CONTENTS

1. GENERAL SAFETY RULES

2. OPERATING HAZARDS

3. KNOW YOUR TRUCK

4. DAILY SAFETY INSPECTION

5. OPERATING PROCEDURES

6. EMERGENCY TOWING

7. PLANNED MAINTENANCE

8. SPECIFICATIONS

A MESSAGE TO HYUNDAI LIFT TRUCK OPERATORS

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

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

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

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

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

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

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

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

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

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

INTRODUCTION

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

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

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

Routine Servicing and Maintenance

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

Operator Daily Inspection - Safety and Operating Checks

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

Planned Maintenance

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

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

Service Manual

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

HOW TO USE THIS MANUAL

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

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

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

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

Section 4. Daily Safety Inspection, presents details on how to perform the operator's daily safety inspection and refuel the lift truck.

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

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

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

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

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

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

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

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

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

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

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

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

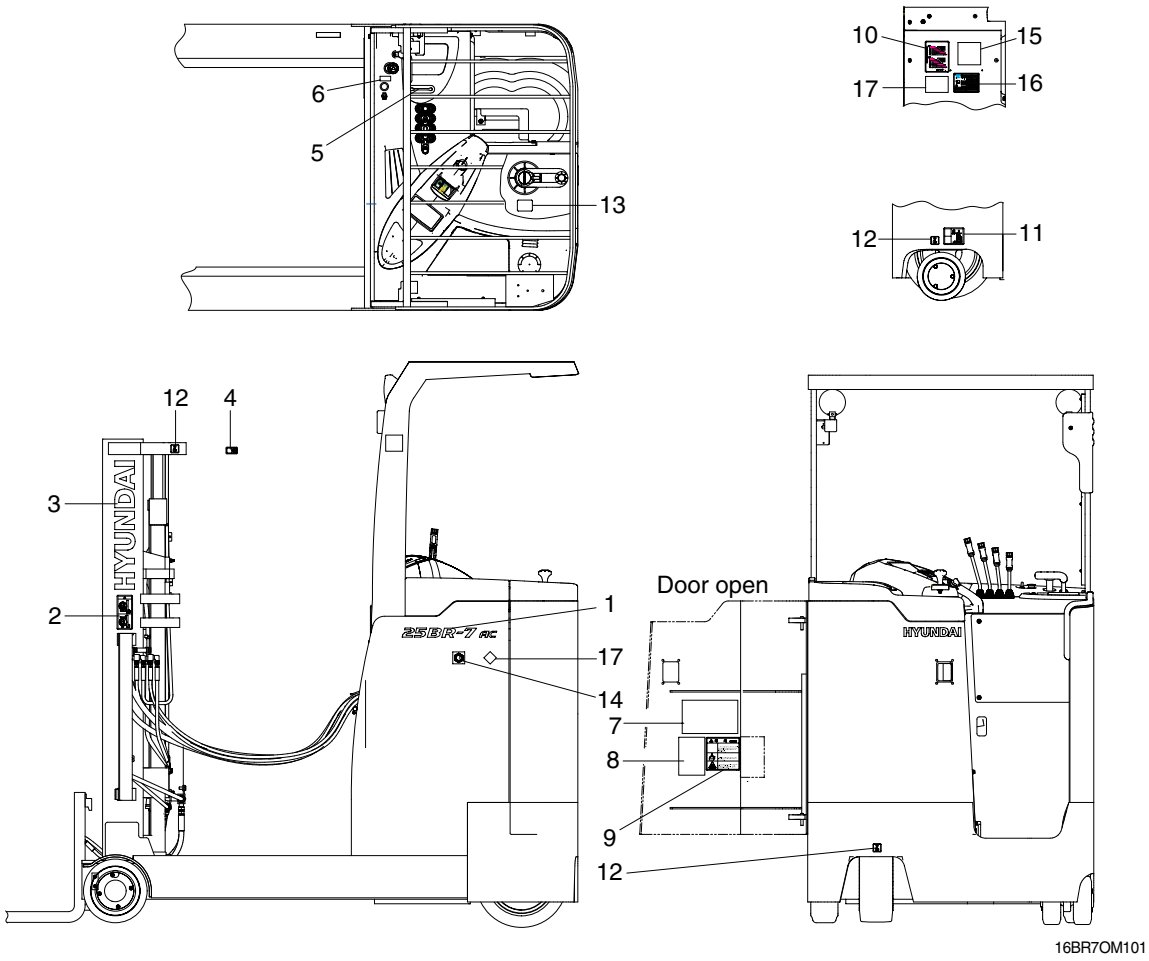
This manual is intended to be a permanently attached part of your lift truck. Keep it on the truck as a ready reference for anyone who may drive or service it. If the truck you operate is not equipped with a manual, ask your supervisor to obtain one and have it attached to the truck. And, remember, your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

SAFETY LABELS

1. LOCATION

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

1) 10/13/14/15/18/20/25BR



1	Model name	8	Maintenance instructions	13	Reverse steering
2	Warning mast	9	Battery handling	14	Temperature
3	Logo	10	Load capacity chart	15	Warning safety
4	Hand caution	11	Hanger	16	Name plate
7	Circuit diagram	12	Oil inlet	17	EE mark

2. DESCRIPTION

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

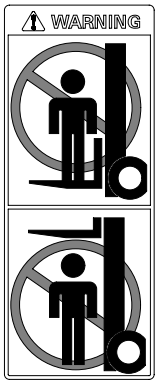
Replace any safety label that is damaged, or missing.

1) WARNING MAST(Item 2)

This warning label is positioned on the side of the mast.

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

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



D35AOM62

2) TEMPERATURE(Item 14)

This warning label is positioned on the side cover.

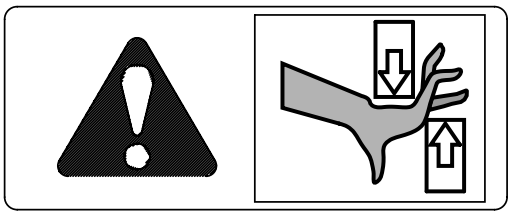
⚠ **Coolant must be checked as specified in the maintenance chart.**

77070FW06

3) HAND CAUTION(Item 4)

This warning label is positioned on the top side of mast.

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



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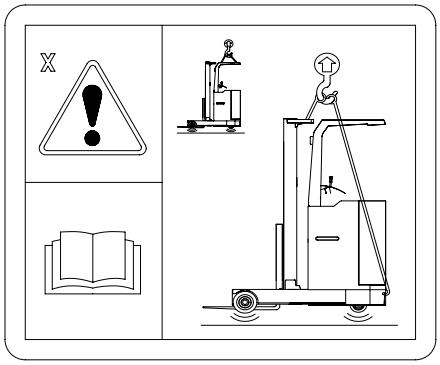
4) HANGER(Item 11)

(1) This warning label is positioned on the front frame.

⚠ **Refer to page 1-18 for safe loading procedures.**



16BR7FW12

5) Battery handling(Item 9)

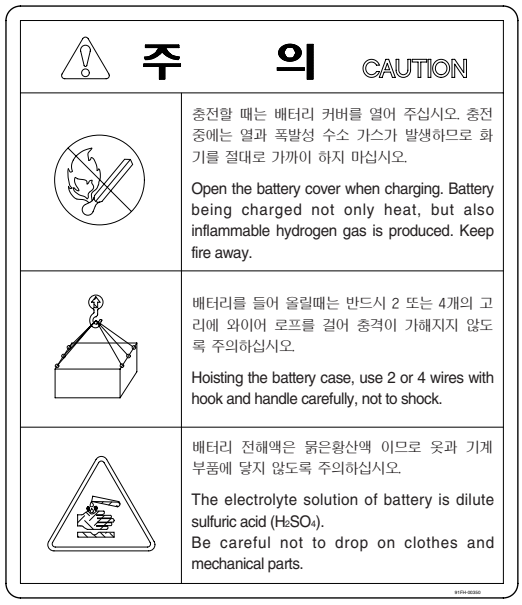
This battery handling is located on the right side frame of the cab.

⚠ **Refer to page 7-20 for a safe battery removal.**

※ Open the battery cover when charging. Battery being charged not only heat, but also inflammable hydrogen gas is produced. Keep fire away.

※ Hoisting the battery case, use 2 or 4 wires with hook and handle carefully, not to shock.

※ The electrolyte solution of battery is dilute sulfuric acid (H_2SO_4).
Be careful not to drop on clothes and mechanical parts.



15BT7FW11

6) WARNING SAFETY(Item 15)

This warning safety is located on the right side frame of the cab.

(1) Before putting this truck in operation, test brakes, steering controls, horn and other devices for safety and easy of operation.

(2) Only trained and qualified persons should operate this truck.

(3) Operate truck or auxiliary devices only from operator's seat.

(4) Use drivers overhead guard and load backrest extension unless conditions prevent their use.

(5) Before key switch ON, place shift lever in neutral position.

(6) Spread forks far apart and place them on center completely under loaded.
Do not handle unstable of loosely stacked loads.

(7) Use extreme care with long, high or wide loads and do not overload truck. (See load chart)

(8) Travel with load or lifting mechanism at minimum ground clearance and tilted back. Except on ramps travel with the load trailing when the load interferes with visibility.

(9) Operate on ramps with load upgrade. Travel slowly with caution and do not turn on inclines.

(10) Avoid sudden starts, stops direction reversals, unsafe speed and reverse braking. Reduce speed for turns or uneven or slippery surface.

(11) Never lift or lower loads while truck is in motion.

(12) Do not allow anyone to stand or pass under load or lifting mechanism keep all body parts out of upright and within confines of truck.

(13) Do not carry passengers. Do not elevate personal without secured safety platform.

(14) Lift with mast vertical or tilted sightly back. Never forward.
Lift loads smoothly and slowly-avoid sudden jerks.

(15) When leaving truck, turn off power, lower lifting mechanism, place shift in neutral. Key or connector plug removed. Also check wheel if truck is on an incuse or to be worked ON.


WARNING

FOR SAFETY

1. Before putting this truck in operation, test brakes, steering controls, horn and other devices for safety and easy of operation.
2. Only trained and qualified persons should operate this truck.
3. Operate truck or auxiliary devices only from operator's seat.
4. Use drivers overhead guard and load backrest extension unless conditions prevent their use.
5. Before key switch ON, place shift lever in neutral position.
6. Spread forks far apart and place them on center completely under loaded. Do not handle unstable of loosely stacked loads.
7. Use extreme care with long, high or wide loads and do not overload truck.

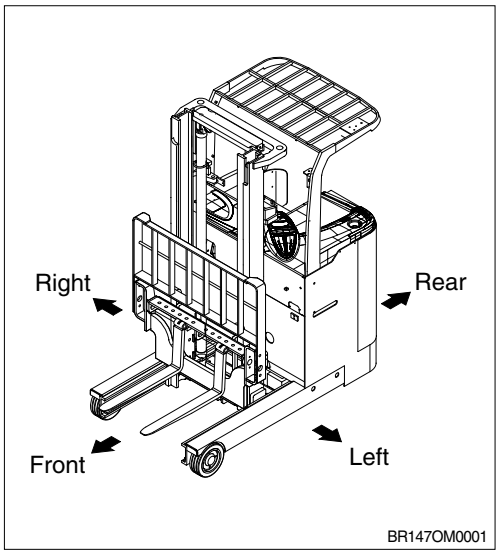
SEE LOAD CHART

8. Travel with load or lifting mechanism at minimum ground clearance and tilted back. Except on ramps travel with the load trailing when the load interferes with visibility.
9. Operate on ramps with load upgrade. Travel slowly with caution and do not turn on inclines.
10. Avoid sudden starts, stops direction reversals, unsafe speed and reverse braking. Reduce speed for turns or uneven or slippery surface.
11. Never lift or lower loads while truck is in motion.
12. Do not allow anyone to stand or pass under load or lifting mechanism keep all body parts out of upright and within confines of truck.
13. Do not carry passengers. Do not elevate personal without secured safety platform.
14. Lift with mast vertical or tilted sightly back. Never forward. Lift loads smoothly and slowly-avoid sudden jerks.
15. When leaving truck, turn off power, lower lifting mechanism, place shift in neutral. Key or connector plug removed. Also check wheel if truck is on an incuse or to be worked ON.

15BT7FW05

1. DIRECTION

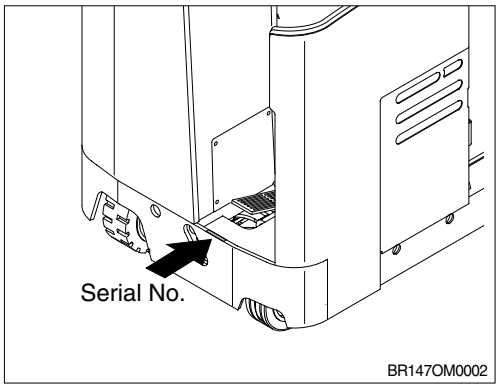
The direction of this machine indicate forward, backward, right and left when machine is in the travelling direction.



2. SERIAL NUMBER

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

1) MACHINE SERIAL NUMBER
It's shown on the rear right side of the frame.



3. SYMBOLS

⚠ **Important safety hint.**

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

※ **It indicates the useful information for operator.**

1. DAILY INSPECTION

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

Check for damage and maintenance problems.

Have repairs made before you operate the truck.

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

BR147OM00

2. DO'S AND DON'TS

Do watch for pedestrians.

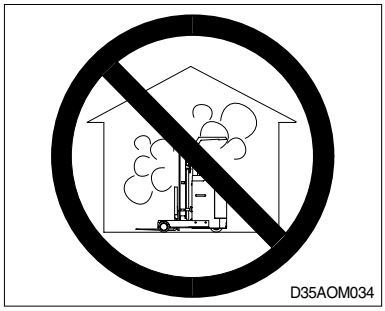
Do wear safety equipment when required.

Don't mix drugs or alcohol with your job.

Don't block safety or emergency equipment.

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

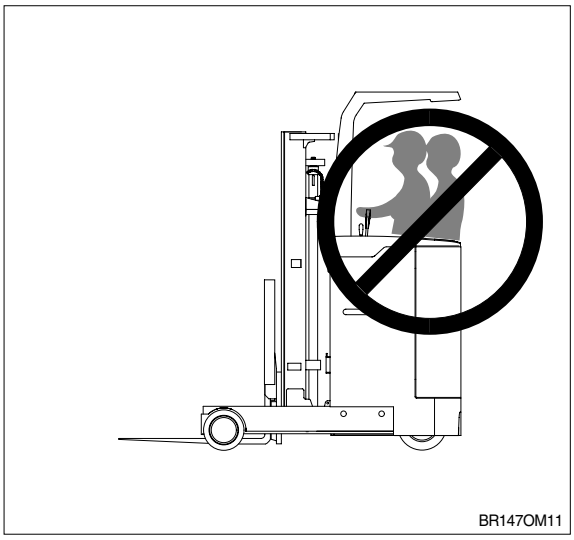
Don't operate the truck outdoors in rainy day.



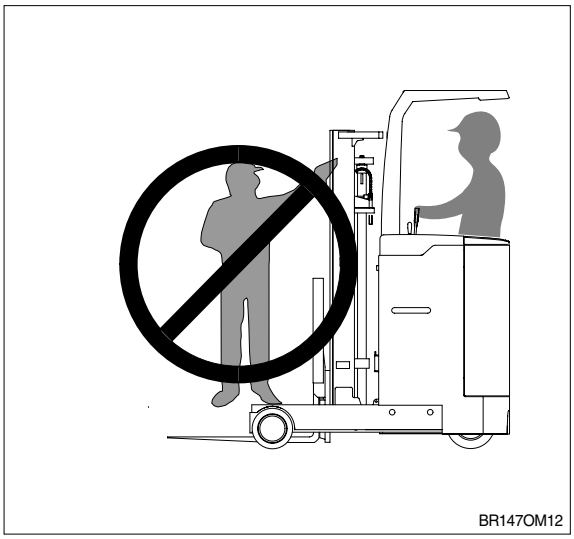
Don't perform battery charging service in the room without adequate ventilation.

3. NO RIDERS

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

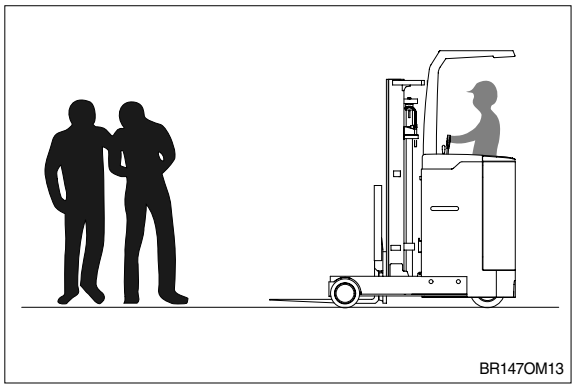


2) Never transport personnel on the forks of a lift truck.

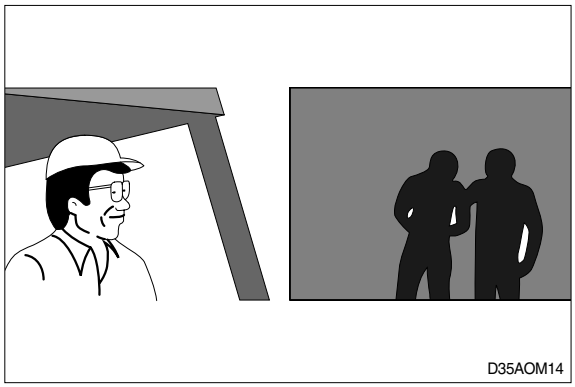


4. PEDESTRIANS

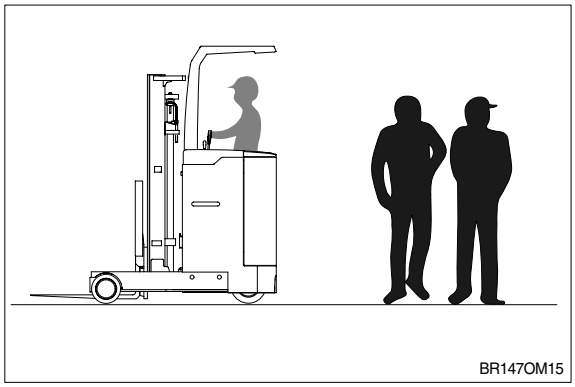
1) Watch where you are going. Look in the direction of travel. Pedestrians may use the same roadway you do. Sound your horn at all intersections or blind spots.



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



3) Make people stand back, even when you are parked.



5. OPERATOR PROTECTION

1) Keep under the overhead guard.

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

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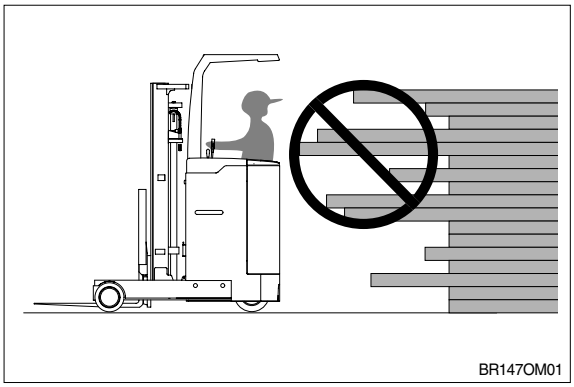
3) Be specially careful when traveling in reverse and maneuvering in tight areas.



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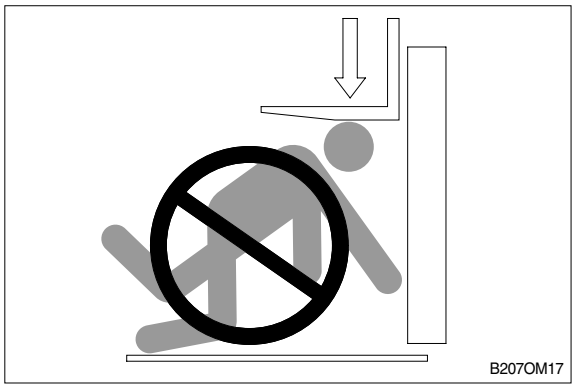
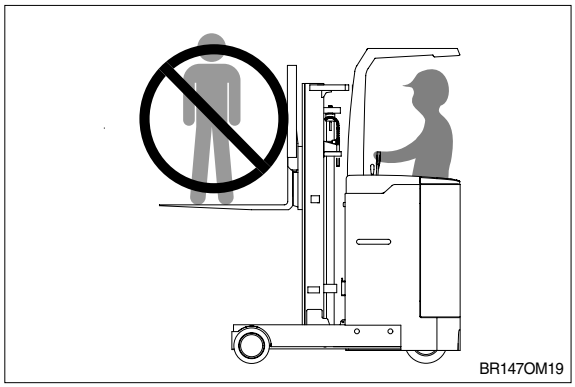
6. FORK SAFETY

Never allow anyone to walk under raised forks.

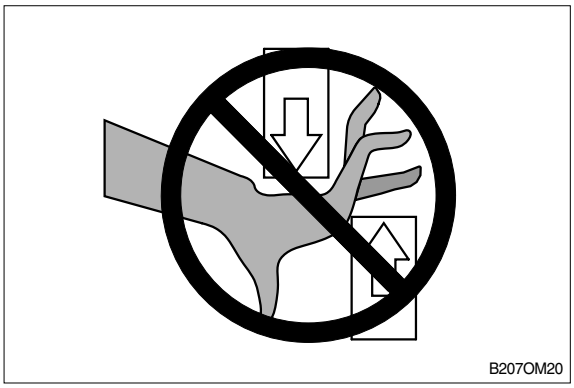


There is special equipment to raise people for overhead work.
DO NOT USE LIFT TRUCKS.



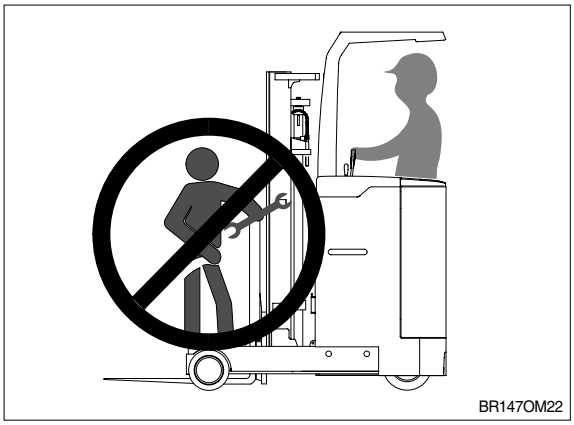
7. PINCH POINTS

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



⚠ Don't use the mast as a ladder.

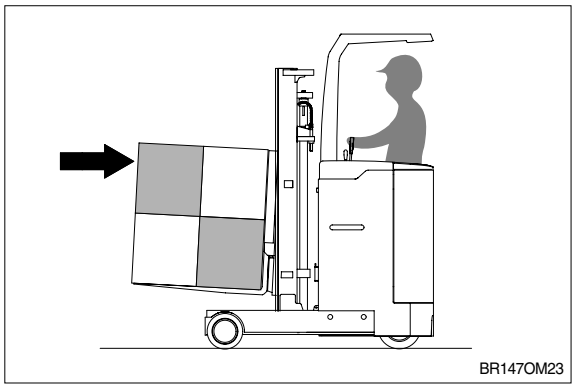
⚠ Never try to repair the mast, carriage, chain, or attachment yourself. Always get a trained mechanic.



