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 forward-reverse lever 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 forward-reverse lever in NEUTRAL.

(4) Press the parking brake switch to the LOCK position.

(5) Stop the engine.

(6) Turn the start 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 truck 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 100hours 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 **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 truck.

(2) The monitor installed on this truck does not entirely guarantee the condition of the truck.
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. Replace damaged or worn parts at proper time to keep the performance of truck.

(2) Use Hyundai 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 Hyundai 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.

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	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
12	Intake air line	Every 2 years
13	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 2,500 hours or three 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.

※ CALIFORNIA AND FEDERAL EMISSION CONTROL WARRANTY STATEMENT
YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board (ARB), Environmental Protection Agency and Hyundai Construction Equipment (HCE) are pleased to explain the emissions control system warranty on your Model Year 20-21 off-road Large Spark-Ignition (LSI) engine. In all 50 states, new LSI engines must be designed, built and equipped to meet the State's stringent anti-smog standards. HCE must warrant the emissions control system on your LSI engine for the period of time listed below provided there has been no abuse, neglect or improper maintenance of your LSI engine. Your emissions control system may include parts such as the carburetor, regulator or fuel-injection system, ignition system, engine computer unit (ECM), catalytic converter and air induction system. Also included may be sensors, hoses, belts, connectors and other emission-related assemblies. Where a warrantable condition exists, HCE will repair your LSI engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE:
The Model Year 20-21 emissions control system is warranted for three years or 2,500 hours, whichever comes first, unless otherwise specified herein. If any emission-related part on your equipment is defective, the part will be repaired or replaced by HCE.

OWNER'S WARRANTY RESPONSIBILITIES:
-As the LSI engine owner, you are responsible for performance of the required maintenance listed in your owner's manual. HCE recommends that you retain all receipts covering maintenance on your LSI engine, but HCE cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
-As the LSI engine owner, you should however be aware that HCE may deny you warranty coverage if your LSI engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
-Your engine is designed to operate on propane (HD-5 or HD-10 specification), gasoline (E15 or less), or compressed natural gas. Use of any other fuel may result in your engine no longer operating in compliance with California's emissions requirements. To confirm the fuel(s) this engine is capable of operating on, see the Emission Control Information label located under hood.
-You are responsible for initiating the warranty process. The ARB suggests that you present your LSI engine to an HCE dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible.
If you have any questions regarding your warranty rights and responsibilities, you should contact HCE at 1-877-509-2254.

GENERAL EMISSIONS WARRANTY COVERAGE:
HCE warrants to the ultimate purchaser and each subsequent purchaser that the LSI engine is:
Designed, built and equipped so as to conform with all applicable regulations; and
Free from defects in materials and workmanship that cause the failure of a warranted part to be identical in all material respects to that part as described in the application for certification. The warranty period begins on the date the equipment is delivered to an ultimate purchaser or is first placed into service.
Subject to certain conditions and exclusions as stated below, the warranty on emission-related parts is as follows:
(1) Any warranted part that is not scheduled for replacement as required maintenance in the written instructions supplied, is warranted for the warranty period specified herein. If the part fails during the period of warranty coverage, the part will be repaired or replaced by HCE according to subsection (4) below. Any such part repaired or replaced under warranty will be warranted for the remainder of the period.

(2) Any warranted part that is scheduled only for regular inspection in the written instructions supplied is warranted for the warranty period specified herein. Any such part repaired or replaced under warranty will be warranted for the remaining warranty period.
(3) Any warranted part that is scheduled for replacement as required maintenance in the written instructions supplied is warranted for the period of time before the first scheduled replacement date for that part. If the part fails before the first scheduled replacement, the part will be repaired or replaced by HCE according to subsection (4) below. Any such part repaired or replaced under warranty will be warranted for the remainder of the period prior to the first scheduled replacement point for the part.
(4) Repair or replacement of any warranted part under the warranty provisions herein must be performed at a warranty station at no charge to the owner.
(5) Notwithstanding the provisions herein, warranty services or repairs will be provided at all of our distribution centers that are franchised to service the subject engines or equipment.
(6) The LSI engine owner will not be charged for diagnostic labor that is directly associated with diagnosis of a defective, emission-related warranted part, provided that such diagnostic work is performed at a warranty station.
(7) HCE is liable for damages to other engine or equipment components proximately caused by a failure under warranty of any warranted part.
(8) Throughout the LSI engine warranty period specified herein, HCE will maintain a supply of warranted parts sufficient to meet the expected demand for such parts.
(9) Any replacement part may be used in the performance of any warranty maintenance or repairs and must be provided without charge to the owner. Such use will not reduce the warranty obligations of HCE.
(10) Add-on or modified parts that are not exempted by the Air Resources Board may not be used. The use of any non-exempted add-on or modified parts by the ultimate purchaser will be grounds for disallowing a warranty claim. HCE will not be liable to warrant failures of warranted parts caused by the use of a non-exempted add-on or modified part.

WARRANTED PARTS:
The repair or replacement of any warranted part otherwise eligible for warranty coverage may be excluded from such warranty coverage if HCE demonstrates that the LSI engine has been abused, neglected, or improperly maintained, and that such abuse, neglect, or improper maintenance was the direct cause of the need for repair or replacement of the part. That notwithstanding, any adjustment of a component that has a factory installed, and properly operating, adjustment limiting device is still eligible for warranty coverage. The following emissions warranty parts are covered for 3 years or 2,500 hours, whichever occurs first, unless otherwise specified:

Air Mass Sensor Assembly
Air/Fuel Ratio Feedback and Control System
Catalytic Converter *
Engine Control Module *
Exhaust Manifold
Fuel Injection System
Gasoline fuel tank, fuel cap and fuel lines
Ignition Module
Air Intake System
Oil Filler Cap
Positive Crankcase Ventilation Valve
EPR-Electronic Actuator *

Miscellaneous Items Used In the Above Systems: valves, sensors used for electronic controls, hoses, belts, connectors, assemblies, clamps, fittings, tubing, wiring, sealing gaskets or devices, mounting hardware, pulleys, belts and idlers.
* Covered for five years or 3,500 hours of operation, whichever occurs first.

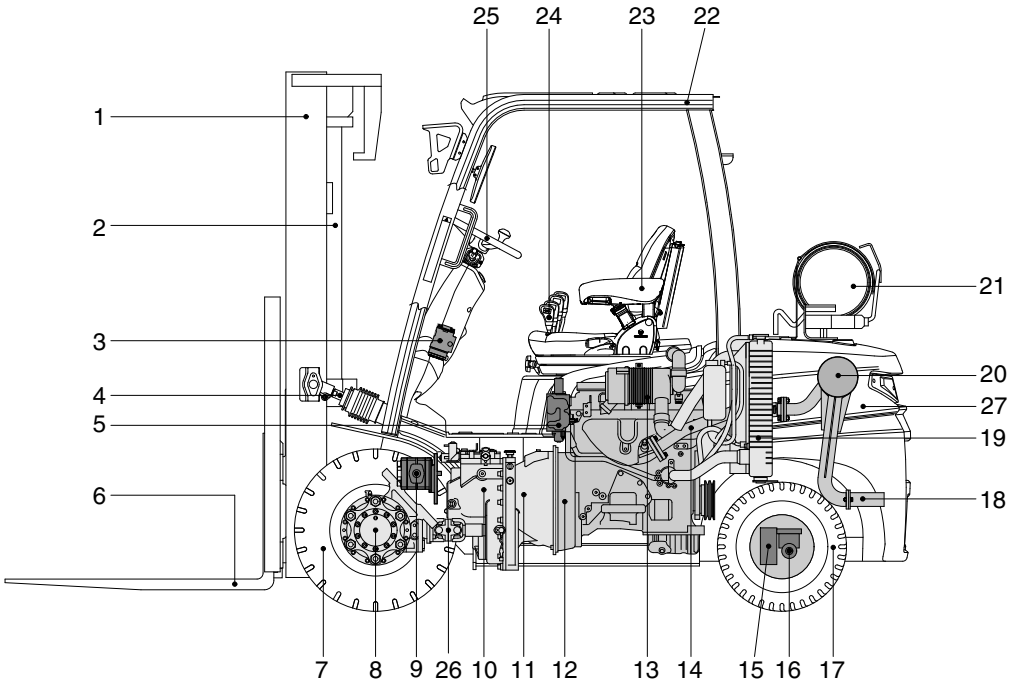
MAINTENANCE SCHEDULE

Perform the following maintenance on the engine at the hours indicated and at equivalent hour intervals thereafter. For maintenance or other work that is not performed under warranty, maintenance, replacement, or repair of the emission-control devices and systems may be performed by any engine repair establishment or individual.

GASOLINE AND LPG CERTIFIED ENGINE MAINTENANCE REQUIREMENTS									
Date put inot Service :	Interval Hours								
	Daily	500	1000	1500	2000	2500	3000	4000	5000
General Maintenance Section									
Visual check for leaks	X								
Check engine oil level	X								
Check coolant level	X								
Change engine oil and filter	Every 250 hours or 180 days of operation								
Check LPG/Gas system for leaks	After any service or maintenance activity								
Inspect accessory drive belts			X		X		X	X	X
Replace Drive Belt								X	
Inspect electrical system					X			X	
Inspect all vacuum lines and fittings					X			X	
Engine Coolant Section									
Clean debris from radiator core	Every 100 hours or 60 days of operation								
Change coolant	Annually								
Inspect coolant hoses for cracks, swelling or deterioration			X		X		X	X	X
Engine Ignition System									
Inspect Battery case for damage			X		X		X	X	X
Inspect battery cables			X		X		X	X	X
Check all electrical connectors			X		X		X	X	X
Check ignition coil boots						X			X
Change Spark Plugs						X			X
Fuel System Maintenance									
Replace fuel filter (Gas & LPG)	Every 500 hours or every 3 months, whichever comes first								
Inspect lock off for leaks & closing					X			X	
Check LPG/Gas regulator pressure					X			X	
Leak check LPG/Gas fuel lines					X			X	
Drain DSR for oil build up *1						X			X
Inspect DSR for coolant leaks	Annually or every 2,000 hours, whichever comes first								
Check air induction for leaks					X				
Check manifold for vacuum leaks					X				
Check injector & rails for leaks					X				
Inspect air cleaner	Every 250 hours or every 100 hours in dusty environments								
Replace air filter	Every 1000 hours or every 6months,whichever comes first								
Engine Exhaust System									
Inspect exhaust manifold for leaks					X			X	
Inspect exhaust piping for leaks					X			X	
Inspect catalyst inlet and outlet					X			X	
Check HEGO sensors connections					X			X	
*1 If the fuel outlet of the Dual-Stage Regulator (DSR), or the hose routing between the DSR & the Electronic Pressure Regulator (EPR) is below the inlet of the EPR, the oil must be drained every 250 hours.									
This maintenance schedule represents the manufacturer's recommended maintenance intervals to maintain proper engine and equipment function. Additional Federal, State or Local regulations may require operators to conduct engine or equipment inspections at more frequent intervals than those specified above.									

