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CLARK®

Operator's Manual

TWLi20

OM-1206

IMPORTANT! Do not remove this manual from the lift truck.

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Lift Truck Information

Model _____

Type _____

Serial No. _____

Truck Weight _____

Rated Capacity _____

Gross Weight _____

Component Serial Number

Drive Axle (left) _____

Drive Axle (right) _____

Steer Axle _____

Hydraulic Pump/Motor _____

Controller(s) _____

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YOU can prevent accidents

First: Know the rules of safe lift truck operation and the safety rules specific to your work area.

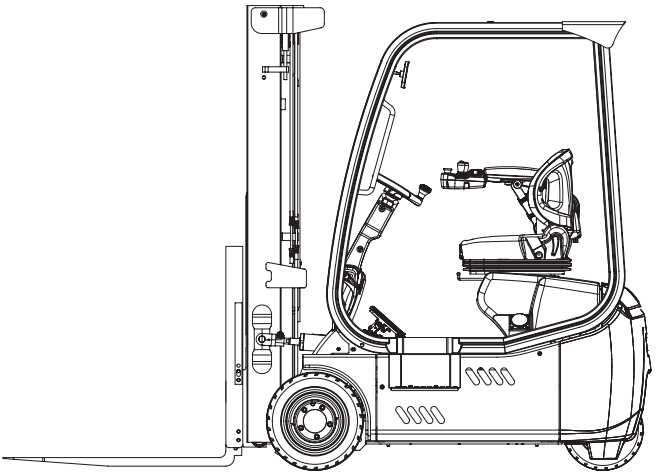
Next: Read the Operator's Manual. If you do not understand something, ask your supervisor.

LEARN about the lift truck you operate!

Know YOUR lift truck

Then: Operate your lift truck safely.

And: Keep your lift truck in a safe operating condition with correct and regular maintenance.



WARNING

If you do not follow these rules, there is a risk of injury or death.

IMPORTANT!

Do not expose this manual to hot water or steam.

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A Message to Operators

Your CLARK lift truck is a specialized machine with unique operating characteristics, designed to perform a specific task. It requires specific instructions and rules for safe operation and maintenance.

Its function and operation is not like a car or ordinary passenger vehicle. Specialized instructions and rules are required to ensure safe and correct operation and maintenance.

The safe operation of our lift trucks is of utmost importance to CLARK.

Lift truck accidents are most commonly caused by...

- **An incorrectly trained operator.**
- **An inexperienced operator.**
- **An operator not obeying basic lift truck safety rules.**
- **A damaged or malfunctioning lift truck.**

For these reasons, CLARK wants you to know how to safely operate and properly maintain your lift truck.

The primary function of this manual is to help you learn how to safely operate your lift truck. This manual gives the correct safety rules and hazards of lift truck operation. It also identifies the special components and features of your specific lift truck and tells their function.

This manual is not a training manual. It is a resource to assist trained and authorized operators how to safely operate their lift truck by showing the correct procedures.

This manual does not include information about every possible condition that may result in an accident. Be aware of all possible hazards in your specific work area and be certain to correct or avoid them.

Always make sure that the lift truck is maintained to a safe, working condition. Do not operate a damaged or malfunctioning lift truck. Practice safe operation each time you operate your lift truck.

Let's set high standards in safety together!

Before starting the lift truck, make sure you understand all safe and correct operating procedures. It is your responsibility to operate the lift truck safely and efficiently.

Know that both the federal Occupational Safety and Health Act (OSHA) and state and local law, require operators to be trained and certified in the safe operation of their lift truck. It is an OSHA requirement that lift truck be inspected BEFORE every shift. If you have not been certified (or need recertification) to operate or inspect your lift truck, tell your supervisor.

All CLARK lift trucks are designed and built to handle hard work, but not abuse from an operator. They are designed and built to be dependable, but are only as safe and efficient as the operator(s) and person(s) responsible for using and maintaining them.

Do not make repairs to any lift truck unless you have been authorized and properly trained to do so.

For questions concerning the proper maintenance or repair of your CLARK lift truck, please contact your CLARK dealer.

Only use genuine CLARK replacement parts and accessories to ensure optimal performance of your lift truck!

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Foreword

CLARK welcomes you to the growing group of professionals who own, operate, and maintain our lift trucks. We take pride in our tradition of quality product and superior value that the CLARK name represents.

This operator's manual has been specially prepared to help you use and maintain your CLARK lift truck in a safe and correct manner. It describes the safe operation, maintenance, and features unique to your CLARK lift truck.

The safe and productive operation of your lift truck depends on both skill and operator knowledge.

The operator must...

- **Read and understand the safety rules found in this manual.**
- **Read and practice the safe driving and safe load handling techniques shown in this manual.**
- **Know the construction and features of the lift truck and how they function.**
- **Know the capabilities and limitations of the lift truck.**
- **Ensure the lift truck is maintained to a safe working condition**

Your CLARK lift truck has been designed and built to be as safe and efficient as today's technology can allow. As manufactured, it meets all applicable and mandatory design and construction requirements of the ANSI / ITSDF B56.1 Safety Standard for Low Lift and High Lift Trucks.

Importance of Routine Inspection and Maintenance

The regular care and maintenance of your CLARK lift truck is absolutely necessary for your safety. It ensures a lower overall cost of ownership and optimal lift truck productivity. A damaged or malfunctioning lift truck is a potential source of danger to the operator, any personnel working nearby, and anyone else in the area.

Always keep your lift truck in a safe, operating condition by following the recommended service schedule described in the *Planned Maintenance* section of this manual.

Operator's Daily Inspection

You are required to inspect your lift truck daily and to ensure it is safe to operate. The importance of this *Daily Inspection* is described later in this manual. You can provide your own checklist sheet or your CLARK dealer can supply you with copies of a helpful **Operator's Daily Checklist** that is specific to your lift truck.

Planned Maintenance

In addition to the *Daily Inspection*, CLARK recommends that a *Planned Maintenance (PM)* program be performed by an authorized and properly trained technician. This safety and maintenance inspection and service will provide an opportunity to thoroughly examine the operating condition of your lift truck. Any *Planned Maintenance* can be scheduled through your CLARK dealer to meet your particular lift truck application and usage.

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The periodic *Planned Maintenance* program covers inspections, operational checks, cleaning, lubrication, and minor adjustments. Any necessary adjustments and timely maintenance will be performed to maximize the service life of components and reduce unscheduled downtime. These procedures are outlined in this manual and described in detail in your specific lift truck's service manual. Your CLARK dealer can help with implementing a *Planned Maintenance* program and providing properly trained and authorized service technicians to keep your lift truck operating safely and efficiently.

Always Practice Safe Operation

Incorrect operation can cause accidents. Do not operate an improperly setup, damaged, or malfunctioning lift truck.

Read and understand the procedures for safe driving and maintenance described in this manual. If you have questions, ask for assistance.

Stay alert and follow the safety rules, regulations, and procedures for lift truck operation. Avoid accidents by identifying and avoiding potentially dangerous procedures or situations.

Drive and work safely and follow the safety messages in this manual and attached to your lift truck.

Safety Messages and Warnings

The **safety messages and warnings,** found in this manual and attached to the lift truck, identify specific areas where potential hazards exist. Make sure to **know and understand** the meaning of these instructions, symbols, and messages. Damage to the lift truck, serious injury, or death to you and/or other personnel may result if these messages are not followed.

NOTE
Provides helpful information related to procedures, equipment, tools, specifications, or other special data.

CAUTION
There is a risk of damage to the lift truck or nearby objects.

WARNING
There is a risk of injury or death to the operator or nearby personnel.

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How to Use this Manual

The **Operator's Manual** contains important information about the safe operation, features, functions, and maintenance of your CLARK lift truck.

IMPORTANT!

Read the Operator's Manual before operating your lift truck.

- All descriptions, images, and specifications in this manual were correct at the time of printing.
- CLARK Material Handling Company reserves the right to make improvements and changes in specifications and/or design, without notice and without incurring obligation. Contact your authorized CLARK dealer for information on possible updates or revisions to this or other CLARK technical information.
- The examples, illustrations, and explanations in this manual are intended to help improve your skill and knowledge as a professional lift truck operator and to take full advantage of the capabilities and features of your new lift truck.
- Always read and understand the information located in *General Safety Rules* and *Operating Hazards*.
- Follow the instructions and procedures about how to correctly maintain your lift truck, including recommended service intervals and component capacities.
- Safe and careful driving is your responsibility! Drive defensively and be aware of other personnel who are working nearby. Know your lift truck's capabilities and limitations.
- Follow all IMPORTANT, CAUTION, WARNING, and DANGER messages to avoid damage to the lift truck and/or injury to yourself or others.
- OHSA requires that the Operator's Manual be permanently attached to your lift truck. Keep this manual on the lift truck as a reference for anyone who may operate or service it. If the lift truck you operate is not equipped with an Operator's Manual, tell your supervisor immediately.
- Your authorized CLARK dealer is ready to help! They can provide you with any additional information about the features, operation, and maintenance of your lift truck.

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Safety Standards

IMPORTANT!

Familiarize yourself with the safety instructions contained in the following publications:

ANSI / ITSDF B56.1 Safety Standard for Low Lift and High Lift Trucks

Available from: Industrial Truck Standards Development Foundation, 1750 K Street NW Suite 460, Washington, DC 20006.

NFPA 505 Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance and Operations

Available from: National Fire Protection Association, Inc., 1 Batterymarch Park, Quincy, MA 02169.

OSHA 1910.178 Powered Industrial Trucks

Available from: Occupational Safety & Health Administration, 200 Constitution Ave NW, Washington, DC 20210.

UL 583 Standard for Electric-Battery-Powered Industrial Trucks

Available from: Underwriters Laboratory Headquarters, 333 Pfingsten Road, Northbrook, IL 60062.

IMPORTANT!

Your CLARK lift truck has been built to meet all applicable mandatory design and construction requirements of the **ANSI / ITSDF B56.1 Safety Standard for Low Lift and High Lift Trucks**. No additions, omissions, or modifications should be made to the lift truck that affect compliance to the above requirements or in any way minimize the effectiveness of its safety devices.

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Section 1. General Safety Rules

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Do’s and Don’ts

DON’T mix drugs or alcohol with your job.

DO watch for pedestrians.

DON’T block safety equipment.

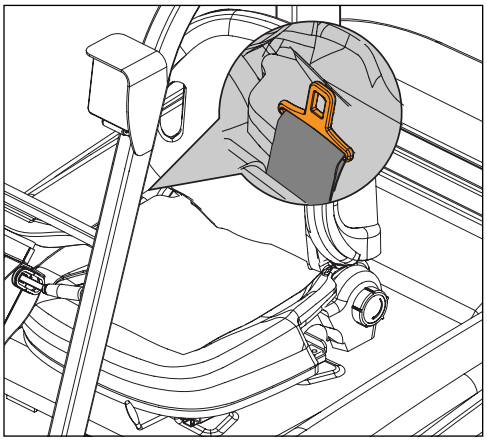
DO wear personal protective equipment.

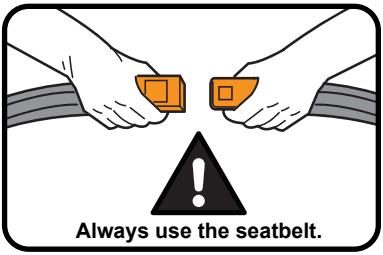
DON’T smoke in NO SMOKING areas.

DON’T operate or store the lift truck outdoors during rain or snow conditions.

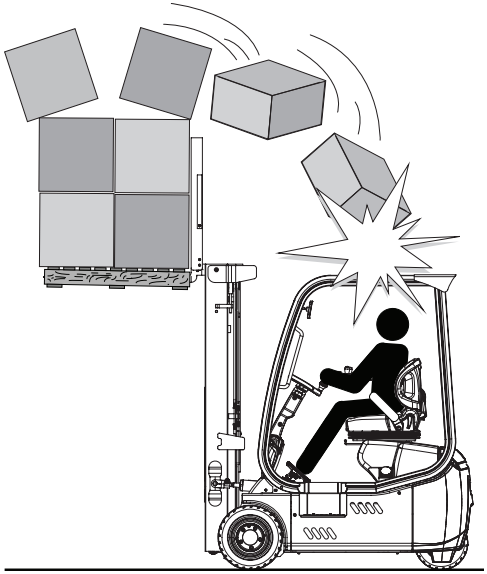
Operator Protection

Seat Belt





Overhead Guard



WARNING

- Stay under the overhead guard when operating the lift truck.
- Keep arms and legs inside the operator's compartment.
- Be careful when traveling in reverse and in tight areas.

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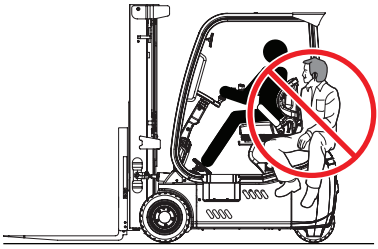
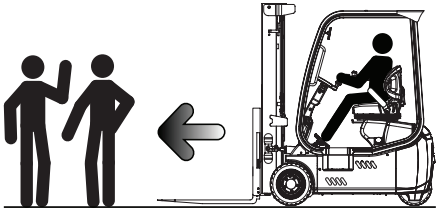
No Riders

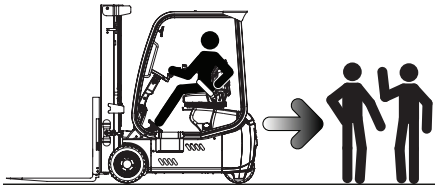


WARNING
The operator is the only person allowed on the lift truck.

WARNING
Do not transport personnel with the lift truck.

Nearby Personnel





WARNING

- Look in the direction you are traveling.
- Slow down and operate the horn at every intersection or location where visibility is limited.
- Tell personnel to stand back, even when parked.
- Be aware of all personnel in your work area.

Upright

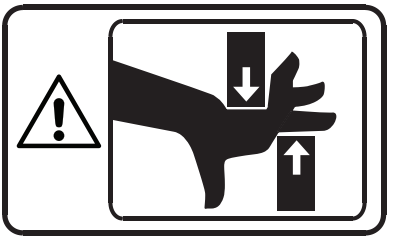
Forks and Upright

WARNING
Do not walk or stand under raised forks.

WARNING
Do not raise personnel with the lift truck.

WARNING
Do not use the upright as a ladder.

Pinch Points



WARNING
Keep hands, feet, and legs out of the upright.