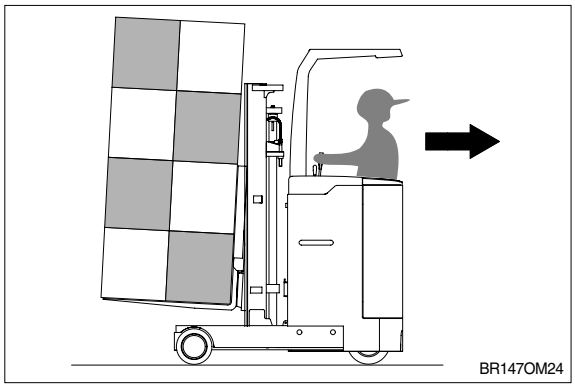
8. TRAVEL

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

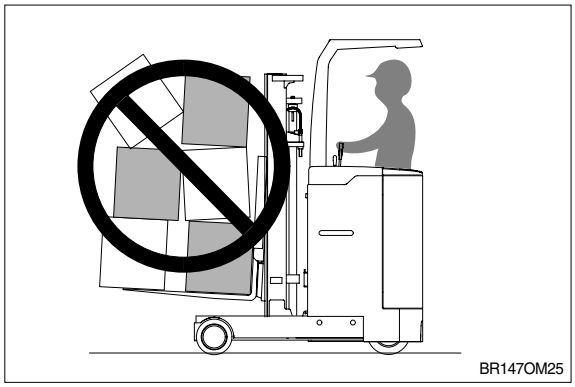
⚠ **Never lift or lower the load when the truck is in motion.**



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



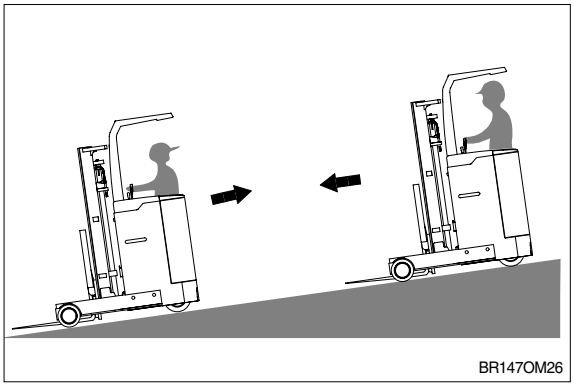
3) Unstable loads are a hazard to you and to your fellow workers. Always make certain that the load is well stacked and evenly positioned across both forks. Never attempt to lift a load with only one fork.



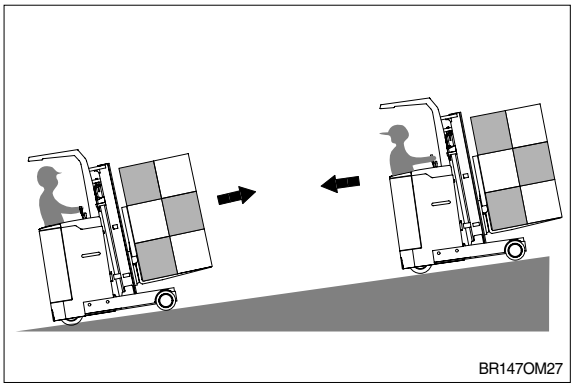
9. GRADES, RAMPS, SLOPES AND INCLINES

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

1) **UNLOADED** - Forks downgrade



2) **LOADED** - Forks upgrade



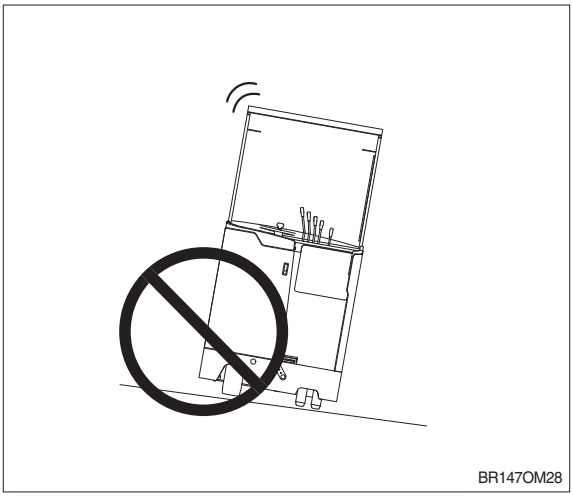
10. TIP OVER

1) LATERAL TIP OVER

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

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

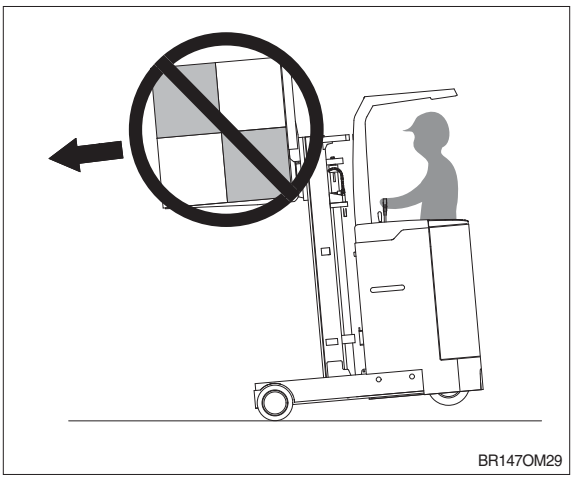
(3) Lateral tip over can occur loaded or unloaded by turning on an incline or ramp.



2) LONGITUDINAL TIP OVER

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

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



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

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

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

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

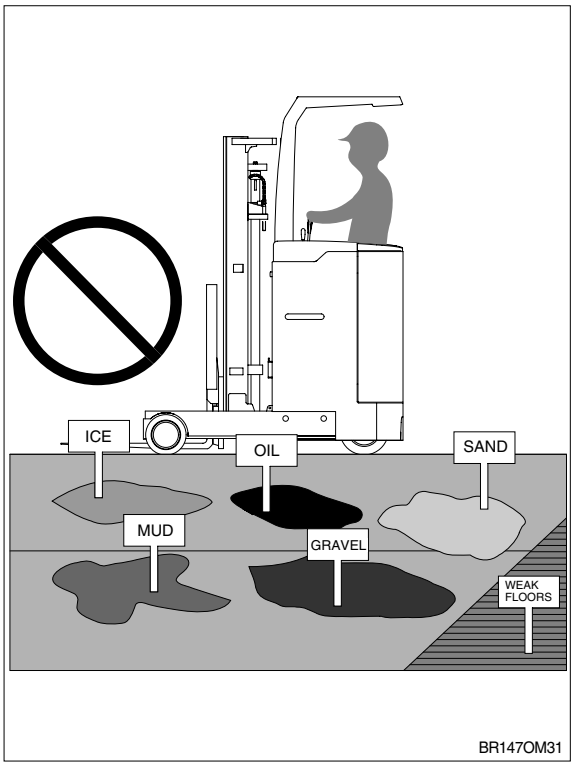
⚠ Some operators travel (Drive) the machine with a raised load and reached-out mast, which is strictly prohibited by global safety rules.

In case of driving or reposition the machine is unavoidable, this only can be allowed for a limited distance with a retracted mast (reached-in) and at a speed of max 2 Km/h.

11. SURFACE AND CAPACITY

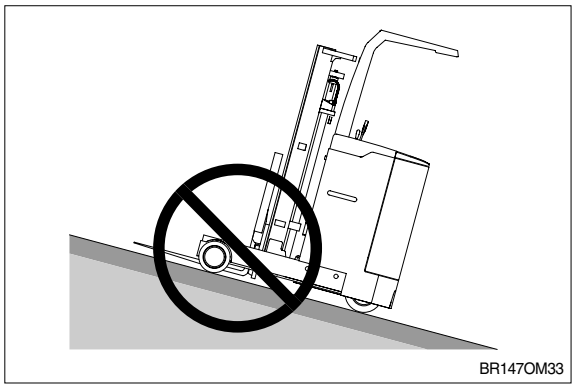
Avoid these conditions. They can cause a truck to tip over or lose traction for braking or driving.

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

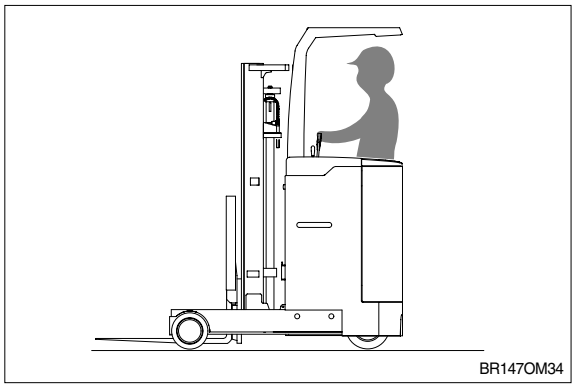


12. PARKING

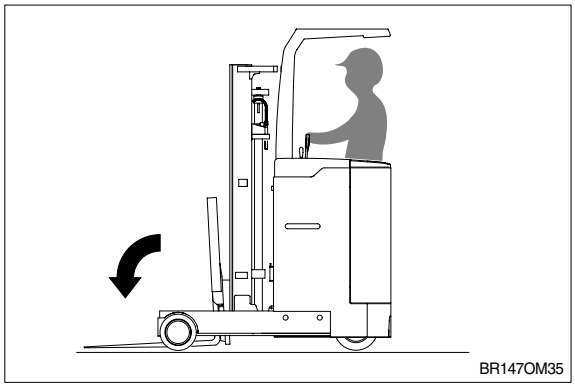
1) Never park on a grade.



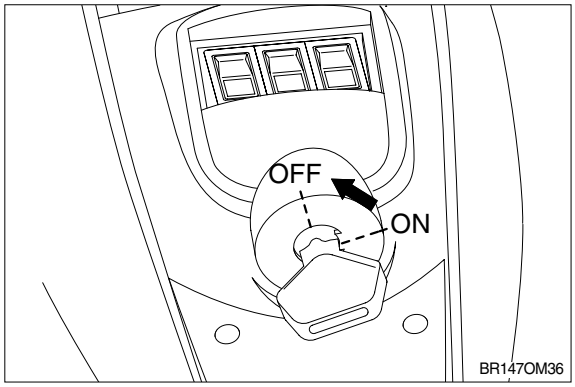
2) Always come to a complete stop before leaving truck. Be sure travel control is in NEUTRAL.



3) Lower forks fully to floor and tilt forward.



4) Turn key to OFF position.



13. LIFTING, JACKING AND BLOCKING

⚠ **Lifting or jacking any large piece of equipment such as forklift truck presents obvious hazards. It must be done with great care and forethought.**

1) SAFE PARKING

Before working on truck :

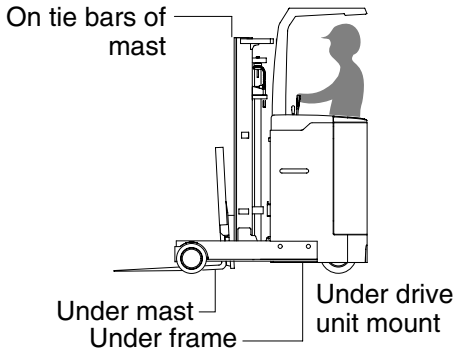
(1) Park truck on a hard, level and solid surface, such as a concrete floor with no gaps or breaks.
(2) Put mast in vertical position and fully lower the forks or attachment.
(3) Put all controls in neutral. Turn key switch OFF and remove key.
(4) Apply the parking brake and block the wheel.

⚠ **Defective equipment can cause accidents. All tools and lifting equipment must be in good condition, meet the load capacity requirements and have OSHA labels when required. Tools with defects and have failures causing severe injury or death.**

2) LIFTING, BLOCKING AND JACKING POINTS

Use the following illustration to locate general lifting, blocking and jacking points on the truck. Read the procedures for raising, blocking or jacking specific components of the truck to make sure you understand the correct, safe procedures.

⚠ **Do not attempt to lift the truck by the overhead guard or the counterweight. Severe injury may result and the truck can be damaged.**



3) RAISING TRUCK WITH A HOIST

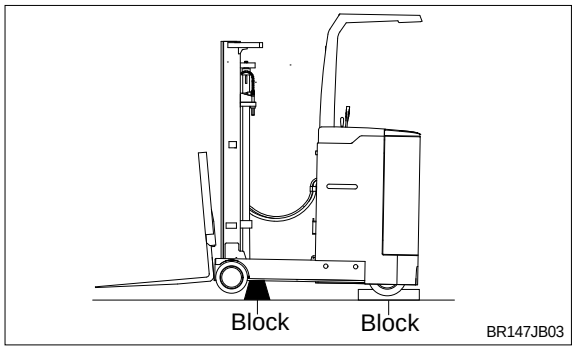
When suitable equipment is available, the front of the truck may be raised by means of a hoist, with wheel cradles placed under the wheels or blocking placed under the frame.

△ **When lifting the front of the truck, watch truck for signs of lateral instability. It may tip sideways. You may have to support or guide the side of the truck or overhead guard to prevent tipping.**

(1) Park truck safely as described in "Safe Parking". Block rear steer wheels.
(2) Check trunnion bolts to make sure they are tightened to correct torque. Bolt torques must be 7.5-8.0kgf · m(55-59ft · lb).
(3) To raise the front of the truck using the mast, spread two chains on the outer rail tiebar the mast.

⚠ **Chain and hoist used to lift truck should be checked to make sure they are of safe lifting capacity. See the truck data plate for information.**

(4) Slowly lift truck and lower drive wheels onto the cradles or place blocking under frame prop points.
(5) When maintenance work is completed, lower the truck to the floor by reversing the lifting procedure. Check to be sure no tools or equipment are under the truck or wheels.



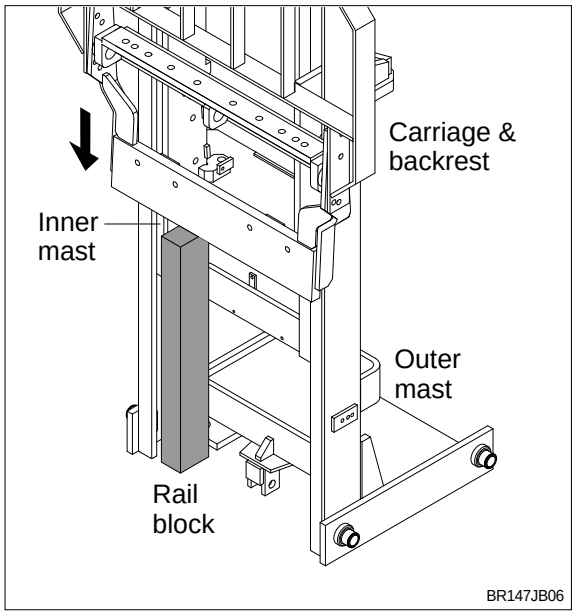
4) BLOCKING THE MAST IN RAISED POSITION

(1) Park truck safely as described in "Safe Parking".
(2) Put blocks in front of and behind load wheels.
(3) Put wooden support blocks conveniently near mast rails before raising the mast. Use two 1118mm(44in) hardwood blocks or equal, of about 305mm(12in) and 610mm(24in) length.

※ **For standard masts, block may need length cut to suit. For triple stage masts the carriage may be blocked up, as shown.**

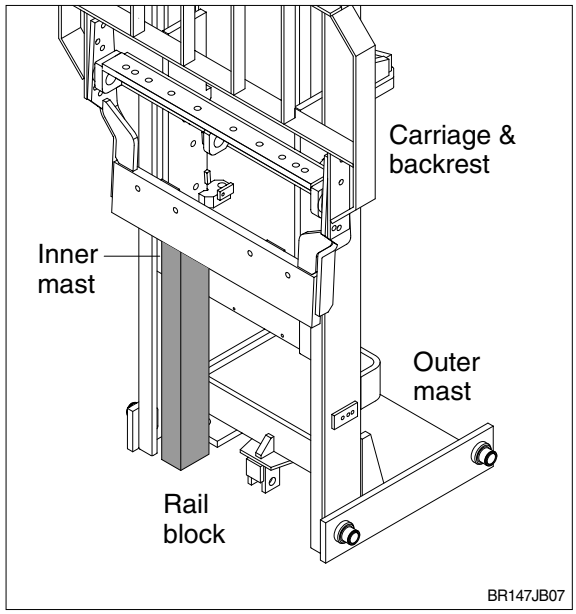
(4) Start truck and raise the mast carriage.

(5) Hold the taller block against inner rail and lower the mast until carriage rests on block.



(6) Hold the shorter block against the outer rail and lower the mast until inner rail rests on the block.

(7) Reverse the procedure to remove blocking.



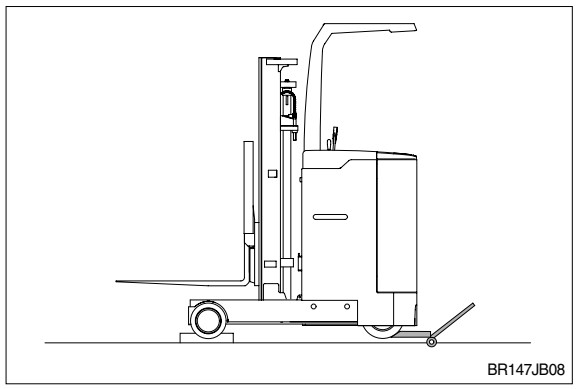
5) RAISING REAR OF TRUCK

The truck may be raised at the rear by jacking and blocking under the center of the frame member at either the front or rear steer axle mounting, or under the center section of the steering axle. Refer to truck data plate for truck weights.

(1) Park truck safely as described in "Safe Parking". Put blocks at front and rear of load wheels.

(2) Put a floor jack under the steering axle mounting frame member, centered between the two wheels.

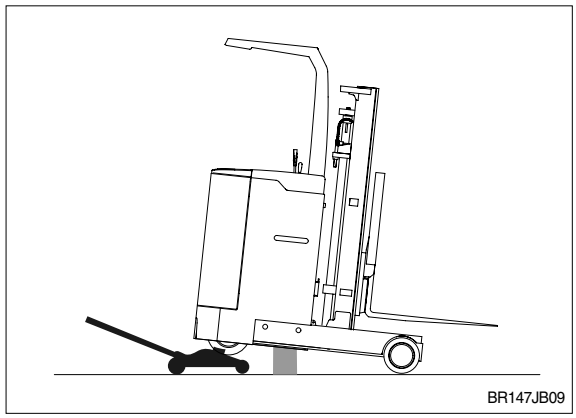
※ **If there is insufficient clearance under frame for your jack, the truck may first be driven onto shims, to increase the ground clearance.**



(3) Raise the truck only as high as necessary to perform the maintenance work.

(4) Put blocks at both sides of the truck, fully under the frame main side structure. Put the blocks in front of butt close to the counterweight and rear wheels for the best truck stability.

(5) Put an equal amount of blocks under each side of the truck to provide a level working position.
Lower the truck onto the blocks and remove the jack.



△ **Before performing any maintenance work, check the truck for stable condition on the blocking.**

(6) When maintenance work is completed, lower the rear side of the truck to the floor by reversing the above procedure and lowering each side of the truck 50mm(2in) at a time :
- Put jack under frame and raise truck.
- Carefully remove blocks and lower truck.
- Remove jack and blocks from drive wheels.

6) RAISING ENTIRE TRUCK

Refer to truck data plate for truck weights.

(1) Park truck safely as described in "Safe Parking". Lower mast fully.

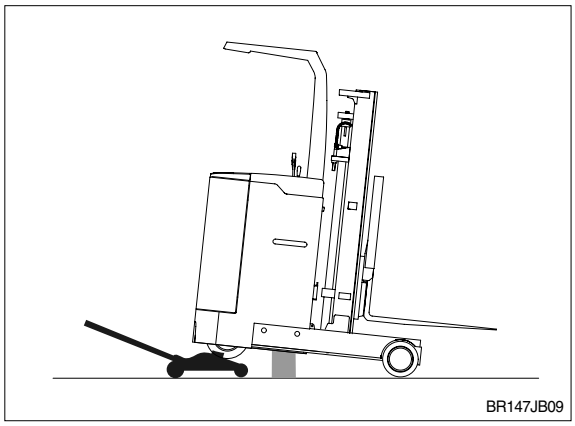
(2) If necessary, drive truck onto boards to increase ground clearance.

⚠ **LATERAL TIP OVER. When jacking side of truck, be sure mast is lowered fully and do not raise one side of the truck more that about 50mm(2in) higher than the other, to avoid tipping truck over laterally.**

LONGITUDINAL TIP OVER. If the mast is removed while the truck is blocked up, the truck will tip backwards due to the heavy counterweight.

(3) Put the jack under side frame near the center of the truck.

※ **Be sure to put the jack squarely and fully under the main side structure of the frame. Do not put the jack under the outer covers which enclose the hydraulic sump tanks.**


BR147JB09

(4) Carefully raise the truck one side at a time, only as high as necessary to do the maintenance work and more than a maximum of 150mm(6in) total.

(5) Put blocks under the side frame. Spread the blocks close to the steer and load wheel for maximum stability.

(6) If using one jack, lower the truck onto the blocks and move the jack to the opposite side. Repeat the lifting procedure.

(7) Put the same size blocks under each side of the truck so it will be level.

△ **Be sure to put the jack squarely and fully under the main side structure of the frame. Do not put the jack under the outer covers which enclose the hydraulic sump tanks.**

(8) When maintenance work is completed, lower the entire truck to the floor by reversing the lifting procedure. Lower the truck one side at a time, while carefully removing the blocks. Check to be sure no tools or equipments are under the truck or wheels.

※ **Depending on jack height, shims under the tires may be needed for clearance to allow removal of jack.**

7) SHIPPING TIE-DOWN INSTRUCTIONS

(1) Front of truck

① With mast and Carriage Installed

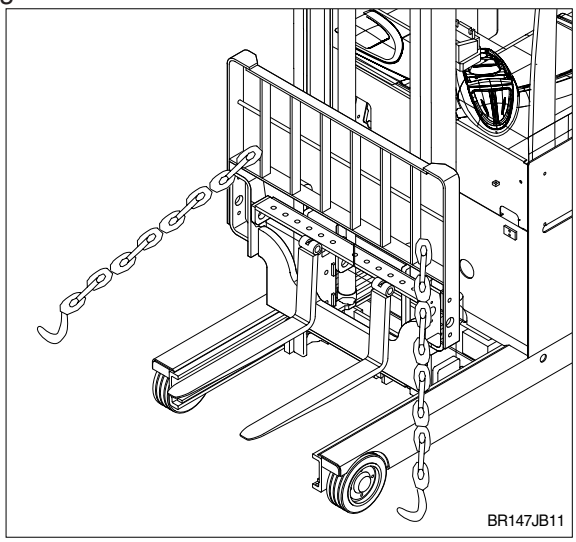
a. Lower the carriage fully.

b. Put a tie down(e.g., chain) between the carriage fork bars.

② Without a mast and Carriage Installed

a. Put a chain across the truck floor plate.

※ **Protect truck from chain damage by using covered chain or protective material under the chain at contact points.**



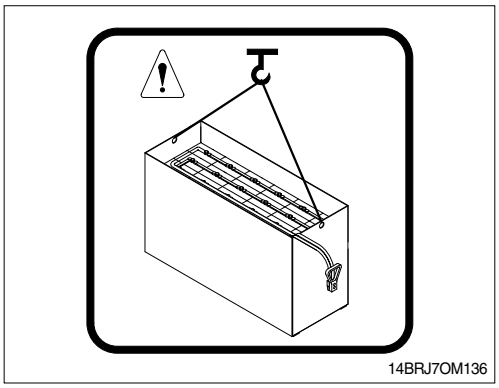
(2) Rear of truck

① Attach the tie down to pocket in bottom of counterweight.

14. LOADING AND UNLOADING BY CRANE

1) Check the weight, length, width and height of the truck referring to the chapter 8, specifications when you are going to hoist the truck.

⚠ **Before loading the truck, battery must be removed. Refer to page 7-22 for a safe battery removal.**



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.

