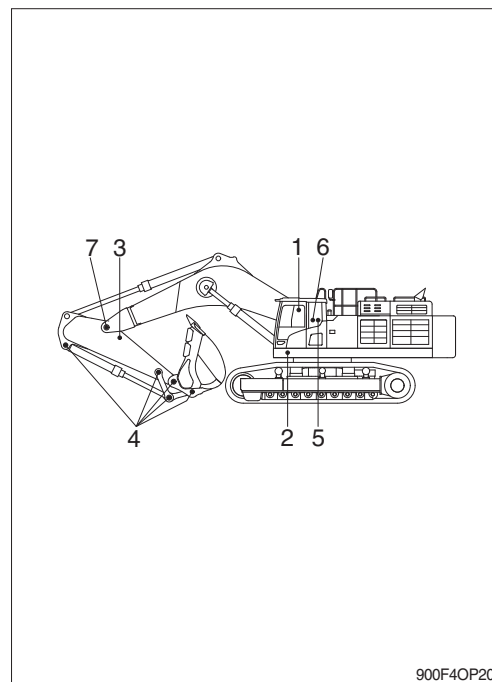
※ Shorten lubricating interval when working in the water or dusty place.

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

※ Mount the lip to be faced outside when replace the dust seal.

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

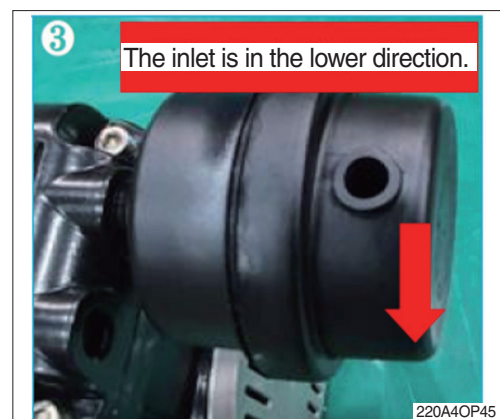
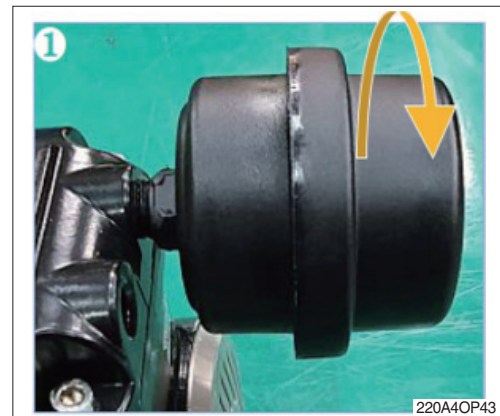
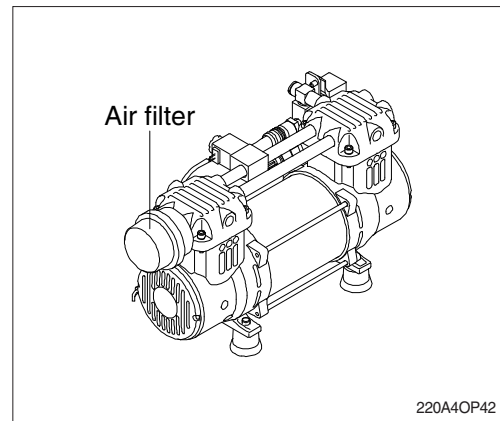
※ Assemble the seal same direction with picture and use with plastic hammer when replace.



41) REPLACEMENT OF THE AIR COMPRESSOR'S AIR FILTER

- (1) Loosen the air filter cap counterclockwise.
- (2) Use pressurized air from the inside to the outside when cleaning the air filter.
- (3) Reassemble by reverse order of disassembly.
- ※ **Please install the air inlet in the lower direction.**
- (4) If the air filter is damaged or badly contaminated, use a new filter.

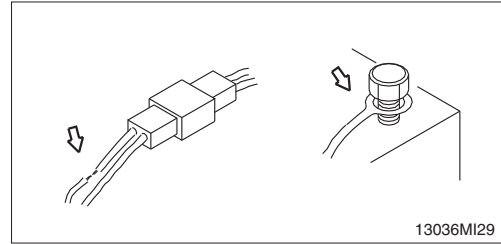
△ If you are using the air compressor on the equipment when cleaning the air filter, the use for a long time can cause internal damage to a piston ring or a liner. Because dust or a contaminant may be inhaled through the air inlet. Please use for a short time at a clean place.



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

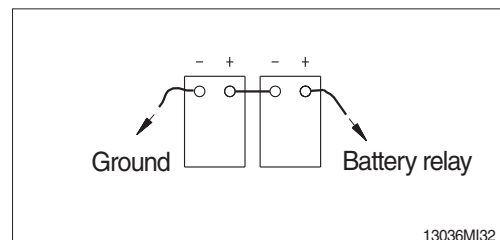
Never discard a battery.

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

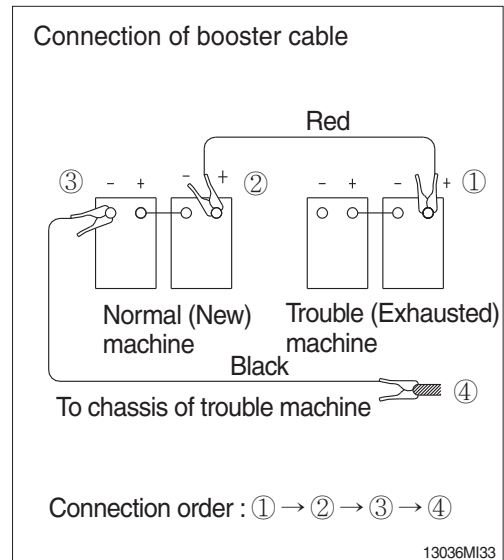
Keep following order when you are going to start engine using booster cable.

(1) Connection of booster cable

※ **Use the same capacity of battery for starting.**

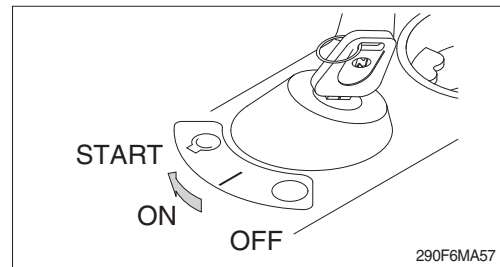
- ① Make sure that the starting switches of the normal machine and trouble machine are both at the OFF position.
- ② Connect the red terminal of booster cable to the battery (+) terminal between exhausted and new battery.
- ③ Connect the black terminal of the booster cable between new battery (-) terminal 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

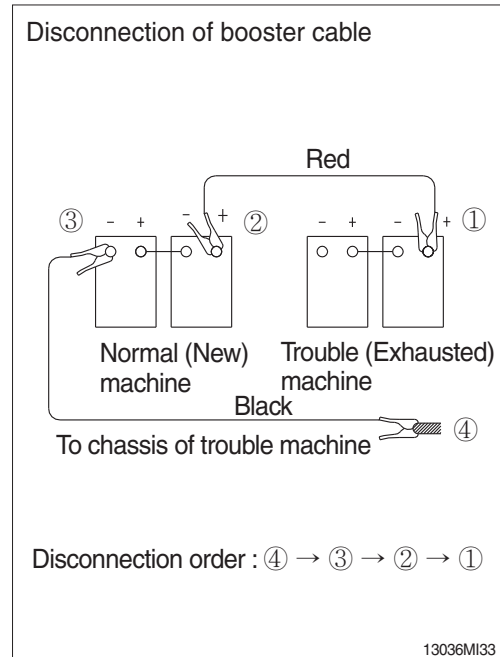
- ① Take off the booster cable (black).
- ② Take off the booster cable (red) connected to the (+) terminal.
- ③ Run engine with high idle until charging the exhausted battery by alternator, fully.

▲ **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

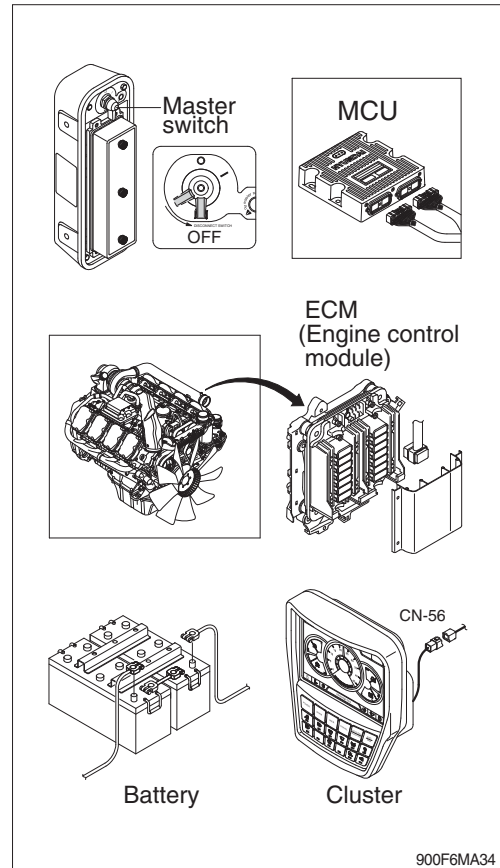
Before start to welding, follow the below procedure.

- 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, ECM, 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.

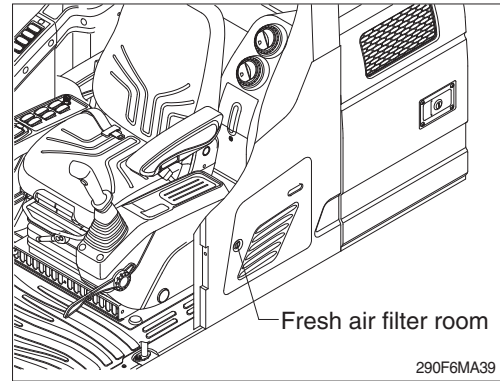


8. AIR CONDITIONER AND HEATER

1) CLEAN AND REPLACE OF FRESH AIR FILTER

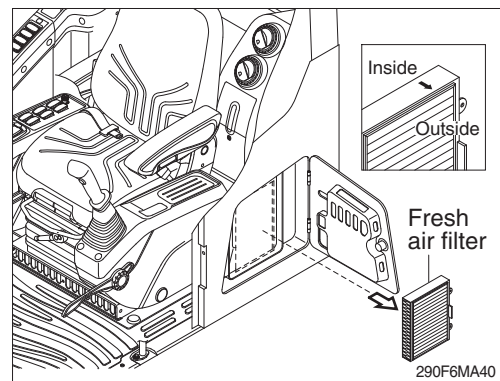
※ **Always stop the engine before servicing.**

(1) Open the fresh air filter room.



(2) Remove the fresh air filter.

