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A MESSAGE TO HYUNDAI LIFT TRUCK OPERATORS

Lift trucks are specialized for machines with unique operating characteristics, designed to perform a specific job. Their function and operation are not like a car or ordinary truck. They required specific instructions and rules for safe operation and maintenance.

Safe operation of lift trucks is of primary importance to HYUNDAI.
Our experience with lift truck accidents has shown that when accidents happen and people are killed or injured, the causes are:

- **Operator not properly trained**
- **Operator not experienced with lift truck operation**
- **Basic safety rules not followed**
- **Lift truck not maintained in safe operating condition**

For these reasons, HYUNDAI wants you to know about the safe operation and correct maintenance of your lift truck.

This manual is designed to help you operate your lift truck safely.
This manual shows and tells you about safety inspections and the important general safety rules and hazards of lift truck operation. It describes the special components and features of the truck and explains their function. The correct operating procedures are shown and explained. Illustrations and important safety messages are included for clear understanding. A section on maintenance and lubrication is included for the lift truck mechanic.

The operator's manual is not a training manual. It is a guide to help trained and authorized operators safety operate their lift truck by emphasizing and illustrating the correct procedures. However, it cannot cover every possible situation that may result in an accident. You must watch for hazards in your work areas and avoid or correct them. It is important that you know and understand the information in this manual and that you know and follow your company safety rules!
Be sure that your equipment is maintained in a safe condition. Do not operate a damaged or malfunctioning truck. Practice safe operation every time you use your lift truck. Let's join together to set high standards in safety.

Remember, before you start operating this lift truck, be sure you understand all driving procedures. It is your responsibility, and it is important to you and your family, to operate your lift truck safely and efficiently.

△**Be aware that the Federal Occupational Safety and Health Act (OSHA) and state laws require that operators be completely trained in the safe operation of lift trucks; It is also an (OSHA) requirement that a machine inspection be performed before every shift. If you need training in operating or inspecting your lift truck, ask your supervisor.**

HYUNDAI lift trucks are built to take hard work, but not abuse. They are built to be dependable, but they are only safe and efficient as the operator and the persons responsible for maintaining them. Do not make any repairs to this truck unless you have been trained in safe lift truck repair procedures and are authorized by your employer.

This manual describes procedures for operation, handling, lubrication, maintenance, checking and adjustment. It will help the operator realize peak performance through effective, economical and safe machine operation.

INTRODUCTION

HYUNDAI welcomes you to the growing group of professionals who own, operate and maintain HYUNDAI lift trucks. We take pride in the long tradition of quality products and superior value the HYUNDAI name represents. This manual familiarizes you with safety, operating, and maintenance information about your new lift truck. It has been specially prepared to help you use and maintain your HYUNDAI lift truck in a safe and correct manner.

Your HYUNDAI lift truck has been designed and built to be as safe and efficient as today's technology can make it. As manufactured, for some models, it meets all the applicable mandatory requirements of ANSI B56.1-1988 Safety Standard for Powered Industrial Trucks. Some trucks are also furnished with equipment to help you operate safely; for example, load back rest, parking brake and horn are standard equipment.

Safe, productive operation of a lift truck requires both skill and knowledge on the part of the operator. The operator must know, understand, and practice the safety rules and safe driving and load handling techniques described in this manual. To develop the skill required, the operator must become familiar with the construction and features of the lift truck and how they function, the operator must understand its capabilities and limitations, and see that it is kept in a safe condition.

Routine Servicing and Maintenance

Regular maintenance and care of your lift truck are not only important for economy and utilization reasons; it is essential for your safety. A faulty lift truck is a potential source of danger to the operator, and to other personnel working near it. As with all quality equipment, keep your lift truck in good operating condition by following the recommended schedule of maintenance.

Operator Daily Inspection - Safety and Operating Checks

A lift truck should always be examined by the operator, before driving, to be sure it is safe to operate. The importance of this procedure is emphasized in this manual with a brief illustrated review and later with more detailed instructions. HYUNDAI dealers can supply copies of a helpful **Drivers Daily Checklist.** It is an OSHA requirement.

Planned Maintenance

In addition to the daily operator inspection, HYUNDAI recommends that a planned maintenance(PM) and safety inspection program be performed by a trained and authorized mechanic on a regular basis. The PM will provide an opportunity to make a thorough inspection of the safety and operating condition of your lift truck. Necessary adjustments and repairs can be done during the PM, which will increase the lift or components lifecycle and reduce unscheduled downtime and increase safety. The PM can be scheduled to meet your particular application and lift truck usage.

The procedures for a periodic planned maintenance program that covers inspections, operational checks, cleaning, lubrication, and minor adjustments are outlined in this manual. Your HYUNDAI dealer is prepared to help you with a Planned Maintenance Program by trained service personnel who know your lift truck and can keep it operating safely and efficiently.

Service Manual

In-depth service information for trained service personnel is found in Service Manual.

HOW TO USE THIS MANUAL

This manual is a digest of essential information about the safe operation, the features and functions and explains how to maintain your lift truck. This manual is organized into nine major parts:

Section 1. Safety hints, reviews and illustrates accepted practices for safe operation of a lift truck.

Section 2. Operating Hazards, warns of conditions that could cause damage to the truck or injury to the operator or other personnel.

Section 3. Know Your Truck, describes the major operating components, systems, controls, and other features of your truck and tells how they function.

Section 4. Operator Maintenance and Care, presents details on how to perform the operator's daily safety inspection and refuel the lift truck.

Section 5. Starting and Operating Procedures, discusses specific instructions on the safe, efficient operation of your lift truck.

Section 6. Emergency Starting and Towing, gives instructions for towing your truck in an emergency and for using battery jumper cables to start your truck in an emergency.

Section 7. Planned Maintenance and Lubrication, describes the PM (Planed Maintenance) program.

Section 8. Specifications, provides reference information and data on features, components, and maintenance items.

Section 9. Troubleshooting, provides trouble symptoms, causes and methods of remedy.

Section10. Testing and Adjusting, gives instructions for testing and adjusting.

※**The descriptions and specifications included in this manual were in effect at the time of printing.** HYUNDAI reserves the right to make improvements and changes in specifications or design, without notice and without incurring obligation. Please check with your authorized HYUNDAI dealer for information on possible updates or revisions.

The examples, illustrations, and explanations in this manual should help you improve your skill and knowledge as a professional lift truck operator and take full advantage of the capabilities and safety features of your new lift truck.

The first section of the manual is devoted to a review, with illustrations and brief messages, of general safety rules and the major operating hazards you can encounter while operating a lift truck. Next, you will find description's of the components of your specific lift truck model and how the instruments, gauges, and controls operate. Then, you will find a discussion of safe and efficient operating procedures, followed by instruction's on how to tow a disabled lift truck. The later sections of the manual are devoted to maintenance and truck specifications.

Take time to carefully read the **Know Your Truck** section. By acquiring a good basic understanding of your truck's features, and how they function, you are better prepared to operate it both efficiently and safely.

In **Planned Maintenance,** you will find essential information for correct servicing and periodic maintenance of your truck, including charts with recommended maintenance intervals and component capacities. Carefully follow these instructions and procedures.

Each major section has its own table of contents, so that you can find the various topics more easily.

We urge you to first carefully read the manual from cover to cover. Take time to read and understand the information on general safety rules and operating hazards. Acquaint yourself with the various procedures in this manual. Understand how all gauges, indicator lights, and controls function. Please contact your authorized HYUNDAI dealer for the answers to any questions you may have about your lift truck's features, operation, or manuals.

Operate your lift truck safely; careful driving is your responsibility.
Drive defensively and think about the safety of people who are working nearby. Know your truck's capabilities and limitations. Follow all instructions in this manual, including all symbols (⚠ △ ※) and messages to avoid damage to your lift truck or the possibility of any harm to yourself or others.

This manual is intended to be a permanently attached part of your lift truck. Keep it on the truck as a ready reference for anyone who may drive or service it. If the truck you operate is not equipped with a manual, ask your supervisor to obtain one and have it attached to the truck. And, remember, your HYUNDAI dealer is pleased to answer any questions about the operation and maintenance of your lift truck and will provide you with additional information should you require it.

※ **Illustrations may differ from your truck, but they are applicable to your truck.**

EC REGULATION APPROVED

· Noise level (2000/14/EC and EN 12053) are as followings.

Model	LWA(EU only)	LPA
180D-9	108 dB	77 dB

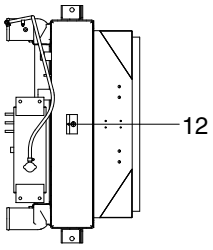
· The value of vibrations transmitted by the operator's seat are lower than standard value of (2005/88/EC)

CE

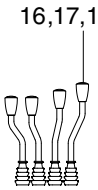
SAFETY LABELS

1. LOCATION

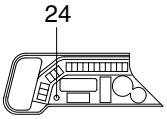
Always keep these labels clean. If they are lost or damaged, attach them again or replace them with new labels.



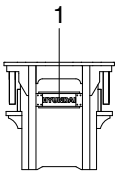
"VIEW" (RADIATOR TOP)



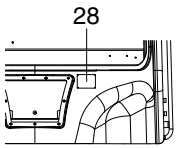
CABIN RCV LEVER



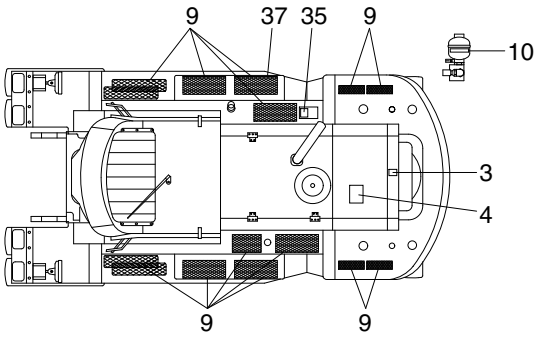
CONSOLE BOX

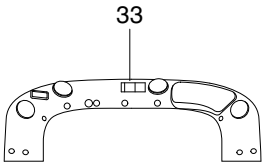


VIEW A

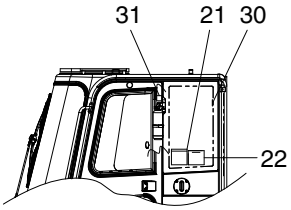


VIEW B-B

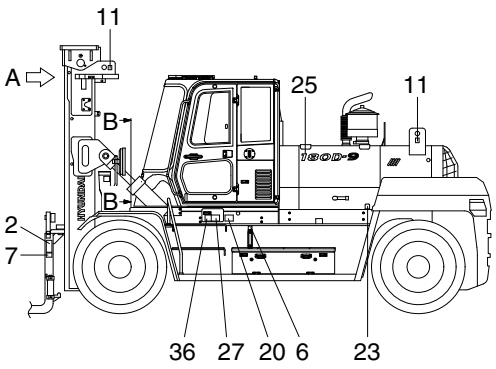


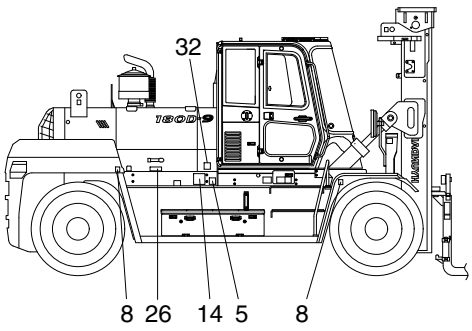


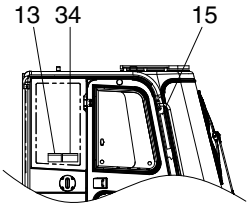
DASH BOARD COVER



CABIN INSIDE - RH







CABIN INSIDE - LH

180D9OM101

1	Logo	13	Safety instruction (OPSS)	25	Name
2	Warning-mast	14	Electric welding	26	Brake cooling oil
3	Temperature	15	Operator safety	27	Cab tilt (Up/Stop/Down)
4	Radiator	16	Attach	28	Name plate
5	Fuel	17	Attach	30	Hammer
6	Hydraulic oil	18	Attach	31	Fire extinguisher
7	Hand caution	19	Attach	32	Noise level
8	Tire pressure	20	Tilt cab warning	33	Start warning
9	Safety work	21	Start procedure	34	Air compressor-cabin
10	Accumulator	22	Load capacity	35	DEF / AdBlue®
11	Hook	23	Engine room	36	Up/down (tilt cab)
12	Radiator fan	24	Start key	37	Air compressor-tank

2. DESCRIPTION

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

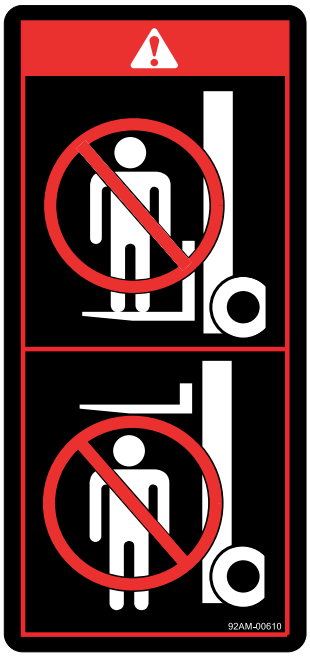
Replace any safety label that is damaged, or missing.

1) **WARNING-MAST** (Item 2)

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

⚠ **Never stand or work under the raised forks even if the hydraulic safety lock lever is applied.**

⚠ **In case of working under the forks, it is essential to support the carriage with blocks.**

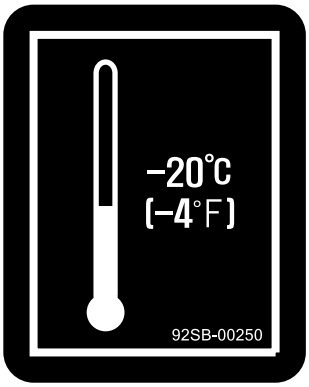


25L7A0OM06

2) **TEMPERATURE** (Item 3)

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

⚠ **Coolant must be checked as specified in planned maintenance intervals.**



25L7A0OM10

3) **Radiator** (Item 4)

This warning label is positioned on the top side of the engine hood to warn the danger or injury due to hot water which can be spotted out from the radiator when openring the radiator cap.

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

93HS-00110

4) **HAND CAUTION** (Item 7)
This warning label is positioned on the both side of carriage.

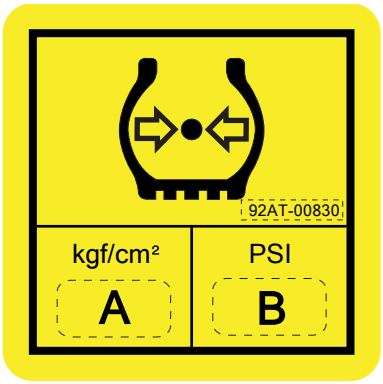
⚠ **It warns of the danger of injury from movement between rails, chains, sheaves, fork carriage, and other parts of the mast assembly. Do not climb on or reach into the mast. Personal injury will result if any part of your body is put between moving parts of the mast.**

92HV-00620

5) **TIRE PRESSURE** (Item 8)
This label is positioned on near the front and rear fender. (2 places of left and right respective-ly)

⚠ **Tire pressure must be checked in accordance with planned maintenance intervals.**

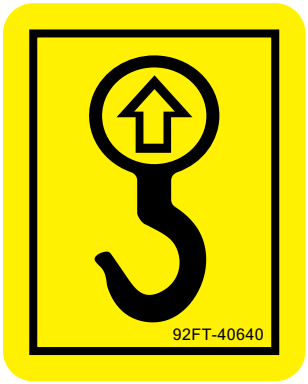
⚠ **Refer to page 5-3 for the regulated tire air pressure (A and B).**



25L7A0OM08

6) **HOOK** (Item 11)
This warning label is positioned near the lifting bracket on the frame and the top side of mast.

⚠ **Refer to page 5-34 for safe loading procedures.**



180D7EOM102

7) **RADIATOR FAN** (Item 12)
This warning label is positioned on the top side of the radiator.

⚠ **It warns of the danger or injury from spinning fan blades when the engine is running. Be sure that you keep your hands, fingers, arms, and clothing away from a spinning fan. Don't stand in line with a spinning fan. Fan blades can break at excessively high RPM and be thrown out of the engine compartment.**

93HS-00120

8) **SAFETY INSTRUCTION** (Item 13)
This warning label is positioned on the inside of cabin door if the truck is for USA or equipped with *OPSS.

⚠ **This forklift is equipped with an operator existence sensing system per ISO 3691.**

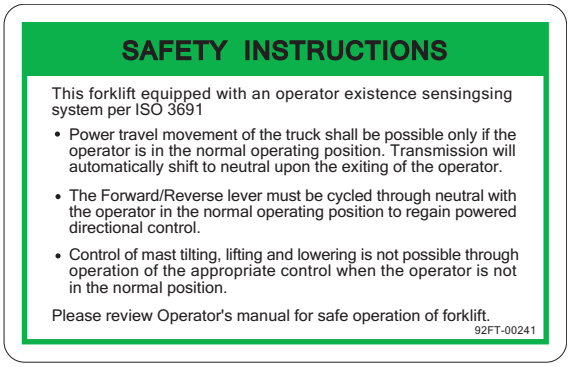
(1) Power travel movement of the truck shall be possible only if the operator is in the normal operating position. Transmission will automatically shift to neutral upon the exiting of the operator.

(2) The forward/reverse lever must be cycled through neutral with the operator in the normal operating position to regain powered direction control.

(3) Control of mast tilting, lifting and lowering is not possible through operation of the appropriate control when the operator is not in the normal position.

※ **Please review this manual for safe operation of forklift.**

Truck for USA or equipped with *OPSS.

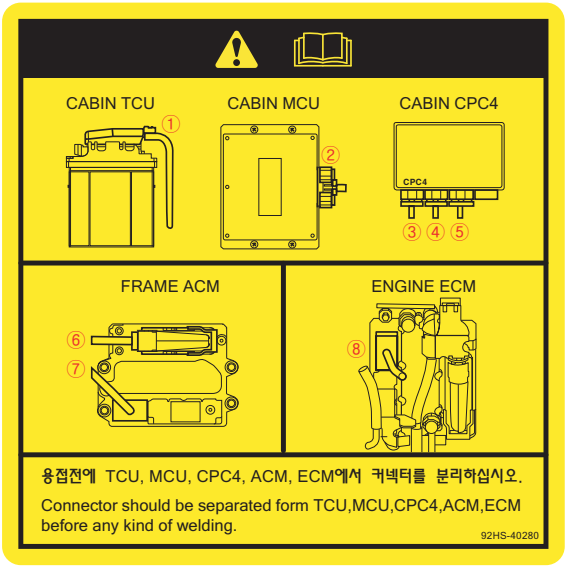


92FT-00241

*OPSS : Operator Presence Sensing System

9) **ELECTRIC WELDING** (Item 14)
This warning label is located on the right side frame.

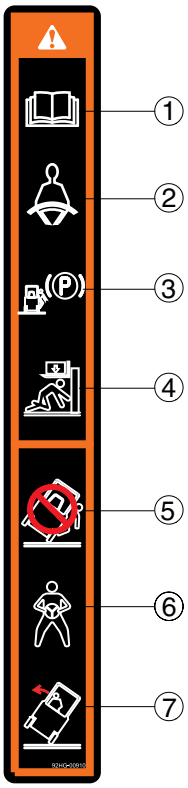
※ **Please separate the connector from TCU, MCU and ECM before weldng.**



92HS-40280

10) OPERATOR SAFETY (item 15)

This warning label is positioned on the front outside of overhead guard stay-LH.



25L7AOM09-1

(1) Refer to operator's manual in detail.
(2) Always buckle up the seat belt for safety operation.
(3) When the operator get off the machine, always pull the parking brake lever so that the machine can keep with stopping condition.
(4) The people should not pass through under forks and other attachments which are lifted or being lifted.
(5) Do not jump down from the machine. It can be caused that the operator have severe injury or death in the event of a tip over.
(6) Outstretch the legs as widely as possible and grasp firmly the steering handle.
(7) Lean the body to the opposite direction in order to avoid severe injury or death when the machine is tipped over.

※ **Refer to page 3-3 for details.**

11) START PROCEDURE (item 21)

This warning label is located on the right side of the cabin inside.

Start Procedure

1.The fuel transfer pump is self-priming.
When the Keyswitch is in ON position, the fuel transfer pump operates for 30 seconds & then shuts off.
- This fuel lift pump automatically forces the air out of the low pressure side of the fuel system from the air bleed fitting to fuel return line.
- This feature can be used to check the operation of lift pump and to fill the low pressure side fuel system after the services.
- Air grid heater operates depending on ambient temperature.

2. Wait until the self-priming is completed.
3. Start cranking.
If necessary or the engine would not start, 30 seconds lift pump cycle can be repeated until air is purged from low pressure side of fuel system.
4. Re-cranking.
5. If the engine still would not start,
please contact the nearest HYUNDAI or Benz dealers.

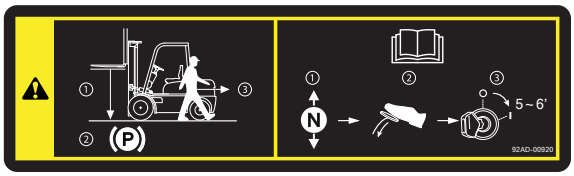
91LB-11170-1

91LB-11170-1

(1) The fuel transfer pump is self-priming.
When the keyswitch is in ON position, the fuel transfer pump operates for 30 seconds and then shuts off.
① This fuel lift pump automatically forces the air out of the low pressure side of the fuel system from the air bleed fitting to fuel return line.
② This feature can be used to check the operation of lift pump and to fill the low pressure side fuel system after the services.
③ Air grid heater operates depending on ambient temperature.
(2) Wait until the self-priming is completed.
(3) Start cranking.
If necessary or the engine would not start, 30 seconds lift pump cycle can be repeated until air is purged from low pressure side of fuel system.
(4) Re-cranking.
(5) If the engine still would not start, please contact the nearest HYUNDAI or Benz dealers.

12) START WARNING (Item 33)

This warning label is positioned on the middle side of dashboard cover.



50DEFW55

※ **Start key switch after 5~6 seconds from ON position. It needs approx 5~6 seconds to set correct position of throttle.**

(1) Warnings before leaving the operator seat.
- Be sure to lower the attachment to the ground.
- Apply the parking brake.

(2) Cautions before starting or operating the truck.
- Put the gear shift lever in the neutral.
- Apply the brake.
- Read this operator's manual carefully.

13) TILT CABIN WARNING (Item 36)

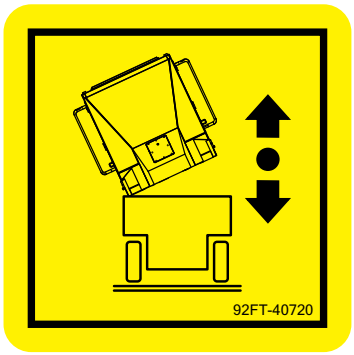
This warning label is positioned on the lift side of frame.

When tilting cab for service, the cab MUST BE FULLY EXTENDED UP or DOWN.

1. To raise cab, depress switch down until fully raised.
2. To lower cab, depress switch down until fully lowered.

⚠ **To prevent cab from lowering unexpectedly, do not change the directional change lever manually when opening cab.**

※ **Refer to page 3-22 for tilt switch.**

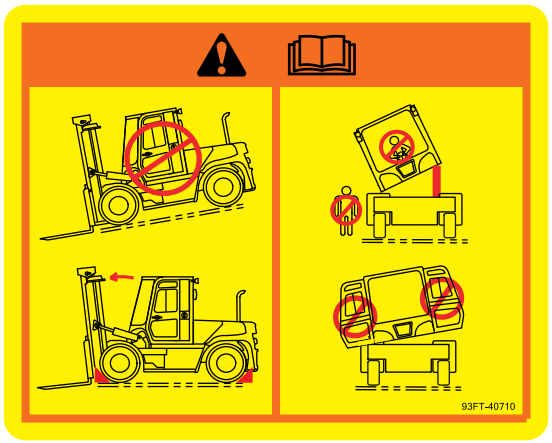


92FT-40720

14) TILT CABIN WARNING (Item 20)

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

⚠ **Refer to page 7-15 for safe tilting procedure.**



50D7EFW04

15) AIR COMPRESSOR-CABIN (Item 34)

This warning label is positioned on the left side of cabin inside.

(1) Park on a flat place to use the air compressor.

(2) Be sure the engine working during the use of air compressor. After the use, make sure the compressor switch off.

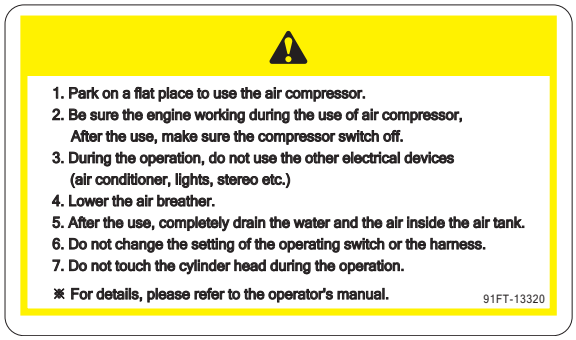
(3) During the operation, do not use the other electrical devices (air conditioner, lights, stereo etc.)

(4) Bleed the air breather.

(5) After the use, completely drain the water and the air inside the air tank.

(6) Do not change the setting of the operating switch or the harness.

(7) Do not touch the cabin tilting cylinder head during the operation.



91FT-13320

16) ENGINE ROOM (Item 23)

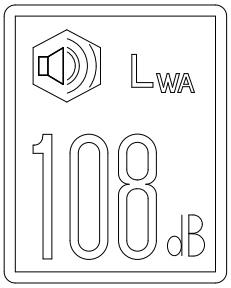
This warning label is located on the both side of engine hood.

⚠ Don't wash the engine room.

92HN-00261

17) NOISE LEVEL (Item 32)

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



92FT-00350

18) **FIRE EXTINGUISHER** (Item 31)

This label is positioned on the rear top side of cabin.

⚠ **Be familiarized with the fire extinguisher instructions.**

3000SL02

19) **ACCUMULATOR** (item 10)

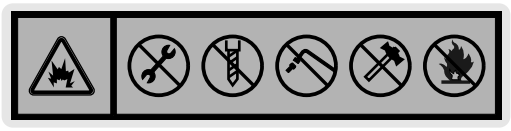
This warning label is positioned on the accumulator of the solenoid valve.

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

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

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

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



1107A0FW46

20) **DEF / AdBlue®** (item 35)

This label is positioned on the rear side of frame.

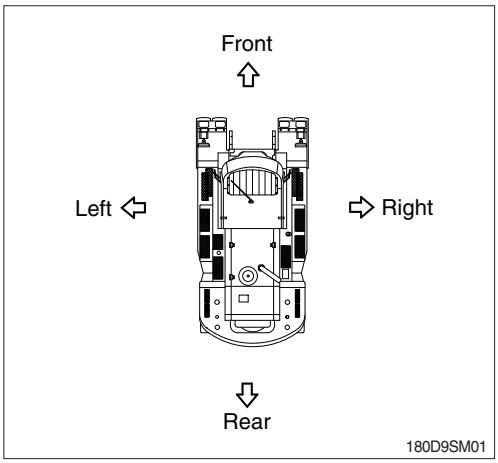
Fill the DEF / AdBlue® only.

Never use diesel oil.

92HS-00121

1. DIRECTION

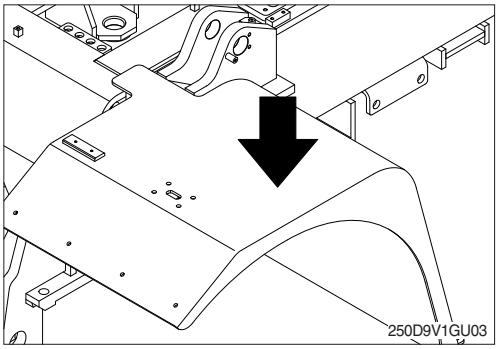
The directions of this truck indicate forward, backward, right and left when truck is in the travelling direction.



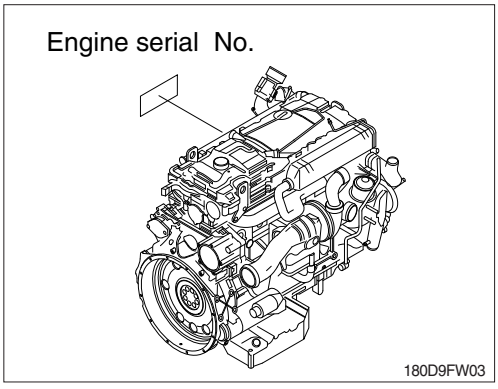
2. SERIAL NUMBER

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

1) TRUCK SERIAL NUMBER
It is shown on the left fender.



2) ENGINE SERIAL NUMBER
The numbers are located on the engine name plate.



3. 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.

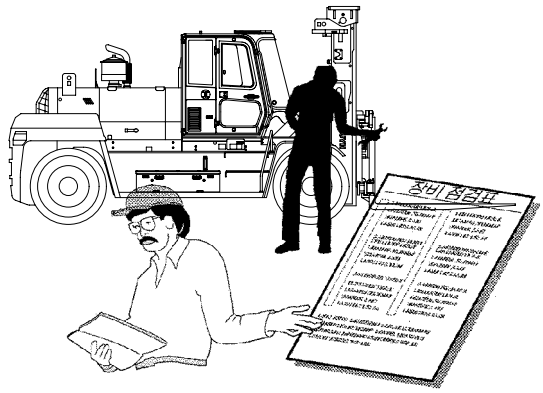
1. DAILY INSPECTION

At the beginning of each shift, inspect your truck and fill out a check, maintenance and lubrication table.

Check for damage and maintenance problems.

Have repairs made before you operate the truck.

Do not make repairs yourself. Lift truck mechanics are trained professionals. They know how to make repairs safe.



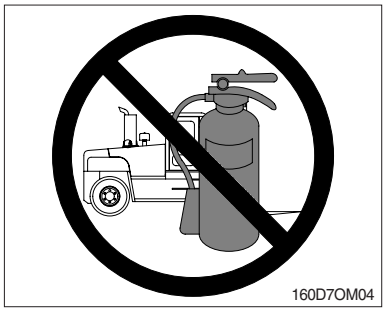
180D9OM02

2. DO'S AND DON'TS

Do watch for pedestrians.

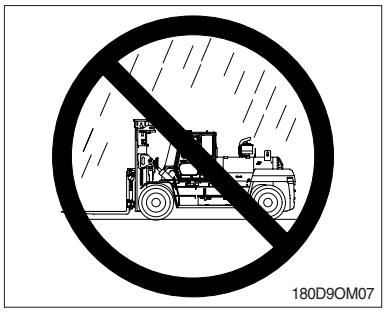
Do wear safety equipment when required.

Don't mix drugs or alcohol with your job.



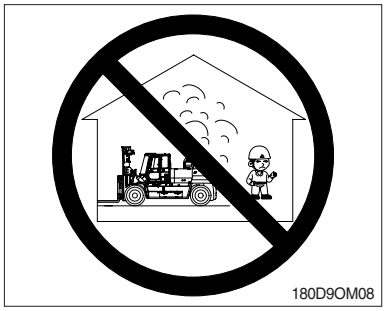
Don't block safety or emergency equipment.

Don't smoke in NO SMOKING areas or when charging.



Don't operate the truck outdoors in rainy day.

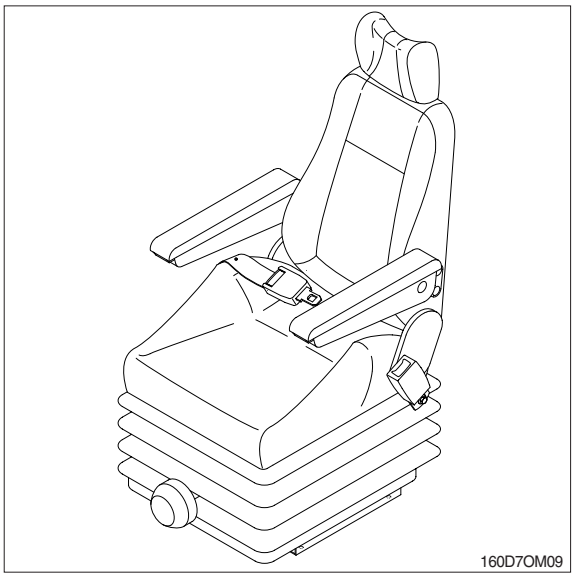
※ **Exclude the truck equipped cabin.**



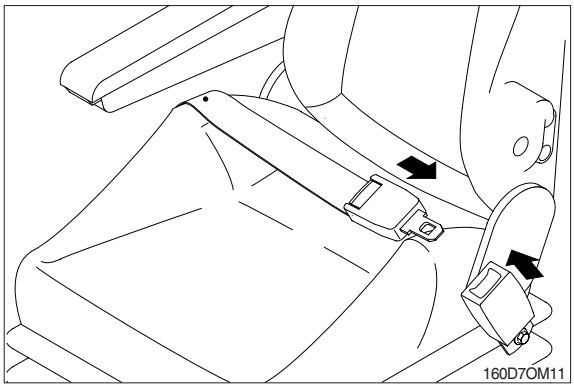
Exhaust gas is dangerous.
Do not operate the truck at the inhouse, if possible.
Provide adequate ventilation when working in a closed space.

3. SEAT BELTS

⚠ Always buckle up for the truck equipped with safety belt.

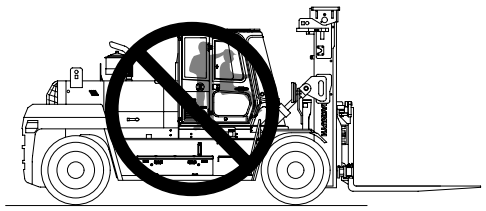


⚠ Seat belts can reduce injuries.



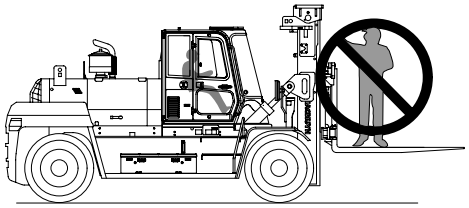
4. NO RIDERS

1) The operator is the only one who should be on a truck.



180D9OM12

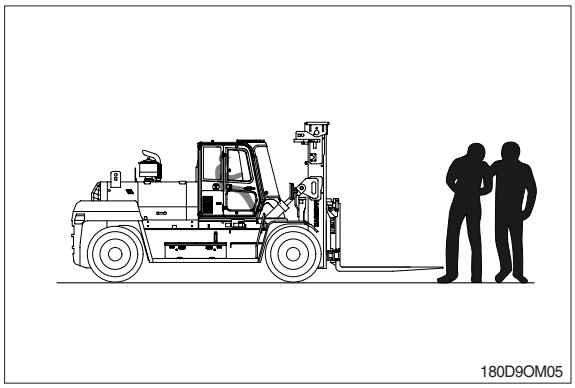
2) Never transport personnel on the forks of a lift truck.



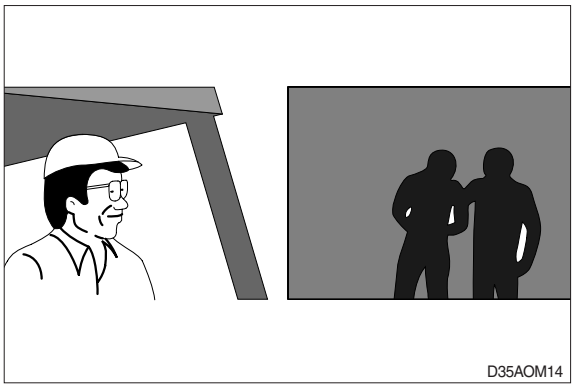
180D9OM14

5. PEDESTRIANS

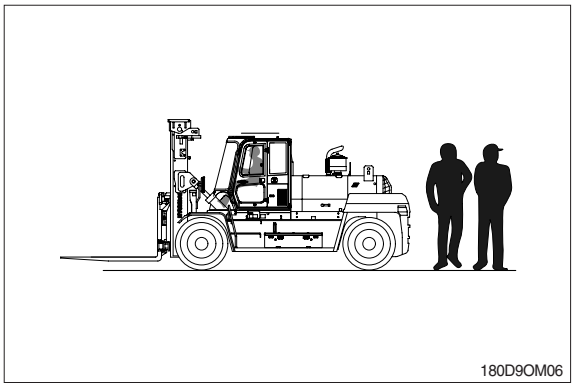
1) Watch where you are going. Look in the direction of travel. Pedestrians may use the same roadway you do. Sound your horn at all intersections or blind spots.



2) Watch for people in your work area even if your truck has warning lights or alarms. People may not watch for you.



3) Watch for people standing back, even when you are parked.

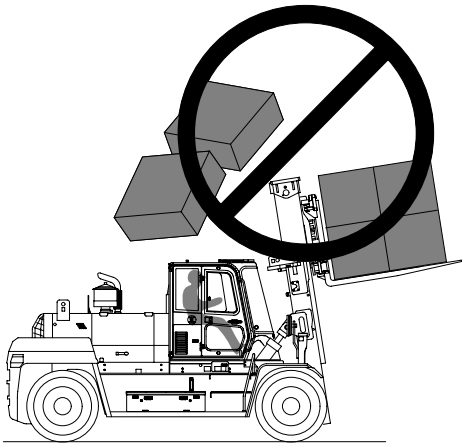


6. OPERATOR PROTECTION

1) Stay inside the cabin.

2) Always keep your body within the confines of the truck.

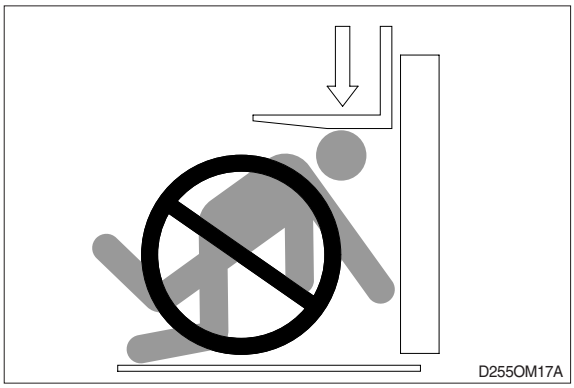
⚠ **Do not operate truck without cabin or overhead guard, unless condition prevent use of it.**



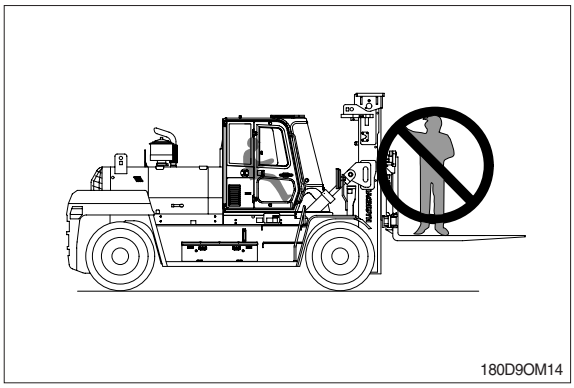
180D9OM16

7. FORK SAFETY

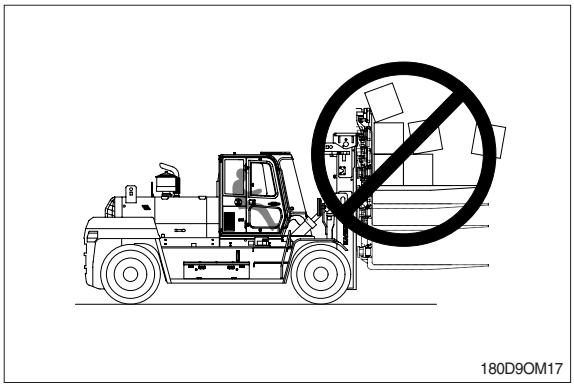
Never allow anyone to walk under raised forks.



There is special equipment to raise people for overhead work.
DO NOT USE LIFT TRUCKS.

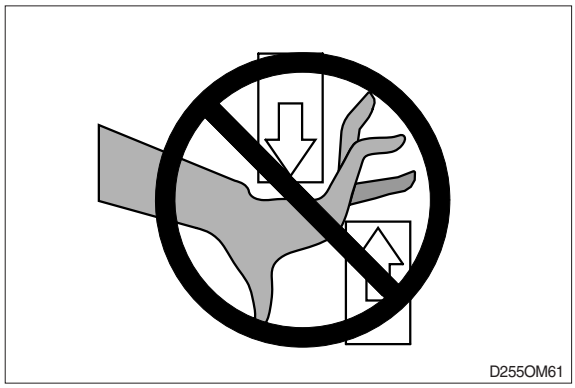


Always lower the load slowly.
Raise and lower with mast vertical or tilted slightly back (Never forward).



8. PINCH POINTS

⚠ Keep hands, feet and legs out of the mast.



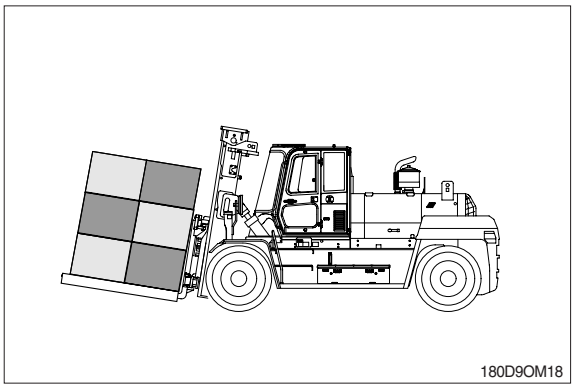
⚠ Don't use the mast as a ladder.

⚠ Never try to repair the mast, carriage, chain, or attachment by yourself. Always get a trained mechanic.

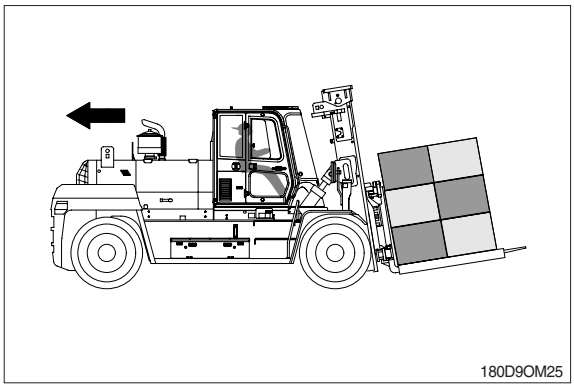
9. TRAVEL

1) Travel with the load near the floor/ground, with mast tilted back to cradle the load whenever possible.

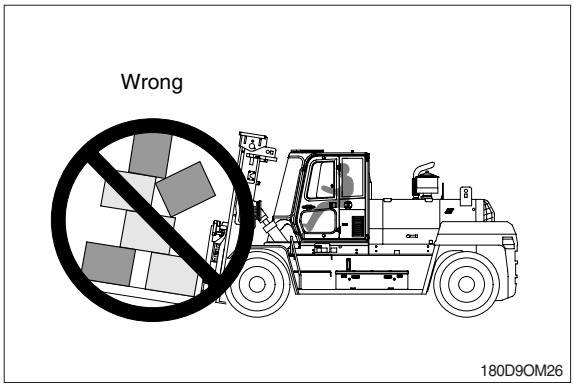
⚠ **Never lift or lower the load when the truck is in motion.**


180D9OM18

2) When handling bulky loads that restrict your vision operate your truck in reverse to improve visibility. Be sure to pivot in the seat to give maximum visibility.


180D9OM25

3) Unstable loads are a hazard to you and to your fellow workers. Always make certain that the load is well stacked and evenly positioned across both forks. Never attempt to lift a load with only one fork.

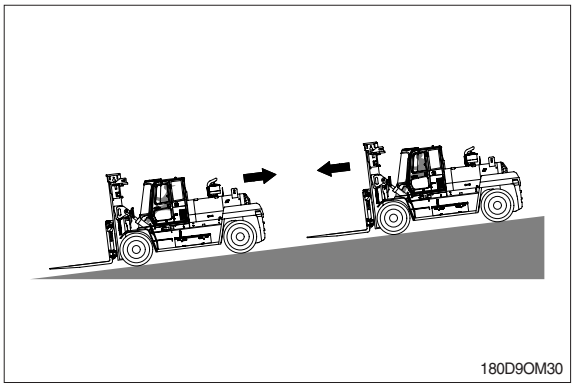


180D9OM26

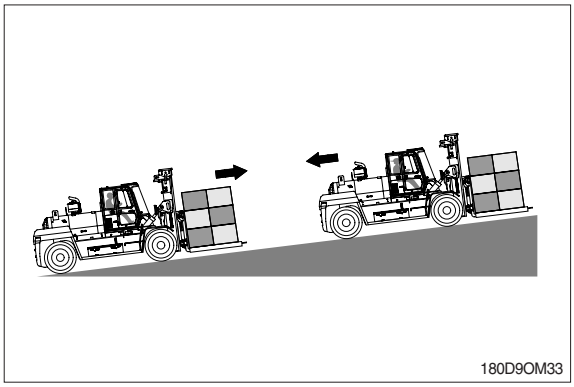
10. GRADES, RAMPS, SLOPES AND INCLINES

⚠ Never turn on a grade, either loaded or unloaded.

1) Unloaded-Forks downgrade



2) Loaded - Forks upgrade



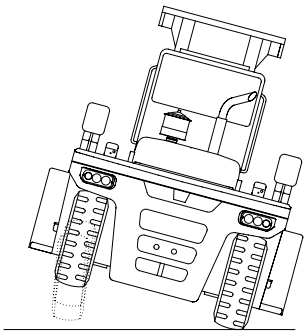
11. TIP OVER

1) LATERAL TIP OVER

(1) Lateral tip over can occur with a combination of speed and sharpness of turn. This combination will exceed the stability of the truck. This condition is even more likely with an unloaded truck.

(2) With the load or mast raised, lateral tip over can occur while turning and/or braking when traveling in reverse or accelerating and turning while traveling forward.

(3) Lateral tip over can occur loaded or unloaded by turning on an incline or ramp.



180D9OM38

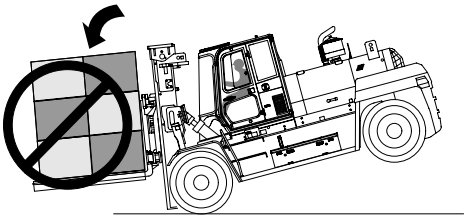
2) LONGITUDINAL TIP OVER

(1) Longitudinal tip over can occur with combination of overloading and load elevated also with capacity load and elevated. This combination will exceed the stability of the truck. This condition is even more likely with excessive forward tilt, braking in forward travel or accelerating rearward.

(2) Longitudinal tip over can occur by driving with the load down slope on a steep grade.

Lateral and longitudinal tip over can occur if the truck is driven over objects on the floor or ground, off the edge of improved surfaces, or into potholes in the road surface, or by running into overhead objects or collisions.

An off dock type of tip over can occur if the truck is steered too close to the dock edge, driven off the edge of the dock or ramp, or if the highway truck or trailer rolls away from the dock or is driven away during loading.



180D9OM39

⚠ The conditions listed above can be further aggravated by overloading, excessive tilt, or off center loads.

⚠ Lift truck tip over can cause serious injury or death if the operator is trapped between the truck and the ground.

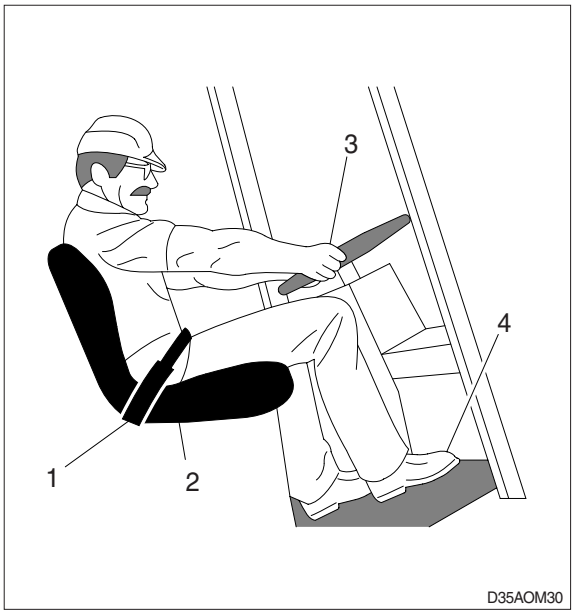
3) WHAT TO DO IN CASE OF A TIP OVER

⚠ If your truck starts to tip over, Do not jump.

⚠ Brace yourself as illustrated right.

1. Make sure your seat belt is fastened securely, if the truck is equipped with seat belt.
2. Stay in your seat.
3. Grip the wheel.
4. Brace your feet.

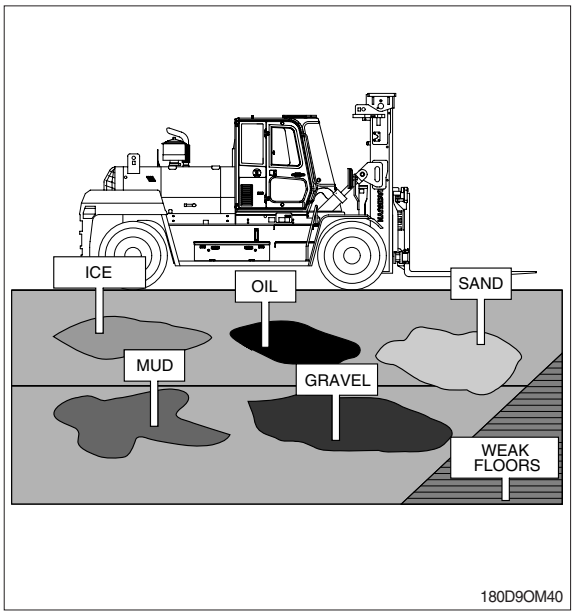
⚠ Your chances for survival in a tip-over are better if you stay with the truck, in your seat.



12. SURFACE AND CAPACITY

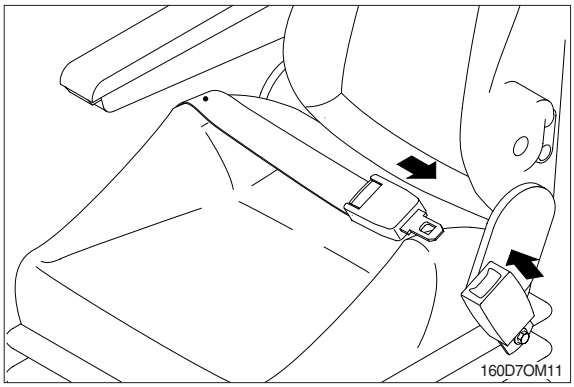
Avoid these conditions. They can cause a truck to tip over or lose traction for braking or driving.

⚠ **Know the weight of your truck and load. Especially when using elevators, Know the capacity of the elevator you intend to use. Do not overload.**



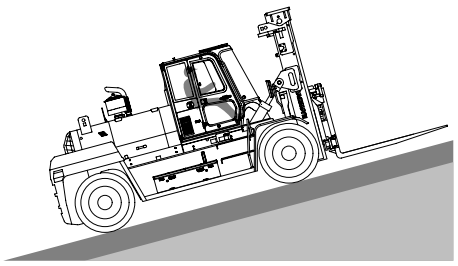
TIP OVER

⚠ **Seat belts can reduce injuries. ALWAYS BUCKLE UP**



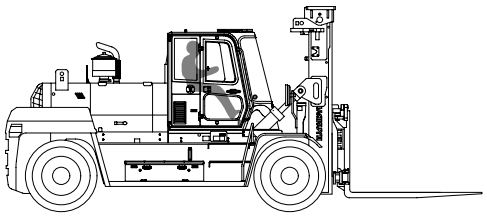
13. PARKING

1) Never park on a grade.



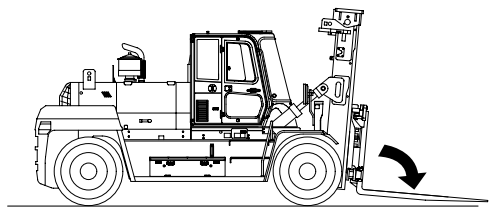
180D9OM41

2) Always come to a complete stop before leaving truck. Be sure travel control is in NEUTRAL.



180D9OM42

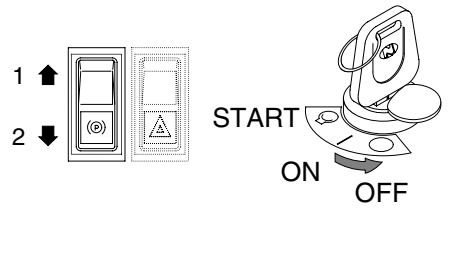
3) Lower forks fully to floor and tilt forward.



180D9OM44

4) Set parking brake.
   Position 1 : OFF (Release)
   Position 2 : ON (Lock)

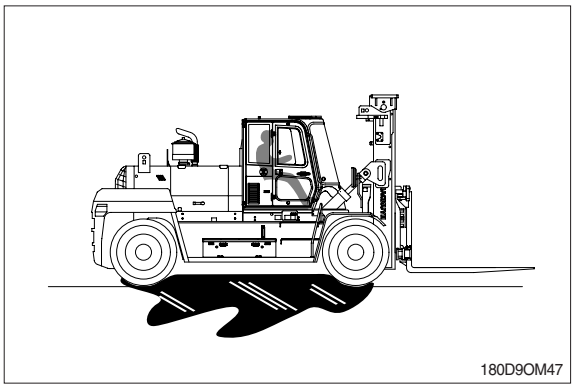
5) Turn key to OFF position.



