OPERATING MANUAL

HSD-EX-40

DO NOT REMOVE THIS MANUAL FROM THIS UNIT

Part Number: OIM-HSDEX40-2022

Contents

Forward

To OWNERS, USERS, and OPERATORS:

The safe and efficient operation of a lift truck requires skill and alertness on the part of the operator. To develop the skill required, the operator must:

- Receive training, pursuant to OSHA 1910.178(l), in the proper operation of THIS truck.
- Understand the capabilities and limitations of the truck.
- Become familiar with the construction of the truck and see that it is maintained in good condition.
- Read and properly understand the warnings, instructions, and operating procedures in this manual.

In addition, a qualified person, experienced in lift truck operation, must guide a new operator through several driving and load handling operations before the new operator attempts to operate the truck alone.

It is the responsibility of the employer to ensure that the operator can see, hear, and has the physical and mental ability to operate the equipment safely.

Various laws and regulations require the employer to train lift truck operators. These laws and regulations include:

- Occupational Safety and Health Act (OSHA) (USA)
- Canada Material Handling Regulations

This Operating Manual is the original instruction and contains information necessary for the operation and maintenance of a basic fork truck. Optional equipment is sometimes installed that can change some operating characteristics described in this manual. Ensure the necessary instructions are available and understood before operating the truck.

Safety Symbols

The following symbols and words indicate safety information in this manual:

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury and property damage.

Indicates safety information regarding operating in a hazardous environment.

⚠ WARNING

AUTHORIZED, TRAINED OPERATOR ONLY!

Know the Equipment

- KNOW operating, inspection, and maintenance instructions in Operating Manual.
- DO NOT operate or repair truck unless trained and authorized.
- INSPECT truck before use.
- DO NOT operate if truck needs repair. Tag truck and remove key. Repair truck before use. Always use RICO Approved parts when making repairs. Replacement parts must meet or exceed the specifications of the original equipment manufacturer.
- USE attachments for intended purpose only.
- ENSURE truck is equipped with overhead guard and load backrest adequate for the load.

Look Where You are Going

- IF YOU CAN'T SEE, DON'T GO.
- TRAVEL in reverse if load blocks forward vision.
- ENSURE tail swing area is clear before turning.
- SOUND horn at intersections or whenever vision is blocked.
- WATCH clearances, especially overhead.

Know Your Loads

- HANDLE only stable loads within specified weight and load center. See Nameplate on this truck.
- DO NOT handle loose loads higher than load backrest.
- SPACE forks as far apart as load allows and center load between forks. Keep load against load backrest.

Protect Yourself, Fasten Your Seat Belt!

- AVOID bumps, holes, loose materials, and slippery areas.
- AVOID sudden movements. Operate all controls smoothly.
- NEVER turn on, or angle across an incline. Travel slowly.
- TRAVEL on inclines with load uphill or unloaded with mast downhill.
- TILT mast slowly and smoothly.
- LIFT or LOWER with mast vertical or tilted slightly back. Use minimum tilt when stacking elevated loads.
- TRAVEL with carriage as low as possible and tilted back.
- SLOW DOWN before turning, especially without load.

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE THE TRUCK TO TIP OVER!

DO NOT JUMP off if the truck tips! HOLD steering wheel firmly. BRACE your feet. LEAN FORWARD and AWAY from point of impact.

Hazardous Locations

ONLY OPERATE THIS TRUCK IN AREAS APPROVED FOR USE!

- It is the responsibility of the employer to determine the hazard classification of any particular atmosphere or location according to ANSI/NFPA 505.
- No repairs shall be made in Class I, II, and III locations.
- Battery changing and charging shall be performed in designated, nonhazardous areas.

Model Description

Figure 1. Diagram of Major Components

1. Overhead Guard
2. Seatbelt
3. Mast
4. Load Backrest Extension
5. Carriage
6. Forks
7. Drive Tires
8. Steer Tires
9. Counterweight

General

The lift truck covered in this Operating Manual has solid rubber tires (often called cushion tires) that are pressed onto the rim.

A battery supplies power for the traction motor, hydraulic pump motor, control panel, and display panel.

The truck covered in this Operating Manual is manufactured with two motors: a traction motor and a hydraulic pump motor.

Both motors use AC motor and control technology and are housed within the EX motor enclosure.

See Figures 2 & 2.5

The truck described in this manual has regenerative braking. This is in addition to the regular service brakes at the drive wheels. Regenerative braking allows the operator to change the direction of travel without applying the service brakes. When a new direction of travel is selected, regenerative braking uses the motor to stop the truck before traveling in the opposite direction.

A brake pedal actuates the hydraulic service brakes at the drive wheels. A foot-operated parking brake also actuates the same brakes.

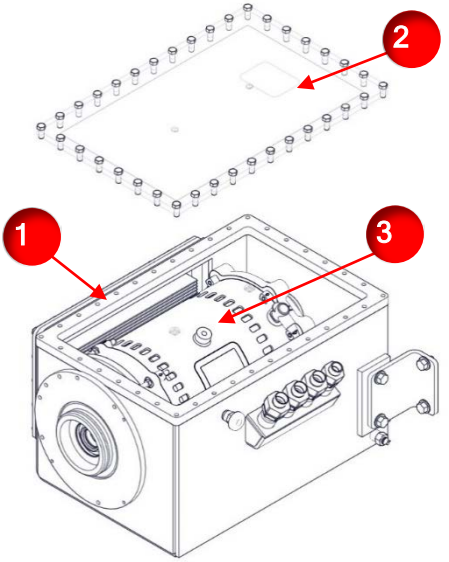


Figure 2. EX Motor Enclosure

1. EX Motor Enclosure
2. EX Motor Enclosure Lid
3. Traction Motor
4. Hydraulic Pump Motor
5. Hydraulic Pump

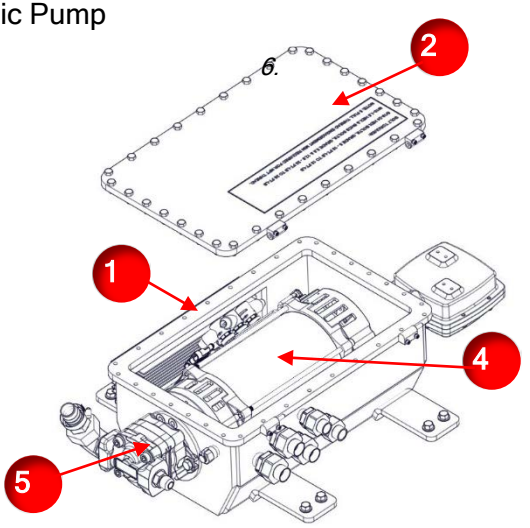


Figure 2.5. EX Motor Enclosure

The truck covered in this Operating Manual is equipped with manual hydraulic levers to operate load handling functions.

Forward or reverse movements are controlled by a direction control switch located on the left side of the first lever.

See Figure 3.

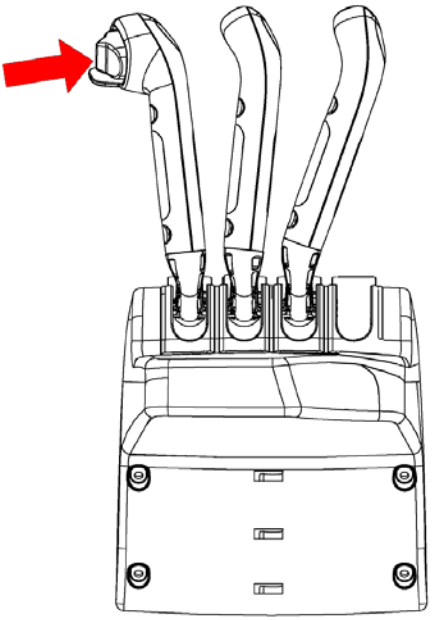


Figure 3. Manual Hydraulic Levers and Directional Control Switch

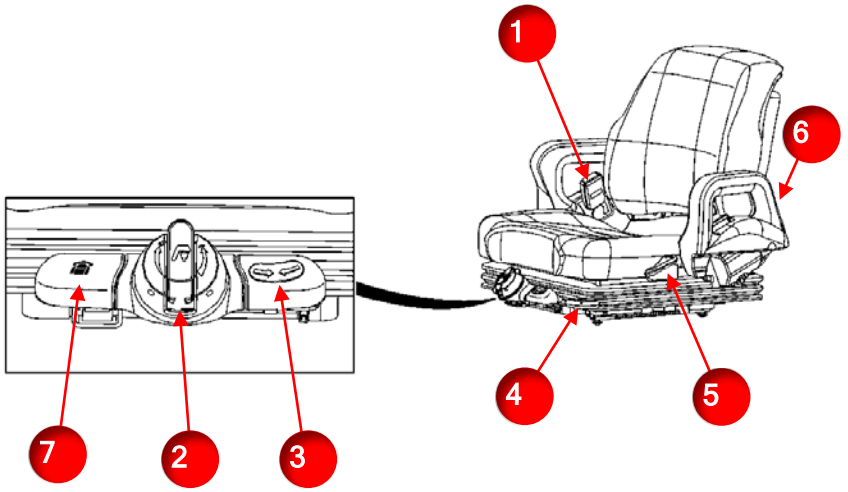


Figure 4. Seat Components

1. Seatbelt
2. Weight Adjustment Knob
3. Ride Position Indicator
4. Forward/Backward Adjustment Lever
5. Backrest Angle Adjustment Lever
6. Hip Restraint Bracket
7. Swivel Latch Release Lever

Operator Protection Equipment

The OVERHEAD GUARD is intended to offer reasonable protection to the operator from falling objects but cannot protect against every impact. Therefore, it must not be considered a substitute for good judgment and care when handling loads. Do not remove the overhead guard.

See Figure 1.

The SEATBELT and HIP RESTRAINT BRACKETS provide additional means to help the operator keep the head and torso within the confines of the truck frame and operator compartment if a tip over occurs. This restraint system is intended to reduce the risk of the head and torso being trapped between the truck and the ground, but it cannot protect the operator against every potential injury in a tip over. The hip restraint bracket will help the operator resist side movement if the seat belt is not fastened. It is not a substitute for the seatbelt. Always fasten the seatbelt.

