



# OPERATING MANUAL

**H2.0-3.0XT (A380)**

**DO NOT REMOVE THIS MANUAL FROM THIS UNIT**



---

**LIFT TRUCK MODEL**\_\_\_\_\_

**SERIAL NUMBER**\_\_\_\_\_

**ENGINE MODEL**\_\_\_\_\_

**SERIAL NUMBER**\_\_\_\_\_

**TRANSMISSION TYPE**\_\_\_\_\_

**SERIAL NUMBER**\_\_\_\_\_

**MAST LIFT HEIGHT**\_\_\_\_\_

**GROUP NUMBER**\_\_\_\_\_

**CARRIAGE TYPE**\_\_\_\_\_

**GROUP NUMBER**\_\_\_\_\_

**DRIVE TYRE SIZE**\_\_\_\_\_

**STEERING TYRE SIZE**\_\_\_\_\_



**SPECIAL EQUIPMENT OR ATTACHMENTS**

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# HYSTER

# FOREWORD

## 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 any potential hazards that may exist in the work place where the lift truck is intended to be used.
- 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** is the original instruction and 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 EC and/or 2006/42/EC:



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- **Dimensional Details:** Certain information is shown on the truck Nameplate. For additional dimensional details on this or any other specific truck, consult your dealer.
- **Noise Levels:** 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:
  - Without Cab, with PSI Engines – 79.0 dB(A)
  - Without Cab, with Yanmar Engines – 79.0 dB(A)
  - With Cab, with PSI Engines – 80.0 dB(A)
  - With Cab, with Yanmar Engines – 81.0 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.). Work-site vibration levels may vary depending on actual operating and surface conditions.

Whole-body vibration:

- Measured whole-body vibration at the operator position, based upon standard production truck with full-suspension or comfort-suspension seat is listed below.
- Declared whole-body vibration emission value is in accordance with EN 12096.
  - Full-suspension seat measured vibration emission value  $a_{w,z} = 0.6 \text{ m/s}^2$
  - Comfort-suspension seat measured vibration emission value  $a_{w,z} = 0.8 \text{ m/s}^2$
  - Uncertainty,  $K = 0.2 \text{ m/s}^2$
- Values determined according to EN 13059
  - Hand-arm vibration:
    - Hand-arm vibration emission value =  $< 2.5 \text{ m/s}^2$
- **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



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confirm compliance with European Directive 94/9/ce. If you are in doubt, please contact your **Hyster** dealer for assistance.

- **Manufacturer:** Hyster Europe, Centennial House, Building 4.5, Frimley Business Park, Frimley, Surrey GU16 7SG, United Kingdom
- **The EC Conformity:** Each lift truck ships with a unique EC Declaration of Conformity certificate. See the end of this section for a sample EC Declaration of Conformity certificate which complies with Machinery Directive 2006/42/EC.

### 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.**



## FOREWORD

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### Atmospheric Conditions

This range of fork 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):	+50°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% (non-condensing)

### Lifting



When transporting the truck, should lifting be required, please use the points indicated on the truck by the hook symbols.



## HYSTER

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### Truck Modification

Unauthorized truck modification is not permitted. To obtain authorization contact your **Hyster** dealer.

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

1. Arrange for the modification or alteration to be designed, tested, and implemented by an engineer(s) expert in industry trucks and their safety;
2. Maintain a permanent record of the design, test(s), and implementation of the modification or alteration;
3. Approve and make appropriate changes to the capacity plate(s), decals, tags and instruction handbook;
4. Affix a permanent and readily visible label to the truck stating the manner in which the truck has been modified or altered together with the date of modification or alteration, and the name and address of the organization that accomplished the tasks.







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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!**

### **KNOW THE EQUIPMENT:**

- ALWAYS use 3 points of contact when getting on and off the truck.
- KNOW operating, inspection, and maintenance instructions in this **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 auxiliary equipment (attachments) for intended purpose only.
- VERIFY 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.
- SOUND horn at intersections or where vision is blocked.
- WATCH clearances, especially overhead.

### **KNOW YOUR LOADS:**

- HANDLE only stable loads within specified weight and load center. See Nameplate on 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.

### **USE COMMON SENSE:**

- DO NOT use truck to lift people unless there is no other practical option. Then, use only a securely attached



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## Warning

### **WARNING**

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

special work platform. Follow instructions in this Operating Manual.

- OBEY traffic rules. Yield right-of-way to pedestrians.
- BE in complete control at all times.
- ALLOW NO ONE under or near lift mechanism or load.
- OPERATE truck only from operator's seat.
- KEEP arms, legs, and head inside operator's compartment.
- DO NOT move truck if anyone is between truck and stationary object.
- BEFORE DISMOUNTING, neutralize travel control, lower carriage, and set brake.
- WHEN PARKING, also shut off power, close LPG fuel valve, block wheels on inclines.

#### **KNOW THE AREA:**

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

#### **PROTECT YOURSELF FASTEN YOUR SEAT BELT!**

- AVOID bumps, holes, and loose materials.
- AVOID sudden starts or stops.



## Warning

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# **WARNING**

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

- NEVER turn on or angle across an incline.
- TRAVEL on inclines with load uphill or when unloaded with lift mechanism downhill.
- TILT mast slowly and smoothly. LIFT or LOWER with upright 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.

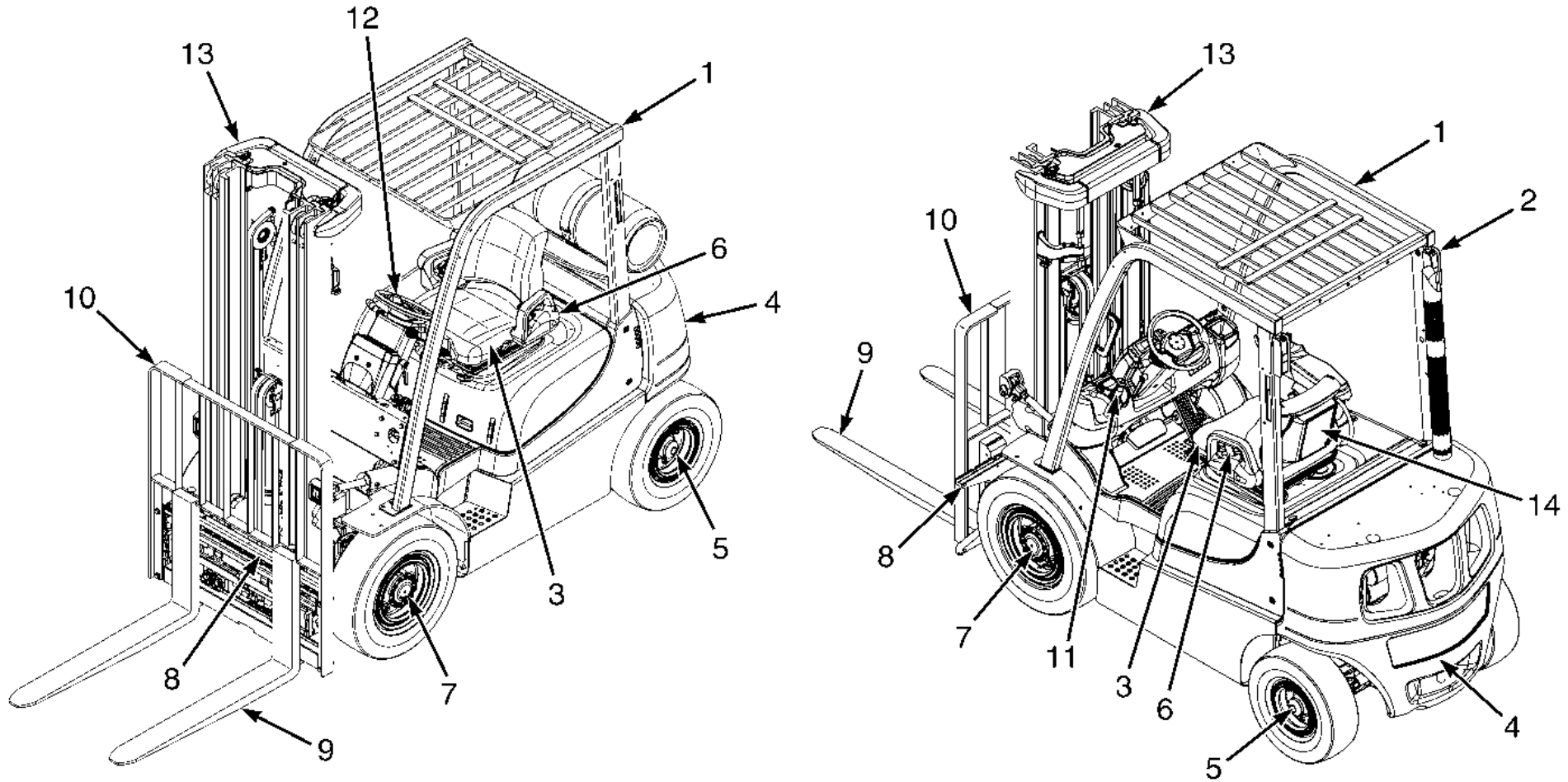
**FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE THE LIFT TRUCK TO TIP.**

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



# HYSTER

## Model Description



BO191557

Figure 1. Model View Showing Major Components of H2.0-3.0XT



## Model Description

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**HYSTER**

### *Legend for Figure 1*

- |                                    |                                    |
|------------------------------------|------------------------------------|
| 1. OVERHEAD GUARD                  | 8. CARRIAGE                        |
| 2. TAIL, BRAKE, AND REVERSE LIGHTS | 9. FORKS                           |
| 3. SEAT                            | 10. LOAD BACKREST EXTENSION        |
| 4. COUNTERWEIGHT                   | 11. PARKING BRAKE                  |
| 5. STEERING AXLE                   | 12. STEERING WHEEL                 |
| 6. SEAT BELT AND HIP RESTRAINT     | 13. MAST                           |
| 7. DRIVE AXLE                      | 14. OPERATING MANUAL (BEHIND SEAT) |





# HYSTER

## Model Description

### Model Description

#### General

This **Operating Manual** is for the following models of lift trucks:

#### H2.0-3.0XT (A380)

These lift trucks are available with the following engine:

- PSI 2.4L engine which uses LPG fuel
- PSI 2.4L bi-fuel engine which uses Petrol and LPG fuels
- Yanmar 2.6L engine which uses diesel fuel
- Yanmar 3.3L engine which uses diesel fuel

These lift truck models are equipped with a Basic Powershift or Electronic Powershift transmission.

The H2.0-3.0XT lift trucks are equipped with pneumatic tyres or solid rubber tyres that look like pneumatic tyres. See **Wheels and Tyres** in the **Maintenance Section** for a description of these tyres.

#### Operator Protection Equipment

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

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.

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

The SEAT BELT AND HIP RESTRAINT provide additional means to help the operator keep the head and torso substantially within the confines of the lift truck frame and overhead guard 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 cannot



## Model Description

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protect the operator against all possible injury in a tipover. The hip restraint will help the operator resist side movement. It is not a substitute for the seat belt. Always fasten the seat belt.

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.

## Nameplate

### **WARNING**

**DO NOT add to or modify the lift truck. Any modification that affects the safe operation of the truck cannot be undertaken without the written authorization of Hyster Company.**

**Any change to the lift truck, the tyres, or its equipment can change the lifting capacity. The lift truck must be rated as equipped and the Nameplate must show the new capacity rating.**

The capacity is specified in kilograms (kg) and pounds (lb). The capacity is the maximum load that the lift truck can handle for the load condition shown on the Nameplate.

The maximum capacity for the lift truck, at full load height, must be shown on the Nameplate. Special capacities with the load height reduced or with optional load centers, may also be shown on the Nameplate.

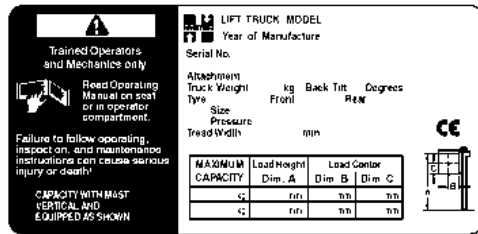
The lift truck serial number code is on the Nameplate. The serial number code is also stamped on the right-hand side of the lift truck frame, under the floorplate.

When a lift truck is shipped incomplete from the factory, the Nameplate is covered by an INCOMPLETE label as shown in **Figure 2**. If the equipment on the truck is changed, the Nameplate is covered by a NOTICE label as shown in **Figure 2**. If your lift truck has either of these labels, do not operate the lift truck. Contact your dealer for **Hyster** lift trucks to obtain a complete correct Nameplate.



# HYSTER

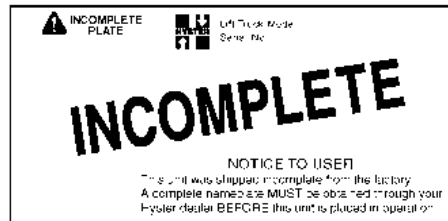
## Model Description



(A)



(B)



(C)

HO191243

- A. NAMEPLATE (CE NAMEPLATE SHOWN)
- B. NOTICE LABEL
- C. INCOMPLETE LABEL

**Figure 2. Nameplate and Labels**

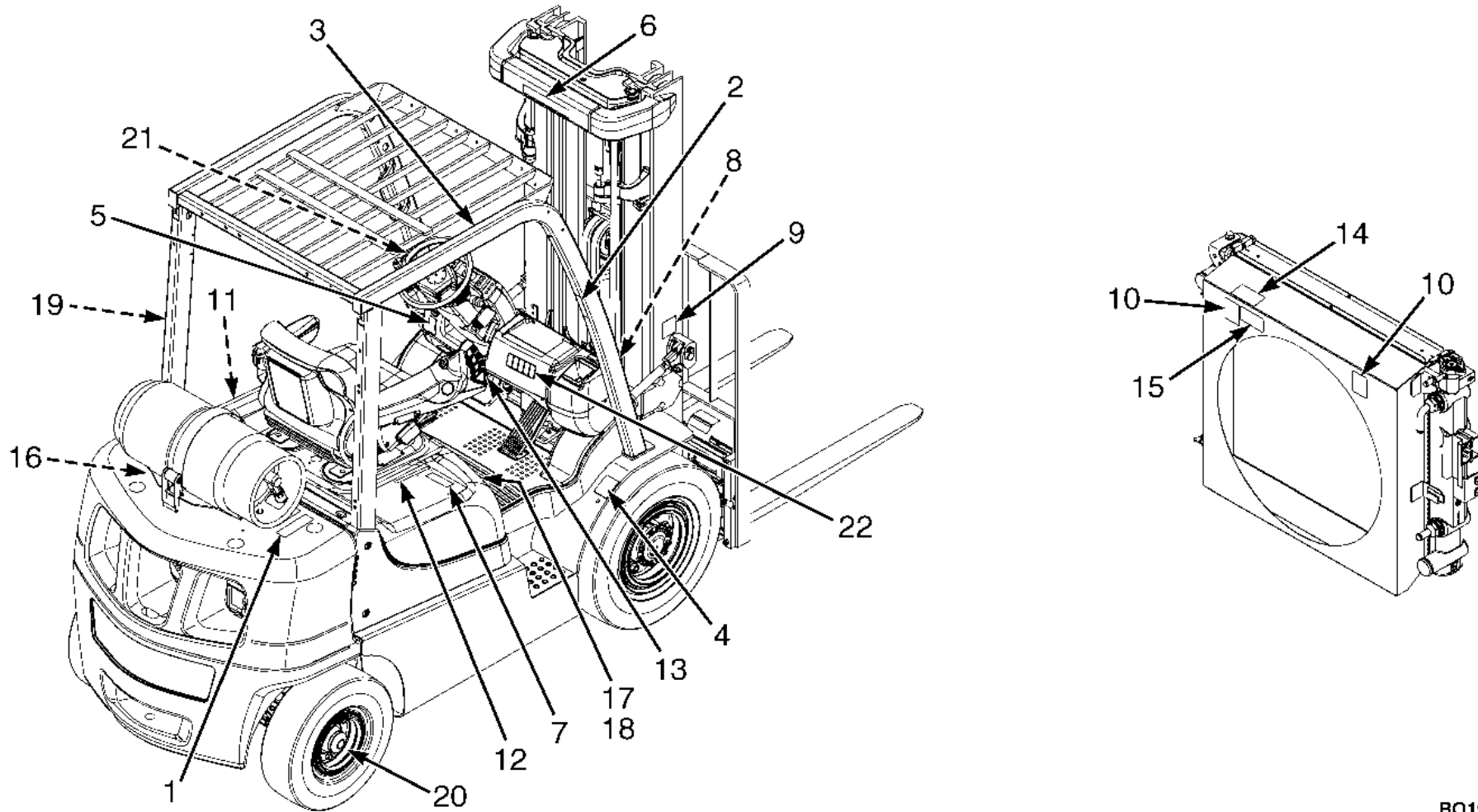
## Safety Labels

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 3**.

All possible label configurations that can be on the lift trucks covered in this **Operating Manual** are not shown in **Figure 3**. See the **Parts Manual** for label part numbers and a complete listing of all labels that are available for the lift trucks covered in this **Operating Manual**.

## Model Description

**HYSTER**



BO191559

Figure 3. Warning and Safety Labels (Sheet 1 of 3)



# HYSTER

# Model Description

**1**

**2**

**3**

**4**

**5**

**6**

**7**

MINIMUM CAPACITY		LOAD HEIGHT		LOAD CENTER	
kg	lbs	mm	in	mm	in
1	2000	1100	43	1100	43
2	4000	1100	43	1100	43
3	6000	1100	43	1100	43

**8**

**9**

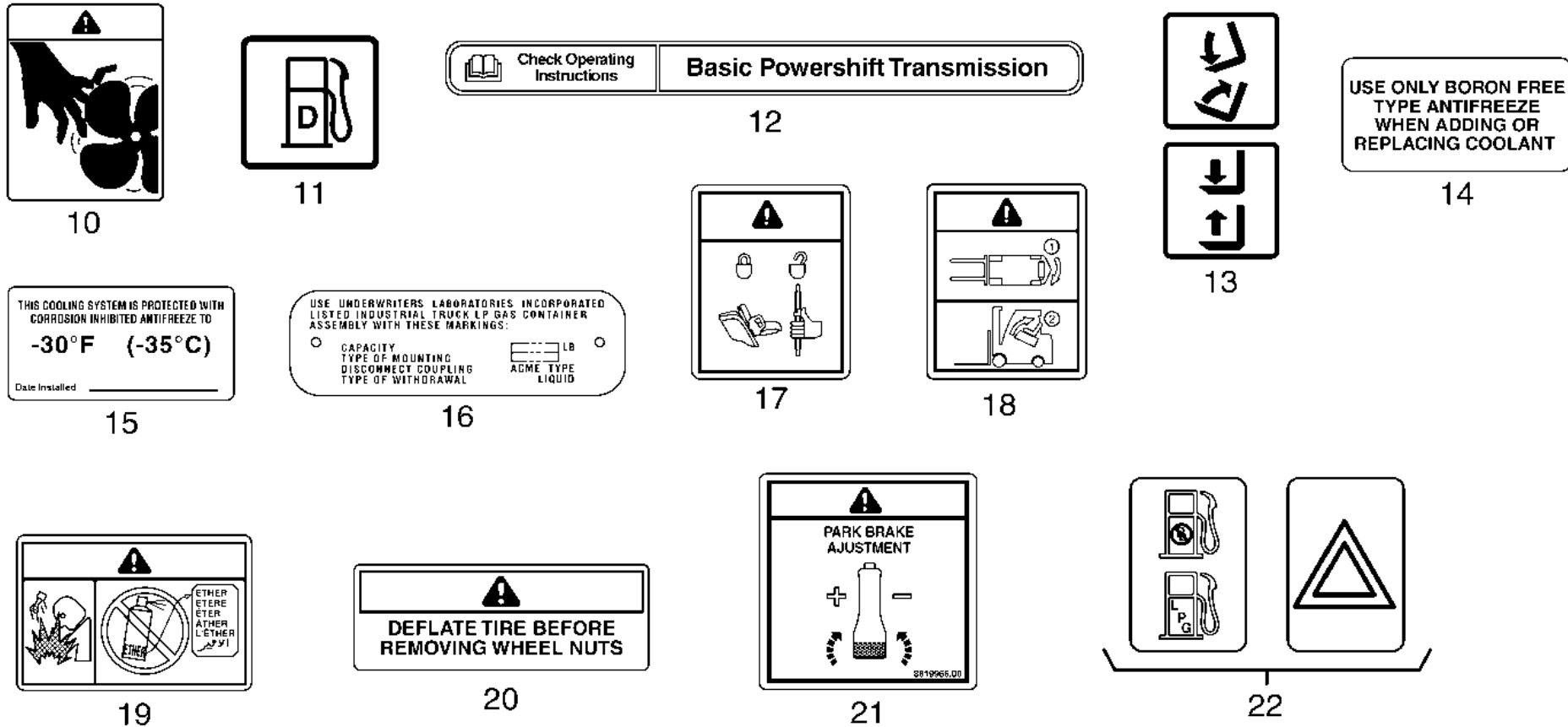
HO191255

Figure 3. Warning and Safety Labels (Sheet 2 of 3)



## Model Description

**HYSTER**



HO191256

Figure 3. Warning and Safety Labels (Sheet 3 of 3)



# HYSTER

## Model Description

### Legend for Figure 3

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. FLAMMABLE LP-GAS</li> <li>2. TIPOVER WARNING</li> <li>3. OPERATION WARNING</li> <li>4. NO RIDERS</li> <li>5. WARNING FOR PARKING BRAKE</li> <li>6. MAST WARNING</li> <li>7. NAMEPLATE</li> <li>8. NO ONE ON OR UNDER FORKS</li> <li>9. MAST WARNING</li> <li>10. FAN WARNING</li> </ol> | <ol style="list-style-type: none"> <li>11. DIESEL FUEL LABEL (NOT SHOWN)</li> <li>12. TRANSMISSION LABEL (EXAMPLE ONLY)</li> <li>13. LIFT AND TILT LABEL</li> <li>14. BORON-FREE ANTIFREEZE</li> <li>15. ANTIFREEZE WARNING</li> <li>16. LPG TANK WARNING</li> <li>17. LOCKING GAS SPRING</li> <li>18. BONNET OPENING CAUTION</li> <li>19. ETHER WARNING (DIESEL ONLY)</li> <li>20. SPLIT WHEEL WARNING (PNEUMATIC TYRES ONLY)</li> </ol> |
|---|---|

## Controls

### **WARNING**

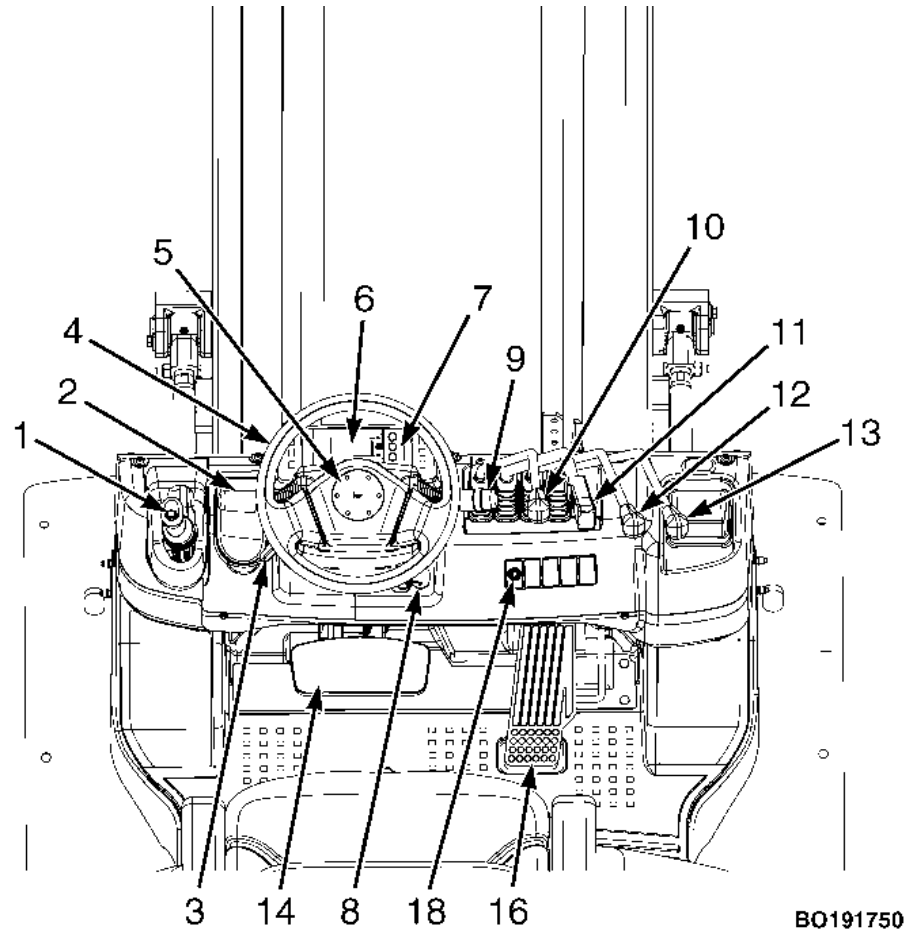
If any of the instruments, levers, or pedals do not operate as described in the following tables, report the

**problem immediately. DO NOT operate the lift truck until the problem is corrected.**

Not all lift trucks have all of the controls shown in **Figure 4** and **Table 1**.

## Model Description

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**Figure 4. Controls**





# HYSTER

## Model Description

### Legend for Figure 4

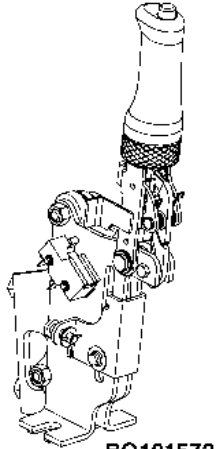
- |                               |                                     |
|-------------------------------|-------------------------------------|
| 1. PARKING BRAKE LEVER        | 10. LIFT/LOWER LEVER                |
| 2. DIRECTION CONTROL LEVER    | 11. TILT LEVER                      |
| 3. STEERING COLUMN TILT LEVER | 12. 3RD AUXILIARY LEVER             |
| 4. STEERING WHEEL             | 13. 4TH AUXILIARY LEVER             |
| 5. HORN                       | 14. BRAKE PEDAL                     |
| 6. DASH DISPLAY               | 15. INCHING/BRAKE PEDAL (NOT SHOWN) |
| 7. CONTROL BUTTON PANEL       | 16. ACCELERATOR PEDAL               |
| 8. KEY SWITCH                 | 17. MONOTROL PEDAL (NOT SHOWN)      |
| 9. LIGHT SWITCH/INDICATOR     | 18. TRACTION SPEED LIMITER LIGHT    |



**Model Description**

**HYSTER**

*Table 1. Controls*

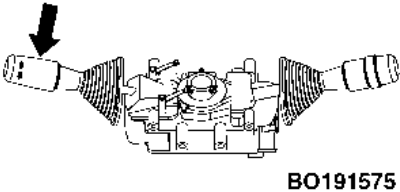
Item No.	Item	Function
1	 <p>BQ191572</p> <p>Parking Brake Lever</p>	<p>Parking Brake to be on when lift truck is parked. Pull parking brake lever backward all the way to set it.</p> <p>Push the top button to release the lock, while pulling on the lever, and push lever forward to release parking brake.</p>



# HYSTER

## Model Description

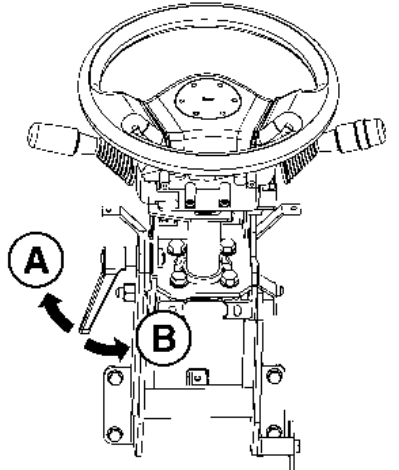
Table 1. Controls (Continued)

Item No.	Item	Function
2	 <p>BO191575</p> <p>Direction Control Lever</p>	<p><b>⚠ CAUTION</b>            This lift truck has a neutral switch. The engine will not start at a position other than neutral.</p> <p><b>Always change the shift lever from forward/reverse when the lift truck is stopped to protect the equipment and for safety.</b></p> <p><b>NOTE:</b> This truck series has a safety alarm. If the operator leaves the operator seat with the Direction Control lever not in neutral, an alarm will sound even with the key switch <b>OFF</b>.</p> <p>This lever is used to change from forward to reverse travel. This truck is equipped with a travel interlock system as a standard feature. If the operator is not in the operator seat, the direction control does not work and the transmission will stay in neutral.</p>

## Model Description

**HYSTER**

*Table 1. Controls (Continued)*


Item No.	Item	Function
3	 <p style="text-align: center;">B0191570</p> <p>Lever For Steering Column Tilt</p> <p><b>A.</b> Lock</p> <p><b>B.</b> Release Lock</p>	<p><b>⚠ CAUTION</b></p> <p>Adjust the steering wheel when the lift truck is stopped, as adjustment during travel is dangerous.</p> <p>Adjust steering wheel as needed.</p>
4	Steering Wheel	The steering wheel controls the position of the steer tyres.



# HYSTER

## Model Description

*Table 1. Controls (Continued)*

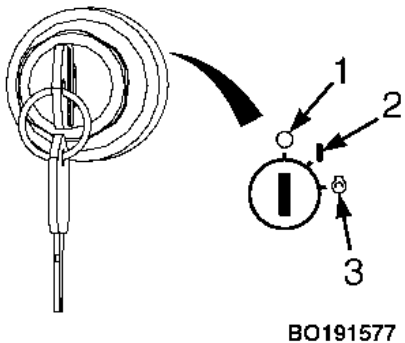
Item No.	Item	Function
5	Horn 	The horn button controls the operation of the horn.
6	Dash Display	The screen shows icons for the warning and indicator lights. The display also shows operator messages for the different functions. All programmed warning and indicator lights will light up for two seconds (Start Check) when System Power is turned ON.
7	Control Button Panel	These buttons are used to change items shown on the dash display. See Operating Procedures section of this manual for instructions.



