OPERATING MANUAL

J2.2-3.5XN (A276)

DO NOT REMOVE THIS MANUAL FROM THIS UNIT

PART NO. 1689094 **10/17**

LIFT TRUCK MODEL_____ **SERIAL NUMBER**_____

TRACTION MOTOR_____ **SERIAL NUMBER**_____

HYDRAULIC PUMP MOTOR_____ **SERIAL NUMBER**_____

STEERING PUMP MOTOR_____ **SERIAL NUMBER**_____

MAST LIFT HEIGHT_____ **GROUP NUMBER**_____

CARRIAGE TYPE_____ **GROUP NUMBER**_____

DRIVE TIRE SIZE_____ **STEERING TIRE SIZE**_____

SPECIAL EQUIPMENT OR ATTACHMENTS

_____

_____

_____

Foreword

To OWNERS, USERS, and OPERATORS:

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

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

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

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

NOTE: A comprehensive operator training program is available from **Hyster Company**. For further details, contact your dealer for **Hyster** lift trucks.

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

Some of the components and systems described in this **Operating Manual** will **NOT** be installed on your unit. If you have a question about any item described, contact your dealer for **Hyster** lift trucks.

The following additional information is provided as specified in Machinery Directive 98/37 EEC:

- **Dimensional Details:** Certain information is shown on the lift truck Nameplate. For additional dimensional details on this or any other specific truck, consult your dealer.

Foreword

HYSTER

- **Noise Levels. Note:** The directive legally requires this information. The values have been calculated from the acoustic power levels for lifting and driving only and are only used for comparable value for different trucks. Higher or lower noise emissions can exist during operation of the truck, for example due to type of operation, environmental influences, and additional noise source outside of the truck.

  In accordance with standards EN 12053 and EN ISO 4871, the equivalent sound pressure level (Lpaz) at the operator position is in the range of: 65.0 - 67.0 db(A).

- **Human Vibration (Whole-Body and Hand-Arm Vibration). Note:** The whole-body vibration level is measured according to standard EN 13059 which contains specific test criteria (load, speed, roadway surface, etc.). Worksite vibration levels may vary depending on actual operating and surface conditions.

  Whole-body vibration:

— Measured whole body vibration at the operator position, based on standard production truck with full-suspension seat is listed below.

— Declared whole-body vibration emission value is in accordance with EN 12096.

- Measured vibration emission value $a_{W,Z}$ = **0.5** m/s^2
- Uncertainty, K = **0.2** m/s^2

— Values determined according to EN 13059.

Hand-arm vibration:

— Hand-arm vibration emission value = <2.5 m/s^2

- **Hazardous Atmosphere:** Before any truck within the European Community can be operated in a Potentially Explosive Atmosphere, it is necessary that the truck is suitably converted for the application. Conversions should only be carried out by a **Hyster** approved supplier. Confirmation of the conversion can be made by referring to the truck Declaration of Conformity which will confirm compliance with European Directive 94/9/ce. If you are in doubt, please contact your **Hyster** dealer for assistance.

⚠ CAUTION

Disposal of batteries must meet local environmental regulations.

CAUTION

Disposal of lubricants and fluids must meet local environmental regulations.

NOTE: Hyster lift trucks are not intended for use on public roads.

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

WARNING

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

CAUTION

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

On the lift truck, the WARNING symbol is on orange background. The CAUTION symbol is on yellow background.

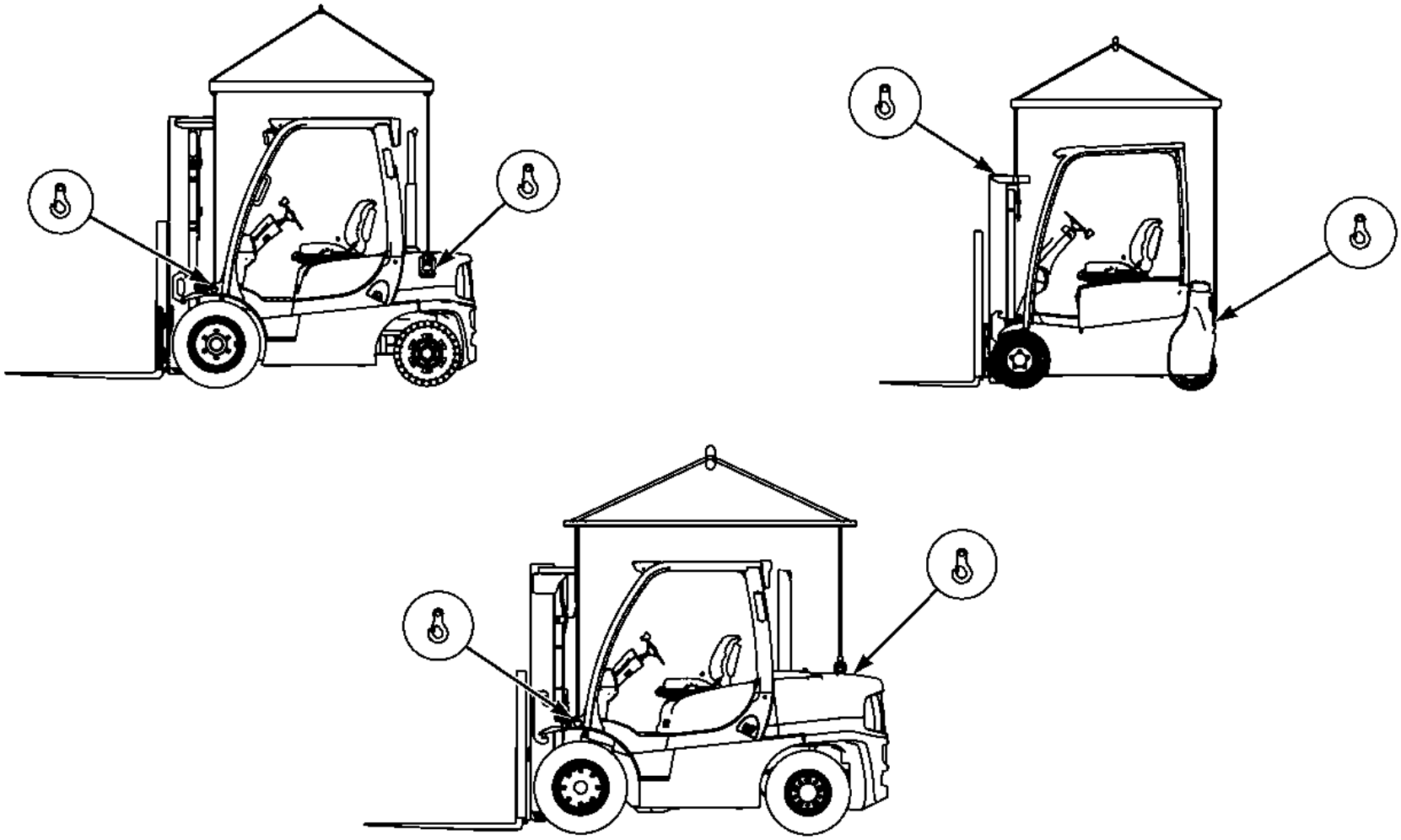
Atmospheric Conditions

This range of lift trucks is designed to work in the following atmospheric conditions:

Average ambient temperature for continuous duty:	+25°C
Maximum ambient temperature (with reduced performance):	+40°C
Lowest ambient temperature for trucks intended for use in normal indoor conditions:	+5°C
Lowest ambient temperature for trucks intended for use in normal outdoor conditions:	−20°C
Altitude:	Up to 2000m
Relative humidity:	From 30% to 95% (noncondensing)

Lifting

When transporting the truck, should lifting be required, please use the points indicated on the truck by the hook symbols. Traction batteries should be removed and lifted separately by the lifting eyes on the battery box.



Lifting points applicable to lift trucks shipped to Russia.

HYSTER

CE

EC DECLARATION OF CONFORMITY

WE

HYSTER EUROPE
CENTENNIAL HOUSE
BUILDING 4.5
FRIMLEY BUSINESS PARK
FRIMLEY, SURRY GU16 7SG
UNITED KINGDOM

DECLARE UNDER OUR SOLE RESPONSIBILITY THAT THE MACHINE

CATEGORY: FORKLIFT BATTERY POWERED

TYPE _____

SERIAL NUMBER(S) _____

YEAR OF CONSTRUCTION _____

IS IN CONFORMITY WITH THE MACHINERY DIRECTIVE 2006/42/EC. COMPLIANCE WITH THIS DIRECTIVE IS ESTABLISHED BY MEETING THE TECHNICAL REQUIREMENTS OF THE RELEVANT STANDARDS, INCLUDING EN ISO 3691-1

OTHER APPLICABLE DIRECTIVES:
2014/30/EU - EMC EMISSIONS

TECHNICAL FILE CONTROLLED BY THE ENGINEERING MANAGER, HYSTER-YALE UK LIMITED, CRAIGAVON, NORTHERN IRELAND

NAME _____

POSITION PLANT MANAGER
(BLOCK LETTERS)

SIGNATURE _____

DATE _____

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Warning

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⚠ WARNING

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE SERIOUS INJURY OR DEATH!
AUTHORIZED, TRAINED OPERATOR ONLY!

The following WARNING is a label and must be on the lift truck.

KNOW THE EQUIPMENT:

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

LOOK WHERE YOU ARE GOING:

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

KNOW YOUR LOADS:

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

⚠ WARNING

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE SERIOUS INJURY OR DEATH!
AUTHORIZED, TRAINED OPERATOR ONLY!

KNOW THE AREA:

- CHECK dockboard width, capacity, and security.
- NEVER enter a trailer or railroad car unless the wheels are blocked.
- WATCH floor strength.
- FILL fuel tank or charge battery only in designated area.
- AVOID sparks or open flame.
- Provide ventilation.
- TURN OFF engine when fueling.
- DO NOT start truck if fuel is leaking.
- KEEP vent caps clear when charging battery.
- DISCONNECT battery during servicing.

USE COMMON SENSE:

- NEVER transport people on any part of the truck.
- DO NOT use truck to lift people unless there is no other practical option. Then, use only a securely attached special work platform.
- ALLOW NO ONE under or near lift mechanism or load.
- DO NOT move truck if anyone is between truck and stationary object.
- OPERATE truck only from operator's seat.
- KEEP arms, legs, and head inside operator's compartment.
- OBEY traffic rules. Yield right-of-way to pedestrians.
- BE in complete control at all times.
- BEFORE DISMOUNTING, neutralize travel control, lower carriage, and set brake.
- WHEN PARKING, also shut off power, close LPG fuel valve, block wheels on inclines.

Warning

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⚠ WARNING

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE SERIOUS INJURY OR DEATH!
AUTHORIZED, TRAINED OPERATOR ONLY!

PROTECT YOURSELF, FASTEN YOUR SEAT BELT!

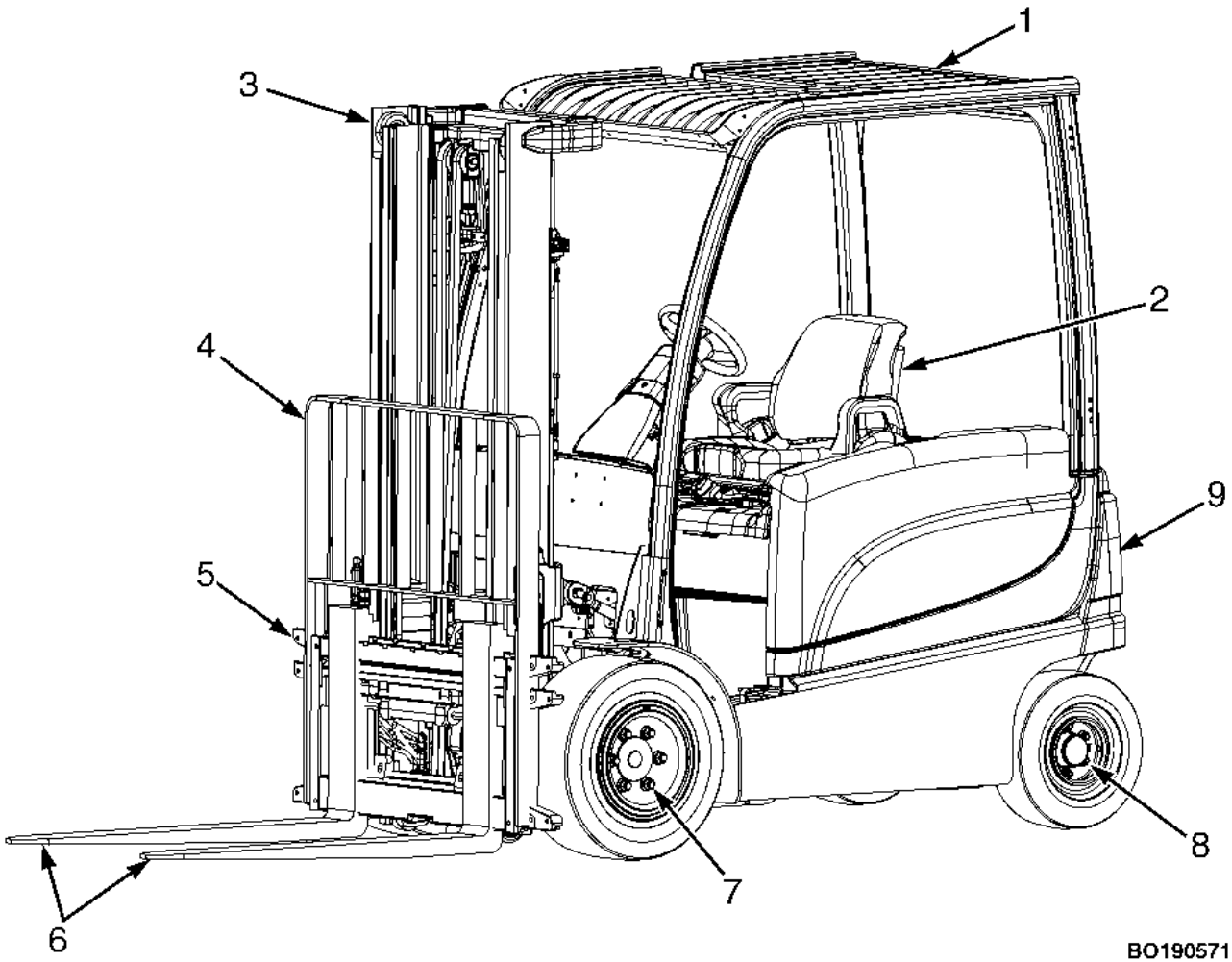
- AVOID bumps, holes, loose materials, and slippery areas.
- AVOID sudden movements. Operate all controls smoothly.
- NEVER turn on, or angle across an incline. Travel slowly.
- TRAVEL on inclines with load uphill or unloaded with mast downhill.
- TILT mast slowly and smoothly.
- LIFT or LOWER with mast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

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

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

HYSTER

Model Description



1. OVERHEAD GUARD
2. SEAT BELT AND HIP RESTRAINT BRACKET
3. MAST
4. LOAD BACKREST EXTENSION
5. CARRIAGE
6. FORKS
7. DRIVE AXLE AND WHEELS
8. STEERING AXLE AND WHEELS
9. COUNTERWEIGHT

Figure 1. Model View Showing Major Components

Model Description

General

This series of electric lift trucks is available in the following models (see **Figure 1**):

J2.2XN, J2.5XN, J3.0XN, and J3.5XN (A276)

The lift trucks covered in this **Operating Manual** are equipped with pneumatic tires or solid rubber tires that look like pneumatic tires. See **Tires and Wheels** in the **Maintenance Section** for a description of these tires.

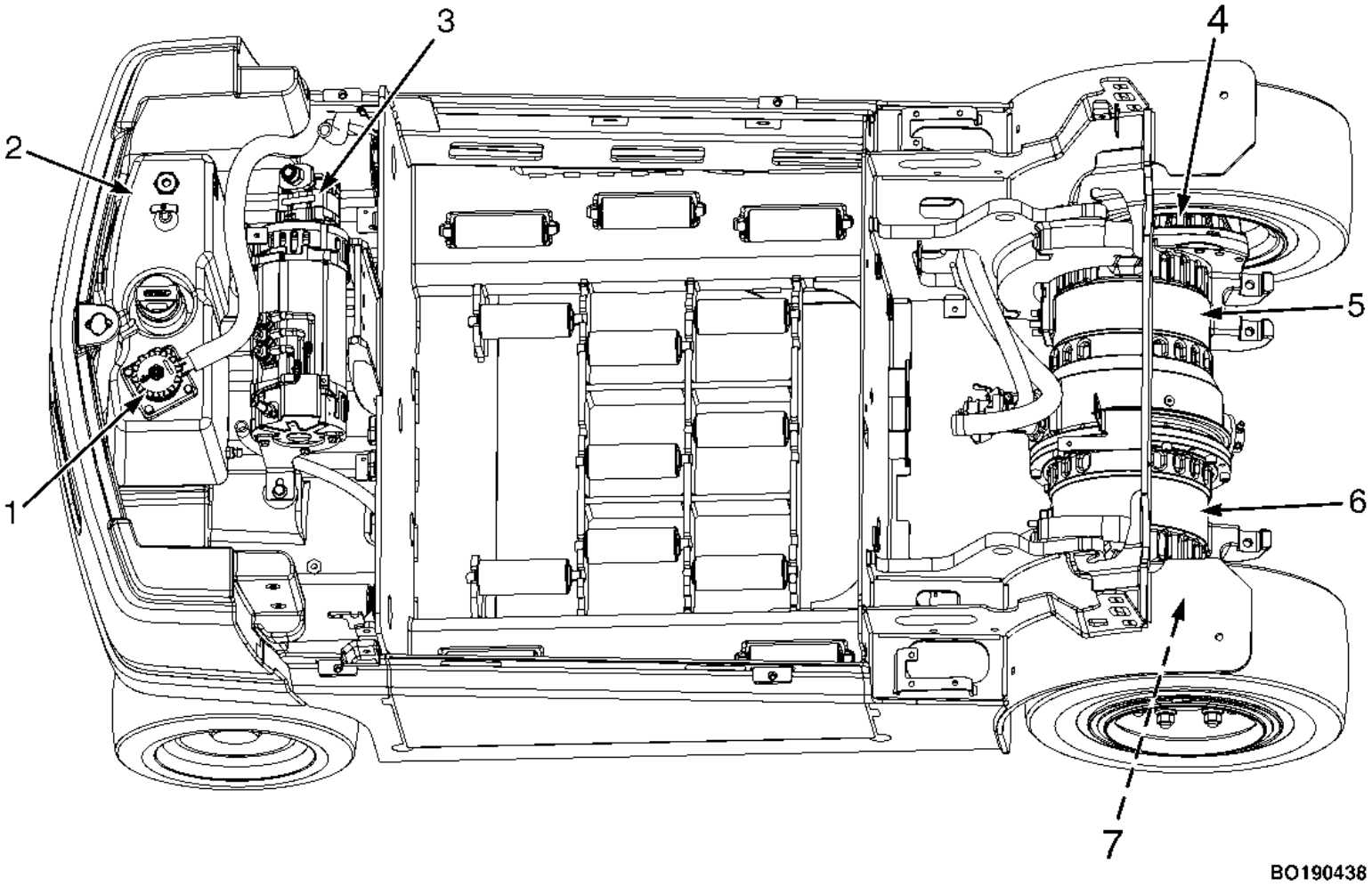
The operation of the lift truck is the same for all models. A battery supplies power for the traction motor, hydraulic pump motor, control panel, and display panel.

The lift trucks covered in this **Operating Manual** are manufactured with three motors: two traction motors and a hydraulic pump motor. See **Figure 2**.

The motors use AC motor and control technology. The traction motors are mounted between the left and right transmissions on the drive axle. The hydraulic pump motor is mounted behind the driver and inside the counterweight. See **Figure 2**.

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

A brake pedal actuates the hydraulic service brakes at the drive wheels. The lift trucks covered in this manual are equipped with an Automatic Parking Brake (APB) that has a manual override handle that will disable the APB if the lift truck loses power and has to be towed (see **Figure 3**). See the **Operating Procedures** section for more information on the APB.



1. HYDRAULIC FILTER
2. HYDRAULIC TANK
3. HYDRAULIC PUMP MOTOR
4. LEFT TRANSMISSION
5. LEFT TRACTION MOTOR
6. RIGHT TRACTION MOTOR
7. RIGHT TRANSMISSION

Figure 2. Motor Locations

Model Description

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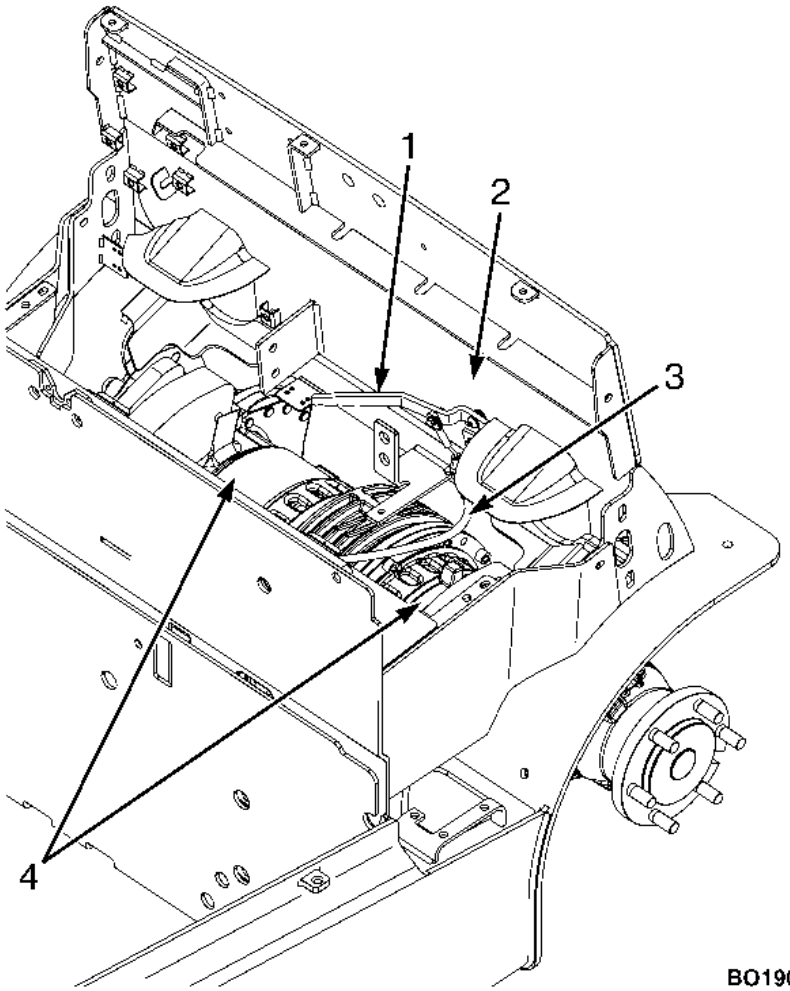

1. MANUAL OVERRIDE HANDLE
2. FRONT BULKHEAD
3. AUTOMATIC PARKING BRAKE CABLE
4. TRACTION MOTORS

Figure 3. Automatic Parking Brake Manual Override Handle

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Model Description

The lift trucks covered in this **Operating Manual** can be equipped with either standard manual hydraulic levers or Electro-Hydraulic (E-Hydraulic) mini-levers.

Forward or reverse movements can be controlled by either a MONOTROL® pedal or a direction control switch. If the lift truck is equipped with E-Hydraulic mini-levers, the direction control switch is located on the left side of the armrest, in front of the horn button. If the lift truck is equipped with manual hydraulic levers, the direction control switch is located on the left side of the first lever. See **Figure 4**.

All lift trucks are equipped with a Battery Discharge Indicator (BDI) and an hourmeter. The bar graph type of BDI shows the state of charge of the battery. These lift trucks have Liquid Crystal Display (LCD) screen. The LCD screen shows the battery bar graph and provides other service information. Hourmeter operating time(s) are also shown on the LCD screen.

See **Display Panel Features** in this section for a more detailed description of how these display panels operate.

Model Description

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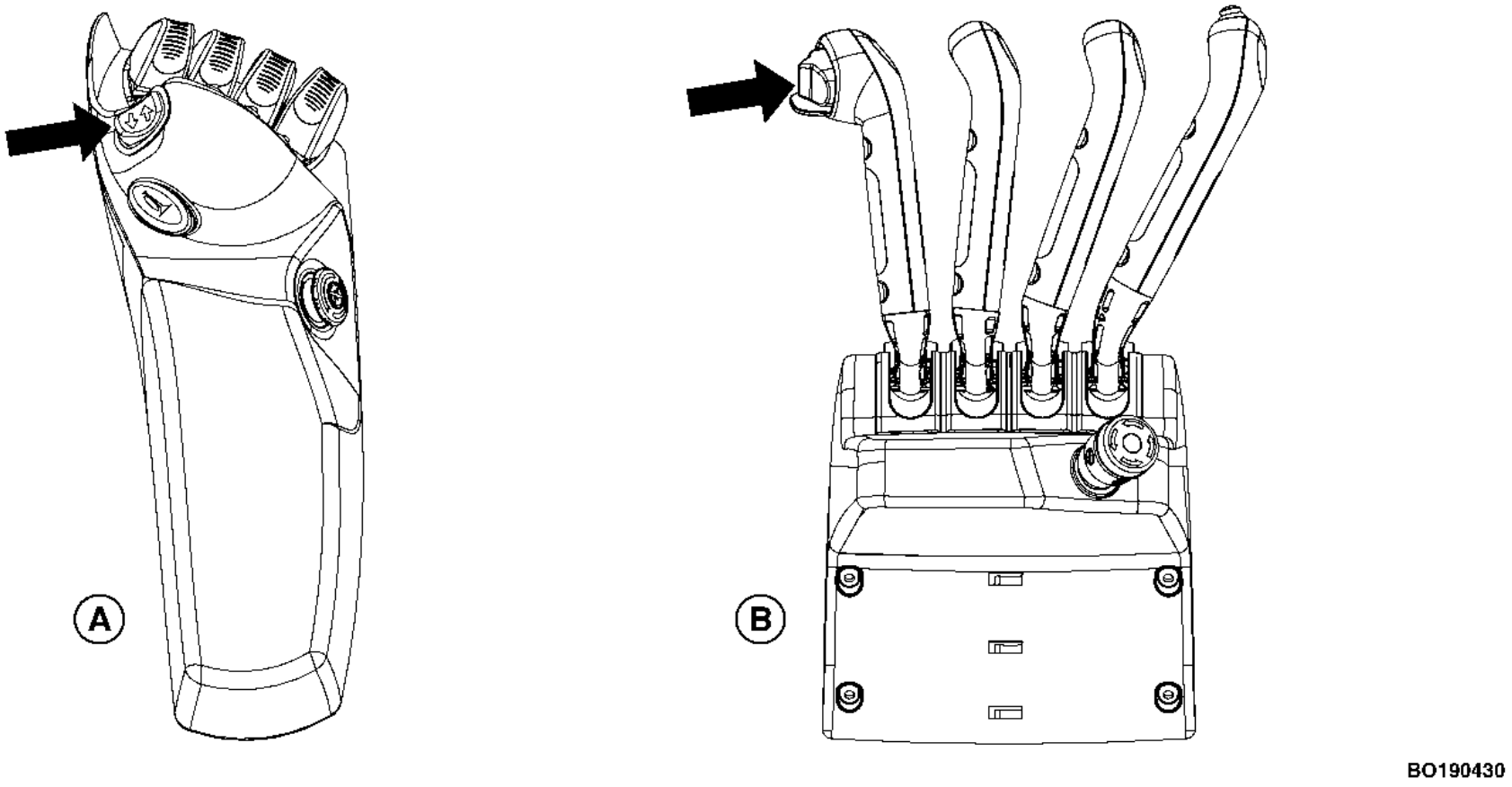

A. E-HYDRAULIC CONTROL MINI-LEVERS

B. MANUAL HYDRAULIC CONTROL LEVERS

Figure 4. Direction Control Switch

The electric lift trucks described in this manual are equipped with a full suspension swivel seat. See **Figure 5**.

The full suspension swivel seat allows the operator to move the seat to the left and to the right. The seat can be moved 5 degrees to the left and 12 degrees to the right.

The full suspension swivel seat allows the operator to better see where he is going when driving the lift truck in reverse.

Model Description

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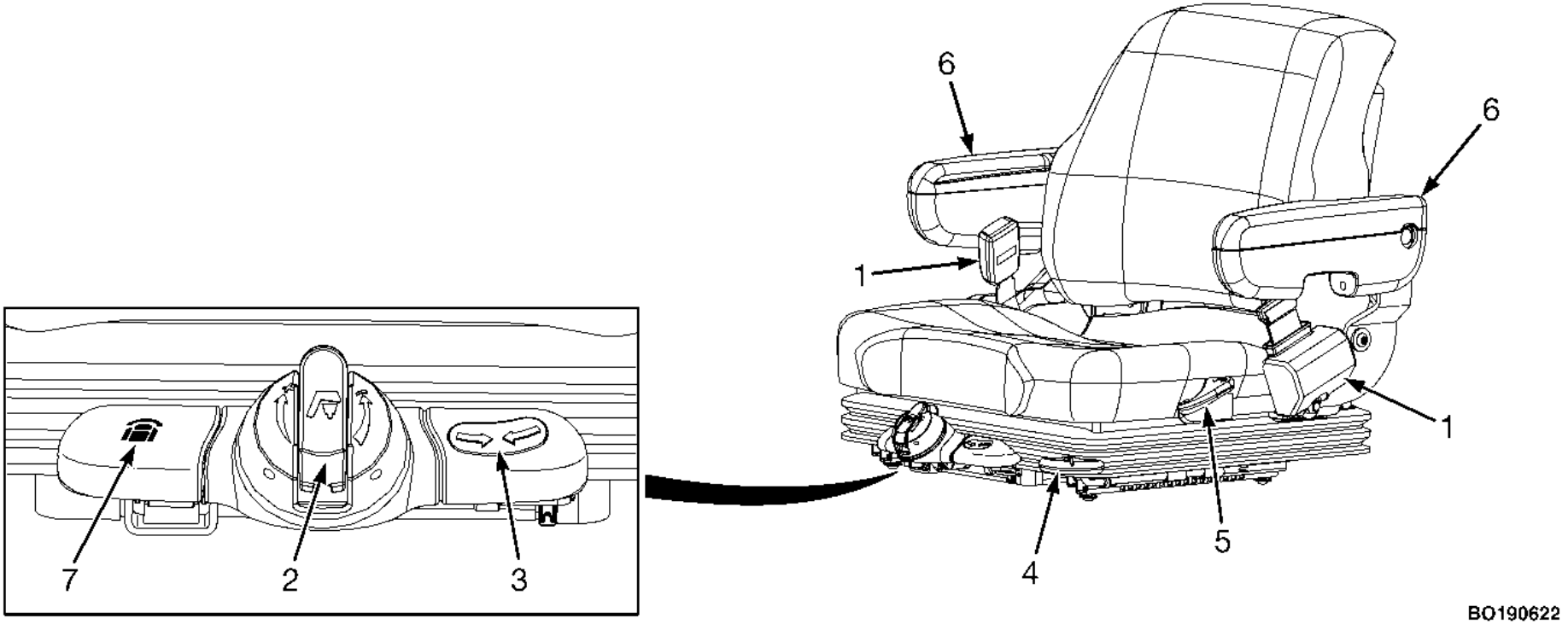


1. SEAT BELT
2. WEIGHT ADJUSTMENT KNOB
3. RIDE POSITION INDICATOR
4. FORWARD/BACKWARD ADJUSTMENT LEVER
5. BACKREST ANGLE ADJUSTMENT LEVER
6. ARMREST
7. SWIVEL LATCH RELEASE LEVER

Figure 5. Seat Components

Operator Protection Equipment

The OVERHEAD GUARD is intended to offer reasonable protection to the operator from falling objects, but cannot protect against every possible impact. Therefore, it must not be considered a substitute for good judgment and care when handling loads. Do not remove the overhead guard. See **Figure 1**.

The BATTERY RESTRAINT SYSTEM is designed to hold the battery within the battery compartment if a tipover occurs. The battery restraint system is made up of a front and side spacer plates, the battery retention pin, the right and left side battery covers, and a rod that helps prevent the battery from moving side to side. If the lift truck is equipped with an optional battery restraint system, the right side battery cover is a removable battery gate.

The hood and hood latch mechanism also help to keep the battery within the battery compartment if a tipover occurs. The hood can be raised for access to the battery. Gas springs help raise and hold the hood in the up position.

The battery restraint system must function so that the operator restraint system can operate correctly. Operation of the battery restraint system without rollers requires that the maximum movement allowed for the battery is 13 mm (0.5 in.) in any horizontal direction. For lift trucks with the roller option, the maximum movement allowed for the battery is 2 mm (0.039 in.) in any horizontal direction. This will reduce the risk of operator injury in a truck tipover. An adjustable battery spacer plate prevents the front-to-back movement of the battery. Batteries for this series of lift trucks must all have the same length dimension to just fit the battery compartment width. For correct battery sizes, see the **Battery Specifications** in the back of this manual.

NOTE: The seat belt can be either black or red.

This lift truck is equipped with one of the three seat belt configurations.

- Seat belt with no operation interlock.
- Seat belt with operation interlock. Seat belt must be fastened for lift truck to start or to travel.
- Seat belt with sequencing interlock. Operator must be in the seat, then the seat belt fastened before lift truck will operate. This seat belt is used with the Optional Operator Presence System.

The SEAT BELT and ARMRESTS provide additional means to help the operator keep the head and torso substantially within the confines of the truck frame and

operator compartment if a tipover occurs. This restraint system is intended to reduce the risk of the head and torso being trapped between the lift truck and the ground, but it can not protect the operator against all possible injury in a tipover. The armrest will help the operator resist side movement if the seat belt is not fastened. It is not a substitute for the seat belt. Always fasten the seat belt.

This lift truck may be equipped with an optional operator presence system which will not allow the truck to travel unless the seat belt it fastened. When equipped, a seat belt interlock includes sequencing/logic for the seat pressure switch and seat belt switch. The weight of the operator must be detected prior to the seat belt switch being engaged to enable operations.

The LOAD BACKREST EXTENSION is installed to keep loose parts of the load from falling back toward the operator. It must be high enough, with openings small enough to prevent the parts of the load from falling backwards. If a load backrest extension that is different from the one installed on your truck is required, contact your dealer for **Hyster** lift trucks.

Nameplate

⚠ WARNING

Any change to the lift truck, the tires or its equipment can change the lifting capacity. If the Nameplate does not show the maximum capacity, or if the lift truck equipment, including the battery for electric trucks, does not match that shown on the Nameplate, the lift truck must not be operated.

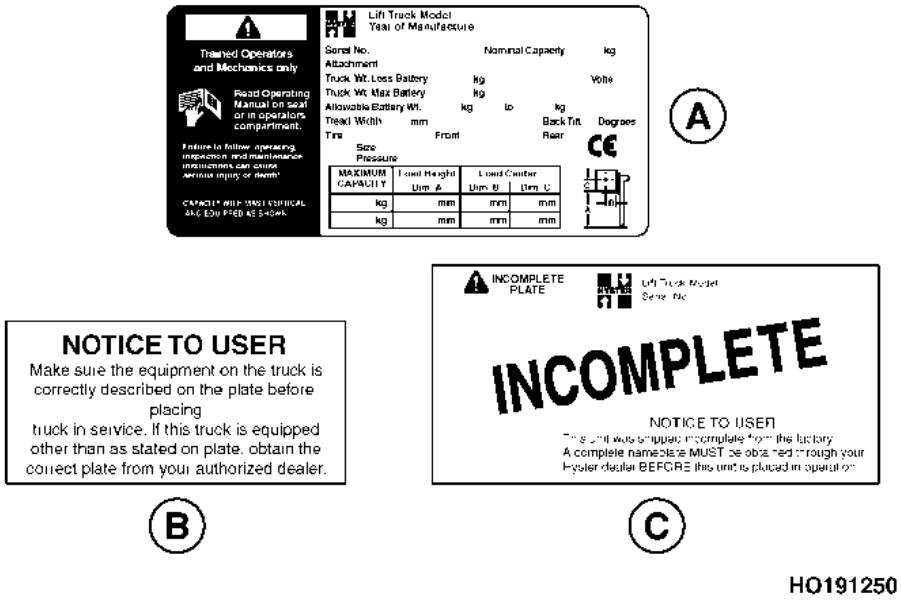
The maximum capacity of the lift truck is shown on the Nameplate. The capacity is specified in kilograms (kg) and pounds (lb).

NOTE: The image in **Figure 6** is a sample only. Reference the actual nameplate installed on the truck for actual truck specifications.

Special capacities with the load height reduced or with optional load centers, may also be shown on the Nameplate. The lift truck serial number code is on the Nameplate. The serial number code is stamped on the outside face of plate attached to rear bulkhead.

When a lift truck is shipped incomplete from the factory, the Nameplate is covered by the labels shown in **Figure 6**. If your lift truck has this type of label, do not operate the lift

truck. Contact your dealer for **Hyster** lift trucks to obtain a complete Nameplate.



A. NAMEPLATE
B. NOTICE LABEL
C. INCOMPLETE LEVEL

Figure 6. Nameplate and Label

Safety Labels

Safety labels are installed on the lift truck to provide information about possible hazards. It is important that all safety labels are installed on the lift truck and can be read. See **Figure 7**. See the **Parts Manual** for a list of all the labels installed on the lift truck and for the location of the labels.

Model Description

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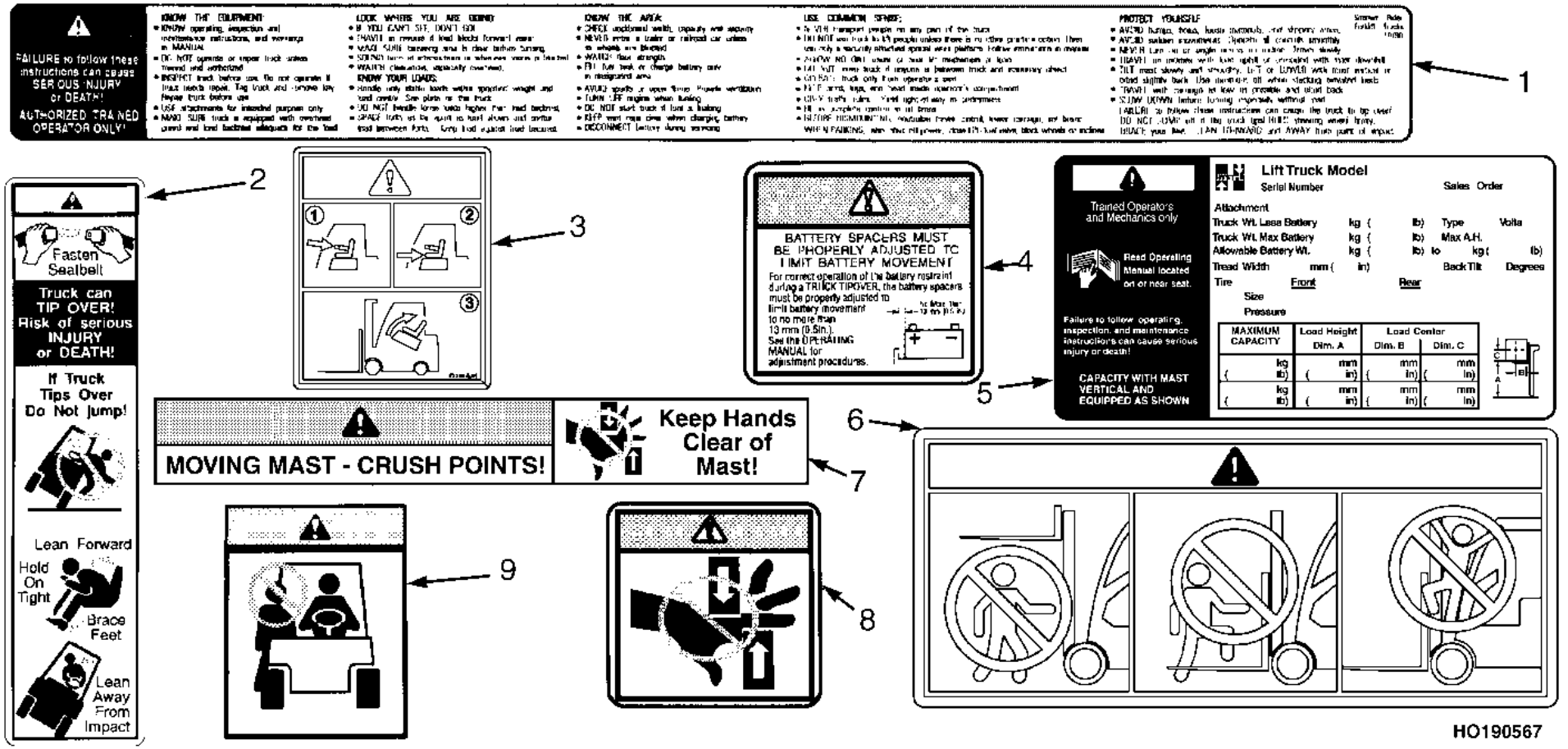

Figure 7. Warning and Safety Labels

Legend for Figure 7

1. OPERATOR WARNING
2. TIPOVER WARNING LABEL
3. E-HYDRAULICS CAUTION
4. BATTERY SPACER WARNING
5. NAMEPLATE
6. MAST WARNING
7. MAST WARNING
8. PINCH POINTS
9. NO RIDERS

Operator's Controls

(See Figure 8, Figure 9, and Table 1)

WARNING

If any of the levers or pedals do not operate as described in the following tables, report the problem immediately. Injury to personnel can occur if the levers or pedals do not operate as described in the following table. DO NOT operate the lift truck until the problem is corrected.

