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Operator Manual

Model 8510

Pallet Truck

ACR®

RAYMOND

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This Operator Manual must remain on the pallet truck in the pocket provided.

The Owner Manual should remain with the owner, supervisor, or foreman responsible for the operation of this pallet truck.

If you need a replacement for either manual, contact your authorized Raymond Solutions and Support Center whose name appears on the back cover.

This publication, 1369801/001C, applies to the Model 8510 Pallet Truck, and to all subsequent releases of this product until otherwise indicated in new editions or bulletins. Changes occur periodically to the information in this publication.

To order additional copies of this manual, part number 1369801/001C, contact your local authorized Raymond Solutions and Support Center.

If you need assistance with your pallet truck, contact your local authorized Raymond Solutions and Support Center.

To locate your Solutions and Support Center, go to www.raymondcorp.com.

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This Raymond product is covered by one or more United States Patents. For more information go to www.raymondcorp.com/patents.

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Compliance Statements

Product Model: Raymond Advance Operator Assist Technology: Remote Transmitter Unit (RTU) and Remote Receiver Unit (RRU)

Manufacturer: The Raymond Corporation, 22 South Canal Street, Greene, NY 13778 www.raymondcorp.com.usa

Technical Support: www.raymondcorp.com.

United States

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

NOTE: Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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Compliance Statements

Canada

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Mexico

Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

NOTE: Changes or modifications not expressly approved by the manufacturer could void the user'sauthority to operate the equipment.

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Compliance Statements

Product Model: Raymond Advance Operator Assist Technology: Charger

Manufacturer: The Raymond Corporation, 22 South Canal Street, Greene, NY 13778 www.raymondcorp.com.usa

Technical Support: www.raymondcorp.com.

United States

This device complies with Part 18 of the FCC rules.

NOTE: Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for an industrial device, pursuant to part 18 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in an industrial installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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How to Use This Manual

This manual reinforces your training so you can help prevent personal injury and property damage.

You should read this entire manual and all warning decals before operating your pallet truck or tow tractor.

To Find Information Quickly

- Look it up in the Index at the back of the book.
- Look it up in the Table of Contents.
- Look for the section title in the page heading.

Warnings and Cautions

You will see two kinds of safety reminders in this manual:

WARNING: Warning indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.

CAUTION: Caution indicates a potentially hazardous situation, which, if not avoided, could result in minor or moderate injury or in damage to the pallet truck, tow tractor, or nearby objects. It can also be used to alert against unsafe practices.

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How to Use This Manual

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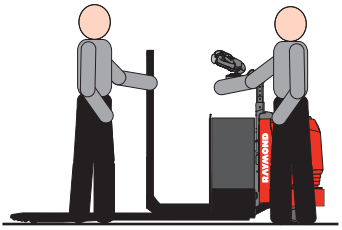
Training

Federal law requires you to be trained and authorized to operate this lift truck.



There is an excerpt of the training requirements under "Selected OSHA Regulations" in the back of this manual.

Neither this manual nor the Owner Manual is a substitute for training.

Read and obey all warnings, cautions, and instructions in this manual and on the lift truck.

CAUTION: Operate this lift truck slowly in an open area until you understand the controls completely.

Raymond builds safe and reliable products. To operate this lift truck safely, you must be properly trained. This manual is intended to remind you of your training so you can help prevent personal injury and property damage.

Talk with your supervisor if you have any questions or concerns about operating this lift truck.

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Safety Standards Compliance

This lift truck complies with the following standards and regulations in effect on the date the lift truck was built:

- ANSI/ITSDF B56.1, an American National Standard
- ANSI/ITSDF B56.5, an American National Standard (lift trucks with Raymond Advance™ Operator Assist Technology)
- Underwriters Laboratories (UL) 583
- Occupational Safety and Health Administration (OSHA) 29 C.F.R. Section 1910.178

Selected portions of these standards and regulations appear in this manual.

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Safety Requirements

WARNING: Industrial equipment can be hazardous.

Powered industrial equipment can be hazardous. This lift truck is not like an automobile. It does not drive, steer, or stop like an automobile.

Lift truck accidents often result from:

- Careless operators
- Untrained and unauthorized use
- Poor maintenance

Your lift truck is part of a material handling system that has three parts:

- The operator
- The lift truck
- The workplace environment

Safe operation of your lift truck requires:

- Your knowledge, training, skill, and attitude
- Active and attentive supervision to reinforce correct operational behavior
- Good lift truck maintenance
- A safe workplace with an appropriately configured lift truck

Certain optional features enhance the operation of your lift truck in special conditions.

See “Options” in the Owner Manual for more information.

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Model 8510 Lift Truck

Model 8510 with PowerSteer Control Handle

Model 8510 with Optional Manual Steer

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Model 8510 with Raymond Advance™ Operator Assist Technology

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Safety

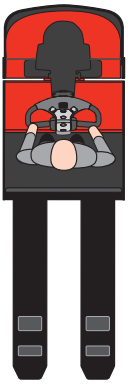
Start-Up Safety

Do not operate this lift truck until you have checked all systems with the Operator's Daily Checklist. See the "Lift Truck Operation" section.

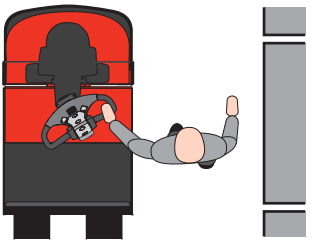
To Operate Safely

Report any malfunction or unsafe condition to your supervisor immediately. Do not operate the lift truck until the condition is corrected.

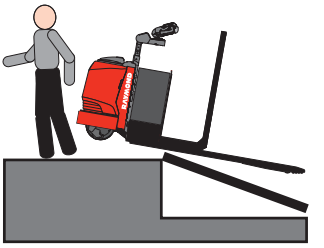
WARNING: Keep all parts of your body inside the operator compartment while riding the Model 8510 lift truck. Keep your hands on the designated grips. Your head, arms, hands, legs, or feet can be seriously injured if they strike objects outside the operator compartment while the lift truck is moving.



WARNING: Keep your body clear of the lift truck, pallet, and nearby objects. Keep your hand on the directional/speed control while walking with a lift truck. Your head, arms, hands, legs, or feet can be seriously injured if they strike objects while the lift truck is moving.



WARNING: Exception: If your lift truck starts to tip or fall off a dock or dockboard, get off the lift truck immediately and move quickly away. If the lift truck tips over, you could be seriously injured or killed.



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WARNING: Never carry unauthorized personnel.

CAUTION: Operate the lift truck slowly and in an open area until you become thoroughly familiar with the lift truck controls.

WARNING: Never let anyone stand on or ride the forks.

To Drive Safely

If you leave the lift truck unattended, fully lower the forks, turn the ON/OFF switch to the OFF (**O**) position, remove the key (if so equipped), and disconnect the battery.

Start, stop, change direction, travel, and brake smoothly.

Always look in the direction you are driving. Keep a clear view.

Travel with the forks as low as possible for floor conditions.

When you cannot see around the load, drive with the load behind you. Always look where you are driving.

Operate this lift truck at a speed that is safe for conditions. Always be mindful of changing conditions and how they might impact lift truck operation.

Keep a safe distance from other lift trucks and objects.

Keep to the right whenever possible.

Do not pass another lift truck going in the same direction at intersections, blind spots, or other dangerous locations.

Obey all traffic rules. Yield the right of way to pedestrians.

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Stop the lift truck and sound the horn when you approach intersections or crosswalks, when you exit an aisle, or when you cannot see clearly.

Always approach and leave aisles slowly.

Slow down for turns and for uneven, wet, or slippery surfaces that could cause the lift truck to slide or tip.

Do not drive over objects on the floor.

Keep the lift truck under control at all times.