See Figure 4.

The LOAD BACKREST EXTENSION is installed to keep loose parts of the load from falling back toward the operator. It must be high enough, with openings small enough to prevent the parts of the load from falling backward. If a load backrest extension that is different from the one installed on your truck is required, contact your local authorized Hyster© / Yale© dealer.

See Figure 1.

Protection Against Mechanical Sparks

The periphery of the truck covered in this Operating Manual is protected from mechanical sparks by means of bumpers or cladding constructed of non-sparking materials.

See Figure 5.

DO NOT operate the truck in a hazardous location if the non-sparking material is missing or worn through to the underlying ferrous metals.

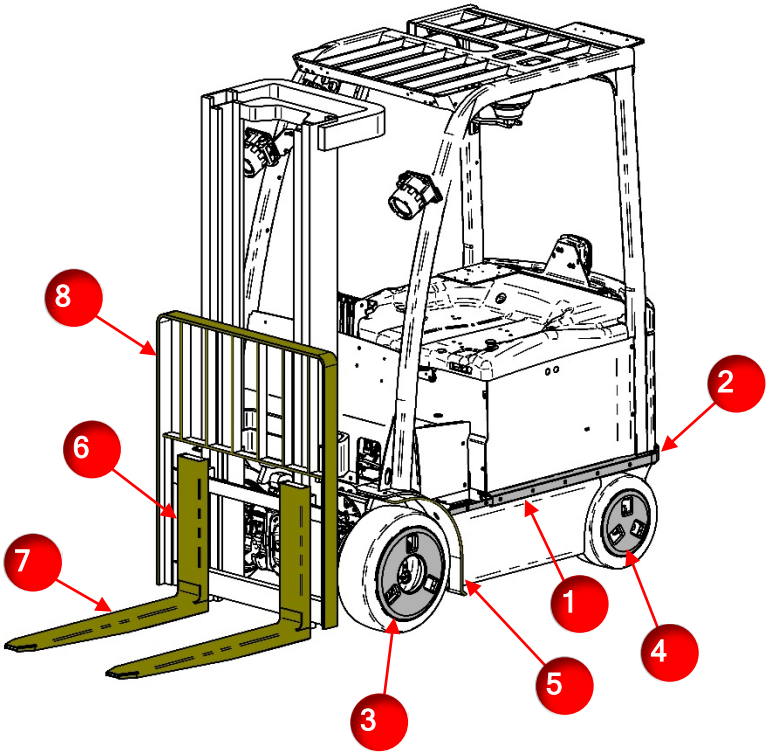


Figure 5. Typical Protection Against Mechanical Sparks

1. Truck Body: Aluminum Bumpers on Sides
2. Rear Counterweight: Aluminum Bumper on Back
3. Drive Hub: Aluminum Cap
4. Steer Hub: Aluminum Cap
5. Drive Tire Fender: Brass Cladding on Sides
6. Fork Shank: Brass Cladding on Front and Sides
7. Fork Blade: Brass Cladding on Front, Sides, Top, and Bottom
8. Load Backrest Extension: Brass Cladding on Front and Sides

Nameplate

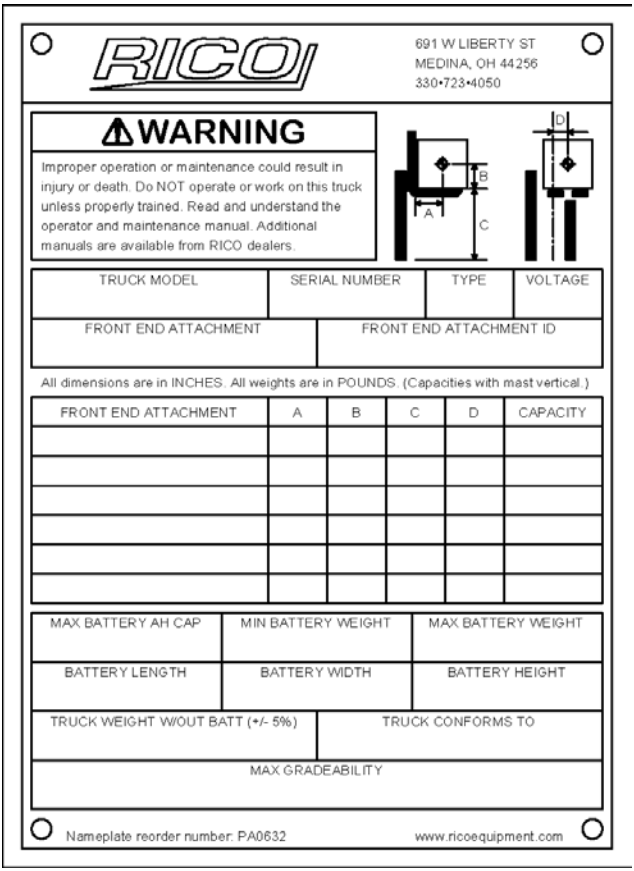


Figure 6. Nameplate

⚠ WARNING

Any changes to the truck, its tires, or its equipment can affect its capacity, stability, or safe operation. If the truck equipment–including the battery–does not match that shown on the Nameplate, the truck must not be operated.

The truck's nameplate is located on the battery hood to the rear and right of the seat. The nameplate contains the following information:

- Truck model
- Truck serial number
- Type designation (EX)
- Nominal truck voltage
- Rated capacity in pounds and kilograms
- Rated load center in inches and millimeters
- MAX lift height at the rated capacity
- Alternate capacities with removable attachments or at various load centers or lift heights
- Removable attachment information (if applicable)
- MIN and MAX service weight of battery
- Truck weight without battery
- MAX grade percentage which the truck is rated to traverse

Contact RICO Manufacturing for capacities at lift heights or load centers not given on your truck's nameplate.

Safety Labels

Safety labels are installed on the truck to provide information about potential hazards. It is important that all safety labels are present a legible.

If a label is missing or cannot be read, contact your local authorized Hyster© / Yale© dealer. Replacement part numbers can be found in your truck's maintenance manual.

See Figure 7 - Figure 18.

Figure 7

Notice of FM approval.

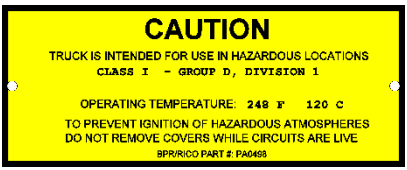


Figure 8

Identification of the hazardous locations the truck is tested and approved to operate in per NFPA Standard 505.

Figure 9

Warning against servicing electrical equipment in a hazardous area.

Figure 10

EX marker on both sides and rear of truck.

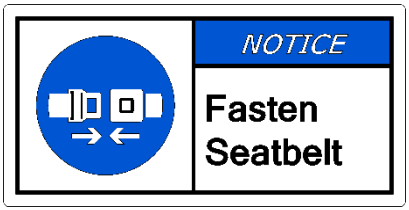


Figure 11

Fasten seatbelt notice.

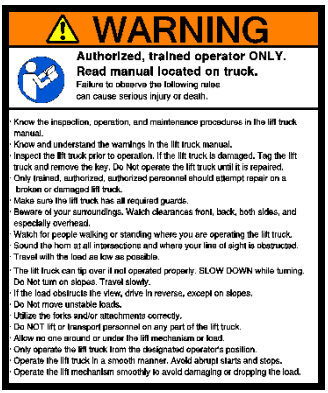


Figure 12

Operator warning.

Figure 13

Tip-over warning.

Figure 14

Mast warning.

Figure 15

No passengers warning.

Figure 16

Mast crush hazard warning.

Figure 17

MAX capacity warning.

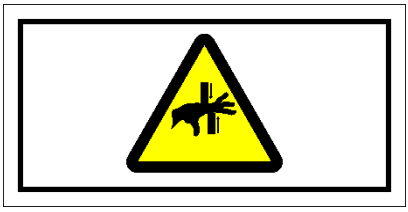


Figure 18

Pinch or crush point hazard.

Operator Controls

Figure 19. Operator Controls

1. Horn Button
   - Push horn button to warn pedestrians and others when approaching intersections and other blind areas.
2. Accelerator Pedal
   - Push down on the accelerator pedal to increase the speed of the truck.
3. Display Panel
   - See Display Panel Features in this section for details.
4. Power Switch
   - OFF position deenergizes all electric circuits except the horn. ON position energizes all electric circuits.
5. Light Switch
   - Rocker switch turns lights (if equipped) on and off.
6. Lift/Lower Lever
   - Pull back towards the operator to raise the carriage. Push forward to lower the carriage.
7. Tilt Control Lever
   - Push the lever forward to tilt the mast forward. Pull the lever back towards the operator to tilt the mast backward.
8. Axillary Hydraulic Functions Lever
   - This lever can have two methods of operation, depending on the attachment.
9. Brake Pedal
   - Applies the service brake when pressed.
10. Parking Brake Pedal
    - Push down to apply the parking brake.
11. Parking Brake Release Handle
    - Pull handle to release the parking brake.
12. Steering Wheel
    - When traveling forward, turning the wheel clockwise will steer the truck to the right and counterclockwise to the left.
13. Emergency Disconnect Switch
    - Push to disconnect all electrical power. Pull to reset.
14. Steering Column Tilt Position Lever
    - Lift the tilt position lever to adjust the steering column up or down.