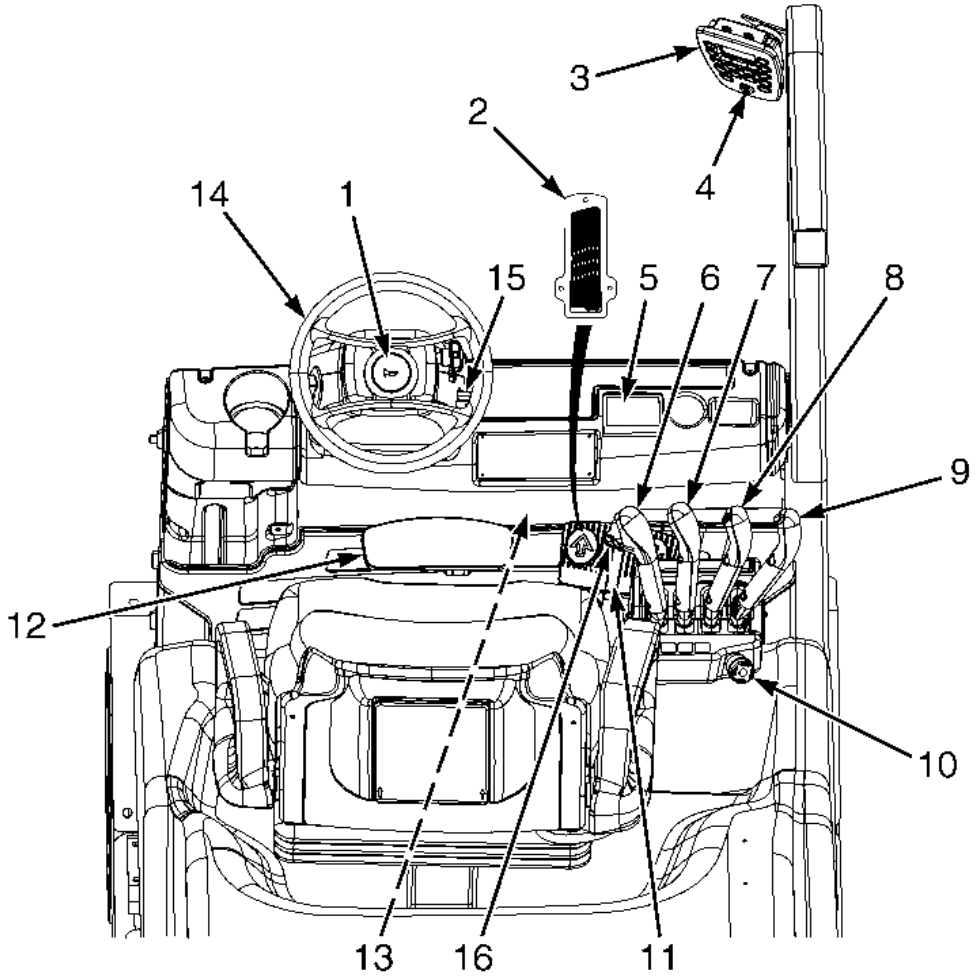

Figure 8. Operator Controls - Manual Hydraulic Controls

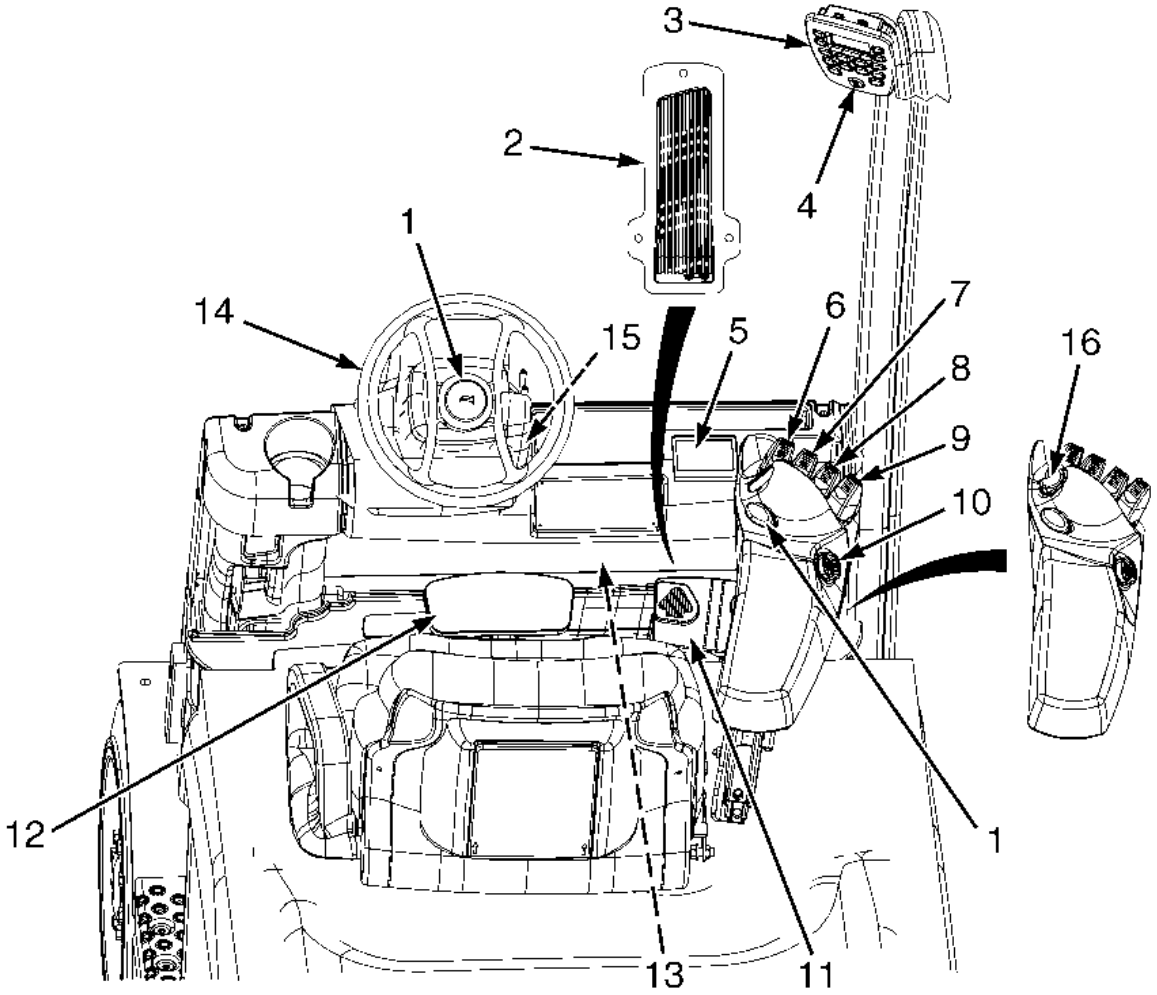

Figure 9. Operator Controls - Electro-Hydraulic Controls

Model Description

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Table 1. Operator Controls (See Figure 8 and Figure 9)

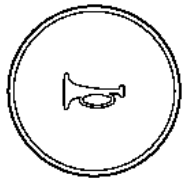
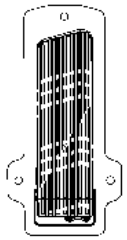
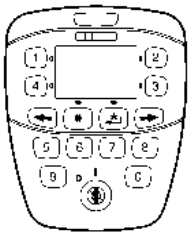
Item No.	Item	Function
1	Horn Button  BO210021	Push the horn button to warn pedestrians and others when approaching intersections and other blind areas. If lift truck is equipped with E-Hydraulic controls, there is another horn button located on the armrest. The lift trucks covered in this **Operating Manual** are also equipped with a horn button on the right side of the hood. See the end of this table for information on this horn button.
2	Accelerator Pedal  BO190246	The accelerator pedal is used with the direction control switch described in this table and when the lift truck is not equipped with a MONOTROL® pedal. Push down on the accelerator pedal to increase the speed of the lift truck
3	Display Panel  BO190560	See **Display Panel Features** in this section, and **Figure 10**, **Figure 11**, **Table 2**, and **Table 3** for a detailed description of the Display Panel.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

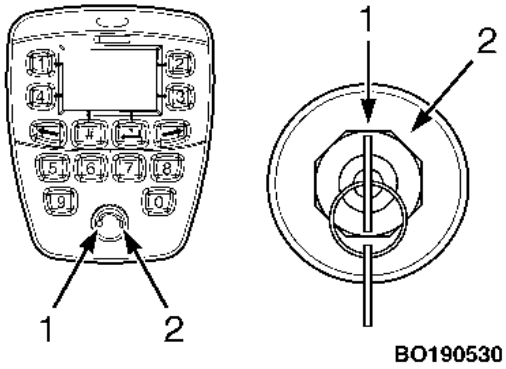
Item No.	Item	Function
4	Key Switch and Keyless Switch  	**⚠ WARNING** **The ignition switch is a reed switch which uses an applied magnetic field. If a strong magnet is placed near the ignition switch, it may not function properly (such as not shutting off power). To ensure ignition switch functions properly, DO NOT place a magnet near the ignition switch.** The lift trucks covered in this **Operating Manual** can be equipped with either a key switch or keyless switch. Both options will have two positions: No. 1 Position: **OFF** position. De-energizes all electric circuits except for the horn and any optional work lights or 12 volt outlets. No. 2 Position: **ON** position. Energizes all electric circuits. The key or keyless switch will be in this position during normal operation.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

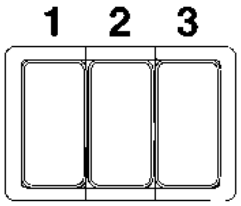
Item No.	Item	Function
5	Light Switches and Front Wiper Switch  BO190762	There is a rocker switch for each of the following light functions: **1.** Front Driving and Tail lights. **2.** Rear Driving light and the Strobe light or sometimes Strobe light only. **3.** Operator Compartment light or sometimes Strobe light only. All of these lights are not on every unit. **4.** Front Wiper/Washer Switch. Rock switch back toward operator for **ON** position, forward toward front screen for **OFF** position and push down for window washer.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

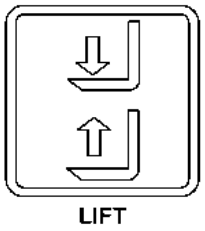
Item No.	Item	Function
6	Lift/Lower Control Lever 	**NOTE:** Manual hydraulic control levers are standard on the trucks covered in this manual. Electronic hydraulic mini-levers are available as an optional control feature for the hydraulic functions. To enable the operation of the hydraulic functions, the operator must be on the seat and the seat belt should be fastened. **NOTE:** For lift trucks equipped with optional operator presence system, the operator must be on the seat and the seat belt must be fastened. The lift/lower control lever can be either the first manual lever or first mini-lever to the right of the operator's seat. Pull backward toward operator to raise the carriage and forks. Push forward to lower the carriage and forks. For lift trucks equipped with Mast Height Limiter Switch, when mast is raised > 500 mm (1.6 ft) the truck speed will slow to 3 km/h (1.8 mph). If the lift/lower control lever has the label shown at top left, the lift truck is equipped with a MONOTROL® pedal. If the lift/lower control lever has the label shown at bottom left, the lift truck is equipped with a standard accelerator pedal.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

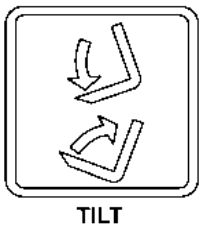
Item No.	Item	Function
7	Tilt Control Lever   BO190624	**NOTE:** Manual hydraulic control levers are standard on the trucks covered in this manual. Electronic hydraulic mini-levers are available as an optional control feature for the hydraulic functions. To enable the operation of the hydraulic functions, the operator must be on the seat and the seat belt should be fastened. **NOTE:** For lift trucks equipped with optional operator presence system, the operator must be on the seat and the seat belt must be fastened. The tilt control lever can be either the second manual lever or second mini-lever to the right of the operator's seat. Push the lever forward to tilt the mast and forks forward. Pull the lever backward toward operator to tilt the mast and forks backward. On the standard lift truck, the manual lever or mini-lever has the label shown at top left. These trucks can be equipped with the Return to Set Tilt (RTST) option if truck has electronic hydraulic mini-levers. The RTST option automatically stops the tilt function at a set point. To override the RTST option, push down on the tilt control lever and move it forward or backward.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

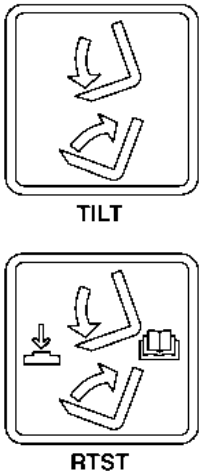
Item No.	Item	Function
7	Tilt Control Lever (Cont) 	The mini-lever has the label shown at bottom left if the RTST option is available on the lift truck. When tilt set point delay feature is used, a timer can be set so that the operator does not need to push the override button. The operator keeps the tilt mini-lever actuated for the programmed amount of time (0.1 to 3.0 seconds). The RTST will be overridden, and tilt will continue. RTST is intended as an operator aid in positioning forks or attachments for their application to minimize product damage and facilitate load handling. Care should be taken to operate the truck in accordance with load handling instructions as described in **Operating Techniques** in the **Operating Procedures** section of this **Operating Manual**.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

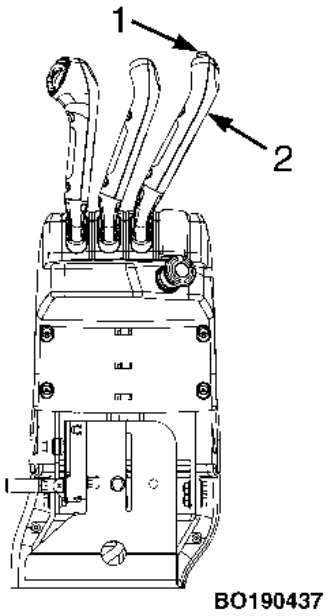
Item No.	Item	Function
8	Manual Control Lever for Auxiliary Hydraulic Functions (3rd Lever)  **1.** CLAMP BUTTON **2.** THIRD LEVER	**NOTE:** Manual hydraulic control levers are standard on the trucks covered in this manual. Electronic hydraulic mini-levers are available as an optional control feature for the hydraulic functions. To enable the operation of the hydraulic functions, the operator must be on the seat and the seat belt should be fastened. **NOTE:** For lift trucks equipped with optional operator presence system, the operator must be on the seat and the seat belt must be fastened. The third manual control lever is installed to the right of the manual tilt control lever. This lever can have two methods of operation, depending on the attachment. **Trucks without clamp attachment:** The lever is operated by moving it forward and backward. The lever is spring loaded to return to the neutral position when released.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

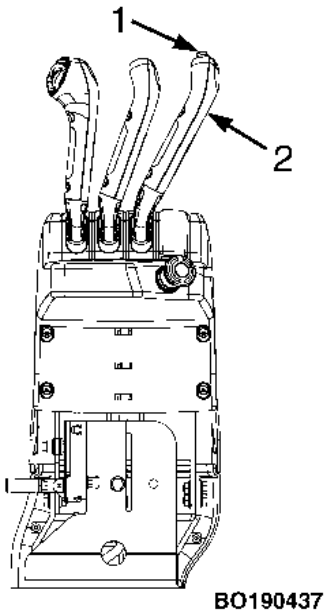
Item No.	Item	Function
8	Manual Control Lever for Auxiliary Hydraulic Functions (3rd Lever)  **1.** CLAMP BUTTON **2.** THIRD LEVER	**NOTE:** If truck is equipped with a three function control valve, three levers and clamp attachment, the last (3rd) lever controls clamp functions. **Trucks with clamp attachment:** The button on the lever enables clamp function. Lever movement is inhibited until button is pressed. Press the button and pull backward (toward the operator) to close the clamp. To release the clamp, press the button and push lever forward (away from the operator). If there is no lever activity for approximately 4 seconds, lever movement will be inhibited.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

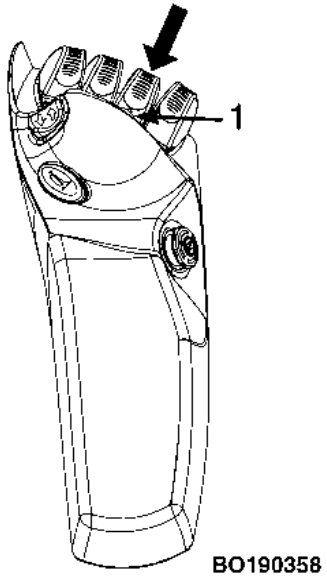
Item No.	Item	Function
8	Electronic Control Mini-Lever for Auxiliary Hydraulic Functions (3rd Mini-Lever)  **1.** CLAMP BUTTON	**NOTE:** To operate the mini-levers, the operator must be on the seat. For lift trucks equipped with optional operator presence system, the operator must be on the seat and the seat belt must be fastened. The third electronic control mini-lever is installed to the right of the electronic tilt control lever. This lever can have two methods of operation, depending on the attachment. **Trucks without clamp attachment:** The mini-lever is operated by moving it forward or backward. The mini-lever is spring loaded to return to the neutral position when released.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

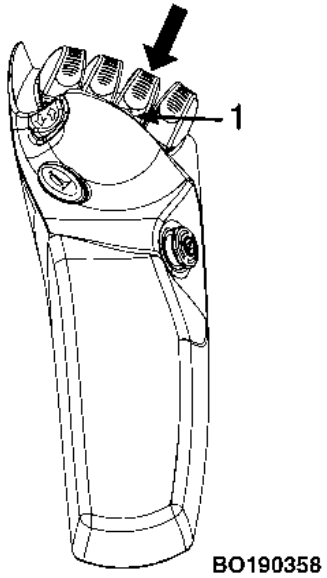
Item No.	Item	Function
8	Electronic Control Mini-Lever for Auxiliary Hydraulic Functions (3rd Mini-Lever) (Cont)  **1.** CLAMP BUTTON	**NOTE:** If truck is equipped with a three function control valve, three mini-levers and clamp attachment, the last (3rd) mini-lever controls clamp functions. **Trucks with clamp attachment:** The button on the MLM enables clamp function in software. Pull backward on the mini-lever to close the clamp. To release the clamp, press the button and push mini-lever forward. If there is no mini-lever activity for approximately 4 seconds moving the mini-lever forward will have no effect.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

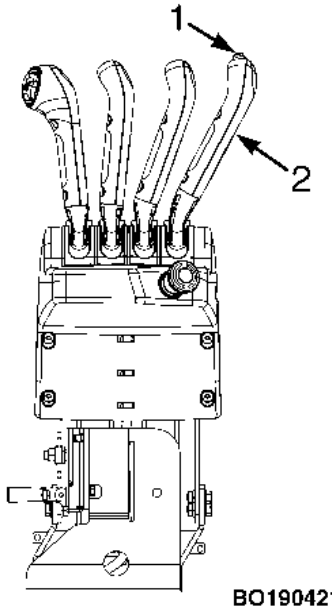
Item No.	Item	Function
9	Manual Control Lever for Auxiliary Hydraulic Functions (4th lever)  **1.** CLAMP BUTTON **2.** FOURTH LEVER	**NOTE:** Manual hydraulic control levers are standard on the trucks covered in this manual. Electronic hydraulic mini-levers are available as an optional control feature for the hydraulic functions. To enable the operation of the hydraulic functions, the operator must be on the seat and the seat belt should be fastened. **NOTE:** For lift trucks equipped with optional operator presence system, the operator must be on the seat and the seat belt must be fastened. The fourth manual control lever is installed to the right of the third manual control lever. This lever can have two methods of operation, depending on the attachment. **Trucks without clamp attachment:** The lever is operated by moving it forward or backward. The lever is spring loaded to return to the neutral position when released.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

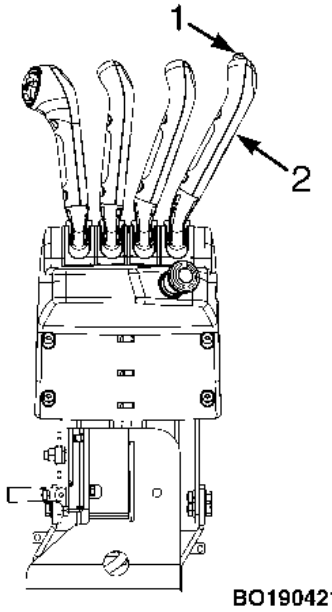
Item No.	Item	Function
9	Manual Control Lever for Auxiliary Hydraulic Functions (4th lever) (Cont)  **1.** CLAMP BUTTON **2.** FOURTH LEVER	**NOTE:** If truck is equipped with four function control valve, four levers and clamp attachment, the last (4th) lever controls clamp functions. **Trucks with clamp attachment:** The button on the lever enables clamp function. Lever movement is inhibited until button is pressed. Press the button and pull backward (toward the operator) to close the clamp. To release the clamp, press the button and push lever forward (away from the operator). If there is no lever activity for approximately 4 seconds, lever movement will be inhibited.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

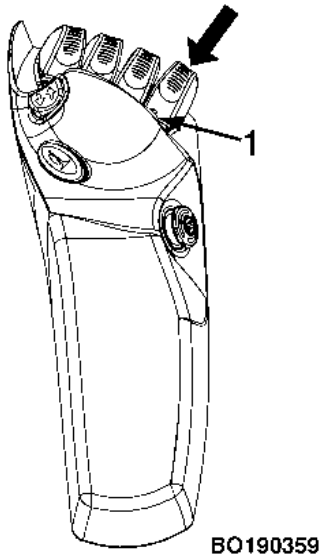
Item No.	Item	Function
9	Electronic Control Mini-Lever for Auxiliary Hydraulic Functions (4th mini-lever)  **1.** DUAL FUNCTION OR CLAMP BUTTON	**NOTE:** To operate the mini-levers, the operator must be on the seat. For lift trucks equipped with optional operator presence system, the operator must be on the seat and the seat belt must be fastened. The fourth electronic control lever is installed to the right of the third electronic control lever. This lever can have three methods of operation, depending on the attachment. **Trucks without clamp attachment, four mini-levers, and four function control valve:** The mini-lever is operated by moving it forward or backward. The mini-lever is spring loaded to return to the neutral position when released. **Trucks without clamp attachment, four mini-levers, and five function control valve:** The lever is dual function.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

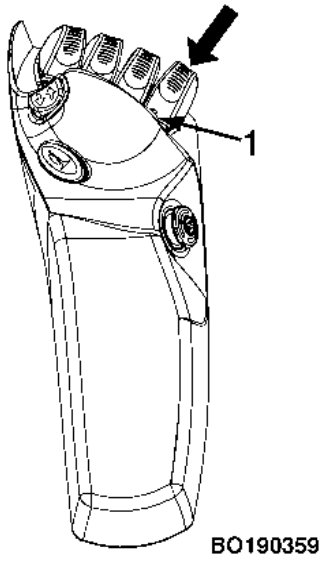
Item No.	Item	Function
9	Electronic Control Mini-Lever for Auxiliary Hydraulic Functions (4th mini-lever) (Cont)  **1.** DUAL FUNCTION OR CLAMP BUTTON	**NOTE:** If truck is equipped with four function control valve, four mini-levers and clamp attachment, the last (4th) mini-lever controls clamp functions. **Trucks with clamp attachment:** The button on the MLM enables clamp function in software. Pull backward on the mini-lever to close the clamp. To release the clamp, press the button and push mini-lever forward.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

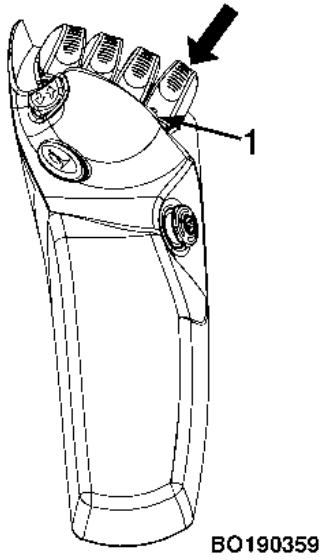
Item No.	Item	Function
9	Electronic Control Mini-Lever for Auxiliary Hydraulic Functions (4th mini-lever) (Cont)  **1.** DUAL FUNCTION OR CLAMP BUTTON	**NOTE:** If truck is equipped with a five function control valve, four mini-levers, and clamp attachment, the last (4th) mini-lever controls clamp functions and the 3rd mini-lever control the 3rd and 5th functions. **Trucks with clamp attachment, four mini-levers, and five function control valve:** The third mini-lever becomes a dual function mini-lever. Move the 3rd mini-lever forward or backward to operator the 3rd function. Press the button and move the mini-lever forward or backward to operate the 5th function. Pull backward on the 4th mini-lever to close the clamp. To release the clamp, press the button and push 4th mini-lever forward.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

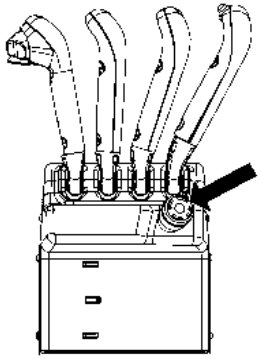
Item No.	Item	Function
10	Emergency Disconnect Switch (manual levers)  BO190422	The emergency disconnect switch, on trucks equipped with manual levers, is located behind the levers. The operator can disconnect all electrical power to the lift truck by pushing the emergency disconnect switch down until it clicks. The automatic park brake will engage. To reset (reconnect) the emergency disconnect switch and energize the electrical circuits, the operator must turn the switch clockwise until it pops up.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

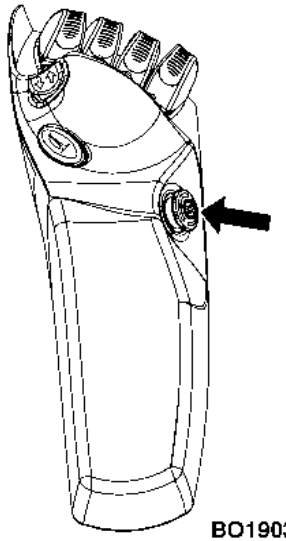
Item No.	Item	Function
10	Emergency Disconnect Switch (E-Hydraulics)  BO190360	The emergency disconnect switch, on trucks equipped with E-Hydraulic mini-levers, is located on the right side of the armrest. The operator can disconnect all electrical power to the lift truck by pushing the emergency disconnect switch in until it clicks. The automatic park brake will engage. To reset the emergency disconnect switch and energize the electrical circuits, the operator must turn the switch clockwise until it pops up.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

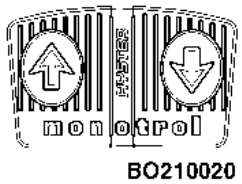
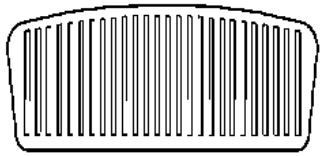
Item No.	Item	Function
11	MONOTROL Pedal 	When the lift truck is equipped with a MONOTROL® pedal, the direction and the speed of travel is controlled by the MONOTROL® pedal. When the right (REVERSE) side of the pedal is pushed, the lift truck will move in the reverse direction. When the left (FORWARD) side of the pedal is pushed, the lift truck will move in the forward direction. The speed of the lift truck increases when the pedal is pushed further.
12	Brake Pedal 	This pedal, controlled by the operator's foot, applies the service brakes when pushed.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

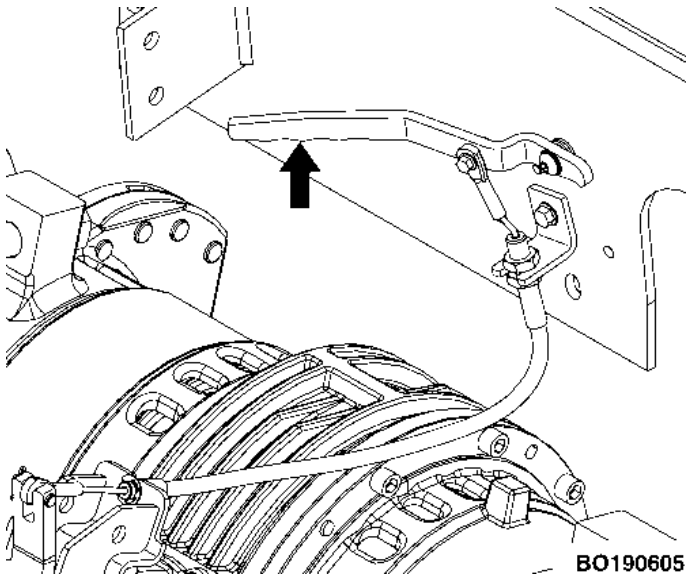
Item No.	Item	Function
13	Automatic Parking Brake Manual Override Handle 	The truck is equipped with an Automatic Parking Brake (APB). The APB will apply a brake to the traction motor after the lift truck stops. See the **Operating Procedures** for a more detailed description on how the APB works. If the lift truck loses power and has to be towed, there is a manual override handle that will disable the APB. The manual override handle is located underneath the floor mat and floor plates and mounted to the front bulkhead. To apply the manual override, remove the floor mat and floor plates and pull the handle up.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

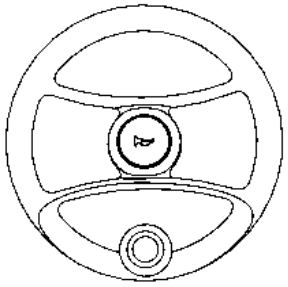
Item No.	Item	Function
14	Steering Wheel  BO190410	The steering wheel controls the movement of the steer wheels. Rotate the steering wheel clockwise to make a right turn, and counterclockwise to make a left turn.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

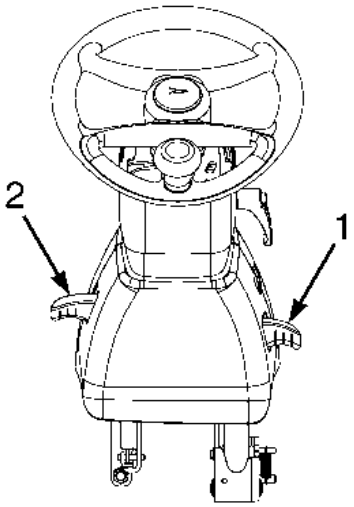
Item No.	Item	Function
15	Steering Column Tilt Memory Lever (Optional)  BO190589 **1.** TILT POSITION LEVER **2.** TILT MEMORY LEVER	Lift the tilt position lever to adjust the steering column up or down for the operator's comfort. This tilt memory lever permits moving the steering column from a locked position to an upright position and back to the original locked position. Lift the lever to move the steering column to exit the truck. The lever will lock when the steering column is returned to the original position. Make sure the lever is locked before operating the lift truck. If steering tilt position is set at the full upright position, the steering column will not move when the tilt memory lever is lifted. Use the tilt position lever to reset the steering column to the desired position.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

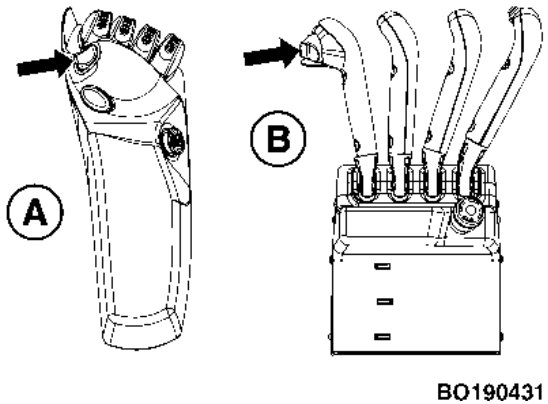
Item No.	Item	Function
16	Direction Control Switch  **A.** E-HYDRAULIC CONTROL LEVERS **B.** MANUAL HYDRAULIC CONTROL LEVERS	The direction control switch is used on some lift trucks. When the lift truck is equipped with a direction control switch, it will also have an accelerator pedal instead of a MONOTROL® pedal. If the lift truck is equipped with E-Hydraulic mini-levers, the direction control switch is located on the left side of the armrest, in front of the horn button. If the lift truck is equipped with manual hydraulic levers, the direction control switch is located on the left side of the first lever. The direction control switch has two positions: **Forward** and **Reverse**. Push the top part of the switch to travel forward. Push the bottom part of the switch to travel in reverse. When a direction of travel has been selected, it will show up on the display panel and the corresponding direction arrow (top for **Forward**, bottom for **Reverse**) will fill in and become a solid color. The lift truck will automatically be in the neutral position when the lift truck is first started up. When the parking brake is applied, the lift truck will be in **Neutral**.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

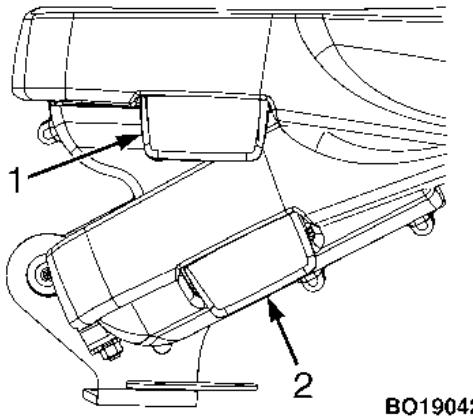
Item No.	Item	Function
	Armrest Adjustment Handles, Lift Trucks With E-Hydraulic Controls (Not Shown in **Figure 9**)  **1.** SMALL ADJUSTMENT HANDLE **2.** LARGE ADJUSTMENT HANDLE	The armrest on lift trucks equipped with E-Hydraulic mini-levers, is adjustable for operator comfort. The large adjustment handle on the lower part of the slide assembly, moves the armrest up and down in a diagonal direction, to adjust the height of the armrest. Pull up on the handle and move armrest to desired height. Release handle to set armrest height. The small adjustment handle, located on the right side of the armrest cushion, moves the armrest forward and backward to adjust the distance of the mini-levers. Pull up on handle and slide armrest either forward or backward until desired distance is achieved. Release handle to set armrest distance.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

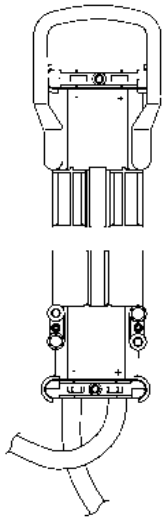
Item No.	Item	Function
	Battery Connector (Not Shown in **Figure 8** and **Figure 9**)  BO190642 **80V Black**	**⚠ CAUTION** **Make sure both halves of the connectors are the same type and color. Make sure the voltage of the battery is the same as specified on the Nameplate. The halves of the connector must be joined for operation. Separate the halves of the connector to disconnect the battery.** The battery connector is in two parts. One half of the connector is attached to the battery cables and has a handle as shown. The other half of the connector is connected to the electrical system of the lift truck.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

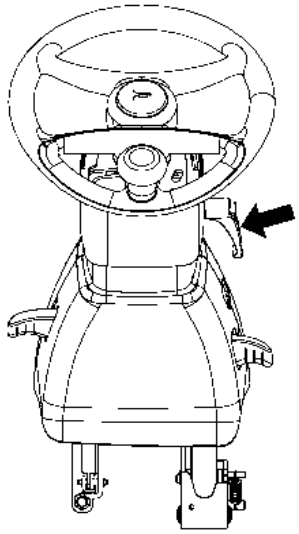
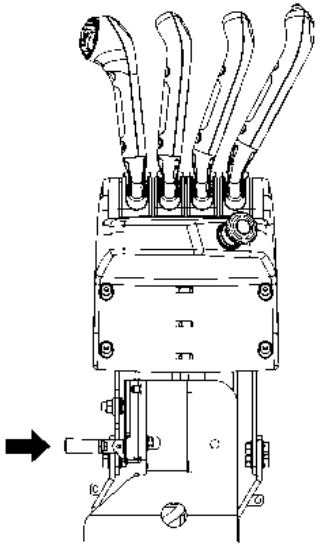
Item No.	Item	Function
	Steering Column Telescopic Locking Handle (Optional) (Not Shown in **Figure 8** and **Figure 9**)  BO190590	Loosen the telescopic column locking handle. Turn the locking handle counterclockwise and slide the steering column in or out to desired setting. Turn the telescopic locking handle clockwise to lock steering column at the desired height.

Table 1. Operator Controls (See Figure 8 and Figure 9) (Continued)

Item No.	Item	Function
	Release Lever, Manual Hydraulic Control Levers (Not Shown in **Figure 8**)  BO190423	To move the manual hydraulic control lever assembly so that the hood can be opened, pull the release lever out and push the manual hydraulic control lever assembly toward the dash panel. To put the manual hydraulic control lever assembly back into position for operator usage, push the manual hydraulic control lever assembly toward the hood. The lever assembly will click once and lock into place.

Display Panel Features

Display Panel

See **Figure 10**.

NOTE: the features listed below are standard display panel functions.

- LCD (Liquid Crystal Display) Screen.
- Battery Discharge Indicator (BDI) (with lift interrupt when enabled).
- Status Codes.
- System time/date display.
- Hourmeter of traction and lift pump times.
- Numeric push key pad.
- Provides four driving Performance Modes that are accessed through the key pad.

NOTE: The features listed below must be enabled with a software update prior to use on the lift truck.

- Allows preassigned operator passwords to control operator access to vehicle.
- Allows scheduled maintenance reminders to be programmed in and will alert the operator through an audible and visual alarm when scheduled maintenance is due.
- Provides the ability to set up an operator checklist where the operator must answer Yes or No to a set of questions before lift truck will start.
- Hydraulic fluid low icon. This icon will appear if the system detects low hydraulic fluid. Available with the Hydraulic Fluid Level Monitoring option.
- Hydraulic filter restriction icon. This icon will appear if the system detects a restriction in the hydraulic filter. This is an optional feature.

Display Panel Keys

⚠ WARNING

If any of the instruments, levers, or pedals do not operate as described in the following tables, report the problem immediately. Injury to personnel can occur if the instruments, levers, or pedals do not operate as described in the following table. DO NOT operate the lift truck until the problem is corrected.

The display panel is equipped with 10 numeric keys, two arrow keys (left and right arrows), and two symbol keys (the STAR key and the POUND key). See **Figure 10**.

If multiple keys are pressed at the same time, the display panel will ignore all keys. If a key has already been pressed and a second one is pressed right afterward, the display panel will ignore the second key.

All key presses are accepted for a single entry and key entries cannot be repeated by holding down the key. For example, holding the **3** key down while entering a password number, will only result in one instance of **3** being entered regardless of how long the user presses the **3** key. To enter multiple **3** the user must press the **3** key multiple times.

The lift trucks covered in this **Operating Manual** can be equipped with several different options and configurations. Depending on the equipment on the lift truck, the key functions described in **Table 2** will vary and may not pertain to your lift truck.

Display Panel Features

HYSTER

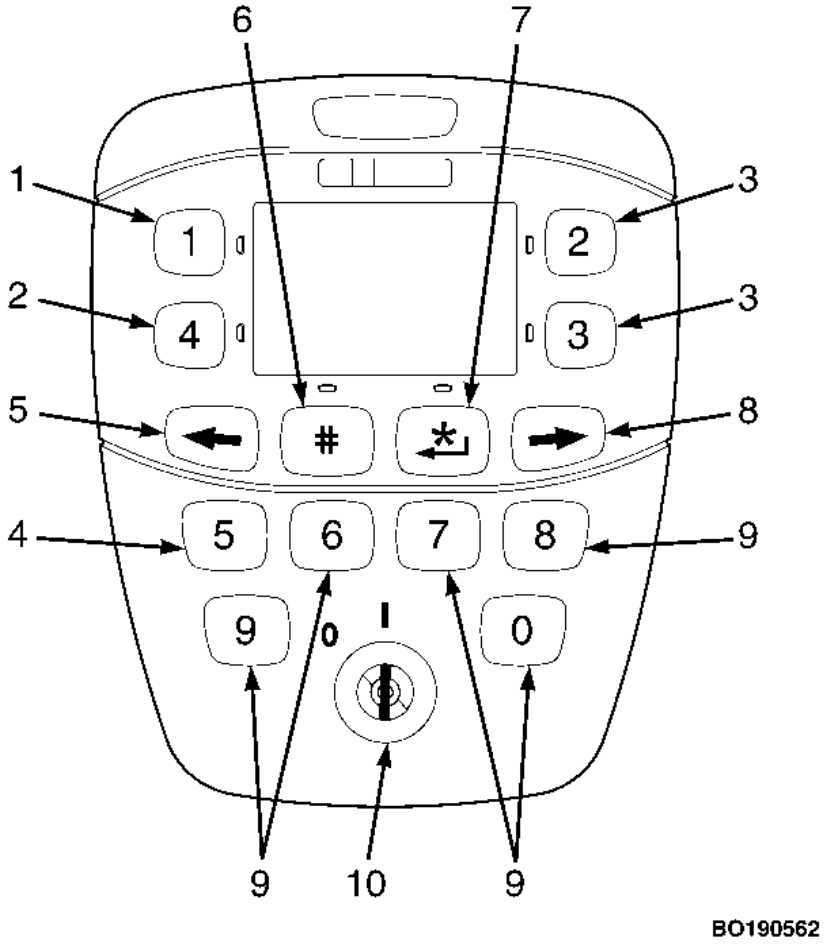


Figure 10. Display Panel Keys

Table 2. Display Panel Keys (See Figure 10)

Item No.	Item	Function
1	1 Key	When an operator is in the *Password Screen*, if enabled, for entering passwords, this key allows entry of the number 1 for password purposes. Once a password has been successfully entered, or if a password is not required, the display panel will go to the *Operator Screen*. This screen contains all the necessary components for normal operation of the lift truck. In this screen Key 1 is enabled to decrease Performance Mode; press the 1 key to go to the next lower level of performance; level 1 performance mode is the slowest and level 4 is the fastest. When an operator, if authorized, is in any of the additional menus that are available (Calibrations, Diagnostics, and Truck Setup menus) the 1 key is enabled to enter the number 1 for data entry purposes.

Table 2. Display Panel Keys (See Figure 10) (Continued)

Item No.	Item	Function
2	4 Key	When an operator is in the *Password Screen*, if enabled, for entering passwords, this key allows entry of the number 4 for password purposes. Once a password has been successfully entered, the display panel will go to the *Operator Screen*. This screen contains all the necessary components for normal operation of the lift truck. In this screen, Key 4 is enabled to increase Performance Mode; press the 4 key to go to the next highest level of performance; level 1 performance mode is the slowest and level 4 is the fastest. When an operator, if authorized, is in any of the additional menus that are available (Calibrations, Diagnostics, and Truck Setup menus) the 4 key is enabled to enter the number 4 for data entry purposes.

Table 2. Display Panel Keys (See Figure 10) (Continued)

Item No.	Item	Function
3	2 and 3 Keys	When an operator is in the *Password Screen*, if enabled, for entering passwords, these keys allow entry of the number 2 and 3 for password purposes. Once a password has been successfully entered, or if a password is not required, the display panel will go to the *Operator Screen*. When an operator, if authorized, is in any of the additional menus that are available (Calibrations, Diagnostics, and Truck Setup menus) the 2 and 3 keys allow the operator to scroll up or down within the menu. Press the 2 key to scroll up and press the 3 key to scroll down. When an operator, if authorized, is working in any of the menus, other than the *Password* menu, is prompted to enter a data value that contains numbers, the scrolling features of the 2 and 3 keys will be disabled and keys 2 and 3 can be used to enter numeric values. Once the numeric data value has been entered and the Enter key pressed, the scrolling feature for keys 2 and 3 will be enabled again.

Display Panel Features

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Table 2. Display Panel Keys (See Figure 10) (Continued)

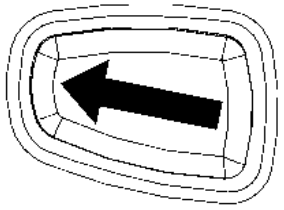
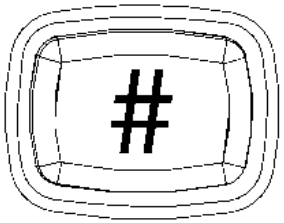
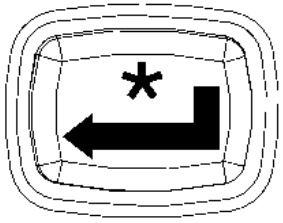
Item No.	Item	Function
4	5 Key	When an operator is in the *Password Screen*, if enabled, for entering passwords, this key is enabled to enter the number 5 for password purposes. Once a password has been successfully entered, or if a password is not required, the display panel will to the *Operator Screen*. When an operator, if authorized, is in any of the additional menus that are available (Calibrations, Diagnostics, and Truck Setup menus) the 5 key is enabled to enter the number 5 for data entry purposes.
5	Scroll Back (Left Arrow Key)  BO190369	This key is used for the following functions: • Decreasing the value of a selected operating function. • Scrolling backward through a list of possible menu selections.

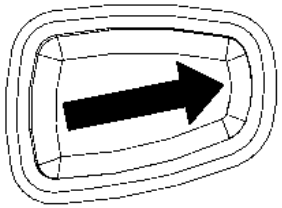
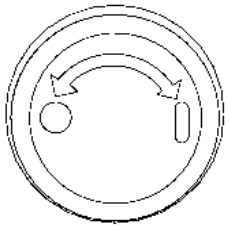
Table 2. Display Panel Keys (See Figure 10) (Continued)

Item No.	Item	Function
6	Pound Key  BO190370	If the Operator Checklist is enabled on the lift truck, the Pound Key is used to indicate an issue with the current item in the list. See **Operator Checklist** in the **Operating Procedures** section for more information on using the Operator Checklist.
7	Enter Key (STAR Key)  BO190371	This key is used for menu entry and menu navigation. Use the STAR key to select a menu to be viewed. Within the selected menu, use the STAR key to select sub menus associated with the selected menu.

Display Panel Features

HYSTER

Table 2. Display Panel Keys (See Figure 10) (Continued)

Item No.	Item	Function
8	Scroll Forward (Right Arrow Key)  BO190372	This key is used for the following functions: • Increasing the value of a selected operating function. • Scrolling forward through a list of possible menu selections.
9	6, 7, 8, 9, and 0 Keys	The 6, 7, 8, 9, and 0 keys are enabled to enter the numbers 6, 7, 8, 9, and 0 for data entry purposes.
10	Keyless Start Switch or Key Switch  BO190373	See **Table 1** for more information.

Display Panel - LCD Screen and Warning and Indicator Lights

The LCD screen uses a series of icons and numeric values to communicate important truck information to the operator, supervisor, and service technician. See **Figure 11**.

The warning and indicator lights described in **Table 3** appear when the LCD screen is displaying the *Operator Screen*. The *Operator Screen* contains all the components necessary for normal operation of the lift truck. When the lift truck power is first turned **ON**, all icons in **Table 3** will illuminate. After 10 seconds, the seat belt, low brake fluid, service due (if equipped), motor temperature icons, and low hydraulic fluid (if equipped) will no longer be illuminated and will illuminate again only if there is a problem in that particular area.

The following icons and information is displayed at all times on the LCD screen when the truck is running, and the LCD screen is displaying the *Operator Screen*. See **Figure 11** and **Table 3**:

- The current performance mode the truck is operating under
- The Battery Display Indicator (BDI)
- The direction indicators showing which direction the truck is traveling in
- The neutral/park brake indicator
- The truck hourmeter
- System time

For more information and detailed description of the other warning and indicator lights that can be displayed on the LCD screen and are not covered in this **Operating Manual**, see the sections **User Interface - Supervisor** 2200 SRM 1335 or **User Interface - Service Technician** 2200 SRM 1336.

Display Panel Features

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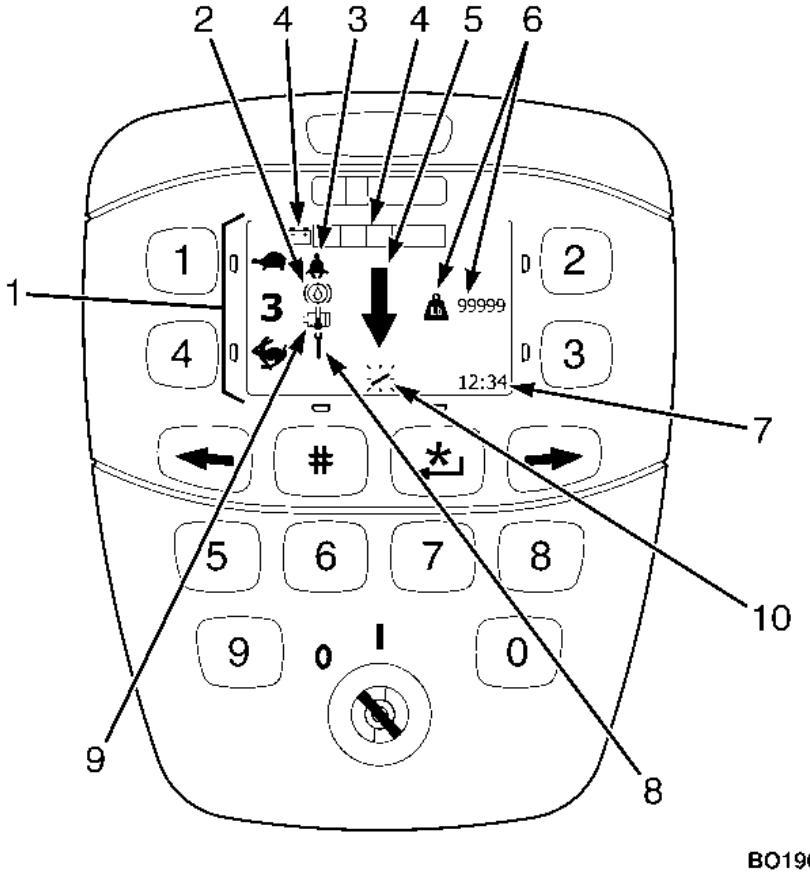
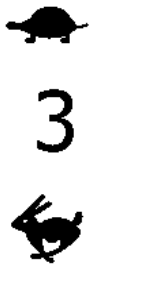


Figure 11. Display Panel - LCD Screen and Warning and Indicator Lights

Table 3. Display Panel - LCD Screen and Warning and Indicator Lights (See Figure 11)

Item No.	Item	Function
1	Indicator Light, Performance Mode 	There are four performance modes to choose from. Each mode changes acceleration and speed. The tortoise icon on the top decreases the performance mode and the hare on the bottom increases the performance mode. The numeric value (numbers 1 through 4) in the middle indicates which performance mode the truck is currently in. The number 1 is the slowest and the number 4 is the fastest. Push the 1 key, next to the tortoise, to decrease the performance mode. Push the 4 key, next to the hare, to increase the performance mode. The lift truck will now operate within the parameters set for that mode number until the performance mode is changed again.
2	Warning Light, Low Brake Fluid 	**CAUTION** **Do not continue to operate lift truck if light is on. Damage to equipment may occur.** The low brake fluid icon will illuminate when the brake fluid sensor indicates a low brake fluid condition in the brake reservoir.

Display Panel Features

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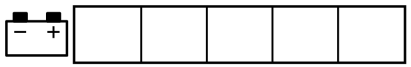
Table 3. Display Panel - LCD Screen and Warning and Indicator Lights (See Figure 11) (Continued)

Item No.	Item	Function
3	Warning Light, Fasten Seat Belt  BO190374	**⚠ WARNING** **Always fasten seat belt when operating the lift truck. Serious injury to personnel may occur if seat belt is not fastened.** This icon will stay illuminated for approximately 10 seconds when the *Operator Screen* first appears on the display panel after the key or keyless switch has been turned to the **ON** position. The light will disappear after 10 seconds or until the screen is changed, whichever occurs first. The fasten seat belt icon will also illuminate if the operator returns to the seat after being off of it for more than 10 seconds.

Table 3. Display Panel - LCD Screen and Warning and Indicator Lights (See Figure 11) (Continued)

Item No.	Item	Function
4	Indicator Light, Battery Display Indicator (BDI)  BO190377	**⚠ CAUTION** **DO NOT operate the lift truck when the Battery State-of-Charge (BSOC) is too low and the battery icon is flashing. Continued operation with a low battery can cause damage to the battery and lift truck.** A bar graph, representing the Battery State-of-Charge (BSOC) is visible on the LCD screen at all times while the *Operator Screen* is displayed. When the battery is fully charged, the bar graph will be completely shaded. As the battery discharges, shaded blocks will disappear from the top of the graph on down. When the battery drops below 25 percent BSOC, an audible alarm will sound and the battery icon will begin to flash, indicating that the battery charge is too low and must be charged soon. Continued operation will cause lift-interrupt (if enabled) to occur to help prevent battery damage. Lift-interrupt prevents the operator from lifting loads and saves enough battery power for operator to move lift truck to a battery recharger. At lift-interrupt, there are no segments (bars) displayed, and the Battery symbol is flashing.

Display Panel Features

HYSTER

Table 3. Display Panel - LCD Screen and Warning and Indicator Lights (See Figure 11) (Continued)

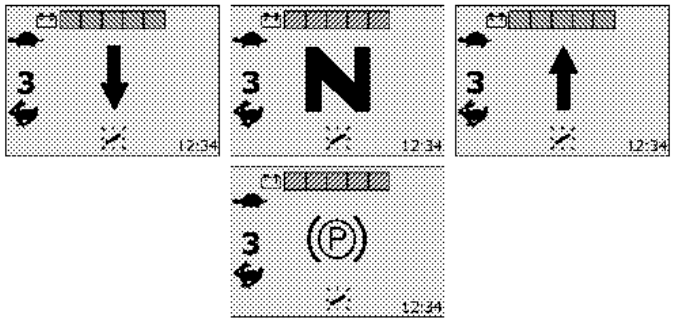
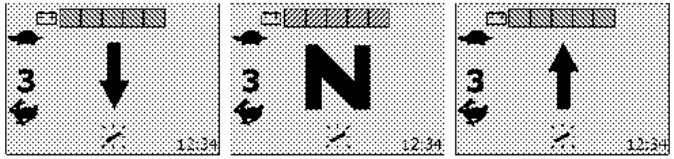
Item No.	Item	Function
5	Indicator Light, Direction Indicators  BO191125	The direction indicator lights indicate which direction the lift truck is currently traveling. With software versions less than 4.32, when a direction of travel has been selected, the corresponding direction arrow (up for **Forward**, down for **Reverse**) will illuminate. When the parking brake has been applied, the **N** or **Arrows** will disappear and the parking brake applied icon will take its place. When the parking brake is disengaged, the **N** or **Arrows** will reappear.
5	Indicator Light, Parking Brake Not Applied, Direction Indicators  BO191126	With software versions 4.32 and greater, the direction indicator lights indicate which direction the lift truck is set to travel. The corresponding direction arrow (up for **Forward**, down for **Reverse**) will illuminate. When the parking brake is disengaged, the **N** or **Arrows** (based on direction selected) will appear.

Table 3. Display Panel - LCD Screen and Warning and Indicator Lights (See Figure 11) (Continued)

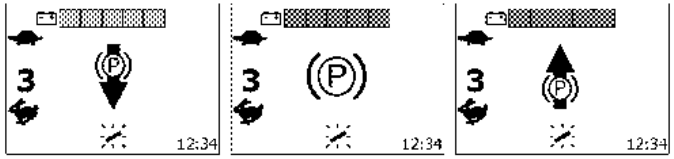
Item No.	Item	Function
5	Indicator Light, Parking Brake Applied, Direction Indicators  BO191127	With software versions 4.32 and greater, when a direction of travel has been selected, the corresponding arrow (up for **Forward**, down for **Reverse**) will illuminate. These symbols will illuminate whenever the parking brake has been applied.