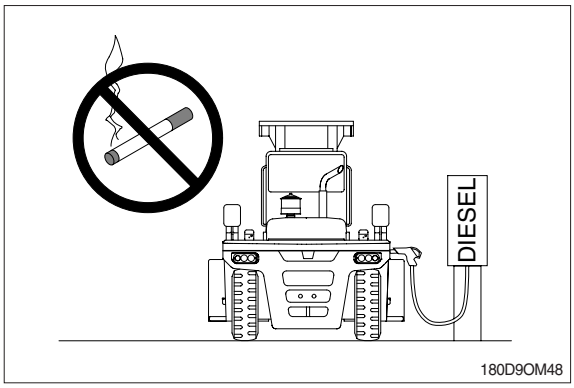
160D7OM37

14. REFUELING

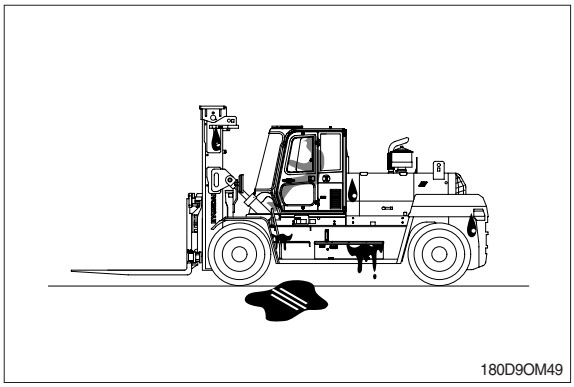
1) Before adding oil, check around truck for oil leakage.



2) Keep away from fire when adding oil or during operation.

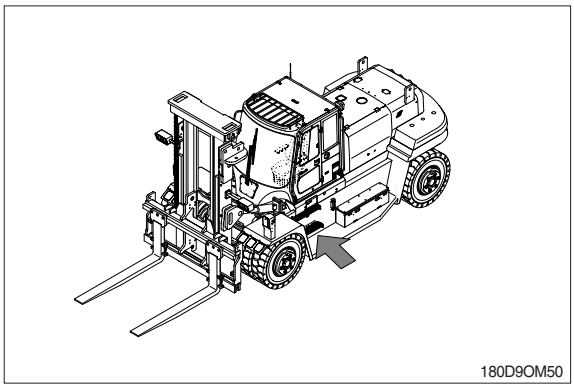


3) After adding oil, wipe off any oil spilled on truck.

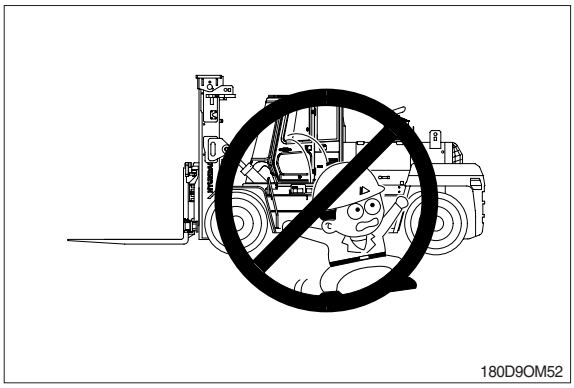


15. STEP

1) When getting on or off the truck, use the step provided.



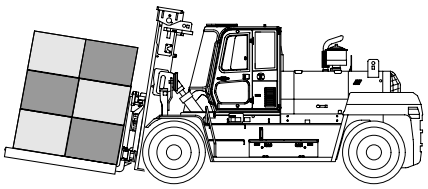
2) Do not jump up or down from the truck.



16. OPERATOR'S SAFETY RULES

1) All operational functions require that the operator be seated in the operator's seat.

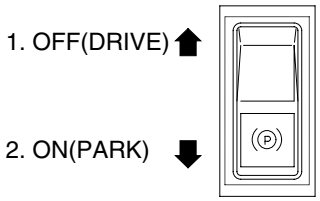
⚠ **Always buckle up if a seat belt is provided.**



180D9OM18

2) Parking brake must be locked in the PARK POSITION before exiting from the vehicle.

⚠ **Parking brake must remain locked in the park position (ON) except when an operator is in the normal operating position.**



160D7OM24

3) ISO 3691 REGULATIONS (TRUCK FOR USA OR EQUIPPED WITH A *OPSS)

⚠ **This forklift truck is equipped with an Operator Existence Sensing System per ISO 3691.**

*OPSS : Operator Presence Sensing System

(1) Traction safety warning

① This function works when the key switch is ON or START position.
② The transmission (power automatically cutoff) in 2 seconds from the driver's off the seat.
③ At the same time, the warning lamp and alarm will sound intermittently if drive lever was not returned to neutral.
④ To release the function, the forward-reverse lever must be cycled through neutral with the operator in the normal operating position to regain powered directional control.

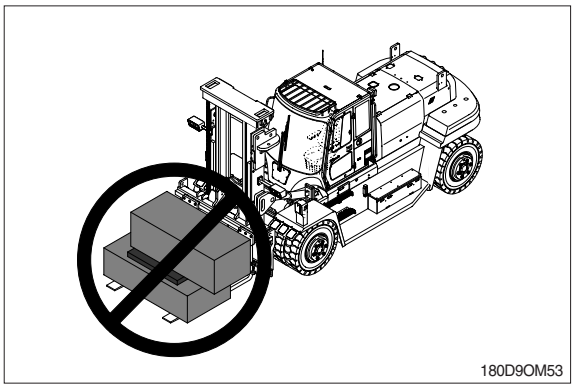
(2) Parking brake warning

① This function works when the key switch is not only ON or START position but also OFF position.
② Alarm sounds in 2 seconds from the driver's off the seat with the parking lever released.
③ To release the function, the parking switch must be turned to ON (PARK) position.
④ When the key switch is OFF position, alarm will sound only for 30 seconds .

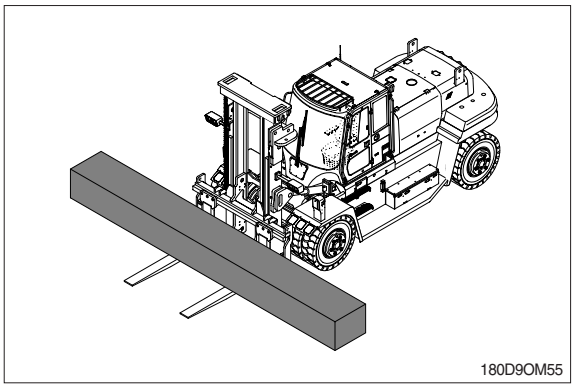
1. LOOSE LOADS

⚠ Loose or unbalanced loads are dangerous. Observe these precautions.

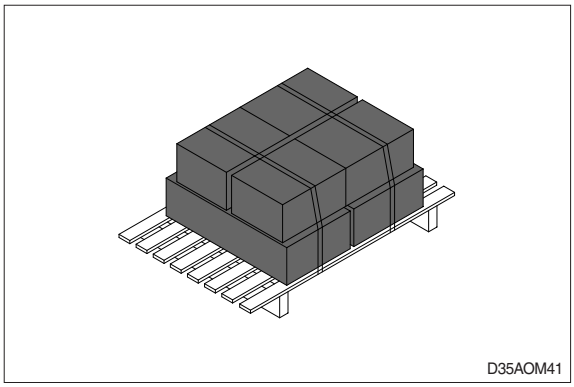
Never carry loose or uneven material.



Center wide loads.

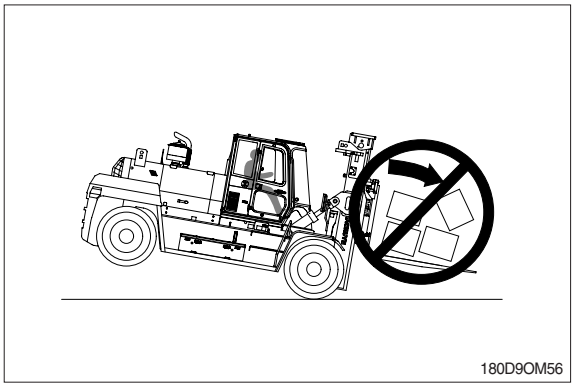


Stack and band loose material.



Avoid sudden braking or starting

⚠ When the truck is loaded, do not drive at maximum speed.

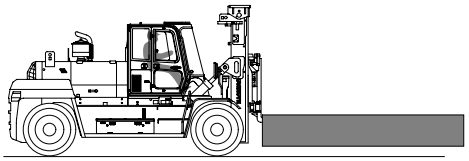


2. LONG AND WIDE LOADS

⚠ **With long or wide loads, you need more room. So slow down and watch your clearance.**

When extra-long material makes it necessary to travel with the load elevated, do so with extreme care and be alert to load end-swing when turning.

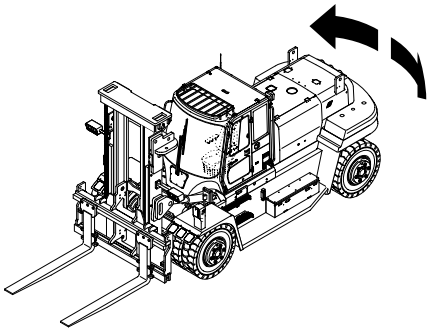
⚠ **A long load reduces the capacity of the truck. Know and understand your truck load rating.**



180D9OM57

3. REAR SWING

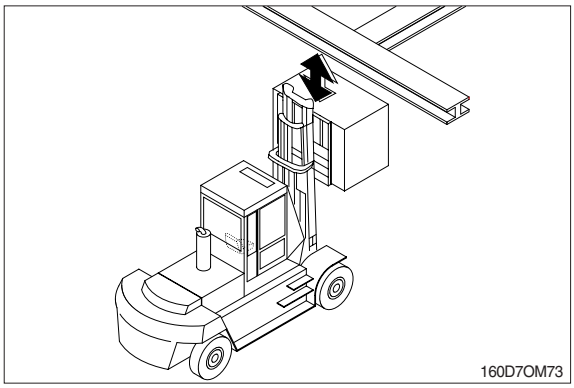
⚠ **When turning, be sure the rear end of the truck does not swing into racks, posts, etc. Watch for pedestrians beside the truck.**



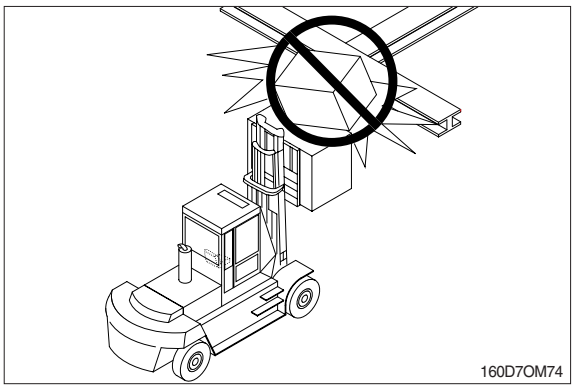
180D9OM43

4. LOW OVERHEAD CLEARANCE

⚠ Know the height of your truck, with and without a load. Check your clearances. Keep the load low and tilted back.

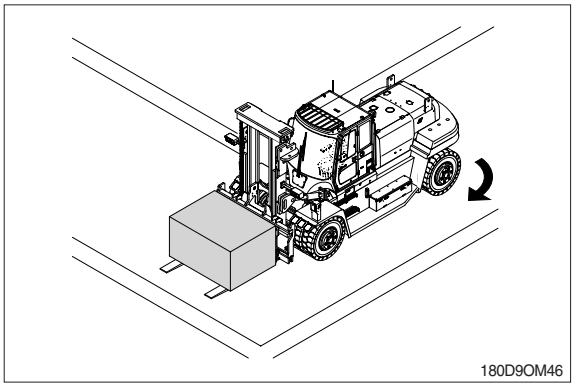


⚠ Watch overhead clearance:
Moving into overhead structures can tip a truck over, or spill a load.

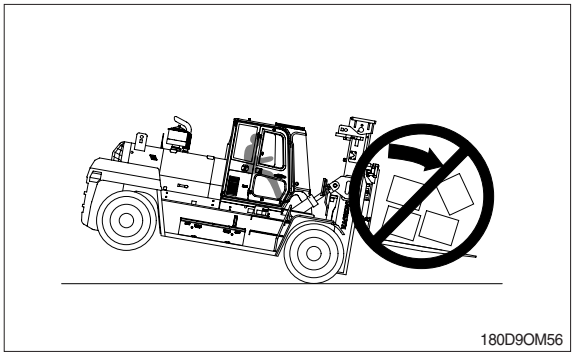


5. FAST TURNS AND HIGH LOADS

⚠ Slow down before turning.
The truck can tip over.

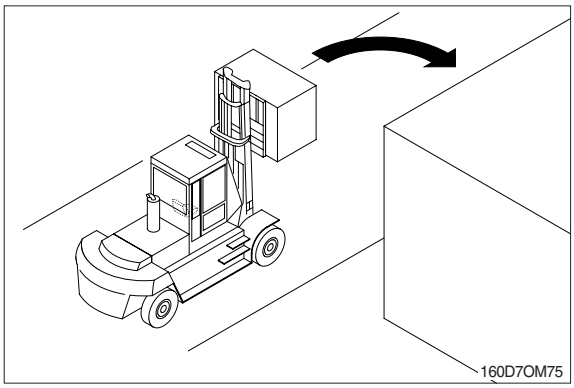


⚠ Turn too sharp with a raised load and your truck can tip even at slow speeds. Travel with a load raised only when removing or depositing a load.



6. RIGHT ANGLE STACKING

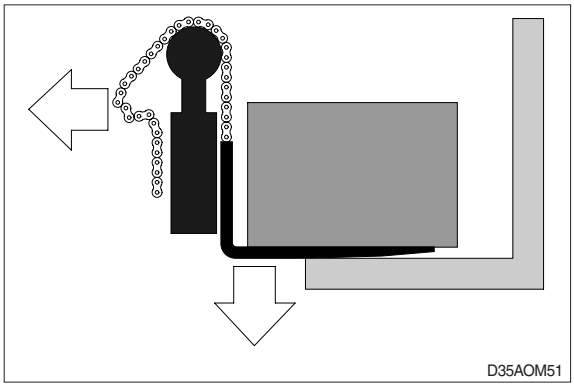
⚠ When right angle stacking or moving with a raised load to clear low objects, avoid sharp turns and move slowly.

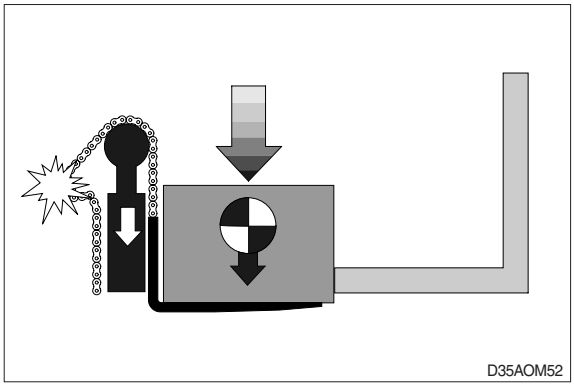


7. CHAIN SLACK

⚠ Slack chains mean rail or carriage hang-up.
Raise the forks before you move, or broken chains can result.

⚠ In case forks with loads are stuck while lowering the mast, lift the mast again and prevent chains from being slack.

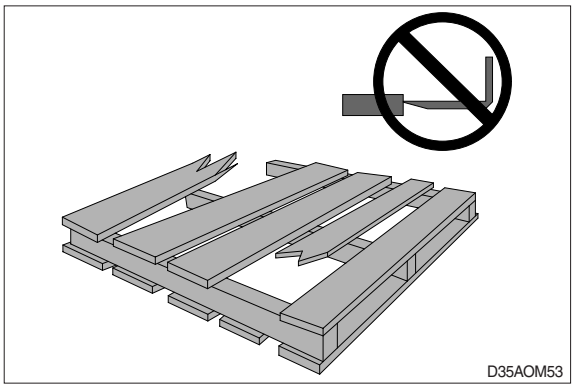




8. PALLETS AND SKIDS

⚠ Do not move or store materials on damaged pallets or skids. Items can fall through them causing severe injury or death.

⚠ Be sure the pallet or skid you are using is in good condition and does not have defective or missing components and fasteners.



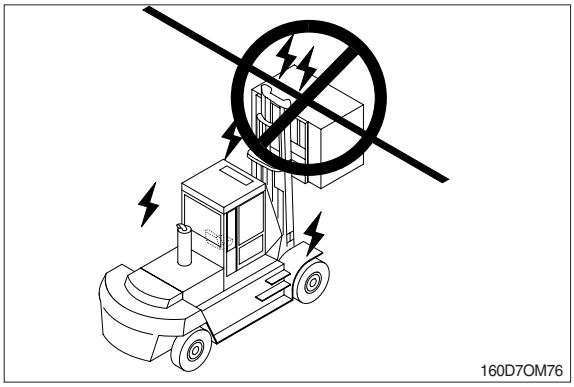
9. CAUTION FOR ELECTRICAL LINES

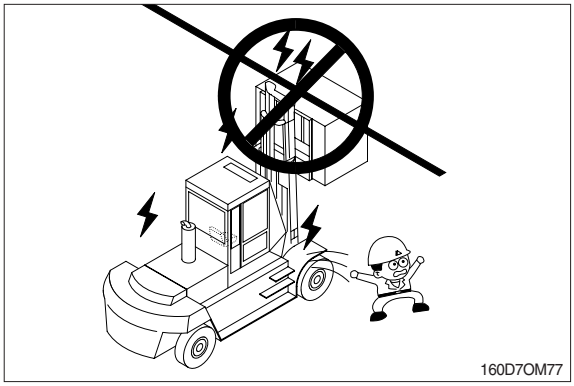
⚠ When moving the truck with the mast raised, watch out electrical lines over the truck.

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

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

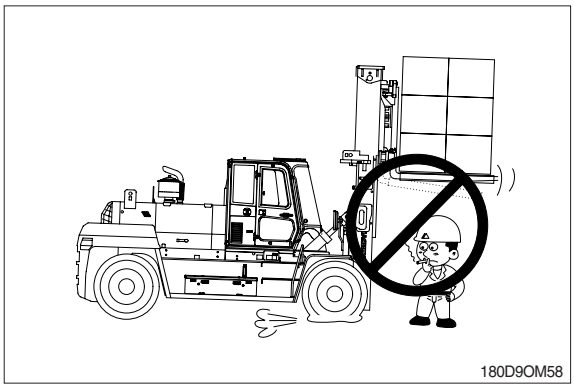
⚠ If the truck touches the electric power lines, keep sitting on the operator's seat and make sure the personnel on the ground not to touch the truck until turning off the electric current.
Jump off the truck without contacting the truck when you need to get off.



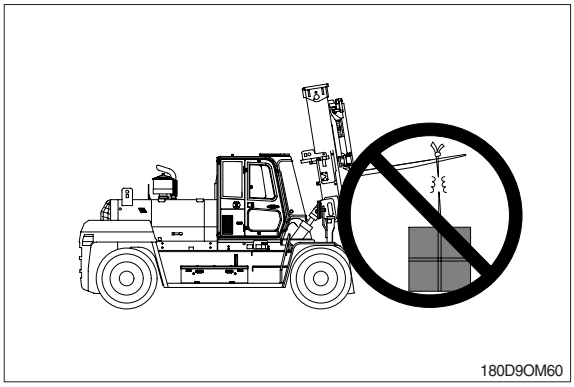


10. LIFTING LOADS

Never permit any persons to stand or pass under lifted load.

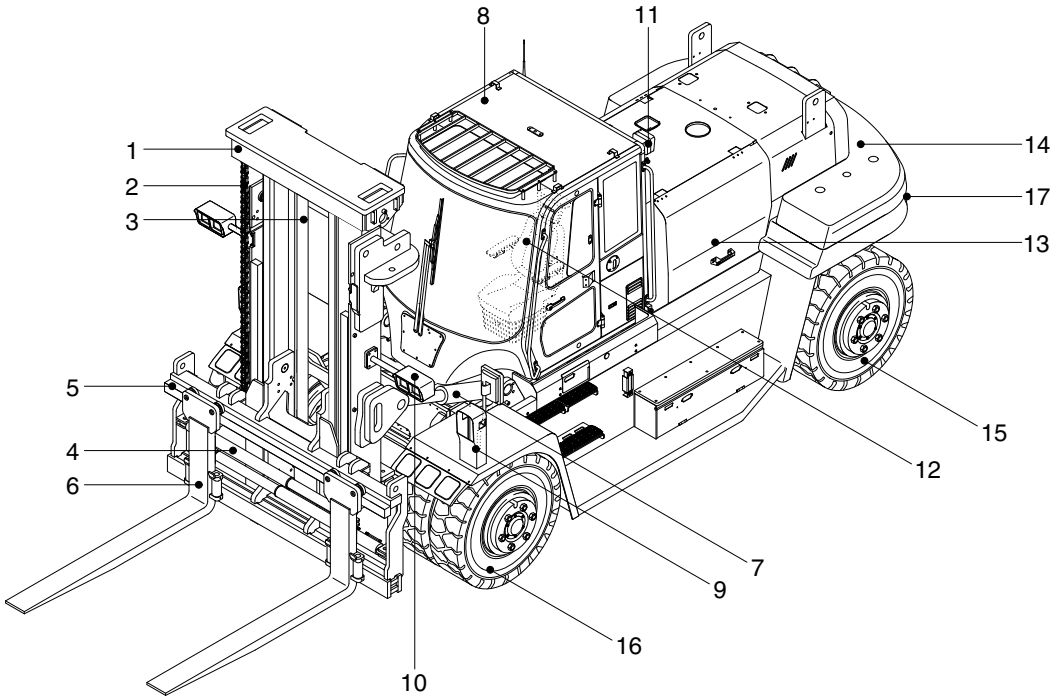


Never use wire rope to lift a load.



1. GENERAL LOCATIONS

1) 180D-9

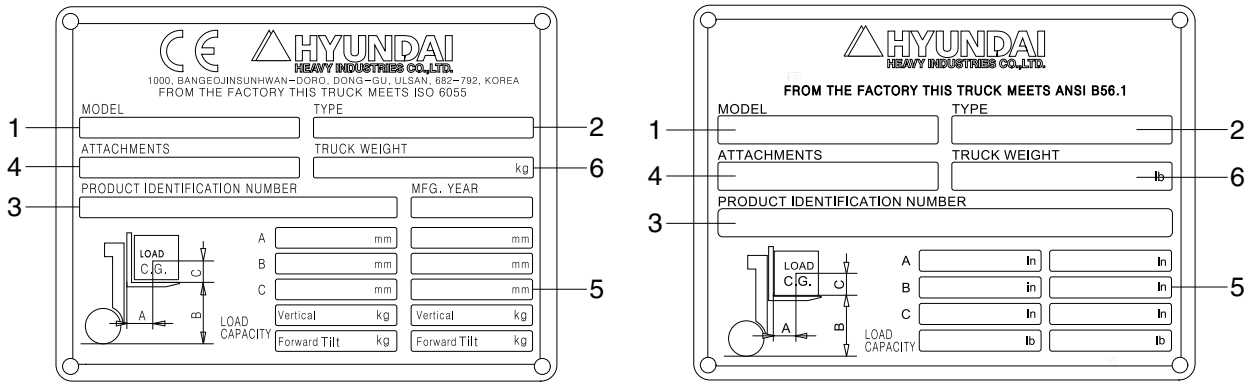


180D9OM54

1	Mast	7	Tilt cylinder	13	Bonnet
2	Lift chain	8	Cabin	14	Counterweight
3	Lift cylinder	9	Head light-fender	15	Rear wheel
4	Fork positioner cylinder	10	Work lamp-mast	16	Front wheel
5	Carriage	11	Work lamp-cabin rear	17	Rear combination lamp
6	Forks	12	Operator's seat		

2. DATA/SAFETY PLATES AND DECALS

1) TRUCK DATA AND CAPACITY PLATE



50D7EOM56

(1) Truck model number or registered name

(2) The type is represented a kind of truck such as diesel.

(3) Truck serial number

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

(4) Attachment description (If any installed)

The user must see that the truck is marked to identify the attachment (s), including the weight of the truck/attachment combination and truck capacity with the attachment.

(5) Capacity rating, load center, and lifting height data

Shows the maximum load capacity of this truck with relation to load centers and fork heights (See diagram on plate). Personal injury and damage to the truck can occur if these capacities are exceeded.

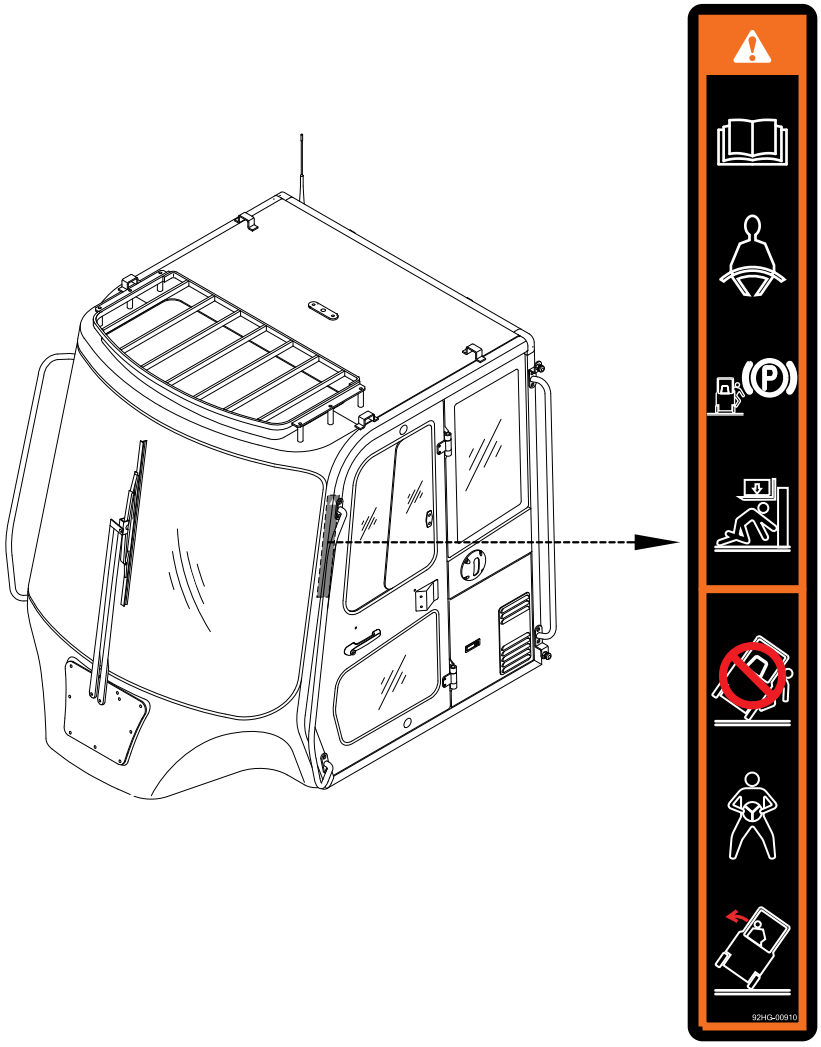
Do not exceed the maximum capacity specified.

(6) Truck weight

The approximate weight of the truck without a load on the forks. This weight plus the weight of the load must be considered when operating on elevators, elevated floors, etc. to be sure they are safe.

⚠ Before modifications that affect the stability of safety systems are made written approval from HYUNDAI. Contact your authorized HYUNDAI dealer for a new nameplate showing the revised capacity.

2) OPERATOR SAFETY WARNING DECAL



250D9OM59

⚠ **Safety and warning decals are placed in conspicuous locations on the truck to remind you of essential procedures or to prevent you from making an error that could damage the truck or possibly cause personal injury. You should know, understand, and follow these instructions. Safety and warning decals. Should be replaced immediately if missing or defaced (Damaged or illegible). Refer to the page 0-3 for the location of all decals.**

⚠ **Operator/Tip-over warning decal**

This decal is located on cabin's upper-left side frame. Its purpose is to remind the operator that staying in the seat provides the best chance of avoiding injury in the event of a truck-tipping or driving off a dock mishap.

Lift trucks can be tipped over if operated improperly. Experience with lift truck accidents has shown that the driver cannot react quickly enough to jump clear of the truck and cabin as the truck tips. To protect operators from severe injury or death in the event of a tip over, it is best to be held securely in the seat. So, please, always buckle up when driving your lift truck.

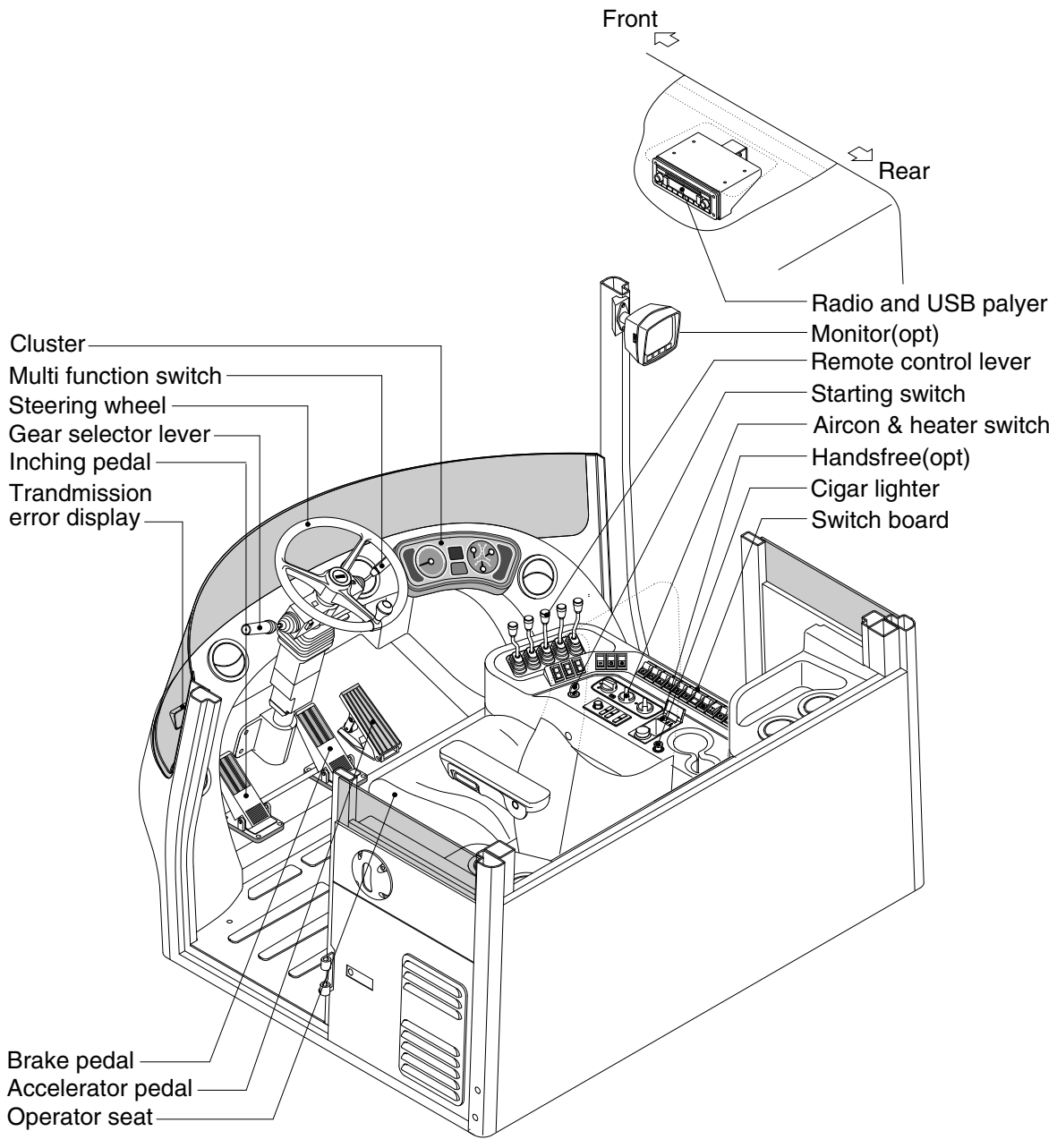
3. CAB DEVICES

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 truck to be monitored at a glance.

(2) It is equipped with a safety warning system for early detection of truck malfunction.



180D9CD01

4. CLUSTER

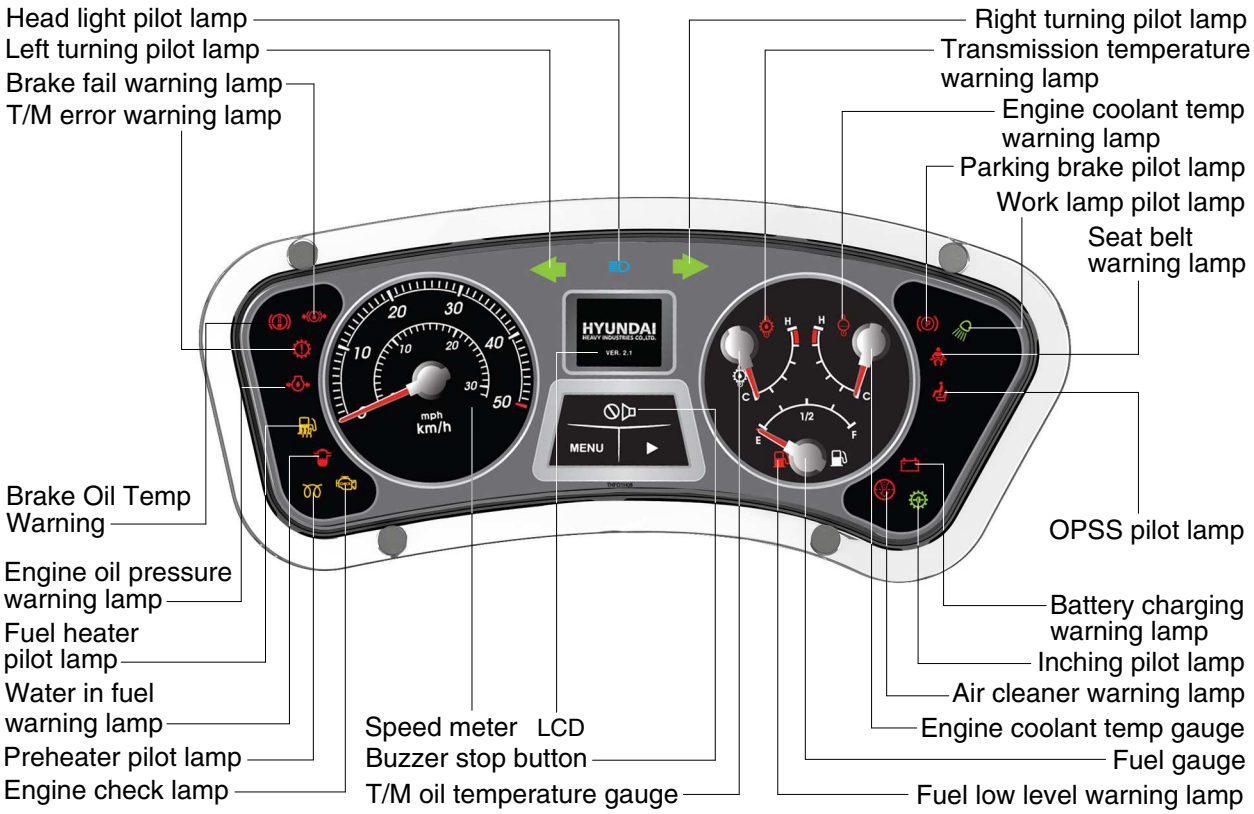
1) STRUCTURE

The gauges panel consists of gauges and monitors as shown below, to warn the operator in case of abnormal truck operation or conditions for the appropriate operation and inspection.

- Gauges : Indicate operating status of the truck.
- Warning lamp : Indicate abnormality of the truck.
- Pilot lamp : Indicate operating status of the truck.

※ **The monitor installed on this truck does not entirely guarantee the condition of the truck. Daily inspection should be performed according to chapter 7. PLANNED MAINTENANCE AND LUBRICATION.**

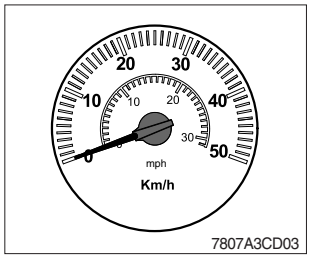
※ **When the monitor provides a warning immediately check the problem, and perform the required action.**



160D7ECD02

2) GAUGE

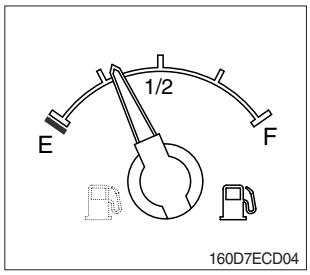
(1) Speed meter



7807A3CD03

① The speed meter displays the speed of truck in mph and km/h.

(2) Fuel gauge

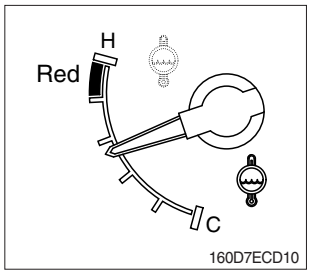


① This gauge indicates the amount of fuel in the fuel tank.

② Fill the fuel when the indicator moves **E** point, refuel as soon as possible to avoid running out of fuel.

※ **If the gauge indicates below E point even though the truck is on the normal condition, check the electric device as that can be caused by the poor connection of electricity or sensor.**

(3) Engine coolant temperature gauge

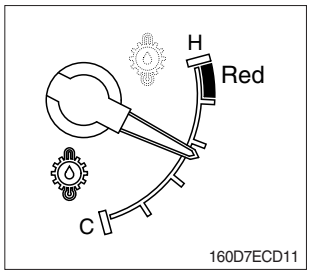


① This indicates the temperature of coolant.
- Red range : Above 104°C (219°F)

② Keep idling engine at low speed until the indicator is in the operating range.

③ If the indicator is in the red range, turn OFF the engine, check the radiator and engine.

(4) Transmission oil temperature gauge



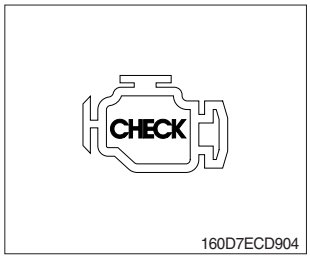
① This range indicates the temperature of transmission oil.
- Red range : Above 107°C (225°F)

② Keep idling engine at low speed until the indicator is in the operating range.

③ If the indicator is in the red range, it means the transmission is overheated. Be careful that the indicator does not move into the red range.

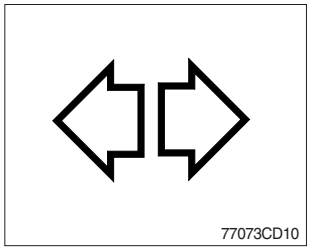
3) WARNING AND PILOT LAMP

(1) Engine check lamp



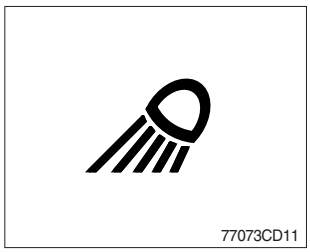
① This lamp lights ON during a nonfatal engine system error. The engine can still be run, but the fault should be corrected as soon as possible.

(2) Direction pilot lamp



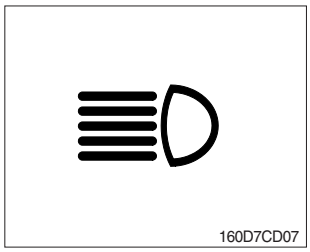
① This lamp flashes when the signal indicator lever is moved.

(3) Work lamp pilot lamp (front / rear)



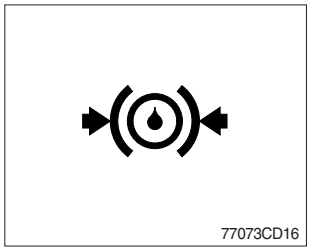
① This lamp lights ON when cabin work lamp switch is pressed.

(4) Head light pilot lamp



① This lamp comes ON when the main light switch is operated to 2nd step.

(5) Brake fail warning lamp

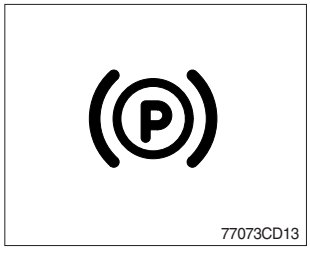


① The lamp lights ON when the oil pressure of service brake drops below the normal range.

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

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

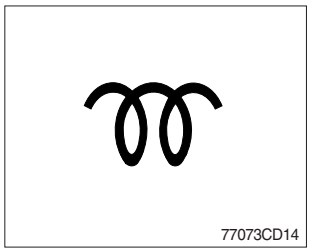
(6) Parking brake pilot lamp



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

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

(7) Preheater pilot lamp



① This lamp lights ON when start switch is turned clockwise to the ON position. Light will turn off after approximately 15~45 seconds, depending on engine coolant temperature, indicating that preheating is completed.

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

※ **Refer to page 5-12.**

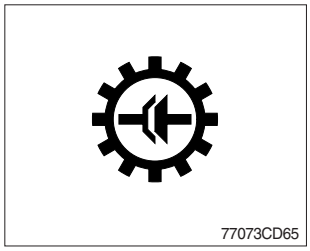
(8) OPSS pilot lamp (option)

① This signal lamp lights ON when the operator leaves the seat.

② Powered travel movement of the truck shall be possible only if the operator is in the normal operating position. Transmission will automatically shift to neutral upon the exiting of the operator.

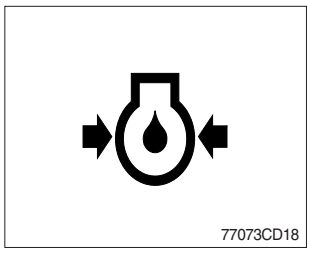
③ The forward/reverse lever must be cycled through neutral with the operator in the normal operating position to regain powered direction control.

(9) Inching pilot lamp



① When the inching switch is pressed, the lamp lights ON.

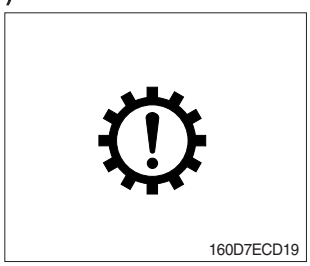
(10) Engine oil pressure warning lamp



① This lamp comes ON for a while after starting the engine because of the low oil pressure.

② If the lamp comes ON during engine operation, shut OFF engine immediately. Check oil level.

(11) Transmission error warning lamp



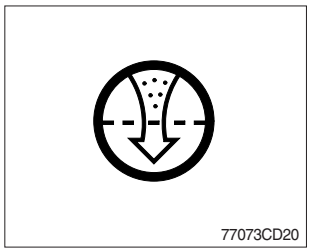
① This lamp lights ON and the T/M message display shows the error codes when an error occurs in the transmission.

② Immediately pull the truck to a convenient stop. Stop the engine. Investigate the cause.

※ **Consult a HYUNDAI dealer to investigate the cause.**

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

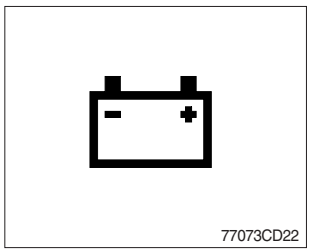
(12) Air cleaner warning lamp



① This lamp operates by the vacuum caused inside when the filter of air cleaner is clogged.

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

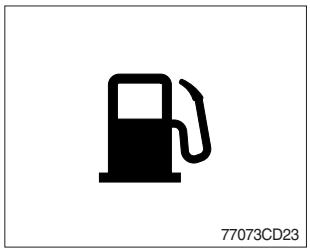
(13) Battery charging warning lamp



① This lamp is ON after key switch is turned ON.

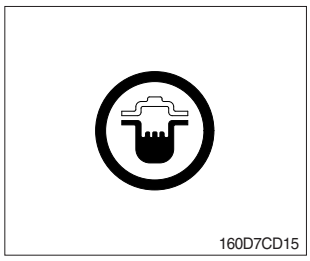
② Check the battery charging circuit when this lamp comes ON during engine operation.

(14) Fuel low level warning lamp



① Fill the fuel immediately when the lamp is turned ON.

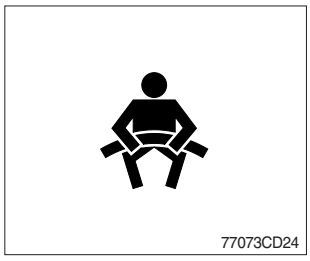
(15) Water in fuel warning lamp



① This lamp lights up when the water separators full of water or malfunctioning.

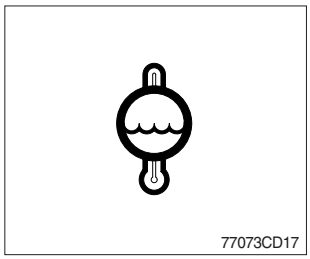
※ **When this lamp lights up, stop the truck and spill water out of the separator.**

(16) Seat belt warning lamp



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

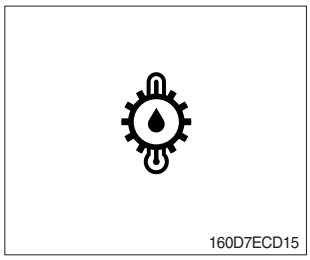
(17) Engine coolant temperature warning lamp



① This lamp is turned ON when the temperature of cooling water is over the normal temperature(104°C, 219°F).

② Check the cooling system when the lamp is ON.

(18) Transmission oil temperature warning lamp

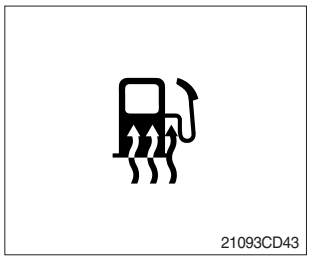


① This lamp informs the operator that transmission oil is above the specified temperature.

- Transmission oil temperature warning lamp ON : Abnormal
- Transmission oil temperature warning lamp OFF : Normal

※ **When this lamp lights up during operation, stop the engine and check the machine.**

(19) Fuel heater pilot lamp

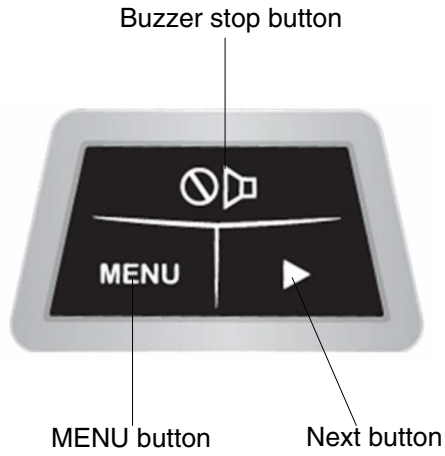


① This lamp is turned ON when the coolant temperature is below 10°C (50°F) or the hydraulic oil temperature 20°C (68°F).

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

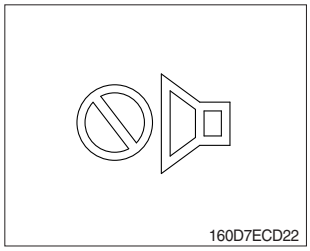
4) Cluster button

Each button has the following function.



160D7ECD121E

(1) Buzzer stop button

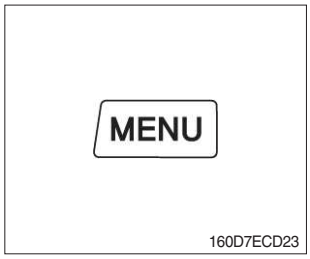


160D7ECD22

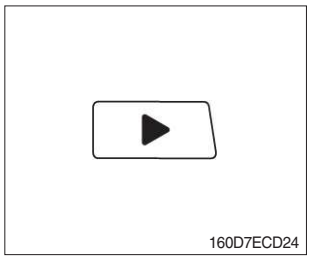
① This switch is used to stop the buzzer sound.

② Stop the buzzer when the switch is pressed.

(2) Menu and next button



160D7ECD23



160D7ECD24

① This switches are used to choose the model or display the engine error on the LCD.

② Model select mode

- The model is displayed on the LCD when the menu button [MENU] and next button [▶] are pressed simultaneously for some longer seconds.
- Please don't change your truck model identity because it is already pre-set on the truck before delivery.

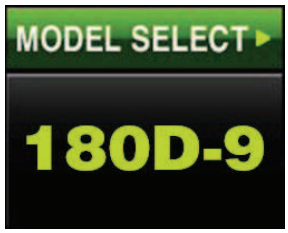
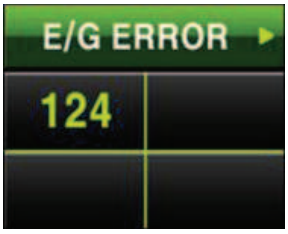
③ Engine error display

- The engine error is displayed on the LCD when the menu [MENU] button is pressed.
- On pressing the next button [▶], next page is displayed in case the error was occurred 5 or more.
- On pressing the next button [▶] once more, the LCD gets back to normal display status.

5) LCD

LCD has the functions to display start mode, standby mode, cruise function, model select and engine error.

NO	Display	Name	Description
1		Start mode	- Display initialization state with HYUNDAI logo and program version.
2		Standby mode	- Displays on the idle state. - Displays rpm, odometer and hourmeter
3			- Odometer is on, ODO is activated.
4			- Hourmeter is on, is activated.

NO	Display	Name	Description
5		Model select	- On model select mode, displays like this image. ※ Refer to the page 3-11.
		Engine error display	- In case of below 4 engine errors displays like this image. ※ Refer to the page 3-11.
			- In case of over 4 engine errors displays like this image.
			- To display next page in case of over 4 errors, press ▶.

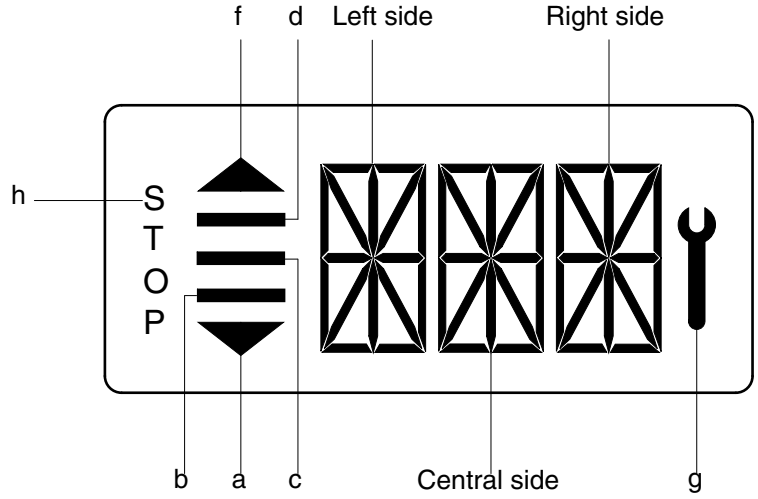
5. TRANSMISSION MESSAGE INDICATOR

1) TRANSMISSION ERROR DISPLAY

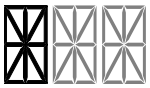
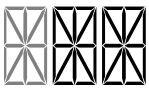
(1) Function

The display can be used with the gear selector. It indicates speed and driving direction as well as the activated inching.

When driving in the automatic mode, a bar indicator gives additionally also information about the selected driving range ; The automatic range is symbolized by arrows above and below the bar indicator. In case of possible errors in the system, a wrench appears on the display, combined with indication of the error number. Also sporadically occurring errors can be indicated.



D507CD33

1	Bars	a, f	Automatic range (up and down shiftion)
		b, c, d,	Preselected gear
2	Left side		For the moment still without function
3	Central and Right side		On the two alphanumerica 16-segment display, the electric control unit issues the actual state of gear and driving direction. Besides, a two digit error code will be indicated via these two segment
4	Spanner	g	Electronic control unit recognized an error, is flashing
5	Letters STOP	h	Immediate stop is required(at the moment not activated)

(2) Abbreviations

OC : Open circuit
SC : Short circuit
OP mode : Operating mode
TCU : Transmission control unit
EEC : Electronic engine controller
PTO : Power take off

2) DO AEB WORK

(1) Start engine after parking the machine on flat floor and blocking wheels.
(2) Release parking brake.
(3) With stepping on the service brake, operate T/M STALL (3 stage).
※ To avoid defect of clutch pack, repeat 10 sec of operation and 10 sec of placing neutral.
(4) When the T/M oil temperature reaches 75~80°C, lock the parking brake and then shift gear to neutral position to keep the machine at LOW RPM.
(5) Connect the AEB STARTER to T/M controller.
(6) Push AEB STARTER over 3 seconds.
(7) Confirm the status of AEB from the DISPLAY.
- Normal operation shows "ST, KR, KV, K1, K2, K3" orderly for 3~5 minutes.
- After the succesful completion, it displays "OK".
- With a new controller, it may display "F6" error code before AEB, it will disappear.

(8) In case of abnormal running, it may display "STOP" with the appropriate error code.
(9) After truobleshooting, start the machine again to repeat above.
※ As the STALL operation has to be done, the SERVICE BRAKE must be locked perfectly to avoid the fatal accident.
※ AEB mode : It controls the disc internal of the transmission, automatically.