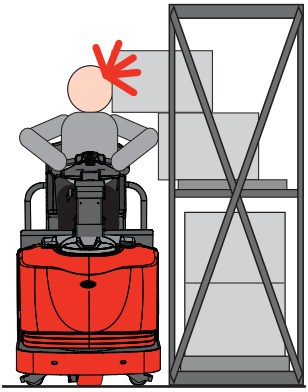
Look out for objects sticking out from racks, shelves, and walls.

WARNING: If you do not operate your lift truck safely, you could be injured by objects protruding from the rack or entering the operator compartment.

Pay attention to your operating environment.

Travel at the safest speed that conditions allow and always within authorized facility speed limits. Operate the lift truck only at a speed that allows the lift truck to be stopped safely at all times and under all travel conditions.

Make sure there is enough light. Drive only in well lit areas.



CAUTION: Operate the lift truck slowly and in an open area until you become thoroughly familiar with the lift truck controls.

Operate this lift truck only from the designated operating positions.

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Pedestrians

Always keep pedestrians safe. Other people in your area or facility might not know how this lift truck works.

Always yield the right of way to pedestrians.

Do not rely on audible alarms to notify pedestrians of your presence. Always stop and sound the horn when you approach intersections or crosswalks, doorways, when exiting trailers, or whenever your view is obstructed.

Keep a clear view, make eye contact with pedestrians and acknowledge the right of way before proceeding.

Do not assume that pedestrians are never present in areas intended or marked as only for lift trucks.

Slow down in areas of high foot traffic.

Do not allow pedestrians between the lift truck and the rack when you are using the lift truck in orderpicking mode.

WARNING: Never drive this lift truck toward or up close to anyone, especially someone standing next to a solid object like a wall or workbench.

WARNING: Never attempt to operate the lift truck in Remote Mode when the lift truck is not in view. Remain with, and in control of, the lift truck at all times. Make sure the area around the lift truck is free of obstructions and pedestrian traffic before operating in Remote Mode.

NOTE: Pedestrian safety training materials are available to assist users in satisfying their duty to provide a safe work environment. For more information, please contact your local Raymond Solutions and Support Center or independent authorized training provider.

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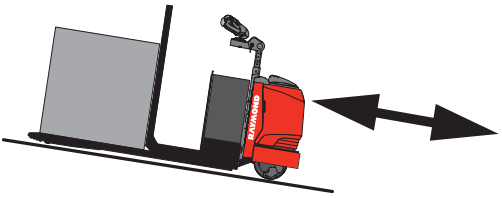
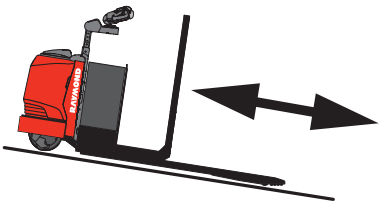
Ramps

WARNING: Align the lift truck with the ramp before driving up or down. Drive slowly in a straight line up or down the ramp. Do not angle or turn the lift truck; the lift truck could tip.

Keep a safe distance from edges of ramps/slopes.

Use special care when operating on ramps. Operate on ramps with the load end upgrade when carrying a load. Operate on ramps with the load end downgrade when the lift truck is empty.





Do not leave the lift truck unattended on the ramp or slope. The lift truck could tip.

WARNING: Never park the lift truck on a ramp. The lift truck could tip.

Lift the forks only enough to clear the ramp.

WARNING: Failure to obey correct methods of ramp operation can result in a lack of lift truck stability that may cause severe personal injury. Refer to "Ramp Operation" for correct operational procedures.

WARNING: Do not use the Raymond Advance™ Operator Assist Technology for Raymond Advance™ system on a ramp.

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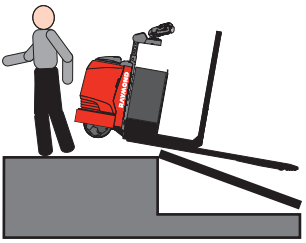
Dockboards

Make sure any movable dockboard is wide enough and strong enough to carry the load. The load capacity must be marked plainly. Before you drive on a dockboard, make sure it is fastened securely to prevent slipping. The sides of the dockboards should be high enough to prevent the lift truck from running over the edge.

Make sure the dockboard has enough contact with the dock and carrier to prevent rocking or sliding. The dockboard should have hand holds, or other means, for safe handling.

Drive the lift truck slowly and smoothly. Do not jar the dockboard out of position.

WARNING: If your lift truck starts to tip or fall off a dock or dockboard, get off the lift truck immediately and move quickly away. If the lift truck tips over, you could be seriously injured or killed.



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Highway Trucks, Trailers, and Railroad Cars

WARNING: Securely set the brakes and chock the wheels of highway trucks, trailers, and railroad cars before you load or unload them.

WARNING: Never enter a trailer unless the wheels are chocked.

WARNING: Check the highway truck, trailer, and railroad car doorway clearance.

WARNING: Make sure floors of highway trucks, trailers, and railroad cars will support the weight of the loaded lift truck.

WARNING: Cross railroad tracks only at approved floor grade crossings.

WARNING: Do not park lift trucks within 8 ft. (2.4 m) of railroad tracks.

Ask local railroad authorities or your supervisor which warning devices to use.

Elevators

Check with your supervisor before you use this lift truck in or near an elevator.

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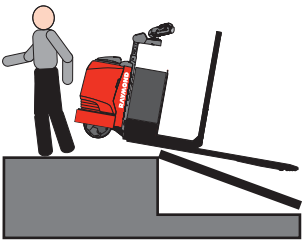
To Handle Loads Safely

Do not overload this lift truck. See the specification tag for capacity information.

Move only secure or stable loads. If your load shifts, your lift truck could tip over.

WARNING: If your lift truck starts to tip or fall off a dock or dockboard, get off the lift truck immediately and move quickly away. If the lift truck tips over, you could be seriously injured or killed.



Do not handle unstable, loosely stacked, or oversized loads. Use extra care when handling long, high, or wide loads.

Use a lift truck equipped with long forks when handling long loads.

Push the forks completely under the load.

Center the load before lifting.

Avoid quick starts, stops, or turns that could shift the load or tip the lift truck.

Do not push loads around on the floor.

Do not use damaged pallets.

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Stability

Your lift truck is designed to be steady and stable. Stability is affected by:

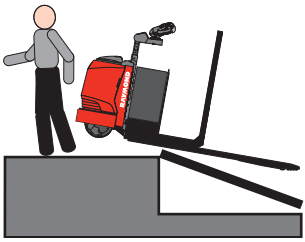
- Lift truck weight, load weight, and weight distribution
- Wheelbase
- Wheel tread width
- Method of suspension
- Tires

The lift truck's specification tag lists the maximum load allowed.

Lift trucks can tip or overturn. This can be caused by:

- Driving, braking, or turning too fast
- Careless load handling by an operator
- Too much load weight and height
- Poor floor conditions
- Rapid changes in speed, turns, or direction of travel.
- Incorrect distribution of load weight

WARNING: If your lift truck starts to tip or fall off a dock or dockboard, get off the lift truck immediately and move quickly away. If the lift truck tips over, you could be seriously injured or killed.



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Battery Safety

Read, understand, and obey all instructions and warnings on the battery and in the battery and battery charger manufacturers' manuals.

WARNING: Failure to follow all of the instructions and warnings in the battery manufacturers' manual can result in electrical shock, serious injury, or death, or can damage the battery, potentially rendering it inoperable. A battery can present a risk of electrical shock, fire or explosion from vented gases. Observe proper precautions.

Tell your supervisor if you have concerns or questions about battery safety or procedures.

WARNING: Explosive hydrogen gas forms when a lead acid battery is charging. An open flame or spark can cause this gas to explode. Serious personal injury or property damage could occur. This can happen even hours after charging. Ventilate the area to eliminate this hazard.

WARNING: Lead acid batteries contain sulfuric acid, which causes burns to skin and clothing. If battery acid contacts your clothing or skin, flush the area immediately with cold water. If battery acid gets on your face or in your eyes, flush the area with cold water immediately and get medical attention.