4. PLANNED MAINTENANCE INTERVALS

1) MAJOR COMPONENT LOCATIONS



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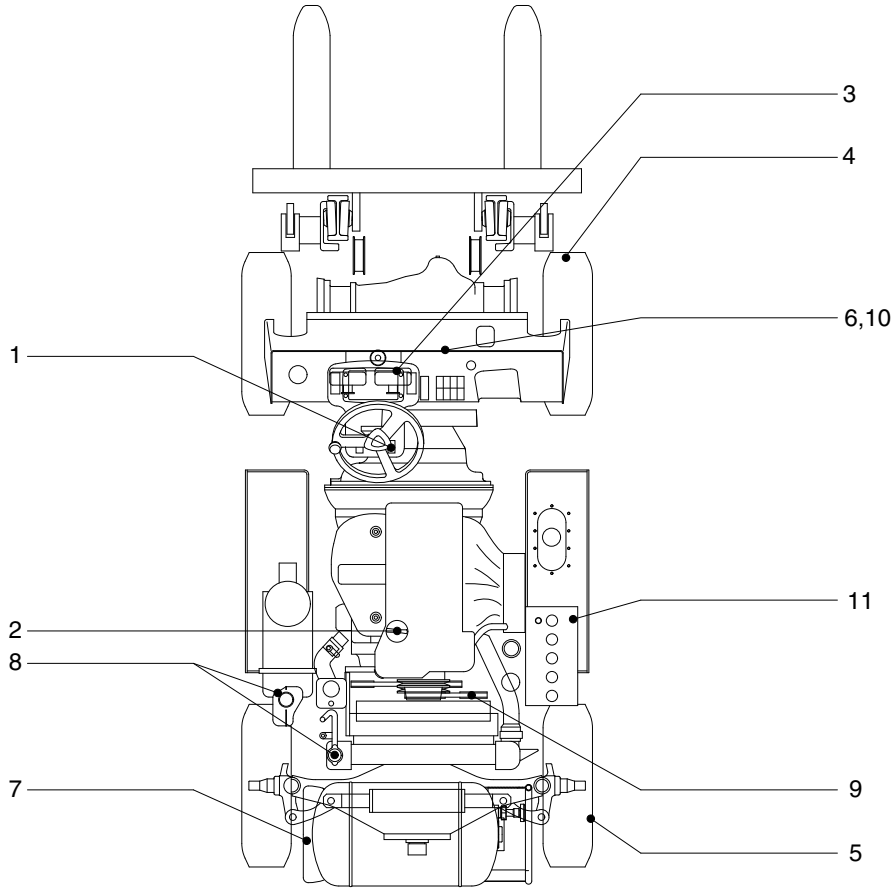
1	Mast	10	Transmission	19	Radiator
2	Lift cylinder	11	Torque converter	20	Muffler
3	Steering unit	12	Engine	21	LPG tank
4	Tilt cylinder	13	Air cleaner	22	Overhead guard
5	Control valve	14	Exhaust pipe	23	Seat
6	Fork	15	Steering axle	24	Control lever
7	Front wheel	16	Steering cylinder	25	Steering wheel
8	Drive axle	17	Rear wheel	26	Drive shaft
9	Hydraulic pump	18	Tail pipe	27	Counterweight

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	Parking brake operation	Check, Adjust	-	-	1	7-33
2	Engine oil level	Check, Add	EO	5.7 (1.5)	1	5-4
3	Pedal linkage operation	Check, Adjust	-	-	1	7-33
4	Drive rim and tire air pressure	Check, Add	-	-	2	5-3, 7-17
5	Steer rim and tire air pressure	Check, Add	-	-	2	5-3, 7-17
6	Lamp operation	Check, Replace	-	-	1	7-32
7	Fuel level (LPG)	Check, Add	F	15 (4.0)	1	5-11
8	Radiator coolant	Check, Add	C	10 (2.65)	1	7-25
9	Fan belt tension and damage	Check, Adjust, Replace	-	-	1	5-5
10	Horn operation	Check, Replace	-	-	1	7-32
11	Battery	Check, Clean	-	-	1	7-18

※ Oil symbol
Refer to the recommended lubricants for specification.
F : Fuel HO : Hydraulic oil EO : Engine oil GO : Gear oil
MO : Transmission oil BF : Brake fluid C : Coolant G : Grease

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							
	Air cleaner element			Clean		R							
	Transmission oil	MO			A	R						R	
	Transmission oil filter					R						R	
	Differential gear oil	GO			A	R						R	
	Brake oil	BF				R							
	Radiator coolant	C						R					
	Fork condition and wear				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

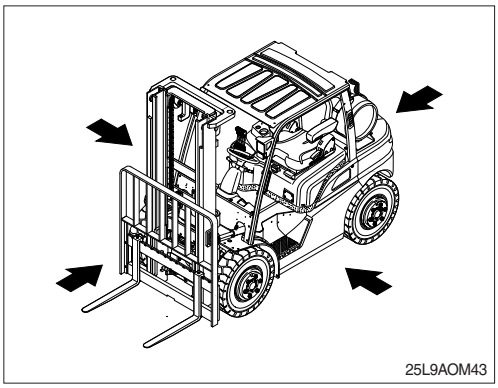
I : Visual inspection (repair or replace if required) M : Measurement (adjust if required)

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.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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.**

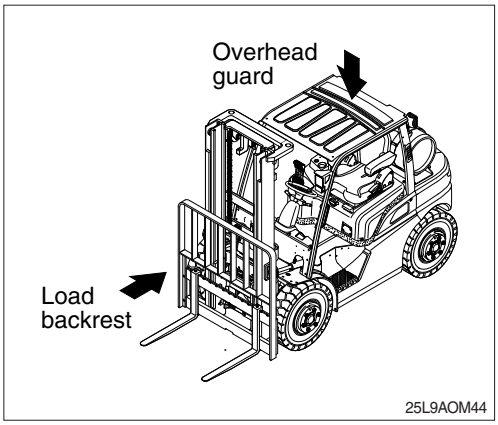
Inspect the truck, before and after starting the engine, for any sign of external leakage of fuel, engine coolant, transmission fluid, etc..

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

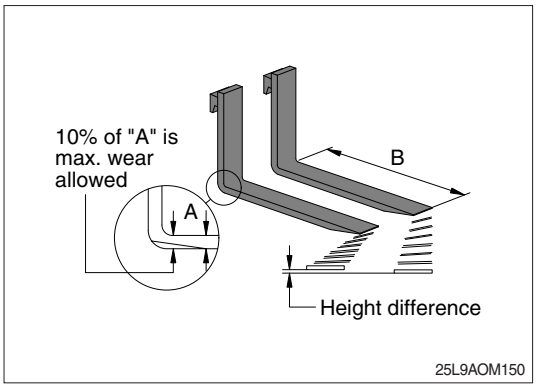
Inspect the mast assembly, load backrest, rails, carriage rollers, lift chains, and lift and tilt cylinders. Look for obvious wear and maintenance problems and damaged or missing parts. Check for any loose parts or fittings. Check for leaks, damaged or loose rollers, and rail wear (metal flaking). Carefully 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

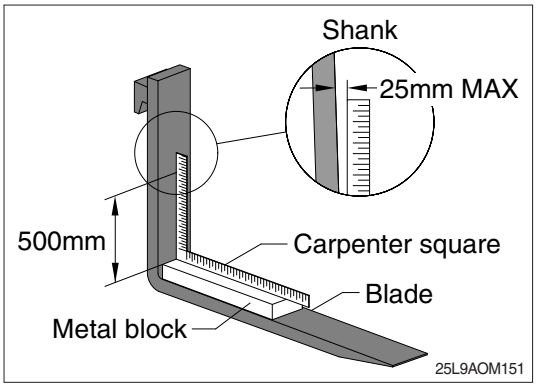
Inspect the load forks for cracks, breaks, bending, and wear. The fork top surfaces should be level and even with each other. The height difference between both fork tips refer to below table.

Model	Fork length (B) (mm)	Height difference (mm)
All	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 metal block to make sure it is not bent more than 25 mm (1 in) maximum.



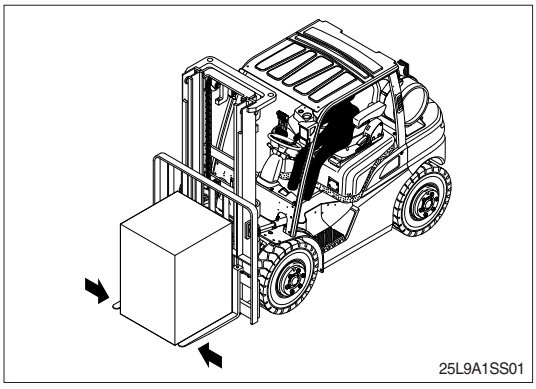
※ If the fork blades are obviously bent or damaged, have them inspected by a trained maintenance person before operating the truck.

Inspect the fork locking pins for cracks or damage.

Reinsert them and note whether they fit properly.