Table 3. Display Panel - LCD Screen and Warning and Indicator Lights (See Figure 11) (Continued)

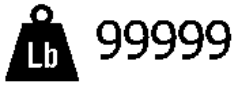
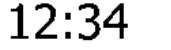
Item No.	Item	Function
6	Indicator Light, Load Weight Indicator  BO190385	The Load Weight Indicator option is available; If this option is enabled, this icon will appear whenever there is a load on the forks. When the operator lifts up a load, the load weight will be displayed on the LCD screen in place of the system time. The load weight will continue to be displayed on the LCD screen as long as the load is on the forks, and will remain on the screen for five seconds after the load has been removed from the forks. After the five seconds have elapsed and another load is not put on the forks, the system time will reappear in place of the load weight icon. The load weight will be displayed in either pounds (lb) or kilograms (kg). The unit of measure to be displayed is set up by either a supervisor or service technician. See the **Operating Procedures** section for procedures to set up and calibrate the load weight.
7	Indicator Light, System Time  BO190379	This icon displays the time of day and is located below the hourmeter. The time format is adjustable by either a supervisor or service technician.

Table 3. Display Panel - LCD Screen and Warning and Indicator Lights (See Figure 11) (Continued)

Item No.	Item	Function
8	Warning Light, Service Due Light 	The service due icon will illuminate when either an active fault is present in the system or when scheduled maintenance is due or almost due, if lift truck is equipped with this feature. When an active fault is present in the system, the wrench symbol will flash on and off repeatedly. The Status Code for the fault will also be displayed on the LCD screen. Status Codes indicate to the operator that a possible malfunction or incorrect truck use has occurred. Status Codes are code numbers for a symptom or malfunction. Have an authorized service technician check and repair the lift truck if a status code number appears. When scheduled maintenance is due or almost due, the service due light will illuminate and be displayed continuously until scheduled service is performed. If maintenance is not performed before the scheduled time, lift truck operation will decrease by 50% until maintenance is performed. The service technician or supervisor must also set the memory for the next maintenance time to allow normal operation again.

Display Panel Features

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Table 3. Display Panel - LCD Screen and Warning and Indicator Lights (See Figure 11) (Continued)

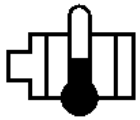
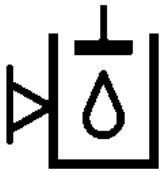
Item No.	Item	Function
8	Warning Light, Service Due Light (Cont) 	If there is a restriction in the hydraulic filter, the service due icon will illuminate and the message "Hydraulic filter restriction" will appear on the display panel. The hydraulic filter restriction feature is an optional feature.
9	Warning Light, Motor Temperature High Warning  BO190380	**CAUTION** **DO NOT operate the lift truck when the motor temperature is too high. Damage to the hydraulic system can occur.** This icon will illuminate and stay illuminated when one of the following things have happened: the traction motor or hydraulic pump motor temperature has become too high. If this icon appears, the lift truck must be checked by a service technician right away. Continued operation of the lift truck when this icon is illuminated, will cause damage to the hydraulic system.

Table 3. Display Panel - LCD Screen and Warning and Indicator Lights (See Figure 11) (Continued)

Item No.	Item	Function
10	Steer Angle Indicator 	The steer angle indicator shows the current forward steering direction when the accelerator or MONOTROL® pedal is depressed.
	Warning Light, Hydraulic Fluid Level Low (Not Shown in **Figure 11**) 	**CAUTION** **DO NOT operate the lift truck when the hydraulic fluid is low. Damage to the hydraulic system can occur.** This icon is only available if the lift truck is equipped with the Hydraulic Fluid Level Monitoring option. If the system detects a low hydraulic fluid level, this icon will illuminate and stay illuminated until hydraulic fluid has been added to the hydraulic system. The icon is located below the wrench (Service Due) icon.

Display Panel Features

HYSTER

Table 3. Display Panel - LCD Screen and Warning and Indicator Lights (See Figure 11) (Continued)

Item No.	Item	Function
	Indicator Light, Truck Hourmeter (Not Shown in **Figure 11**)  BO190378	The hourmeter displays the number of hours of operation on the lift truck. The hourmeter contains 5 digits and an hourglass icon. The hourmeter will always be visible to the operator as long as the display panel has the *Operator Screen* displayed. Turning the key, or keyless switch to the **OFF** position, or pressing the scroll forward key (see **Figure 10** and **Table 2**) with the key or keyless switch in the **OFF** position, will display the truck hourmeter and the pump hourmeter for five seconds. See **Figure 12**.

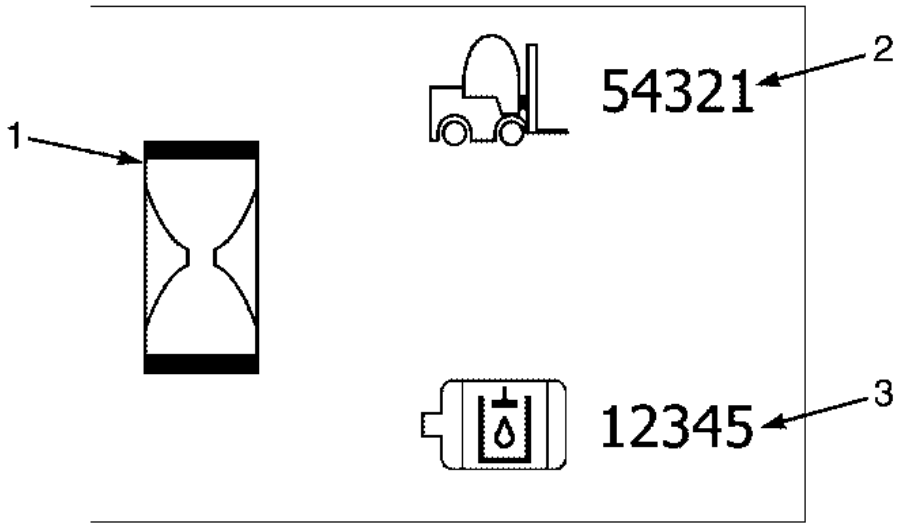
Normal Sequence of Operation - Display Panel

Following is the normal sequence that occurs after the operator is on the seat with the battery connected:

- After the key or keyless switch is moved to the **ON** position, the LCD screen will display the *Operator Screen* where the icons shown in **Figure 11** and **Table 3** will appear on the LCD screen. After 10 seconds, the seat belt, low brake fluid, and motor temperature icons will no longer be illuminated and will illuminate again only if there is a problem in those areas.
- The bar graph for battery-state-of charge is on LCD screen. If the battery is discharged to lift-interrupt, the battery indicator symbol will also be flashing. If a battery of the wrong voltage has been installed, the Wrench light symbol will also be flashing. Have these problems corrected before attempting operation.

Turn the key or keyless switch to the **OFF** position. The following display sequence will occur:

- Display panel shows the hourmeter hours for the truck and hydraulic pump motors for five seconds. See **Figure 12**.



1. HOURMETER ICON
2. TRUCK HOURS
3. HYDRAULIC PUMP MOTOR HOURS

Figure 12. Hourmeter Display at System Shutoff

Normal Sequence of Operation - Display Panel With Options

Following is the normal sequence that occurs after the operator is on the seat with the battery connected:

NOTE: If the password or operator check features are not enabled, the *Operator Screen* will appear after the key or keyless switch is moved to the **ON** position.

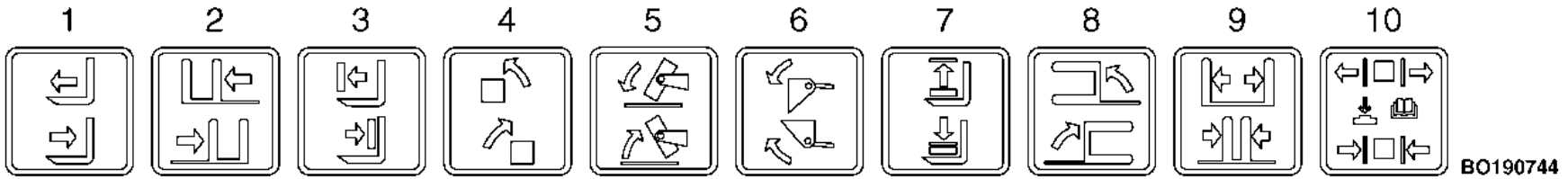
- After the key or keyless switch is moved to the **ON** position, the *Password Screen* will be on the LCD screen if this function is enabled.
- After password is correctly entered, or if it is disabled, the first item of the Operator Checklist will be on the LCD screen if this function is enabled.
- After Checklist is complete, or if it is disabled, the LCD screen will display the *Operator Screen* and the icons shown in **Figure 11** and **Table 3** will appear on the LCD screen. After 10 seconds, the seat belt, low brake fluid, service due (if enabled), motor temperature icons, and low hydraulic fluid (if enabled) will no longer be illuminated and will illuminate again only if there is a problem in those areas.
- The last Performance Mode operation will be on the LCD screen as MODE #___. The bar graph for battery-state-of charge is also on LCD screen. If the battery is discharged to lift-interrupt, the battery indicator symbol will also be flashing. If a battery of the wrong voltage has been installed, the Wrench symbol will also be flashing. Correct these problems before attempting normal operation.

Turn the key or keyless switch to the **OFF** position. The following display sequence will occur:

- Display panel shows the hourmeter hours for the truck and hydraulic pump motors. See **Figure 12**.

Table 4. Auxiliary Control Levers

Function	Direction of Movement	
	Load or Equipment	Control Lever
1. REACH	Retract/Extend	Backward/Forward
2. SIDESHIFT	Right/Left	Backward/Forward
3. PUSH-PULL	Backward/Forward	Backward/Forward
4. ROTATE	Clockwise/Counterclockwise	Backward/Forward
5. UPENDER	Up/Down	Backward/Forward
6. SCOOP	Up/Down	Backward/Forward
7. LOAD STABILIZER	Down (Clamp)/Up (Release)	Backward/Forward
8. SWING (FORKS)	Right/Left	Backward/Forward
9. FORK SPREAD	Together/Apart	Backward/Forward
10. CLAMP	Clamp/Release	Backward/Forward



Operating Procedures

General

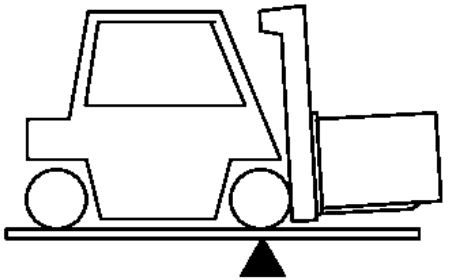
Know Your Lift Truck

WARNING

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

The fork lift truck is designed to pick up and move materials. The basic lift truck has a lift mechanism with forks on the front to engage the load. The lift mechanism lifts the load so that it can be moved and stacked.

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



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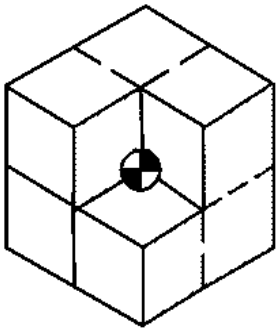
The lift truck is based on the principle of two weights balanced on opposite sides of a pivot (fulcrum). This is the same principle used for a seesaw.

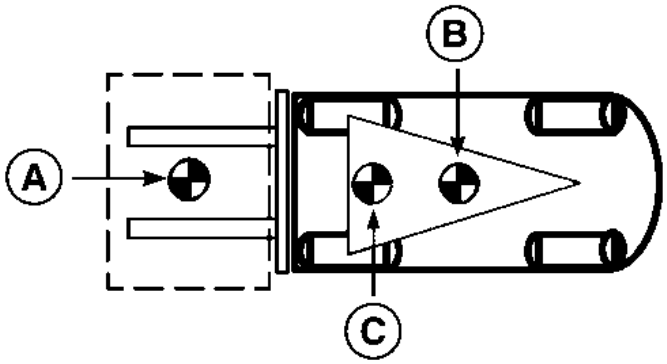
In order for this principle to work for a lift truck, the load on the forks must be balanced by the weight of the lift truck. The location of the center of gravity of both the truck and the load is also a factor.

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

Stability and Center of Gravity

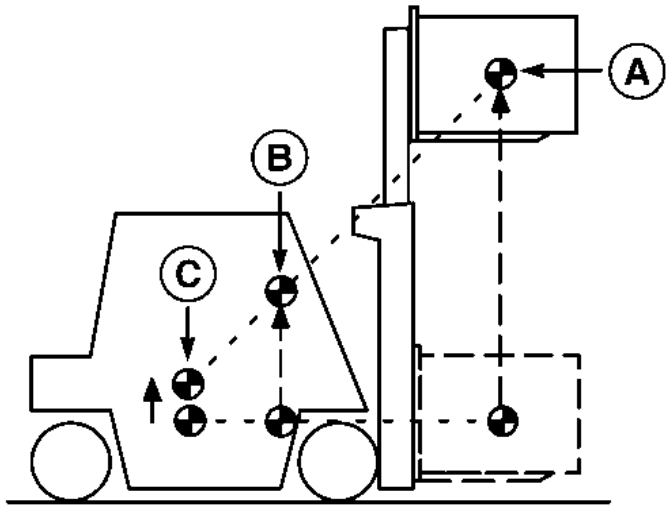


The center of gravity (CG) of any object is the single point about which the object is balanced in all directions. Every object has a CG. When the lift truck picks up a load, the truck and load have a new combined CG. The stability of the lift truck is determined by the location of its CG, or if the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



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

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



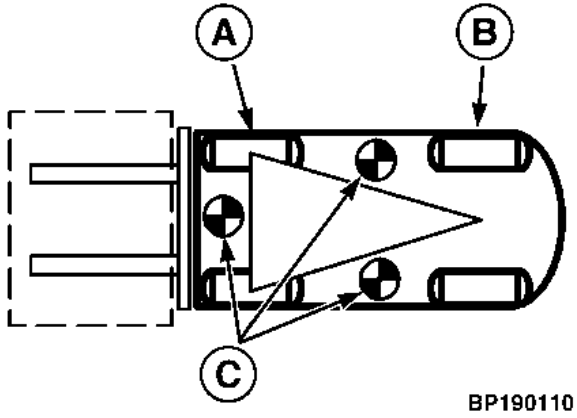
A. CG LOAD **B.** COMBINED CG **C.** CG TRUCK

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

These dynamic forces are caused by things like acceleration, braking, turning, and operating on uneven surfaces or on an incline. These factors must be considered when traveling with an unloaded truck, as well, **because an**

unloaded truck will tip over to the side easier than a loaded truck with its load in the lowered position.

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



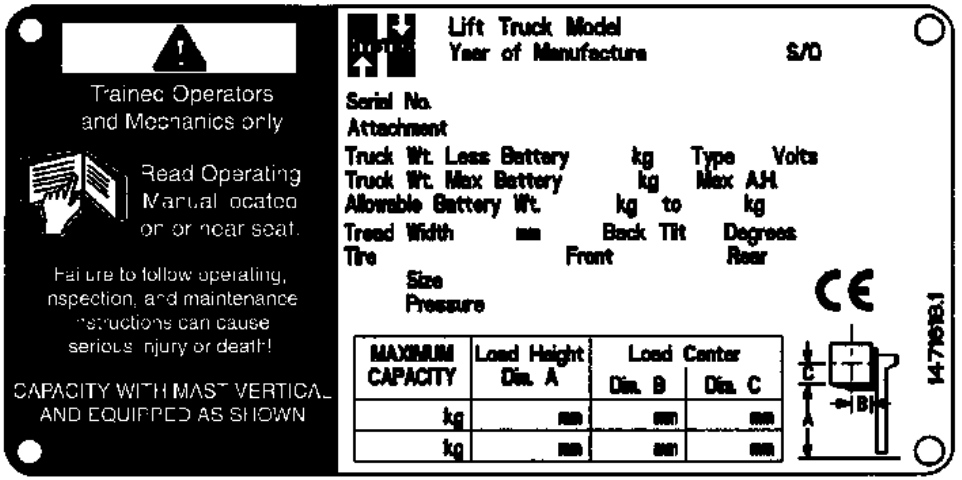
A. DRIVE AXLE
B. STEERING AXLE
C. CG - TRUCK WILL TIP OVER

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

Capacity (Weight and Load Center)

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

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



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The load center of a load is determined by the location of its center of gravity. The load center is measured from the front face of the forks, or the load face of an attachment, to

the center of gravity of the load. Both the vertical and horizontal load centers are specified on the Nameplate.

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

Impact Sensor

The lift trucks covered in this **Operating Manual** may be equipped with an optional impact sensor that can be enabled or disabled by a service technician or supervisor. The impact sensor will sense when the lift truck has hit an object, and will cause the lift truck to shutdown. There are two types of impact that the Vehicle System Manager (VSM) recognizes: soft impact and hard impact.

The data parameters that determine whether an impact is a soft or hard one are entered into the lift truck's VSM by personnel with a service or supervisor password (see **Operator Passwords** in this section).

If the impact sensor option is enabled and an impact has been detected, then lift truck will shut down once the Impact Shutdown Timer has expired (range is from 0 to 30 seconds). During this time an alarm will sound and the Impact Detection icon will be displayed on the LCD screen. If the time is set to 0 seconds, the lift truck will shut down right after the impact is detected and no alarm will sound.

The Impact Shutdown Timer and other Impact related setup parameters can be set by either a service technician or supervisor.

The truck can be configured to completely shut down after an impact, which will include the electro-hydraulic functions. If a load is in the raised position and needs to be lowered, see **Load Handling, Emergency Load Lowering** and **Figure 20**.

Once shutdown, the lift truck cannot move until the impact sensor is reset by a supervisor or service technician. The Impact Detection icon will be displayed on the LCD screen any time the accelerator pedal is depressed (or hydraulic lever is moved, if configured to shut the truck completely down) while the truck is shut down.

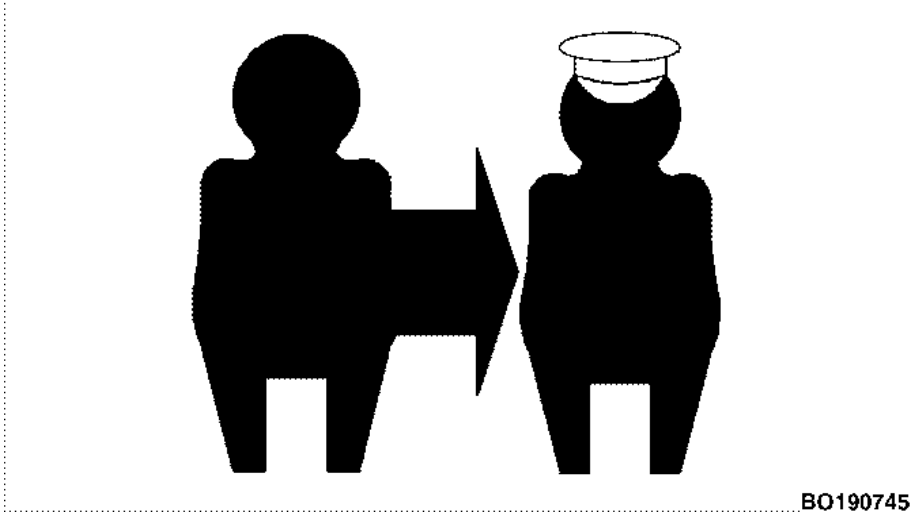


Figure 13. Impact Detected Icon

To clear messages and reset truck to normal operation, an Impact Reset must be performed by either a service technician or supervisor. See **User Interface - Supervisor** 2200 SRM 1335 or **User Interface - Service Technician** 2200 SRM 1336 for procedures.

Cabin Heater

⚠ WARNING

Safety instructions must be followed or property damage and/or personal injury may occur.

SAFETY INSTRUCTIONS

- **The cabin heater must not be covered in any way.**
- **DO NOT place objects on the cabin heater and DO NOT block air ducts.**
- **DO NOT insert any objects into the cabin heater.**
- **During heater operation, the outside cover will get hot.**
- **If the cabin heater does not work normally, it should be immediately taken out of service and the problem corrected.**
- **The cabin heater may not be modified from its original design.**

The lift truck covered in this manual may be equipped with an optional Cabin Heater. The Cabin Heater is a bolt-on accessory that consists of the Cabin Heater, wiring harness, primary and secondary air filters, heater control unit, and necessary hardware.

At lift truck startup, the display on the control unit shows current operating parameters. The display shows in sequence: program version, followed by configuration and operating voltage.

Choice of temperature display settings is shown in the startup sequence together with current operating parameters. C0 indicates Celsius degrees and F0 indicates Fahrenheit degrees. The setting may be altered by pressing either the TEMP + or − button during start up sequence. The new setting is displayed in blinking until the choice is confirmed by pressing the ON button (within 2 seconds). The chosen setting will be stored and preserved even though the heater may be disconnected from the battery.

After the operating parameters have been shown or adjusted, the cabin heater enters standby mode. This is indicated by a green dot in the control unit display. The cabin heater is now ready for use.

See **Figure 14** and **Table 5** for a description of operation for the cabin heater.

Operating Procedures

HYSTER

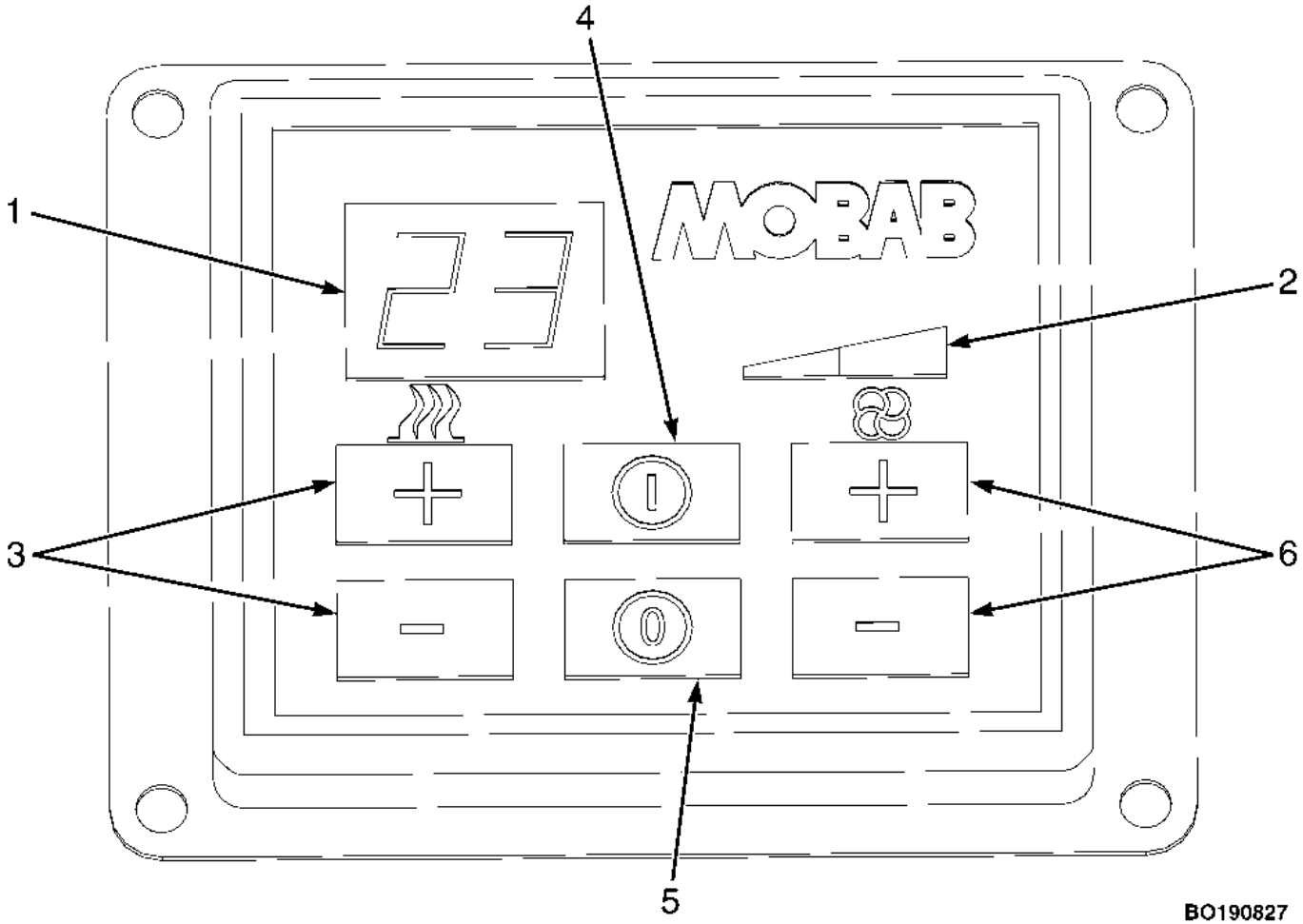


Figure 14. Cabin Heater Operation

Table 5. Cabin Heater Operation

Item No.	Item Description	Description of Operation
1	Display	Displays requested temperature, operating parameters, and error messages.
2	Fan Speed Indicator	Displays current fan speed selected by operator.
3	Temperature Adjustment	Press + to increase temperature or − to decrease temperature. LO indicates that all heat is turned off. HI indicates that full heating power is turned on.
4	ON Button	Press this button to start the cabin heater. The fan starts and the requested temperature is shown in the display.
5	OFF Button	Press this key to turn off the cabin heater. The fan speed and requested temperature are stored. Standby mode is indicated by a green dot in the display.
6	Fan Speed Adjustment	Press + to increase or − to decrease the fan speed. If risk of overheating should occur, the fan speed will increase automatically.

Inspection Before Operation

⚠ WARNING

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

See **Checks and Inspection Procedures** in the **Maintenance Section** of this manual for detailed instructions. Also refer to **Table 1** for operation and description of controls.

☑ Checks With the Key or Keyless Switch OFF

Inspect the lift truck before use and every eight hours or daily as described in the **Maintenance** section of this **Operating Manual**.

Before using the lift truck, make the following checks:

- Oil level in the hydraulic tank.
- Electrolyte level and specific gravity of the battery are correct, unless lift truck is equipped with optional "No Maintenance" battery.
- Battery weight is within the range of battery weights on the Nameplate.
- Battery restraint mechanism operates correctly and is latched.
- The spacer plate is adjusted to limit forward, backward, or side to side battery movement.
- Condition of forks, carriage, chains, mast, and overhead guard.
- Leaks from the hydraulic system.
- Condition of wheels and tires.
- Seat belt fastens correctly.
- Seat is securely fastened to the battery cover.

Operator Passwords

The lift trucks covered in this manual have an optional password feature.

The Operator Passwords are a series of five numbers. Each of the five number digits can be the numbers 1 through 5. If enabled, the password number series must be entered into the memory by a technician or a supervisor and assigned to an operator. Remember the password. If password is lost, contact your supervisor or a service technician. Supervisor Level password can be used to add, delete, or edit Operator Passwords.

After the five-digit password has been entered, press the enter button (*) and the system will check the password against the currently stored password list on the truck. If less than five digits are entered, pressing the enter button (*) will have no effect. If more than five digits are entered, the system will only use the last five digits entered. For example, if 123453 is entered, the LCD screen will only show 23453 as the currently entered password.

If the password is valid, the LCD screen moves onto the *Operator Screen* and the truck power can be turned on. If the password is not valid, the *Invalid Password Screen* will appear for up to five seconds and the truck power cannot be turned on. The operator can re-enter the password again before or after the five seconds have elapsed.

If the password is entered again before the five seconds are over, the *Invalid Password Screen* will disappear and the *Enter Password Screen* will reappear. See **Figure 15**.

There are three password types used on these trucks:

- **Operator:** Allows operator to operate lift truck.
- **Supervisor:** Same rights as the Service Level password, except Supervisor Level password cannot add, change, or delete Service Level passwords
- **Service:** Has all rights assigned to Operator and Supervisor passwords. Can add, edit, and delete Operator, Supervisor, and Service passwords and view all truck diagnostic information. Allows access to truck service parameters within preset limits. On trucks with hood switch option, allows starting truck with hood open.

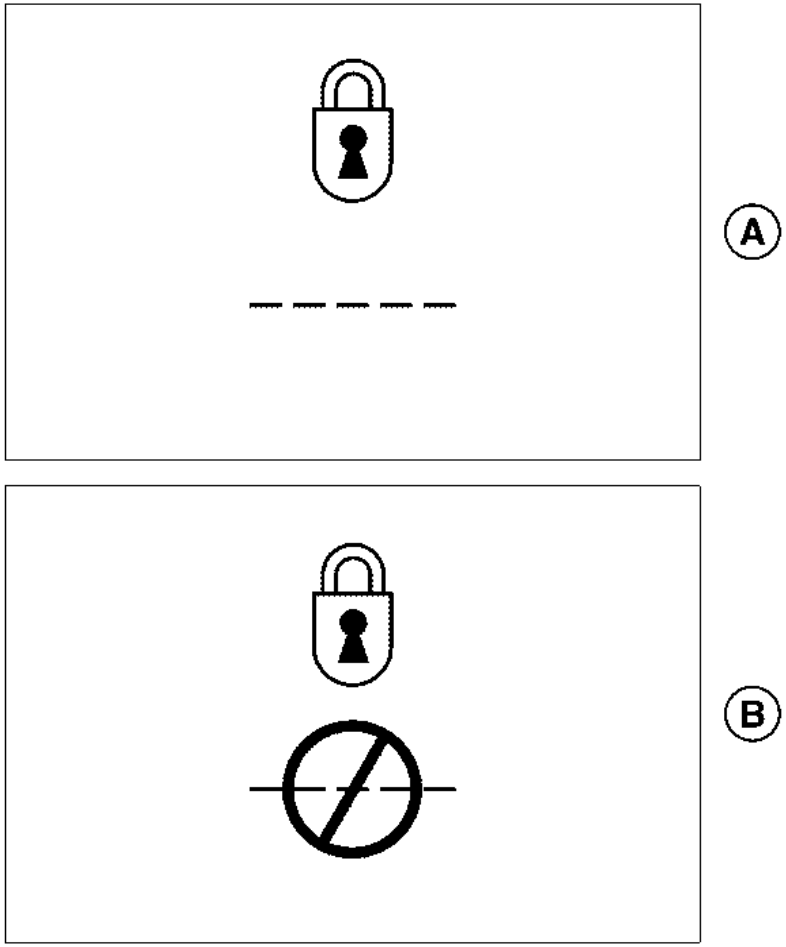


Figure 15. Operator Password Screens

Legend for Figure 15

A. ENTER PASSWORD SCREEN
B. INVALID PASSWORD SCREEN

Operator Checklist

If your lift truck is equipped with the optional operator checklist, it can be enabled or disabled by a supervisor or service technician. See **Table 6**.

Table 6. Operator Checklist Icon Definitions

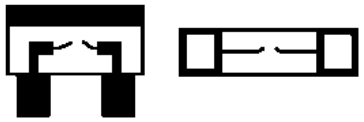
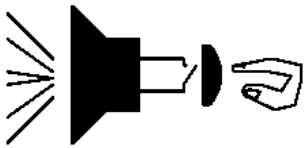
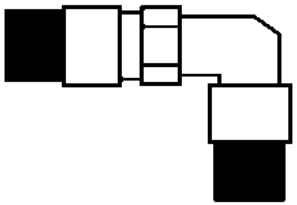
Icon	Definition
	Check Parking Brake
 BO190538	Check Fuses
 BO190553	Check Horn
 BO190539	Check Hoses

Table 6. Operator Checklist Icon Definitions (Continued)

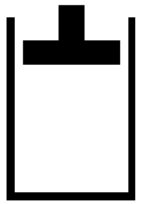
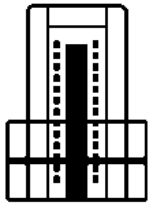
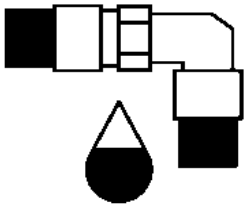
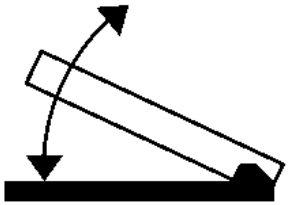
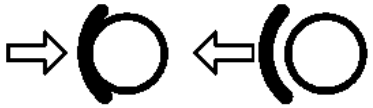
Icon	Definition
 BO190540	Check Hydraulics
 BO190541	Check Mast
 BO190542	Check for Leaks

Table 6. Operator Checklist Icon Definitions (Continued)

Icon	Definition
	Check Operator Restraint
 BO190543	Check Pedal Movement
 BO190544	Check Service Brake

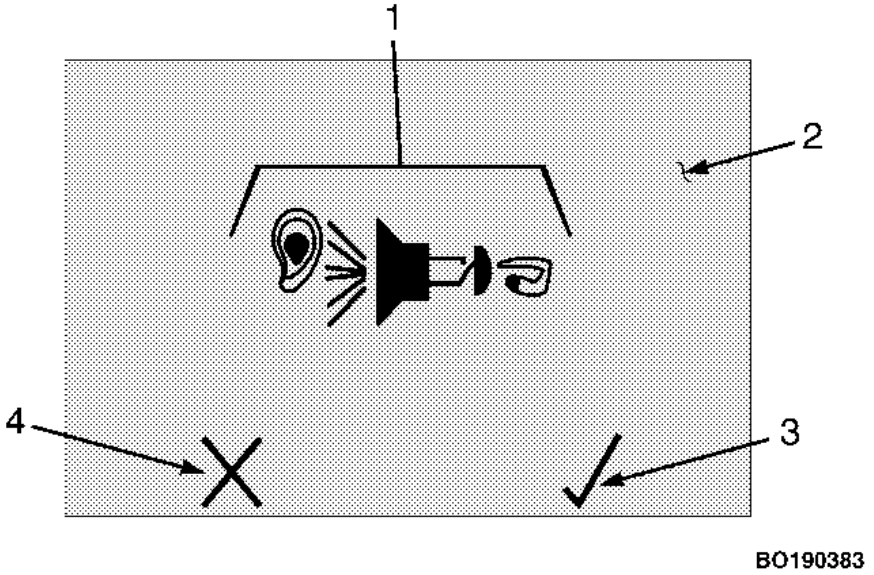
The operator checklist will appear on the LCD screen when the lift truck is powered **ON** and the correct password is entered, unless this operator satisfactorily completed the checklist less than 8 hours earlier. If the password function is not activated, the operator checklist will appear after lift truck is powered **ON** and the checklist has not been satisfactorily completed within the last 8 hours.

The operator checklist can store a maximum of 30 items. Each item includes a graphic representation of a system or component the operator is to check. The operator is instructed to press the Enter (*) button to select the check mark (**YES** response) or the Pound button to select the X (**NO** response) on the LCD screen. See **Figure 10** and **Table 2**.

Selecting the check mark indicates that the current item in the checklist is operating properly. Selecting the X indicates a problem or issue with the current item in the checklist. See **Figure 16**. After the operator has provided an answer, the screen will move onto the next item in the checklist. The process repeats itself until all items in the checklist have been answered. All responses to items in the checklist are kept in the Operator Checklist Log, which can only be accessed by personnel with a supervisor or service technician password.

Once the checklist has been completed and all items were answered with a check mark (**YES** response), the lift truck operation is enabled. If any checklist item is answered with an X (**NO** response), the maintenance due icon on the *Operating Screen* will flash repeatedly. See **Figure 11** and **Table 3**.

If any item on the checklist is marked with an X (**NO**), the maximum truck speed will be reduced by 50%. This condition can only be changed if the checklist is redone and every item is checked ✓ (**YES**) in the checklist. Alternatively, an authorized supervisor or service technician can turn off the checklist feature which will restore full truck performance.



1. ITEM OR COMPONENT BEING CHECKED
2. LCD SCREEN
3. CHECK MARK (* KEY)
4. X MARK (# KEY)

Figure 16. Operator Checklist Screen

Mounting and Dismounting

⚠ WARNING

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

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

If equipped, be sure cab door is secured in the closed position or removed before starting lift truck operations.

Start-Up Procedure - SRO Circuit

Lift Trucks with Software Versions Less than 4.32

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

1. Sit on the seat to close seat switch. Check to ensure all operator controls, traction and hydraulic, are in the neutral position. If a control is not in a neutral position, it must be returned to neutral and remain in the neutral position for 0.1 second before starting the lift truck. Turn the key or keyless switch to the **ON** position.

2. Select the direction of travel and push the accelerator or push the MONOTROL® pedal.

If **Step 2** is done before **Step 1** and the lift truck moves, the SRO function is not operating correctly. The sequence within Step 1 is not important. The lift truck must not be operated if the SRO circuit does not function correctly. If the SRO circuit does not operator correctly, have the Master Controller Checked by authorized service technician.

When you want the lift truck to travel in the Forward or Reverse direction:

1. Make sure a charged battery of the correct voltage is installed and connected.

2. Sit on the seat to close seat switch and turn key or keyless switch to the **ON** position.

3. Release the parking brake.

4. Select the direction of travel using the MONOTROL® pedal or the optional direction control switch. See **Figure 8**, **Figure 9**, and **Table 1**

5. Push the MONOTROL® or accelerator pedal for acceleration.

Lift Trucks with Software Versions 4.32 and Greater

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

For standard lift trucks, follow this starting procedure:

1. Make sure a charge battery of the correct voltage is installed and connected.

2. Sit on the seat to close seat switch. Check to ensure all operator controls, traction and hydraulic, are in the neutral position. If a control is not in the neutral position, it must be returned to neutral position before starting the lift truck.

3. Turn the key or keyless switch to the **ON** position.

4. Perform one of the following actions:

a. For lift trucks with manual parking brake, release the parking brake.

b. For lift trucks with automatic parking brake, press the service brake pedal.

5. Select the direction of travel using the MONOTROL® pedal or the optional direction control switch. See **Figure 8**, **Figure 9**, and **Table 1**.

6. Push the MONOTROL® or accelerator pedal for acceleration.

If Step 5 is done before Step 1 through Step 4 and the lift truck moves, the SRO function is not operating correctly. The lift truck must not be operated if the SRO circuit does not function correctly. If the SRO circuit does not operate correctly, have the Master Controller checked by authorized service technician.

For lift trucks equipped with the Optional Operator Presence System (OPS), follow this starting procedure:

1. Make sure a charged battery of the correct voltage is installed and connected.

2. Sit on the seat to close seat switch. Fasten seat belt to close belt switch. Check to ensure all operator controls,

traction and hydraulic, are in neutral position. If a control is not in the neutral position, it must be returned to neutral position before starting the lift truck.

3. Turn the key or keyless switch to the **ON** position.

4. Perform one of the following actions:

a. For lift trucks with manual parking brake, release the parking brake; if the parking brake was **NOT** set, recycle brake.

b. For lift trucks with automatic parking brake, press the service brake pedal.

5. Select the direction of travel using the MONOTROL® pedal or the optional direction control switch. See **Figure 8**, **Figure 9**, and **Table 1**.

6. Push the MONOTROL® or accelerator pedal for acceleration.

Lift Truck Interlocks

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

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

The battery cover switch, or if lift truck is equipped with a battery gate switch, must indicate that the batteries are secure in the battery compartment.

If any of the above actions are not performed while operating the lift truck, the traction motor will be disabled. The LCD screen on the display panel will provide a brief text message to the operator explaining which action is not being performed and causing the traction motor to be disabled. Examples of this are "Seat Interlock" or "Parking Brake Interlock." Once the needed action is completed, the traction motor will be enabled and the operator can continue to drive the lift truck.

HYDRAULIC INTERLOCKS: The hydraulic functions are enabled when the operator is in the seat (occupancy sensor), seat belt is fastened, and the battery cover switch, or if lift truck is equipped with a battery gate switch, indicates that the battery is secure in the battery compartment.

If any of the above actions are not performed while operating the lift truck, the hydraulic functions will be disabled.

The LCD screen on the display panel will provide an icon to the operator indicating which action needs to be performed to enable hydraulic functions. Examples of this are "Seat Interlock" or "Battery Not Secure." See **Table 7**. Once the needed action is completed, the hydraulic function will be enabled and the operator can continue to load and unload material.

Table 7. Alert Screens/Interlock Notifications

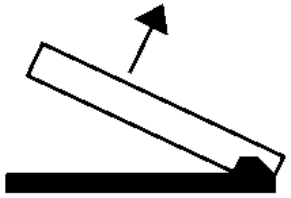
Icon	Condition	Operator Action Required
 BO190545	Accelerator Pressed (SRO Not Satisfied).	Release The Accelerator Pedal.
	Standard OPS, Accelerator Pressed (SRO Not Satisfied)	Press Service Brake Pedal
	Equipped with Optional OPS, Accelerator Pressed (SRO Not Satisfied)	Apply Parking Brake

Table 7. Alert Screens/Interlock Notifications (Continued)

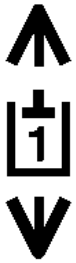
Icon	Condition	Operator Action Required
 BO190990	Hydraulic Function 1 Out of Neutral.	Release Hydraulic Function 1 Lever or Button.
 BO190991	Hydraulic Function 2 Out of Neutral, or Function 2 Button Out of Neutral.	Release Hydraulic Function 2 Lever or Button.

Table 7. Alert Screens/Interlock Notifications (Continued)

Icon	Condition	Operator Action Required
 BO190992	Hydraulic Function 3 Out of Neutral, or Function 3 Button Out of Neutral.	Release Hydraulic Function 3 Lever or Button.
 BO190993	Hydraulic Function 4 Out of Neutral, or Function 4 Button Out of Neutral.	Release Hydraulic Function 4 Lever or Button.

Table 7. Alert Screens/Interlock Notifications (Continued)

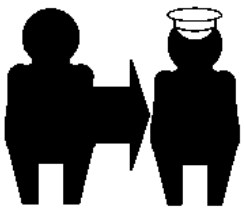
Icon	Condition	Operator Action Required
 BO190998	Direction Select in Neutral.	Take Lift Truck Out of Neutral by Pushing the Monotrol Pedal or Moving Direction Control Switch and Pushing Accelerator Pedal.
 BO190552	Operator out of the Seat or Seatbelt Not Fastened.	Sit Fully in the Seat and Fasten Seat Belt.
 BO190546	Impact Detected.	Service Technician or Supervisor Password Must be Entered to Reset System.

Table 7. Alert Screens/Interlock Notifications (Continued)

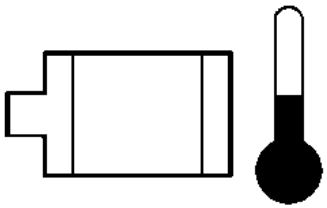
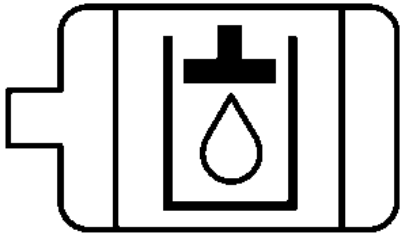
Icon	Condition	Operator Action Required
	Motor(s) Temperature Over Shutdown Temperature.	Allow Motor(s) to Cool off, Then Recycle Key or Keyless Switch to Satisfy SRO.
 BO190547	Key Switch Not Detected in **OFF** Position.	Cycle the Key Switch.
	Park Brake Applied.	Release Park Brake.
	Battery is Not Secured.	Close Battery Gate/Hood Fully.

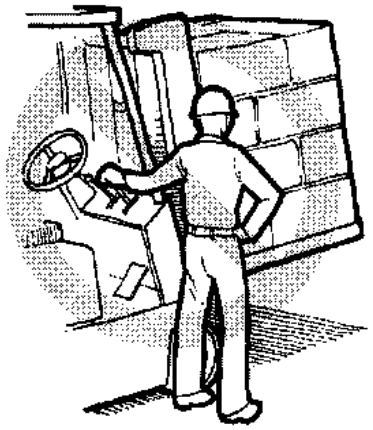
Table 7. Alert Screens/Interlock Notifications (Continued)

Icon	Condition	Operator Action Required
	Fault Has Been Detected.	Notify Service Technician to Correct the Fault.
 BO190994	Truck Disabled Due to E-Steer Controller.	Notify Service Technician to Correct the Fault.
 BO190995	Truck Disabled Due to Right (Single) Traction Controller.	Notify Service Technician to Correct the Fault.

Table 7. Alert Screens/Interlock Notifications (Continued)

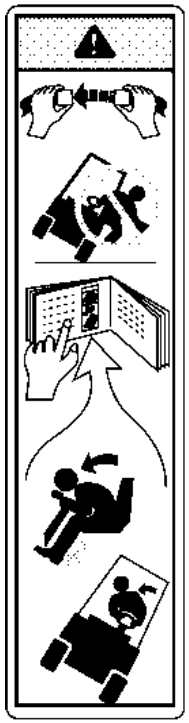
Icon	Condition	Operator Action Required
 BO190996	Truck Disabled Due to Left Traction Controller.	Notify Service Technician to Correct the Fault.
 BO190997	Truck Disabled Due to Pump Controller.	Notify Service Technician to Correct the Fault.

Checks With the Key or Keyless Switch ON


BO190535

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

The operator must be aware that the lift truck can tip over. There is a great risk that the operator or someone else can be killed or injured if trapped or hit by the truck as it tips over. The risk of injury can be reduced if the operator stays on the truck. If the truck tips over do not jump off.


BO190113

WARNING

FASTEN SEAT BELT
If Lift Truck Tips Over

- **Do Not Jump – Stay On Truck**
- **Hold Firmly To Steering Wheel – Brace Feet – Lean Forward And Away From Impact**

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

THE SEAT BELT AND HIP RESTRAINT BRACKET provide a means to help the operator keep the head and torso substantially within the confines of the truck frame and overhead guard if a tipover occurs. This protection system is intended to reduce the risk of the head and torso being trapped between the truck and the ground, but it cannot protect the operator against all possible injury in a tipover.

Make sure that the area around the lift truck is clear before making any operational checks. Be careful when making

the checks. If the lift truck is stationary during a check, apply the parking brake. Proceed carefully.

Check the operation of the following functions as described in the **Maintenance** section.

- Check the operation of the horn and indicator lights.
- Operate the lift, tilt, and auxiliary functions to check for correct operation of the mast, carriage, and attachments.
- Check the operation of the steering system.
- Check the operation of the MONOTROL® pedal or the directional control lever and the accelerator pedal.
- Check the operation of the service brakes and the park brake.
- Check that hood is securely latched.

Load Weighing Sensor

If the lift truck is equipped with the optional load weight sensor, it will display the weight of the load in either pounds or kilograms on the LCD screen. See **Figure 11** and **Table 3**. The unit of measure is preset by a service technician or a supervisor and can be changed by a service technician or supervisor.

The operator can access the load weight function by pressing the scroll forward or scroll backward button on the display panel until the *Calibrations Menu* appears. Press the #2 button to scroll up or the #3 button to scroll down to scroll through the menu selections within the *Calibrations Menu* until the Load Weight menu appears. Press the enter (*) button to enter the load weight menu.

To most accurately weigh a load, follow these instructions:

1. With a load on the forks, position the mast in a vertical position.

2. Lift the load 0.6 m (2 ft) off the ground, but if free-lift cylinder is present, not more than maximum free lift.

3. Lower the load 51 mm (2 in.). Stop lowering, wait 1 second, and read the load weight. This will be the most accurate weight. Waiting longer to read the load weight will reduce accuracy.

Set Load Weight to Zero

The operator can set the load weight to zero, when the no load weight displayed on the LCD screen with the forks/attachment 0.6 m (2 ft) off the ground and is not within ±2% of truck capacity. Example: This is ±45 kg (100 lb) for a 2268 kg (5000 lb) truck.

To set the Load Weight System to zero, perform the following procedures:

1. Turn lift truck power **ON**.

2. If lift truck is equipped with optional Operator Password feature, enter operator password to enter the main menu. See the section **Operator Passwords** for procedures.

3. If lift truck is equipped with optional Operator Checklist feature, fill out the checklist questions. See the section **Operator Checklist** for the procedures. After checklist is completed, the LCD screen will show the *Operator Screen*.

4. From the *Operator Screen*, press the scroll back (left arrow key) or scroll forward (right arrow key) to go to the *Calibrations Menu Screen*. See **Table 8**.

5. Press the #3 button to select the *Calibrations Menu*.

6. Press the #2 button to scroll up or the #3 button to scroll down until the weight icon appears on the LCD screen. See **Table 8**.

7. Press the enter (*) button to select the Load Weight-Set Zero feature.

8. With no load on the forks, position the mast in a vertical position. See **Table 8**.

9. Lift the empty forks/attachment 0.6 m (2 ft) off the ground but if free-lift cylinder is present, not more than maximum free lift. Then, lower the forks/attachment 51 mm (2 in.), wait 1 second, and IMMEDIATELY press the (*) key to set the zero point.

The Load Weight System is now set to zero.

Table 8. Set Load Weight to Zero

Icon	Definition
 BO190551	Calibration Main Menu
 BO190550	Weight
 BM081095	Position Empty Forks at Load Weight Height

Operating Techniques

⚠ WARNING

Before operating the lift truck FASTEN YOUR SEAT BELT.