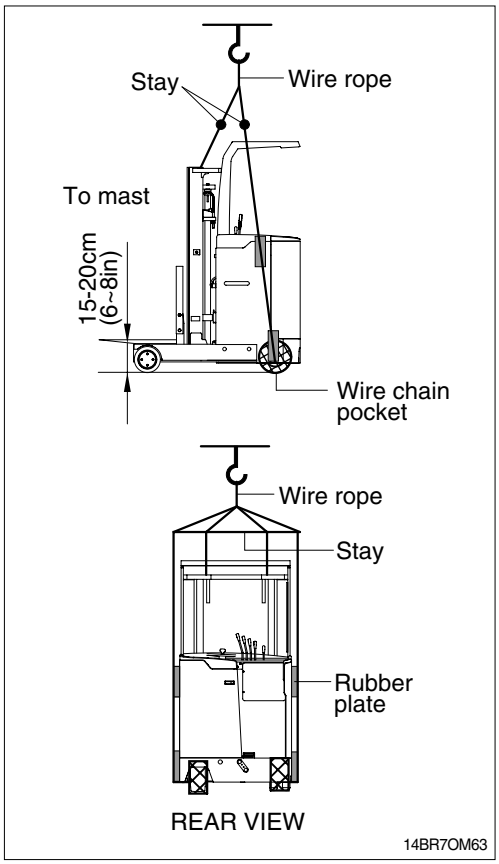
5) Install the wire rope and stay like the illustration.

⚠ **Make sure wire rope is proper size.**

⚠ **The wrong hoisting method or installation of wire rope can cause damage to driver and truck.**

⚠ **Do not load abruptly.**

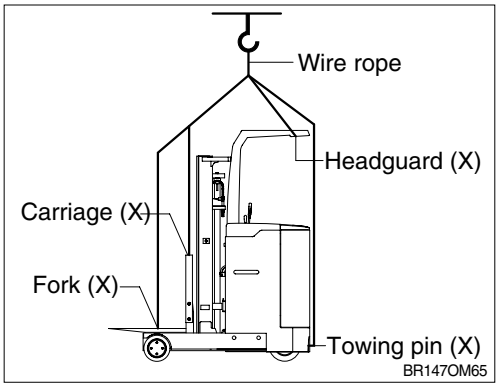
⚠ **Keep area clear of personnel.**



⚠ **Do not install the wire to unsafe position such as forks, carriage, head guard, counterweight lifting hole or towing pin, etc.. It can cause a serious 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 man.**

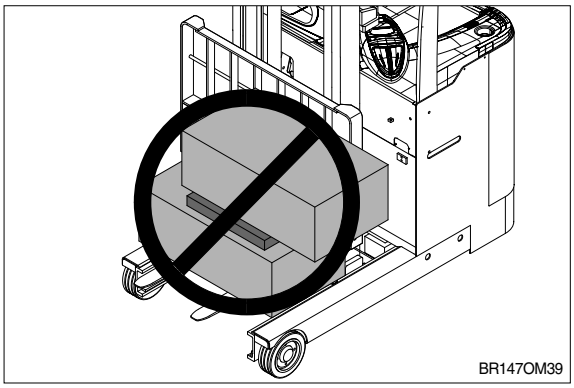


2. OPERATING HAZARDS

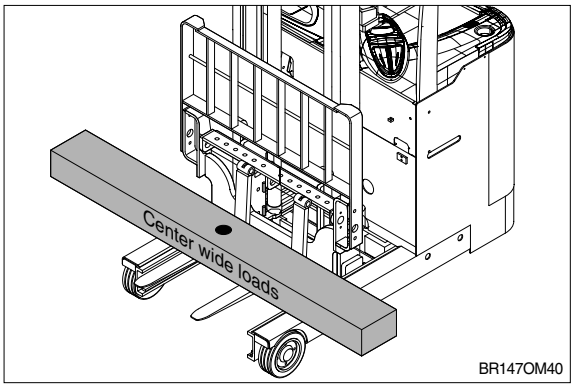
1. LOOSE LOADS

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

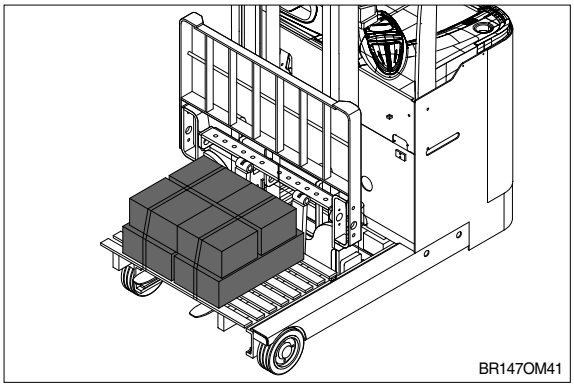
Never carry loose or uneven material.



Center wide loads.



Stack and band loose material.

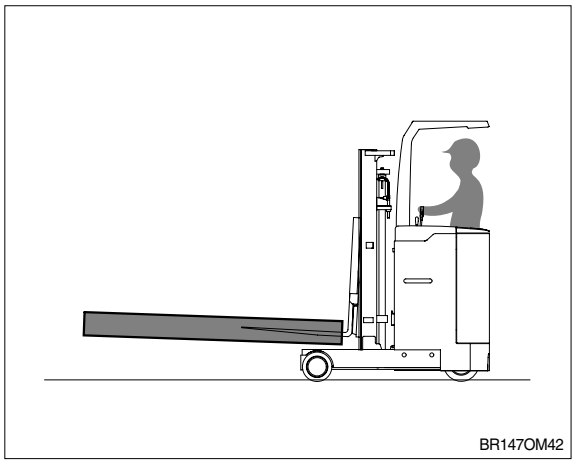


2. LONG AND WIDE LOADS

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

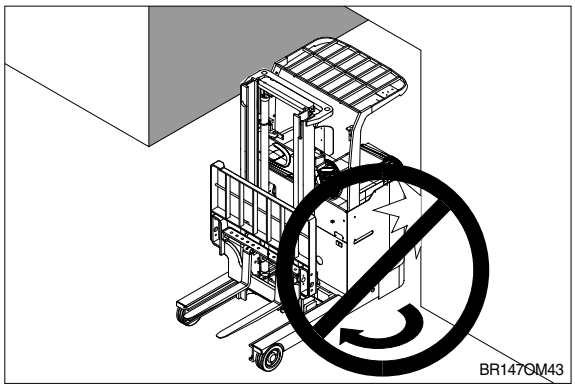
When extra-long material makes it necessary to travel with the load elevated, do so with extreme care and be alert to load end-swing when turning.

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



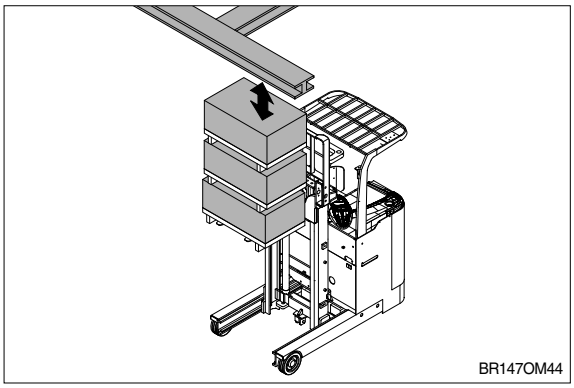
3. REAR SWING

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

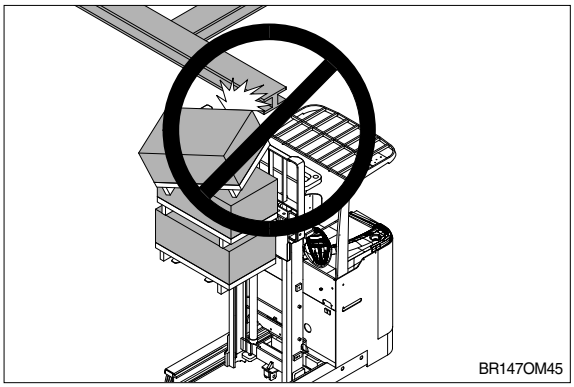


4. LOW OVERHEAD CLEARANCE

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

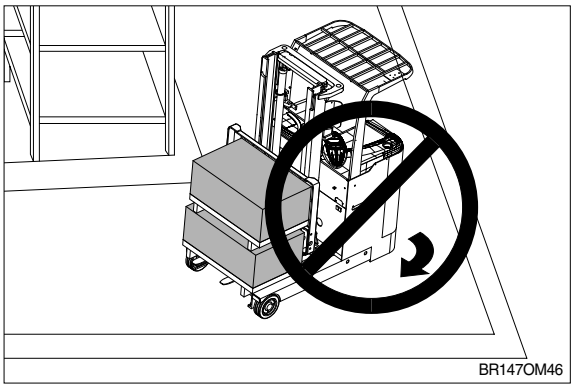


⚠ Watch overhead clearance:
Moving into overhead structures can tip a truck over, or spill a load.

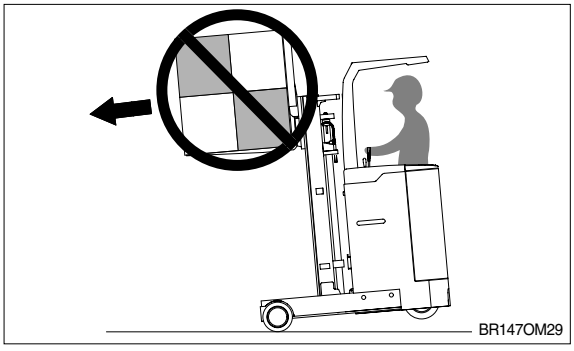


5. FAST TURNS AND HIGH LOADS

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



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

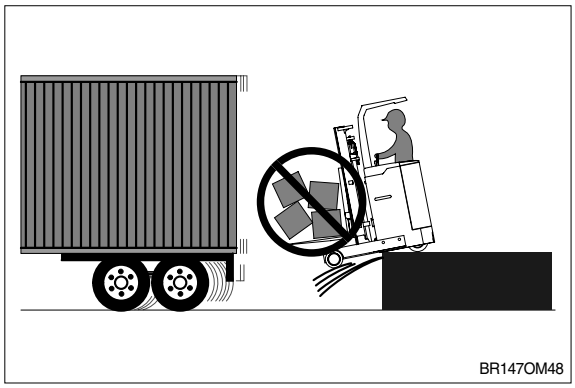


6. DROP-OFFS

⚠ To avoid these hazards, you must:

1) Talk to the truck driver yourself: make sure the driver does not move the trailer until you are done.
2) Apply trailer brakes.
3) Use wheel chocks.
4) Use trailer-to-dock locking system if available.

⚠ The impact of moving in and out of a trailer may cause the trailer to creep or move.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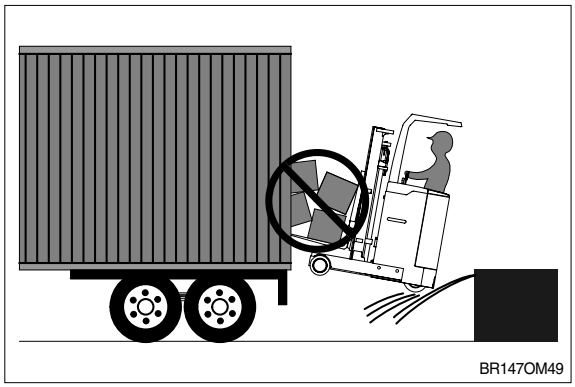
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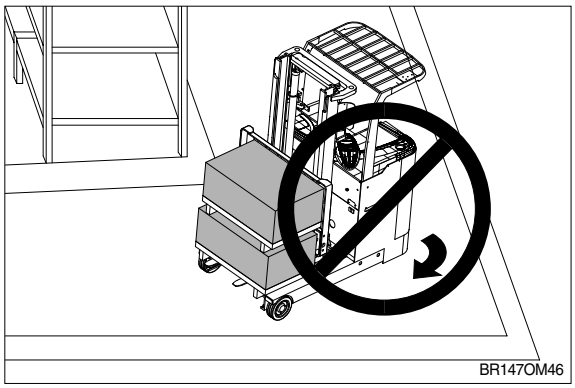
7. RIGHT ANGLE STACKING

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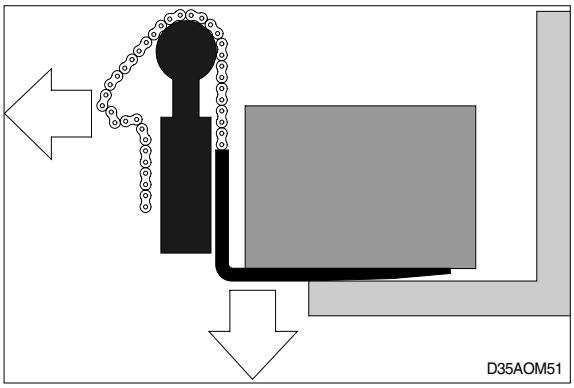
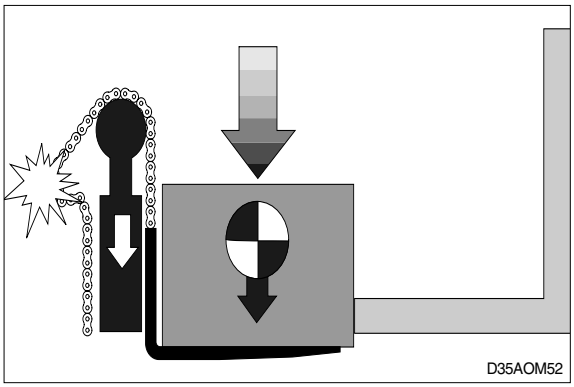
8. CHAIN SLACK

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

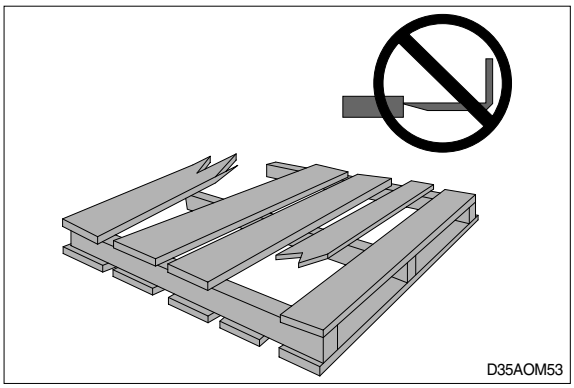




9. PALLETS AND SKIDS

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

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

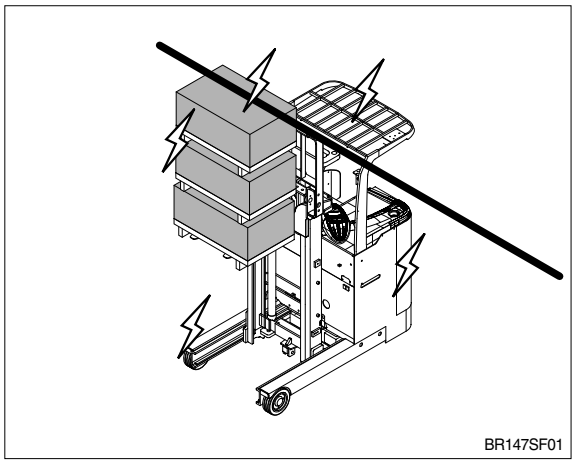


10. CAUTION FOR ELECTRICAL LINES

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

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

Supply voltage	Min safe separation
6.6 kV	3m (10ft)
33.0 kV	4m (13ft)
66.0 kV	5m (16ft)
154.0 kV	8m (26ft)
275.0 kV	10m (33ft)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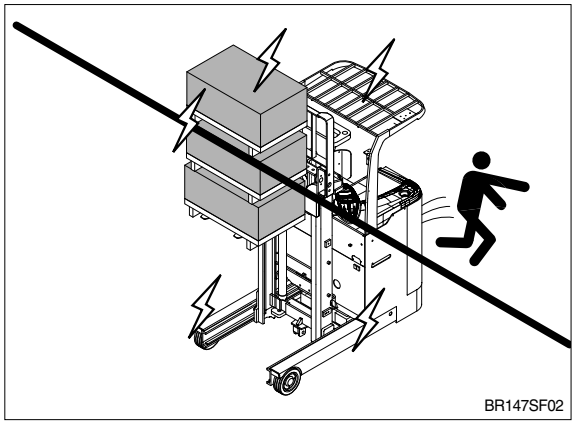
⚠ If the machine touches the electric power lines, keep standing in the operator's compartment and make sure the personnel on the ground do not touch the machine until turning off the electric current.
Jump off the machine without contacting the machine when you need to get off.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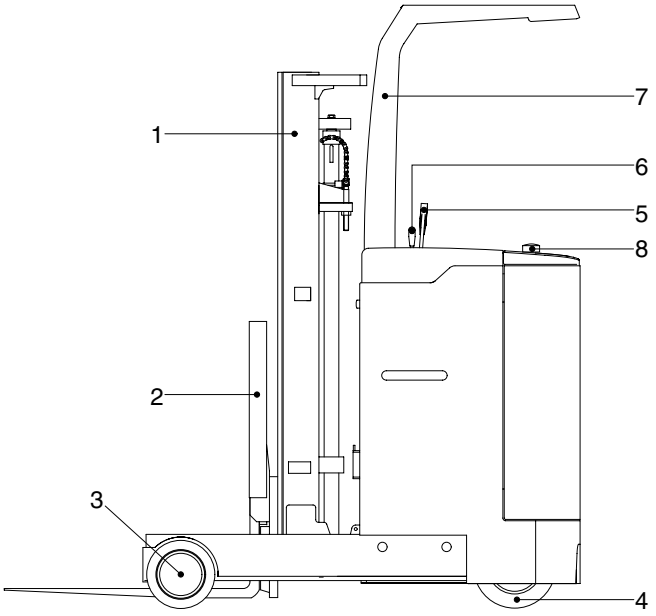
1. GENERAL LOCATIONS

1) OUTLINE



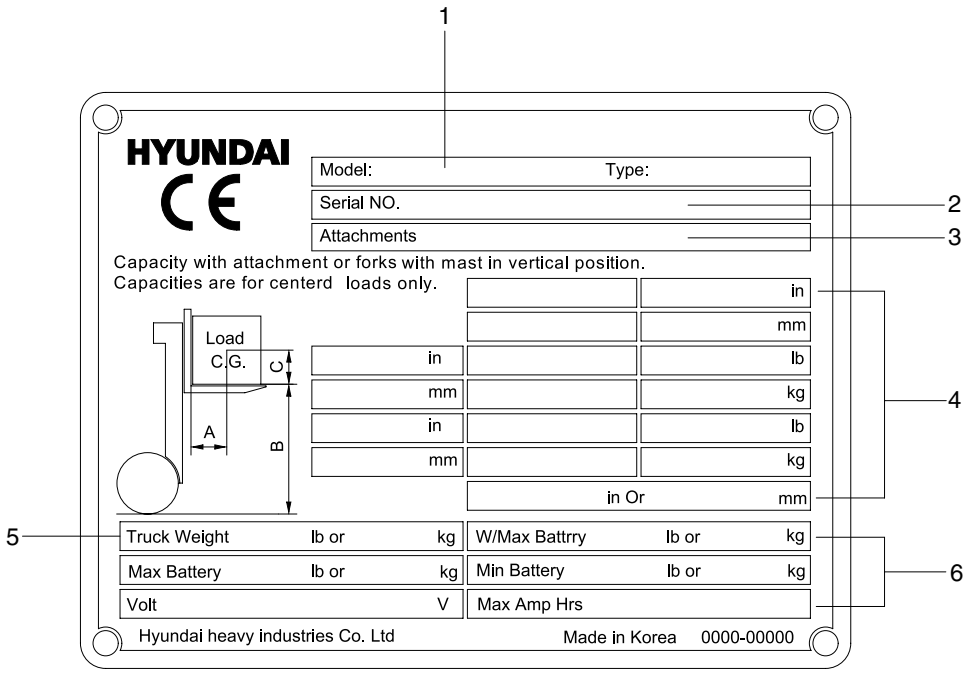
BR147OM54

TRUCK TYPE : Electric, 36, 48 Volt.

1	Mast	5	Control lever
2	Carriage and backrest	6	Accelerator
3	Load tire	7	Overhead guard
4	Drive unit and tire	8	Steering wheel

2. DATA/SAFETY PLATES AND DECALS

1) TRUCK DATA AND CAPACITY PLATE



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(1) Truck model number or registered name

(2) Truck serial number

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

(3) Attachment description(If any installed)

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

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

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

Do not exceed the maximum capacity specified.

(5) Truck weight

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

(6) Battery weight and system voltage

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

2) OPERATING SAFETY WARNING DECAL

⚠ WARNING

FOR SAFETY:

1. BEFORE PUTTING THIS TRUCK IN OPERATION TEST BRAKES, STEERING CONTROLS, HORN AND OTHER DEVICES FOR SAFETY AND EASY OF OPERATION.
2. ONLY TRAINED AND QUALIFIED PERSONS SHOULD OPERATE THIS TRUCK.
3. OPERATE TRUCK OR AUXILIARY DEVICES ONLY FROM OPERATOR'S SEAT.
4. USE DRIVERS OVERHEAD GUARD AND LOAD BACKREST EXTENSION UNLESS CONDITIONS PREVENT THEIR USE.
5. BEFORE KEY SWITCH ON, PLACE SHIFT LEVER IN NEUTRAL POSITION.
6. SPREAD FORKS FAR APART AND PLACE THEM ON CENTER COMPLETELY UNDER LOADED. DO NOT HANDLE UNSTABLE OF LOOSELY STACKED LOADS.
7. USE EXTREME CARE WITH LONG, HIGH OR WIDE LOADS AND DO NOT OVERLOAD TRUCK.

SEE LOAD CHART

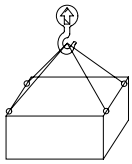
8. TRAVEL WITH LOAD OR LIFTING MECHANISM AT MINIMUM GROUND CLEARANCE AND TILTED BACK EXCEPT ON RAMPS TRAVEL WITH THE LOAD TRAILING WHEN THE LOAD INTERFERES WITH VISIBILITY.
9. OPERATE ON RAMPS WITH LOAD UPGRADE TRAVEL SLOWLY WITH CAUTION AND DO NOT TURN ON INCLINES.
10. AVOID SUDDEN STARTS, STOPS, DIRECTION REVERSALS UNSAFE SPEED AND REVERSE BRAKING, REDUCE SPEED FOR TURNS OR UNEVEN OR SLIPPERY SURFACE.
11. NEVER LIFT OR LOWER LOADS WHILE TRUCK IS IN MOTION.
12. DO NOT ALLOW ANYONE TO STAND OR PASS UNDER LOAD OR LIFTING MECHANISM KEEP ALL BODY PARTS OUT OF UPRIGHT AND WITHIN CONFINES OF TRUCK.
13. DO NOT CARRY PASSENGERS. DO NOT ELEVATE PERSONAL WITHOUT SECURED SAFETY PLATFORM.
14. LIFT WITH MAST VERTICAL OR TILTED SLIGHTLY BACFK. NEVER FORWAD. LIFT LOADS SMOOTHLY AND SLOWLY - AVOID SUDDEN JERKS.
15. WHEN LEAVING TRUCK, TURN OFF POWER, LOWER LIFTING MECHANISM, PLACE SHIFT IN NEUTRAL KEY OR CONNECTOR PLUG REMOVED. ALSO CHECK WHEELS IF TRUCK IS ON AN INCLINE OR TO BE WORKED ON.

BR147OM59

⚠ 주 의 CAUTION

충전할 때는 밧데리 커버를 열어 주십시오.
충전중에는 열과 폭발성 수소 가스가 발생하므로
화기를 절대로 가까이 하지 마십시오.

