OPERATING MANUAL

Challenger

H16XM-9, H16XM-12, H18XM-7.5, H18XM-9 (A238)

DO NOT REMOVE THIS MANUAL FROM THIS UNIT

PART NO. 4089517 4/14

LIFT TRUCK MODEL_____ **SERIAL NUMBER**_____

ENGINE MODEL_____ **SERIAL NUMBER**_____

TRANSMISSION TYPE_____ **SERIAL NUMBER**_____

MAST LIFT HEIGHT_____ **GROUP NUMBER**_____

CARRIAGE TYPE_____ **GROUP NUMBER**_____

DRIVE TIRE SIZE_____ **STEERING TIRE SIZE**_____

SPECIAL EQUIPMENT OR ATTACHMENTS

HYSTER

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 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 2006/42/EC:

- **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:** Per EEC methods, according to EN 12053: Continuous A-weighted at workstation; H16XM-9,

H16XM-12, H18XM-7.5, and H18XM-9 is 73.0 dBA for Tier 4i/Stage III B engines.

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

  Whole-body vibration:

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

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

    - Measured vibration emission value $a_{W,Z}$ = **0.21** m/s^2
    - Uncertainty, K = **0.3** m/s^2

  — Values determined according to EN 13059.

  Hand-arm vibration:

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

- **Hazardous Atmosphere:** Before any truck within the European Community can be operated in a Potentially Explosive Atmosphere, it is necessary that the truck is suitably converted for the application. Conversions should only be carried out by a **Hyster** approved supplier. Confirmation of the conversion can be made by referring to the truck Declaration of Conformity which will confirm compliance with European Directive 94/9/CE. If you are in doubt, please contact your **Hyster** dealer for assistance.
- **Manufacturer:** Hyster Europe, Centennial House, Building 4.5, Frimley Business Park, Frimley, Surry GU16 7SG, United Kingdom
- **The EC Conformity:** Each lift truck equipped with an EC certified engine 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.

NOTE: A fork lift truck is intended to pick-up, move, and tier materials.

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

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

⚠ WARNING

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

⚠ CAUTION

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

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

Atmospheric Conditions

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

Average ambient temperature for continuous duty:	25 °C (77 °F)
Maximum ambient temperature (with reduced performance):	45 °C (109 °F)
Lowest ambient temperature for trucks intended for use in normal indoor conditions:	5 °C (41 °F)
Lowest ambient temperature for trucks intended for use in normal outdoor conditions:	–20 °C (10 °F)
Altitude:	Up to 2000m
Relative humidity:	From 30% to 95% (non-condensing)

Lifting

Lifting eyes and instruction decal are optional. DO NOT lift a truck other than by jacks under the truck unless the lifting eye option or special lifting eyes are installed.

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.

HYSTER

CE

EC DECLARATION OF CONFORMITY

WE

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

DECLARE UNDER OUR SOLE RESPONSIBILITY THAT THE MACHINE

CATEGORY: FORKLIFT IC ENGINE POWERED

TYPE _____

SERIAL NUMBER(S) _____

YEAR OF CONSTRUCTION _____

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

OTHER APPLICABLE DIRECTIVES:

2004/108/EC - EMC EMISSIONS

2000/14/EC - SOUND POWER FOR IC ENGINED FORKLIFT AS AMMENDED BY 2005/88/EC.

TYPICAL VALUE dB

GUARANTEED VALUE, dB

CONFORMITY ASSESSMENT PROCEDURE: INTERNAL CONTROL OF PRODUCTION AND RESULTS OBTAINED BY FOLLOWING NMHG TEST PROCEDURE TEP 361, IN LINE WITH THE REQUIREMENTS OF DIRECTIVE 2000/14/EC

TECHNICAL FILE CONTROLLED BY THE ENGINEERING MANAGER, NACCO MATERIALS HANDLING LTD/B.V., CRAIGAVON, NORTHERN IRELAND/NIJMEGEN, THE NETHERLANDS.

NAME _____

POSITION PLANT MANAGER
(BLOCK LETTERS)

SIGNATURE _____

DATE _____

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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 **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

⚠ 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

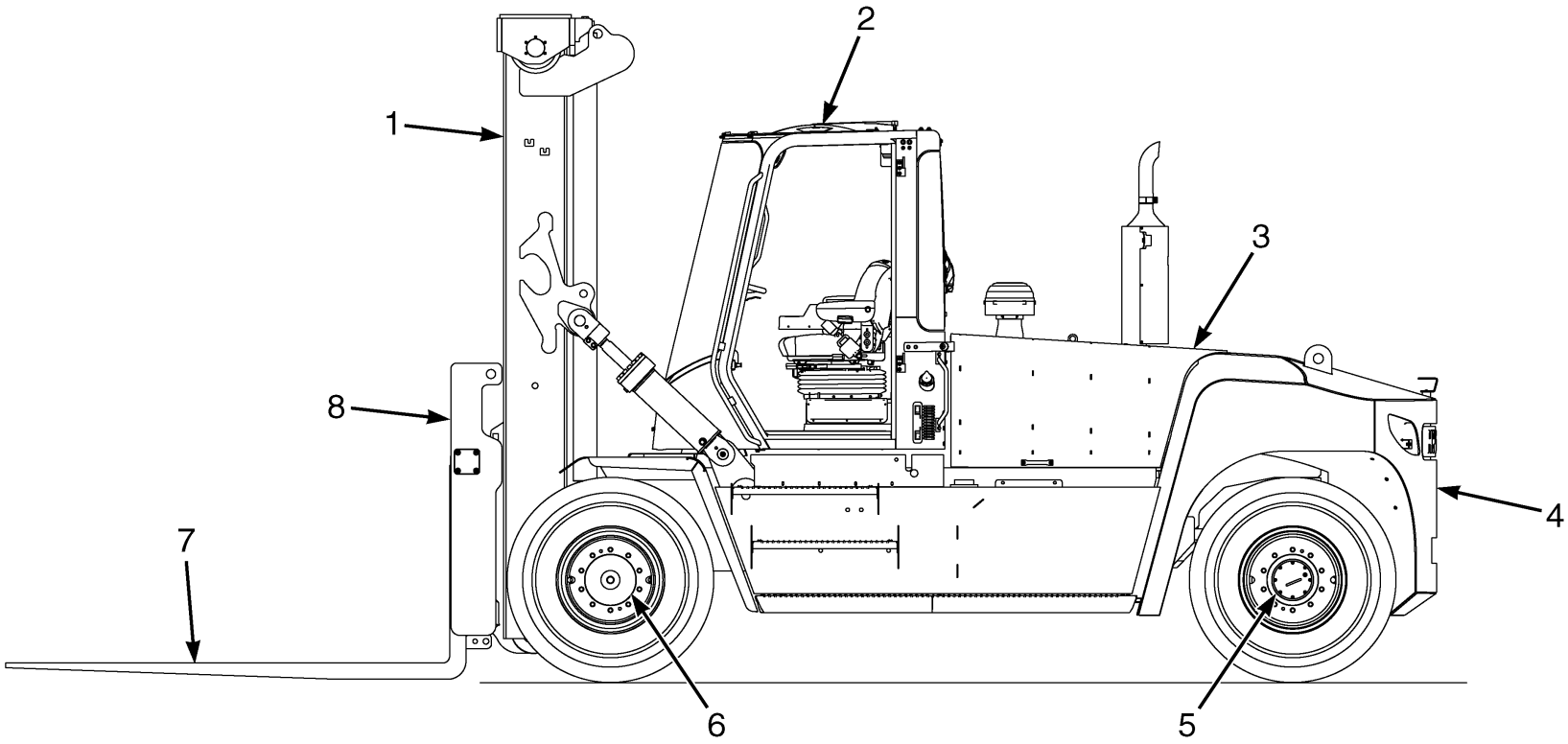
FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE SERIOUS INJURY OR DEATH!
AUTHORIZED, TRAINED OPERATOR ONLY!

- 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.

Model Description



1. MAST
2. OPERATOR CAB
3. HOOD
4. COUNTERWEIGHT
5. STEERING AXLE
6. DRIVE AXLE
7. FORKS
8. CARRIAGE AND LOAD BACKREST

Figure 1. Model View Showing Major Components

General

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

H16XM-9, H16XM-12, H18XM-7.5, and H18XM-9 (A238e)

These lift trucks have a Cummins QSB6.7, Tier4i engine. The ZF powershift transmission has three forward and reverse speeds.

Forward and reverse travel is controlled by either a **MONO-TROL®** pedal or a shift lever with a direction change function. An accelerator pedal controls the speed of the engine.

The lift trucks can be equipped with attachments, such as fork positioners, or a sideshift carriage.

Operator Protection Equipment

The operator compartment 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. See Figure 1.

The seat belt provides an additional means to help the operator keep the head and torso substantially within the confines of the lift truck frame and operator compartment if a tipover occurs. This restraint system is intended to reduce the risk of the head and torso being trapped between the lift truck and the ground, but it cannot protect the operator against all possible injury in a tipover. Always fasten the seat belt.

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 tires, 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.

Model Description

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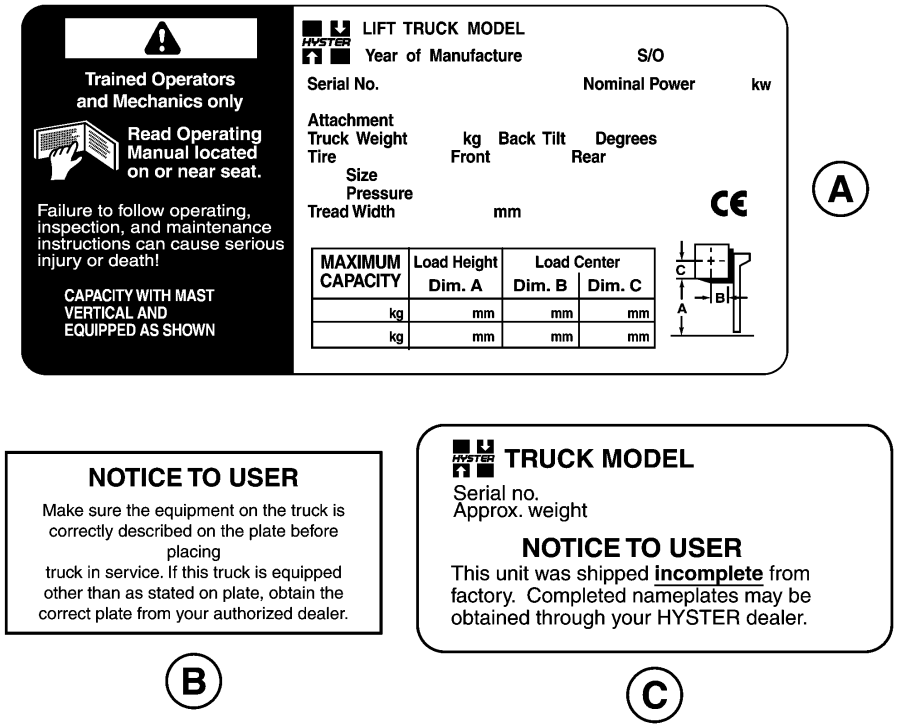
The maximum capacity for the lift truck, at full load height, must be shown on the Nameplate. Special capacities with the load height reduced or with optional load centers, may also be shown on the Nameplate.

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 engine compartment hood.

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.



A. NAMEPLATE
B. NOTICE LABEL
C. INCOMPLETE LABEL

Figure 2. Nameplate and Labels

Safety Labels

Safety labels are installed on the lift truck to give information about possible hazards. It is important that all safety labels are installed on the lift truck and can be read. See Figure 3.

If labels that have warnings or cautions are damaged, they must be replaced. Refer to the **Parts Manual** for the labels and the locations of the labels.

Model Description

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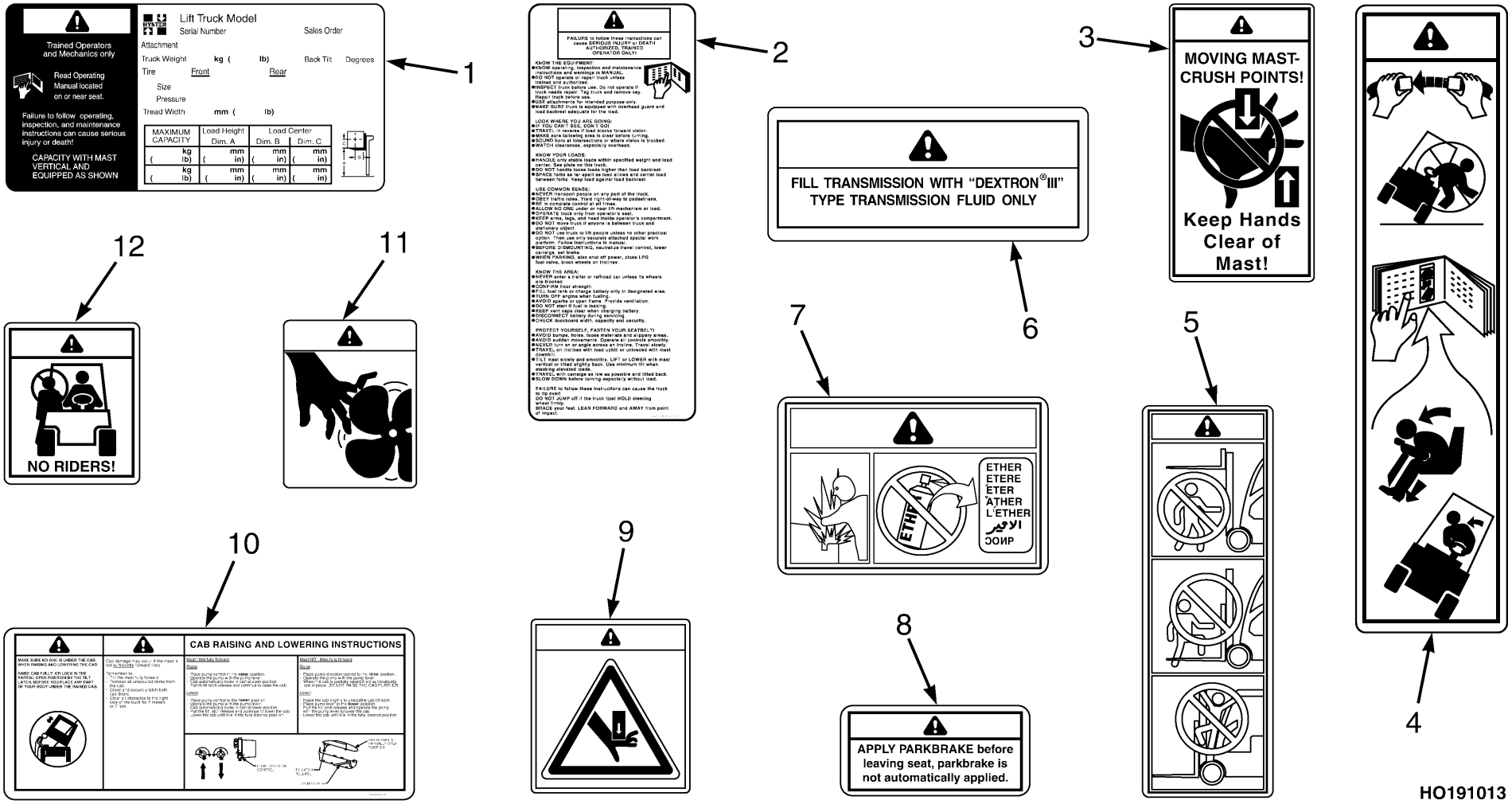
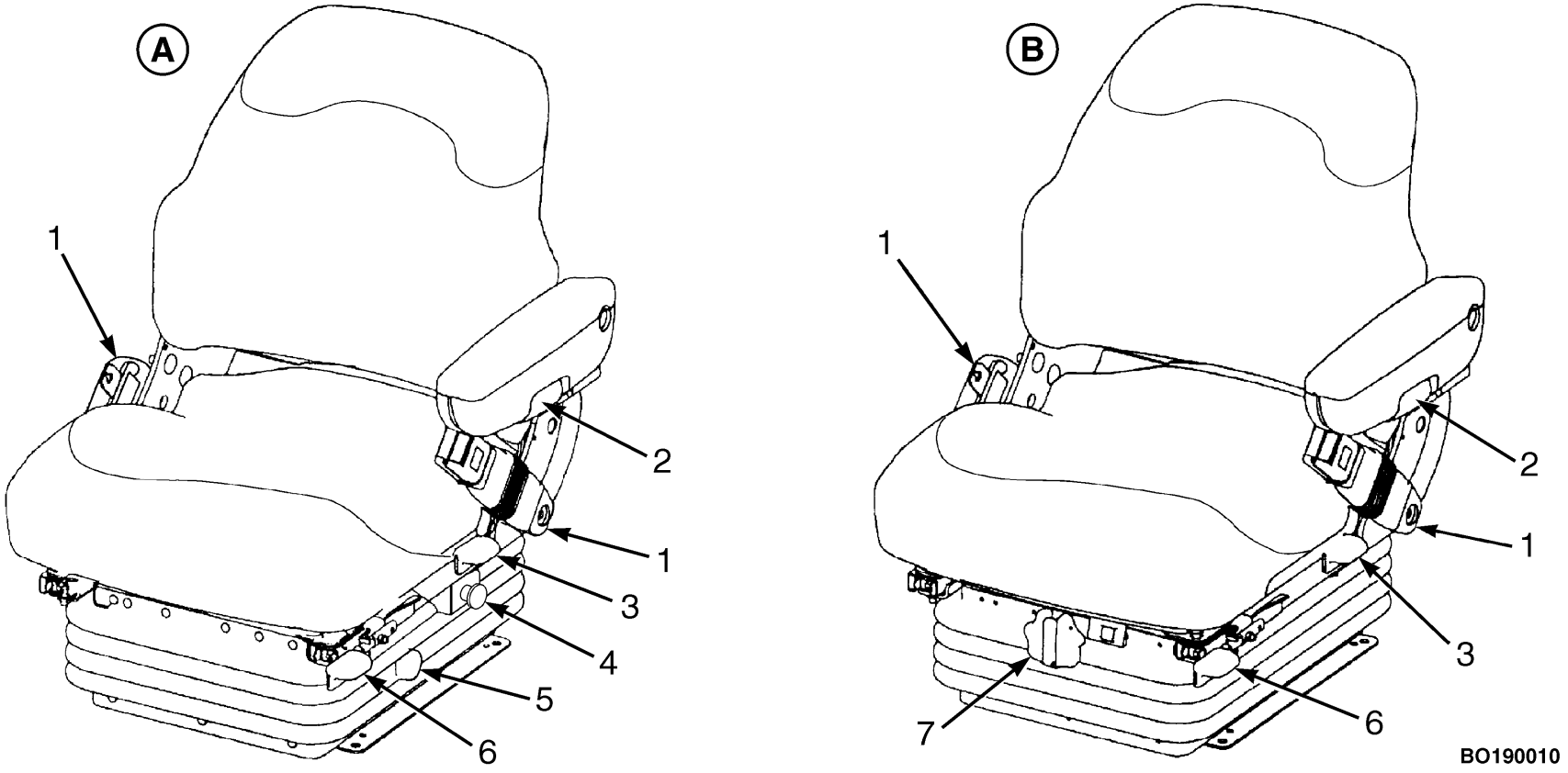


Figure 3. Warning and Safety Labels

Legend for Figure 3

1. NAMEPLATE
2. OPERATOR WARNING LABEL
3. MAST WARNING LABEL
4. TIPOVER WARNING LABEL
5. NO ONE ON OR UNDER FORKS LABEL
6. TRANSMISSION FLUID CAUTION LABEL
7. ETHER WARNING LABEL
8. PARK BRAKE WARNING LABEL
9. PINCH POINT WARNING LABEL
10. TILT CAB WARNING LABEL
11. FAN WARNING LABEL
12. NO RIDERS LABEL

Controls, Instructions, Indicators, and Switches



A. AIR SEAT

B. MECHANICAL SEAT

Figure 4. Seat Controls

Table 1. Seat Controls (See Figure 4)

Item No.	Item	Function
1	Seat Belt and Seat Belt Retractor	Seat belt must be properly fastened before starting lift truck operations.
2	Arm Rest Adjustment	Controls the angle of the armrest.
3	Back Rest Adjustment	Controls the vertical angle of the backrest. **LIFT** the lever to release and adjust the backrest. **PUSH** down the lever to lock the backrest in position.
4	Air Seat Height Adjustment	Controls the height of the seat. **PULL** out the lever switch to raise the seat. **PUSH** in the lever switch to lower the seat.
5	Air Seat Weight Adjustment	**TURN** know clockwise to achieve a smoother suspension. **TURN** knob counterclockwise to increase rigidity of the suspension.
6	Forward/Backward Seat Movement	Controls the **FORWARD** and **BACKWARD** movement of the seat on the seat rails. **LIFT** lever to release the seat for adjustment. **PUSH** lever down to lock the seat in position.

Table 1. Seat Controls (See Figure 4) (Continued)

Item No.	Item	Function
7	Mechanical Seat Height Adjustment	Controls the height of the mechanical seat. Rotate this knob to raise or lower the height of the seat.

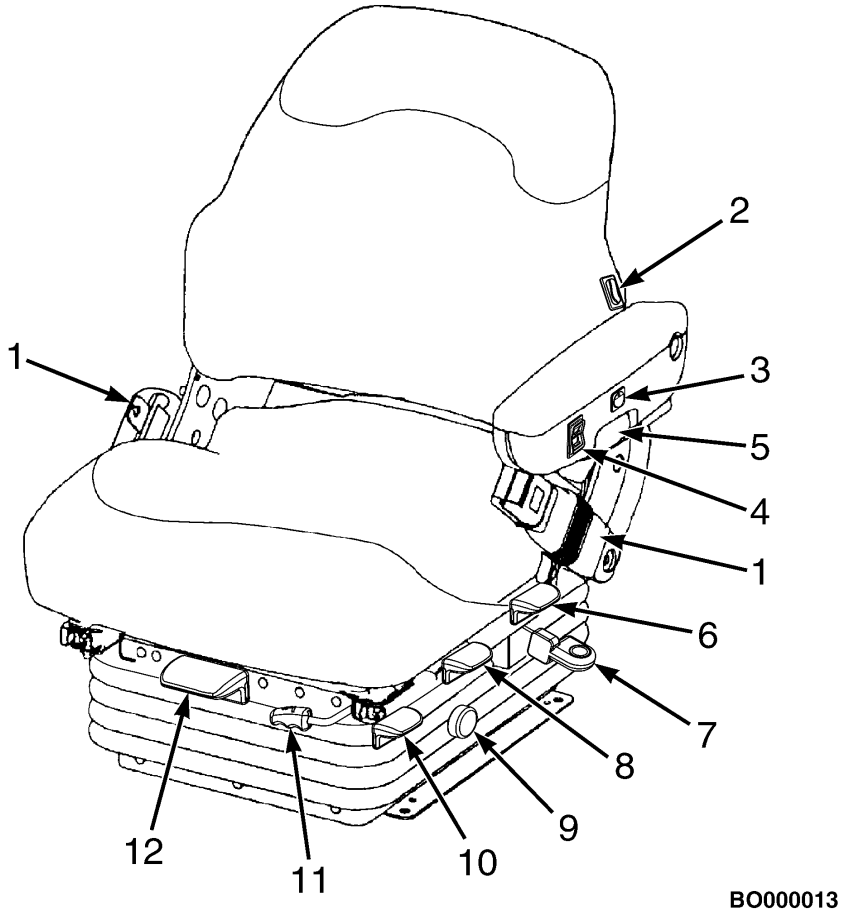


Figure 5. Sears Deluxe Seat

Table 2. Seat Controls (See Figure 5)

Item No.	Item	Function
1	Seat Belt and Seat Belt Retractor	Seat belt must be properly fastened before starting lift truck operations.
2	Lumbar Adjustment	Push top of switch to increase lumbar support. Push bottom of switch to decrease lumbar support.
3	Seat Heating Switch	Push top of switch to switch heating ON. Push bottom of switch to switch heating OFF.
4	Height/Weight Adjustment	Sit in the seat and push top of switch for automatic adjustment into mid height and mid stroke position. To change the height for individual needs, push top of switch to raise and push bottom of switch to lower the seat.
5	Armrest Tilt Adjustment	Turn the knob to adjust the tilt angle of the armrest.
6	Back Rest Adjustment	Lift the lever to release and adjust the backrest. Push down on the lever to lock the backrest in position.
7	Fore/Aft Isolator	Lift lever to allow 25 mm (1 in.) fore/aft movement. Press lever down to lock fore/aft movement.