3) DISPLAY DURING AEB-MODE

Symbol	Meaning	Remarks
PL	AEB-starter is plugged at the diagnostic plug	
ST	AEB-Starter-button is pressed	
K1.....K3 KV, KR	Calibrating clutch K1...K3, KV or KR resp.	
_and Kx	Wait for start, initialization of clutch Kx, x : 1, 2, 3, V, R	
≡and Kx	Fast fill time determination of clutch Kx	
=and Kx	Compensating pressure determination of clutch Kx	
OK	Calibration for all clutches finished	Transmission stays in neutral, you have to restart the TCU(ignition off/on) after removing AEB-Starter
STOP	AEB canceled(activation stopped)	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
STOP and Kx	AEB stopped, clutch Kx can't be calibrated	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
Spanner and Kx	Kx couldn't be calibrated, AEB finished	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
△E	Engine speed too low → raise enging speed	
▽E	Engine speed too high → lower enging speed	
△T	Transmission oil temperature too low → heat up transmission	
▽T	Transmission oil temperature too high → cool down transmission	
FT	Transmission temperature not in defined range during calibration	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
FB	Operating mode not NORMAL or transmission temperature sensor defective or storing of Calibrated values to EEPROM-has failed.	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
FO	Output speed_not_zero	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
FN	Shift lever not in Neutral position	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
FP	Park brake_not_applied	Transmission stays in neutral, you have to restart the TCU(ignition off/on)
STOP	AEB-Starter was used incorrect or is defective. Wrong device or wrong cable used.	Transmission stays in neutral, you have to restart the TCU(ignition off/on)

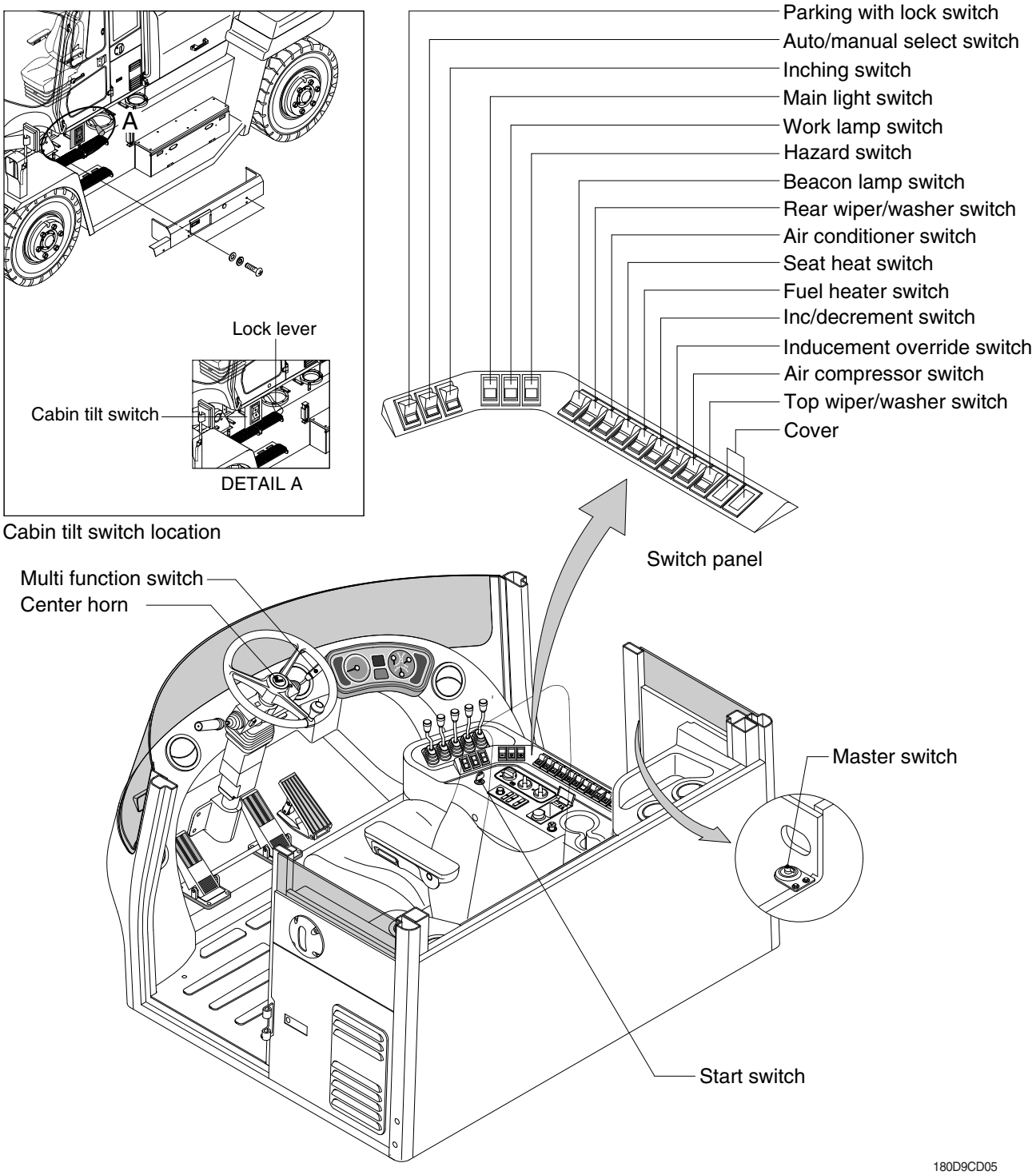
4) INITIALIZING THE INCHING SENSOR

(1) Start engine after parking the machine on flat floor and blocking wheels.
(2) Release parking brake and keep neutral gear shift.
(3) Adjust the inching sensor linkage so that the regular voltage is supplied to inching sensor when operating the pedal.
※ Regular voltage ; Before pedal operation (1±0.1V), After pedal operation (3.5±0.1V).
(4) Stop the engine and then just KEY ON. (Release parking brake, keep neutral gear)
(5) Connect the AEB STARTER to the T/M controller.
(6) Push AEB STARTER over 3 seconds.
(7) If display shows "▼IP", Step on the pedal fully.
(8) If display shows "▲IP", release "OK"
(9) After the successful completion, it displays "OK".
(10) In case of abnormal running, it may display "STOP" with the appropriate error code.
(11) After troubleshooting, start the machine again to repeat above.
※ Above works are to be done with the parking brake released, so machine's wheels must be blocked for safety.

5) DISPLAY DURING INCHPEDAL CALIBRATION

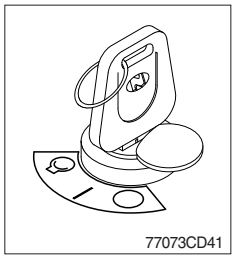
Symbol	Meaning	Remarks
▼IP	Push down the pedal slowly until endposition is reached and hold this position	
▲IP	Release the pedal slowly until endposition is reached	
IP blinkt	A problem occurred, release the pedal slowly until endposition is reached	If the expected endposition could not be reached, release the pedal and try again
OK	Finished inchpedal calibration successful	
FN and Stop	Shift lever not in Neutral position	Calibrations is aborted
FS and Stop	Sensor supply voltage AU1 is out of the specified range	Calibrations is aborted
FO and Stop	Outputspeed_not_zero	Calibrations is aborted
SL and Stop	Sensor voltage below specified range	Calibrations is aborted
SU and Stop	Sensor voltage below specified range	Calibrations is aborted
IL and Stop	Sensor position for released pedal out of specified range	Calibrations is aborted
IU and Stop	Sensor position for released pedal out of specified range	Calibrations is aborted
TO and Stop	Time-out calibration, pedal not moved after calibration start	Calibrations is aborted
DL and Stop	Angle between pedal positions released and pressed to small	Calibrations is aborted
DU and Stop	Angle between pedal positions released and pressed to small	Calibrations is aborted
FI and Stop	Sensor signal 1 and 2 don't match together	Calibrations is aborted

6. SWITCHES



Cabin tilt switch location

1) START SWITCH

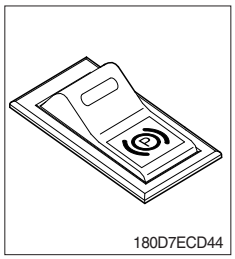


(1) There are three positions, OFF, ON and START.

- ○ (OFF) : None of electrical circuits activate.
- | (ON) : All the systems of truck operate.
- (START) : Use when starting the engine.
  Release key immediately after starting.

※ **After engine start, electric circuit of start intercepted. Increase the durability of start motor after engine start, electric circuit of starting intercepted.**

2) PARKING WITH LOCK SWITCH

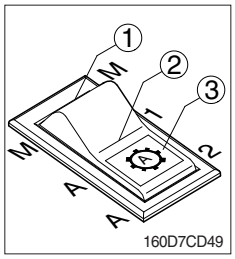


(1) This switch is used to lock or release parking brake of the truck.

(2) If this switch is pressed, the parking brake is applied and the gauge panel warning lamp will comes ON.

※ **When operating the gear selector lever, be sure to release the parking brake. If the truck is operated with the parking brake engaged, the brake will overheat and may cause the brake system to go out of order.**

3) AUTO/MANUAL SELECT SWITCH



(1) Manual mode (①)

Press the top of the switch for the manual mode of the autoshift function. The operator selects the desired speed and the desired direction in the manual mode with the gear selector lever.

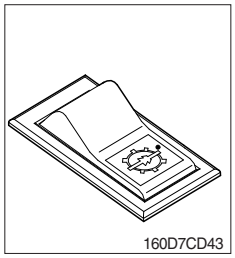
(2) Automatic 1st mode (②)

Place the switch in the middle position for the autoshift function changing from **1st** to **3rd** gear shift mode.

(3) Automatic 2nd mode (③)

Press the bottom of the switch fully for the autoshift function changing from **2nd** to **3rd** gear shift mode.

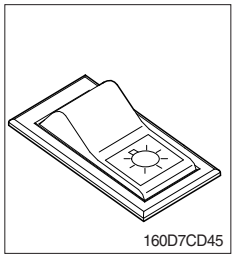
4) INCHING SWITCH



(1) If this switch is pressed, inching operation is applied to inching pedal.

(2) Also, inching lamp on the cluster is illuminated.

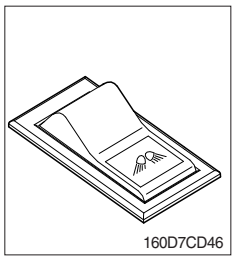
5) MAIN LIGHT SWITCH



(1) This switch is used to operate the clearance lamp and head light by two steps.

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

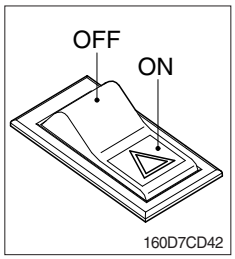
6) WORK LAMP SWITCH



(1) This switch is used to operate the front and rear work lamps by two steps.

- First step : Front work lamp comes ON.
- Second step : Rear work lamp comes ON.

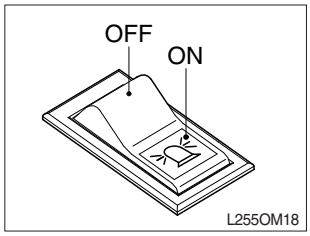
7) HAZARD SWITCH (option)



(1) Use for parking, or loading truck.

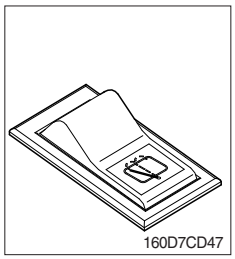
※ **If the switch is left ON for a long time, the battery may be discharged.**

8) BEACON SWITCH (option)



(1) This switch turn ON the rotary light.

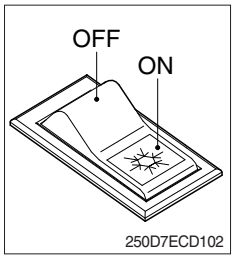
9) REAR WIPER AND WASHER SWITCH



(1) This switch is used to operate the rear wiper and washer by two steps.

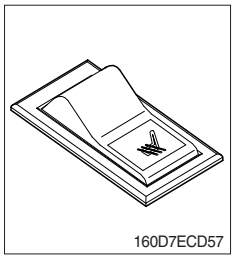
- First step : The rear wiper operates.
- Second step : The washer liquid is sprayed and the rear wiper is operated only while pressing. If release the switch, return to the first step position.

10) AIR CONDITIONER SWITCH



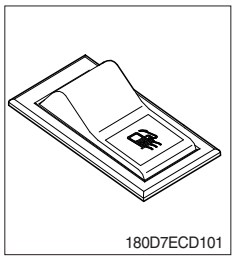
(1) This switch is used to turns ON or OFF the air conditioner.

11) SEAT HEAT SWITCH (option)



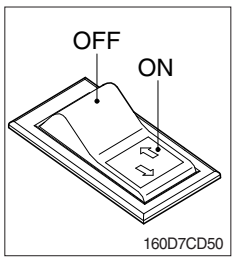
(1) This switch is used to heat the seat.

12) FUEL HEATER SWITCH



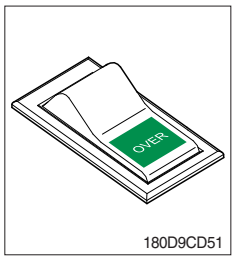
(1) This switch is used for the fuel heater of the pre-heater assy.

13) INC/DECREMENT SWITCH



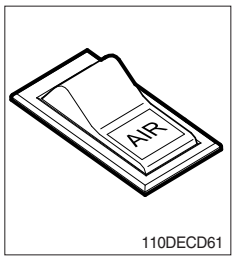
(1) When engine running, the low rpm of engine increase or decrease by 25 rpm by operating this switch.
(2) Engine low rpm returns to normal value when engine restarted.

14) INDUCEMENT OVERRIDE SWITCH



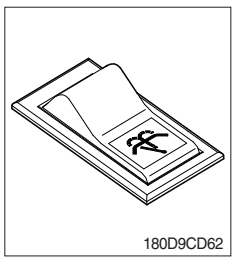
(1) If an emission-related malfunction of the exhaust gas aftertreatment system or DEF/AdBlue® supply is detected, this will lead to operating restrictions (engine torque and engine speed limitation)
(2) In emergencies, this switch can be operated to override the operating restriction. This means that full engine power is available for a minimum of 30 minutes. this emergency function by operating the switch can be activated a maximum of three times.

15) AIR COMPRESSOR SWITCH (option)



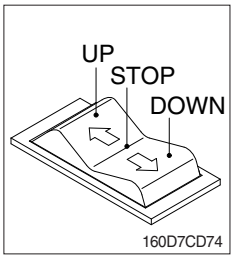
(1) This switch is used to operate air compressor.

16) TOP WIPER/WASHER SWITCH



(1) This switch is used to operate top wiper.

17) CABIN TILT SWITCH



(1) Tilting UP cabin

Press the top of the switch fully to tilt the cabin upward.

(2) STOP the tilting operation (Default)

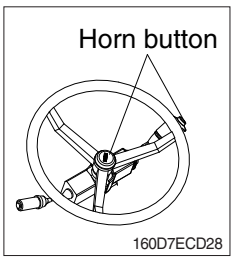
Release the switch to stop the tilting operation.

(3) Tilting DOWN cabin

Press the bottom of the switch fully to tilt the cabin downward.

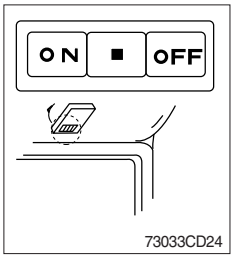
※ Refer to page 7-15 for cabin tilting procedure.

18) HORN BUTTON



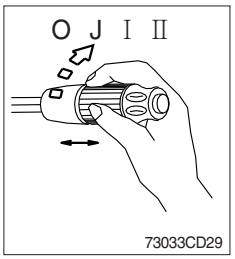
(1) If you press the button on the top of the multifunction switch and the center of the steering wheel, the horn will sound.

19) CAB LAMP SWITCH



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

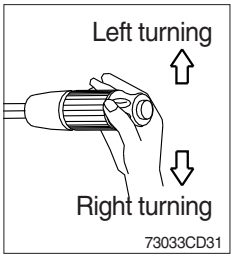
20) MULTI FUNCTION SWITCH



(1) Front wiper and washer switch

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

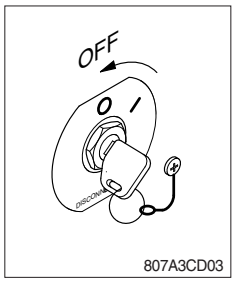
※ Check the quantity of washer liquid in the tank. If the level of the washer liquid is LOW, add the washer liquid (In cold, winter days) or water. The capacity of the tank is 1 liter.



(2) Turning switch

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

21) MASTER SWITCH

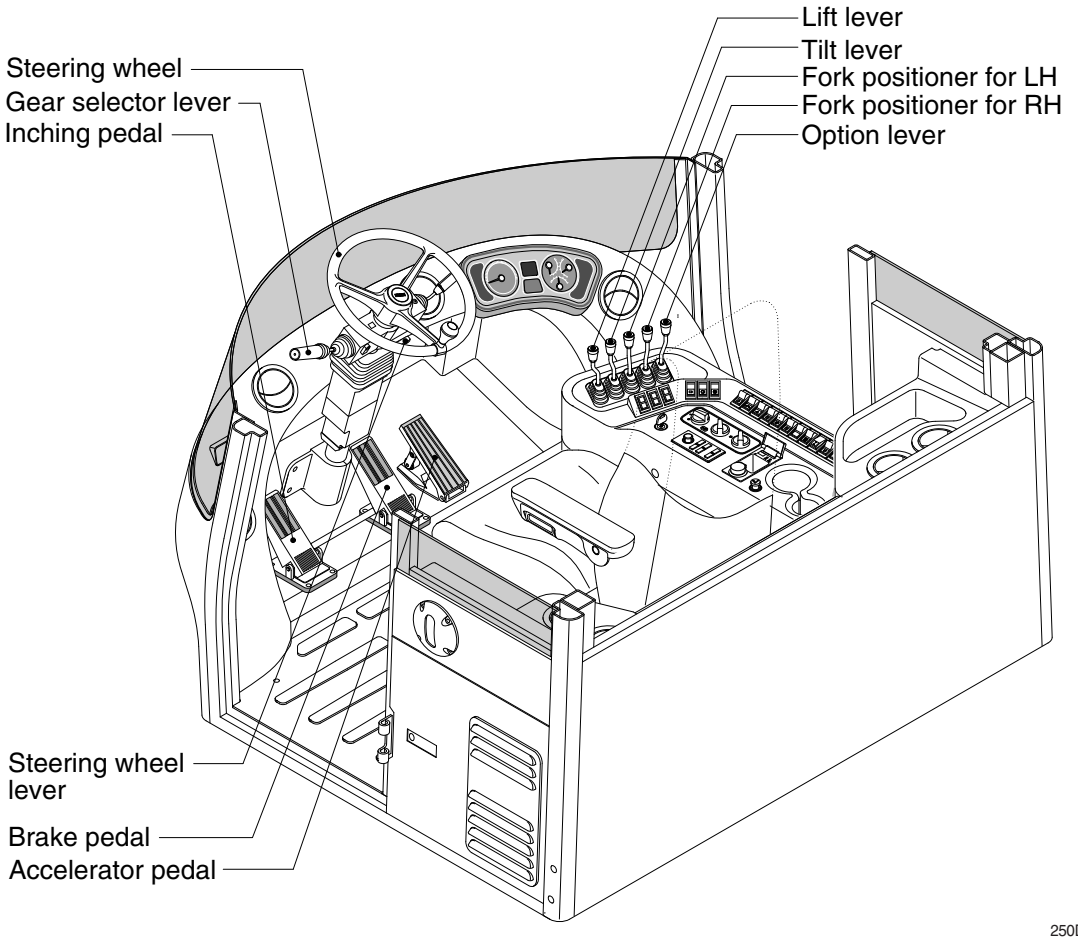


(1) This switch is used to shut off the entire electrical system.
When the machine is not operated for a long time, turn OFF the master switch for the safety purpose.

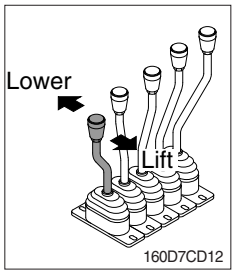
(2) I : The battery remains connected to the electrical system.
O : The battery is disconnected to the electrical system.

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

7. CONTROL DEVICE



1) LIFT LEVER



(1) LIFT

PULL the lever BACK to LIFT the forks.

(2) LOWER

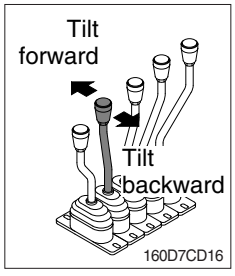
PUSH the lever FORWARD to LOWER the load.

(3) HOLDING

When the lever is released, the lifting or lowering action stops.

※ **Lifting speed is controlled by accelerator pedal. Lowering speed is controlled by lever only.**

2) TILT LEVER



(1) TILT FORWARD

PUSH the lever FORWARD to tilt mast FORWARD.

(2) TILT BACKWARD

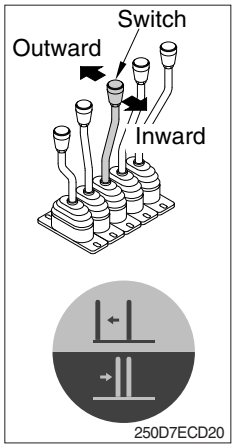
PULL the lever BACK to tilt mast BACKWARD.

(3) HOLDING

When the lever is released, tilting action stops.

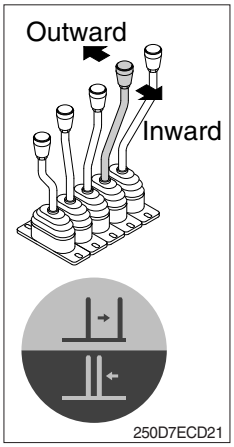
※ **Forward and backward tilting speeds are controlled by tilt lever and accelerator pedal.**

3) FORK POSITIONER



① LH FORK MOVEMENT

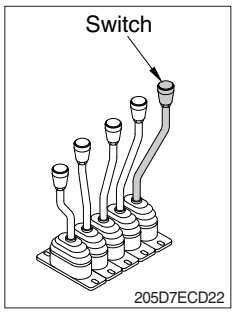
- Push the lever forward to move outward for the LH fork.
- Pull the lever backward to move inward for the LH fork.
- In case of switch operation, this lever becomes side shift which is actually performed by both fork movement.



② RH FORK MOVEMENT

- Push the lever forward to move outward for the RH fork.
- Pull the lever backward to move inward for the RH fork.

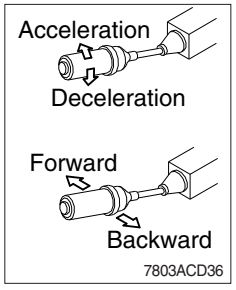
4) OPTION LEVER



OPTIONAL ATTACHMENT MOVEMENT

- Push and pull the lever for optional operation operates.
- In case of switch operation, this lever operates one more attachment.

5) GEAR SELECTOR LEVER



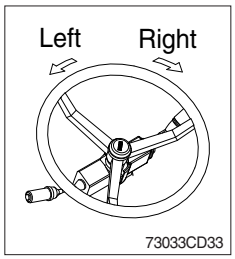
(1) This lever is used for gear selection, forward 3 stages and reverse 3 stages.

(2) If you push the gear selector lever, the truck moves forward, but pulling the gear selector lever, the truck moves backward.

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

※ **Auto parking function : Parking operated automatically to increase the safety of vehicle when transmission gear is neutral and user leaves seat.**

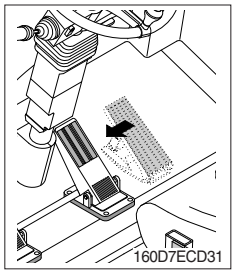
6) STEERING WHEEL



(1) A steering cylinder in the center of the steering axle will operate the steering function.

(2) Turning the steering wheel left, the truck moves to the left side and turning it right, the truck moves to the right side.

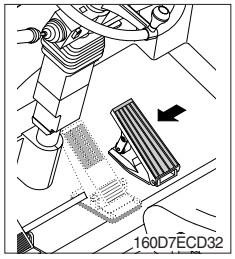
7) BRAKE PEDAL



(1) If the pedal is pushed, braking force is generated and bring the truck to a stop.

※ **Do not operate the truck with stepping on the brake pedal unnecessarily, or bring premature wear of brake disc.**

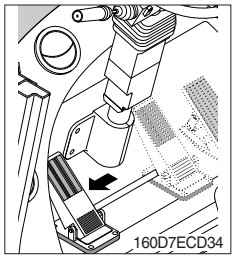
8) ACCELERATOR PEDAL



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

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

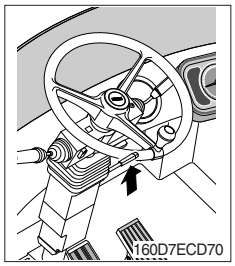
9) INCHING PEDAL

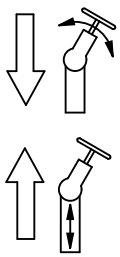


(1) Inching pedal is used for fine control of forward and reverse movement when lifting up or putting down loads.

※ **Do not put your foot on the inching pedal or brake pedal unless using it.**

10) STEERING WHEEL LEVER



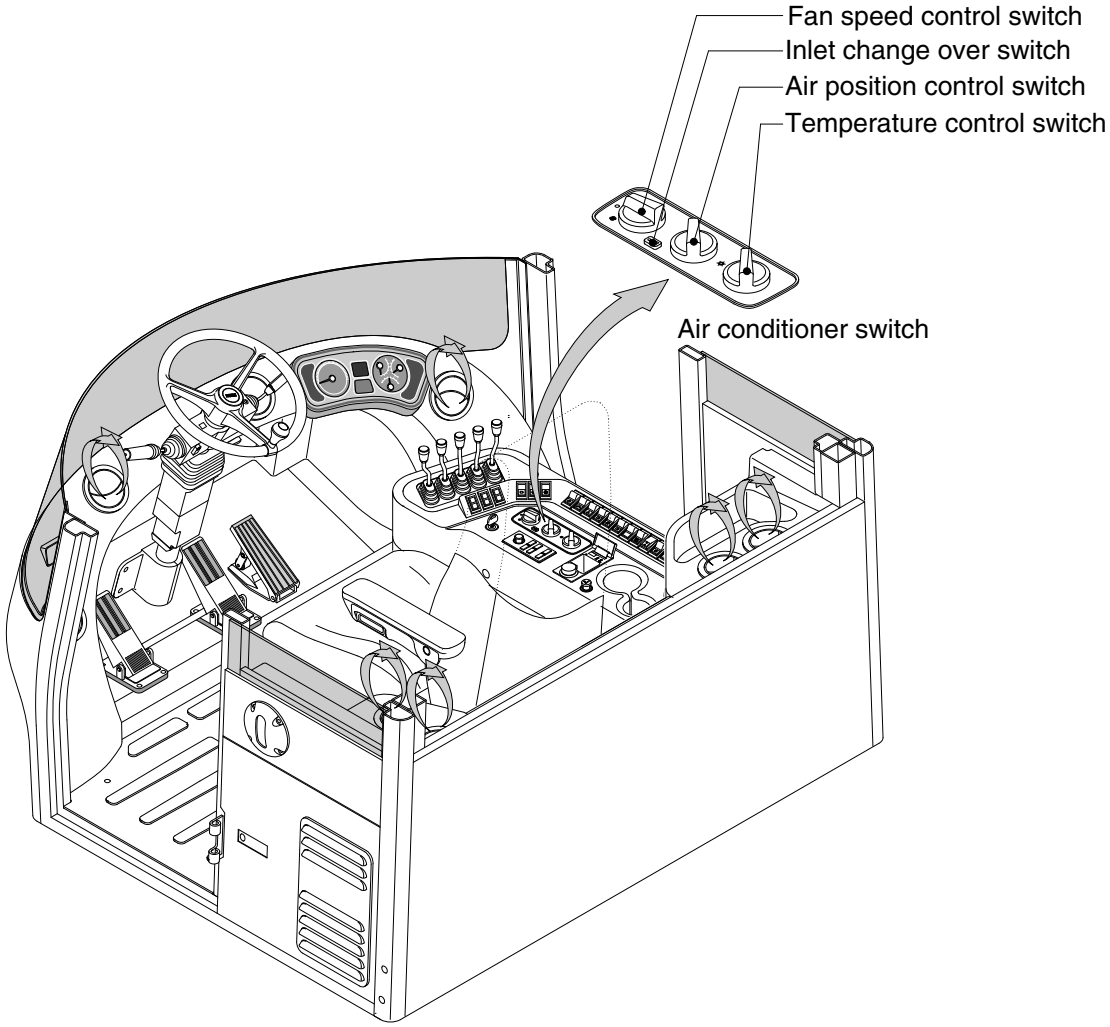


(1) By pulling down the lever, the wheel is adjustable to tilt.

(2) By pulling up the lever, the wheel is adjustable to telescope.

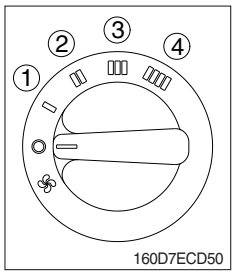
8. AIR CONDITIONER AND HEATER

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



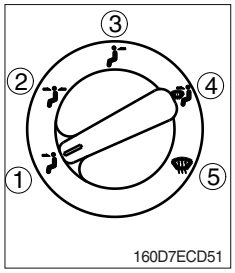
250D9CD90

1) FAN SPEED CONTROL SWITCH



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

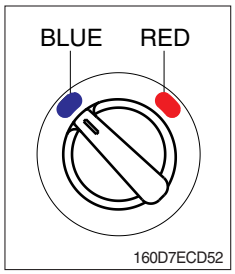
2) AIR POSITION CONTROL SWITCH



(1) This switch regulates the air position.

① Front
② Front & rear
③ Rear
④ Front & defrost
⑤ Defrost

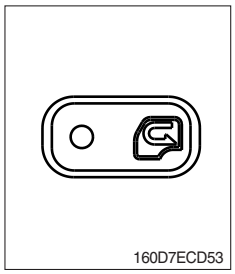
3) TEMPERATURE CONTROL SWITCH



(1) This switch regulates the temperature of air.

- Right side (red zone) : Heat up air temperature
- Left side (blue zone) : Cool down air temperature

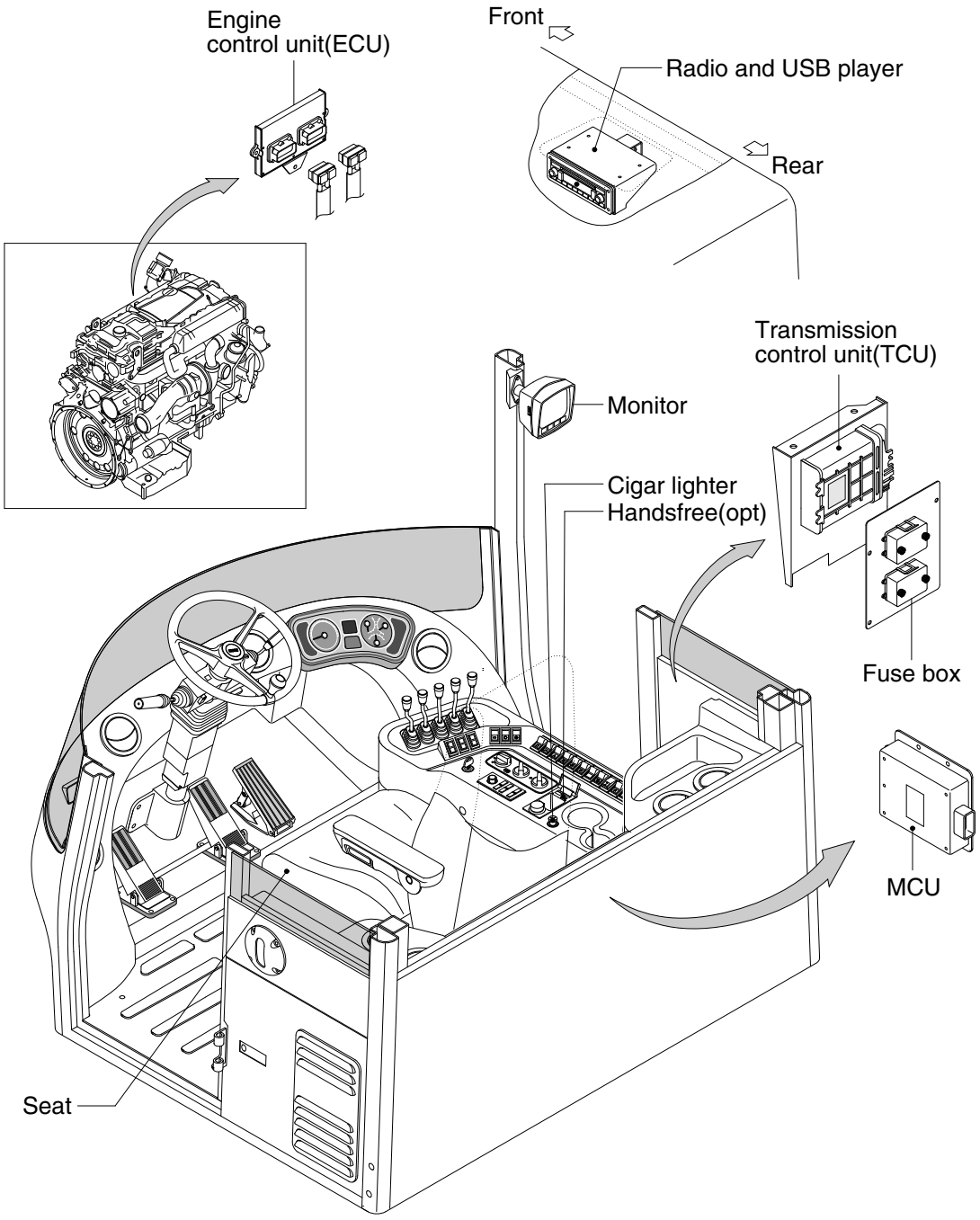
4) INLET CHANGE OVER SWITCH



(1) If this switch is pressed, air from the outside is inhaled

(2) If this switch is not pressed, air in the cab is recirculated.

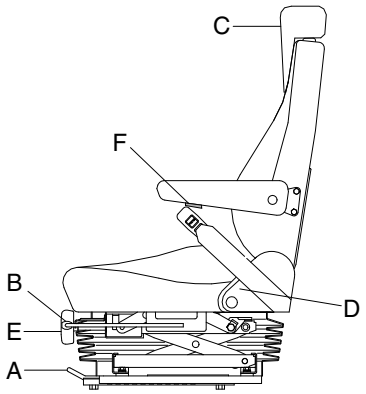
9. OTHERS



180D9CD09

1) SEAT

The seat is adjustable to fit the contours of the operator's body. It will reduce operator fatigue due to long work hours and enhance work efficiency.



180D7ECD50

(1) Forward/Backward adjustment

Pull lever (A) to adjust seat forward or backward.

(2) Upward/Downward adjustment

Push or pull the height adjust lever (B) to adjust seat upward or downward.

(3) Reclining adjustment

Pull lever (D) to adjust seat back rest.

(4) Arm rest adjustment

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

(5) Cushion adjustment (E)

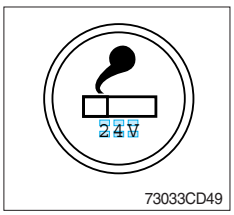
Adjusting handle to the operator's weight.

(6) Shoulder rest (C)

The shoulder rest can be adjust to upside.

※ **Refer to page 5-8 for the details.**

2) CIGAR LIGHTER



73033CD49

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

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

※ **Service socket**

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

3) FUSE BOX

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

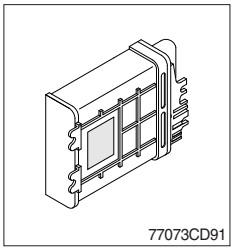
(2) The fuse box cover indicates the capacity of each fuse and circuit it protects.

※ **Replace a fuse with another of the same capacity.**

⚠ **Before replacing a fuse, be sure to turn OFF the starting switch.**

※ **Refer to 7-45.**

4) TRANSMISSION CONTROL UNIT (TCU)



77073CD91

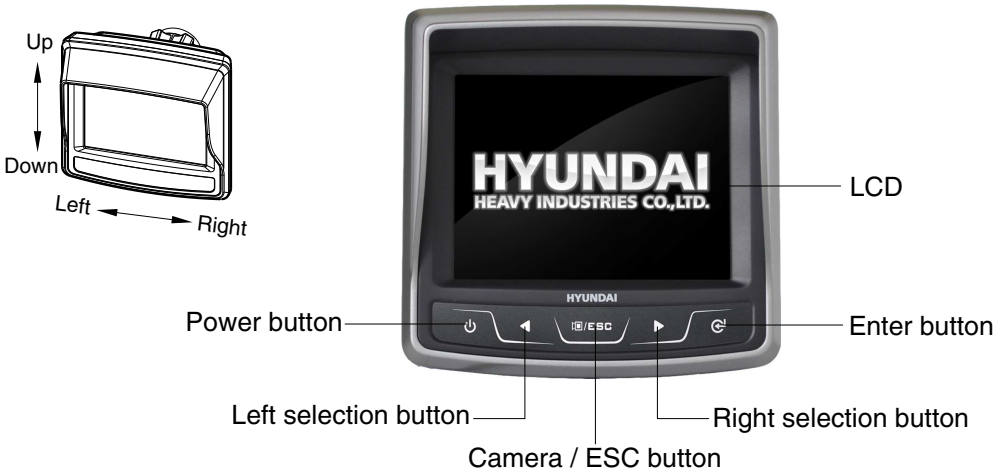
(1) The control unit is shifting the required speeds fully-automatically under consideration of the following criteria.

- Gear selector lever position
- Driving speed
- Load level

7) MONITOR

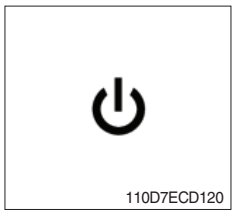
· Adjusting the angle

Upwards and downwards up to 7°, total 14°. Swivels left and right up to 15°, total 30°.



250D7ECD100

(1) Power button

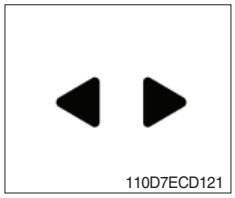


110D7ECD120

① To turn the power off or on.

② To switch the monitor on or off, press and hold the power button for two second.

(2) Left / right selection button



110D7ECD121

① Select button allow you to select various monitor options and to input passwords.

(3) Camera / ESC button

110D7ECD122

① To enter camera screen, press the Camera/ESC button at the menu selection screen.

② To return to the menu selection screen, press the Camera/ESC button on the camera screen.

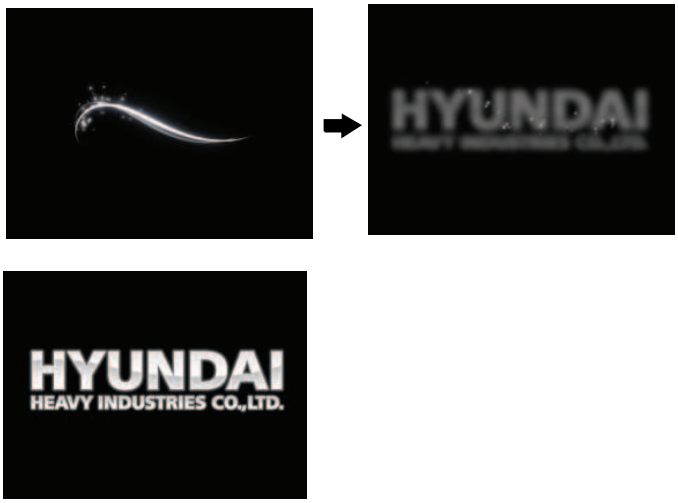
③ To cancel menu selection or escape from the menu, press the Camera/ESC button.

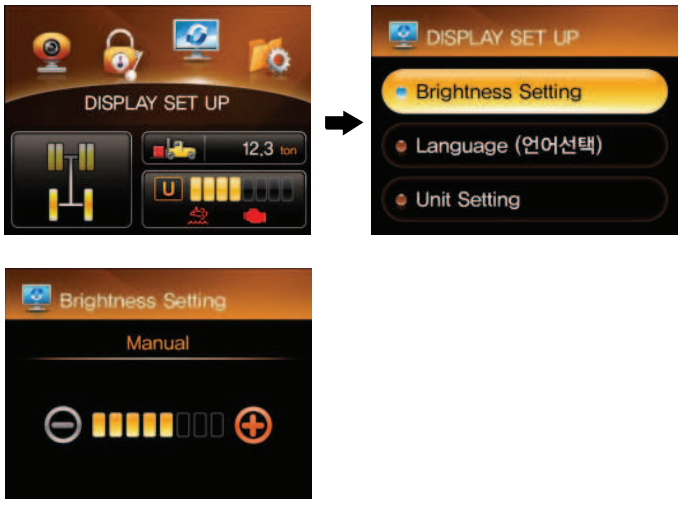
(4) Enter button

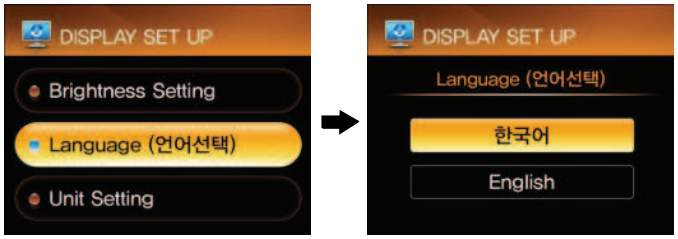
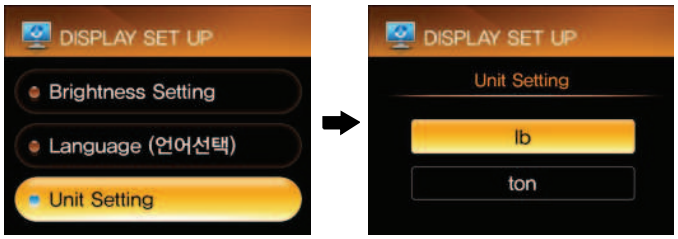
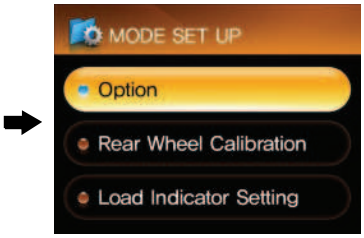
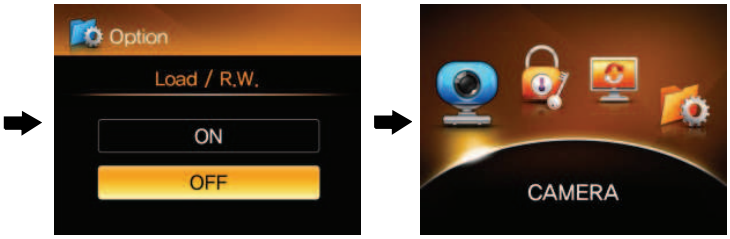
110D7ECD123

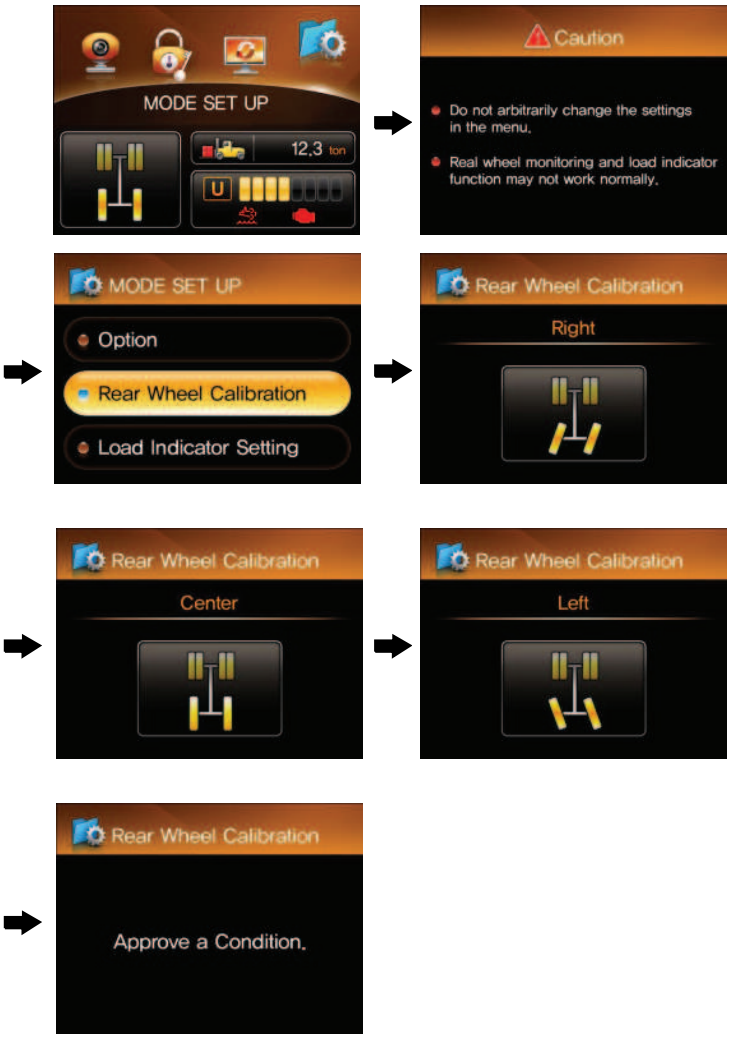
① To choose the option, press the enter button.

(5) LCD

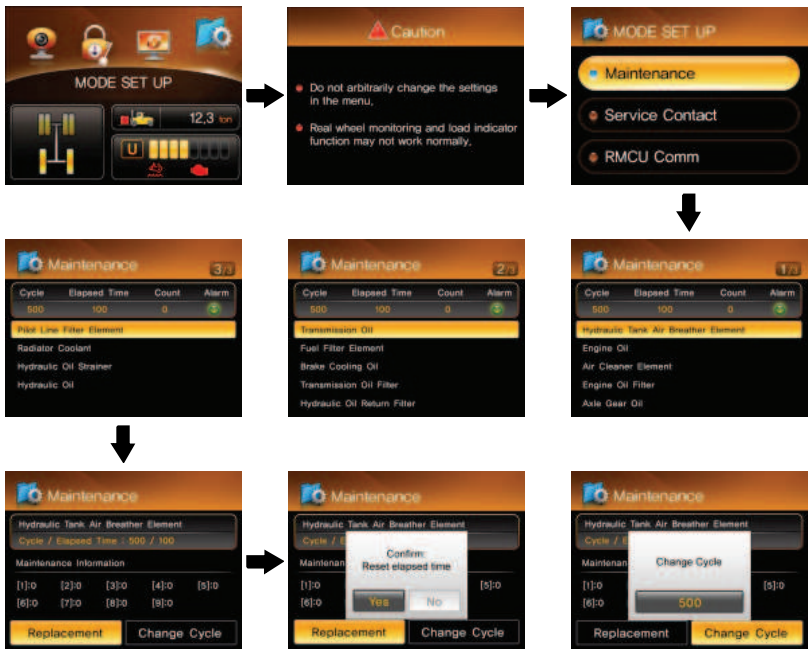
No	Name	Description
1	**Starting animation** 	
2	**Camera selection** 	To enter camera screen, press the ↵ or ESC button. To return to menu selection screen, press ESC button.
3	**ESL (Engine Starting Limit) screen** 	The password must be 5~10 digits long. After input password, you must input ✻ . ※ Default password : '0000000000'(digit '0', 10 times)

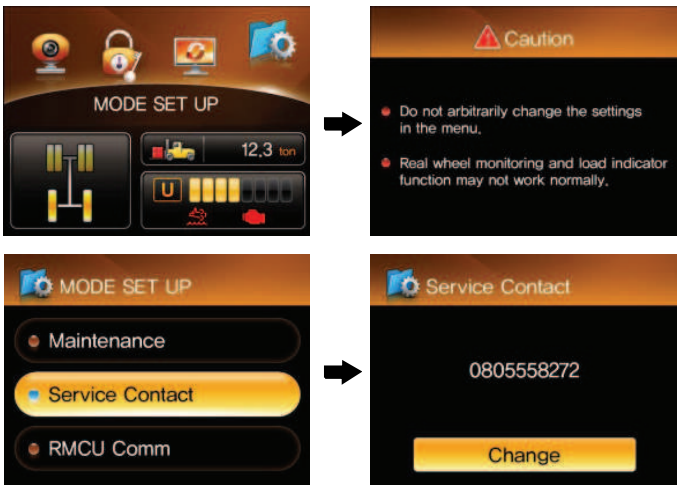
No	Name	Description
4	**Changing password** 	The password must be 5~10 digits long. After input password, you must input ∗ . ※ Default password : '0000000000'(digit '0', 10 times)
5	**Display set up screen** 	1) LCD brightness To adjust to display brightness, press ◀ or ▶ to decrease or increase.

No	Name	Description
5	**Display set up screen**  	2) Language selection Set a Korean or English.
	 	3) Unit setting Set a unit load indicator.
6	**Mode set up screen**     	1) Select on option Forklift change the main screen

No	Name	Description
6	**Mode set up screen** 	2) Rear wheel calibration The user revises a forklift truck streeing angle. ※ Right set rear wheel calibration ➡ To the left as possible to steer wheel (steer wheel LEFT) ➡ ※ Center set rear wheel calibration ➡ To the center as possible to steer wheel (steer wheel CENTER) ➡ ※ Left set rear wheel calibration ➡ To the right as possible to steer wheel (steer wheel RIGHT) ➡

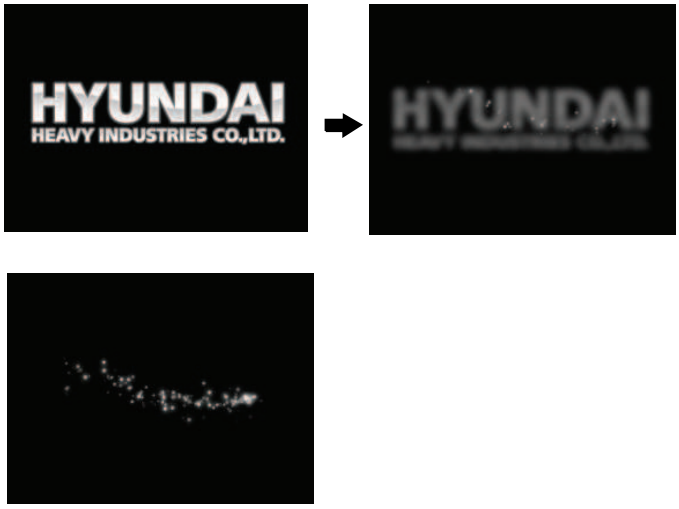
No	Name	Description
6	**Mode set up screen**  **Equipment model selection varies depending on the mast** 180D-9 | V-MAST | - | -	3) Load indicator setting MAST Select

No	Name	Description
6	**Mode set up screen**  	4) Load indicator setting **Calibration** Correct a fork-lift load indicator After input passwords, you must input *. ※ **Define password is : "00008282"** ※ Tare ➡ In the unloaded from the ground waiting 8 seconds after lift 30 ㎝ ➡ Tare ON ➡  ※ Weight correction ➡ Input a password ➡ Loaded enter the weight. (Input ton) ➡ In the loaded from the ground waiting 5 seconds after lift 30 ㎝ ➡ Weight correction ON ➡ 
	 	5) Maintenance Change the replacement cycle of expandable supplies. Using ◀ ▶ button for changing the replacement cycle.

No	Name	Description
6	**Mode set up screen** 	6) Service Contact Check and change of contact information for customer service.
		7) RMCU Communication

No	Problem	Possible causes/consequences and ▶ Solutions
7	**Warning lamp**   LIM : Engine limit lamp : DEF lamp  : DEF gauge	
	The lights up.	An emissions-relevant malfunction in the exhaust gas aftertreatment system or in the DEF / AdBlue® supply has been detected. ▶ Top up the DEF / AdBlue® tank immediately. ▶ If this does not help : have the exhaust gas aftertreatment system checked at a qualified specialist workshop. Have the malfunction rectified immediately. If you do not, engine output may be reduced and engine speed may be limited. If there are no malfunctions, the indicator lamp only goes out after further test routines. The system check may involve several engine starts, several hours or several journeys without a malfunction.
	The lamp is flashing and LIM lamp lights up.	You have not rectified an emissions-relevant malfunction that has been detected in the exhaust gas aftertreatment system or in the DEF / AdBlue® supply. Reduced engine output is active. The engine torque is limited to a maximum of 75% across the whole engine speed range. The limitation will take effect the next time the engine is started. ▶ Adapt your driving/operating style. ▶ Top up the DEF / AdBlue® tank immediately. ▶ If this does not help : have the malfunction rectified at a qualified specialist workshop. If you do not follow the instructions, engine speed may be limited.
	The and LIM lamps are flashing.	You have not rectified an emissions-relevant malfunction that has been detected in the exhaust gas aftertreatment system or in the DEF / AdBlue® supply. Reduced engine output and engine speed limitation are active. The engine torque is limited to a maximum of 50% across the whole engine speed range. The engine speed is limited to a maximum of 60%. The limitation will take effect by means of a ramp function. ▶ Adapt your driving/operating style. ▶ Top up the DEF / AdBlue® tank immediately. ▶ If this does not help : have the malfunction rectified at a qualified specialist workshop. If you do not follow the instructions, further engine speed limitation may be imposed.

No	Problem	Possible causes/consequences and ▶ Solutions
7	The and LIM indicator lamps are flashing STOP ENGINE and lights up.	You have not rectified an emissions-relevant malfunction that has been detected in the exhaust gas aftertreatment system or in the DEF / AdBlue® supply. Reduced engine output and engine speed limitation are active. The engine torque is limited to a maximum of 20% across the whole engine speed range. The engine speed is limited to idling speed. ▶ Adapt your driving/operating style. ▶ Top up the DEF / AdBlue® tank immediately. ▶ If this does not help : have the malfunction rectified at a qualified specialist workshop.
	The , LIM and STOP ENGINE indicator lamps are flashing.	You have not rectified an emissions-relevant malfunction that has been detected in the exhaust gas aftertreatment system or in the DEF / AdBlue® supply. Reduced engine output and engine speed limitation are active. The engine torque is limited to a maximum of 20% across the whole engine speed range. The engine speed is limited to idling speed. ▶ Stop the vehicle/equipment, paying attention to road and traffic conditions. ▶ Have the malfunction rectified at a specialist workshop.

No	Name	Description
8	**Ending animation** 	

4. OPERATOR MAINTENANCE AND CARE

1. DAILY SAFETY INSPECTION

Before using a lift truck, it is the operator's responsibility to check its condition and be sure it is safe to operate.
Check for damage and maintenance problems; have repairs made before you operate the truck. Unusual noises or problems must be reported immediately to your supervisor or other designated authority.
Do not make repairs yourself unless you are trained in lift truck repair procedures and authorized by your employer. Have a qualified mechanic make repairs using genuine HYUNDAI or HYUNDAI-approved parts.

⚠ Do not operate a truck if it is in need of repair. If it is in an unsafe condition, remove the key and report the condition to the proper authority. If the truck becomes unsafe in any way while you are operating it, stop operating the truck, report the problem immediately, and have it corrected.

Lift trucks should be inspected every eight hours, or at the start of each shift. In general, the daily inspection should include the visual and functional checks described on the followings.

⚠ Leaking hydraulic oil may be hot or under pressure. When inspecting a lift truck, wear safety glasses and do not check for leaks with bare hands.