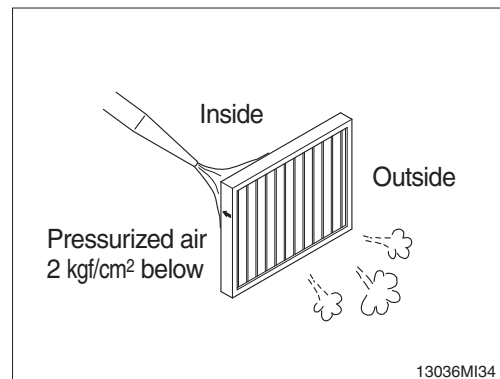
※ **When installing a filter, be careful not to change the filter direction.**



(3) Clean the filter using a pressurized air (below 2 kgf/cm², 28 psi).

△ **When using pressurized air, be sure to wear safety glasses.**

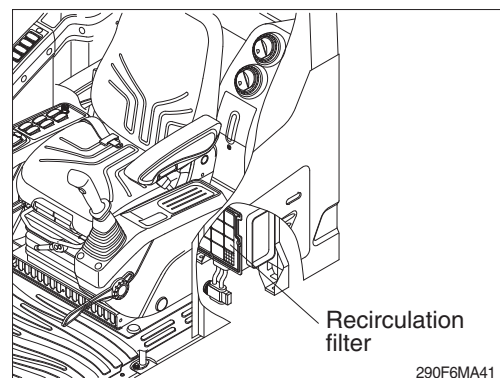
(4) **Inspect the filter after cleaning. If it is damaged or badly contaminated, use a new filter.**



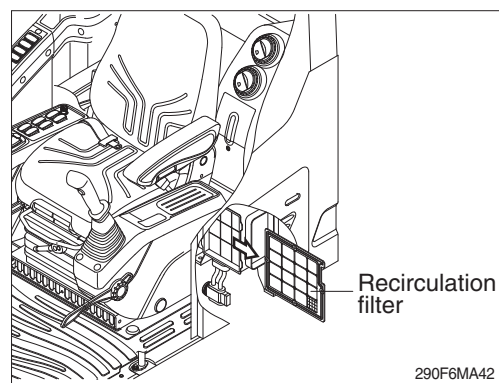
2) CLEAN AND REPLACE OF RECIRCULATION FILTER

※ **Always stop the engine before servicing.**

(1) Move seat and console box to arrow direction using the adjust knob.



- (2) Remove recirculation filter.

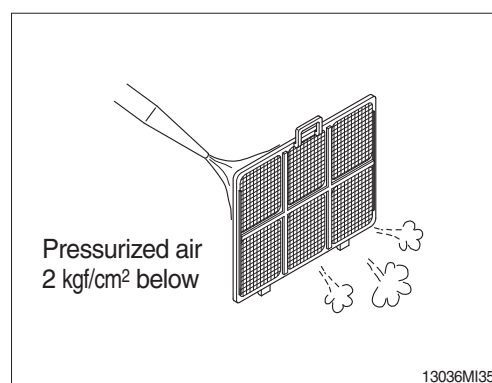


- (3) Clean the recirculation filter using a pressurized air (below 2 kgf/cm², 28 psi) or washing with water.

△ 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

TROUBLESHOOTING GUIDE

1. ENGINE

※ This guide is not intended to cover every conditions, however many of the more common possibilities are listed.

Trouble	Service	Remark
The engine oil pressure lamp lights ON when engine speed is raised after completion of warm up.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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 3-34 and 4-4.
Exhaust gas is white or blue.	<ul style="list-style-type: none"> • Adjust to specified oil quantity. • Replace with specified fuel. 	
Exhaust gas occasionally turns black.	<ul style="list-style-type: none"> • Clean or replace the air cleaner element. • Check the nozzle. • Check engine compression pressure. • Clean or replace the turbocharger. 	
Combustion noise occasionally changes to breathing sound.	<ul style="list-style-type: none"> • Check the nozzle. 	
Unusual combustion noise or mechanical noise.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Check the alternator. • Check and repair wiring. 	
Unusual noise is emitted from the alternator.	<ul style="list-style-type: none"> • Check the alternator. 	
Starting motor does not turn when starting switch is turned ON.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Charge the battery. • Check the safety relay. 	
Starting motor turns the engine sluggishly.	<ul style="list-style-type: none"> • Charge the battery. • Check the starting motor. 	
The starting motor disengages before the engine starts up.	<ul style="list-style-type: none"> • Check and repair the wiring. • Charge the battery. 	
The engine warming up lamp does not go ON.	<ul style="list-style-type: none"> • 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.)	<ul style="list-style-type: none"> • 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.)	<ul style="list-style-type: none"> • Check the monitor. • Check and repair the wiring. 	

3. OTHERS

Trouble	Service	Remark
Track slip out of place. Excessive wear of the sprocket.	<ul style="list-style-type: none"> Adjust tension of track. 	
Bucket either rises slowly or not at all.	<ul style="list-style-type: none"> Add oil to specified level. 	
Slow speed of travel, swing, boom, arm and bucket.	<ul style="list-style-type: none"> Add oil to specified level. 	
Unusual noise emitted from pump.	<ul style="list-style-type: none"> Clean the hydraulic tank strainer. 	
Excessive oil temperature rise of hydraulic oil.	<ul style="list-style-type: none"> Clean the oil cooler. Adjust fan belt tension. Add oil to specified level. 	

1. SELECTING HYDRAULIC BREAKER

※ Read safety hints in this manual and breaker & quick coupler manuals in website (Dealer Portal) before using breaker and quick coupler.

- 1) Become familiar with the manual and select breakers suitable to machine specifications.
- 2) Make careful selection in consideration of oil quantity, pressure and striking force, to enable satisfied performance.
- 3) When apply a breaker to the machine, consult your local dealer of HD Hyundai Construction Equipment for further explanation.

2. CIRCUIT CONFIGURATION

- 1) As for breaker oil pressure line, use extra spool of main control valve.
- 2) Set proper breaker pressure on load relief valve.
- ※ **The initial setting pressure of load relief valve for breaker is 200 bar.**
- 3) The pressure of the HX900 L system is 330 kgf/cm² (4690 psi).

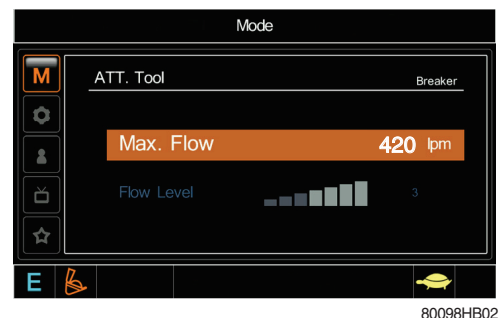
4) Adjusting oil quantity

- (1) Use the breaker mode from work tool of cluster.
Use select switch to control the oil flow quantity.
· Setting oil quantity : 420 lpm

Flow set

- Max flow : Set the maximum flow for the attachment.
- (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



- 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 HD Hyundai Construction Equipment 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	

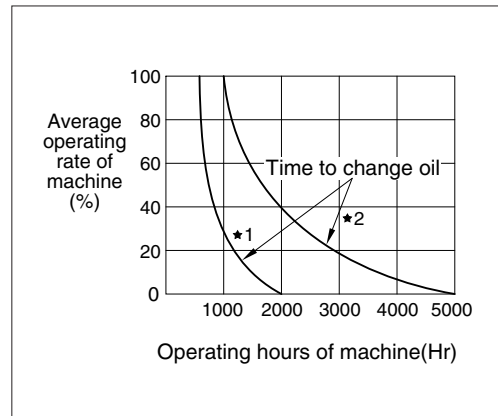
*¹: Conventional hydraulic oil

*²: HD Hyundai Construction Equipment genuine long life hydraulic oil

● Replace following filter same time

- Hydraulic return filter : 1 EA
- Pilot line filter : 1 EA
- Drain filter cartridge : 1 EA

Hyd oil change guide for hydraulic breaker



*¹: Conventional hydraulic oil

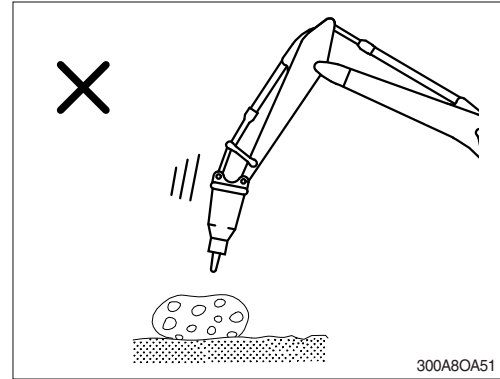
*²: HD Hyundai Construction Equipment genuine long life hydraulic oil

4. PRECAUTIONS WHILE OPERATING THE BREAKER

DO NOT BREAK ROCK WHILE LOWERING

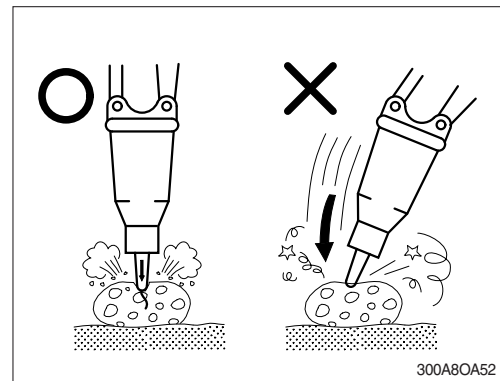
As the breaker is heavy in comparison with bucket, it must be operated slowly.

If breaker is rapidly pushed down, working device may be damaged.



DIRECTION OF THRUST

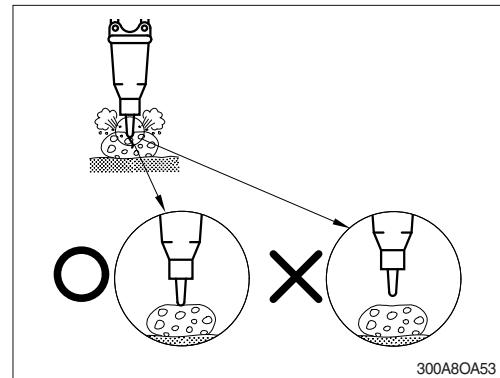
Apply a thrust in a straight line with the tool. Place the tool on a rock with the hammering side as vertically as possible. If the hammering side is oblique, the tool may slip during hammering, causing the chisel and piston to break, or seized. When breaking, select the point of a rock on which hammering can perform stably and fully stabilize the chisel to the hammer.



PROPER THRUST

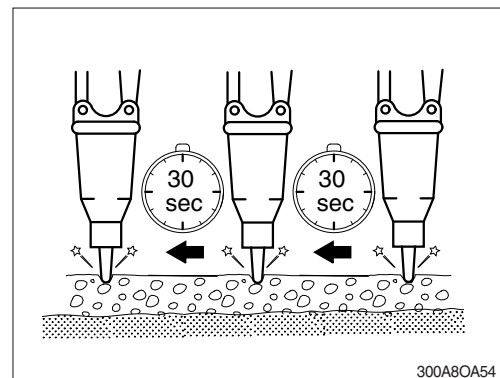
To break effectively, a proper thrust force must be applied to the breaker. If thrust is too low, impact energy of the piston may not be sufficient to break rocks.

