CONTENTS

FOREWORD

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

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

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

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

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

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

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

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

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

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

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

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

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

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.

L_{WA} : 106dB (EU only)

L_{PA} : 74dB

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

CE

EC Declaration of Conformity

(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.

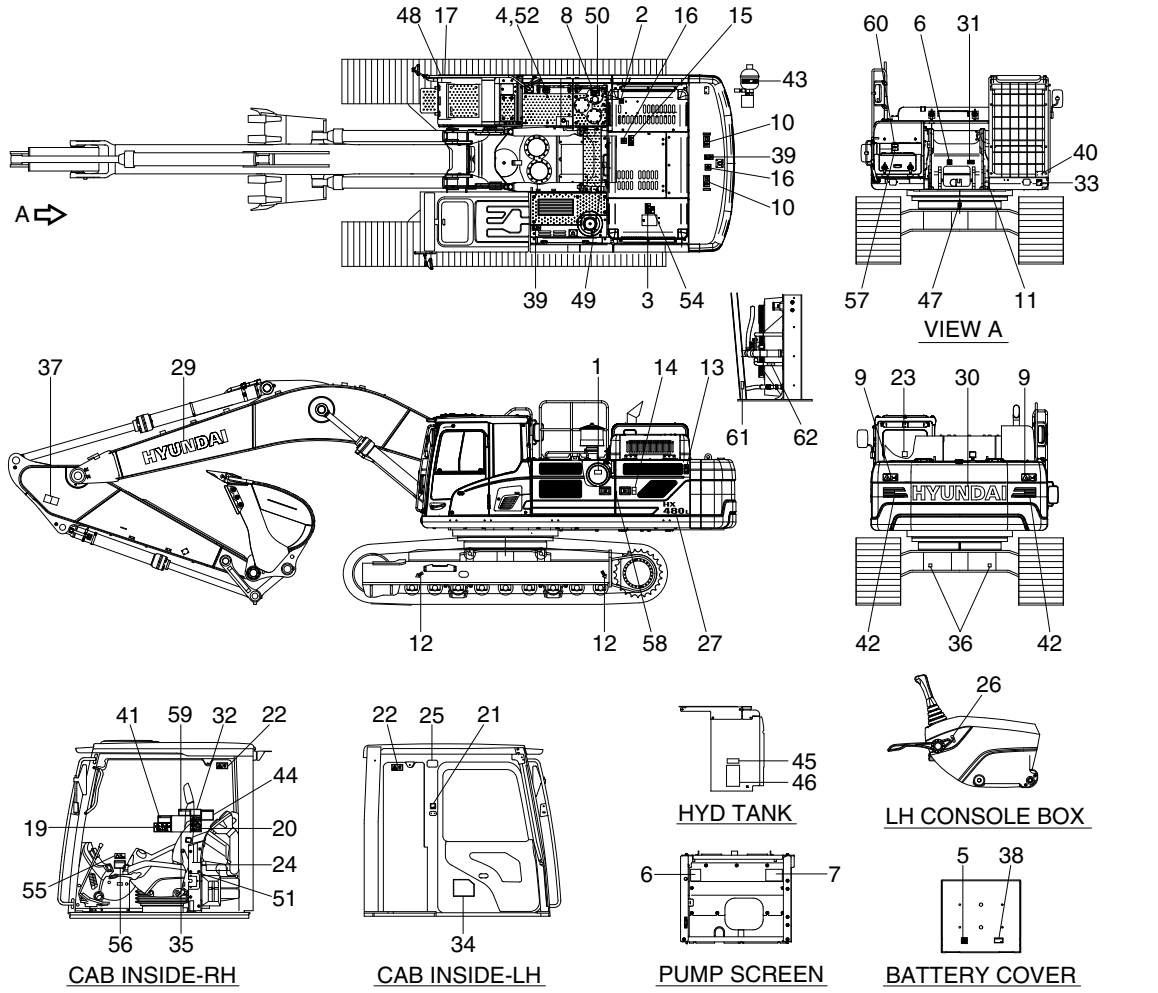
TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

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

SAFETY LABELS

1. LOCATION

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



480F0SL01

1	Air cleaner filter	22	Safety front window	43	Accumulator
2	Turbocharger cover	23	Safety rear window	44	M/control pattern change valve
3	Radiator cap	24	Air conditioner filter	45	M/control pattern change-w/o valve
4	Fueling	25	ROPS plate	46	M/control pattern change-w/valve
5	Battery accident	26	Safety knob	47	Swing bearing grease
6	High pressure hose	27	Model name	48	Battery position
7	Hydraulic oil level	29	Trade mark (boom)	49	Lubrication oil
8	Hydraulic oil lub	30	Trade mark (CWT)	50	Fuel shut off
9	Keep clear-rear	31	Reduction gear grease	51	MCU/ECM connector
10	Lifting eye	32	Clamp locking	52	Ultra low sulfur diesel
11	Name plate	33	Noise level LWA	54	Surge tank
12	Slinging ideogram	34	Service instruction	55	Key off caution
13	Keep clear-side	35	Lifting chart	56	RCV lever
14	Stay fix	36	Tie	57	Diesel exhaust fluid
15	Engine hood shearing	37	Keep clear-boom/arm	58	Air compressor
16	No step	38	Electric welding	59	Air compressor cab
17	Transporting	39	Falling	60	DEF/AdBlue® tank
19	M/control pattern	40	FOPS FOG plate	61	Refrigerant
20	Ref operator's manual	41	Caution (water separator, turbocharger)	62	Use handrail
21	Hammer	42	Reflecting		

2. DESCRIPTION

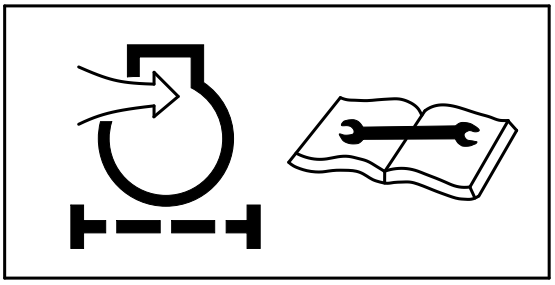
There are several specific warning labels on this machine please become familiarized with all warning labels.

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

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

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

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



21070FW01

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

This warning label is positioned on the turbocharger 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 radiator.

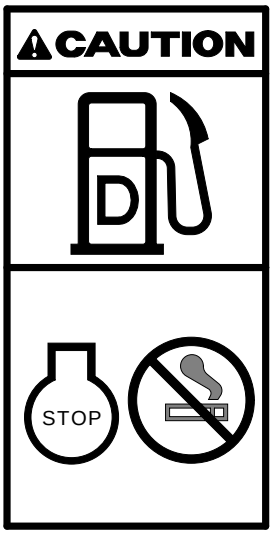
⚠ **Never open the filler cap while engine running or at high coolant temperature. Hot coolant can cause serious burns, injury or death.**

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.

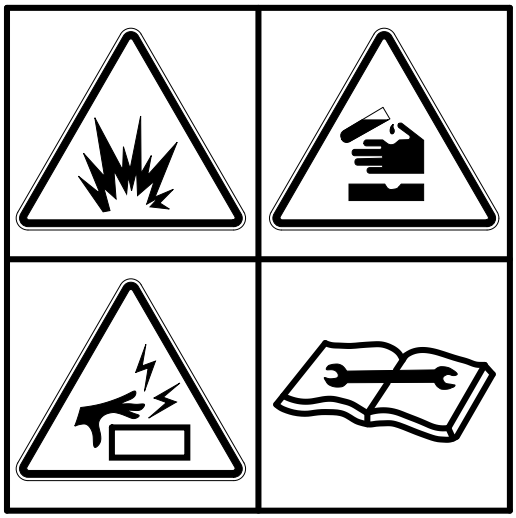
With electrolyte at proper level, less space may cause the gases to be accumulated in the battery.

⚠ 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 right side of the hydraulic tank.

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

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

※ See the maintenance section for details.

14070FW29

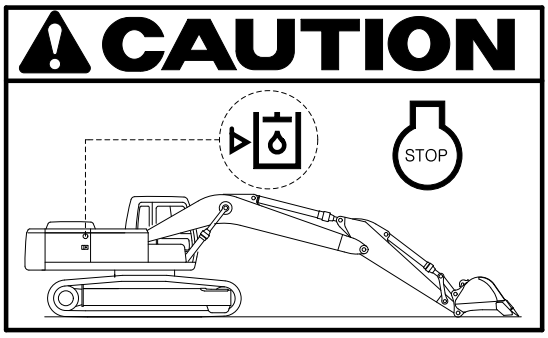
7) HYDRAULIC OIL LEVEL (item 7)

This warning label is positioned on the screen plate.

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

※ Check oil level on the level gauge.

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



21070FW07

8) HYDRAULIC OIL LUBRICATION (item 8)

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

※ Do not mix with different brand oils.

⚠ Never open the filler cap while high temperature.

⚠ Loosen the cap slowly and release internal pressure completely.

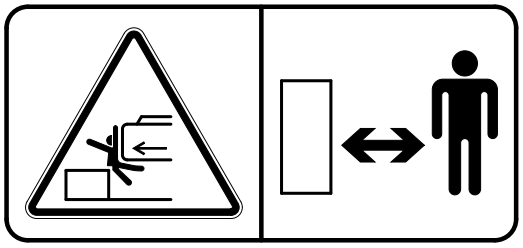
14070FW08

9) KEEP CLEAR-REAR (item 9)

This warning label is positioned on the rear of counterweight.

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

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



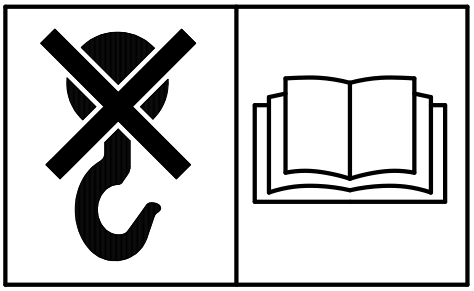
21090FW09

10) LIFTING EYE (item 10)

This warning label is positioned on the counterweight.

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

※ See page 5-13 for proper lifting method of the machine.



21070FW10

11) KEEP CLEAR-SIDE (item 13)

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

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

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

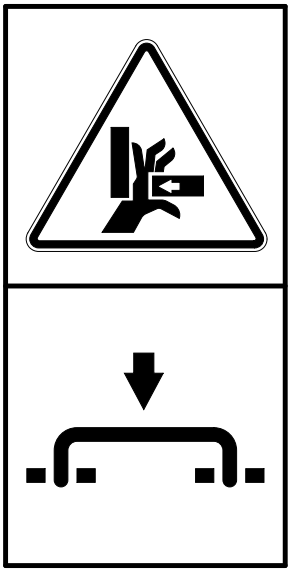
21070FW13

12) STAY FIX (item 14)

This warning label is positioned on the side cover.

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

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



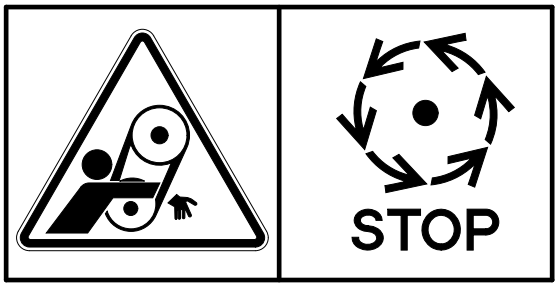
21070FW14

13) ENGINE HOOD SHEARING (item 15)

This warning label is positioned on the engine hood.

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

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



21070FW15

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

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

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

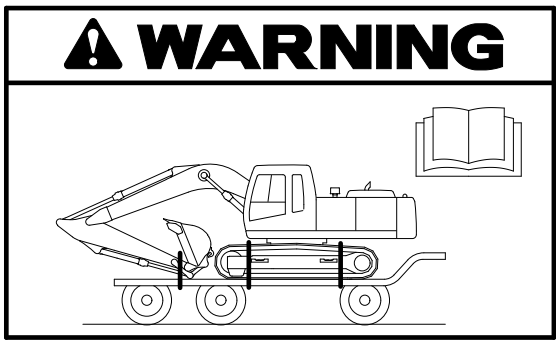
21070FW16

15) **TRANSPORTING** (item 17)

This warning label is positioned right side of upper frame.

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

See page 5-12 for details.



14070FW17

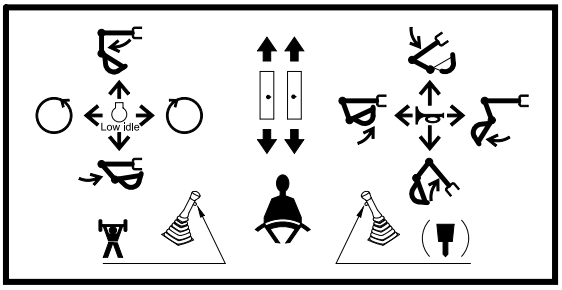
16) **MACHINE CONTROL PATTERN** (item 19)

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

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

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

See page 4-12 for details.



36070FW19

17) REF OPERATOR'S MANUAL (item 20)

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

(1) Ref operator manual

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

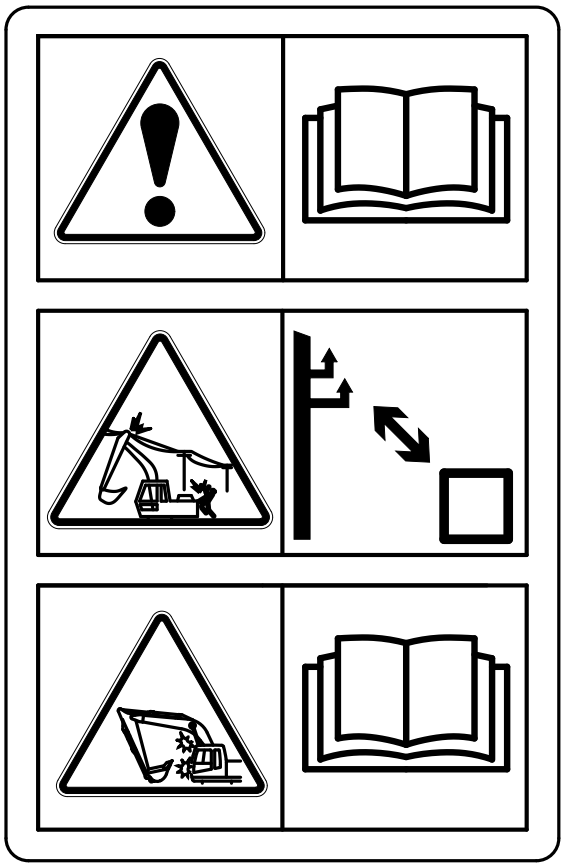
⚠ Do not operate this machine unless you have read and understand the instructions and warnings in this manual.
Failure to follow the instructions or warnings could result in injury or death.

(2) Max height

⚠ Serious injury or death can result from contact with electric lines.
An electric shock being received by merely coming into the vicinity of an electric lines, the minimum distance should be kept considering the supply voltage as page 1-7.

(3) Interference

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



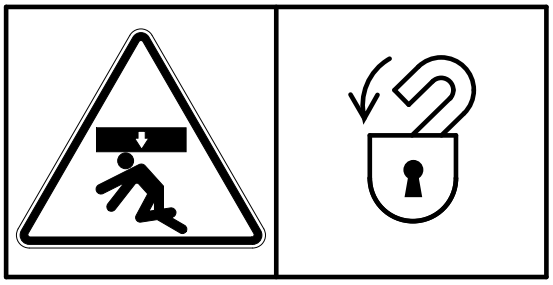
2609A0SL05

18) 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 3-67 for details.



21070FW24

19) **SAFETY REAR WINDOW** (item 23)

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

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

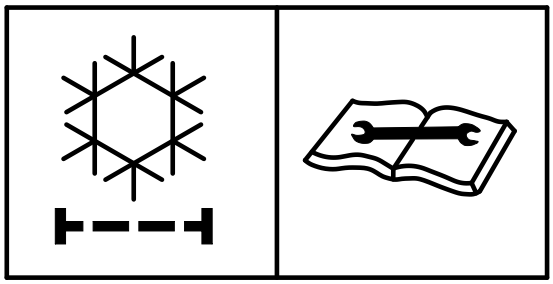
※ **To remove rear window, pull the ring and push out the glass.**

2609A0SL02

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

This warning label is positioned on the air conditioner cover.

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

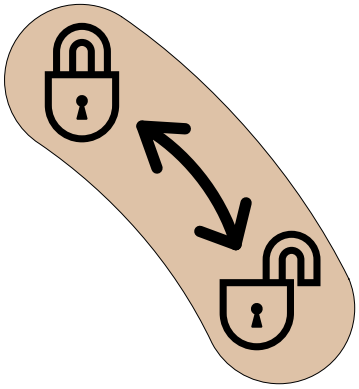


21070FW26

21) **SAFETY 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.**

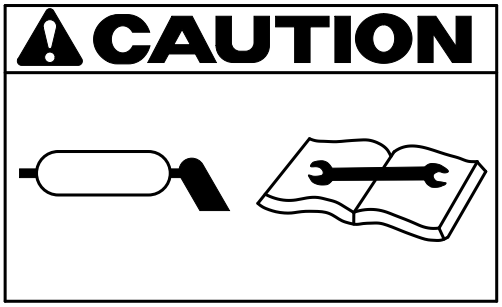


30007A1FW07A

22) **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.



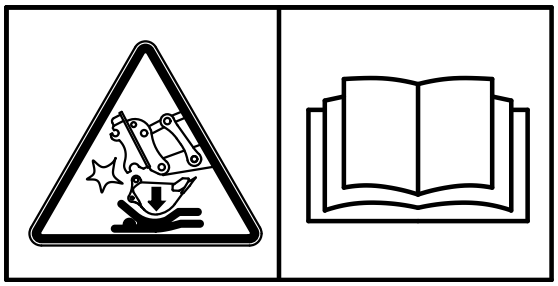
21070FW35

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

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

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

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



14070FW60

24) **TIE** (item 36)

This warning label is positioned on the lower frame.

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

⚠ **See page 4-15 for detail.**

4507A0FW02

25) **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

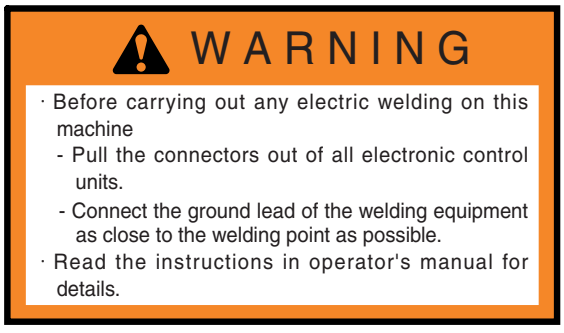
26) **ELECTRIC WELDING** (item 38)

This warning label is positioned on the battery cover.

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

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

※ **See page 6-46 for detail.**



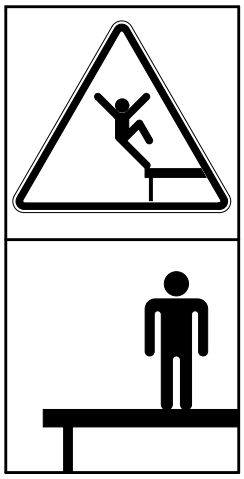
7807AFW20

27) **FALLING** (item 39)

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

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

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



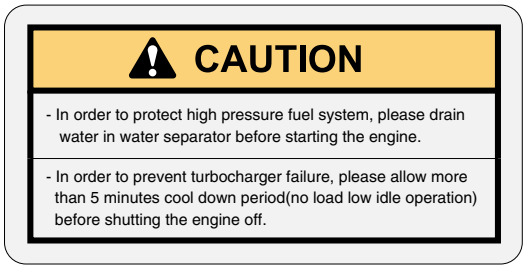
14070FW30

28) **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

29) **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

30) **ACCUMULATOR** (item 43)

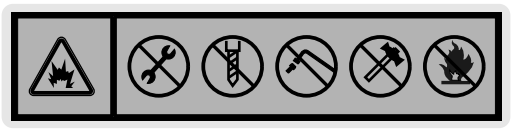
This warning label is positioned on the accumulator of the solenoid valve.

※ **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

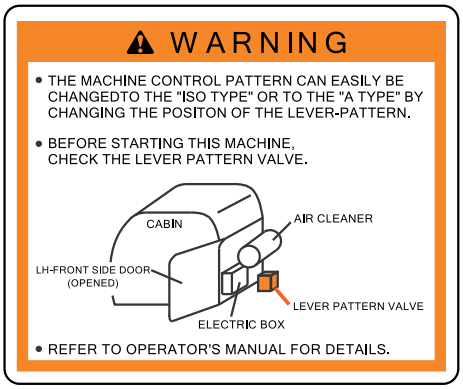
31) **MACHINE CONTROL PATTERN CHANGE VALVE** (item 44)

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.**



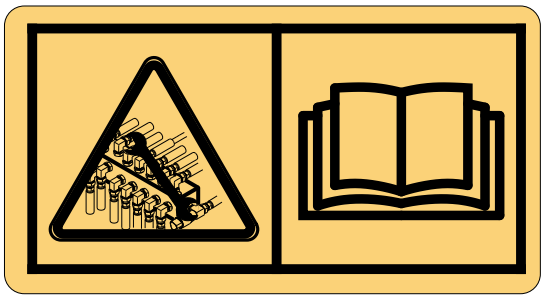
2609A0SL11

32) **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

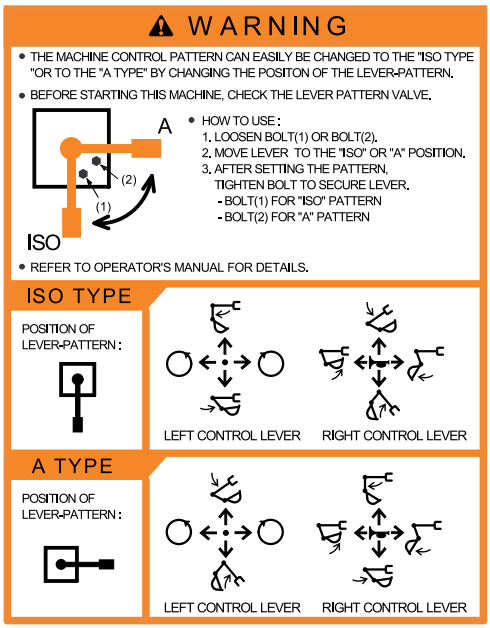
33) **MACHINE CONTROL PATTERN CHANGE-W/VALVE** (item 46)

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.**

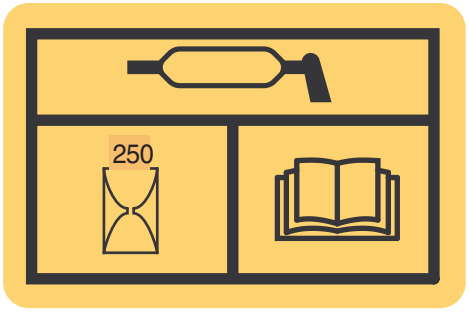


38090FW01A

34) **SWING BEARING GREASE** (item 47)

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

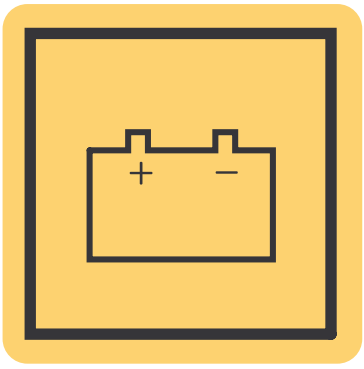
※ **See page 6-37 for details.**



38090FW02

35) **BATTERY POSITION** (item 48)

This warning label is positioned left inside of side cover.



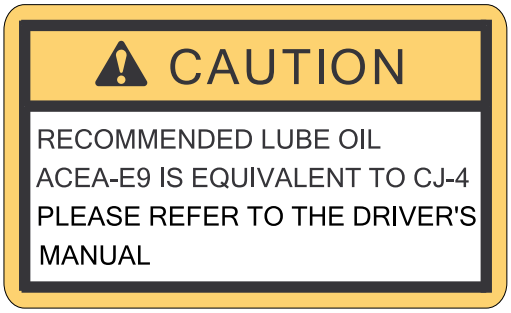
38090FW03

36) **LUBRICATION OIL** (item 49)

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

※ **Recommended lubrication oil ACEA-E9 is equivalent to API CJ-4.**

※ **See page 6-10 for details.**



290F0SL03

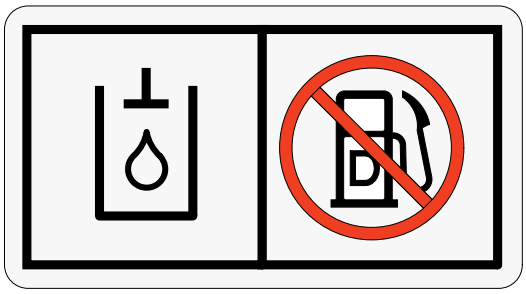
37) **FUEL SHUT OFF** (item 50)

This warning label is positioned on the left 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

38) **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 3-67 for details.**

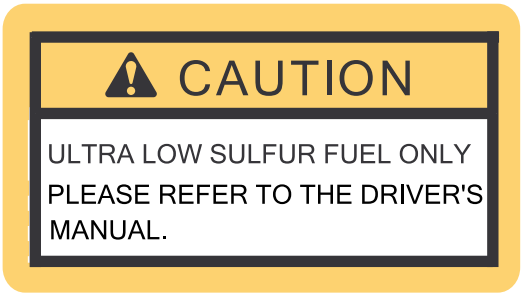
235Z90FW52

39) **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



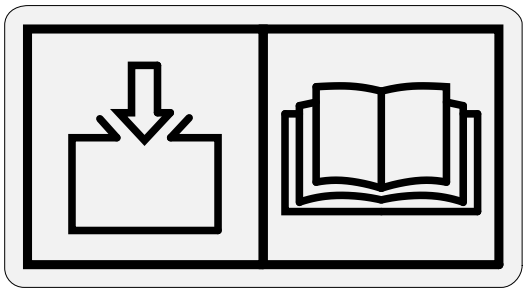
2609A0SL03

40) **SURGE TANK** (item 54)

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

This system must be filled slowly to prevent air locks.

※ **Fill rate ≤ 11 lpm**



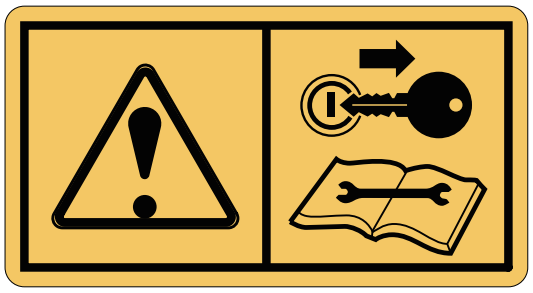
3009A0FW54

41) **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

42) **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

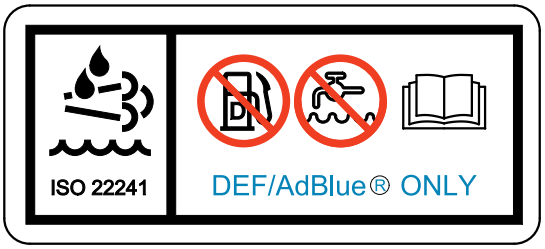
43) **DIESEL EXHAUST FLUID** (item 57)

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

44) **AIR COMPRESSOR** (item 58)

This warning label is positioned on the oil cooler screen.

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

480F0SL04

45) **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.**

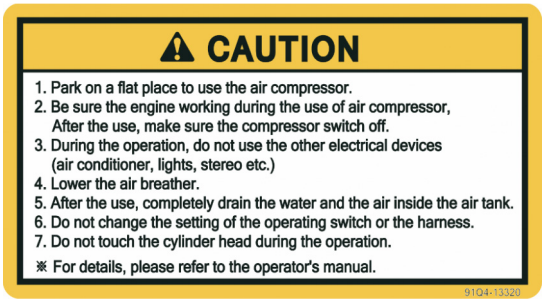
※ **During the operation, do not use the other electrical devices (air conditioner, lights, stereo etc.)**

※ **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.**



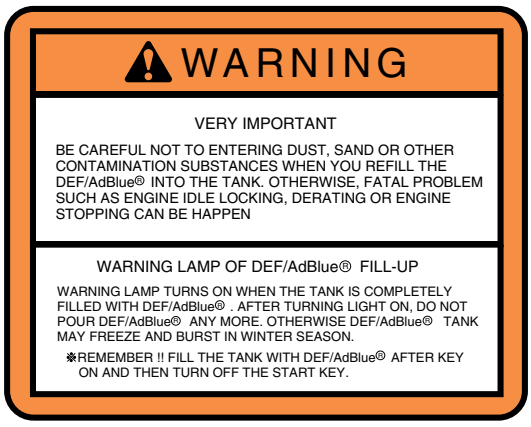
480F0SL05

46) **DEF/AdBlue® TANK** (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.**



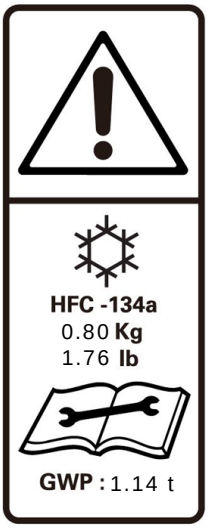
480F0SL06

47) **REFRIGERANT** (item 61)

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

⚠ **Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death.**

※ **Refer to the page 6-51.**



480F0FW30

MACHINE DATA PLATE

290F0FW06

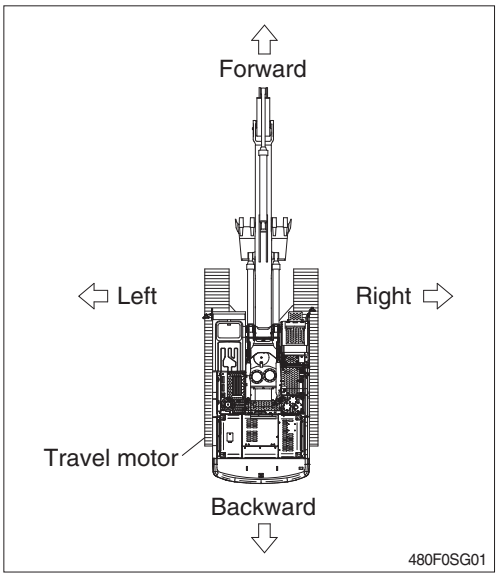
1	Machine type / model	2	Product identification number	3	Engine power
4	Operating mass	5	Manufacturing year	6	Maximum certified weight

※ 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.

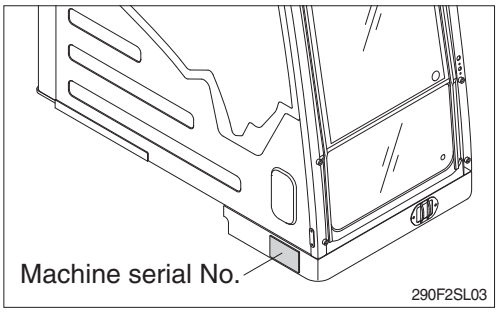


2. SERIAL NUMBER

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

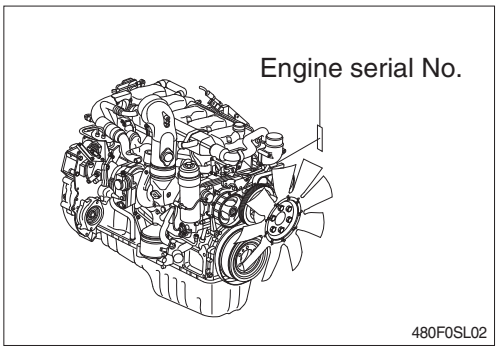
1) MACHINE SERIAL NUMBER

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

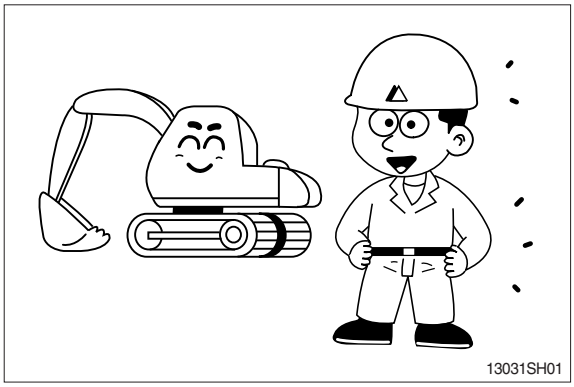
⚠ Important safety hint.

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

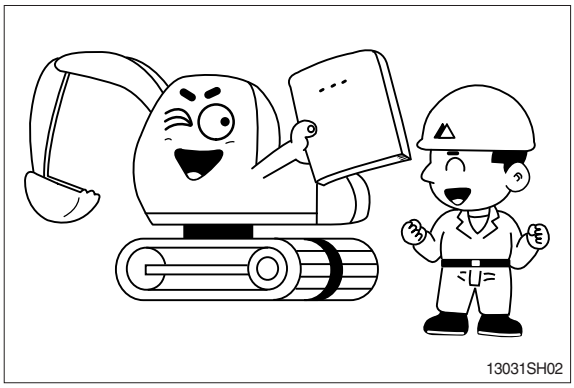
※ It indicates the useful information for operator.

1. BEFORE OPERATING THE MACHINE

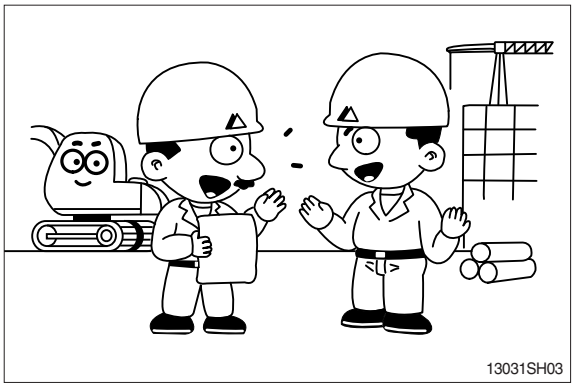
Think-safety first.
In special situation, wear protective clothing including a safety helmet, safety shoes, gloves, safety glasses and ear protection as required by the job condition.
Almost every accident is caused by disregarding the simple and fundamental safety hints.


13031SH01

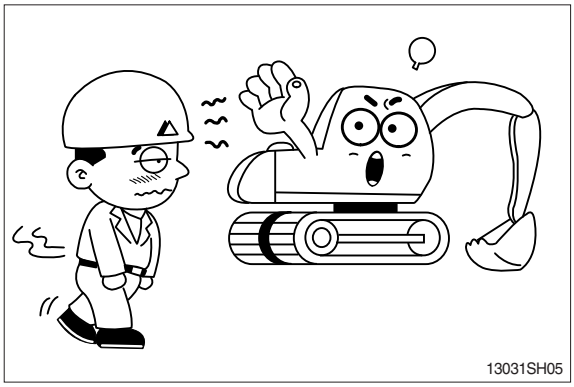
Be sure to understand thoroughly all about the operator's manual before operating the machine.
Proper care is your responsibility.


13031SH02

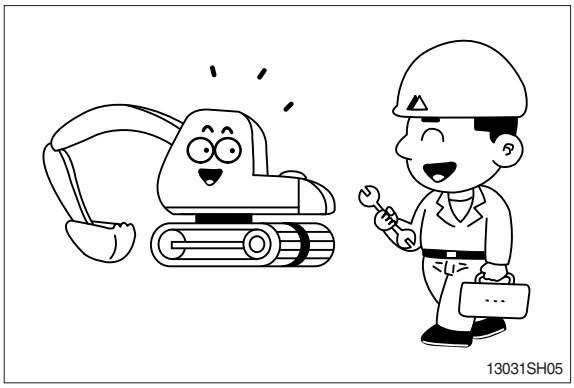
Fully understand the details and process of the construction before starting the work.
If you find anything dangerous on the job, consult with the job supervisor for the preventive measures before operating the machine.


13031SH03

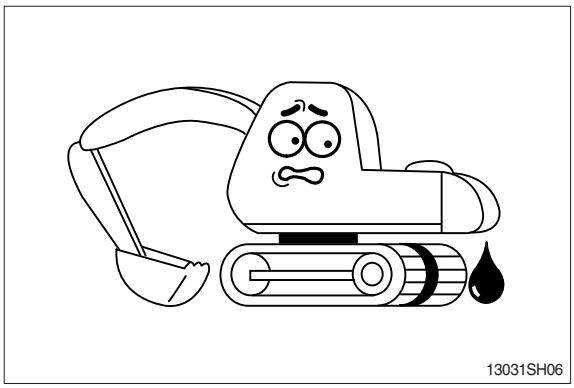
Do not operate when tired, or after drinking alcoholic beverages or any type of drugs.


13031SH05

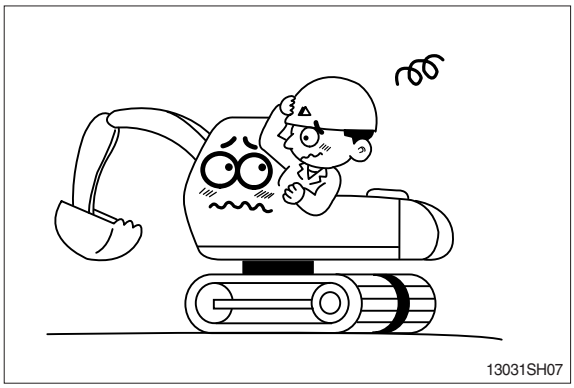
Check daily according to the operation manual.
Repair the damaged parts and tighten the loosened bolts.



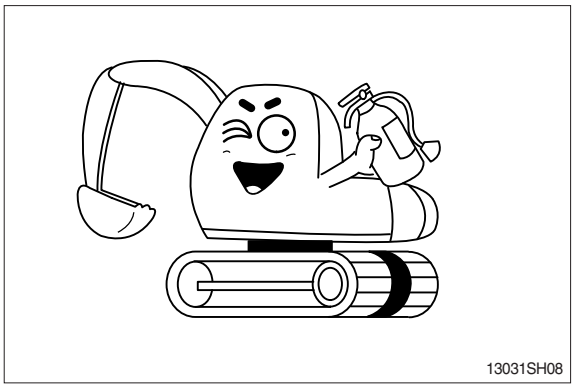
Check for leakage of engine oil, hydraulic oil, fuel and coolant.
Keep machine clean, clean machine regularly.



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.

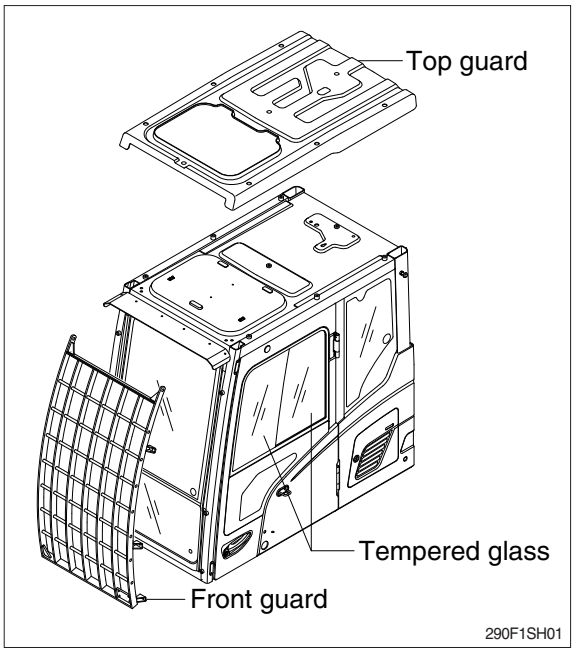


PROTECTION AGAINST FALLING OR FLYING OBJECTS

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

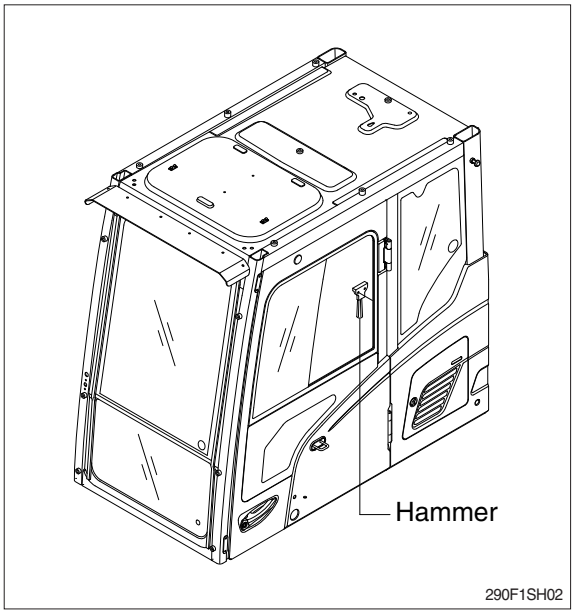
Any modification made without authorization from HD Hyundai Construction Equipment can create hazards.

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.

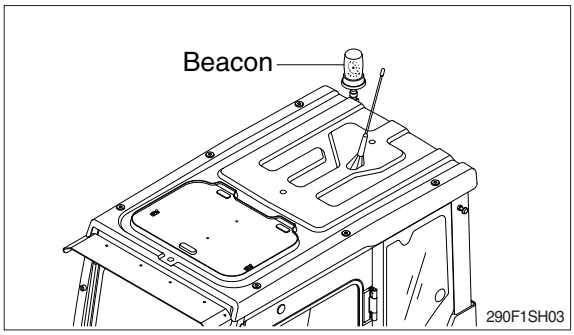
Be sure you know the phone numbers of persons you should contact in case of an emergency.



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

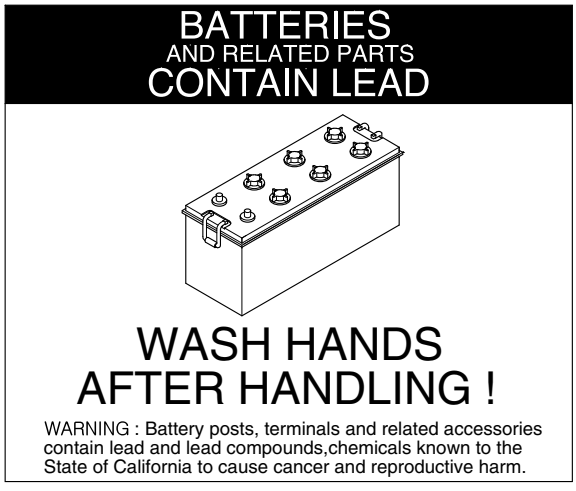
Check machine control pattern for conformance to pattern on label in cab.
If not, change label to match pattern before operating machine.
Failure to do so could result in injury.

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.

SAFETY FEATURES

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

MACHINE CONTROL PATTERN

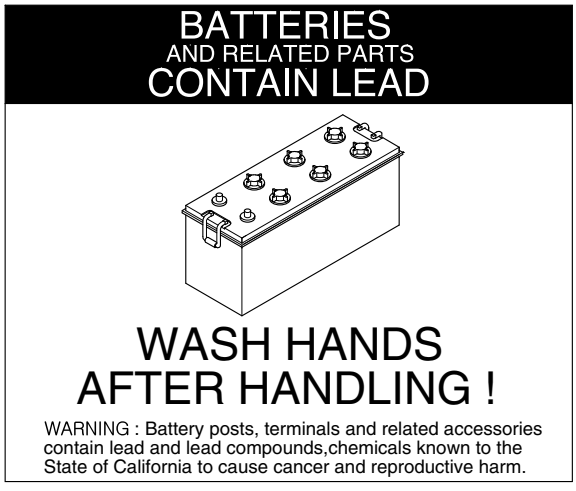
Check machine control pattern for conformance to pattern on label in cab.
If not, change label to match pattern before operating machine.
Failure to do so could result in injury.

CALIFORNIA PROPOSITION 65

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

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

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



13031SH55

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

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

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

3001SH02

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

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

3001SH03

Battery and battery cables

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

3001SH04

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

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

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

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

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

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

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

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

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

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

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

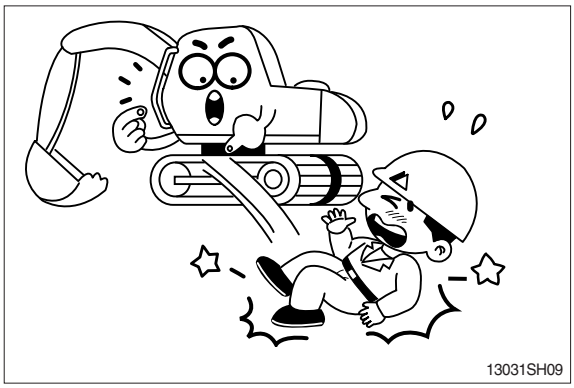
Sources

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.

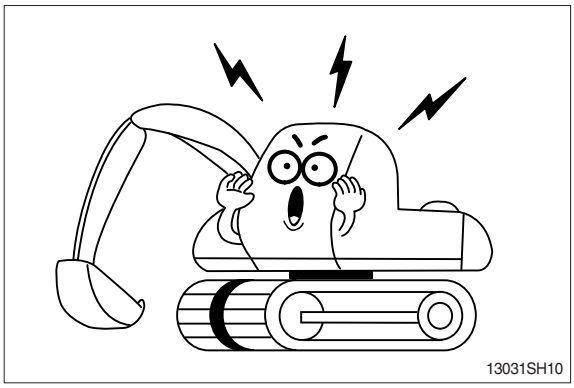
You should check the original directive. This document summarizes part of the content of the applicable law. This document is not meant to substitute the original sources. Other parts of these documents are based on information from the United Kingdom Health and Safety Executive.

2. DURING OPERATING THE MACHINE

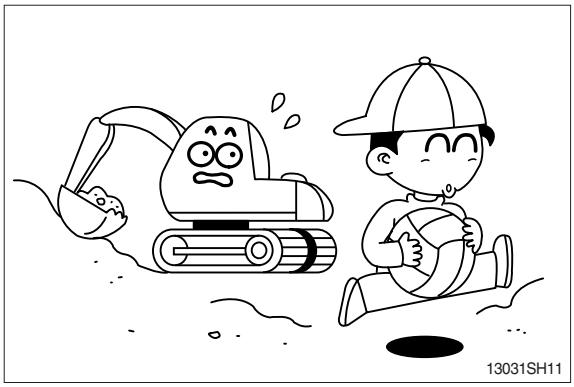
Use the handle and footstep when getting on or off the machine.
Do not jump on or off the machine.



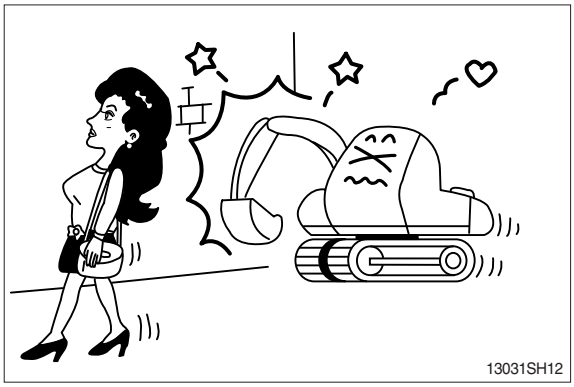
Sound the horn to warn nearby personnel before operating the machine.
Remove all the obstacles like frost on the window before operating the machine for the good visibility.



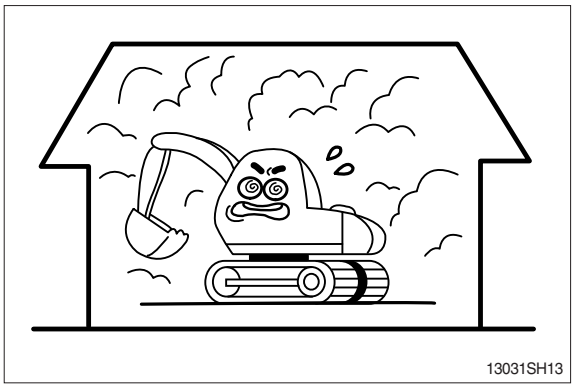
Operate carefully to make sure all personnel or obstacles are clear within the working range of the machine.
Place safety guards if necessary.



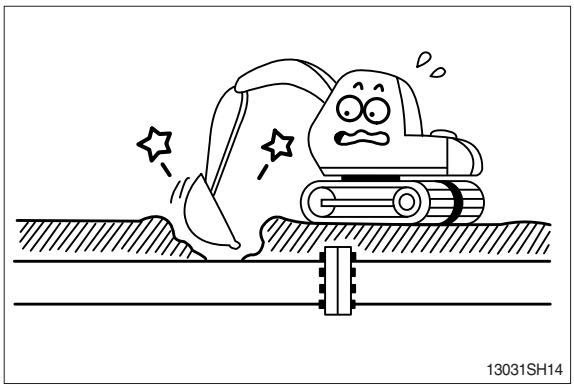
When using the work equipment, pay attention to job site.



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

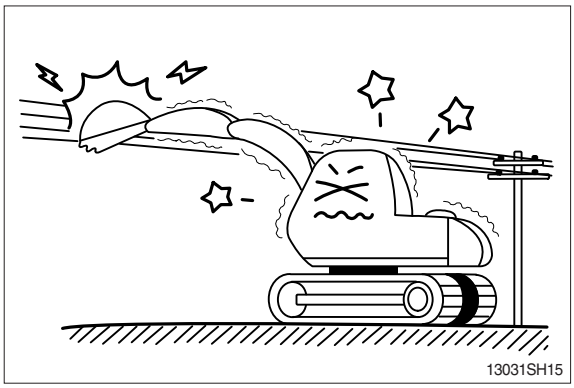


Check the locations of underground gas pipes or water line and secure the safety before operation.

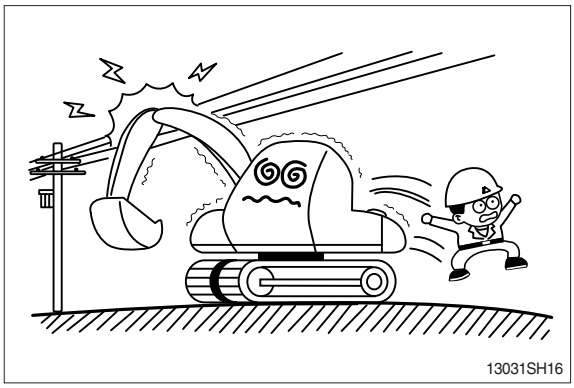


The operating near the electrical lines is very dangerous.
Operate within safe working range permitted as below.

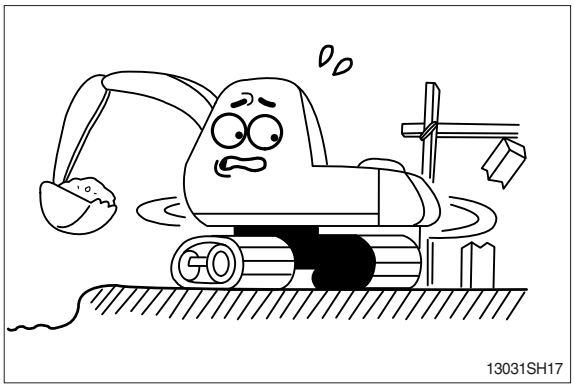
Supply voltage	Min safe separation
6.6 kV	3m (10 ft)
33.0 kV	4m (13 ft)
66.0 kV	5m (16 ft)
154.0 kV	8m (26 ft)
275.0 kV	10m (33 ft)



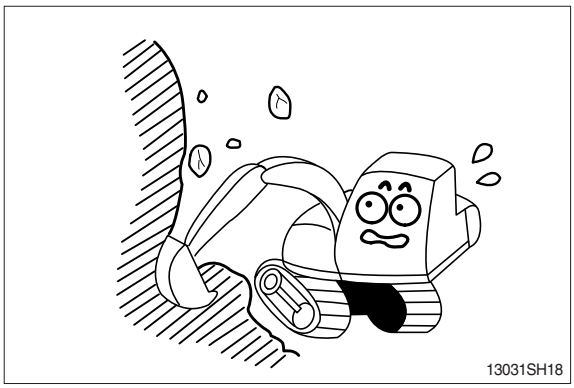
If the machine touches the electric power lines, keep sitting on the operator's seat and make sure the personnel on the ground not to touch the machine until turning off the electric current. Jump off the machine without contacting the machine when you need to get off.



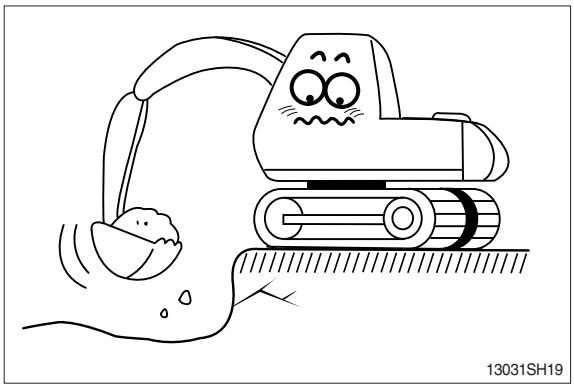
Watch out for obstacles.
Be particularly careful to check the machine clearance during the swing.



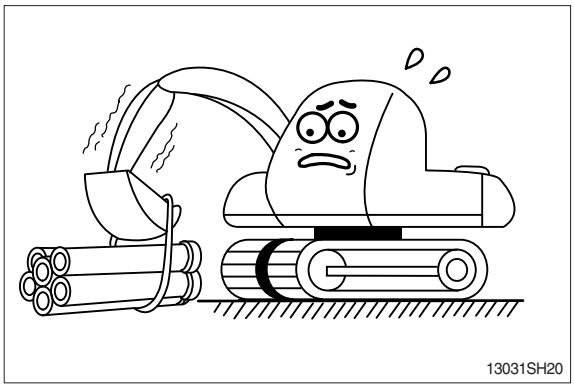
When using the machine as breaker or working in a place where stones may fall down, cab roof guard and head guard should be provided for proper protection.



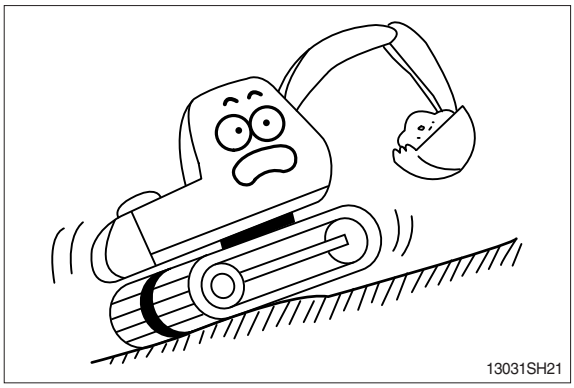
Avoid operating on a cliff or soft ground as there is danger of rolling over.
Make sure to get off easily as keeping the track at a right angle and putting the travel motor into the backward position when working on a cliff or soft ground inevitably.



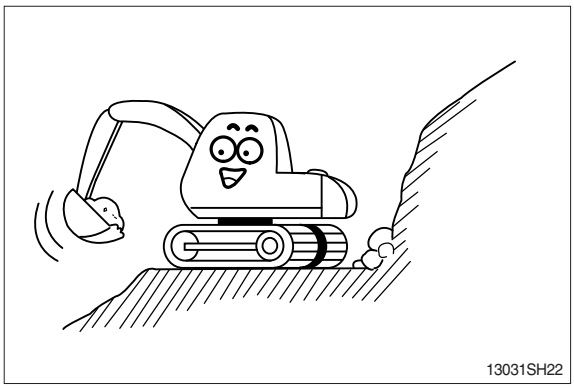
Operate for the lifting work considering the capacity of machine, weight and width of the load.
Be careful not to lift exceeding the machine capacity as it can be the cause of machine damage and safety accident.



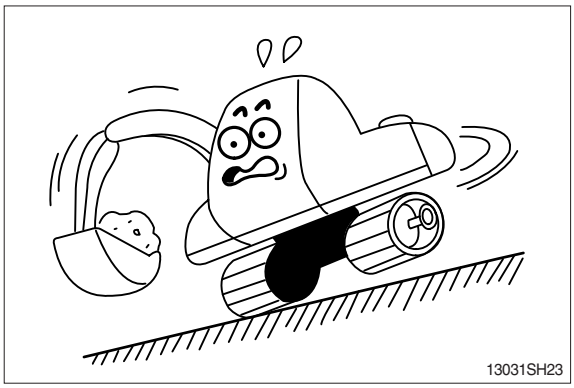
The operation on a slope is dangerous.
Avoid operating the machine on a slope of over 10 degree.



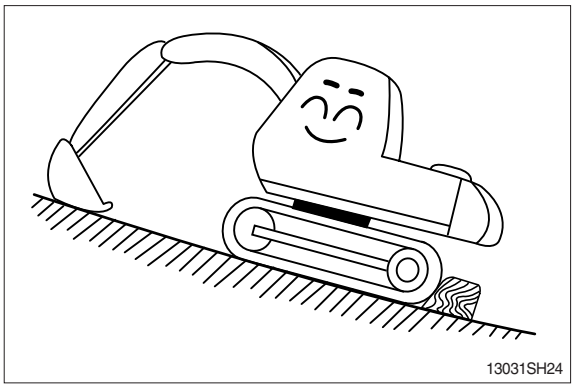
Operate the machine after making ground flat when operation is required on a slope.



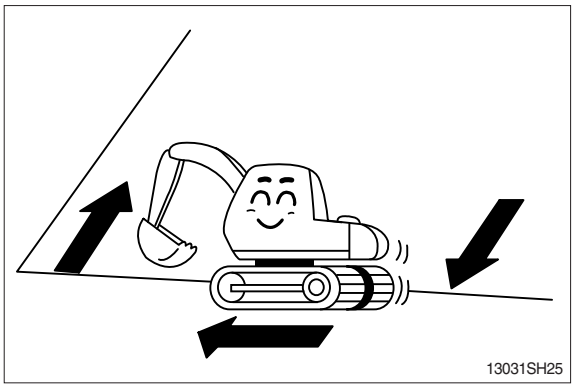
The swing on the slope can be danger of rolling over.
Do not operate to swing the machine with the bucket loaded on a slope since the machine may lose its balance under such an instance.



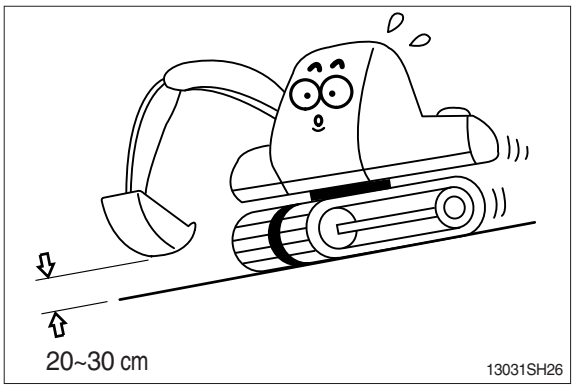
Avoid parking and stopping on a slope.
Lower the bucket to the ground and block the track when parking.



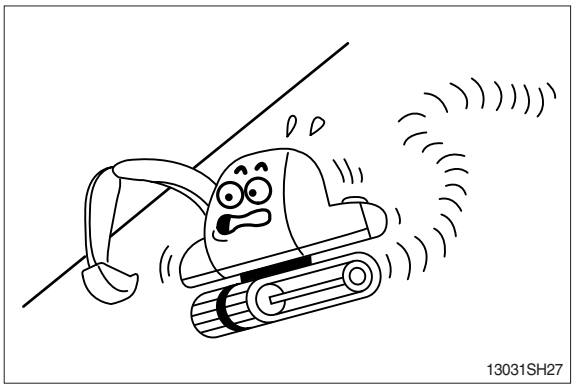
Avoid traveling in a cross direction on a slope as it can cause the danger of rolling over and sliding.



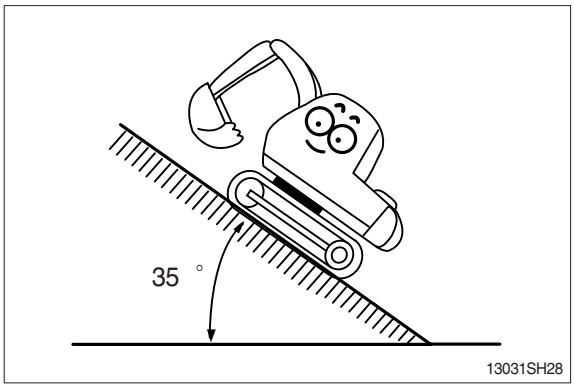
Traveling on a slope is dangerous.
Be sure to operate slowly when traveling down a slope and maintain the bucket at a height of 20~30 ㎝ (1 ft) above the ground so that it can be used as brake in an emergency.



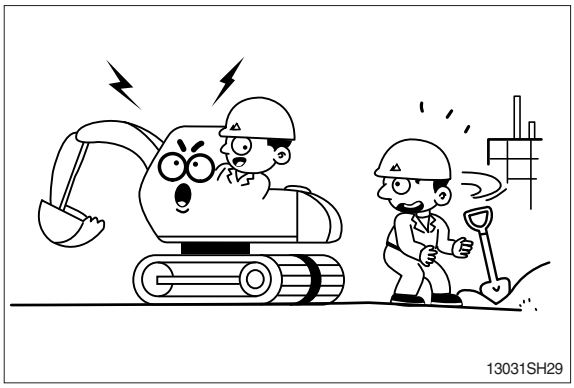
Steering of the machine while traveling on a slope is dangerous.
When an inevitable turning of direction is required, turn on the flat and solid ground.



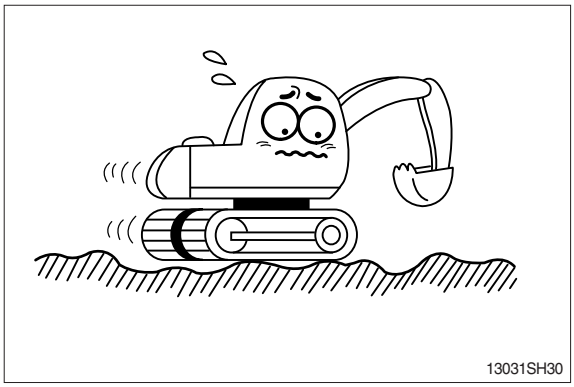
The engine angularity limits are 35 degree.
Do not operate by more than the engine limits in any case.



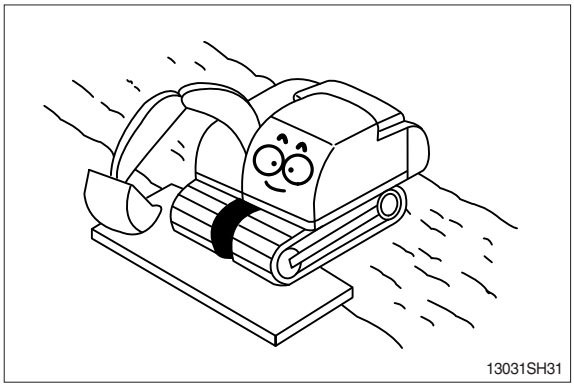
Before traveling the machine, sound the horn to warn nearby personnel.
Operate forward and backward correctly with confirming the location of the travel motor.



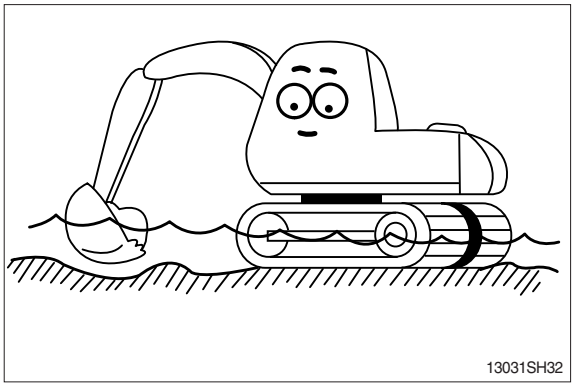
Slow down when traveling through obstacles or uneven ground.



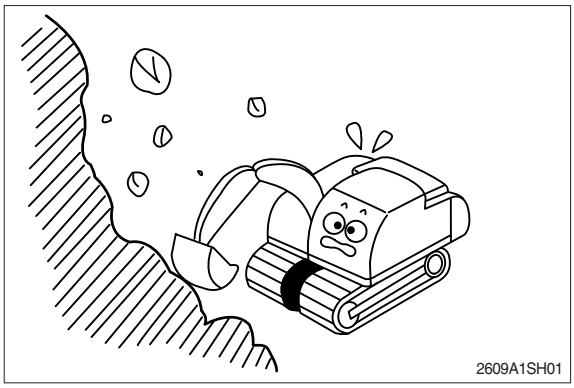
When working on soft ground, place mats or wood boards on the ground to prevent the machine sinking.



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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MOUNTING AND DISMOUNTING

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

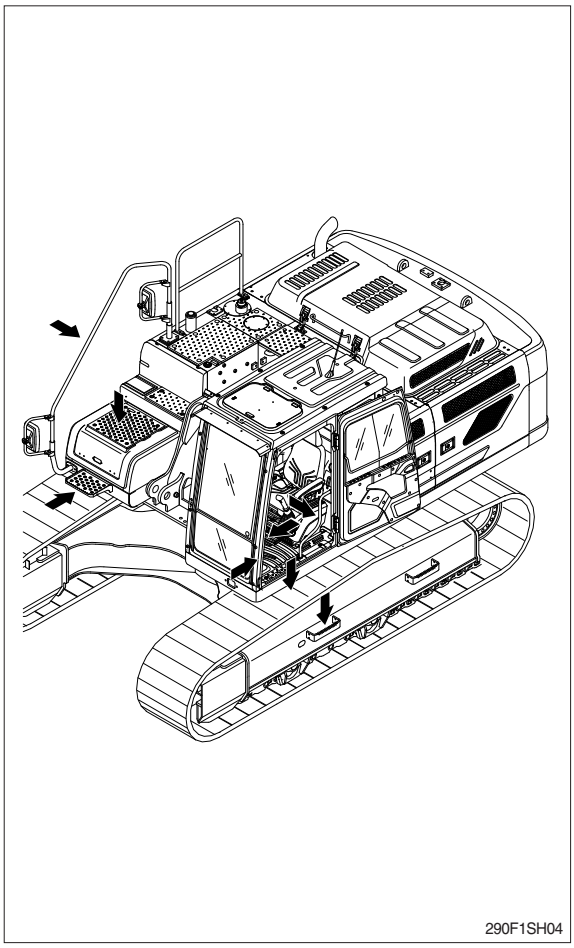
When mounting or dismounting, always face the machine and use the handrails, machine or track frame steps, and track shoes. Additional track frame step can be fitted for wider optional shoe. In this case please contact your HD Hyundai Construction Equipment distributor.