## Model Description

**HYSTER**

*Table 1. Controls (Continued)*

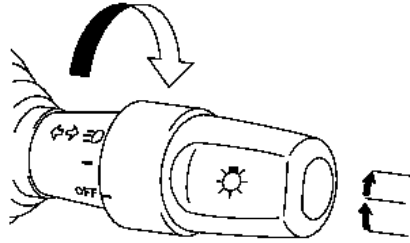
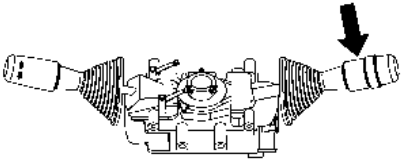
Item No.	Item	Function
8	<p>Key</p>  <p>Switch</p> <p>BO191577</p>	<p><b>NOTE:</b> The key switch has a function of anti-restart, so if the engine does not start even when the key is turn to <b>ST</b>, return the key to <b>OFF</b> once, and then try again after 5 to 10 seconds. Turn key <b>OFF</b> before removing it.</p> <p>The key switch is on the right side of the steering column near the cowl. The key switch has three positions:</p> <ol style="list-style-type: none"> <li>1) <b>OFF</b> position: De-energizes all electrical circuits except for the horn</li> <li>2) <b>ON</b> position: Energizes all electrical circuits except the start circuit. The key switch will be in this position during normal operations.</li> <li>3) <b>START</b> position: Energizes the starter motor for starting the engine. A spring returns the key to <b>ON</b> position when the key is released.</li> </ol>



# HYSTER

## Model Description

*Table 1. Controls (Continued)*

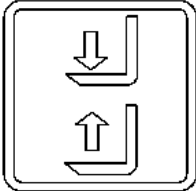
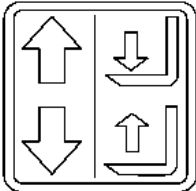
Item No.	Item	Function											
9	<p>Light</p>  <p>Switch</p> <p>BO191583</p>	<p>The light switch is integrated with the indicator lever. When the switch is turned forward the light is turned <b>ON</b>. When the switch is turned backward the light is turned <b>OFF</b>.</p> <table border="1" data-bbox="768 715 1279 927"> <thead> <tr> <th rowspan="2">Mark</th> <th colspan="2">Lighting</th> </tr> <tr> <th>Front light</th> <th>Tail light</th> </tr> </thead> <tbody> <tr> <td>—</td> <td></td> <td>○</td> </tr> <tr> <td>≡D</td> <td>○</td> <td>○</td> </tr> </tbody> </table> <p>BO191584</p>	Mark	Lighting		Front light	Tail light	—		○	≡D	○	○
Mark	Lighting												
	Front light	Tail light											
—		○											
≡D	○	○											
9	 <p>Lindicator Lever</p> <p>BO191576</p>	<p>To indicate the turning direction of the lift truck, push the indicator lever forward for the left indicator to blink or pull the indicator lever backward for the right indicator to blink.</p>											



## Model Description

**HYSTER**

*Table 1. Controls (Continued)*

Item No.	Item	Function
10	<p>Lift/Lower Control Lever</p>  <p>LIFT</p>  <p>FR   LIFT</p> <p>BO190623</p>	<p><b>NOTE:</b> If the operator is not in the seat or leaves the seat, hydraulic controls are not active to avoid unintentional movement of front end equipment.</p> <p><b>NOTE:</b> Manual hydraulic control levers are standard on the trucks covered in this manual.</p> <p>The lift/lower control lever is the first manual lever to the right of the operator's seat. Pull backward toward the operator to raise the carriage and forks. Push forward to lower the carriage and forks.</p>







# HYSTER

## Model Description

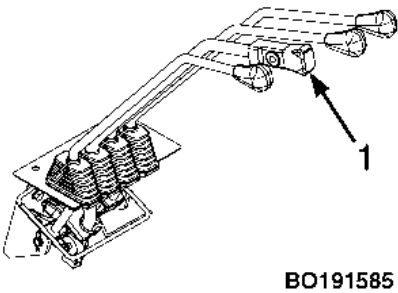
*Table 1. Controls (Continued)*

Item No.	Item	Function
11	<p>Tilt Control Lever</p>  <p>TILT</p>  <p>RTST BO190624</p>	<p><b>NOTE:</b> If the operator is not in the seat or leaves the seat, hydraulic controls are not active to avoid unintentional movement of front end equipment.</p> <p><b>NOTE:</b> Manual hydraulic control levers are standard on the trucks covered in this manual.</p> <p><b>NOTE:</b> To operate the mini-levers, the operator must be on the seat.</p> <p>The tilt control lever is the second manual 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 the operator to tilt the mast and forks backward. To tilt the mast to the rear, pull the tilt lever backward. To tilt the mast forward, push the tilt lever forward. The speed of the tilt can be adjusted by the pull/push stroke. There is a built-in tilt-lock mechanism which prevents the mast from tilting forward when the key switch is <b>OFF</b>.</p>

## Model Description

**HYSTER**

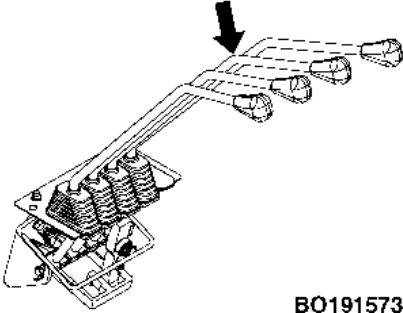
*Table 1. Controls (Continued)*

Item No.	Item	Function
11	 <p>BO191585</p> <p>Tilt Control Lever With RTST</p>	<p>These trucks can be equipped with Return to Set Tilt (RTST) option if truck has manual hydraulic levers. The vertical stop position will be set at the factory. Push the tilt lever knob switch while moving the mast forward or backward, with a light load, the mast will return to vertical position. To stop RTST, release the tilt lever knob switch.</p> <p>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 <b>Operating Techniques</b> on the <b>Operating Procedures</b> section of this <b>Operating Manual</b>.</p>

# HYSTER

## Model Description

Table 1. Controls (Continued)

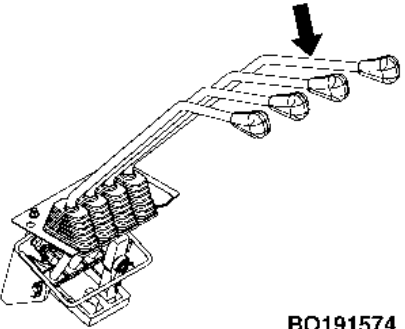
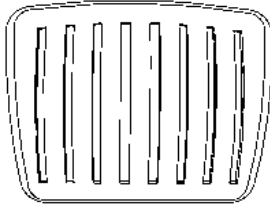
Item No.	Item	Function
12	 <p style="text-align: center;">B0191573</p> <p>Manual Control Lever for 3rd Auxiliary Functions</p>	<p><b>⚠ WARNING</b> A manual control lever with a detent must be installed when an attachment with a clamp is installed. See your dealer for Hyster lift trucks to get the correct control lever.</p> <p><b>NOTE:</b> Manual hydraulic control levers are standard on the trucks covered in this manual.</p> <p><b>NOTE:</b> If truck is equipped with only three levers and clamp attachments, the last (3rd) lever controls clamp functions.</p> <p>The third control lever is installed to the right of the tilt control lever. This lever can have two methods of operation, depending on the attachments. The lever is operated by moving forward and backward.</p> <p><b>Control Lever with a Detent - Attachments with a clamp action::</b> The lever is spring-loaded toward the operator. The lever is operated by moving it to the right, then forward and back.</p> <p><b>Control Lever without a Detent - Attachments without a clamp action:</b> The lever is operated by moving it forward and back.</p>



## Model Description

**HYSTER**

*Table 1. Controls (Continued)*

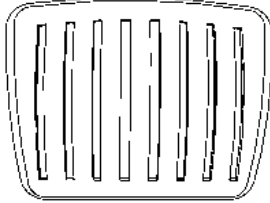
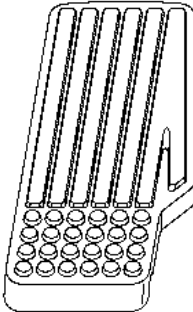
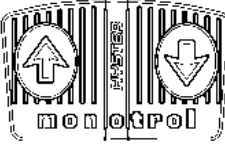
Item No.	Item	Function
13	 <p style="text-align: center;">BO191574</p> <p>Manual Control Lever for 4th Auxiliary Functions</p>	<p><b>NOTE:</b> Manual hydraulic control levers are standard on the trucks covered in this manual.</p> <p><b>NOTE:</b> If truck is equipped with four levers and clamp attachment, the last (4th) lever controls clamp functions.</p> <p>The fourth control lever is installed to the right of the third manual control lever. This lever can have two methods of operation, depending on the attachments.</p> <p><b>Control Lever with a Detent - Attachments with a clamp action::</b> The lever is spring-loaded toward the operator. The lever is operated by moving it to the right, then forward and back.</p> <p><b>Control Lever without a Detent - Attachments without a clamp action:</b> The lever is operated by moving it forward and back.</p>
14	<p>Brake Pedal</p>  <p style="text-align: center;">BO190632</p>	<p>This pedal, controlled by the operators right foot, controls the application of the service brakes.</p>



# HYSTER

## Model Description

*Table 1. Controls (Continued)*

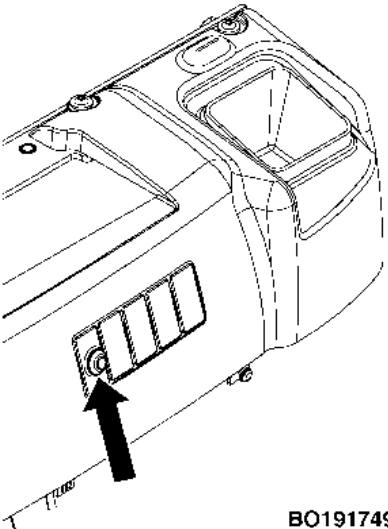
Item No.	Item	Function
15	Inching/ Brake Pedal (Not Shown in <b>Figure 4</b> )  BO190632	By varying the position of the inching/brake pedal, the operator can move the lift truck slowly while a high engine speed is used for lifting loads. Completely depressing the pedal disengages the transmission and applies the service brakes. The engine can be started when the inching/brake pedal is fully depressed and Direction Control Lever is in neutral.
16	Accelerator Pedal  BO191578	This pedal controls the speed of the engine and is operated by the operator right foot.
17	MONOTROL® Pedal (Not Shown in <b>Fig- ure 4</b> )  BO210020	The MONOTROL® Pedal controls the speed and direction of the lift truck. Pushing on the right side of the pedal causes the lift truck to move in reverse. Pushing on the left side of the pedal causes the lift truck to move in forward. The speed of the engine increases as the pedal is depressed. The reverse lights and the optional reverse alarm will be on in the reverse position during normal operation.



**Model Description**

**HYSTER**

*Table 1. Controls (Continued)*

Item No.	Item	Function
18	 <p>BO191749 Traction Speed Limiter Light</p>	<p>For lift trucks equipped with a Yanmar engine and traction speed limiter, this light will illuminate if the traction speed limiter is not working properly.</p>



# HYSTER

## Model Description

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/Anticlockwise	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

1	2	3	4	5	6	7	8	9	10

BO190744



## Model Description

**HYSTER**

### Dash Display

#### **WARNING**

If any of the instruments, levers, or pedals do not operate as described in the following tables, report the problem immediately. **DO NOT** operate the lift truck until the problem is corrected.

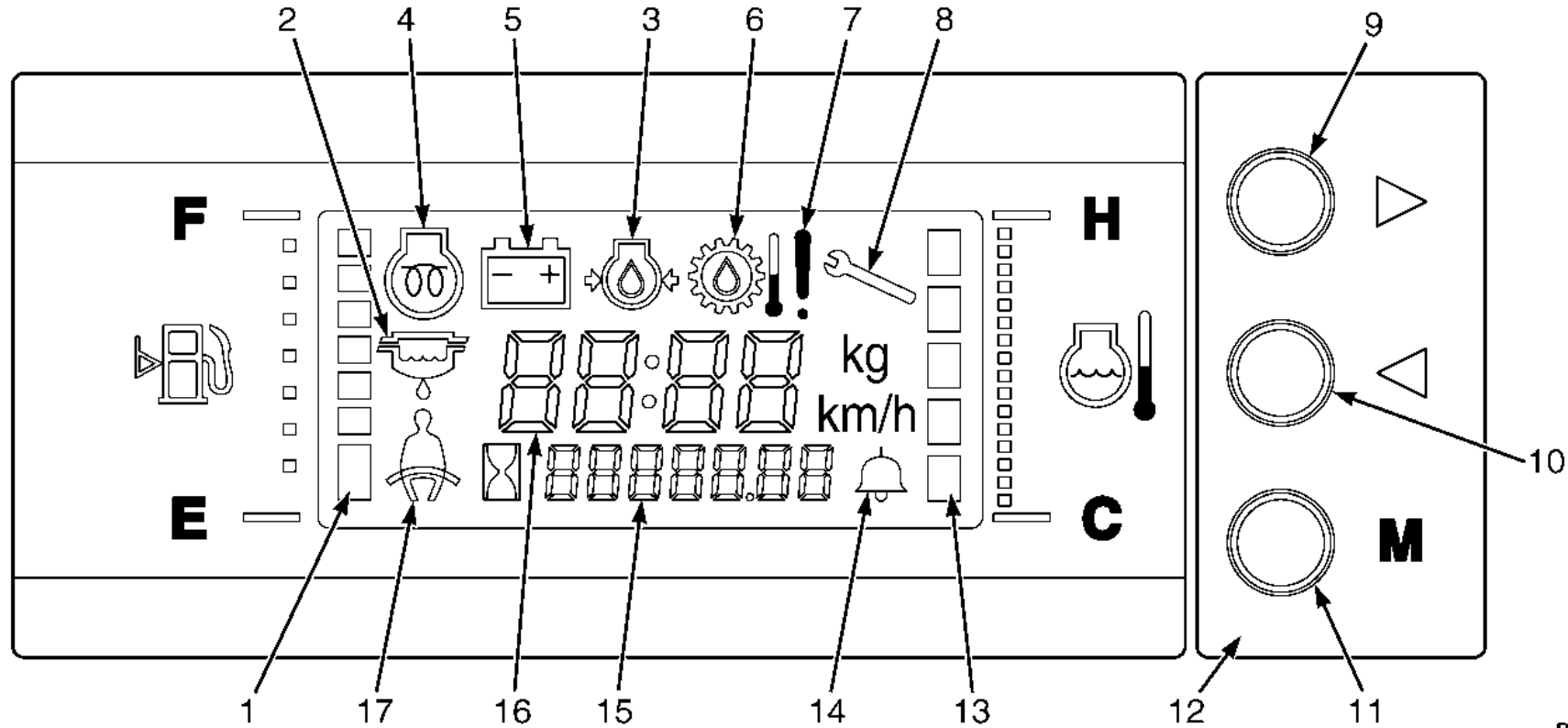
Depending on the equipment installed on the lift truck, warning and indicator lights on the Display will vary and

may not contain all the warning and indicator lights shown in **Figure 5** and **Table 2**. When the warning lights and indicators are on, the operator will see the appropriate symbol. When the warning lights and indicators are off, the operator will see a black panel. Unless noted in **Table 2**, all programmed warning and indicator lights will light up for one second when System Power is turned **ON**.



# HYSTER

## Model Description



B0191561

**Figure 5. Dash Display - Warning and Indicator Lights**



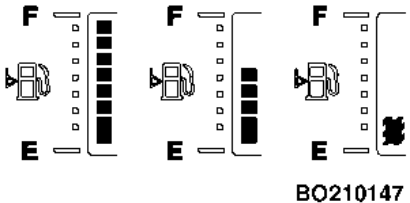

## Model Description

**HYSTER**

### Legend for Figure 5

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. FUEL GAUGE</li> <li>2. SEDIMENTER (DIESEL ONLY)</li> <li>3. ENGINE OIL PRESSURE</li> <li>4. GLOW LAMP</li> <li>5. BATTERY CHARGE</li> <li>6. TORQUE CONVERTER OIL TEMPERATURE</li> <li>7. WARNING</li> <li>8. MAINTENANCE REQUIRED</li> <li>9. DISPLAY CHANGE BUTTON FOR CLOCK</li> </ol> | <ol style="list-style-type: none"> <li>10. DISPLAY CHANGE BUTTON FOR HOUR METER</li> <li>11. MODE CHANGE BUTTON</li> <li>12. CONTROL BUTTON PANEL</li> <li>13. COOLANT TEMPERATURE</li> <li>14. ALARM SET</li> <li>15. HOUR METER, CALENDAR</li> <li>16. CLOCK, SPEED, MESSAGE</li> <li>17. SEAT BELT</li> </ol> |
|---|--|

**Table 2. Dash Display - Warning and Indicator Lights (See Figure 5)**


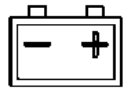




Item No.	Item	Function
1	 <p style="text-align: center;">Fuel Gauge</p>	<p><b>NOTE:</b> There is no LPG fuel gauge or indicator light. When a lift truck with an LPG engine has low fuel, a warning buzzer beeps.</p> <p>This gauge indicates the amount of remaining fuel in the fuel tank.</p> <p>Always refill fuel before the gauge reaches the bottom bar. If the fuel level reaches the bottom bar, a warning buzzer beeps.</p>
2	<p>Sedimenter (Diesel Only)</p> 	<p>This amber indicator light will illuminate if the fuel-water separator sensor indicates that water must be drained. Not on at Start Check.</p>



# HYSTER

## Model Description

*Table 2. Dash Display - Warning and Indicator Lights (See Figure 5) (Continued)*



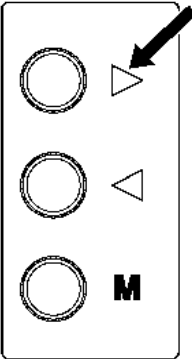
Item No.	Item	Function
3	Glow Lamp 	This amber indicator light will illuminate for up to 10 seconds after engine start up signifying that the glow plugs are functioning properly at temperatures up to 80 °C (176 °F) coolant temperature.
4	Battery Charge Lamp 	This icon will be <b>ON</b> when the key switch is <b>ON</b> and the engine is not running. The icon must go <b>OFF</b> when the engine is running.
5	Engine Oil Pressure 	 <b>CAUTION</b> <b>Stop the engine immediately if this icon is ON while the engine is running.</b>  This icon is <b>ON</b> when the key switch is in the <b>ON</b> position and must go <b>OFF</b> when the engine is running.
6	Torque Converter Oil Temperature Warning 	 <b>CAUTION</b> <b>Do not continue to operate the lift truck if the icon is ON when the engine is running. Make sure the oil level is correct and add fluid as needed. Let the transmission cool before operating the lift truck.</b>  The icon must go <b>OFF</b> when the engine is running.



## Model Description

**HYSTER**

*Table 2. Dash Display - Warning and Indicator Lights (See Figure 5) (Continued)*

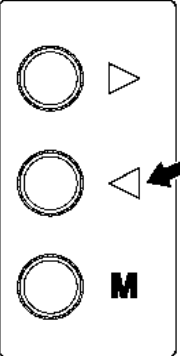
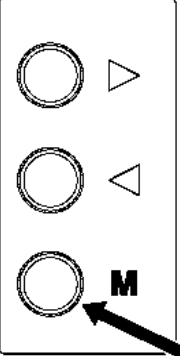
Item No.	Item	Function
7	Warning 	
8	Maintenance Required 	This amber light will illuminate when a fault that is not engine related and requires immediate attention occurs.
9	Display Change Button - Center Figures 	Each time you press a button the display changes to show operating information about the truck. Each screen will show either the date and the hours recorded on that date, or a fault and the hourmeter reading at which it occurred.



# HYSTER

## Model Description

*Table 2. Dash Display - Warning and Indicator Lights (See Figure 5) (Continued)*

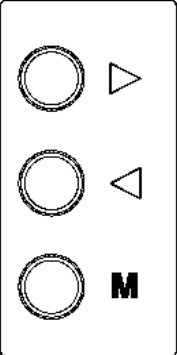
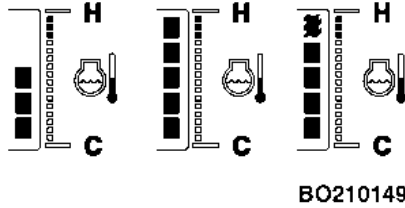


Item No.	Item	Function
10	<p>Display Change Button - Bottom Figures</p> 	<p>Press this button while the calendar date is showing to update the date and time shown on the display.</p>
11	<p>Mode Change Button</p> 	<p>Pressing this button at the same time as the Display Change Buttons will activate a different item on the display for adjustment. The item will blink until changed. Pressing this button once will return the display to normal mode.</p>



## Model Description

**HYSTER**

*Table 2. Dash Display - Warning and Indicator Lights (See Figure 5) (Continued)*

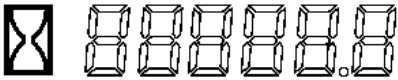
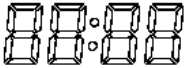

Item No.	Item	Function
12	Control Button Panel 	The panel contains the Display Change and Mode Change Buttons.
13	 Coolant Temperature Gauge	<p> <b>CAUTION</b>                      Do not continue to operator the lift truck when the gauge indicates that the engine is too hot (full bars indicated, and warning buzzer beeping).</p> <p>This gauge indicates the temperature of the engine cooling water. Start operation after the engine has been warmed up and the bare gauge starts raising. When the bar gauge reaches around the middle bar, the water temperature is optimum.</p>
14	Alarm Set  BO191568	The icon is <b>ON</b> when the alarm is on.



# HYSTER

## Model Description

*Table 2. Dash Display - Warning and Indicator Lights (See Figure 5) (Continued)*

Item No.	Item	Function
15	 <p style="text-align: center;">BO210148</p> <p>Hour Meter</p>	<p>Hourmeter - The hour meter operates when the key switch is in the <b>ON</b> position. Periodic Maintenance recommendations are based on these hours.</p>
16	<p>Clock</p> 	<p>The clock displays the current time.</p>
17	<p>Seat Belt</p> 	<p><b>⚠ WARNING</b>  <b>Always fasten the seat belt when operating the lift truck.</b></p> <p>The icon flashes for 10 seconds anytime the key switch is put in the <b>ON</b> position. If the seat belt interlock option is equipped, the icon goes <b>OFF</b> immediately after fastening the seat belt.</p>



## Operating Procedures

**HYSTER**

### Operating Procedures

#### General

#### Know Your Lift Truck

##### **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 shift the transmission to neutral. If the lift truck is left on a grade, without the parking brake fully applied, the lift truck will free-wheel down the grade, possibly causing injury or property damage.

##### **WARNING** **EXHAUST GASES**

Exhaust from internal combustion engines contains carbon monoxide and other harmful chemicals. Carbon monoxide is a colourless, odorless poison and can cause unconsciousness or death without warning. Long-term exposure to exhaust or chemicals in the exhaust can cause cancer, birth defects, and other reproductive harm. Avoid exposure to engine exhaust.

If engines are operated in confined spaces, maintain adequate ventilation or vent exhaust to the outside. Do not exceed applicable air contaminant limits.

Follow the inspection and maintenance schedule and procedures in this manual. Do not alter exhaust, ignition, or fuel systems.

##### **WARNING** **FIRE HAZARD**

The hot engine surfaces and exhaust of internal combustion engine powered lift trucks can present fire hazards when operating in areas containing flammable gases, vapors, liquids, dusts, fibers, or paper debris. Engine and exhaust component surface temperatures can exceed the ignition temperatures of common solvents, fuels, oil, paper, and other organic materials (wood, wheat, cotton, etc.). Exhaust emitted sparks can ignite these materials as well. Engine and exhaust surface temperatures increase after engine shutoff, presenting increased fire hazard. Check the engine compartment frequently in areas containing combustible dust, fibers, or paper and remove any foreign materials. Contact your local Hyster dealer for forklift



## HYSTER

## Operating Procedures

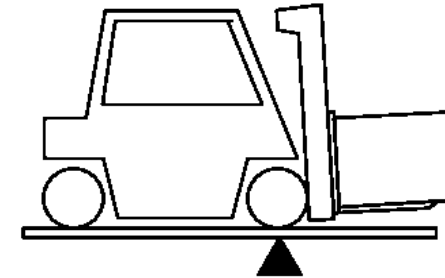
modifications that may be appropriate in environments with fire hazards.

Operate the lift truck only in areas that have been approved for lift truck operation.

Only the designated types of approved lift trucks may be used in areas classified as hazardous by the authority having jurisdiction. Areas classified as hazardous must be identified by signs to show the type of approved lift truck required for operation in the area. Modifications or poor maintenance can result in the lift truck being unsuitable for operation in areas classified as hazardous.

The fork lift truck is designed to pickup, move, and tier materials. The basic lift truck has a lift mechanism and 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.



BO190107

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.

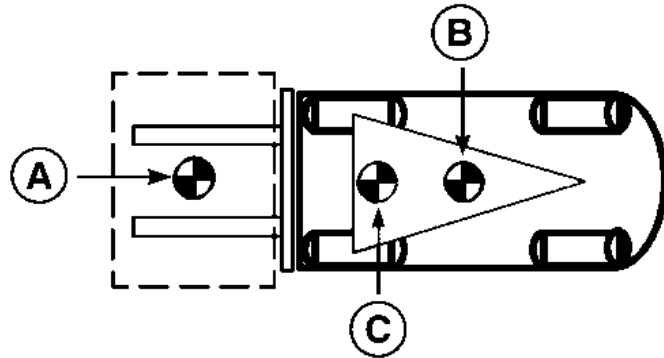
### Stability and Center of Gravity

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.

## Operating Procedures

**HYSTER**



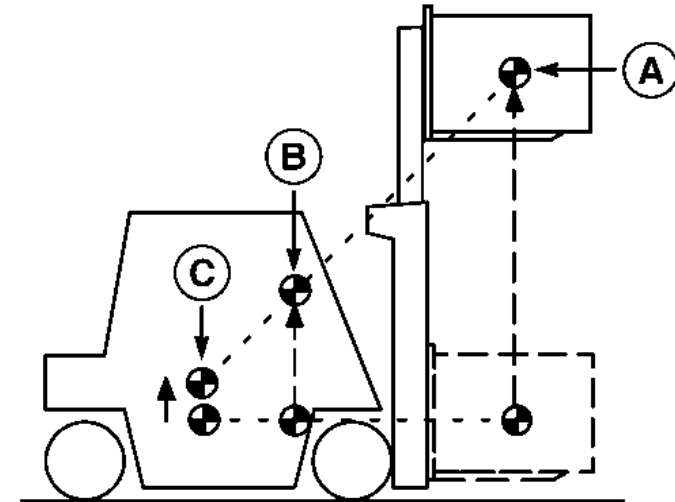
A. CG LOAD

B. CG TRUCK

C. 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.

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 the mast moves up and down.



A. CG LOAD

B. COMBINED CG

C. CG TRUCK

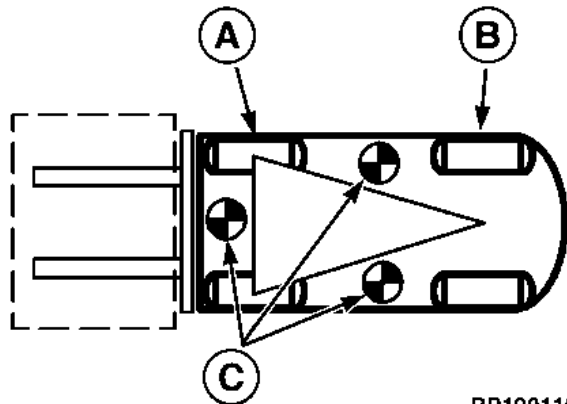
The center of gravity, and therefore the stability of the loaded lift truck, is affected by a number of factors such as size, weight, shape, and position of the load; the height to which the load is raised; the amount of forward and backward tilt; tyre pressure and the dynamic forces created when the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



# HYSTER

## Operating Procedures

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 axle and the pivot of the steering axle.



BP190110

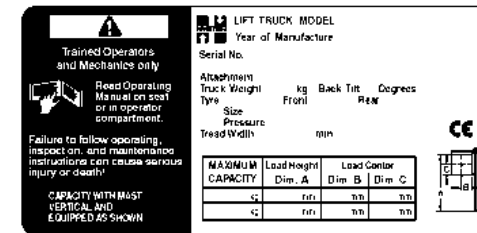
- A. DRIVE AXLE
- B. STEERING AXLE
- C. TRUCK WILL TIP OVER

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

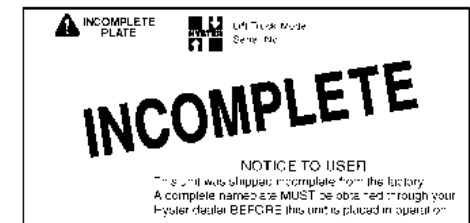
center is specified in millimeters and inches. The capacity is the maximum load that the lift truck can handle, with the mast vertical, for the load condition shown on the Nameplate.



A

**NOTICE TO USER**  
Make sure the equipment on the truck is correctly described on the plate before placing truck in service. If this truck is equipped other than as stated on plate, obtain the correct plate from your authorized dealer.

B



C

HO191243

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.



## Operating Procedures

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

### Inspection Before Operation

#### **WARNING**

**Report damage or faulty operation immediately. Do not operate a lift truck that needs repair. 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 if truck is equipped with key switch option.**



#### **Checks With the Engine Stopped**

Inspect the lift truck before use and every eight hours or daily as described in the **Maintenance** section of this **Operating Manual**. Inspect more frequently if used in severe operating conditions.

Before using the lift truck, make the following checks:

- Condition of forks, carriage, chains, header hoses, mast, attachment, and overhead guard.
- Condition of wheels and tyres.
- Seat belt fastens correctly.
- Seat is correctly fastened to its mounts. Bonnet is correctly latched.
- Condition of the engine compartment. Ensure all surfaces are free of oils, lubricants, fuel, and organic dusts or fibers (paper, wood, cotton, agricultural grass/grain, etc). Remove all foreign materials.
- Coolant level in the cooling system and condition of the drive belts.
- Condition of the radiator and screen. Clean if necessary.
- Fuel level.
- Oil level in the engine.
- Oil level in the hydraulic tank.
- Leaks from the engine, transmission, hydraulic system, and fuel system.
- Loose or missing hardware.



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## Operating Procedures

- Check transmission oil level.

### 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.

### Lift Truck Interlocks

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

**DRIVE INTERLOCKS:** Traction is enabled when the operator is in the seat (occupancy sensor), seat belt should be fastened, a direction of travel is selected, engine is running, and the parking brake is released. If any of the above actions are not performed while operating the lift truck,

traction will be disabled. To reactivate traction, the operator must return to the seat. Once the needed actions are completed, traction will be enabled and the operator can continue to load and unload material.

**HYDRAULIC INTERLOCKS:** The hydraulic functions are enabled when the operator is in the seat (occupancy sensor), seat belt should be fastened, and the engine is running. 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 a non-service fault message "Hydraulic Interlock Engaged." To reactivate hydraulics, the operator must return to the seat. Once the needed actions are completed, the hydraulic function will be enabled and the operator can continue to load and unload material.

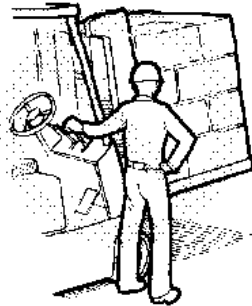


## Operating Procedures

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### Starting Procedure

DO NOT start or operate the lift truck, including any of its functions or attachments, from any place other than the designated operator's position.



BO190112

#### **⚠ WARNING**

**LPG is very flammable. An odor of LPG fuel can indicate a leak in the fuel system. DO NOT start the engine until the fuel leak is repaired and the atmosphere is free of LPG.**

**NOTE:** Lift trucks have a "Clear Flood Mode" programmed into the ECU. When accelerator is depressed more than 80% during cranking, the ECU will not allow any fuel into the engine. This allows the engine to clear any excess fuel out of the intake manifold and cylinders.

1. If the lift truck uses LPG fuel, open fuel valve on LPG tanks.
2. Make sure that parking brake is applied.
3. Put direction control lever for transmission in **NEUTRAL** position.
4. Make sure lift truck bonnet is closed.

5. Turn key to the **ON** position. If lift truck is equipped with a diesel engine and engine is cold, the cold start indicator light will illuminate and the cold start circuit will be energized.

6. On lift trucks equipped with a LPG engine, turn the key to the **START** position to engage the starter.

On lift trucks equipped with a diesel engine, if cold start delay is required, the cold start indicator will be illuminated and a countdown time of ten seconds is displayed. When countdown reaches 0, turn the key to the **START** position to engage the starter.

For all engine types, if engine fails to start after 30 seconds, the starter will shut down for 60 seconds to cool off. A 60-second countdown timer will appear on the LCD screen showing the time remaining before a restart attempt can be tried. To restart engine, repeat **Step 5** and **Step 6**.

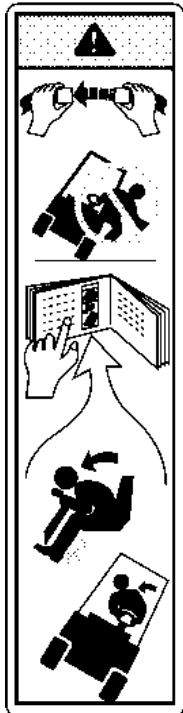


# HYSTER

## Operating Procedures



### Checks With the Engine Running



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 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!**

THE SEAT BELT AND HIP RESTRAINT bracket provides a means to help the operator keep the head and torso sub-

stantially 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 can not protect the operator against all possible injury in a tipover.

Make sure that the area around the lift truck is clear before starting the engine or making any operational checks. Be careful when making the checks. If the lift truck is stationary during a check, apply the parking brake and make sure the direction control is in **NEUTRAL**. Proceed carefully.

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

- Check the operation of the horn, gauges, 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 direction control lever and accelerator pedal.
- Check the operation of the service brakes and parking brake.



## Operating Procedures

- Check the operation of the steering system.
- Check the oil level in the transmission when the oil is at operating temperature 50 °C (120 °F). Turn the truck off and wait one minute. Then check the transmission oil level.

## 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**.

**NOTE:** When the Emergency Locking Retractor (ELR) seat belt is properly buckled across the operator, the belt will permit slight operator repositioning without activating the locking mechanism. If the truck tips, 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.

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## 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. 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





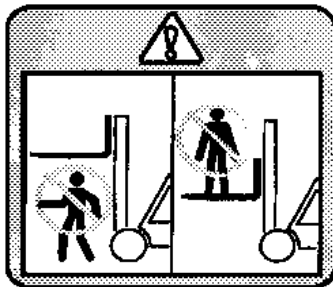
## HYSTER

## Operating Procedures

prepare the new operator for proper defensive driving and to expect the unexpected.

### **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.

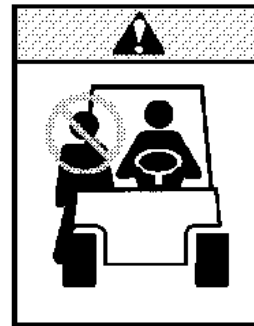


BO190117

If a lift truck is used to elevate a worker, a safety platform must be attached to the forks and carriage. It must have a solid floor with a surface to prevent the feet of the worker from slipping, hand rail, toe board, and 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

**2. 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.

**3. ADJUST SEAT - INTERNAL SUSPENSION**



## Operating Procedures

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### Seat Position Adjustment (Semi-Suspension)

- Fore and aft adjustment - It is recommended that the seat be adjusted so that the thigh is horizontal to the ground so that the best ergonomic position is achieved. See **Figure 6**.

### Seat Adjustment for Operator Weight (Semi-Suspension)

#### 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 maximum weight of 130 kg (287 lb) for semi-suspension seat.

- The weight adjustment knob can be turned to increase or decrease the weight resistance. As the weight adjustment knob is turned the "stiffness" of the suspension can be felt to increase or decrease on which way the weight adjustment knob is turned. See **Figure 6**.

#### 4. ADJUST SEAT - STANDARD FULL SUSPENSION.

### Seat Position Adjustment

- Fore and aft adjustment - It is recommended that the seat be adjusted so that the thigh is horizontal to the ground so that the best ergonomic position is achieved. See **Figure 6**.

### 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 (3.15 in.) suspension. See **Figure 6**.
- The handle can be turned anticlockwise to increase or clockwise to decrease the weight resistance, pull handle



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## Operating Procedures

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. See **Figure 6**.

### 5. ADJUST SEAT - PREMIUM FULL SUSPENSION

#### Seat Position Adjustment

- Fore and aft adjustment - It is recommended that the seat be adjusted so that the thigh is horizontal to the ground so that the best ergonomic position is achieved. See **Figure 6**.

#### 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.

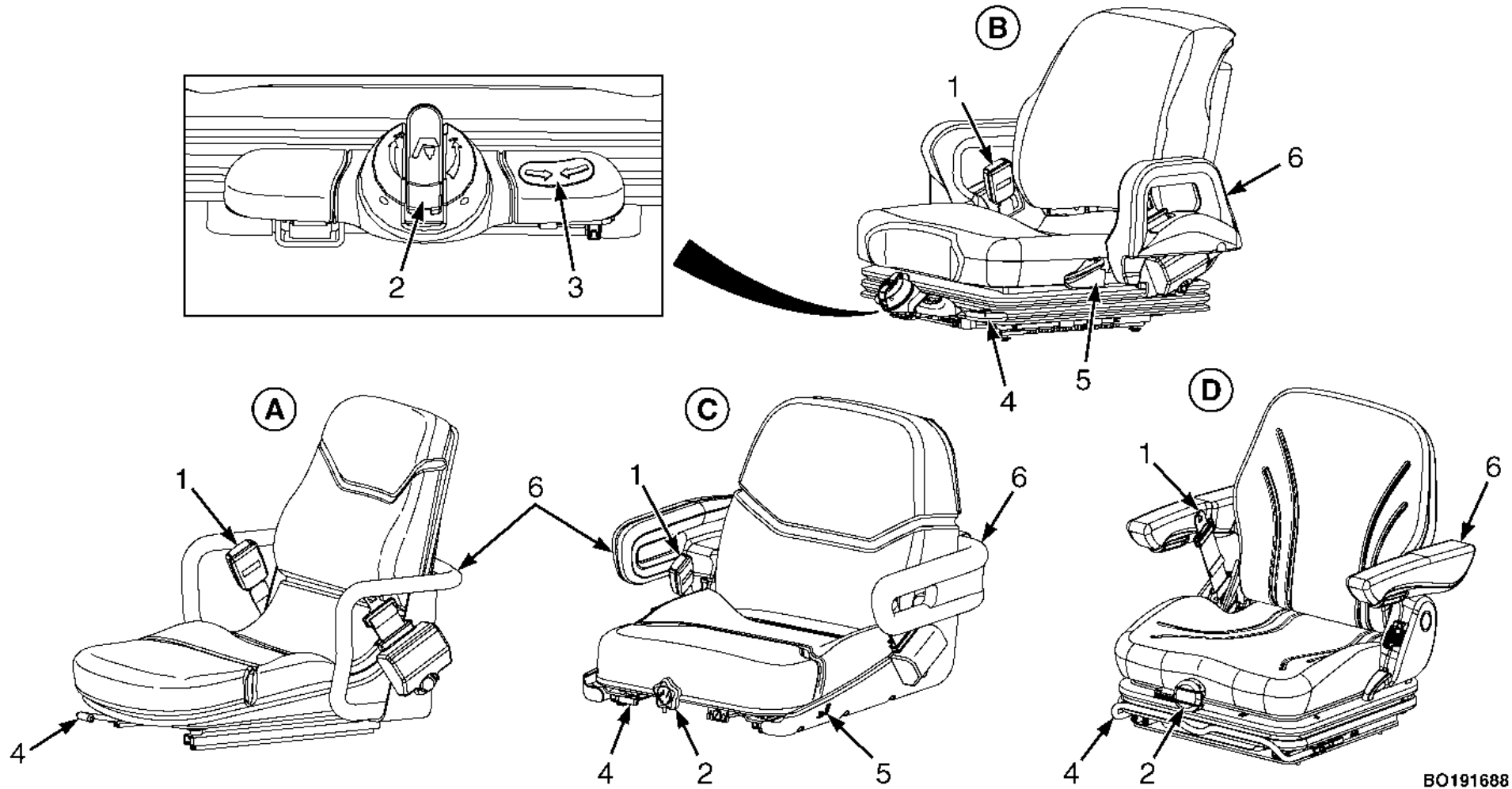
**NOTE:** It is important to adjust weight setting for each operator.

