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, overhead guard 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 250hours, each 100 hours and daily service at the same time.

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※ 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 **Severe operation**
Prolonged operating hours or constant usage.

③ **Extreme operation**

- In sandy or dusty locations, such as cement plants, lumber mills, and coal dust or stone crushing sites.
- High-temperature locations, such as steel mills and foundries.
- Sudden temperature changes, such as constant trips from buildings into the open air, or in refrigeration plants.

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 recommend replacement interval.

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

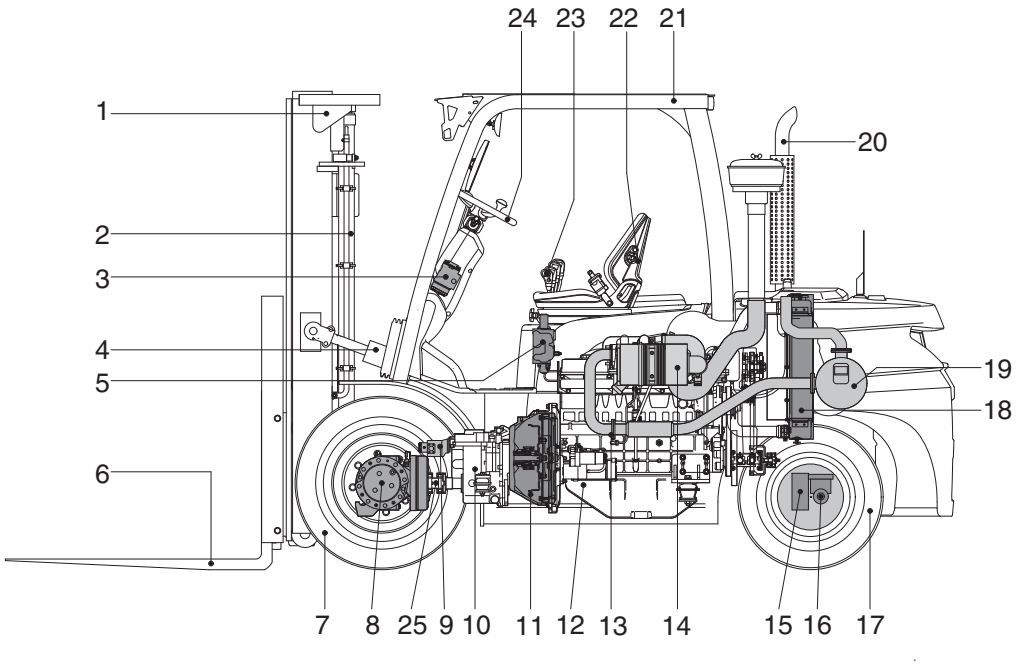
No.	Periodical replacement of safety parts	Interval
1	Fuel hose	Every 2 to 4 years
2	Hydraulic pump hose	Every 2 years
3	Power steering hose	Every 2 years
4	Packing, seal, and O-ring of steering cylinder	Every 2 to 4 years
5	Lift chain	Every 2 to 4 years
6	Lift cylinder hose	Every 1 to 2 years
7	Tilt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

4. PLANNED MAINTENANCE INTERVALS

1) MAJOR COMPONENT LOCATIONS



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1	Mast	10	Transmission	19	Muffler
2	Lift cylinder	11	Torque converter	20	Silencer
3	Steering unit	12	Engine	21	Overhead guard
4	Tilt cylinder	13	Exhaust pipe	22	Seat
5	Control valve	14	Air cleaner	23	Control lever
6	Fork	15	Steering axle	24	Steering wheel
7	Front wheel	16	Steering cylinder	25	Drive shaft
8	Drive axle	17	Rear wheel		
9	Hydraulic pump	18	Radiator		

2) MAINTENANCE CHECK LIST

(1) Every 10 hours service

Check items	Service	Remarks
Visual inspection		
· Brake oil	Check, Add	5-4
· Air cleaner element	Check, Clean	7-19
· Truck for obvious damage and leaks	Check, Repair or Replace	4-1
· Warning plates and decals	Check, Replace	0-5, 3-2, 3-3
· Condition of tires and wheels. Air pressure. Wheel nut	Check, Add or Replace	5-3, 7-16
· Lift chain and fastener	Check, Adjust	7-37, 38
· Carriage or attachment and forks	Check, Repair or Replace	7-14
· Fuel level	Check, Refill	5-12
· Engine oil level	Check, Add	5-4
· Coolant level (Radiator & reservoir tank)	Check, Add	5-4
· Water separator	Check, Clean	5-6
· Hydraulic oil level, air breather filter, return filter	Check, Refill, Clean	5-6
· Fan belt tension and damage	Check, Replace	5-5
· Tilt pin and mast roller	Check	7-37
Function tests		
· Horn and lamp	Check, Repair or Replace	5-6
· Gauges and instrument panel	Check, Repair or Replace	5-6
· Warning light	Check, Repair or Replace	5-6
· Service brake and inching operation	Check, Repair or Replace	7-34
· Parking brake operation.	Check, Repair or Replace	7-34
· Accelerator and engine speed operation	Check, Adjust or Replace	5-15, 10-1
· Directional and speed control operation	Check, Repair or Replace	5-15
· Steering wheel operation	Check, Repair or Replace	5-13
· Noise and vibration	Check, Repair or Replace	5-12

(2) Every 50 hours service

Check items	Service	Remarks
Air cleaner element	Check, Clean	7-19
Water separator	Check, Clean	5-6
Transmission oil level	Check, Add	7-28
Lubrication		
· Steering axle linkage pin	Check, Clean, Lubricate	7-34
· Drive shaft	Check, Lubricate	7-35
Tightening torques		
· Pump mounting bolt torque	Check, Tight	8-4
· Drive axle mounting bolt	Check, Tight	8-4
· Tilt cylinder mounting and yoke bolt	Check, Tight	8-4
· Drive & steering axle wheel mounting bolt & nut	Check, Tight	8-4
· Counterweight mounting bolt	Check, Tight	8-4
· Cabin mounting bolt	Check, Tight	8-4
· Main pump & MCV mounting bolt	Check, Tight	8-4
· Engine & radiator mounting bolt	Check, Tight	8-4
· Transmission mounting bolt	Check, Tight	8-4
· Steering axle mounting bolt	Check, Tight	8-4
· Fuel hose and clamp bands	Check, Tight	

(3) Initial 50 hours service

Check items	Service	Remarks
Engine oil	Change	7-20
Engine oil filter	Replace	7-20

(4) Initial 100 hours service

Check items	Service	Remarks
Differential gear oil	Change	7-28
Transmission oil	Change	7-28
Transmission oil filter	Replace	-

(5) Every 250 hours service

Check items	Service	Remarks
Differential gear oil	Check, Add	7-28
Air breather	Clean	7-28
Radiator hose and clamp bands	Check, Tight	-
Air cleaner element	Clean, Replace	7-19
Fan belt tension	Adjust	5-5
Intake air line	Check	-
Lubrication		
· Lift chain	Check, Lubricate	7-36
· Mast roller	Check, Lubricate	7-36
· Lift cylinder rod end	Check, Lubricate	7-36
· Lift cylinder tube end	Check, Lubricate	7-36
· Tilt cylinder rod end	Check, Lubricate	7-36
· Tilt cylinder tube end	Check, Lubricate	7-36
· Steering cylinder rod end	Check, Lubricate	7-36
· Steering cylinder tube end	Check, Lubricate	7-36
· Attachment option cylinder rod end	Check, Lubricate	7-36
· Attachment option cylinder tube end	Check, Lubricate	7-36
· Steering axle wheel bearing	Check, Lubricate	7-36
· Pedal pivot	Check, Lubricate	7-36

(6) Every 500 hours service

Check items	Service	Remarks
Trunnion bolt	Check, Tight	8-4
Fuel filter	Replace	7-20
Battery	Check, Replace	7-18
★Engine oil and oil filter	Change/Replace	7-20
Fan belt	Replace	5-5
Hydraulic oil return filter	Replace	7-29

★ In case of the hard operating condition or use high sulfur containing fuel above than 0.5% or use low grade of engine oil requires reduced oil change intervals.

(7) Every 1000 hours service

Check items	Service	Remarks
Fuel filter	Change	7-20
Transmission oil & filter	Change	7-28
Differential gear oil	Change	7-28
Brake oil	Replace	-

(8) Every 1500 hours service

Check items	Service	Remarks
Oil separator element	Replace	7-27
PCV valve	Check, Replace	7-27
EGR cooler	Check, Replace	7-26

(9) Every 2000 hours service

Check items	Service	Remarks
Hydraulic oil*1	Replace	7-29
Hyd suction strainer	Replace	7-30
Radiator coolant	Replace	7-29
Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-