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.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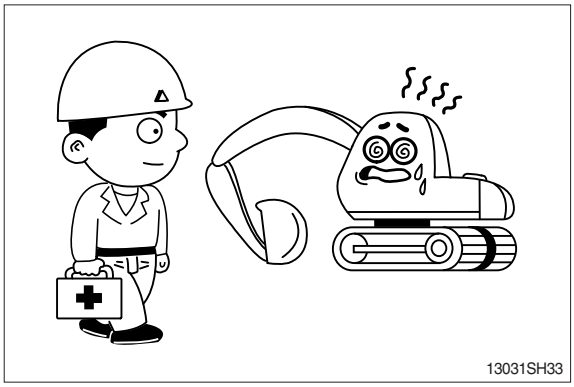
KEEP RIDERS OFF MACHINE

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

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

3. DURING MAINTENANCE

Stop the engine immediately when the trouble of the machine is found.
Inspect immediately the cause of trouble such as vibration, overheating and trouble in the cluster then repair.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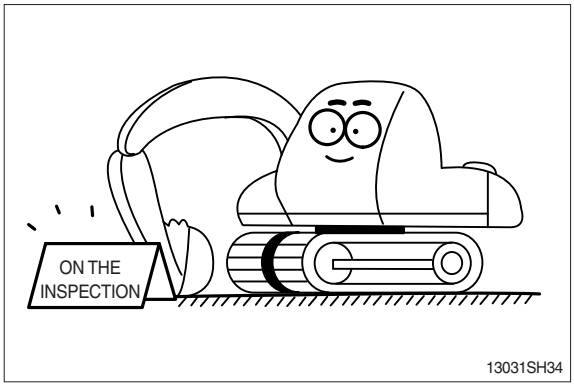
Park on a flat place and stop the engine for inspecting and repairing. Properly TAG machine is not operational. (remove start key)
Extreme care shall be taken during maintenance work. Parts may require additional safe guard.



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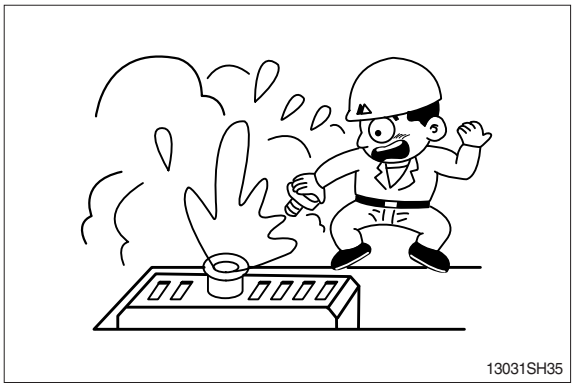
Do not remove the radiator cap from hot engine.
Open the cap after the engine cools, below 50 °C (122 °F) to prevent personal injury from heated coolant spray or steam.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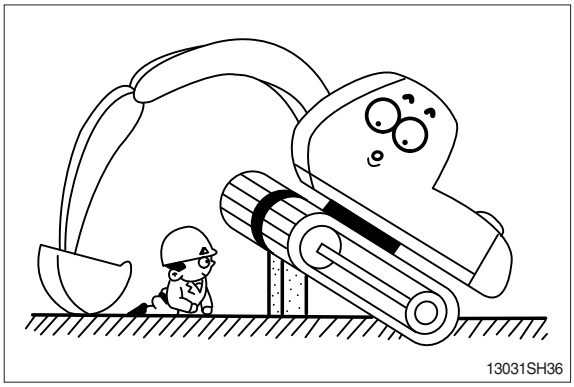
Do not work below the machine.
Be sure to work with proper safety supports.
Do not depend on the hydraulic cylinders to hold up the equipment and attachment.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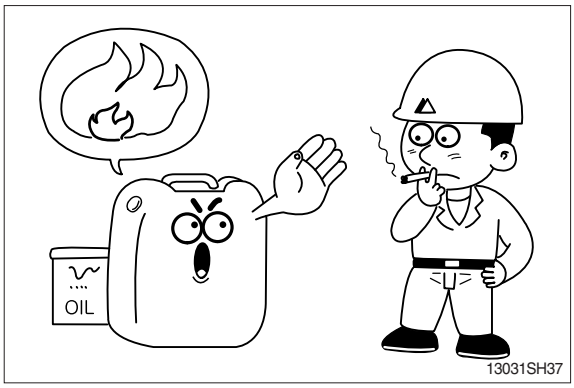
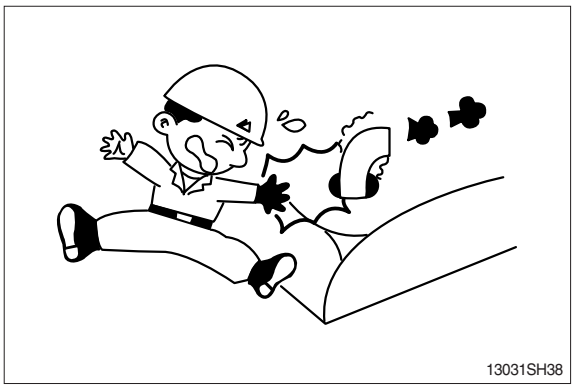
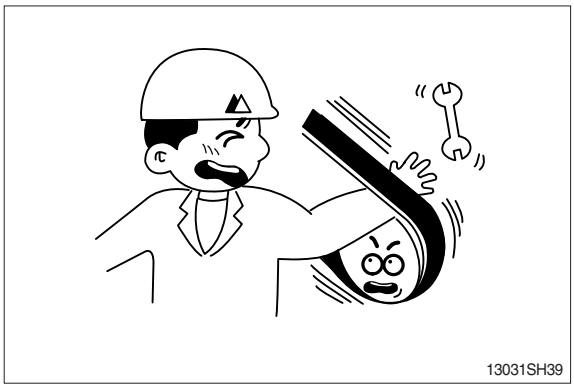
There is the danger of fire in fuel and oil.
Store in cool and dry area, away from any open flames.



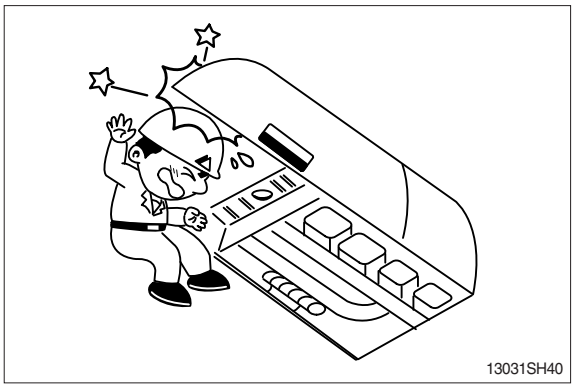
Do not touch exhaust pipe, or may cause severe burn.



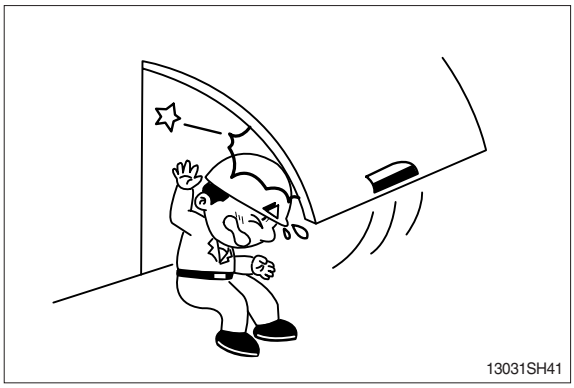
Do not open the engine hood and covers while the engine is running.



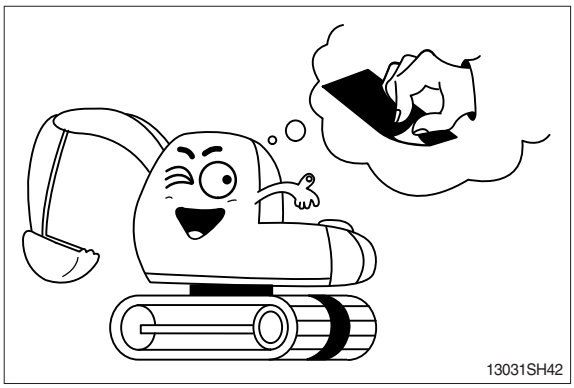
Be careful of not hitting the edges when you service engine.



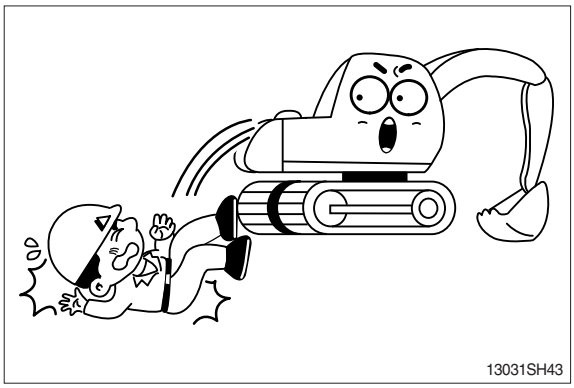
Be careful that the front window may be promptly closed.
Be sure to support stay, when the side door needs to be opened.
Be careful that the open side door may closed by the external or natural force like strong wind.


13031SH41

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

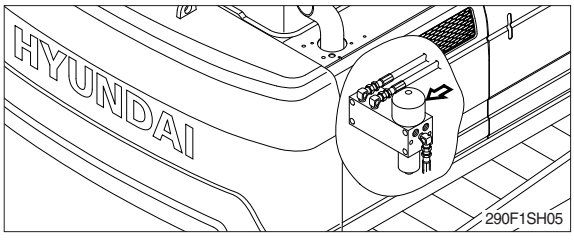

13031SH42

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


13031SH43

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.



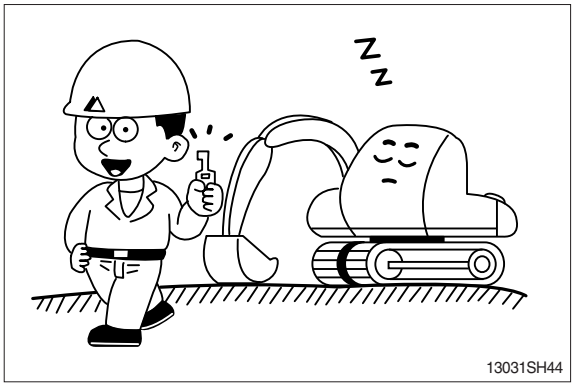
290F1SH05

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.

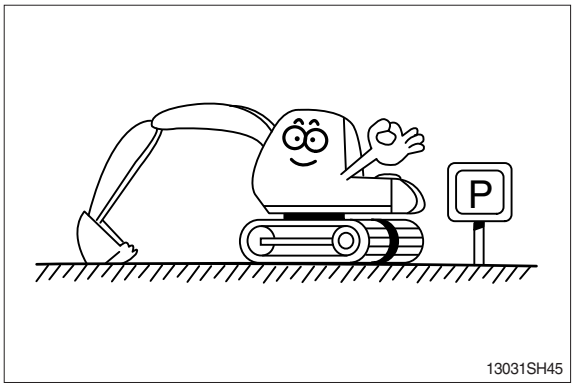
4. PARKING

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.



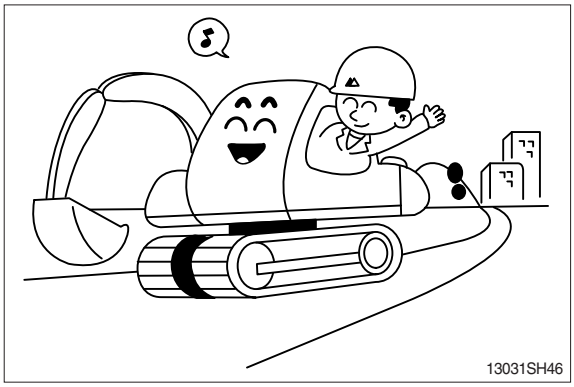
13031SH44

Park the machine in the flat and safe place.

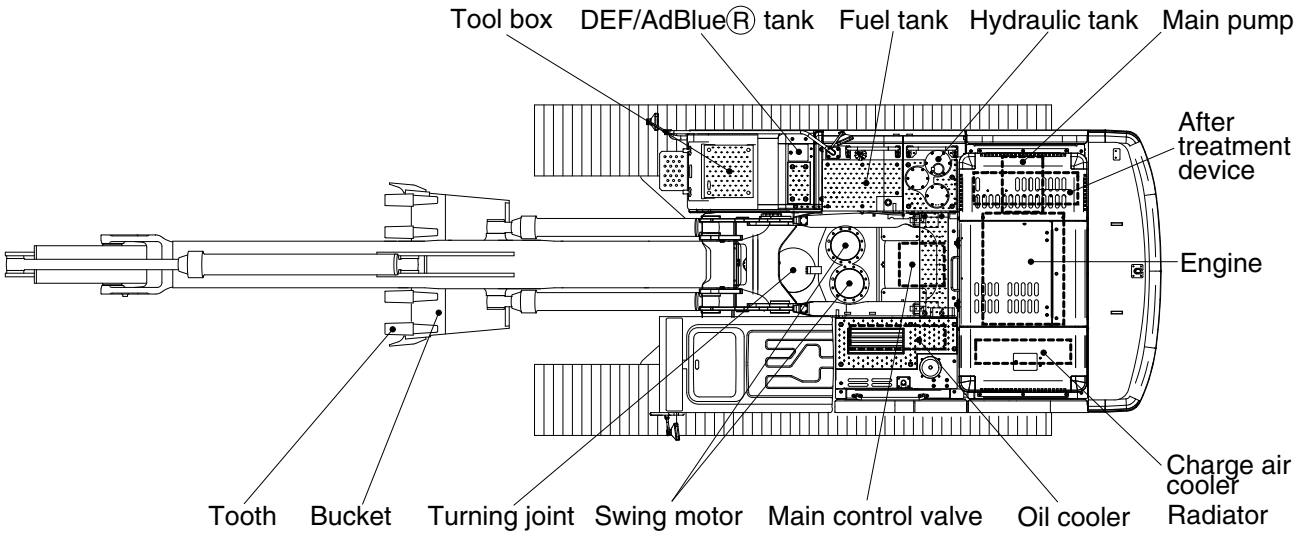


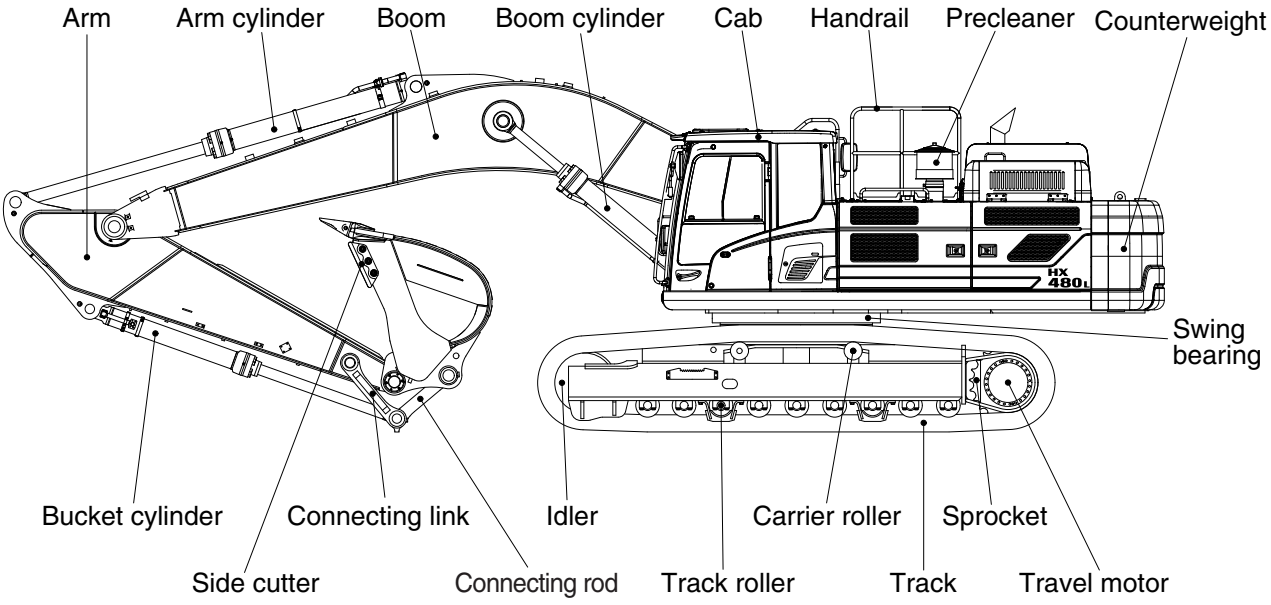
13031SH45

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


13031SH46

1. MAJOR COMPONENT



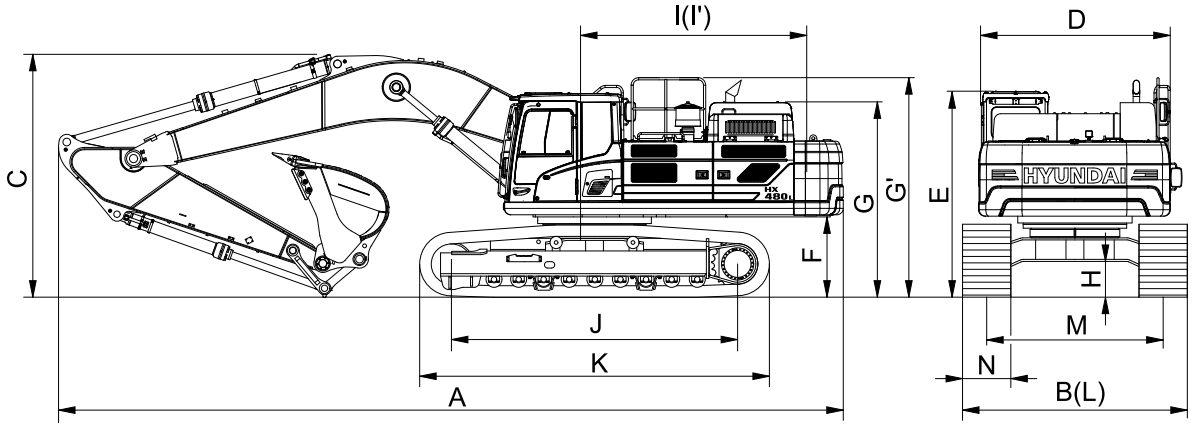


480F2SP01

2. SPECIFICATIONS

1) HX480 L

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

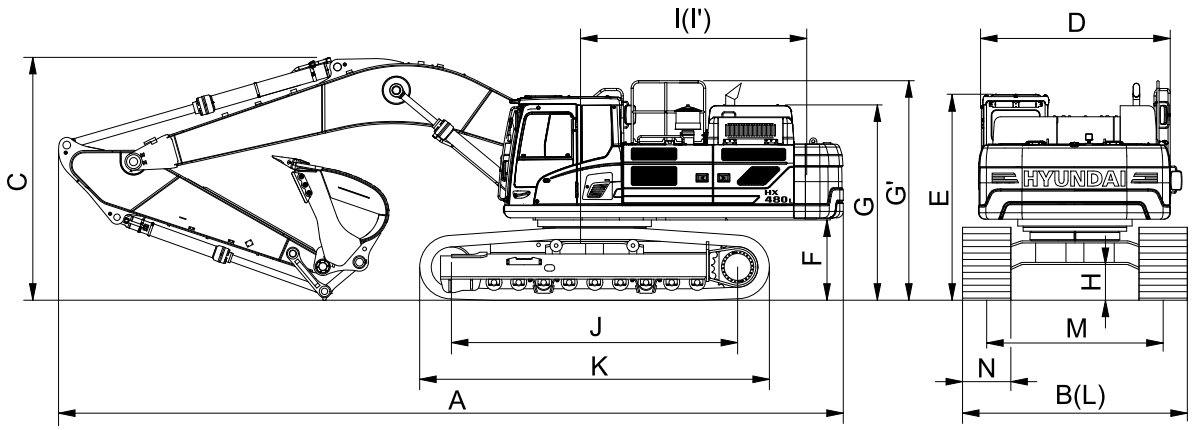


480F2SP02

Description		Unit	Specification
Operating weight		kg (lb)	49500 (109130)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.20 (2.88)
Overall length	A	mm (ft-in)	12260 (40' 3")
Overall width, with 600 mm shoe	B		3340 (10' 11")
Overall height	C		3790 (12' 5")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3220 (10' 7")
Ground clearance of counterweight	F		1295 (4' 3")
Engine cover height	G		2890 (9' 6")
Overall height of handrail	G'		3450 (11' 3")
Minimum ground clearance	H		560 (1' 10")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width	L		3340 (10' 11")
Track gauge	M		2740 (9' 0")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.86 (12.23)
Max traction force		kg (lb)	34100 (75180)

2) HX480 L

· 7.06 m (23' 2") BOOM, 2.40 m (7' 10") ARM

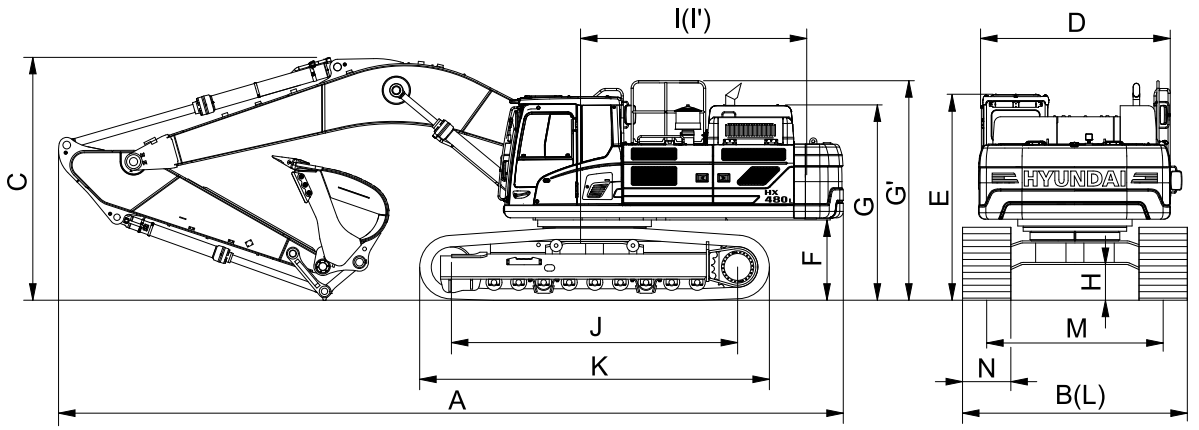


480F2SP02

Description		Unit	Specification
Operating weight		kg (lb)	49260 (108600)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.20 (2.88)
Overall length	A	mm (ft-in)	12510 (41' 1")
Overall width, with 600 mm shoe	B		3340 (10' 11")
Overall height	C		4010 (13' 2")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3220 (10' 7")
Ground clearance of counterweight	F		1295 (4' 3")
Engine cover height	G		2890 (9' 6")
Overall height of handrail	G'		3450 (11' 3")
Minimum ground clearance	H		560 (1' 10")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width	L		3340 (10' 11")
Track gauge	M		2740 (9' 0")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.86 (12.23)
Max traction force		kg (lb)	34100 (75180)

3) HX480 L

· 7.06 m (23' 2") BOOM, 2.90 m (9' 6") ARM

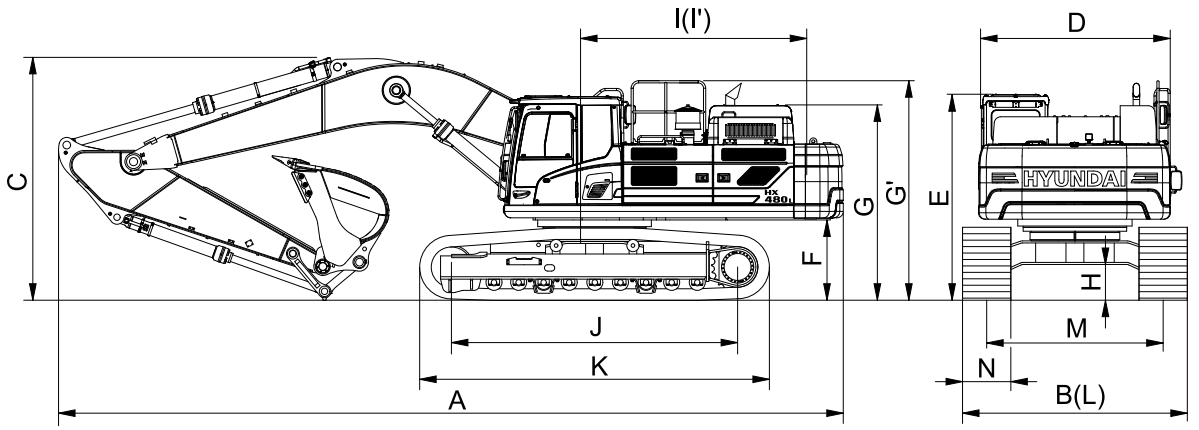


480F2SP02

Description		Unit	Specification
Operating weight		kg (lb)	49460 (109040)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.20 (2.88)
Overall length	A	mm (ft-in)	12390 (40' 8")
Overall width, with 600 mm shoe	B		3340 (10' 11")
Overall height	C		3900 (12' 10")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3220 (10' 7")
Ground clearance of counterweight	F		1295 (4' 3")
Engine cover height	G		2890 (9' 6")
Overall height of handrail	G'		3450 (11' 3")
Minimum ground clearance	H		560 (1' 10")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width	L		3340 (10' 11")
Track gauge	M		2740 (9' 0")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.86 (12.23)
Max traction force		kg (lb)	34100 (75180)

4) HX480 L

· 7.06 m (23' 2") BOOM, 4.00 m (13' 1") ARM

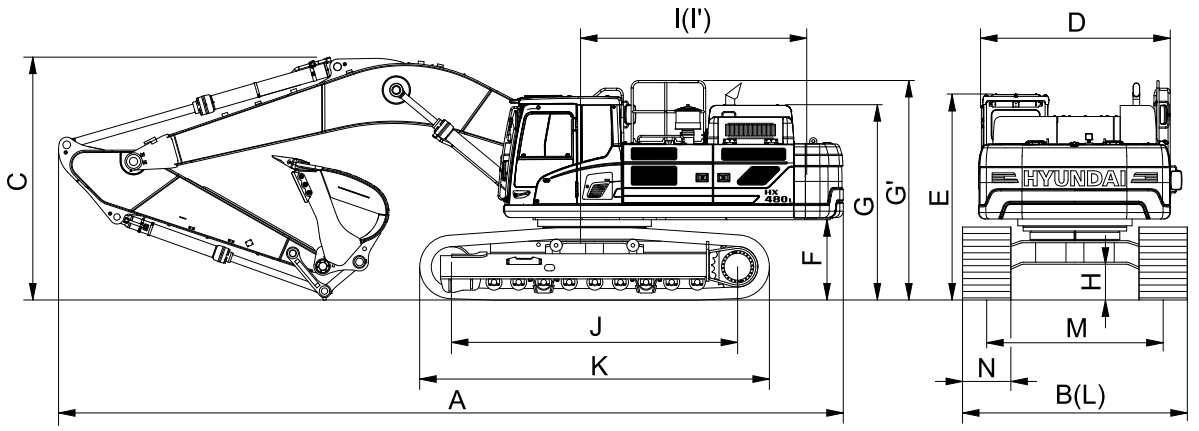


480F2SP02

Description		Unit	Specification
Operating weight		kg (lb)	49600 (109350)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.20 (2.88)
Overall length	A	mm (ft-in)	12230 (40' 1")
Overall width, with 600 mm shoe	B		3340 (10' 11")
Overall height	C		4110 (13' 6")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3220 (10' 7")
Ground clearance of counterweight	F		1295 (4' 3")
Engine cover height	G		2890 (9' 6")
Overall height of handrail	G'		3450 (11' 3")
Minimum ground clearance	H		560 (1' 10")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width	L		3340 (10' 11")
Track gauge	M		2740 (9' 0")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.86 (12.23)
Max traction force		kg (lb)	34100 (75180)

5) HX480 L

· 6.55 m (21' 6") BOOM, 2.40 m (7' 10") ARM

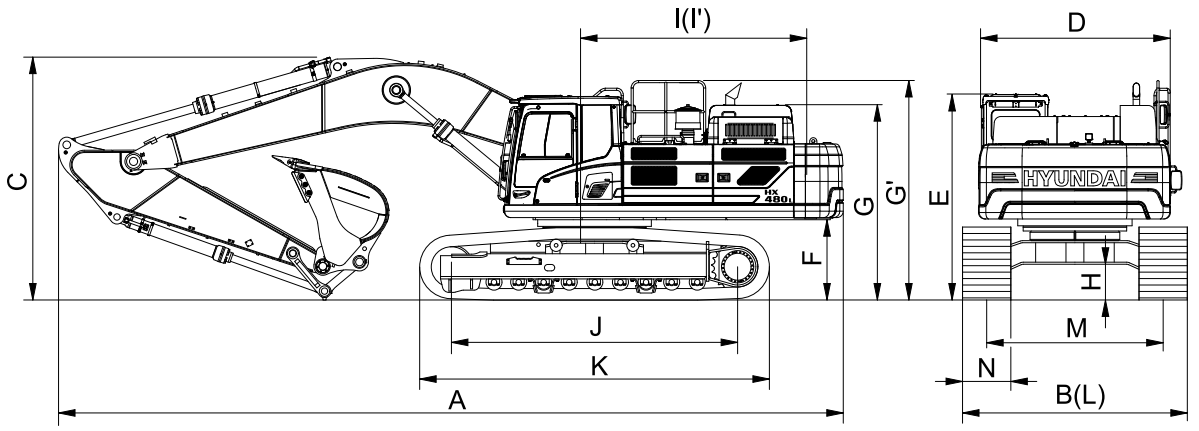


480F2SP02

Description		Unit	Specification
Operating weight		kg (lb)	49220 (108510)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.20 (2.88)
Overall length	A	mm (ft-in)	11990 (39' 4")
Overall width, with 600 mm shoe	B		3340 (10' 11")
Overall height	C		4130 (13' 7")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3220 (10' 7")
Ground clearance of counterweight	F		1295 (4' 3")
Engine cover height	G		2890 (9' 6")
Overall height of handrail	G'		3450 (11' 3")
Minimum ground clearance	H		560 (1' 10")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width	L		3340 (10' 11")
Track gauge	M		2740 (9' 0")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.86 (12.23)
Max traction force		kg (lb)	34100 (75180)

6) HX480 L

· 6.55 m (21' 6") BOOM, 2.90 m (9' 6") ARM

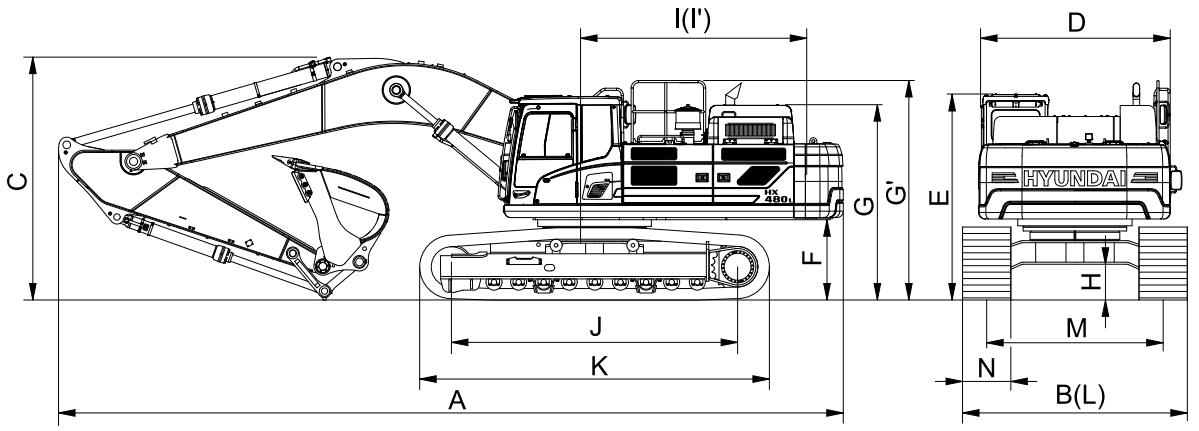


480F2SP02

Description		Unit	Specification
Operating weight		kg (lb)	49420 (108950)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.20 (2.88)
Overall length	A	mm (ft-in)	11870 (38' 11")
Overall width, with 600 mm shoe	B		3340 (10' 11")
Overall height	C		4050 (13' 3")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3220 (10' 7")
Ground clearance of counterweight	F		1295 (4' 3")
Engine cover height	G		2890 (9' 6")
Overall height of handrail	G'		3450 (11' 3")
Minimum ground clearance	H		560 (1' 10")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width	L		3340 (10' 11")
Track gauge	M		2740 (9' 0")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.86 (12.23)
Max traction force		kg (lb)	34100 (75180)

7) HX480 L

· 9.00 m (29' 6") BOOM, 6.00 m (19' 8") ARM

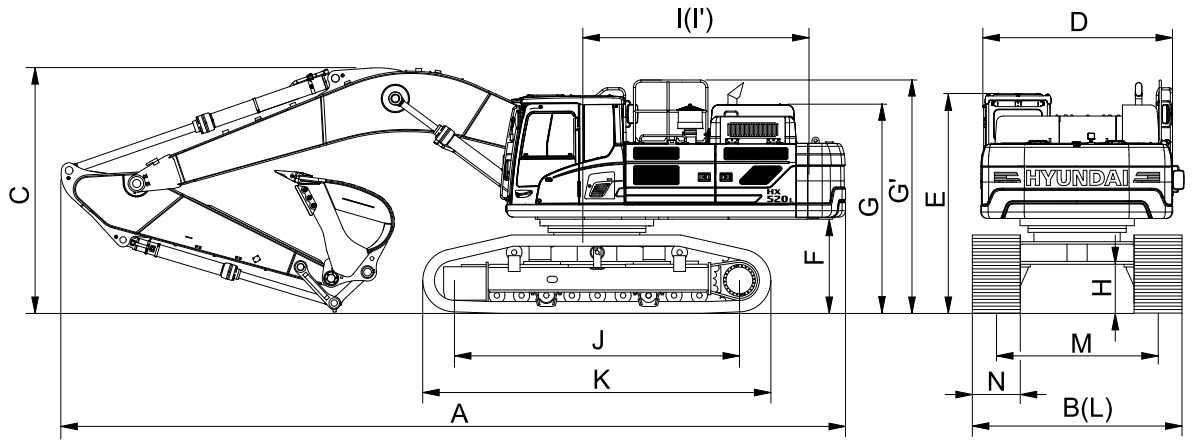


480F2SP02

Description		Unit	Specification
Operating weight		kg (lb)	50550 (111440)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	1.38 (1.80)
Overall length	A	mm (ft-in)	14230 (46' 8")
Overall width, with 600 mm shoe	B		3640 (11' 11")
Overall height	C		3990 (13' 1")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3220 (10' 7")
Ground clearance of counterweight	F		1295 (4' 3")
Engine cover height	G		2890 (9' 6")
Overall height of handrail	G'		3450 (11' 3")
Minimum ground clearance	H		560 (1' 10")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width	L		3340 (10' 11")
Track gauge	M		2740 (9' 0")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.86 (12.23)
Max traction force		kg (lb)	34100 (75180)

8) HX520 L

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

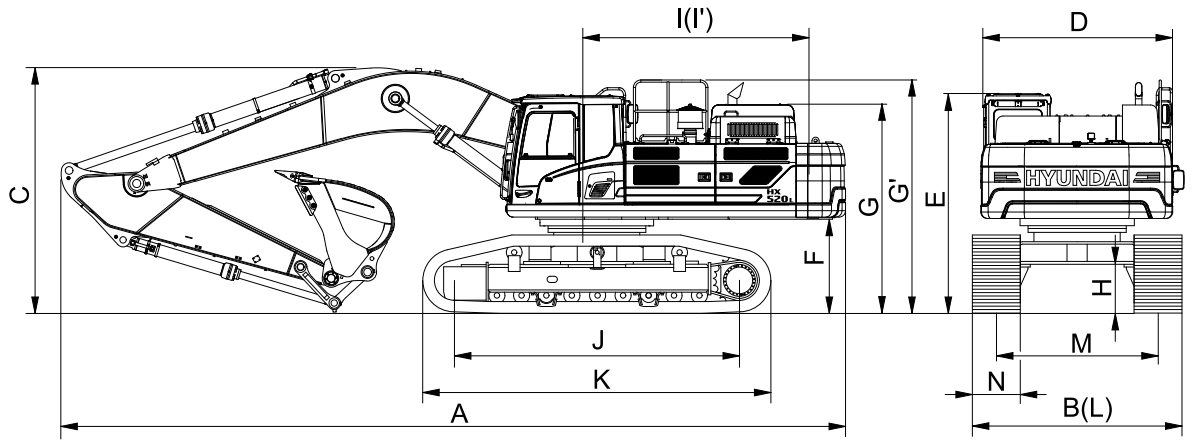


480F2SP03

Description		Unit	Specification
Operating weight		kg (lb)	52400 (115520)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.20 (2.88)
Overall length	A	mm (ft-in)	12260 (40' 3")
Overall width, with 600 mm shoe (transport position / working position)	B		2980/3540 (9' 10"/11' 7")
Overall height	C		3790 (12' 5")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3340 (10' 11")
Ground clearance of counterweight	F		1445 (4' 9")
Engine cover height	G		3030 (9' 11")
Overall height of handrail	G'		3595 (11' 8")
Minimum ground clearance	H		770 (2' 6")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width (transport position / working position)	L		2990/3540 (9' 10"/11' 7")
Track gauge (transport position / working position)	M		2380/2940 (7' 10"/9' 8")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.91 (12.94)
Max traction force		kg (lb)	34100 (75180)

9) HX520 L

· 7.06 m (23' 2") BOOM, 2.40 m (7' 10") ARM

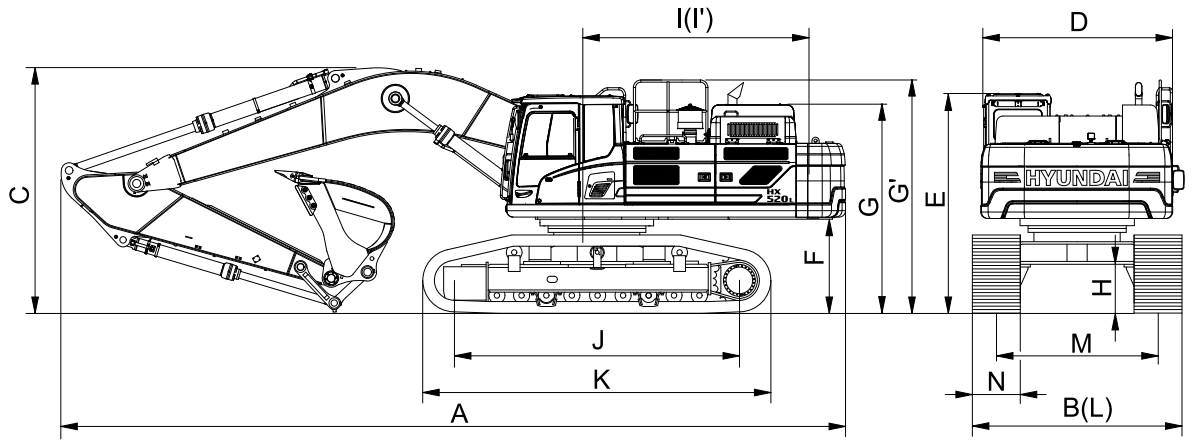


480F2SP03

Description		Unit	Specification
Operating weight		kg (lb)	52160 (114990)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.20 (2.88)
Overall length	A	mm (ft-in)	12510 (41' 1")
Overall width, with 600 mm shoe (transport position / working position)	B		2980/3540 (9' 10"/11' 7")
Overall height	C		4070 (13' 4")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3340 (10' 11")
Ground clearance of counterweight	F		1445 (4' 9")
Engine cover height	G		3030 (9' 11")
Overall height of handrail	G'		3595 (11' 8")
Minimum ground clearance	H		770 (2' 6")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width (transport position / working position)	L		2990/3540 (9' 10"/11' 7")
Track gauge (transport position / working position)	M		2380/2940 (7' 10"/9' 8")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.91 (12.94)
Max traction force		kg (lb)	34100 (75180)

10) HX520 L

· 7.06 m (23' 2") BOOM, 2.90 m (9' 6") ARM

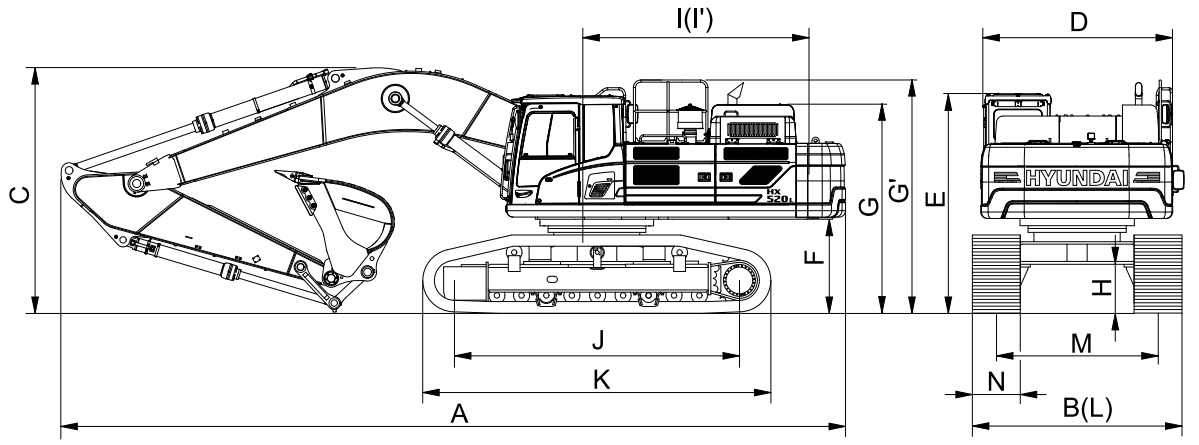


480F2SP03

Description		Unit	Specification
Operating weight		kg (lb)	52360 (115430)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.20 (2.88)
Overall length	A	mm (ft-in)	12380 (40' 7")
Overall width, with 600 mm shoe (transport position / working position)	B		2980/3540 (9' 10"/11' 7")
Overall height	C		3920 (12' 10")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3340 (10' 11")
Ground clearance of counterweight	F		1445 (4' 9")
Engine cover height	G		3030 (9' 11")
Overall height of handrail	G'		3595 (11' 8")
Minimum ground clearance	H		770 (2' 6")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width (transport position / working position)	L		2990/3540 (9' 10"/11' 7")
Track gauge (transport position / working position)	M		2380/2940 (7' 10"/9' 8")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.91 (12.94)
Max traction force		kg (lb)	34100 (75180)

11) HX520 L

· 7.06 m (23' 2") BOOM, 4.00 m (13' 1") ARM

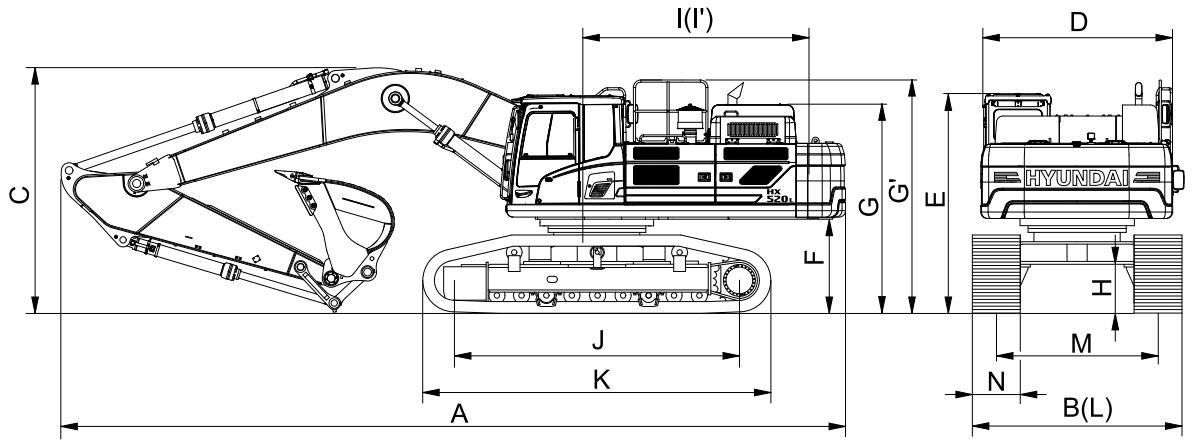


480F2SP03

Description		Unit	Specification
Operating weight		kg (lb)	52500 (115740)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.20 (2.88)
Overall length	A	mm (ft-in)	12250 (40' 2")
Overall width, with 600 mm shoe (transport position / working position)	B		2980/3540 (9' 10"/11' 7")
Overall height	C		4090 (13' 5")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3340 (10' 11")
Ground clearance of counterweight	F		1445 (4' 9")
Engine cover height	G		3030 (9' 11")
Overall height of handrail	G'		3595 (11' 8")
Minimum ground clearance	H		770 (2' 6")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width (transport position / working position)	L		2990/3540 (9' 10"/11' 7")
Track gauge (transport position / working position)	M		2380/2940 (7' 10"/9' 8")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.91 (12.94)
Max traction force		kg (lb)	34100 (75180)

12) HX520 L

· 6.55 m (21' 6") BOOM, 2.40 m (7' 10") ARM

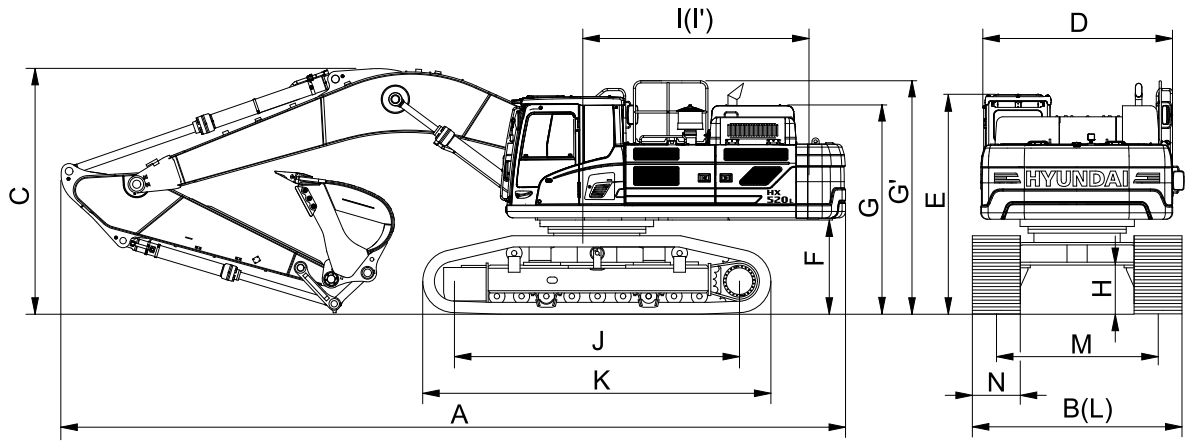


480F2SP03

Description		Unit	Specification
Operating weight		kg (lb)	52120 (114900)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.20 (2.88)
Overall length	A	mm (ft-in)	12000 (39' 4")
Overall width, with 600 mm shoe (transport position / working position)	B		2980/3540 (9' 10"/11' 7")
Overall height	C		4190 (13' 9")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3340 (10' 11")
Ground clearance of counterweight	F		1445 (4' 9")
Engine cover height	G		3030 (9' 11")
Overall height of handrail	G'		3595 (11' 8")
Minimum ground clearance	H		770 (2' 6")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width (transport position / working position)	L		2990/3540 (9' 10"/11' 7")
Track gauge (transport position / working position)	M		2380/2940 (7' 10"/9' 8")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.91 (12.94)
Max traction force		kg (lb)	34100 (75180)

13) HX520 L

· 6.55 m (21' 6") BOOM, 2.90 m (9' 6") ARM

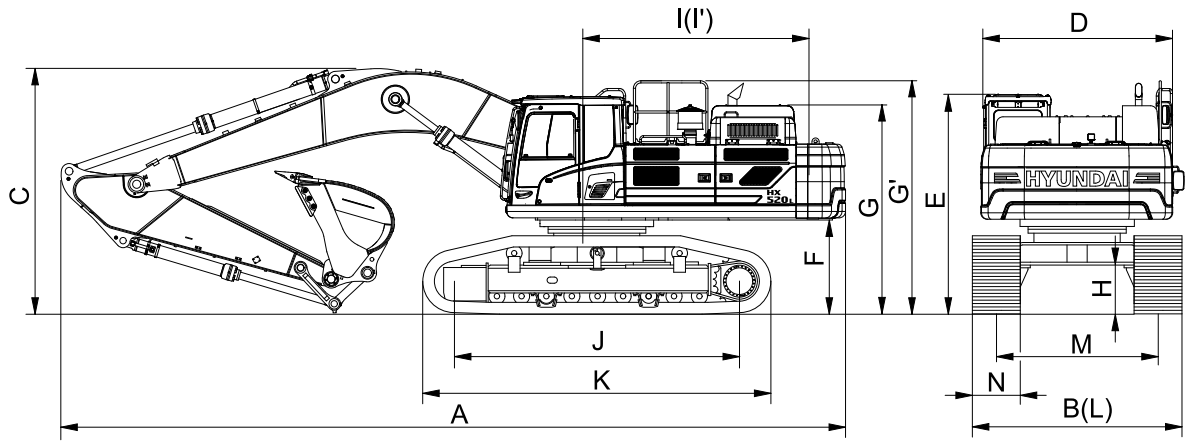


480F2SP03

Description		Unit	Specification
Operating weight		kg (lb)	52320 (115350)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.20 (2.88)
Overall length	A	mm (ft-in)	11870 (38' 11")
Overall width, with 600 mm shoe (transport position / working position)	B		2980/3540 (9' 10"/11' 7")
Overall height	C		4080 (13' 5")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3340 (10' 11")
Ground clearance of counterweight	F		1445 (4' 9")
Engine cover height	G		3030 (9' 11")
Overall height of handrail	G'		3595 (11' 8")
Minimum ground clearance	H		770 (2' 6")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width (transport position / working position)	L		2990/3540 (9' 10"/11' 7")
Track gauge (transport position / working position)	M		2380/2940 (7' 10"/9' 8")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.91 (12.94)
Max traction force		kg (lb)	34100 (75180)

14) HX520 L

· 9.00 m (29' 6") BOOM, 6.00 m (19' 8") ARM



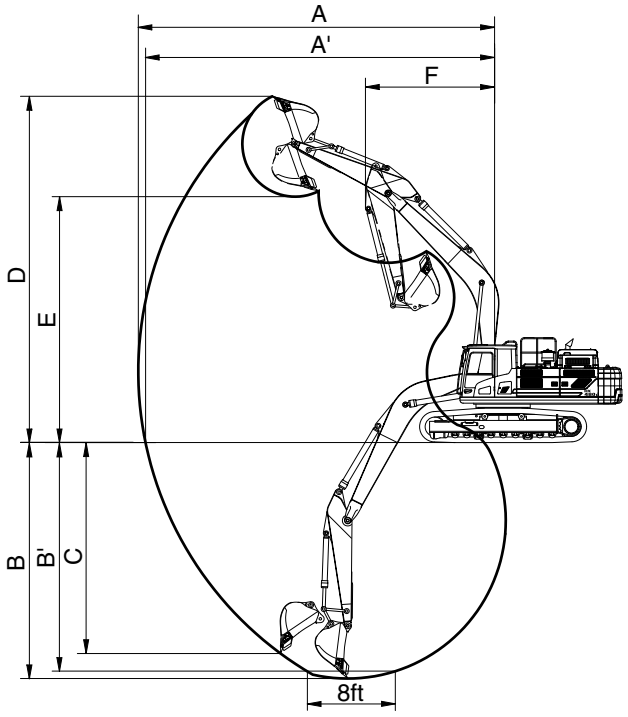
480F2SP03

Description		Unit	Specification
Operating weight		kg (lb)	53410 (117750)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	1.38 (1.80)
Overall length	A	mm (ft-in)	14200 (46' 7")
Overall width, with 600 mm shoe (transport position / working position)	B		2980/3540 (9' 9"/11' 7")
Overall height	C		3960 (13' 0")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3390 (11' 2")
Ground clearance of counterweight	F		1445 (4' 9")
Engine cover height	G		2980 (9' 9")
Overall height of handrail	G'		3595 (11' 8")
Minimum ground clearance	H		770 (2' 6")
Rear-end distance	I		3885 (12' 9")
Rear-end swing radius	I'		3940 (12' 11")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5405 (17' 7")
Undercarriage width (transport position / working position)	L		2980/3540 (9' 9"/11' 7")
Track gauge (transport position / working position)	M		2380/2940 (7' 10"/9' 8")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.3/5.3 (2.1/3.3)
Swing speed		rpm	8.6
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.91 (12.94)
Max traction force		kg (lb)	34100 (75180)

3. WORKING RANGE

1) HX480 L

· 7.06 m (23' 2") BOOM



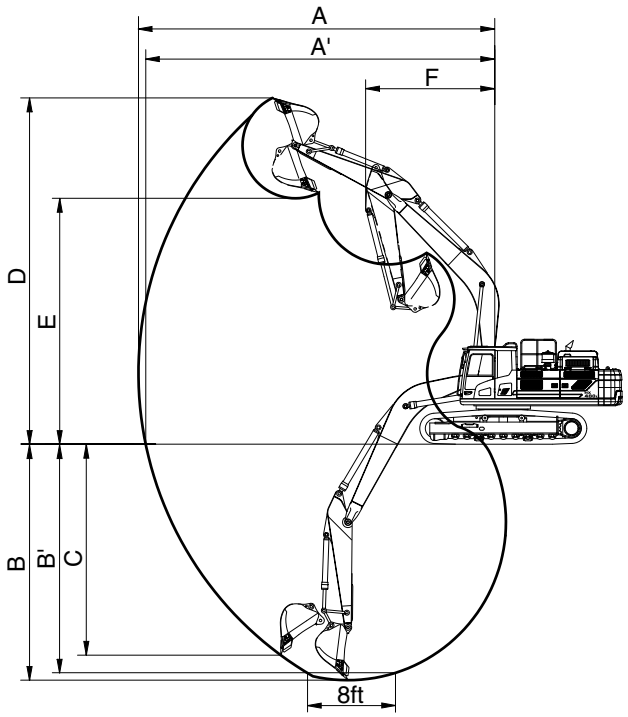
480F2SP04

Description		2.40 m (7' 10") Arm	2.90 m (9' 6") Arm	3.38 m (11' 1") Arm	4.00 m (13' 1") Arm
Max digging reach	A	11200 mm (36' 9")	11620 mm (38' 1")	12040 mm (39' 6")	12600 mm (41' 4")
Max digging reach on ground	A'	10980 mm (36' 0")	11410 mm (37' 5")	11840 mm (38'10")	12410 mm (40' 9")
Max digging depth	B	6780 mm (22' 3")	7280 mm (23'11")	7760 mm (25' 6")	8380 mm (27' 6")
Max digging depth (8ft level)	B'	6600 mm (21' 8")	7120 mm (23' 4")	7620 mm (25' 0")	8250 mm (27' 1")
Max vertical wall digging depth	C	4790 mm (15' 9")	5800 mm (19' 0")	5920 mm (19' 5")	6470 mm (21' 3")
Max digging height	D	10600 mm (34' 9")	10830 mm (35' 6")	10910 mm (35'10")	11130 mm (36' 6")
Max dumping height	E	7260 mm (23'10")	7390 mm (24' 3")	7540 mm (24' 9")	7760 mm (25' 6")
Min swing radius	F	5160 mm (16'11")	4890 mm (16' 1")	4850 mm (15'11")	4710 mm (15' 5")
Bucket digging force	SAE	220.7 [240.8] kN	220.7 [240.8] kN	220.7 [240.8] kN	220.7 [240.8] kN
		22500 [24550] kgf	22500 [24550] kgf	22500 [24550] kgf	22500 [24550] kgf
		49600 [54120] lbf	49600 [54120] lbf	49600 [54120] lbf	49600 [54120] lbf
	ISO	255.0 [278.1] kN	255.0 [278.1] kN	255.0 [278.1] kN	255.0 [278.1] kN
		26000 [28360] kgf	26000 [28360] kgf	26000 [28360] kgf	26000 [28360] kgf
		57320 [62520] lbf	57320 [62520] lbf	57320 [62520] lbf	57320 [62520] lbf
Arm crowd force	SAE	276.6 [301.7] kN	224.6 [245.0] kN	191.2 [208.6] kN	170.6 [186.1] kN
		28200 [30760] kgf	22900 [24980] kgf	19500 [21270] kgf	17400 [18980] kgf
		62170 [67810] lbf	50490 [55070] lbf	42990 [46890] lbf	38360 [41840] lbf
	ISO	290.3 [316.7] kN	234.4 [255.7] kN	199.1 [217.2] kN	176.5 [192.6] kN
		29600 [32290] kgf	23900 [26070] kgf	20300 [22150] kgf	18000 [19640] kgf
		65260 [71190] lbf	52690 [57470] lbf	44750 [48830] lbf	39680 [43300] lbf

[ ] : Power boost

2) HX480 L

· 6.55 m (21' 6") BOOM



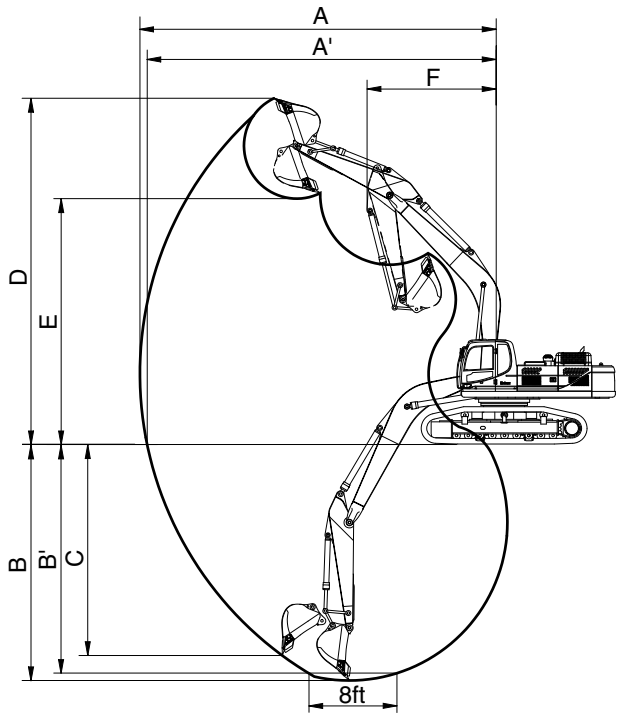
480F2SP04

Description		2.40 m (7' 10") Arm	2.90 m (9' 6") Arm
Max digging reach	A	10690 mm (35' 1")	11130 mm (36' 6")
Max digging reach on ground	A'	10470 mm (34' 4")	10910 mm (35'10")
Max digging depth	B	6390 mm (21' 0")	6890 mm (22' 7")
Max digging depth (8ft level)	B'	6210 mm (20' 4")	6730 mm (22' 1")
Max vertical wall digging depth	C	4510 mm (14'10")	5550 mm (18' 3")
Max digging height	D	10240 mm (33' 7")	10510 mm (34' 6")
Max dumping height	E	6890 mm (22' 7")	7060 mm (23' 2")
Min swing radius	F	4870 mm (16' 0")	4540 mm (14'11")
Bucket digging force	SAE	220.7 [240.8] kN	220.7 [240.8] kN
		22500 [24550] kgf	22500 [24550] kgf
		49600 [54120] lbf	49600 [54120] lbf
	ISO	255.0 [278.1] kN	255.0 [278.1] kN
		26000 [28360] kgf	26000 [28360] kgf
		57320 [62520] lbf	57320 [62520] lbf
Arm crowd force	SAE	276.6 [301.7] kN	224.6 [245.0] kN
		28200 [30760] kgf	22900 [24980] kgf
		62170 [67810] lbf	50490 [55070] lbf
	ISO	290.3 [316.7] kN	234.4 [255.7] kN
		29600 [32290] kgf	23900 [26070] kgf
		65260 [71190] lbf	52690 [57470] lbf

[ ] : Power boost

3) HX480 L

· 9.00 m (29' 6") BOOM

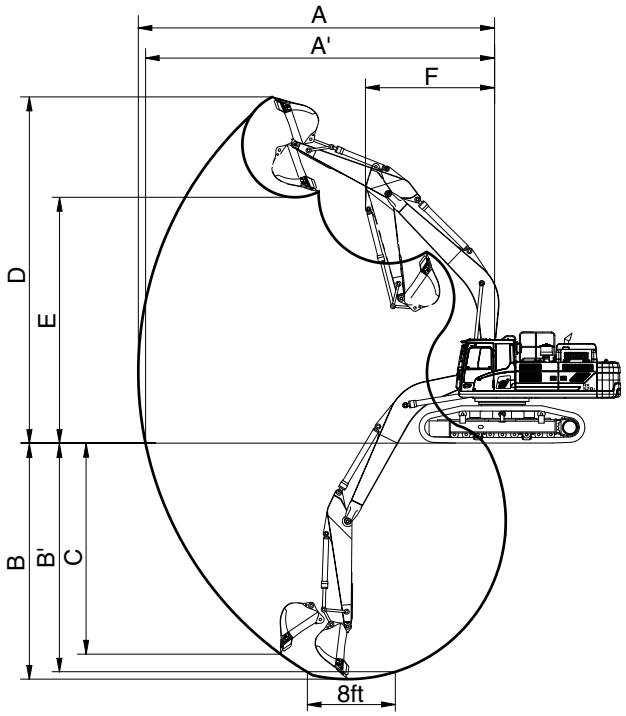


4809A2SP04

Description		6.00 m (19' 8") Arm
Max digging reach	A	16180 mm (53' 1")
Max digging reach on ground	A'	16030 mm (52' 7")
Max digging depth	B	12020 mm (39' 5")
Max digging depth (8ft level)	B'	11920 mm (39' 1")
Max vertical wall digging depth	C	8510 mm (27'11")
Max digging height	D	12440 mm (40'10")
Max dumping height	E	9260 mm (30' 5")
Min swing radius	F	6140 mm (20' 2")
Bucket digging force	SAE	184.4 kN
		18800 kgf
		41450 lbf
	ISO	213.8 kN
		21800 kgf
		48060 lbf
Arm crowd force	SAE	103.0 kN
		10500 kgf
		23150 lbf
	ISO	105.9 kN
		10800 kgf
		23810 lbf

4) HX520 L

· 7.06 m (23' 2") BOOM



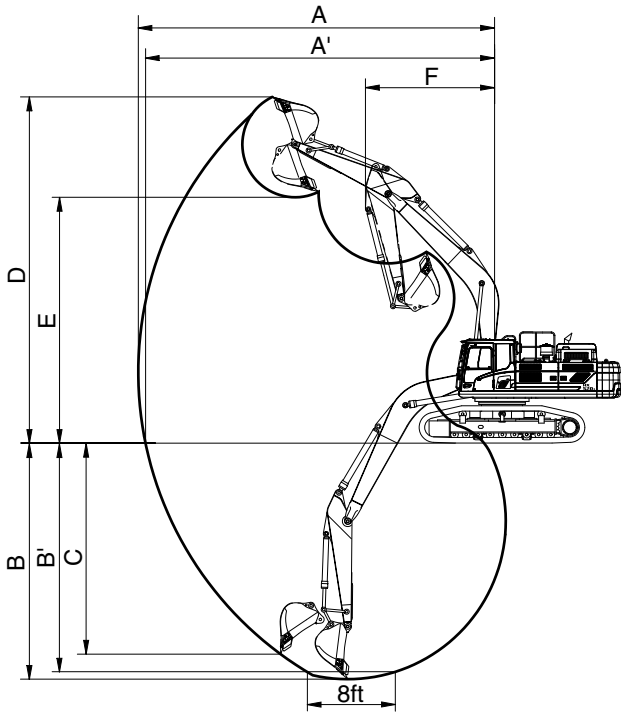
480F2SP05

Description		2.40 m (7' 10") Arm	2.90 m (9' 6") Arm	3.38 m (11' 1") Arm	4.00 m (13' 1") Arm
Max digging reach	A	11200 mm (36' 9")	11620 mm (38' 1")	12040 mm (39' 6")	12600 mm (41' 4")
Max digging reach on ground	A'	10950 mm (35'11")	11380 mm (37' 4")	11810 mm (38' 9")	12380 mm (40' 7")
Max digging depth	B	6630 mm (21' 9")	7130 mm (23' 5")	7610 mm (25' 0")	8230 mm (27' 0")
Max digging depth (8ft level)	B'	6460 mm (21' 2")	5980 mm (22'11")	7470 mm (24' 6")	8110 mm (26' 7")
Max vertical wall digging depth	C	4650 mm (15' 3")	5660 mm (18' 7")	5770 mm (18'11")	6320 mm (20' 9")
Max digging height	D	10750 mm (35' 3")	10980 mm (36' 0")	11060 mm (36' 3")	11280 mm (37' 0")
Max dumping height	E	7410 mm (24' 4")	7540 mm (24' 9")	7690 mm (25' 3")	7910 mm (25'11")
Min swing radius	F	5160 mm (16'11")	4890 mm (16' 1")	4850 mm (15'11")	4710 mm (15' 5")
Bucket digging force	SAE	241.2 [263.2] kN	241.2 [263.2] kN	241.2 [263.2] kN	241.2 [263.2] kN
		24600 [26840] kgf	24600 [26840] kgf	24600 [26840] kgf	24600 [26840] kgf
		54230 [59170] lbf	54230 [59170] lbf	54230 [59170] lbf	54230 [59170] lbf
	ISO	280.5 [306.0] kN	280.5 [306.0] kN	280.5 [306.0] kN	280.5 [306.0] kN
		28600 [31200] kgf	28600 [31200] kgf	28600 [31200] kgf	28600 [31200] kgf
		63050 [68780] lbf	63050 [68780] lbf	63050 [68780] lbf	63050 [68780] lbf
Arm crowd force	SAE	278.5 [303.8] kN	225.6 [246.1] kN	192.2 [209.7] kN	171.6 [187.2] kN
		28400 [30980] kgf	23000 [25090] kgf	19600 [21380] kgf	17500 [19090] kgf
		62610 [68300] lbf	50710 [55310] lbf	43210 [47130] lbf	38580 [42090] lbf
	ISO	291.3 [317.7] kN	235.4 [256.7] kN	200.1 [218.2] kN	177.5 [193.7] kN
		29700 [32400] kgf	24000 [26180] kgf	20400 [22250] kgf	18100 [19750] kgf
		65480 [71430] lbf	52910 [57720] lbf	44970 [49050] lbf	39900 [43540] lbf

[ ] : Power boost

5) HX520 L

· 6.55 m (21' 6") BOOM



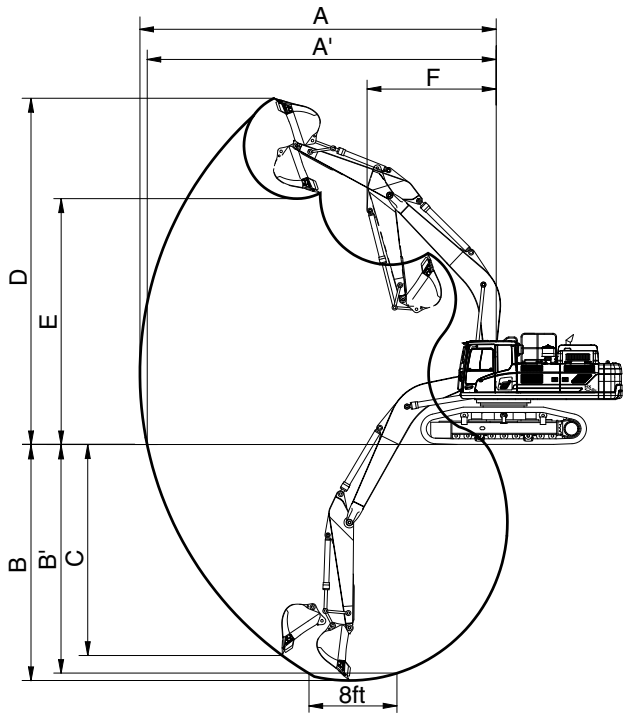
480F2SP05

Description		2.40 m (7' 10") Arm	2.90 m (9' 6") Arm
Max digging reach	A	10690 mm (35' 1")	11130 mm (36' 6")
Max digging reach on ground	A'	10430 mm (34' 3")	10870 mm (35' 8")
Max digging depth	B	6240 mm (20' 6")	6740 mm (22' 1")
Max digging depth (8ft level)	B'	6060 mm (19'11")	6580 mm (21' 7")
Max vertical wall digging depth	C	4370 mm (14' 4")	5420 mm (17' 9")
Max digging height	D	10390 mm (34' 1")	10660 mm (35' 0")
Max dumping height	E	7040 mm (23' 1")	7210 mm (23' 8")
Min swing radius	F	4870 mm (16' 0")	4540 mm (14'11")
Bucket digging force	SAE	241.2 [263.2] kN	241.2 [263.2] kN
		24600 [26840] kgf	24600 [26840] kgf
		54230 [59170] lbf	54230 [59170] lbf
	ISO	280.5 [306.0] kN	280.5 [306.0] kN
		28600 [31200] kgf	28600 [31200] kgf
		63050 [68780] lbf	63050 [68780] lbf
Arm crowd force	SAE	278.5 [303.8] kN	225.6 [246.1] kN
		28400 [30980] kgf	23000 [25090] kgf
		62610 [68300] lbf	50710 [55310] lbf
	ISO	291.3 [317.7] kN	235.4 [256.7] kN
		29700 [32400] kgf	24000 [26180] kgf
		65480 [71430] lbf	52910 [57720] lbf

[ ] : Power boost

6) HX520 L

· 9.00 m (29' 6") BOOM



480F2SP05

Description		6.00 m (19' 8") Arm
Max digging reach	A	16180 mm (53' 1")
Max digging reach on ground	A'	16010 mm (52' 6")
Max digging depth	B	11870 mm (38'11")
Max digging depth (8ft level)	B'	11770 mm (38' 7")
Max vertical wall digging depth	C	8360 mm (27' 5")
Max digging height	D	12590 mm (41' 4")
Max dumping height	E	9410 mm (30'10")
Min swing radius	F	6140 mm (20' 2")
Bucket digging force	SAE	184.4 kN
		18800 kgf
		41450 lbf
	ISO	213.8 kN
		21800 kgf
		48060 lbf
Arm crowd force	SAE	103.0 kN
		10500 kgf
		23150 lbf
	ISO	105.9 kN
		10800 kgf
		23810 lbf

4. WEIGHT

1) HX480 L

Item		HX480 L	
		kg	lb
Upperstructure assembly		20120	44360
Main frame weld assembly		4640	10230
Engine assembly		1075	2370
Main pump assembly		190	420
Main control valve assembly		420	930
Swing motor assembly		230	510
Hydraulic oil tank assembly		450	990
Fuel tank assembly		270	600
Counterweight	6.55 m, 7.06 m boom	9200	20280
	9.0 m boom	10700	23590
Cab assembly		490	1080
Lower chassis assembly		19000	41890
Track frame weld assembly		7060	15570
Swing bearing		720	1590
Travel motor assembly		440	970
Turning joint		50	110
Track recoil spring		310	680
Idler		250	550
Sprocket		95	210
Carrier roller		40	90
Track roller		87	190
Track-chain assembly (600 mm standard triple grouser shoe)		2700	5950
Front attachment assembly (7.06 m boom, 3.38 m arm, 2.20 m^3 SAE heaped bucket)		10380	22880
7.06 m boom assembly		3570	7870
6.55 m boom assembly		3560	7850
9.0 m boom assembly		4310	9500
3.38 m arm assembly		1820	4010
2.20 m^3 SAE heaped bucket		2030	4480
Boom cylinder assembly		870	1920
Arm cylinder assembly		600	1320
Bucket cylinder assembly		360	790
Bucket control linkage total		185	410

2) HX520 L

Item		HX520 L	
		kg	lb
Upperstructure assembly		21180	46690
Main frame weld assembly		4640	10230
Engine assembly		1075	2370
Main pump assembly		190	420
Main control valve assembly		420	930
Swing motor assembly		230	510
Hydraulic oil tank assembly		450	990
Fuel tank assembly		270	600
Counterweight	6.55 m, 7.06 m boom	10200	22490
	9.0 m boom	10700	23590
Cab assembly		490	1080
Lower chassis assembly		20800	45860
Lower track frame		2130	4700
Center frame support		8070	17790
Swing bearing		720	1590
Travel motor assembly		440	970
Turning joint		50	110
Track recoil spring		310	680
Idler		250	550
Sprocket		95	210
Carrier roller		40	90
Track roller		87	190
Track-chain assembly (600 mm standard triple grouser shoe)		2700	5850
Front attachment assembly (7.06 m boom, 3.38 m arm, 2.20 m^3 SAE heaped bucket)		10420	22970
7.06 m boom assembly		3570	7870
6.55 m boom assembly		3560	7850
9.0 m boom assembly		4310	9500
3.38 m arm assembly		1820	4010
2.20 m^3 SAE heaped bucket		2030	4480
Boom cylinder assembly		870	1920
Arm cylinder assembly		600	1320
Bucket cylinder assembly		400	880
Bucket control linkage total		185	410

5. LIFTING CAPACITIES

1) HX480 L

(1) 6.55 m (21' 6") boom, 2.40 m (7' 10") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 9,200 kg (20,280 lb) counterweight.

