No. OB-7E3DE

UNICARRIERS
A Lifetime of Trusted Value

OPERATION & MAINTENANCE MANUAL

ELECTRIC FORKLIFT TRUCK

Reach type

FRSB14-8
FRSB16-8
FRSB20-8
FRSB25-8

- It is the responsibility of the Operator and Supervisor to read and understand this manual.
- Protect the earth and be kind to your lift truck.

UniCarriers Corporation

Thank you very much for your purchase of UniCarriers' product.

This Operation & Maintenance Manual was written to provide the owner/ operator with information about the safe operation and maintenance of the UniCarriers forklift truck. Read this manual thoroughly and become completely familiar with the lift truck before using it. If you have any questions, see your dealer.

This manual was compiled based on the standard models. For trucks other than the standard models, only the differences are explained.

Due to improvements in design, it is possible that the description contained herein may not completely apply to the truck delivered to you.

NOTE
If the truck is to be leased, loaned or sold to anyone, this manual must be with the truck.

CONTENTS

1. SAFETY

CONTENTS

FOREWORD

- All operators and supervisors must read the safety instructions given on the following pages carefully and understand them thoroughly, before operating or servicing the truck.
- Understand the characteristics of the truck and follow the operating and servicing procedures specified. Work safely.
- **Always follow all the instructions, including all warning messages, in this OPERATION AND MAINTENANCE MANUAL. Failure to do so may result in injury to people or may damage the truck or other assets.**

The meanings of the safety symbols and messages

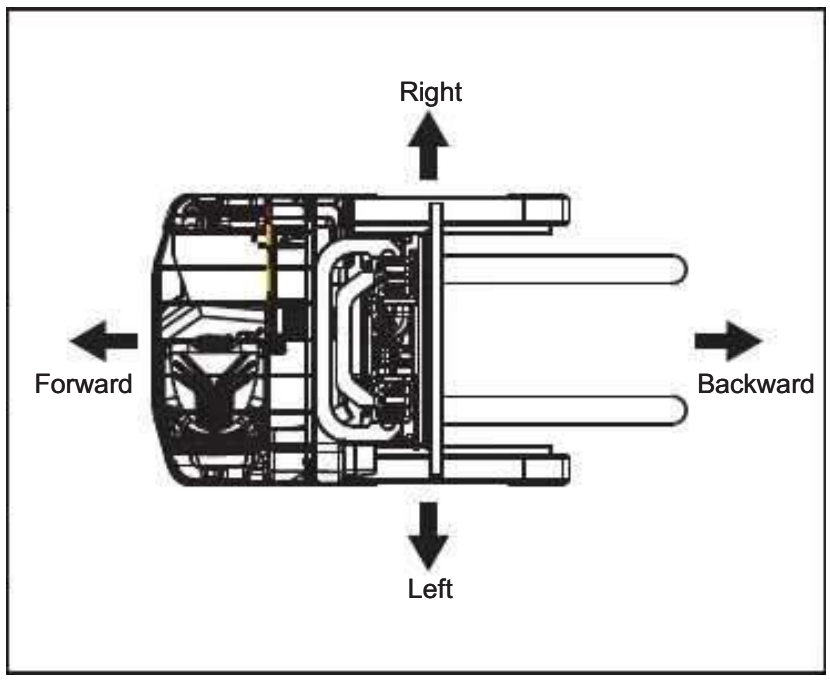
A variety of safety instructions are found throughout this manual, and there are safety and warning decals on the truck. Follow all instructions for the safe operation and servicing of the truck. Safety instructions are accompanied by the safety alert symbols and signal words shown on the right.

This is the safety alert symbol. It is used to warn the reader about a potential source of human injury. To prevent injury or death, make sure you understand and follow all the safety messages following this safety alert symbol.

Signal word (designates the degree of hazard)	Definition
⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
CAUTION	Indicates a hazardous situation which, if not avoided, may result in damage to the truck or other property.
NOTE	Indicates information which will help extend the service life of the truck.

How the four sides of the truck in this manual are identified

The front, back, right and left sides of the truck in this manual are identified in the figure on the right.



FOR OPERATORS AND SUPERVISORS

Lift truck accidents cause dozens or hundreds of deaths every year, and even greater numbers of personal injuries.

UniCarriers 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.

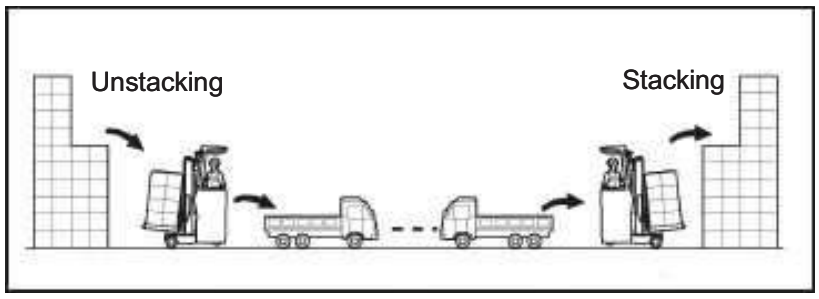
It is not possible to describe all potentially hazardous situations which may occur while operating, inspecting or servicing a forklift truck.

The safety instructions including the warning and caution messages in this manual and on the decals attached to the forklift, are not intended to cover all possible working hazards. If you operate, inspect or service the forklift in a manner not described in this manual, please be careful because you do so at your own risk.

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

- Pages 1-2 through 1-16 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 1-17 and the following pages contain specific precautions directly related to the operation of the lift truck. Make sure the operators read all instructions carefully and understand them completely.

■ TRAIN OPERATORS TO STACK SAFELY



“Stacking” means piling up palletized loads or materials directly on top of each other, without using racks or shelves to separate them.

If loads are not properly stacked, they may slip or fall, endangering the operator as well as fellow workers in the area.

Safety classes should be held to train all operators in the proper method of stacking and unstacking loads.

■ PERIODIC REFRESHER TRAINING IS REQUIRED

The operator must undergo periodic refresher training, by completing a practical training course. Forklift truck design is moving ahead rapidly, including the use of new microprocessor technology and automatic controls. In addition, the standards and safety regulations for forklift trucks are also changing all the time. Even an experienced operator should receive refresher training to ensure that the operator has the knowledge and skills needed to operate a powered industrial truck safely.

■ 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.

■ PROVIDE AND MAINTAIN EMERGENCY EQUIPMENT

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.

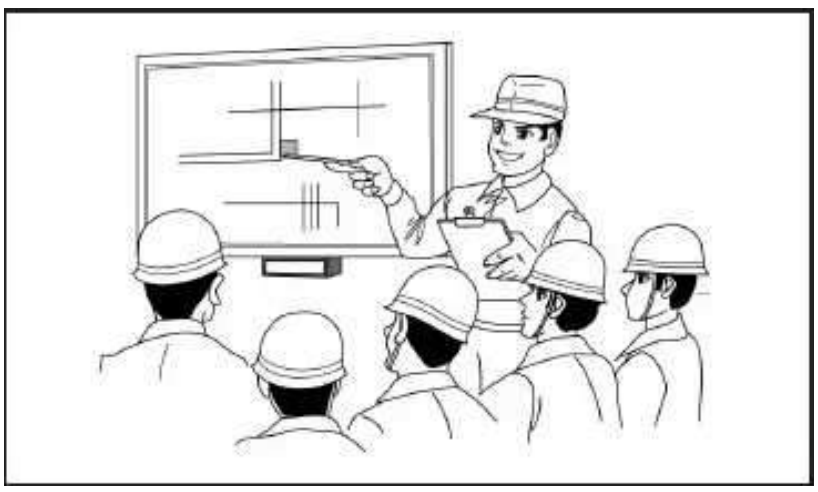
■ WEAR PROTECTIVE GEAR

- Always wear proper work clothes for driving. Work clothes should be designed to prevent any part from accidentally catching on levers 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.

■ KNOW WHO TO CALL IN AN EMERGENCY

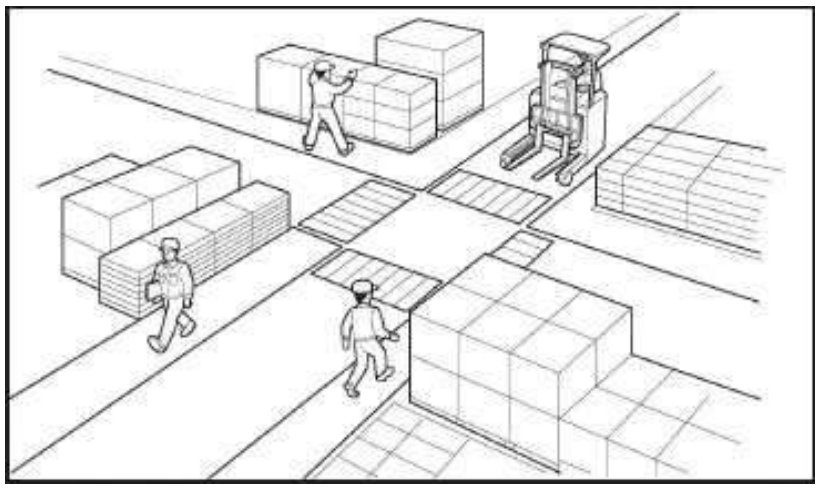
Keep information on hand to allow immediate calls for help in case of a fire, accident or other emergency.

■ MAKE AN OPERATING PLAN AND DISCUSS IT



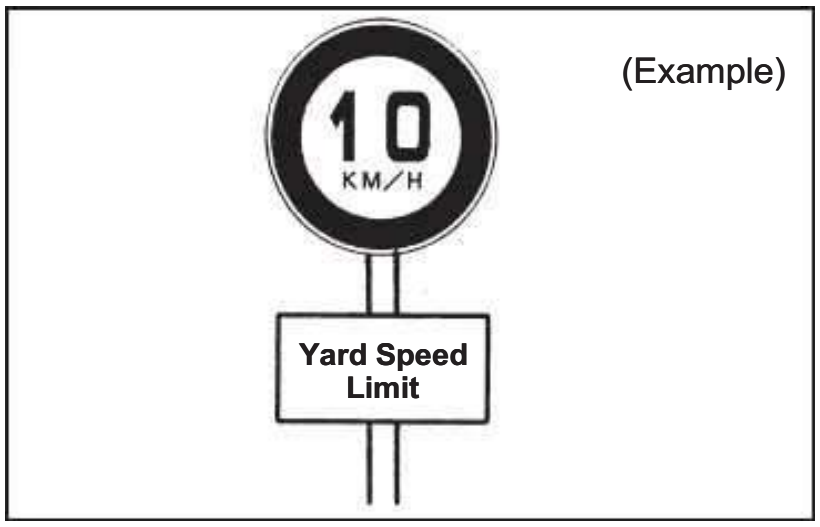
Before using the lift truck, plan out the travel routes and operating procedures, and thoroughly discuss the details with all personnel involved.

■ MARK THE TRAVEL LANES



Designate the travel lanes for the lift truck and mark them clearly, so they will be kept free of obstruction.

■ SET SPEED LIMITS



(Example)

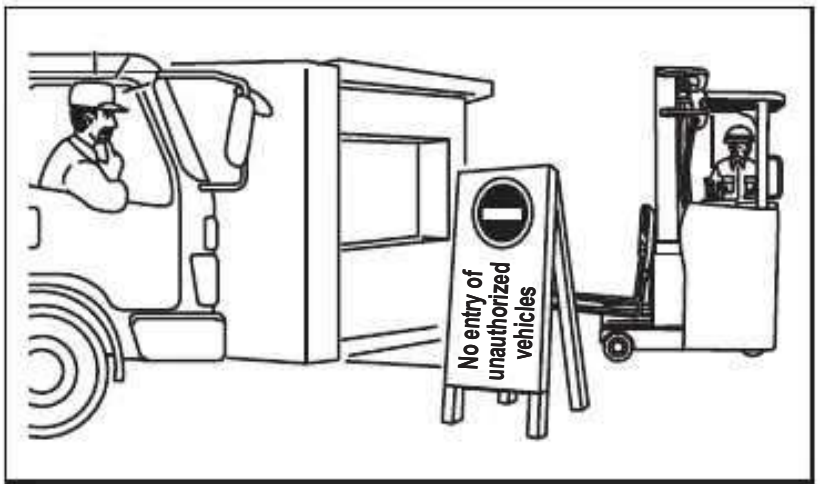
Set appropriate speed limits on your company grounds, and post signs that are clearly visible.

■ KEEP PEOPLE OUT OF THE OPERATING AREA

No Pedestrians

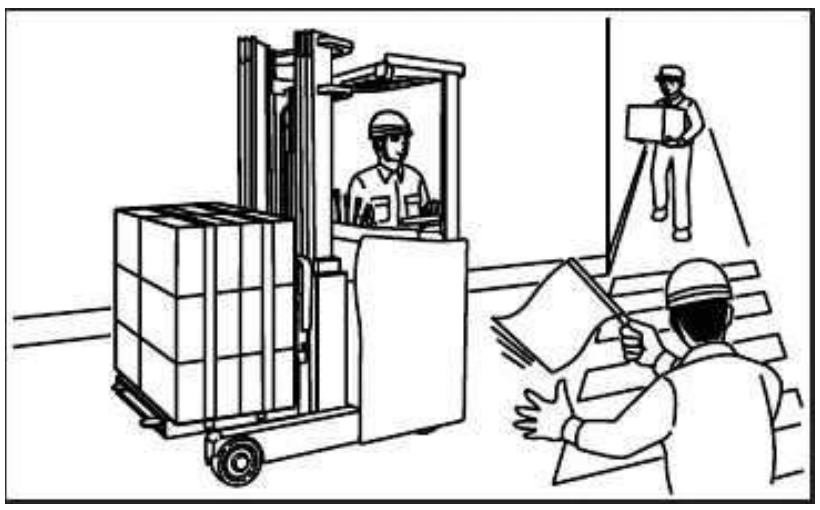
No other personnel should be allowed in areas where the lift truck is used.
Where other people must be present, post a guard whose job is to make sure people stay clear of moving vehicles.

■ KEEP UNAUTHORIZED VEHICLES OUT



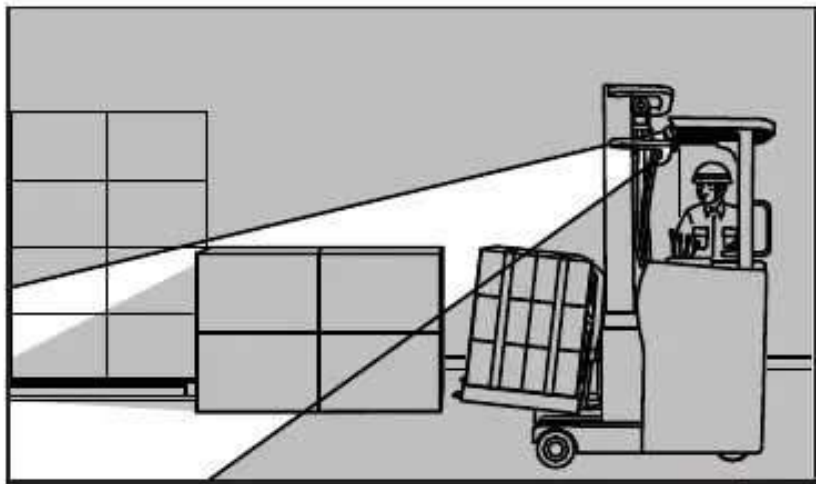
Unauthorized vehicles must be kept out of the load handling areas. Post signs or give signals as required.

■ ASSIGN TRAFFIC GUARDS TO CONGESTED AREAS



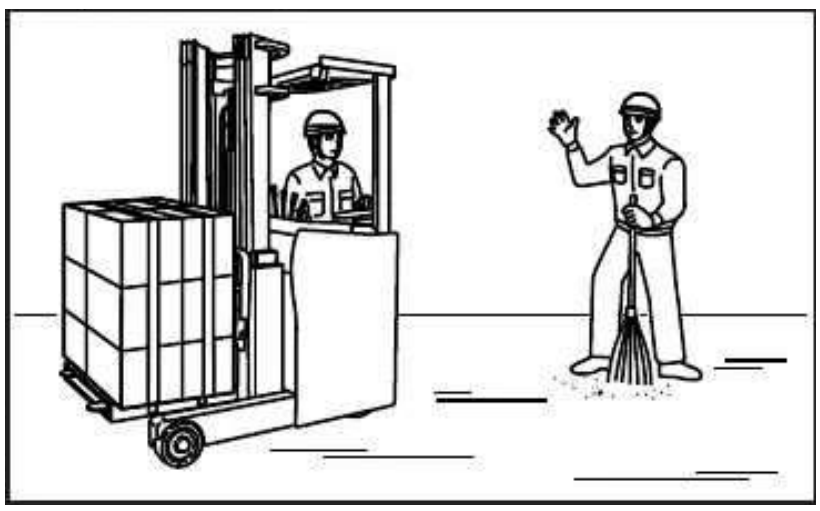
Post a traffic guard in confined or congested areas where other people or vehicles may pass. All personnel must obey the guide's signals.

■ PROVIDE ADEQUATE LIGHTING



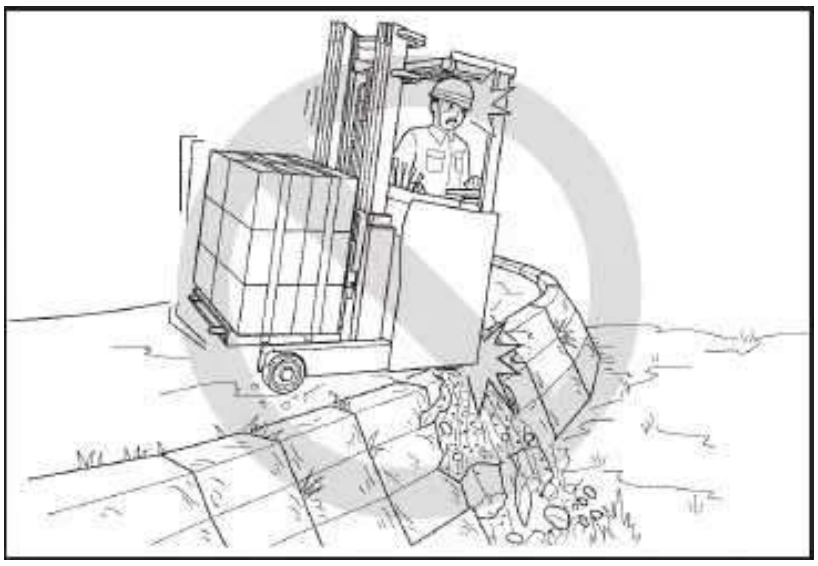
Safe operation requires well-lit traveling routes, so pedestrians and obstacles can be easily seen. Use headlights, taillights, helmet lamps or other lights as appropriate.

■ KEEP THE GROUND LEVEL AND DRY



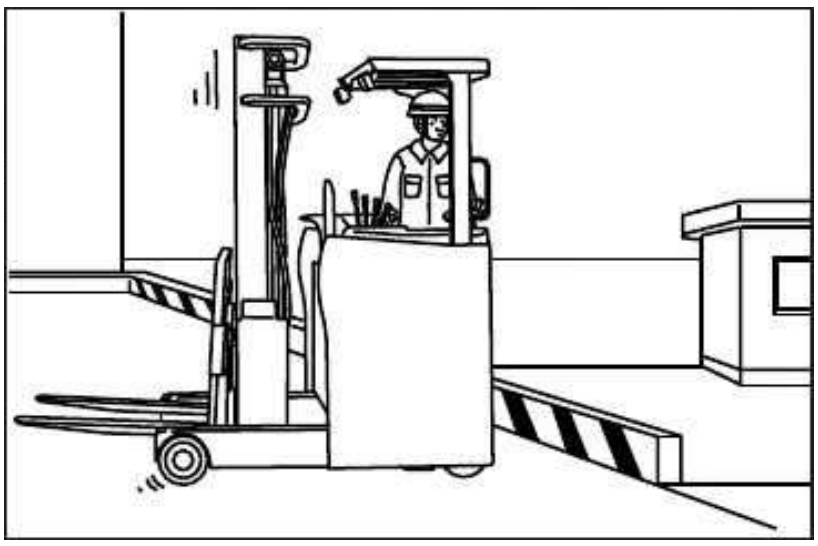
Be sure that all areas where the lift truck travels are level and regular. Clear away pools of oil or water.

■ SAFETY MEASURES FOR DANGER SPOTS



Post warning signs or take other appropriate measures to ensure that lift truck operators keep away from danger spots as they travel.

■ INSTALL CURBS OR RAILINGS



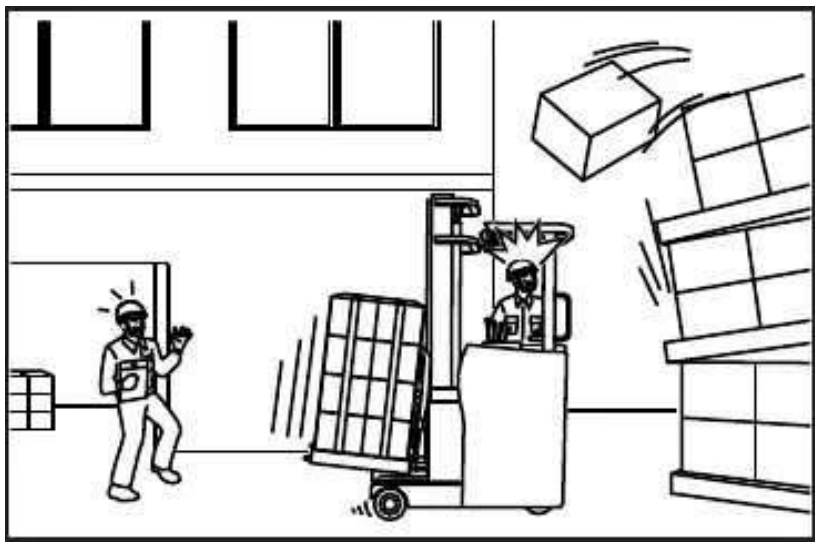
If the truck is to be used on a loading dock, sea wall or other raised surface, install curbs or railings to prevent the truck from falling off.

■ DO NOT USE A LIFT TRUCK IN THE PRESENCE OF FLAMMABLE GAS

⚠ WARNING

The FRSB14-25 reach trucks are not designed to prevent explosions. Do not use them in the presence of flammable gas.

■ 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.

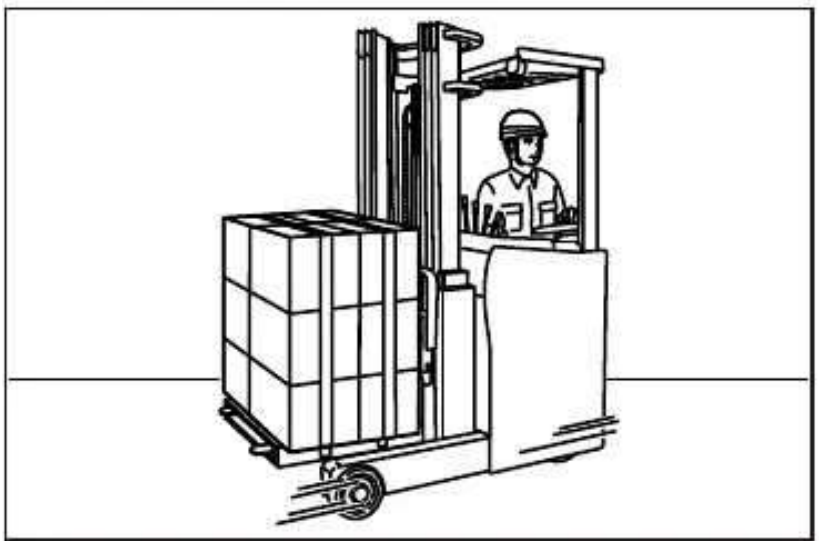
■ DO NOT USE LIFT TRUCKS IN THE PRESENCE OF STRONG ELECTROMAGNETISM

The electric and electronic control systems of the truck can be affected by a strong electromagnetic field and may fail to operate normally, if the truck is operated in the presence of strong electromagnetism. It is not advisable to use the lift truck in such an environment.

■ CAUTIONS REGARDING WATER

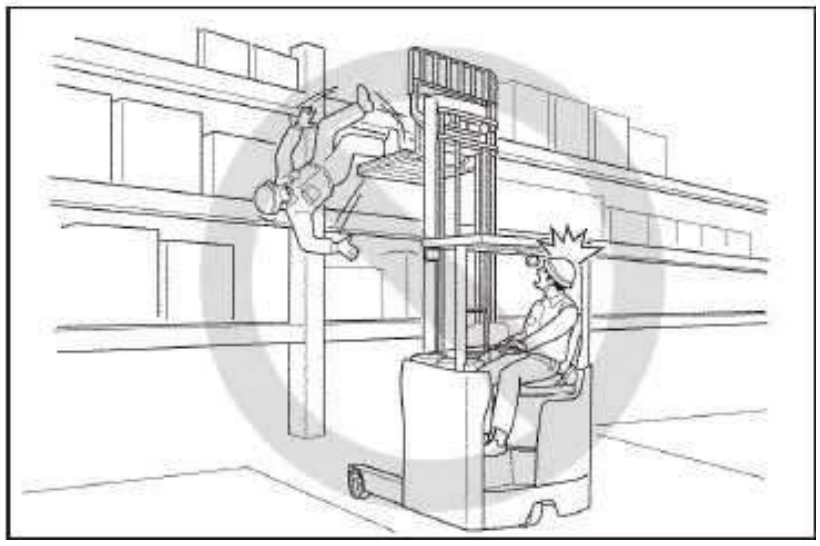
- Avoid operating the lift truck in the rain or leaving it outdoors on rainy days.
- When washing the lift truck take care to prevent water from splashing on the electrical parts. Cover the electrical parts with a vinyl tarp or plastic bag if necessary. Getting the electrical parts wet might cause the electrical system to malfunction and make it difficult to control the lift truck properly.

■ PROPER USES OF THE LIFT TRUCK



The proper use of a lift truck is to carry a load that is placed on the pallet, and to stack the load only within the prescribed stack height limit.
With the correct attachment, a lift truck may be used to carry and stack loads that cannot be palletized.

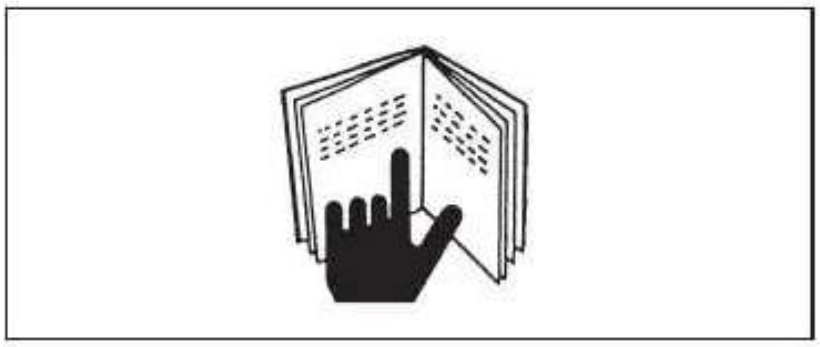
■ IMPROPER USES



Transporting a person, lifting a person, and towing another vehicle are examples of improper use of a lift truck. The types of uses specified in this manual as improper must never be requested or permitted, under any circumstances.
(Examples of Improper Use)

- Transporting or lifting a person on the forks or pallet.
- Carrying a person on the pallet to control the load.
- Attaching wire ropes to 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 open or close the door of a freight vehicle.

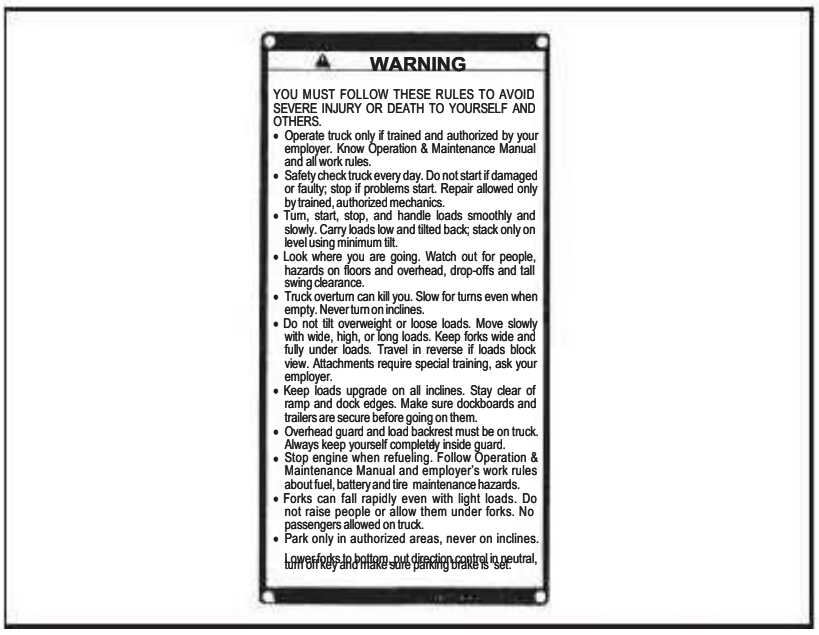
■ READ THE MANUAL AND DECALS



Read the Operation & Maintenance Manual and caution plates on the truck, and become familiar with your truck and its specific operating and servicing procedures. Remember that individual lift trucks may differ in design and construction, one from another. Follow the instructions on 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.

■ KEEP DECALS LEGIBLE



The decals on the truck describe safety precautions and operating instructions. Replace any damaged or missing decals. Check that the decals are present and legible during regular inspections.

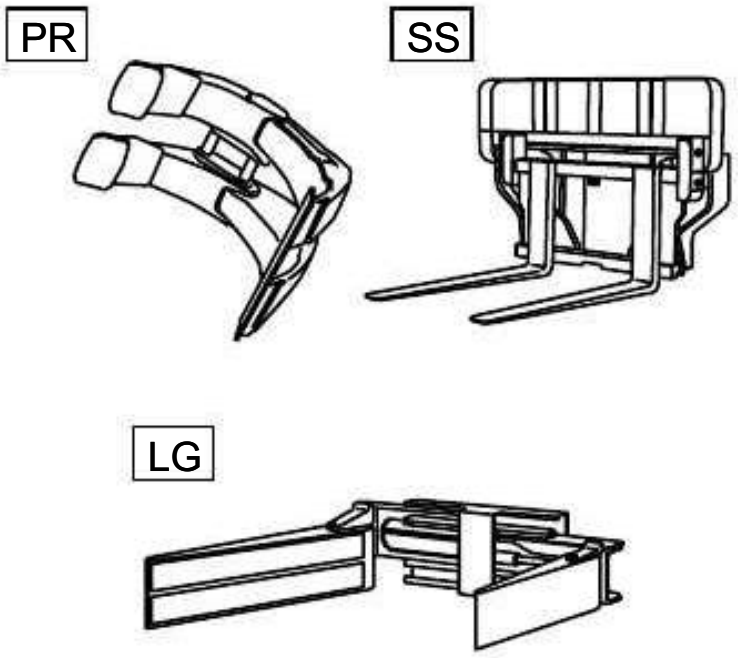
■ USE THE RIGHT TRUCK FOR THE JOB

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

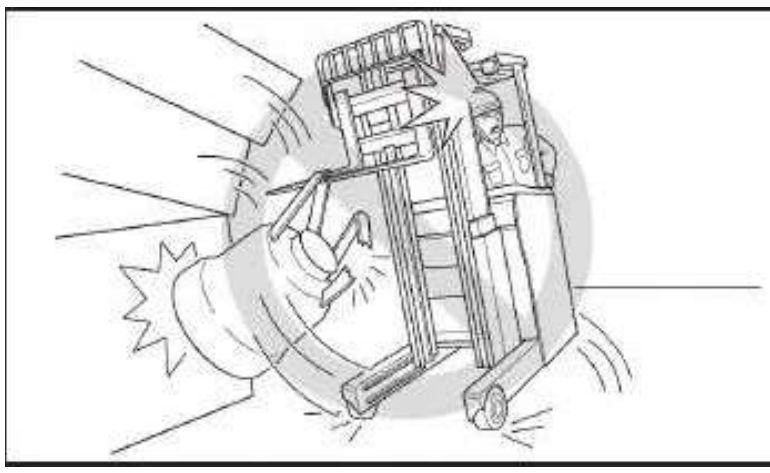
Check Point	Choice
Capacity	Load capacities range from 0.5 to 42 tons. Pay particular attention to the load center. (UniCarriers Lift Truck Capacities: 0.5, 0.7, 0.9, 1, 1.35, 1.5, 2, 2.25, 2.5, 2.75, 3, 3.5, 4, 4.5, 5, 6, 7, 8, 10, 10.5, 11.5, 12, 13.5, 15, 18, 20, 22, 23, 24, 25, 30, 37, or 42 tons.)
Power Source	Gasoline (including LPG), natural gas, diesel, and battery-powered models are available. Fuel costs and exhaust composition will vary.
Counterbalance	On counterbalanced models, the counterweight at the rear makes the vehicle longer than an ordinary 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-prevention or safety-reinforced construction is required. (A battery power source always offers better protection against fire than a combustion engine.)

■ USE THE PROPER ATTACHMENT

A few examples of attachments are shown below:



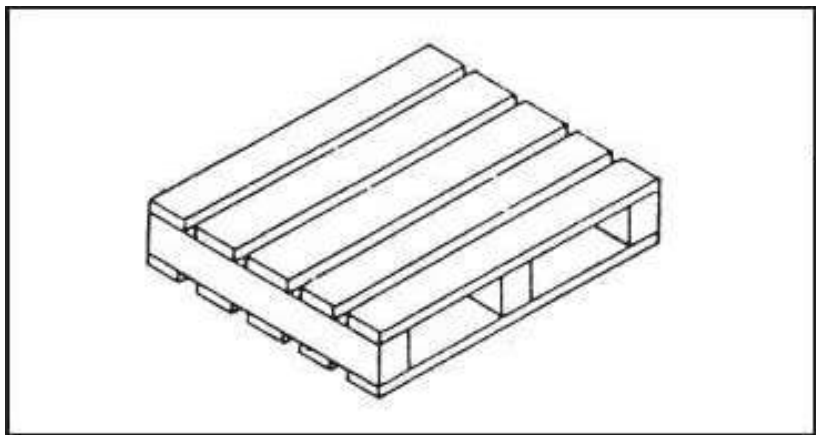
PR: Paper roll clamp (for handling paper rolls or drums)
LG: Load grab (for handling boxes and bags)
SS: Side shifter (for vanning or devanning or handling loads in other narrow spaces)



⚠ WARNING

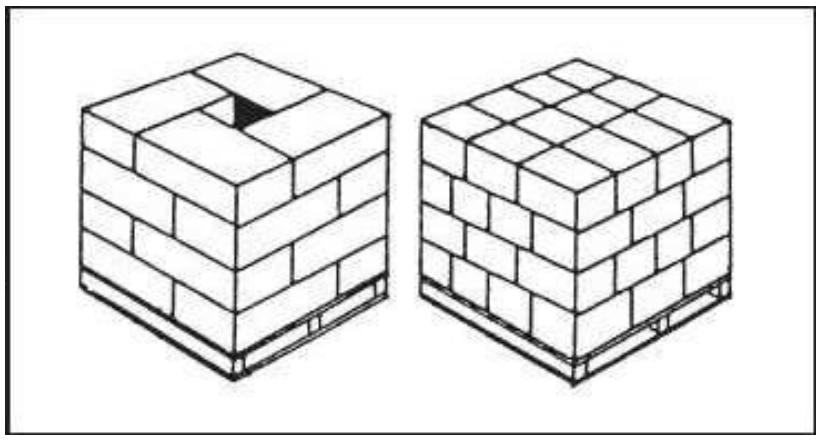
Avoid hoisting a load with wire rope hung from the forks or an attachment, and avoid lifting a freight container with forks, because there is danger of the truck's tipping over.
If necessary, have a qualified operator use a hook or crane arm attachment.

■ USE STURDY PALLETS



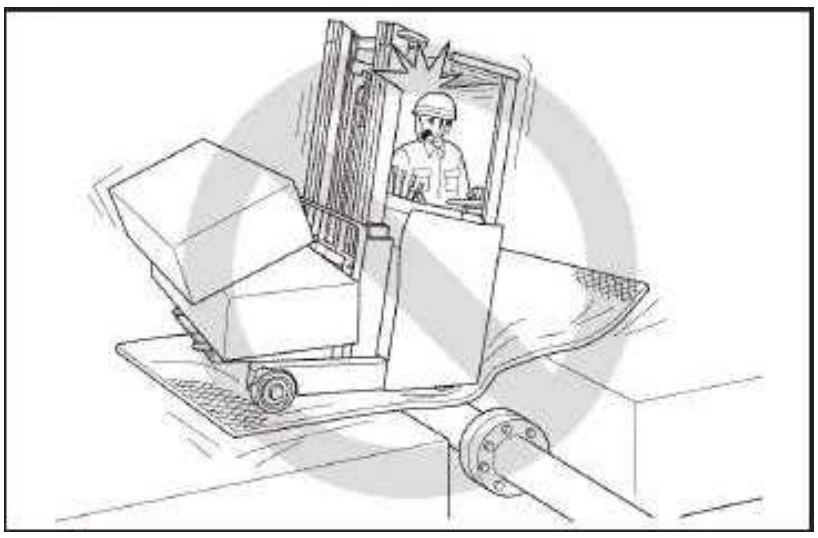
Pallets and skids must be strong enough to withstand the heavy weights of loading and unloading. Remove or repair any damaged pallet.

■ STACK LOADS SECURELY



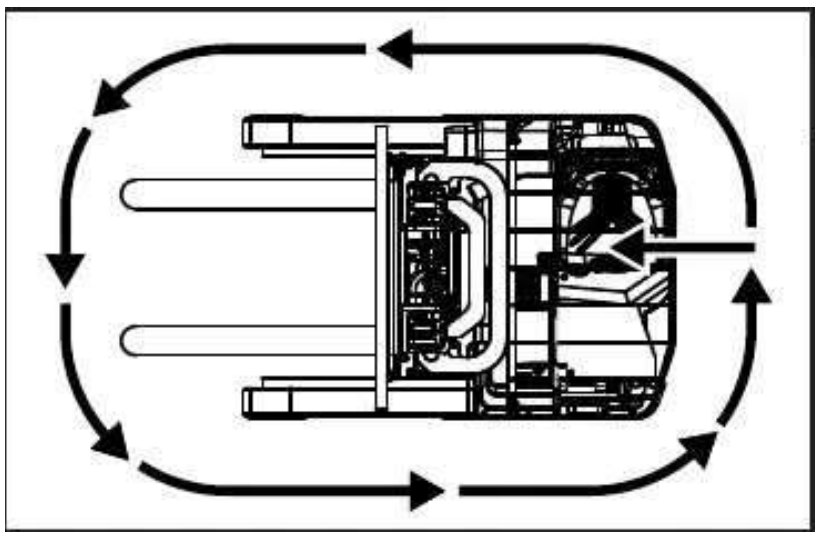
When stacking loads on the pallet, place items so they are stable and will not fall over easily, and be sure the weight is evenly distributed. Secure the top layer with a cord wrapped around it or with some other such method.

■ KNOW THE WITHSTAND LOAD OF YOUR FLOOR



The lift truck is heavier than you might think. For example, a 1.5-ton truck weighs almost 2 tons, when empty. And then, when loaded, 80 to 90% of the total weight of the reach truck is usually concentrated on the trailing 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 work shift to ensure that all essential safety features are working. Any abnormality must be reported to the supervisor, who is responsible for correcting it.

■ PERIODIC INSPECTIONS ARE MANDATORY

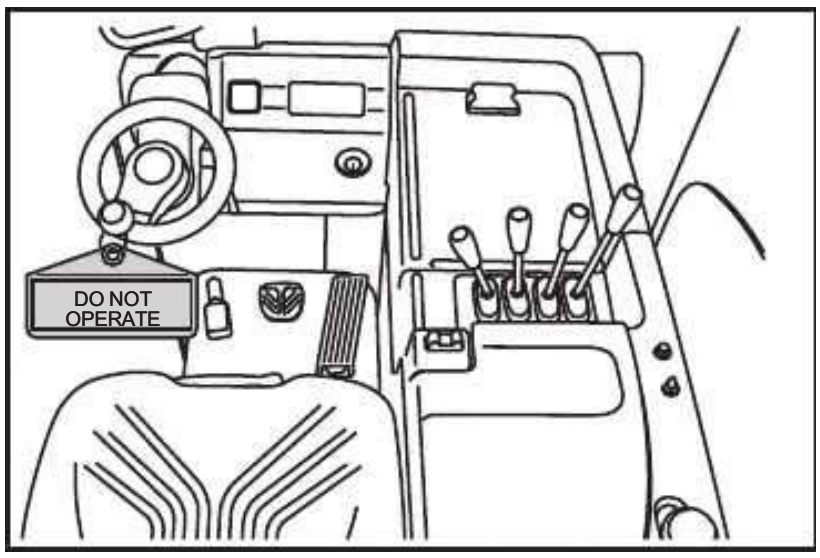
Monthly and annual inspections must be performed thoroughly, and any abnormality promptly repaired. Only a certified expert who has the advanced skills and equipment is allowed to conduct inspections.

■ REPLACE SAFETY PARTS REGULARLY

Names of the safety parts	Recommended replacement interval (year)
Load handling system hydraulic hose	1 – 2
Lift chain	2 – 4
Electromagnetic brake	9 – 10

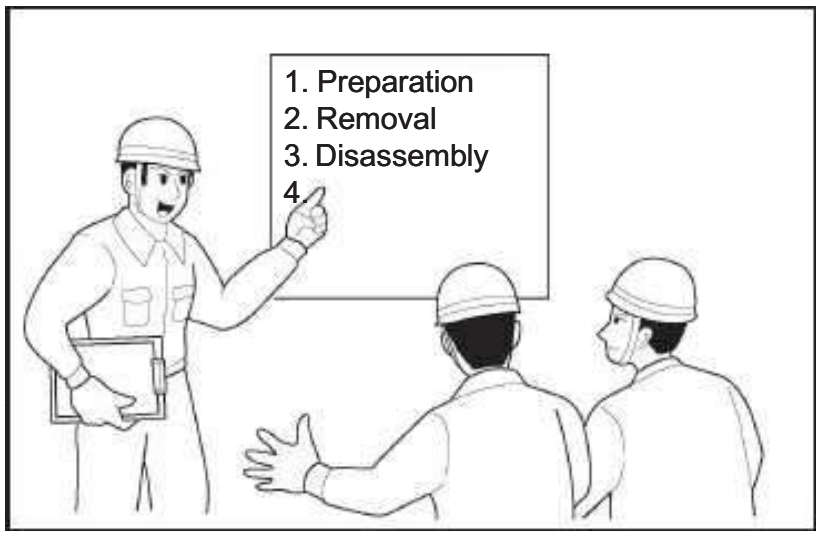
Certain critical parts must be replaced at regular intervals. Since it is difficult to detect wear on these parts by visual inspection, they must be replaced at the specified intervals, because a failure would result in a falling load or runaway truck.

■ NEVER USE AN UN-MAINTAINED TRUCK



A truck that has failed an inspection must not be operated. Hang a sign in the control area that says DO NOT OPERATE and remove the key, to make sure no one uses it. Then report the problem to the supervisor and wait for repairs 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 serious injury.

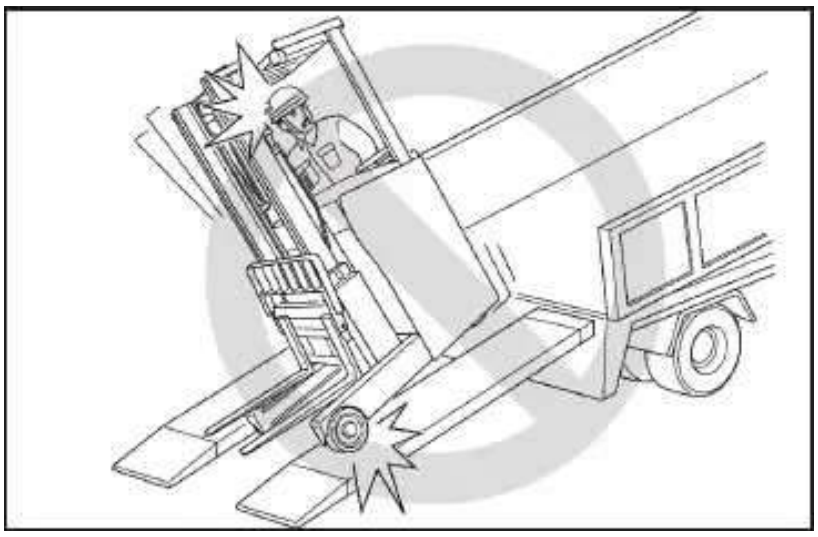
■ NEVER RUN ON PUBLIC ROADS

Use of the reach-type forklift truck should be limited to special applications in warehousing and in-plant assignments.

Never run the truck or work using the truck on public roads.

Being compact, the truck cannot negotiate irregularities or gradients. If you venture to do so, the truck might tip over. The truck may also impede the passage of other vehicles and pedestrians, since it runs slowly and turns sharply.

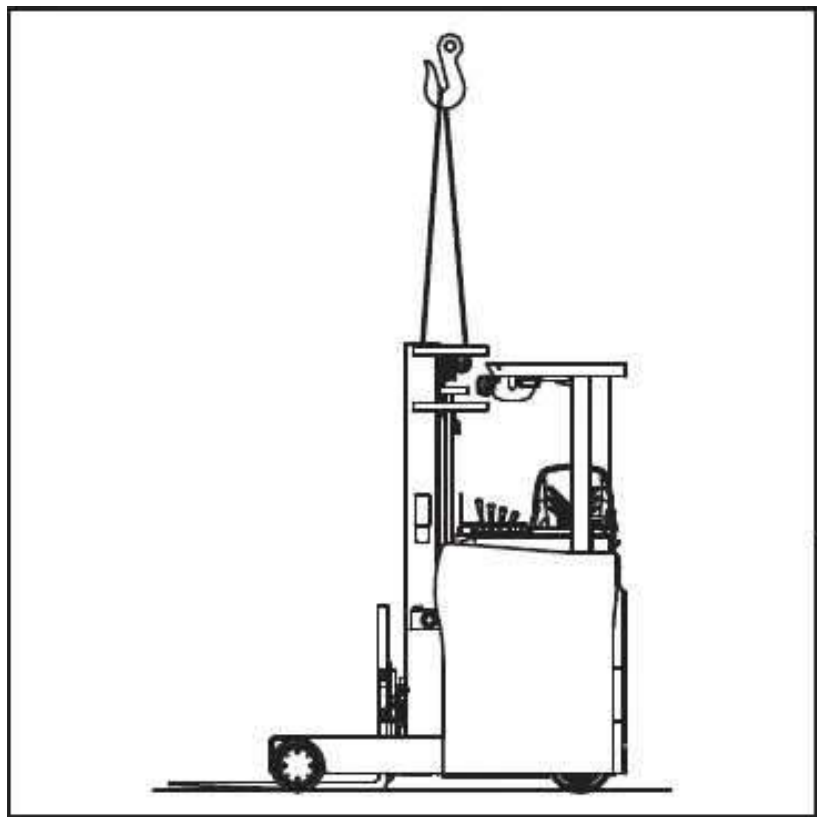
■ LOADING THE LIFT TRUCK ONTO A TRUCK TRAILER (USE RAMPS)



Work on a hard, level road surface when loading the lift truck onto or unloading it from a trailer:

- Be certain that the ramps are long and wide enough, as well as strong enough.
- Do not load or unload the lift truck when it is raining, unless the ramps have anti-slip surfaces.
- Jack up the trailer securely to prevent it from upending during loading or unloading.