Display Panel Features

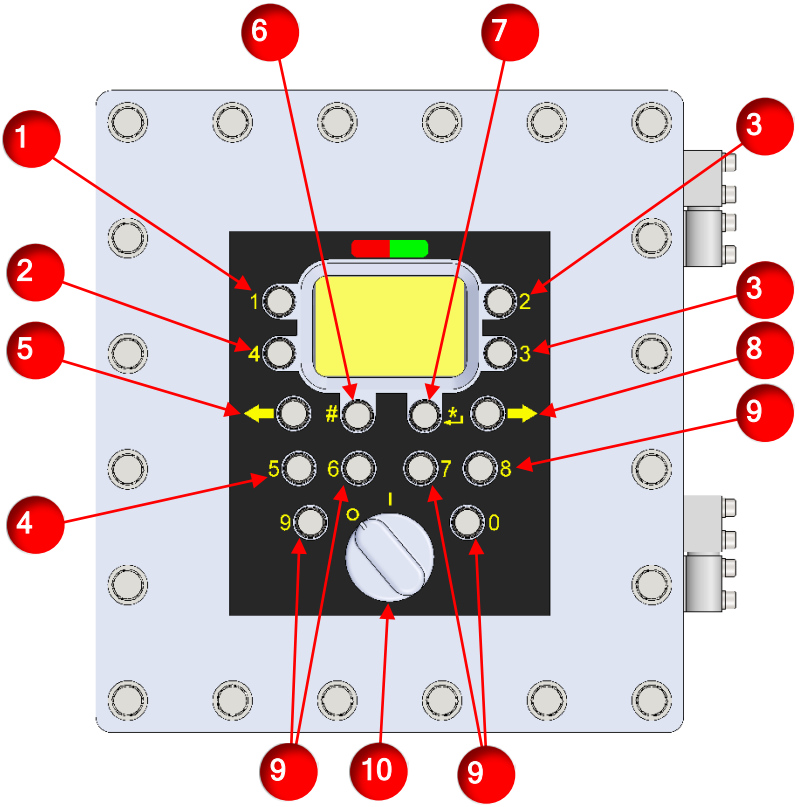


Figure 20. Display Panel Keys

1. 1 Key
    - When an operator is in the Password Screen, if enabled, for entering passwords, this key allows entry of the number 1 for password purposes.
    - Once a password has been successfully entered, or if a password is not required, the display panel will go to the Operator Screen. This screen contains all the necessary components for normal operation of the lift truck. In this screen Key 1 is enabled to decrease Performance Mode; press the 1 key to go to the next lower level of performance; level 1 performance mode is the slowest and level 4 is the fastest.
    - When an operator, if authorized, is in any of the additional menus that are available (Calibrations, Diagnostics, and Truck Setup menus) the 1 key is enabled to enter the number 1 for data entry purposes.
2. 4 Key
    - When an operator is in the Password Screen, if enabled, for entering passwords, this key allows entry of the number 4 for password purposes.
    - Once a password has been successfully entered, the display panel will go to the Operator Screen. This screen contains all the necessary components for normal operation of the lift truck. In this screen, Key 4 is enabled to increase Performance Mode; press the 4 key to go to the next highest level of performance; level 1 performance mode is the slowest and level 4 is the fastest.
    - When an operator, if authorized, is in any of the additional menus that are available (Calibrations, Diagnostics, and Truck Setup menus) the 4 key is enabled to enter the number 4 for data entry purposes.

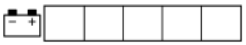
3. 2 and 3 Keys
    - When an operator is in the Password Screen, if enabled, for entering passwords, these keys allow entry of the number 2 and 3 for password purposes.
    - Once a password has been successfully entered, or if a password is not required, the display panel will go to the Operator Screen.
    - When an operator, if authorized, is in any of the additional menus that are available (Calibrations, Diagnostics, and Truck Setup menus) the 2 and 3 keys allow the operator to scroll up or down within the menu. Press the 2 key to scroll up and press the 3 key to scroll down.
    - When an operator, if authorized, is working in any of the menus, other than the Password menu, is prompted to enter a data value that contains numbers, the scrolling features of the 2 and 3 keys will be disabled and keys 2 and 3 can be used to enter numeric values. Once the numeric data value has been entered and the Enter key pressed, the scrolling feature for keys 2 and 3 will be enabled again.
4. 5 Key
    - When an operator is in the Password Screen, if enabled, for entering passwords, this key is enabled to enter the number 5 for password purposes.
    - Once a password has been successfully entered, or if a password is not required, the display panel will go to the Operator Screen.
    - When an operator, if authorized, is in any of the additional menus that are available (Calibrations, Diagnostics, and Truck Setup menus) the 5 key is enabled to enter the number 5 for data entry purposes.
5. Scroll Back (Left Arrow Key)
    - This key is used for decreasing the value of a selected operating function or scrolling backward through a list of menu selections.

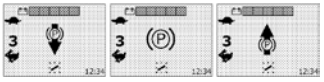
6. **Pound Key**
    - If the Operator Checklist is enabled on the lift truck, the Pound Key is used to indicate an issue with the current item in the list. See Operator Checklist in the Operating Procedures section for more information on using the Operator Checklist.
7. **Enter (Star) Key**
    - This key is used for menu entry and menu navigation. Use the STAR key to select a menu to be viewed. Within the selected menu, use the STAR key to select sub menus associated with the selected menu.
8. **Scroll Forward (Right Arrow Key)**
    - This key is used for increasing the value of a selected operating function or scrolling forward through a list of menu selections.
9. **6, 7, 8, 9, and 0 Keys**
    - These keys are enabled to enter the numbers 6, 7, 8, 9, and 0 for data entry purposes.
10. **Power Switch**
    - OFF position deenergizes all electric circuits except the horn. ON position energizes all electric circuits.

Display Panel – Screen and Warning and Indicator Lights

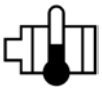
Item	Function
Indicator Light, Performance Mode 	There are four performance modes to choose from. Each mode changes acceleration and speed. The tortoise icon on the top decreases the performance mode and the hare on the bottom increases the performance mode. The numeric value (numbers 1 through 4) in the middle indicates which performance mode the truck is currently in. The number 1 is the slowest and the number 4 is the fastest. Push the 1 key, next to the tortoise, to decrease the performance mode. Push the 4 key, next to the hare, to increase the performance mode. The lift truck will now operate within the parameters set for that mode number until the performance mode is changed again.
Warning Light, Low Brake Fluid 	⚠ CAUTION **Do not continue to operate lift truck if light is on. Damage to equipment may occur.** The low brake fluid icon will illuminate when the brake fluid sensor indicates a low brake fluid condition in the brake reservoir.

Item	Function
Warning Light, Fasten Seatbelt 	**⚠ WARNING** **Always fasten seat belt when operating the lift truck. Serious injury may occur if seat belt is not fastened.** This icon will stay illuminated for approximately 10 seconds when the Operator Screen first appears on the display panel after the truck has been turned on. The light will disappear after 10 seconds or until the screen is changed, whichever occurs first. The fasten seat belt icon will also illuminate if the operator returns to the seat after being off of it for more than 10 seconds.

Item	Function
Indicator Light, Battery Discharge Indicator (BDI) 	⚠ CAUTION **DO NOT operate the lift truck when the battery icon is flashing. Continued operation with a low battery can cause damage to the battery and lift truck.** A bar graph, representing the Battery State-of-Charge (BSOC), is visible on the LCD screen at all times while the Operator Screen is displayed. When the battery is fully charged, the bar graph will be completely shaded. As the battery discharges, shaded blocks will disappear from the top of the graph on down. When the battery drops below 25 percent BSOC, an audible alarm will sound and the battery icon will begin to flash, indicating that the battery charge is too low and must be charged soon. Continued operation will cause lift-interrupt (if enabled) to occur to help prevent battery damage. Lift-interrupt prevents the operator from lifting loads and saves enough battery power for operator to move lift truck to a battery recharger. At lift-interrupt, there are no segments (bars) displayed, and the Battery symbol is flashing.

Item	Function
Indicator Light, Parking Brake Not Applied, Direction Indicators 	The direction indicator lights indicate which direction the lift truck is set to travel. The corresponding direction arrow (up for Forward, down for Reverse) will illuminate. When the parking brake is disengaged, the N or Arrow (based on direction selected) will appear.
Indicator Light, Parking Brake Applied, Direction Indicators 	When a direction of travel has been selected, the corresponding direction arrow (up for Forward, down for Reverse) will illuminate. These symbols will illuminate whenever the parking brake has been applied.

Item	Function
Warning Light, Service Due Light 	The service due icon will illuminate when either an active fault is present in the system or when scheduled maintenance is due or almost due, if lift truck is equipped with this feature. When an active fault is present in the system, the wrench symbol will flash on and off repeatedly. The Status Code for the fault will also be displayed on the LCD screen. Status Codes indicate to the operator that a possible malfunction or incorrect truck use has occurred. Status Codes are code numbers for a symptom or malfunction. Have an authorized service technician check and repair the lift truck if a status code number appears. When scheduled maintenance is due or almost due, the service due light will illuminate and be displayed continuously until scheduled service is performed. If maintenance is not performed before the scheduled time, lift truck operation will decrease by 50% until maintenance is performed. The service technician or supervisor must also set the memory for the next maintenance time to allow normal operation again.

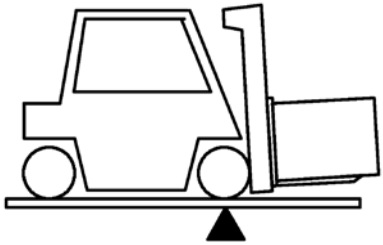
Item	Function
Warning Light, Motor Temperature High Warning 	⚠ CAUTION **DO NOT operate the lift truck when the motor temperature is too high. Damage to the hydraulic system can occur.** This icon will illuminate and stay illuminated when one of the following things have happened: the traction motor or hydraulic pump motor temperature has become too high. If this icon appears, a service technician must check the lift truck right away. Continued operation of the lift truck when this icon is illuminated, can cause damage to the hydraulic system.
Indicator Light, Truck Hour-Meter 	The hour-meter displays the number of hours of operation on the lift truck. The hour-meter contains 5 digits and an hourglass icon. The hour-meter will always be visible to the operator as long as the display panel has the Operator Screen displayed. Turning the power switch to the OFF position or pressing the scroll forward key with the power switch in the OFF position will display the truck hour-meter and the pump hour-meter for five seconds.

Operating Procedures

ALWAYS make sure the parking brake is fully applied before leaving the lift truck. If the parking brake is not applied when the operator gets out of the seat or turns the lift truck OFF, an alarm will sound for 60 seconds. If the lift truck is left on a grade, without the parking brake fully applied, the lift truck will freewheel down the grade, possibly causing injury or property damage.

Know Your Lift Truck

In order to understand how the fork lift truck can pick up a load, you must first know some basic things about the lift truck.