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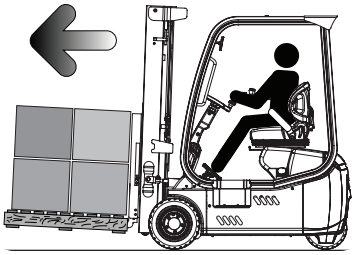
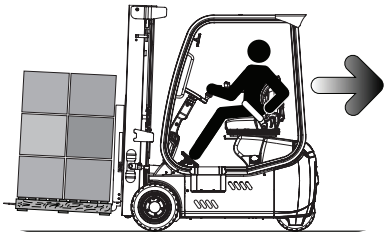
Forward Travel

- Lower the forks to a safe height and tilt the upright back when traveling with a load.
- Do not lift or lower a load while the lift truck is moving.



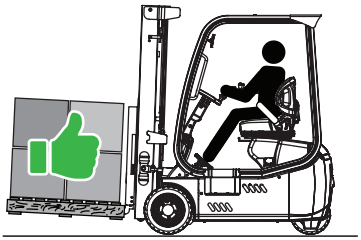
Reverse Travel

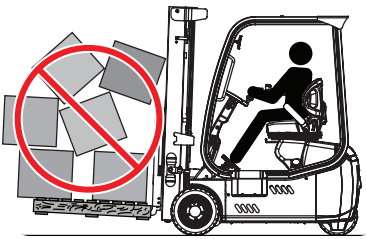
- Operate the lift truck in reverse when handling loads that restrict your view.
- Be sure to rotate in your seat and look in the direction of travel.



Loaded Travel

- Unstable loads are a hazard to you and other personnel.
- Make sure all loads are stacked correctly and equally positioned across the forks.
- Put the heaviest part of the load closest to the front wheels of the lift truck.
- Do not attempt to lift a load using only one fork.





Parking

Parking Rules

- Do not park the lift truck on a ramp or grade.
- Do not leave the lift truck before coming to a complete stop.
- Park the lift truck in authorized areas only.
- Do not block traffic.
- Put the directional switch in the neutral position.
- Fully lower the upright and/or attachments to the ground.
- Remove the key when leaving the lift truck for an extended period.

NOTE
The lift truck is equipped with a **Self-Activating Parking Brake (SAPB)**.

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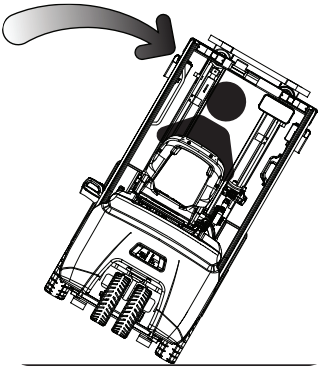
Tipover

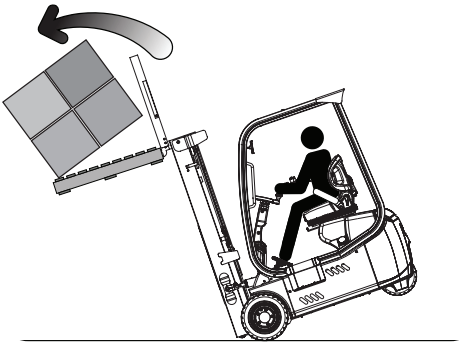
Side Tipover

- Tipover can occur when a certain combination of travel speed and turn sharpness **exceeds** the stability of the lift truck. This is most likely to occur with an unloaded lift truck.
- Tipover can occur while turning with the upright raised or braking in reverse with the upright raised or accelerating during a turn.
- Side tipover can occur when attempting to turn on a ramp or grade.



Forward Tipover

- Tipover can occur when a certain combination of overloading and load elevation **exceeds** the stability of the truck. This is most likely to occur because of excessive forward tilt, braking when traveling forward, or accelerating in reverse.
- Tipover can occur when traveling with the forks pointed down grade with a load.



WARNING

To avoid a tipover, do not operate your lift truck: over foreign objects, on rough surfaces, near drop offs, or off-center with a capacity load.

What To Do in Case of a Tipover

WARNING
DO NOT JUMP! During a tipover, your best chance of survival is to **stay in the seat**.

BRACE YOURSELF AS ILLUSTRATED BELOW!

1. **Always use your seatbelt.**
2. **Stay in your seat.**
3. **Hold the steering wheel tightly and brace your feet.**
4. **Lean away from the impact.**

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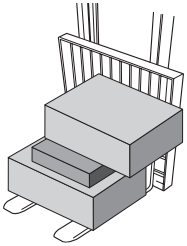
Load Handling

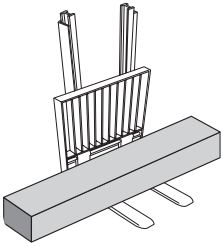
Unbalanced Loads

Do not lift or move uneven loads.



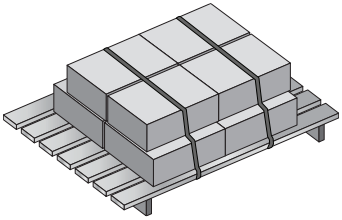
Wide Loads

Center wide loads on the forks.



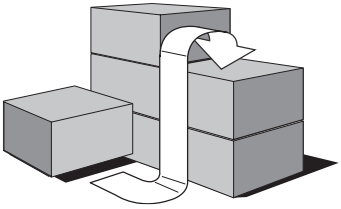
Loose Material

Stack and band loose material.



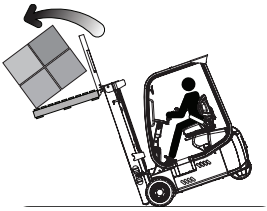
Right-Angle Stacking

Avoid sharp turns and move slowly.



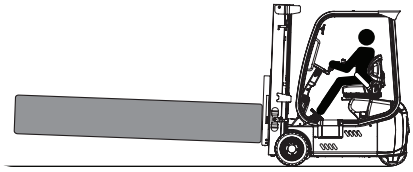
High Loads

Do not turn sharply with a raised load.



Long or Wide Loads

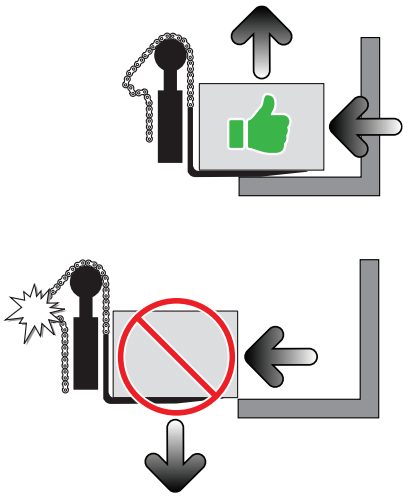
Long or wide loads require more clearance.



WARNING

- Always secure loose loads before handling.
- Long loads decrease the capacity of your lift truck. Know and understand your lift truck's load rating.
- Be careful when traveling with an elevated load and know about load end swing.
- Only travel with a raised load when picking or dropping off a load to a rack or shelf.

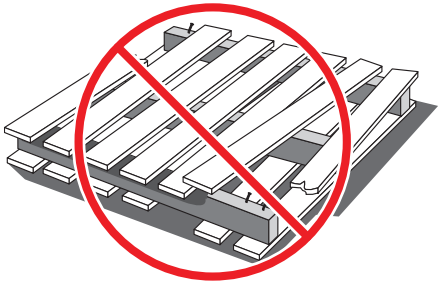
Chain Slack



WARNING

Check for chain slack before attempting to lower a load or when withdrawing the forks after placing a load. Chain slack is caused by the upright rails, carriage, or forks hanging up. Raise the forks before moving, or damage to the chains may occur.

Pallets and Skids



WARNING

Possibility of crushing injury or death. Do not move or store material on damaged pallets or skids. Damaged skids and pallets can cause material to fall unexpectedly.

Always use pallets or skids that are in good condition.

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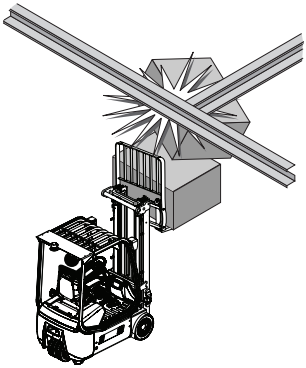
Collisions

Overhead Clearance

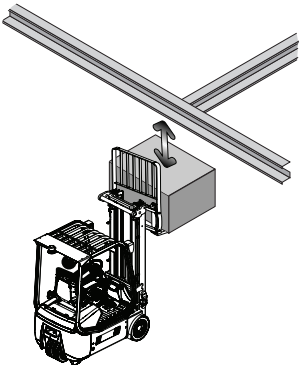
WARNING

- Know your overhead clearance and look for obstacles.
- Hitting an overhead structure can cause the lift truck to tipover or drop its load.
- Keep the load low and tilted back.

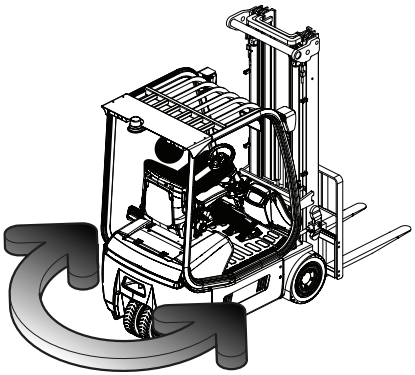


WARNING

- Know the total height of your lift truck, with and without load.
- Check your surroundings and ceiling height.
- Keep the load low and tilted back.

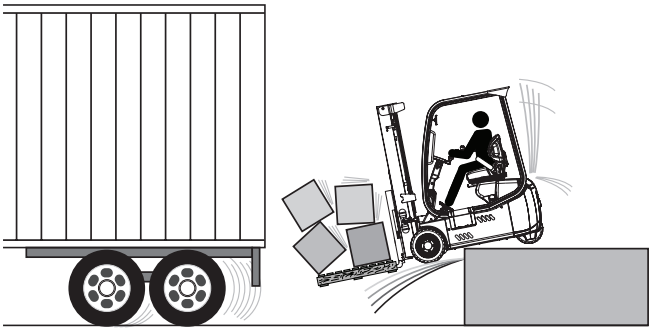


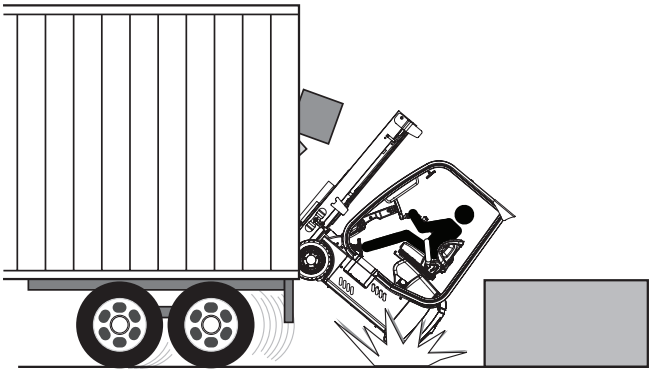
Rear End Swing



WARNING
Slow down and look for obstacles and other personnel before turning. Always know where the rear of the lift truck is positioned.

Drop-Offs





WARNING

When operating on a dock or drop-off, do the following:

- Tell the driver not to move the trailer.
- Use the trailer brakes.
- Install wheel chocks.
- Use a trailer-to-dock system if available.

The trailer may move unexpectedly while loading or unloading.

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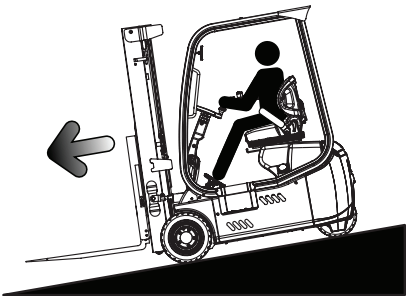
Ramps and Grades

Unloaded Travel

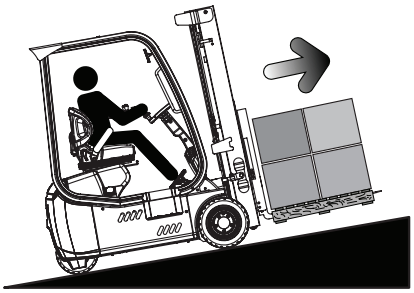


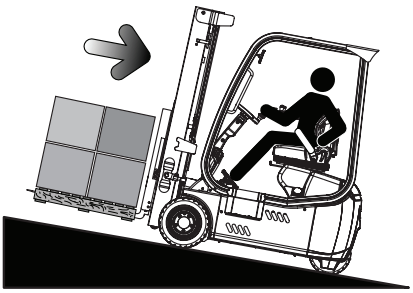
When Traveling Unloaded...
Keep Forks Pointed Down Grade

WARNING
Always look in the direction of travel.

WARNING
Do not turn on a grade.

Loaded Travel





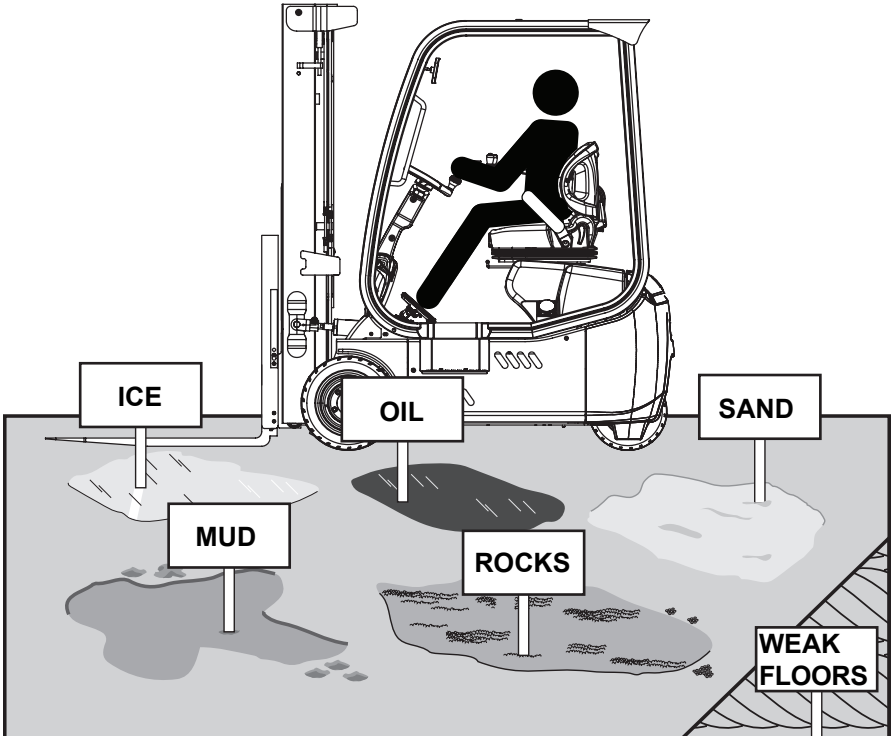
When Traveling Loaded...
Keep Forks Pointed Up Grade

WARNING

When operating the lift truck, ascend or descend grades slowly, and with caution.