Table 2. Seat Controls (See Figure 5) (Continued)

Item No.	Item	Function
8	Swivel Adjustment	Seat can be swiveled into three 7° increments to the right and left. Lift lever and swivel seat into desired position. Release the lever to lock.
9	Damper Adjustment	Turn knob clockwise to increase rigidity of the suspension. Turn knob counterclockwise to achieve a smoother suspension.
10	Fore/Aft Seat Assembly Adjustment	The lever controls the 200 mm (7.8 in.) forward and backward position adjustment of the seat assembly in 10 mm (0.3 in.) increments. Lift the lever to release the seat for adjustment. Push lever down to lock the seat in position.
11	Fore/Aft Cushion Adjustment	The lever controls the 60 mm (2.3 in.) forward and backward position adjustment of the cushion in 10 mm (0.3 in.) increments. Lift the lever to release the cushion for adjustment. Push lever down to lock the cushion in position.

Table 2. Seat Controls (See Figure 5) (Continued)

Item No.	Item	Function
12	Seat Cushion Tilt Adjustment	The lever controls the tilt position of the cushion in two increments of 5 degrees. Lift the lever to release the cushion for adjustment. Push lever down to lock the cushion in position.

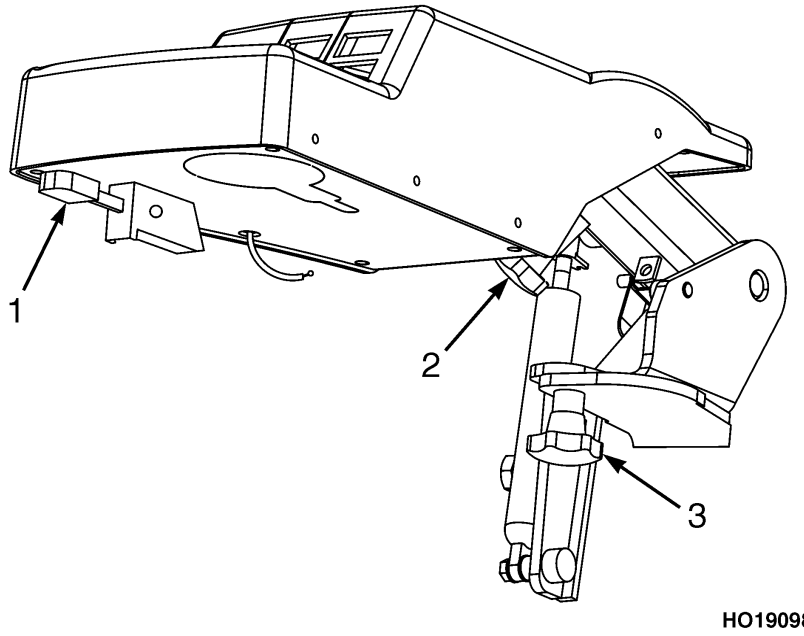


Figure 6. Spring-Assisted Armrest

Table 3. Spring-Assisted Armrest (See Figure 6)

Item No.	Item	Function
1	Lever	**PULL** lever to unlock spring assisted armrest. **PUSH** armrest until it latches into normal position.
2	Front/Rear Adjustment	**TURN** counterclockwise to allow adjustment. **TURN** clockwise firmly to secure in desired position.
3	Sideways Adjustment	**TURN** counterclockwise to allow adjustment. **TURN** clockwise firmly to secure in desired position.

Model Description

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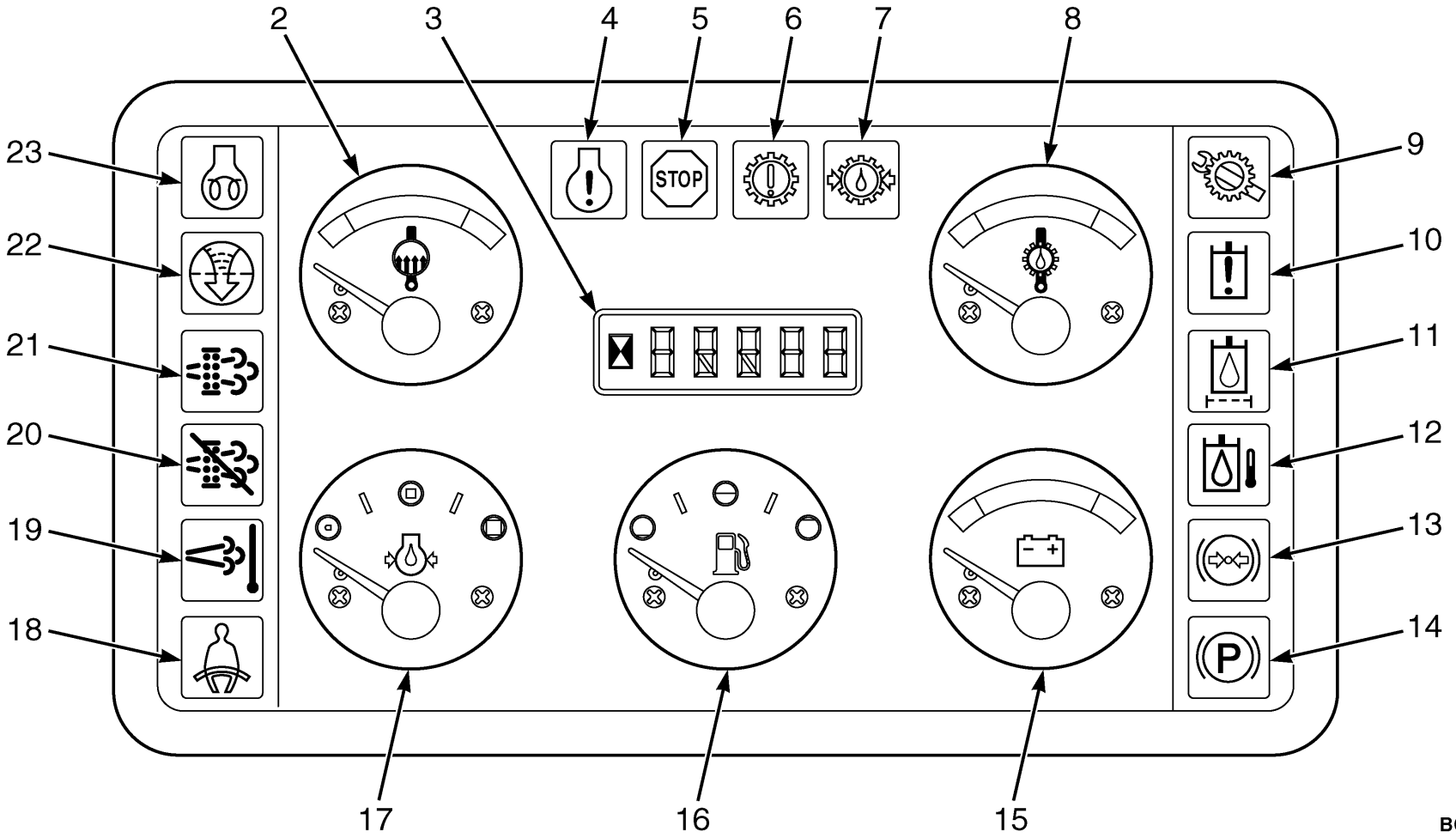


Figure 7. Instrument and Indicators for Stage IIIB/Tier 4i Option

Table 4. Instruments and Indicators (See Figure 7)

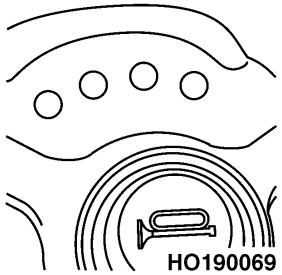
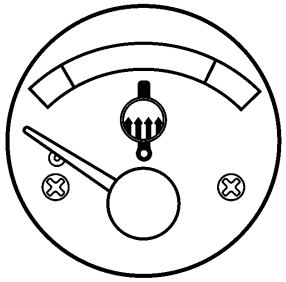
Item No.	Item	Function
1	Central Warning Lights  HO190069	**WARNING** **When these red lights are ON, there is a fault condition with the lift truck. Stop the truck and look at instrument panel to determine which system has a fault condition or lift truck damage or personal injury may occur.**
2	Coolant Temperature Gauge  HO190307	Gauge indicates coolant temperature when the key switch is in the **ON** position. When the temperature is near a critical value, the gauge symbol will **FLASH** red and the engine warning light and the central warning lights will come **ON**. A fault code will be displayed. Engine performance may decrease. When the temperature has exceeded a critical value, the engine stop light will be **ON** and the buzzer will sound. **Immediately shut down the engine, or damage to the lift truck will occur**. **NOTE:** For emergency situations automatic engine shut down can be reset. Turn the key switch to **OFF**, and then to **ON** position, and restart the engine. If the fault is still present, the engine will only run for a limited time.

Table 4. Instruments and Indicators (See Figure 7) (Continued)

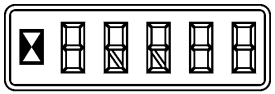
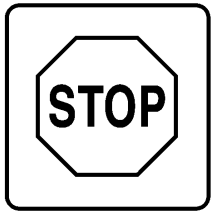
Item No.	Item	Function
3	Hourmeter/Fault Code Display  HM080747	The hourmeter operates while the engine is running. Periodic maintenance recommendations are based on these hours. It also displays engine, transmission, and hydraulic faults. Additional information is indicated when faults occur. If more than one fault is present, the faults will scroll. The explanation of fault codes is located in Table 6.
4	Engine Warning Light  BO190774	This warning light is **ON** when an engine fault has been detected. The central warning lights will be **ON**. Determine which fault is present and take appropriate action immediately.
5	Engine Stop Warning Light  HO190301	If the red engine stop warning light comes **ON**, there is a critical fault condition. A fault code will be displayed. The buzzer will sound. The central warning lights will be **ON**. **Immediately shut down the engine, or damage to the lift truck will occur**. **NOTE:** For emergency situations automatic engine shutdown can be reset. Turn the key switch to **OFF** and then to **ON**, and restart the engine. If the fault is still present, the engine will only run for a limited time.

Table 4. Instruments and Indicators (See Figure 7) (Continued)

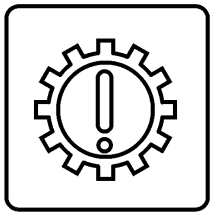
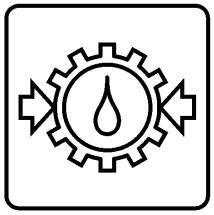
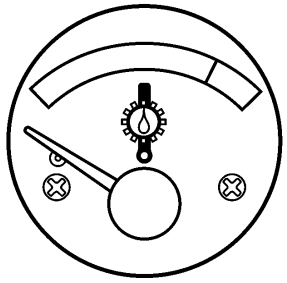
Item No.	Item	Function
6	Transmission Warning Light  HO190302	This warning light is **ON** when a transmission fault has been detected. The central warning lights will be **ON**. A fault code will be displayed. Determine which fault is present and take appropriate action immediately.
7	Transmission Pressure Feedback Warning Light  HO190303	Red light will **FLASH** if a incorrect pressure is detected. A fault code will be displayed. The transmission may shift to **NEUTRAL**. The buzzer will sound. The central warning lights will come **ON**. Shutdown mode remains selected until the controller is switched **OFF**.
8	Transmission Oil Temperature Gauge  HO190306	This gauge indicates transmission oil temperature when the key switch is in the **ON** position. When the temperature is near a critical value, the gauge symbol will **FLASH** red, the transmission warning light and the central warning lights will be **ON**. A fault code will be displayed. Engine performance may decrease. When the temperature has exceeded a critical value, the buzzer will sound. **Immediately shut down the engine, or lift truck damage will occur**.

Table 4. Instruments and Indicators (See Figure 7) (Continued)

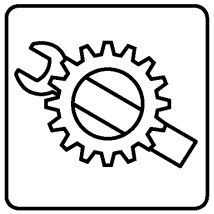
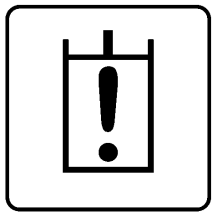
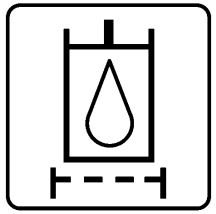
Item No.	Item	Function
9	Transmission Calibration Warning Light  BO190755	This orange light is **ON** when the Transmission Calibration Switch in the side console has been activated and is in the down position. For normal truck operation the Transmission Calibration Switch must be deactivated (in the up position) and the Transmission Calibration Warning Light must be **OFF**.
10	Hydraulic System Malfunction Warning Light  HO190273	This orange warning light is **ON** when an hydraulic system malfunction has been detected. The central warning lights will be **ON**. A fault code will be displayed. Determine which fault is present and take appropriate action immediately.
11	Hydraulic Oil Filter Restriction Warning Light (Optional)  HO190274	This light is not functional and remains **OFF** during operation. This light is **ON** during the initial light check only.

Table 4. Instruments and Indicators (See Figure 7) (Continued)

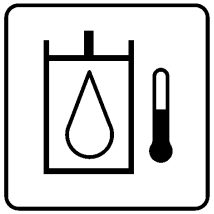
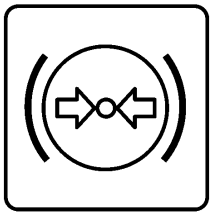
Item No.	Item	Function
12	Hydraulic Oil High Temperature Warning Light (Optional)  HO190275	**CAUTION** **Do not continue to operate the lift truck when the red light is ON, or lift truck damage may occur.** Red warning light comes **ON** when the hydraulic oil temperature is high. The buzzer sounds. The central warning lights will be **ON**.
13	Brake System Low Pressure Warning Light  HO190276	**WARNING** **Do not operate the lift truck when the red light is ON. Immediately shut down the engine, or personal injury may occur.** Red warning light comes **ON** when the brake pressure is low. The buzzer will sound. The central warning lights will be **ON**. After starting the engine, wait until the light is **OFF**, before releasing the park brake or operating the lift truck.
14	Parking Brake Warning Light  HO190299	Red warning light is **ON** when the parking brake is applied.

Table 4. Instruments and Indicators (See Figure 7) (Continued)

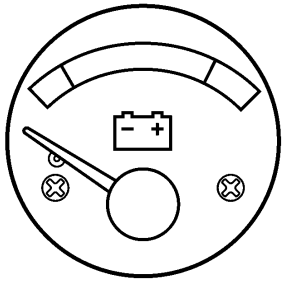
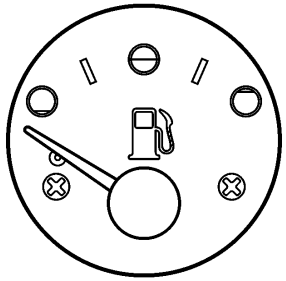
Item No.	Item	Function
15	Voltmeter Gauge  HO190277	The voltmeter indicates the system voltage. When the ignition is **ON** and the engine is not running, the gauge symbol will be red. When the engine is running and the system voltage is below 22.5 VDC, the gauge symbol will **FLASH** red. The central warning lights will be **ON**.
16	Fuel Level Gauge  HO190305	When the fuel level is 10% or less of the tank capacity, the gauge symbol will **FLASH** red. The central warning lights will be **ON**. The hourmeter/fault code display will show "FUEL".

Table 4. Instruments and Indicators (See Figure 7) (Continued)

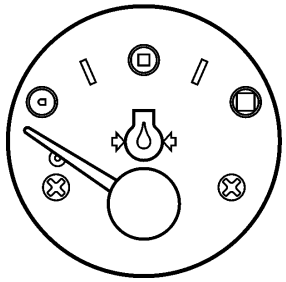
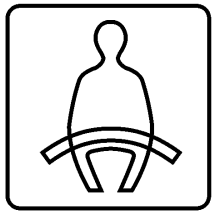
Item No.	Item	Function
17	Engine Oil Pressure Gauge  HO190304	When the engine is running, the needle is approximately in the middle of the gauge, indicating normal engine oil pressure. When engine oil pressure is near a critical value, the gauge symbol will **FLASH** red, the engine warning light and the central warning lights will come **ON**, and a fault code will be displayed. Engine performance may decrease. When engine oil pressure is below a critical value, the engine stop light will be **ON** and the buzzer will sound. **Immediately shut down the engine, or damage to the lift truck will occur**. **NOTE:** For emergency situations automatic engine shut down can be reset. Turn the key switch to **OFF**, and then to **ON** position, and restart the engine. If the fault is still present, the engine will only run for a limited time.
18	Seat Belt Warning Light  HO190298	**WARNING** **Before driving the lift truck, always fasten your safety belt or personal injury may occur.** Orange light is **ON** for 10 seconds after the key is placed in the **ON** position.

Table 4. Instruments and Indicators (See Figure 7) (Continued)

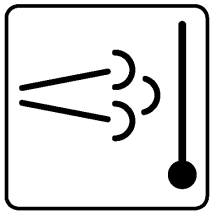
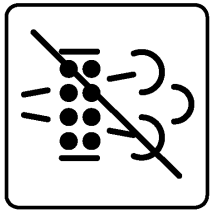
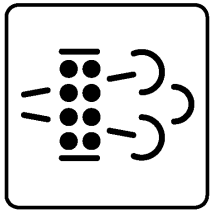
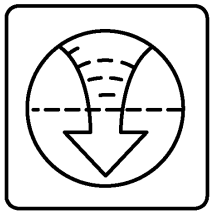
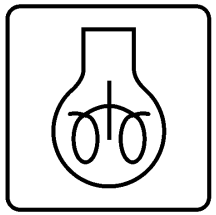
Item No.	Item	Function
19	High Exhaust Temperature Warning Light  BO190775	This light is **NOT** functional and remains **OFF** during operation. This light is **ON** during the initial light check only.
20	Regeneration Inhibit Warning Light  BO190776	This light is **NOT** functional and remains **OFF** during operation. This light is **ON** during the initial light check only.
21	Diesel Particulate Filter Light  BO190777	This light is **NOT** functional and remains **OFF** during operation. This light is **ON** during the initial light check only.

Table 4. Instruments and Indicators (See Figure 7) (Continued)

Item No.	Item	Function
22	Engine Air Filter Warning Light  BO190778	Orange engine air filter warning light is **ON** when the air filter is dirty or has an obstruction. If the light is **ON**, replace the main filter element. The central warning lights will be **ON**.
23	Engine Wait to Start Light  HO190300	This warning light is **ON** for 15 seconds after the key is turned to the **ON** position when engine temperature is below −3 °C (27 °F). It indicates that the cold start aid has been activated. After 15 seconds, the light will go **OFF** to indicate that the engine can be started.

Model Description

HYSTER

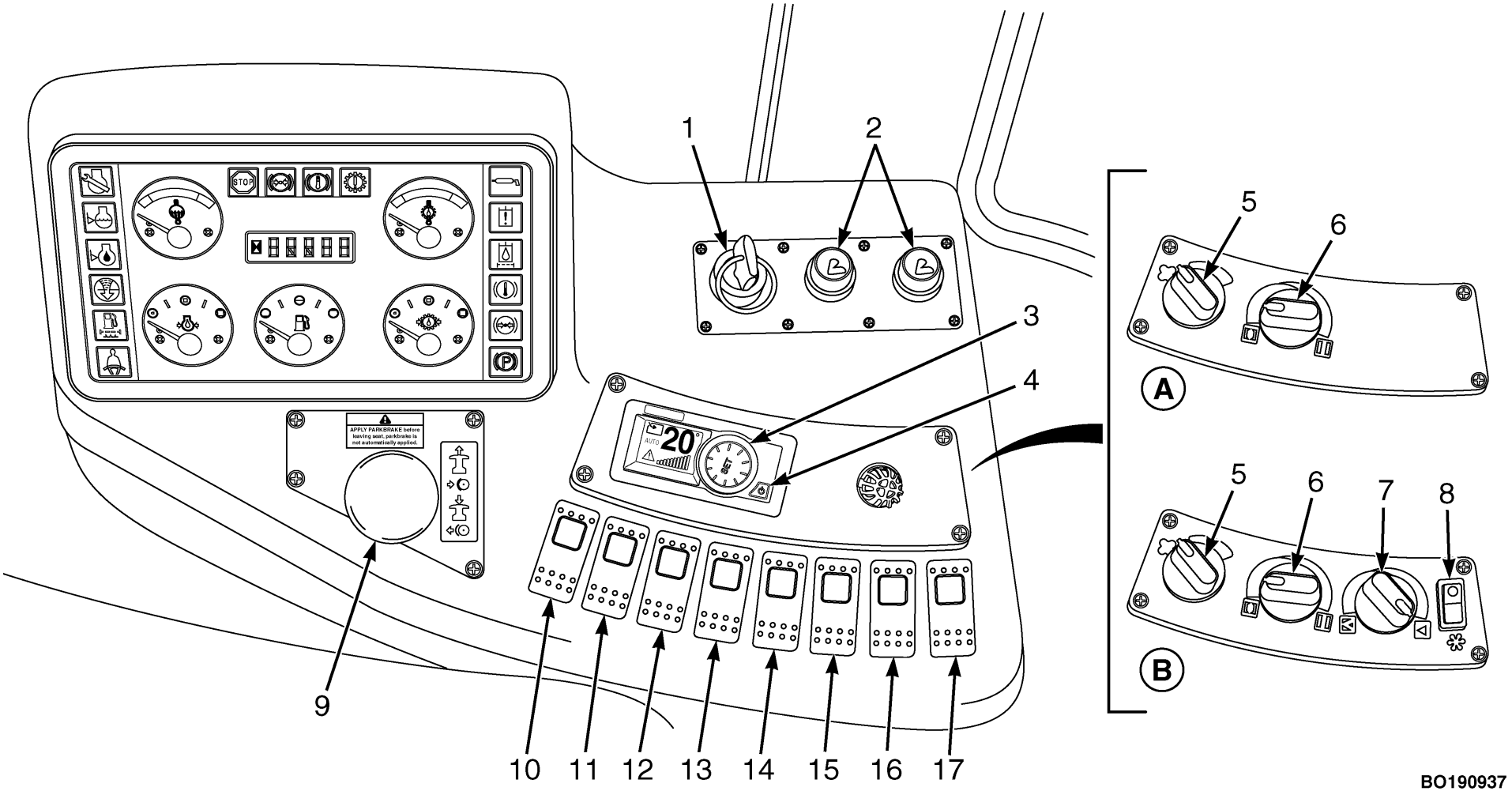


Figure 8. Switches on Side Console

Table 5. Switches (See Figure 8)

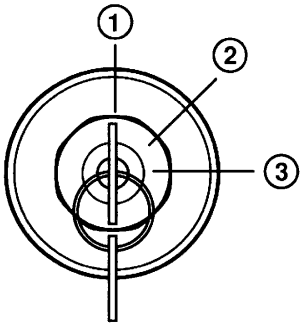
Item No.	Item	Function
A	Dash Panel Switches (Optional)	Heater.
B	Dash Panel Switches (Optional)	Air conditioning.
1	Key Switch  BO190097	The key switch has three positions: No. 1 Position: **OFF**. De-energizes all electric circuits except for the horn and headlights. No. 2 Position: **ON**. Energizes all electric circuits except the starter circuit. The key switch will be in this position during normal operation. No. 3 Position: **START**. Energizes the starter motor and the cold start solenoid for starting the engine. A spring returns the key to the No. 2. Position (**ON**) when the key is released. **NOTE:** There is a mechanical lockout that prevents the key switch from being returned to the **START** position without first being returned to the **OFF** position.
2	Optional Auxiliary 12 VDC Power Outlet  HO190295	12 VDC Max 10 Amps outlet.