Follow these precautions when working with or around lift truck batteries:

- Wear personal protective equipment for eyes, face, and skin. This equipment includes goggles or face shield, rubber gloves (with or without arm shields), and a rubber apron. Make sure a shower and eye wash station are nearby.
- Do not smoke, use open flames, or use devices that produce sparks near lift truck batteries.

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- The battery must not move more than 0.5 in. (13 mm) side-to-side or front-to-back within the battery compartment.
- Make sure that there is not excess battery cable slack outside the running lines of the lift truck.
- Never lay tools or metal objects on top of the battery. A short circuit could cause a lead acid battery to explode or damage a lithium-ion battery.
- Poor battery condition may negatively impact your lift truck's performance. Properly maintaining your batteries, including use of the battery manufacturer's recommended charging cycles, will help you realize optimal battery life and performance.

Warning Decals

Read and obey all warning decals on your lift truck. If you have any questions about these warnings, ask your supervisor.

If a decal is damaged or missing, report it to your supervisor. Your local authorized Raymond Solutions and Support Center will replace it without charge. (See "Location of Warning Decals" for the location of the numbered decals shown in the following table.)

1	
	WARNING **For your safety and the safety of others.** Do not operate this truck unless trained and authorized to do so. Read all warnings and instructions contained in the Operator's Manual and on the truck. 1. Check all operating systems and safety devices as noted in the Operator's Manual. Report any unsafe conditions immediately. Do not operate truck until corrected. 2. Never place any part of your body outside the truck while in riding/operating position.

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	3. Travel with the load as low as possible. 4. Operate truck only from operating position. Keep hands on designated grips. Keep feet clear of truck while operating in orderpicking mode. Do not carry passengers. 5. Do not overload truck. Check nameplate for capacity. 6. Start, stop, change direction, travel and brake smoothly. Slow down for turns and on uneven or slippery surfaces that could cause truck to slide or tip. 7. Use extreme care when traveling without load. Excessive speed with abrupt turns or on uneven surfaces may cause truck to tip over. 8. Always look in direction of travel. Keep a clear view, and travel with load trailing. 9. Use special care when operating on ramps. Travel slowly and do not angle or turn. Do not leave truck unattended on the ramp. 10. Do not handle unstable or loosely stacked loads. 11. Observe applicable traffic regulations. Yield right of way to pedestrians. Slow down and sound horn at intersections and/or whenever vision is obstructed. 12. When leaving truck unattended, ensure forks are fully lowered and remove key.	
2		**WARNING** Do not connect charger to truck connector.
3		Emergency Disconnect
In addition to the main lift truck warning decals, your Raymond Advance™ Operator Assist Technology equipped lift truck will also have the following decal installed.		
4		NOTE: ISO 7010 symbol P010 means “Do Not Touch”

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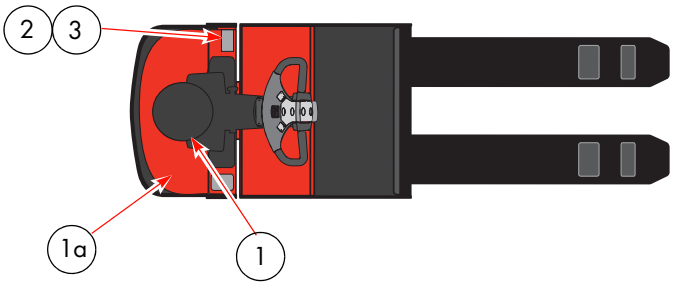
Location of Warning Decals

See "Warning Decals" for the description of decals.



On lift trucks equipped with Raymond Advance™ Operator Assist Technology, the Main Warning Decal is on the corner of the main tractor cover (position 1a).

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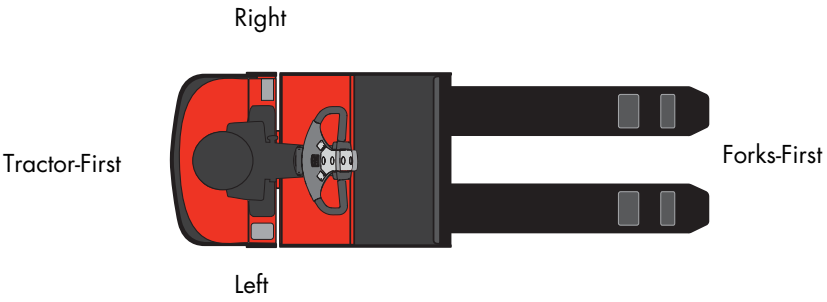
Lift Truck Direction Reference

"Left" and "right" assume you are standing in the operator compartment facing away from the forks.

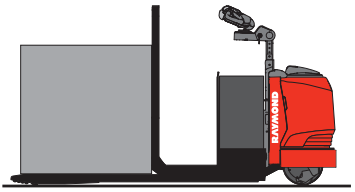
The operator compartment is where you stand to operate the lift truck.



Capacity and Rating

The lift truck is rated for performance by load weight.

Load weight includes the weight of the pallet, container, or load-holding attachment. Load weight should be evenly distributed.



WARNING: Exceeding the maximum load weight could affect safe operation, affect stability, or damage the lift truck.

Review the specification tag on the compartment cover for the lift truck's capacity. For example, see "Specification Tag."

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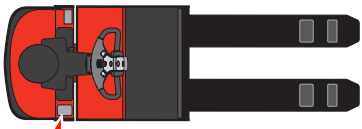
Specification Tag

The specification tag for the lift truck shows capacity, lift truck weight, and battery weight information.

The specification tag is on the upper right side of the tractor when facing the lift truck.

A second specification tag is inside the tractor compartment on the right side bulkhead plate as you face the motor compartment. On lift trucks equipped with the optional right-side battery connector, the specification tag is on the upper left side of the tractor.



RAYMOND

THE RAYMOND CORPORATION
GREENE, NY 13778 USA

TAG NO.

MODEL	SERIAL NUMBER	VOLTS
TRUCK WEIGHT +/- 5% W/MAX BATTERY, LBS (KGS)	BATTERY WEIGHT MAXIMUM, LBS (KGS)	BATTERY RATE AMP-HOUR
WITHOUT BATTERY	MINIMUM	HOUR RATE

HORIZONTAL MOTION OF BATTERY MUST NOT EXCEED 0.5 IN (13 mm)
ATTACH RESTRAINT TO COMPARTMENT AS REQUIRED.

MAX. CAPACITY (UNIFORMLY DISTRIBUTED LOAD)
LBS KGS

THIS FORKLIFT TRUCK MEETS OR EXCEEDS DESIGN SPECIFICATIONS OF ANSI/ITSDF B56.1 IN EFFECT ON THE DATE OF MANUFACTURE FOR TYPE _ INDUSTRIAL TRUCKS WHEN EQUIPPED WITH TYPE _ BATTERY.

Figure 1: Model 8510 Specification Tag

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Model 8510 with Raymond Advance™ Operator Assist Technology

Model 8510 lift trucks with Raymond Advance™ Operator Assist Technology have a supplemental specification tag with ratings applicable while operating in Remote Mode.

Figure 2: Specification Tag for Model 8510 with Raymond Advance™ Operator Assist Technology

THESE SPECIFICATIONS APPLY DURING USE IN REMOTE MODE ONLY.	
Rated Speed 3.6 mph / 5.8 km/h	Maximum Load Boundary
Rated Load See Main Specification Tag	14.75 in. (375 mm)
Maximum Grade Capability Level Ground Only	62 in. (1575 mm)
This industrial truck meets or exceeds design specifications of ANSI/ITSDF B56.5 part IV in effect on the date of manufacture.	14.75 in. (375 mm)

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Your Lift Truck

Operator Compartment

The operator compartment is where you stand on the lift truck to operate it when riding.