- On grades 10% or greater, always limit travel speed to 4.8 km/h (3.0 mph) or less.
- Do not exceed the maximum operating grade for your specific lift truck model, as defined in this Operator's Manual.
- Do not park on a ramp or grade.

Surface and Capacity



WARNING
Do not travel over poor surface conditions which can cause the lift truck to tipover or lose traction when braking or traveling.

WARNING
Do not travel over a surface that cannot support the weight of a fully loaded lift truck. Know the combined weight of the load and the lift truck.

WARNING
Do not travel through standing water or damage could occur to the lift truck or its battery.

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Section 3. Know Your Lift Truck

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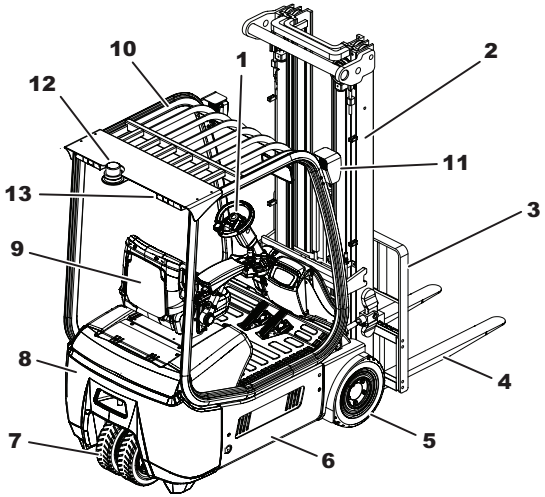
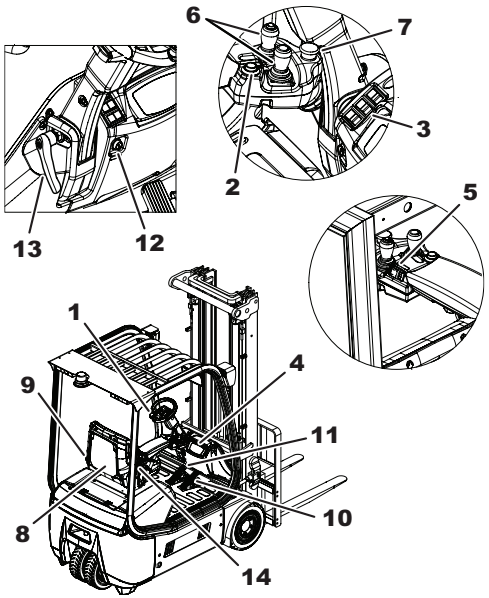
Lift Truck Components



1. Steering Wheel
2. Upright
3. Load Backrest
4. Forks
5. Drive Wheels
6. Battery Compartment
7. Steer Tires
8. Counterweight
9. Seat
10. Overhead Guard
11. Headlights
12. Strobe Light
13. Warning Lights

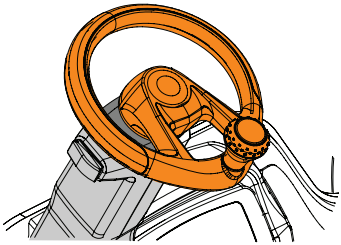
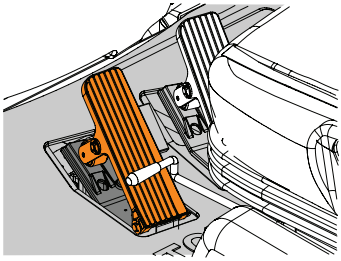
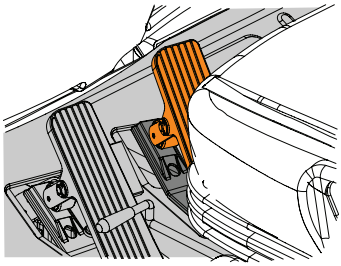
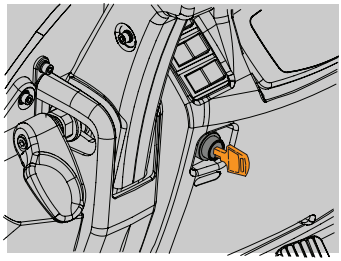
Operator Compartment



1. Steering Knob
2. Horn
3. Accessory Switches
4. Dash Display
5. Directional Control
6. Control Levers
7. Emergency Disconnect
8. Operator's Manual
9. Seatbelt
10. Accelerator
11. Brake Pedal
12. Keyswitch
13. Locking Lever
14. Hip Restraints

NOTE
Your lift truck may vary in appearance depending on the model and optional equipment.

Operator Controls

Driving Controls		
Name	**Description**	**View**
Steering Wheel	The steering wheel controls the position of the rear steer tires. The position of the steer tires is shown on the dash display.	
Brake Pedal	The brake pedal controls the braking of the lift truck. Press down on the brake pedal to slow or stop the lift truck.	
Accelerator Pedal	The accelerator pedal controls the speed of the lift truck. Press on the accelerator pedal to increase the speed. Release the accelerator to coast.	
Keyswitch	The keyswitch turns the lift truck on or off. When the lift truck is off, all lift truck functions are disabled, including travel, hydraulics, and steering.	

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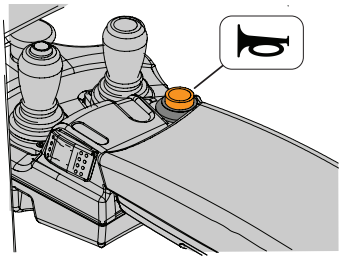
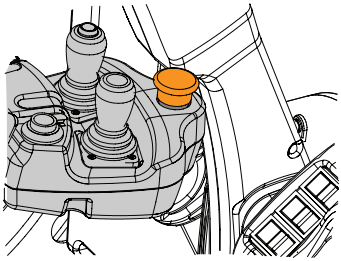
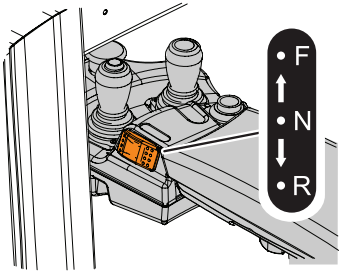
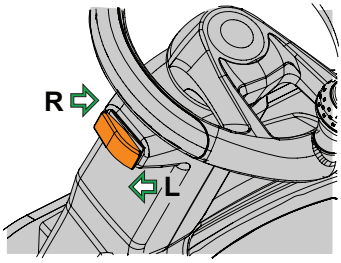
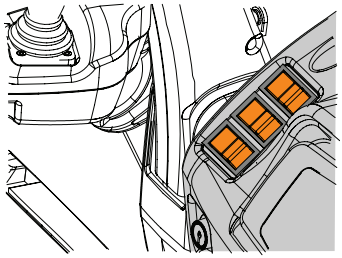
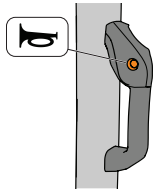
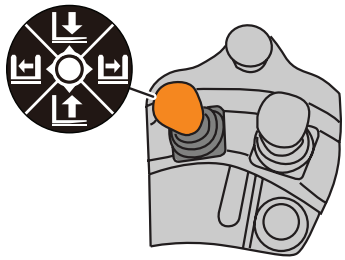
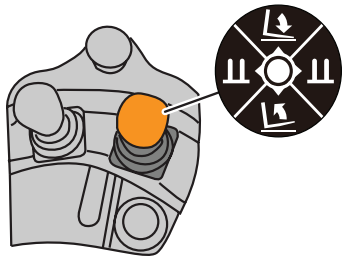
Driving Controls		
Name	**Description**	**View**
Horn	The horn to used to alert nearby personnel while operating the lift truck.	
Emergency Disconnect	The emergency disconnect switch enables the operator to immediately turn lift truck power off. Only use this in an emergency situation.	
Directional Control	The directional switch is used to change the driving direction of the lift truck. The three positions are forward, neutral, and reverse.	
Turn Signal Switch	The turn signal switch is used to activate the left and right turn indicator lights. The operator must manually change or turn off the turn signal lights.	

Driving Controls		
Name	**Description**	**View**
Accessory Switches	The accessory switches control electrical options such as headlights, work lights, and hazard lights.	
Rear Horn Button	The rear horn button enables the operator to operate the horn when traveling in reverse.	
Hydraulic Controls		
Lift Control and Side Shift Control Lever	This lever controls the raising and lowering of the upright and the carriage sideshifter. Pull the lever back to lift the upright. Push the lever forward to lower the upright. Push the lever to the right or left to change the carriage position.	
Tilt Control and Fork Positioning Lever	This lever controls the vertical position of the upright and the auxiliary function (if equipped). Pull the lever backward to tilt the upright back. Push the lever forward to tilt the upright forward. Push the lever to the right or left to use the auxiliary function.	

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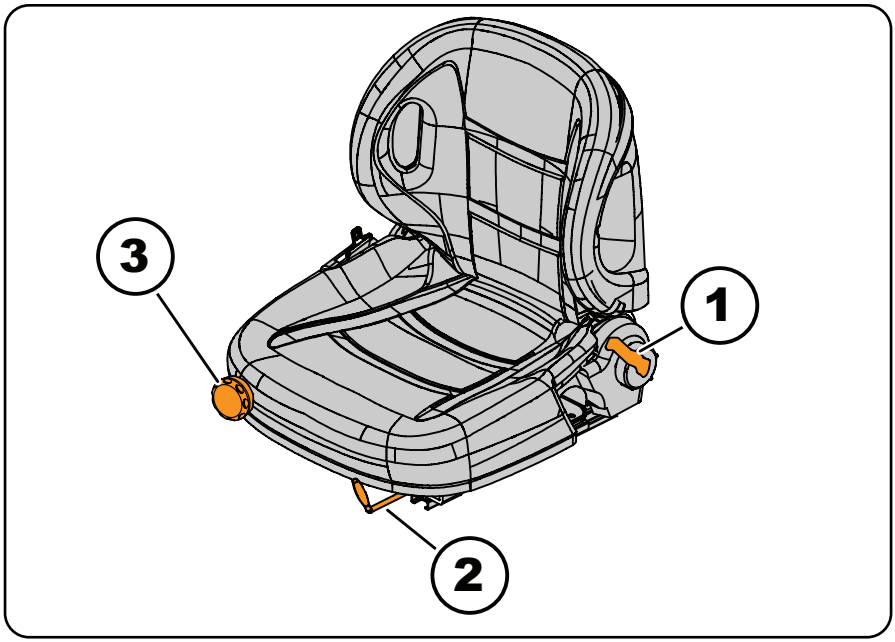
Seat



The standard operator's seat offers three types of adjustment for optimal operator comfort. The seat can be adjusted for recline angle, front-to-rear position, and suspension firmness.

Adjusting the Seat Recline:

- Pull back on the side lever (**1**) and lean backward or forward to position the seat back cushion. Release the lever to lock into place.

Adjusting the Seat Position:

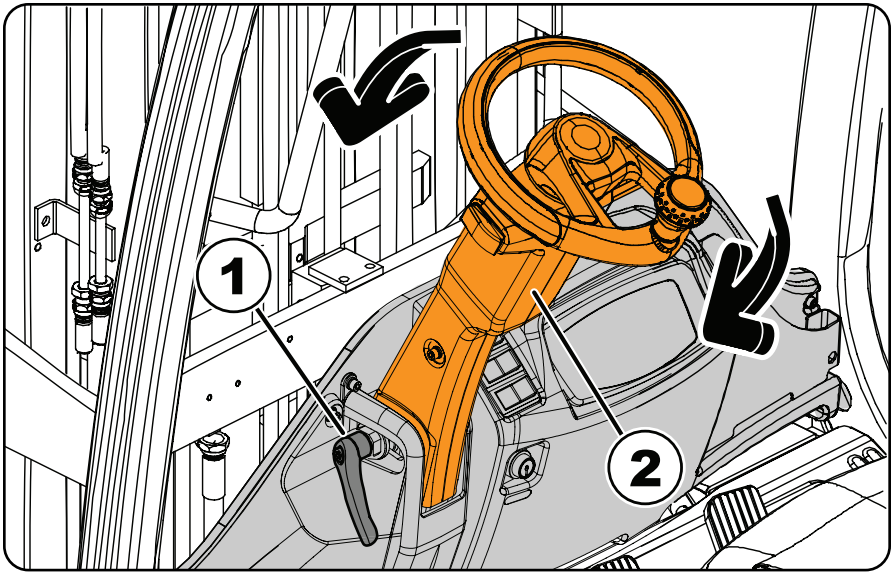
- Pull up on the front lever (**2**) and slide the seat forward or backward. The seat should be positioned so that the steering wheel and pedals are easy to reach and comfortable to operate. Release the lever to lock into place.

Adjusting the Seat Firmness:

- Loosen or tighten the adjustment knob (**3**) to adjust for the weight of the operator.

WARNING
Do not adjust the seat while operating the lift truck.

Steering Column



The steering column offers two-way tilt adjustment for optimal operator comfort.

Adjusting the Steering Column:

- Loosen the locking lever (**1**) to release the steering column.
- Rotate the steering column (**2**) up or down to adjust the tilt angle.
- Tighten the locking lever (**1**) to secure the steering column position. If needed, pull the locking lever out to adjust its position.

WARNING
Do not adjust the steering column while operating the lift truck.

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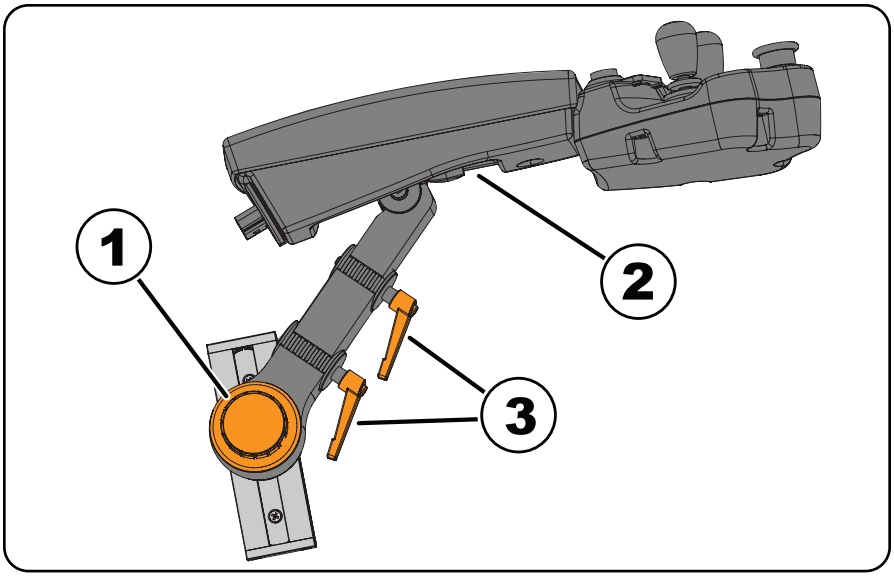
Armrest



The operator armrest offers four-way adjustment for optimal operator comfort. The armrest can be adjusted by recline angle, front-to-rear position, and height.