Table 5. Switches (See Figure 8) (Continued)

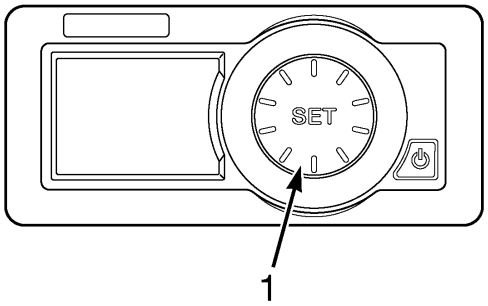
Item No.	Item	Function
3	Set/Select Button (Optional)  BO000010	1. This button is used to select and set the different climate modes. See Table 8.

Table 5. Switches (See Figure 8) (Continued)

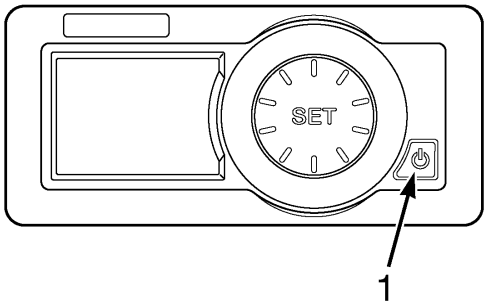
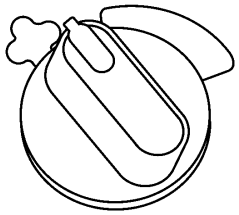
Item No.	Item	Function
4	Power **ON/OFF** Button (Optional)  BO000011	1. Push the button to switch the electronic climate control unit **ON** and **OFF**.
5	Heater/Air Conditioner Fan Switch  HO190449	Switch controls the fan for the heater, defroster, and A/C systems. Turn the switch to the right to increase the speed of the fan.

Table 5. Switches (See Figure 8) (Continued)

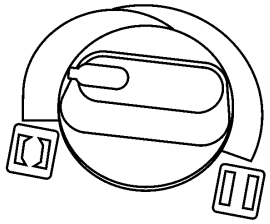
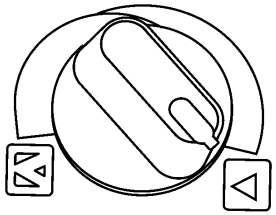
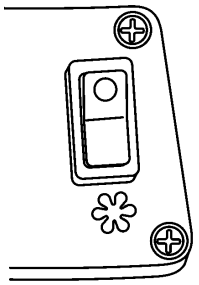
Item No.	Item	Function
6	Heat Control Knob  HO190450	Knob controls the heater valve. To close the heater valve, turn knob counterclockwise. When knob is turned to the left, cab heat decreases. When knob is turned to the right, cab heat increases.
7	Air Control Knob  HO190451	Knob controls fresh air ventilation in the cab through the cab vents. When knob is turned to the left, fresh air enters the cab. When knob is turned to the right, air is recirculated in the cab.
8	Optional A/C Switch  HO190454	Switch controls the operation of the air conditioning (A/C) system. **PUSH** top of switch to turn the air conditioning system **ON**. **PUSH** bottom of switch to turn air conditioning system **OFF**. **NOTE:** When the A/C is switched **ON**, set the cabin heating control to the cold position.

Table 5. Switches (See Figure 8) (Continued)

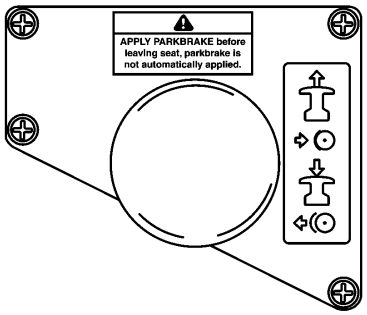
Item No.	Item	Function
9	Parking Brake Knob  HO190066	**WARNING** **Apply parking brake before leaving truck. Parking brake is NOT automatically applied. Always apply brake when leaving truck or lift truck damage or personal injury may occur.** **NOTE:** The parking brake **must** be applied before starting the engine. The red knob controls the operation of the parking brake as follows: • With knob **PUSHED** in, parking brake is released. • With knob **PULLED** out, parking brake is applied. **NOTE:** Before applying the park brake, make sure the lift truck has come to a complete stop.
10	Carriage or Attachment Work Light 	Switch controls lights for the fork carriage or container attachment. **PUSH** top of switch to turn lights **ON**. **PUSH** bottom of switch to turn lights **OFF**.

Table 5. Switches (See Figure 8) (Continued)

Item No.	Item	Function
11	Light Switch 	This switch controls the side, tail, and front fender lights. **PUSH** top of switch to move the switch from **OFF** to position 1 and 2. **PUSH** bottom of switch to return the switch from position 2 to position 1 and **OFF**. In position 1, the side and tail lights are **ON**. In position 2, the side, tail, and front fenders lights are **ON**.
12	Flood Lights Switch 	This switch can either be a one position switch or a two position switch. **PUSH** top of switch to move the switch from **OFF** to position 1 and 2. **PUSH** bottom of switch to return the switch from position 2 to position 1 and **OFF**. As a one position switch it either switches the rear working lights **ON**, or the flood, side and tail lights. As a two position switch the flood, side and tail lights are **ON** in position 1. In position 2 the optional rear working lights are also **ON**.

Table 5. Switches (See Figure 8) (Continued)

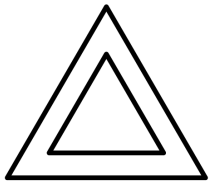
Item No.	Item	Function
13	Optional Beacon Switch 	This switch controls the beacon. **PUSH** top of switch to turn the beacon **ON**. **PUSH** bottom of switch to turn the beacon **OFF**.
14	Hazard Switch 	This switch controls the hazard warning lights. **PUSH** top of switch to turn lights **ON**. **PUSH** bottom of switch to turn lights **OFF**.
15	Diagnostic Switch	This switch is used to access and exit the fault log mode. The procedure to access and exit is described in the SRMs listed in Table 6.
16	Blank	
17	Top Window Heating Switch	This switch controls the electrical heating of the top window. Push top of switch to turn **(ON)** heat. Push bottom of switch to turn **(OFF)** heat.

Table 5. Switches (See Figure 8) (Continued)

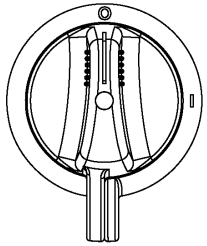
Item No.	Item	Function
	Battery Disconnect Lever  BO190989	Battery disconnect lever is located on the right side of lift truck near base of stairs. Operation of lever is shown on the label. **NOTE: DO NOT** operate battery disconnect lever until 60 seconds after key switch is in **OFF** position.

Table 6. Explanation of Fault Codes

Code Starts With	System	Reference or Explanation
E	Engine	See **Engine Fault Code Guide** 600 SRM 1101
t	Transmission	See **Transmission Operation and Diagnostics** 1300 SRM 1455 for ZF Transmission.
tE	Transmission	See Table 7.
tCold	Transmission	Transmission temperature is below −10 °C (14 °F) and gears will not be engaged. Operate engine until tCold warning has cleared.
h	Hydraulics	See **Hydraulic Control System** 1900 SRM 1495.

Table 6. Explanation of Fault Codes (Continued)

Code Starts With	System	Reference or Explanation
hCold	Hydraulics	Hydraulic oil temperature in the reservoir is below −5 °C (23 °F). All hydraulic functions can be operated normally, but the controller limits engine speed proportional to the hydraulic oil temperature. At −20 °C (−4 °F), the engine speed is limited to 1000 rpm. Above −5 °C (23 °F), the controller does not limit engine speed. Limitation of the engine speed reduces maximum hydraulic performance. Apply hydraulic functions to raise hydraulic oil temperatures.
hHot	Hydraulics	Hydraulic oil temperature in the reservoir exceeds 90 °C (194 °F). Reduce hydraulic oil temperature by reducing hydraulic power demand until code hHot has disappeared.
bHot	Brakes	Hydraulic oil temperature at the brakes exceeds 110 °C (230 °F). Reduce hydraulic oil temperature by reducing usage of the brakes eg by limiting travel speed.
fUel	Engine	Fuel level is 10% or less of tank capacity. Refuel soon.

Table 7. Transmission Exceed Codes

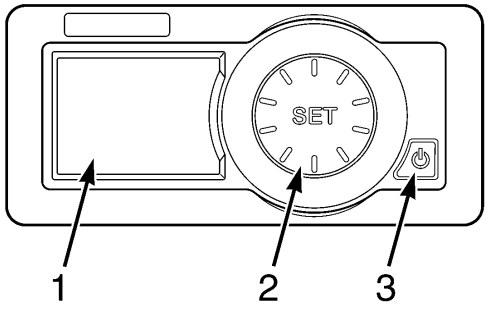
Code	Explanation	Operator Action
tE001	The vehicle speed is too high to make the requested downshift.	Slow down the vehicle to allow the controller to downshift.
tE101	The vehicle speed is too high to make the requested direction change.	Be aware that the controller has put the transmission into neutral. Slow down the vehicle to allow the controller to change direction.
tE201	The engine speed is too high to make the requested direction change or re-engagement.	Lower engine speed.
tE300	The reduced vehicle speed limitation is active.	Be aware.
tE301	The reduced vehicle speed limitation is active, however, the vehicle speed is above the speed limitation.	Reduce vehicle speed below the maximum vehicle speed.
tE302	The vehicle speed is above the maximum vehicle speed limit.	Reduce vehicle speed below the maximum vehicle speed.
tE400	Abnormal acceleration is detected.	One or both drive wheels are skidding. Automatic shifting is disabled. Adjust braking effort to floor conditions.
tE401	Abnormal acceleration is detected.	One or both drive wheels are spinning. Automatic shifting is disabled. Apply throttle according driving conditions.
tE501	Transmission needs recalibration.	Contact Maintenance to have the transmission recalibrated.

Table 7. Transmission Exceed Codes (Continued)

Code	Explanation	Operator Action
tE600	Operator is not seated and shift lever is NOT in Neutral and/or parking brake is NOT activated.	Shift lever to neutral and/or apply parking brake.
tE701	Turbine speed exceeds the limit.	Reduce vehicle speed. The controller has reduced engine speed to idle.

Table 8. Climate Control Operating Instructions

Controls



BO190661

1. **LCD Display**
   During normal operation, the set-point temperature, blower speed, operation mode and fresh/recirc air selection are displayed. In Test/Diagnostic mode, error messages will be displayed on screen for troubleshooting. Display's contrast is automatically compensated for all temperatures.
2. **SET/SELECT Button**
   During normal operation, it is used for selecting between modes. In Test/Diagnostic mode, it is used to test and diagnose different components with the HVAC system.
3. **Power Button**
   Turns HVAC unit ON and OFF.

Table 8. Climate Control Operating Instructions (Continued)

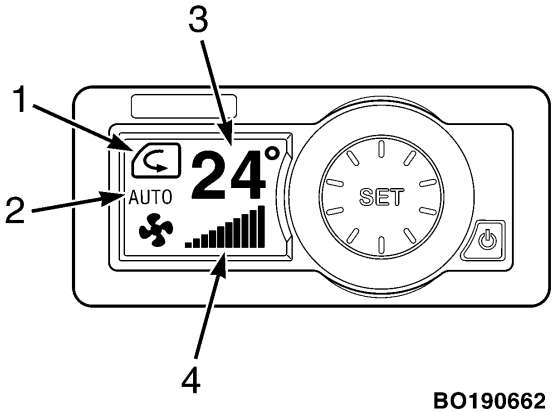
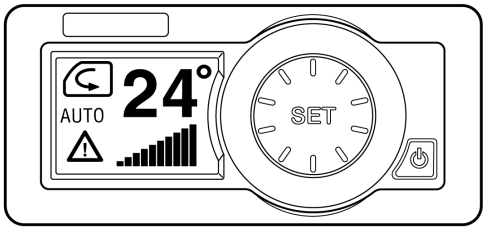
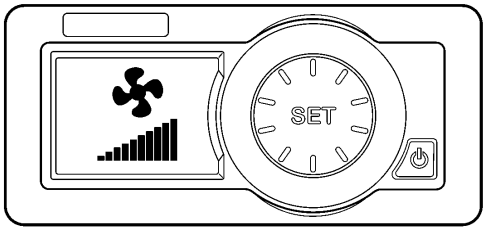
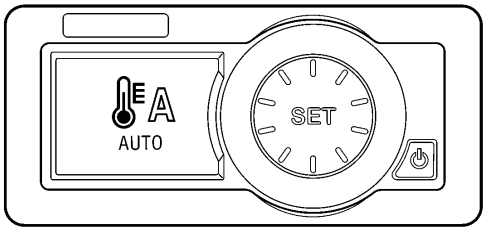
Main Display Screen  BO190662	**1. Air Circulation Setting** The air mix can be set from full fresh air or full re-circulated air. **2. Mode** It displays HVAC system's modes (Automatic, Heat, Cool, and Defrost). **3. Temperature Set-Point** Displays current inside set-point temperature. **4. Blower Speed** Displays current blower speed setting.
Operation Menus	
 BO190663	**Main Screen:** When the controller is turned on, the main screen will appear. Current set-point temperature, climate control mode, air-circulation and blower speed are displayed. A ⚠ symbol will be displayed when there is any fault with the HVAC system.

Table 8. Climate Control Operating Instructions (Continued)

<table>
<tr><td> 

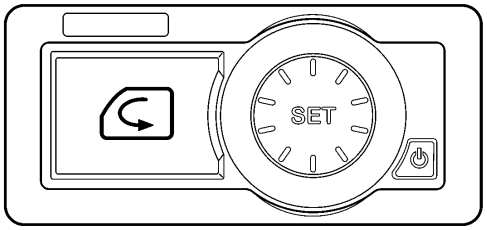
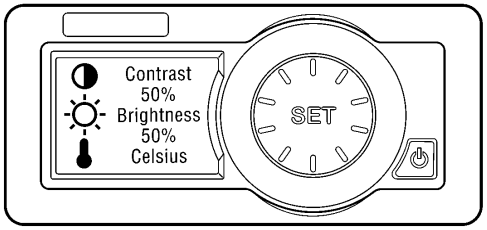
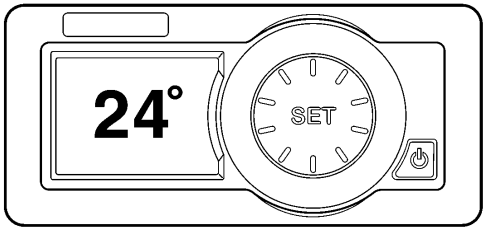
BO190664</td><td colspan="2">Blower Speed Settings:
Press the SET knob until the blower icon appears, then turn the knob clockwise to increase blower speed and counterclockwise to decrease blower speed with 5% increments. Blower speed cannot be adjusted in defrost mode.</td></tr>
<tr><td rowspan="5"> 

BO190665</td><td colspan="2">Climate Control Mode Settings:
Press the SET knob until the climate control mode icon appears, then rotate the SET knob until required control mode is displayed.</td></tr>
<tr><td>  </td><td>AUTO: According to the temperature set-point, the controller takes over and constantly analyzes system's electronic temperature sensors to maintain temperature.</td></tr>
<tr><td>  </td><td>Cool: Cycling the A/C compressor controls interior temperature. The heater valve will remain closed,</td></tr>
<tr><td>  </td><td>Heat: Interior temperature is regulated with the electronic heater valve. A/C compressor will remain off when heat mode is activated.</td></tr>
<tr><td>  </td><td>Defrost: When defrost mode is activated, the A/C compressor is turned on, blower is turned on full speed and heater valve is fully opened.</td></tr>
</table>

Model Description

HYSTER

Table 8. Climate Control Operating Instructions (Continued)

 BO190666	 	**Air Circulation Settings:** Press the SET knob until the air circulation mode icon appears. Turn the knob clockwise for full recirculated air or counterclockwise for full fresh air.
 BO190667		**Display Settings:** To adjust display settings and temperature scale, press the SET knob until the display settings screen appear. Then, turn SET knob clockwise or counterclockwise to adjust settings.
 BO190668		**Turning HVAC System OFF:** In the main screen, press the Power button to switch of HVAC system off. When system is turned off, the back light will switch off and the cab interior temperature will be displayed on screen.

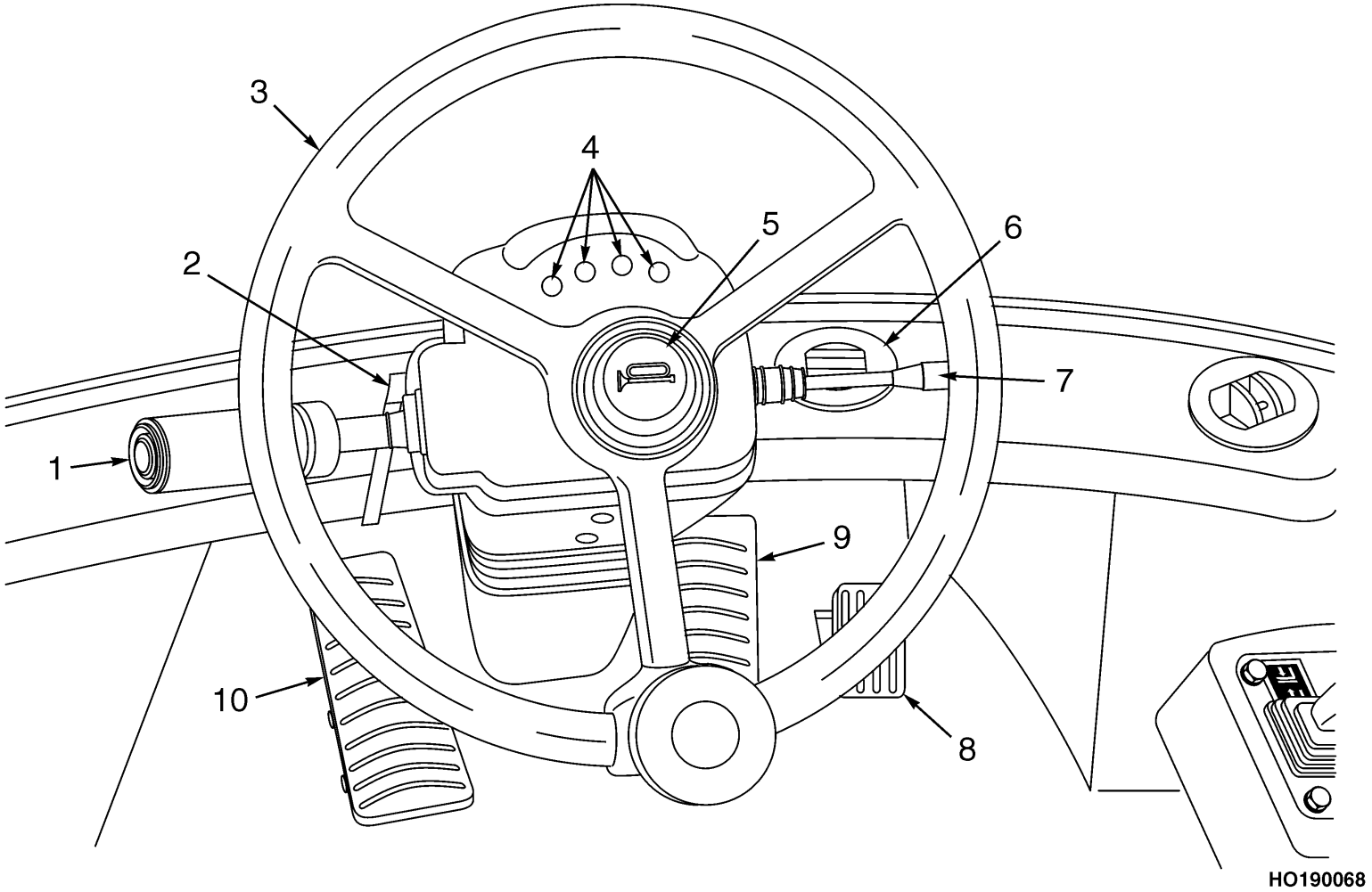


Figure 9. Controls and Signals

Table 9. Controls and Signals (See Figure 9)

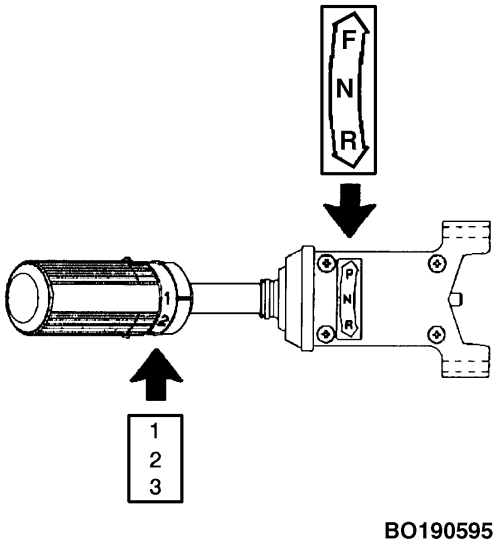
Item No.	Item	Function
1	3 Position Shift Lever 	When the travel directions are controlled by the shift lever, the shift lever is provided with the **FORWARD (F)** and **REVERSE (R)** position. **PUSH** the shift lever to move to **FORWARD (F)** to travel in the forward position. **PULL** the shift lever to move to **REVERSE (R)** to travel in the reverse direction. The center position is **NEUTRAL (N)**. Place the shift lever in **NEUTRAL (N)** position or depress inching/brake pedal if shift lever is in **FORWARD** or **REVERSE** position before the engine can be started. The shift lever has three range positions: **1** First gear. The transmission will stay in this gear until the operator selects another gear. **2** Second gear. The transmission will start in second gear and will allow the transmission to automatically shift between second and third gears.

