EKKO®

MATERIAL HANDLING EQUIPMENT

MOVING AHEAD

OPERATION & MAINTENANCE MANUAL

ELECTRIC FORKLIFT TRUCK

Counter–balanced type

EK25T-LI ~ EK40T-LI

⚠ It is the responsibility of the Operator and Supervisor to read and understand this manual.
The truck should be operated only by qualified operators.

EKKO

MATERIAL HANDLING EQUIPMENT

EKKO GROUP (hereinafter called EKKO) warrants our equipment under normal operating conditions to be of proper materials and first class workmanship

Standard Warranty

EKKO standard warranty for new equipment shall be twelve (12) months after delivery of the initial purchaser, retail or lessee.

Limitations and Exclusions

The warranty is not applicable for inclusive of any of the following:

1.Equipment which has been subjected to alterations and/or modifications not approved in writing from EKKO. Neglect, unauthorized repair, misuse, lack of reasonable proper maintenance, accidents, normal adjustments, improper repairs or placements, use of parts which don't conform to' EKKOs specifications.

2.Normal replacement of any and all consumable parts such as, but not limited to: hydraulic oil, seals, o–rings, and/or parts required to perform a regular maintenance service.

3.Fast wear spare parts.

4.Attachments, components, parts or accessories of products or equipment not manufactured by.EKKO

5.Used products or equipment.

Limited Liability

1.Any and all other express, statutory, and implied warranties applicable to the products, including, without limitation, all implied warranties of merchantability and fitness for use, are expressly disclaimed.

2.In no event shall the dealer, its customers or users be entailed to recover incidental or consequential damages, including, but not limited to, damages or inconvenience, rental or replacement equipment, loss of profits, or other commercial loss.

3.EKKO neither assumes nor authorizes any other to assume for it any other liability in connection with the sale or service of the equipment.

4.No modifications, alterations or changes of this limited warranty is permitted or authorized by EKKO.

EKKO

MATERIAL HANDLING EQUIPMENT

EKKO Material Handling Warranty Policies:

This warranty policy manual is published to assist authorized dealers in administrating warranty coverage. This manual may be revised to reflect changes in policies and procedures as they occur. Only items covered by EKKO Material Handling's expressed warranty contained in dealership authorization letter, all corresponding and necessary agreement and/or documents are covered by warranty.

1. Warranty Coverage

(1)Standard Warranty Coverage: one (1) year

(2)Only items covered by EKKO Material Handling's expressed warranty contained in dealership authorization letter, all corresponding and necessary agreement and/or documents are covered by warranty.

(3)Items not covered by warranty, but not limited to:

–Additional labor expenses

–Additional working time –Fast–wear parts like wheels, rollers, bearings, etc.

–Consumable items like batteries, oil, seals, etc.

–Freight cost for replacement parts

–Easy–broken parts

–Equipment modifications not authorized in writing by EKKO Material Handling.

–Damage due to incorrect storage or improper usage.

–Replacement of items by persons who is not the authorized

Material Handling dealership.
–Loss of time, inconvenience, loss of machine use, or other consequential damage.
–Machine transportation costs
–Oil analysis
–Overheating problems caused by debris restricting airflow.
–Shop supply items such as welding, oil–added, etc.
–Environmental charges
–Over capacity, accidents, misuse, negligence, modifications, in lack of performing maintenance per manufacturers schedule.
–Deterioration of gasket, seals, o–rings, electric wiring and connectors, caused by chemicals, sand, or other environmental conditions.
2.Warranty Start Date
(1)Warranty period starts on the date of delivery to the first rental or retail customer.
(2)Warranty on stock machines: Stock machines are defined as units properly maintained in dealers stock as new. They can not have been demonstrated or rented. A machine may remain in stock for a leased with a full standard machine warranty. Machines in stock longer than twelve (12) months will have the remaining portion of the normal twelve (12) months standard warranty.
(3)Warranty on Demonstrations Machines:
To support dealer demonstrations programs the warranty will not be activated when a new machine is used purely for demonstration until that machine has operated for 100 hours. For each 100 hours of part of that which exceeds the 100 maximum, one month of warranty will be deducted from the machine warranty. This will only apply provided:
–The machine is maintained and serviced as required.
–The machine is used only as a demonstrator, may not be in the rental fleet.
–The machine has not been in stock longer than 12 months.
–A demo machine has been filed at EKKO material handling.
3.Parts Warranty Policy Please refer to the parts policies and procedures manual.
4.Parts Warranty Claims
Parts warranty claims must have a copy of the original parts sale invoice and its broken pictures attached to the claim.
5.parts Warranty Return Requests
From time to time you may be requested to return a defective warranty part for further analysis. The following must be adhered to:
–Don’t return any parts unless requested to do so.
–Returned parts must be cleaned and fully assembled.
–Parts must be shipped on prepaid basis.
–EKKO Material Handling will reimburse the dealers for freight o n warranty parts returned to EKKO.
–The claim would be declined if the claiming parts are not returned within 30 days of date of application.
6.Claim Requirements
(1)All requests for warranty must be in writing.
(2)The claim parts list required must be clearly stated at a time.
(3)Photo requirements: all claiming parts will have to offer clear photos before and after esp. photos must clearly show details of the affected area.
7. Claim Submission
(1)Claims must be received within 30 days of the repair date. Claims received by EKKO
Material Handling after 30 days of the
repair date will be considered to be late and will be no exceptions to this policy.
(2)Claims returned for resubmitting must be corrected and returned within 30 days of the date of return. Claims not received within 30 days will be declined.
(3)Claims can only be submitted two (2) times. If after the second

time, the claim is not correct in providing the information as requested, it will be declined and no further consideration will be given.

8.Parts Reimbursement

(1)Authorized dealers will receive current price list less 20% for all parts accepted under normal warranty. But there will not be any further consideration for customs, duty, or brokerage fees.

(2)No reimbursement will be given for freight, or parts surcharges, that may be incurred in obtaining parts for warranty.

(3)Parts used for warranty repairs purchased outside of EKKO Material Handling's distribution system must be pre–approved by EKKO material Handling and a copy of the original invoice must be submitted with the warranty claim. These parts will be reimbursed at invoice cost and there will not be any consideration for customs, duty, freight, or brokerage fees to receive these parts.

9.Warranty For Approved Attachments

Warranty for approved attachments carry the warranty of their respective manufacturers and warranty claims should be submitted to the respective manufacturers.

10.Dealer Obligations

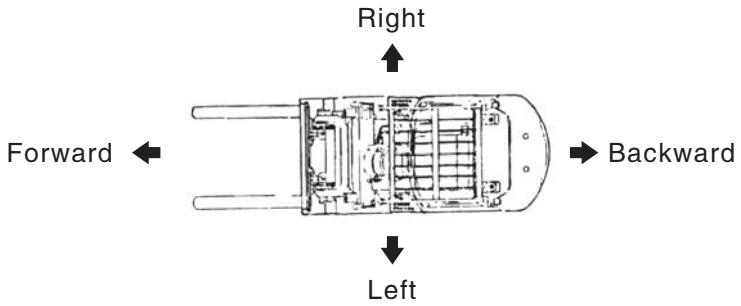
(1)Receiving Inspection: to be performed when the machine arrives at the dealers. Any damage to the machine must be resolved with the trucking company. Any missing items must be noted on the receiving inspection. Inspection reports must be sent to EKKO Material Handling within two (2) days, of the receiving date. Reports that are received late will not be considered for assistance with any missing items.

(2)Ship Inspections: to be performed prior to machines leaving the dealership. Copies to be sent to EKKO Material Handling within 3 0 days of inspection date. All information must be complete.

(3)Delivery / Warranty Registration: completed, signed, and sent to EKKO material handling within 10 days of delivery. A delivery / warranty registration file is required each time a machine is demonstrated, assigned to the rental fleet, or retailed. Without this file the warranty can not be paid.

This manual and the decals affixed to the truck use the following safety alert indications.

SIGNAL WORD	CLASSIFICATION
⚠ DANGER	Failure to follow the instructions in the message will likely cause a serious accident or death.
⚠ WARNING	Failure to follow the instructions in the message might cause a serious accident or death.
⚠ CAUTION	Failure to follow the instructions in the message may cause personal injury or damage to the truck or other property.
NOTE	The information will help to prolong the service life of the truck. The message is not directly related to accident prevention.



The diagram above indicates the meanings of the terms "forward", "backward", "right" and "left" used in this manual.

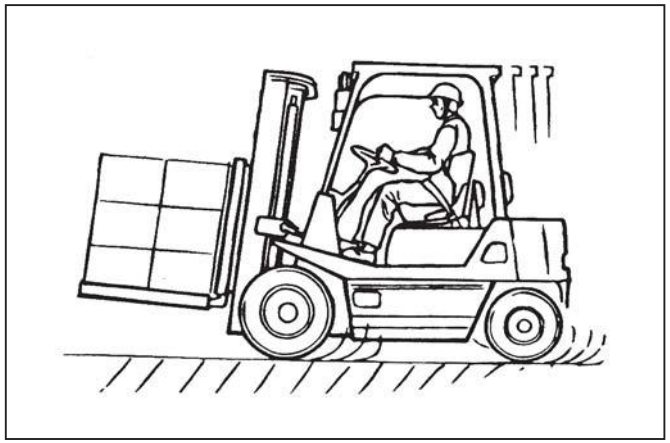
FOR SUPERVISORS

Lift truck accidents cause dozens or hundreds of deaths every year, and even greater numbers of personal injuries.
EKKO has steadily improved the design and fabrication of our lift trucks so they may be used more safely and efficiently, but many accidents still occur due to improper use. Accidents are often the result of more than just "bad driving", The use of inappropriate types of equipment, the selection of inappropriate attachments or accessories, inappropriate operating environments, careless designation of operators, and failure to properly train the operator are other common causes of accidents.

This chapter covers the methods of accident prevention which are primarily the responsibility of supervisory personnel.

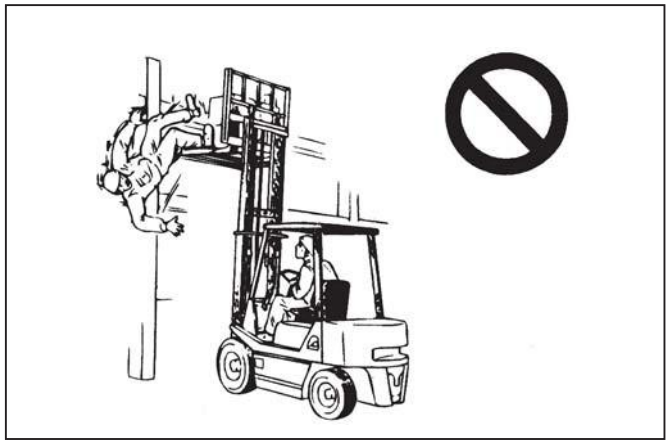
Pages 1–2 through 1–13 contain instructions which should be enforced by the personnel supervising the operation of the lift truck. Please make sure the operators also read these pages.
Page 1–14 and the following pages contain specific precautions directly related to the operation of the lift truck.

■ PROPER USE OF THE LIFT TRUCK



The proper use of a lift truck is to transport a load which is placed on the pallet and stacked within the prescribed height limit.
With a proper attachment, a lift truck may be used to transport a load which is stacked elsewhere than on the pallet.

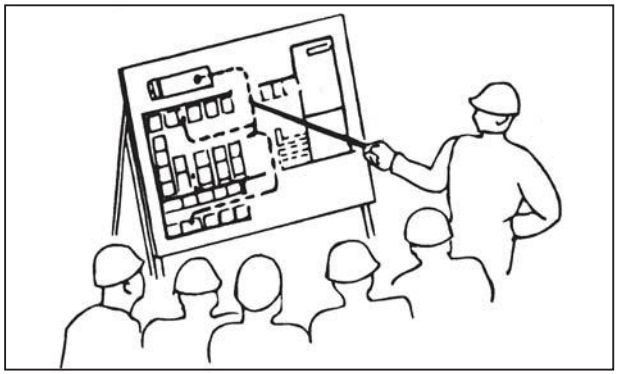
■ IMPROPER USE



Transporting a person, elevating a person, and towing another vehicle are examples of the improper use of a lift truck. Uses which this manual specifies as improper must never be requested or permitted, under any circumstances.

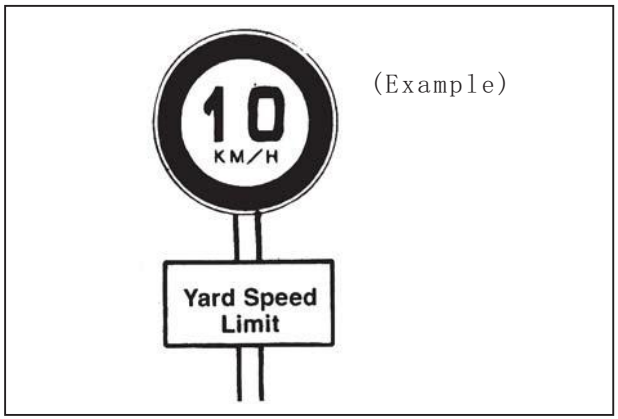
(Examples of Improper Use)
Transporting or elevating a person on the forks or pallet.
Carrying a person on the pallet to control the load.
Hanging a cable on the forks to suspend a load.
Towing another vehicle.
Pushing a load or another vehicle with the forks.
Using the forks or truck body to close or open the door of a freight vehicle.

■ MAKE AN OPERATING PLAN AND DISCUSS IT



Before using the lift truck, plan out the travel routes and operating procedures, and thoroughly discuss the details with all personnel involved.

■ SET SPEED LIMITS

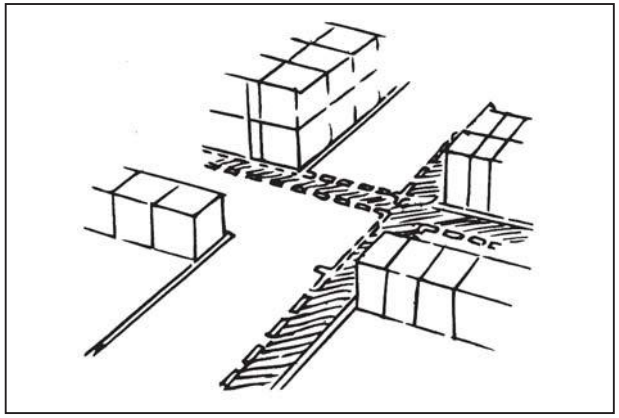


■ INSTALL CURBS OR RAILINGS



If the truck is to be used on a loading dock, shore wall or other raised surface, install curbs or railings.

■ MARK THE TRAVEL LANES



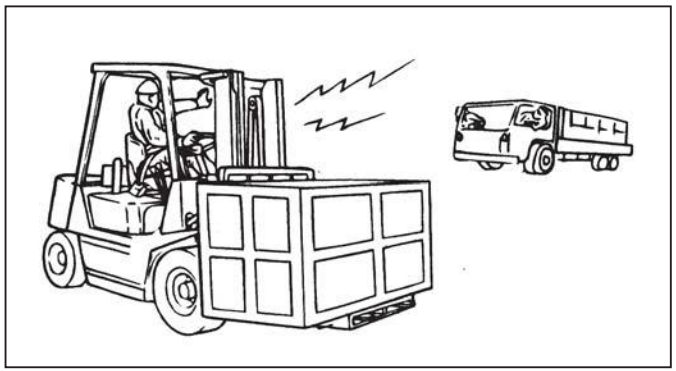
Designate the travel lanes for the lift truck and mark them

■ KEEP PEOPLE OUT OF THE OPERATING AREA



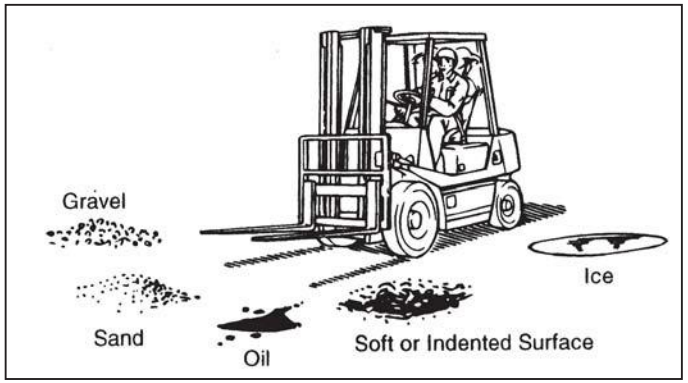
No other personnel should be allowed in areas where the lift truck is used.
Where other people must be present, post a guide whose job is to make sure people stay clear of moving vehicles.

■ KEEP UNAUTHORIZED VEHICLES OUT



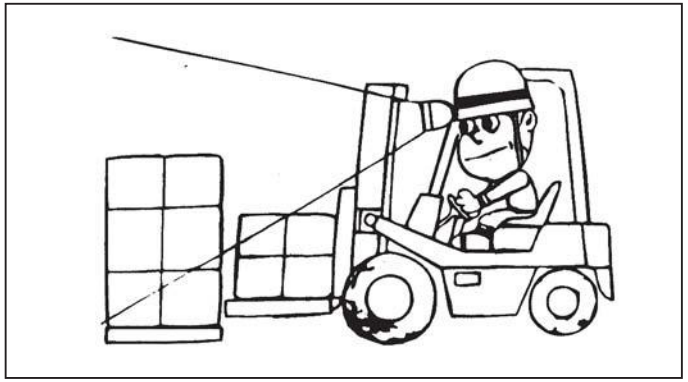
Unauthorized vehicles must be kept out of the load handling areas. Post signs or give signals as required.

■ KEEP THE GROUND LEVEL AND DRY



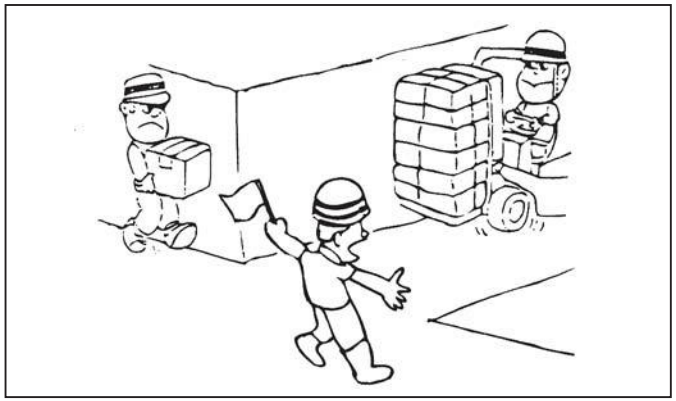
Be sure that all areas where the lift truck travels are level and regular. Clear away pools of oil or water.

■ PROVIDE ADEQUATE LIGHTING



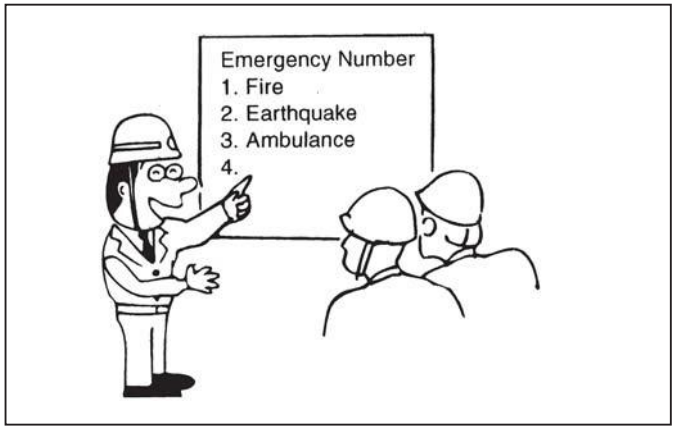
Safe operation requires well–lift traveling routes, so pedestrians and obstacles can be easily seen. Use headlights, taillights, helmet lamps or other lights as appropriate.

■ASSIGN TRAFFIC GUIDES TO CONGESTED AREAS



Post a traffic guide in confined or congested areas where other people or vehicles may pass. All personnel must obey the guide.

■ KNOW WHO TO CALL IN AN EMERGENCY



Keep information on hand to allow immediate calls for help in case of a fire, accident or other emergency.

■ PROPER USE OF THE LIFT TRUCK



(Example)

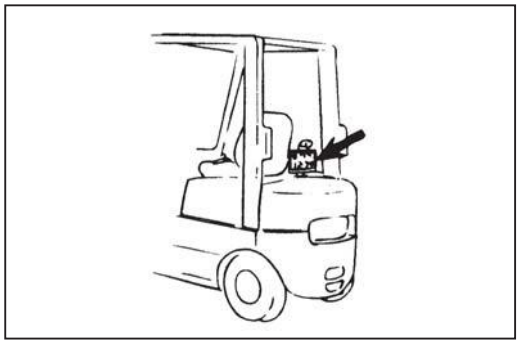
Fire extinguishers and first aid kits should be provided and maintained for use in case of a fire or accident. All personnel should understand the location and use of emergency equipment.

■ SAFETY MEASURES FOR DANGER SPOTS



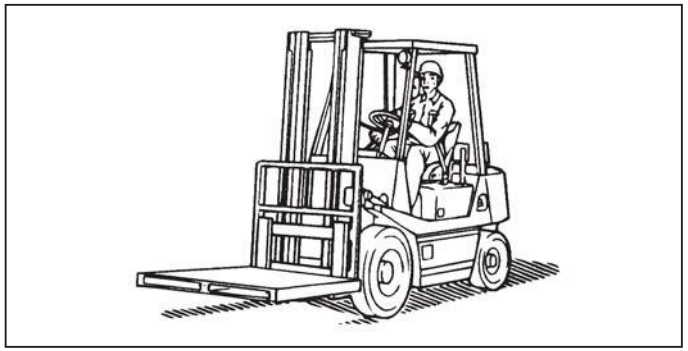
Post warning signs or take other appropriate measures to ensure

■GOT A LICENSE?



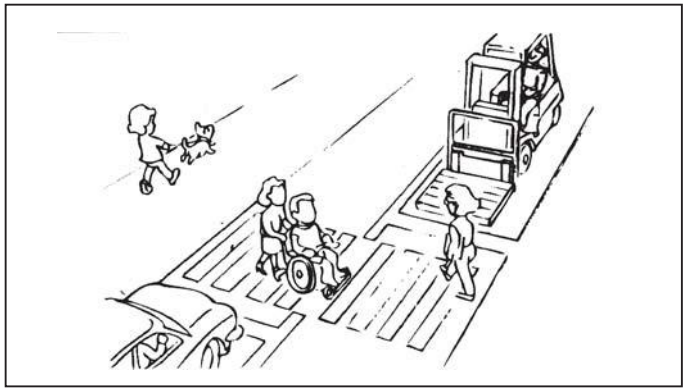
Before traveling on a public road, be sure that the truck has been licensed and inspected as required by local laws.

■ NO LOAD, NO TOWING



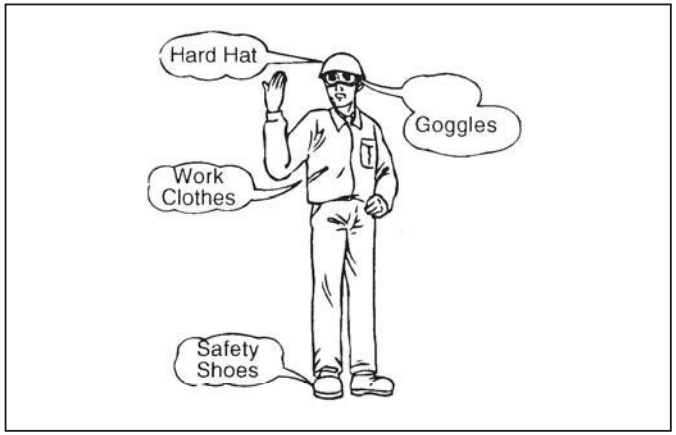
It is usually illegal to carry a load on a public road. It is also not allowed to tow another vehicle on a public road (with the possible exception of a disabled vehicle). Never tow another vehicle, even on company property.

■ OBEY TRAFFIC LAWS, AND TURN OFF YOUR LIGHTS



On a public road, the lift truck must obey the same laws as any other vehicle. Do not use rear working light or tail lamp.

■WEAR PROTECTIVE GEAR

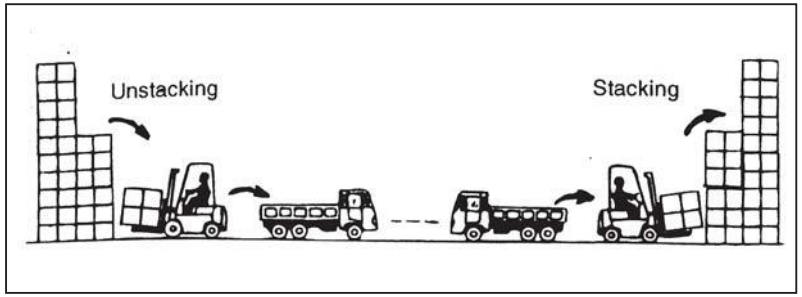


Always wear proper work clothes for driving. Work clothes should be designed to prevent any part from accidentally catching on knobs or other parts of the truck or equipment. For example, shirts and trousers should have tight cuffs.

Always wear a hard hat and safety shoes.

Wear other protective gear as appropriate to the conditions of the work site, i.e., Goggles or gloves.

■TRAIN YOUR STAFF TO STACK SAFELY



"Stacking" means piling palleted load or materials directly on top of each other, without using racks or shelves to separate them. If the stacking work is not done properly, the loads may slip or fall, endangering the operator as well as any other personnel in the area. Safety classes should be held to train all operators in the proper metliods of stacking and unstacking loads.
(Your EKKO dealer can provide information about training for safe stacking.)

■ TIRED OR UNWELL? SEND THEM HOME!



Do not let people take chances. An operator who is overworked or fatigued, an operator who is feeling unwell, or an operator who is intoxicated must not be allowed in the driver's seat.

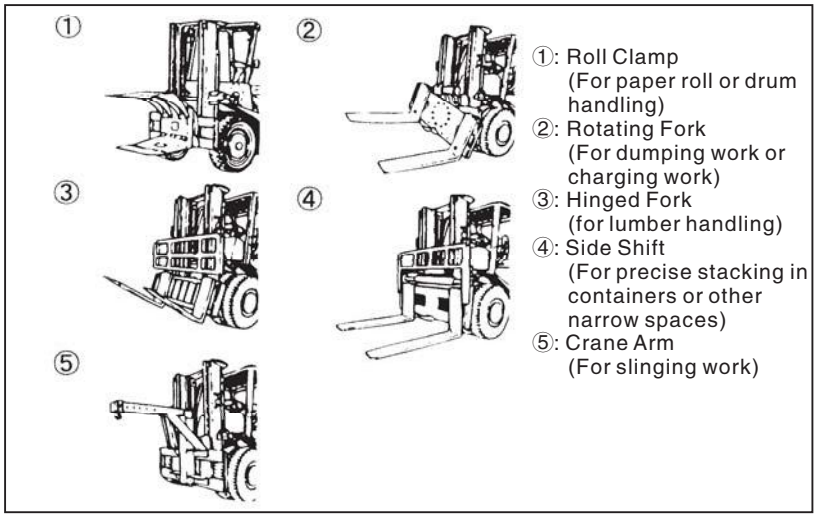
■USE THE RIGHT TRUCK FOR THE JOB

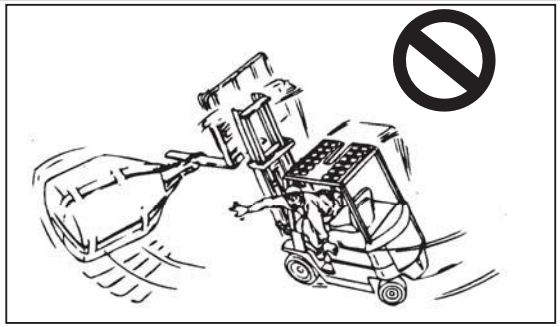
Be sure the type and capacity of the lift truck is suitable for the work environment.

Check Point	Choice
Capacity	Load capacities range from 0.5 to 42 tons. Pay particular attention to the load center. Lift Truck Capacities: 0.5, 0.7, 0.9, ,1 1.35,1.5,2,2.25,2.5,2.75,3,3.5,4,4.5,5,6,7,8,10, 10.5,11.5,12,13.5,15,18,20,22,23,24,25,30,27,o r 42 tons.
Power Source	Gasoline, natural gas, diesel, and battery–powered models are available. Fuel costs and exhaust composition will vary.
Balance	On counterbalanced models, the counterweight at the rear makes the vehicle longer than a reach truck. A reach truck performs loading and unloading by extending the front part of the mast outward, which gives it the advantage of compactness.
Tires	For indoor use, there are models with solid tires (best for reach trucks) and cushion tires (engine type or battery type). Both are compact. For outdoor use, pneumatic tires work well. Solid cushion tires, with the same dimensions as pneumatic tires, may be the best choice in cases where the load materials or surface conditions could puncture pneumatic tires.
Flammable Materials	For handling flammable materials such as petrochemicals, a combustion engine is too dangerous. An electric vehicle with explosion–proof or safety–reinforced construction is required. (A battery power source always offers better protection against fire than a combustion engine.)

■ USE THE PROPER ATTACHMENT

Popular Attachment Examples

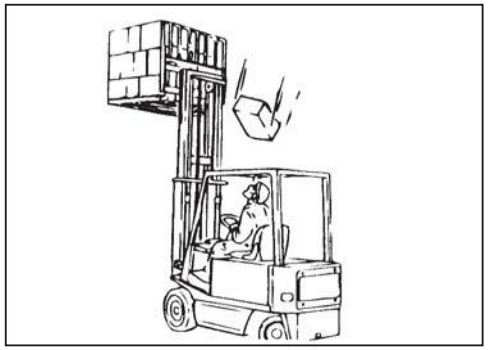




⚠ WARNING

Avoid hoisting a load with wire rope hung from the forks or an attachment, or avoid lifting a freight container with forks, because there is danger of the truck tipping. If necessary, have a qualified operator use a hook or crane arm attachment.

■ NO OPERATION WITHOUT LIGHTS, OVERHEAD GUARD, OR LOAD BACKREST



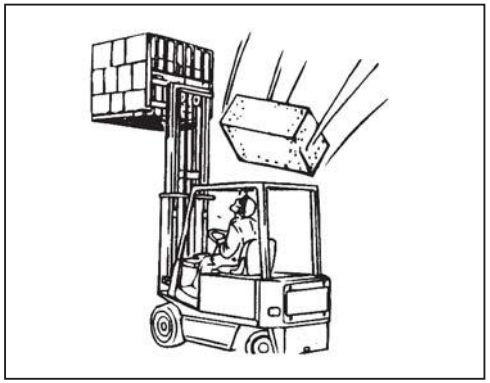
The lift truck cannot be used if the headlights, taillights, overhead guard, load backrest, horn or turn signals have been removed. Any parts that have been temporarily removed for some reason must be reattached immediately.