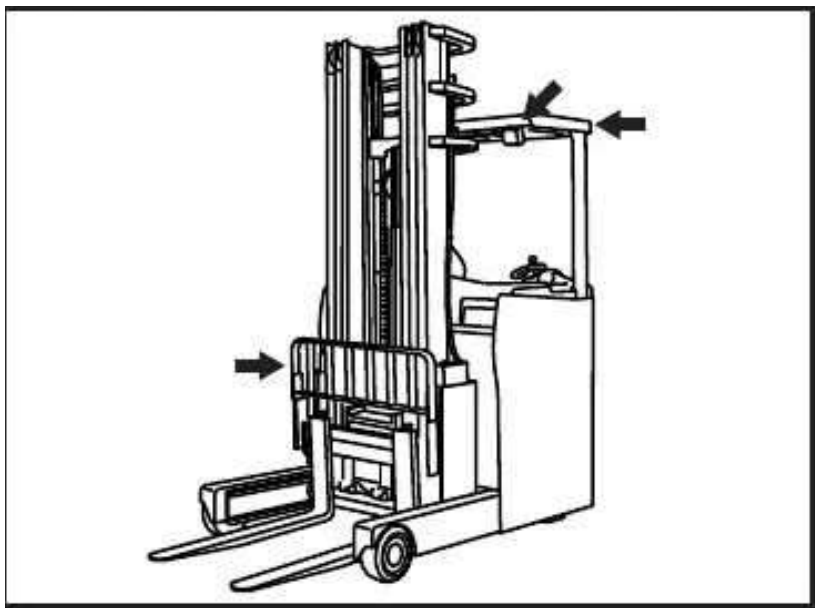
■ LOADING THE LIFT TRUCK ONTO A TRUCK TRAILER (USE A CRANE)



Load or unload the lift truck on a hard, flat road surface, and follow these precautions:

- Use a crane to hoist the lift truck to load or unload it from the truck trailer.
- When hoisting the lift truck, attach wire ropes to the lifting hooks at the top of the mast.
- Do not attach a wire rope to the overhead guard to hoist the lift truck. The lift truck could fall over.
- Use strong enough wire rope to support the entire weight of the lift truck. Do not use kinked, deformed or frayed wire rope.
- Never stand or walk under a hoisted lift truck.

■ NEVER OPERATE WITHOUT LIGHTS, THE OVERHEAD GUARD, OR THE LOAD BACKREST



The lift truck must not be used if the work lights, overhead guard, load backrest, or horn have been removed. Any parts that have been temporarily removed for some reason must be reattached immediately.

■ DO NOT MAKE MODIFICATIONS WITHOUT PRIOR APPROVAL

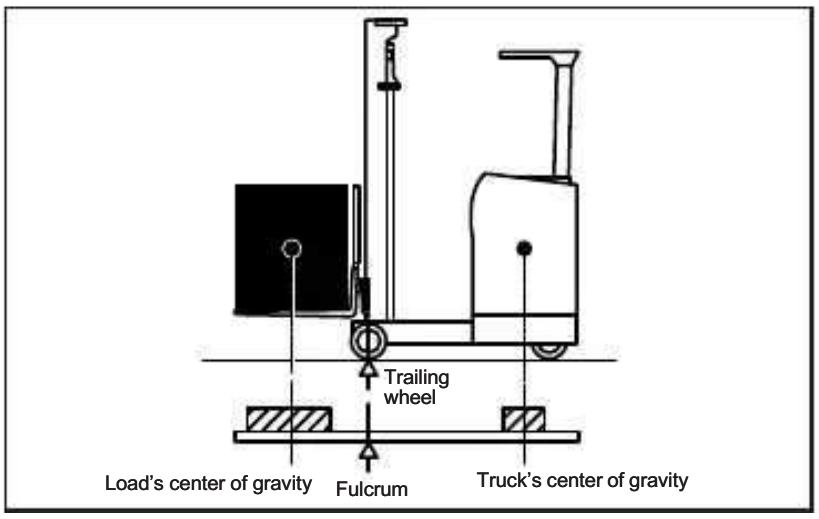
Modifications or additions that affect the capacity, construction or strength of the lift truck must not be performed by the user without the manufacturer's or his authorized representative's prior written permission.
For example, don't add a counterweight.

■ IMPLEMENTATION OF MODIFICATIONS

Only in the event that the truck manufacturer is no longer in business and there is no successor in the interest to the business, the user may arrange for a modification or alteration to a powered industrial truck, provided, however, that the user shall:

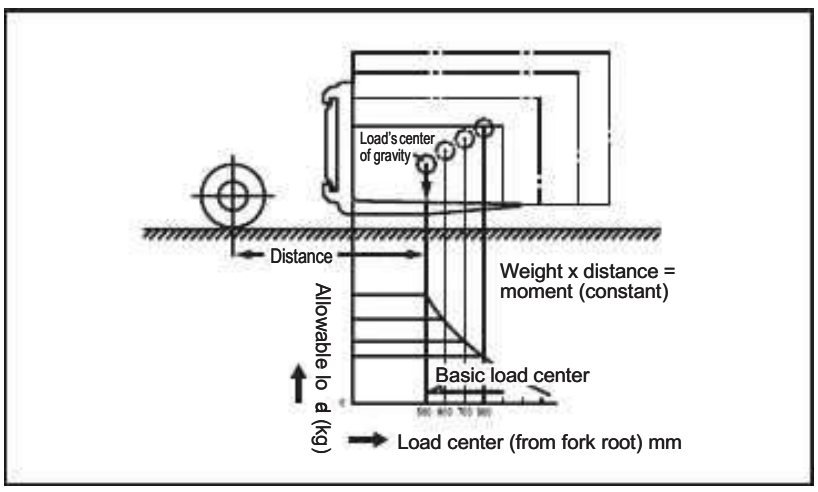
a) arrange for the modification or alteration to be designed, tested and implemented by an engineer(s) expert in industrial trucks and their safety;
b) maintain a permanent record of the design, test(s) and implementation of the modification or alteration;
c) approve and make appropriate changes to the capacity plate(s), decals, tags and instruction handbook;
d) affix a permanent and readily visible label to the truck stating the manner in which the truck has been modified or altered together with the date of the modification or alteration, and the name and address of the organization that accomplished the tasks.

■ HOW TRUCK BALANCE IS MAINTAINED



Reach trucks have load handling equipment, including a mast assembly, which travels back and forth along the outriggers. The trailing wheels of the truck work as a fulcrum to achieve balance between the truck's center of gravity and the load's center of gravity. The relationship between the locations of those two centers of gravity is vitally important for safety. The stability of the reach truck is maintained best when the mast assembly is fully retracted.

■ KNOW THE CENTER OF GRAVITY OF YOUR LOAD



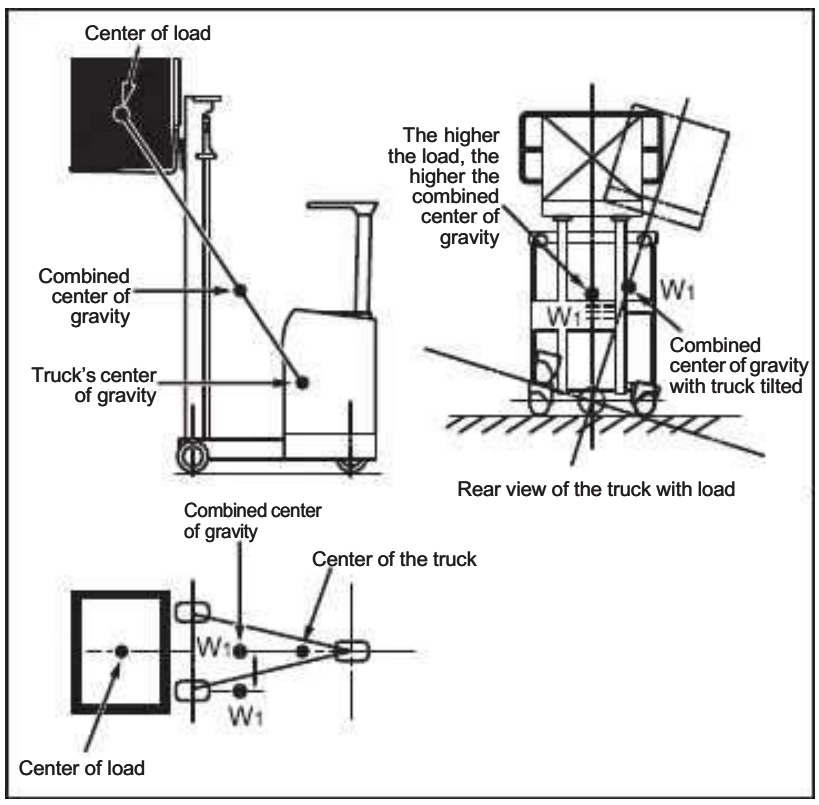
Materials of various shapes such as boxes or flat or cylindrical items may be loaded on the lift truck. In order to accurately judge the stability of the truck, it is vitally important for the operator to know the location of the center of gravity for each type of load.

■ HOW THE CENTER OF GRAVITY SHIFTS

The stability of the lift truck is determined by the combined 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 assembly is advanced or retracted along the outriggers or the forks are raised or lowered, the combined center of gravity also changes. The center of gravity is also governed

by the following factors:

- Size, weight and shape of the load
- Acceleration, deceleration and turning radius
- Loading or unloading height
- Surface condition and gradient of the road
- Tilt angle of the forks
- Type of attachment used
- Tire material



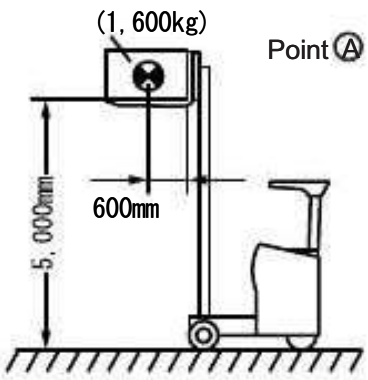
■ THE TRUCK TIPS WHEN THE CENTER OF GRAVITY IS OUTSIDE THE STABILITY TRIANGLE

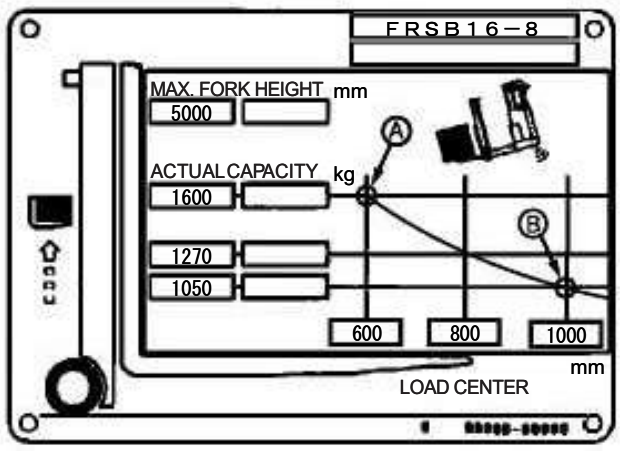
For a reach truck to remain stable, the combined center of gravity must be inside the triangle formed by the ground contact points of the left and right trailing wheels and the ground contact point of the drive wheel. This is called the stability triangle.
If the combined center of gravity moves back further than the trailing wheels, the truck will tip over backward with the trailing wheels as the fulcrum. If the combined center of gravity moves outside the stability triangle to the left or the right, the truck will fall over to that side.

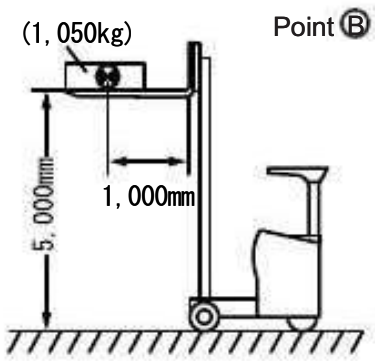
■ MAXIMUM LOAD (LOAD WEIGHT AND LOAD CENTER)

HOW TO READ THE LOAD CHART

When the load is raised higher, or the load's center of gravity is moved further backward (toward the trailing wheels), the allowable load is reduced accordingly.







The load center is determined by the distance from the face of the forks (or the front face of the load backrest) to the center of gravity of the load. The maximum load is the maximum weight allowable with that nominal load center.

The Load Chart, showing the relationship between the load center and the maximum permissible load, is attached to the truck as a decal. When the load center moves closer toward the tips of the forks, the combined center of gravity also moves further to the rear, which reduces the truck's lifting capacity.

■ ACCELERATING, DECELERATING AND TURNING

Inertia refers to the principle that a stationary object remains stationary as long as there is no external force acting to move it, and that a moving object continues moving at a constant speed as long as there is no external force acting to stop it.

When the lift truck starts to move there is a momentary backward force (resistance to moving) due to inertia, and when it stops there is a momentary forward force (resistance to stopping). As a result, if the brakes are applied suddenly while the truck is traveling in reverse, the backward force will become strong enough to tip the truck over backward. 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 tip over sideways. Since the zone of sideways stability is especially narrow, it is necessary to slow down a lot when turning, in order to prevent the truck from tipping.

When the load is elevated the combined center of gravity is raised, increasing the danger that the truck will tip over backward or sideways.

⚠ DANGER

■ If the truck starts to tip over, do not jump off it.

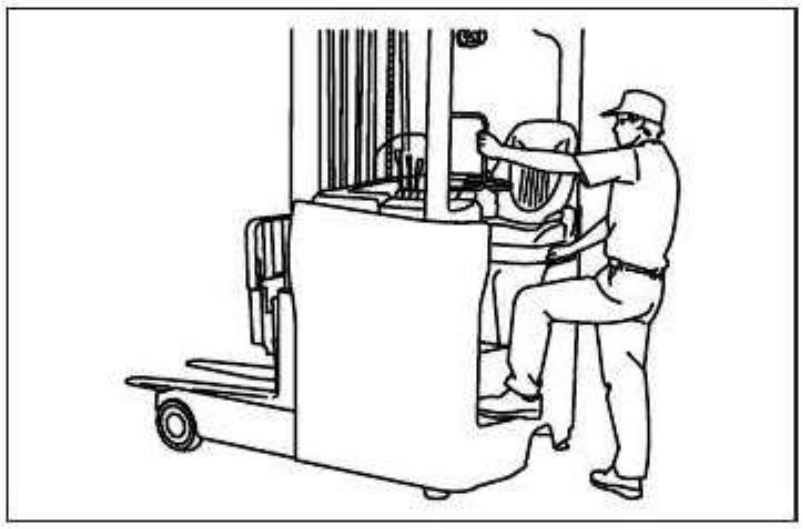
- **If the truck begins to tip over, hold onto the steering wheel firmly. Brace your feet. Lean away from the direction that the truck is tipping.**
- **After the truck has tipped over, turn off the key switch and leave the truck as soon as possible.**
- **If you ever feel the truck start to tip over, do not jump off the truck. You can be crushed under the truck, and be seriously injured or killed.**

⚠ WARNING

■ Do not operate the lift truck until preoperation checks are finished

If any defect is found during checking, report it to the supervisor and have it repaired.
Do not operate the truck until the malfunction or damage is properly repaired.

■ Mount properly



Never mount or dismount a moving truck. When mounting or dismounting the truck, make sure the truck is at a complete stop and use the assist grips.

■ When starting

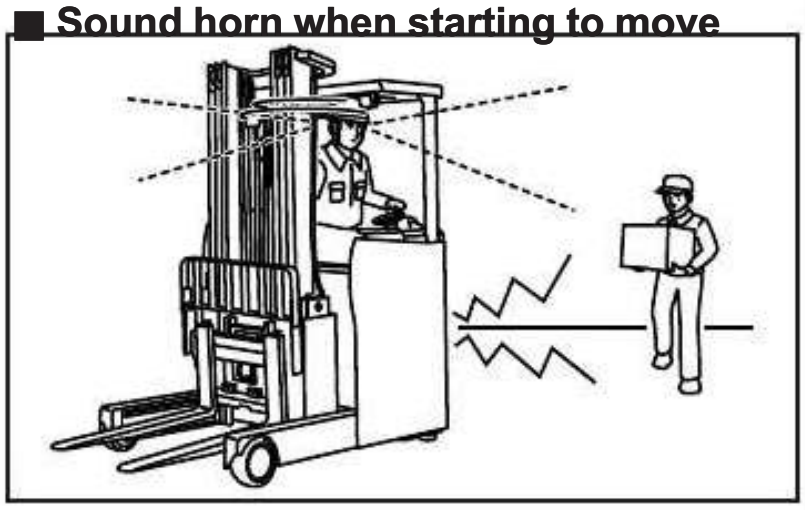
Before starting your lift truck (before turning the key switch on), follow the procedure given below:

- Make sure there is no one around the truck and sit down in the operator's seat.
- Make sure the accelerator pedal is in the "up" position.
- Make sure the brake pedal is not pressed.

■ Do not move the controls unless you are in the operator's seat

- Do not operate the controls (the levers and pedals) when you are not in the operator's seat.
- Always keep your body under the overhead guard while you operate the controls.
- Keep your arms, legs, and hands within the operator's compartment. Be especially careful to keep your left foot inside the operator's compartment.

■ Sound horn when starting to move



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

⚠ WARNING

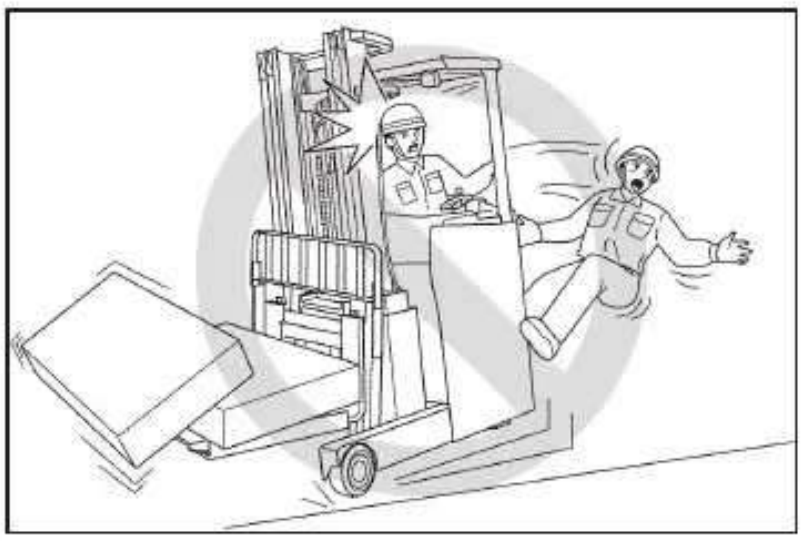
■ Keep your hands clean

It is dangerous to operate the steering wheel, load handling levers or direction shift switch with greasy hands. If your hands are contaminated with grease, oil, or dirt, wash your hands.

■ Keep the truck's center of gravity low while traveling (especially when loaded)

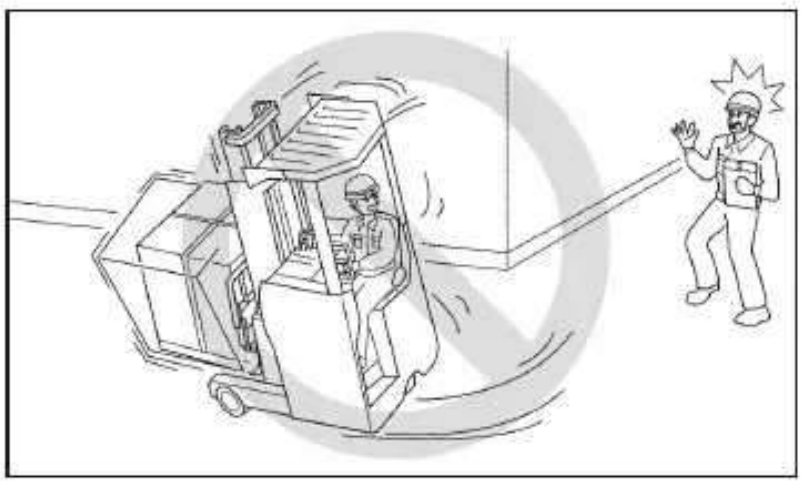
When traveling with a load, keep the load 5 to 10 cm higher than the top surface of the outriggers, with the mast fully retracted and the forks tilted back so as to lower the truck's center of gravity as far as possible. When traveling without a load, keep the forks 20 - 30 cm above the floor surface or ground and tilted back, with the mast fully retracted.

■ Never use a person as an additional counterweight



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

■ Avoid sudden starts, stops and sharp turns



Start, stop and turn slowly. Slow down the truck enough before turning. Especially note, an unloaded truck is prone to tip over when it is turned sharply, because the front of the truck is heavy. A loaded truck with the mast held high might tip over if the truck is turned sharply, resulting in personal injury or damage to the load.

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

■ Stay away from the edge of the road

There is a danger that soft ground can collapse, especially at the edge of a road or path. Stay away from such conditions. Keep an appropriate distance from the edge of a narrow road or a platform.
Do not drive on soft ground.

■ Do not travel over a floor surface or ground covered with water, nor operate the truck in a low-temperature, highly humid or dusty environment.

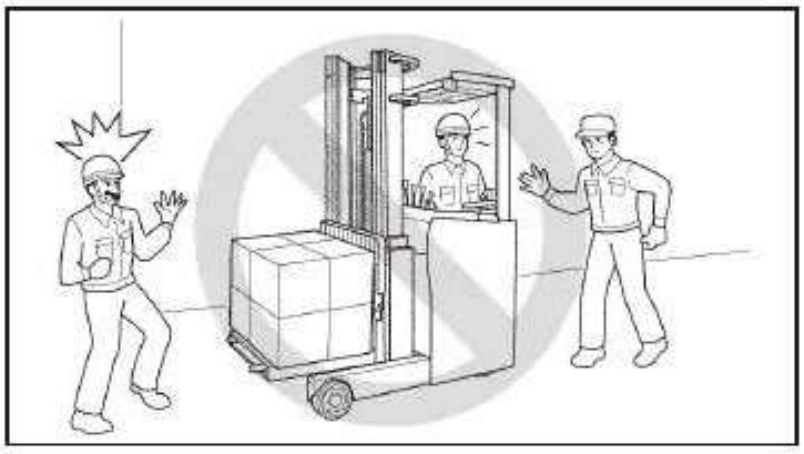
⚠ WARNING

■ Avoid running on a slippery surface

■ Do not drive over obstacles (curbs, railroad tracks, ditches)

If it is unavoidable, be careful.

■ 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, slow down and be careful to maintain a safe distance. Moreover, keep 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 overtake other vehicles where vision is restricted**
  Do not overtake other trucks at intersections, corners, narrow aisles and other locations where your vision is restricted.
- **Slow down at corners**
  Slow down and sound the horn at intersections and other locations where your vision is restricted.
- **Come to a complete stop before crossing roads or at corners**

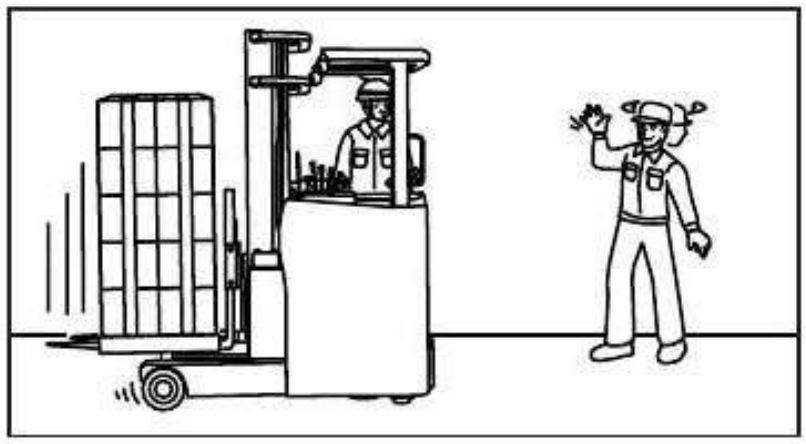
■ When going into areas where there are limits in height and width, use the following precautions:

- 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.

■ The front of the truck swings outward when turns are made while driving in reverse

If the truck is turned while driving in reverse, the front of the truck will swing outwards. Before turning, make sure there is enough clearance from the wall and other obstacles to allow for this.

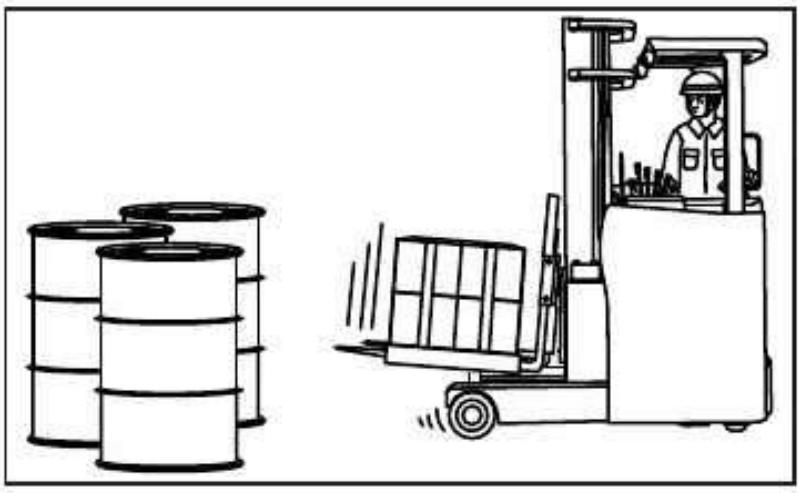
■ Have a helper guide you when handling bulky loads



When handling bulky loads that restrict your vision, operate the truck in forward to improve visibility. Have a helper stand outside the truck, and tell him to give you instructions to guide you so you can work safely.

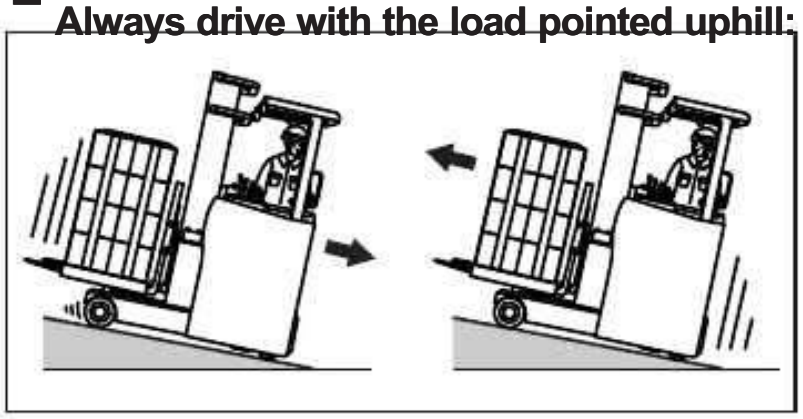
⚠ WARNING

■ Do not rely too much on side view mirrors or the backup buzzer



When traveling, always look in the direction of travel. Do not rely too much on the side view mirrors and the backup buzzer.

■ Always drive with the load pointed uphill:



- Do not make turns on a gradient. There is danger that the truck will tip over.
- Keep the forks and pallet at an appropriate ground clearance height.
- When operating an unloaded truck on a grade, have the rear end (fork side) of your truck pointed downhill.
- When operating a loaded truck on a grade, have the rear end (fork side) of your truck pointed uphill.
- When going down a grade, use the brake.
  When going down a grade, use the foot brake and drive carefully. When you drive a truck equipped with a regenerative braking system, use the foot brake at the same time.
- Never turn the key switch OFF while running on a gradient.

■ Brake the truck in plenty of time:

- The stopping distance of the truck is longer on a downhill than on a flat surface.
  The truck is also prone to skidding sideways when braked on a downhill run. Keep the traveling speed under your control.
- The truck takes a little longer than usual to come to a stop on a slippery surface. Brake the truck in plenty of time.

■ Do not turn off the key switch while traveling

Do not turn off the key switch while traveling. You cannot turn the truck with the key switch off.

■ When driving over a ramp:

- Do not drive near the edge of a ramp or loading bridges; otherwise the truck might fall over, leading to personal injury or even death.
- Before driving over a ramp or loading bridge, make sure it is properly secured. Never exceed its rated capacity. Do not use a damaged ramp or loading bridge.
- Have the brakes set and wheels blocked in place to prevent the trailer from moving.
- Jacks must be installed to support the trailer when the lift truck goes onto the trailer.
- Drive carefully and slowly across the ramp or loading bridge.
- Watch out for bystanders.
- Give instructions to the trailer driver not to move the trailer until load handling has been finished.
- Make sure the ramp or loading bridge is secured.
- On rainy days, the lift truck is apt to skid on the ramp or loading bridge.
  Use anti-skid ramps or loading bridges; otherwise cancel the operation.
- Make sure the ramp or loading bridge is free from lubricant.

WARNING

■ Stop operation immediately if you notice any abnormal operating noise or vibration while traveling

The drive system of the truck, including the wheels, might malfunction for some reason. Stop operation immediately and ask your local UniCarriers dealer to make repairs.

■ 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.

■ 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 the truck carefully; reckless driving and operation can cause personal injury or an accident.

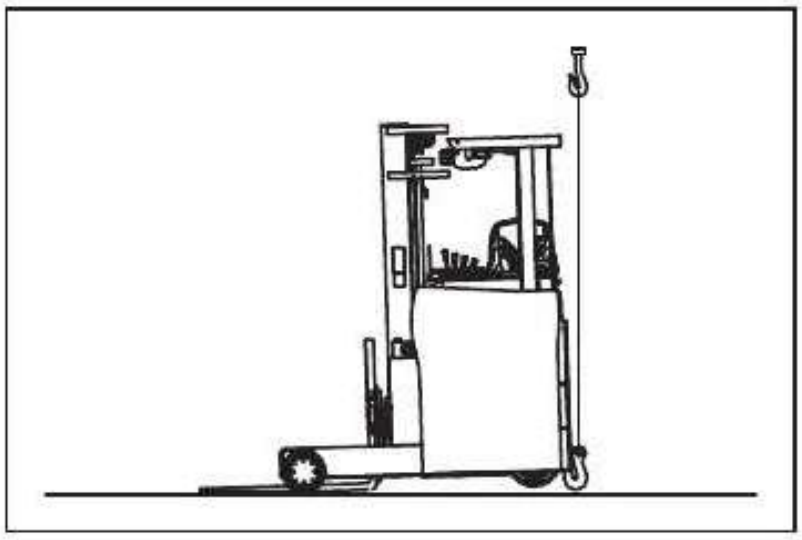
■ When you are operating several trucks

When operating several trucks, remember that their operating controls -- including the brake, accelerator pedal and loading handling levers -- have their own characteristics, even if the trucks are of the same specification. When you change trucks, keep this point in mind. In particular, pay attention to possible differences in the braking system.

■ Do not use another vehicle to tow a disabled lift truck

Do not tow a disabled lift truck with a defective brake or steering unit using another vehicle. There is a danger that the lift truck could get out of control during towing.

■ If you need to move a disabled lift truck, raise the drive wheel off the ground using a crane or the like.



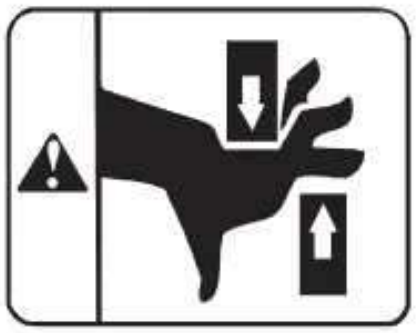
⚠ DANGER

■ Do not operate the reach lever when you are not in the operator's seat

- Do not operate the reach lever with your body positioned between the mast and the truck frame; otherwise there is a danger of serious personal injury or death.
- The mast should only be advanced or retracted from the operator's seat.

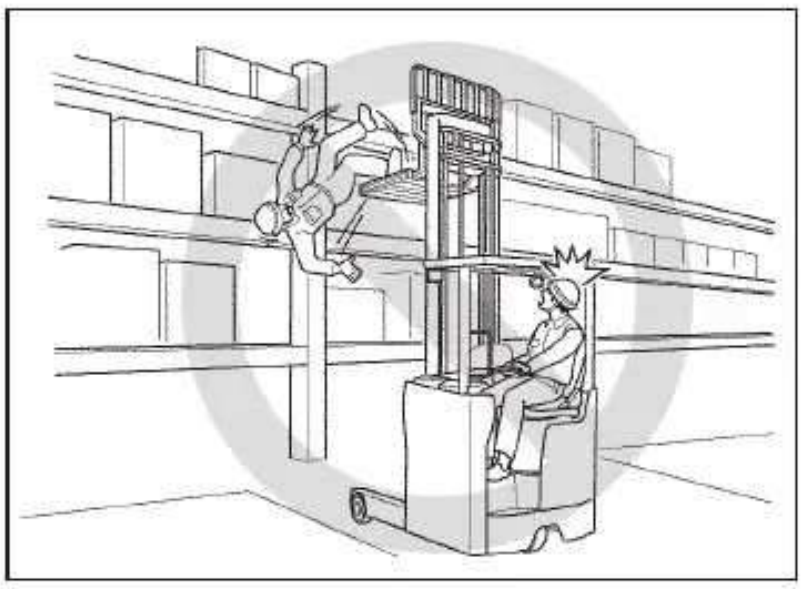
■ Do not put your hands or feet into the mast assembly

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



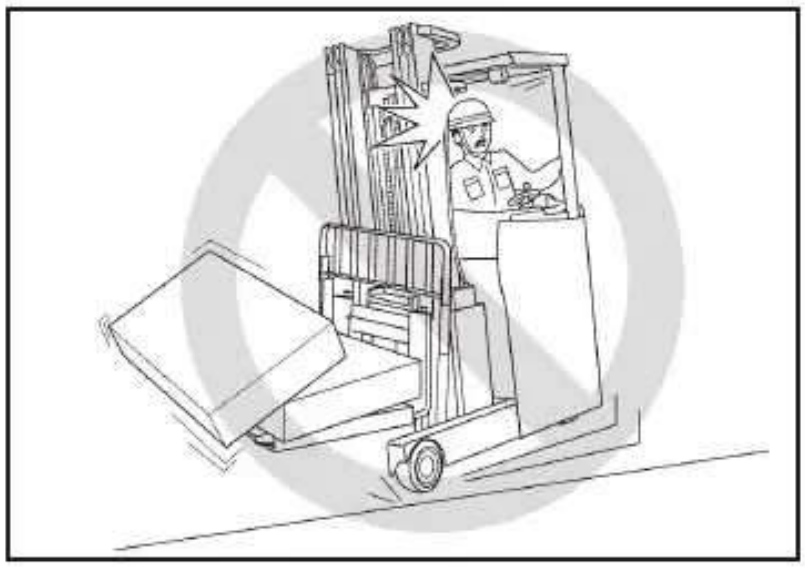
■ Never lift a person

Never allow anyone to ride on the forks.
They might fall off and be injured.



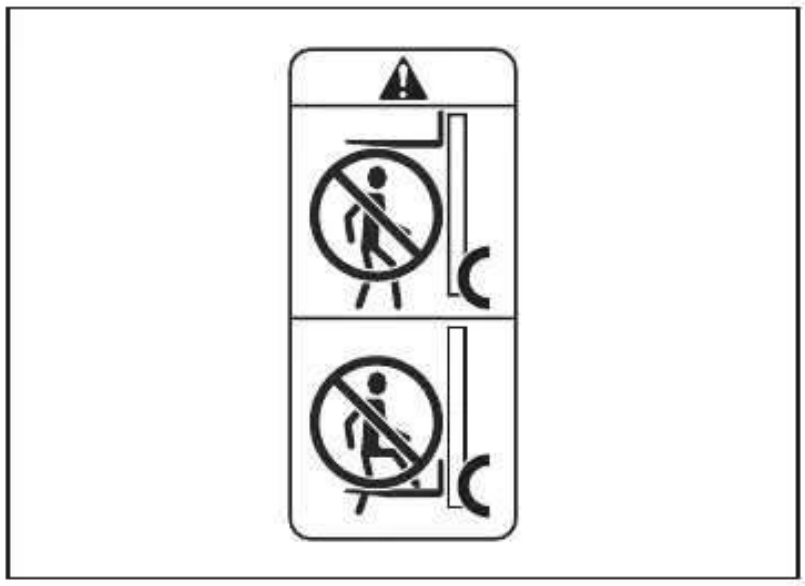
■ Never overload

Do not exceed the rated load capacity specified on the load chart attached to the lift truck; otherwise the drive wheel may be raised, thus making it difficult to travel and turn. There is also danger that the truck will tip over.



■ Never lift a load above a person

Never permit anyone to stand or walk under raised forks. The forks can descend rapidly and unexpectedly, causing serious personal injury.



⚠ WARNING

■ Keep anyone but your helper away from the working area

■ Do not let other people or trucks approach your lift truck during operation

■ When working in a group, have one person present to give directions, and follow his instructions

■ Do not use your truck for other purposes than the ones 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 vehicle using a wire rope.
- Do not push or pull loads with the forks; otherwise, the load might fall off or get damaged. In particular, a truck with a maximum lift height of more than 150 cm might tip over, if you try to do that.
- Do not push anything sideways using the side shifter.

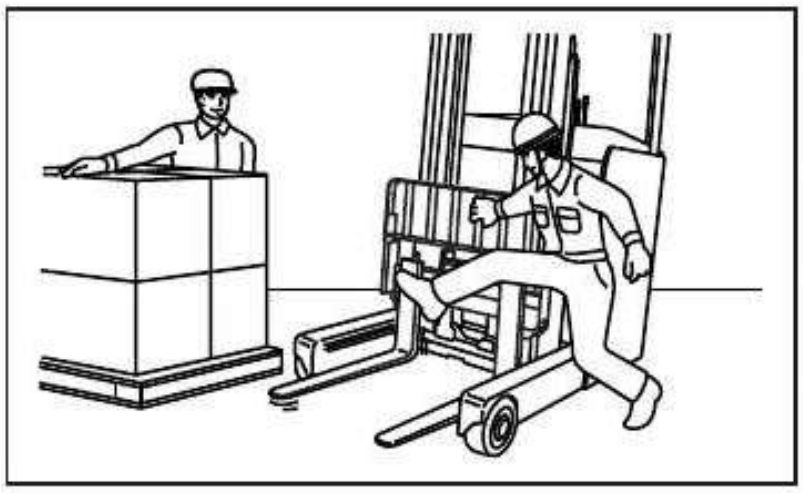
■ Pay attention to the fork tips

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

■ Adjust the fork spread properly

Adjust the fork spread correctly to fit the size of the load you are going to handle.

■ Adjust the fork spread with your feet



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

■ Make sure the forks are securely locked

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

■ Do not pick up loads from another truck

- Do not pick up loads from the forks of another truck. This might cause an off-centered load or cause the load to fall off.
- Do not lift a load off the forks by hand.

■ Do not hold loads on the forks by hand

Do not hold loads on the forks using your hands. If the truck moves unexpectedly, the load might fall off, landing on the person trying to support it.

■ Make sure loads are in contact with the load backrest

Insert the forks into the pallet as far as possible to bring the loads into contact with the load backrest.

⚠ WARNING

■ Do not stack loads too high on the forks

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

■ Do not lift unstable loads

Do not handle unstable loads. Ensure that loads on pallets are stable, neat, cross-tied if possible, and evenly distributed.

■ Use special caution when stacking or unstacking loads

When stacking or unstacking loads, stabilize them with ropes or other means, to prevent from falling off.

■ Use strong enough pallets and skids

Pallets and skids must be strong enough to withstand the load weights. If you use a damaged pallet or skid, the load might fall off the forks.

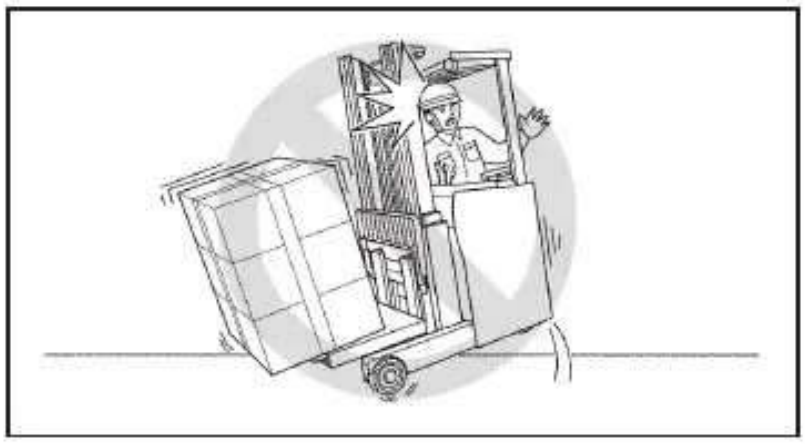
■ Use extreme caution when handling long or bulky loads

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

■ Be alert for overhead hazards

Be careful not to let the mast or overhead guard contact any 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 could tip over. Remember that the mast becomes taller when the forks are raised. Extreme caution should be exercised when traveling forward.

■ Do not jerk the load handling levers while there are loads on the forks



Avoid sudden operations with the forks or the mast while there are loads on the forks; otherwise the truck might tip over.

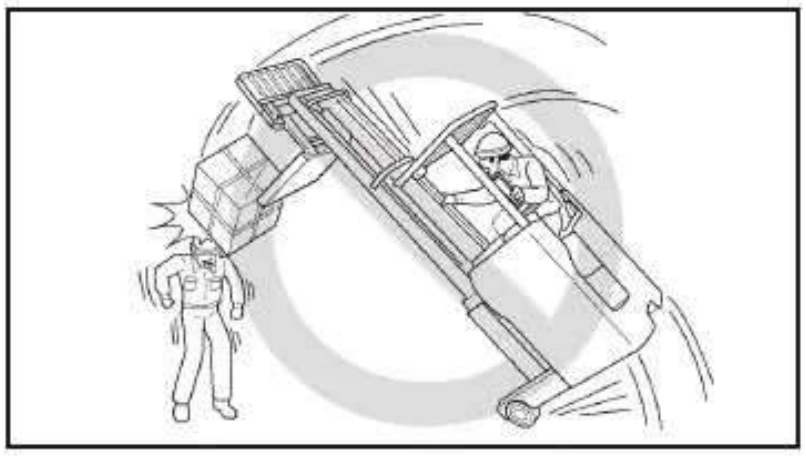
■ Never operate the reach mechanism when the load is in contact with the ground

Never operate the reach mechanism with the load in contact with the ground (with the forks down).

■ Do not push or pull loads by using the reach mechanism

Do not push or pull the load by using the force of the reach cylinder.

■ Do not tilt the mast forward with high loads



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

⚠ WARNING

■ Do not lift the forks or start with mast tilted forward

Do not perform the following operations when the mast is tilted forward: lifting the forks, elevating and retracting the mast, and starting and traveling with the truck.

■ Do not handle loads on a sloping grade

■ Do not squeeze loads into a stack

Do not squeeze loads into a stack by using the truck's traction force or by moving the mast forward. This will cause damage to the truck or loads, possibly causing the truck to tip over.

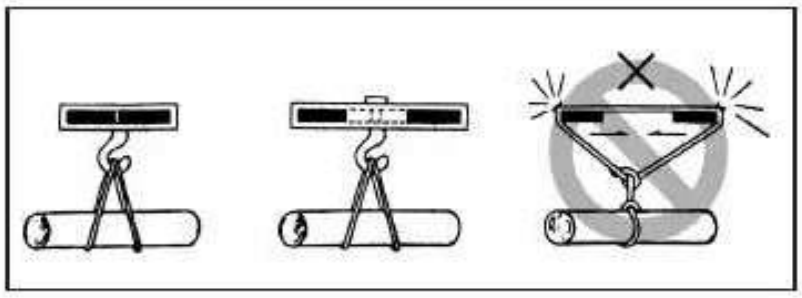
■ Do not lift off-centered loads

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 can cause the truck to turn over.

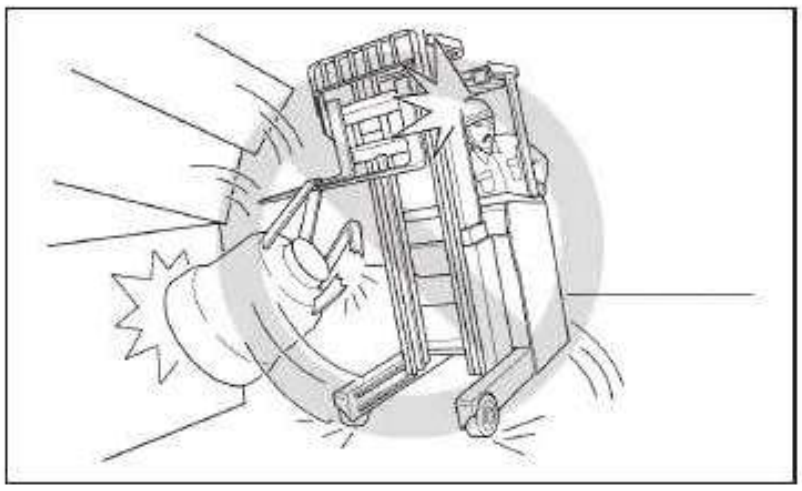
■ Keep the chains tight

A slack chain can lead to a mast rail or carriage hang-up, which might cause the sudden fall of loads or the carriage, or make the truck tip over. Keep the lift chains stretched tight at all times.

■ Do not hang loads from wire ropes attached directly to the forks:



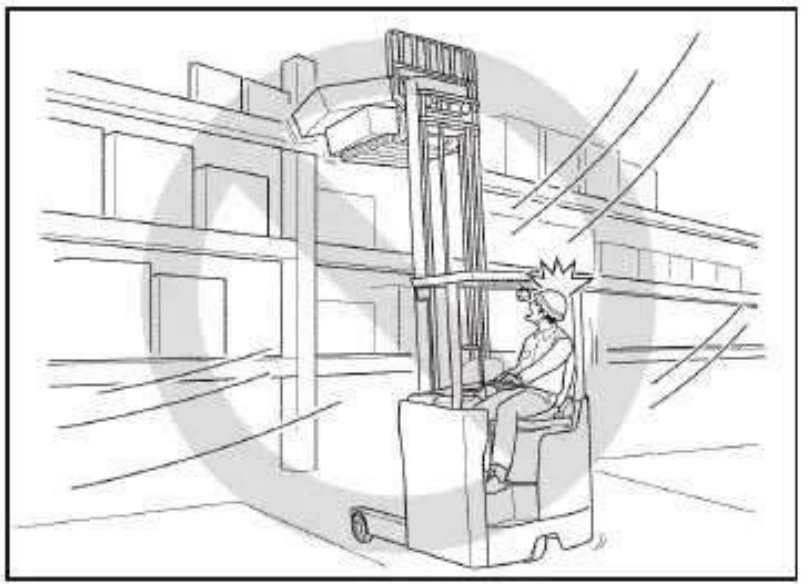
- Do not hang loads from wire ropes attached directly to the forks or attachment. If the wire ropes break or slide off, personal injury might result. In particular, never attach a wire rope on one of the forks to lift a load; there is a danger that the lift truck will turn over.



- 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 are properly attached. The ropes should be as short as possible and still have an adequate angle of spread between the legs.
  - ◎ Travel and turn when very carefully with a hanging load held by wire ropes; otherwise, if the load swings, the truck could tip over or nearby items could be damaged.

⚠ WARNING

■ A strong wind can cause loads to spill or the truck to tip over



Loads can spill or the truck could tip over due to a strong wind. The risk of such an accident increases particularly seriously when the loads are raised high. Stop the operation or take necessary safety measures when a strong wind is blowing.

■ Do not operate the side shifter with the forks raised

There is a danger that the truck may lose its lateral balance, and flip over sideways. The use of side shifters should be limited to aligning the truck's center of gravity with the load's center of gravity when picking up a load.