Adjusting the Armrest:

- Loosen the knob (**1**) to release the armrest. Adjust the armrest to the desired height. Tighten the knob to secure the armrest.
- Loosen the bolt (**2**), then adjust the armrest tilt position. Tighten the bolt to secure the armrest.
- Loosen the locking levers (**3**) release the armrest. Adjust the armrest to the desired position. If needed, pull the locking lever(s) out to adjust their position.

WARNING
Do not adjust the armrest while operating the lift truck.

Parking Brake

The lift truck is equipped with a Self-Activating Parking Brake (SAPB) system which consists of an electromagnetic (EM) brake attached to each drive motor. They are controlled by the traction controller. During normal operation, the EM brakes are disengaged to allow the drive motors to turn freely. When the truck is stopped, the EM brakes automatically engage and prevent the drive motors from turning.

If battery power is interrupted while traveling, such as when the emergency disconnect is depressed, the lift truck comes to a stop and the parking brake is applied. Repeated use of the parking brake in this manner is considered abuse and will damage the parking brake system.

The Self-Activating Parking Brake Engages When...

- The lift truck is stopped.
- The operator attempts to leave the seat.
- The emergency disconnect switch is pressed.
- The key switch is turned OFF.
- The battery cable is disconnected from the battery.

CAUTION

Damage to the parking brake will occur if used repeatedly to stop.

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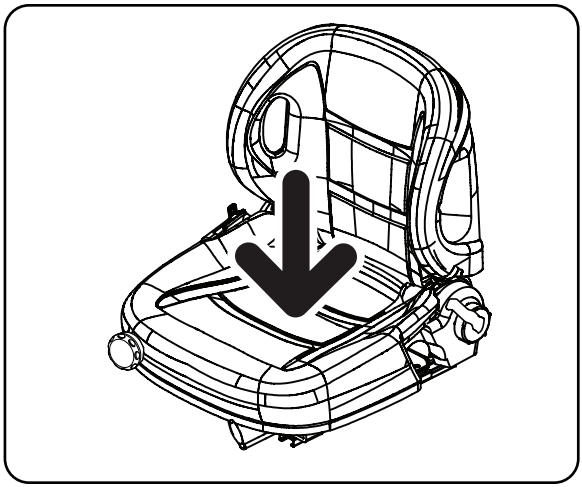
Operator Presence System



The Operator Presence System (OPS) consists of a safety switch located in the bottom of the operator's seat. It determines if the operator is seated correctly while operating the lift truck. The operator must sit in the seat to travel or use the hydraulic controls.

If the operator is not in a correct seating position, both travel and hydraulic operations are interrupted. An alarm will appear on the dash display if travel or hydraulic operation is attempted without sitting in the seat.

If the lift truck is traveling and the OPS switch is disengaged, the lift truck will come to a controlled stop and the parking brake will apply. The OPS switch must be depressed to resume operation. If this occurs, an icon and alarm message will appear on the dash display to inform the operator.

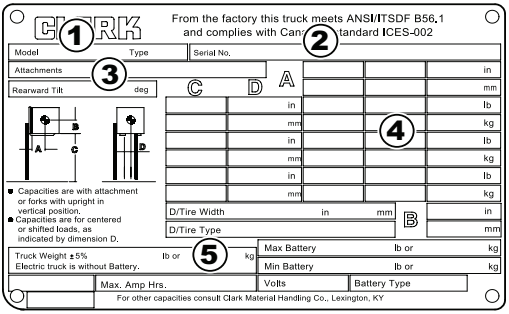
WARNING

Do not attempt to leave the operator's seat while the lift truck is moving. Remain seated, with the seat belt securely fastened, until the lift truck is fully stopped and the parking brake icon appears on the display.

Data Plate

Data Plate

The data plate contains important information about the specifications and lifting capacity of your lift truck. If it is missing or damaged, remove the lift truck from service and contact your authorized CLARK dealer for a replacement.



(1) Model and Type: Identifies the model and type of lift truck. Certain types of lift trucks are not permitted in areas that contain fire hazards - watch for marked areas.

(2) Serial Number: A unique identification number assigned to your lift truck. It is also stamped on the frame of your lift truck. Use this number when requesting service information or ordering replacement parts to ensure accuracy.

(3) Attachments: Lists the current attachment(s) installed on the lift truck. The operator must make sure this matches with what is actually installed on the lift truck.

(4) Capacity: Shows the maximum lifting capacity of the lift truck with respect to the load center and the fork height.

(5) Weight: The unloaded weight of the lift truck. It does not include the weight of the battery. Always use the total (loaded) weight of the lift truck when operating on elevators, dock boards, or floors with a limited capacity.

CAUTION

By law, all modifications affecting capacity or safety must be approved by the manufacturer before changes to the lift truck can be made.

A new data plate is required whenever modifications are made to the lift truck that may affect capacity, such as adding an attachment. Contact your authorized CLARK dealer for an updated data and capacity plate showing the correct capacity.

WARNING

Lift truck capacity DOES NOT increase if the load center is less than what is shown on your data plate. DO NOT exceed the maximum capacity!

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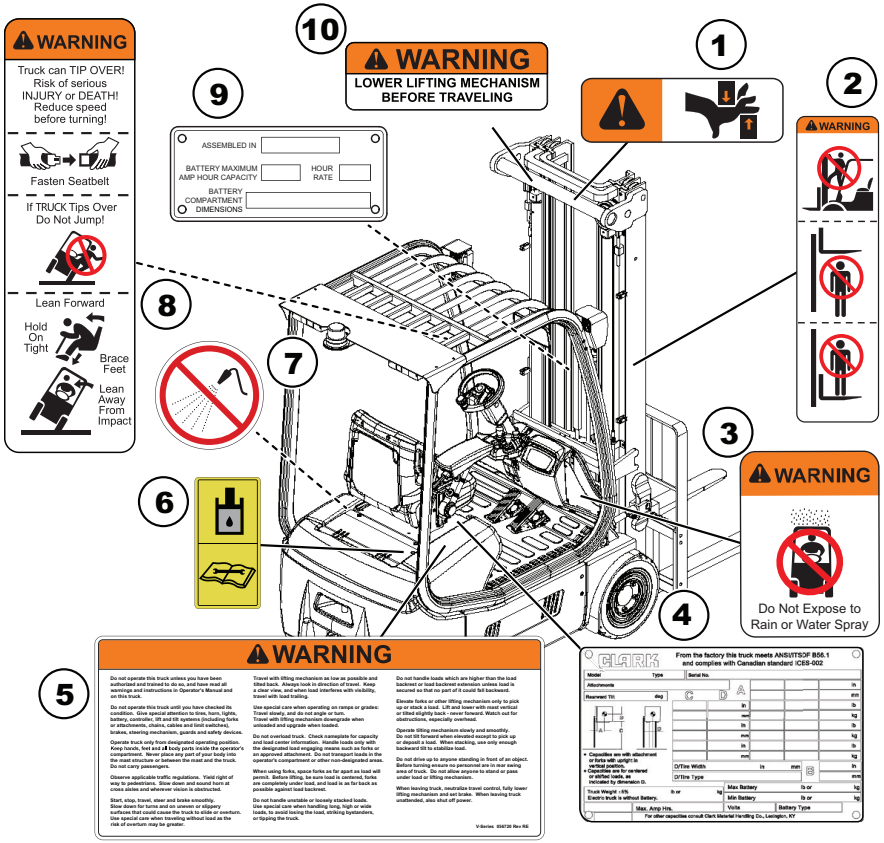
Decals

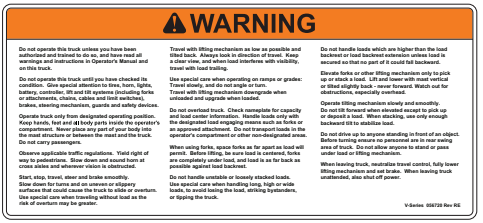
Decal Locations



1. Upright Safety
2. Fork Safety
3. Outdoor Use
4. Data Plate
5. Operator Safety
6. Hydraulic Fluid
7. Battery Cleaning
8. Tipover Safety
9. Battery Specification
10. Travel Safety

WARNING

Safety or warning decals that are unreadable or missing should be replaced immediately.

Safety Decals		
Name	**Description**	**View**
Operator Safety	The operator safety decal informs the operator to always read and understand this Operator's Manual before operating the lift truck.	
Tipover Safety	The tipover safety decal shows how to reduce the chance of operator injury during a tipover.	
Outdoor Use	The outdoor use decal warns the operator to not operate the lift truck outside during poor weather conditions or in a work area that would allow water or moisture to damage the lift truck or its battery.	

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Safety Decals		
Name	**Description**	**View**
Battery Cleaning	The battery cleaning decal warns the operator to not allow the battery to be exposed to pressurized water when cleaning or operating.	
Fork Safety	The fork safety decals show the risk of serious injury or death when the forks are in a raised position.	
Upright Safety	The upright safety decal warns of the risk of serious injury when placing body parts between the moving components of the upright.	
Travel Safety	The travel safety decal warns the operator of to lower the upright before traveling.	

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Section 4. Operating the Display

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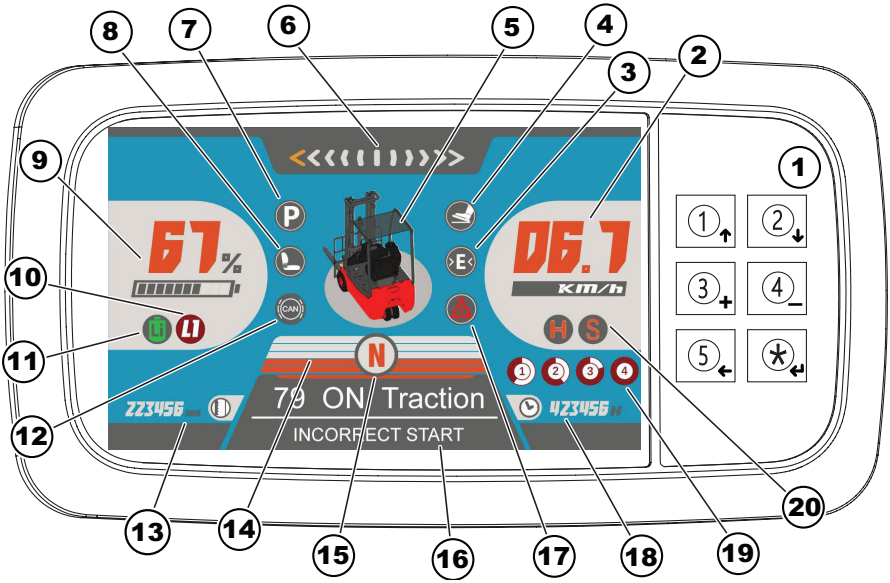
Display Overview

Dash Display



1. Menu Buttons
2. Speedometer
3. Brake Pedal
4. Accelerator
5. Truck Position
6. Steer Position
7. Parking Brake (NOT USED)
8. Seat Switch
9. Battery Charge
10. Low Battery
11. Battery Status
12. Braking Level
13. Lift Limit (NOT USED)
14. Accelerator Position
15. Travel Direction
16. Fault Information
17. Fault Icon
18. Hour Meter
19. Hydraulic Speeds
20. Performance Modes

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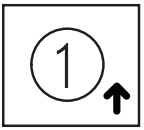
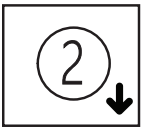
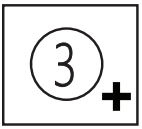
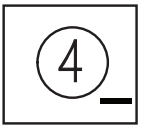
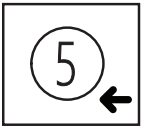
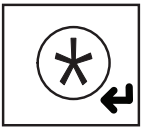
Menu Buttons		
Name	**Function**	**Button**
Up Button (1)	Press the UP button to change the operating mode (default) or the speed mode (if enabled). When in the menu, press the UP button to move to a higher menu level.	
Down Button (2)	Press the DOWN button to change the acceleration mode (if enabled). When in the menu, press the DOWN button to move to a lower menu level.	
Plus Button (3)	Press the PLUS button to increase the display screen brightness. When in the menu, press the PLUS button to increase a value.	
Minus Button (4)	Press the MINUS button to decrease the display screen brightness. When in the menu, press the MINUS button to decrease a value.	
Exit Button (5)	When in the menu, press the EXIT button to exit a submenu.	
Enter Button (*)	Press the ENTER twice (2x) to enter the menu. A password is required to enter the display menu. When in the menu, press the ENTER button to save a value or enter a submenu.	

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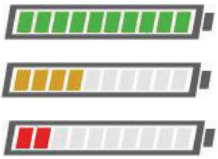
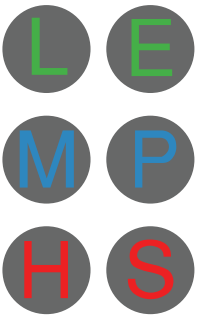
Icons

Icons		
Name	**Description**	**Icon**
Speed	The speed icon shows the lift truck's travel speed.	
Battery	The battery icon shows the remaining battery charge percentage.	
Battery Charge	The battery charge icon shows the remaining battery charge level. Each increment on the icon is equal to approximately 10% of total battery charge. When the icon is green, the charge level is greater than 40% and does not need to be charged. When the icon is yellow, the charge level is less than 40% and should be charged soon. When the icon is red, the charge level is less than 30% and should be charged now.	
Hour Meter	The hour meter icon shows the total operating hours of the lift truck.	
Direction Icon	The direction icon shows the current direction of travel. The three directions of travel are forward (↑), reverse (↓), and neutral (N).	
Steer Position	The steer position icon shows the rear steer wheel position on the display.	

Icons		
Name	**Description**	**Icon**
Truck Position	The truck position icon shows the direction of travel in 360 degrees while operating the lift truck.	
Fault	The fault icon is shown when a controller fault has occurred.	
Fault Information	The fault information icon is displayed when an alarm (error) has occurred. The fault code, fault description, and the controller in error mode are shown.	
Seat Switch	The seat switch icon changes from GREY to RED when the lift truck is turned on and the operator is not sitting in the seat correctly.	
Performance Modes	The performance mode icons show the lift truck's current operating mode. There are three levels of maximum speed and three levels of acceleration. Mode E: slow acceleration Mode P: standard acceleration Mode S: fast acceleration Mode L: low speed Mode M: medium speed Mode H: high speed Standard Mode: the default start mode is H/S. Press the UP (1) button on the dash display to change the performance mode to L/E or H/S). Optional Mode: press the UP (1) button to change the speed mode. Press the DOWN (2) button to change the acceleration mode.	