Breaking force is transferred to the breaker body, arm and boom resulting in damage of those parts.



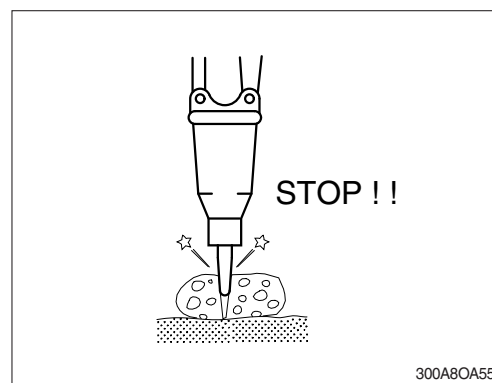
Move the impact point from the edge to the interior. Never try to break off a too large block, if the object has not broken within 30 seconds. The object should be broken up piece by piece in small blocks. Large distance steps will not improve working results.

Operating the breaker longer than 30 seconds may cause damage to the breaker.



BLANKS THRUST

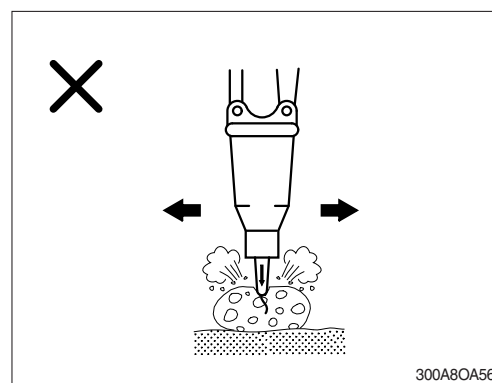
Blank blows, which are impact on the chisel without contact with the object, are very harmful for the breaker. Always press the chisel down onto the material before starting the breaker. And stop operation immediately as soon as the object has been broken. If operation is continued, blank blows could result in excessive wear to major components.



DO NOT MOVE MACHINE OR BREAKER WHILE STRIKING

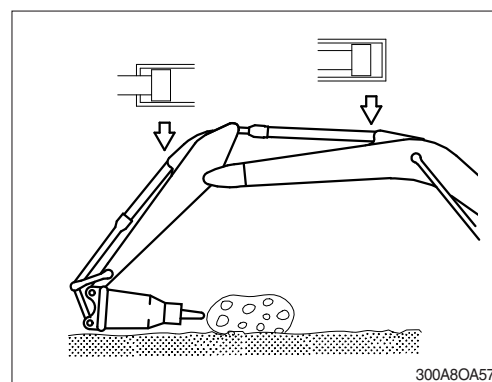
Do not move hammer while striking.

This will cause damage to the working device and the swing system.



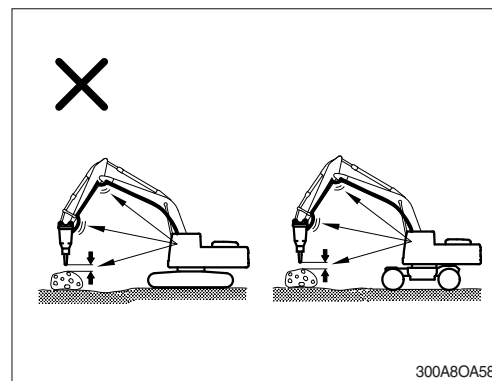
OPERATE BREAKER WITH A GAP IN EXCESS OF 100 mm (4 inches) FROM THE END OF THE STROKE TIP

If breaker is operated with the end tip, the cylinder may be damaged.



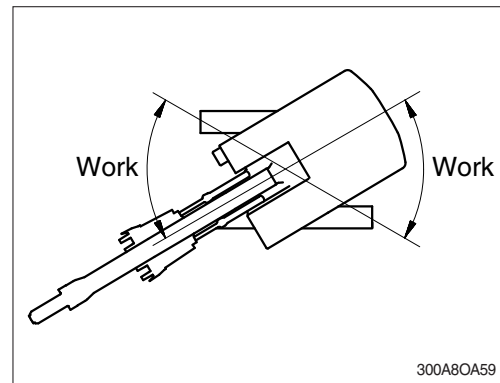
STOP THE OPERATION IMMEDIATELY IF HOSES VIBRATE EXCESSIVELY

Violent pulsations of the high / low pressure breaker hoses could indicate an accumulator fault. Check for oil leaks at the hose fitting points retightening as necessary. Should symptoms persist, contact the service shop appointed by the Hyundai dealer in your territory for repair. An excessive gap between tool and workpiece between strikes may indicate seizure of the tool in the front head. Disassemble the front head, inspect the components and repair or replace defective parts.

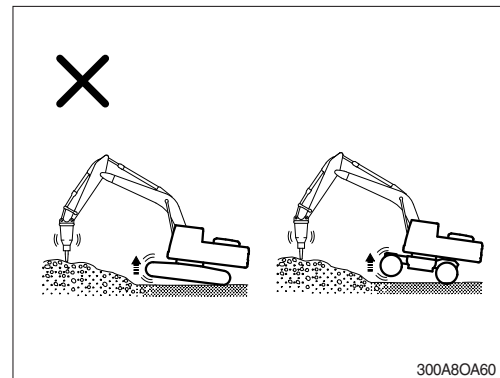


DO NOT WORK WHILE IN A SWING STATE

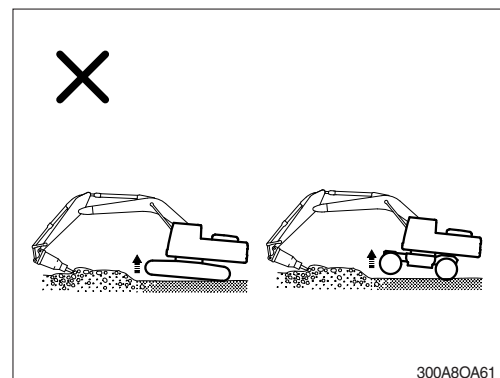
Do not work while swinging the upper structure. It cause oil leakage of the bend in the track shoe and rollers.



Conversely, if thrust is excessive or breaking is performed with boom of the lower chassis raised as shown, the machine may suddenly tip toward the movement. The breaker body may strike the broken rocks violently resulting in damage.

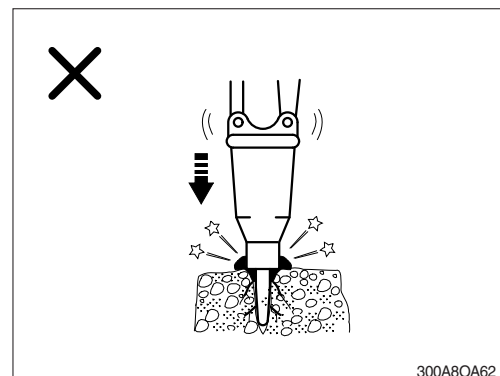


Do not extend the bucket cylinder fully and thrusting to raise the machine off the ground.



Excessive force as above may also result in vibrations being transmitted to the tracks causing damage.

Care is required to ensure adequate but not excessive force is applied to the breaker in operation.



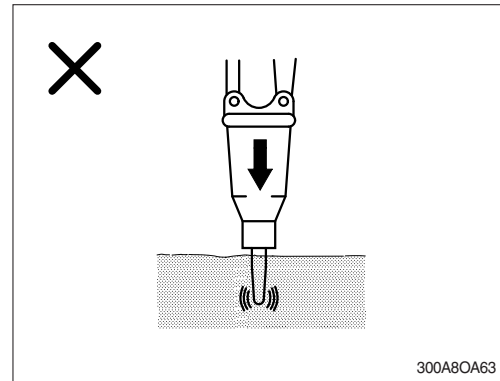
NEVER DRIVE THE CHISEL INTO THE GROUND

If the advance is too large and the chisel is not rocked to release the dust, the chisel will be driven into the material without breaking the material. This causes the chisel tip to glow red-hot and lose its hardness.

As a result, the chisel wears out more quickly. Operating in this way is not permitted.

Dust dampens impact power, when the chisel is inserted into the ground, and reduces the efficiency of the breaker. Tilt the breaker slightly backward and forward, not more than 5° , while operating so that the dust can escape.

Do not rock the breaker at angles greater than 5° or the chisel will be broken.

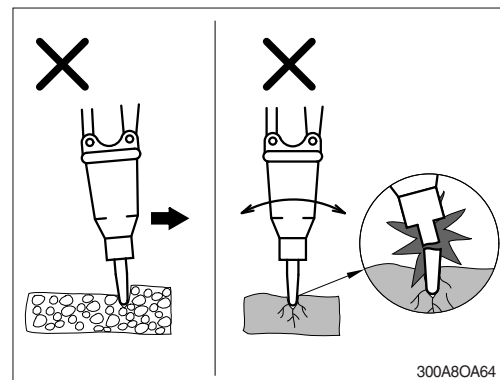


NEVER USE AS A LEVER

Do not use the chisel as a lever; e.g. crowbar, as this will cause the chisel to break.

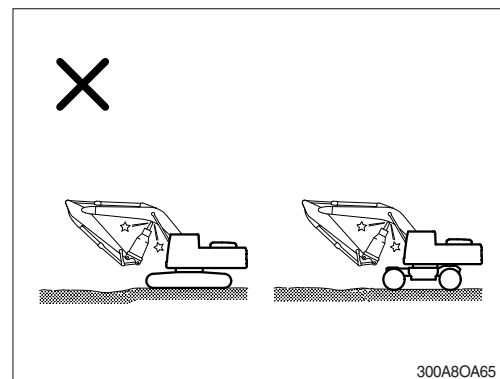
Under any circumstances, operating in this way is not permitted.

Most of bending failure of the chisel may be caused by lever action in stone that is inside hard or frozen ground. Be careful and stop operating if you feel sudden resistance under the chisel.



TAKE CARE OF CHISEL AND BOOM INTERFACE

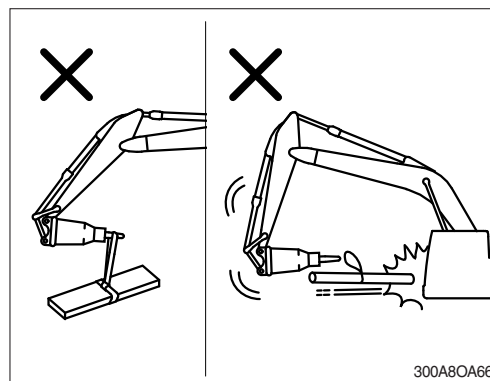
Be aware of clearance between breaker tip and the underside of boom as shown.