**NOTE:** The seat is designed for maximum weight of 145 kg (320 lb) for premium full suspension seat.

- The target is for the "ride indicator" to fall between the arrows when operator sits upright in seat with feet positioned on pedals. This ensures that the operator sits upright in seat with feet positioned on pedals. This ensures that the operator is set at the midpoint of the 80 mm (3.15 in.) suspension
- The handle can be turned as shown to increase or decrease weight resistance. Pull handle out before turning. As the handle is turned the "stiffness" of the suspension can be felt to increase or decrease on which way handle is turned. See **Figure 6**.

## Operating Procedures

**HYSTER**



BO191688

**Figure 6. Seat Adjustment**



# HYSTER

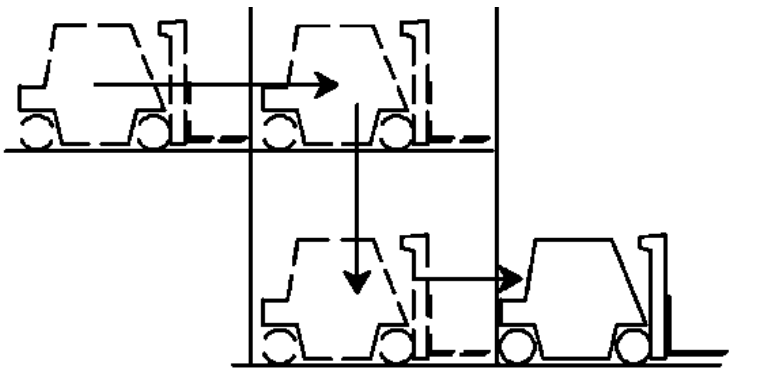
## Operating Procedures

### Legend for Figure 6

- A. STANDARD NON-SUSPENSION SEAT
- B. PREMIUM FULL SUSPENSION SEAT
- 1. SEAT BELT
- 2. WEIGHT ADJUSTMENT KNOB
- 3. RIDE POSITION INDICATOR

- C. SEMI-SUSPENSION SEAT
- D. STANDAR FULL SUSPENSION SEAT
- 4. FORWARD/BACKWARD ADJUSTMENT LEVER
- 5. BACKREST ANGLE ADJUSTMENT LEVER
- 6. ARMREST

6. DO NOT drive a lift truck into an lift unless authorized to do so. Approach the lift slowly. After the lift is properly leveled, the lift truck must be centered so that the lift is balanced.



BO190118

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

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



### Driving and Direction Changes

**KNOW YOUR TRANSMISSION.** These lift truck models are equipped with a Basic Powershift or Electronic Powershift transmission. See **Table 3** and **Figure 7**. Read the following section carefully.

*Table 3. Transmissions*

Operational Feature	Basic Powershift or Electronic Powershift
Electronic Inching	Yes

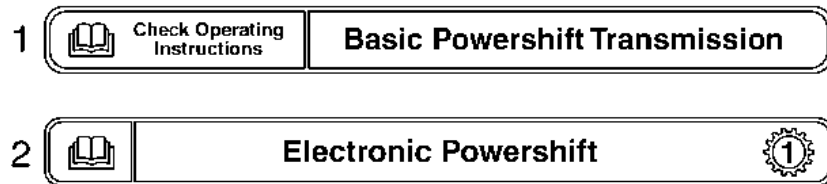


## Operating Procedures

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*Table 3. Transmissions (Continued)*

Operational Feature	Basic Powershift or Electronic Powershift
Electronic Control of Direction Changes	Yes



HO210054

1. BASIC POWERSHIFT TRANSMISSION
2. ELECTRONIC POWERSHIFT

**Figure 7. Transmission Labels**

### General

The lift truck can have either a MONOTROL® Pedal, a Direction Control Lever, or a Direction Control Switch to control the transmission. 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, rock the switch toward the palm rest to go **FORWARD** and toward the base to go in **REVERSE**. If the truck has a direction control lever, move the lever toward the front of the lift truck to go **FORWARD** and toward the rear of the lift truck to go in **REVERSE**.

### Normal Operations

In normal operating conditions, either at start or while driving the lift truck can only be maintained at a stopped position by applying the service brake or parking brake.

When moving away from a stop:

1. Select direction while maintaining braking.
2. Depress the accelerator or MONOTROL® Pedal.
3. Release the brakes (parking and/or service brake).

Depress the accelerator or MONOTROL® Pedal to ensure the lift truck will move in the selected direction when the brakes are released.

Due to variable load and grade conditions, this procedure minimizes the possibility of the lift truck traveling in a direction opposite to the one selected.



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## Operating Procedures

### 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 shift the transmission to neutral. 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.

These lift trucks are equipped with an Operator Presence System (OPS). The OPS feature has an electrical sensor in the seat which senses the presence of the operator. This allows the transmission in internal combustion engine trucks to be engaged only when the operator is in the seat. This feature also locks out lift and tilt functions. The OPS is designed with slight delay in the seat sensor to allow the operator to reposition himself without disengaging the transmission. When the seat sensor disengages the transmission (neutral position), the operator must select neutral, then re-select a direction to re-engage the traction (travel mode).

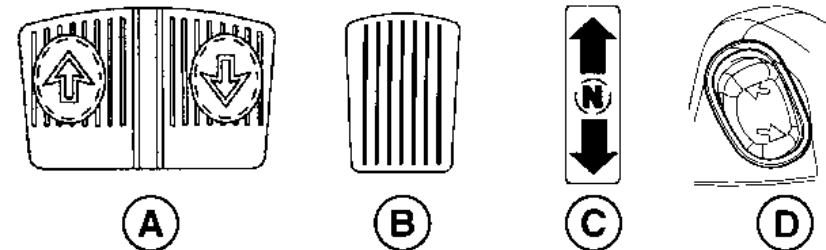
A switch in the operator's seat will automatically shift the transmission to neutral within 1-2 seconds when the opera-

tor leaves the seat of the lift truck with the engine running and without applying the parking brake.

### Basic Powershift or Electronic Powershift Transmission

#### **⚠ WARNING**

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



BO210035

- A. MONOTROL® pedal
- B. ACCELERATOR
- C. DIRECTION CONTROL LEVER
- D. MLM DIRECTION CONTROL

## Operating Procedures

**HYSTER**

### CAUTION

The drive train can be damaged if the lift truck is traveling too fast when the controls are changed to the opposite direction of travel.

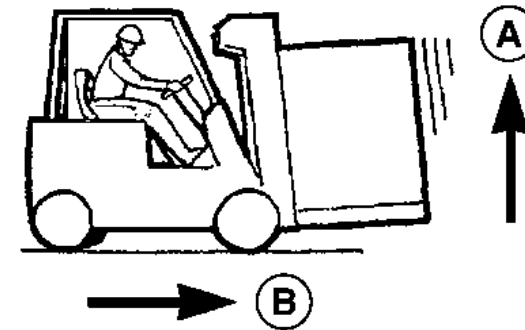
The operator can change the direction of travel at slow travel speeds (less than a walking speed), but the mast must not be in a raised position. If the lift truck is moving rapidly, slow to a walking speed before changing the direction of travel.

### Inching Control

### WARNING

Inching requires coordinated movement of the inching/brake pedal and the accelerator pedal. New operators must practice this procedure before attempting to handle loads.

Inching is the movement of a lift truck that allows a slow travel speed while keeping the engine speed high for fast operation of the lift mechanism or prevents rollback on an incline.



BO190120

A. FAST

B. SLOW

The inching/brake pedal is used to control the inching operation. During operation as the inching/brake pedal is applied, the clutch in the transmission gradually disengages while the brakes engage.

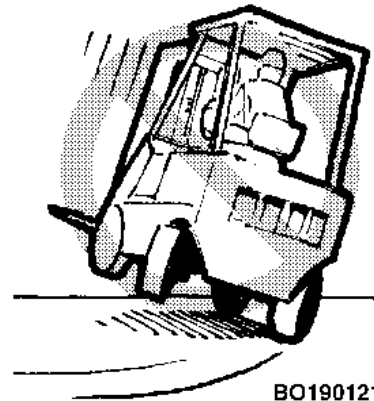


## HYSTER

## Operating Procedures

### Steering (Turning)

**⚠ 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.



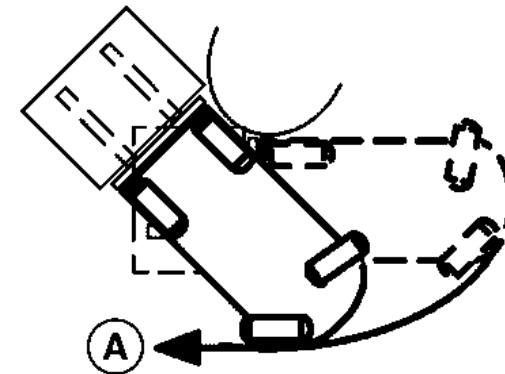
BO190121

**⚠ 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.

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. Mast tilt, off-center loads, and uneven

ground will aggravate these conditions and cause the fork-lift to become unstable.

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



BO190122

#### A. TAIL SWING

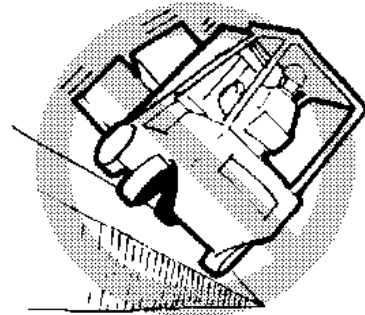
Because lift trucks are designed to work in a relatively small space, they can turn sharper than some other vehicles. Most lift trucks are steered by the rear wheels and the rear of the lift truck can move to the side very fast during a turn. This movement is called "tail swing". An operator must be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



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observe the tail swing area when making a turn can lead to injury or death.

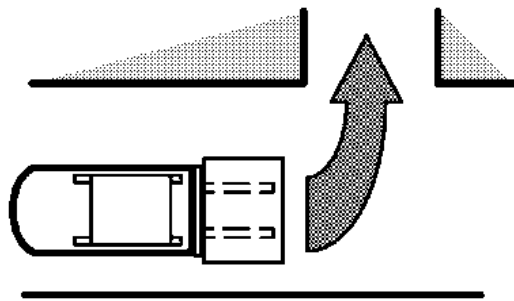
DO NOT turn on an incline. To reduce the possibility of a tipover, a lift truck must not be driven across an incline.



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.



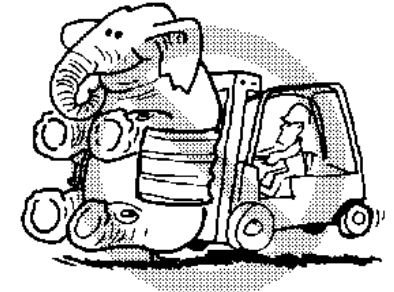
BO190125

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 swing will permit. This action permits the lift truck to enter the narrow aisle going straight ahead.

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## Load Handling, General

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



BO190124

However, factors such as weak floors or uneven terrain, loads with a high center of gravity, unevenly distributed loads, or tyre condition can mean that the safe working load is less than the capacity shown on the Nameplate. When such conditions exist, the operator must reduce the load so 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 fail.**

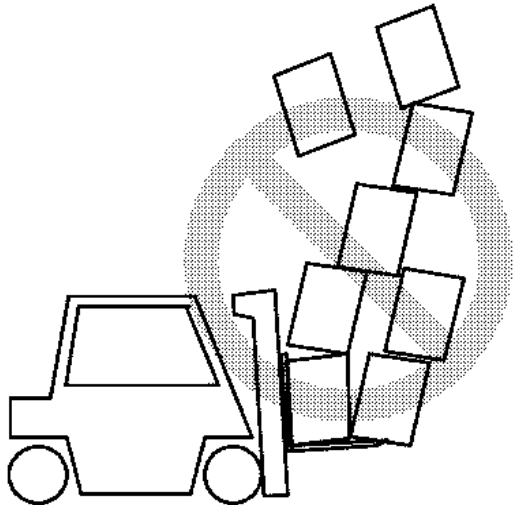
2. Handle only stable loads. A load can have unstable items that can easily shift and fall on someone.

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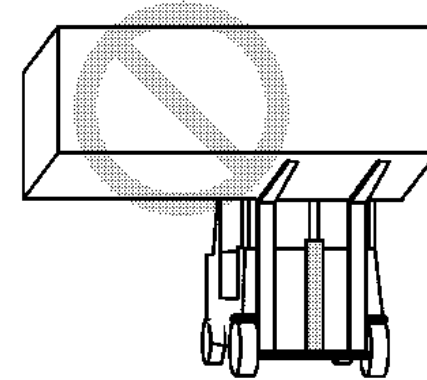
## Operating Procedures

### WARNING

If the fork/locking pin is not fully engaged, the fork could become unintentionally disengaged.



BO190126



BO190127

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

If the weight of the load is not centered between the forks, the load can fall from the forks when you turn a corner or hit a bump. An off-center load will increase the possibility of the truck tipping over to the side. Make sure the pins that keep the forks in position are engaged so that the forks cannot move.

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

## Operating Procedures

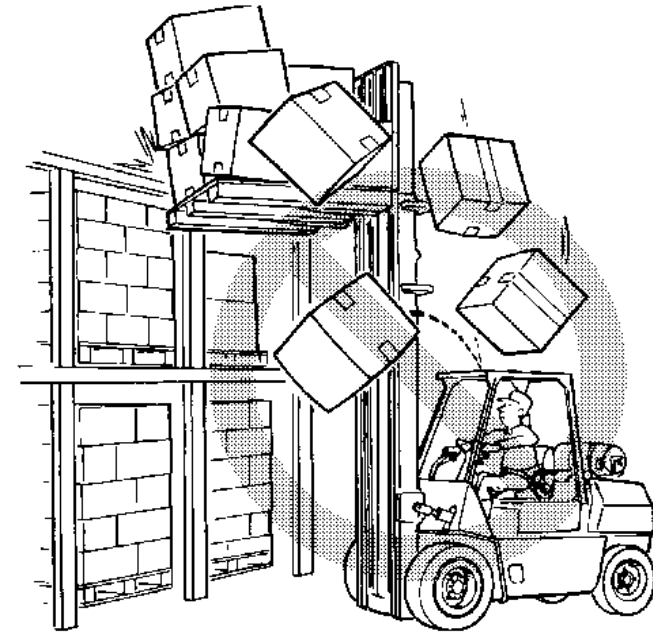
**HYSTER**

### Load Handling, Lifting, Lowering, and Tilting

The **LIFT** and **TILT** functions are controlled by separate levers. See the **Controls** section in the **Model Description** section for the correct operation.

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

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



B0190128

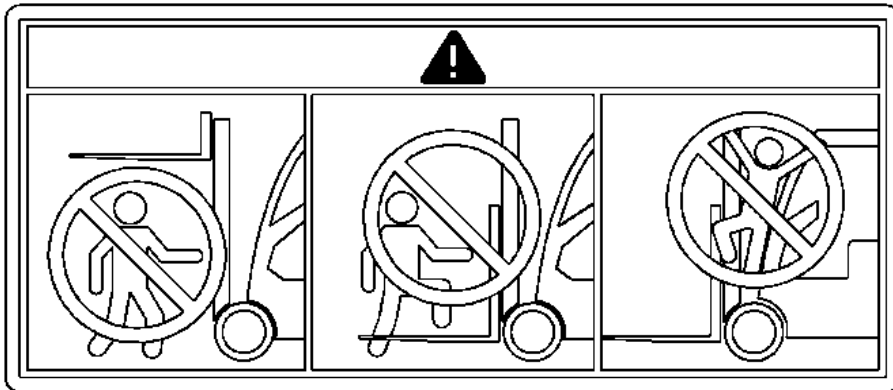
A lift truck without an overhead guard provides no such protection and other personnel have no overhead protection. Avoid hitting objects such as stacked material that could become dislodged and fall.

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.

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## Operating Procedures

### ⚠ WARNING



BO190290

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

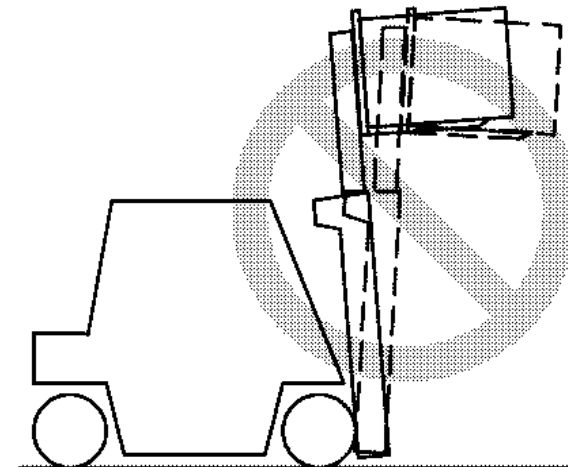
### ⚠ WARNING



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.



## Operating Procedures

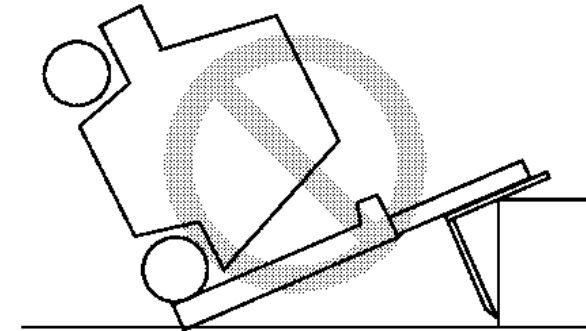
**HYSTER**

### **WARNING**

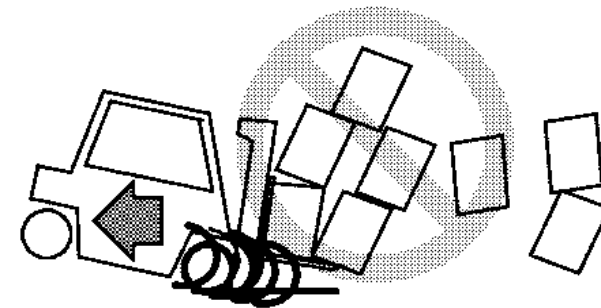
The lift truck can tip over forward when the load is raised. Forward tipping is even more likely when tilting forward, braking when traveling forward, or accelerating in reverse.

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.

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



### **Load Handling, How to Engage and Disengage a Load**



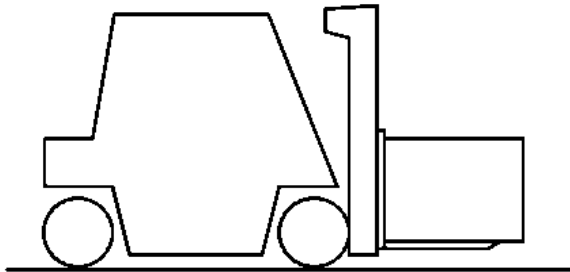
1. Avoid fast starts. Sudden movement can cause the lift truck to tip. People can be hurt or killed and material can be damaged.



## HYSTER

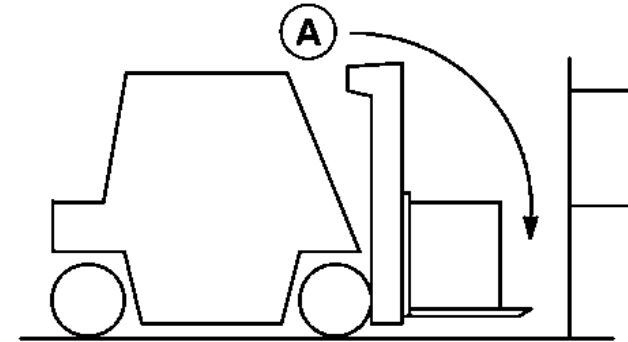
## Operating Procedures

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.



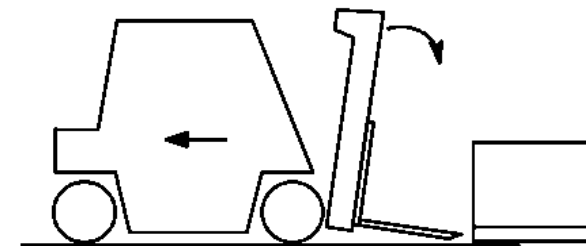
2. Move forward slowly until the forks are in position under the load. The forks must support at least two-thirds (2/3) of the length of the load.

Make sure that the load is centered between the forks. 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

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.

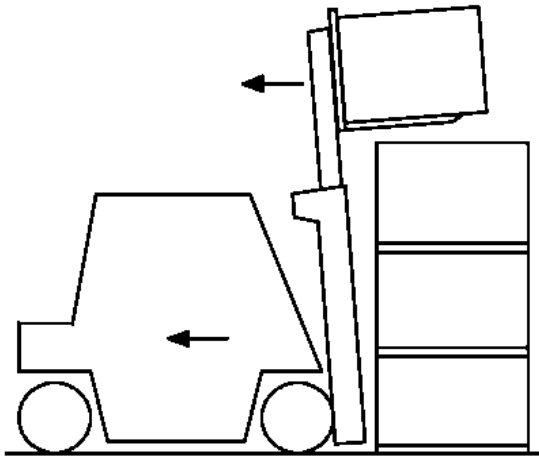


3. When a load is put on the floor, tilt the mast forward to a vertical position and lower the load. Tilt the mast forward to

## Operating Procedures

**HYSTER**

permit smooth removal of the forks. Carefully move the lift truck backward to remove the forks from under the load.

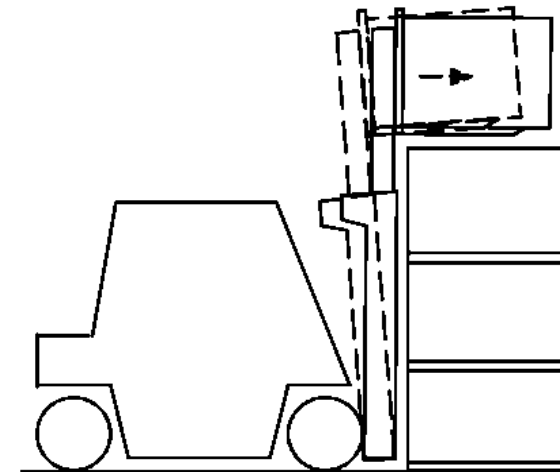


4. If the load is being removed from a stack, slowly move the lift truck away from the stack. When the load is clear of the stack, lower the load for traveling. Always travel with the load as low as possible and tilted backward. Lowering speed is controlled by the position of the control lever. Lower 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.

### **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.**

5. To put the load on a stack, align the lift truck with the stack. 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. Be careful not to damage or move adjacent loads.



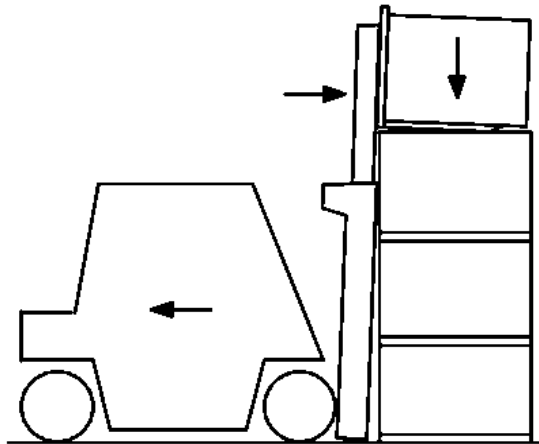




## HYSTER

## Operating Procedures

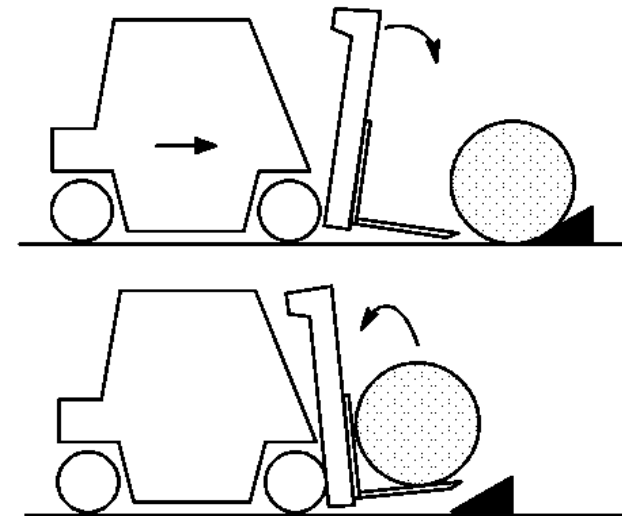
**IF THE LIFT TRUCK TIPS OVER EITHER TO THE SIDE OR FORWARD, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN FORWARD AND AWAY FROM THE POINT OF IMPACT.**



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. Tilt the mast forward just enough to permit smooth removal of the forks from 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.

6. 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.



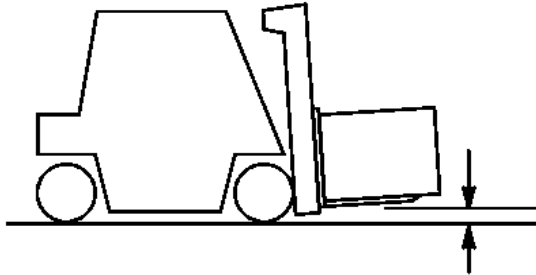
### Load Handling, Traveling

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.



## Operating Procedures

**HYSTER**



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

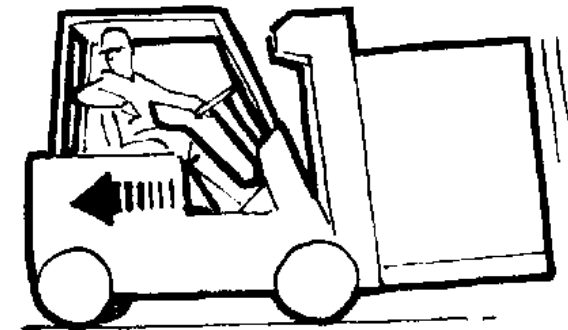
When the mast, carriage, or load is in a raised position, the stability of the lift truck is reduced. This is also critical when the lift truck is not carrying a load. The ability of the lift truck to resist side tipping can be less on a lift truck without a load than it is on a lift truck with a load 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 tail swing 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 is required. Never drive when visibility is obstructed.

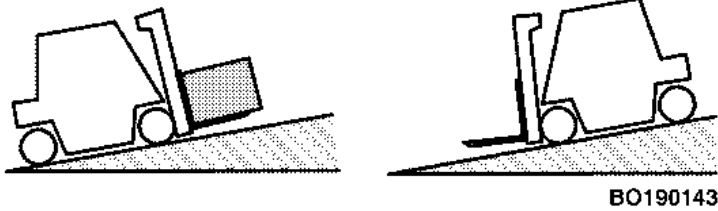


4. When traveling up or down grades in excess of 5% with a **heavily loaded** lift truck, keep the load upgrade to maintain control.



# HYSTER

## Operating Procedures



When operating an **unloaded** lift truck on a grade in excess of 5%, keep the counterweight upgrade.

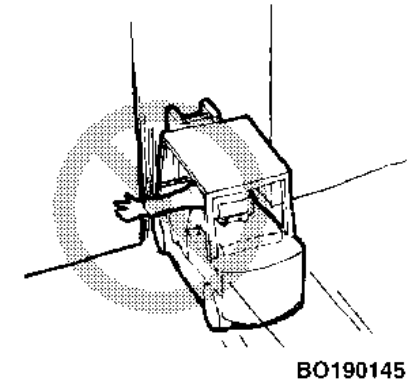
**5.** Watch out for pedestrians at all times. DO NOT drive up to anyone standing in front of an object. Use extra care at cross-aisles, doorways, and other locations where pedestrians can step into the path of travel of the lift truck.



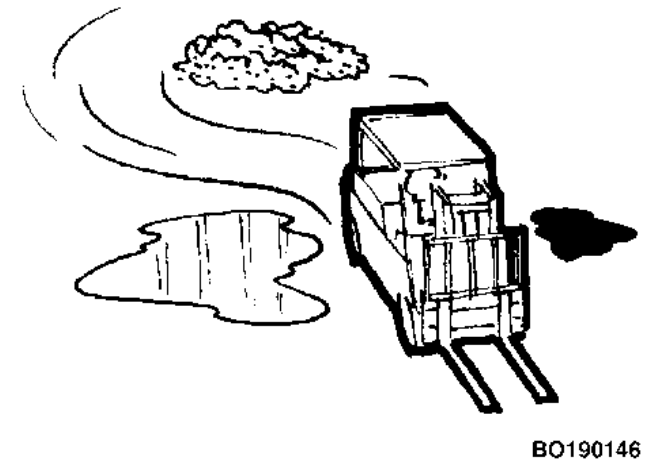
BO190144

Slow down when approaching blind intersections or turns and sound the horn. The horn is to warn pedestrians that there is a vehicle in the area and to be alert to possible danger.

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



**7.** Avoid bumps, holes, mud, slick spots, and loose materials that may cause the lift truck to swerve or tip. If unavoidable, slow down.



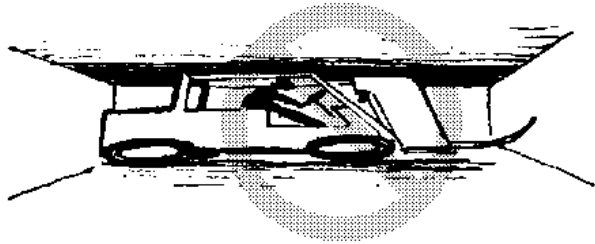
Different models of lift trucks are designed to operate under different conditions. Solid rubber tyre models are designed to operate on relatively smooth, firm surfaces. Lift trucks with pneumatic tyres can adapt to more uneven ground. Always make sure you pick the smoothest route for your lift truck.



## Operating Procedures

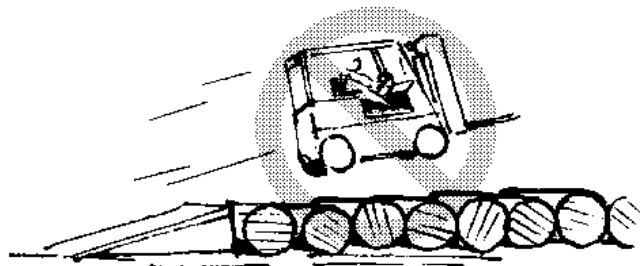
**HYSTER**

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



BO190147

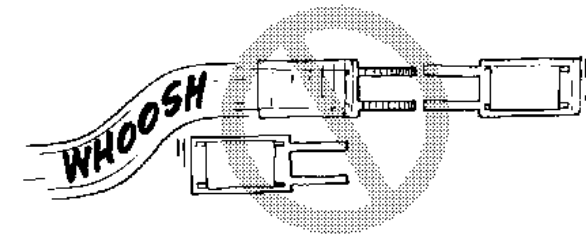
The operator must be aware that the forks can sometimes extend beyond the front of the load. If the forks extend beyond the load, the operator can hit an object or lift another load. Serious accidents can be caused by mast and overhead guards hitting pipes and beams near the ceiling.



BO190148

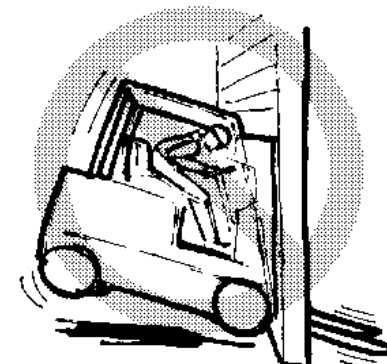
9. DO NOT indulge in stunt driving or horseplay.

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 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.



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## HYSTER

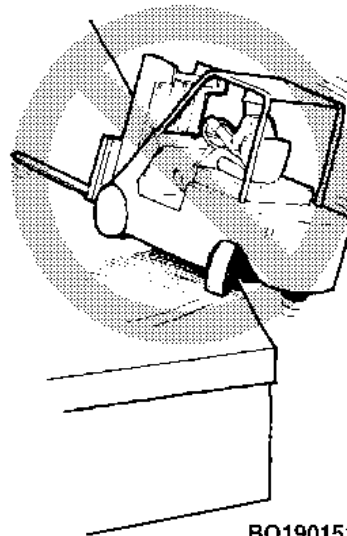
## Operating Procedures

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.

### Lorry, Freight Wagons, 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 traveling 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.

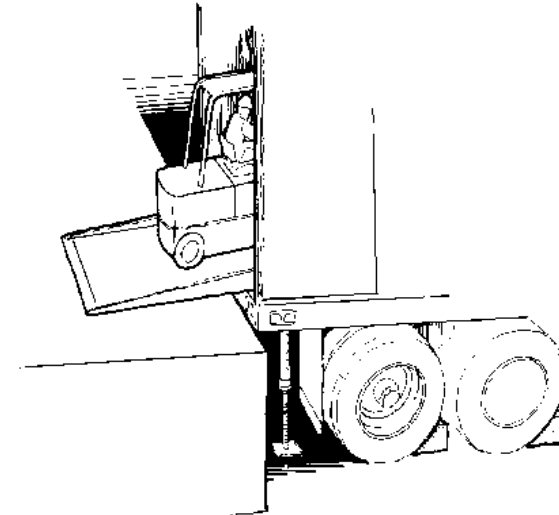


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**IF THE LIFT TRUCK FALLS OFF THE DOCK, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN FORWARD AND AWAY FROM THE POINT OF IMPACT.**

Before operating in a lorry or freight wagons observe the following:

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



BO190152

- Check to make sure that the brakes on the lorry 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



## Operating Procedures

**HYSTER**

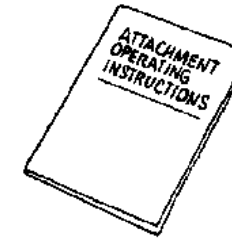
front and rear of a lorry trailer to prevent it from moving or tipping during loading or unloading.

- Make sure that the freight wagons brakes are set and the wheels are blocked while loading or unloading. Do this check so that the freight wagons will not move due to the movement of the lift truck in and out of the freight wagons.
- Check the condition of the driving surface. Make sure the floor will support the weight of the lift truck and the load.
- Make sure the dock board is secured, in good condition, and of the proper capacity.
- When entering a freight wagons, the operator can enter at an angle (if the dock plate or bridge is wide enough). This will reduce the turning required after entering.
- Never leave a parked truck on a dock plate.

## Attachments

### **WARNING**

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

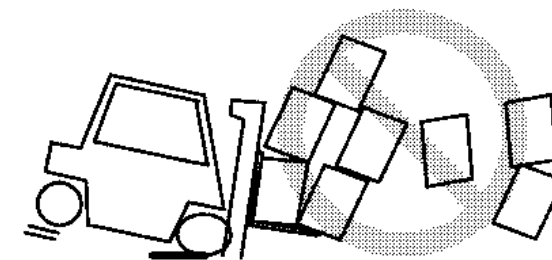


BO190153

If an attachment is installed on the lift truck, make sure the operating instructions are available and understood before operating the attachment. For the operation of attachment control levers, see **Figure 4** and **Table 1**.

Attachments must be removed or installed by trained personnel only.

## Stopping



BO190154



## HYSTER

## Operating Procedures

Stop the lift truck as gradually as possible. Hard braking and wheel sliding can cause the forklift to tip or the load to fall off of the forks and damage the load or hurt someone.

### Parking

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.
2. Fully lower the forks or carriage. Tilt mast forward until the tips of the forks touch the ground.
3. If equipped, move the Direction Control Lever to the **NEUTRAL** position.
4. Turn the key to the **OFF** position to stop the engine.
5. To release seat belt, press red release button and guide belt carefully back into retractor with your hand.
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 can not move.
7. Check engine compartment, if operating in areas containing combustible material, and remove foreign debris.

See **FIRE HAZARD WARNING** at the beginning of this section.

8. If the lift truck is not in active use, close the fuel valve at the tank. If the lift truck is going to be left over night or longer, the truck must be parked outside or the LPG tank must be removed and stored outside.