Table 9. Controls and Signals (See Figure 9) (Continued)

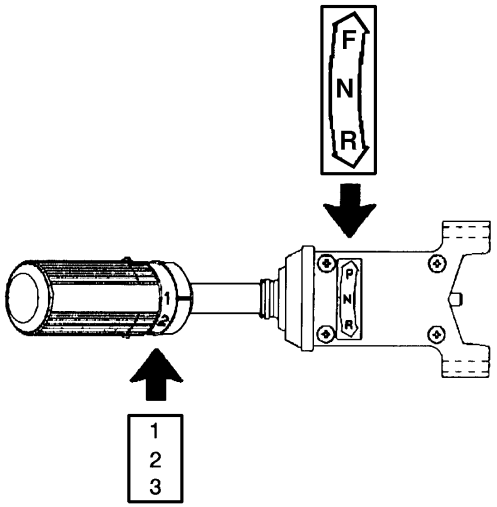
Item No.	Item	Function
1	3 Position Shift Lever (Cont)  BO190595	**3** This position allows the transmission to automatically shift between all three gears. **NOTE:** The transmission will automatically shift to **NEUTRAL (N)** if the transmission oil pressure is low or if the oil is too hot. This will occur with the shift lever in any position. To override the transmission protection in case of emergency, turn the key switch **OFF** and then **ON** and restart the engine. This will allow lift truck movement in first gear for 30 seconds. When the travel directions are controlled by the **MONOTROL®** pedal, the shift lever is **NOT** provided with a **FORWARD** and **REVERSE** position. See item 8 for the **MONOTROL®** pedal explanation.

Table 9. Controls and Signals (See Figure 9) (Continued)

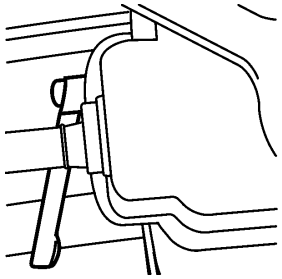
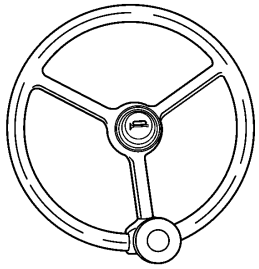
Item No.	Item	Function
2	Steering Column Adjustment  HO190458	**⚠ WARNING** **Make sure steering column adjustment lever is locked into place before moving lift truck. Never attempt to adjust steering column when lift truck is moving or personal injury may occur.** The steering column tilts **FORWARD**, **BACKWARD**, and **TELESCOPES** for adjustment. Release the lever and move the steering column to the desired position, then fasten the lever.
3	Steering Wheel  HO190459	The steering wheel controls the position of the steer tires.

Table 9. Controls and Signals (See Figure 9) (Continued)

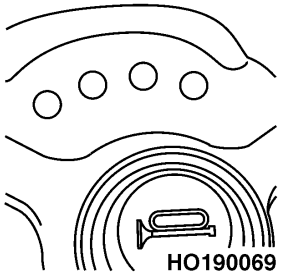
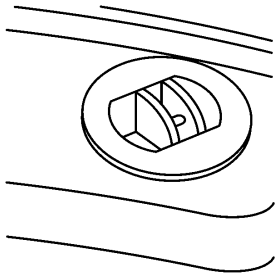
Item No.	Item	Function
4	Central Warning Lights 	**⚠ WARNING** **When these red lights are ON, there is a malfunction with the lift truck. Stop and look at the console to determine which system has a malfunction or lift truck damage, or personal injury may occur.** Lights are **ON**, when there is a fault condition with the lift truck. Look at the console to determine which system has a fault condition.
5	Horn 	The horn button controls the operation of the horn.
6	Cab Vent 	The cab vent provides fresh air, a combination of fresh and heated air, and ventilation into the cab. With air conditioning, it vents cool air into the cab.

Table 9. Controls and Signals (See Figure 9) (Continued)

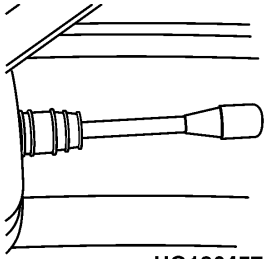
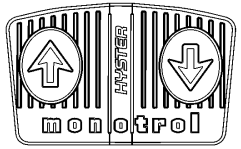
Item No.	Item	Function
7	Turn Signal Lever  HO190457	The turn signal lever is mounted on the right side of the steering column. When operating the turn signal lever, the red light in the lever blinks. **PUSH** it **FORWARD** for a left-hand turn signal. **PULL** it **BACKWARD** for a right-hand turn signal.
8	Accelerator Pedal  BO190098	This pedal controls the speed of the engine and lift truck. **NOTE:** This pedal is used on units that have a direction control lever.
8	MONOTROL® Pedal  BO210020	The **MONOTROL®** pedal controls the speed and direction of the lift truck. Pushing the right side of the pedal causes the lift truck to move in reverse. Pushing the left side of the pedal causes the lift truck to move forward. The speed of the engine increases as the pedal is depressed. When in the reverse position the reverse lights and alarm will be **ON**.
9	Brake Pedal 	The brake pedal is located to the left of the accelerator pedal. This pedal controls the application of the service brakes.

Table 9. Controls and Signals (See Figure 9) (Continued)

Item No.	Item	Function
10	Inching/Brake Pedal 	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. On units with a **MONOTROL®** pedal, the engine can be started when the inching/brake pedal is fully depressed or when the parking brake is applied. **NOTE:** When releasing inching/brake pedal, transmission will only engage if engine speed is below 1500 rpm.

Model Description

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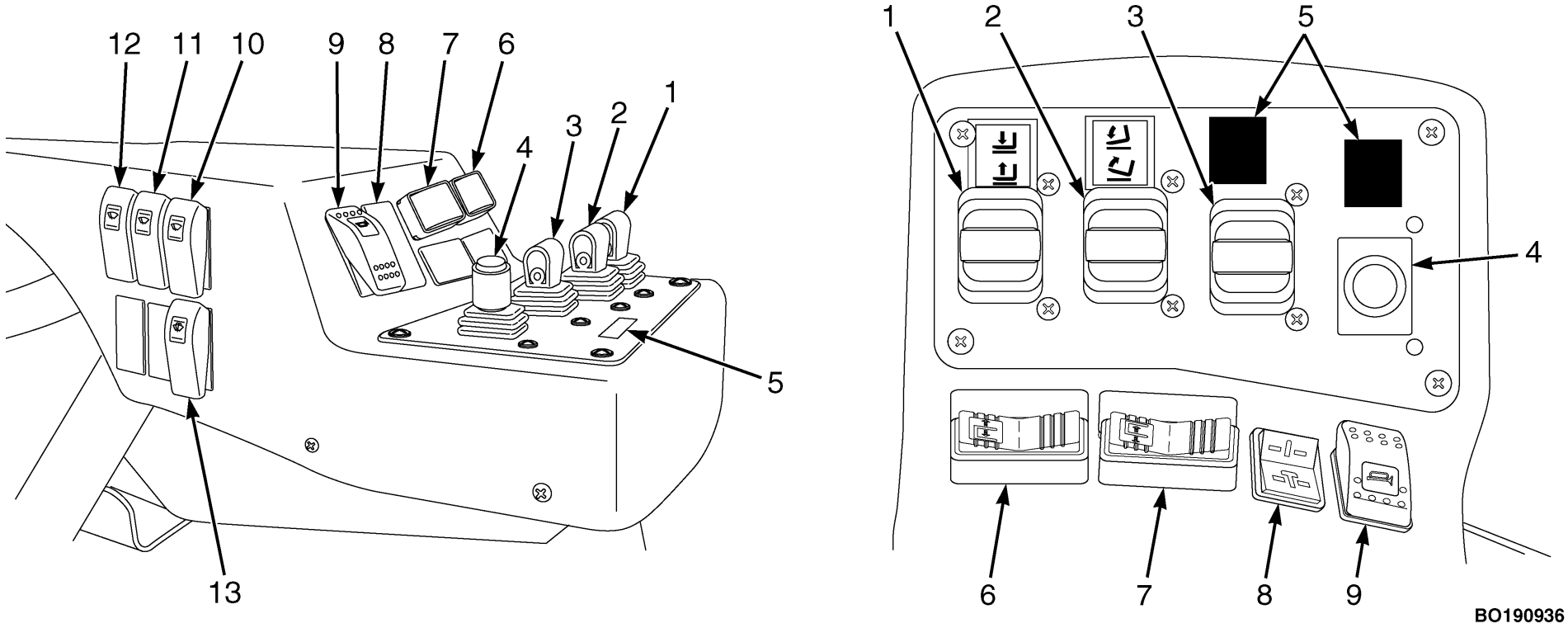

Figure 10. Controls and Switches on Armrest (Joystick Optional) (Sheet 1 of 2)

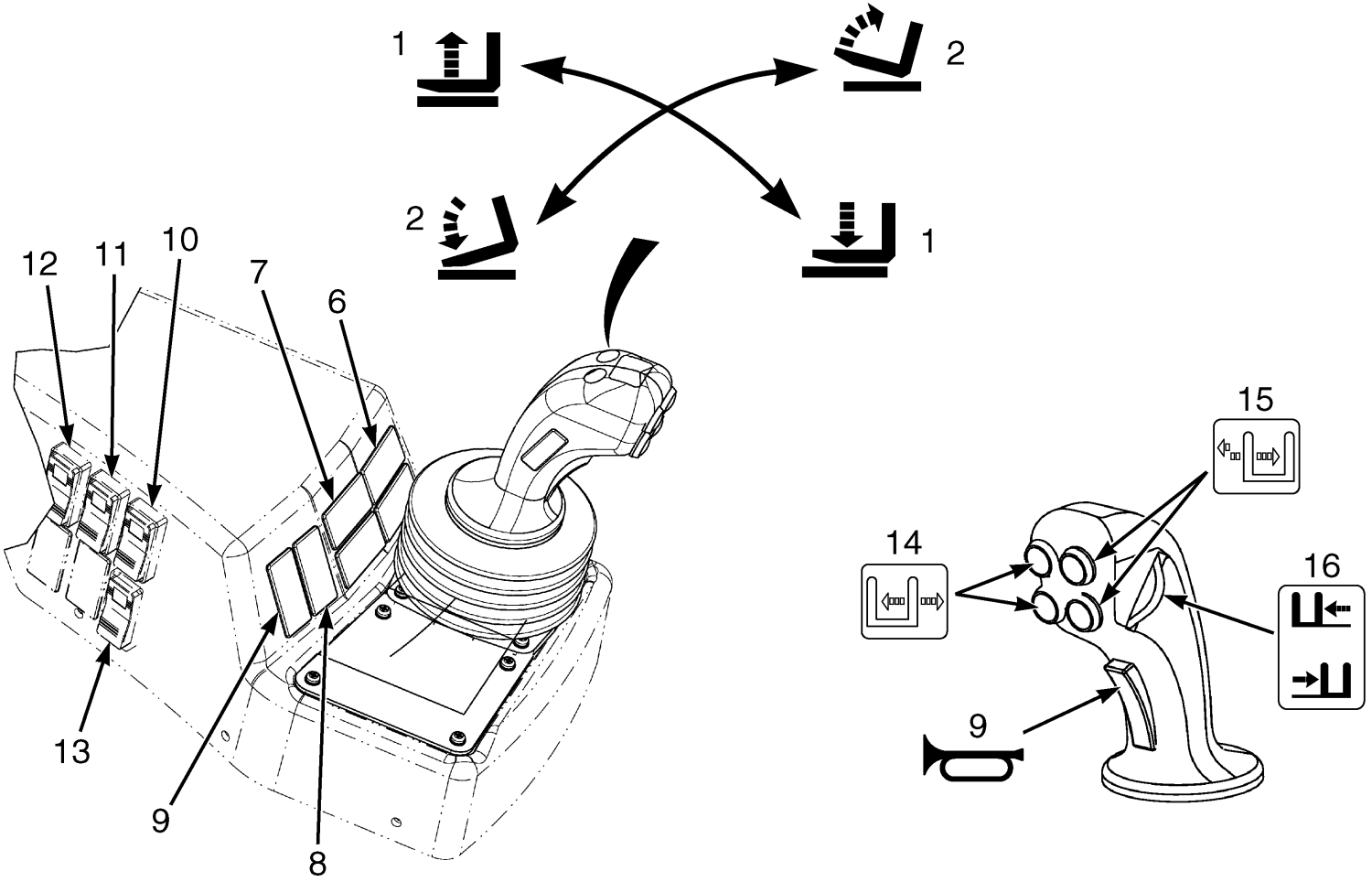

Figure 10. Controls and Switches on Armrest (Joystick Optional) (Sheet 2 of 2)

Model Description

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Table 10. Controls and Switches on Armrest (Joystick Optional) (See Figure 10)

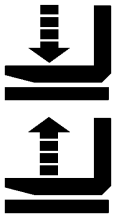
Item No.	Item	Function
1	Lift/Lower Control Lever or Joystick  BO190090	The lift/lower lever is the first control lever to the right of the steering wheel. **PULL** back on the lever or joystick to **RAISE** the carriage and forks. **PUSH** the lever or joystick forward to **LOWER** the carriage and forks. **NOTE:** The idle speed will increase when operating this lever.
2	Tilt Control Lever or Joystick 	The tilt control lever is on the right of the lift/lower control lever. **PUSH** the control lever **FORWARD** or move the joystick to the **LEFT** to tilt the mast and forks forward. **PULL BACKWARD** on the control lever or move the joystick to the **RIGHT** to tilt the mast and forks backward.
3	Auxiliary Control Lever	The lever will operate the auxiliary function according to directions indicated in Table 11.

Table 10. Controls and Switches on Armrest (Joystick Optional) (See Figure 10) (Continued)

Item No.	Item	Function
4	Auxiliary Control Lever	**WARNING** **When an attachment with a clamp is installed, a particular control lever must be installed. See your dealer for Hyster Lift Trucks to get the correct control lever.** Trucks without clamp attachment have an auxiliary lever that is similar to the levers for the lift and tilt function. See Figure 10, item 3. Trucks with a clamp attachment have a round control lever which has to be pushed down first to activate the clamp function. To engage the clamp, **PUSH** the lever down and then backward. To release the clamp, **PUSH** the lever down and then forward. The lever is spring loaded to return to the neutral position when released.
5	Function Label	A label is attached in front of the auxiliary lever according the function connected. See Table 11.

Table 10. Controls and Switches on Armrest (Joystick Optional) (See Figure 10) (Continued)

Item No.	Item	Function
6	Auxiliary switch	A label is attached on the switch according the function connected. See Table 11. **PUSH** on the left side or right side of the switch depending on the desired movement as indicated on the label. Release the switch to deactivate the function.
7	Auxiliary switch	A label is attached on the switch according the function connected. See Table 11. **PUSH** on the left side or right side of the switch depending on the desired movement as indicated on the label. Release the switch to deactivate the function.
8	Auxiliary switch	A label is attached on the switch according the function connected. See Table 11. **PUSH** on the left side or right side of the switch depending on the desired movement as indicated on the label. Release the switch to deactivate the function.

Table 10. Controls and Switches on Armrest (Joystick Optional) (See Figure 10) (Continued)

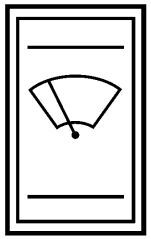
Item No.	Item	Function
9	Horn Switch 	Push on bottom of the switch to operate the horn.
10	Front Window Wiper Switch  HO190452	This switch controls the front window wiper. **PUSH** bottom of switch to move the switch from position 2 to **OFF** and position 1. **PUSH** top of switch to move the switch from position 1 to **OFF** and position 2. In position 1, the front window wiper is **ON** for continuous operation. In position 2, the front window wiper is **ON** for intermittent operation.

Table 10. Controls and Switches on Armrest (Joystick Optional) (See Figure 10) (Continued)

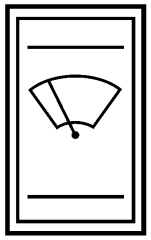
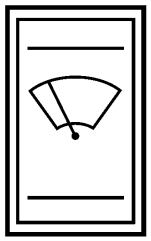
Item No.	Item	Function
11	Top Window Wiper and Washer Switch  HO190452	This switch controls the top window wiper and washer. **PUSH** bottom of switch to move the switch from **OFF** to position 1 and 2. Release the button to return from position 2 to position 1. **PUSH** top of switch to return the switch from position 1 to **OFF**. In position 1, the top window wiper is **ON**. In position 2, the top window wiper and washer are **ON**.
12	Rear Window Wiper and Washer Switch  HO190452	This switch controls the rear window wiper and washer. **PUSH** bottom of switch to move the switch from **OFF** to position 1 and 2. Release the button to return from position 2 to position 1. **PUSH** top of switch to return the switch from position 1 to **OFF**. In position 1, the rear windshield wiper is **ON**. In position 2, the rear windshield wiper and washer are **ON**.

Table 10. Controls and Switches on Armrest (Joystick Optional) (See Figure 10) (Continued)

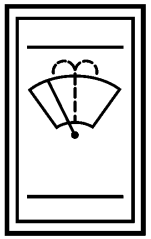
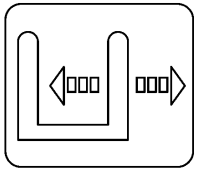
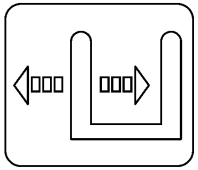
Item No.	Item	Function
13	Front Window Washer Switch  HO190453	**PUSH** on bottom of switch to turn the front window washer **ON** for timed wash/wipe operation. The wash operation will continue as long as the button of the switch is being pushed.
14	Right Fork Position Switch (With Fork Positioner)  BO190614	Right fork position is changed by this switch. **PUSH** top button to move right fork out. **PUSH** lower button to move right fork in.
15	Left Fork Position Switch (With Fork Positioner)  BO190613	Left fork position is changed by this switch. **PUSH** top button to move left fork out. **PUSH** lower button to move left fork in. **NOTE:** Switch may also be used for other functions added to unit.

Table 10. Controls and Switches on Armrest (Joystick Optional) (See Figure 10) (Continued)

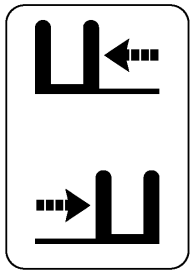
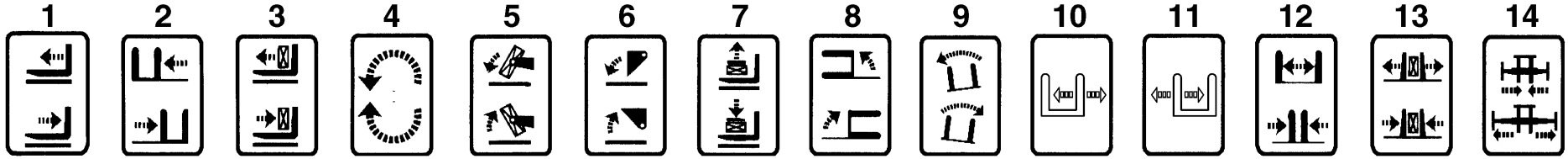
Item No.	Item	Function
16	Side Shift Thumb Wheel 	The carriage position is changed by the thumb wheel. Scroll the thumb wheel **UP** to move the carriage to the right. Scroll the thumb wheel **DOWN** to move the carriage to the left. The lever is spring loaded to return to the neutral position when released.

Table 11. Auxiliary Control Levers

Function The control levers will be arranged in the following order from left to right.	Direction of Movement	
	Load or Equipment	Control Lever
1. REACH	Retract/Extend	Backward/Forward
2. SIDESHIFT	Right/Left	Backward/Forward
3. PUSH-PULL	Backward/Forward	Backward/Forward
4. ROTATE	Clockwise/Counterclockwise	Backward/Forward
5. UPENDER	Up/Down	Backward/Forward
6. SCOOP	Up/Down	Backward/Forward
7. LOAD STABILIZER	Down (Clamp)/Up (Release)	Backward/Forward
8. SWING (FORKS)	Right/Left	Backward/Forward
9. SWING (CLAMP)	Right/Left	Backward/Forward
10. LH FORK POSITIONER	Together/Apart	Backward/Forward

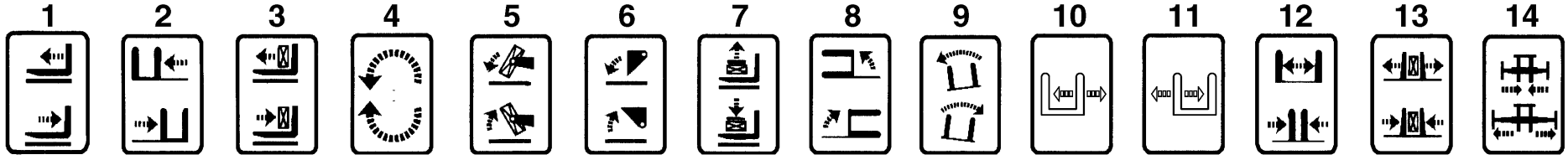


Model Description

HYSTER

Table 11. Auxiliary Control Levers (Continued)

Function The control levers will be arranged in the following order from left to right.	Direction of Movement	
	Load or Equipment	Control Lever
11. RH FORK POSITIONER	Together/Apart	Backward/Forward
12. FORK SPREAD	Together/Apart	Backward/Forward
13. CLAMP	Clamp/Release	Backward/Forward
14. EXTEND/RETRACT	Extend/Retract	Backward/Forward



Operating Procedures

General

Know Your Lift Truck

⚠ WARNING

EXHAUST GASES

Exhaust from internal combustion engines contains carbon monoxide and other harmful chemicals. Carbon monoxide is a colorless, 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.

DO NOT use diesel engines indoors where soot can accumulate.