OPEN THE BATTERY COVER WHEN CHARGING.
BATTERY BEING CHARGED NOT ONLY HEAT,
BUT ALSO INFLAMMABLE HYDROGEN GAS
IS PRODUCED.
KEEP FIRE AWAY.



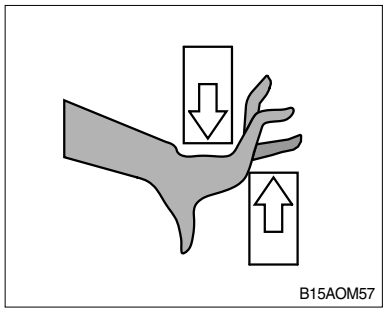
밧데리를 들어 올릴때는 반드시 2 또는 4개의
고리에 와이어 로프를 걸어 충격이 가해지지
않도록 주의하십시오.

HOISTING THE BATTERY CASE,USE 2 OR 4
WIRES WITH HOOK AND HANDLE CAREFULLY,
NOT TO SHOCK.

밧데리 전해액은 묽은 황산액 이므로 옷과 기계
부품에 닿지 않도록 주의하십시오.

THE ELECTROLYTE SOLUTION OF BATTERY
IS DILUTE SULFURIC ACID(H_2SO_4).
BE CAREFUL NOT TO DROP ON CLOTHES
AND MECHANICAL PARTS.

BR147OM60



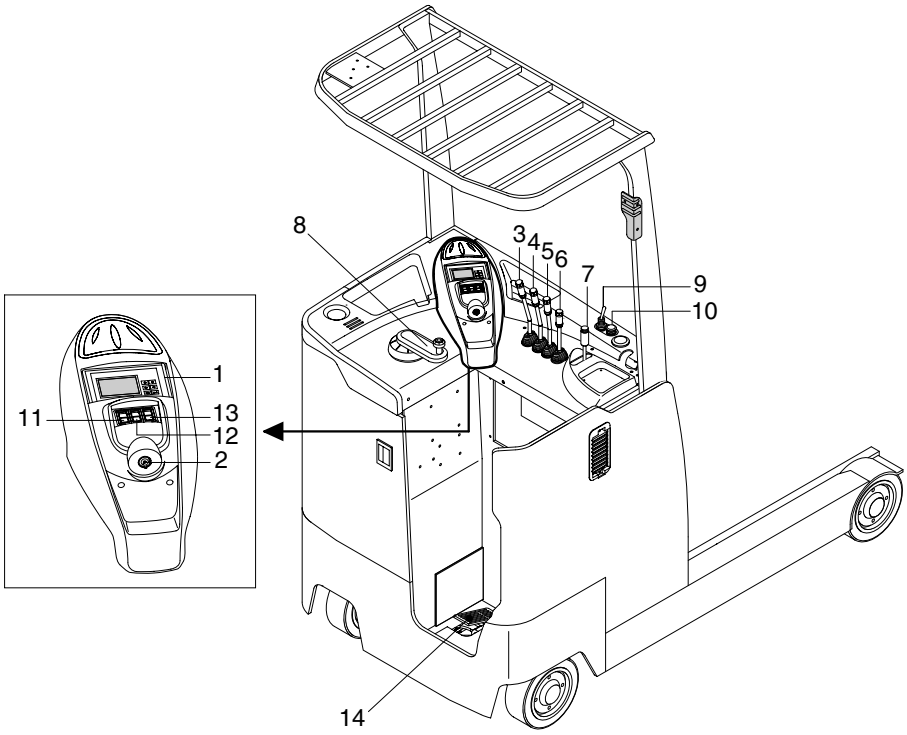
⚠ Mast warning decal

This safety decal is placed on the mast to warn of the danger of injury from movement between rails, chains, sheaves, fork carriage, and other parts of the mast assembly. Do not climb on or reach into the mast. Personal injury will result if any part of your body is put between moving parts of the mast.

⚠ Keep away from forks decal

This safety decal is placed on the mast to warn of the danger of injury from forks when they are in the raised position. Do not ride on or stand under forks or attachments. The forks can fall and cause injury or death. Always make sure that the forks are in the fully lowered position when they are not handling a load.

3. INSTRUMENTS AND CONTROLS



16BR7OM62

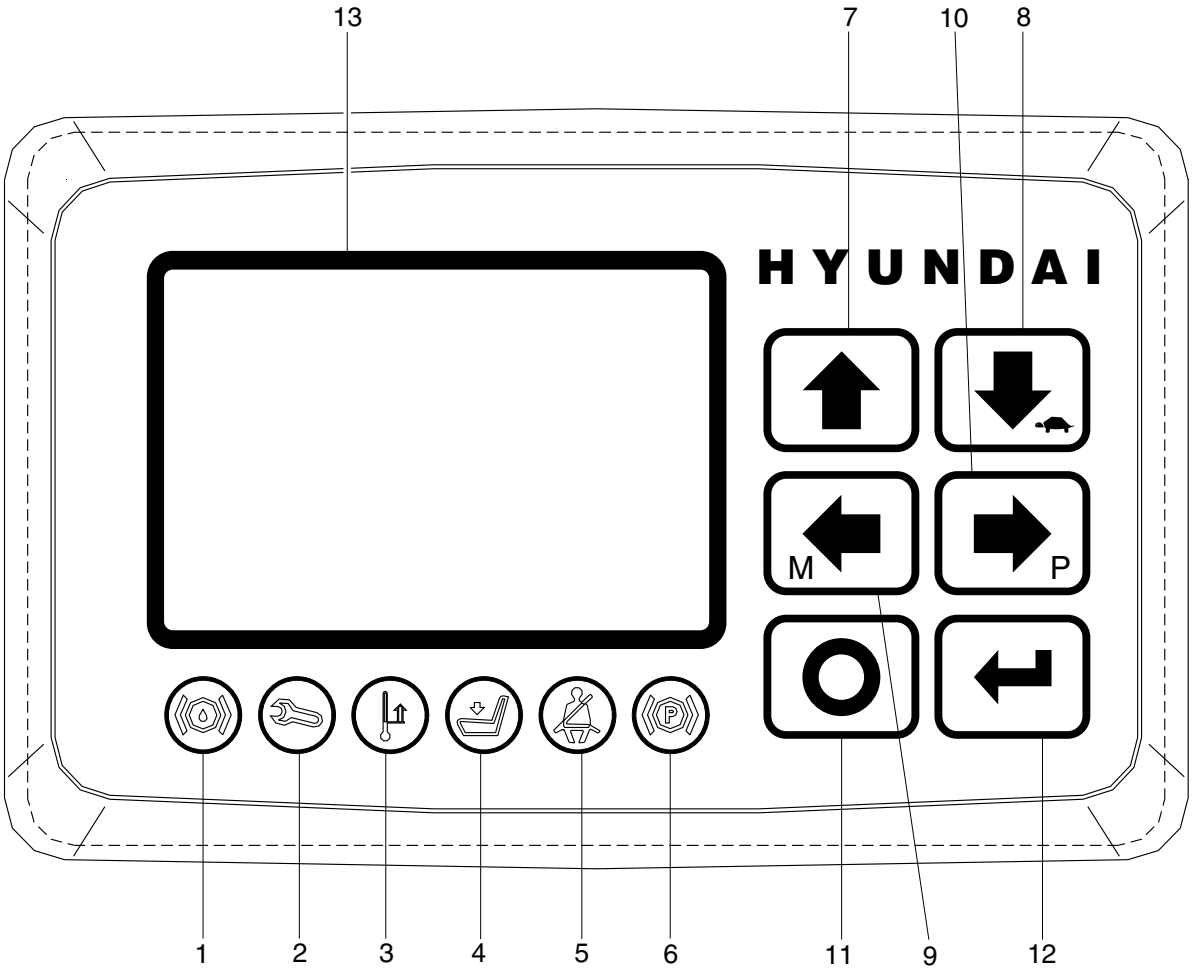
1	Monitor panel	8	Steering wheel
2	Start switch	9	Turn signal switch
3	Lift lever	10	Horn switch
4	Tilt lever	11	Head lamp switch
5	Reach lever	12	Rear work lamp switch(Option)
6	Attachment lever(Option)	13	Beacon lamp switch(Option)
7	Accelerator	14	Brake pedal

※ **Familiarize yourself with the controls and follow safe operating procedures.**

4. INSTRUMENTS PANEL

1) STRUCTURE

The instrument panel has six built-in red LED, which provide the operator with an easy information about the status of some truck devices.



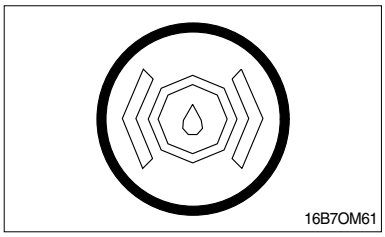
15B7OM65

1 Oil level warning lamp (option)
2 Wrench warning lamp
3 Thermometer warning lamp
4 Seat warning lamp
5 Seat belt warning lamp (option)
6 Handbrake warning lamp
7 Key 1 button
8 Key 2 button
9 Key 3 button
10 Key 4 button
11 Key 5 button
12 Key 6 button
13 LCD function

2) WARNING LAMP

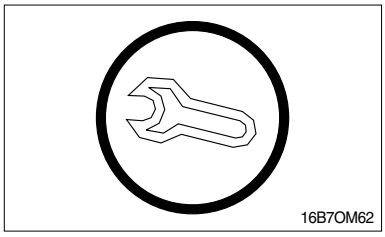
When the key switch is OFF, the display makes a general test lighting and switching OFF all the LED in sequence.

(1) Oil level warning lamp (Option)



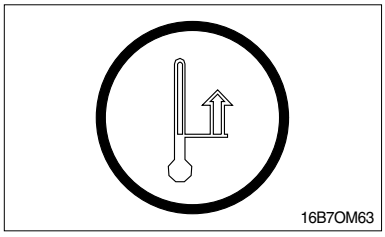
This LED lights when the measured oil level of the hydraulic circuit is under the minimum acceptable mark.
To connect the oil sensor output to the Analogue Input #1.

(2) Wrench warning lamp



This LED blinks when truck is in alarm condition.

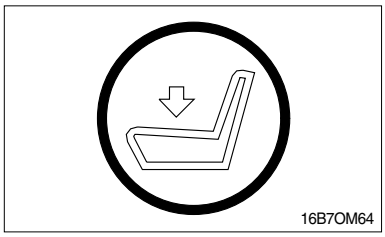
(3) Thermometer warning lamp



This LED blinks when one truck's controller is in alarm due IMS high temperature.

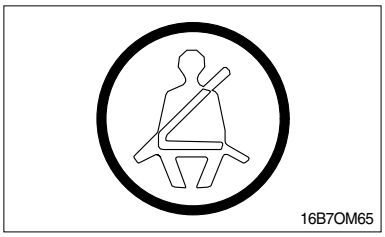
※IMS : Input motor switch

(4) Seat warning lamp



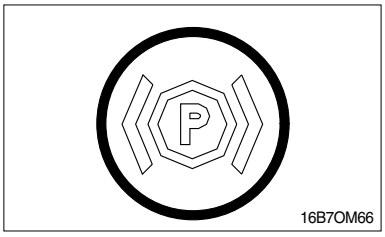
This LED lights when the operator is not on the seat.

(5) Seat belt warning lamp (Option)



(1) This LED lights to signal that the seat belt is not correctly fastened. To connect the Seat belt sensor to the Analogue Input #2.

(6) Handbrake warning lamp

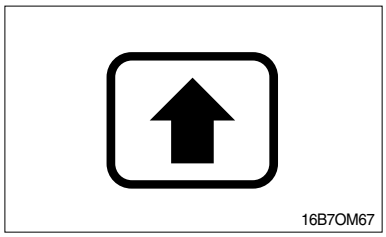


(1) This LED lights when the handbrake is activated.

3) TESTER MENU

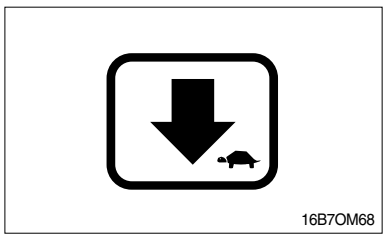
Status of keyboard buttons can be monitored in real time in the TESTER menu.

(1) Key 1 button



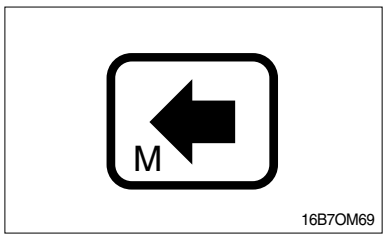
Status of ↑ keyboard button:
ON = Input active, button pushed
OFF = Input not active, button released

(2) Key 2 button



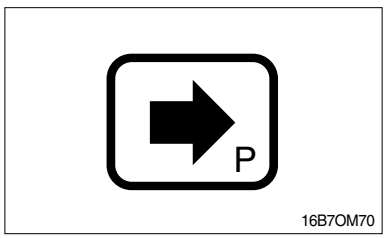
Status of ↓ TURTLE keyboard button:
ON = Input active, button pushed
OFF = Input not active, button released

(3) Key 3 button



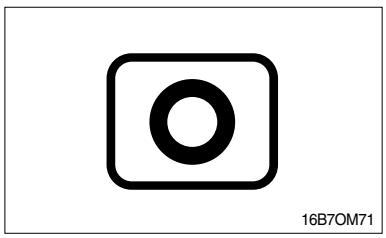
Status of ← M (Menu) keyboard button:
ON = Input active, button pushed
OFF = Input not active, button released

(4) Key 4 button



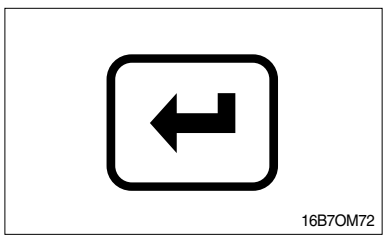
Status of → P (Performance) keyboard button:
ON = Input active, button pushed
OFF = Input not active, button released

(5) Key 5 button



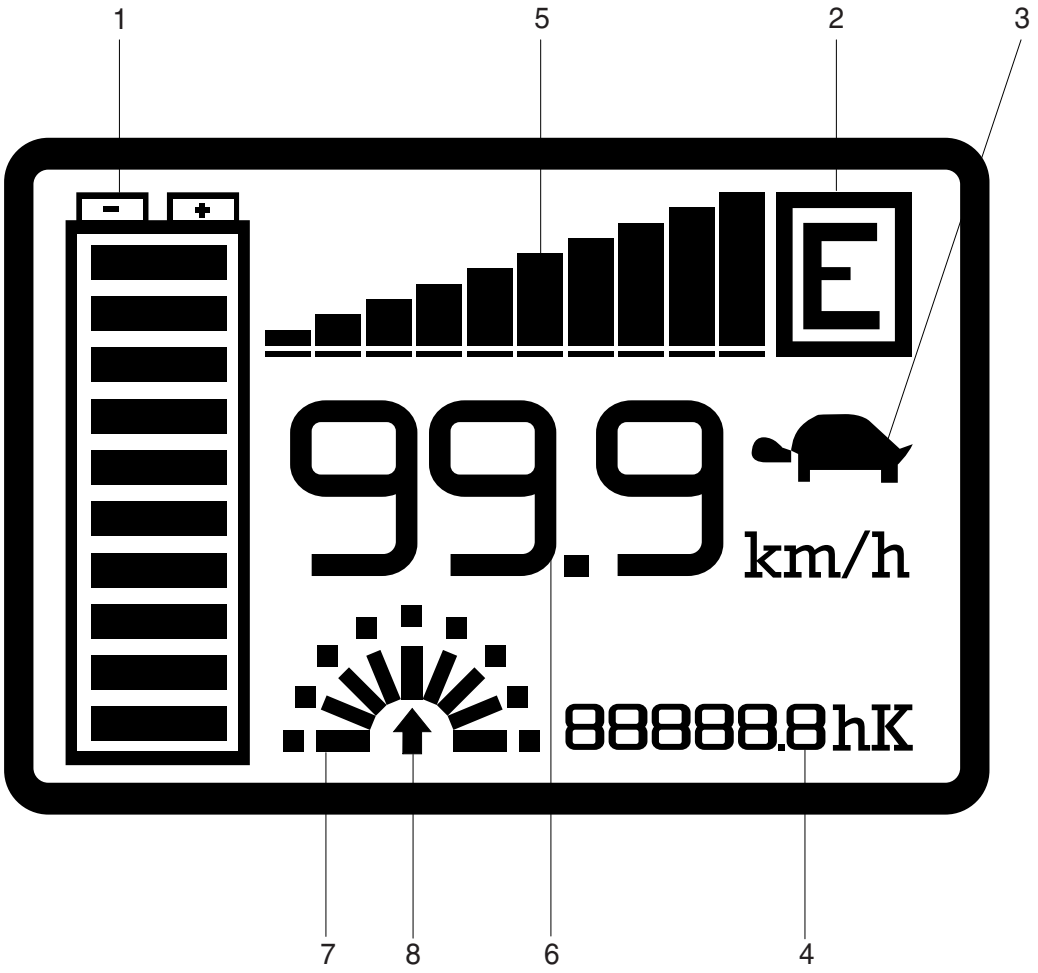
Status of ○ (Esc) keyboard button:
ON = Input active, button pushed
OFF = Input not active, button released

(6) Key 6 button



Status of ↵ (Enter) keyboard button:
ON = Input active, button pushed
OFF = Input not active, button release

4) LCD FUNCTION



(1) Battery's state of charge

The battery's state of charge indication is displayed on the left side of the unit (1); it is shown by ten notches. Each notch represents the 10% of the battery charge. As the battery becomes discharged, the notches turn off progressively, one after the other, in proportion to the value of the residual battery charge. When the residual battery charge is $\leq$ 20 % the notches displayed start to blink.

(2) Performance

The letter which appears in the rectangle displayed in the top right side of the unit (2) shows the performance mode which is being used in the controller.

Performances can be scrolled pressing button . When one performance is selected, the related information will be sent via can-bus to traction and pump controllers that will manage this data. The standard functioning reduces truck performance passing from the high to economic performance.

The real meaning, in terms of parameters level of these performances, depends on software present on pump and traction controllers:

- "H" corresponds to highest performance;
- "N" corresponds to normal performance;
- "E" corresponds to economic performance;

(3) Turtle

The turtle symbol (3) is normally off; when it appears (fixed) it shows activation of the "soft" mode of the truck, in which maximum speed and acceleration are reduced. The "soft" mode can be activated pressing button [↓].

(4) Hour meter

The number displayed on the bottom right side of the unit (4) shows the Hours Worked.
The letter present near the hour meter shows which hour meter is displayed:

- K : the key hour meter is displayed;
- T : the traction hour meter is displayed;
- P : the pump hour meter is displayed; it increases if pump control is working.

(5) Accelerator

The accelerator level indication is displayed on the central top side of the unit (5); it is shown by ten notches. When the accelerator level is minimum only a notch is displayed, when the accelerator level is maximum all the ten notches are displayed. Each notch represents 1/10 of the difference between maximum and minimum accelerator level.

(6) Speed

The number displayed under the accelerator notches on the center of the unit (6) shows the truck speed. The unit can be km/h or mph depending on the SPEED UNIT parameter setting.

(7) Wheel position

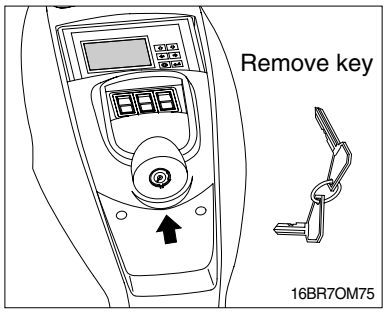
The notch displayed on the left of the hour meter (7) represents the wheel (only one of the nine notches is displayed) and shows the steering angle (it corresponds to the relative truck direction if the truck is running).

(8) Running direction

The arrow (8) shows the set truck running direction. The arrow point is up when the truck is forward running; the arrow point is down when the truck is reverse running. If the truck doesn't run a dot is displayed instead of the arrow.

5. OPERATING SWITCHES AND LEVERS

1) START SWITCH

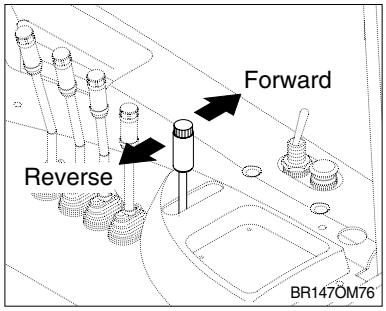


(1) Power is supplied to the control circuit through this switch, which is placed on OFF→ ON clockwise.

① OFF : The Key can be removed or inserted and power is turned off.

② ON : Both control circuits for hydraulics and running can be activated.

2) DIRECTIONAL CONTROL LEVER



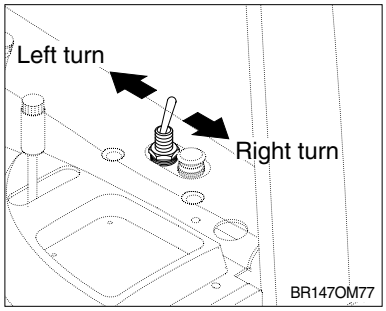
(1) This lever serves to make forward/backward directional changes. For the forward directions, place the lever on the FORWARD position.

(2) In the neutral, the running control circuits is turned off.

(3) For the backward direction, place the lever on the REVERSE position.

(4) The electrical brake will be applied by shifting the lever to the opposite position of running direction.

3) FLASHER SWITCH

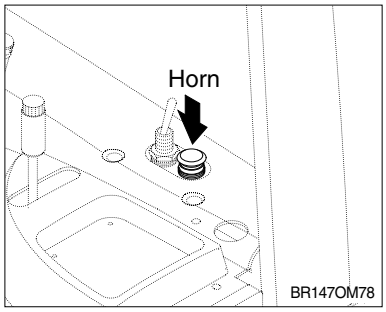


(1) When making a left or right turn, use this switch to flash the flash lamp to indicate which direction the vehicle is turning to.

(2) For a right turn, place the switch on the RIGHT position.

(3) For a left turn, place the switch on the LEFT position.

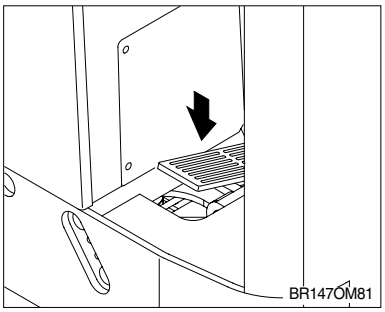
4) HORN SWITCH



(1) This horn switch is a type of push-button.

(2) The horn switch is reset automatically, if it is released.

5) BRAKE PEDAL

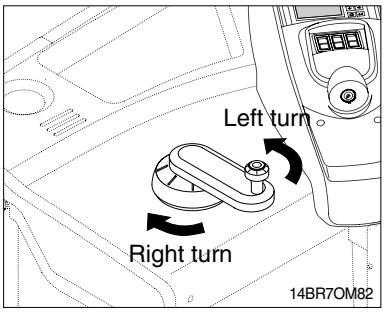


(1) When this pedal is depressed, the vehicle runs, while the vehicle stops when the pedal released.

⚠ **Special care should be required for the operation of the brake at loading.**

⚠ **This vehicle has no parking brake system.**
But once the pedal released, service brake is always applied to the machine.

6) STEERING WHEEL

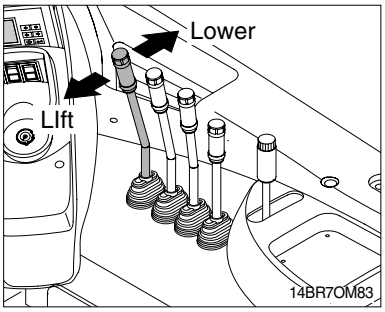


(1) The steering wheel of the vehicle is provided with the knob to allow steering with one hand.