*1 Conventional hydraulic oil

(10) Every 5000 hours service

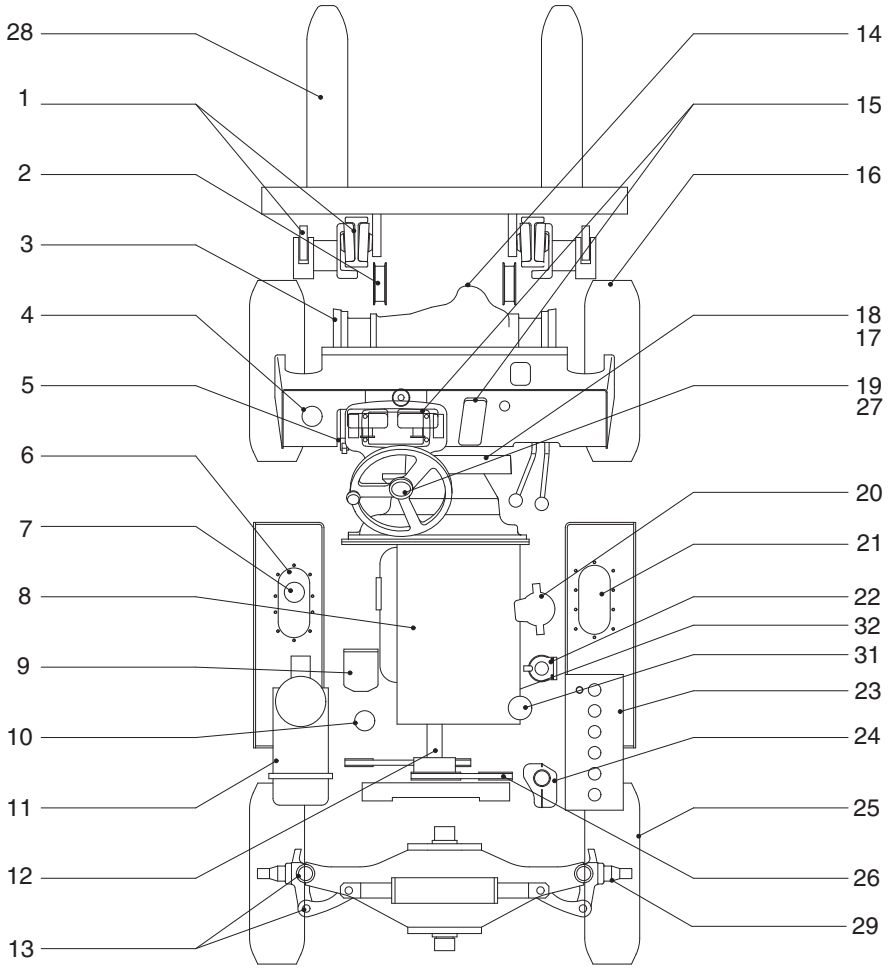
Check items	Service	Remarks
Hydraulic oil*2	Replace	7-29

*2 Hyundai genuine long life hydraulic oil

(11) When required

Check items	Service	Remarks
Fuel system		
· Fuel tank	Drain, Clean	5-12
· Water separator	Drain, Clean	5-6
· Fuel filter	Replace	7-20
Engine lubrication system		
· Engine oil	Replace	7-20
· Engine oil filter cartridge	Replace	7-20
Engine cooling system		
· Coolant	Add, Change	7-21, 35
· Radiator	Clean	7-29
Engine air intake system		
· Air cleaner element	Replace	7-19
Hydraulic tank		
· Hydraulic oil	Add, Replace	7-29
· Hydraulic oil suction strainer	Check, Clean	7-29
· Return oil filter element	Replace	7-29
· Air breather filter	Replace	7-37
Tire air pressure	Check, Refill	5-3

5. MAINTENANCE CHART



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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, please it by a new one.
※ For other details, refer to the service manual.

Service interval	Item No.	Description	Service Action	Oil symbol	Capacity (ℓ)	Service point No.
10 Hours or daily	1	Tilt pin & Mast roller	Check, Add	G	-	2
	2	Lift chain	Check, Add	EO	-	2
	4	Brake oil	Check, Add	BF	0.5	1
	5	Parking brake operation	Check, Adjust	-	-	1
	6	Hydraulic oil level	Check, Add	HO	65	1
	8	Engine oil level	Check, Add	EO	13.2	1
	10	Hyd. tank air breather element	Check, Clean	-	-	1
	15	Pedal linkage operation	Check, Adjust	-	-	1
	16	Drive rim & Tire air pressure	Check, Add	-	-	2
	19	Lamp operation	Check, Replace	-	-	9
	21	Fuel level	Check, Add	DF	116	1
	22	Water separator	Check, Drain	-	-	1
	24	Radiator coolant	Check, Add	C	15	1
	25	Steer rim & Tire air pressure	Check, Add	-	-	2
	26	Fan belt tension	Check, Adjust	-	-	1
	27	Horn operation	Check, Replace	-	-	1
50 Hours or weekly	11	Air cleaner element	Check, Clean	-	-	1
	12	Hydraulic pump drive	Check, Add	G	-	1
	13	Steering axle linkage	Check, Add	G	-	1
	17	Transmission oil level	Check, Add	MO	12	1
Initial 50 Hours	8	Engine oil	Change	EO	13.2	1
	9	Engine oil filter	Replace	-	-	1
Initial 100 Hours	14	Differential gear oil	Change	GO	10.5	1
	17	Transmission oil	Change	MO	12	1
	18	Transmission oil filter	Replace	-	-	1
250 Hours or monthly	1	Tilt pin & Mast roller	Check, Lubricate	G	-	2
	2	Lift chain	Check, Lubricate	EO	-	2
	10	Hyd. tank air breather element	Replace	-	-	1
	14	Differential gear oil	Check, Add	GO	10.5	1
	28	Fork condition and wear	Check, Replace	-	-	2
500 Hours or 3 monthly	3	Trunnion bolt	Check, Adjust	-	-	4
	7	Hydraulic oil return filter	Replace	-	-	1
	8	Engine oil	Change	EO	13.2	1
	9	Engine oil filter	Replace	-	-	1
	11	Air cleaner element	Replace	-	-	1
	20	Fuel filter	Replace	-	-	1
	23	Battery electrolyte	Check, Add	-	-	1 (2)
1000 Hours or 6 monthly	4	Brake oil	Change	BF	0.5	1
	14	Differential gear oil	Change	GO	10.5	1
	16	Brake condition and wear	Check, Replace	-	-	2
	17	Transmission oil	Change	MO	12	1
	18	Transmission oil filter	Replace	-	-	1
	29	Steering axle wheel bearing	Check, Add	G	-	2
1500 Hours	30	PCV valve	Check, Replace	-	-	1
	31	Oil separator element	Replace	-	-	1
	32	EGR cooler	Check, Replace	-	-	1
2000 Hours	6	Hydraulic strainer	Check, Clean	HO	-	1
	6	Hydraulic oil*1	Change	HO	65	1
	24	Radiator coolant	Change	C	15	1
	-	Hoses, fittings, clamps (fuel, coolant, hydraulic)	Check, Retighten, Replace	-	-	-
5000 Hours	6	Hydraulic oil*2	Change	HO	65	1

*1 Conventional hydraulic oil *2 Hyundai genuine long life hydraulic oil

※ Oil symbol

Refer to the recommended lubricants for specification.

DF : Diesel fuel HO : Hydraulic oil EO : Engine oil GO : Gear oil

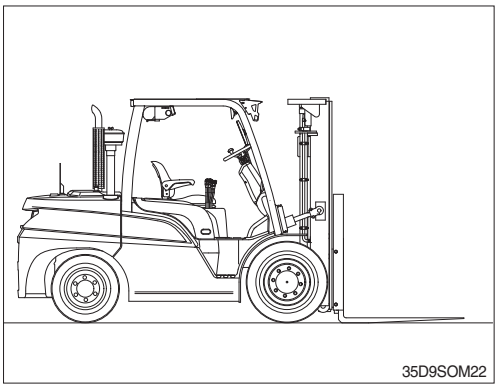
MO : Transmission oil BF : Brake fluid C : Coolant G : Grease

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

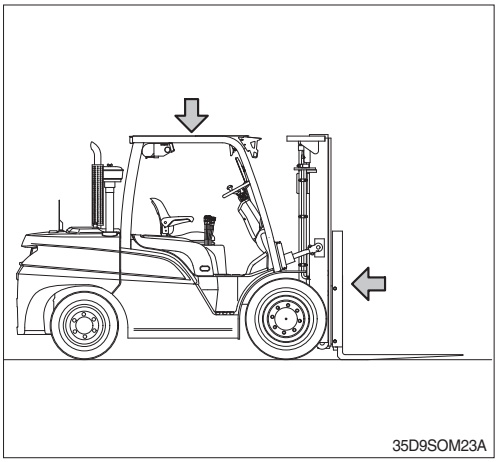
Inspect the truck, before and after starting the engine, for any sign of external leakage of fuel, engine coolant, transmission fluid, etc..

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) OVERHEAD GUARD

Be sure that the driver's overhead guard and any safety devices are in place, undamaged, and attached securely. Check the overhead guard 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.

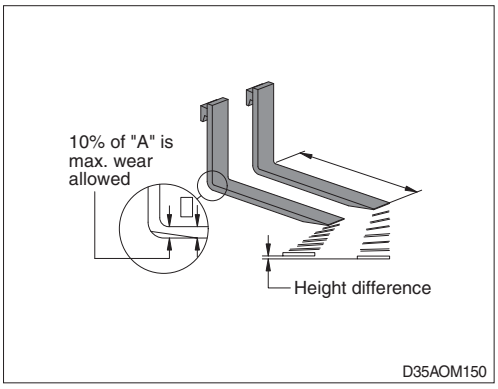
△ **Mast and lift chains require special attention and maintenance to remain in safe operating condition. Refer to lift chain maintenance in this section for additional information.**

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.