BO190114

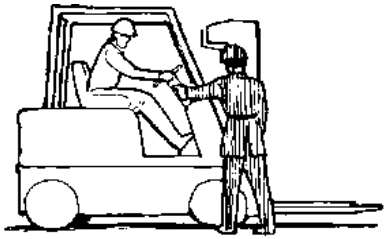
There are a number of operations, if not performed carefully, that can cause the lift truck to tip. If you have not read the WARNING page in the front of this Operating Manual, do so NOW. As you study the following information about how to properly operate a lift truck, remember the WARNINGS.

Basic Operating Procedures

Many people make the mistake of thinking that operating a lift truck is the same as driving an automobile. This is not true. It is true that some lift truck operating procedures are as simple and obvious as driving the family automobile. (e.g. Look where you are going, start and stop smoothly, etc.) But a lift truck is a special machine designed to do a much different job than an automobile. Because of the

close areas in which a lift truck operates and its other operating characteristics (like rear wheel steering and tail-swing), every operator must receive additional training, even if they have a license to drive an automobile.

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


BO190115

1. AUTHORIZED AND TRAINED OPERATOR ONLY. This means the operator must be trained to drive the lift truck and it means that the operator must thoroughly understand the procedures for lift truck operation. It also means that a qualified person experienced in lift truck operation must guide the operator through several driving and load handling operations before the operator attempts to operate the lift truck alone. A basic education in proper driving and load handling techniques is absolutely necessary to prepare the new operator for proper defensive driving and to expect the unexpected.


HO190472

2. Operate the lift truck only in areas that have been approved for lift truck operation. Certain areas contain hazardous flammable gases, liquid, dust, fibers, or other materials. Lift trucks that are operated in these areas must have special fire safety approval.

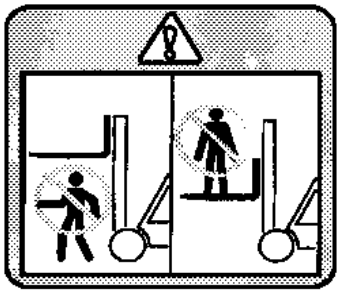
These areas must be designated to show the type of lift truck approval required for operation in the area. Changes to special equipment or poor maintenance can make the lift truck lose its special approval.

⚠ WARNING

This lift truck is designed for handling materials. A lift truck is not designed to lift people. Do not use a lift truck to lift people unless it has been determined that there is no other practical option (scaffolds, elevated work platforms, aerial baskets, etc.) to perform the needed work.

Operating Procedures

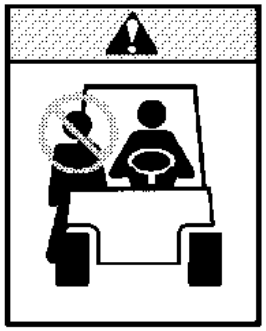
HYSTER


BO190117

If a lift truck is used to elevate a worker, a safety platform must be attached to the forks and carriage. The platform must have a solid floor with a surface to prevent the feet of the worker from slipping, hand rail, toe board, and a screen or shield at least 2 m (7 ft) high between the people on the platform and the lift mechanism.

The combined weight of the platform, load, and personnel is not to exceed one-half of the capacity as indicated on the nameplate of the truck on which the platform is used.

Before anyone is allowed in the platform, lift and lower the mast slowly with the platform in place to make sure the mast functions properly. Apply the parking brake. DO NOT travel with people in the platform. The operator must remain at the controls. Watch for overhead obstructions.


BO190116

3. NO RIDERS. A lift truck is built for only one person – the operator. It is dangerous for anyone to ride on the forks or anywhere else on the lift truck.

4. ADJUST SEAT.

Seat Position Adjustment (Swivel Seat)

- The seat swivels 12 degrees to the right to allow the operator a more ergonomic position when driving in reverse.
- The seat swivels 5 degrees to the left to allow an easier exit of the truck.
- The neutral position is shown in **Figure 17**.

Seat Position Adjustment (Full Suspension, High Back Seat)

NOTE: The lift trucks covered in this **Operating Manual** may be equipped with an optional full suspension, high back seat with adjustable headrest and lumbar support.

- To adjust the lumbar support, move the adjustment wheel to increase or decrease lumbar support to desired position. See **Figure 18**.
- To adjust the headrest, position hands under the headrest and lift headrest up until desired position is reached. See **Figure 18**.

Seat Adjustment for Operator Weight

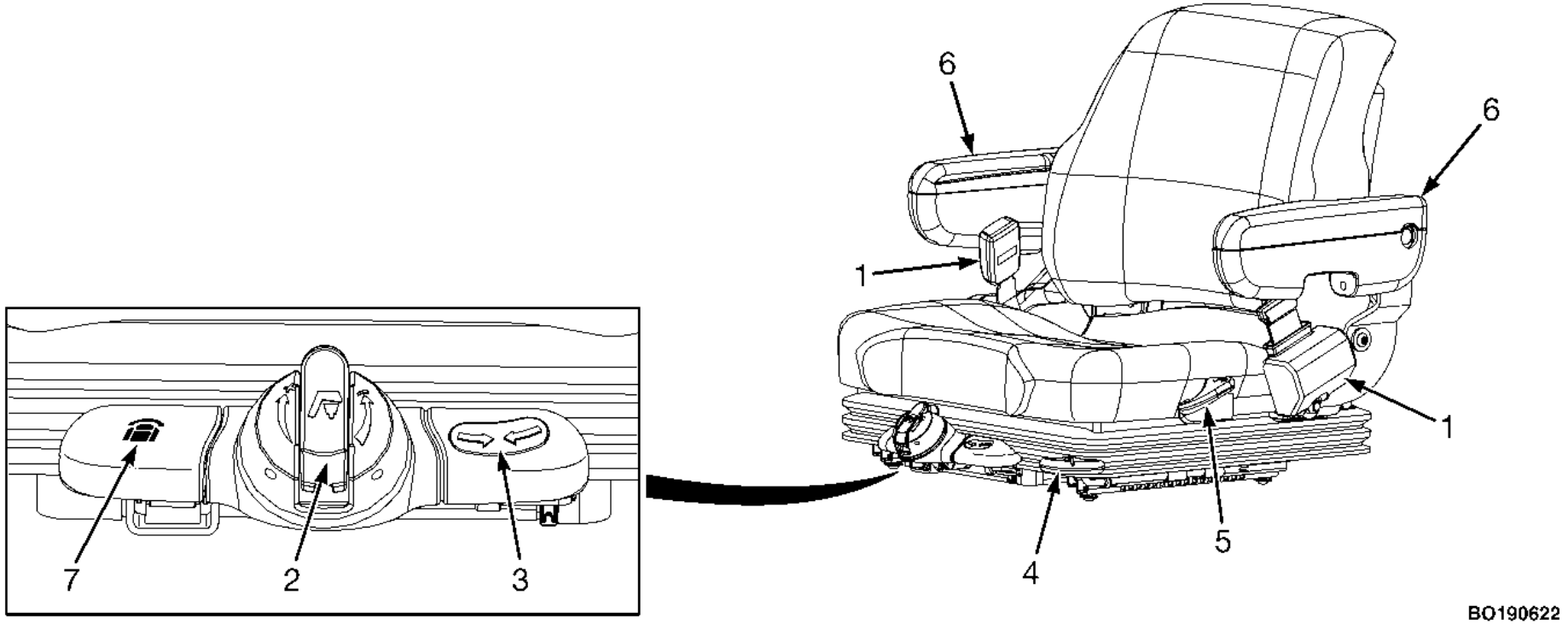
CAUTION

A major cause for high Whole Body Vibration is caused by the operator not adjusting the seat to his/her weight.

NOTE: It is important to adjust the weight setting for each operator.

NOTE: The seat is designed for a maximum weight of 135 kg (298 lb)

- The target is for the "ride indicator" to fall between the arrows when the operator sits upright in the seat with the feet positioned on the pedals. This ensures that the operator is set at the midpoint of the 80 mm (3.5 in.) suspension.
- The handle can be turned as shown to increase or decrease the weight resistance, pull handle out before turning. As the handle is turned the "stiffness" of the suspension can be felt to increase or decrease depending on which way the handle is turned.
- The measured vibration levels measured to EN13059 are noted in the front of this manual in the **Foreword** section.



A. STANDARD, NON-SWIVEL SEAT

1. SEAT BELT
2. WEIGHT ADJUSTMENT KNOB
3. RIDE POSITION INDICATOR
4. FORWARD/BACKWARD ADJUSTMENT LEVER

B. FULL SUSPENSION SWIVEL SEAT

5. BACKREST ANGLE ADJUSTMENT LEVER
6. ARMREST
7. SWIVEL LATCH RELEASE LEVER

Figure 17. Seat Adjustment (Full Suspension and Swivel Seats)

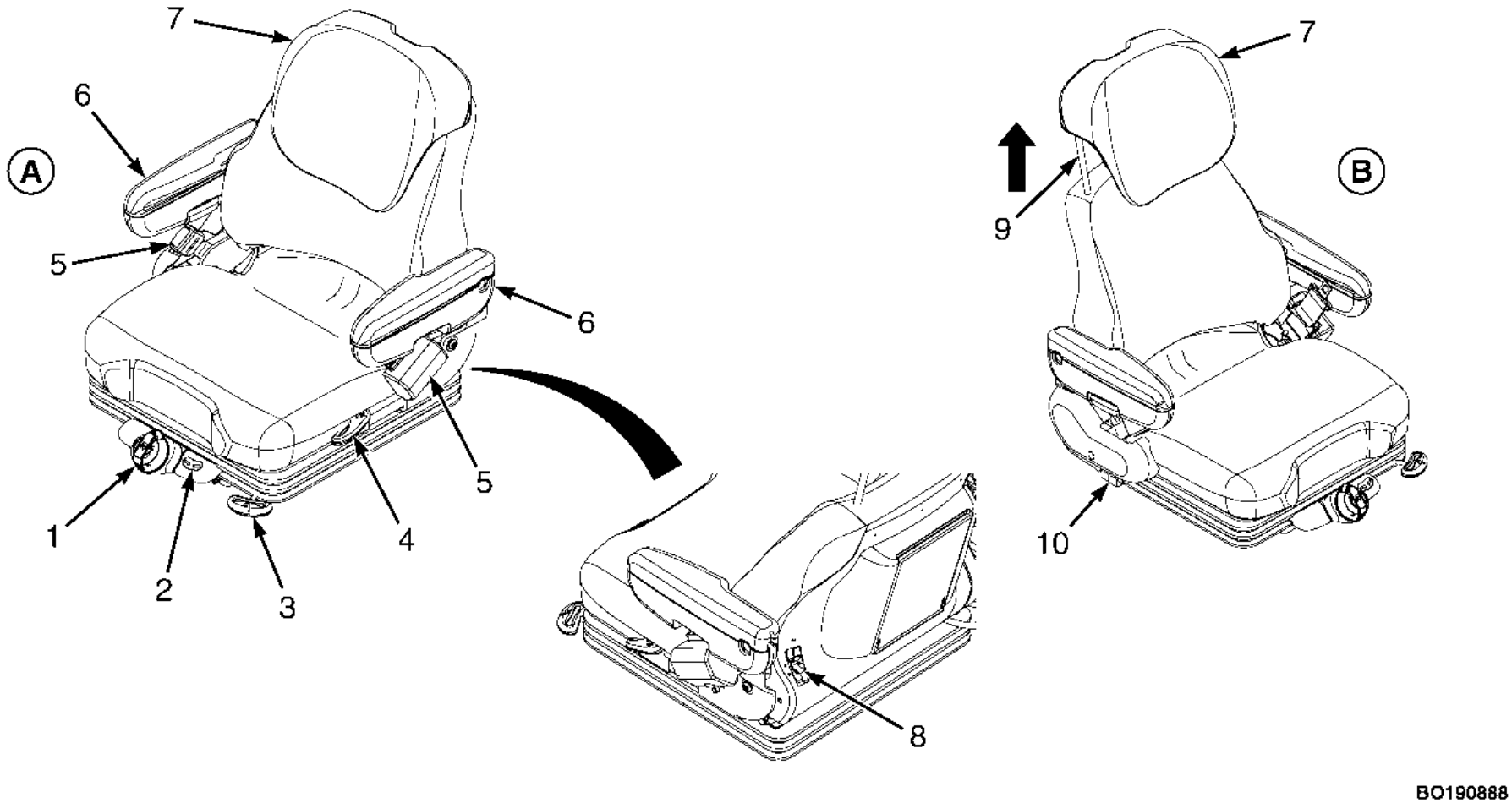


Figure 18. Seat Adjustment (Full Suspension, High Back Seat)

Legend for Figure 18

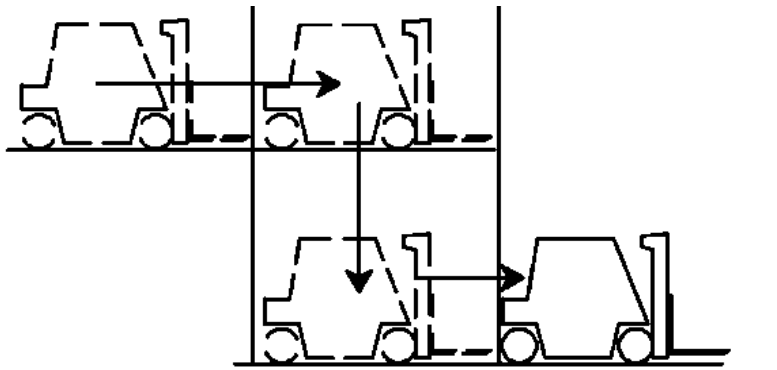
A. HEADREST IN NEUTRAL POSITION

1. WEIGHT ADJUSTMENT KNOB
2. RIDE POSITION INDICATOR
3. FORWARD/BACKWARD ADJUSTMENT LEVER
4. BACKREST ANGLE ADJUSTMENT LEVER
5. SEAT BELT

B. HEADREST FULLY EXTENDED

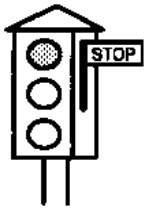
6. ARMREST
7. ADJUSTABLE HEADREST
8. ADJUSTMENT WHEEL
9. HEADREST ADJUSTMENT ROD
10. SEAT ELECTRICAL CONNECTOR

5. Do not drive a lift truck into an elevator unless authorized to do so. Approach the elevator slowly. After the elevator is properly leveled, the lift truck must be centered so that the elevator is balanced.



BO190118

When the lift truck is in the proper position in the elevator, set the brakes, put the controls in **NEUTRAL**, and shut off the power. It is advisable that all other personnel leave the elevator before the lift truck enters or leaves.



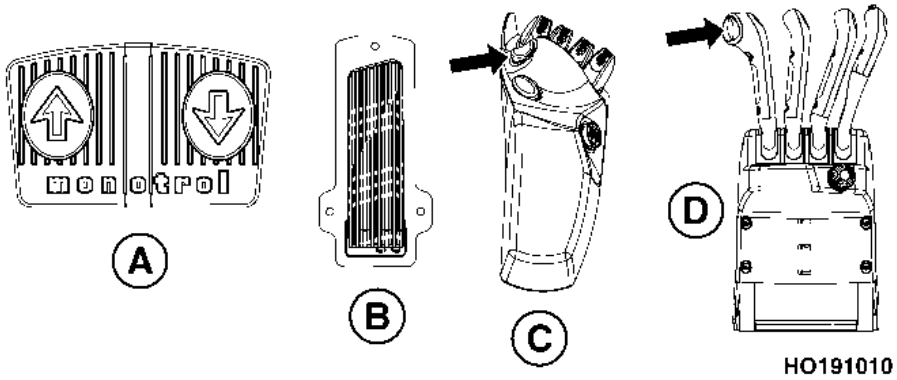
HO190473

6. Drive carefully, observe traffic rules, and be in full control of the lift truck at all times. Be completely familiar with all the driving and load handling techniques described in this **Operating Manual**.

Driving and Direction Changes

These lift trucks can have either a MONOTROL® pedal or a direction control switch with an accelerator pedal. If the lift truck has a MONOTROL® pedal, push on the left side of the pedal to go **FORWARD**, or the right side of the pedal to go in **REVERSE**. If the lift truck has a direction control switch, push the top part of the switch to travel **FORWARD**. Push the bottom part of the switch to travel in **REVERSE**.

After direction of travel has been selected, push down on the accelerator pedal.



A. MONOTROL® PEDAL
B. ACCELERATOR PEDAL
C. DIRECTION CONTROL SWITCH- E-HYDRAULIC CONTROLS
D. DIRECTION CONTROL SWITCH - MANUAL CONTROLS

⚠ WARNING

DO NOT select the travel direction if the accelerator is depressed. The lift truck will move rapidly and can cause damage or injury.

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

If the lift truck is equipped with a MONOTROL® pedal, place foot on the service brake pedal and release the parking brake. Select the direction of travel by slowly depressing on either the left or right side of the MONOTROL® pedal. Remove foot from service brake pedal. Continue pressing the MONOTROL® pedal to move the lift truck in the selected direction.

⚠ WARNING

Changing the direction of travel to reverse when the lift truck is traveling fast can cause the load to come off the forks and cause damage to equipment and serious injury to personnel.

The operator can change the direction of travel while the lift truck is moving by moving the foot to the other side of the MONOTROL® pedal, or by moving the direction control switch for travel in the opposite direction. This action uses the motor for braking and can take place at any travel speed.

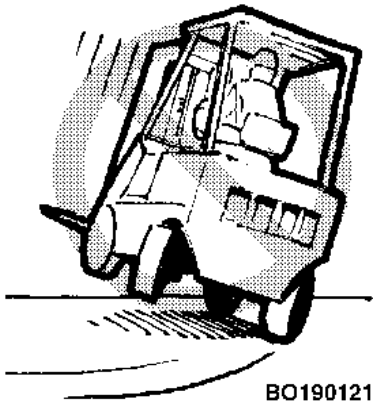
The lift truck will come to a stop and then accelerate in the opposite direction, unless the MONOTROL® pedal or accelerator pedal is released. The braking action of the motor can be used to stop the lift truck. To stop the lift truck quickly, use the service brakes.

Steering (Turning)

Most operators can understand the need to be careful when handling loads. But some operators do not realize that a tipover can occur with an empty lift truck because similar dynamic forces are present. In fact, the lift truck will actually tip over easier when empty, than when loaded with the load lowered. Rearward tilt, off-center loads, and uneven ground will aggravate these conditions.

⚠ WARNING

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



BO190121

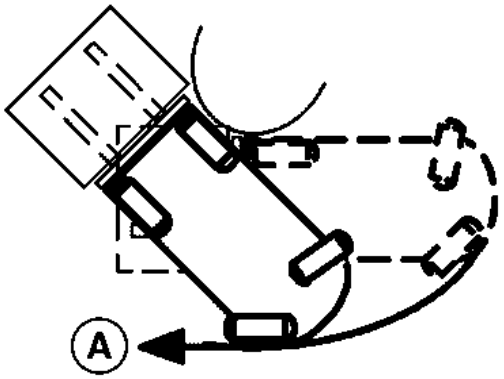
⚠ WARNING

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

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

⚠ WARNING

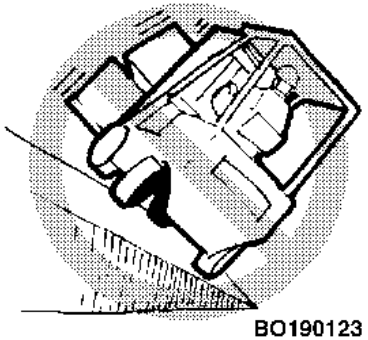
Failure to observe the tail swing area when making a turn can injure or kill someone.



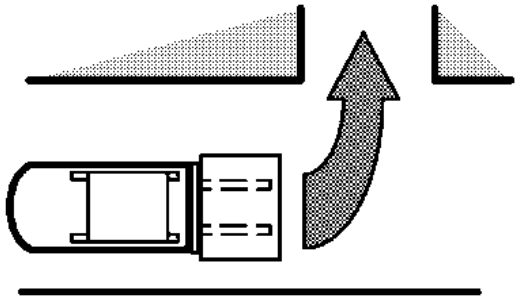
BO190122

A. TAIL SWING

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


BO190123

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


BO190125

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

Synchronized Steering Control

This feature is only available on lift trucks equipped with the Synchronized Steering function, and is set by personnel with a supervisor or service technician level password.

This feature allows either the supervisor or service technician to adjust the position that the steering wheel will be in when the lift truck is traveling straight ahead.

The operator will notice that the steering wheel always returns to the same position when the lift truck starts to travel in a straight direction after completing a turn.

Auto Power Off

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

If the lift truck is equipped with the Operator Password feature, the operator must re-enter his password. If the Operator Checklist feature is enabled, the operator will NOT have to redo the checklist items if the same operator re-applies power within one hour of Auto Power Off.

Standard Operator Presence System

⚠ WARNING

ALWAYS make sure the parking brake is fully applied before leaving the lift truck. If the operator leaves the lift truck without applying the parking brake, a seat activated switch will cut off all electrical and hydraulic power to the lift truck.

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

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

Lift Trucks with Software Versions Less than 4.32

If the lift truck is equipped with a direction control switch or MONOTROL® pedal and the operator leaves the seat without engaging the parking brake, the **N** indicator light on the LCD screen will illuminate regardless of the position of the direction control switch or MONOTROL®pedal. When the operator returns to the seat, the indicator light will change from **N** to the direction of travel that the direction control switch or MONOTROL® pedal was in when the operator left the lift truck. The operator can resume travel by depressing the accelerator or MONOTROL® pedal. See **Figure 9** and **Table 1**.

If the operator leaves the seat, the hydraulic functions will stop and the mini-lever or manual lever will return to the neutral position. The operator must sit back down on the seat in order to continue hydraulic functions.

Lift Trucks with Software Versions 4.32 and Greater

If the lift truck is equipped with a direction control switch or MONOTROL® pedal and the operator leaves the seat without engaging the parking brake, the **N** indicator light on the LCD screen will illuminate regardless of the position of the direction control switch or MONOTROL® pedal. When the operator returns to the seat, the indicator light will change from **N** to the direction of travel that the direction control switch or MONOTROL® pedal was in when the operator left the lift truck. To resume travel, if the lift truck is

equipped with a manual parking brake, release the brake; if the lift truck is equipped with an automatic parking brake, press the service brake pedal. Then press the accelerator or MONOTROL® pedal.

Optional Operator Presence System

⚠ WARNING

ALWAYS make sure the parking brake is fully applied before leaving the lift truck. If the operator leaves the lift truck without applying the parking brake, a seat activated switch will cut off all electrical and hydraulic power to the lift truck.

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

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

For lift trucks equipped with a manual parking brake, when the operator returns to the seat, if it was not set, the parking brake must be applied and released.

Lift Trucks with Software Versions 4.32 and Greater

If the lift truck is equipped with a direction control switch or MONOTROL® pedal and the operator leaves the seat without engaging the parking brake, the **N** indicator light on the LCD screen will illuminate regardless of the position of the direction control switch or MONOTROL® pedal. When the operator returns to the seat, the indicator light will change from **N** to the direction of travel that the direction control switch or MONOTROL® pedal was in when the operator left the lift truck. To resume travel, if the lift truck is equipped with a manual parking brake, release the brake; if the lift truck is equipped with an automatic parking brake, press the service brake pedal. Then press the accelerator or MONOTROL® pedal.

Automatic Parking Brake

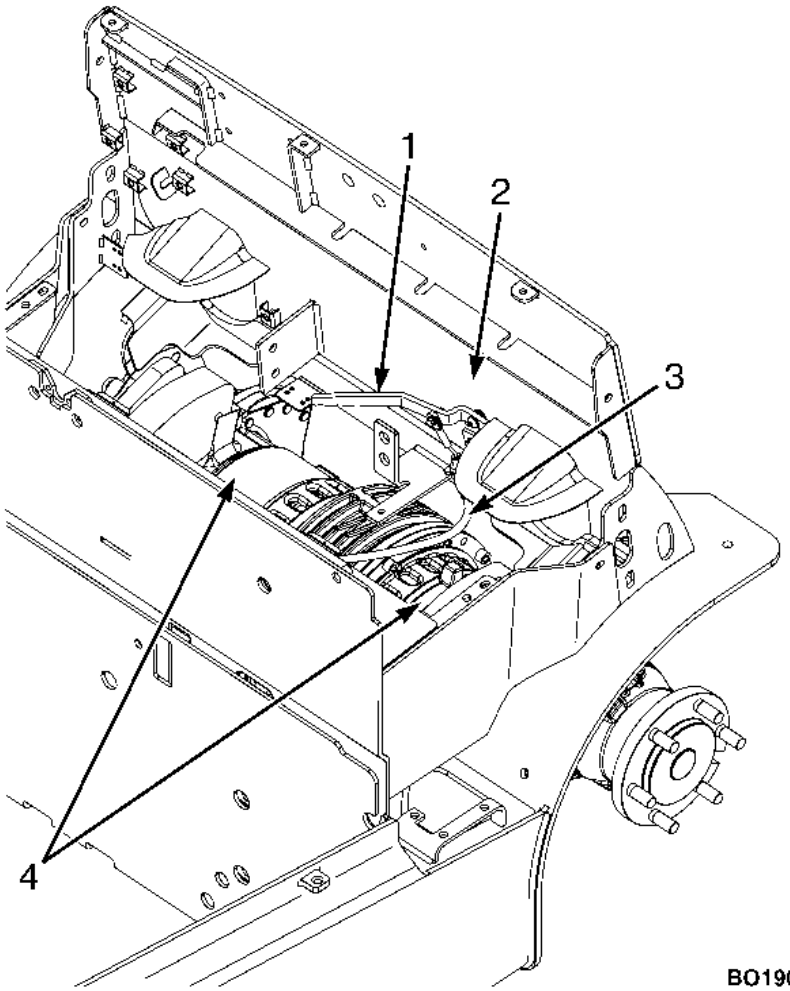
The lift trucks covered in this **Operating Manual** are equipped with an Automatic Parking Brake (APB). The APB will apply a brake to the traction motor after the truck stops if the operator does any of the following actions:

- Leaves the seat.
- Turns lift truck power to **OFF**.
- Takes his foot off the accelerator or MONOTROL® pedal, and leaves it off while the truck until the truck coasts to a stop.

To release the APB, the operator must follow the procedure below:

1. Sit in the seat.
2. Fasten the seat belt.
3. Turn the key or keyless switch to the **ON** position, if the lift truck power was turned OFF.
4. Press the service brake pedal, if the operator left the seat or if lift truck power was turned OFF.
5. Press the accelerator or MONOTROL® pedal.

If the lift truck loses power and has to be towed, there is a manual override handle that will disable the APB. The manual override handle is located underneath the floor mat and floor plates and mounted to the front bulkhead. To apply the manual override, remove the floor mat and floor plates and pull the handle up. See **Figure 19**.

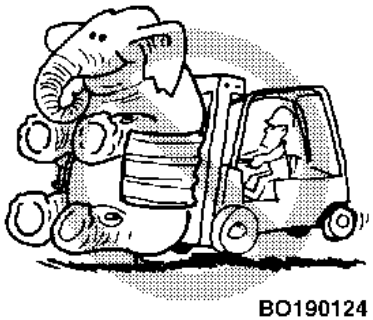


NOTE: MANUAL OVERRIDE HANDLE SHOWN IN DISENGAGED POSITION. TO ENGAGE, PULL HANDLE UP.

1. MANUAL OVERRIDE HANDLE
2. FRONT BULKHEAD
3. AUTOMATIC PARKING BRAKE
4. TRACTION MOTORS

Figure 19. Automatic Parking Brake

Load Handling, General

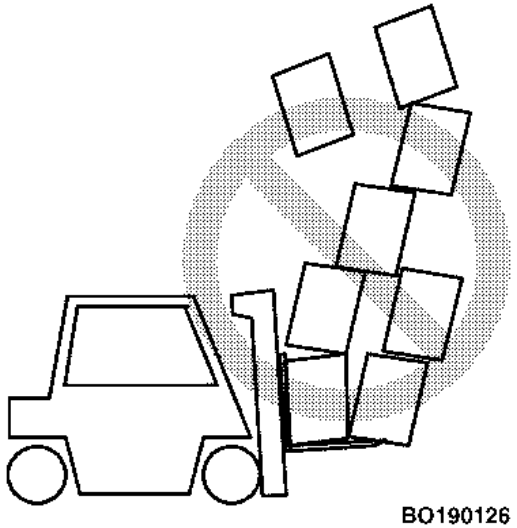

BO190124

1. The capacity is the maximum load that the lift truck can handle for the load condition shown on the Nameplate. The operator must know whether or not a load is within the maximum capacity of the lift truck before the load is handled.

However, such factors as weak floors, uneven terrain, special load handling attachments, or loads having a high center of gravity can mean that the safe working load is less than the rated capacity. When such conditions exist, the operator must reduce the load so that the lift truck will remain stable.

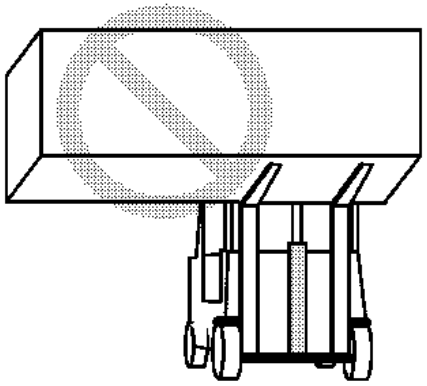
⚠ WARNING

DO NOT handle a load if any loose part of it is above the load backrest or any part of the load is likely to fall.


BO190126

2. Handle only stable loads. A load can have unstable items that can easily shift and fall on someone.

3. Position each fork the same distance from the center of the carriage. This action will help center the load on the carriage. Set the forks as far apart as possible for maximum support of the load. Center the weight of the load between the forks.



BO190127

If the weight of the load is not centered between the forks, the load can fall from the forks when you turn a corner or hit a bump. An off center load will increase the possibility of the truck tipping over to the side.

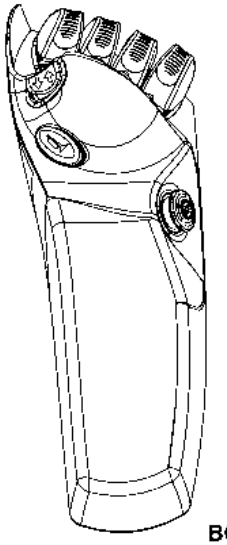
Make sure the pins that keep the forks in position are engaged so that the forks cannot move.

4. Check the condition of the driving surface. Make sure the floor will support the weight of the lift truck and the load.

Load Handling, Lifting, Lowering, and Tilting

NOTE: The lift trucks covered in this manual can be equipped with either standard manual hydraulic levers or Electro-Hydraulic (E-Hydraulic) mini-levers. See **Figure 8**, **Figure 9**, and **Table 1**.

The **LIFT** and **TILT** functions are controlled by separate manual levers or optional mini-levers. See the **Operator's Controls** section in the **Model Description** section for the correct operation.



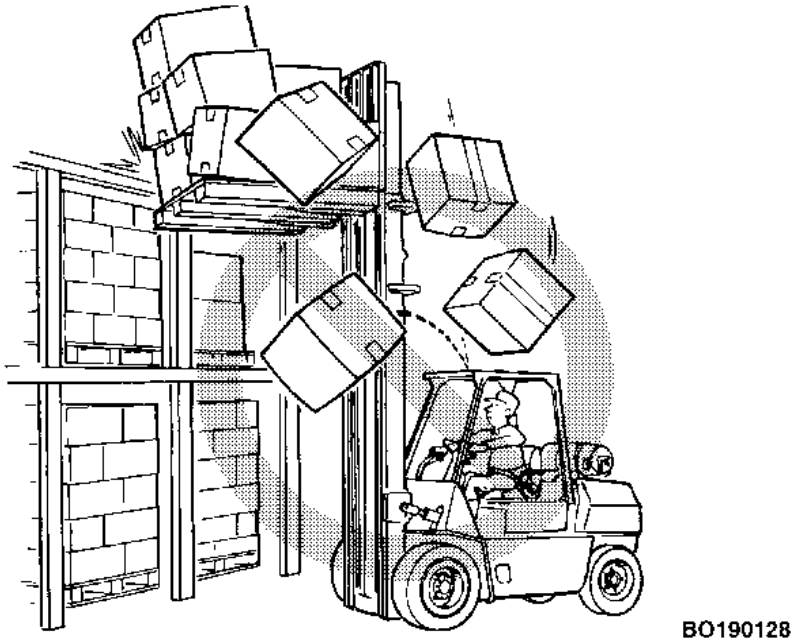
BO190400

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

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

Operating Procedures

HYSTER

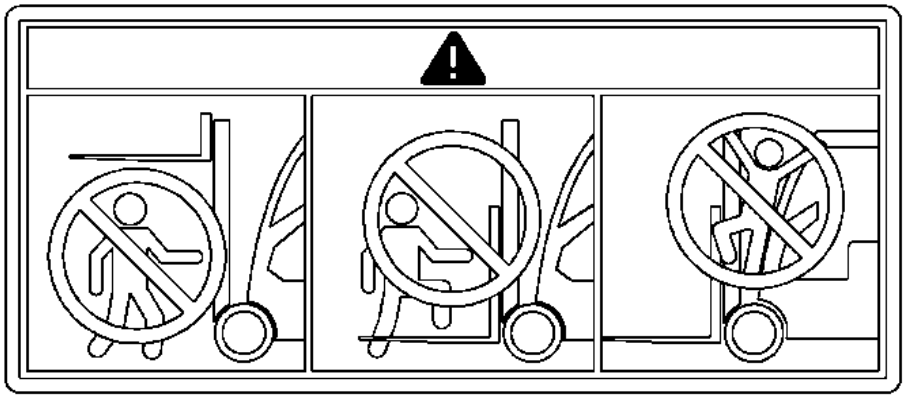


BO190128

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

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

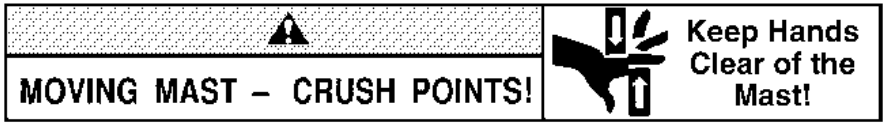
⚠ WARNING



BO190290

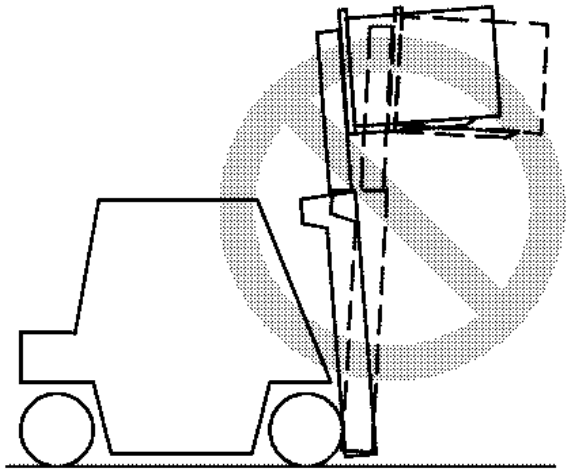
Keep yourself and all others clear of the lift mechanism. Never allow anyone under or on the forks.

⚠ WARNING



NEVER put hands, arms, head, or legs through the mast or near the carriage or lift chains. This warning applies not only to the operator but also a helper. A helper must not be near the load or lift mechanism while the operator is attempting to handle a load. The

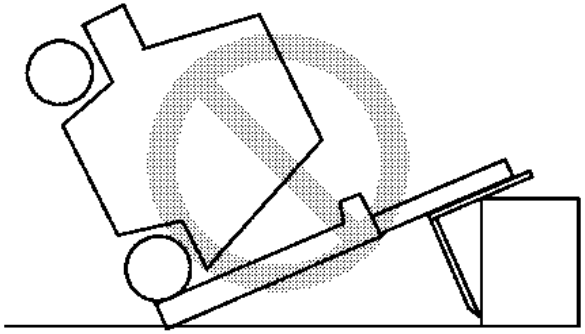
lift mechanism has moving parts with close clearances that can cause serious injury.



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

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

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



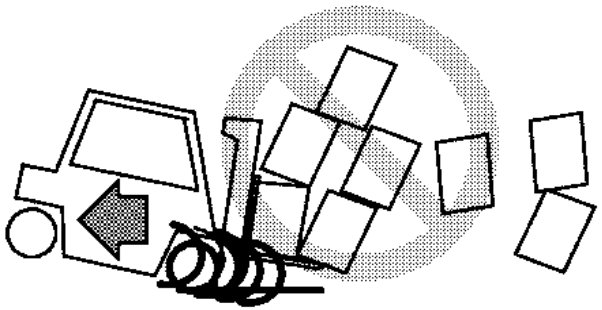
⚠ WARNING

The lift truck can tip over forward when the load is raised. Forward tipping is even more likely when tilting forward, braking when travelling forward, or accelerating in reverse.

⚠ WARNING

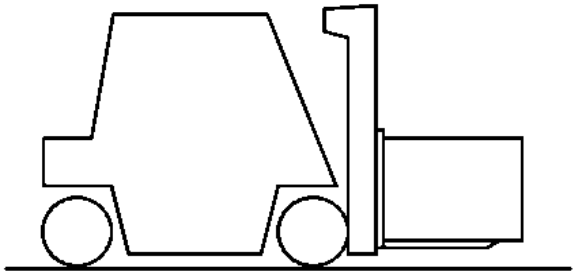
IF THE LIFT TRUCK TIPS OVER, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN AWAY FROM POINT OF IMPACT.

Load Handling, How to Engage and Disengage a Load



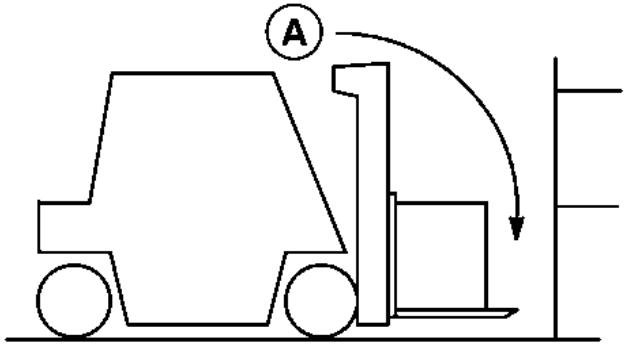
1. Avoid fast starts. Sudden movement can cause the lift truck to tip. People can be hurt or killed and material can be damaged.

Approach the load carefully. Make sure that the truck is perpendicular to the load. Raise the forks to the proper height for engaging the load.



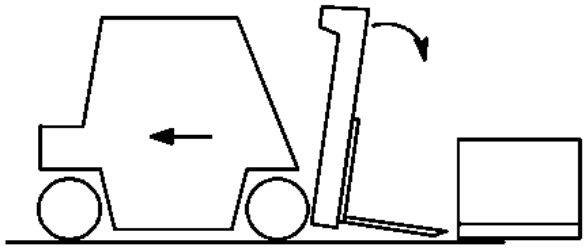
2. Move forward slowly until the forks are in position under the load. The forks must support at least two-thirds (2/3) of the length of the load. Make sure that the load is centered between the forks.

3. Make sure that the forks do not extend past the load so that loads or equipment that are behind the load being lifted are not damaged. Lift the load a small distance from the floor to make sure the lift truck has the capacity to lift the load.

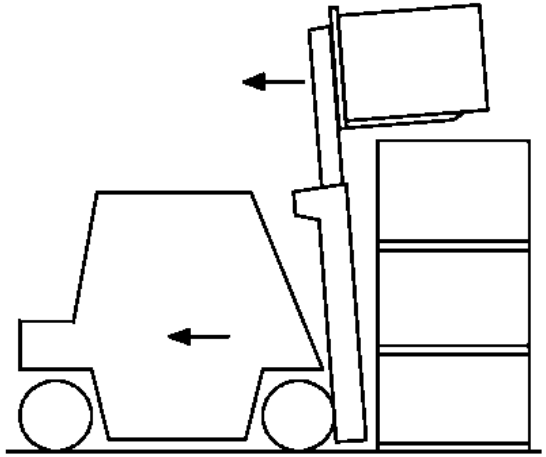


A. BE CAREFUL OF FORKS BEYOND THE LOAD.

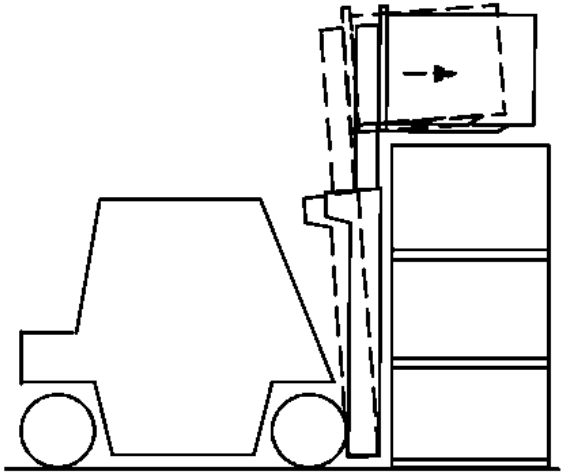
4. If the forks are longer than the load, move the forks under the load so that the tips of the forks do not extend beyond the load. Lift the load from the surface. Move **Backward** a few inches, then lower the load onto the surface and inch **Forward** to engage the load against the carriage. Tilt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



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



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



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

Operating Procedures

HYSTER

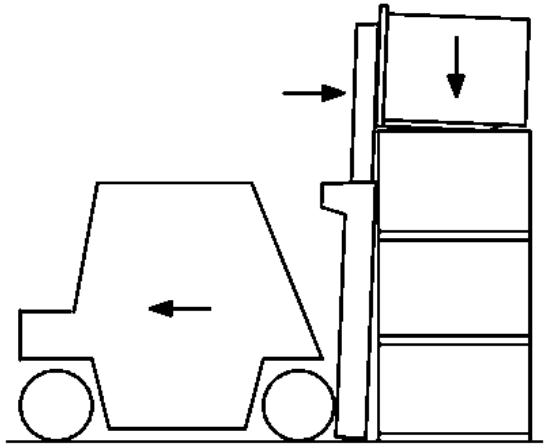
electric lift truck. Use caution not to damage or move adjacent loads.

⚠ WARNING

Move carefully and smoothly when the load is raised over a stack. When the load is elevated, the center of gravity of the lift truck and the load is much higher. The lift truck can tip over when the load is raised.

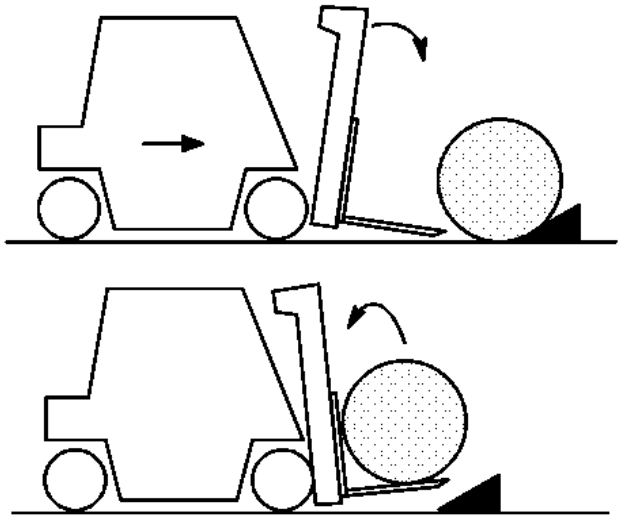
⚠ WARNING

IF THE LIFT TRUCK TIPS OVER EITHER TO THE SIDE OR FORWARD, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN FORWARD AND AWAY FROM THE POINT OF IMPACT.



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

NOTE: Not every load can be lifted using only the forks of a lift truck. Some loads will require a special attachment.

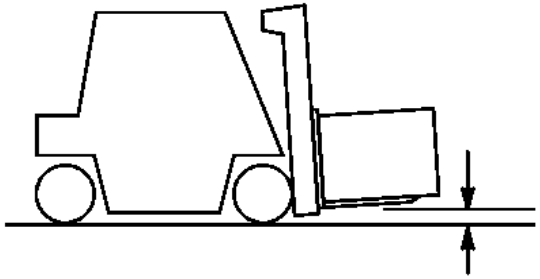


9. When lifting round objects, use a block behind the object. Tilt the mast forward so that the forks can slide

along the floor under the object to be lifted. Tilt the mast fully backward to help keep the load on the forks.

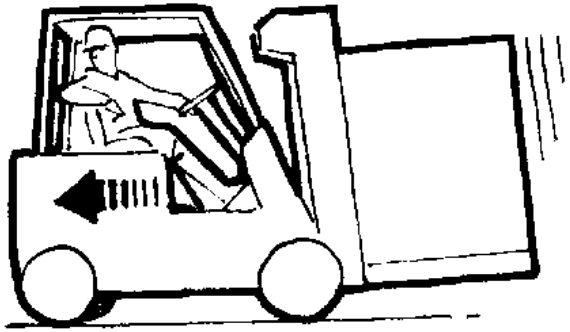
Load Handling, Traveling

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



2. Travel with the lift mechanism raised only enough to clear the ground or obstacles.

When the mast, carriage, or load is in a raised position, the stability of the lift truck is reduced. This stability is also critical when the lift truck is not carrying a load. The ability of the lift truck to resist side tipping can be less on a lift truck without a load than it is on a lift truck with a load in the lowered (travel) position. Therefore, a lift truck without a load is more likely to tip sideways, especially in a turn, than a lift truck with a load carried in the lowered position.



⚠ WARNING

Some lift trucks have mirrors for viewing along the side to observe the tailswing area. These mirrors are an aid to the driver, but are NOT driving mirrors and must NOT be used as such when operating in reverse. Always look in the direction of travel to avoid damage to something or injury to someone.

3. For better visibility with large loads, travel with the load trailing, but always keep a proper lookout in the direction of travel. Normally, direction of travel is determined by the best visibility available to the operator.

If the lift truck must travel in a direction where visibility is obstructed, a lookout helper may be required.

Operating Procedures

HYSTER

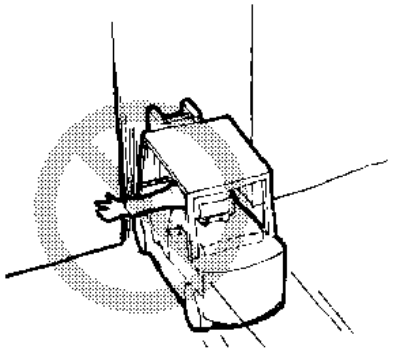
BO190143

4. When traveling up or down a grade with a **heavily loaded** lift truck, keep the load upgrade to maintain control. When operating an **unloaded** lift truck on a steep grade, keep the counterweight upgrade.

BO190144

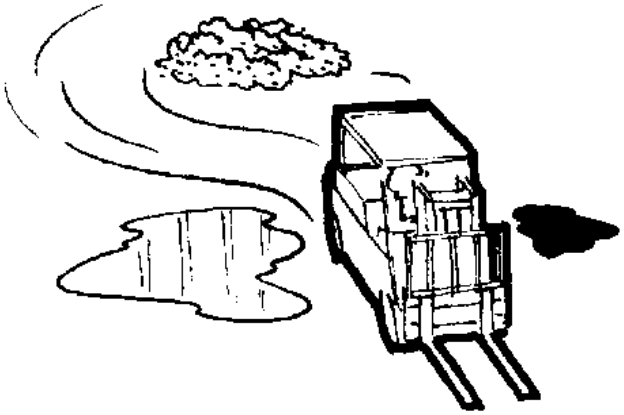
5. Watch out for pedestrians at all times. Do not drive up to anyone standing in front of an object. Use extra care at cross aisles, doorways, and other locations where pedestrians can step into the path of travel of the lift truck. Slow down when approaching blind intersections or turns. Sound the horn to warn pedestrians that there is a vehicle in the area and to be alert to possible danger.

6. Anytime the lift truck is moving, keep arms, legs, etc., inside the operator's compartment. Arms and legs outside the machine can be injured when passing obstructions.



BO190145

7. Avoid bumps, holes, slick spots, and loose materials that may cause the lift truck to swerve or tip.



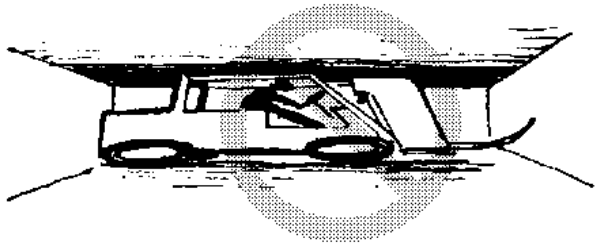
BO190146

If unavoidable, slow down.