NEVER USE FOR LIFT OR TRANSPORT PURPOSES

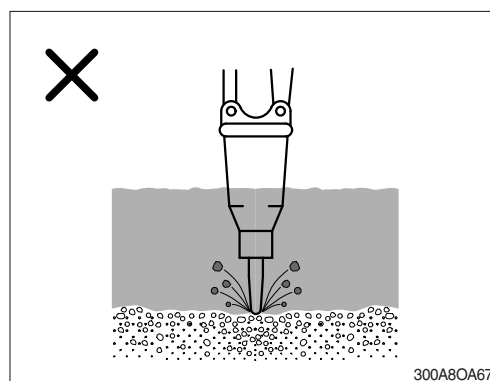
The hydraulic breaker is not designed to lift or transport loads. Never use the chisel as a lifting point.

This is dangerous and could damage the breaker or the chisel.



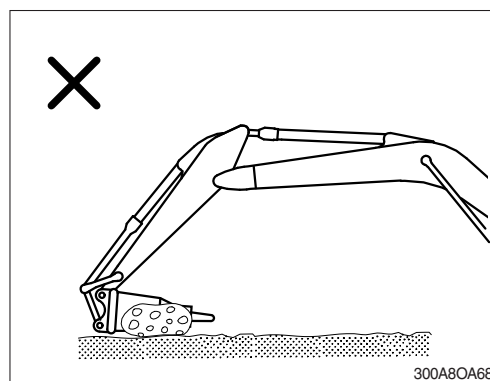
NEVER USE THE HYDRAULIC BREAKER UNDER WATER

The hydraulic breaker, as a standard assembly, never be used in or under water without prior conversion. If you use under water, water fills the impact chamber between the piston and the chisel, a strong hydraulic pressure wave is generated and will damage the seals in the breaker. And, in addition, corrosion, lack of lubrication or penetration of water could result in further damage to components of the breaker and the lower chassis. To operate the breaker under water, compressed air must be supplied into the breaker, into the impact chamber of the front-head, prior to use. Consult your HD Hyundai Construction Equipment dealer for the underwater kit.



DO NOT USE BREAKER TO CARRY BROKEN STONE OR ROCK BY SWING OPERATING

This may damage the operation device and swing system.

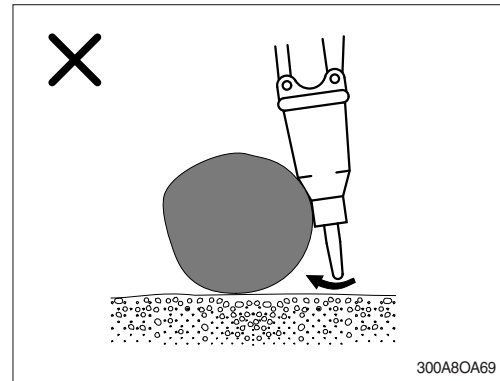


NEVER USE THE CHISEL OR HYDRAULIC BREAKER TO MOVE ROCKS OR OTHER OBJECTS

The hydraulic breaker is not designed for this usage.

Do not use the breaker or chisel to roll, push the object or reposition the lower chassis.

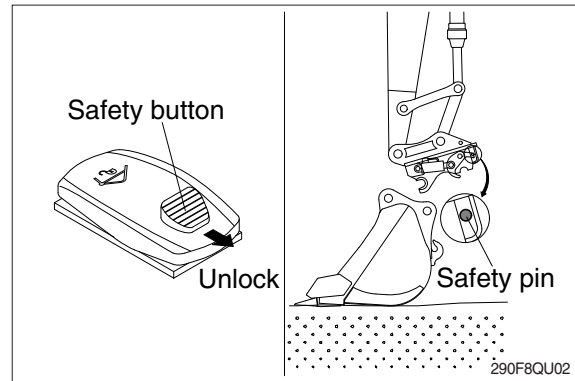
This may cause damage to the breaker and the lower chassis.



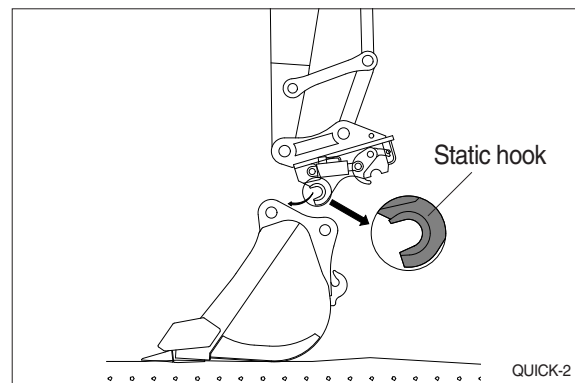
5. QUICK CLAMP

1) FIXING BUCKET WITH QUICK CLAMP

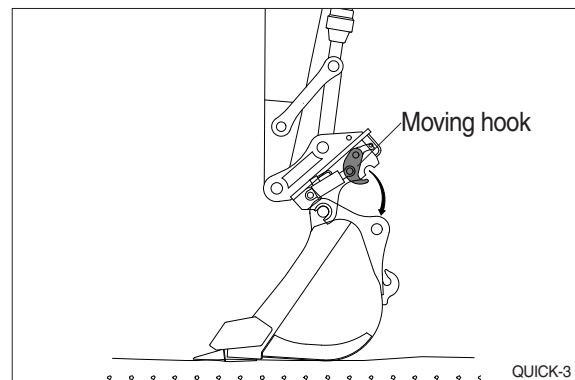
- (1) Before fixing bucket, remove safety pin of the moving hook.
- (2) Pulling safety button, press the quick clamp switch to unlock position. Then, the moving hook is placed on release position.



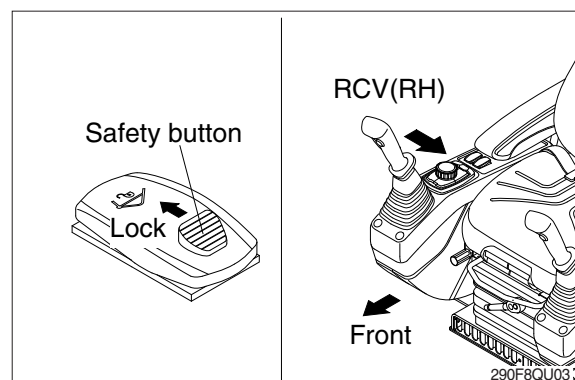
- (3) Aligning the arm and bucket, insert static hook of quick clamp to the bucket pin.



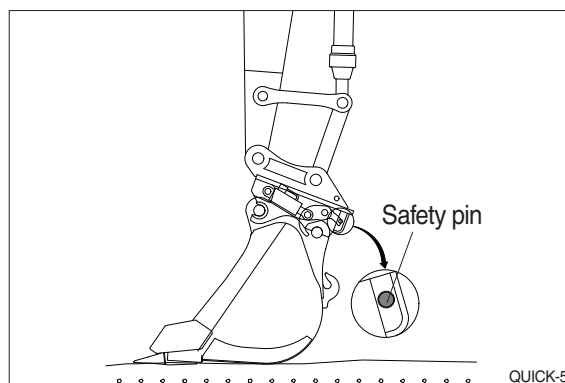
- (4) Operate RCV lever to bucket-in position. Then, the moving hook is coupled with the bucket link pin. Make sure that the moving hook is completely contacted with bucket link pin.



- (5) Push safety button to lock position. Operate RCV lever to bucket-in position.
- ※ **Be sure to check connection status between bucket pins and hooks of quick clamp.**



- (6) After checking the connection status between bucket pins and hooks of quick clamp, **insert safety pin of moving hook to lock position.**



2) REMOVE BUCKET FROM QUICK CLAMP

Removing procedure is reverse of fixing.

3) PRECAUTION OF USING QUICK CLAMP

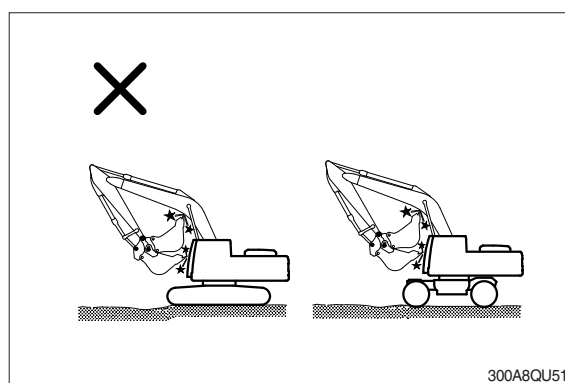
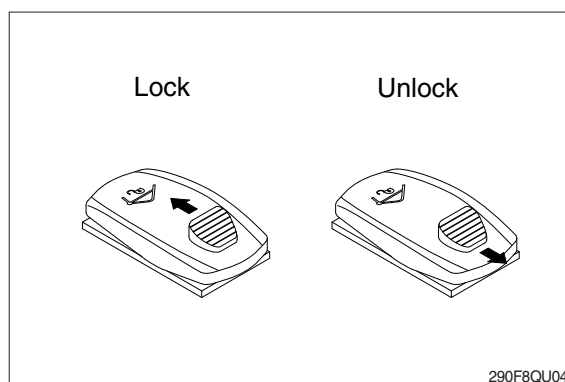
- ⚠ When operating the machine with quick clamp, confirm that the quick clamp switch is lock position and safety pin of moving hook is inserted.

Operating the machine with quick clamp switch unlocked and without safety pin of moving hook can cause the bucket to drop off and bring about the accident.

- ⚠ Serious injury or death can result from this accident.

- ⚠ Be careful to operate the machine equipped with quick clamp. The bucket may hit cab, boom and boom cylinders when it reaches vicinity of them.

HD Hyundai Construction Equipment will not be responsible for any injury or damage in case that safety pin is not installed properly.