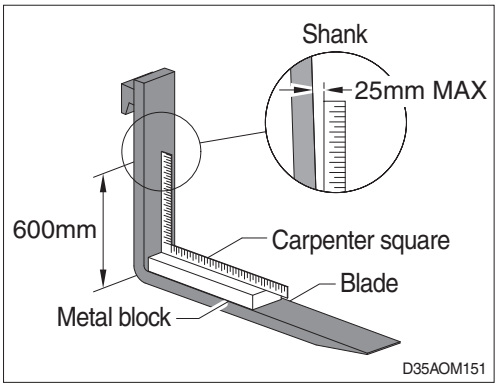
mm

Model	Fork length	Height difference
All models	equal or below 1500	3
	above 1500	4



⚠ 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 50 mm (2 in) thick metal block, at least 100 mm (4 in) wide by 600 mm (24 in) long with parallel sides, on the blade of the fork with the 100 mm (4 in) surface against the blade. Put a 600 mm (24 in) carpenter's square on the top of the block and against the shank. Check the fork 500 mm (20 in) above the blade to make sure it is not bent more than 25 mm (1 in) maximum.

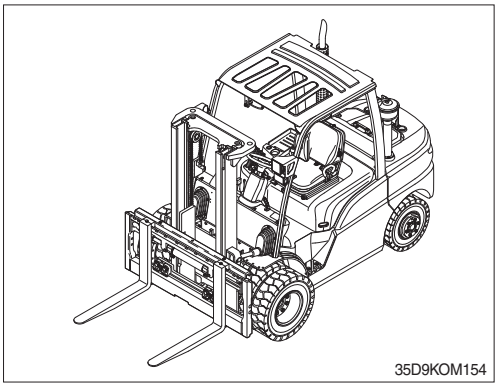


※ **If the fork blades are obviously bent or damaged, have them inspected by a trained maintenance person before operating the truck.**

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

5) SIDE SHIFT

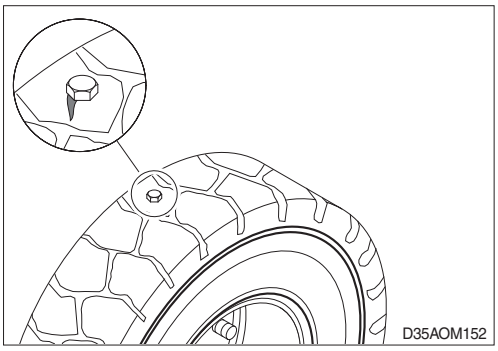
When operating the lever for the side shift and the hanger bar which the forks and the backrest are mounted on it, operator can accurately insert the forks under pallets or stack loads correctly without moving the fork lift.



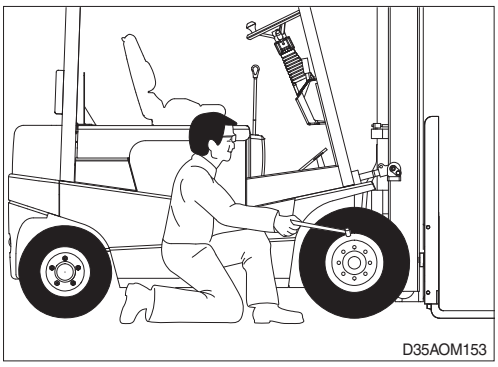
6) WHEEL AND TIRES

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 is 689 kpa (100 psi).

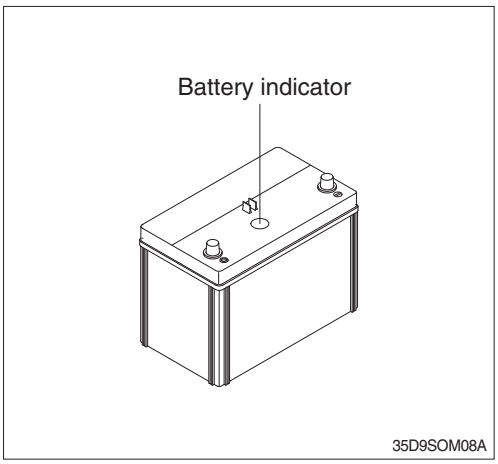


7. REPLACEMENT AND CHECK

1) BATTERY

Check the battery condition per the table below.
Add water, or recharge as shown by the indicator.

Battery condition	Mark	Color
Normal		Green
Insufficient distilled water		White
Insufficient charge		Red



⚠ 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.

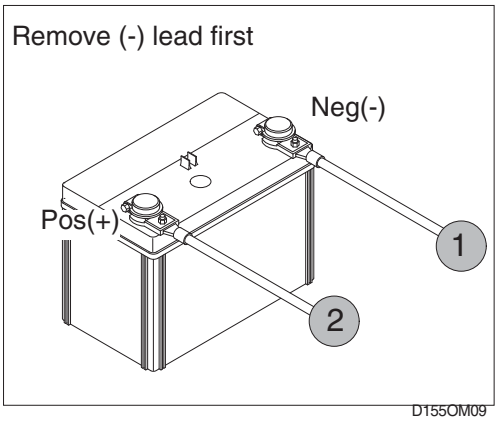
⚠ The electrolyte is sulphuric acid, so it is dangerous. When measuring the specific gravity or temperature of the electrolyte, or when adding distilled water, be careful not to get electrolyte on your skin or clothes. If electrolyte gets on your skin or clothes, wash it off with fresh water immediately. If electrolyte gets in your eyes, wash it out with fresh water and go to a doctor immediately.

(1) Removing and installing

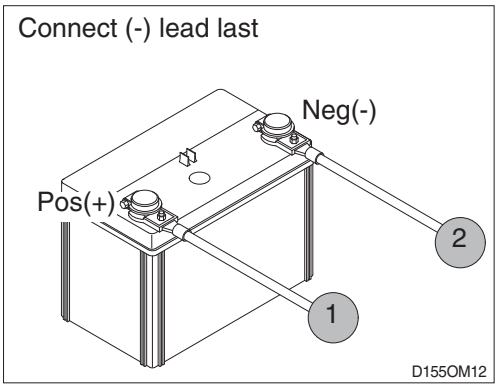
① Remove the lead from the ground side (Normally the (-) terminal side) of the battery. It is dangerous to let a tool, etc., touch the (+) terminal and the body at the same time, since this causes a spark.

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.**



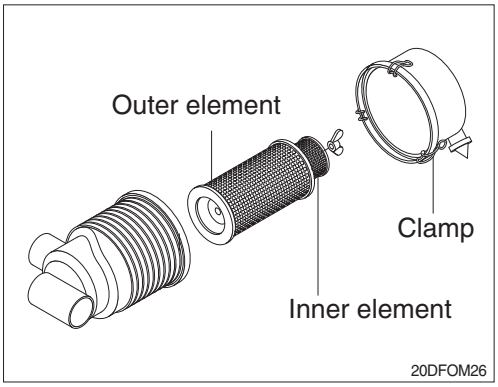
2) AIR CLEANER ELEMENT

(1) Removal

① **Double element type**

Remove the cover by pulling off the clamps, and loosen the wing nut to pull out the outer element.

※ **During periodic service, replace only the outer element. Do not replace the inner element unless damaged.**



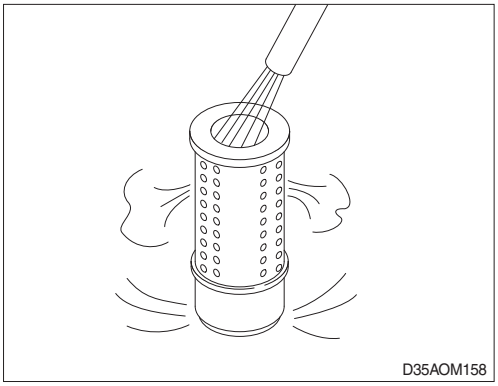
(2) Cleaning

① **Cleaning with compressed air**

Blow dry compressed air (Max 30psi) from inside along pleats. Next blow air form outside along pleats, then blow from inside again and check element.

② **Cleaning with cleaning agent**

If there is grease or carbon on the element, use a special element cleaner, following the instruction given with the cleaner. Have a spare element ready so that the machine can start working again immediately.



※ **Keep clean condition for the air cleaner element all the times.**
A dirty air cleaner could be decreased output power of the engine at worst and it also will be caused to increase fuel consumption and black smoke.

(3) Installation

When installing the element, check that the cleaner housing and element cover are completely in close contact then tighten the nut.

※ Make sure that bottom cap are securely installed. If it is loosely installed, dust will be drawn in and air cleaner will fail to function properly.

⚠ When using compressed air, use safety glasses, face shield and other protective clothes. Never point the air nozzle at anyone. Never clean or replace air cleaner while engine is running.

⚠ OSHA approved eye protection rated for 200kPa(30psi) is required for air cleaning operation.

Replace element if exhaust is black, or if lack of engine power is noted even after cleaning element. When cleaning the element or element housing, cover the air flow outlet port of the housing with a clean cloth or tape to prevent dirt or dust from entering. Do not clean the elements by bumping or tapping them.

3) ENGINE

(1) Check of engine oil level

① Make the engine level.

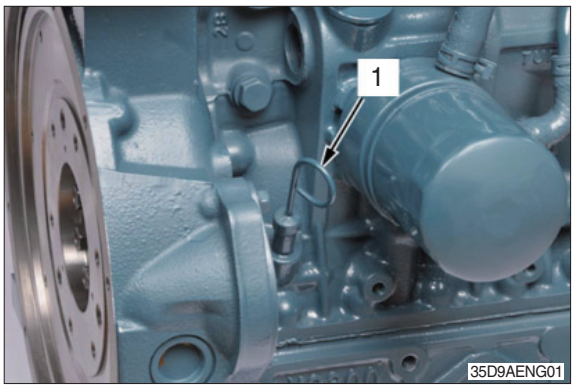
② Pull out the dipstick (1) and clean it. Put in and pull it out again.
Make sure that the oil level is between the 2 notches.

③ If the level is too low, add new oil to the specified level.