Different models of lift trucks are designed to operate under different conditions. Cushion tire models are designed to operate on relatively smooth, firm surfaces. Lift trucks with pneumatic tires can adapt to more uneven ground. Always make sure you pick the smoothest route for your lift truck.

⚠ WARNING

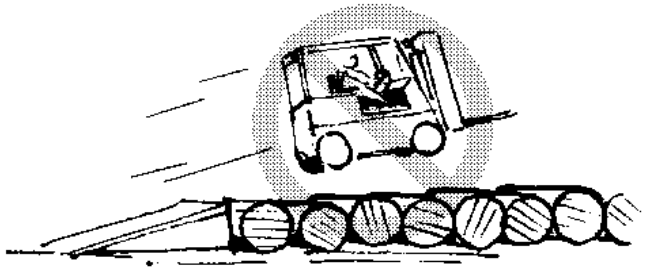
Serious accidents can be caused by mast and overhead guards hitting pipes and beams near the ceiling.



BO190147

8. Watch clearances, especially forks, mast, overhead guard, and tailswing. A lift truck is designed to perform a wide variety of functions within limited space.

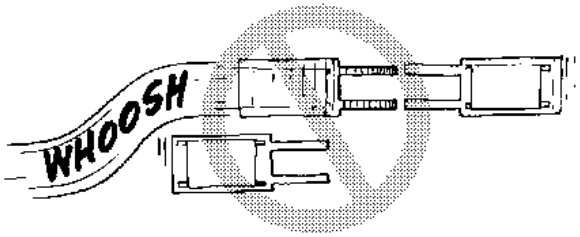
The operator must be aware that the forks can sometimes extend beyond the front of the load. If the forks extend beyond the load, the operator can hit an object or lift another load. Serious accidents can be caused by mast and overhead guards hitting pipes and beams near the ceiling.



BO190148

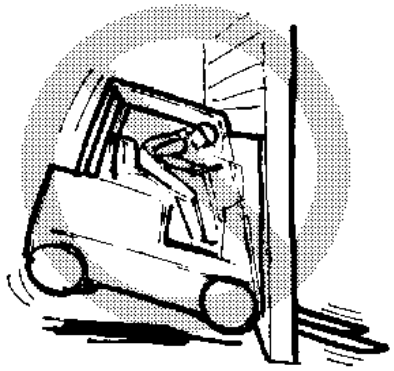
9. Do not indulge in stunt driving or horseplay.

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



BO190149

11. Stay away from the edge of the road. Keep the wheels of the lift truck, particularly the steer wheels, on the roadway. If the wheels are allowed to run off the edge of the travel surface onto soft ground, the lift truck can tip over.



BO190150

12. Under all travel conditions, operate the lift truck at a speed that will permit it to be brought to a stop in a safe manner.

Load Handling, Emergency Load Lowering

WARNING

When the electronic signal is disrupted, the mast assembly can ONLY be lowered with the emergency load lowering valve, located on the main hydraulic valve. When using the emergency load lowering valve to lower a load, serious injury can result if anyone is near or under the load. See Figure 20.

WARNING

Always lower the mast assembly when leaving the lift truck unattended.

NOTE: The emergency load lowering valve is to be used ONLY if the electrical signal to the main control valve has been disrupted and there is a load lifted.

The emergency load lowering valve is located on the front side of the main control valve. See **Figure 20**.

To use the emergency load lowering valve, follow these steps:

1. Remove floor mat and floor plate.

2. Turn the emergency load lowering valve counterclockwise. The more opened the valve is, the faster the load is lowered.

3. When load has been safely lowered, turn the valve clockwise until it is tight to set the emergency load lowering valve back into operation mode.

4. Install floor plate and floor mat.

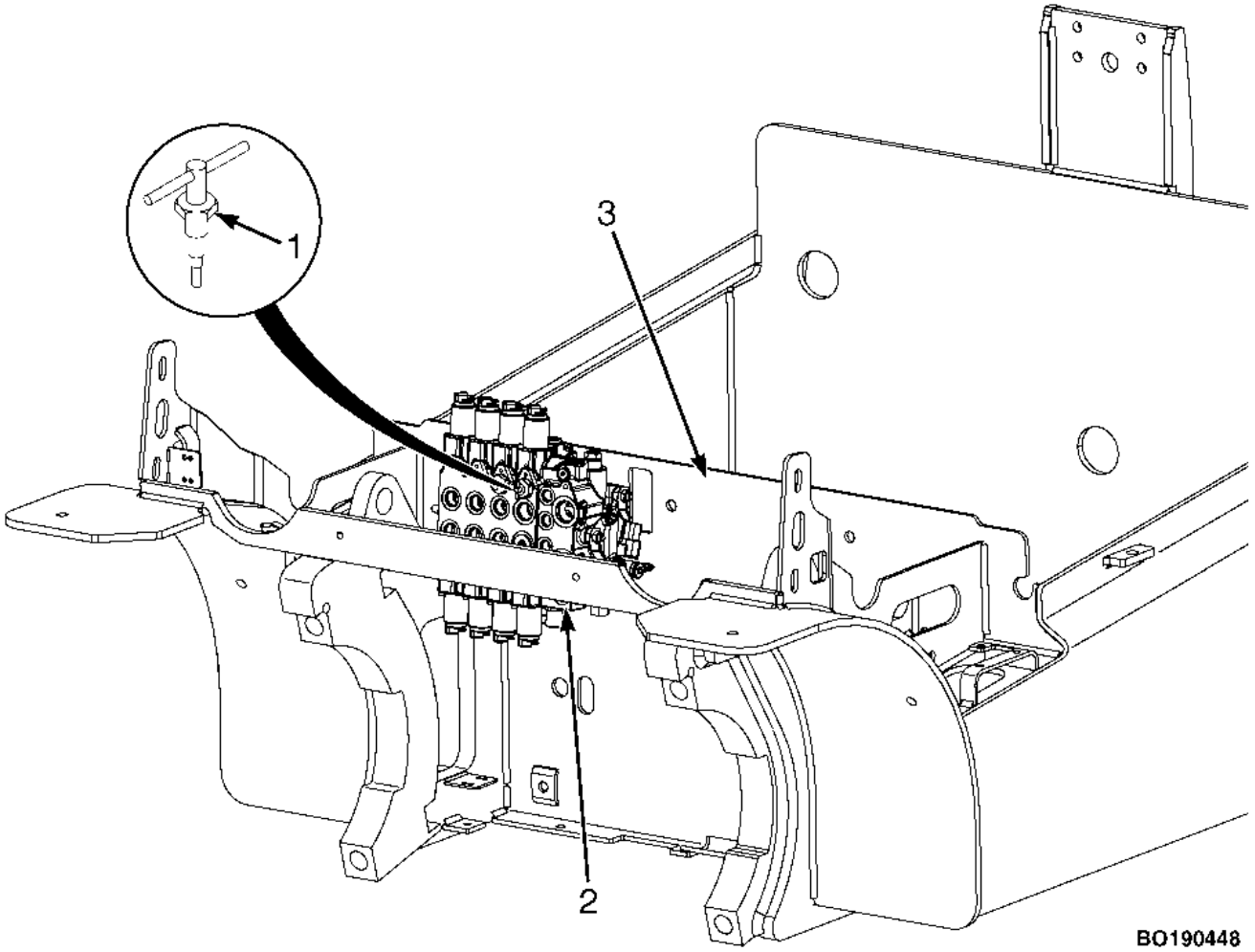


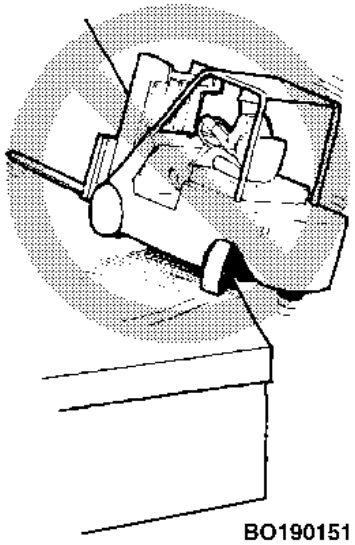
Figure 20. Emergency Load Lowering Valve

Legend for Figure 20

NOTE: ELECTRONIC HYDRAULIC (E-HYDRAULIC) MAIN CONTROL VALVE SHOWN. THE EMERGENCY LOAD LOWERING VALVE ON THE MANUAL MAIN CONTROL VALVE IS LOCATED IN THE SAME POSITION.

1. EMERGENCY LOAD LOWERING VALVE
2. MAIN CONTROL VALVE
3. FRONT BULKHEAD

Highway Truck, Railroad Cars, and Docks



⚠ WARNING

Maintain a safe distance from the edge of docks, ramps, platforms, and other similar working surfaces. Watch the "tail swing." Remember when travelling in the forward direction and the steering wheel is turned to move the lift truck away from the edge of the dock the rear will swing toward the edge. This action can cause the lift truck to fall off the dock.

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

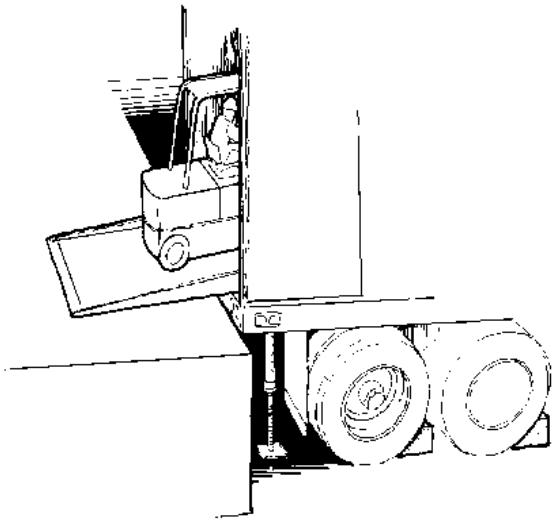
Before operating in a highway truck or railroad car, observe the following:

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

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

Check to make sure that the brakes on the highway truck are set and that wheel blocks have been placed on both

sides of the rear wheels (unless a dock locking mechanism is engaged). Fixed jacks may be necessary to support the front and rear of a highway truck trailer to prevent it from moving or tipping during loading or unloading.



BO190152

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

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

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

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

Attachments

⚠ WARNING

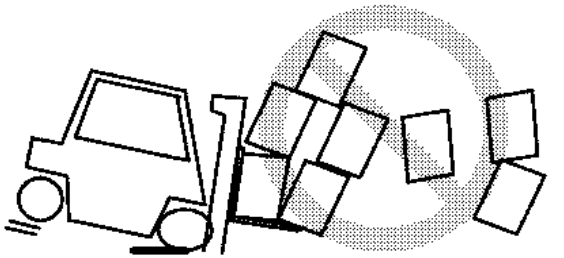
Make sure the Nameplate is correct if an attachment has been installed.

BO190153

If an attachment is installed on the lift truck, make sure the operating instructions are available and understood before operating the attachment. See **Table 4** for the operation of attachment control levers.

Attachments must be removed or installed by trained personnel only.

Stopping



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

Parking

WARNING

ALWAYS apply the parking brake when you leave the lift truck. Never apply parking brake while truck is moving.

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

1. Stop the lift truck and apply the parking brake. Applying the parking brake will put the lift truck in the **NEUTRAL** position.

2. Fully lower the forks or carriage. Tilt mast forward until the tips of the forks touch the ground.

3. Turn the key or keyless switch to the **OFF** position. See **Figure 10**.

4. To release seat belt, press red release button, and guide belt carefully back into the retractor with your hand.

5. Disconnect the battery when leaving the lift truck.

6. If the lift truck must be left on an incline, put blocks on the down hill side of the wheels so that the lift truck cannot move.

7. Do not park the lift truck so that it limits access to fire aisles, stairways, and fire equipment.

Maintenance

General

⚠ WARNING

DO NOT make repairs or adjustments unless you have both authorization and training. Repairs and adjustments that are not correct can make a dangerous operating condition.

DO NOT operate a lift truck that needs repairs. Report the need for repairs immediately. If repair is necessary, put a DO NOT OPERATE tag in the operator's area. Remove the key from the key switch. Disconnect the battery connector.

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

⚠ CAUTION

Disposal of lubricants and fluids must meet local environmental regulations.

Disposal of batteries must meet local environmental regulations.

This section contains a **Maintenance Schedule** and the instructions for maintenance and inspection.

The **Maintenance Schedule** has time intervals for inspection, lubrication and maintenance for your lift truck. The service intervals are given in both operating hours recorded on the lift truck hourmeter, and in calendar time. Use the interval that occurs first.

The recommendation for the time intervals are for one shift of operation per day. The time intervals must be decreased from the recommendations in the **Maintenance Schedule** for the following conditions:

- If the lift truck is used more than one shift per day.
- If the lift truck must work in dirty operating conditions.
- Poor ground conditions.
- Intensive usage at high performance levels or other abnormal conditions will require more frequent servicing.

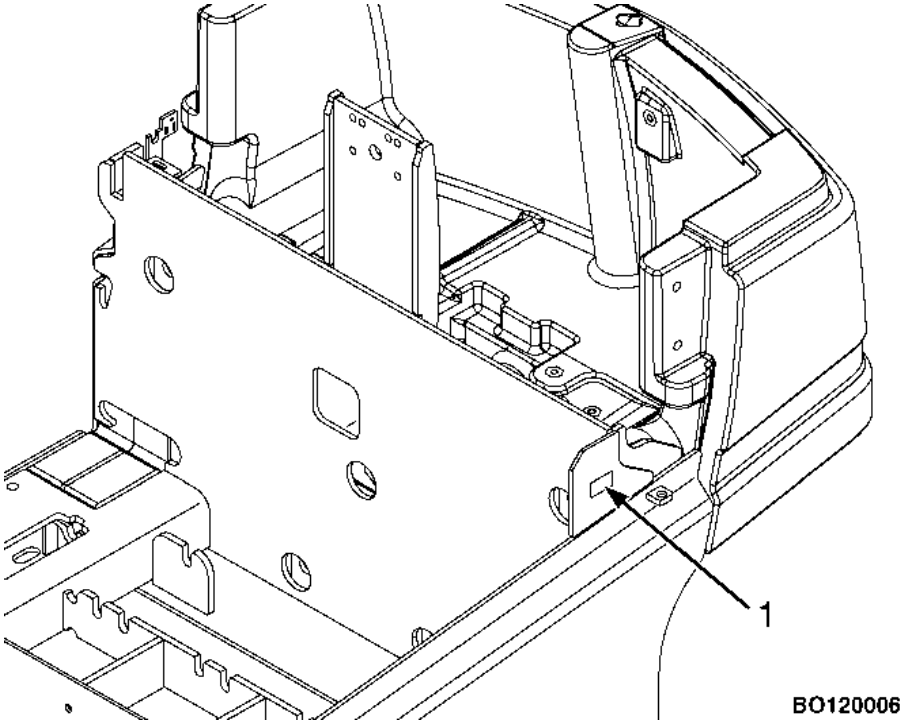
Your dealer for **Hyster** lift trucks will advise you on the maintenance time intervals based on their survey of the application.

Your dealer for **Hyster** lift trucks has the equipment and trained service personnel to do a complete program of inspection, lubrication, and maintenance. A regular program of inspection, lubrication, and maintenance will help your lift truck provide more efficient performance and operate for a longer period of time.

Some users have service personnel and equipment to do the inspection, lubrication, and maintenance shown in the **Maintenance Schedule**. Service Manuals are available from your dealer for **Hyster** lift trucks to help users who do their own maintenance.

Serial Number Data

The serial number code for the lift truck is on the Nameplate and stamped into outside face of plate. See **Figure 21**.



1. SERIAL NUMBER

Figure 21. Serial Number Stamp

How to Move a Disabled Lift Truck

WARNING

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

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

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

Never carry a disabled lift truck unless the lift truck MUST be moved and cannot be towed. The lift truck used to carry the disabled lift truck MUST have a rated capacity equal to or greater than the weight of the disabled lift truck. The capacity must be for a load center equal to half the width of the disabled lift truck. See the Nameplate of the disabled lift truck for the approximate total weight. The forks must extend the full width of the disabled lift truck. Center the weight of the disabled lift truck on the forks and be careful not to damage the under side of the lift truck.

How to Tow the Lift Truck

1. The towed lift truck must have an operator.

2. Raise the carriage and forks approximately 300 mm (12 in.) from the surface. Install a chain to prevent the carriage and mast channels from moving.

3. Tow with another lift truck of equal or greater capacity than the disabled lift truck. Install a load of approximately half-capacity on the forks of the lift truck that is being used to tow the disabled lift truck. The half-capacity load will increase the traction of the lift truck. Keep the load as low as possible.

4. Use a towing link made of steel that fastens to the tow pins in the counterweights of both lift trucks.

5. Remove the floor mat and floor plate, and pull up on the manual override handle to release the automatic parking brake. See **Figure 19**.

6. Tow the lift truck slowly.

How to Put a Lift Truck On Blocks

WARNING

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

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

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

NOTE: Some lift trucks have lifting eyes. These lift points can be used to raise the lift truck so that blocks can be installed.

How to Raise the Drive Tires

1. Put blocks on each side (front and back) of the steer tires to prevent movement of the lift truck. See **Figure 22**.

2. Put the mast in a vertical position. Put a block under each outer mast channel.

3. Tilt the mast fully forward until the drive tires are raised from the surface.

4. Put additional blocks under the frame behind the drive tires.

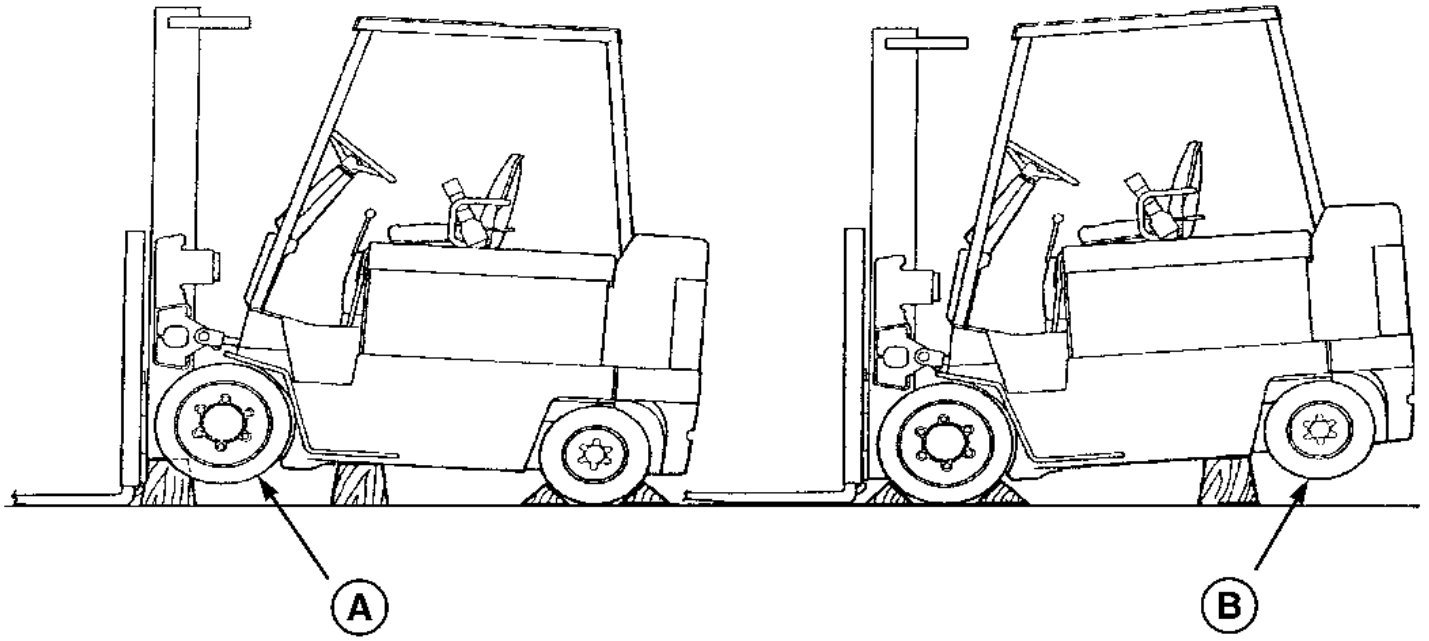
5. If the hydraulic system will not operate, use a hydraulic jack under the side of the frame near the front. Make sure that the jack has a capacity equal to at least half the weight of the lift truck. See the Nameplate.

How to Raise the Steering Tires

1. Apply the Automatic Parking Brake. Put blocks on both sides (front and back) of the drive tires to prevent movement of the lift truck. See **Figure 22**.

2. Use a hydraulic jack to raise the steering tires. Make sure that the jack has a capacity of at least 2/3 of the total weight of the lift truck as shown on the Nameplate.

3. Put the jack under the steering axle or frame to raise the lift truck. Put blocks under the frame to support the lift truck.



A. DRIVE WHEEL

B. STEER WHEEL

Figure 22. Put a Lift Truck on Blocks

How to Clean a Lift Truck

⚠ CAUTION

Your lift truck may be damaged if water or cleaning agents come in contact with electrical components. DO NOT directly spray any electrical components, especially connectors, switches, electro-hydraulic controls, battery area, and dash display during the cleaning process.

Portions of your lift truck may be washed with a non-heated pressure washer. Steam cleaning is not recommended in most instances, as condensation may form in electrical components causing damage or erratic behavior. For cleaning guidelines and components to avoid, see the **Periodic Maintenance** section of the **Service Manual** for your lift truck.

Maintenance Schedule

HYSTER

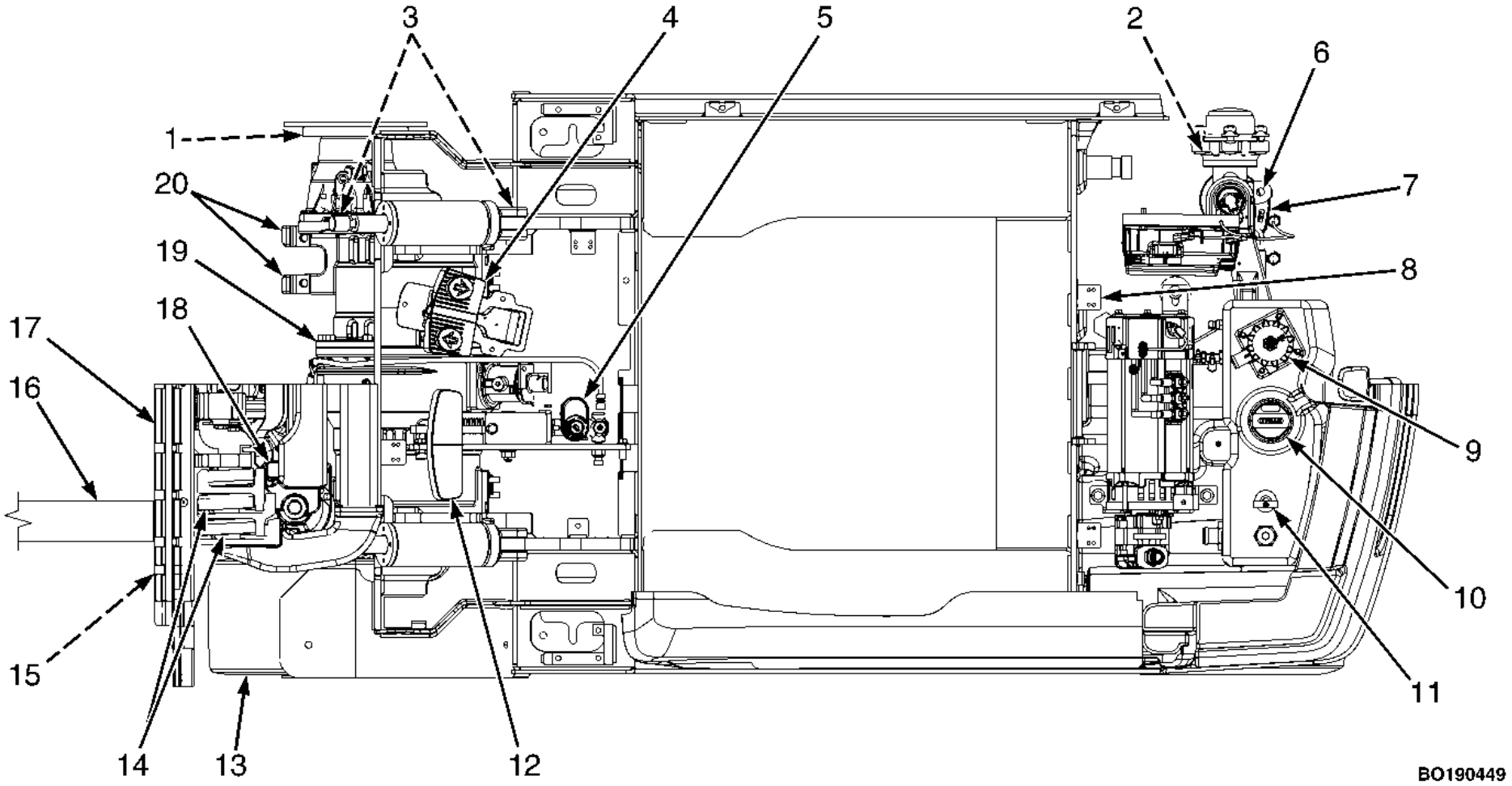


Figure 23. Maintenance Points

Maintenance Schedule

Table 9. Maintenance Schedule (See Figure 23)

Item No.	Item	Shift	1000 hr/ 6 mo.	2000 hr/ 1 yr.	4000 hr/ 2 yr.	Procedure or Quantity	Specifications
13	TIRES	X				Check Condition	
	AUTOMATIC PARKING BRAKE	X CIL				Check Operation.	Must hold capacity load on a 15% grade [a slope that increases 1.5 m in 10 m (1.5 ft increase in 10 ft)].
1	SERVICE BRAKES	X CIL				Check Operation.	See **Parts Manual**.
5	BRAKE FLUID Master Cylinder Oil	CIL	X	C		0.18 liter (0.4 pt)	Dexron® III Transmission Fluid
19	DRIVE UNIT ASSEMBLY/ WET BRAKE	X				Check for Leaks.	
18	LIFT CHAINS	X				Check Condition. Lube if Necessary. See NOTE 3.	30W Engine Oil.
16	FORKS	X	X	X		Check Condition. Replace if Necessary.	
X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation.							

Maintenance Schedule

HYSTER

Table 9. Maintenance Schedule (See Figure 23) (Continued)

Item No.	Item	Shift	1000 hr/ 6 mo.	2000 hr/ 1 yr.	4000 hr/ 2 yr.	Procedure or Quantity	Specifications
4	DIRECTION AND SPEED CONTROL PEDALS	X				Check Operation. Lubricate as Necessary.	Use Multipurpose Grease. See NOTE 1.
11	HYDRAULIC OIL Standard Truck (Total Capacity)	X			C	29.0 liter (30.6 qt) See NOTE 7.	0 to 48 °C (32 to 118 °F) Hydraulic Oil ISO VG 46.
11	HYDRAULIC OIL Cooler/Freezer Truck (Total Capacity)	X		C		29.0 liter (30.6 qt) See NOTE 7.	−29 to 48 °C (−20 to 118 °F) Hydraulic Oil ISO VG 32 - VI ≥ 140 (High Viscosity Index Oil per ISO 11158 L-HV)
11	HYDRAULIC OIL Sub-Zero Construction (Total Capacity)	X		C		29.0 liter (30.6 qt) See NOTE 7.	−40 to 22 °C (−40 to 71.6 °F) Hydraulic Oil MIL-H-5606A
	HORN, LIGHTS, AND ALARM	X				Check Operation.	
	OIL LEAKS	X				Check for Leaks.	
	SAFETY LABELS	X				Replace as Necessary.	See **Parts Manual**.
X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation.							

Table 9. Maintenance Schedule (See Figure 23) (Continued)

Item No.	Item	Shift	1000 hr/ 6 mo.	2000 hr/ 1 yr.	4000 hr/ 2 yr.	Procedure or Quantity	Specifications
	BATTERY AND BATTERY RESTRAINT SYSTEM	X				Check Condition.	See NOTE 4 and NOTE 9.
	HOOD LATCH AND RELEASE HANDLE	X, L				Lubricate as Necessary. Check Operation.	See NOTE 8.
	MANUAL CONTROL LEVER RELEASE LATCH	X, L				Lubricate as Necessary. Check Operation.	See NOTE 8.
	STEERING COLUMN TILT MEMORY LEVER	X				Lubricate as Necessary. Check Operation.	Use Multipurpose Grease. See NOTE 1.
	OPERATOR RESTRAINT SYSTEM	X CIL				Check Condition. Check Operation.	
	LIFT SYSTEM OPERATION CHECK	X				Check Operation.	
	OPERATOR PRESENCE SYSTEM CHECK		X			Check Operation.	
X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation.							

Maintenance Schedule

HYSTER

Table 9. Maintenance Schedule (See Figure 23) (Continued)

Item No.	Item	Shift	1000 hr/ 6 mo.	2000 hr/ 1 yr.	4000 hr/ 2 yr.	Procedure or Quantity	Specifications
20	PIVOTS (MAST)	X	L			2 Fittings. Lubricate as Required.	Use Multipurpose Grease. See NOTE 1.
14	MAST SLIDING SURFACES	X	L			Lubricate as Required. See NOTE 5.	Use Multipurpose Grease. See NOTE 1.
17	INTEGRAL SIDESHIFT CARRIAGE	X	L			2 Fittings. See NOTE 5.	Use Multipurpose Grease. See NOTE 1.
17	INTEGRAL SIDESHIFT CARRIAGE Fork Positioner		L			Lubricate as Required. 2 Fittings. See NOTE 2.	Use Multipurpose Grease. See NOTE 1.
	HEADER HOSES, HOSE FITTINGS, AND CLAMPS	X	X			Inspect for Kinked, Flattened, Stiff, or Charred Hoses.	Replace if Necessary.
	HYDRAULIC CONTROL LEVERS AND PEDALS	X				Check Operation.	
	STEERING SYSTEM	X				Check Operation.	
X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation.							

Table 9. Maintenance Schedule (See Figure 23) (Continued)

Item No.	Item	Shift	1000 hr/ 6 mo.	2000 hr/ 1 yr.	4000 hr/ 2 yr.	Procedure or Quantity	Specifications
19	DRIVE UNIT ASSEMBLY Gear Oil		X			Check Oil Level. 1.0 liter (1.1 qt) Total for Both Chambers.	Use Gear Oil SAE 80W-90 API GL-5 or SAE 85W-140 API GL-5
19	DRIVE UNIT ASSEMBLY Wet Brake Oil		X			Check Oil Level. 3.25 liter (3.4 qt)	Dexron® III Transmission Fluid
3	TILT CYLINDER ROD END PINS	X	L				Use Multipurpose Grease. See NOTE 1.
12	BRAKE PEDAL LINKAGE AND SHAFTS		L			Lubricate Linkage and Shafts. See NOTE 2.	Use Multipurpose Grease. See NOTE 1 and NOTE 8.
18	LIFT CHAINS		L			Check Stretch and Lubricate. See NOTE 2 and NOTE 3.	30W Engine Oil.
X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation.							

Maintenance Schedule

HYSTER

Table 9. Maintenance Schedule (See Figure 23) (Continued)

Item No.	Item	Shift	1000 hr/ 6 mo.	2000 hr/ 1 yr.	4000 hr/ 2 yr.	Procedure or Quantity	Specifications
18	LIFT CHAINS	X	X			Check Adjustment and Length. See NOTE 2.	
15	FORK PINS AND GUIDES	X	L			Lubricate as Necessary. See NOTE 2.	Use SAE 10W-30 Engine Oil.
10	HYDRAULIC TANK BREATHER		X	C		Clean or Replace. See NOTE 2.	See **Parts Manual**.
17	INTEGRAL SIDESHIFT CARRIAGE (Upper/Lower Bearings)		X			Check Wear. 4 Bearings. See NOTE 5.	2.5 mm (0.098 in.) Minimum Thickness.
17	INTEGRAL SIDESHIFT CARRIAGE Lower Mounting Hooks		X			Check for Wear and Clearance. See NOTE 2.	0.76 mm (0.03 in.) Minimum Wear Limit.
8	LINE CONTACTORS		X			Check Condition.	See **Parts Manual**. See NOTE 9.
6	STEERING KING PINS		L			4 Fittings. Lubricate as Required. See NOTE 2.	Use Multipurpose Grease. See NOTE 1.
X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation.							

Table 9. Maintenance Schedule (See Figure 23) (Continued)

Item No.	Item	Shift	1000 hr/ 6 mo.	2000 hr/ 1 yr.	4000 hr/ 2 yr.	Procedure or Quantity	Specifications
7	STEERING TIE RODS		L			4 Fittings. Lubricate as Required. See NOTE 2.	Use Multipurpose Grease. See NOTE 1.
	HINGES, LEVERS, LINKAGE, PEDALS, SEAT RAILS, AND LATCHES		L			Lubricate as Required. See NOTE 2.	Use Multipurpose Grease. See NOTE 1 and NOTE 10.
	HYDRAULIC CONTROL LEVERS		L			Lubricate as Required.	Use Silicone Lubricant Hyster P/N 328388
	HEATER - AIR FILTER		C			Replace Air Filters. 2 Filters	
	HEATER - HEATER ELEMENT		X			Clean Heater Element.	Use Compressed Air.
	HEATER - OPERATING CONDITION		X			Check Operation and Heater Condition.	
17	INTEGRAL SIDESHIFT CARRIAGE (Upper/Lower Bearings)			C		Replace Bearings. 4 Bearings.	2.5 mm (0.098 in.) Minimum Thickness. See **Parts Manual**.
X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation.							

Maintenance Schedule

HYSTER

Table 9. Maintenance Schedule (See Figure 23) (Continued)

Item No.	Item	Shift	1000 hr/ 6 mo.	2000 hr/ 1 yr.	4000 hr/ 2 yr.	Procedure or Quantity	Specifications
2	STEER WHEEL BEARINGS			L		Check Grease.	Use Multipurpose Grease. See NOTE 1.
9	HYDRAULIC OIL FILTER			C		1 Filter. See NOTE 2 and NOTE 7.	See **Parts Manual**.
19	DRIVE UNIT ASSEMBLY Gear Oil				C	Change Oil. 1.0 liter (1.1 qt) Total for Both Chambers.	Use Gear Oil SAE 80W-90 API GL-5 or SAE 85W-140 API GL-5
19	DRIVE UNIT ASSEMBLY Wet Brake Oil				C	Change Oil. 3.25 liter (3.4 qt)	Dexron® III Transmission Fluid
18	LIFT CHAINS			L		Remove Lift Chains to Clean and Lubricate.	30W Engine Oil.
	STEERING POSITION SENSOR				X	Check Sensor Assembly and Column Gear Teeth.	Replace Sensor or Column Gear as Required.
X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation.							

Table 9. Maintenance Schedule (See Figure 23) (Continued)

Item No.	Item	Shift	1000 hr/ 6 mo.	2000 hr/ 1 yr.	4000 hr/ 2 yr.	Procedure or Quantity	Specifications
	TELESCOPIC STEERING COLUMN				L	Lubricate.	Use Manual Steering Gear Grease. See NOTE 6.

NOTE 1: Multipurpose grease with 2-4% Molybdenum Disulfide.
NOTE 2: Recommended service intervals are based on a normal application in a clean environment. Applications involving contaminated environments such as high levels of airborne debris (dust and waste paper); chemical or abrasive compounds; poor ground conditions; intensive usage at high performance levels; or other abnormal conditions will require more frequent servicing. At your request, your **Hyster** dealer will advise you of the appropriate service intervals based on an application survey.
NOTE 3: Lubricate if dry or at first sign of visible surface rust.
NOTE 4: Equalization charge is required approximately each month.
NOTE 5: Maximize life of surfaces by lubricating every 250 hours for first 1000 hours.
NOTE 6: Multipurpose Lithium Base Grease.
NOTE 7: Hydraulic oil sampling and analysis is a recommended practice. See **Hydraulic Cleanliness Procedures** 1900 SRM 1620 for oil cleanliness and water content guidelines. For lift trucks operating in heavy duty applications or highly contaminated environments, take oil samples every 500 hours. Normal operating conditions may allow for less frequent oil sampling. Oil sampling should be done just prior to all oil and filter changes.
NOTE 8: Lubricate with anti-seize grease compound for lift trucks equipped with Outdoor Protection/Wash-down Package.
NOTE 9: Spray electrical connection with rust inhibitor-ignition sealer, after components are properly tightened, for lift trucks equipped with Outdoor Protection/Wash-down Package.
NOTE 10: Coat all brake linkage pivot points, exposed brake cables, pivot shafts and bushing with anti-seize lubricant for lift trucks equipped with Outdoor Protection/Wash-down Package.

X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation.

Maintenance Procedures Every Shift

⚠ WARNING

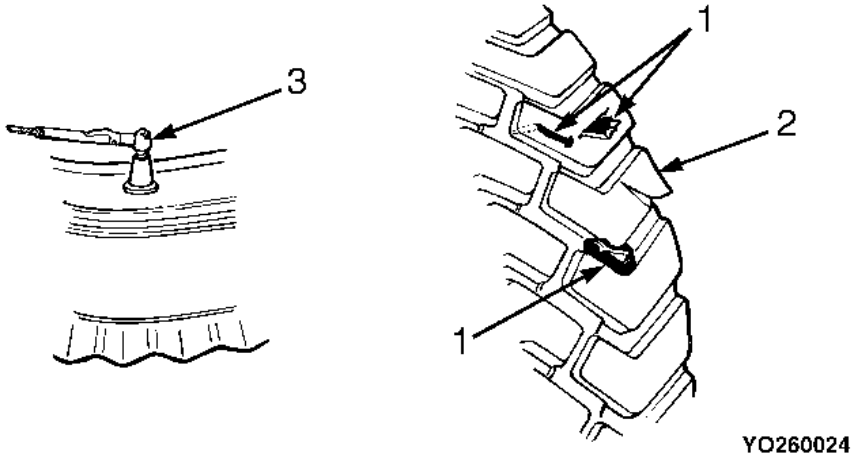
DO NOT operate a lift truck that needs repairs. Report the need for repairs immediately. If repair is necessary, put a DO NOT OPERATE tag in the operator's area. Remove the key from the key switch.

Inspect the lift truck after every shift or daily before use. Put the lift truck on a level surface. Lower the carriage and forks and turn the key or keyless switch to the **OFF** position. Apply the Automatic Parking Brake. Remove the floor mat and floor plate. Inspect for leaks and conditions that are not normal. Clean any oil spills. Make sure that lint, dust, paper and other materials are removed from the compartments. Make the additional checks as described in the following paragraphs of **How to Make Checks With the Key or Keyless Switch OFF** and **How to Make Checks With the Key or Keyless Switch ON**.

How to Make Checks With the Key or Keyless Switch OFF

Tires and Wheels

Inspect the tires for wire, rocks, glass, pieces of metal, holes, cuts and other damage. See **Figure 24**. Remove any object that will cause damage. Check for loose or missing hardware. Remove any wire strapping or other material that is wrapped around the axle.



1. CHECK FOR DAMAGE (REMOVE NAILS, GLASS, AND OTHER OBJECTS FROM THE TREAD)
2. CHECK EDGES FOR WEAR
3. CHECK TIRE PRESSURE

Figure 24. Tires Check

Forks, General

NOTE: Forks must be removed or installed by trained personnel only.

The identification of a fork describes how the fork is connected to the carriage. These lift trucks have hook forks.

Forks, Remove

NOTE: If lift truck is equipped with a fork positioner attachment, perform **Step 1** first, before going to **Step 2**. If lift truck is not equipped with a fork positioner attachment, go to **Step 2**.

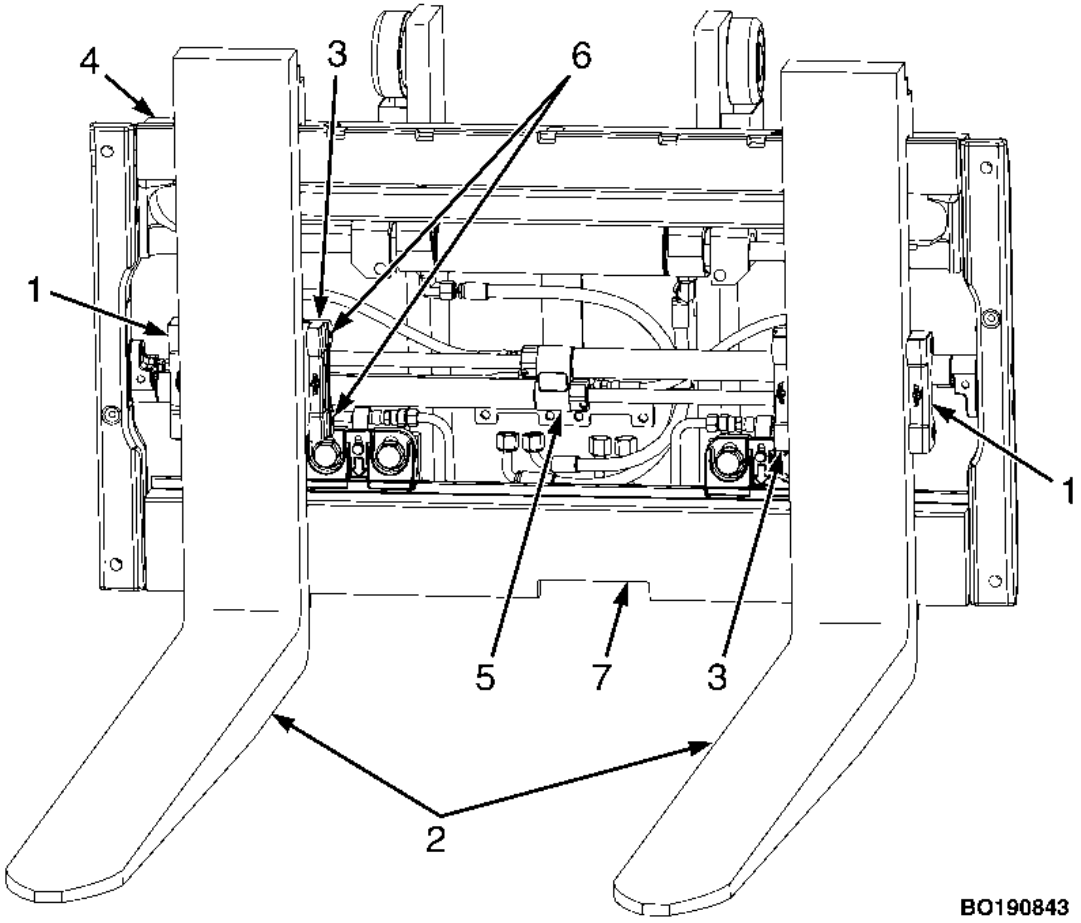
1. Lower the carriage and remove four capscrews from inner fork carriers. Remove inner fork carriers from fork positioner. See **Figure 25** or **Figure 26**.

⚠ WARNING

DO NOT try to move a fork without a lifting device. The forks can weigh 45 to 115 kg (99 to 254 lb).

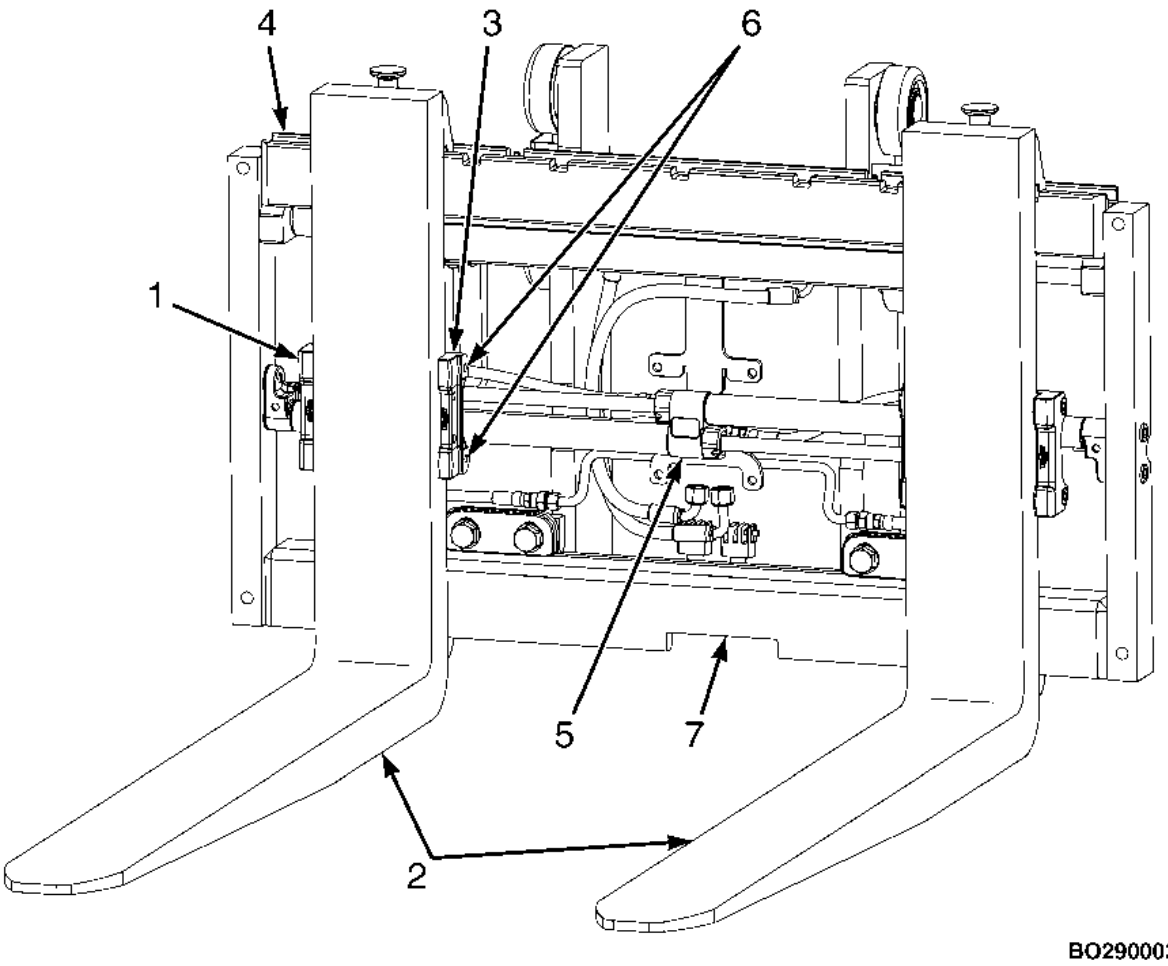
NOTE: Forks are to be replaced only in sets and not individually.

2. A fork can be removed from the carriage for replacement of the fork or other maintenance. Slide a hook fork to the fork removal notch on the carriage. See **Figure 27**. Lower the fork onto blocks so that the lower fork hook moves through the fork removal notch. See **Figure 28** and **Figure 30**. Lower the carriage further so that the top fork hook is disengaged from the top carriage bar. Move the carriage away from the fork, or use a lifting device to move the fork away from the carriage.