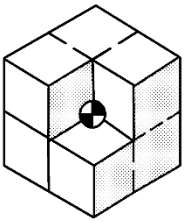


The lift truck is based on the principle of two weights balanced on opposite sides of a pivot (fulcrum). This is the same principle used for a seesaw.

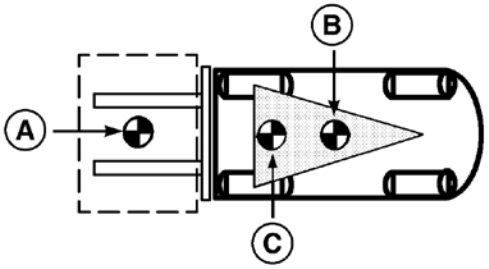
In order for this principle to work for a lift truck, the load on the forks must be balanced by the weight of the lift truck. The location of the center of gravity of both the truck and the load is also a factor.

This basic principle is used for picking up a load. The ability of the lift truck to handle a load is discussed in terms of center of gravity and both forward and side stability.

Stability and Center of Gravity

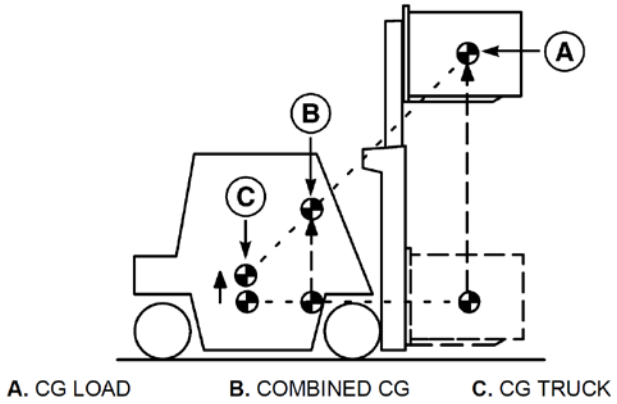


The center of gravity (CG) of any object is the single point about which the object is balanced in all directions. Every object has a CG. When the lift truck picks up a load, the truck and load have a new combined CG. The stability of the lift truck is determined by the location of its CG, or if the truck is loaded, the combined CG.



A. CG LOAD **B.** CG TRUCK **C.** COMBINED CG

The lift truck has moving parts and therefore has a CG that moves. The CG moves forward and back as the mast is tilted forward and back. The CG moves up and down as mast moves up and down. The CG moves left and right as the traverse frame moves left and right.



A. CG LOAD **B.** COMBINED CG **C.** CG TRUCK

The center of gravity, and therefore the stability of the loaded lift truck, is affected by a number of factors, such as size, weight, shape, and position of the load; the height to which the load is raised; tire pressure; and the dynamic forces created when the truck is moving.

These dynamic forces are caused by things like acceleration, braking, turning, and operating on uneven surfaces or on an incline. These factors must be considered when traveling with an unloaded truck, as well, because an unloaded truck will tip over to the side easier than a loaded truck with its load in the lowered position.

In order for the lift truck to be stable, not tip over forward or to the side, the CG must stay within the area of the lift truck represented by a triangle drawn between the drive wheels and the pivot of the steering axle.

If the CG moves forward of the drive axle, the lift truck will tip forward. If the CG moves outside of the line represented by the lines drawn between the drive wheels and the steering axle pivot, the lift truck will tip to that side.

Capacity (Weight and Load Center)

The capacity of the lift truck is shown on the Nameplate. The capacity is listed in terms of weight and load center.

The weight is specified in kilograms and pounds. The load center is specified in millimeters and inches. The capacity is the maximum load that the lift truck can handle for the load condition shown on the Nameplate.

The load center of a load is determined by the location of its center of gravity. The load center is measured from the front face of the forks, or the load face of an attachment, to the center of gravity of the load. Both the vertical and horizontal load centers are specified on the Nameplate.

Loads should be transported while centered on the centerline of the lift truck. The operator must know whether or not a load is within the maximum capacity of the lift truck before the load is handled.

Inspection Before Operation

Report damage or faulty operation immediately. Do not operate a damaged or defective lift truck. A lift truck will only do its job when it is in proper working order. If repairs are required, install a tag in the operator's area stating DO NOT OPERATE and remove the key from the key switch.

At the beginning of each shift and before operating the truck, make the following checks:

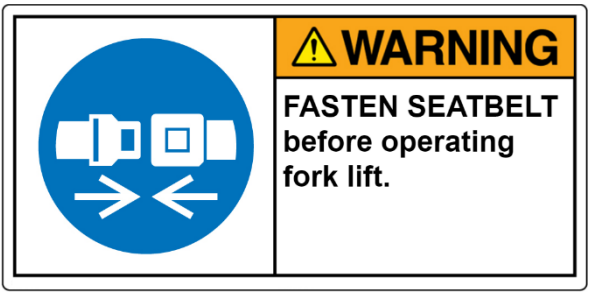
Walk-Around Inspection

- **Forks**: Properly secured, not bent or cracked, brass cladding is not missing or badly worn.
- **Lift Chains**: In place and free of excessive wear or damage.
- **Aluminum Bumpers**: Properly fastened to both sides of truck and rear counterweight.
- **Aluminum Hub Caps**: Present on both drive and steer tires.
- **Tires**: Intact and free of excessive wear, cracking, or chunking.
- **Exposed Minerally Insulated (MI) Cables**: Free of damage. Clamps and connections secured.
- **Nameplate**: In place. Capacity and load center are legible.
- **Hydraulic System**: Free of leaks. Hoses free of visible wear or damage.
- **Guards**: All guards are in place and intact.
- **Hood**: Fully closed and securely locked.

To avoid serious injury when entering or exiting the lift truck, ALWAYS USE 3-POINTS OF CONTACT. Maintain contact simultaneously with two hands and one foot or with two feet and one hand while climbing on or off the lift truck.

Place feet carefully. Always face the lift truck when climbing on or off. Use added care when surfaces are slippery. Keep hands free of any obstacles such as food, beverages, or tools.

Do not turn lift truck power on nor operate the lift truck, including any of its functions or attachments, from any place other than the designated operator's position.



The seat belt is installed to help the operator stay on the truck if the lift truck tips over. IT CAN ONLY HELP IF IT IS FASTENED.

Make sure that the area around the lift truck is clear before making any operational checks. If the lift truck is stationary during a check, apply the parking brake. Proceed carefully.

Once seated, fasten seatbelt, and adjust seat and steer column to comfortable positions.

While checking drive system, drive slowly at first to confirm that plugging and the service brake are functioning properly. Then drive at a faster speed and recheck.

All initial operational checks should be performed when the truck is unloaded.

Operational Inspection

- **Seatbelt**: Properly latched and free of cuts, fraying, or other damage.
- **Seat**: Locked in position.
- **Display Panel**: Indicator lights are working.
- **Battery**: Sufficiently charged.
- **Parking Brake**: Disengages and engages.
- **Power Disconnect**: Cuts power to truck when pushed in.
- **Safety Devices**: Horn, strobe, and other lights function properly.
- **Load Handling Controls**: Lift, lower, tilt, and auxiliary functions operate properly.
- **Steering System**: Free of binding. Operates smoothly.
- **Drive System**: Accelerates smoothly in forward and reverse. Plugging functions properly.
- **Service Brake**: Ensure proper stopping distance.

Startup Procedure

The lift trucks covered in this manual are equipped with a Static Return to OFF (SRO) circuit that prevents travel of the lift truck if the starting sequence is not correct. The function of the SRO circuit is to make sure the operator is in the correct position before the lift truck will operate.

1. Make sure a charged battery of the correct voltage is installed and connected.
2. Sit on the seat to close seat switch. Check to ensure all operator controls, traction and hydraulic, are in the neutral position. If a control is not in the neutral position, it must be returned to neutral position before starting the lift truck.
3. Turn the power switch to the ON position.
4. Release the parking brake.
5. Select the direction of travel using the direction control switch.
6. Push the accelerator pedal for acceleration.

If Step 5 is done before Step 1 through Step 4 and the lift truck moves, the SRO function is not operating correctly. The lift truck must not be operated if the SRO circuit does not function correctly.

If the SRO circuit does not operate correctly, have the Master Controller checked by authorized service technician.

Lift Truck Interlocks

Certain operator actions, if not performed correctly while operating the lift truck, will cause either the traction motor or hydraulic functions to become disabled.

DRIVE INTERLOCKS: The traction motor is enabled when the operator is in the seat (occupancy sensor), seat belt is fastened, a direction of travel is selected, and the parking brake is released.

HYDRAULIC INTERLOCKS: The hydraulic functions are enabled when the operator is in the seat (occupancy sensor) and the seat belt is fastened.

Basic Operating Procedures

Many people make the mistake of thinking that operating a lift truck is the same as driving an automobile. This is not true. It is true that some lift truck operating procedures are as simple and obvious as driving the family automobile. (e.g. Look where you are going, start and stop smoothly, etc.) But a lift truck is a special machine designed to do a much different job than an automobile. Because of the close areas in which a lift truck operates and its other operating characteristics (like rear wheel steering and tail-swing), every operator must receive additional training, even if they have a license to drive an automobile.

The following discussion lists basic procedures applicable to lift truck operation:

1. AUTHORIZED AND TRAINED OPERATOR ONLY. This means the operator must be trained to drive the lift truck and it means that the operator must thoroughly understand the procedures for lift truck operation. It also means that a qualified person experienced in lift truck operation must guide the operator through several driving and load handling operations before the operator attempts to operate the lift truck alone. A basic education in proper driving and load handling techniques is absolutely necessary to prepare the new operator for proper defensive driving and to expect the unexpected.
2. Operate the lift truck only in areas that have been approved for lift truck operation. Certain areas contain hazardous flammable gases, liquid, dust, fibers, or other materials. Lift trucks that are operated in these areas must have special fire safety approval. These areas must be designated to show the type of lift truck approval required for operation in the area. Changes to special equipment or poor maintenance can make the lift truck lose its special approval.
3. NO RIDERS. A lift truck is built for only one person – the operator. It is dangerous for anyone to ride on the forks or anywhere else on the lift truck.