5) SIDE SHIFT

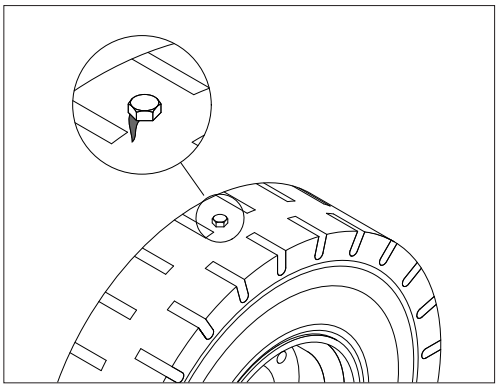
When operating the lever for the side shift and the hanger bar which the forks and the backrest are mounted on it, operator can accurately insert the forks under pallets or stack loads correctly without moving the fork lift.



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.



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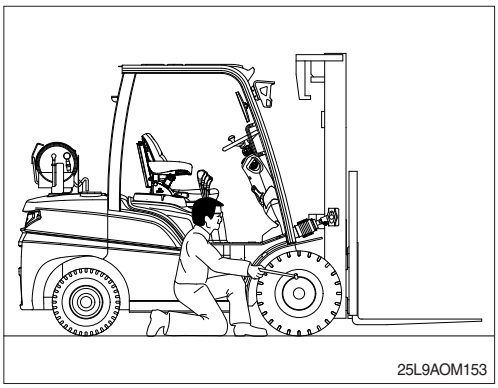
⚠ **Check tire pressure from a position facing the tread of the tire, not form the side. Use a long handled gauge to keep your body away from the side. If tires are low, do not operate and do not add air. Check with a mechanic. The tire may require removal and repair.**

Incorrect (low) tire pressure can reduce the stability of your lift truck. Do not operate truck with low tire pressure. Refer to the page 5-3 for proper cold inflation.



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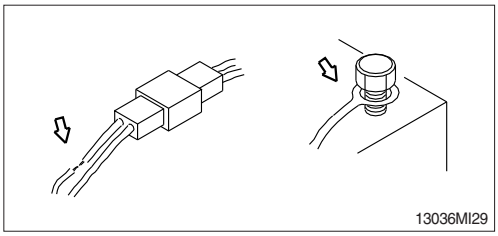
1) WIRING, GAUGES

Check regularly and repair the loose or malfunctioning gauges when found.



2) BATTERY

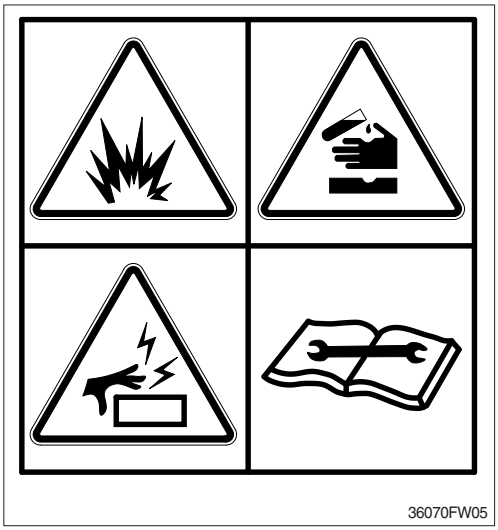
(1) Clean

① Wash the terminal with hot water if it is contaminated, and apply grease to the terminals after washing.

⚠ The battery gas can explode. Keep sparks and flames away from the batteries.

⚠ Always wear protective glasses when working with the batteries.

⚠ Do not stain clothes or skin with the electrolyte as it is acid.
Be careful not to get the electrolyte in the eyes. Wash with clean water and go to the doctor if it enters the eyes.



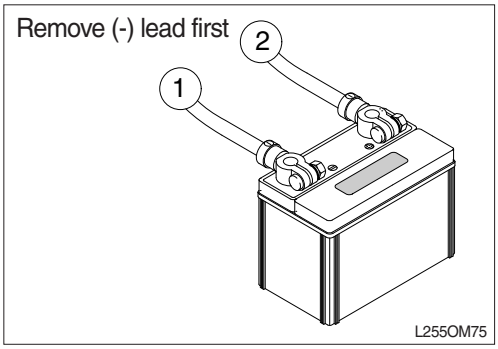
(2) Recycle

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

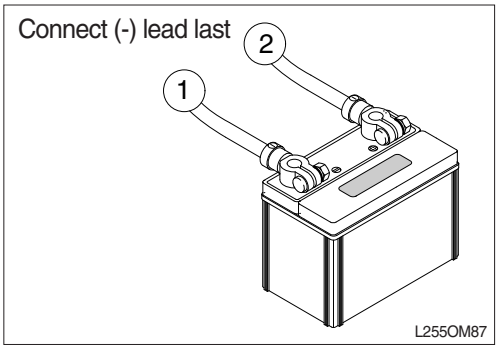
① Remove the lead from the ground side (Normally the (-) terminal side) of the battery. It is dangerous to let a tool, etc., touch the (+) terminal and the body at the same time, since this causes a spark.



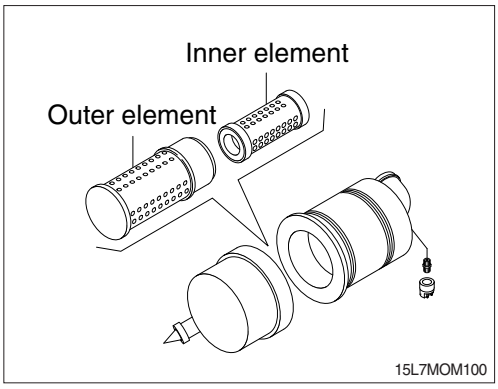
② When remounting, connect the ground connection last.

⚠ Do not allow tools to touch the (+) terminal and the body of the truck at the same time. This can cause sparking and explosion.

Dispose of old battery in locally approved manner.



3) AIR CLEANER ELEMENT

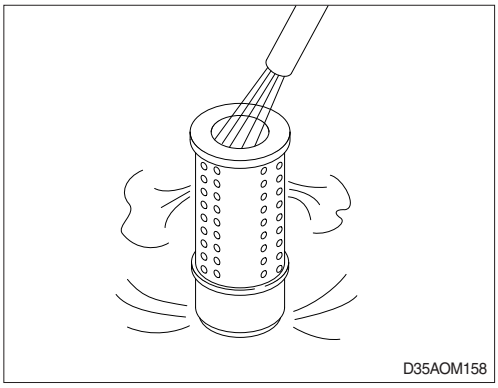


(1) Removal

① Double element type
Remove cover and pull out 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 30 psi) 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 truck can start working again immediately.

(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 vacuum valve is 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 200 kPa (30 psi) 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.

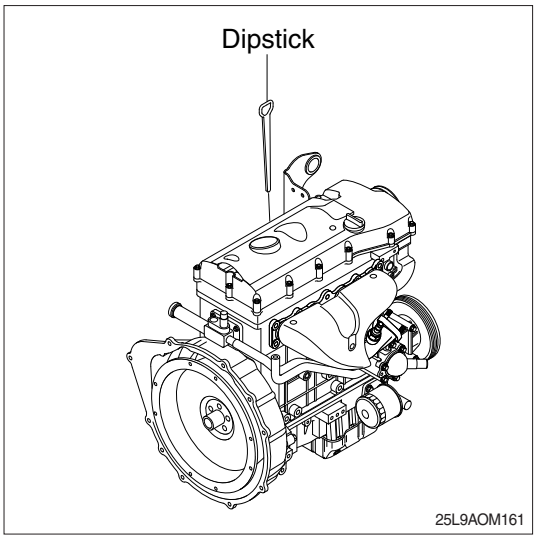
4) ENGINE

(1) Engine oil level check

Check the oil level with the truck on a level place 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.

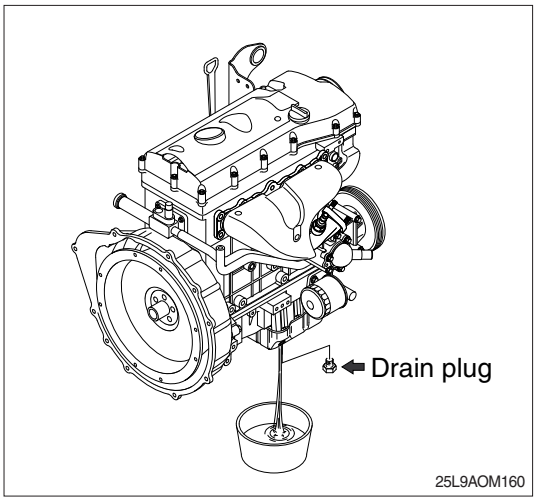
※ If the oil is contaminated or diluted, change the oil regardless of the regular change interval.
※ Check oil level after engine has been stopped for 15 minutes.
※ Do not operate unless the oil level is in the normal range.



(2) Engine oil change

① Warm up engine oil then park the truck in level place with forks lowered.
② Stop the engine and apply parking brake.
Remove drain plug and drain engine oil.
③ Tighten the drain plug and fill the engine oil
④ to the proper level.
Operate the engine at low idle and shut the
⑤ engine off and check the oil level with the dipstick.
⑥ Inspect for leaks at the drain plug.

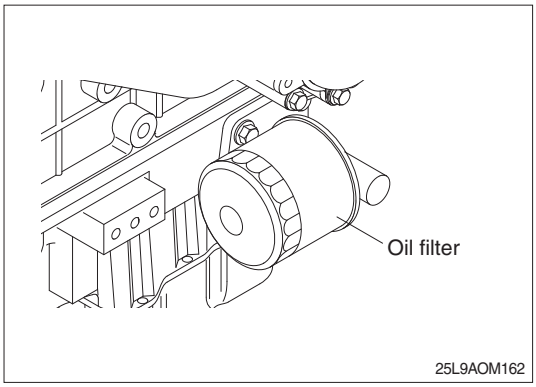
※ Also replace the engine oil filter.
Check oil level using dipstick after changing the engine oil. Dispose of old oil in locally approved manner.



(3) Engine oil filter replacement

① Clean around the filter head and remove the filter using a filter wrench.
② Install the new filter after thinly coating the packing surface with engine oil.
③ After replacing the engine oil filter, start the engine to check for oil leakage from the filter mounting surface.
④ Check the engine oil level using the dipstick.

※ When adding engine oil, do not let the oil overflow from the filler port.



5) TRANSMISSION

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

(1) Preparation

① Park the truck in a level place and lower the forks.

② Then stop the engine and apply the parking brake.

(2) Oil level check

① Run the engine at low idle speed.

② Pull out the dipstick and check the oil level.