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

Load point height		Load radius								At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.7 ft)		6.0 m (19.6 ft)		7.5 m (24.5 ft)		Capacity		Reach
												m (ft)
6.0 m (19.6 ft)	kg					*13100	*13100	*12540	9840	10830	6430	9.71
	lb					*28880	*28880	*27640	21700	23890	14190	31.72
4.5 m (14.7 ft)	kg			*18500	*18500	*15010	13670	*13400	9460	9840	5750	10.16
	lb			*40800	*40800	*33100	30150	*29530	20850	21690	12680	33.19
3.0 m (9.8 ft)	kg					*17090	12800	*14450	9010	9410	5440	10.33
	lb					*37680	28230	*31850	19860	20740	11980	33.74
1.5 m (4.9 ft)	kg					*18620	12140	15190	8620	9430	5410	10.24
	lb					*41060	26750	33480	19010	20790	11940	33.44
Ground Line	kg			*24870	18570	*19220	11770	14910	8380	9930	5700	9.88
	lb			*54820	40940	*42370	25950	32860	18470	21900	12570	32.28
-1.5 m (-4.9 ft)	kg			*23780	18600	*18850	11680	14840	8320	11150	6430	9.21
	lb			*52420	41000	*41560	25750	32710	18340	24570	14180	30.1
-3.0 m (-9.8 ft)	kg	*27210	*27210	*21680	18870	*17410	11840			*11320	8010	8.15
	lb	*59990	*59990	*47800	41590	*38370	26090			*24960	17650	26.61
-4.5 m (-14.7 ft)	kg			*18000	*18000					*10800	9470	7.4
	lb			*39690	*39690					*23810	20870	24.19

Note 1. Lifting capacity is based on ISO 10567.
2. Load point is the end pin point of front attachment.
3. Lifting capacity does not exceed 75% of tipping load or 87% of hydraulic capacity.
4. *indicates the load limited by hydraulic capacity.

※ Lifting capacities are based upon a standard machine conditions.
Lifting capacities will vary with different work tools, ground conditions and attachments.
The difference between the weight of a work tool attachment must be subtracted.
Consult your HD Hyundai Construction Equipment dealer regarding the lifting capacities for specific work tools and attachments.

⚠ Failure to comply to the rated load can cause possible personal injury or property damage.
Make adjustments to the rated load as necessory for non-standard configurations.

(2) 6.55 m (21' 6") boom, 2.90 m (9' 6") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 9,200 kg (20,280 lb) counterweight.

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

Load point height		Load radius										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.7 ft)		6.0 m (19.6 ft)		7.5 m (24.5 ft)		9.0 m (29.4 ft)		Capacity		Reach
														m (ft)
7.5 m (24.5 ft)	kg							*11560	10150			*8700	7060	9.39
	lb							*25480	22390			*19180	15560	30.67
6.0 m (19.6 ft)	kg							*12010	9940			*8690	5950	10.12
	lb							*26480	21910			*19170	13120	33.06
4.5 m (14.7 ft)	kg			*17020	*17020	*14310	13870	*12990	9520			*8820	5340	10.55
	lb			*37530	*37530	*31560	30580	*28630	20990			*19440	11770	34.45
3.0 m (9.8 ft)	kg			*21620	20330	*16560	12950	*14170	9040	11500	6600	8810	5040	10.71
	lb			*47670	44820	*36500	28550	*31230	19920	25350	14550	19420	11110	34.99
1.5 m (4.9 ft)	kg			*24550	18980	*18370	12190	15180	8600	11240	6370	8800	5000	10.62
	lb			*54130	41850	*40490	26860	33470	18960	24780	14040	19410	11020	34.71
Ground Line	kg			*25300	18440	*19310	11710	14830	8290			9220	5230	10.28
	lb			*55770	40660	*42560	25830	32700	18280			20330	11540	33.59
-1.5 m (-4.9 ft)	kg	*23710	*23710	*24660	18350	*19280	11530	14680	8160			10230	5840	9.65
	lb	*52280	*52280	*54370	40450	*42510	25420	32370	17990			22550	12870	31.52
-3.0 m (-9.8 ft)	kg	*29990	*29990	*22950	18540	*18250	11600	*14760	8250			*11610	7100	8.65
	lb	*66110	*66110	*50590	40860	*40230	25570	*32540	18180			*25590	15650	28.26
-4.5 m (-14.7 ft)	kg	*25460	*25460	*19850	19020	*15750	11960					*10980	9450	7.36
	lb	*56130	*56130	*43770	41930	*34730	26380					*24210	20830	24.05

(3) 7.06 m (23' 2") boom, 3.38 m (11' 1") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 9,200 kg (20,280 lb) counterweight.

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

Load point height		Load radius										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.7 ft)		6.0 m (19.6 ft)		7.5 m (24.5 ft)		9.0 m (29.4 ft)		Capacity		Reach
														m (ft)
6.0 m (19.6 ft)	kg							*11510	9900	*11340	7020	*7750	4930	11.05
	lb							*25370	21820	*25010	15480	*17090	10870	36.08
4.5 m (14.7 ft)	kg					*14080	13730	*12700	9410	11690	6770	*7880	4450	11.43
	lb					*31040	30270	*28000	20740	25770	14910	*17370	9820	37.34
3.0 m (9.8 ft)	kg			*21750	19990	*16510	12740	*14050	8870	11350	6460	7570	4210	11.58
	lb			*47940	44070	*36390	28080	*30970	19550	25020	14250	16680	9280	37.83
1.5 m (4.9 ft)	kg			*24850	18580	*18470	11920	14950	8390	11030	6180	7540	4160	11.5
	lb			*54780	40950	*40730	26270	32950	18490	24320	13620	16630	9180	37.57
Ground Line	kg			*25740	18010	*19570	11410	14550	8040	10790	5960	7830	4320	11.19
	lb			*56750	39710	*43150	25150	32070	17720	23800	13140	17270	9530	36.55
-1.5 m (-4.9 ft)	kg	*19090	*19090	*25340	17890	*19780	11180	14330	7850	10680	5860	8530	4740	10.62
	lb	*42080	*42080	*55870	39430	*43600	24640	31600	17310	23540	12910	18800	10450	34.69
-3.0 m (-9.8 ft)	kg	*25270	*25270	*24050	18010	*19150	11180	14320	7840			9890	5580	9.74
	lb	*55720	*55720	*53020	39710	*42220	24650	31570	17280			21810	12290	31.82
-4.5 m (-14.7 ft)	kg	*28240	*28240	*21780	18370	*17570	11390	*14330	8040			*11250	7290	8.43
	lb	*62250	*62250	*48020	40490	*38740	25120	*31590	17720			*24800	16080	27.54
-6.0 m (-19.6 ft)	kg			*18000	*18000							*10910	8780	7.61
	lb			*39690	*39690							*24060	19360	24.85

(4) 7.06 m (23' 2") boom, 2.40 m (7' 10") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 9,200 kg (20,280 lb) counterweight.

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

Load point height		Load radius										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.7 ft)		6.0 m (19.6 ft)		7.5 m (24.5 ft)		9.0 m (29.4 ft)		Capacity		Reach
														m (ft)
7.5 m (24.5 ft)	kg							*11920	9980			*10790	6730	9.53
	lb							*26280	22010			*23790	14850	31.14
6.0 m (19.6 ft)	kg					*13370	*13370	*12470	9690			9730	5700	10.26
	lb					*29480	*29480	*27490	21370			21450	12560	33.5
4.5 m (14.7 ft)	kg					*15530	13250	*13530	9230			8903	5120	10.68
	lb					*34250	29220	*29830	20340			19630	11290	34.88
3.0 m (9.8 ft)	kg					*17700	12330	*14680	8740	11330	6460	8540	4850	10.84
	lb					*39020	27200	*32370	19260	24980	14250	18820	10690	35.4
1.5 m (4.9 ft)	kg					*19140	11690	14860	8330	11080	6240	8550	4820	10.75
	lb					*42190	25780	32760	18370	24430	13760	18840	10640	35.12
Ground Line	kg					*19600	11380	14580	8090	10940	6110	8960	5060	10.41
	lb					*43210	25090	32140	17830	24120	13470	19750	11160	34.02
-1.5 m (-4.9 ft)	kg			*23820	18210	*19210	11320	14500	8020			9930	5650	9.79
	lb			*52520	40150	*42360	24960	31960	17680			21890	12460	31.98
-3.0 m (-9.8 ft)	kg	*26660	*26660	*22010	18460	*17980	11470	14660	8160			*11270	6860	8.81
	lb	*58780	*58780	*48530	40690	*39630	25290	32320	17980			*24840	15120	28.78
-4.5 m (-14.7 ft)	kg			*19030	18970	*15480	11890					*10630	8730	7.71
	lb			*41950	41820	*34120	26210					*23430	19240	25.19

(5) 7.06 m (23' 2") boom, 2.90 m (9' 6") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 9,200 kg (20,280 lb) counterweight.

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

Load point height		Load radius										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.7 ft)		6.0 m (19.6 ft)		7.5 m (24.5 ft)		9.0 m (29.4 ft)		Capacity		Reach
														m (ft)
7.5 m (24.5 ft)	kg							*11300	10110			*9200	6210	9.96
	lb							*24920	22290			*20290	13690	32.54
6.0 m (19.6 ft)	kg							*12000	9780			9110	5290	10.65
	lb							*26450	21560			20090	11660	34.78
4.5 m (14.7 ft)	kg			*18460	*18460	*14840	13460	*13150	9290	11630	6710	8370	4760	11.05
	lb			*40690	*40690	*32720	29680	*28980	20480	25630	14800	18440	10500	36.09
3.0 m (9.8 ft)	kg			*23200	19320	*17170	12480	*14420	8760	11310	6430	8020	4500	11.2
	lb			*51150	42600	*37860	27520	*31790	19320	24930	14170	17680	9920	36.6
1.5 m (4.9 ft)	kg			*21570	18200	*18920	11730	14850	8310	11020	6170	8010	4460	11.12
	lb			*47550	40110	*41710	25860	32750	18320	24290	13590	17650	9830	36.33
Ground Line	kg			*24530	17880	*19730	11310	14500	8000	10820	5990	8350	4650	10.8
	lb			*54090	39420	*43500	24920	31970	17640	23850	13200	18400	10250	35.27
-1.5 m (-4.9 ft)	kg	*19550	*19550	*24880	17880	*19650	11160	14350	7870			9170	5140	10.2
	lb	*43100	*43100	*54840	39430	*43320	24600	31640	17350			20210	11340	33.32
-3.0 m (-9.8 ft)	kg	*27720	*27720	*23290	18090	*18730	11240	14410	7930			10790	6140	9.28
	lb	*61120	*61120	*51340	39890	*41300	24770	31780	17470			23790	13530	30.31
-4.5 m (-14.7 ft)	kg	*26110	*26110	*20660	18540	*16750	11550					*10990	8290	7.87
	lb	*57560	*57560	*45550	40870	*36930	25460					*24220	18270	25.72

(6) 7.06 m (23' 2") boom, 4.00 m (13' 1") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 9,200 kg (20,280 lb) counterweight.

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

Load point height		Load radius														At max. reach		
		1.5 m (4.9 ft)		3.0 m (9.8 ft)		4.5 m (14.7 ft)		6.0 m (19.6ft)		7.5 m (24.5 ft)		9.0 m (29.4 ft)		10.5 m (34.3 ft)		Capacity		Reach
																		m (ft)
7.5 m (24.5 ft)	kg											*10200	7350			*7160	5140	11.03
	lb											*22500	16210			*15780	11340	36.02
6.0 m (19.6 ft)	kg											*10730	7180			*7190	4460	11.64
	lb											*23660	15830			*15840	9820	38.02
4.5 m (14.7 ft)	kg									*11990	9630	*11430	6900	8920	5040	7240	4040	12
	lb									*26430	21230	*25200	15200	19650	11100	15970	8900	39.21
3.0 m (9.8 ft)	kg					*19780	*19780	*15510	13090	*13450	9050	11470	6560	8720	4860	6960	3820	12.14
	lb					*43610	*43610	*34200	28870	*29650	19960	25280	14460	19220	10710	15340	8420	39.67
1.5 m (4.9 ft)	kg					*23740	19050	*17790	12160	*14820	8510	11110	6230	8520	4680	6930	3766	12.07
	lb					*52340	42000	*39230	26810	*32660	18770	24490	13740	18780	10310	15270	8303	39.43
Ground Line	kg			*13800	*13800	*25590	18130	*19290	11510	14620	8090	10810	5970	8360	4530	7154	3886	11.77
	lb			*30430	*30430	*56410	39970	*42530	25390	32230	17840	23840	13160	18440	9990	15772	8568	38.46
-1.5 m (-4.9 ft)	kg	*14500	*14500	*17930	*17930	*25840	17790	*19900	11170	14320	7830	10630	5810			7706	4217	11.24
	lb	*31970	*31970	*39520	*39520	*56971	39230	*43860	24620	31580	17270	23430	12800			16990	9298	36.73
-3.0 m (-9.8 ft)	kg	*18590	*18590	*22750	*22750	*25020	17790	*19650	11070	14220	7740	10590	5770			8768	4871	10.43
	lb	*40980	*40980	*50160	*50160	*55170	39230	*43320	24400	31350	17070	23350	12720			19329	10738	34.06
-4.5 m (-14.7 ft)	kg			*28640	*28640	*23220	18040	*18520	11190	14330	7830					10836	6139	9.24
	lb			*63150	*63150	*51200	39780	*40830	24660	31580	17270					23890	13534	30.17
-6.0 m (-19.6 ft)	kg			*26350	*26350	*20150	18570	*16170	11560							*10846	8506	7.73
	lb			*58080	*58080	*44430	40950	*35660	25470							*23910	18753	25.26

(7) 9.00 m (29' 6") boom, 6.00 m (19' 8") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 10,200 kg (22,490 lb) counterweight.

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

Load point height		Load radius												At max. reach		
		3.0 m (9.8 ft)		5.0 m (16.3 ft)		7.0 m (22.9 ft)		9.0 m (29.4ft)		11.0 m (35.9 ft)		13.0 m (42.5 ft)		Capacity		Reach
																m (ft)
8.0 m (26.1 ft)	kg											*5500	3770	*4660	2920	14.78
	lb											*12130	8310	*10280	6440	48.27
6.0 m (19.6 ft)	kg									*8570	5400	6630	3620	*4700	2460	15.40
	lb									*18890	11910	14610	7980	*10370	5430	50.32
4.0 m (13.1 ft)	kg							*10020	7380	8790	4980	6370	3380	4500	2180	15.72
	lb							*22080	16280	19380	10980	14050	7460	9920	4810	51.37
2.0 m (6.5 ft)	kg			*19230	16740	*13910	10040	*11610	6620	8300	4530	6090	3120	4350	2040	15.76
	lb			*42390	36900	*30660	22120	*25600	14580	18300	9990	13430	6880	9590	4500	51.47
Ground Line	kg	*8600	*8600	*16340	14820	*16100	8930	11010	5960	7870	4130	5840	2880	4380	2030	15.50
	lb	*18960	*18960	*36020	32670	*35480	19690	24270	13140	17340	9100	12870	6360	9660	4480	50.64
-2.0 m (-6.5 ft)	kg	*10720	*10720	*16220	14070	15820	8280	10510	5510	7550	3840	5660	2710	4630	2170	14.95
	lb	*23630	*23630	*35750	31010	34870	18260	23160	12140	16640	8460	12470	5980	10210	4780	48.83
-4.0 m (-13.1 ft)	kg	*13060	*13060	*18160	13920	15510	8012	10250	5280	7380	3680			5170	2500	14.06
	lb	*28800	*28800	*40040	30690	34190	17660	22600	11640	16280	8120			11390	5520	45.92
-6.0 m (-19.6 ft)	kg	*15680	*15680	*21300	14130	15540	8037	10230	5260	7400	3700			6120	3160	12.74
	lb	*34570	*34570	*46950	31160	34250	17720	22560	11600	16320	8170			13690	6970	41.61
-8.0 m (-26.1 ft)	kg	*18670	*18670	*20410	14660	*15830	8330	10490	5490					*7810	4550	10.82
	lb	*41160	*41190	*45000	32330	*34890	18370	23120	12100					*17230	10020	35.33
-10.0 m (-32.7 ft)	kg			*16900	15630	*13170	9000							*9870	6980	8.72
	lb			*37270	34450	*29030	19840							*21760	15400	28.48

2) HX520 L

(1) 6.55 m (21' 6") boom, 2.40 m (7' 10") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 10,200 kg (22,490 lb) counterweight.

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

Load point height		Load radius								At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.7 ft)		6.0 m (19.6 ft)		7.5 m (24.5 ft)		Capacity		Reach
												m (ft)
6.0 m (19.6 ft)	kg					*13290	*13290	*12630	11600	*11260	7540	9.80
	lb					*29290	*29290	*27840	25560	*24840	16610	32.02
4.5 m (14.7 ft)	kg			*19010	*19010	*15250	*15250	*13520	11190	10630	6840	10.22
	lb			*41910	*41910	*33630	*33630	*29820	24660	23430	15070	33.39
3.0 m (9.8 ft)	kg					*17320	15170	*14580	10730	10240	6540	10.36
	lb					*38170	33450	*32140	23650	22560	14410	33.86
1.5 m (4.9 ft)	kg					*18760	14520	*15410	10350	10320	6560	10.25
	lb					*41370	32000	*33970	22810	22740	14460	33.48
Ground Line	kg			*24850	22470	*19270	14170	*15740	10110	10920	6940	9.86
	lb			*54790	49530	*42470	31240	*34690	22290	24080	15310	32.22
-1.5 m (-4.9 ft)	kg	*26490	*26490	*23670	22520	*18800	14100	*15300	10070	*11680	7850	9.17
	lb	*58390	*58390	*52180	49650	*41440	31090	*33740	22210	*25740	17300	29.95
-3.0 m (-9.8 ft)	kg	*26910	*26910	*21450	*21450	*17220	14290			*11150	9790	8.05
	lb	*59330	*59330	*47290	*47290	*37970	31510			*24580	21590	26.31
-4.5 m (-14.7 ft)	kg			*17540	*17540					*10720	*10720	7.49
	lb			*38660	*38660					*23640	*23640	24.46

Note 1. Lifting capacity is based on ISO 10567.
2. Load point is the end pin point of front attachment.
3. Lifting capacity does not exceed 75% of tipping load or 87% of hydraulic capacity.
4. *indicates the load limited by hydraulic capacity.

※ Lifting capacities are based upon a standard machine conditions.
Lifting capacities will vary with different work tools, ground conditions and attachments.
The difference between the weight of a work tool attachment must be subtracted.
Consult your HD Hyundai Construction Equipment dealer regarding the lifting capacities for specific work tools and attachments.

⚠ Failure to comply to the rated load can cause possible personal injury or property damage.
Make adjustments to the rated load as necessory for non-standard configurations.

(2) 6.55 m (21' 6") boom, 2.90 m (9' 6") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 10,200 kg (22,490 lb) counterweight.

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

Load point height		Load radius										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.7 ft)		6.0 m (19.6 ft)		7.5 m (24.5 ft)		9.0 m (29.4 ft)		Capacity		Reach
														m (ft)
7.5 m (24.5 ft)	kg							*11640	*11640			*8710	8100	9.54
	lb							*25650	*25650			*19200	17850	31.17
6.0 m (19.6 ft)	kg							*12110	11690			*8690	6970	10.24
	lb							*26700	25770			*19170	15360	33.44
4.5 m (14.7 ft)	kg			*17530	*17530	*14570	*14570	*13130	11250			*8810	6340	10.63
	lb			*38640	*38640	*32110	*32110	*28940	24800			*19410	13990	34.73
3.0 m (9.8 ft)	kg			*22060	*22060	*16800	15320	*14310	10750	12550	7950	*9040	6060	10.77
	lb			*48640	*48640	*37040	33770	*31550	23710	27660	17530	*19930	13370	35.18
1.5 m (4.9 ft)	kg			*24760	22820	*18540	14560	*15320	10320	12290	7720	*9420	6070	10.66
	lb			*54590	50310	*40880	32100	*33770	22750	27100	17010	*20770	13380	34.82
Ground Line	kg			*25340	22320	*19390	14110	*15870	10020			*9990	6380	10.29
	lb			*55860	49210	*42740	31100	*34980	22090			*22030	14070	33.62
-1.5 m (-4.9 ft)	kg	*24530	*24530	*24590	22260	*19270	13950	*15750	9910			*10870	7120	9.63
	lb	*54080	*54080	*54220	49070	*42480	30750	*34720	21840			*23960	15700	31.47
-3.0 m (-9.8 ft)	kg	*29690	*29690	*22760	22480	*18120	14040	*14610	10020			*11430	8670	8.59
	lb	*65460	*65460	*50180	49560	*39940	30960	*32200	22100			*25200	19120	28.07
-4.5 m (-14.7 ft)	kg			*19480	*19480	*15400	14460					*10840	*10840	7.50
	lb			*42950	*42950	*33960	31880					*23900	*23900	24.50

(3) 7.06 m (23' 2") boom, 2.40 m (7' 10") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 10,200 kg (22,490 lb) counterweight.

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

Load point height		Load radius										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.7 ft)		6.0 m (19.6 ft)		7.5 m (24.5 ft)		9.0 m (29.4 ft)		Capacity		Reach
														m (ft)
7.5 m (24.5 ft)	kg							*11960	11760			*10860	7810	9.66
	lb							*26360	25920			*23940	17210	31.56
6.0 m (19.6 ft)	kg					*13590	*13590	*12590	11430			10460	6730	10.35
	lb					*29970	*29970	*27750	25200			23050	14840	33.80
4.5 m (14.7 ft)	kg					*15800	15620	*13670	10950	*12580	8060	9650	6150	10.74
	lb					*34820	34430	*30150	24130	*27740	17770	21280	13550	35.07
3.0 m (9.8 ft)	kg					*17920	14690	*14820	10450	12380	7810	9320	5880	10.87
	lb					*39510	32390	*32680	23030	27290	17210	20540	12970	35.52
1.5 m (4.9 ft)	kg					*19270	14070	*15700	10050	12140	7590	9380	5900	10.76
	lb					*42480	31010	*34600	22150	26760	16730	20670	13000	35.16
Ground Line	kg					*19640	13780	15940	9820			9870	6210	10.40
	lb					*43300	30370	35140	21640			21760	13700	33.97
-1.5 m (-4.9 ft)	kg			*23730	22120	*19170	13740	*15770	9760			10980	6940	9.75
	lb			*52320	48760	*42270	30290	*34760	21530			24210	15300	31.85
-3.0 m (-9.8 ft)	kg	*26500	*26500	*21830	*21830	*17840	13910	*14540	9930			*11140	8420	8.74
	lb	*58420	*58420	*48130	*48130	*39330	30680	*32060	21900			*24560	18560	28.54
-4.5 m (-14.7 ft)	kg			*18680	*18680	*15140	14380					*10560	10260	7.80
	lb			*41180	*41180	*33380	31710					*23280	22620	25.47

(4) 7.06 m (23' 2") boom, 2.90 m (9' 6") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 10,200 kg (22,490 lb) counterweight.

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

Load point height		Load radius										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.7 ft)		6.0 m (19.6 ft)		7.5 m (24.5 ft)		9.0 m (29.4 ft)		Capacity		Reach
														m (ft)
7.5 m (24.5 ft)	kg							*11360	*11360			*9210	7190	10.11
	lb							*25050	*25050			*20310	15860	33.03
6.0 m (19.6 ft)	kg							*12120	11520			*9220	6250	10.76
	lb							*26730	25400			*20340	13770	35.15
4.5 m (14.7 ft)	kg			*19010	*19010	*15110	*15110	*13300	11010	*12330	8060	9050	5720	11.13
	lb			*41900	*41900	*33310	*33310	*29320	24270	*27180	17770	19940	12600	36.37
3.0 m (9.8 ft)	kg			*23620	23090	*17420	14840	*14570	10470	12350	7770	8730	5470	11.26
	lb			*52060	50900	*38400	32710	*32120	23090	27230	17130	19250	12050	36.80
1.5 m (4.9 ft)	kg			*21570	*21570	*19080	14100	*15610	10020	12070	7510	8770	5460	11.16
	lb			*47560	*47560	*42070	31080	*34410	22090	26600	16560	19320	12040	36.45
Ground Line	kg			*25090	21760	*19800	13690	15860	9730	11880	7340	9180	5720	10.81
	lb			*55310	47970	*43660	30190	34960	21440	26180	16170	20230	12610	35.32
-1.5 m (-4.9 ft)	kg	*20350	*20350	*24810	21780	*19640	13570	15730	9610			10110	6330	10.19
	lb	*44860	*44860	*54690	48020	*43300	29910	34670	21180			22280	13950	33.30
-3.0 m (-9.8 ft)	kg	*28610	*28610	*23130	22020	*18630	13670	*15310	9690			*11360	7540	9.23
	lb	*63060	*63060	*50990	48550	*41080	30140	*33750	21360			*25040	16620	30.17
-4.5 m (-14.7 ft)	kg			*20370	*20370	*16510	14020					*10730	10170	7.79
	lb			*44910	*44910	*36390	30910					*23650	22430	25.43

(5) 7.06 m (23' 2") boom, 3.38 m (11' 1") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 10,200 kg (22,490 lb) counterweight.

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

Load point height		Load radius										At max. reach		
		3.0 m (9.8 ft)		4.5 m (14.7 ft)		6.0 m (19.6 ft)		7.5 m (24.5 ft)		9.0 m (29.4 ft)		Capacity		Reach
														m (ft)
6.0 m (19.6 ft)	kg							*11640	*11640	*11410	8380	*7750	5820	11.18
	lb							*25650	*25650	*25160	18480	*17080	12840	36.53
4.5 m (14.7 ft)	kg			*17410	*17410	*14350	*14350	*12860	11130	*12030	8110	*7860	5340	11.54
	lb			*38390	*38390	*31640	*31640	*28360	24540	*26530	17890	*17330	11780	37.70
3.0 m (9.8 ft)	kg			*22210	*22210	*16770	15090	*14210	10580	12390	7800	*8060	5120	11.67
	lb			*48960	*48960	*36960	33280	*31330	23320	27320	17200	*17760	11280	38.11
1.5 m (4.9 ft)	kg			*25070	22400	*18660	14280	*15370	10100	12080	7520	8240	5100	11.57
	lb			*55270	49380	*41150	31490	*33880	22260	26630	16570	18160	11250	37.78
Ground Line	kg			*25800	21880	*19670	13790	15900	9760	11850	7310	8590	5320	11.23
	lb			*56880	48230	*43370	30400	35040	21510	26120	16110	18930	11730	36.69
-1.5 m (-4.9 ft)	kg	*19680	*19680	*25300	21780	*19800	13580	15700	9580	11750	7210	9370	5830	10.64
	lb	*43390	*43390	*55780	48010	*43640	29940	34620	21130	25890	15900	20660	12860	34.77
-3.0 m (-9.8 ft)	kg	*25950	*25950	*23920	21930	*19080	13600	15710	9590			*10510	6840	9.74
	lb	*57200	*57200	*52740	48350	*42069	29990	34630	21140			*23180	15080	31.82
-4.5 m (-14.7 ft)	kg	*27870	*27870	*21540	*21540	*17390	13850					*10990	8910	8.39
	lb	*61430	*61430	*47480	*47480	*38330	30530					*24230	19640	27.41

(6) 7.06 m (23' 2") boom, 4.00 m (13' 1") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 10,200 kg (22,490 lb) counterweight.

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

Load point height		Load radius														At max. reach		
		1.5 m (4.9 ft)		3.0 m (9.8 ft)		4.5 m (14.7 ft)		6.0 m (19.6ft)		7.5 m (24.5 ft)		9.0 m (29.4 ft)		10.5 m (34.3 ft)		Capacity		Reach
																		m (ft)
7.5 m (24.5 ft)	kg											*10410	8730			*7170	6000	11.19
	lb											*22950	19250			*15800	13240	36.54
6.0 m (19.6 ft)	kg											*10810	8540			*7190	5300	11.77
	lb											*23840	18830			*15850	11680	38.45
4.5 m (14.7 ft)	kg									*12150	11350	*11540	8240	*9510	6140	*7280	4890	12.11
	lb									*26800	25030	*25430	18170	*20960	13550	*16050	10770	39.55
3.0 m (9.8 ft)	kg					*20300	*20300	*15800	15460	*13620	10760	*12390	7900	9570	5960	*7450	4680	12.23
	lb					*44750	*44750	*34820	34070	*30040	23730	*27310	17410	21110	13140	*16430	10310	39.94
1.5 m (4.9 ft)	kg					*24060	22850	*18020	14520	*14970	10220	12150	7570	9380	5780	7590	4650	12.13
	lb					*53050	50390	*39730	32020	*33000	22530	26780	16690	20670	12730	16720	10260	39.63
Ground Line	kg			*14190	*14190	*25720	21980	*19430	13890	*15930	9810	11860	7310	9230	5640	7860	4820	11.82
	lb			*31290	*31290	*56710	48450	*42840	30620	*35120	21620	26150	16120	20340	12430	17340	10630	38.60
-1.5 m (-4.9 ft)	kg	*14900	*14900	*18380	*18380	*25860	21670	*19950	13560	15680	9560	11690	7160			8490	5240	11.26
	lb	*32850	*32850	*40520	*40520	*57000	47780	*43980	29900	34570	21070	25770	15770			18730	11550	36.78
-3.0 m (-9.8 ft)	kg	*19020	*19020	*23290	*23290	*24940	21700	*19620	13480	15600	9480	11670	7140			*9460	6020	10.42
	lb	*41940	*41940	*51340	*51340	*54990	47830	*43250	29720	34390	20910	25720	15730			*20850	13280	34.05
-4.5 m (-14.7 ft)	kg			*29320	*29320	*23030	21980	*18390	13630	*15130	9600					*10910	7550	9.20
	lb			*64640	*64640	*50780	48470	*40550	30040	*33350	21160					*24050	16650	30.05
-6.0 m (-19.6 ft)	kg					*19800	*19800	*15870	14040							*10660	9810	7.93
	lb					*43650	*43650	*35000	30950							*23500	21620	25.91

(7) 9.00 m (29' 6") boom, 6.00 m (19' 8") arm equipped with 2.20 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 10,200 kg (22,490 lb) counterweight.

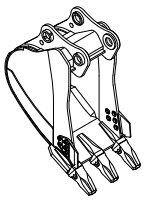
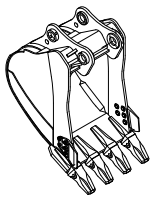
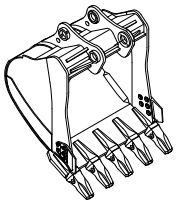
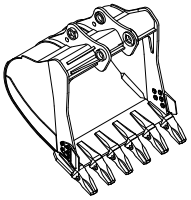
· : Rating over-front · : Rating over-side or 360 degree

Load point height		Load radius												At max. reach		
		3.0 m (9.8 ft)		5.0 m (16.3 ft)		7.0 m (22.9 ft)		9.0 m (29.4ft)		11.0 m (35.9 ft)		13.0 m (42.5 ft)		Capacity		Reach
																m (ft)
8.0 m (26.1 ft)	kg											*5650	4340	*4660	3370	14.83
	lb											*12460	9560	*10280	7430	48.46
6.0 m (19.6 ft)	kg									*8630	6090	6910	4180	*4710	2900	15.44
	lb									*19020	13410	15230	9200	*10380	6390	50.43
4.0 m (13.1 ft)	kg							*10140	8260	9120	5650	6650	3930	4720	2620	15.74
	lb							*22350	18200	20100	12460	14660	8670	10410	5770	51.40
2.0 m (6.5 ft)	kg			*19580	18830	*14100	11260	*11720	7480	8630	5200	6370	3670	4580	2490	15.75
	lb			*43170	41510	*31090	24830	*25850	16500	19030	11470	14040	8090	10100	5480	51.44
Ground Line	kg	*8750	*8750	*16190	*16190	*16220	10170	11440	6830	8200	4800	6120	3430	4640	2500	15.47
	lb	*19290	*19290	*35700	*35700	*35760	22420	25210	15060	18090	10590	13490	7570	10220	5510	50.54
-2.0 m (-6.5 ft)	kg	*10880	*10880	*16310	16250	16450	9540	10950	6390	7900	4520	5950	3270	4910	2670	14.90
	lb	*24000	*24000	*35960	35830	36270	21030	24140	14090	17410	9950	13110	7210	10830	5880	48.66
-4.0 m (-13.1 ft)	kg	*13250	*13250	*18360	16130	16170	9290	10710	6170	7740	4370			5500	3060	13.97
	lb	*29200	*29200	*40470	35570	35650	20480	23620	13610	17070	9640			12120	6740	45.64
-6.0 m (-19.6 ft)	kg	*15890	*15890	*21580	16380	16220	9340	10720	6180	7780	4410			*6510	3820	12.62
	lb	*35030	*35030	*47580	36110	35760	20580	23620	13610	17150	9720			*14360	8420	41.22
-8.0 m (-26.1 ft)	kg	*18910	*18910	*20210	16950	*15890	9660	10990	6430					*7990	5450	10.63
	lb	*41690	*41690	*44550	37370	*34580	21290	24230	14170					*17610	12020	34.72
-10.0 m (-32.7 ft)	kg			*16560	*16560	*12870	10380							*9870	7950	8.72
	lb			*36500	*36500	*28380	22880							*21760	17520	28.48

6. BUCKET SELECTION GUIDE

1) HX480 L

(1) GENERAL BUCKET

			
1.00 m³ SAE heaped bucket	1.38 m³ SAE heaped bucket	2.20 m³, 2.79 m³ SAE heaped bucket	3.00 m³ SAE heaped bucket

Capacity		Width	Weight	Recommendation						
				7.06 m (23' 2") boom				6.55 m (21' 6") boom		9.00 m (29' 6") boom
SAE heaped	CECE heaped			2.4 m arm (7' 10")	2.9 m arm (9' 6")	3.38 m arm (11' 1")	4.0 m arm (13' 1")	2.4 m arm (7' 10")	2.9 m arm (9' 6")	6.00 m arm (19' 8")
1.00 m³ (1.31 yd³)	0.90 m³ (1.18 yd³)	1030 mm (41")	1450 kg (3200 lb)	○	○	○	○	○	○	○
1.38 m³ (1.80 yd³)	1.24 m³ (1.62 yd³)	1215 mm (48")	1670 kg (3680 lb)	○	○	○	○	○	○	●
2.20 m³ (2.88 yd³)	1.93 m³ (2.52 yd³)	1685 mm (66")	2030 kg (4480 lb)	○	○	○	⊙	○	○	
2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	1865 mm (73")	2300 kg (5070 lb)	⊙	⊙	●	●	○	○	
3.00 m³ (3.92 yd³)	2.70 m³ (3.53 yd³)	1985 mm (78")	2440 kg (5380 lb)	●	●	●	●	○	○	

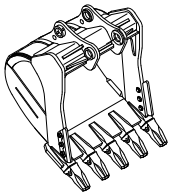
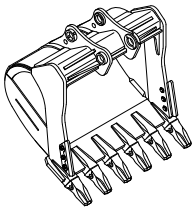
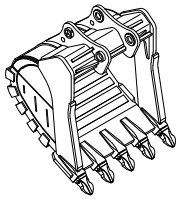
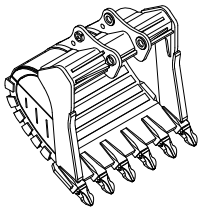
○ Applicable for materials with density of 2000 kg/m³ (3370 lb/yd³) or less

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

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

※ These recommendations are for general conditions and average use.
Work tools and ground conditions have effects on machine performance.
Select an optimum combination according to the working conditions and the type of work that is being done.
Consult your HD Hyundai Construction Equipment dealer for information on selecting the correct boom−arm−bucket combination.

(2) HEAVY DUTY AND ROCK-HEAVY DUTY BUCKET

			
◈2.20 m³ SAE ◈2.43 m³ SAE ◈2.79 m³ SAE heaped bucket	◈3.20 m³ SAE heaped bucket	◆2.20 m³ SAE ◆2.43 m³ SAE ◆2.79 m³ SAE heaped bucket	◆3.20 m³ SAE heaped bucket

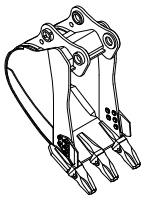
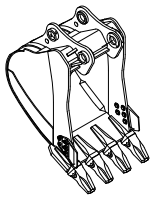
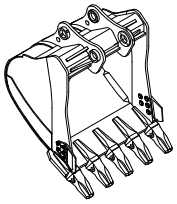
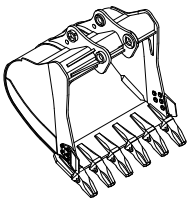
Capacity		With	Weight	Recommendation						
				7.06 m (23' 2") boom				6.55 m (21' 5") boom		9.00 m (29' 6") boom
SAE heaped	CECE heaped			2.4 m arm (7' 10")	2.9 m arm (9' 6")	3.38 m arm (11' 1")	4.0 m arm (13' 1")	2.4 m arm (7' 10")	2.9 m arm (9' 6")	6.00 m arm (19' 8")
◈2.20 m³ (2.88 yd³)	1.93 m³ (2.52 yd³)	1685 mm (66")	2320 kg (5110 lb)	○	○	⊙	⊙	○	○	
◈2.43 m³ (3.18 yd³)	2.11 m³ (2.76 yd³)	1830 mm (72")	2450 kg (5400 lb)	⊙	⊙	⊙	●	○	○	
◈2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	1865 mm (73")	2630 kg (5800 lb)	⊙	●	●	●	○	○	
◈3.20 m³ (4.19 yd³)	2.82 m³ (3.69 yd³)	2075 mm (82")	2870 kg (6330 lb)	●	●	●		⊙	⊙	
◆2.20 m³ (2.88 yd³)	1.93 m³ (2.52 yd³)	1685 mm (66")	2610 kg (5750 lb)	○	⊙	⊙		○	○	
◆2.43 m³ (3.18 yd³)	2.11 m³ (2.76 yd³)	1830 mm (72")	2730 kg (6020 lb)	⊙	⊙	●		○	○	
◆2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	1865 mm (73")	2950 kg (6500 lb)	●	●	●		○	⊙	
◆3.20 m³ (4.19 yd³)	2.82 m³ (3.69 yd³)	2075 mm (82")	3230 kg (7120 lb)	●	●			⊙	⊙	

◈ : Heavy duty bucket
◆ : Rock-Heavy duty bucket

○ Applicable for materials with density of 2000 kg/m³ (3370 lb/yd³) or less
⊙ Applicable for materials with density of 1600 kg/m³ (2700 lb/yd³) or less
● Applicable for materials with density of 1100 kg/m³ (1850 lb/yd³) or less

2) HX520 L

(1) GENERAL BUCKET

			
1.00 m³ SAE heaped bucket	1.38 m³ SAE heaped bucket	2.20 m³ SAE 2.79 m³ SAE heaped bucket	3.00 m³ SAE heaped bucket

Capacity		Width	Weight	Recommendation						
				7.06 m (23' 2") boom				6.55 m (21' 6") boom		9.00 m (29' 6") boom
SAE heaped	CECE heaped			2.4 m arm (7' 10")	2.9 m arm (9' 6")	3.38 m arm (11' 1")	4.0 m arm (13' 1")	2.4 m arm (7' 10")	2.9 m arm (9' 6")	6.00 m arm (19' 8")
1.00 m³ (1.31 yd³)	0.90 m³ (1.18 yd³)	1030 mm (41")	1450 kg (3200 lb)	○	○	○	○	○	○	○
1.38 m³ (1.80 yd³)	1.24 m³ (1.62 yd³)	1215 mm (48")	1670 kg (3680 lb)	○	○	○	○	○	○	●
2.20 m³ (2.88 yd³)	1.93 m³ (2.52 yd³)	1685 mm (66")	2030 kg (4480 lb)	○	○	○	○	○	○	
2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	1865 mm (73")	2300 kg (5070 lb)	○	⊙	⊙	⊙	○	○	
3.00 m³ (3.92 yd³)	2.70 m³ (3.53 yd³)	1985 mm (78")	2440 kg (5380 lb)	⊙	⊙	⊙	●	○	○	

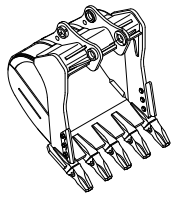
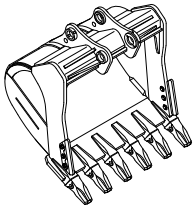
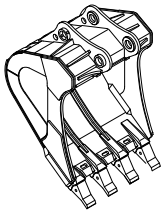
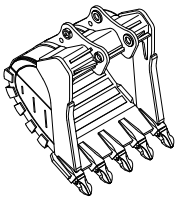
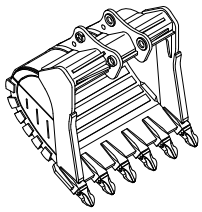
○ Applicable for materials with density of 2000 kg/m³ (3370 lb/yd³) or less

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

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

※ These recommendations are for general conditions and average use.
Work tools and ground conditions have effects on machine performance.
Select an optimum combination according to the working conditions and the type of work that is being done.
Consult your HD Hyundai Construction Equipment dealer for information on selecting the correct boom−arm−bucket combination.

(2) HEAVY DUTY AND ROCK-HEAVY DUTY BUCKET

				
◈2.20 m³ SAE ◈2.43 m³ SAE ◈2.79 m³ SAE heaped bucket	◈3.20 m³ SAE heaped bucket	◆1.81 m³ SAE heaped bucket	◆2.20 m³ SAE ◆2.43 m³ SAE ◆2.70 m³ SAE ◆2.79 m³ SAE heaped bucket	◆3.00 m³ SAE ◆3.20 m³ SAE heaped bucket

Capacity		With	Weight	Recommendation						
				7.06 m (23' 2") boom				6.55 m (21' 5") boom		9.00 m (29' 6") boom
SAE heaped	CECE heaped			2.4 m arm (7' 10")	2.9 m arm (9' 6")	3.38 m arm (11' 1")	4.0 m arm (13' 1")	2.4 m arm (7' 10")	2.9 m arm (9' 6")	6.00 m arm (19' 8")
◈2.20 m³ (2.88 yd³)	1.93 m³ (2.52 yd³)	1685 mm (66")	2320 kg (5110 lb)	○	○	○	○	○	○	
◈2.43 m³ (3.18 yd³)	2.11 m³ (2.76 yd³)	1830 mm (72")	2450 kg (5400 lb)	○	○	○	⊙	○	○	
◈2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	1865 mm (73")	2630 kg (5800 lb)	○	⊙	⊙	●	○	○	
◈3.20 m³ (4.19 yd³)	2.82 m³ (3.69 yd³)	2075 mm (82")	2870 kg (6330 lb)	⊙	●	●	●	⊙	⊙	
◆1.81 m³ (2.37 yd³)	1.50 m³ (1.96 yd³)	1540 mm (61")	2650 kg (5840 lb)	○	○	○		○	○	
◆2.20 m³ (2.88 yd³)	1.93 m³ (2.52 yd³)	1685 mm (66")	2610 kg (5750 lb)	○	○	○		○	○	
◆2.43 m³ (3.18 yd³)	2.11 m³ (2.76 yd³)	1830 mm (72")	2730 kg (6020 lb)	○	○	⊙		○	○	
◆2.70 m³ (3.53 yd³)	2.39 m³ (3.13 yd³)	1800 mm (71")	2770 kg (6110 lb)	○	⊙	⊙		○	○	
◆2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	1865 mm (73")	2950 kg (6500 lb)	⊙	⊙	⊙		○	⊙	
◆3.00 m³ (3.92 yd³)	2.76 m³ (3.61 yd³)	1995 mm (79")	3040 kg (6700 lb)	⊙	●	●		⊙	⊙	
◆3.20 m³ (4.19 yd³)	2.82 m³ (3.69 yd³)	2075 mm (82")	3230 kg (7120 lb)	●	●	●		⊙	⊙	

◈ : Heavy duty bucket
◆ : Rock-Heavy duty bucket

○ Applicable for materials with density of 2000 kg/m³ (3370 lb/yd³) or less
⊙ Applicable for materials with density of 1600 kg/m³ (2700 lb/yd³) or less
● Applicable for materials with density of 1100 kg/m³ (1850 lb/yd³) or less

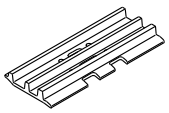
7. UNDERCARRIAGE

1) HX480 L

(1) TRACKS

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

(2) TYPES OF SHOES

Model	Shapes		Triple grouser				
							
HX480 L	Shoe width	mm (in)	600 (24)	700 (28)	750 (30)	800 (32)	900 (36)
	Operating weight	kg (lb)	49500 (109130)	50020 (110280)	50280 (110850)	50540 (111420)	51060 (112570)
	Ground pressure	kgf/cm² (psi)	0.86 (12.23)	0.75 (10.67)	0.70 (9.95)	0.66 (9.39)	0.59 (8.39)
	Overall width	mm (ft-in)	3340 (10' 11")	3440 (11' 3")	3490 (11' 5")	3540 (11' 7")	3640 (11' 11")
	Shoe width	mm (in)	★600 (24)	★700 (28)	-	-	-
	Operating weight	kg (lb)	49315 (108720)	49835 (109870)	-	-	-
	Ground pressure	kgf/cm² (psi)	0.86 (12.23)	0.74 (10.52)	-	-	-
	Overall width	mm (ft-in)	3340 (10' 11")	3440 (11' 3")	-	-	-
	Shoe width	mm (in)	●600 (24)	●700 (28)	-	-	-
	Operating weight	kg (lb)	49680 (109530)	50230 (110740)	-	-	-
	Ground pressure	kgf/cm² (psi)	0.86 (12.23)	0.75 (10.67)	-	-	-
	Overall width	mm (ft-in)	3340 (10' 11")	3440 (11' 3")	-	-	-

★ : Double grouser
● : Heavy duty grouser

(3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

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

(4) SELECTION OF TRACK SHOE

Suitable track shoes should be selected according to operating conditions.

Method of selecting shoes

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

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

※ **Table 1**

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

※ **Table 2**

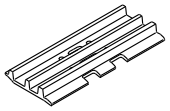
Category	Applications	Applications
A	Rocky ground, river beds, normal soil	· Travel at low speed on rough ground with large obstacles such as boulders or fallen trees
B	Normal soil, soft ground	· These shoes cannot be used on rough ground with large obstacles such as boulders or fallen trees · Travel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

2) HX520 L

(1) TRACKS

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

(2) TYPES OF SHOES

Model	Shapes		Triple grouser			
						
HX520 L	Shoe width	mm (in)	600 (24)	700 (28)	750 (30)	800 (32)
	Operating weight	kg (lb)	52400 (115520)	52920 (116670)	53180 (117240)	53440 (117810)
	Ground pressure	kgf/cm² (psi)	0.91 (12.94)	0.79 (11.23)	0.74 (10.52)	0.70 (9.95)
	Overall width	mm (ft-in)	3540 (11' 7")	3640 (11' 11")	3690 (12' 1")	3740 (12' 3")
	Shoe width	mm (in)	★600 (24)	★700 (28)	-	-
	Operating weight	kg (lb)	52215 (115110)	52735 (116260)	-	-
	Ground pressure	kgf/cm² (psi)	0.91 (12.94)	0.78 (11.09)	-	-
	Overall width	mm (ft-in)	3540 (11' 7")	3640 (11' 11")	-	-
	Shoe width	mm (in)	●600 (24)	●700 (28)	-	-
	Operating weight	kg (lb)	52580 (115920)	53130 (117130)	-	-
	Ground pressure	kgf/cm² (psi)	0.91 (12.94)	0.79 (11.2)	-	-
	Overall width	mm (ft-in)	3540 (11' 7")	3640 (11' 11")	-	-

★ : Double grouser
● : Heavy duty grouser

(3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

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

(4) SELECTION OF TRACK SHOE

Suitable track shoes should be selected according to operating conditions.

Method of selecting shoes

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

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

※ **Table 1**

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

※ **Table 2**

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

8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Scania DC13
Type	4-cycle turbocharged charger air cooled diesel engine
Cooling method	Water cooling
Number of cylinders and arrangement	6 cylinders, in-line
Firing order	1-5-3-6-2-4
Combustion chamber type	Direct injection type
Cylinder bore × stroke	130 × 160 mm (5.12" × 6.3")
Piston displacement	12700 cc (775 cu in)
Compression ratio	17.5 : 1
Rated net horse power (SAE J1349)	424 Hp at 1900 rpm (316 kW at 1900 rpm)
Rated gross horse power (SAE J1995)	444 Hp at 1900 rpm (331 kW at 1900 rpm)
Maximum torque	232 kgf · m (1678 lbf · ft) at 1300 rpm
Engine oil quantity	38 ℓ (10 U.S. gal)
Dry weight	1075 kg (2370 lb)
Low idling speed	800 ± 50 rpm
High idling speed	1900 + 50 rpm
Rated fuel consumption	152.8 g/Hp · hr at 1900 rpm
Starting motor	24V-5.5kW
Alternator	24V-100A
Battery	2 × 12V × 200Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 200 cc/rev
Maximum pressure	330 kgf/cm² (4690 psi) [360 kgf/cm² (5120 psi)]
Rated oil flow	2 × 380 ℓ/min (100.4 U.S. gpm / 83.6 U.K. gpm)
Rated speed	1750 rpm

[ ] : Power boost

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	16 cc/rev
Maximum pressure	40 kgf/cm^2 (570 psi)
Rated oil flow	28 ℓ /min (7.4 U.S. gpm/6.2 U.K. gpm)

4) MAIN CONTROL VALVE

Item		Specification	
		HX480/520 L	HX480/520 L Long reach
Type		9 spools	
Operating method		Hydraulic pilot system	
Main relief valve pressure		330 kgf/cm^2 (4690 psi) [360 kgf/cm^2 (5120 psi)]	
Port relief valve pressure	Boom	380 kgf/cm^2 (5400 psi)	380 kgf/cm^2 (5400 psi)
	Arm	380 kgf/cm^2 (5400 psi)	280 kgf/cm^2 (3980 psi)
	Bucket	380 kgf/cm^2 (5400 psi)	280 kgf/cm^2 (3980 psi)

[ ] : Power boost

5) SWING MOTOR

Item	Specification
Type	Fixed displacement axial piston motor
Capacity	142.6 cc/rev
Relief pressure	285 kgf/cm^2 (4050 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	63.3 kgf · m (458 lbf · ft) over
Brake release pressure	Craking : 20.9 kgf/cm^2 (297 psi) Full stroke : 35.5 kgf/cm^2 (505 psi)
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	330 kgf/cm^2 (4690 psi)
Capacity (max / min)	281.7/175.9 cc/rev
Reduction gear type	3-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	15.7 kgf/cm^2 (114 psi) below
Braking torque	120 kgf · m (1707 lbf · ft) over

7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	Ø170 × Ø115 × 1570 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	Ø190 × Ø130 × 1820 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	Ø160 × Ø110 × 1370 mm (HX480 L) Ø170 × Ø115 × 1370 mm (HX520 L)
	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
HX480 L	Standard	600 mm (24")	0.86 kgf/cm^2 (12.23 psi)	53	3340 mm (10' 11")
	Option	700 mm (28")	0.75 kgf/cm^2 (10.67 psi)	53	3440 mm (11' 3")
		750 mm (30")	0.70 kgf/cm^2 (9.95 psi)	53	3490 mm (11' 5")
		800 mm (32")	0.66 kgf/cm^2 (9.39 psi)	53	3540 mm (11' 7")
		900 mm (36")	0.59 kgf/cm^2 (8.39 psi)	53	3640 mm (11' 11")
		★600 mm (24")	0.86 kgf/cm^2 (12.23 psi)	53	3340 mm (10' 11")
		★700 mm (28")	0.74 kgf/cm^2 (10.52 psi)	53	3440 mm (11' 3")
		●600 mm (24")	0.86 kgf/cm^2 (12.23 psi)	53	3340 mm (10' 11")
		●700 mm (28")	0.75 kgf/cm^2 (10.67 psi)	53	3440 mm (11' 3")
HX520 L	Standard	600 mm (24")	0.91 kgf/cm^2 (12.94 psi)	53	3540 mm (11' 7")
	Option	700 mm (28")	0.79 kgf/cm^2 (11.23 psi)	53	3640 mm (11' 11")
		750 mm (30")	0.74 kgf/cm^2 (10.52 psi)	53	3690 mm (12' 1")
		800 mm (32")	0.70 kgf/cm^2 (9.95 psi)	53	3740 mm (12' 3")
		★600 mm (24")	0.91 kgf/cm^2 (12.94 psi)	53	3540 mm (11' 7")
		★700 mm (28")	0.78 kgf/cm^2 (11.09 psi)	53	3640 mm (11' 11")
		●600 mm (24")	0.91 kgf/cm^2 (12.94 psi)	53	3540 mm (11' 7")
		●700 mm (28")	0.79 kgf/cm^2 (11.2 psi)	53	3640 mm (11' 11")

★ : Double grouser

● : Heavy duty grouser

9) BUCKET

Item	Capacity		Tooth quantity	Width
	SAE heaped	CECE heaped		
HX480 L	1.00 m³ (1.31 yd³)	0.90 m³ (1.18 yd³)	3	1030 mm (41")
	1.38 m³ (1.80 yd³)	1.24 m³ (1.62 yd³)	4	1215 mm (48")
	2.20 m³ (2.88 yd³)	1.93 m³ (2.52 yd³)	5	1685 mm (66")
	2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	5	1865 mm (73")
	3.00 m³ (3.92 yd³)	2.70 m³ (3.53 yd³)	6	1985 mm (78")
	◈2.20 m³ (2.88 yd³)	1.93 m³ (2.52 yd³)	5	1685 mm (66")
	◈2.43 m³ (3.18 yd³)	2.11 m³ (2.76 yd³)	5	1830 mm (72")
	◈2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	5	1865 mm (73")
	◈3.20 m³ (4.19 yd³)	2.82 m³ (3.69 yd³)	6	2075 mm (82")
	◆2.20 m³ (2.88 yd³)	1.93 m³ (2.52 yd³)	5	1685 mm (66")
	◆2.43 m³ (3.18 yd³)	2.11 m³ (2.76 yd³)	5	1830 mm (72")
	◆2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	5	1865 mm (73")
	◆3.20 m³ (4.19 yd³)	2.82 m³ (3.69 yd³)	6	2075 mm (82")
HX520 L	1.00 m³ (1.31 yd³)	0.90 m³ (1.18 yd³)	3	1030 mm (41")
	1.38 m³ (1.80 yd³)	1.24 m³ (1.62 yd³)	4	1215 mm (48")
	2.20 m³ (2.88 yd³)	1.93 m³ (2.52 yd³)	5	1685 mm (66")
	2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	5	1865 mm (73")
	3.00 m³ (3.92 yd³)	2.70 m³ (3.53 yd³)	6	1985 mm (78")
	◈2.20 m³ (2.88 yd³)	1.93 m³ (2.52 yd³)	5	1685 mm (66")
	◈2.43 m³ (3.18 yd³)	2.11 m³ (2.76 yd³)	5	1830 mm (72")
	◈2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	5	1865 mm (73")
	◈3.20 m³ (4.19 yd³)	2.82 m³ (3.69 yd³)	6	2075 mm (82")
	◆1.81 m³ (2.37 yd³)	1.50 m³ (1.96 yd³)	4	1540 mm (61")
	◆2.20 m³ (2.88 yd³)	1.93 m³ (2.52 yd³)	5	1685 mm (66")
	◆2.43 m³ (3.18 yd³)	2.11 m³ (2.76 yd³)	5	1830 mm (72")
	◆2.70 m³ (3.53 yd³)	2.39 m³ (3.13 yd³)	5	1800 mm (71")
	◆2.79 m³ (3.65 yd³)	2.47 m³ (3.23 yd³)	5	1865 mm (73")
	◆3.00 m³ (3.92 yd³)	2.76 m³ (3.61 yd³)	6	1995 mm (79")
	◆3.20 m³ (4.19 yd³)	2.82 m³ (3.69 yd³)	6	2075 mm (82")

◈ : Heavy duty bucket
◆ : Rock - heavy duty bucket

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	38.0 (10)	★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	7.0×2 (1.8×2)	★SAE 75W-90
Final drive		12×2 (3.2×2)	SAE 80W-90
Hydraulic tank	Hydraulic oil	Tank : 262 (69.2) System : 486 (128.4)	★ISO VG 15 ISO VG 32 ISO VG 46, HBHO VG 46★3 ISO VG 68
Fuel tank	Diesel fuel★1	621 (182)	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and soft water★2	49.0 (13)	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.

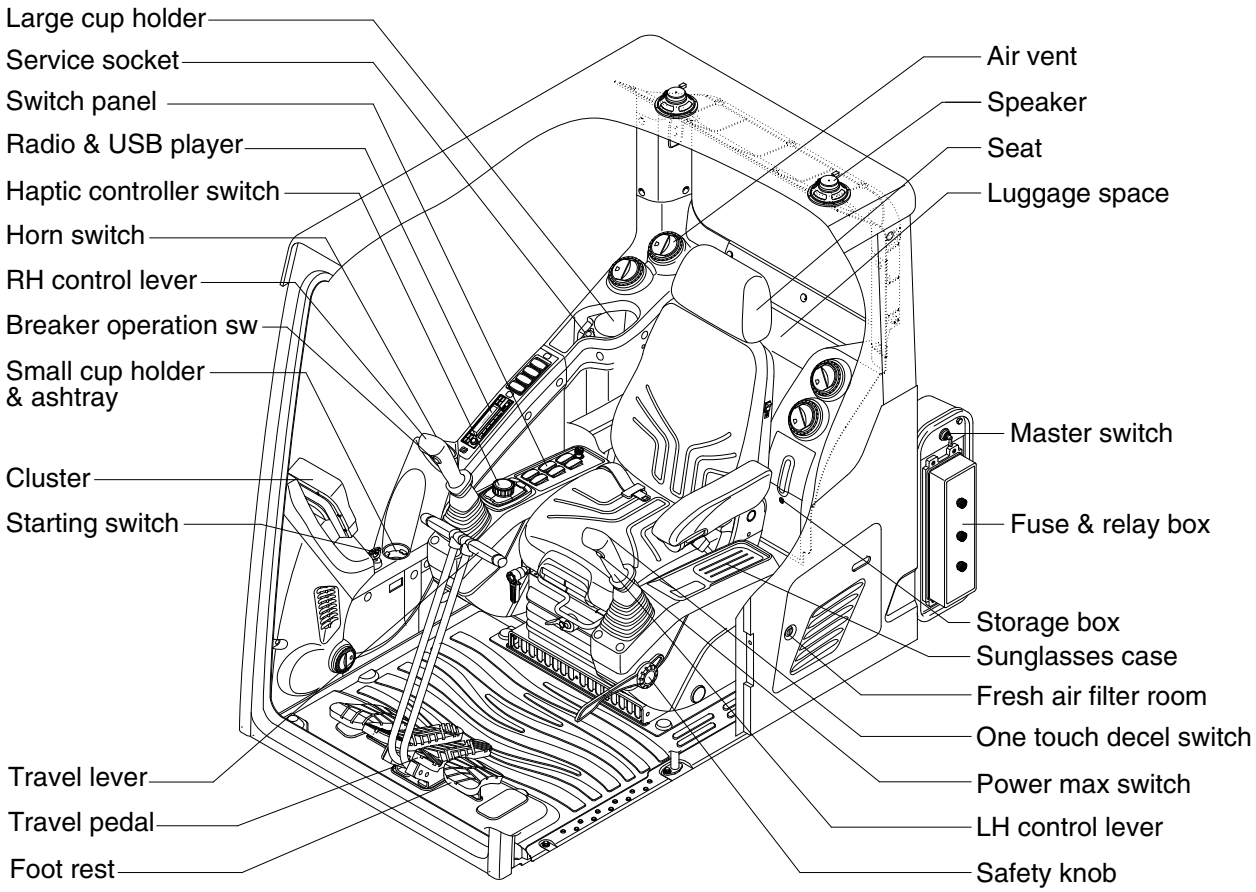
1. CAB DEVICES

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

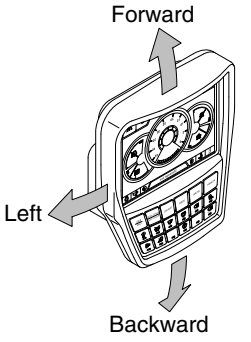
※ The warning lamp pops up and/or blinks and the buzzer sounds when the machine has a problem.