WARNING

■ Park in the specified area

■ Park on a hard surface

■ Park in an out-of-traffic area

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

■ Block the wheels when parking on a slope

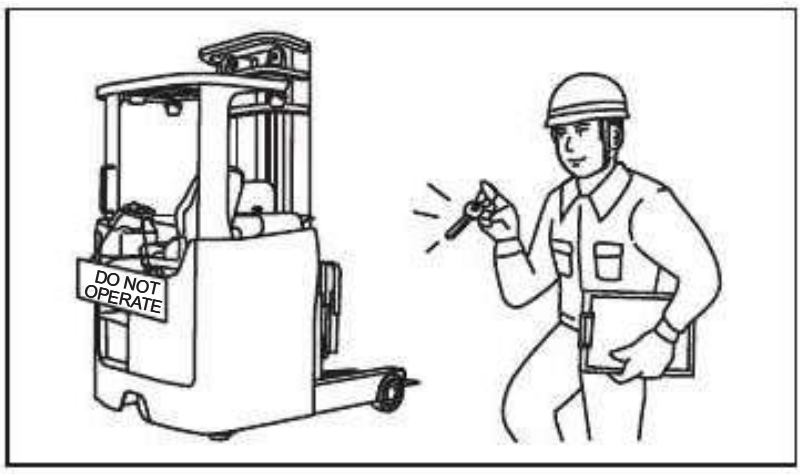
If it is unavoidable to park on a slope, apply the parking brake securely and block the wheels.

■ Do not park near flammables

■ When parking a disabled truck

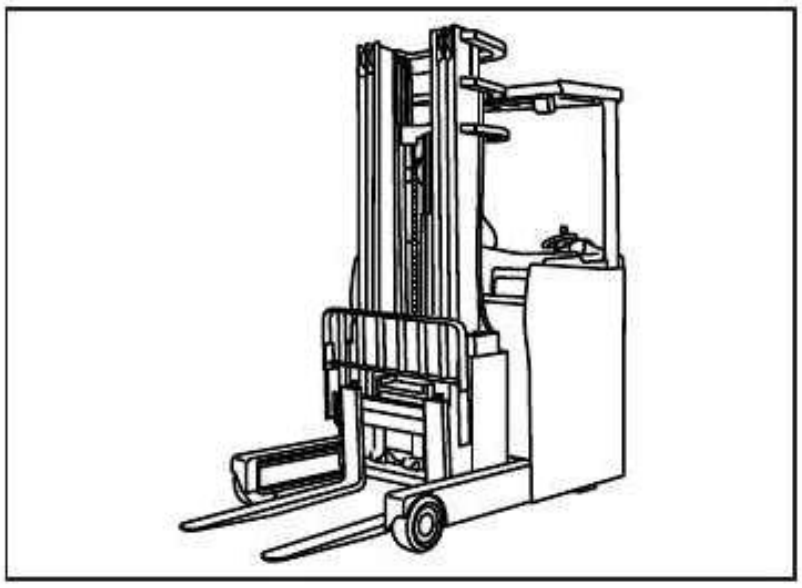
If it is not possible to lower the forks to the ground due to a faulty load handling mechanism, attach a sign to the tips of the forks to prevent pedestrians and other vehicles from bumping against the forks. Park the truck at an out-of-traffic area and take measures to keep people from passing under the raised forks.

■ Remove the key from a disabled truck and put up a sign



Turn off the key switch and remove the key. Attach a sign saying DO NOT OPERATE.

■ When leaving the truck, observe the following procedure:



- Park the truck in an out-of-traffic area.
- Remove your foot from the brake pedal.
- Release the accelerator pedal.
- Retract the mast fully.
- Lower the forks to the ground.
- Tilt the forks a little forward and make sure the fork tips are in contact with the ground surface.
- Turn the key switch OFF.
- Remove the key.

⚠ DANGER

■ Inspection and maintenance must only be performed by qualified personnel

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

■ Precautions to take when using battery chargers

- **Do not disconnect the power supply plug or battery connectors during charging; otherwise there is a danger of generating sparks and causing an explosion.**
- **Do not try to touch any components inside the charger.**

■ Precautions to take when using a jack

Do not go under the truck while it is jacked up. The truck might fall, crushing you under it. Before jacking up the truck:

- **Remove the load from the truck.**
- **Block the wheels to prevent an accidental roll.**
- **The operator must leave the operator's seat. Lift the truck off the ground a little bit and put supports under the frame at both sides of the truck to prevent the truck from falling.**

⚠ WARNING

■ Do not operate a truck if it is need of repair

If at any time your lift truck is found to be in need of repair, or is defective or unsafe, hang a sign in the control area that says DO NOT OPERATE, remove the key and then report the problem to the designated supervisor. The truck should be taken out of service until it has been restored to a safe operating condition.

■ Park on 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 dust-free.

■ Insure good ventilation

When performing inspection and maintenance indoors, make sure there is good ventilation.

■ Have fire prevention equipment handy

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

■ Wipe up any spilt oil or grease

Wipe up 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 allowed (when handling lubricants, batteries, cloth wetted with oil)

No fire is allowed. Never smoke or use fire or a naked flame when handling lubricants, batteries or cloth with oil on it.

■ Use the appropriate tools

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

■ Do not use tools for other purposes than those specified

Do not use tools for purposes other than the specified ones. You can cause a serious accident.

■ Avoid loose fitting clothing

Wear the protective clothing called for by the job conditions.

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

⚠ WARNING

■ When working in a group, have a designated leader and follow his instructions

■ Turn the key switch off

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

■ Unless otherwise specified, the key switch must be off

The truck is to be parked with the key switch off, and battery connectors disconnected unless the conditions require otherwise.

■ Before starting inspection or maintenance, place all load handling levers in neutral

■ Make sure the forks and other attachments (if any) are on the ground

■ If it is unavoidable to work under raised forks or attachments, use a stable support under the inner mast and/or the carriage to prevent the forks or attachment from falling down unexpectedly

■ Do not put your feet under the forks

■ Use caution to avoid getting your fingers pinched

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

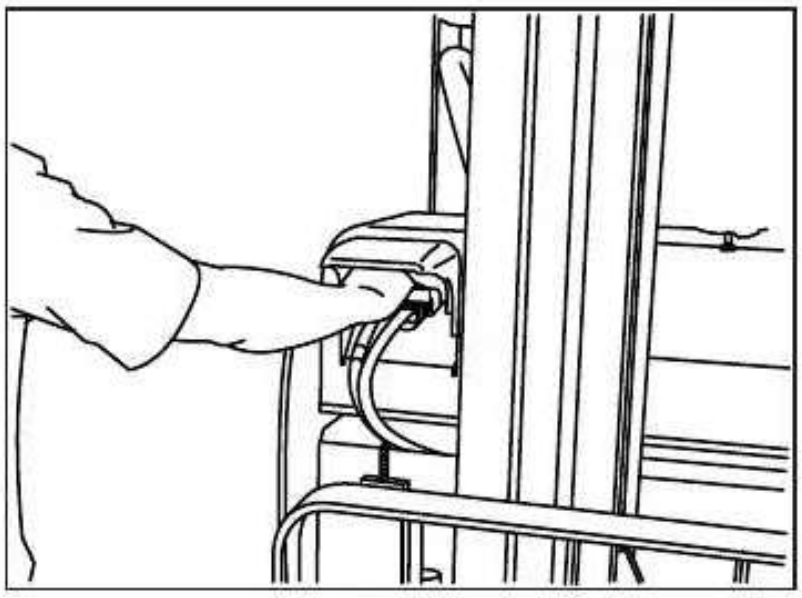
■ Use caution when making checks in elevated locations

Do not climb on the truck frame to inspect or service the truck. If you must climb up on the truck, wear a hard hat and be careful not to fall. When making checks or performing servicing in an elevated location, use an appropriate step stool or work platform and wear a hard hat, a safety belt and a safety rope.

■ Do not use the mast as a ladder:

- When carrying out checks or making adjustments, do not use the connecting member or load backrest as a ladder. The mast can move unexpectedly, pinching or cutting your hands or feet.
- Do not use the mast as a ladder. You might fall from the mast, experiencing a serious accident.

■ Make sure the battery connectors are disconnected before working on the rotating parts



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

⚠ WARNING

■ Wear protective gear when checking for leaks

To check for oil leaks, wear safety glasses and thick gloves and use a piece of cardboard or wood as a test target. High pressure oil can penetrate the skin or cause blindness.

■ Hydraulic oil is hot immediately after the truck stops operating

Immediately after the truck stops operating or running, the hydraulic oil is hot and under high pressure. Do not try to drain the hydraulic oil or replace the filter at that time. Hot oil might spurt out and cause burns.

■ Release the oil pressure before working on the system

The hydraulic circuit has residual pressure. Before working on the system, release the pressure.

How to release the oil pressure:

Lower the forks on the ground. Turn off the key switch and move each of the valve levers back and forth.

■ Checking the accumulator and its pipes is hazardous

Inspecting the piping where an accumulator is installed is hazardous. When it needs to be inspected, ask your UniCarriers dealer to do it.

■ If high pressure oil comes in contact with your body, get medical attention immediately

■ You should not attempt to repair or modify the drive motor or inverter yourself

Inspection or repair of the drive motor or inverter should be done by specialists.

■ Precautions to be taken when handling batteries:

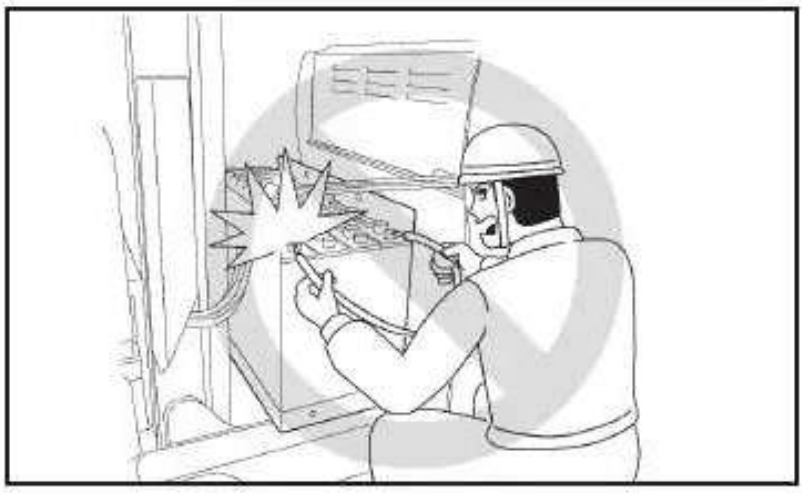
- **If electrolyte gets on your skin, flush it off with a large amount of water.**

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 your eyes. If battery electrolyte comes in contact with the skin or clothing, wash it away immediately with a large amount of water.

- **If electrolyte gets into your eyes, get medical attention.**
  If electrolyte gets into your eyes, flush it out immediately with a large amount of water and get medical attention.
- **If anyone swallows electrolyte accidentally.**
  Get him to drink a whole lot of water and induce vomiting, or get him to drink milk with egg white and salad oil mixed in it. Send for a doctor.
- **Wear safety glasses when handling batteries.**
  Wear rubber gloves, rubber boots, and safety glasses when changing or charging batteries, adding battery electrolyte, or adjusting the specific gravity of the battery electrolyte.
- **The electric truck has high voltage batteries.**
  The batteries used in electric trucks are high voltage -- more than 48 V. If anyone touches one by mistake, he can get an electrical shock or a burn.

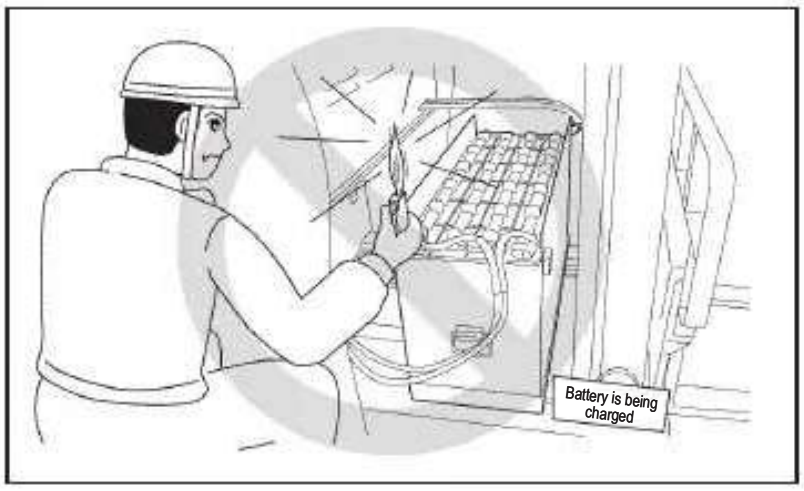
⚠ WARNING

- **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 key switch and charger switch before connecting or disconnecting the battery or charger cable.
- **Do not put any metal tools 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 can cause sparks, leading to an explosion. Make sure the terminals are tight. Be careful to avoid having faulty connections to the battery terminals.

- **Poor attachment of the battery connectors can cause sparks or an overheated plug, resulting in an explosion or burns.**
- **When charging the battery, follow the instructions in the Instruction Manual of the charger.**
- **If you stop the charging process midway, make sure to press the STOP button on the charger.**
- **Do not connect or disconnect the power supply plug with wet hands.**
- **No fire permitted during charging**

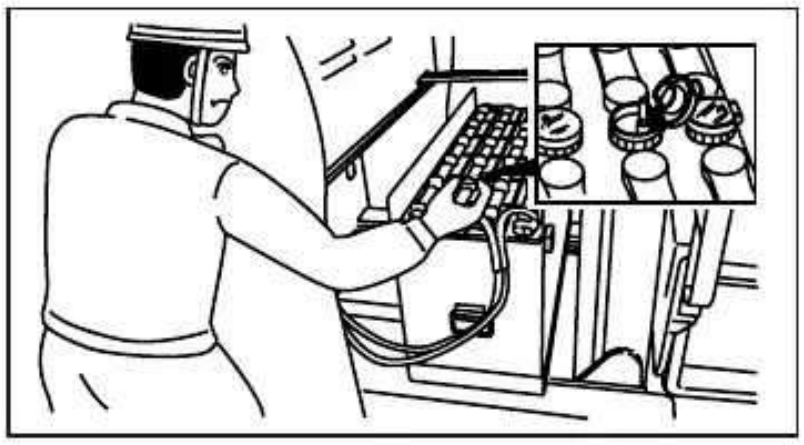


Batteries give off hydrogen gas during charging. No fire. No sparks.

- **Make sure the battery electrolyte temperature is below 40°C**
  Hydrogen gas is released from the battery during charging, and the battery also heats up. Before trying to charge the battery, make sure the battery electrolyte temperature is below 40°C.
  (If the electrolyte temperature reaches 50°C or higher, stop charging and wait until the electrolyte temperature drops to 40°C or lower.)
- **Provide good ventilation when charging**
  Since hydrogen gas is released from the battery during charging, you need good ventilation; otherwise an explosion might result. Keep the battery case cover open.
- **If any of the following problem is found, contact your local UniCarriers dealer:**
  - ◎ Loose or excessively discolored battery plug or charger plug (overheated plug)
  - ◎ Battery electrolyte temperature is excessively high or excessive electrolyte is consumed.
  - ◎ Charging safety timer functions (or the charging lamp blinks)
- **When cleaning the battery, make sure the battery caps are securely tightened**

⚠ WARNING

- **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 can cause an explosion.
- **Static electricity from the body**
  Before checking or cleaning the battery, remove static electricity from your body by touching some metallic item at a distance from the battery.
- **Pay attention to the 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 deteriorate and the battery life may be shortened, and in the worst case an explosion might occur. Keep the battery electrolyte level between the “UPPER LEVEL” and the “LOWER LEVEL” markings at all times. Add purified water if the level is low. Do not overfill beyond the “UPPER LEVEL” marking; otherwise electrolyte spills and causes electric leakage.
- **Neutralize any spilled electrolyte with sodium bicarbonate, soda ash, lime or other neutralizing agent until the fizzing stops, and wash it away with a lot of water; otherwise the floor surface might corrode.**
- **Repairing the battery terminals, cables or plugs must be taken care of by a specialist.**
  Repairing the battery terminals, cables or plugs requires a high level of skill. If they are not repaired in the correct order or manner, the worker can get injured or the battery might malfunction.
- **Any used battery should be recycled. Do not dispose of it yourself. Consult your local UniCarriers dealer.**

■ Obey all regulations

When disposing of waste oil, solvents, or old batteries, obey the regulations and rules.

■ Keep the tension of the right and left chains even

Uneven tension on the right and left chains means uneven loads, even though they are properly placed on the forks. The truck could tip over.

■ Keep the side view mirrors, backup alarm, and lamps in good working condition

Adjust the side view mirrors so you have full vision to the rear and keep the mirror’s surface clean (if so equipped). The backup buzzer should sound when the direction shift switch 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.

PREVENTING VEHICLE FIRES

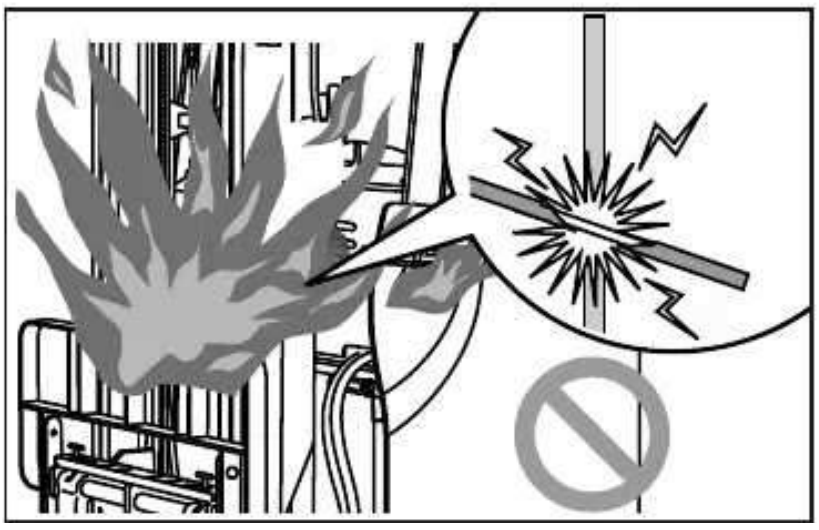
Observe the following precautions to prevent the possibility of fires in your forklift truck, or in the facility where the truck is stored or operated. Before starting the day's work or before each shift, always make sure to perform the following checks. If any problem is found, operation of the truck should be halted until the problem is corrected.

⚠ Check for any spilt oil

Wipe up any spilt oil. Remove any deposits or accumulation of flammable debris (paper, leaves or wood waste). They can be a fire hazard.

- Before starting the day's work or before each shift, check the truck for flammables. Remove any if found.

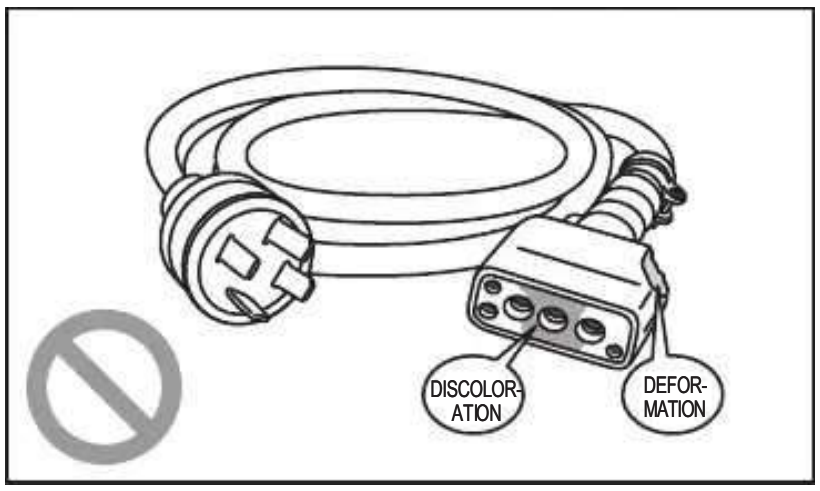
⚠ Check for electrical shorts



Electrical wires that short can cause a fire.

- Clean all the wiring connections and ensure the plugs are securely connected.
- Before starting the day's work or before each shift, check the cables, wiring and electrical components for looseness, twists, stiffened or cracked insulation, and fraying.
- Also check for missing or damaged terminal caps.
- If any problem is found or you are not sure about the safety of the truck, consult your local UniCarriers dealer.

⚠ Check for charger cable



A discolored or deformed connector, socket or cable of the charger can cause a fire.

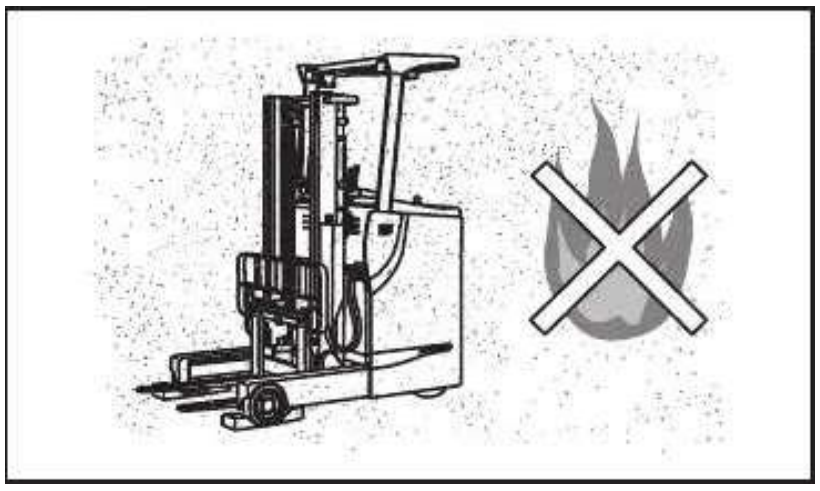
- Before charging, check connectors, socket and cable of the charger.
- If any problem is found or you are not sure about the safety of the charging system, consult your local UniCarriers dealer.

⚠ Check for oil leaks

Hydraulic oil and lubricant leaks can cause a fire.

- Before starting the day's work or before each shift, check all the hose clamps for looseness. Notice if any are missing. Check the hoses for twists, friction wear or damage.
- If any problem is found or you are not sure about the safety of the truck, consult your local UniCarriers dealer.

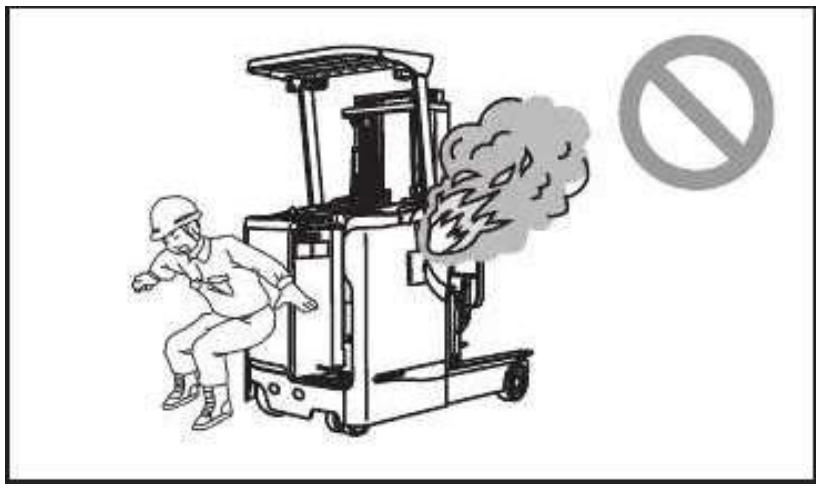
⚠ Ensure that there is good ventilation during charging



Never allow sparks or open flame near a charging battery. Have a good ventilation. Batteries produce explosive hydrogen gas while charging, which could cause an explosion resulting in injury or death.

- Charge batteries in a well ventilated area, free of rainwater, sparks or open flame.
- Make sure that there is constant, good ventilation during charging, when charging the battery indoors.

⚠ How to escape from a truck on fire



A vehicle fire might cause a serious personal injury or even death. If the truck catches on fire during operation, get out of the burning vehicle observing the following procedure:

- Immediately lower the forks on the ground, apply the parking brake, and turn off the key switch to shut off the power supply.
- Get out of the burning vehicle quickly using the steps and handrails. Do not jump off the truck.
- If possible, fight the fire using a fire extinguisher.

⚠ Never smoke in the operator's compartment or around the truck (No fire)

Any flammable objects inside the operator's compartment or hydrogen gas produced from the battery can catch fire from a cigarette or cigarette butt, leading to a vehicle fire.

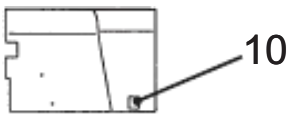
- Never smoke in the operator's compartment or around the truck.

⚠ Never make modifications without prior approval

Modifications performed without prior approval can cause a fire hazard. Do not make any modification to your truck without getting prior approval from the manufacturer. If you need a modification of your truck, consult your local UniCarriers dealer. Modifications made without UniCarriers' prior approval will void your vehicle's warranty.

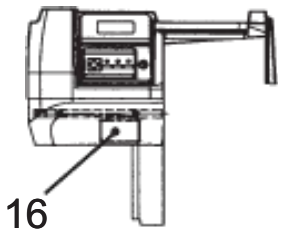
CAUTION PLATES

The caution plates attached to the truck explain precautions to be taken when using the truck, and procedures for operating the truck. Follow the instructions on the caution plates as well as those in this manual. Damaged or missing decals must be replaced with new ones.



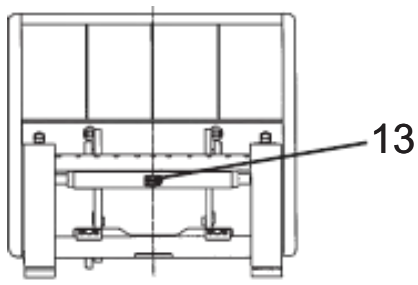
View C

View B

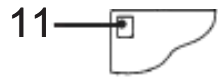


View A

15	Load chart (see page 5-4.)
16	Name plate (see page 5-8.)
17	List of lubrication points

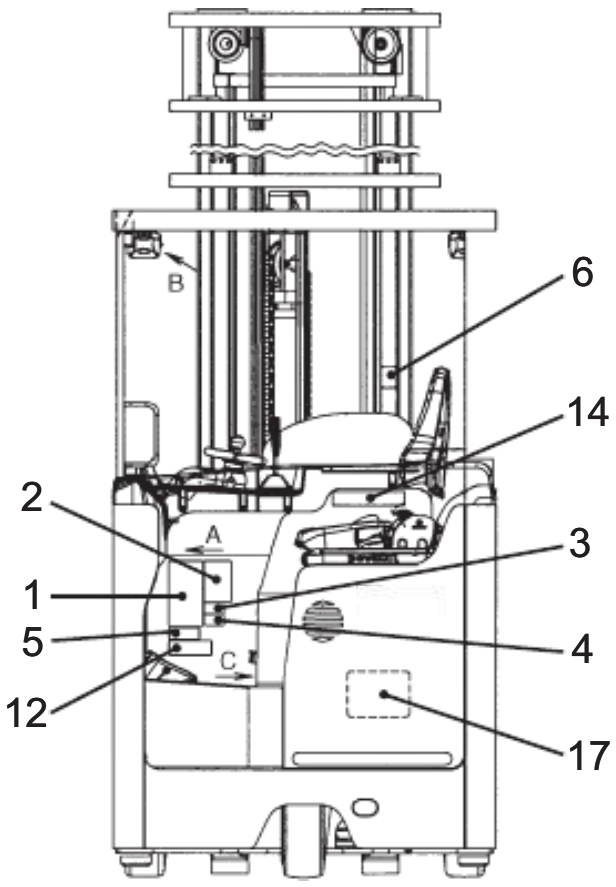


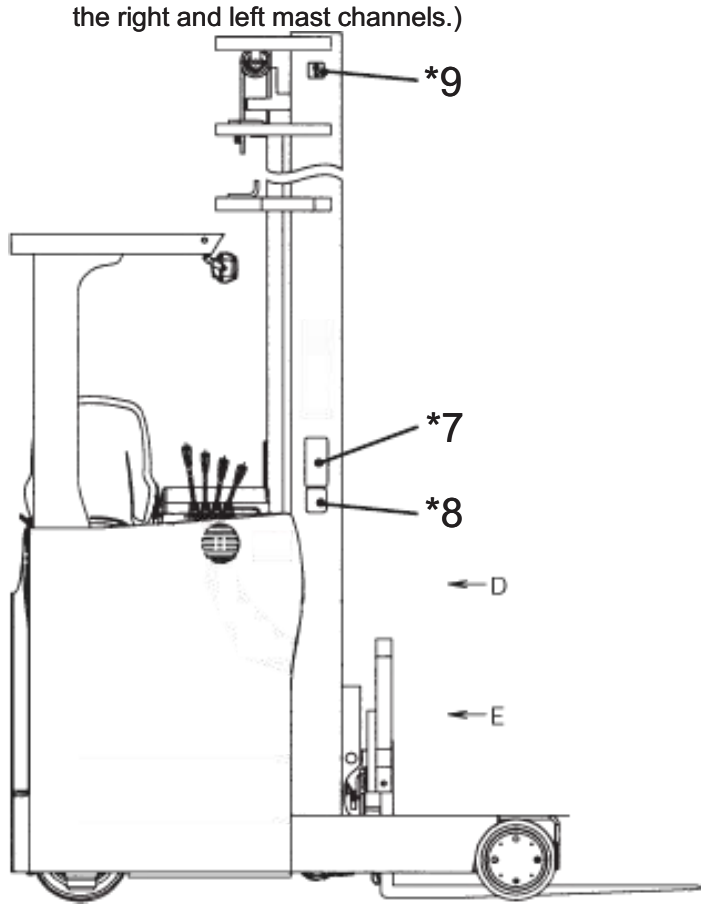
View E



View D

(Decals with an asterisk * are attached to the right and left mast channels.)

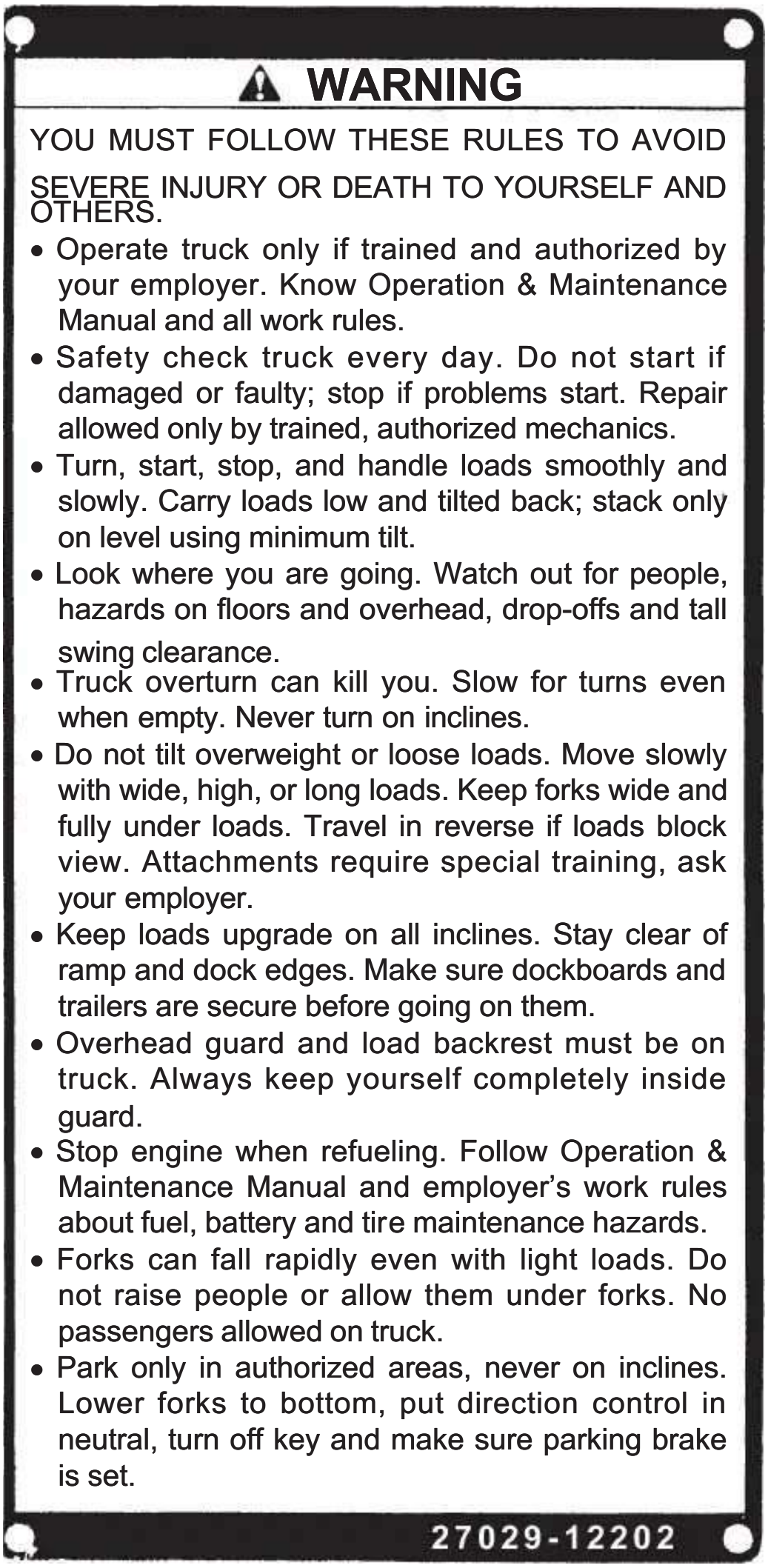




CAUTION

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 attached to the truck body.

1. Safe operation



2. Precautions while removing and returning the battery

⚠ WARNING

- Never place yourself between the battery and mast or truck body.
- Make sure to remove and return the battery back with the truck parked on a level surface and in an area with no obstacles in front.
- Keep the forks at a height of 10 to 30 cm and be sure the truck is unloaded.
- Make sure the key switch is "OFF", the forks are lowered to the ground or floor surface and the battery connectors are disconnected before inspecting the battery, adding battery electrolyte or water, or replacing the battery.
- When returning the battery back, make sure that the battery is housed securely in the battery case and that the battery cable is not twisted, kinked or caught in the battery case or the truck body.

Removing and returning battery back

- Pulling the battery out of the truck
  1. Retract the mast fully backward and press the battery lock release pedal fully.
  2. With the battery lock release pedal pressed, push the reach lever. The battery will come out as the mast advances.
- Putting the battery back in place
  1. Press the battery lock release pedal fully, and then pull the reach lever to retract the mast fully. The battery case will be returned to its original position by the mast movement.
  2. When the battery is returned back, the battery cable might be twisted, kinked or caught in the battery case or the truck body. If this happens, put the battery cable in its proper place and then put the battery case back in place.
  3. Make sure the mast is fully retracted.

Battery inspection and adding electrolyte or water should be performed with the battery case pulled out and the battery connectors disconnected.

27E49-12301

3. Precautions while operating the truck

⚠ WARNING

Keep arms, legs, and hands inside the operator's compartment while traveling or load handling; otherwise there is danger of being injured due to entanglement and other types of accidents.

27E49-12401

4. How to use the load meter

⚠ CAUTION

Load meter can operate in the range of free-lifting.

57B06-A2711

5. Caution to be taken when using the side-shifter

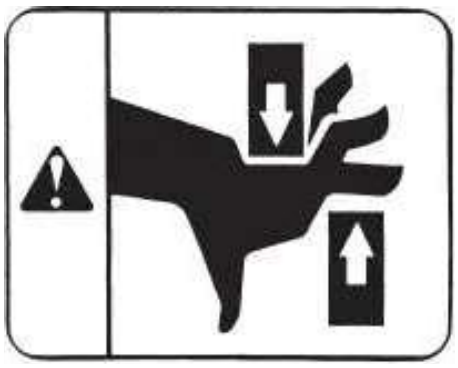
⚠ WARNING

CAUTION TO BE TAKEN WHEN USING SIDE SHIFTER

* Make sure the center of the load is aligned with the center of the truck before operating hydraulic controls or traveling with load.
* Do not operate side shifter with the forks raised high (150 cm or higher), excluding when the load can be stabilized as it is over the shelf.
* Do not operate side shifter during traveling. Do not jerk side shifter.
* Make sure the bottom of forks is clear of ground or shelf surface.
* Do not use side shifter for purposes other than specified. Do not shove loads with side shifter.

61F16-12701

6. Do not put your hand or foot on the mast



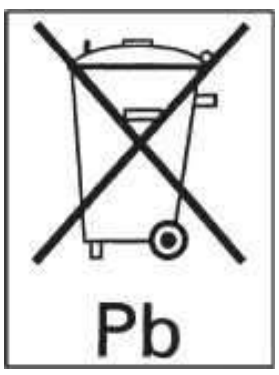
7. Do not stand or walk under raised forks

8. Do not enter the space between the mast and frame

9. Hoisting points on the truck

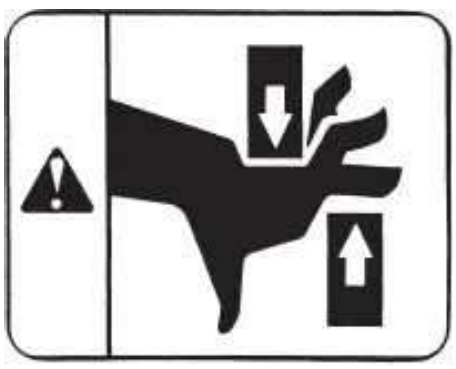
10. Be careful to not let your hands get pinched.

11. Do not throw away worn out batteries (EU region)

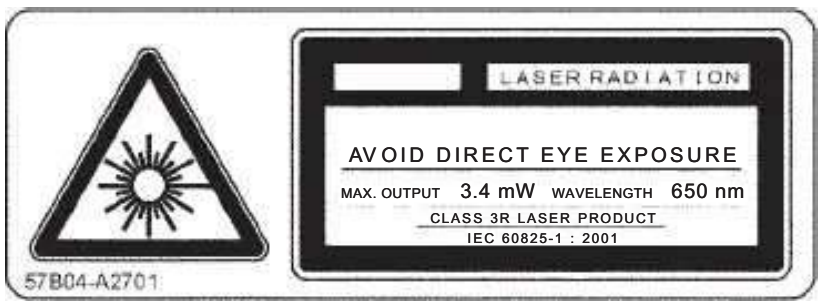


Any used battery should be recycled.

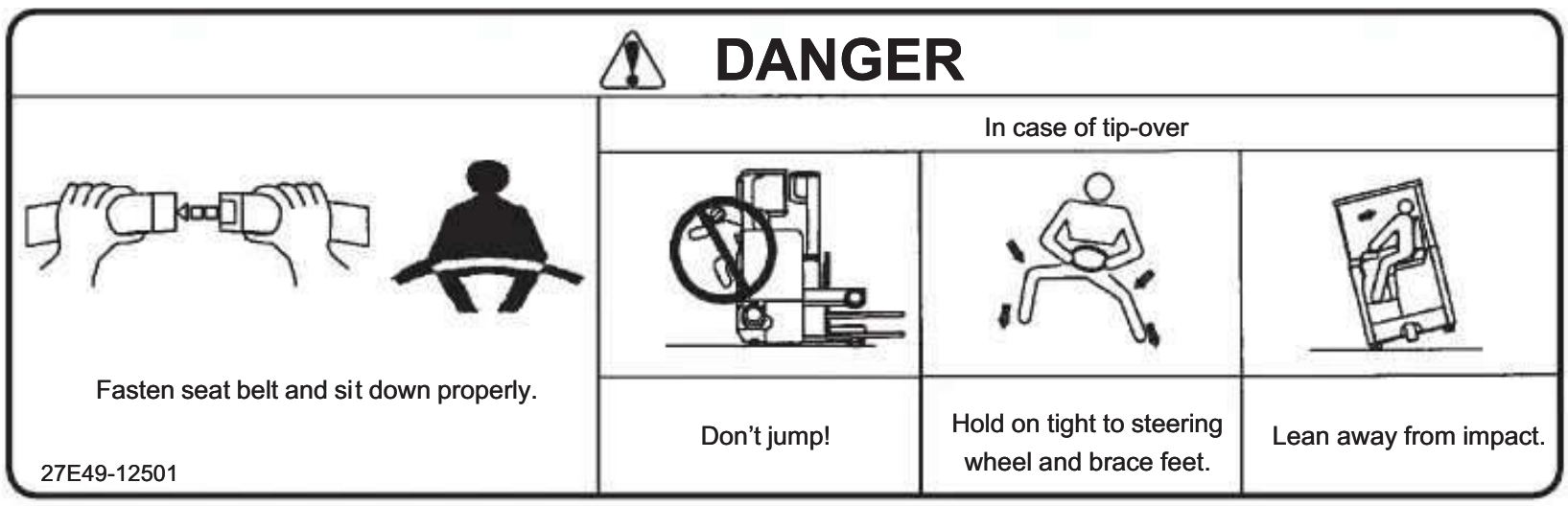
13. Do not put your hands or feet in the fork carriage or fork carriage plate



12. Precautions concerning the laser beam (option)



14. Wear seat belts and follow tip-over safety procedures



■ 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 purified water 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 or 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 during 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 a 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 or 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.

MEMO

2. OPERATING CONTROLS

CONTENTS

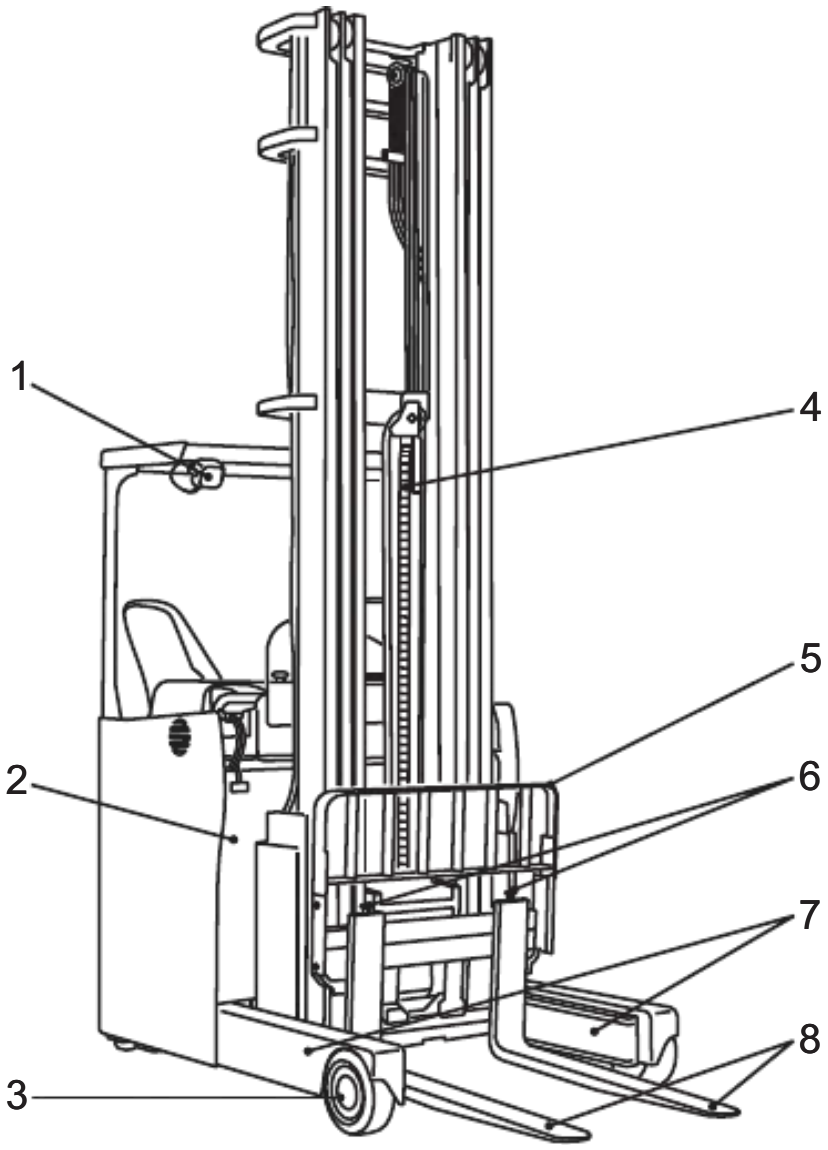
A variety of safety instructions are found throughout this manual. Follow all the instructions, for the safe operation and servicing of the truck.

Safety instructions are accompanied by the safety alert symbols and signal words shown below.

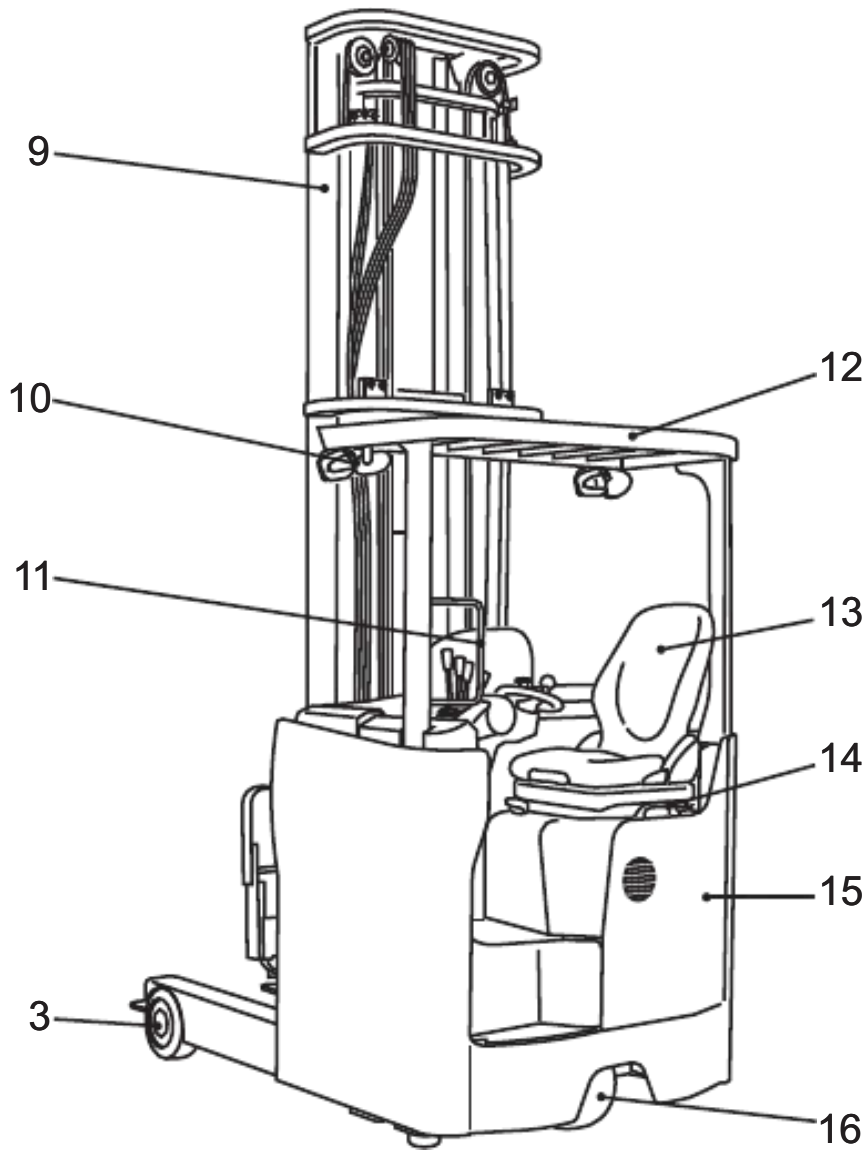
This is the safety alert symbol. It is used to warn the reader about a potential source of human injury. To prevent injury or death, make sure you understand and follow all the safety messages following this safety alert symbol.

Signal word (designates the degree of hazard)	Definition
⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
CAUTION	Indicates a hazardous situation which, if not avoided, may result in damage to the truck or other property.
NOTE	Indicates information which will help extend the service life of the truck.