1) VISUAL CHECKS

First, perform a visual inspection of the truck and its major components;

(1) Walk around your lift truck and take note of obvious damage that may have been caused by operation during the last shift.

(2) Check that all capacity, safety, and warning plates or decals are attached and legible.

(3) Check before and after starting engine for leaking fuel, engine coolant, transmission fluid, etc.

(4) Check for hydraulic oil leaks and loose fittings.

⚠ Do not use bare hands to check. Oil may be hot or under pressure.

(5) Be sure that the driver's overhead guard, load back rest and all other safety devices are in place, securely fastened and undamaged. Inspect for damaged or missing parts, corrosion, cracks, breaks etc.

(6) Check all of the critical components that handle or carry the load.

(7) Look the mast and lift chains over. Check for obvious wear and maintenance problems such as damaged or missing parts, leaks, slack or broken chains, rust, corrosion, bent parts, cracks, etc.

(8) Carefully inspect the load forks for cracks, breaks, bending, twists, and wear. Be sure that the forks are correctly installed and locked in their proper position.

(9) Inspect the wheels and tires for safe mounting, wear condition, and air pressure.

(10) Check the hydraulic sump oil level, engine oil level, and fuel level.

2) FUNCTIONAL CHECKS

Check the operation of the truck as follows.

※ **Before performing these checks, familiarize yourself with the starting, operating, and shutdown procedures in Section 5 of this manual. Also, know the safety rules given in Section 1 of this manual.**

(1) Test warning devices, horn, light, and other safety equipment and accessories.

(2) Start the engine and be sure all controls and systems operate freely and return to neutral properly. Check the:

① Gauges, meters, and indicator lights
② Service brakes, inching pedal, and parking brakes
③ Hydraulic controls: lift, tilt, and auxiliary (If installed)
④ Accelerator
⑤ Directional control
⑥ Steering system
⑦ Lift mechanism and any attachments.

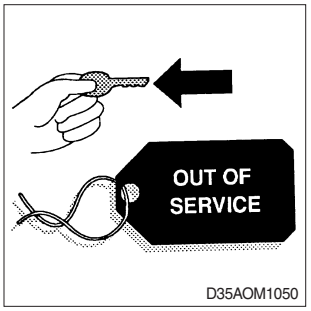
When the functional check are completed, follow the **standard shutdown procedures** given in Section 5, **Starting and operating procedures.**

3) CONCLUDING THE INSPECTION

⚠ Do not operate a lift truck that has a maintenance problem or is not safe to operate.

(1) Instead, remove the key from the starting switch and put an **Out of service tag** on the truck.

(2) If all of the daily inspection checks were normal or satisfactory, the truck can be operated.



2. SUGGESTION FOR NEW TRUCK

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 truck and shorten lifetime of the truck.**

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.

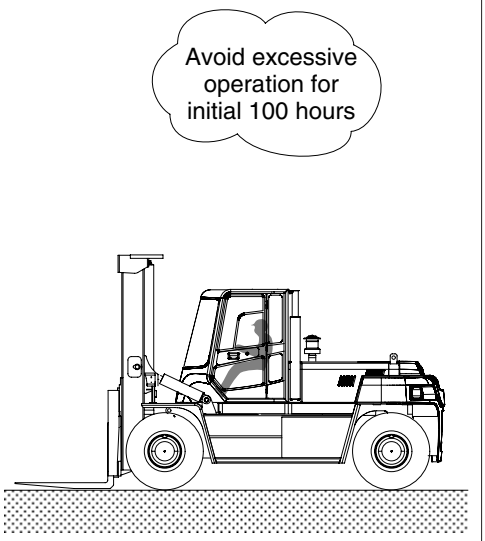
(4) Warm up the truck fully before operation.

(5) Check the gauges during operation.

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

4) Replace following after initial 50 hours of operation.

Checking items	Service
Engine oil Engine oil filter element	Replace



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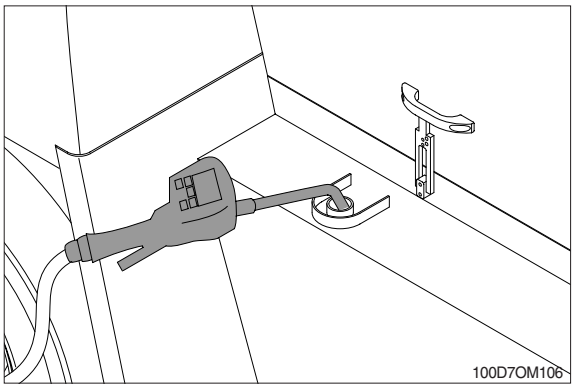
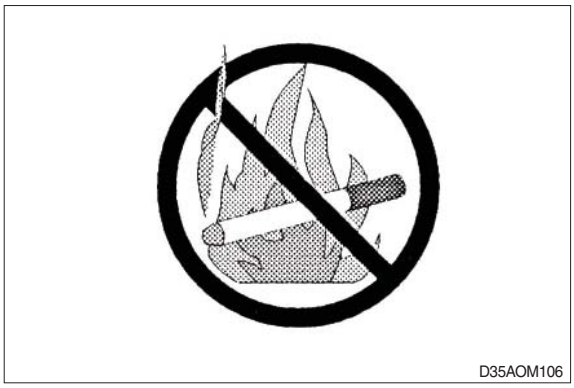
3. FUEL SAFETY PRACTICES

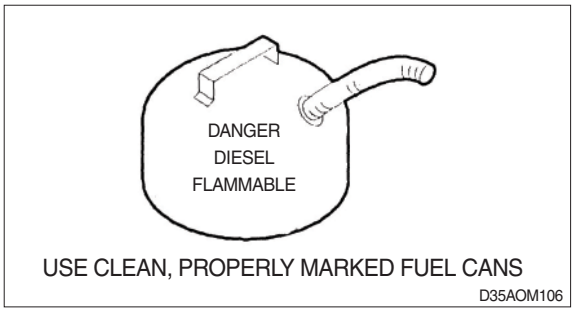
REFUELING DIESEL TRUCKS



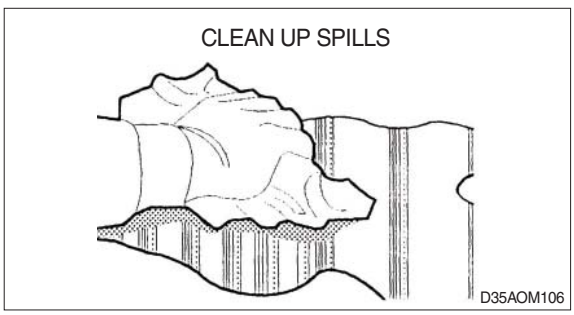
⚠ Stop the engine when refueling.
All lights and flames shall be kept at a safe distance while refueling.



⚠ Make sure that the fuel oil cans are kept cleaned and attached safety indication or letters on the can.



⚠ Wipe off the spilt fuel oil immediately.



4. ENGINE OIL SERVICE INTERVAL AND MANAGEMENT

It is the operator's responsibility to check its condition and be sure it is safe to operate. Please check engine oil condition periodically.

⚠ Daily check

· Engine oil should be checked once a day before operation.

⚠ Periodic check

· Service should be done whichever comes first from operating hours or usage period.

· Be sure to use prescribed engie oil.

Service item	Action	Service interval	
Engine oil and oil filter	Replace	General condition	Harsh condition
		Every 500 hours or 1year	Every 250 hours or 6 months

※ This oil service interval can be different by engine models.

Harsh condition is as follows.

1. Repeated short operation (repeated cold operation)
2. Frequent driving in sandy or dusty places
3. When using excessive engine idle
4. Frequent driving on uphill and downhill roads
5. Frequent driving with rapid acceleration/deceleration or continuous high-load
6. When operating in salt, corrosion or low temerature conditions

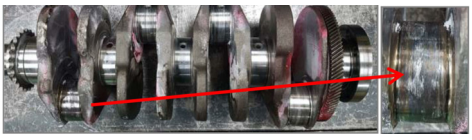
※ Problems with poor engine oil management

⚠ Excessive or little engine oil filling

Engine oil quantity (lower)	① Damage on E/G moving parts with poor lubrication due to premature E/G oil deterioration ☞ Crankshaft, camshaft, conrod bearing, piston scuffing, etc. ② Damage on moving parts due to aeration in E/G oil, etc	Oil level gauge unchecked after filling E/G oil
Engine oil quantity (over)	① Damage on after-treatment unit due to excessive blow-by gas ② Dieseling due to excessive blow-by gas ③ Damage (melting) on piston due to E/G oil flow into combustion chamber ④ Injector tip burnout and E/G hestiation due to abnormal combustion by E/G oil in combustion chamber	

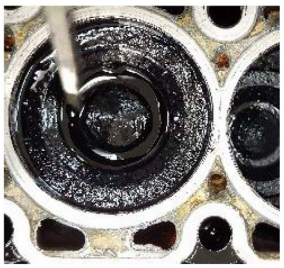
※ This service interval is for R-engine model.

< Problem picutres >



< Crankshaft pin seizure >

< Connecting rod bearing seizure >



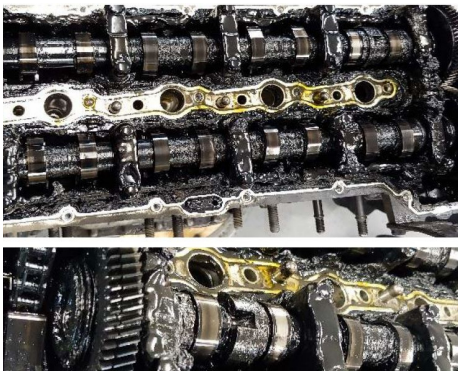
< Engine oil in combustion chamber >

< Connecting rod broken >

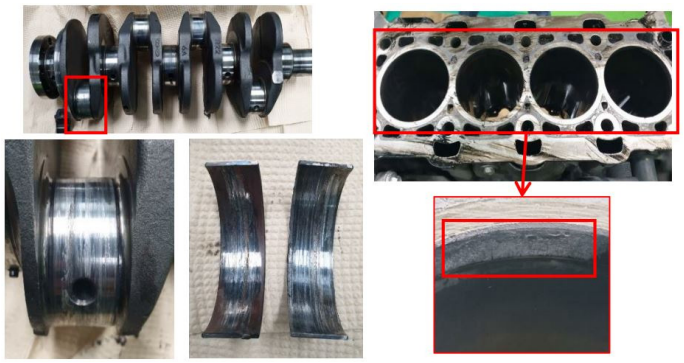
⚠ Engine oil contamination (neglecting daily and periodic check)

Gelled	① Excessive wear and seizure of turbocharger shaft bearings due to delayed oil supply to turbocharger ② Excessive wear and seizure of crankshaft main bearing ③ Excessive oil consumption due to piston scuffing and cylinder block bore scratches	Checking and replacement not performed Water inflow etc
Viscosity (high)	④ Excessive wear and seizure of connecting rod bearings ⑤ Excessive wear and seizure of cam shaft bearings ⑥ Engine power reduction and hesitation due to poor autolash ⑦ Excessive chain noise due to poor timing chain tensioner ⑧ Wear and burnout due to lack of lubrication of timing chain lever, guide	

< Problem picutres >



< Contaminated and gelled engine oil >



< Excessive wear of moving parts >

5. OPERATING PROCEDURES

1. BEFORE OPERATING THE TRUCK

Be sure that you have read and understand the information in this Operator's Manual and are trained and authorized before operating the lift truck.

⚠ A lift truck can be dangerous if not used properly. Safe operation is the responsibility of the operator.

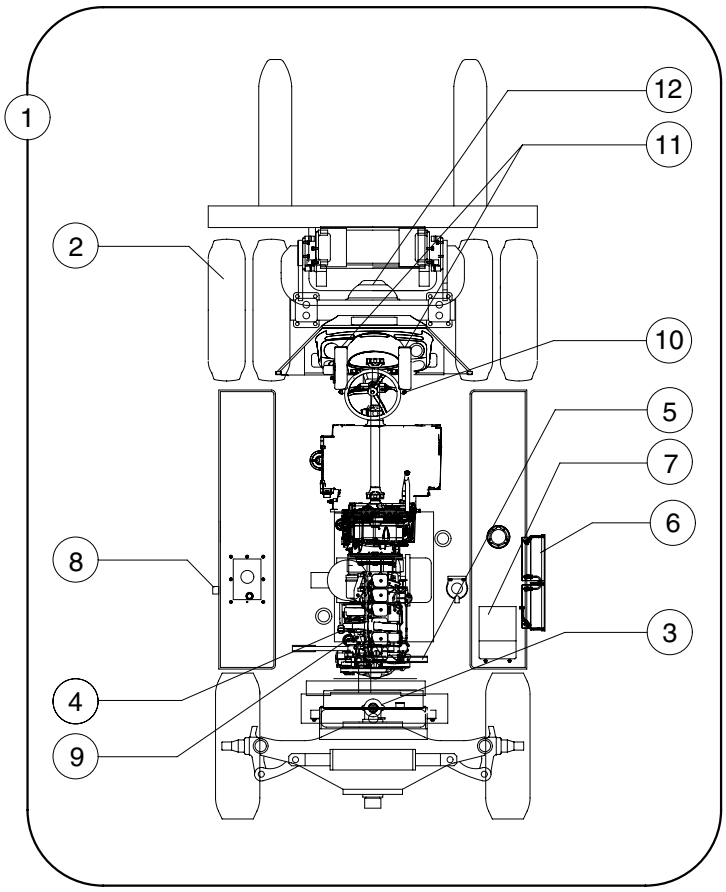
⚠ Do not start or operate the truck, or any of its functions or attachments, from any place other than the designated operator's position.

⚠ Inspect your lift truck before operating at the start of each shift. Before putting your truck to use, check the operation of the controls and all systems.

⚠ Protect yourself. Do not operate truck without closing the cabin door or without fastening seat belt unless conditions prevent its use.
Use special care if operation without these safety rules are required.

2. CHECK BEFORE STARTING

1) The Occupational Safety and Health Act (OSHA) required that truck users examine their trucks before each shifts to be sure they are in safe working order. Defects when found shall be immediately reported and corrected. The truck shall be taken out of service until it has been restored to safe operating condition.



1 Oil leakage
2 Tire air pressure
3 Coolant level
4 Engine oil level
5 Fan belt tension
6 Battery
7 Brake cooler oil level
8 Hydraulic oil level
9 Water separator
10 Multi function switch
11 Pedals
12 Axle oil level

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2) A thorough walk-around check should be made BEFORE starting engine. This is required for your personal safety and to realize maximum service life for your truck.
   ① The numbers on the inspection chart show the order of inspection
   ② These numbers correspond to the check item numbers given on the next pages.
   ③ Hang a caution sign on the truck (for example, **Do not start or Maintenance in progress**). This will prevent anyone from starting or moving the truck by mistake.

3. CHECK BEFORE STARTING ENGINE

1) CHECK FOR WATER OR OIL LEAKAGE

(1) Walk around your HYUNDAI truck and check for water, oil or hydraulic leakage. Examine truck for obvious damage.

(2) Check overhead guard, backrest, forks, mast and lift chains for crack or obvious damage.

(3) If any damage or leaks are detected contact your HYUNDAI dealer or tire repair shop.

2) CHECK TIRE AIR PRESSURE/CHECK TIRE RIM

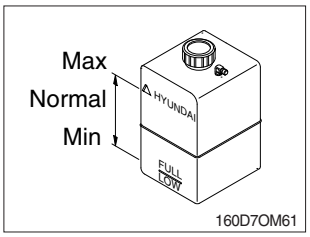
• **Air pressure and torque**

Item	Unit	Front tire	Rear tire
Tire air pressure	kgf/cm^2	10	10
	psi	142	142
	bar	10.8	10.8
Hub nut tightening torque	kgf · m	83.2	
	lbf · ft	601	
	N.m	805	

⚠ The tires are under high inflation pressure, so failure to follow the correct procedures when changing or servicing tires and rims could cause the tire to explode, causing serious injury or damage. The tires and rims should always be serviced or changed by trained personnel using the correct tools and procedures. For details of procedures, contact your HYUNDAI dealer or tire repair shop.

⚠ If there is any deformation, damage, or wear of the rim, or any doubt about the condition, always replace the rim. Never try repairing, welding, or heating.

3) CHECK COOLANT LEVEL

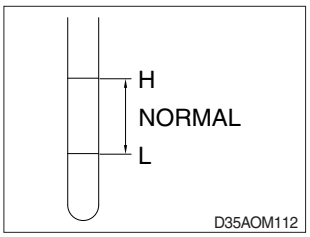


(1) If the cooling water in the radiator sub-tank is not within normal range when cool, add water to the MAX line.

⚠ If antifreeze is being used, pay careful attention to the ratio of antifreeze and water when adding coolant.

⚠ If the sub-tank is completely empty, first add water directly to the radiator. Then add water to the sub-tank.
Always allow the radiator to cool down before adding water.
At the operating temperature, the engine cooling water is at high temperature and pressure, so it is dangerous to try to open the radiator cap. Wait until the radiator is cool enough to be touched by hand before opening the radiator cap. Loosen the radiator cap slowly to release the pressure, then loosen the cap.

4) CHECK OIL LEVEL IN ENGINE OIL PAN



(1) Stop the engine, pull out the dipstick and check the oil level.

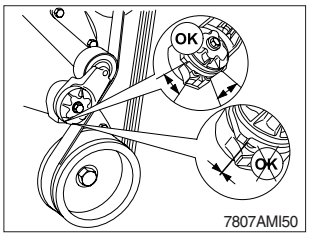
(2) The oil surface line on the dipstick should be between H and L. If below L, remove the filler cap and add engine oil through the oil level.

※ Change the oil if it is marked dirty or discolored.

⚠ Oil level is to be checked with the truck placed at flat level and at least 3 minutes after the engine stopped.

⚠ Do not touch hot components or allow hot oil to contact your skin.

5) CHECK FAN BELT TENSION



Cooling fan belt tensioner

Maintenance check

(1) With the engine turned off, check that neither the top nor bottom tensioner arm stop is touching the cast boss on the tensioner body. If either of the stops is touching a boss, the alternator belt must be replaced. Check to make certain the correct belt part number is being used if either condition exists.

⚠ When using a steam cleaner, wear safety glasses or a face shield, as well as protective clothing. Hot steam can cause serious personal injury.

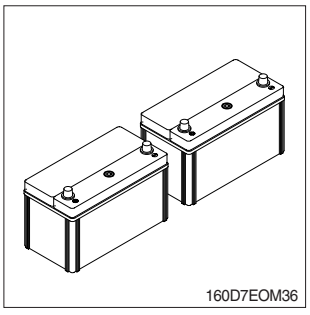
⚠ Wear safety glasses or a face shield, as well as protective clothing, to prevent personal injury when using a steam cleaner or high-pressure water.

Check the tensioner pulley and body for cracks. If any cracks are noticed, the tensioner **must** be replaced. Refer to a cummins authorized repair facility.

Check the tensioner for dirt buildup. If this condition exists, the tensioner **must** be removed and steam-cleaned.

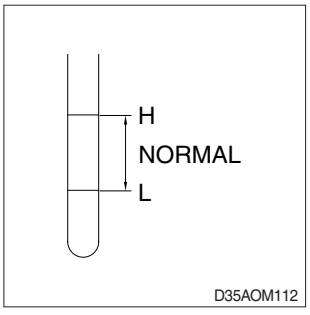
With the cooling fan belt removed, check that the bottom tensioner arm stop is in contact with the bottom tensioner arm stop boss on the tensioner body. If these two are **not** touching, the tensioner **must** be replaced.

6) CHECK BATTERY



⚠ Battery maintenance need serious care and safety service. Refer to 10. REPLACEMENT AND CHECK in SECTION 7. and always keep the safety rules.

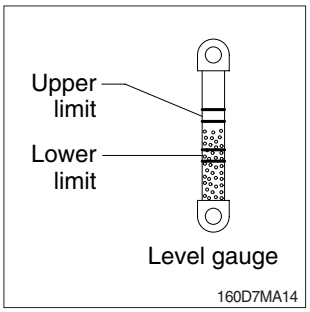
7) CHECK BRAKE COOLER OIL LEVEL



(1) Rest fork on ground and stop engine. Pull out dipstick and check oil level. If insufficient, add oil.

⚠ Hot oil and components can cause personal injury. Do not allow hot oil or components to contact skin.

8) CHECK HYDRAULIC OIL LEVEL



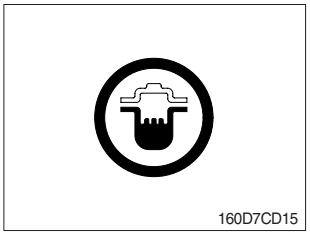
(1) Rest fork on ground and stop engine.

(2) Check the oil level from the level gauge of hydraulic oil tank.

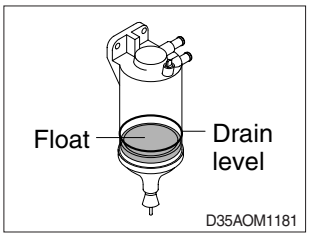
(3) In accordance with the mast equipped, the oil level differs.

Gauge	ℓ (U.S.gal)	V - mast	TS - mast
Lower limit	256 (67.6)	V300 ~ V600	-
Upper limit	278.8 (73.7)	V650 ~ V700	TS395 ~ TS700

9) CHECK WATER SEPARATOR

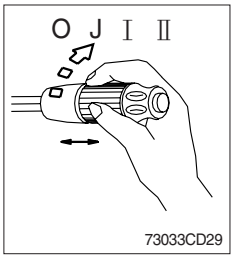


(1) WIF (Water in fuel) warning lamp.
If the warning lamp stays on, drain the water from the fuel filter.



(2) When the float of separator meets the red line (drain level), drain water.

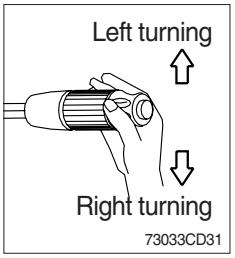
10) MULTI FUNCTION SWITCH



(1) Front wiper and washer switch

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

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



(2) Turning switch

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

11) CHECK PEDALS

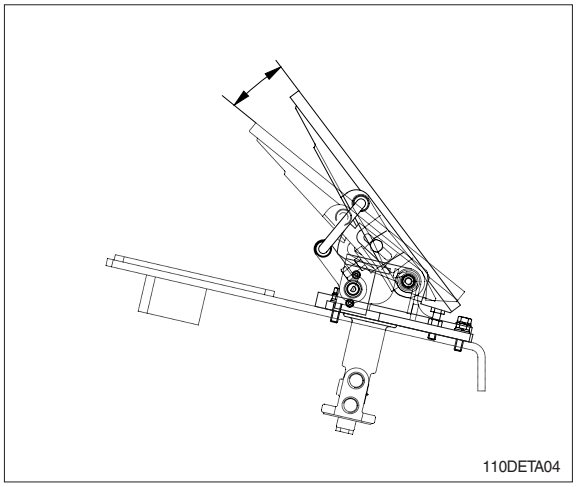
Check for any catching or abnormal heaviness when depressing the pedals.

(1) Inching pedal

① Free play : Max 1°
② Interlock stroke with brake pedal : 7° (20~24 mm)

(2) Brake pedal

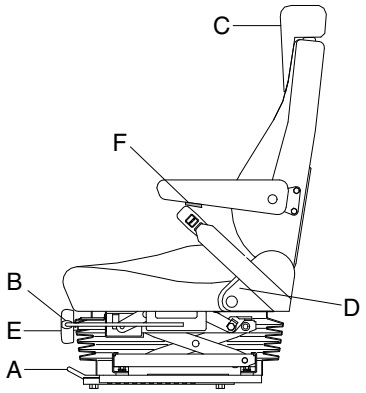
① Free play : Max 1°



4. SEAT ADJUSTMENT

1) SEAT ADJUSTMENT

The seat is adjustable to fit the contours of the operator's body. It will reduce operator fatigue due to long work hours and enhance work efficiency.



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(1) Forward/Backward adjustment (slide adjustment)

Pull lever (A) to adjust seat forward or backward.

(2) Upward/Downward adjustment (Lift adjustment, STD seat only)

① Push or pull the height adjuster lever (B) to adjust seat upward or downward.

② Forward or backward side adjustment only can be made, tilting to one side, by pushing or pulling the lever (B) respectively.

(3) Reclining adjustment

Pull lever (D) to adjust seat backrest angle.

(4) Arm rest adjustment

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

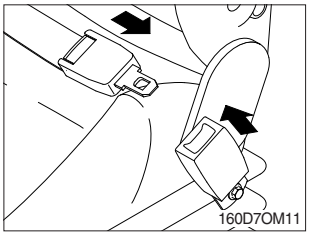
(5) Cushion adjustment (E)

Adjusting handle to the operator's weight.

(6) Shoulder head rest (C)

The shoulder rest can be adjusted.

2) BUCKLING UP



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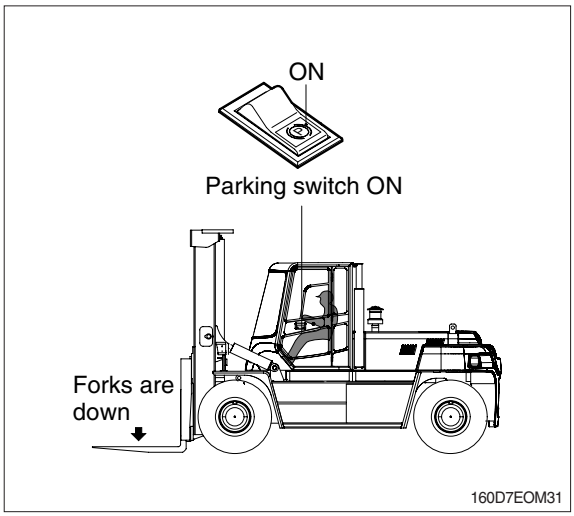
(1) Buckling up. Be sure that you put on the seat belt. Connect and adjust the seat belt strap to a snug, comfortable position.

⚠ Always wear your seat belt when operating a lift truck. Failure to wear seat belt will result in injury or death in an event of an accident.

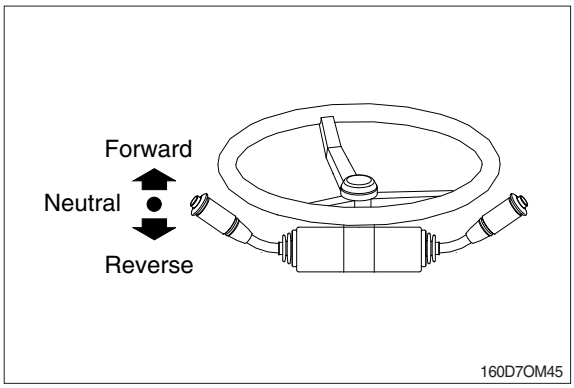
5. STARTING FROM A SAFE CONDITION

Always start from a safe condition.
Before operating a lift truck, make sure that :

- You are safely seated in the truck.
- Seat belt is buckled up.
- The parking brake is applied.
- The forks are fully lowered to the floor or ground.
- You are familiar with how all the controls function.
- All controls are in neutral or other correct position.
- The truck has received its daily inspection and ready and safe to operate.



Put the direction control lever in the NEUTRAL position, before starting. The truck should start only in the NEUTRAL position. If it starts in gear, have the truck serviced.



6. GENERAL STARTING AND OPERATING TIPS

Before you start the truck, make sure that you have taken all the above-mentioned precautions, you have read this manual, you are starting from a safe condition, with the directional control in NEUTRAL, the seat adjusted, and your seat belt buckled.

⚠ **INSPECT YOUR LIFT TRUCK BEFORE OPERATING at the start of each shift. Before you put your truck to use, check the operation of the controls and all systems.**

Turn off any lights or optional electrical equipment while you crank the engine. This reduces the electrical load on your battery.

Avoid excessive starter cranking (In excess of 30 seconds). To avoid starter overheating or damage, do not crank the starter continuously for more than 30 seconds at a time. If the engine fails to start, wait two to three minutes before again attempting to start your lift truck.

If your battery is **run down** (discharged) or becomes discharged while you try to start your truck, please refer to Section 6, **Emergency Starting and Towing**, in this manual.

To avoid damage to your truck or possible harm to yourself. Follow these recommendations :

- Warm the engine up before driving or applying a load. Idle engine at low idle rpm for a few minutes to circulate and warm the oil. Then increase speed to approximately half-throttle for a short period or until the engine coolant reaches approximately 100°F. This procedure helps prolong engine life.
- Let the engine run until the normal operating temperature is reached. Then operate the controls and check all gauges and warning indicators to be sure they are functioning properly. Stop the engine and make a visual inspection for oil, water, or fuel leaks.
- Do not operate the engine at speeds above idle for more than brief periods without a load.
- Do not run the engine at maximum power continuously until the engine is fully warmed up.
- Never operate the engine at more than the regular no-load governed speed. Excessive speeds are harmful.

※ **The governor is set at the factory and should not need adjustment.**

- Avoid extended (in excess of 10 minutes) and unnecessary idling of the engine. Turn off the engine instead.
- **Carbon monoxide** is colorless and odorless, but can be present with all other exhaust fumes.

⚠ **Exhaust gases are harmful and can cause serious injury or death. Proper ventilation is always necessary for safe inside operation or warm-up.**

⚠ **Due to the precise, tolerances of diesel injection systems, it is extremely important that the diesel fuel be kept clean and free of dirt or water. Dirt or water in the system can cause severe damage to both the injection pump and the injection nozzles.**

7. STARTING AND STOPPING THE ENGINE

1) CHECK INDICATOR LIGHTS

(1) Check if parking brake switch is ON.

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

(3) Turn the key to the ON position, and check following.

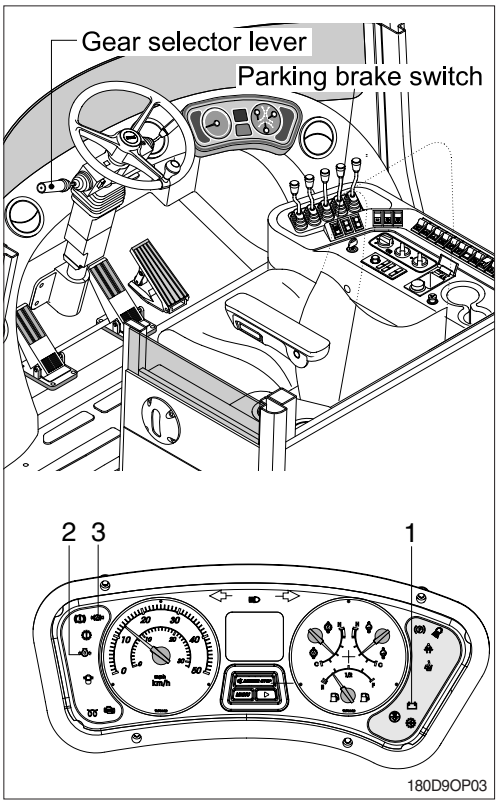
① If all the lamps light ON after sounding buzzer for 3 seconds.

※ **If the lamps do not light or the buzzer is not sounded, check disconnection of wire.**

② Only below lamps will light ON and all the other light will be turned OFF after 3 seconds.

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

※ **Start the engine after all of the lamps OFF. (Only above 3 lamps remain ON)**



2) STARTING ENGINE IN NORMAL TEMPERATURE

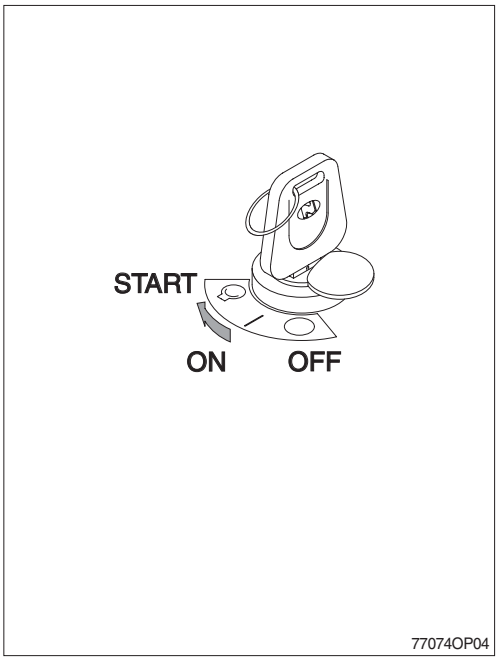
※ **Sound the horn to warn the surroundings after checking if personnel or obstacles are in the area.**

(1) Turn the starting switch to START position to start the engine.

※ **If the engine does not start, allow the starter to cool for about 2 minutes before attempting to start the engine again.**

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

(3) The starting switch will automatically return to the ON position.



3) STARTING ENGINE IN A COLD WEATHER

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

※ Replace the engine oil and fuel referring to recommended oils at page 7-55.
Fill the anti-freeze solution to the coolant as required.

(1) Check if the parking brake is locked(With the parking switch ON).

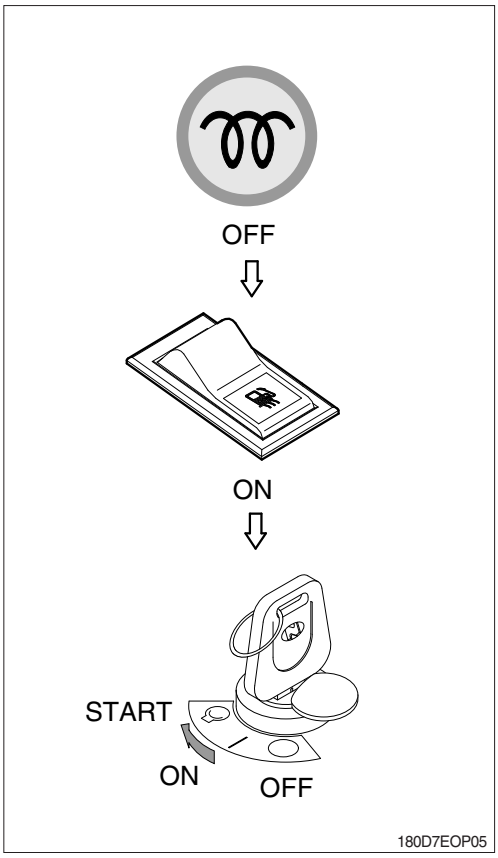
(2) Check if the gear selector lever is in the neutral position.

(3) Starting the engine while the ambient temperature is below 0°C.

① Turn the start key switch to "ON" position.

② Wait until the gauge of the monitor should be set.

③ Push down the heating symbol ( ) on the fuel heater switch so that it can heat the fuel oil after the heating signal ( ) on the cluster goes out and then wait for 5 minutes.



④ Turn the start key switch to "Start" position.

⑤ Release the start key switch when the engine is started.

⑥ Keep sufficiently idling condition after starting the engine.
Travelling the machine or operation of the attachments could be caused shut-down of the engine.

※ In the event of the winter season, the fuel oil happens WAX from -6°C.
When the ambient temperature is below -6°C, do not operate the machine under high load condition so that it can operate normally the fuel system of the engine, and operate the machine after keeping idle condition of the engine in a way.

(4) Starting the engine at freeze-up (severe cold winter season) condition.

① When the ambient temperature is below 0°C, carry out the same method according to above procedure.

② Operate the engine in a way so that it can supply a sufficient oil to the engine and hydraulic system due to heating the oil under low speed and low load condition after starting the engine.

③ At the severe cold condition below -15°C, do not operate the machine under the high load condition after starting the engine in a way.
Keep the idle condition of the engine for 20~30 minutes at the severe cold condition (freeze-up condition).

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 OFF?

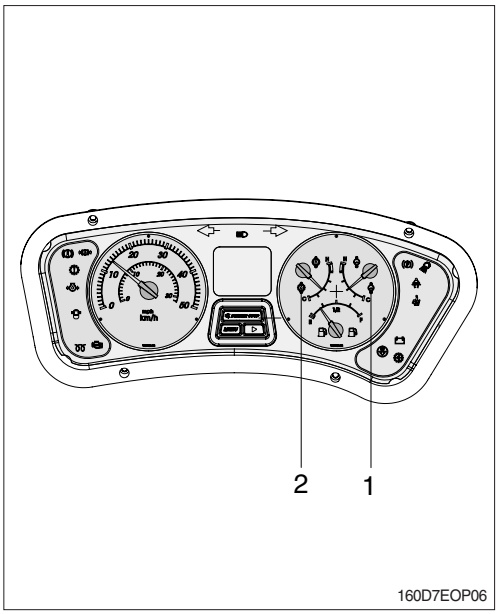
(4) Check the following after warming up operation.

① Is the indicator of engine coolant temperature gauge (1) in the operating range?

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

③ Is the engine sound and the color of exhaust gas normal?

④ Are the sound and vibration normal?



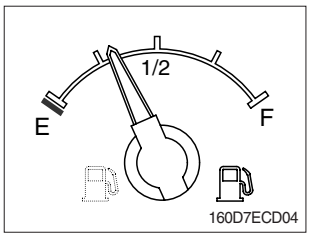
※ **Do not increase engine speed quickly after starting, it can make damage engine or turbocharger.**

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

(5) Check engine exhaust color.

Exhaust gas color	Criteria
Colorless, light blue	OK
Black	Check for incomplete combustion
White	Check for oil leakage

(6) Check fuel tank level.

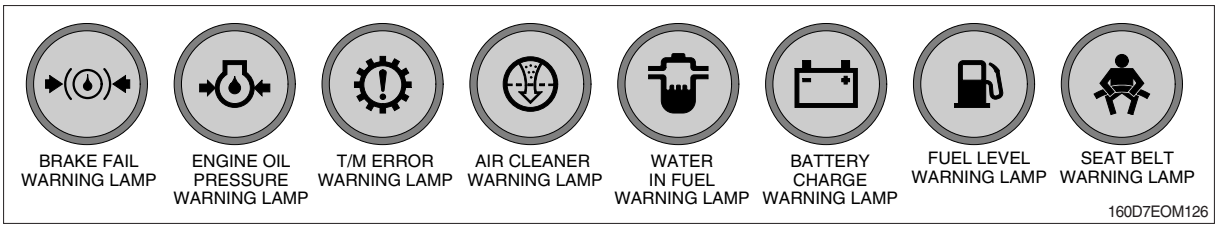


If the indicator points to **F**, the tank is full. If the indicator enters the **E** range, refill the fuel tank immediately. Do not operate the truck below this level. Do not use low quality fuel or fuel mixed with kerosene. Clean the area around the cap before adding fuel to prevent dirt from entering the tank.
Always fill the tank at the end of the day's operation. If air remains in the tank, the moisture in the air will condense inside the tank and form water in the fuel.

⚠ Do not smoke or allow any flame near the truck when refueling. Refueling produces explosive fumes. The truck should be refueled only at the specified refueling point.

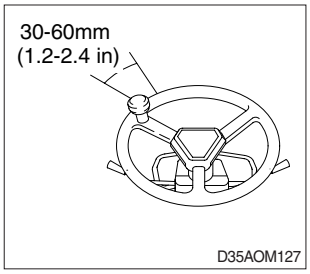
⚠ Stop the engine and get off the truck when refueling.

(7) Check warning lamps.



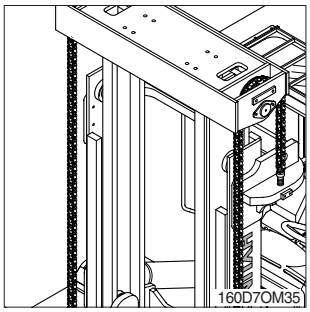
※ **These lamps light up to indicate an abnormality.**
So, if one of these lamps is lighted, take appropriate service and maintenance.

(8) Check steering wheel play.



If the steering wheel play is over 30~60 mm (1.2~2.4 in), check or repair it.

(9) Check lift chain tension.



Raise forks 10 to 15 cm (4 to 6 in) from ground. Push with a rod to check that both chains have approximately same amount of slack.

· Adjusting lift chain

① Loosen locknut and turn the adjust nut.

② Equalize tension on the lift chain.

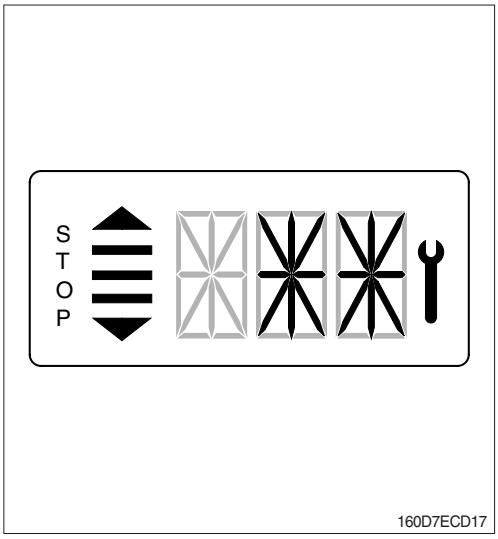
⚠ Do not put hands into the mast.

(10) Check steering wheel.
Check that steering wheel does not wobble or suddenly pull to one side. Check also for any abnormal heaviness in steering.

(11) Check rear view mirror.
Adjust the rearview mirror for best rearward visibility.

5) TRANSMISSION COLD STARTING

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



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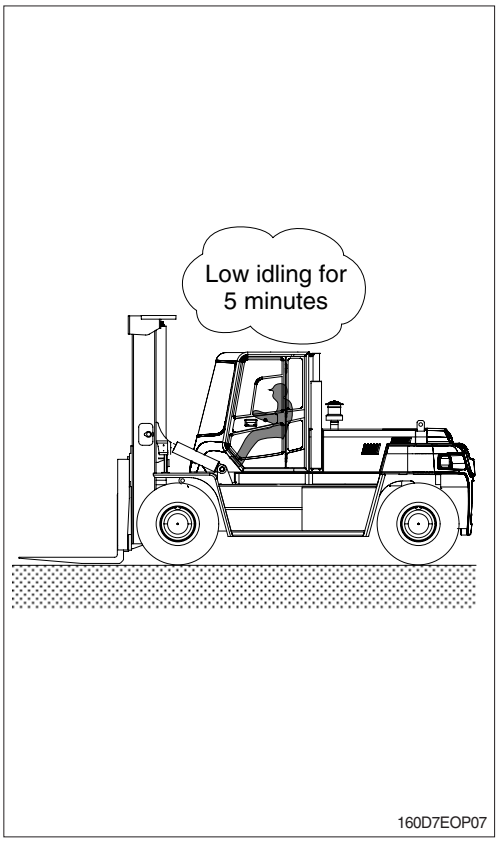
6) TO STOP THE ENGINE

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

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



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8. WARMING-UP OPERATION

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

1) Run the engine at low idling for 5 minutes.

2) Speed up the idling and run the engine at mid-range speed.

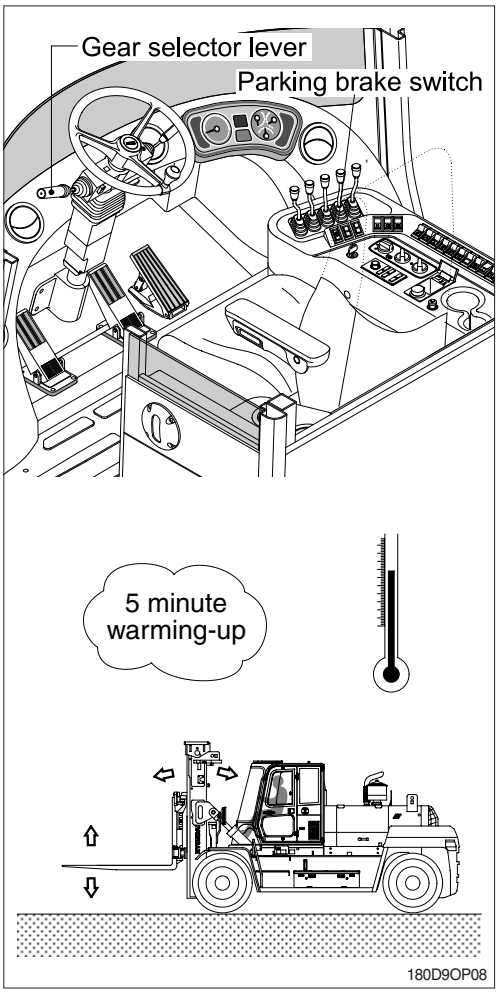
3) Lift the forks slightly and tilt the mast forward to the stroke end to relieve hydraulic pressure.

※ **Do not leave hydraulic pressure relieved for more than 30 seconds.**

4) Tilt back to the stroke end to relieve hydraulic pressure.

※ **Do not leave hydraulic pressure relieved for more than 30 seconds.**

5) Repeat the procedure 3) - 4) several times until warm-up operation is completed.

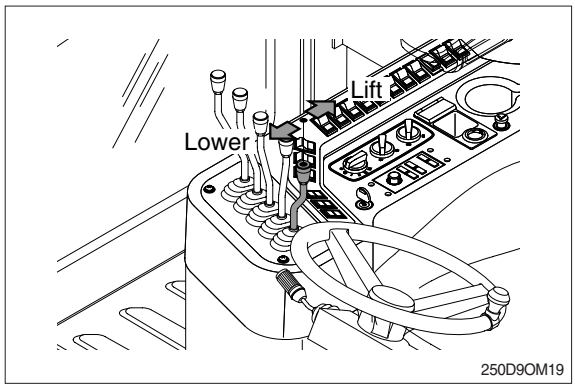


9. LEVERS AND PEDALS

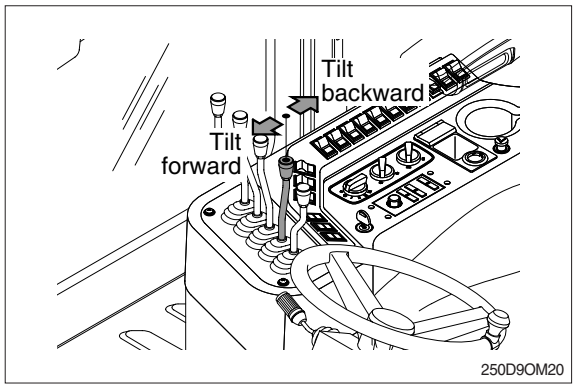
1) POSITIONING FORKS AND MAST

When driving, with or without a load, it is a good practice to always raise the forks slightly and tilt the mast (forks) backward. Raising the forks and tilting them back prevents the fork tips from catching on possible obstructions and reduce the wear on the fork blades from striking or dragging on the floor or ground. See safety messages on next page.

Pull back on the lift control lever and raise the forks 150 to 200 mm (6 to 8 inch) above the floor. Then, using the tilt control, tilt the mast back slightly to raise the fork tips.



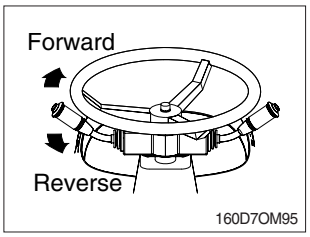
The mount of forward and backward tilt to be used is governed by the application.



⚠ When the mast (carriage and/or load) is raised into a high (Elevated) position, the stability of the truck is reduced.
Some of the other conditions that may affect stability are ground and floor conditions, grade, speed, loading, dynamic and static forces, and the judgement exercised by the operator. Trucks equipped with attachments behave as partially loaded trucks even when operated without a load on the attachment. Also, improper operation, faulty maintenance, or poor housekeeping may contribute to a condition of instability.

⚠ For stability, do not travel with the load or carriage in a highly elevated position. Travel with the lift mechanism raised only enough to clear the ground or obstacles.

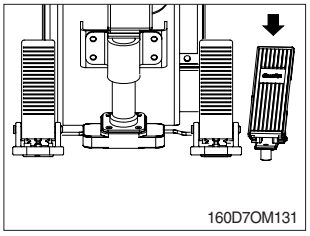
2) SELECTING DIRECTION OF TRAVEL



Push the direction control lever forward, center it , or pull it back for FORWARD, NEUTRAL, or REVERSE, respectively.
Traction is disabled in NEUTRAL.

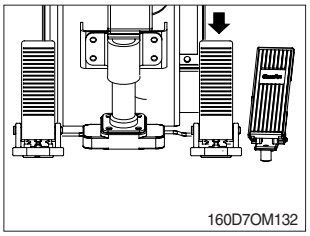
⚠ During traveling in forward or reverse direction, a sudden change of direction can cause to drop a load and damage to the machine.

3) USING THE ACCELERATOR PEDAL



With the parking brake released and the direction control in FORWARD or REVERSE, put your foot on the accelerator pedal and push down smoothly until the truck is moving at the desired speed.

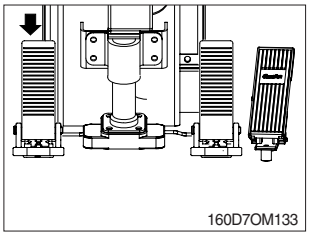
4) BRAKING PEDAL



To stop the truck, lift your foot from the accelerator pedal and put it on the brake pedal. Push down on the brake pedal in a smooth, firm motion until the truck is stopped.

⚠ Stop the lift truck as gradually as practical. Hard braking and wheel sliding are dangerous, increase wear, and can cause you to loose a load and damage to the lift truck. Can cause tip-over.

5) INCHING PEDAL



Use the inching pedal and the accelerator pedal in combination to vary lift and travel speeds independently. The further you depress the inching pedal, the more the driving clutch slips, reducing travel motion. With the inching pedal fully depressed, the brakes fully engage. You operate the inching pedal with your left foot for precise control of travel speed, while you operate the accelerator pedal together with the lift control to vary lift speed.

⚠ In case of slipping the clutch, it can be caused to happen heating problem in the system due to excessive friction of the discs, and reduced a durability or a lifetime of the components as result.

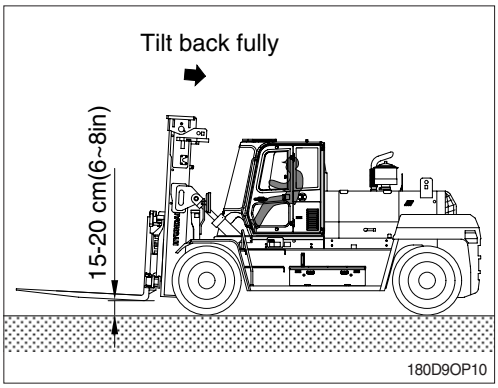
⚠ Pay particularly careful attention to do not press repeatedly the pedal and it is essential to cut off the power for travelling by pressing the pedal sufficiently to prevent from heating problem.

10. TRAVELING OF THE TRUCK

1) BASIC OPERATION

(1) Traveling posture

Lift the forks so that the forks are placed 15~20 ㎝ (6~8 in) above the ground and tilt back the mast fully.

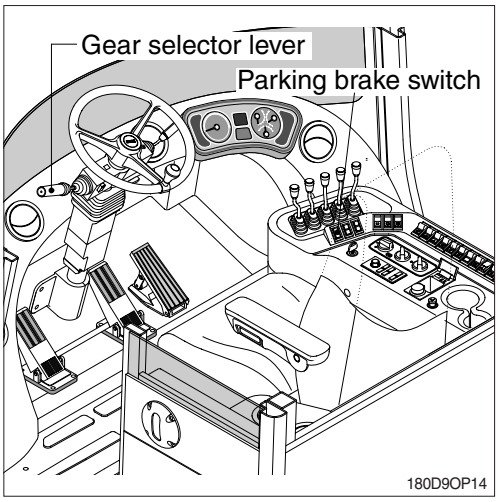


(2) Traveling operation

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

① Release the parking brake.

② Put the gear selector lever in the 1st stage of forward or backward direction and press gently the accelerator pedal to move the truck.



(3) Changing direction and speed

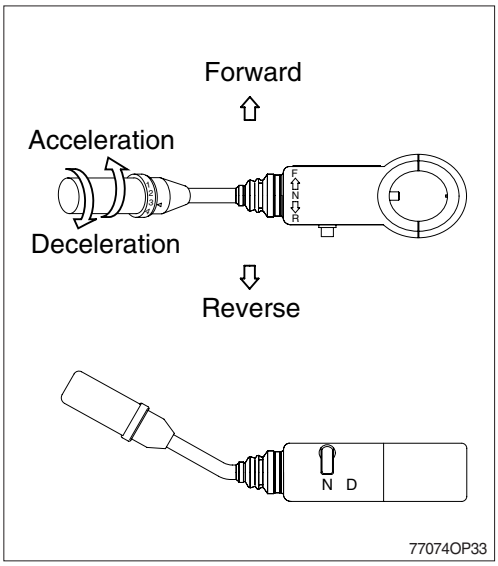
① The gear selector is designed for the mounting on the left side of the steering column.

② The positions (speeds) 1 to 3 are selected by a rotary motion, the driving direction Forward (F)-Neutral (N)-Reverse (R) by tilting the gear selector lever.

③ A neutral lock is installed as protection against inadvertent drive off.

- **Position N** - Gear selector lever blocked in this position
- **Position D** - Driving

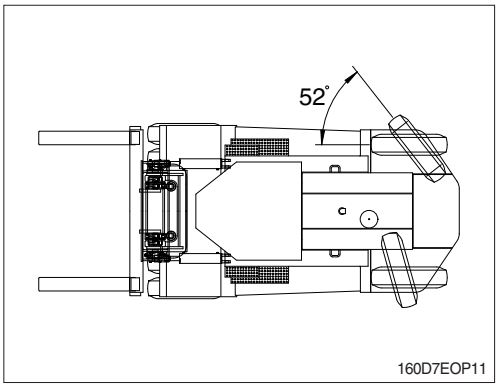
④ When doing work, run the truck in the 1st or 2nd speed.



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

(4) Turning the truck

① Turn the truck by moving the steering wheel into the desired direction.
② You can turn the truck to the left or right by 56.15 degree.
※ Do not turn the truck abruptly when traveling at high speed and avoid turn on a slope.
⚠ Steering does not function with engine OFF.