4. ADJUST SEAT POSITION.
   - The seat swivels 12 degrees to the right to allow the operator a more ergonomic position when driving in reverse.
   - The seat swivels 5 degrees to the left to allow an easier exit of the truck.
5. ADJUST SEAT FOR OPERATOR WEIGHT.
   - The target is for the "ride indicator" to fall between the arrows when the operator sits upright in the seat with the feet positioned on the pedals. This ensures that the

operator is set at the midpoint of the 80 mm (3.5 in.) suspension.

- The handle can be turned as shown to increase or decrease the weight resistance, pull handle out before turning. As the handle is turned the "stiffness" of the suspension can be felt to increase or decrease depending on which way the handle is turned.

6. DO NOT drive a lift truck into an elevator unless authorized to do so.
   - Approach the elevator slowly. After the elevator is properly leveled, the lift truck must be centered so that the elevator is balanced.
   - When the lift truck is in the proper position in the elevator, set the brakes, put the controls in NEUTRAL, and shut off the power. It is advisable that all other personnel leave the elevator before the lift truck enters or leaves.
7. Drive carefully, observe traffic rules, and be in full control of the lift truck at all times. Be completely familiar with all the driving and load handling techniques described in this Operating Manual.

Drive and Direction Changes

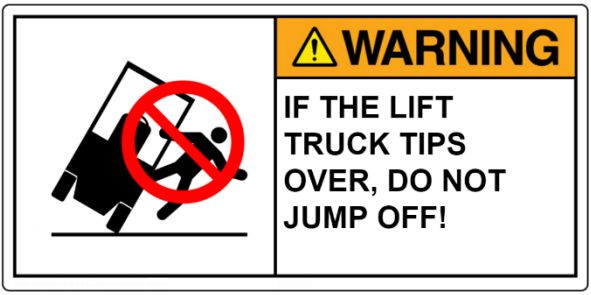
Push the top part of the switch to travel FORWARD. Push the bottom part of the switch to travel in REVERSE. After direction of travel has been selected, push down on the accelerator pedal.

The lift truck will move rapidly and can cause damage or injury.

To move the lift truck, select a direction, release the parking brake, and push down on the accelerator pedal.

Steering

Lift trucks can tip over even at very slow speeds. The combination of speed and the sharpness of a turn can cause a tip-over. A lift truck is less stable when the forks are elevated, with or without a load.

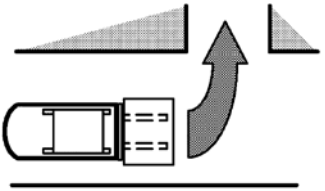


HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN FORWARD AND AWAY FROM THE POINT OF IMPACT.

Because lift trucks are designed to work in a relatively small space, they can turn sharper than some other vehicles. Most lift trucks are steered by the rear wheels and the rear of the lift truck can move to the side very fast during a turn. This movement is called "tail-swing." An operator must be aware of the tail-swing and always check to make sure the tail-swing area is clear before turning.

Do not turn on an incline. To reduce the possibility of a tip-over, a lift truck must not be driven across an incline.

When possible, keep both hands on the steering wheel. During most loading or unloading operations, the operator steers with the left hand. The right hand is used to operate the lift, tilt, and attachment controls.



When turning the lift truck from a wide aisle into a narrow aisle, start the turn as close to the opposite stock pile as tail-swing will permit. This action permits the lift truck to enter the narrow aisle going straight ahead.

Auto Power Off

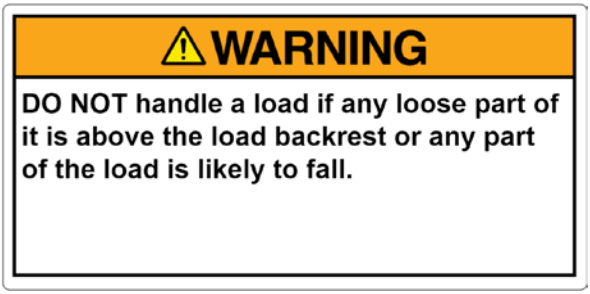
If the lift truck is inactive for 15 minutes, it will automatically power off, even if the operator is in the seat. To turn lift truck power ON again, turn the power switch to the ON position. If the power switch is in the ON position when the lift truck powers off, turn it to the OFF position and then back to the ON position.

Operator Presence System (OPS)

The lift trucks covered in this manual are equipped with an Operator Presence System (OPS). The OPS feature has an electrical sensor switch in the seat which senses the presence of the operator. The OPS is designed with slight delay in the seat switch to allow the operator to reposition himself without disabling all hydraulic and electrical functions.

The operator must be on the seat before turning the power switch ON to provide power to the lift truck. If the operator leaves the seat while the truck is moving or does not apply the parking brake before getting off the seat, the seat switch will cut off power to the lift truck.

Load Handling, General



1. The capacity is the maximum load that the lift truck can handle for the load condition shown on the Nameplate. The operator must know whether or not a load is within the maximum capacity of the lift truck before the load is handled.
   - However, such factors as weak floors, uneven terrain, special load handling attachments, or loads having a high center of gravity can mean that the safe working load is less than the rated capacity. When such conditions exist, the operator must reduce the load so that the lift truck will remain stable.
2. Handle only stable loads. A load can have unstable items that can easily shift and fall on someone.
3. Position each fork the same distance from the center of the carriage. This action will help center the load on the carriage. Set the forks as far apart as possible for maximum support of the load. Center the weight of the load between the forks.
   - If the weight of the load is not centered between the forks, the load can fall from the forks when you turn a corner or hit a bump. An off-center load will increase the possibility of the truck tipping over to the side.
   - Make sure the pins that keep the forks in position are engaged so that the forks cannot move.
4. Check the condition of the driving surface. Make sure the floor will support the weight of the lift truck and the load.

Load Handling Controls

The LIFT and TILT functions are controlled by separate manual levers.

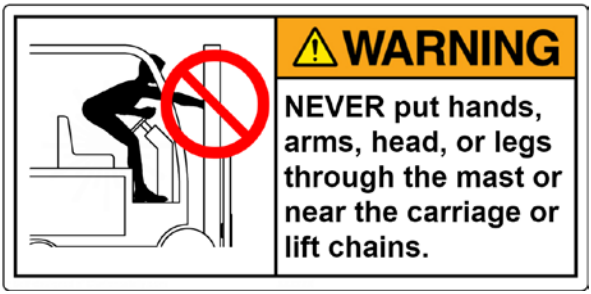
The speed of the hydraulic functions is controlled by the position of the control levers. The farther the manual hand lever is moved from the NEUTRAL position, the faster the speed of the hydraulic function.

Do not lift or hit anything that can fall on the operator or a bystander. Remember, a lift truck equipped with an overhead guard and load backrest extension provides reasonable protection to the operator from falling objects but cannot protect against every possible impact.

A lift truck without an overhead guard provides no such protection and other personnel have no overhead protection. Avoid hitting objects such as stacked material that could become dislodged and fall.

The operator must exercise care while working near such objects. Whether the lift truck is loaded or empty, do not travel with the load or carriage in a raised position.

Keep yourself and all others clear of the lift mechanism. Never allow anyone under or on the forks.



This warning applies not only to the operator but also a helper. A helper must not be near the load or lift mechanism while the operator is attempting to handle a load. The lift mechanism has moving parts with close clearances that can cause serious injury.

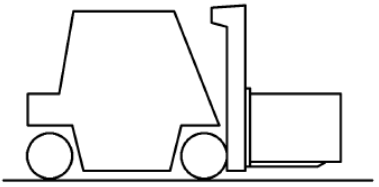
Lift and lower with the mast vertical or tilted slightly backward from vertical. Tilt elevated loads forward only when directly over the unloading place.

If the lift mechanism is raised to pick up or deposit a load, keep the tilt angle in either direction to a minimum. Backward and Forward tilt are helpful, but they affect side and forward stability.

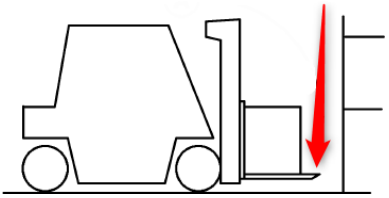
Do not tilt in either direction more than necessary when handling a load that is raised. The lift truck can tip forward if the mast is tilted forward with a load in the raised position.

Load Handling, Engaging and Disengaging a Load

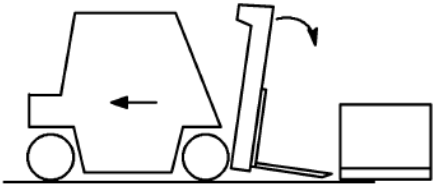
1. Avoid fast starts. Sudden movement can cause the lift truck to tip. People can be hurt or killed, and material can be damaged.
    - Approach the load carefully. Make sure that the truck is perpendicular to the load. Raise the forks to the proper height for engaging the load.



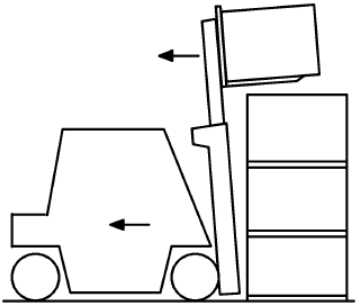
2. Move forward slowly until the forks are in position under the load. The forks must support at least two-thirds (2/3) of the length of the load. Make sure that the load is centered between the forks.
3. Make sure that the forks do not extend past the load so that loads or equipment that are behind the load being lifted are not damaged. Lift the load a small distance from the floor to make sure the lift truck has the capacity to lift the load.



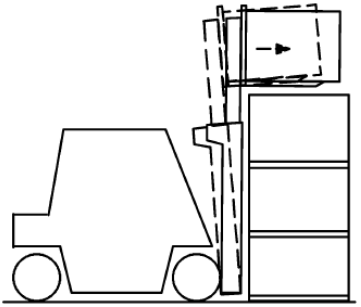
4. If the forks are longer than the load, move the forks under the load so that the tips of the forks do not extend beyond the load. Lift the load from the surface. Move Backward a few inches, then lower the load onto the surface and inch Forward to engage the load against the carriage. Tilt the mast backward just far enough to lift the load from the surface.