■ OBTAIN APPROVAL FOR ANY MODIFICATION



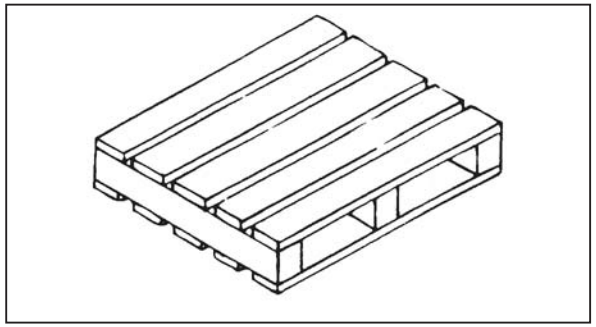
Modifications or additions that affect the capacity, construction or strength of the truck must not be performed by the user without the manufacturer's prior permission. For example, don't add a

■ DO NOT RELY ON THE OVERHEAD GUARD



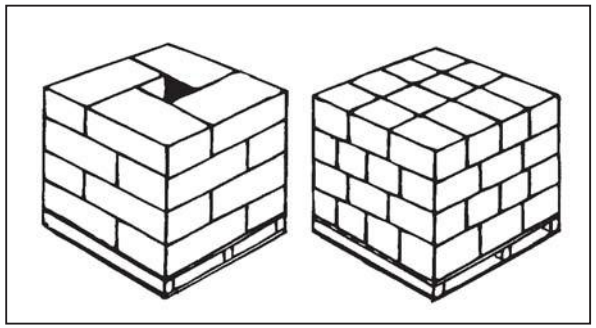
The overhead guard is a protective device that will moderate the impact of an object falling from overhead, but it cannot withstand every impact. If a heavy object seems likely to fall on the truck, make every effort to prevent it from doing so.

■USE STURDY PALLET MATERIALS



Pallets and skide must be strong enough to withstand the weight of loads. Remove or repair any damaged pallets.

■ STACK LOADS SECURELY



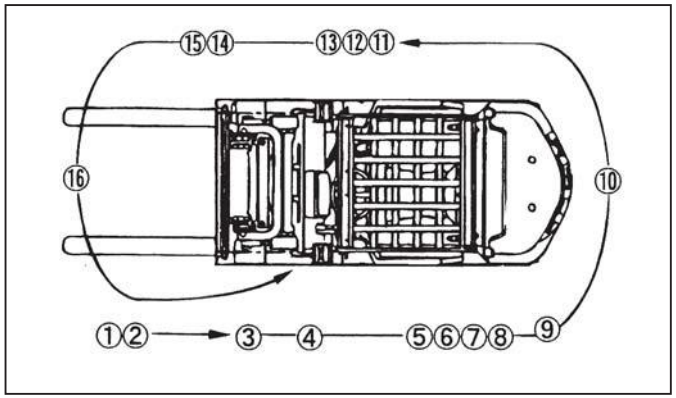
When stacking loads, place them in a stable manner that they will not easily come apart, and be sure the weight is evenly distributed. Secure the top layer with a cord wrapped like a headband or in a similar fashion.

■ KNOW THE LOAD BEARING CAPACITY OF THE FLOOR



The lift truck is heavier than it appears. For example, a 2–ton truck weights almost 3.5 tons even when empty. Furthermore, when loaded, 80 to 90% of the total weight is concentrated on the front wheels. Check the strength of your floors and roadways, and if necessary reinforce them.

■ ALWAYS INSPECT BEFORE OPERATING



The operator should always inspect the truck before each use to verify that all essential safety features are working. Any abnormality is to be reported to the supervisor, who is responsible for correcting it.

■ PERIODIC INSPECTIONS ARE MANDATORY

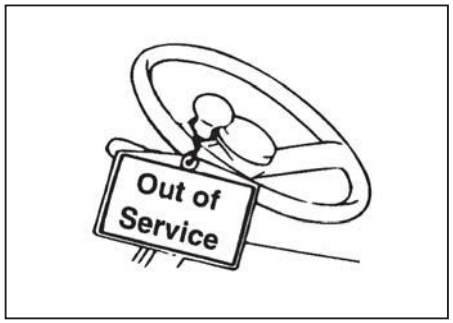
Monthly and annual inspections must be performed thoroughly, and any abnormality promptly repaired. Only a certified expert who has the advanced skills and equipment is required to conduct the inspections. Preserve the inspection logs for at least three years.

■ REPLACE SAFETY PARTS REGULARLY

	Name of Safety parts	Recommended replace–ment interval(years)
1	Cups and dust seals of master cylinder and wheel cylinders	1
2	Power steering hose	2
3	Reserve tank tubing	2–4
4	Steering actuator rubber boots	2
5	Lift chain	2–4
6	Load handling means hoses	1–2

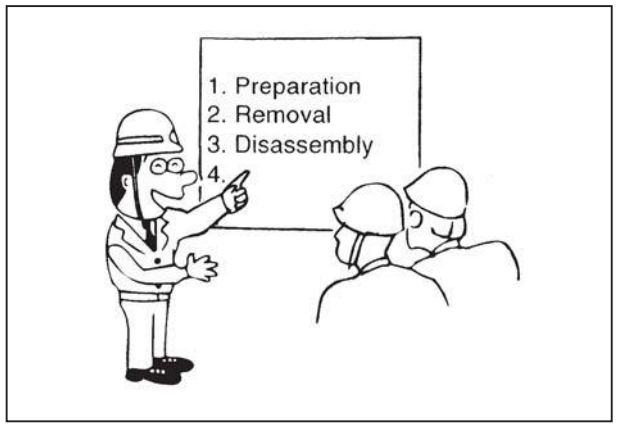
Certain critical parts must be replaced at regular intervalvs. Since it is difficult to detect wear on the above parts by visual inspection, they must be replaced after a certain period of time. Failure to do so would result in a falling load or runaway truck.

■ NEVER USE AN UN–MAINTAINED TRUCK



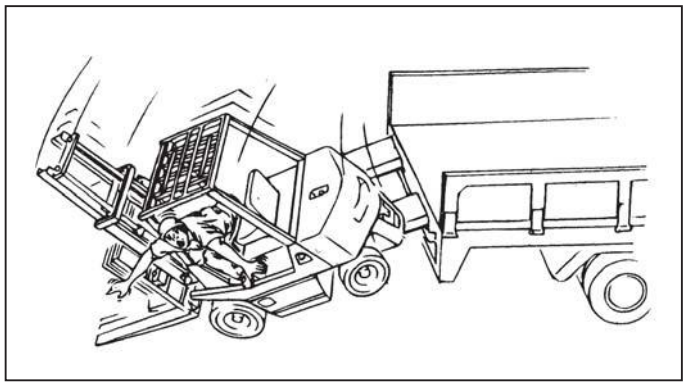
A truck that has not passed an inspection must never be operated. Hang a sign on the truck and remove the ignition switch, to make sure no one uses it. Then report the problem to the supervisor and wait for the repair to be completed.

■ DESIGNATE A REPAIR AND ASSEMBLY SUPERVISOR



Repairs and the mounting and dismounting of attachments must be performed under the direction of a designated supervisor. The body and major parts of the lift truck are quite heavy and under very high pressure. Repair or assembly work undertaken without careful and thorough preparation can lead to a serious injury.

■ TRANSPORTING THE LIFT TRUCK

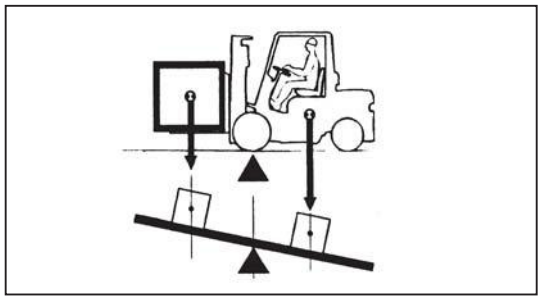


Use a level, hard road surface when loading the truck onto or unloading from a trailer. Be certain that the loading ramps have sufficient length and width as well as strength. Do not load or unload the truck when it is raining, unless the ramps are fitted with an anti–slipping surfaces.

It is safest to use a self–loading trailer truck equipped with a jack and winch. For loading, tilt the pallet with the jack, attach the winch to the towing pin of the lift truck, start the engine, and pull it up. The operator must not ride on the lift truck while loading or unloading.

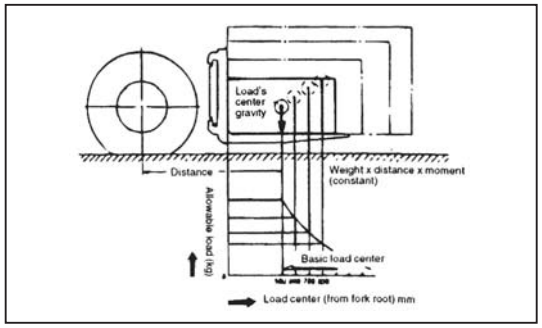
■ KEEP PEOPLE OUT OF THE OPERATING AREA

Lift trucks are equipped with load handling means including a mast and forks at their front. The front wheels of the truck work as a fulcrum to balance the center of gravity of the truck and the center of gravity of the load. The relationship between the locations of those two centers of gravity is vitally important for safety.



■ KNOW THE CENTER OF GRAVITY OF YOUR LOAD

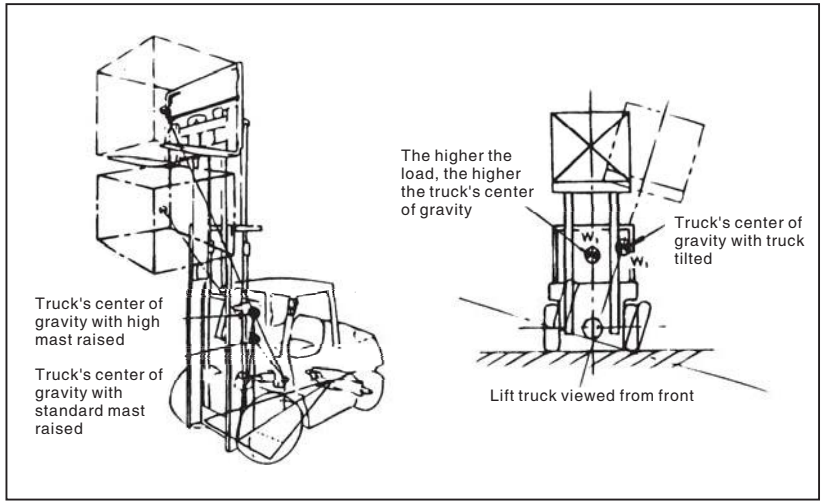
Materials of various shapes such as boxes or flat or cylindrical items may be loaded on the lift truck. In order to accurately judge the stability of the truck, it is vitally important for the operator to know the location of the center of gravity for each type of load.



■ HOW THE CENTER OF GRAVITY SHIFTS

The stability of the lift truck is determined by the overall center of gravity, which is the product of the centers of gravity of the truck and the load. When the truck is empty, this point is the same as the center of gravity for the truck, and when it is loaded it shifts according to the center of gravity of the load. Since the center of gravity of the load changes whenever the mast is tilted forward or backward or the fork is raised or lowered, the overall center of gravity also changes. The center of gravity is also governed by the following factors.

- Size, weight and shape of the load
- Unloading height
- Tilt angle of the fork
- Tire inflation
- Acceleration, deceleration and turning
- Surface condition and gradient of the road
- Type of attachment



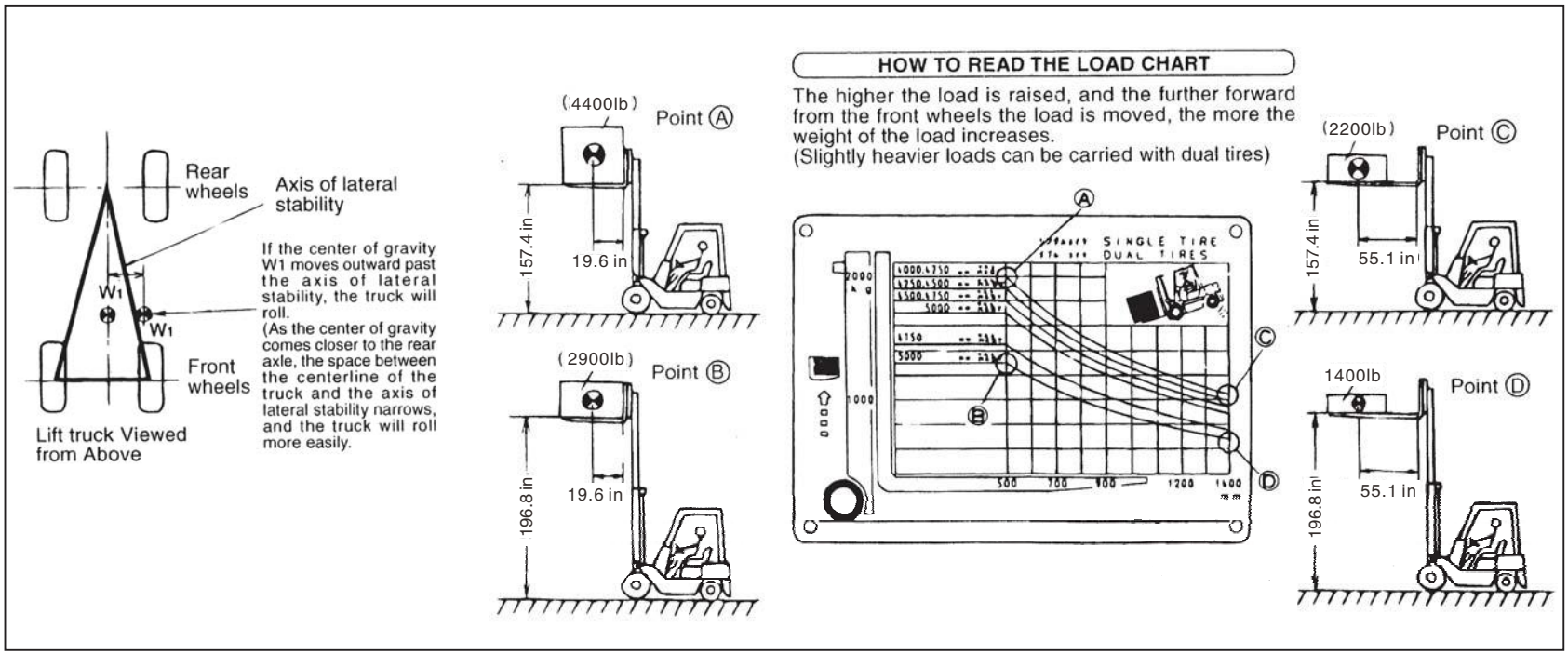
■ OUTSIDE THE TRIANGLE OF BALANCE, THE TRUCK TIPS

For a lift truck to remain stable, the overall center of gravity must be inside the triangle formed by the contact points of the left and right front tires and the center point between the steering wheels. The triangle defines the area of stability for the center of gravity. If the overall center of gravity moves further forward than the front wheels, the truck will tip forward with the front wheels as the fulcrum. If the overall center of gravity moves outside the triangle to the right or the left, the truck will fall over in that direction.

■ RATED LOAD (LOAD WEIGHT AND LOAD CENTER)

The load center is the distance from the front face of the forks to the center of gravity of the load. The rated load is the maximum weight allowable with the nominal load center.

The load Chart, showing the relationship between the load center and the rated load, is attached to the truck as a decal. The rated load decreases as the load center moves toward the tip of the forks, and as the overall center of gravity moves forward.



■ACCELERATING, DECELERATING AND TURNING

The principle of inertia provides that a stationary object will remain stationary as long as there is no external force acting on it, and that a moving object will continue moving at a constant speed as long as there is no external force acting on it.

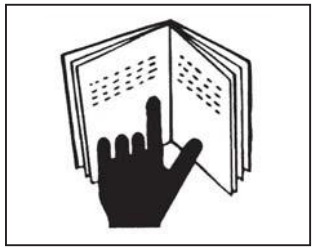
Due to inertia, when the lift truck starts to move there is a momentary backward force, and when it stops there is a momentary forward force. As a result, if the brakes are applied suddenly, there is a very strong hazard that the forward force will become strong enough for the truck to tip forward.

Likewise, when the truck is turning there is a centrifugal force that pulls it outward from the turning center. This force can cause the truck to fall sideways. Since the zone of lateral stability is especially narrow, it is necessary to slow down substantially when turning in order to prevent the truck from tipping.

When the load is elevated the overall center of gravity is raised, increasing the danger of the truck tipping over to the front or side.

⚠ Read manual and decals

Read the Operation & Maintenance manual and caution plates in the truck, and become familiar with your truck and operating procedures. Remember that individual lift trucks might be different in design and construction from one another. Observe the caution decals on the truck. Keep this Operation and Maintenance manual on the truck as a ready reference for anyone who may drive or service it.



⚠ When starting

Before starting your lift truck (before turning the key switch on), make sure to:

Apply the parking brake securely.

Place the F/R lever in neutral.

Press the brake pedal.

Adjust the steering column angle and driver's seat properly.

Do not try to adjust them during operation; otherwise a serious accident might occur. After adjustment, make sure they are securely locked.

Make sure there is no one under or around the truck and seat yourself on the driver's seat.

⚠ Before reversing the direction of travel, bring the truck to a complete stop

It is dangerous to reverse the direction of travel abruptly.

⚠ Carry the load low

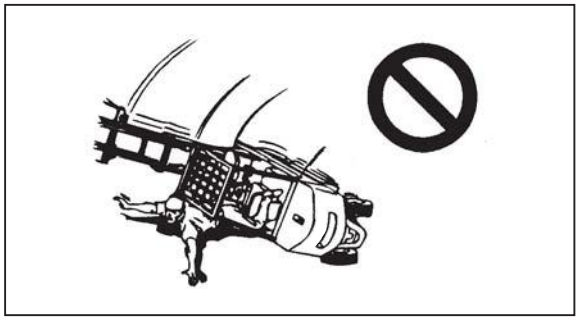
It is dangerous to travel with forks lifted higher than is appropriate, regardless of whether loaded or not. Keep the load as low as possible while traveling. Do not turn the truck with the load raised high.

⚠ Keep the truck's center of gravity low while traveling (when loaded in particular)

When traveling (when loaded in particular), keep the forks 7 8 in above the floor or ground and tilted back, so as to lower the truck's center of gravity as far as possible.

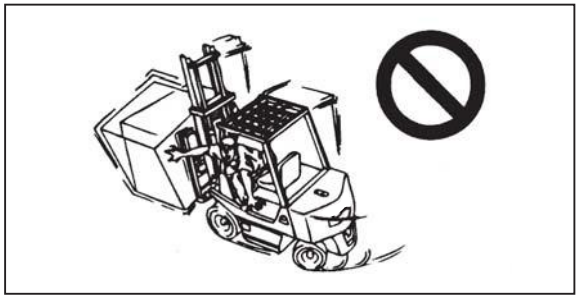
⚠ Do not jerk the forks (lift, down, and tilt) when loaded

The truck might tip over.



⚠ Avoid sharp starts, stops and turns

Start, stop and turn slowly. Before turning, slow down the truck sufficiently. In particular, an unloaded truck might tip over when it is turned sharply, because the rear of the truck is heavy.



⚠ Back down and drive up on a slope

Do not make turns on a gradient. There is danger of the truck upsetting.

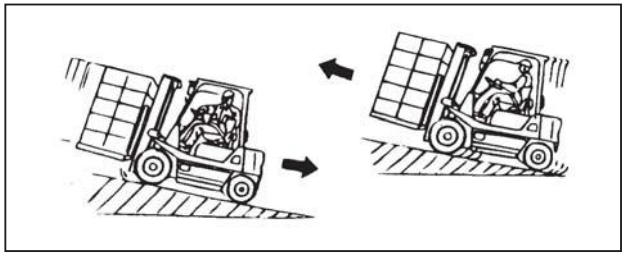
Keep the forks and pallet at an appropriate ground clearance height.

When operating an unloaded truck on grades, have the rear end of your truck pointed up–hill.

When operating a loaded truck on grades, have the rear end of your truck pointed down–hill.

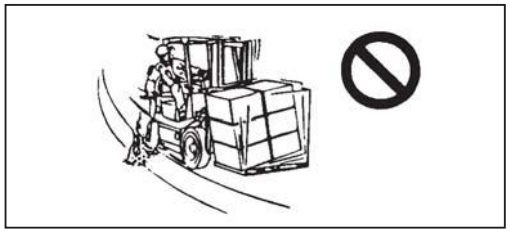
When descending a grade, use the foot and regenerative brakes properly.

When descending a grade, never turn the key switch off.



⚠ Stay away from the edge of road

There is a fear of the edge of a soft ground collapsing. Stay away from such a place. Keep appropriate distance from the edge of a narrow road or a platform.



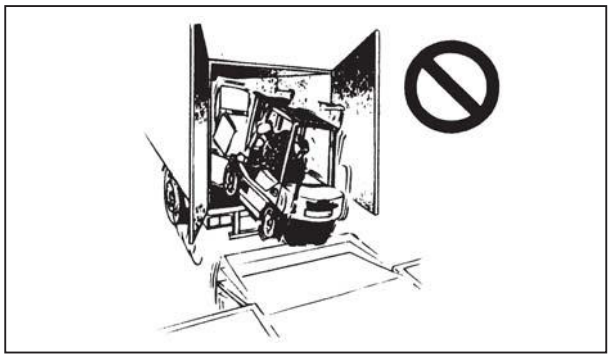
⚠ When driving over a dockboard

Do not ride on the edge of the dockboard or bridgoplates; otherwise the truck might fall down ,leading to personal injury or even death.

Before driving over a dockboard or bridgeplate, make sure it is properly secured. Never exceed its rated capacity. Do not use a damaged dockboard or bridgeplate.

Have the brakes set and wheels blocks in place to prevent the trailer from moving.

Jacks must be installed to support the trailer when the truck goes into the trailer.



Drive carefully and slowly across the dockboard or bridgeplate.

Watch for bystanders.

Give instructions to the trailer driver not to move the trailer until load handling is finished.

Make sure the dockboard or bridgeplate is secured.

⚠ Never use man as an additional counterweight

Do not use man as an additional counterweight. Do not offer rides to others.



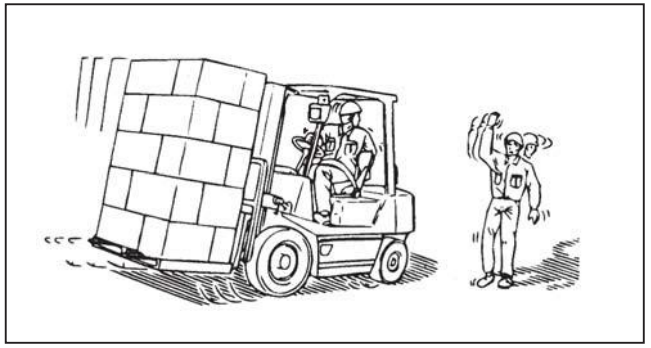
⚠ Reverse travel

When traveling in reverse, always look in the direction of travel. Do not rely too much on the sideview mirrors (if so equipped) and backup buzzer.



⚠ Have a guide when handling bulky loads

When handling bulky loads which restrict your vision, operate the truck in reverse and have a guide.



⚠ Preoperational checks

Do not start your shift until preoperational checks are finished. If any problem is found, report to your supervisor and take necessary measures.

⚠ Keep sideview mirrors, backup alarm, and lamps in good working condition

Adjust the sideview mirrors to gain a full rear vision and keep the mirrors' surface clean (if so equipped). The backup buzzer should sound when the F/R lever is placed in the reverse position. If the buzzer fails to sound, have it repaired. Make sure the lamps turn on and off properly. Burned–out bulbs must be replaced with new ones.

⚠ Keep your hands clean

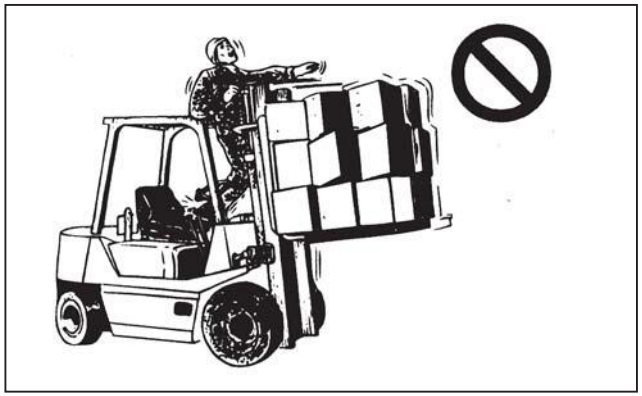
It is dangerous to operate the steering wheel and levers with greasy hands. If grease, oil or soil is sticking to your hands, clean if off.

⚠ Mount properly

Never mount or dismount a moving truck. When mounting or dismounting the truck, use proper procedures. Make sure the truck is at a complete stop. Support your body using the steps and hand grips properly. Keep the steps always clean.

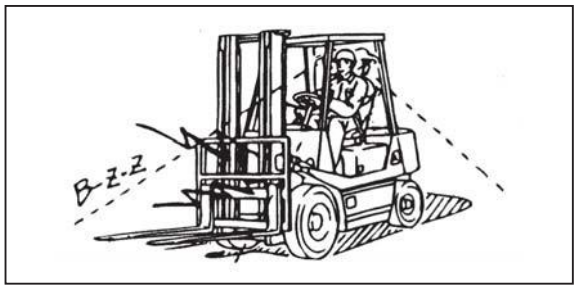
⚠ Do not move controls unless properly seated

Do not operate the controls (levers and pedals) unless you are properly seated.



⚠ Sound horn when starting

Before starting, make sure no one is near the truck. Let other workmen and bystanders know you are starting up by sounding horn.



⚠ Do not turn the key switch off

If the key switch is turned off, the power steering unit goes ineffective, making it hard to steer.

⚠ Safe traveling

Always look in the direction of travel

Always look in the direction of travel; failure to do so will lead to an accident. When passing an oncoming truck each other, slow down and use caution to have a safe distance. Moreover, maintain a safe distance from the truck ahead of you at all times.

Observe speed limits

Observe the specified speed limits.

Make sure there is no one or obstacle around the truck and in the direction of travel or turning

Do not go past other trucks where vision is restricted



Do not go past other trucks at intersections, corners, narrow aisles or other locations where your vision is restricted.

Slow down at corners

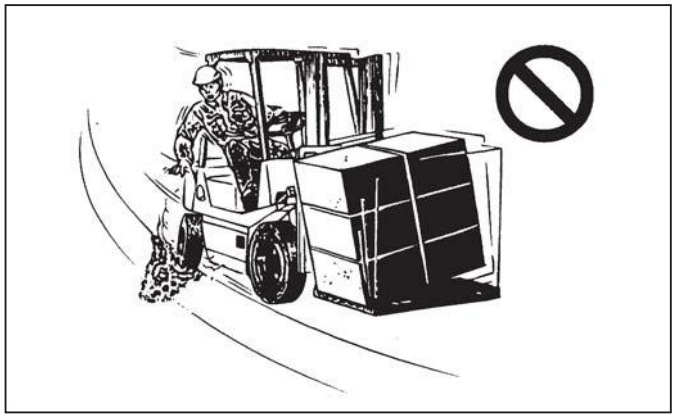
Slow down and sound horn at intersections and other locations where your vision is restricted.

Come to a complete stop before crossing roads or at corners

⚠ Do not travel over a floor or ground surface covered with water

Do not travel over a floor or ground surface covered with water. Go round any pothole in the road.

⚠ Do not ger into a soft ground area



⚠ Do not ride on obstacles (curb, railroad tracks, ditches)

If unavoidable, be careful.

⚠ Avoid running on a slippery surface

⚠ Know the load bearing capacity of the floor

Before entering a building or going into an elevator, make sure the floor is strong enough to withstand the weights of the truck and the loads.

⚠ When going into areas where there are limits in height and width, use the following cautions

Make sure there is enough height and width for the truck to pass.
Do not put your hands and feet outside the truck.
Make sure there is no one around the truck.
Watch out for outdoor electric cables and other obstacles.

⚠ Rear steer, rear swing

When the truck is turned in forward driving, the rear of the truck swings outwards. Before turning, make sure there is enough clearance from the wall and other obstacles.

⚠ Brake the truck in good time

The truck takes a little longer to come to a stop on a slippery surface than on a usual surface. Brake the truck in good time.
In addition, the stopping distance of the truck is longer on a downhill. Keep the traveling speed under your control.

⚠ Practice safe driving and load handling techniques

Before using the lift truck, you must practice safe driving and load handling techniques. Even after getting familiar with the operation of the truck, operate th truck carefully; reckless driving and operation will cause a personal injury or an accident.

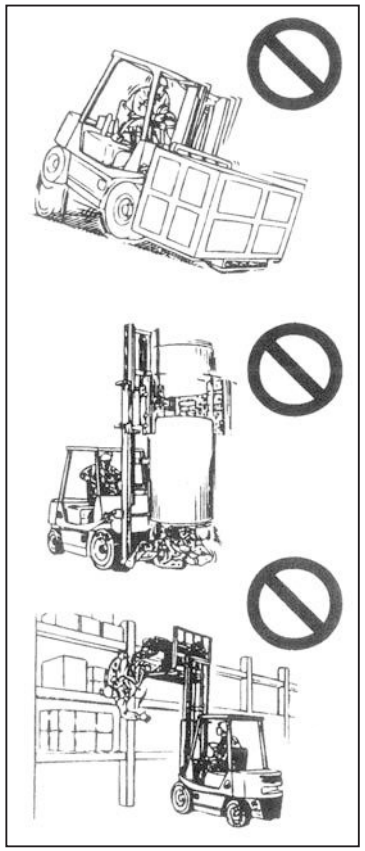
⚠ When using multiple trucks

When operating multiple trucks, remember that their operating controls have their own characteristics even if the trucks are of the same specification. If you change the trucks, keep this point in mind. In particular, pay attention to the brake system.

⚠ WARNING

Never overload

Know the rated capacity of your lift truck and its attachment, if any, and never exceed it; otherwise the rear wheels will be raised, thus making it difficult to travel and turn.
There is also danger of the truck tipping over.



Never lift a load over anyone

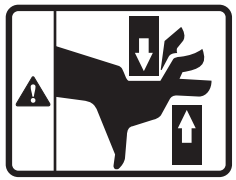
Never permit anyone to stand under raised forks.
The forks might fall down unexpectedly, thus causing a personal injury.

Never elevate a man

Never allow other person(s) to ride on the forks. He might fall off the forks, getting injured.

Do not put your hands or feet into the load handling system

Never put your hands or feet on the mast or mast connecting members; otherwise your hands or feet might be cut if the mast moves unexpectedly.



⚠ Do not lift off–centered loads

Make sure that the loads are evenly positioned across the forks and that the load's center of gravity is aligned with the truck's center of gravity. Off–centered loads might cause the truck to turn over.

⚠ Make loads come in contact with load backrest

Insert the forks into the pallet as far as possible to make the loads come in contact with the load backrest.

⚠ Do not lift unstable loads

Do not handle unstable loads. When handling loose loads, make sure they are stable enough before lifting.

⚠ Use due caution when handling loads

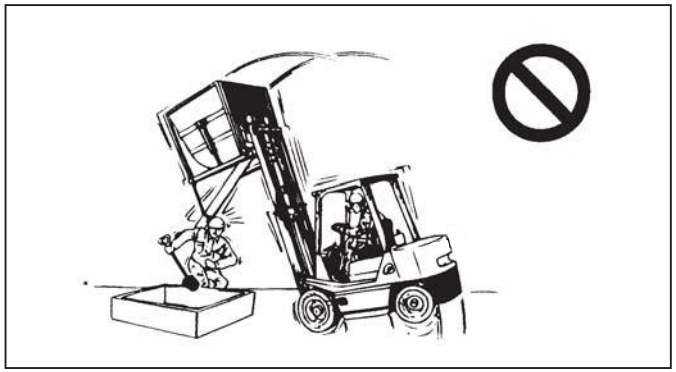
When handling loads, fix them with ropes or others, to prevent from falling off.

⚠ Do not stack loads too high on forks

Do not stack loads on forks in such a way that the top of loads exceeds the load backrest height; otherwise, loads might fall to the operator side, and in the worst case lead to a serious injury or death.