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 modifications that may be appropriate in environments with fire hazards.

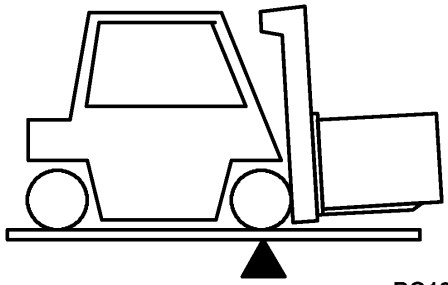
Operate the lift truck only in areas that have been approved for lift truck operation.

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 pick up, move, and tier materials on firm and essentially flat surfaces. 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 lift truck can pick up a load, you must first know some basic things about the lift truck.



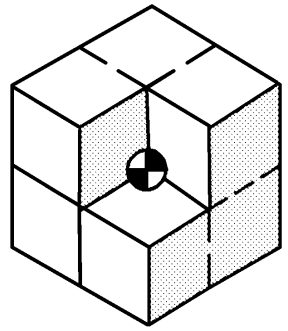
BO190107

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.

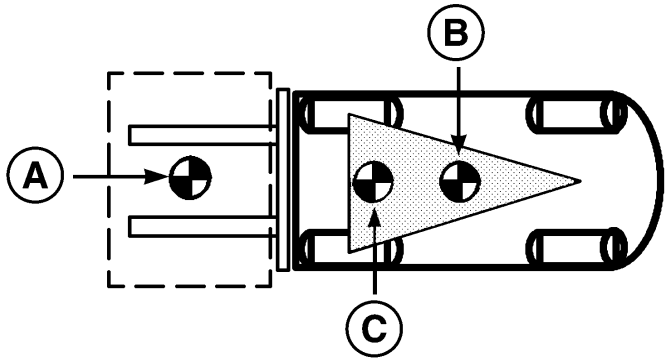
This basic principle is used for picking up a load. The ability of the lift truck to handle a load is discussed in terms of center of gravity and both forward and side stability.

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.



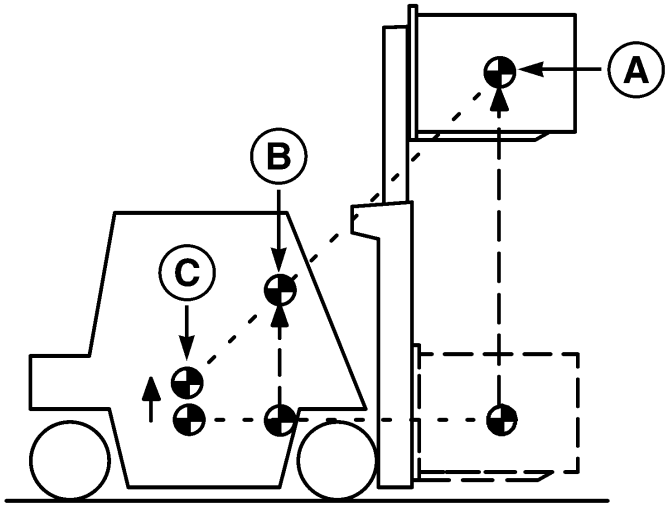
Every object has a CG. When the lift truck picks up a load, the truck and load have a new combined CG.



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.

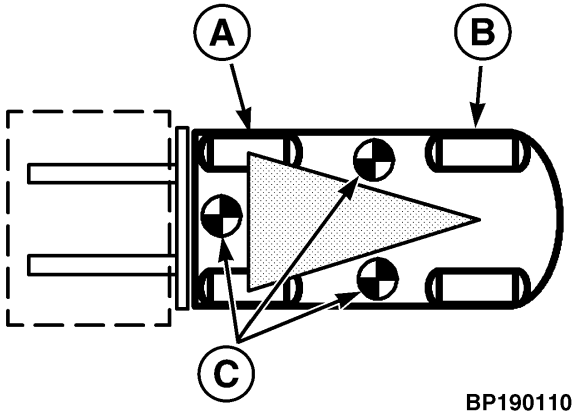
The lift truck has moving parts and, therefore, has a CG that moves. The CG moves forward and back as the mast is tilted forward and back. The CG moves up and down as the mast moves up and down.



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

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



BP190110

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

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

Dynamic forces can cause the center of gravity to move outside of the stability triangle. Operators must be trained to understand the effects of dynamic forces and how their actions can have either a positive or negative influence on such forces. Operators should practice defensive driving and recognize the need to operate at speeds commensurate with surface conditions, other vehicular traffic, presence of pedestrians, weather conditions, etc. At all times, the operator should be in control and travel at speeds which will allow the operator to bring the truck safely to a stop.

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. This load must weigh less than the maximum weight for a load center shown on the Nameplate. See Figure 11.

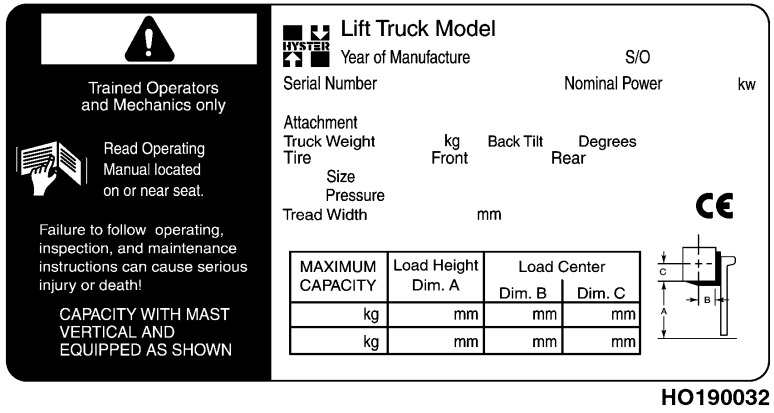


Figure 11. Nameplate

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

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

Inspection Before Operation

⚠ 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.

☑ Checks With the Engine Stopped

Inspect the lift truck before use and every 8 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 operator compartment.
- Condition of wheels and tires.
- Seat belt fastens correctly.
- Seat is correctly fastened to its mounts. Hood 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.
- 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.

Starting Procedures

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

WARNING

DO NOT use starting fluid (ether) or other flammable liquids as starting aids. The engine is equipped with an electric heater for a starting aid. Use of ether or other flammable liquids can cause a fire and explosion, causing serious personal injury and engine damage.

CAUTION

Do not engage the starter for more than 10 seconds at a time. If the engine does not start, turn the key switch to OFF. Wait 60 seconds before engaging the starter again.

If lift truck is equipped with the standard OPS:

1. Either:

a. Apply the parking brake.

b. If equipped, put the directional control lever for the transmission in the N (**NEUTRAL**) position.

c. Completely depress the inching/brake pedal.

If lift truck is equipped with the optional OPS:

1. The following sequence must be followed for engine to start.

a. Operator must be in seat.

b. Seat belt must be fastened.

c. Make sure parking brake is applied.

2. Turn key to the **ON** position. Wait until all warning lights are **OFF**.

3. Turn the key to the **START** position to engage the starter. Allow the key to return to the **ON** position when the engine starts. Only engage the starter for a maximum of 10 seconds.

4. If the engine does not start after four attempts, get help from authorized service personnel.

5. With the engine running at idle, check the gauges and indicator lights for correct operation. See **Controls, Instruments, Indicators, and Switches** section in this **Operating Manual**.

6. Check for engine fault codes. The ECM (Engine Control Module) controls and monitors the engine and records fault conditions using fault codes. In case of an active fault, the Engine Warning Light or the Engine Stop Warning Light will come **ON**. See Table 4.

These codes may appear when the following occurs:

- The Engine Warning Light will come **ON** when operating conditions are getting near the maximum permissible values, and the ECM may decrease engine performance. Check and monitor dashboard gauges and warning lights to take appropriate action when needed.
- The Engine Stop Warning Light will come **ON** when operating conditions are beyond the permissible values. Immediately switch **OFF** the engine.

In either case, read all active fault codes immediately by using the fault code display. See Table 4. Record each code. Refer to Table 6, for Additional Information. Early communication of the recorded fault code(s) to your **Hyster** lift truck dealer will assist them in preparing for a service call.

Heating Hydraulic Oil

When hydraulic oil temperature in the reservoir is below −5 °C (23 °F), the hydraulic controller limits engine speed proportional to the hydraulic oil temperature. The fault code display will show 'hCold'. At −20 °C (−4 °F), the engine speed is limited to 1000 rpm. Above −5 °C (23 °F), the controller does not limit engine speed. Apply hydraulic functions to raise hydraulic oil temperature. For a quicker rise of hydraulic oil temperature, apply hydraulic functions against relief.

Manual Shutdown Procedures

1. Place the lift truck on a solid, level surface.

2. Apply parking brake.

3. Put the shift lever for the transmission in the **NEUTRAL** (N) position.

⚠ CAUTION

The turbocharger can be severely damaged when switching off a hot engine when the 3 to 5 minute idle period is not performed.

4. Allow the turbocharger of the engine to cool down and to obtain the lowest possible turbo speed before stopping the engine. If engine coolant temperature is low to moderate, keep the engine at lowest idle for 3 minutes before turning the key switch to **OFF**. If engine temperature is high, keep the engine at lowest idle for at least 5 minutes before turning the key switch to **OFF**.

Automatic Shutdown Procedures

NOTE: Should any warning light come on to signal derate, the operator should try to moderate the truck duty so that shutdown is avoided if at all possible.

Coolant Temperature

If the coolant temperature reaches 107 °C (225 °F), the torque derate will start.

The engine will shut down if the coolant temperature is equal to or greater than 114 °C (237 °F) for 30 seconds or more.

Intake Manifold Temperature

If the intake manifold temperature reaches 94 °C (201 °F), the torque derate will start.

The engine will shut down if the intake manifold temperature is equal to or greater than 114 °C (237 °F) for 30 seconds or more.

Engine Oil Pressure

The engine will shut down after 5 minutes if the engine oil pressure is below the low limit for 10 seconds. Before the shutdown situation is reached, there will be a derate.

Empty Seat Engine Shutdown (Optional)

The engine shuts down if the operator is not on the seat during a certain time. This time has been set by the factory at 15 minutes and can be adjusted by your dealer between 5 and 15 minutes. To restart the engine, turn the key switch to **OFF** and follow the normal starting procedures.

Operator Presence System (OPS)

The lift trucks covered in this manual are equipped with an Operator Presence System (OPS). Some lift trucks are equipped with an optional Operator Presence System which will not allow the truck to travel or operate hydraulic mast functions unless the operator is in the seat and the seat belt is also fastened.

The OPS feature has an electrical switch in the seat which senses the presence of the operator. When the operator is in the seat, the transmission can be engaged and hydraulic functions can be operated. When the operator is absent, the transmission will disengage and hydraulic mast functions cannot be operated. The OPS is designed with a slight delay in the seat switch to allow the operator to reposition himself without disabling the transmission and all hydraulic functions.

To check operation of the OPS, there must be no operator in the seat for at least 2.5 seconds. Verify the hydraulic functions do not operate and that the transmission is disengaged.

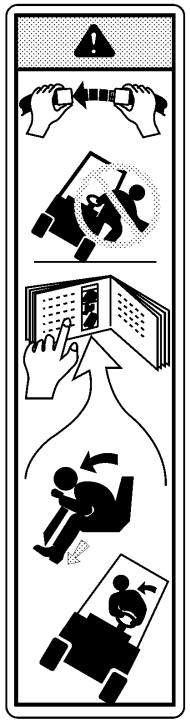
To check operation of the optional OPS, an additional check is required. With operator in the seat and seat belt **NOT** fastened for at least 2.5 seconds, verify the hydraulic mast functions do not operate and the transmission is disengaged.

If the OPS does not operate as expected, remove truck from service until repairs are completed.

To reset the OPS and allow full truck operation, the operator must be seated. For trucks equipped with the optional Operator Presence System, the seat belt must also then be fastened. Engage the transmission using any of the following actions:

- Depress the inching brake pedal more than 75%.
- Move the gear selector into the NEUTRAL position, and then move the gear selector into travel mode.
- Make a direction change using the **MONOTROL®** pedal.

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 provides a means to help the operator keep the head and torso substantially within the confines of the truck frame and overhead guard if a tipover occurs. This protection system is intended to reduce the risk of the head and torso being trapped between the truck and the ground, but it cannot protect the operator against all possible injuries 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:

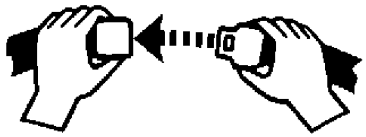
- Check the operation of the horn, gauges, and indicator lights.
- On Cummins engines, there is an indicator lamp in the wire harness at the alternator. This indicator lamp is **ON**, if alternator output voltage is below battery voltage.

- Check the oil level in the powershift transmission when the oil is at operating temperature. Make sure the transmission is in **NEUTRAL**, the parking brake is applied, and the engine is running at idle speed.
- Operate the **LIFT, TILT**, and **AUXILIARY** functions to check for correct operation of the mast, carriage, and attachments.
- Check the operation of the **MONOTROL** pedal or the optional direction control lever and accelerator pedal.
- Check the operation of the service brakes and parking brake.
- Check the operation of the steering system.

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.

General

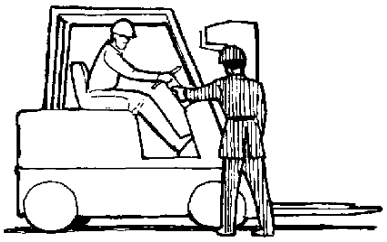
NOTE: When the Emergency Locking Retractor (ELR) seat belt is properly buckled across the operator, the belt will permit slight operator repositioning without activating the locking mechanism. If the truck tips, travels off a dock, or comes to a sudden stop, the locking mechanism will be activated and hold the operator's lower torso in the seat.

Basic Operating Procedures

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

Operating Procedures

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


BO190115

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

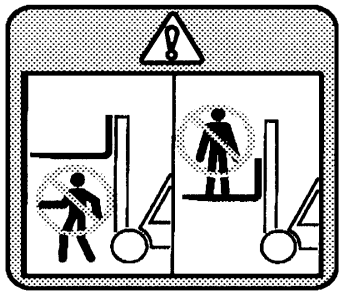
2. Operate the lift truck only in areas that have been approved for lift truck operation.


HO190472

Certain areas contain hazardous flammable gases, liquid, dust, fibers or other materials. Lift trucks that are operated in these areas must have special fire safety approval. These areas must be designated to show the type of lift truck approval required for operation in the area. Changes to special equipment or poor maintenance can make the lift truck lose its special approval.

⚠ WARNING

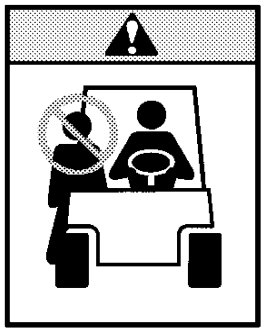
This lift truck is designed for handling materials. A lift truck is not designed to lift people. Do not use a lift truck to lift people unless it has been determined that there is no other practical option (scaffolds, elevated work platforms, aerial baskets, etc.) to perform the needed work.


BO190117

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

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

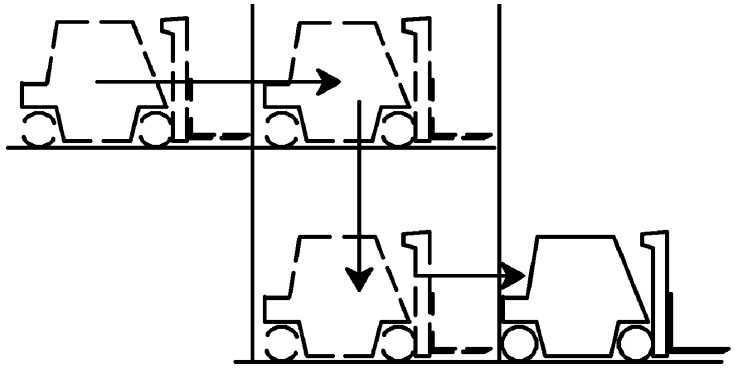
Before anyone is allowed in the platform, lift and lower the mast slowly with the platform in place to make sure the mast functions properly. Apply the parking brake. Do not travel with people in the platform. The operator must remain at the controls. Watch for overhead obstructions.



BO190116

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

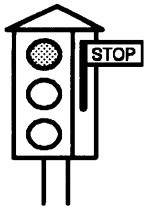
4. DO NOT drive a lift truck into an elevator unless authorized to do so. Approach the elevator slowly. After the elevator is properly leveled, the lift truck must be centered so that the elevator is balanced.



BO190118

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

5. 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**.



HO190473

Driving and Direction Changes

⚠ WARNING

If any of the instruments, levers, or pedals do not operate as described, report the problem immediately. DO NOT operate the lift truck until the problem is corrected. See the section Description in this Operator Manual for instruments, levers, and pedals.

⚠ CAUTION

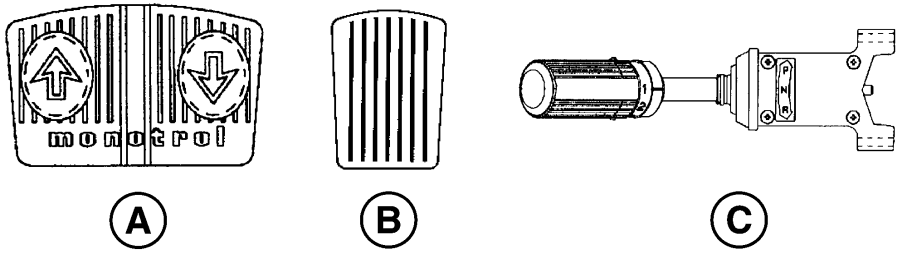
The drive train can be damaged if the lift truck is travelling too fast when the controls are changed to the opposite direction of travel.

NOTE: During the operation of the truck, the transmission controller may display transmission exceed codes on the hourmeter and fault indicator display. These codes are shown in Table 7.

The transmission can have either a shift lever with direction change function or a shift lever without the direction change function. The **MONOTROL®** pedal is installed if the shift lever does not have the direction change function. The shift lever controls the three speeds of 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 equipped with a direction change function, move the shift lever toward the front of the lift truck to go forward. Move the shift lever toward the rear of the lift truck to go in reverse. To move the lift truck, push on the brake pedal, and release the parking brake. Now, push down on the **MONOTROL®** pedal or the accelerator pedal while releasing the brake pedal.

A loaded or unloaded lift truck can usually start to move with the range lever in the second position. Start in the first position when the lift truck is on a grade. After the lift truck is moving, push forward on the range lever to increase speed or pull back to select a lower range as necessary.

The lift truck has the capability of making directional shifts at travel speeds up to a walking pace, but the mast must not be raised and the load must be stable. If the lift truck is moving rapidly, slow to a walking speed before changing the direction of travel.



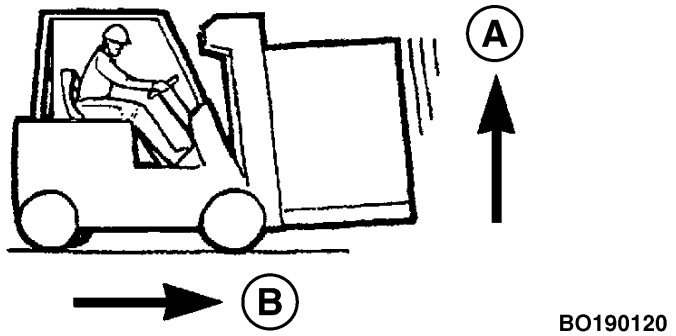
A. MONOTROL® PEDAL
B. ACCELERATOR PEDAL
C. SHIFT LEVER

Inching/Braking

⚠ WARNING

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

The lift truck has a brake pedal and a inching/brake pedal. The brake pedal (middle pedal) applies only the brakes. Slightly pushing the inching/brake pedal (left-hand pedal) will apply the service brakes and, further pushing the pedal, will fully disengage the transmission.



A. FAST **B.** SLOW

The inching/brake pedal is used to control the inching operation. When the inching/brake pedal is initially applied, the clutch in the transmission is partially disengaged and the movement of the truck is slow. When the inching/brake pedal is fully applied, the transmission is completely disengaged and the brakes are applied. Use the accelerator pedal to keep the engine speed high while inching.

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

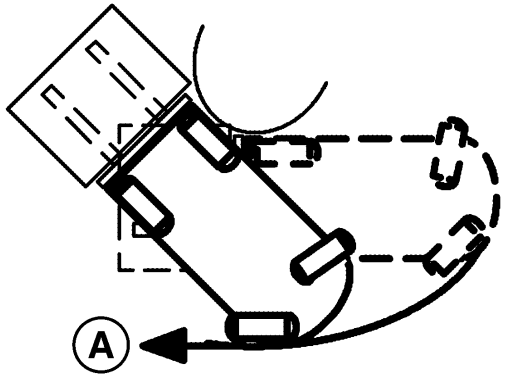
⚠ WARNING

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 lift truck to become unstable. Failure to observe the tail swing area when making a turn can lead to injury or death.

⚠ WARNING

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

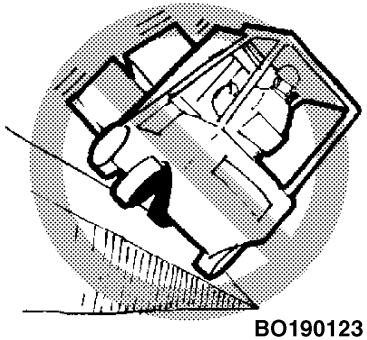


BO190122

A. TAIL SWING

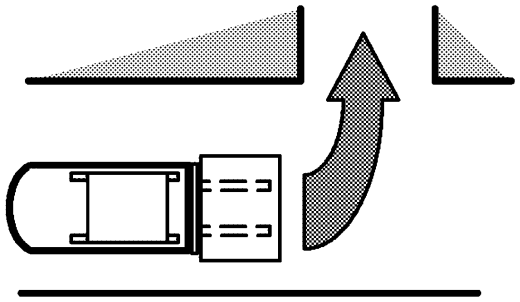
Because lift trucks are designed to work in a relatively small space, they can turn sharper than some other vehicles. Most lift trucks are steered by the rear wheels and the rear of the lift truck can move to the side very fast during a turn. This movement is called tail swing. An operator must be aware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

Load Handling, Lifting, Lowering, and Tilting

The LIFT and TILT functions are controlled by separate levers or by a joystick. Refer to the **Controls, Instruments, Indicators, and Switches** section for proper operation.