③ Add oil through oil filler plug if necessary.

④ Always check oil level using dipstick after add oil.

(3) Change (oil and filter)

① Remove drain plug and drain the oil into a suitable container.

※ **When changing oil, remove screen and clean it with flushing oil.**

② Remove the filter cartridge.
Dispose of the used oil filter cartridge properly.

③ Apply a light coat of oil to the gasket of a new oil filter cartridge.

④ Install the new 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.

⑤ Mount the drain plug of the transmission after cleaning it.

⑥ Fill the oil through the filling plug and check if the oil is at the appropriate level.

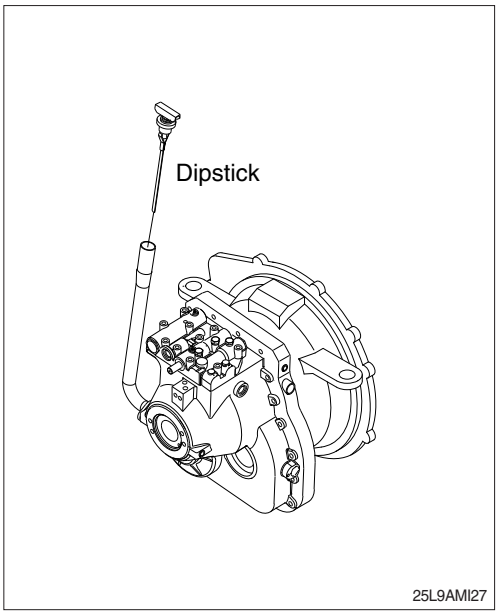
⑦ The proper oil amount is 12 liters (3.2 U.S. gallons).

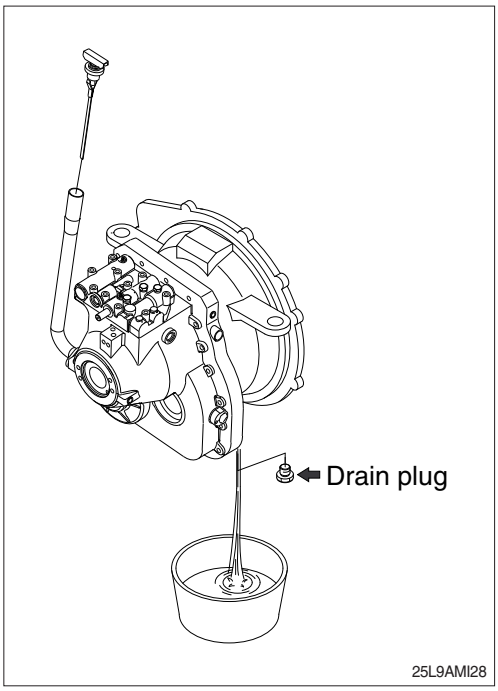
※ **It is imperative to pay attention to absolute cleanliness of oil and filter.**

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

※ **Blow dry compressed air from the inside of screen to outside and install when completely dry.**

※ **Dispose of old oil in locally approved manner.**

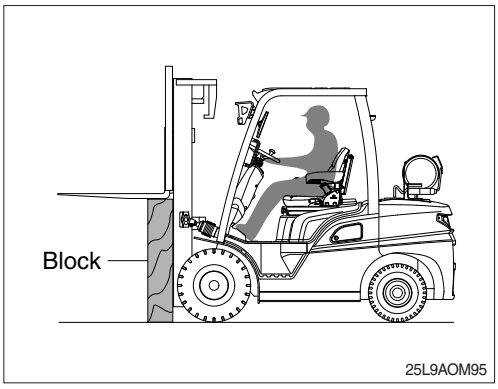




6) DIFFERENTIAL CASE

(1) Preparation

① Park the truck in a level place.
② Set the mast vertical, and raise the forks approx. 1 m.
③ Put blocks under the fork carriage.
④ Stop the engine and apply the parking brake.



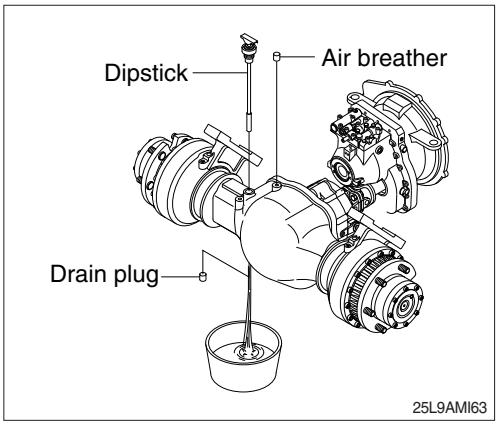
(2) Oil level check

① Pull out the dipstick, and check that oil level is between the normal range.
② If necessary, add oil through the dipstick hole and check if the oil is at the appropriate level.

(3) Change

① Remove drain plug and drain the oil into a suitable container.
② Mount the drain plug after cleaning it.
③ Fill the axle oil with a clean oil to the proper level.
· Quantity : 5.6 ℓ (1.5 U.S. gallons)

※ **Dispose of used oil in locally approved manner.**



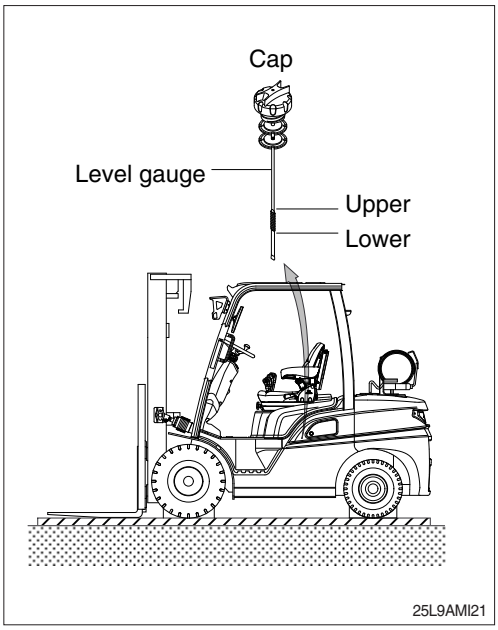
7) HYDRAULIC OIL TANK

(1) Preparation

① Park the truck in a level place and lower the forks.
② Then stop the engine and apply the parking brake.

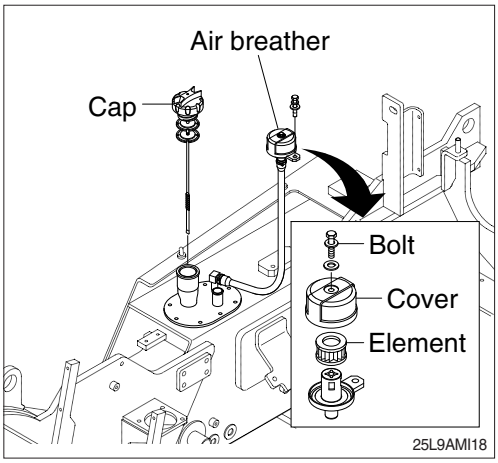
(2) Hydraulic oil level check

① Leave for about 5 minutes after stop the engine.
② Loosen the cap and check the oil level at the cap. The cap is located on the flange of the hydraulic oil tank.
③ The oil level is normal if it is between Upper and Lower.
※ **Add hydraulic oil, if necessary.**



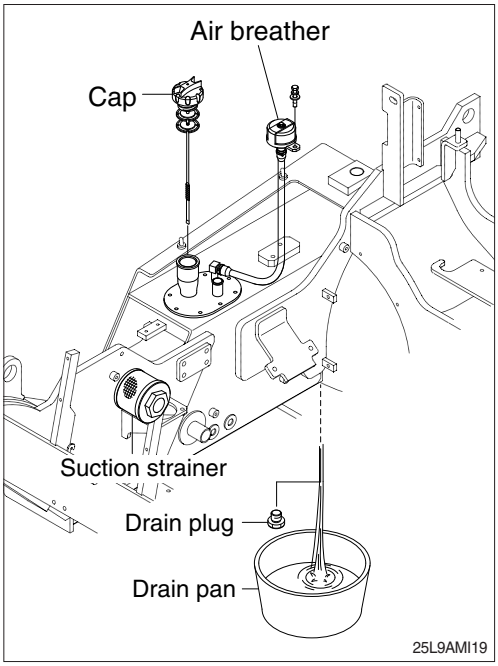
(3) Filling hydraulic oil

① Stop the engine to the position of level check.
② Check air breather filter element 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.



(4) Change the hydraulic oil

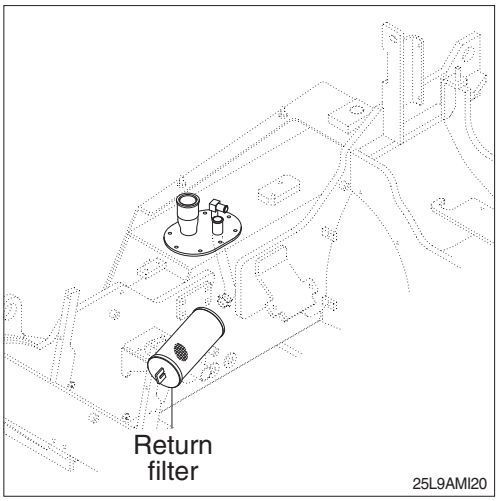
① Lower the forks on the ground and extend the tilt cylinder to the maximum.
② Loosen the cap and relieve the pressure in the tank.
③ Prepare a suitable drain pan.
④ To drain the oil loosen the drain plug.
⑤ After draining oil, tighten the drain plug.
⑥ Remove the suction strainer and clean it.
⑦ Fill proper amount of recommended oil.
⑧ 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.**



(5) Cleaning and replacing return filter

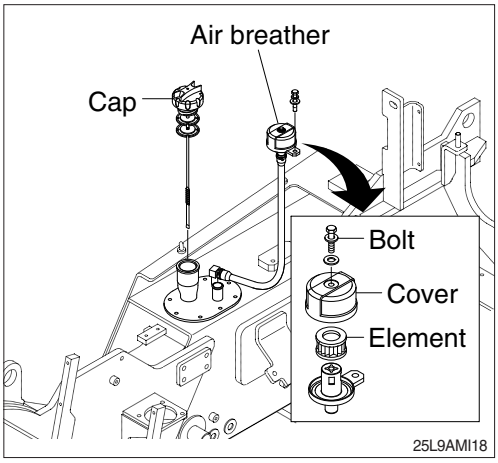
Clean and replace the return filter in the following manner.