⚠ Do not tilt the mast with loads high

Use minimum forward and reverse tilt when stacking and unstacking loads. Never tilt forward unless the load is over stack; otherwise the truck might tip over.



⚠ Do not lift or start with mast tilted forward

When the mast is tilted forward, do not perform the following operations: lifting the forks and starting and traveling the truck.

⚠ Do not stack or unstack loads on a sloping grade

⚠ Keep the chains tight

A slack chain means the mast tail or carriage hang–up, which might cause the sudden fall of loads or carriage or the truck to tip over. Keep the lift chains stretched tight at all time.

⚠ Do not use your truck for purposes other than specified

Do not use the truck to open or close the doors of freight cars or warehouses.

Do not push other trucks.

Do not hoist loads, using ropes hung on the forks.

Do not tow another vehicles.

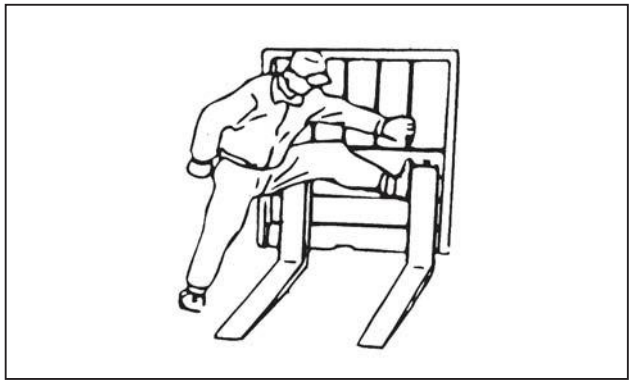
Do not push or pull loads with forks; otherwise, the load might fall off or get damaged. In particular, the truck with the max. lift height of more than 59 in might tip over, if you try to do that.

⚠ Adjust fork spacing properly

Adjust the fork spacing suitable according to the size of the load.

⚠ Adjust fork spacing with your feet

Adjust the fork spacing with your feet. Do not use your hands. You hands might get pinched between the forks and carriage.



⚠ Make sure forks are securely locked

After adjusting the fork spacing, lock the forks with fork stoppers. Unlocked forks will slide during traveling, causing the load to fall off.

⚠ **Keep the tension of the right and left chains even**

Uneven tension of the right and left chains means uneven loads even if they are properly placed on the forks. It may also lead to broken chains.

⚠ **Pay attention to the fork tips**

The fork tips are sharp and could cause personal injury. In addition, if they catch on obstructions, the truck might lose control, leading to an accident.

⚠ **Keep anyone but a guide away from the working area**

⚠ **Do not let other persons or truck approach your lift truck during operation**

⚠ **When working in a group, have a person present to give guidance and follow his instructions**

⚠ **Use pallets and skids strong enough**

Pallets and skids must be strong enough to withstand the weight of loads. Use of a damaged pallet or skid might let the load fall off the forks.

⚠ **Use extreme caution when handling long or bulky loads**

Lift and lower the load carefully so as not to hit it against something around the truck. Keep the load as low as possible. Be careful when turning the truck, to prevent it from moving out of position or falling off.

⚠ **Be alert for overhead hazards**

Use caution not to let the mast or overhead guard contact overhead power cables, piping, sprinklers or overhead cross beams. If part of the truck comes in contact with them, the load might fall off the forks or the truck tip over. Remember that the mast height becomes higher when the forks are raised.

⚠ **Do not pick up loads from other truck**

Do not pick up loads from raised forks of other truck. This might cause an off–centered load or the load to fall off.

⚠ **Do not hold loads on the forks by hand**

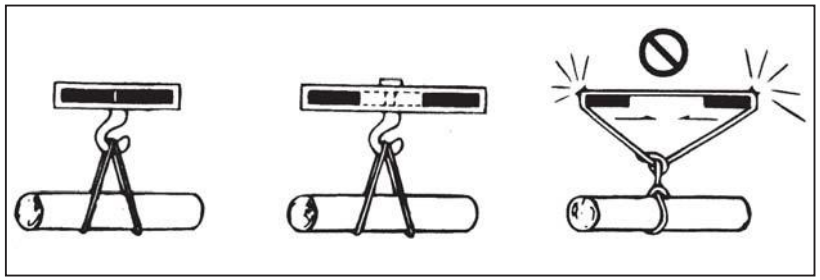
Do not hold loads on the forks by hand. If the truck moves unexpectedly, the load might fall off, getting the person caught under it.

⚠ **Do not squeeze loads into the stack**

Do not squeeze loads into the stack using the truck's traction force. This will damage the truck or loads, causing the truck to tip over.

⚠ Do not hang loads with wire ropes attached directly on the forks

Do not hang loads with wire ropes attached directly on the forks or attachment. If the wire ropes break or slide off, a personal injury might result. In particular, the use of a wire rope hung on one of the forks might cause the truck to turn over.



Use a hook attachment or crane arm attachment to hang loads.

Make sure that the wire ropes are strong enough to withstand the weight of the load and properly attached. The length of the ropes should be as short as possible but with adequate spread angle between legs.

Carefully travel and turn when hanging a load with wire ropes; otherwise, if the load swings, the truck might turn over. Keep the load as low as possible.



⚠ When leaving the truck, observe the following conditions

Lower the forks on the ground at an out–of–traffic area.

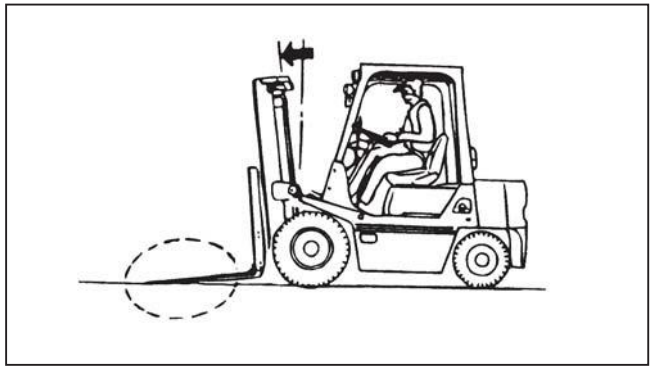
Tilt the forks a little forward to make the fork tips in close contact with the ground surface.

Apply the parking brake.

Place the direction control lever in neutral.

Turn the key switch off.

Remove the key.



⚠ Park at the specified area

⚠ Park on a hard surface

⚠ Park at an out–of–traffic area

Park at an out–of–traffic area. Avoid parking near emergency exits, stairs, or fire hydrants.

⚠ Do not park near flammables

⚠ Block the wheels when parking on a slope

If unavoidable to park on a slope, apply the parking brake securely and block the wheels

⚠ When parking a faulty truck

When it is not possible to lower the forks on the ground due to a faulty load handling mechanism, attach a sign to the tip of the forks to prevent pedestrians and other vehicles from bumping against the forks. Park the truck at an out–of–traffic area and take measures so as not to let people pass under the raised forks.

⚠ Remove the key from a faulty truck and put up a sign

Turn the key switch off and remove the key. Attach a sign in the control area stating DO NOT OPERATE.

⚠ Do not ride on front guard

It is dangerous to use the truck body or mast as a ladder to ride on a high place.

You might be caught between the mast and truck body, resulting in a serious accident.



⚠ WARNING

Inspection and maintenance of the truck should be performed only by qualified and authorized personnel. Improper inspection, maintenance or repairs will cause

⚠ Park on a hard, level ground

Before performing inspection and maintenance, make sure to park the truck on a hard, level surface. Also make sure the place is dry and without dust.

⚠ Have a good ventilation

When performing inspection and maintenance indoors, have a good ventilation.

⚠ Have a fire prevention equipment handy

Have a fire prevention equipment handy whenever working indoors. Know how to use it.

⚠ Make sure the forks and other attachment (if any) are on the ground

⚠ Turn the key switch off

Make sure to turn the key switch off and disconnect the battery receptacle.

⚠ Unless otherwise specified, key switch must be off

Unless otherwise needed, the truck is to be parked with the key switch off, and battery receptacle disconnected.

⚠ Place all the load control levers in neutral

Make sure the accelerator lever and load control levers are in neutral.

⚠ Wipe any spilt oil or grease

Wipe any spilt oil or grease. If the truck is contaminated with oil or grease, it is difficult for you to find possible cracks or other defects.

⚠ No fire (when handling lubricants, batteries, cloth wetted with oil)

No fire. Never smoke or use fire or naked flame when handling lubricants, batteries or cloth wetted with oil.

⚠ Avoid loose fitting clothing

Wear protective clothing called for by job conditions.

⚠ Wear safety gear (hard hat, safety shoes, safety shoes, safety glasses, gloves)

⚠ Use caution not to fall down from the truck when working on the truck

⚠ Do not put your feet under the forks

⚠ Use caution not to get your finders pinched in the floor plates or hood

Be careful so as not to get your fingers caught when closing the battery cover or doors.

⚠ **If unavoidable to work under raised forks or attachment, use a stable support under the inner mast and/or the carriage to prevent the forks or attachment from falling down unexpectedly.**

⚠ **When working in a group, have a leader and follow his instructions**

⚠ **Use appropriate tools**

Use appropriate tools suitable for the job you have been assigned. Use of inappropriate tools might cause a serious accident.

⚠ **Do not use tools for purposes other than specified**

Do not use tools for purposes other than specified. It can cause a serious accident.

⚠ **Hydraulic oil is hot immediately after the operation of the truck is stopped**

Immediately after the operation or running of the truck is stopped, the hydraulic oil is hot and in high pressure. Do not try to drain the hydraulic oil or replace the filter. Hot oil might spout out to cause burns.

⚠ **Release oil pressure before working**

The hydraulic circuit has residual pressure. Before working on the system, release the pressure. To check for oil leaks, wear safety glasses and gloves and use a piece of cardboard or wood. High pressure oil penetrates the skin. It can cause blindness.

⚠ **Checking of accumulator and piping is hazardous**

Inspection of piping where an accumulator is installed is hazardous. When it needs to be inspected, ask your TEU dealer.

⚠ **When high pressure oil comes in contact with your body, immediately get medical attention.**

⚠ Remove the battery receptacles before working on rotating parts

Use due caution when working on rotating parts, not to get your body entangled in them. Before checking a rotating part, make sure to turn the key switch off and disconnect the battery receptacles. Do not bring something near rotating parts.



⚠ Do not use the mast as a ladder

When carrying out checks or adjustment, do not use the connection member or load backrest as a ladder. The mast might move unexpectedly, pinching or cutting your hands or feet.

Do not use the mast as a ladder. You might fall down from the mast, leading to a serious accident.

Caution to be taken when adjusting tire inflation pressure (rim, compressor)

When checking tire inflation pressure, position yourself in the path of rotation, not on the side of the tire.

When inflating a tire using a compressor, first adjust the air pressure of the compressor; otherwise the air pressure will rise to the maximum pressure of the compressor, leading to a serious accident.

Inflating tires to a high pressure requires special skill.

Inflating tires requires special skill. Tires must be inflated only by a qualified person

When using compressed air, wear safety glasses and mask.

When inflating tires, wear safety glasses and mask because dust might get into your eyes or mouth.



Leave the disassembly and reassembly of tires, tubes and rims to a specialist

The inflation pressure of tires of the lift truck is very high (about 700 to 1000 kPa) and thus due caution must be required to disassemble or reassemble the tires. An improperly reassembled tire might cause explosion to let parts fly into pieces, resulting in a serious personal injury.

⚠ Do not loosen the wheel assembly nuts when changing a tire

The wheel assembly is locked in two ways: Hub nut type and nut type. In the hub nut type wheel assembly, the wheel is installed to the hub; in the nut type, a wedge ring is inserted between the wheel and the hub to lock the wheel assembly.
The tire is secured with the side ring and the lock ring.
When removing a tire from the truck, make sure the lock ring is securely installed; otherwise, the side ring, tire, and wedge ring might burst out, resulting in a severe accident.

⚠ Do not loosen bolts and nuts of split rim assembly

The wheel has hub nuts that secure the wheel to the hub and rim nuts and bolts that assemble two rims together. When removing a tire from the truck, do not loosen the bolts and nuts of the split rim assembly.
If the bolts and nuts of the split rim assembly are removed, the rims, bolts or nuts might blow off due to the internal pressure of the tire, bolts or nuts might blow off due to the internal pressure of the tire, to cause a serious personal injury.

When replacing the rim assembly, install a new rim assembly with the head of each of the dowel bolts of the rim assembly pointing outside. (This helps make it difficult to loosen the rim bolts with the tire attached to the truck. Some bolts have a special shape for this purpose.)

After replacing tires, test run the truck to check to see if the hub nuts are securely tightened. If a loose hub nut is found, tighten it to the specified torque.

⚠ WARNING

Cautions to be taken when using the jack
Do not enter under the truck while it is jacked up. The truck might fall, getting you caught under it.

Before jacking up the truck, remove the loads from the truck.

When jacking up the truck, the operator must leave the truck.

Lift the truck a little off the ground surface and put supports at both sides of the frame to prevent the truck from falling.

Before jacking up, block the wheels to prevent them from rotating unexpectedly.

Lifting the truck must be performed only by qualified personnel (for crane or slinging work).

The truck must be lifted by attaching wire ropes to the designated parts.

Use strong wire ropes
Make sure the wire ropes are strong enough to lift the truck

⚠ Cautions to be taken when handling batteries

If electrolyte gets on your skin, flush it off with a copious amount of water

The battery electrolyte contains dilute sulfuric acid, a very corrosive material. It can destroy most things it touches. It will cause painful and serious burns if it gets on the skin. It can cause blindness if it gets into eyes. If battery electrolyte comes in contact with the skin or clothing, wash it away immediately with a copious amount of water.

If electrolyte gets into your eyes, get medical attention

If electrolyte gets into your eyes, flush it off immediately with a copious amount of water and get medical attention.

Wear safety glasses when handling batteries

Wear rubber gloves, rubber boots, safety glasses when changing or charging batteries, adding battery electrolyte, or adjusting the specific gravity of the battery electrolyte.

If anyone swallowed electrolyte accidentally

Let him drink a copious amount of water or milk with egg white and salad oil mixed in it and send him to a doctor.

No fire

Since explosive hydrogen gases are always being released from the battery, there is a danger of causing an explosion. Never smoke or use fire or naked flame near the battery. No sparks. To prevent the generation of sparks, turn off the charger switch before connecting or disconnecting the battery or charger cable.

Do not short both poles for checking the battery's state of charge

Remove the negative(–) terminal of the battery first and reinstall it last (Engine trucks).

When removing the battery, disconnect the negative (–) terminal first. When reinstalling, connect the positive (+) terminal first and then connect the negative (–) terminal.

Do not connect or disconnect the battery receptacles with the battery circuit conducting (Electric trucks)

Do not put and metal tool on the battery case

Do not short the battery terminals

Do not short the battery terminals by placing a piece of metal between the positive and negative terminals.. A loose terminal might cause sparks, causing an explosion. Make sure the terminals are tight. Use caution not to have the wrong connections of the battery terminals.

When turning the screw of the positive pole of the battery, use caution not to allow the tool to touch the metal parts of the truck, as the engine (Engine trucks).

If the tool touches metal parts, there might occur sparks, causing an accident.

Pay attention to battery electrolyte level

Do not operate the truck or charge the battery when the battery electrolyte level is below the LOWER LEVEL marking; otherwise, the components inside the battery may be deteriorated and the battery life shortened, and in the worst case and explosion might occur. Keep the battery electrolyte level between the UPPER LEVEL and LOWER LEVEL markings at all times. Add purified water if the lever is low.

When cleaning the battery, make sure the battery caps are securely tightened

Have a good ventilation when charging

Since hydrogen gases are released from the battery during charging. Have a good ventilation; otherwise an explosion might result. Keep the battery case cover open.

When charging the battery, follow the instructions in the Instruction Manual of the charger

No fire during charging

Batteries give off hydrogen gases during charging. No fire. No sparks.

Make sure the battery electrolyte temperature is below 35℃

Hydrogen gases are released from the battery during charging, causing the battery to heat. Before trying to charge the battery, make sure the battery electrolyte temperature is below 35℃. (If the electrolyte temperature reaches 50℃ or more, discontinue charging and wait until the electrolyte temperature drops to 35℃ or lower.)

The truck 's batteries are high voltage

The batteries used for electric trucks are high voltages more than 48 volts. If anyone touches it inadvertently, he can get an electrical shock accident or burn.

Static electricity is hazardous

Static electricity is generated when cleaning the top surface or connections of the battery with a dry cloth, or covering the battery with a vinyl sheet. It might cause an explosion.

Static electricity from the body

Before checking or cleaning the battery, remove static electricity from your body by touching metallic parts at a place away from the battery.

⚠ **Caution to be taken when starting the engine using a booster cable (Engine trucks)**

When starting the engine using a booster cable, wear safety glasses. When starting the engine using the battery of another vehicle, use caution to prevent the truck whose battery is dead from coming in contact with the vehicle with a charged battery.

Shut down the engine and connect the cable.

Use caution to prevent the cable from getting entangled in the fan or fan belt.

Do not have the wrong connections of the booster cable. Use due caution to prevent the positive (+) terminal from coming in contact with the negative (–) terminal.

⚠ **Do not try to jump start the truck. The truck might jerk, causing an accident (Engine trucks)**

⚠ **Obey regulations**

When disposing of waste oil, solvent, or discharged battery, obey the regulations and rules.

⚠ **Handling Long Life Coolant (LLC) (Engine trucks)**

The LLC is flammable and poisonous. When storing it, attach a label "Dangerous substance" and keep it out of reach of children.

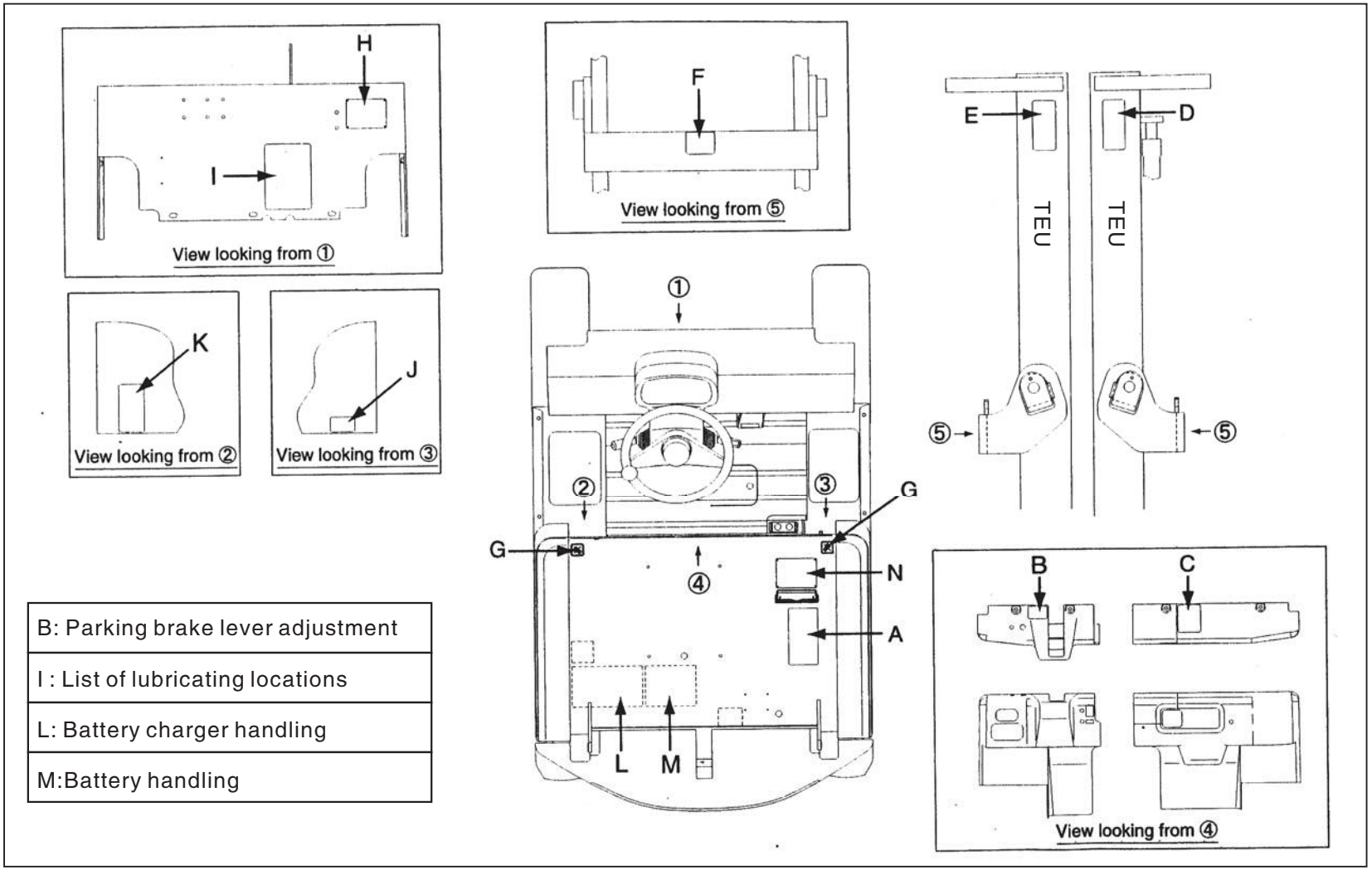
The LLC is flammable. When handling the LLC, never smoke or use fire or naked flame near the LLC.

The LLC is poisonous. Do not swallow it. If anyone swallowed it accidentally, let him drink a lot of water, induce vomiting and get medical attention immediately.

⚠ WARNING

Never hoist your lift truck by attaching ropes or wires to its overhead guard or counterweight; otherwise there is the possibility of the chassis getting damage or falling. If hoisting the lift truck is necessary for any reason such as transportation, use an optional "Chassis Lifting Eye". For the Chassis Lifting Eye, consult your TEU dealer.

The caution plates attached to the lift truck explain cautions to be taken when using the truck, and procedures for operating the truck. Read messages on the caution plates as well as the description in this manual. Damaged or missing decals must be replaced with new ones.



B: Parking brake lever adjustment
I : List of lubricating locations
L: Battery charger handling
M:Battery handling

A. Safe operation

⚠ WARNING

YOU MUST FOLLOW THESE RULES TO AVOID SEVERE INJURY OR DEATH TO YOURSELF AND OTHERS.

1. Operate truck only if trained and authorized by your employer. Know Operation & Maintenance Manual and all work rules.
2. Safety check truck every day. Do not start if damaged or faulty; stop if problems start. Repair allowed only by trained, authorized mechanics.
3. Turn, start, stop, and handle loads smoothly and slowly. Carry loads low and tilted back; stack only on level using minimum tilt.
4. Look where you are going. Watch out for people, hazards on floors and overhead, drop-offs and tail swing clearance.
5. Truck overturn can kill you. Slow for turns even when empty. Never turn on inclines.
6. Do not lift overweight or loose loads. Move slowly with wide, high, or long loads. Keep forks wide and fully under loads. Travel in reverse if loads block view. Attachments require special training, ask your employer.
7. Keep loads upgrade on all inclines. Stay clear of ramp and dock edges. Make sure dockboards and trailers are secure before going on them.
8. Overhead guard and load backrest must be on truck. Always keep yourself completely inside guard.
9. Stop engine when refueling. Follow Operation & Maintenance Manual and employer's work rules about fuel, battery and tire maintenance hazards.
10. Forks can fall rapidly even with light loads. Do not raise people or allow them under forks. No passengers allowed on truck.
11. Park only in authorized areas, never on inclines. Lower forks to bottom, put direction control in neutral, turn off key and make sure parking brake is set.
12. Fasten the seat belt, when operating the lift truck.

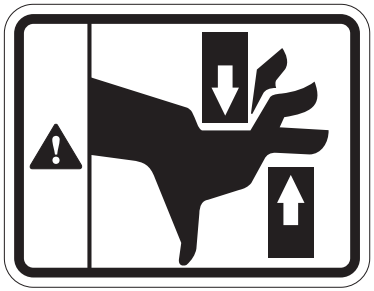
C. Warning for front guard



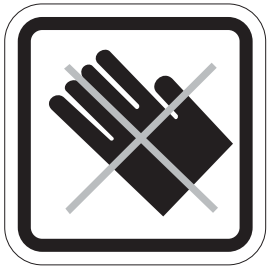
D,E. Warning for load handling means



F. Warning for mast connecting members



G. Entanglement



H. Name plate

HYTSU **FORK TRUCK LOAD AND WARNING NOTICE**

OPERATORS MUST BE TRAINED AND AUTHORISED.
DO NOT OPERATE THE LIFT TRUCK IF IT IS IN NEED OF REPAIR.
THIS CAPACITY PLATE IS NOT TRANSFERABLE AND
IS INVALIDATED BY ANY CHANGE TO SPECIFICATIONS.

HYTSU GROUP

MODEL

SERIAL NO.

CHASSIS NO.

CLOSED HEIGHT

MAX LIFTING HEIGHT mm

Rated Capacity

kg

Rating With Attachment

kg

LOAD CENTRE **500** **600** **700** mm

IMPORTANT NOTICE
- Legislation increasingly requires that components meet original forklift manufacturer's standards
- Ensure compliance by fitting only genuine HYTSU replacement parts available from a HYTSU genuine parts franchised distributor or dealer
- The user of incorrect parts can impair safety and performance and may invalidate forklift warranty

* AUSTRALIAN STANDARD DUTY OF CARE AS2359 Part 6 15.2
* EC certificate conformity
* American standard conformity

Only Qualified and Authorised Personnel shall be permitted to maintain, repair, adjust and inspect industrial trucks.

WARNING
USER OF FORK LIFT TRUCK FORKS, GRAB, SLIPPERS OR JIB

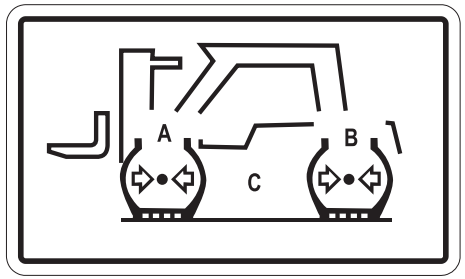
1. STAY CLEAR OF OVERHEAD WIRES
2. DO NOT LIFT LOAD UNLESS PLACED EVENLY ON FORKS
3. DO NOT TRANSPORT OR MANOEUVRE WITH LOAD RAISED ABOVE 300mm EXCEPT TO CLEAR OBSTRUCTIONS AND THEN ONLY WITH MAST TILTED BACK TOWARDS DRIVER
4. DO NOT TILT MAST FORWARD EXCEPT WHERE NECESSARY TO PICK UP OR DEPOSIT A LOAD
5. DO NOT NEGOTIATE ANY INCLINE UNLESS MAST END IS UP HILL
6. DO NOT REVOLVE GRAB WHEN RAISED OR WHILST TRAVELLING
7. GRIP ROLL ONLY IN ITS CENTRE WHEN REVOLVING
8. CENTRALISE GRAB ARMS ON CARRIAGE BEFORE LIFTING
9. DO NOT TILT MAST FORWARD WHEN LOAD SUSPENDED ON JIB
10. KEEP JIB AS LOW AS POSSIBLE AT ALL TIMES BY USING MINIMUM LENGTH SLINGS OR LIFTING BEAM
11. DO NOT USE JIB ATTACHMENT UNLESS THE ALLOWABLE LOAD IS MARKED ON THE JIB AT EACH HOOK POSITION

MANUFACTURER \ DESIGNER \ DISTRIBUTOR: **HYTSU GROUP** **MADE IN CHINA**

WEBSITE: WWW. HYTSU. COM **TEL: 0086 21 58690003** **FAX: 0086 21 58692793**

WHERE FITTED USE THE SEAT BELT

J. Tire inflation pressure (example)



A		B	C
850 (8.5)	850 (8.5)	KPa (kg/cm^2)	Fb15
850 (8.5)	850 (8.5)	KPa (kg/cm^2)	FB18
1000 (10)	900 (9)	KPa (kg/cm^2)	FB20
1000 (10)	900 (9)	KPa (kg/cm^2)	FB25

K. Warning decal for handling inflated tires



N. Load chart: Do not overload!

(For load charts, see page 5–4.)

CAUTION

The instructions on the caution plates carried in this manual may differ from those on the caution plates attached to the truck body. In such a case, observe the instructions on the caution plates

■Caution plate for handling batteries

⚠ WARNING

If the battery is used or charged when the electrolyte level is below the LOWER LEVEL mark, the battery may be damaged. It may also reduce the battery life or cause an explosion.
Add electrolyte so that the level is between the UPPER LEVEL and LOWER LEVEL marks.

⚠ WARNING

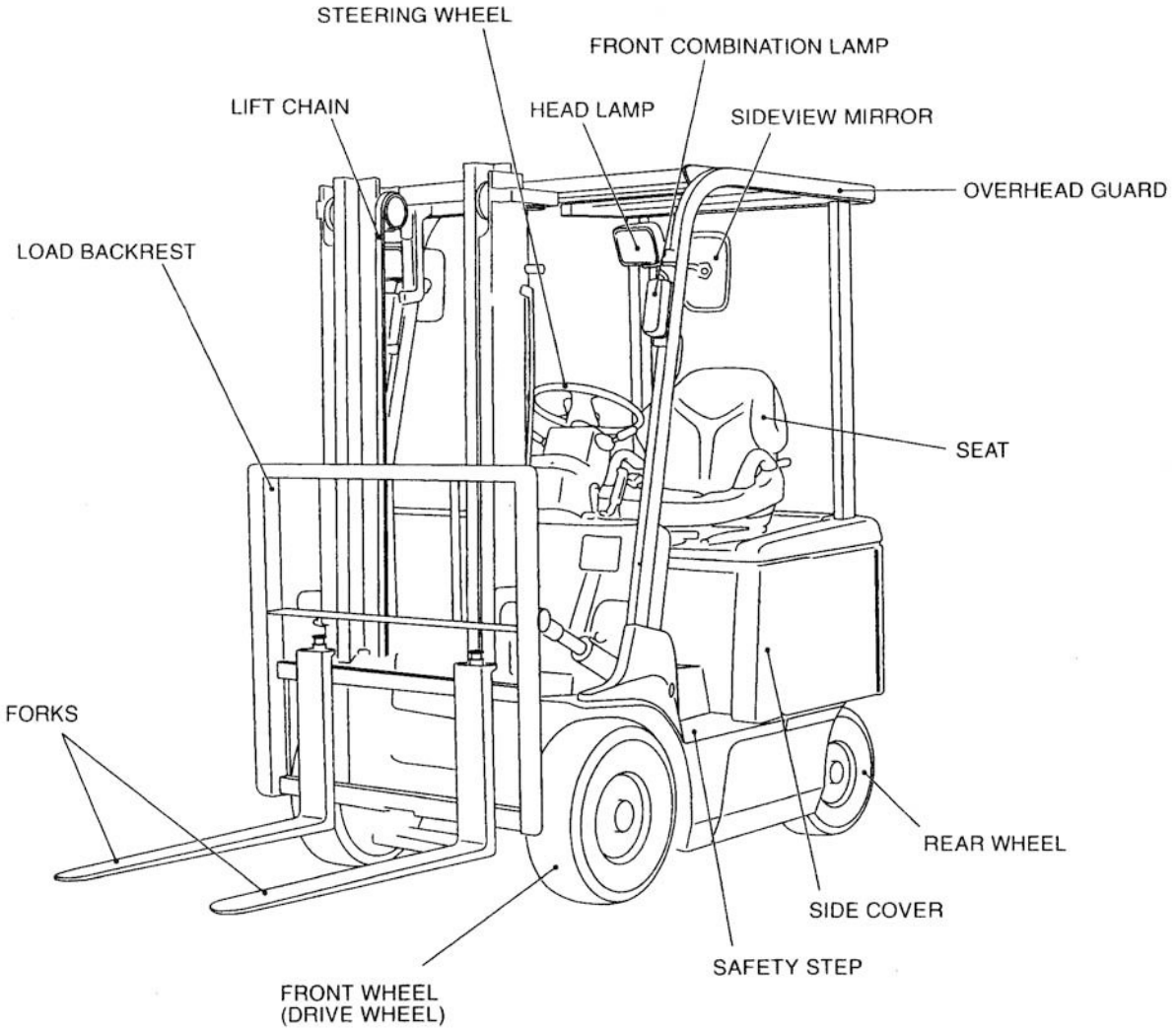
Hydrogen gas produced by a battery can explode. Keep all open flames and sparks away from the battery. To prevent sparks, when connecting or disconnecting the battery or charger cables, be sure to stop the engine and turn off the charger switch.