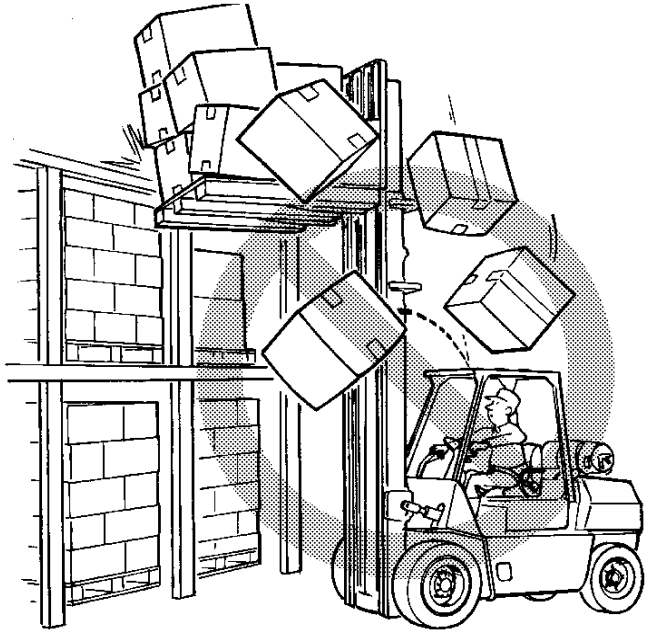
The speed of the hydraulic functions is controlled by the position of the control levers or the position of the joystick and the speed of the engine. The farther the hand lever or joystick is moved from the **NEUTRAL** position, the faster the speed of the hydraulic function.

Do not lift or hit anything that can fall on the operator or a bystander.

Remember, a lift truck equipped with a **Hyster** operator compartment provides reasonable protection to the operator from falling objects, but cannot protect against every possible impact.

Operating Procedures

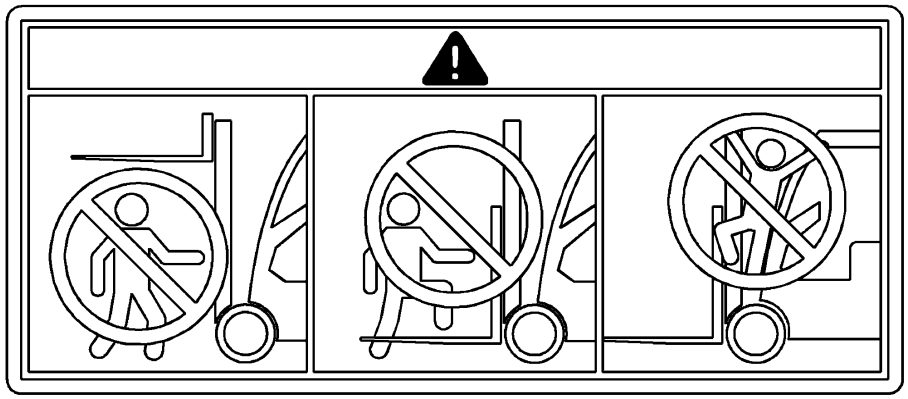
HYSTER



BO190128

The operator must exercise extreme care while working near objects. Whether the lift truck is loaded or empty, do not travel with the load or carriage in a raised position for FLT trucks. For ECH trucks, it is permitted to travel with the container maximum 1 m (3.3 ft) above the seat height and mast fully back tilted..

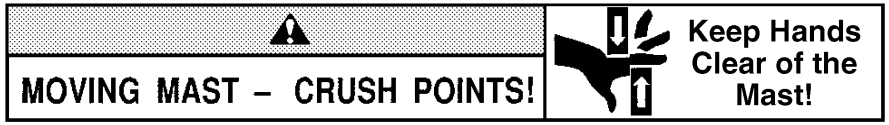
⚠ WARNING



BO190290

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

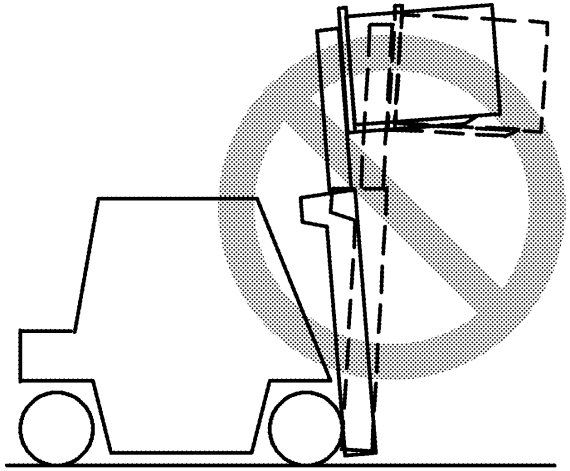
⚠ WARNING



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

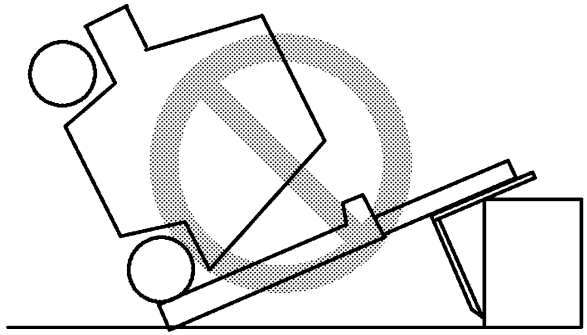
moving parts with close clearances that can cause serious injury.

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



⚠ WARNING

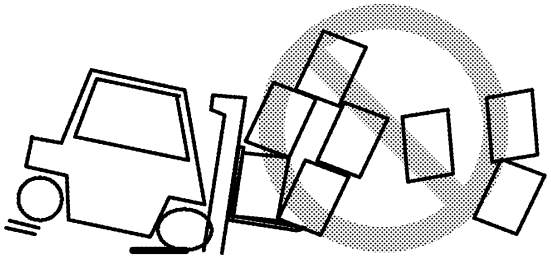
The lift truck can tip over forward when the load is raised. Forward tipping is even more likely when tilting forward, braking when travelling forward or accelerating in REVERSE.



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

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 any more than necessary when handling elevated loads. The lift truck can tip forward if the mast is tilted forward with a load in the raised position.

Stopping



BO190154

Stop the lift truck as gradually as possible. Hard braking and wheel sliding can cause the load to fall from the forks and damage the load or cause personal injury. With an attachment, hard braking may reduce stability.

Parking

NOTE: The parking brake, when in good condition and correctly adjusted, will hold a lift truck with a capacity load on a 15% grade [a slope that increases 1.5 m in 10 m (1.5 ft in 10 ft)].

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

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

1. Stop the lift truck and apply the parking brake. Applying the parking brake puts the transmission in **NEUTRAL** when the lift truck has a **MONOTROL®** pedal.

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

3. On units with a direction control lever, put the control lever for the transmission in **NEUTRAL**.

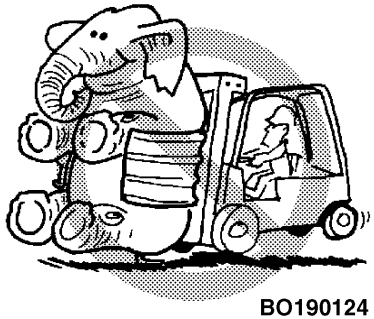
4. With the engine at idle speed, wait 3 to 5 minutes before turning key switch to **OFF**.

5. Immediately check engine compartment and remove any foreign materials if operating in areas containing combustible material.

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

FLT (Fork Lift Truck)

Load Handling, General


BO190124

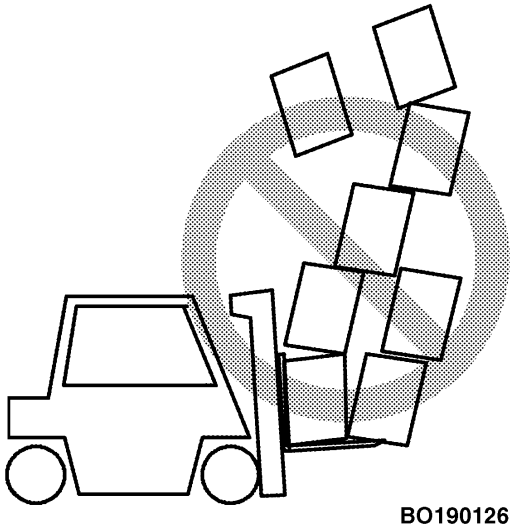
1. Handle only loads within the rated capacity as shown on the Name-plate. This rating represents the maximum load that can be lifted.

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

⚠ WARNING

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

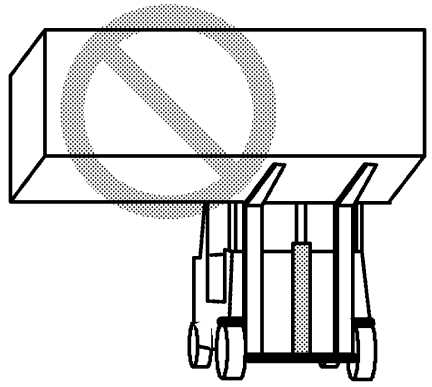
Loads such as bundles of lumber or empty containers can fall backward onto the truck if they extend past the top of the carriage and mast.


BO190126

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

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

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.

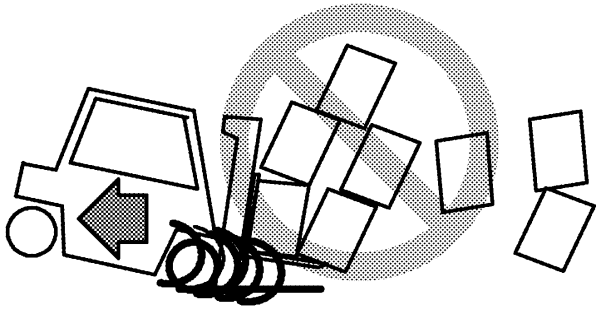

BO190127

Operating Procedures

HYSTER

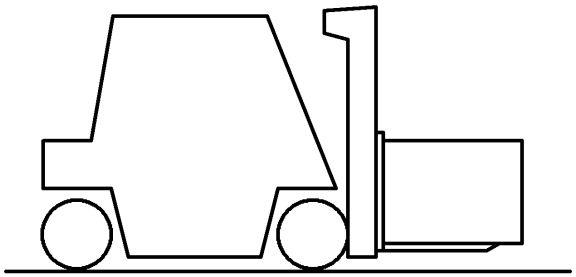
4. Check the condition of the driving surface. Make sure the surface will support the weight of the lift truck and the load.

Load Handling, How to Engage and Disengage a Load



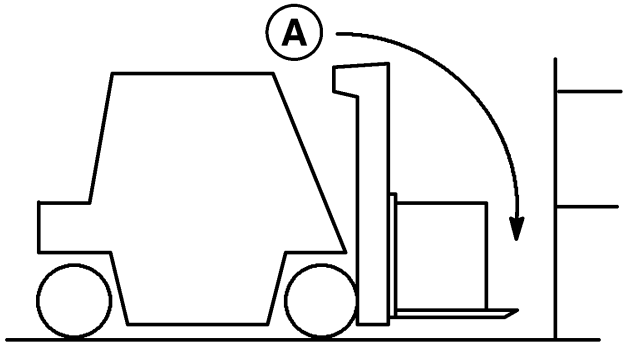
1. Avoid fast starts. Sudden movement can cause the lift truck to tip. People can be hurt or killed and material can be damaged.

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



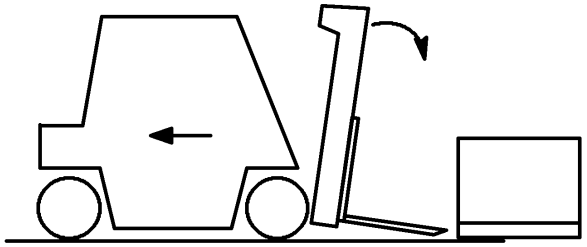
2. Move forward slowly until the forks are in position under the load. The forks must support at least two-thirds of the length of the load.

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 surface to make sure the lift truck has the capacity to lift the load.

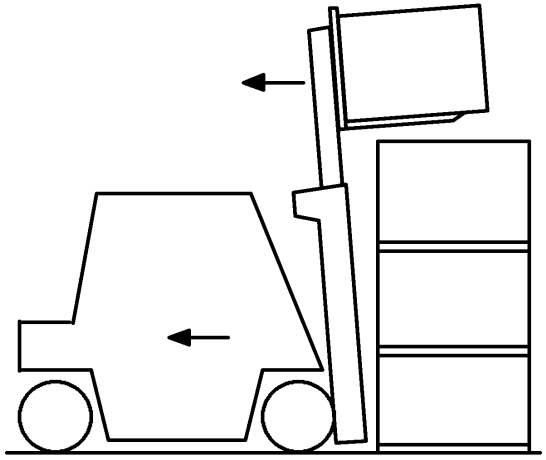


A. BE CAREFUL OF FORKS BEYOND THE LOAD

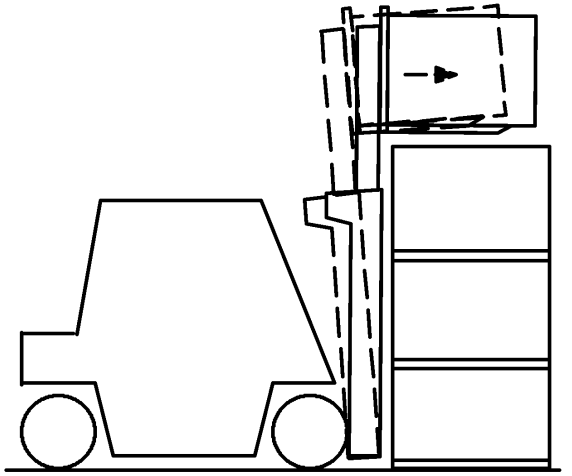
If the forks are longer than the load, move the forks under the load so that the tips of the forks do not extend beyond the load. Lift the load from the surface. Move backward a few inches, then lower the load onto the surface and inch forward to engage the load against the carriage. Tilt the mast backward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



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



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 travelling. 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.



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

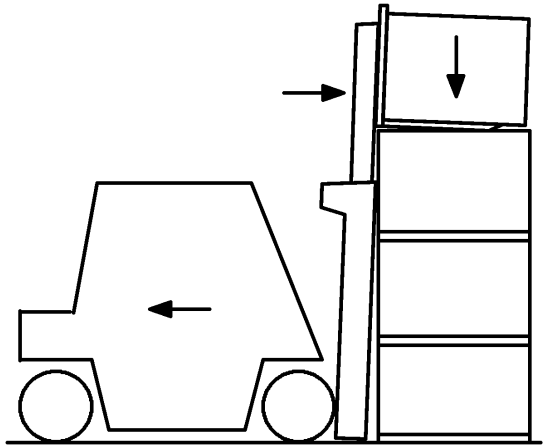
Operating Procedures

HYSTER

⚠ WARNING

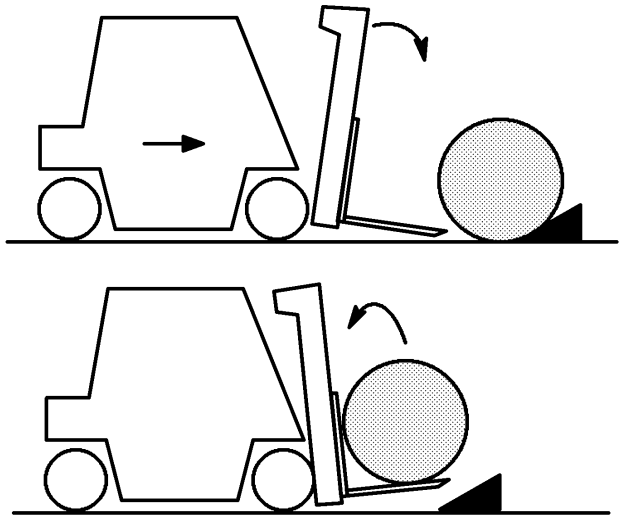
Move carefully and smoothly when the load is raised over a stack. When the load is elevated, the center of gravity of the lift truck and the load is much higher. The lift truck can tip over when the load is raised.

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

Load Handling, Traveling

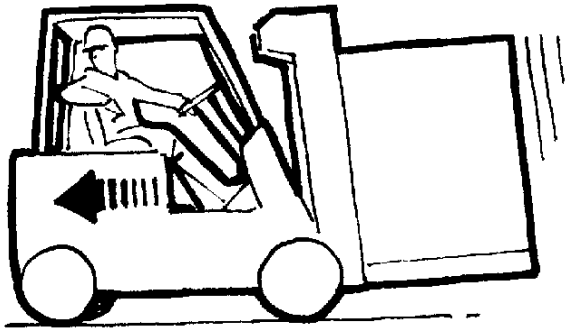
1. When traveling with the load lowered, keep the load against the carriage and the mast tilted fully backward. This action will help keep the load on the forks and give good forward and side stability.

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

When the mast, carriage, or load is in a raised position, the stability of the lift truck is reduced. This 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.

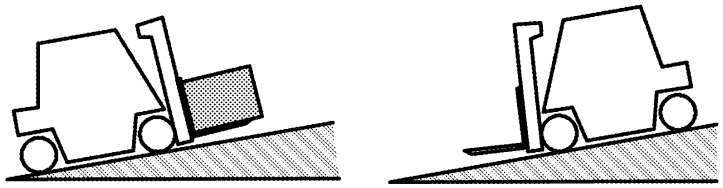
⚠ WARNING

The 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 may be required.

Operating Procedures



BO190143

4. When traveling up or down a grade with a heavily loaded lift truck, keep the load upgrade to maintain control.

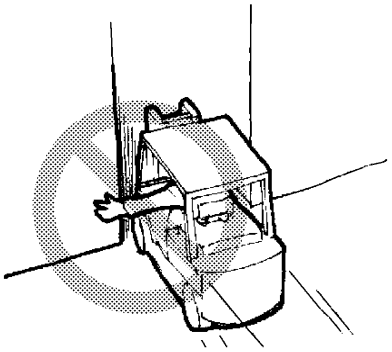
When operating an unloaded lift truck on a steep grade, keep the counterweight upgrade.

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

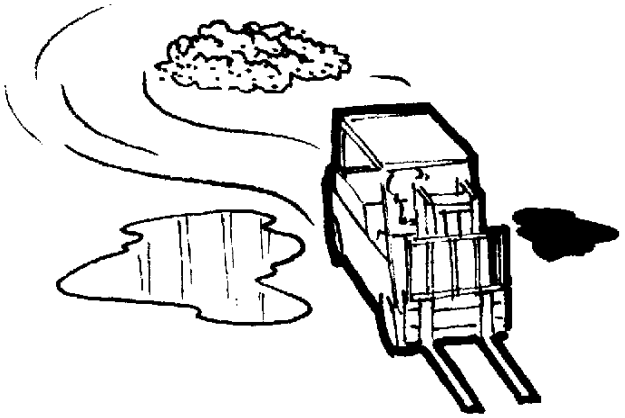
Slow down when approaching blind intersections or turns and sound the horn. The horn is to warn pedestrians that there is a vehicle in the area and to be alert to possible danger.

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



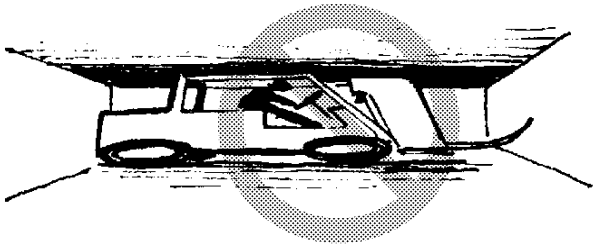
BO190145

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



BO190146

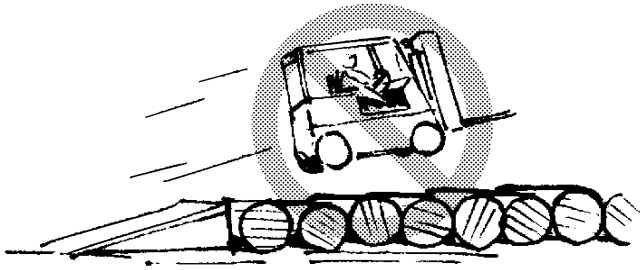
Different models of lift trucks are designed to operate under different conditions. Solid rubber tire models are designed to operate on relatively smooth, firm surfaces. Lift trucks with pneumatic tires can adapt to more uneven ground. Always make sure the smoothest route for your lift truck.



BO190147

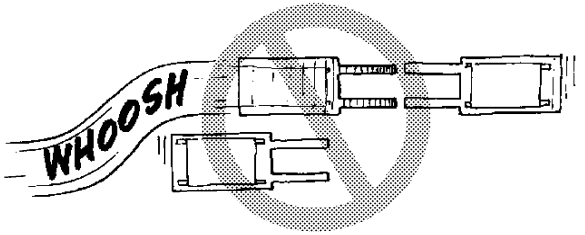
8. Watch clearances, especially forks, mast, overhead guard, and tail swing. A lift truck is designed to perform a wide variety of functions within limited space.

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



BO190148

9. DO NOT indulge in stunt driving or horseplay.



BO190149

10. DO NOT pass another lift truck travelling in the same direction at intersections, blind spots, or at other dangerous locations.

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

⚠ WARNING

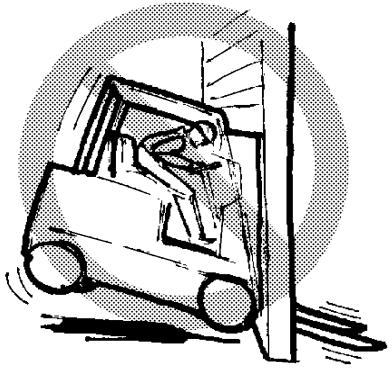
Remember when traveling in the forward direction and the steering wheel is turned to move the lift truck away from the edge of the dock, the rear will swing toward the edge. This can cause the lift truck to fall off the dock.

12. Stay away from the edge of docks.

Operating Procedures

HYSTER

13. 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.



BO190150

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. Remove the key from the key switch.

⚠ 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 hourmeter, and in calendar time. Use the interval that occurs first.

The recommendation for the time intervals are for 8 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 8 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** trucks has a complete program of inspection, lubrication, and maintenance. A regular program of inspection, lubrication, and maintenance will help your lift truck give more efficient performance and operate for a longer period of time.

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

Serial Number Data

The serial number for the lift truck is on the Nameplate and is stamped on the frame at the right-hand side of the operator. See Figure 2.

How to Move a Disabled Lift Truck

⚠ WARNING

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

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

If the engine cannot run, there is no power available for the hydraulic steering system and the service brakes. This condition can make the lift truck difficult to steer and to stop. 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. Do not use a lifting device that supports the under side of the lift truck as it will damage components on the under side of the lift truck.

NOTE: For wet brakes, the park brake is on the disc on the prop shaft. The park brake can be disengaged by backing out the adjusting screw.

How to Tow the Lift Truck

1. Remove the drive shaft.

2. The towed lift truck must have an operator.

3. Tow the lift truck slowly.

4. Raise the carriage and forks approximately 30 cm (12 in.) from the surface. Install a chain to prevent the carriage and mast channels from moving.

5. 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 half of a capacity load on the forks of the lift truck that is being used to tow the disabled lift truck. This half-capacity load will increase the traction of the lift truck. Keep the load as low as possible.