① Remove the flange by loosening the mounting bolt.
② Remove the return filter from the tank.
③ Replace the return filter element with a new one.
④ Install the flange on the tank.
· Tightening torque : 3.4±0.7 kgf · m
(24.6±5.0 lbf · ft)



(6) Replacement of element in hydraulic tank breather

① Loosen the cap and relieve the pressure in the tank.
② Loosen the bolt and remove the cover.
③ Pull out the element.
④ Replace the element with a new one.
⑤ Reassemble by reverse order of disassembly.
· Tightening torque : 1.14~1.74 kgf · m
(8.2~12.6 lbf · ft)



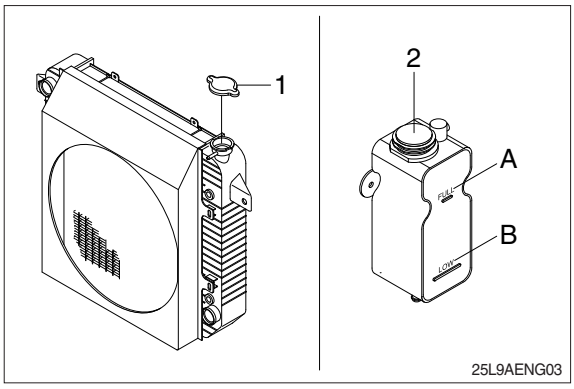
8) COOLING SYSTEM

(1) Check coolant level

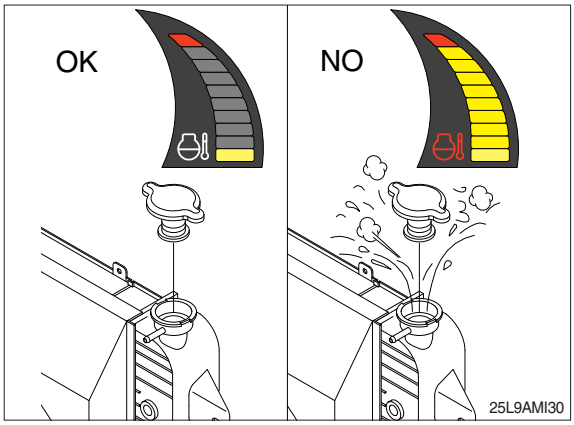
① Check the coolant level at reservoir tank.
② Add the mixture of antifreeze and water after if coolant is not sufficient.
③ The coolant level should indicate between A (full) and B (low).
④ Replace gasket of surge tank cap when it is damaged.

⚠ 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.



1	Radiator cap	A	Full
2	Reservoir tank	B	Low



(2) Flushing and refilling of radiator

① Change coolant

Avoid prolonged and repeated skin contact with used antifreeze. Such prolonged repeated contact can cause skin disorders or other bodily injury.

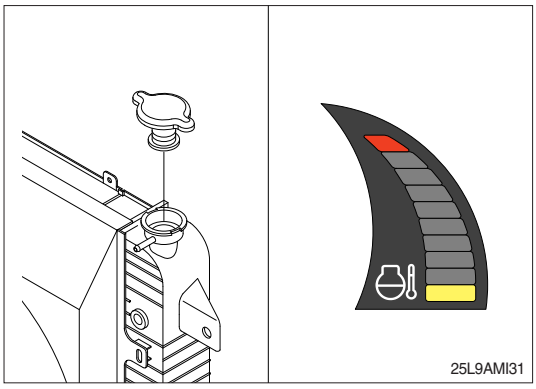
Avoid excessive contact-wash thoroughly after contact.

Keep out of reach of children.

※ Protect the environment : Handling and disposal of used antifreeze can be subject to federal, state, and local law regulation.

Use authorized waste disposal facilities, including civic amenity sites and garages providing authorized facilities for the receipt of used antifreeze.

If in doubt, contact your local authorities for guidance as to proper handling of used antifreeze.

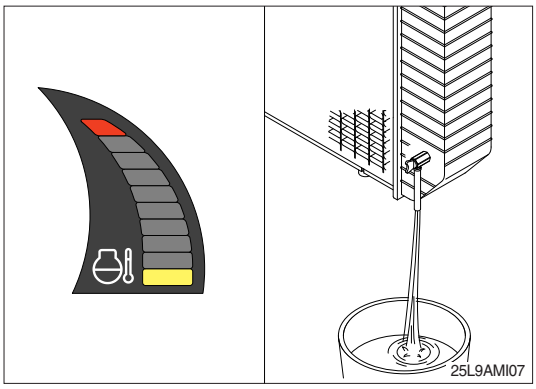


⚠ Wait until the temperature is below 50 ˚C (122 ˚F) before removing the coolant system pressure cap.

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

Drain the cooling system by opening the drain valve on the radiator and opening the drain valve on the bottom of the engine oil cooler housing.

A drain pan with a capacity of 15 liters (4.0 U.S. gallons) will be adequate.

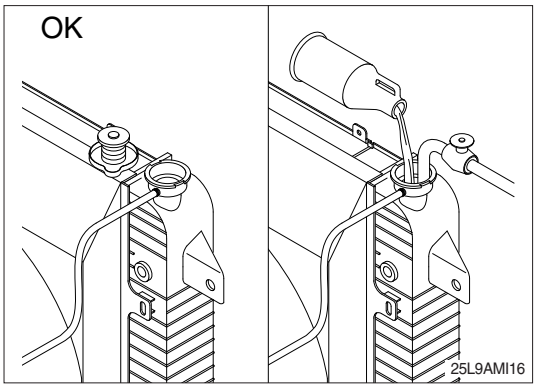


② Flushing of cooling system

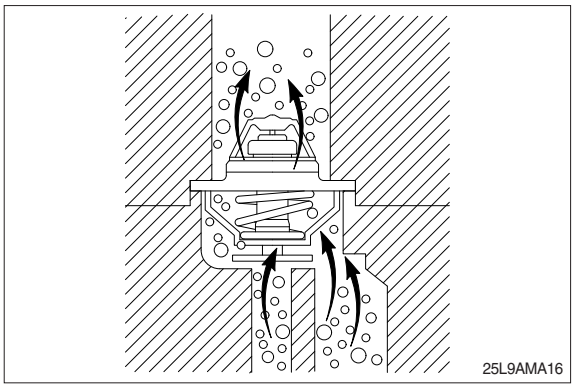
a. Fill the system with a mixture of sodium carbonate and water (or a commercially available equivalent).

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

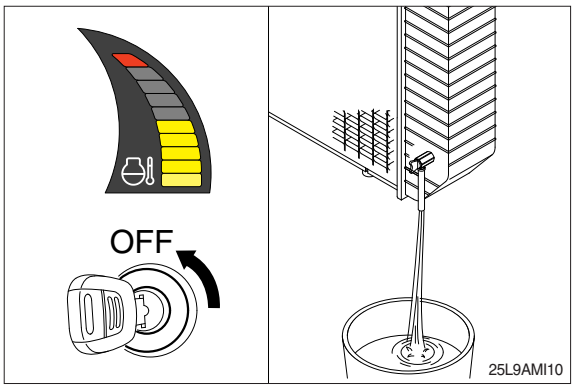
※ Do not install the radiator cap. The engine is to be operated without the cap for this process.



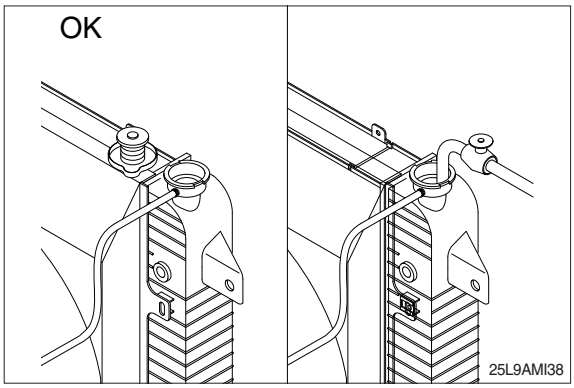
※ **During filling, air must be vented from the engine coolant passages.**
The system must be filled slowly to prevent air locks or serious engine damage can result. Wait 2 to 3 minutes to allow air to be vented, then add mixture to bring the level to the top.



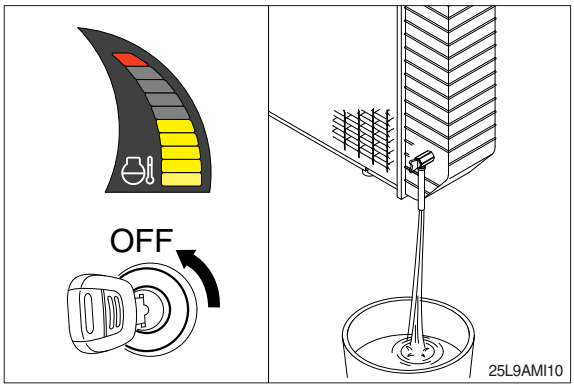
b. Operate the engine for 5 minutes with the coolant temperature above 80 ˚C (176 ˚F).
Shut the engine off, and drain the cooling system.



c. Fill the cooling system with clean water.
※ **Be sure to vent the engine and aftercooler for complete filling.**
※ **Do not install the radiator cap.**



d. 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.**

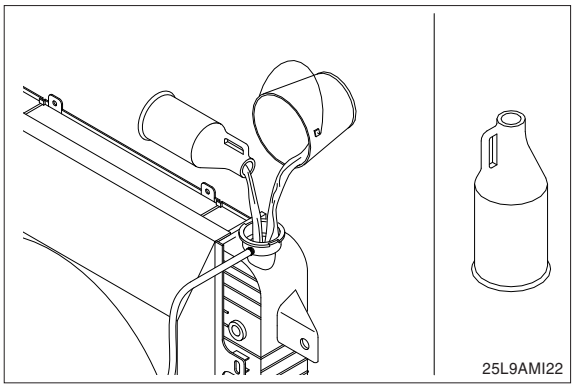


③ **Cooling system filling**

a. Use a mixture of 50 percent water and 50 percent ethylene glycol antifreeze to fill the cooling system. Refer to page 7-47.