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Icons		
Name	**Description**	**Icon**
Low Battery	The low battery icon is displayed when the battery charge level is low and the lift truck is in battery protection mode. Mode L1: hydraulic lift function is disabled. Mode L2: hydraulic lift function is disabled, travel speed is limited to the primary cutback. Mode L3: hydraulic lift function is disabled, travel speed is limited to the secondary cutback. Mode L4: lift truck function is fully disabled.	
Battery Status	The battery status icon indicates that the lift truck is communicating properly with the BMS (battery management system). If it is flashing, there is an error with the battery, BMS, or battery connection.	
Accelerator	The accelerator icon changes from GREY to RED when the operator presses on the accelerator pedal.	
Accelerator Position	The accelerator position icon shows the position (not engaged to fully engaged) when the operator presses on the accelerator pedal.	
Service Brake	The service brake icon changes from GREY to RED when the operator presses the brake pedal.	

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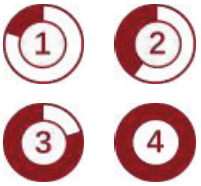
Icons		
Name	**Description**	**Icon**
Brake Pedal Position	The brake pedal position icon shows the position (not engaged to fully engaged) when the operator presses on the brake pedal. Grey: no braking amount applied Green: low braking amount applied Orange: medium brake amount applied Red: high brake amount applied	
Hydraulic Speed	The hydraulic speed icons show the speed level for each hydraulic function. 1: Lift / Lower 2: Tilt 3: Auxiliary 3rd Function (side shift) 4: Auxiliary 4th Function (fork positioner)	

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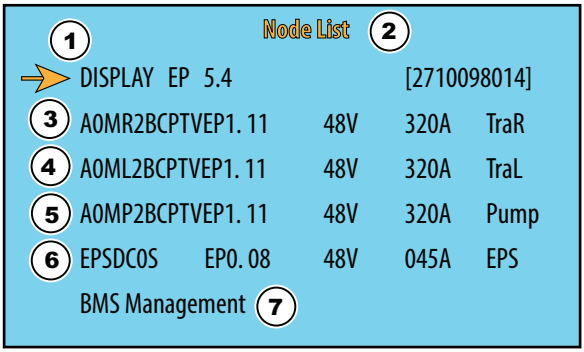
Menu

Menu Description

The display menu is intended for use by a certified lift truck technician only. It allows the technician to view and adjust controller settings, view and clear controller errors, enable or disable lift truck options, and teach or learn sensors. The controller submenus are structured similar to the ZAPI® Smart Console (CLARK Part No.8118502) diagnostic handset and can perform the same functions. A password **is required** to enter this menu.



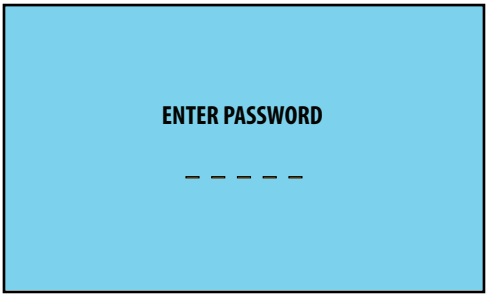
1. Current Selection
2. Display Menu
3. Traction Controller (right)
4. Traction Controller (left)
5. Pump Controller
6. Steer Controller (EPS)
7. Battery Management System (BMS)

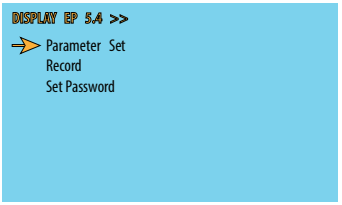
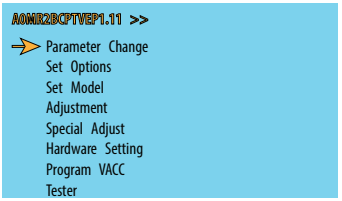
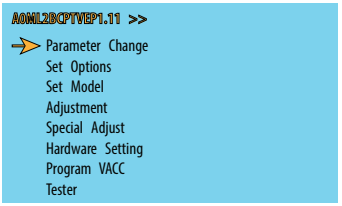
WARNING

If a service alarm (controller error) occurs, immediately stop operation of the lift truck and contact your supervisor or CLARK dealer. Do not operate a faulty or damaged lift truck.

Entering the Menu

- Press the ENTER button twice (2x) to show the password screen.
- Type the correct password using the 1 through 5 buttons.
- Enter the menu.



Main Menu Descriptions		
Name	**Description**	**View**
Display	The display menu allows for a technician to adjust dash display and other operating features. Refer to the Service Manual for additional information.	
Traction Controller (Right)	The traction controller menu allows the technician to adjust settings, enable and disable options, teach (learn) sensors, and view real-time readings related to the traction motor and controller. Refer to the Service Manual for additional information.	
Traction Controller (Left)	The traction controller menu allows the technician to adjust settings, enable and disable options, teach (learn) sensors, and view real-time readings related to the traction motor and controller. Refer to the Service Manual for additional information.	

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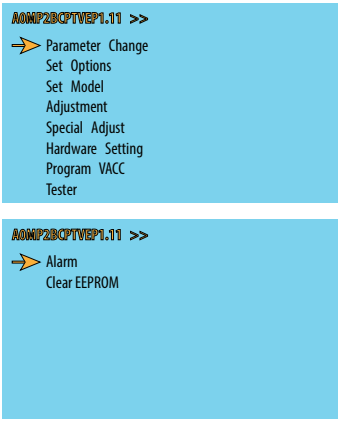
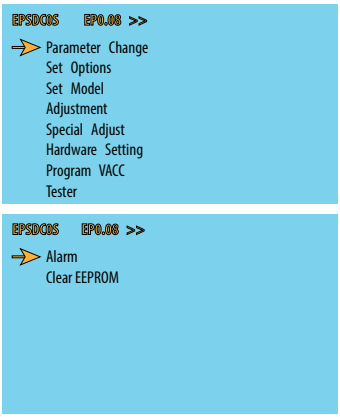
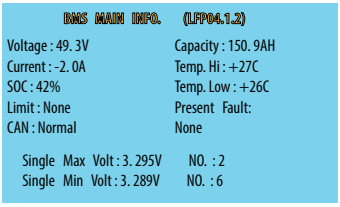
Main Menu Descriptions		
Name	**Description**	**View**
Pump Controller	The pump controller menu allows the technician to adjust settings, enable and disable options, teach (learn) sensors, and view real-time readings related to the hydraulic pump motor and controller. Refer to the Service Manual for additional information.	
Steer Controller (EPS)	The steer controller menu allows the technician to adjust settings, enable and disable options, teach (learn) sensors, and view real-time readings related to the steer motor and controller. Refer to the Service Manual for additional information.	
BMS Management	The battery management system (BMS) menu allows the technician to view the battery readings for the lithium-ion BMS. Refer to the Service Manual for additional information.	

Operator Settings

Operator Settings		
Name	**Description**	**Menu Operation**
Brightness	Allows for adjustment of the display brightness level, use the PLUS (3) and MINUS (4) buttons.	**Adjusted Using Menu Buttons**
Performance Modes	Allows for the acceleration mode and speed mode to be adjusted separately by the operator or to lock the mode selection to either H/S or L/E.	**Adjust Performance Mode** DISPLAY → PARAMETER SET → SPE MODE OPTION → OFF (0) or ON (1)
Units	The unit of measurement for the speed icon can be shown in either SI or US customary.	**Adjust Unit of Measurement** DISPLAY → PARAMETER SET → SPEED UNIT → MPH or KM/H
Speed Mode	The speed mode can be set to always be the same at truck startup.	**Adjust Speed Mode** DISPLAY → PARAMETER SET → START SPEED → MEDIUM (0), LOW (1), or HIGH (2)
Acceleration Mode	The acceleration mode can be set to always be the same at truck startup.	**Adjust Acceleration Mode** DISPLAY → PARAMETER SET → START ACC → FAST (0), SLOW (1), or MEDIUM (2)
Language	The dash display can be set to show either English or Chinese.	**Adjust Language** DISPLAY → PARAMETER SET → LANGUAGE → ENGLISH (0) or CHINESE (1)
Password	The password is adjustable and must be 5-digits in length.	**Adjust Password** DISPLAY → SET PASSWORD → ENTER NEW PASSWORD
Key Beep	The key beep can be turned ON or OFF.	**Enable / Disable Key Beep** DISPLAY → PARAMETER SET → KEY BEEP → ON or OFF

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Operator Settings		
Name	**Description**	**Menu Operation**
Password Enable	If enabled, requires a password to be entered before operating the lift truck.	**Adjust Password Enable** DISPLAY → PARAMETER SET → PASSWORD ENABLE → OFF or ON
Charge Soon Mode	Allows the technician to adjust at what battery charge level the initial hydraulic and travel cutback occurs.	**Adjust Charge Soon Mode** DISPLAY → PARAMETER SET → LA. BAT LOW BDI% → 40% to 3%
Charge Now Mode	Allows the technician to adjust at what battery charge level the final hydraulic and travel cutback occurs.	**Adjust Password Enable** DISPLAY → PARAMETER SET → BMS LOW BDI% → 30% to 3%

NOTE
For additional information regarding the specific use and operation of this display, refer to the Service Manual.

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Section 5. Operating Your Lift Truck

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Before Operating the Lift Truck

IMPORTANT!
Read the Operator's Manual before operating the lift truck.

WARNING

- Safe operation is always the responsibility of the operator!
- The operator must be trained and authorized to operate this lift truck.
- Only operate the lift truck in a safe and controlled manner. Improper use of a lift truck is dangerous and can cause injury or death to the operator or nearby personnel.
- Do not operate the lift truck without an overhead guard. Do not remove the overhead guard unless specifically authorized.
- Always inspect the lift truck before starting your shift. Make sure all controls and systems operate correctly and as intended from the manufacturer.
- Do not attempt to start or operate the lift truck from outside of the operator's position. Always sit in the seat with the seatbelt correctly latched before operating the lift truck.
- The overhead guard is intended to protect the operator from falling objects but it cannot protect against every possible situation. Always use safe judgment and extra care when handling loads.

Starting From a Safe Condition

Before operating the lift truck, do the following:

1. **Read and understand the Operator's Manual.**
2. **Perform the required Daily Inspection.**
3. **Check that the upright is fully lowered to the ground.**
4. **Check that all lift truck controls are in neutral.**
5. **Enter the operator's station and sit in the seat.**
6. **Adjust the seat and the steering column.**
7. **Use the seatbelt, ensuring it is correctly latched.**
8. **Put the directional control into neutral.**
9. **Turn the keyswitch to the ON position.**
10. **Check that the self-activating parking brake is engaged.**

Safe Operation

Look where you are going...

Check that your intended path of travel is clear of obstacles and pedestrians. Watch for other personnel, lift trucks, and any other obstructions in your path of travel and work area. Do not rely on your lift trucks warning lights or alarms to alert others while operating your lift truck. Do not allow personnel to walk under raised forks. Use the horn at intersections and wherever your view is obstructed.

Protect yourself and those around you...

Do not operate the lift truck or its attachments from outside the operator's position. Keep arms, legs, and hands inside the operator's compartment when operating the lift truck. Do not reach or place hands, arms, legs or head into the upright when operating the lift truck. Do not use the upright as a ladder. Do not allow personnel to be near the upright when operating the lift truck.

Do not allow riders...

Do not use the lift truck to carry other personnel. The operator is the only person allowed on the lift truck.

Always have control of your lift truck...

Do not operate a lift truck if your hands or feet are wet or greasy. Avoid bumps, holes, slick spots, and debris in your path that may cause the lift truck to lose traction or tipover. If unavoidable, slow down and carefully drive past them. Always reduce speed when traveling on wet or slick areas. Avoid sudden movements when operating the lift truck. Start, stop, travel, steer, and brake in a smooth and controlled way. Operate your lift truck at a speed that allows for safe, controlled stopping. Do not raise the load except when stacking. Always travel slowly while turning, especially when unloaded.

Grades, ramps, and inclines...

Use care when operating on ramps, inclines, and uneven areas. Always travel straight up and down slowly when on a sloped surface. Do not attempt to turn or drive at an angle when on sloped surface. When operating a loaded lift truck, always travel with the forks pointed upgrade. When operating an unloaded lift truck, always travel with the forks pointed downgrade.

Practice safe operation every time...

It is your responsibility to safely operate your lift truck. Do not perform stunt driving or horseplay. Observe your work areas traffic rules. Always be in control of your lift truck. Read and understand the information in this Operator's Manual. Stay alert and look for warning icons and indicators that may appear on the display. If an error message appears, immediately stop operating the lift truck. Report the issue to your supervisor or lift truck technician. Do not operate a lift truck that is faulty or is in need of repair.

WARNING

Only operate in work areas that have been approved for your lift truck type. Always check the classification of the work area in which you intend to operate. The type designation for the lift truck is shown on the data and capacity plate.

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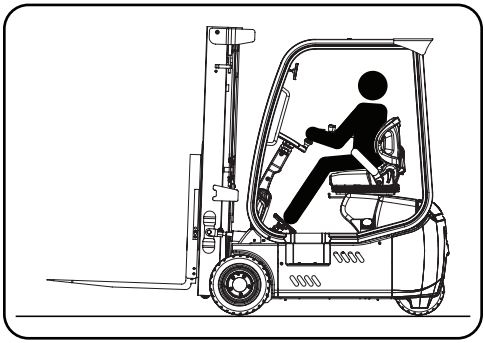
Positioning the Forks for Traveling

When traveling with or without a load, it is recommended to have the forks slightly raised and the upright tilted back. This helps prevent the fork tips from catching on the ground or debris while traveling. It also helps to reduce the amount of fork wear.

1. Raise the forks approximately 150-200 mm (6-8 in) above the floor.
2. Tilt the upright back slightly to raise the fork tips.



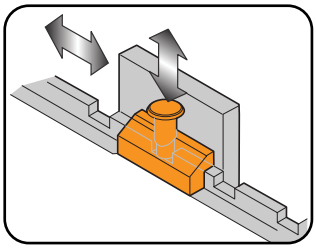
WARNING
Do not travel with a raised upright to avoid possible tipover.

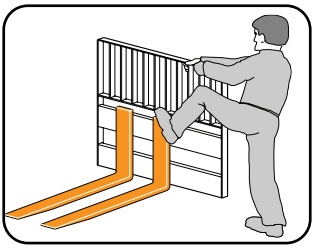
NOTE
The most common conditions that affect lift truck stability are: surface condition, grade, truck speed, load weight, and load size. Lift trucks equipped with optional attachments may have the operating stability of a partially loaded lift truck, even when unloaded.