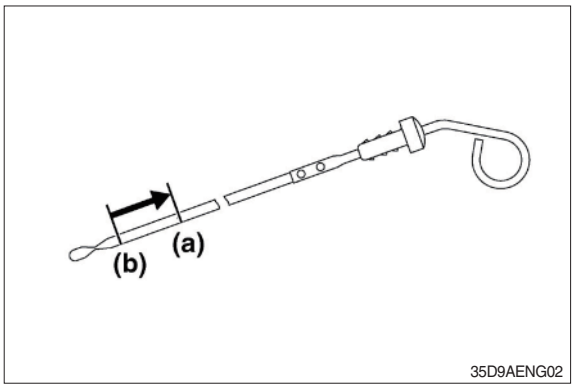
※ When you use an oil of different brand or viscosity from the previous, drain the remaining oil. Do not mix 2 different types of oil.

※ When you examine the engine oil level, make sure that you put it in a level position. If not, you cannot measure oil quantity accurately.

※ Make sure that you keep the oil level between the upper and lower lines of the dipstick.
Too much oil can decrease the output or cause too much blow-by gas.



1 Dipstick

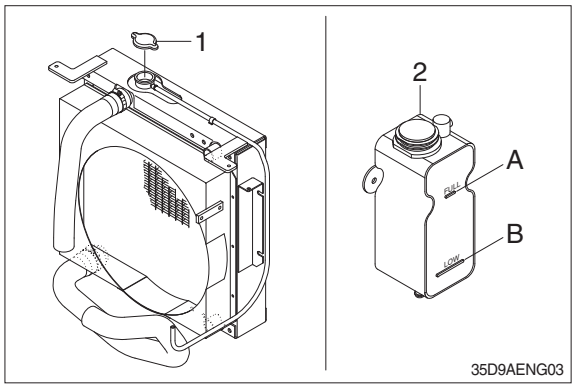


(a) Upper line (b) Lower line

On the closed breather type engine, the port absorbs the mist and too much oil can cause oil hammer. But if the oil level is not sufficient, the moving parts of engine can get a seizure.

(2) Check of coolant level

⚠ Do not remove the radiator cap when the engine is hot.
Then loosen the cap slightly to release unwanted pressure before you remove the cap fully.



1	Radiator cap	A	Full
2	Reservoir tank	B	Low

① Make sure that the coolant level is between Full A and Low B.

② If the coolant level is too low, find out the cause that there is less coolant.

Case 1

If the coolant decreases by evaporation, add only clean and soft water.

Case 2

If the coolant decreases by leak, add coolant of the same manufacturer and brand in the specified mixture ratio (clean, soft water and L.L.C.). If you cannot identify the coolant brand, drain all the remaining coolant and add a new brand of coolant mix.

※ When you add the coolant, release the air from the engine coolant channels. The engine releases the air when it shakes the radiator upper and lower hoses.

※ Make sure that you close the radiator cap correctly. If the cap is loose or incorrectly closed, coolant can flow out and the engine can overheat.

※ Do not use an anti-freeze and scale inhibitor at the same time.

※ Do not mix the different type or brand of L.L.C..

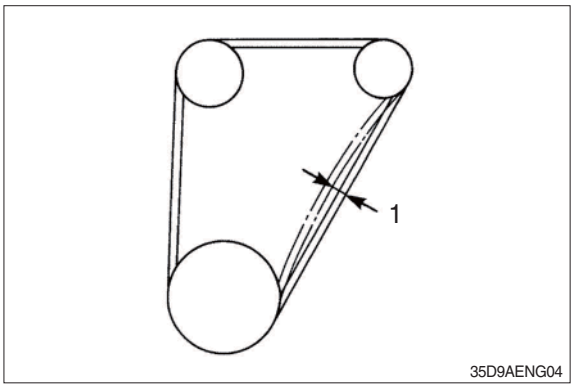
(3) Check of fan belt

① Examine if the fan belt is worn out and sunk in the pulley groove, and if it is, replace it.

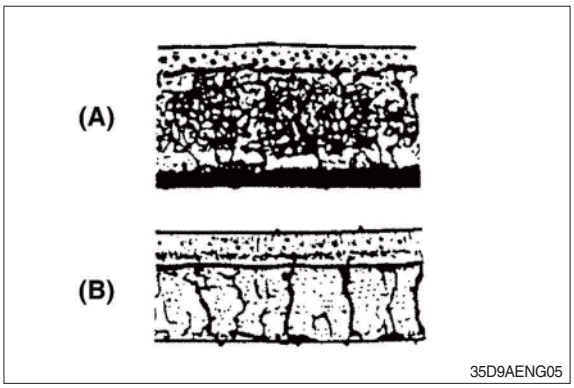
② Push the belt halfway between the fan drive pulley and alternator pulley at a specified force 98 N (10 kgf, 22 lbf) to measure the deflection (1).

③ If the measurement is out of the factory specifications, loosen the alternator mounting screws and adjust its position.

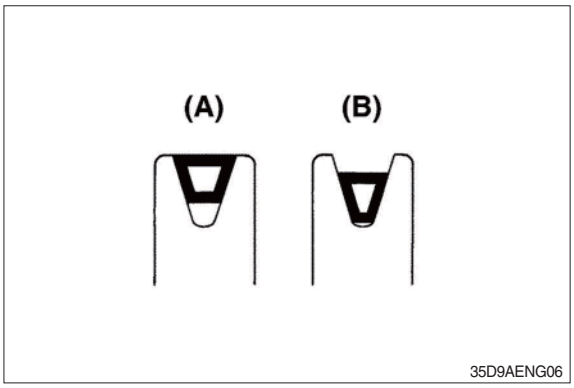
Deflection (1)	Factory specification	10 ~ 12 mm (0.40 ~ 0.47 in)



1 Deflection



(A) OK (B) Wear

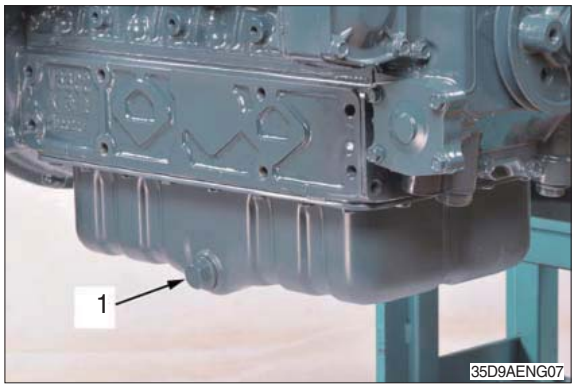


(4) Change of engine oil

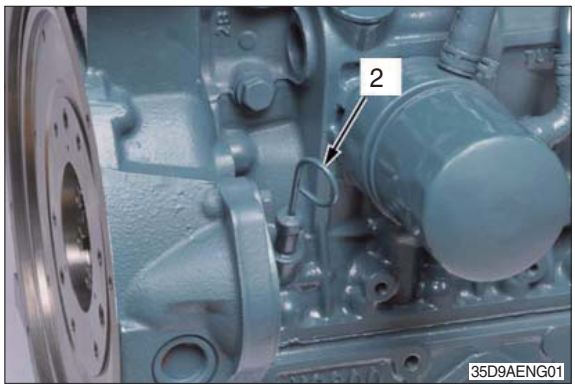
⚠ Make sure that you stop the engine before you change the engine oil.

① Start and warm-up the engine for approximately 5 minutes.
② Put an oil pan below the engine.
③ Remove the drain plug (1) at the bottom of the engine and drain the oil fully.
④ Tighten the drain plug (1).
⑤ Fill new oil until the upper line on the dipstick (2).

※ When you use an oil of different brand or viscosity from the previous, drain the remaining oil.
※ Do not mix 2 different types of oil.
※ Engine oil must have the properties of API classification CI-4. Use the correct SAE engine oil by reference to the ambient temperature.



1 Drain plug



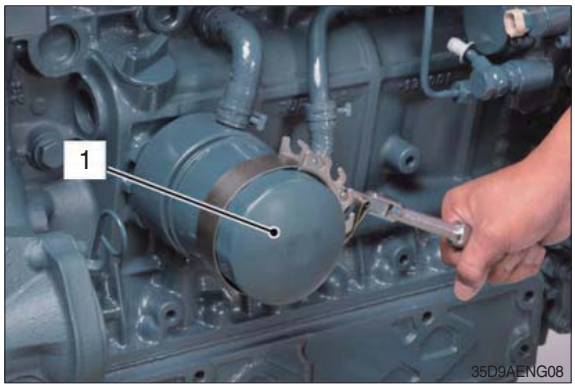
2 Dipstick

(5) Replacement of oil filter cartridge

⚠ Make sure that you stop the engine before you replace the oil filter cartridge.

① Remove the oil filter cartridge (1) with the filter wrench.
② Apply a thin layer of oil on the new cartridge gasket.
③ Install the new cartridge by hand. Do not tighten too much because it can cause deformation of the rubber gasket.
④ After you replace the cartridge, the engine oil usually decrease by a small level. Make sure that the engine oil does not flow through the seal and read the oil level on the dipstick. Fill the engine oil until the specified level.

※ To prevent serious damage to the engine, replacement element must be highly efficient. Use only a Hyundai genuine filter or its equivalent.