(5) Precautions when driving

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

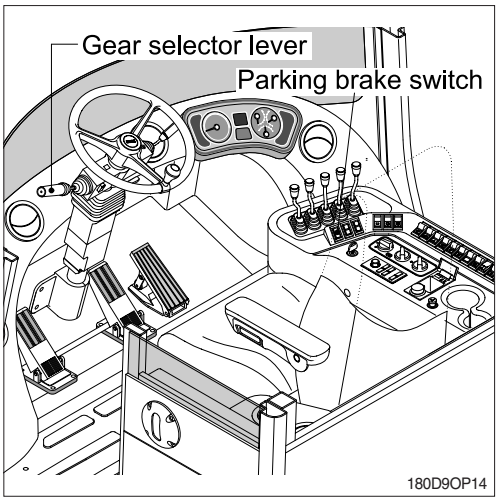
⚠ Do not drive the forklift more than 30 minutes without idling.
If the truck is driven 30 minutes, stop driving and keep it 10 minutes under idle condition.
Excessive Driving may cause overheating of brake and tires and this may result in short life cycle of those parts.

(6) Stopping the truck

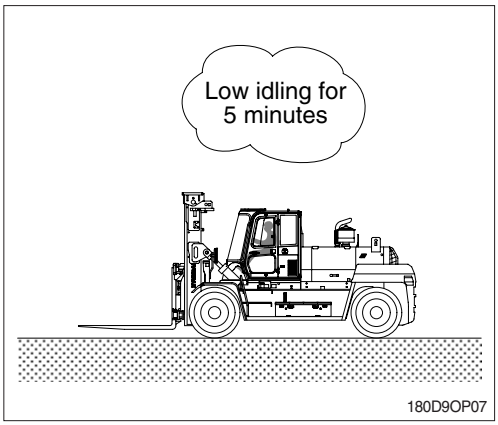
① Press the brake pedal to stop the truck.

② Put the gear selector lever in the neutral position.

③ Press the parking brake switch.



④ Lower the forks to the ground.



(7) Stopping engine

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

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

① Check if the parking brake is in the lock position.

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

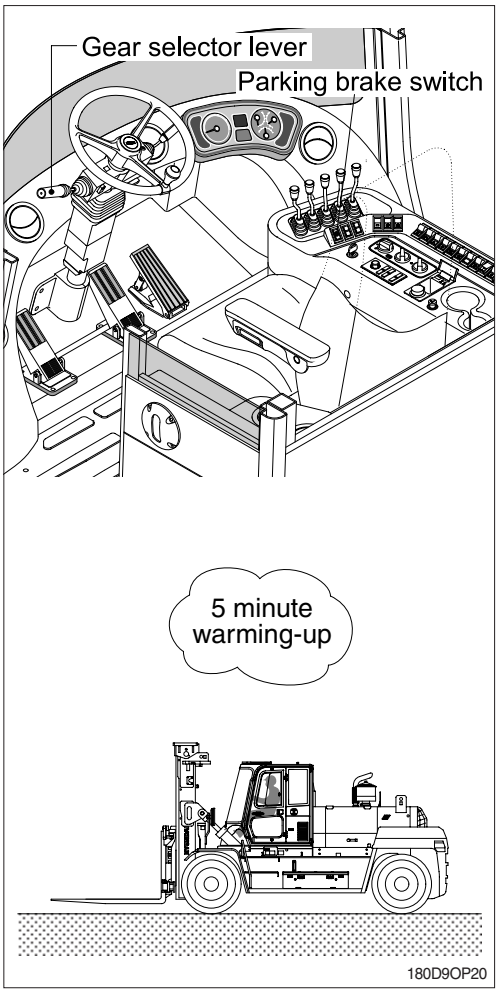
③ Run the engine at low speed without operating the equipment for about 5 minutes. Turn the starting key to the OFF position and remove the key.

(8) Checks after the engine stopped

① Check the leakage of oil and water, the work equipment and the exterior of the truck.

② Refill the fuel tank.

③ Remove any debris inside of the engine room and attached to the truck.



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2) TRAVELING ON A SLOPE

(1) Never travel down a slope in neutral.

(2) Lower the forks 15-20 ㎝ (6~8 in) to the ground.

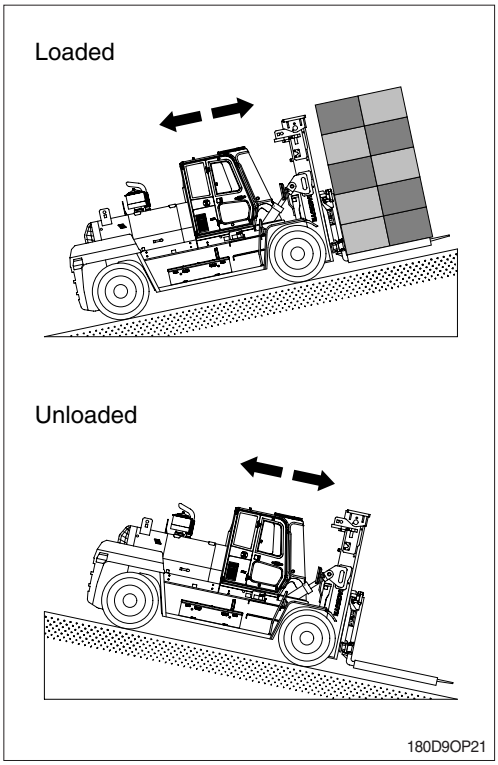
(3) Never turn on a slope, either loaded or unloaded.

(4) Never park on a slope.

(5) **Loaded** - move with **forks upgrade**
Unloaded - move with **forks downgrade**

※ **Truck 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 truck to lose its balance and turn over.**



180D9OP21

11. OPERATING SAFELY

Safe operation is the responsibility of the operator.

1) WATCH WHERE YOU ARE GOING. DON'T GO IF YOU CAN'T SEE...

(1) Before driving, check all around to be sure that your intended path of travel is clear of obstructions and pedestrians.

⚠ **LOOK WHERE YOU DRIVE. Watch out for pedestrians, other vehicles, obstructions (especially overhead), and drop-offs. If the load blocks your view, drive backwards, except up slopes.**

(2) Do not allow anyone to stand or pass under the load or raised forks.
Watch for people in your work area even if your truck has warning lights or alarms. They may not watch for you.

(3) Sound horn at intersections and wherever vision is obstructed.
Do not drive a truck up to anyone standing in front of an object.

2) PROTECT YOURSELF AND THOSE AROUND YOU...

(1) Operate the truck only from the designated operator's position. Stay within the confines of the lift truck profile dimensions. Keep all body parts inside the operator's compartment and away from the danger of passing obstructions. Keep inside the cabin.

※ **A cabin is intended to offer protection to the operator from falling objects, but cannot protect against every possible impact. Therefore, it should not be considered a substitute for good judgement and care in loading, handling, storage, etc.**

⚠ **Keep clear of the mast and lift mechanism. NEVER reach into or put hands, arms, legs, or head into or through the mast structure or near the carriage or lift chains. Never put any part of your body between the mast and the truck.**
Don't use the mast as a ladder.
Keep all other persons clear of the load and mast mechanism while attempting to handle a load.

3) NO RIDERS...

(1) Do not carry passengers. The operator is the only one who should be on the truck.

4) ALWAYS BE IN FULL CONTROL OF YOUR LIFT TRUCK...

(1) Never operate a lift truck or its attachments if you are not in the designated operator's position.

(2) Never operate a lift truck when your hands and feet are wet or greasy.

(3) Always pick the smoothest travel route for your lift truck. Avoid bumps, holes, slick, spots, and loose objects or debris in your path that may cause the truck to swerve or tip. If these conditions are unavoidable, slow down and carefully drive past them. Slow down for wet or slippery surfaces.

(4) Avoid any sudden movement, it can cause the truck to tip-over.
Start, stop, travel, steer, and brake smoothly.

(5) Operate your lift truck under all conditions at a speed that will permit it to be brought safely to a stop.

(6) Travel with the fork carriage tilted back and raised only enough to fully clear the ground or obstacles. When the carriage (load) is in an elevated position the stability of the truck is reduced.

(7) Do not elevate the load except during stacking.

5) GRADES, RAMPS, AND INCLINES...

(1) Use special care when operating on ramps, inclines, and uneven areas. Travel slowly. Travel straight up and down. Do not turn or drive at an angle across an incline or ramp. Do not attempt to operate on grades in excess of those specified and/or recommended by the manufacturer.

(2) When the truck is loaded, travel with the load upgrade. When the truck is empty, travel with lifting mechanism (mast) downgrade.

(3) Always brake with the right foot pedal (Not with the inching pedal) when travelling down incline. If you should travel down incline for long distance, apply the engine brake with lower gear. Brake mal-function such as performance drop, excessive wear of friction material and disc stick can be caused by continuous brake operation making the oil overheating. In that case, stop traveling, apply parking brake with neutral gear position and stay during 10 minutes with engine idle speed.

⚠ Do not travel down incline with neutral gear state.
It makes the brake oil overheated due to excessive brake operation.

6) PRACTICE SAFE OPERATION EVERY TIME YOU USE YOUR TRUCK...

(1) Careful driving and operation is your responsibility. Be completely familiar with all the safe driving and load handling techniques in this Operator's Manual. Use common sense. Drive carefully do not indulge in stunt driving or horseplay. Observe traffic rules. Watch for people and hazards. Slow down, be in full control of your lift truck at all times.

(2) Follow the instructions in this manual to avoid damage to your truck or the possibility of injury to yourself of others.

(3) During your work, observe all functions of your lift truck. This allows you to immediately recognize a problem or irregularity that could affect the safe operation of your truck.

(4) Periodically check the gauges and warning indicator lights in the instrument panel to be sure they indicate a normal condition. If an abnormal condition appears bring the truck to a safe condition and safe location, shut off the starting switch immediately and report the problem.

⚠ Do not continue to operate a truck that has a malfunction. Stop and have it fixed.

⚠ Always wear your seat belt when operating your truck.

12. LOAD HANDLING

1) GENERAL

Handle only loads that are within the truck rated capacity as shown on the nameplate. This rating specifies the maximum load that should be lifted. However, other factors such as special load handling attachments, load having a high center of gravity, or uneven terrain may dictate that the safe working load be less than the rated capacity. Under these conditions, the operator must reduce the load carried so that the lift truck remains stable.

Handle only stable or safely arranged loads. Do not handle loads made up of loose, unevenly stacked, or unstable items that can easily shift and fall. Take the time to correctly stack and hand loose items. Center the load on the forks.

Do not lift anything that might fall on the operator or a bystander. Do not handle loads that are higher than the fork carriage unless the load is secured so that no part of it can fall backward.

Keep the load back against the LBR. Loads placed out on the ends of the forks can make the lift truck less stable and more likely to tip up.

Lift and lower with the mast vertical or tilted slightly back-never tilted forward.

Operate lift and tilt controls slowly and smoothly. Never tilt the mast forward when the carriage(load) is raised, except to pick up or deposit a load over a rack or stack.

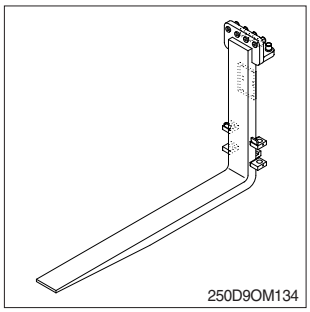
⚠ **Slack chains mean rail or carriage hang-up. Raise the mast before you move. If the mast malfunctions in any way or becomes stuck in a raised position, operate the lift control to eliminate any slack chains by raising the carriage. DO NOT go under a raised mast or forks to attempt repairs.**
DO NOT climb the mast or the truck.

Remember your truck is designed to carry loads forward of the front wheels so that the weight of the load is counterbalanced by the weight of the truck.

The farther the load is carried from the pivot point (Center of front wheels), the less the weight on the steer wheels. Therefore, always carry the load as close to the front wheels as possible (Back and flush against the face of the forks.)

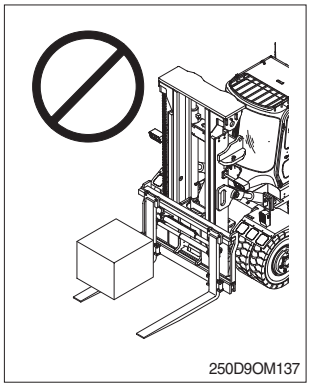
The capacity load shown on the nameplate is represented by a cube in weight is evenly distributed, with the center of gravity located a standard distance from the face of the forks. If the weight of the actual load to be handled is not evenly distributed, put the heaviest part closest to the carriage.

2) ADJUSTING THE LOAD FORKS



The load forks are adjustable on the hanger, carriage. Forks should be spaced as far apart as the load will allow. Both forks should always be the same distance from the center of the fork carriage. To adjust the forks, raise the carriage slightly. Tilt the mast fully forward to reduce friction and make the fork slide easier.

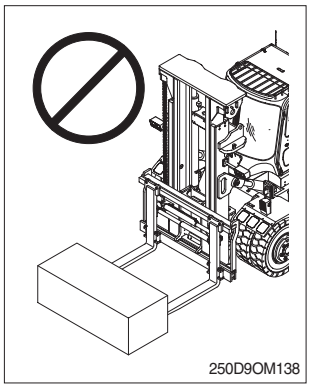
3) LOAD ON FORKS



(1) Do not elevate the load with one fork.

Loading with one fork cause the tip over, serious injury or death of operator.

The work can cause the height difference between both fork tips.



(2) Do not elevate the load with the ends of the forks.

This work can cause the height difference tips due to overload in the end of the forks.

The load should be loaded at least over 2/3 of fork length.

4) TRAVELING WITH LOAD

Travel with load or carriage as low as possible and tilted back. Never travel with the load or carriage raised (elevated) in a high position. Do not elevate the load except during stacking.

Observe all traffic regulations and watch for other traffic, pedestrians, and safe clearances. Always look in the direction of travel. Keep a clear view of the path of travel and when the load blocks your visibility, travel in reverse with load trailing (Except when climbing an incline).

Avoid sudden movements when carrying a load-start, stop, travel, steer, and brake smoothly. Steer clear of bumps, holes, and loose materials or debris on the ground. Lift and tilt slowly and smoothly. Go slowly when turning. Cross railroad tracks slowly and at an angle wherever possible.

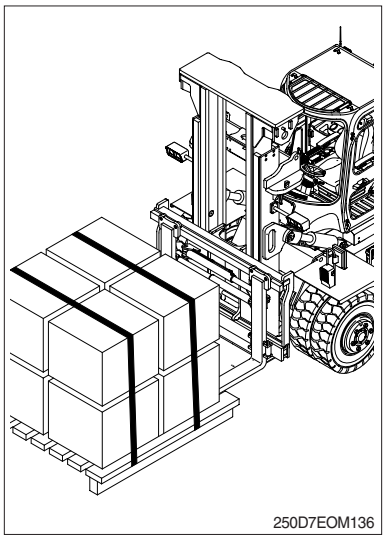
Use special care when handling and traveling with long, high, or wide loads-to avoid losing the load, striking bystanders or obstructions, or tipping the truck.

Watch clearances around the truck and load as you travel. Raise the forks or attachment only to pick up or stack a load. Look out for obstructions, especially overhead.

Be aware that exaggerated tail swing, when turning while traveling forward, is a characteristic of lift trucks that are steered by the rear wheels. Accordingly, you need to become accustomed to tail swing and always check the tail swing area of the counterweight to be sure i is clear before you turn.

Always be concerned about the stability of your lift truck. When attachments are used, extra care should be taken in securing, manipulating, positioning, and transporting the load. Because attachments generally add extra weight and complexity to the truck, operate trucks equipped with attachments as partially-loaded trucks when not handling load.

5) PICKING UP AND MOVING LOADS



When picking up a load from the ground, approach the load slowly and carefully align the truck square with the load. The forks should be adjusted to fit the load or pallet being handle and spread as wide as possible to provide good stability and balance. Before lifting, be sure the load is centered and the forks are fully under and supporting the load. Fork length should be at least 2/3 of load length. With the lift and tilt controls, adjust the forks to the correct height and angle for freely engaging the load pallet. Move forward until the forks are squarely and completely under the load.

⚠ Be Sure that the forks do not extend beyond the load, causing damage or tipping of other adjacent loads or materials behind the load being moved.

If the forks are longer than the load, move the tips partially under the load without extending beyond the load. Raise the load to clear the ground. Back out several inches, or whatever distance is necessary, then set the load down and move forward until the load is positioned against the carriage.

Raise the load from the ground or stack by tilting the mast back just enough to lift the load from the surface. When stacking or tiering, use only enough backward tilt to stabilize the load.

Then raise the load to traveling height and tilt fully back to travel (Except for loads that must be transported as level as possible).

6) UNLOADING

To deposit a load on the floor after being moved into the correct position, tilt the mast forward to a vertical position and lower the load.

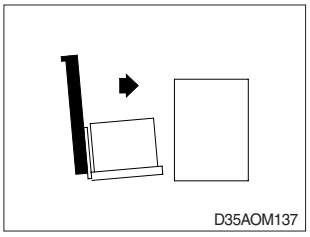
Adjust the fork height and tilt the mast forward slightly, as necessary, for smooth removal of the forks from the load (Pallet).

Carefully back away to clear the forks from the load.

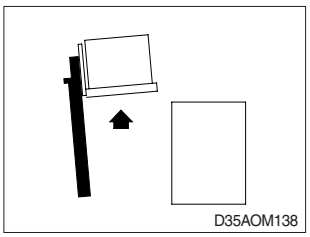
Raise the forks to traveling height and tilt forks to a level position 150~200 mm (6~8 in) off the floor.

7) STACKING

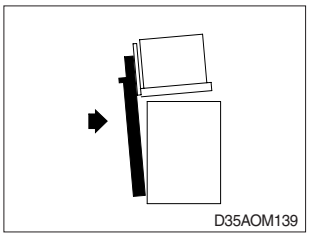
(1) To put a load on a stack



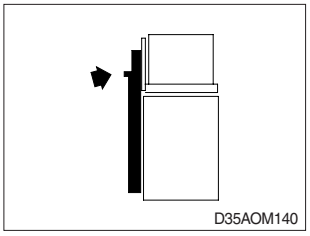
① Approach slowly and align the lift truck and load squarely with the stack.



② Raise the load as the lift truck nears the stack.

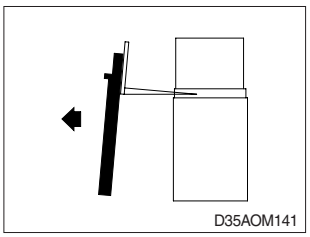


③ Move forward slowly until the load almost touches the stack. The leading edge and sides of the load pallet should line up exactly with the near edge and side of the load or rack on which you are stacking.

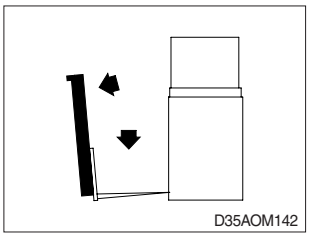


④ Stop close to the stack and further lift the load high enough to clear the top of the stack. Slowly move the load into position. Use care not to damage or move adjacent loads.

⑤ When the load is aligned with the stack beneath it, tilt the mast to the vertical position and carefully lower the load onto the top of the stack.



⑥ Lower the forks slightly to clear the load pallet. Tilt the forks forward slightly, if necessary.



⑦ Check your travel path, then carefully back away until the forks are clear of the stack. Stop and lower the forks to the travel position [150~200 mm (6~8 in) above the ground], then tilt back for travel.

(2) To move a load from a stack

Approach the stack carefully, truck lined up squarely with the load. With mast vertical, raise the forks to the correct height for freely engaging the load pallet. Adjust fork angle as necessary to fit squarely under the load. Move (inch) forward until the forks are under the load.

Be sure that the forks do not extend beyond the load, causing damage or tipping of other adjacent loads or materials behind the load being moved. If the forks are longer than the load, move the tips partially under the load without extending beyond the load.
Raise the load to clear the under surface. Back out several inches, then set the load down and move forward until the front face of the forks contacts the load. Be careful that the fork tips now clear the adjacent load or material behind the load being moved.

Raise the load from the stack by tilting the mast back just enough to lift the load from the surface. Or, with the mast still vertical, raise the forks until they begin to lift the load. at this point, apply the minimum back tilt that will stabilize the load.

Check your travel path, slowly back up until clear of the stack, stop, and then lower the load to the travel position [150~200 mm (6~8 in) off the ground]. Tilt full back to travel (Except for certain loads that may have to be transported as level as possible). Be sure the load is back flush against the carriage or front face of the forks.

※ **Certain loads must be transported as level as possible.**

13. SHUT DOWN PROCEDURE

※ **Always leave your lift truck in a safe condition.**

1) WHEN YOU LEAVE YOUR TRUCK, OR PARK IT, FOLLOW THESE SAFELY RULES

(1) Park in a safe area away from normal traffic.
(2) Never park on a grade or a slope.
(3) Never park in areas that block emergency routes or equipment, access to fire aisles, or stairways and fire equipment.

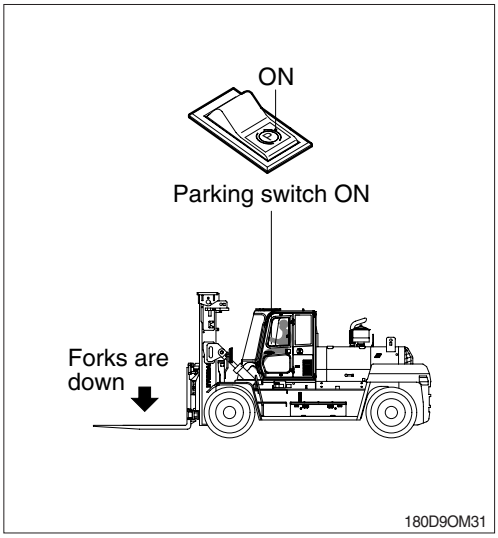
2) BEFORE LEAVING THE OPERATOR'S POSITION

(1) Bring the truck to a complete stop.
(2) Put the directional control lever in the NEUTRAL position.
(3) Turn parking switch ON.
(4) Lower the lifting mechanism-carriage and forks or attachment fully to the ground.

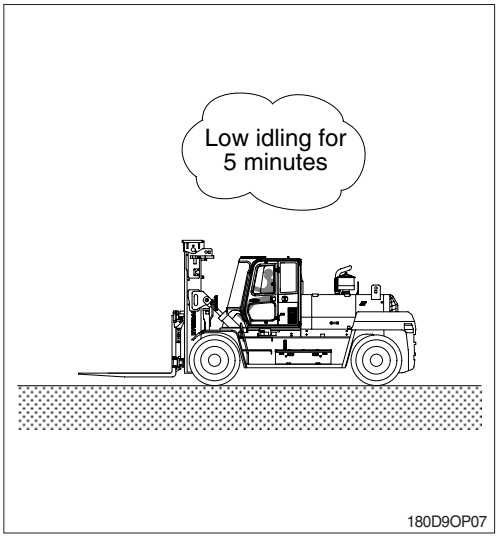
3) IN ADDITION, WHEN LEAVING THE TRUCK UNATTENDED

(1) Tilt the mast forward until the forks are level and flat on the ground. Let the engine run at idle speed.
(2) Turn the starting switch to the OFF position and remove the key.
(3) Block the wheels, if the truck must be left on an incline or you have any doubt about the truck moving from a safe position.

※ **If the lift truck has been working hard, let the engine idle a few minutes before shutting it off.**



⚠ CAUTION FOR TURBOCHARGER PROTECTION
In order to prevent turbocharger failure, please let the engine idle for more than 5 minutes before shutting it off.



14. STORAGE

1) BEFORE STORAGE

When you keep your forklift truck in storage for an extended period of time, observe the following safeguard instruction:

(1) Wash and tidy the truck and house it in a dry building.

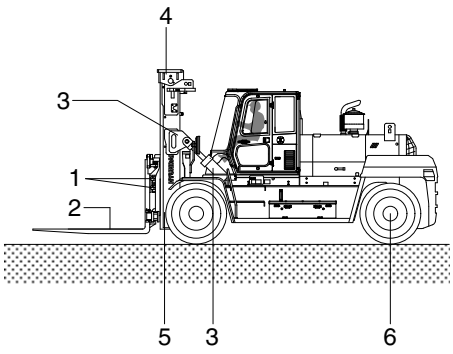
(2) When the truck has to be placed outdoors, park it on a even ground and cover it securely with canvas.

(3) Give enough fuel, grease, lubricant and oil.

(4) Coat exposed piston rods of all hydraulic cylinders fully with grease.

(5) Cover batteries after removing terminals, or remove battery from the truck and store separately.

(6) When the atmospheric temperature is anticipated to drop below 0°C, add antifreeze. (Refer to COLD WEATHER OPERATION about ratio of water and antifreeze.)



1 Adjust cylinder(2EA)
2 Fork(2EA)
3 Tilt cylinder(Left/Right, 2EA)
4 Lift chain(2EA)
5 Mast support(Left/Right, 2EA)
6 Steering axle(5EA)

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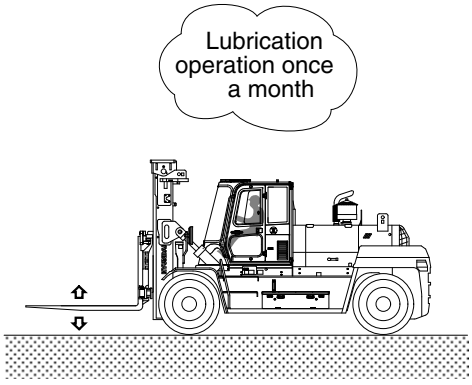
2) DURING STORAGE

(1) Operate the engine and move the truck for a short distance **once a month** so that a new oil film will be coated over movable parts and component surfaces. Remove and storage the battery at the same time.

⚠ The above operations should be performed in the open. If they have to be performed inside a building, open the windows and doors to improve ventilation.
This is to avoid the danger of gas poisoning.



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※ 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

After storage (When it is kept without cover or the rust-preventive operation once a month is not carried out), you should apply the following treatment before operation.

(1) Remove the drain plugs from the oil pan and other cases and drain any water.

(2) Remove the rocker housing cover and lubricate the valves and rocker arms well. Inspect the valve operation.

(3) After the engine is started, run it at idling speed until it is warmed up completely.

15. TRANSPORT

1) PRECAUTIONS FOR LOADING AND UNLOADING

Contact your HYUNDAI forklift distributor for advice regarding transportation of the truck.

When loading or unloading the truck on or from a transporter, using loading ramp, the following precautions must always be observed.

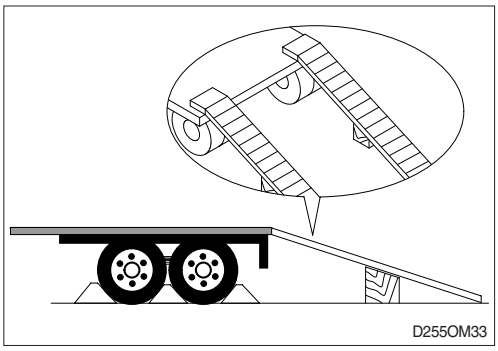
⚠ Check travel route for overpass clearance.

Make sure there is adequate clearance if the lift truck being transported is equipped with a high mast or cab.

Remove ice, snow or other slippy material from the shipping lift truck and the loading dock.

(1) Ensure that the transporter cannot move by applying the brake and putting blocks under the wheels. Place the transmission control in NEUTRAL.

(2) Fix the loading ramps securely so that the centers of the transporter and truck are aligned. (The loading ramps should be of sufficient width, length and thickness to permit safe loading or unloading.)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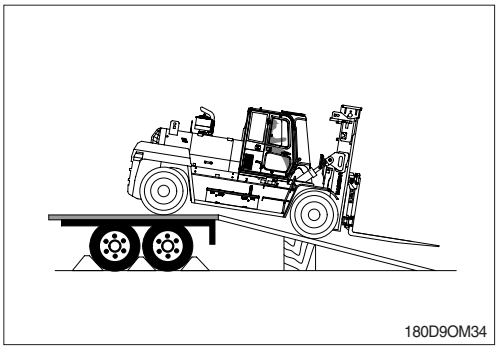
(3) After checking that the truck is aligned with the loading ramps, back the truck slowly up the ramps to load it on the transporter.

⚠ When on the loading ramps, never change direction. If it is necessary to change direction, drive off the ramp and realign the truck.

Block the wheels and secure the lift truck with tiedowns.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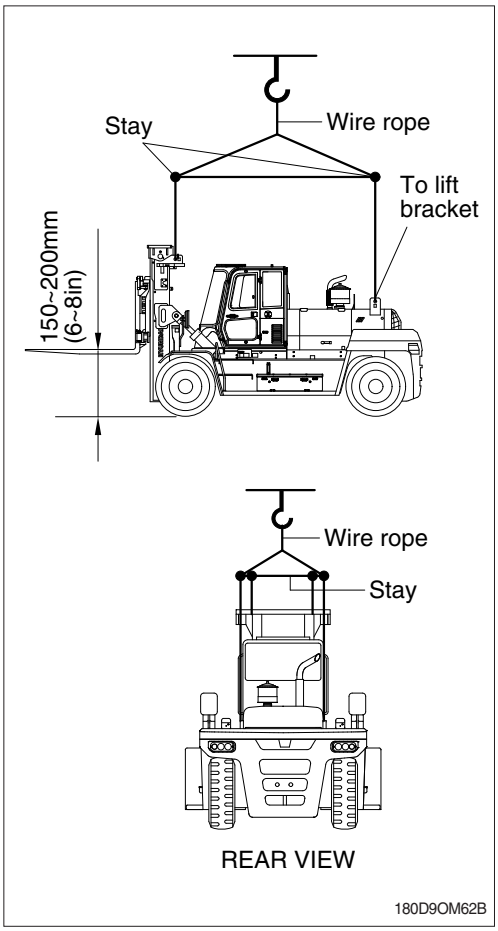
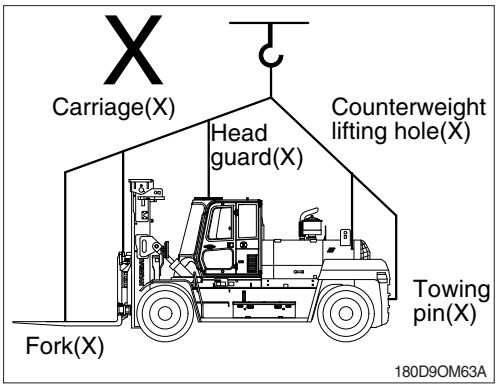
16. LOADING AND UNLOADING BY CRANE

1) Check the specification of the truck when you are going to hoist the truck.
2) Use long wire rope and stay to keep the distance with the machine as it should avoid touching with the truck body.
3) Put a rubber plate where the wire rope contact with the truck's body to prevent damage.
4) Place crane on the proper place.
5) Install the wire rope and stay like the illustration.



⚠ Make sure wire rope is proper size.
⚠ Make sure that the truck is shut down and safety lock lever is OFF before hoisting. Lifting the truck with engine running can cause serious accident.
⚠ The wrong hoisting method or installation of wire rope can cause damage to driver and truck.
⚠ Do not load abruptly.
⚠ Keep area clear of personnel.
⚠ Recommend to manufacture the stays separately as per lifting conditions.



⚠ Do not install the wire to unsafe position such as forks, carriage, head guard, counterweight lifting hole or towing pin, etc.. It can cause serious injury or damage to driver and truck.
⚠ If there is any problem to lift a truck, please contact your dealer.
⚠ Perform the lifting service with skilled service men.

6. EMERGENCY STARTING AND TOWING

1. HOW TO TOW A DISABLED TRUCK

If your lift truck becomes disabled but it can be moved freely on its own wheels without further damage, use the following procedures to tow it safely to a repair area.

△ **It is important for your safety and the care of your lift truck to use the proper equipment and carefully follow these recommendations for safe towing.**

⚠ **DO NOT tow a lift truck if there is a problem with the brakes or tires or the steering cannot be operated. DO NOT tow up or down ramps and steep inclines. DO NOT attempt to tow a lift truck if traction or weather conditions are poor.**

1) Be sure to apply the parking brake or block the drive wheels on the disabled truck while working around it.

2) When possible, raise the carriage (forks) on the disabled truck about 300 mm (12 in) from the floor or ground. Secure the carriage with a chain.

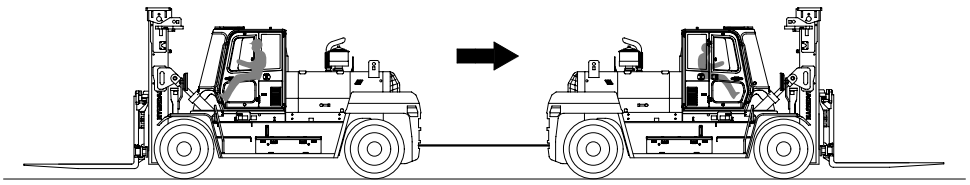
3) Obtain another lift truck of equal or larger size carrying a partial load for traction.

4) Check that the counterweight bolts are in place and properly torqued. (This bolt is made of a special high tensile steel and is not commercially available. Replace it, when necessary, only with a genuine HYUNDAI replacement part).

5) Use an approved, solid metal tow bar with towing couplers that connect to the towing pins in the counterweights.

6) Release the parking brake on the towed vehicle.

7) Transmission control is in neutral.



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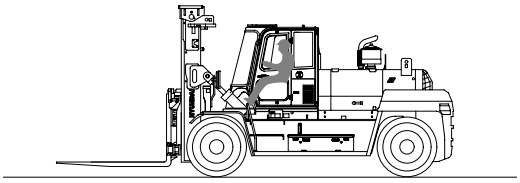
8) Tow the disabled truck backward. An operator must be on the towed truck.

   Tow the truck slowly. Careful towing is necessary to prevent injury to personnel or damage to the truck. The truck should be towed at a speed of less than 8 km/h (5 mph) with a driver in the seat. Do not lift the truck or any wheels off the floor or ground while the truck is being towed.

⚠ **The power steering will not operate on the disabled truck when the engine is not running.**

9) Park the disabled truck in authorized areas only. Fully lower the forks to the floor, put the directional control lever in the NEUTRAL position and turn the staring switch to the OFF position. Turn on the parking brake switch. Remove the key and, when necessary, block the wheels to prevent the truck from rolling.

Lift truck parking



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⚠ **Always engage the parking brake when parking a lift truck. The truck can move and cause injury or death to personnel near it.**

2. HOW TO USE BATTERY JUMPER CABLES

If your lift truck battery is discharged (dead), you can start your lift truck by Jumping it from another lift truck that has a 24V negative-ground electrical system. The "Booster" battery must be fully charged and in good condition. This section explains how to perform this procedure safely. To avoid damage to your lift truck and your battery or the possibility of harm to yourself, follow the instructions and warnings carefully. If you have any doubts, ask for help from an experienced mechanic.

If your truck has a battery with terminals on the side you will need a set of jumper cables with matching connector clamps or cable adapters for side mounted battery terminals.

△ **Use only a 24V NEGATIVE GROUND SYSTEM to jump your truck. You can injure yourself and permanently damage your truck's 24V starting motor and ignition system by connecting it to a 24V power supply or to a positive ground system.**

⚠ **BATTERIES CONTAIN SULFURIC ACID. Avoid acid contact with skin, eyes, or clothing. If acid contacts your eyes or skin, flush immediately with water and get medical assistance. Wear safety glasses when working near the battery to protect against possible splashing of the acid solution.**

1) If the discharged battery has filler caps, check the fluid level. Do not use an open flame to check and do not smoke. If low, add distilled water to the correct level. Be sure to install the caps before jump starting.

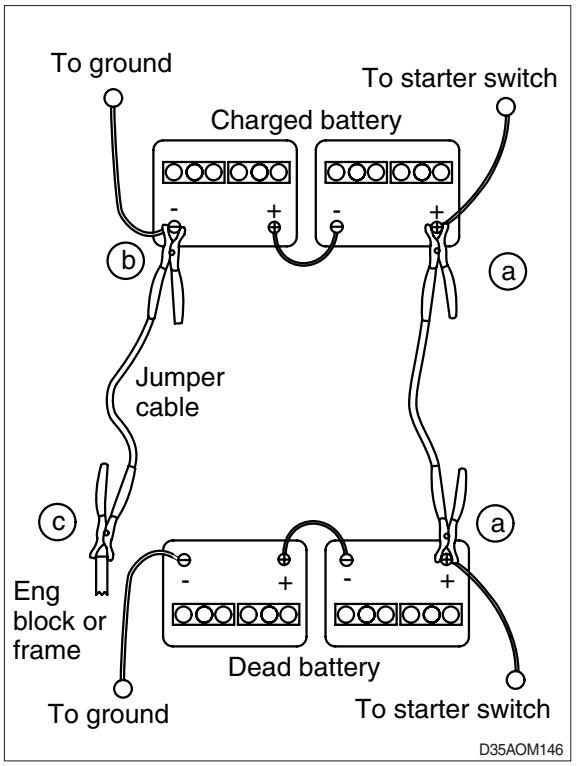
2) Do not jump start, charge, or test a sealed type battery if the test indicator looks illuminated or has a bright color. Install a new battery.

⚠ **BATTERIES EMIT EXPLOSIVE GAS. Do not smoke or have open flames or sparks in battery charging areas or near batteries. An explosion can result and cause injury or death.**
Hydrogen gas is produced during normal battery operation.
Hydrogen can explode if flames, sparks, or lighted tobacco are brought near the battery. When charging or using a battery in an enclosed space, always provide ventilation and shield your eyes. Wear safety glasses when working around batteries.

3) Put the truck with the booster battery as near to the other truck as necessary for the jumper cables to reach both batteries. Check and make sure that the trucks do not touch each other. Use particular care when connecting a booster battery to prevent sparks.

4) On both trucks:
   ① Apply the parking brake.
   ② Put the directional control lever in the NEUTRAL position.
   ③ Turn the starting switch to the OFF position.
   ④ Turn all accessories to the OFF position and leave them off until after the engine has been started and the jumper cables have been removed.

⚠ **To avoid short circuits, remove all jewelry and do not permit any metal tools to make contact between the positive battery terminal and other metal on the truck. When you connect jumper cable clamps to the positive terminals of the two batteries, make sure that neither clamp contacts any other metal. Injury can occur from electrical shock or explosion.**



5) Connect the jumper cables in the following sequence:
   ⓐ Connect a jumper cable from the positive (+; red) terminal on one battery to the positive (+; red) terminal on the other battery. Never connect positive (+; red) to negative (-; black), or negative to positive.
   ⓑ Connect one end of the second cable to the grounded negative (-; black) terminal of the **Jumper vehicle** battery.
   ⓒ Connect the other end of the second cable to a stationary, solid metallic point on the engine of the **Stalled vehicle**, not to the negative (-; black) terminal of its battery. Make this connection at a point at least 450 mm (18 in) away from the battery, if possible. Do not connect it to pulleys, fans or other parts that move. Do not touch hot manifolds that can cause sever burns.
6) Start the engine on the **Jumper vehicle** and run the engine at a moderate speed for a minimum of five minutes.
7) Start the engine on the **Stalled vehicle.** Follow the starting instructions in section 5, **Starting and Operating Procedures** in this manual. Be sure that the engine is at idle speed before disconnecting the jumper cables.
8) Remove the jumper cables by reversing the installation sequence exactly. Start by removing the last jumper cable from the stalled vehicle first. Remove the cable end from the engine block first, then the other end of the negative (-; black) cable.
9) Remove both ends of the positive (+; red) cable.

7. PLANNED MAINTENANCE AND LUBRICATION

1. INTRODUCTION

ONLY TRAINED AND AUTHORIZED PERSONNEL should perform planned maintenance. Local HYUNDAI dealers are prepared to help customers put in place a planned maintenance program for checking and maintaining their lift trucks according to applicable safety regulations.

⚠ Powered industrial trucks may becomes hazardous if maintenance is neglected.

As outlined in section 4, operator maintenance and care, the operator should make a safety inspection of the lift truck before operating it. The purpose of this daily examination is to check for any obvious damage and maintenance problems, and to have minor adjustments and repairs made to correct any unsafe condition.

In addition to the operator's daily inspection, HYUNDAI recommends that the owner set up and follow a periodic planned maintenance (PM) and inspection program. The PM identifies needed adjustments, repairs, or replacements so they can be made before failure occurs. The specific schedule(frequency) for the PM inspections depends on the particular application and lift truck usage.

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

This section recommends typical planned maintenance and lubrication schedules for items essential to the safety, life, and performance of the truck. It also outlines safe maintenance practices and gives brief procedures for inspections, operational checks, cleaning, lubrication, and minor adjustments.

Specifications for selected components, fuel, lubricants, critical bolt torques, refill capacities, and settings for the truck are found in section 8.

If you have needed for more information on the care and repair of your truck, see your HYUNDAI dealer.

2. SAFE MAINTENANCE PRACTICES

The following instructions have been prepared from current industry and government safety standards applicable to industrial truck operation and maintenance. These recommended procedures specify conditions, methods, and accepted practices that aid in the safe maintenance of industrial trucks. They are listed here for the reference and safety of all workers during maintenance operations. Carefully read and understand these instructions and the specific maintenance procedures before attempting to do any repair work. When in doubt of any maintenance procedure, please contact your local HYUNDAI dealer.

1) Powered industrial trucks can become hazardous if maintenance is neglected. Therefore, suitable maintenance facilities and trained personnel and procedures shall be provided.

2) Maintenance and inspection of all powered industrial trucks shall be performed in conformance with the manufacturer's recommendations.

3) Follow a scheduled planned maintenance, lubrication, and inspection system.

4) Only trained and authorized personnel are permitted to maintain, repair, adjust, and inspect industrial trucks and must do so in accordance with the manufacturer's specifications.

5) Always wear safety glasses. Wear a safety (hard) hat in industrial plants and in special work areas where protection is necessary and required.

6) Properly ventilate work area, vent exhaust fumes, and keep shop clean and floors dry.

7) Avoid fire hazards and have fire protection equipment present in the work area. Do not use an open flame to check for level or leakage fuel, electrolyte, or coolant. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.

8) Before starting work on truck.

(1) Raise drive wheels free of floor and use oak blocks or other positive truck positioning devices.

(2) Remove all jewelry (watches, rings, bracelets, etc.).

(3) Put oak blocks under the load engaging means, inner masts, or chassis before working on them.

(4) Disconnect the battery ground cable (-) before working on the electrical system.

※ **Refer to the jacking and blocking section in the service manual for proper procedures.**

9) Operation of the truck to check performance must be conducted in an authorized, safe, clear area.

10) Before starting to operate the truck.

(1) Be seated in a safe operating position and fasten your seat belt.

(2) Make sure parking brake is applied.

(3) Put the direction control in NEUTRAL.

(4) Start the engine.

(5) Check functioning of lift and tilt systems, direction and speed controls, steering, brakes, warning devices, and load handling attachments.

11) Before leaving the truck.

(1) Stop the truck.

(2) Fully lower the load-engaging means: mast, carriage, forks or attachments.

(3) Put the directional control in NEUTRAL.

(4) Apply the parking brake.

(5) Stop the engine.

(6) Turn the key switch to the OFF position.

(7) Put blocks at the wheels if the truck must be left on an incline.

12) Brakes, steering mechanisms, control mechanisms, warning devices, lights, governors, lift overload devices, lift and tilt mechanisms, articulating axle stops, load backrest, cabin and frame members must be carefully and regularly inspected and maintained in a safe operating condition.

13) Special trucks or devices designed and approved for hazardous area operation must receive special attention to insure that maintenance preserves the original approved safe operating features.

14) Fuel systems must be checked for leaks and condition of parts. Extra special consideration must be given in the case of a leak in the fuel system. Action must be taken to prevent the use of the truck until the leak has been corrected.

15) All hydraulic systems must be regularly inspected and maintained in conformance with good practice. Tilt and lift cylinders, valves, and other parts must be checked to assure that drift or leakage has not developed to the extent that it would create a hazard.

16) When working on the hydraulic system, be sure the engine is turned off, mast is in the fully-lowered position, and hydraulic pressure is relieved in hoses and tubing.

⚠ Always put oak blocks under the carriage and mast rails when it is necessary to work with the mast in an elevated position.

17) The truck manufacturer's capacity, operation, and maintenance instruction plates, tags, or decals must be maintained in legible condition.

18) Batteries, limit switches, protective devices, electrical conductors, and connections must be maintained in conformance with good practice. Special attention must be paid to the condition of electrical insulation.

19) To avoid injury to personnel or damage to the equipment, consult the manufacturer's procedures in replacing contacts on any battery connection.

20) Industrial trucks must be kept in a clean condition to minimize fire hazards and help in detection of loose or defective parts.

21) Modifications and additions that affect capacity and safe truck operation must not be done without the manufacturer's prior written approval. This is an OSHA requirement.
Capacity, operation, and maintenance instruction plates, tags, or decals must be changed accordingly.

22) Care must be taken to assure that all replacement parts, including tires, are interchangeable with the original parts and of a quality at least equal to that provided in the original equipment. Parts, including tires, are to be installed per the manufacturer's procedures. Always use genuine HYUNDAI or HYUNDAI-approved parts.

23) When removing tires follow industry safety practices. Most importantly, deflate pneumatic tires completely prior to removal. Following assembly of tires on multi-piece rims, use a safety cage or restraining device while inflating.

24) Use special care when removing heavy components, such as counterweight, mast, etc.. Be sure that lifting and handling equipment is of the correct capacity and in good condition.

3. INSTRUCTIONS BEFORE MAINTENANCE

1) INTERVAL OF MAINTENANCE

(1) You may inspect and service the machine by the period as described at based on service meter of LCD.

(2) Shorten the interval of inspect and service depending on site condition. (Such as dusty area, quarry, sea shore and etc.)

(3) Practice the entire related details at the same time when the service interval is doubled.
For example, in case of 250 hours, carry out all the maintenance each 250 hours, each 100 hours and daily service at the same time.

※ Time intervals between maintenance are largely determined by operating conditions. For example, operation in sandy, dusty locations requires shorter maintenance intervals than operation in clean ware-houses. The indicated intervals are intended for normal operation. The operating condition classifications are ;

① **Normal operation**
Eight hour material handling, mostly in buildings or in clean, open air on clean paved surfaces.

② **Harsh operation**

a. All harsh working environment

b. Long term heavy load operation

c. High and low temperature working environment

d. Sudden change in temperature

e. Dusty or sandy working environment

f. Highly corrosive chemical working environment

g. Damp working environment

If the lift truck is used in severe or extreme operating conditions, you must shorten the maintenance intervals accordingly.

※ **Since the operating environment of lift trucks varies widely, the above descriptions are highly generalized and should be applied as actual conditions dictate.**

2) PRECAUTION

(1) Start 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 maintenance.

(3) Engine and hydraulic components have been preset in the factory. Do not allow unauthorized personnel to reset them.

(4) Ask to your local dealer or Hyundai for maintenance advise it unknown.

(5) Drain the used oil and coolant in a container and handle according to the method of handling for industrial waste to meet with regulations of each province or country.

3) PROPER MAINTENANCE

(1) Replace and repair of parts
It is required to replace the wearable and consumable parts such as hose, tube and filter etc., regularly. Replaced 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.

(7) Stop the engine when you fill the oil.

(8) Relieve hydraulic system of the pressure by opening of breather when repairing the hydraulic system.

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

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

※ **Be sure to start the maintenance after fully understanding the section 1, safety hints.**

4) PRECAUTION WHEN INSTALLING HYDRAULIC HOSES OR PIPE.

(1) Be particularly careful that joint of hose, pipe and functioning item are not damaged. Avoid contamination.

(2) Assemble after cleaning the hose, pipe and joint of function 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.

5) PERIODICAL REPLACEMENT OF SAFETY PARTS

(1) These are the parts which the operator cannot judge the remained lifetime of them by visual inspection.

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

※ Replacement of consumable service parts is not covered under warranty.

No.	Periodical replacement of safety parts	Interval
1	Fuel hose	Every 2 to 4 years
2	Hydraulic pump hose	Every 2 years
3	Power steering hose	Every 2 years
4	Packing, seal, and O-ring steering cylinder	Every 2 to 4 years
5	Lift chain	Every 2 to 4 years
6	Lift cylinder hose	Every 1 to 2 years
7	Tilt cylinder hose	Every 1 to 2 years
8	Side shift cylinder hose	Every 1 to 2 years
9	Brake hose or tube	Every 1 to 2 years
10	Brake reservoir tank tube	Every 2 to 4 years
11	Intake air line	Every 2 years
12	Coolant hose and clamps	Every 2 years

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

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

6) EMISSION-RELATED COMPONENTS WARRANTY (USA AND CANADA ONLY)

Hyundai 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.

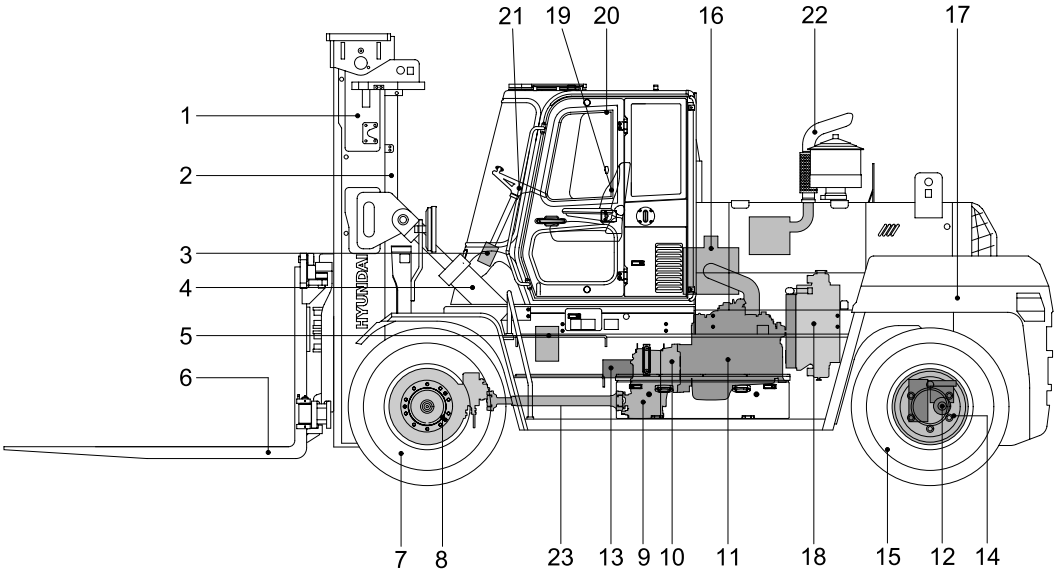
Naturally, this warranty does not cover to damage arising from accident, misuse or negligence, use of non-Hyundai parts, or from alterations not authorized by Hyundai.

※ 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.

4. PLANNED MAINTENANCE INTERVALS

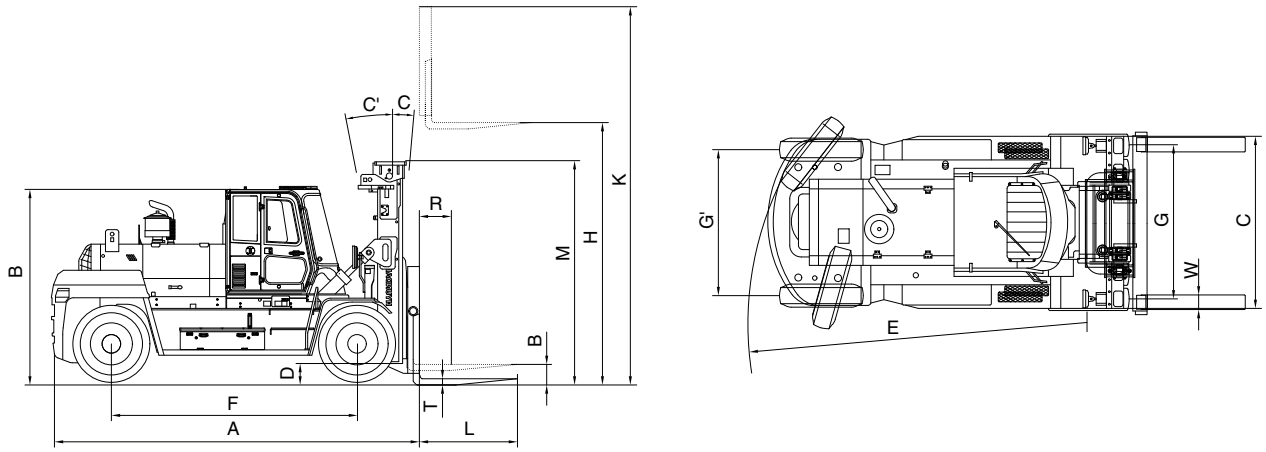
1) MAJOR COMPONENTS LOCATION



180D9OM21

1	Mast	9	Transmission	17	Counterweight
2	Lift cylinder	10	Torque converter	18	Radiator
3	Steering unit	11	Engine	19	Seat
4	Tilt cylinder	12	Steering cylinder	20	Cabin
5	Main control valve	13	Hydraulic pump	21	Steering wheel
6	Fork	14	Steering axle	22	Muffler
7	Front wheel	15	Rear wheel	23	Propeller shaft
8	Drive axle	16	Air cleaner		

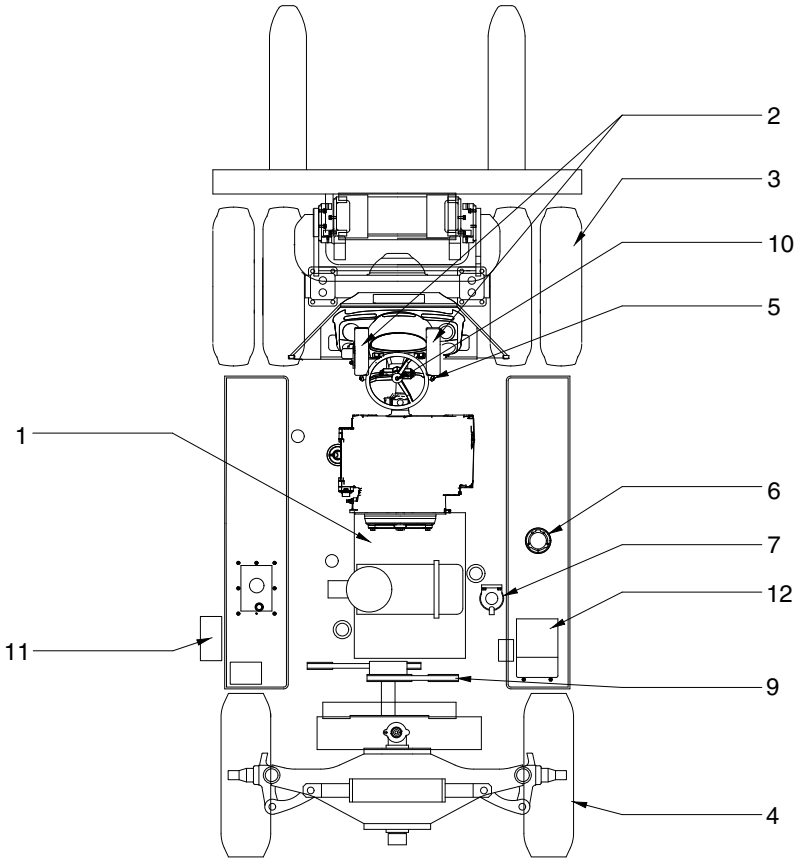
1. SPECIFICATION TABLE



180D9SP01

Model			Unit	180D-9
Capacity			kg (lb)	18000 (40000)
Load center		R	mm (in)	900 (38)
Weight (Unloaded)			kg (lb)	26251 (57870)
Fork	Lifting height	A	mm (ft·in)	3320 (10' 11")
	Free lift	B	mm (ft·in)	0
	Lifting speed (Unload/Load)		mm/sec	420/370
	Lowering speed (Unload/Load)		mm/sec	300/420
	L×W×T	L,W,T	mm (in)	2450×250×100 (100×9.8×3.9)
Mast	Tilt angle (forward/backward)	C/C'	degree	10/10
	Max height	K	mm (ft·in)	4960 (16' 3")
	Min height	M	mm (ft·in)	3350 (11' 0")
Body	Travel speed (Unload)		km/h	37.5
	Gradeability (Load)		degree (%)	17.3 (31.1%)
	Min turning radius (Outside)	E	mm (ft·in)	5220 (18' 1")
ETC	Operating pressure		kgf/cm^2	240
	Hydraulic oil tank		ℓ (U.S.gal)	See page 7-55.
	Fuel tank		ℓ (U.S.gal)	312 (82.4)
Overall length		A	mm (ft·in)	5595 (18' 4")
Overall width		C	mm (ft·in)	2540 (8' 4")
Cabin height		B	mm (ft·in)	2990 (9' 10")
Ground clearance (Mast)		D	mm (in)	245 (9.6)
Wheel base		F	mm (ft·in)	3750 (12' 4")
Wheel tread front/rear		G/G'	mm (ft·in)	1860/2033 (6' 1" / 6' 8")

2) SERVICE LOCATIONS



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※ Service intervals are based on the hourmeter reading.
※ Stop the engine when servicing.
※ Do not open the cap or drain plug to avoid injury by unexpected spouting of high temperature fluid or gas.
※ Open the cap slowly to relieve pressure.
※ Always keep the surface of control & instrument panels clean in case of damage or malfunction detected in panel, replace it with a new one.
※ Depending on the ambient and operation contions, the replacement cycle may be shortened.
- All harsh working environment
- Long term heavy load operation
- High and low temperature working environment
- Sudden change in temperature
- Dusty or sandy working environment
- Highly corrosive chemical working environment
- Damp working environment

※ For other details, refer to the service manual.