DO NOT park the lift truck so that it limits access to fire aisles, stairways, and fire equipment.

### Disconnecting Attachment Hydraulic Quick-Disconnect Hoses

1. Turn the key switch or keyless switch to the **OFF** position.
2. Disconnect the negative terminal of the battery.
3. Move the manual hydraulic levers forward and backward to relieve the system hydraulic pressure.
4. Disconnect the Quick-Disconnect hose connections. See **Figure 8**.



## Operating Procedures

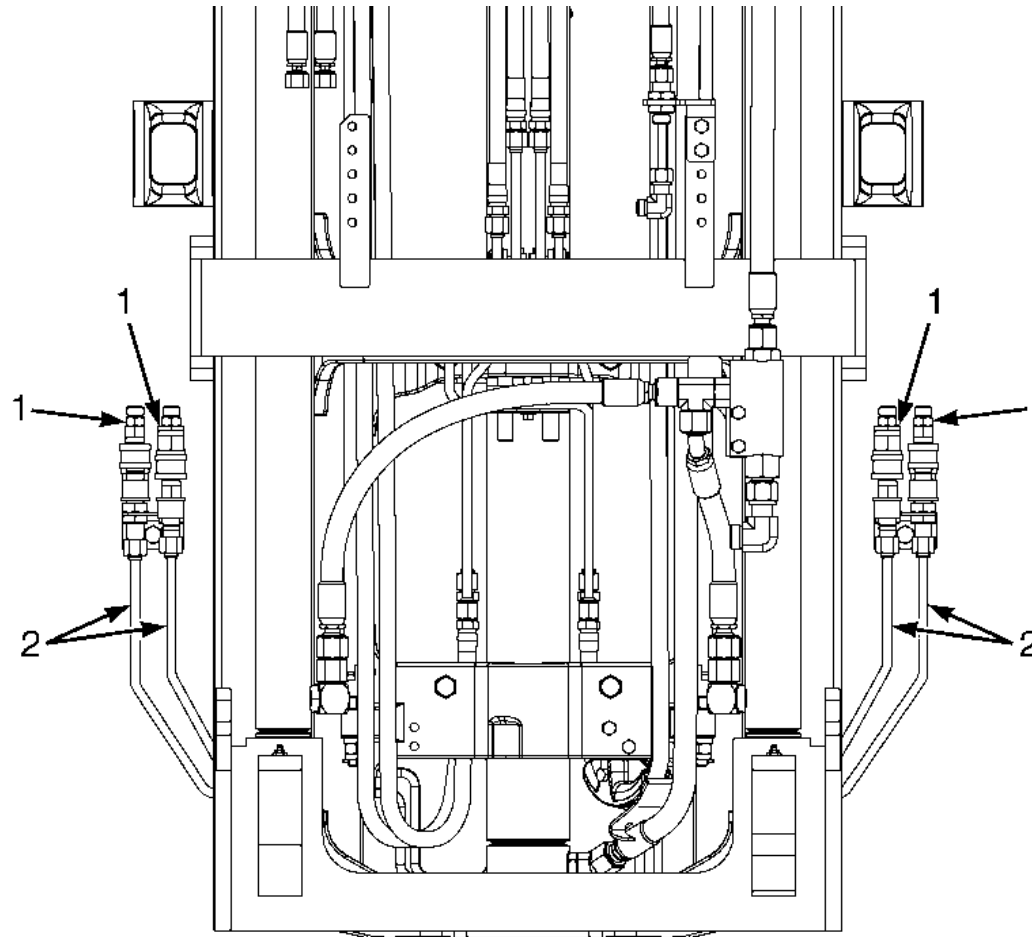
**HYSTER**

### Connecting Attachment Hydraulic Quick-Disconnect Hoses

1. Connect the Quick-Disconnect hose connections. See **Figure 8**.
2. Connect the negative terminal of the battery.

3. Turn the key switch or keyless switch to the **ON** position and start the engine.
4. Move the manual hydraulic levers forward and backward, and check the hydraulic system for leaks.





BO191586

1. QUICK-DISCONNECT FITTINGS

2. HYDRAULIC TUBES

**Figure 8. Quick-Disconnect Hoses Connections**



## Maintenance

**HYSTER**

### Maintenance

#### General

##### **WARNING**

**DO NOT** make modifications to the lift truck that affect the safe operation of the lift truck. Don't add parts or components that affect visibility.

**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 and remove the key.

##### **CAUTION**

**Disposal of lubricants and fluids 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 hour meter, and in calendar time. Use the interval that occurs first.

The recommendation for the time intervals are for eight hours 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 eight hours per day.
- If the lift truck must work in dirty operating conditions.
- Poor ground conditions.
- Intensive usage at high performance levels on other abnormal conditions will require more frequent servicing.

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.



## HYSTER

## Maintenance

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 for the lift truck is on the Nameplate. It is also on the right side of the frame, under the floor plate.

### How to Move a Disabled Lift Truck

#### **WARNING**

Use extra caution when towing a lift truck if any of the following conditions exist:

1. Brakes do not operate correctly.
2. Steering does not operate correctly.
3. Tyres are damaged.
4. Traction conditions are bad.
5. The lift truck must be towed on a slope.

If the engine cannot run, there is no power available for the hydraulic steering system. This condition can

**make the lift truck difficult to steer. Poor traction can cause the disabled lift truck or towing vehicle to slide. A slope will also make the lift truck more difficult to stop.**

**Never lift and move a disabled lift truck unless the disabled lift truck MUST be moved and cannot be towed. A lift truck used to move a disabled lift truck MUST have a capacity rating equal to or greater than the weight of the disabled lift truck. The capacity of the lift truck used to move a disabled lift truck must have 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. Put the weight center of the disabled lift truck on load center of the forks. Be careful to not damage the under side of the lift truck.**

### How to Tow the Lift Truck

1. The towed lift truck must have an operator.
2. Tow the lift truck slowly.
3. Using a lift truck or a lifting device that can be attached to the mast (i.e., come-a-long), raise the carriage and forks



## Maintenance

**HYSTER**

approximately 30 cm (12 in.) from surface. Install a chain around a mast crossmember and the carriage, to prevent carriage and mast channels from moving.

4. If another lift truck is used to tow the disabled lift truck, that lift truck must have an equal or larger capacity than the disabled lift truck. Install approximately 1/2 of a capacity load on the forks of the lift truck that is being used to tow the disabled lift truck. This 1/2 capacity load will increase the traction of the lift truck. Keep the load as low as possible.

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

### 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, drive axle, engine and transmission, and the counterweight. When the lift truck is put on blocks, put additional blocks in the following positions to maintain stability:**

1. **Before removing the mast and drive axle, put blocks under the counterweight so that the lift truck cannot fall backward.**
2. **Before removing the counterweight, put blocks under the mast assembly so that the lift truck cannot fall forward.**

**The surface must be solid, even, and level when the lift truck is put on blocks. Make sure that any blocks used to support the lift truck are solid, one piece units.**

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

### How to Raise the Drive Tyres (See Figure 9)

1. Put blocks on each side (front and back) of the steering tyres to prevent movement of the lift truck.
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 tyres are raised from the surface.



## **HYSTER**

## **Maintenance**

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

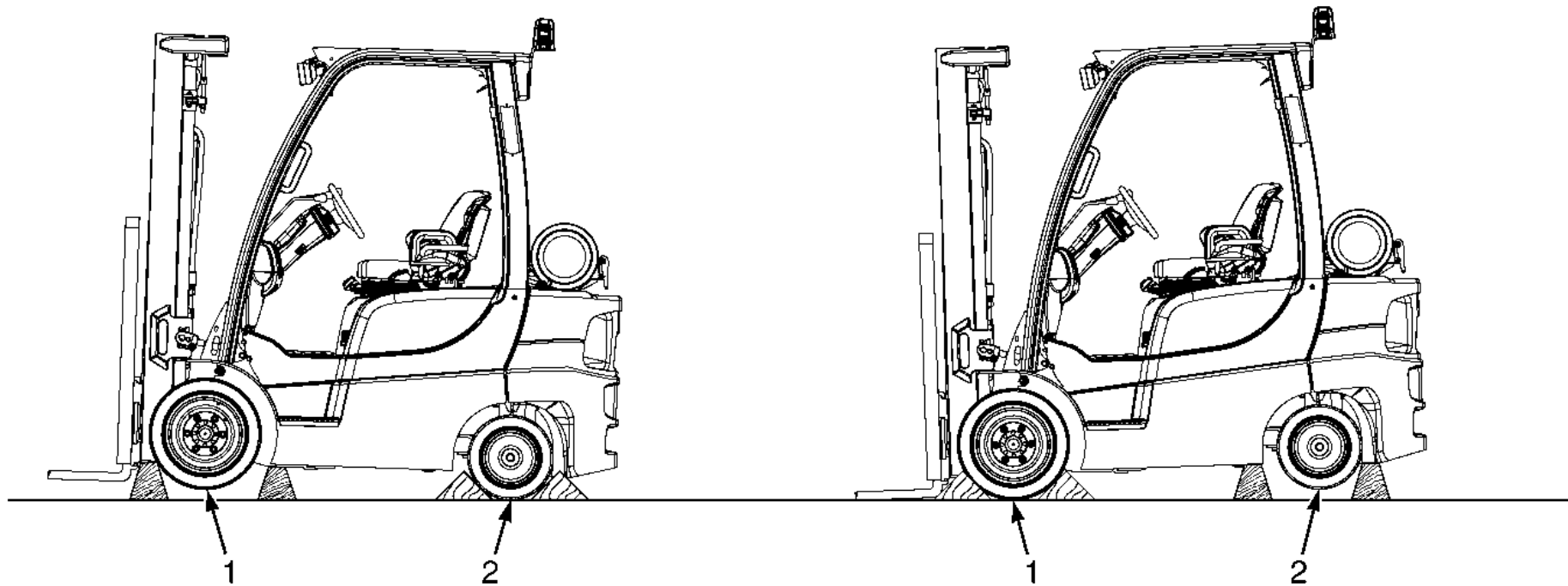
### **How to Raise the Steering Tyres (See Figure 9)**

1. Apply the parking brake. Put blocks on both sides (front and back) of the drive tyres to prevent movement of the lift truck.

2. Use a hydraulic jack to raise the steering tyres. 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.

## Maintenance

**HYSTER**



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1. DRIVE TYRES

2. STEERING TYRES

**Figure 9. Put a Lift Truck on Blocks**



## HYSTER

## Maintenance Schedule

### How to Clean a Lift Truck



#### CAUTION

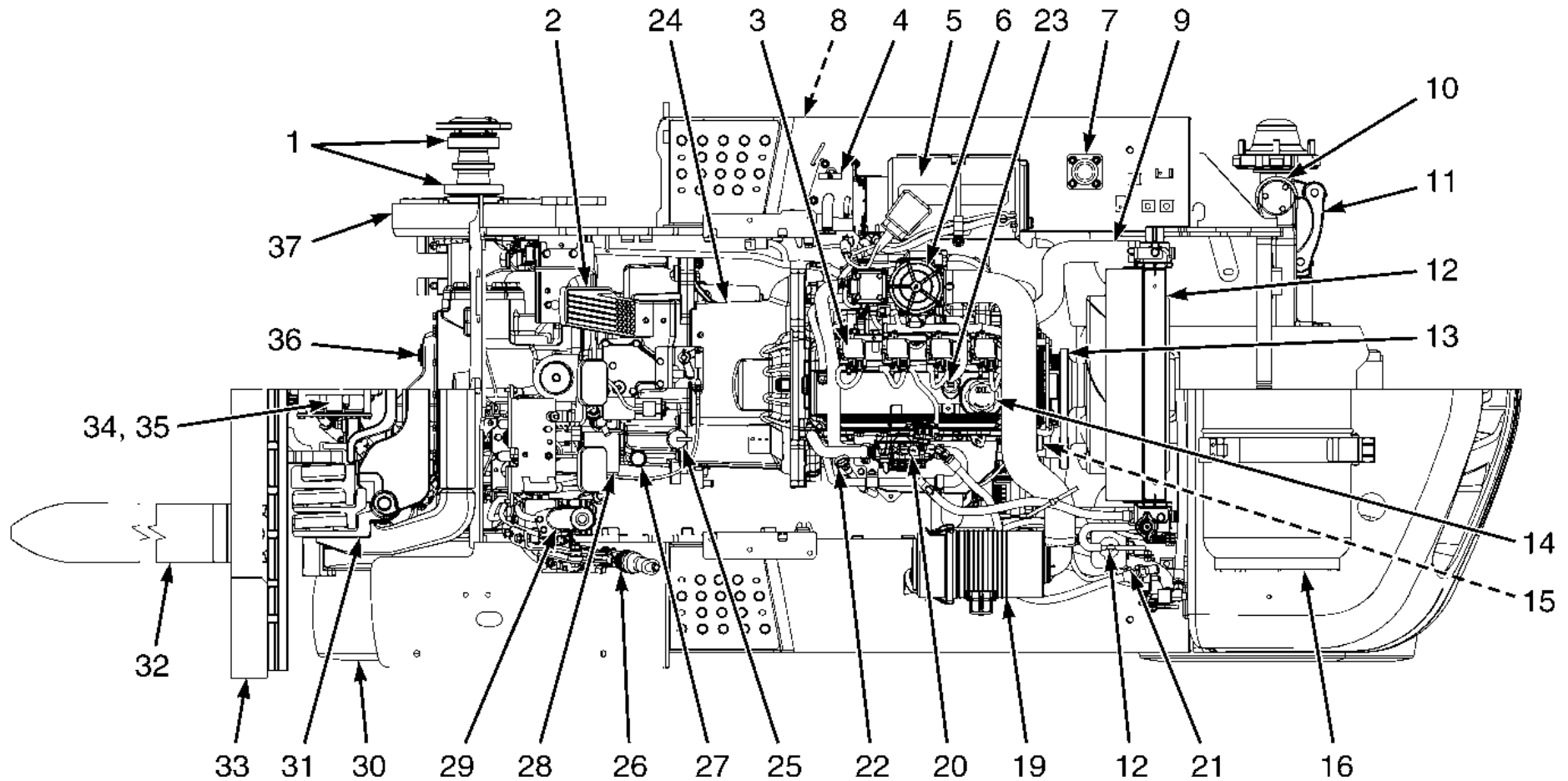
Your lift truck may be damaged if water or cleaning agents come in contact with electrical components. **DO NOT** directly spray any electrical components, especially connectors, switches, electro-hydraulic controls,

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**



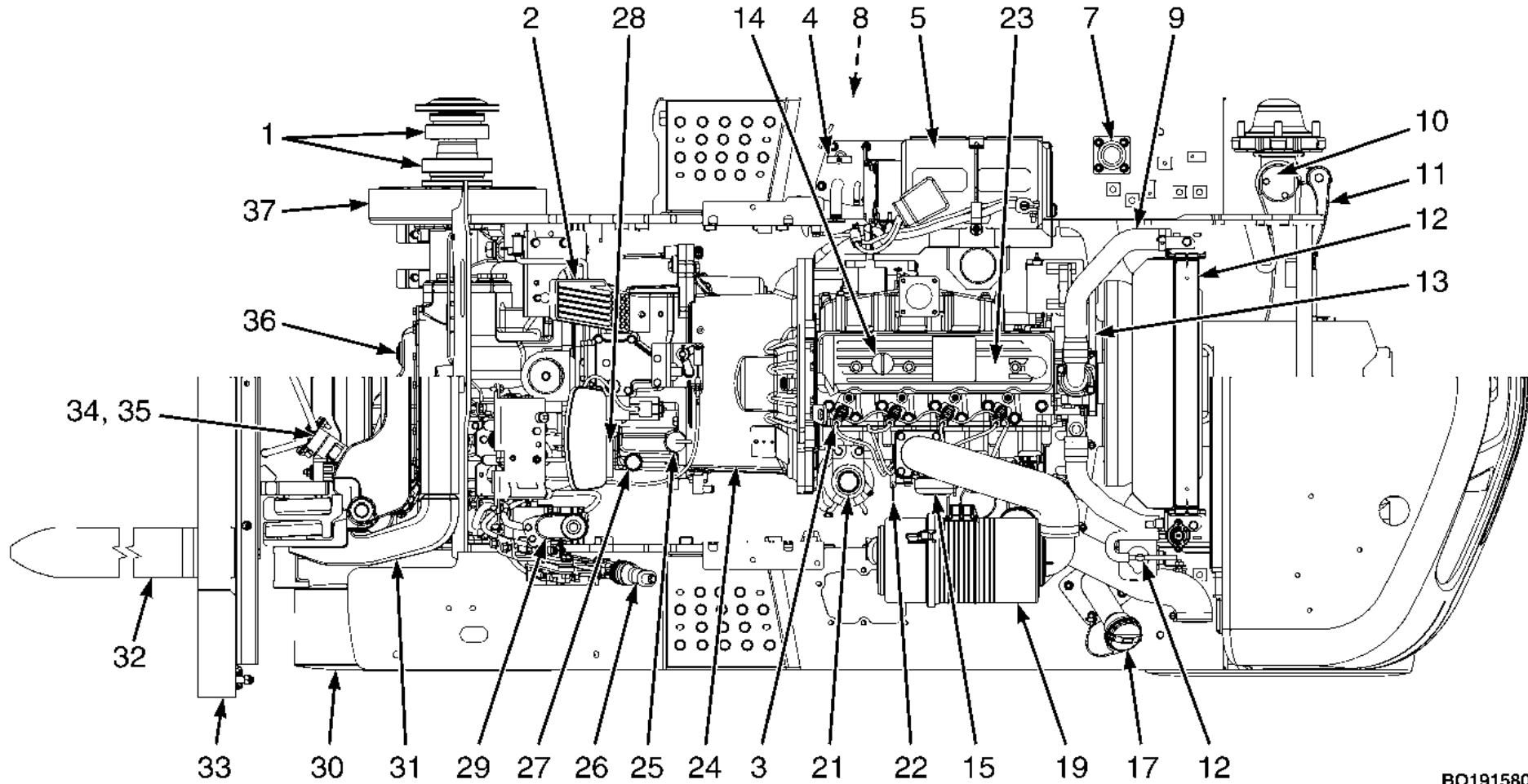
BO191579

**Figure 10. Maintenance and Lubrication Points, PSI 2.4L LPG Trucks**



# HYSTER

## Maintenance Schedule

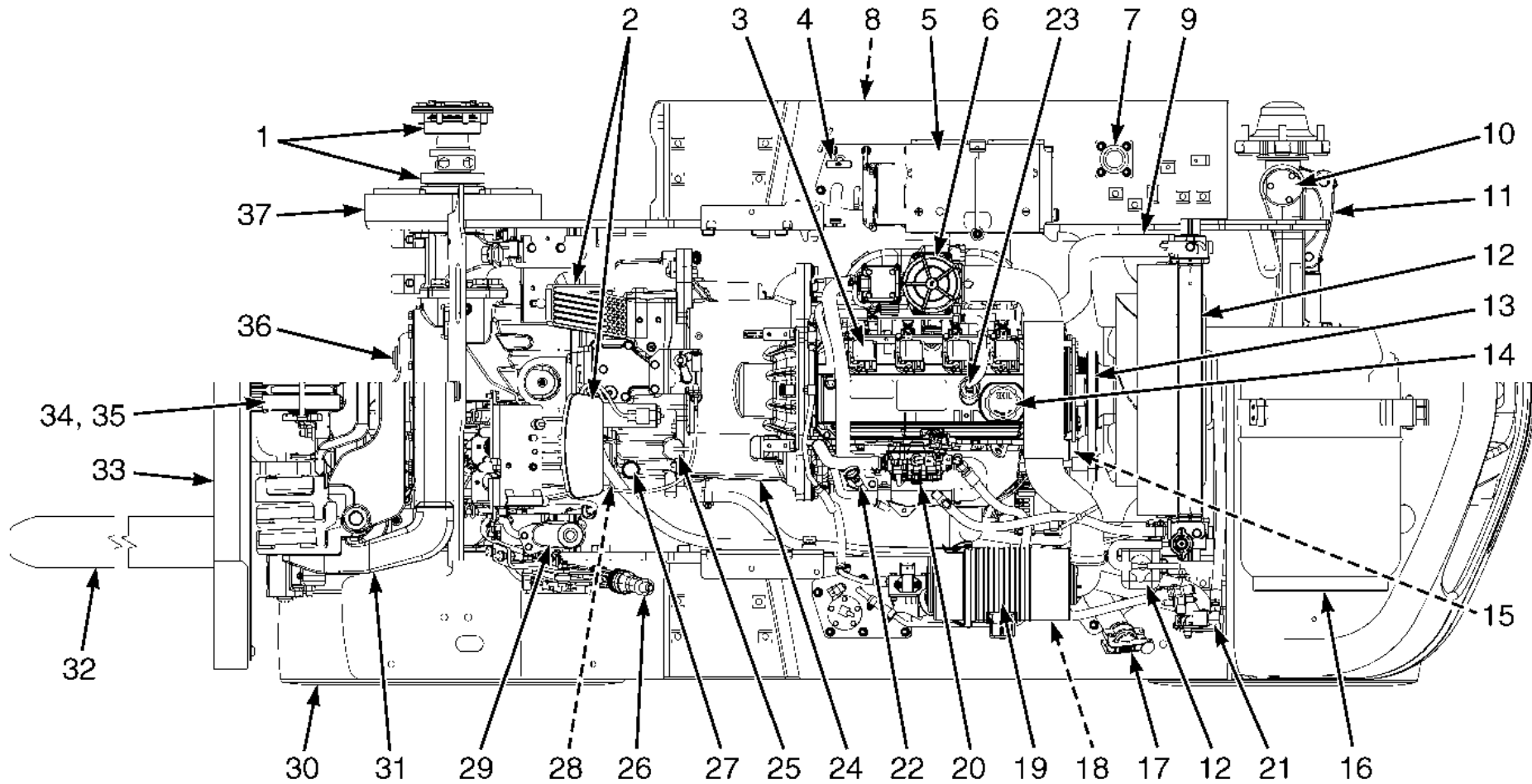


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**Figure 11. Maintenance and Lubrication Points, Yanmar 2.6L and 3.3L Diesel Trucks**

## Maintenance Schedule

**HYSTER**



BO191581

**Figure 12. Maintenance and Lubrication Points, PSI 2.4L Bi-Fuel Trucks**



# HYSTER

## Maintenance Schedule

### Maintenance Schedule

(See Figure 10, Figure 11, and Figure 12)

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
30	TYRES AND WHEELS	X					Check Condition.	See Nameplate.
	SAFETY LABELS	X					Replace as Neces- sary.	See <b>Parts Manual</b> .
31, 33, 34, 35	MAST, CARRIAGE, HEADER HOSES, LIFT CHAINS, AND ATTACHMENT	X					Check Condition and Lubrication.	See <b>Parts Manual</b> .
	SEAT BELT, HIP RESTRAINTS, AND SEAT RAILS	X					Check Condition and Operation.	
	BONNET AND SEAT LATCHES	X					Check Condition and Operation.	

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



## Maintenance Schedule

**HYSTER**

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
	ENGINE COMPARTMENT	X					Remove Combustible Materials. See NOTE 5 and NOTE 15.	
	CHECK FOR LEAKS - FUEL, OIL, WATER	X					Check for Leaks. See NOTE 1.	
	HYDRAULIC HOSES	X					Check Condition. See NOTE 15.	See <b>Parts Manual</b> .
9	COOLANT HOSES	X					Check Condition. See NOTE 15.	See <b>Parts Manual</b> .
16	FUEL TANK PSI 2.4L LPG Engine	CIL					29.9 liter (7.9 gal)	LPG - HD 5
17	FUEL TANK Yanmar Diesel Engines	CIL					69 liter (18.2 gal)	No. 2 Diesel
17	FUEL TANK Petrol - PSI 2.4L Bi-Fuel Engine	CIL					69 liter (18.2 gal)	86 Octane Petrol Minimum
	HORN, LIGHTS, ALARMS, FUSES, AND RELAYS	X					Check Operation.	

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



# HYSTER

## Maintenance Schedule

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
37	SERVICE BRAKES	X					Check Operation.	
37	SERVICE BRAKES				X		Check Lining Thickness.	1.0 mm (0.04 in.) Minimum
26	PARKING BRAKE	X					Check Operation.	
	ACCELERATOR CABLE					C	1 Cable	See <b>Parts Manual</b> .
36	DRIVE AXLE	X					Check for Leaks. Check Operation.	
36	DIFFERENTIAL AND DRIVE AXLE OIL		X		C		6.5 liter (6.9 qt) See NOTE 14.	SAE 80W-90 API GL-5
	STEERING CONTROLS	X					Check Operation and Condition.	
24	TRANSMISSION	X					Check for Leaks and Operation.	
25	TRANSMISSION OIL DIP- STICK		X				Check Oil Level. See NOTE 15.	John Deere JDM J20C
25	TRANSMISSION OIL				C		8.3 liter (8.8 qt) See NOTE 15.	John Deere JDM J20C

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



## Maintenance Schedule

**HYSTER**

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
28	TRANSMISSION OIL FILTER				C		1 Filter See NOTE 4 and NOTE 15.	See <b>Parts Manual</b> .
27	TRANSMISSION OIL BREATHER			C			1 Breather See NOTE 15.	See <b>Parts Manual</b> .
4	HYDRAULIC OIL	X	X		C		30.0 liter (31.7 qt) See NOTE 2, NOTE 3, NOTE 13 and NOTE 15.	ISO VG 46Hydraulic Oil -20 °C (-4 °F) and Above
8	HYDRAULIC OIL RETURN FILTER				C		1 Filter See NOTE 13 and NOTE 15.	See <b>Parts Manual</b> .
7	HYDRAULIC TANK BREATHER		X		C		Inspect and Replace as Neces- sary. See NOTE 13 and NOTE 15.	See <b>Parts Manual</b> .
5	BATTERY AND CABLE TERMINALS		X				Clean.	

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



# HYSTER

## Maintenance Schedule

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
14	ENGINE OIL PSI Engines	X CIL	C Every 6 mo				4.9 liter (5.2 qt) See NOTE 4, NOTE 5, and NOTE 15.	-20 to 30 °C (20 °F) and Below SAE 5W-20 16 °C (60 °F) and Below SAE 5W-30 -18 °C (0 °F) and Above SAE 10W-30 API SL ILSAC GF3 SAE J2362
15	ENGINE OIL FILTER PSI Engines		C Every 6 mo				1 Filter See NOTE 4, NOTE 5, and NOTE 15.	See <b>Parts Manual</b> .

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



## Maintenance Schedule

**HYSTER**

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
14	ENGINE OIL Yanmar Diesel Engines		C				10.2 liter (10.8 qt) See NOTE 4, NOTE 5, and NOTE 15.	20 °C (68 °F) and Over SAE 40 10 to 30 °C (50 to 86 °F) SAE 30 0 to 20 °C (32 to 68 °F) SAE 20 -16 to 40 °C (3 to 103 °F) SAE 15W-40 -20 to 30 °C (-4 to 86 °F) SAE 10W-30 -10 to 10 °C (14 to 50 °F) SAE 20W -20 to 10 °C (-4 to 50 °F) SAE 10W API CG-4 or Better
15	ENGINE OIL FILTER Yanmar Diesel Engines		C				1 Filter See NOTE 4, NOTE 5, and NOTE 15.	See <b>Parts Manual</b> .
19	AIR FILTER	X CIL			C		1 Filter See NOTE 5, NOTE 6, and NOTE 11.	See <b>Parts Manual</b> .

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





# HYSTER

## Maintenance Schedule

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
13	DRIVE BELT PSI Engines		X				Check for Wear and Damage. Adjust as Needed.	
13	DRIVE BELT Yanmar Diesel Engines		X				Check for Wear and Damage. Adjust as Needed.	
6	LPG REGULATOR PSI Engine		X				Drain Tar. See NOTE 5.	
6	LPG REGULATOR FILTER PSI Engine				C		1 Filter	See <b>Parts Manual</b> .
20	LPG VAPORIZER PSI Engine		X					
	ENGINE IDLE SPEED PSI Engine		X					850 ±25 RPM
	ENGINE GOVERNED SPEED (No Load) PSI Engine		X					2700 ±25 RPM
	ENGINE IDLE SPEED Yanmar Engine		X					850 ±50 RPM

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



## Maintenance Schedule

**HYSTER**

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
	ENGINE GOVERNED SPEED (No Load) Yanmar Engine		X					2625 ±25 RPM
	PCV Valve PSI 2.4L Engine				C		Replace as Neces- sary.	See <b>Parts Manual</b> .
23	VALVE ADJUSTMENT PSI Engine						Not Adjustable.	
23	VALVE ADJUSTMENT Yanmar Engine			X			Adjust as Needed.	Intake (cold) 0.20 ±0.05 mm (0.008 to 0.002 in.) Exhaust (cold) 0.20 ±0.05 mm (0.008 to 0.002 in.)
	TIMING Yanmar 2.6L Engine				X		Adjust as Needed.	Preset at 4° ATDC
	TIMING Yanmar 3.3L Engine				X		Adjust as Needed.	Preset at 6° ATDC
21	LPG FUEL FILTER PSI Engines			C			1 Filter	See <b>Parts Manual</b> .
18	GASOLINE FUEL FILTER PSI Bi-Fuel Engine		C				1 Filter	See <b>Parts Manual</b> .

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



# HYSTER

## Maintenance Schedule

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
21	FUEL WATER SEPARATOR FILTER Yanmar Diesel	CIL	C				1 Filter Drain Water from Filter as Required..	See <b>Parts Manual</b> .
21	IN-LINE FUEL STRAINER Yanmar Diesel			C			1 Filter	See <b>Parts Manual</b> .
3	FUEL INJECTORS PSI Engines					X	Check and Replace if Necessary. 4 Injectors See NOTE 7 and NOTE 15.	See <b>Parts Manual</b> .
3	FUEL INJECTORS Yanmar Diesel Engines				X		Check and Replace if Necessary. 4 Injectors See NOTE 15.	See <b>Parts Manual</b> .
3	SPARK PLUGS PSI Bi-Fuel Engine			C			Change Spark Plugs. 4 Plugs	Torch P/N DK7RTC 0.9 mm (0.035 in.)
12	COOLING SYSTEM PSI Engine	X CIL				C	11.0 liter (11.6 qt)	See NOTE 12.
12	COOLING SYSTEM Yanmar Engines	X CIL			C		11.5 liter (12.2 qt)	See NOTE 12.
	CLEAN DEBRIS FROM RADIATOR CORE		X				See NOTE 5.	

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



## Maintenance Schedule

**HYSTER**

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
32	FORKS	X	X		X		Check Condition.	
32	FORK LATCHES		L				Lubricate as Required.	Multipurpose Grease See NOTE 8.
	LIFT SYSTEM, OPERATE	X					Check Operation.	
31	MAST Sliding Surfaces and Load Roller Surfaces		L				Lubricate as Required. See NOTE 9.	Multipurpose Grease See NOTE 8.
35	HEADER HOSES		X				Check Condition.	
34	LIFT CHAINS	X	L	L, X			Check Condition. Lube as Required. See NOTE 10.	Engine Oil SAE 30W
	MAST Pivots		L				2 Fittings	Multipurpose Grease See NOTE 8.

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



# HYSTER

## Maintenance Schedule

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
	MAST Sideshift Carriage (Upper and Lower Bear- ing Strips)	X	L	X	C		Lubricate as Required. 2 Fittings for Upper Bearings and 2 Lower Bearing Strips. Check Lower Bear- ing Strips for Wear.	Multipurpose Grease See NOTE 8 and NOTE 10. 0 mm (0 in.) Minimum Thick- ness.
	MAST Fork Positioner	X	L	X			Lubricate as Required. 2 Fittings	Multipurpose Grease See NOTE 8.
	MAST Fork Positioner Cylinder Rod Anchors	X	L	X			Lubricate as Required. 2 Anchors	Multipurpose Grease See NOTE 8.
	MAST Fork Positioner and Lower Hook Capscrews		X				Check Torque. 8 Capscrews	
	TILT CYLINDER ENDS		L				4 Fittings	Multipurpose Grease See NOTE 8.
	BRAKE MASTER CYLINDER ROD END PIN		L					Use Silicone Spray Hyster Part No. 328388.

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



## Maintenance Schedule

**HYSTER**

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
	MANUAL HYDRAULIC HAND LEVERS		L					API SM ILSAC GF4 SAE J2362
29	BRAKE FLUID Master Cylinder	CIL	X		C		0.2 liter (0.21 pt)	SAE J-1703 (DOT 3)
1	DRIVE AXLE Wheel Bearings				L		Check Grease.	Multipurpose Grease See NOTE 8.
10	STEERING AXLE Spindle Bearings			L			4 Fittings	Multipurpose Grease See NOTE 8.
11	STEERING AXLE Tie Rods		L				4 Fittings	Multipurpose Grease See NOTE 8 and NOTE 17.
	STEERING AXLE King Pins		L				4 Fittings	Multipurpose Grease See NOTE 8 and NOTE 17.
	STEERING AXLE Wheel Bearings				L		Check Grease.	Multipurpose Grease See NOTE 8.
2	PEDALS, LEVERS, SEAT RAILS, CABLES, HINGES, LINKAGES		L				Lubricate as Required.	Use Silicone Spray Hyster Part No. 328388.
26	PARKING BRAKE ADJUSTMENT			X			Adjust as Neces- sary.	Must Hold a Full Capacity Load on a 15% Grade.
26	PARKING BRAKE			L			Lubricate as Required.	Use Silicone Spray Hyster Part No. 328388.

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



# HYSTER

## Maintenance Schedule

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
30	WHEEL NUTS Drive Wheels	X					Check Torque.	450 to 500 N•m (332 to 369 lbf ft)
30	WHEEL NUTS Steer Wheels	X					Check Torque.	155 to 175 N•m (114 to 129 lbf ft)
	TIMING BELT PSI Engine					C See NOTE 5. See NOTE 15.	Replace. See NOTE 16.	See <b>Parts Manual</b> .
	INSPECT ENGINE ELECTRICAL SYSTEM, CONNECTORS			x				
	INSPECT ENGINE VACUUM AND FUEL LINES AND FITTINGS				X			
	INSPECT LOCK-OFF FOR LEAKS AND ENSURE LOCK-OFF CLOSING				X			
	TEST LPG REGULATOR PRESSURE				X			

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



## Maintenance Schedule

**HYSTER**

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
	CHECK AIR INDUCTION SYSTEM FOR LEAKS				X			
	CHECK MANIFOLD FOR VACUUM LEAKS				X			
	CHECK THROTTLE SHAFT FOR STICKING				X			
	CHECK INJECTORS AND RAILS FOR LEAKS				X			
	INSPECT EXHAUST MANIFOLD AND PIPING FOR LEAKS				X			
	INSPECT CATALYST INLET AND OUTLET				X			
	INSPECT MUFFLER INLET AND OUTLET				X		Replace as Needed.	

NOTE 1: Check fuel system for leaks prior to any service or maintenance activity.

NOTE 2: Heavy-duty or high-temperature operations require more frequent checks.

NOTE 3: Heavy-duty or contaminated applications will require hydraulic oil change at 2000 hours.

NOTE 4: Change engine oil and filter after first 100 hours of operation. Change transmission oil filter after first 500 hours of operation.