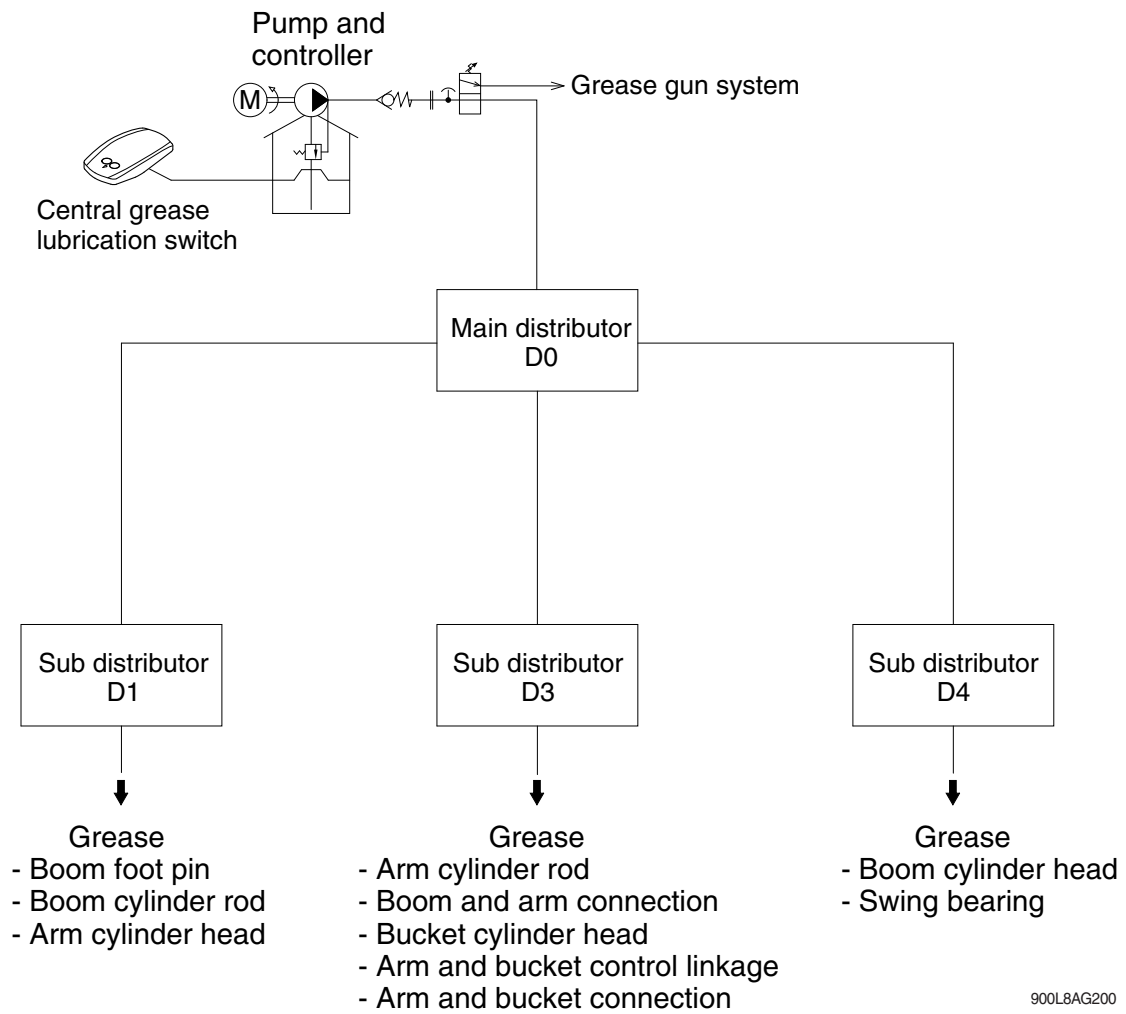
6. CENTRAL GREASE LUBRICATION SYSTEM

1) SAFETY INSTRUCTION

Please observe the contents of the following description to use this product safely. In this manual warning and caution are intended to prevent death or serious injury that may be caused to the operator who are around the product and damage that may be caused the articles that are around the product, as well as to use safely and correctly.

- (1) Do not use strange materials to clean the pump in any case.
Otherwise it may cause damage and explosion of pump.
- (2) Do not remodel the pump in any case . It may result in a bodily accident or failure.
- (3) Do not use gasoline to clean the pump in any case. It may cause ignition or explosion.
- (4) Do not use any solvent or chemical which corrode these materials .
- (5) Do not operate the gun lever with the discharge port facing to another person during machine operation at any case.
- (6) Do not use silicon grease
- (7) After the end of using pump, please be sure to shut off the power of this machine to release the internal pressure.
- (8) When replacing any port as maintenance, please be sure to stop the power to the machine to avoid having fingers nipped because of a malfunction.
- (9) Using of the pump for other purpose could lead to personal injuries or damages on properties.

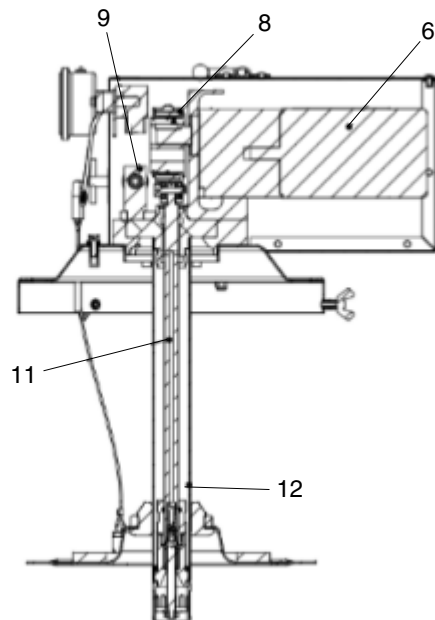
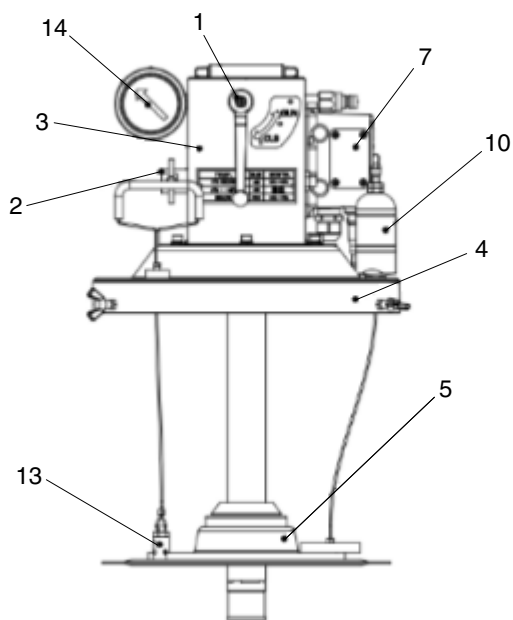
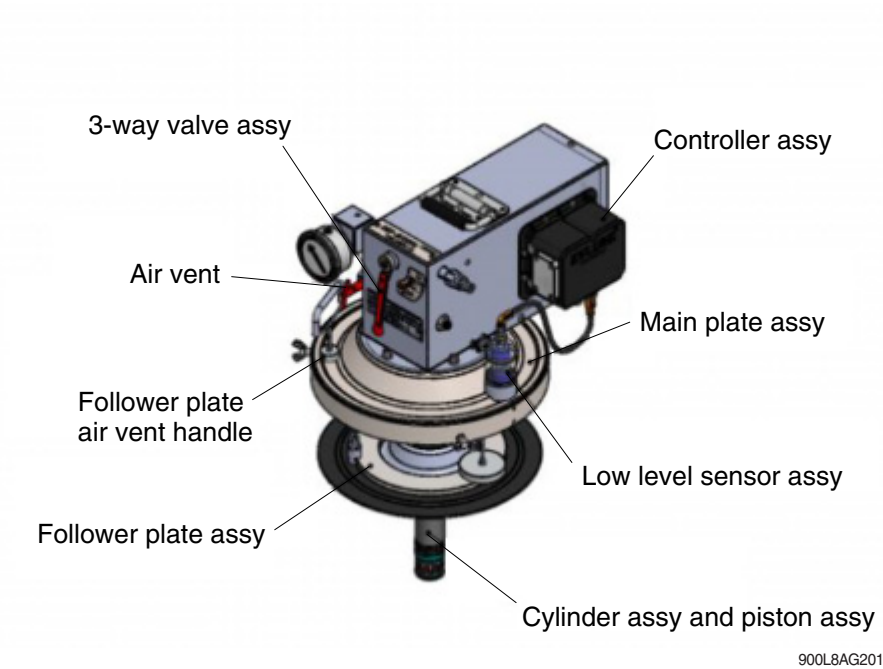
2) SYSTEM LAYOUT



※ Refer to 8-23 page for details.

3) PUMP DEVICE

(1) Major component



900L8AG202

- | | | | | | |
|---|----------------------|----|------------------|----|-------------------------------------|
| 1 | 3-way valve assy | 6 | Motor assy | 11 | Piston assy |
| 2 | Inline air vent assy | 7 | Controller | 12 | Cylinder assy |
| 3 | Pump cover assy | 8 | Cam assy | 13 | Grease level gauge & airvent handle |
| 4 | Main plate assy | 9 | Distributor assy | 14 | Pressure gauge block assy |
| 5 | Follower plate assy | 10 | Low level sensor | | |

(2) Specification

Item	Specification
Input power	24 VDC
RPM	25 rpm
Current	Max 15 amp
Output volume	50 cc/min \pm 20 %
Discharge pressure	Max. 280 bar \pm 20 % at 20 °C, NLGI No.2
Operating temperature	-35 to 70 °C (depending on the grease type)
Lubricant	NLGI No. 000 ~ NLGI No. 2
Filter	1st filter : #30, 2nd filter : #50
Dimension (W x L x H)	369 x 419 x 496 mm
Grease canister	I.D : 280~300 mm, Height : 345 mm

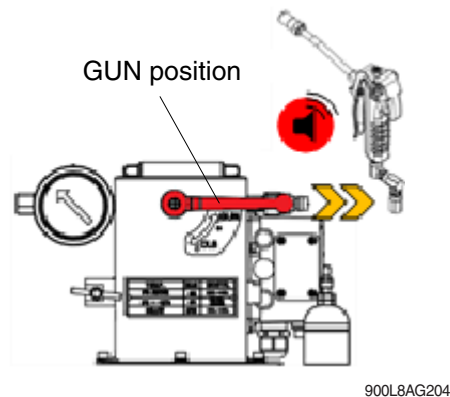
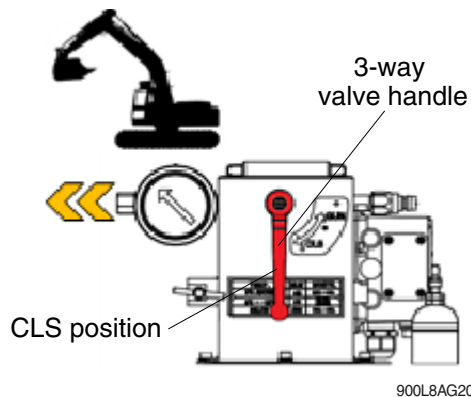
(3) Grease at temperature

Temperature	NLGI	Remark
0°C above	#2	-
0 ~ -15°C	#0	-
-15 ~ -29°C	#00	Suited for extremely low temperature
-30°C below	#000	

- ※ It could be reducing a grease output volume after 30 min running.
- ※ When you use pump lower than -10°C continuously, you should use a low temperature grease and check air bubble periodically.

(4) Selection of mode

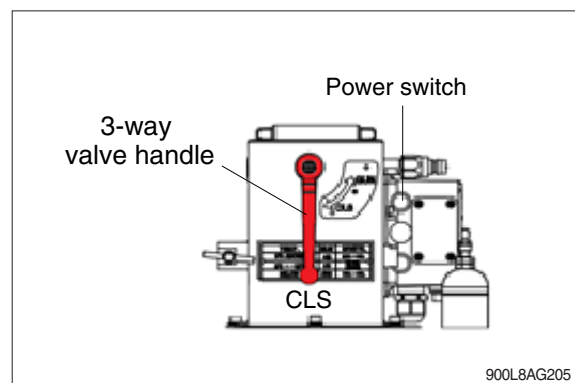
- ① Two kinds of operation modes can be selected as below.



② CLS mode

Please follow the following process to change CLS mode.