⚠ DANGER

Handle the battery carefully; otherwise you will get injured.
Pay attention to an open flame or static electricity which might cause an explosion or a fire.
Sulfuric acid will cause painful and serious burns if it gets on the skin. It can cause blindness if it gets into eyes.
Touching a conducting part with bare hands will cause an electric shock accident.
Do not connect or disconnect the battery plugs with the battery turned ON; otherwise you might get burnt or an explosion might occur.

No fire. Do not smoke. Keep sparks or flames away from batteries.
Static electricity: Do not clean batteries with a duster or dry cloth.
Ventilation: Get a good ventilation. Do not use or charge batteries in c closed place or an area where ventilation is poor.
Sulfuric acid: If sulfuric acid comes in contact with your skin or clothing, wash it away using a copious amount of water immediately. If sulfuric acid gets into your eyes, wash your eyes with a copious amount of water immediately and get to a doctor.
Electrolyte level: Keep the battery electrolyte level proper at all times. If the level is too low, the battery will build up heat; if the level is too high, electric leakage will occur.
Electric shock accident: Wear safety glasses, rubber gloves, and shoes with rubber soles when servicing or inspecting batteries.


STEERING WHEEL
FRONT COMBINATION LAMP
LIFT CHAIN
HEAD LAMP
SIDEVIEW MIRROR
OVERHEAD GUARD
LOAD BACKREST
SEAT
FORKS
REAR WHEEL
SIDE COVER
SAFETY STEP
FRONT WHEEL
(DRIVE WHEEL)

The following symbols, found throughout this manual, alert you to potentially hazardous conditions to the owner and the operator. Become completely familiar with the truck before proceeding with operating, checking and servicing.

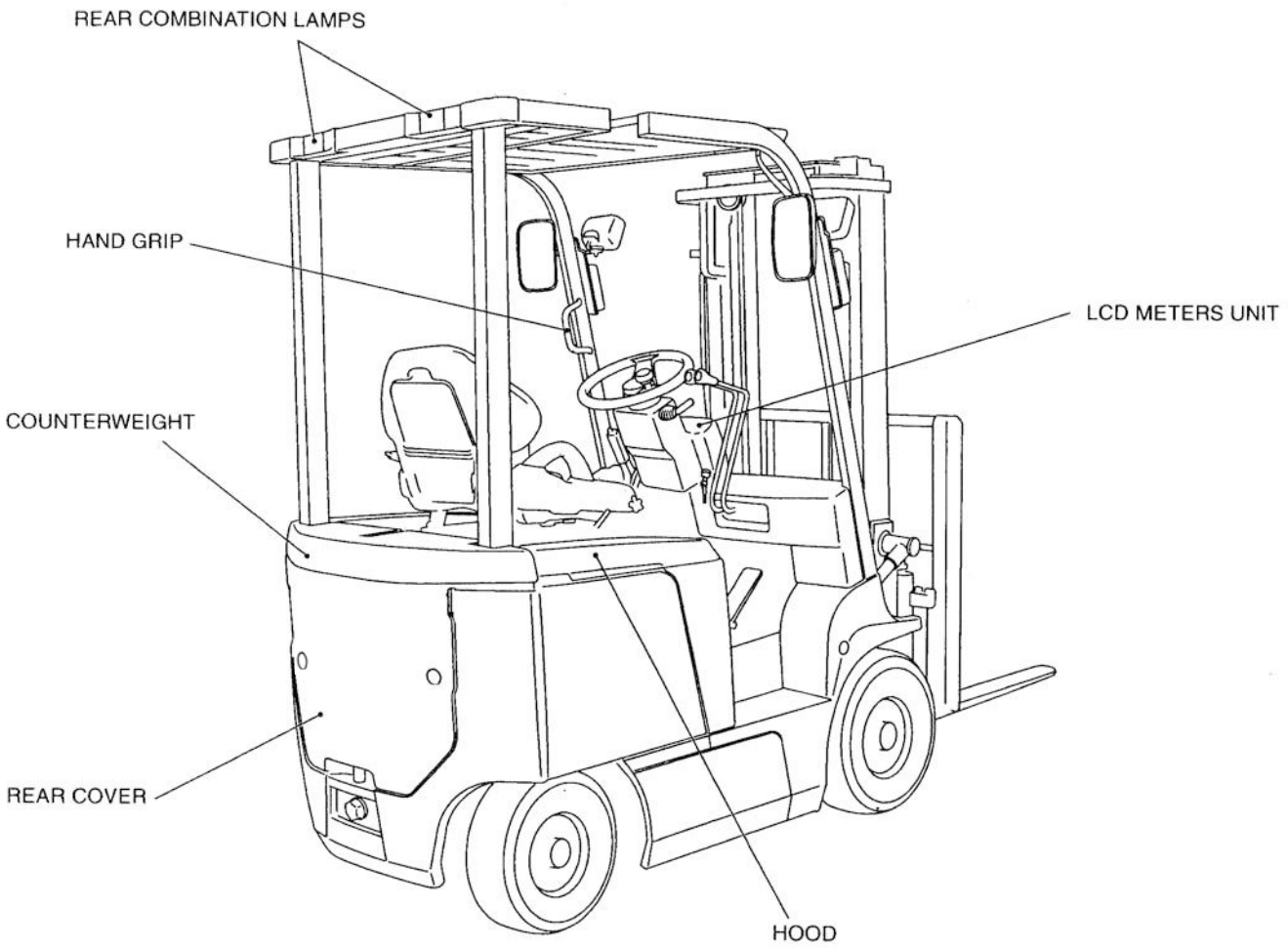
This manual and decal affixed to the truck use the following safety alert indications.

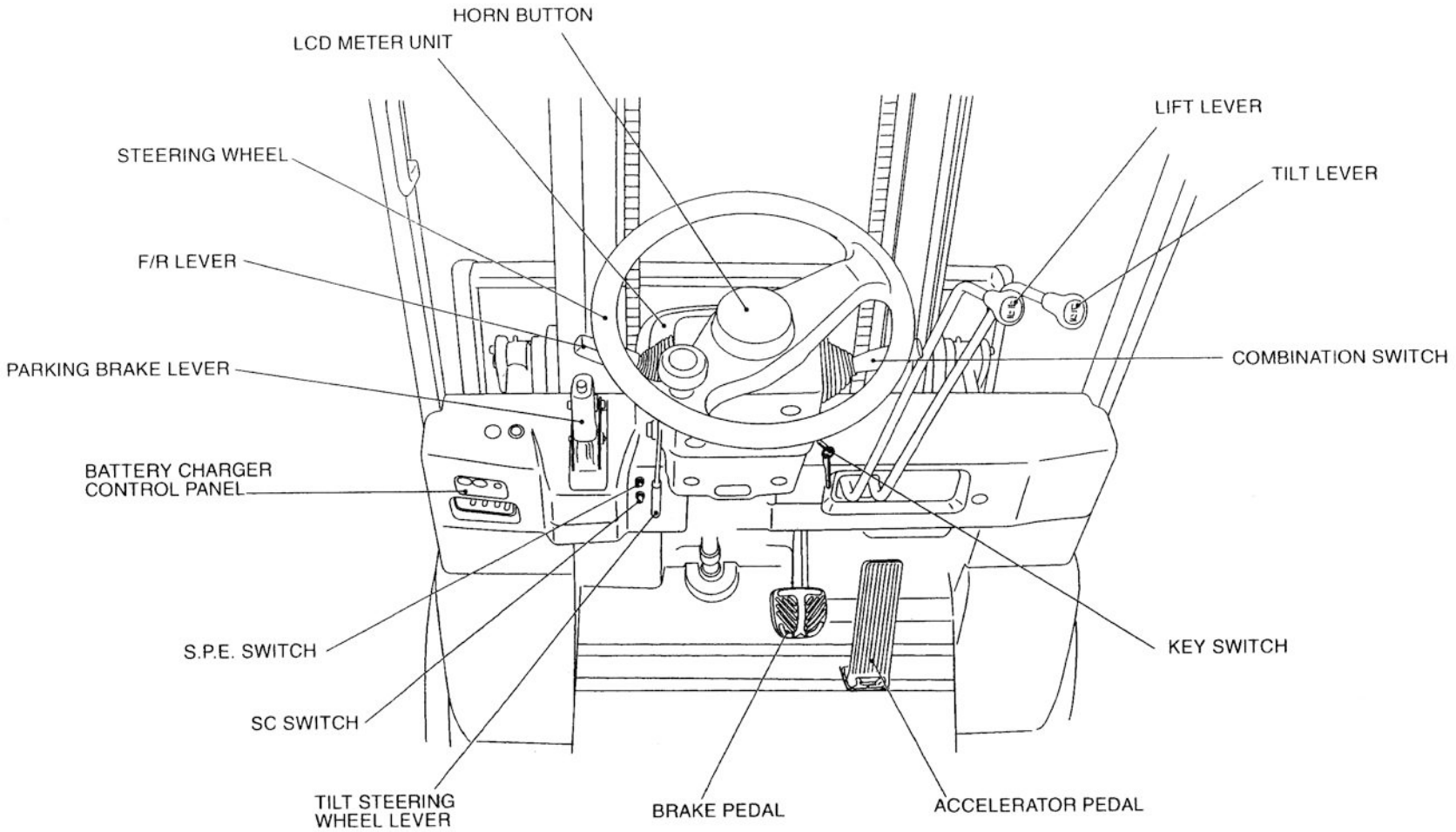
SIGNAL WORD	CLASSIFICATION
⚠ DANGER	Failure to follow the instructions in the message will likely cause a serious accident or death.
⚠ WARNING	Failure to follow the instructions in the message might cause a serious accident or death.
⚠ CAUTION	Failure to follow the instructions in the message may cause personal injury or damage to the truck or other property.
NOTE	The information will help to prolong the service life of the truck. The message is not directly related to accident prevention.

2.OPERATING CONTROLS

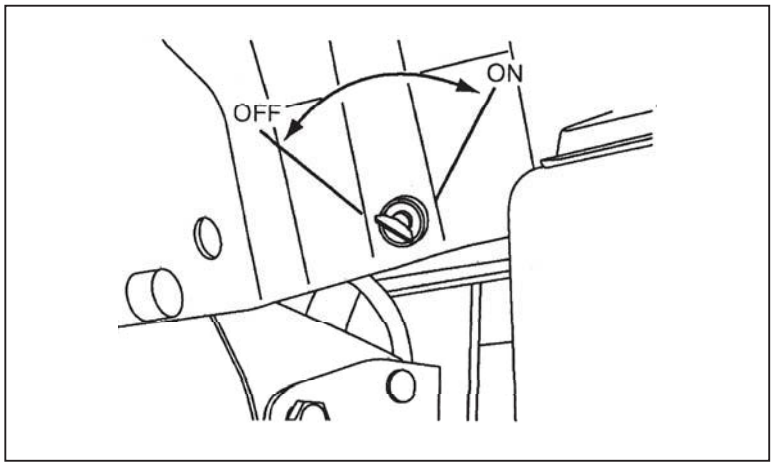
CONTENTS

PICTORIAL NOMENCLATURE ..... 2 – 1
INSTRUMENTS AND CONTROLS ..... 2 – 3
SWITCHES ..... 2 – 4
LCD METER UNIT ..... 2 – 7
BATTERY CHARGE INDICATOR AND DISPLAY ..... 2 – 8
REGENERATIVE BRAKING ..... 2 – 10
LEVERS AND PEDALS ..... 2 – 16
TRUCK BODY ..... 2 – 20
OPTIONAL EQUIPMENT ..... 2 – 28


REAR COMBINATION LAMPS
HAND GRIP
LCD METERS UNIT
COUNTERWEIGHT
REAR COVER
HOOD


HORN BUTTON
LCD METER UNIT
LIFT LEVER
STEERING WHEEL
TILT LEVER
F/R LEVER
COMBINATION SWITCH
PARKING BRAKE LEVER
BATTERY CHARGER
CONTROL PANEL
KEY SWITCH
S.P.E. SWITCH
SC SWITCH
TILT STEERING
WHEEL LEVER
BRAKE PEDAL
ACCELERATOR PEDAL

SWITCHES



KEY SWITCH

⚠ CAUTION

Disconnect the battery receptacle before working on the electric components. The electric circuit is live even if the key switch is turned OFF.

Before leaving the truck, make sure the key switch is turned off and remove the key.

OFF.....The key switch is OFF. Key insertion and draw–out position.

ON.....The electric circuit is closed. After 1 second of self–check, the truck becomes ready for operation. The power indicator lights up.

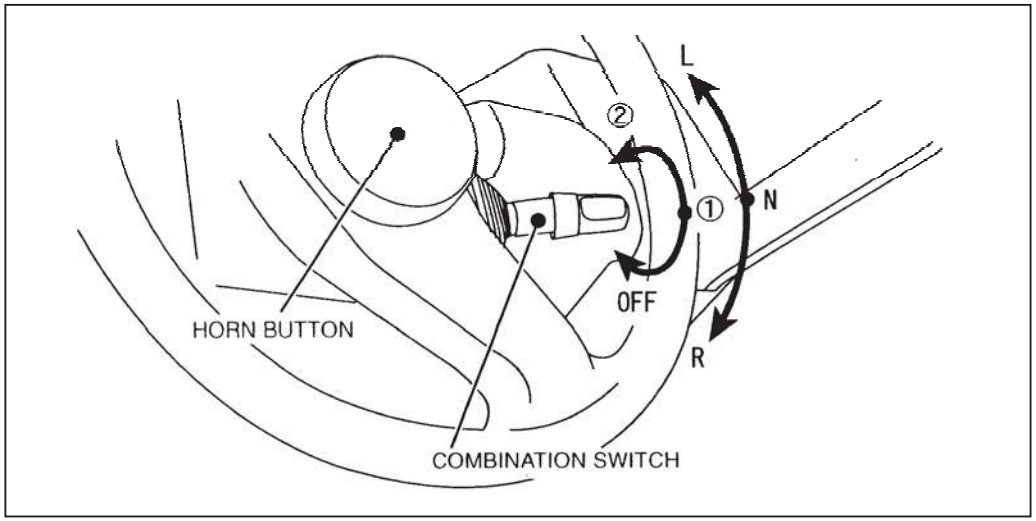
NOTE

If the following operation is carried out, the safety circuit of the truck is activated. In this state, the truck won't start. If you want to start the truck, release the safety circuit.

The F/R (Forward/Reverse) lever is operated with the key switch OFF. (That is, the key switch is turned on with the forward/reverse lever in positions other than neutral.)

– Resetting the safety circuit–

Place the F/R lever in neutral and turn the key switch OFF and then ON.



COMBINATION SWITCH (LIGHTING)

This light switch can be rotated in 2 steps.

Stage / Light	OFF	①	②
Clearance light	OFF	ON	ON
Tail light	OFF	ON	ON
Head light	OFF	OFF	ON

NOTE

The above lights turn on or off regardless of the position of the key switch.
Remember to turn them off when leaving the truck.

(TURN SIGNAL)

Use the turn signals (front and rear) to indicate the traveling direction of the truck.

L	Left lights turn on.
N	OFF
R	Right lights turn on.

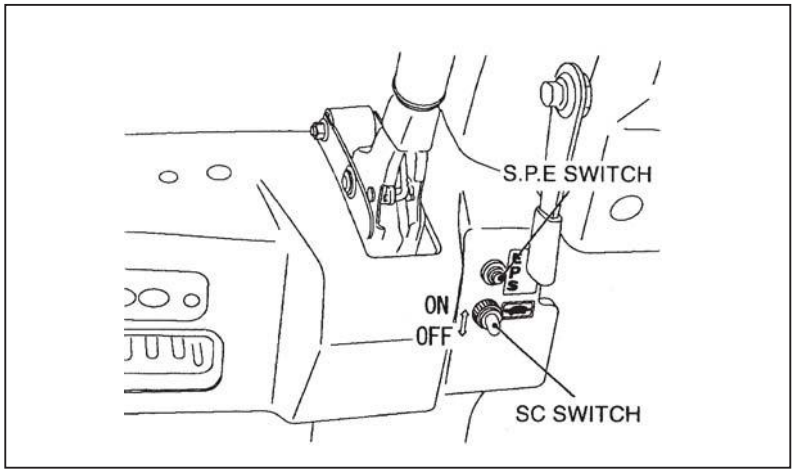
NOTE

The turn signal lever automatically returns to neutral when the steering wheel is returned to the straight position.

The turn signal lever may be optionally located at the right side of the steering column.

HORN BUTTON

Press the horn button at the center of the steering wheel to sound the horn.
The horn sounds regardless of the key switch position.



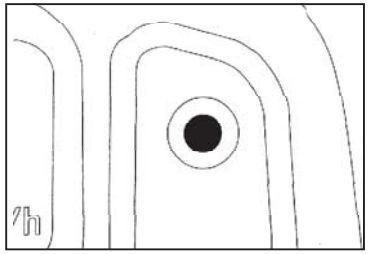
SPEED CONTROL (SC) SWITCH

When this switch is turned on, the mark appears on the display, indicating that speed control is in action.

To release speed control turn the switch off. The mark will disappear.

S.P.E SWITCH

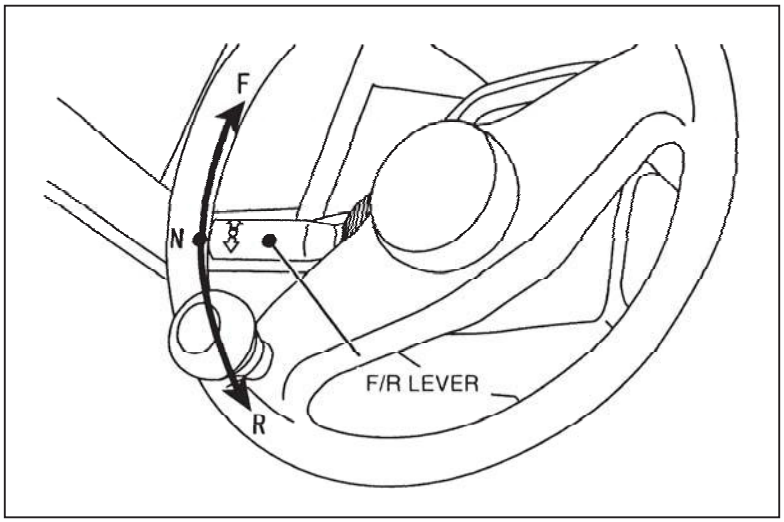
Every time the S/P/E switch is pressed, the letter S, P, or E appears in turns on the LCD meter unit. Set the power mode of the truck with this switch.



POWER LAMP

The light comes on when the key switch is turned on.

LEVERS AND PEDALS



F/R LEVER

Use this lever to select the traveling direction of the truck.

F	Forward
N	Neutral (Ⓝappears on the display.)
R	Reverse (The back–up light comes on and the back–up buzzer sounds.)

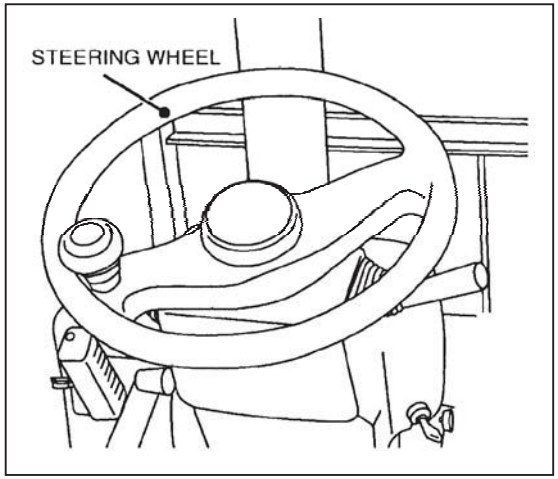
■ Regeneration (switch–back regeneration)

This truck is equipped with regenerative brake system. The regenerative brake system automatically returns electric energy created by braking to the batteries for better use of energy.

It operates when the following conditions are met:

・The accelerator pedal is stepped on.

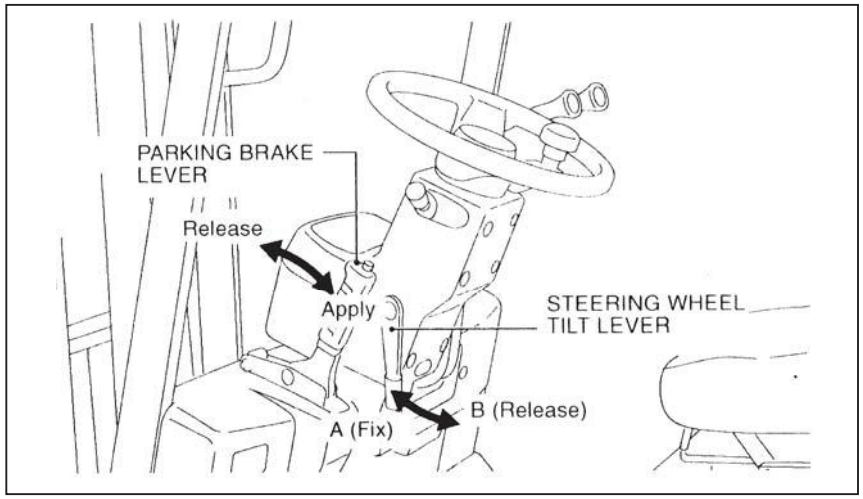
・The F/R lever is reversed while traveling.



Steering wheel

> **⚠ CAUTION**
>
> Do not turn the key switch OFF while traveling. When the key switch is turned OFF, steering operation becomes hard.

When traveling the truck, hold the steering wheel knob with your left hand. Do not remove your hand from the knob while traveling. The truck comes with poser steering to provide smooth, light steering with the key switch on.



PARKING BRAKE LEVER

⚠ CAUTION

When parking on a grade, be sure to block the wheels.

Before pulling the parking brake lever, step on the brake pedal.

Use the parking brakes to park the truck. Pulling the lever toward you applies the brakes to the two front wheels. The indicator (Ⓟ) lights up on the LCD. To release the parking brakes, push the parking brake lever forward.

TILT STEERING WHEEL LEVER

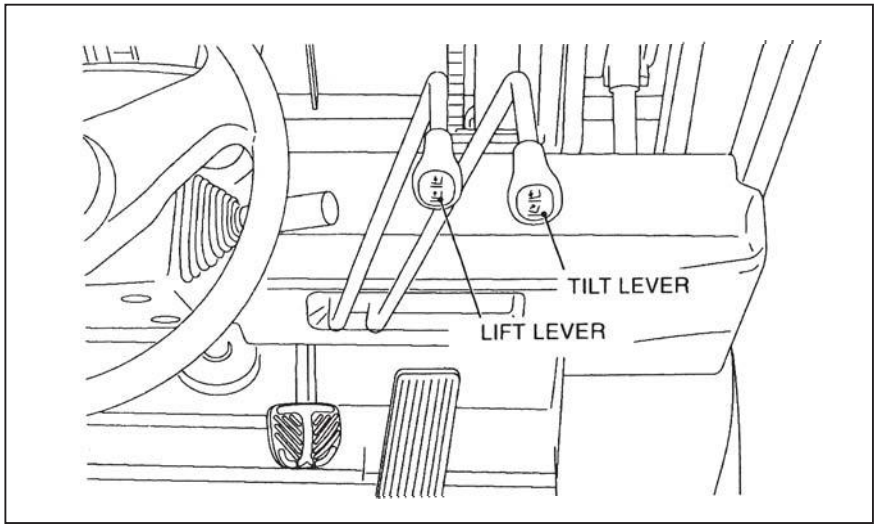
⚠ CAUTION

Set the steering column at the most comfortable position before trying to start the truck.

After adjusting the steering column position, turn the lever in the direction of "A" to lock the steering column.

Never try to adjust the steering

The steering wheel column can be tilted forward and backward according to the operator's physique. Turn the lever in the direction of "B" to loosen the steering wheel column. After adjustment, turn the lever to "A" to lock.



LIFT LEVER

⚠ CAUTION

Seat yourself in the operators seat and make sure there is no one around the truck before trying to operate the lift lever.

Pulling back the lever will raise the forks and pushing forward it will lower the forks. The lifting speed of the forks can be controlled by the tilt angle of the lever.

TILT LEVER

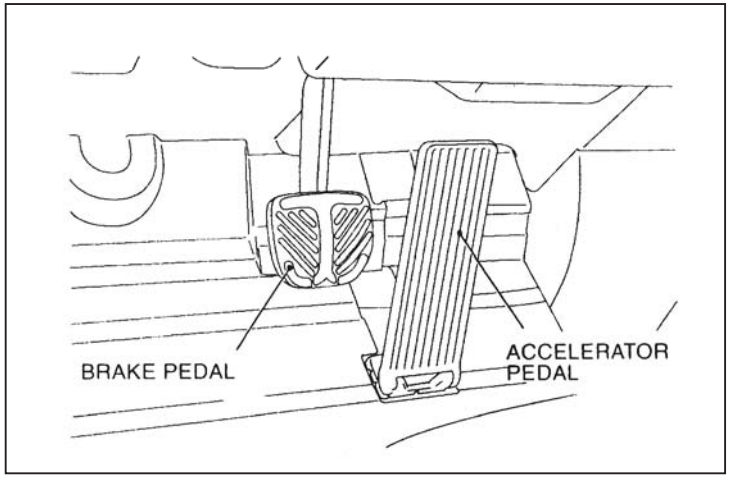
⚠ CAUTION

Seat yourself in the operators seat and make sure there is no one around the truck before trying to operate the tilt lever.

Pulling the tilt lever will tilt backward the mast and pushing forward it will tilt the mast forward.
The tilting speed of the mast can be controlled by the tilt angle of the tilt lever.

NOTE

If the tilt lever is operated with the key switch OFF, the mast won't tilt forward due to the operation of the tilt–lock mechanism incorporated in the control valve. This is not the malfunction of the system.



PEDALS

The truck has 2 foot controls: brake pedal and accelerator pedal (from the left).

BRAKE PEDAL

Step on the brake pedal to slow down the truck. Brake lamps light up when the brake pedal is pressed.

Before stepping on the brake pedal, release the accelerator pedal first.

ACCELERATOR PEDAL

The accelerator pedal controls the traveling speed of the truck.

Turn the key switch ON and shift the F/R lever into forward or reverse, and step on the accelerator pedal. The traveling speed is indicated on the display.

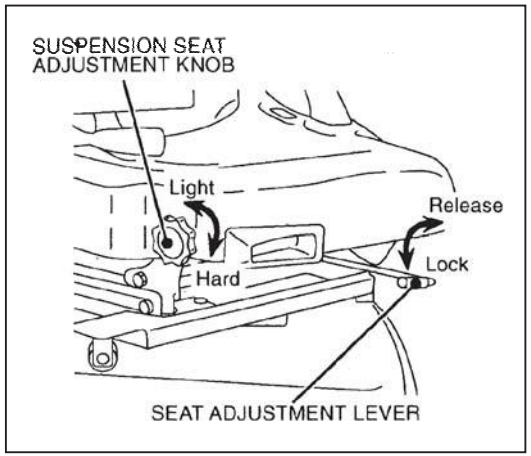
⚠ CAUTION

Brake switch

Do not remove the brake switch.

When the brake pedal is stepped on, the brake switch operates to turn the brake lamp on and activates brake regeneration.

TRUCK BODY

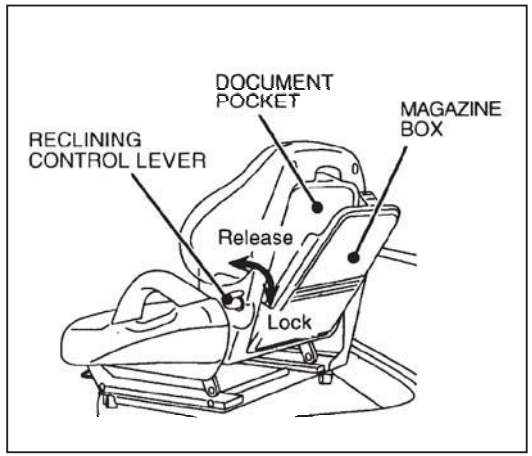


DRIVER'S SEAT SUSPENSION

⚠ CAUTION

Adjust the suspension of the driver's seat using the adjustment knob before starting the day's work or each shift. Do not try to adjust the suspension during operation.

Adjust the driver's seat suspension properly to suit the individual operator's physique and to provide best comfort.
Turn the adjustment knob to the value of your weight. The seat absorbs shock and vibration to provide comfort during traveling and operation.

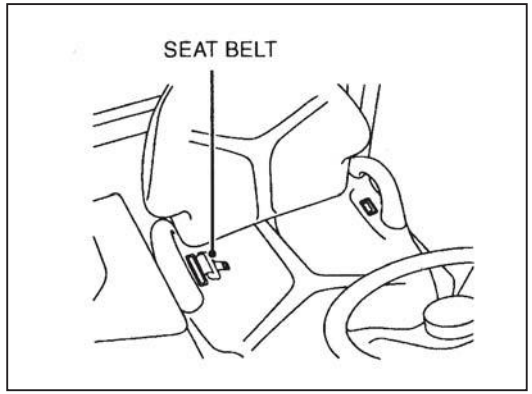


SEAT ADJUSTMENT LEVER
RECLINING CONTROL LEVER

⚠ CAUTION

Adjust the seat position before starting your day's work or each shift. Make sure the seat is securely locked.

Adjust the driver's seat to a position to suit the individual operator's physique.
To unlock, pull up the lever.
After adjustment, try to move the seat back and forth to make sure that the seat is securely locked.



DOCUMENTS POCKET AND MAGAZINE BOX

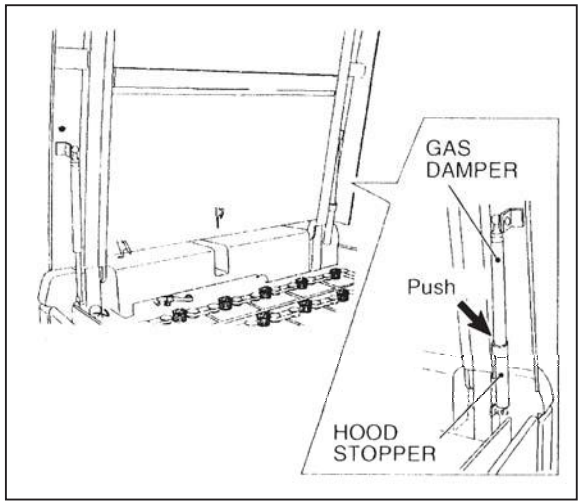
The driver's seat has a document pocket and magazine box at its back. Use them for storing the Instruction manual and others.
Remember to close the document pocket before operation.