1 Oil filter cartridge

(6) Replacement of fuel filter cartridge

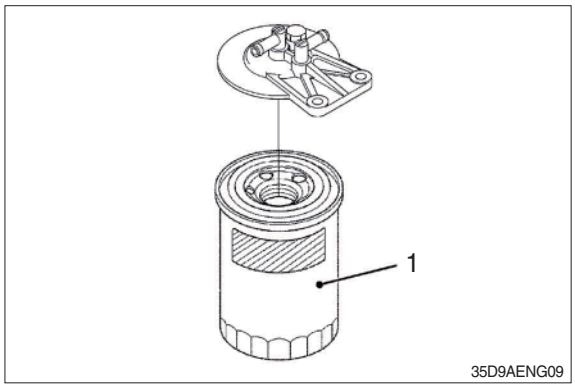
① Remove the fuel filter cartridge (1) with filter wrench.

② Apply a thin layer of fuel to the surface of the new filter cartridge gasket before you put it on.

③ Tighten the new cartridge by hand.

④ Open the fuel valve and bleed the fuel system.

⑤ Operate the engine for a while and check if there is not the fuel leakage from the filter.



1 Fuel filter cartridge

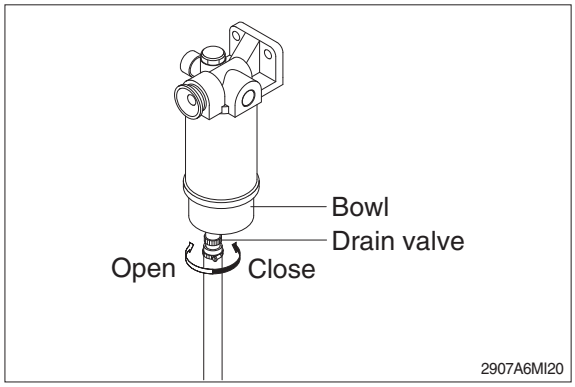
(7) Check and draining of water separator

※ Inspect or drain the collection bowl of water daily and replace the element every 500hours.

① Drain water

a. Open bowl drain valve to evacuate water.

b. Close drain valve.



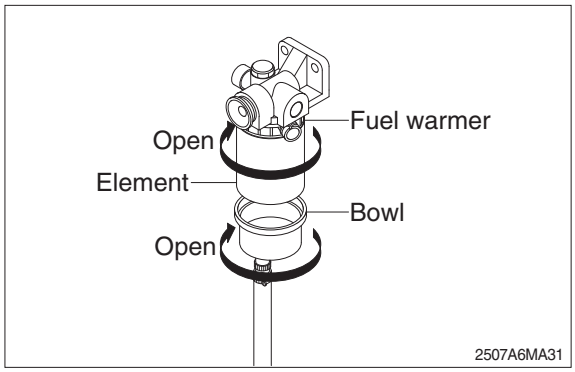
② Replace element

a. Drain the unit of fuel. Follow "Drain water" instructions above.

b. Remove element, fuel warmer and bowl from filter head.

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

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

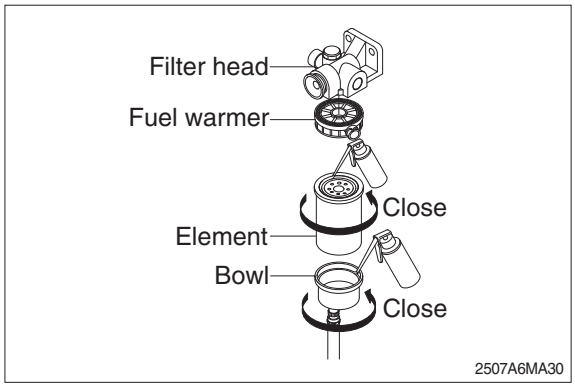


d. Lubricate new bowl seal with clean fuel or motor oil and place in bowl gland.

e. Attach bowl to new element firmly by hand.

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

g. Attach the element, fuel warmer and bowl to the head.



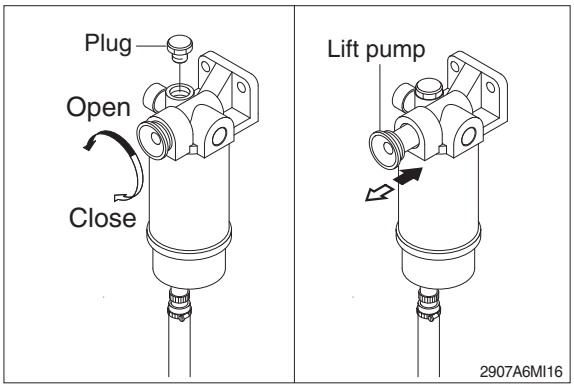
(8) Bleeding the fuel system

① Loosen fuel supply line plug at the outlet of prefilter.

② Do hand-priming the lift pump repeatedly until air bubbles comes out from fuel supply line completely.

③ Tighten fuel supply line to its origin position.

⚠ The fuel pump, high-pressure fuel lines, and fuel rail contain very high-pressure fuel. Do not loosen any fittings while the engine is running. Personal injury and property damage can result. Wait at least 10 minutes after shutting down the engine before loosening any fittings in the high-pressure fuel system to allow pressure to do decrease to a lower level.



(9) Check of EGR cooler

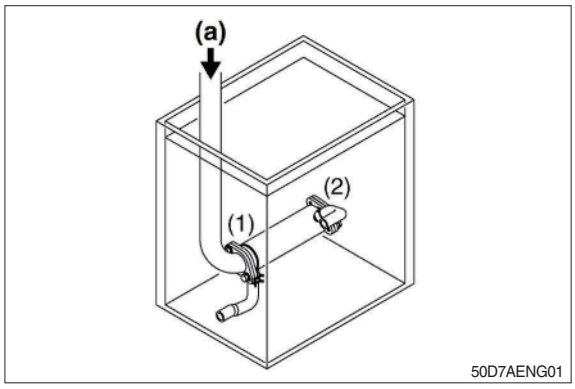
① Exhaust gas passage

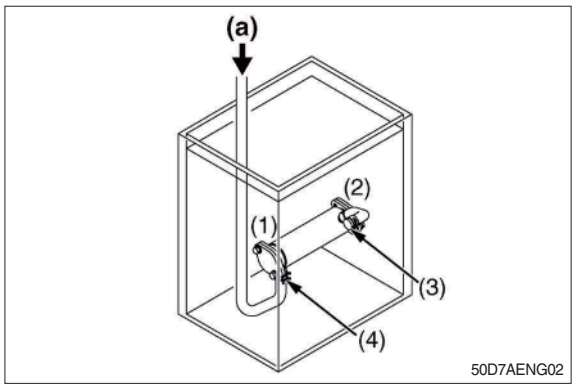
a. Block the EGR cooler exhaust gas outlet (2).
b. Attach an air hose to the EGR cooler exhaust gas inlet (1) and then submerge it in a water tank.
c. Check that the coolant passage is full of water.
d. Apply the specified amount of air pressure (a) (290 kPa, 3.0 kgf/cm2, 43 psi) to the air hose side, and check that there are no air leaks in any of the EGR cooler parts.
e. If there are air leaks, replace the EGR cooler.

② Coolant passage

a. Block the EGR cooler exhaust gas inlet (1), EGR cooler exhaust gas outlet (2), and the coolant outlet (3).
b. Attach an air hose to the EGR cooler coolant inlet (4), and then submerge it in a water tank.
c. Apply the specified amount of air pressure (a) (250 kPa, 2.5 kgf/cm2, 36 psi) to the air hose side, and check that there are no air leaks in any of the EGR cooler parts.
d. If there are air leaks, replace the EGR cooler.

EGR cooler leakage test pressure	Factory specification	Exhaust gas passage	3.0 kgf/cm2 (43 psi)
		Coolant passage	2.5 kgf/cm2 (36 psi)



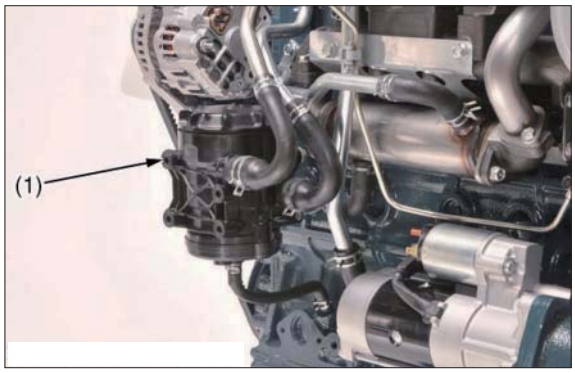


1 Exhaust gas inlet
2 Exhaust gas outlet
3 Coolant outlet
4 Coolant inlet
a Air pressure

(10) Replacement of oil separator element

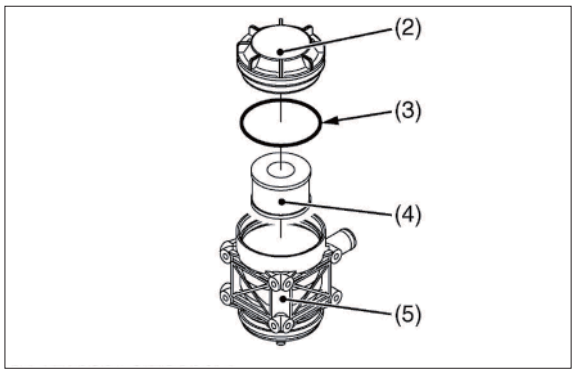
⚠ Be sure to stop the engine before replacement the oil separator element.

① Remove the cover (2).
② Remove the oil separator element (4) and O-ring (3).
③ Replace the oil separator element and O-ring with a new one.