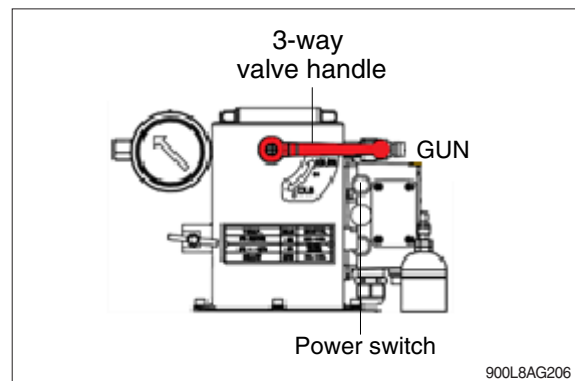
- Power switch OFF.
- Change 3-way valve handle to CLS position
- Power switch ON.



③ GUN mode

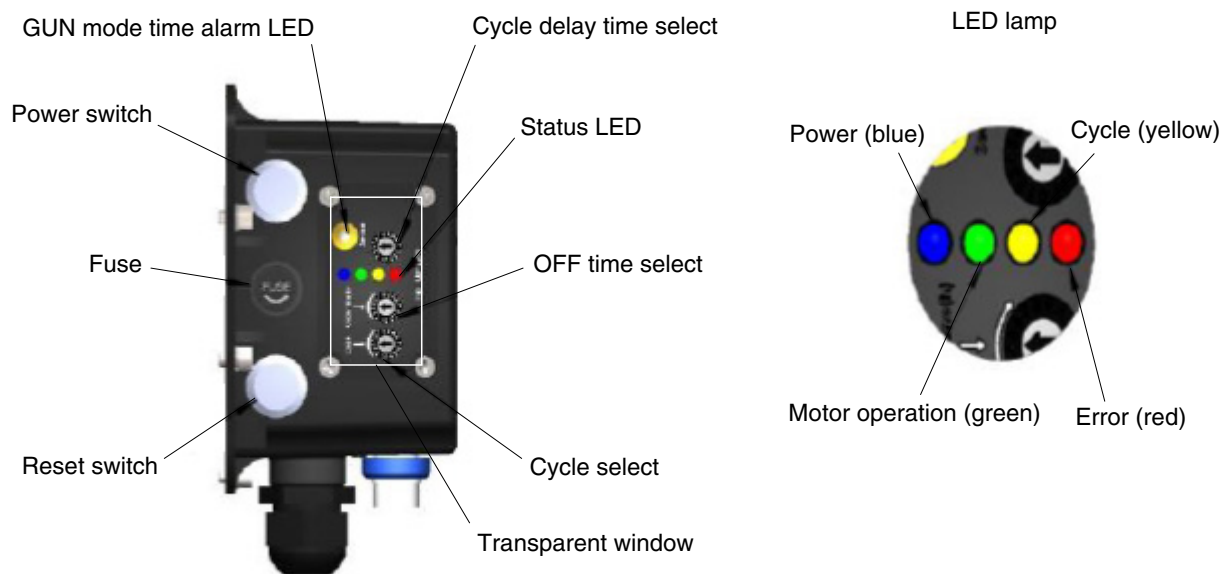
Please follow the following process to change GUN mode.

- Power switch OFF.
- Change 3-way valve handle to GUN position
- Power switch ON.

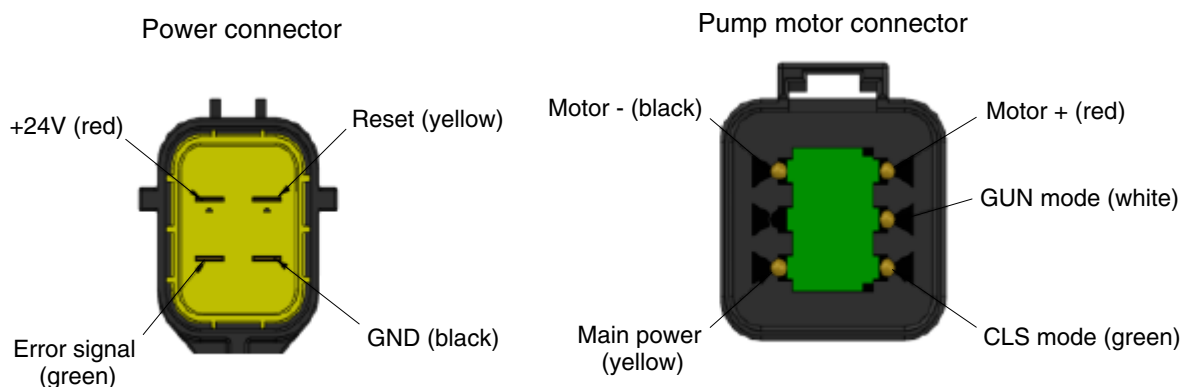


4) CONTROLLER

(1) Control panel and connector



900L8AG207



900L8AG208

(2) Specification of controller

Item	Specification
Power	24 VDC
Current	Max. 6 amp.
Control	Cycle No. of main distributor stroke
Temperature	On stock : -40 ~ +85 °C
	In service : -35 ~ +70 °C
Lube cycle	Max. 32
Off time	0.5 h up to 32 h

(3) Parameter change procedures

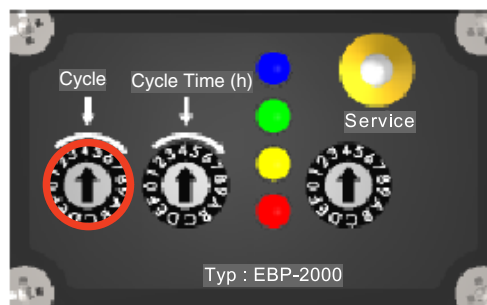
This procedures are carry out at the CLS mode.

- a. Power switch OFF.
- b. Open transparent window in front of the controller.
- c. Set number of lube cycle with a minus (-) screw driver.
※ **Refer to 8-15 page for details.**
- d. Set number of lube off time with a minus (-) screw driver.
※ **Refer to 8-15 page for details.**
- e. Close transparent window.
- f. Power switch ON.
- g. After one lube cycle off, push reset switch.
- h. Check whether pump is working as programmed or not.
※ **Please check number of moving a stroke of D0 distributor sensor or cycle LED at LED display.**
▲ **Please make sure to close controller transparent window.**
▲ **If it is not closed perfect, it will cause malfunction of controller**
▲ **Please change lube on and lube off cycle setting according to the working condition of equipment such as working hours per day, working environment etc.**

(4) Parameter selection

① Cycle

Number of lubrication cycle can be selected with rotary switch "Cycle". (standard 16 cycle)

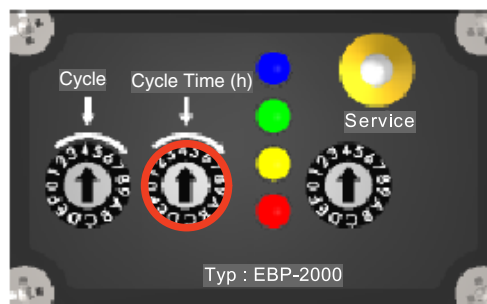


900L8AG209

Mark	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Cycle	0	1	2	3	4	5	6	7	8	9	12	16	20	24	28	32

② Off time

Off Time can be selected with rotary switch "Cycle Time (h)". (standard 0.5 h)



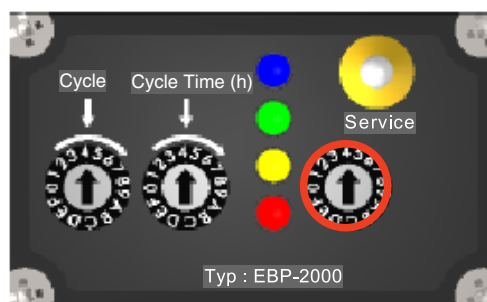
900L8AG210

Mark	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Off time (h)	0.5	1	2	3	4	5	6	7	8	9	12	16	20	24	28	32

③ Cycle delay time

(Please let this parameter as standard without modification)

Cycle delay time can be selected with rotary switch "Service". (standard 12 min)



900L8AG211

Mark	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Cycle delay time (h)	0.5	1	2	3	4	5	6	7	8	9	12	16	20	24	28	32

(5) LED lamp display

① Lube on/off and error

Status	Reason	Reference	LED display
Standby	Controller standby	Not error	CLS system LED
Lube on	Working lube on (motor running)	Not error	Pump running
Cycle error	Stop main distributor	See page 8-21	Cycle error Check the system in accordance with the guideline Cabin
	Pump out of order	See page 8-20	
Level error	Grease level too low	See page 8-17	Level error Cabin Replace a new lubricant

② Reset switch and buzzer

Status	Control panel	Reset switch / buzzer
Standby	CLS system LED 	
Pump running	Pump running 	
Stroke error	Cycle error Check the system in accordance with the guideline	
Level error	Level error Replace a new lubricant	

※ Green LED on reset switch is displayed when error occurs.

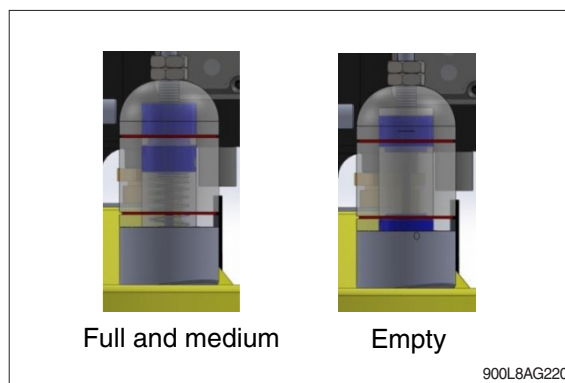
5) GREASE LEVEL CHECK AND REPLACE GREASE CANISTER

(1) Check grease level

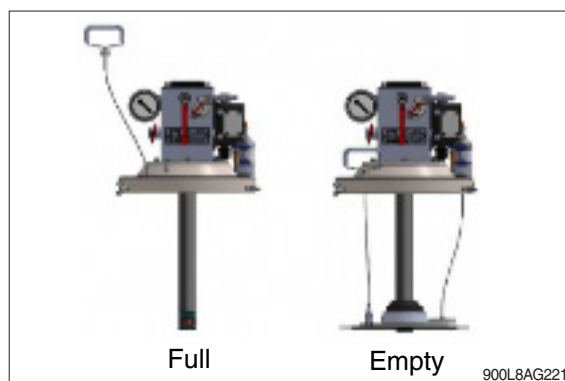
Grease level could be checked as follows.

- ① Error LED of controller : Refer to page 8-16.