3) DAILY (OR EVERY 10 HOURS) CHECK LIST

Item No.	Description	Service Action	Oil symbol	Capacity ℓ (U.S. gal)	Service point	Remark
1	Engine oil level	Check, Add	EO	26 (6.9)	1	7-17
2	Pedal linkage operation	Check, Adjust	-	-	1	7-47
3	Drive rim and tire air pressure	Check, Add	-	-	2	5-3, 7-14
4	Steer rim and tire air pressure	Check, Add or Replace	-	-	2	5-3, 7-14
5	Lamp operation	Check, Replace	-	-	10	7-47
6	Fuel level	Check, Add	DF	312 (82.4)	1	5-14
7	Prefilter	Check, Drain	-	-	1	7-27
8	Radiator coolant	Check, Add	C	42.7 (11.3)	1	7-19
9	Fan belt tension and damage	Check, Adjust, Replace	-	-	1	7-24
10	Horn operation	Check, Replace	-	-	1	5-5, 7-52
11	Battery	Check, Clean	-	-	2	7-44, 45
12	DEF level	Check, Add	DEF	40 (10.6)	1	7-27, 28

※ Oil symbol
Refer to the recommended lubricants for specification.
DF : Diesel fuel HO : Hydraulic oil EO : Engine oil GO : Gear oil G : Grease
MO : Transmission oil BO : Brake cooling oil C : Coolant DEF : Diesel Exhaust Fluid

4) PERIODICAL CHECK LIST

Service item		Oil Symbol	Service interval Hours								Initial Hours		
			50	250	500	1000	1500	2000	3000	4000	50i	100i	250i
Tightening (Mounting bolt)	Pump, MCV, steering unit, priority valve				T								T
	Tilt cylinder rod cover				T								T
	Lift, attachment, steering cylinder							T					
	Mast				T								
	Drive and steering axle				T								
	Drive and steering axle wheel		T										
	Counterweight, cabin		T										
	Engine, radiator, transmission		T										
	Hose, fitting, clamp (fuel, coolant, hydraulic)							T					
Lubrication	Tilt pin and mast roller	G			L								L
	Lift chain	EO			L								L
	Steering axle (linkage, kingpin, trunnion	G		L									
	Attachment cylinder rod and tube end			L									
	Pedal pivot				L								
	Drive shaft			L*1	L*2								
	Tilt cylinder rod	G		L*1	L*2								
	Tilt cylinder tube end	G			L								
	Steering unit spline (column shaft)	G						L					
Oli Leakage	Hydraulic tank				I								I
	Valve (MCV, priority, brake)				I								I
	Pump, steering unit				I								I
	Lift, tilt, steering cylinder			I*1	I*2								I
Function test	Steering wheel operation				I								I
	Natural drop and forward tilt							I					
	Fork load indicator (option)							I					
	Mast tilt angle measurement							M					
Periodic replacement parts	Engine oil	EO			R						R		
	Engine oil filter				R						R		
	Fuel filter					R							
	Prefilter element				R								
	Air cleaner element				R								
	Transmission oil	MO			A	R						R	
	Transmission oil filter					R						R	
	Axle gear oil	GO			A	R						R	
	Brake cooling oil and straniner	BO		A		R						R	
	Radiator coolant	C						R					
	Pilot line filter element					R					R		
	DEF/adBlue® filter					C				R (5000)			
	Brake line filter (strainer)				Clean								
	Air conditioner filter (outer)				Clean	R							
	Fan belt tensioner					C							
	Fan belt					R							
	Hydraulic oil tank air breather filter			R*1	R*2								
	Hydraulic oil return filter					R							
	Hydraulic oil suction strainer							Clean					
	Hydraulic oil	HO		A				R*3		R*4 (5000)			

*1 Harsh condition *2 Normal condition *3 Conventional hydraulic oil *4 Hyundai genuine long life hydraulic oil

A : Aid C : Checking L : Lubrication R : Replacement T : Retightening

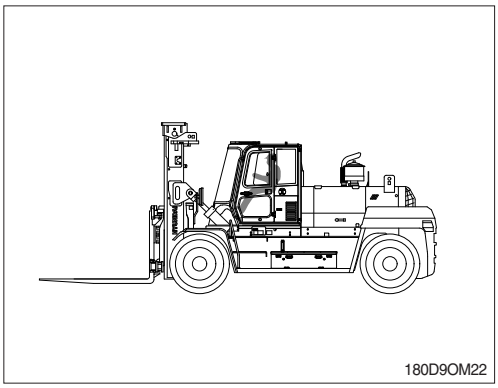
I : Visual inspection (repair or replace if required) M : Measurement (adjust if required)

5. HOW TO PERFORM PLANNED MAINTENANCE

1) VISUAL INSPECTION

First, perform a visual inspection of the lift truck and its components. Walk around the truck and take note of any obvious damage or maintenance problems.

Check to be sure all capacity, safety, and warning plates are attached and legible.


180D9OM22

※ **NAMEPLATES AND DECALS: Do not operate a lift truck with damage or lost decals and nameplates. Replace them immediately. They contain important information.**

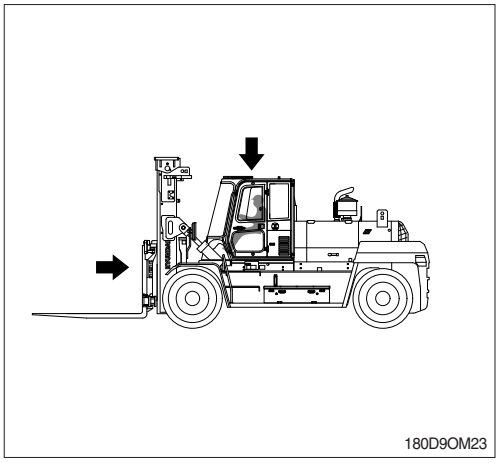
Inspect the truck, before and after starting the engine, for any sign of external leakage of fuel, engine coolant, transmission fluid, etc..

Check for hydraulic oil leaks and loose fittings.

⚠ **HYDRAULIC FLUID PRESSURE: Do not use your hands to check for hydraulic leakage. Fluid under pressure can penetrate your skin and cause serious injury.**

2) CABIN

Be sure that the driver's cabin and any safety devices are in place, undamaged, and attached securely. Check the cabin for damage. Be sure that it is properly positioned and all mounting fasteners are in place and tight.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3) LOAD HANDLING COMPONENTS

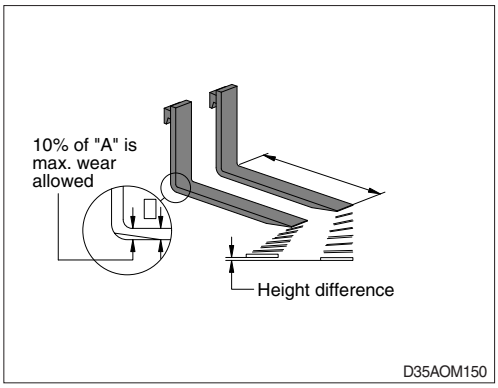
Inspect the mast assembly, load backrest (LBR), rails, carriage rollers, lift chains, and lift and tilt cylinders. Look for obvious wear and maintenance problems and damaged or missing parts. Check for any loose parts or fittings. Check for leaks, damaged or loose rollers, and rail wear (metal flaking). Carefully check the lift chains for wear, rust, corrosion, cracked or broken links, stretching etc.. Check that the lift and carriage chains are correctly adjusted to have equal tension. Check that the lift chain anchor fasteners and locking means are in place and tight. Inspect all lift line hydraulic connections for leaks.

△ **Mast and lift chains require special attention and maintenance to remain in safe operating condition. Refer to lift chain maintenance in this section for additional information.**

4) FORKS

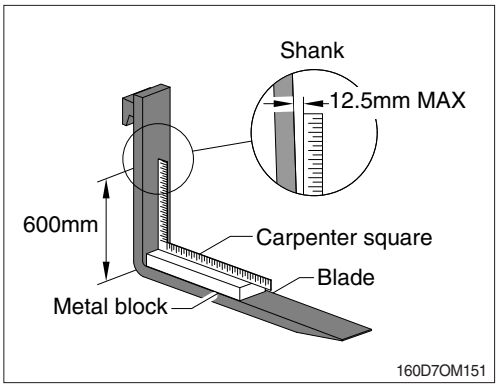
Inspect the load forks for cracks, breaks, bending, and wear. The fork top surfaces should be level and even with each other. The height difference between both fork tips refer to below table.

Fork length	Height difference (mm)
equal or below 1500	3
above 1500	6



⚠ If the fork blade at the heel is worn down by more than 10%, the load capacity is reduced and the fork must be replaced.

Inspect the forks for twists and bends. Put a 5 cm (2 in) thick metal block, at least 10 cm (4 in) wide by 61 cm (24 in) long with parallel sides, on the blade of the fork with the 10 cm (4 in) surface against the blade. Put a 61 cm (24 in) carpenter's square on the top of the block and against the shank. Check the fork 51 cm (20 in) above the blade to make sure it is not bent more than 12.5 mm (0.5 in) maximum.



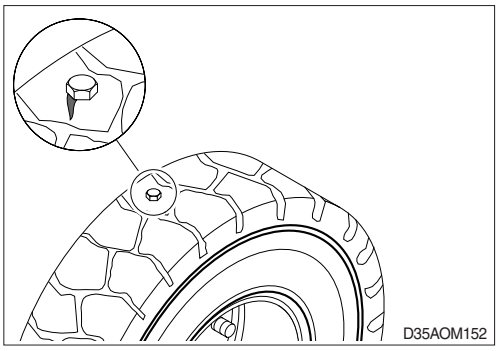
※ If the fork blades are obviously bent or damaged, have them inspected by a trained maintenance person before operating the truck.

Inspect the fork locking pins for cracks or damage. Reinsert them and note whether they fit properly.

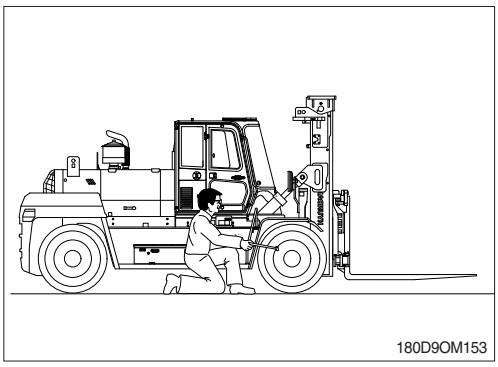
5) WHEEL AND TIRES

Check the condition of the drive and steering wheels and tires. Remove objects that are embedded in the tread. Inspect the tires for excessive wear and breaks or **chunking out.**

Check all wheel lug nuts or bolts to be sure none are loose or missing. Replace missing bolts or lug nuts. Torque loose or replaced items to specifications.



⚠ Check tire pressure from a position facing the tread of the tire, not form the side. Use a long handled gauge to keep your body away from the side. If tires are low, do not operate and do not add air. Check with a mechanic. The tire may require removal and repair.
Incorrect (low) tire pressure can reduce the stability of your lift truck. Do not operate truck with low tire pressure.



· Proper cold inflation : Refer to attached decal.

6) TILTING CABIN

⚠ Keep clearance of people except the operator before tilting the cabin.

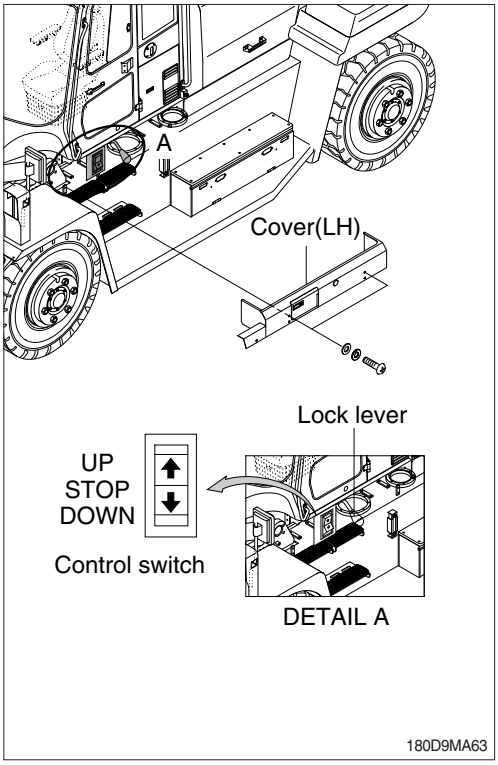
⚠ Before tilting the cabin, make sure that the mast is vertical or tilted forward. Otherwise, the operation could be blocked by mast tilt cylinders.

(1) Locate the truck on the plain and stable floor.

※ **Apply parking brake before servicing.**

(2) Turn the start switch to OFF position.
Remove the frame cover (LH) by removing the mounting bolts or opening the door. The control switch is located between cabin and side frame.

(3) By tilting the cabin, service of hydraulic and electric system such as hydraulic components, hydraulic pipings, electric components, and electric wirings can be easily performed. It is recommended that the service requiring tilting cabin must be carefully performed with a skilled service man.

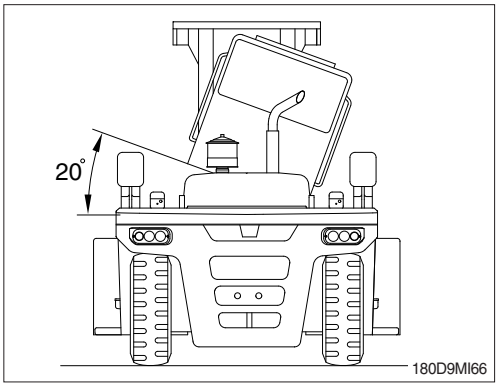


(4) Tilting the cabin back to normal position.

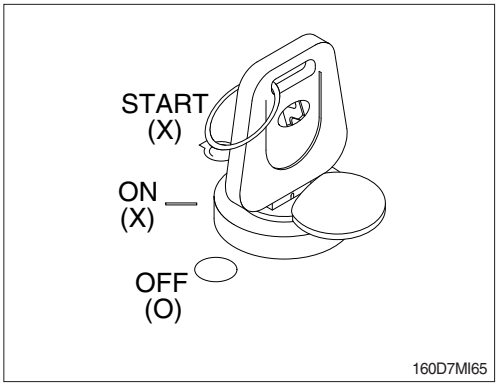
① Turn the key switch (C) to ON position. Keep pushing the downside of the switch (A) until the cabin stops at the angle of 20°.

② Release the locking lever (B) and then keep pushing the downside of the switch (A) again until the cabin completely stops at the normal position.

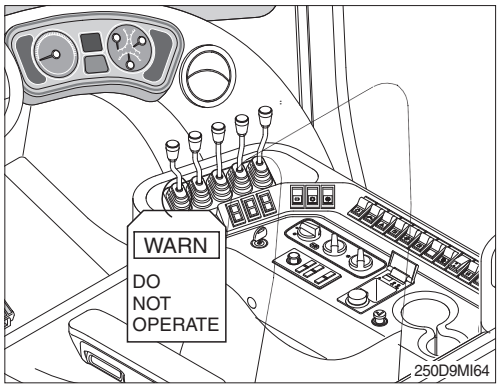
※ **After finishing the work, cover (LH) must be installed to prevent abnormal operation.**



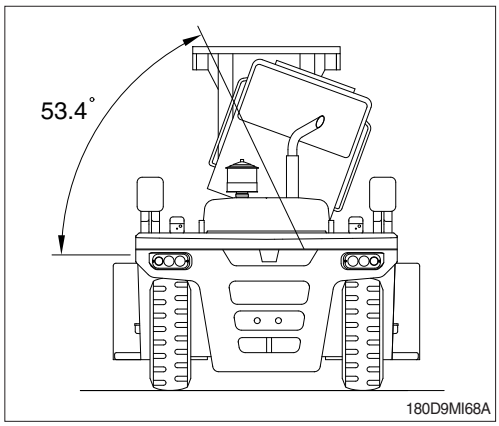
⚠ Do not operate cabin tilting function while the power is ON or engine is running.



⚠ **Do not operate the tilt control switch or any control parts while servicing under the tilted cabin. It can cause severe injury or death.**



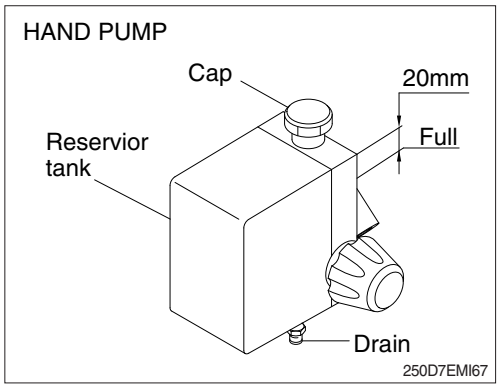
※ **The angle of fully tilted cabin is 53.4°.**



(5) Replacement of hydraulic oil for hand pump.

Open upper cap and fill 0.5 ℓ by using funnel. After filling, operate tilt cylinder 2~3 times and close the cabin completely to check the oil level in tank. If necessary, fill more oil to keep the level.

· Tank capacity : 0.7 ℓ



1) CHECK ENGINE OIL LEVEL

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

(1) Pull out the dipstick and wipe with a clean cloth.

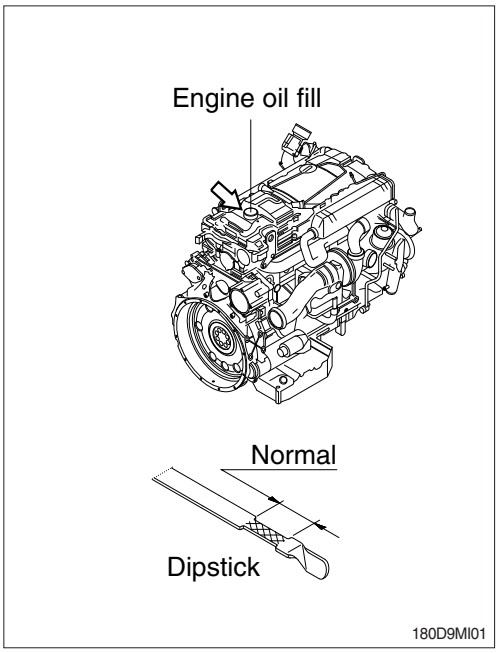
(2) Check the oil level by inserting the dipstick completely into the hole and pulling out again.

(3) If oil level is LOW, add oil and then check again.

※ **If the oil is contaminated or diluted, change the oil regardless of the regular change interval.**

※ **Check oil level after engine has been stopped for 15 minutes.**

⚠ **Do not operate unless the oil level is in the normal range.**

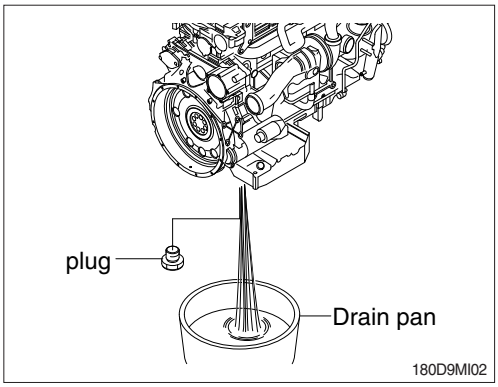


2) REPLACEMENT OF ENGINE OIL AND OIL FILTER

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

(2) Remove the plug and allow the oil to drain.
- Wrench size : 24 mm

※ **A drain pan with a capacity of 30 liters (6.6 U.S.gallons) will be adequate.**

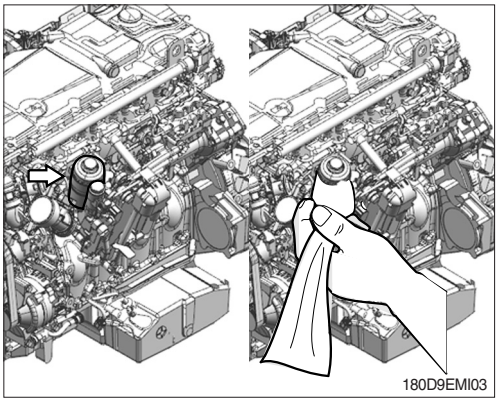


(3) Clean the area around the oil filter head.

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

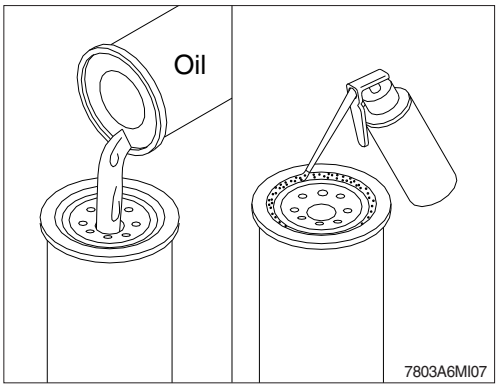
(5) Clean the gasket surface of oil filter head.

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



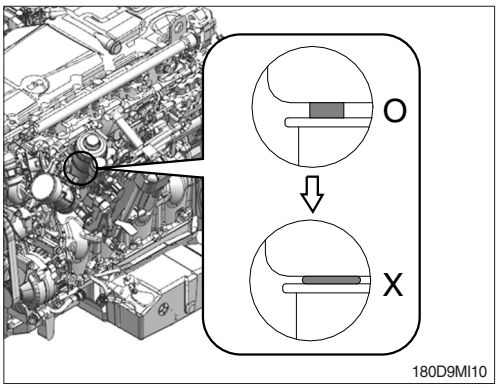
(6) Apply a light film of lubricating oil to the gasket sealing surface before installing the filter.

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

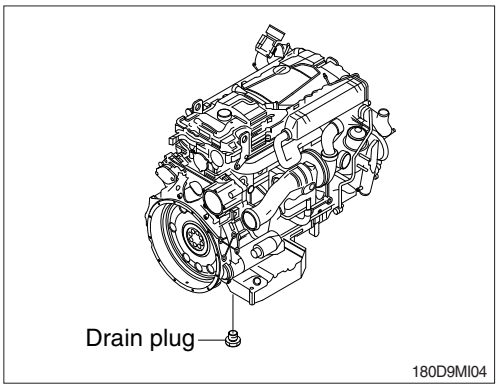


(7) Install the filler to the filter head.

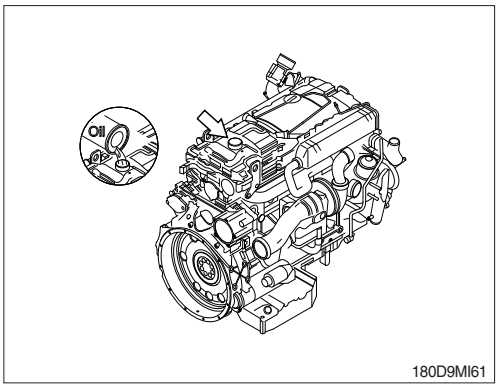
※ **Mechanical over-tightening may distort the threads or damage the filter element seal.**



(8) Clean and inspect the oil drain plug threads and the seal surface. If any damage is found, the oil drain plug must be replaced. Install and tighten the oil drain plug.

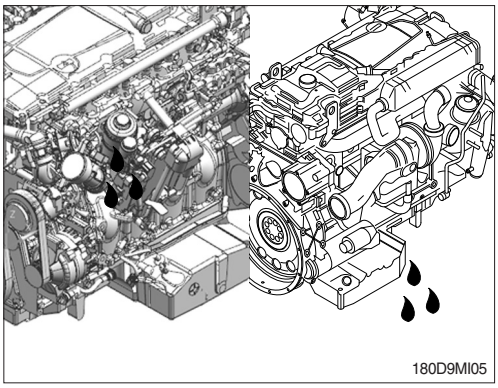


(9) Fill the engine with clean oil to the proper level.
· Quantity : 27 ℓ (7.1 U.S.gallons)



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

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



3) CHECK COOLANT LEVEL

(1) Check the coolant level at reservoir tank.

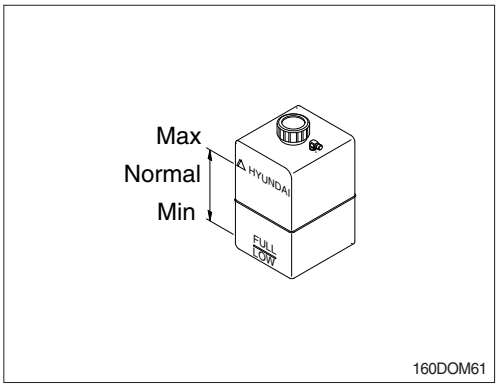
(2) Add the mixture of antifreeze and water after if coolant is not sufficient.

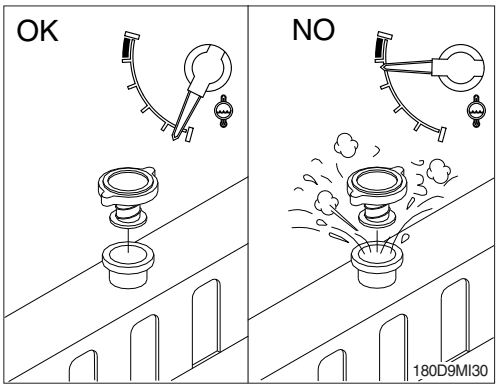
(3) The coolant level should indicate the middle position.

(4) Replace gasket of radiator cap when it is damaged.

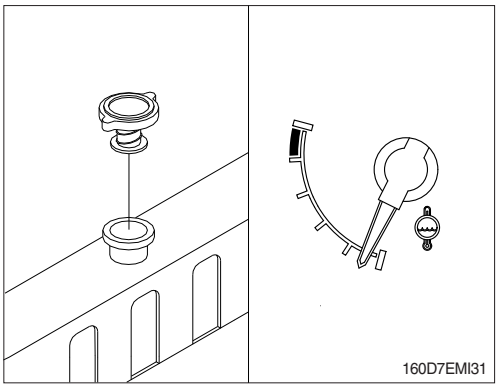
⚠ **Do not remove the radiator cap from a hot engine. Wait until the coolant temperature is below 50°C (120°F) before removing the radiator cap. Heated coolant spray or steam can cause personal injury.**

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





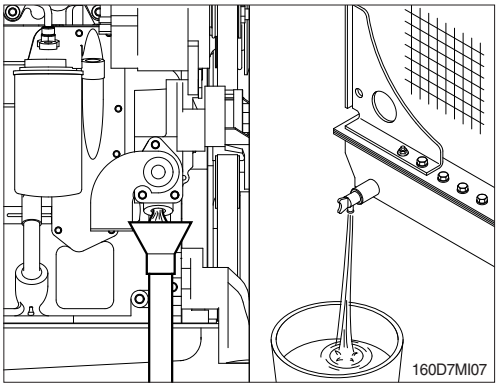
4) FLUSHING AND REFILLING OF RADIATOR



(1) Change coolant

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

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



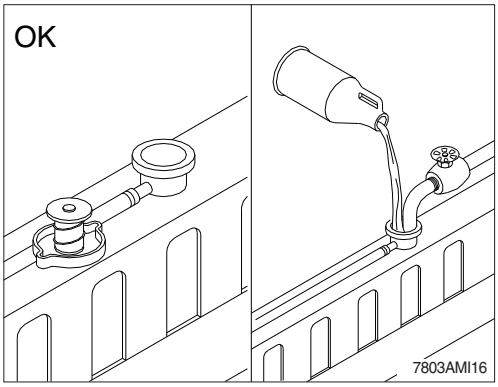
⚠ Wait until the temperature is below 50°C (120°F) before removing the coolant system radiator cap. Failure to do so can cause personal injury from heated coolant spray.
Drain the cooling system by removing the plug on the fuel tank and removing the plug in the bottom of the water inlet.
A drain pan with a capacity of 45 liters (11.9 U. S.gallons) will be adequate in most applications.

(2) Flushing of cooling system

① Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).

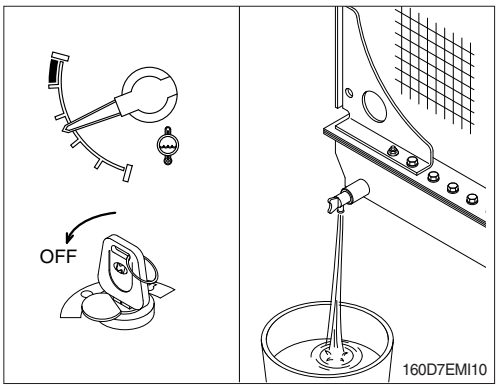
※ Use 0.5 kg (1.0 pound) of sodium carbonate for every 23 liters (6.0 U.S. gallons) of water.

※ Do not install the radiator cap. The engine is to be operated without the cap for this process.



※ **The system must be filled properly to prevent air locks.**
During filling, air must be vented from the engine coolant passages. Wait 2 to 3 minutes to allow air to be vented; then add mixture to bring the level to the top.
Adequate venting is provided for a fill rate of 19 liters/minute (5 U.S.gal/minute)

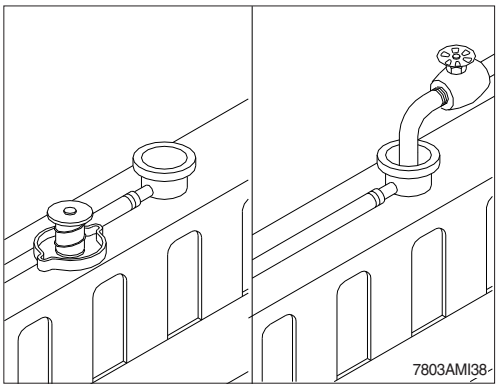
② Operate the engine for 5 minutes with the coolant temperature above 80°C (176°F).
Shut the engine off, and drain the cooling system.



③ Fill the cooling system with clean water.

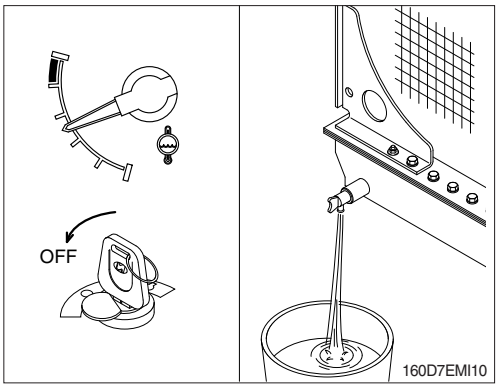
※ **Be sure to vent the engine and aftercooler for complete filling.**

※ **Do not install the radiator cap or the new coolant filter.**



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

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

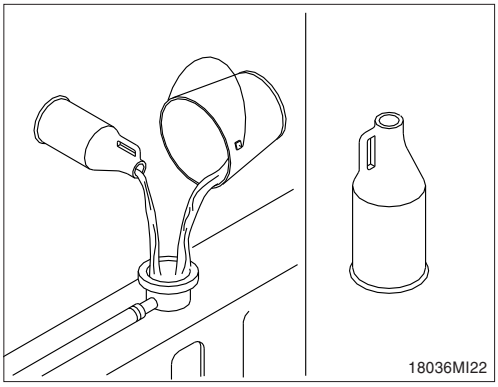


(3) Cooling system filling

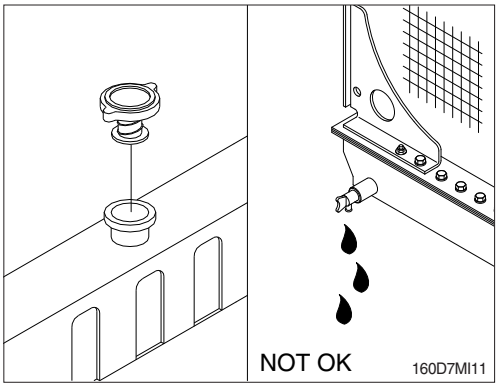
※ The system must be filled properly to prevent air locks.
During filling, air must be vented from the engine coolant passages. Wait 2 to 3 minutes to allow air to be vented; then add mixture to bring the level to the top.
Adequate venting is provided for a fill rate of 19 liters/minute (5 U.S.gal/minute)

① Use a mixture of 50 percent water and 50 percent ethylene glycol antifreeze to fill the cooling system.

※ Coolant capacity (Engine only); 23.5 ℓ (6.2 U.S.gallons)
※ Use the correct amount of DCA4 corrosion inhibitor to protect the cooling system.



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

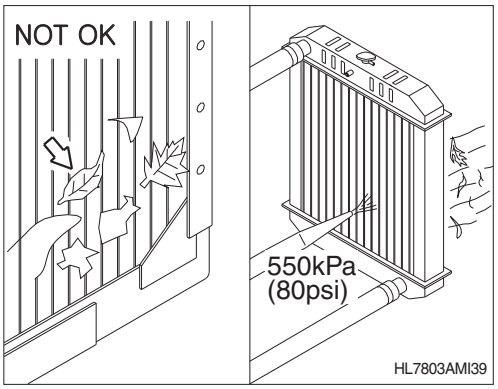


5) CLEAN RADIATOR AND OIL COOLER

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

(1) Visually inspect the radiator for clogged radiator fins.

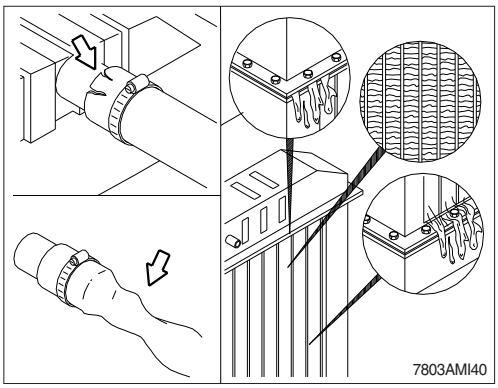
(2) Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.
Blow the air in the opposite direction of the fan air flow.



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

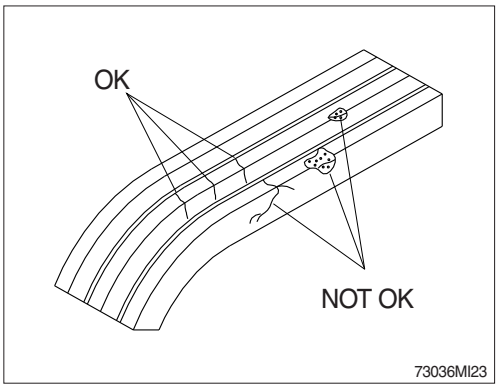
※ **If the radiator must be replaced due to bent or broken fins which can cause the engine to overheat, refer to the manufacturer's replacement procedures.**

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



6) DRIVE BELT

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

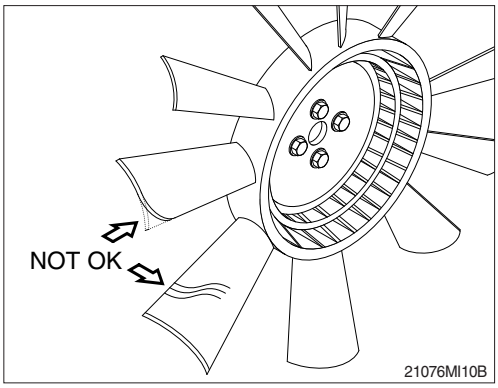


7) INSPECTION OF COOLING FAN

⚠ **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.**

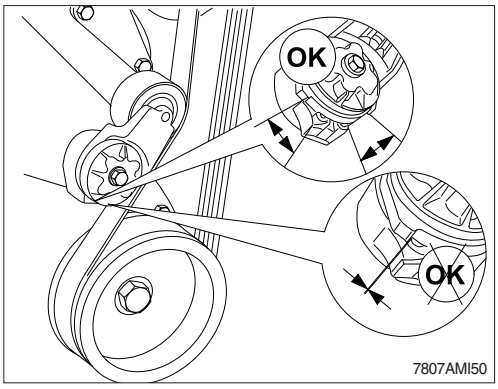
※ **Rotate the crankshaft by using the engine barring gear.**

※ **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.

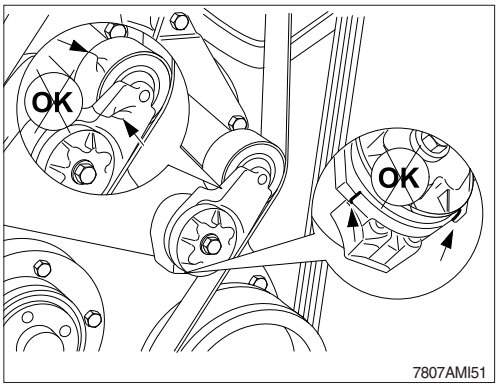


8) BELT TENSIONER, AUTOMATIC ADJUSTMENT

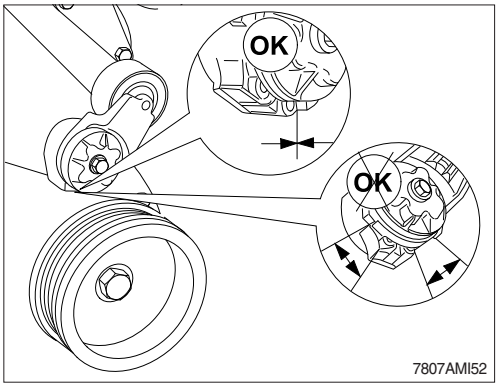
(1) Every 1000hours, or 1 year, whichever occurs first, inspect the automatic belt tensioner.
With the engine turned off, check that neither the top nor bottom tensioner arm stop is touching the cast boss on the tensioner body. If either of the stops is touching a boss, the alternator belt must be replaced.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



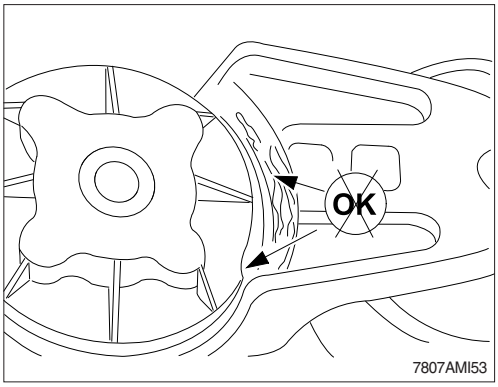
(2) Check the tensioner pulley and body for cracks. If any cracks are noticed, the tensioner must be replaced. Refer to a Cummins Authorized Repair facility. Check the tensioner for dirt buildup. If this condition exists, the tensioner must be removed and steam-cleaned.



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



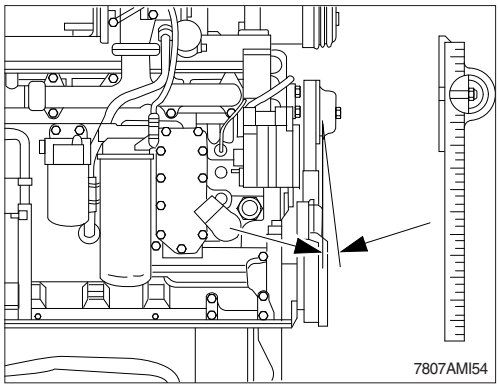
(4) Inspect the tensioner for evidence of the pivoting tensioner arm contacting the stationary circular base. If there is evidence of these two areas touching, the pivot tube bushing has failed and the tensioner must be replaced.



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

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

(6) Install the belt.



9) CLEANING OF AIR CLEANER

(1) Primary element

① Remove the cover by pulling off the clamps and loosen the wing nut to pull out the outer 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, 40psi) forward and backward equally.

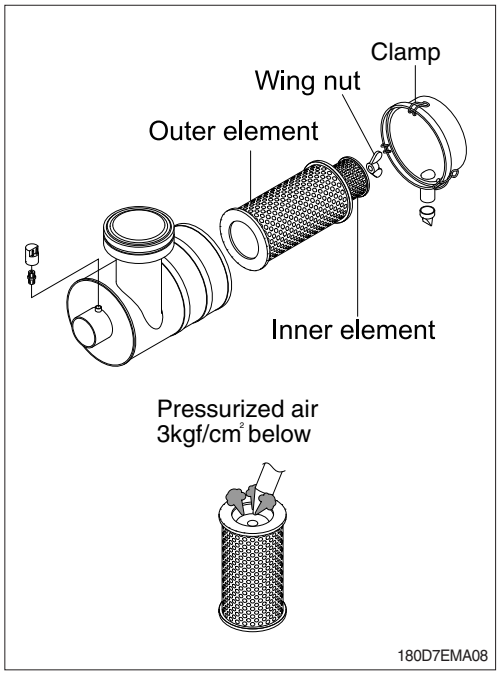
④ Inspect for cracks or damage of element by putting a light bulb inside of the element.

⑤ Insert element and fasten the clamps.

※ **When the air cleaner warning lamp is ON, clean the primary element.**

※ **The primary element should be replaced if the warning lamp is ON after installation of a clean primary element, or if the exhaust smoke is still black.**

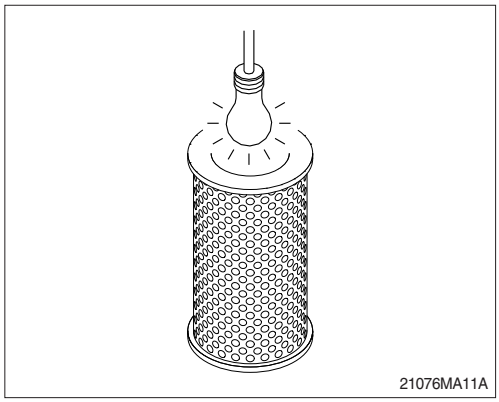
※ **Replace the primary element after 10 times cleanings.**



(2) Safety element

※ **The safety element should be replaced at the time the primary element is replaced.**

※ **Always replace the safety element. Never attempt to reuse the safety element by cleaning the element.**



10) FUEL TANK

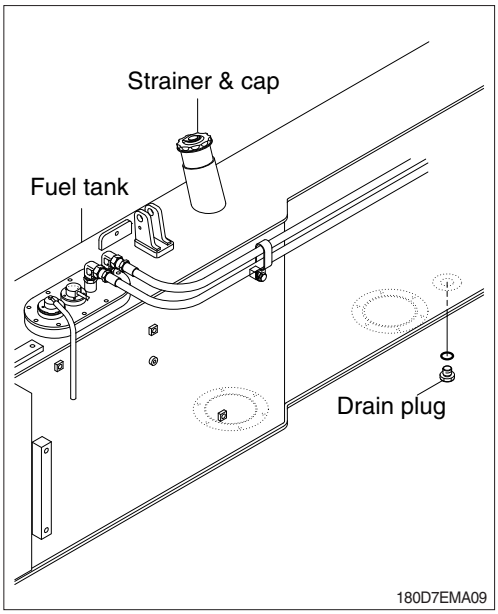
(1) Fill fuel fully when system the operation to minimize water condensation, and check it with fuel gauge before starting the machine.

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

※ **Be sure to LOCK the cap of fuel tank.**

※ **Remove the strainer of the fuel tank and clean it if contaminated.**

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



11) REPLACEMENT OF FUEL FILTER

(1) Clean around the filter head, remove the filter and clean the gasket surface.
· Wrench size : 90~95 mm (3.5~3.8 in)

(2) Replace the O-ring.

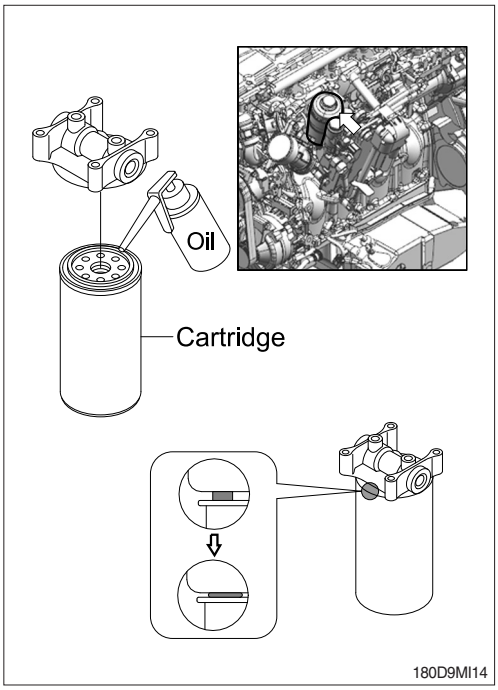
(3) Apply engine oil on the gasket of filter when mounting, and tighten 3/4 to 1 turn more after the gasket touches the filter head.

(4) Relieve the air after mounting.

※ **Do not pre-fill an on-engine fuel filter with fuel. The system must be primed after the fuel filter is installed. Pre filling the fuel filter can result in debris entering the fuel system and damaging fuel system components.**

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

※ **If air is in the fuel system, the engine will not start. Start engine after bleeding the air according to the method of bleeding air.**



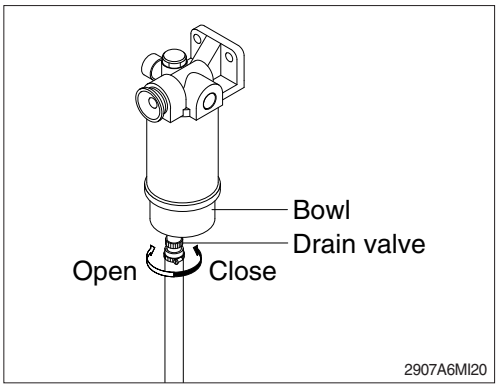
12) PREFILTER

※ **Inspect or drain the collection bowl of water daily and replace the element every 500hours.**

(1) Drain water

① Open bowl drain valve to evacuate water.

② Close drain valve.



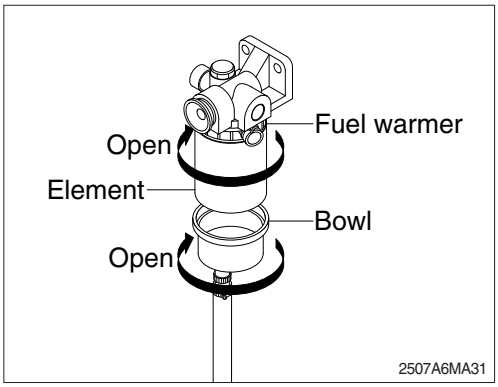
(2) Replace element

① Drain the unit of fuel. Follow "Drain water" instructions above.

② Remove element, fuel warmer and bowl from filter head.

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

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

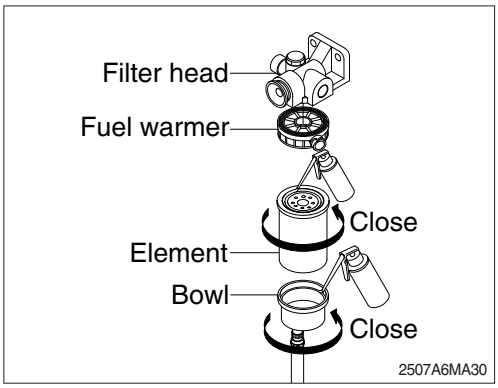


④ Lubricate new bowl seal with clean fuel or motor oil and place in bowl gland.

⑤ Attach bowl to new element firmly by hand.

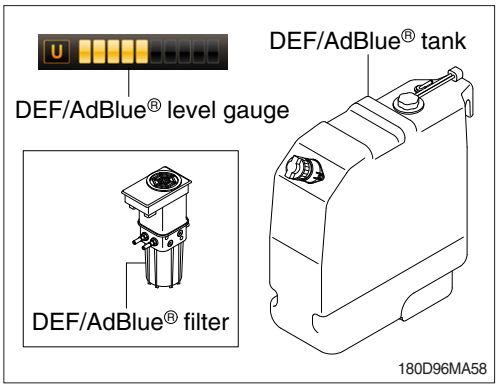
⑥ Lubricate new element seal and place in element top gland.

⑦ Attach the element, fuel warmer and bowl to the head.

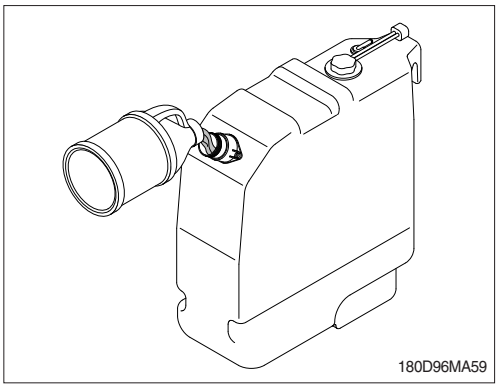


13) DEF / AdBlue® TANK

(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.



Before filling the tank

① Switch off the engine.

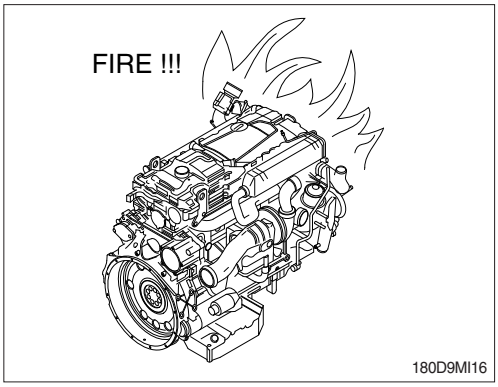
② Secure the vehicle against rolling away. Always fill the tank with at least 5 liters, as smaller amounts could cause malfuctions.

⚠ Do not allow diesel fuel to run into the DEF / AdBlue® tank. You could otherwise damage the exhaust gas aftertreatment system.

⚠ Do not mix additives to DEF / AdBlue®.

14) 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.



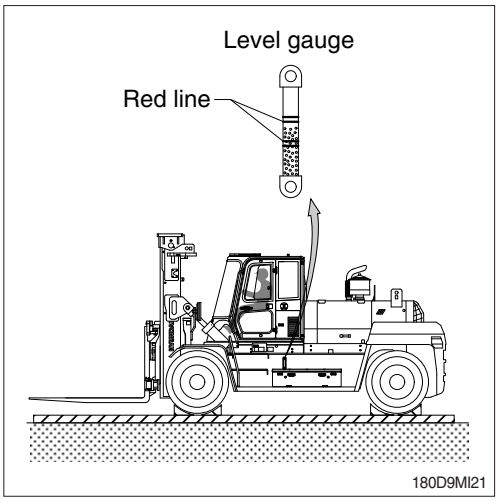
15) HYDRAULIC OIL CHECK

(1) Lower the forks on the ground at a flat location as in the illustration.
Stop the engine and then leave for about 5 minutes.

(2) Check the oil level at the level gauge. The level gauge is located on the left side of the hydraulic oil tank.

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

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



16) FILLING HYDRAULIC OIL

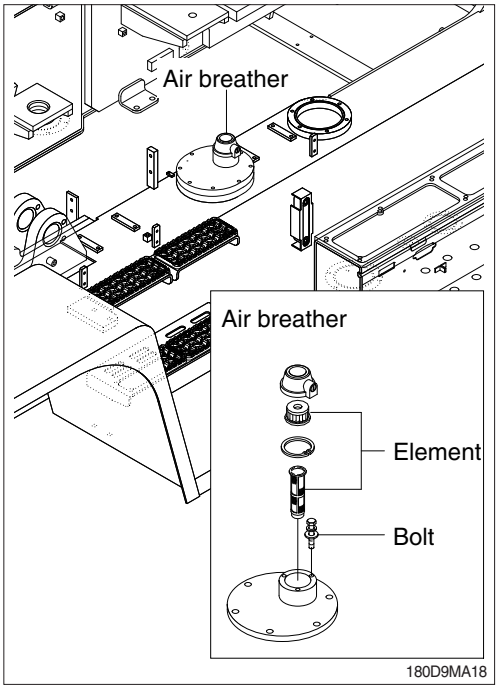
(1) Stop the engine to the position of level check.