6. 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:

1. **Before removing the mast and drive axle, put blocks under the counterweight so that the lift truck cannot fall backward. See Figure 12.**
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. Put a steel plate on top of the block.

CAUTION

Do not place blocks under fuel or hydraulic tanks.

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 Tires

1. Put blocks on each side (front and rear) of the steering tires to prevent movement of the lift truck. See Figure 12.

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

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

4. Put additional blocks with steel plates under the frame behind the drive tires. Make sure the blocks are under frame channels and not under tanks and compartments.

5. If the hydraulic system will not operate, use a hydraulic jack under drive axle. Make sure that the jack has a capacity equal to at least half the weight of the lift truck. See Figure 2.

How to Raise the Steer Tires

1. Apply the parking brake. Put blocks on both sides (front and rear) of the drive tires to prevent movement of the lift truck. See Figure 12.

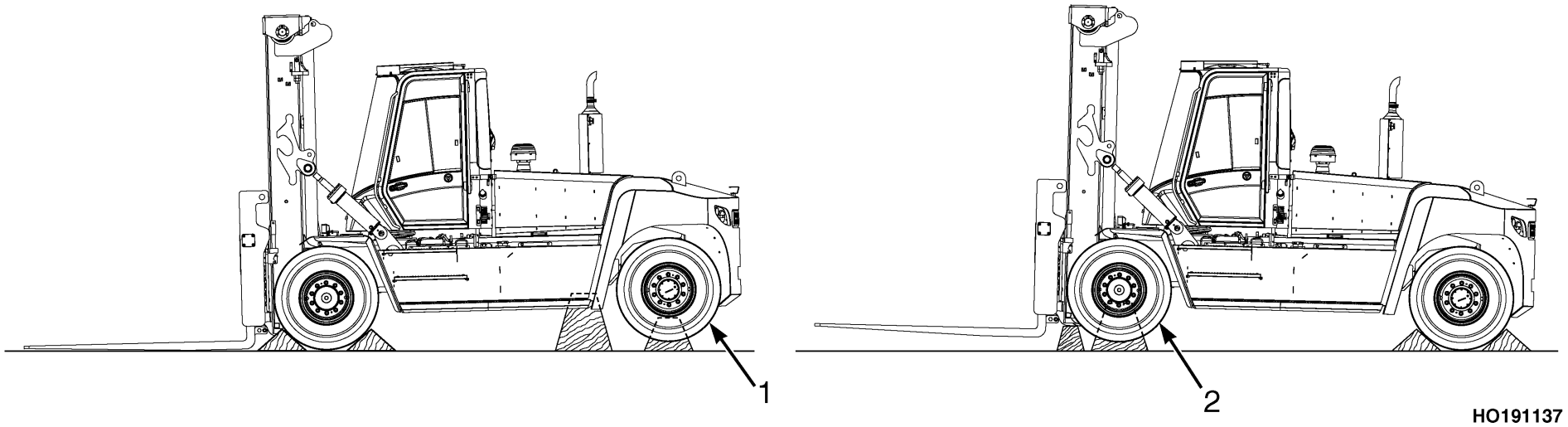
2. Put blocks between the steering axle and the frame. See Figure 13.

⚠ WARNING

DO NOT put a jack under the counterweight to raise the lift truck.

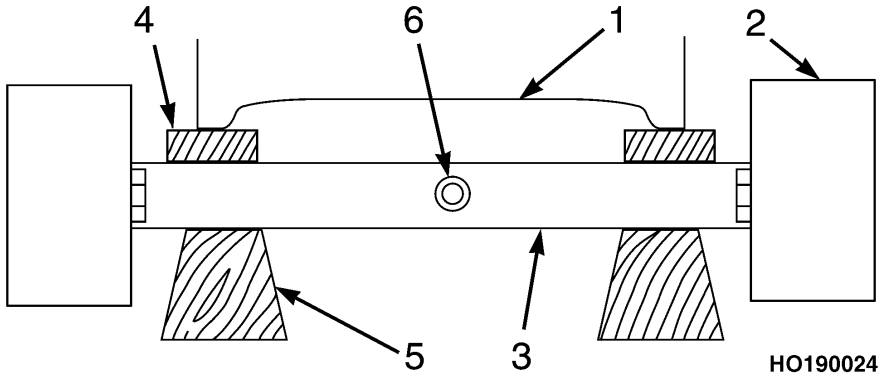
3. Place a hydraulic jack under center of steering axle to raise the steering tires. Make sure that the jack has a capacity of at least 2/3 of the total weight of the lift truck. See the Nameplate.

4. Put blocks with steel plates under both sides of the steering axle to support the lift truck.



1. STEERING TIRES
2. DRIVE TIRES

Figure 12. Put a Lift Truck on Blocks



1. FRAME
2. WHEEL
3. STEERING AXLE
4. BLOCKS BETWEEN FRAME AND AXLE
5. SUPPORT BLOCKS
6. STEERING AXLE PIVOT POINT

Figure 13. Steering Axle Blocks

How to Clean a Lift Truck

⚠ CAUTION

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

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

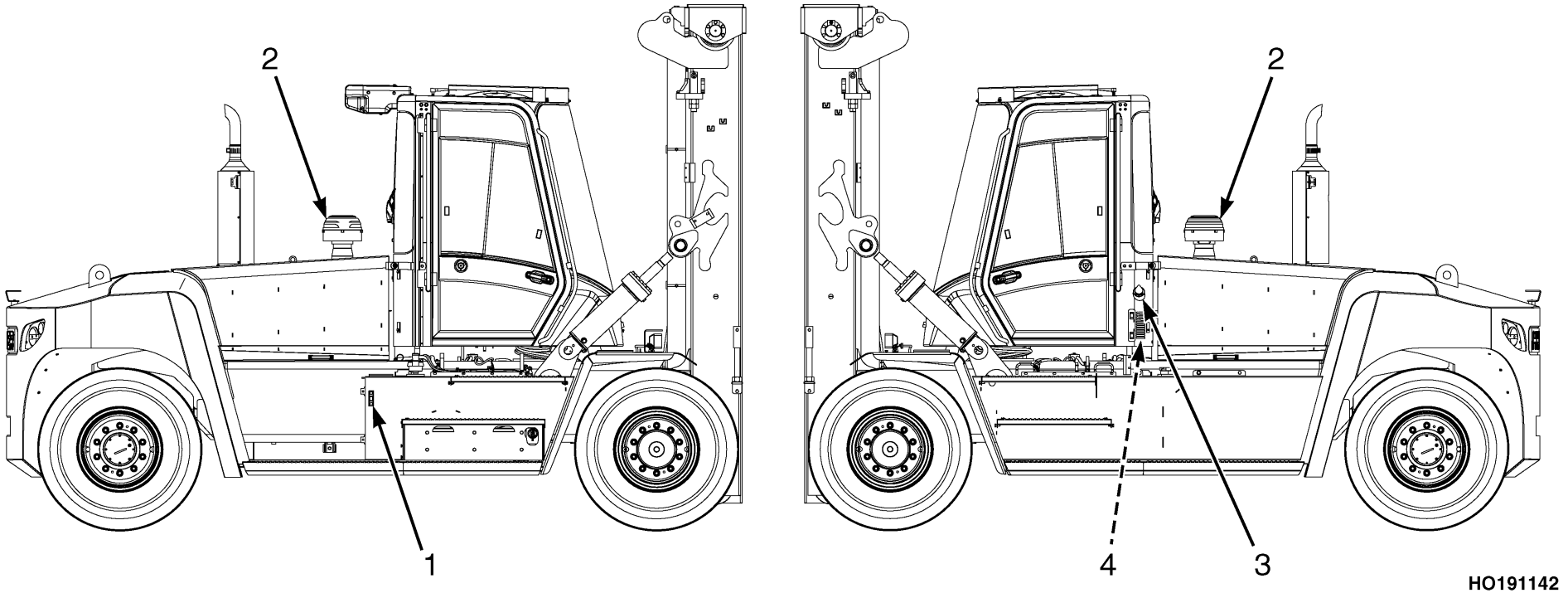


Figure 14. Maintenance Points (Sheet 1 of 3)

Daily Inspections

HYSTER

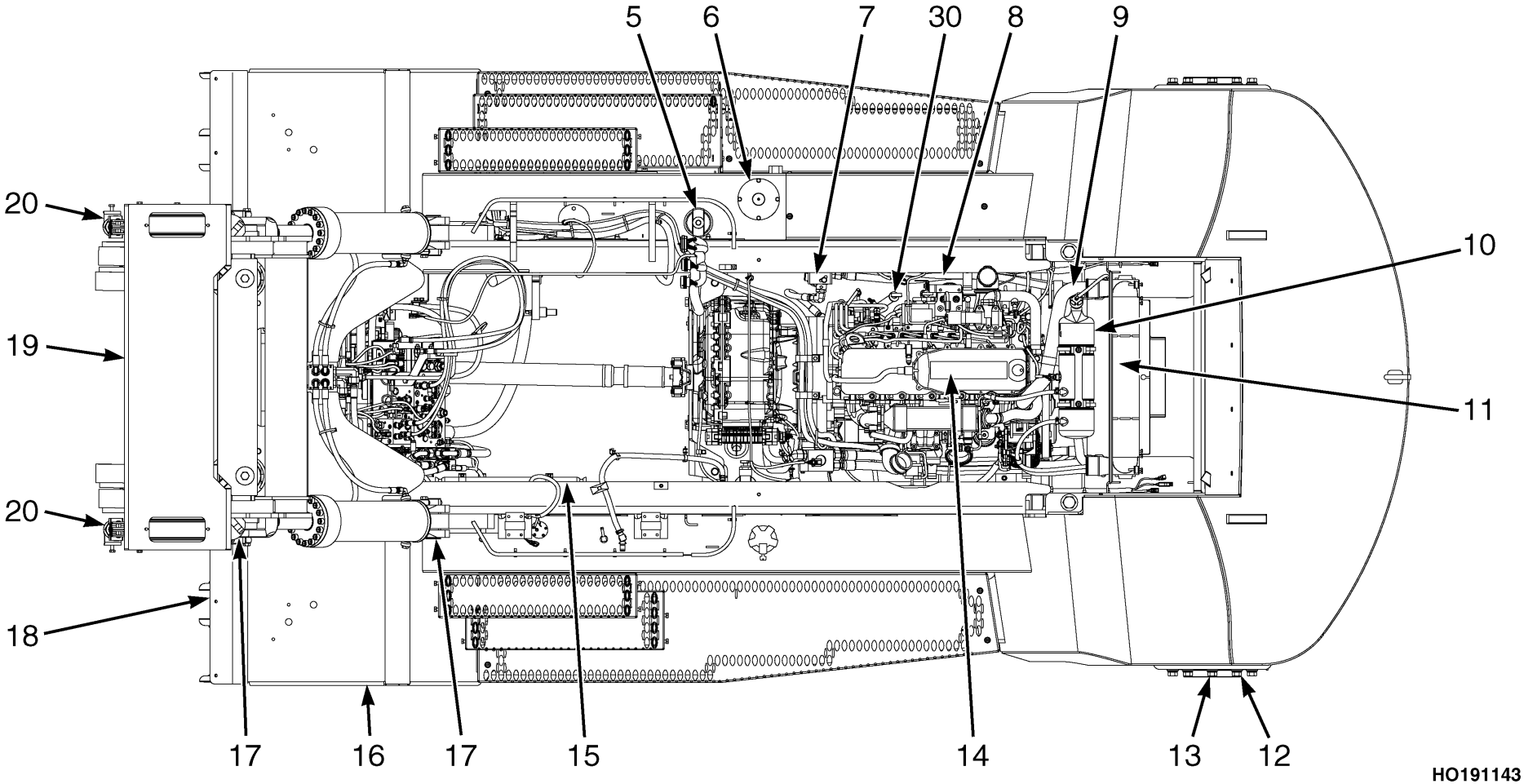


Figure 14. Maintenance Points (Sheet 2 of 3)

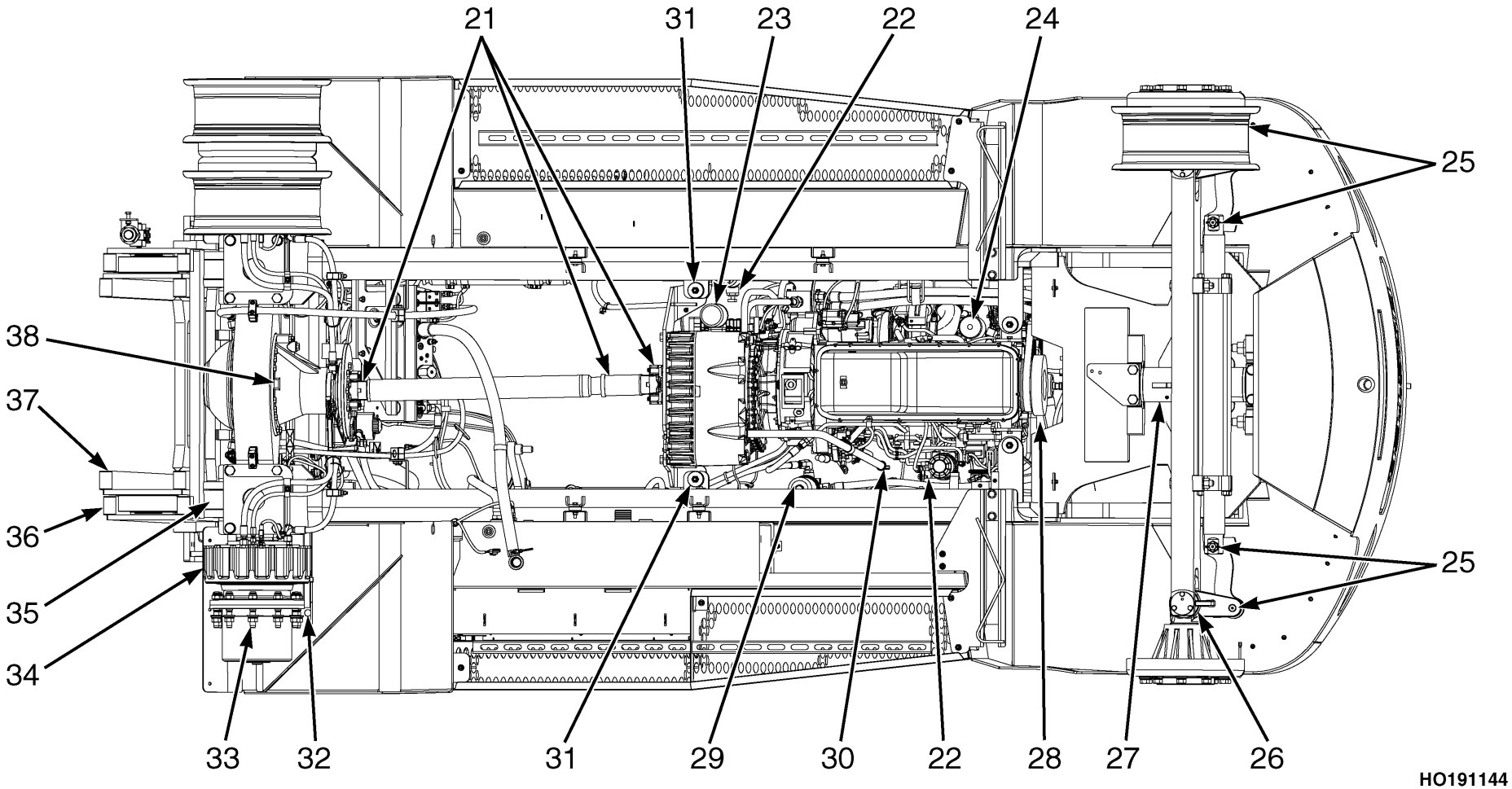


Figure 14. Maintenance Points (Sheet 3 of 3)

Daily Inspections

Table 12. Daily Inspections - Condition Check

Item No.	Item	Procedure
	Warning Safety Labels	Check for presence and readability. See **Parts Manual**.
18	Wheels, Tires, and Tire Pressure	Check condition and pressure. See **Nameplate**.
12	Wheel Nuts Drive and Steer Wheels	Re-torque 8 hours after replacement of wheel or 8 hours after a nut could be turned after re-torquing. 615 to 710 N•m (453.6 to 523.6 lbf ft)
	Mast Mounting Bolts	Re-torque mast mounting bolts to 320 N•m (236 lbf ft), 20 hours after replacement of a mast, or 20 hours after a mast mounting bolt could be turned at re-torqueing.
19	Frame, Mast, Carriage, and Attachment	Check condition. Repair as necessary.
	Header Hose Assembly	Visually inspect hoses for leaks, wear, and damage. Check for proper tracking during operation. Repair as necessary.
20	Lift Chains	Check condition and lubrication. Repair if necessary.
	Forks	Check condition. Replace as necessary. See **Parts Manual**.
See Figure 14 for Item Nos.		

Table 12. Daily Inspections - Condition Check (Continued)

Item No.	Item	Procedure
	Fuel, Oil, and Coolant Leaks	Check for leaks. Repair as necessary.
	Engine Air Intake Piping and Charge Air Piping	Check proper fitting. Look for leaks. Repair as necessary.
28	Drive Belts	Check tension and condition. Repair as necessary.
	Engine Compartment	Remove combustible materials. Remove all foreign materials.
11	Radiator Sections for Engine Coolant, Charge Air Cooler, Transmission, and Hydraulic Oil	Check and clean when necessary. Check hoses and tube connections for leaks.
See Figure 14 for Item Nos.		

Daily Inspections

HYSTER

Table 13. Daily Inspections - Fluid Level Check

Item No.	Item	Procedure
3	Windshield Washer Fluid	Check level in reservoir. Add if needed.
1	Hydraulic System Oil	Check level indicator. Add hydraulic oil as needed through the hydraulic return filter. John Deere JDM-J20C
8	Engine Oil Level	Maintain level at two-thirds of full range on dipstick when cold. See Table 21 and Table 22.
See Figure 14 for Item Nos.		

Table 14. Daily Inspections − Checks With the Engine Running

Item No.	Item	Procedure
	Seat Belt, Seat Rails, and Steering Column	Check condition and operation. Repair as necessary. See **Parts Manual**.
	Horn, Gauges, Lights, Alarms, and Control System	Visual or audible verification. Repair as necessary.
	Windows and Mirrors	Clean and adjust as necessary.
	Fault Codes	Check fault code warning lights. The display should be free of fault codes. Report any fault to have it diagnosed and repaired.
2	Engine Air Filter	Replace main element when warning light is **ON**. Replace safety element every third time main element is replaced.
22	Fuel Water Separator	Drain water/sediment when the maintenance light is **ON**.
10	Coolant Level	Add coolant when warning light is **ON**. Report loss of coolant. **3174102 - Shell Rotella ELC** **3116456 - Eurol Coolant XL-NM or equivalent**
	Fuel Level	Avoid low fuel level; refuel in time. See Table 21.
See Figure 14 for Item Nos.		

Table 14. Daily Inspections − Checks With the Engine Running (Continued)

Item No.	Item	Procedure
	Control Levers, Switches, and Pedals	Check operation as described in the **Operating Manual**. Repair as necessary.
34	Parking and Service Brakes	Check operation. Repair as necessary.
	Steering System	Check operation. Repair as necessary.
19	Mast, Carriage, and Attachment	Check operation. Repair as necessary.
30	Transmission	Check operation. Repair as necessary.
	Operator Presence System	Check functionality. Repair as necessary.
30	Transmission Oil Level	Add oil if needed. Dexron® III
See Figure 14 for Item Nos.		

Table 15. First Inspection After First 20 Hours of Operation

Item No.	Item	Procedure	Quantity	Specification
	Mast Mounting Bolts	Retorque to 320 N•m (236 lbf ft)	2	Re-torque mast mounting bolts to 320 N•m (236 lbf ft), 20 hours after replacement of a mast, or 20 hours after a mast mounting bolt could be turned at re-tor-queing.

Table 16. First Inspection After First 100 Hours of Operation

Item No.	Item	Procedure	Quantity	Specification
20	Lift Chains	Adjust and lubricate.	2	Lubricate with engine oil. SAE 15W-40 −18 °C (0 °F) and up.
23	Transmission Oil Filter	Change.	1	See **Parts Manual**.
See Figure 14 for Item Nos.				

Table 16. First Inspection After First 100 Hours of Operation (Continued)

Item No.	Item	Procedure	Quantity	Specification
	Fork Guide Bearing Blocks for Dual Function Carriage only.	Check Clearance	2	Check clearance. Re-shim bearing blocks to 0.5mm when clearance exceeds 2mm.
See Figure 14 for Item Nos.				

Table 17. First Inspection After First 250 Hours of Operation

Item No.	Item	Procedure	Quantity	Specification
33	Drive Axle	Adjust wheel bearing Pre-torque		450 N•m (332 lbf ft)
	Drive Axle	Replace oil	20 liter (5.3 gal) + 2.3 liter (0.6 gal) each hub	API-GL-5, MIL-210513, SAE 80W-90
	Steer Wheel Hubs	Replace oil	0.8 liter (27.05 oz)each hub	API-GL-5, MIL-210513, SAE 80W-90
See Figure 14 for Item Nos.				

Table 18. Truck Maintenance Schedule − Inspect and Adjust

Item No.	Item	Interval	Procedure
	Warning and Safety Labels	250 hr/3 mo	Check for presence and readability. Replace if necessary. See **Parts Manual**.
19	Mast, Carriage, Attachment	250 hr/3 mo	Check condition. Repair as necessary.
20	Lift Chains	250 hr/3 mo	Check condition and adjustment. Replace and adjust as necessary. See **Parts Manual**.
	Forks	250 hr/3 mo	Check condition. Replace as necessary. See **Parts Manual**.
18	Tires and Tire Pressure	250 hr/3 mo	Check condition and pressure. See **Nameplate**.
33 12, 16	Wheel Nuts Drive and Steer Wheels	250 hr/3 mo	Check torque. 615 to 710 N•m (453.6 to 523.6 lbf ft)
5	Hydraulic Tank Breather	250 hr/3 mo	Inspect restriction indicator. Replace element when necessary. If equipped, the Filter Monitoring System will indicate that replacement of the element is required. See **Parts Manual**.
	Fuel, Oil, and Coolant Leaks	250 hr/3 mo	Check for leaks. Repair as necessary.
See Figure 14 for Item Nos.			

Table 18. Truck Maintenance Schedule − Inspect and Adjust (Continued)

Item No.	Item	Interval	Procedure
	Engine Air Intake Piping and Charge Air Piping	250 hr/3 mo	Check for wear points, damage, leaks, loose clamps, or loose connections. Repair as necessary.
9	Coolant Hoses	250 hr/3 mo	Inspect for cracks, cuts, and collapsing. Replace as necessary. See **Parts Manual**.
28	Drive Belts	250 hr/3 mo	Check tension and condition. Replace if necessary. See **Parts Manual**.
	Engine Compartment	250 hr/3 mo	Remove combustible materials. Remove all foreign materials.
11	Radiator Sections for Engine Coolant, Charge Air Cooler, Transmission, and Hydraulic Oil	250 hr/3 mo	Check and clean when necessary. Check hoses and tube connections for leaks.
38	Drive Axle and Differential	250 hr/3 mo	Check oil levels. Clean magnetic plugs. API-GL-5 SAE 80W-90
	Steering Wheel Hubs	250 hr/3 mo	Check oil levels and clean magnetic plugs. API-GL-5 SAE 80W-90.
3	Windshield Washer Fluid	250 hr/3 mo	Check level in reservoir. Add when needed.
See Figure 14 for Item Nos.			