- ② Level sensor of pump



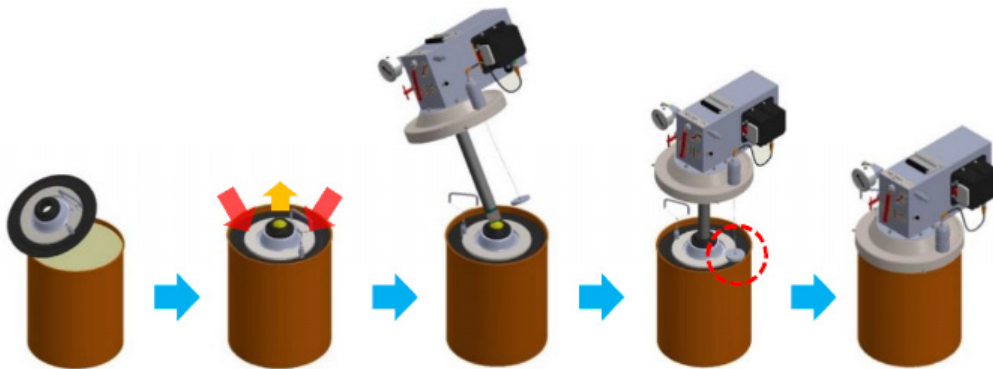
- ③ Air vent handle of follower plate



(2) Replace grease canister

Please follow the below procedure.

- ① Power switch off.
- ② Open clamp and unfasten wing bolt (3EA).
- ③ Pull air vent handle of follower plate up.
- ④ Remove grease pump from grease canister.
- ⑤ Remove grease canister and fix a new grease canister and open cover of canister.
- ⑥ Arrange follower plate to be fixed the center of grease canister and check below.
 - a. Level sensor cable to be striated.
 - b. air vent handle cable to be striated.
- ⑦ Insert pump into grease canister and push follower plate down as well as.
- ⑧ Close clamp and fasten wing bolt (3EA).
- ⑨ Power switch on.
- ⑩ Remove air bubble with air vent according to the instruction.
※ Refer to page 8-19 for details.



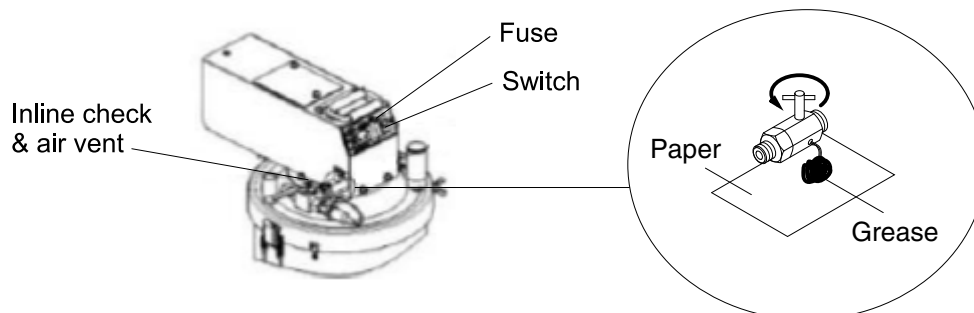
900L8AG222

- ※ Please follow the reversed procedure of the above procedure when you take out pump from canister. Please check air vent when you replace grease canister if there is not higher pressure or low grease output volume.

6) REMOVE AIR POCKET

- (1) Turn 3-way valve handle to GUN position.
- (2) Lay paper down under air vent.
- (3) Push reset switch ON.
- (4) Open air vent until air mixed grease come out completely.
- (5) Close air vent and turn 3-way valve handle to CLS position.
- (6) Check pressure gage.

※ The grease mixed air is cloudy in white



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7) MAINTENANCE

(1) Pump device

Interval	Item	Remarks
Daily	Pump Controller	Check output pressure Check status of controller display
Monthly	Check pump clamping Controller Grease level Parts fastened	Check pump Push reset switch (page 8-13) and check Check grease level sensor and manual level handle Check and make it fasten if necessary

(2) Lube system

Interval	Item	Remarks
Daily	Lube point & gage	Check visually lubrication status of lube points & gage
Weekly	Distributor leakage Lubricant level	Please change fitting or make it tidy if leakage Check grease level with level sensor and manual lever
Monthly	Grease output pressure Lube line	Check pressure gage Check lube visually

8) TROUBLESHOOTING

(1) Pump device

Item	Reason	Solution
Pump does not work	Power off Electric cable connector disconnected Fuse out Pump motor broken	Check fuse and 3-way valve handle Re-connect cable connector Change fuse Change motor assy
Grease are not discharged although pump operate	Grease low level Air pocket occurred Filter blocked Piston assy broken	Change grease canister Remove air pocket using air vent Check filter and clean Change piston assy
Pump could not have either a high pressure or accurate grease volume	Air pocket at inside pump Filter blocked Pump seal broken Relief valve broken	Remove air pocket using with air vent Check filter and clean Change cylinder assy Relief valve re-adjust or change distributor assy
Reduced pump RPM	High pressure in lube line Too low temperature	Check lube line and points. Change kind of grease as low temperature grade
Pumping pressure will be gone up too high	Relief valve adjusted too high	Relief valve re-adjust or change distributor assy
Others	Contact to HD Hyundai Construction Equipment dealer or service center.	

(2) Lube system

Item	Reason	Solution
Grease are not delivered to certain lube point	Lube line broken Lube point broken Distributor blocked	Change lube point fitting and line Check lube point blocked Change distributor
Cycle error	Please push reset switch and check cycle error again and follow the following procedure if there is cycle error will not be gone	
	Grease empty Air pocket occurred Certain lube point blocked Lube line blocked Distributor blocked, broken or leakage Pump out of order	Please refer to page 8-18 Remove air pocket Check lube point Check lube line Check distributor and change it Check pump as pump manual
Noise at certain point	Lack of grease Blocked lube point	Adjust lube on cycle (refer to page 8-14) Check Lube point
Main distributor (D0) are leaked and pressure gage goes up to higher	Seal broken due to over pressure occurred by certain lube point blocked Filter blocked at front of main distributor (D0)	Change seal and repair lube point blocked Clean filter
Level sensor error	Check grease level Temperature too low	Change grease canister Change kind of grease as pump manual
Others	Contact to HD Hyundai Construction Equipment dealer or service center.	

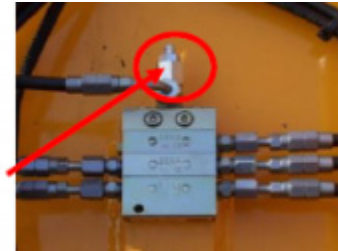
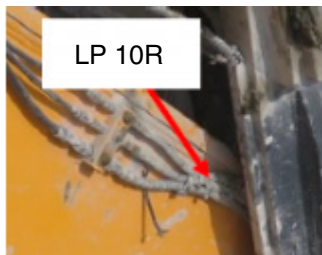
(3) Find distributor and lube line blocked

Please follow the following information. (refer to page 8-25)

- ① Disconnect input main lube line of main distributor (D0).
- ② Check whether grease come out through main lube line or not.
- ③ Connect main lube line and check each outlet of distributor as one by one after disconnect each sub lube line to each sub distributor.
- ④ Please check for sub distributor as main distributor (D0) done.
- ⑤ Although all distributor and lube line are not out of order, if grease could not come out through certain distributor or lube line, it means this distributor or lube line is blocked.
Therefore please change this distributor or lube line.
- ⑥ Although all distributor and lube line are not out of order, if cycle sensor error display continually, please connect at this lube point with manual grease gun and check it.

9) GREASE NIPPLE FOR MANUAL FILLING

There is grease nipple installed at distributor and grease nipple block for filling grease needed additionally or emergency.