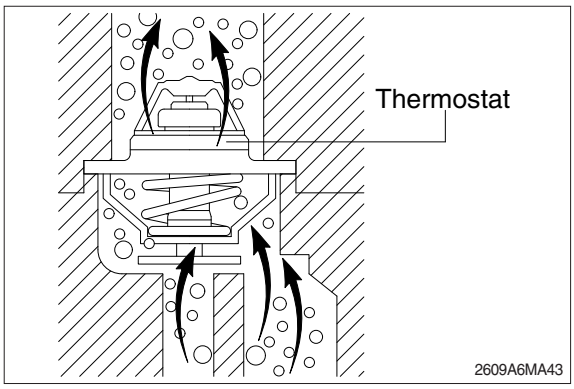
※ **Use the correct amount of DCA4 corrosion inhibitor to protect the cooling system.**

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

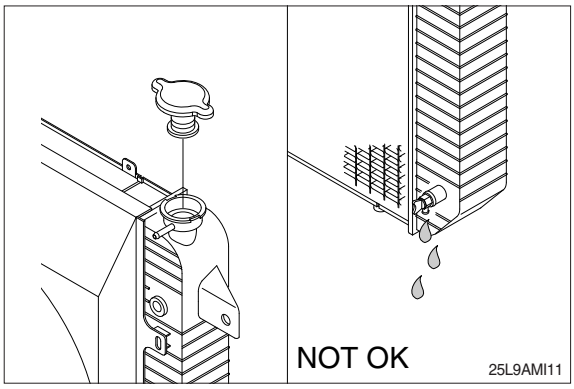


b. The system has a maximum fill rate of 19 liters (5.0 U.S. gallons) per minute. Do not exceed this fill rate.

※ **The system must be filled slowly to prevent air locks.**
During filling, air must be vented from the engine coolant passage.



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



(3) Clean radiator and oil cooler

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

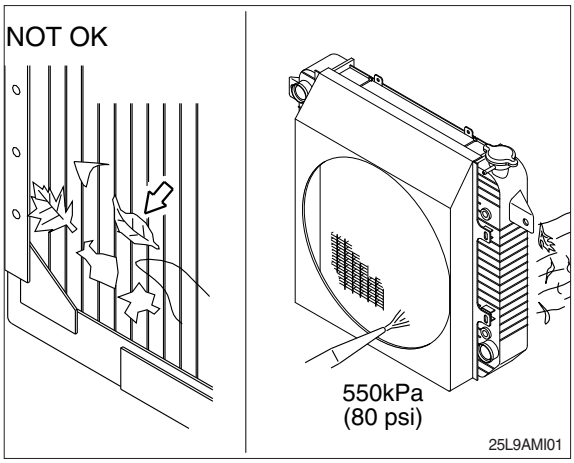
① Visually inspect the radiator for clogged radiator fins.

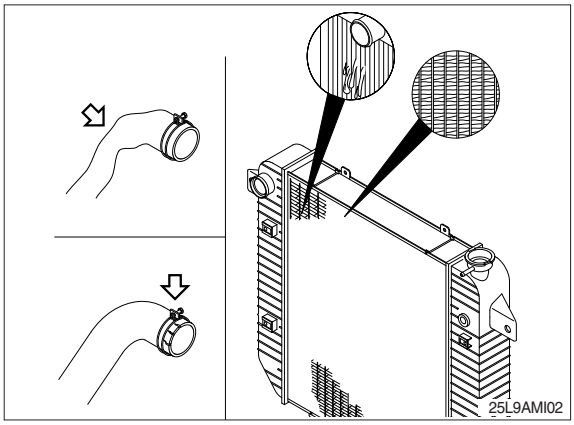
② Use 550 kPa (80 psi) air pressure to blow the dirt and debris from the fins.
Blow the air in the opposite direction of the fan air flow.

③ Visually inspect the radiator for bent or broken fins.

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

④ Visually inspect the radiator for core leaks.





9) TIRE REPLACEMENT

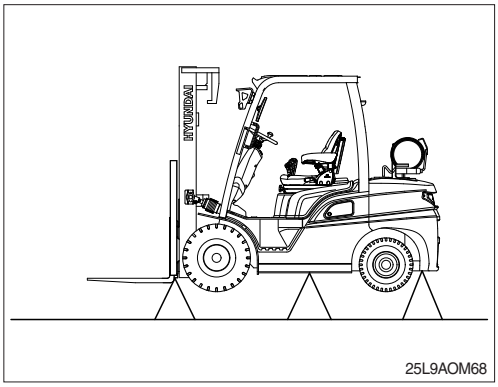
(1) Park the truck in a safe and level place suitable for changing the tire. Then lower the forks, stop the engine, and apply the parking brake.

⚠ The tires 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.

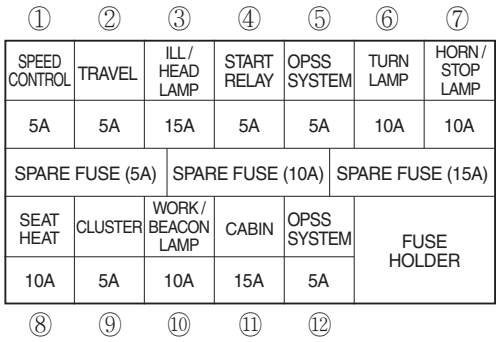


(5) Replace the tire and tighten the lug nuts partially. The mounting faces of the wheel, lug nuts and wheels must be free from any dirt or lubricant of any kind.
(6) Tighten the lug nuts on opposite sides in turn, and check that there is no play in the wheel.
(7) Lower the jack to lower the truck to 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 page 5-3, CHECK BEFORE STARTING ENGINE.

⚠ Precautions for adjusting the inflation pressure when repairing a puncture.
⚠ The tires used on the 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.

10) FUSES REPLACEMENT

No.	Capacity	Color	Related electrical component
①	5A	Tan	Speed control
②	5A	Tan	Travel
③	15A	Blue	Illumination / head lamp
④	5A	Tan	Start relay
⑤	5A	Tan	OPSS system
⑥	10A	Red	Turn lamp
⑦	10A	Red	Horn / stop lamp
⑧	10A	Red	Seat heat
⑨	5A	Tan	Cluster
⑩	10A	Red	Work / beacon lamp
⑪	15A	Blue	Cabin
⑫	5A	Tan	OPSS system



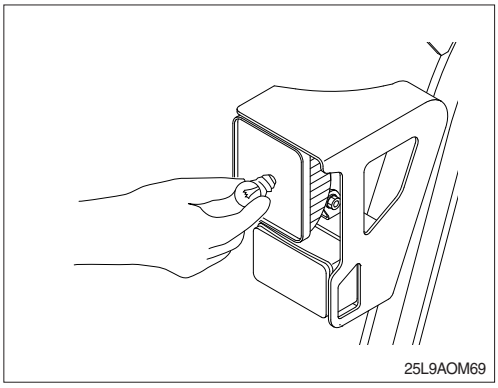
① Turn the starting switch OFF.

② Open the cover of the fuse box or relay box, and replace fuses or relays inside (to open the cover of the fuse box or relay box, push the side of the cover lightly with a finger, and pull the cover forward to remove it.)

⚠ When replacing the fuse or relay, check the relationship between the fuse or relay and the electrical components it protects. Always replace fuses or relays with a same capacity. Always turn the start switch OFF before replacing any fuse or relay.

11) LAMP BULBS REPLACEMENT

Lamp	Spec (12V)
Head lamp	55W
Turn signal lamp	21W
Stop/clearance lamp	21/5W
Backup lamp	10W
Beacon lamp (option)	LED
Rear work lamp (option)	55W



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

12) FUNCTIONAL TESTS

You will start the engine to complete the functional tests, so be sure that :

- Press the parking brake switch to the LOCK position.
- Put the forward-reverse lever 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) Neutral start function

Check the operation of the neutral start function by placing the forward-reverse lever in FORWARD or REVERSE and turning the starting switch to START position. The starter must not engage until the forward-reverse lever is moved to the NEUTRAL position.

(3) 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.

(4) Indicator lights

Check that all lights are functioning and indicate normal truck operation as described in section 3, Know your truck, in this manual.

(5) Service brakes and inching pedal

With the forward-reverse lever 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).

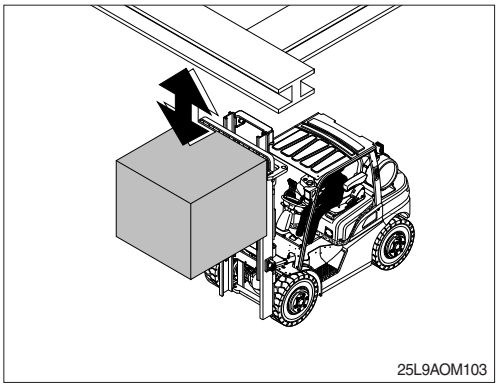
(6) Parking brake

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.

(7) 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.

(8) Auxiliary controls (option)

If your lift truck is equipped with an attachment, test the control lever for correct function and briefly operate the attachment.

(9) 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.

(10) 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 forward-reverse 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 forward-reverse 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 forward-reverse lever in FORWARD. Press the inching pedal fully down and hold. Depress the accelerator pedal. The truck should not move. Now, with the accelerator pedal 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.

13) FLUIDS, FILTERS AND ENGINE ACCESSORIES

To check fluid levels and other components within the engine compartment, unlatch and open the bonnet to access the engine compartment.

⚠ To avoid the possibility of personal injury, never work in the engine compartment with the engine running, except when it is absolutely necessary to check or make adjustments. Take extreme care to keep hands, tools, loose clothing, etc., away from fan and drive belts. Also remove watches, bracelets, and rings.

(1) Engine accessories

Inspect the engine coolant hoses and fan belt (s). Look for leaking and obvious damage, worn (frayed) condition, breaks, etc. that could cause failure during operation.

(2) Engine air cleaner

Check the engine air cleaner for damage and contamination (excessive dirt build-up and clogging). Be sure that the air cleaner hose is securely connected (not loose or leaking). Fan or cone shaped dust deposit on tube or hose surfaces indicate a leak.