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°



290F3CD47

2) GAUGE

(1) Operation screen

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

Default

Option

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

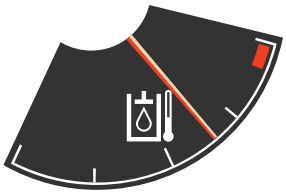
290F3CD53

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

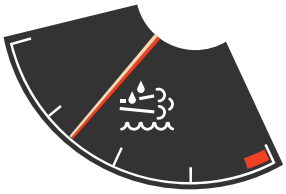
290F3CD55

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.

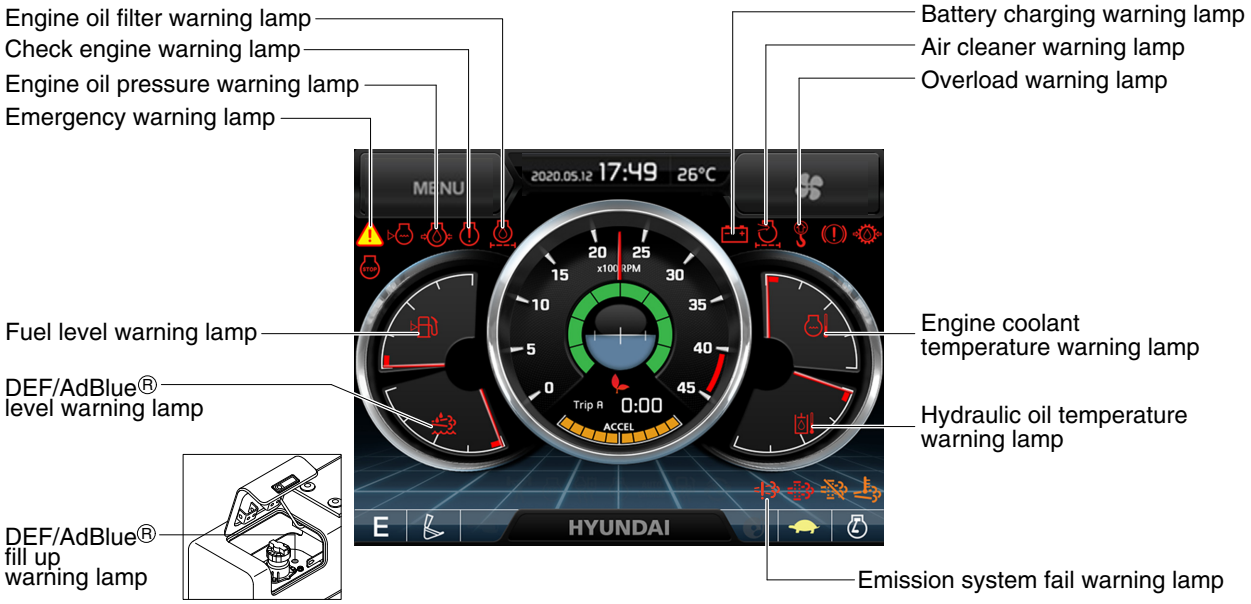
- White : Idle operation
- Green : Economy operation
- Yellow : Non-economy operation at a medium level.
- Red : Non-economy operation at a high level.

(9) Accel dial gauge

290F3CD59

① This gauge indicates the level of accel dial.

3) WARNING LAMPS

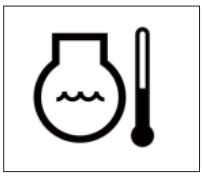


※ **Warning lamps and buzzer**

Warnings	When error happened	Lamps and buzzer
All warning lamps except below	Warning lamp pops up on the center of the LCD and the buzzer sounds	· The pop-up warning lamp moves to the original position and blinks, and the buzzer stops when ; - the buzzer stop switch (AUTO IDLE / Buzzer Stop) is pushed - the 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	· 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 **※ Refer to page 3-10 for details.**
	Warning lamp pops up on the center of the LCD and the buzzer sounds	**※ Refer to page 3-7 for details.**

※ Refer to page 3-15 for the buzzer stop switch (AUTO IDLE / Buzzer Stop) and page 3-55 for the haptic controller.

(1) Engine coolant temperature warning lamp



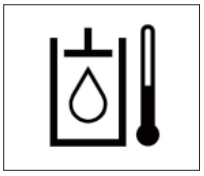
290F3CD61

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 AUTO IDLE Buzzer Stop is pushed. And the buzzer stops and , lamps keep blink.

③ Check the cooling system when the lamps keep blink.

(2) Hydraulic oil temperature warning lamp



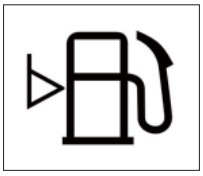
290F3CD62

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

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

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

(3) Fuel level warning lamp



290F3CD63

① This warning lamp pops up and the buzzer sounds when the level of fuel is below 92 ℓ (24.3 U.S. gal).

② Fill the fuel immediately when the lamp blinks.

(4) Emergency warning lamp

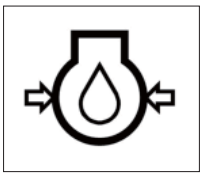
290F3CD64

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 AUTO IDLE Buzzer Stop is pushed. And the buzzer stops.

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

(5) Engine oil pressure warning lamp



290F3CD65

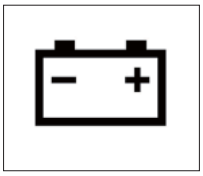
① This warning lamp pops up and the buzzer sounds when the engine oil pressure is low.
② If the lamp blinks, shut OFF the engine immediately. Check oil level.

(6) 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.

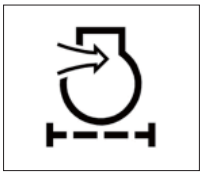
(7) Battery charging warning lamp



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

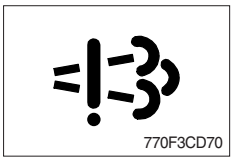
① This warning lamp pops up and the buzzer sounds when the filter of air cleaner is clogged.
② Check the filter and clean or replace it.

(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.

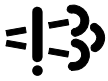
(10) Emission system fail warning lamp



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

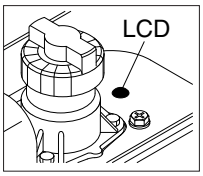
① This warning lamp indicates when ON or blinking, that the DEF/AdBlue® level is low as table below.

※ 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%	· The DEF/AdBlue® level has fallen below the initial warning level (20%).
Blink	10%	· 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%	· 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



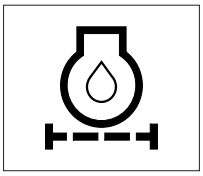
290F3CD272

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) Eninge oil filter warning lamp

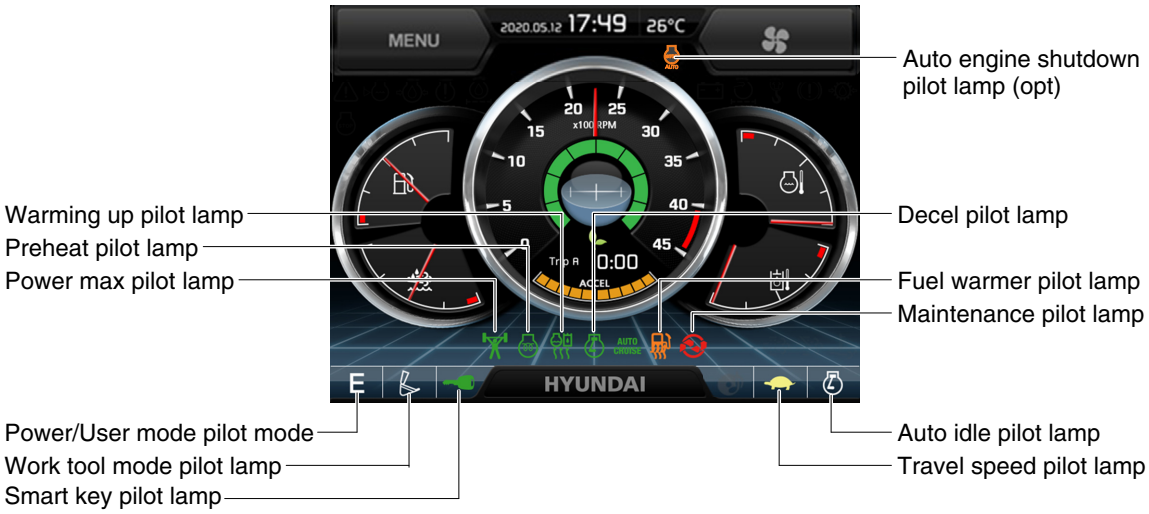


300A3CD306

① This warning lamp pops up and the buzzer sounds when the filter of eninge 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	P	Heavy duty power work mode
		S	Standard power mode
		E	Economy power mode
2	User mode	U	User preferable power mode
3	Work tool mode		General operation - IPC speed mode
			General operation - IPC balance mode
			General operation - IPC efficiency mode
			Breaker operation mode
			Crusher operation mode
4	Travel mode		Low speed traveling
			High speed traveling
5	Auto idle mode		Auto idle

(2) Power max pilot lamp

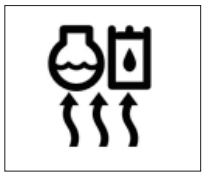
290F3CD78

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

② The power max function is operated maximum 8 seconds.

※ **Refer to 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

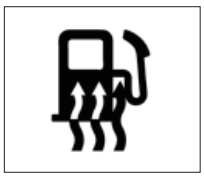
① Operating one touch decel switch on the RCV lever makes the lamp ON.

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

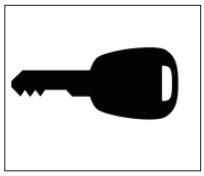
290F3CD83

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.

(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 a authentication fails, green when succeeds.
※ Refer to the page 3-23.

(8) Auto engine shutdown pilot lamp (opt)

220A3CD202A

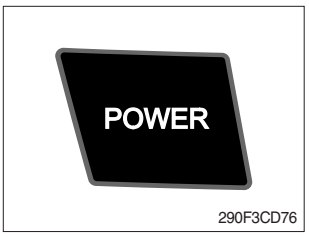
① This lamp is turned ON when the auto engine shutdown is activated
※ Refer to the page 3-20-1.

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

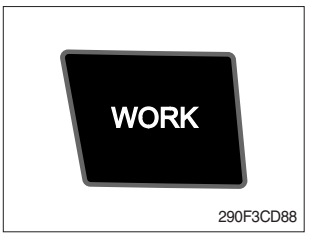


290F3CD76

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

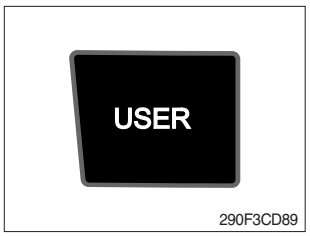


290F3CD88

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.

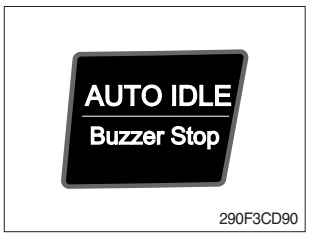
(4) Travel speed switch

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.

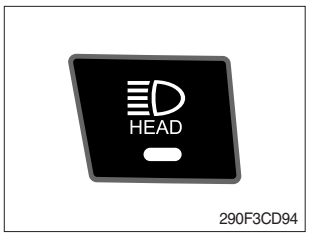
③ If the camera is not installed, this switch is used only ESC function.

(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.

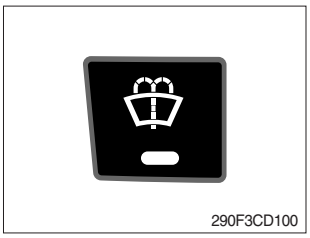
(9) Intermittent wiper switch

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

(10) Wiper switch

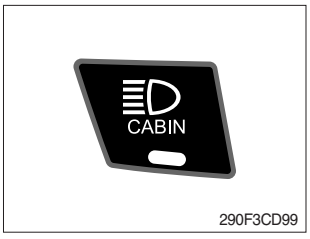
① This switch is used to operate the window wiper.
② Note that the wiper will self-park when switched off.
③ The pilot lamp is turned ON when operating the switch.
※ If the wiper does not operate with the switch in ON position, turn the switch OFF immediately. Check the cause. If the switch remains ON,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

(11) Washer switch



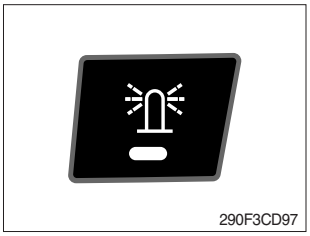
① The washer liquid is sprayed and the wiper is operated only while pressing this switch.
② The pilot lamp is turned ON when operating the switch.

(12) Cab light switch



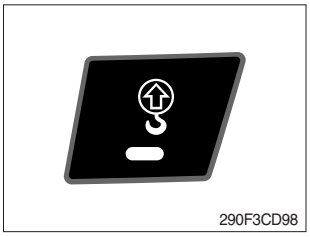
① This switch turns ON the cab light on the cab.
② The pilot lamp is turned ON when operating the switch.

(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.

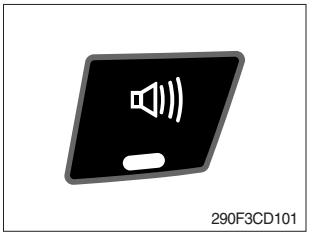
(14) Overload switch (opt)



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.

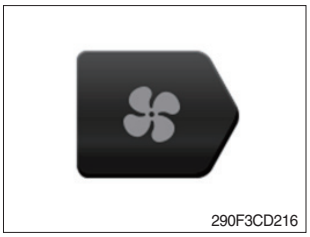
⚠ Overloading the machine could impact the machines stability which could result in tipover hazard. A tipover hazard could result in serious injury or death. Always activate the overload warning device before you handle or lift objects.

(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.**

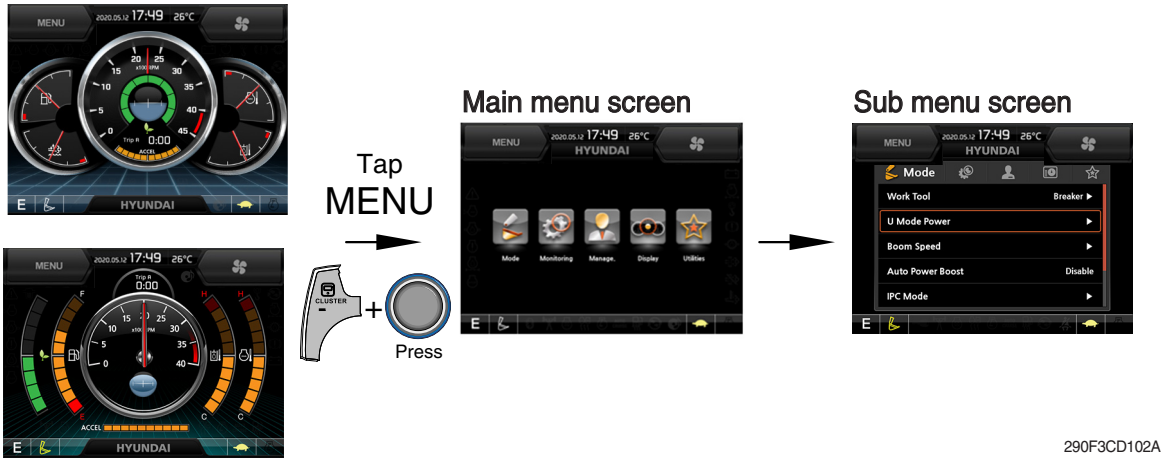
(17) Main menu quick touch switch

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 3-55 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 IPC mode Auto engine shutdown (option) Initial mode Emergency mode	Breaker, Crusher, Not installed User mode only Enable, Disable Speed mode, Balance mode, Efficiency mode 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, 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

210WF3CD108A

290F3CD253A

A

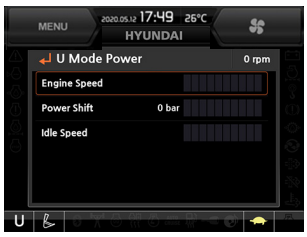
290F3CD254A

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

210WF3CD111A



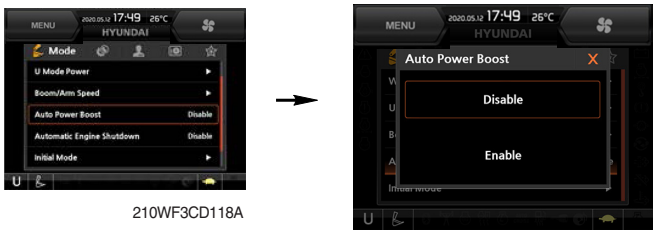
290F3CD112A

· 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	1200	800	0
2	1300	850	3
3	1350	900	6
4	1450	950	9
5	1550	1000 (auto decel)	12
6	1650	1050	16
7	1700	1100	20
8	1750	1150	26
9	1800	1200	32
10	1850	1250	38

※One touch decel & low idle : 800 rpm

③ Auto power boost



210WF3CD118A

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 IPC mode

290F3CD310A

290F3CD311A

290F3CD304A

290F3CD312A

290F3CD305A

290F3CD313A

290F3CD306A

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

· This mode is applied only general operation mode of the work tool mode.

※ Please update the cluster programs if this mode is not displayed in the mode setup menu. Refer to the page 3-24-1.

⑤ Automatic engine shutdown (option)

210WF3CD11A 210WF3CD12A 210WF3CD13A

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

⑥ Initial mode

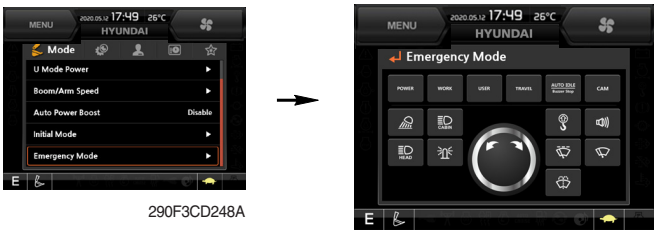
290F3CD122A 290F3CD119A

· **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

⑦ Emergency mode



290F3CD248A 290F3CD249A

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

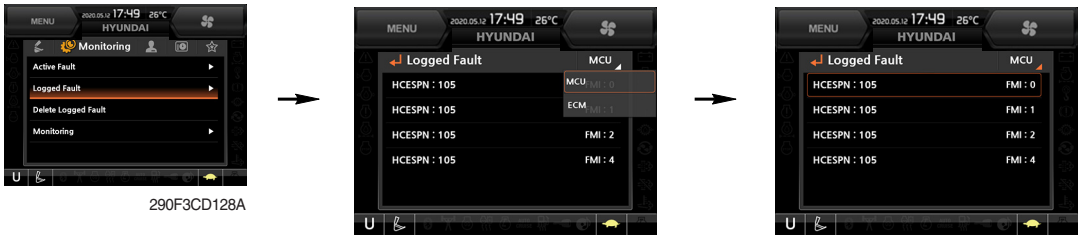
(3) Monitoring

① Active fault

290F3CD120A　290F3CD121A　290F3CD125A

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

② Logged fault



290F3CD128A　290F3CD123A　290F3CD124A

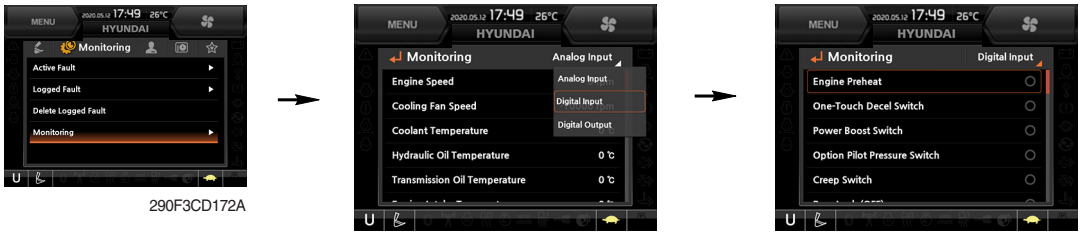
· The logged faults of the MCU, engine ECM, air conditioner or AAVM (option) can be checked by this menu.

③ Delete logged fault

290F3CD134A　290F3CD126A　290F3CD127A

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

④ Monitoring



290F3CD172A　290F3CD188A　290F3CD189A

· 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

210WF3CD14A

210WF3CD15A

A

B

C

D

210WF3CD16

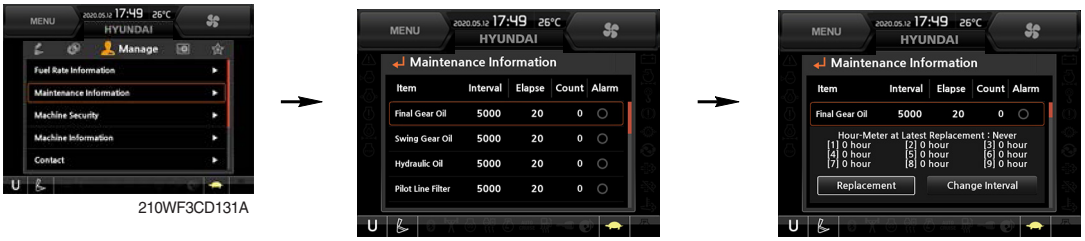
· **General record (A)**
- Average fuel rate (left) (from "Reset" to now)
  Fuel consumption devided by engine run time (service meter time).
- A days fuel used (right)
  Fuel consumption from 24:00 (or "Reset" time) to now (MCU real time).

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

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

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

② Maintenance information



210WF3CD131A

290F3CD132A

290F3CD133A

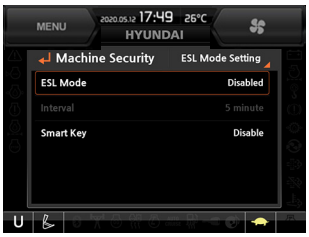
- Alarm lamp (●) is ON when oil or filter needs to be changed or replaced.
- Replacement : The elapsed time will be reset to zero (0).
- Change interval : The change or replace interval can be changed in the unit of 50 hours.

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

③ Machine security

210WF3CD190B

290F3CD135B



290F3CD136A

· **ESL mode setting**

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

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

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

※**Default password : 00000 +** ✔

※**Password length : (5~10 digits) +** ✔

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

290F3CD137A

290F3CD138A

· **Password change**

- The password is 5~10 digits.

210WF3CD190A

290F3CD140B

290F3CD135C

Enter the current password

290F3CD142B

Enter the new password

290F3CD143B

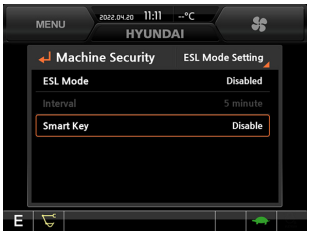
Enter the new password again

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

- Smart key

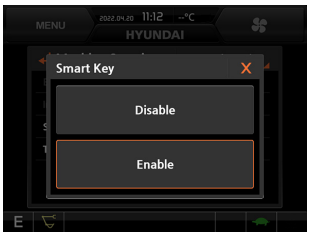
210WF3CD190A

290F3CD135C



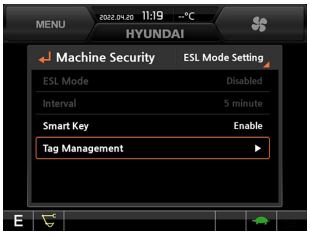
290F3CD001

· 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.

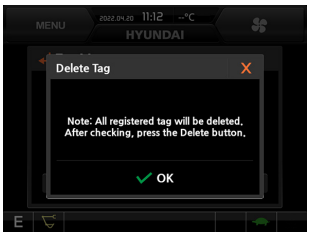


290F3CD002

- 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.

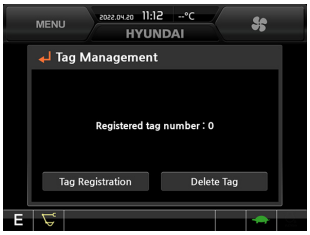


290F3CD003



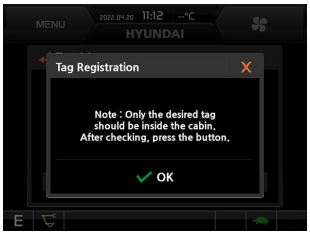
290F3CD006

Deleting



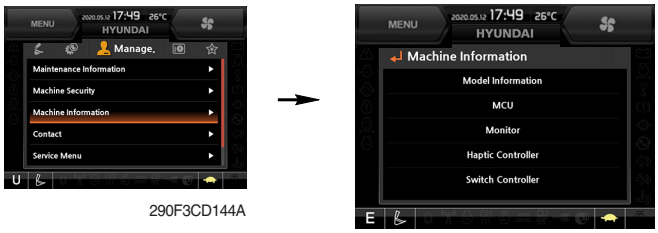
290F3CD004

Registering



290F3CD005

④ Machine Information



290F3CD144A

290F3CD145A

· 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)

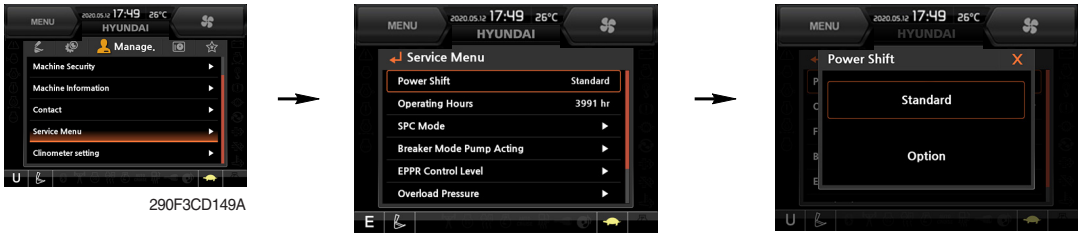
290F3CD146A

290F3CD147A

290F3CD148A

Enter the new A/S phone number

⑥ Service menu



290F3CD149A

290F3CD250A

290F3CD251A

· Power shift (standard/option) : Power shift pressure can be set by option menu.
· Operating hours : Operating hours since the machine line out can be checked by this menu.
· Breaker mode pump acting (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

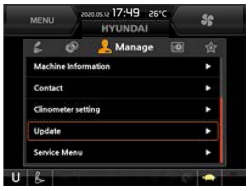
⑦ Clinometer

290F3CD252A

290F3CD253A

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

⑧ Update (cluster & ETC devices)

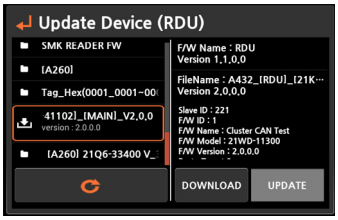


210WF3CD17A

210WF3CD18A

210WF3CD19A

380F3CD04A



380F3CD06

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

(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

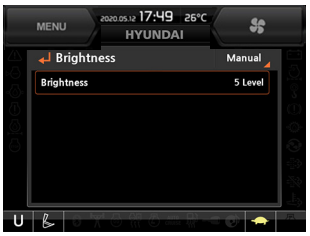
290F3CD158A

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

③ Brightness

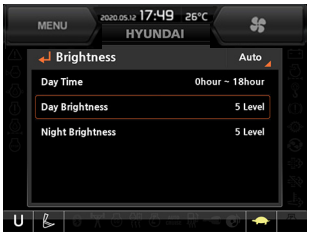
290F3CD159A

290F3CD160A

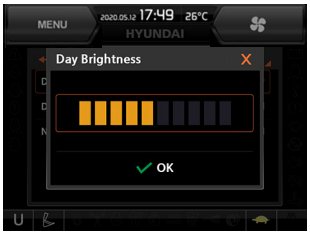


290F3CD139A

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

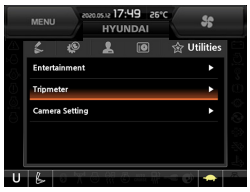
290F3CD156B

B Type (Option) 290F3CD194A

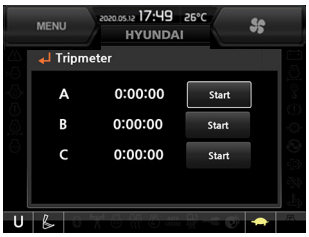
290F3CD167B

(6) Utilities

① Tripmeter



290F3CD168A

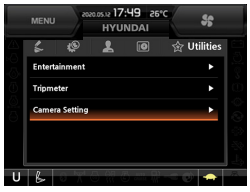


290F3CD169A

- 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.



290F3CD200A

290F3CD255A

290F3CD256A

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

290F3CD156A

290F3CD221

④ **AAVM** (All Around View Monitoring, option)

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

290F3CD244A

- **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.

290F3CD156C

The beginning screen

AAVM mode

290F3CD222

- **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.

290F3CD246A

· 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.

290F3CD247A

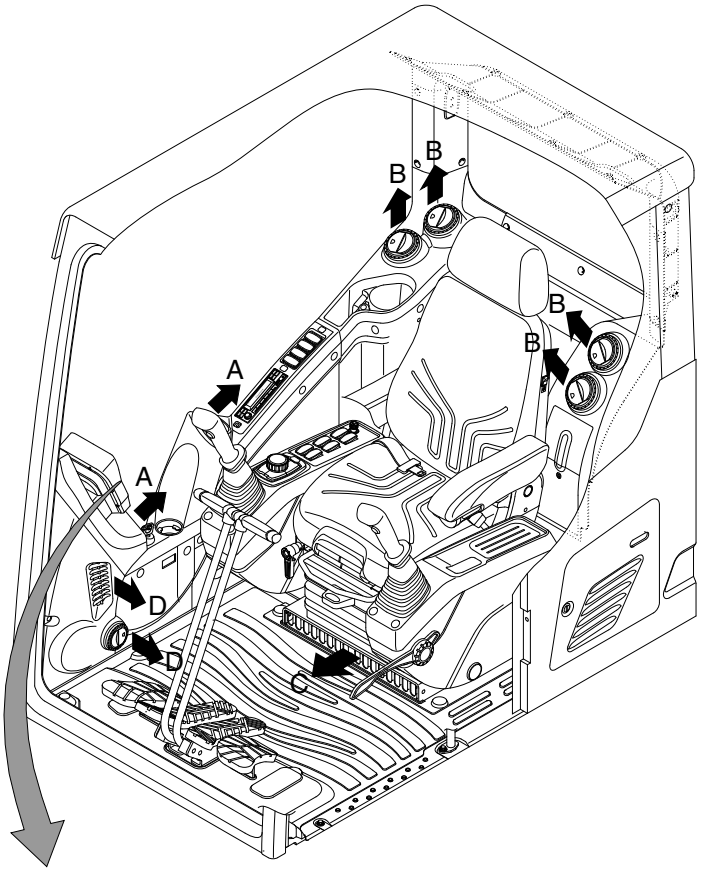
· When the worker or pedestrian go inside of red line (radius 3 m), an internal danger area of equipping on the cluster screen, the warning buzzer sounds and it displays the red rectangular box for the recognition of the worker and pedestrian.
At this time, the operator should stop work immediately, 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.

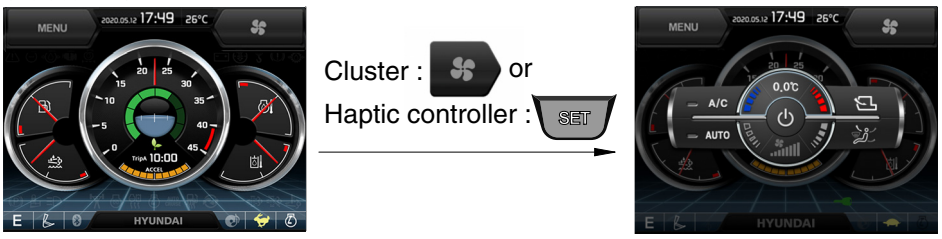
7) AIR CONDITIONER AND HEATER

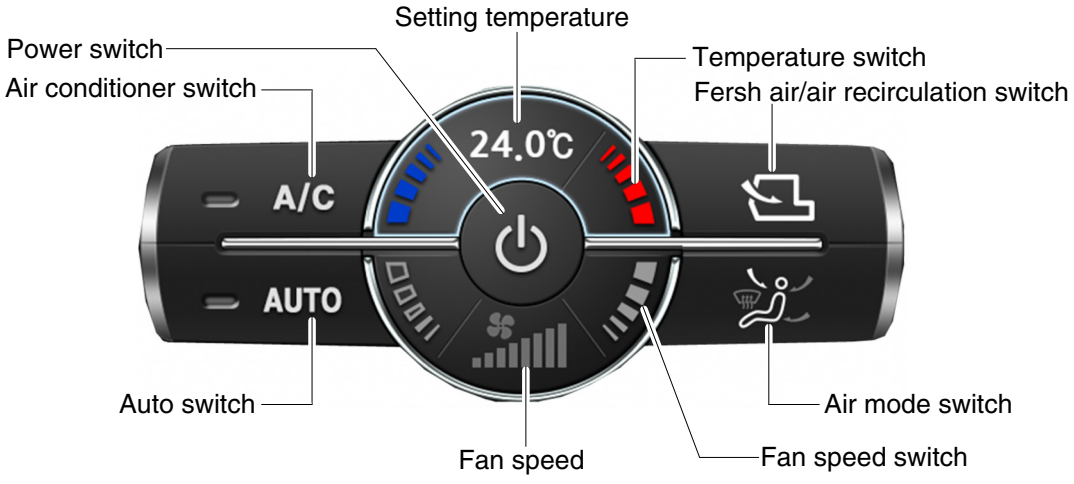
Full auto air conditioner and heater system automatically keeps the optimum condition in accordance with operator's temperature configuration sensing ambient and cabin inside temperature.

· **Location of air flow ducts**



Cluster LCD





290F3CD201A

※ **Haptic controller : Refer to page 3-55.**

(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.

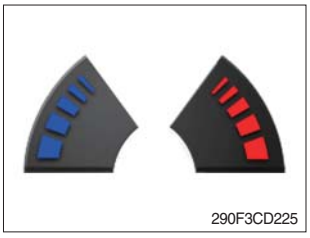
(3) Auto switch

① Auto air conditiner 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

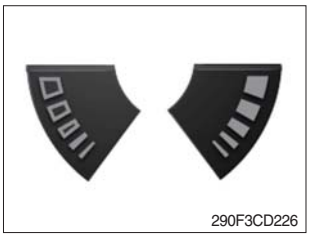


① Setting temperature indication
· Lo (17˚C), 17.5~31.5˚C, Hi (32˚C)
② Max cool and max warm beeps 5 times.
③ The max cool or the max warm position operates as following table.

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

(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.

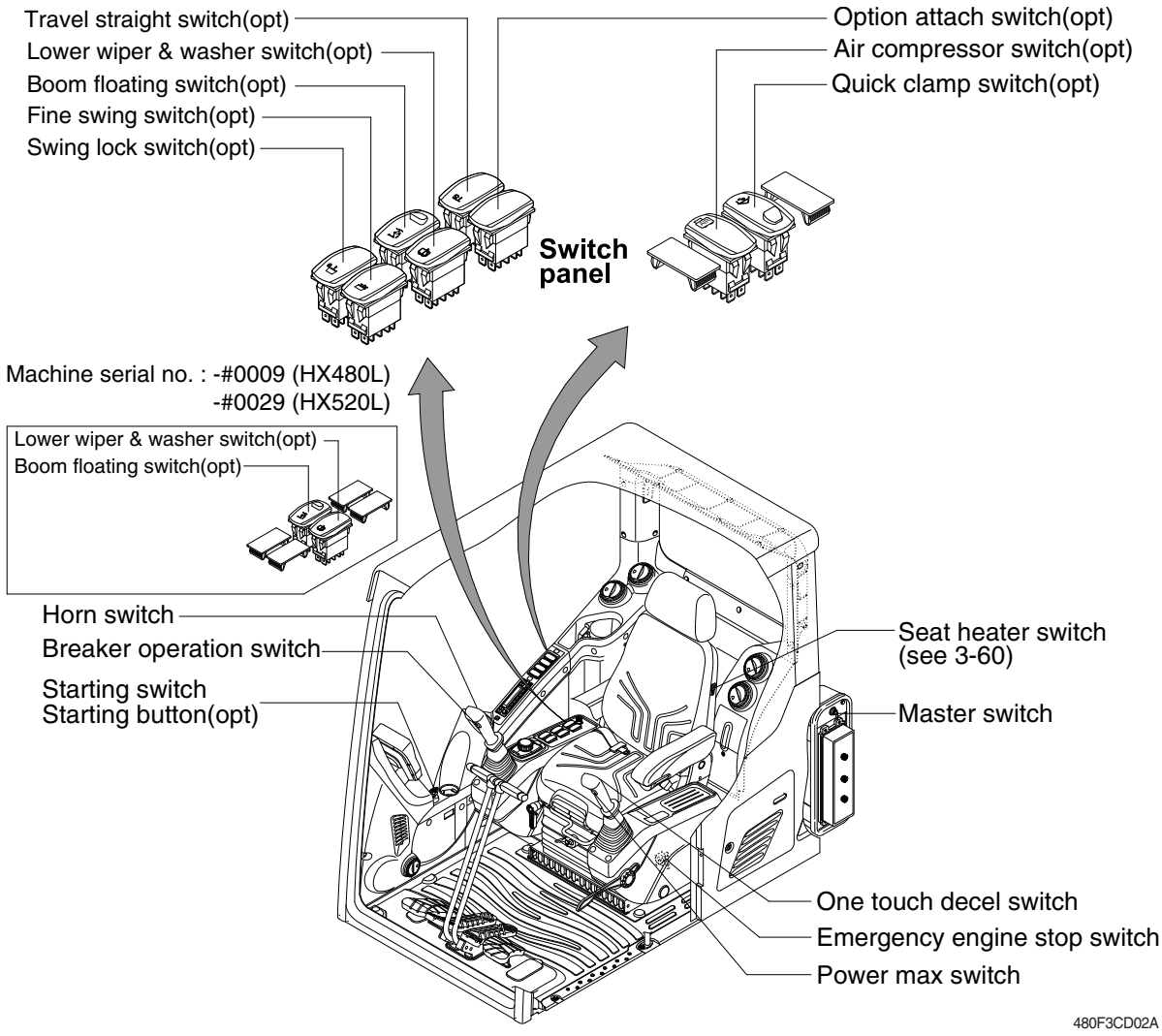
8) SELF DIAGNOSIS FUNCTION

(1) Diagnostic methods : Diagnostic information window, select

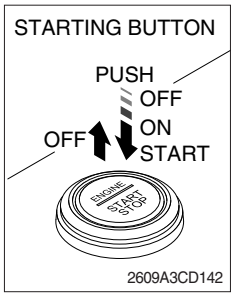
(2) Diagnostic indication (Displays fault)

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



1) STARTING SWITCH & STARTING BUTTON (OPT)



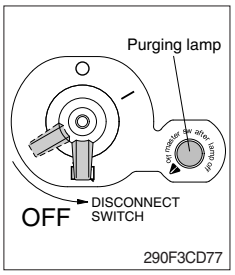
Starting button with smart key tag (opt)

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

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

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

2) MASTER SWITCH



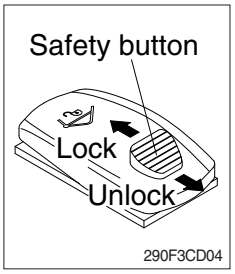
(1) This switch is used to shut off the entire electrical system.

(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.

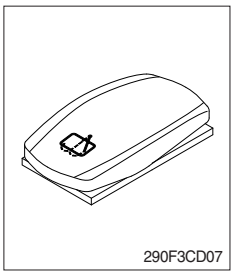
※ **Refer to the page 8-6 for details.**

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.

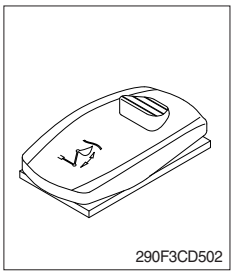
5) LOWER WIPER AND WASHER SWITCH (option)



(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.

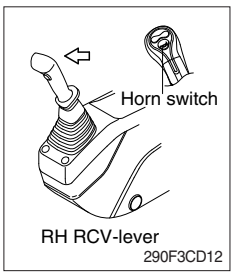
6) BOOM FLOATING SWITCH (option)



(1) This mode is used to smooth boom operation.

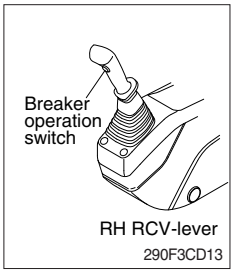
(2) Rod and head of boom cylinder are connected to the tank at the same time. So boom can be moved by the ground shape though only arm operation.

7) HORN SWITCH



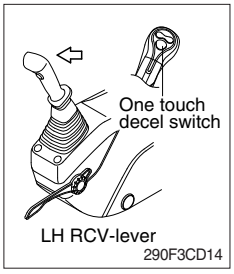
(1) This switch is at the top of right side control lever.
On pressing, the horn sounds.

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

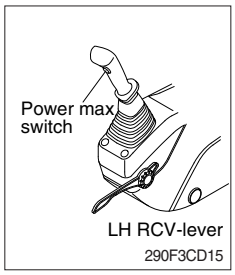


(1) This switch is used to actuate the deceleration function quickly.

(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) POWER MAX SWITCH

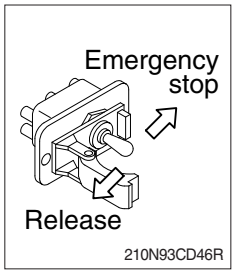


(1) This switch activate power max function.
When this switch is kept pressed, hydraulic power of work equipment will be increased to approx 110 percent during 8 seconds.

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

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

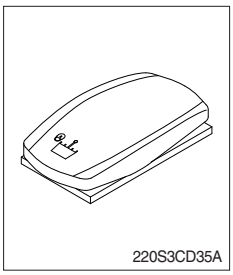
11) EMERGENCY ENGINE STOP SWITCH



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

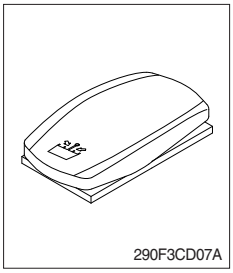
※ **Be sure to keep the emergency switch on the release position when restart the engine.**

12) SWING LOCK SWITCH (option, HX480L #0010- / HX520L #0030-)



(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.

13) FINE SWING SWITCH (option, HX480L #0010- / HX520L #0030-)

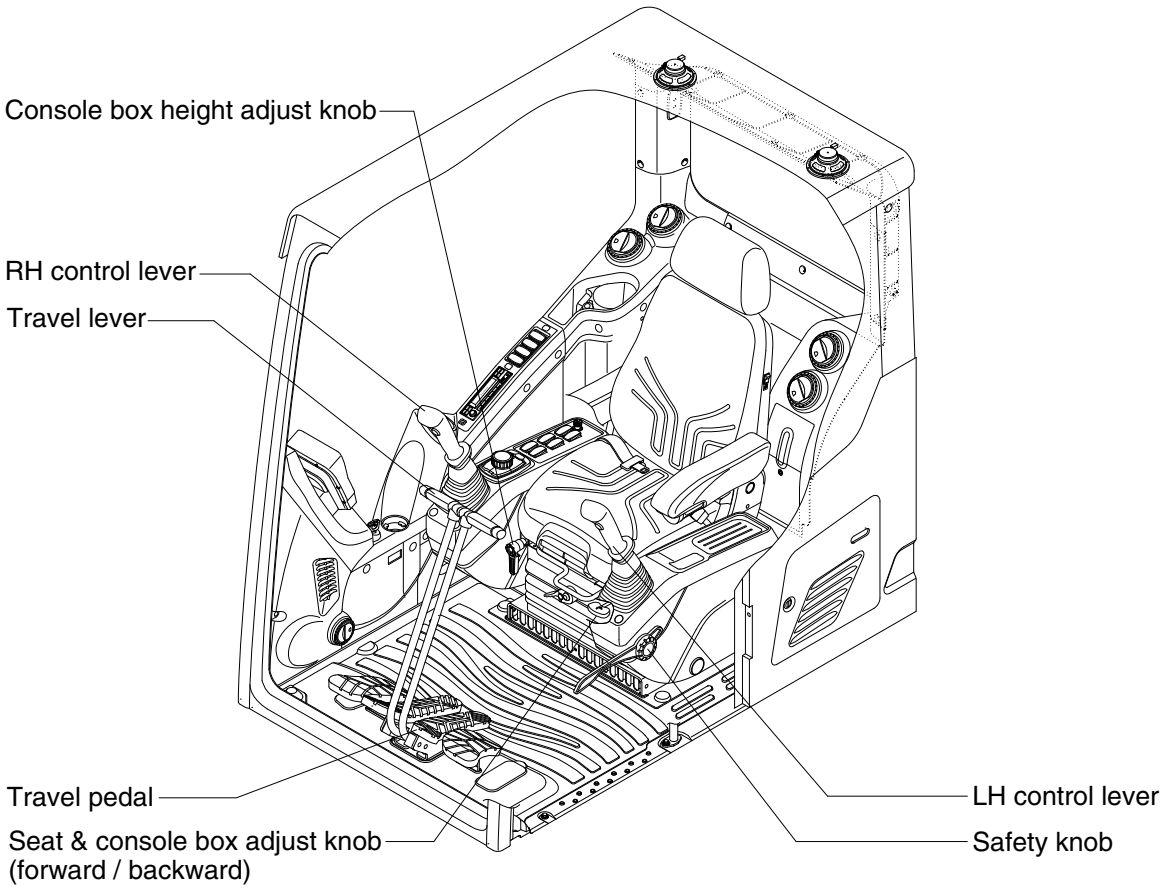


(1) When the switch is pressed ON position, the swing parking brake is released.

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

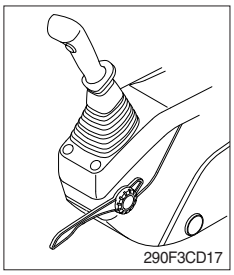
⚠ **If the machine is operating on a slope with the switch in this position, swing motion may become uncontrollable which could result in property damage, personal injury or death. Do not use this position when the machine is operating on a slope.**

4. LEVERS AND PEDALS



290F3CD16

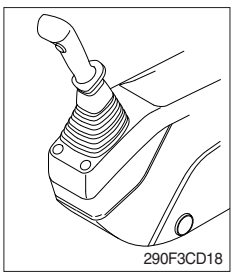
1) LH CONTROL LEVER



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

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

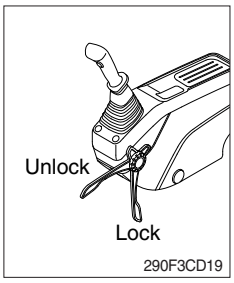
2) RH CONTROL LEVER



(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 LEVER



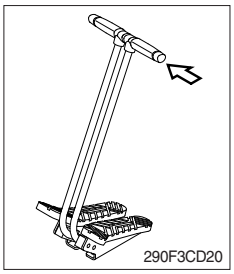
(1) All control levers and pedals are disabled from operation by locating the lever to lock position as shown.

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

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

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

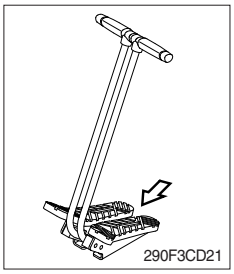
4) TRAVEL LEVER



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

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

5) TRAVEL PEDAL

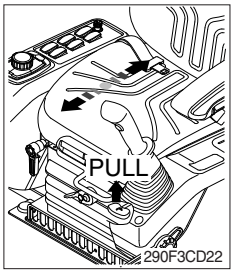


(1) This pedal is used to move the machine forward or backward.

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

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

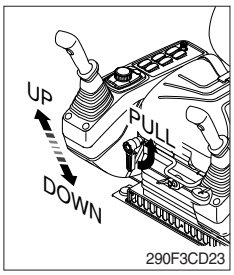
6) SEAT AND CONSOLE BOX ADJUST KNOB (forward/backward)



(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").

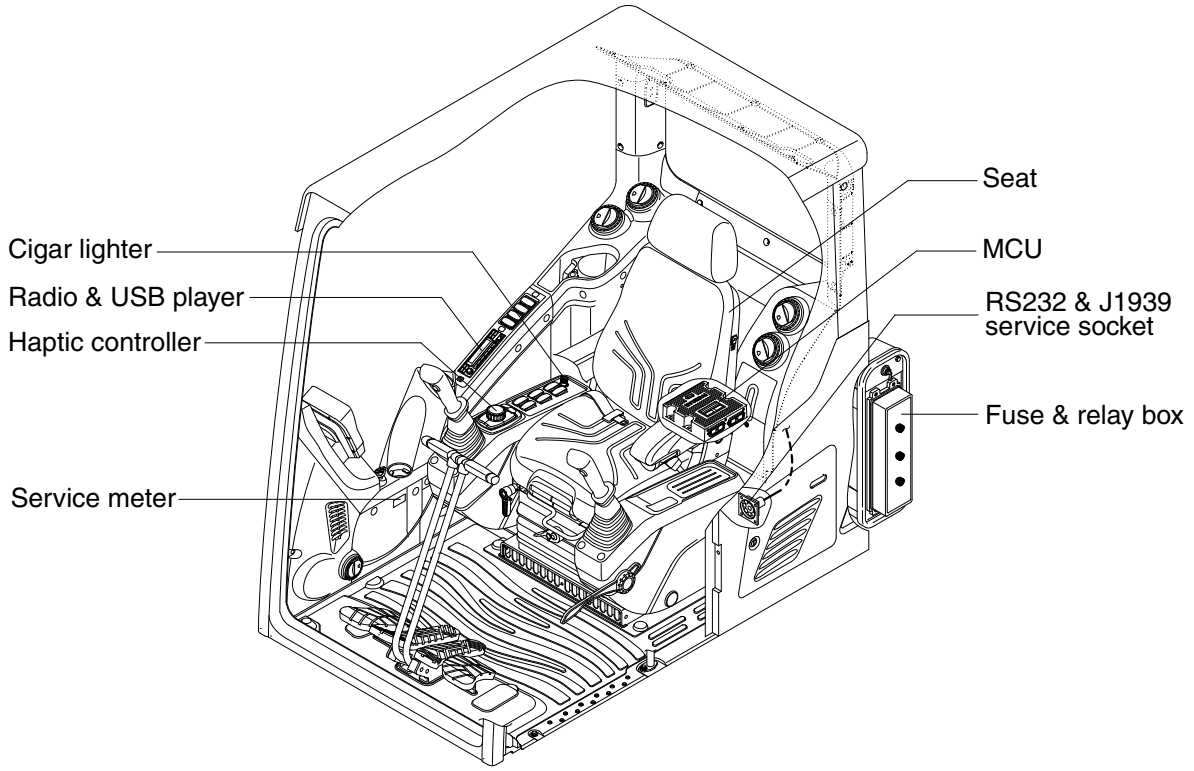
7) CONSOLE BOX (CONTROL LEVER) HEIGHT ADJUST KNOB



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

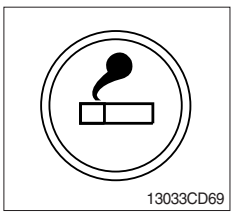
(2) The control levers can be moved upward and downward over 80 mm (2.4").

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.

2) RADIO AND USB PLAYER : HX480 MACHINE SERIAL NO.: -#0057
RADIO AND USB PLAYER : HX520 MACHINE SERIAL NO.: -#0086

■ BASIC FUNCTIONS

75793CD62-2

■ FRONT PANEL PRESENTATION

1 SEL ····· Audio selection button

····· Audio selection knob

2 ····· Power and volume button

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

4 ····· UP / DOWN tuning button

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

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

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

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

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

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

11 ····· Aux function

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

13 MUTE ····· Audio mute button

14 AM/FM ····· AM / FM button (radio)

15 ····· Send

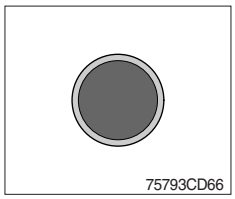
16 ····· End

17 MIC ····· MIC (microphone)

18 AUX ····· Aux connector

■ GENERAL

(1) Power and volume button



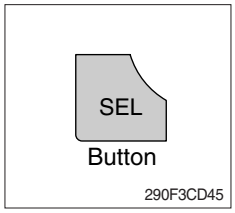
① **Power ON/OFF button**

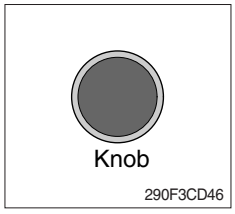
Press power button to turn the unit ON or OFF shortly.
When the power is ON, the previous mode (last memory) will appear.

② **Volume up / down control**

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

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





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

BASS → TREBLE → BAL → LOUD → EQ → BASS

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

② **Bass control**

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

③ **Treble control**

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

④ Balance control

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

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

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

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

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

⑤ Loud control

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

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

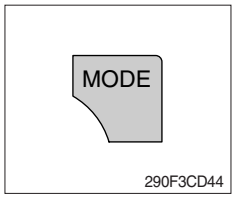
To select the loudness feature, press SEL button until LOUD ON or LOUD OFF is displayed, then turn selection knob left or right to activate or deactivate loudness.

⑥ Equalizer (EQ)

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

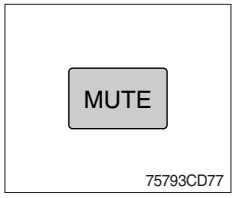
To select the desired curve, first select the EQ mode by pressing SEL button until the "EQ OFF" indication appears on the display panel. Within 5 seconds of choosing the EQ mode, turn selection knob to select an equalizer curve as desired.

(3) Mode button



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

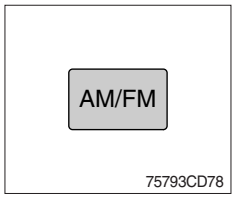
(4) Audio mute button



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

■ RADIO

(1) AM / FM / LW band selector

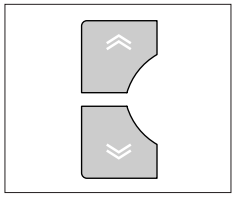


① Each time this button is pressed, the radio button is changed.
Each time this button is pressed, LCD displays each band as follows :

FM1 → FM2 → FM3 → AM → LW → FM1

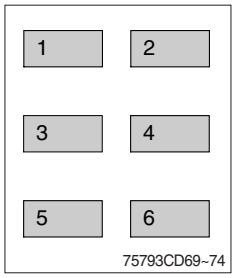
※ LW band is only available for Europe.

(2) Up / down tuning



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

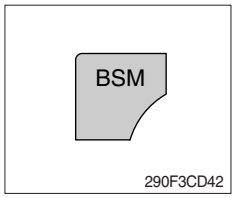
(3) Station pre-set button



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

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

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



① **Pre-set scan (PS)**

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

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

② **Best station memory (BSM)**

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

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

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

■ USB PLAYER

75793CD81-1

(1) USB function

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

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

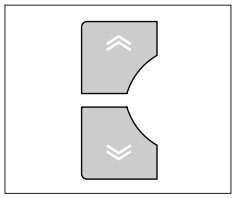
※ If there are no files on USB device, playback will revert back to the previous mode after displaying “NO FILE”.

(2) AUX function

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

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

(3) File selection & cue / review button



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① **File selection function**

This button is used to select file up / down.

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

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

② **Cue / review functions**

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

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

(4) MP3 directory / file searching

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

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

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

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

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

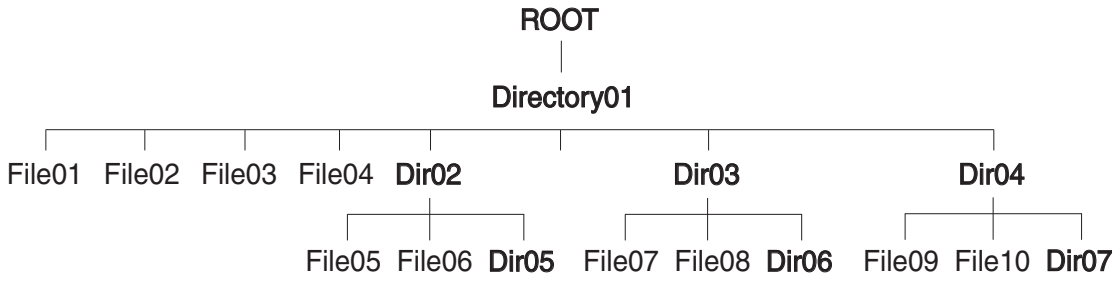
· Method 2 : ROOT→Dir01→Dir02→Dir05→Dir03→Dir06→Dir04→Dir07→ROOT

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

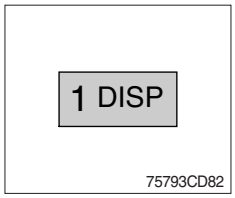
For instance, the file search changes in Dir01 as follows.

File01 → File02 → File03 → File04 → File01

※ MP3 directory / file configuration



(5) ID3 v2 display

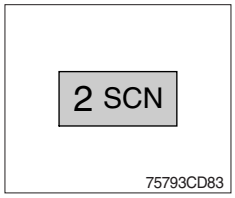


① Disp button is used to change the display information.
While playing an MP3 file, you can change the file information shown on the LCD display.
Each time you press DISP (display), the display changes to show the following.

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

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

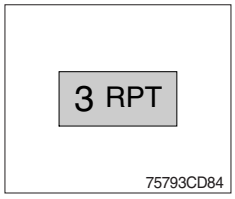
(6) File scan (SCN)



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

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

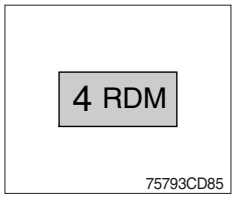
(7) Repeat play selector (RPT)



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

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

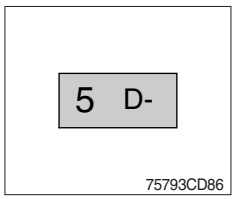
(8) Random play selector (RDM)



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

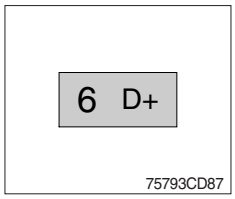
※ In case of MP3 file, when the random button is pressed and held longer than 2 seconds, the RDM mark will blink on the LCD display and play all files in directory randomly until the directory random mode is cancelled by pressing the random button again or by activating the scan or repeat functions (RDM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

(9) Directory down



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

(10) Directory up



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

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

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

■BLUETOOTH

(1) Introduce

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

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

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

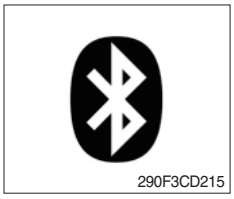
Check your mobile phone owner's manual for details.

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

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

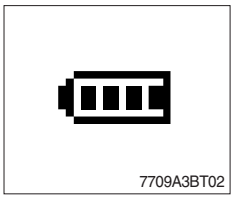
※ As a bluetooth wireless connection can extend to 10 meters, your bluetooth device may automatically connect to the bluetooth radio even if the device is not in the machine.

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


290F3CD215

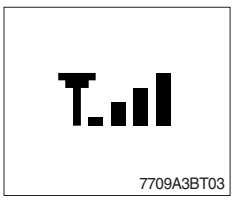
① Bluetooth indicator

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


7709A3BT02

② Battery strength indicator

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


7709A3BT03

③ Single level indicator

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

(2) Bluetooth function

① Pairing a bluetooth mobile phone or music player

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

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

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

a. Connection method

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

※ (a) The bluetooth radio allows a maximum of 6 bluetooth devices to be paired.
(b) Bluetooth technology only allows one phone to be connected to your bluetooth radio at one time.
(c) If a bluetooth music player is to be connected together with a mobile phone, refer to the page 3-55, PLAYING MUSIC USING BLUETOOTH AUDIO.
(d) Bluetooth connection with a mobile phone is normally established using the Hands-Free Profile (HFP). However, in some cases, the connection may use Head Set Profile (HSP) and some functions may not be available.
(e) As each mobile phone or music player brand and model has a different menu structure and control names, you may need to refer to the user manual of your bluetooth device for the correct procedure to connect to another bluetooth device.
(f) Once the bluetooth pairing is complete, automatic connection between mobile phone and the bluetooth radio is possible whenever the starting switch is switched ON.
The mobile phone must be set to automatically connect to the bluetooth radio to allow this automatic connection.

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

② Disconnecting a bluetooth device

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

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

③ Select a bluetooth device

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

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

Table 2-1

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

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

SAMSUNG → LG → APPLE → MOTOROLA → BACK → SAMSUNG

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

④ Deleting a previously paired bluetooth device

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

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

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

Table 2-2

⑤ Basic telephone operation

a. Using the bluetooth radio for hands-free calls

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

b. Last call number redials

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

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

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

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

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

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

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

(3) Funtion of bluetooth audio player

① Playing music using bluetooth audio

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

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

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

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

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

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

② Connecting a bluetooth music player and mobile phone simultaneously

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

(4) Bluetooth setting

① Setting the automatic call answer feature

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

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

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

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

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

② Setting calling voice volume

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

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

③ Setting the ring volume

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

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

RADIO AND USB PLAYER (WITH BLUETOOTH) : HX480 MACHINE SERIAL NO.: #0058-
RADIO AND USB PLAYER (WITH BLUETOOTH) : HX520 MACHINE SERIAL NO.: #0087-

9403CD100

■ FRONT PANEL PRESENTATION

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

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

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

4 ····· Call & Pair button

5 ····· Call end button

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

7 ····· Station preset 2

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

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

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

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

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

13 ····· Auto tune up, Seek up button

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

15 ····· USB connector

16 ····· AUX IN Jack

17 ····· MIC hole

RADIO AND USB PLAYER (WITHOUT BLUETOOTH) : HX480 MACHINE SERIAL NO.: #0058-
RADIO AND USB PLAYER (WITHOUT BLUETOOTH) : HX520 MACHINE SERIAL NO.: #0087-

9403CD101

■ FRONT PANEL PRESENTATION

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

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

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

4 ····· Radio seek up button

5 ····· Radio seek down button

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

7 ····· Station preset 2

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

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

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

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

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

13 ····· Track up button

14 ····· Track down button

15 ····· USB connector

16 ····· AUX IN Jack

■ GENERAL

(1) Power and volume button

① Power ON / OFF button

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

② Volume UP/DOWN control knob

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

③ Initial volume level set up

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

④ Clock ON/OFF control

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

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

⑤ Clock adjustment

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

(2) Menu Selection

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

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

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

② Bass control

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

③ Treble control

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

④ Balance control

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

⑤ Fader control

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

⑥ EQ control

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

EQ OFF → CLASSIC → POP → ROCK → JAZZ

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

⑦ Loud control

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

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

⑧ Beep control

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

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

(3) Mute control

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

(4) Mode selection

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

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

■ RADIO

(1) Mode button

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

(2) Manual tuning button

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

(3) Auto tuning button

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

(4) Station preset button

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

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

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

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

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

■ USB PLAYER

(1) USB playback


9403CD110

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

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

(2) Track Up / Down button

9403CD106

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

9403CD107

(3) MP3 directory / File searching

9403CD111

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

(4) Directory Up / Down button

9403CD112

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

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

(5) Track Scan Play (SCAN) button

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

(6) Track Repeat Play (RPT) button

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

(7) Track Random Play (RDM) button

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

(8) ID3 v2 (DISP)

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

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

* USB Information and Notice

a. Playback FILE SYSTEM and condition allowance.
   - FAT, FAT12, FAT16 and FAT32 in the file system.
   - V1.1, V2.2 and V2.3 in the TAG (ID3) version.

b. Display up to 32 characters in the LCD display.

c. No support any of MULTI-CAED Reader.

d. No high speed playback but only playing with normal full speed.

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

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

■ AUX OPERATION

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

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

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

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

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

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

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

■ **BLUETOOTH** (if equipped)

1) Using a bluetooth wireless connection

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

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

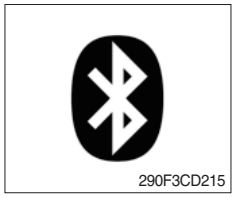
※ **Since this audio unit is on standby to connect with your cellular phone via bluetooth wireless technology, using this audio unit without running the engine can result battery drainage.**

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

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

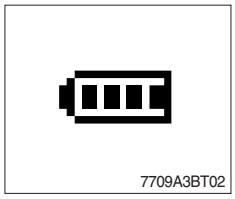
※ **Digital Noise & Echo suppression system provides the best sound clarity with little or no distortion (Echo & side tone will happen depending on cellular phone or service network).**

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



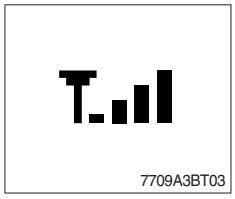
① Bluetooth icon

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



② Battery icon

It indicates the battery status of the connected bluetooth device.



③ Single strength icon

It indicates the signal strength of the connected bluetooth device.

2) Pairing in hands free modes

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

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

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

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

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

3) Cellular phone pairing mode

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4) Bluetooth connection and disconnection

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


9403CD118

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


9403CD117

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

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

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

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

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

5) Using the audio unit as a handsfree device

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


9403CD117/8

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

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

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

6) Audio transfer between the audio unit and phone

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

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

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

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

7) Last call number dialing

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

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

8) To make a call by cellular phone

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

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

9) Using the audio unit as bluetooth music

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

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

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

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

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

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

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

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

■ RESET AND PRECAUTIONS

1) Reset function

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

(1) press and hold 

simultaneously for about 5 seconds. (without Bluetooth)

Press and hold 


simultaneously for about 5 seconds. (with Bluetooth)

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

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

2) Precautions

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

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

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

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

(3) Tuning range

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

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

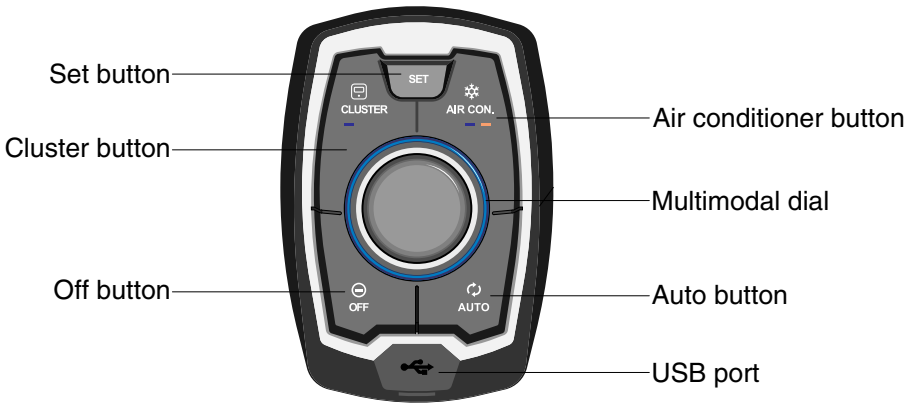
(4) USB version : USB 1.1

(5) Bluetooth version : V2.1

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

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.