PICTORIAL NOMENCLATURE

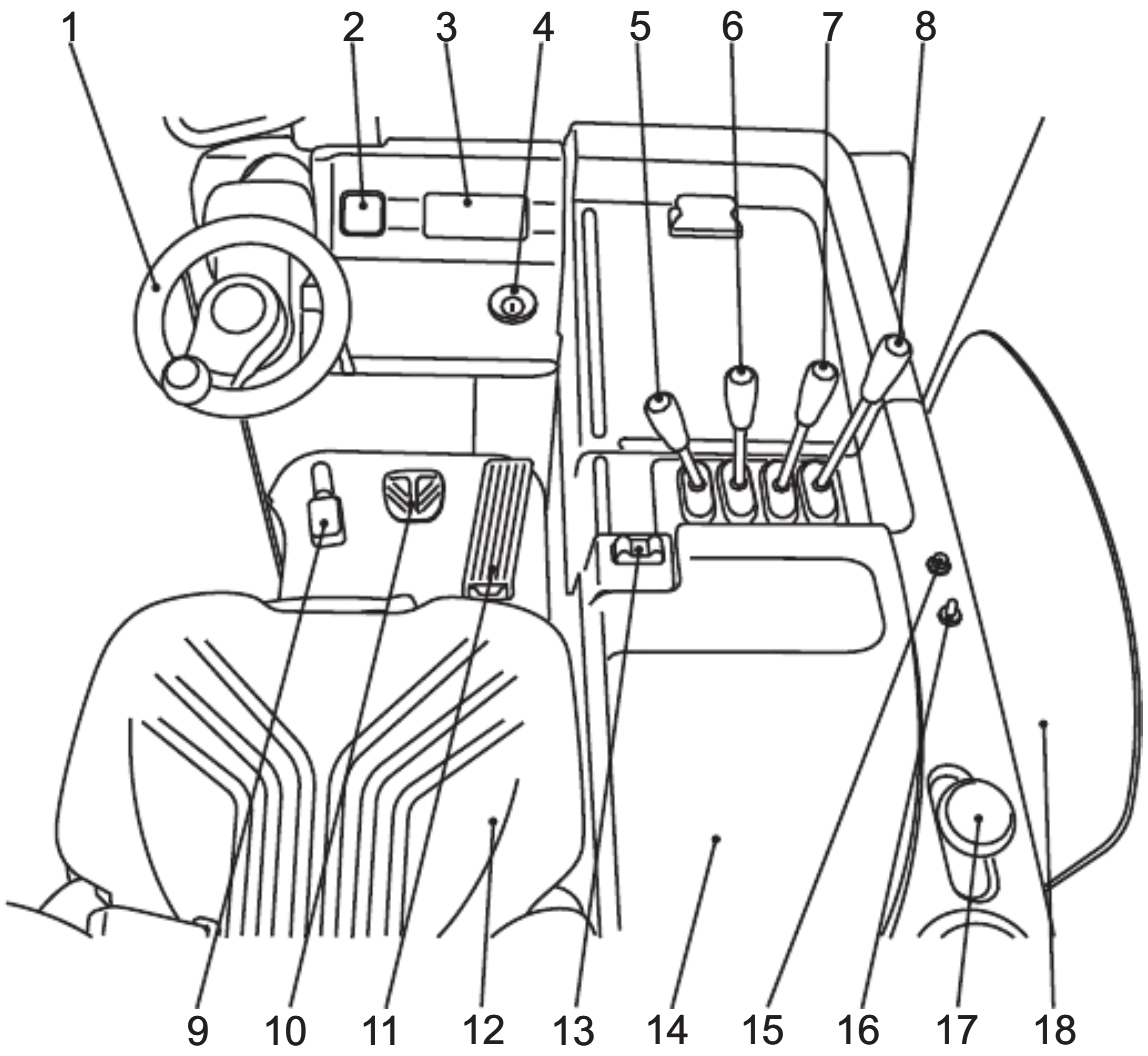


1. WORK LIGHT
2. BATTERY (OPTIONAL)
3. TRAILING WHEEL
4. LIFT CHAIN
5. LOAD BACKREST
6. FORK STOPPER
7. REACH GUIDE (OUTRIGGER)
8. FORKS



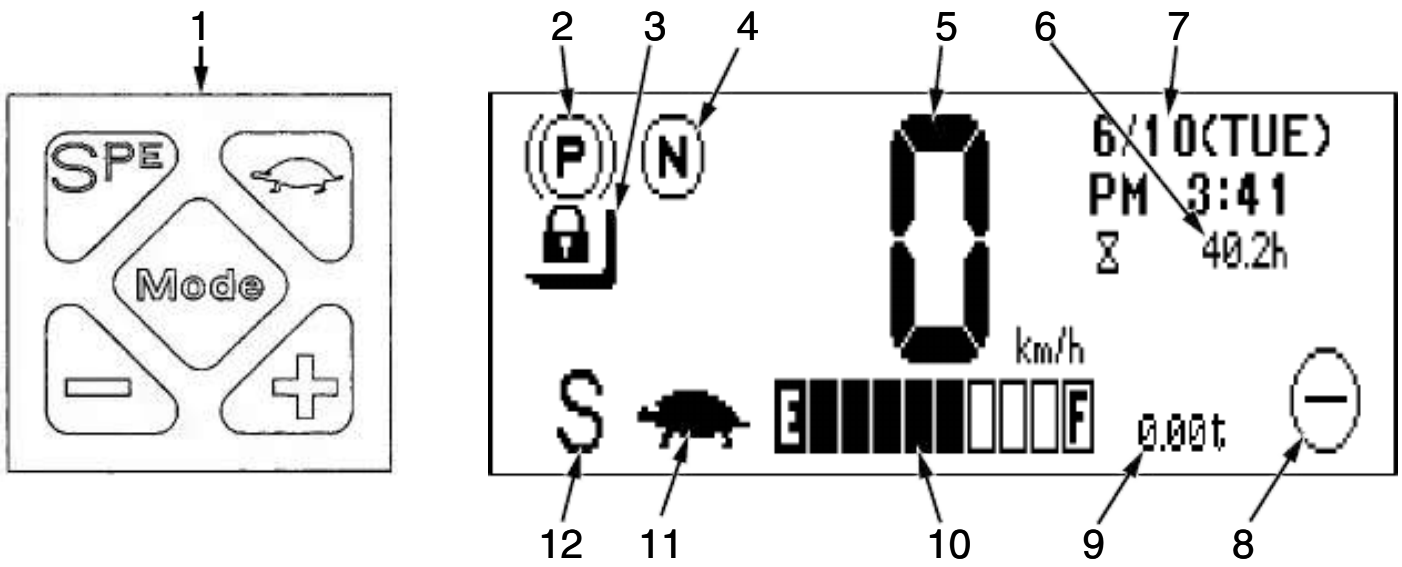
9. MAST
10. SIDEVIEW MIRROR
11. ASSIST GRIP
12. OVERHEAD GUARD
13. OPERATOR'S SEAT
14. ASSIST GRIP
15. MOTOR HOOD
16. DRIVE WHEEL

• OPERATOR'S COMPARTMENT



1. STEERING WHEEL
2. KEYPAD
3. INSTRUMENT PANEL
4. KEY SWITCH
5. LIFT LEVER
6. REACH LEVER
7. TILT LEVER
8. SIDE-SHIFT LEVER
9. FOOT SWITCH
10. BRAKE PEDAL
11. ACCELERATOR PEDAL
12. OPERATOR'S SEAT
13. DIRECTION SHIFT SWITCH
14. ARMREST
15. HORN SWITCH
16. LIGHTING SWITCH
17. EMERGENCY POWER CUT-OFF SWITCH
18. ARM GUARD

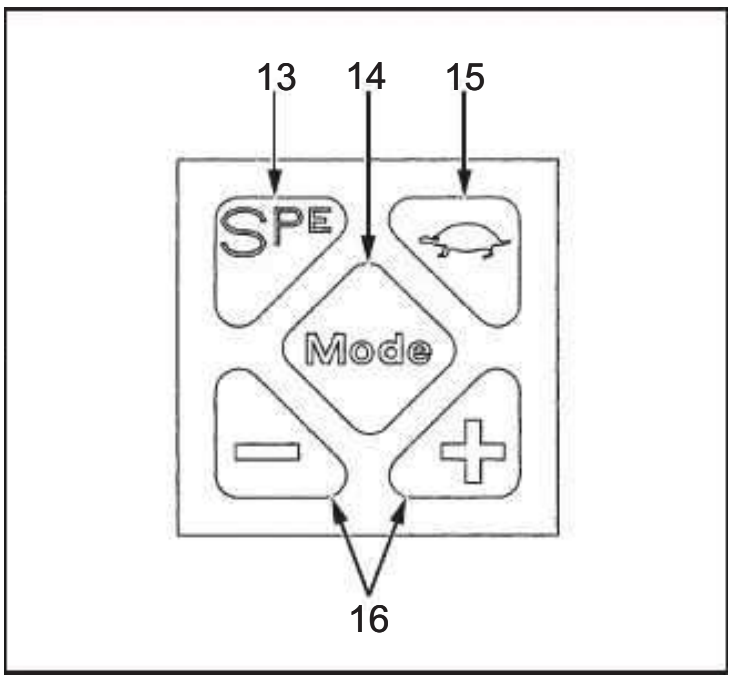
• INSTRUMENT PANEL LAYOUT



1. KEYPAD
2. PARKING BRAKE INDICATOR LIGHT
3. INTERLOCK WARNING LIGHT
4. NEUTRAL STATUS INDICATOR
5. TRAVEL SPEED METER
6. HOUR METER
7. DATE AND TIME
8. DRIVE-WHEEL ANGLE INDICATOR
9. LOAD METER
10. BATTERY CHARGE LEVEL INDICATOR
11. LOW-SPEED TRAVEL (TURTLE) INDICATOR
12. S.P.E. MODE INDICATOR

INSTRUMENT PANEL

KEYPAD



S.P.E. BUTTON [13]

Every time the S.P.E. button is pressed, the operating power mode changes, with the letter S, P or E appearing (S → P → E → S). Use this button to set the operating power mode of the truck.

SCREEN SELECTION "MODE" BUTTON [14]

Screen selection	Every time this button is pressed, the instrument panel screen changes: Main screen → Power consumption screen → Hour meter screen → Main screen
Date and time screen	If this button is pressed for more than 3 seconds, the Date and Time screen appears.

LOW-SPEED TRAVEL (TURTLE) BUTTON [15]

When you press the turtle mark button on the keypad, the truck gets in the low-speed travel mode. To release the low-speed travel mode, press the button again.

- Normal-speed travel mode
  When the turtle mark button on the keypad is turned off, the low-speed (turtle) mark on the instrument panel disappears.
- Low-speed travel mode
  When the turtle mark button on the keypad is turned on, the low-speed (turtle) mark appears on the instrument panel.

+/- BUTTONS [16]

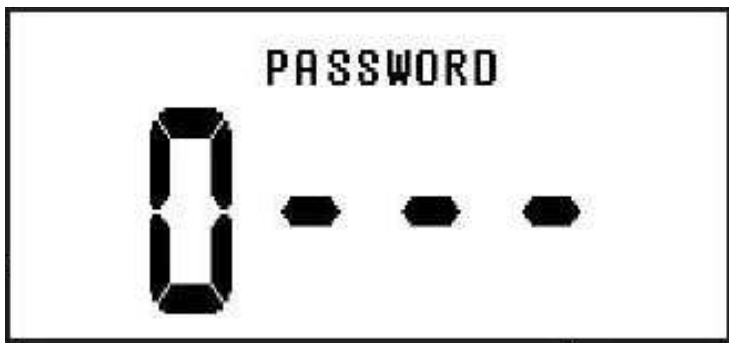
Change the date and time using the +/- buttons on the keypad.

INSTRUMENT PANEL

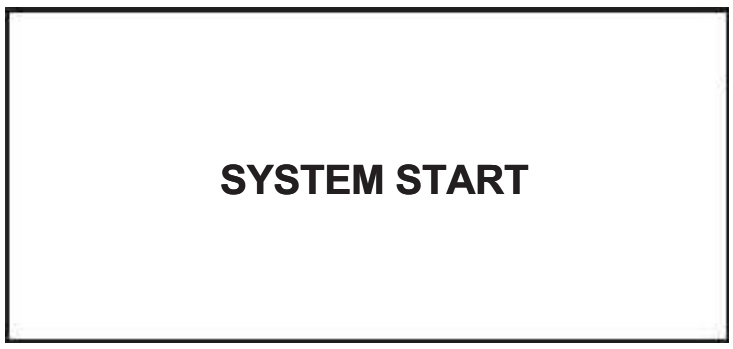
This section explains the operation of the instrument panel.
Turn the key switch to the “ON” position.

PASSWORD INPUT SCREEN

If the truck is password-protected, this screen is shown on the instrument panel when the key switch is turned to “ON”.
The truck won’t to operate unless the specified 4-digit password is entered properly.
For the procedure for canceling the current password, see page 2-11.



INITIAL SCREEN SHOWN WHEN KEY SWITCH IS TURNED TO "ON"

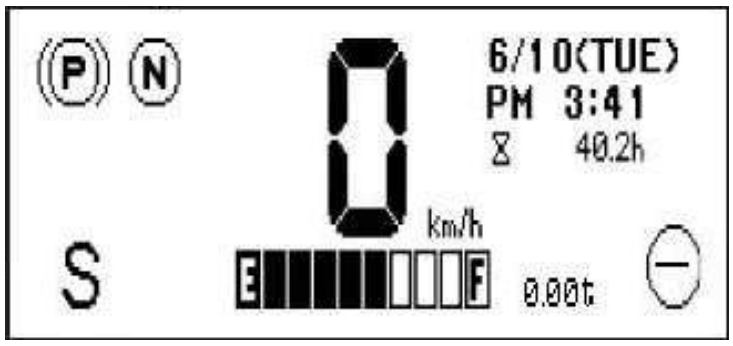


MAIN SCREEN 2 - 3 SECONDS AFTER

The Main screen (which is usually shown during operation) appears. If there is something unusual in the system, the error screen is shown.

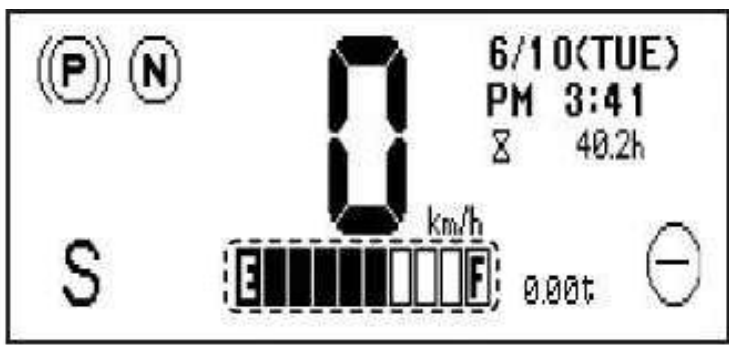
WARNING

If the error screen is shown on the instrument panel, contact your local UniCarriers dealer. (See the "TROUBLESHOOTING GUIDE" Section in 4. MAINTENANCE.)



BATTERY CHARGE LEVEL INDICATOR

The battery charge level indicator indicates the battery’s condition of charge. If the battery charge level drops to overdischarge level (factory set to level 2), the frame of the indicator blinks.

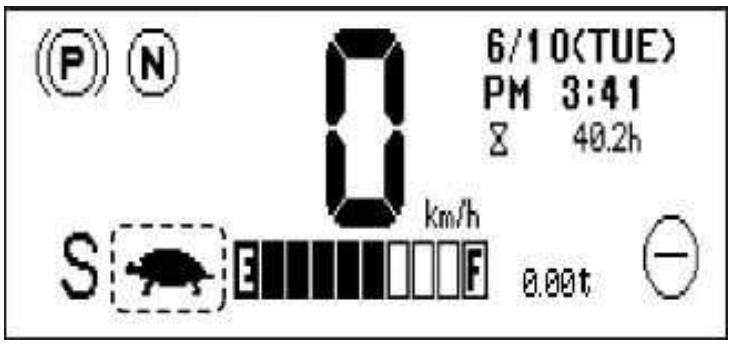


NOTE

The battery charge level indicator usually does not quickly respond to the current operating status of the battery, because it reads and processes voltage data of the battery that is in the “off” state.
If the truck is used for traveling and load handling continuously, the battery charge level indicator cannot read voltage data from the battery, so that the indicator might not progress correctly.

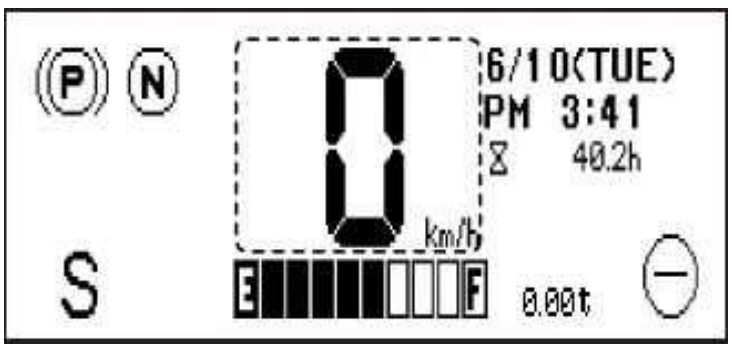
LOW-SPEED TRAVEL (TURTLE) INDICATOR

When you press the turtle button on the keypad, the turtle icon appears on the instrument panel. In this mode, the truck's travel speed is limited to 5 km/h (factory setting).



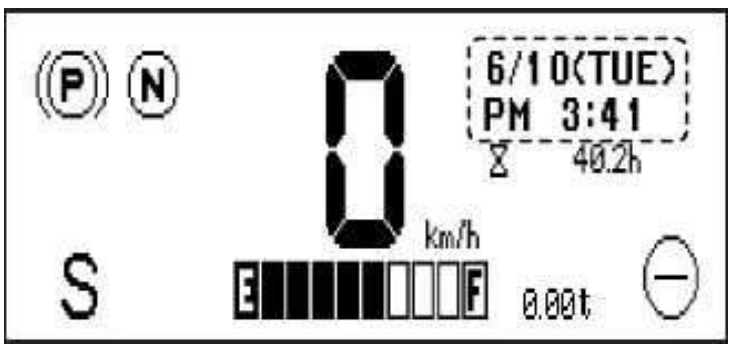
TRAVEL SPEED METER

This meter indicates the travel speed of the truck.



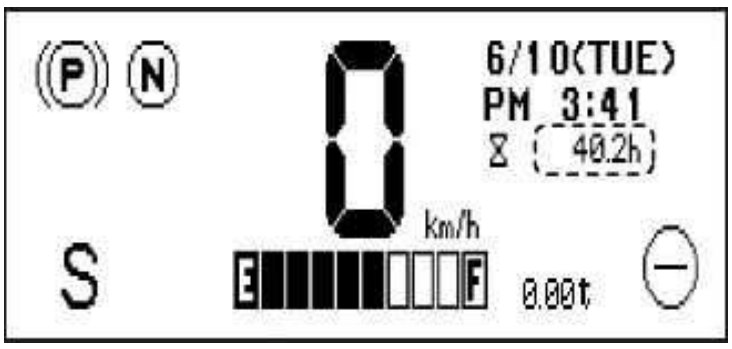
DATE AND TIME

The current date and time are shown on the right corner of the screen.



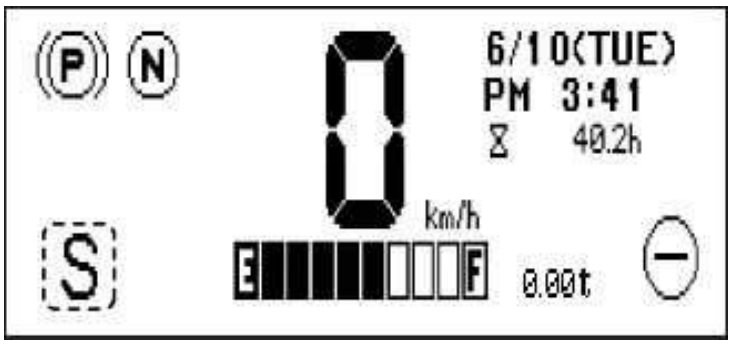
HOUR METER

The hour meter indicates the total time the key switch has been in the "ON" position.



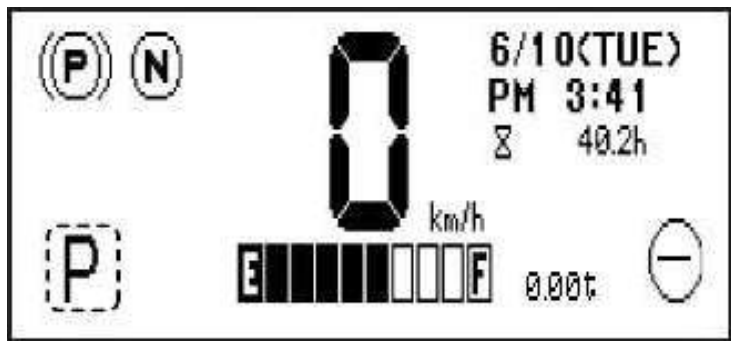
S (SUPER) MODE INDICATOR

Use the S mode when your task requires large power in a short time, such as speedy running or carrying heavy loads.



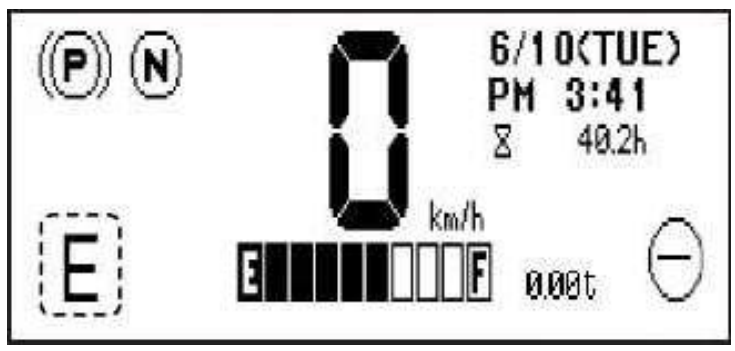
P (POWER) MODE INDICATOR

Use this mode when you need to carry loads a long distance at a high speed.



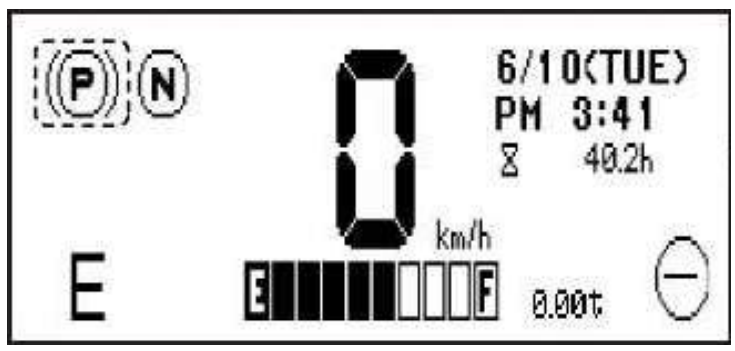
E (ECONOMY) MODE INDICATOR

Use the E mode when your task takes a long time to finish. The truck can work a long time on a single battery charge in this mode. The E mode is suitable for handling loads carefully or carrying a fragile load slowly.



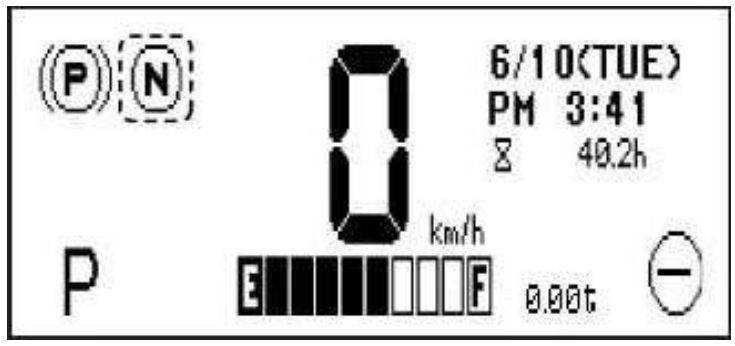
PARKING BRAKE INDICATING LIGHT

Light comes on when the parking brake is applied.
The truck won't move when this light is ON.



NEUTRAL STATUS INDICATOR

Light comes on when the key switch is turned to "ON" and goes out when the direction shift switch is placed in the forward or reverse position.



NEUTRAL SAFETY INDICATOR

If light blinks when the key switch is turned to "ON", it indicates that the accelerator pedal or brake pedal is not in the "up" position or any of the load handling levers is not in the neutral position. Place the accelerator pedal and brake pedal in the "up" position and the load handling levers in neutral.

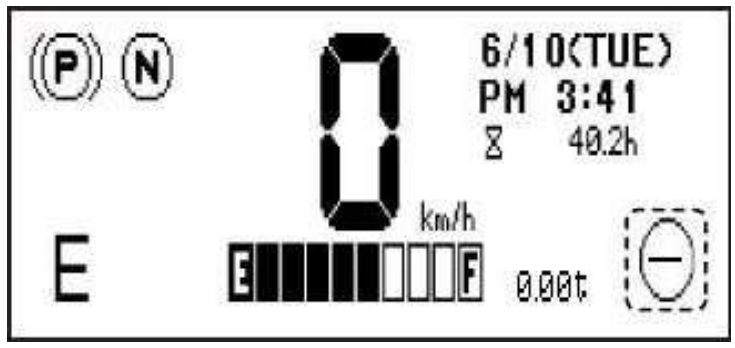
DRIVE-WHEEL ANGLE INDICATOR

The indicator shows the direction of the drive wheel.

Forward travel: Black arrow on the white background

Reverse travel: White arrow on the black background

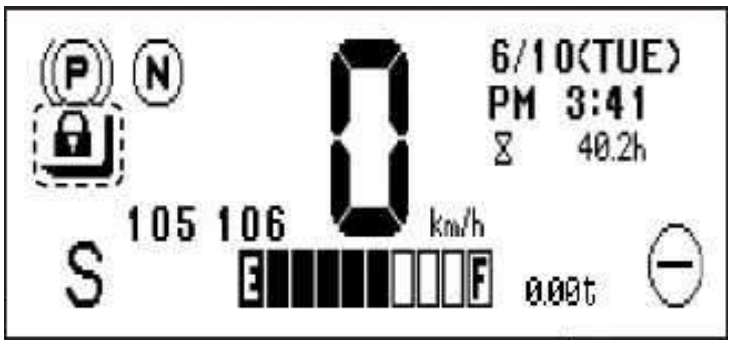
Neutral: Black bar on the white background



INTERLOCK WARNING LIGHT

Light comes on when the operator is not in the operator's seat. With the interlock warning light ON, the truck won't travel and the load handling system won't operate.

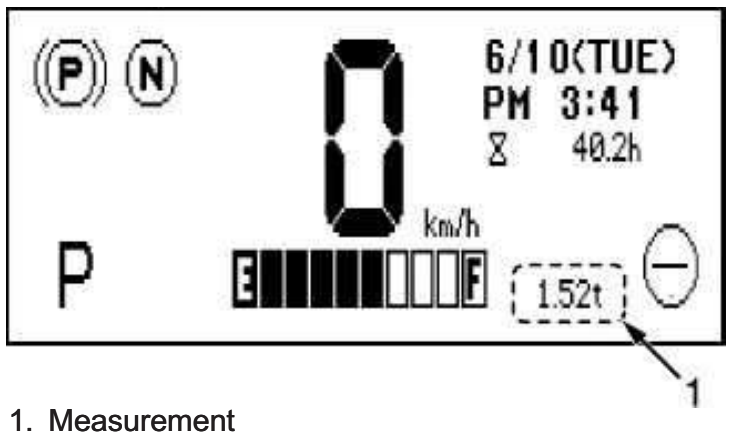
If the key switch is turned to the "ON" position with no operator present in the operator's seat, the neutral safety indicating light blinks and the interlock warning light comes on. The truck won't travel. When the interlock system is activated, number 105 or 106 is shown on the screen. For the procedure for releasing the interlock system, see page 2-24.



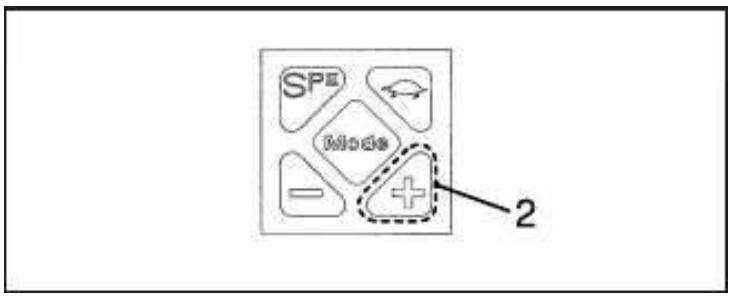
LOAD METER

The load meter indicates the weight of the load being carried on the forks. The measurement of the load weight [1] starts 3 seconds after both the travel and load handling systems are stopped, and is repeated after that every 0.5 seconds for 4 seconds. The load meter keeps showing the most recently measured value until a new measurement is obtained.

If the "+" button [2] on the keypad is pressed and held down while the instrument panel is showing the main screen, the truck is stationary, and the load handling levers are in neutral, the load meter will be reset to zero. If the load weight is a minus value, the load meter will read zero.



1. Measurement



2. + button

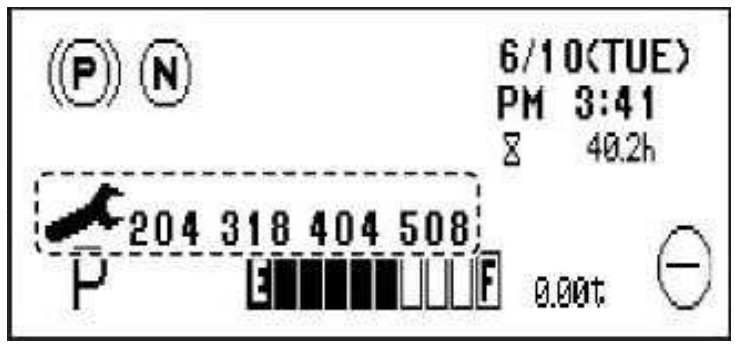
NOTE

The load weight [1] shown on the screen should only be used as a guide. It is not necessarily accurate because it is calculated using the hydraulic pressure applied to the lift cylinders.

ERROR SCREEN

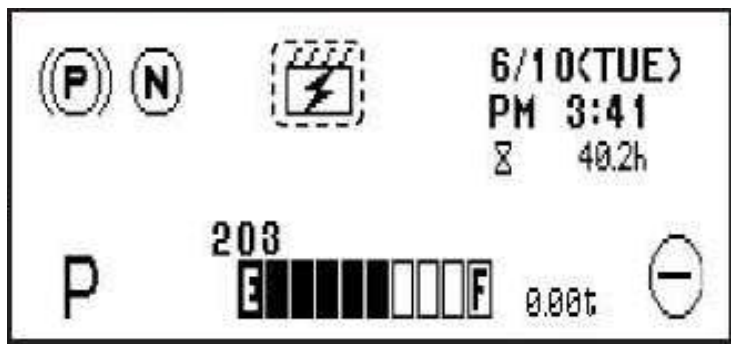
ERROR CODES

If a failure occurs with the truck, the “wrench” icon appears along with a 3-digit error code. If an error code appears, consult your local UniCarriers dealer.



CONTROLLER OVERHEAT WARNING LIGHT

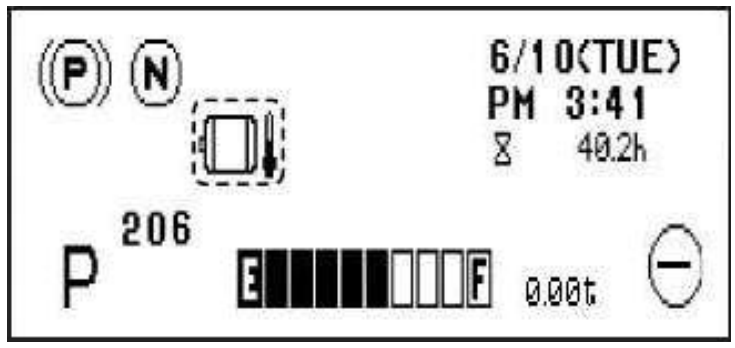
The controller overheat icon blinks when the traveling or load handling operation is too much to the truck, with the corresponding error code “203” indicated. It usually stays off. If the icon starts blinking, stop the operation immediately and wait until the light goes out.



MOTOR OVERHEAT WARNING LIGHT

The motor overheat icon blinks when the drive motor has overheated, with the corresponding error code “206” indicated.

It usually stays off. If the icon starts blinking, stop the operation immediately and wait until the light goes out.

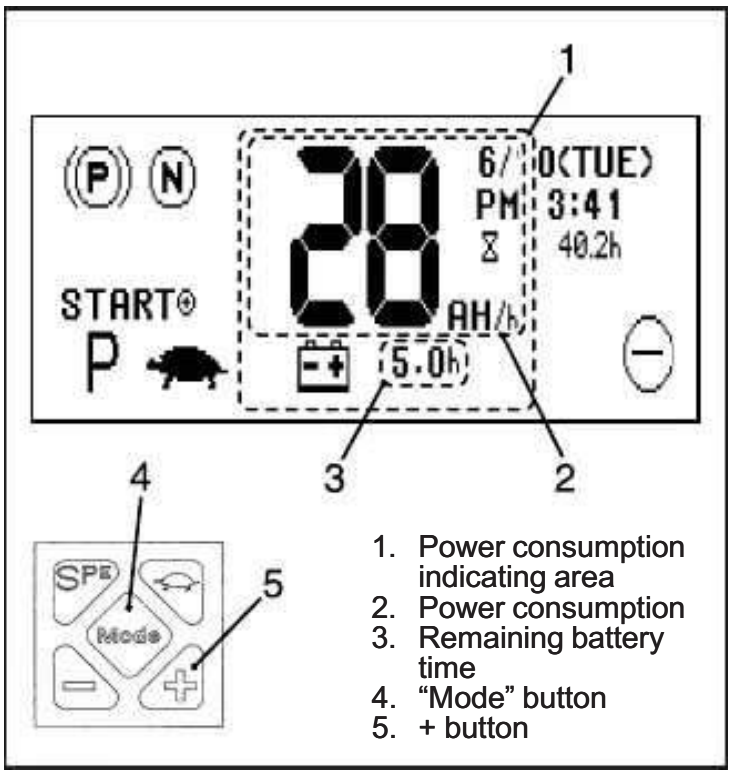


> **NOTE**
> If neglect of such warning lights will cause the truck to stop eventually.

POWER CONSUMPTION SCREEN

On the Main screen, press the “Mode” button [4] at the center of the keypad to display the power consumption screen.

- The power consumption [2] represents the power consumption per hour.
- The remaining battery time [3] represents the length of time the truck can operate in the future without recharging, estimated by calculating from the average operating rate of the truck so far.
- The readings of the power consumption [2] and remaining battery time [3] are updated every 6 minutes.



NOTE

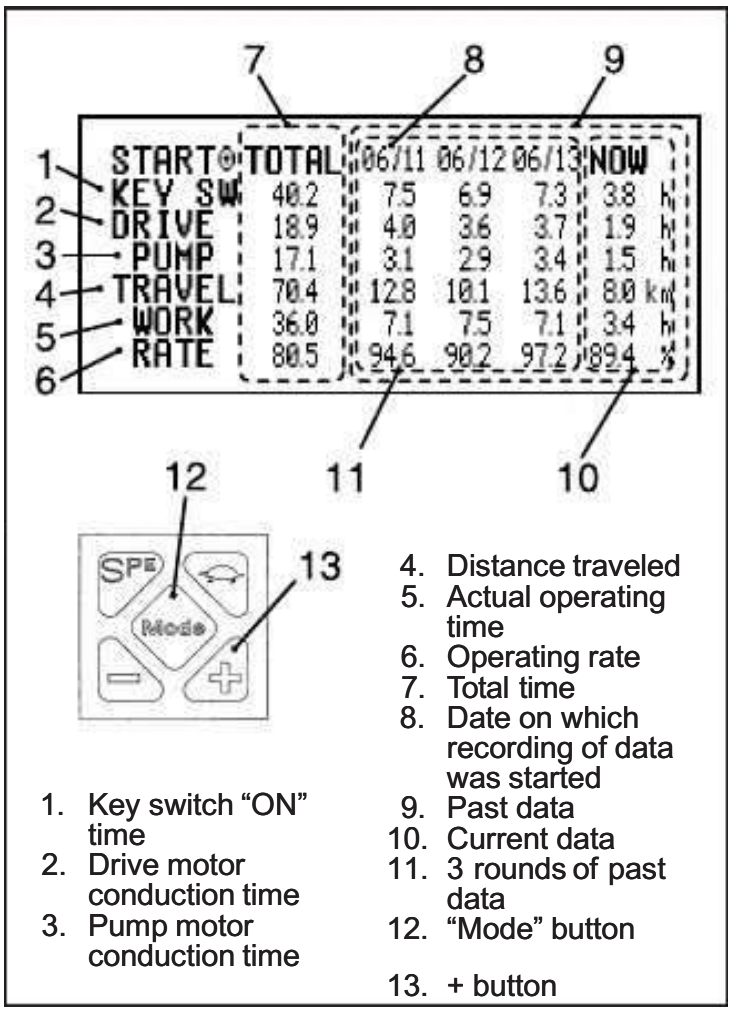
- The power consumption and remaining battery time should be used as a rough guide, because they are roughly calculated from the reading of the battery discharge indicator.
- The battery capacity used for the basis of calculation is factory set.
  If the battery is changed to a battery whose capacity is different from the factory setting, consult your local UniCarriers dealer.

HOUR METER SCREEN

Every time the “Mode” button [12] is pressed, the screen changes as follows:

→ Main screen → Power consumption screen → Hour meter screen

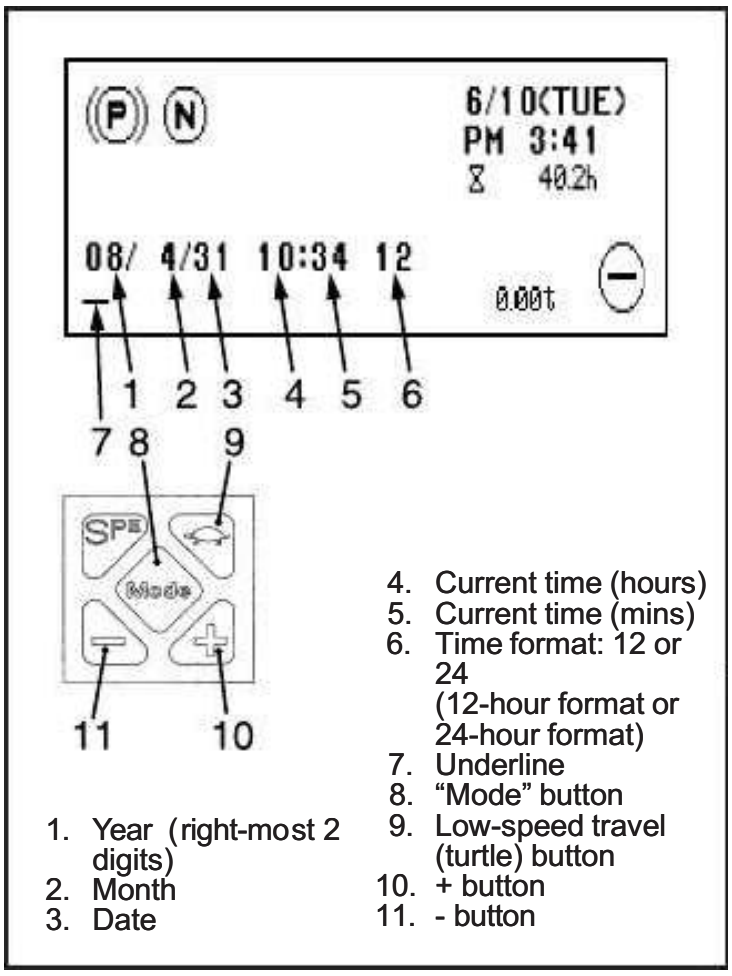
- The current hour meter data can be reset by pressing the + button [13] and holding it down for a while. The current data will be shifted to the left row in the history table.
- Three rounds of past data can be stored in the history table.
- Actual operating time: the total conduction time of the drive motor or pump motor
- Operating rate: Actual operating time/the total time the key switch is kept in the “ON” position



SETTING AND CHANGING THE DATE AND TIME

On the Main screen, press the “Mode” button [8] in the center of the key pad and hold it down for 3 seconds to display the Date and Time screen.
You can change any item when it is underlined [7].

- The underline [7] shifts one digit to the right every time the “Mode” button [8] is pressed.
- If the “Mode” button [8] is pressed when the underline [7] is located under the time format [6] item, the change will be stored in memory and the display will return to the Main screen.
- An underlined [7] number can be increased and decreased using the + and - buttons.
  For example, PM10:34, (WED) October 15, 2008 can be shown as follows:
  → 08 / 10 / 15 / 22 / 34 / 12
- If the low-speed travel (turtle) button is pressed, the display will return to the Main screen. Then, you can start all over again.
- Even when the 12-hour format is selected, enter the current time in the 24-hour format.
- The day of the week will be added automatically.



1. Year (right-most 2 digits)
2. Month
3. Date
4. Current time (hours)
5. Current time (mins)
6. Time format: 12 or 24 (12-hour format or 24-hour format)
7. Underline
8. “Mode” button
9. Low-speed travel (turtle) button
10. + button
11. - button

CANCELING A PASSWORD

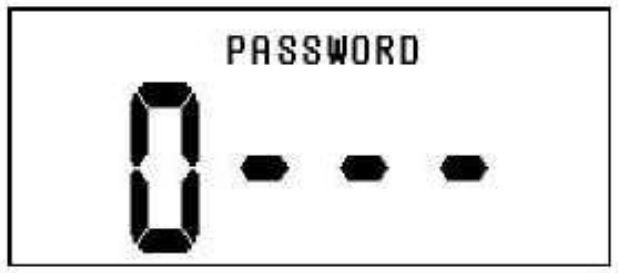
If the truck is password-protected, the PASSWORD screen will appear when the key switch is turned to the “ON” position. Enter the 4-digit password on the PASSWORD screen.
The truck won’t operate unless the correct password is entered.

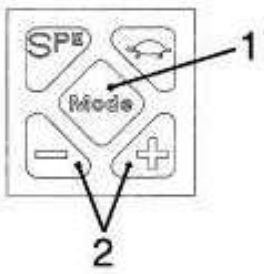
- Every time the “Mode” button [1] is pressed, the digit that can be changed shifts one digit to the right.
- The value of a digit (0 - 9) can be increased or decreased using the + and - buttons [2].
- After entering the password, press the “Mode” button [1] and hold it down for 3 seconds to confirm the entry. If the password is accepted, the Main screen will appear and you will be able to operate the truck.
  If the password is wrong, the ERROR screen appears and then the PASSWORD screen will be displayed again.
- The password will be remembered for 2 hours after the key switch is turned “OFF”.
  If the key switch is turned to the “ON” position within 2 hours after the key switch is turned “OFF”, the instrument panel will be displayed immediately on the Main screen, bypassing the PASSWORD screen, and you will be able to operate the truck.
  If two hours have passed after the key switch is turned “OFF”, you will need to enter the password again.

NOTE

- If you want a password protection system for the truck, contact your local UniCarriers dealer. Your UniCarriers dealer will set the passwords for the system.
- Two different passwords can be used.

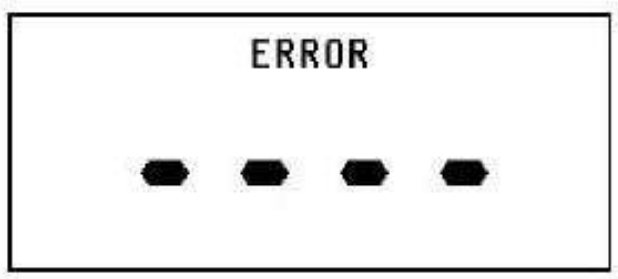
PASSWORD INPUT SCREEN





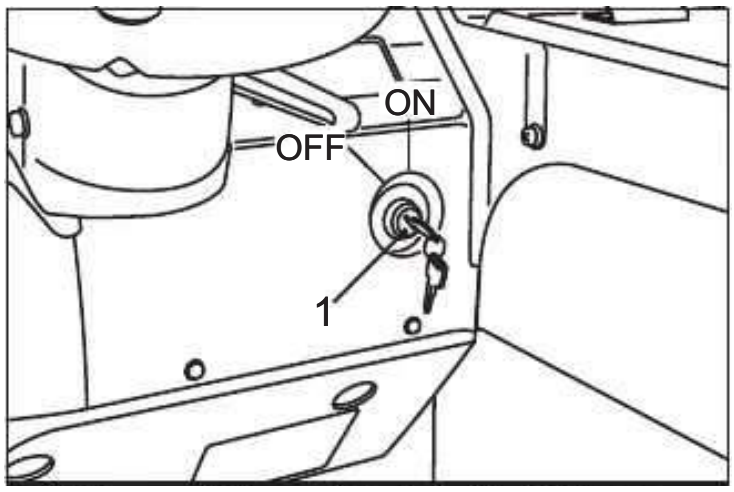
1. “Mode” button
2. + and - buttons

PASSWORD ERROR SCREEN



SWITCHES

KEY SWITCH [1]



⚠ WARNING

- **Disconnect the battery connectors before working on the electric components. The electric circuit is live even if the key switch is turned "OFF".**
- **Note that the steering system, instrument panel and electromagnetic brake will be disabled immediately after the key switch is turned "OFF".**

OFF: Key insertion and draw-out position. The electric control circuit is open.

ON: The electric circuit is closed. Self-check takes places for about 2 seconds and the truck will be ready for operation.

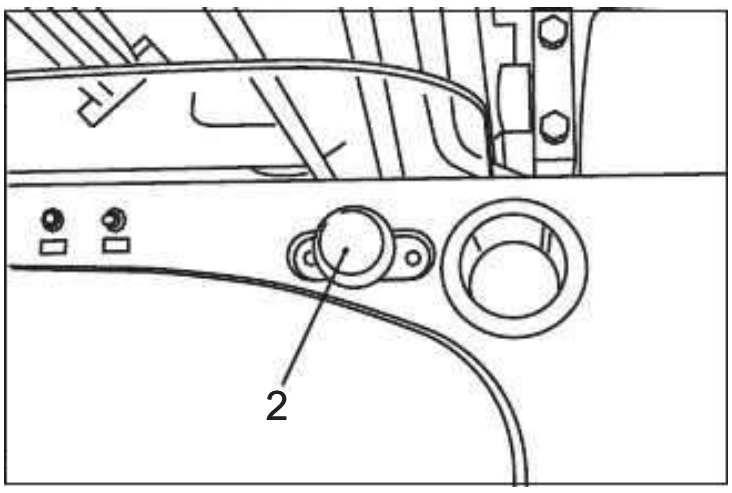
☞ NOTE

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

AUTO POWER OFF FUNCTION

If no operation is carried out for 15 minutes after the power of the truck is turned on, the power will automatically be turned OFF.
If you want to turn the power ON again, turn the key to the “OFF” position and then to the “ON” position again.

EMERGENCY POWER CUT-OFF SWITCH [2]



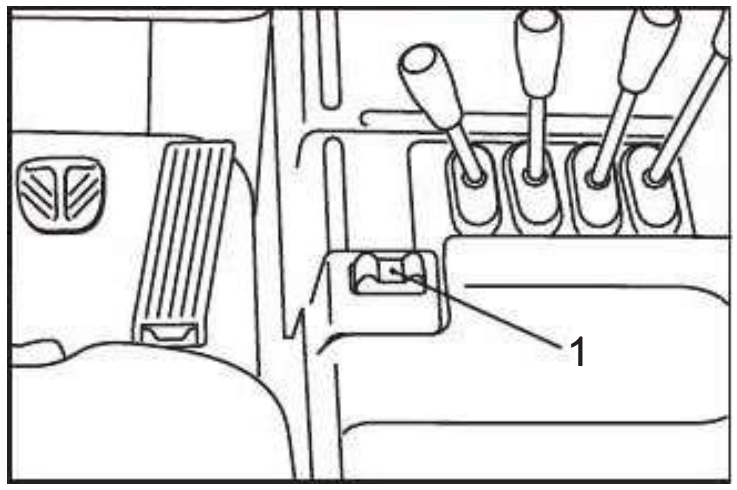
⚠ WARNING

- **Before you are going to touch any internal electronic parts, be sure to press this switch or disconnect the battery connectors; otherwise, you might get injured.**
- **Except in an emergency, turn off the key switch before you press the emergency power cut-off switch.**
- **Note that the steering system, instrument panel and electromagnetic brake will be disabled immediately after the power supply is cut off.**

In the event of an emergency, press the emergency power cut-off switch. The power supply will be cut off to disable all the electronic functions of the truck. To reset the emergency power cut-off switch, turn the key switch off and then pull up the emergency power cut-off switch.