Change or service the air cleaner element every one year, depending upon your application. Service intervals may also be determined by the air cleaner warning lamp.

(3) Battery

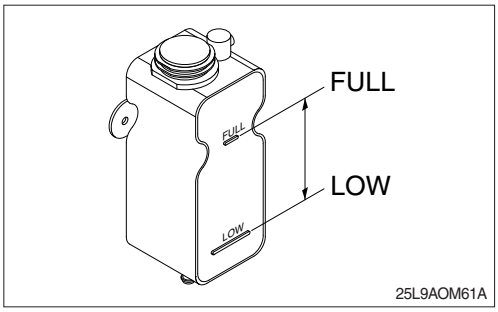
Inspect the battery for damage, cracks, leaking condition, etc.. If the terminals are corroded, clean and protect them with HYUNDAI battery saver (Available from your HYUNDAI dealer). If your battery has removable cell caps, check to be sure the cells are all filled. Refill them with distilled water.

⚠ EXPLOSIVE GASES : Do not smoke or have open flames or sparks near batteries. An explosion can cause injury or death.

(4) Engine cooling system

To check engine coolant level, open the hood to the engine compartment. Visually inspect the recovery bottle, locate the Full and Low marks.

The Full mark indicates maximum level at operating temperature. The Low mark indicates additional coolant needs to be added to the system.



△ A level anywhere between the Full and Low marks is normal.

※ Inspect the coolant level in the overflow bottle only.

⚠ Do not remove the radiator cap when the radiator is hot. STEAM from the radiator will cause severe burns. Do not remove the radiator cap to check the coolant level.

⚠ Never remove the radiator cap while the engine is running. Stop the engine and wait until it has cooled. Failure to do so could result in serious personal injury from hot coolant or steam blowout and/or damage to the cooling system or engine.

If the level is low, add a 50/50 mixture of specified coolant and water to the correct fill level. If you have to add coolant more than once a month or if you have to add more than one quart at a time, check the coolant system for leaks.

- Check engine oil for presence of coolant leaking into engine.
- Inspect the coolant for condition. Look for excessive contamination or rust or oil in the coolant solution.
- Check the PM time interval for need to change coolant.
- Check the condition of radiator cap rubber seal and radiator filler neck for damage. Be sure they are clean.
- Check overflow hose for logging or damage.

※ Your lift truck cooling system is filled with a factory installed solution of 50% water and 50% permanent-type antifreeze containing rust and corrosion inhibitors. You should leave the solution in year around. Plain water may be used in an emergency, but replace it with the specified coolant as soon as possible to avoid damage to the system. Do not use alcohol or methanol antifreeze.

(5) Engine oil and filter

Locate the engine oil dipstick. Pull the dipstick out, wipe it with a clean wiper, and reinsert it fully into the dipstick tube. Remove the dipstick and check oil level.

It is normal to add some oil between oil changes. Keep the oil level between the H and L mark on the dipstick by adding oil as required. **Do not overfill**. Use the correct oil as specified under lubricant specification.

It is recommended to :

- Check and add the engine oil every day.
- Change and replace the engine oil and oil filter every 500 hours.
- Remove the oil pan drain plug to drain old oil after the truck has been in operation and the engine oil is operating temperature.

⚠ Engine oil at operating temperature is hot and can cause burns. Beware of splashing oil.

- Carefully check for leaks after changing oil and installing new filter.

※ The time interval for changing engine oil depends upon your application and operating conditions. To determine the correct schedule for your truck, check the engine oil condition regulauly.

OIL PERFORMANCE DESIGNATION : To help achieve proper engine performance and durability, use only engine lubricating oils of the proper quality. For LPG and gasoline engines, HYUNDAI recommends that you use motor oil that meets API service classification API SG, SL, SAE 10W-30 oil or better.

(6) Hydraulic oil tank

Check the hydraulic oil tank oil level. Correct oil level is important for proper system operation. Low oil level can cause pump damage. Over filling can cause loss of oil or lift system malfunction. Hydraulic oil expands as its temperature rises. Therefore, it is preferable to check the oil level at operating temperature (after approximately 30 minutes of truck operation). To check the oil level, first park the truck on a level surface and apply the parking brake.

Put the mast in a vertical position and lower the fork carriage fully down. Pull the dipstick out, (attached to the sump breather) wipe it with a clean wiper, and reinsert it. Remove dipstick and check oil level. Keep the oil level above the LOW mark on the dipstick by adding recommended hydraulic oil only, as required. **Do not overfill.**

Check the condition of the hydraulic oil (age, color or clarity, contamination). Change the oil as necessary.

(7) Hydraulic oil and filter change

Drain and change the hydraulic oil every 2000 or 5000 operating hours. (Severe service or adverse conditions may require more frequent oil change). Please to page 7-14 for service interval. Replace the hydraulic return filter at every oil change. Remove, clean, and reinstall the hydraulic system suction line strainer at every 2000 hours. Check for leaks after installation of the filter. Also, check that the hydraulic line connections at the filter adapter are tightened correctly.

(8) Hydraulic tank air breather maintenance and inspection

Remove the air breather and inspect for excessive (obvious) contamination and damage. Replace the air breather, per recommended PM schedule or as required by operating conditions.

(9) Transmission oil check

To check the transmission oil locate the dipstick. The dipstick is located on the driver's left hand side under the floor plate near the transmission valve. Before checking, run the engine until the unit is at operating temperature. This is important since transmission oil temperature should be minimum of 65˚C (150˚F) to 120˚C (250˚F) maximum, the engine should also be at operating temperature. Apply the parking brake.

With the engine operating at idle and the transmission in NEUTRAL, and the parking brake set, check the oil on the dipstick. Fill, if necessary, to the Normal zone on the dipstick, using the transmission oil recommended by HYUNDAI.

※ **Check the planned maintenance interval (operating hours) or the condition of the oil to determine if the transmission oil needs to be changed.**

14) 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 page 7-30 for additional information on truck blocking and jacking. Also refer to page 7-41 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.

15) 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.

16) 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 9. SPECIFICATIONS)

Critical items include :

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

17) 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

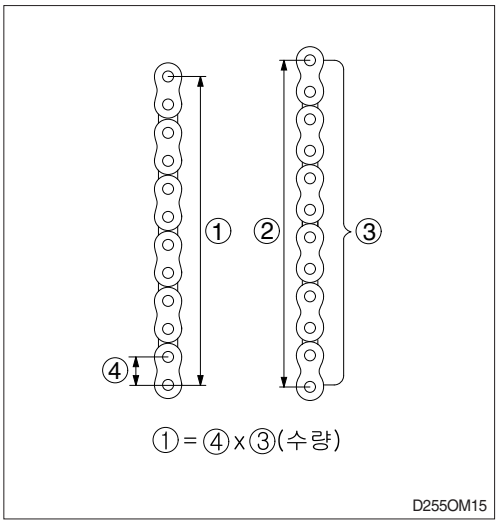
Inspect and lubricate the lift chains every PM (250 hours). When operating in corrosive environments, inspect the chains every 50 hours. During the inspection, check for the following conditions :

- 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 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.

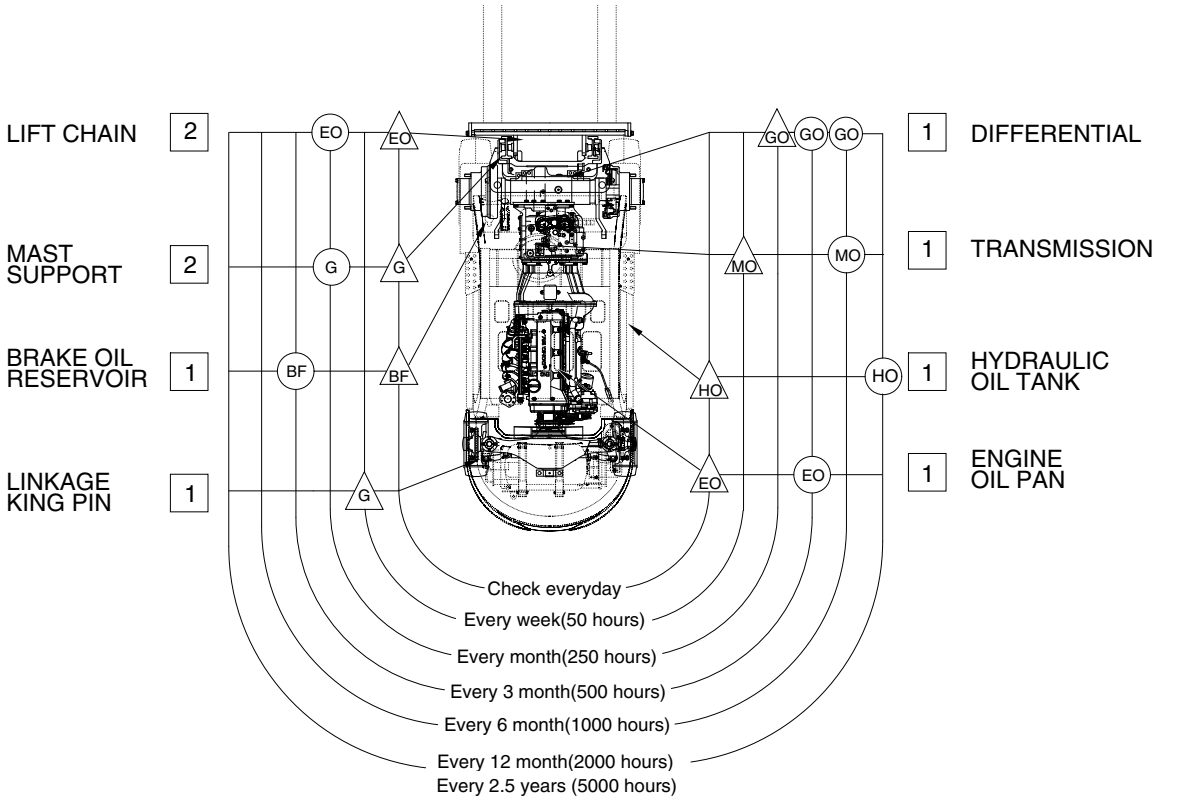
④ **Pitch**

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.