(2) Perform the loading operation with the right hand and operate the steering wheel with the left hand.

⚠ **Particular care should be taken for the rapid operation of the steering wheel.**

7) LIFT LEVER

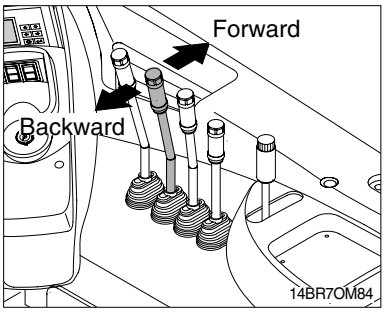


(1) This lever controls the lifting and lowering of the fork. For lifting, pull the lever backward, and for lowering, push it forward.

(2) Lifting and lowering speeds can be adjusted by varying the amount of a lever tilt.

(3) Maximum lowering speed is kept constant regardless of loads through the flow control valve.

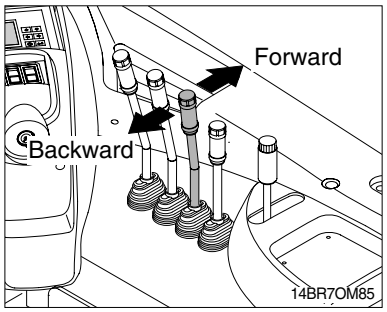
8) TILT LEVER



(1) This lever controls the forward and backward tilt of the forks. For the forward tilt, push the lever forward, and for the backward tilt, pull it backward.

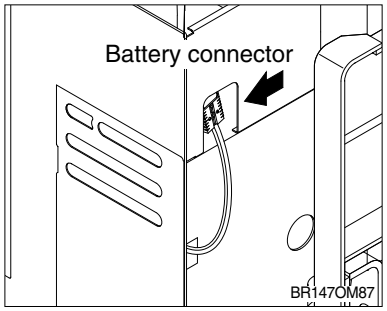
(2) Tilting speed can be adjusted by varying the amount of lever tilt.

9) REACH LEVER



(1) This lever controls the pushing-out and drawing-in of the mast. Pushing the lever forward push out the mast, and pulling the lever backward draw in the mast. Speed adjustment can be made by varying the amount of lever tilt. The reach mechanism is intended for use in loading and unloading of cargo so that when the vehicle is running, the mast should always be drawn in all the way.

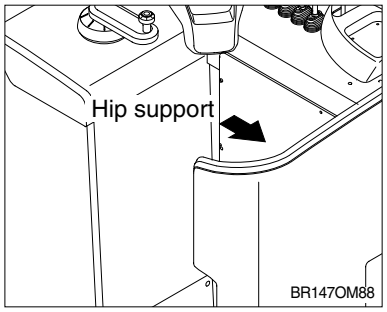
6. BATTERY CONNECTOR



Be sure to connect the connector for the battery and body.

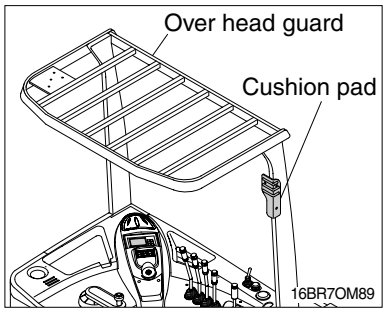
7. SUPPORT AND SAFETY PARTS

1) HIP SUPPORT



To reduce fatigue of an operator, the pads are provided at the places to where waist touch.

2) OVER HEAD GUARD



The overhead guard is of rugged construction that serves to ensure the safety of the operator.

4. DAILY SAFETY INSPECTION

1. INSPECTING YOUR TRUCK

Before using a lift truck, **it is the operator's responsibility** to check its condition and be sure it is safe to operate.

Check for damage and maintenance problems; have repairs made before you operate the truck. Unusual noises or problems must be reported immediately to your supervisor or other designated authority.

Do not make repairs yourself unless you are trained in lift truck repair procedures and authorized by your employer. Have a qualified mechanic make repairs using genuine HYUNDAI or HYUNDAI-approved parts.

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

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

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

2. VISUAL CHECKS

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

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

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

3) Check that the battery is installed and secured in position correctly. Check battery connector for safe condition.

4) Lock for any external leakage around drive unit.

5) Check for hydraulic oil leaks and loose fittings.

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

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

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

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

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

10) Inspect the wheels and tires for safe mounting, wear condition.

11) Check the hydraulic sump oil level.

3. FUNCTIONAL CHECKS

Check the operation of the truck as follows.

※ **Before performing these checks, familiarize yourself with the operating procedures in Section 5.**

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

2) With the truck on, check the diagnostic display, or the hour meter and battery discharge indicator (depending on which truck you have). The diagnostic display should show the charge remaining on the battery or a fault code. If the fault code is not an operator fault code call a service technician.

3) Be sure all controls and systems operate freely and return to neutral properly. Check the:
 (1) Service brakes
 (2) Hydraulic controls : lift, tilt, reach and auxiliary (If installed)
 (3) Accelerator control
 (4) Directional control
 (5) Steering system
 (6) Lift mechanism and any attachments

· **When the functional checks are completed:**
 ① Bring truck to complete stop.(Release brake pedal completely)
 ② Put directional control lever in the NEUTRAL position.
 ③ Lower the lift mechanism fully.
 ④ Turn the start switch to the OFF position.

· **If you are going to leave the truck unattended:**
 ⑥ Remove the key.
 ⑦ Block the wheels, if the truck is parked on an incline or has the possibility of moving.

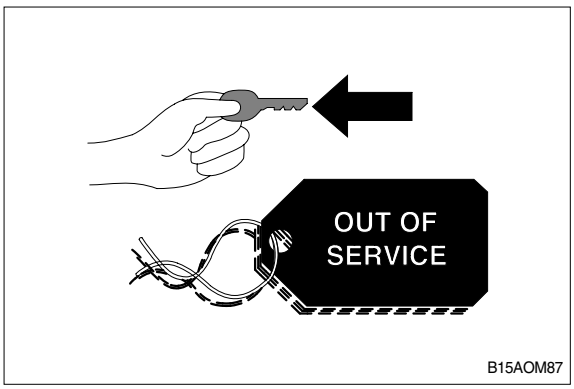
4. CONCLUDING THE INSPECTION

Make a record on the "Driver's Daily Checklist" of all the operating and truck problems that you find. Review the checklist to be sure it has been completed and turn it into the person responsible for lift truck maintenance. Be sure any unusual noises or problems are investigated immediately.

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

Remove the key from the starting switch and put an **"OUT OF SERVICE"** tag on the truck.

If all of the Daily Inspection checks were normal or satisfactory, the truck can be operated.



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5. OPERATING PROCEDURES

1. BEFORE OPERATING THE TRUCK

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

⚠ **This equipment can be dangerous if not used properly.**
Safe operation is the responsibility of the operator.

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

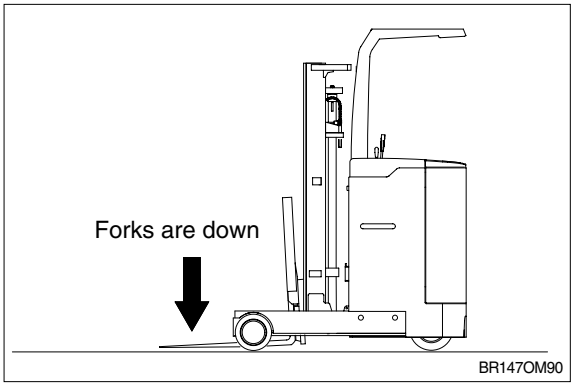
⚠ **Inspect your lift truck before operating at the start of day or shift. Before putting your truck to use, check the operation of the controls and all systems.**

⚠ **Protect yourself. Do not operate truck without a DRIVER'S OVERHEAD GUARD unless conditions prevent its use. Do not remove overhead guard unless specifically authorized. Use special care if operation without this safety device is required.**

2. STARTING FROM A SAFE CONDITION

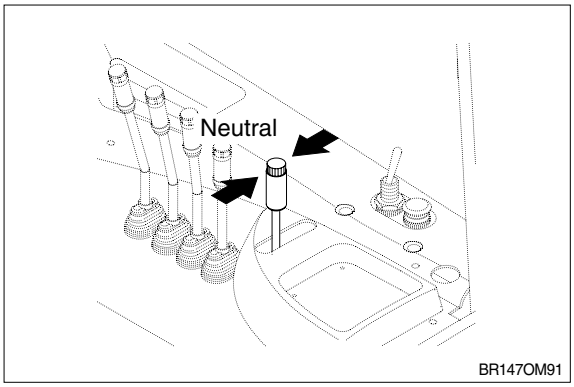
Always start from a safe condition. Before operating a lift truck, make sure that:

1) Check that the battery cable is connected to body.
2) The forks are fully lowered to the floor or ground.
3) You are familiar with how all the controls function.



4) All controls are in neutral or other correct position.
5) A lift truck has received its daily inspection and is ready to operate.

Put the direction control lever In the NEUTRAL position, before turning the key switch to ON. The truck should start only in the NEUTRAL position.



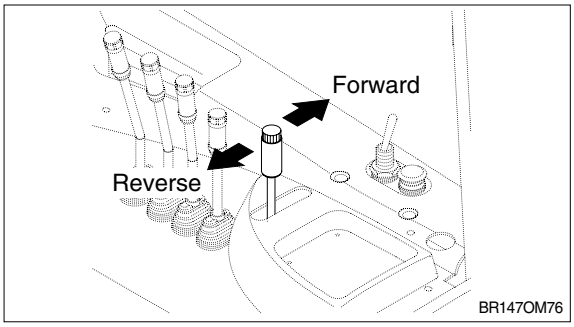
3. STARTING THE TRUCK

Before you start the truck, make sure that you have taken all the above mentioned precautions and that the directional control lever is in NEUTRAL. Also you must lift the fork by 150~200mm(6~8in), fully tilt the fork backward and draw the mast all the way.
To start the truck, turn the key switch clockwise to the ON position.

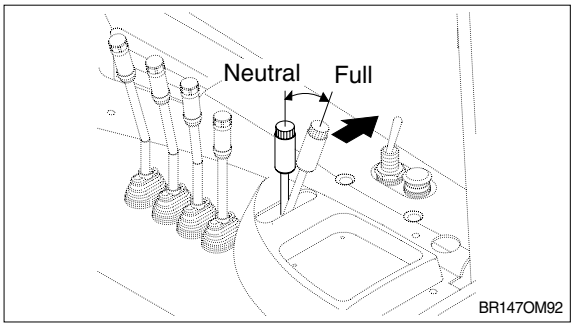
1) RUNNING

(1) Step down fully on the brake pedal with the left foot and place the directional control lever on the FORWARD position (or the REVERSE position).

(2) The vehicle will start forward (or backward).



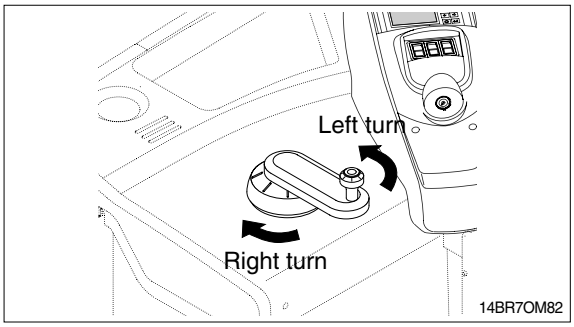
(3) By varying the tilting angle of direction control lever, the vehicle speed can be controlled freely from zero to top speed. Even if the drive lever is operated abruptly, the vehicle starts smoothly without impulse. The vehicle can be inched with ease.



2) TURNING

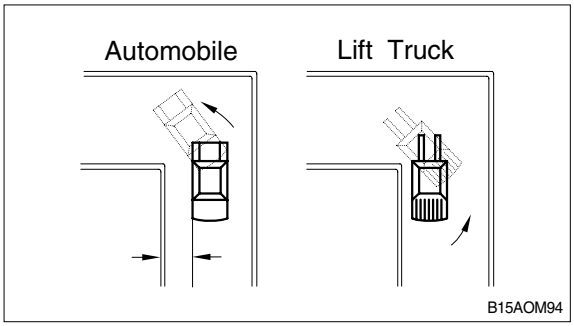
(1) Hold the steering knob with the left hand to operate the steering.

(2) Forklift trucks are steered by the rear wheels.



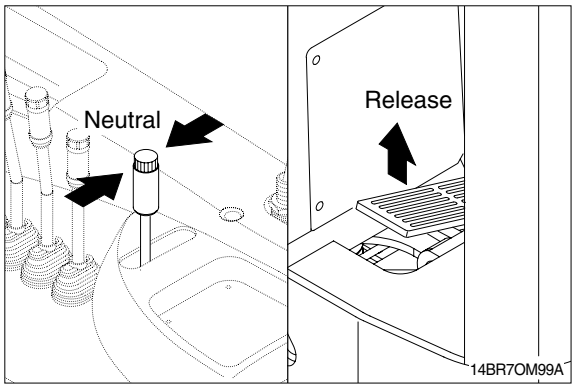
(3) So when travelling FORWARD, keep to the inside and when travelling in REVERSE, keep to the outside when turning.

(4) When turning, do not let the outside of the counterweight touch anything.

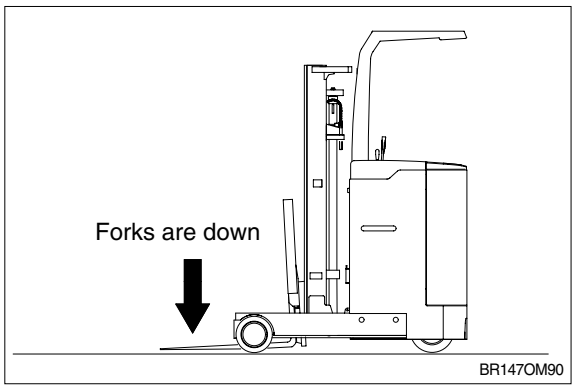


3) STOPPING AND PARKING

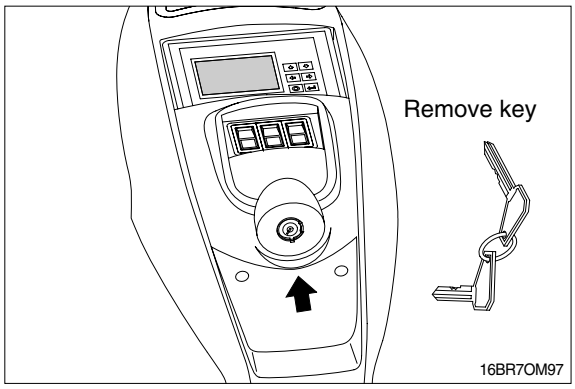
(1) To stop the vehicle in position, release the brake pedal smoothly after returning the drive lever to the neutral and reducing speed.



(2) When parking the vehicle, release the foot from the brake pedal, check to see if the drive lever is at the neutral, and have the forks lowered in direct contact with ground.

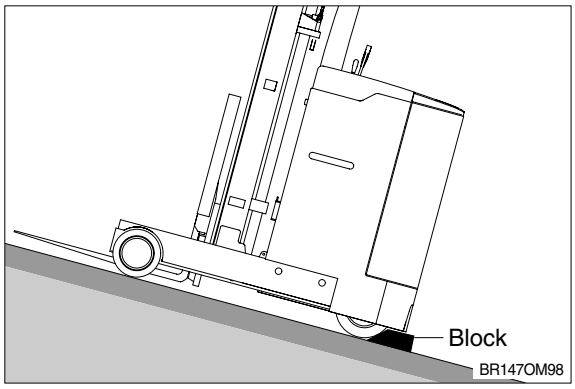


(3) When leaving the vehicles, do not fail to remove the key.



(4) Avoid parking in a slope as possible.
When parking on a slope, be sure to lock the wheels and confirm the safety.

⚠ Applying the abrupt brake and turning the vehicle rapidly at a steep slope with a load mounted may cause falling down. Special care should be required to this point.



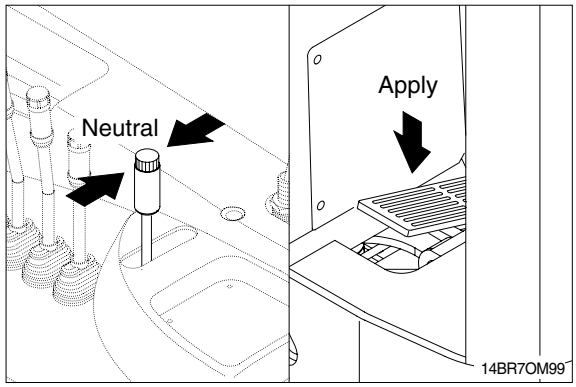
4. CONTROLLING SPEED

By varying the tiltingangle of direction control lever, the vehicle speed can be controlled freely from zero to top speed.

5. BRAKING

To stop the truck, put the direction control lever in neutral position and then release the brake pedal smoothly until the vehicle stops.

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



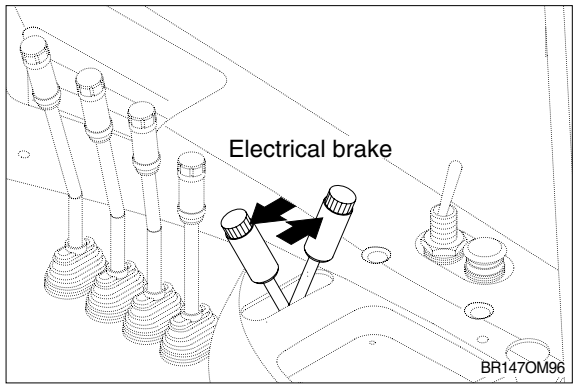
6. PLUGGING

1) You can change direction, without braking, by **"plugging"**. As you are traveling, move the directional control lever to the opposite direction and keep the lever tilted. The truck should be slow to a smooth, controlled stop and then accelerate in the opposite direction.
2) You can control the plugging distance with the direction control lever:
   The farther the lever is tilted, the shorter the reversal distance.

⚠ **Be careful when plugging. Any sudden change in direction can cause the load to move or fall off the forks.**

3) ELECTRICAL BRAKE

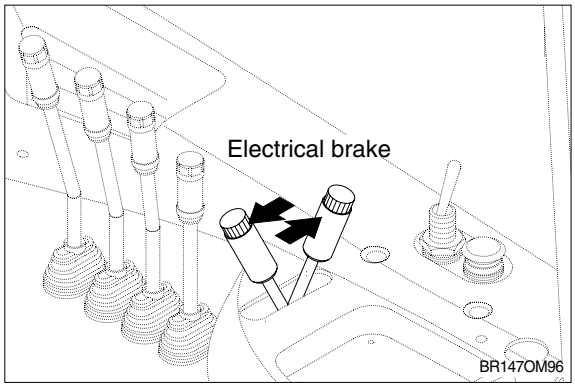
(1) Opposite to the direction of vehicle advanced will actuate the electrical brake.
(2) After stopping of the vehicle through the electrical brake, the vehicle runs to the opposite direction by keeping the direction control lever tilted.
(3) Avoid applying the electrical brake to the vehicle accelerated very much in a downward slope. Carefully apply the electrical brake so that loads may not be damaged.



4) REGEN BRAKE

(1) Regen provides vehicle braking by controlling the motor as a generator and returning the generated energy back to the battery.

(2) A direction switch change will initiate regen braking at a level set by the direction brake current level. Braking effort is proportional to the accelerator position, with a minimum accelerator position giving 50% of the set brake level increasing to 100% for a full stroke.



7. OPERATING SAFELY

Safe operation is the responsibility of the operator.

1) Watch where you are going. Don't go if you can't see...

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

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

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

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

2) Protect yourself and those around you...

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

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

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

3) No riders...

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

4) Always be in full control of your lift truck...

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

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

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

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

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

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

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

5) Grades, ramps, and inclines...

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

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

(3) Always brake with the right foot pedal(Not with the inching pedal) when travelling down incline.

6) Practice safe operation every time you use your truck...

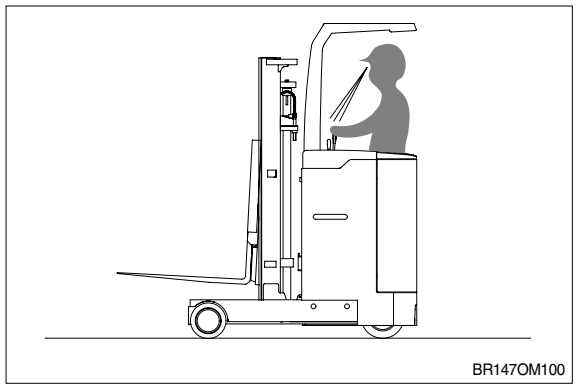
(1) Careful driving and operation is your responsibility. Be completely familiar with all the safe driving and load handling techniques in this Operator's Manual. Use common sense. Drive carefully;do not indulge in stunt driving or horseplay. Observe traffic rules. Watch for people and hazards. Slow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

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

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

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

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



8. LOAD HANDLING

1) GENERAL

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

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

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

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

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

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

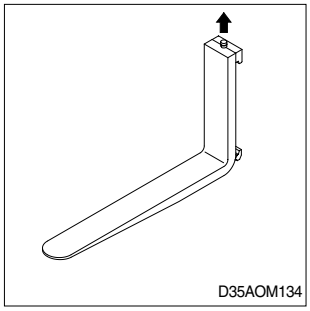
⚠ **Slack chains mean rail or carriage hang-up. Raise the mast before you move. If the mast malfunctions in any way or becomes stuck in a raised position, operate the lift control to eliminate any slack chains by raising the carriage. DO NOT go under a raised mast or forks to attempt repairs.**
DO NOT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

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

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

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

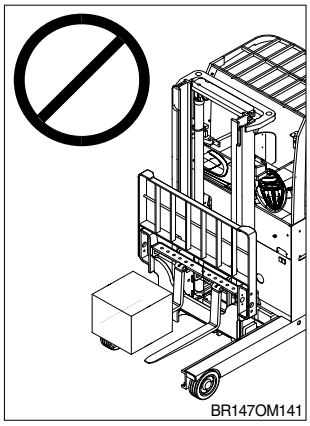
2) ADJUSTING THE LOAD FORKS



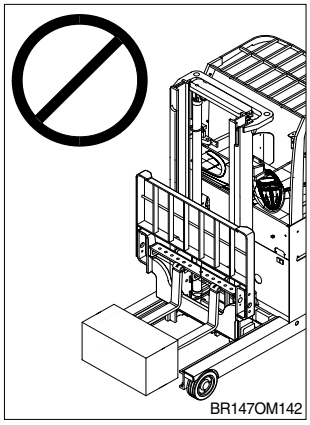
The load forks are adjustable on the hanger, carriage. Forks should be spaced as far apart as the load will allow. Both forks should always be the same distance from the center of the fork carriage. To adjust the forks, raise the carriage slightly. Tilt the forks fully forward to reduce friction and make the fork slide easier.
Unlock the fork locking pins.
Position the forks by pushing them away from you. Secure the fork locking pins.

⚠ Make sure the load backrest(LBR) or fork retaining bolts are fasten securely in place.

3) LOAD ON FORKS



(1) Do not elevate the load with one fork.
Loading with one fork cause the tip over, serious injury or death of operator.
The work can cause the height difference between both fork tips.



(2) Do not elevate the load with the ends of the forks.
This work can cause the height difference tips due to overload in the end of the forks.
The load should be loaded at least over 2/3 of fork length.