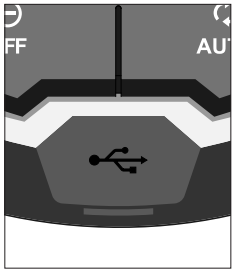
(5) Auto button

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

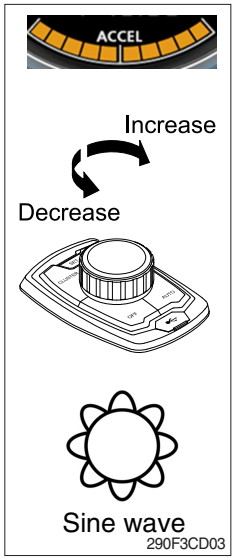

290F3CD179

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**

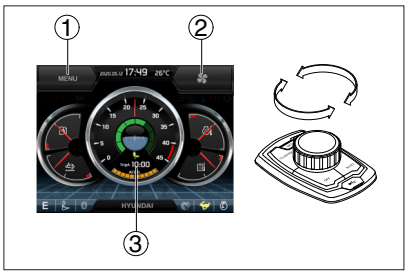


290F3CD03

- 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

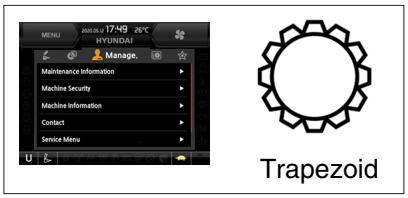


290F3CD240A

- 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



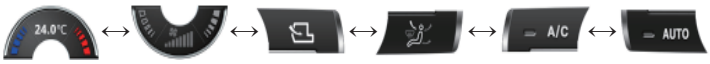
290F3CD180A

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

③ Air conditioner menu

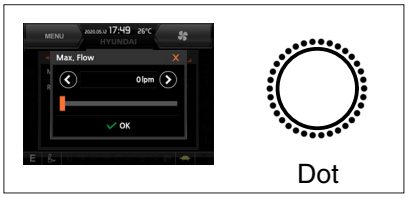
290F3CD181A

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



- Dial operating pattern is mixed type trapezoid torque.

④ Slide choice menu



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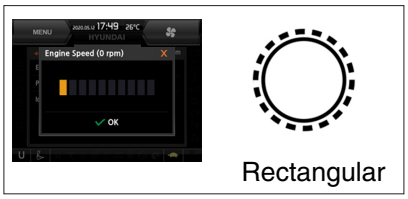
- You can increase or decrease the slide choice bar.
- Dial operating pattern is repeat dot interval torque.

⑤ Level choice menu



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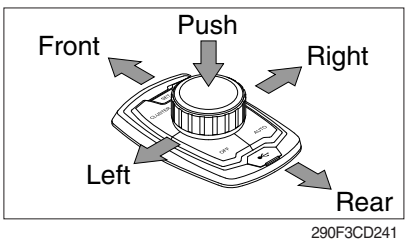
- You can increase or decrease the level choice bar.
- Dial operating pattern is integrate rectangular torque.

⑥ Push button



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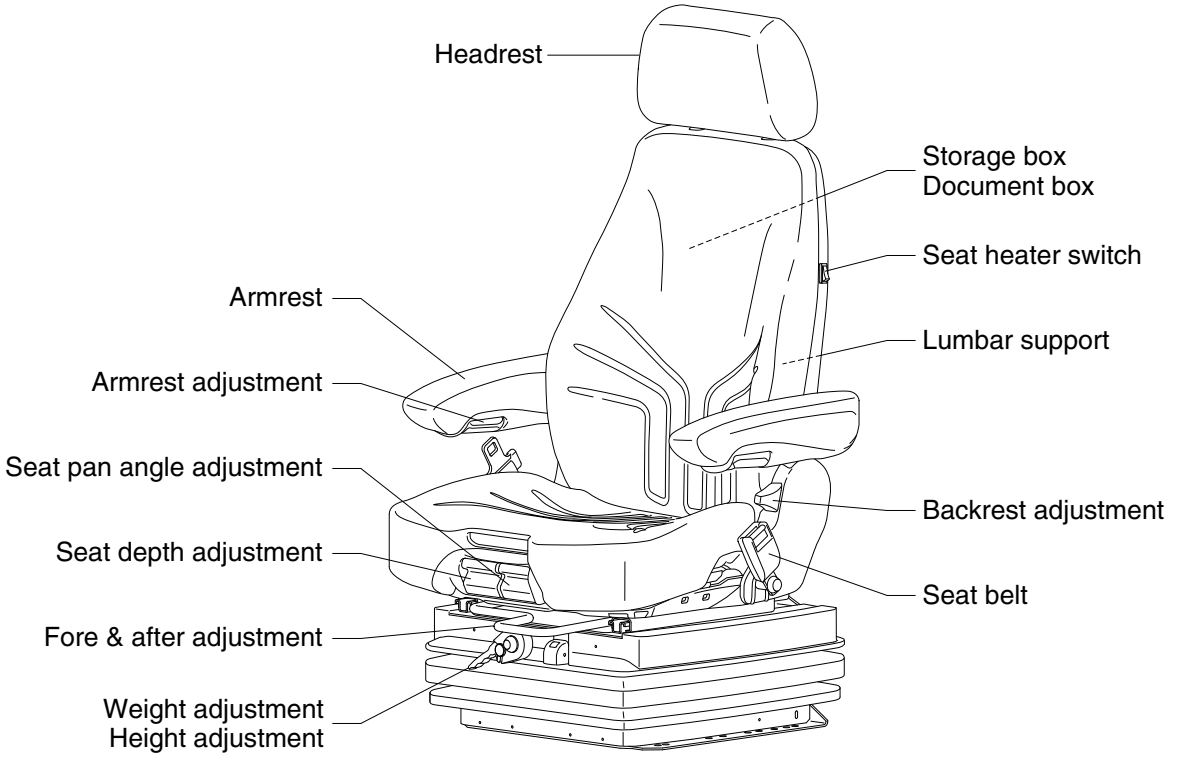
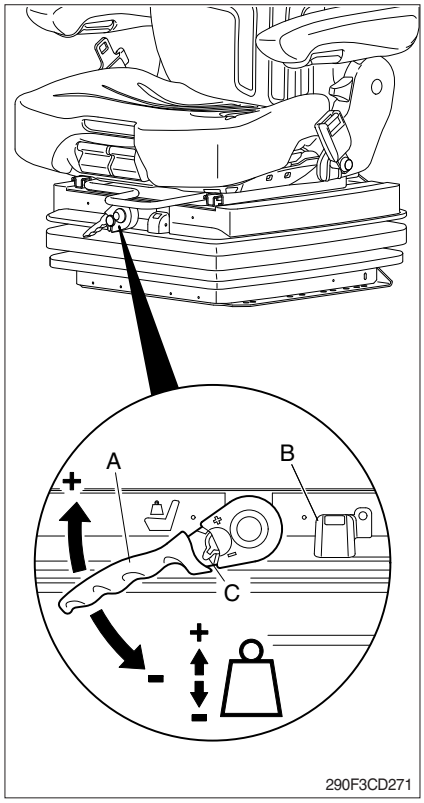
- **Push** : Select the current menu or the pop-up warning lamp move to the original position when warning lamp is happened.
- **Left** : ESC
- **Right** : CAM
- **Front** : Cluster main menu
- **Rear** : Return to acceleration mode

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.



(1) Weight and height adjustment



With socket wrench (A) :

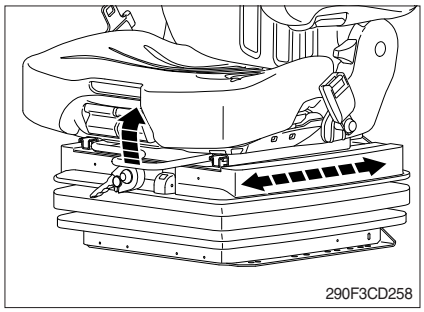
① The seat has to be adjusted for the operator's weight and height by tilting the handle (+) up or down (-) with the operator not sitting on the seat.

② The rotational direction is reversed by toggling the ratchet with the switch (C).

③ The operator's weight and the seat height are adjusted correctly when the green marking is completely visible in the indicator window (B) for weight and height.

④ The height can be adjusted individually as long as the green marking is visible.

(2) Fore/after adjustment



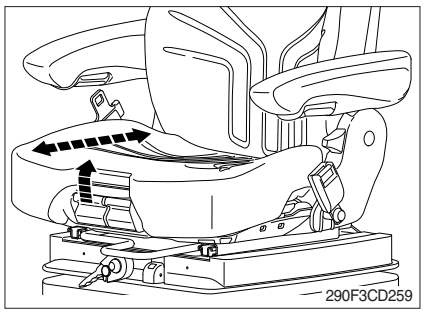
① The fore/after adjustment is released by lifting the locking lever.

⚠ 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.

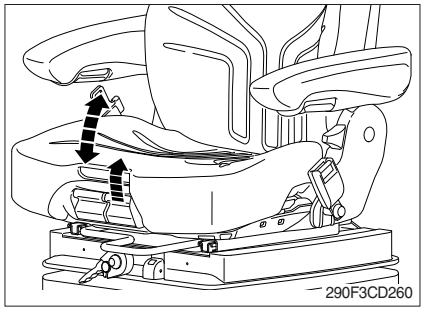
(3) Seat depth adjustment



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.

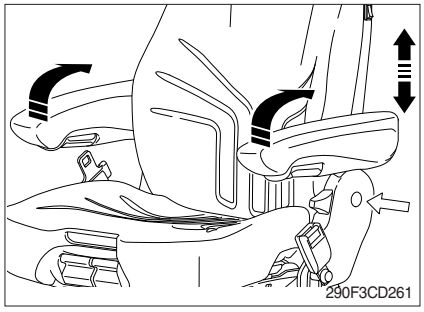
(4) Seat pan angle adjustment



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.

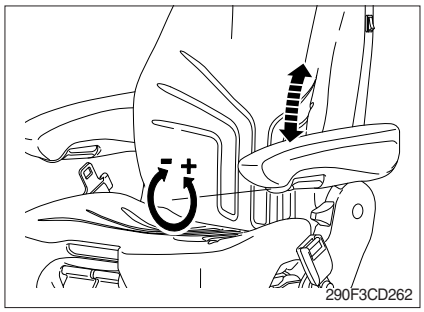
(5) Armrests



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.

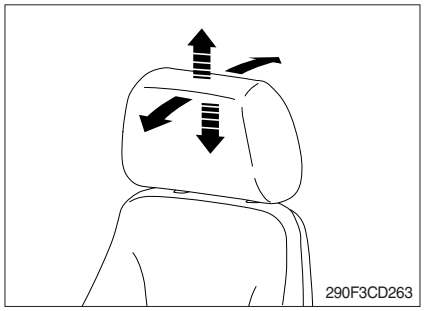
(6) Armrest adjustment



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

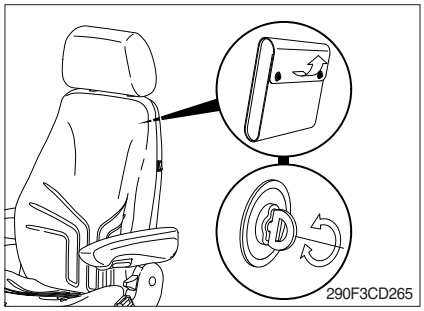


① The headrest can be individually adjusted for height by pulling it upward over the various increments up the end stop.

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.

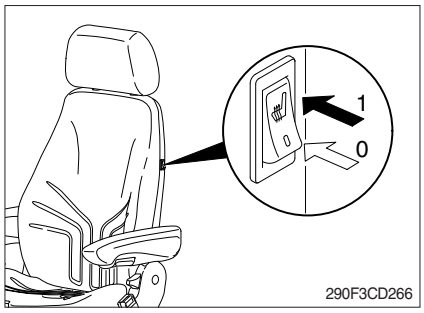
(8) Document box



① The document box is placed on the rear side of the backrest.

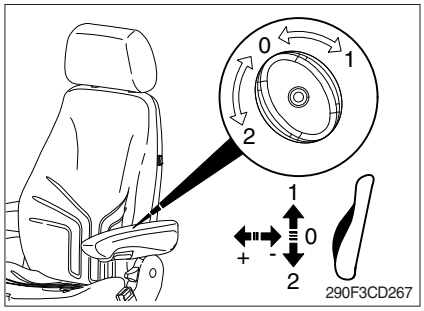
② To open the document box, first twist the turn lock closures 90° to the left or the right and then fold the cover of the document box upwards.

(9) Seat heater switch



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

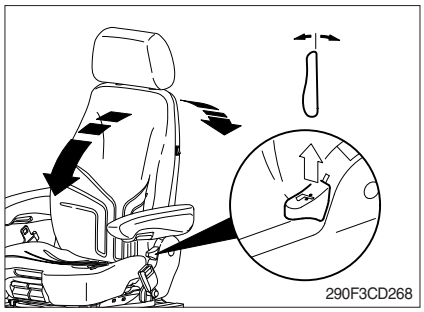
(10) Lumbar support



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.

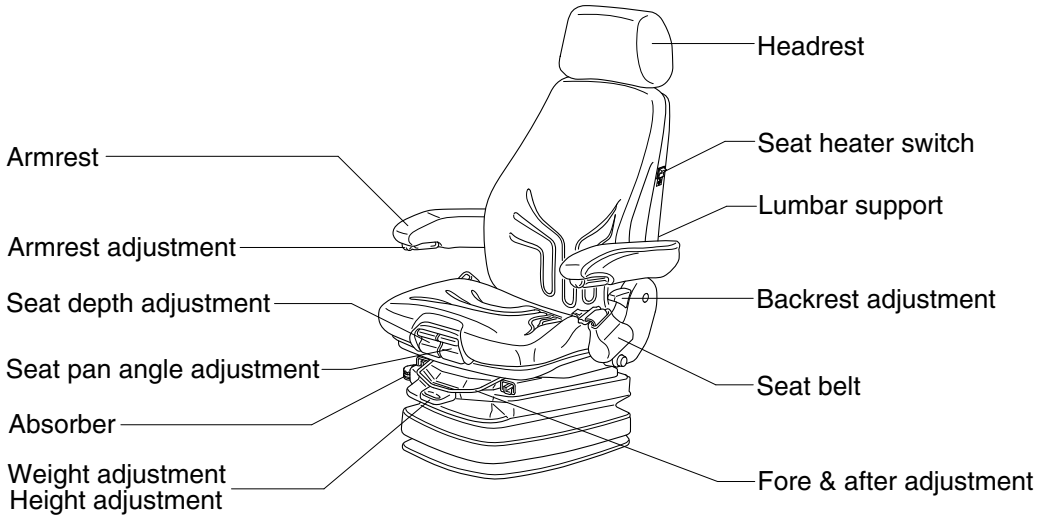
※ **Do not clean the seat with a pressure washer.**

During cleaning, the upholstery must not be soaked through.

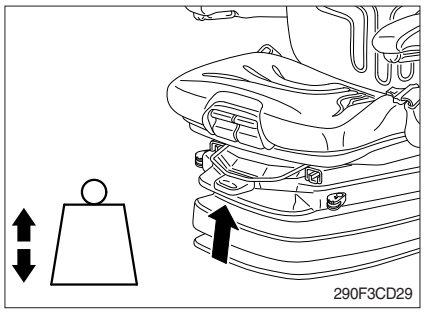
Use standard commercially available upholstery or plastics cleaning agent. Test first for compatibility on a small, concealed area.

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.



(1) Weight adjustment



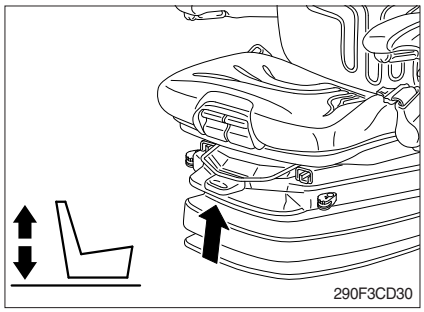
① The seat should be adjusted for the operator's weight by briefly pulling the actuator lever of the automatic weight and height adjuster (arrow) with the machine at a standstill and the operator's sitting on the seat.

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



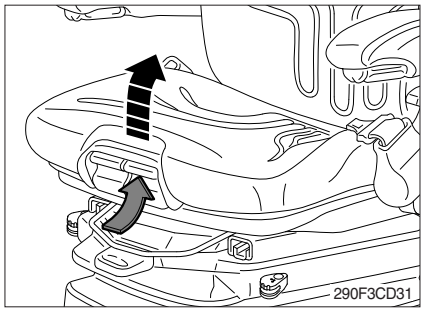
① The seat height can be set pneumatically and is continuously adjustable.

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.**

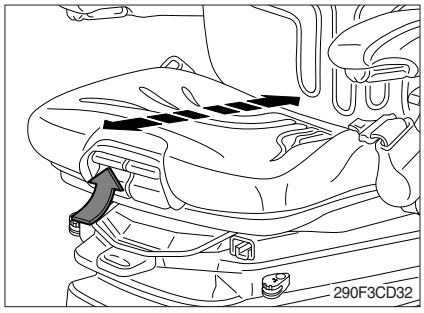
(3) Seat pan angle adjustment



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.

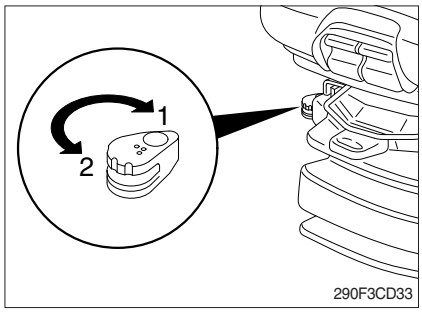
(4) Seat depth adjustment



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

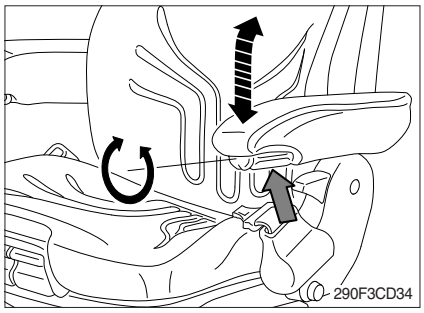


① The absorber setting of the seat can be varied to suit the on and off-road working conditions.
The cushioning effect can be individually adjusted for this purpose.

Turn the lever to the desired position and release.

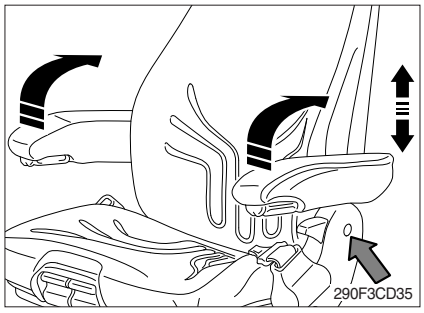
1 Soft
2 Hard

(6) Armrest adjustment



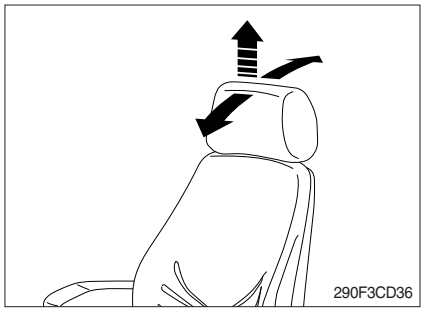
① The inclination of the armrests can be modified by turning the adjustment knob (arrow).

(7) Armrests



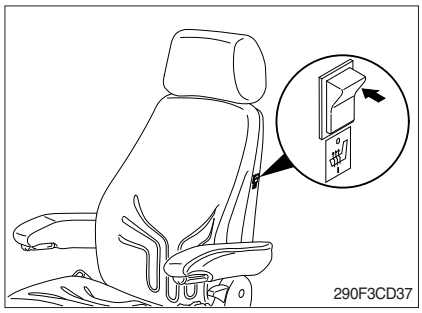
① The armrests can be folded up if required and the height individually adjusted.
② To adjust the armrests for height, separate the round cap (see arrow) from the cover, loosen the hexagon nut (size 13 ㎜), adjust the armrest to the desired position and tighten the nut again. Press the previously separated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

(8) Headrest



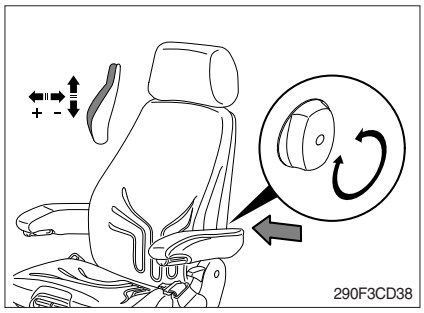
① The headrest can be individually adjusted for height by pulling it upward over the various increments up the end stop.
② By pushing forward or rearward the angle of the headrest can be adjusted individually.
③ To remove the headrest, pull it over the end stop.

(9) Seat heater switch



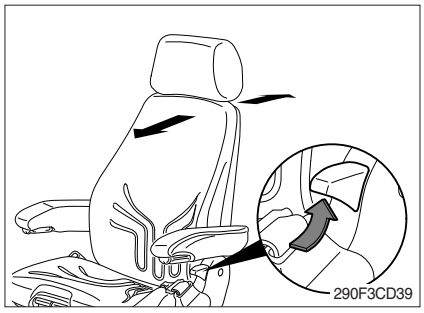
① The seat heater is turned on by pressing the switch.

(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.

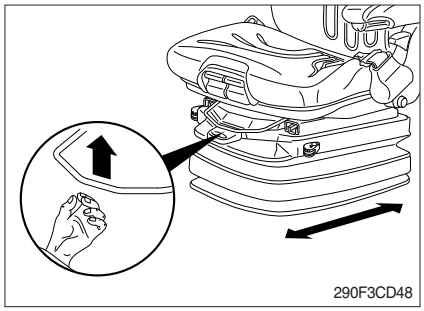
(11) Backrest adjustment



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.**

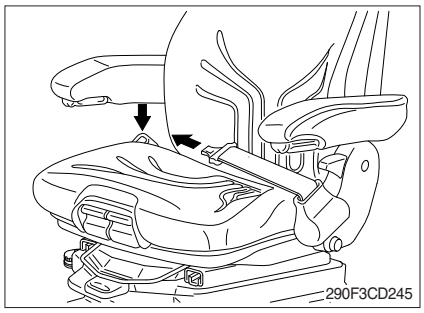
(12) Fore & after adjustment



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

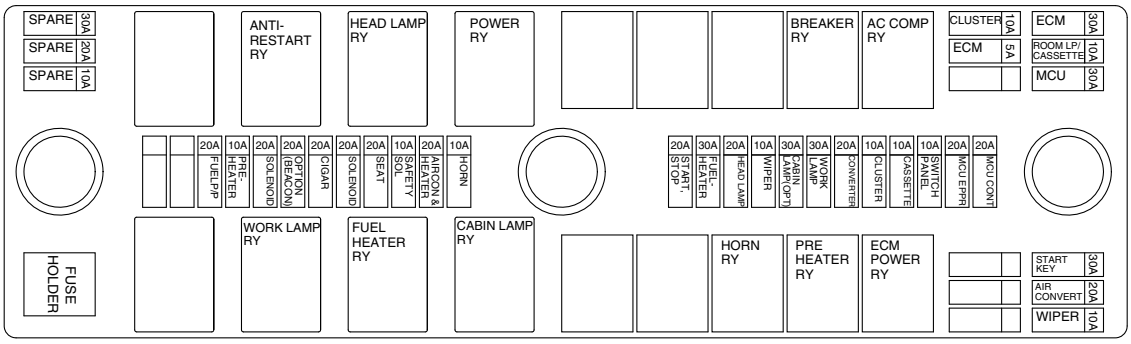
※ **The locking lever must latch into the desired position. It should not be possible to move the operator seat into another position when it is locked.**

(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

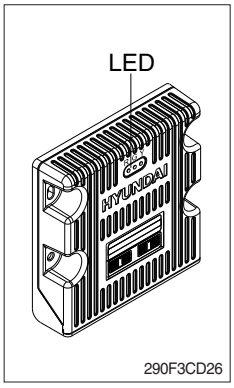
(1) The fuses protect the electrical parts and wiring from burning out.

(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

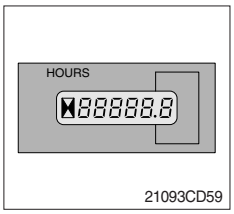
(1) To match the pump absorption torque with the engine torque, MCU varies EPPR valve output pressure, which control pump discharge amount whenever feedbacked engine speed drops under the reference rpm of each mode set.

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

G : green, R : red, Y : yellow

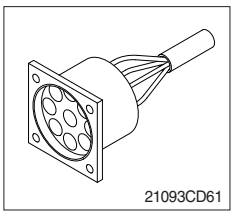
8) SERVICE METER



(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.

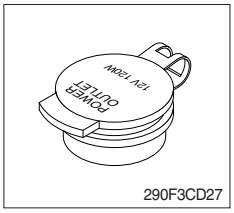
(2) ECM communicates the engine data with cummins INSITE adapter through the connector.

① ECM fault code check

② ECM program change

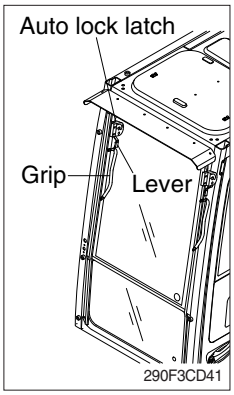
③ Engine data monitoring & test

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

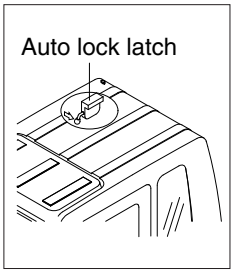


(1) Perform the following procedure in order to open the upper windshield.

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 untill it's completely fixed), please be careful as it can cause personal injury if the windshield is not fixed or falls off.



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

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

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

1. SUGGESTION FOR NEW MACHINE

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

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

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

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

3) Be careful during the initial 100 hours operation

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

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

(3) Tighten bolts.

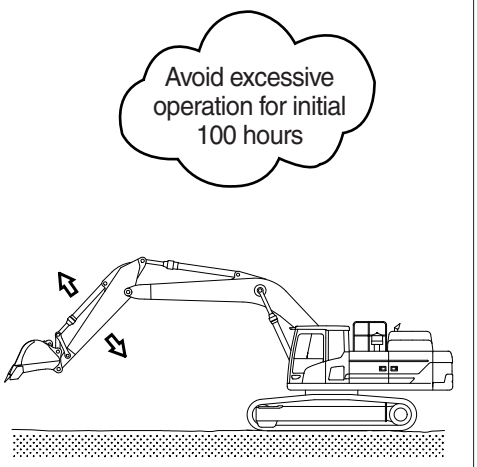
(4) Warm up the machine fully before operation.

(5) Check the gauges occasionally during the operation.

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

4) Replace followings after initial 250 hours of operation

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



480F4OP01

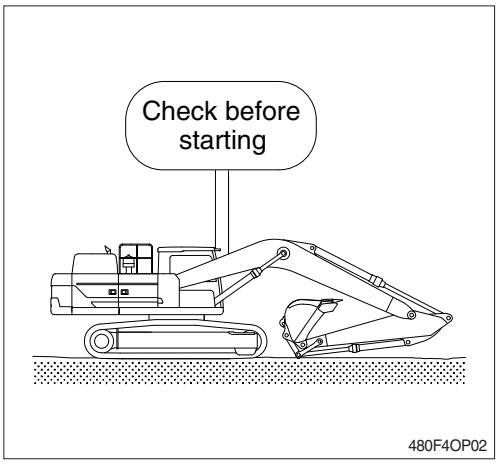
2. CHECK BEFORE STARTING THE ENGINE

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.



480F4OP02

3. STARTING AND STOP THE ENGINE

1) CHECK INDICATOR LIGHTS

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

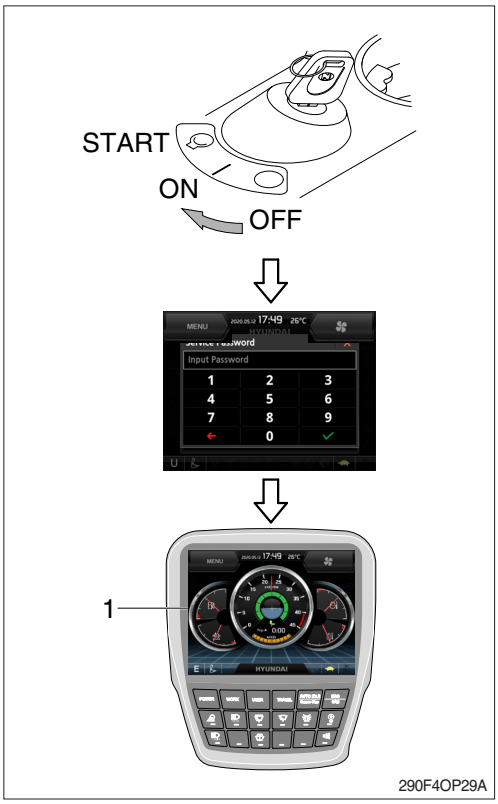
(2) Turn the starting switch to the ON position. Buzzer sounding for 4 seconds with HYUNDAI logo on cluster.

※ **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.**

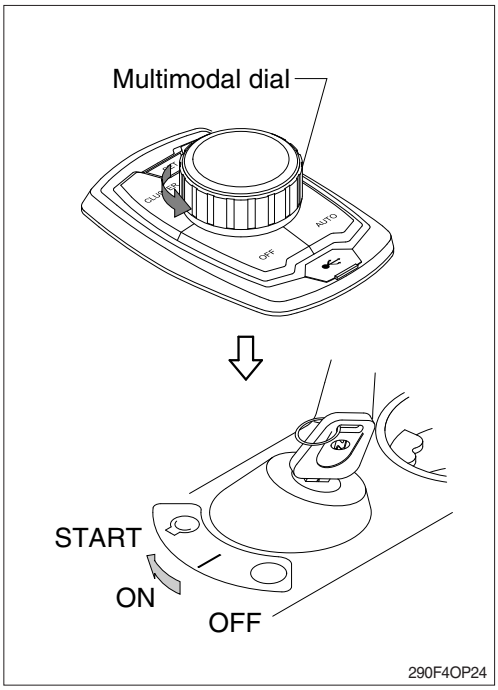
(1) Turn the multimodal dial to low idle position.

(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 stater to cool for about 2 minutes before re-attempting to start the engine again.**

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



3) STARTING ENGINE IN COLD WEATHER

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

※ **Replace the engine oil and fuel referring to recommended oils at page 2-44.**

※ **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.

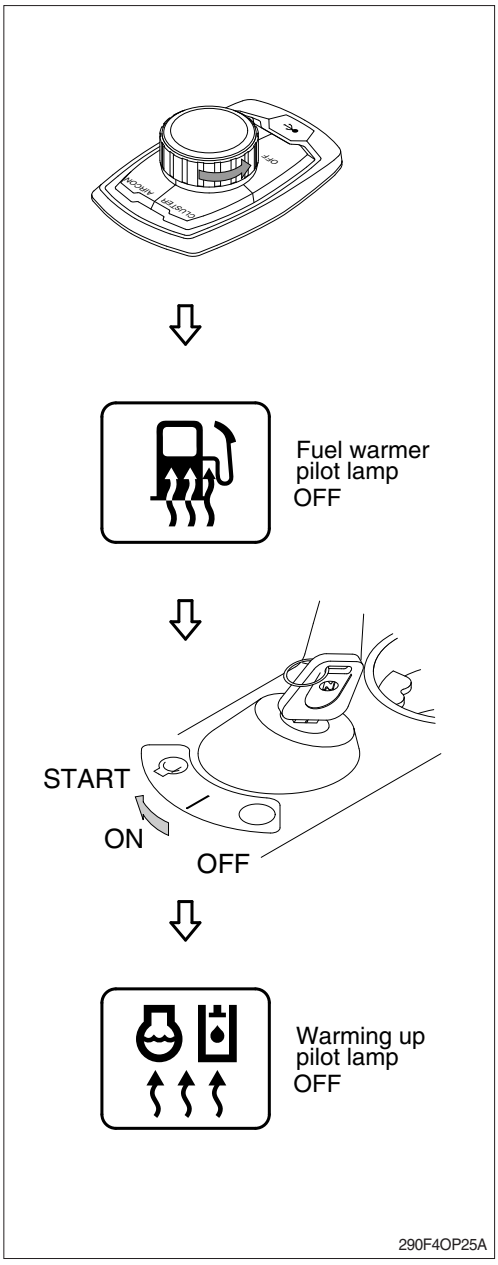
(4) Start the engine by turning the starting switch to START position after the fuel warmer pilot lamp OFF.

※ **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.**

290F4OP30A

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.

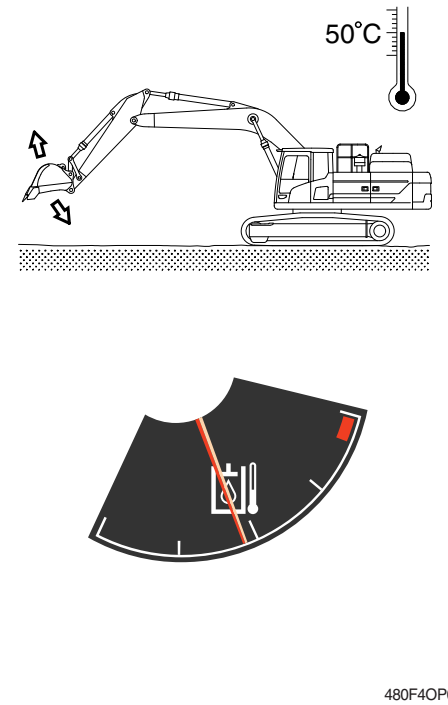
(3) Operate bucket lever for 5 minutes.

※ **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.



480F4OP03

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.**

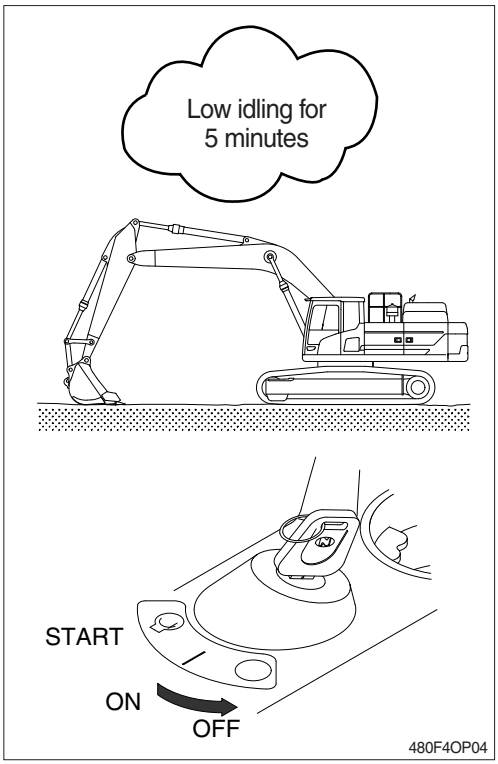
(1) Down the bucket on the ground then put all the levers in the neutral position.

(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.

290F4OP31A

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

(3) User mode

① User mode is useful for setting the user preperable power quickly.
(engine speed, power shift and idle speed)

② There are two methods for use of user mode.

a. In operation screen

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

Refer to page 3-16.

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.

290F4OP32A

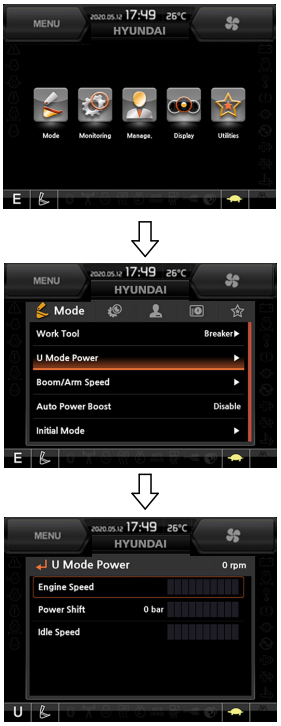
- High idle rpm, auto idle rpm and EPPR pressure can be adjusted and memorized in the U-mode.

※ **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	1200	800	0
2	1300	850	3
3	1350	900	6
4	1450	950	9
5	1550	1000 (auto decel)	12
6	1650	1050	16
7	1700	1100	20
8	1750	1150	26
9	1800	1200	32
10	1850	1250	38

※One touch decel & low idle : 800 rpm



290F4OP33A

(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).

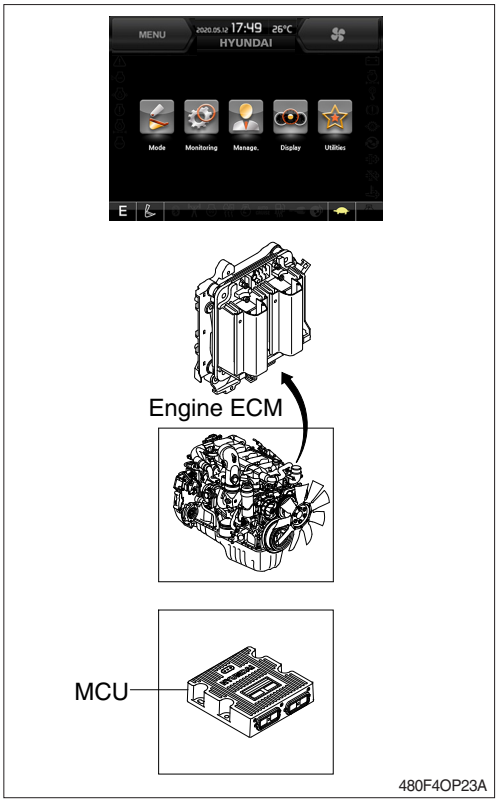
② **Engine ECM (Electronic Control Module)**

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

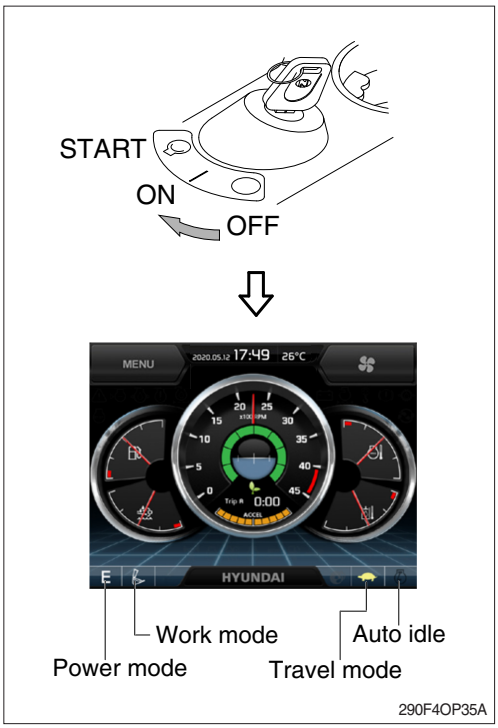
① When start key switch is turned on, the cluster turns on and buzzer sounds for 4 seconds. And then main information as gauges and engine speed are displayed on LCD.

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.

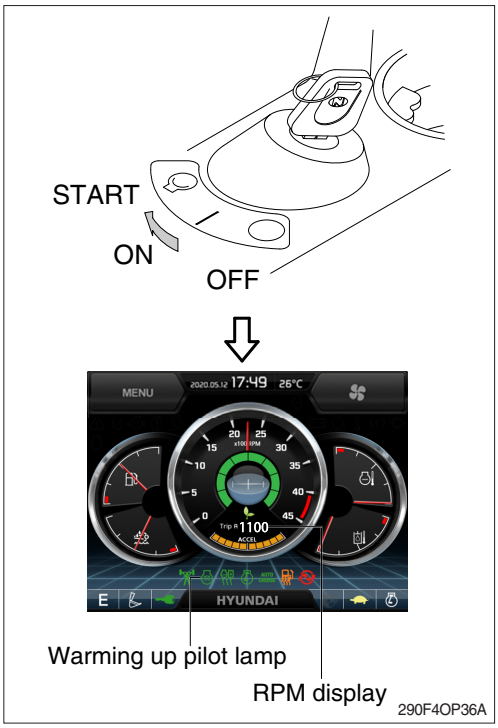


(2) After engine start

① When the engine is started, rpm display indicates low idle, 800 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.



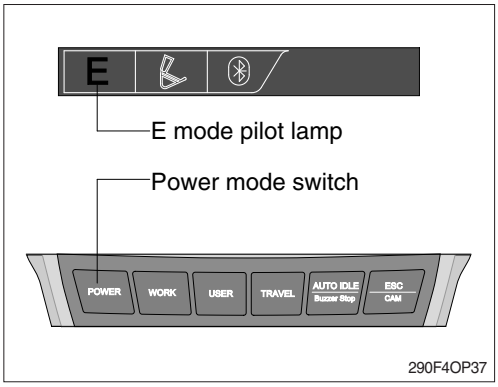
3) SELECTION OF POWER MODE

(1) E mode

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

Engine rpm	Effect
1650	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.**

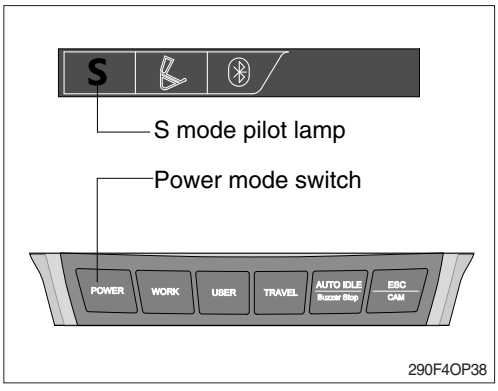


(2) S mode

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

Engine rpm	Effect
1750	Standard power

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

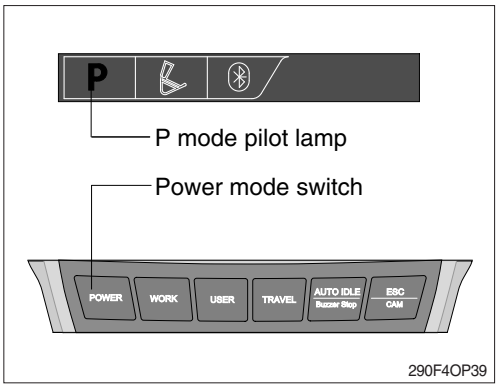


(3) P mode

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

Engine rpm	Effect
1850	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.

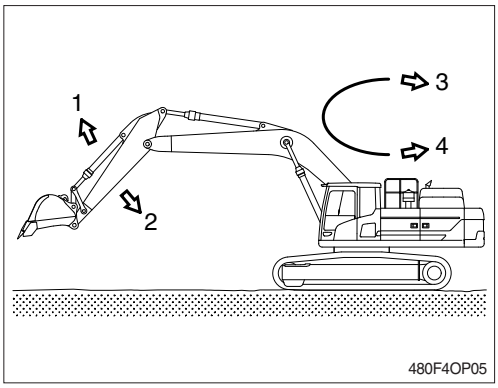
3) When you release the control lever, control lever returns to neutral position automatically.

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

290F4OP26

※ Left control lever

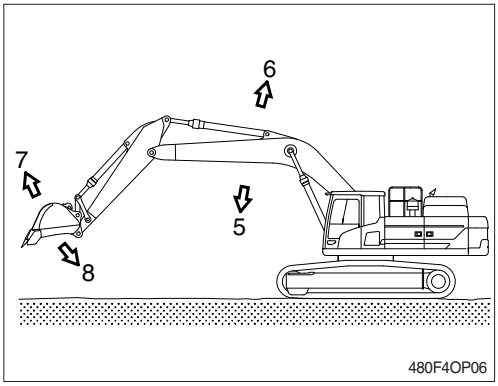
1 Arm roll-out
2 Arm roll-in
3 Swing right
4 Swing left



480F4OP05

※ Right control lever

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



480F4OP06

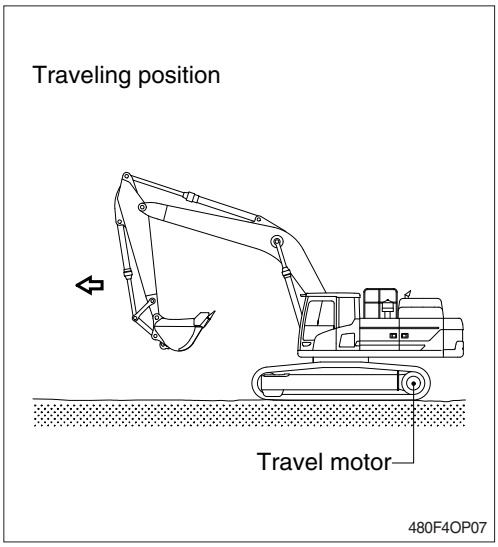
6. TRAVELING OF THE MACHINE

1) BASIC OPERATION

(1) Traveling position

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

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



(2) Traveling operation

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

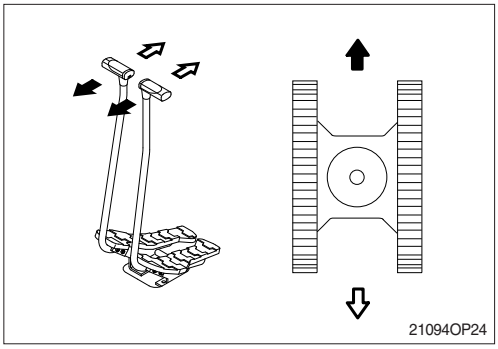
※ **Do not travel continuously for a long time.**

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

(3) Forward and backward traveling

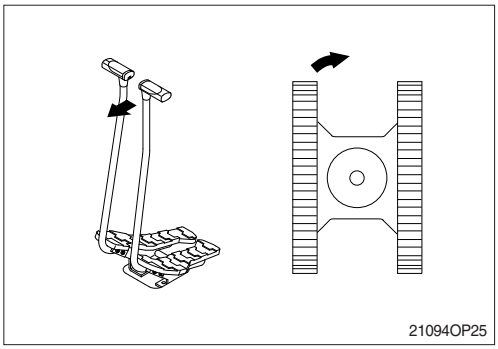
When the left and right travel lever or pedal are pushed at the same time, the machine will travel forward or backward.

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



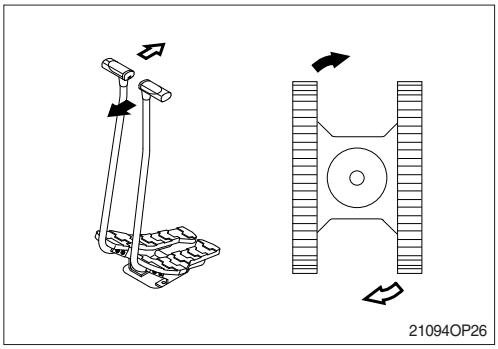
(4) Pivot turning

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



(5) Counter rotation

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



2) TRAVELING ON A SLOPE

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

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

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

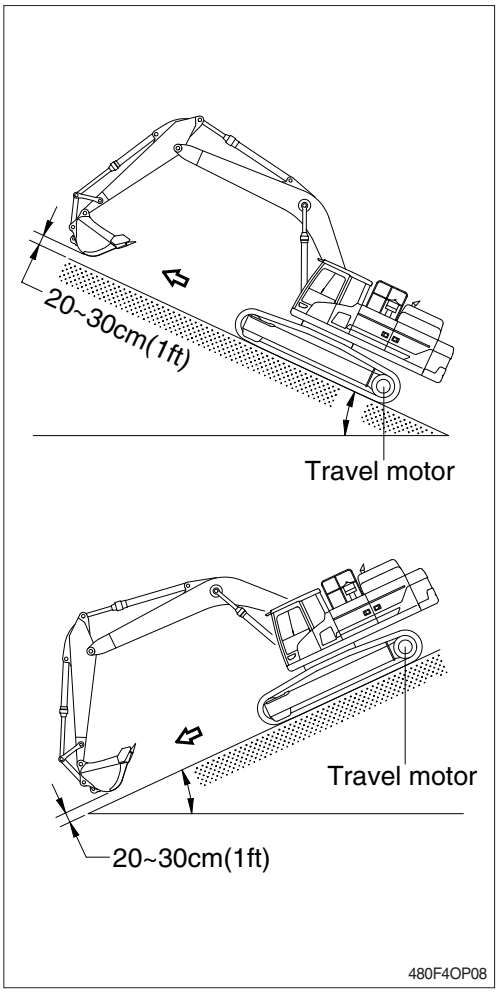
(4) When parking on a slope, use the bucket as a brake and place blocks behind the tracks to prevent sliding.

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

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

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

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



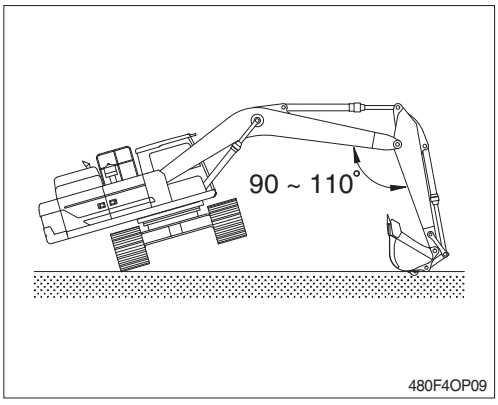
3) TRAVELING ON SOFT GROUND

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

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

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

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



4) TOWING THE MACHINE

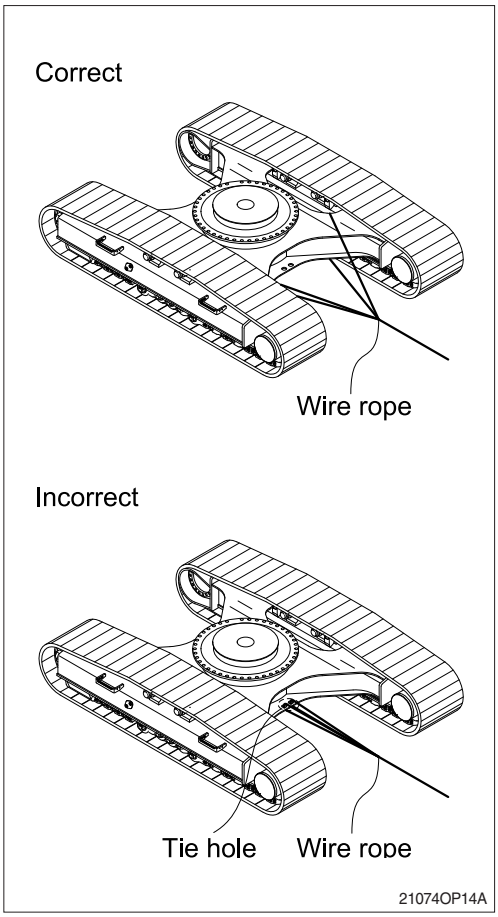
Tow the machine as follows when it can not move on it's own.

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

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

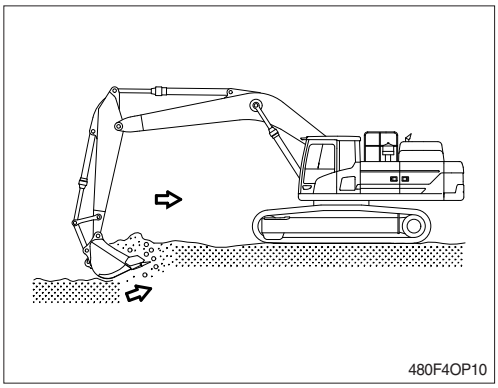
※ **Never tow the machine using only the tie hole, because this may break.**

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

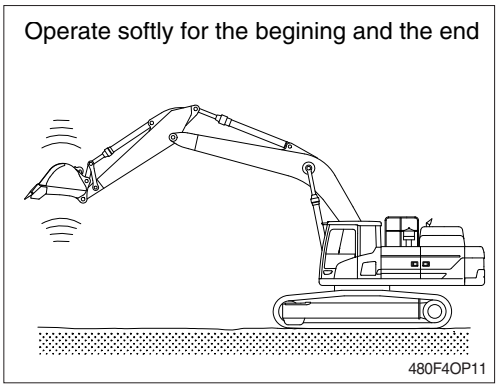


7. EFFICIENT WORKING METHOD

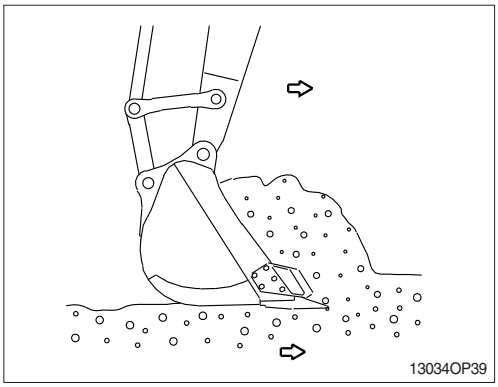
1) Do the digging work by arm.
   Use the pulling force of arm for digging and use together with the digging force of the bucket if necessary.



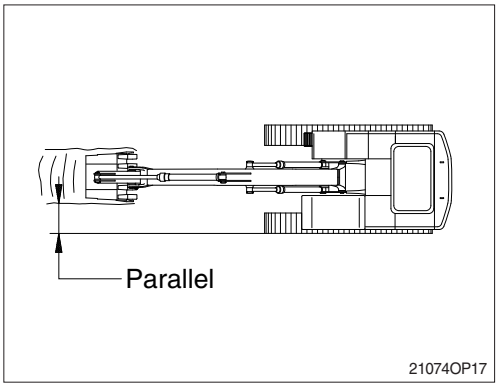
2) When lowering and raising the boom operate softly for the beginning and the end.
   In particularly, sudden stops while lowering the boom may cause damage to the machine.



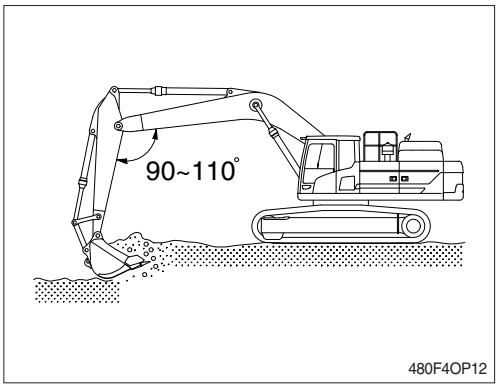
3) The digging resistance and wearing of tooth can be reduced by putting the end of bucket tooth to the digging direction.



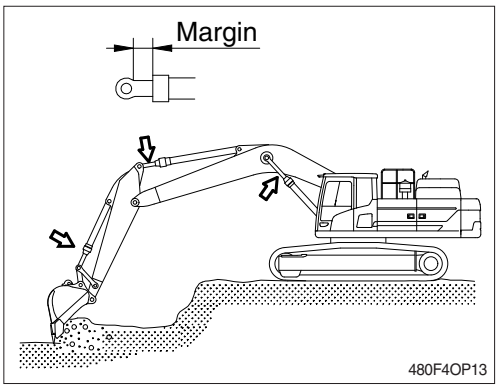
4) Set the tracks parallel to the line of the ditch to be excavated when digging ditch. Do not swing while digging.



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

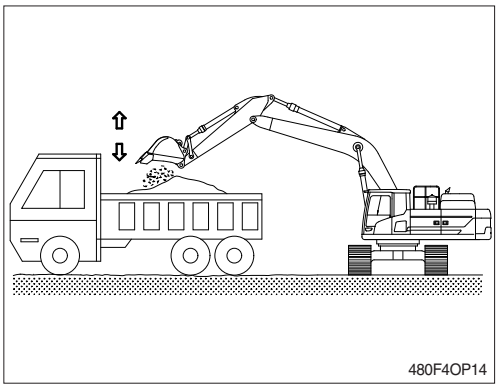


6) Operate leaving a small safety margin of cylinder stroke to prevent damage of cylinder when working with the machine.

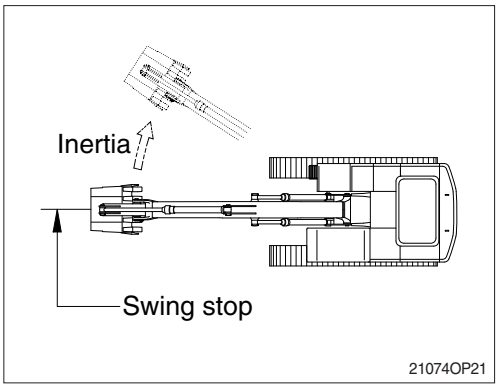


7) Keep the bucket to the dumping position and the arm horizontal when dumping the soil from the bucket.
   Operate bucket lever 2 or 3 times when hard to dump.

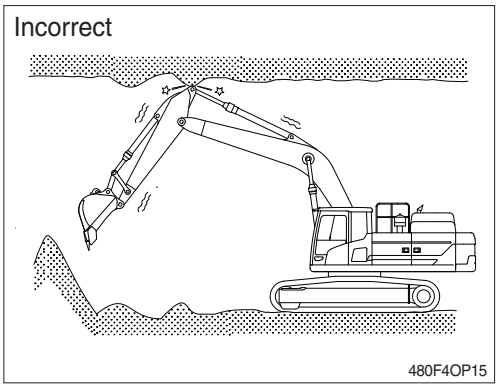
※ **Do not use the impact of bucket tooth when dumping.**



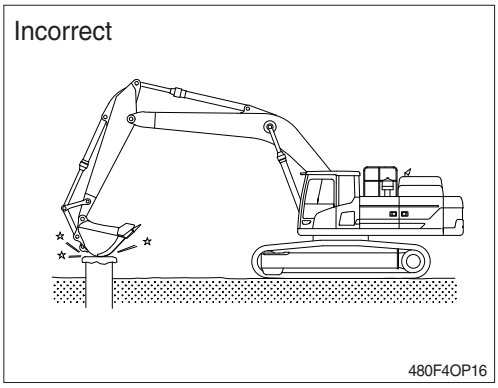
8) Operate stop of swing considering the swing slip distance is created by inertia after neutralizing the swing lever.



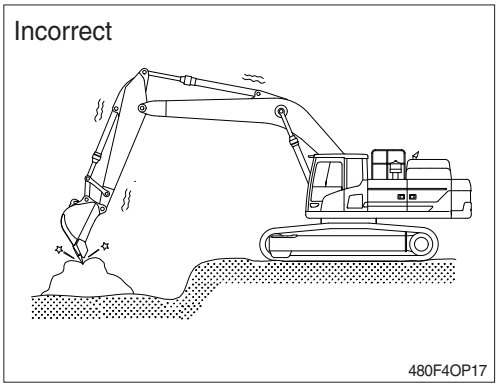
9) If the excavation is in an underground location or in a building, make sure that there is adequate overhead clearance and that there is adequate ventilation.



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



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



12) NEVER CARRY OUT EXCESSIVE OPERATIONS

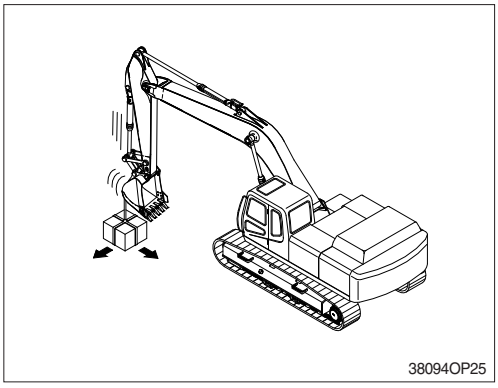
Operation exceeding machine performance may result in accident or failure.

Carry out lifting operation within specified load limit.

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

Never travel while carrying a load.

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



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.

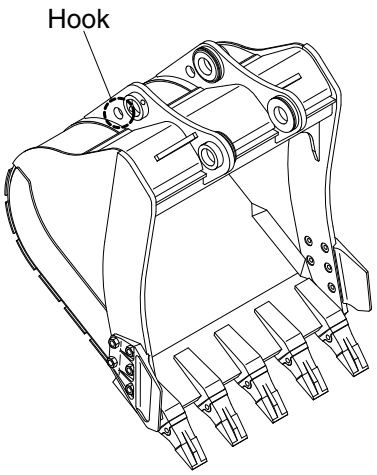
When performing lifting operation, never raise or lower a person.

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.

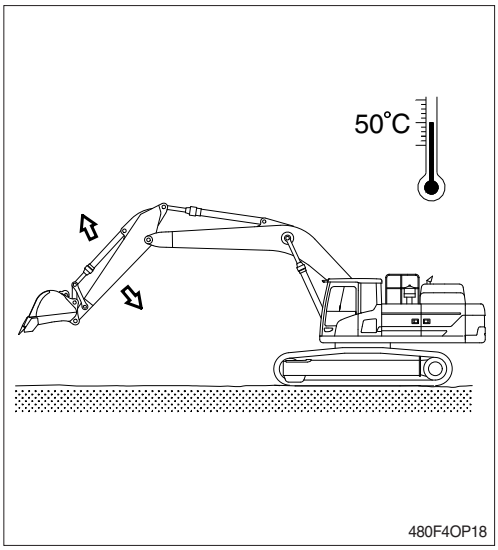
Never leave the operator's seat while lifting a load.



290F4OP42

8. OPERATION IN THE SPECIAL WORK SITES

1) OPERATION THE MACHINE IN A COLD WEATHER



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

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

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

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

(5) Always keep the battery completely charged.

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

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

2) OPERATION IN SANDY OR DUSTY WORK SITES

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

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

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

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

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

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

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

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

3) SEA SHORE OPERATION

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

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

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

4) OPERATION IN MUD, WATER OR RAIN WORK SITES

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

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

(3) Perform all daily lubrication and service.

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

5) OPERATION IN ROCKY WORK SITES

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

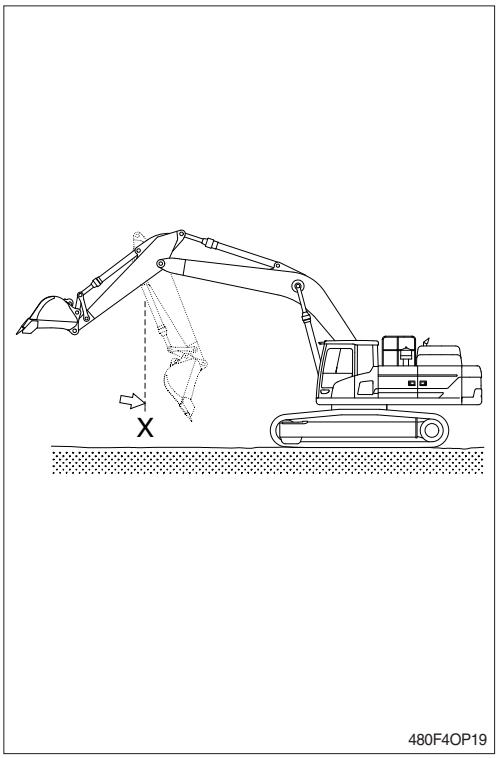
(2) Loosen the track tension a little when working in such areas.

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

9. NORMAL OPERATION OF EXCAVATOR

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

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



10. ATTACHMENT LOWERING (when engine is stopped)

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

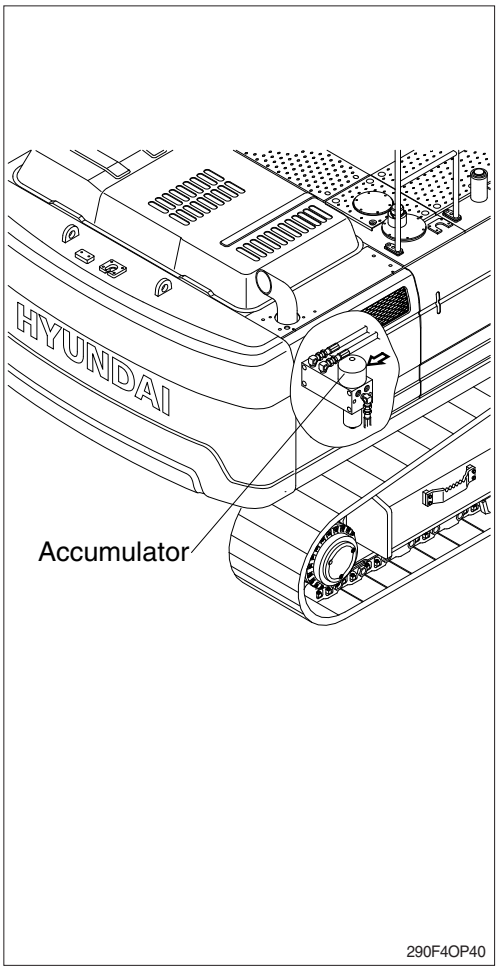
⚠ **Be sure no one is under or near the attachment before lowering the boom.**

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

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

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

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



11. STORAGE

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

1) BEFORE STORAGE

(1) Cleaning the machine

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

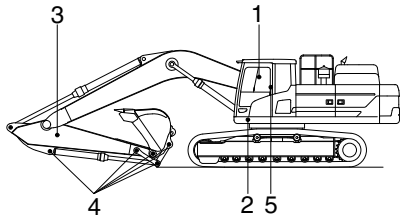
(2) Lubrication position of each part

Change all oil.

※ Be particularly careful when you reuse the machine.

As oil can be diluted during storage.

Apply an anticorrosive lubricant on the exposed part of piston rod of cylinder and in places where the machine rusts easily.



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

480F4OP20

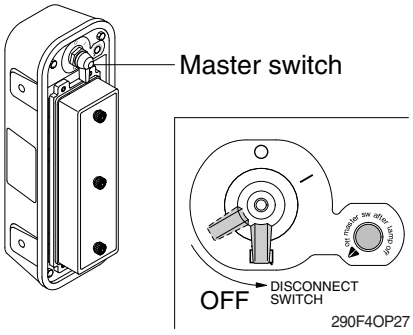
(3) Master switch

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

⚠ Off the master switch after lamp off.

⚠ It may cause severe failure of aftertreatment device.

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



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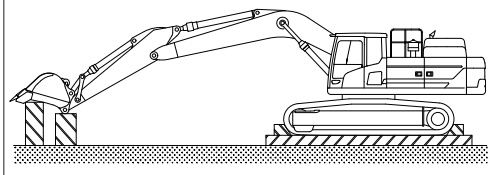
(5) Prevention of dust and moisture

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.