DIRECTION SHIFT SWITCH [1]

Tilt the switch toward the operator's seat to travel forward, and toward the mast to travel in reverse. The switch will automatically return to neutral when your hand is removed. However, the truck will continue moving in the selected direction. Whenever the direction shift switch is placed in the "reverse" position, the backup buzzer sounds.

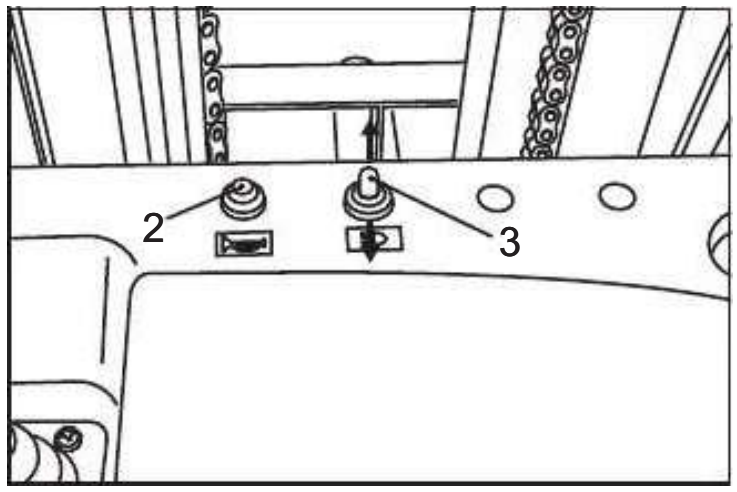


HORN SWITCH [2]

Press this switch to sound the horn.
The horn sounds regardless of the ON/OFF position of the key switch.

LIGHTING SWITCH [3]

Push forward on the switch to turn the work lights on. To turn them off, pull back on the switch. The work lights come on regardless of the ON/OFF position of the key switch.

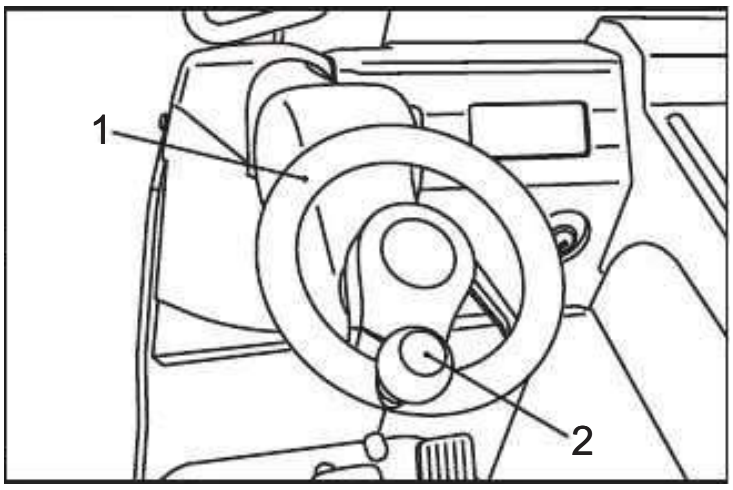


LEVERS AND PEDALS

STEERING WHEEL [1]

The truck turns to the right when the steering wheel is turned clockwise and to the left when it is turned counterclockwise.

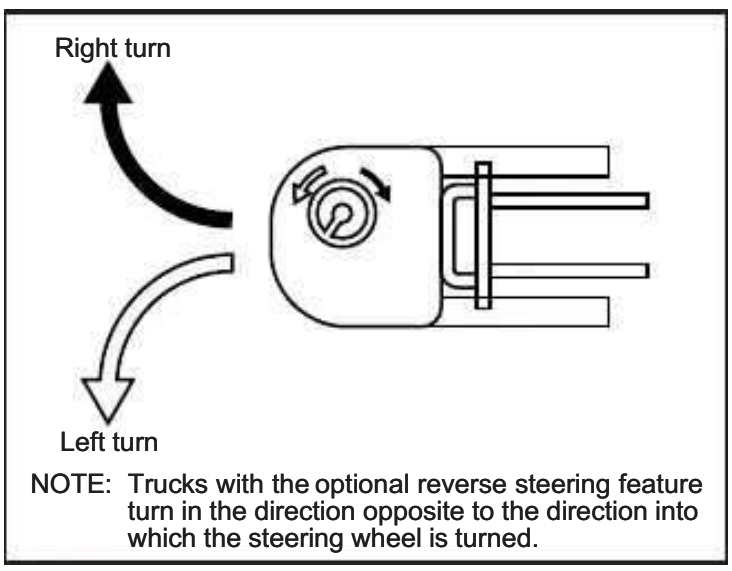
While traveling, hold the steering wheel knob [2] with your left hand. Do not remove your hand from the knob while traveling.



NOTE

SSC (Safe Speed Control)

The SSC automatically limits the maximum speed when the truck makes a turn, to prevent the truck from tipping over.



NOTE: Trucks with the optional reverse steering feature turn in the direction opposite to the direction into which the steering wheel is turned.

POWER STEERING

WARNING

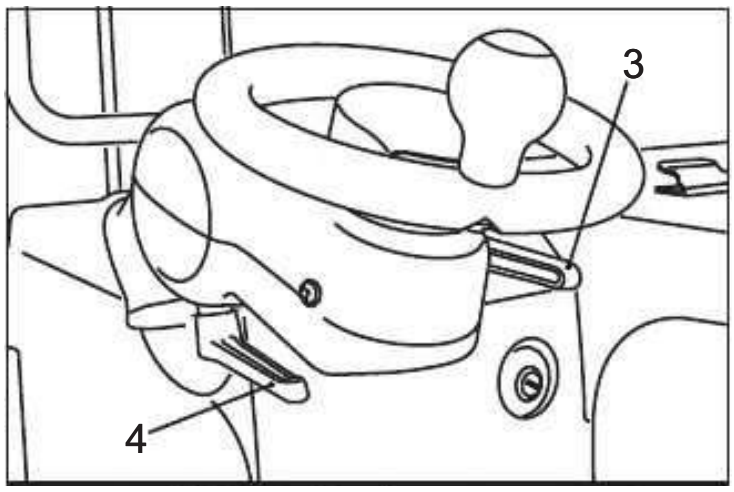
Do not turn the key switch OFF while traveling. If the key switch is turned OFF, the truck won't be able to turn.

The truck comes with electronic power steering, which functions whenever the steering wheel is turned with the key switch on.

ADJUSTMENT OF THE STEERING COLUMN ANGLE AND POSITION

WARNING

- **Adjusting the steering column angle and position should be performed before starting operation.**
- **After making the adjustment, tighten the adjustment levers securely.**
- **Do not try to make the adjustment during operation.**



The steering column angle and fore/aft position can be adjusted.

Make the adjustment in the following manner, to suit the operator's physique:

- Lower this lever [3] to adjust the angle of the steering column.
- Move this lever [4] outward to adjust the forward and back position of the steering column.

LOAD HANDLING LEVERS

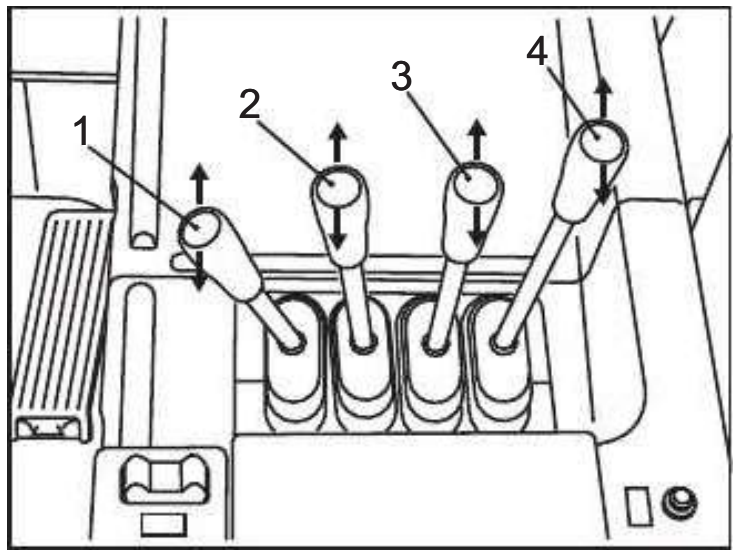
⚠ WARNING

If the operator leaves the operator's seat or stands up during a load handling operation, the interlock system will stop the load handling system. If this happens, return the load handling levers to neutral or release your hand from the load handling levers. If the operator sits down again while a load handling lever is still in an operating position, the interlock system will be released. In this case, the load handling system is liable to cause an abrupt move of the truck, resulting in a serious accident.

⚠ CAUTION

Make sure to obey the following instructions when you operate levers (lift, tilt, reach and side-shift).

- **Seat yourself in the operator's seat.**
- **Make sure there is no one around the truck.**



LIFT LEVER [1]

Pull back on the lift lever to raise the forks and push it forward to lower the forks.
The lifting speed of the forks can be controlled by the tilt angle of the lever.

REACH LEVER [2]

Pull back on the lever to retract the mast and push it forward to advance it.

The speed of advancing and retracting the mast can be controlled by varying the tilt angle of the lever. This lever is also used to remove and return the battery pack.

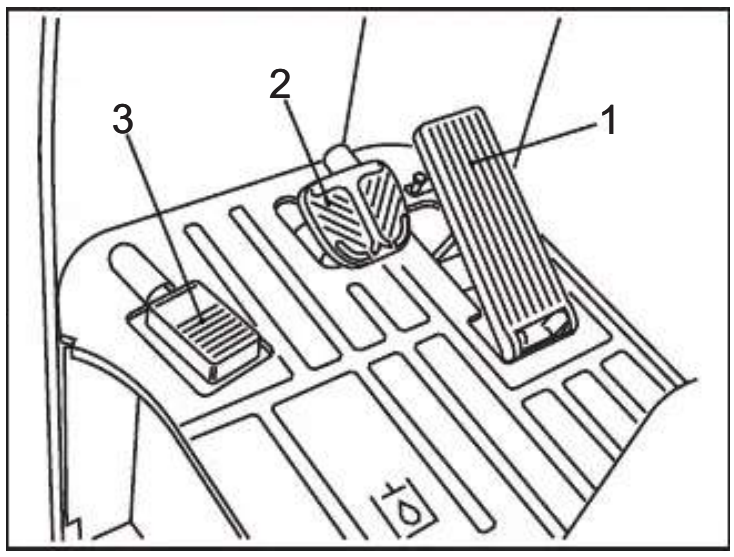
TILT LEVER [3]

Pull back on the tilt lever to tilt the forks backward and push it forward to tilt the forks forward. The tilt speed of the forks can be controlled by varying the tilt angle of the lever.

SIDE-SHIFT LEVER [4]

Pull back on the side-shift lever to shift the forks to the left and push forward on it to shift to the right. The side-shift speed of the arm can be controlled by varying the tilt angle of the lever.

ACCELERATOR PEDAL [1]



You can move the truck by pressing the accelerator pedal while the direction shift switch is in forward or reverse, and the foot switch [3] is depressed.
The traveling speed can be controlled smoothly by varying the amount of pressure on the accelerator pedal. The traveling speed is displayed as a direct numeric readout on the instrument panel.

BRAKE PEDAL [2]

⚠ WARNING

Avoid hard braking. You might be thrown out of the truck by the sudden stop or the load might fall off the forks. Abusing the brakes by hard braking will cause shorten the life of the electromagnetic brake system.

The brake is applied by depressing the brake pedal. The braking force can be controlled by varying the amount of pressure on the brake pedal. When the brake pedal is pressed down all the way, the maximum braking force is applied and also the drive power circuit is disconnected. The brake pedal is only operable when the key switch is in the ON position.

REGENERATIVE BRAKING (ELECTRONIC BRAKING)

Regenerative braking is put into effect whenever you reverse the direction shift switch or release the accelerator pedal.

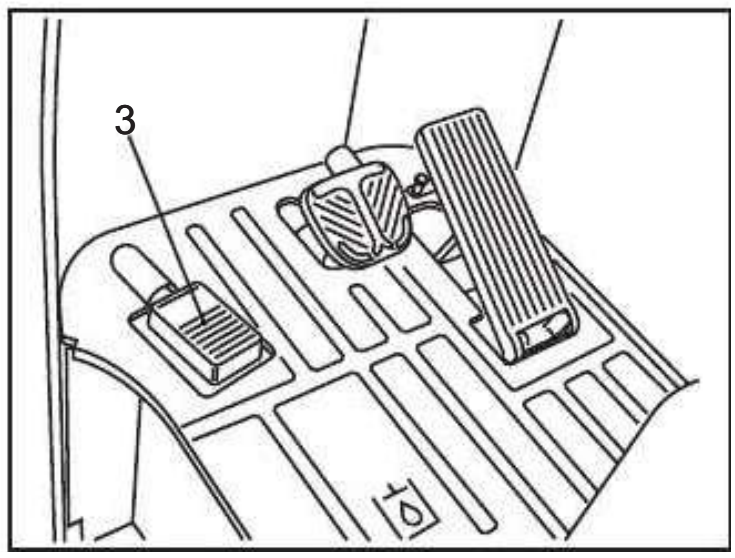
When the accelerator pedal is released

Regenerative braking (electronic braking) is in effect when the accelerator pedal is released while the reach truck is traveling.

During switchback operations

Regenerative braking (electronic braking) occurs during switchback operations or when the direction shift switch is reversed. This braking force can be adjusted by varying the amount of pressure on the accelerator pedal.

FOOT SWITCH [3]

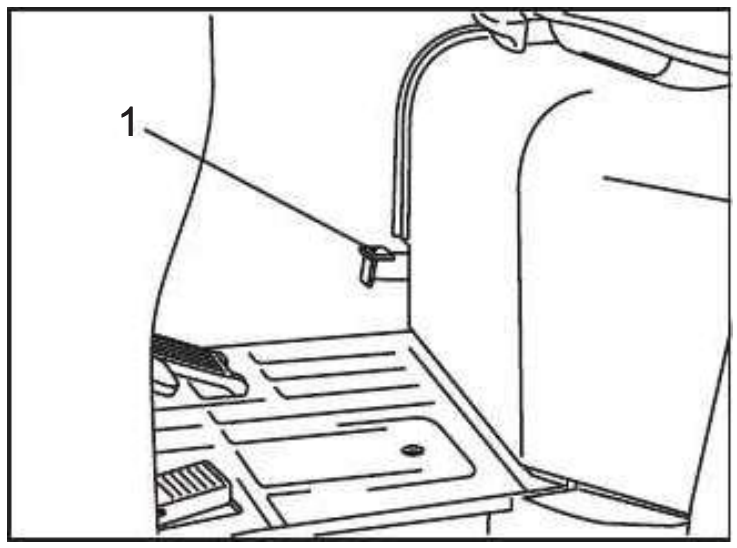


⚠ WARNING

Keep the foot switch depressed with your left foot during operation. The foot switch is a safety device that helps keep your left leg in the operator's compartment. Operation of the truck in confined spaces with your leg outside the operator's compartment might cause it to be crushed between the truck and a building wall or post, resulting in a broken leg.

If the foot switch is released during operation, the brake is applied and the traveling circuit shuts off automatically.

BATTERY LOCK RELEASE PEDAL [1]

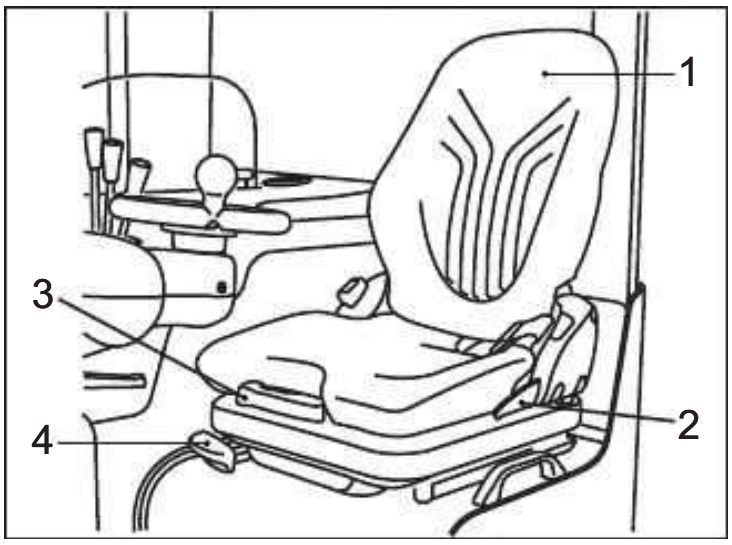


This pedal is used to remove and return the battery pack.

Step on the pedal and hold it down while pressing the reach lever to advance the mast. Then remove or return the battery pack.

TRUCK BODY

OPERATOR'S SEAT [1]

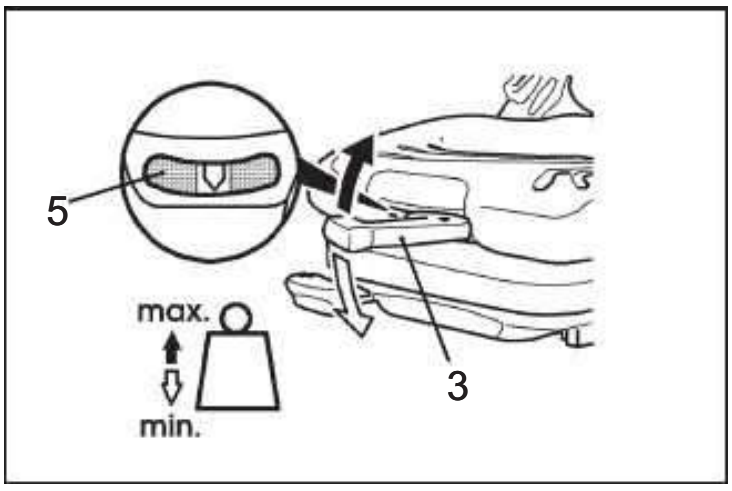


⚠ WARNING

Adjust the seat to provide easy access to all the controls before the day's work or before each shift and make sure the seat is locked in the desired position.

The operator's seat is a suspension seat which can be adjusted to the driver's weight.
The position and backrest angle can also be adjusted to the driver's physique.

SUSPENSION ADJUSTMENT KNOB [3]

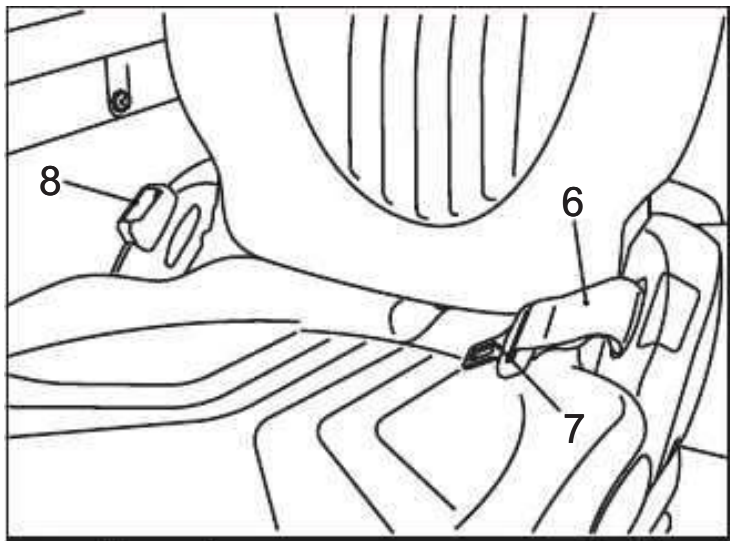


The suspension can be adjusted within an operator range from 45 to 170 kg, in the following manner:
Sit in the seat, pull out the knob [3] and move it up or down so that the arrow is in the clear middle area of the viewing window [5].

FORE/AFT ADJUSTMENT LEVER [4]
BACK RECLINE ADJUSTMENT LEVER [2]

Pull up the fore/aft adjustment lever and adjust the position of the seat forward or back within the range of 165 mm.
Pull up the back recline adjustment lever and adjust the backrest angle to suit yourself.

SEAT BELT [6]



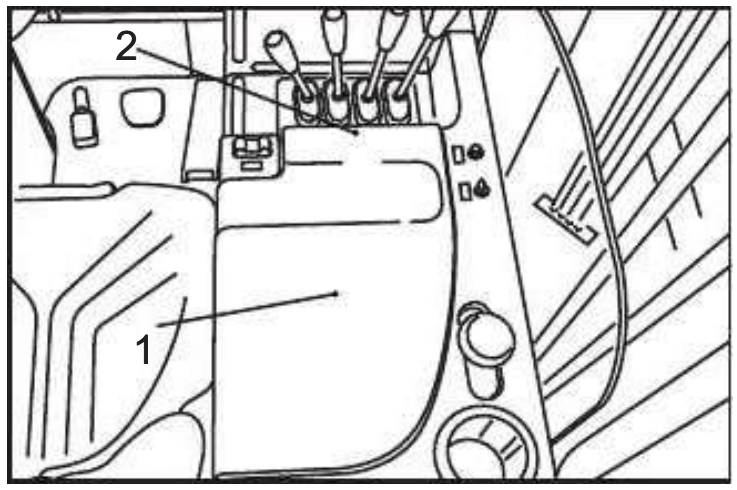
⚠ WARNING

Be sure to fasten the seat belt before starting the truck; otherwise, if the truck turns over, the operator could be thrown out and, in the worst case, the operator could be crushed by the truck.

Pull out the connector [7] on the left side and insert it into the receptacle [8] on the right side until it clicks into place.
To unfasten the seat belt, press the red button (PRESS) on the receptacle unit [8], and the belt will automatically wind up into the seat.

ARMREST [1]
ASSIST GRIP [2]

When traveling the truck, put your right elbow on the armrest with your right hand holding the assist grip. This way, you can operate the truck more safely with less fatigue.

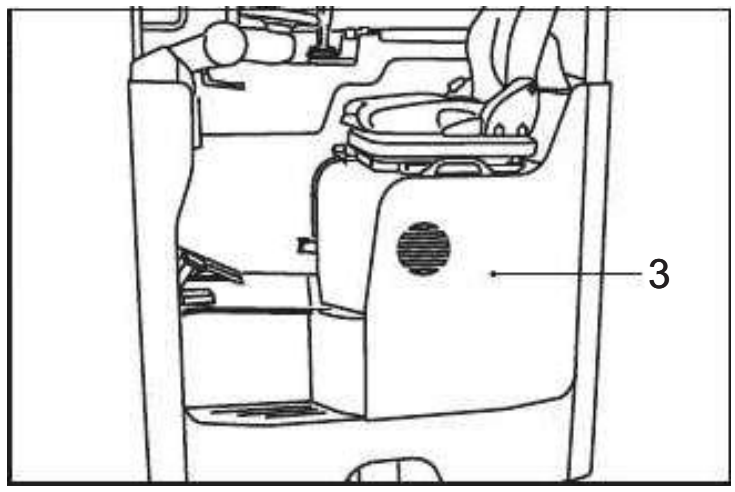


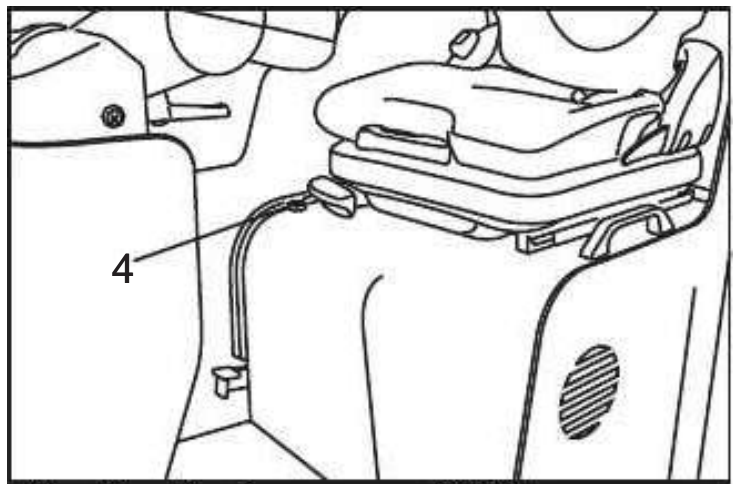
MOTOR HOOD [3]

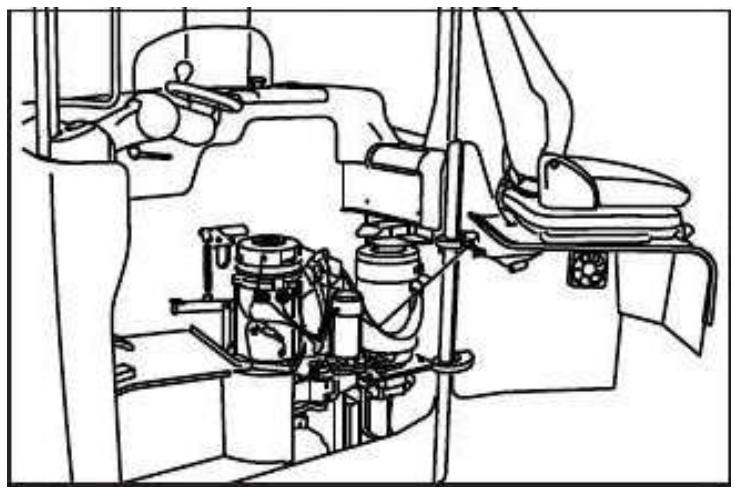
⚠ WARNING

Make sure the cover is securely closed before starting the truck.
An incompletely locked cover might open while operating, causing an accident.

If you want to inspect or service the motor, drive unit or electromagnetic brake unit, open the motor hood.
The motor hood is locked in place with the knob bolt [4] to the right of the operator's seat. Remove the knob bolt and open the motor hood.
To close the motor hood, return it to its original position and tighten the knob bolt to lock the hood in place.

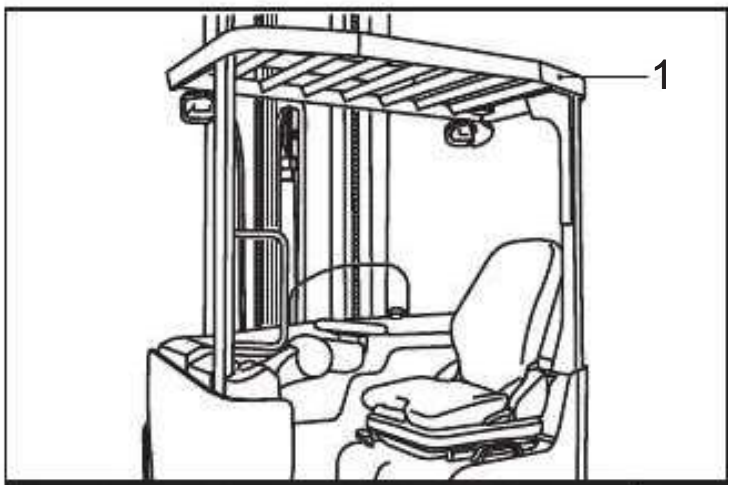






< Open motor hood >

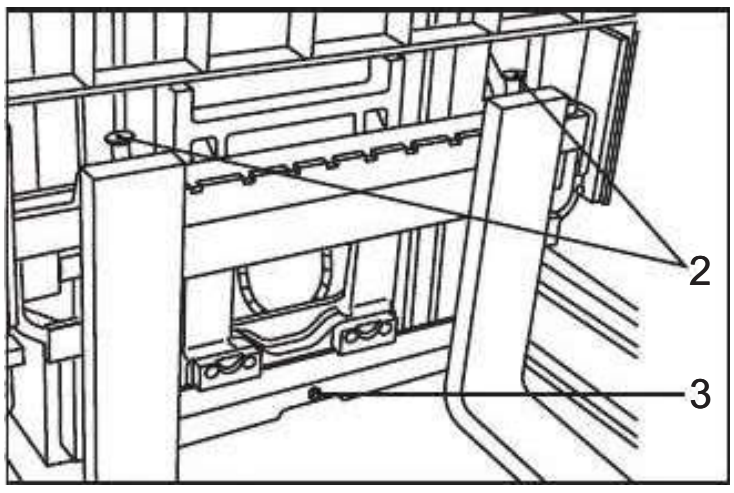
OVERHEAD GUARD [1]



⚠ 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 a serious accident.

FORK STOPPERS [2]



⚠ CAUTION

- **The forks should be set symmetrically to the truck centerline, and the fork stoppers should always be set.**
- **When adjusting fork spread, hold the load backrest and push the forks with your foot. Do not use your hand.**

The forks are secured with the fork stoppers. Pull the fork stoppers up a little bit and turn them 90°. Then adjust the fork spread using your feet to suit the size of the load you are going to handle.

Then adjust the fork spacing in five stages laterally according to the size of the load you are going to carry.

FORK LOCKING BOLT [3]

⚠ CAUTION

Do not remove the fork locking bolt except in the following situations; otherwise the forks might disengage from the carriage, causing personal injury.

- **When it is necessary to remove the forks.**
- **When there is some reason to bring the right and left forks together in the center.**

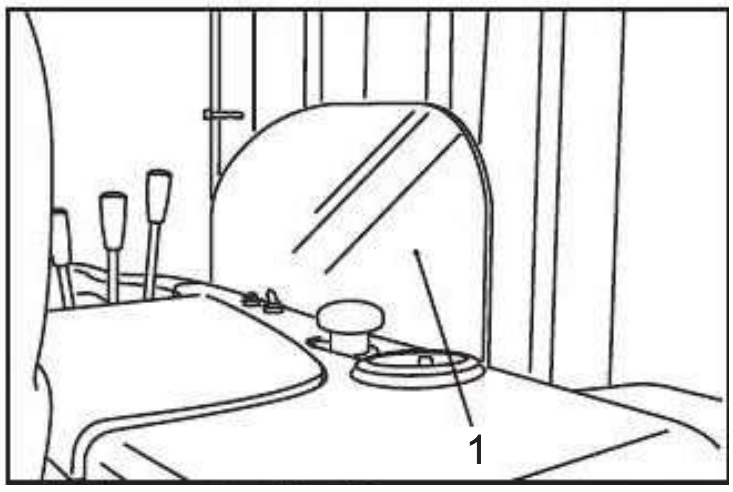
The fork prong can come off the carriage when is moved to the center. This bolt prevents the fork from being used in the center.

ARM GUARD [1]

⚠ WARNING

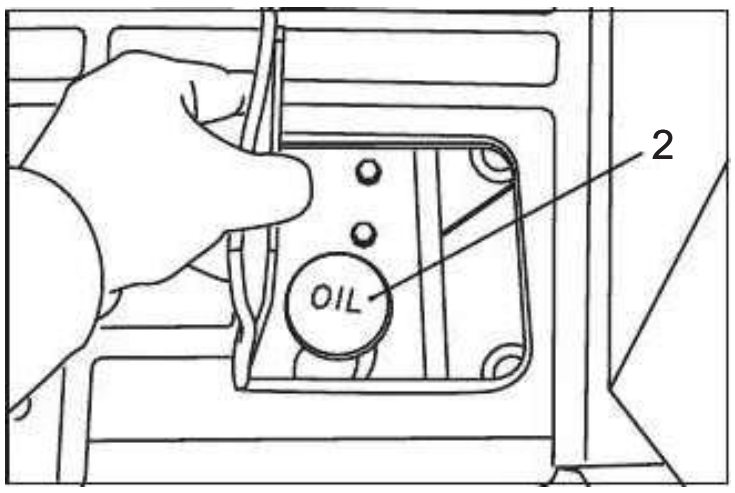
The arm guard is a safety device that protects the operator from injury.
Do not remove it. A damaged arm guard should be replaced with a new one.

The arm guard helps prevent the operator from reaching into the mast and getting his arm caught or accidentally cut off.



HYDRAULIC OIL TANK CAP [2]

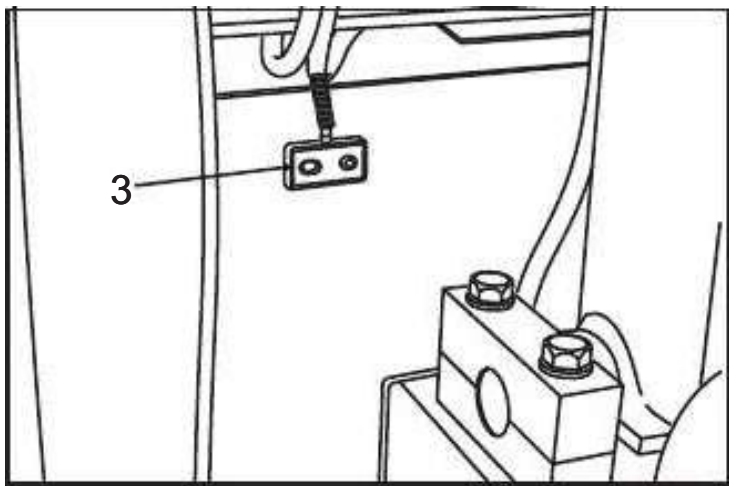
The hydraulic oil tank cap is located under the floorboard.
Remove the cap and pour hydraulic oil through the fill port.
The tank cap is fitted with an oil dipstick.



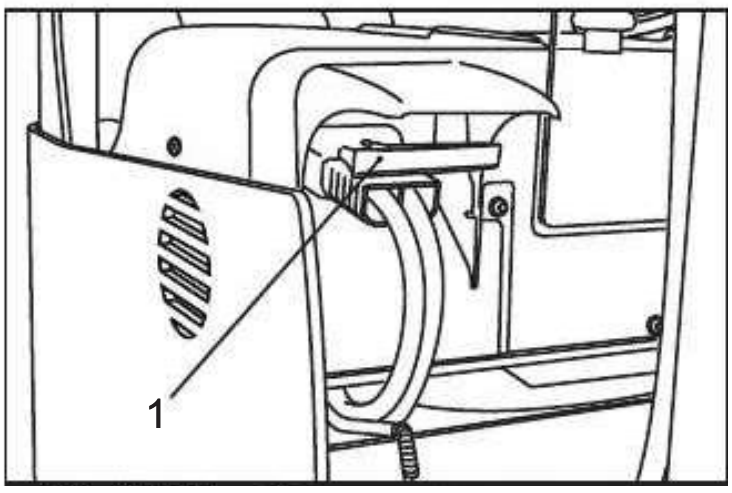
BATTERY ELECTROLYTE LEVEL INDICATOR (OPTION) [3]

The battery electrolyte level indicator is on the battery case, so you can check the electrolyte level in the battery without pulling out the battery.
The green lamp stays on, and indicates 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 is blinks, add distilled water as soon as possible.
Check the electrolyte levels in all the cells periodically.



BATTERY CONNECTORS [1]



⚠ WARNING

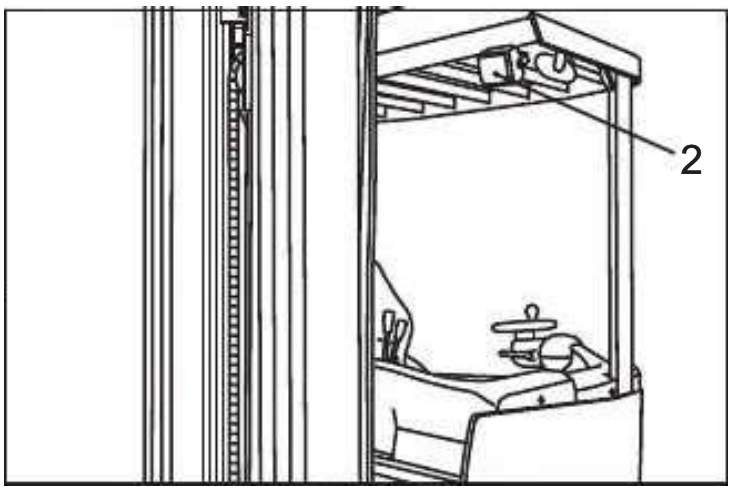
- **Make sure the battery connectors are disconnected before trying to touch any of the internal electric parts.**
- **There is voltage present in the main circuit even when the key switch is turned "OFF".**

The battery connectors are used to make and break the connection between the battery and the truck's electric parts. Under normal conditions the battery connectors connected.

NOTE

- Turn the key switch "OFF", first, before disconnecting the battery connectors.
- Make sure the key switch is "OFF" before trying to connect the battery connectors.

WORK LIGHTS [2]

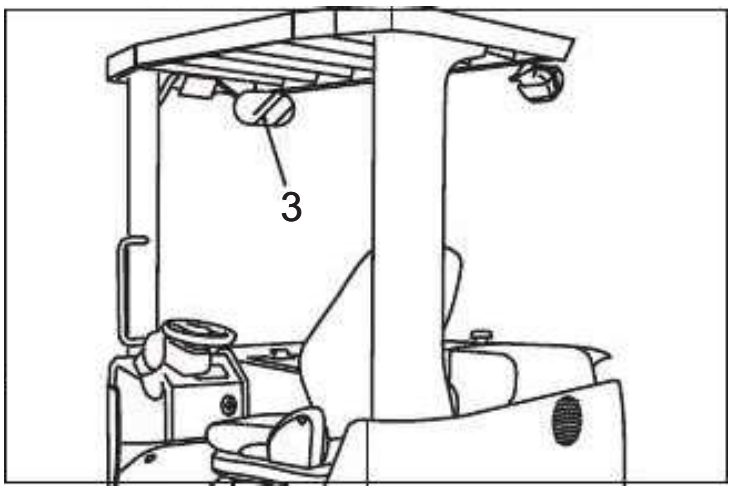


⚠ CAUTION

Make sure that the work lights turn on and off as they should. If a light bulb is blown out, replace with a new one. If the lens is dirty or damaged, clean or repair it.

The truck has work lights as standard equipment. Keep the lenses clean and intact at all times.

SIDEVIEW MIRROR [3]



⚠ WARNING

When traveling in reverse, always look in the direction of travel to make sure there is no one around the truck or in the path of travel. Do not put too much confidence in the sideview mirrors.

The sideview mirrors are located on the overhead guard, to use when checking the area behind the truck.

SAFETY DEVICES

Model FRSB14-25 series forklift trucks come equipped with a variety of safety devices, including an overhead guard, load backrest, seat belt, arm guard and foot switch. This section covers some of the other safety devices used for the safe operation of the traveling and load handling systems.

SSC (SAFE SPEED CONTROL)

⚠ WARNING

The SSC is not a device to prevent turnovers. Slow down to a safe speed to make turns.

The SSC automatically limits the maximum travel speed when the truck starts turning.
This truck is more likely to turn over than some others, because of its design characteristics, if it is turned at high speed. Therefore, the truck is designed so the maximum travel speed is automatically limited when making turns, to reduce the risk of turning over.

TRAVEL AND LOAD HANDLING SPEED LIMITER

⚠ WARNING

The travel and load handling speed limiters are not turnover prevention devices.
Exercise extra care when handling loads with the forks raised high.

When the loaded forks are raised high up, the truck's center of gravity is shifted upward, and this increases the truck's tendency to tip over. Truck travel, or movement of the load using the reach mechanism or the side shifter, will increase the risk of turnover considerably, when the load is high.
This truck is designed so the travel, reach and side-shifting speeds are limited according to the fork lift height and load weight, to reduce the risk of truck turnovers.

INTERLOCK

The interlock is a safety device that cuts off the power to the drive and load handling circuits when the operator leaves the operator's seat during operation. This device helps prevent an accident from happening if the operator is not in the correct driving position or if the controls are moved unintentionally when no one is in the operator's seat.

The truck won't travel and the load handling system won't operate if the operator is not in the operator's seat. The operator's presence in the operator's seat is detected by an interlock switch under the seat.

⚠ WARNING

- **Do not leave the operator's seat while the forks are lowering. If the interlock is activated while the forks are lowering, they will stop suddenly and the load may shift or fall off the forks.**
- **Do not rest anything heavy in the operator's seat; otherwise the interlock may fail to operate as it should.**
- **Do not modify the interlock switch under the operator's seat. The interlock switch is designed to turn on when the operator sits there.**
- **Seat yourself squarely in the operator's seat when operating the truck.**
  An offset position while driving may cause the interlock to be activated.
- **If the interlock is activated while the truck is going up a ramp and the truck stops, do not operate the reach lever, because the mast could move unexpectedly due to its own weight.**
- **If the interlock is activated on a truck with an optional load handling attachment, do not operate the attachment lever. The attachment might move unexpectedly due to its own weight.**

INTERLOCK OPERATION AND HOW TO RELEASE THE INTERLOCK

- **When the key switch is in the "OFF" position:**
  Interlock operation
  - ○ The forks won't go down when the lift lever is placed in the "down" position.

  How to release the interlock
  - ○ Sit in the operator's seat and turn the key switch to the "ON" position.

- **When the key switch is turned from the "OFF" position to the "ON" position when you are not in the operator's seat:**
  Interlock operation
  - ○ The load handling system won't operate when the load handling levers are operated.
  - ○ The neutral status indicator light will blink, the interlock indicator light will come on, and error code "106" will be displayed on the instrument panel.

  How to release the interlock
  - ○ Turn the key switch to the "OFF" position. Sit in the operator's seat and then turn the key switch to the "ON" position.
    All of the signals – the neutral status indicator light, interlock indicator light and the error code – will go out.

- **If you leave the operator's seat with the key switch in the "ON" position**
  Interlock operation
  - ○ The interlock indicator light comes on and the error code "105" is displayed on the instrument panel.
  - ○ The load handling system remains operative for 3 seconds after the operator leaves the operator's seat. If more than 3 seconds passes, the load handling levers will become inoperative from outside the operator's seat.

  How to release the interlock
  - ○ Sit in the operator's seat properly, and you will be able to actuate the load handling system.

OPTIONAL EQUIPMENT

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

HEADLIGHTS (RWL)

⚠ CAUTION
It is recommended to use the optional headlights when you are working in a place where the lighting is insufficient.

The headlights illuminate the road or floor at night and allow the operator to see any obstacles on the road or floor easily.

STROBE LIGHT (FLL)

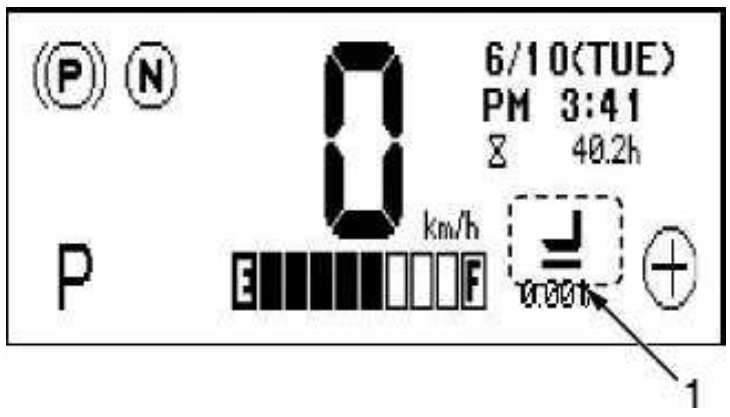
Use the optional strobe light if you need to use the truck near fellow workers or bystanders or when the work place is noisy.

FORWARD TRAVEL CHIME (TAF)

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

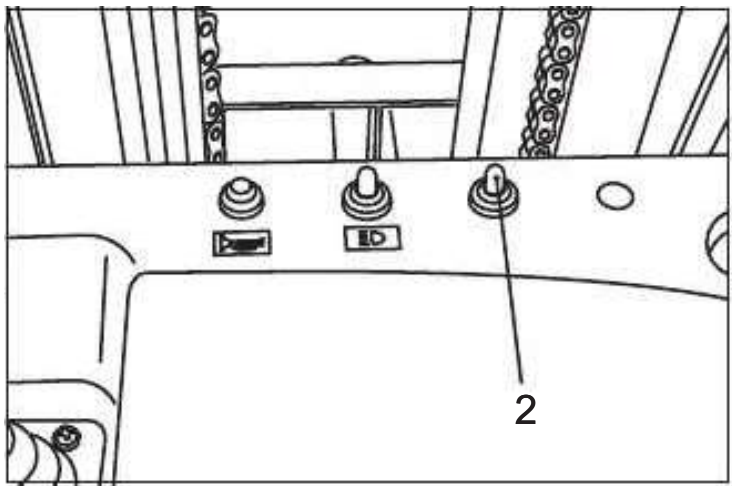
FORK POSITIONING LASER UNIT (OPTION)

A fork positioning laser unit is installed on the carriage. It emits a visible laser beam to help the operator check the fork height by looking at the meter panel to make it easy to insert the forks into the openings in a pallet.



OPERATION

- Push the laser switch [2] forward to the “ON” position and tilt the forks until they are horizontal and a laser beam will be visible. The “Forks are level” icon [1] is displayed on the meter panel.
- The “Forks are level” icon [1] can be found on the Main screen and on the Fuel consumption indicator screen.



1. “Forks are level” icon 2. Laser switch

NOTE

Remember that the forks may not be level even if the “Forks are level” icon [1] is lit when there is a heavy load on the forks, because the forks may bend to some extent.

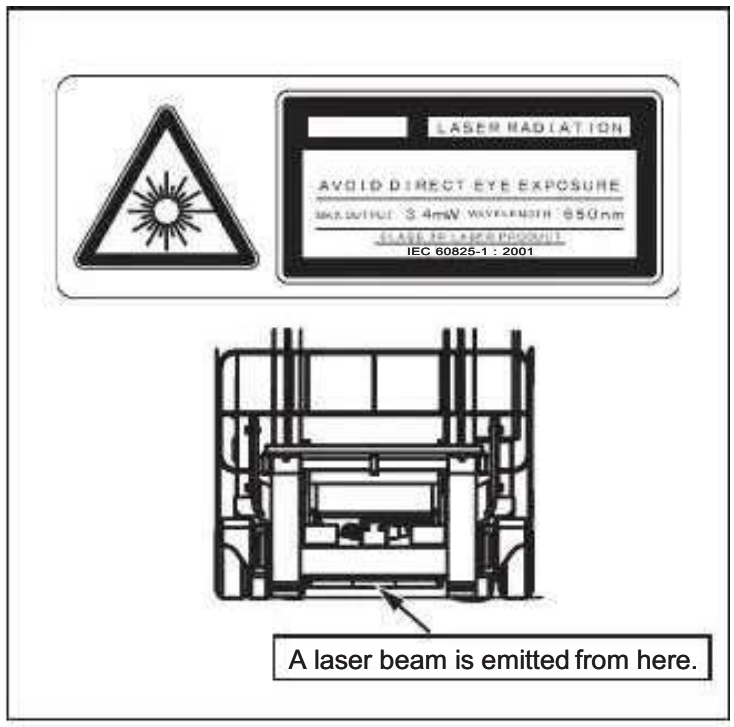
PRECAUTIONS WHEN USING THE FORK POSITIONING LASER UNIT

The fork positioning laser unit emits a laser beam. Make sure to observe the following cautions when using the unit to protect yourself and your fellow workers.