4) TRAVELING WITH LOAD

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

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

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

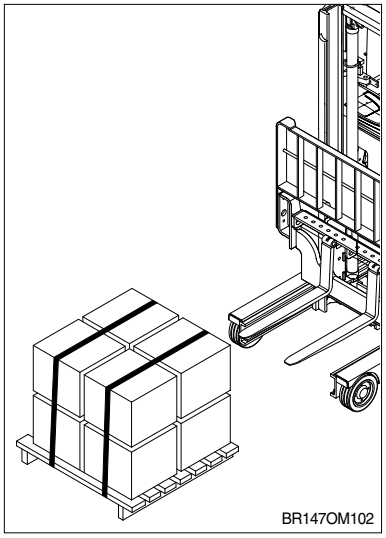
Use special care when handling and traveling with long, high, or wide loads-to avoid losing the load, striking bystanders or obstructions, or tipping the truck.

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

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

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

5) PICKING UP AND MOVING LOADS



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

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

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

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

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

6) UNLOADING

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

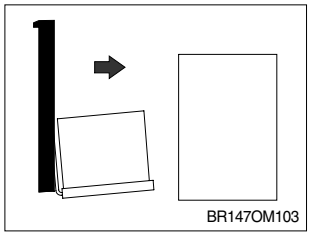
Adjust the fork height and tilt the forks forward slightly, as necessary, for smooth removal of the forks from the load(Pallet).

Carefully back away to clear the forks from the load.

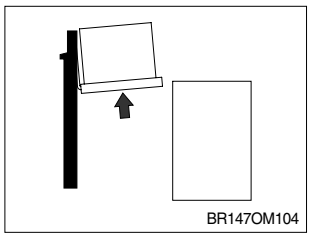
Raise the forks to traveling height and tilt forks to a level position 150~200mm(6~8in) off the floor.

7) STACKING

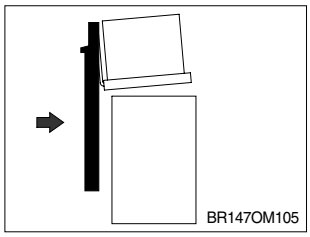
(1) To put a load on a stack



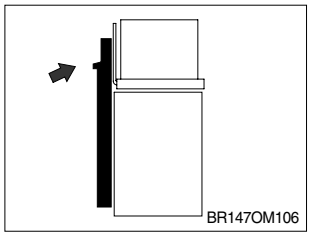
① Approach slowly and align the lift truck and load squarely with the stack.



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

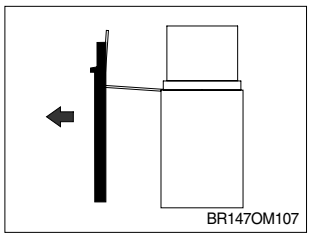


③ Move forward slowly until the load almost touches the stack. The leading edge and sides of the load pallet should line up exactly with the near edge and side of the load or rack on which you are stacking.

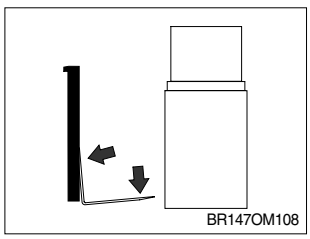


④ Stop close to the stack and further lift the load high enough to clear the top of the stack. Slowly move the load into position. Use care not to damage or move adjacent loads.

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



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



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

(2) To move a load from a stack

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

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

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

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

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

9. SHUT DOWN PROCEDURE

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

1) When you leave your truck, or park it, follow these safety rules

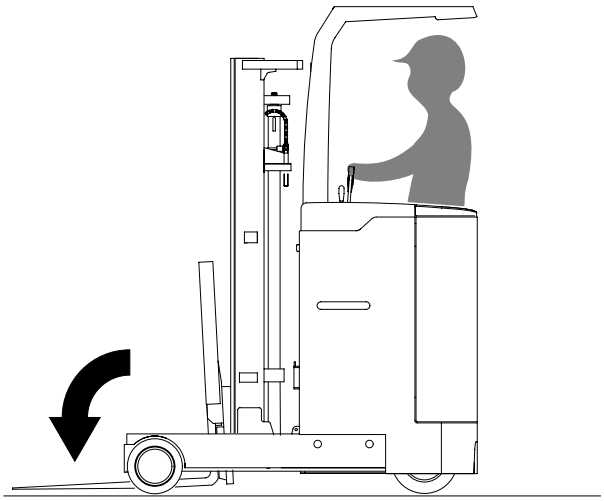
(1) Park in a safe area away from normal traffic.
(2) Never park on a grade.
(3) Never park in areas that block emergency routes or equipment, access to fire aisles, or stairways and fire equipment.

2) Before leaving the operator's position

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

3) In addition, when leaving the truck unattended

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



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6. EMERGENCY TOWING

1. TOWING PRECAUTIONS

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

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

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

2. TOWING PROCEDURES

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

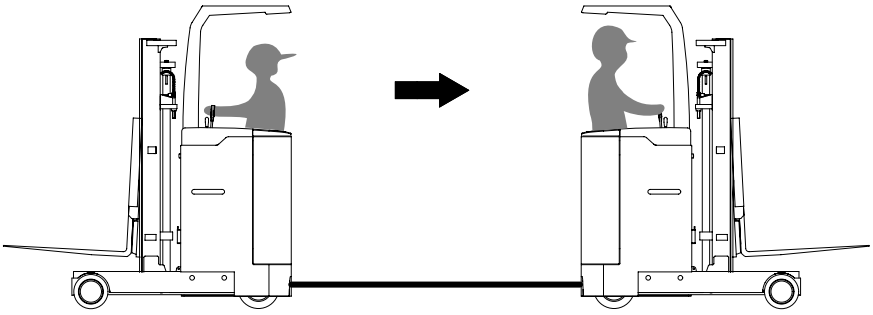
2) When possible, raise the carriage(forks) on the disabled truck about 12in(300mm) from the floor or ground. Secure the carriage with a chain.

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

4) Use an approved, solid metal tow bar with towing couplers that connect to the towing pins in the rear side of frame.

5) Release the service brake on the towed vehicle.

6) Directional control lever is in the neutral.
Tow the disabled truck backward. **An operator must be on the towed truck**.



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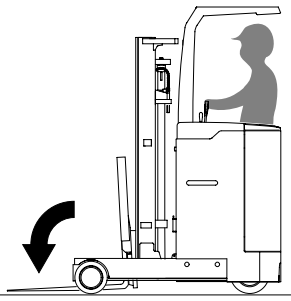
7) Tow the truck slowly. Careful towing is necessary to prevent injury to personnel or damage to the truck. The truck should be towed at a speed of less than 5mph (8km/h) with a driver in the seat. Do not lift the truck or any wheels off the floor or ground while the truck is being towed.

⚠ The power steering will not operate on the disabled truck when the EPS motor is not running, which makes the steering handwheel difficult to turn.

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

LIFT TRUCK PARKING



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7. PLANNED MAINTENANCE

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.

Regular maintenance and care of your lift truck is not only important for full and efficient truck life also essential for your safety. The importance of maintaining your lift truck in a safe operating condition by servicing it regularly and, when necessary, repairing it promptly cannot be emphasized too strongly. Experience has shown that powered industrial trucks can cause injury if improperly used or maintained. In the interest of promoting safety, several current industry and government safety standards specify that any powered industrial truck not in safe operating condition be removed from service and that all repairs be made by trained and authorized persons.

To assist you in keeping your lift truck in service and in good operating condition, this section outlines maintenance procedures that should be done at regular intervals. This planned approach is considered essential to the life and safe performance of your truck.

It is your responsibility to be alert for any indication that your truck may need service and have it attended to promptly. You play an important part in maintenance. Only you can make sure that your lift truck regularly receives the care it needs.

△ **Powered industrial truck may become hazardous if maintenance is neglected.**

As outlined in Section 4, **Daily safety inspection** 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 operators daily inspection, HYUNDAI recommends that the owner set up and follow a periodic planned maintenance(PM) and inspection program. Performed on a regular basis **by trained personnel,** the program provides thorough inspections and checks of the safe operating condition of the lift truck. 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.

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 need for more information on the care and repair of your truck, see you 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, 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 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 fluid or electrolyte levels.

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 blocks under the load-engaging means, inner masts or chassis before working on them.

(4) Disconnect the battery connector before working on the electrical system.

※ **Refer to the 1-13 "Jacking and Blocking" section 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) Put the directional control lever in NEUTRAL.

(2) Turn the key switch to the ON position.

(3) 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. Tilt mast forward.
(3) Put the directional control lever in NEUTRAL.
(4) Turn the key switch to the OFF position.
(5) Put blocks at the wheels if the truck must be left on an incline.

12) Brakes, steering mechanisms, control mechanisms, warning devices, lights, lift overload devices, lift, tilt and reach 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) 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.

15) When working on the hydraulic system, be sure the battery is disconnected, mast is in the fully-lowered position and hydraulic pressure is relieved in hoses and tubing.

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

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

17) 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.

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

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

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

21) 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.

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

3. PLANNED MAINTENANCE INTERVALS

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

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

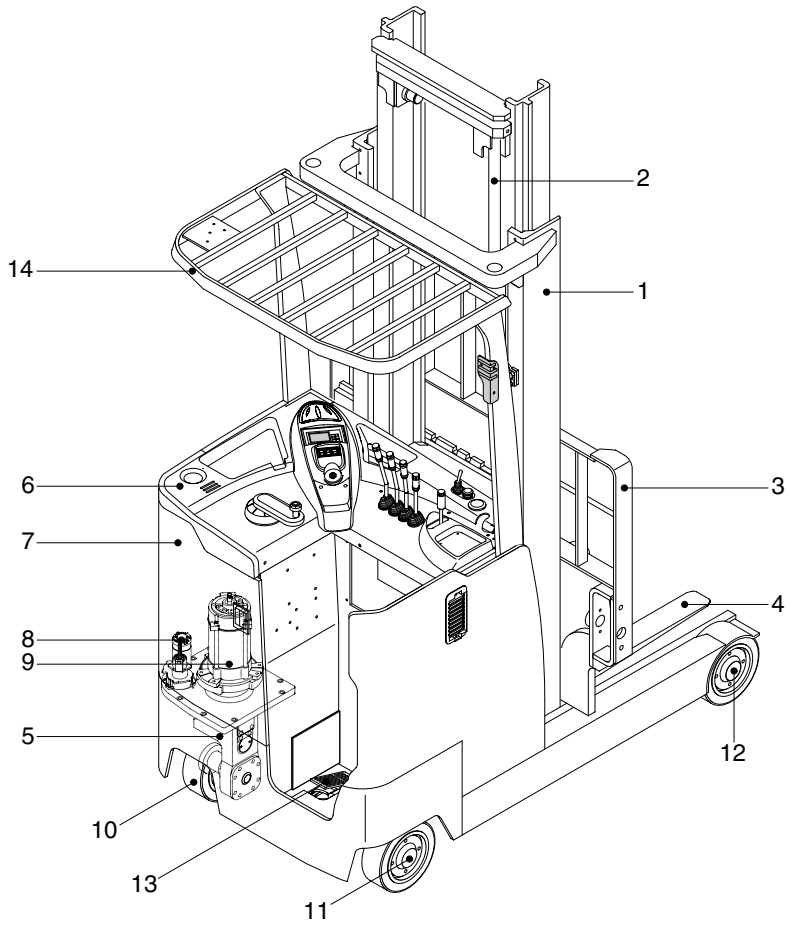
If the lift truck is used in severe or extreme operating conditions, you must shorten the maintenance intervals accordingly.

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

The maintenance time intervals referred to in this manual relate to truck operating hours as recorded on the hourmeter, and are based on experience which HYUNDAI has found to be convenient and suitable under typical(normal or average) operating conditions.

4. MAJOR COMPONENT LOCATIONS

Use the illustration below to locate components included in the PM procedures.



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1	Mast	6	Dash board	11	Caster wheel
2	Lift cylinder	7	Frame	12	Load wheel
3	Carriage and backrest	8	EPS motor	13	Brake pedal
4	Forks	9	Drive motor	14	Overhead guard
5	Drive unit	10	Drive wheel		

5. DAILY MAINTENANCE CHECKS

The PM intervals depend on hour meter records of operation.

PM interval
A : 8~10 hours or daily
B : 50~250 hours or every month(Typical PM interval)
C : 450~500 hours or every 3 months
D : 900~1000 hours or every 6 months
E : 2000 hours or every year

Daily maintenance checks	A	B	C	D	E
Check truck for obvious damages and leaks.	●				
Check clean battery terminals.	●				
Check electrolyte level.	●				
Check capacity, warning plates and decals.	●				
Check condition of tires and wheels. Remove embedded objects.	●				
Check for missing or loose wheel lug nuts.	●				
Check hydraulic sump oil level.	●				
Check gauges and instruments.	●				
Check warning lights and hourmeter.	●				
Check overhead guard condition and bolts.	●				
Check horn operation and other warning devices.	●				
Check steering operation.	●				
Check service brake operation.	●				
Check directional and speed controls operation.	●				
Check lift, tilt and reach operation.	●				
Check mast, lift chains and fasteners.	●				
Check carriage or attachments and forks.	●				
Check optional safety equipment.(Alarms, Lights etc.)	●				

6. PERIODIC MAINTENANCE CHECKS

The PM intervals depend on hour meter records of operation.

PM interval
A : 8~10 hours or daily
B : 50~250 hours or every month(Typical PM interval)
C : 450~500 hours or every 3 months
D : 900~1000 hours or every 6 months
E : 2000 hours or every year

Periodic checks and planned maintenance (PM)	A	B	C	D	E
Check truck visually and inspect components.		●			
Test drive truck/check functional performance.		●			
Check torque on critical fasteners.		●			
Lubricate truck.(See component)		●			
Clean/Check battery terminals, electrolyte level.		●			
Check battery cables/truck receptacle.		●			
Perform battery load test.		●			
Test ground.		●			
Check drive unit fluid level.		●			
Replace drive unit fluid.(initial only)		●			
Drain and replace drive unit fluid.					●
Check drive unit mounting and fasteners.		●			
Check brake condition and wear.		●			
Lubricate steering gear and steering bearing of drive unit.		●			
Lubricate drive unit.		●			
Replace hydraulic sump fluid and strainer.					●
Replace hydraulic sump filter.				●	
Replace hydraulic sump breather.				●	
Lubricate tilt cylinder rod ends.		●			
Lubricate mast fittings.		●			
Check lift chain adjustment and wear.		●			
Check/lubricate lift chains.		●			
Check contactors. (Replace contactor tips if roughness is remarkable)		●			

7. 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 and maintenance problems. Check for loose fasteners and fittings.

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

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

· Inspect the truck for any sign of external leakage: drive axle 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.**

· Be sure that the driver's overhead guard, load backrest extension and safety devices are in place, undamaged and attached securely.

Then check all of the critical components that handle or carry the load.

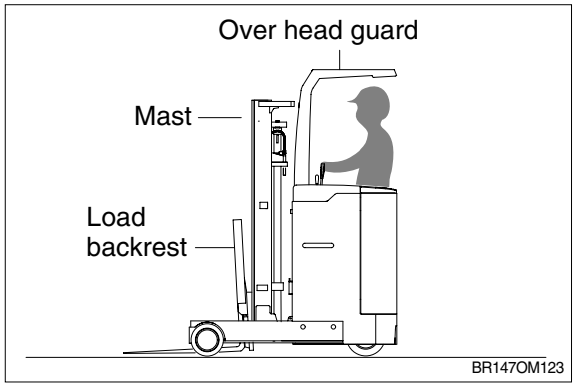
1) OVERHEAD GUARD

Check the overhead guard for damage. Be sure that it is properly positioned and all mounting fasteners are in place and tight.

2) LOAD BACKREST

Check the load backrest for damage. Inspect the welds on the carriage and load backrest for cracks.

Be sure that the mounting fasteners are all in place and tight.



3) MAST ASSEMBLY

Inspect the mast assembly : Rails, carriage rollers, lift chains, lift cylinders 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, any damaged or loose rollers and rail wear(metal flaking). Inspect all lift line hydraulic connections for leaks.

4) LIFT CHAIN

Carefully check the lift chains for wear, rust, corrosion, cracked or broken links, stretching, etc.. Check that the lift and carriage chains are adjusted to have equal tension. Check that the lift chain anchor fasteners and locking means are in place and tight.

△ **Masts and lift chains require special attention to maintain them in safe operating condition.**

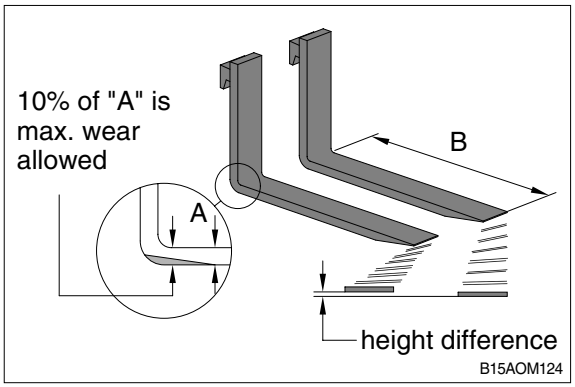
· **Mast can drop suddenly. Look at the mast, but keep hands out.**

· **Lift chain repairs and adjustments should be made by trained service personnel.**

5) FORKS

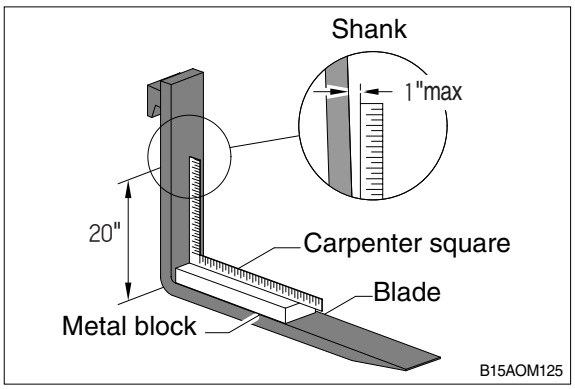
Inspect the load forks for cracks, breaks, bending, and wear. The fork top surfaces should be level and even with each other. The height difference between both fork tips refer to below table.

Model	Fork length (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 2" thick metal block, at least 4" wide by 24" long with parallel sides, on the blade of the fork with the 4" surface against the blade. Put a 24" carpenter's square on the top of the block and against the shank. Check the fork 20" above the blade to make sure it is not bent more than 1" maximum.



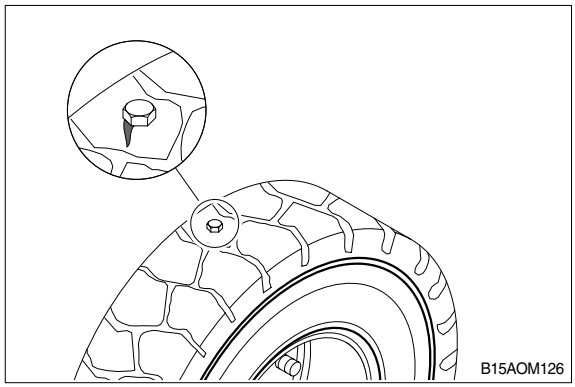
※ **If the fork blades are obviously bent or damaged, have them inspected by a trained maintenance person before operating the truck.**

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

6) WHEELS 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 of them is loose or missing. Replace missing bolts or lug nuts. Torque loose or replaced items to specifications.



8. MAINTENANCE GUIDE

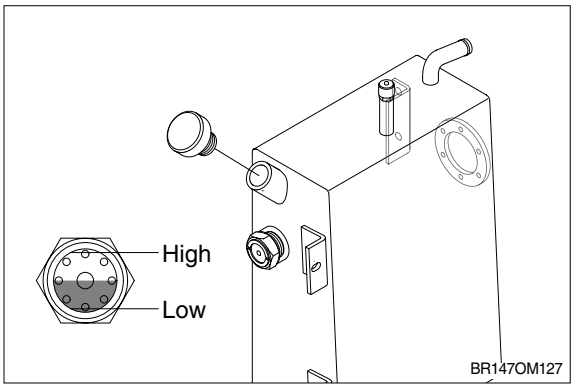
1) CHECK AND SUPPLY HYDRAULIC OIL

Check the hydraulic sump tank fluid level. Correct fluid level is important for proper system operation. Low fluid level can cause pump damage.

Hydraulic fluid expands as its temperature rises. Therefore, it is preferable to check the fluid level at operating temperature(after approximately 30 minutes of truck operation). To check the fluid level, first park the truck on a level surface and apply the parking brake.

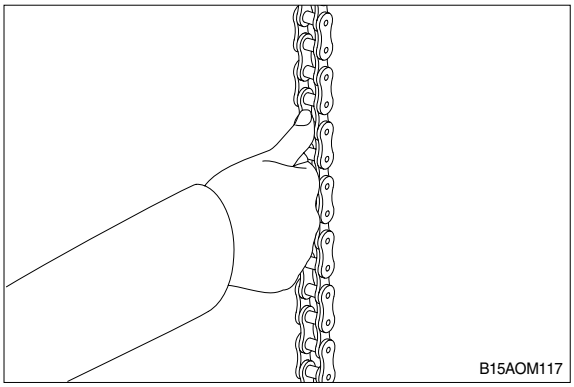
Put the mast upright in a vertical position and lower the fork carriage fully down. Check the hydraulic oil level. Keep the oil level above the LOW mark by adding recommended hydraulic fluid only, as required . **Do not overfill**.

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



2) CHECK AND ADJUSTMENT OF LIFT CHAIN TENSION

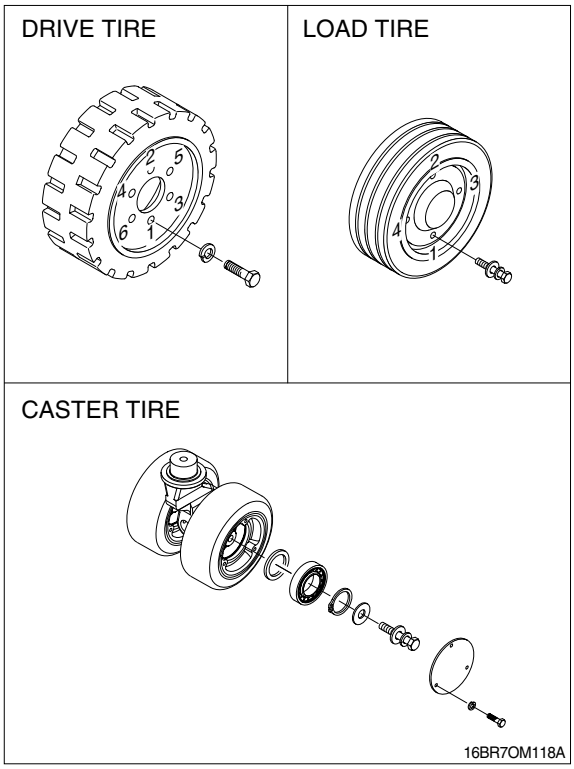
Set the fork in its horizontal position on an even ground. Raise it up to 20~30㎝ from the ground and push the chain with both hands. If the tension is too high or too low on one side, adjust it with the chain anchor bolt.



3) CHECKING OF HUB NUT TIGHTENING CONDITION

Make sure that the hub nut is firmly tightened.

Tightening and checking should be made in a diagonal order to prevent unbalanced tightening. (See the figure.)



4) GREASING OF EACH PARTS

Clean the following parts before greasing.

(1) Lift chain : Clean the chain with a brush greased with SAE 30~40(Brush over the gear oil low viscosity).

(2) Rolling part of mast guide rail roller : Brush over grease.