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





# HYSTER

## Maintenance Schedule

Item No.	Item	8 Hr/ 1 Day	500 Hr/ 1 Yr	1000 Hr/ 1 Yr	2000 Hr/ 1 Yr	4000 Hr/ 2 Yr	Procedure or Quantity	Specification
<p>NOTE 5: 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 <b>Hyster</b> dealer will advise you of the appropriate service intervals based on an application survey.</p> <p>NOTE 6: In dirty or dusty environments, replace at 1000 hours or as needed.</p> <p>NOTE 7: Check fuel injectors at 5000 hours or 7 years. See <b>PSI 2.4L Engine</b>0600 SRM 1755 for procedures.</p> <p>NOTE 8: Multipurpose grease with 2 to 4% Molybdenum Disulfide.</p> <p>NOTE 9: Lubricate mast every three months if unit has less than 1000 hours.</p> <p>NOTE 10: Lubricate if dry or at first sign of visible surface rust.</p> <p>NOTE 11: Do not open the air filter canister except to change the air filter element. See the Periodic Maintenance Manual for your lift truck for the correct procedure to change air filter element.</p> <p>NOTE 12: Use Ethylene Glycol Boron-free Antifreeze. Purchase a pre-diluted 50/50 solution; or mix 50% concentrate with 50% distilled or deionized water.</p> <p>NOTE 13: Hydraulic oil sampling and analysis is a recommended practice. See <b>Hydraulic Cleanliness Procedures</b> 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.</p> <p>NOTE 14: Change differential/drive axle oil at 2400 hours. Use hour interval only.</p> <p>NOTE 15: Turn lift truck engine <b>OFF</b> prior to performing maintenance or checks in engine compartment.</p> <p>NOTE 16: Change timing belt every 6000 hours. Use hour interval only. Use <b>Kit-Service 6000 hours</b> specified in the <b>Parts Manual</b> for your lift truck.</p> <p>NOTE 17: Lubricate tie rod ends and king pins at 300 hours. Use hour interval only.</p>								
<p>X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation</p>								

## Maintenance

**HYSTER**

### Maintenance Procedures Every 8 Hours or Daily

#### How to Make Checks With the Engine Stopped

##### **WARNING**

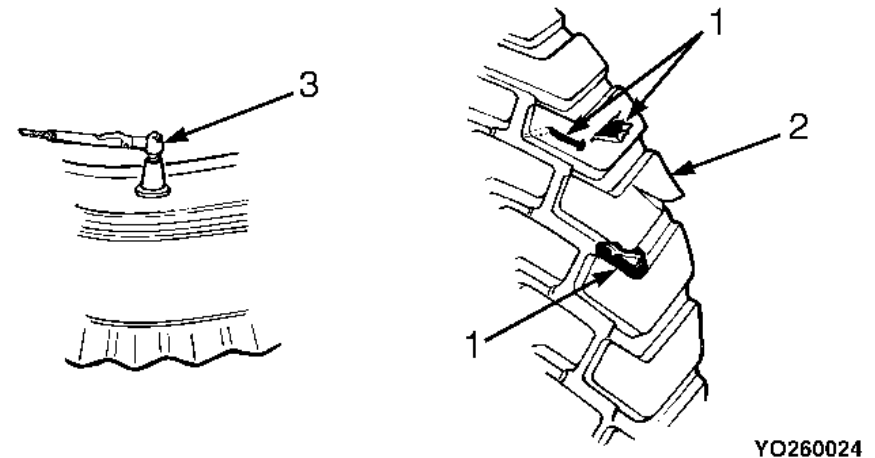
**DO NOT** operate a lift truck that needs repairs. Report the need for repairs immediately. If repair is necessary, put a **DO NOT OPERATE** tag in the operator's area and remove the key.

Put the lift truck on a level surface. Lower the carriage and forks, stop the engine, and apply the parking brake. Open the bonnet and check for leaks and conditions that are not normal. Clean any oil or fuel spills. Ensure all surfaces are free of oils, lubricants, fuel and organic dust or fibers (paper, wood, cotton, agricultural grass/grain, etc.).

#### Tyres and Wheels

Check the tyres for damage (see **Figure 13**). Check the tread and remove any objects that will cause damage.

Check for bent or damaged rims. 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. MAKE SMOOTH EDGES
3. CHECK THE TYRE PRESSURE (PNEUMATIC TYRES)

**Figure 13. Check the Tyres**



## HYSTER

## Maintenance

### Safety Labels

#### WARNING

Safety labels are installed on the lift truck to give information about operation and 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 location on the lift truck. See the **Parts Manual**, the **Model Description** section in this **Operating Manual**, or the **Frame** section of the **Service Manual** 100 SRM 1984 for the correct location of the safety labels. See the **Parts Manual** for the part numbers of the safety labels.

### Mast, Carriage, Header Hoses, Lift Chains, and Attachment

(See Figure 25 and Figure 14)

#### 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 engine is **STOPPED**.

**DO NOT** try to correct the alignment of the fork tips by bending the forks or adding shims. If either fork is damaged, replace the forks as a set.

Never repair damaged forks by heating or welding. Forks are made of special steel using special procedures. If either fork is damaged, replace the forks as a set.

**DO NOT** operate fork lift without lateral fork stops in place. Forks may disengage from fork carriage.

1. Inspect the welds on the mast, cylinders, and carriage for cracks. Make sure that the capscrews and nuts are tight.
2. Inspect the carriage to be sure fork stops are in place. Fork stops prevent forks from laterally disengaging from the carriage.
3. Inspect the channels for wear in the areas where the rollers travel. Inspect the rollers for wear or damage.
4. Inspect the load backrest extension for cracks and damage.
5. If the lift truck is equipped with a sideshift carriage or attachment, inspect the parts for cracks and wear. Make

## Maintenance

**HYSTER**

sure the parts that fasten the sideshift carriage or attachment to the carriage are in good condition.

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

7. Check that the lift chains are correctly lubricated. Use SAE 30 engine oil to lubricate the lift chains.

8. Inspect the lift chains for cracks or broken links and worn or turned pins. Lift chains must be replaced as a set. See **Figure 14**.

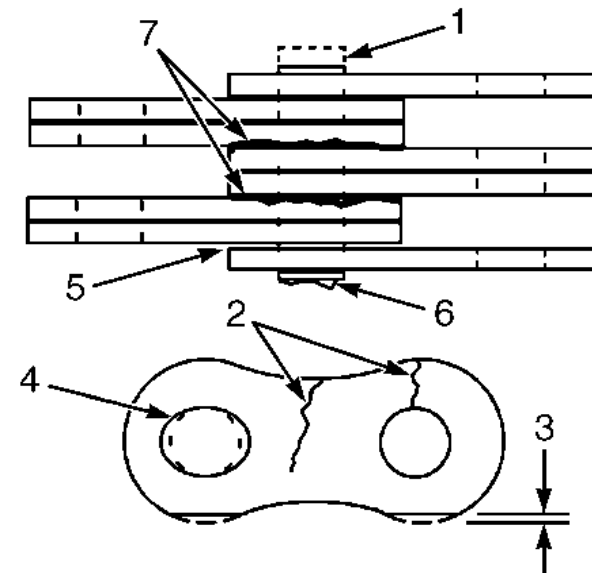
9. Inspect the chain anchors and pins for cracks and damage.

10. 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.**

## Operator Restraint System

The seat belt, hip restraint, seat, bonnet, and bonnet latches are all part of the operator restraint system (see

**Figure 15** and **Figure 16**). Each item must be checked to make sure it is fastened correctly, functions correctly, and is in good condition.



- |    |           |    |              |
|----|-----------|----|--------------|
| 1. | WORN PIN  | 5. | LOOSE LEAVES |
| 2. | CRACKS    | 6. | DAMAGED PIN  |
| 3. | EDGE WEAR | 7. | CORROSION    |
| 4. | HOLE WEAR |    |              |

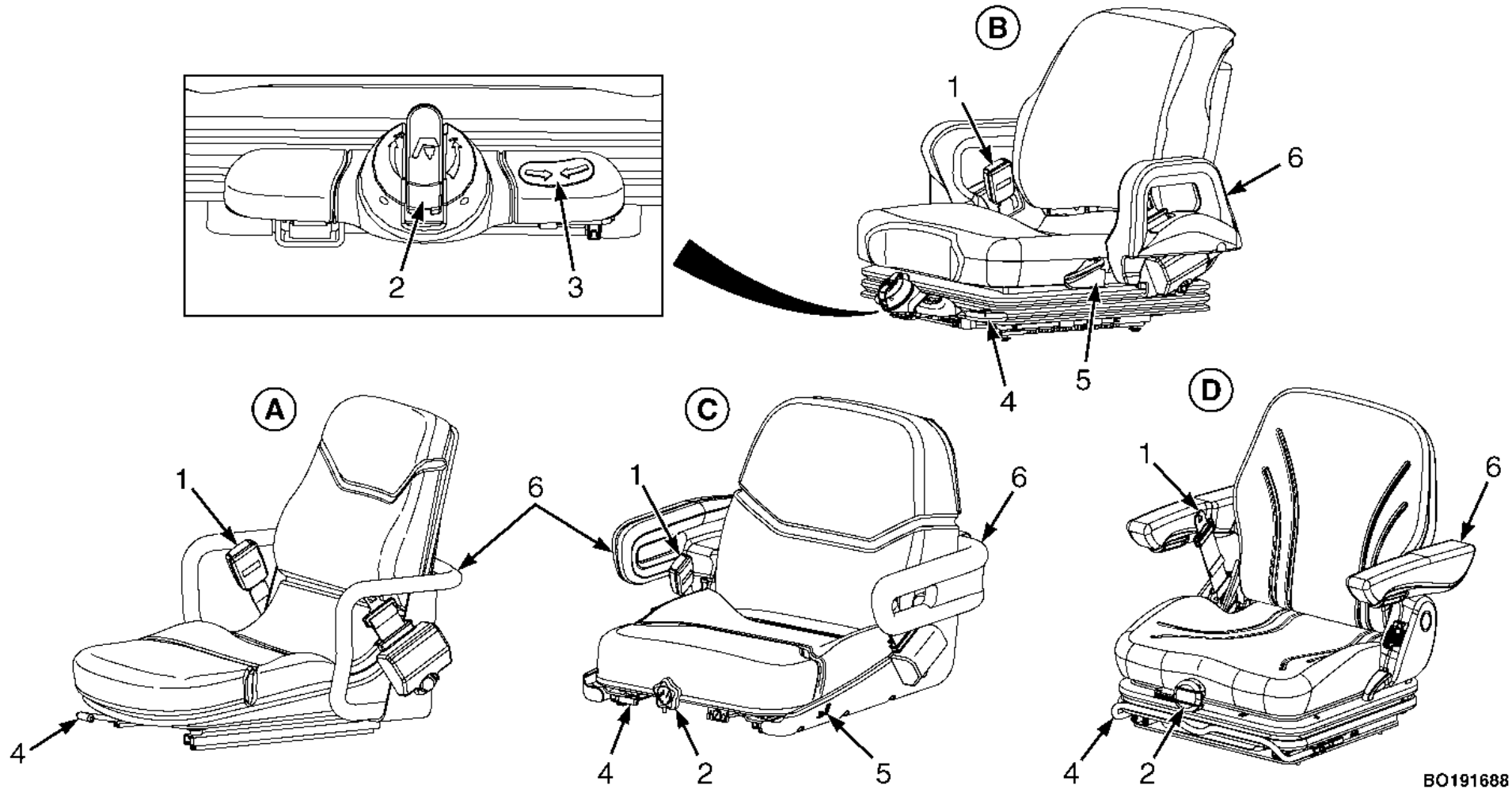
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**Figure 14. Lift Chain Check**



# HYSTER

# Maintenance



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Figure 15. Seat Check



## Maintenance

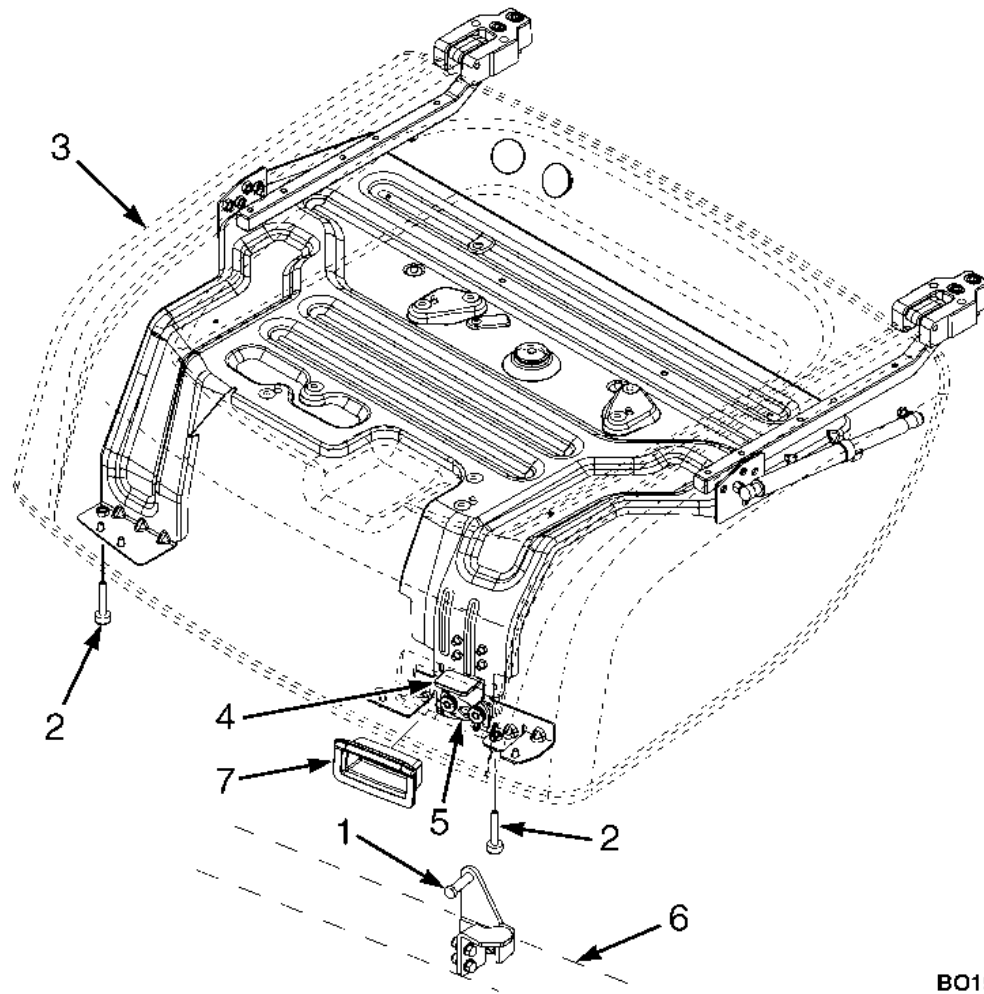
**HYSTER**

### *Legend for Figure 15*

- |           |                              |           |                                   |
|-----------|------------------------------|-----------|-----------------------------------|
| <b>A.</b> | STANDARD NON-SUSPENSION SEAT | <b>C.</b> | SEMI-SUSPENSION SEAT              |
| <b>B.</b> | PREMIUM FULL SUSPENSION SEAT | <b>D.</b> | STANDARD FULL SUSPENSION SEAT     |
| <b>1.</b> | SEAT BELT                    | <b>4.</b> | FORWARD/BACKWARD ADJUSTMENT LEVER |
| <b>2.</b> | WEIGHT ADJUSTMENT KNOB       | <b>5.</b> | BACKREST ANGLE ADJUSTMENT LEVER   |
| <b>3.</b> | RIDE POSITION INDICATOR      | <b>6.</b> | HIP RESTRAINT                     |

# HYSTER

# Maintenance



1. LATCH STRIKER
2. BUMPER
3. BONNET
4. BONNET RELEASE HANDLE
5. BONNET LATCH
6. LIFT TRUCK FRAME
7. BOOT

BO190687

**Figure 16. Bonnet and Bonnet Latch Check**



## Maintenance

**HYSTER**

### ***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 15**.

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 bonnet 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 bonnet 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 bonnet 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 bonnet in the open position, replace the seat belt assembly.

### **Bonnet and Seat Latches**

Make sure the seat rails and latch striker are not loose. The seat rails must lock tightly in position, but move freely when unlocked (see **Figure 15**). The seat rails must be correctly fastened to the bonnet and the bonnet fastened to the hinges on the frame. Try to lift the bonnet to make sure it is fastened correctly and will not move. If adjustment is required, go to Bonnet Latch Check in the **Periodic Maintenance** section of the service manual.





## **HYSTER**

## **Maintenance**

### **Engine Compartment**

Check for the presence of any combustible material such as paper, leaves etc. Remove any combustible materials.

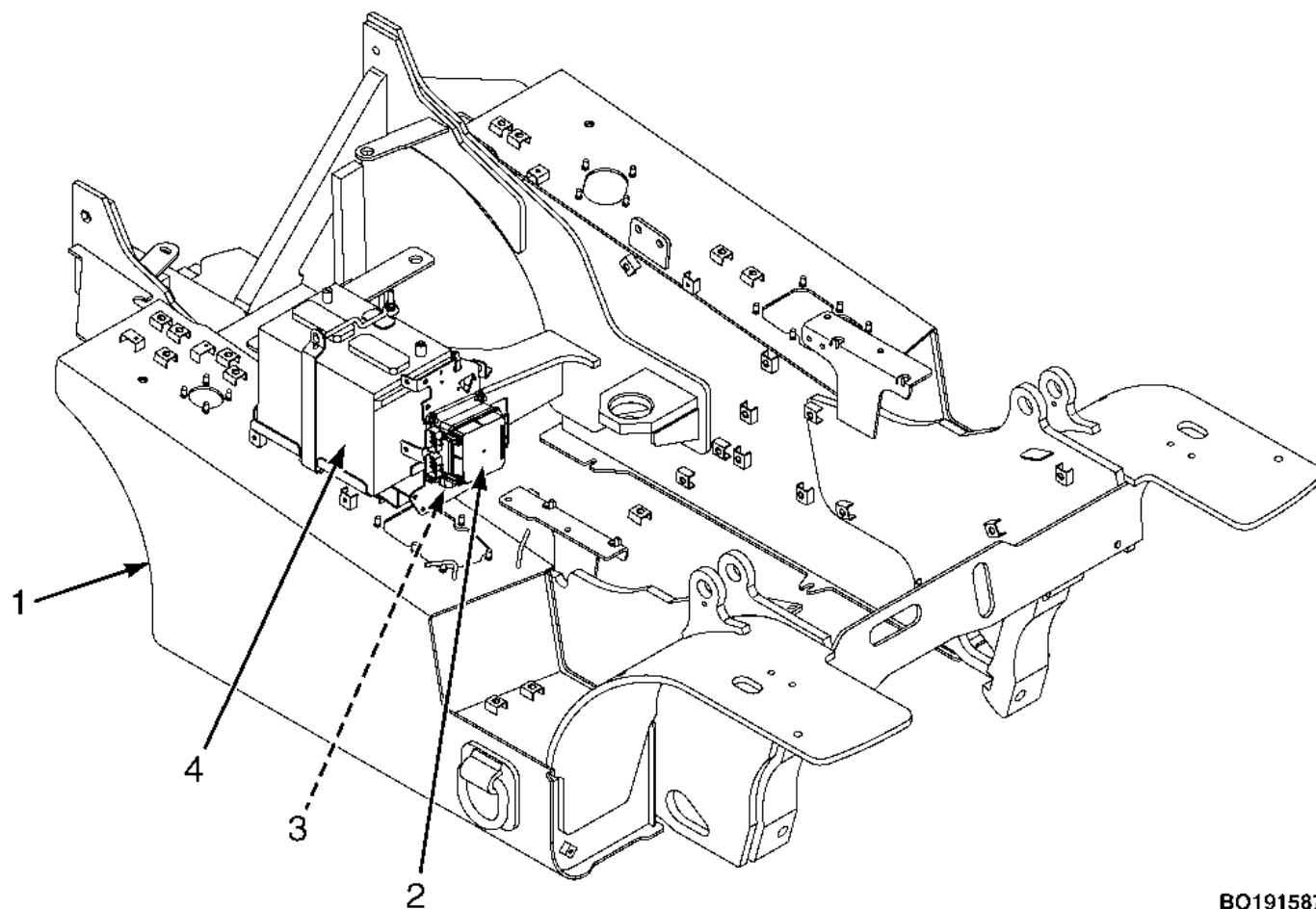
### **Earth Static Strap**

If lift truck is equipped with a Earth Static Strap (see **Figure 17**), check to be sure Earth Static Strap is securely in

place and in contact with the ground. Check attaching hardware. If worn, missing or not in contact with the ground, replace strap and mounting hardware as required.

## Maintenance

**HYSTER**



1. FRAME
2. PDM
3. EARTH STATIC STRAP
4. BATTERY

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**Figure 17. Earth Static Strap**



## HYSTER

## Maintenance

### Fuel, Oil, and Coolant Leaks, Check

#### **WARNING**

All fuels are very flammable and can burn or cause an explosion. **DO NOT** use an open flame to check the fuel level or to check for leaks in the fuel system. If there is a leak in the fuel system, extra care must be used during the repair. **DO NOT** operate the lift truck until a leak is repaired.

Make a visual check for leaks on and under the lift truck. If possible, find and report the leak to maintenance for repair. Leaks often indicate a need for repair of damaged or worn components. Leaks in the LPG fuel system are usually not visible unless ice is present. There is however, usually a strong odor. Fuel leaks **MUST** be repaired **IMMEDIATELY**.

Check the fuel system for leaks and the condition of parts. When fuel is added to the lift truck, see the section, **How to Add Fuel to the Lift Truck**.

Also check the condition of the radiator or heater hoses that are not leaking. Soft or cracked hoses need to be replaced before a major leak occurs.

### Hydraulic Hoses

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.

### Coolant Hoses

Check the condition of the coolant hoses for serviceability by inspecting for cracks or other obvious damage. Check to insure that the coolant hoses are not leaking. If any hose is leaking, report it to maintenance for repair.

### Transmission

Check the transmission for leaks, damage, and loose components. Heavy-duty or high-temperature operations can require more frequent checks.

## Maintenance

**HYSTER**

### Hydraulic System Oil

**⚠ WARNING**

At operating temperature the hydraulic oil is **HOT**. Do not permit the hot oil to touch the skin and cause a burn.

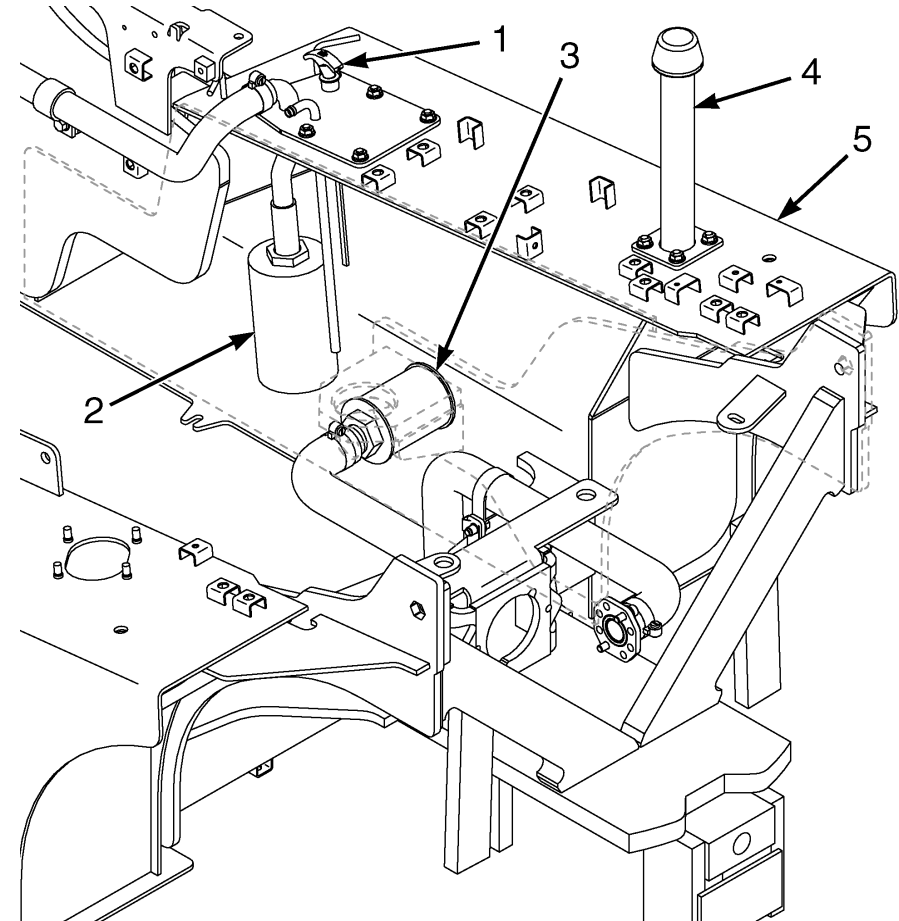
**⚠ CAUTION**

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

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

After the engine has stopped, wait one minute before checking the oil level. Keep hydraulic oil at the correct level as indicated on the dipstick, located on top of right frame channel. See **Figure 18**. Use the correct oil as shown in the **Maintenance Schedule**.

Check the hydraulic system for leaks and damaged or loose components. Heavy-duty or high-temperature operations can require more frequent checks.



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**Figure 18. Hydraulic System Oil Check**



## HYSTER

## Maintenance

### Legend for Figure 18

- |                   |                         |
|-------------------|-------------------------|
| 1. DIPSTICK       | 4. BREATHER/FILLER NECK |
| 2. RETURN FILTER  | 5. RIGHT FRAME CHANNEL  |
| 3. SUCTION FILTER |                         |

### Engine Oil

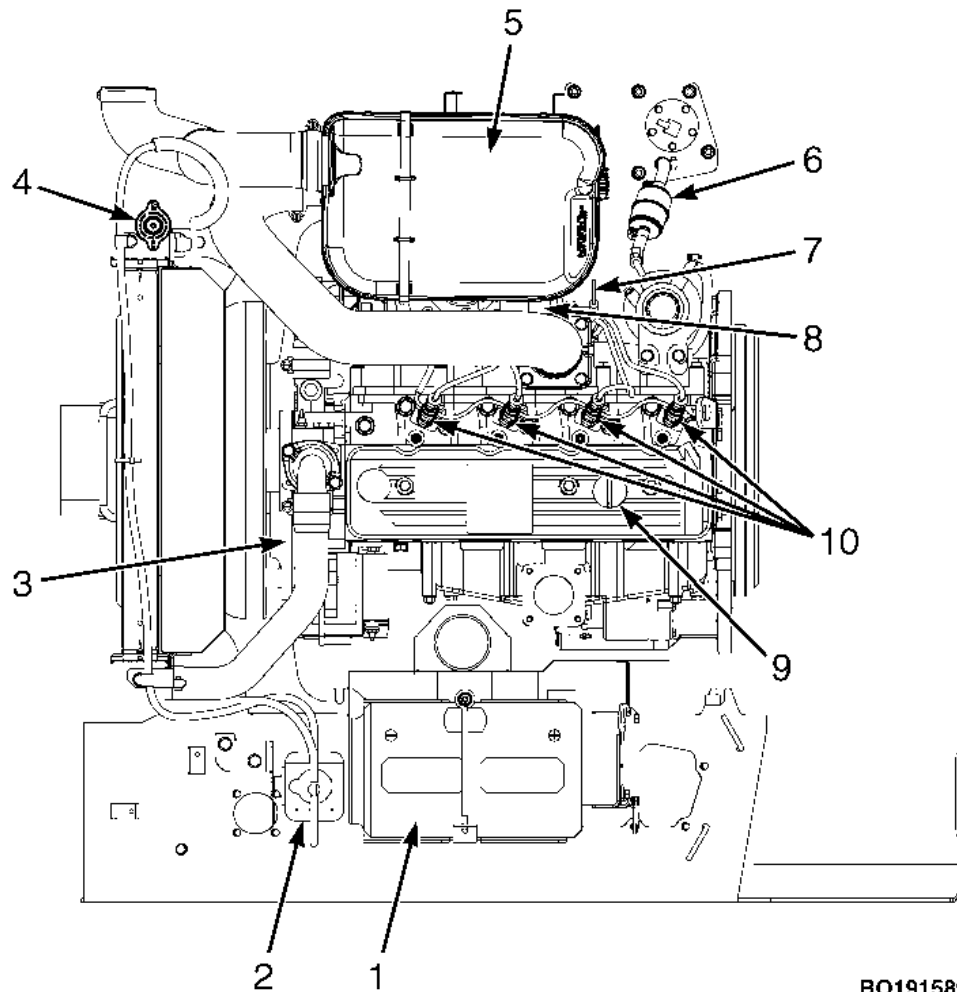
After the engine has stopped, wait one minute before checking the oil level. See **Figure 19**, **Figure 20**, **Figure 21**, and **Figure 22**. Keep the oil at the correct level as indicated on the dipstick. Use the correct oil as shown in the **Maintenance Schedule**.

There is an indicator light for the engine oil pressure on the Dash Display. During normal operation the red indicator light will illuminate when the key switch is turned to **ON** and will stay illuminated until correct oil pressure is obtained, at which time the light will go off.

If the light continues to stay on when the engine is running, the engine oil pressure is low. Stop the engine and check the oil level. See **Figure 19**, **Figure 20**, **Figure 21**, and **Figure 22**. DO NOT restart the engine until the low pressure condition has been corrected.

## Maintenance

**HYSTER**



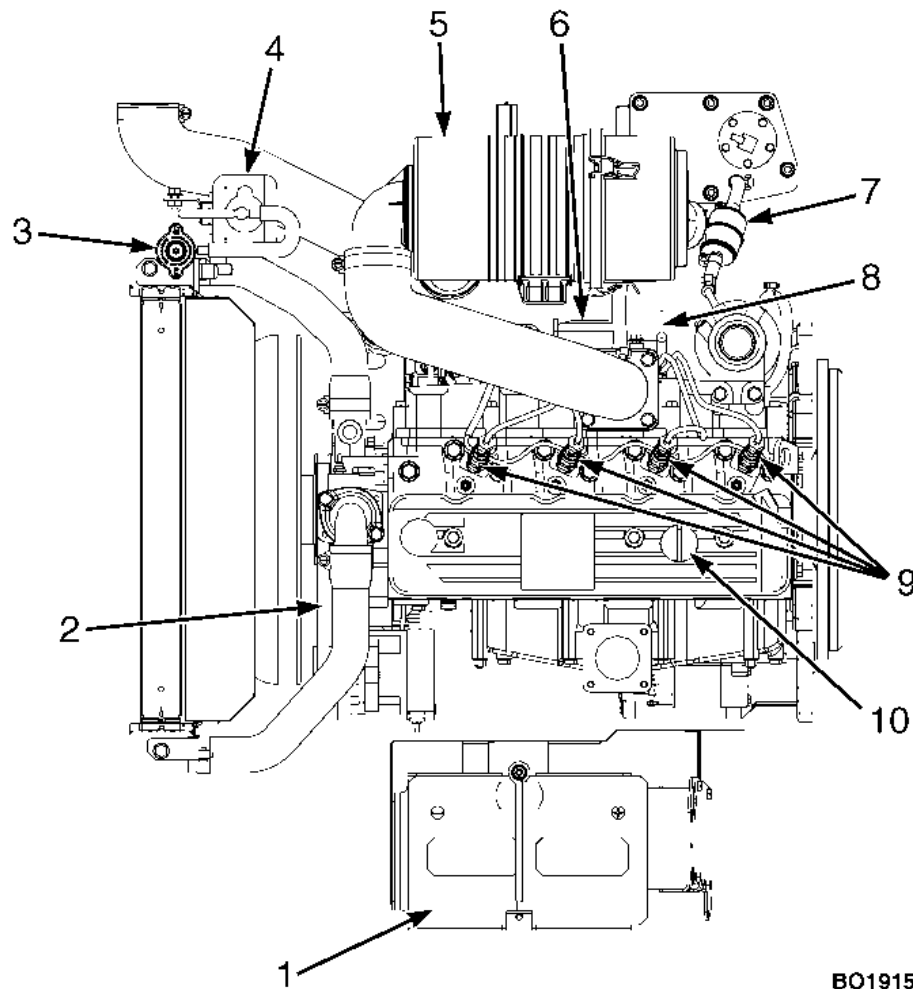
1. BATTERY
2. AUXILIARY COOLANT RESERVOIR
3. DRIVE BELT
4. RADIATOR CAP
5. AIR FILTER
6. FUEL FILTER
7. DIPSTICK ENGINE OIL
8. ENGINE OIL FILTER
9. ENGINE OIL FILL
10. FUEL INJECTOR

BO191589

**Figure 19. Yanmar 2.6L Diesel Engine Maintenance Points**

# HYSTER

# Maintenance



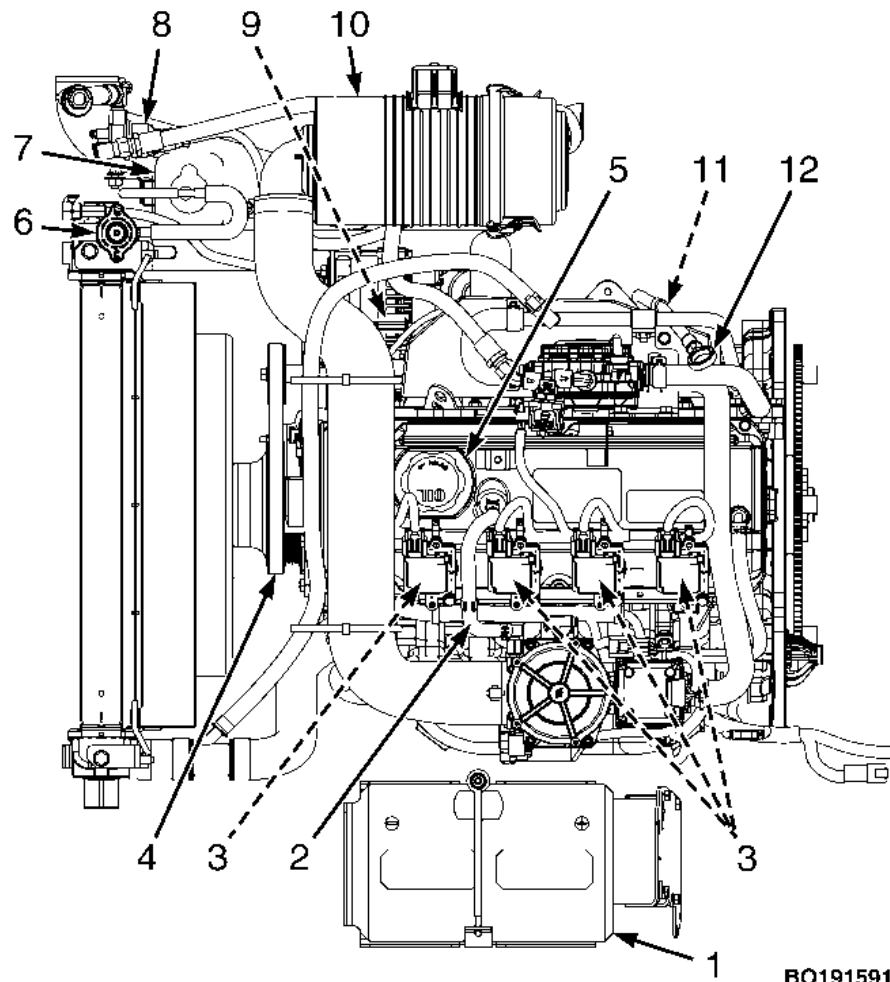
1. BATTERY
2. DRIVE BELT
3. RADIATOR CAP
4. AUXILIARY COOLANT RESERVOIR
5. AIR FILTER
6. ENGINE OIL FILTER
7. FUEL FILTER
8. DIPSTICK ENGINE OIL
9. FUEL INJECTOR
10. ENGINE OIL FILL

BO191590

**Figure 20. Yanmar 3.3L Diesel Engine Maintenance Points**

## Maintenance

**HYSTER**



1. BATTERY
2. PCV VALVE
3. SPARK PLUGS
4. DRIVE BELT
5. ENGINE OIL FILL
6. RADIATOR CAP
7. AUXILIARY COOLANT RESERVOIR
8. FUEL FILTER
9. ENGINE OIL FILTER
10. AIR FILTER
11. ENGINE OIL DRAIN PLUG
12. DIPSTICK ENGINE OIL

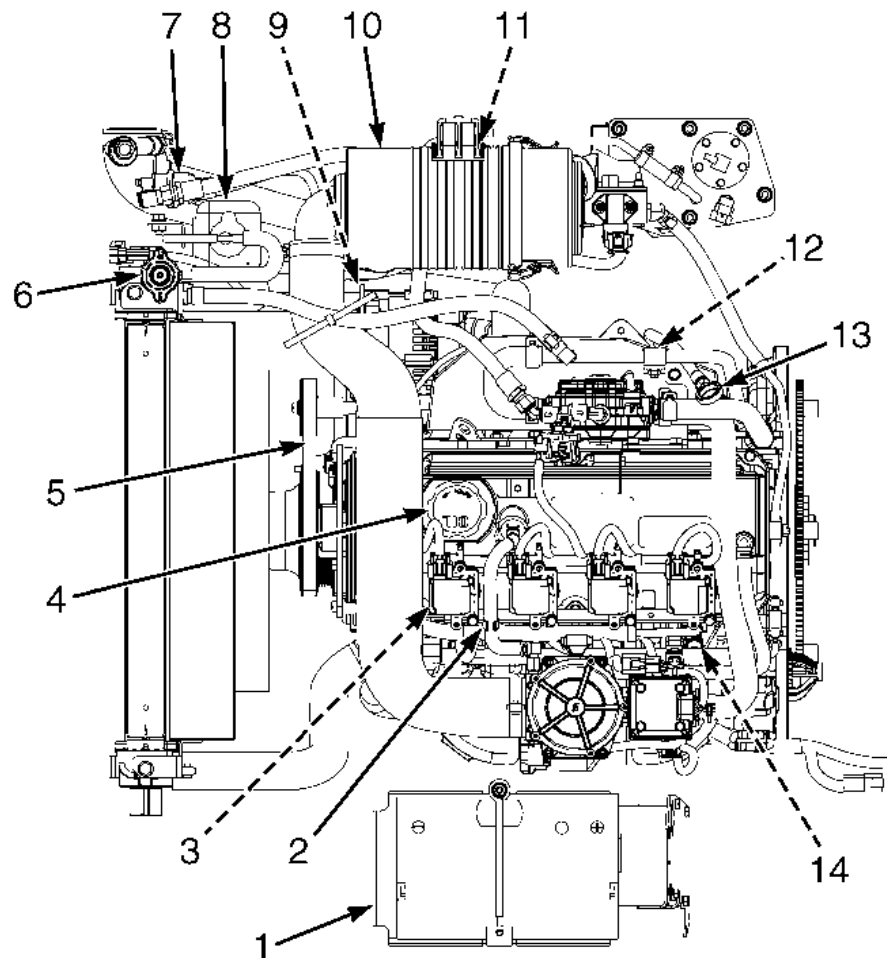
BO191591

**Figure 21. PSI 2.4L LPG Engine Maintenance Points**



# HYSTER

# Maintenance



1. BATTERY
2. PCV VALVE
3. SPARK PLUGS
4. ENGINE OIL FILL
5. DRIVE BELT
6. RADIATOR CAP
7. LPG FUEL FILTER
8. AUXILIARY COOLANT RESERVOIR
9. ENGINE OIL FILTER
10. AIR FILTER
11. PETROL FUEL FILTER
12. ENGINE OIL DRAIN PLUG
13. DIPSTICK ENGINE OIL
14. INJECTOR

BO191592

**Figure 22. PSI 2.4L Bi-Fuel Engine Maintenance Points**



## Maintenance

**HYSTER**

### Air Filter

The air filter canister should not be opened until an air filter element replacement is required. An air filter element replacement is required when one of the following occurs:

- the specified number of hours has passed since the last filter element replacement

DO NOT operate the lift truck until the air filter element has been replaced.