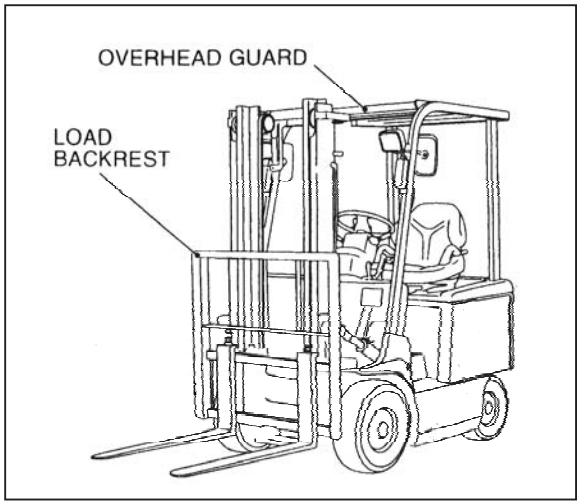
SEAT BELT

⚠ WARNING

Be sure to fasten the seat belt before starting traveling or operator might be thrown out and, in the worst case, the operator can be crushed by the truck causing severe injury or even death.

Pull out the connector at the right side and insert it into the receptacle at the left side until it clicks. To unfasten the seat belt, press the red button by the receptacle, and the belt automatically winds up into the





HOOD STOPPER

⚠ CAUTION

After opening the hood, make sure gas damper stopper is engaged.

Use caution not to get your fingers caught in the hood when closing it.

The hood has a stopper at the middle of the gas damper. After opening the hood, make sure the gas damper stopper is securely engaged. When closing the hood, hold the hood and push the gas damper stopper to bring the hood down slowly.

OVERHEAD GUARD

⚠ WARNING

The overhead guard is an important safety device which protects the operator from falling objects. Make sure it is securely installed. Do not use the truck with the overhead guard removed or modified; otherwise it might cause

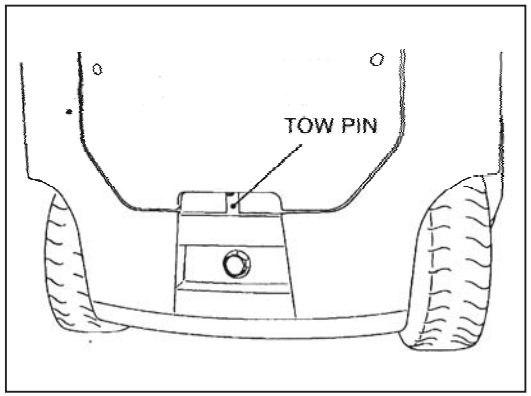
NOTE

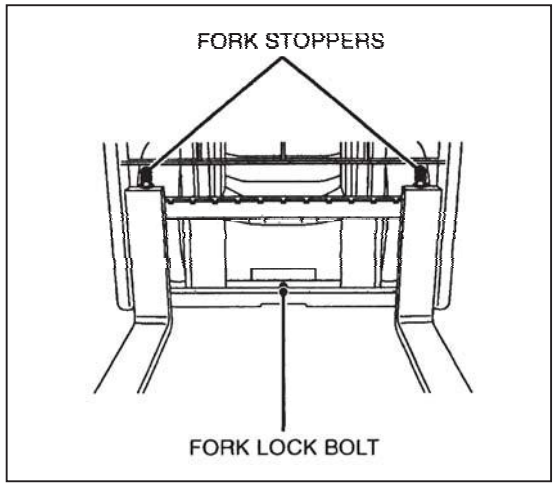
Keep the vinyl rain gutter always clear of dust.

LOAD BACKREST

⚠ CAUTION

The load backrest is an important safety device which protects the operator from a falling load if the forks disengage from the carriage. Make sure the load backrest is securely installed. Do not use the truck with the load backrest removed or modified; otherwise it might cause





TOW PIN

⚠ CAUTION

Do not use the tow pin for towing another vehicle or for being towed by another vehicle.

Use the tow pin for the following cases:

When the truck has bogged down in the mud or a side ditch.

When loading onto or unloading from a trailer for transportation.

FORK STOPPER

⚠ CAUTION

The forks should be set symmetrically to the truck centerline, and fork stoppers should always be set.

When adjusting fork spacing, hold the load backrest and push the forks

Secure the forks with the fork stoppers.

Pull up the fork stoppers a little and turn 90° .

Then adjust the fork spacing using your foot according to the size of the load you

FORK LOCK BOLT

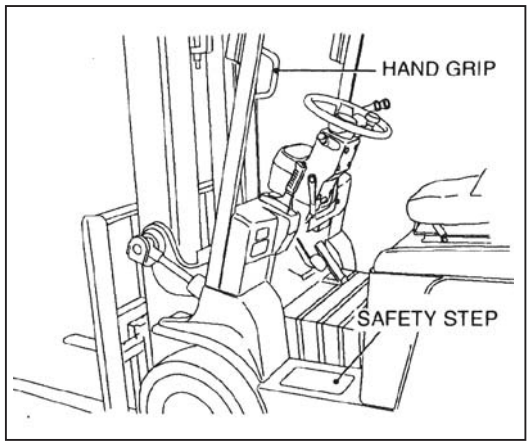
⚠ CAUTION

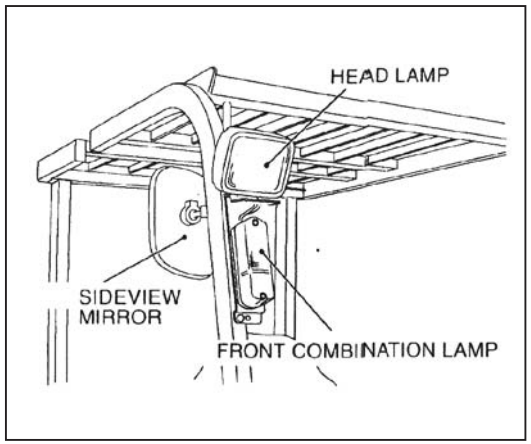
Do not remove the fork lock bolt other than the following cases; otherwise the forks might disengage from the carriage, causing personal injury.

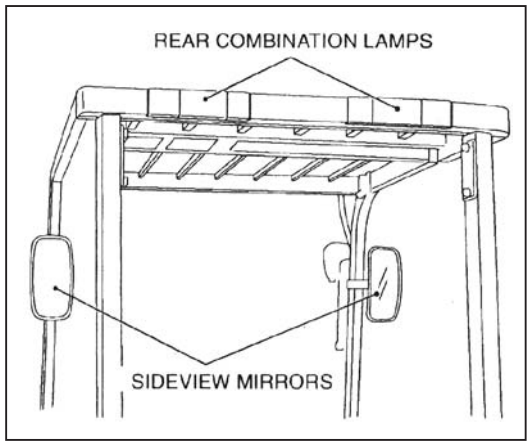
When removal of the forks is needed.

When gathering the right and left forks together to the center

When a fork prong is moved to the center, it will come off the carriage. This bolt prevents the fork from being used at the







SAFETY STEP AND HAND GRIP

⚠ CAUTION

Use the safety step and hand grip when mounting and dismounting.
Do not hold the steering wheel when getting on or off. Do not
mount or dismount while the truck is in motion.

The truck is equipped with a safety step at front left side of the body and a hand grip on one of the front poles of the overhead guard. When mounting or dismounting, use the safety step and hand grip.

LIGHT AND LAMPS

⚠ CAUTION

Check that lights and lamps come on and off properly. If any light bulb is blown out, replace with a new one. If the lens is contaminated or damaged, clean or repair.

Front side
The truck has head lamps and front combination lamps (turn signals and clearance lamps) at its front side.
Rear side
The truck has rear combination lamps (tail lamps, brake lamps, back–up lamps, turn

SIDEVIEW MIRRORS

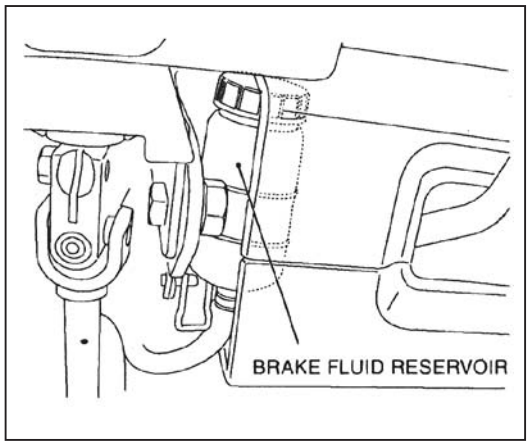
⚠ CAUTION

When traveling in reverse, alwarys look in the direction of travel. Do not rely too much on the sideview mirrors.

Keep the mirror surfaces always clean.

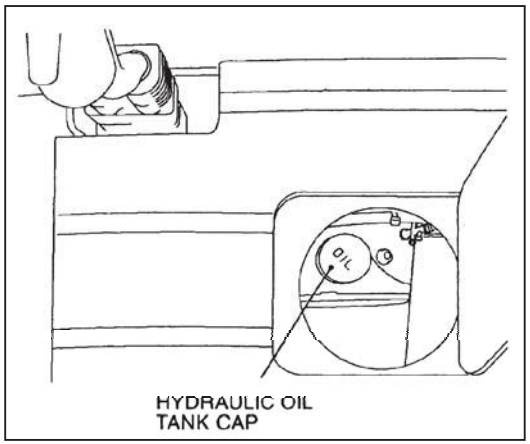
Adjust the sideview mirrors to gain full rear vision.

The sideview mirrors are provided on the front poles of the overhead guard, one for each.



BRAKE FLUID RESERVOIR

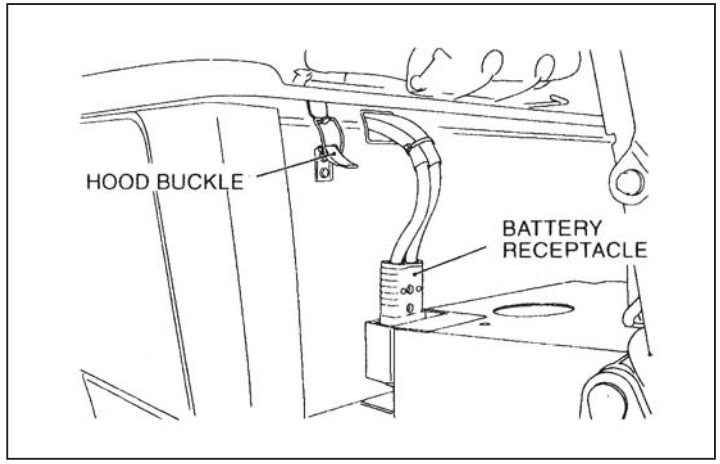
The brake fluid reservoir is located under the front guard at the right side of the steering column. The operator can check the brake fluid level from outside.

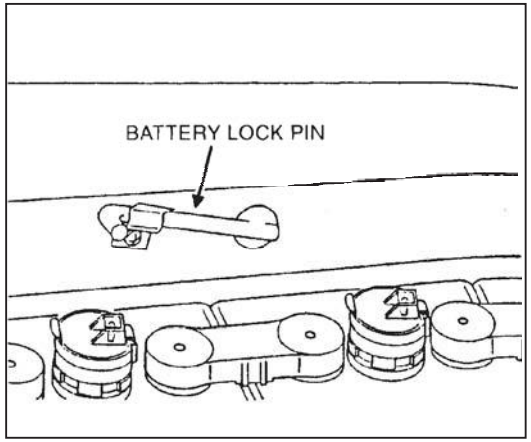


HYDRAULIC OIL TANK CAP

The hydraulic oil tank cap is located under the floor mat.

The tank cap is fitted with an oil dipstick for easy level checking.





BATTERY RECEPTACLE

⚠ CAUTION

Make sure the battery receptacles are disconnected before trying to touch any of the internal electric parts.

The voltage is present in the main circuit even if the key switch is turned off.

Do not disconnect the battery receptacles while traveling. The power steering system becomes inoperative.

The battery receptacles couple and uncouple the connection between the battery and the truck's electric parts.

NOTE

When disconnecting the batter receptacles, first turn OFF the key switch.

Before trying to connect the battery receptacles, make sure the key switch is in OFF.

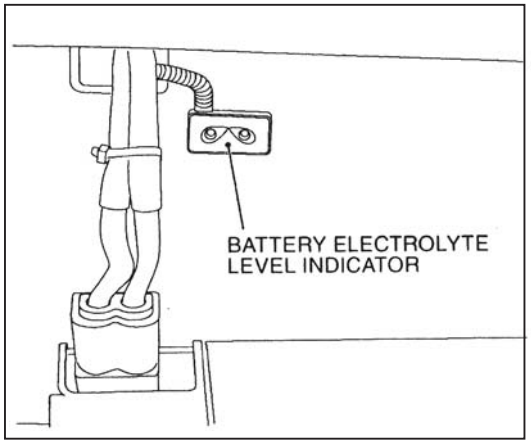
When giving a charge to the battery with the truck–mount charger, do not

BATTERY LOCK PIN

⚠ CAUTION

Make sure to set the battery lock pin.

The battery lock pin connects the battery case to the truck body, preventing the battery case from vibrating during traveling. To replace the battery with a new one, disengage the battery lock pin and remove the battery electrolyte level sensor wiring.



BATTERY ELECTROLYTE LEVEL INDICATOR (EXB Option)

The battery electrolyte level indicator is installed on the battery case for checking the electrolyte level in the battery.

The green lamp stays on to indicate that the level indicator sensor is operating.

The red lamp comes on when the electrolyte level gets close to the lower limit. If the red lamp blinks, add purified water as soon as possible.

Check the electrolyte level in all cells periodically.

OPTIONAL EQUIPMENT

Here are some pieces of optional equipment which are deeply related to safe operation of the truck.
For more information about optional equipment, consult your local TEU dealer.

REAR WORK LIGHT (RWL)

> **⚠ CAUTION**
>
> **It is advisable to use an optional rear work light when you are working in a place where sufficient light is not available.**

The rear work light illuminates the road or floor behind the truck at night to allow the operator to recognize obstacles, if any, on the road or floor easily.

BEACON LIGHT (YELLOW, RED) (RLY, RLR)

Use an optional beacon light in the case when the truck is required to work near fellow workers or bystanders or when the work place is noisy.

SOUND VOLUME–ADJUSTABLE BACK–UP BUZZER (BBA)

You can switch over the sound volumes in two stages, according to the noise level at the work place.

FORWARD TRAVEL CHIME (TAF)

When the truck travels forward, the chime sound to left fellow workers know the truck is moving.

PNEUMATIC CUSHION TIRE (UNIQUE TIRE, TR01)

Use tires of this type when you are going to work in an area where there are debris or anything that might blow the tires on the road or floor surface.

FIRE EXTINGUISHER (FE)

Use the fire extinguisher for putting out a fire. An optional fire extinguisher will be attached to one of the rear supports of the overhead guard.

The following symbols, found throughout this manual, alert you to potentially hazardous conditions to the owner and the operator. Become completely familiar with the truck before proceeding with operating, checking and servicing.

This manual and decals affixed to the truck use the following safety alert indications.

SIGNAL WORD	CLASSIFICATION
⚠ DANGER	Failure to follow the instructions in the message will likely cause a serious accident or death.
⚠ WARNING	Failure to follow the instructions in the message might cause a serious accident or death.
⚠ CAUTION	Failure to follow the instructions in the message may cause personal injury or damage to the truck or other property.
NOTE	The information will help to prolong the service life of the truck. The message is not directly related to accident prevention.

3.OPERATION

CONTENTS

FROPER OPERATION ..... 3 – 1
- DURING BREAK–IN ..... 3 – 1
- RELATIONSHIP BETWEEN LOAD AND STABILITY OF TRUCK ..... 3 – 1
- BASIC LOAD CENTER AND RATED LOAD ..... 3 – 2
- THE STABILITY OF LIFT TRUCK ..... 3 – 2
- TRAVELING AND STARTING ON A SLOPE ..... 3 – 2
- TRANSPORTING LIFT TRUCK ..... 3 – 3
- OPERATING LIFT TRUCK ..... 3 – 3

HANDLING THE BATTERY ..... 3 – 8
- BATTERY CARE ..... 3 – 8
- POWER SUPPLY EQUIPMENT FOR CHARGER ..... 3 – 13

LOAD HANDLING ..... 3 – 17
- PICK–UP ..... 3 – 17
- STACKING ..... 3 – 17
- UNSTACKING ..... 3 – 18

STORING ..... 3 – 19
- BEFORE STORING; DAILY STORAGE ..... 3 – 19
- LONG–TERM STORAGE; OPERATING AFTER LONG–TERM STORAGE ..... 3 – 20
- PROHIBITION OF WASHING TRUCK BODY AND BATTERY WITH WATER ..... 3 – 21
- CLEANING ..... 3 – 21
- AFTER CLEANING ..... 3 – 21
- WASHABLE ITEMS ..... 3 – 21

To operate the lift truck safely and get the most out of it, correct procedures are described on the following pages:

DURING BREAK–IN

We recommend to operate the truck under light load conditions for the first stage of operation to get the most from it. Especially, the requirements given below should be observed while the truck is in a stage of 200 hours of operation.

⚠ **Always warm up your truck before putting it into work regardless of the seasons.**

⚠ **Perform specified preventive maintenance services carefully and completely.**

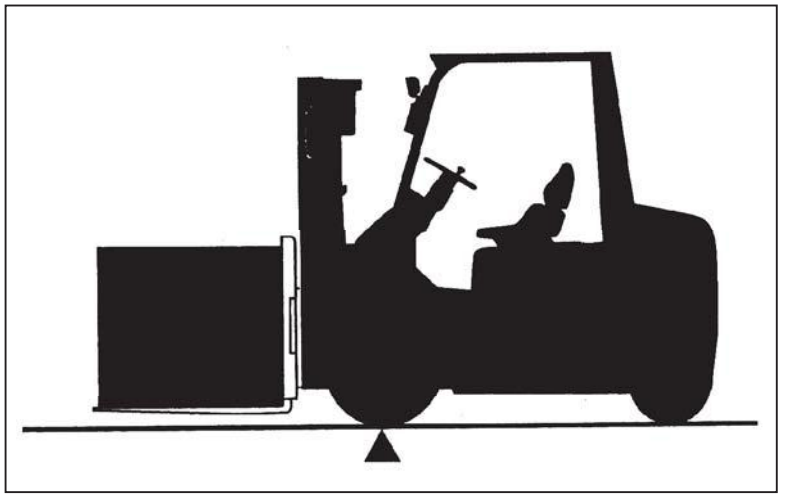
⚠ **Never "race" or play games with the truck. Avoid sudden stops, starts or turns.**

⚠ **Oil changes and lubrication are recommended to do earlier than specified.**

RELATIONSHIP BETWEEN LOAD AND STABILITY OF TRUCK

The lift truck deeps a balance of weight between the truck and the load on the forks with the center of the front wheels as a fulcrum when the rated capacity load is placed in position.

Due care should be paid to the weight and the load's center of gravity to maintain stability.



If the rated capacity is exceeded, there is a danger of the rear wheels being raised and in the worst case, the truck will turn over, resulting in a fatal accident. The load placed near the fork tips practically has the same effect that the weight of the load is increased. In this case, the load weight must be reduced accordingly.

BASIC LOAD CENTER AND RATED LOAD

⚠ CAUTION

When traveling with loads, keep the forks 15 to 20 cm (6 to 18 in.) above the ground surface and keep the mast tilted back fully.

The allowable load of a truck equipped with an attachment is reduced in comparison with that of the standard truck.

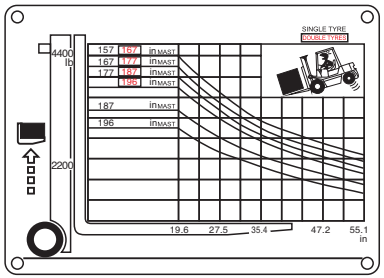
If the truck is equipped with a load–handling means such as a hinged fork, load grab, or rotating clamp, its allowable load will be reduced as compared with that of the standard truck (a truck without any attachment) for the following reasons:

Never exceed the allowable load indicated on the load chart attached onto the truck or attachment.

Reasons for a reduction in the allowable load:

1)The weight of an attachment is added.

2)The attachment shifts the basic load center position



The basic load center is the distance from the front face of the forks to the load's center of gravity. The chart given above shows the relationship between the basic load center and the weight of loads to be allowable for the 2–ton truck. This chart is called a

THE STABILITY OF LIFT TRUCK

The stability of lift trucks is stipulated in JIS (Japanese Industrial Standards) or in other national industrial standards, and TEU lift trucks are manufactured complying with these standards. However, note that the stability of lift trucks is not assured at all times, but only when the following conditions are properly observed.

The ground or floor surface is level and hard.

The truck travels under standard loaded or unloaded condition.

The truck is operated carefully and the forks are properly manipulated; that is, the forks are not tilted forward more than necessary, when stacking or unstacking.

Load handling is carried out carefully and slowly.

In addition, keep the truck in good working condition for safe operation and traveling.

Standard unloaded condition

This means that the forks are raised 30 cm (12 in.) above the ground or floor surface and tilted back fully without loads.

Standard loaded condition

This means that the forks are raised 30 cm (12 in.) above the ground or floor surface with a load placed at the basic load center position of the forks.

TRAVELING AND STARTING ON A SLOPE

When traveling on a slope with a load on the forks, have the load pointed up–hill.

When traveling on a slope without load, have the rear end of the truck pointed up–hill to prevent the drive wheels from skidding.

TRANSPORTING LIFT TRUCK

⚠ CAUTION

Transporting the lift truck on a trailer truck

Securely lock the lift truck in place to prevent it form moving on the trailer truck by fastening with wire ropes and blocking the wheels.

When loading or unloading the lift truck onto or from a trailer truck or when traveling over public roads, pay attention to the overall length, overall height, and weight and

CAUTIONS TO BE TAKEN WHEN LOADING AND UNLOADING LIFT TRUCK

⚠ CAUTION

Never try to move the steering wheel when halfway up a ramp; otherwise the truck might fall down, leading to a serious accident.

⚠ **Use ramps of sufficient length, width, and strength.**

⚠ **Before loading or unloading the lift truck, make sure to apply the parking brake to the trailer truck and block its wheels.**

⚠ **Ramps must be securely locked to the trailer truck. Their surface must be clean and dry.**

⚠ **Loading and unloading must be carried out on a level surface. The right and left ramps must be the same height.**

When loading the lift truck onto a trailer truck, back it up the ramps slowly with care.

OPERATING LIFT TRUCK
GETTING ON AND OFF

⚠ CAUTION

Do not hold the steering wheel when getting on the truck. Do not jump on or off the truck. You might slip or tumble down, leading to personal injury.

1)Make sure there is no one around the truck.
2)Using the safety step and hand grip, get on the truck from the left side of the truck.
3)Fasten the seat belt for your safety's sake. It will help prevent you from getting injured when the truck tips over.

BEFORE STARTING LIFT TRUCK

⚠ CAUTION

It takes about 1 second after the key switch is turned on, to make the control circuit ready for functioning to allow the truck to start.

Do not place the F/R lever in forward "F" or reverse "R" before the key switch is turned on; otherwise the truck might not start.

If this is the case, return the F/R lever to neutral "N".

Do not bottom the accelerator pedal rapidly. It is

⚠ CAUTION

Make sure there is no one around the truck and let other workmen and bystanders know you are starting up by honking.

1)Pull back the lift lever to raise the forks 1.9 to 3.9 in from the ground or floor surface.
2)Pull back the tilt lever to tilt back the mast fully.
3)Pull back the lift lever again to raise the forks 5.9 to 7.8 in from the ground or floor surface.
4)Make sure there is no one around the truck and let other workmen and bystanders know you are starting up by honking.

STARTING LIFT TRUCK

⚠ CAUTION

Press the brake pedal fully before shifting the F/R lever into forward "F" (or reverse "R")

⚠ CAUTION

When traveling in reverse, look in the direction of travel and be alert for pedestrians, other trucks or obstacles in your path of travel. Do not rely too much on the sideview mirrors.

1)Step on the brake pedal.
2)Place the F/R lever into forward "F" (or reverse "R")
3)Release the parking brake.
4)Remove your foot from the brake pedal and step down the accelerator pedal gradually.
5)You can control the traveling speed by stepping on the accelerator pedal.

NOTE

Do not keep your foot on the brake pedal after starting the truck.

TURNING

⚠ WARNING

Note that the higher the traveling speed or the smaller the turning radius, the possibility of the truck rolling over sideways increases when making a travel turn.

⚠ CAUTION

Note that the rear end (counterweight) of the truck swings when you turn the truck.

Unlike general passenger cars, the steer wheels are located at the rear of the truck. This causes the rear end of the truck to swing out when a turn is made. Slow down the truck and move toward a side to which you are turning. The steering wheel should be turned a bit earlier than as with the front–wheel steering car.

Grab the steering wheel knob with your left hand.

Your right hand is used to operate the load handling levers.

Before making a turn, slow down to about 3.1 mph and turn the steering wheel slowly, making sure there is no one around the truck.

SIMULTANEOUS OPERATION OF TRAVELING AND LOAD HANDLING (INCHING)

⚠ WARNING

Simultaneous operation (inching operation) of traveling and load handling requires skillfulness. The operator is required to know the shape of the load he is going to handle, the possibility of slipping, deformation, and load's center of gravity. In addition, he needs to lift the forks horizontally at a slow speed, ensuring the stability of the truck. Use due caution when carrying out inching operation.

Do not tilt the mast forward when the load is raised high.

Do not tilt the mast forward unless the load is over a stack or at a low lift height.

To reduce the risk of the truck tipping over, do not lift the

1)Under the usual traveling posture, approach the pick–up or deposit area up to 118 to 196 in from it.

2)Step on the brake pedal fully (bring the truck to a complete stop).

3)Step on the accelerator pedal to gain a traveling speed suitable for

4)Operate the lift lever to lift the forks.

SLOWING DOWN

Ease up on the accelerator pedal. If necessary, step on the brake pedal.

If not in emergency, you can slow down and stop the truck by releasing the accelerator pedal. Rapidly releasing the accelerator pedal will not bring the truck to a repid stop.

If you need to stop the truck immediately, step on the brake pedal fully.

PARKING

⚠ CAUTION

Safe parking

Park the truck on a level ground, preferably in a wide area.

If parking the truck without load on a slope is unavoidable position the load handling means down–hill and block the wheels to prevent accidental roll.

Park the truck in a designated area or out–of–traffic area. If necessary, put signposts or signal lights around the truck.

Park the truck on a hard ground. Avoid soft ground, deep mud or slippery surfaces.

If you cannot lower the forks on the ground due to a broken load handling system, put a caution cloth to the fork end and park in an out–of–traffic area.

Pay attention to the ground condition because it might be slippery.

Dismount from the truck after making sure it has come to a complete stop. Do not dismount from the truck in motion.

Never jump off the truck.

Dismount from the truck, facing the truck and using the

Ease up on the accelerator pedal and if necessary step on the brake pedal to stop the truck. Place the F/R lever in neutral "N".

Park the truck in an out–of–traffic area and follow these steps:
1)Pull the parking brake lever fully to apply the parking brake.
2)Lower the forks on the ground.
3)Turn the key switch OFF.
4)Remove the key and keep it.
5)Dismount from the truck carefully.

GROUND CONDITION

⚠ CAUTION

Use due caution when traveling on a rough surface.

When crossing a railroad, be sure to stop and ensure the safety, and cross the railroad track at an angle.

Go around obstacles such as rocks and stumps, or pot holes. If unavoidable, reduce the speed and go over them slowly and carefully. Use caution not to damage the bottom of the truck. Cross a small bump diagonally if the aisle width is enough to do so.

Lift truck performance depends upon the ground condition or floor condition and travel speed should be adjusted properly.

TRAVELING ON SNOWY OR FROZEN ROAD

When traveling on a snowy or frozen road, avoid sudden acceleration, stops or turns; otherwise the truck might skid to cause a serious accident.
Control the traveling speed carefully using the accelerator pedal.

BATTERY CARE

⚠ DANGER

Cautions to be taken when handling battery

Gases produced by the battery con be explosive. D o not smoke.

Do not use open flame for inspection.

No fire. Do not smoke. Keep sparks or open flame away from the battery.

Keep proper electrolyte level. If the levrl is too low (below LOWER LIMIT), the battery will build up heat, leading to an explosion.

Have a good ventilation. Do not use or store batteries in a closed place or an area where ventilation is poor.

Avoid electric shock accident. Wear rubber gloves when servicing and inspecting the battery.

Avoid static electricity. Do not clean the battery case with a duster or dry cloth.

Avoid sulfuric acid. The electrolyte is sulfuric acid and thus it might cause burns or blindness if it comes in contact with the skin, eye, or clothing.

If electrolyte comes in contact with your skin or clothing, wash it away using a copious amount of water immediately.

If electrolyte gets into your eyes, wash your eyes with a copious amount of water immediately and get medical attention.

⚠ WARNING

Cautions to be taken when charging batteries

In order to prevent an electric shock accident, be sure to ground the facility power source securely.

In order to prevent an electric shock accident, do not put your hand or anything inside the equipment; otherwise it will lead an accident if the power switch is ON or the battery receptacles are connected.

Charge in areas well ventilated and not exposed to rain water. Keep flammable materials away from the area.

It is recommended that the floor be covered with an acid–resistant material and be well drained, since there is a fear of acidic electrolyte spilling on the floor during charge.

Never smoke or use fire in the charging area especially at the termination of charging since explosive hydric gas is released from the battery while being charged.

The hood should be kept open while charging.

Do not disconnect the battery connectors while charging; otherwise sparks may be fired, leading to a fatal accident.

Swit ch over the input voltage switching taps according to the input voltage. Consult the battery manual for its operation. If the input voltage does not agree with the setting of the tap, a burned transformer or a short circuit due to deteriorated insulation might occur.

Keep the key switch turned OFF while charging, for safety's sake.

Use fuses and non–fuse circuit breaker with the specified capacity. Do not use the power supply together with other kinds of equipment. Failure to do so will cause a damaged

⚠ CAUTION

Make sure the electrolyte temperature is below 40℃ when starting charging. If not, wait until the temperature drops below 40℃.

If the electrolyte temperature exceeds 50℃ while charging, the battery service life will be shortened.

Do not try to charge the battery when the ambient temperature is extremely low. Charging in a cold storage or outdoors in a cold region will shorten the battery service life.

Frequent overcharges or equalizing charges causes the battery's electrolyte temperature to rise, and if the electrolyte temperature exceeds 50℃, the battery service life will be shortened.

Use a charger appropriate for each battery capacity.
Charging with an improper charger or using a charger for the other purposes will cause a trouble.

Do not disconnect the charger cable from the power source while charging. If the charger cable is disconnected by mistake, press the charge stop button without fail. The load handling or traveling circuit won't function unless this button is pressed.

If the LCD won't operate when the key switch is turned on after finishing the charge, press the charge stop button.

Use caution not to allow electrolyte splash over the truck body or electric components. If they are contaminated with electrolyte, contact your local TEU dealer.

DAILY CHARGE (NORMAL CHARGE) (EXB Option)

⚠ CAUTION

Charge the battery in a well ventilated place, free from rain drops, away from naked flames or fire.