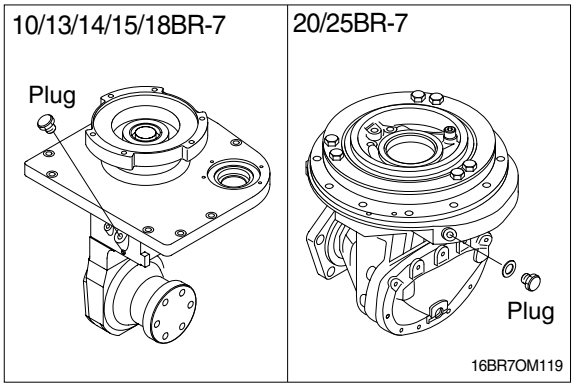
(3) Slide guide and slide rail : Brush over leaked oil.

(4) Sliding parts of inner mast and outer mast : Brush over leaked oil.

(5) Sliding parts of fork and finger bar : Brush over grease.

5) CHECK FOR THE OIL LEVEL OF THE DRIVING GEAR CASE

Check for the oil level by taking out the plug provided front side of the gear case.

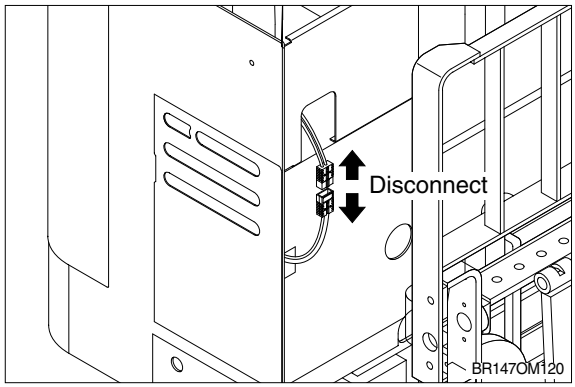


6) EXTERNAL APPEARANCE CHECK OF THE VEHICLE

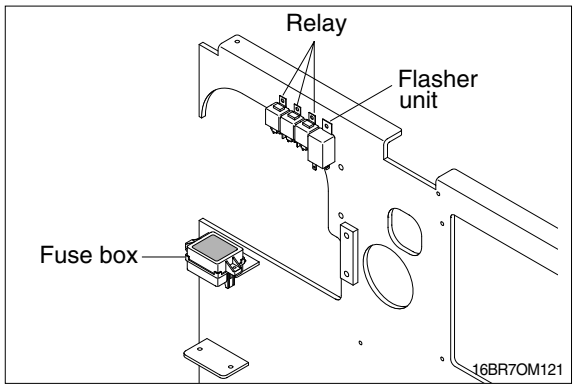
Check for the external appearance of vehicles. If any defect is found immediately contact the service station.

7) FUSE REPLACEMENT

(1) Disconnect the battery connector.



(2) Remove the blown fuse and replace with a new one.



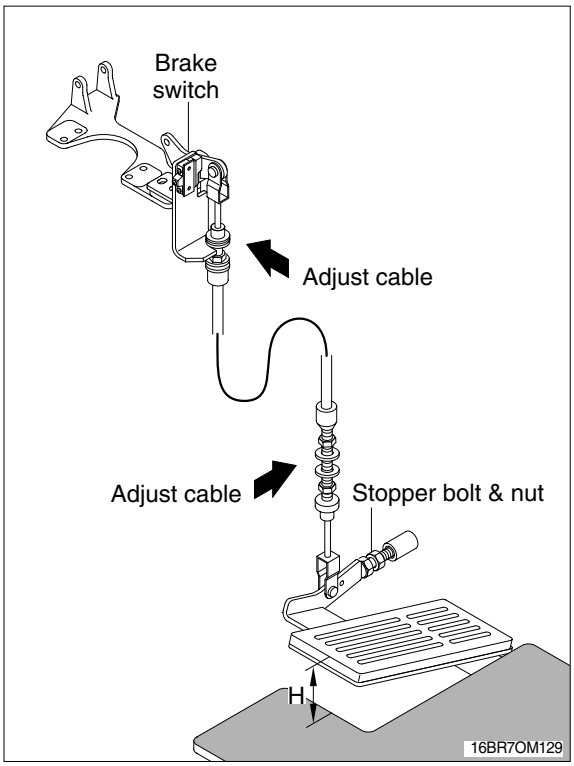
※ **The blown fuse must be replaced with a fuse of the same capacity. When the fuses are often blown out contact the service station for inspection. Never use a conductor for a fuse.**

8) CHECK AND ADJUSTMENT OF THE SERVICE BRAKE SYSTEM

(1) Check the pedal height(H) and adjust the stopper bolt & nut.

Model	Height(mm)
10/13BR-7	47±1.0
14/15/18BR-7	47±1.0
20/25BR-7	65±1.0

(2) Check the brake switch to be operating condition while the pedal is depressed.



(3) Check the gap(B) between brake cam and adjusting bolt.

· B : 0.8~1.2mm

If the gap is too long and short adjust the adjusting bolt.

· Adjust nut tightening torque

11.4~12.6kgf · m(82.5~91.1lbf · ft)

Check the operation of the cam and bolt and then lubricate grease to them.

(4) Check the brake pad wear or any damage.

If brake pad is contacted any one side or pad thickness is 4.5mm, pad should be replaced together.

· Brake pad bolt tightening torque

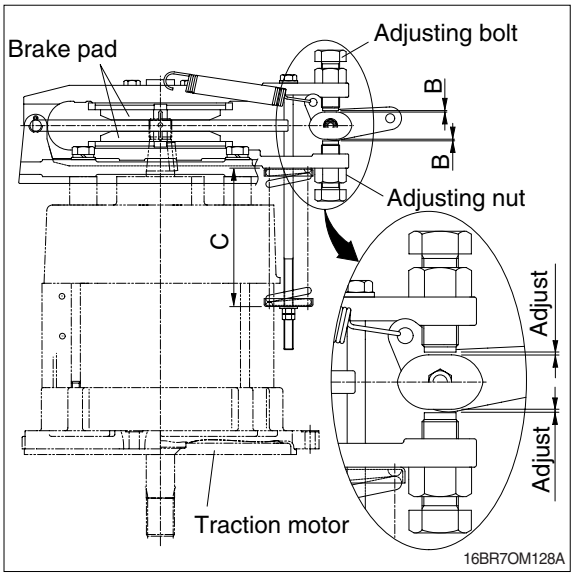
1.8~2.7kgf · m(13.0~19.5lbf · ft)

(5) Check the height(C) of brake spring and adjust the spring.

Model	Height(mm)
10/13BR-7	123±1.0
14/15/18BR-7	118±1.0
20/25BR-7	104±1.0

· Spring nut tightening torque

1.8~2.7kgf · m(13.0~19.5lbf · ft)



9) LIFT CHAIN MAINTENANCE

The chain system on the mast was designed for safe, efficient and reliable transmission of lifting force from hydraulic cylinder to the forks, safe use of your truck with minimum down-time depends on the correct care and maintenance of the lift chains. Most complaints of unacceptable chain performance are a result of poor maintenance. Chains need periodic maintenance to give maximum service life.

⚠ Do not attempt to repair a worn chain. Replace worn or damaged chainswith a set (LH & RH). Do not piece chains together.

10) 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 50hours. During the inspection, check for the following conditions:

(1) Rust and corrosion, cracked plates, raised or turned pins, tight joints, wear and worn pins or holes.

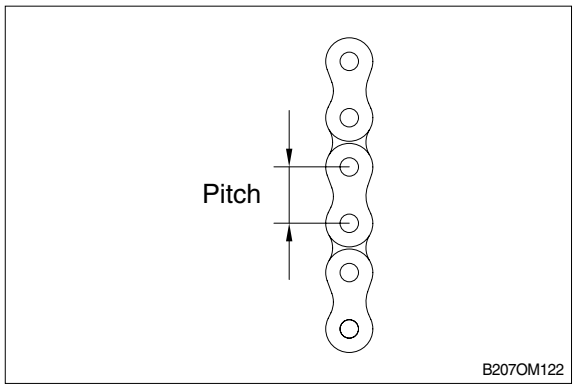
(2) When the pins or holes become worn, the chain becomes longer. When a section of chain is 3% longer than a section of new chain, the chain is worn and must be discarded.

(3) 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.

11) 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 lift 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

12) LIFT CHAIN WEAR AND REPLACEMENT CRITERIA



All chains must be replaced if any link has wear of 3% or more, or if any of the damaged conditions noted 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.**

9. CRITICAL FASTENER 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.

Check critical items, including :

- Load backrest extension
- Overhead guard
- Tilt cylinder mounting & yokes
- Mast mounting & components

Refer to 「8. SPECIFICATIONS」 for critical tightening torque value.

10. AIR CLEANING THE TRUCK

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. A clean condition helps prevent fires and helps the truck run cooler.

Lift trucks should be air cleaned at every PM interval and more often if needed.

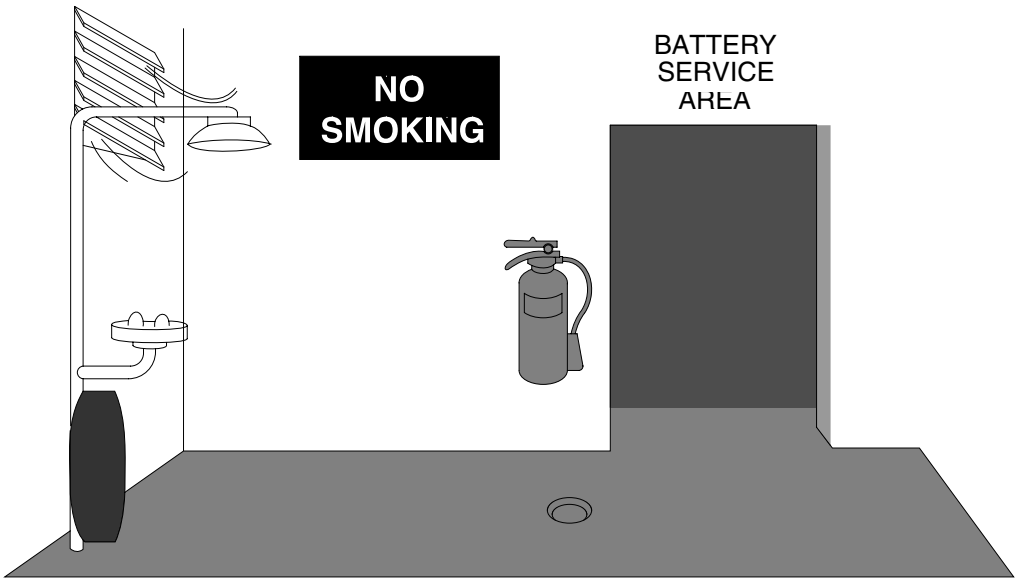
Use an air hose with special adapter or extension having a control valve and a nozzle to direct the air properly. Use clean, dry, low pressure, compressed air. Restrict air pressure to 30 psi (207 kPa), maximum. (OSHA requirement.)

⚠ Wear suitable eye protection and protective clothing.

Air clean : mast assembly; drive unit; battery; cables; switches and wiring harness; drive and hydraulic motors; and caster, suspension, linkage.

11. ELECTRIC TRUCK BATTERY MAINTENANCE

1) GENERAL



B15AOM128

Battery charging installations must be located in areas designated for that purpose. These areas must be kept free of all non-essential combustible materials.

Facilities must be provided for :

- Flushing spilled electrolyte.
- Fire protection.
- Protecting charging apparatus from damage by trucks.
- Adequate ventilation for dispersal of fumes from gassing batteries.

When handling acid concentrates greater than 50 percent acid (above 1,400 specifics gravity), an eye wash fountain must be provided.

A conveyor, overhead hoist or equivalent material handling equipment must be provided for handling batteries.

⚠ Electric truck batteries are heavy and awkward to handle. They are filled with a very hazardous chemical solution. On charge, they give off hydrogen and oxygen which, in certain concentrations, are explosive. And they are costly. Before you remove, service or install a truck battery, carefully read the following recommendations and instructions.

2) BATTERY HANDLING

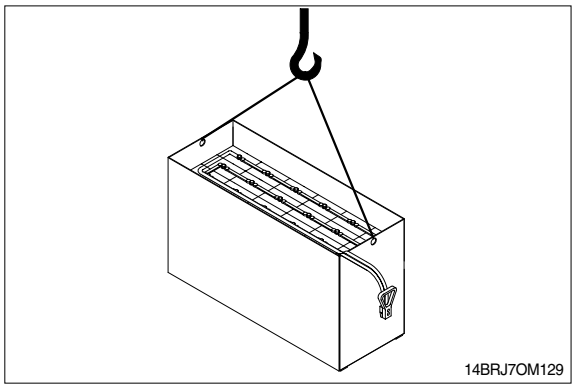
(1) Change(remove) or service storage batteries only in an area designated for this purpose.

(2) Be sure this area has provisions to flush and neutralize spillage, to ventilate fumes from gassing batteries and for fire protection.

(3) This area should be equipped with material-handling tools designed for removing and replacing batteries, including a conveyor or overhead hoist. Use lift hooks that have safety latches.

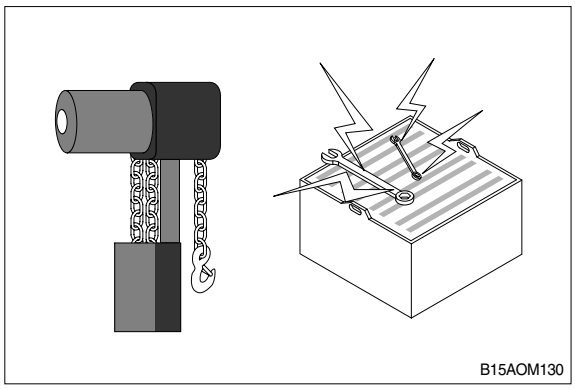
(4) Always use a special lifting device such as an insulated spreader bar to attach the hoist to the battery. The width of the spreader bar hooks must be the same as the lifting eyes of the battery, to prevent damage to the battery. If the spreader bar hooks are movable, carefully adjust the position(width) of the hooks so that the pull is directly upward(vertical) and no side load or force (pressure) is exerted on the battery case. Be sure the lift hooks are the correct size to fit the lifting eyes of the battery.

(5) If the battery does not have a cover of its own or has exposed terminals and connectors, cover the top with a non-conductive (insulating) material, e.g., a sheet of plywood or heavy cardboard, prior to attaching the lifting device.



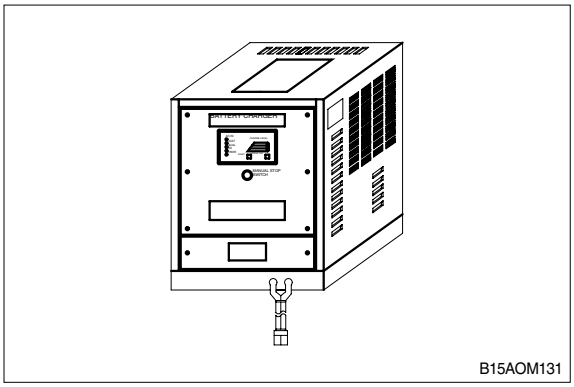
(6) Chain hoists or power battery hoists must be equipped with loadchain containers to accumulate the excess lifting chain.

(7) Keep all tools and other metallic objects away from the terminals.



3) BATTERY CHARGING

The charger is of the automatic type so that only requirement for charging is to insert the plug, there being no need for maintaining watch .



(1) Instruction

① When inserting the plug and connecting the battery connector, the input power lamp and the battery connection lamp light on and charge is started after a few seconds.
The power is automatically cut off after completion of charge.

② **Functions**
The function of indication lamps and switches.

- **Input power lamp** : Only lighting on during charge. Check the plug and input power if the lamp does not light on.
- **Battery connection lamp** : Lighting on when the charger and the battery are connected. Check the connector if the lamp does not light on.
- **75% charge lamp** : Lighting on from 75% charge to completion.
- **Full charge lamp** : Lighting on when charging is completed.
- **Input disconnect lamp** : Lighting on when the input supply line is disconnected. At this time, check the input power.
- **Over voltage lamp** : Lighting on when the manual stop button is pushed or charger voltage is above 66. At this time, unplug and disconnect the battery and charger connectors.
- **Over current lamp** : Lighting on when the current is overload. At this time, unplug, open charger door and push the thermal relay button on the electro-magnetic switch plug again after about 5 minutes and if this lamp lights on again stop charging and call A/S.
- **Ordinary/Equalizing charge convert switch** : Place the switch to left side for ordinary charge and to right side for equalizing charge.
- **Manual stop button** : During charge, push this button to stop charging.
- **Reversion button** : After stop charging artificially or push the manual stop button, use this button to revert to charging.
- **Voltage/current confirming button** : The indicator always show battery voltage and when push this button, the current is displayed in the indicator.

(2) Installation of the charger

① Place for installation
Install the charger at a place with good ventilation, no excessive temperature, low humidity and little dust.

② For the primary of the transformer, use the taps corresponding to the power voltage difference. For example, 218V(measured value)-220V(primary).

③ Confirm the earth line of charging cable wire and make sure the earth line connects the earth of building.

(3) Ordinary charge

① The procedure for charging is as follows:
- Remove the key of vehicle.
- Confirm the convert switch at ordinary charge position.
- Connect the battery connector and the charging connector.
- Make sure the pilot lamp lights.

② The procedure after completion of charging is as follows:
- Ensure that the full charge lamp lights on.
- Disconnect the battery connector from the charge connector.

③ The procedure for stopping charging halfway is as follows :
- Push the manual stop button.
- Disconnect the battery connector from the charge connector.

(4) Equalizing charge

Continual repetition of ordinary charge will create a certain amount of performance difference among the cells. For this reason, the battery is slightly overcharged from time to time to equalize the performance among the cells, that is, given equalizing charge.
Equalizing charge should be given in the following cases:

① A battery that is subject to daily repetition of charge and discharge. For the battery, equalizing charge should be performed once a month.
② When discharged over the designated capacity.
③ When recharge had been delayed after discharge.
④ When a short-circuit has occurred.
Equalizing charge is performed in the same way as in ordinary charge. However, place the ordinary/equalizing charge convert switch on the equalizing charge position.

△ **Excessive equalizing charge may shorten the life of the battery.**

(5) Supplementary charge

If one day operation cannot be completed with single charge, rest period should be utilized to charge and it is performed in almost the same way as ordinary charge.

(6) Notices

① When installing the charger confirm the input voltage and use the tops corresponding to the poser voltage in the area.
② Charge the battery immediately after use and once a month even in storage.
③ Take care not to let the battery specific gravity lower in winter time especially.
④ During charging, if electrolyte temperature of the battery in above 50℃ stop charging.
⑤ During charging, as an inflammable gas is generated out of the battery, particular care should taken for fire and ventilation.

4) BATTERY INSTALLATION & REMOVAL FROM TRUCK

When the spare battery is used for continuous operation or it is required to check the battery, motor, etc., remove the battery through the following procedure:

(1) Battery removal

① Turn on the key.

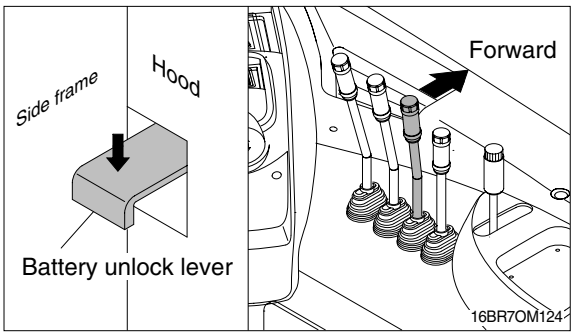
② Foot on the the battery unlock lever to unlock the battery assembly.

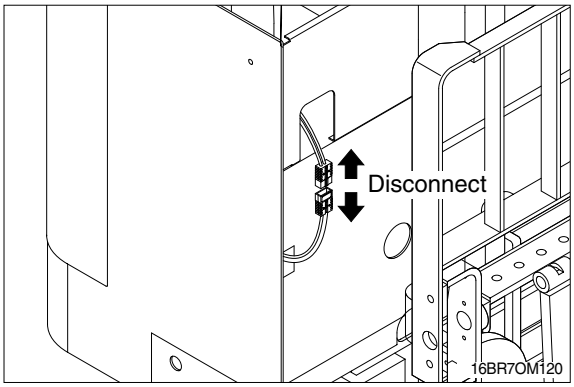
③ Push the reach lever until battery get out of frame inside.

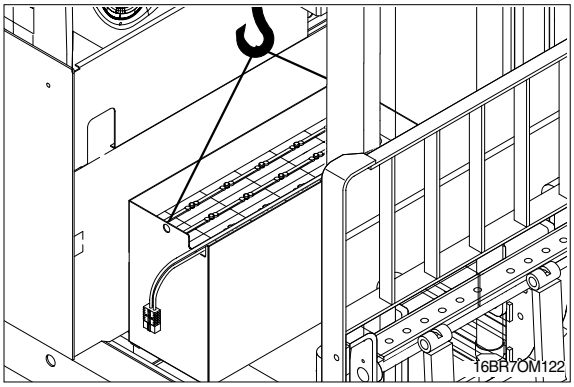
④ Turn off the key.

⑤ Disconnect the battery connector.

⑥ Using a battery hanger, carefully raise the battery assembly.







(2) Battery installation

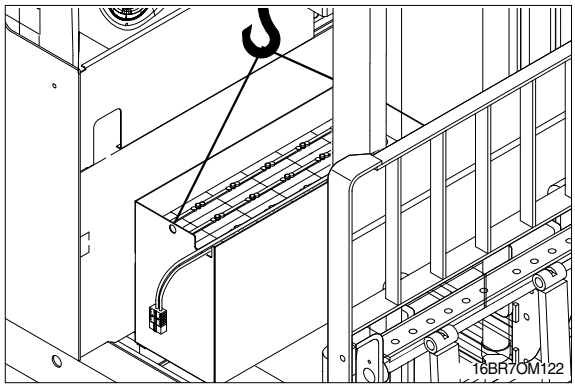
① Using a battery hanger, carefully put the battery assembly on the guard rail between mast and frame.

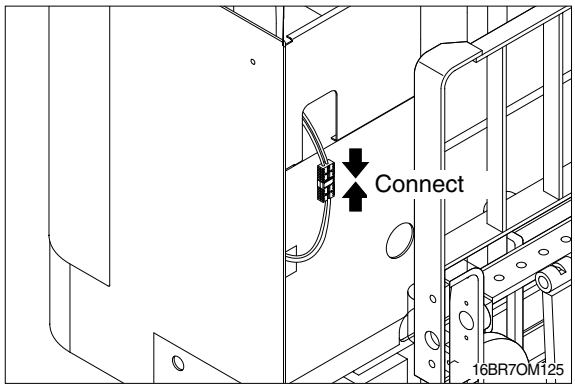
② Connect the battery connector.

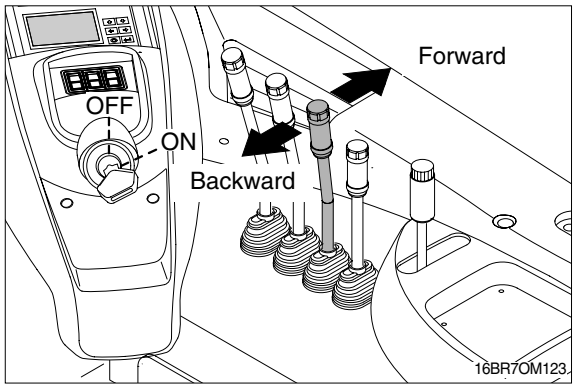
③ Turn on the key.

④ Pull the reach lever until it sounds locked. (Auto lock)

⑤ Complete installation.