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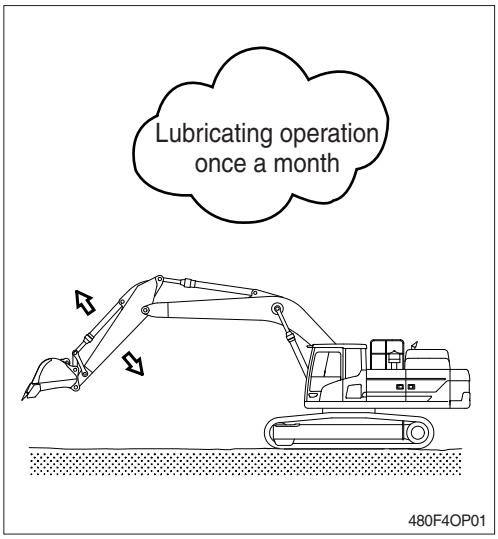
2) DURING STORAGE

Start engine and move the machine and work equipment once a month and apply lubrication to each part.



※ **Check the level of engine oil and coolant and fill if required when starting engine.**

※ **Clean the anticorrosive on the piston rod of cylinder.**

※ **Operate the machine such as traveling, swing and work equipment operation to make sure enough lubrication of all functional components.**

※ BATTERY

① **Once a month, start the engine for 15 minutes (or use a charger) to charge the battery.**

② **Every 2 months, check the battery voltage and keep battery voltage over 25.08V.**

③ **If the machine stock period is over 6 months, disconnect the battery negative (-) terminal.**

3) AFTER STORAGE

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

(1) Wipe off the anticorrosive lubricant on the hydraulic piston rod.

(2) Completely fill fuel tank, lubricate and add oil.

(3) **When storage period is 6 months over**

If the machine stock period is over 6 months, carry out the following procedure.

This procedure is to drain condensation water for the **swing reduction gear** durability.

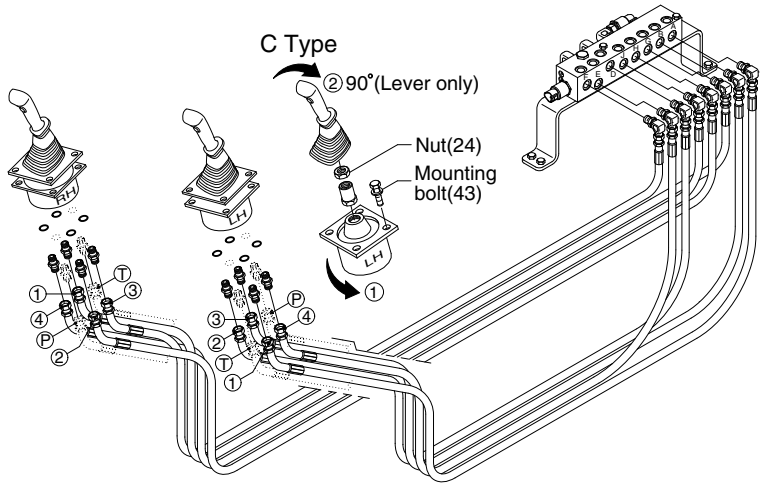
※ **Remove the drain port plug and drain the water until the gear oil comes out and then tighten the drain plug.**

※ **Refer to the service instruction, section 6 for the drain plug location.**

※ **If the machine is stored without carrying out the monthly lubricating operation, consult your HD Hyundai Construction Equipment dealer for service.**

12. RCV LEVER OPERATING PATTERN

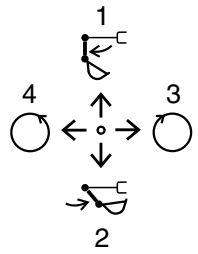
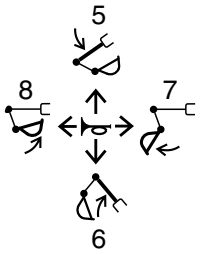
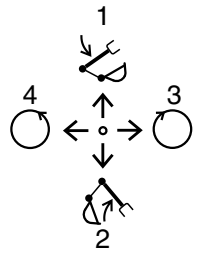
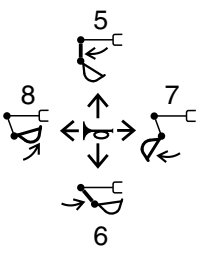
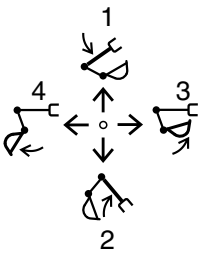
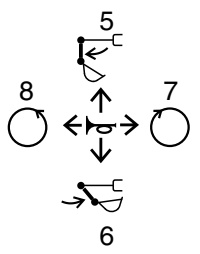
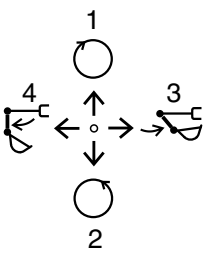
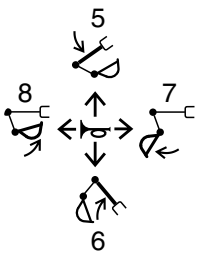
1) PATTERN CHANGE VALVE NOT INSTALL (standard)



480F4OP41

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

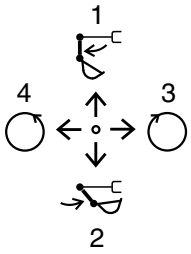
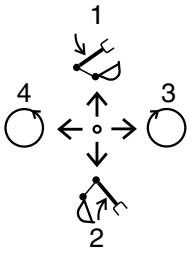
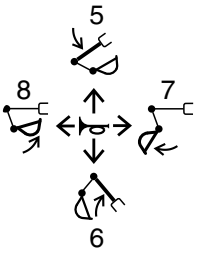
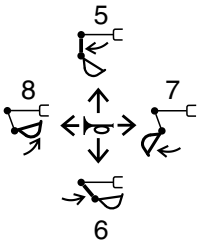
※ The hose modification works must be carried out between RCV lever and terminal block (Not between terminal block and MCV).

Pattern	Operation		Control function		Hose connection (port)		
	Left RCV lever	Right RCV lever			RCV lever	Change of Terminal block	
						From	To
ISO Type HD Hyundai Construction Equipment			Left	1Arm out	②	D	-
				2Arm in	④	E	-
				3Swing right	③	B	-
				4Swing left	①	A	-
			Right	5Boom lower	④	J	-
				6Boom raise	②	H	-
				7Bucket out	①	G	-
				8Bucket in	③	F	-
A Type			Left	1Boom lower	②	D	J
				2Boom raise	④	E	H
				3Swing right	③	B	-
				4Swing left	①	A	-
			Right	5Arm out	④	J	D
				6Arm in	②	H	E
				7Bucket out	①	G	-
				8Bucket in	③	F	-
B Type			Left	1Boom lower	②	D	J
				2Boom raise	④	E	H
				3Bucket in	③	B	F
				4Bucket out	①	A	G
			Right	5Arm out	④	J	D
				6Arm in	②	H	E
				7Swing right	①	G	B
				8Swing left	③	F	A
C Type			Left	① Loosen the RCV lever mounting bolt (43) and rotates lever assy 90˚ counterclockwise; then install. ② To put lever in correct position, disassemble nut (24) 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

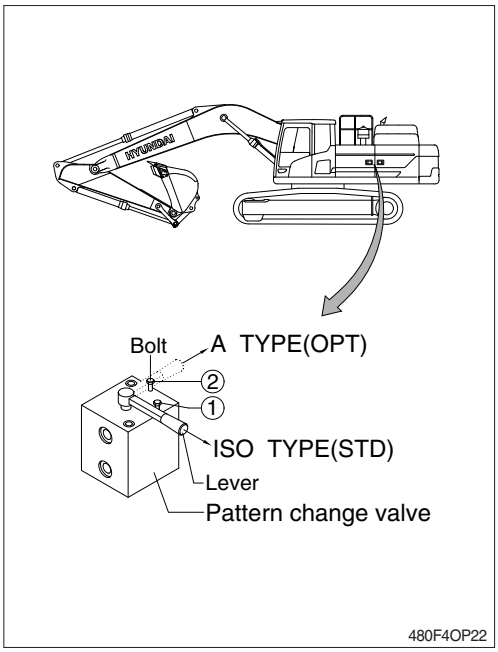
① Loosen bolt.

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.



1. PREPARATION FOR TRANSPORTATION

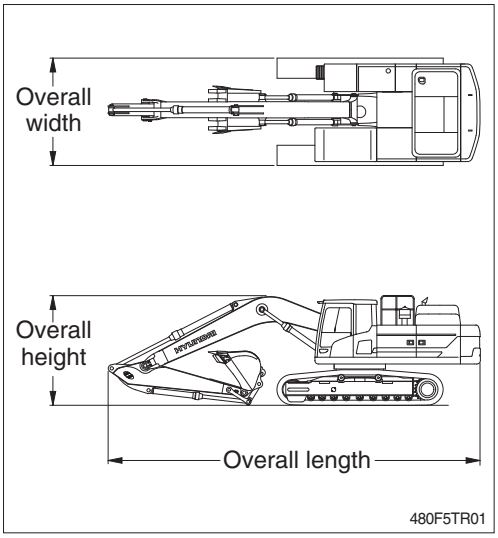
1) When transporting the machine, observe the various road rules, road transportation vehicle laws and vehicle limit ordinances, etc.

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.

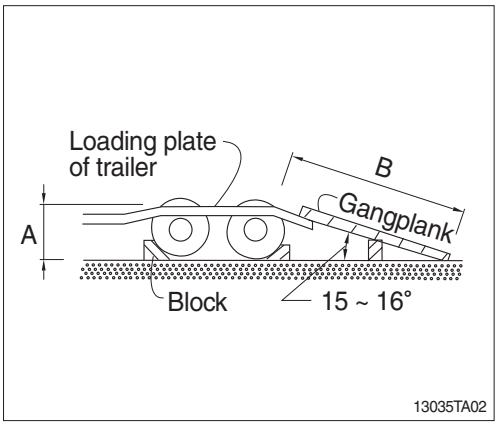
4) Get the permission from the related authority if necessary.

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



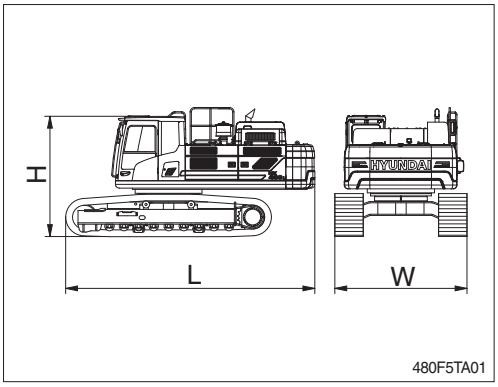
2. DIMENSION AND WEIGHT

1) HX480 L

(1) Base machine

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	6616 (21' 8")
H	Height	mm (ft-in)	3190 (10' 6")
W	Width	mm (ft-in)	3340 (10' 11")
Wt	Weight	kg (lb)	39280 (86600)

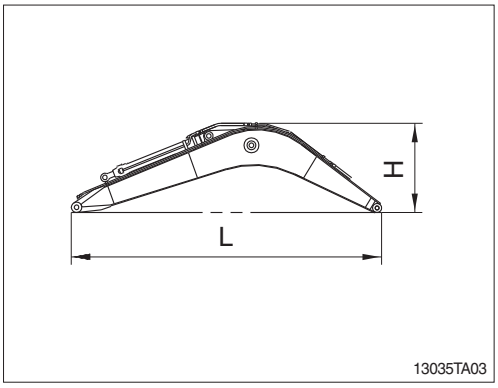
※ With 600 mm (24") triple grouser shoes and 9200 kg (20290 lb) counterweight.



(2) Boom assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	7320 (24' 0")
H	Height	mm (ft-in)	1940 (6' 4")
W	Width	mm (ft-in)	830 (2' 9")
Wt	Weight	kg (lb)	4540 (10010)

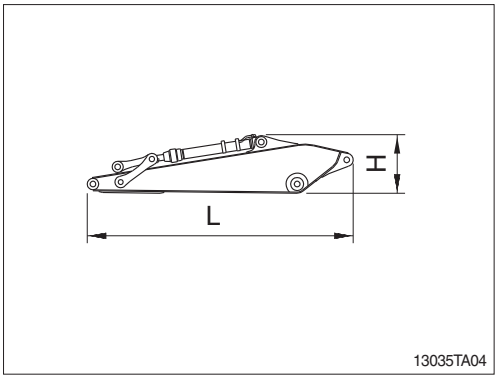
※ 7.06 m (23' 2") boom with arm cylinder (included piping and pins).



(3) Arm assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	4650 (15' 3")
H	Height	mm (ft-in)	1210 (4' 0")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	2780 (6130)

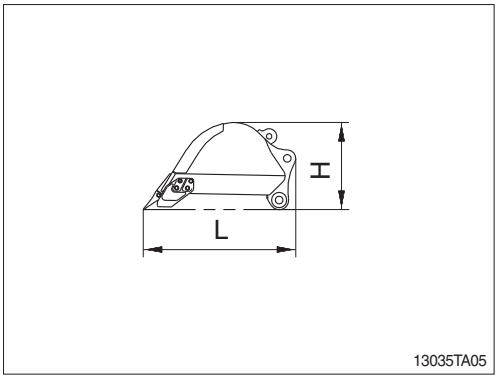
※ 3.38 m (11' 0") arm with bucket cylinder (included linkage and pins).



(4) Bucket assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2170 (7' 1")
H	Height	mm (ft-in)	1430 (4' 8")
W	Width	mm (ft-in)	1685 (5' 6")
Wt	Weight	kg (lb)	2030 (4475)

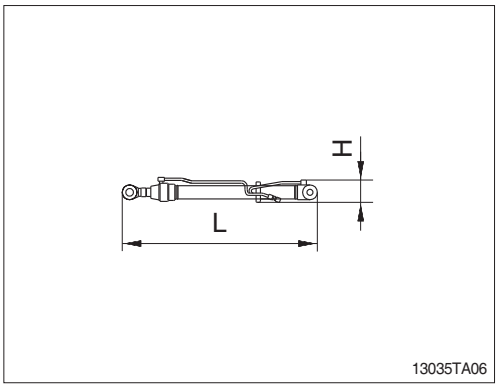
※ 2.20 m^3 (2.88 yd^3) SAE heaped bucket (included tooth and side cutters).



(5) Boom cylinder

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2260 (7' 5")
H	Height	mm (ft-in)	305 (1' 0")
W	Width	mm (ft-in)	480 (1' 7")
Wt	Weight	kg (lb)	435 (960) × 2

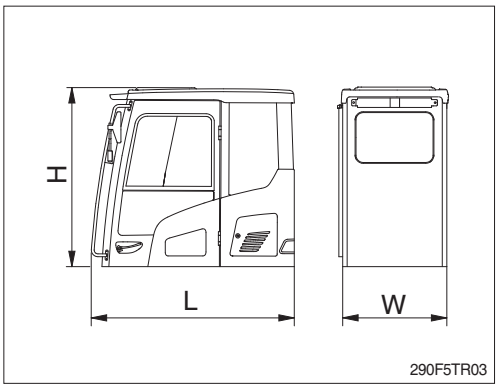
※ Included piping.



(6) Cab assembly

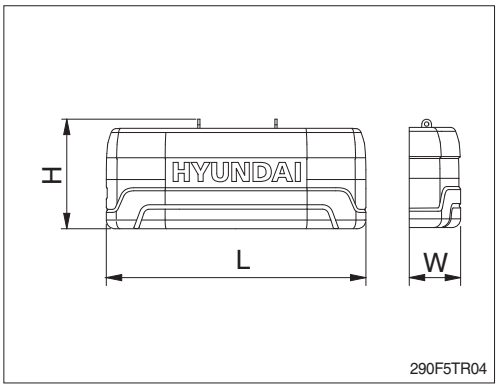
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1950 (6' 5") [2070 (6' 10")]
H	Height	mm (ft-in)	1780 (5' 10") [1822 (6')]
W	Width	mm (ft-in)	1104 (3' 7") [1126 (3' 8")]
Wt	Weight	kg (lb)	554.9 (1201) [709.8 (1565)]

[ ] : with FOG GUARD



(7) Counterweight

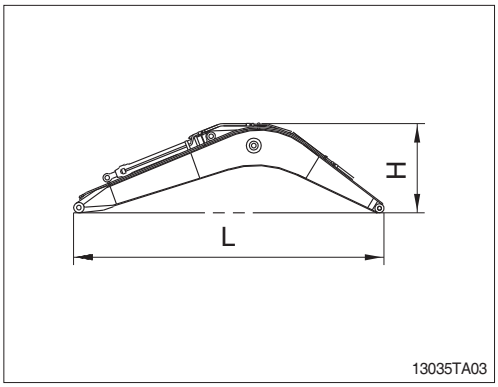
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2980 (9' 9")
H	Height	mm (ft-in)	1250 (4' 1")
W	Width	mm (ft-in)	770 (2' 6")
Wt	Weight	kg (lb)	9200 (20280)



(8) Boom assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	6810 (22' 4")
H	Height	mm (ft-in)	2050 (6' 9")
W	Width	mm (ft-in)	830 (2' 9")
Wt	Weight	kg (lb)	4500 (9920)

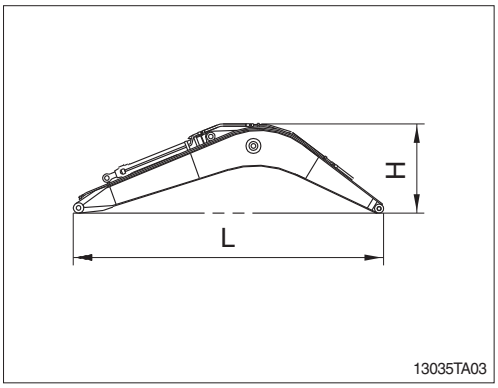
※ 6.55 m (21' 6") boom with arm cylinder (included piping and pins).



(9) Boom assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	9270 (30' 5")
H	Height	mm (ft-in)	2130 (7' 0")
W	Width	mm (ft-in)	830 (2' 9")
Wt	Weight	kg (lb)	5290 (11660)

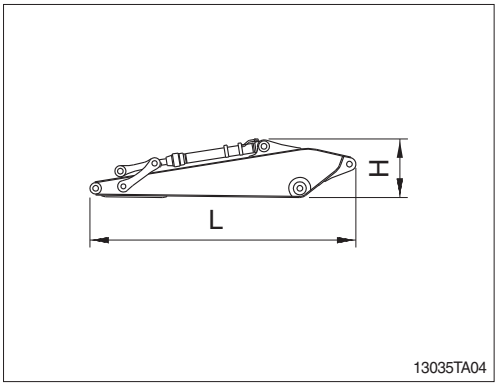
※ 9.00 m (29' 6") boom with arm cylinder (included piping and pins).



(10) Arm assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	3760 (12' 4")
H	Height	mm (ft-in)	1340 (4' 5")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	2540 (5600)

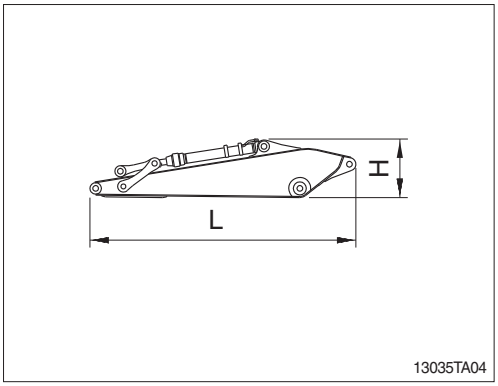
※ 2.4 m (7' 10") arm with bucket cylinder (included linkage and pins).



(11) Arm assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	4200 (13' 9")
H	Height	mm (ft-in)	1230 (4' 0")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	2740 (6040)

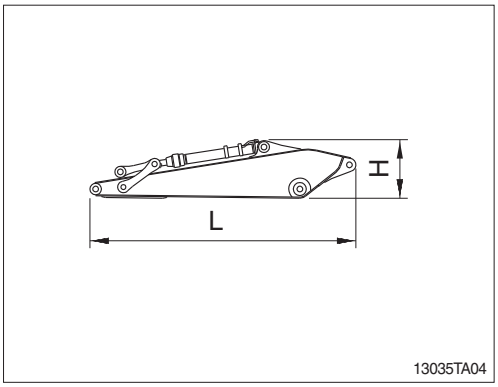
※ 2.90 m (9' 6") arm with bucket cylinder (included linkage and pins).



(12) Arm assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	5280 (17' 4")
H	Height	mm (ft-in)	1060 (3' 6")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	2880 (6350)

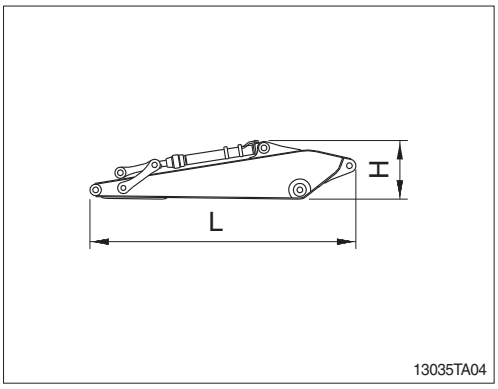
※ 4.00 m (13' 1") arm with bucket cylinder (included linkage and pins).



(13) Arm assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	7270 (23' 10")
H	Height	mm (ft-in)	1080 (3' 7")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	3440 (7580)

※ 6.00 m (19' 8") arm with bucket cylinder (included linkage and pins).



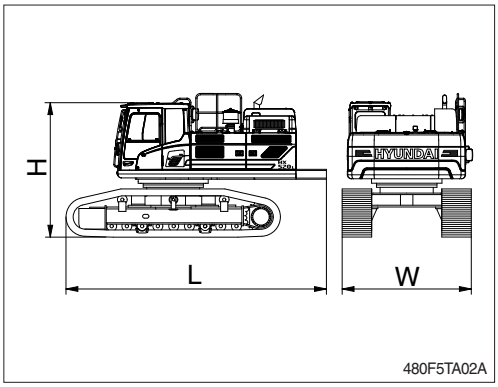
2) HX520 L

(1) Base machine

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	6570 (21' 7")
H	Height	mm (ft-in)	3330 (10' 11")
W	Width	mm (ft-in)	2990 (9' 10")
Wt	Weight	kg (lb)	31940 (70415)

※ With 600 mm (24") triple grouser shoes and without counterweight.

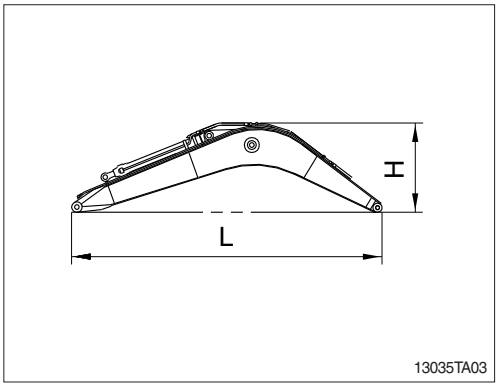
※ Remove catwalk for transport.



(2) Boom assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	7320 (24' 0")
H	Height	mm (ft-in)	1940 (6' 4")
W	Width	mm (ft-in)	830 (2' 9")
Wt	Weight	kg (lb)	4540 (10010)

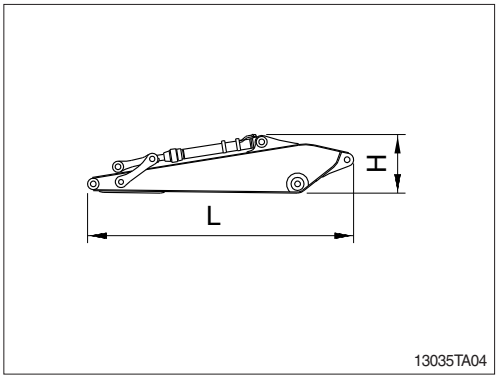
※ 7.06 m (23' 2") boom with arm cylinder (included piping and pins).



(3) Arm assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	4660 (15' 3")
H	Height	mm (ft-in)	1210 (4' 0")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	2820 (6220)

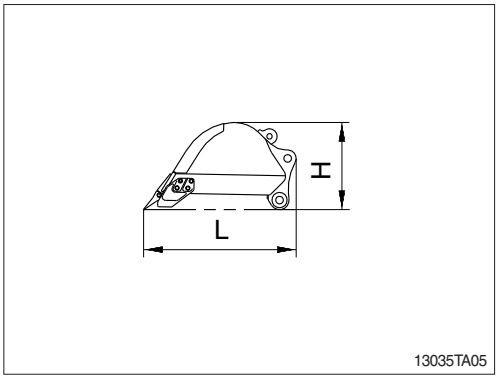
※ 3.38 m (11' 1") arm with bucket cylinder (included linkage and pins).



(4) Bucket assembly

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2170 (7' 1")
H	Height	mm (ft-in)	1430 (4' 8")
W	Width	mm (ft-in)	1685 (5' 6")
Wt	Weight	kg (lb)	2030 (4475)

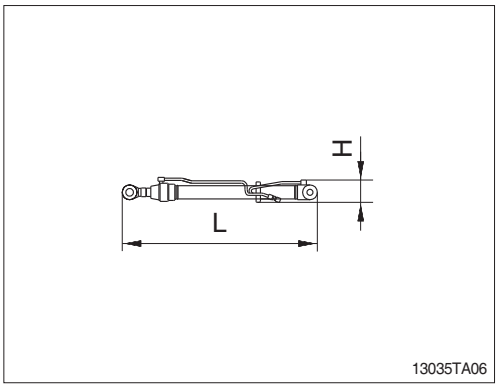
※ 2.20 m^3 (2.88 yd^3) SAE heaped bucket (included tooth and side cutters).



(5) Boom cylinder

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2260 (7' 5")
H	Height	mm (ft-in)	305 (1' 0")
W	Width	mm (ft-in)	477 (1' 7")
Wt	Weight	kg (lb)	435 (960) × 2

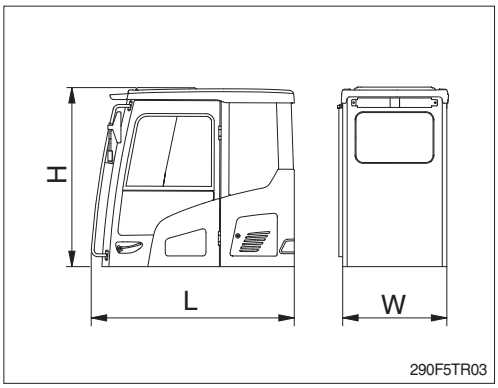
※ Included piping.



(6) Cab assembly

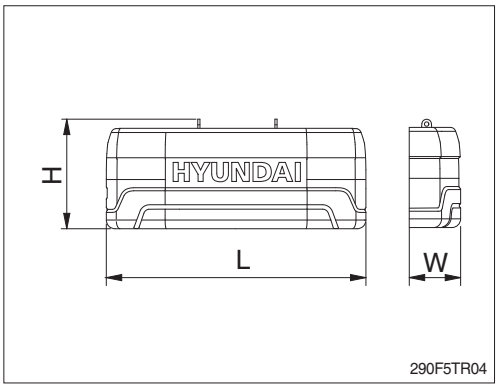
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	1950 (6' 5") [2070 (6' 10")]
H	Height	mm (ft-in)	1780 (5' 10") [1822 (6')]
W	Width	mm (ft-in)	1104 (3' 7") [1126 (3' 8")]
Wt	Weight	kg (lb)	486.8 (1073) [641.7 (1415)]

[ ] : with FOG GUARD



(7) Counterweight

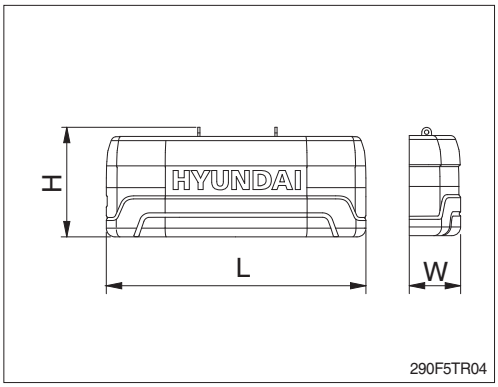
Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2980 (9' 9")
H	Height	mm (ft-in)	1250 (4' 1")
W	Width	mm (ft-in)	770 (2' 6")
Wt	Weight	kg (lb)	10200 (22490)



(8) Counterweight (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	2980 (9' 9")
H	Height	mm (ft-in)	1250 (4' 1")
W	Width	mm (ft-in)	770 (2' 6")
Wt	Weight	kg (lb)	10700 (23590)

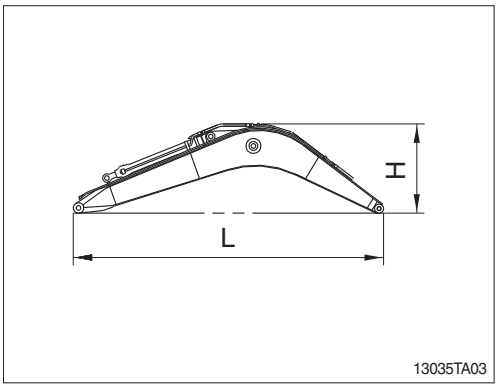
※ 9.0 m Boom, 5.85 m Arm only



(9) Boom assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	6810 (22' 4")
H	Height	mm (ft-in)	2050 (6' 9")
W	Width	mm (ft-in)	830 (2' 9")
Wt	Weight	kg (lb)	4500 (9920)

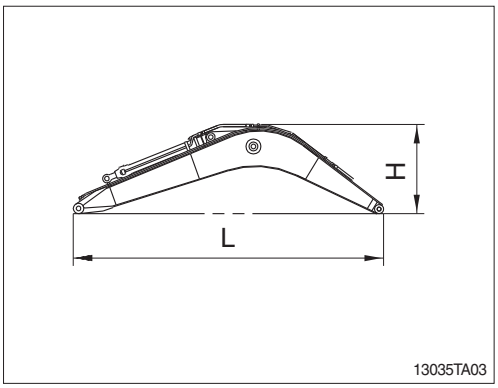
※ 6.55 m (21' 6") boom with arm cylinder (included piping and pins).



(10) Boom assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	9270 (30' 5")
H	Height	mm (ft-in)	2130 (7' 0")
W	Width	mm (ft-in)	830 (2' 9")
Wt	Weight	kg (lb)	5290 (11660)

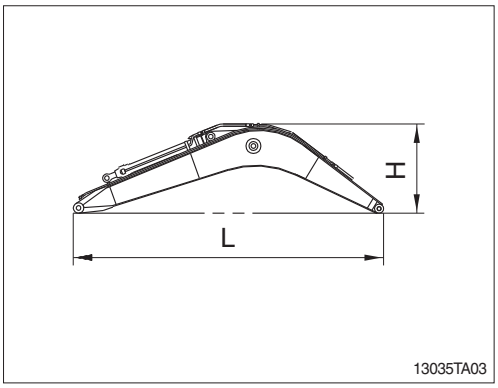
※ 9.00 m (29' 6") boom with arm cylinder (included piping and pins).



(11) Boom assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	11770 (38' 7")
H	Height	mm (ft-in)	1980 (6' 6")
W	Width	mm (ft-in)	830 (2' 9")
Wt	Weight	kg (lb)	5960 (13140)

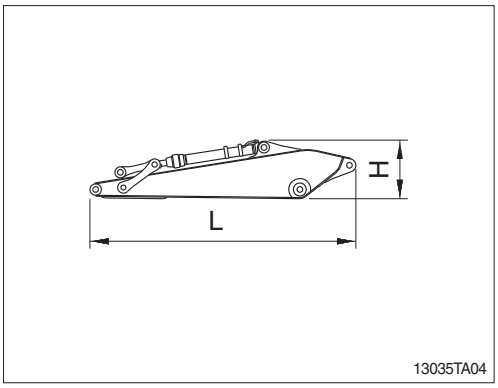
※ 11.50 m (37' 9") boom with arm cylinder (included piping and pins).



(12) Arm assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	3760 (12' 4")
H	Height	mm (ft-in)	1340 (4' 5")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	2580 (5690)

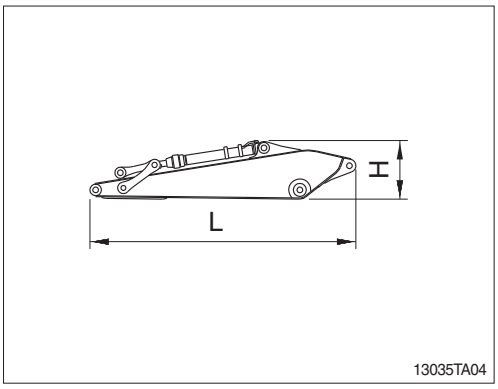
※ 2.4 m (7' 10") arm with bucket cylinder (included linkage and pins).



(13) Arm assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	4200 (13' 9")
H	Height	mm (ft-in)	1230 (4' 0")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	2780 (6130)

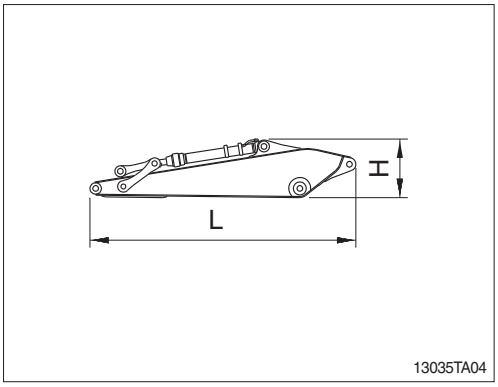
※ 2.90 m (9' 6") arm with bucket cylinder (included linkage and pins).



(14) Arm assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	5280 (17' 4")
H	Height	mm (ft-in)	1060 (3' 6")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	2920 (6440)

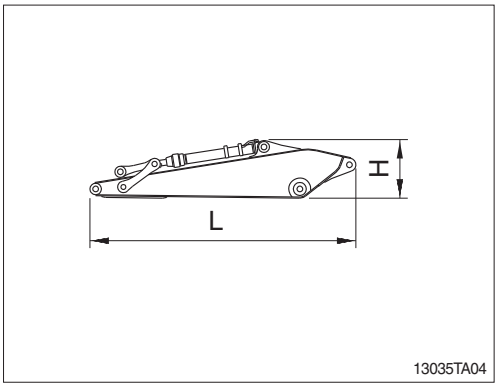
※ 4.00 m (13' 1") arm with bucket cylinder (included linkage and pins).



(15) Arm assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	7270 (23' 10")
H	Height	mm (ft-in)	1080 (3' 7")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	3440 (7580)

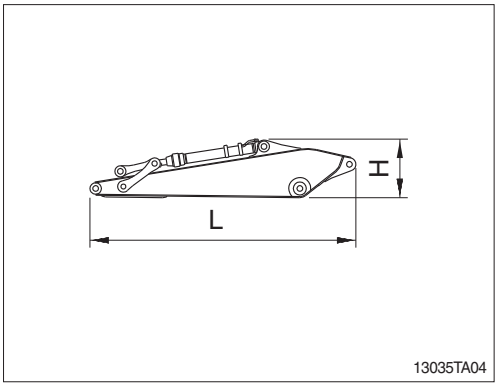
※ 6.00 m (19' 8") arm with bucket cylinder (included linkage and pins).



(16) Arm assembly (option)

Mark	Description	Unit	Specification
L	Length	mm (ft-in)	9790 (32' 1")
H	Height	mm (ft-in)	1300 (4' 3")
W	Width	mm (ft-in)	620 (2' 0")
Wt	Weight	kg (lb)	3340 (7360)

※ 8.50 m (27' 11") arm with bucket cylinder (included linkage and pins).

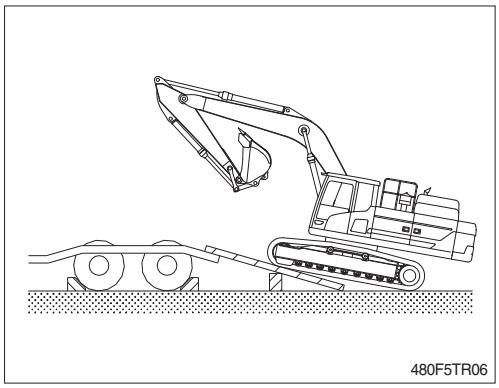


3. LOADING THE MACHINE

1) Load and unload the machine on a flat ground.

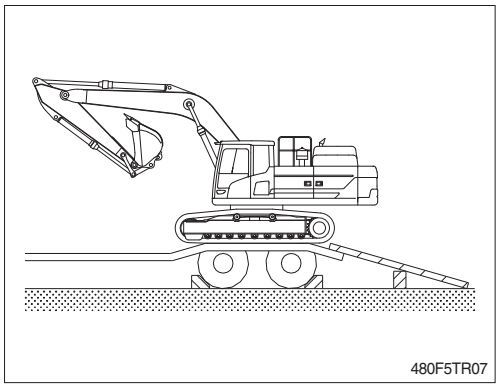
2) Use the gangplank with sufficient length, width, thickness and gradient.

3) Place the swing lock/fine switch to the LOCK position (if equipped) before fixing the machine at the bed of trailer and confirm if the machine parallels the bed of trailer.
Keep the travel motor in the rear when loading and in the front when unloading.

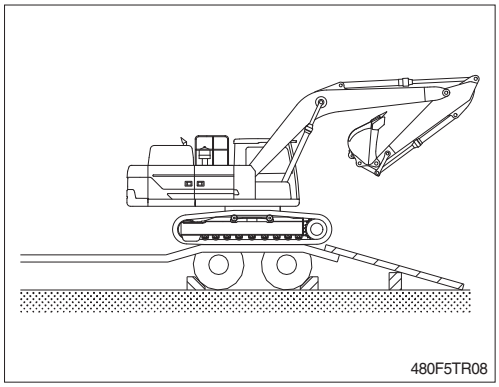

480F5TR06

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

(1) Stop loading when the machine is located horizontally with the rear wheel of trailer.


480F5TR07

(2) Place the swing lock/fine switch to the LOCK position (if equipped) after the swing the machine 180 degree.


480F5TR08

(3) Lower the working equipment gently after the location is determined.

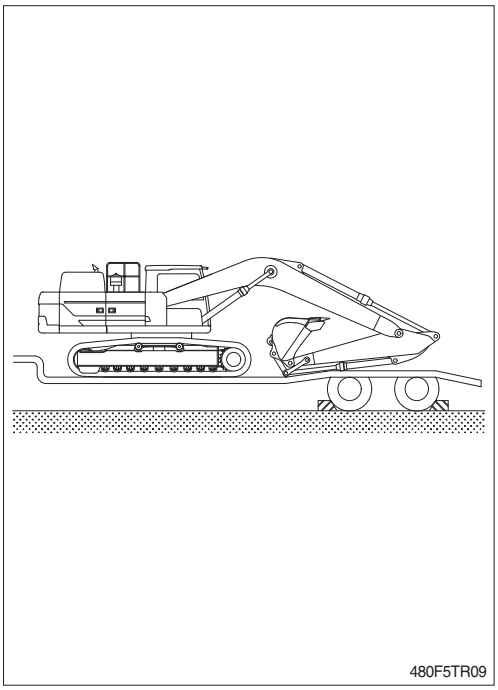
※ **Place rectangular timber under the bucket cylinder to prevent the damage of it during transportation.**

⚠ **Be sure to keep the travel speed switch on the LOW (turtle mark) while loading and unloading the machine.**

⚠ **Avoid using the working equipment for loading and unloading since it will be very dangerous.**

⚠ **Do not operate any other device when loading.**

⚠ **Be careful on the boundary place of loading plate or trailer as the balance of machine will abruptly be changed on the point.**

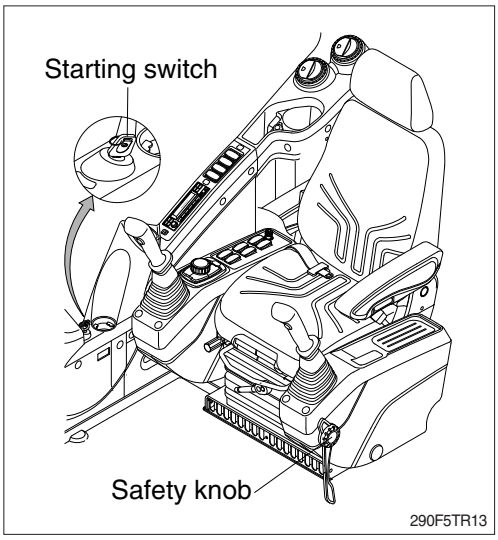

480F5TR09

4. FIXING THE MACHINE

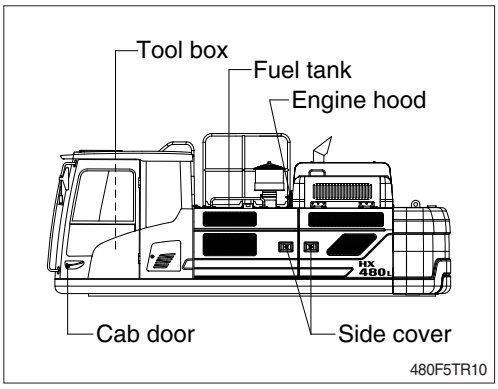
1) Lower down the working device on the loading plate of trailer.

2) Keep the safety knob on the LOCK position.

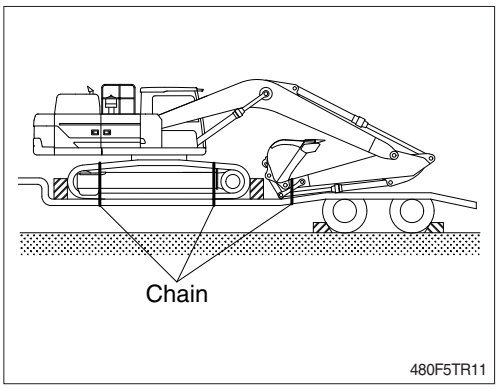
3) Turn OFF all the switches and remove the key.



4) Secure all locks.



5) Place timber underneath of the track and fix firmly with wire rope to prevent the machine from moving forward, backward, right or left.



5. LOADING AND UNLOADING BY CRANE

⚠ The wrong hoisting method or installation of lifting device can cause serious injury, death, or damage to the machine.

1) Check the weight, length, width and height of the machine referring to chapter 2, Specification when you are going to hoist the machine.

2) Use approved lifting device and ensure distance between lifting device and machine to avoid con tact between the two.

※ **Remove any parts (footboard, etc) that may be damaged by contact with the lifting device before lifting.**

3) Place rubber plates at lifting points to avoid any damage to the machine.

4) Place crane in the proper place.

5) Install approvd lifting device as shown in the illustration.

6) Use stay between the wire rope and the machine to prevent damage to the rope or machine.
Set the lifting angle of the wire rope to 30°~ 40°.

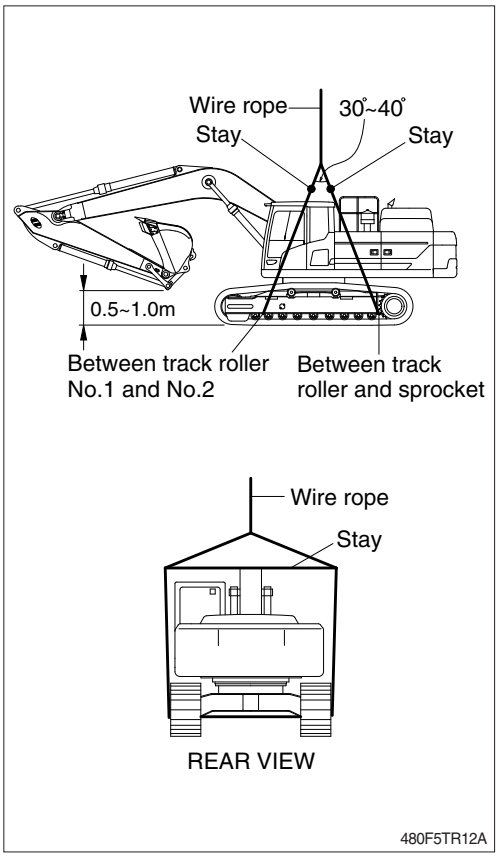
7) After the machine comes off the ground, check the hook condition and the lifting posture, and then lift slowly.

⚠ Ensure that lifting device is free form any damage and is approved for the weight being lifted and supported.

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

⚠ Do not load abruptly.

⚠ Keep area clear of any and all personnel.



6. DISASSEMBLE FOR TRANSPORTATION

1) DISCONNECTING HYDRAULIC HOSES AND LINES

(1) Position the machine on flat, firm and level ground.

(2) Retract the bucket cylinder and arm cylinder completely.

(3) Lower the boom to the ground as shown.

(4) Stop the engine.

(5) 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.

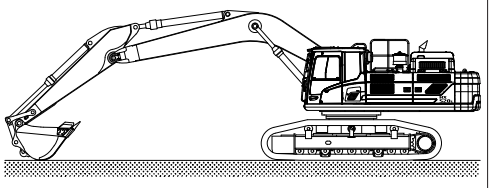
(10) Disconnect hoses and lines.

※ **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.



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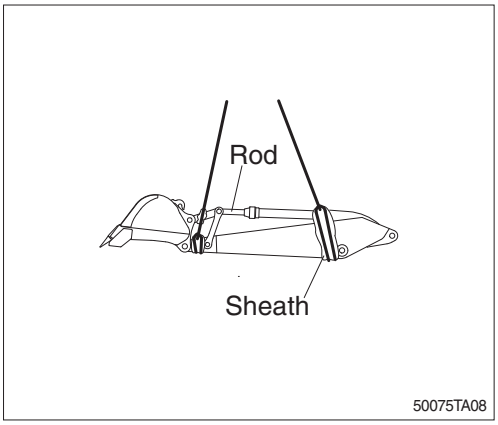
2) DISASSEMBLING ATTACHMENT

※ **Follow the disconnecting hydraulic hoses and lines procedure before disassemble the components.**

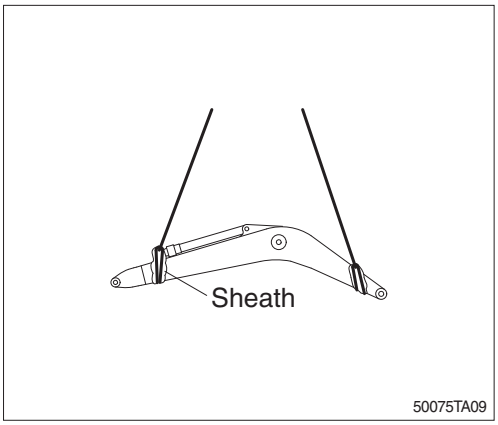
(1) Bucket and arm with bucket cylinder

Use cable sheaths to protect the lifting cable from being damaged by the edges of the arm.
Protect piston rod and the cylinder tube.



(2) Boom with arm cylinder

Use cable sheaths to protect the lifting cable from being damaged by the edges of the boom.
Secure piston rod of the arm cylinder to the cylinder tube.



3) COUNTERWEIGHT REMOVAL AND INSTALLATION

(1) Counterweight removal

① Position the machine on flat, firm and level ground, free from any obstruction or interference.

② Keep the service position.

③ Turn the safety knob to the LOCK position to lock the system securely.

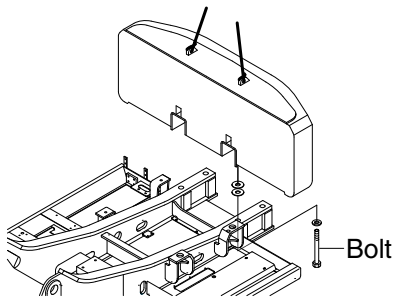
※ Refer to the page 3-39 for details.

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.



50075TA10

(2) Counterweight installation

① Carry out installation in the reverse order to removal.

·Tightening torque : 390±40 kgf · m
(2820±290 lbf · 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.

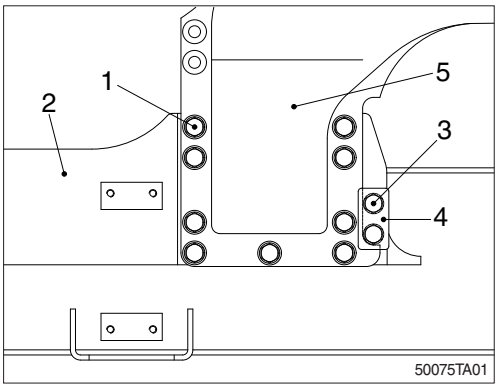
7. ADJUSTABLE TRACK GAUGE (HX520 L ONLY)

1) LOWER TRACK RETRACTION

⚠ Do not retract the track gauge except transporting purpose.

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

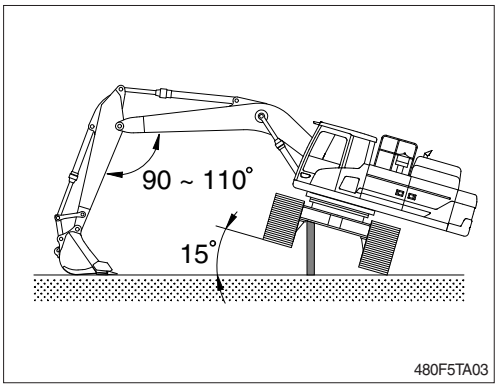
※ Do not loosen two bolts (3) on guide (4).



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

※ If lower track does not slide in this condition, allow lower track that is not contraction ground to move back and forth slowly.

⚠ The arm must be set at 90~110˚.
Never set it at an angle less than 90˚.



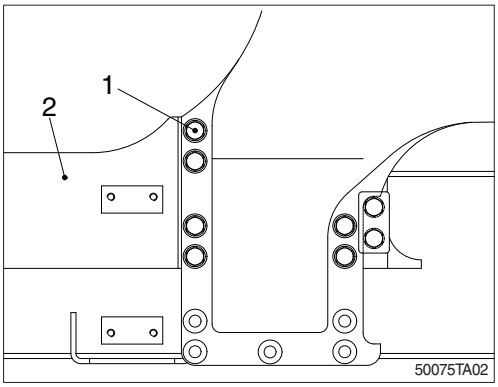
(3) After lower track (2) has slid into place, lower superstructure to ground.
Install six spacers and bolts (1).

※ Tighten bolts to 220±20 kgf · m (1590±145 lbf · ft)

※ Repeat procedure at opposite side center frame support.

(4) After the bolts for one side frame are fastened, repeat steps 1 thru 3 for opposite side frame.

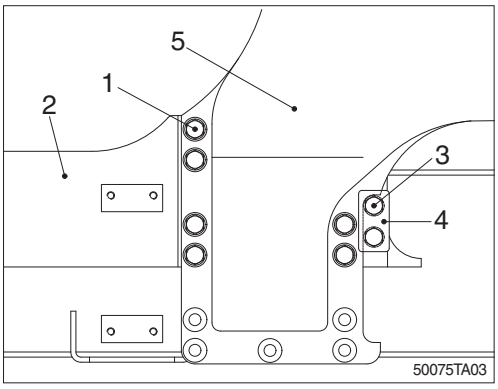
(5) Store remaining bolts, spacers with machine.



2) FRAME EXTENSION

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

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



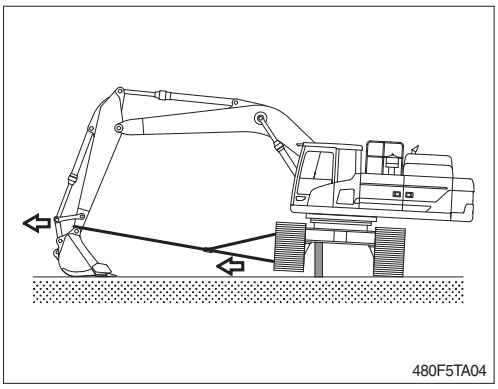
(2) Turn superstructure so that it is perpendicular to lower track to be extended.

※ **Do not attach cable on side frame step.**

(3) Attach one end of cable on arm and the other end on lower track.
Connect it with an appropriate holding device on both ends.

(4) Raise lower track slightly with jack and block. Extend arm gradually to side frame out until it hits stop.

(5) After lower track has slid into place, lower superstructure to ground.
Remove cable.

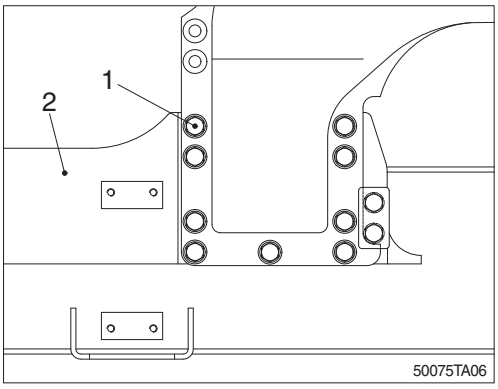


(6) Install nine spacers and bolts (2).

※ **Tighten bolts to 220±20 kgf·m (1590±145 lbf·ft)**

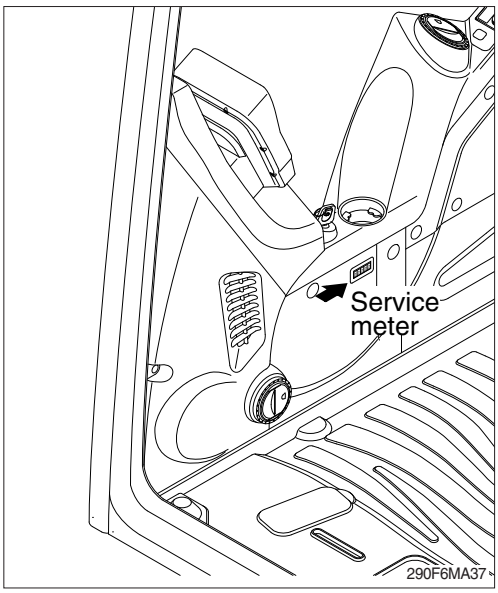
※ **Repeat procedure at opposite track frame support.**

(7) After the bolts for one side frame are fastened repeat steps 1 thru 6 for other side frame.



1. INSTRUCTION

1) INTERVAL OF MAINTENANCE



(1) You may inspect and service the machine by the period as described at page 6-12 based on hour meter at control panel.

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

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

2) PRECAUTION

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

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

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

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

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

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

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

(5) Ask to your local dealer or HD Hyundai Construction Equipment for the maintenance advice if unknown.

3) PROPER MAINTENANCE

(1) Replace and repair of parts

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

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

(2) Use genuine parts.

(3) Use the recommended oil.

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

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

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

Stop the engine when you fill the oil.

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

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

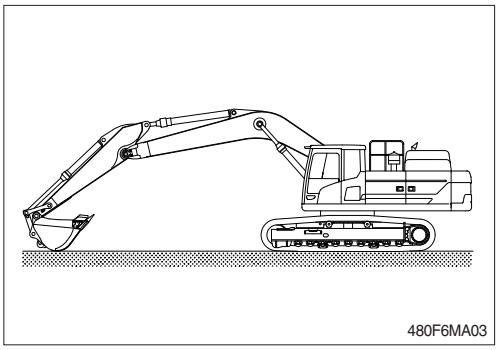
(9) For more detail information of maintenance, please contact local HD Hyundai Construction Equipment dealer.

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

4) RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM

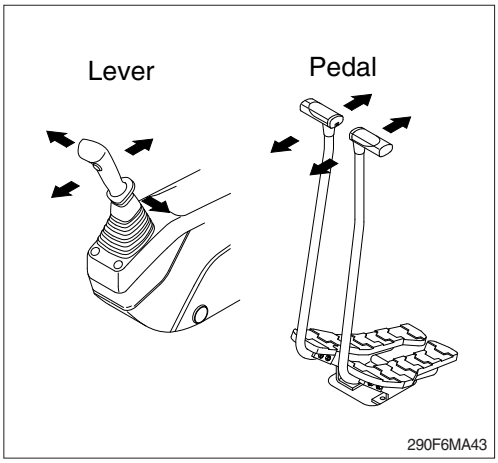
※ **Spouting of oil can cause the accident when loosening the cap or hose right after the operating of machine as the machine or oil is on the high pressure on the condition.**
Be sure to relieve the pressure in the system before repairing hydraulic system.

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

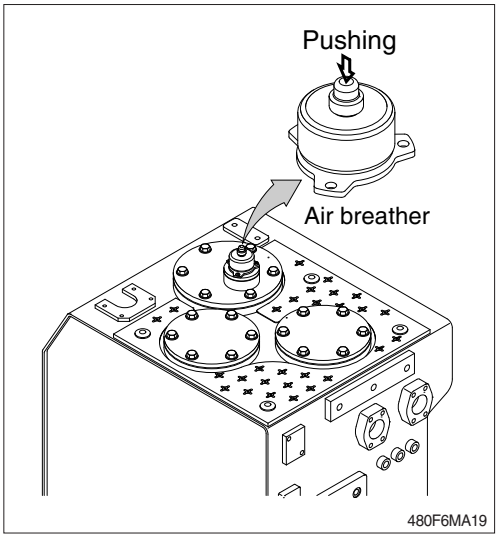


(2) Set the safety knob completely in the UNLOCK position, operate the control levers and pedals fully to the front, rear, left and right, to release the pressure in the hydraulic circuit.

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



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



5) PRECAUTION WHEN INSTALLING HYDRAULIC HOSES OR PIPES

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

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

(3) Use genuine parts.

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

(5) Keep the specified tighten torque.

6) PERIODICAL REPLACEMENT OF SAFETY PARTS

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

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

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

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

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

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

2. TIGHTENING TORQUE

Use following table for unspecified torque.

1) BOLT AND NUT

(1) Coarse thread

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

(2) Fine thread

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

2) PIPE AND HOSE (FLARE type)

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

3) PIPE AND HOSE (ORFS type)

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

4) FITTING

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

5) TIGHTENING TORQUE OF MAJOR COMPONENT

· HX480 L

No.	Descriptions		Bolt size	Torque	
				kgf · m	lbf · ft
1	Engine	Engine mounting bolt (FR, bracket)	M16 × 1.5	28 ± 3.0	203 ± 21.7
2		Engine mounting bolt (RR, bracket)	M14 × 2.0	18 ± 2.0	130 ± 14.5
3		Engine mounting bolt (frame)	M22 × 2.5	69.6 ± 7.0	503 ± 50.6
4		Radiator mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
5		Coupling mounting socket bolt	M20 × 2.5	46.5 ± 2.5	336 ± 18.1
6		Main pump housing mounting bolt	M10 × 1.5	6.7 ± 1.0	48.7 ± 7.2
7	Hydraulic system	Main pump mounting bolt	M20 × 2.5	44 ± 6.6	318 ± 47.7
8		Main control valve mounting nut	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
9		Fuel tank mounting bolt	M20 × 2.5	46 ± 5.1	333 ± 36.9
10		Hydraulic oil tank mounting bolt	M20 × 2.5	57.9 ± 8.0	419 ± 57.9
11		Turning joint mounting bolt, nut	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
12	Power train system	Swing motor mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
13		Swing bearing upper part mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
14		Swing bearing lower part mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
15		Travel motor mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
16		Sprocket mounting bolt	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
17	Under carriage	Carrier roller mounting bolt, nut	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
18		Track roller mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
19		Track tension cylinder mounting bolt	M22 × 1.5	87.2 ± 12.5	631 ± 90.4
20		Track shoe mounting bolt, nut	M24 × 3.0	140 ± 14	1012 ± 101
21		Track guard mounting bolt	M24 × 3.0	100 ± 15	723 ± 108
22	Others	Counterweight mounting bolt	M42 × 3.0	390 ± 40	2821 ± 289
23		Cab mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
24		Operator's seat mounting bolt	M 8 × 1.25	4.05 ± 0.8	29.3 ± 5.8

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

· HX520 L

No.	Descriptions		Bolt size	Torque	
				kgf · m	lbf · ft
1	Engine	Engine mounting bolt (FR, bracket)	M16 × 1.5	28 ± 3.0	203 ± 21.7
2		Engine mounting bolt (RR, bracket)	M14 × 2.0	18 ± 2.0	130 ± 14.5
3		Engine mounting bolt (frame)	M22 × 2.5	69.6 ± 7.0	503 ± 50.6
4		Radiator mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
5		Coupling mounting socket bolt	M20 × 2.5	46.5 ± 2.5	336 ± 18.1
6		Main pump housing mounting bolt	M10 × 1.5	6.7 ± 1.0	48.7 ± 7.2
7	Hydraulic system	Main pump mounting bolt	M20 × 2.5	44 ± 6.6	318 ± 47.7
8		Main control valve mounting nut	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
9		Fuel tank mounting bolt	M20 × 2.5	46 ± 5.1	333 ± 36.9
10		Hydraulic oil tank mounting bolt	M20 × 2.5	57.9 ± 8.0	419 ± 57.9
11		Turning joint mounting bolt, nut	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
12	Power train system	Swing motor mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
13		Swing bearing upper part mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
14		Swing bearing lower part mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
15		Travel motor mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
16		Sprocket mounting bolt	M20 × 2.5	57.9 ± 6.0	419 ± 43.4
17	Under carriage	Carrier roller mounting bolt, nut	M16 × 2.0	29.7 ± 3.0	215 ± 21.7
18		Track roller mounting bolt	M24 × 3.0	100 ± 10	723 ± 72.3
19		Track tension cylinder mounting bolt	M22 × 1.5	87.2 ± 12.5	631 ± 90.4
20		Track shoe mounting bolt, nut	M24 × 3.0	140 ± 14	1012 ± 101
21		Track guard mounting bolt	M24 × 3.0	100 ± 15	723 ± 108
22		Adjustable track gauge bolt	M33 × 3.5	220 ± 20	1590 ± 145
23	Others	Counterweight mounting bolt	M42 × 3.0	390 ± 40	2821 ± 289
24		Center frame support & lower track mounting bolt	M33 × 3.5	220 ± 20	1591 ± 145
25		Cab mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
26		Operator's seat mounting bolt	M 8 × 1.25	4.05 ± 0.8	29.3 ± 5.8

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

3. FUEL, COOLANT AND LUBRICANTS

1) NEW MACHINE

New machine used and filled with following lubricants.

Description	Specification
Engine oil (API CI-4, ACEA-E9)	SAE 10W-30, ★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 80W-90 (GL-4/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 ≤ 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	38.0 (10)	★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	7.0×2 (1.8×2)	★SAE 75W-90
Final drive		12×2 (3.2×2)	SAE 80W-90
Hydraulic tank	Hydraulic oil	Tank : 262 (69.2) System : 486 (128.4)	★ISO VG 15 ISO VG 32 ISO VG 46, HBHO VG 46★3 ISO VG 68
Fuel tank	Diesel fuel★1	621 (182)	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and soft water★2	49.0 (13)	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		
Engine oil level	Check, Add	6-19
Coolant level	Check, Add	6-24
Fan belt tension and damage	Check, Adjust	6-27, 28, 29
Air cleaner (oil bath, option)	Check, Clean, Add	6-30-1, 2, 3
Fuel tank	Check, Refill	6-30-4
Fuel return filter element	Check, Clean	6-30-4
DEF/AdBlue® tank	Check, Add	6-35
Hydraulic oil level	Check, Add	6-36-1
★ 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		
Control panel & pilot lamp	Check, Clean	6-46

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

2) EVERY 50 HOURS SERVICE

Check items	Service	Page
Fuel tank (water, sediment)	Drain	6-30-4
Swing reduction gear oil	Check, Add	6-39
Track tension	Check, Adjust	6-41
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 & 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		

4) EVERY 200 HOURS SERVICE

Check items	Service	Page
★ Return filter	Replace	6-38
★ Drain filter cartridge	Replace	6-38
★ Pilot line filter	Replace	6-39

★ Replace 3 filters for continuous hydraulic breaker operation only.

5) INITIAL 250 HOURS SERVICE

Check items	Service	Page
Engine oil	Change	6-19, 20
Engine oil filter	Replace	6-23
Fuel return filter element	Replace	6-30-4
Fuel main filter element	Replace	6-31, 32, 33
Hydraulic oil return filter	Replace	6-38
Drain filter cartridge	Replace	6-38
Pilot line filter element	Replace	6-39
Swing reduction gear oil	Change	6-39
Travel reduction gear case	Change	6-40

6) EVERY 250 HOURS SERVICE

Check items	Service	Page
Bolts & Nuts	Check, Tight	6-8
· Sprocket mounting bolts		
· Travel motor mounting bolts		
· Swing motor mounting bolts		
· Swing bearing mounting bolts		
· Engine mounting bolts		
· Counterweight mounting bolts		
· Turning joint locating bolts		
· Track shoe mounting bolts and nuts		
· Hydraulic pump mounting bolts		
Swing bearing grease	Lubricate	6-39
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		
Battery (voltage)	Check, Clean	6-46
Aircon & heater fresh air filter	Check, Clean	6-49

7) INITIAL 500 HOURS SERVICE

Check items	Service	Page
Aircon & heater filter (inner)	Replace	6-49

※ Service the above items only for the new machine, and thereafter keep the normal service interval.

8) EVERY 500 HOURS SERVICE

Check items	Service	Page
★Engine oil	Change	6-19, 20
Centrifugal oil cleaner (O-ring)	Clean (Replace)	6-20, 21, 22, 23
★Engine oil filter	Replace	6-23
Oil cooler	Check, Clean	6-25
Radiator, cooler fin and charge air cooler	Check, Clean	6-26, 27
Air cleaner element (primary)★1	Check, Clean	6-30
Fuel return filter element	Change	6-30-4
DEF/AdBlue® tank (with filler filter)	Check, Clean	6-36

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

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

9) EVERY 1000 HOURS SERVICE

Check items	Service	Page
Air breather element	Replace	6-31, 32, 33
Swing reduction gear oil	Change	6-35, 36
Pilot line filter	Replace	6-38
Travel motor reduction gear oil	Change	6-38
Grease in swing gear and pinion	Change	6-38
Fuel main filter element	Replace	6-39
DEF/AdBlue® supply module filter	Replace	6-39
Hydraulic oil return filter	Replace	6-40
Drain filter cartridge	Replace	6-40

10) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Coolant	Change	6-24, 25, 26
Air cleaner element (primary, safety)★3	Replace	6-30
Air cleaner (oil bath, option)	Disassemble, Clean, Replace	6-30-1, 2, 3
Hydraulic oil★1	Change	6-37
HBHO★2	Change	6-37
Hydraulic tank suction strainer	Check, Clean	6-37
RCV lever	Check, Lubricate	6-41
Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-

★1 Conventional hydraulic oil

★2 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.