### Forks

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

### Forks, Remove



#### WARNING

**DO NOT try to move a fork without a lifting device. Each hook fork for these lift trucks can weigh 45 to 115 kg (99 to 253 lb).**

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

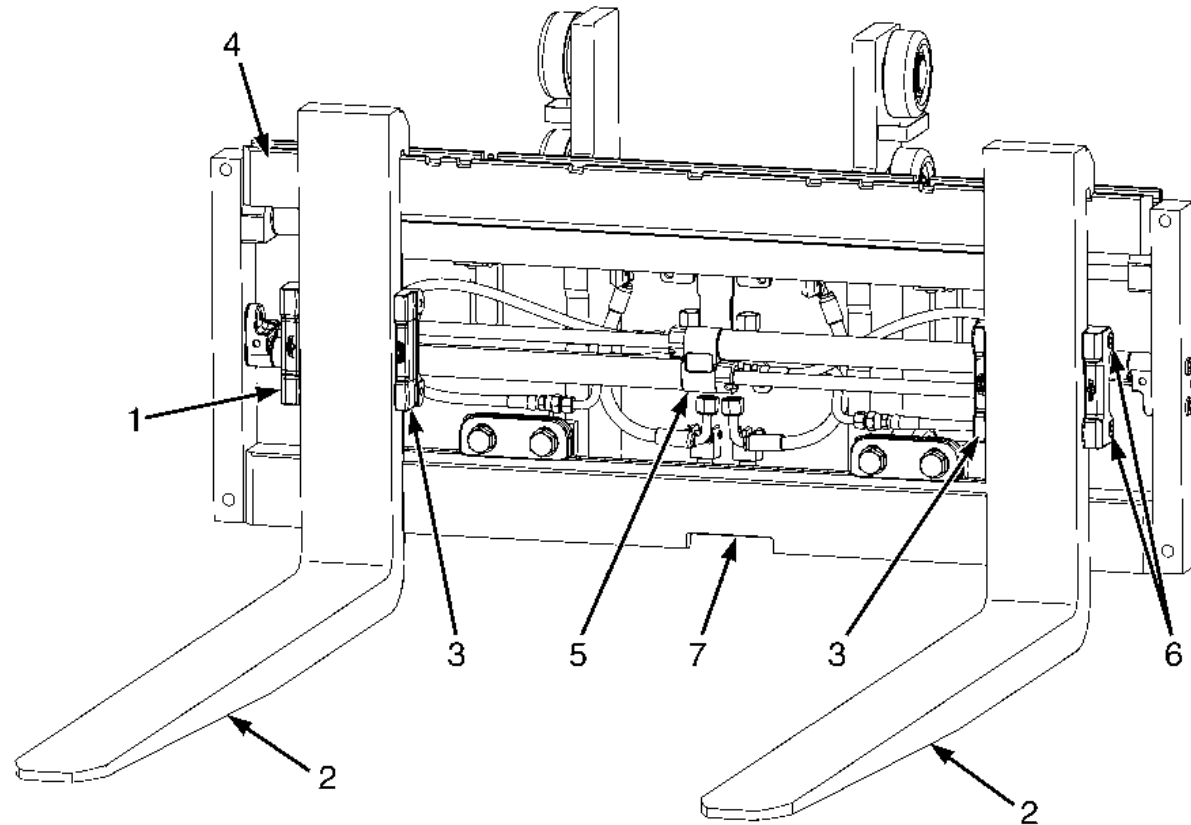
**NOTE:** If lift truck is equipped with fork positioner attachment, perform **Step 1** and **Step 2**. If lift truck is not equipped with a fork positioner attachment, go to **Step 2**.

**1.** Lower carriage and remove four capscrews from inner fork carriers. Remove inner fork carriers from integral side shift carriage. See **Figure 23**.

**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 24**.

Lower the fork onto blocks so that the bottom hook of the fork moves through the fork removal notch. See **Figure 24**.

Lower the carriage further so that the top hook of the fork 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.



BQ290008

**Figure 23. Fork Positioner**

## Maintenance

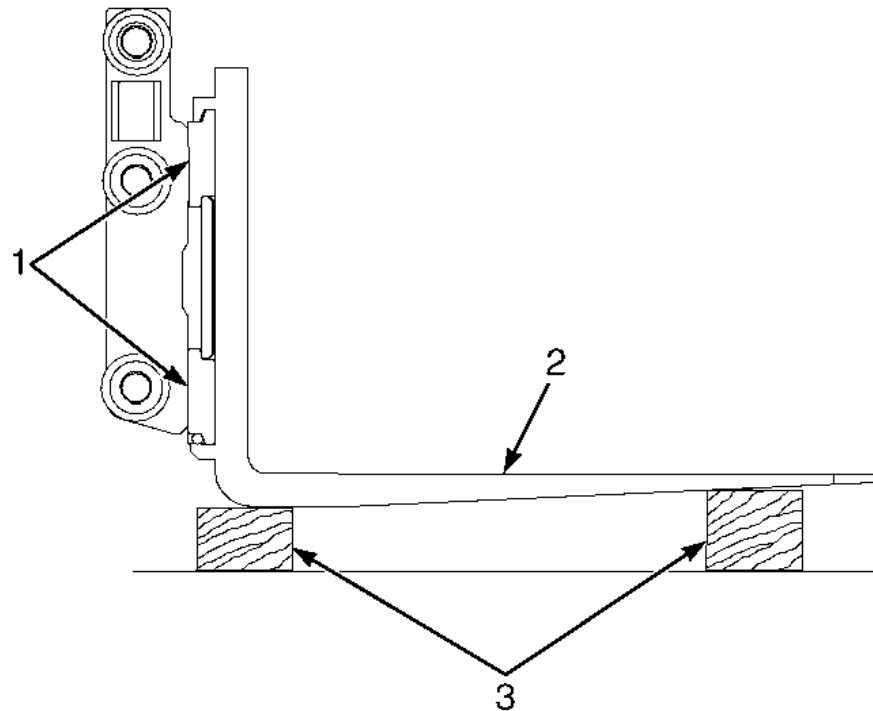
**HYSTER**

### Legend for Figure 23

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

### Legend for Figure 24

- |                  |           |
|------------------|-----------|
| 1. CARRIAGE BARS | 3. BLOCKS |
| 2. HOOK FORK     |           |



BO190824

**Figure 24. Remove a Hook Fork**

### Forks, Inspect

#### **⚠ WARNING**

**DO NOT** try to correct for 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 fork. 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 25**. Check that the bottom of the fork is not worn (Item 4 in **Figure 25**).



## HYSTER

## Maintenance



### CAUTION

**Remove fork latch pins if adding a fork positioner attachment. Damage to forks and other carriage components can occur if fork latch pins are not removed prior to using attachment.**

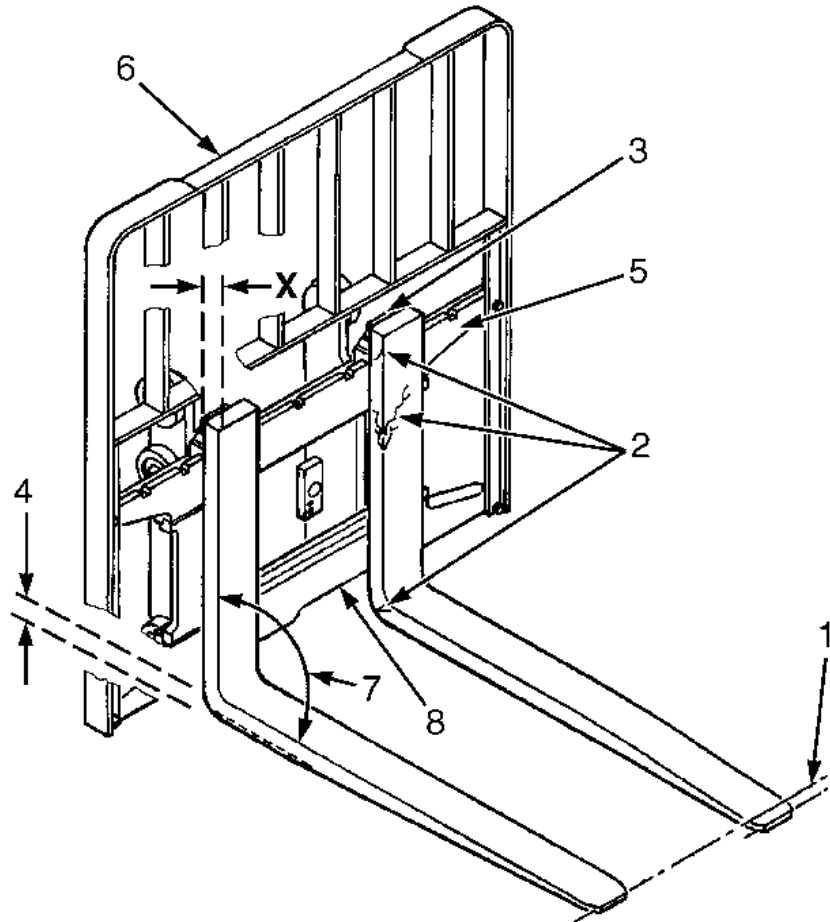
2. Replace any damaged or broken parts that are used to keep the forks locked in position.
3. Inspect fork wear. Ensure heel wear is not more than 10% of original thickness. If fork wear is more than 10%, fork must be replaced or rerated. Perform fork wear inspection using a BOL256N1 caliper ruler Hyster P/N 4092984 as follows. See **Figure 26**.
  - 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 25**) 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.

## Maintenance

**HYSTER**



Fork Tip Alignment	
Length of Forks	3% Dimension
1000 mm (39.5 in)	30 mm (1.17 in)
1016 mm (40 in)	30 mm (1.2 in)
1100 mm (43 in)	33 mm (1.29 in)
1200 mm (47 in)	36 mm (1.42 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

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**Figure 25. Forks Check**

# HYSTER

## Maintenance

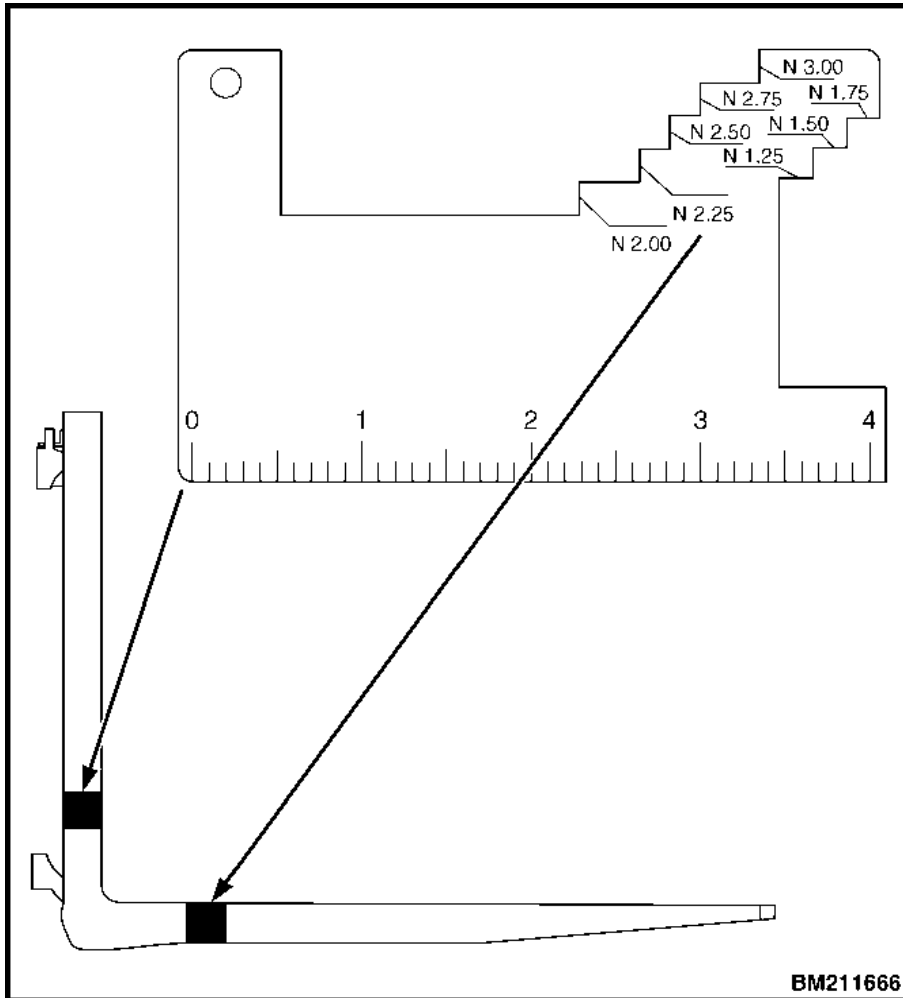


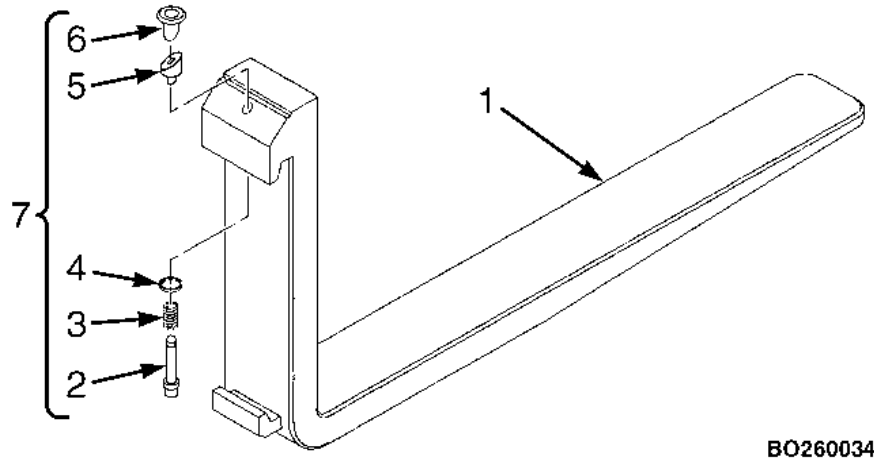
Figure 26. Fork Wear

### Forks, Install

1. Move the fork and carriage so that the top hook on the fork can engage the upper carriage bar. Raise the carriage to move the lower hook through the fork removal notch. Slide the fork on the carriage so that both upper and lower hooks engage the carriage. Engage the lock pin with a notch in the upper carriage bar. See **Figure 27**.
2. If lift truck is equipped with a fork positioner attachment, install fork carriers using four capscrews. Tighten capscrews to 35 N•m (25 lbf ft). See **Figure 23**.

## Maintenance

**HYSTER**



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- |             |                      |
|-------------|----------------------|
| 1. FORK     | 5. WEDGE             |
| 2. LOCK PIN | 6. KNOB              |
| 3. SPRING   | 7. LOCK PIN ASSEMBLY |
| 4. WASHER   |                      |

**Figure 27. 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 24** and **Figure 27**. The lock pins are installed through the top fork hooks and fit into slots in the top carriage bar. If pin does not remain engaged in carriage

slot, replace with new pin. 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.

### Brake Fluid

#### **⚠ WARNING**

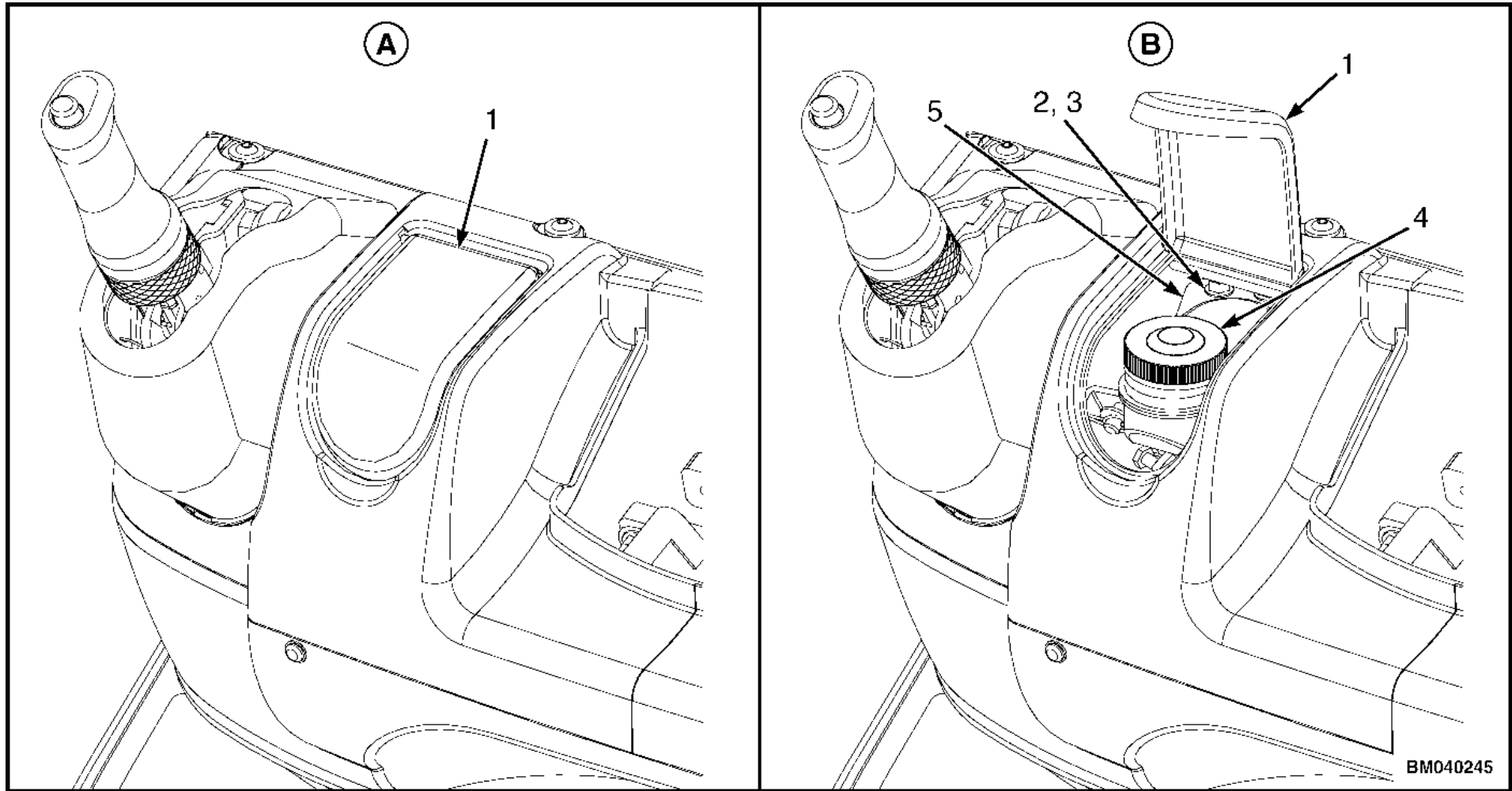
Small amounts of water in the brake system can cause reduced braking performance if the water reaches the wheel cylinder areas. **DO NOT** allow water entry. Ensure that the sealed reservoir lid is properly replaced.

Replace the brake fluid in the system if there is dirt or water in the system.

**On lift trucks with dry brakes, only use SAE J-1703 (DOT 3) brake fluid in the master cylinder.**

Open cover to brake fluid reservoir. Open reservoir and check fluid level. If fluid is low, fill to within 2.5 mm (0.1 in.) of max line on reservoir. See **Figure 28**.





**Figure 28. Brake Fluid Reservoir Cover**



## Maintenance

**HYSTER**

### Legend for Figure 28

**A.** COVER CLOSED

1. COVER
2. CAPSCREW
3. NUT

**B.** COVER OPEN

4. BRAKE FLUID RESERVOIR
5. MOUNTING BRACKET

## How to Make Checks With the Engine Running

### **WARNING**

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

### **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 that the area around the lift truck is clear before starting the engine or making any checks of the operation.

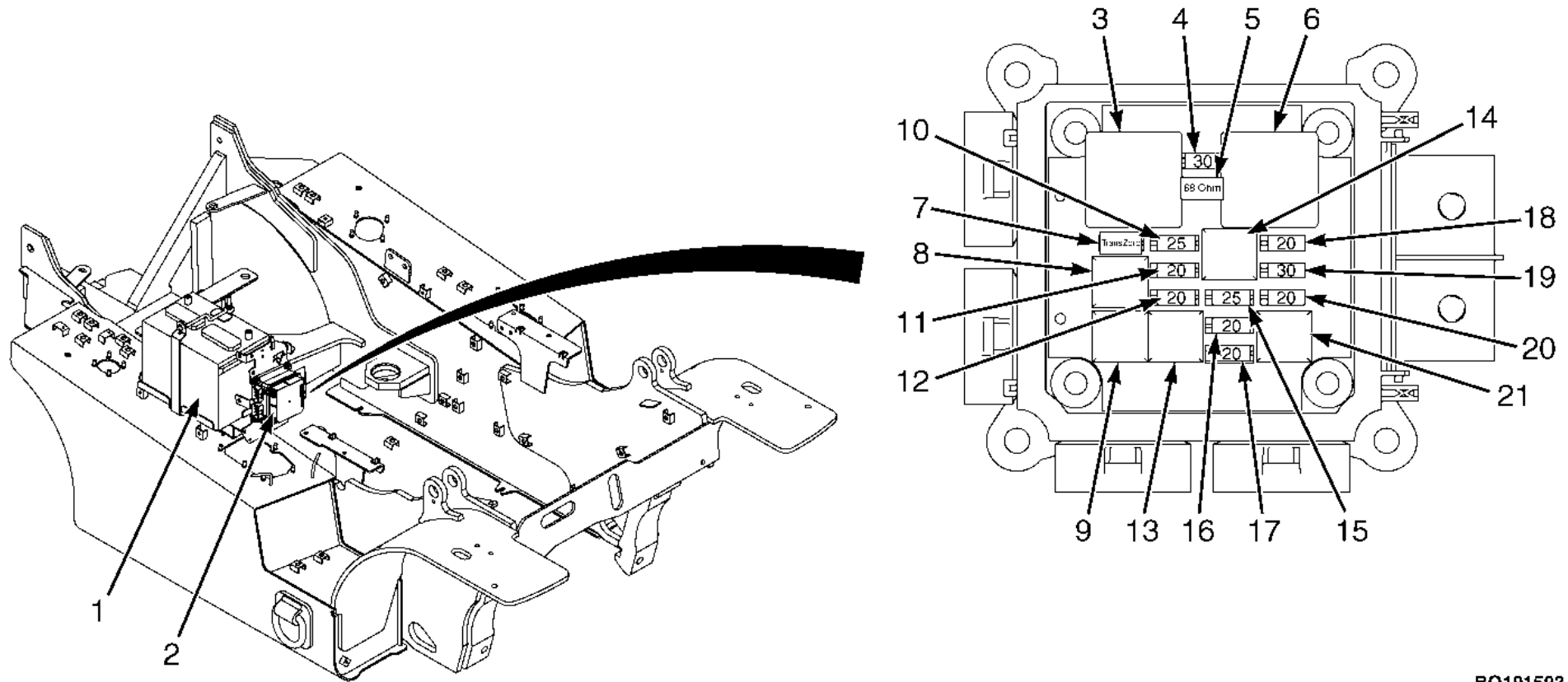
Be careful when making the checks. If the lift truck is stationary during a check, apply the parking brake and put the transmission in **NEUTRAL**. Make the checks carefully.

## Indicator Lights, Horn, Fuses, and Relays

Turn key to **ON** position. Check all indicator lights for correct operation as described in **Table 1**. Check the operation of the horn. Start the engine by turning the key switch to the **START** position. If any of the indicator lights do not operate correctly, check the fuses. The fuses are located in the Power Distribution Module (PDM) which is under the bonnet next to the battery on the right side. See **Figure 29**.

# HYSTER

# Maintenance



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Figure 29. PDM Showing Fuses and Relays



## Maintenance

**HYSTER**

### Legend for Figure 29

**NOTE:** BONNET REMOVED FOR CLARITY.

- |                                    |                               |
|------------------------------------|-------------------------------|
| 1. BATTERY                         | 12. REAR WORK LIGHT (20 AMP)  |
| 2. POWER DISTRIBUTION MODULE (PDM) | 13. FRONT WORK LIGHT RELAY    |
| 3. START RELAY                     | 14. BACKUP RELAY              |
| 4. STARTER (30 AMP)                | 15. BATTERY+ (25 AMP)         |
| 5. RESISTOR (68 OHM)               | 16. FRONT WORK LIGHT (20 AMP) |
| 6. IGNITION 3 RELAY                | 17. BATTERY+ (20 AMP)         |
| 7. TRANZORB                        | 18. BACKUP (20 AMP)           |
| 8. IGNITION 1 RELAY                | 19. IGNITION 3+ (30 AMP)      |
| 9. REAR WORK LIGHT RELAY           | 20. FUEL/RUN (20 AMP)         |
| 10. BATTERY (25 AMP)               | 21. FUEL/RUN RELAY            |
| 11. IGNITION 1+ (20 AMP)           |                               |

## Service Brakes

### Brake Fluid Level

#### **WARNING**

If the brake system has a power assist (or boost), braking will be more difficult if the engine is not running.

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.

### Operation, Check

Check the operation of the service brakes. Push on the inching/brake pedal. The service brakes must be applied before the inching/brake pedal reaches the floor plate. The pedal must stop firmly and must not move slowly down after the brakes are applied. The service brakes must apply equally to both drive wheels. The service brakes must not pull the lift truck to either side of the direction of travel when they are applied. The service brakes are automatically adjusted when the transmission is in reverse and the lift truck is moving and the brakes are firmly applied. Full



## HYSTER

## Maintenance

application of the inching/brake pedal applies the service brakes and puts the transmission in **NEUTRAL**.

### Parking Brake

If the operator leaves the seat without setting the parking brake and the key is in the **OFF** position for a period of 3 minutes or less, an audible alarm will sound for 1 minute.

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

### Engine Oil Pressure

There is an indicator light for the engine oil pressure on the Dash Display. During normal operation the red indicator light will illuminate when the key switch is turned to **ON** and will stay illuminated until correct minimum oil pressure is obtained, at which time the light will go off. If the light con-

tinues to stay on when the engine is running, the engine oil pressure is low. Stop the engine and check the oil level. See **Engine Oil** section in this manual. **DO NOT** restart the engine until the low pressure condition has been corrected.

### Cooling System

#### **WARNING**

**DO NOT** remove the radiator cap from the radiator when the engine is hot. When the radiator cap is removed, the pressure is released from the system. If the system is hot, the steam and boiling coolant can cause burns.

There is a coolant temperature gauge on the Dash Display. When the bar gauge reaches the middle bar, the temperature is optimum. If the gauge shows full bars, the engine is too hot and a warning buzzer will sound.

Make sure the coolant level is between the **ADD** and **FULL** marks on the auxiliary coolant reservoir (See **Figure 30**). The coolant will expand as it is heated and the level in the auxiliary coolant reservoir will increase.

## Maintenance

**HYSTER**

### CAUTION

Additives may damage the cooling system. Before using additives, contact your local Hyster dealer.

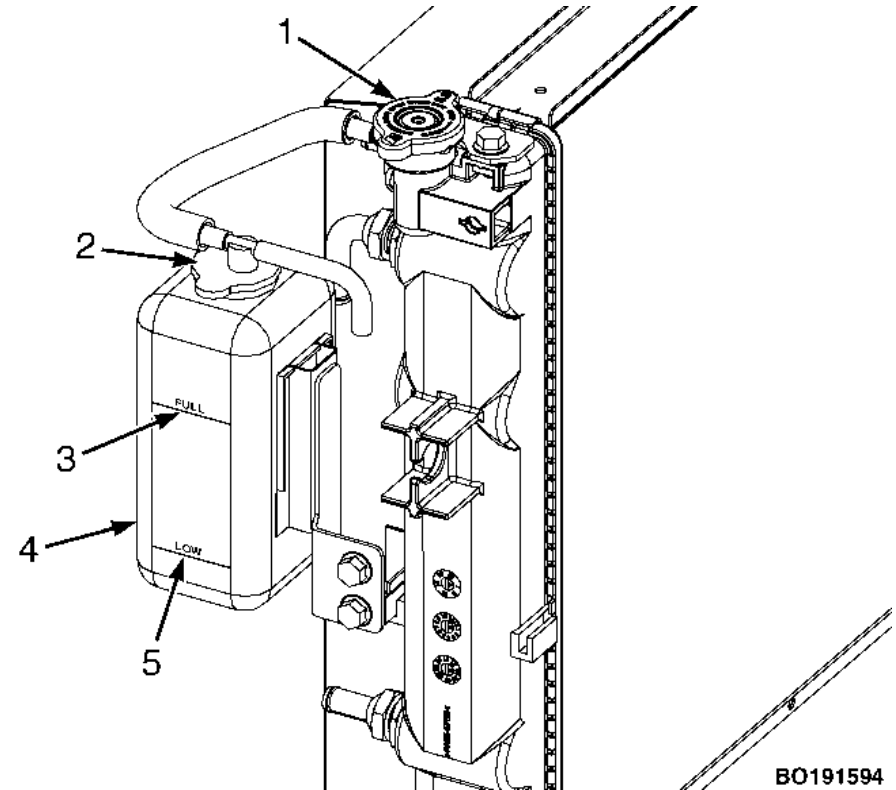
If coolant is added, use the correct mixture of water and ethylene glycol shown in the **Maintenance Schedule**.

### WARNING

Compressed air can move particles so that they cause injury to the user or to other personnel. Make sure that the path of the compressed air is away from all personnel. Wear protective goggles or a face shield to prevent injury to the eyes.

Check the radiator fins. Clean the radiator with compressed air or water as needed.

Check for and remove any debris on the radiator core. If the indicator light turns on again after restarting, shut down the lift truck and do not operate the lift truck until the problem is corrected.



1. RADIATOR CAP
2. FILL CAP
3. FULL MARK
4. AUXILIARY COOLANT RESERVOIR
5. ADD MARK (LOW)

**Figure 30. Auxiliary Coolant Reservoir**



## HYSTER

## Maintenance

### Steering System

#### WARNING

The lift truck has hydraulic power steering. The steering can be difficult if the engine is not running.

Make sure the steering system operates smoothly and provides good steering control. Make sure the steering column can be adjusted and the gas cylinder function is correct.

### Control Levers and Pedals

Check that the control levers for the transmission, mast, and attachment operate as described in **Table 1**. Check that the pedals operate correctly as described in **Table 1**.

### Lift System Operation

#### WARNING

When working on or near the mast, see **Safety Procedures When Working Near the Mast** in the **Periodic Maintenance** for your lift truck.

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 engine is **STOPPED**.

If the mast cannot be lowered, use chains on the mast weldments and carriage so that they can not move. Make sure the moving parts are attached to a part that does not move. See the **Periodic Maintenance** section of the service manual for additional information.

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

Perform the following checks and inspections:

1. Check for leaks in the hydraulic system. Check the condition of the hydraulic hoses and tubes.

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

2. Slowly raise and lower the mast several times without a load. Raise the mast to its full height at least once. The mast components must raise and lower smoothly in the correct sequence. Hose must track properly during operation.