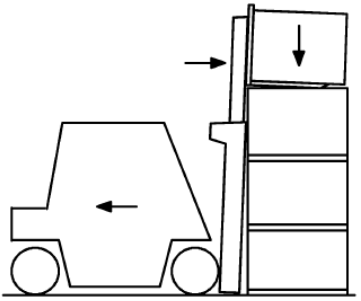
5. When a load is put on the floor, tilt the mast forward to a vertical position and lower the load. Tilt the mast forward to permit smooth removal of the forks. Carefully move the lift truck backward to remove the forks from under the load.



6. If the load is being removed from a stack, slowly move the lift truck away from the stack. When the load is clear of the stack, lower the load for traveling. Always travel with the load as low as possible and tilted backward. Lowering speed is controlled by the position of the control lever. Lower slowly and smoothly. Slowly return the control lever to the Neutral position so that the load is not dropped or that the lift truck is not tipped over due to the rapid stop of the load.



7. To put the load on a stack, align the lift truck with the stack. Lift the load to eye level and then tilt the load forward until it is level. Raise the load higher than the point where it will be placed. Do not raise the load to a point below where the load is to be placed and "jog" the load up into position. This operation uses added energy, particularly with an electric lift truck. Use caution not to damage or move adjacent loads.



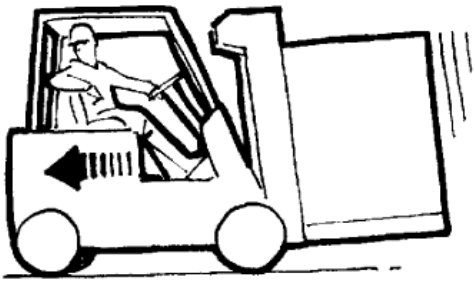
8. Move Forward slowly. When the load is in position, lower the load on to the stack or the rack. Lower the forks just enough to remove them from under the load. Do not lower the forks so that they will drag on the surface under the load. Carefully move the lift truck Backward to remove the forks from under the load. Lower the forks when traveling.

Load Handling, Traveling

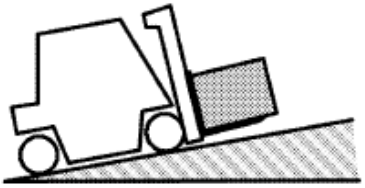
1. When traveling with the load lowered, keep the load against the carriage and the mast tilted fully backward. This action will help keep the load on the forks and provide good forward and side stability.

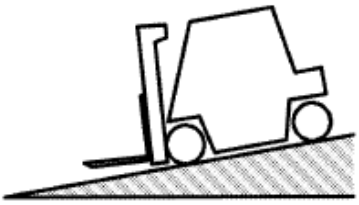
2. Travel with the lift mechanism raised only enough to clear the ground or obstacles.
   - When the mast, carriage, or load is in a raised position, the stability of the lift truck is reduced. This stability is also critical when the lift truck is not carrying a load. The ability of the lift truck to resist side tipping can be less on a lift truck without a load than it is on a lift truck with a load in the lowered (travel) position. Therefore, a lift truck without

a load is more likely to tip sideways, especially in a turn, than a lift truck with a load carried in the lowered position.

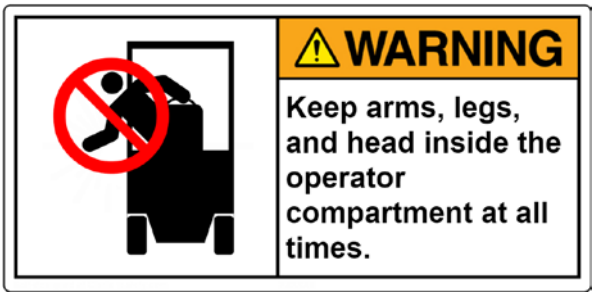


3. For better visibility with large loads, travel with the load trailing, but always keep a proper lookout in the direction of travel. Normally, direction of travel is determined by the best visibility available to the operator.
   - If the lift truck must travel in a direction where visibility is obstructed, a lookout helper may be required.



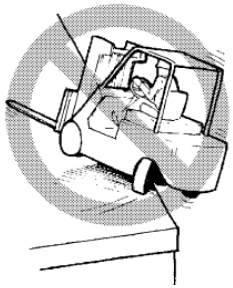


4. When traveling up or down a grade with a loaded lift truck, keep the load upgrade to maintain control. When operating an unloaded lift truck on a steep grade, keep the counterweight upgrade.
5. Watch out for pedestrians at all times. Do not drive up to anyone standing in front of an object. Use extra care at cross aisles, doorways, and other locations where pedestrians can step into the path of travel of the lift truck. Slow down when approaching blind intersections or turns. Sound the horn to warn pedestrians that there is a vehicle in the area and to be alert to possible danger.



6. Anytime the lift truck is moving, keep arms, legs, etc., inside the operator's compartment. Arms and legs outside the machine can be injured when passing obstructions.
7. Avoid bumps, holes, slick spots, and loose materials that may cause the lift truck to swerve or tip. If unavoidable, SLOW DOWN.
8. Watch clearances, especially forks, mast, overhead guard, and tail-swing. A lift truck is designed to perform a wide variety of functions within limited space.
    - The operator must be aware that the forks can sometimes extend beyond the front of the load. If the forks extend beyond the load, the operator can hit an object or lift another load. Serious accidents can be caused by mast and overhead guards hitting pipes and beams near the ceiling.
9. Do not indulge in stunt driving or horseplay.
10. Do not pass another lift truck traveling in the same direction at intersections, blind spots, or at other dangerous locations.
11. Stay away from the edge of the road. Keep the wheels of the lift truck, particularly the steer wheels, on the roadway. If the wheels are allowed to run off the edge of the travel surface onto soft ground, the lift truck can tip over.
12. Under all travel conditions, operate the lift truck at a speed that will permit it to be brought to a stop in a safe manner.

Highway Truck, Railroad Cars, and Docks



⚠WARNING

Maintain a safe distance from the edge of docks, ramps, platforms, and other similar working surfaces.

Watch the "tail-swing." Remember when travelling in the forward direction and the steering wheel is turned to move the lift truck away from the edge of the dock the rear will swing toward the edge. This action can cause the lift truck to fall off the dock.

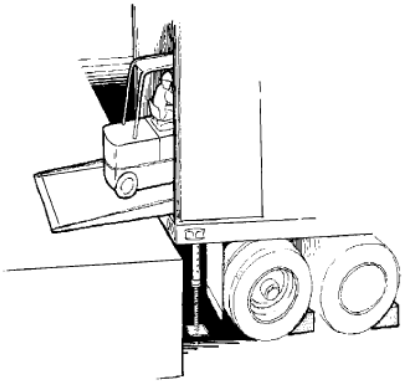
IF THE LIFT TRUCK FALLS OFF THE DOCK, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN FORWARD AND AWAY FROM THE POINT OF IMPACT.

Before operating in a highway truck or railroad car, observe the following:

DO NOT use a lift truck to move a railroad car.

DO NOT use a lift truck to open or close the door on a railroad car unless the lift truck has an attachment that is specifically designed for opening and closing railroad car doors and the operator is trained in its use.

Check to make sure that the brakes on the highway truck are set and that wheel blocks have been placed on both sides of the rear wheels (unless a dock locking mechanism is engaged). Fixed jacks may be necessary to support the front and rear of a highway truck trailer to prevent it from moving or tipping during loading or unloading.



Make sure that the railroad car brakes are set, and the wheels are blocked while loading or unloading. Do this so that the railroad car will not move due to the movement of the lift truck in and out of the railroad car.

Check the condition of the driving surface. Make sure the floor will support the weight of the lift truck and the load before operating on that surface.

Make sure the dock board is secured, in good condition and of the proper capacity.

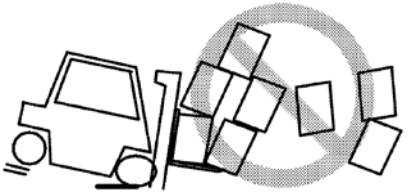
When entering a railroad car, the operator can enter at an angle (if the dock plate or bridge is wide enough). This will reduce the turning required after entering.

Attachments

If an attachment is installed on the lift truck, make sure the operating instructions are available and understood before operating the attachment.

Attachments must be removed or installed by trained personnel only.

Stopping



Stop the lift truck as gradually as possible. Hard braking and wheel sliding can cause the load to fall off of the forks and damage the load or hurt someone. The lift truck can also be stopped using regenerative braking or plugging. Regenerative braking and plugging minimize brake wear damage.

Parking

Never apply parking brake while truck is moving.

The operator must never leave a lift truck in a condition so that it can cause damage and injury. When parking the lift truck, do the following operations:

1. Stop the lift truck and apply the parking brake. Applying the parking brake will put the lift truck in the NEUTRAL position.
2. Fully lower the forks or carriage. Tilt mast forward until the tips of the forks touch the ground.
3. Turn the power switch to the OFF position.
4. If the lift truck must be left on an incline, put blocks on the downhill side of the wheels so that the lift truck cannot move.
5. Do not park the lift truck so that it limits access to fire aisles, stairways, and fire equipment.

Maintenance

Repairs and adjustments that are not correct can make a dangerous operating condition.

DO NOT operate a lift truck that needs repairs. Report the need for repairs immediately. If repair is necessary, put a DO NOT OPERATE tag in the operator's area. In a non-hazardous area Disconnect the battery connector.

DO NOT work under a raised carriage. Lower the carriage or use a chain to prevent the carriage and the inner or intermediate weldments from lowering when doing maintenance. Make sure that the moving parts are attached to parts that cannot move.

How to Move a Disabled Lift Truck

Use extra care when towing a lift truck if there is a problem with any of the following:

- Brakes do not operate correctly.
- Steering does not operate correctly.
- Tires are damaged.
- Traction conditions are bad.
- The lift truck must be moved on a steep grade.

If the hydraulic pump motor, which includes the steering control functions, does not operate, steering control of the lift truck can be slow. This can make the control of the lift truck difficult. If there is no electrical power, there is no power steering. DO NOT tow the lift truck if there is no power. Poor traction can cause the disabled lift truck or towing vehicle to slide. Steep grades will require additional brake force to stop the lift truck.