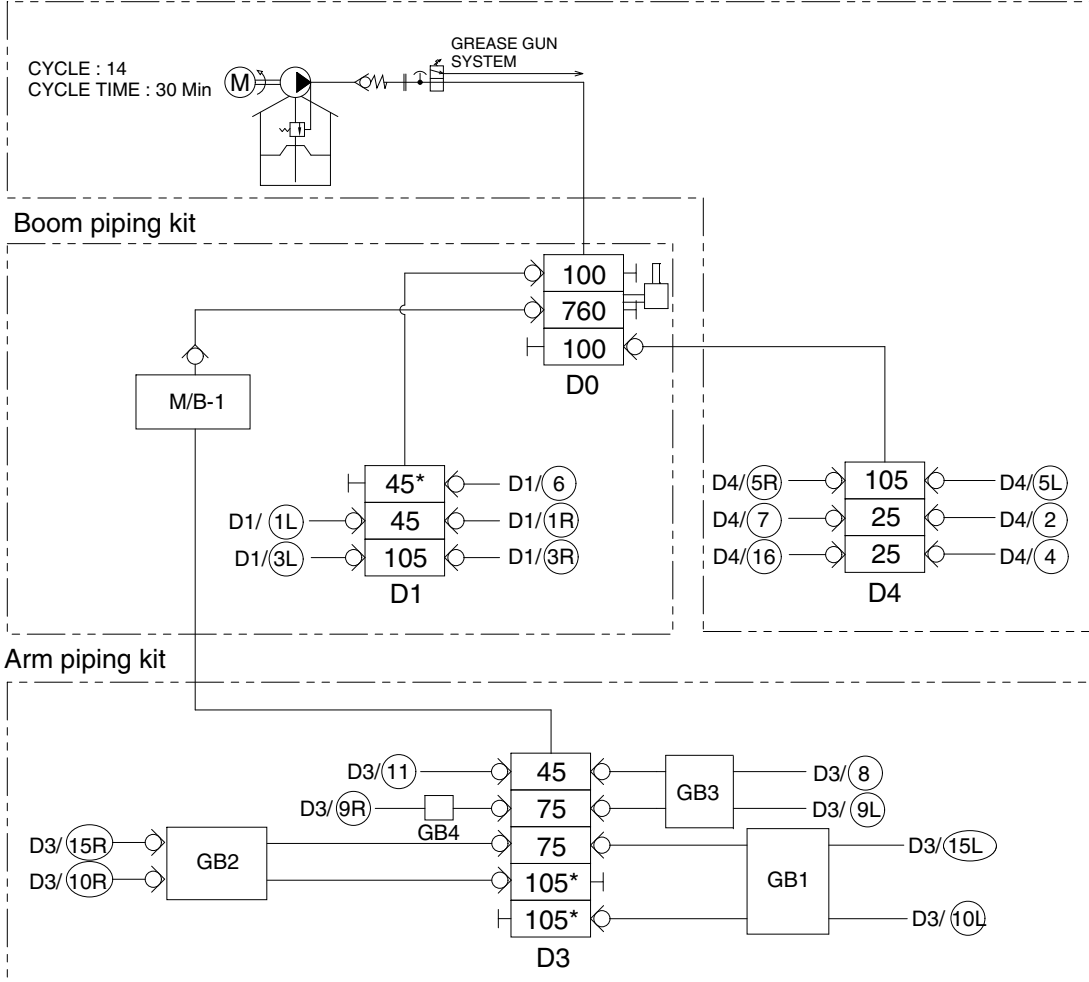


900L8AG224

10) SYSTEM DIAGRAM

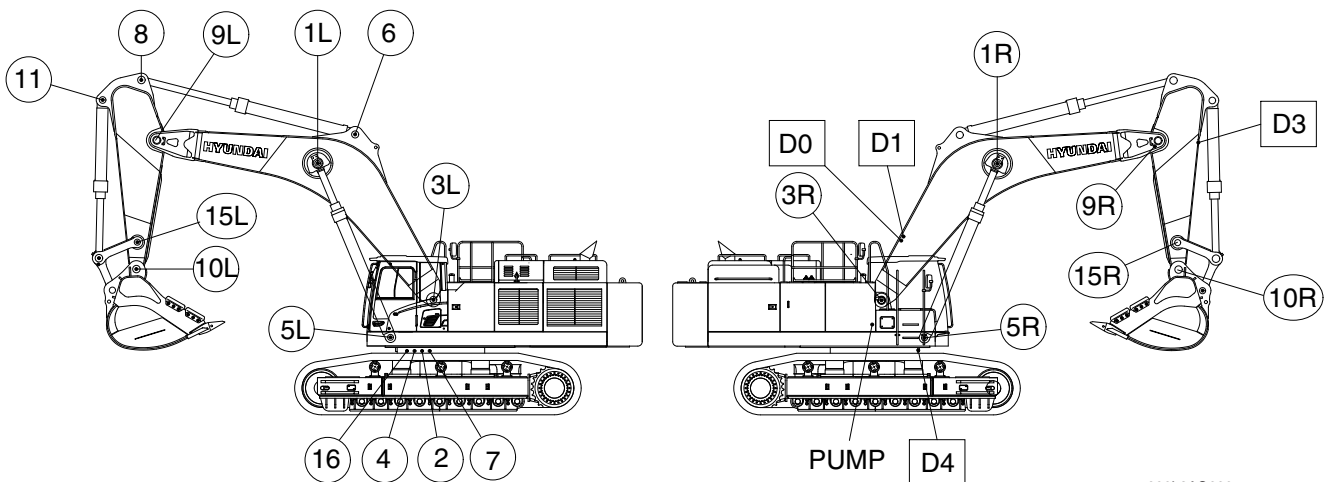
(1) Lube system

Main piping kit



900L8AG225

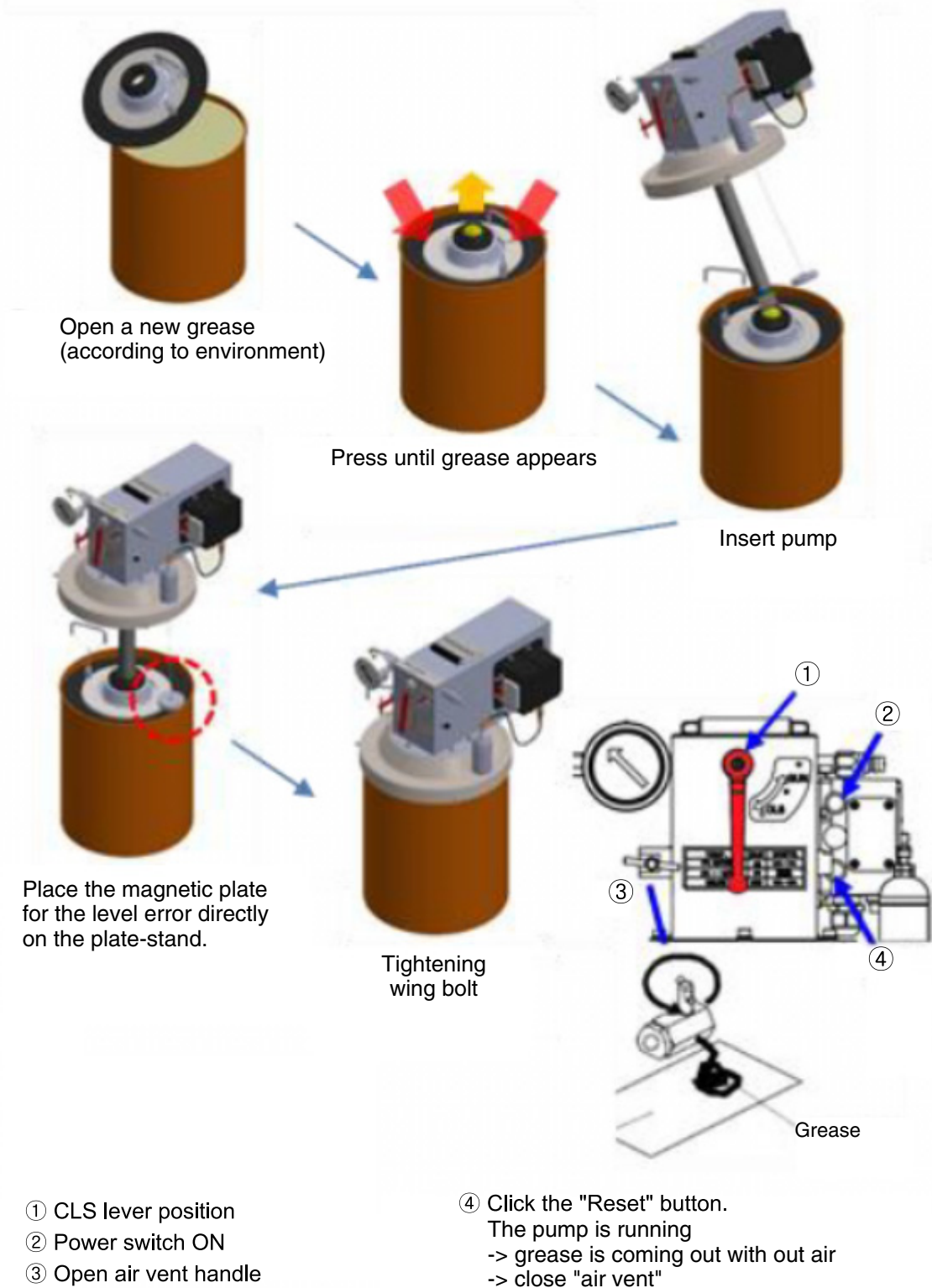
(2) Lube point



900L8AG226

Appendix 1

Replace a new lubricant

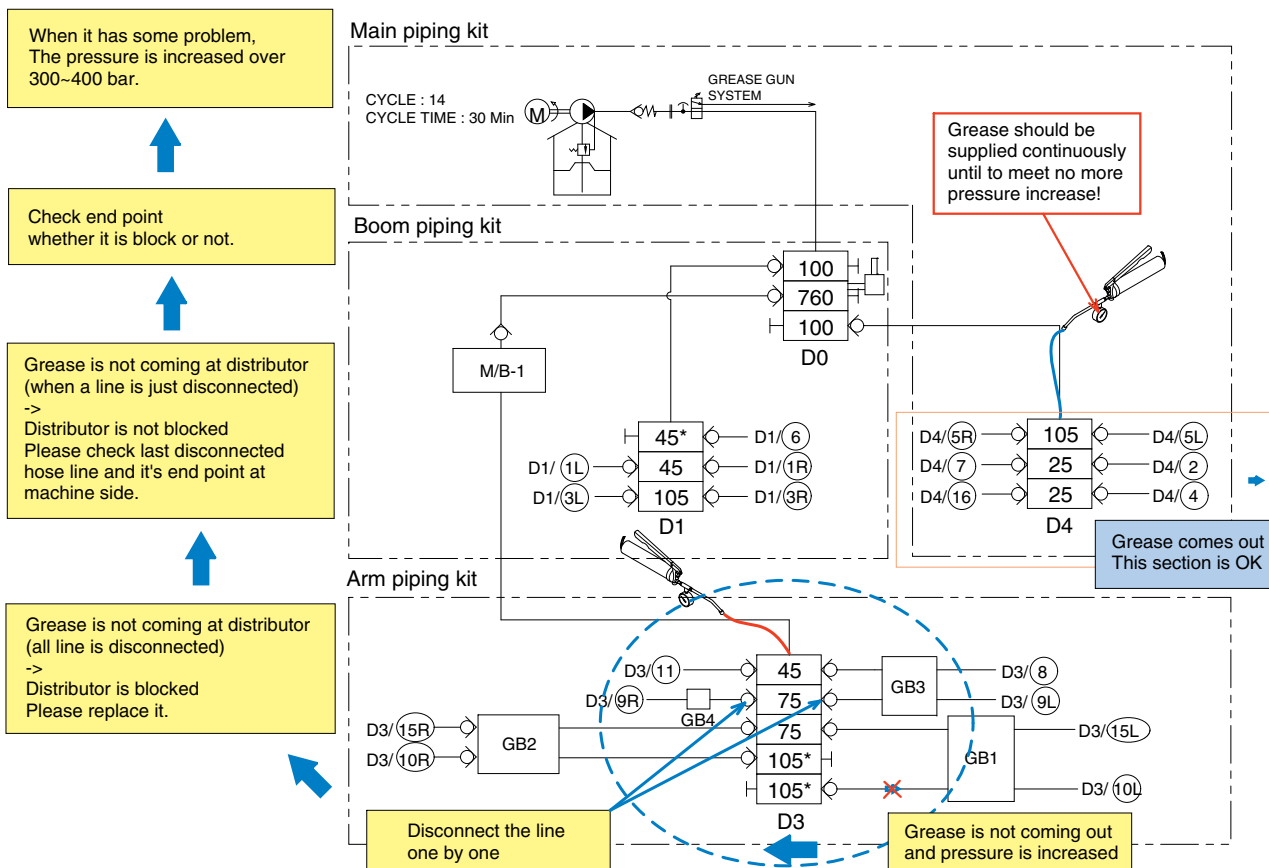
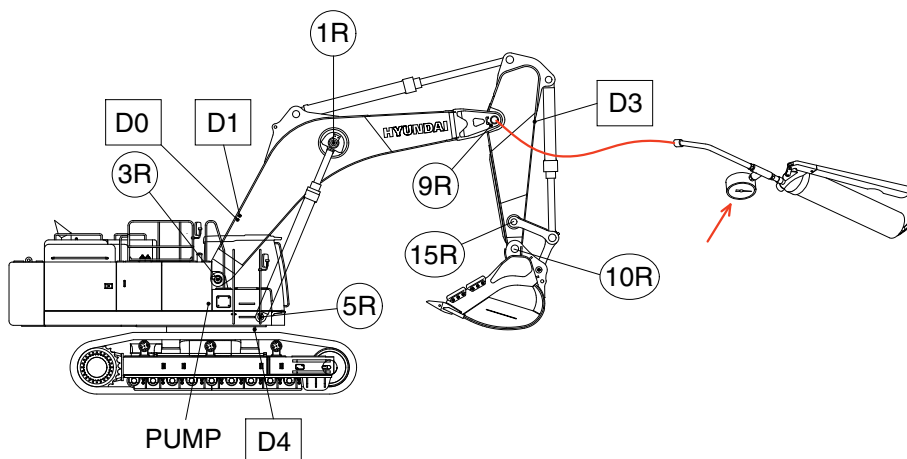


900L8AG230

Appendix 2

Example

To find out the end blocked point



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