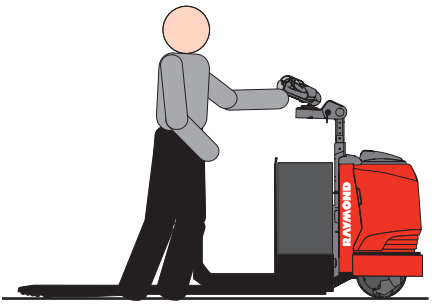
Correct Operating Positions

The following pages show the correct operating positions for the lift truck.

WARNING: Always keep one hand on the control handle and keep feet clear of the lift truck during walk beside operation.

Order Picking Position

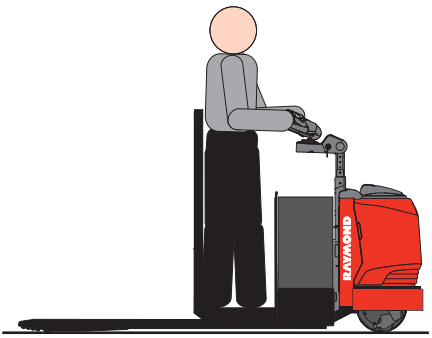
You may walk beside the Model 8510 equipped with optional jog buttons or switches to operate the lift truck in order picking mode.



WARNING: Make sure there is enough space to prevent you from being trapped between the lift truck and nearby objects.

Riding Position

Keep all parts of your body inside the operator compartment while riding the Model 8510. Keep your hands on the designated grips. Place both feet on the compartment floor and both hands on the control handle.



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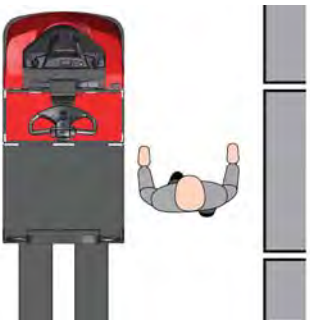
Correct Remote Mode Operating Position

You may walk beside the Model 8510 equipped with Raymond Advance™ Operator Assist Technology to operate the lift truck in Remote Mode. When in Remote Mode, manual operation of the lift truck from the riding position or using the control handle is not allowed.

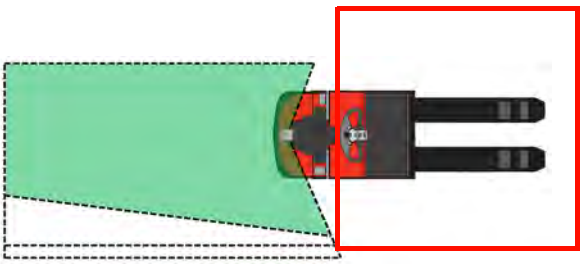
CAUTION: Do not operate the Model 8510 with Raymond Advance™ Operator Assist Technology from the operator compartment when operating in Remote Mode.

WARNING: Always remain with, and in control of, the lift truck when operating in Remote Mode. Do not leave the lift truck unattended.

WARNING: Make sure there is enough space to prevent you from being trapped between the lift truck and nearby objects.



Remain behind the Laser Sensor Unit (LSU) Stop Field when operating the Model 8510 with Raymond Advance™ Operator Assist Technology in Remote Mode.



WARNING: Do not use the Raymond Advance™ Operator Assist Technology on a ramp.

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Raymond Advance™ Operator Assist Technology for Raymond Advance™ System Definitions and Acronyms

The following definitions and acronyms are used in this manual when referencing the Raymond Advance™ Operator Assist Technology for the Raymond Advance™ system components and operation in Remote Mode.

APM: Auxiliary Processing Module – Mounted under the tractor cover. The APM controls the lift truck functions when Raymond Advance™ Operator Assist Technology for the Raymond Advance™ system is active, including the automated steering.

BLE: BlueTooth® Low Energy – The communication method used to relay signals between the RTU and RRU after initially paired.

I/O: Input/Output.

LED: Light-Emitting Diode – A series of colored lights on the Raymond Advance™ System Operator Display. Used to communicate the status of the Raymond Advance™ system.

LSU: Laser Sensor Unit – Mounted under the Raymond Advance™ system cover. Used for maintaining distance from a rack and for obstruction detection.

NFC: Near-Field Communication – The communication method used to pair the RTU and the RRU.

RRU: Remote Receiver Unit – Contained within the Raymond Advance™ Operator Assist Technology for Raymond Advance™ System Operator Display mounted under the Raymond Advance™ system cover. Used to communicate to the APM and the RTU when the Raymond Advance™ Operator Assist Technology for the Raymond Advance™ system is active.

RTU: Remote Transmitter Unit – The device used by an operator to send requests to the Raymond Advance™ Operator Assist Technology for Raymond Advance™ system (for example: a travel command or to unpair).

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VM: Vehicle Manager – Contained within the control handle of the lift truck. Used to control the functions of the lift truck. When the Raymond Advance™ Operator Assist Technology for the Raymond Advance™ system is active, the VM sends and receives information to and from the APM to control the functions of the lift truck.

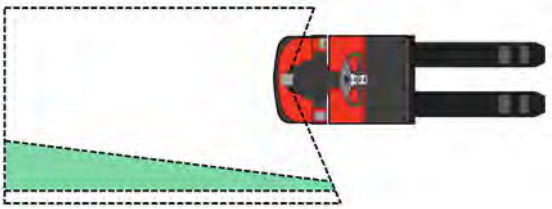
Manual Mode: The mode in which the Raymond Advance™ Operator Assist Technology for the Raymond Advance™ system is disabled and manual operation of the lift truck from the riding position or using the control handle is allowed.

NOTE: Manual Mode may be active even if an RTU is paired.

Remote Mode: The mode in which the Raymond Advance™ Operator Assist Technology for the Raymond Advance™ system is active. When this mode is enabled and an RTU is paired, manual operation of the lift truck from the riding position or using the control handle is not allowed. The operator controls the lift truck movement with the RTU.

Field Set: The configuration of the LSU that determines the specifications of the Tracking Field, Steer Field, and Stop Field used by the lift truck for steering when in Remote Mode. See the definition of each of the field types.

Steer Field: The middle portion of the field set that is used to determine when the lift truck should attempt to navigate around a detected obstacle. See "Remote Mode System Sensors" for additional information on fields and expected lift truck behavior.



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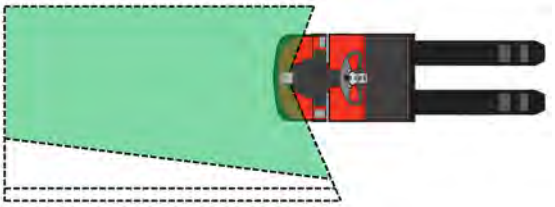
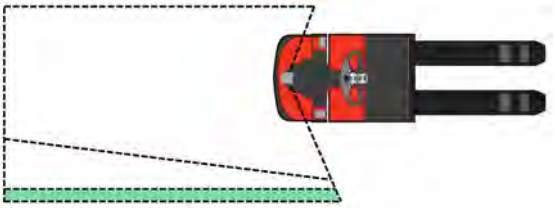
Stop Field: The portion of the field set that is closest to the center of the lift truck. This field is used to cause the lift truck to stop when an obstruction is detected in the lift truck travel path. See "Remote Mode System Sensors" for additional information on fields and expected lift truck behavior.



Tracking Field: The portion of the field set that is closest to the rack on the tracking side. This field is used to maintain a pre-determined distance from a rack. See "Remote Mode System Sensors" for additional information on fields and expected lift truck behavior.



Remote Mode System Components

The Raymond Advance™ Operator Assist Technology for Raymond Advance™ system includes the following components. See Figure 3 on page 32 for component location.

Auxiliary Processing Module (APM) – Mounted under the tractor cover. The APM controls the lift truck functions when the Raymond Advance™ Operator Assist Technology for Raymond Advance™ system is active, including the automated steering.

Charger – Each charger can recharge up to 10 Raymond Advance™ Operator Assist Technology for Raymond Advance™ system Remote Transmitter Units at one time.