35D9AENG20

1 Oil separator

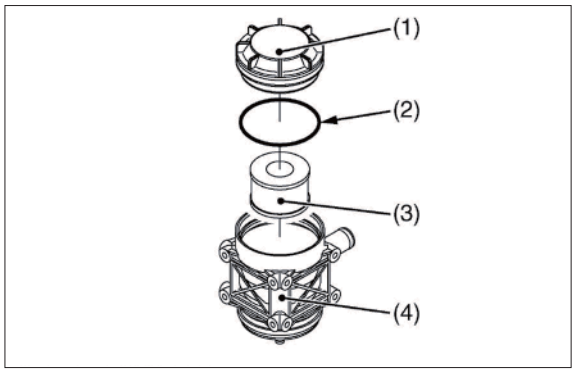


35D9AENG21

2	Cover	3	O-ring
4	Element	5	Body

(11) Check of PCV valve (Positive Crankcase Ventilation)

① Remove the cover (1) and element (3).
② Press on the PCV valve and check that it moves smoothly.
③ If it does not move smoothly, replace the oil separator.



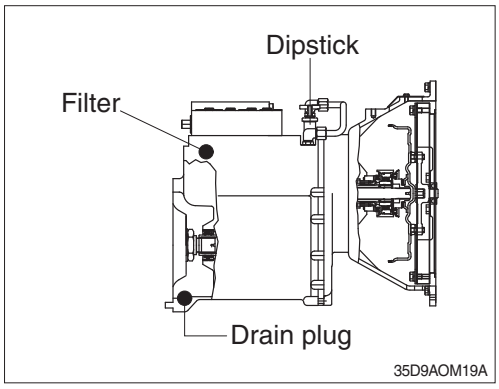
35D9AENG22

1	Cover	2	O-ring
3	Element	4	Body

35D9AENG23

4) TRANSMISSION

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



(1) Transmission oil

Park the truck in a level place and lower the forks. Apply the parking brake. Gear selector in neutral position.

(2) Oil level check

① At engine idling speed.
② Open inspection plate, and oil level can be checked using dipstick.
③ Add oil through oil filler plug if necessary.
④ Always check oil level using dipstick after add oil.

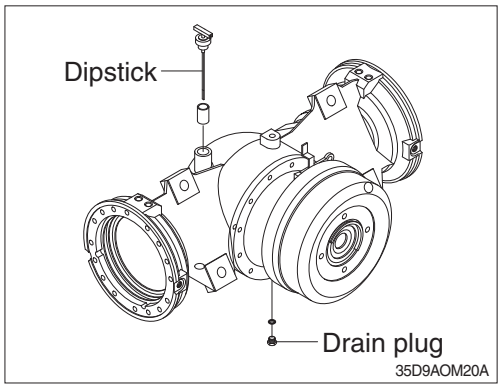
(3) Change

① Remove drain plug.
② When changing oil, remove strainer and clean it with flushing oil.

⚠ OSHA approved eye protection rated for 200 kPa (30 psi) is required for air cleaning operation.

- Blow dry compressed air from the inside of strainer to outside and install when completely dry.
- Dispose of used oil in locally approved manner.

5) DIFFERENTIAL CASE



(1) Differential oil

Park the truck in a level place. Set the mast vertical, and raise the forks approx. 1m. Put blocks under the fork carriage.

Then stop the engine and apply the parking brake.

(2) Oil level check

Remove level plug, and check that oil is filled up to hole.

(3) Change

Change oil after removing drain plug.

Add oil until it just begins to flow out of the oil level.

Dispose of used oil in locally approved manner.

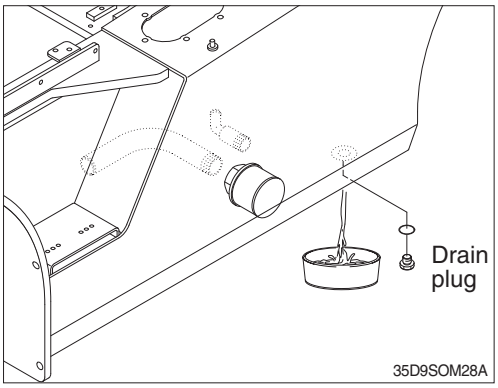
6) HYDRAULIC TANK

(1) Hydraulic oil change

Park the truck in a level place and lower the forks.

Then stop the engine and apply the parking brake.

Change oil after removing drain plug on tank bottom.



(2) Strainer Cleaning

⚠ OSHA-approved eye protection rated for 200 kPa (30 psi) is required for air cleaning operation.

① When changing oil, remove strainer and clean it with flushing oil. Blow dry compressed air from inside of strainer to outside and install when completely dry.
Dispose of oil in locally approved manner.

② Bleed the air after checking the oil level as below;

- Start engine.
- Check for mast overhead clearance.
- Fully raise and lower mast and also fully tilt it forward and backward several times.
- Recheck oil level.

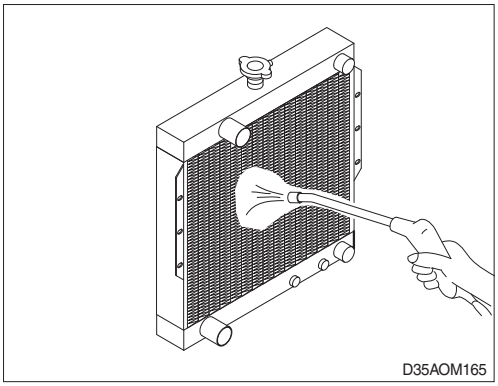
7) COOLING SYSTEM

(1) Radiator fins cleaning

Remove dust between radiator fins with compressed air. Steam or water may be used instead of compressed air. Air pressure should be less than 200 kPa (30 psi). Nozzle of cleaning device should be held about 50 mm (2 in) from radiator fins. Also, check rubber hose connected to radiator. Replace if cracked or deteriorated. Check that hose clamps are tight.

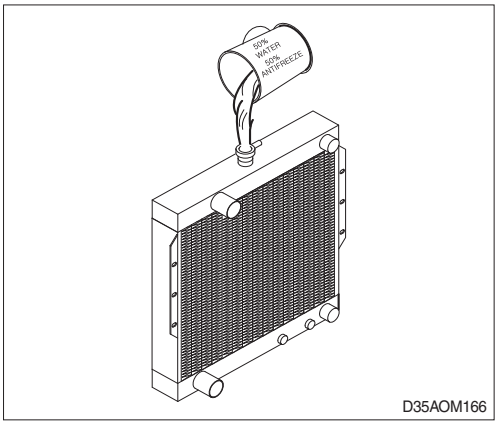
⚠ Be sure to keep air or steam nozzle at right angles to radiator. Wear safety glasses and a face shield when using compressed air.

(2) Radiator Cleaning



① Close drain valves and add clean, soft water (city water, etc.) through water filler. Add radiator cleaner and run the engine at idling speed for 15 minutes.
② Stop engine and drain water from drain valves.
③ Add clean water and run at idling speed (5 to 10 minutes). Then stop the engine and drain water.
④ Close drain valves and fill radiator with clean water.

※ Do not pour cold water in an overheated engine. It can be caused the crack of the engine block due to sudden cooling.



⚠ For low temperatures, add antifreeze. (See cold weather operation for details). When not using antifreeze, add anticorrosive compound. Park truck on level ground and clean radiator.

※ Replace the coolant from time to time to clean up the cooling system so that it can prevent the engine from overheating problem and always keep the specified level for the coolant.

※ Dispose of used antifreeze mixture in locally approved manner.

8) TIRE REPLACEMENT

① Park the truck in a safe and level place suitable for changing the tire. Then lower the forks, stop the engine, and apply the parking brake.

⚠ 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 personal using the correct tools and procedures. For details of procedures, contact your HYUNDAI dealer. Wear safety glasses and a face shield when using compressed air.

② Block the tire at the opposite corner from the tire to be replaced.

③ Loosen the lug nuts slightly with a lug nut wrench.

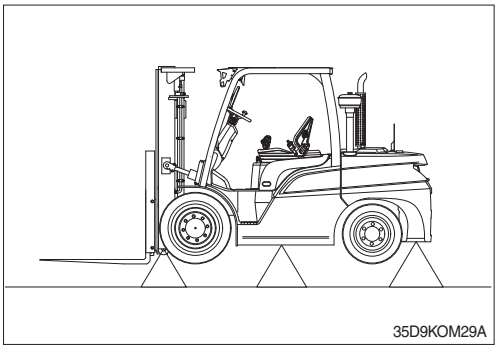
④ Jack up the truck to raise the tire from the ground, then remove the lug nuts and take off the tire.

※ **Points to fit jack when jacking up**

Front tires : Bottom of outer mast or bottom of frame.

Rear tires : Bottom of counterweight or bottom of rear axle.

⚠ When jacking up the truck, always check carefully that the jack does not come out of position. When jacking up the truck, never go under the truck. For wheels using a separate type rim, check first that the rim nut is not loose before loosening the lug nuts. Be careful not to mistake the rim nuts and lug nuts.



⑤ Replace the tire and tighten the lug nuts partially. The mounting faces of the wheel, lug nuts and wheels must be free from any dirt or lubricant of any kind.

⑥ Tighten the lug nuts on opposite sides in turn,
and check that there is no play in the wheel.

⑦ Lower the jack to lower the truck to the ground, then tighten the lug nuts to the specified tightening torque (For details, see service data).

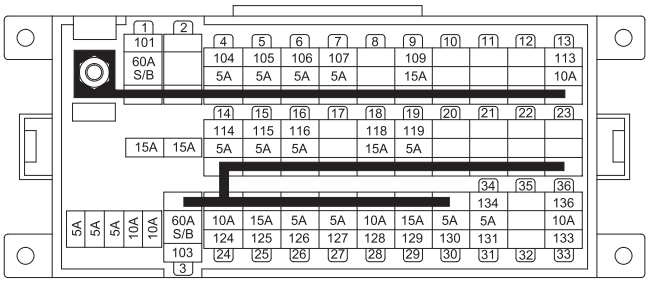
⑧ Check and adjust the inflation pressure.
Tire inflation pressure : For details, see 5-3 page, CHECK BEFORE STARTING ENGINE.