## Maintenance

**HYSTER**

3. The inner weldments and the carriage must lower completely.
4. Raise the mast 1 m (3 ft) with a capacity load. The inner weldments and the carriage must raise smoothly. Lower the mast. All moving components must lower smoothly.
5. Lower the load to approximately 0.3 m (1 ft). Tilt the mast forward and backward. The mast must tilt smoothly and both tilt cylinders must stop evenly.
6. Check that the controls for the attachment operate the functions of the attachment. See the symbols by each of the controls. Make sure all of the hydraulic lines are connected correctly and do not leak.

## How to Add Fuel to the Lift Truck

### Liquefied Petroleum Gas (LPG)

#### **WARNING**

Close the fuel valve on the tank when the lift truck is not in active use. **DO NOT** park the lift truck near heat or ignition sources.

For complete instructions on the storage of LPG fuels and the refueling of LPG tanks, refer to NFPA 58 & 505.

**LPG is extremely flammable. When checking or filling an LPG tank: No smoking. Stop engine.**

**Frost on the surface of the tank, the valves or fittings and the odor of LPG fuel indicates a leak. Inspect the LPG system and repair a leak immediately. An LPG fuel leak creates an explosion and fire hazard. Do not attempt to start the engine if there is a leak in the LPG fuel system.**

**Only trained and authorized personnel are permitted to operate filling equipment.**

**Use only the LPG tank indicated on the label on the tank bracket. DO NOT use an LPG tank that is damaged. A damaged LPG tank must be removed from service.**

#### **WARNING**

**LPG tanks are heavy. The weight of an LPG tank can exceed the maximum recommended weight for safe lifting by an individual. Get assistance when lifting or lowering an LPG tank. Use correct lifting procedures.**

**LPG can cause an explosion. DO NOT cause sparks or permit flammable material near the LPG system. LPG fuel systems can be disconnected indoors only if the**





## **HYSTER**

## **Maintenance**

**lift truck is at least 8 m (26 ft) from any open flame, motor vehicles, electrical equipments, or ignition source.**

**Removable LPG tanks must be removed from the fork lift before filling. If the lift truck is equipped with a non-removable LPG tank, make sure all components (engine, transmission, muffler, catalytic muffler) have surface temperatures that have cooled to below 427 °C (800 °F).**

### ***LPG Tank, Removal***

**1. Removable LPG tanks can be replaced indoors only if the lift truck is a minimum of 8 m (26 ft) from any open**

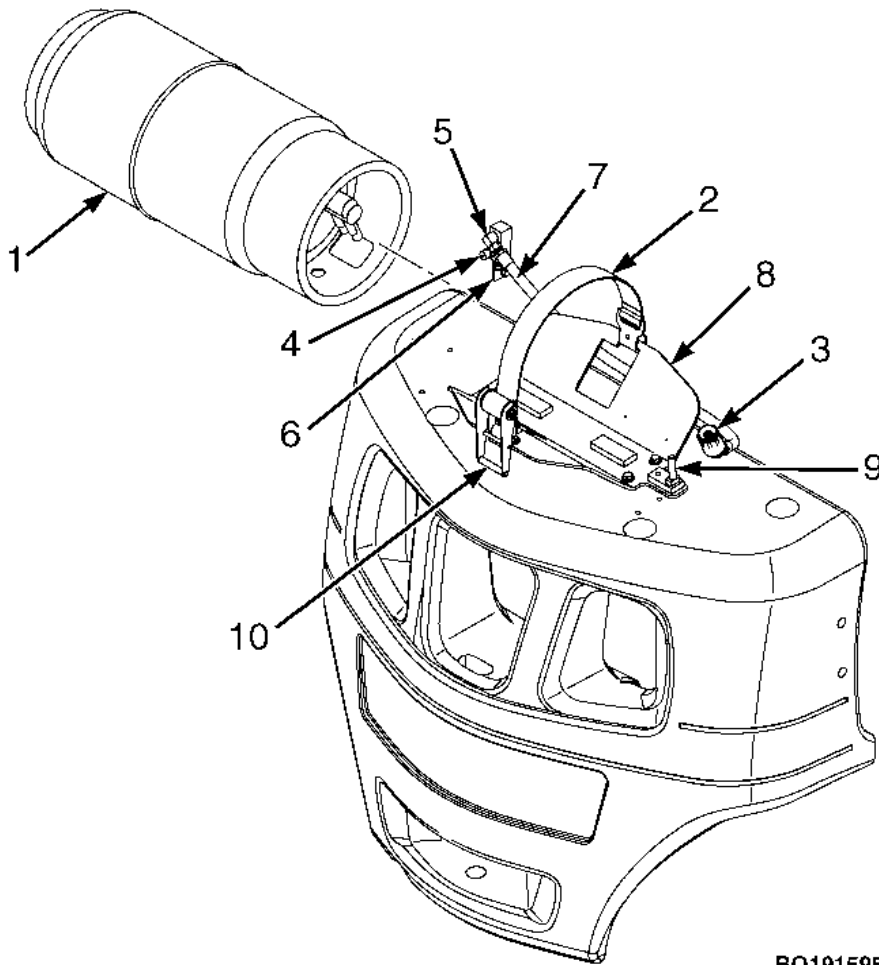
**flame, motor vehicles, electrical equipment, or ignition source. Move lift truck to an area where LPG tanks are changed.**

- 2. Turn the shutoff valve clockwise until the valve is completely closed.**
- 3. Run the engine until it stops, then turn the key switch to the OFF position.**
- 4. Disconnect the quick-disconnect fitting on the LPG tank. See Figure 31.**
- 5. Unlatch the tank strap and remove the LPG tank from the bracket.**

## Maintenance

**HYSTER**

NOTE: FABRIC TANK STRAP SHOWN.



1. LPG TANK
2. TANK STRAP
3. QUICK DISCONNECT FITTING
4. HYDROSTATIC RELIEF VALVE
5. LPG BULKHEAD BRACKET
6. FITTING
7. HOSE ASSEMBLY
8. LPG TANK BRACKET
9. LPG TANK PIN
10. TANK LATCH

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**Figure 31. LPG Tank and Bracket**



## HYSTER

## Maintenance

### LPG Tank, Fill

#### **WARNING**

**Read and follow all the refueling precautions and instructions under Liquefied Petroleum Gas (LPG). Removable LPG tanks must be removed from the fork lift before filling.**

**NOTE:** The following instructions are general procedures. There is a variation in equipment for filling LPG tanks. The local authorities that have jurisdiction have specific rules and regulations for filling LPG tanks. Make sure these rules and regulations are available and understood.

1. Check the gauge on tank to make sure it needs filling. During the fill operation, the LPG tank must be in a position so that the liquid level indicator will always be in the vapor space above the liquid level.
2. Open the liquid outlet valve and bypass return valve on the storage tank.
3. Start the pump.
4. Connect the supply hose to the quick disconnect fitting on the LPG tank (see **Liquefied Petroleum Gas (LPG)**). If the LPG tank has an auxiliary fill fitting, connect the supply

hose to this fitting. Make sure the correct adapter is used to connect the supply hose to the auxiliary fill fitting.

5. Open the vent valve on the liquid level indicator.
6. Open the fuel valve on the LPG tank.
7. Open the valve on the end of the supply hose.
8. Watch for a discharge from the vent valve on the liquid level indicator. When a cloud of visible vapor appears, the LPG tank is full. Do not fill the LPG tank to more than the maximum level indicated by the liquid level indicator. Immediately close the valve at the end of the supply hose.
9. Close the vent valve on the LPG tank.
10. Close the fuel valve on the LPG tank.
11. Disconnect the hose supply.
12. Stop the pump.
13. Close the liquid outlet and the bypass return valve on the storage tank.



## Maintenance

**HYSTER**

### LPG Tank, Install

#### **WARNING**

**Make sure the alignment pin extends through the correct hole in the rim of the LPG tank. The hose or fittings can be damaged if the LPG tank is not installed in the correct position. A damaged hose or fitting can release LPG fuel and cause an explosion and fire hazard.**

1. Install the LPG tank into the bracket so that the LPG tank pin is in the correct hole in the bracket. Replace LPG tank pin if damaged. Close the tank strap latches.
2. Connect the quick disconnect fitting to the shutoff valve on the tank. Hand-tighten the valve to the fitting. See **Figure 31**.
3. Turn the fuel valve anticlockwise to open the fuel valve.
4. Inspect the fuel system for leaks when the fuel valve is open. There are four methods used to inspect the fuel system for leaks:
  - a. **Sound** - Listen for sound of LPG escaping from a tank fitting or hose connection.

b. **Smell** - LPG has a very distinctive odor. If you smell LPG, **DO NOT** start the engine.

c. **Soapy Water** - This method is used in conjunction with **Step b** above. If the odor of LPG is present but escaping fuel cannot be heard, apply soapy water to the fittings and observe for bubbles.

d. **Frost** - If the amount of LPG escaping is sufficient, frost may appear on the fittings.

### Petrol and Diesel Fuel

#### **WARNING**

**When fuel is added, keep the funnel or fuel nozzle in contact with the metal of the fuel tank to reduce the possibility of static electric sparks. Clean any spilled fuel.**

1. Remove the fuel cap. Make sure the fuel tank is filled with the correct fuel for the type of engine in the lift truck. Clean the fuel cap and make sure vent is clear.
2. Replace the fuel cap.



# HYSTER

## Maintenance

### Wheels and Tyres

#### General

This series of lift trucks have pneumatic tyres or solid rubber tyres that look like pneumatic tyres. These variations in tyres also cause a variation in the types of wheels and the disassembly and assembly procedures.

#### Pneumatic Tyre With Tube, Repair

#### Remove Wheels From Lift Truck

#### **WARNING**

A solid rubber tyre that is the same shape as a pneumatic tyre can be installed on a three-piece or four-piece wheel for a pneumatic tyre. **DO NOT** make changes in the parts of the rim if this type of solid rubber tyre is installed instead of a pneumatic tyre. Changes to the parts of the rim can cause a failure of the wheel and cause an accident.

The type of tyre and the tyre pressure (pneumatic tyres) are shown on the Nameplate. Make sure the Nameplate is correct for the type of tyres on the lift truck. If the truck is equipped with bias-ply tyres, the

ply rating listed on the Nameplate is the minimum ply rating that must be installed. tyre with ply ratings greater than or equal to the Nameplate listed ply rating may be acceptable. Check with your Hyster dealer whether a specific bias-ply tyre is approved for use on Hyster trucks.

#### **WARNING**

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

Deflate tyre completely before removing the wheel from the lift truck. If dual wheels are used, deflate both tyres. Air pressure in the tyres can cause the tyre and rim parts to explode causing serious injury or death.

Always wear safety glasses.

Never loosen the nuts that hold the inner and outer wheel halves together when there is air pressure in the tyre.

#### **CAUTION**

Not all makes of radial tyres have sufficient sidewall strength for successful use on forklift trucks. This can affect stability and ride quality. Check with your dealer



## Maintenance

**HYSTER**

**whether a specific radial tyre is approved for use on Hyster trucks.**

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 air from the tyre. Remove the valve core to make sure that all of the air is out of the inner tube. Push a wire through the valve stem to make sure that the valve stem does not have a restriction.

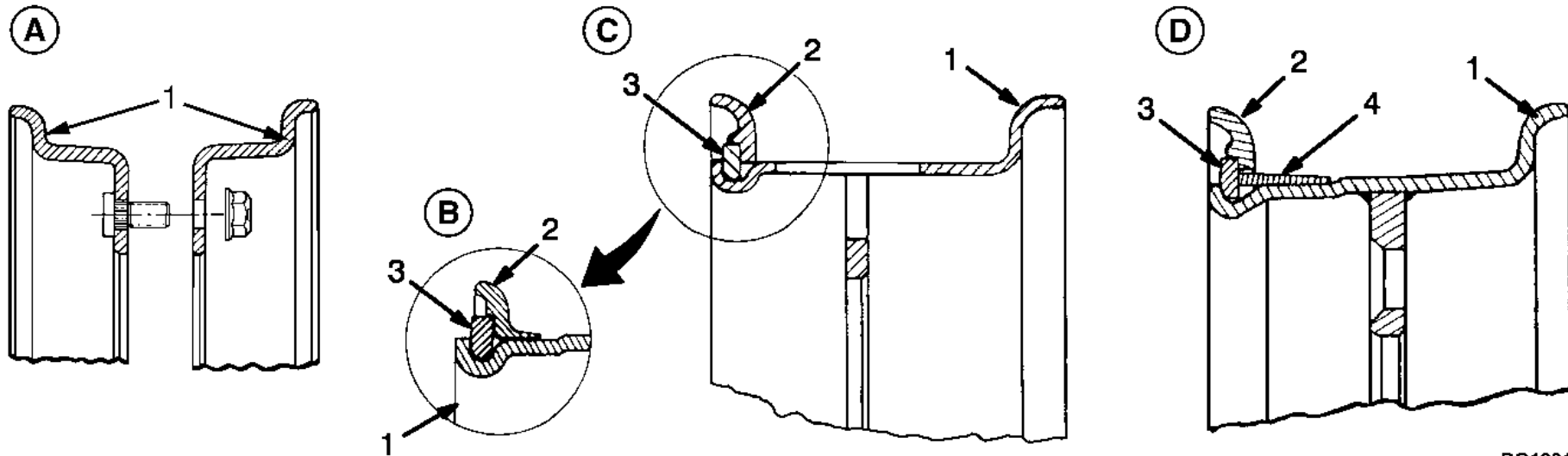
3. Remove the wheel nuts and remove the wheel and tyre from the lift truck. Lift truck tyres and wheels are heavy.

### Remove Tyre From Wheel

When disassembling wheels, see **Figure 32**. There are several types of wheels used on this series of lift trucks. See **Tyre Removal, Two-Piece Wheel** and **Tyre Removal, Three- and Four-Piece Wheels**.

# HYSTER

## Maintenance



BO190184

- A. TWO-PIECE WHEEL
- B. OPTIONAL RIM ASSEMBLY

- 1. WHEEL RIM
- 2. SIDE FLANGE

- C. THREE-PIECE WHEEL
- D. FOUR-PIECE WHEEL

- 3. LOCK RING
- 4. FLANGE SEAT

**Figure 32. Types of Pneumatic Wheels**

## Maintenance

**HYSTER**

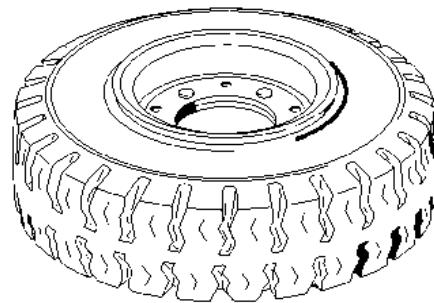
### *Tyre Removal, Two-Piece Wheel*

#### **⚠ WARNING**

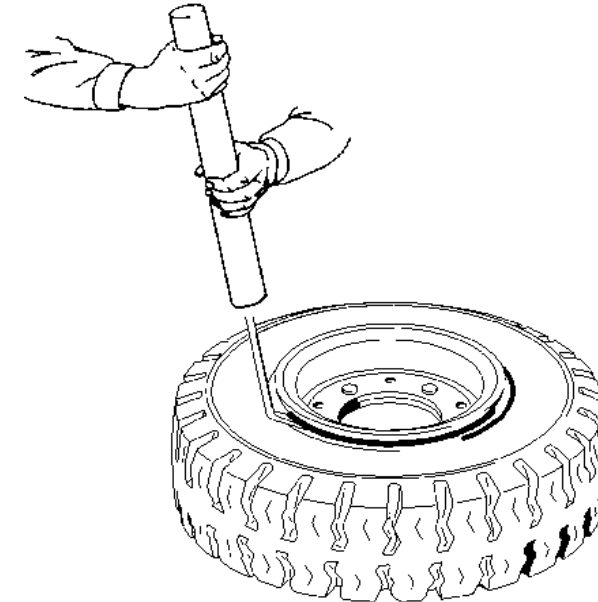
Make sure all of the air pressure is removed from the tyre before a wheel is disassembled. Air pressure in the tyres can cause the tyre and rim parts to explode causing serious injury or death.

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

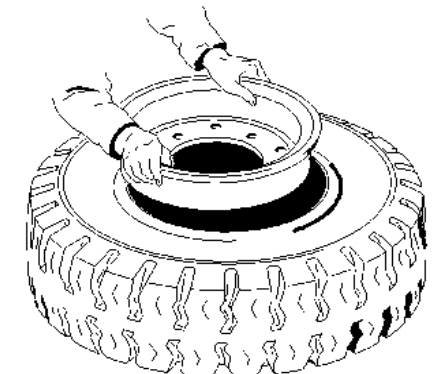
1. Remove the nuts that fasten the wheel rims together.



2. Loosen the tyre bead from the wheel rim.



3. Remove the wheel rims from tyre. Remove the inner tube and flap.





## HYSTER

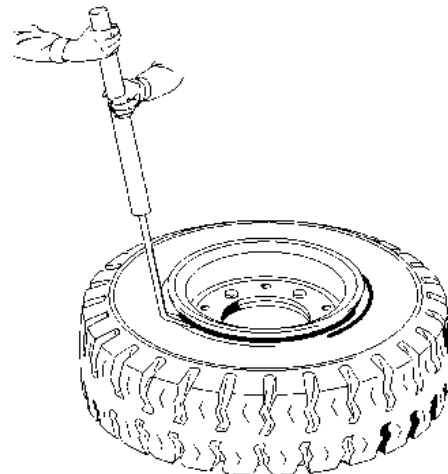
### Tyre Removal, Three- and Four-Piece Wheels

#### WARNING

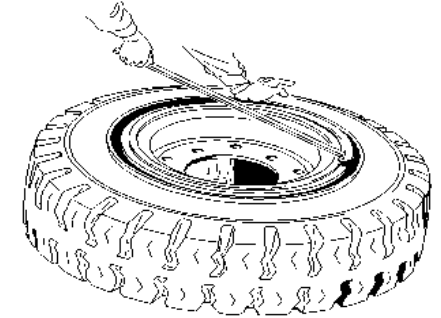
Make sure all of the air pressure is removed from the tyre before a wheel is disassembled. Air pressure in the tyres can cause the tyre and rim parts to explode causing serious injury or death.

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

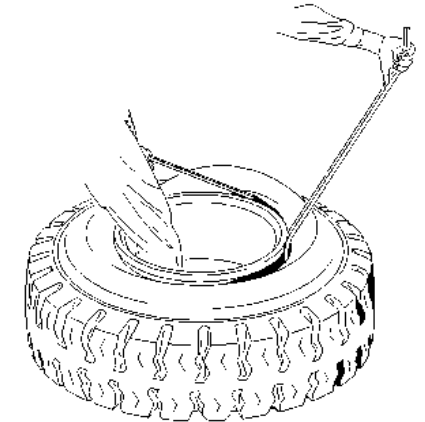
1. Loosen the tyre bead from the side flange.



2. Put the tyre tool into the slot between the lock ring and wheel rim. Remove the lock ring and side flange. If there is a flange seat, remove it.



3. Loosen the bead from the other side of the wheel rim. Remove the valve stem from the wheel.



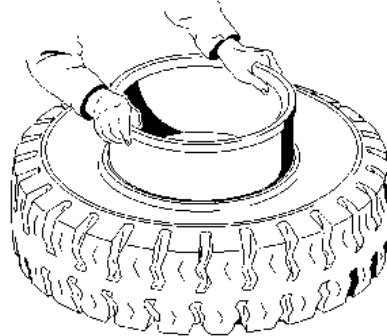
## Maintenance



## Maintenance

**HYSTER**

4. Remove the wheel rim from the tyre.



## Install Wheel in Tyre

### **⚠ WARNING**

Damage to the tyre and wheel assembly and injury or death can occur if you do not do the following procedures:

- Clean and inspect all parts of the wheel before installing the tyre.
- DO NOT use any damaged or repaired wheel parts.
- Make sure that all parts of the wheel are the correct parts for that wheel assembly.
- DO NOT mix parts between different types or manufacturers of wheels.

- DO NOT mix types of tyres, type of tyre tread, or wheel assemblies of different manufacturers on any one lift truck.

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 side 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.

1. Clean and inspect all parts of the wheel. Paint any parts that have rust or corrosion.
2. Install a new inner tube in the tyre. Used tubes and flaps can cause tyre failure.

### **⚠ WARNING**

DO NOT lubricate the tyre bead with antifreeze or petroleum-based liquid. Vapors from these liquids can cause an explosion during inflation or use.

3. Apply a rubber lubricant or a soap solution to the tyre bead and tube.
4. Install a new tyre flap.



## HYSTER

## Maintenance

### **⚠ WARNING**

**DO NOT** lubricate the tyre bead with antifreeze or petroleum-based liquid. Vapors from these liquids can cause an explosion during inflation or use.

5. Make sure the rim is the correct size for the tyre. Lubricate the part of the wheel that contacts the bead and flap.

6. Install the three-piece or four-piece wheel in the tyre as shown in **Tyre Installation Three- or Four-Piece Wheel**.

7. Install the two-piece wheel in the tyre as shown in **Tyre Installation Two-Piece Wheel**.

### *Tyre Installation Three- or Four-Piece Wheel*

### **⚠ WARNING**

**Damage to the tyre and wheel assembly and injury or death can occur if you do not do the following procedures:**

- Clean and inspect all parts of the wheel before installing the tyre.
- **DO NOT** use any damage or repaired wheel parts.
- Make sure that all parts of the wheel are the correct parts for that wheel assembly.

- **DO NOT** mix parts between different types or manufacturers of wheels.
- **DO NOT** mix types of tyres, type of tyre tread, or wheel assemblies of different manufacturers on any one lift truck.

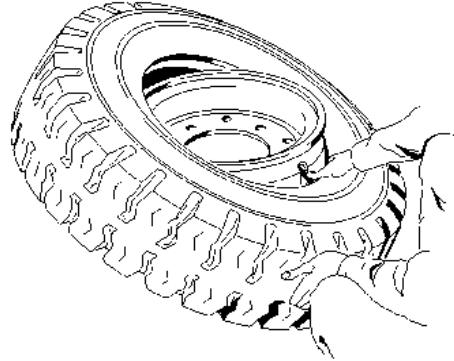
**DO NOT** use a steel hammer on the wheel. Use a rubber, lead, plastic, or brass hammer to put parts together. Make sure that the side ring is in the correct position. The ends of the side ring must not touch. The clearance at the ends of the side ring will be approximately 13 to 25 mm (0.5 to 1.0 in.) after it is installed. If the clearance is wrong, the wrong part has been used.

1. Install the inner tube and the rubber flap in the tyre.

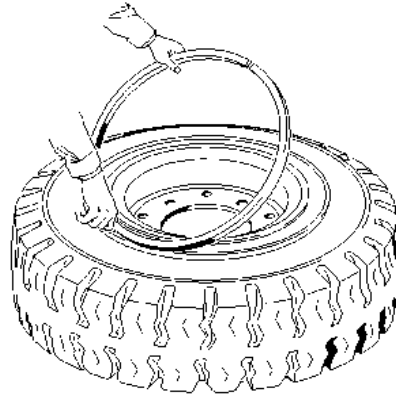


## Maintenance

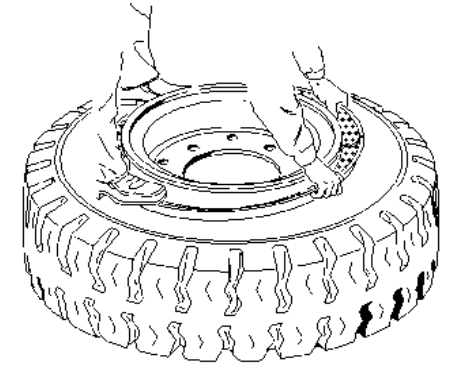
2. Install the wheel rim in the tyre. Make sure the stem of the inner tube is aligned with the slot in the rim.



3. Turn over the rim and tyre. Put blocks under the rim so that the rim is 8 to 10 cm (3 to 4 in.) above the floor. Install the flange seat (if used) and the lock ring.



4. Put the lock ring in the correct position on the rim. Add air pressure to the tyre as described in **Add Air to Pneumatic Tyres With Tube.**

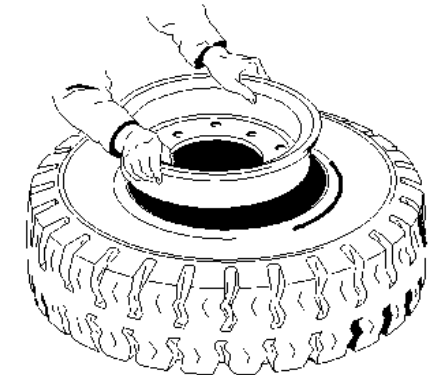


### *Tyre Installation Two-Piece Wheel*

#### CAUTION

**DO NOT** use pneumatic-shaped, solid tyres on two-piece bolt together drive wheels. Spinning may occur.

1. Install the inner tube and the rubber flap in the tyre. Install both halves of the wheel rim in the tyre. Make sure the stem of the inner tube is aligned with the slot in the rim.

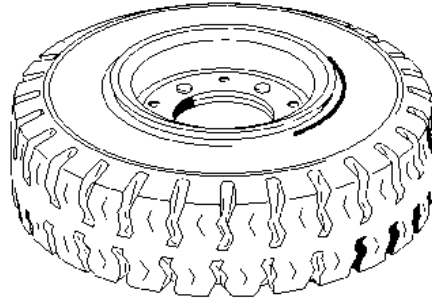


**HYSTER**

## HYSTER

## Maintenance

2. Tighten the nuts that hold the rim halves together to 175 N•m (130 lbf ft). Add air pressure to the tyre as described in **Add Air to Pneumatic Tyres With Tube**.



### Add Air to Pneumatic Tyres With Tube

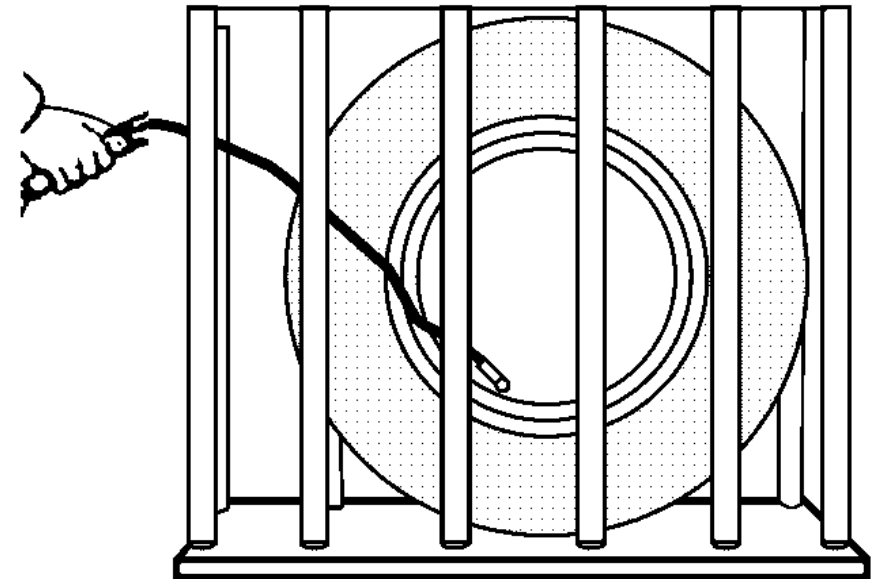
#### WARNING

Add air pressure to the tyres only in a safety cage. See Figure 33. Inspect the safety cage for damage before use. When air pressure is added, use a chuck that fastens onto the valve stem of the inner tube. Make sure there is enough hose to permit the operation to stand away from the safety cage when air pressure is added to the tyre.

#### WARNING

DO NOT sit or stand by the safety cage. DO NOT use a hammer to try and correct the position of the side flange or lock ring when the tyre has air pressure greater than 20 kPa (3 psi) of air pressure to the tyre.

1. Put the tyre in a safety cage. See **Figure 33**.
2. Add 20 kPa (3 psi) of air pressure to the tyre.
3. Check that all wheel parts are correctly installed. Hit the lock ring lightly to make sure that it is in the seat.



BO260046

*Figure 33. Add Air to Tyres With Tube*

4. If installation is correct, add air pressure to the tyre to the specified pressure. See Nameplate.



## Maintenance

**HYSTER**

5. Check that all wheel parts are correctly installed. If installation is not correct, remove all of the air pressure from the tyre. Remove the valve core to make sure all of the air pressure has been removed and then make adjustments. The clearance at the ends of the lock ring will be approximately 13 to 25 mm (0.5 to 1.0 in.) when the tyre has the correct air pressure.

### Install the Wheels

Install the wheel on the hub. On the drive wheels tighten the nuts in a cross pattern to a torque value of 450 to 500 N•m (332 to 369 lbf ft). If the wheels are the two-piece rims, make sure the nuts that fasten the rim halves together are toward the brake drum when they are installed.

The steering wheels are fastened to the spindle of the steering axle with a large castle nut. Make sure inner and outer bearings are correctly lubricated with grease. Install inner bearing assembly and wheel on spindle. Install outer bearing cone and castle nut. Tighten castle nut to 60 N•m (44 lbf ft) while wheel is rotated. Loosen castle nut until hub turns freely with no end play. Tighten castle nut to 3.0 to 6.0 N•m (425 to 850 lbf in). Install cotter pin in castle nut. If the cotter pin cannot be installed, loosen the castle nut to

the first position where the cotter pin can be installed. Install cap for bearings.

### Pneumatic Tubeless Tyre, Repair

#### Remove Tyre From Lift Truck

#### WARNING

**Wheels must be changed and tyres repaired by trained personnel only.**

**Deflate tyres completely before removing the wheel from the lift truck. If dual wheels are used, deflate both tyres. Air pressure in the tyres can cause the tyre and rim parts to explode causing serious injury or death.**

**Always wear safety glasses.**

**Never loosen the nuts that hold the inner and outer wheels halves together when there is air pressure in the tyre.**

The Tubeless Bead Seal (TBS) enables tubeless tyres to be used on wheel rims that were designed to be used with a tube.

The main component of the TBS is a special rubber ring that fits inside the tyre between the tyre beads to ensure



## HYSTER

the airtightness of the existing wheel and the tubeless tyre assembly. See **Figure 32**.

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 valve cap and core to remove all air from the tyre.
3. Remove the wheel nuts and remove the wheel and tyre from the lift truck. Lift truck tyres and wheels are heavy.

### Remove Tyre From Wheel

#### **WARNING**

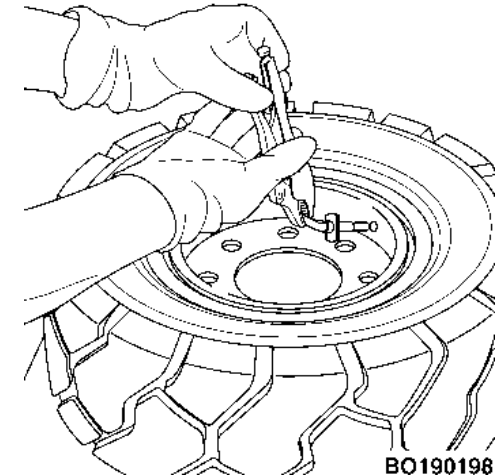
**Make sure all of the air pressure is removed from the tyre before a wheel is disassembled. Air pressure in the tyres can cause the tyre and rim parts to explode causing serious injury or death.**

**Keep tyre tools in firm contact with the wheel parts. If the tool slips, it can move with enough force to cause an injury.**

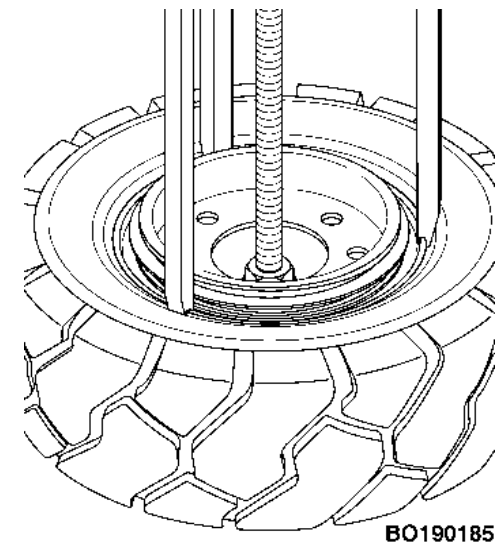
**NOTE:** There are several types of wheels used on these lift trucks. When disassembling wheels, see **Figure 32**.

## Maintenance

1. If wheel rim is a three- or four-piece rim, turn the valve 1/4 turn and remove valve from wheel.



2. Put wheel and tyre assembly on the press. Position the feet of the press on the loose flange. Push press down on loose flange to expose the locking ring.

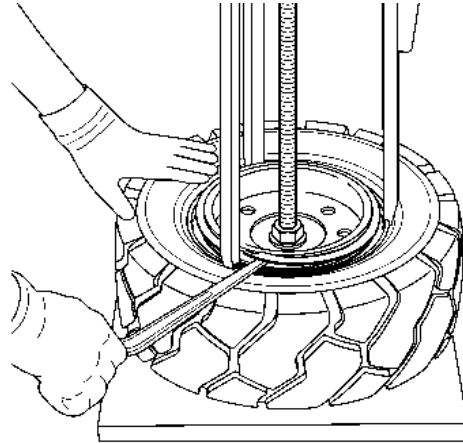




## Maintenance

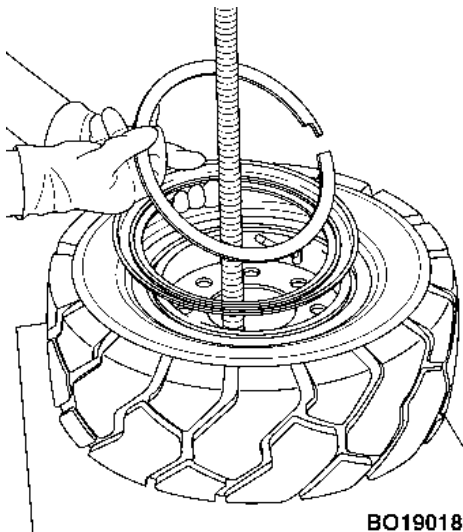
**HYSTER**

3. Remove the loose flange locking ring and the advance band (four-piece wheel only) using a tyre tool.



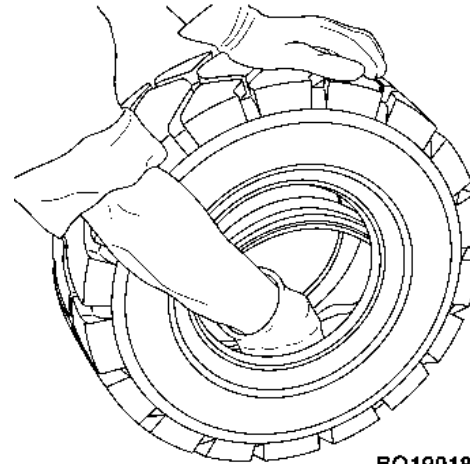
BO190186

4. Remove the press and remove the loose flange locking ring and the advance band (four-piece wheel only) from the tyre and wheel assembly.



BO190187

5. Push the TBS toward the inside of the tyre to remove it.



BO190188

## Install Tyre on Wheel

### **⚠ WARNING**

Damage to the tyre and wheel assembly and injury or death can occur if you do not do the following procedures:

- Clean and inspect all parts of the wheel before installing the tyre.
- **DO NOT** use any damaged or repaired wheel parts.
- Make sure that all parts of the wheel are the correct parts for that wheel assembly.