(2) Check air breather filter and replace it if necessary.

(3) Loosen cap 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.



17) CHANGE THE HYDRAULIC OIL

(1) Lower the forks on the ground and extend the tilt cylinder to the maximum.

(2) Loosen the cap and relieve the pressure in the tank.

(3) Prepare a suitable drain pan.

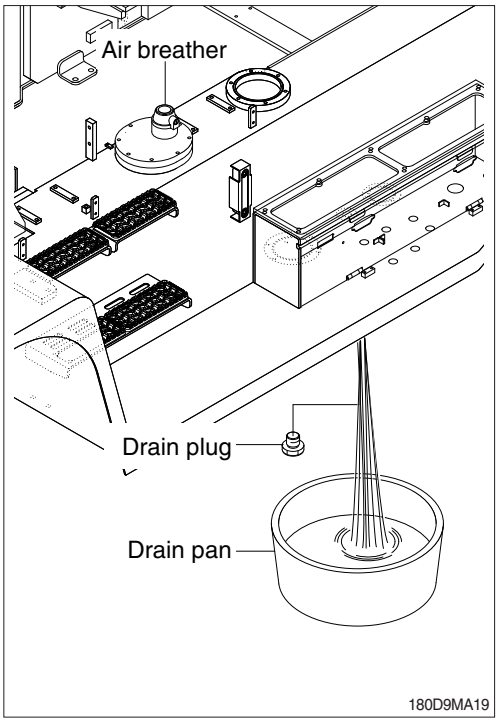
(4) To drain the oil loosen the drain plug.

(5) After draining oil, tighten the drain plug.

(6) Fill proper amount of recommended oil.

(7) Start engine and run continually. Release the air by full stroke of control lever.

※ **The oil must be free of bubbles. If bubbles are present in the oil, air is entering the hydraulic system. Inspect the suction hoses and hose clamps for leakage or damage.**



18) CLEANING AND REPLACING RETURN FILTER

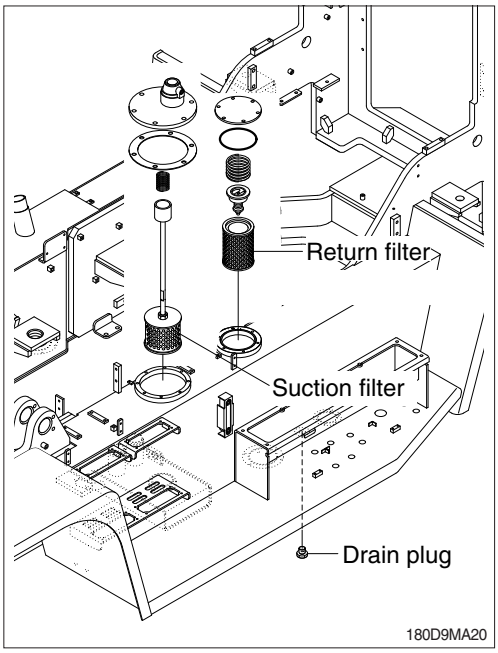
Clean and replace the return filter in the following manner.

(1) Remove the flange by loosening the mounting bolt.

(2) Remove return filter from the tank.

(3) Replace the return filter element with new one.

(4) Install the cover on the tank.
· Tightening torque : 6.9±1.4 kgf · m
(50±10 lbf · ft)



19) REPLACEMENT OF ELEMENT IN HYDRAULIC TANK BREATHER

(1) Loosen the cap and relieve the pressure in the tank.

(2) Loosen the screw and remove the cover.

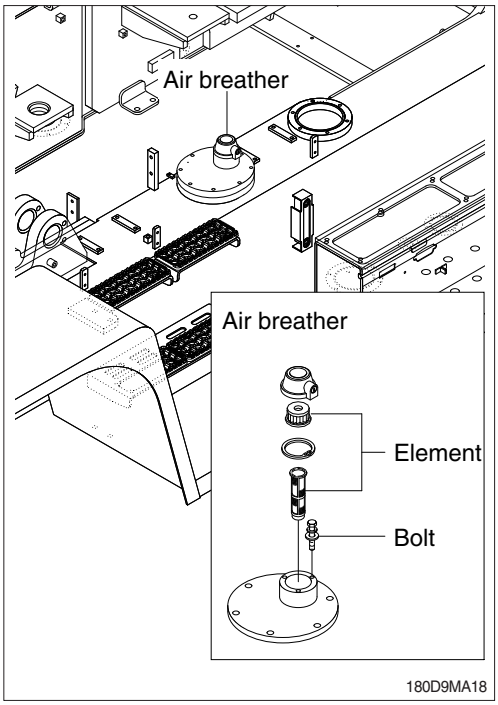
(3) Pull out the filter.

(4) Replace the filter with new one.

(5) Reassemble by reverse order of disassembly.

· Tightening torque of the bolts :

2.7~4.1 kgf · m (19.5~29.7 lbf · ft)



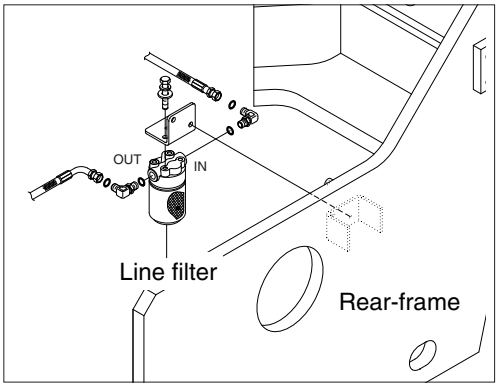
20) REPLACE THE ELEMENT OF THE BRAKE LINE FILTER

(1) Remove the filter case from the filter assy.

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

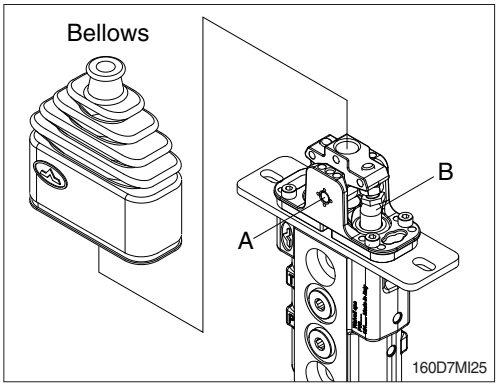
(3) Replace filter element and O-ring with new parts.

(4) Reassemble line filter.



21) LUBRICATE RCV LEVER

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



22) TIRE PRESSURE

(1) Inappropriate tire pressure is a primary cause for tire damage. Insufficient tire pressure will damage internal carcass of tire. Repeated excessive bending will damage or break the carcass. Excessive pressure will also cause premature damage of tire.

(2) Recommended tire pressure (When tire is cooled)

Size	Pressure
12.00-20, 20PR	10 kgf/cm^2 (142 psi)

(3) Continuous operation will produce heat and increase pressure on tire. But such phenomenon was already taken into account when designing a tire. Do not try to remove normally increased air because tires may be crushed or overinflated.

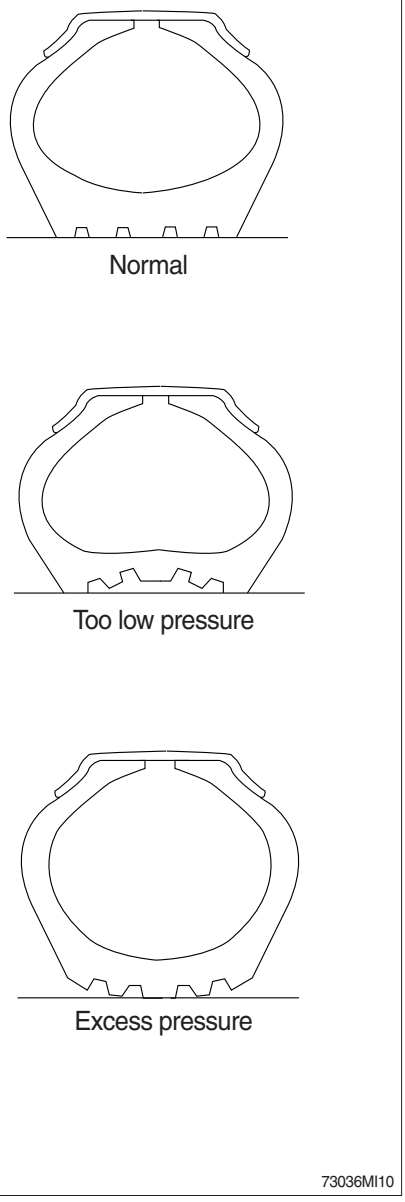
(4) The three major causes for excessive heat and pressure of tire are insufficient pressure, excessive load and overspeed. Avoid excessive load and overspeed in order to keep tires in good shape.

⚠ Do not inflate tires using flammable gases or alcohol injector.
This cause explosion or personal injury.

⚠ Inflate tires at the pressure level recommended by the manufacturer, and check periodically pressure and wear of tires.

⚠ When replacing the inflated tire, do not stand near the tire.

※ Check the tire when the tire is at normal temperature and the machine is not loaded.



⚠ Do not use recycled wheel parts.

⚠ When removing lockering or inflating tire, use safety cable or chain to ensure safety.
Be sure to bleed air before removing lockering. Never inflate tires unless the lockering is assembled in its place.

※ Avoid the followings when traveling.

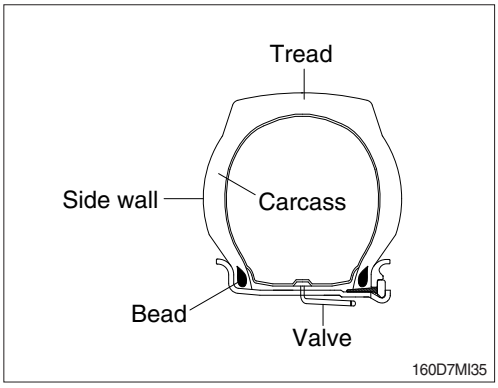
① Rubbing tires against road bank or rack at cargo-unloading spot.
② Tires slippage during working.
③ Abrupt starting of machine.
④ When oil, grease or gasoline smeared on tire, clean those. Otherwise it may cause of permanent deformation.

23) REPLACEMENT OF TIRE

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

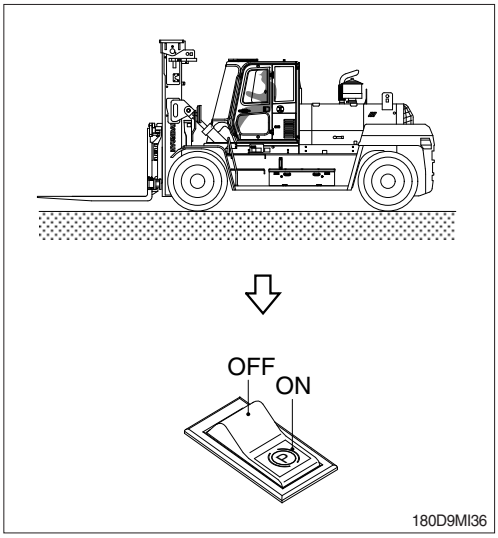
(1) Tires to be replaced

① Tires with broken or bent bead wires
② Tires exposed more than 1/4 of carcass fly.
③ Tires whose carcass is damaged more than 1/3 of the tire width.
④ Tires which show fly separation.
⑤ Tires which has a radial crack near the carcass.
⑥ Tires which are judged to be unsuitable for use because of deformation or damage.

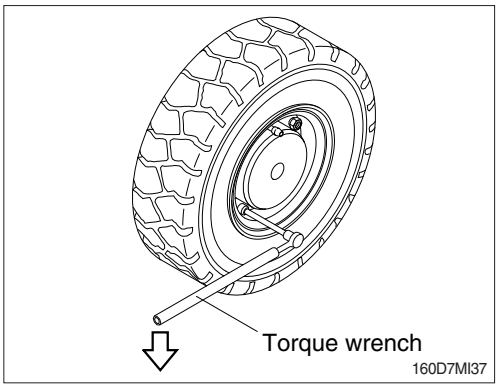


(2) Separation of tire

① After moving the machine to flat ground, lower the fork to the ground and turn the parking brake switch ON.

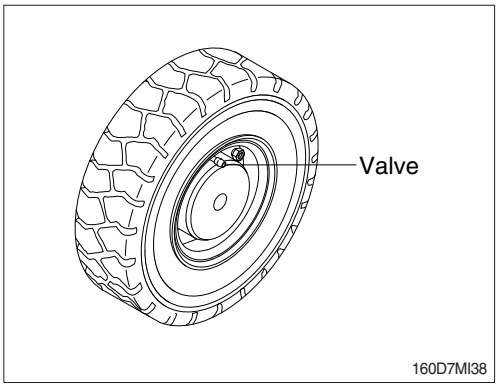


② Loosen slightly all wheel mounting.
· Tools : Socket 22 ㎜
Torque wrench
Extension bar
③ Lift the machine with a jack.
④ Loosen all wheel mounting nuts and replace the tire.



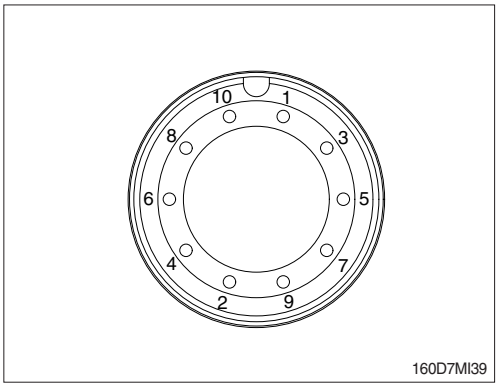
(3) Direction of tire to be installed

① Be careful that the valve should be facing the outside.



(4) Mounting of tire

① Lightly tighten nuts as shown in the illustration.
② Lower the jack after tire is replaced.
③ Tighten nuts according to the specified tighten torque.
· 71~96 kgf · m (513~694 lbf · ft)

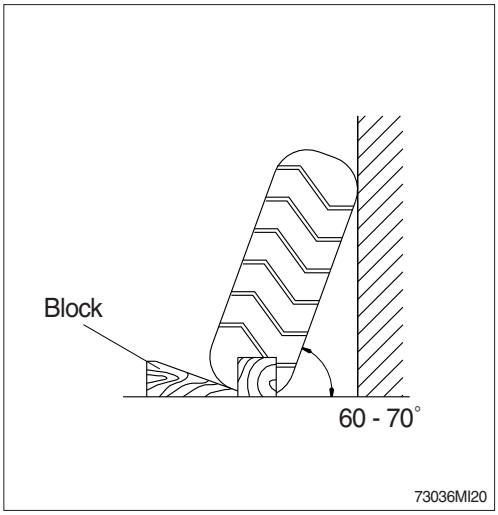


24) STORING TIRES AFTER REMOVAL

As a basic rule, store the tires in a warehouse which unauthorized persons cannot enter. If the tire are stored outside, always erect a fence around the tires and put up "No Entry" and other warning signs that even young children can understand.

Stand the tire on level ground, and block it securely so that it cannot roll or fall over.

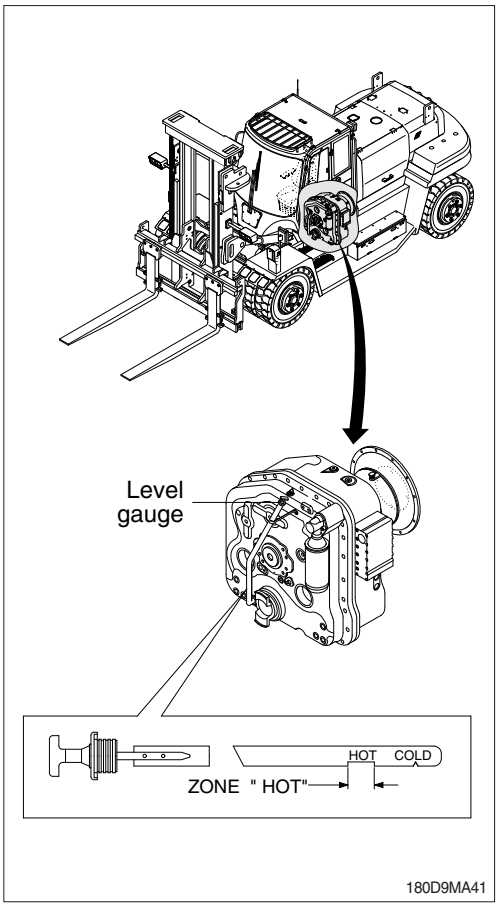
If the tire should fall over, get out of the way quickly. The tires for construction equipment are extremely heavy, so trying to hold the tire may lead to serious injury.



25) CHECK TRANSMISSION OIL LEVEL

(1) The oil level check must be carried out as follows; oil level check (weekly).
(2) At horizontally standing machine.
(3) Transmission in neutral position.
(4) In cold start phase, the engine must be running about 2~3 minutes at idling speed, and the marking on the oil level gauge must then be lying above the cold start mark COLD.
(5) At operating temperature of the transmission (about 80~90 °C) .
(6) At engine idling speed.
(7) Loosen oil level gauge by counterclockwise rotation, remove and clean it.
(8) Insert oil level gauge slowly into the oil level tube until contact is obtained, and pull it out again.
(9) On the oil level gauge, the oil level must be lying in the zone HOT.
(10) Insert the oil level gauge again, and tighten it by clockwise rotation.

⚠ When checking, press the parking brake switch and fix the tires with blocks.



26) REPLACEMENT OF TRANSMISSION OIL AND FILTER ELEMENT

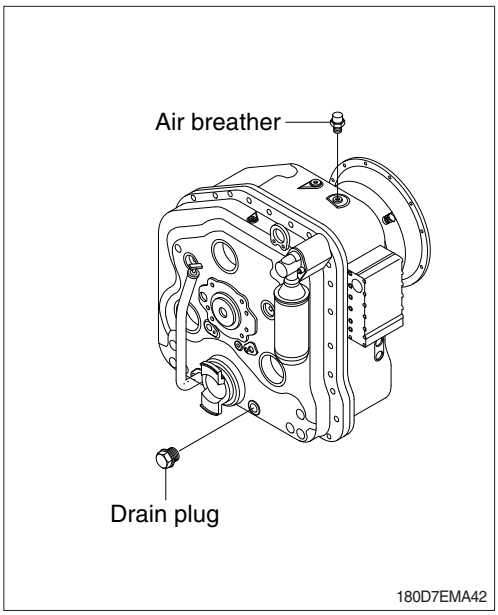
(1) Operate the machine for a few minutes in order to warm the transmission oil.

(2) Move the machine to flat ground. Lower the forks to the ground and slightly apply downward force.

(3) Press the parking brake switch and stop the engine.

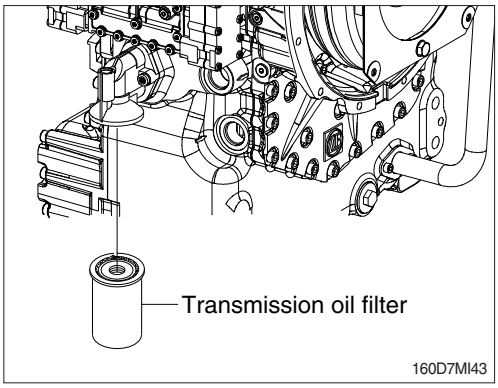
(4) Open transmission air breather to relieve internal air pressure.

(5) Remove the transmission drain plug. Allow the transmission oil to drain into a suitable container.



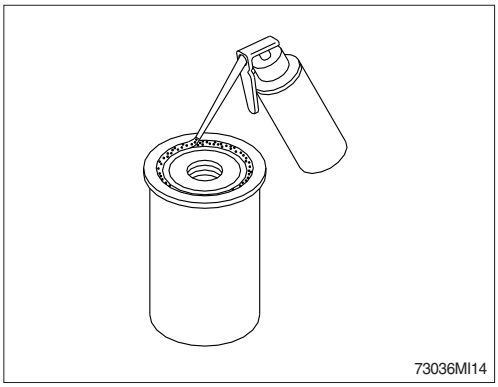
(6) Remove the transmission oil filter cartridge. Dispose of the used transmission oil filter cartridge properly.

(7) Clean the filter cartridge mounting base. Remove any part of the filter cartridge gasket that remains on the filter cartridge mounting base.



(8) Apply a light coat of oil to the gasket of a new transmission oil filter cartridge.

(9) Install the new transmission oil filter cartridge. Screw the filter in until contacts with the sealing surface is obtained and tighten it now by hand about 1/3 to 1/2 turn.



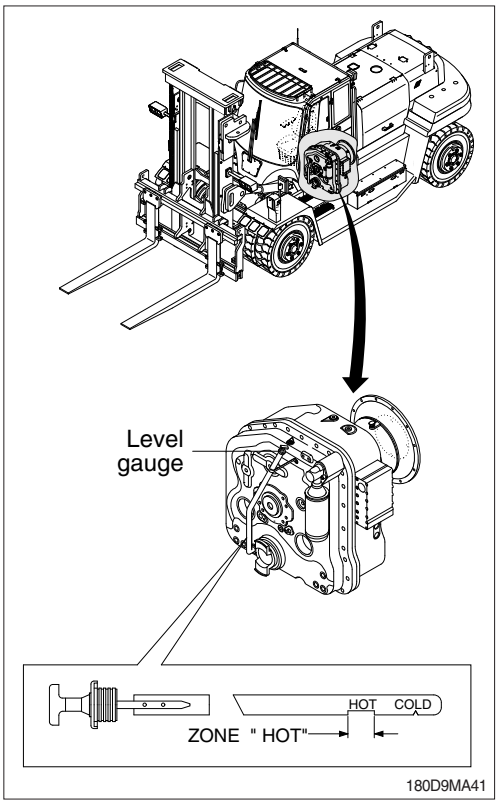
(10) Mount the drain plug of transmission after cleaning it.

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

(12) The proper oil amount is 27 liters (7.1 U.S. gallons)

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

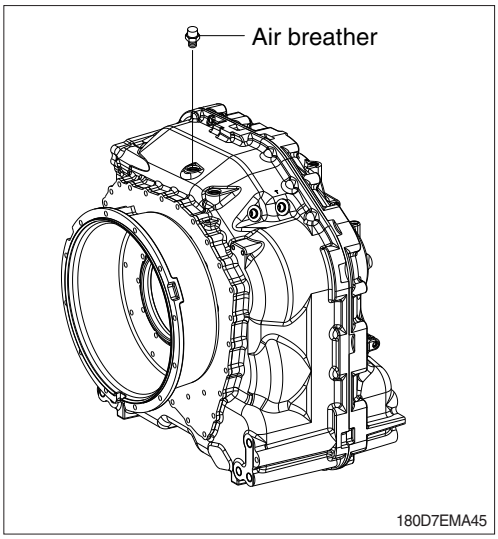
⚠ It is imperative to pay attention to absolute cleanliness of oil and filter.
Binding is in any case the marking on the oil level gauge.



27) CLEANING TRANSMISSION AIR BREATHER

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

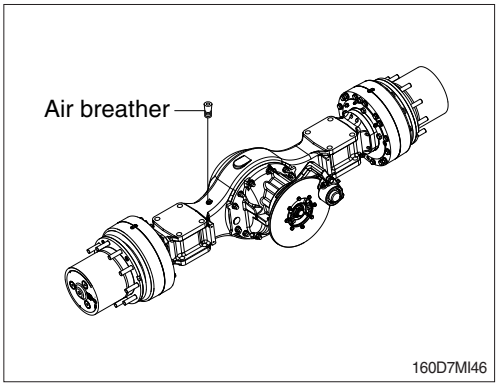
(2) Remove the air breather and wash it with cleaning oil.



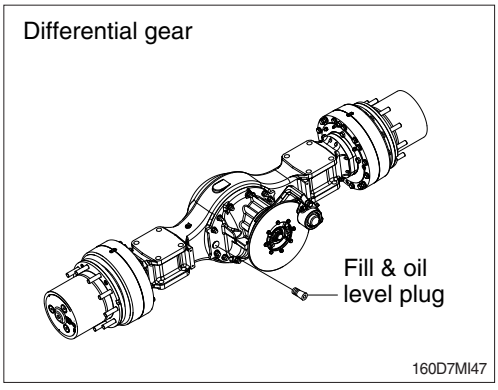
28) CHECK AND SUPPLYING AXLE OIL

(1) Move the machine to flat ground.

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



(3) Remove the plug and check the oil amount.
If the oil level is at the hole of the plug, it is normal.

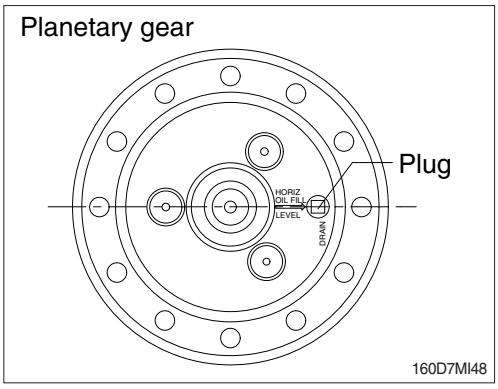


(4) If the oil level is below the plug hole, supply oil through a plug hole.

⚠ When checking the oil level, press the parking brake switch and fix front and rear frames using the safety lock bar.

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

※ Set the plug of planetary gear in parallel to the ground.



29) CHANGE THE AXLE OIL

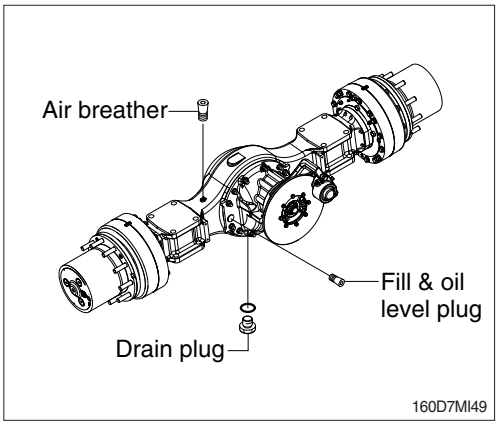
(1) Place a case under drain plug to catch oil.

(2) Remove the air breather to relieve internal pressure.

(3) Drain oil in the differential gear.

① Remove the refilling plug and remove the drain plug to drain oil off.

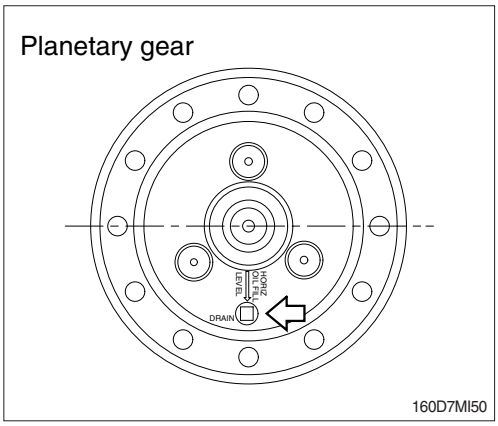
② Wash drain plug and install it.



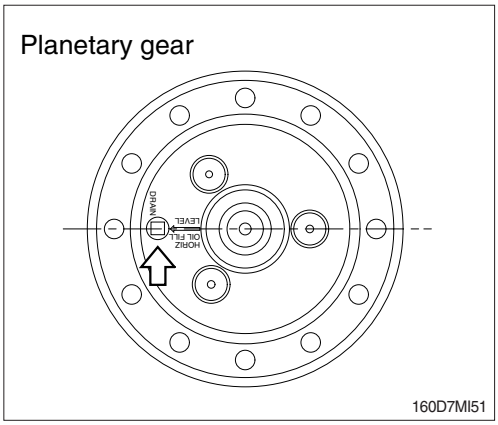
(4) Drain oil in the planetary gear.

① Drain oil by removing drain plug.

※ The drain plug should be facing the ground.



(5) After draining, put the drain plug of planetary gear in parallel to the ground.

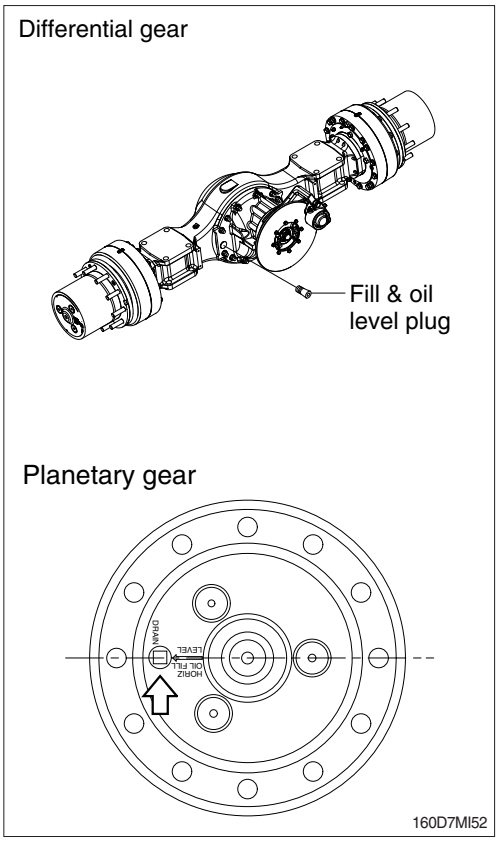


(6) Supply oil into the differential gear and the planetary gear.
· Oil amount : 27.5 ℓ (7.3 U.S. gal) (Differential gear)+2×3.2 ℓ (0.8 U.S. gal) (Planetary gear)

(7) Supply oil until it overflows from the oil filler, then install the plug.

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

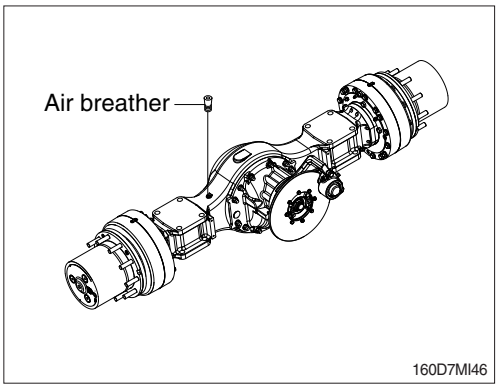
※ **If a work requires frequent use of brake, replace it earlier than normal change interval.**



30) CLEANING AXLE BREATHER

(1) Remove dust or debris around the breather.

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



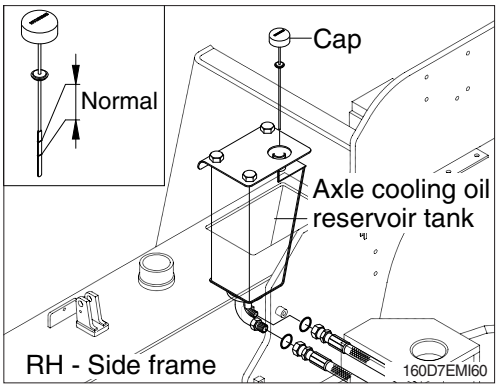
31) STRAINER FOR THE TRANSMISSION AND AXLE COOLING LINE

(1) Remove suction filter element from the flange assy using spanner.

(2) Check and clean throughly inside of the suction filter element by using compressed air.

(3) Reassemble the element on the flange assy.

※ **Replace new element if necessary.**



32) LUBRICATION

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

(2) After lubricating, clean off spilled grease.

⚠ Press the parking brake switch and fix front and rear tires with blocks.

⚠ Set the mast and forks in a stable position and turn the hydraulic safety lock valve into the lock position.

(3) Lubrication points

① Adjust cylinder : 2EA

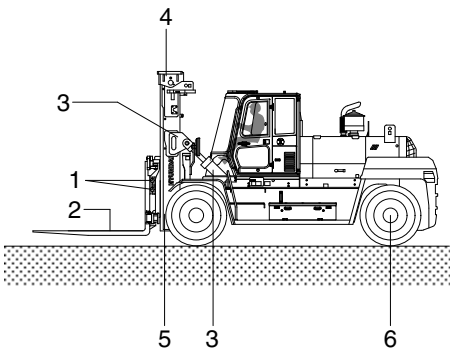
② Forks : 2EA

③ Tilt cylinder : Left/Right, 2EA

④ Lift chain : 2EA

⑤ Mast support : Left/Right, 2EA

⑥ Steering axle : 5EA



1 Adjust cylinder(2EA)
2 Fork(2EA)
3 Tilt cylinder(Left/Right, 2EA)
4 Lift chain(2EA)
5 Mast support(Left/Right, 2EA)
6 Steering axle(5EA)

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33) FORKS REPLACEMENT

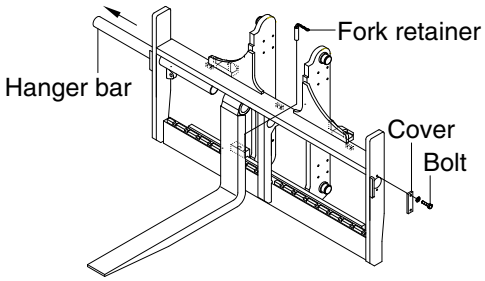
① Lower the fork carriage until the forks are approximately 25 mm (1 in) from the floor.

② Take out the spring pin and remove the pin weld assy.

③ Remove only one fork at a time.

※ On larger forks it may be necessary to use a block of wood.

④ Reverse the above procedure to install load forks.



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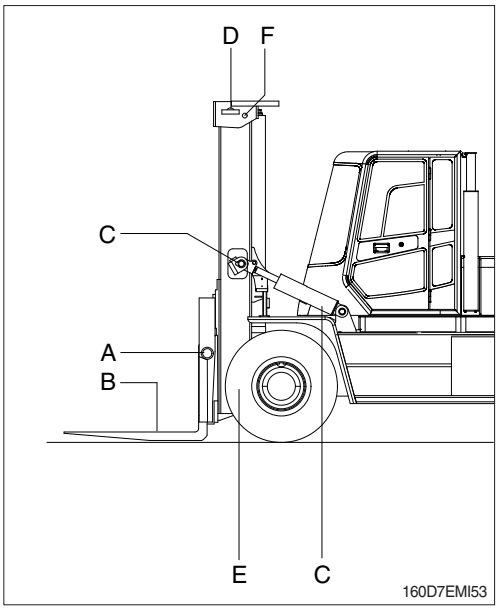
34) MAINTENANCE OF WORK EQUIPMENT

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

No.	Description	Qty
A	Fork adjustment cylinder pin	2
B	Fork shaft	1
C	Tilt cylinder pin	2
D	Load chain	2
E	Mast support pin	2
F	Chain sheave pin	2

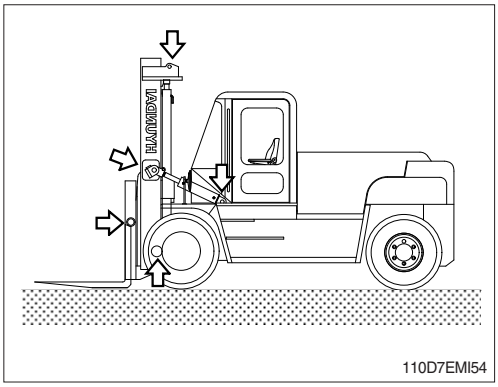


※ Shorten lubricating interval when working in the water or dusty place.

(2) Check for wear and tear of work equipment pins and bushings.

(3) Check for damage of forks and mast linkage part.

※ Check daily and lubricate the fork positioner hanger bar and bottom plate where the fork is contacted, or the forks may vibrate temporarily while positioning.

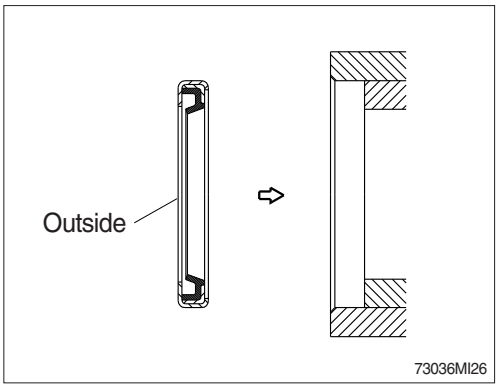


(4) Dust seals are mounted on the rotating part of working device to extend the lubricating interval.

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

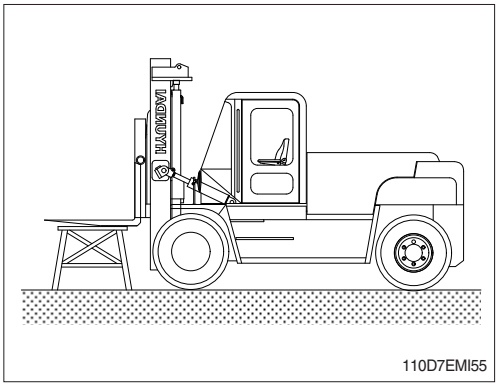
※ If it is assembled in wrong direction, it will cause fast wear of pin and bushing, and create noise and vibration during operation.

※ Make sure the seals are not damaged or deformed.



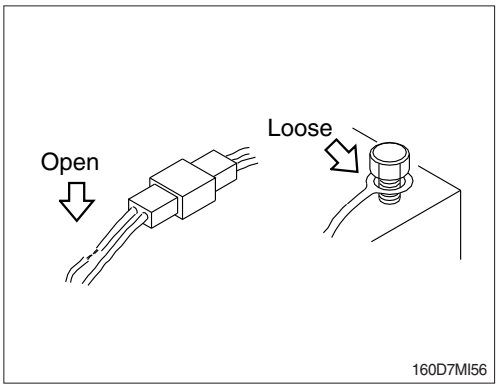
34) WORK EQUIPMENT SUPPORT

When carrying out inspection and maintenance with the forks raised, fit a stand under the forks securely to prevent the work equipment from coming down. In addition, set the work equipment control levers to the Hold position and Lock with the safety lock.



1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



2) WELDING REPAIR

Before start to welding, follow the below procedure.

(1) Shout off the engine and remove the starting switch.

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

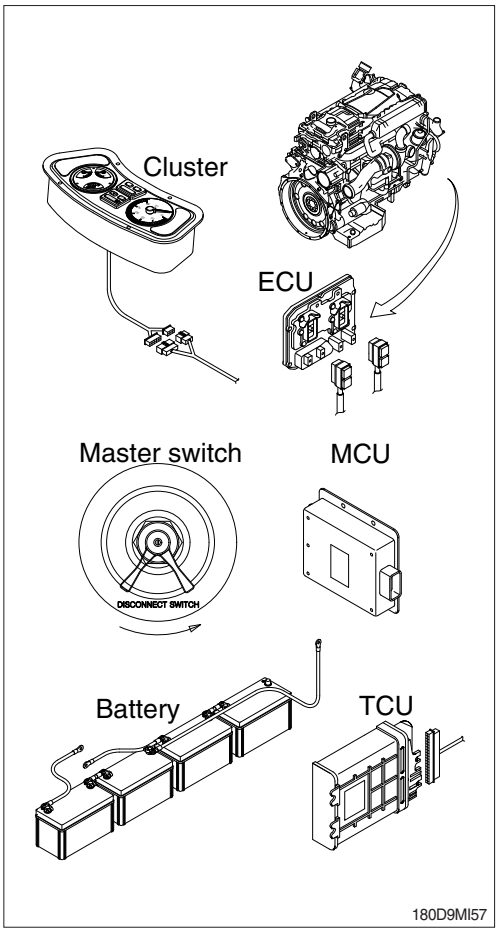
(3) Before carrying out any electric welding on the machine, the battery cables should be disconnected and the connectors pulled out of the electronic control units (ECU, MCU, TCU, cluster etc).

(4) Connect the earth (ground) lead of the welding equipment as close to the welding points as possible.

※ Do not weld or flame cut on pipes or tubes that contain flammable fluids. Clean them thoroughly with nonflammable solvent before welding or flame cutting on them.

⚠ Do not attempt to welding work before carry out the above.

If not, it will caused serious damage at electric system.

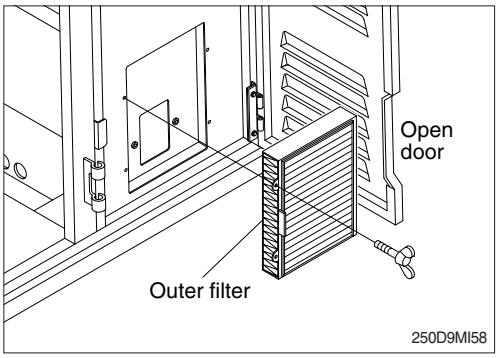


8. AIR CONDITIONER AND HEATER

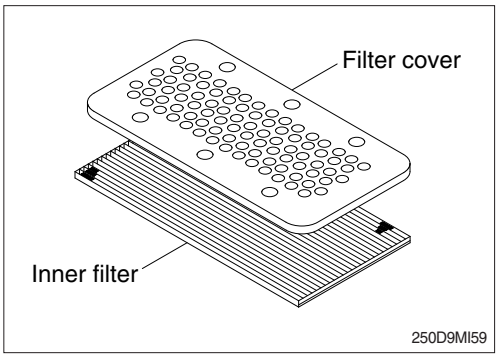
1) CLEANING AND REPLACING FILTER

※ Always stop the engine before servicing.

(1) Open the door, loosen the wing bolt and remove the outer filter.



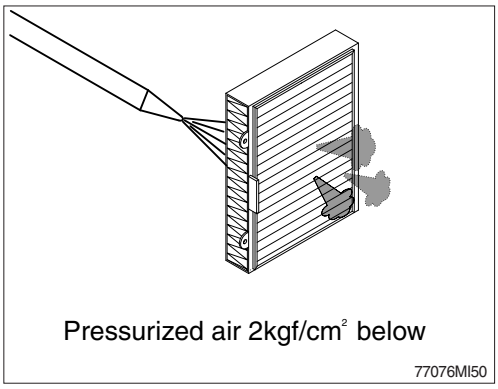
(2) Open the cover of air conditoner and remove the inner filter.



(3) Clean the recircular plenum using a pressurized air (Below 2 kgf/cm², 28 psi).

△ **When using pressurized air, be sure to wear safety glasses.**

(4) Inspect the filter after cleaning. If it is damaged or badly contaminated, use a new filter.



2) 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.

3) CHECK DURING SEASON

Ask the service center for replenishment of refrigerant or other maintenance service so that the cooling performance is not damaged.

4) CHECK DURING OFF-SEASON

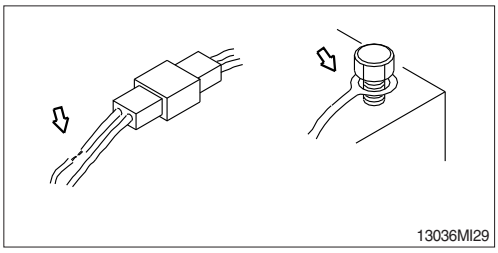
Operate the air conditioner 2 or 3 times a month (Each for a few minutes) to avoid loss of oil film in the compressor.

5) Refrigerant amount : 850 ± 50 g

9. REPLACEMENT AND CHECK

1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



2) BATTERY

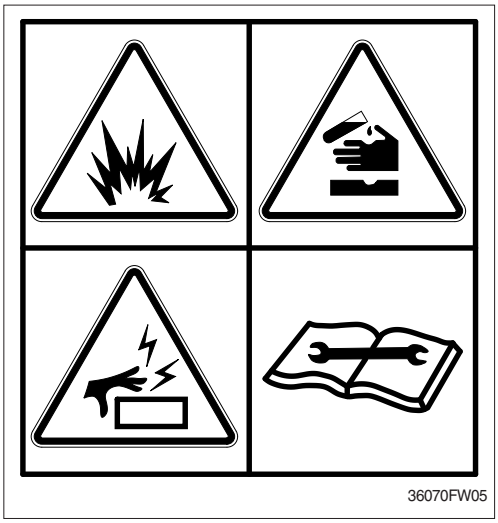
(1) Clean

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.

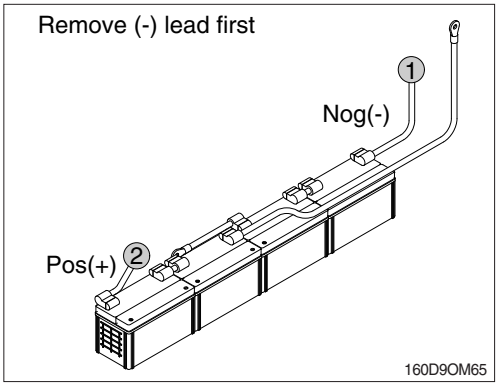
- A battery supplier
- An authorized battery collection facility
- Recycling facility

(3) Removing and installing

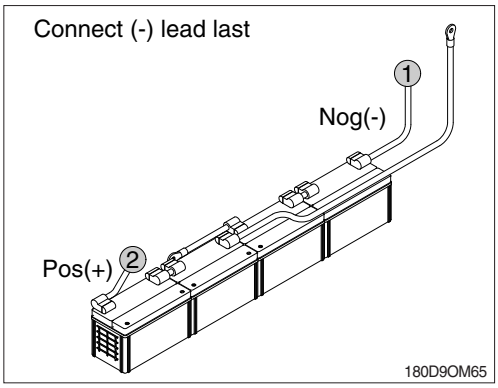
① Remove the lead from the ground side (Normally the (-) terminal side) of the battery. It is dangerous to let a tool, etc., touch the (+) terminal and the body at the same time, since this causes a spark.

② When remounting, connect the ground connection last

⚠ Do not allow tools to touch the (+) terminal and the body of the truck at the same time. This can cause sparking and explosion.
When reinstalling the cables after replaced the battery, pay close attention to maintaining the same alignment state of the cables as it was when supplied. Otherwise, the machine can be exposed to the fire hazards.



⚠ Prior to reinstall the cable, inspect in detail and confirm the condition of the cables and replace it when the cables possess any kind of abnormal damages such as cracking and wear out of the cable sheath that make you feel somedangerous to use it. Do consult an expert about this matter when you are not able to judge its condition. It is strongly recommended to keep the surroundings of the battery cables clean so that the machine can be freed from the risk of firing by eliminating the flammable contaminations such as oil, dust and etc. acting as a fire developer. Dispose of the old battery in locally approved manner.



3) FUSES REPLACEMENT

(1) Fuse box (B+)

No.	Capacity	Related electrical component
①	-	-
②	30 A	MCM/ACM (B+)
③	30 A	Battery power
④	30 A	CPC4 (B+)
⑤	10 A	OBD (B+)
⑥	10 A	Start key (B+)
⑦	10 A	TCU (B+)
⑧	10 A	Turn lamp (B+)
⑨	10 A	OPSS system
⑩	5 A	MP3 player
⑪	5 A	Room lamp
⑫	5 A	Cluster
⑬	-	-
⑭	15 A	Cabin tilt
⑮	5 A	Monitor RMCU
⑯	5 A	Horn
⑰	10 A	DEF sensor
⑱	-	-
⑲	-	-
⑳	-	-
㉑	-	-
㉒	-	-
㉓	-	-
㉔	-	-
㉕	-	-
㉖	-	-
㉗	-	-
㉘	-	-
㉙	-	-
㉚	-	-
㉛	10 A	Neutral relay
㉜	15 A	Time delay relay
㉝	15 A	Time delay relay

					-	-	①
③	30 A	BATT POWER			30 A	MCM/ACM	②
㉔	-	-	15 A ⑭	CABIN TILT	15 A	CPC4	④
㉕	-	-	5 A ⑮	MONITOR RMCU	10 A	OBD	⑤
㉖	-	-	5 A ⑯	HORN	10 A	START KEY(B+)	⑥
㉗	-	-	-	-	10 A	TCU (B+)	⑦
㉘	-	-	-	-	10 A	TURN LAMP(B+)	⑧
㉙	-	-	-	-	5 A	CPSS SYSTEM	⑨
㉚	-	-	-	-	5 A	MP3 PLAYER	⑩
㉛	10 A	NEUTRAL POWER	-	-	5 A	ROOM LAMP	⑪
㉜	15 A	TIME DELAY RELAY	-	-	5 A	CLUSTER	⑫
㉝	15 A	TIME DELAY RELAY	-	-	-	-	⑬

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(2) Fuse box (IG)

No.	Capacity	Related electrical component
①	-	-
②	-	-
③	60 A	IG power
④	5 A	Back-up
⑤	10 A	CPS system
⑥	15 A	Cigar jack/ tilt alarm
⑦	15 A	DC/DC converter
⑧	10 A	MCU
⑨	15 A	MP3 handsfree
⑩	10 A	Monitor / Cluster
⑪	20 A	Aircon heater
⑫	15 A	Seat heater
⑬	10 A	Park solenoid
⑭	10 A	Illumination lamp
⑮	15 A	Head lamp
⑯	15 A	Front work lamp
⑰	15 A	Rear work lamp
⑱	15 A	Wiper horn
⑲	15 A	Fuel warmer main
⑳	5 A	Beacon lamp
㉑	5 A	RMCU
㉒	10 A	Brake lamp selector valve
㉓	15 A	TCU IG
㉔	10 A	ACM, MCM
㉕	10 A	CPC4 / OBD
㉖	5 A	ALT IG
㉗	10 A	TCP wiper
㉘	20 A	Air compressor
㉙	-	-
㉚	-	-
㉛	-	-
㉜	-	-
㉝	-	-

					-	-	①
③	60 A	IG POWER			-	-	②
㉔	10 A	ACM,MCM	10 A ⑭	ILLUM LAMP	5 A	BACK-UP	④
㉕	10 A	CPC4 OBD	15 A ⑮	HEAD LAMP	10 A	OPSS SYSTEM	⑤
㉖	5 A	ALT IG	15 A ⑯	WORK LAMP FRONT	15 A	CIGAR JACK TILT ALARM	⑥
㉗	10 A	TOP WIPER	15 A ⑰	WORK LAMP REAR	15 A	DC/DC CONVERTER	⑦
㉘	10 A	AIR COM-PRESSOR	15 A ⑱	F/R WIPER HORN	10 A	MCU	⑧
㉙	-	-	15 A ⑲	F/WARMER MAIN	15 A	MP3 HAND FREE	⑨
㉚	-	-	5 A ⑳	BEACON LAMP	10 A	MONITOR CLUSTER	⑩
㉛	-	-	5 A ㉑	RMCU	20 A	AIRCON HEATER	⑪
㉜	-	-	10 A ㉒	BRAKE LAMP SELECTOR VALVE	15 A	SEAT HEATER	⑫
㉝	-	-	15 A ㉓	TCU IG	10 A	PARK SOLENOID	⑬

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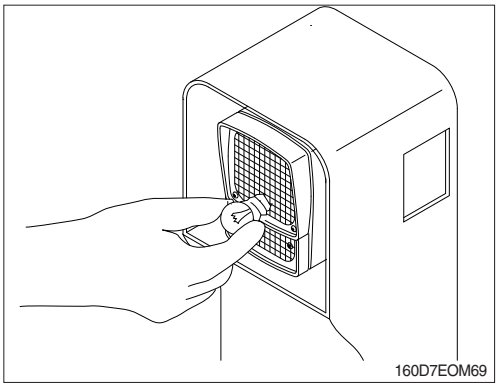
① Turn the starting switch OFF.

② Open the cover of the fuse box, and replace fuses inside (To open the cover of the fuse box, push the side of the cover lightly with a finger, and pull the cover forward to remove it.)

⚠ When replacing the fuse, check the relationship between the fuse and the electrical components it protects. Always replace fuses with a fuse of the same capacity. Always turn the starting switch OFF before replacing any fuse.

4) LAMP BULBS REPLACEMENT

Lamp	Spec (24V)
Head lamp(up)	75W
Head lamp(down)	70W
Turn signal lamp	LED
Clearance lamp	LED
Stop lamp	LED
Backup lamp	LED
License lamp (option)	10W
Beacon lamp (option)	Strobe type
Rear work lamp	65W



⚠ **After checking that the fuse is not blown and that there is no disconnection in the wiring harness, replace the lamp bulb.**

5) FUNCTIONAL TESTS

You will start the engine to complete the functional tests, so be sure that:

- The Parking brake is applied.
- Directional control is in NEUTRAL.
- Forks are fully lowered to the floor or ground.
- All controls are in neutral or other correct position.
- You are familiar with the safety procedures given in section 5. **Starting and operating procedures,** in this manual.

As you test the following components, be sure they are properly mounted and working correctly.

(1) Horn

Press the horn button to check horn function. If the horn or any other part does not operate, report the failure and have it repaired before the truck is put into operation.

(2) Hour meter

Start the engine and let it warm up until it runs evenly and accelerates smoothly when you push on the accelerator pedal. Check the hour meter for operation with the engine running. Write the hour meter reading on the PM report form. Report any malfunction or damage.

(3) Indicator lights

Check that all lights are functioning and indicate normal truck operation as described in section 3, **Know your truck,** in this manual.

(4) Service brakes and inching pedal

With the direction control in NEUTRAL and the engine running, push the service brake pedal fully down and hold. The brakes should apply before the pedal reaches the floorplate. If the pedal continues to creep downward, report the failure immediately. Do not operate the truck until the brakes are repaired. Perform the same check with the inching pedal. (Additional braking/inching checks will follow).

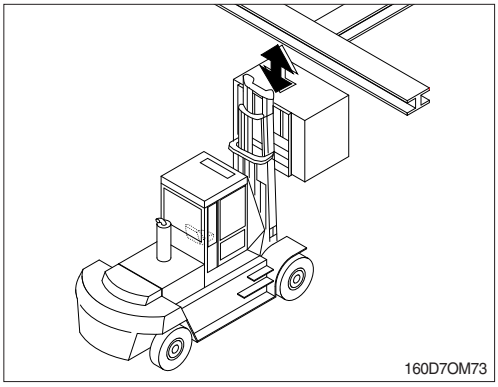
(5) Parking brake

Check the function of the parking brake. Release, then reapply. To check parking brake holding capability, park the lift truck on a grade and apply the parking brake. The parking brake should hold a lift truck with rated load on a 15% grade.

⚠ Do not operate a lift truck if the service or parking brakes are not operating properly.

(6) Lift mechanisms and controls

Pull back on the tilt control lever and hold until the mast reaches the full back tilt position. Push forward on the lever to return the mast to the vertical position. Release the lever.