I/O – The red button on the end of the Remote Transmitter Unit that is used to power on the Remote Transmitter. It is also used to wake an inactive RTU or unpair from the lift truck.

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Laser Sensor Unit (LSU) – Mounted under the Raymond Advance™ Operator Assist Technology for Raymond Advance™ system cover. Used for maintaining distance from a rack and for obstruction detection.

Remote Receiver Unit (RRU) – Contained within the Raymond Advance™ Operator Assist Technology for Raymond Advance™ system operator display mounted under the Raymond Advance™ system cover. Used to communicate to the APM and the RTU when the Raymond Advance™ Operator Assist Technology for Raymond Advance™ system is active.

Remote Transmitter Unit (RTU) – The device used by an operator to send requests to the Raymond Advance™ Operator Assist Technology for Raymond Advance™ system (for example: a travel command or to unpair).

Side Selection Switches – Push buttons mounted on either side of the Raymond Advance™ Operator Assist Technology for Raymond Advance™ system. The Side Selection Switches are used to select the side of the aisle that is used for tracking. See "System Activation and Side Selection" for additional details on the Side Selection Switches.

Status Lights – Amber lights mounted on either side of the Raymond Advance™ Operator Assist Technology for Raymond Advance™ system. Status lights are used to indicate the side of the aisle that will be used for tracking. They are also used for indicating when the Stop Field is occupied or when an RTU has been unpaired from the system. See "Status Lights" for additional information on the Status Lights.

Toggle Switch – The toggle switch is located to the right of the RRU display when facing the lift truck from the operator position. It is used to turn the Raymond Advance™ Operator Assist Technology for Raymond Advance™ system ON or OFF.

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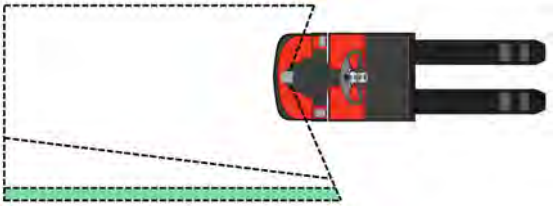
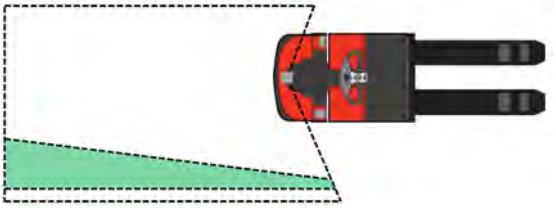
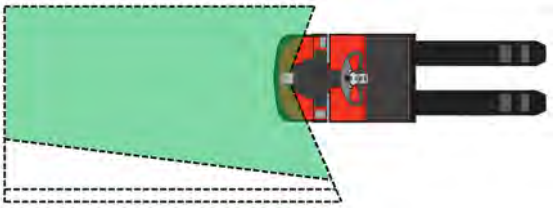
Remote Mode System Sensors

When the Raymond Advance™ Operator Assist Technology for the Raymond Advance™ system is active, the Laser Sensor Unit (LSU) uses a pre-configured field set to determine proximity to the rack and identify the correct behavior of the lift truck. Each field set consists of three fields: tracking, steer, and stop.

NOTE: The following images show all tracking to be on the left side of the lift truck. This information also applies to tracking on the right side of the lift truck when the field sets are mirrored.

Table 1. Laser Sensor Field Identification

Field Name	Field Area
Tracking Field	
Steer Field	
Stop Field	

The following table shows examples of expected lift truck behavior under specific scanner field conditions.

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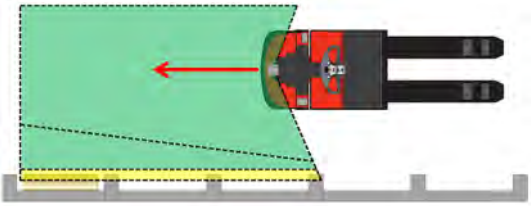
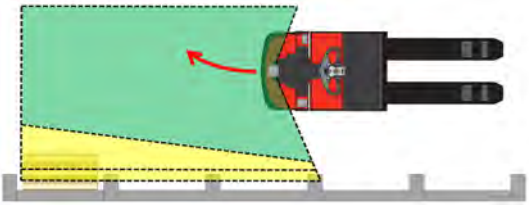
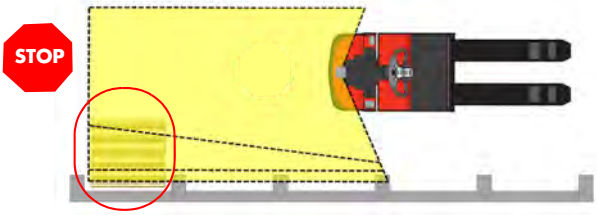
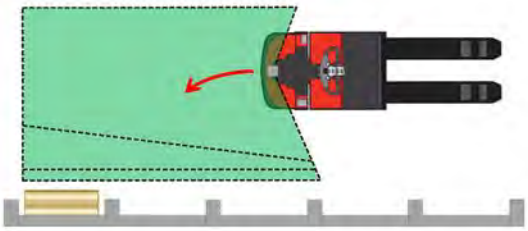
Table 2.

Scanner Scenario	Expected Behavior
	
Tracking Field: Occupied **Steer Field:** Vacant **Stop Field:** Vacant	The lift truck will travel tractor-first in a straight line aligned with the Tracking Field.
	
Tracking Field: Occupied **Steer Field:** Occupied **Stop Field:** Vacant	The lift truck will steer in an attempt to navigate around a detected obstacle, as necessary, until it is tracking at the predefined distance from the rack with the Tracking Field.
	
Tracking Field: Occupied **Steer Field:** Occupied **Stop Field:** Occupied	The lift truck will stop.
	
Tracking Field: Vacant **Steer Field:** Vacant **Stop Field:** Vacant	The lift truck will adjust its position toward the rack until it is tracking at the predefined distance from the rack with the Tracking Field.

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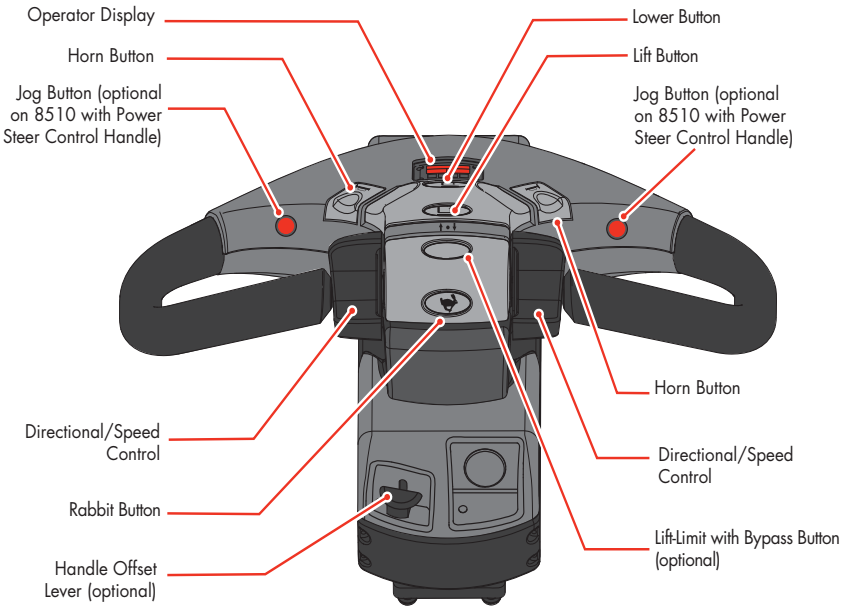
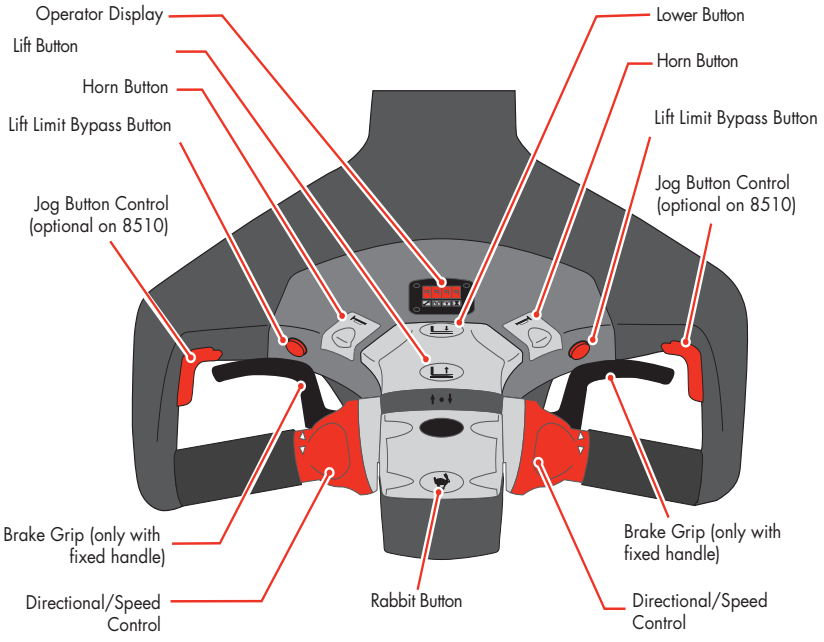
Controls