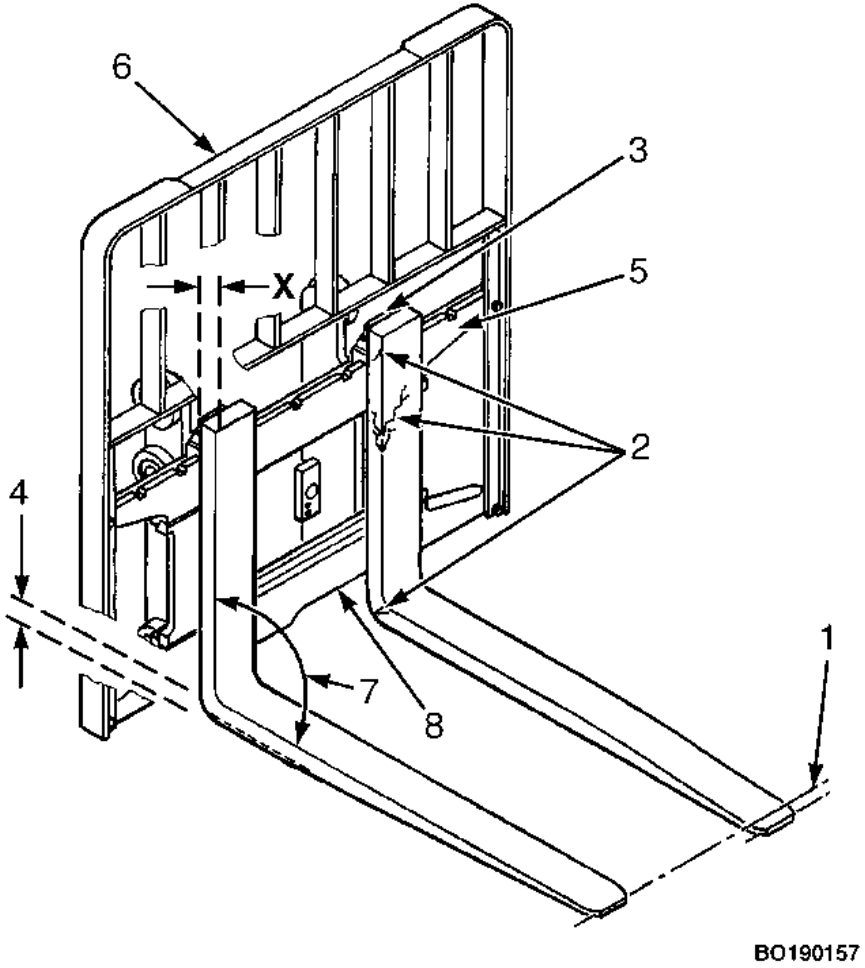
1. OUTER FORK CARRIER
2. FORKS
3. INNER FORK CARRIER
4. SIDESHIFT CARRIAGE
5. FORK POSITIONER
6. CAPSCREWS
7. FORK REMOVAL NOTCH

Figure 25. Fork Positioner Prior to December, 2016



1. OUTER FORK CARRIER
2. FORKS
3. INNER FORK CARRIER
4. SIDESHIFT CARRIAGE
5. FORK POSITIONER
6. CAPSCREWS
7. FORK REMOVAL NOTCH

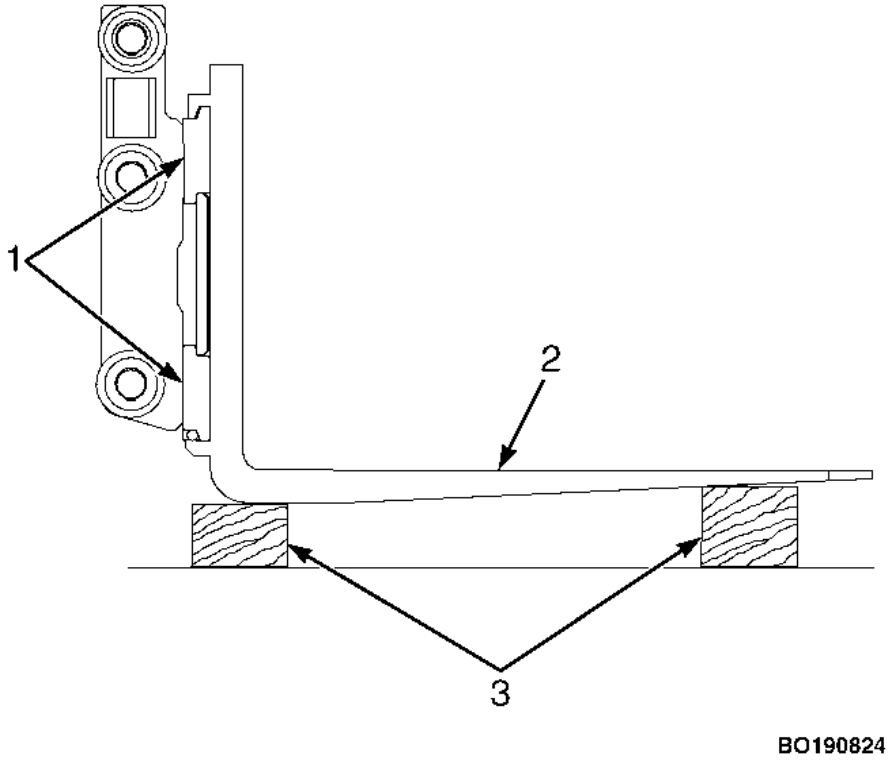
Figure 26. Fork Positioner After December, 2016



Fork Tip Alignment	
Length of Forks	**3% Dimension**
914 mm (36 in)	27 mm (1.08 in)
1000 mm (39 in)	30 mm (1.17 in)
1067 mm (42 in)	32 mm (1.26 in)
1100 mm (43 in)	33 mm (1.29 in)
1200 mm (47 in)	36 mm (1.42 in)
1400 mm (55 in)	42 mm (1.65 in)
1500 mm (59 in)	45 mm (1.77 in)

1. TIP ALIGNMENT (MUST BE WITHIN 3% OF FORK LENGTH)
2. CRACKS
3. LATCH DAMAGE
4. HEEL OF FORK (MUST BE 90% OF DIMENSION “X”)
5. CARRIAGE
6. LOAD BACKREST EXTENSION
7. MAXIMUM ANGLE 93°
8. FORK REMOVAL NOTCH

Figure 27. Forks Check



1. CARRIAGE BARS
2. HOOK FORK
3. BLOCKS

Figure 28. Hook Fork Removal

Forks, Inspect

WARNING

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

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

1. Inspect the forks for cracks and wear. Check that the fork tips are aligned as shown in **Figure 27**. Check that the bottom of the fork is not worn (item 4 in **Figure 27**).

2. Replace any damaged or broken parts that are used to keep the forks locked in position. See **Figure 30**.

3. Inspect fork wear. Ensure heel wear is not more than 10% of original thickness. If fork wear is more than 10%, fork must be replaced or rerated. Perform fork wear inspection using a BOL256N1 caliper ruler Hyster P/N 4092984 as follows. See **Figure 29**.

a. Determine normal thickness of "N" of fork using scale or ruler portion of caliper ruler. Measurement has to be done on fork shank using caliper ruler.

b. Position caliper at end of heel internal radius (item 4, **Figure 27**) with opening corresponding to measured thickness of fork shank in **Step a** above. (e.g. for N 1.75 use N 1.75 opening). This is typically the section of fork where wear is greatest. Note that opening distance has been reduced by 10% from nominal thickness.

c. If fork enters opening, it is mandatory to replace it. DANGER OF BREAKING. Furthermore, a 10% reduction in fork blade thickness results in 20% reduction in operating capacity.

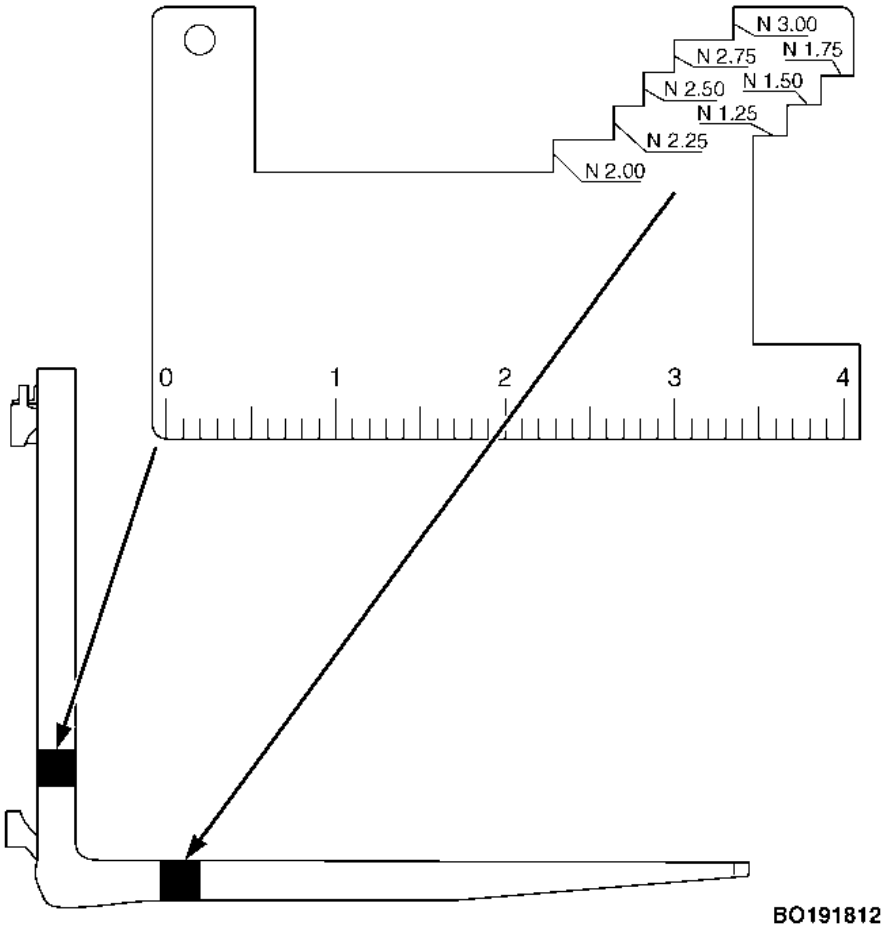


Figure 29. Fork Wear Check

Forks, Install

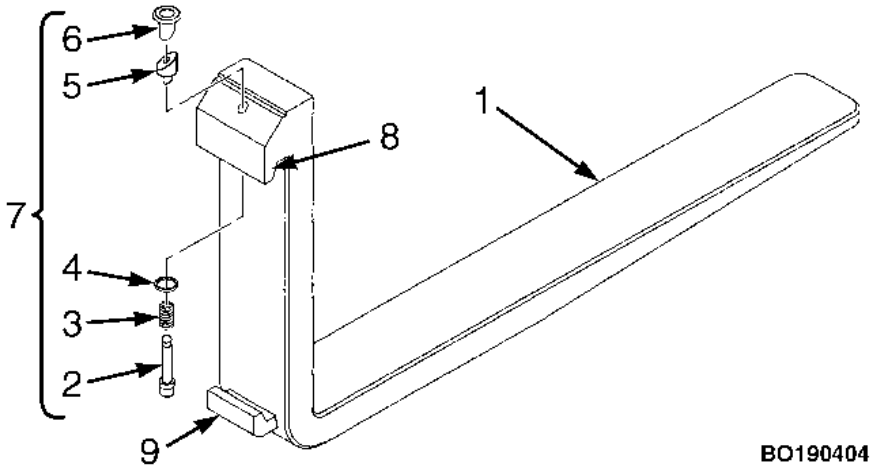
⚠ WARNING

DO NOT try to move a fork without a lifting device. The forks can weigh 45 to 115 kg (99 to 254 lb).

NOTE: Forks are to be replaced only in sets and not individually.

1. Move the fork and carriage so that the top fork hook can engage the top carriage bar. Raise the carriage to move the lower fork hook through the fork removal notch. Slide the fork on the carriage so that both upper and lower fork hooks engage the carriage. Engage the lock pin with a notch in the top carriage bar. See **Figure 30**.

2. If lift truck is equipped with a fork positioner, install inner fork carriers using four capscrews. Tighten capscrews to 35 N•m (25 lbf ft). See **Figure 25**.



1. FORK
2. LOCK PIN
3. SPRING
4. WASHER
5. WEDGE
6. KNOB
7. LOCK PIN ASSEMBLY
8. TOP FOR HOOK
9. LOWER FORK HOOK

Figure 30. Fork Lock Pin Assembly

Forks, Adjust

NOTE: During the adjustment of the forks, the heel of the forks should not be touching the ground.

The forks are connected to the carriage by hooks and lock pins. See **Figure 30**. These lock pins are installed through the top fork hooks and fit into slots in the top carriage bar. Adjust the forks as far apart as possible for maximum support of the load. Hook forks will slide along the carriage bars to adjust for the load to be lifted. Raise the lock pin in each fork to slide the fork on the carriage bar. Make sure the lock pin is engaged in the carriage bar to lock the fork in position after the width adjustment is made.

Inspection of Mast, Carriage, Header Hoses, Lift Chains, and Attachments

⚠ WARNING

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

1. Inspect the welds on the mast, cylinders, and carriage for cracks. Make sure that the capscrews and nuts are tight.

2. Inspect the channels for wear in the areas where the rollers travel. Inspect the rollers for wear or damage.

3. Inspect the load backrest extension for cracks and damage.

4. If the lift truck is equipped with a sideshift carriage or attachment, inspect the parts for cracks and wear. Make sure the parts that fasten the sideshift carriage or attachment to the carriage are in good condition.

⚠ WARNING

Always wear the proper protective equipment including eye protection and petroleum-resistant gloves when handling hydraulic oil. Thoroughly wash oil from exposed areas of skin as soon as possible.

⚠ WARNING

Never check for leaks by putting hands on hydraulic lines or components under pressure. Hydraulic oil under pressure can be injected into the skin.

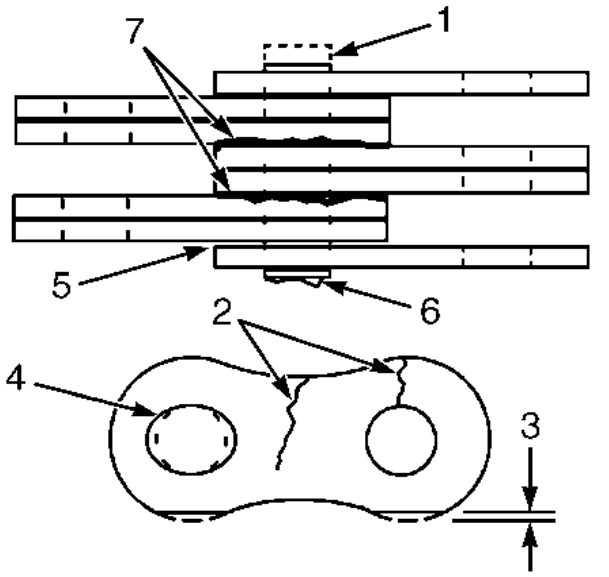
5. Visually inspect hoses/fittings for hydraulic leaks; hose covers for cuts, cracks, or exposed reinforcement; defective/broken clamping devices or sheaves; and proper tracking during operation. Adjust/repair/replace hose/components as necessary.

6. Check that lift chains are correctly lubricated. Use SAE 10W-30 engine oil to lubricate lift chains.

7. Inspect the lift chains for cracks or broken links and worn or turned pins. Lift chains must be replaced as a set. See **Figure 31**.

8. Inspect the chain anchors and pins for cracks and damage.

9. Make sure the lift chains are adjusted so that they have equal tension. **Adjustments or replacement of the lift chains must be done by authorized personnel.**



1. WORN PIN
2. CRACKS
3. EDGE WEAR (MAXIMUM 5% OF NEW)
4. HOLE WEAR
5. LOOSE LEAVES
6. DAMAGED PIN
7. CORROSION

Figure 31. Check the Lift Chains

Safety Labels

WARNING

Safety labels are installed on the lift truck to provide information about possible hazards. It is important that all safety labels are installed on the lift truck and can be read.

Check that all safety labels are installed in the correct locations on the lift truck. See the **Parts Manual** or the section **Frame** 100 SRM 1342 of the **Service Manual** for the correct locations of the safety labels.

Steering Column Tilt Memory Lever

Make sure the tilt memory lever for the steering column operates correctly. The tilt memory lever must NOT allow the column to move unless the tilt memory lever is released. See **Figure 32**.

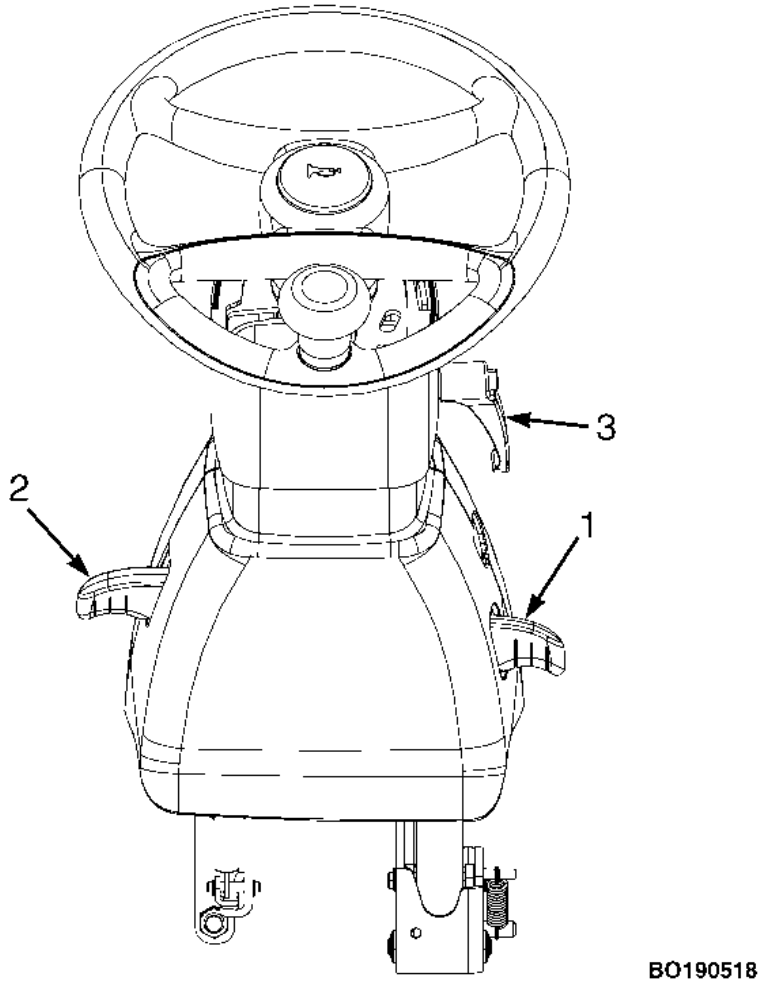


Figure 32. Steering Column Tilt Memory Lever

Legend for Figure 32

NOTE: OPTIONAL TELESCOPIC STEERING COLUMN SHOWN.

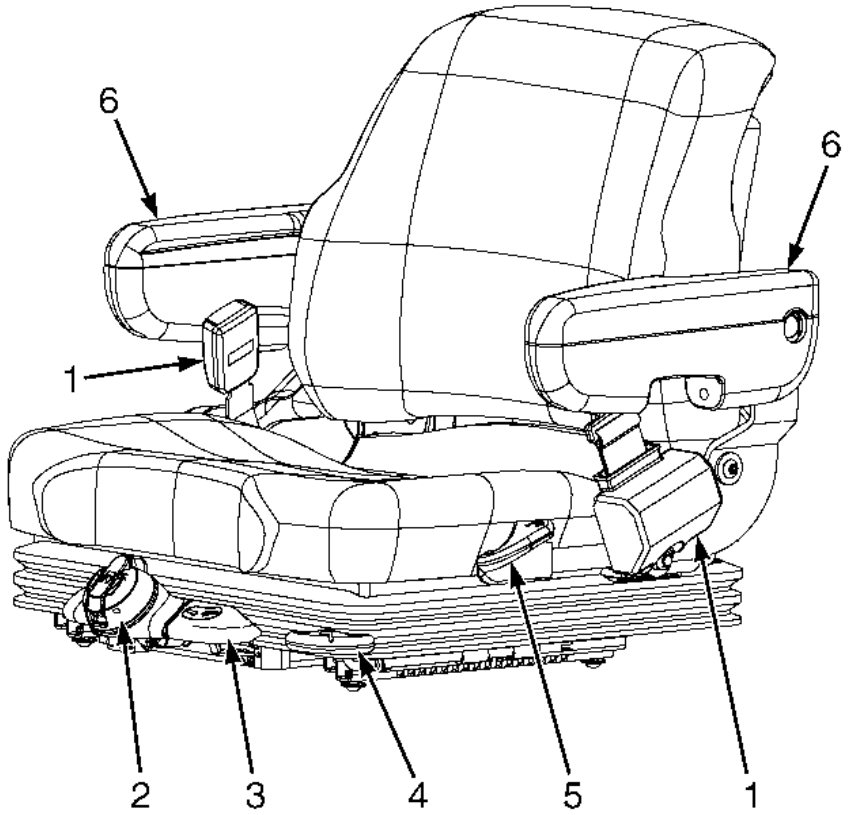
1. TILT POSITION LEVER
2. TILT POSITION (OPTIONAL TILT MEMORY) LEVER
3. TELESCOPIC COLUMN LOCKING HANDLE

Operator Restraint System

There is an indicator icon on the display panel for the seat belt. The icon is ON as described in the **Model Description** section of this manual. The indicator icon can help the operator remember to fasten the seat belt.

The seat belt, armrest, and the seat and seat mounting components are the parts of the operator restraint system. See **Figure 33**. Each item must be checked to make sure it is attached securely, functions correctly and is in good condition.

Make sure the seat rails are not loose. See **Figure 33**. The seat rails must lock securely in position, but move freely when unlocked. The seat rails must be securely attached to the mounting surface.



1. SEAT BELT
2. WEIGHT ADJUSTMENT KNOB
3. RIDE POSITION INDICATOR
4. FORWARD/BACKWARD ADJUSTMENT LEVER
5. BACKREST ANGLE ADJUSTMENT LEVER
6. ARMREST

Figure 33. Operator Restraint System

Emergency Locking Retractor (ELR)

When the ELR style seat belt is properly buckled across the operator, the belt will permit slight operator repositioning without activating the locking mechanism. If the truck tips over, travels off a dock, or comes to a sudden stop, the locking mechanism will be activated and hold the operator's lower torso in the seat. See **Figure 33**.

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

NOTE: The following seat belt operation checks must be performed three times before replacing the seat belt assembly.

- With the hood closed and in the locked position, pull the seat belt slowly from the retractor assembly. Make sure the seat belt pulls out and retracts smoothly. If the seat belt does not pull out of the retractor assembly the internal latch may be locked. Pull firmly on the seat belt and hold for a moment to remove slack from the belt in the retractor. Release the seat belt. Seat belt will retract and the internal latch will unlock. If the seat belt cannot be pulled from the retractor assembly or the belt will not retract, replace the seat belt assembly.
- With the hood closed and in the locked position, pull the seat belt with a sudden jerk. Make sure the seat belt will not pull from the retractor assembly. If the seat belt can be pulled from the retractor when it is pulled with a sudden jerk, replace the seat belt assembly.
- With the hood in the open position, make sure the seat belt will not pull from the retractor assembly. If the seat belt can be pulled from the retractor, with the hood in the open position, replace the seat belt assembly.

Battery Restraint System

⚠ WARNING

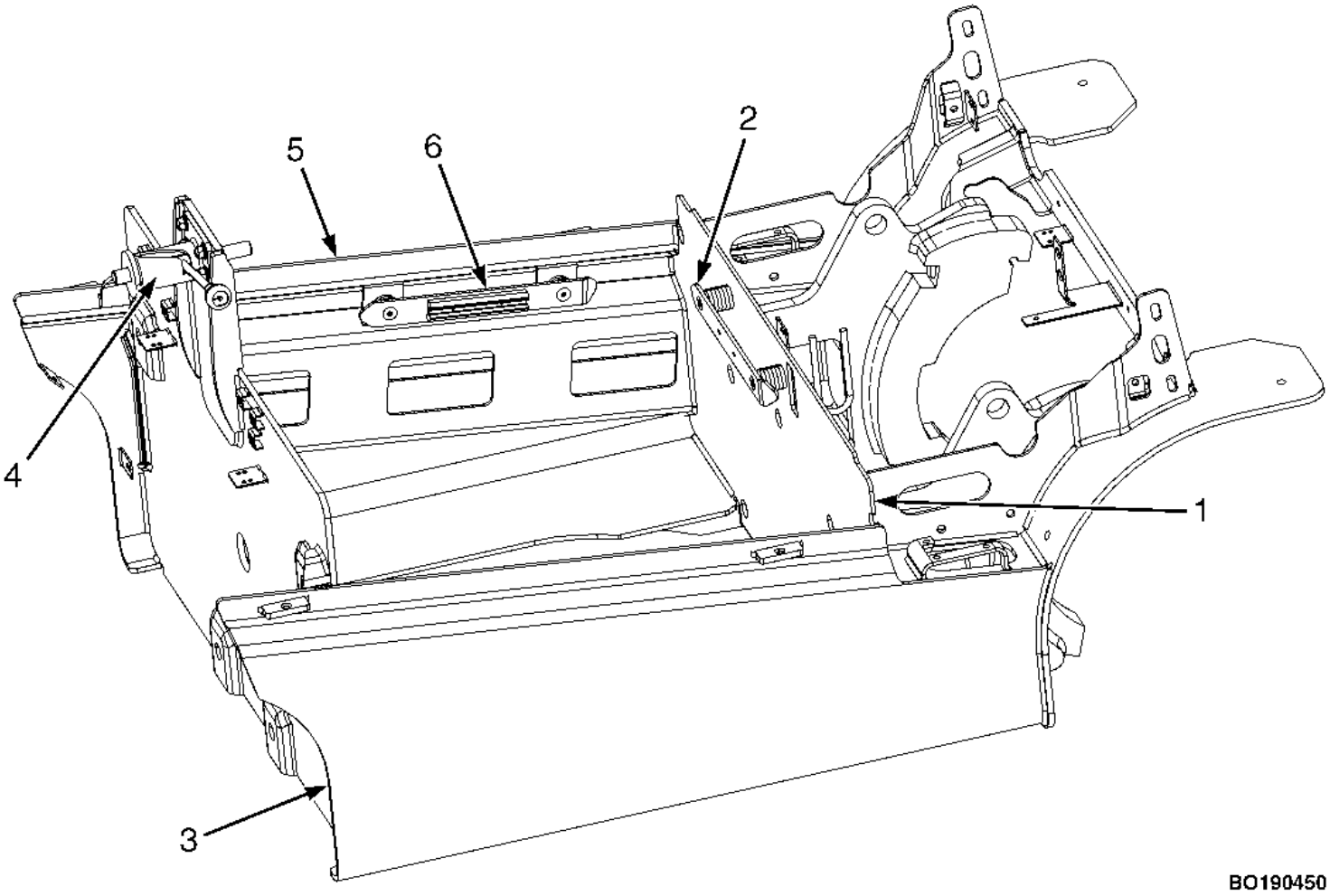
The hood latch mechanism and battery restraint system must operate correctly before a lift truck is operated.

The battery restraint system is made up of a front and side spacer plates, the battery retention pin, the right and left side battery covers, and a rod that helps prevent the battery from moving side-to-side. See **Figure 34**, **Figure 35**, **Figure 36**, **Figure 37**, and **Figure 38**.

Maintenance

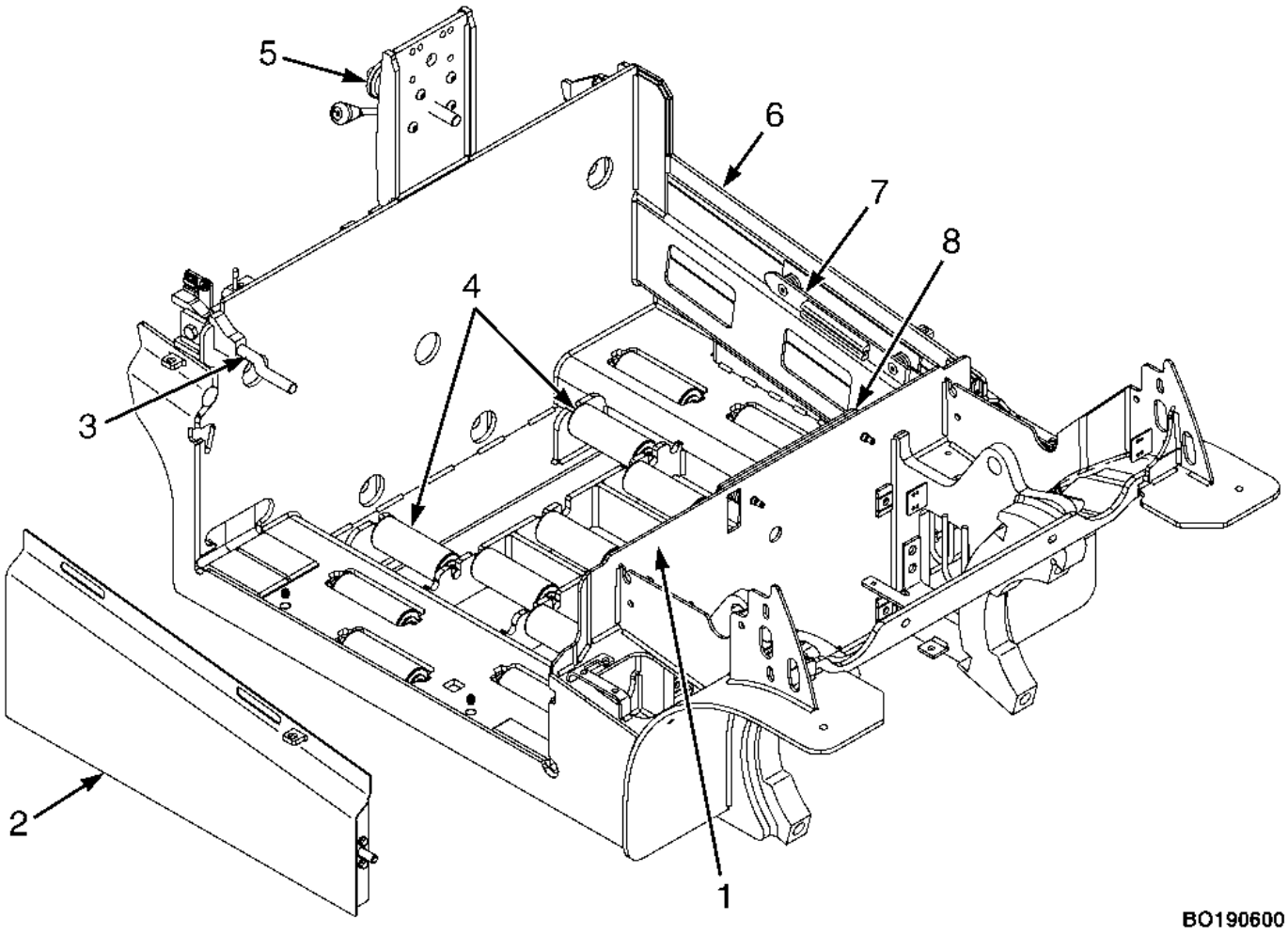
The front and side spacer plates are adjustable. The front spacer plate helps prevent the battery from moving forward and backward. The side spacer plate and rod help prevent side-to-side movement of the battery. The retention pin helps to prevent the battery from falling out of the battery compartment if a tipover occurs.

The battery restraint system must function so that the operator restraint system can operate correctly. Operation of the battery restraint system without rollers requires that the maximum movement allowed for the battery is 13 mm (0.50 in.) in any horizontal direction. For lift trucks with the roller option, the maximum movement allowed for the battery is 2 mm (0.039 in.) in any horizontal direction. This will reduce the risk of operator injury in a truck tipover. Batteries for this series of lift trucks must all have the same length dimension to just fit the battery compartment width. For correct battery sizes, see the **Battery Specifications** in the back of this manual.



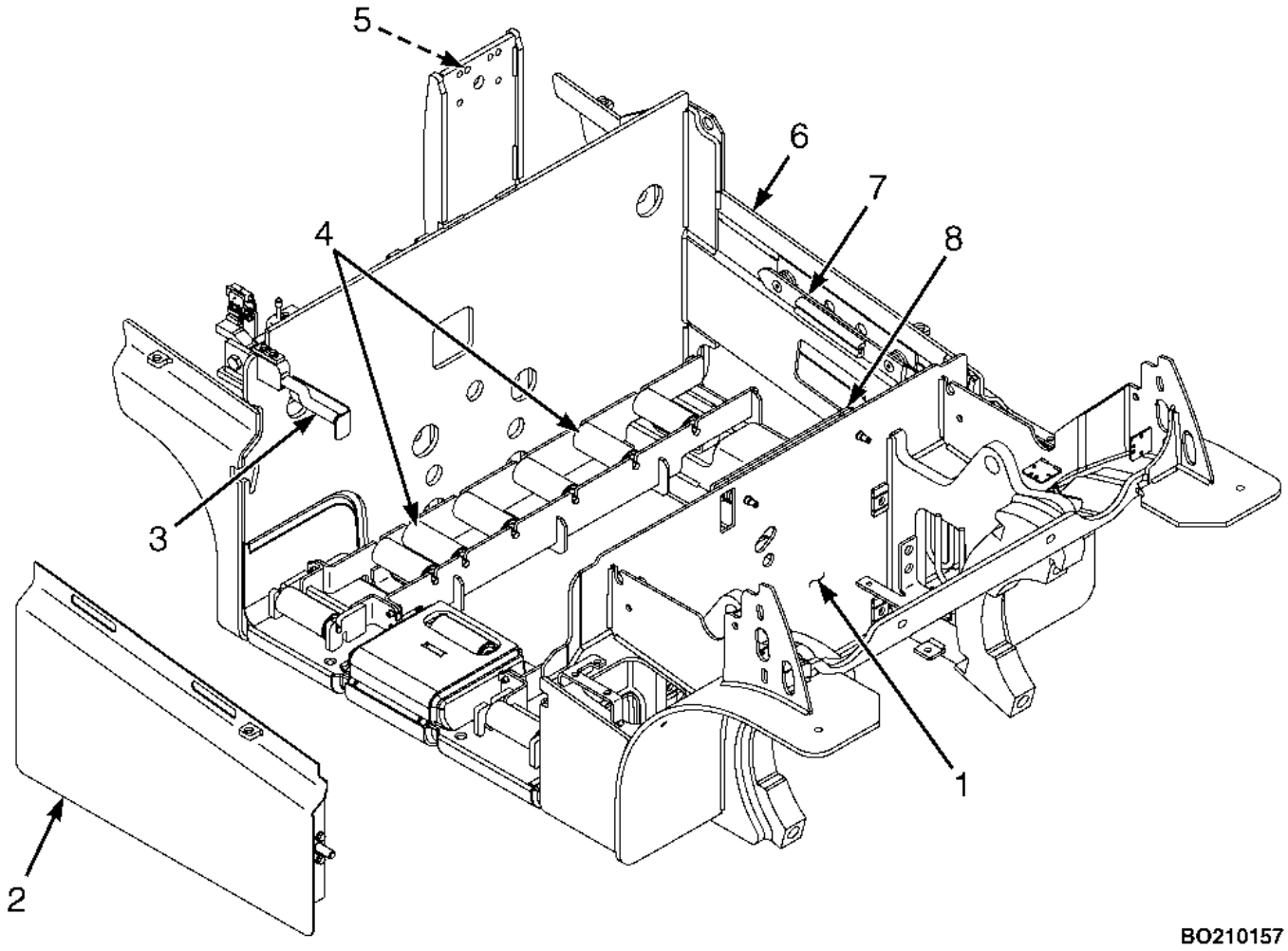
1. FRONT BULKHEAD
2. FRONT SPACER PLATE
3. RIGHT SIDE BATTERY COVER
4. RETENTION PIN
5. LEFT SIDE BATTERY COVER
6. SIDE SPACER PLATE

Figure 34. Standard Battery



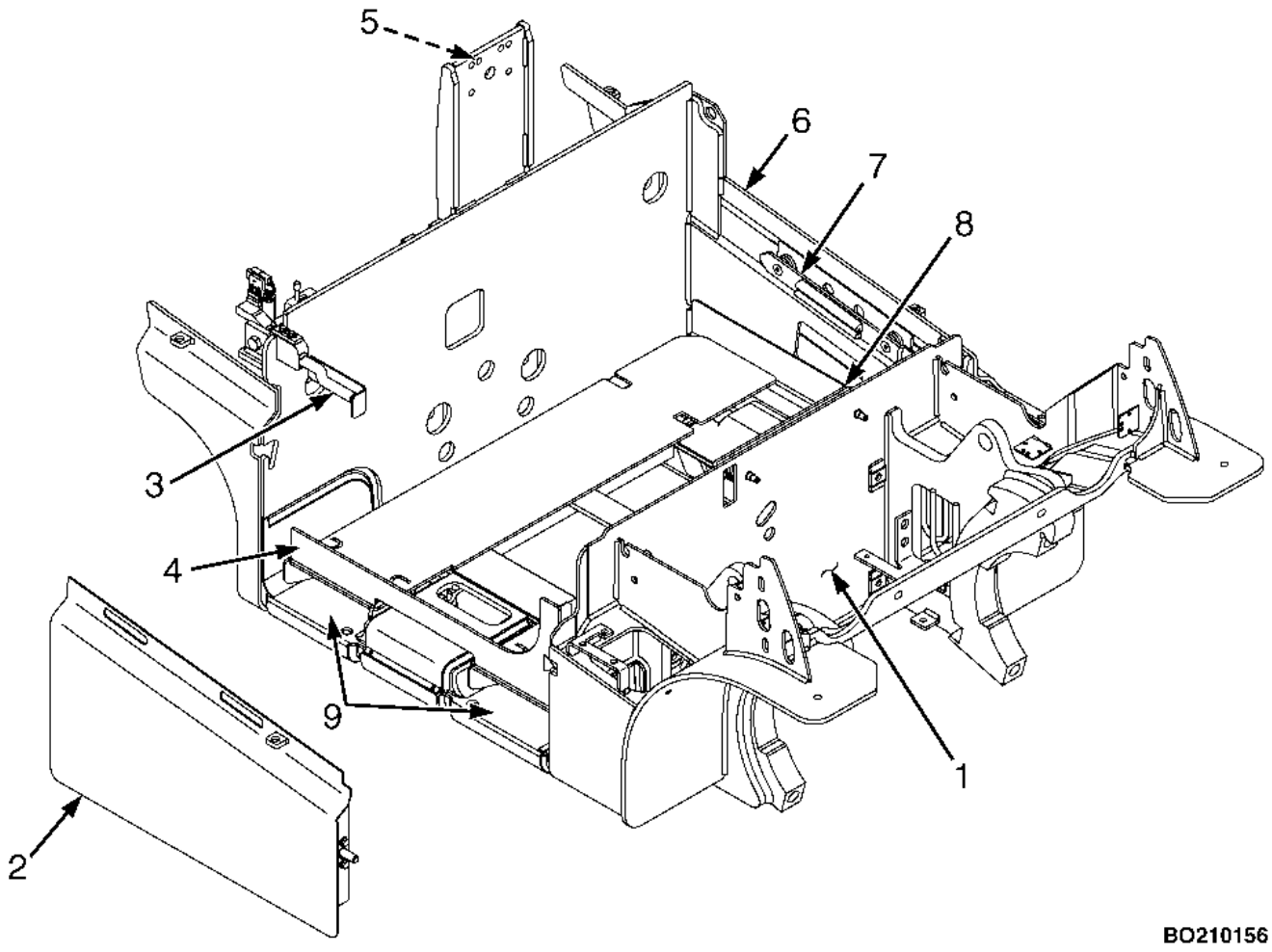
1. FRONT BULKHEAD
2. BATTERY GATE (RIGHT SIDE)
3. ROD
4. SIDE ROLLERS
5. RETENTION PIN
6. LEFT SIDE BATTERY COVER
7. SIDE SPACER PLATE
8. FRONT SPACER PLATE

Figure 35. Optional Battery With Side Rollers and Battery Gate for Lift Trucks Manufactured Prior to June, 2016



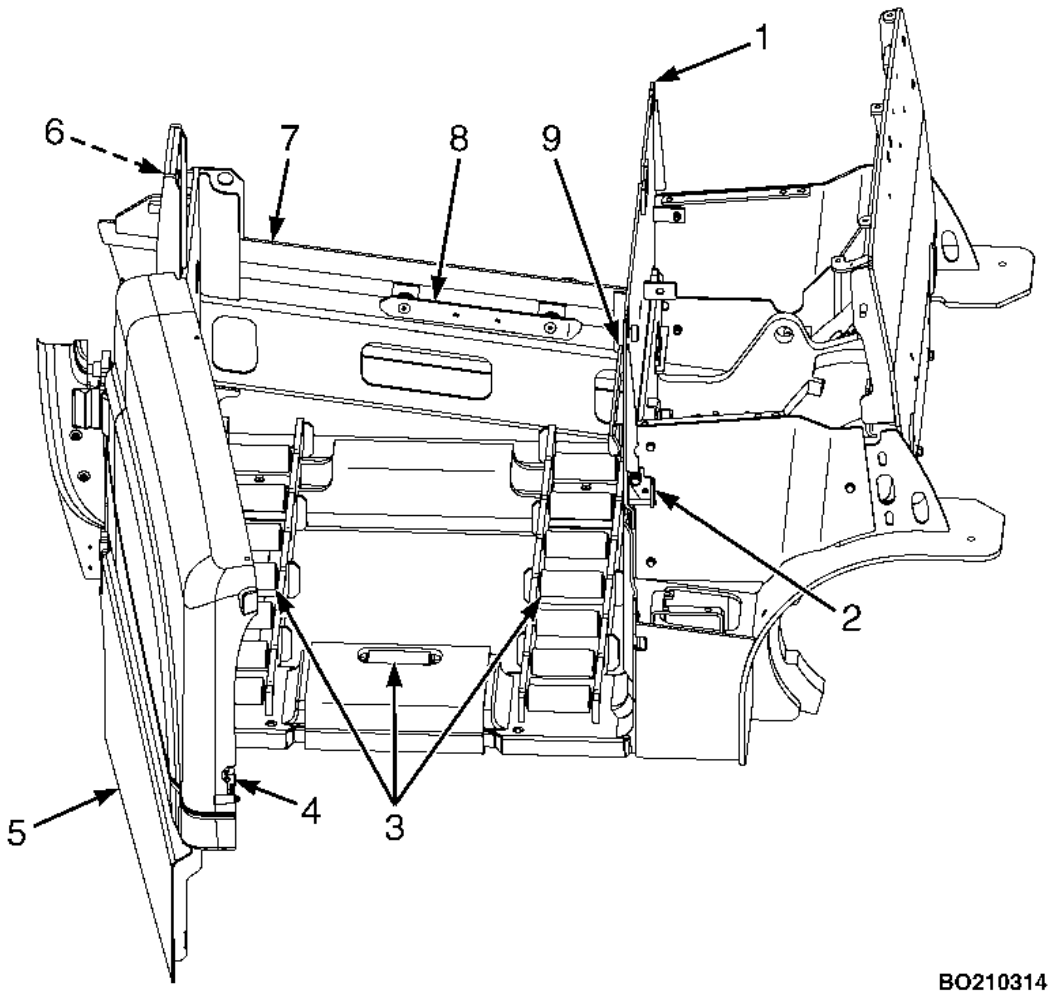
1. FRONT BULKHEAD
2. BATTERY GATE (RIGHT SIDE)
3. ROD
4. SIDE ROLLERS
5. RETENTION PIN
6. LEFT BATTERY COVER
7. SIDE SPACER PLATE
8. FRONT SPACER PLATE

Figure 36. Optional Battery With Side Rollers and Battery Gate for Lift Trucks Manufactured After June, 2016



1. FRONT BULKHEAD
2. BATTERY GATE (RIGHT SIDE)
3. ROD
4. BATTERY FORK TRAY
5. RETENTION PIN
6. LEFT BATTERY COVER
7. SIDE SPACER PLATE
8. FRONT SPACER PLATE
9. FORK POCKETS

Figure 37. Optional Battery Restraint System With Forklift Removal System



NOTE: HINGED DOOR WITH SIDE ROLLERS SHOWN. BATTERY RESTRAINT SYSTEM FOR LIFT TRUCKS EQUIPPED WITH FORK-LIFT REMOVAL SYSTEM SIMILAR.

1. FRONT BULKHEAD
2. STRIKER
3. SIDE ROLLERS
4. LATCH
5. HINGED BATTERY DOOR (RIGHT SIDE)
6. RETENTION PIN
7. LEFT BATTERY COVER
8. SIDE SPACER PLATE
9. FRONT SPACER PLATE

Figure 38. Battery Restraint System with Hinged Battery Door

Hood Latch and Hood Release Handle

WARNING

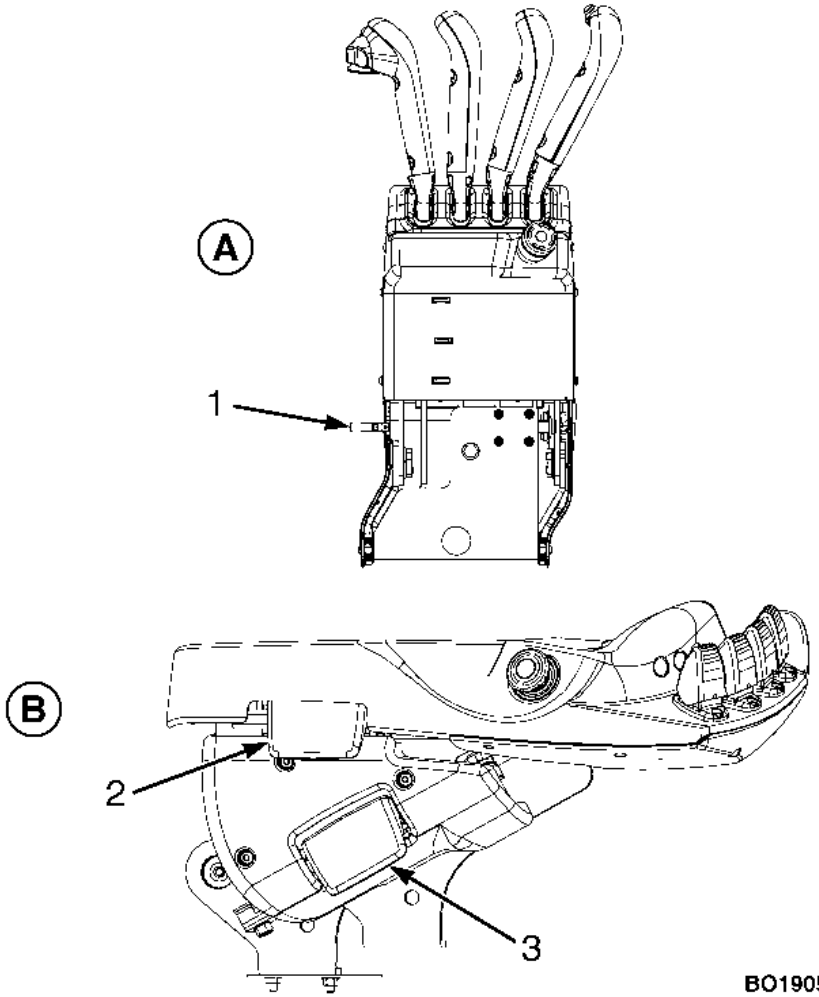
The hood latch mechanism and battery restraint system must operate correctly before a lift truck is operated.

The hood and hood latch mechanism also help keep the battery within the battery compartment if a tipover occurs. The hood can be raised for access to the battery. Gas springs help raise and hold the hood in the fully open position.

Manual Hydraulics

1. Use the tilt position lever and tilt the steering column all the way up. See **Figure 32**.

2. Slide the seat all the way back. Release the latch for the control lever assembly and move the assembly to the forward position. See **Figure 39**.



A. MANUAL CONTROL LEVERS
B. E-HYDRAULIC CONTROL MINI-LEVERS

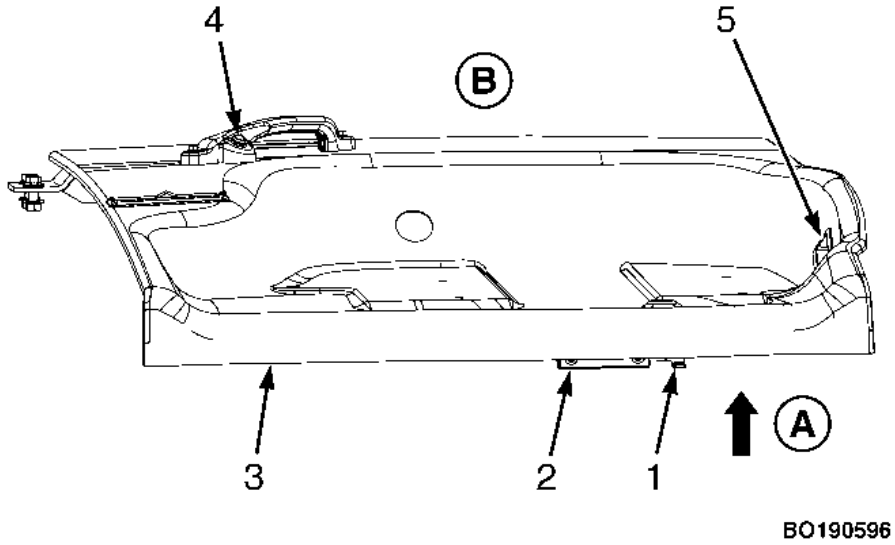
1. MANUAL CONTROL LEVERS RELEASE LATCH
2. SMALL ADJUSTMENT HANDLE - MOVES ARMREST FORWARD OR BACKWARD
3. LARGE ADJUSTMENT HANDLE - MOVES ARMREST UP OR DOWN

Figure 39. Hydraulic Control Lever Release

NOTE: The hood can be raised from either side of the lift truck.