After the day's work, or each shift or whenever the LCD meter unit shows the low battery voltage alarm or the battery charge indicatior drops to the level 3 or less, charge the battery in the following manner. If the battery has not discharged so much, the microprocessor will control the charging process properly.
The length of time required for charging varies with the battery capacity and the amount of discharge. As a rough standard, when the battery has discharged 75 to 100%, it will take 8 to 13 hours to charge the battery completely.

NOTE

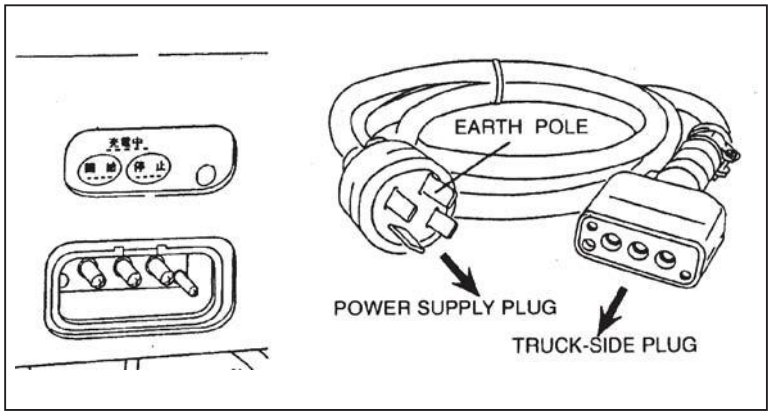
Note that the charge monitor does not necessarily show the accurate battery capacity and thus might not agree with the display level on the LCD meter unit.

⚠ WARNING

While charging is in progress or when the charging cables are connected, do not try to touch any of the internal electrical parts.
If you need to do so, make sure to stop the charger, remove the charger cables and disconnect the battery receptacles.

⚠ CAUTION

Make sure the plugs are securely inserted into their respective receptacles.



1)Turn off the key switch of the truck.
2)Make sure the line switch of the power supply is OFF.
3)Insert the truck–side plug of the charger cable into the truck–side receptacle.
4)Insert the power supply plug of the charger cable into the power supply receptacle.
5)Turn on the power supply switch.

6)Press the "Start" button on the charger control panel.
The "Charging in progress" lamp lights up and charging starts.
While charging, you can hear the transformer buzzing.
The truck–mount type charger won't start charging if the AC power supply is not turned on or battery receptacles are not connected.
7)When the battery is fully charged in 8 to 13 hours after the start of charging, the charger automatically stops operation and the "Charging in progress" lamp goes out.
8)After charging is completed, make sure the "Charging in progress" lamp on the charger control panel goes out. Turn the power supply switch off and remove the plugs of the charger.
9)Before trying to start the truck, make sure to measure the specific gravity of each cell of the battery.

Fluid temperature	Specific gravity
10℃	1.287
20℃	1.280
30℃	1.273
40℃	1.266

10)Do not remove the plugs while charging.
If you need to remove any plug while charging for any reason, follow the procedure below:
①Press the stop button.
②Turn the power supply switch OFF.
③Remove th plugs.

NOTE
When removing the plug, hold the plug body, not the cord; otherwise the wires may be broken.

EQUALIZING CHARGE (EXB Option)

The truck–mount type charger automatically gives an equalizing charge to the battery with the microprocessor. Therefore, there is usually no need for the operator to do anything. However, give an equalizing charge manually in any of the following cases.

The battery has been overdischarged.

Purified water has been added.

The discrepancy in specific gravity among cells is more than 0.02 (at the electrolyte temperature of 20℃).

Manual equalizing charge consists of normal charge plus super equalizing charge.

When performing manual equalizing charge, give normal charge to the battery and then give super equalizing charge by pressing the "Super equalizing charge" button

While super equalizing charge is in progress, the "Charging in progress" lamp and "Super equalizing charge" lamp on the charger control panel stay on.

AUXILIAR CHARGE (EXB Option)

If the residual capacity on the LCD meter unit shows level 3 or less after the day's work or each shift, give the battery an auxiliary charge during a break. The procedure for giving a cycle charge is the same as the normal charge.

If you want to stop an auxiliary charge, make sure to press the "Stop" button, turn the power supply switch off and then remove the charger cables.

SUPER EQUALIZING CHARGE (EXB Option)

Super equalizing charge is composed of ordinary equalizing charge and automatic auxiliary charge. Since auxiliary charge is automatically carried out every 24 hours after an equalizing charge is carried out, you don't need to worry about a low battery voltage even after the track is not used for several days.

Super equalizing charge can be carried out by pressing the "Super equalizing charge" button after normal charge is completed.

The "Super equalizing charge" lamp does not go out even after charging is automatically completed ("Charging in progress" lamp goes out). Turn off the lamp in the following manner:

When the "Charging in progress" lamp is on, press the "Stop" button.

When the "Charging in progress" lamp is off, press the "super equalizing charge" button or turn the key switch on.

NOTE

Frequent full–discharges of the battery will shorten the battery service life. If your task requires full discharge of the battery frequently, it is advisable to use a high–capacity battery or have a spare battery.

Lamp blinking while charging

If the "Charging in progress" lamp on the control panel is blinking, it indicates that charging has not been completed successfully.

The 2nd timer of the charger functions and charging is forcefully discontinued in 15 to 17 hours.

The electric power failure lasts for more than 120 hours while charging.

NOTE

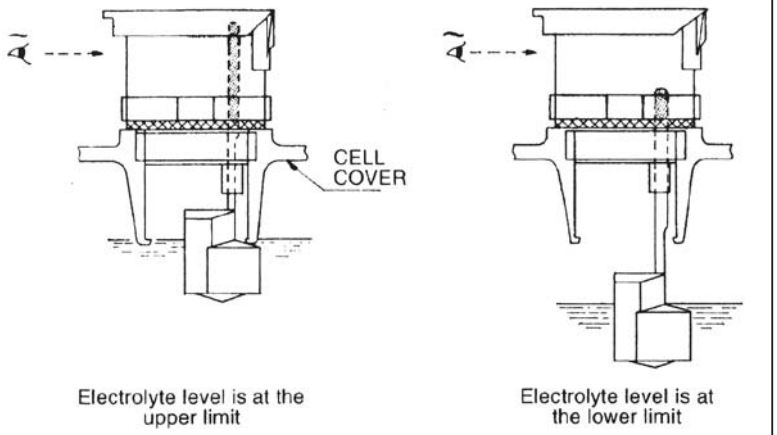
While the "Charging in progress" lamp is blinking, no charging is performed. It is necessary to check the cause of trouble and fix it. For the procedure for troubleshooting, consult your local TEU dealer.

CHECKING ELECTROLYTE LEVEL

⚠ WARNING

If the battery is used for a long time or charging is performed with the electrolyte level below the LOWER LEVEL, the pole plates will get deteriorated and in the worst case the battery might explode.

Do not use open flame for checking the electrolyte level; otherwise there is a fear of ignition or explosion.



Check the red float support rod in the cell plug to see if the electrolyte level is at the upper limit.

PROCEDURE FOR ADDING WATER

⚠ CAUTION

Overfilling purified water will cause electrical leakage of the battery.

Do not exceed the specified upper limit.

Open the cap of each cell plug and pour purified water through a funnel into the cell. Stop adding water when the red ring reaches the top position. After adding water, close the cell plug cap until it clicks.

Centralized water fill unit (option)

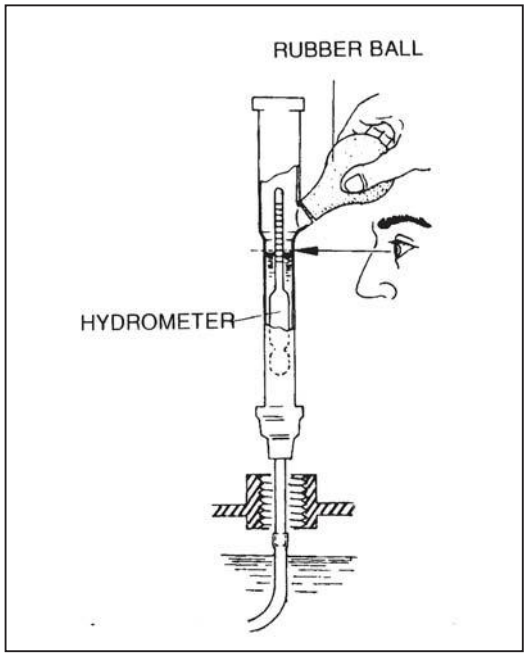
Remove the centralized water fill port cap and pour purified water using the purified water tank. Stop adding water when the red float rod reaches the top position. After adding water, do not leave the cock of the purified water tank open for more than 30 seconds.1

CONVERSION OF SPECIFIC GRAVITY AT VARIOUS TEMPERATURES

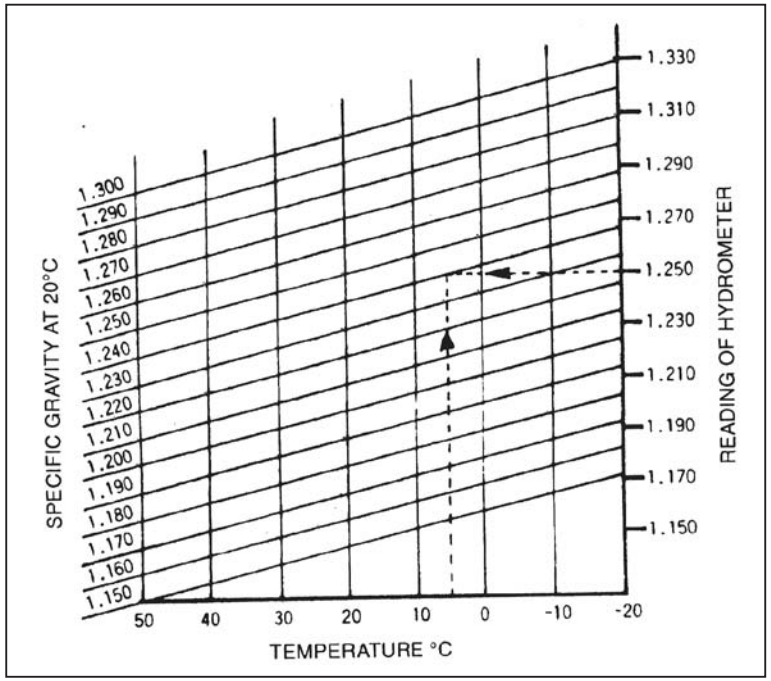
The specific gravity of battery electrolyte varies with the temperature. To know the correct specific gravity of the electrolyte, you should measure the electrolyte temperature, too, and convert the measured specific gravity into the value at the standard temperature, using the conversion table.

The standard specific gravity of the electrolyte in a fully charged battery is 1.280 at the standard temperature of 20℃.

How to read hydrometer



CONVERSION TABLE



Example:

Suppose the electrolyte temperature is 5℃ and the hydrometer reads 1.250. When converted into the specific gravity at 20℃, the figure is 1.240,0.040 lower than the standard value. Normal charge is needed.

PICK–UP

⚠ CAUTION

The fork spacing should be usually adjusted for more than 1/2 and less than 3/4 of the pallet width.

1)The fork spacing should be as wide as possible to maintain proper balance of the load.
2)Place the truck right in front of the load to be handled.
3)The pallet should be positioned parallel with both forks.
4)Insert the forks into the pallet as far as possible.
5)To raise the load from the ground:
①Once lift the forks 1.9 to 3.9 in off the ground or floor surface, and make sure the load is stable.
②After making sure the load is stable and evenly positioned on the forks, tilt back the mast fully and lift the forks up to 5.9 to 7.8 in off the ground or floor surface. Start running.
6)When handling a bulky load which restricts your vision, drive the truck in reverse or sideways.

STACKING

⚠ CAUTION

Never tilt the mast forward with the load upreised except when the forks are over the rack or a stack.
Do not leave the truck with the load upraised.

1)When approaching the deposit area, slow down your truck.
2)Stop the truck before the area where your load is to be deposited.
3)Confirm the safety of the deposit position.
4)Tilt the mast forward until the forks become horizontal.
5)Raise the forks until they are a little higher than the deposit position.
6)Move forward slowly to place the load directly over the desired area and stop the truck.
7)Make sure the load is just over the desired area. Slowly lower the load into position. Make sure the load is securely stacked.
8)Disengage the forks from the pallet or load using necessary lift–tilt operation, and then back away.
9)After making sure the fork tips leave the pallet or load, lower the forks to the basic traveling position (5.9 to 7.8 in off the ground or floor surface).
10)Tilt back the mast.

UNSTACKING

1)When approaching the area where the load is to be retrieved, slow down the truck.

2)Stop the truck right in front of the load where the distance between the fork tips and the load is about 11.8 in.

3)Check the condition of the stack.

4)Tilt the mast forward until the forks become horizontal and lift up to the position of the pallt or skid.

5)Make sure the forks are positioned properly for the pallet. Move forward slowly to insert the forks into the pallet as far as possible. Stop the truck.

* If the forks are hard to be fully inserted, use the following procedure:

①Move forward to insert 3/4 of the forks. Raise the forks 1.9 to 3.9 in , back away 3.9 to 7.8 in with the pallet or skid on the forks. Lower the pallet or skid on the stack.

②Move forward again to insert the forks into the pallet fully.

6)Raise the forks 1.9 to 3.9 inoff the stack.

7)Confirm the safety behind the truck and back away slowly to the position where the load can be put safely.

8)Slowly lower the load to a height of 5.9 to 7.8 in above the ground or floor surface. Tilt back the mast fully and move th the desired area.

BEFORE STORING

⚠ CAUTION

If any time your lift truck is found to be in need of repair, defective or unsafe, the condition should be reported to the supervisor, and the truck should be taken out of service until it has been restored to safe operating condition.

Before storing the lift truck, clean it thoroughly and perform inspection using the following procedure:

Wipe away grease, oil etc., adhering to the body of the truck with shop rag. Use water, if needed.

While washing the truck, check the general condition of the truck. Especially check the truck body for dents or cracks, the tires for wear or nails or stones in the tread.

Check for leakage of hydraulic oil.

Apply grease, where needed.

Check for looseness of the hub nuts and cylinder piston rod joints.

Check the mast rollers to see that they rotate smoothly.

Lift the forks up to the top position and lower to the lower limit. Repeat this procedure to prime oil into the lift cylinders.

DAILY STORAGE

Park the truck at a specified place and block the wheels.

Place the F/R lever in neutral "N" and pull the brake lever fully.

Remove the starter key and keep it in a safe place.

LONG–TERM STORAGE

Perform the following checks in addition to "BEFORE STORING" and "DAILY STORAGE" operations.

Taking the rainy season into consideration, park the truck at a higher and hard ground.

Remove the battery from the truck.

Even though the truck is parked indoors, if the place is hot or humid, the battery should be kept in a dry, cool place, and charged once a month.

Apply anti–rust to the exposed parts such as cylinder rods and shafts that tend to rust.

Cover components which may be caught with humidity, such as the air breather and air cleaner.

Put the truck in the operating state once a week and turn the key switch on. Warm it up sufficiently before moving the truck a little back and forth.

Avoid parking on a soft ground such as an asphalt ground in summer.

OPERATING AFTER LONG–TERM STORAGE

Remove covers used to seal off moisture.

Remove antirust from the exposed parts.

Drain foreign matter and water from the hydraulic oil tank.

Charge the battery and mount it on the truck. Connect the cables.

Perform preoperational checks carefully.

PROHIBITION OF WASHING TRUCK BODY AND BATTERY WITH WATER

In general, do not wash the truck body or battery with water using a hose or steam cleaner. The tires may be washed with water, but floor board should be removed from the truck body before washing. While washing, use caution not to splash water over the accelerator unit. If possible, remove the accelerator unit.

If water is splashed over the battery, water or foreign matter might enter through the cap, leading to a short battery service life. In addition, the electrolyte might spill to cause environmental pollution. Wipe any dirty battery case with a wet shop rag and dry it completely by blowing air. If necessary, leave it to a specialist.
If the battery case needs to be cleaned, dismount it from the truck. After cleaning, the battery must be dried completely before mounted again on the truck.

Do not clean the following electrical components with water

Controller and contactors
Motors (drive, pump)
Transformer (in the side cover)
Charger control panel (in the hood)
Battery unit and receptacles
Meter panel box
Accelerator unit (under floorboard)

CLEANING

Pull the parking brake lever fully to stop the truck.
Turn the key switch OFF and disconnect the battery receptacles.

AFTER CLEANING

Use compressed air to blow away drops of water and make sure the washed areas are completed dry.

When operating the truck for the first time after cleaning, perform a trial run and make sure the truck operates without any problem.

Item	Washing with water	Remarks
Frame surfaces, mast, forks, tires and rear axle	Allowed	Use caution not to splash water on unwashable components.
Counterweight	Allowed	Use caution not to splash water on the cover joints of the battery inside the rear cover.
Inner surfaces of side cover	Allowed	Use caution not to wet the components inside covers.
Floorboard and floorboard mat	Not allowed	Do not wash with water because the motors are located under the floorboard. Clean them by blowing air. If severely contaminated, remove them and clean with water. Make sure they are completely dry before reinstalling.
Battery hood and battery case	Not allowed	Clean them by blowing air or wiping with wet shop rag.
Meter panel box and steering wheel	Not allowed	Ditto
Motors	Not allowed	Ditto

The following symbols, found throughout this manual, alert you to potentially hazardous conditions to the owner and the operator. Become completely familiar with the truck before proceeding with operating, checking and servicing.

This manual and decals affixed to the truck use the following safety alert indications.

SIGNAL WORD	CLASSIFICATION
⚠ DANGER	Failure to follow the instructions in the message will likely cause a serious accident or death.
⚠ WARNING	Failure to follow the instructions in the message might cause a serious accident or death.
⚠ CAUTION	Failure to follow the instructions in the message may cause personal injury or damage to the truck or other property.
NOTE	The information will help to prolong the service life of the truck. The message is not directly related to accident prevention.

4. MAINTENANCE

CONTENTS

PREOPERATIONAL CHECKS..... 4 – 1
CAUTION IN CHECKING ..... 4 – 1
ITEMS TO BE CHECKED..... 4 – 3
PERIODICAL CHECK..... 4 – 11
PERIODICAL REPLACEMENT OF SECURITY PARTS..... 4 – 11
WEEKLY (50 OPERATION HOURS) CHECKS..... 4 – 12
MONTHLY (200 OPERATING HOURS) CHECKS..... 4 – 13
3 MONTHS (600 OPERATING HOURS) CHECKS..... 4 – 17
6 MONTHS (1200 OPERATING HOURS) CHECKS.... 4 – 18
ANNUAL (2400 OPERATING HOURS) CHECKS..... 4 – 19
PERIODICAL CHECK SCHEDULE..... 4 – 20

To ensure the safety in operation and performance of the lift truck, be sure to check the following daily before starting the operation.

⚠ CAUTION

If any abnormality is found in preoperational checks, hang a sign of DO NOT OPERATE on the control area, remove the start key, and report the condition to the supervisor. The operation should be halted until the truck is completely repaired.

Check for oil leaks as it may cause a fire.

Waste fluid due to lubricant changes should not be thrown away (into sewage, earth, or incinerater, etc.). It will cause water, soil, and air pollution and the responsible personnel will be punished by law.

CAUTION IN CHECKING

Use EKKO genuine parts only.

Use EKKO genuineor recommended lubricants only.

Clean the oil fillers and grease fittings using a brush or cloth before supplying oil or greasing.

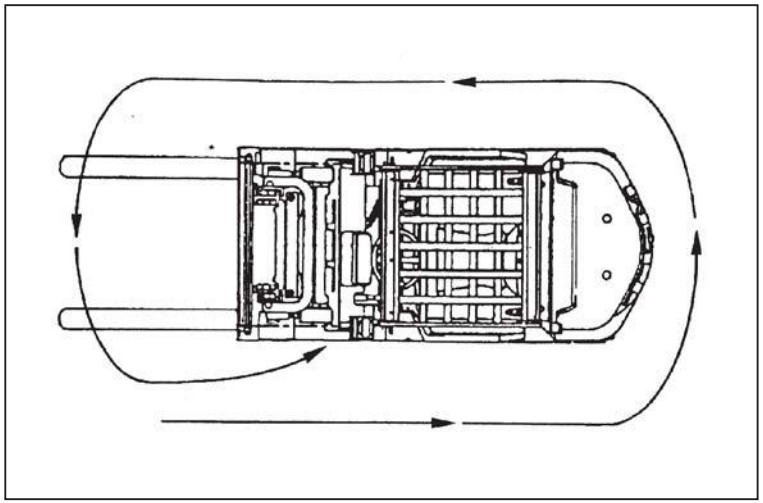
Oil level check and supply should be performed with the truck parked on the level surface.

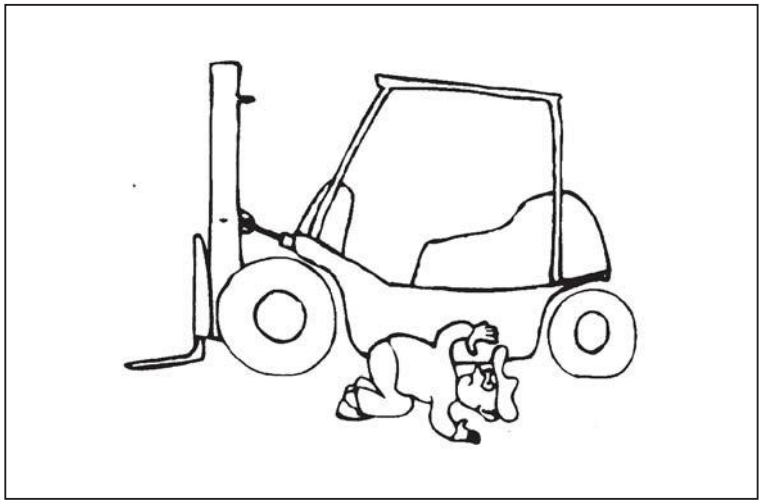
Preventive maintenance services should be done in an orderly manner with utmost care to prevent personal injury.

Make sure to remove the battery receptacle before checking electrical equipment.

If an inspection should be carried out under the raised forks, fix them by placing stable supports between the fork mast inner frame and the ground to prevent the forks from falling down.

Any time the truck or controls are found to malfunction, stop the operation of the truck immediately and report the condition to the supervisor. Never operate a fault truck.





■General condition

Check the truck body for dents, cracks, and tires for wear or nails caught in the tread.

■State of the truck

Check the inclination of the truck. If the truck is tilted to either side, it suggests that the tires or wheels are defective. Contact your local TUE dealer.

■Oil and water leaks

Check for oil and water leaks under the truck. If there is a pool of oil or water on the ground or floor, contact your local TUE dealer.

ITEMS TO BE CHECKED

1 DEFECTS FOUND IN PREVIOUS CHECKING

⚠ CAUTION

Never try to operate a faulty truck.

Check to see if any defects found in the previous checking have been repaired properly.

2 TIRE CONDITION CHECK

⚠ CAUTION

Tires of the lift truck have high inflation pressure. Make sure tires and rims are normal and set the inflation pressure to the standard level. Do not overinflate tires. When inflating tires with an air compressor, first adjust the compressor air pressure. Failure to do so will cause a serious accident since the compressor delivers the maximum pressure.

A small bend of the rim or a slightly damaged tire might cause a flat tire, leading to a serious accident. If you find any

Keep the inflation pressure of the tires always at a proper level.

NOTE

Low air pressure shortens the service life of tires, Unevenness of air pressure between right and left tires will cause hard steering or the truck to wander.



The standard tire pressure is indicated on the decal on the left side of the front guard.

Unit kPa (kg/cm^2)

	Front wheel, single	Front wheel double	Rear wheel
FB15,18	850(8.5)	700(7.0)	850(8.5)
FB20,25	1000(10.0)	850(8.5)	900(9.0)

Turn the tire valve cap counterclockwise and remove it. Measure the inflation pressure with the tire pressure gauge, and adjust it to the standard level.

Then, check that there is no air leakage from the tire valve before replacing the cap.

Check that tires are not damaged on the tread surface or side wall, or the rim is not bent.

The lift truck needs tires with high inflation pressure to carry heavy loads.

HUB NUT CHECK

⚠ CAUTION

A loose hub nut can be dangerous: the wheel may come off the truck, causing the truck to tip over.

Check that the hub nuts (A) are not loose. All nuts should be tightened with the specified torque.

■HUB NUT TIGHTENING TORQUE

Model	Front wheel		Rear wheel	
	Tire size	Hub nut N–m (kg–m)	Tire size	Hub nut N–m (kg–m)
FB15,18	(Single) 6.00–9–10PR	223–267 (22.7–27.2)	16x6–8–10PR	127–190 (13–19.4)
	(Double) 4.50–8–12PR	(Inner nuts Outer nuts) 223–267 (22.7–27.2)		
FB20,25	(Single) 21x9–16PR	223–267 (22.7–27.2)	18x7–8–14PR	
	(Double) 6.00–9–10PR	(Inner nuts Outer nuts) 223–267 (22.7–27.2)		

The Order of Tightening Double Nuts

On the hub nuts for the double nuts, fix the inside tire's rims with the inner nuts (inside, square head) and then fix the outside tire's rims with the outer nuts (outside, hexagonal heads). Tighten the square–headed inner nuts diagonally to the specified torque and then tighten the hex–headed outer nuts to the same torque.

⚠ CAUTION

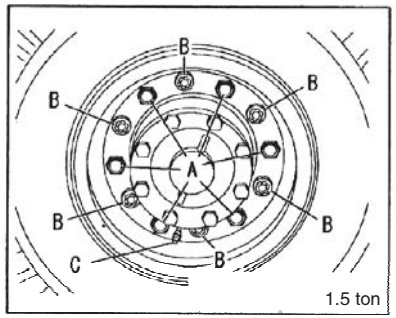
Do not use tires with loose two–piece rim connecting bolts

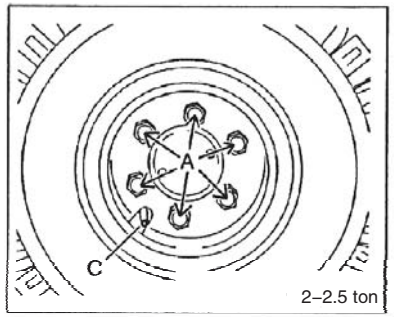
The rear tires use two–piece rims which are composed of inner and outer rims connected with bolts (B). Make sure to check the rear tires for loose bolts of the two–piece rims before starting the truck. Do not operate the truck with loose rim bolts.

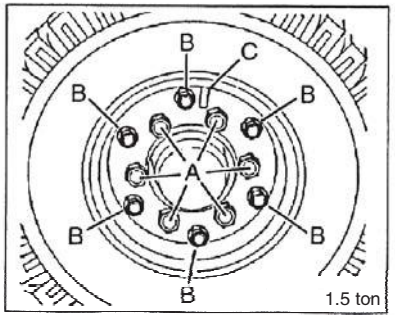
If any loose rim bolt is found, remove the core from the air valve (C) and deflate the tire completely and remove the tire from the truck body.

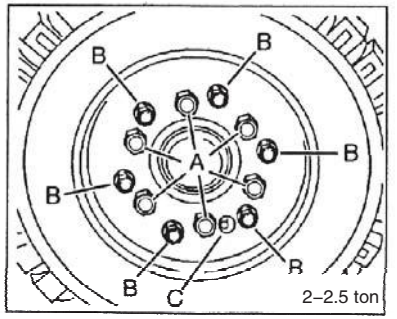
A special tool is required for loosening or tightening the bolts of two–piece rims.

In addition, retightening of the connecting bolts, the disassembly and reassembly of the tires and rims, and the inflating of the tires are dangerous. Leave such a work to a specialist.





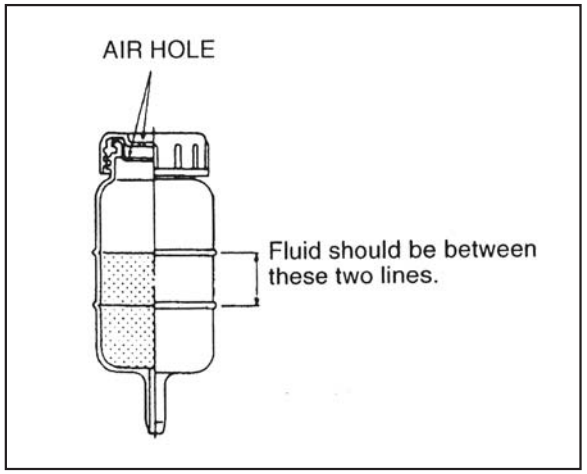




3 OVERHEAD GUARD

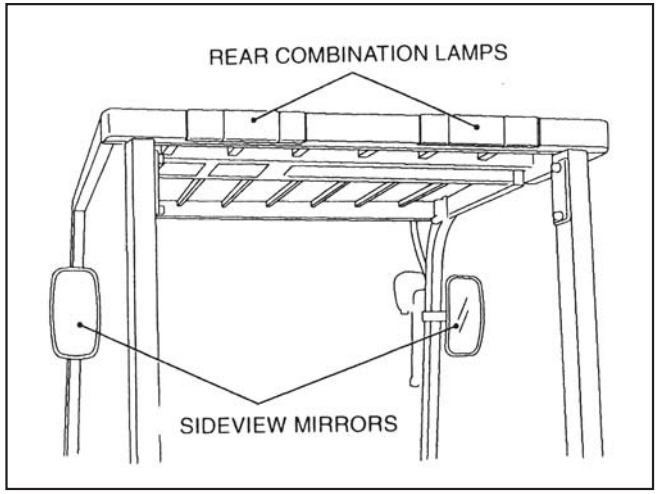
Check the overhead guard for loose bolts or nuts or damage.

4 BRAKE FLUID



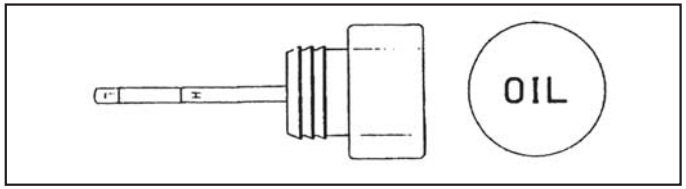
The level of the brake fluid can be checked from outside without removing the cap of the reserve tank.
Check that the fluid is filled to the specified level.

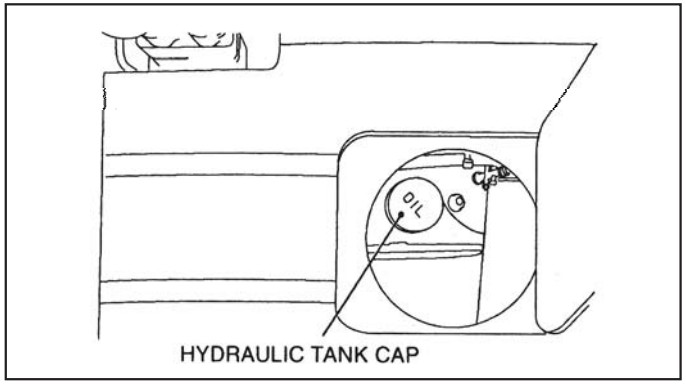
5 REAR COMBINATION LAMPS



Make sure that the lens of the rear combination lamps (tail lamp, brake lamp, backup light, rear reflector) are not broken or dirty.

6 HYDRAULIC OIL LEVEL





Check the hydraulic oil level with a level gauge.
Open the check cover under the floor mat, remove the tank cap, and clean the level gauge with a clean cloth. Then insert the level gauge and pull it out gently to read the maximum oil level.
It is good if the oil is up to the upper line on the gauge. If it is below the lower line, suppl oil.