Never carry a disabled lift truck unless the lift truck MUST be moved and cannot be towed. The lift truck used to carry the disabled lift truck MUST have a rated capacity equal to or greater than the weight of the disabled lift truck. The capacity must be for a load center equal to half the width of the disabled lift truck.

See the Nameplate of the disabled lift truck for the approximate total weight. The forks must extend the full width of the disabled lift truck. Center the weight of the disabled lift truck on the forks and be careful not to damage the underside of the lift truck.

1. The towed lift truck must have an operator.
2. Raise the carriage and forks approximately 300 mm (12 in.) from the surface. Install a chain to prevent the carriage and mast channels from moving.
3. Tow with another lift truck of equal or greater capacity than the disabled lift truck. Install a load of approximately half-capacity on the forks of the lift truck that is being used to tow the disabled lift truck. The half-capacity load will increase the traction of the lift truck. Keep the load as low as possible.
4. Use a towing link made of steel that fastens to the tow pins in the counterweights of both lift trucks.

5. Release the parking brake.
6. Tow the lift truck slowly.

How to Put a Lift Truck on Blocks

The lift truck must be put on blocks for some types of maintenance and repair. The removal of the following assemblies will cause large changes in the center of gravity: mast and drive assembly, battery, or the counterweight.

When the lift truck is put on blocks, put additional blocks in the following positions to maintain stability:

- Before removing the mast and drive assembly, put blocks under the counterweight so that the lift truck cannot tip backward.
- Before removing the battery and counterweight, put blocks under the mast assembly so that the lift truck cannot tip forward.

Put the lift truck on blocks only if the surface is solid, even and level. Make sure that any blocks used to support the lift truck are solid, one-piece units.

How to Raise the Drive Tires

1. Put blocks on each side (front and back) of the steer tires to prevent movement of the lift truck. *See Figure 21*.
2. Put the mast in a vertical position. Put a block under each outer mast channel.
3. Tilt the mast fully forward until the drive tires are raised from the surface.
4. Put additional blocks under the frame behind the drive tires.
5. If the hydraulic system will not operate, use a hydraulic jack under the side of the frame near the front. Make sure that the jack has a capacity equal to at least half the weight of the lift truck. See the Nameplate.

How to Raise the Steering Tires

1. Apply the parking brake. Put blocks on both sides (front and back) of the drive tires to prevent movement of the lift truck. *See Figure 21*.
2. Use a hydraulic jack to raise the steering tires. Make sure that the jack has a capacity of at least 2/3 of the total weight of the lift truck as shown on the Nameplate.
3. Put the jack under the steering axle or frame to raise the lift truck. Put blocks under the frame to support the lift truck.

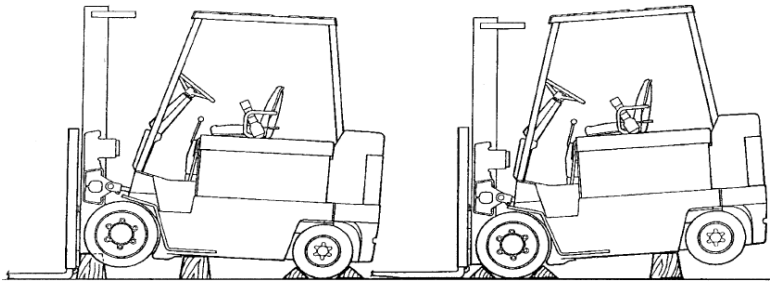


Figure 21. Lift Truck on Blocks

Maintenance Schedule

X = Check (Replace, Repair, or Lubricate if Necessary) C = Change L = Lubricate				
Item	8 hr/ 3 Daily	500 hr/ 3 mo.	2000 hr/ 1 yr.	Specifications
Tires	X			
Parking Brake	X	L		
Service Brake	X			
Brake Fluid		X	C	SAE J-1703 (DOT 3)
Lift Chains	X	L		SAW 10W-30
Forks	X			
Speed Control Pedal	X			Multipurpose Grease
Hydraulic Oil	X		C	ISO VG46
Horn, Lights, and Alarms	X			
Oil Leaks	X			
Safety Labels	X			
Battery	X			
Hood Latch	X			Multipurpose Grease
Steering Column Tilt	X			Multipurpose Grease
Seat Belt	X			
Parking Brake	X			
Mast Pivots		L		Multipurpose Grease
Mast Sliding Surfaces		L		Multipurpose Grease
Integral Side-Shift Carriage		L		Multipurpose Grease
Hoses, Hose Fittings, and Clamps		X		
Tilt Cylinder Rod End Pins	X	L		Multipurpose Grease

X = Check (Replace, Repair, or Lubricate if Necessary) C = Change L = Lubricate				
Item	8 hr/ 3 Daily	500 hr/ 3 mo.	2000 hr/ 1 yr.	Specifications
Brake Pedal Linkage		L		Multipurpose Grease
Fork Pins and Guides	X	L		SAE 10W-30
Hydraulic Tank Breather		X	C	
Contactors		X		
Steering Kingpins		L		Multipurpose Grease
Wheel Bearings			L	Multipurpose Grease
Hydraulic Oil Filter			C	
Exposed Flex Conduit	X			
Flex Conduit Within Truck Body		X		
Ex Enclosures		X		Ensure all Fasteners are Secured. Boxes Free of Damage.
Enclosure Cooling Fan Motors			X	

Maintenance Procedures

Inspect the lift truck after every eight hours or daily before use. Put the lift truck on a level surface. Lower the carriage and forks and turn the power switch to the OFF position. Apply the parking brake. Remove the floor mat and rear plate. Inspect for leaks and conditions that are not normal. Clean any oil spills. Make sure that buildup of lint, dust, paper, and other materials are removed.

Tires and Wheels

Inspect the tires for wire, rocks, glass, pieces of metal, holes, cuts, and other damage. Remove any object that will cause damage. Check for loose or missing hardware. Remove any wire strapping or other material that is wrapped around the axle.

Steering tires are static-conductive. The use of nonconductive tires could result in fire or explosion. Only replace with factory approved tires.

Forks

DO NOT try to correct fork tip alignment by bending the forks or adding shims. Replace bent forks.

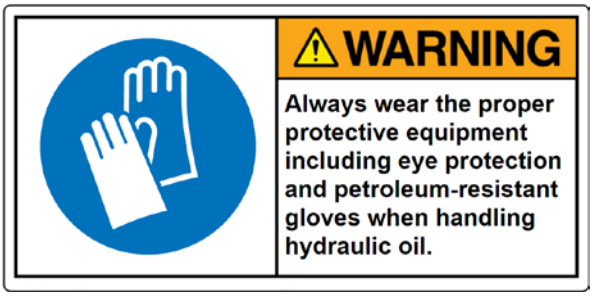
Never repair damaged forks by heating or welding. Forks are made of special steel using special procedures. Replace damaged forks. Forks are to be replaced only in sets and not individually.

1. Inspect the brass-cladding on the forks for cracks, wear, or missing sections. Pay special attention to the tips and heal of the forks.
   - If any portion of the base metal is visible through the cladding, the fork must be replaced.
2. Check the angle between the fork shank and blade. If the angle is greater than 93°, the fork has likely undergone permanent deformation and should be replaced.

Inspection of Mast and Attachments

Lower the lift mechanism completely. Never allow any person under a raised carriage. DO NOT put any part of your body in or through the lift mechanism unless all parts of the mast are completely lowered, and the lift truck motor is OFF.

1. Inspect the welds on the mast, cylinders, and carriage for cracks. Make sure that the cap screws and nuts are tight.
2. Inspect the channels for wear in the areas where the rollers travel. Inspect the rollers for wear or damage.
3. Inspect the load backrest extension for cracks and damage.
4. If the lift truck is equipped with a side-shift carriage or attachment, inspect the parts for cracks and wear. Make sure the parts that fasten the side-shift carriage or attachment to the carriage are in good condition.



Thoroughly wash oil from exposed areas of skin as soon as possible.

Hydraulic oil under pressure can be injected into the skin.

5. Visually inspect hoses/fittings for hydraulic leaks; hose covers for cuts, cracks, or exposed reinforcement; defective/broken clamping devices or sheaves; and proper tracking during operation. Adjust/repair/replace hose/ components as necessary.
6. Check that lift chains are correctly lubricated. Use SAE 10W-30 engine oil to lubricate lift chains.
7. Inspect the lift chains for cracks or broken links and worn or turned pins. Lift chains must be replaced as a set.
8. Inspect the chain anchors and pins for cracks and damage.
9. Make sure the lift chains are adjusted so that they have equal tension.
    - Authorized personnel must perform adjustments or replacement of the lift chains.

Safety Labels

Check that all safety labels are installed in the correct locations on the truck. *See Figure 7 - Figure 18.*

Operator Restraint System

The seatbelt, hip restraint brackets, and the seat and seat mounting components are the parts of the operator restraint system. Each item must be checked to make sure it is attached securely, functions correctly and is in good condition.

Make sure the seat rails are not loose. The seat rails must lock securely in position but move freely when unlocked. The seat rails must be securely attached to the mounting surface.

A seatbelt that is damaged, worn, or does not operate properly will not provide protection when it is needed. The end of the belt must fasten correctly in the latch. The seatbelt must be in good condition. Replace the seatbelt if it is damaged or worn.

Battery Lock

Make sure the hood latch is closed and locked prior to driving the truck into a hazardous location.

Note: A padlock is installed on the hood latch to prevent its opening by unauthorized personnel in hazardous locations.

Battery

Metal on the battery can cause a short circuit and possible damage or injury.

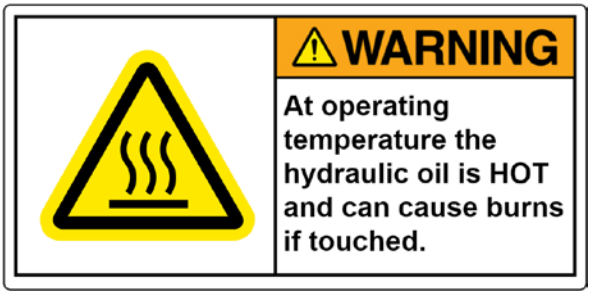
The acid in the electrolyte can cause injury. If the electrolyte is spilled, use water to flush the area. Make the acid neutral with a solution of sodium bicarbonate (soda). Acid in the eyes must be flushed with water immediately.