⚠ Be sure that there is adequate overhead clearance before raising the mast.

Pull back on the lift control lever and raise the fork carriage to full height. Watch the mast assembly as it rises. Release the lever.

If the maximum fork height is not reached, this indicates there is an inadequate (low) oil level in the hydraulic sump tank or severe binding within the mast.

Push forward on the lift control lever. Watch the mast as it lowers. When the forks reach the floor, release the lever.

All movements of the mast, fork carriage, and lift chains must be even and smooth, without binding or jerking. Watch for chain wobble or looseness; the chains should have equal tension and move smoothly without noticeable wobble.

(7) Auxiliary controls (Option)

If your lift truck is equipped with an attachment, test the control lever for correct function and briefly operate the attachment.

(8) Steering system

※ The steering system, steering axle, and steering linkage on your truck should be inspected periodically for abnormal looseness and damage, leaking seals, etc.. Also, be alert for any changes in steering action. Hard steering, excessive freeplay (Looseness), or unusual sound when turning or maneuvering indicates a need for inspection or servicing.

Check the steering system by moving the steering handwheel in a full right turn and then in a full left turn. Return the handwheel to the straight ahead position. The steering system components should operate smoothly when the handwheel is turned. Never operate a truck that has a steering system fault.

⚠ Fasten your seat belt before driving the truck.

(9) Direction control, braking and inching

※ Be sure that the travel area is clear in front of the truck.

① Push firmly on the brake pedal. Release the parking brake. Move the directional control lever from NEUTRAL to FORWARD.

② Remove your right foot from the service brake pedal and put it on the accelerator pedal. Push down until the truck moves slowly forward. Remove your foot from the accelerator pedal and push down on the service brake pedal to stop the truck. The brakes should apply smoothly and equally.

※ Be sure the travel area is clear behind the truck.

③ Put the directional control lever in the REVERSE travel position. Release the service brake and push down on the accelerator pedal until the truck moves slowly in the reverse direction. Remove your foot from the accelerator pedal and push down on the service brake pedal to stop the truck. The brakes should apply smoothly and equally.

④ Put the directional control in FORWARD. Press the inching pedal fully down and hold. Depress the accelerator. The truck should not move. Now, with the accelerator still depressed, slowly release the inching pedal until the truck **Inches** forward smoothly and slowly.

※ Report any problems.

※ When you have completed the operational tests, park and leave the truck according to standard shut down procedure as described in section 5 of this manual. Be sure to make a record of all maintenance and operating problems you find.

6) LUBRICATION

(1) Truck chassis inspection and lubrication

Lubrication and inspection of truck chassis components, including steering wheels, steering axle linkage, steering cylinder, and wheel bearings are easier if the truck is raised and blocked up under the frame. Refer to your service manual for additional information on truck blocking and jacking. Also refer to your service manual for the location of grease fittings.

Inspect the steering cylinder piston rods, seals, and fasteners for damage, leaks, and looseness. Lubricate the steering axle linkage rod ends and linkage pivot points. Be sure to clean the grease fittings before lubricating, and remove the excess grease from all points after lubricating. Lubricate miscellaneous linkage as needed.

(2) Mast and tilt cylinder lubrication

Clean the fittings and lubricate the tilt cylinder rod end bushings (forward end) and both the base rod-end bushings (rear end). Clean and lubricate the mast trunnion bushings.

(3) Lift chains

Lubricate the entire length of the mast rail lift and carriage chains with HYUNDAI chain and cable lube.

7) AIR CLEANING

Always maintain a lift truck in a clean condition. Do not allow dirt, dust, lint, or other contaminants to accumulate on the truck. Keep the truck free from leaking oil and grease. Wipe up all oil spills. Keep the controls and floorboards clean, dry, and safe. A clean truck makes it easier to see leakage and loose, missing, or damaged parts, and helps prevent fires. A clean truck runs cooler. The environment in which a lift truck operates determines how often and to what extent cleaning is necessary.

For example, trucks operating in manufacturing plants that have a high level of dirt, dust, or lint(for example, cotton fibers or paper dust) in the air or on the floor or ground, require more frequent cleaning. The radiator especially may require daily air cleaning to ensure correct cooling.

If air pressure does not remove heavy deposits of grease, oil, etc., it may be necessary to use steam or liquid spray cleaner.

※ Lift trucks should be air cleaned at every PM interval, or more often if necessary.

Use an air hose with special adapter or extension, a control valve, and a nozzle to direct the air properly. Use clean, dry, low pressure, compressed air. Restrict air pressure to 207 kPa (30 psi), maximum (OSHA requirement).

⚠ Wear suitable eye protection and protective clothing when air cleaning. Never point the air nozzle at anyone.

Air clean the mast assembly, drive axle, radiator- from both counterweight and engine side, engine and accessories, drive line and related components, and steering axle and cylinder.

8) CRITICAL FASTENER TORQUE CHECKS

Fasteners in highly loaded(critical) components can quickly fail if they become loosened. Also, loose fasteners can cause damage or failure of the component. For safety, it is important that the correct torque be maintained on all critical fasteners of components that directly support, handle, or control the load and protect the operator. (SEE SECTION 8. SPECIFICATIONS)

Critical items include:

- Drive axle mounting
- Cabin
- Drive and steering wheel mounting
- Tilt cylinder mounting and yokes
- Counterweight mounting
- Mast mounting and components

Torque specifications are in your service manual.

9) LIFT CHAIN MAINTENANCE

The chain system on the mast was designed for safe, efficient, and reliable transmission of lifting force from hydraulic cylinder to the forks. Safe use of your truck with minimum down time depends on the correct care and maintenance of the lift chains. Most complaints of unacceptable chain performance are a result of poor maintenance. Chains need periodic maintenance to give maximum service life.

⚠ Do not attempt to repair a worn chain. Replace worn or damaged chains with a set (LH & RH). Do not piece chains together.

(1) Lift chain inspection and measurement

Inspect and lubricate the lift chains every 10 hours or daily and check tension every 250 hours or monthly. When operating in corrosive environments, inspect the chains every 50 hours. During the inspection, check for the following conditions:

· Rust and corrosion, cracked plates, raised or turned pins, tight joints, wear, and worn pins or holes.

· When the pins or holes become worn, the chain becomes longer. When a section of chain is 3% longer than a section of new chain, the chain is worn and must be discarded.

· Chain wear can be measured by using a chain scale or a steel tape measure. When checking chain wear, be sure to measure a segment of chain that moves over a sheave. Do not repair chains by cutting out the worn section and joining in a new piece. If part of a chain is worn, replace all the chains of both sides on a truck.

(2) Lift chain lubrication

Lift chain lubrication is an important part of your maintenance program. The lift chains operate under heavy loadings and function more safely and have longer life if they are regularly and correctly lubricated. HYUNDAI chain lubricant is recommended; it is easily sprayed on and provides superior lubrication. Heavy motor oil may also be used as a lubricant and corrosion inhibitor.

(3) Lift chain wear and replacement criteria

① New chain length

The distance from the first pin counted to the last pin counted in a span while the chains are lifting a small load.

② Worn chain length

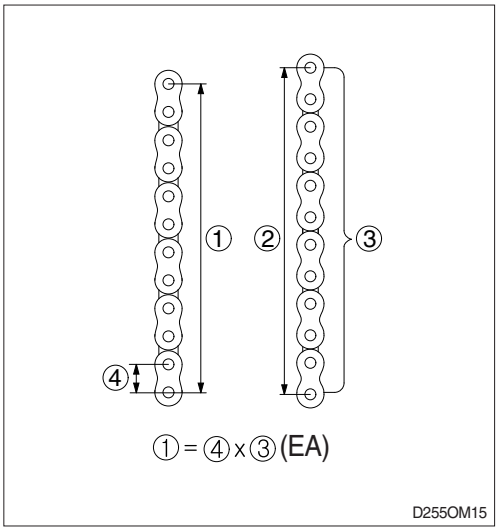
The distance from the first pin counted to the last pin counted in a span while the chains are lifting a small load.

③ Span

The number of pins in the length (Segment) of chain to be measured.

④ Pitch

The distance from the center of one pin to the center of the next pin.

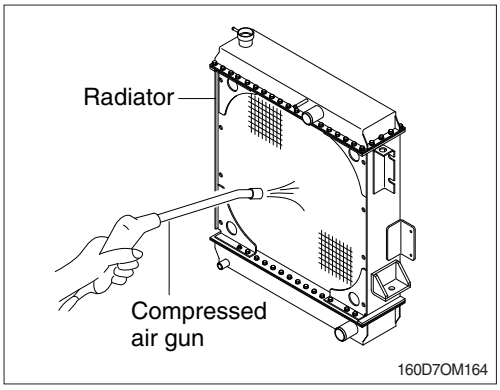


All chains must be replaced if any link has wear of 3% or more, or if any of the damaged conditions notes above are found during inspection. Order replacement chains from your HYUNDAI dealer. Replace all chains as a set. Do not remove factory lubrication or paint new chains. Replace anchor pins and worn or broken anchors when installing new chains. Adjust tension on new chains. Lubricate chains when they are installed on the mast.

※ Please refer to your service manual for additional information on lift chain measurement and maintenance.

10. HANDLING TRUCK IN EXTREMELY HOT PLACES

Pay careful attention particularly to the following points when handling the truck in extremely hot places.



1) Scale and rust form more easily in the cooling system, so wash with anticorrosion liquid. Always try to have clean and soft water circulating in the system.

2) Clogging of the radiator fins is one cause of overheating, so use air or water jets to clean the fins. When doing this, the air nozzle must be at right angles to the radiator.
   · Air pressure max : 2 kgf/cm^2 (30 psi)

3) Check the fan belt tension. If it is too slack, adjust the tension. (SEE SECTION 8. SPECIFICATIONS)

4) In case of overheating, do not stop the engine immediately.
   (1) Run the engine at low idling.
   (2) Open the hood to ventilate the engine compartment.
   (3) When the water temperature drops, stop the engine.
   (4) Check the cooling water level. If it is low, add more water.

⚠ **Wear safety glasses and a face shield when using compressed air. Never touch the radiator cap while the engine is hot. Steam may spurt out. Wait until the water temperature drops. It is extremely dangerous to try to check the fan belt tension while the engine is running. When inspecting the fan belt or other moving parts, or near such parts, always stop the engine first.**

11. COLD WEATHER OPERATION

1) PREPARATION FOR LOW TEMPERATURE

(1) Replace lubrication oil with oil of the prescribed viscosity.

(2) Fuel of low pour point must be used. ASTM D975 No.1 diesel fuel should be used at ambient temperature lower than -5°C.

(3) When ambient temperatures are below use an anti-freeze mixture per the above table to prevent freezing of the cooling system.

Min ambient temperature (°C)	-5	-10	-15	-20	-25	-30	-50
Amount of antifreeze(%)	25	30	35	40	45	50	60
Amount of water(%)	75	70	65	60	55	50	40

⚠ Use permanent type antifreeze.
⚠ Use soft water (city water, etc.) as mixing water.
⚠ Cooling system must be thoroughly flushed before filling with antifreeze mixture.
⚠ When the climate becomes warmer and antifreeze is not needed, replace with soft water (city water, etc.) after thoroughly cleaning the cooling system.
⚠ Do not expose antifreeze to flame. It is inflammable.

※ Dispose of old antifreeze mixture in locally approved manner.

2) BATTERY

As ambient temperature drops, battery capacity will drop and electrolyte may sometimes freeze if battery charge is low. Maintain battery at a charge level of over 75% and insulate it against cold temperature so that truck can be readily started the next morning.

※ When the electrolyte level is low, add distilled water in the morning before work instead of after the day's work. This is to prevent fluid from freezing at night.

3) CARE AFTER DAILY OPERATION

(1) Drain water from fuel system to prevent freezing.
(2) Fill the tank at the end of each day of operation to drive out moisture laden air to prevent condensation.
Do not fill the tank to top.

⚠ Explosive fumes may be present during refueling.

12. RECOMMENDATION TABLE FOR LUBRICANTS

1) NEW MACHINE

New machine uses following fuel, coolant and lubricant.

Description	Specification
Engine oil	SAE 10W-30/15W-40 (API CJ-4 class or better)
DEF / AdBlue®	ISO 22241 (32.5% high-purity urea and 67.5% deionized water)
T/M oil	Engine oil SAE10W-30 (API CF4 class or better)
Gear oil	SAE 80W-90/Donax TD
Hydraulic oil	ISO VG46/VG68, Hyundai genuine long life hydraulic oil ISO VG15, Conventional hydraulic oil★1
Grease	Lithium base grease NLGI No.2
Fuel	ASTM D975-No.2
Coolant	Mixture of 50% ethylene glycol base antifreeze and 50% water

- SAE : Society of Automotive Engineers
- API : American petroleum Institute
- ISO : International Organization for Standardization
- NLGI : National Lubricating Grease Institute
- ASTM : American Sociery of Testing and Material
- DEF compatible with AdBlue®

★1 : Cold region
Russia, CIS, Mongolia

13. FUEL AND LUBRICANTS

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	26 (6.9)	★SAE 5W-40 SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
DEF/AdBlue®	Mixture of urea and deionized water	40 (10.6)	ISO 22241 (High-purity urea and + deionized water (32.5:67.)
Torque converter transmission	Transmission oil	32 (8.5)	SAE 10W-30 SAE 15W-40
Axle brake	Gear oil	19+2×1.7 (5.0+2×0.4)	SAE 80W-90/API GL-5
	Cooling	19 (5.02)	DONAX TD
Hydraulic tank	Hydraulic oil	Simplex mast : 256 (67.6) Triplex mast : 278.8 (73.7)	★ISO VG 15 ISO VG 46
Cabin tilt hand pump	Hydraulic oil	0.7 (0.2)	ISO VG 68
Fuel tank	Diesel fuel★1	312 (82.4)	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (Grease nipple)	Grease	-	★NLGI NO.1 NLGI NO.2
Radiator	Antifreeze : soft water★2	42.7 (11.3)	★Ethylene glycol base permanent type (60 : 40) Ethylene glycol base permanent type (50:50)

NOTES :

① SAE numbers given to engine oil should be selected according to ambient temperature.

② For engine oil used in engine oil pan, use SAE 10W oil when the temperature at the time of engine start up is below 0˚C, even if the ambient temperature in daytime is expected to rise to 10˚C or more.

③ DEF compatible with AdBlue®

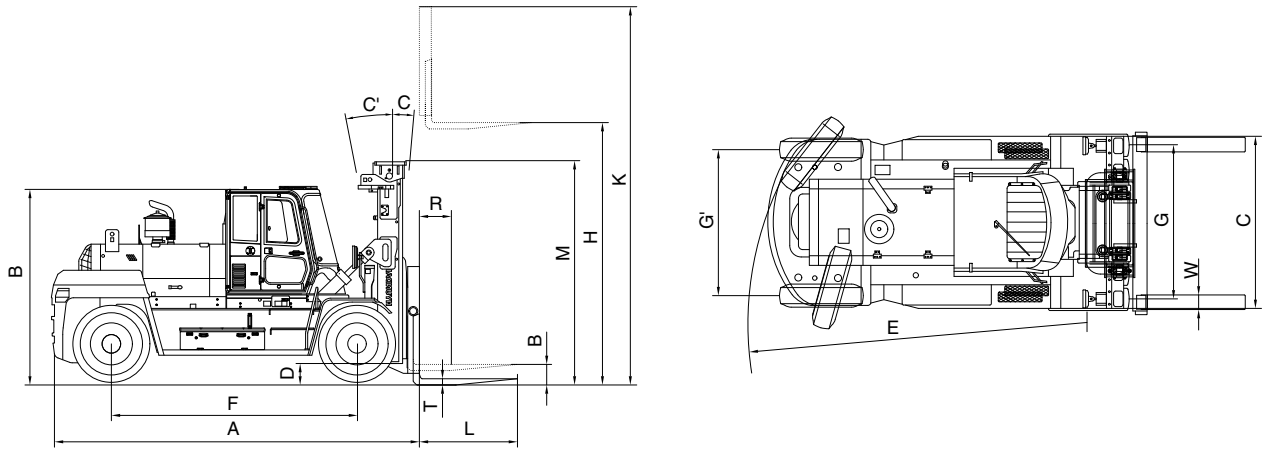
④ Use engine oil of API service class CJ-4.

★ : Cold region
Russia, CIS, Mongolia

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

★2 : Soft water
City water or distilled water

1. SPECIFICATION TABLE



180D9SP01

Model			Unit	180D-9
Capacity			kg (lb)	18000 (40000)
Load center		R	mm (in)	900 (38)
Weight (Unloaded)			kg (lb)	26251 (57870)
Fork	Lifting height	A	mm (ft·in)	3320 (10' 11")
	Free lift	B	mm (ft·in)	0
	Lifting speed (Unload/Load)		mm/sec	420/370
	Lowering speed (Unload/Load)		mm/sec	300/420
	L×W×T	L,W,T	mm (in)	2450×250×100 (100×9.8×3.9)
Mast	Tilt angle (forward/backward)	C/C'	degree	10/10
	Max height	K	mm (ft·in)	4960 (16' 3")
	Min height	M	mm (ft·in)	3350 (11' 0")
Body	Travel speed (Unload)		km/h	37.5
	Gradeability (Load)		degree (%)	17.3 (31.1%)
	Min turning radius (Outside)	E	mm (ft·in)	5220 (18' 1")
ETC	Operating pressure		kgf/cm^2	240
	Hydraulic oil tank		ℓ (U.S.gal)	See page 7-55.
	Fuel tank		ℓ (U.S.gal)	312 (82.4)
Overall length		A	mm (ft·in)	5595 (18' 4")
Overall width		C	mm (ft·in)	2540 (8' 4")
Cabin height		B	mm (ft·in)	2990 (9' 10")
Ground clearance (Mast)		D	mm (in)	245 (9.6)
Wheel base		F	mm (ft·in)	3750 (12' 4")
Wheel tread front/rear		G/G'	mm (ft·in)	1860/2033 (6' 1" / 6' 8")

2. SPECIFICATION FOR MAJOR COMPONENTS

1) ENGINE

Item	Unit	Specification
Model	-	Benz 6R 1000 C30
Type	-	4 cycle turbocharged and inter cooled 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
Cylinder bore X stroke	mm (in)	110 × 135 mm (4.33" × 5.31")
Piston displacement	cc (cu in)	7700 (470)
Compression ratio	-	17.5 : 1
Rated gross horse power	hp/rpm	285/2200
Maximum gross torque at rpm	kgf · m/rpm	117/1400
Engine oil quantity	ℓ (U.S.gal)	26 (6.9)
Dry weight	kg (lb)	723 (1594)
High idling speed	rpm	2200
Low idling speed	rpm	600
Rated fuel consumption	g/ps.hr	165
Starting motor	V-kW	DENSO, 24-7.5
Alternator	V-A	24-70
Battery	V-AH	24-100

2) MAIN PUMP

Item	Unit	Specification
Type	-	Axial piston variable pump
Capacity	cc/rev	74+74
Maximum operating pressure	bar	300
Rated speed (Max/Min)	rpm	2550/500

3) MAIN CONTROL VALVE

Item	Unit	Specification
Type	-	Sectional
Operating method	-	Hydraulic pilot
Main relief valve pressure	bar	240/165
Flow capacity	lpm	400

4) STEERING UNIT

Item	Unit	Specification
Type	-	Load sensing/Non load reaction/Dynamic signal
Capacity	cc/rev	520
Rated flow	lpm	45.4

5) POWER TRAIN DEVICES

Item			Specification
Torque converter	Model		W340, 1.773/271 (ZF SACH)
	Type		3 Element, 1 stage, 2 phase
	Stall ratio		1.773 : 1
Transmission	Type		Full auto, power shift
	Gear shift(FWD/REV)		3/3
	Adjustment		Electrical single lever type
	Overhaul ratio	FR	1 : 5.683 2 : 2.304 3 : 0.963
		RR	1 : 5.041 2 : 2.044 3 : 0.854
Axle	Type		Front-wheel drive type, fixed location
	Gear ratio		11.73 : 1
	Gear		Ring & Pinion gear type
Wheels	Q'ty(FR/RR)		Double : 4/2
	Front(drive)		12.00-20-20 PR
	Rear(steer)		12.00-20-20 PR
Brakes	Travel		Front wheel, wet disc brake
	Parking		Axle pinion, hydraulic released caliper brake
Steering	Type		Full hydraulic, power steering
	Steering angle		71.9° to both right and left angle, respectively

3. TIGHTENING TORQUE

NO	Item		Size	kgf · m	lbf · ft
1	Engine	Engine mounting bolt, nut	M24×3.0	100±15	723±109
2		Radiator mounting bolt, nut	M12×1.75	12.8±3.0	93±22
3	Hydraulic system	Hydraulic pump mounting bolt	M12×1.75	12.8±3.0	93±22
4		MCV mounting bolt, nut	M12×1.75	12.8±3.0	93±22
5		Steering unit mounting bolt	M10×1.5	6.9±1.4	50±10
6		Tilt cylinder; rod-end bolt, nut	M14×2.0	19.6±4.0	142±28.9
7	Power train system	Transmission mounting bolt, nut	M20×2.5	100±15	723±109
8		Torque converter mounting bolt	M10×1.5	4.5±0.6	32.5±4.3
9		Drive axle mounting bolt, nut	M24×3.0	100±15	723±109
10		Steering axle mounting bolt, nut	M24×3.0	100±15	723±109
11		Front wheel mounting nut	M22×1.5	84±12	608±87
12		Propeller shaft(To T/M)	M12×1.5	15±2	109±14.5
		Propeller shaft(To D/Axle)	M12×1.75	12.3±2.5	89±18
13	Others	Counterweight mounting bolt 1	M30×3.5	199±29.9	1439±216
		Counterweight mounting bolt 2	M24×3.0	100±15	723±109
14		Operator's seat mounting nut	M 8×1.25	3.4±0.7	24.6±5
15		Cab mounting nut	M16×2.0	29.7±4.5	215±32
16		Mast mounting bolt	M14×2.0	19.6±2.9	144±23

1. ENGINE SYSTEM

Trouble symptom	Probable cause	Remedy
The drive pinion does not turn or turns too slowly.	· The battery is not sufficiently charged. · The connecting cable to the starter motor is loose. · The earth connection to the battery is loose. · The starter motor solenoid switch is faulty or the starter motor is faulty.	· Charge the battery. · Tighten the cable on the terminal. If necessary, solder on a new terminal. · Tighten the cable on the terminal. If necessary, solder on a new terminal. · Have it checked at a qualified specialist workshop.
The engine does not start or stalls again immediately.	· The fuel tank is empty. · The fuel filter is blocked. · The fuel prefilter contains water. · The fuel prefilter is blocked. · Leaks or insufficient pressure in the low-pressure fuel circuit	· Refill the fuel tank. · Replace the filter element. · Drain the fuel prefilter. · Replace the filter element. · Check for leaks (visual check), replace the seals if necessary. · Have the fuel pressure tested at a qualified specialist workshop. Replace the seals.
Engine fails to start when the ambient temperature is low.	· The fuel is not resistant to cold. The flow properties of the diesel fuel are inadequate due to paraffin separation. · The engine oil viscosity is incorrect.	· Malfunctions resulting from paraffin separation can be corrected by warming the entire fuel system, e.g. by parking the vehicle in a heated area. · Refuel with winter fuel. · Alter the engine oil viscosity to the conditions of use. · If the engine does not start after another attempt, have the cause traced and rectified at a qualified specialist workshop.
The engine stops inadvertently.	· The power supply to the engine management (MCM) or the exhaust gas aftertreatment (ACM) control modules is interrupted or there is a short circuit in the wiring. · Leaks or insufficient pressure in the low-pressure fuel circuit.	· Check the electrical fuses · Have the power supply checked at a qualified specialist workshop. · Carry out a check for leaks (visual check). · Have the fuel pressure tested at a qualified specialist workshop.
The engine is in emergency running mode.	· There is an interruption to the control units' data flow.	· Check the connectors on the control units for secure seating and corrosion. · Read out the control unit's fault memory. · Have it checked at a qualified specialist workshop.

Trouble symptom	Probable cause	Remedy
The engine surges, vibrates or runs irregularly.	· There is a malfunction in the fuel system.	· Carry out a check for leaks (visual check). · Read out the control unit's fault memory. · Have it checked at a qualified specialist workshop.
The engine's output is poor (lack of power).	· The air filter is dirty or blocked. · The charge-air temperature is too high; the charge-air cooler or radiator is dirty on the exterior. · The coolant temperature is too high. · Malfunction in the fuel system (blocked, leaking). · Poor fuel grade · The charge-air system is leaking; the hose clip on the charge-air hose is loose or damaged. · An operating restriction is activated due to an emissions-relevant malfunction.	· Replace the air filter element. · Clean the exterior of the charge-air cooler and radiator. · Check the temperature sensor; replace if necessary. Check the fan speed. · Check the thermostat and replace as necessary. Consult a qualified specialist workshop. · Visual inspection for leaks · Consult a qualified specialist workshop. · Use the specified type of fuel and fuel grade. · Check the charge-air system for leaks. · Check the charge-air pressure sensor and, if necessary, replace. · Consult a qualified specialist workshop. · Observe information on the warning and indicator lamps.
There is an interruption in the tractive power.	· There is an increased voltage drop to the control units (loose contact).	· Check the battery terminals on the battery and the connectors on the control units for secure seating and corrosion.
The engine braking effect is poor.	· The cause must be established in a qualified specialist workshop.	· Consult a qualified specialist workshop.
Fuel consumption is too high.	· The cause must be established in a qualified specialist workshop.	· Consult a qualified specialist workshop.
The engine gets too hot (according to the coolant temperature gauge).	· There is not enough coolant in the cooling system. · The coolant temperature sensor or display is faulty. · The poly-V-belt is damaged. · The fan does not switch on correctly. · The radiator is dirty on the inside; the radiator is very dirty on the outside. · The thermostat is faulty.	· Add and bleed the coolant. · Replace the sensor or display. · Replace the poly-V-belt. · Consult a qualified specialist workshop. · Clean the radiator. · Check and replace as necessary. · Consult a qualified specialist workshop.

Trouble symptom	Probable cause	Remedy
Indicator lamps do not light up at IGNITION ON.	· The lamps are faulty or the electrical cables are interrupted.	· Consult a qualified specialist workshop.
The charge current indicator lamp lights up when the engine is running.	· The poly-V-belt is slipping. · The poly-V-belt is torn. · The alternator or sensor is faulty.	· Check the belt tensioner function. · Check that the poly-V-belt contact surfaces are not torn, damaged, oily or glazed. Replace the poly-V-belt if necessary. · Replace the poly-V-belt. · Check the alternator or sensor. · Consult a qualified specialist workshop.
The engine is "knocking".	· The engine is misfiring.	· Consult a qualified specialist workshop.
The engine is "knocking".	· There is bearing damage.	· Consult a qualified specialist workshop.
There are abnormal sounds.	· The air intake pipe and exhaust gas pipe are leaking, causing a whistling noise. · The turbine or compressor wheel is scraping the housing; there are foreign objects in the compressor or turbine housing; bearings have seized on the rotating parts. · The valve clearance is excessive. · The poly-V-belt is slipping.	· Rectify the cause of the leak and, if necessary, replace gaskets. · Have the exhaust gas turbocharger checked at a qualified specialist workshop. · Check and adjust the valve clearance. · Check that the poly-V-belt contact surfaces are not torn, damaged, oily or glazed. Replace the poly-V-belt if necessary.

2. ELECTRICAL SYSTEM

Trouble symptom	Probable cause	Remedy
Lamps dimming even at maximum engine speed.	· Faulty wiring.	· Check for loose terminal and disconnected wire.
Lamps flicker during engine operation.	· Improper belt tension.	· Adjust belt tension.
Charge lamp does not light du-ring normal engine operation.	· Charge lamp defective. · Faulty wiring.	· Replace. · Check and repair.
Alternator makes abnormal sounds.	· Alternator defective.	· Replace
Starting motor fails to run.	· Faulty wiring. · Insufficient battery voltage.	· Check and repair. · Recharge battery.
Starting motor pinion repeats going in and out.	· Insufficient battery voltage.	· Recharge battery.
Excessively low starting motor speed.	· Insufficient battery voltage. · Starting motor defective.	· Recharge battery. · Replace
Starting motor comes to a stop before engine starts up.	· Faulty wiring. · Insufficient battery voltage.	· Check and repair. · Recharge battery.
Heater signal does not become red.	· Faulty wiring. · Glow plug damaged.	· Check and repair. · Replace
Engine oil pressure caution lamp does not light when enigne is stopped (with starting switch left in"ON" position).	· Caution lamp defective. · Caution lamp switch defective.	· Replace · Replace

3. TORQUE FLOW SYSTEM

Trouble symptom	Probable cause	Remedy
1. Excessive oil temperature rise		
1) Torque converter	· Improper oil level.	· Check oil level. Add or drain oil as necessary.
	· Impeller interfering with surroundings.	· After draining oil from oil tank and transmission, check and replace interfering parts.
	· Stator and free wheel malfunctioning.	· Check engine (stalling) speed. If necessary, replace.
	· Air sucked in.	· Check the inlet side joint or pipe. If necessary, retighten joint or replace gasket.
	· Water intruding into transmission case.	· Check drained oil. If necessary, change oil.
	· Bearing worn or seizing.	· Disassemble, inspect, repair or replace.
	· Gauge malfunctioning.	· Check and, if necessary, replace.
2) Transmission	· Clutch dragging.	· Check to see whether or not machine moves even when transmission is placed in neutral position. If so, replace clutch plate.
	· Bearing worn or seized.	· Disassemble, check and replace.
2. Noise operation		
1) Torque converter	· Cavitation produced.	· Change oil, replace parts leaking air.
	· Flexible plate damaged.	· Listen to rotating sound at lowspeed operation. If necessary, replace flexible plate.
	· Bearing damaged or worn.	· Disassemble, check and replace.
	· Gear damaged.	· Disassemble, check and replace.
	· Impeller interfering with surroundings.	· Check impeller or check drained oil for mixing of foreign matter. If necessary, change oil.
	· Bolt loosening.	· Disassemble and check. If necessary, retighten or replace.
	· Spline worn.	· Disassemble, check and replace.
	· Noise gear pump operation.	· Disassemble, check and replace.
2) Transmission	· Dragging caused by seizing clutch.	· Check to see whether or not machine moves even when transmission is in neutral position. If so, replace clutch plate.
	· Bearing worn or seizing.	· Disassemble, check and replace
	· Gear damaged.	· Disassemble, check and replace
	· Bolt loosening.	· Disassemble, check and retighten or replace
	· Spline worn.	· Disassemble, check and replace

Trouble symptom	Probable cause	Remedy
3. Low output power		
1) Torque converter	· Insufficient hydraulic pressure :	
	- Low oil level.	- Check oil level and add oil
	- Air sucked in.	- Check joints and pipes. If necessary, retighten joint or replace packing.
	- Oil filter clogging.	- Check and replace
	- Oil pump worn. (Low delivery flow)	- Check oil pressure. If necessary replace pump.
	- Regulator valve coil spring fatigued.	- Check spring tension. If necessary, replace.
	- Control valve spool malfunctioning.	- Disassemble, check and repair or replace.
	- Piston or O-ring worn.	- Disassemble, check measure and replace.
	· Stator free wheel cam damaged.	- Check stalling speed. (Increased engine load will cause excessive drop of stalling speed.)
		- Check oil temperature rise. If any, replace free wheel.
2) Transmission	· Flexile plate deformed	· Replace flexible plate
	· Stator free wheel seizing.	- Check temperature plate. (No-load will cause temperature rise)
		- Replace free wheel if a drop of starting output is found.
	· Impeller damaged for interfering with the surroundings.	- Check drained oil for foreign matter. If any, change oil.
	· Use of poor quality of oil or arising of air bubbles.	- Check and change oil.
	- Air sucked in from inlet side.	- Check joints and pipes. If necessary, retighten joint or replace packing.
	- Low torque converter oil pressure accelerates generation of air bebbles.	- Check oil pressure.
	- Oil mixing with water.	- Check drained oil and change oil.
	- Inching rod out of adjustment.	- Check and adjust.
	· Clutch slipping	
	- Lowering of weight.	- Check oil pressure.
	- Piston ring or O-ring worn.	- Disassemble, check, measure and replace.
	- Clutch piston damaged.	- Disassemble, check and replace.
	- Clutch plate seizing or dragging.	- Check to see whether or not machine moves even when transmission is in neutral position. If so, replace.

Trouble symptom	Probable cause	Remedy
4. Unusual oil pressure		
1) Oil pressure is high	· Control valve malfunctioning.	(1)Check for spool operation. If necessary, replace valve. (2)Check for clogging of small hole in valve body. If necessary, clean or repair.
	· Cold weather. (high oil viscosity)	· When atmospheric temp is below freezing point (when normal oil pressure is recovered if heated to 60~80˚C), change oil.
	· Use of improper oil.	· Check and change oil.
2) Oil pressure is low	· Gear pump malfunctioning (worn).	· Disassemble, check and replace.
	· Oil leaks excessively : (1) Control valve oil spring defective.	· Check spring tension (see spring specification). If necessary replace.
	(2) Control valve spool defective.	· Disassemble, check, and repair or replace valve.
	· Air sucked in.	· Check joints and pipes. If necessary, retighten joint or replace packing.
	· Low oil level.	· Check oil level and add oil.
	· Oil filter clogging.	· Check and replace.
3) Transmission	· Oil leaks excessively.	· Disassemble, check (piston ring and O-ring for wear and other defects), and replace.
5. Power is not transmitted		
1) Torque converter	· Clutch plate damaged.	· Check for damage by listening to abnormal sounds at a low converter speed and replace.
	· Low oil level.	· Check oil level and add oil
	· Oil pump driving system faulty.	· Disassemble and check for wear of pump gear, shaft and spline. Replace defective parts.
	· Shaft broken.	· Check and replace.
	· Lack of oil pressure.	· Check oil pump gear for wear and for oil suction force. If necessary, replace pump.
2) Transmission	· Low oil level.	· Check oil level and add oil.
	· Inching valve and link lever improperly positioned.	· Check measure and adjust.
	· Forward/reverse spool and link lever improperly positioned.	· Check and adjust.
	· Clutch fails to disengage : (1) Clutch case piston ring defective.	· Disassemble, check and replace
	(2) Main shaft plug slipping out.	· Disassemble, check and repair or replace
	· Clutch seizing.	· Check to see whether or not machine moves even then transmission is in neutral position. If so, replace.
	· Shaft broken off.	· Disassemble, check(main shaft, etc.), and replace.
	· Clutch drum damaged (spring groove).	· Disassemble, check and replace.
	· Clutch snap ring broken.	· Disassemble, check and repair or replace.

Trouble symptom	Probable cause	Remedy
5. Power is not transmitted (Continue)	· Foreign matter intruding into oil passage to clutch. · Shaft spline worn.	· Disassemble, check and repair or replace. · Disassemble, check and replace.
6. Oil leakage (Transmission and torque converter)	· Oil leaks from oil seal.	· Disassemble and check for wear of seal lips and mating sliding surfaces (pump boss, coupling etc.) Replace oil seal, pump boss, coupling, etc.
	· Oil leaks from case joining surfaces.	· Check and retighten or replace packing.
	· Oil leaks from joint or pipe.	· Check and repair or replace gasket.
	· Oil leaks from drain plug.	· Check and retighten or gasket.
	· Oil leaks from a crack.	· Check and replace cracked part.

4. STEERING SYSTEM

Trouble symptom	Probable cause	Remedy
1. Steering wheel drags.	· Low oil pressure. · Bearing faulty. · Spring spool faulty. · Reaction plunger faulty. · Ball-and-screw assembly faulty. · Sector shaft adjusting screw excessively tight. · Gears poorly meshing. · Flow divider coil spring fatigued.	· Check locknut. Repair. · Clean or replace. · Clean or replace. · Replace. · Clean or replace. · Adjust. · Check and correct meshing. · Replace.
2. Steering wheel fails to return smoothly.	· Bearing faulty. · Reaction plunger faulty. · Ball-and-screw assy faulty. · Gears poorly meshing.	· Clean or replace. · Replace. · Clean or replace. · Check and correct meshing.
3. Steering wheel turns unsteadily. Steering system makes abnormal sound or vibration.	· Locknut loosening. · Metal spring deteriorated. · Gear backlash out of adjustment. · Air in oil circuit.	· Retighten. · Replace. · Adjust. · Bleed air.
4. Abnormal sound heard when steering wheel is turned fully	Valve · Faulty. (Valve fails to open.) Piping · Pipe (from pump to power steering cylinder) dented or clogged.	· Adjust valve set pressure and check for specified oil pressure. · Repair or replace.
5. Piping makes abnormal sounds.	Oil pump · Lack of oil. · Oil inlet pipe sucks air. · Insufficient air bleeding.	· Add oil. · Repair. · Bleed air completely.
6. Valve or valve unit makes abnormal sounds.	Oil pump · Oil inlet pipe sucks air. Valve · Faulty. (Unbalance oil pressure) Piping · Pipe (from pump to power steering) dented or clogged. · Insufficient air bleeding.	· Repair or replace. · Adjust valve set pressure and check specified oil pressure. · Repair or replace. · Bleed air completely.
7. Insufficient or variable oil flow.	· Flow control valve orifice clogged.	· Clean.
8. Insufficient or variable discharge pressure.	Piping · Pipe (from tank to pipe) dented or clogged.	· Repair or replace.

5. BRAKE SYSTEM

Trouble symptom	Probable cause	Remedy
1. Insufficient braking force	· Hydraulic system leaks oil. · Hydraulic system leaks air. · Disk worn. · Brake valve malfunctioning · Hydraulic system clogged	· Repair and add oil. · Bleed air. · Replace · Repair or replace. · Clean.
2. Brake acting unevenly. (Truck is turned to one side during braking.)	· Tires unequally inflated. · Brake out of adjustment. · Disk surface roughened. · Wheel bearing out of adjustment. · Hydraulic system clogged.	· Adjust tire pressure. · Adjust. · Repair by polishing or replace. · Adjust or replace. · Clean.
3. Brake trailing.	· Pedal has no play. · Piston cup faulty. · Brake valve return port clogged. · Hydraulic system clogged. · Wheel bearing out of adjustment.	· Adjust. · Replace. · Clean. · Clean. · Adjust or replace.
4. Overheat	· Cooling oil insufficient. · Cooling system malfunctioning. · Excessive braking.	· Add. · Repair or replace. · Use engine brake.

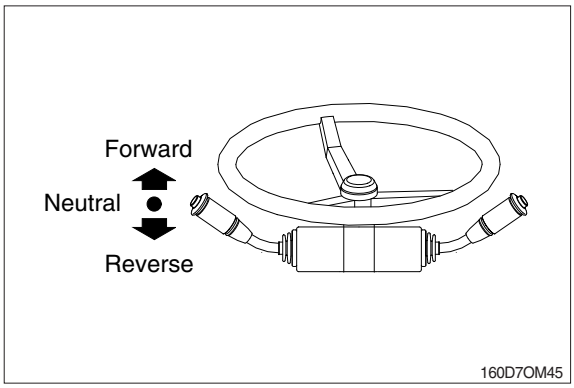
6. HYDRAULIC SYSTEM

Trouble symptom	Probable cause	Remedy
1. Large fork lowering speed.	· Seal inside control valve defective. · Oil leaks from joint or hose. · Seal inside cylinder defective.	· Replace spool or valve body. · Replace. · Replace packing.
2. Large spontaneous tilt of mast.	· Tilting backward : Check valve defective. · Tilting forward : tilt lock valve defective. · Oil leaks from joint or hose. · Seal inside cylinder defective.	· Clean or replace. · Clean or replace. · Replace. · Replace seal.
3. Slow fork lifting or slow mast tilting.	· Lack of hydraulic oil. · Hydrauic oil mixed with air. · Oil leaks from joint or hose. · Excessive restriction of oil flow on pump suction side. · Relief valve fails to keep specified pressure. · Poor sealing inside cylinder. · High hydraulic oil viscosity. · Mast fails to move smoothly. · Oil leaks from lift control valve spool. · Oil leaks from tilt control valve spool.	· Add oil. · Bleed air. · Replace. · Clean filter. · Adjust relief valve. · Replace packing. · Change to SAE10W, class CF engine oil. · Adjust roll to rail clearance. · Replace spool or valve body. · Replace spool or valve body.
4. Hydraulic system makes abnormal sounds.	· Excessive restriction of oil flow pump suction side. · Gear or bearing in hydraulic pump defective.	· Clean filter. · Replace gear or bearing.
5. Control valve lever is locked	· Foreign matter jammed between spool and valve body. · Valve body defective.	· Clean. · Tighten body mounting bolts uniformly.
6. High oil temperature.	· Lack of hydraulic oil. · High oil viscosity. · Oil filter clogged.	· Add oil. · Change to SAE10W, class CF engine oil. · Clean filter.

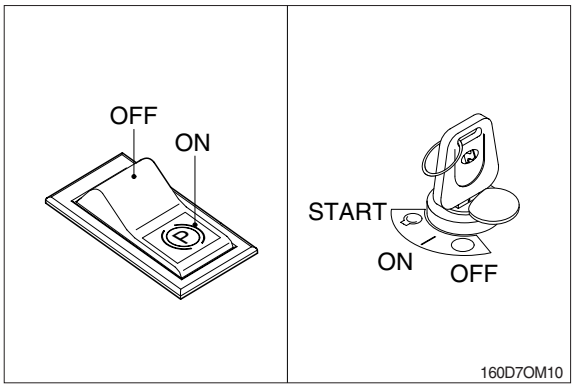
1. ENGINE SYSTEM

1) EASE OF STARTING, NOISE

(1) Set gear shift lever at NEUTRAL.



(2) Turn ON the parking brake switch.
(3) Turn ON start switch, automatically heating operated.
(4) When heater signal lamp goes out, turn key to START, and start engine.
※ **When engine starts, check if it starts smoothly, and if it makes any abnormal noise.**

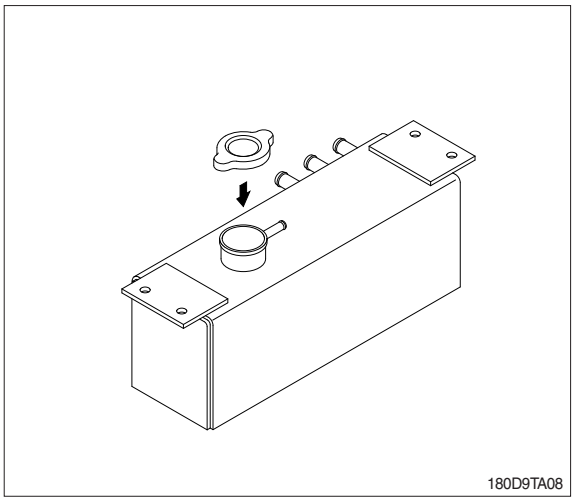


2) WHEN ACCELERATOR PEDAL IS DEPRESSED

(1) Check that accelerator pedal does not catch when depressed.
(2) Check that engine speed increases in accordance with amount pedal is depressed.
(3) When doing this, check that engine speed changes without gasping, abnormal noise, abnormal explosions, or irregular vibration.
(4) Check that exhaust gas is colorless when the engine is idling, and a thin black color when accelerator pedal is depressed.
(5) Set height of stopper bolt according to following table, then adjust with accelerator rod on trucks and stopper bolt so that engine speed is within specified range when accelerator pedal is fully depressed.
(6) Max speed : SEE SECTION 8. SPECIFICATIONS

3) RADIATOR CAP

(1) Push pressure regulator spring with finger and check that tension is correct.
(2) Pull negative pressure valve, and check that it is closed when released.
(3) If packing is damaged, replace whole radiator cap assembly.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4) FUEL FILTER

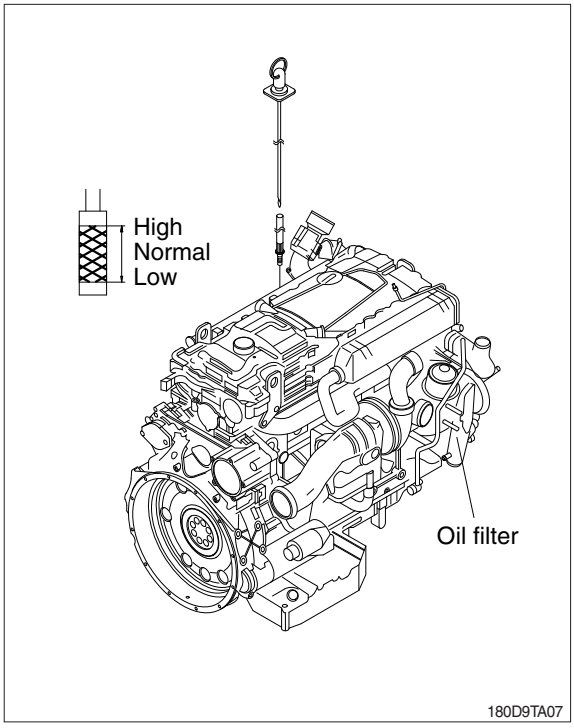
(1) The fuel filter element cannot be inspected from the outside, so replace it periodically (refer to page 7-26).
Always use HYUNDAI Forklift genuine parts when replacing the element. After replacing the element, run the engine and check for oil leakage from the filter mount.

5) ENGINE OIL

(1) Check oil level with dipstick and add oil if necessary.
(2) Check oil for discoloration or deterioration. Change oil if discolored or deteriorated.
(3) Engine oil quantity : See section 8. Specification

6) ENGINE OIL FILTER

The condition of the oil filter element cannot be inspected from the outside so replace the engine oil filter (refer to section 7. Maintenance and lubrication)
Use a filter wrench and remove the whole cartridge assembly.



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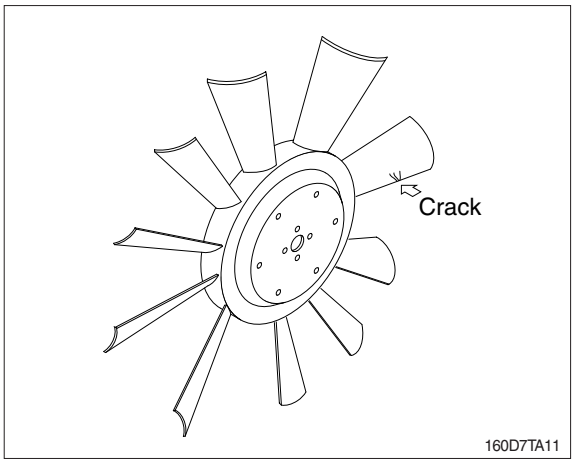
7) FAN

Move fan backwards and forwards by hand to check for looseness.
Tighten mounting bolt with a spanner.



2. DRIVE SYSTEM

1) GEAR SHIFT LEVER

(1) Neutral starting

Engine can be started only when the shifting lever is in neutral position.

(2) Shifting FWD/REV lever

① **Forward**

Push the lever forward then forward solenoid valve operates and oil comes to forward clutch thus the truck will run forward.

② **Reverse**

Pull the lever backward then reverse solenoid valve operates and oil comes to reverse clutch thus the truck will run backward.

2) OIL LEAKAGE

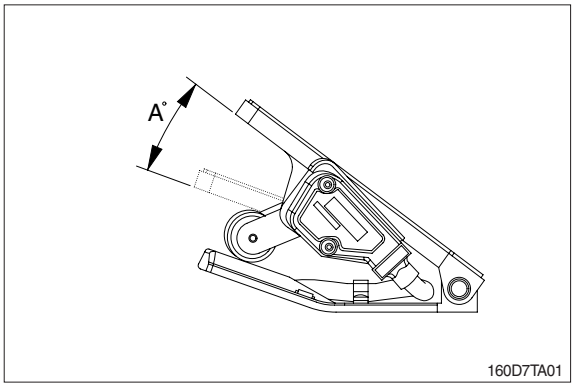
Check that there is no oil leakage from torque converter, transmission or control valve. If oil oozes out and forms drops, replace packing.

3) ADJUSTMENT OF PEDAL

(1) Accelerator pedal

Pedal operation range is "A". If the range is differ much from specification, replace the pedal immediately.

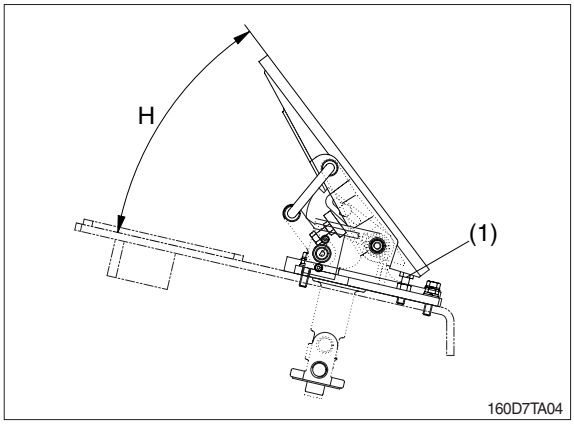
· Pedal angle (A) : 17.5°



(2) Brake pedal

· Adjust stopper bolt (1) so that pedal angle is "H".

· Pedal angle (H) : 35°



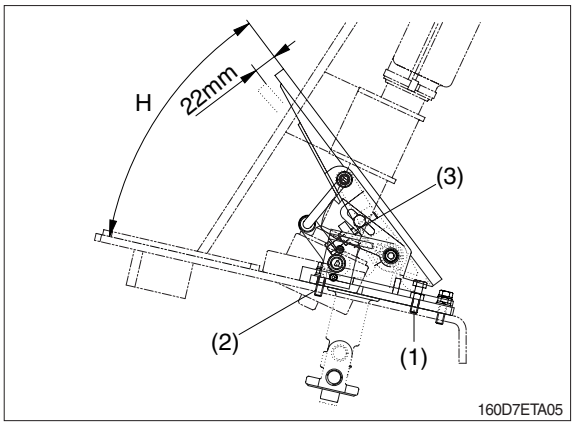
(3) Inching pedal

· Adjust stopper bolt (1) so that pedal angle is "H" (voltage : 1±0.1V).

- Pedal angle (H) : 35°

· When fully pedaled, voltage is controlled to 3.5±0.1 V.

· Adjust bolt (3) so that brake pedal interconnects with inching pedal at inching pedal stroke, 22 mm (0.9 in).



3. TRAVEL SYSTEM

1) TIRES

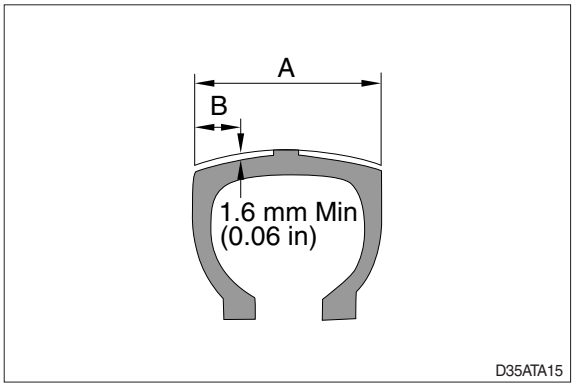
(1) Check tire pressure using tire gauge : SEE page 5-3 CHECK BEFORE STARTING ENGINE.

(2) Check visually for cracks and damage to tread and side wall. If crack or damage is serious, replace tire.

(3) Wear

Measure tread of pneumatic tires(tires with air). Depth of tread must be at least 1.6mm (0.06in) at point 1/4 across width of tread. A/B≒4.

(4) Check tire visually for uneven wear, stepped wear or any other abnormal wear. Check also for pieces stuck in tire.



2) HUB NUTS

Use wrench to check for loose hub nuts.

Tighten any loose hub nuts to specified tightening torque : SEE SECTION 8.SPECIFICATIONS

3) RIM SIDE RING

Check rim side ring for deformation or cracks. Check visually or use crack detection method.

· Rear rim connecting nut torque : SEE SECTION 8.SPECIFICATIONS

4) STEERING AXLE

(1) Push axle in from one side or measure front to rear clearance with feeler gauge. Check that clearance is within 2 mm. If clearance is more than 2 mm, insert shim to reduce clearance to within 0.7 mm.

· Mounting bolt torque : SEE SECTION 8.SPECIFICATIONS

(2) Measure clearance between center pin and bushing. Check that clearance is within 0.5 mm (0.02 in) and that there is an oil groove on the bushing.

5) DRIVE AXLE

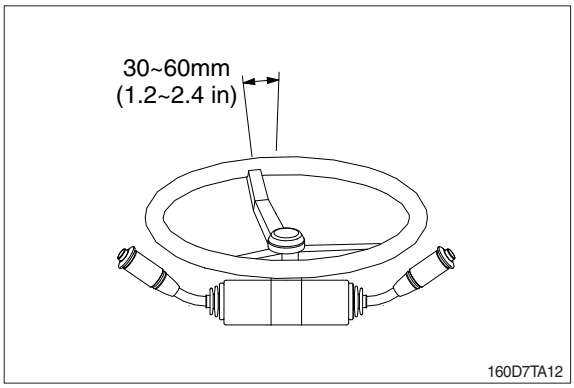
Check that there is no deformation or crack around mounting bolts of front axle and main frame and at welds. Check visually or use crack detection method.

Mounting bolt torque : SEE SECTION 8.SPECIFICATIONS

4. STEERING SYSTEM

1) STEERING WHEEL

Set rear wheels facing straight forward, then turn steering wheel to left and right. Measure range of steering wheel movement before rear wheel starts to move. Range should be 30~60 mm at rim of steering wheel. If play is too large, adjust at gearbox. Test steering wheel play with engine at idling.



2) KNUCKLE

Check knuckle visually or use crack detection method. If the knuckle is bent, the tire wear is uneven, so check tire wear.

3) STEERING AXLE

(1) Put camber gauge in contact with hub and measure camber. If camber is not within 1±0.5°, rear axle is bent.
(2) Ask assistant to drive truck at minimum turning radius.
(3) Fit bar and a piece of chalk at outside edge of counterweight to mark line of turning radius.
(4) If minimum turning radius is not within ±100 mm (±4 in) of specified value, adjust turning angle stopper bolt.