Control Locations

The following illustrations show the location of controls and indicators.



PowerSteer



Optional Manual Steer

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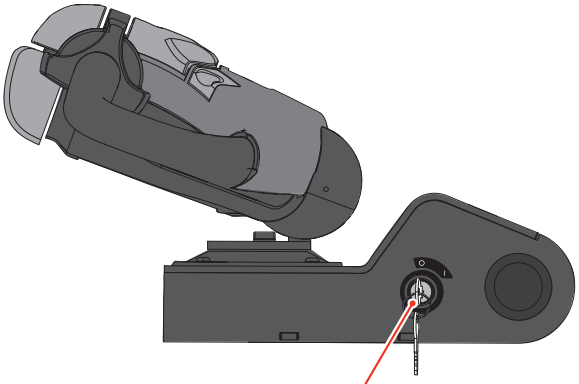

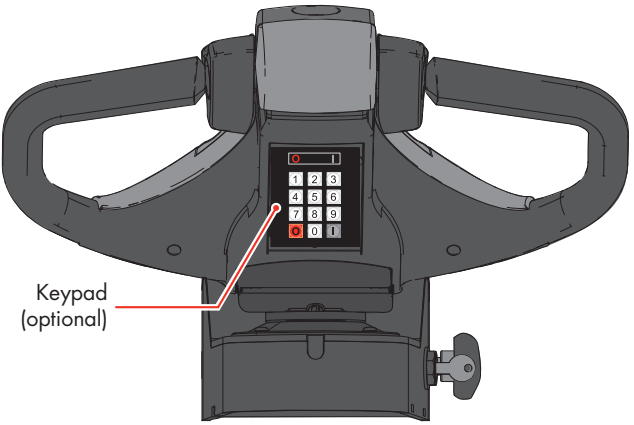

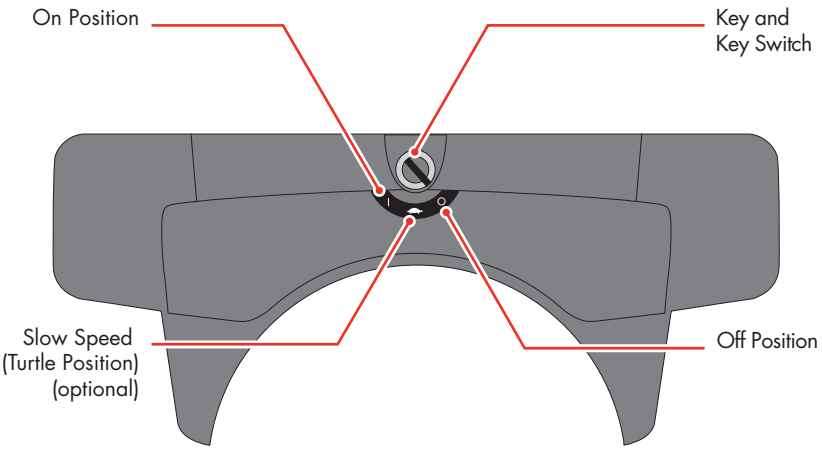

Manual Steer Only

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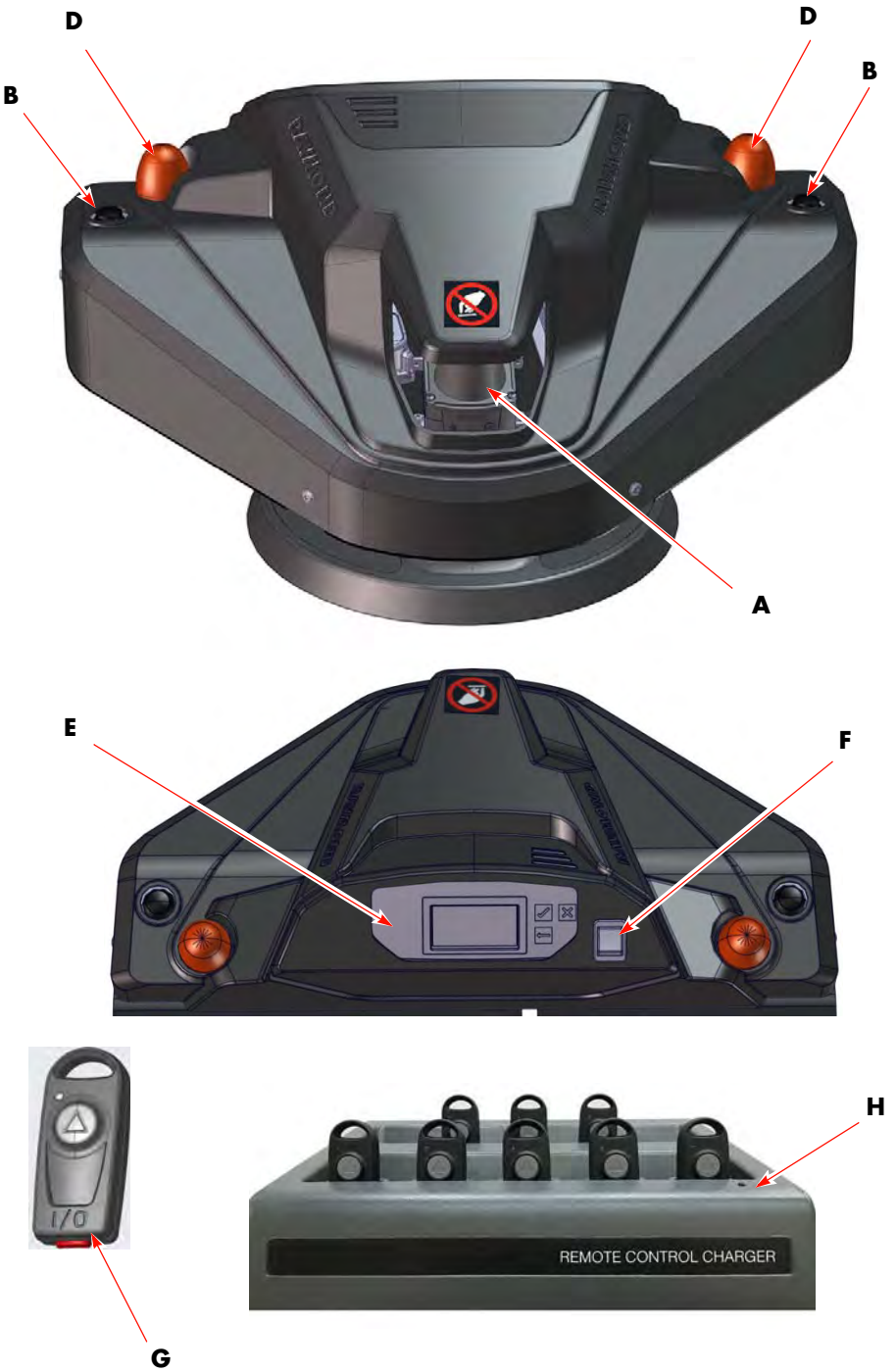
Controls