7. LUBRICATION CHART



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NOTES

① △: Check, add oil when needed.

② ○: Change oil or add oil.

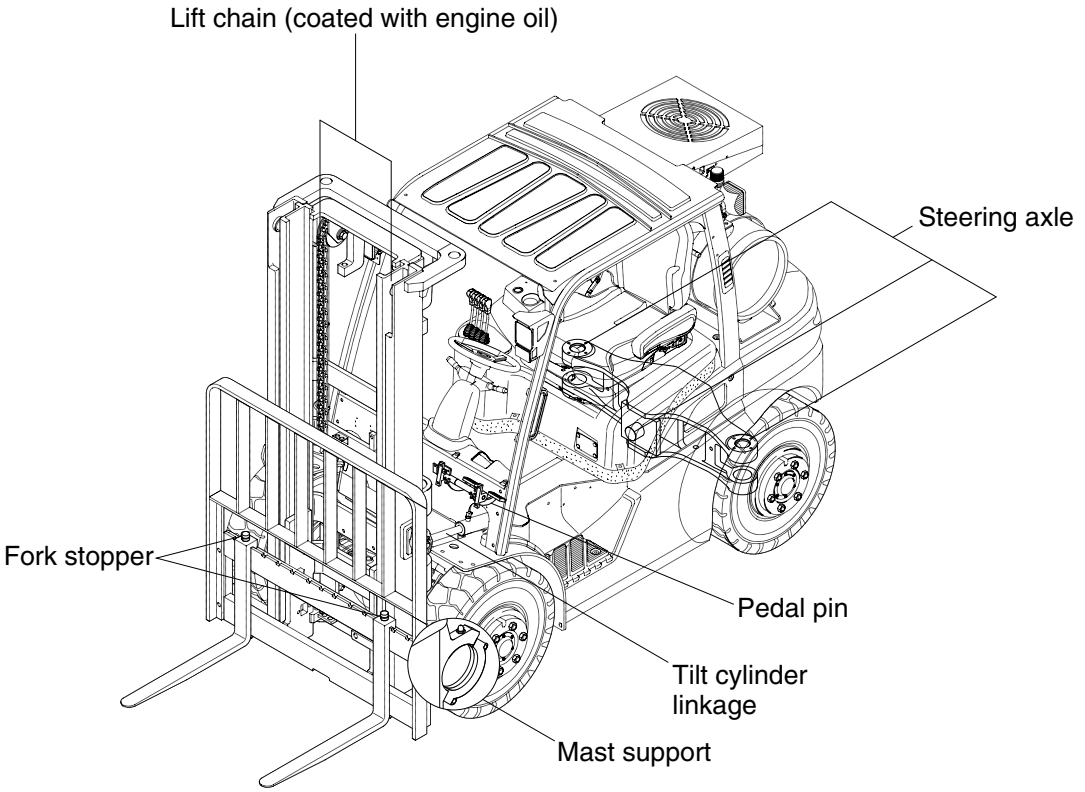
③ Figures in squares indicate number of lubricating points.

④ All service intervals in the chart are based on daily, 1 week, 1 month, 3 months, 6 months, 12 months, 30 months and service meter readings.

Mark	Kind of lubricants	In moderate weather	Cold region★
EO	Engine oil	API SL class or better	
MO	T/M oil	ATF DEXRON III	
GO	Gear oil	Shell Donax TD	
HO	Hydraulic oil	ISO VG 68	ISO VG 15
BF	Brake fluid	Azolla ZS 32 (Hydraulic oil, ISO VG 32)	
G	Grease	NLGI No. 2	NLGI No.1

★ Cold region : Russia, CIS, Mongolia

8. GREASING POINT



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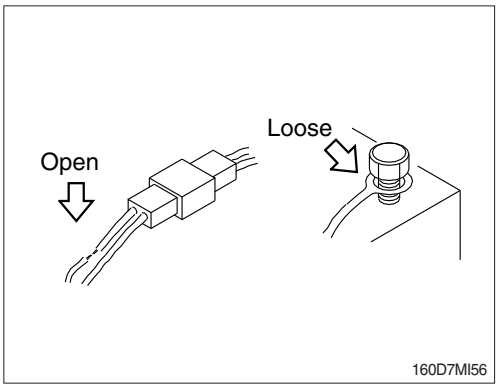
1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



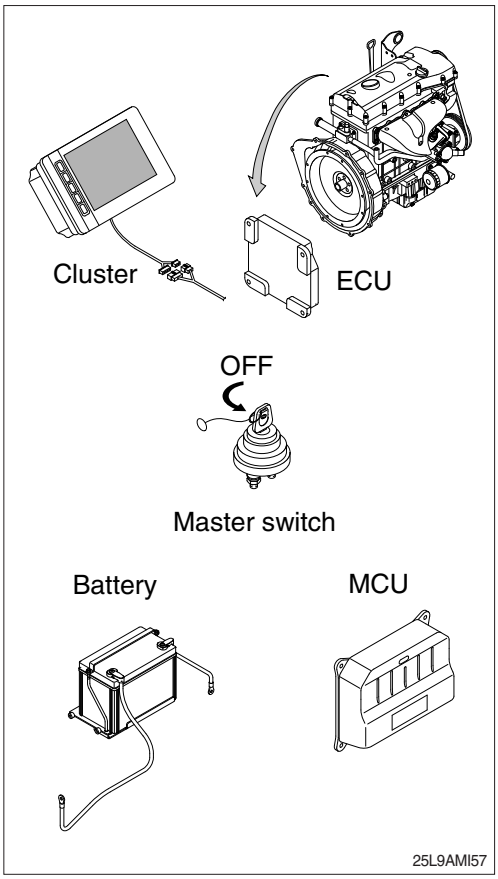
2) WELDING REPAIR

Before start to welding, follow the below procedure.

(1) Shut off the engine and remove the start switch.
(2) Disconnect ground cable from battery by master switch.
(3) Before carrying out any electric welding on the truck, the battery cables should be disconnected and the connectors pulled out of the electronic control units (MCU, ECU, cluster etc).
(4) Connect the earth (ground) lead of the welding equipment as close to the welding points as possible.

※ Do net 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.



10. AIR CONDITIONER AND HEATER

1) 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.

2) CHECK DURING SEASON

Ask the service center for replenishment of refrigerant or other maintenance service so that the cooling performance is not damaged.

3) 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.

4) REFRIGERANT

(1) Equipment contains fluorinated greenhouse gas.

Model	Type	Quantity	GWP
25L/30L/35L-9A, 35LN-9A	HFC-134a	0.55 kg (1.21 lb)	787 CO_2 eq.

※ GWP

Global warming potential (GWP) is a measure of how much heat a gas traps in the atmosphere relative to that of carbon dioxide (CO2). GWP is calculated in terms of the 100-year warming potential of 1 kg of a greenhouse gas relative to 1 kg of CO2.

(2) Envior

The air conditioning system of the machine is filled with HFC-134a refrigerant at the factory.
HFC-134a refrigerant is a flourinated greenhouse gas and contributes to global warming.
Do not release refrigerant into the environment.

(3) Safety precautions

Work on the air conditioning system must only be performed by a qualified service technician.
Do not attempt to preform work on the air conditioning system.
Wear safety goggles, chemical resistant gloves and appropriate personal protective equipment to protect bare skin when there is a risk of contact with refrigerant.

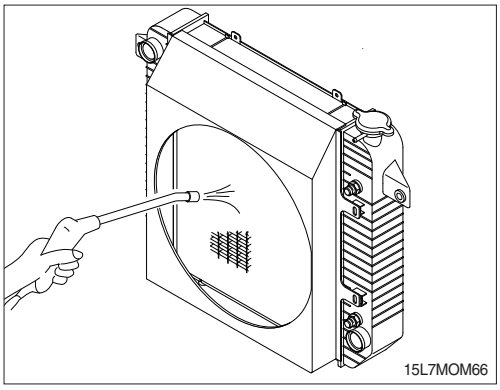
(4) Action in case of exposure

① Eye contact / Limited skin contact
Rinse with warm water and apply a light bandage. Seek medical attention immediately.

② Extensive skin contact
Rinse with warm water and carefully heat the area with warm water or warm clothing.
Seek medical attention immediately.

③ Inhalation
Leave the area and find fresh air. Seek medical attention immediately.

11. 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 9. SPECIFICATIONS)

4) In case of overheating, do not stop the engine immediately.

(1) Run the engine at low idling.

(2) Open the bonnet 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.

12. 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) Use a mixture of 50 percent soft water and 50 percent ethylene glycol antifreeze to fill the cooling system. Refer to page 7-47.

⚠ Use ethylene glycol base antifreeze.
⚠ Use soft water (city water, etc.) as mixing water.
⚠ Cooling system must be thoroughly flushed before filling with antifreeze mixture.
⚠ 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.

13. RECOMMENDATION TABLE FOR LUBRICANTS

1) NEW TRUCK

New truck uses following fuel, coolant and lubricant.

Description	Specification
Engine oil	SAE 10W-30 (API SL class or better)
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★
Grease	Lithium base grease NLGI No.2
Fuel	LPG
Brake fluid	Azolla ZS32 (Hydraulic oil ISO VG32)
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 Society of Testing and Material

★ : Cold region
Russia, CIS, Mongolia

14. 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	5.7 (1.5)	★SAE 5W-40 SAE 10W-30 (API SM class or better)
Torque converter transmission	ATF	8.5 (2.2)	ATF DEXRON III
Axle	Gear oil	5.6 (1.48)	Shell Donax TD
Hydraulic tank	Hydraulic oil	· 2.5 TON 36 (9.5) · 3.0/3.3 TON 38 (10.0)	★ISO VG 15 ISO VG 46 ISO VG 68
Fuel tank	LPG	15 (4.0)	LPG
Fitting (Grease nipple)	Grease	-	★NLGI NO.1 NLGI NO.2
Brake reservoir tank	Brake oil	0.5 (0.13)	Azolla ZS32 (Hydraulic oil ISO VG32)
Radiator	Antifreeze : soft water	10 (2.65)	★Ethylene glycol base permanent type (60 : 40) Ethylene glycol base permanent type (50:50)

★ : Cold region
Russia, CIS, Mongolia

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.**