⚠ Precautions for adjusting the inflation pressure when repairing a puncture.

※ **The tires used on forklift trucks have a high inflation pressure, so any cracks or deformation of the rim are extremely dangerous. When adjusting the inflation pressure, do not raise the pressure above the correct level under any circumstances. If the pressure of the compressor is not adjusted beforehand, the pressure inside the tire will rise to the maximum air pressure of the compressor, and this may cause a serious accident. Therefore, always be extremely careful when carrying out this work.**

9) FUSES REPLACEMENT

No.	Capacity	Related electrical component
①	60A	Alternator
②	-	-
④	5A	Horn
⑤	5A	Flasher unit
⑥	5A	Warning buzzer
⑦	5A	MCU
⑧	-	-
⑨	15A	ECU
⑩	-	-
⑪	-	-
⑫	-	-
⑬	10A	OHG/Cabin
③	60A	Main power
⑭	5A	Gear selector
⑮	5A	Auto level solenoid
⑯	5A	OPSS solenoid
⑰	-	-
⑱	15A	Combi switch
⑲	5A	Alternator IG
⑳	-	-
㉒	-	-
㉓	-	-
㉔	10A	MCU/Cluster
㉕	15A	OHG/Cabin
㉖	5A	Brake lamp/WIF
㉗	5A	Seat heater
㉘	10A	Work/beacon lamp
㉙	15A	Fuel warmer
㉚	5A	Signal power
㉛	5A	Start relay
㉜	-	-
㉝	10A	ECU
㉞	5A	Start relay
㉟	-	-
㊱	10A	ECU



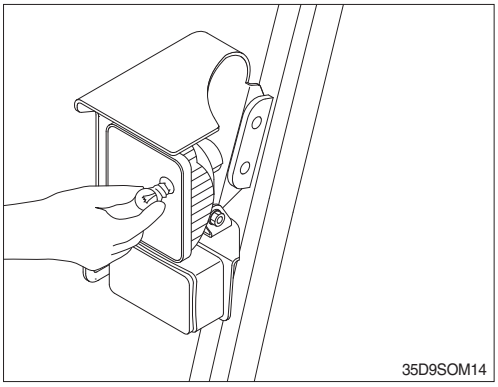
① Turn the starting switch OFF.

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.

10) LAMP BULBS REPLACEMENT

Lamp	Spec (for 24 V)
Head lamp	75W
Turn signal lamp	LED
Clearance lamp	LED
Stop lamp	LED
Backup lamp	LED
License lamp (option)	5W
Beacon lamp (option)	LED
Rear work lamp	70W



⚠ **After checking that the fuse is not blown and that there is no disconnection in the wiring harness, replace the lamp bulb.**

11) 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 floor plate. 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).

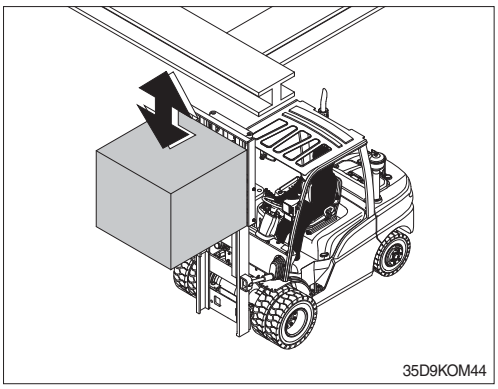
(5) Parking brake

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 that 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.**

12) 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 machine 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.

13) 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.

14) 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 8. SPECIFICATIONS)

Critical items include:

- Drive axle mounting
- Overhead guard
- Drive and steering wheel mounting
- Tilt cylinder mounting and yokes
- Counterweight mounting
- Mast mounting and components

Torque specifications are in your service manual.

15) 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. Do not piece chains together.**

(1) Lift chain inspection and measurement

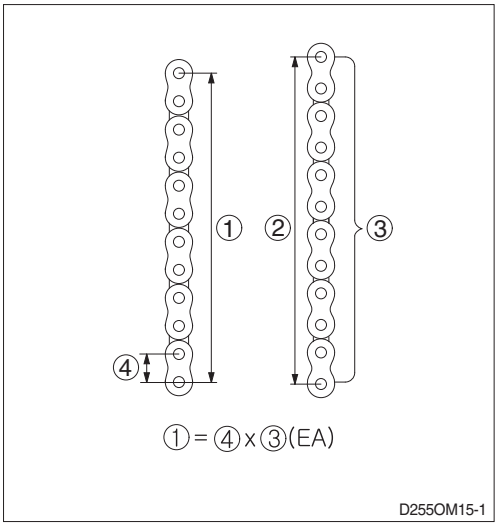
Inspect and lubricate the lift chains every PM (50~250 hours). When operating in corrosive environments, inspect the chains every 50 hours. During the inspection, check for the following conditions:

- 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 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.

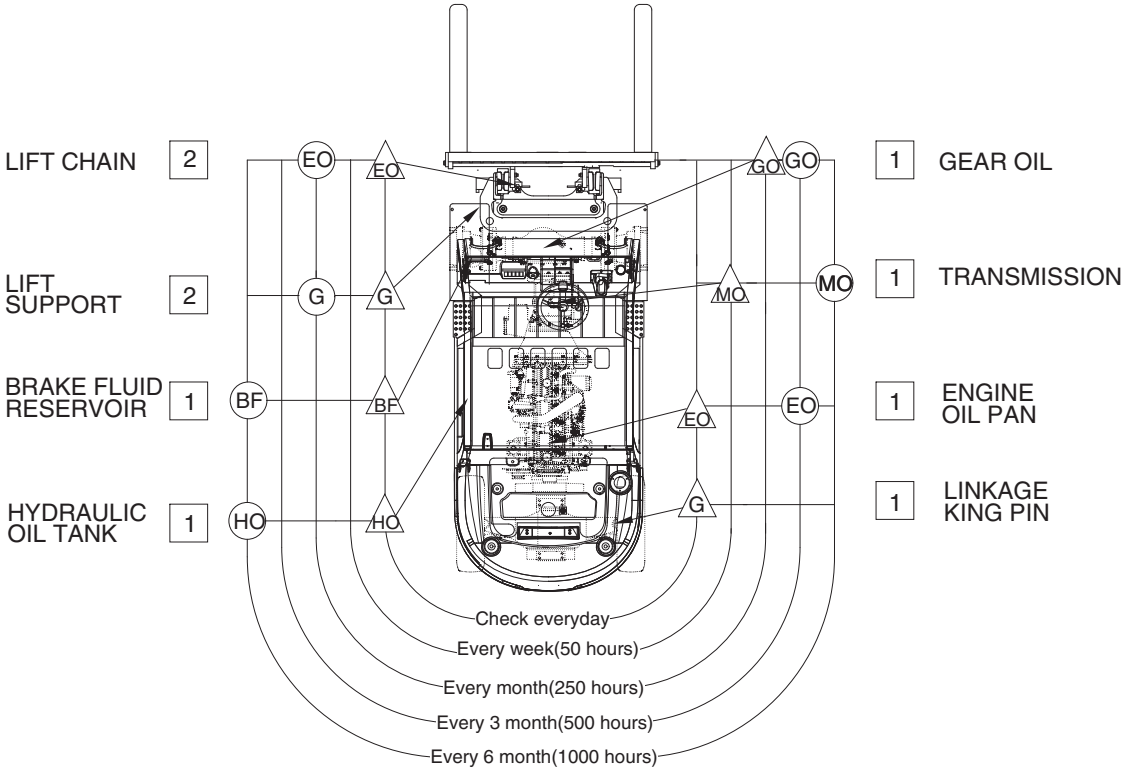
④ **Pitch**

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.**

8. LUBRICATION CHART



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NOTES

① △: Check, add oil when needed.

② ○: Change oil or add oil.

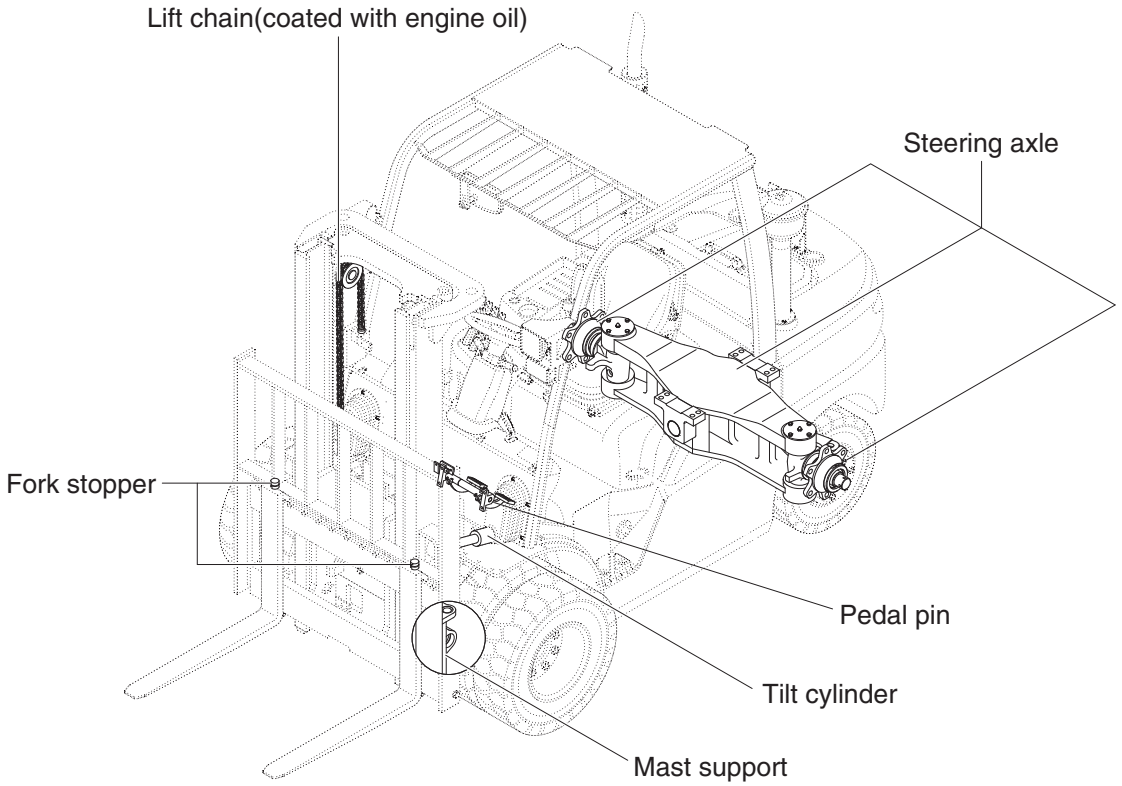
③ Figures in squares indicate number of lubricating points.