Adjusting the Forks

The forks are adjustable on the carriage. When carrying a load, the forks should be spaced as far apart as possible. Position each fork an equal distance from the center of the carriage.

1. Raise the carriage so that the forks do not contact the ground.
2. Tilt the upright fully forward.
3. Release the fork locking pin.
4. Slide the fork to the desired position using your foot as shown below.
5. Secure the fork using the locking pin.
6. Repeat the procedure for the other fork.





WARNING
Forks are heavy and can cause a crushing injury. Use care when adjusting the forks.

Load Handling

Overview

- Always handle loads that are at or below the lift truck's rated capacity. The rated capacity can be found on the capacity and data plate. This rating specifies the maximum load that should be lifted. However, other factors such as using a special attachment, handling loads with a high center of gravity, or traveling over uneven surfaces may reduce the safe working load to be less than the rated capacity. Under these conditions, the operator must reduce the load carried so that the lift truck remains stable and safe to operate.
- Do not handle loads made up of loose, unevenly stacked, or unstable items that can easily shift and fall. Only handle stable loads or loads that are safely secured. Always appropriately stack and band loose loads. Center the load on the forks. Do not lift a load that may fall.
- Do not handle loads that are taller than the fork carriage unless the load is properly secured to prevent it from sliding back or falling. Always keep the back of the load against the carriage.
- If a load is placed on the end of the forks, it lowers the lift truck's stability. Always lift and lower the load with the upright either tilted slightly tilted back or vertical. Do not tilt the upright forward when the load is raised, except to pick up or drop off a load over a rack or stack.
- The lift truck is designed to handle loads positioned forward of the front wheels so that the weight of the load is counterbalanced by the weight of the lift truck.
- The farther the center of gravity of the load is from the lift truck's load center, the greater the leverage and the more force attempts to lift the rear of the lift truck. Always position the load as close to the front wheels as possible and flush against the carriage.
- If the lifting chains become slack, this may indicate there is upright or carriage hang up.

Picking Up and Moving Loads

- When picking up a load, approach the load slowly and align the lift truck square with the load. The forks should be adjusted to fit the load or pallet being handled and spaced as wide as possible to provide the best stability and balance. Before lifting, make sure the load is centered and the forks are fully supporting the load. The fork length should be at least two-thirds the length of the load. Use the lift and the tilt controls to adjust the forks to the correct height and angle to easily engage the load pallet. Move forward until the forks are squarely and completely under the load.
- If the forks are longer than the load, move back until they no longer extend beyond the load. Raise the load high enough to clear the floor. Move back slowly, enough to clear any obstacles, and set the load down. Move forward until the load is squarely positioned against the load backrest or carriage.
- Raise the load from the floor or stack by tilting the upright back just enough to lift the load from the surface. When stacking or tiering, only use enough backward tilt to stabilize the load.
- Raise or lower the load to traveling height and tilt the upright fully back to travel, except for loads that must be transported as level as possible.
- Make sure the forks do not extend past the load.

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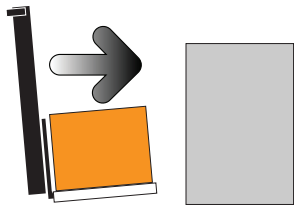
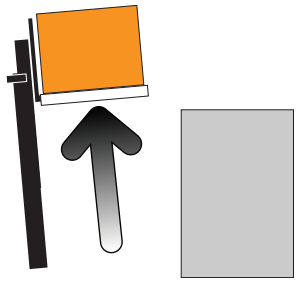
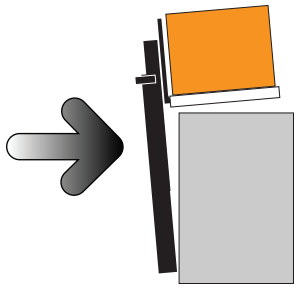
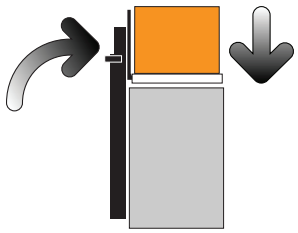
Traveling with a Load

- Always travel with the load as low as possible and the upright tilted back. Do not travel with a raised load. Do not attempt to raise the load except when stopped or stacking.
- Know and follow all traffic rules and regulations for your work area. Look and be aware of other vehicles, personnel, and other obstacles. Always look in the direction of travel and ensure a clear view of your intended path of travel. If a load blocks your visibility, travel in reverse with the load trailing, except when traveling up a slope or incline.
- Avoid sudden movements when carrying a load. Always slow down when turning. During normal operation, always start, stop, travel, steer, and brake smoothly. Operate the hydraulic controls slowly and smoothly.
- Avoid traveling over bumps, holes, and loose materials or debris to prevent loss of control or damage to the lift truck. Always slow down and cross at an angle when traveling over railroad tracks.
- Use extra care when traveling with long, high, or wide loads. Look and be aware of the clearances around the lift truck and the load when traveling. Raise the forks or attachment only enough to pick or stack the load. Look for and avoid obstructions, especially ones that are overhead.
- Know that exaggerated tail swing occurs when turning while traveling forward. This is characteristic of all lift trucks that are steered by the rear wheels. Always check the tail swing area of the counterweight to be sure it is clear before attempting to turn the lift truck.
- Always be aware about the current stability condition of your lift truck. When special attachments are used, additional care should be used when securing, manipulating, positioning, and transporting the load. Special lift truck attachments add weight and complexity to the lift truck, make sure to operate a lift truck equipped with an attachment as partially loaded when not handling a load.

WARNING

When operating the lift truck, ascend or descend grades slowly, and with caution.

- On grades 10% or greater, always limit travel speed to 4.8 km/h (3.0 mph) or less.
- Do not exceed the maximum operating grade for your specific lift truck model, as defined in this Operator's Manual.

Stacking a Load		
Step	**Procedure**	**View**
1	Drive forward slowly while aligning the load squarely with the stack	
2	Raise the load as the lift truck approaches the stack.	
3	Drive forward slowly until the load is almost touching the stack. The leading edge and sides of the load pallet should be lined up with the near edge and side of the load or rack on which you are stacking.	
4	Stop close to the stack and raise the load high enough to clear the top surface of the stack. Position the load slowly so that it aligns with the load or rack beneath it. Use care not to move or damage nearby loads. Once aligned, tilt the upright to the vertical position and carefully lower the load until fully supported on top of the stack.	

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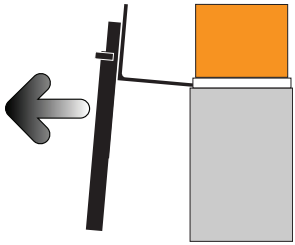
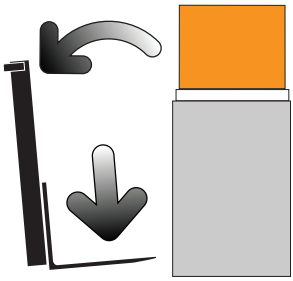
Stacking a Load		
Step	**Procedure**	**View**
5	Lower the forks slightly to disengage the load pallet. Tilt the forks slightly forward, if needed to clear the pallet.	
6	Check for nearby personnel and obstructions, then carefully move backward until the forks are clear of the stack. Stop and lower the forks to the travel position and then tilt the upright fully back.	

Unstacking a Load

1. Slowly approach the stack with the lift truck lined up squarely with the load.
2. When near the stack, tilt the upright to the vertical position.
3. Raise the forks high enough to freely engage the load pallet. Adjust fork angle as necessary to position the forks squarely under the load.
4. Move forward until the forks are under the load. Make sure that the forks do not extend beyond the load. If the forks are longer than the load, move backward until the fork tips do not extend beyond the load.
5. Raise the load enough to clear the top surface of the stack. Move backward slightly and then set the load down. Move forward until the front face of the forks contacts the load.
6. Tilt the upright back slightly until the load is raised high enough to clear the stack or, with the upright in the vertical position, raise the forks until the load is raised high enough to clear the stack. Tilt the upright back just enough to stabilize the load.
7. Check for nearby personnel and obstructions, then carefully move backward until clear of the stack.
8. Stop and lower the load to the travel position and then tilt the upright back. Make sure the load is fully back against the carriage or front face of the forks. Some loads may have to be transported as level as possible.

Dropping Off a Load

1. Move the load into the correction position.
2. Tilt the upright to the vertical position.
3. Fully lower the load.
4. As needed, adjust the fork height and tilt the upright forward slightly to easily remove the forks from the load pallet.
5. Carefully move backward until the forks are clear from the load.
6. Raise the forks to the travel position and tilt the upright fully back.

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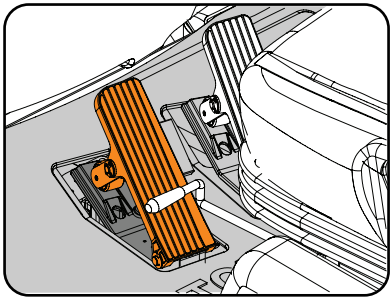
Normal Braking



The braking system for the lift truck is electronically controlled. When the brake pedal is depressed while traveling, the drive motor direction is reversed and the lift truck slows down.

Stopping the Lift Truck

Push down firmly on the brake pedal until the lift truck comes to a stop. The farther the brake pedal is depressed the quicker the lift truck will slow down and come to a stop. When fully stopped, the self-activating parking brake will engage.

Plugging

The lift truck can change direction, without braking, by plugging. Plugging is a method of braking the lift truck and changing direction quickly. While traveling forward or backward, move the directional control lever to the opposite direction while keeping the accelerator pedal depressed. The lift truck will slow to a controlled stop and then begin to accelerate in the opposite direction.

The plugging distance is controlled using the accelerator pedal. The farther the accelerator is depressed, the shorter the distance will be until the lift truck changes direction. The shortest plugging distance occurs when the accelerator pedal is fully depressed.

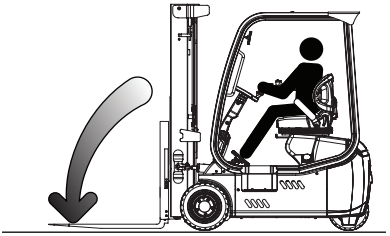
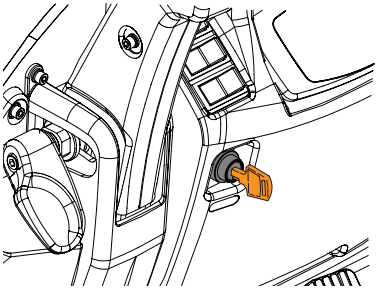
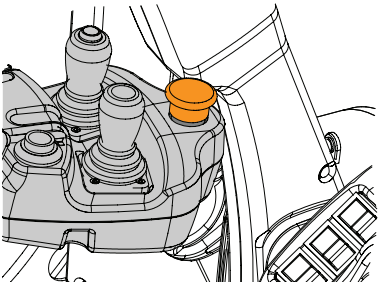
Release Braking

When the accelerator pedal is released while traveling, the drive motor directions are reversed and the lift truck will come to a controlled stop. When fully stopped, the self-activating parking brake will engage.

WARNING

Always stop the lift truck using smooth, controlled braking. Excessively hard braking can cause wheel sliding and loss of control, which can lead to a tipover or accident.

Parking

Parking the Lift Truck		
Step	**Procedure**	**View**
1	Stop the lift truck. Put the directional control in neutral. Lower the upright to the ground.	
2	The lift truck is equipped with a **Self-Activating Parking Brake**.	
3	Turn the key switch OFF.	
4	If leaving the lift truck for an extended period, press the emergency disconnect, remove the key, and block the wheels.	

WARNING

- Park away from high traffic areas.
- Do not block emergency exits or routes, stairways, or equipment.
- Do not park on a ramp or grade.

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Section 6. Maintaining Your Lift Truck

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WARNING

THIS SECTION IS INTENDED FOR SERVICE TECHNICIANS ONLY!
The following information is to be used as a reference for determining your lift truck's Planned Maintenance (PM) schedule. For complete maintenance and service information, refer to your Service Manual.

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Safe Maintenance

The following instructions have been prepared from current industry and government safety standards applicable to industrial truck operation and maintenance. They are listed here for the reference and safety of all workers during inspection and maintenance operations. If you have any questions regarding the inspection or maintenance procedures for your lift truck, please contact your CLARK dealer.

1. Lift trucks can become hazardous if maintenance is neglected. Therefore, suitable maintenance facilities, trained personnel and procedures shall be provided.
2. Maintenance and inspection of all lift trucks shall conform with the manufacturer's recommendations.
3. A scheduled planned maintenance, lubrication, and inspection system shall be followed.
4. Properly ventilate all work areas and keep floor clean and dry.
5. Do have fire protection equipment present in the work area. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.
6. Operation of the lift truck to check performance must be conducted in an authorized, safe and clear area.
7. **Before Starting Maintenance or Repair**:
   - Raise and support the lift truck using an appropriate lifting device.
   - Use appropriate supports prior to beginning work.
   - Disconnect the battery before working on the electrical system.
   - Fully lower the upright and relieve the hydraulic pressure before working on the hydraulic system.
8. **Before Driving the Lift Truck**:
   - Connect the battery connector.
   - Insert the key and turn the keyswitch to the on position.
   - Check that the path of travel is clear.
   - Check the function of the directional controls and the emergency disconnect switch.
   - Check the service and emergency brake functions.
9. **Before Leaving the Lift Truck**:
   - Park the lift truck in a designated area.
   - Fully lower the upright to the ground.
   - Turn the keyswitch to off and remove the key.
   - Unplug the battery connector.
10. All brakes, steering mechanisms, control mechanisms, warning devices, lights, guards and safety devices, lift mechanisms, and frame members must be carefully and regularly inspected and maintained to a safe operating condition.
11. Specialized lift trucks or devices designed and approved for hazardous area operation must receive special attention to ensure that maintenance preserves the original, approved safe operating features.
12. The hydraulic system must be regularly inspected and maintained to ensure that excessive leakage (drift) has not developed to the extent that it creates a hazard.
13. All batteries, motors, controllers, switches, protective devices, electrical conductors and connections must be inspected and maintained.
14. Refer to the manufacturer's (CLARK) procedures for replacing battery contacts to avoid injury or damage to the equipment.
15. Lift trucks must be kept clean to minimize the risk of fire and to aide in the detection of damaged or defective parts.
16. Always use replacement parts and fluids that are of a quality at least equal to that of the Original Equipment Manufacturer (OEM).