NOTE

Too much oil will cause oil leak.

If the oil level is above the upper line, drain to reduce it to the proper level.

Check the hydraulic oil level with the truck parked on the level surface, the mast vertical and the forks on the ground surface.

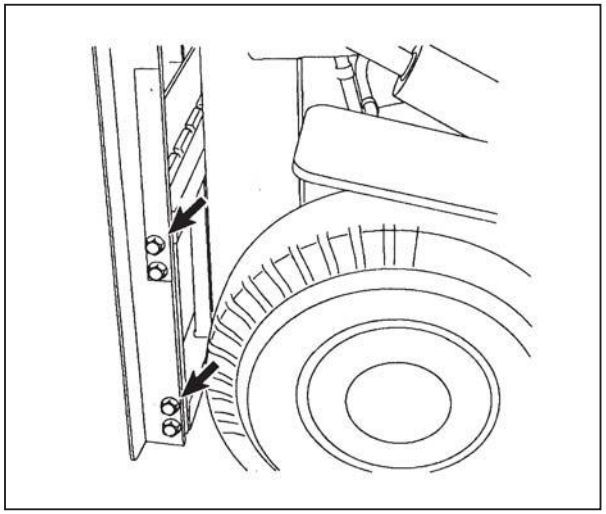
7 HYDRAULIC OIL PIPING AND CYLINDERS

Check that oil is not leaking from the hydraulic oil piping and cylinders (lift, tilt).

8 LOAD BACKREST

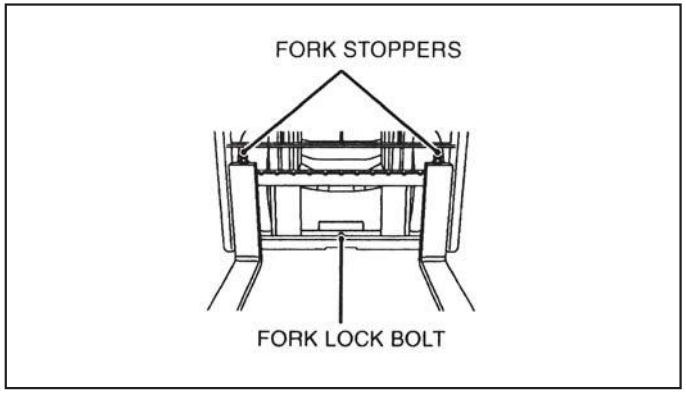
CAUTION

Do not modify or remove the load backrest.
The operator may get injured by a falling load.
The forks may come off the carriage.



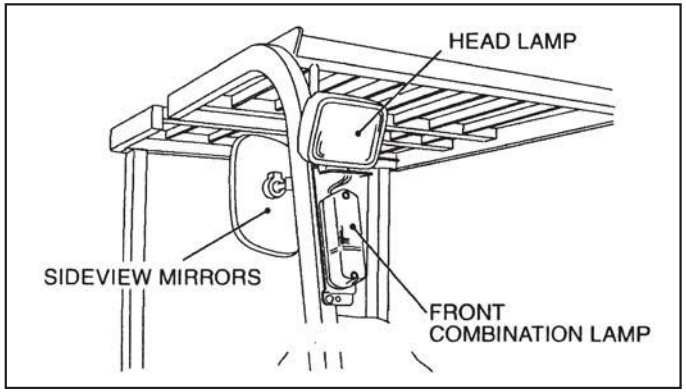
Check that the load backrest is not damaged or mounting bolts (4 on the right and left) are not loose or missing.

9 FORKS, FORK STOPPERS, AND FORKS LOCK BOLT



Check that the fork stoppers are properly engaged, the forks are not bent or cracked, and the fork lock bolt is not loose.

10 HEAD LAMP AND FRONT COMBINATION LAMP



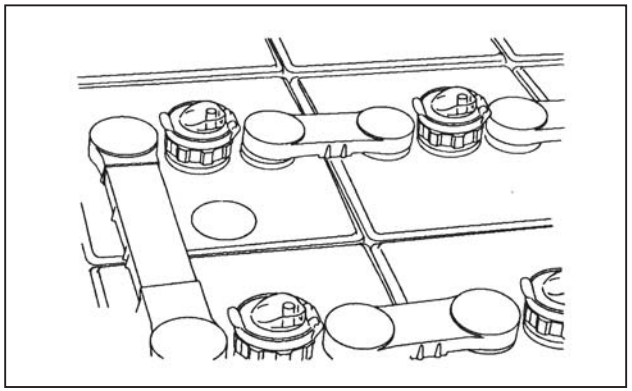
Check that the lens on the head lamp is not damaged or dirty.
Check also the front combination lamp in the same manner.

11 BATTERY ELECTROLYTE LEVEL

⚠ CAUTION

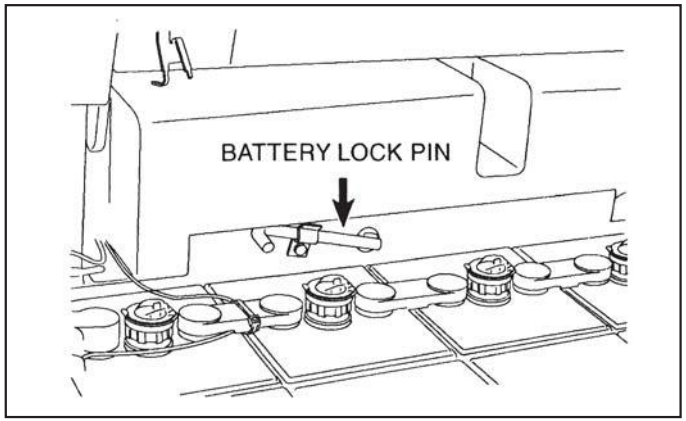
Do not use or charge the battery with the electrolyte below LOWER LEVEL; otherwise, the plate will deteriorate faster, which may cause battery explosion.

Never use naked flame source to check the battery electrolyte level. It may ignite or explode.



Check the battery electrolyte level.
Look in the battery plug to confirm that the level mark is visible.

12 BATTERY STOPPER



Make sure that the battery stopper is not loose.

Close the hood

⚠ CAUTION

Use due caution not to get your fingers pinched when closing the hood.

Use caution not to get your fingers pinched between the hood and the truck body when closing the hood.

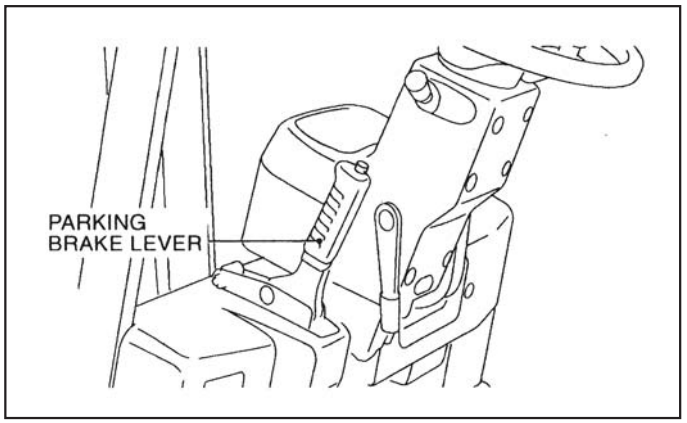
13 ADJUSTING DRIVER'S SEAT AND STEERING COLUMN ANGLE

Get on the truck and adjust the driver's seat to the position which provides easy access to foot and hand controls. Also make sure that you can operate the steering wheel smoothly.
After adjusting the seat position and steering column angle, lock

14 SIDEVIEW MIRROR

Check that the sideview mirrors are not dirty or damaged.
Adjust the mirror in the driver's seat to gain full rearview when you are seated.

15 PARKING BRAKE OPERATION



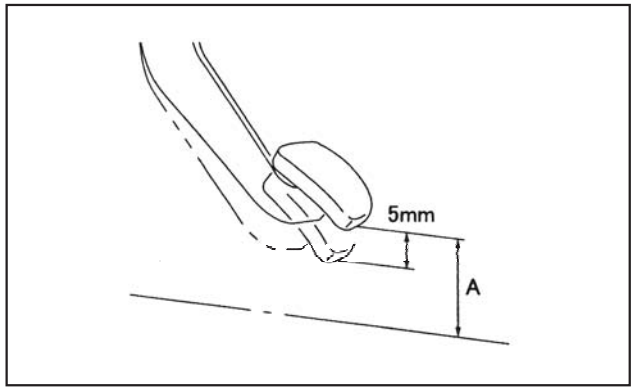
Make sure that the brake works properly.
The brake must be properly applied when you pull the lever fully toward you.

Turn the key switch ON

16 LOAD HANDLING LEVERS

Check that the load handling levers (lift, tilt, and attachment) are not loose and can be operated smoothly.

21 BRAKE PEDALS



Step on the brake pedal to check that it moves smoothly. Remove your foot from the pedal to see if it returns to its original position.
Play of the brake pedal is 0.19in

A: Height of the brake pedal from the floor.....3.5in

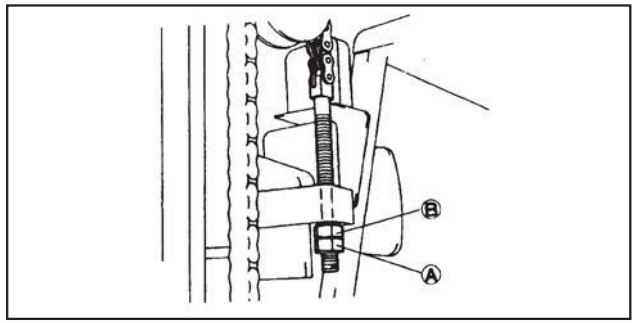
22 MAST OPERATION

Operate each of the lift and tilt levers two or three times to check that the forks and mast operate smoothly without squeaking, and that they are not loose.
(If the truck is equipped with a hydraulic attachment, check it and its control lever as well.)

NOTE

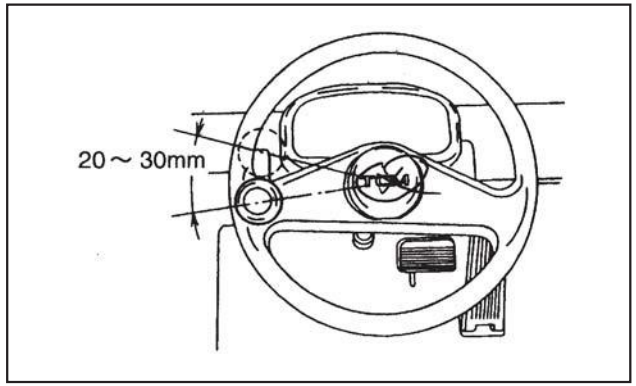
WARMING UP CYLINDERS
Before starting the work, warm up the cylinders. This lubricates packing and seals in the cylinders to make them ready for operation.

23 LIFT CHAIN TENSION



Raise the forks 1.9 in off the ground or floor surface and check that the right and left lift chains have the same tension.
If the tension is not even, adjust it with the chain anchor bolt. After adjustment, securely tighten the lock nut.

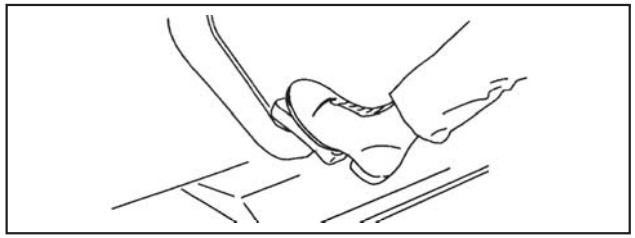
24 STEERING WHEEL



Turn the steering wheel counterclockwise and clockwise to check that the play is within the range of 0. 7–1.1 i n .
Check also that it does not move vertically.

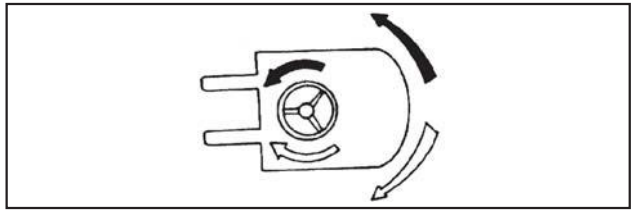
Run the truck at a low speed (in a safe place)

25 BRAKE TEST



Run the truck slowly and press the brake pedal to check that the truck is braked properly.
Make sure that the brake lamps are lit when the brake pedal is stepped on.

26 STEERING WHEEL TEST



Run the truck at a low speed and slightly turn the steering wheel to the right and left to check that the truck is steered smoothly without problem.

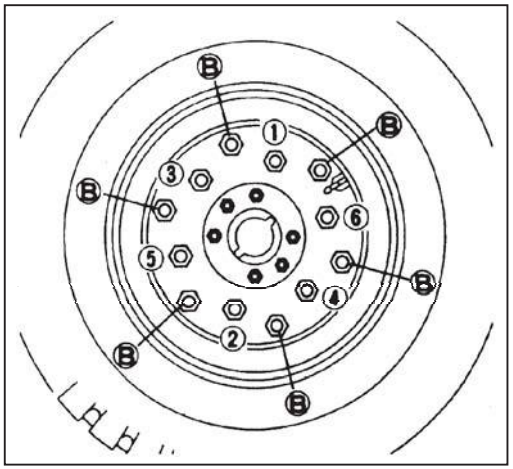
27 PARKING BRAKE TEST

Check that the truck is stopped when the parking brake lever is pulled and that it stays in the same position after stopped.

28 BACKUP LIGHT

Check that the backup light turns on when the change lever is shifted to the backward gear.

REPLACING TIRES AND REPAIRING FLAT TIRE



Get tools and jack necessary for replacing tires.

Front wheel

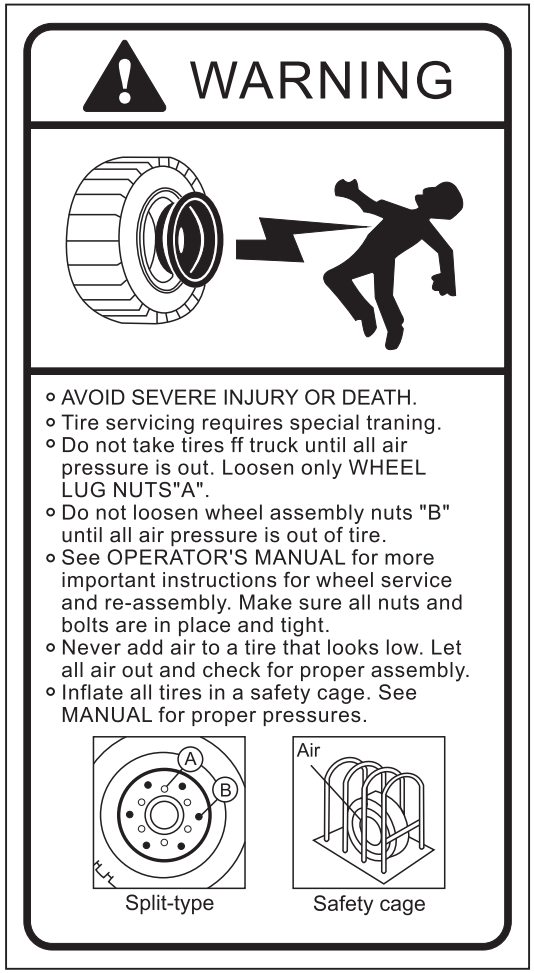
⚠ CAUTION

When removing a tire from the truck, remove air from the tire completely and then remove the hub nuts.

1)Park the truck on a level, hard surface and turn off the key switch. Do not have any load on the forks.
2)Apply the parking brake and block the wheels. Put a jack under the truck frame.
3)Jack up the truck to an extent that the tire still remains on the ground. Loosen the hub nuts (①–⑥). Do not remove them yet.
4)Jack up the truck until the tire leaves off the ground. Remove the hub nuts.
5)Remove the tire from the hub.
6)When reinstalling the tire, use the reverse order of removal.
Tighten the hub nuts in a diagonal order and evenly.
Hub nut tightening torque: See page 4–4.
After installing the tire to the truck, adjust the inflation pressure to the standard inflation pressure, if needed.

Rear wheel

Proceed in the same manner as with the front wheel tire, except that the position of the jack goes under the counterweight.
Hub nut tightening torque: See page 4–4.



Remove a tire from the rim

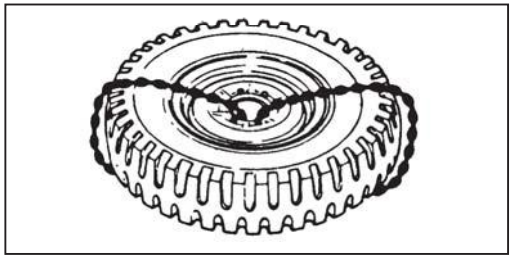
⚠ CAUTION

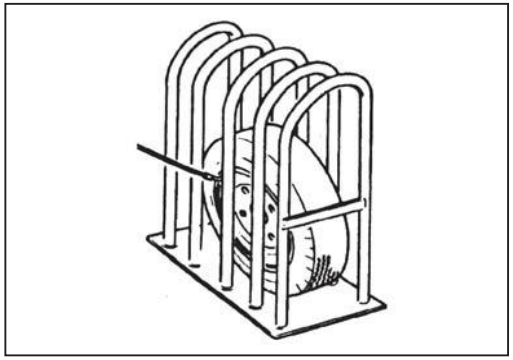
Before removing a tire from the rim, remove the valve core to release the air pressure from the tire completely. In the case of the split type rim, remove air from the tire before loosening the split rim connecting bolt (B); in the case of the side ring type rim, remove air from the tire before removing the side ring (lick ring).

The assembling of a tire, tube, rim, and flap and inflating of a tire which has been removed from the truck should be done only by qualified personnel. The lift truck uses tires which have an inflation pressure far higher than those of general passenger cars. The use of improper parts or work procedure will cause a serious accident. Tires should be inflated with them attached to the truck or by putting in a safety cage, even if you are qualified to inflate tires.

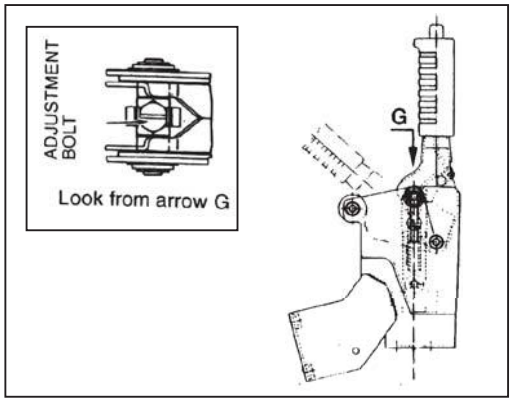
The split rim connecting bolts must be tightened to the specified torque using the special tool, with the tire inflation pressure removed completely.

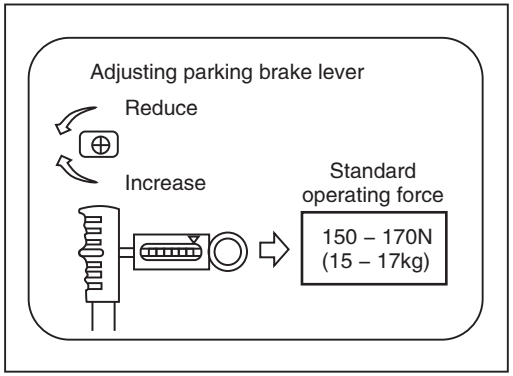
Install the split rim on the truck with the rim connecting bolt head pointing





ADJUSTING OPERATING FORCE OF PARKING BRAKE





ADJUSTMENT

1)Engage the spring scale to the parking brake lever as shown above and measure the force required to operate the lever.

Standard operating force: 150–170N (15–17 kg).

2)If the measurement is not within the range of the standard operating force, turn the adjustment bolt with a screwdriver to adjust the operating force of the lever.

Reduce by turning the bolt counterclockwise.

Increase by turning the bolt clockwise.

3)The cable of a new truck tends to elongate. It is advisable to adjust it sometimes after the day's work or each shift.

⚠ CAUTION

Be sure to read INSPECTION AND MAINTENANCE in this manual before checking or servicing the truck.

Periodical checks are required to keep your truck in a safe and good condition.

Continual use of a damaged or abnormal truck may cause a serious accident. Even if it appecars to be in a good condition, do not leave it as it is. Early discovery of trouble which may cause breakdown or poor performance will greatly improve the working efficiency and operability, prolong its service life, and lower the maintenance cost.

Preoperational checks, supply of oil and grease, and cleaning of filter elements should be carried out by the customer, and other complicated checks should be carried out by the customer, and other complicated checks should be left to your TUE dealer. If checking or servicing is performed without enough knowledge, special tools or equipment, personal injury may occur.

Every one month of operation is calculated as 200 operating hours in this manual.

PERIODICAL REPLACEMENT OF SECURITY

	Name of Safety Parts	Recommended replace–ment interval (years)
1	Cups and dust seals of master cylinder and wheel cylinders	1
2	Power steering hose	2
3	Reserve tank tubing	2 – 4
4	Steering actuator rubber boots	2
5	Lift chain	2 – 4
6	Load handling means hoses	1 – 2

In order to perform safe operation, the importance of preventive maintenance of the truck cannot be too emphasized. Especially the parts listed in the table below must be replaced periodically since they are the most important parts for security of the truck and the operator.

Moreover, these security parts are liable to be damaged and deteriorated in the course of time, and it is difficult to determine by ordinary maintenance whether they are beyond their respective service limits or not. The security parts must be replaced with new ones when their respective service limits have been reached, even if they appear to be good.

Any time abnormalities are found, these parts should be replaced even during the replacement term.

NOTE

Replacement of security parts, however, is not subject to warranty claim.

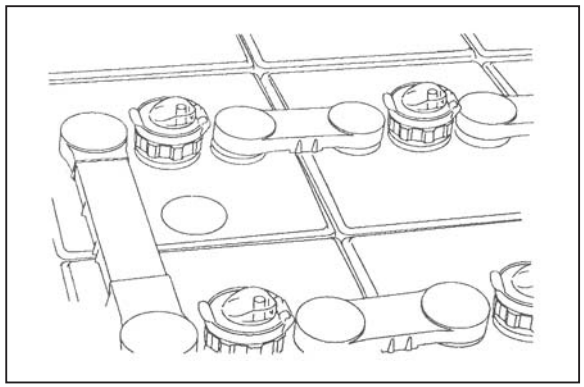
WEEKLY (50 OPERATING HOURS) CHECKS

Check the following items in addition to preoperational checks.

Preoperational and weekly checks should be performed by the user of the EKKO battery type tr uc k

Check the truck thoroughly to ensure safe and comfortable operation.

Items to be checked
Cleaning the battery Measurement and adjustment of the battery's specific gravity and the temperature of electrolyte



■ CLEANING THE BATTERY

⚠ CAUTION

Do not clean the battery with dry with dry or chemical cloth as it may cause static electricity and explosion. Always use damp cloth for cleaning.

The top surface and joints of the battery must be kept clean and dry. Tighten the plugs securely.

MONTHLY (200 OPERATING HOURS) CHECKS

Check the following items in addition to preoperational and weekly (50 operating hours) checks.

Adjustment and replacement of components and parts listed as monthly check items are difficult and need sufficient technical knowledge and special tools.

Items to be checked
Battery – Equalizing charge
Battery receptacles – Damage and looseness
Wiring – Damage and discoloration
Contactors – Rough surface of contact points
Controller – Cleaning and loose connections
Battery charger – Proper operation
Fuses – Rated capacity and proper installation
Front axle – oil leaks
Front axle mount bolts – looseness (first time only)
Tires – Tread depth and foreign matter in tread
Front and rear axles – Deformation, cracks and damage
Steering gear box – Loose mounting bolts
Rod, arm and king pin – Looseness, bending, and damage
Rear axle – Proper installation
Brake piping – Mixing of air
Brake system – Operation and looseness of rod and cable
Brake piping – Damage, oil leaks, interference with other parts, and looseness.
Brake fluid – Leakage
Brake drum – Loose mounting
Forks – Cracks and wear
Mast – Cracks and damage
Mast support – Cap bolts (first time only)
(View Mast) – Looseness of lift cylinder tail lock bolts, piston rod head mounting bolts, cylinder U–bolts, piston head guide mounting bolts (first time only)
Lift bracket – Cracks and damage
Loading system rollers – Loose rollers and cracked or damage roller pins
Lift chains and anchor pins – Looseness
Lift chains – Elongation, lubrication, and tension
Pumps – Operation and oil leaks
Valves – Looseness of control levers
Valve control lever micro – switch – Operation and damage
Control valve – Operation of relief valve and tilt – lock valve
Hydraulic oil piping – Oil leaks and damage

Items to be checked
Sheaves – Operation, damage and looseness
Rollers (end, side and retaining) – Operation, looseness and amage
Cylinders (lift and tilt) – Operation and oil leaks
Attachments – General condition and installation
Major bolts and nuts – Retightening (new loaders only)
Chassis – Lubrication

■ LUBRICATING LIFT CHAIN

Apply engine oil to the lift chains using a lubricator or brush. To allow oil to enter between each pin and link plate of the lift chain, observe the following conditions:

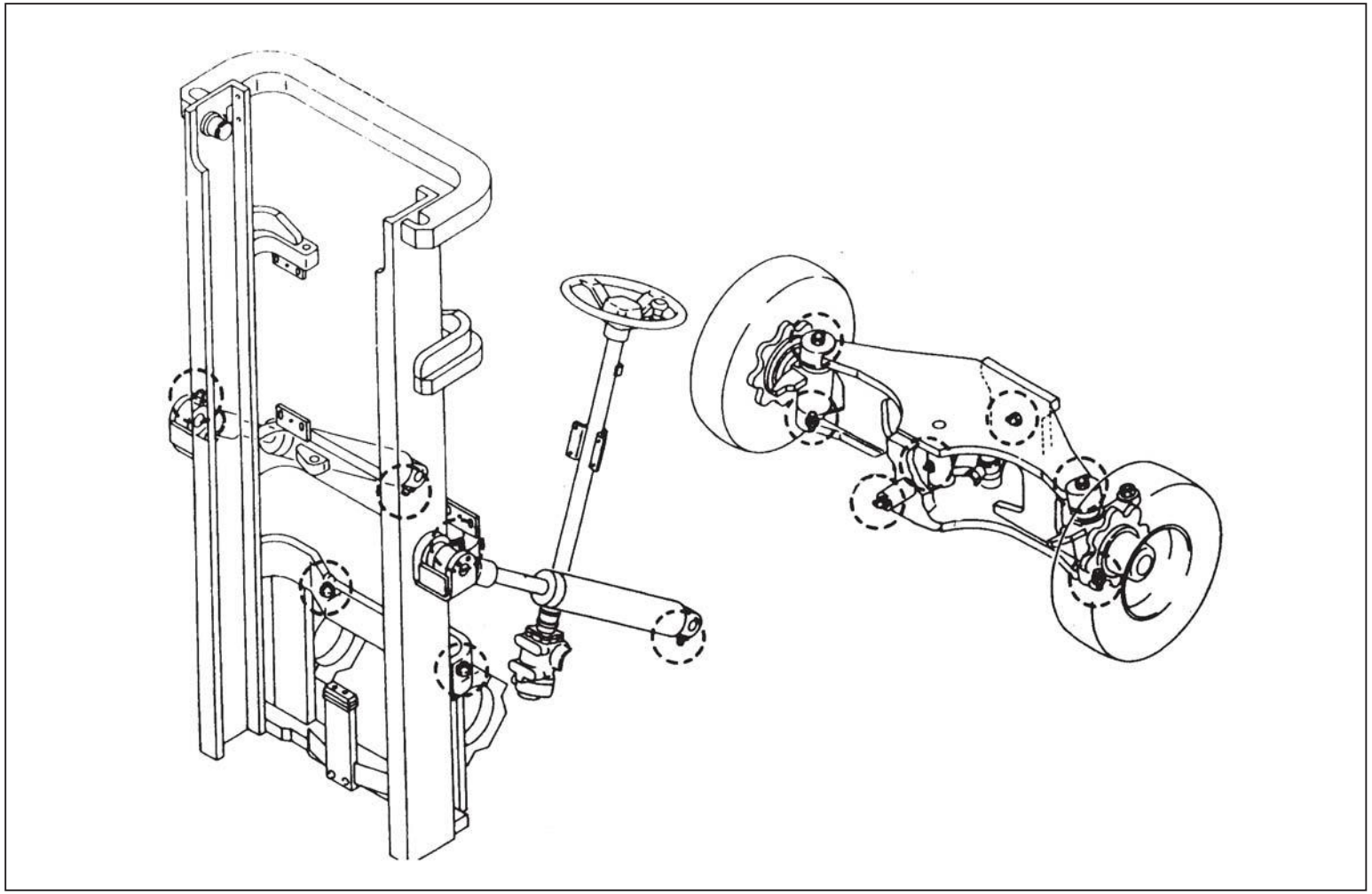
1)Loosen the chain sufficiently.

2)After applying engine oil, move the mast up and down fully at least 10 times.

NOTE

If your lift truck is used near a port or coastal area, the lift chains might be damaged by salty breeze. After a storm or typhoon, it is advisable to wash them with fresh water before lubricating in the manner described above.

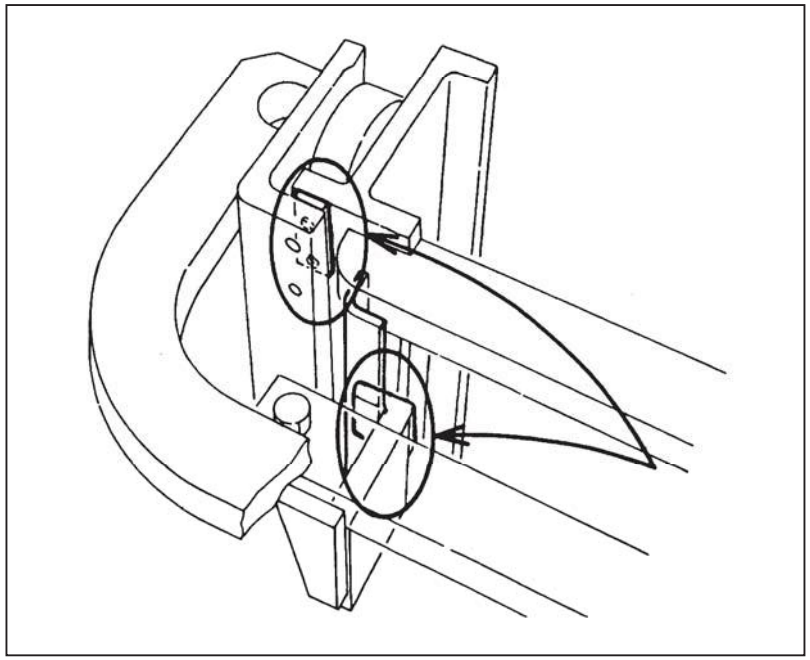
■ GREASING POINTS
MAST AND STEERING SYSTEM



MAST REAR SLIPPER (FOR OPTIONAL MAST)

⚠ WARNING

Do not climb the mast. Do not pour your hand or foot on the connecting members or into the mast assembly. You might get injured if the mast moves accidentally.



Apply grease on the U–shape guides shown in the sketch (for masts with free lift mechanism)

3 MONTHS (600 OPERATING HOURS) CHECKS

Perform the following checks in addition to preoperational, weekly (50 operating hours), and monthly (200 operating hours) checks.