3. Push the hood release lever up to unlatch the hood. Place one hand in the plastic handle on the hood and the other hand on the hood latch handle and raise hood to the up position. See **Figure 40**.

4. To close hood, lower the hood until the latch clicks. Try to lift the hood to make sure the hood is locked down. The hood must be locked in the down position during lift truck operation.



A.	RELEASE DIRECTION	**B.**	FRONT VIEW
1.	HOOD RELEASE LEVER	4.	HOOD HORN BUTTON
2.	HOOD LATCH ASSEMBLY	5.	HOOD HANDLE
3.	HOOD		

Figure 40. Hood and Hood Latch Components

E-Hydraulics

1. Use the tilt position lever and tilt the steering column all the way up. See **Figure 32**.

2. Slide the seat all the way back. Move the armrest all the way back and all the way down. See **Figure 39**.

NOTE: The hood can be raised from either side of the lift truck.

NOTE: Trucks equipped with E-hydraulics feature an intermediate hood opening position. There are two lever positions that disable the intermediate stop.

3. Push the hood release lever up to unlatch the hood. See **Figure 40**.

a. Place hand in hood handle (see **Figure 40**) and raise hood to the intermediate stop point. See **Figure 41**.

b. Turn lever until it clicks. Lever will be vertically oriented. See **Figure 41**. Raise hood to full upright position.

NOTE: The intermediate stop can alternately be temporarily disabled by rotating its lever 90° and holding it in this position with one hand while controlling the hood opening/closing with the other hand.

4. To close hood, lower hood until latch touches the striker. Push down on hood until it clicks to lock. Try to lift hood up using hood handle to make sure hood is securely latched. The hood must be locked in the down position during lift truck operation.

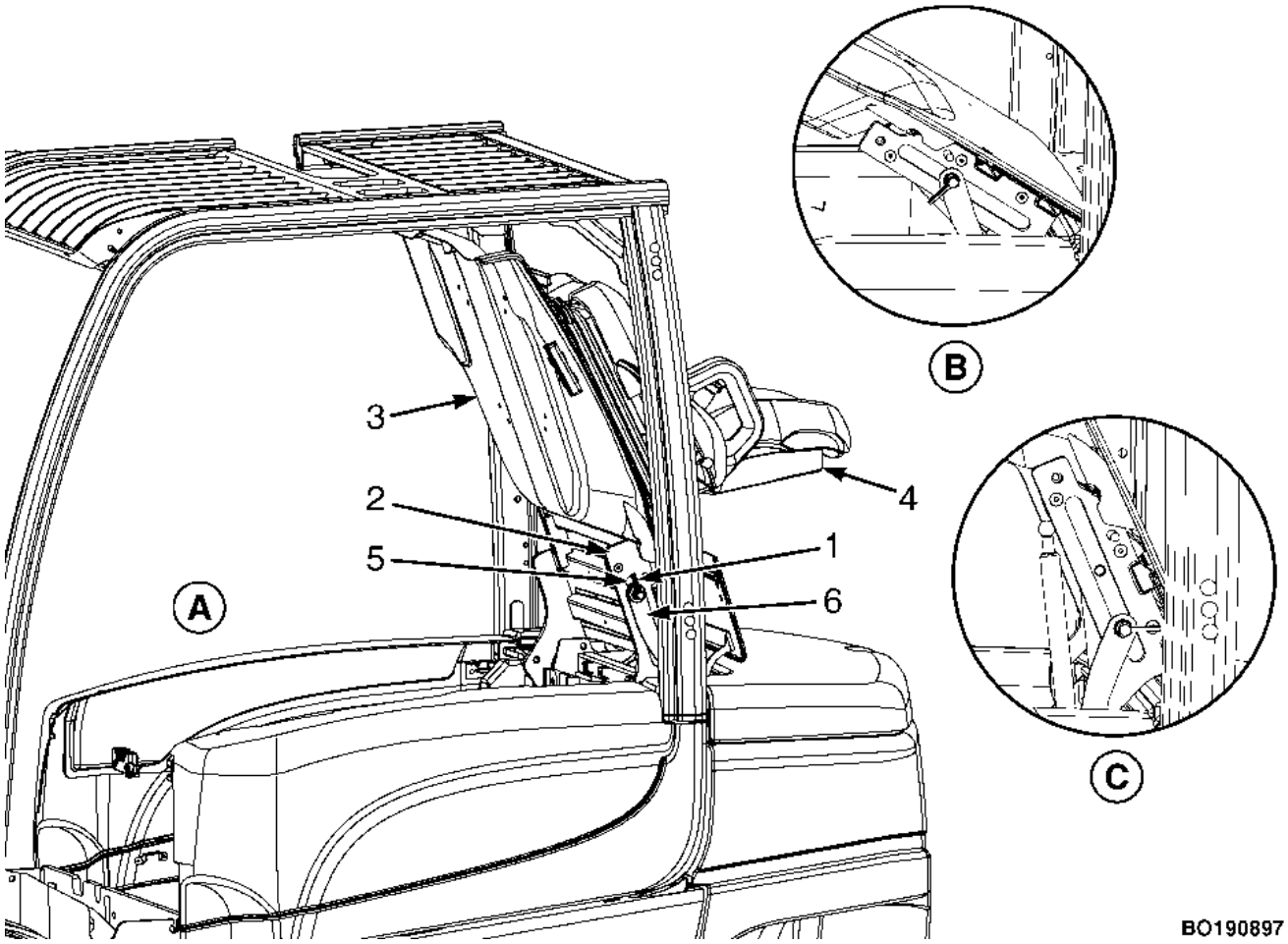


Figure 41. Opening the Hood

NOTE: FULL-SUSPENSION SEAT AND RAISED HOOD SHOWN.

A. HOOD RAISED TO FULL UPRIGHT POSITION, LEVER TURNED TO TEMPORARY DISABLING POSITION (PARALLEL TO HINGE SLOT)

B. HOOD RAISED TO INTERMEDIATE STOP POINT

C. HOOD RAISED TO FULL UPRIGHT POSITION, LEVER TURNED TO PERMANENT DISABLING POSITION (POINTING UP)

1. LEVER
2. PLATE
3. HOOD
4. SEAT
5. HINGE SLOT
6. LINK PLATE

Battery

⚠ WARNING

Never put tools or other metal on the battery. Metal on the battery can cause a short circuit and possible damage or injury.

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

Batteries generate explosive fumes. Keep the vents in the caps clean. Keep sparks or open flames away from the battery area. DO NOT make a spark from the battery connections.

Disconnect the battery when doing maintenance.

NOTE: There can be one of two types of batteries. One type has removable cell caps. The other type has sealed cells. The sealed batteries require a different charger, the electrolyte level or specific gravity cannot be checked and water cannot be added to the electrolyte. Make sure that the voltage and the weight of the battery are correct as shown on the Nameplate. See **Battery Specifications** at the back of this manual to check for correct battery dimensions.

Keep the battery case, top cover and the area for the battery clean and painted. Leakage from the battery and corrosion can cause a malfunction in the electric controls of the lift truck. Use a water and sodium bicarbonate (soda) solution to clean the battery and the battery area. Keep the top of the battery clean, dry and free of corrosion.

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

Inspect the battery case, connector and cables for damage, cracks or breaks. See the battery dealer in the area to repair any damage.

On batteries with cell caps, check the level of the electrolyte daily on a minimum of one cell. Add only distilled water, as necessary, to all cells that do not have the correct electrolyte level. The correct level is halfway between the top of the plates and the bottom of the fill hole.

On lift trucks equipped with Outdoor Protection/Wash-down Package, spray battery terminals with rust inhibitor-ignition

sealer after battery terminal connects are properly tightened.

Hydraulic System

⚠ WARNING

At operating temperature the hydraulic oil is HOT. DO NOT permit the oil to contact the skin and cause a burn.

⚠ WARNING

Always wear the proper protective equipment including eye protection and petroleum-resistant gloves when handling hydraulic oil. Thoroughly wash oil from exposed areas of skin as soon as possible.

⚠ CAUTION

DO NOT permit dirt to enter the hydraulic system when the oil level is checked or the filter is changed.

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

NOTE: The dipstick is located in the counterweight, behind the seat.

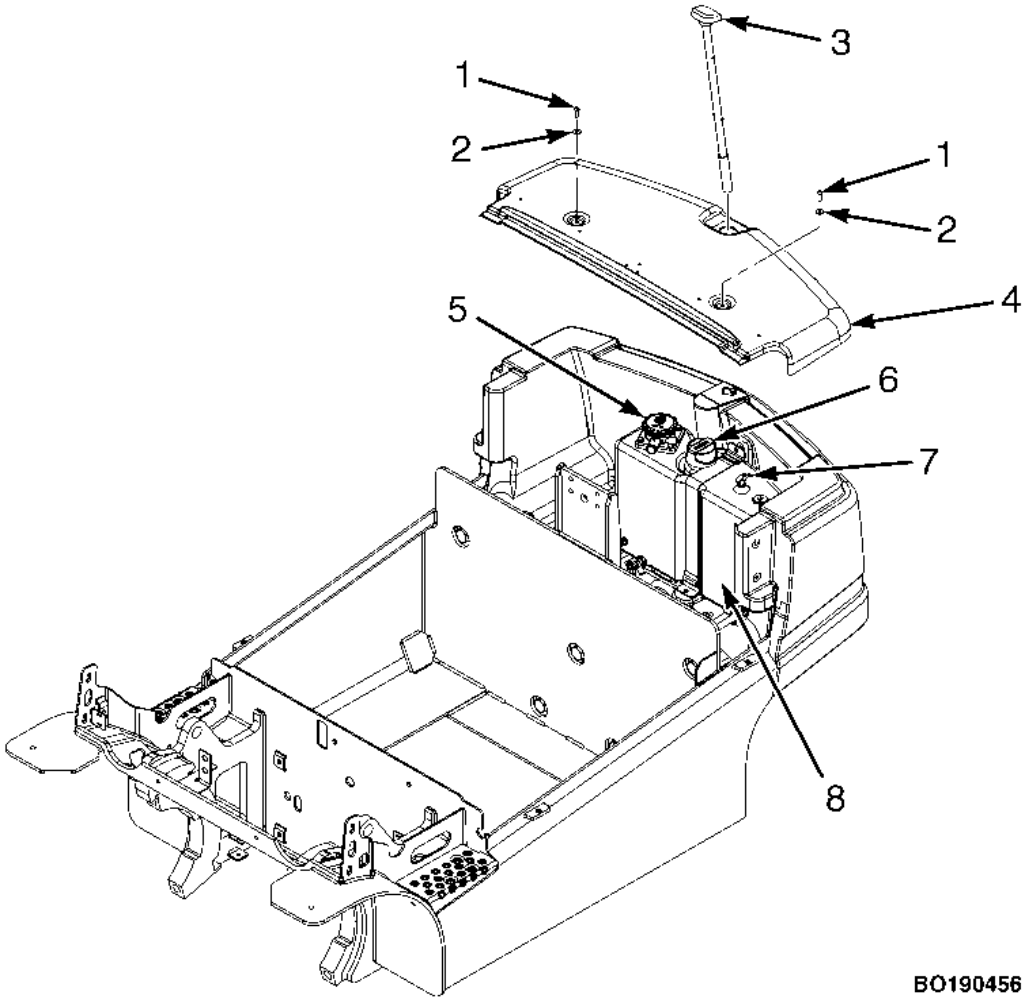
1. Turn lift truck **OFF** and wait one minute before checking the hydraulic oil level.

2. Remove two capscrews, washers, and tow pin from counterweight and counterweight cover. Remove the counterweight cover for access to the dipstick. See **Figure 42**.

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

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

5. Install the counterweight cover, two washer, two capscrews, and tow pin when inspection is completed. See **Figure 42**.



1. CAPSCREW
2. WASHER
3. TOW PIN
4. COUNTERWEIGHT COVER
5. HYDRAULIC OIL FILTER
6. HYDRAULIC BREATHER
7. HYDRAULIC OIL DIPSTICK
8. HYDRAULIC TANK

Figure 42. Hydraulic System Check

How to Make Checks With the Key or Keyless Switch ON

⚠ WARNING

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

Make sure the area around the lift truck is clear before moving the lift truck. Be careful when making the checks.

Horn, Lights, and Alarm

1. Check the operation of the horn by pressing the horn button on the steering wheel. The horn will operate when the key or keyless switch is in any position. If lift truck is equipped with E-Hydraulic controls, there is a second horn button located on the armrest. See **Figure 9** and **Table 1**.

There is also a handle with a horn button either on the right rear side of the hood or on the right overhead guard leg. The location of the handle depends on what size of battery the lift truck is equipped with. See the **Model Description** section and **Table 1**.

2. If lift truck is equipped with lights, check the operation of the lights using the appropriate rocker switch, located on the right side of the steering column. See **Figure 9** and **Table 1**. The lights will operate when the key or keyless switch is in any position.

3. Check the strobe light by turning the key or keyless switch to the **ON** position and check the operation of the light. The strobe light can also be operated with a rocker switch.

4. Check the backup alarm on lift trucks equipped with a direction control switch by sitting in the seat and turning the key or keyless switch to the **ON** position. Pushing down on the direction control switch to put it in reverse will sound the alarm.

5. Check the backup alarm on lift trucks equipped with a MONOTROL® pedal by sitting in the seat, turning the key or keyless switch to the **ON** position and pressing the reverse arrow on the MONOTROL® pedal.

6. Check the seat switch. Turn the key or keyless switch to the **OFF** position and leave the seat. Do not apply the parking brake. If the seat switch is working correctly, an alarm will sound when the operator leaves the seat after turning the lift truck **OFF**, but does not apply the parking brake. If lift truck is equipped with the Seat Activated parking brake option, the parking bake will be automatically applied when

the operator leaves the seat after turning the lift truck **OFF**. The parking brake will release when the operator returns to the seat and the accelerator or MONOTROL® pedal is applied.

Steering System

⚠ WARNING

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

Make sure that the steering system operates smoothly and provides good steering control. See the **Model Description** section in this manual.

Service Brakes

⚠ WARNING

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

⚠ CAUTION

Use only Dexron® III transmission fluid from a sealed container in the master cylinder reservoir. Use of automotive or other unapproved fluids can damage the brake system.

There is an indicator icon on the display panel for the brake fluid level. The icon is illuminated as described in the **Model Description** section of this manual. If the icon is illuminated during operation, the fluid in the reservoir for the brake master cylinder is too low. Add brake fluid and check for leaks. The reservoir is under the brake pedal and floor plate. See **Figure 23**. Clean the area around the fill cap so that no dirt enters the reservoir.

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

Automatic Parking Brake

There is an indicator icon on the display panel for the Automatic Parking Brake (APB). The icon is illuminated as described in the **Model Description** section of this manual. See the **Operating Procedures** section for a description of how the APB works.

Make sure the service brakes operate correctly before checking the operation of the Automatic Parking Brake. Check the operation of the APB. The APB, when in good condition will hold a lift truck with a capacity load on a 15% grade [a slope that increases 1.5 m in 10 m (1.5 ft increase in 10 ft)]. If the APB requires repair or service, notify service personnel.

Control Levers and Pedals

Check that the levers for the mast and attachment operate as described in **Model Description** section of this manual. The brake pedals are checked as described in the preceding **Service Brakes** and **Automatic Parking Brake** paragraphs with the operation of the brakes.

Direction and Speed Control Pedals

Check that the direction and speed control pedals operate as described in the **Model Description** section of this manual. Lubricate the MONOTROL® pedal or accelerator pedal joints as needed. See the **Maintenance Schedule**.

Lift System Operation

⚠ WARNING

NEVER work under a raised carriage or forks. Lower the carriage or use chains on the mast weldments and carriage so that they cannot move. Make sure the moving parts are attached to a part that does not move.

DO NOT try to locate hydraulic leaks by putting hands on pressurized hydraulic components. Hydraulic oil can be injected into body by pressure.

NOTE: Some parts of the mast move at different speeds during raising and lowering.

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

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

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

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

Check that the controls for the attachment operate the functions of the attachment. See the symbols by each of the controls as shown in **Table 4**. Make sure all of the hydraulic lines are connected correctly and do not leak.

Oil Leaks

WARNING

DO NOT try to locate hydraulic leaks by putting hands on pressurized hydraulic components. Hydraulic oil can be injected into the body by pressure.

Visually check the hydraulic system, steering system, and drive unit assembly/wet brake system for leaks.

How to Charge the Battery

WARNING

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

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

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

Disconnect the battery when doing cleaning and maintenance.

CAUTION

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

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

CAUTION

Always make sure the color in the window of the charger connector is the same as the color in the window of the battery connector.

NOTE: This series of trucks can have one of two types of batteries. One type has removable cell caps. A green key for battery voltage shows in the window of the battery connector for batteries with cell caps. The other type has sealed cells and the electrolyte cannot be checked. A gray key for battery voltage shows in the window of the battery connector for sealed batteries. These sealed batteries also require a different charger.

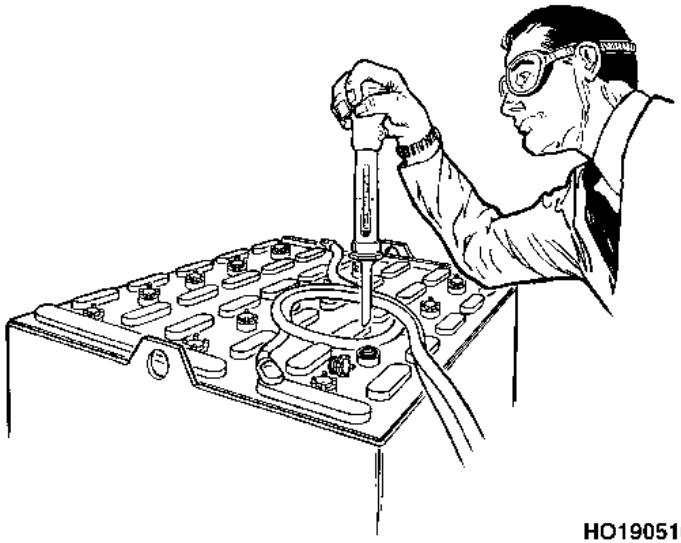
NOTE: Many installations have battery chargers that can follow a program to automatically charge a battery according to recommendations of the battery manufacturer. Use the recommendations of the battery manufacturer for charging the battery.

Correct use of the hydrometer and proper operation of the battery charger is important. See **Figure 43**. Follow the instructions of the charger manufacturer. Never let the battery discharge below the minimum value given by the battery manufacturer. A fully charged battery will have a specific gravity of 1.265 to 1.310 at 25 °C (77 °F). See **Figure 43**. Never charge a battery at a rate that will raise the electrolyte temperature above 49 °C (120 °F). Never let a battery stay discharged for long periods.

Normal Charge: This charge is normally given to a battery that is discharged from normal operation. Many customers charge the battery at regular intervals that depend on use. This procedure will keep the battery correctly charged if the battery is not discharged below the limit. Always use a hydrometer to check the battery if the battery is charged at regular intervals and has cell caps. Frequent charging of a battery that has a 2/3 or more charge can decrease the life of the battery.

Equalizing Charge: This charge is at a low rate and balances the charge in all of the cells. The equalizing charge is normally given approximately once a month. It is a charge at a slow rate for three to six hours in addition to the regular charging cycle. Do not give an equalizing charge more than once a week. The most accurate specific gravity measurements for a charged battery will be after an equalizing charge. If the specific gravity difference is more than 0.020 between cells of the battery after an equalizing charge, there can be a defective cell. Consult your battery dealer.

Also see the service manual **Industrial Battery**, 2240 SRM 1, for additional information on the charging and maintenance of a battery.



Specific Gravity Reading	Electrolyte Temp.	Correction Points	Correct Value
1.210	31 °C (87 °F)	+0.003	1.213
1.210	27 °C (80 °F)	+0.001	1.211
1.210	25 °C (77 °F)	0.000	1.210
1.210	18 °C (64 °F)	−0.004	1.206
+0.001 or −0.001 for each 2 degrees C from the 25-degree base value.			

Figure 43. Check Specific Gravity

Rapid Charge

The lift trucks covered in the **Operating Manual** may be equipped with one of two optional Rapid Charge Systems: The Basic Rapid Charge System or the Integrated (Quick Connect) Rapid Charge System.

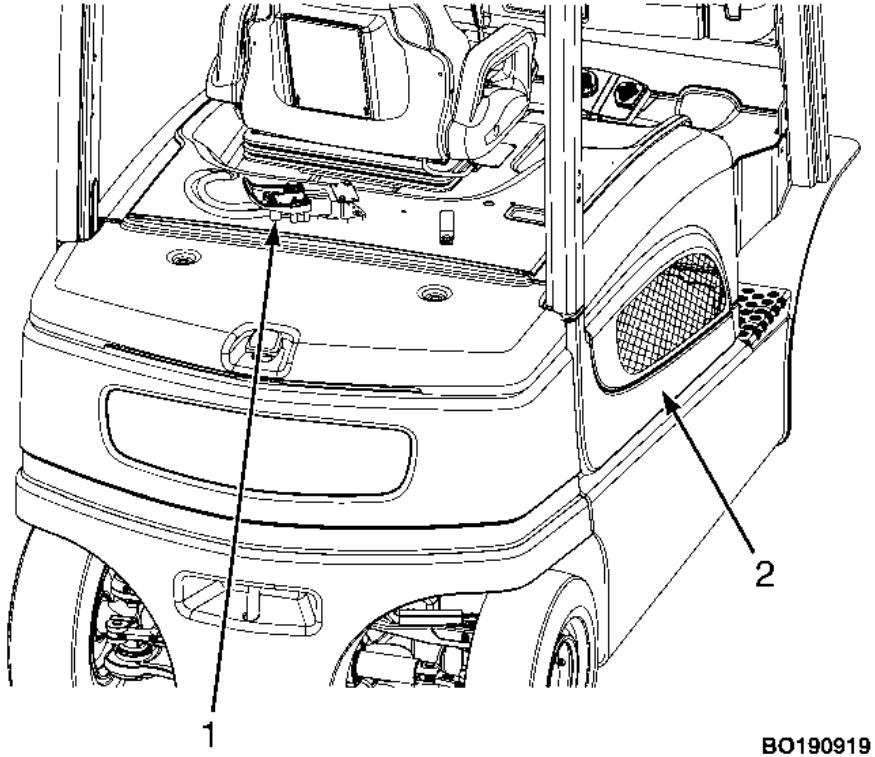
On lift trucks equipped with either Rapid Charge System, the battery is charged during operator breaks or when the lift truck is not being used. Both systems provide extended operation with a single battery. Connect or disconnect battery from the Rapid Charge System using connectors shown in **Figure 44** and **Figure 45**.

Features of the Basic Rapid Charge System include (see **Figure 44**):

- Battery connector externally mounted for easy access.
- Vented side covers for improved battery cooling.
- Requires rapid charge vented battery and sealed battery fan box with thermostat.

Features of the Integrated (Quick Connect) Rapid Charge System include (see **Figure 45**):

- Power cables from hood mounted connector are wired to the existing truck battery connections, eliminated the need to run cables from the battery to the top side of hood.
- The Integrated Rapid Charge System easily supports rapid, fast, and convenient charging.
- Cut outs in the battery compartment side panel are standard with the Integrated Rapid Charge System and help support vented tray batteries and batteries with side-mounted cooling fans.
- An interlock switch on the hood mounted connector housing door prevents truck from being operated during charging.

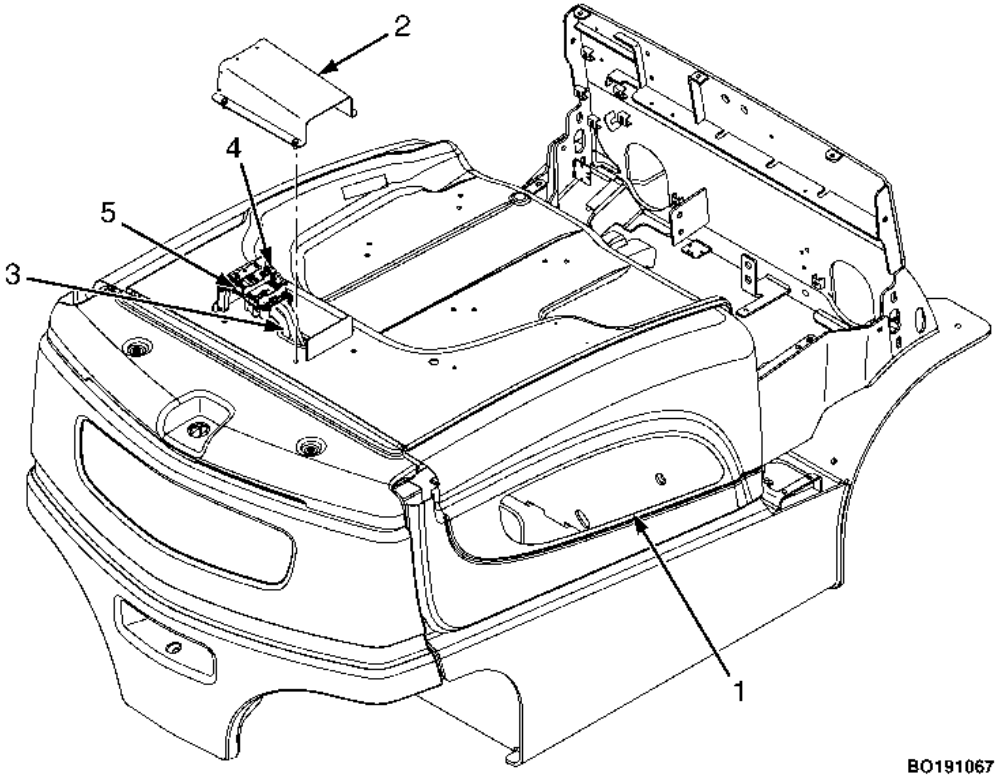


1. RAPID CHARGE CONNECTOR
2. VENTED SIDE COVER

Figure 44. Basic Rapid Charge System

Maintenance

HYSTER



1. SIDE PANEL CUT OUT
2. CONNECTOR COVER (HOUSING)
3. BATTERY CABLES
4. INTERLOCK SWITCH
5. BATTERY CONNECTOR

Figure 45. Integrated (Quick Connect) Rapid Charge System

How to Change Batteries

General

WARNING

Batteries are heavy and can cause an injury. Use care to avoid injury. DO NOT put hands, arms, feet and or legs between the battery and a solid object.

Make sure the capacity of the crane and spreader bar is greater than the weight of the battery. The weight of the battery is normally shown on the battery case. The maximum battery weight is shown on the lift truck Nameplate. The spreader bar must NOT be made of metal or it must have insulated straps.

The replacement battery must fit the battery area correctly. Adjust the front spacer plate to prevent battery movement in the battery compartment. Make sure that the battery voltage and weight of the replacement battery is correct as shown on the Nameplate.

Before connecting the battery, make sure the key or keyless switch is in the OFF position and the Automatic Parking Brake is set.

CAUTION

Batteries must be discarded according to local environmental regulations.

Battery Exchange Stacker, Battery Replacement

The battery exchange stacker is a special tool for removing and installing batteries.

NOTE: Before operating Stacker, read and understand the Stacker Operating Manual. Lift Trucks using a battery stacker require the battery to sit on a battery tray. The battery and tray are removed from and installed to lift trucks as a unit.

NOTE: See Stacker Operating Manual for fork face adjustments.

1. Remove the forward fork stop from the battery tray using following steps:

a. Remove the battery from the tray using a crane and spreader bar.

b. Raise or turn tray upside down.

c. Remove nut, washer, bolt, and forward fork stop. See **Figure 49**.

d. Lower or turn tray right side up.

e. Install the battery in the tray.

Hinged Battery Door

1. Follow steps below to remove battery from lift truck:

a. Ensure steer wheels for battery replacement lift truck are straight and centered to avoid contact with hinged battery door.

b. Before removing the battery, the hood must be raised to the full upright position. See **Hood Latch and Hood Release Handle** for procedures.

c. Disconnect the battery connector and move it to a position where it will not be damaged during battery remove/install.

d. Open hinged door by lifting up on door release lever and opening hinged door. See **Figure 46**.

e. Swing hinged door as far as possible (150°).

f. Slide the lever by pushing the pin, and rotate battery retention plate to the UP position.

g. Release vertical retention pin by pulling backward.

h. Raise the forks of the stacker enough to enter the battery compartment. Ensure forks are spaced to insert into fork pockets. See **Figure 48**.

i. Steer stacker forward until forks can enter lift truck battery compartment. Make sure forks are centered in battery compartment.

j. Move forward until fork tips hit fork stop (item 2, **Figure 49**) or fork face contacts battery.

k. Raise forks and battery in tray approximately 120 mm (4.7 in.) to clear the frame, then back out of the battery compartment. Make sure battery is against fork face.

l. Using stacker, transport battery and tray to charging/storage area.

m. Place battery in tray on battery stand. See **Figure 50**. Remove stacker.

2. Follow steps below to install battery in lift truck:

a. Position stacker with forks pointing toward battery stand.

b. Move forward until fork tips hit fork stop (item 2, **Figure 49**) or fork face contact battery.

c. Raise battery in tray away from battery stand. Make sure battery is against fork face.

d. Back stacker away from battery stand; then transport battery in tray to lift truck requiring battery installation.

e. Ensure hinged battery door is open all the way (150°).

f. Position stacker with forks facing lift truck battery compartment and move stacker forward, placing battery in tray in battery compartment.

g. Lower battery in tray into position and reverse stacker out of compartment.

h. Connect battery connector.

i. Secure horizontal and vertical battery retention mechanisms.

j. Push on hinged battery door to release tension on door spring; close and latch hinged battery door.

Lift Out Battery Door

1. Follow steps below for battery removal:

a. Before removing the battery, the hood must be raised to the full upright position. See **Hood Latch and Hood Release Handle** .

b. Disconnect the battery connector and move it to a position where it will not be damaged during battery remove/install.

c. Remove lift out battery door by lifting until the bracket rods slide sideways through the notches in the frame channel. See **Figure 47**.

d. Slide the lever by pushing the pin, and rotate battery retention plate to the UP position.

e. Release vertical retention pin by pulling backward.

f. Raise the forks of the stacker enough to enter the battery compartment. Ensure forks are spaced to insert into fork pockets. See **Figure 48**.

g. Steer stacker forward until forks can enter lift truck battery compartment. Make sure forks are centered in battery compartment.

h. Move forward until fork tips hit fork stop (item 2, **Figure 49**) or fork face contacts battery.

i. Raise forks and battery in tray approximately 120 mm (4.7 in.) to clear the frame, then back out of the battery compartment. Make sure battery is against fork face.

j. Using stacker, transport battery and tray to charging/ storage area.

k. Place battery in tray on battery stand. See **Figure 50**. Remove stacker.

2. Follow steps below to install battery in lift truck:

a. Position stacker with forks pointing toward battery stand.

b. Move forward until fork tips hit fork stop (item 2, **Figure 49**) or fork face contact battery.

c. Raise battery in tray away from battery stand. Make sure battery is against fork face.

d. Back stacker away from battery stand; then transport battery in tray to lift truck requiring battery installation.

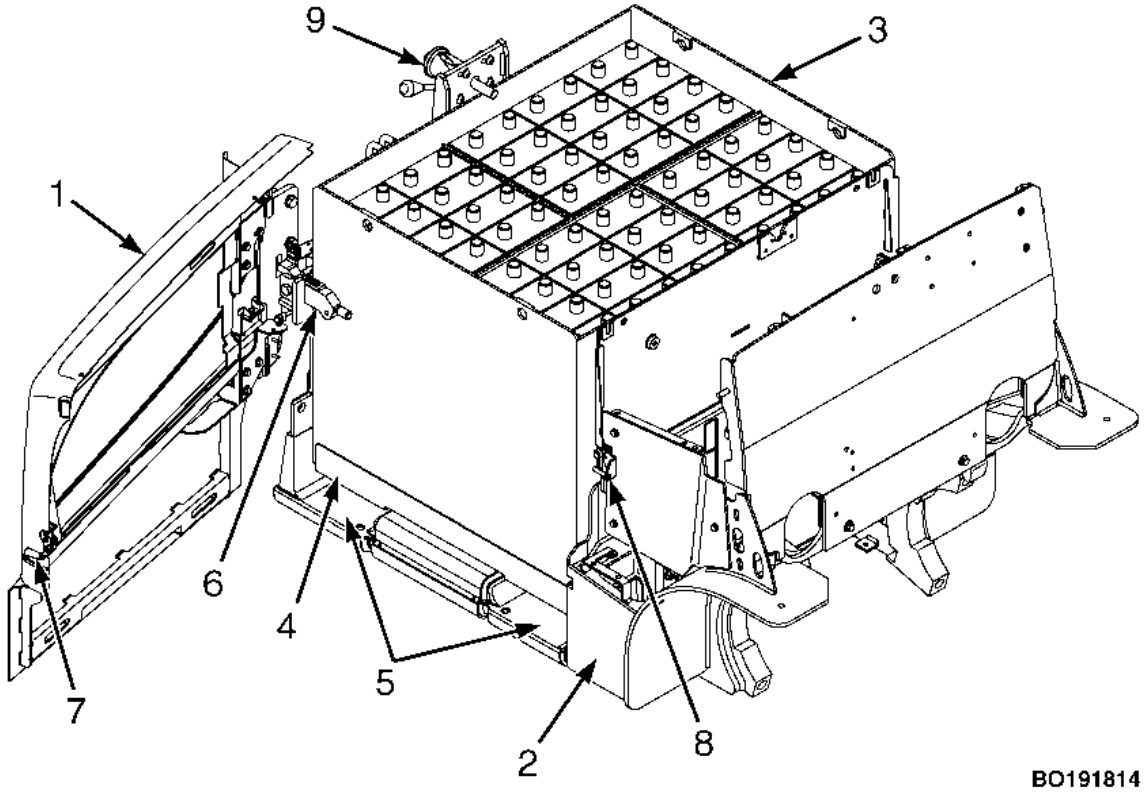
e. Position stacker with forks facing lift truck battery compartment and move stacker forward, placing battery in tray in battery compartment.

f. Lower battery in tray into position and reverse stacker out of compartment.

g. Connect battery connector.

h. Secure horizontal and vertical battery retention mechanisms.

i. Install lift out battery door.



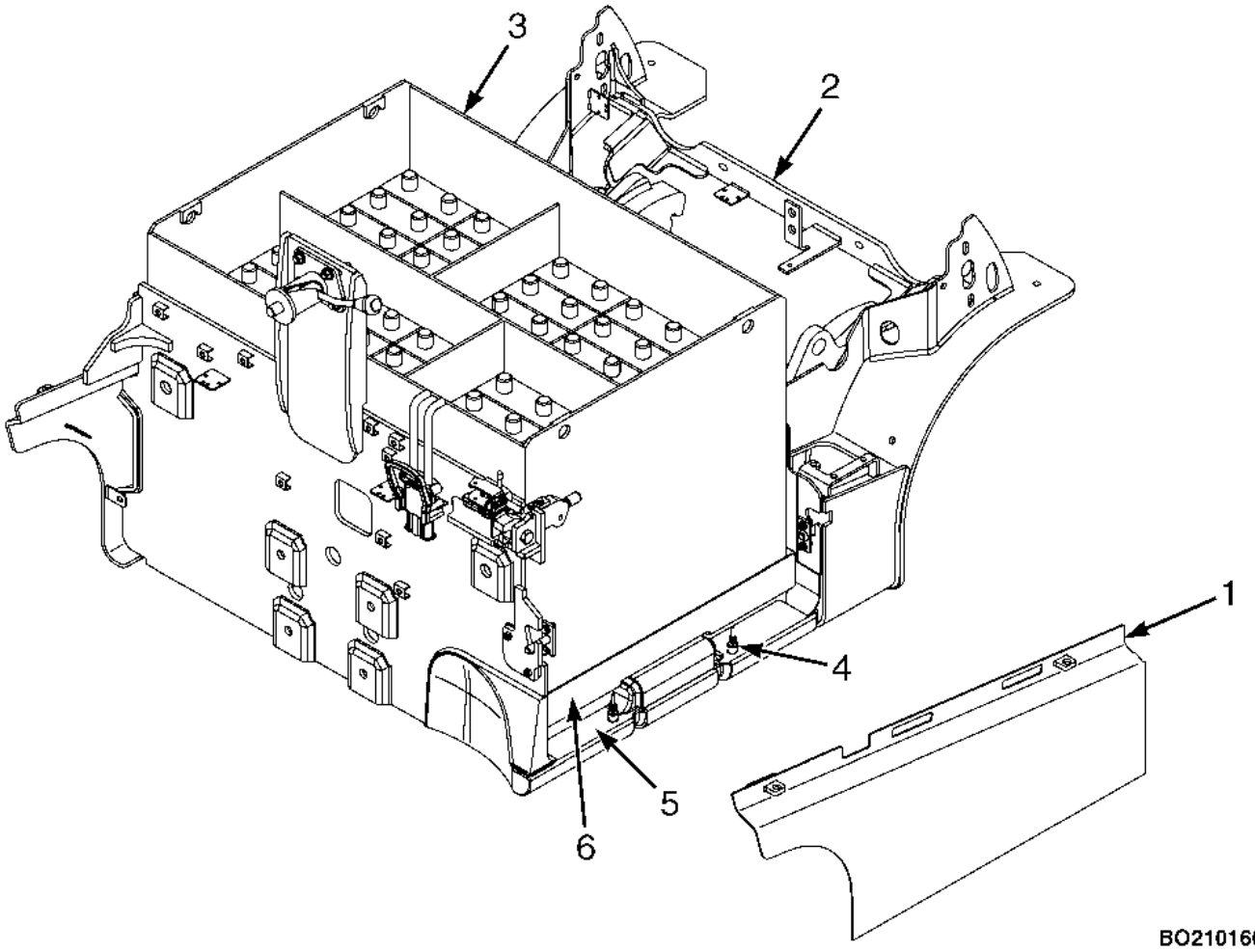
NOTE: LATE VERSION BATTERY RETENTION SHOWN.

1. HINGED BATTERY DOOR
2. RIGHT FRAME CHANNEL
3. BATTERY
4. FORKLIFT REMOVAL TRAY
5. FORK POCKET
6. HORIZONTAL RETENTION
7. HINGED DOOR LATCH
8. HINGED DOOR RELEASE LEVER
9. VERTICAL RETENTION

Figure 46. Hinged Battery Door and Fork Pockets

Maintenance

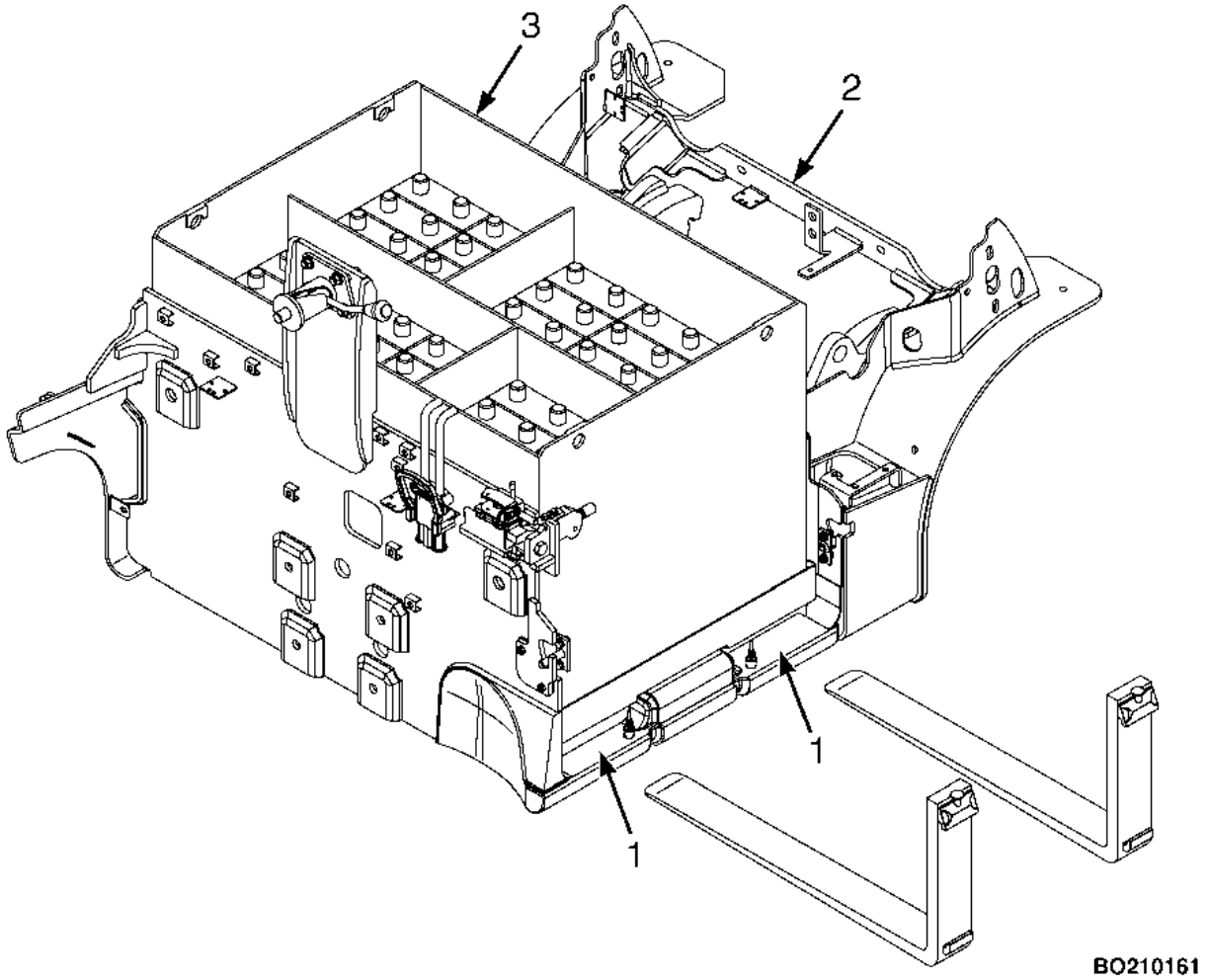
HYSTER



NOTE: LATE VERSION BATTERY RETENTION SHOWN.

1. LIFT OUT BATTERY DOOR
2. FRAME
3. BATTERY
4. FORK POCKET
5. BATTERY TRAY

Figure 47. Lift Out Battery Door and Fork Pockets



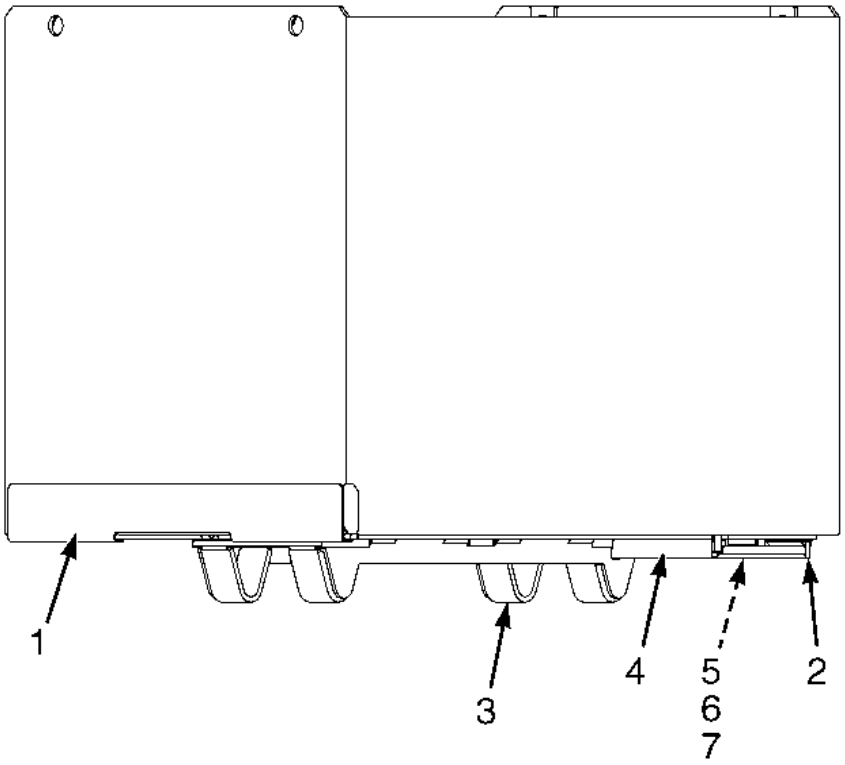
NOTE: LIFT TRUCK WITH LIFT OUT BATTERY DOOR SHOWN, LIFT TRUCK WITH HINGED BATTERY DOOR SIMILAR. LATE VERSION BATTERY RETENTION SHOWN.

1. FORK POCKETS

Figure 48. Battery Removal, Fork Placement

Maintenance

HYSTER



1. TRAY
2. FORK STOP
3. SUPPORT PLATES
4. FORWARD FORK STOP
5. NUT
6. WASHER
7. BOLT

Figure 49. Battery Tray with Battery

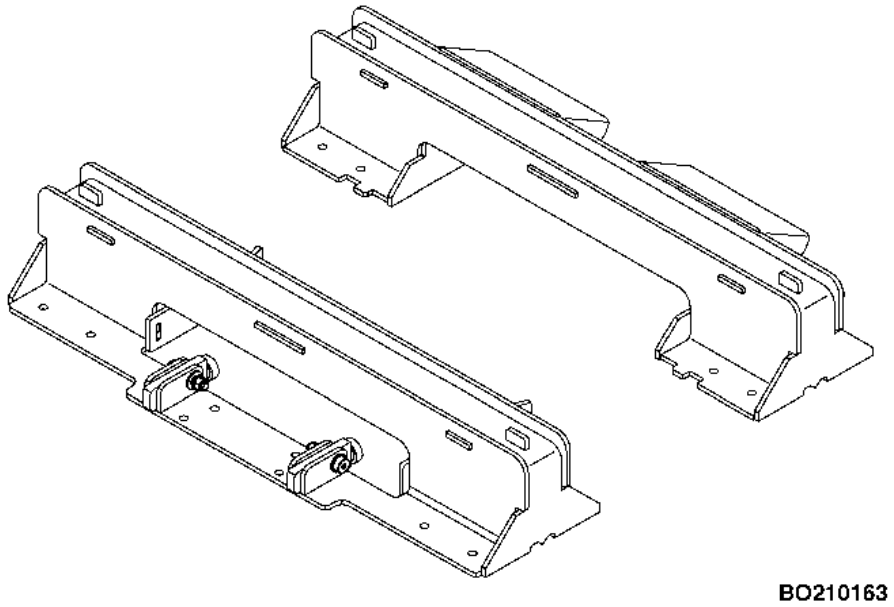


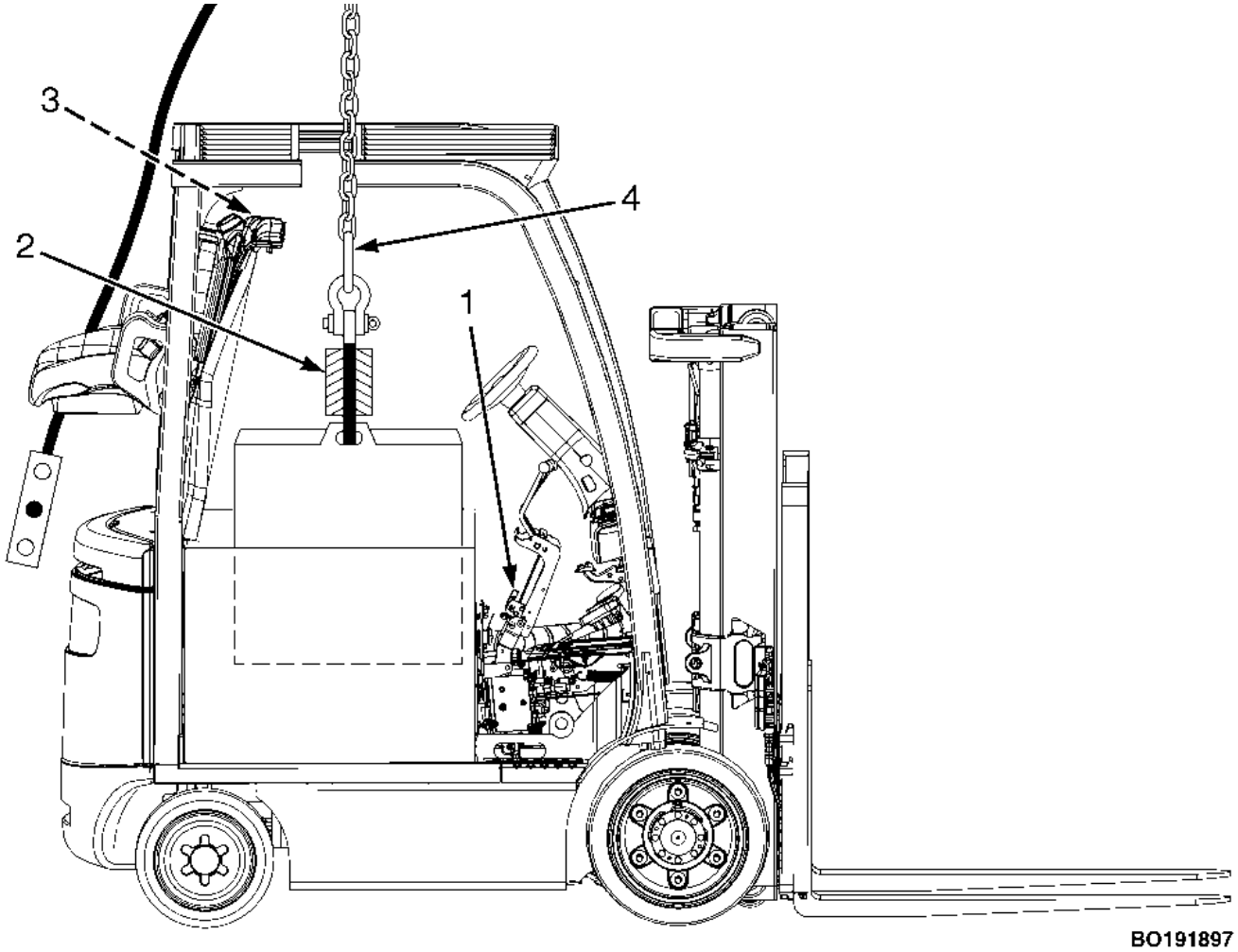
Figure 50. Battery Stand

Remove the Battery, Standard Battery Restraint System

1. Before removing the battery, the hood must be raised to the full upright position. See **Hood Latch and Hood Release Handle** for procedures.