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

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

11) EVERY 4000 HOURS SERVICE

Check items	Service	Page
Fuel tank breather	Replace	6-34

12) EVERY 5000 HOURS SERVICE

Check items	Service	Page
Hydraulic oil★4	Change	6-37

★4 HD Hyundai Construction Equipment genuine long life

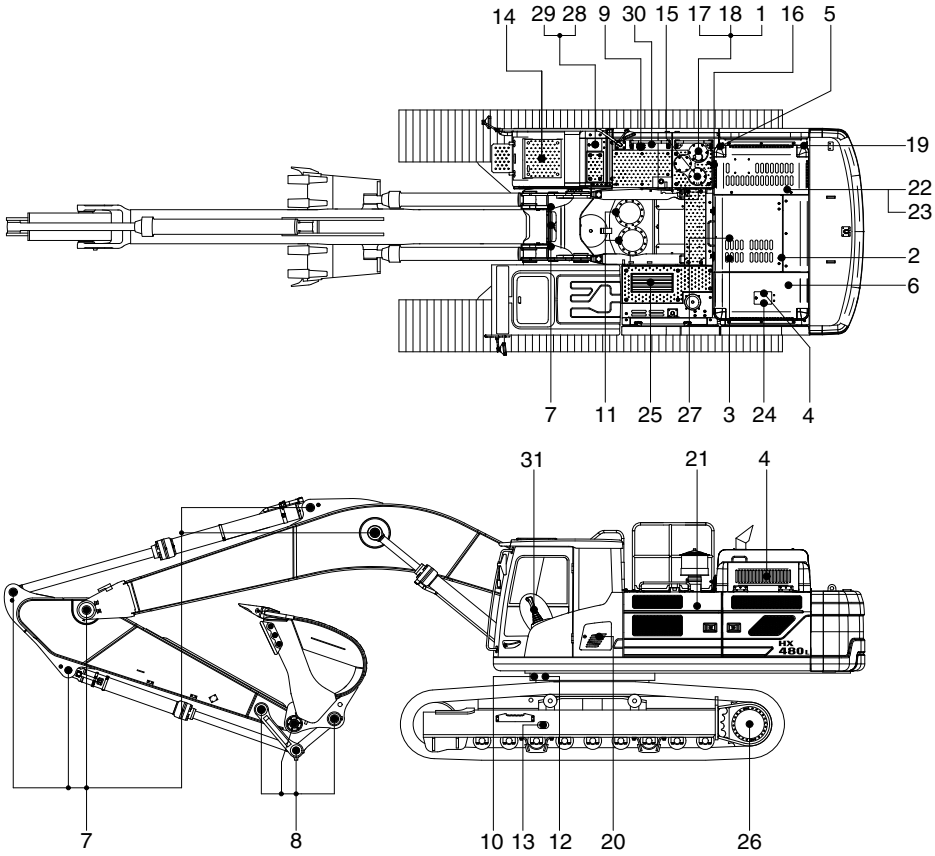
※Change oil every 1000 hours of continuous hydraulic breaker operation.

13) WHEN REQUIRED

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

Check items	Service	Page
Engine lubrication system		
· Engine oil	Change	6-19, 20
· Engine oil filter	Replace	6-23
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
· Air cleaner (oil bath, option)	Check, Clean, Replace	6-30-1, 2, 3
Fuel system		
· Fuel tank	Drain or Clean	6-30-4
· Fuel return filter element	Clean or Replace	6-30-4
· Fuel main filter element		
Hydraulic system	Replace	6-31, 32, 33
· Hydraulic oil	Add or Change	6-36-1
· Suction strainer	Clean	6-37
· Return filter	Replace	6-38
· Drain line filter	Replace	6-38
· Element of breather	Replace	6-38
· Pilot line filter	Replace	6-39
· RCV lever	Lubricate	6-41
Undercarriage		
· Track tension	Check, Adjust	6-41
Bucket		
· Bucket assy	Replace	6-42
· Tooth	Replace	6-43
· Side cutter	Replace	6-43
· Linkage	Adjust	6-44
Air conditioner and heater		
· Fresh air filter	Clean, Replace	6-49
· Recirculation filter	Clean	6-50
Other		
· DEF/AdBlue® tank	Check, Add	6-35
· DEF/AdBlue® supply module filter	Replace	6-34, 35, 36

5. MAINTENANCE CHART



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Caution

1. Service intervals are based on the hour meter reading.
2. The number of each item shows the lubrication point on the machine.
3. Stop engine while filling oil, and use no open flames.

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ (U.S.gal)	Service points No.
10 Hours or daily	1	Hydraulic oil level	Check, Add	HO	262 (69.2)	1
	2	Engine oil level	Check, Add	EO	38.0 (10)	1
	4	Radiator coolant	Check, Add	C	49.0 (13)	1
	5	Fuel return filter element	Check, Clean	-	-	1
	6	Fan belt tension and damage	Check, Adjust	-	-	1
	9	Fuel tank	Check, Refill	DF	621 (182)	1
	21	Air cleaner (oil bath, option)	Check, Clean, Add	EO	5.0 (1.3)	1
	29	DEF/AdBlue® tank	Check, Add	DEF	69 (18.2)	1
50 Hours or weekly	8	Bucket linkage pins	Check, Add	PGL	-	6
	9	Fuel tank (water, sediment)	Check, Clean	-	621 (182)	1
	11	Swing reduction gear oil	Check, Add	GO	7.0 (1.8)	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	-	2
	14	Battery (voltage)	Check	-	-	1
	20	Aircon and heater fresh air filter	Check, Clean	-	-	1

Service interval	No.	Description	Service action	Oil symbol	Capacity ℓ (U.S.gal)	Service points No.
Initial 250 Hours	2	Engine oil	Change	EO	38.0 (10)	1
	3	Engine oil filter	Replace	-	-	1
	5	Fuel return filter element	Replace	-	-	1
	11	Swing reduction gear oil	Change	GO	7.0 (1.8)	2
	15	Hydraulic oil return filter	Replace	-	-	2
	16	Drain filter cartridge	Replace	-	-	1
	19	Pilot line filter element	Replace	-	-	1
	23	Fuel main filter element	Replace	-	-	1
	26	Travel reduction gear case	Change	GO	12 (3.2)	2
500 Hours	2	Engine oil	Change	EO	38.0 (10)	1
	3	Engine oil filter	Replace	-	-	1
	5	Fuel return filter element	Replace	-	-	1
	21	Air cleaner element (primary)	Check, Clean	-	-	1
	24	Radiator, oil cooler, charge air cooler	Check, Clean	-	-	3
	25	Oil cooler	Check, Clean	-	-	1
	27	Centrifugal oil cleaner (O-ring)	Clean (Replace)	-	-	1
	29	DEF/AdBlue® tank (with filler filter)	Check, Clean	DEF	69 (18.2)	1
Initial 500 Hours	28	Aircon & heater recirculation filter	Replace	-	-	1
1000 Hours	11	Swing reduction gear oil	Change	GO	7.0 (1.8)	2
	12	Swing gear and pinion grease	Change	PGL	14 kg (31 lb)	1
	15	Hydraulic oil return filter	Replace	-	-	2
	16	Drain filter cartridge	Replace	-	-	1
	17	Air breather element	Replace	-	-	1
	19	Pilot line filter element	Replace	-	-	1
	22	Fuel prefilter element	Replace	-	-	1
	23	Fuel main filter element	Replace	-	-	1
	26	Travel reduction gear case	Change	GO	12 (3.2)	2
	28	DEF/AdBlue® supply module filter	Replace	-	-	1
2000 Hours	1	Hydraulic oil★1	Change	HO	262 (69.2)	1
	1	Hydraulic oil (HBHO★2)	Change	-	262 (69.2)	1
	4	Radiator coolant	Change	C	49.0 (13)	1
	18	Hydraulic oil suction strainer	Check, Clean	-	-	1
	21	Air cleaner element (primary)	Replace	-	-	1
	21	Air cleaner element (safety)	Replace	-	-	1
	21	Air cleaner (oil bath, option)	Disassemble, Clean, Replace	EO	5.0 (1.3)	1
	31	RCV lever	Check, Lubricate	PGL	-	2
	-	Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-	-	-
4000 Hours	30	Fuel tank breather filter	Replace	-	-	1
5000 Hours	1	Hydraulic oil★3	Change	HO	262 (69.2)	1
As required	20	Aircon & heater fresh filter	Replace	-	-	1
	20	Aircon & heater recirculation filter	Clean, Replace	-	-	1
	21	Air cleaner element (primary)	Clean, Replace	-	-	1
	21	Air cleaner element (safety)	Replace	-	-	1
	21	Air cleaner (oil bath, option)	Check, Clean, Replace	EO	5.0 (1.3)	1
	29	DEF/AdBlue® tank	Check, Add	DEF	69 (18.2)	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 **GO : Gear oil** **HO : Hydraulic oil** **DEF : DEF/AdBlue®**

C : Coolant **PGL : Grease** **EO : Engine oil**

1) CHECK ENGINE OIL LEVEL

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

(1) Pull out the dipstick and wipe with a clean cloth.

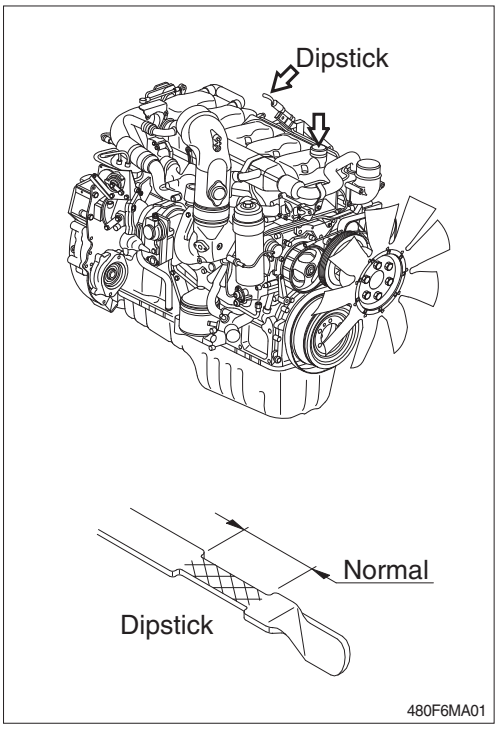
(2) Check the oil level by inserting the dipstick completely into the hole and pulling out again.

(3) If oil level is LOW, add oil and then check again.

※ **If the oil is contaminated or diluted, change the oil regardless of the regular change interval.**

※ **Check oil level after engine has been stopped for 15 minutes.**

⚠ **Do not operate unless the oil level is in the normal range.**



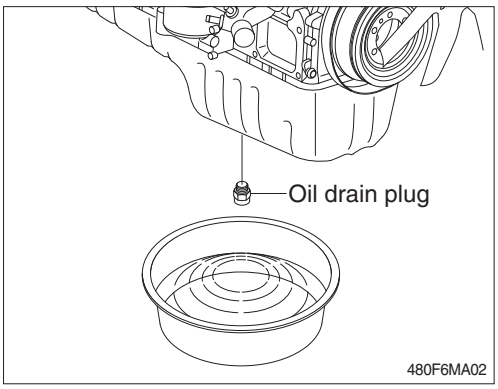
2) REPLACEMENT OF ENGINE OIL

※ **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.

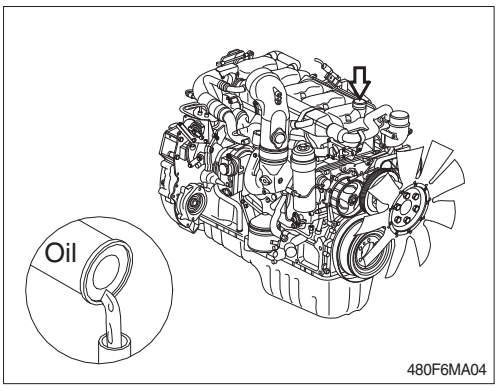
(2) Remove the oil drain plug. Drain the oil immediately to be sure all the oil and suspended contaminants are removed from the engine.

※ **A drain pan with a capacity of 45 liters (11.9 U.S. gallons) will be adequate.**

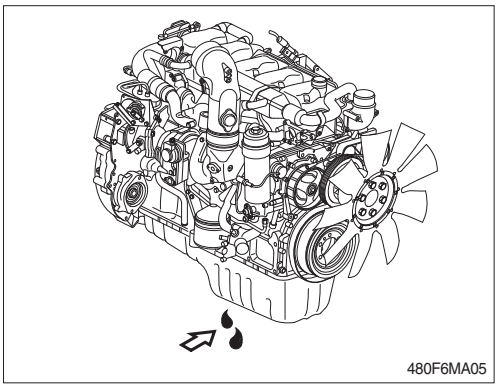


(3) Clean and check the lubricating oil drain plug threads and sealing surface.
Install the lubricating oil pan magnet drain plug.

(4) Fill the engine with clean oil to the proper level.
· Quantity : 38 ℓ (10 U.S.gallons)



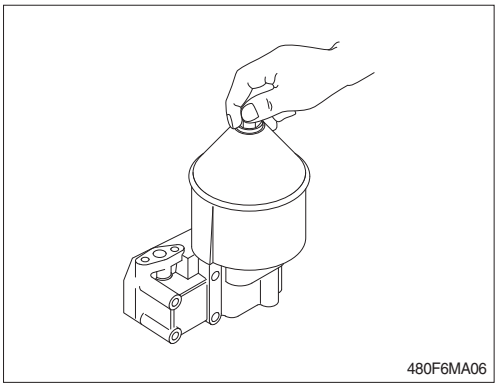
(5) Operate the engine at low idle and inspect for leaks at the filters and the drain plug.
Shut the engine off and check the oil level with the dipstick. Allow 15 minutes for oil to drain down before checking.



3) CLEANING THE CENTRIFUGAL OIL CLEANER

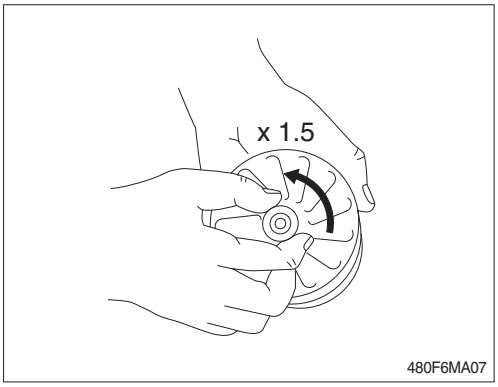
※ When cleaning the centrifugal oil cleaner there will be some dirt deposits in the rotor cover. If this is the case, this indicates that the rotor is working. If it is not working, the cause must be established immediately.
If the dirt deposit exceeds 28 mm at the recommended intervals, the rotor cover should be cleaned more often.

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



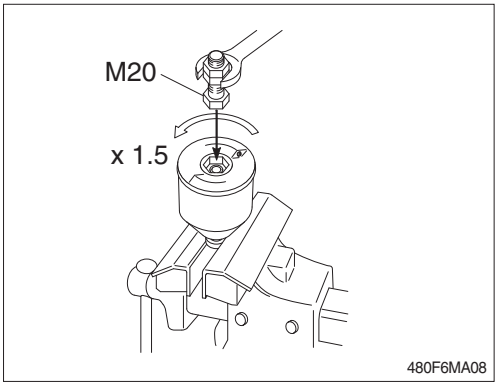
(1) Clean the outside of the cover.
Unscrew the nut and remove the cover.

(2) Lift out the rotor.
Wipe off the outside of the rotor.
Unscrew the rotor cover nut about one and a half turns.



(3) 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.

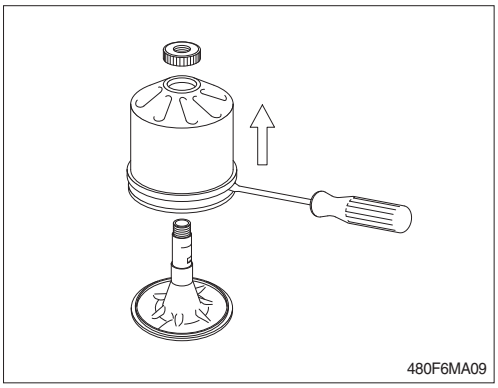
※ The rotor must not be put in a vice. This may cause damage resulting in rotor imbalance.



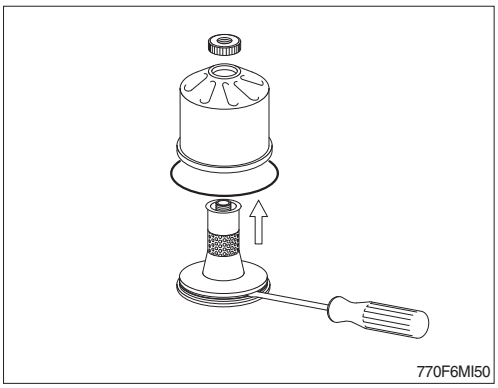
(4) Hold the rotor and tap lightly on the rotor nut with a plastic mallet or against the workbench, so that the rotor cover comes loose from the bottom plate.

※ Never strike on the rotor directly as this may damage the bearings.

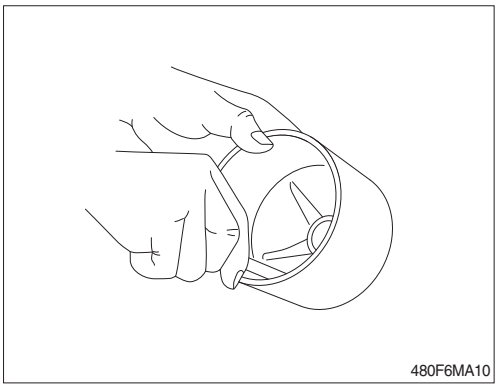
(5) Remove the rotor cover by holding the rotor in both hands and tapping the rotor nut against the table. Never strike the rotor directly as this may damage its bearings.



(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.



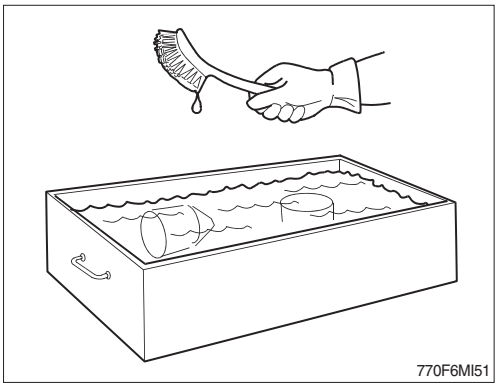
(7) Remove the paper insert and scrape away any remaining dirt deposits inside the rotor cover. If the deposits are thicker than 28 mm (1.1"), the centrifugal oil cleaner must be cleaned more often.



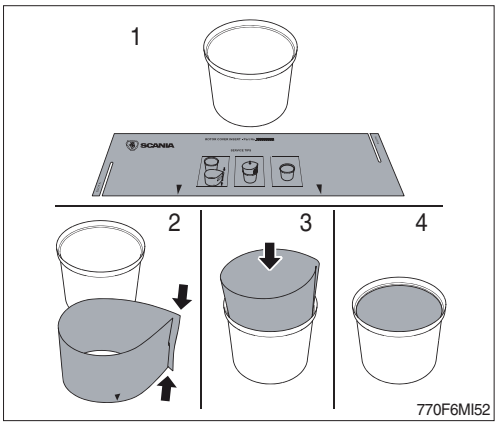
(8) Wash the parts.

(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. Fit the strainer onto the rotor.



(12) Fit the strainer onto the rotor.

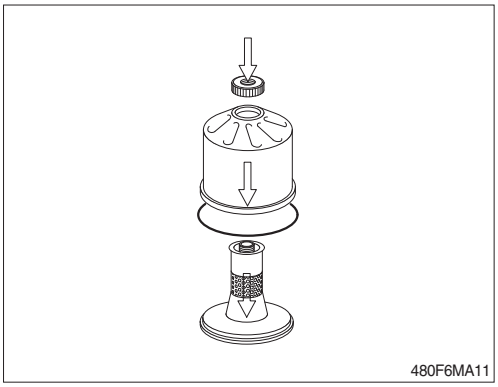
(13) Fit a new O-ring by sliding it over the strainer.

(14) Refit the rotor cover. Make sure that the O-ring is seated correctly on the inside.

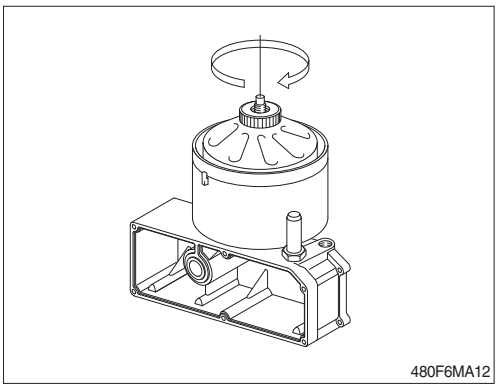
(15) Screw the rotor nut back on by hand.

(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).

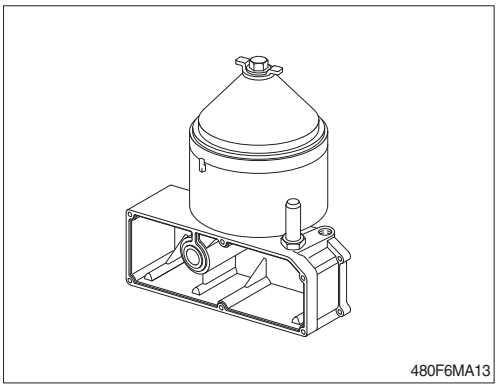
※ **Take care not to damage the rotor shaft.**



(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

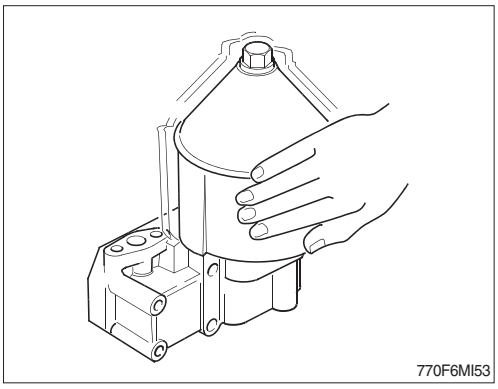
Operational testing need only be carried out if it is suspected that the centrifugal oil cleaner is not working properly. For example, if there is an abnormally small amount of deposit in the centrifugal oil cleaner in relation to the distance driven.

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.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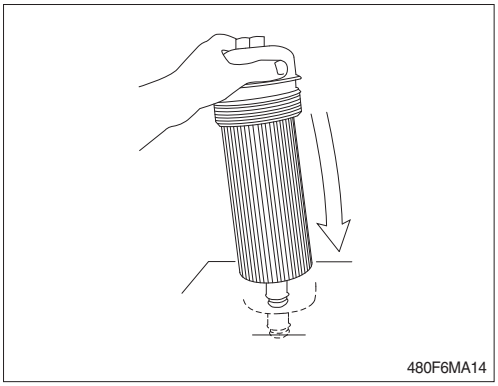
4) REPLACEMENT OF ENGINE OIL FILTER

※ 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.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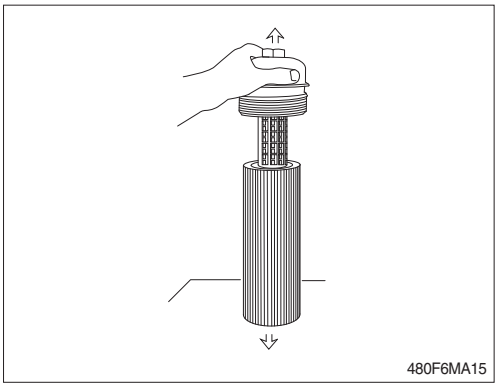
(3) Detach the old filter from the cover by holding the cover and carefully tapping the entire filter element against something hard. Remember that there will be oil splashes.

(4) Fit the new filter and tighten the filter cover to 2.54 kgf · m (18.4 lbf · ft).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5) CHECK COOLANT

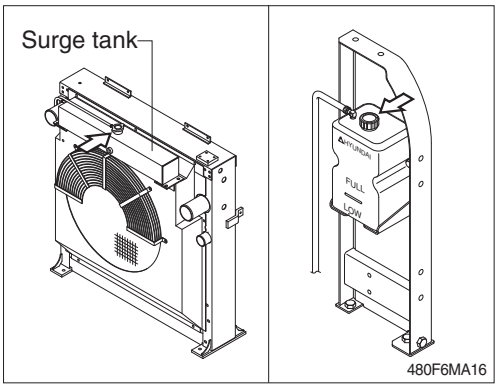
(1) Check if the level of coolant in reservoir tank is between FULL and LOW.

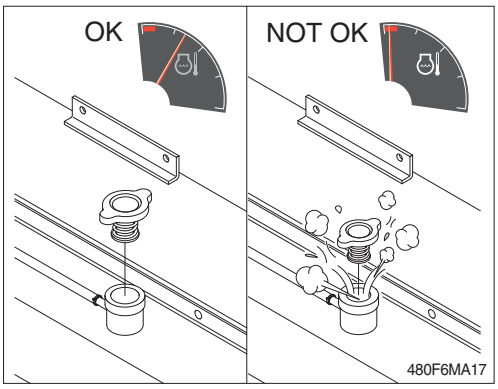
(2) Add the mixture of antifreeze and water after removing the cap of the reservoir tank if coolant is not sufficient.

(3) Be sure to use the reservoir empty, add the coolant by opening the cap of surge tank.

(4) Replace gasket of radiator cap when it is damaged.

⚠ **Hot coolant can spray out if surge tank cap is removed while engine is hot. Remove the cap after the engine has cooled down.**



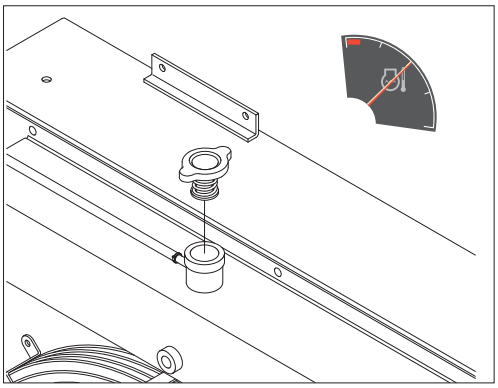


6) FLUSHING AND REFILLING OF RADIATOR

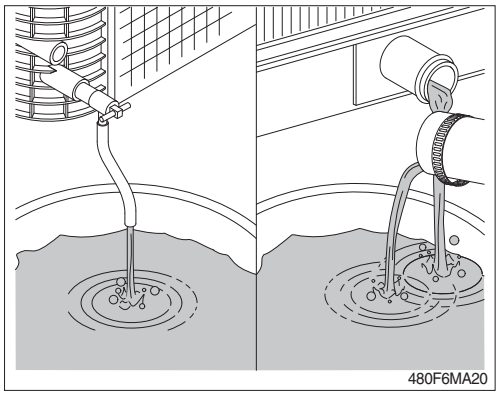
(1) Change coolant

⚠ **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 57 liters (15 U.S. gallons) will be adequate.



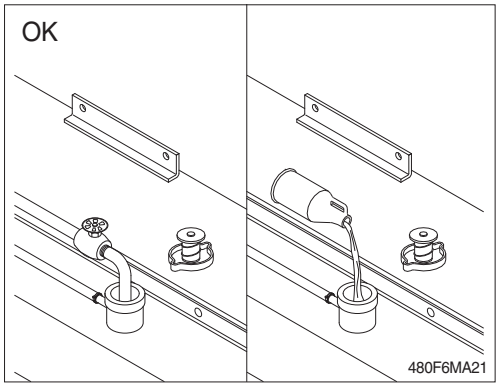
(2) Flushing of cooling system

① Remove the thermostats.

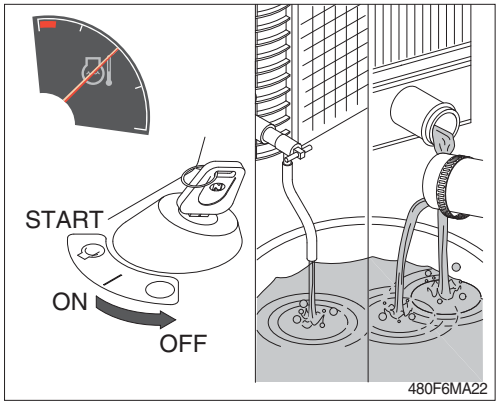
② Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).

※ **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.**



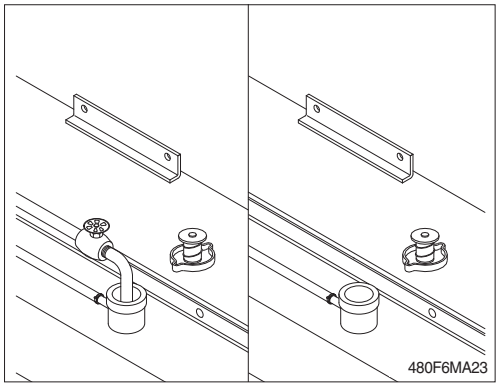
③ Operate the engine for 5 minutes with the coolant temperature above 80°C (176°F) .
Shut the engine off, and drain the cooling system.



④ Fill the cooling system with clean water.

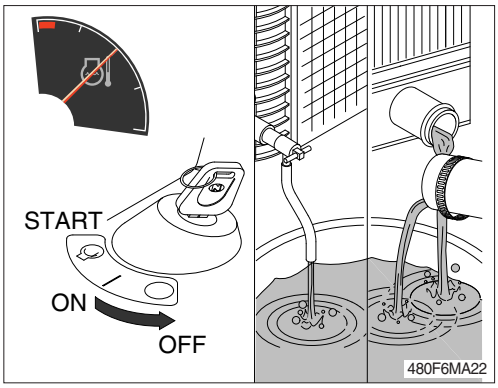
※ **Be sure to vent the engine and aftercooler for complete filling.**

※ **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.

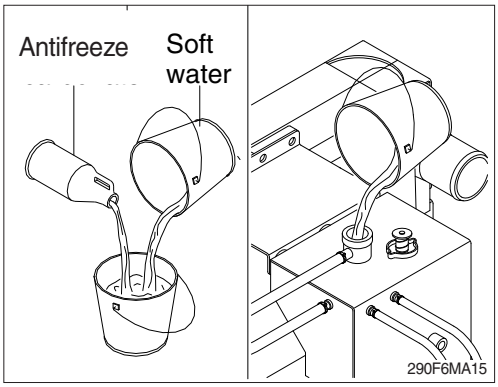
※ **If the water being drained is still dirty, the system must be flushed again until the water is clean.**



(3) Cooling system filling

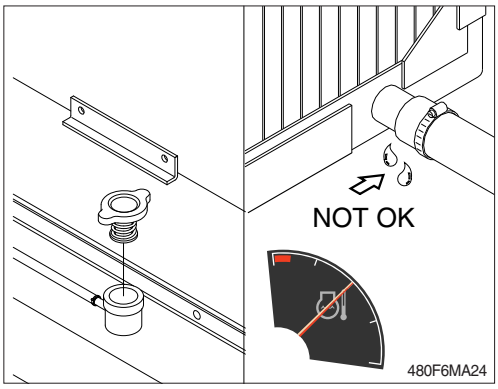
① Use a mixture of 50 percent soft water and 50 percent ethylene glycol antifreeze to fill the cooling system. Refit to the page 6-10.

※ **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.

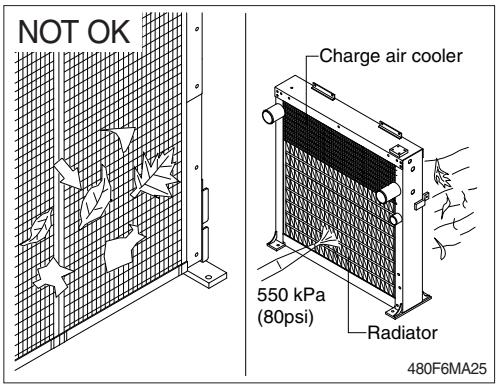


7) CLEAN RADIATOR AND OIL COOLER

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.

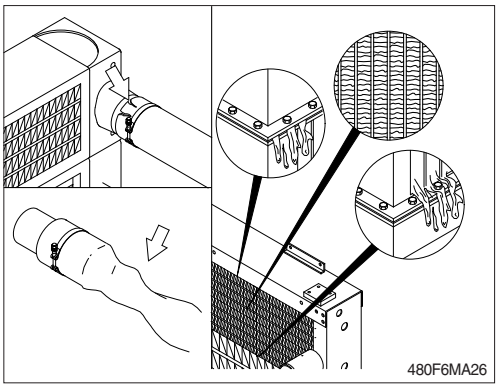
(2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.
Blow the air in the opposite direction of the fan air flow.



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

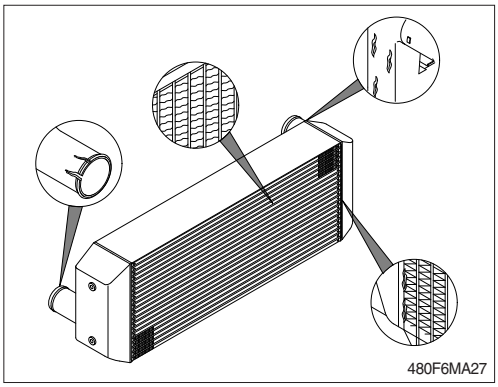
※ **If the radiator must be replaced due to bent or broken fins which can cause the engine to overheat, refer to the manufacturer's replacement procedures.**

(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.

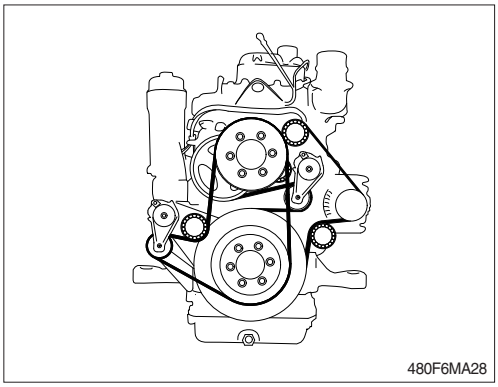


9) FAN BELT

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

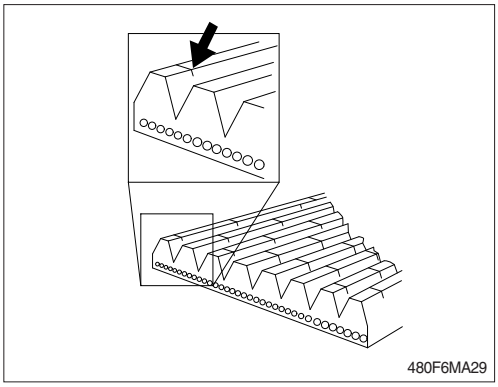
(1) Check the drive belt thoroughly, particularly at the idler rollers.

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



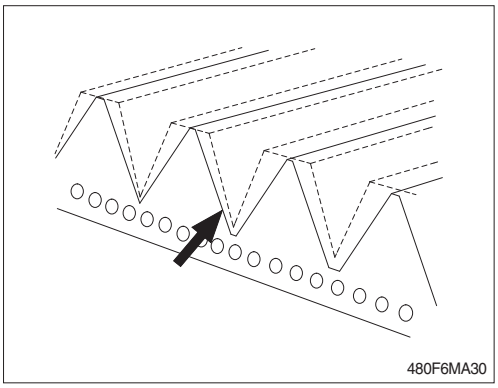
(2) Check the drive belt for cracks.

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

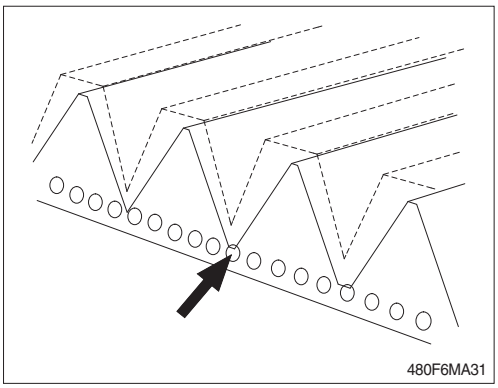


(4) Check the drive belt wear.

(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.

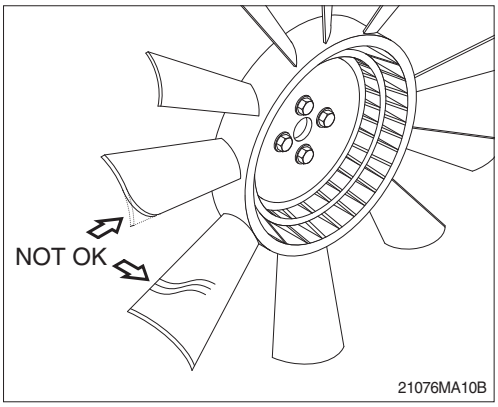


10) INSPECTION OF COOLING FAN

⚠ 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.

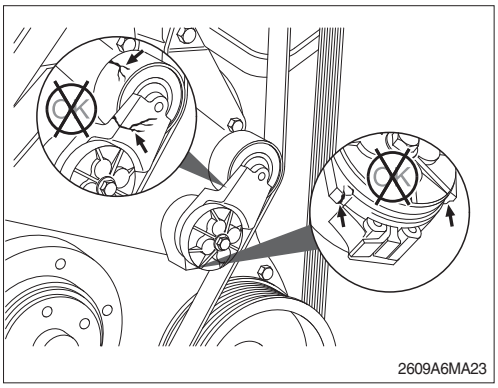
※ Rotate the crankshaft by using the engine barring gear.

※ 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.

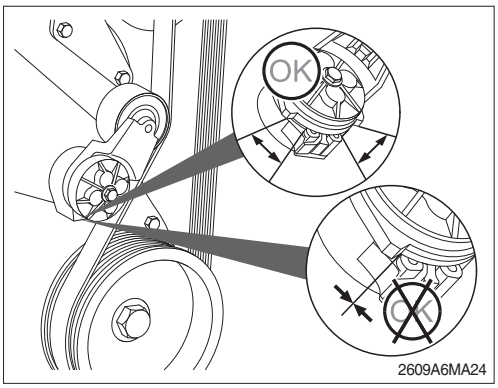


11) FAN BELT TENSIONER

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

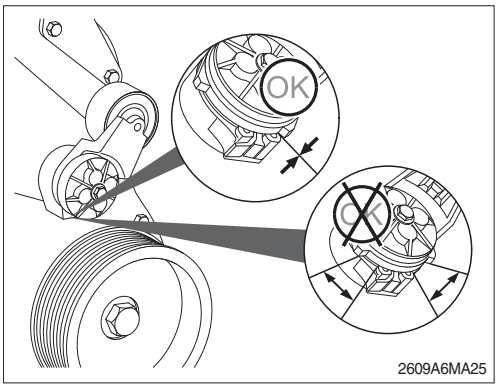


(2) With the belt installed, verify that neither tensioner arm stop is in contact with the spring case stop.
After replacing the belt, if the tensioner arm stops are still in contact with the spring case stop, replace the tensioner.

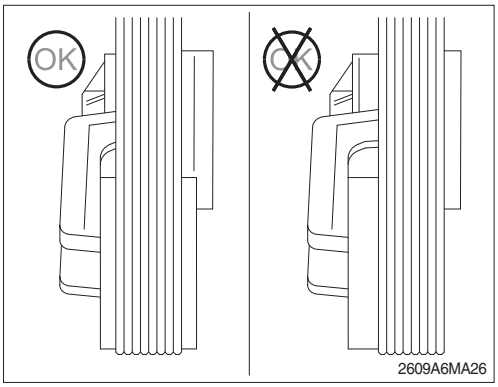


(3) With the belt removed, verify that the tensioner arm stop is in contact with the spring case stop.
If these two are not touching, the tensioner must be replaced.

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



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



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.

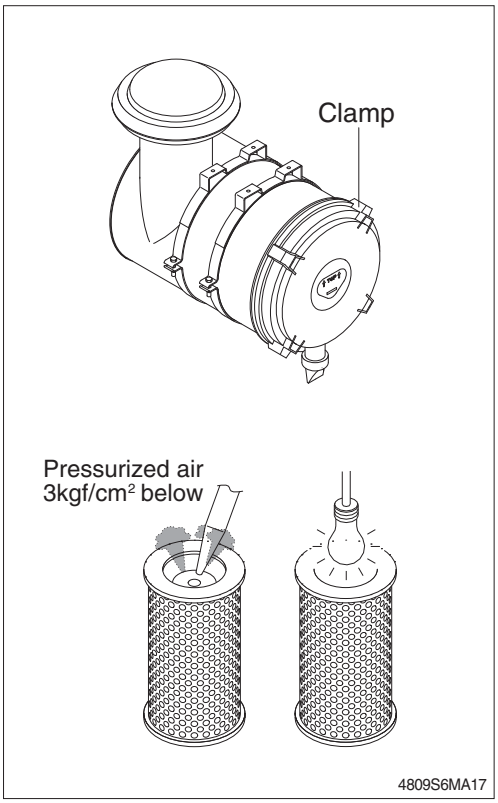
⑤ Insert element and tighten wing nut.

※ 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.



12-1) AIR CLEANER (OIL BATH)
(S/N HX480 L : -#0191 / HX520 L : -#0195)

△ **Always cover the engine intake hole while the air cleaner is being serviced.**

(1) General service

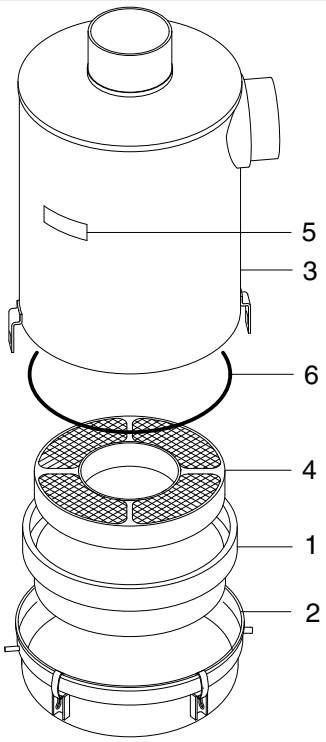
① The oil bath air cleaner should be inspected constantly for leaks and damage.

② The removable element assembly (4) should be removed the from the oil cups (1, 2) and inspected daily or at each oil cup service.

③ Watch all connections for mechanical tightness. Be sure cleaner outlet pipe is not fractured.

④ If air cleaner has been dented or damaged, check all connections immediately.

⑤ In case of leakage and if adjustment does not correct the trouble, replace necessary parts or O-ring.



1 Inner cup assy
2 Outer cup assy
3 Body assy
4 Removable element
5 Marking
6 O-ring

480S6MA35

(2) Oil cup

① Service the inner oil cup (1) and outer oil cup (2) daily or when 1/2" of dirt has collected in bottom of either cup.

※ **Severe operating conditions may require several inspections daily.**

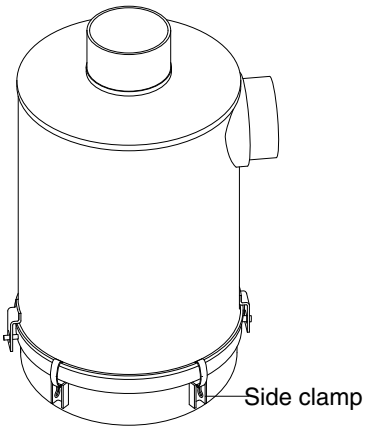
② Loosen the side clamps and removing bottom of unit and lift the removable element assembly (4) from the oil cup.

③ Pour out the oil and remove inner cup (1) from out cup (2) and remove sludge and wipe clean.

④ Reassembled inner cup (1) in outer cup (2) and refill both cups to indicated oil level.

⑤ The same oil specified for the engine crankcase is generally acceptable.

※ **Do not over fill or under fill the cup.**
Overfilling means loss of capacity and under filling means lack of efficiency.



480S6MA36

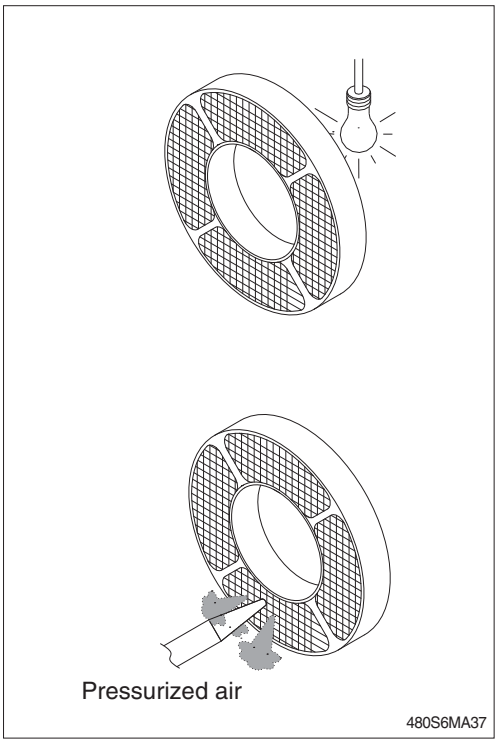
(3) Removable element

① First step in servicing removable element assembly is hold up to a strong light. An even, bright pattern of light through the wire element means if is clean.

② If removable element is even partially plugged with dirt, lint or chaff, wash thoroughly with solvent.
Then blowout with compressed air.

③ Inspect lower portion of body assembly and center tube each time oil cup is serviced. See back side for service details.

④ Reassemble removable element assembly to serviced oil cups and to air cleaner body.
Be sure the oil cup is tight to body assembly.

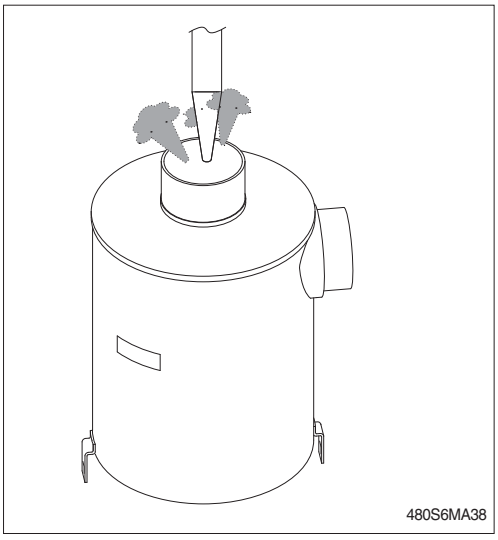


(4) Body assembly

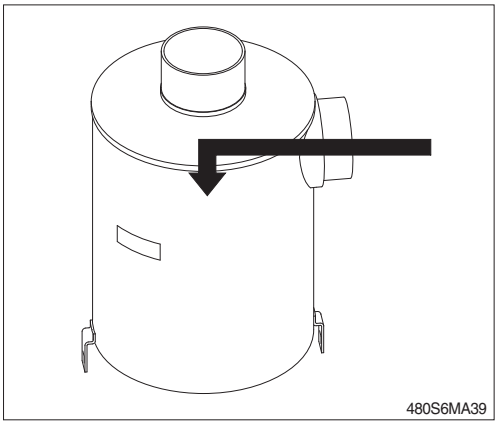
The lower portion of the body assembly should be inspected each time the air cleaner is serviced. If there is any sign of build-up or plugging, the body assembly should be removed and cleaned. At least once a year, remove the body assembly and perform the following service steps.

① Remove oil cup and removable element assembly.

② Check and clean center tube.



③ Pump solvent through the air outlet with sufficient force and volume to produce a hard, even stream out the bottom of the body assembly. Reverse flush until all foreign material is removed.



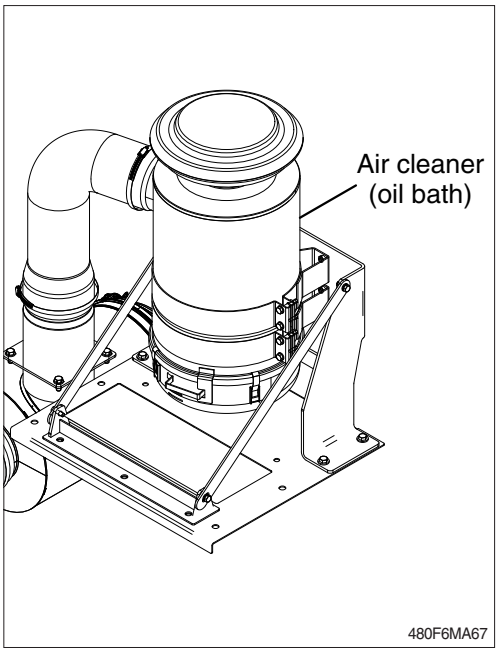
12-2) AIR CLEANER (OIL BATH, OPTION)
(S/N HX480 L : #0192- / HX520 L : #0196-)

※ In harsh working condition, the filter element must be inspected and cleaned daily or change the oil.

※ Failure to manage filters can cause degradation. If the filter is clogged, engine damage and power loss will occur.

※ In order to ensure the filtration efficiency of oil bath, it is recommended to replace a set of metal elements every year.

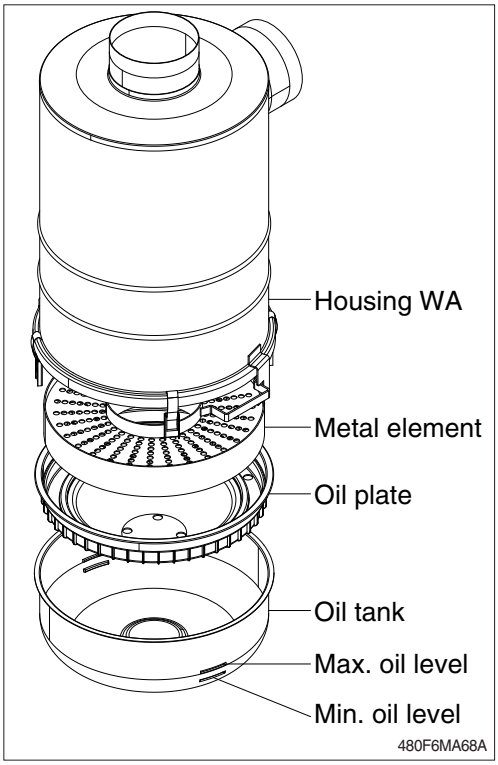
※ The maximum ash capacity of the filter element is approximately to 14 kg (31 lb).



(1) Check air cleaner
Check the inside and outside of the air cleaner.

(2) Cleaning and replacement of filter element

① Disassemble as shown the illustration.
② Check the filter element with the light.
③ Clean or change the filter elment if necessary. Immerse the filter element in diesel for 20 to 30 minutes, take out the filter element and then wash is with diesel to remove the remaining dust on the filter element.
④ Use commpressed air to dry completely.
⑤ Check the housing WA.
⑥ Check the lower body of the air cleaner and center tube everytime when the oil tank is serviced. Replace any broken, cracked or missing part.
⑦ After serviced, assemble oil tank with oil plate and fill the oil (3 ~ 5 ℓ / 0.8 ~ 1.3 U.S. gal) in the guide line. Frequently check whether the oil tank buckle for looseness.



13) FUEL TANK

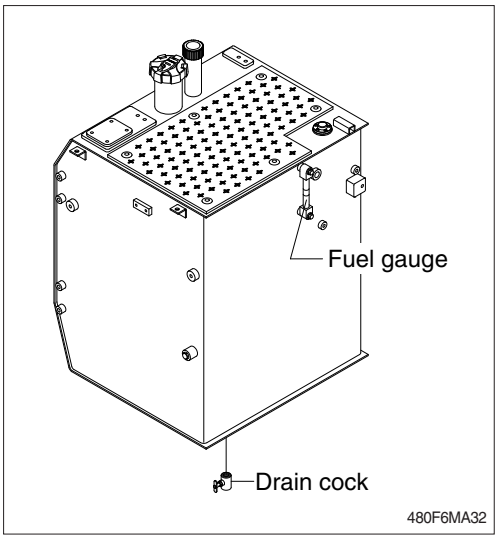
(1) Fill fuel fully when system the operation to minimize water condensation, and check it with fuel gauge before starting the machine.

(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.



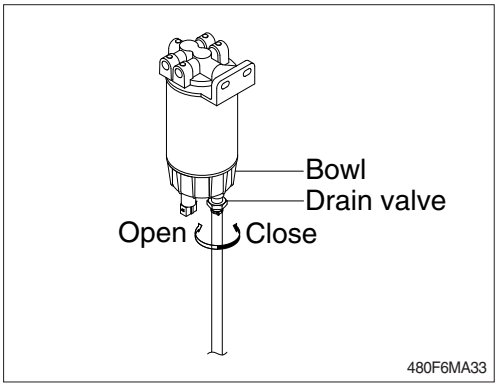
14) FUEL RETURN FILTER

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

(1) Drain water

① Open bowl drain valve to evacuate water.

② Close drain valve.



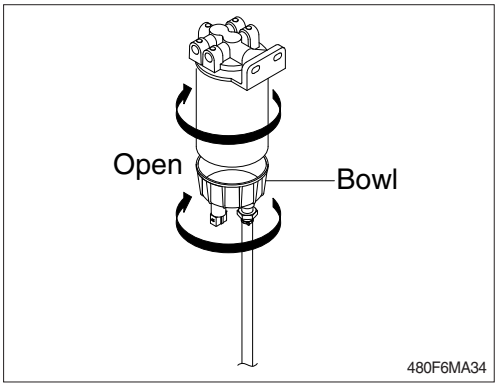
(2) Replace element

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.

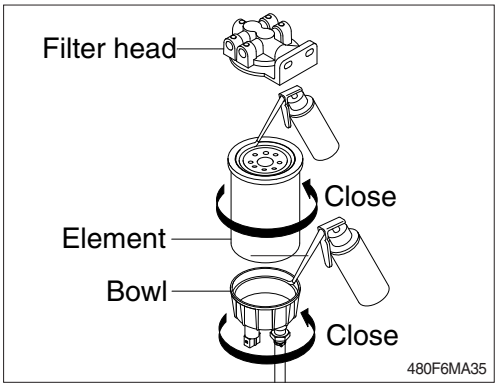


④ Lubricate new bowl seal with clean fuel or motor oil and place in bowl gland.

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

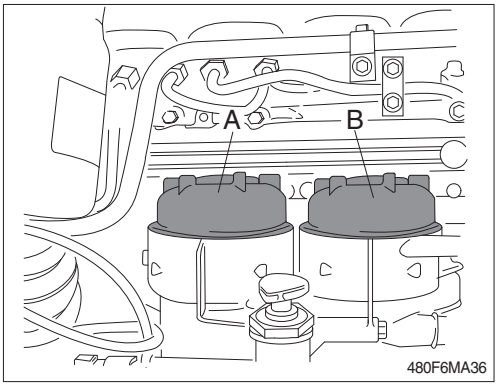
※ The fuel system is very sensitive to dirt. It is therefore important that everything is as clean as possible when work is carried out on the fuel system.

- 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

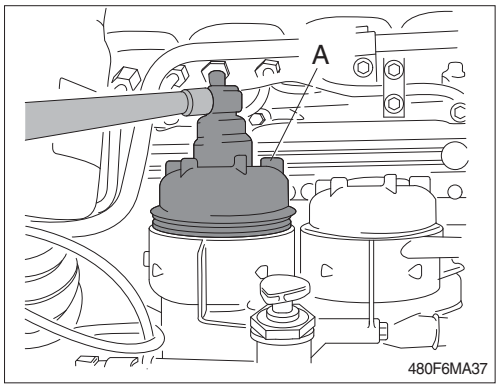
※ **Always start with the water separating suction filter A. Do not open the pressure filter cover B until housing for the water separating suction filter A is completely drained.**



※ **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 ㎜ socket).

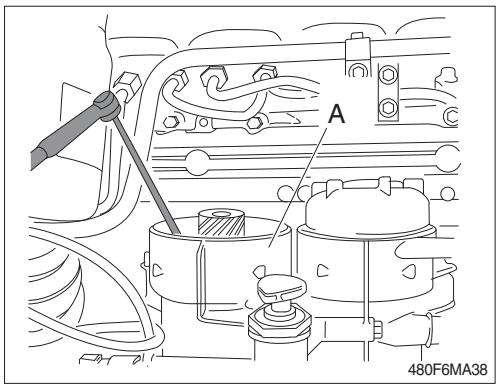
※ **Wait a minimum of 2 minutes to allow as much of the fuel as possible to drain out of the filter housing.**



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

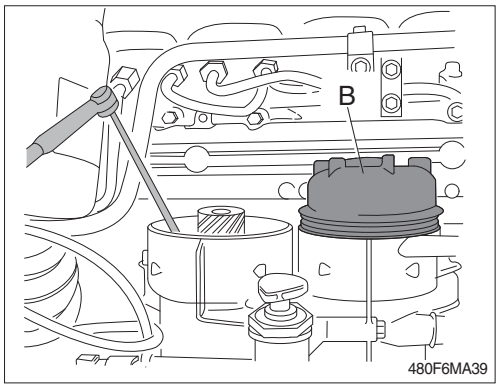
(5) Make sure the suction tool is completely drained before starting work.
Draw out remaining fuel and any particles using suction tool or a similar tool.

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



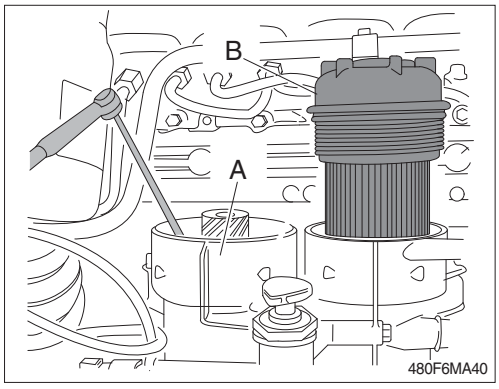
(7) Make a mark on the pressure filter cover B.
Unscrew the cover 3 to 4 turns, using a closed tool with hexagon driver socket. Draw out fuel which may drain into the water separating suction filter housing when the pressure filter is detached.

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



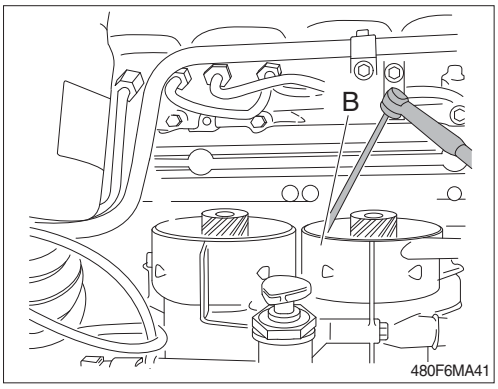
(8) Unscrew the pressure filter cover B and lift it up slowly with the filter element.

(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.

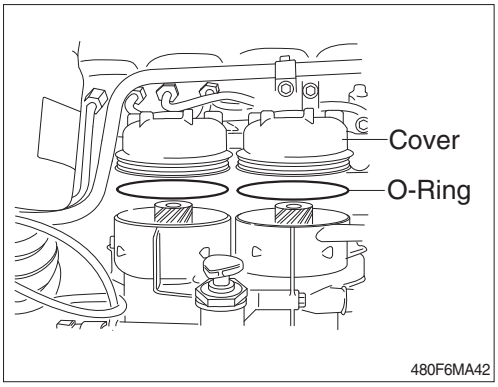
※ **Check that there is no remaining packaging material stuck to the filters.**

(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.**



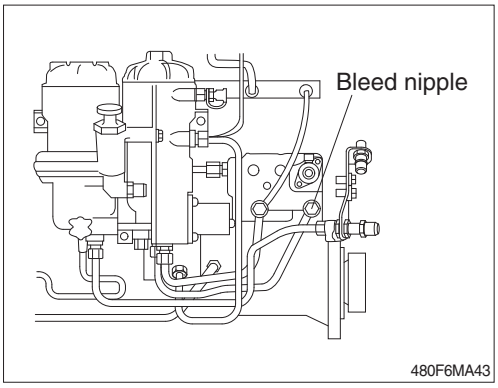
(15) Press down the filter element with filter cover into the filter housing.

(16) Screw on the filter cover. Use a closed tool with hexagon driver (36 mm socket).

· Tightening torque : 2.5 kgf · m (18 lbf · ft)

(17) Check that there is no gap between the filter cover and the filter housing. If there is a gap, repeat the procedure and make sure that the bleed nipple is open.

(18) Turn the fuel supply and return shut-off valve to the ON position.



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.

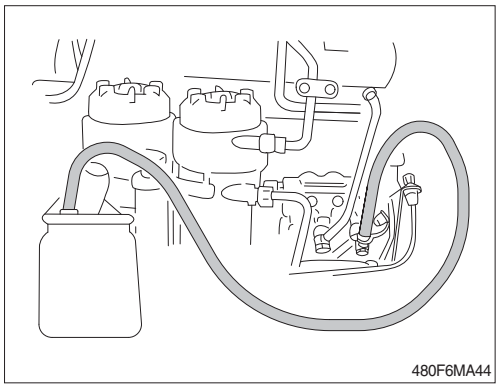
(4) Pump by hand until fuel comes out of the hose. This may take around 100 pump strokes. Depending on the installation, a significantly greater number of pump strokes may be required before fuel comes out.

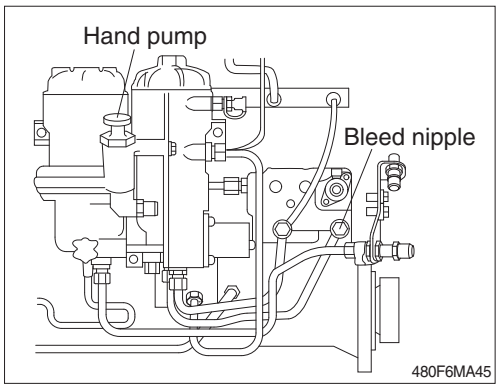
(5) Close the bleed nipple.

(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.



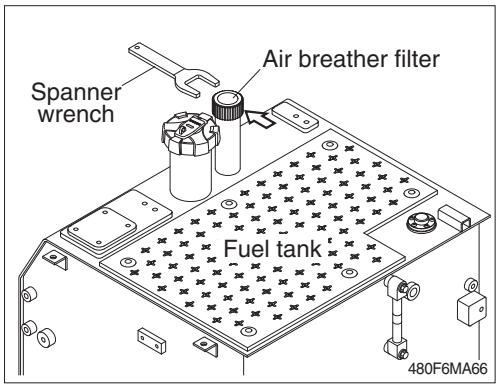


17) REPLACEMENT OF FUEL TANK AIR BREATHER FILTER

(1) Stop the engine.

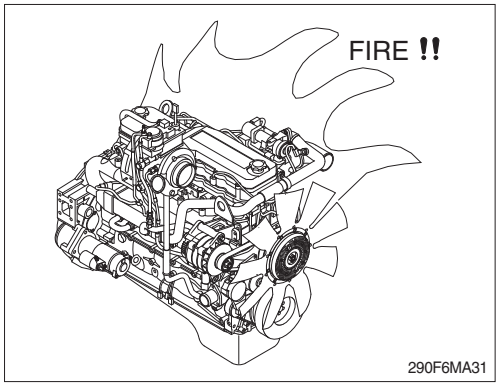
(2) Remove the air breather filter using the special spanner wrench and dispose it in accordance with environmental regulations.

(3) Replace the filter with new one.
- Tightening torque : 0.95±1.0 kgf · m (6.9±7.2 lbf · 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.

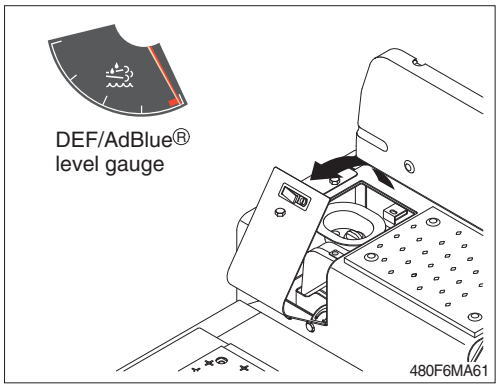
(2) If the DEF/AdBlue® level is found to below, DEF/AdBlue® must be added.

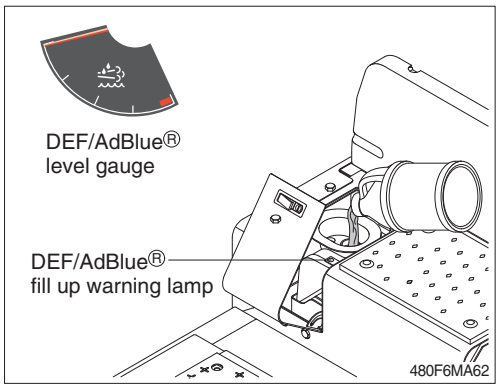
(3) DEF/AdBlue® fill up warning lamp turns on when tank is completely filled with DEF/AdBlue®. After turning light on, do not pour DEF/AdBlue® any more.

※ **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 be happen.**

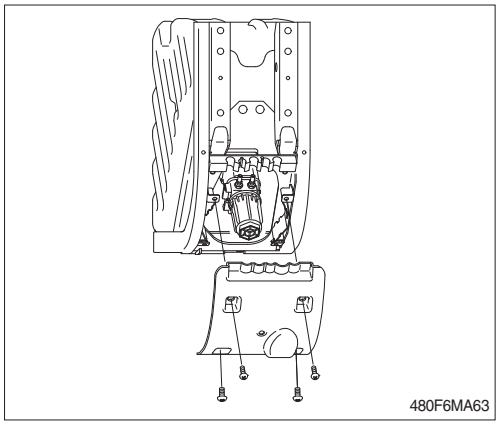
⚠ **It is unlawful to tamper with or remove any component of the aftertreatment system. It is also unlawful to use a catalyst solution that does not meet the specifications provided or the operate the machine with no catalytic solution.**





20) DEF/AdBlue® SUPPLY MODULE FILTER

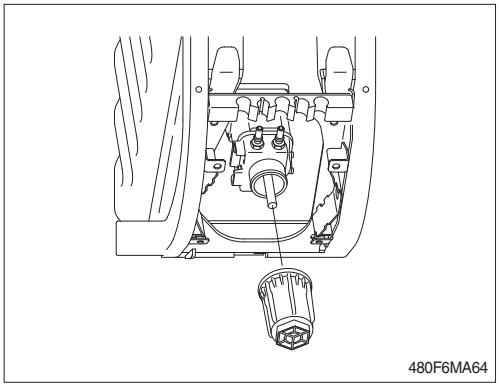
(1) Remove the cover on the rear of the DEF/AdBlue® tank.



(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.

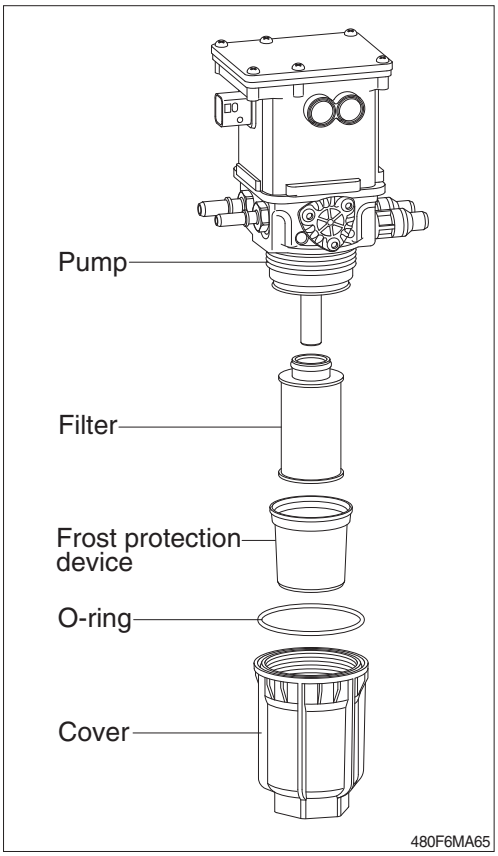
(8) Fit the new filter.