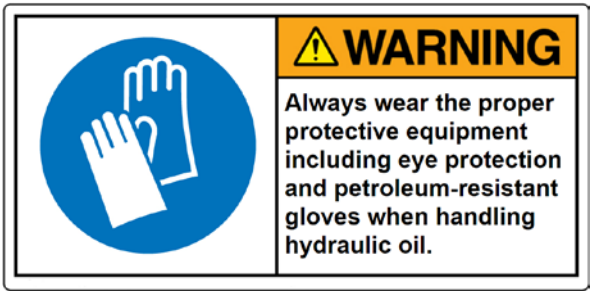
Batteries generate explosive fumes. Keep the vents in the caps clean. Keep sparks or open flames away from the battery area. DO NOT make a spark from the battery connections. Disconnect the battery when doing maintenance only while in a non-hazardous area.

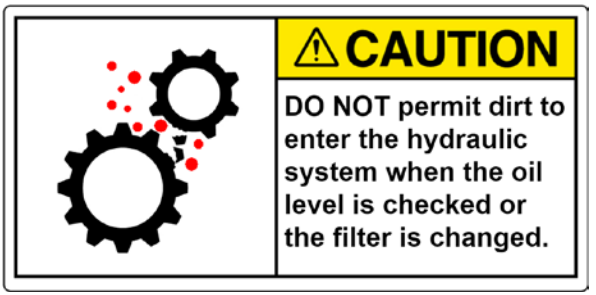
Make sure the battery is charged and has the correct weight, voltage, and ampere hour rating for the lift truck. See the Nameplate.

Inspect the battery case, connector and cables for damage, cracks, or breaks.

Hydraulic System







Never operate the pump without oil in the hydraulic system. The operation of the hydraulic pump without oil will damage the pump.

NOTE: The dipstick/fill is located under the rear floor plate, on the left side of the operator compartment. Remove the floor mat and rear floor plate for access to the dipstick/fill.

Turn lift truck OFF and wait one minute before checking the hydraulic oil level.

Check the hydraulic oil level when the oil is at operating temperature, the carriage is lowered, the mast is vertical, and the power switch is in the OFF position. Add hydraulic oil only as needed. If more hydraulic oil is added than the FULL level, the hydraulic oil will leak from the breather during operation.

Inspect the hydraulic system for leaks and damaged or loose components. Check the condition of the hydraulic hoses for serviceability by inspecting for cracks or other obvious damage. Check to ensure that the hydraulic hoses are not leaking. If any hose is leaking, report it to maintenance for repair.

Reinstall the rear floor plate and floor mat when inspection is completed.

Steering System

Because the lift truck has hydraulic power steering, steering can be difficult when the power steering pump is not operating.

Make sure that the steering system operates smoothly and provides good steering control.

Service Brake

Loss of fluid from the brake fluid reservoir indicates a leak. Repair the brake system before using the lift truck. Replace the brake fluid in the system if there is dirt, water, or oil in the system.

Check the operation of the service brakes. Push on the brake pedal. The brakes must be applied before the pedal reaches the floor plate. The brake pedal must stop firmly and must not move slowly down after the brakes are applied. The brakes must apply equally to both drive wheels with no noticeable pull to either side. The service brakes are automatically adjusted as the brakes are applied when the lift truck changes directions.

Parking Brake

Make sure the service brakes operate correctly before checking the operation of the parking brake. Check the operation of the parking brake. The parking brake, when in good condition and correctly adjusted, will hold a lift truck with a capacity load on a 15% grade [a slope that increases 1.5 meters in 10 meters (1.5 feet increase in 10 feet)]. If parking brake requires adjustment, notify service personnel.

Control Levers

Check that the levers for the mast and attachment operate properly.

Direction and Speed Controls

Check that the direction and speed controls operate properly.

Lift System

Lower the carriage or use chains on the mast weldments and carriage so that they cannot move. Make sure the moving parts are attached to a part that does not move.

Slowly raise and lower the mast several times without a load. The mast components must raise and lower smoothly in the correct sequence. The carriage raises first, then the inner weldment and intermediate weldment (three-stage masts only).

The inner and intermediate weldments and the carriage must lower completely.

Raise the forks 1 m (3 ft) with a capacity load. The inner weldment and carriage must raise smoothly. Lower the forks. All moving components must lower smoothly.

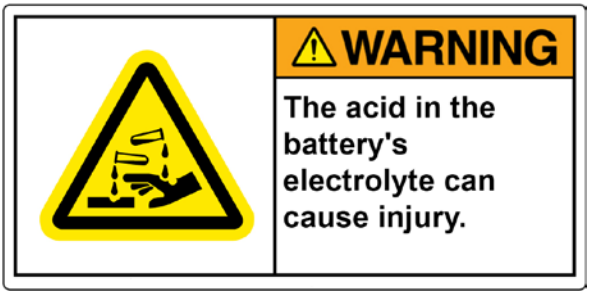
With the load lowered, tilt the mast backward and forward. The mast must tilt smoothly and both tilt cylinders must stop evenly.

Check that the controls for the attachment operate the functions of the attachment.

Oil Leaks

Visually check the hydraulic system, steering system, and brake system for leaks.

Battery Charging



If electrolyte is spilled, use water to flush the area. Make the acid neutral with a solution of sodium bicarbonate (soda) and water. Acid in the eyes must be immediately flushed with water.

Batteries generate explosive fumes when they are being charged. Keep fire, sparks, and burning material away from the battery charger area. Prevent sparks from the battery connectors.

Charge batteries only in the special area for charging batteries. When charging the batteries, keep the vent caps clean. The battery charger area must have ventilation so that explosive fumes are removed. Open the hood over the battery or remove the cover if the battery has a cover.

DO NOT disconnect the battery connector in a hazardous (EX) location. Charging is not permitted in classified areas.

Disconnect the battery when doing cleaning and maintenance.

Never connect the battery charger plug to the plug of the lift truck. You can damage the traction control circuit. Make sure the charger voltage is the correct voltage for the battery.

Use only battery chargers approved by the battery manufacturer or dealer.

See the battery charger operating manual for further information.

Battery Removal

1. Tilt the steering column all the way up. Make sure it is latched.
2. Loosen the set screws from the battery connector lock.
3. Disconnect the battery connectors and move them to a position so that they will not be damaged during battery removal.

4. Release the latch for the control lever assembly and move the assembly to the forward position.
5. Release the padlock from the latch handle.
6. Slide the seat all the way back. Push the latch handle to the right to raise the hood and seat to the fully raised position.
7. Use a spreader bar and crane to lift the battery from the lift truck.

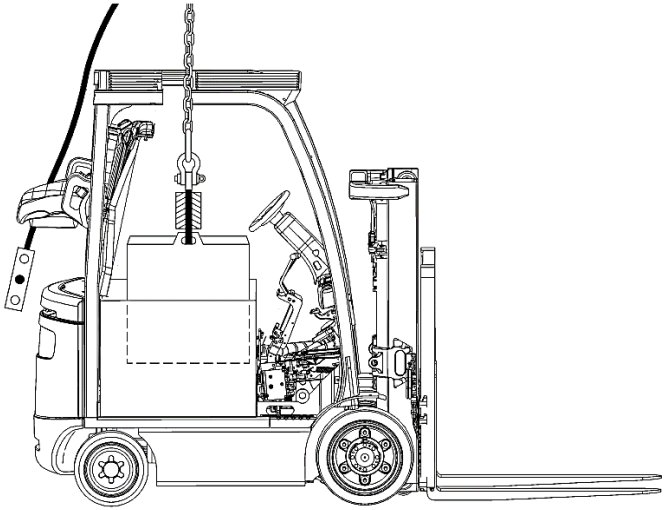
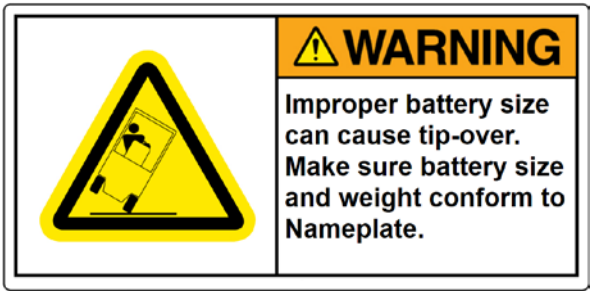


Figure 22. Battery Removal

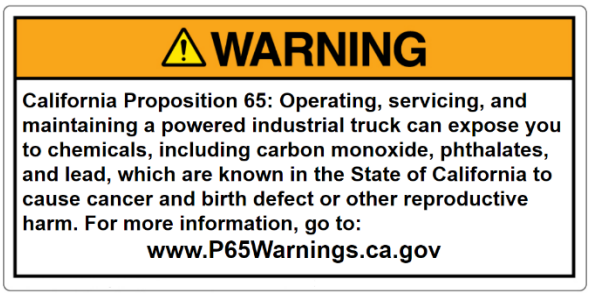
Battery Installation



When a replacement battery is installed, make sure its size and weight are within the limits established by the truck's nameplate. When installed, there should be a maximum of 13 mm (0.50 in) total clearance around the parameter of the battery. A battery that is under weight or shifts excessively during operation can lead to truck instability.

1. Use a spreader bar and crane to place the battery into the battery enclosure.
2. Close and latch the hood. Slide the seat to the desire position.
3. Reinstall the padlock on the latch.

4. Pull the release lever out and move the control lever assembly into position over the hood. Release the release lever to lock the control lever assembly into place.
5. Connect the battery connectors.


⚠WARNING
California Proposition 65: Operating, servicing, and maintaining a powered industrial truck can expose you to chemicals, including carbon monoxide, phthalates, and lead, which are known in the State of California to cause cancer and birth defect or other reproductive harm. For more information, go to:
www.P65Warnings.ca.gov