2. Disconnect the battery connector and move it to a position so that it will not be damaged during battery removal. Lift the side panels to remove them.

3. If lift truck is equipped with a standard battery restraint system, use a spreader bar and crane to lift the battery from the lift truck. See **Figure 51**.



1. CONTROL LEVERS RELEASE HANDLE
2. SPREADER BAR
3. SEAT ADJUSTMENT HANDLE
4. CRANE

Figure 51. Battery Removal - Standard Battery Restraint

WARNING

Be sure that any platform used to slide the battery onto can support the weight of the battery. See the Name-plate for battery weight. Serious injury to personnel and damage to the lift truck and battery can result if the platform can not support the weight of the battery.

4. If lift truck is equipped with an optional battery restraint system with side rollers:

a. Remove the battery gate by lifting until the bracket rods slide sideways through the notches in the frame channel.

b. Slide the lever by pushing the pin, and rotate battery retention plate to the UP position.

c. Slide the battery out of the battery compartment onto a suitable platform that can support the weight of the battery. See **Figure 52** and **Figure 53**.

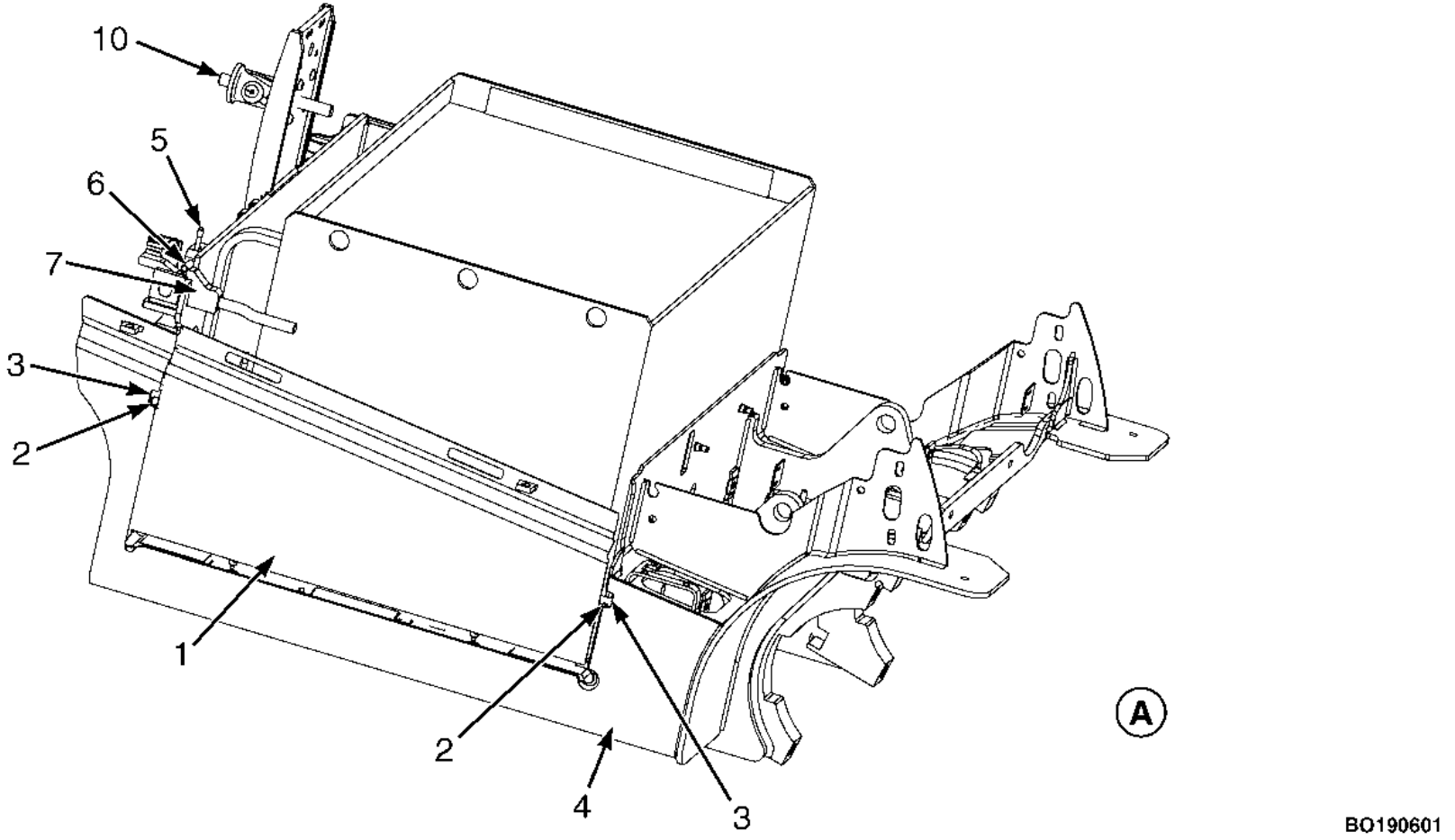


Figure 52. Battery Removal - Optional Battery Restraint System for Lift Trucks Manufactured Prior to June, 2016 (Sheet 1 of 2)

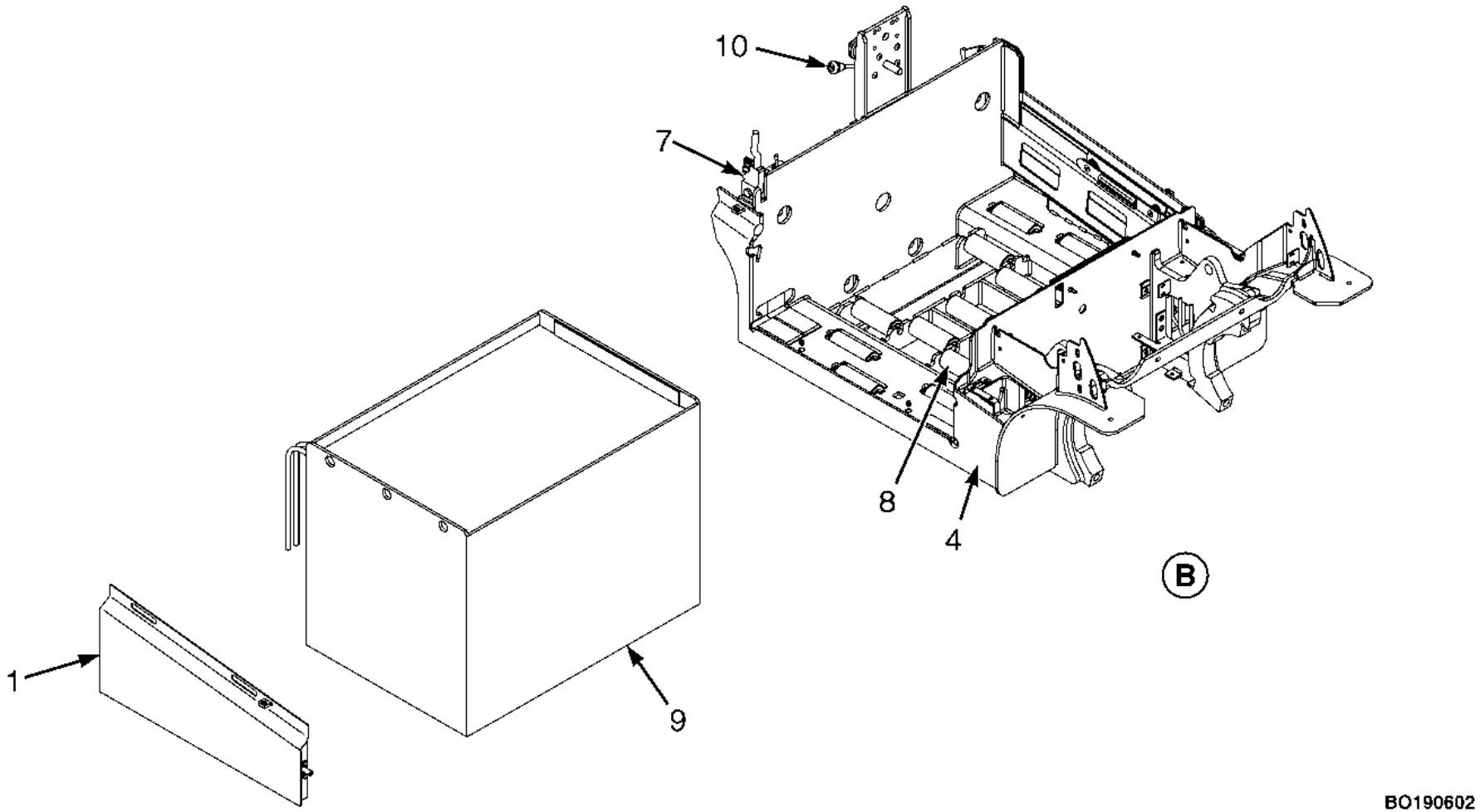


Figure 52. Battery Removal - Optional Battery Restraint System for Lift Trucks Manufactured Prior to June, 2016 (Sheet 2 of 2)

Legend for Figure 52

A. BATTERY LOADED

1. BATTERY GATE
2. BRACKET RODS
3. NOTCHES
4. RH FRAME CHANNEL
5. PIN

B. BATTERY UNLOADED

6. LEVER
7. BATTERY RETENTION PIN
8. SIDE ROLLER
9. BATTERY

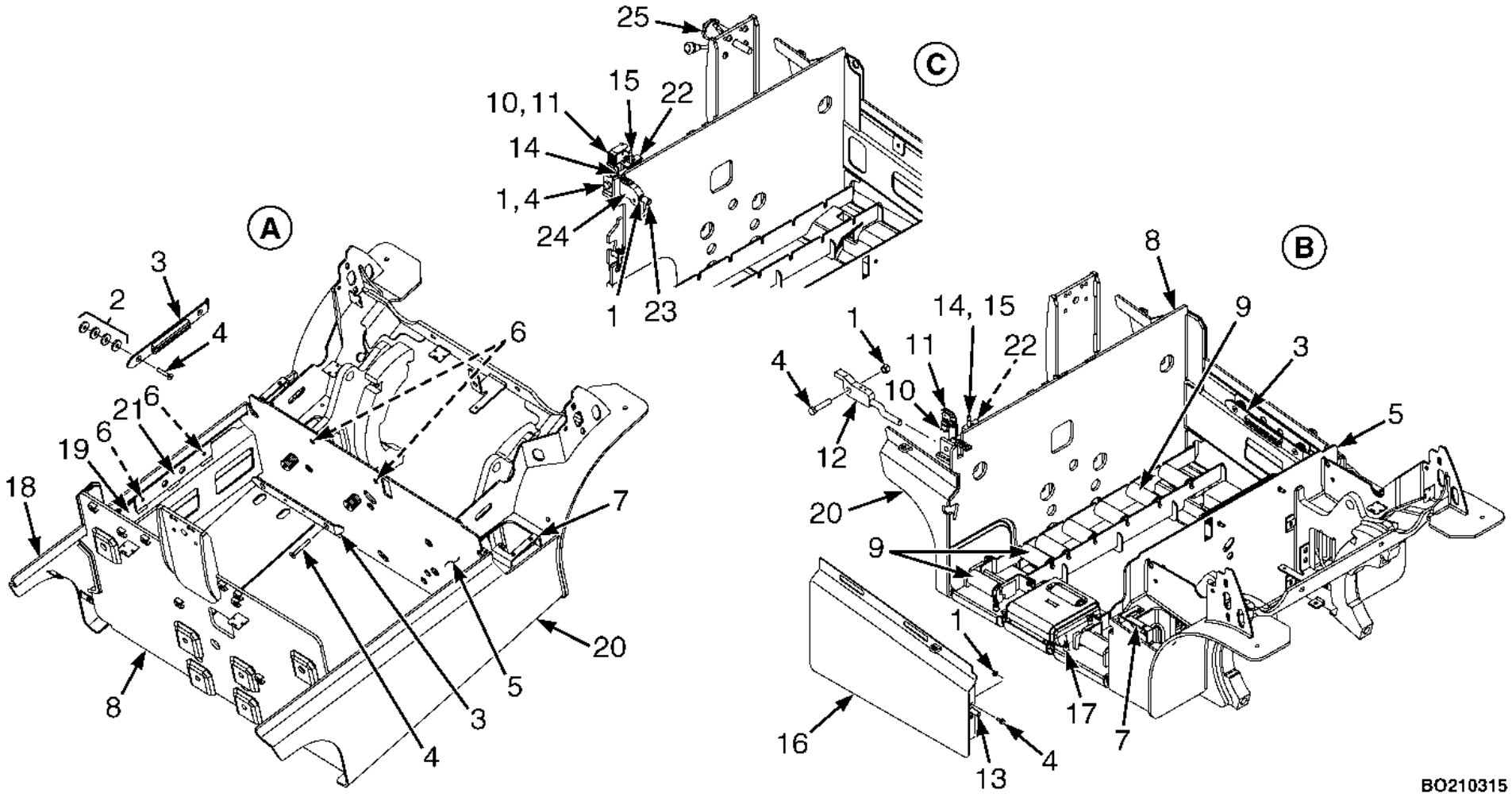


Figure 53. Battery Removal - Optional Battery Restraint System Manufactured After June, 2016

Legend for Figure 53

NOTE: BOTH STANDARD AND OPTIONAL VERSIONS SHOWN.

A. STANDARD COMPONENTS - VERTICAL BATTERY REMOVAL
B. OPTIONAL COMPONENTS - HORIZONTAL BATTERY REMOVAL (EARLY VERSION BATTERY RETENTION)
C. OPTIONAL COMPONENTS - HORIZONTAL BATTERY REMOVAL (LATE VERSION BATTERY RETENTION)

1. NUT
2. SPACER
3. BATTERY SPACER PLATE
4. CAPSCREW
5. FRONT BULKHEAD
6. INSERT
7. SIDE STEP MOUNTING BRACKET
8. REAR BULKHEAD
9. BATTERY ROLLERS
10. MAGNET
11. BATTERY GATE SWITCH
12. BATTERY RETENTION PLATE
13. BRACKET
14. PIN
15. LEVER
16. BATTERY GATE
17. BULLET ISOLATOR
18. LEFT FRAME CHANNEL
19. INNER FRAME CHANNEL
20. RIGHT FRAME CHANNEL
21. BATTERY SPACER PLATE MOUNTING BRACKET
22. SPRING
23. PIN - BATTERY RELEASE
24. HANDLE
25. VERTICAL RETENTION

Install the Battery

WARNING

Correct operation of the battery restraint system without rollers requires that the battery does not move more than 13 mm (0.50 in.) in any horizontal direction.

Correct operation of the battery restraint system with rollers requires that the battery does not move more than 2 mm (0.039 in.) in any horizontal direction.

Make sure the battery spacer plate is correctly adjusted. Serious injury to personnel can occur if battery spacer plate is not adjusted correctly.

1. When a replacement battery is installed, make sure the battery fits the battery compartment width with a maximum of 13 mm (0.50 in.) clearance for battery restraint systems without rollers or 2 mm (0.039 in.) clearance for battery restraint system with rollers. See **Figure 54**. If lift truck is equipped with a standard battery restraint system, use a spreader bar and crane to place the battery into the battery compartment. See **Figure 51**.

2. If lift truck is equipped with an optional battery restraint system with side rollers:

a. Slide the battery off of the support platform and onto the rollers that are in the battery compartment.

b. Rotate the battery retention plate to the DOWN position; ensure lever slides into position. See **Figure 52** and **Figure 53**.

c. Install battery gate by sliding bracket rods sideways into the notches in the frame channel and lowering the battery gate.

3. For battery restraint system without rollers, adjust the spacer plate to prevent the battery from moving more than a total of 13 mm (0.50 in.) forward or backward. There must be enough clearance for battery removal.

For battery restraint system with rollers, adjust the spacer plate to prevent the battery from moving more than a total of 2 mm (0.039 in.) forward or backward. There must be enough clearance for battery removal.

See **Figure 54**.

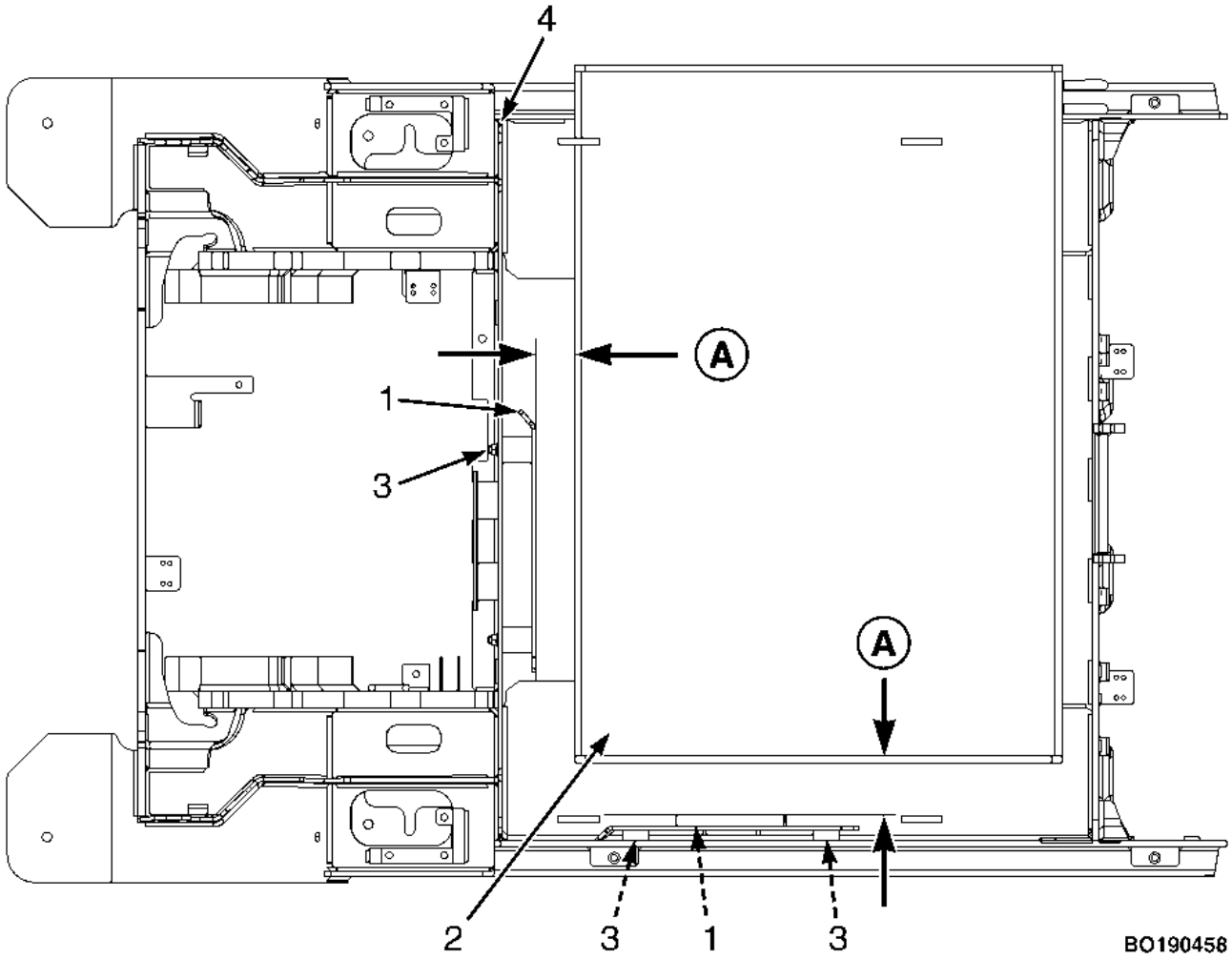
4. Connect the battery connector.

5. On lift trucks equipped with Outdoor Protection/Wash-down Package, spray battery connector terminals with rust inhibitor-ignition sealer after battery terminal connections are properly tightened.

6. Install side panels.

7. Close the hood. See **Hood Latch and Hood Release Handle** for procedures. After hood is securely latched, slide seat to desired position.

8. If lift truck is equipped with E-Hydraulic mini-levers, adjust the armrest if it was moved prior to raising the hood. If lift truck is equipped with manual hydraulic control levers, push the manual hydraulic control lever assembly towards the hood. The lever assembly will click once and lock into place.



A. FOR BATTERY RESTRAINT SYSTEM WITHOUT ROLLERS, 13 MM (0.50 IN.) MAXIMUM
FOR BATTERY RESTRAINT SYSTEM WITH ROLLERS, 2 MM (0.039 IN.) MAXIMUM

1. SPACER PLATE
2. BATTERY
3. ADJUSTMENT CAPSCREW
4. BULKHEAD

Figure 54. Battery Compartment Spacers

Battery Replacement, Forklift Removal System

⚠ WARNING

To avoid injury and to prevent damage to battery and lift truck, be sure that any lift truck used to remove the battery from another lift truck has enough lifting capacity to safely remove the battery. See the Name-plate for lifting capacity.

1. Follow steps below for battery removal:

a. Before removing the battery, the hood must be raised to the full upright position. See **Hood Latch and Hood Release Handle**.

b. Disconnect the battery connector and move it to a position where it will not be damaged during battery remove/install.

c. If lift truck is equipped with hinged battery door, ensure steer wheels of the battery replacement lift truck are straight and centered to avoid contact with hinged battery door.

d. If lift truck is equipped with a lift out battery door, remove the battery door by lifting until the bracket rods slide sideways through the notches in the frame channel. See **Figure 47**.

e. If lift truck is equipped with a hinged battery door, open hinged door by lifting up on door release and opening battery door. See **Figure 46**.

f. Swing hinged battery door as far as possible (150°) until it locks in the open position.

g. Slide the lever by pushing the pin, and rotate battery retention plate to the UP position.

h. Ensure forks of lift truck are spaced to insert into fork pockets. See **Figure 48**.

i. If the forks are longer than 1000 mm (39.4 in.), remove the forward fork stop following steps below:

(1) Remove the battery from the tray using a crane and spreader bar.

(2) Raise or turn tray upside down.

(3) Remove nut, washer, bolt, and forward fork stop. See **Figure 49**.

(4) Lower or turn tray right side up.

(5) Install the battery in the tray.

j. Insert forks until the end rests against the fork stop. See **Figure 49**.

k. Raise the forks approximately 120 mm (4.7 in.) to clear the frame.

l. Tilt mast back to ensure batter is level.

m. Reverse lift truck until tray is clear of the battery compartment.

n. Lower tray with battery until tray support plates are on the ground.

o. Lower forks and move lift truck forward until the battery is positioned against the face of the forks.

p. Lift forks and transport tray with battery to battery charging/storage area.

q. Lower tray with battery so that the support plates are on the ground. See **Figure 49**.

2. Follow steps below for battery installation:

a. Using lift truck raise tray with battery from the ground or battery stand. Make sure battery is positioned against face of forks.

b. Transport tray with battery to lift truck requiring battery installation.

c. Set tray with battery on the ground and reverse lift truck until forks clear forward fork stop or fork stop.

d. Raise forks slightly and pull forward until forks hit fork stop or forward fork stop.

e. Lift tray, make sure forks are centered in fork pockets and tray with battery centered in compartment. Ensure the battery is level.

f. If lift truck requiring battery installation is equipped with hinged battery door, ensure steer wheels are straight and centered to avoid contact with hinged battery door.

g. If lift truck requiring battery installation is equipped with a hinged battery door, be sure the door is open all the way (150°).

h. Move lift truck forward, place tray in compartment, lower battery, and reverse lift truck out of the way.

i. Connect battery connector.

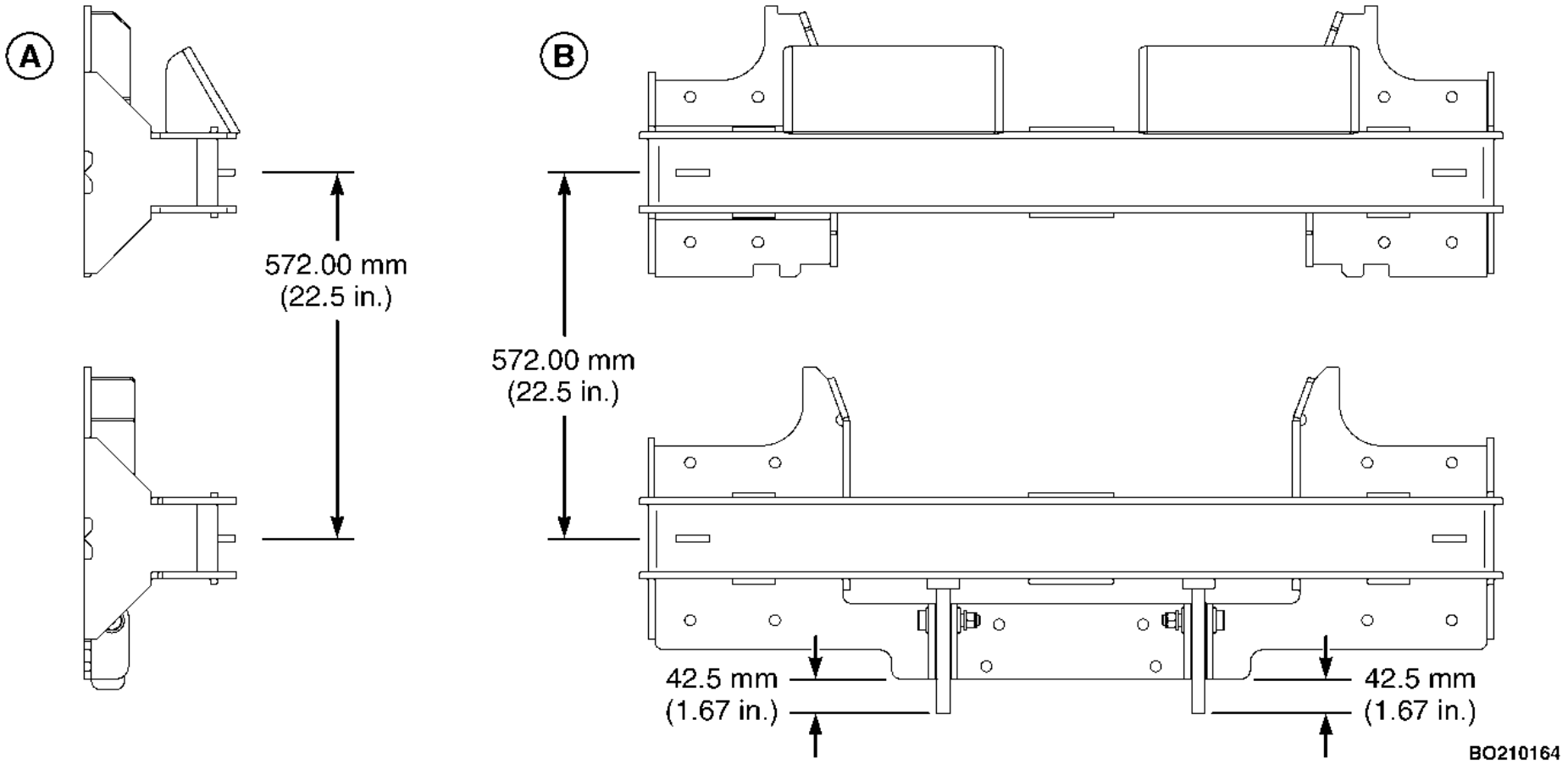
j. Secure battery retention mechanism.

k. Install lift out battery door if equipped.

l. If lift truck is equipped with hinged battery door, push on hinged battery door to release tension on door spring and then close and latch hinged battery door.

Battery Stand Set-up

The supports need to be placed on the floor in the configuration shown in **Figure 55**. They must be bolted to the floor for stability. Usage of this system requires two battery stands.



A. SIDE VIEW
B. TOP VIEW

Figure 55. Battery Stand Set-up

Tires and Wheels

Snap-On Solid Rubber Tires

⚠ WARNING

Wheels must be changed and tires repaired by trained personnel only.

Always wear safety glasses.

Lift truck tires and wheels are very heavy. Use caution when removing or installing tires and wheels or personal injury may occur.

NOTE: See **Capacities and Specifications** 8000 SRM 1375 for wheel and tire sizes.

1. Put the lift truck on blocks as described in **How to Put a Lift Truck On Blocks** at the beginning of this section.

2. Remove the wheel nuts and remove the wheel and tire from the lift truck. Lift truck tires and wheels are heavy.

NOTE: See **Figure 56** when you disassemble the wheels. There are several types of wheels used on these series of lift trucks.

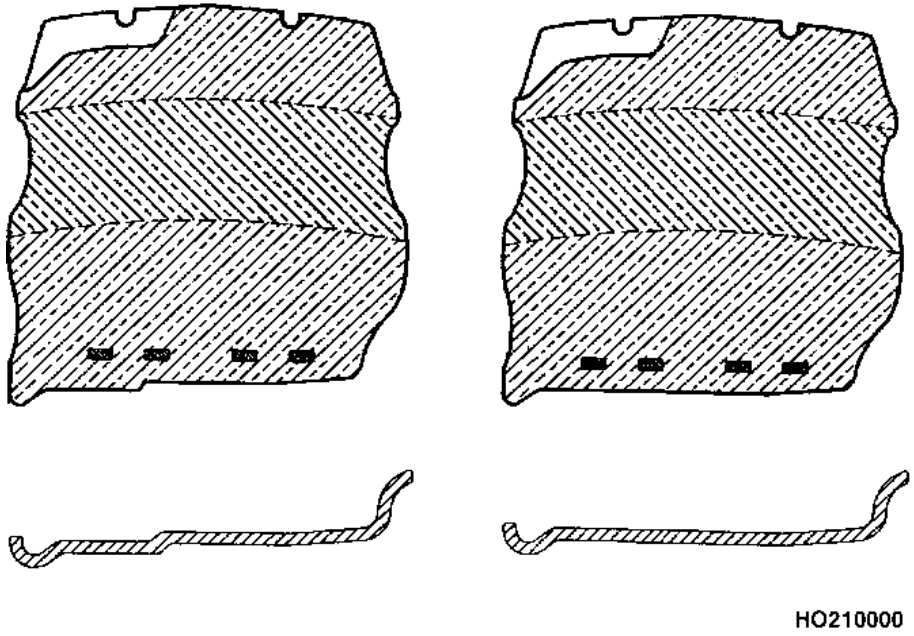


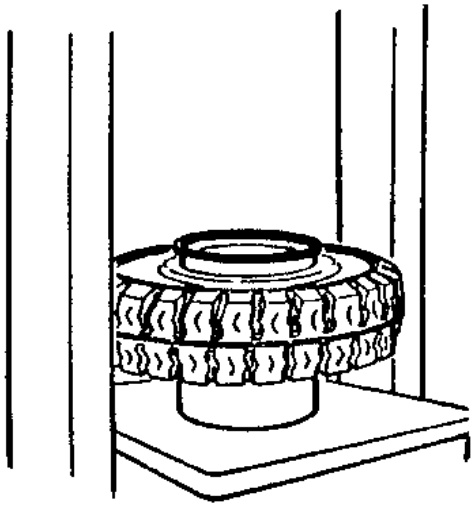
Figure 56. Snap-On Tire and Rim Specifications

Remove the Snap-On Solid Tire From the Wheel

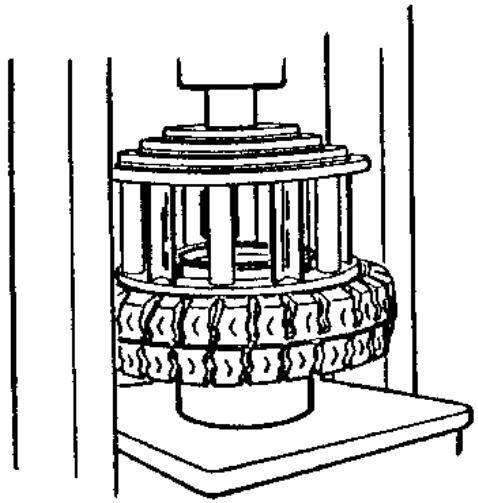
WARNING

Keep tire tools in firm contact with the wheel. If the tool slips, it can move with enough force to cause serious injury.

1. Put a support under the wheel rim. Make sure the wheel rim is at least 150 to 200 mm (6 to 8 in.) from the bed of the press.



2. Put the cage in position on the tire. Use the press to push the tire from the wheel rim.



Install the Snap-On Solid Tire on the Wheel

WARNING

Failure to follow these procedures will cause damage to the tire and wheel assembly and can cause injury.

- **Clean and inspect all parts of the wheel before installing the tire.**
- **DO NOT use any damaged or repaired wheel parts.**
- **Make sure that all parts of the wheel are the correct parts for the wheel assembly.**

- **DO NOT mix parts between different types or manufacturers of wheels.**
- **DO NOT mix type of tires, type of tire tread, or wheel assemblies of different manufacturers on any one lift truck.**

⚠ WARNING

DO NOT use a steel hammer on the wheel. Use a rubber, lead, plastic, or brass hammer to put parts together. Make sure that the side ring is in the correct position. The ends of the side ring must not touch. The clearance at the ends of the lock ring will be approximately 13 to 25 mm (0.5 to 1.0 in.) after it is installed. If the clearance is wrong, the wrong part has been used.

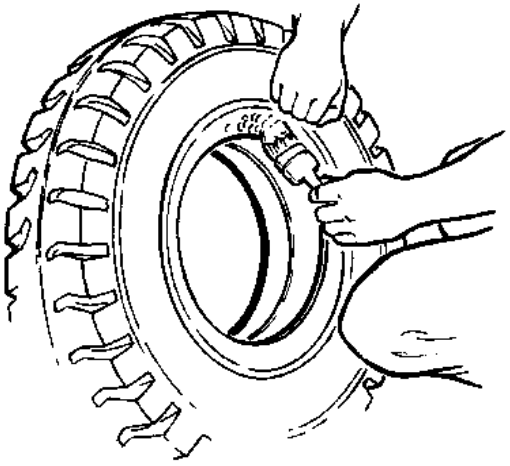
⚠ CAUTION

Too much lubricant can cause the tire to slide and move around the wheel rim.

NOTE: When wheels are disassembled, see **Figure 56**. There are several types of wheels used on this series of lift trucks.

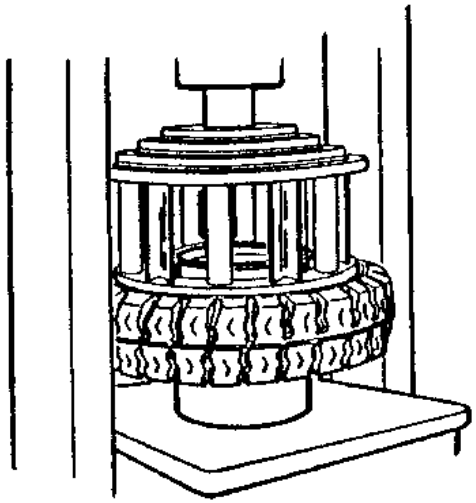
⚠ WARNING

Keep tire tools in firm contact with the wheel. If the tool slips, it can move with enough force to cause serious injury.



1. Lubricate the wheel rim and the inner surface of the tire with tire lubricant.

2. Put the wheel rim on the bed of the press. Put the tire over the wheel rim. Put the cage in position on the tire. Use the press to install the tire on the wheel rim.



Install Snap-On Solid Tire and Wheel on Lift Truck

WARNING

Lift truck tires and wheels are very heavy. Use caution when removing or installing tires and wheels or personal injury may occur.

1. Install wheel assembly on lift truck.

2. Install and tighten wheel nuts in a diametric pattern. Tighten steering wheel nuts to 155 to 175 N•m (114 to 130 lbf ft). Tighten drive wheel nuts to 339 to 380 N•m (250 to 280 lbf ft).

3. Remove lift truck from blocks.

How to Put an Electric Sit Down Rider Truck in Storage

To prevent problems, the lift truck must be correctly serviced and maintained during storage.

Components that need extra care during storage are electric motors, hydraulic components, and electric truck batteries.

Electric trucks can best be protected by being operated for a short period of time each month.

Before any lift truck is put in storage, you must choose an area which is clean, dry, and free from dust or fumes in the air that can harm the lift truck.

Electric drive motors must be operated to keep them free of rust and dirt caused by condensation over periods when the truck is not used. Operate the truck with the motor at its normal temperature for at least five minutes.

This operating period will also allow the Motor Controller to remove any moisture in the control area.

For safety and increased floor space, it is recommended remove the forks and tag them with the truck serial number.

Before operating a truck each month, make a visual inspection for leaks or signs of wear or damage. Take care of any problems immediately. Also, check the fluid level in the hydraulic tank and brake master cylinder.

Electric trucks must not have batteries installed during storage. A fully-charged battery must be available to operate the lift truck.

CAUTION

Do not use a battery charger as a power source for any reason.

All hydraulic cylinders must be put through a complete operation cycle several times each month. This will help keep the seals active and coat the interior walls with oil. Operate each cylinder, to the stop in both directions.

To protect the tilt cylinder rods, park your truck with the mast tilted fully backward (cylinders fully retracted).

When parked, with the power off, operate each control handle to release hydraulic pressure.

Masts are to be stored fully lowered.

Coat any exposed part of all cylinder rods with SAE 30 or SAE 40 engine oil.

Put blocks at the front and rear of a drive tire when parked - do not apply the Automatic Parking Brake.

How to Put Batteries in Storage

Batteries are to be placed on a wood pallet and put in storage in a dry, cool area.

Lead acid batteries will slowly 'self-discharge' over a period of time due to their chemical properties. If the self-discharge is not controlled, too much sulfation can occur which is difficult to reduce and can damage the plates. A discharged battery with a specific gravity of 1,100 will freeze at −7.8 °C (18 °F). A fully-charged battery with a specific gravity of 1.280 will freeze at −66 °C (−86.8 °F).

This 'self-discharge' is due to chemical action; therefore, that chemical action can be accelerated by heat resulting in a more rapid 'self-discharge.' The rate of discharge can be an average of about 0.001 point drop in specific gravity each day.

The following procedure must be followed when placing a battery in storage or when it is not in operation for more than 30 days.

1. Perform equalizing charge before placing new batteries in storage. Used batteries must be fully charged and allowed to balance for approximately three more hours.

2. Neutralize and clean the battery. Clean with a solution of 500 mL of baking soda in one 4.0 L of water.

3. Put the battery in a cool, dry location for storage.

4. Check each cell in the battery at least once every 30 days and give an additional charge when specific gravity falls below 1.240.

5. Protect batteries from getting dirty.

If a greasy film forms on the top of a battery, it is acid and must be neutralized with the baking soda solution described above.

Battery chargers must be disconnected from the AC power source when not in use.

How to Put a Lift Truck Back Into Service

Electric lift trucks are best protected by being operated for a short period of time each month as stated in the section **How to Put an Electric Sit Down Rider Truck in Storage**. Before returning an electric lift truck to service, perform the following checks:

1. Install battery into lift truck. See the section **How to Change Batteries** in this maintenance section for procedures. If a new battery will be installed, give an equalizing charge before using. If a used battery will be installed, it must be fully charged and allowed to balance for approximately three hours before using.

2. If the forks were removed, install forks.

3. Operate the truck with the traction motor at its normal temperature for at least five minutes. This will clean any dirt or rust, caused by condensation, from the drive motor.

4. Operate the hydraulic cylinders through a complete operation cycle to coat the interior walls with oil. Operate each cylinder to the stop in both directions.

5. Check all fluid levels.

6. Check condition of tires.

How to Move a Lift Truck on a Transport

Before the lift truck is moved on a transport, check the selected route to make sure there is enough clearance for the lift truck as loaded on the transport vehicle. Bridges, overpasses, powerlines, and natural barriers can prevent clearance. Removal of the mast can be necessary.

If a trailer is the method of transportation, use blocks in front and back of the trailer tires to prevent movement of the trailer when the lift truck is loaded and unloaded. If a loading ramp is used, make sure that the ramp is the correct design and capacity.

If the lift truck is equipped with lifting eyes, use a crane to load and unload the lift truck from the transport. If the truck is not equipped with approved lifting eyes, do not lift the truck by attaching a lifting device to any other part of the lift truck for the purposes of loading or unloading.

Loading

If components and attachments must be removed for transport of the lift truck, see the **Service Manual** for removal procedures.

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

1. Apply the parking brake.

2. If the mast is mounted on the lift truck, fully lower the forks or carriage. Tilt the mast **FORWARD** until the tips of the forks touch the surface.

3. Turn the key switch to the **OFF** position. Check that all switches and accessories are turned off.

WARNING

The straps or chains used to fasten the lift truck to the transport must be directly connected to the lift truck frame or to a component (drive axle, tow pin) that is solidly attached to the frame. Do not fasten a strap or chain to the mast or any attachment to hold the lift truck on the transport.

CAUTION

Make sure that any straps or chains used to fasten the lift truck to the transport do not contact any tubes, hoses, hydraulic cylinders, or other parts of the truck that are easily damaged.

4. Secure the lift truck tires to the transport vehicle using straps or chains.

5. Put blocks in front and back of the lift truck tires to prevent any movement of the lift truck. Make sure the blocks are attached to the load surface.

If the lift truck is transported in severe weather or any other condition that can damage the lift truck, cover the lift truck. Make sure the protective cover is designed for the application and is securely fastened.

Unloading

If components normally attached to the lift truck were removed for transport, see the **Service Manual** for installation procedures.

1. If used, remove any protective cover.

2. Make sure the parking brake is applied.

3. Disconnect the straps or chains.

4. Remove the wheel blocks.

5. Check that all switches and accessories are turned off.

6. Unload the lift truck.

Preparation for Use

After being transported or stored, the lift truck must be prepared for use for proper operation. All problems must be corrected before use of the lift truck. See the **Service Manual** for procedures.

Preparation After Transport

1. Complete the unloading procedures.

2. Inspect the lift truck for damage and missing components.

3. Follow the steps in the section **How to Make Checks with the Key or Keyless Switch OFF**.

Changes to the Overhead Guard

⚠ WARNING

Do not operate the lift truck without the overhead guard correctly fastened to the lift truck.

Do not make changes to the overhead guard by welding or drilling. Changes that are made by welding or by drilling holes that are too big in the wrong location, can reduce the strength of the overhead guard.

See your dealer for Hyster lift trucks BEFORE performing any changes to the overhead guard.

Battery Specifications

Table 10. Battery Specifications

Model	Min. Compartment Size Length × Width	Battery Size Minimum/Maximum		Weight		Maximum Battery Height
		Length	Width	Minimum	Maximum	
J2.2-2.5XN	717 × 1034 mm (28 × 41 in.)	708 to 711 mm (27.8 to 27.9 in.)	1025 to 1028 mm (40.4 to 40.5 in.)	1480 kg (3263 lb)	1636 kg (3607 lb)	782 to 786 mm (30.8 to 30.9 in.)
J2.5-3.5XN	861 × 1034 mm (34 × 41 in.)	852 to 855 mm (33.5 to 33.6 in.)		1770 kg (3902 lb)	1956 kg (4312 lb)	

WARNING

The battery must fit the battery compartment so that the battery restraint system will operate correctly. Use only batteries with the correct length shown in this table. For lift trucks with battery restraint system without roller option, adjust the spacer plate and side spacers to prevent the battery from moving more than 13 mm (0.50 in.) forward or backward. For lift trucks with battery restraint system with the roller option, adjust the spacer plate and side spacers to prevent the battery from moving more than 2 mm (0.039 in.) forward or backward.

The tolerances of the battery compartment are +3 and −0 mm (0.118 and −0 in.). The battery size column shows the size range that will permit the battery to still fit into a battery compartment.

The battery *compartment* length is front to back. Width is side to side. The "length" dimension of the battery must fit within the battery compartment side-to-side dimension with a clearance of 13 mm (0.50 in.) maximum for lift trucks without the roller option. For lift trucks with the roller option, the maximum clearance is 2 mm (0.039 in.). Battery width must fit within the battery compartment front-to-back dimension.

Maintenance Register

Protect your investment in materials handling equipment! Keep a high-residual value in your **Hyster** lift truck! Do the maintenance according to the **Maintenance Schedule** in this **Operating Manual**.

Your dealer for **Hyster** lift trucks has the equipment and trained service personnel to do a complete program of inspection, lubrication, and maintenance.

This **Maintenance Register** is used to record the time of each periodic inspection and maintenance. The dealer's stamp or authorized signature confirms that maintenance and inspection was done at regular intervals by authorized personnel.

1. Operating Hours _____ Date _____	2. Operating Hours _____ Date _____	3. Operating Hours _____ Date _____	4. Operating Hours _____ Date _____
5. Operating Hours _____ Date _____	6. Operating Hours _____ Date _____	7. Operating Hours _____ Date _____	8. Operating Hours _____ Date _____
9. Operating Hours _____ Date _____	10. Operating Hours _____ Date _____	11. Operating Hours _____ Date _____	12. Operating Hours _____ Date _____
13. Operating Hours _____ Date _____	14. Operating Hours _____ Date _____	15. Operating Hours _____ Date _____	16. Operating Hours _____ Date _____

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HYSTER

17. Operating Hours _____ Date _____	18. Operating Hours _____ Date _____	19. Operating Hours _____ Date _____	20. Operating Hours _____ Date _____
21. Operating Hours _____ Date _____	22. Operating Hours _____ Date _____	23. Operating Hours _____ Date _____	24. Operating Hours _____ Date _____
25. Operating Hours _____ Date _____	26. Operating Hours _____ Date _____	27. Operating Hours _____ Date _____	28. Operating Hours _____ Date _____
29. Operating Hours _____ Date _____	30. Operating Hours _____ Date _____	31. Operating Hours _____ Date _____	32. Operating Hours _____ Date _____
33. Operating Hours _____ Date _____	34. Operating Hours _____ Date _____	35. Operating Hours _____ Date _____	36. Operating Hours _____ Date _____
37. Operating Hours _____ Date _____	38. Operating Hours _____ Date _____	39. Operating Hours _____ Date _____	40. Operating Hours _____ Date _____
41. Operating Hours _____ Date _____	42. Operating Hours _____ Date _____	43. Operating Hours _____ Date _____	44. Operating Hours _____ Date _____

NO MATTER HOW YOU SAY IT . . .

La Sécurité Ça Se Paye
La Seguridad Compensa
Betriebssicherheit Macht Sich Bezahlt
Passaa Oll Huolellinen
Veiligheid Voor Alles
Säkerhet Först
Essere Sicuro Paga
Seguranca Paga
Sikkerhet Først
Pinter Be Awas

सावधान और जिन्दा रहो !

في التأني السلامة

安全第一

SAFETY PAYS!

OPERATING MANUAL

J2.2-3.5XN (A276)

DO NOT REMOVE THIS MANUAL FROM THIS UNIT

PART NO. 1689094 **10/17**