④ All service intervals in the chart are based on daily, 2 weeks, 1 month, 3 months, 6 months, and service meter readings.

Mark	Kind of lubricants	In moderate weather	Cold region
EO	Engine oil	API CI-4	
MO	T/M oil	ATF DEXRON III	
GO	Gear oil	SHELL DONAX TD	
HO	Hydraulic oil	ISO VG 46, VG 68	ISO VG 15★
BF	Brake fluid	AZOLLA ZS32 (Hydraulic oil ISO VG32)	
G	Grease	NLGI No. 2	NLGI No.1★

★ : Cold region
Russia, CIS, Mongolia

9. GREASING POINT



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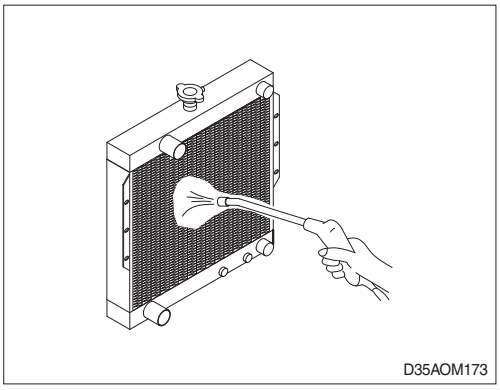
10. HANDLING MACHINE IN EXTREMELY HOT PLACES

Pay careful attention particularly to the following points when handling the machine in extremely hot places.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■ **Cooling system**

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/cm² (30 psi)
3) Check the fan belt tension. If it is too slack, adjust the tension. (SEE 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.

※ Always keep fill the coolant to specified level and check for coolant leaks if necessary.

■ **Battery**

In case of operating the machine in hot weather, it will be fallen fast the electrolyte level of the battery. Always check the electrolyte level of the battery and make sure that the level is kept near the upper level.

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 machine 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. 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 machine 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.)

2) DURING STORAGE

(1) Operate the engine and move the machine 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.

※ 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.

13. TRANSPORT

1) PRECAUTIONS FOR LOADING AND UNLOADING

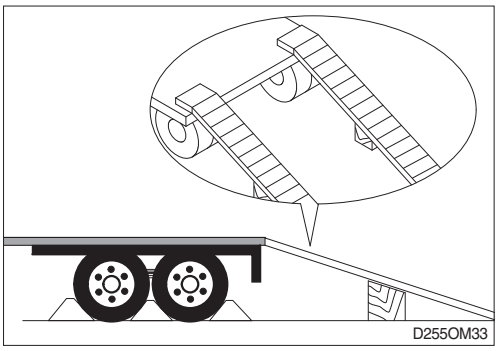
Contact your HYUNDAI forklift distributor for advice regarding transportation of the machine.
When loading or unloading the machine on or from a transporter, using loading ramp, the following precautions must always be observed.

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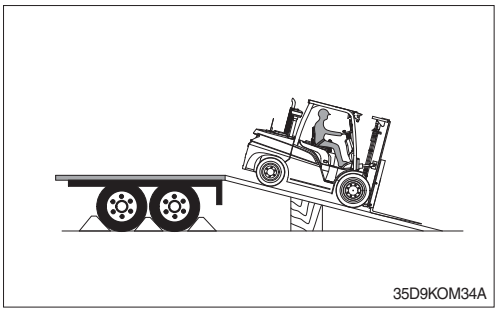
(3) After checking that the machine is aligned with the loading ramps, back the machine slowly up the ramps to load it on the transporter.

⚠ When on the loading ramps, never change direction. If it is necessary to change direction, drive off the ramp and realign the machine.
Block the wheels and secure the lift truck with tiedowns.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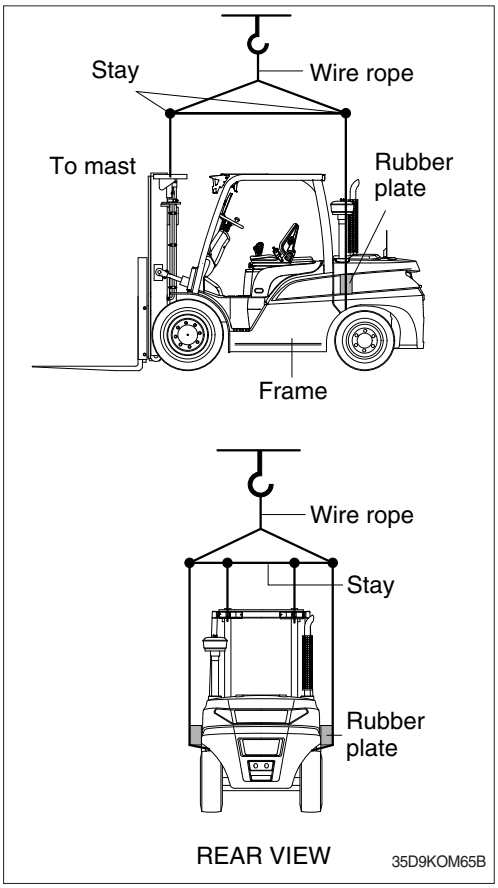
14. LOADING AND UNLOADING BY CRANE

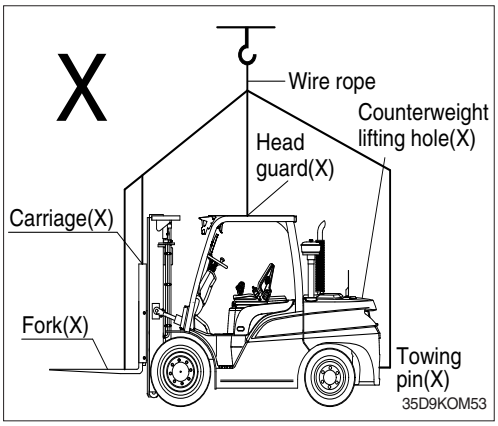
1) Check the specification of the truck when you are going to hoist the truck.
2) Use long wire rope and stay to keep the distance with the machine as it should avoid touching with the truck body.
3) Put a rubber plate where the wire rope contact with the truck's body to prevent damage.
4) Place crane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

6) If there is lifting brackets on the truck's body, use them to lift a truck.

⚠ **Use appropriate method for your forklift truck.**
⚠ **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.**



15. RECOMMENDATION TABLE FOR LUBRICANTS

1) NEW MACHINE

New machine uses following fuel, coolant and lubricant.

Description	Specification
Engine oil	SAE 15W-40 (API CI-4 class)
T/M oil	ATF DEXRON III
Gear oil	Shell Donax TD
Hydraulic oil	ISO VG46/VG68, Hyundai genuine long life hydraulic oil ISO VG15, Conventional hydraulic oil★1
Brake oil	AZOLLA ZS32 (Hydraulic oil ISO VG32)
Grease	Lithium base grease NLGI No.2 ★1 NLGI No.1
Fuel	ASTM D975-No.2 ★2 Ultra low sulfur diesel
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

★1 : Cold region
Russia, CIS, Mongolia
★2 Ultra low sulfur diesel
- sulfur content ≤ 15 ppm

16. 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	13.2 (3.49)	★SAE 5W-40 SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
Torque converter transmission	Transmission oil	12 (3.2)	ATF DEXRON III
Axle	Gear oil	10.5 (2.8)	Shell Donax TD
Hydraulic tank	Hydraulic oil	65 (17.2)	★ISO VG 15 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel★1	116 (30.6)	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (Grease nipple)	Grease	-	★NLGI NO.1 NLGI NO.2
Brake reservoir tank	Brake oil	0.5 (0.13)	★AZOLLA ZS10 (Hydraulic oil, ISO VG10) AZOLLA ZS32 (Hydraulic oil, ISO VG32)
Radiator	Antifreeze : Water	15 (3.96.)	Ethylene glycol base permanent type (50:50) ★Ethylene glycol base permanent type (60 : 40)

NOTES :

- Engine oil should be API classification CI-4.
- Change the type of engine oil according to the ambient temperature.
- When using oil of different brands from the previous one, be sure to drain all the previous oil before adding the new engine oil.

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

★ : Cold region
Russia, CIS, Mongolia