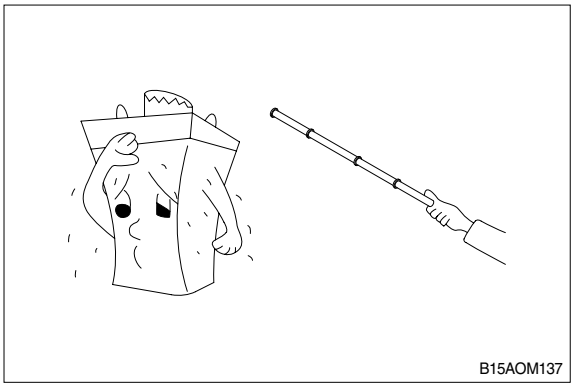




5) BATTERY CLEANING AND CARE

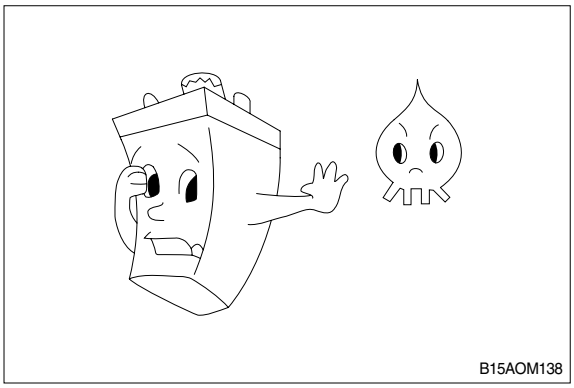
(1) Avoid over-discharge

If used until the vehicle can no longer run, battery life will be shortened. If the battery capacity indicator's red lamps turns on at on load lift, stop operation and charge the battery without delay.



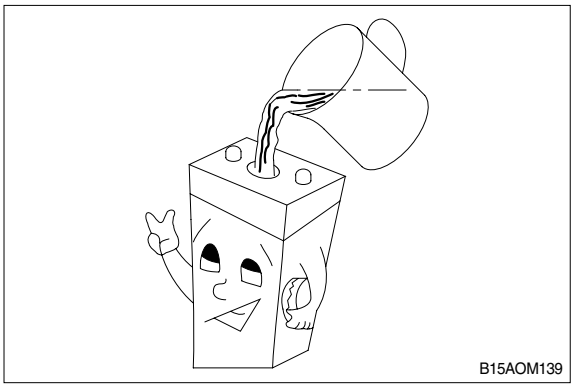
(2) Inflammable

In any case, keep fire away from the battery because it contains an inflammable gas.



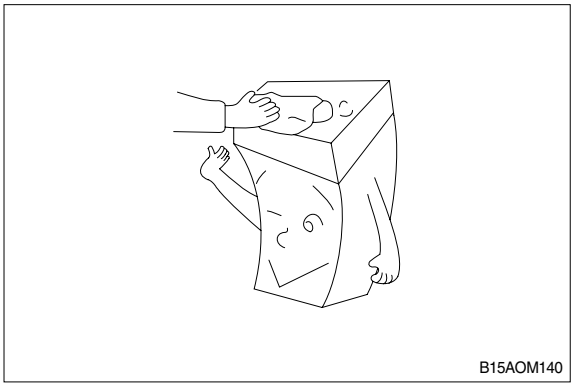
(3) Refilling distilled water

Refill distilled water to maintain the electrolyte level to the specified height before starting equalizing charge, because electrolyte is lost through decomposition during charge and also through natural evaporation. It is unnecessary to refill dilute sulfuric acid into the battery except the case of losing electrolyte by running over.



(4) Keep the battery clean

Keep the battery, in particular the upper surface, clean and dry and keep the filler plugs tightly screwed.



12. OILS

1) NEW MACHINE

New machine uses following lubricants and oils.

Description	Specification
Gear oil	SAE 80W/90
Hydraulic oil	ISO VG46/VG68, Hyundai genuine long life hydraulic oil
	ISO VG15, Conventional hydraulic oil *1
Grease	NLGI No.2

- API : American Petroleum Institute
- SAE : Society of Automotive Engineers
- ISO : International Organization for Standardization
- NLGI : National Lubricating Grease Institute

*1 Cold region
Russia, CIS, Mongolia

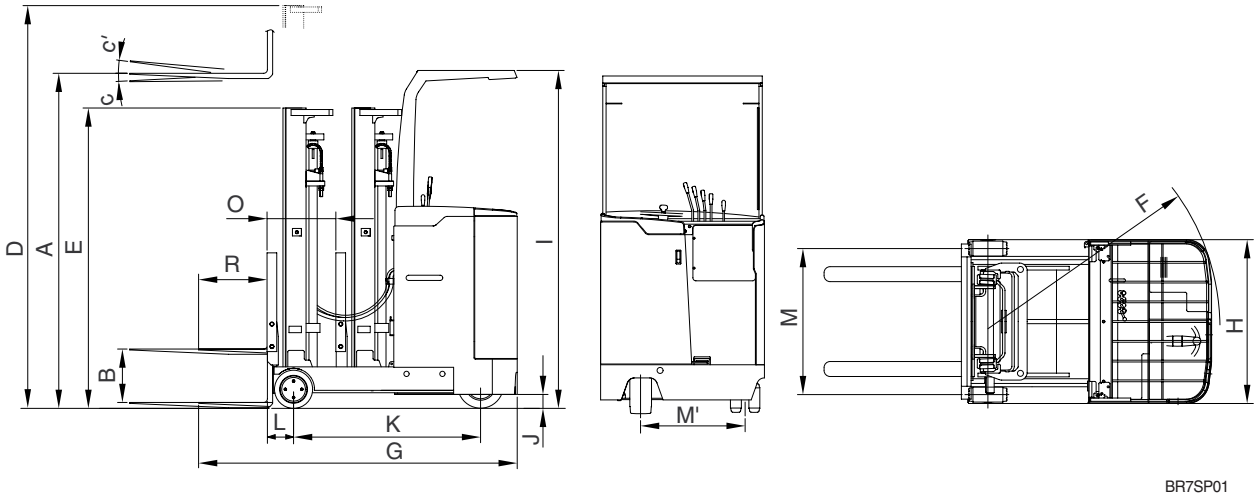
2) RECOMMENDED LUBRICANTS

Service point	Kind of fluid	Capacity ℓ (U.S. gal)		Ambient temperature ℃(°F)
		10/13/14/ 15/18BR-7	20/25BR-7	-50 (-58) -30 (-22) -20 (-4) -10 (14) 0 (32) 10 (50) 20 (68) 30 (86) 40 (104)
Drive unit	Gear oil	1.6 (0.42)	4.4 (1.16)	SAE 80W/90
Hydraulic oil tank	Hydraulic oil	18.1 (4.0)	24 (5.3)	* ISO VG 15 ISO VG 46 ISO VG 68
Fitting (Grease nipple)	Grease	0.1 (0.03)	0.1 (0.03)	* NLGI No.1 NLGI No.2

* Cold region
Russia, CIS, Mongolia

1. SPECIFICATIONS

1) 10/13BR-7

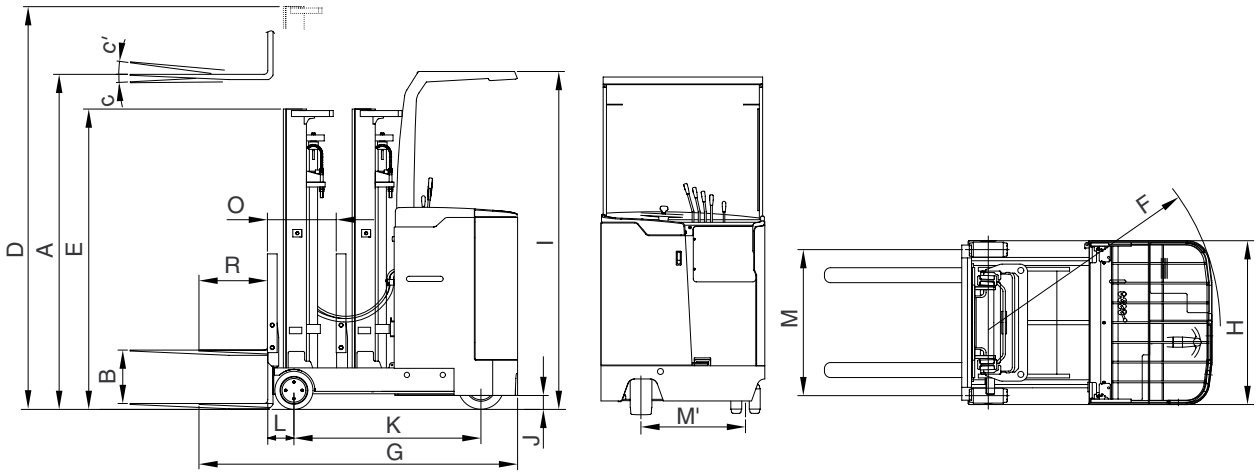


BR7SP01

Model			Unit	10BR-7	13BR-7
Capacity			kg	1000	1250
Load center		R	mm	500	←
Weight(Unloaded, with battery)			kg	2169	2214
Fork	Lifting height	A	mm	3000	←
	Free lift	B	mm	357	←
	Lifting speed(Unload/Load)		mm/sec	480/300	480/290
	Lowering speed(Unload/Load)		mm/sec	450/500	←
	L×W×T	L,W,T	mm	900×100×35	←
Mast	Tilt angle (forward/backward)	C/C'	degree	3/5	←
	Max height	D	mm	4025	←
	Min height	E	mm	1991	←
Body	Travel speed(Unload)		km/h	11.5	11.5
	Gradeability(Unload/Load)		%	18/21	19/18
	Min turning radius(Outside)	F	mm	1425	1460
ETC	Max hydraulic pressure		kgf/cm²	135	←
	Hydraulic oil tank		ℓ	18	←
Overall length(With fork)		G	mm	2110	←
Overall width(Load wheel)		H	mm	1070	←
Overhead guard height		I	mm	2260	←
Ground clearance		J	mm	85	←
Wheel base		K	mm	1115	1150
Wheel tread(Front/rear)		M/M'	mm	970 *1070/650	←
Reach stroke		O	mm	330	365

* Wide frame

2) 14/15/18BR-7

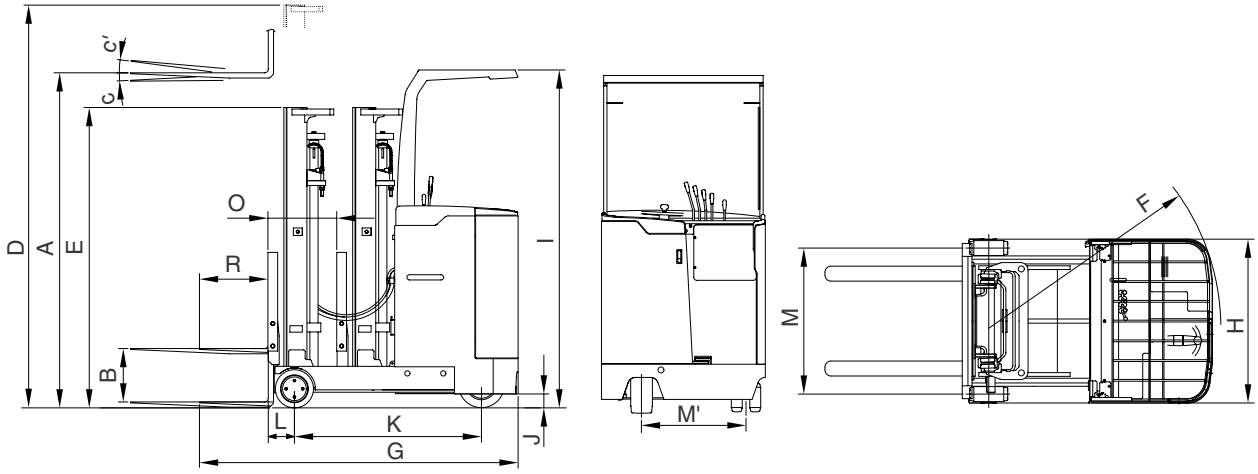


BR7SP01

Model			Unit	14BR-7	15BR-7	18BR-7
Capacity			kg	1350	1500	1800
Load center		R	mm	500	←	←
Weight(Unloaded, with battery)			kg	2240	2385	2427
Fork	Lifting height	A	mm	3000	←	←
	Free lift	B	mm	357	←	←
	Lifting speed(Unload/Load)		mm/sec	480/300	480/290	480/280
	Lowering speed(Unload/Load)		mm/sec	450/500	←	←
	L × W × T	L,W,T	mm	900 × 100 × 35	←	←
Mast	Tilt angle (forward/backward)	C/C'	degree	3/5	←	←
	Max height	D	mm	4025	←	←
	Min height	E	mm	1991	←	←
Body	Travel speed(Unload)		km/h	11	←	←
	Gradeability(Unload/Load)		%	16/30	16/29	15/26
	Min turning radius(Outside)	F	mm	1545	1605	1775
ETC	Max hydraulic pressure		kgf/cm²	190	←	←
	Hydraulic oil tank		ℓ	18	←	←
Overall length(With fork)		G	mm	2120	2155	←
Overall width(Load wheel)		H	mm	1070	←	←
Overhead guard height		I	mm	2260	←	←
Ground clearance		J	mm	70	←	←
Wheel base		K	mm	1250	1315	1500
Wheel tread(Front/rear)		M/M'	mm	970 *1070/650	←	←
Reach stroke		O	mm	450	480	665

* Wide frame

3) 20/25BR-7



BR7SP01

Model			Unit	20BR-7	25BR-7
Capacity			kg	2000	2500
Load center		R	mm	500	←
Weight(Unloaded, with battery)			kg	2738	2926
Fork	Lifting height	A	mm	3000	←
	Free lift	B	mm	415	←
	Lifting speed(Unload/Load)		mm/sec	470/300	470/280
	Lowering speed(Unload/Load)		mm/sec	450/500	←
	L×W×T	L,W,T	mm	1050×100×45	←
Mast	Tilt angle(Forward/backward)	C/C'	degree	3/5	←
	Max height	D	mm	4030	←
	Min height	E	mm	2025	←
Body	Travel speed(Unload)		km/h	12	←
	Gradeability(Unload/Load)		%	16/18	15/16
	Min turning radius(Outside)	F	mm	1790	1985
ETC	Max hydraulic pressure		kgf/cm²	190	←
	Hydraulic oil tank		ℓ	24	←
Overall length(With fork)		G	mm	2373	←
Overall width(Load wheel)		H	mm	1200	←
Overhead guard height		I	mm	2296	←
Ground clearance		J	mm	77	←
Wheel base		K	mm	1500	1700
Wheel tread(Front/rear)		M/M'	mm	1060 *1180/730	←
Reach stroke		O	mm	607	807

* Wide frame

2. SPECIFICATION FOR MAJOR COMPONENTS

1) 10/13BR-7

(1) MOTOR

Item	Unit	Drive motor	Hydraulic pump motor
Model	-	TSA200-100-063	TSA170-210-009
Type	-	AC	
Rated voltage	Vac	32V 3ø	30V 3ø
Output	kW	4.4	15.8
Insulation	-	Class F	

(2) BATTERY

Item	Unit	10BR-7	13BR-7
Model	-	VCI 225	
Rated voltage	V	48	
Capacity	AH/hr	225/5	
Electrolyte	-	WET	
Dimension(W×D×H)	mm	994×270×581.7	
Connector(CE spec)	-	SB350(SBE320)	
Weight	kg	380	

(3) CHARGER

Item	Unit	10/13BR-7
Type	-	Constant current, constant voltage
Battery capacity for charge	V-AH	48-200~230
AC input	V	Triple phase 410
		Single phase 220
		Triple phase 220/380
		Triple phase 440
DC output	V	62±1
Charge time	hr	8±2
Connector(CE spec)	-	SB 350(SBE320)

(4) GEAR PUMP

Item	Unit	Specification
Type	-	Fixed displacement gear pump
Capacity	cc/rev	16.5
Maximum operating pressure	bar	210
Rated speed(max/min)	rpm	3000/500

(5) MAIN CONTROL VALVE

Item	Unit	Specification
Type	-	3 spool, 4 spool
Operating method	-	Mechanical
Main relief valve pressure	bar	135

(6) DRIVE UNIT

Item	Unit	Specification
Gear ratio	-	20.125
Oil quantity	l	1.6

(7) WHEELS

Item	Specification
Type(Load / Drive /Caster)	Urethane / Rubber / Rubber
Quantity(Load / Drive /Caster)	2 / 1 / 2
Load wheel	254 × 100
Drive wheel	305 × 145
Caster wheel	178 × 73

(8) BRAKES

Item	Specification
Brakes(Service & Parking)	Disc brake.

2) 14/15/18BR-7

(1) MOTOR

Item	Unit	Drive motor	Hydraulic pump motor
Model	-	TSA200-160-104	TSA170-210-009
Type	-	AC	
Rated voltage	Vac	30V 3 ø	
Output	kW	6.8	15.8
Insulation	-	Class F	

(2) BATTERY

Item	Unit	14BR-7	15BR-7	18BR-7
Model	-	VCI 230	VCF 280	VCI 300
Rated voltage	V	48		
Capacity	AH/hr	230/5	280/5	300/5
Electrolyte	-	WET		
Dimension(W×D×H)	mm	994×378×581.7		
Connector(CE spec)	-	SB350(SBE320)		
Weight	kg	400	480	500

(3) CHARGER

Item	Unit	14BR-7	15/18BR-7
Type	-	Constant current, constant voltage	
Battery capacity for charge	V-AH	48-200~230	48-280~365
AC input	V	Triple phase 410	
		Single phase 220	
		Triple phase 220/380	
		Triple phase 440	
DC output	V	62±1	
Charge time	hr	8±2	
Connector(CE spec)	-	SB 350(SBE320)	

(4) GEAR PUMP

Item	Unit	Specification
Type	-	Fixed displacement gear pump
Capacity	cc/rev	19.6
Maximum operating pressure	bar	210
Rated speed(max/min)	rpm	3000/500

(5) MAIN CONTROL VALVE

Item	Unit	Specification
Type	-	3 spool, 4 spool
Operating method	-	Mechanical
Main relief valve pressure	bar	190

(6) DRIVE UNIT

Item	Unit	Specification
Gear ratio	-	20.125
Oil quantity	l	1.6

(7) WHEELS

Item	Specification
Type(Load / Drive /Caster)	Urethane / Rubber / Rubber
Quantity(Load / Drive /Caster)	2 / 1 / 2
Load wheel	254 × 100
Drive wheel	305 × 145
Caster wheel	178 × 73

(8) BRAKES

Item	Specification
Brakes(Service & Parking)	Disc brake.

2) 20/25BR-7

(1) MOTOR

Item	Unit	Drive motor	Hydraulic pump motor
Model	-	TSA200-160-104	TSA170-210-009
Type	-	AC	
Rated voltage	Vac	30V 3 ø	
Output	kW	6.8	15.8
Insulation	-	Class F	

(2) BATTERY

Item	Unit	20/25BR-7
Model(Type)	-	VCI 335
Rated voltage	V	48
Capacity	AH/hr	335/5
Electrolyte	-	WET
Dimension(W×D×H)	mm	994×378×581.7
Connector(CE spec)	-	SB350(SBE320)
Weight	kg	560

(3) CHARGER

Item	Unit	20/25BR-7
Type	-	Constant current, constant voltage
Battery capacity for charge	V-AH	48-280~365
AC input	V	Triple phase 410
		Single phase 220
		Triple phase 220/380
		Triple phase 440
DC output	V	62±1
Charge time	hr	8±2
Connector(CE spec)	-	SB 350(SBE320)

(4) GEAR PUMP

Item	Unit	Specification
Type	-	Fixed displacement gear pump
Capacity	cc/rev	19.6
Maximum operating pressure	bar	210
Rated speed(max/min)	rpm	3000/500

(5) MAIN CONTROL VALVE

Item	Unit	Specification
Type	-	3 spool, 4 spool
Operating method	-	Mechanical
Main relief valve pressure	bar	190

(6) DRIVE UNIT

Item	Unit	Specification
Max input torque	kgf · m	2200
Max input rpm	rpm	3500
Gear ratio	-	20.9
Oil quantity	l	4.4

(7) WHEELS

Item	Specification
Load / Drive / Caster	Urethane / Rubber / Rubber
Quantity(Load / Drive / Caster)	2 /1 /2
Load wheel	267 × 114
Drive wheel	382 × 142
Caster wheel	204 × 76

(8) BRAKES

Item	Specification
Brakes(Service & Parking)	Disc brake.

3. TIGHTENING TORQUE

1) 10/13BR-7

NO	Items		Size	kgf · m	lbf · ft
1	Electric system	Hyd pump motor mounting bolt	M10×1.5	6.9±1.4	50±10
2		Drive motor mounting bolt	M 8×1.25	2.0±0.2	14.4±1.4
3		Steering motor mounting bolt	M10×1.5	6.9±1.4	50±10
4	Hydraulic system	Hydraulic pump mounting bolt	M10×1.5	5±1.0	36.2±7.2
5		MCV mounting bolt, nut	M 8×1.25	2.5±0.5	18.1±3.6
6	Power train system	Drive wheel mounting bolt	M16×1.5	20.5±1.5	148.3±10.8
7		Load wheel mounting nut	M40×1.5	5±0.5	36.2±3.6
8		Caster wheel mounting bolt	M12×1.75	12.0±1.0	89.8±7.2
9		Drive unit bracket mounting bolt	M12×1.75	14.3±1.0	103.4±7.2
10	Other	Head guard mounting bolt	M12×1.75	19±3.0	137.4±21.7

2) 14/15/18BR-7

NO	Items		Size	kgf · m	lbf · ft
1	Electric system	Hyd pump motor mounting bolt	M10×1.5	6.9±1.4	50±10
2		Drive motor mounting bolt	M 8×1.25	2.0±0.2	14.4±1.4
3		Steering motor mounting bolt	M10×1.5	6.9±1.4	50±10
4	Hydraulic system	Hydraulic pump mounting bolt	M10×1.5	5±1.0	36.2±7.2
5		MCV mounting bolt, nut	M 8×1.25	2.5±0.5	18.1±3.6
6	Power train system	Drive wheel mounting bolt	M16×1.5	20.5±1.5	148.3±10.8
7		Load wheel mounting nut	M40×1.5	5±0.5	36.2±3.6
8		Caster wheel mounting bolt	M12×1.75	12.0±1.0	89.8±7.2
9		Drive unit bracket mounting bolt	M12×1.75	14.3±1.0	103.4±7.2
10	Other	Head guard mounting bolt	M12×1.75	19±3.0	137.4±21.7

3) 20/25BR-7

NO	Items		Size	kgf · m	lbf · ft
1	Electric system	Hyd pump motor mounting bolt	M10×1.5	6.9±1.4	50±10
2		Drive motor mounting bolt	M 8×1.25	2.0±0.2	14.4±1.4
3		Steering motor mounting bolt	M10×1.5	6.9±1.4	50±10
4	Hydraulic system	Hydraulic pump mounting bolt	M10×1.5	5±1.0	36.2±7.2
5		MCV mounting bolt, nut	M 8×1.25	2.5±0.5	18.1±3.6
6	Power train system	Drive unit mounting bolt, nut	M12×1.75	14.3±1.0	103.4±7.2
7		Drive wheel mounting nut	M14×1.5	14±1.5	101.2±10.8
8		Load wheel mounting nut	M50×1.5	5±0.5	36.2±3.6
9		Caster wheel mounting bolt	M12×1.75	10±2.0	72.3±14.4
10		Drive unit bracket mounting bolt	M12×1.75	14.3±1.0	103.4±7.2
11	Others	Head guard mounting bolt	M12×1.75	19±3.0	137.4±21.7