WARNING

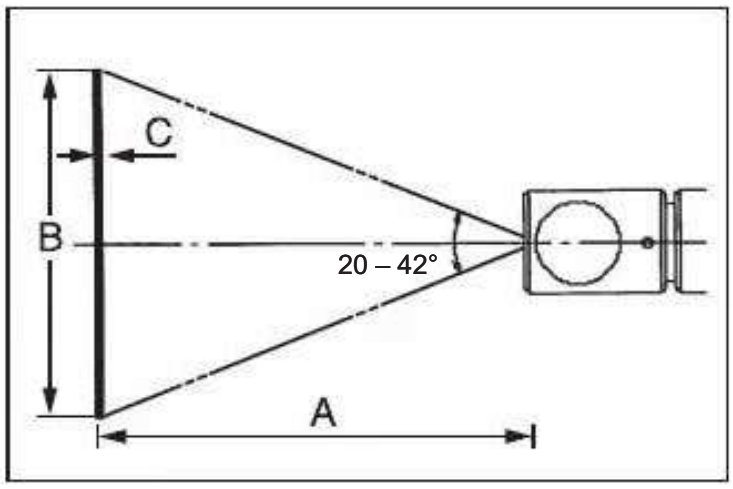
- **Do not look directly at the laser light source or a reflected laser beam in a mirror; otherwise you may damage your eyes. If you accidentally look at the laser beam and experience any problem with your vision or feel discomfort in your eyes, seek medical attention immediately.**
- **Let fellow workers know about the hazard of the laser unit and make sure they do not look directly at the laser beam.**
- **Verify that the fork positioning laser unit is functioning properly before starting the day’s work, or before each shift. If it is not working correctly, contact your local UniCarriers dealer.**
- **Do not try to disassemble or modify the fork positioning laser unit. You may cause an accident.**

Laser beam caution decal



- **Do not use the laser unit in a place where it will be subject to water splashes or condensation will occur.**
- **Do not use the laser unit in a place where the laser beam might cause equipment around it to malfunction.**
- **The fork positioning laser unit is intended to improve work efficiency, especially when retrieving loads from an elevated position. The operator is required to check the fork position by direct observation as well as by looking at the instrument panel.**
- **The fork positioning laser unit should only be used while the truck is on a flat surface. The fork position cannot be correctly monitored on an inclined surface.**

Laser beam width



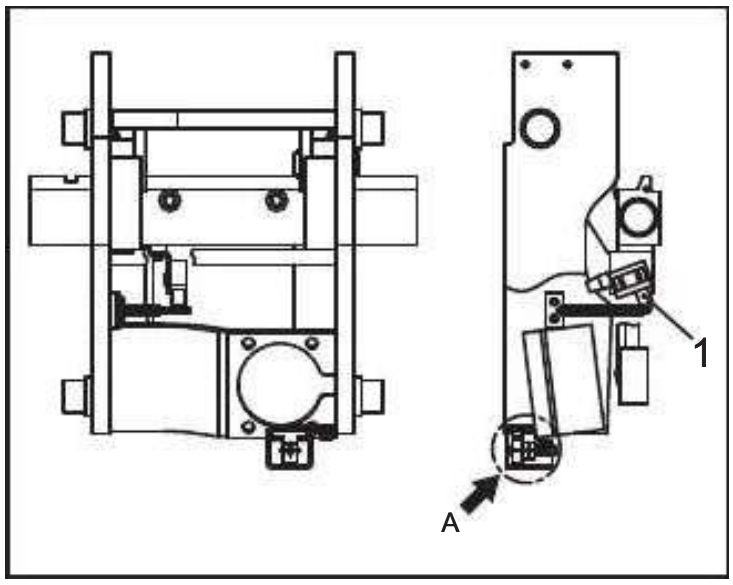
Max. A:B ≒ 1:0.8
Min. A:B ≒ 1:0.35
C = The beam is less than 2 mm wide at a distance of 5 m or less

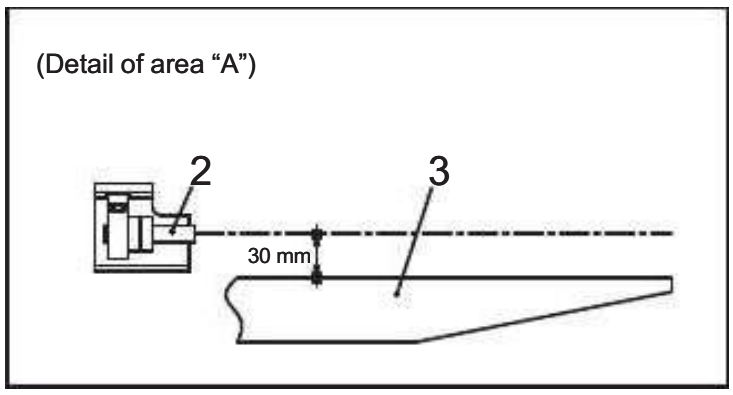
A: Distance B: Beam length C: Beam width

INSTALLING THE FORK POSITIONING LASER UNIT

- Install the laser unit [2] so that the laser beam source is 30 mm above the surface of the forks [3].
- Adjust the limit switch [1] so that the laser beam is only emitted when the forks are level.

⚠ CAUTION
The installation and adjustment of the laser unit requires a high level of skill. Leave it to your local UniCarriers dealer.





1. Limit switch
2. Laser marker
3. Fork

LASER BEAMS

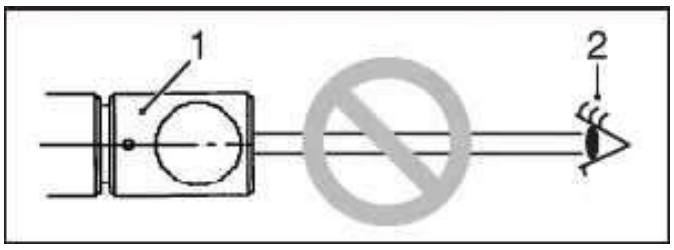
The fork positioning laser unit uses a laser. Laser safety requirements are defined in IEC 60825-1.

1) Laser safety

Unlike incandescent lamps, lasers can damage your skin or eyes if not used properly. The operator and his fellow workers must be careful.

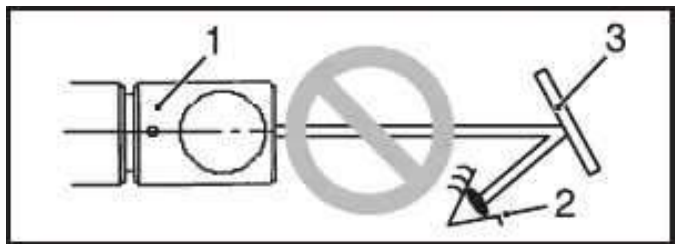
In particular, special care must be taken to protect the eyes. Do not look directly at a laser light source or a laser beam reflected in a mirror. If you accidentally look at the laser beam and experience any problem with your vision or feel discomfort in your eyes, seek medical attention immediately.

Do not look directly at the laser.



1. Laser beam source 2. Eye

Do not look a laser reflected in a mirror.



3. Mirror

2) Laser classification by IEC

Light from lasers is classified into seven categories, according to the degree of hazard.

The UniCarriers fork positioning laser unit uses a laser to produce light that is in Class 3R.

Use caution when using the laser unit.

Class	Degree of hazard
1	Class 1 lasers are safe for use under all reasonably-anticipated conditions of use.
1M	Class 1M lasers are safe for use under all reasonably-anticipated conditions of use. However they may be hazardous if the user uses an optical apparatus within the beam.
2	Class 2 lasers are lasers emitting radiation in the visible portion of the spectrum. The power of these lasers is such that they will normally be protected by a physiological aversion response (blink reflex).
2M	Class 2M lasers emit in the visible region in the form of a large diameter or divergent beam. It is presumed that the human blink reflex will be sufficient to prevent damaging exposure, but if the user places an optical apparatus within the beam, the laser output may become dangerous.
3R	Class 3R lasers are potentially dangerous to observe directly, but the degree of risk is lower than a Class 3B laser.
3B	Class 3B lasers are usually dangerous to observe directly. A diffuse reflection is usually not a hazard.
4	Class 4 lasers are dangerous to the eye if there is direct exposure to laser beam and may cause a dangerous diffuse reflection. The direct beam can produce skin damage and can also be a fire hazard. Due caution must be taken when using Class 4 lasers.

3. OPERATION

CONTENTS

A variety of safety instructions are found throughout this manual. Follow all the instructions, for the safe operation and servicing of the truck.

Safety instructions are accompanied by the safety alert symbols and signal words shown below.

This is the safety alert symbol. It is used to warn the reader about a potential source of human injury. To prevent injury or death, make sure you understand and follow all the safety messages following this safety alert symbol.

Signal word (designates the degree of hazard)	Definition
⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
CAUTION	Indicates a hazardous situation which, if not avoided, may result in damage to the truck or other property.
NOTE	Indicates information which will help extend the service life of the truck.

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

DURING BREAK-IN

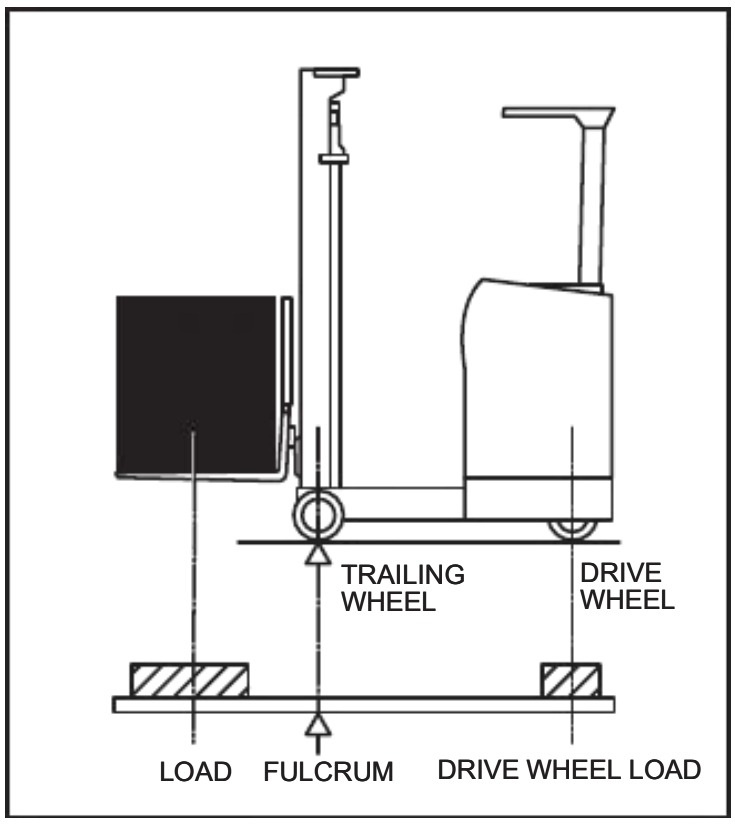
We recommend to operate the truck under light load conditions for the first stage of operation to get the most from it. Especially, the requirements given below should be observed while the truck is in a stage of 200 hours of operation.

★ 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 THE STABILITY OF THE TRUCK AND LOAD

The reach truck maintains the balance between the load applied on the drive wheel and the load on the forks using the trailing wheels as a fulcrum, when a rated capacity load is in position on the forks.
Due care must be paid to the weight and center of gravity of the load on the forks, so as to maintain the stability of the truck.

If the rated capacity is exceeded, there is a danger that the drive wheel will be lifted off the surface and, in the worst case, the truck will tip over backwards, resulting in a fatal accident. When a load is resting near the fork tips, it has essentially the same effect as an increase in the weight of the load. If this distribution is necessary, the load weight must be reduced accordingly.

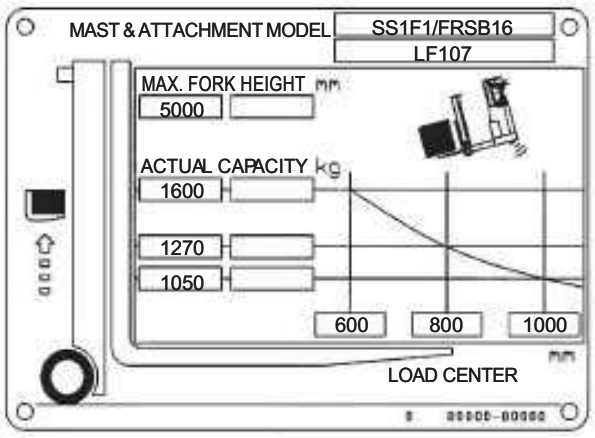


BASIC LOAD CENTER AND RATED LOAD

⚠ WARNING

- **When traveling with loads, keep the forks 5 to 10 cm (2 to 4 in.) above the upper surface of the outriggers, retract the mast fully and keep the forks 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 loading attachment, 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:
  - **○ The weight of an attachment is added.**
  - **○ The attachment shifts the basic load center position forward, and thus the allowable load is reduced.**



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 a reach truck with a capacity of 1.6 tons. This chart is called a load chart and is attached to the truck.

THE STABILITY OF LIFT TRUCK

The stability of lift trucks is stipulated in ISO Standard. 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 vertical, 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.

☞ NOTE

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.

TRANSPORTING THE LIFT TRUCK

TRANSPORTING THE LIFT TRUCK ON A TRAILER TRUCK

⚠ WARNING

- **Securely lock the lift truck in place to prevent it from 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 width, overall height, and weight and observe the local traffic regulations.**

For the dimensions and weight of the lift truck, refer to page 5-3 “SPECIFICATIONS.”

After the lift truck has been transported to a new destination, preoperational and performance inspections should be carefully performed before it is used. (See the “PREOPERATIONAL CHECKS” section in “4. MAINTENANCE”.)

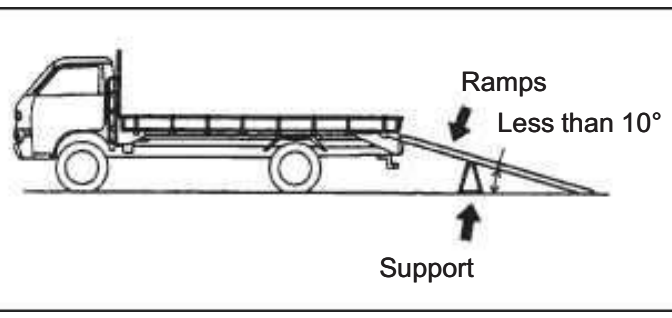
LOADING AND UNLOADING THE LIFT TRUCK

It is advisable to ask a specialist to load and unload the lift truck on or off the trailer. The lift truck operator may not be familiar with this kind of work. When loading or unloading the lift truck yourself, use proper ramps or a loading bridge.

■ WHEN USING RAMPS

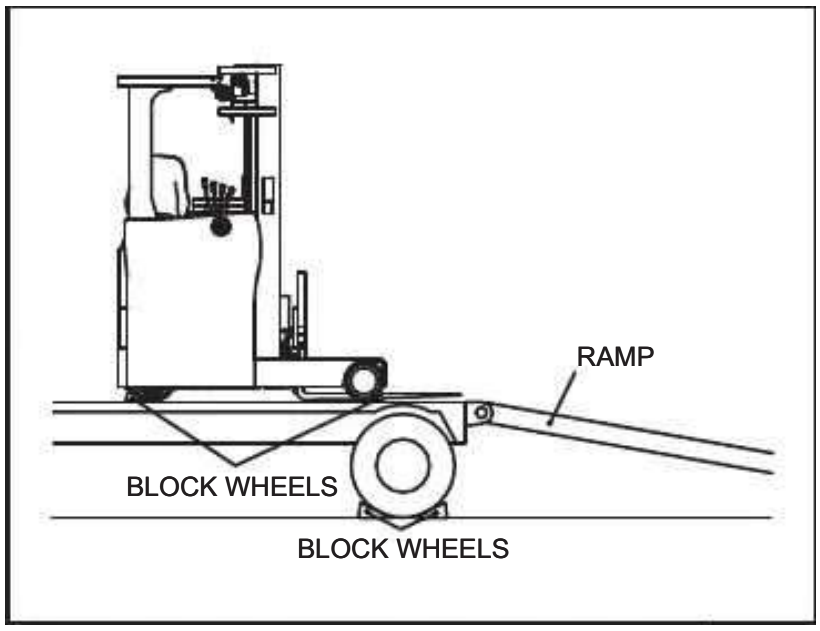
⚠ WARNING

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



Set the ramps at an angle of less than 10°. Use the table below as a rule of thumb.

Bed height	Ramp length
1000 mm	5800 mm
750 mm	4300 mm
500 mm	2900 mm



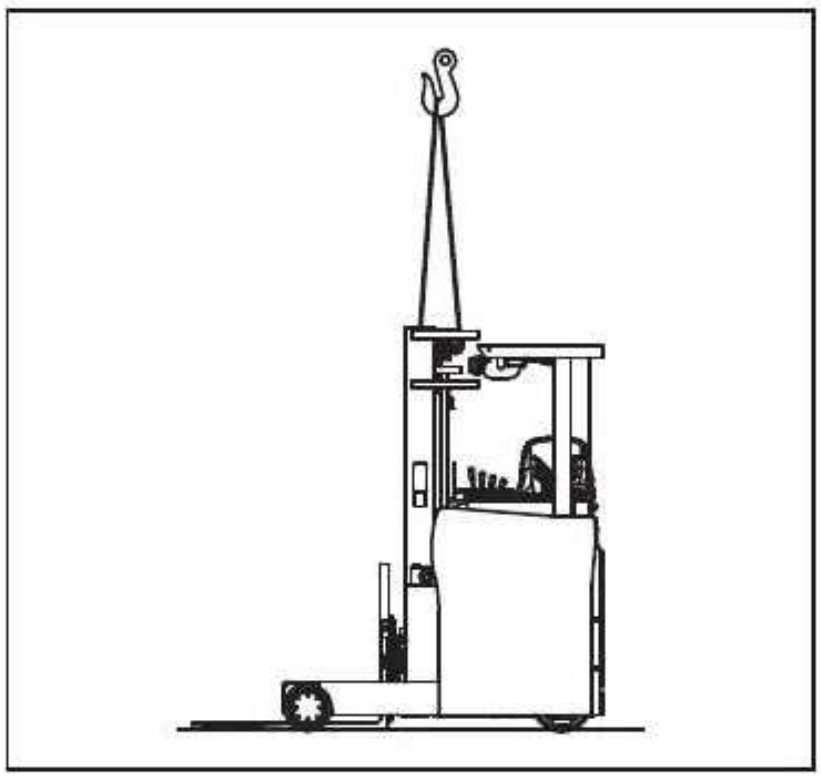
Observe the following cautions when loading or unloading the lift truck on or off a trailer.

- 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, drive it forward going up the ramps slowly with care.
- Jack up the truck trailer securely to prevent it from upending during loading or unloading.
- Give instructions to the truck trailer driver not to move the truck trailer until load handling has been finished.
- Make sure the ramp or loading bridge is secured.
- On rainy days, the lift truck is apt to skid on the ramp or loading bridge. Use anti-skid ramps or loading bridges; otherwise cancel the operation.

■ WHEN USING A CRANE

⚠ WARNING

- **Never stand or walk under a hoisted lift truck.**
- **Do not attach a wire rope to the overhead guard to hoist the lift truck. The lift truck could fall over.**



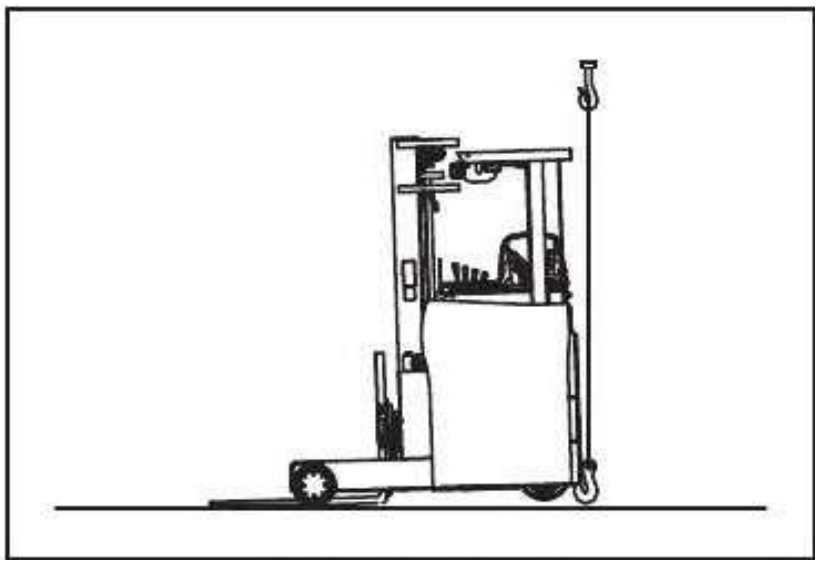
- Work on a hard, level road surface when loading the lift truck onto or unloading it from a truck trailer.
- Make sure the truck trailer is securely braked with the wheels blocked.
- Hoist the lift truck with a crane and load or unload it from the truck trailer.
- When hoisting the lift truck, attach wire ropes to the lifting hooks at the top of the mast.
- Use wire rope strong enough to support the entire weight of the lift truck. Do not use kinked, deformed or frayed wire rope.

MOVING THE LIFT TRUCK (IN AN EMERGENCY)

⚠ WARNING

Do not use another vehicle to tow a disabled lift truck. The drive wheel of a disabled lift truck may be locked so that the lift truck might tip over or the brake system might be damaged if towed by another vehicle.

If you need to move a disabled lift truck, raise the drive wheel off the ground using a crane or the like. Moving a lift truck in this manner must only be done when a truck is disabled and needs to be moved a short distance to an out-of-truck area.



For the procedure for transporting an FRSB truck, refer page 3-4 “TRANSPORTING THE LIFT TRUCK.”

For the weight of the FRSB trucks, refer to page 5-3 “SPECIFICATIONS.”

OPERATING THE LIFT TRUCK

MOUNTING AND DISMOUNTING

⚠ CAUTION

Do not grab the steering wheel when getting on or off. Never get on or off a moving truck; otherwise there is a danger of slipping or falling, thus causing serious personal injury.

1) Make sure no one is under, on or close to the truck.
2) Use the assist grips and steps when getting on and off the truck.
3) After getting on the truck, fasten the seat belt securely.

STARTING PROCEDURE

⚠ WARNING

- **Seat yourself squarely in the operator's seat and turn the key switch to the "ON" position.**
- **Make sure there is no one around the truck.**

1) Turn the key switch "ON". (All items are shown on the instrument panel.)
2) Hold the steering wheel knob lightly with your left hand.
3) Raise the forks 30 cm from the ground or floor surface.
4) Retract the mast fully.
5) Tilt the forks back fully.

STARTING UP

⚠ WARNING

- **Make sure there is no one around the truck and let other workmen and bystanders know, by honking, that you are starting up.**
- **Slow down:**
  - **at aisle intersections**
  - **in confined areas**
  - **on rough ground or floor surfaces**
  - **when approaching a load or an obstacle.**
- **Traveling forward**
  When you travel forward, look in the direction of travel and be alert for pedestrians, other trucks or obstacles in your path of travel.
- **Keep the foot switch depressed with your left foot while operating the truck.**
  Keep your body (especially your left leg) inside the operator's compartment to prevent it from being pinned between the truck and a building wall or post.
- **If either the steering or brake system fails to operate normally during travel, the electromagnetic brake will immediately be applied and it will stop the truck quickly. Be careful that the sudden stop does not throw you out of the truck.**

1) Press the brake pedal fully with your right foot.
2) Press the foot switch with your left foot.
3) Place the direction shift switch in the forward or reverse position. The direction of travel is displayed by the drive-wheel angle indicator on the instrument panel.
4) Release the brake pedal and press the accelerator pedal. The travel speed can be controlled by varying the amount of pressure on the accelerator pedal.

TURNING

⚠ WARNING

Note that the front of the truck will swing in the opposite direction from the direction of turn if the truck is turned while driving in reverse. Before turning, slow down and pull over toward the side to which you are going to turn. The steering wheel should be turned a bit sooner than with a general passenger car.

- Grab the steering wheel knob with your left hand.
- Your right hand is used to operate the load handling levers.

CAUTION

Avoid sharp turns; otherwise the cradle stopper attached under the truck may damage the floor surface. Slow well down before turning.

NOTE

When turning, the maximum truck speed is automatically limited by the SSC.

STOPPING AND PARKING

1) Let up on the accelerator pedal to slow down.
2) Depress the brake pedal fully to stop the truck.

When you park the truck, stop it in an out-of-traffic area and follow this procedure:

1) Retract the mast fully using the reach lever.
2) Tilt the forks fully forward using the tilt lever.
3) Lower the forks to make them contact the ground or floor surface, using the lift lever.
4) Turn the key switch "OFF", remove the key and keep it safe.
5) Unfasten the seat belt and carefully get off the truck.

⚠ WARNING

- **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.**
- **Check for traffic in both directions. Step down from the truck by facing it and using the safety step and assist grips.**

GROUND CONDITION

⚠ WARNING

- **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.

PICK-UP

1) The fork spread should be as wide as possible to maintain the 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 as far as possible into the pallet.
5) Raise the load 5 to 10 cm off the upper surface of the outriggers. To raise the load from the ground: First lift the forks 5 to 10 cm off the ground or floor surface, and make sure the load is properly positioned across both forks.
6) If you find the load on the forks is off center, raise the load to a height of 5 to 10 cm above the outriggers and side-shift the forks properly to align the load's center of gravity with the centerline of the truck.

⚠ WARNING

When handling loads with the side-shifter, follow these precautions; otherwise there is a danger of tipping the truck over to the side because of losing lateral balance.

- **Do not travel with an off-center load on the forks. Never lift an uneven load.**
- **Do not operate the side-shifter while lifting a load.**
- **Do not operate the side-shifter with the forks raised quite high (150 cm or higher), except when the load can be stabilized, as it is over a shelf.**
- **Do not operate the side-shifter while traveling. Do not jerk the side-shifter.**

CAUTION

A side-shifting operation should be performed with the forks raised 5 to 10 cm above the top surface of the outriggers.
Do not try to side-shift the load with the bottoms of the forks in contact with the ground or floor surface; otherwise the side-shifter might be damaged.

7) Tilt back the forks fully and retract the mast completely. Start traveling.
8) When handling a bulky load that restricts your vision, drive the truck forward.

STACKING

⚠ WARNING

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

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 forks forward until they are horizontal. If the load is not correctly positioned for stacking, carefully operate the side-shift lever to position the load correctly. Raise the load until the bottom of the load is a little higher than the position where you want to place it.
5) Move forward slowly to place the truck just in front of the correct position, and stop the truck.
6) Using the reach lever, advance the mast to place the load over the correct position.
7) Make sure the load is just above the right place. Slowly lower the load into position. Make sure the load is securely placed or stacked.
   * If the pallet or load is not placed properly, use the following procedure:
     Pull about 1/4 of the forks off the load by retracting the forks and raise the forks 5 to 10 cm. Advance the forks to the correct deposit position and slowly lower the load into position.
8) Fully retract the mast using caution not to hit the pallet or load with forks. Make sure there is no one or obstacle in front of the truck and move forward.
9) After making sure the fork tips leave the pallet or load, lower the forks to the basic traveling position (30 cm off the ground or floor surface).
10) Tilt back the forks.

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 30 cm.
3) Check the condition of the stack.
4) Tilt the forks forward until they are horizontal. If the forks are not in the correct position for stacking, operate the side-shift lever carefully to put them where they should be. Raise the forks until the pallet is in the right position.

⚠ WARNING

When handling loads with the side-shifter, observe the following conditions; otherwise there is a danger that the truck will tip over on its side because lateral balance was lost.

- **Do not travel with an off-center load on the forks. Never lift an uneven load.**
- **Do not operate the side-shifter while lifting a load.**
- **Do not operate the side-shifter with the forks raised high (150 cm or higher), except when the load can be stabilized, as it is over a shelf.**
- **Do not operate the side-shifter while traveling. Do not jerk the side-shifter.**

CAUTION

Side-shifting operations should be performed with the forks raised 5 to 10 cm above the top surface of the outriggers.
Do not try to side-shift the load with the bottom of the forks in contact with the ground or floor surface; otherwise the side-shifter might be damaged.

5) Make sure the forks are positioned properly for the pallet. Move back slowly and stop the truck.
6) Insert the forks into the pallet as far as possible by advancing the mast.
   * If the forks are hard to be fully inserted, use the following procedure:
     Insert 3/4 of the forks and raise them 5 to 10 cm. Pull back the pallet or skid about 10 to 20 cm and lower the pallet or skid on the stack. Insert the forks into the pallet fully.
7) Raise the forks 5 to 10 cm off the stack and fully retract the mast by operating the reach mechanism.
8) Make sure there is no one or obstacle in front of the truck and move forward slowly to the position where the load can be lowered to a safe height.
9) Slowly lower the load to a height of 5 to 10 cm above the upper surface of the outriggers. Tilt back the forks fully and move to the desired area.

BATTERY ELECTROLYTE LEVEL

⚠ WARNING

The battery electrolyte contains dilute sulfuric acid, a very corrosive material. Use special caution when you handle it.

If an accident takes place, take the following emergency measures and get medial attention. Battery electrolyte 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, flush it off immediately with a copious amount of water.**
- **It electrolyte gets into your eyes, flush it off immediately with a copious amount of water for about 15 minutes.**
- **If anyone swallows electrolyte accidentally, let him rinse out his mouth with a copious amount of water and drink a copious amount of water or milk with egg white. Let him lie quietly.**
- **If electrolyte comes in contact with clothing, take off the clothing immediately. Wash the closing with water and then neutralize it with weak alkaline liquid soap.**
- **If a lot of electrolyte scatters or flows out, neutralize it with sodium bicarbonate or flush it off with water. Report to the authorities concerned if necessary.**

CHECKING ELECTROLYTE LEVEL

⚠ DANGER

- **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 rod in the vent plug to see if its top end is visible.

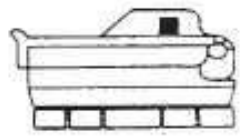
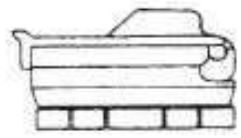
Keep the battery electrolyte level at the specified value at all times.

Due to evaporation and decomposition while charging, the water content of the electrolyte decreases.

NOTE

- If a low electrolyte level is neglected, the pole plates will get deteriorated, causing a short service life of the battery. It the electrolyte level is low, add distilled or purified water. Do not use tap water.
- Addition of distilled water or purified water should be made before charging so that the electrolyte and water added can be mixed well in the battery through charging. If water is added, there usually occur discrepancies in specific gravity among cells. It is advisable to give the battery an equalizing charge.
- The electrolyte is consumed more quickly in the summer than in the winter. In addition, remember that a battery close to the end of its useful life consumes more electrolyte.
- Do not use a commercial battery electrolyte additive. It might cause damage to the battery.

Checking electrolyte level

Proper level	Improper level
Red float rod is visible.	Red float rod is not visible. Add water.
	

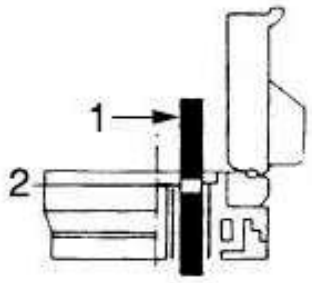
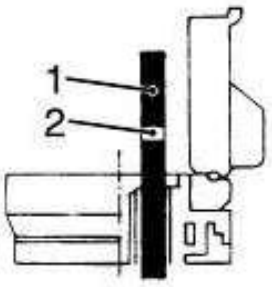
ADDING WATER TO ELECTROLYTE

⚠ CAUTION

Overfilling purified water will cause a low specific gravity of the electrolyte.
Do not exceed the specified upper limit.

Open the vent cap of each cell and pour purified water through the attached funnel into the cell. Stop adding water when the white line on the red float rod in the vent plug is visible. After adding water, close the vent cap until it clicks. If the battery is charged with any vent plug opened, the electrolyte splashes to contaminate the battery case.

Adding water

Addition of water completed	Overfilling of water
The white line on the float rod is just visible.	The white line on the float rod is too high.
	

1. Float rod 2. White line

IF VENT PLUG IS CONTAMINATED

⚠ WARNING

When cleaning vent plugs, wear protective gears such as protective glasses, rubber gloves, and rubber-soled shoes.

The inside of vent plug may be contaminated. Clean any contaminated vent plug with a neutral detergent to keep the float visible.

Removing:
Turn the vent plug counterclockwise and remove it from the vent cap.
Reinstalling:
Reinstall the vent plug in the reverse order of removing. Make sure the vent plug and vent cap are securely assembled.

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; otherwise overfilling of purified water will result.

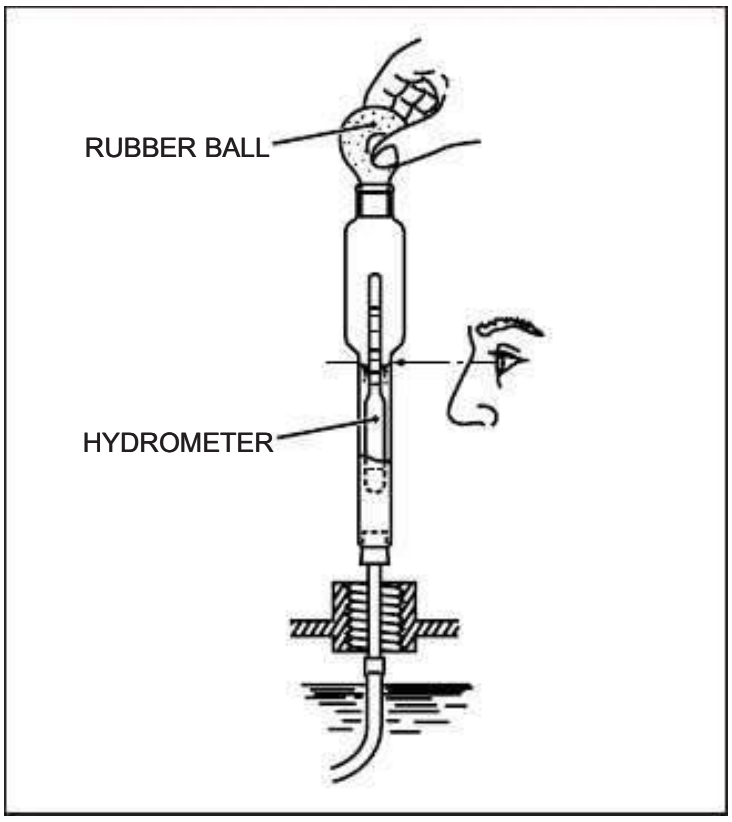
BATTERY ELECTROLYTE SPECIFIC GRAVITY

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°C.

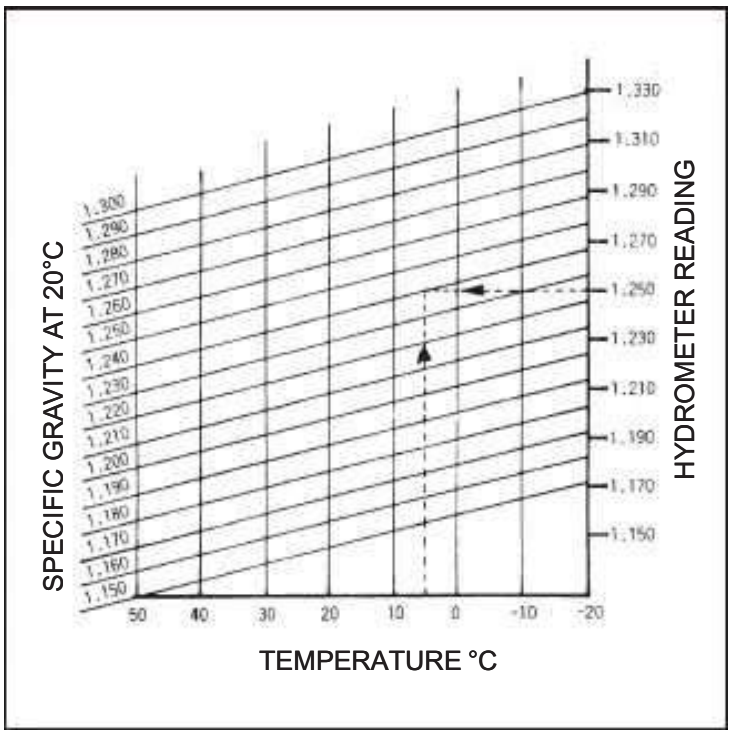
How to read hydrometer



CONVERSION TABLE

Example:

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



CHARGING THE BATTERY

The battery unit supplies power to the truck.
When recharging the battery, observe the following conditions for safe operation.

⚠ WARNING

- **In order to prevent an electric shock accident, be sure to ground the power supply equipment securely.**
- **In order to prevent an electric shock accident, do not put your hand or anything inside the equipment; otherwise it will lead to an accident if the power switch is ON or the battery connectors are connected.**
- **Charge the battery 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 hydrogen gas is released from the battery while being charged.**
- **Do not disconnect the battery connectors while charging; otherwise sparks may be fired, leading to a fatal accident.**
- **Switch 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 battery or charger.**

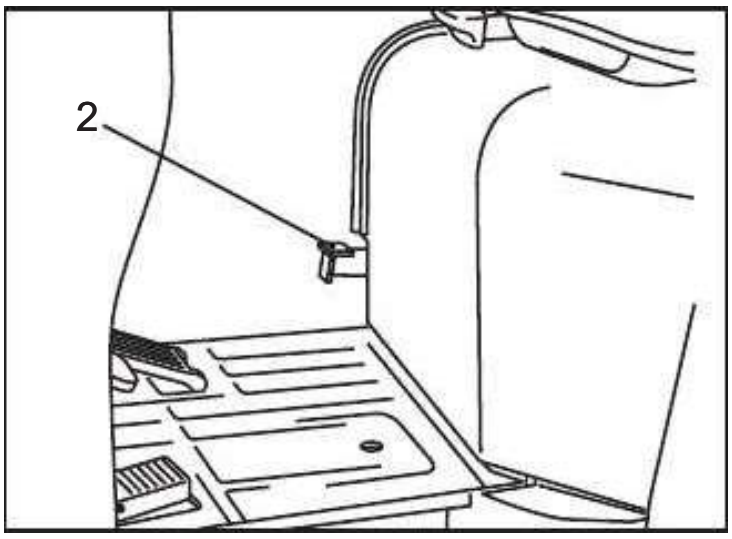
NOTE

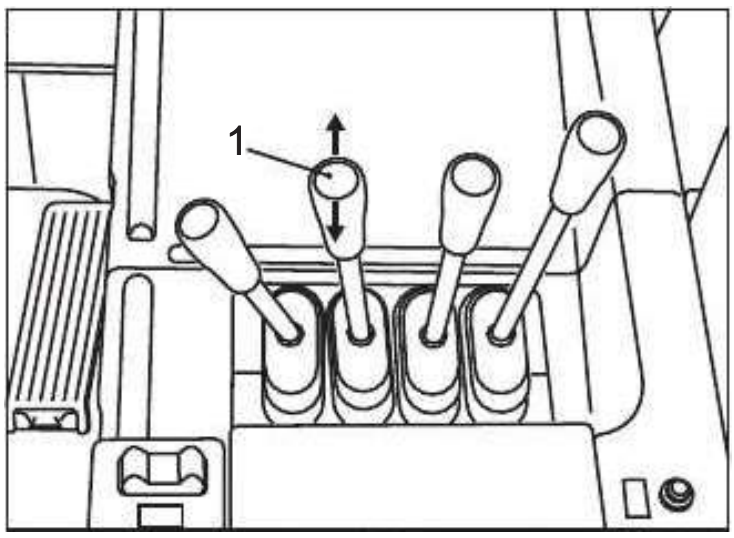
- Make sure the electrolyte temperature is below 40°C when starting charging. If not, wait until the temperature drops below 40°C.
- If the electrolyte temperature exceeds 50°C while charging, the battery service life will be shortened.
- Do not try to charge the battery when the ambient temperature 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°C, the battery service life will be shortened.
- Use a battery charger appropriate for each battery capacity.
  Charging with an improper battery charger or using a battery charger for the other purposes will cause a trouble.
- Do not disconnect the battery charger cable from the power source while charging. If the charger cable is disconnected by mistake, press the charge stop button without fail.
- Check the battery charger and battery for damaged or discolored plug or cable. Check the connectors for looseness. If any defect is found, operation of the battery charger or battery should be halted until the problem is corrected.
- Before trying to recharge the battery, check the electrolyte level of the battery. (For detail, see section "BATTERY ELECTROLYTE LEVEL".)
- Use caution not to allow electrolyte to splash over the truck body or electric components. If they are contaminated with electrolyte, contact your local UniCarriers dealer.

REMOVING AND REINSTALLING THE BATTERY

⚠ WARNING

- **Never place yourself between the battery and the mast or the truck body.**
- **Make sure to remove and reinstall the battery with the truck parked on a level surface and in an area with no obstacles in front.**
- **Keep the forks at a height of 10 to 30 cm and be sure the truck is unloaded.**
- **Make sure the key switch is "OFF", the forks are lowered to the ground or floor surface and the battery connectors are disconnected before inspecting the battery, adding battery electrolyte or water, or replacing the battery.**
- **When returning the battery, make sure the battery is securely housed in the case and the battery cable is not twisted, kinked, or caught in the battery case or the truck body.**





REMOVING THE BATTERY

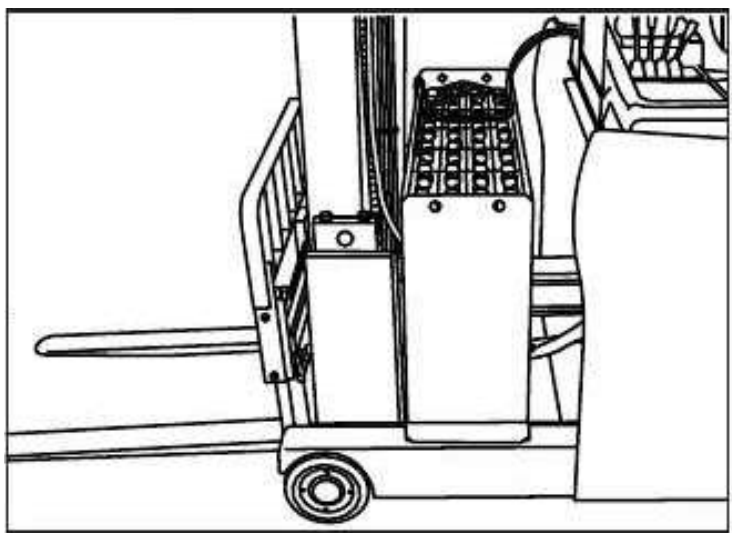
1) Pull back the reach lever [1] to retract the mast fully.
2) Step on the battery lock release pedal [2] fully, with the mast retracted fully.
3) Keeping the battery lock release pedal pressed fully, push the reach lever forward. The battery will come out as the mast advances.

REINSTALLING THE BATTERY

1) Keeping the battery lock release pedal [2] fully pressed, pull the reach lever [1] to retract the mast. The battery case will be returned to its original position by the mast movement.
2) When the battery case is returned back, the battery cable may come off the cable guide or be raised from the cable guide. In that case, first correct the position of the cable and push in the battery.
3) After making sure the mast has been completely retracted, release the battery lock release pedal.

NOTE

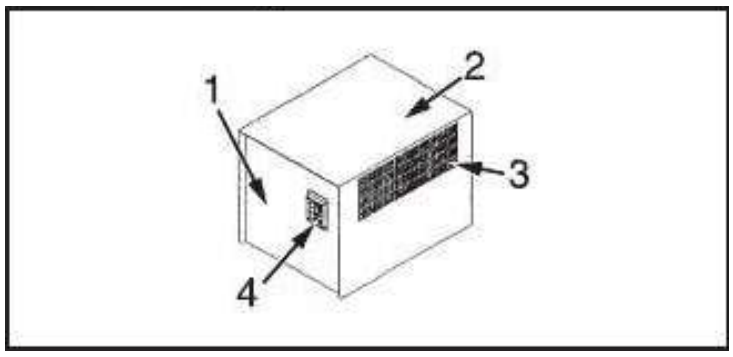
If the battery lock release pedal does not return fully when you release the pedal, step on the pedal again and pull the reach lever to retract the mast again.



(Battery pulled out into view)

STATIONARY BATTERY CHARGER (OPTION)

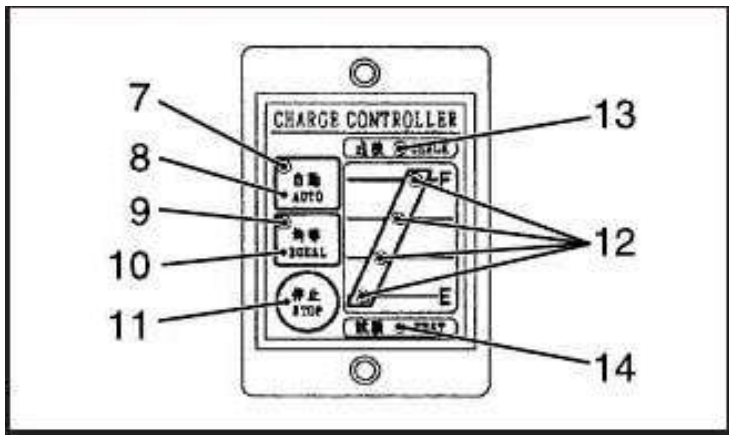
The battery can be recharged using a stationary battery charger. This section covers the operating instructions of the stationary battery charger. For the procedure for handling the battery, see the pages 3-10 and after.



1. Charger
2. Cover
3. Air vent
4. Charger control panel

PICTORIAL NOMENCLATURE

CHARGER CONTROL PANEL



7. Automatic charge indicating light
8. Automatic charge switch
9. Equalizing charge indicating light
10. Equalizing charge switch
11. Stop switch
12. Charge status indicating lights
13. Error light
14. Timer test light

Automatic charge switch [8] and indicating light [7]

When the automatic charge switch [8] is pressed, a normal charge is started.

During the normal charge process, the indicating light [7] stays on.

Equalizing charge switch [10] and indicating light [9]

When the equalizing charge switch [10] is pressed, an equalizing charge is started.

During the equalizing charge process, the indicating light [9] stays on.

Stop switch [11]

When the stop switch [11] is pressed, the charging process is stopped.

Charge status indicating lights [12]

The indicating lights come on in sequence according to the charge level.

1st light (bottom)	Comes on when the charge level is 53.0 V or more.
2nd	Comes on when the charge level is 55.0 V or more.
3rd	Comes on when the pole changing point is reached.
4th (top)	Comes on at the end of a timer interval of the timer. Light does not come on when the battery becomes fully charged by the total timer.

* The charge status indicating lights [12] stay on after the end of a timed interval of the timer.

Error light [13]

Light comes on when an error occurs.

Timer test light [14]

Light comes on when a timer test is performed.

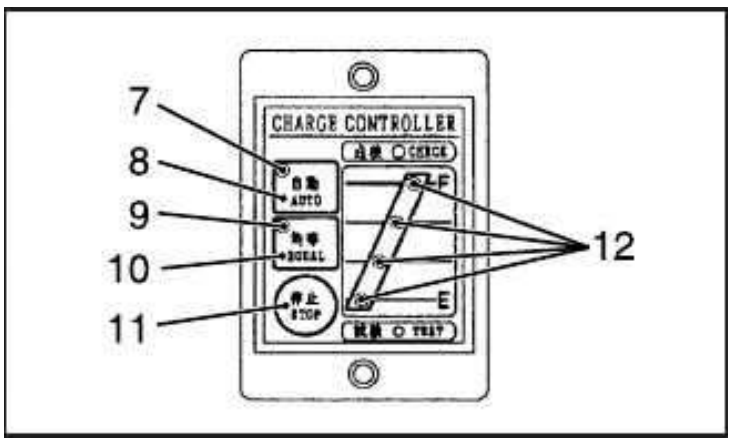
USING STATIONARY BATTERY CHARGER

- Recharging the lift truck battery using the stationary battery charger should be performed only by qualified personnel.
- Park the truck near the battery charger and turn the key switch to the “OFF” position.
- Check the electrolyte level.
- Make sure that the battery charger is suitable for the battery you are going to recharge, in particular regarding the voltage and capacity, referring to the name plate of the charger.
  Connect the output plug of the charger to the battery plug of the truck.
  Turn on the ground-fault circuit breaker.