Items to be checked
Steering gear case – Oil leakage
Steering gear case – Looseness of mounting bolts
Gear box – Oil leakage, looseness of mounting bolts
Fork stopper pin – Damage and wear
Motors (pump and power steering) – Wear of brushes
Motors (pump and power steering) – Rough surface of commutator

6 MONTHS (1200 OPERATING HOURS) CHECKS

Perform the following checks in addition to preoperational, weekly (50 operating hours), monthly (200 operating hours) and 3 months (600 operating hours) checks.

Items to be checked
Contactors – Checking contact points for wear and replacement
Drive motor – Cleaning
Drive motor – Lock current adjustment
Electrical equipment – Insulation
Battery charger – Operation of voltage relay and voltage adjustment
Battery charger electronic timer – Operation and adjustment
Steering gear case – Oil change
Hydraulic oil tank – Cleaning suction strainer
Hydraulic oil – Change
Hydraulic oil system – Replacement of return filter
Relief valve – Adjustment of relief pressure
Mast support – Loose cap bolts
Accelerator pedal – Stopper adjustment
Driver's seat – Damage and loose mounting bolts
Major bolts – Retightening

ANNUAL (2400 OPERATING HOURS) CHECKS

Perform the following checks in addition to preoperational, weekly (50 operating hours), monthly (200 operating hours), 3 months (600 operating hours), and 6 months (1200 operating hours) checks.

Items to be checked
Parking brake – Operation, wear and damage of ratchet
Brake fluid – Change
Master cylinder and wheel cylinder – Operation, oil leaks and damage
Master cylinder and wheel cylinder – Replacement of piston cup and check valve
Wheel brake – Disassembly, inspection, adjustment and replacement of brake drums and brake shoes
Mast support – Wear and damage of bushings
List cylinder – Natural drop
Tilt cylinder – Natural drop
Forks – Color checks of bent area
Truck body frame and cross members – Damage, cracks and loose rivets and bolts

PERIODICAL CHECK SCHEDULE

This check schedule is worked out on the assumption that the lift truck will be used under typical working conditions. If the lift truck is used under severer working conditions, earlier check is required. (The black dots in the table mean change or supply.)

ELECTRIC SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannualy (1200 hrs)	Annually (2400 hrs)
Battery (EXB option)	Check for contamination of battery case	Cleaning		○	○	○	○	○
	Check electrolyte level.	Add if necessary	○	○	○	○	○	○
	Check specific gravity	Adjust		○	○	○	○	○
	Give equalizing charge				○	○	○	○
	Check for insulation	Check				○	○	○
Controller	Check for contamination of the surface	Cleaning			○	○	○	○
	Check for rough contact points of contactor	Check			○	○	○	○
	Check for worn contact points of contactor	Replace if needed					○	○
	Check for insulation	Replace if needed					○	○
Motors (drive, pump, and power steering)	Check for loose connections	Check			○	○	○	○
	Check brushes for wear	Replace if needed				○	○	○
	Check for roughness of commutator	Adjust				○	○	○
	Check for proper operation	Check				○	○	○
	Check for noise	Check				○	○	○
	Check lock current (for drive motor)	Measure and adjust					○	○
	Check for insulation	Measure				○	○	○
	Check for contamination	Cleaning					○	○
Battery charger (EXB option)	Check for proper operation (lamps)	Check				○	○	○
	Check for proper operation and voltage of voltage relay	Adjust				○	○	○

ELECTRIC SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannualy (1200 hrs)	Annually (2400 hrs)
Battery charger (EXB option)	Check for insulation	Adjust				○	○	○
	Check for proper operation of magnet switch	Adjust						○
	Check electronic timer for operation	Adjust				○	○	○
Wiring, terminals, receptacles, couplers	Check for looseness	Retighten	○	○	○	○	○	○
	Check for damage	Check	○	○	○	○	○	○
	Check for discoloration	Check			○	○	○	○

POWER TRAIN

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannualy (1200 hrs)	Annually (2400 hrs)
Front axle	Check for oil leaks	Visual	○	○	○	○	○	○
	Check oil level	Visual			○	●(1st)time only	●	●
	Check mount bolts for looseness	Test hammer			○	○	○	○

STEERING SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannualy (1200 hrs)	Annually (2400 hrs)
Tires	Check inflation pressure	Tire gauge	○	○	○	○	○	○
	Check tires for cracks	Visual	○	○	○	○	○	○
	Check for wear	Depth gauge			○	○	○	○
	Check tires for undue wear	Visual	○	○	○	○	○	○
	Check tires for spikes, stones or foreign matter	Check			○	○	○	○
Tire fasteners (hub, rim mounting bolts, nuts)	Check for looseness	Test hammer	○	○	○	○	○	○
	Check for damage	Visual	○	○	○	○	○	○

STEERING SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannualy (1200 hrs)	Annually (2400 hrs)
Rims and side rings	Check for damage of rims, side rings, and disk wheels	Visual	○	○	○	○	○	○
Wheel bearings	Check for looseness and noise				○	○	○	○
	Disassemble wheel bearings and change grease						●	●
Axle	Check for deformation, cracks and damage.	Visual			○	○	○	○

CONTROLS

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannualy (1200 hrs)	Annually (2400 hrs)
Steering wheel	Check for play	Operate	○	○	○	○	○	○
	Check fo looseness in axial direction	Touch	○	○	○	○	○	○
	Check for looseness in redial direction	Touch	○	○	○	○	○	○
	Check for proper operation	Operate	○	○	○	○	○	○
Steering gear box	Check for loose mounting bolts	Operate			○	○	○	○
Rod, arm	Check for looseness	Operate			○	○	○	○
	Check for bends, damage or wear	Visual			○	○	○	○
Knuckle	Check for looseness and damage of king pin	Operate			○	○	○	○
Rear axle	Check for bends, deformation, cracks or damage	Visal			○	○	○	○
	Check for mounting condition	Test hammer			○	○	○	○
Power steering	Check for proper operation	Operate	○	○	○	○	○	○
	Check boots for rupture	Visual		○	○	○	○	○
	Check for loose mounting or linkage	Visual			○	○	○	○
	Check ball joints	Touch			○	○	○	○

BRAKE SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannualy (1200 hrs)	Annually (2400 hrs)
Brake pedal	Check for play	Operate	○	○	○	○	○	○
	Check for pedal travel	Scale	○	○	○	○	○	○
	Check for braking effect or uneven braking	Operate	○	○	○	○	○	○
	Check for air mixed in brake piping	Operate			○	○	○	○
Parking brake lever	Check for proper operation of lever	Operate	○	○	○	○	○	○
	Check for braking effect	Operate	○	○	○	○	○	○
Rod and cable	Check for proper operation	Operate			○	○	○	○
	Check for loose linkage	Touch			○	○	○	○
Hose and pipe	Check for damage, leaks or intervention	Visual			○	○	○	○
	Check for loose connections or clamp	Touch			○	○	○	○
Oil brake	Check for fluid leaks.	Visual			○	○	○	○
	Check for fluid level and add, if needed.	Visual	○	○	○	○	●	●
	Check master cylinder and wheel cylinders for proper operation.	Operate						○
	Check master cylinder and wheel cylinders for fluid leaks or damage.	Visual						○
	Check master cylinder piston cup and check valve for wear or damage.	Disassembly						●
Brake drum & shoe	Check drum mounting part for looseness.	Test hammer			○	○	○	○
	Check linings for wear.	Slide calipers						○
	Check shoes for proper operation.	Operate						○
	Check anchor pins for rust.	Visual						○
	Check return springs for deterioration.	Scale						○
	Check automatic adjuster for proper operation.	Operate						○
	Check drum for wear or damage.	Visual						○

ELECTRIC SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannualy (1200 hrs)	Annually (2400 hrs)
Back plate	Check for deformations	Visual						○
	Check for crakcs	Visual						○
	Check installation for looseness	Test hammer						○

LOAD HANDLING SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannualy (1200 hrs)	Annually (2400 hrs)
Forks	Check for damage, deformation, or wear	Visual	○	○	○	○	○	○
	Check fork stopper pin for damage or wear	Visual				○	○	○
	Check fork roots and teeth–welded area for cracks or wear	Visual			○	○	○	○
Mast and carriage	Check mast cross members for cracked weld or damage	Visual			○	○	○	○
	Check tilt cylinder bracket and mast for cracks or damage at welded parts	Visual			○	○	○	○
	Check outer and inner masts for cracked weld or damage	Visual			○	○	○	○
	Check carriage for cracked weld or damage	Visual			○	○	○	○
	Check roller bearing for looseness	Touch			○	○	○	○
	Check mast support bushing for wear or damage	Visual					○	○
	Check for mast support bushing bolts for looseness	Test hammer			○(1st)time only		○	○
	Check rollers, roller pins and weld for cracks or damage	Visual			○	○	○	○
	Check for looseness of lift cylinder tail bolts, piston rod head bolts, U bolts, piston head guide bolts	Test hammer		○(1st)time only			○	○
Chain and sheave	Check chain for tension, deformation, damage or corrosion	Touch	○	○	○	○	○	●(2 or 4)years
	Check chains for lubrication	Visual			○	○	○	○
	Check for elongation	Gauge			○	○	○	○

LOAD HANDLING SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannualy (1200 hrs)	Annually (2400 hrs)
Chain and sheave	Check loose linkage of chain anchor pin and chain	Visual			○	○	○	○
	Check sheaves for deformation or damage	Visual			○	○	○	○
	Check sheave bearings for looseness	Touch			○	○	○	○
Attachments	Check for operation and installation	Operate/visual			○	○	○	○
Cylinder	Check piston rod, rod bolt, rod end for looseness deformation and damage	Visual/test hammer	○	○	○	○	○	○
	Check for proper operation	Operate	○	○	○	○	○	○
	Check for oil leaks	Visual	○	○	○	○	○	○
	Check pin and cylinder bushing for wear or damage	Visual			○	○	○	○
Hydraulic pump	Check for oil leaks or noise	Visual/anditory	○	○	○	○	○	○

HYDRAULIC SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannualy (1200 hrs)	Annually (2400 hrs)
Hydraulic oil tank	Check oil level and change oil if contaminated	Visual	○	○	○	○	●	●
	Change suction strainer	Operate					○	○
Inline filter	Change filter cartridge	Operate					●	●
Control valve lever	Check for operation of control lever linkage	Operate	○	○	○	○	○	○
	Check for function of control lever	Operate	○	○	○	○	○	○
Control valve	Check for oil leaks	Visual	○	○	○	○	○	○
	Check relief valve, tilt lock valve for operation	Auditory			○	○	○	○
	Measure relief pressure	Oil pressure gauge					○	○
Hose, piping, hose reel, and swivel joint	Check for oil leaks, looseness, deformation and damage	Visual/auditory	○	○	○	○	○	○
	Check load handling system hoses	Operate						●(2 or 4)years

SAFETY DEVICE AND OTHERS

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannualy (1200 hrs)	Annually (2400 hrs)
Overhead guard and load backrest	Check for loose mounting	Test hammer	○	○	○	○	○	○
	Check for deformation, cracks or damage	Visual	○	○	○	○	○	○
Turn signal	Check for operation and installation	Operate	○	○	○	○	○	○
Alarm	Check for operation and installation	Operate	○	○	○	○	○	○
Lights	Check for operation and installation	Operate	○	○	○	○	○	○
Back–up alarm	Check for operation and installation	Operate	○	○	○	○	○	○
Sideview mirrors	Check for contamination or damage	Visual	○	○	○	○	○	○
	Check for proper visibility	Visual	○	○	○	○	○	○
Meters	Check for operation	Operate	○	○	○	○	○	○
Rear reflector/ License number plate	Check for contamination or damage	Visual	○	○	○	○	○	○
Driver's seat	Check for damage or loose mounting bolts	Visual					○	○
Truck body	Check frame and cross members for damage or cracks	Visual						○
	Check for loose rivets and bolts	Test hammer						○
	Check the results of previous checks	Visual	○	○	○	○	○	○
	Check general condition of truck	Visual	○	○	○	○	○	○
Lubricants and oil change	After cleaning, check for lubrication of each part	Grease pump			○	○	○	○
	Check condition of lubricants	Check						○

The following symbols, found throughout this manual, alert you to potentially hazardous conditions to the owner and the operator. Become completely familiar with the truck before proceeding with operating, checking and servicing.

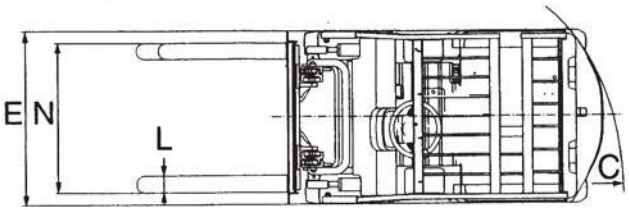
This manual and decals affixed to the truck use the following safety alert indications.

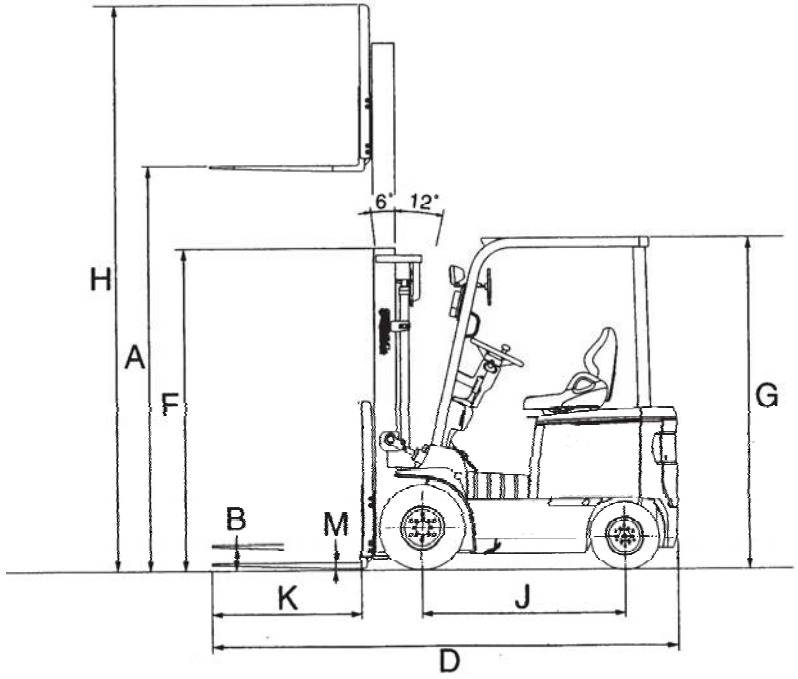
SIGNAL WORD	CLASSIFICATION
⚠ DANGER	Failure to follow the instructions in the message will likely cause a serious accident or death.
⚠ WARNING	Failure to follow the instructions in the message might cause a serious accident or death.
⚠ CAUTION	Failure to follow the instructions in the message may cause personal injury or damage to the truck or other property.
NOTE	The information will help to prolong the service life of the truck. The message is not directly related to accident prevention.

5.SPECIFICATIONS & SERVICE DATA

CONTENTS

SPECIFICATIONS..... 5 – 1
LOAD CHART..... 5 – 3
SERVICE DATA..... 5 – 4
AFTER–THE–SALE SERVICE..... 5 – 9
TRUCK SERIAL NUMBER AND
SERIAL NUMBERS OF MAJOR COMPONENTS..... 5 – 9
TUE'S GENUINE PARTS..... 5 – 10
FOR YOUR RECORDS..... 5 – 11


E
N
L
C


6°
12°
H
A
F
G
B
M
K
J
D

(EXB model)

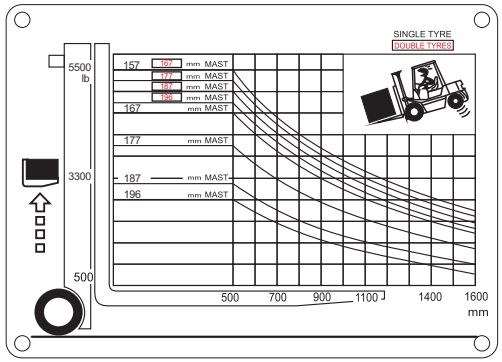
Leading particulars \ Truck model				EK15	EK20	EK20
Max. load			kg/lb	1,500/3300	2,000/4400	2,500/5500
Basic load center			mm/in	500/19.6		
Max. lifting height			A mm/in	3,000/118		
Free lift			B mm/in	155/6.1	160/6.2	160/6.2
Fork lifting speed (No load/Loaded)			mm/s / in/s	580/350 22.8/13.7	510/290 20/11.4	510/255 20/10
Traveling speed (No load/Loaded)	S mode		km/h / mph	16/14 10/8.7	15/13.5 9.3/8.4	15/13.5 9.3/8.4
	P model		km/h / mph	15/13 9.3/8.1	14.5/12.5 9/7.8	14.5/12.5 9/7.8
	E model		km/h / mph	14/12 8.7/7.5	13.5/11.5 8.4/7.1	13.5/11.5 8.4/7.1
Gradability	S mode		%	1/5 / 1/7	1/6 / 1/7	1/6 / 1/7
(Possible to start from	P model		%	1/6 / 1/7	1/6 / 1/7	1/6 / 1/7
the middle of slope)	E model		%	1/7 / 1/7	1/6 / 1/10	1/6 / 1/10
Min, turning radius (most outside of body)			C mm/in	1,700/66.9	1,950/76.7	1,970/77.5
Min. aisle width at right–angle corner			mm/in	1,690/66.5	1,855/73	1,905/75
Overall length (including forks)			D mm/in	2,875/113	3,165/124	3,355/132
Overall width			E mm/in	1,070/42.1	1,150/45.2	1,150/45.2
Overall height (mast)			F mm/in	1,995/78.5	1,995/78.5	1,995/78.5
(overhead guard)			G mm/in	2,050/80.7	2,095/82.4	2,095/82.4
(Max. height during work)			H mm/in	4,030/158.6	4,030/158.6	4,030/158.6
Wheel base			J mm/in	1,250/49.2	1,400/55.1	1,400/55.1
Tread (front wheel/rear wheel)			mm/in	910/900 / 35.8/35.4	955/950 / 37.5/37.4	955/950 / 37.5/37.4
Fork size Length (K) x Width (L) x Thickness (M)			mm/in	920x100x35 / 36x3.9x1.3	920x122x40 / 36x4.8x1.5	1070x122x40 / 36x4.8x1.5
Fork spacing			N mm/in	200 – 920 / 7.8–36.2	245–1020 / 9.6–40.1	245–1020 / 9.6–40.1
Weight (with standard battery)			kg/lb	2,710/5974	3,470/7650	3,850/8487
Traveling motor						
Rated output – Rated voltage			kw/min–V	11.5/3–24.5	13.1/3–25.8	13.1/3–25.8
Hydraulic motor						
Rated output – Rated voltage			kw/min–V	8.6/5–48	9/5–42.6	9/5–42.6
Battery						
(Option)	Power capacity		kmh/mph	19.2/12	21.6/13.5	27.1/16.9
	Capacity		AH/5h	400	450	565
	Voltage		V	48	48	48
Battery charger	Input	Rated voltage (M/H/L tap)	V	60Hz:205/195/215 50Hz:200/190/210		
(Option)		Rated current	A	17	24	24
	Capacity		kVA	6.0	8.5	8.5
	Output	Rated voltage/current	V/A	51–64/80–20	51–64/115–29	51–64/115–29
		Charging time (standard battery)	h	10	8.5	10.5
Traveling speed control unit				AC inverter control		
Load control unit				DC chopper control		
Tire	Front wheel			6.00–9–10PR	21x8–9–16PR	21x8–9–16PR
	Rim size			4.00E DT	9x6.00E	9x6.00E
	Inflation pressure		kPa (kg/cm^2)	850 (8.5)	1000(10)	1000(10)
	Rear wheel			16 x 6–8–10PR	18x7–8–14PR	18x7–8–14PR
	Rim size			4.25DT	4.25DT	4.25DT
	Inflation pressure		kPa (kg/cm^2)	850 (8.5)	900(9)	900(9)

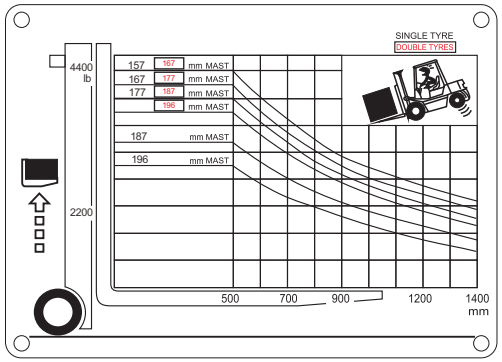
(EXB model)

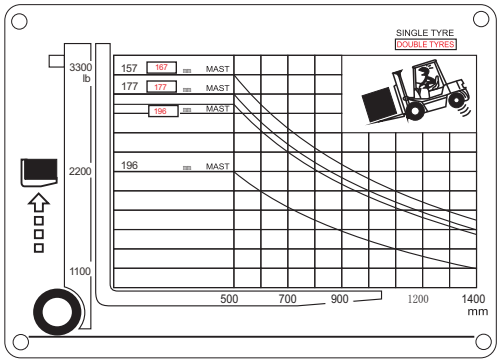
Leading particulars \ Truck model				EK15	EK20	EK25
Max. load			kg/lb	1,500/3300	2,000/4400	2,500/5500
Basic load center			mm/in	500/19.6		
Max. lifting height		A	mm/in	3,000/118		
Free lift		B	mm/in	155/6.1	160/6.2	160/6.2
Fork lifting speed (No load/Loaded)			mm/in s	580/350 / 22.8/13.7	510/290 / 20/11.4	510/255 / 20/10
Traveling speed (No load/Loaded)	S mode		km/h / mph	16/14 / 10/8.7	15/13.5 / 9.3/8.4	15/13.5 / 9.3/8.4
	P model		km/h / mph	15/13 / 9.3/8.1	14.5/12.5 / 9/7.8	14.5/12.5 / 9/7.8
	E model		km/h / mph	14/12 / 8.7/7.5	13.5/11.5 / 8.4/7.1	13.5/11.5 / 8.4/7.1
Gradability	S mode		%	1/5 / 1/7	1/6 / 1/7	1/6 / 1/7
(Possible to start from	P model		%	1/6 / 1/7	1/6 / 1/7	1/6 / 1/7
the middle of slope)	E model		%	1/7 / 1/7	1/6 1/10	1/6 1/10
Min, turning radius (most outside of body)		C	mm/in	1,700/66.9	1,950/76.7	1,980/77.9
Min. aisle width at right–angle corner			mm/in	1,690/66.5	1,855/73	1,905/75
Overall length (including forks)		D	mm/in	2,875/113.1	3,165/124.6	3,355/132
Overall width		E	mm/in	1,070/42.1	1,150/45.2	1,150/45.2
Overall height (mast)		F	mm/in	1,995/78.5	1,995/78.5	1,995/78.5
(overhead guard)		G	mm/in	2,110/83	2,155/84.8	2,155/84.8
(Max. height during work)		H	mm/in	4,030/158.6	4,030/158.6	4,030/158.6
Wheel base		J	mm/in	1,250/49.2	1,400/55.1	1,400/55.1
Tread (front wheel/rear wheel)			mm/in	910/900 / 35.8/35.4	955/950 / 37.5/37.4	955/950 / 37.5/37.4
Fork size Length (K) x Width (L) x Thickness (M)			mm/in	920x100x35 / 36.2x3.9x1.3	920x122x40 / 36.2x4.8x1.5	1,070x122x40 / 42.1x4.8x1.5
Fork spacing		N	mm/in	200–920 7.8–36.2	245–1020 9.6–40.1	245–1020 9.6–40.1
Weight (with standard battery)			kg/lb	2,710/5974	3,470/7650	3,850/8487
Traveling motor						
Rated output – Rated voltage			kw/min–V	11.5/3–24.5	13.1/3–25.8	13.1/3–25.8
Hydraulic motor						
Rated output – Rated voltage			kw/min–V	8.6/5–48	9/5–42.6	9/5–42.6
Traveling speed control unit				AC inverter control		
Load control unit				DC chopper control		
Tire	Front wheel			6.00–9–10PR	21x8–9–16PR	21x8–9–16PR
	Rim size			4.00E DT	9x6.00E	9x6.00E
	Inflation pressure		kPa (kg/cm^2)	850 (8.5)	1000(10)	1000(10)
	Rear wheel			16x6–8–10PR	18x7–8–14PR	18x7–8–14PR
	Rim size			4.25DT	4.25DT	4.25DT
	Inflation pressure		kPa (kg/cm^2)	850(8.5)	900(9)	900(9)

⚠ CAUTION

The load charts below refer to the lift trucks of standard specifications, and those with high mast whose lifting height is less than 5m. Lift trucks with a high mast whose lifting heights is 5m or higher, or those with an attachment have different load charts.







BRAKE PEDAL

Height of brake pedal–––––––––––––––––––––––90mm
Play of brake pedal –––––––––––––––––––––––––5mm

Parking lever

Basic operating power––––––––––––150–170N (15–17kg)

TIGHTENING TORQUE OF BOLTS AND NUTS

Rear axle (axle–frame)
––––––––––––––––––––– 427–634N–m (43.1–64.7 kg–m)
Mast support (mast–frame)
––––––––––––––––––––––––75–111N–m (7.6–11.3 kg–m)
Piston head guide mounting bolt
––––––––––––––––––––134–200N–m (13.6–20.4 kg–m)

CONTROL VALVE

Relief set pressure
FB15/18––––––––––––––––––––14.2MPa (145 kg/cm^2)
FB20/25––––––––––––––––––––14.2MPa (145 kg/cm^2)

REPLACING LIGHT BULBS

Replace any blown–out bulb with a new one of the specified capacity, referring to the table given below.

LAMP CAPACITY

Head lights–––––––––––––––––––––––––––– 48V–40W
Clearance lights––––––––––––––––––––––––– 48V–25W
Turn signals Front––––––––––––––––––––––– 48V–25W
Rear––––––––––––––––––––––– 48V–25W
Tail lights–––––––––––––––––––––––––––––– 48V–10W
License number plate lamp––––––––––––––––– 48V–10W
(option)
Rear work light––––––––––––––––––––––––– 48V–40W
(option)
Brake light––––––––––––––––––––––––––––– 48V–25W
Back–up light––––––––––––––––––––––––––– 48V–10W

FUSE CAPACITY

Truck model / Fuse	EK15/18	20/25
F1 (for traveling inverter)	275A	325A
F2 (for hydraulic pump circuit inverter)	225A	225A
F3 (EPS circuit)	40A	40A
F4 (48–V control power supply)	10A	10A
F5 (lamp circuit)	10A	10A
F6 (battery charger output circuit)	130A	130A
F7 (70–V control power supply)	–	–

* For replacement of any fuse is needed, consult your local TUE dealer.

APPLICABLE BATTERY (EXB Option)

Model / Battery capacity (Ah/5H)		EK15	EK20	EK25	Battery maker		
					Shim–Kobe Electric Machinery	G.S	YUASA
48V	330				○	○	○
	400	○			○	○	○
	450		○		○	○	○
	485	○			○	○	○
	545	○			○	○	○
	465		○	○	○	○	○
	600		○	○	○	○	○
	700		○	○	○	○	○
	865				○	○	○
	935				○	○	○
72V	450				○	–	○
	470				–	–	○
	485				–	○	–
	545				○	○	○

BATTERY CHARGING TIME (STANDARD)
Truck–mount battery charger (EXB Option)

48–V battery

Charger model	Battery capacity (AH/5H)	Standard charging time (H)
M80B, C, D	330	8.5
	400	10
	485	11.5
M115B, C, D	450	8.5
	545	10
	565	10.5
	600	11
	700	12.5
M160B,C,D	865	10.5
	935	11.5

72–V battery

Charger model	Battery capacity (AH/5H)	Standard charging time (H)
N105B, C, D	450	9
	545	10.5

Input voltage range

B mode	C model	D model
(60 Hz, 195–215 V)	(60 Hz, 370–410 V)	(60 Hz, 420–460 V)
(50 Hz, 190–210 V)	(50 Hz, 360–400 V)	(50 Hz, 410–450 V)

Note: If the supply voltage of your charging facility is not within the input voltage range specified above, you need to change the tap.

DIAGNOSTICS

Display	Details	How to reset
 Flashing (at 0.5–second intervals)	Drive motor overheating Pump motor overheating	Switch the key from OFF to ON. Lower the temperature.
 Flashing	Controller overheating Flashing at 0.5–second intervals Flashing at 0.3–second intervals	Switch the key from OFF to ON. Lower the temperature.
 Flashing (at 0.5–second intervals)	Pump motor brush worn	Change brush.
 Flashing	Warning or low battery fluid level	Fill in the battery fluid.
 Flashing	Neutral safety	Return the change lever to the neutral position.



If the display as shown or any of the following numbers appear in the LCD, ask your local TUE dealer for help.

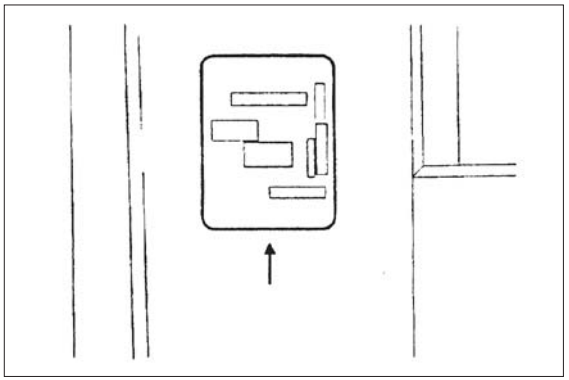
301,302,303,304,305,306,307,308,401,402,403,404,405,406,407,408,501,502,503,504

REFILL CAPACITY

Item \ Truck model		Capacity (liter)		Ambient Temperature at Starting	Grade of Viscosity API Class	Brand of Lubricant Specified		
		EK15/18	EK20/25			Mobil	Shell	Esso
1	Hydraulic oil tank	18	25	higher than –25℃	ISO VG32	Mobil DTE Oil Light	Shell Tellus Oil C–32	Teresso 32
				higher than –40℃	ISO VG22	Mobil DTE 24	Shell Tellus Oil 32	Nuto HP–32
2	Reduction gear/ differential	5	5	–25 – 35℃	SAE 10W–30 CC	Mobil Delvac 1100 or 1200	Shell Rotella	Esso Lube HDX 10W–30
				–25 – 0℃	SAE 10W CD	Mobil Delvac 1310	Shell Rotella TX Oil 10W	Esso Lube D–3 10W
				higher than 0℃	SAE 30 CD	Mobil Delvac 1330	Shell Rotella TX Oil 30	Esso Lube D–3 SAE 30
3	Brake fluid reservoir tank	0.2		—	FMVSS DOT–3	Mobil Super Heavy Duty Brake Fluid	See Note 2	See Note 2
4	Greasing points	Proper amount		higher than –40℃	NLG1 No.1 or 2	Mobil grease JL (2)	Albania grease (1,2)	Beacon (2)

Note 1) The temperature in this table is the ambient temperature at the start of the engine.
Note 2) For more information about lubricants to be used, contact your local TUE DEALER.

SERIAL NUMBERS OF MAJOR COMPONENTS



In addition to the truck serial number, the serial numbers (unit numbers) of major components are imprinted on the truck or indicated on decals. The picture above shows the serial number plate of the mast. These number plates should be retained for future reference in servicing.

TUE'S GENUINE PARTS

However excellent the product is, it deteriorates as used for extended period of time. To ensure the best performance of the lift truck, use the same genuine TUE parts as those used for new trucks.
When ordering spare parts, be sure to designate TUE'S genuine

GENUINE TUE LUBRICANTS

Use genuine TUE'S lubricants for lubrication.