(9) Fit the new frost protection device.

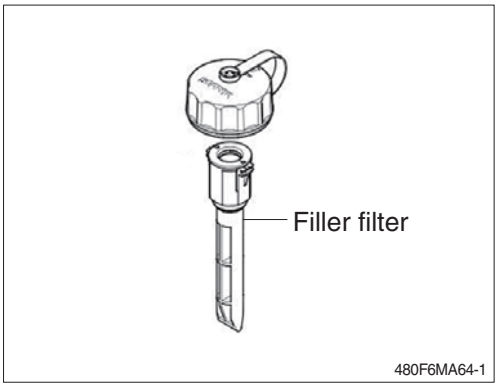
(10) Lubricate the threads with the spray.

(11) Fit the new O-ring in the new cover.

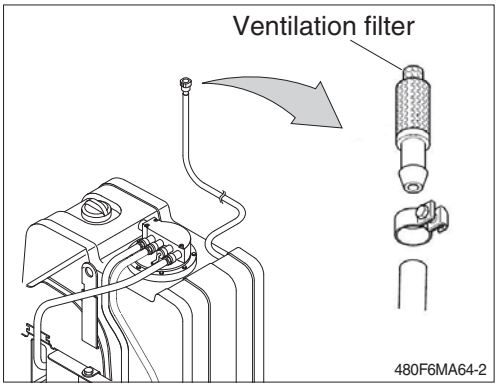
(12) Fit the new cover.
· Tightening torque : 8.2 kgf · m (59.3 lbf · ft)



※ Make sure that the DEF/AdBlue® filler filter is clean. If it is dirty, clean the filler filter with clean water and refit it.



※ Make sure that the DEF/AdBlue® ventilation filter is clean. If it is dirty, clean the ventilation filter with clean water and refit it.



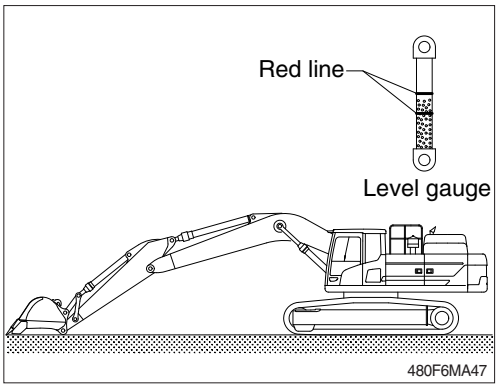
21) HYDRAULIC OIL CHECK

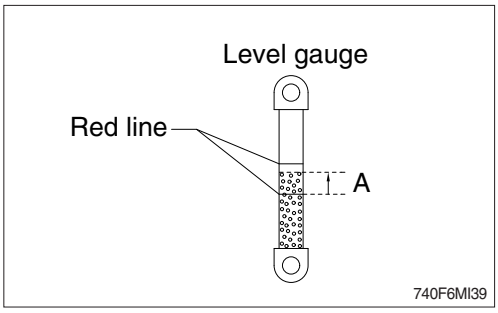
(1) Position the machine as shown in the illustration on the right. Then stop engine.

(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

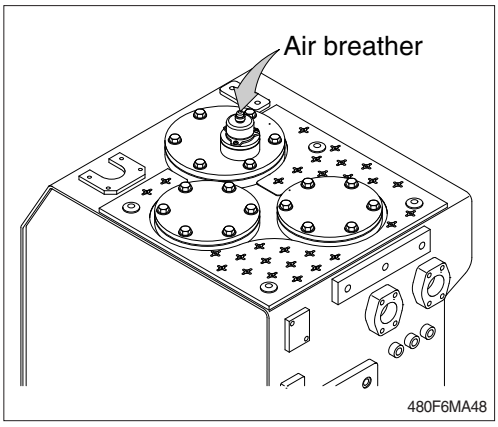
(1) Stop the engine to the position of level check.

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

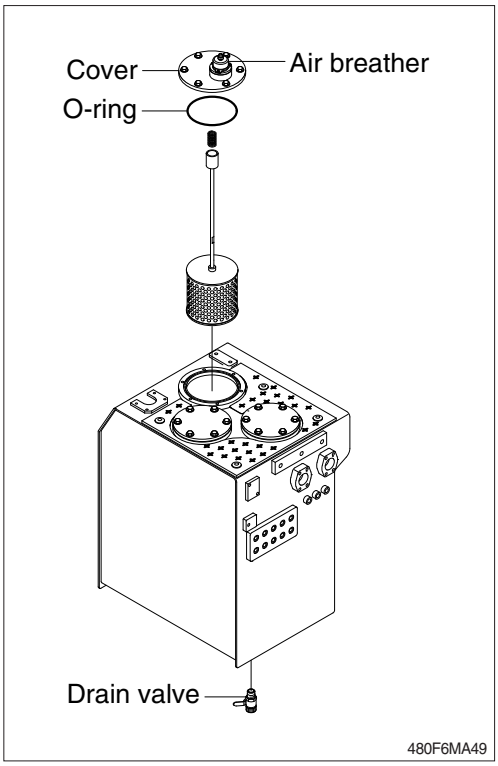
(3) Remove the breather on the top of oil tank and fill the oil to the specified level.

(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±1.4 kgf · m (50±10 lbf · ft)

(4) Prepare a suitable container.

(5) To drain the oil open the drain valve at the bottom of the oil tank.

(6) Fill proper amount of recommended oil.

(7) Put the breather in the right position.

(8) Bleed air hydraulic pump loosen the air breather at top of hydraulic pump assembly.

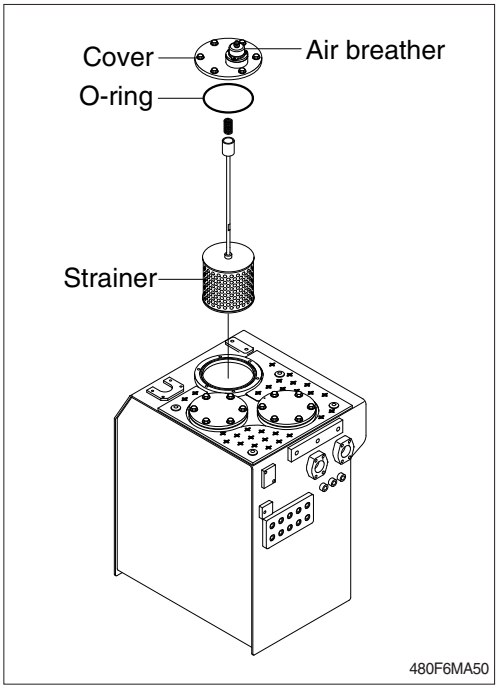
(9) Start engine and run continually. Release the air by full stroke of each control lever.

※ Incase 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±1.4 kgf · m (50±10 lbf · ft)

(2) Pull out the strainer in the tank.

(3) Wash the foreign material on the suction strainer with gasoline or cleaning oil.

(4) Replace the suction strainer if it is damaged.

(5) Assemble with reverse order of disassembly. Be sure to install a new O-ring and reinsert in the oil tank.

※ Loosen the bolt slowly at the cover can be spring out by the spring when removing it.

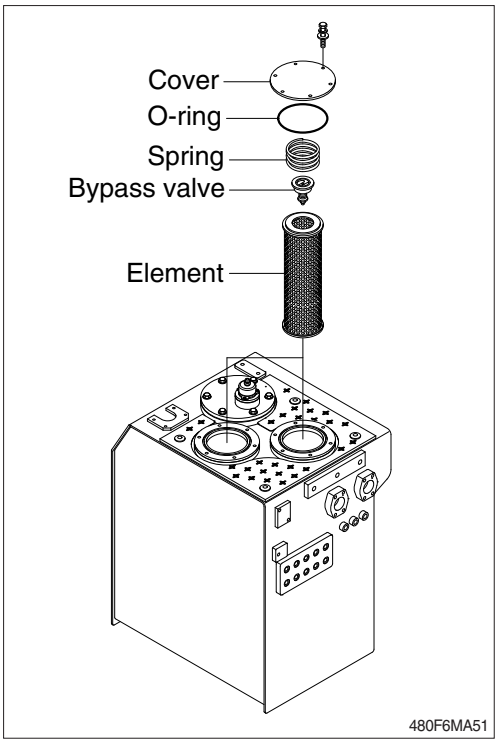
25) REPLACEMENT OF RETURN FILTER

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

(1) Remove the cover.
- Tightening torque : 6.9±1.4 kgf · m (50±10 lbf · ft)

(2) Remove the spring, by-pass valve and return filter in the tank.

(3) Replace the element with new one.



26) REPLACEMENT OF ELEMENT IN HYDRAULIC TANK BREATHER

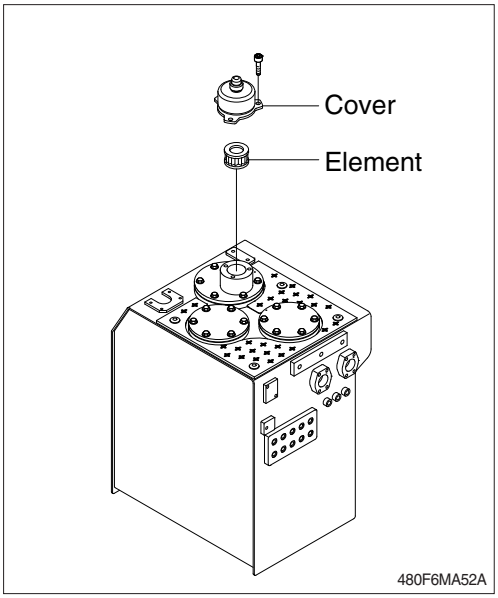
(1) Relieve the pressure in the tank by pushing the top of the air breather.

(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 : 0.8~1.0 kgf · m (5.9~7.4 lbf · ft)

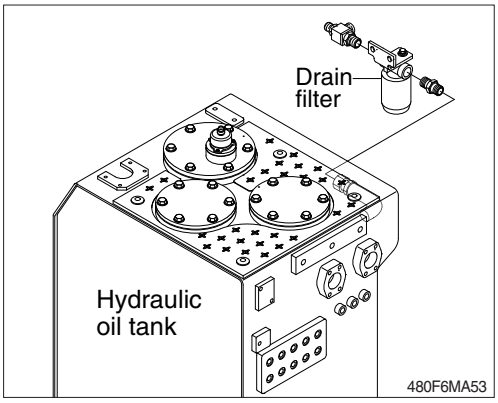


27) REPLACE OF DRAIN FILTER CARTRIDGE

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.



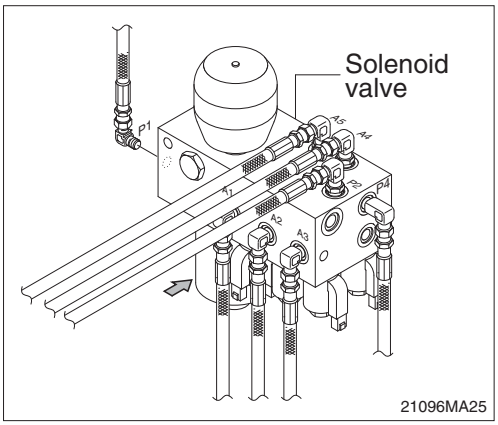
28) REPLACE OF PILOT LINE FILTER

(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.

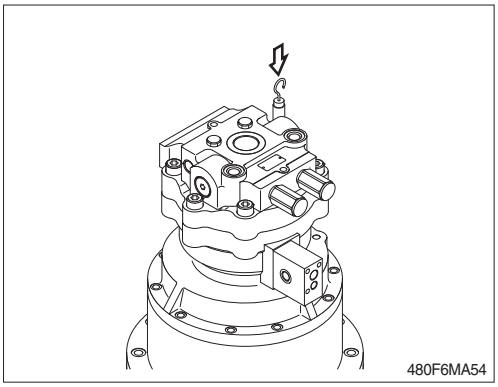


29) CHECK THE SWING REDUCTION GEAR OIL

(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.



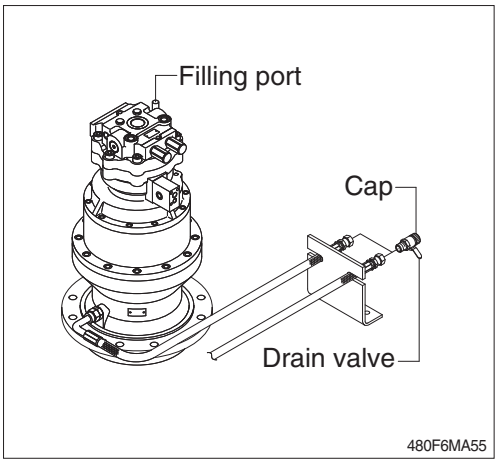
30) CHANGE SWING REDUCTION GEAR OIL

(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.

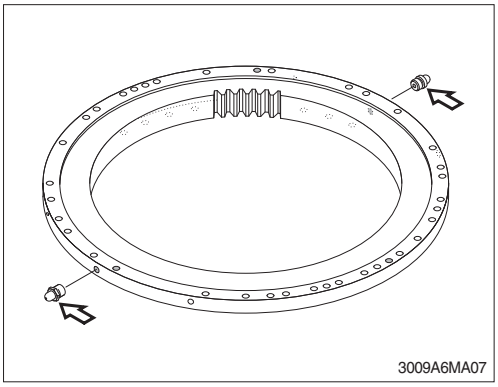
(4) Clean around the valve and close the drain valve and cap.
Fill proper amount of recommended oil.
· Amount of oil : 7.0 ℓ (1.8 U.S.gal)



31) LUBRICATE SWING BEARING

(1) Grease at 2 fitting.

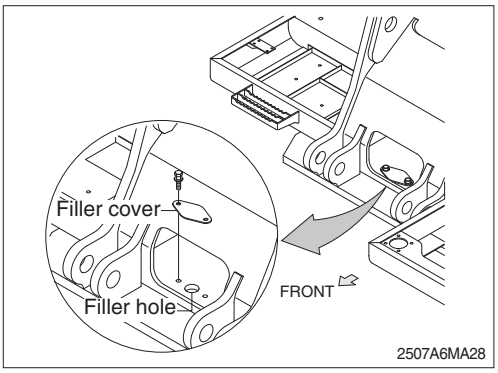
※ Lubricate every 250 hours.



32) SWING GEAR AND PINION

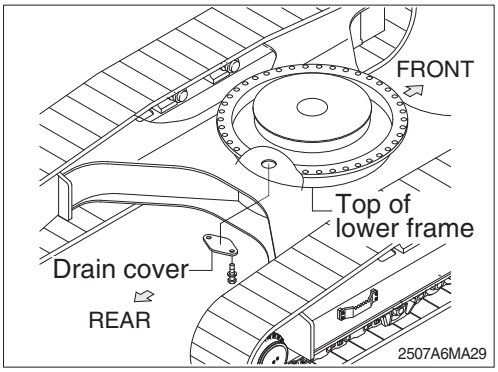
(1) Drain old grease

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

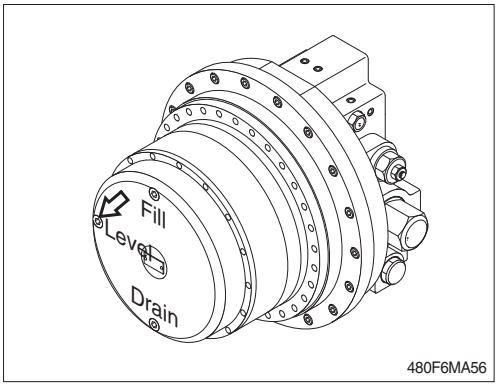
① Install drain cover.
② Fill with new grease.
③ Install filler cover.
· Capacity : 14 kg (31 lb)



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 : 12 ℓ (3.2 U.S.gal)



34) CHANGE OF THE TRAVEL REDUCTION GEAR OIL

(1) Raise the temperature of the oil by traveling machine first.

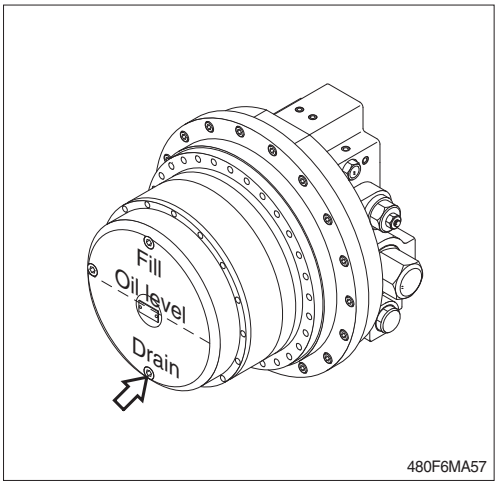
(2) Stop when the position of the drain plug is down.

(3) Loosen the level plug and then the drain plug.

(4) Drain the oil to adequate container.

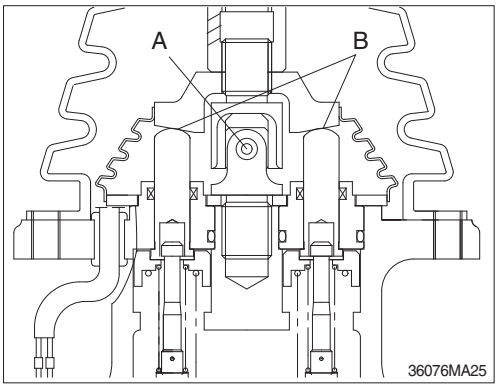
(5) Tighten the drain plug and fill specified amount of oil at filling port.

(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

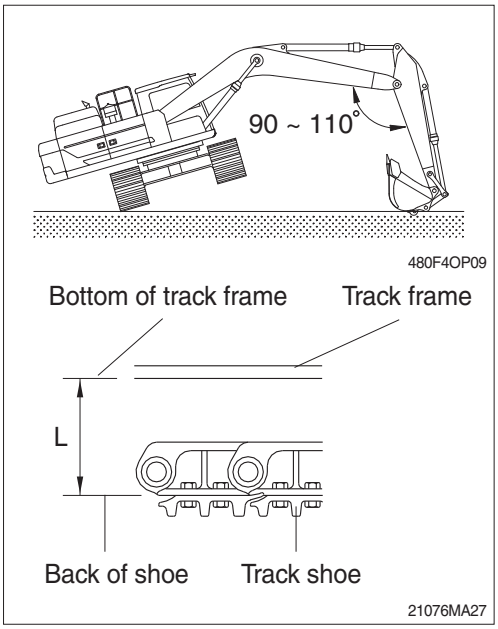
※ It is important to adjust the tension of track properly to extend the lifetime of track and traveling device.

※ The wear of pins and bushings on the under-carriage will vary with the working conditions and soil properties.
It is thus necessary to continually inspect the track tension so as to maintain the standard tension on it.

(1) Raise the chassis with the boom and arm.

(2) Measure the distance between bottom of track frame on track center and track of shoe.

※ Remove mud with rotating the track before measuring.



Working condition	Length (L)	
General	390~420 mm	15.4~16.5"
Swamp	420~460 mm	16.5~18.1"
Sand, Mud, Pebbles	About 460 mm	About 18.1"

(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.

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.

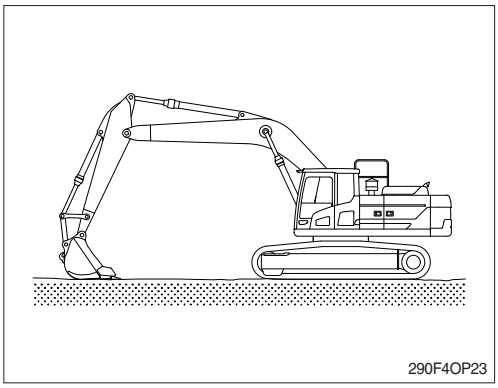
※ If the bucket is lowered strongly to the ground, the resistance will be increased and it will be difficult to remove the pins.

※ 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.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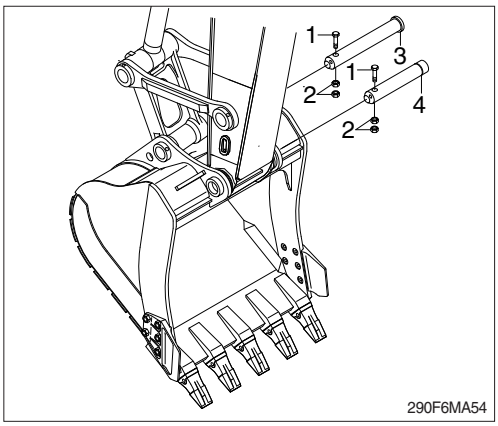

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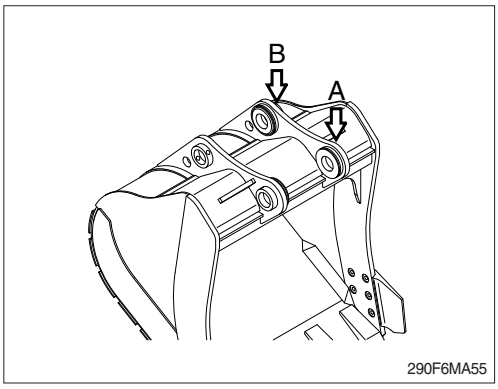

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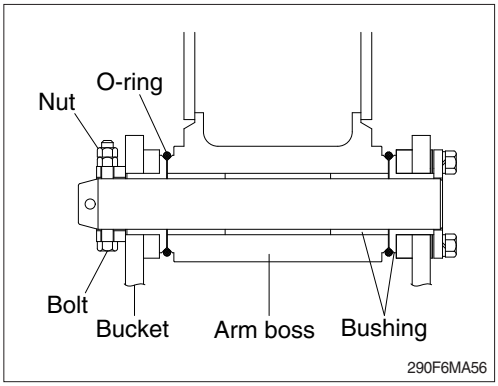

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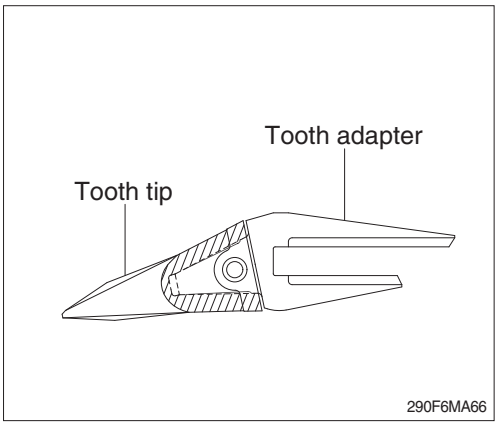
38) REPLACEMENT OF BUCKET TOOTH

(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.

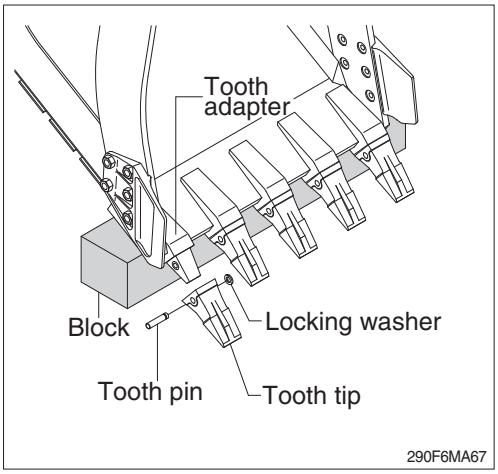
② Remove dust and mud from surface of tooth adapter by using knife.

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).

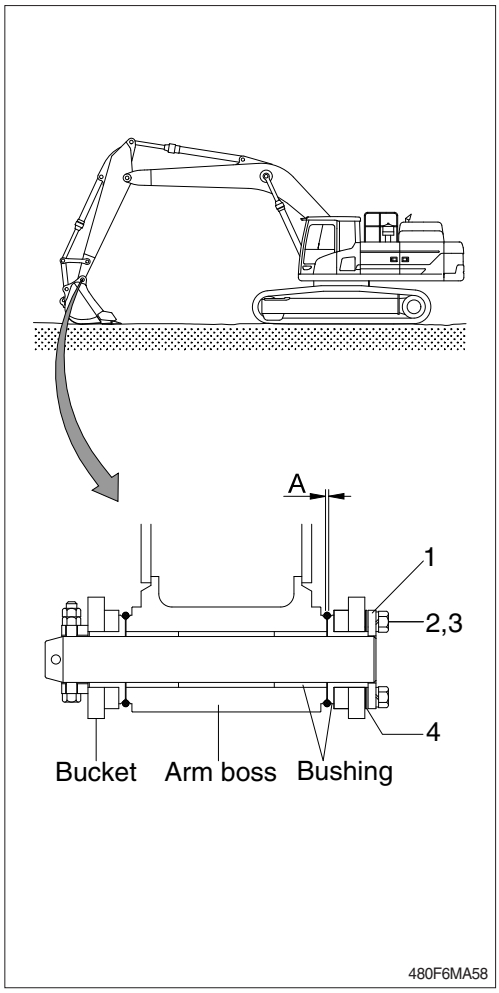
② Remove the shim equivalent value with measuring value.

③ Assemble the parts in the reverse order of removal.

· Tightening torque : 29.6±3.2 kgf · m
(214.0±23.1 lbf · ft)

· Normal clearance : 0.5 ~ 1.0 mm
(0.02 ~ 0.04 in)

※ If the bucket is not adjusted correctly, noise and vibration created during operation, and damaged O-ring, pin and bushing quickly.



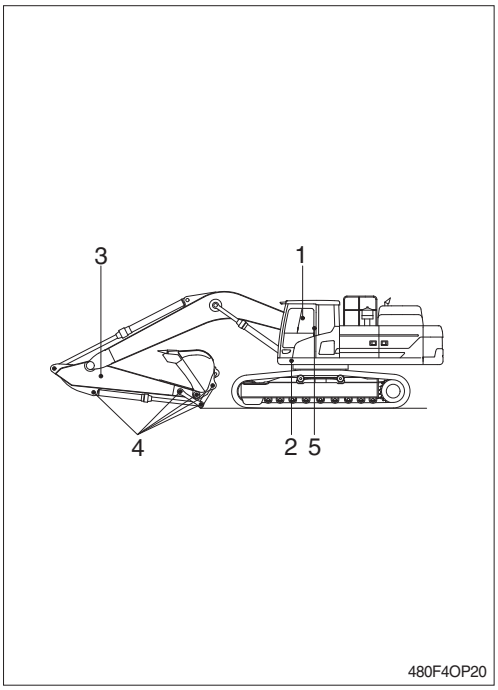
40) LUBRICATE PIN AND BUSHING

(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)	3
	Arm and control link connection pin	1
	Arm and bucket connection pin	1
5	Boom rear bearing center	1

※ **Shorten lubricating interval when working in the water or dusty place.**



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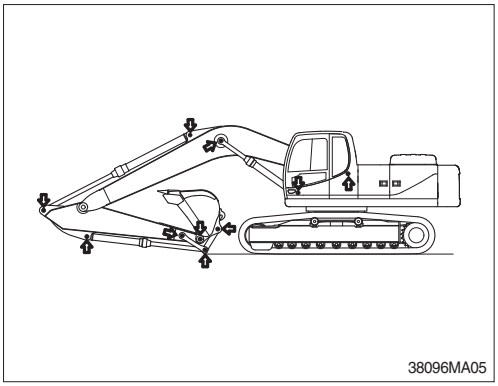
(2) Dust seals are mounted on the rotating part of working device to extend the lubricating interval.

※ **Mount the lip to be faced outside when replace the dust seal.**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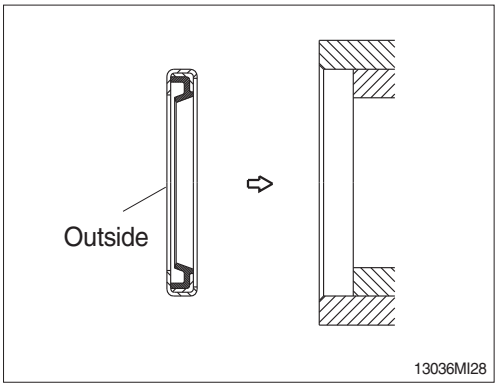
※ **If it is assembled in wrong direction, it will cause fast wear of pin and bushing, and create noise and vibration during operation.**

※ **Assemble the seal same direction with picture and use with plastic hammer when replace.**



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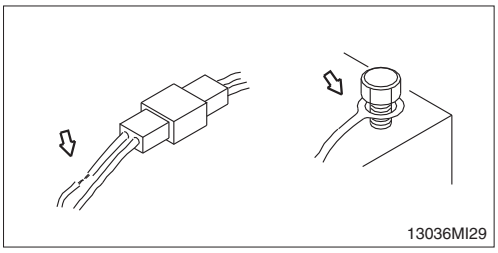
7. ELECTRICAL SYSTEM

1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



2) BATTERY

(1) Clean

① Wash the terminal with hot water if it is contaminated, and apply grease to the terminals after washing.

⚠ Battery gas can explode. Keep sparks and flames away from batteries.

⚠ Always wear protective glasses when working with batteries.

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

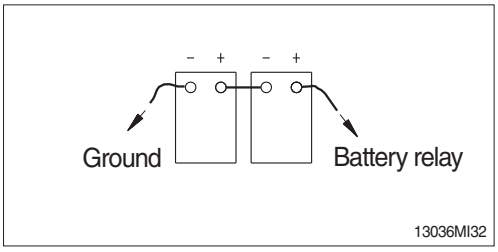
(2) Recycle

Never discard a battery.
Always return used batteries to one of the following locations.

- A battery supplier
- An authorized battery collection facility
- Recycling facility

(3) Method of removing the battery cable

Remove the cable from the ground connection first (⊖ terminal side) and reconnect it last when reassembling.



3) STARTING THE ENGINE WITH A BOOSTER CABLE

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

(1) Connection of booster cable

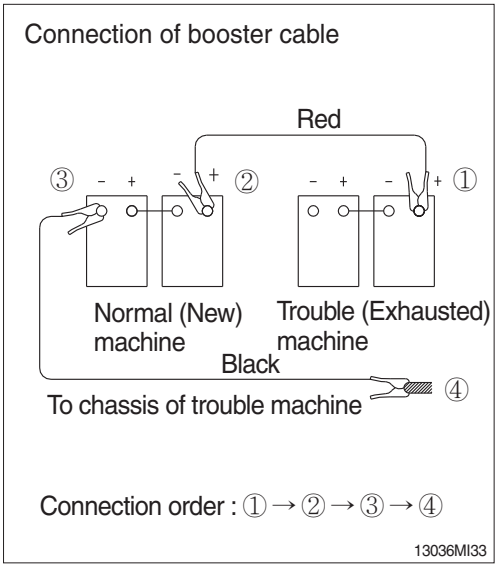
※ Use the same capacity of battery for starting.

① Make sure that the starting switches of the normal machine and trouble machine are both at the OFF position.

② Connect the red terminal of booster cable to the battery (+) terminal between exhausted and new battery.

③ Connect the black terminal of the booster cable between new battery (-) terminal and chassis of trouble machine.

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

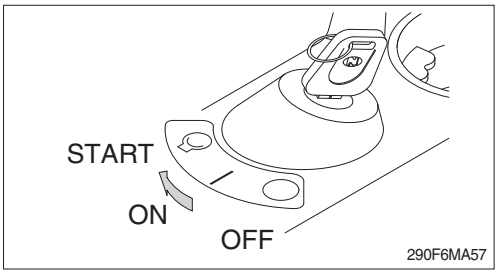


(2) Starting the engine

① Starting the engine of the normal machine and keep it to run at high idle.

② Start engine of the trouble machine with starting switch.

③ If you can not start it by one time, restart the engine after 2 minutes.



(3) Taking off the booster cable

① Take off the booster cable (black).

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

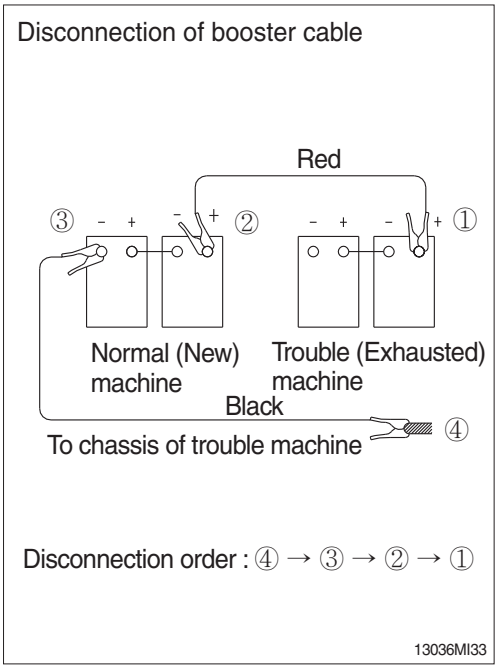
③ Run engine with high idle until charging the exhausted battery by alternator, fully.

⚠ Explosive gas is generated while using the battery or charging it. Keep away flame and be careful not to cause the spark.

※ Charge the battery in the well ventilated place.

※ Place the machine on the earth or concrete. Avoid charging the machine on the steel plate.

※ Do not connect (+) terminal and (-) terminal when connecting booster cable because it will be shorted.



(4) Welding repair

Before start to welding, follow the below procedure.

① Shut off the engine and remove the starting switch.

② Disconnect ground cable from battery by master switch.

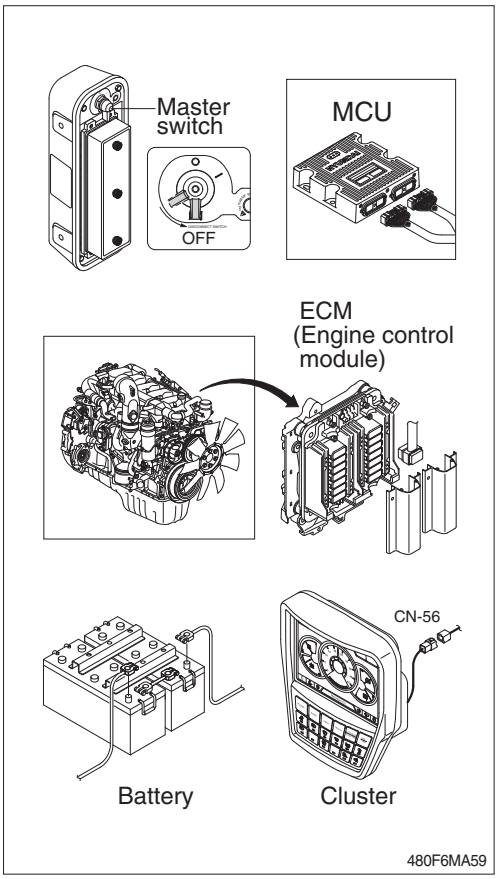
③ Before carrying out any electric welding on the machine, the battery cables should be disconnected and the connectors pulled out of the electronic control units (MCU, ECM, cluster etc).

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.

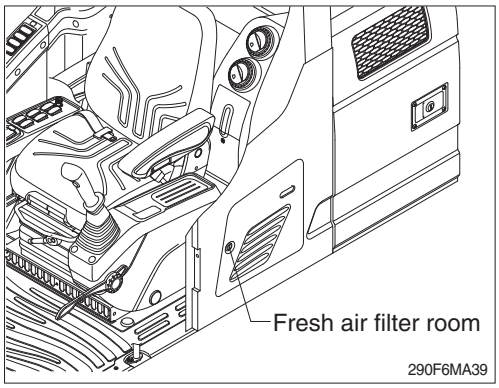
⚠ Do not attempt to welding work before carry out the above.

If not, it will caused serious damage at electric system.



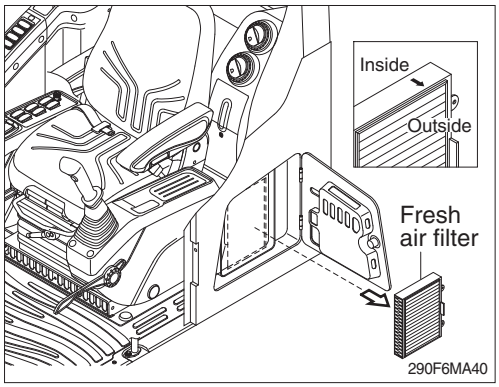
8. AIR CONDITIONER AND HEATER

1) CLEAN AND REPLACE OF FRESH AIR FILTER



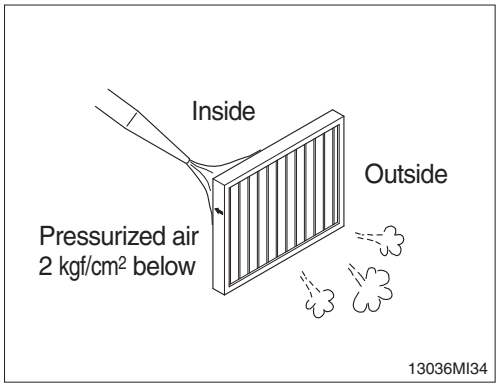
※ **Always stop the engine before servicing.**

(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.**

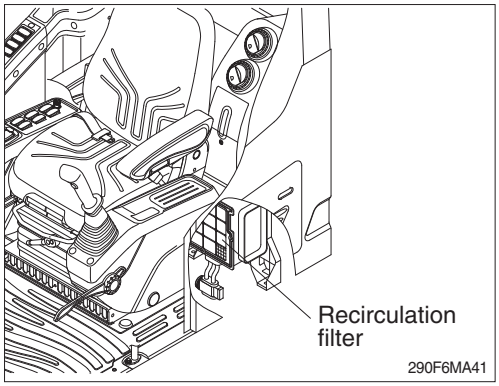


(3) Clean the filter using a pressurized air (below 2 kgf/cm^2, 28 psi).

△ **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.**

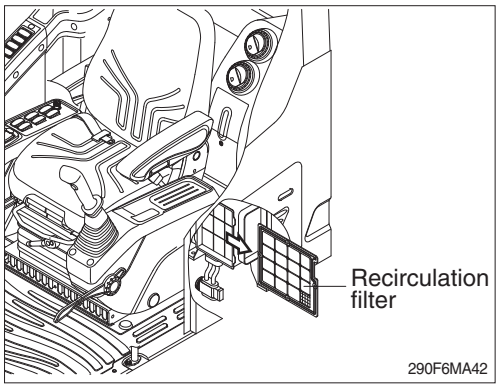
2) CLEAN AND REPLACE OF RECIRCULATION FILTER



※ **Always stop the engine before servicing.**

(1) Move seat and console box to arrow direction using the adjust knob.

(2) Remove recirculation filter.

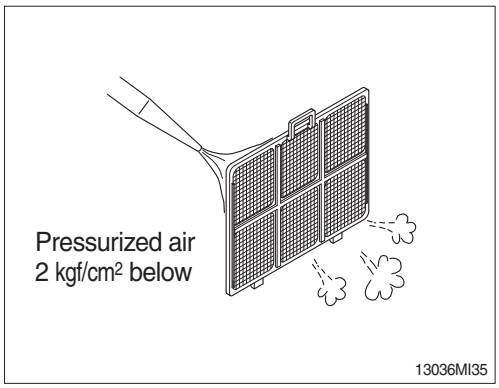


(3) Clean the recirculation filter using a pressurized air (below 2 kgf/cm², 28 psi) or washing with water.

△ **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

(1) Equipment contains fluorinated greenhouse gas.

Model	Type	Quantity	GWP
HX480 L / HX520 L	HFC-134a	0.8 kg (1.76 lb)	1144 CO_2 eq.

※ GWP

Global warming potential (GWP) is a measure of how much heat a gas traps in the atmosphere relative to that of carbon dioxide (CO2). GWP is calculated in terms of the 100-year warming potential of 1 kg of a greenhouse gas relative to 1 kg of CO2.

(2) Environmental precautions

The air conditioning system of the machine is filled with HFC-134a refrigerant at the factory.
HFC-134a refrigerant is a flourinated greenhouse gas and contributes to global warming.
Do not release refrigerant into the environment.

(3) Safety precautions

Work on the air conditioning system must only be performed by a qualified service technician.
Do not attempt to preform work on the air conditioning system.
Wear safety goggles, chemical resistant gloves and appropriate personal protective equipment to protect bare skin when there is a risk of contact with refrigerant.

(4) Action in case of exposure

① Eye contact / Limited skin contact
Rinse with warm water and apply a light bandage. Seek medical attention immediately.

② Extensive skin contact
Rinse with warm water and carefully heat the area with warm water or warm clothing.
Seek medical attention immediately.

③ Inhalation
Leave the area and find fresh air. Seek medical attention immediately.

1. ENGINE

※ **This guide is not intended to cover every conditions, however many of the more common possibilities are listed.**

Trouble	Service	Remark
The engine oil pressure lamp lights ON when engine speed is raised after completion of warm up.	· Add the oil to the specified level. · Replace the oil filter cartridge. · Check oil leakage from the pipe or the joint. · Replace the monitor.	
Steam is emitted from the top part of the radiator (the pressure valve). Coolant level warning lamp lights ON.	· Supply the coolant and check leakage. · Adjust fan belt tension. · Wash out inside of cooling system. · Clean or repair the radiator fin. · Check the thermostat. · Tighten the radiator cap firmly or replace the packing of it. · Replace the monitor.	
The engine does not start when the starting motor is turned over.	· Add fuel. · Repair where air is leaking into fuel system. · Check the injection pump or the nozzle. · Check the valve clearance. · Check engine compression pressure. · In cold weather, check if fuel warmer system is working normal.	Refer to the pages 3-35 and 4-4.
Exhaust gas is white or blue.	· Adjust to specified oil quantity. · Replace with specified fuel.	
Exhaust gas occasionally turns black.	· Clean or replace the air cleaner element. · Check the nozzle. · Check engine compression pressure. · Clean or replace the turbocharger.	
Combustion noise occasionally changes to breathing sound.	· Check the nozzle.	
Unusual combustion noise or mechanical noise.	· Check with specified fuel. · Check over-heating · Replace the muffler. · Adjust valve clearance.	

2. ELECTRICAL SYSTEM

Trouble	Service	Remark
Lamp does not glow brightly even when engine runs at high speed. Lamp flickers while engine runs.	· Check for loose terminals and open-circuit wiring. · Adjust belt tension.	
Battery charging lamp does not go out even when engine runs at high speed.	· Check the alternator. · Check and repair wiring.	
Unusual noise is emitted from the alternator.	· Check the alternator.	
Starting motor does not turn when starting switch is turned ON.	· Check and repair the wiring. · Charge the battery. · Check the starting motor. · Check the safety relay.	
The pinion of the starting motor keeps going in and out.	· Charge the battery. · Check the safety relay.	
Starting motor turns the engine sluggishly.	· Charge the battery. · Check the starting motor.	
The starting motor disengages before the engine starts up.	· Check and repair the wiring. · Charge the battery.	
The engine warming up lamp does not go ON.	· Check and repair wiring. · Check the monitor.	
The engine oil pressure lamp does not light up when engine is stationary (when the starting switch is in ON position.)	· Check the monitor. · Check the caution lamp switch.	
Battery charging lamp does not light up when the engine is stationary. (when the starting switch is in ON position.)	· Check the monitor. · Check and repair the wiring.	

3. OTHERS

Trouble	Service	Remark
Track slip out of place. Excessive wear of the sprocket.	· Adjust tension of track.	
Bucket either rises slowly or not at all.	· Add oil to specified level.	
Slow speed of travel, swing, boom, arm and bucket.	· Add oil to specified level.	
Unusual noise emitted from pump.	· Clean the hydraulic tank strainer.	
Excessive oil temperature rise of hydraulic oil.	· Clean the oil cooler. · Adjust fan belt tension. · Add oil to specified level.	

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 HX480/520 L system is 350 kgf/cm^2 (4980 psi).

4) Adjusting oil quantity

(1) Use the breaker mode from work tool of cluster. Use select switch to control the oil flow quantity.

· Setting oil quantity (300 lpm)

Flow set

· Max flow : Set the maximum flow for the attachment.

(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

480F6MA60A

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/cm^2 (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

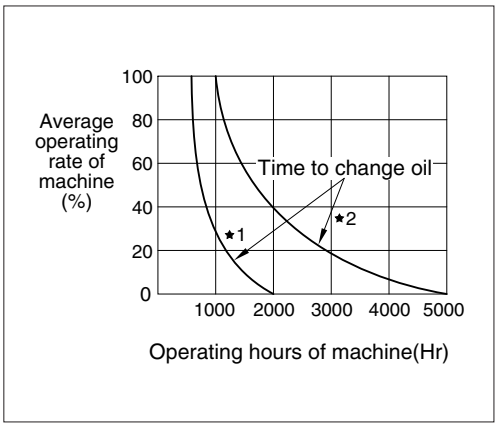
● **Replace following filter same time**

· Hydraulic return filter : 1 EA

· Pilot line filter : 1 EA

· Drain filter cartridge : 1 EA

Hyd oil change guide for hydraulic breaker



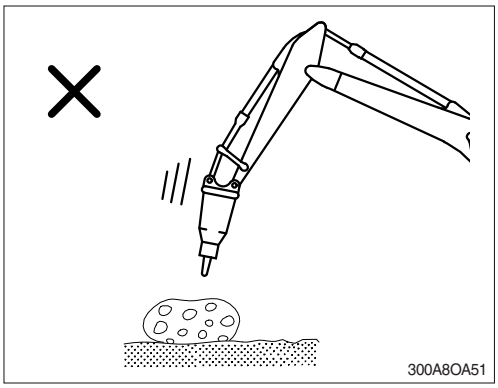
★1 : Conventional hydraulic oil

★2 : HD Hyundai Construction Equipment genuine long life hydraulic oil

4. PRECAUTIONS WHILE OPERATING THE BREAKER

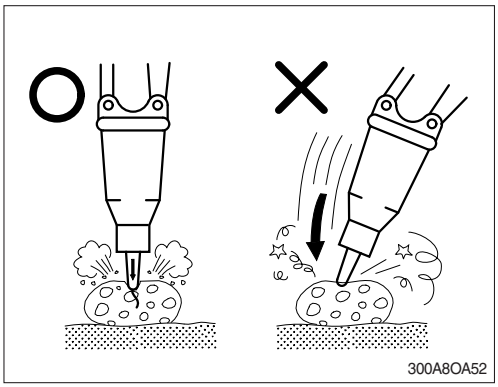
DO NOT BREAK ROCK WHILE LOWERING

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.



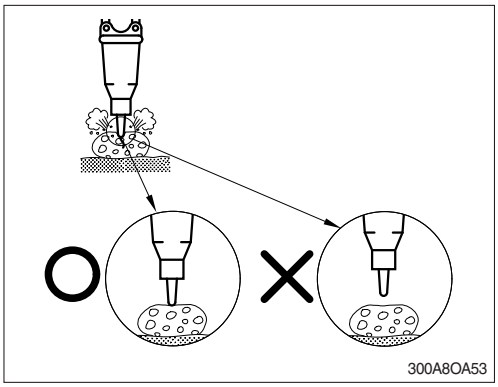
DIRECTION OF THRUST

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.

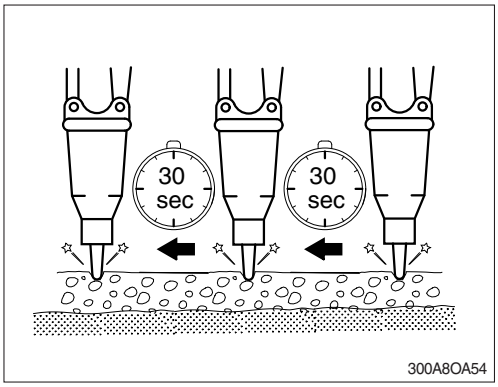


PROPER THRUST

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.

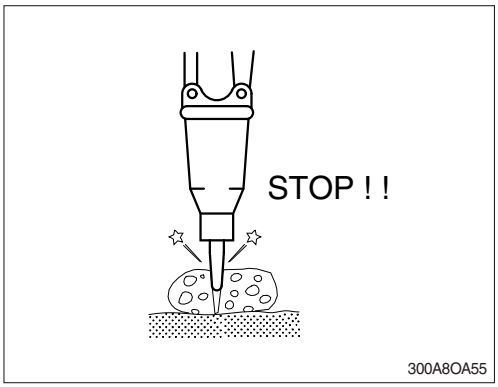


Move the impact point from the edge to the interior. Never try to break off a too large block, if the object has not broken within 30 seconds. The object should be broken up piece by piece in small blocks. Large distance steps will not improve working results.
Operating the breaker longer than 30 seconds may cause damage to the breaker.



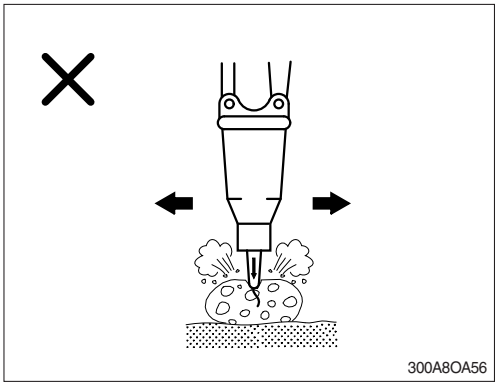
BLANKS THRUST

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.



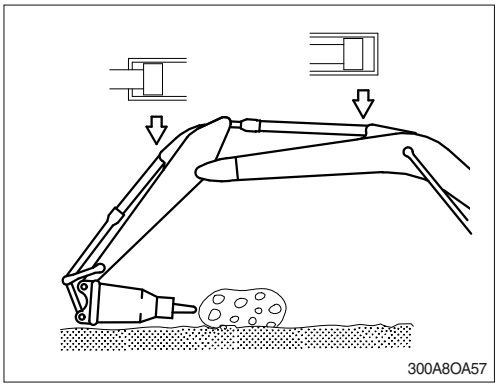
DO NOT MOVE MACHINE OR BREAKER WHILE STRIKING

Do not move hammer while striking.
This will cause damage to the working device and the swing system.



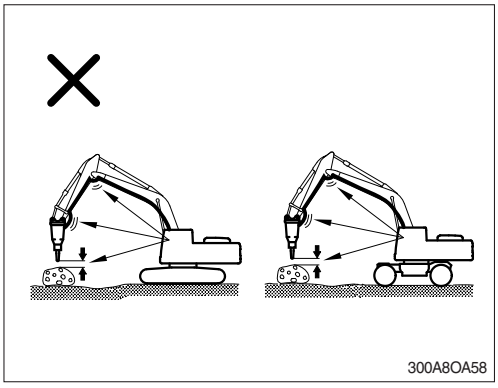
OPERATE BREAKER WITH A GAP IN EXCESS OF 100 mm (4 inches) FROM THE END OF THE STROKE TIP

If breaker is operated with the end tip, the cylinder may be damaged.



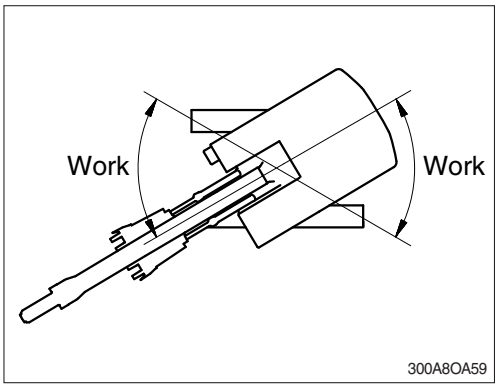
STOP THE OPERATION IMMEDIATELY IF HOSES VIBRATE EXCESSIVELY

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 Hyundal dealer in your territory for repair. An excessive gap between tool and workpiece between strikes may indicate seizure of the tool in the front head. Disassemble the front head, inspect the components and repair or replace defective parts.

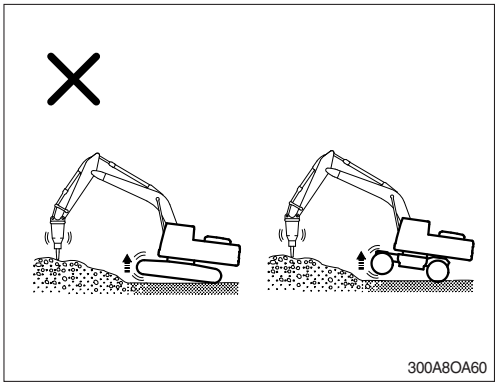


DO NOT WORK WHILE IN A SWING STATE

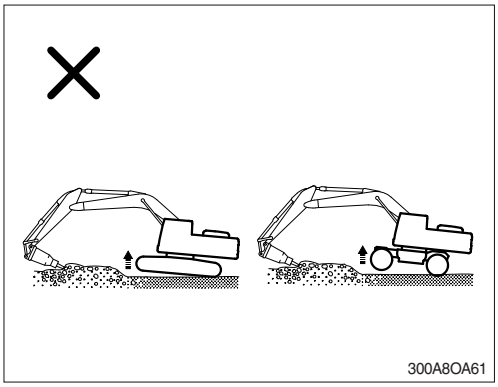
Do not work while swinging the upper structure. It cause oil leakage of the bend in the track shoe and rollers.



Conversely, if thrust is excessive or breaking is performed with boom of the lower chassis raised as shown, the machine may suddenly tip toward the movement. The breaker body may strike the broken rocks violently resulting in damage.

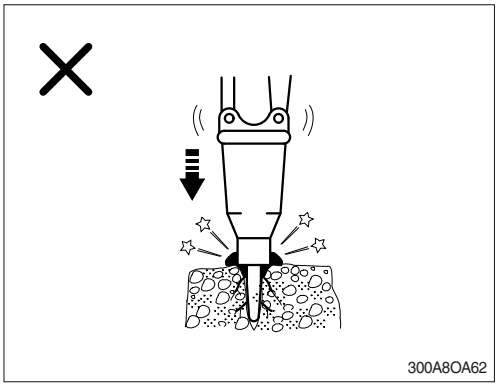


Do not extend the bucket cylinder fully and thrusting to raise the machine off the ground.



Excessive force as above may also result in vibrations being transmitted to the tracks causing damage.

Care is required to ensure adequate but not excessive force is applied to the breaker in operation.



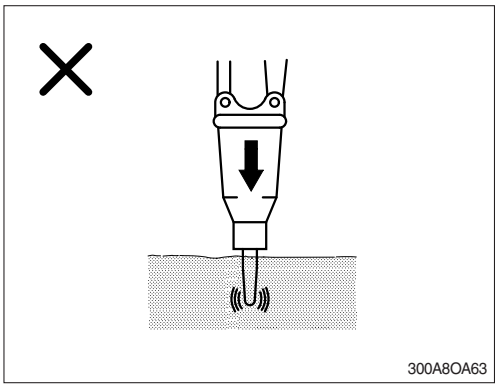
NEVER DRIVE THE CHISEL INTO THE GROUND

If the advance is too large and the chisel is not rocked to release the dust, the chisel will be driven into the material without breaking the material. This causes the chisel tip to glow red-hot and lose its hardness.

As a result, the chisel wears out more quickly. Operating in this way is not permitted.

Dust dampens impact power, when the chisel is inserted into the ground, and reduces the efficiency of the breaker. Tilt the breaker slightly backward and forward, not more than 5°, while operating so that the dust can escape.

Do not rock the breaker at angles greater than 5° or the chisel will be broken.

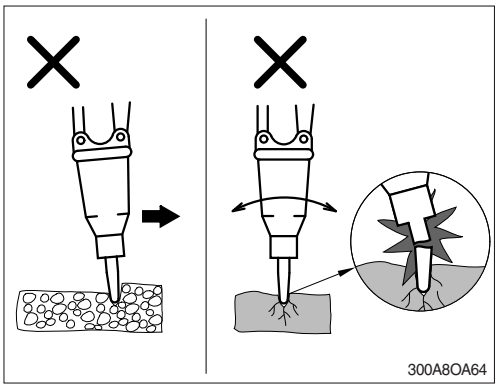


NEVER USE AS A LEVER

Do not use the chisel as a lever; e.g. crowbar, as this will cause the chisel to break.

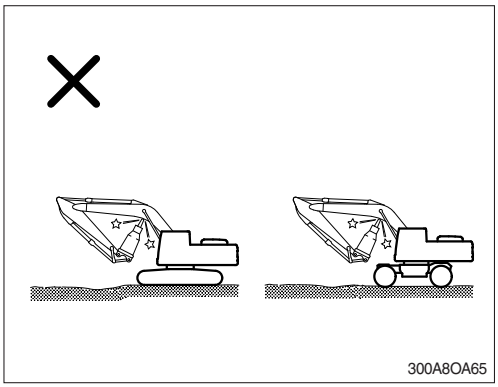
Under any circumstances, operating in this way is not permitted.

Most of bending failure of the chisel may be caused by lever action in stone that is inside hard or frozen ground. Be careful and stop operating if you feel sudden resistance under the chisel.



TAKE CARE OF CHISEL AND BOOM INTERFACE

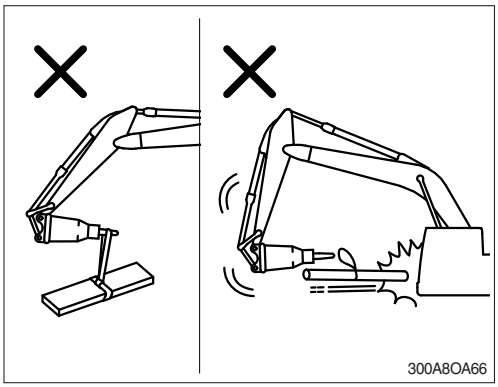
Be aware of clearance between breaker tip and the underside of boom as shown.



NEVER USE FOR LIFT OR TRANSPORT PURPOSES

The hydraulic breaker is not designed to lift or transport loads. Never use the chisel as a lifting point.

This is dangerous and could damage the breaker or the chisel.

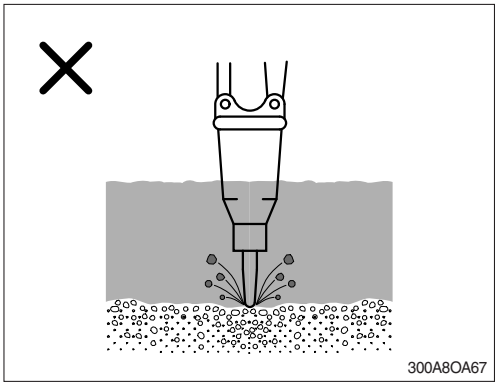


NEVER USE THE HYDRAULIC BREAKER UNDER WATER

The hydraulic breaker, as a standard assembly, never be used in or under water without prior conversion. If you use under water, water fills the impact chamber between the piston and the chisel, a strong hydraulic pressure wave is generated and will damage the seals in the breaker. And, in addition, corrosion, lack of lubrication or penetration of water could result in further damage to components of the breaker and the lower chassis.

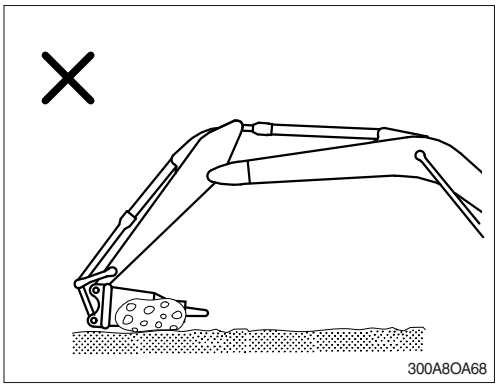
To operate the breaker under water, compressed air must be supplied into the breaker, into the impact chamber of the front-head, prior to use.

Consult your HD Hyundai Construction Equipment dealer for the underwater kit.



DO NOT USE BREAKER TO CARRY BROKEN STONE OR ROCK BY SWING OPERATING

This may damage the operation device and swing system.

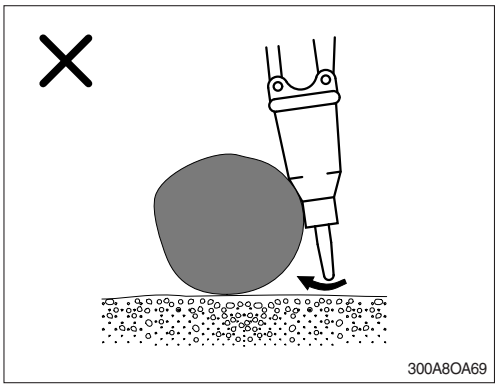


NEVER USE THE CHISEL OR HYDRAULIC BREAKER TO MOVE ROCKS OR OTHER OBJUCTS

The hydraulic breaker is not designed for this usage.

Do not use the breaker or chisel to roll, push the object or reposition the lower chassis.

This may cause damage to the breaker and the lower chassis.

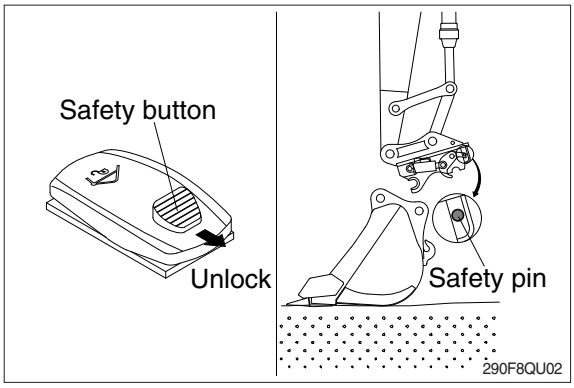


5. QUICK CLAMP

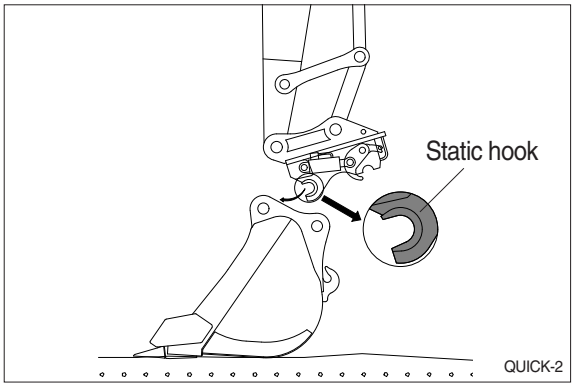
1) FIXING BUCKET WITH QUICK CLAMP

(1) Before fixing bucket, remove safety pin of the moving hook.

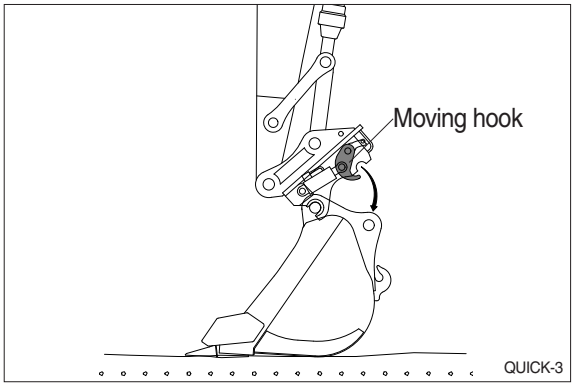
(2) Pulling safety button, press the quick clamp switch to unlock position. Then, the moving hook is placed on release position.



(3) Aligning the arm and bucket, insert static hook of quick clamp to the bucket pin.

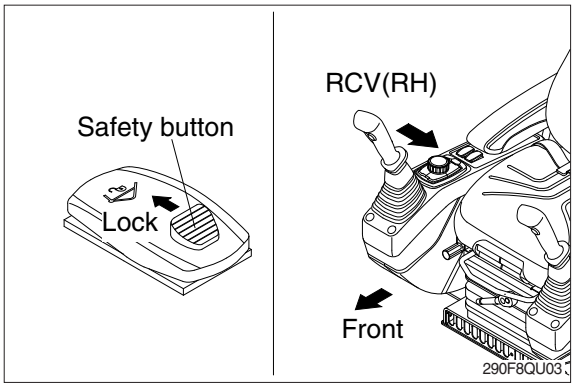


(4) Operate RCV lever to bucket-in position. Then, the moving hook is coupled with the bucket link pin.
Make sure that the moving hook is completely contacted with bucket link pin.

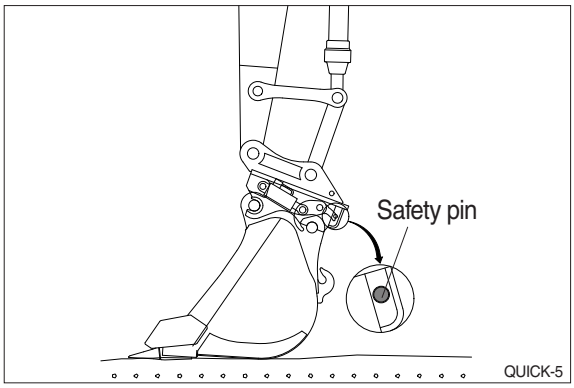


(5) Push safety button to lock position.
Operate RCV lever to bucket-in position.

※ **Be sure to check connection status between bucket pins and hooks of quick clamp.**



(6) After checking the connection status between bucket pins and hooks of quick clamp, **insert safety pin of moving hook to lock position.**



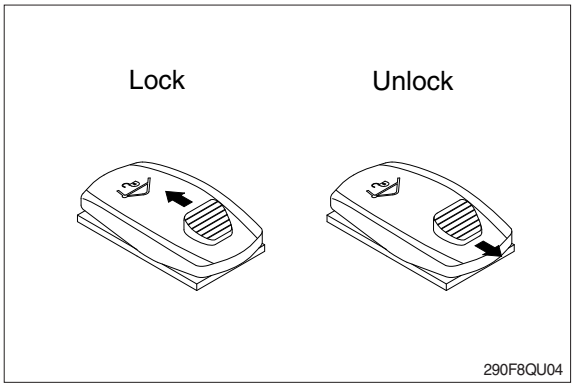
2) REMOVE BUCKET FROM QUICK CLAMP

Removing procedure is reverse of fixing.

3) PRECAUTION OF USING QUICK CLAMP

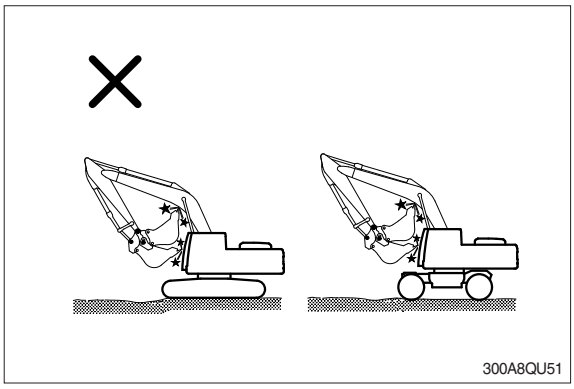
⚠ **When operating the machine with quick clamp, confirm that the quick clamp switch is lock position and safety pin of moving hook is inserted.**
Operating the machine with quick clamp switch unlocked and without safety pin of moving hook can cause the bucket to drop off and bring about the accident.

⚠ **Serious injury or death can result from this accident.**



⚠ **Be careful to operate the machine equipped with quick clamp. The bucket may hit cab, boom and boom cylinders when it reaches vicinity of them.**

HD Hyundai Construction Equipment will not be responsible for any injury or damage in case that safety pin is not installed properly.



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