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Operator's Daily Checklist

Operator's Daily Checklist

Date: _____

Truck Type: ☐ IC Ride (LPG/Diesel/Gas) ☐ Electric Ride ☐ Electric Narrow-Aisle ☐ Electric Walkie-Pallet-Stacker

Truck Serial Number:_____ Operator: _____ Supervisor's OK: _____

Current Hour Meter: _____

Do the following visual checks before the start of each shift:

- Mark each item accordingly: **OK** ☐ **NR** ☒ **NR** = Needs Repair
- Circle the problem and describe in detail using the space provided below.
- Notify your supervisor and/or maintenance department immediately if any issue is found.
- **NEVER OPERATE A DAMAGED OR FAULTY TRUCK!**

OK	NR	VISUAL CHECKS
		Body and Exterior (damaged, worn, missing)
		Wheels and Tires (damaged, worn, loose)
		Battery (damaged, electrolyte level, loose)
		Upright (damaged, loose, missing)
		Forks (damaged, worn, loose)
		Overhead Guard (damaged, loose, missing)
		Data Plate and Decals (damaged, missing)
		Operator's Manual (damaged, missing)
		Hydraulic Fluid (level, dirty, leaking)
		Drive Axle Fluid (level, dirty, leaking)
		Steer Axle Fluid (level, dirty, leaking)
		Brake Fluid (level, dirty, leaking)
		Engine Oil (IC) (level, dirty, leaking)
		Engine Coolant (IC) (level, dirty, leaking)
		Engine (IC) (rough idle, noisy, leaking)

OK	NR	VISUAL CHECKS
		Dash Display (damaged, operation)
		Gauges (damaged, operation)
		Alarm Codes (controller, DTCs)
		Seat Belt (damaged, worn, operation)
		Horn (damaged, operation)
		Lights (damaged, operation)
		Alarms (damaged, operation)
		Direction Control (loose, binding, operation)
		Steering (loose, binding, operation)
		Park Brake (loose, binding, operation, adjustment)
		Service Brake (loose, binding, operation, adjustment)
		Lift (loose, binding, operation, excessive drift)
		Lower (loose, binding, operation, excessive drift)
		Tilt (loose, binding, operation, excessive drift)
		Auxiliary (loose, binding, operation)

Description of Problem(s):

NOTE

CLARK has prepared an *Operator's Daily Checklist* to assist you in performing and documenting your daily inspections. This form is available from your CLARK dealer.

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Daily Inspection

Daily Inspection Overview	Every 8-10 Hours (Daily)	OK	NA	Explanation
CHECK				
Obvious damage	●			
Fluid leaks	●			
Drive and steer tires	●			
Capacity plate and warning decals	●			
Load backrest and attachment	●			
Upright and lift chains	●			
Overhead guard	●			
Battery cables and connections	●			
Ground strap chain	●			
Seat belt operation	●			
Seat switch operation	●			
Dash display operation	●			
Error messages or alarms	●			
Horn and light operation	●			
Hydraulic operation	●			
Speed control operation	●			
Steering control operation	●			
Service brake operation	●			
Parking brake operation	●			

WARNING

OSHA requires the operator to inspect the lift truck before beginning each shift to help ensure a safe operating condition.

Visual and Operational Inspections

Lift Truck Exterior

- Check for obvious damage, fluid leaks, or other maintenance issues.
- Check that all safety, capacity, and warning plates and decals are attached and legible.

Wheels and Tires

- Check the condition of the tires and tread.
- Check the wheel lug nuts.

Load Backrest and Forks

- Check for excessive wear and damaged or missing parts.
- Check for cracks and bent parts.
- Check that the fork tips are level.

Upright and Lift Chains

- Check the lift chains for excessive stretch and wear, broken links, misaligned pins, and rust.
- Check the lift chains for proper lubrication and correct adjustment (equally tensioned).
- Check the upright rails for excessive wear (metal flaking).
- Check the rollers for excessive wear and proper lubrication.
- Check for hydraulic fluid leaks and loose hoses and fittings.

Overhead Guard

- Check for damage to the overhead guard.
- Check that the overhead guard is securely attached to the frame.
- Check that the overhead guard has not been modified.

Battery and Cables

- Check the battery for damage and leaks.
- Check the battery receptacle, cables, and terminals.
- Check that the ground strap chain is installed and touching the floor.

Seat Belt and Seat Switch

- Check for any obvious damage.
- Check that the seat belt functions and latches correctly.
- Check that truck does not operate if the operator is not in the seat.

Dash Display and Errors

- Check that the dash display boots when the truck is turned ON.
- Check for any controller alarms or errors.

Horn and Lights

- Check the horn.
- Check that the work lights (if equipped) work correctly.
- Check that the warning lights (if equipped) work correctly.

Hydraulics

- Check the lift, lower, tilt, and auxiliary hydraulic functions.
- Check for hydraulic pump cavitation with the upright fully raised.
- Check for any binding or rough operation of the upright (racking).

Steering and Speed Control

- Check that the directional switch changes lift truck direction properly.
- Check that steering is smooth and allows for a full range of motion.
- Check that the lift truck accelerates smoothly with no unusual noises.

Service and Parking Brake

- Check that the service brake works properly.
- Check that the self-activating parking brake works properly.

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Cleaning

Cleaning Rules

Always maintain a clean lift truck. Do not allow debris or contaminants to accumulate on the lift truck. Clean any excess or leaking grease and oil before operating the lift truck. Before attempting to clean the lift truck, all efforts to prevent shorting (arcing) of the electric circuits must be completed.

Your specific operating environment determines the amount and extent of cleaning required for your lift truck. For severe truck applications, frequent cleaning is required to allow for safe and optimal lift truck operation.

- Disconnect the battery before cleaning the lift truck.
- Only use clean, dry low-pressure air and/or non-conductive, anti-static brushes to clean electrical components.
- Clean the lift truck at least every PM interval.
- After cleaning, check all lift truck functions before returning to operation.

WARNING
Always wear appropriate eye protection when cleaning.

CAUTION
Per OSHA, when using compressed air to clean the lift truck, air pressure must **not** be greater than 207 kPa (30 psi).

CAUTION
Do not use pressurized water to clean the lift truck.

CAUTION
Do not use flammable solvents to clean the lift truck.

Planned Maintenance

Operating Conditions

Planned maintenance intervals are mostly influenced by operating conditions. The service intervals specified in the following PM table are for normal operation. For severe or extreme operation, the maintenance intervals should be shortened to ensure optimal lift truck performance and reliability. Contact your authorized CLARK dealer if you have questions regarding the recommended service intervals for your specific application.

Normal Operation:

Standard 8 to 10 hour material handling operation in a clean, indoor location with smooth and level floors.

Severe Operation:

Extended operating hours, continuous operation, or routine capacity loads.

Extreme Operation:

High or low temperatures, sudden temperature changes, outdoor use on rough and uneven floors, or dirty environmental conditions.

NOTE

The maintenance intervals described in this manual refer to lift truck operating hours and are intended for normal operating conditions.

NOTE

- Inspect your lift truck before each shift.
- Fill out a daily inspection sheet. Retain for your records.
- Report any issues to your supervisor or service technician.
- Do not operate your lift truck until all issues have been corrected.

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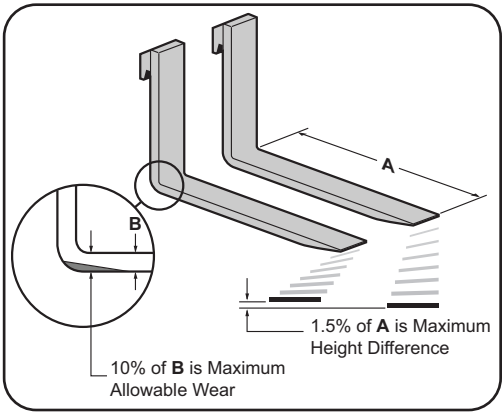
PM Service Intervals	Every 450-500 Hours (6 Months)	Every 900-1000 Hours (12 Months)	Every 2000 Hours (Yearly)
CHECK			
Wheel fastener torque	■		
Drive and steer axle oil level	■		
Hydraulic fluid level	■		
Drive and pump motors	■		
Lift chain stretch and wear	■		
Battery mounting fasteners	■		
Critical fastener torques	■		
CLEAN			
Drive and pump motors	■		
Controllers	■		
Battery vents and terminals	■		
Drive axle breathers	■		
Hydraulic tank breather	■		
LUBRICATE			
Lifting chains	■		
Upright / carriage rails and rollers	■		
Upright mounting pins	■		
Tilt cylinder ends	■		
Hood hinges	■		
Steer axle hub bearings		■	
TEST			
Battery load voltage	■		
Tilt and lift cylinder drift	■		
Electromagnetic brakes (parking)		■	
Main and auxiliary relief pressures			■
REPLACE			
Drive axle fluid		■	
Hydraulic sump breather		■	
Hydraulic sump filters and fluid			■
Steering tank filter and fluid			■

Forks and Lift Chain

Fork Inspection

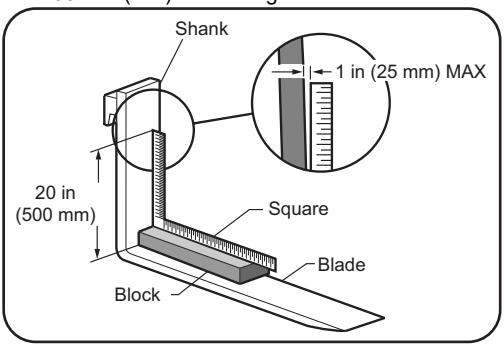
Inspect the load forks for bending and wear:

- The top surfaces of the forks should be level with each other.
- If the height difference between the fork tips is greater than 1.5% of the blade length (**A**), then the forks must be replaced.
- If the fork heel is worn by more than 10% of the thickness (**B**) of the fork blade, then the forks must be replaced. The load capacity of the forks is reduced when the forks have experienced excessive wear.



Inspect the forks for twists and bends:

- Position a 50 mm (2 in) thick block, at least 100 mm (4 in) wide and 600 mm (24 in) long, on the blade of the fork with the 100 mm (4 in) surface against the blade.
- Position a 600 mm (24 in) square on the top of the block and against the shank.
- Check the fork gap at 500 mm (20 in) above the blade. If the gap distance is greater than 25 mm (1 in), then the forks must be replaced.



WARNING

Do not operate a lift truck with bent, damaged, or worn forks.

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Lift Chain Inspection and Lubrication

During normal operating conditions, inspect and lubricate the lift chains every 450 to 500 hours. If operating in corrosive or extreme working conditions, inspect more frequently.

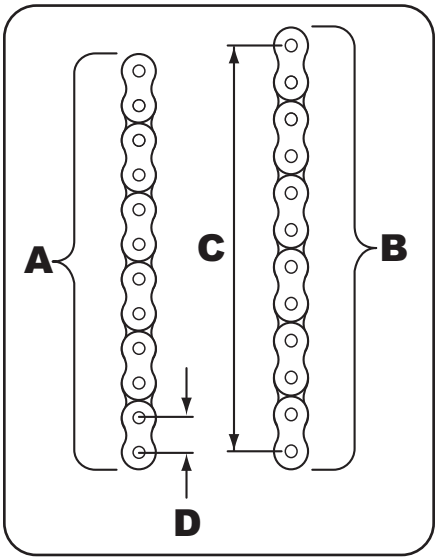
When inspecting, check for: rust and corrosion, cracked plates, raised or turned pins, tight joints, excessive wear, and worn pins and holes.

Lift chain lubrication is a crucial step of your Planned Maintenance program. The correct and timely lubrication of the lift chains will maximize their service life.

Lift Chain Wear and Replacement Criteria:

The lift chain will gradually stretch over time during normal operation. When a section of chain has stretched 3% or more, it is considered excessively worn and must be replaced. When checking for chain stretch, always measure a segment of chain that moves over a sheave.

- **New Chain Length (A):** distance from the first pin counted to the last pin counted in a span while the chains are lifting a small load.
- **Worn Chain Length (B):** distance from the first pin counted to the last pin counted in a span while the chains are lifting a small load.
- **Span (C):** number of pins in the segment of chain to be measured.
- **Pitch (D):** distance from the center of one pin to the center of the next pin.



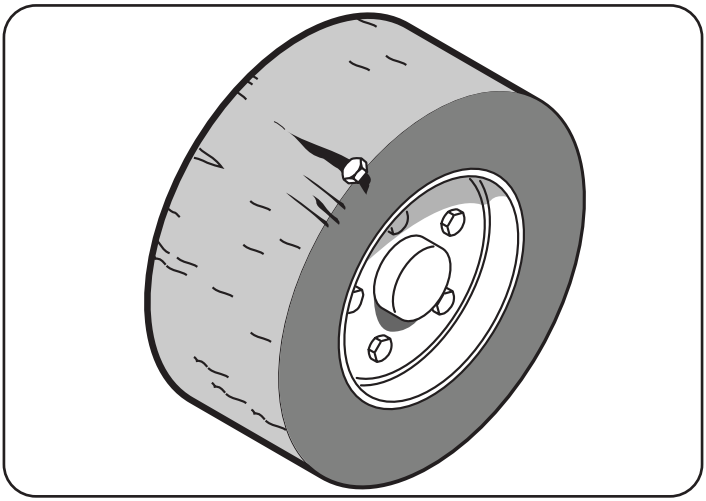
WARNING
Do not attempt to repair a worn or broken lift chain.

Wheels and Tires

Inspect the drive and steer wheels and tires every day before operating the lift truck.

Do the following when inspecting the wheels and tires:

- Inspect the tires for excessive wear. Replace if needed.
- Remove any embedded foreign objects for the tires.
- Inspect the tire for large cracks or missing chunks.
- Check for missing wheel lugs.
- Check for loose fasteners. Tighten any loose or replaced fasteners to the correct specification. Refer to your lift truck's Service Manual for the correct specifications.



WARNING

Tires that are excessively worn or damaged can lower the lifting capacity of your lift truck. Always replace damaged or worn tires.

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Lithium-Ion Battery

Battery Safety

DANGER
Do not keep a battery in service that has been damaged or submerged in water.

DANGER
Do not allow the battery near any open flames, sparks, or electrical arcs. If a lithium-ion battery fire occurs, immediately evacuate the work area. Only use Class D, CO_2, dry chemical, or foam-type fire extinguishers that are intended for lithium-type battery fires.

CAUTION
Do not operate or charge a cold lithium-ion battery without allowing the battery to warm up to the recommended temperature.

CAUTION
The battery must have an identification decal that states the nominal voltage, capacity, weight, and manufacturer's information.

CAUTION
Do not attempt to charge the battery using an unknown or incompatible charger.

CAUTION
Do not use pressurized water, steam, or soaked towels to clean the battery.