## HYSTER

## Maintenance

- **DO NOT** mix parts between different types or manufacturers of wheels.
- **DO NOT** mix types of tyres, type of tyre tread, or wheel assemblies of different manufacturers on any one lift truck.

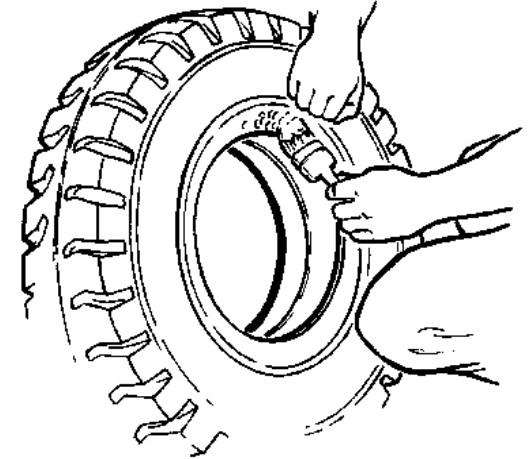
### **WARNING**

**DO NOT** use a steel hammer on the wheel. Use a rubber, lead, plastic, or brass hammer to put parts together.

### **WARNING**

**DO NOT** lubricate the tyre bead with antifreeze or petroleum-based liquid. Vapors from these liquids can cause an explosion during inflation or use.

1. Clean interior and exterior bead area of the tyre. Lubricate tyre beads and the inside of the tyre, up to the tyre shoulders. Apply lubricant to entire underside of the TBS.



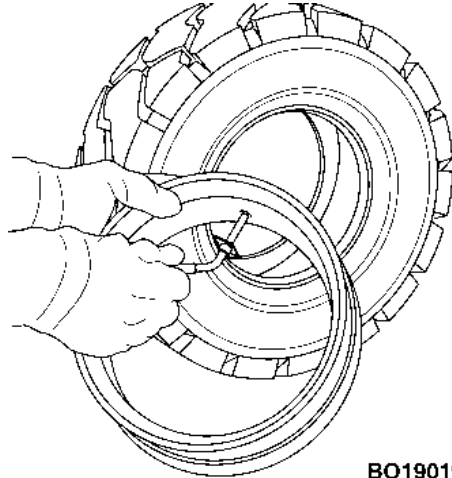
**NOTE:** If the wheel rim width is less than six inches, the TBS will contain one valve hole to accommodate the needle valve. If the wheel rim width is greater than six inches, the TBS will have two holes for the needle valve.

One hole is centrally located and the other is offset, to ensure the correct positioning of the valve in the valve slot. The valve hole that is not used should be sealed with a small plastic plug.

## Maintenance

**HYSTER**

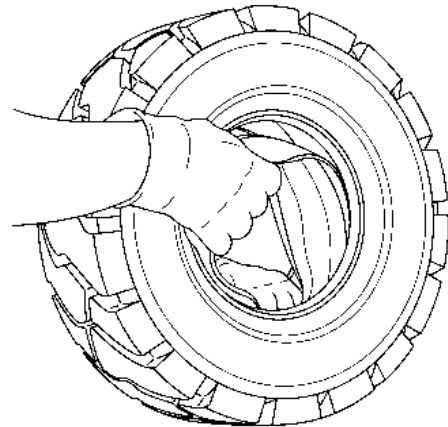
2. Apply lubricant to the needle valve and the valve hole that will be used (see **NOTE** in Step 1), by inserting and removing the lubricated valve several times. If a three- or four-piece wheel is being used, remove the valve. If a two-piece wheel is being used, leave valve in valve hole.



BO190190

If the TBS has two valve holes, lubricate the plastic plug and insert into valve hole that will not be used.

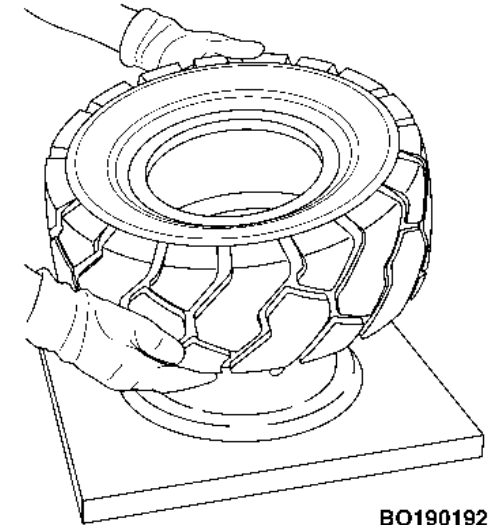
3. Place the TBS inside the tyre, making sure that the wings of the TBS are not folded over. Make a mark on the tyre to note the position of the valve hole in the TBS.



BO190191

4. Apply lubricant to the rim. If a four-piece wheel is being used, lubricate the advance band. Slide the tyre and TBS onto the wheel.

Line up the valve hole in the TBS with the valve slot in the wheel. Lubricate and insert the valve into the valve hole. Make sure it is fully inserted.

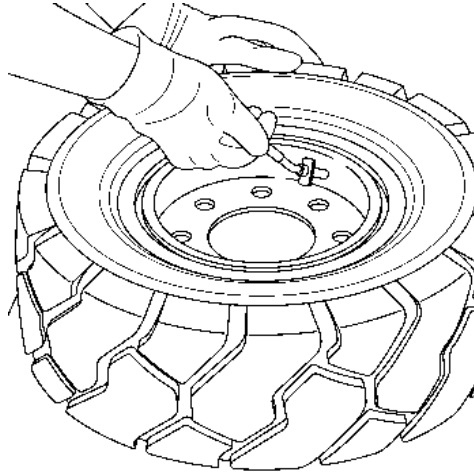


BO190192



## HYSTER

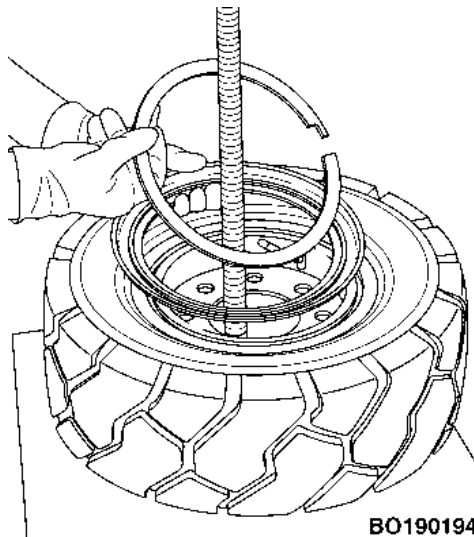
5. Place the wheel and tyre assembly on a flat surface. Turn the valve a 1/4 turn to lock the collar under the edges of the rim valve slot.



BO190193

6. Raise the tyre and position the base and threaded stem of the press through the hole in the center of the wheel. Insert in wheel assembly, the following parts:

- Advance band (four-piece wheel only)
- Loose flange
- Locking ring



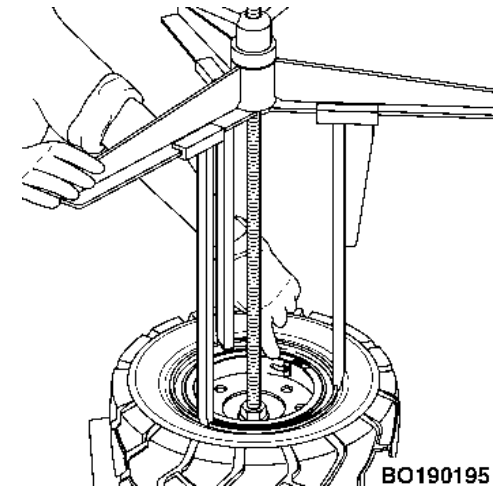
BO190194

7. Position the advance band. Ensure that it does not go in too far and damage the valve. Position the arms of the press onto the loose flange.

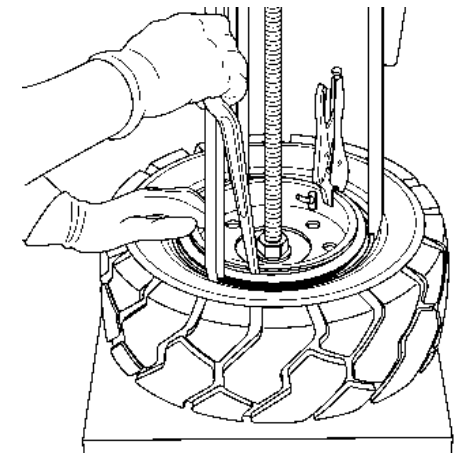
Push down on press to depress the tyre beads until the locking ring groove is fully exposed.

8. Insert tyre tool into the locking ring groove, and a vise grip on other end. Remove vise grip. Release the press and check that all component parts are correctly positioned. Replace the valve core.

9. Inflate tyre to 103 kPa (15 psi). Tap wheel with a mallet to ensure all components are correctly sealed. Remove the press from wheel and tyre assembly.



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BO190196

## Maintenance

## Maintenance

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### Add Air to Pneumatic Tubeless Tyre

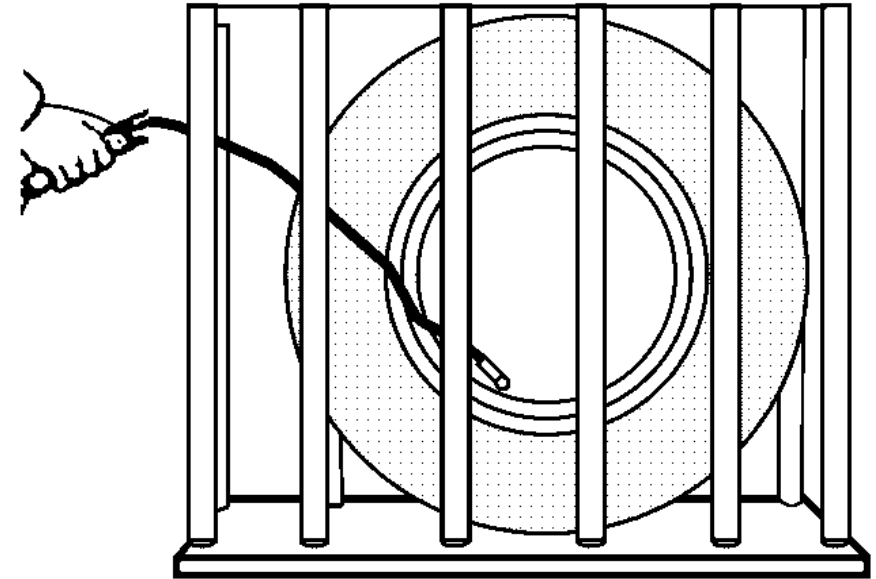
#### **WARNING**

Add air pressure to the tyres only in a safety cage. See Figure 34. Inspect the safety cage for damage before use. When air pressure is added, use a chuck that fastens onto the valve stem. Make sure there is enough hose to permit the operator to stand away from the safety cage when air pressure is added to the tyre. **DO NOT sit or stand by the safety cage.**

Add air to tyre to the recommended pressure that is shown on the Nameplate. Install valve cap to ensure air stays in the tyre.

### Install the Wheels

Install the wheel on the hub. On the drive wheels tighten the nuts in a cross pattern to a torque value of 450 to 500 N•m (332 to 369 lbf ft). If the wheels are the two-piece rims, make sure the nuts that fasten the rim halves together are toward the brake drum when they are installed.



BO260046

**Figure 34. Add Air to Tubeless Tyre**

The steering wheels are fastened to the spindle of the steering axle with a large castle nut. Make sure inner and outer bearings are correctly lubricated with grease. Install inner bearing assembly and wheel on spindle. Install outer bearing cone and castle nut. Tighten castle nut to 60 N•m (44 lbf ft) while wheel is rotated. Loosen castle nut until hub turns freely with no end play. Tighten castle nut to 3.0 to 6.0 N•m (425 to 850 lbf in). Install cotter pin in castle nut. If

## HYSTER

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the cotter pin cannot be installed, loosen the castle nut to the first position where the cotter pin can be installed. Install cap for bearings.

### Solid Rubber Tyres on Pneumatic Wheels, Change

#### WARNING

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

Always wear safety glasses.

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 tyre from the lift truck. Lift truck tyres and wheels are heavy.

### Remove Tyre From Wheel

#### WARNING

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

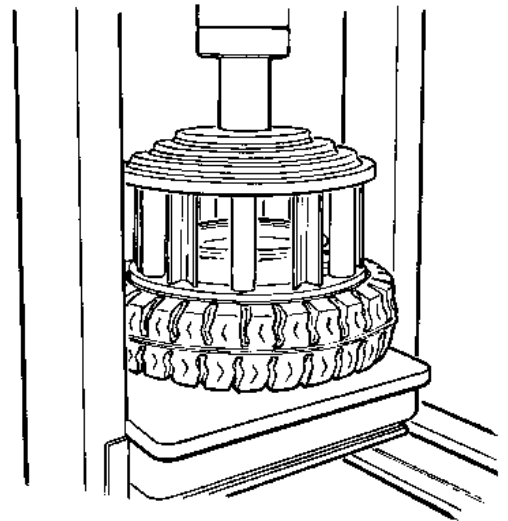
**NOTE:** When disassembling wheels, see **Figure 32**. There are several types of wheels used on these series of lift trucks.

#### WARNING

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

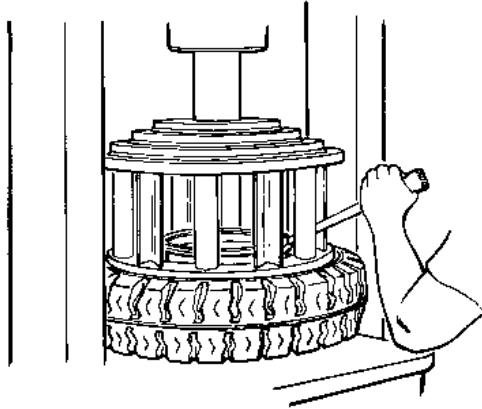
Always wear safety glasses.

1. Put the wheel rim on the bed of the press. Put the cage in position on the tyre. Use the press to push the tyre away from the side flange.

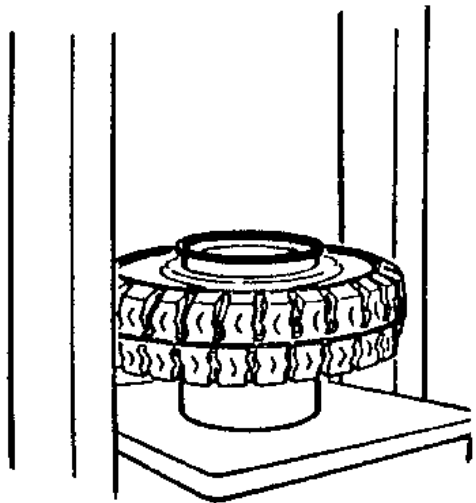


## Maintenance

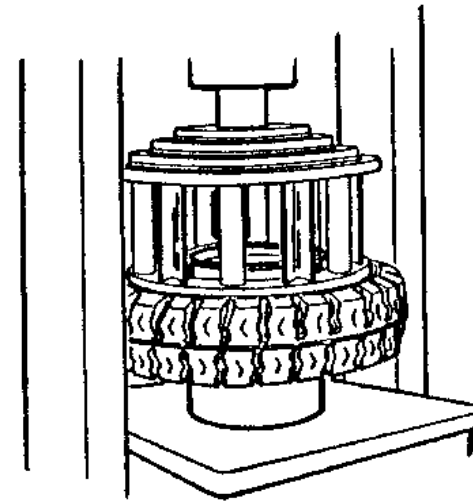
**HYSTER**



2. Put the tyre tool into the slot between the lock ring and the wheel rim. Remove the lock ring and side flange.



3. Turn the tyre over. 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.



4. Put the cage in position on the tyre. Use the press to push the tyre from the wheel rim.

### Install Tyre on Wheel

**⚠ WARNING**

Damage to tyre and wheel assembly and injury or death can occur if you do not do the following procedures:



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- Clean and inspect all parts of the wheel before installing the tyre.
- 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 tyres, type of tyre tread, or wheel assemblies of different manufacturers on any one lift truck.

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 lock ring is in the correct position. The ends of the lock ring must not touch. The clearance at the ends of the side 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.

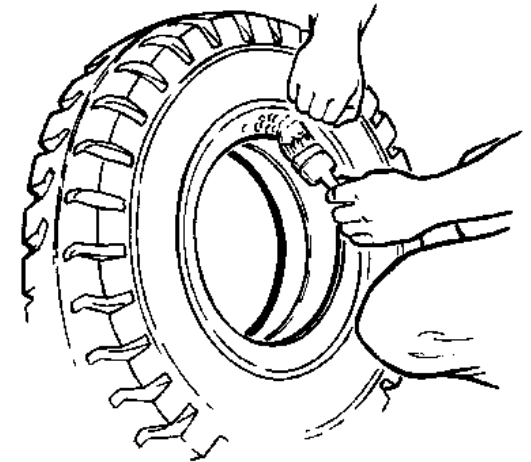
**NOTE:** When disassembling wheels, see **Figure 32**. There are several types of wheels used on these series of lift trucks.



### CAUTION

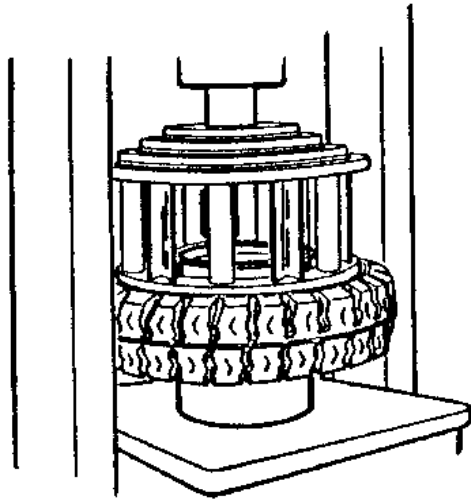
Too much lubricant can cause the tyre to slide and move around the wheel rim.

1. Lubricate the wheel rim and the inner surface of the tyre with tyre lubricant or soap.

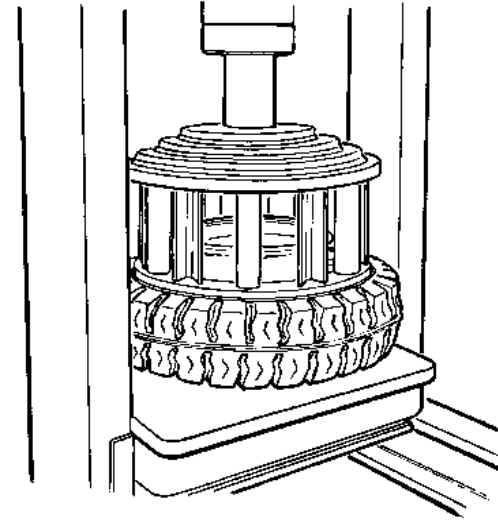


## Maintenance

**HYSTER**



**2.** Put the wheel rim on the bed of the press. Put the tyre over the wheel rim. Put the cage in position on the tyre. Use the press to install the tyre on the wheel rim.

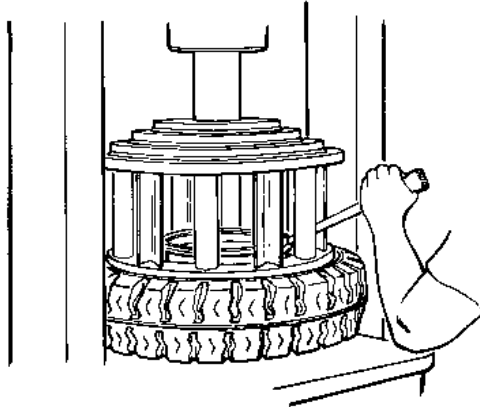


**3.** Remove the cage and put the flange seat (if used), the side ring, and the lock ring in position on the wheel rim. Install the cage on the tyre. Use the press to push the tyre onto the wheel rim so that the side flange and lock ring can be installed.



## HYSTER

## Maintenance



4. While the cage is holding the tyre on the wheel rim, install the lock ring. Use a tyre tool to make sure the lock ring is in the correct position.

### Snap-On Tyre, Change

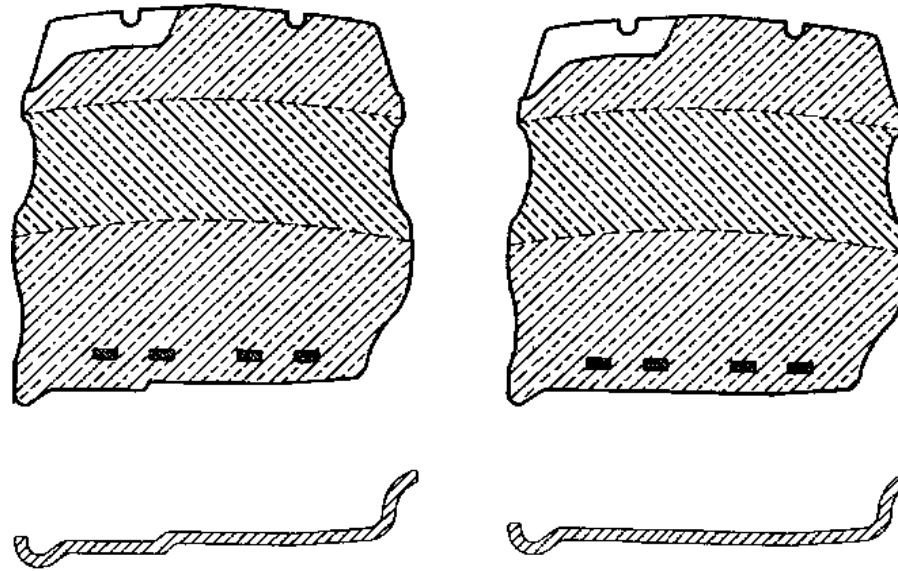
#### **WARNING**

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

**Always wear safety glasses.**

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 tyre from the lift truck. Lift truck tyres and wheels are heavy.

**NOTE:** See **Figure 35** when you disassemble the wheels. There are several types of wheels used on these series of lift trucks.



HO210000

**Figure 35. Tyres and Rim Configurations**

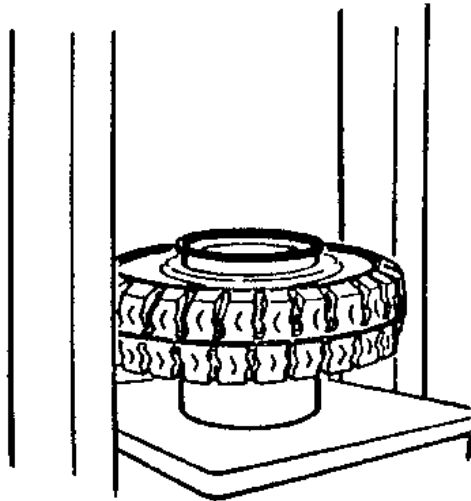
## HYSTER

## Maintenance

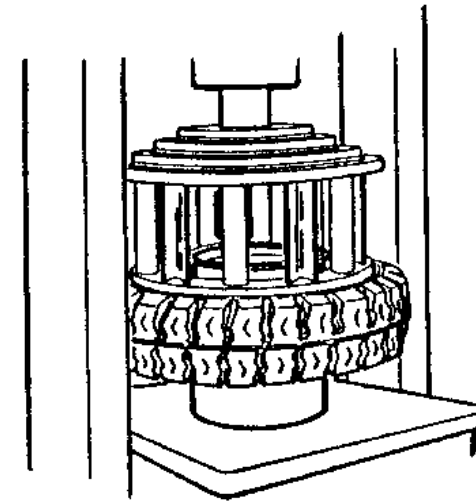
### Remove Tyre, Solid Tyre From Wheel

#### WARNING

Keep tyre 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 tyre. Use the press to push the tyre from the wheel rim.

## Maintenance

**HYSTER**

### Install Snap-On-Tyre, Solid Tyre on Wheel

**NOTE:** When wheels are disassembled, see **Figure 35**. There are several types of wheels used on this series of lift trucks.

#### **WARNING**

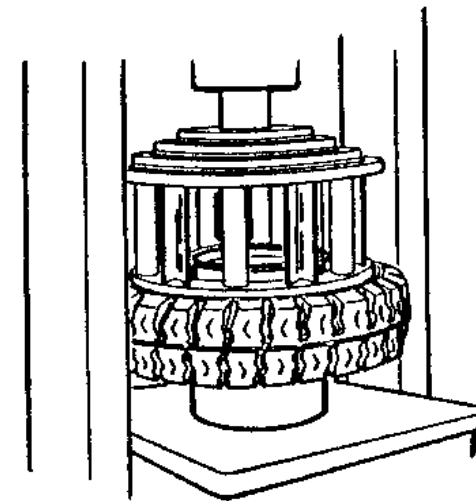
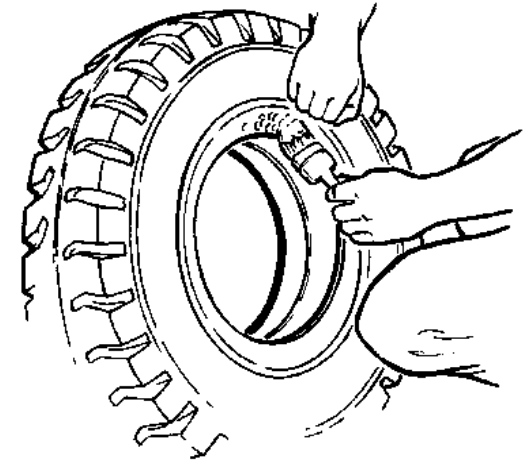
Failure to follow these procedures will cause damage to the tyre and wheel assembly and can cause injury.

- Clean and inspect all parts of the wheel before installing the tyre.
- **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 tyres, type of tyre tread, or wheel assemblies of different manufacturers on any one lift truck.

#### **CAUTION**

Too much lubricant can cause the tyre to slide and move around the wheel rim.

1. Lubricate the wheel rim and the inner surface of the tyre with tyre lubricant.





## **HYSTER**

## **Maintenance**

2. Put the wheel rim on the bed of the press. Put the tyre over the wheel rim. Put the cage in position on the tyre. Use the press to install the tyre on the wheel rim.

### **Operating Procedures for a New or Rebuilt Engine**

A new or rebuilt engine must be operated under special conditions during the first 50 hours. These special conditions prevent damage to the engine until the new parts can wear and adjust to fit each other.

1. Make sure the fluid levels of oil and coolant are correct.
2. Start and run the engine at approximately one-half throttle for 30 minutes for the first operation. Check the gauges and indicators for the correct operation during this first operating period. Check for leaks.
3. If the work conditions are slow and the loads are less than 50% of the truck capacity, a simulated work condition must be used during the first four hours of operation. Operate the lift truck with a minimum load of 75% capacity. Operate the engine through cycles from idle to full throttle

and back to idle. Avoid long periods of high engine speeds with a light load during the first 50 hours of operation. High engine speeds with a light load can cause damage to the cylinders in the engine.

### **Jump-Starting the Lift Truck**

#### **Jump-Starting Using a Battery Charger**

If the battery becomes discharged and requires a booster battery to start the engine, follow these procedures carefully when connecting the jump lead:

1. Disconnect the negative battery terminal of the lift truck being started.
2. Always connect positive jump lead to positive terminal of discharged battery and negative jump lead to negative terminal.
3. Always connect jump lead, that is the earth cables, last.
4. Always connect jump lead to discharged battery before connecting them to booster battery.



## Maintenance

**HYSTER**

### Jump-Starting Using Another Lift Truck

#### **WARNING**

To prevent possible arcing between the two lift trucks, make sure that the lift trucks are not touching.

1. Always connect positive jump lead to positive terminal of discharged battery and negative jump lead to negative terminal.
2. Always connect jump lead, that is the ground cable, last.
3. Always connect jump lead to discharge lift truck battery before connecting them to the fully charged lift truck battery.

### 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. 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.

### How to Put Internal Combustion Engine (ICE) Trucks in Storage

It is important to store your lift truck properly to protect it. The main areas of concern are engines, hydraulic components, and truck batteries. The length of storage time and the storage location determines what procedures you should follow.

Before placing any lift truck in storage, you must choose an area that is clean, dry, and free from airborne contaminants. For safety and increased usable floor area, remove the forks and tag them with the lift truck serial number. For best protection, operate your internal combustion engine lift truck for a short period each month.

The following storage procedures are for conditions and temperatures above 0 °C (32 °F). Adjust these procedures for local conditions and any changes in conditions during storage. The preparations necessary for storage are also determined from the following conditions:

- Short-term storage is from one to six months. Long-term storage is over six months.



## HYSTER

## Maintenance

- Storage Location. A lift truck stored indoors will not require as much external protection as a lift truck stored outdoors.

### Short-Term Storage

Perform the following steps to prepare your lift truck for storage from one to six months:

1. Check lubricant and fluid levels. Completely fill the fuel tank. Make sure the coolant mixture will protect cooling system and engine to lowest temperature expected during storage. Make sure all caps and dipsticks are installed correctly.
2. Fully lower the mast. If lift truck is equipped with forks, tilt mast **FORWARD** until the tips of the forks touch the floor. Apply a thin coat of fresh, high grade SAE 30 or 40 weight engine oil to the exposed cylinder rods. If the forks are removed, tilt mast **BACKWARD** until cylinders are completely retracted. This protects the cylinder rods.
3. Check that all switches and accessories are in the **OFF** position.
4. Activate each control lever to relieve hydraulic pressure.

5. Install blocks, front and rear, at the drive wheels. If the lift truck must be left on an incline, put blocks on the down-hill side of all wheels so that the lift truck cannot move. **DO NOT USE THE PARKING BRAKE.**

6. Disconnect the battery cables from the battery. Apply a protective coating to the cable connectors and battery terminals to prevent corrosion.

7. Check the tyre pressure, if applicable. Make sure the tyres have the correct pressure (see the Nameplate.)

8. Clean the lift truck and engine compartment to prevent corrosion.

9. If the lift truck is not stored indoors, put a cover over the lift truck to prevent damage from the weather. In wet conditions, a cover will not prevent corrosion to the lift truck.

### Long-Term Storage

Do the following steps to prepare the lift truck for storage for 6 months or longer:

1. Complete all short-term storage procedures.
2. Wrap or cover all exterior lights, radiator grill, and air vents with a moisture barrier cover. Use tape to hold the covers in place.



## Maintenance

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3. Remove the battery or batteries from the lift truck. Store the battery or batteries in an approved space. Be sure to follow local regulations. Batteries that are stored for long periods can become damaged. Either keep batteries in service or follow the battery storage procedures below.

4. Spray exterior surfaces and frame with preservative coating.

### While the Lift Truck is in Storage

Each month make a visual inspection for leaks or signs of deterioration. Take corrective action immediately. Check the fluid level in engine, radiator, hydraulic tank, and brake master cylinder.

**NOTE:** Do not shut down an engine before it reaches operating temperature.

Each month set the park brake, start engine, and run until normal operating temperature is reached. This will coat the internal engine components with a film of oil and rid the engine of built-up condensation.

Each month all hydraulic cylinders must be cycled several times to keep the seals active and to coat the interior walls with oil. Actuate each cylinder, in both directions, until it reaches the stops.

Return lift truck to its storage state for another month.

### How to Put Batteries in Storage

Batteries are to be placed on a wooden pallet and stored in a dry, moderately cool area.

Lead acid batteries will slowly "self-discharge" over a period of time due to their chemical makeup. If the self-discharge is left uncontrolled, excessive sulphation can occur which is difficult to reduce and can damage the anodes. A discharged battery with a specific gravity of 1.000 will freeze at  $-7.8\text{ }^{\circ}\text{C}$  ( $18\text{ }^{\circ}\text{F}$ ) A fully-charged battery with a specific gravity of 1.280 will freeze at  $-66\text{ }^{\circ}\text{C}$  ( $-87\text{ }^{\circ}\text{F}$ ).

This "self-discharge" is due to a chemical reaction; therefore, that chemical reaction can be accelerated by heat resulting in more rapid "self-discharge." The rate of discharge can amount to an average of about 0.001 point drop in specific gravity per day.

The following procedure can be followed when placing a battery in storage or when not in operation for more than 30 days.

1. Give an equalizing charge prior to placing new batteries in storage. Used batteries are to be fully charged, then allowed to balance for approximately three more hours.





## HYSTER

## Maintenance

2. Neutralize and clean the battery. Clean with a solution of 100 grams (3.5 oz) of sodium bicarbonate (baking soda) per 1 liter (0.25 gal) of water.
3. Store in a cool, dry location.
4. Check each cell in the battery at least once every 30 days and boost charge when specific gravity falls below 1.240 Hg.
5. Protect batteries from ambient contamination.

If a greasy film forms on the top of a battery, this is acid and must be neutralized with the solution described above.

### Putting a Stored Lift Truck Back Into Service

1. Remove all tape, covers, and preservation materials.
2. Check the lift truck for damage and missing components. Repair damage and/or replace missing components.

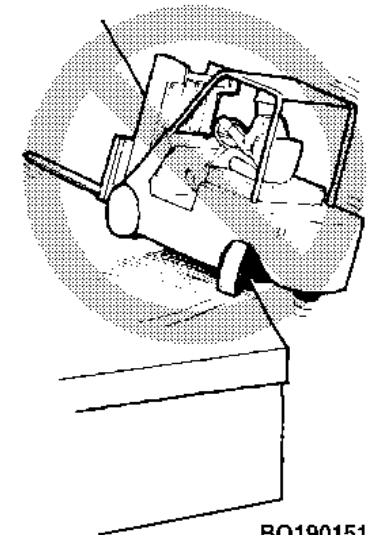
**NOTE:** If the lift truck has been stored longer than one year, all lubricants and fluids must be drained and replaced. See the **Periodic Maintenance** section of your service manual for the procedures.

3. Clean the battery cables and terminals. Check the battery voltage. If the voltage is not correct, charge battery. Connect battery cables to battery.
4. When a lift truck is to be put into service after storage, it must be given the 500-hour inspection shown in the **Periodic Maintenance** service manual.

### How to Move a Lift Truck on a Transport

#### **WARNING**

Stay a safe distance from the edge of docks, ramps, platforms, and other similar working surfaces. Watch the “tail swing.” Remember when traveling 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 can cause the lift truck to fall off the dock.



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#### **WARNING**

**IF THE LIFT TRUCK FALLS OFF THE DOCK, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL,**



## Maintenance

**HYSTER**

### **BRACE YOUR FEET, AND LEAN FORWARD AND AWAY FROM THE POINT OF IMPACT.**

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 tyres 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**

#### **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.**

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. Put the direction control lever for the transmission in **NEUTRAL** and leave the gears of the transmission engaged. **DO NOT** leave the transmission in **NEUTRAL**.



## HYSTER

## Maintenance

4. Turn the key switch to **OFF** to stop the engine and check that all switches and accessories are turned **OFF**.

5. Put blocks in front and back of the lift truck tyres to prevent any movement of the lift truck. Make sure the blocks are attached to the load surface.

If the lift truck is not in active use, close the fuel valve at the LPG tank. If the lift truck is going to be left overnight or longer, the truck must be parked outside or the LPG tank must be removed and stored outside.

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 Periodic Maintenance** 8000 SRM 2000 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 Engine Stopped**.



## Maintenance

**HYSTER**

### 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 _____



# HYSTER

# Maintenance

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 _____



***HYSTER***

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**NOTES**

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## 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 बिन्दा रहौ ।

في التاني السلامة

安全第一

**SAFETY  
PAYS!**



# OPERATING MANUAL

## H2.0-3.0XT (A380)

**DO NOT REMOVE THIS MANUAL FROM THIS UNIT**