Figure 3: Raymond Advance™ Operator Assist Technology for Raymond Advance™ System Component Location



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Item	Description
A	Laser Sensor Unit (LSU)
B	Side Selection Switch (Black)
C	Vehicle Manager (VM) - located in the Control Handle (Not Shown)
D	Status Lights (Amber)
E	Remote Receiver Unit (RRU) Display and Indicator LEDs
F	Toggle Switch
G	Remote Transmitter Unit (RTU)
H	Charger

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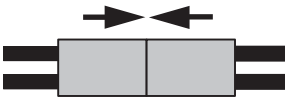
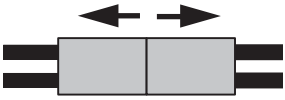
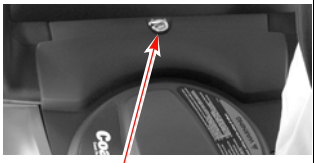
Controls

The individual controls work this way:

Control	Operator Action	Lift Truck Response
Battery Connector		Connects the battery to the lift truck's electrical system. Lift truck is ready for operation.
Emergency Disconnect		Pull the Emergency Disconnect handle to remove battery power from the lift truck's electrical system. Travel and hydraulic functions are disabled.
Keyless Switch (Optional)	 Keyless Switch	Power is ON (**I**) or OFF (**O**).

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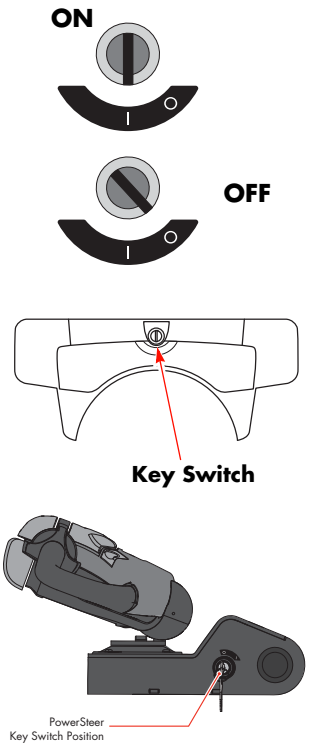
Control	Operator Action	Lift Truck Response
Key Switch		Power is ON (**I**) or OFF (**O**).

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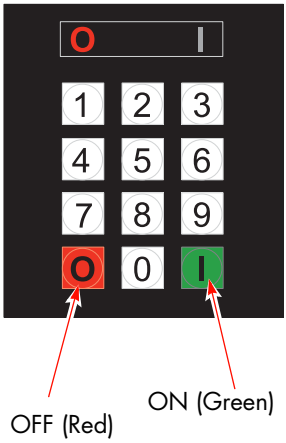
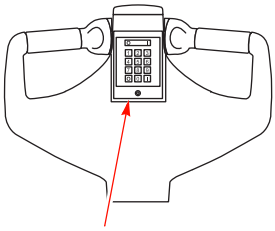
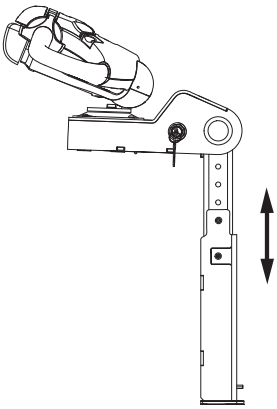
Controls

Control	Operator Action	Lift Truck Response
Keypad (Electronic Key) (Optional)	  Directional/Speed Control Handle Showing Location of Keypad (Electronic Key)	Power is ON (Green) or OFF (Red). (See "Keypad (Optional).")
Handle Height Adjustment (PowerSteer Control Handle)		Placement of the bolts adjusts the height of the handle. Note: Not operator adjustable (consult service technician).

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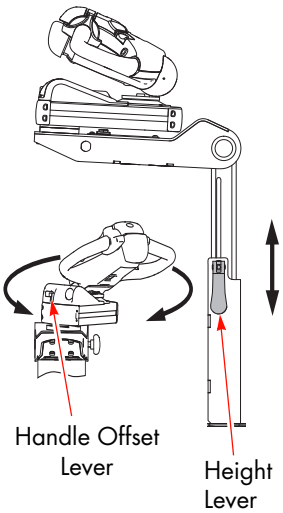
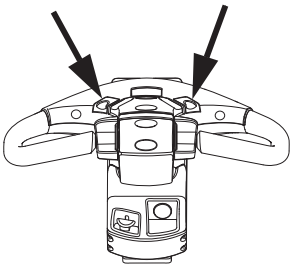
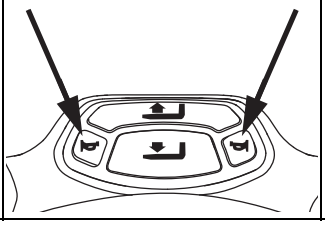
Control	Operator Action	Lift Truck Response
Handle Adjustment (Premium PowerSteer Control Handle) (Optional)		Release the lever to allow the handle to be adjusted for height. Press the handle offset lever down to allow the control head to rotate to either side for walk-beside operation.
Horn		
Horn Button On Load Backrest		

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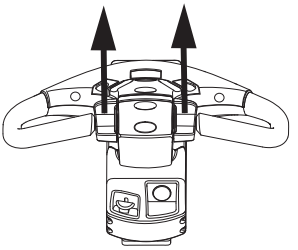
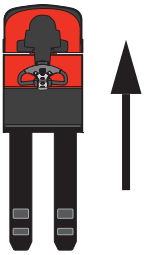
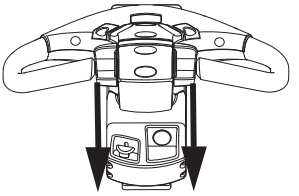
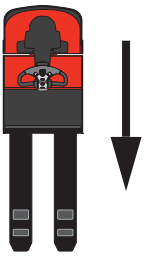
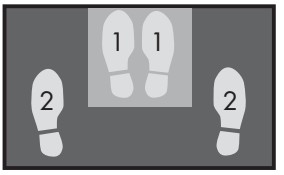
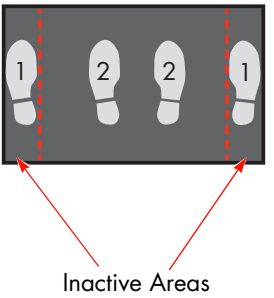
Control	Operator Action	Lift Truck Response
Directional/Speed Control Handle (PowerSteer) (Standard)		
		
Floor Mat (PowerSteer)		For travel when your lift truck floor mat has a gray square in the center front, move the PowerSteer control handle in the up position, step into the gray non-active area of the floor mat then back onto the black area. Pull the handle down into the drive position.
Floor Mat (PowerSteer)		For travel when your lift truck floor mat does not have a gray square in the center front, move the PowerSteer control handle in the up position, step onto the outside edges of the floor mat then back to the center of the mat. Pull the handle down into the drive position. Alternately, you can stand beside the lift truck, raise the handle to the upright position, step onto the mat, and pull the handle down into the drive position.