CAUTION

- Make sure the output plug of the charger is securely connected to the battery plug of the truck. Improper connection of the plugs might cause an overheated plug, lead to a fire.
- Do not connect the output plug of the stationary battery charger to the truck half of the battery connectors. The truck might fail to operate normally.

- The automatic charge light [7] and equalizing charge light [9] on the control panel come on. If the automatic charge switch [8] is pressed, an automatic charge will start. If the equalizing charge switch [10] is pressed, an equalizing charge will start.
- Usually give an automatic charge, and give an equalizing charge once a week.



7. Automatic charge indicating light
8. Automatic charge switch
9. Equalizing charge indicating light
10. Equalizing charge switch
11. Stop light
12. Charge status indicating lights

AUTOMATIC CHARGE

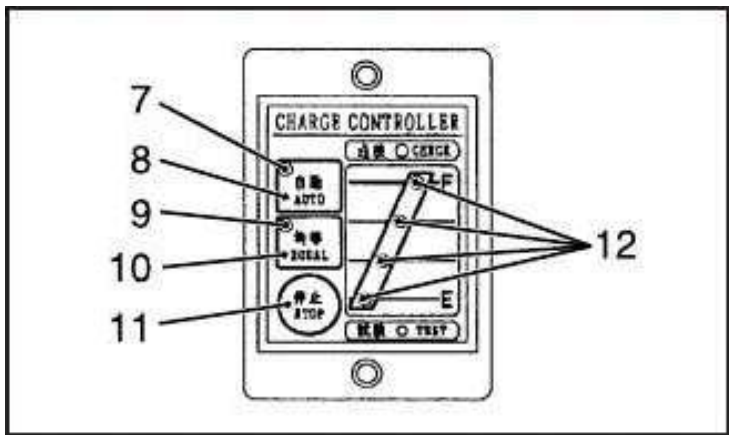
DANGER

- **Never disconnect the power supply plug and the battery connectors while charging.**
- **The battery charger is a high-voltage device. Never put your hand inside the equipment. Otherwise, you might get injured.**

WARNING

- **When you want to stop charging halfway, press the “STOP” switch.**
- **Make sure your hand is not wet when connecting or disconnecting the plugs. Dry your hand or put on a glove, if it is wet.**

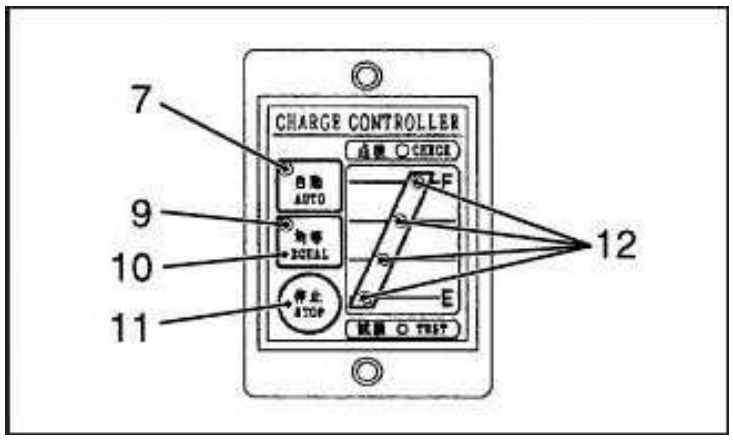
1) Press the automatic charge switch [8]. The automatic charge indicating light [7] comes on and an automatic charge starts.
2) As charging progresses, the charge status indicating lights [12] come on in sequence from the E side to the F side.
3) When charging is completed, all the charge status indicating lights [12] come on with the other indicating lights going out.
4) After charging is completed, turn off the ground-fault circuit breaker and disconnect the battery plug.
5) If you want to stop an automatic charge halfway, press the “STOP” switch [11].
   If an automatic charge is stopped halfway, all the charge status indicting lights [12] will go out and both the automatic charge light [7] and the equalizing charge light [9] will come on. After making sure both lights [7, 9] come on, turn off the ground-fault circuit breaker and disconnect the battery plug.



7. Automatic charge indicating light
8. Automatic charge switch
9. Equalizing charge indicating light
10. Equalizing charge switch
11. Stop light
12. Charge status indicating lights

EQUALIZING CHARGE

1) Press the equalizing charge switch [10]. The equalizing charge light [9] comes on and an equalizing charge starts.
2) As charging progresses, the charge status indicating lights [12] come on in sequence from the E side to the F side.
3) When charging is completed, all the charge status indicating lights [12] come on with the other indicating lights going out.
4) After charging is completed, turn off the ground-fault circuit breaker and disconnect the battery plug.
5) If you want to stop an equalizing charge halfway, press the “STOP” switch [11].
   If an automatic charge is stopped halfway, all the charge status indicting lights [12] will go out and both the automatic charge light [7] and the equalizing charge light [9] will come on. After making sure both lights [7, 9] come on, turn off the ground-fault circuit breaker and disconnect the battery plug.



7. Automatic charge indicating light
9. Equalizing charge indicating light
10. Equalizing charge switch
11. Stop light
12. Charge status indicating lights

CHANGING CHARGING MODE

Stop charging once before changing the charging mode.

INSPECTION AND TROUBLESHOOTING GUIDE

PERIODIC INSPECTION

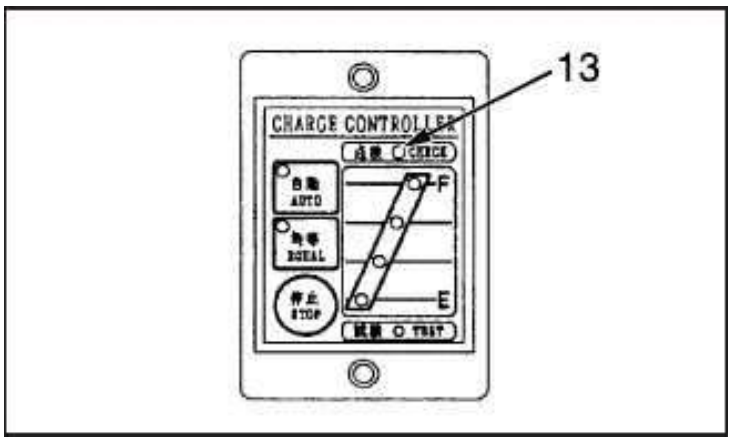
- Inspect the stationary battery charger for damaged input and output cables, cracked battery plug, broken wire of the battery plug terminal, or defective cooling fan at periodic intervals (every month), replacing any defective part with a new one.
- Inspect the electromagnetic switch for poor contact, replacing any defective electromagnetic switch with a new one.
- Clean the exterior of the battery charger case every three months.

OVERHAULING THE BATTERY CHARGER

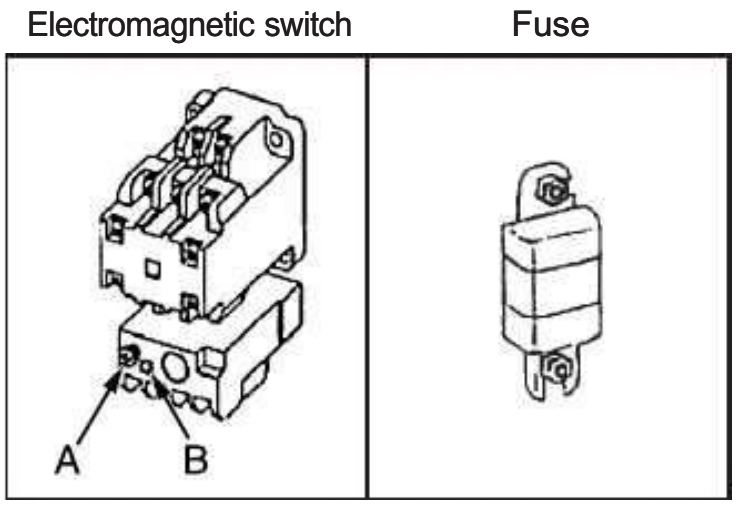
- It is recommended to overhaul the battery charger every 10 years, replacing the control circuit board, capacitor and other components with new ones.
- For overhauling, consult your local UniCarriers dealer.

TROUBLESHOOTING GUIDE

1) If the error light [13] comes on, turn off the ground-fault circuit breaker and disconnect the battery plug.



2) Remove the left-side cover of the battery charger and check for a blown fuse or tripped thermal relay of the electromagnetic switch. If any defect is found, call your local UniCarriers dealer and let him know the details of the trouble.
3) Do not turn on the ground-fault circuit breaker until the cause of the trouble is removed.



A: Press to reset
B: Tripped state (black); normal (white)

INSTALLING BATTERY CHARGER

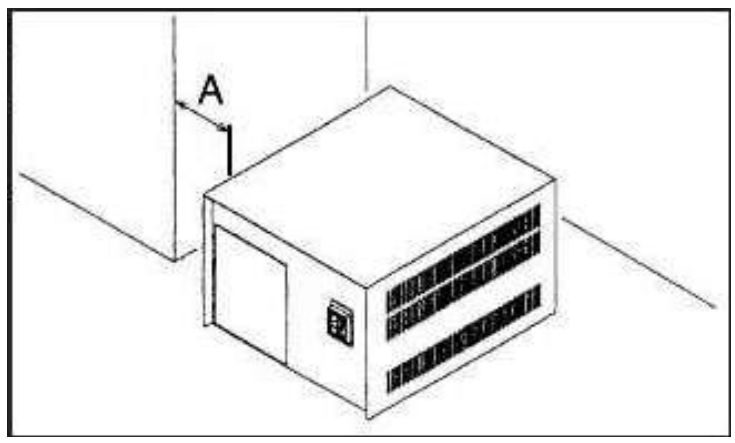
⚠ WARNING

- **Install the battery charger in a dry, well-ventilated area.**
- **Do not install the battery charger in a place exposed to water including rain; otherwise there is a danger of causing an electric shock accident or a fire.**
- **When a charging process reaches its end, a lot of hydrogen gas is released from the battery. If the gas density increases, there is a danger of an explosion. The battery charger should be installed in a well-ventilated area.**
- **The input cable should be connected and disconnected by qualified or authorized personnel.**
- **The input cable should be connected after all the MCBs are turned off. The ground lead must be grounded.**

- When carrying the battery charger, hold the bottom of the chassis.
- The battery charger generates heat during operation. Make sure that adequate space is provided around the battery charger, more than 10 cm at both sides and rear side (A) and more than 30 cm above the top surface.
- Working conditions:

Storage temperature	-20°C to 60°C
Operating temperature	0°C to 40°C
Humidity range	30% to 95% (No condensation of moisture allowed)

- The battery charger should be provided separately with a 3-phase, 200V AC ground-fault circuit breaker (MCB) at the input side.
- Selecting and switching over input taps:
  It is necessary to switch over the taps of the charging transformer according to the AC input voltage for charging.



POWER SUPPLY EQUIPMENT FOR BATTERY CHARGER

⚠ WARNING

- **The power supply equipment must be installed under the directions of a qualified electrical engineer or by a subcontractor designated by your local utilities company.**
- **The power supply equipment for the charger must have a power supply line switch with a dedicated circuit breaker.**
- **The capacities of the power supply equipment and fuses or breakers should be selected properly, referring to the table below; use of fuses or circuit breakers with insufficient capacity will cause damage to the power supply equipment or charger or an accident might occur.**
- **Imperfect grounding will lead to electric shock accident.**
- **Make sure to ground the earth poles of the receptacle on the power supply side; otherwise there is a danger of causing electric shock accident.**

Power supply equipment for the standard stationary battery charger

Applicable truck model	Battery capacity (Ah/5h)	Model	Capacity (kVA)		Recommended circuit breaker capacity (A)	Power supply-side plug of charger cable
			50 Hz	60 Hz		
FRSB14-8 FRSB16-8	360 420	K43-240C048-458	6.9	6.5	30	Ground 4P 20A, 250V
FRSB14-8 FRSB16-8 FRSB20-8 FRSB25-8	500 560	K43-260C048-448	8.3	8.1	40	Ground 4P 30A, 250V
FRSB20-8 FRSB25-8	600 700	K43-270C048-429	11.1	10.7		

Precautions to take when disposing of used battery chargers

Do not throw out used battery chargers. Consult your local UniCarriers dealer or specialist about recycling them.

BEFORE STORING

⚠ WARNING

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 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 parking place and block the wheels. Charge the battery.
- Turn the key switch to "OFF" and slowly operate each load handling control lever 2 to 3 times to let out the remaining pressure in the cylinders and hoses.
- Remove the starter key and keep it sure.

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.
- Dismount the battery from the truck.
  If the truck is out of service for more than two weeks, give an equalizing charge to recharge the battery fully. Disconnect the battery connectors.
- 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 give the battery an auxiliary charge 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 gear oil from the drive unit. Wash inside of the drive unit and pour new gear oil into the drive unit.
- Drain foreign matter and water from the hydraulic oil tank.
- Mount a fully-charged battery on the truck and connect the cables.
- Perform preoperational checks carefully.

MEMO

4. MAINTENANCE

CONTENTS

A variety of safety instructions are found throughout this manual. Follow all the instructions, for the safe operation and servicing of the truck.

Safety instructions are accompanied by the safety alert symbols and signal words shown below.

This is the safety alert symbol. It is used to warn the reader about a potential source of human injury. To prevent injury or death, make sure you understand and follow all the safety messages following this safety alert symbol.

Signal word (designates the degree of hazard)	Definition
⚠ DANGER	**Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**
⚠ WARNING	**Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**
⚠ CAUTION	**Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**
CAUTION	**Indicates a hazardous situation which, if not avoided, may result in damage to the truck or other property.**
NOTE	**Indicates information which will help extend the service life of the truck.**

Before starting the day's work or before each shift, make sure to inspect the following items for safe operation of your lift truck and increased productivity.
The following instructions cover the preoperational inspection of the lift truck in a sequence which will normally be followed.

⚠ WARNING

- **A truck that has failed an inspection must not be operated. Hang a sign in the control area that says DO NOT OPERATE and remove the key, to make sure no one uses it. Then report the problem to the supervisor and wait for repairs to be completed.**
- **Before checking electrical equipment, make sure the battery connectors are disconnected.**
- **If avoidable to check the truck with the forks raised, make sure to put safety blocks between the bottom of the inner mast and the ground surface to prevent the forks from falling.**
- **When checking the truck with the mast advanced, put a pallet or something rigid between the mast and the truck frame, so that you will not be caught in between.**
- **Take necessary safety measures, such as blocking the wheels, before starting inspection or servicing.**
- **If oil leaks are found, wipe any spilt oil completely, locate the cause of the leakage and repair it. Oil leaks will cause fire hazards.**

CAUTION

Waste fluid caused from lubricant change services must not be thrown away thoughtlessly, because they will be a cause of air, water, earth pollution. The service personnel or employer is required to dispose of it properly.

CAUTION IN CHECKING

- Use UniCarriers' genuine parts only.
- Use UniCarriers' genuine or recommended lubricants only.
- Clean the oil fillers and grease fittings using a brush or cloth before supplying oil or greasing.
- Oil level checks 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.

Items to be checked
1. General condition of the truck
2. Defects found in previous checking
3. Wiring
4. Battery electrolyte level indicators (option)
5. Battery stopper
6. Load backrest
7. Forks
8. Trailing wheel
9. Piping
10. Drive wheel
11. Overhead guard
12. Hydraulic oil level
13. Brake pedal
14. Position of operator's seat and steering column
15. Seat belt
16. Steering wheel
17. Instrument panel
18. Horn
19. Back-up buzzer
20. Lights
21. Load handling levers
22. Mast locking bolt
23. Lift chain tension
24. Battery hook
25. Battery electrolyte level
26. Braking effect
27. Electromagnetic brake
28. Foot switch
29. Steering wheel operation

1 GENERAL CONDITION OF THE TRUCK

Check the general condition of the truck, in particular, the truck body for dents or 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 UniCarriers dealer.

Oil leaks

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

2 DEFECTS FOUND IN PREVIOUS CHECKING

⚠ WARNING

Never try to operate a faulty truck.

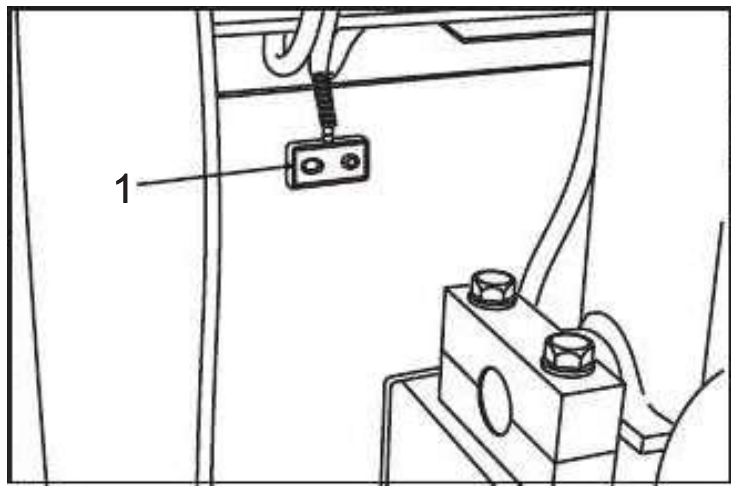
Check to see if any defects found in the previous checking have been repaired properly.

3 WIRING

Check that the battery cable, truck wiring, charger cable and connectors are properly installed and not damaged.

4 BATTERY ELECTROLYTE LEVEL INDICATORS (OPTION)

Check that the battery electrolyte is at the specified level using the battery electrolyte level indicators.
Lighting of the green light indicates that the electrolyte level sensor is functioning properly.
Lighting of the red light indicates that the electrolyte level is within the normal range. If the red light blinks, add purified water as soon as possible.
The battery electrolyte level indicators are optional items for the standard Japanese battery.



1 : BATTERY ELECTROLYTE LEVEL INDICATORS (OPTION)

5 BATTERY STOPPER

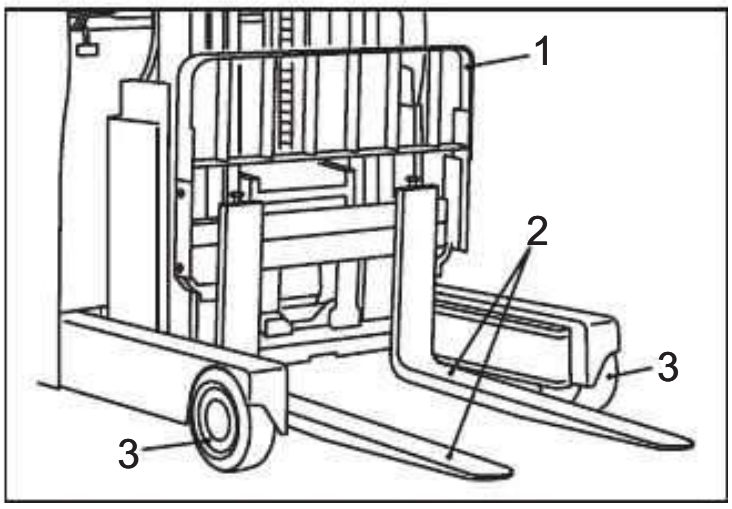
Check that the battery case is securely fastened to the hook on the truck body.
A loose battery case will lead to an unstable operation of the truck.

6 LOAD BACKREST

⚠ WARNING

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

Check that mounting bolts are not loose or missing.



1 : LOAD BACKREST
2 : FORKS
3 : TRAILING WHEEL

7 FORKS

Check that the forks are installed securely and they are free from cracks or bends.

8 TRAILING WHEELS (REAR WHEELS)

Check that trailing wheels are not excessively worn, damaged or cracked.

9 PIPING

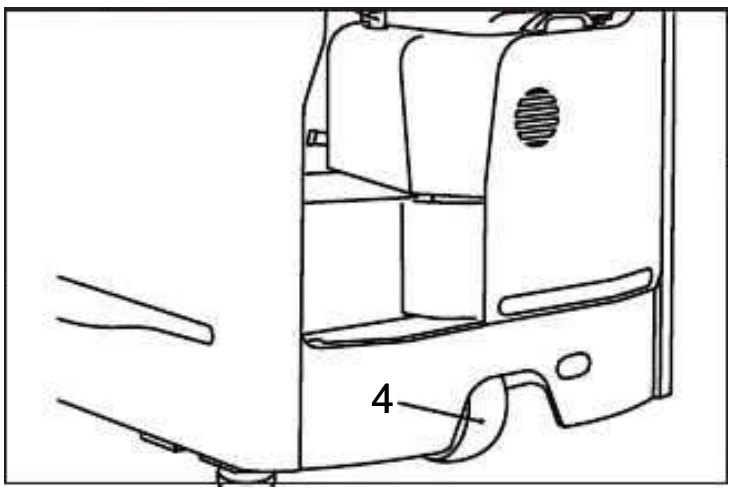
Check that oil is not leaking from the piping and cylinders (lift, tilt, reach, and sideshift).

10 DRIVE WHEEL

Check that the drive wheel is not excessively worn, damaged or cracked.

CAUTION

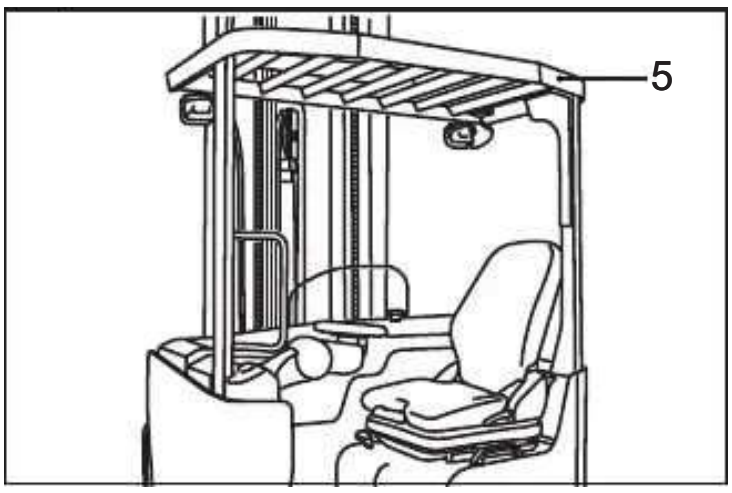
Whenever replacement of the drive tire of the FRSB20 or FRSB25 is required, use a genuine UniCarriers tire; otherwise there is a danger of causing damage to the truck.



4 : DRIVE WHEEL

11 OVERHEAD GUARD

Check the overhead guard for a loose mounting bolt or nut and for cracks.



5 : OVERHEAD GUARD

12 HYDRAULIC OIL LEVEL

Check that the hydraulic oil is at the specified level in the following manner:

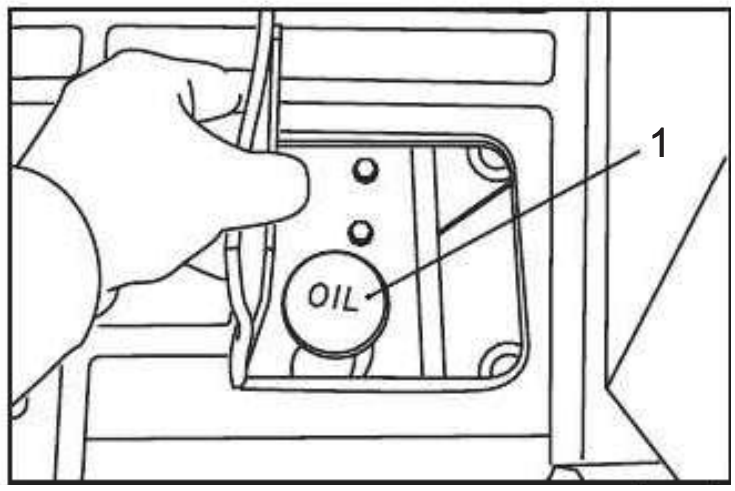
① Open the hydraulic oil tank cover in the floorboard and remove the hydraulic oil tank cap.
② Clean the oil dipstick with a clean waste cloth and reinstall it into the dipstick tube.
③ Remove the dipstick again to check the oil level by seeing the oil adhered to the dipstick.
④ The oil level should be between two slots on the dipstick: “H” and “L” or “S” and “H”.

Lift height	Proper oil level
5.0 – 6.0 m	Between “H” and “L”
6.5 – 8.5 m	Between “S” and “H”

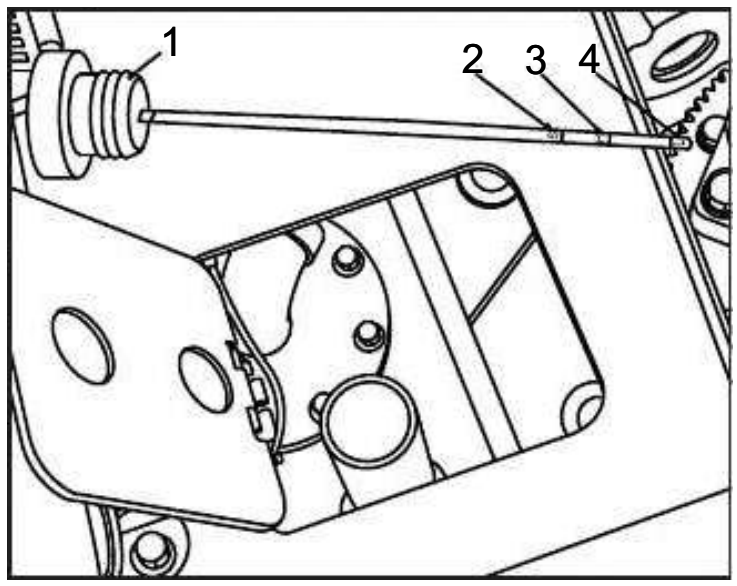
⑤ Reinstall the hydraulic oil tank cap securely.

NOTE

The hydraulic oil level check should be made with the truck parked on a level surface. You cannot check the level correctly when the truck is inclined.



1 : HYDRAULIC OIL TANK CAP/OIL DIPSTICK

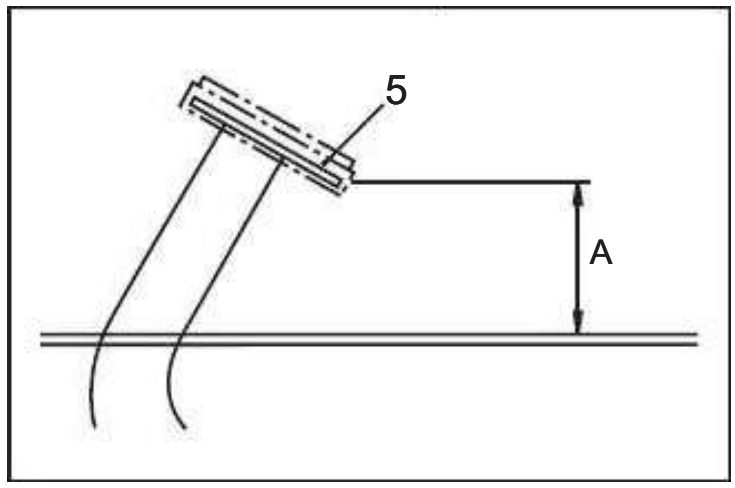


1 : HYDRAULIC OIL TANK CAP/OIL DIPSTICK
2: “S” mark
3: “H” mark
4: “L” mark

13 BRAKE PEDAL

Step on the brake pedal fully and then return it to the original position slowly.

- Check that the pedal moves smoothly without binding.
- Check that the pedal height [A] is 62 mm with the pedal released.
- Depress the brake pedal to the bottom to check if the limit switch clicks.

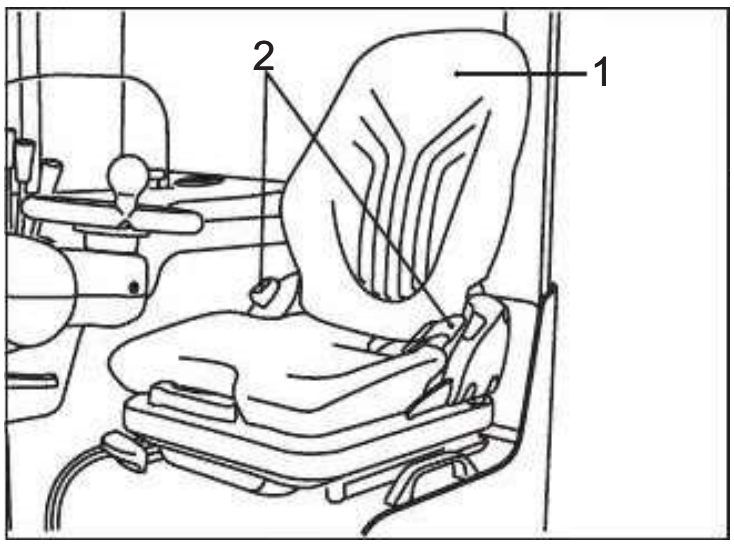


5 : BRAKE PEDAL
A: PEDAL HEIGHT

The following checks should be made from the operator's seat.
Sit in the operator's seat properly and perform the following checks:

14 POSITION OF OPERATOR'S SEAT AND STEERING COLUMN

Sit in the operator's seat and adjust the seat to a position which allows you to press the pedals completely and operate the steering wheel smoothly. Lock the seat and the steering column securely.



1 : OPERATOR'S SEAT
2 : SEAT BELT

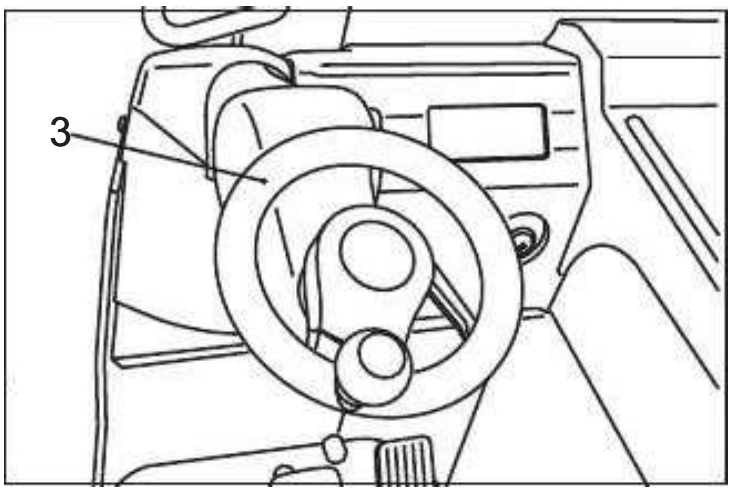
15 SEAT BELT

Check that the seat belt:

- strap is not broken or worn
- anchorages to make sure they are not corroded and securely attached to the vehicle frame
- tongue and the buckle are not damaged and can be engaged and disengaged properly
- webbing does not have frayed stitching

Turn the key switch to "ON".

> **NOTE**
> Make sure the brake pedal is released when turning the key switch to "ON".



3 : STEERING WHEEL

16 STEERING WHEEL

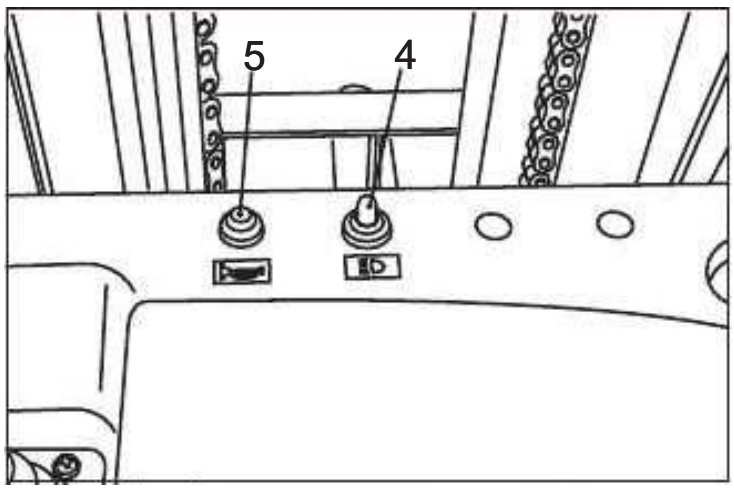
Turn the steering wheel counterclockwise and clockwise to check if it turns smoothly without binding.
Check also that it does not have vertical looseness.

17 INSTRUMENT PANEL

Make sure that all items are displayed on the instrument panel when the key switch is turned to the "ON" position.

18 HORN

Press the horn switch to check that the horn sounds properly.



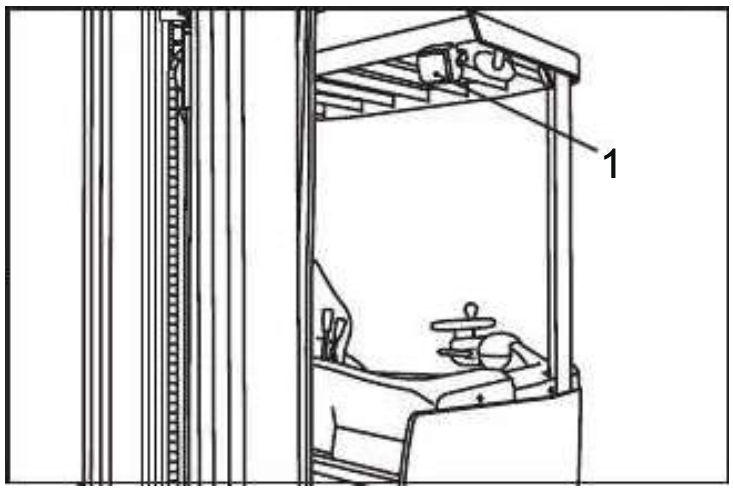
4 : LIGHTING SWITCH
5 : HORN SWITCH

19 BACK-UP BUZZER

Place the direction shift switch in the reverse travel position to check if the back-up buzzer sounds.

20 LIGHTS

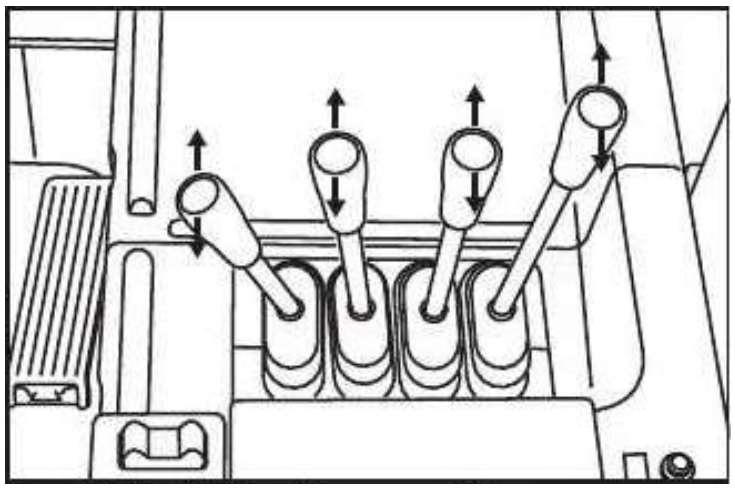
Turn on the lighting switch to check if the work lights are turned on and off properly. Check also that the lenses are clean and intact.
If the truck comes equipped with optional turn signals or headlights, check them too.



1 : WORK LIGHT

21 LOAD HANDLING LEVERS

Move the load handling levers (lift, tilt, reach and side-shift) through their full range twice or three times to check if the forks and mast operate smoothly without squeaking.
Also check the levers for looseness.



LOAD HANDLING LEVERS

NOTE

WARMING UP CYLINDERS

Before starting the day's work or your shift, warm up the cylinders. This lubricates packings and seals in the cylinders to make them ready for operation.

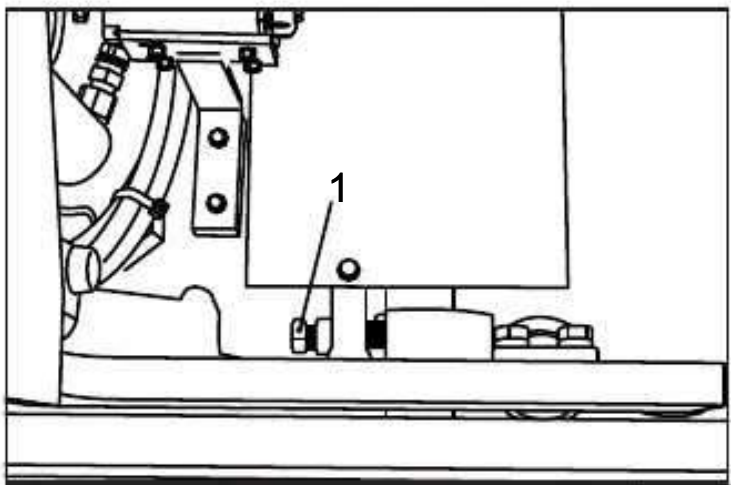
Advance the mast fully and turn off the key switch before performing the following checks:

WARNING

- **When performing the following checks, extra caution must be exercised to avoid getting caught in the truck parts, entanglement of the body in rotating parts, or falling.**
- **When checking the truck with the mast advanced, put a pallet or something rigid between the mast and the truck frame, so that you will not be caught in between.**

22 MAST LOCKING BOLT

Check the mast locking bolt for looseness or missing.



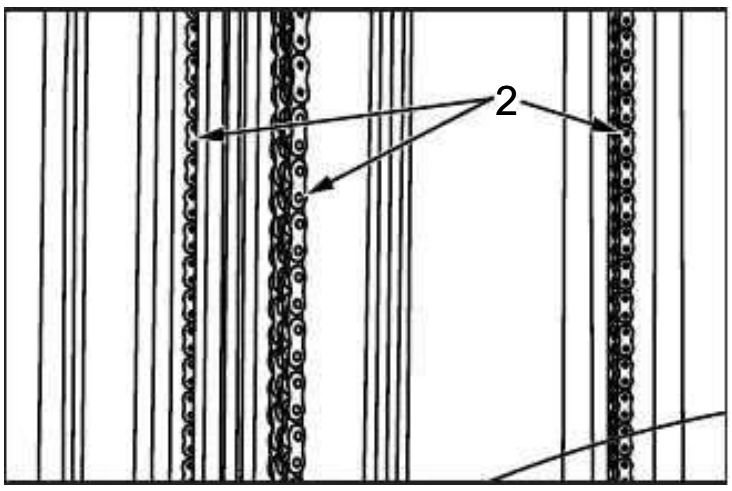
1 : MAST LOCKING BOLT

23 LIFT CHAIN TENSION

⚠ WARNING

Make sure the tension is the same on each chain of the chain set; otherwise, uneven load will occur so that the truck might tip over. A possible shock load might break the chains.

Raise the forks about 5 cm off the ground or floor surface and check that the tension will be the same on each chain of the chain set.
If the tension is not equal, adjust it with the chain anchor bolt.
After adjustment, securely tighten the lock nut of the chain anchor bolt.



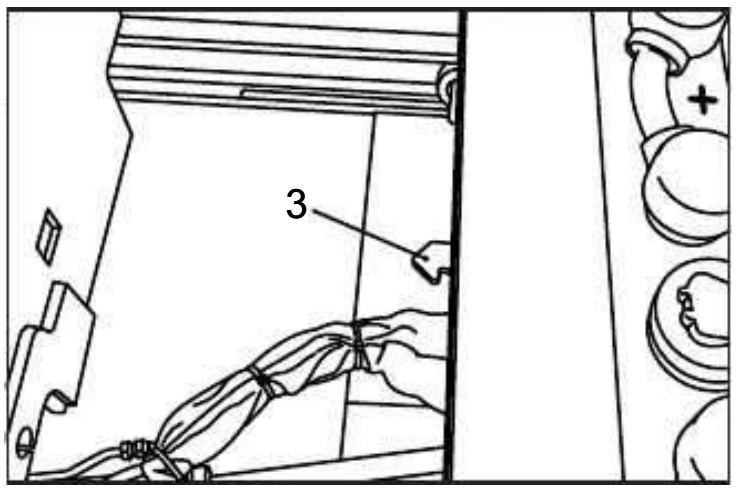
2 : LIFT CHAIN

After completing the checks from 1 through 23, proceed to battery checks. Turn the key switch "ON" and pull out the battery unit from the truck referring to page 3-14.

After pulling out the battery unit, turn the key switch "OFF" and disconnect the battery connectors.

24 BATTERY HOOK

Check that the battery hook is not damaged or missing.

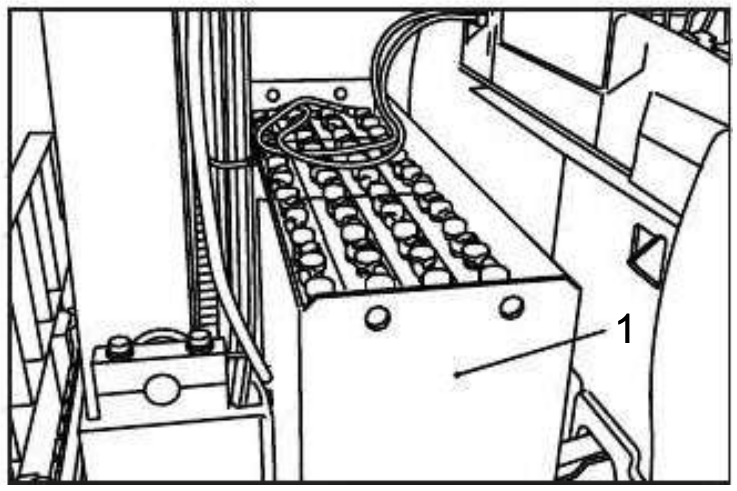


3 : BATTERY HOOK

25 BATTERY ELECTROLYTE LEVEL

> **NOTE**
> You can skip this step if you checked the battery electrolyte level with an optional battery electrolyte level indicators.

Check that the battery electrolyte is at the specified level following the procedure given in page 3-10. If level is low, add purified water.



1 : BATTERY

Return the battery unit into the original position (See page 3-14.)
To make the following checks, run the truck at a low speed in a safe place.

26 BRAKING EFFECT

Step on the brake pedal to check if the truck slows down and comes to a stop properly.

27 ELECTROMAGNETIC BRAKE

Depress the brake pedal fully to check if electromagnetic brake operates with an audible click.

28 FOOT SWITCH

Remove your left foot from the foot switch to check if the brake is applied to stop the truck.

29 STEERING WHEEL OPERATION

Slightly turn the steering wheel to the right and left to check if the truck is steered smoothly without any problem.
Check also that the drive-wheel angle indicator indicates the same direction as the truck travels.

Right turn

Left turn

NOTE: Trucks with the optional reverse steering feature turn in the direction opposite to the direction into which the steering wheel is turned.

WHY PERIODIC INSPECTION IS REQUIRED?

⚠ WARNING

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 left to your UniCarriers dealer. If checking or servicing is performed without enough knowledge, special tools or equipment, a serious personal injury might occur.

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 appears 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, lower the maintenance cost, and provide safe operation.

PERIODICAL REPLACEMENT OF SAFETY PARTS

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

Moreover these safety 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 safety parts must be replaced with new ones when their respective service limits have been reached, even if their appearances are good.

Safety parts should also be repaired or replaced with new ones whenever they are found to be in need of repair or defective.

NOTE

The safety parts are, however, not the objects of warranty claim.

Name of Safety Parts	Recommended replacement interval (years)
Hydraulic hoses for load handling system	1 – 2
Lift chain	2 – 4
Electromagnetic brake	9 – 10

WEEKLY (50 OPERATING HOURS) CHECKS

Check the following items in addition to preoperational checks.

Items to be checked
• Battery – Clean. • Battery – Check battery electrolyte for specific gravity and adjust if needed. • Outriggers – Apply grease.

Preoperational and weekly checks should be performed by the user of the UniCarriers battery type fork truck.

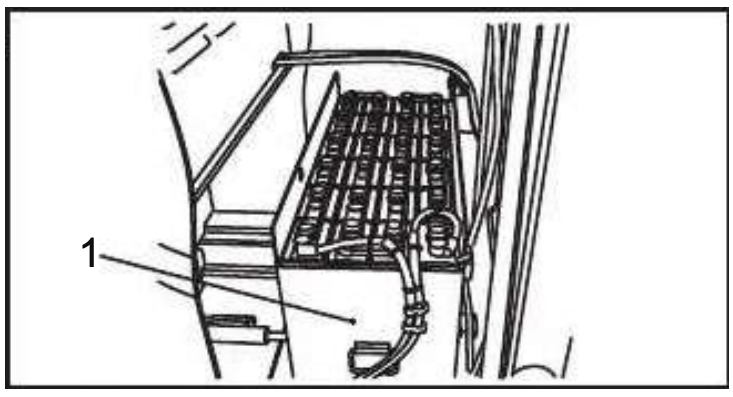
Check the truck thoroughly to ensure safe and comfortable operation.

■ CLEANING THE BATTERY

WARNING

Do not clean the battery 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.



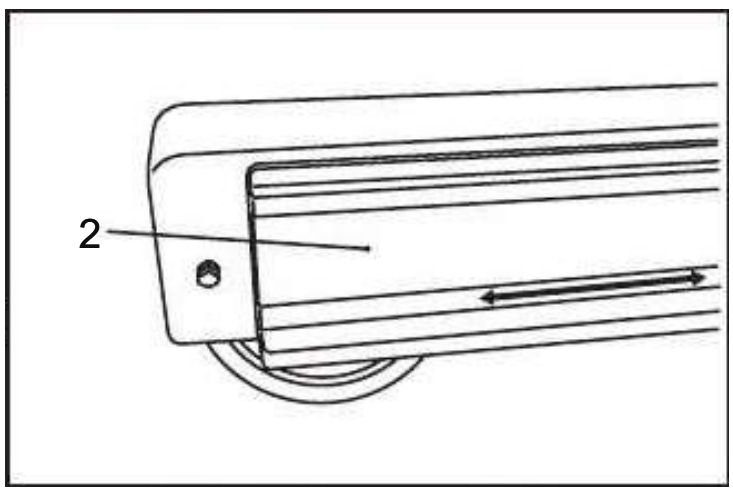
1 : BATTERY

■ CHECK BATTERY ELECTROLYTE SPECIFIC GRAVITY

For the procedure for checking the specific gravity, and adjustment of the electrolyte, see page 3-12.

■ APPLYING GREASE ON OUTRIGGERS

Apply grease thinly to the central area inside of each of the right and left outrigger frames (reach guides).



2 : OUTRIGGER

MONTHLY (200 OPERATING HOURS) CHECKS

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

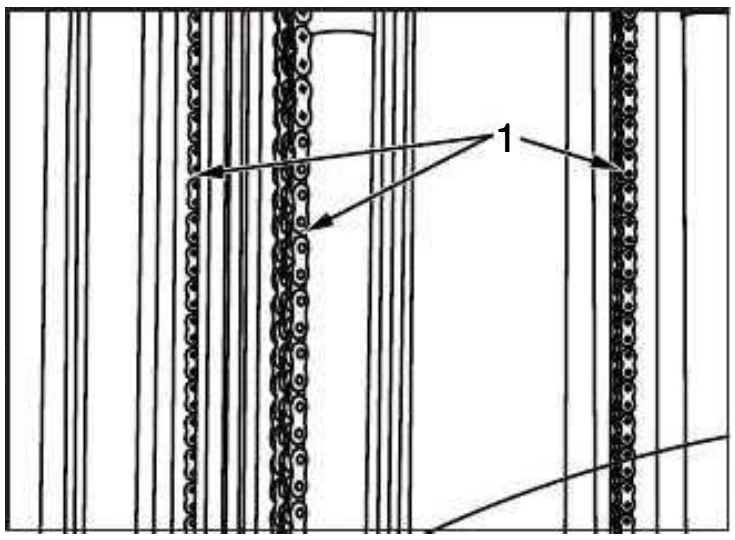
Adjustment and replacement of components and parts listed as monthly check items are difficult and need sufficient technical knowledge and special tools.
It is recommended that one-month or longer periodic inspection be left to a specialist or your authorized dealer.