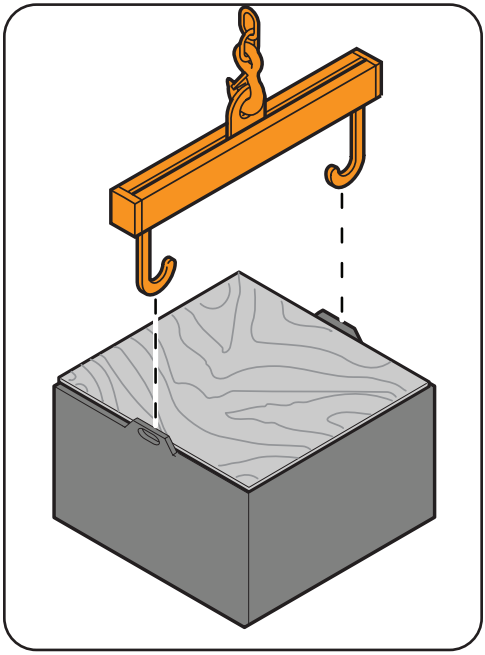
CAUTION
Lithium-Ion Battery Charging Rules:
- Do not excessively charge or discharge the battery.
- Do not bypass or disable the battery management system (BMS).
- Do not use a battery charger that is not approved for your specific battery.

CAUTION
Lithium-Ion Battery Storage Rules:
- Do not store the battery in an extreme hot or cold area.
- Do not store the battery near water.
- Do not store a battery on its side or upside down.
- Do not store a discharged or damaged battery.

Battery Handling

When moving, installing, or removing the battery, do the following:

- Ensure the service area is equipped with the proper tools designed for moving industrial batteries, such as a conveyor or overhead hoist.
- Use lifting hooks that have safety latches and are the correct size.
- Use a specialized attachment device, such as an insulted spreader bar, to install the lifting device to the battery. The width of the spreader bar must be the same as the width of the battery, to prevent damage to the battery.
- Chain hoists must be equipped with containers to accumulate any excess lifting chain.
- Keep all tools and other metal objects away from the battery terminals.
- Only authorized personnel familiar with handling industrial batteries move, store, install, or remove the battery.
- Use insulated tools and lifting equipment only.
- If installing a new battery, check the battery for damage before installing.



WARNING

Always use an appropriate lifting device and proper attachment to handle the battery.

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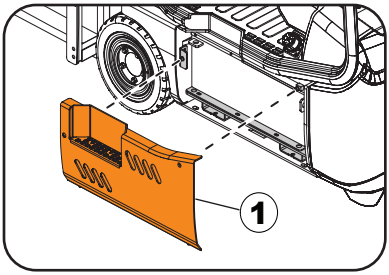
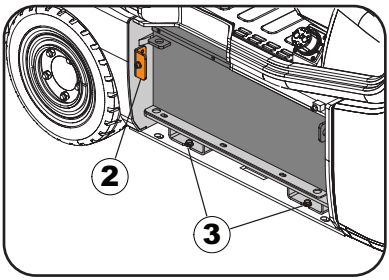
Battery Removal and Installation

Removing and Installing the Battery:

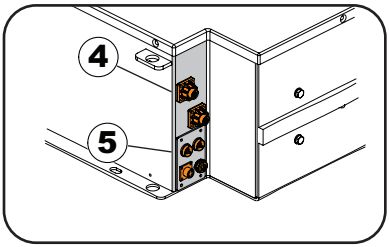
1. Park the lift truck.
2. Turn the lift truck OFF.
3. Remove the left side panel (**1**).



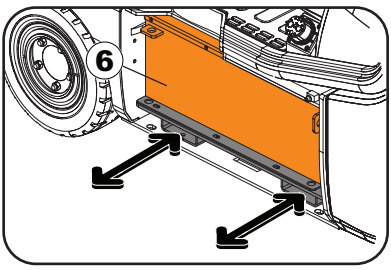
4. Remove the bracket (**2**) and the two bolts (**3**).



5. Disconnect the power cables (**4**) and the communication cables (**5**). Position the cables out of the way.



6. Remove the battery (**6**) from the lift truck.
7. Installation is the reverse procedure of removal.

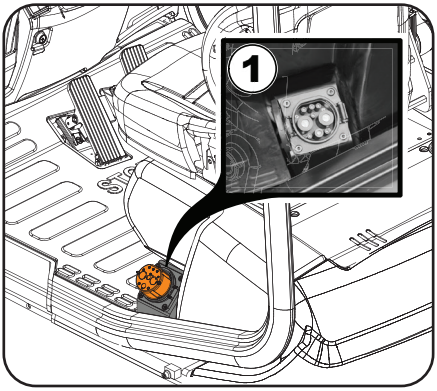


Battery Charging

Always designate a specific area for the purpose of charging lithium-ion batteries. When charging, make sure the battery charger is turned OFF before connecting the battery charging cables. Lithium-ion batteries allow for fast charging, if the battery does not charge completely in a normal period or if the battery management system (BMS) indicates a fault, then remove the battery from service.

Charging the Battery:

1. Park the lift truck.
2. Turn the lift truck OFF.
3. Open the charging receptacle cover.
4. Connect the charger cable to the charging receptacle (**1**).
5. Follow the recommended procedure provided by the BMS or the charging station manufacturer.



Battery Care

Cleaning

CLARK recommends to only use compressed air at less than 207 kPa (30 psi) or a slightly damp towel to clean the battery. The battery, or its charging station, may be equipped with fans, heat sinks, or other cooling devices that require periodic cleaning. Always know and follow the battery manufacturer's recommendations for cleaning and service.

Service

Lithium-ion batteries typically require no maintenance. If needed, any service or maintenance should be performed by a certified technician. CLARK recommends that the battery be inspected annually by a certified technician familiar with industrial lithium-ion batteries. Record all battery service, maintenance, and inspections to maximize the service life of your battery and lift truck.

Optimize Battery Life

Always use and follow the battery management system (BMS). The BMS is the electronic system that monitors battery data and use that data to its operating environment to influence the battery's safety, performance, and service life. It also functions as a safety cut-off device in case of overcharging, overcurrent, or overheating. Lithium-ion battery life is greatly reduced if used outside a temperature range of 0ºC to 40ºC (32ºF to 104ºF) or in an environment with greater than 85% humidity. CLARK recommends to opportunity charge lithium-ion batteries. This is when the battery is recharged for short intervals during a shift period. It reduces or eliminates the need for long charging periods, changing batteries during a shift, and extending shift periods.

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Storage

Lithium-ion batteries should be stored indoors, away from heat sources and direct sunlight, and in a well-ventilated and dry environment. The storage area should have a temperature range of 0-40°C (32-104°F), and a maximum humidity of 85%. CLARK also recommends storing lithium-ion batteries in a raised rack or shelf that allows for protection from possible collision damage. When storing a battery for an extended period, inspect it regularly (every 2 to 3 months) and maintain a charge level of 50% or greater.

Disposal

Any lithium-ion battery that has been damaged, deeply discharged, or is without a properly functioning BMS, should be treated as hazardous material and moved to an outdoor area that is well-ventilated and kept away from flammable materials. Always dispose of damaged or defective lithium-ion batteries properly.

IMPORTANT!

Lithium-ion batteries are hazardous waste that require different disposal procedures as compared to lead-acid batteries. Refer to the federal, state, and local and/or provincial laws and rules applicable to your specific operation. For additional information, contact your local EPA, fire department, the battery manufacturer, or CLARK for assistance.

Shipping

Prior to shipping, always refer to the latest Department of Transportation (DOT) regulations concerning the correct packaging, labeling, and shipping method for lithium-ion batteries.

WARNING

Do not ship or transport a damaged, defective, or recalled lithium-ion battery without knowing and following the latest federal, state, and local shipping laws and regulations.

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Section 7. Towing

Contents

Emergency Towing **86**

WARNING

THIS SECTION IS INTENDED FOR SERVICE TECHNICIANS ONLY!
The following information is to be used as a reference. For complete maintenance and service information, refer to the Service Manual.

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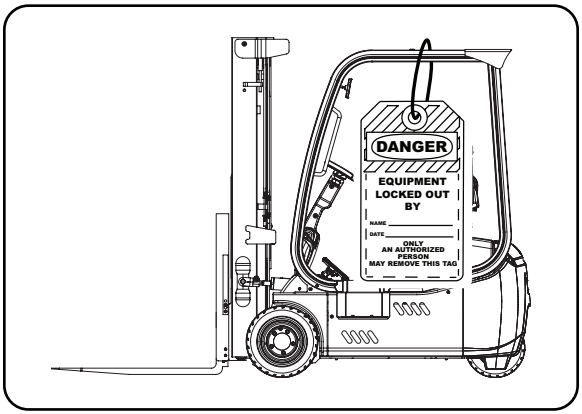
Emergency Towing

Disabled Lift Truck

If your lift truck becomes disabled...

- Safely park the lift truck and remove the key.
- Attach an **OUT OF SERVICE** tag.
- Report the issue to your supervisor or certified lift truck technician.



WARNING

Do not operate a lift truck that has requires service or repair. Do not attempt to service or repair your lift truck.

Towing Rules:

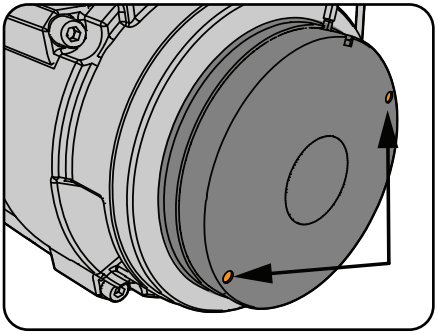
- Do not tow on a grade or if ground conditions are poor.
- If using another lift truck to tow, make sure it is of equal or greater size and carrying a partial load to ensure adequate traction.
- Always use approved tow bars and connections.
- Do not exceed 8 km/h (5 mph) when towing a lift truck.
- An operator must be seated on the disabled lift truck.
- Release the parking brakes before attempting to tow the lift truck.

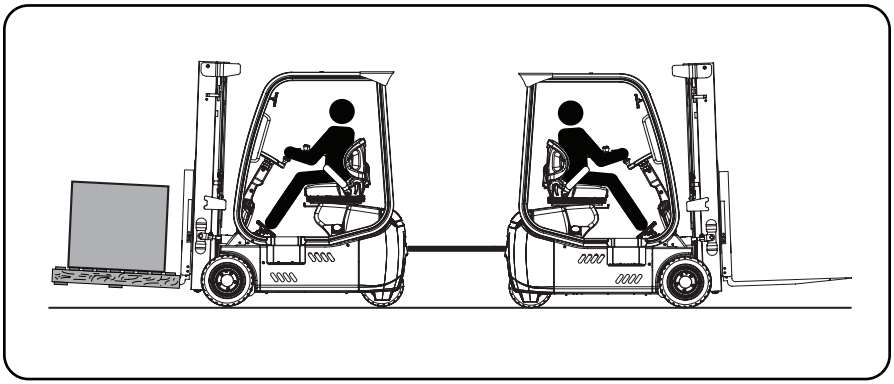
CAUTION

The brake release bolts must be removed before operating or damage will occur.

Towing a Disabled Lift Truck:

1. Raise and secure the upright 300 mm (12 in) off the ground.
2. Check that the counterweight is securely mounted.
3. Block the drive wheels.
4. Tighten the bolts until each brake is fully released. Do not overtighten.
5. Install an approved tow bar to the tow pins on each lift truck.
6. Remove the wheel blocks and tow the disabled lift truck to a designated area.
7. Remove the brake release bolts and return to them to the appropriate storage locations before returning the lift truck to service.





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Section 8. Specifications

Contents

TWLi20 90

CAUTION

Always know the rated load capacity and lift truck weight for your specific lift truck by referring to the data plate attached to the lift truck.

If the data plate is missing, damaged, or modifications have been made to the lift truck that may affect the rated load capacity or weight of the lift truck, then it must be replaced. Contact your CLARK dealer if you require a new or updated data plate.

CAUTION

CLARK products and their specifications are subject to improvements and change without obligation of prior notice.

NOTE

Always use genuine CLARK replacement parts and fluids.

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IMPORTANT!
The **rated load capacities** shown below are based on lift trucks equipped with a standard upright (STD) with a maximum fork height (MFH) of 3000 mm (118 in), standard forks, and a standard weight battery.

Rated Load Capacity

Model	Rated Load Capacity			
	Load Center: 500 mm (19.6 in)		*Load Center: 24 in (610 mm)*	
	kg	*lb*	*lb*	*kg*
TWLi20	2000	4409	4000	1814

IMPORTANT!
The **lift truck weights** shown below are based on lift trucks equipped with a standard upright (STD) with a maximum fork height (MFH) of 3000 mm (118 in), standard forks, and a standard weight battery.

Lift Truck Weight

Model	Gross Weight (Loaded)		Empty Weight (Unloaded)	
	kg	*lb*	*kg*	*lb*
TWLi20	5274	11627	3460	7628

Drive Axle Weight

Model	Drive Axle (Loaded)		Drive Axle (Unloaded)	
	kg	*lb*	*kg*	*lb*
TWLi20	4916	10838	1574	3470

Battery Specifications

Model	Voltage	Capacity	Battery Weight	
	V	*Ah*	*kg*	*lb*
TWLi20	48	360	250	551

IMPORTANT!
The **maximum operating grades** shown below are based on lift trucks equipped with a standard upright (STD) with a maximum fork height (MFH) of 3000 mm (118 in), standard forks, and a standard weight battery.

Operating Grade

Model	Maximum Operating Grade (Loaded)		Maximum Operating Grade (Unloaded)	
	%	*deg*	*%*	*deg*
TWLi20	15	8.5	17	9.6

Wheels and Tires

Solid Pneumatic		
Model	**Drive Tire Size**	**Dual Steer Tire Size**
TWLi20	200x50–10	15x4.5-8

Recommended Lubricants

Type	Part Number	Specification	Component
CLARK Innerslide Lubricant	886396		Upright Rails
CLARK Chain & Cable Lubricant	886399		Lift Chains
NLGI #2 EP General Purpose Grease	VV608	CLARK MS-107C	Upright and Carriage Rollers, Tilt Cylinder Ends, Upright Mounting Pins, Steer Axle Hub Bearings

Recommended Fluids

	Drive Axles	Hydraulic Tank (Steer)	Hydraulic Tank (Main)
Type	SAE 80W-90	AW ISO 32	AW ISO 32
Capacity	0.35 L (0.37 qt)[1]	1.37 L (1.4 qt)	17.3 - 19.3 L (4.5 - 5.1 gal)
Specification	API GL-5	CLARK MS-68	
Part Number	1808014	1800236 (qt) OR 1802155 (gal)	

[1]Capacity is per drive axle.

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Scan Link Below

Safety Starts with You!

OM-1206

CLARK® Material Handling Company

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Lexington KY 40510

Additional copies of this manual are available from your CLARK dealer.