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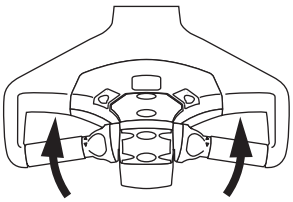
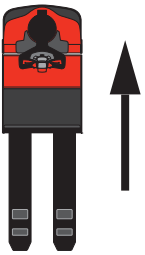
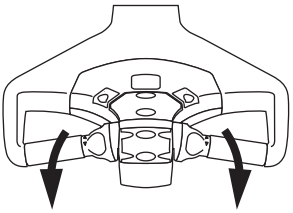
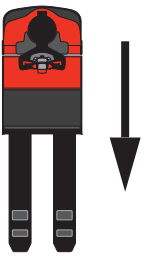
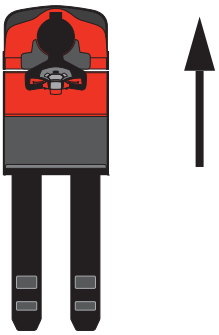
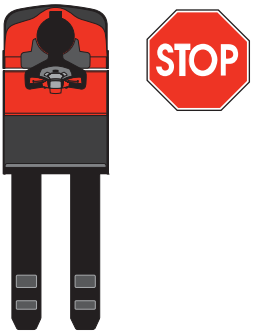
Control	Operator Action	Lift Truck Response
Directional/Speed Control Handle (Manual Steer) (Optional)		
		
Parking Brake	The electrical brake is released when the control handle is put in the operating position and the directional/speed control is activated.	
	The electrical brake is applied when the operator returns the speed control to neutral and the lift truck has come to a complete stop.	

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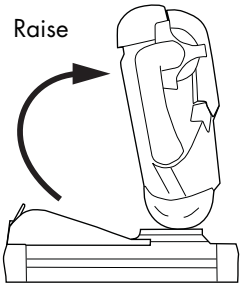
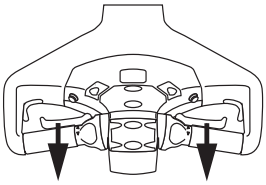
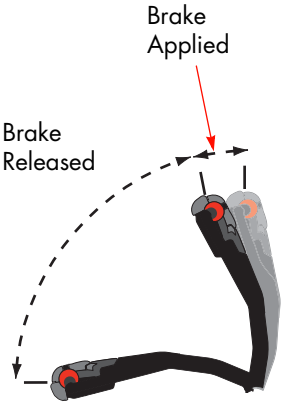
Control	Operator Action	Lift Truck Response
Service Brake	With PowerSteer control handle. 	
	With optional fixed handle. 	
	With optional spring-loaded handle. 	

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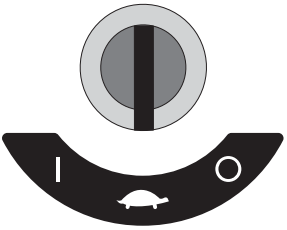
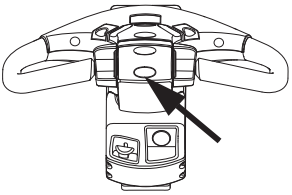
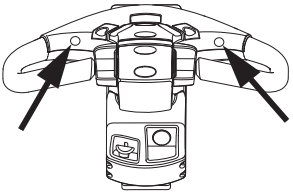
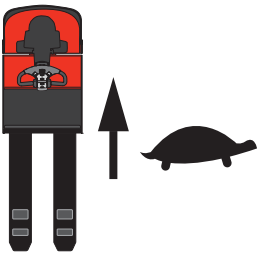
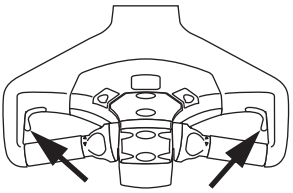
Control	Operator Action	Lift Truck Response
Turtle Speed	Optional (See "Turtle Speed (Optional).")  Three-position key switch.	Lift truck speed limited to normal walking speed.
Rabbit Speed		High speed enabled.
Jog Button Controls (Optional)	 Jog Buttons (PowerSteer Handle)	
	Optional  Jog Buttons (Manual Steer Handle)	

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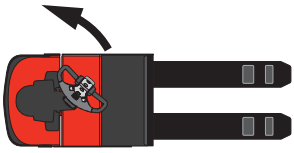
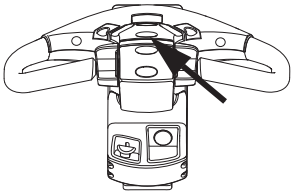
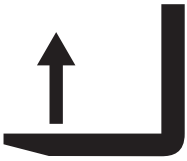
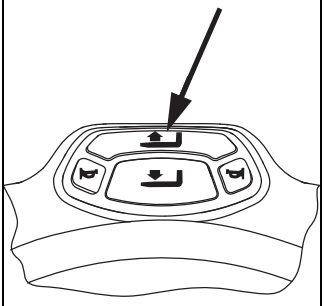
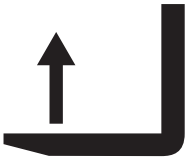
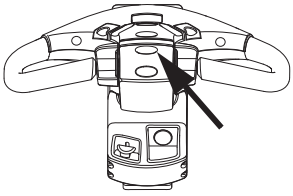
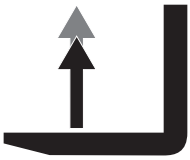
Controls

Control	Operator Action	Lift Truck Response
Steering		
		
Lift		
Lift Button on Load Backrest (Optional)		
Lift-Limit Bypass (Override) Button (PowerSteer) (Optional)	 Press and hold the bypass button, then press the lift button.	

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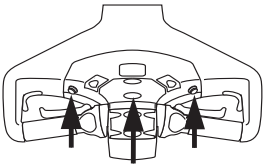
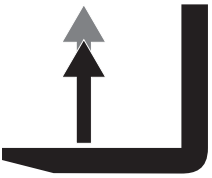
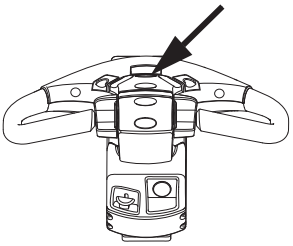
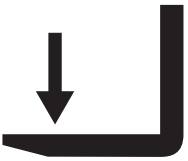
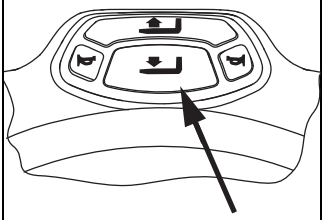
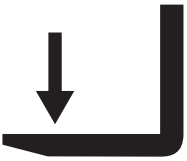
Control	Operator Action	Lift Truck Response
Lift-Limit Bypass (Override) Button (Manual Steer) (Optional)	 Press and hold one bypass button, then press the lift button.	
Lower		
Lower Button on Load Backrest (Optional)		

Lithium-Ion Battery

For lift trucks equipped with a Raymond approved lithium-ion battery, travel is limited to 1.0 mph (1.6 km/h) when the battery is near full discharge or an internal fault is detected. Refer to the battery manufacturer's manual.

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Raymond Advance™ Operator Assist Technology for Raymond Advance™ System

The Raymond Advance™ Operator Assist Technology for Raymond Advance™ system is an option that allows an operator to remotely command the lift truck to travel tractor-first in the aisle while tracking either the left or right rack at a predetermined distance. A Laser Sensor Unit (LSU) is used for maintaining distance from the rack and detecting obstructions.

Status Lights

The Status Lights provide an operator with system information. The Status Lights can indicate:

- the tracking side currently selected
- the system is actively following a command
- the stop field is occupied
- the Remote Transmitter Unit is unpaired from the Remote Receiver Unit

Status Light Activity	Description
Either light illuminated steady	The Raymond Advance™ Operator Assist Technology for Raymond Advance™ system is active. The lift truck is stationary and will track the indicated side of the aisle when a travel command is received.
Either light flashing once per second	The Raymond Advance™ Operator Assist Technology for Raymond Advance™ system is active, travel command is active, and the lift truck is tracking the indicated side of the aisle.
Both lights flashing three times per second	Stop Field is occupied while the Raymond Advance™ Operator Assist Technology for Raymond Advance™ system is active and lift truck has stopped.