Items to be checked
• Battery – Give an equalizing charge • Battery connectors – Check for damage and looseness. • Wiring – Check for damage and discoloration. • Contacts – Check for roughness. • Controller – Clean and check for loose connections. • Direction shift switch – Check for operation and looseness • Accelerator pedal – Check for proper operation and looseness • Safety circuit – Check for operation. • Brake linkage – Check for looseness • Wheel mounting nuts and bolts – Check for looseness • Wheel bearings – Check for looseness, noise and lubrication • Drive unit – Check oil for level and contamination • Drive unit – Check for noise, damage and cracks • Lift chains – Lubricate • Valve control lever micro-switch – Check for proper operation and damage • Relief valve – Check for proper operation • Hose reel – Check for operation, looseness, cracks • Reach guide – Check for looseness • Sheaves – Check for proper operation, damage and looseness • Rollers (end, side and retaining) – Check for proper operation, looseness and damage • Fork carriage plate – Check for operation, looseness, cracks or bends • Mast – Apply grease on the piston head guide • Inner channel – Apply grease on end roller rolling surface • Major bolts and nuts – Retighten (new lift trucks only) • Battery stopper – Check rubber part for missing • Attachment – Check for operation, oil leakage, damage or deformation. • Attachment – Check for proper installation

■ 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:

- Lower the forks on the ground and loosen the chains sufficiently.
- After applying engine oil, move the mast up and down fully at least 10 times.



1 : CHAIN

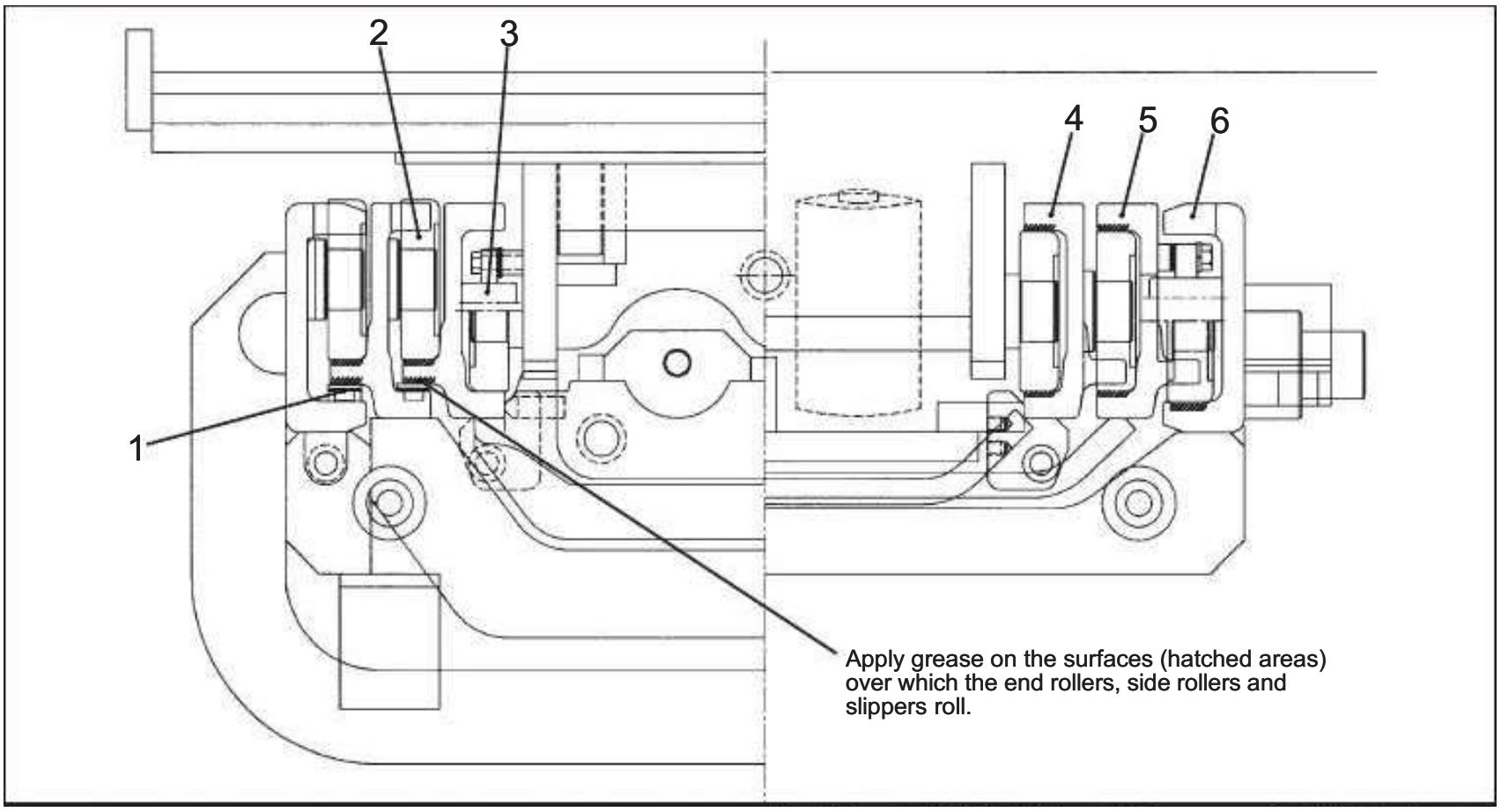
NOTE

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.

■ APPLYING GREASE ON THE MAST

WARNING

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



1. SLIPPER
2. END ROLLER
3. SIDE ROLLER
4. INNER CHANNEL
5. INTERMEDIATE CHANNEL
6. OUTER CHANNEL

3 MONTHS (600 OPERATING HOURS) CHECKS

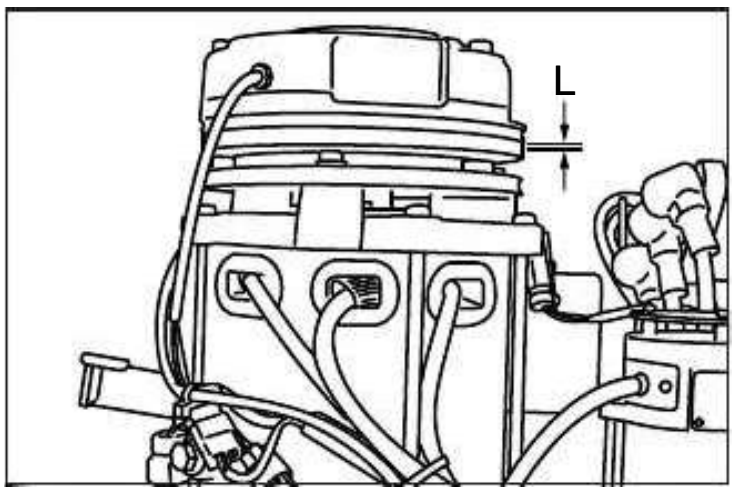
Perform the following checks in addition to preoperational, weekly (50 operating hours), and monthly (200 operating hours) checks.

Items to be checked
• Electrical parts (battery, controller and motors) – Check for insulation • Motor (pump, power steering) – Check brushes for wear. • Motor (pump, power steering) – Check commutator for roughness. • Motor – Check for operation or noise. • Electromagnetic brake – Check for clearance • Drive unit – Change gear oil (new lift trucks only)

■ CHECK ELECTROMAGNETIC BRAKE FOR CLEARANCE

① Open the motor hood.
② Using a thickness gauge, measure the clearance (L) of the electromagnetic brake at three points around its circumference.
③ If the measured value is out of the standard range, replace the electromagnetic brake with a new one.

Standard range of electromagnetic brake clearance (L)	
FRSB14, 16	within 0.70 mm
FRSB20, 25	within 0.95 mm



L : CLEARANCE

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
• Drive motor – Clean. • Battery connectors – Check spring contact for surface roughness and spring effect. • Brake linkage – Check for worn rubber part • Wheel bearing – Change grease • Hydraulic oil tank – Change hydraulic oil. • Drive unit – Change gear oil. • Hydraulic oil tank – Clean suction strainer. • Operator's seat – Check for damage or loose mounting bolts • Major bolts of the truck body – Retighten.

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
• Contactors – Check contact gap and adjust. • Electromagnetic brake – Check lining for wear or looseness • Lift cylinder – Check for natural drop. • Tilt cylinder – Check for natural drop. • Forks – Check for cracks in bent area (color checks)

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.
(○ : Check and adjust, ● : Replace or add)

ELECTRIC SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs.)	Monthly (200 hrs.)	Trimonthly (600 hrs.)	Semiannually (1200 hrs.)	Annually (2400 hrs.)
Battery	Check for contamination of battery case	Cleaning		○	○	○	○	○
	Check electrolyte level	Add if necessary	○	○	○	○	○	○
	Check specific gravity	Measure and 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 the gap between contacts	Check / Adjust						○
	Check for insulation	Measure				○	○	○
	Check for loose connections	Check			○	○	○	○
Motors	Check brushes for wear (pump, power steering)	Replace if needed				○	○	○
	Check for roughness of commutator (pump, power steering)	Adjust				○	○	○
	Check for proper operation	Check				○	○	○
	Check for noise	Check				○	○	○
	Check for insulation	Measure				○	○	○
	Check for contamination	Cleaning					○	○
Wiring, terminals, connectors, couplers	Check for looseness	Retighten	○	○	○	○	○	○
	Check battery connectors for damage or looseness	Check			○	○	○	○
	Check for damage	Check	○	○	○	○	○	○
	Check for discoloration	Check			○	○	○	○
	Check battery connector's contacts for surface roughness and spring effect	Check					○	○
Lights, lamps and horn	Check instrument panel for operation	Check	○	○	○	○	○	○
	Check for proper operation of horn	Check	○	○	○	○	○	○
	Check back-up buzzer for operation	Check	○	○	○	○	○	○
	Check work lights for proper operation and contamination	Cleaning	○	○	○	○	○	○
	Check rear lamp for proper operation and contamination (option)	Cleaning	○	○	○	○	○	○
	Check turn signal for proper operation and contamination (option)	Cleaning	○	○	○	○	○	○
Others	Check direction shift switch for operation and looseness	Check			○	○	○	○
	Check safety device circuit for proper operation (test fuses)	Check			○	○	○	○
	Check accelerator pedal for operation and looseness	Check			○	○	○	○
	Check foot switch for operation	Check	○	○	○	○	○	○

BRAKE SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs.)	Monthly (200 hrs.)	Trimonthly (600 hrs.)	Semiannually (1200 hrs.)	Annually (2400 hrs.)
Brake	Check for braking effect and looseness	Check	○	○	○	○	○	○
Brake pedal	Check for height	Check	○	○	○	○	○	○
Linkage, rod	Check for proper operation of micro-switch	Adjust	○	○	○	○	○	○
	Check for looseness and damage	Adjust			○	○	○	○
	Check for worn rubber part	Check					○	○
Electromagnetic brake	Check for operation and operating noise	Check	○	○	○	○	○	○
	Check for lining clearance	Adjust				○	○	○
	Replace electromagnetic brake	Replace						● (9 or 10 years)

STEERING AND TRAVELING SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs.)	Monthly (200 hrs.)	Trimonthly (600 hrs.)	Semiannually (1200 hrs.)	Annually (2400 hrs.)
Steering wheel	Check for play, looseness and proper operation	Check	○	○	○	○	○	○
Wheels (drive and trailing)	Check for wear and damage	Check	○	○	○	○	○	○
	Check for mounting condition	Retighten			○	○	○	○
	Check for looseness and noise of wheel bearings	Check			○	○	○	○
	Check for grease of wheel bearings	Change					●	●
Drive unit	Check for oil leaks from drive unit gear case	Check	○	○	○	○	○	○
	Check for oil level of drive unit	Change			○	● (1st time only)	●	●
	Check for noise, damage and cracks in drive unit gear case	Check			○	○	○	○

LOAD HANDLING SYSTEM

Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs.)	Monthly (200 hrs.)	Trimonthly (600 hrs.)	Semiannually (1200 hrs.)	Annually (2400 hrs.)
Hydraulic oil tank	Check for oil level and contamination of hydraulic oil	Change	○	○	○	○	●	●
	Check suction strainer	Cleaning					○	○
Lift chain and anchor pin	Check for tension, damage and deformation	Adjust	○	○	○	○	○	○
	Check for lubrication	Lubricate			○	○	○	○
	Check lift chain	Change						● (2 or 4 years)
Hydraulic pump	Check for proper operation, oil leaks, damage and mounting condition	Check	○	○	○	○	○	○
Valve	Check for proper operation, oil leaks, damage and mounting condition	Check	○	○	○	○	○	○
	Check for proper operation of relief valve	Measure pressure			○	○	○	○
	Check for proper operation, looseness and damage of control lever	Check	○	○	○	○	○	○
	Check for damage, looseness and proper operation of micro-switch	Check			○	○	○	○
Hydraulic piping	Check for leaks, looseness, deformation and damage	Retighten	○	○	○	○	○	○
	Check load handling system hose	Change						● (1 or 2 years)
Mast	Check for proper operation, cracks, looseness and bent	Check	○	○	○	○	○	○
	Check for proper operation, cracks and looseness of sheave (chain wheel)	Check			○	○	○	○
	Check for proper operation, looseness and cracks of hose reel	Retighten			○	○	○	○
	Check for looseness of reach guide	Check			○	○	○	○
	Check for proper operation, looseness and damage of each roller (end, side and retaining) and check for loose mounting bolts	Retighten and change			○	○	○	○
	Check for proper operation, looseness, cracks and bent of fork carriage plate	Check			○	○	○	○
	Check for loose locking bolt	Retighten	○	○	○	○	○	○
	Check lubrication of piston head guide	Apply grease			○	○	○	○
Cylinders (lift, tilt, reach and sideshift)	Check for proper operation and oil leaks	Check	○	○	○	○	○	○
	Check for damage of piston rod, rod screw and rod end	Check	○	○	○	○	○	○
	Check for natural drop	Measure						○
Forks	Check for cracks in bent area	Color check						○
	Check for bent, crack and wear	Check	○	○	○	○	○	○
	Check for bent, cracks, wear and damage of stopper pin	Check	○	○	○	○	○	○
Load backrest	Check for cracks, deformation and damage	Check	○	○	○	○	○	○
	Check for loose mounting bolts	Retighten	○	○	○	○	○	○

TRUCK BODY AND OTHERS

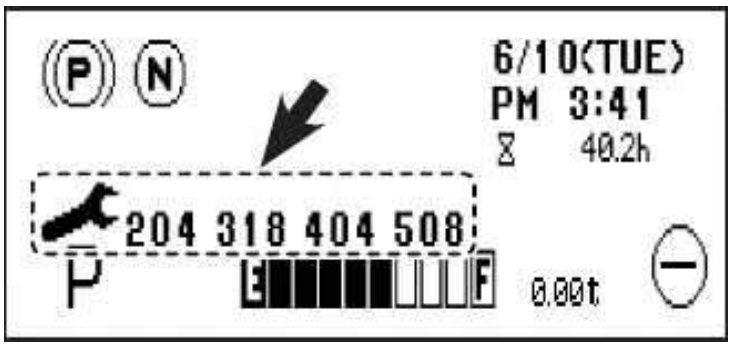
Checking item	Service Required	Tool/remedy	Before work or shift	Weekly (50 hrs.)	Monthly (200 hrs.)	Trimonthly (600 hrs.)	Semiannually (1200 hrs.)	Annually (2400 hrs.)
Overhead guard	Check for cracks and deformation	Check	O	O	O	O	O	O
	Check for loose mounting bolts	Retighten	O	O	O	O	O	O
Outrigger	Check for cracks, damage and deformation	Check	O	O	O	O	O	O
	Check for greasing condition	Apply grease		O	O	O	O	O
Operator's seat	Check for damage or loose mounting bolts	Check					O	O
	Check seat belt for operation	Check	O	O	O	O	O	O
Truck body	Check for loose major bolts	Retighten			O (1st time only)		O	O
	Check for missing rubber of battery stopper	Check			O	O	O	O
	Check battery stopper for operation	Check	O	O	O	O	O	O
Attachment	Check for proper operation, oil leaks, damage and deformation	Check			O	O	O	O
	Check for mounting condition	Check			O	O	O	O
Others	Check for defects found in previous checking	Check	O	O	O	O	O	O

ERRORS AND ERROR CODES

⚠ WARNING

If an error occurs in the truck, excluding some types of errors, consult your UniCarriers dealer. If troubleshooting of internal errors is tried without enough knowledge, special tools or equipment, a serious personal injury might occur.

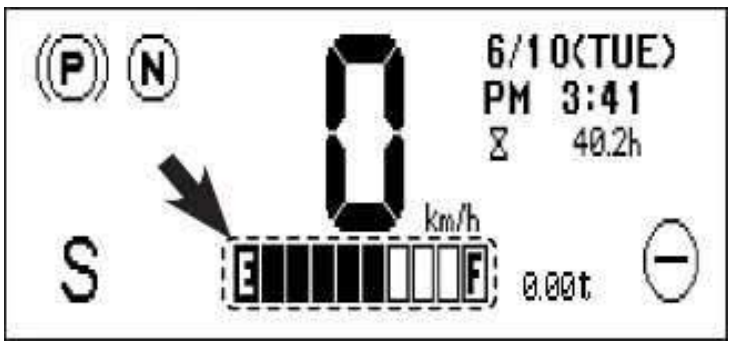
If an error occurs in the truck, an error code corresponding to the problem will be displayed on the instrument panel. Diagnosis or repair of internal errors may require a high level of skill and special tools. Excluding some types of errors, it is advisable to consult your local UniCarriers dealer.



FIELD-SERVICEABLE ERRORS

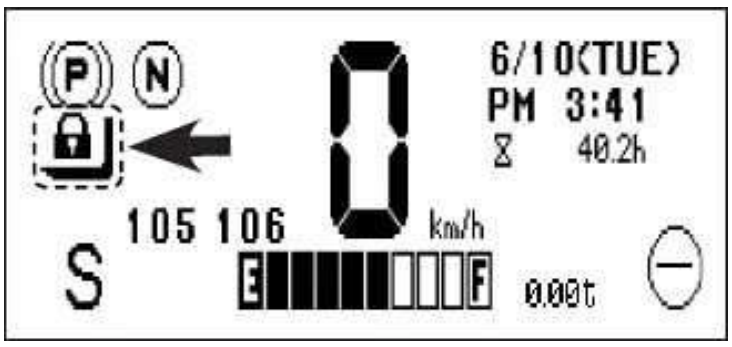
■ Battery charge level indicator blinks: error codes 101, 102

If the battery charge level drops to the overdischarge level, the indicators outlined by a dotted border will blink and error codes “101” and “102” appear on the instrument panel.
Stop operation completely and charge the battery at the designated charging station.



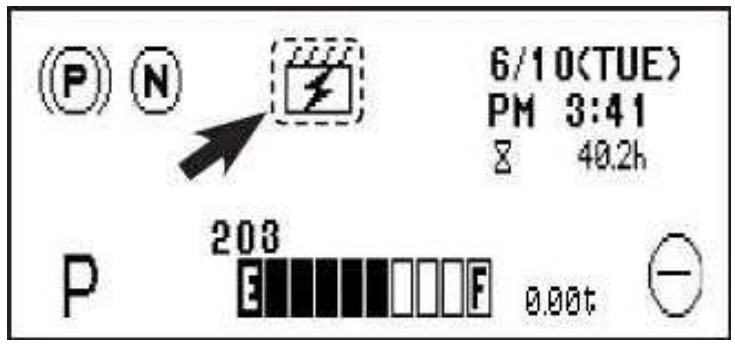
■ Interlock warning light blinks: error codes 105, 106

If the key switch is turned from the “OFF” position to the “ON” position when the operator is not in the operator’s seat, the neutral status indicator blinks and the interlock warning light comes on. The truck won’t start and the load handling system is disabled. If an error code “105” or “106” is displayed, it indicates that the interlock is activated. To release the interlock, refer page 2-24 in the OPERATING CONTROLS section.



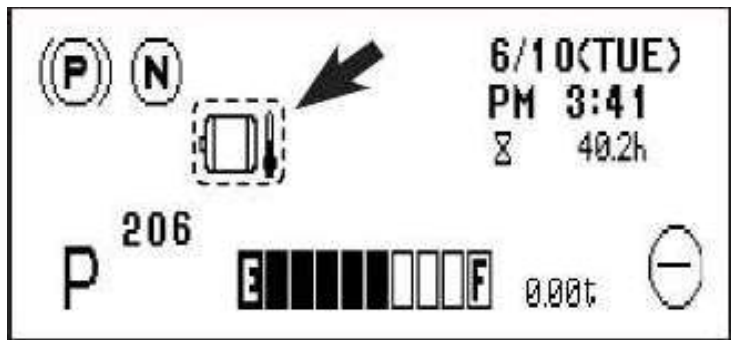
■ Controller overheat warning light blinks: error codes 203, 403

Light blinks when the traveling or load handling operation is too much to the truck, with an error code “203” or “403” displayed. This light usually stays off. If light blinks, stop operation immediately and wait until light goes out.



■ Motor overheat warning light blinks: error code 206

Light blinks when the drive motor has overheated, with an error code 206 displayed.
This light usually stays off. If light blinks, stop operation immediately and wait until the light goes out.



LIST OF ERROR CODES

Here is a list of error codes. If error codes other than “101”, “102”, “105”, “106”, “203”, “206” and “403” are displayed on the instrument panel, stop operation immediately and consult your local UniCarriers dealer.

Error code on display	Icon	Error description
101	Battery charge level indicator blinking (0.3 sec. intervals)	Low voltage; truck stops
102	Battery charge level indicator blinking (0.5 sec. intervals)	Low voltage alarm
103	Battery charge level indicator blinking	Overdischarge warning signal
105	Neutral status indicator blinking (0.3 sec. intervals)	Interlock activated (during operation)
106	Neutral status indicator blinking (0.3 sec. intervals)	Interlock activated (when key switch is turned ON)
201	Wrench icon	Sensor bearing faulty (output restriction)
202	Controller overheat warning light comes on	Traveling controller temperature error
203	Controller overheat warning light blinks	Traveling controller temperature too high
204	Wrench icon	Traveling controller thermosensor faulty
205	Motor overheat warning light comes on	Traveling motor temperature error
206	Motor overheat warning light blinks	Traveling motor temperature too high
207	Wrench icon	Traveling motor thermosensor faulty
210	Wrench icon	F/R switch wire breakage error
211		Traveling system fuse open
212	Wrench icon	Traveling accelerator variable resistor faulty
213	Wrench icon	Traveling power module U phase open
214	Wrench icon	Traveling power module V phase open
215	Wrench icon	Traveling power module W phase open
216	Wrench icon	Traveling current detector faulty (phases U and W)
217	Wrench icon	Fast charging error
218	Wrench icon	Traveling power module shorted
219	Wrench icon	Upper-side FET of traveling power module is shorted
220	Wrench icon	Lower-side FET of traveling power module is shorted
221	Wrench icon	Steering angle sensor variable resistor faulty
222	Wrench icon	No voltage on brake potentiometer and brake switch is turned ON when traveling speed is 0.5 km/h
223	Wrench icon	Brake potentiometer variable resistor faulty
318	Wrench icon	Load dump error (overvoltage)
402	Motor overheat warning light comes on	Load handling controller temperature error
403	Controller overheat warning light blinks	Load handling controller temperature too high
404	Wrench icon	Load handling controller thermosensor faulty
405	Controller overheat warning light comes on	Load handling motor temperature error
406	Wrench icon	Load handling power module open
411		Load handling system fuse open
412	Wrench icon	Lift variable resistor faulty
416	Wrench icon	Load handling current detector faulty
418	Wrench icon	Load handling power module shorted
501	Wrench icon	Contactor open (all fuses open)
502	Wrench icon	Contactor shorted
505	Wrench icon	PS fuse open
506	Wrench icon	PS transistor shorted
507	Wrench icon	PS transistor open
508	Wrench icon	PSOCL
509	Wrench icon	Steering wheel sensor bearing error (broken wire)
510	Wrench icon	Incorrect detection of steering wheel sensor bearing rotating direction
512	Wrench icon	Steering angle potentiometer signal wire error
513	Wrench icon	Wrong connection of steering angle potentiometer and EPS motor
600	Wrench icon	CAN broken wire error (communication between CPUs)
601	Wrench icon	EEPROM error

5. SPECIFICATIONS & SERVICE DATA

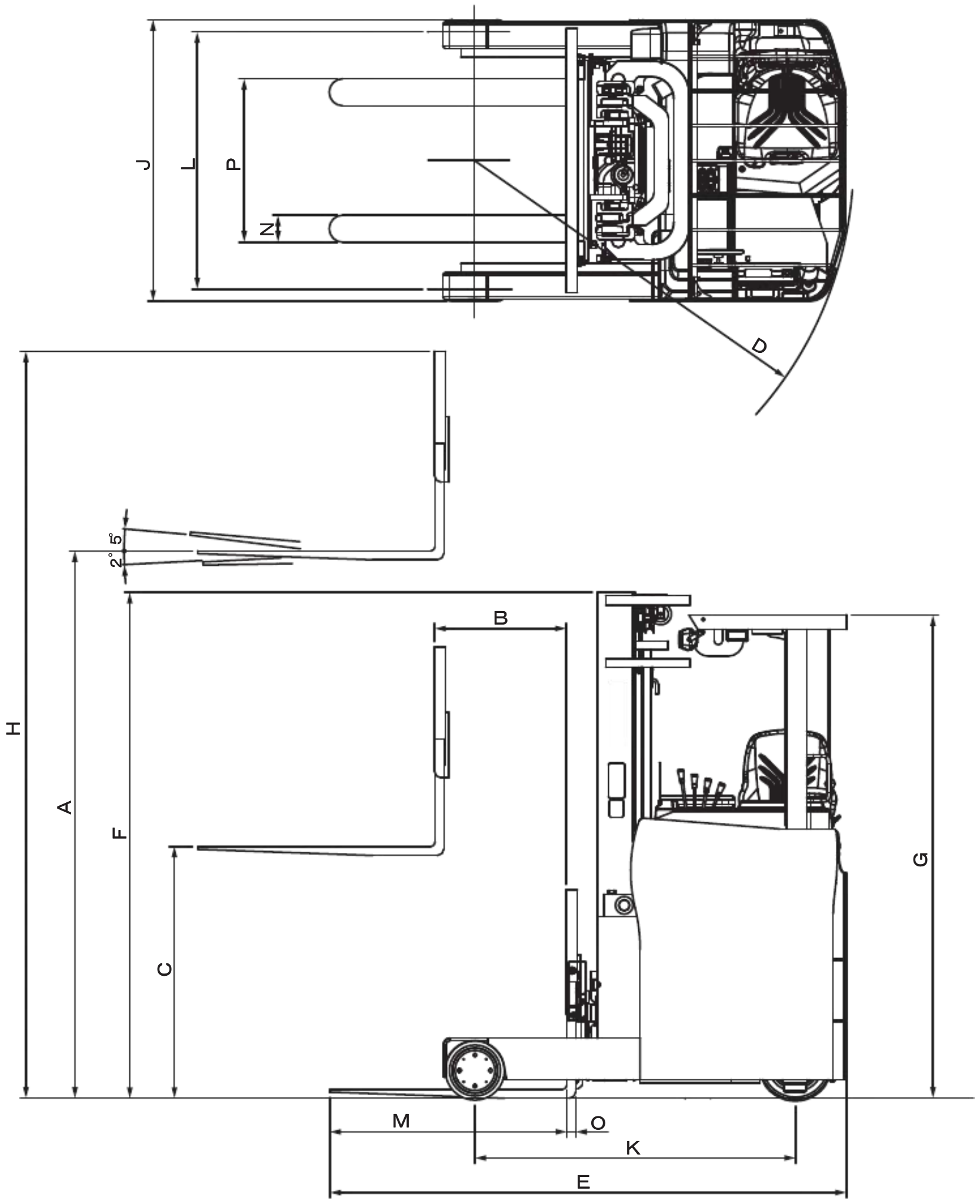
CONTENTS

A variety of safety instructions are found throughout this manual. Follow all the instructions, for the safe operation and servicing of the truck.

Safety instructions are accompanied by the safety alert symbols and signal words shown below.

This is the safety alert symbol. It is used to warn the reader about a potential source of human injury. To prevent injury or death, make sure you understand and follow all the safety messages following this safety alert symbol.

Signal word (designates the degree of hazard)	Definition
⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
CAUTION	Indicates a hazardous situation which, if not avoided, may result in damage to the truck or other property.
NOTE	Indicates information which will help extend the service life of the truck.



The specifications are subject to change without notice.

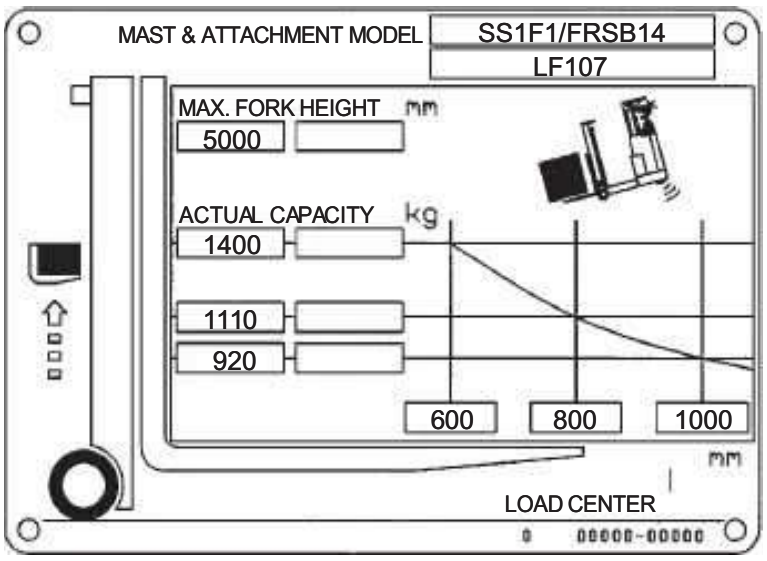
SPECIFICATIONS

Leading particulars			Truck model	FRSB14-8	FRSB16-8	FRSB20-8	FRSB25-8
Rated capacity			kg	1400	1600	2000	2500
Load center			mm	600			
Max. lifting height		A	mm	5000			
Free lift		C	mm	1380		1390	
Reach stroke		B	mm	595		590	705
~~Lifting speed (without load)~~			~~mm/s~~	~~580~~		~~480~~	
Lifting speed (with load)			mm/s	340		305	280
Traveling speed (without load) (both forward and backward)	S mode		km/h	10.0		11.0	
	P mode		km/h	9.5		10.5	
	E mode		km/h	9.0		10.0	
Traveling speed (with load) (both forward and backward)	S mode		km/h	9.0		9.5	
	P mode		km/h	8.5		9.0	
	E mode		km/h	8.0		8.5	
Gradeability (without load)			%	10.5		12.5	
Gradeability (with load)			%	9.0		9.5	
Min. turning radius (most outside of body)		D	mm	1710		1775	1930
Overall length		E	mm	2330		2400	2440
Overall width		J	mm	1270		1348	
Overall height (overhead guard)		G	mm	2180		2245	
Overall height (mast)		F	mm	2280		2285	
Overall height (Max. height during work)		H	mm	5930			
Wheel base		K	mm	1445		1495	1650
Tread (front wheel)		L	mm	1160		1200	
Fork size (length)		M	mm	1070			
Fork size (width)		N	mm	122			
Fork size (thickness)		O	mm	40		45	
Fork spacing		P	mm	245 - 735			
Truck weight (with battery)			kg	3100		3650	3865
Mast weight			kg	850		925	
Drive motor							
Rated output			kW/min	4.3 / 60		6.1 / 60	
Pump motor							
Rated output			kW/min	11.0 / 5			
Power steering motor							
Rated output			kW/min	0.55 / 60			
Speed control unit				FET inverter unit			
Pump control unit				FET DC chopper unit			
Battery (option)							
Type				DIN43531C			
Capacity			AH/5h	420 - 465		560 - 620	
Voltage			V	48			
Tire (trailing wheel)				2 - 255 x 114 (urethane)		2 - 267 x 135 (urethane)	
Tire (drive wheel)				330 x 145 (urethane)		380 x 165 (urethane)	

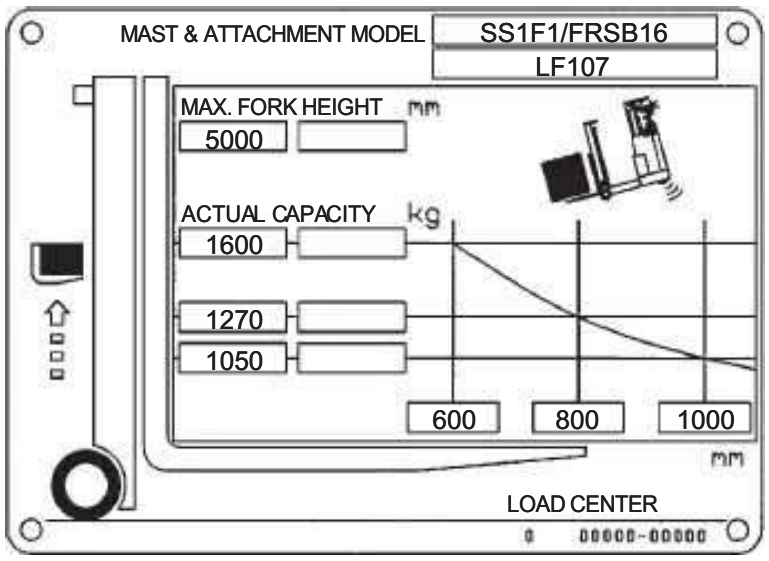
Note: The performance values and weights in this specification table are given for trucks with the following battery weights:
FRSB14, 16: 750 kg, FRSB20, 25: 939 kg

⚠ WARNING

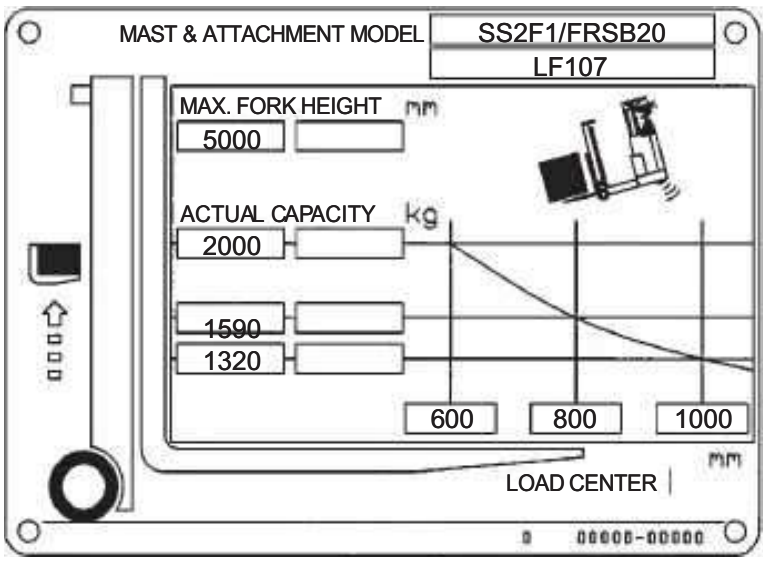
The following load charts are given for the standard truck (lift height of 5 m).
Note that the load charts for trucks with a lift height of more than 5 m are different from the following.
Make sure that the load chart corresponds to the truck you are operating. Keep the load chart clean and legible at all times.



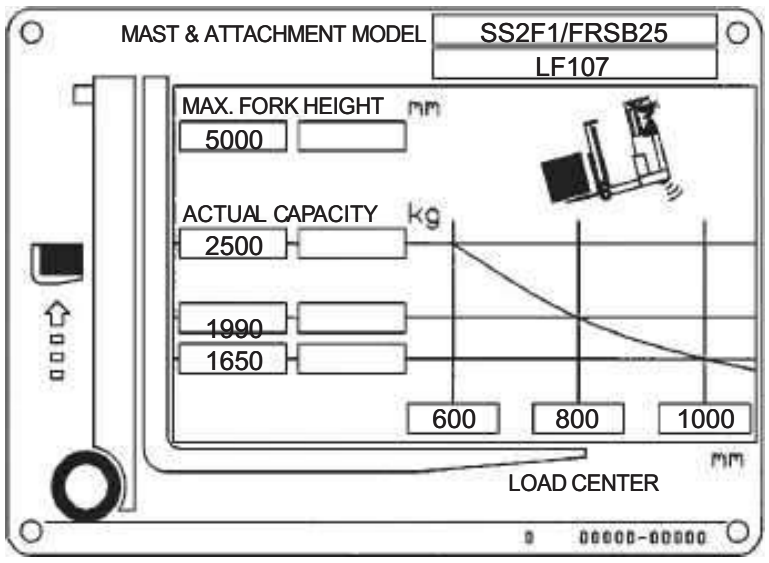
FRSB14-8



FRSB16-8



FRSB20-8



FRSB25-8

SERVICE DATA

- **Deflection of lift chain:** ..... No difference in deflection between the right and left chains when they are pressed by the thumbs of both hands at the same time
- **Height of brake pedal:** ..... 62 mm
- **Electromagnetic brake clearance:** ..... (FRSB14-8, FRSB16-8): within 0.70 mm
  (FRSB20-8, FRSB25-8): within 0.95 mm
- **Vibration in accordance with EN 13059** ..... 0.61 m/s^2
- **Sound pressure level (L_{PAZ}) at operator's position in accordance with EN 12053**..... 77 dB(A)

LIGHT CAPACITY

Work lights (2 pcs.) ..... 48 V – 40 W
Turn signals (2 pcs., option)..... 48 V – 25 W
Headlights (2pcs., option) ..... 48 V – 40 W
Work light (1 pc., option) ..... 48 V – 25 W

FUSE CAPACITY

Fuse circuit	Fuse capacity
F1 (drive)	225 A
F2 (pump)	225 A
F3 (EPS)	40 A
F4 (control)	10 A
F5 (lamp)	10 A
F7 (solenoid)	10 A

SELECTION OF BATTERY

Inner dimension of battery case

Model	Battery capacity (Ah/5h)	Battery weight range (kg)	Battery case size L x W x H (mm)	Battery compartment size L x W x H (mm)	Case weight (kg)
FRSB14-8 FRSB16-8	48 V 420 - 465	750 - 785	283 x 1223 x 784	286 x 1226 x 784	123
FRSB14-8 FRSB16-8 (High-capacity battery)	48 V 560 - 620	930 - 985	355 x 1223 x 784	358 x 1226 x 784	132
FRSB20-8 FRSB25-8	48 V 560 - 620	930 - 985	355 x 1223 x 784	358 x 1226 x 784	132
FRSB20-8 FRSB25-8 (High-capacity battery)	48 V 700 - 775	1115 - 1175	427 x 1223 x 784	430 x 1226 x 784	141

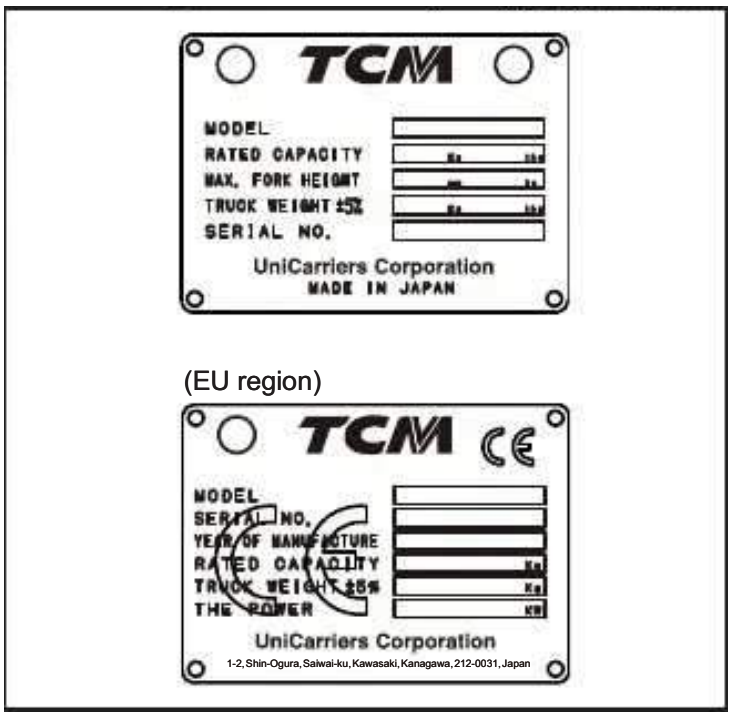
REFILL CAPACITY

Item / Location	Capacity FRSB14-8 FRSB16-8	Capacity FRSB20-8 FRSB25-8	Lubricant	Oil Supplier & Class		
Hydraulic oil tank	(Lift height: 5.0 – 6.0 m) 25 ℓ	(Lift height: 5.0 – 6.0 m) 32 ℓ	HYDRAULIC OIL	Class / Supplier	R & O	ANTIWEAR
				MOBIL	Mobil DTE Oil Light	Mobil DTE 24
	(Lift height: 6.5 – 8.5 m) 27 ℓ	(Lift height: 6.5 – 8.5 m) 34 ℓ		SHELL	SHELL TELLUS OIL C32	SHELL TELLUS OIL 32
				ESSO	TERESSO 32	NUTO HP 32
				CALTEX	Rando Oil 32	Rando Oil HD32
Drive unit	2.1 ℓ	3.2 ℓ	GEAR OIL	Class / Supplier	API Class GL-4 and Higher	
					GL-4	GL-5
				MOBIL	Mobilube 40 Series (75W, 80W, 90)	Mobilube HD (75W, 80W, 60W-90, 90)
Power steering actuator case	0.35 ℓ	0.35 ℓ		SHELL	SHELL SPIRAX EP (90W, 90)	SHELL SPIRAX HP (80W, 90)
				ESSO	ESSO GEAR OIL GP (80W, 80W-90, 85W-90)	ESSO GEAR OIL GX (80W, 80W-90, 85W-90)
				CALTEX	Universal Thuban (80W, 90)	Multipurpose Thuban EP (80W-90, 80W, 90)
Greasing points [Chassis, bearings and others]	Proper amount	Proper amount	GREASE	Class / Supplier	Lithium Base Multi-Purpose Grease (NLGI No. 0, 1 or 2)	
				MOBIL	Mobil grease 70 Series, Mobil grease MP	
				SHELL	SHELL ALBANIA GREASE R Series, SHELL ALBANIA GREASE EPR Series, SHELL RETINAX A	
				ESSO	BEACON Series	
				CALTEX	Marfak All Purpose 2, 3, Marfak Multipurpose 2, 3, Multifak EP 0, 1, 2	

NAME PLATE

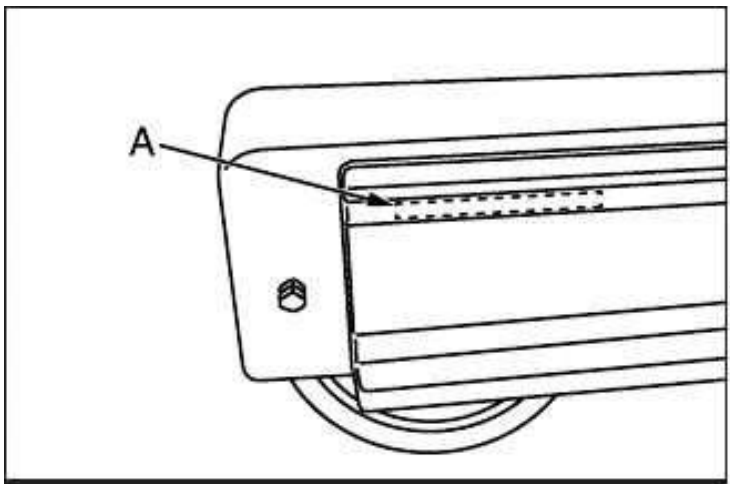
The name plate is located on the front side of the operator's seat.
If gives information about the model name, rated capacity, lift height, weight and serial number of the truck.

NOTE
When you make contact with your local UniCarriers dealer about trouble or place orders, be sure to notify the dealer of the truck serial number in addition to the truck model.



TRUCK SERIAL NUMBER

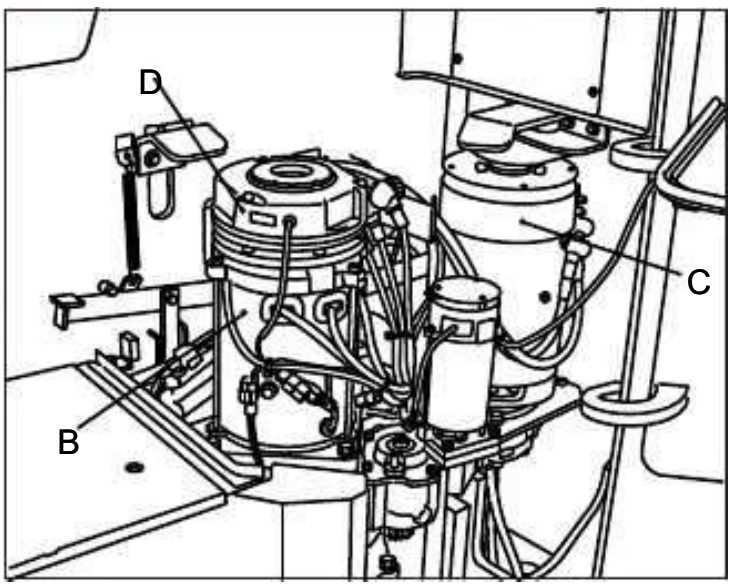
The truck serial number (A) is imprinted at the front end inside of the right outrigger as well as on the name plate.



A : TRUCK SERIAL NUMBER (ex.: 7E4*****)

SERIAL NUMBERS OF MAJOR COMPONENTS

In addition to the truck serial number, the serial numbers (unit numbers) (B) (C) and (D) of major components are imprinted on the truck or indicated on decals. These number plates should be retained for future reference in servicing.



B: DRIVE MOTOR
C: PUMP MOTOR
D: ELECTROMAGNETIC BRAKE

UniCarriers' GENUINE PARTS

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

GENUINE UniCarriers LUBRICANTS

Use genuine UniCarriers lubricants for lubrication.

FOR YOUR RECORDS

MODEL _____

SERIAL NUMBER _____

WEIGHT (WITH BATTERY) _____

RATED CAPACITY _____

MAST TYPE _____

MAST SERIAL NUMBER _____

NAME OF BATTERY MAKER AND
TYPE OF BATTERY _____

BATTERY CAPACITY_____

BATTERY SERIAL NUMBER _____

KEY NUMBER _____

TRUCK CONTROL NUMBER _____

NAME OF SUPERVISOR _____

ATTACHMENT _____

DATE OF PURCHASE _____

AUTHORIZED UniCarriers DEALER

_____

PHONE NUMBER OF AUTHORIZED
UniCarriers DEALER

_____

EC Declaration of conformity

Manufacturer: UNICARRIERS CORPORATION

Address : 1-2, Shin-Ogura, Saiwai-ku, Kawasaki, Kanagawa, 212-0031, Japan

Authorized representative to compose technical documentation
Rudolf Jozef Arntz, Manager UniCarriers Europe GmbH,
Mollsfeld 10, 40670 Meerbusch, Germany

Herewith declares that

REACH TRUCK, MODEL: SERIAL NO.

- is in conformity with the provisions of the Machinery Directive2006/42/EC, and with national implementing legislation;
- is in conformity with the provisions of the following other European directives (insofar as applicable):

2004/108/EC

- the following harmonized standards have been applied (insofar as applicable):
- the following national technical standards and specifications have been used (insofar as applicable):

《 Any additional information 》

SPECIFICATION :

Date:

(Signature)

Manager of Quality Assurance Department

MEMO

6. INDEX

CONTENTS

0 - 9

A

B

C

D

E

F

G

H

I

K

L

M

N

O

P

R

S

T

U

W

No. OB-7E3DE

ISSUED: FEB., 2011
REVISED: MAY, 2011
REVISED: APR., 2013
REVISED: SEP., 2015

UniCarriers Corporation

1-2, Shin-Ogura, Saiwai-ku, Kawasaki, Kanagawa,
212-0031, Japan

JB-1509001(AN) Printed in Japan

UNICARRIERS

UniCarriers Corporation