Table 18. Truck Maintenance Schedule − Inspect and Adjust (Continued)

Item No.	Item	Interval	Procedure
1	Hydraulic System Oil	250 hr/3 mo	Check level indicator. Add hydraulic oil as needed through the hydraulic return filter. John Deere JDM-J20C
10	Coolant Level	250 hr/3 mo	Inspect level at the expansion tank. If level is below "MIN" mark, inspect for leaks, repair as needed, and add coolant to the "MAX" mark. **3174102 - Shell Rotella ELC** **3116456 - Eurol Coolant XL-NM or equivalent**
8	Engine Oil Level	250 hr/3 mo	Maintain level halfway full range on dipstick when cold. See Table 22.
22	Fuel Water Separator	250 hr/3 mo	Drain water until clean fuel flows from the filter.
30	Transmission Oil Level	250 hr/3 mo	Add oil when needed. Dexron® III
	Seat Belt, Seat Rails, and Steering Column	250 hr/3 mo	Check condition and operation. Repair as necessary.
	Operator Presence System	250 hr/3 mo	Check operation. Repair as necessary.
See Figure 14 for Item Nos.			

Table 18. Truck Maintenance Schedule − Inspect and Adjust (Continued)

Item No.	Item	Interval	Procedure
	Header Hose Assembly	500 hr/6 mo	Check for hose damage, tension, and alignment. Repair as necessary.
4	Cab Air Filter	500 hr/6 mo	Check element. Replace element when necessary. See **Parts Manual**.
11	Cooling Fan	500 hr/6 mo	Check for cracks and damage. Replace if necessary. See **Parts Manual**.
34	Parking Brake and Service Brakes	500 hr/6 mo	Check condition and operation. Repair as necessary.
10	Coolant Quality	1000 hr/6 mo	Check acidity and freezing point. Replace factory filled coolant if pH level is lower than 7.7. **3174102 - Shell Rotella ELC** **3116456 - Eurol Coolant XL-NM or equivalent**
	Fork Guide Bearing Blocks on Dual Function Carriage	1000 hr/6 mo	Check clearance. Re-shim wear blocks to 0.5mm when clearance exceeds 2mm.
28	Fan Belt and Tensioner	2000 hr/12 mo	Check tension and belt condition. Replace if necessary. See **Parts Manual**.
	Turbo Charger	2000 hr/12 mo	Inspect blades. Tighten clamps and hardware.
See Figure 14 for Item Nos.			

Table 18. Truck Maintenance Schedule − Inspect and Adjust (Continued)

Item No.	Item	Interval	Procedure
28	Fan Hub, Belt Hub, and Idler Pulley	2000 hr/12 mo	Inspect for proper rotation. Repair as necessary. See **Parts Manual**.
15	Brake System Accumulator	2000 hr/12 mo	Make sure pre-charge pressure is 9.0 ±1.0 MPa (1305 ±73 psi).
	Lift System Accumulator (Optional)	2000 hr/12 mo	10.00 ± 0.5 MPa (1450 ± 73 psi)at 20 °C (68 °F). Measure pre-charge pressure and correct if necessary.
	Transmission Clutch Calibration	2000 hr/12 mo	Perform clutch calibration.
	Inching Pedal Sensor Calibration	2000 hr/12 mo	Check calibration and adjust if necessary.
14	Crankcase Breather Element	2000 hr/12 mo	Replace when necessary. See **Parts Manual**.
31	Engine and Transmission Mounts	3000 hr/12 mo	Check isolators and hardware. Replace as necessary. See **Parts Manual**.
33	Drive Wheel Hub Bearing Pre-torque	3000 hr/12 mo	Re-torque to 450Nm.
13	Steering Wheel Hub Bearing Pre-torque	3000 hr/12 mo	Re-adjust pre-torque if torque for rotating the wheel hub is below 6Nm.
11	Vibration Damper	3000 hr/12 mo	Inspect marks, check for fluid loss and deformation. Replace as necessary. See **Parts Manual**.
See Figure 14 for Item Nos.			

Table 18. Truck Maintenance Schedule − Inspect and Adjust (Continued)

Item No.	Item	Interval	Procedure
14	Engine Valve Adjustment	5000 hr/3 yr	Check valve clearance. See engine identification plate for valve adjustment.
See Figure 14 for Item Nos.			

Table 19. Truck Maintenance Schedule − Lubricate

Item No.	Item	Interval	Quantity	Specification
20	Lift Chains	250 hr/3 mo	2 Chains	Check condition and adjustment. Lubricate with engine oil. SAE 15W-40.
	Chain Sheave Bearings	250 hr/3 mo	2 Fittings	EP2/3 grease.
35	Mast Pivot Pins	250 hr/3 mo	2 Fittings	Lubricate with EP2/3 grease under no load condition.
17	Tilt Cylinder Pivot Pins	250 hr/3 mo	4 Fittings	EP2/3 grease.
36	Carriage Load Rollers	250 hr/3 mo	4 Fittings	EP2/3 Grease
See Figure 14 for Item Nos.				

Table 19. Truck Maintenance Schedule − Lubricate (Continued)

Item No.	Item	Interval	Quantity	Specification
37	Mast Load Rollers	250 hr/3 mo	4 Fittings	EP2/3 Grease
	Fork Guide Bearing Blocks - Dual Function Carriage	250 hr/3 mo	As Required	Molykote 1122 EM-30L Lubricate Contact Area
	Side Shift Bearing Blocks - Side Shift Carriage	250 hr/3 mo	As Required	Molykote 1122 EM-30L Lubricate Contact Area
	Carriage Pins, Fork Pins and Carriage Sliding Surfaces	250 hr/3 mo	As Required	EP2/3 grease. Lubricate Contact Area
25	Steering Axle Tie Rod Pins	500 hr/6 mo	4 Fittings	EP2/3 grease.
26	King Pins	500 hr/6 mo	4 Fittings	EP2/3 grease.
27	Steering Axle Pivot Bearings	500 hr/6 mo	1 Fitting	EP2/3 Grease
	Operator's Cab Door Hinges	1000 hr/6 mo	4 Fittings	EP2/3 grease.
21	Drive Shaft	2000 hr/12 mo	2 Fittings	EP2/3 grease.
See Figure 14 for Item Nos.				

Table 20. Truck Maintenance Schedule - Change

Item No.	Item	Interval	Quantity	Specification
8	Engine Oil	500 hr/6 mo	18.9 liter (5 gal)	See Table 21 and Table 22
24	Engine Oil Filter	500 hr/6 mo	1	See **Parts Manual**.
22	Fuel Filter and Water Separator	500 hr/6 mo	2	See **Parts Manual**.
29	High Pressure Brake Cooling Filter	1000 hr/1 yr	1	See **Parts Manual**. If equipped, the filter monitoring system will indicate that filter replacement is required.
	ZF Transmission Oil	2000 hr/12 mo	20 liter (5.3 gal)	See **Parts Manual**.
23	ZF Transmission Oil Filter	2000 hr/12 mo	1	See **Parts Manual**.
38	Drive Axle and Differential Oil	3000 hr/12 mo	20 liter (5.3 gal) + 2.3 liter (0.6 gal) each hub	API-GL-5 Mil-2105B SAE 90 Replace oil and clean magnetic plugs.
13	Oil in Steering Wheel Hubs	3000 hr/12 mo	0.8 liter (0.21 gal) each hub	API-GL-5 Mil-2105B SAE 90 Replace oil and clean magnetic plugs.
See Figure 14 for Item Nos.				

Table 20. Truck Maintenance Schedule - Change (Continued)

Item No.	Item	Interval	Quantity	Specification
6	Hydraulic System Oil	3000 hr/3 yr	160 liter (42.2 gal)	JDM-J20C. Replace oil at 3000 hours, or take oil sample at 3000, 4000 and 5000 hours and follow instructions of the Laboratory report. Replace oil not later than 6000 hours.
6	Hydraulic Return Line Oil Filter	3000 hr/3 yr	1	See **Parts Manual**. Replace with each oil change.
	Air Conditioning System	5000 hr/3 yr	1300 ±50 grams (2.87 ±0.11 lb) R134A	Contact certified AC specialist for replacing dryer, lubricant, and refrigerant. See **Parts Manual**.
See Figure 14 for Item Nos.				

Daily Inspections

HYSTER

Table 21. Approved Fuel and Engine Oil

Emission Legislation	WWFC Diesel Fuel	Sulfur Content	ASTM D875 Grade No. 2D	Sulfur Content	Engine Oil		Quantity
Tier 4i Stage IIIB Engines	Category 4	<10 mg/kg	S15	<15 mg/kg	ACEA E9 API CJ-4	QSB6.7 T4	14.5 liter (4.2 gal)

Table 22. Required Engine Oil Viscosity

Ambient Temperature	Viscosity
–15 °C (5 °F) and up	15W-40
–20 °C (–4 °F) to 20 °C (68 °F)	10W-30
Below 0 °C (32 °F)	0W-30

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. Remove the key from the key switch.

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

Warning and 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 locations on the lift truck. See the **Parts Manual** for the correct location of the safety labels.

Tires and Wheels

⚠ WARNING

Air pressure in pneumatic tires can cause tire and wheel parts to explode. The explosion of wheel parts can cause serious injury or death.

Remove all of the air from the tires before the tires are removed from the lift truck.

If the air pressure is less than 80% of the correct air pressure, the tire must be removed before air is added. Put the tire in a safety cage when adding air pressure to the tire. Follow the procedures described in Tires and Wheels.

When air is added to the tires, use a remote air chuck. The person adding air must stand to the side of the safety cage and not in front of it.

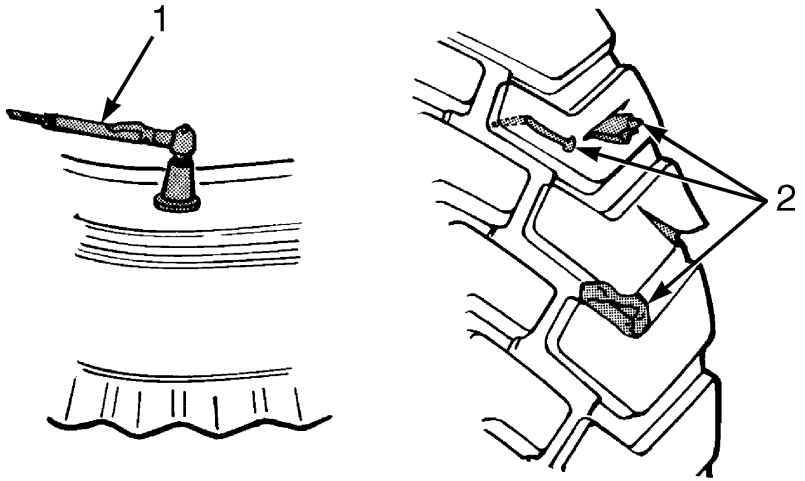
CAUTION

Check all wheel nuts after 2 to 5 hours of operation: when new lift trucks begin operation and on all lift trucks when the drive wheels have been removed and installed. Tighten the nuts in a cross pattern to the correct torque value as shown in Figure 31. When the nuts stay tight for eight hours, the interval for checking the torque can be extended to 250 hours.

Too much nut torque can damage studs, spacer bands, and wheels.

Keep the tires at the correct air pressure. See the Nameplate. Check the air pressure with a gauge when the tires are at ambient temperature. If it is necessary to add air to a tire that is warm, check one of the other tires on the same axle and add air to the tire that has low pressure so that the air pressures are equal. The air pressure of the warm tires must always be equal to or greater than the specification for air pressure for cold tires.

Check the tires for damage. Inspect the tread and remove any objects that will cause damage. Check for bent or damaged rims. Check for loose or missing parts. Remove any wire, straps or other material wrapped around the axle. See Figure 15.



1. CHECK TIRE PRESSURE
2. CHECK FOR DAMAGE

Figure 15. Check the Tires

Inspection of Forks, Mast, and Lift Chains

WARNING

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

Do not try to correct the alignment of the fork tips by bending the forks or adding shims. Replace damaged forks.

⚠ WARNING

Never repair damaged forks by heating or welding. Forks are made of special steel using special procedures. Replace damaged forks.

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

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

3. Inspect the forks for cracks and wear. Check that the fork tips are aligned within 3% of fork length. Check that the bottom of the forks are not worn. See Figure 16.

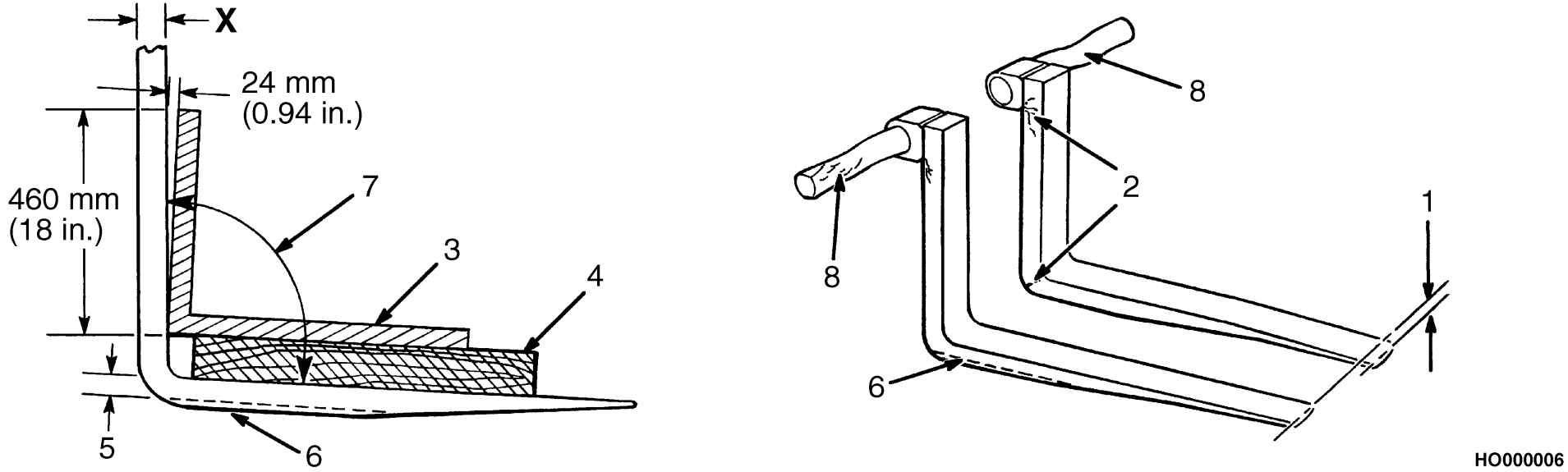


Figure 16. Check the Forks

Legend for Figure 16

Fork Tip Alignment	
Length of Forks	**3% Dimension**
1220 mm (48 in.)	37 mm (1.5 in.)
1830 mm (72 in.)	55 mm (2.2 in.)
2440 mm (96 in.)	74 mm (2.9 in.)

1. TIP ALIGNMENT (MUST BE WITHIN 3% OF FORK LENGTH)
2. CRACKS
3. SQUARE
4. WOOD BLOCK
5. MUST BE 90% OF DIMENSION X
6. FORK WEAR
7. 93° MAXIMUM ANGLE
8. FORK PIN DAMAGE

4. Replace any damaged or broken parts that are used to keep the forks locked in position.

5. Check that the lift chains are correctly lubricated. Use SAE 15W-40 engine oil to lubricate the lift chains.

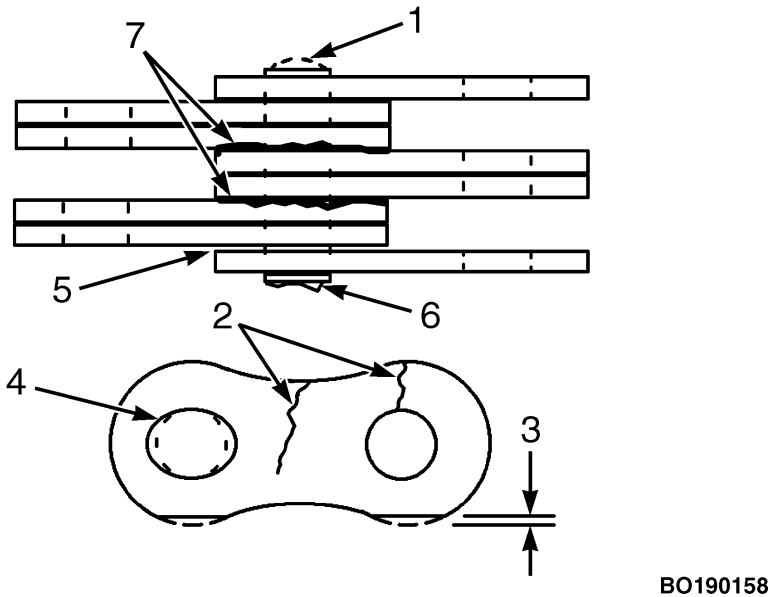
6. If the lift truck is equipped with a sideshift carriage or attachment, inspect parts for cracks and wear. Make sure parts that fasten sideshift carriage or attachment to the carriage are in good condition.

7. Inspect the lift chains for cracks or broken links and pins. Check to see if the pins are in there original position and are not moving out of the lift chains. Replace both lift chains if any of the defects is present as shown in Figure 17.

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

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

10. Re-torque mast mounting bolts to 320 N•m (236 lbf ft), 20 hours after replacement of a mast, or 20 hours after a mast mounting bolt could be turned at re-torqueing.



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

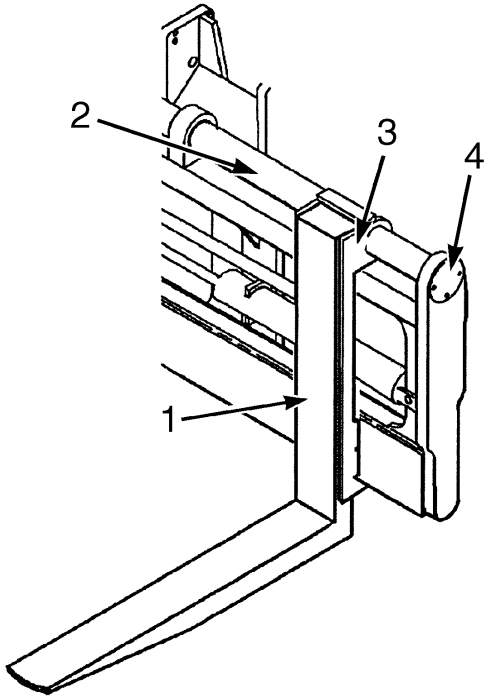
Figure 17. Check Lift Chains

Header Hose Assembly

Visually inspect the header hoses and fittings for leaks, wear, and damage. Check for proper tracking during operation. Check hose cover for cuts, cracks, or exposed reinforcement. Check clamps/sheaves for defective or broken devices or sheaves. Adjust, repair, or replace hoses and/or components as necessary.

Forks, Adjust

The forks are fastened to the carriage with large fork pins. See Figure 18. The position of the forks can be changed manually or hydraulically. To change the position manually, loosen the clampbolts and slide the fork and the clamps into the desired position and tighten the clampbolts to 66 N•m (49 lbf ft).



1. PIN-TYPE FORK
2. FORK PIN
3. FORK GUIDE
4. FORK PIN RETAINER

Figure 18. Forks

Forks, Remove

⚠ WARNING

Do not try to remove a fork without a lifting device. The forks can weigh up to 680 kg (1500 lb) each.

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

A fork can be removed from the carriage for replacement of the fork or other maintenance.

Put the lift truck on a level surface and lower the forks. Tilt the mast so that the forks have stability. Remove the retainers for the fork pins and pull the pins from the carriage. Move the lift truck away from the forks.

Forks, Install

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

Install the forks as follows:

1. Put the forks approximately 1 m (3.3 ft) in front of the carriage.

2. Slowly move the lift truck toward the forks until the fork pins can be installed. Install the forks in the fork guides, then install the fork pins. Install the retainers for the fork pins.

Check for Fuel, Oil, or Coolant Leaks

⚠ 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 fuel, oil, or coolant leaks on and under the lift truck. If possible, find and repair the leak at the source. Leaks often indicate a need for repair of damaged or worn components.

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 and heater hoses. Soft or cracked hoses need to be replaced before a leak occurs.

Engine Air Intake Piping

Inspect the intake piping for wear points and damage to piping, loose clamps, or punctures that can damage the engine. Replace damaged pipes. Tighten clamps to 7 N•m (71 lbf in). See Figure 19.

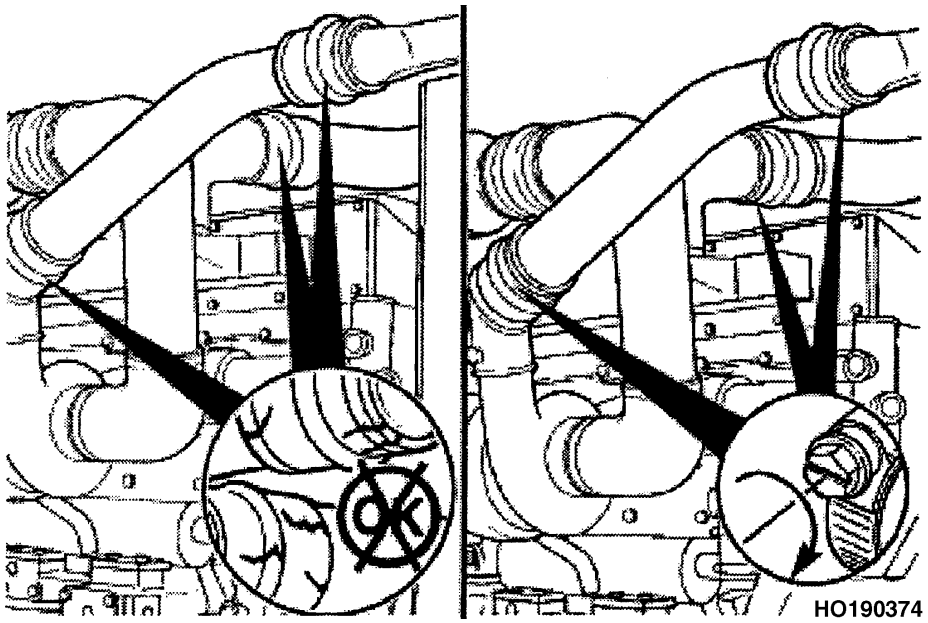
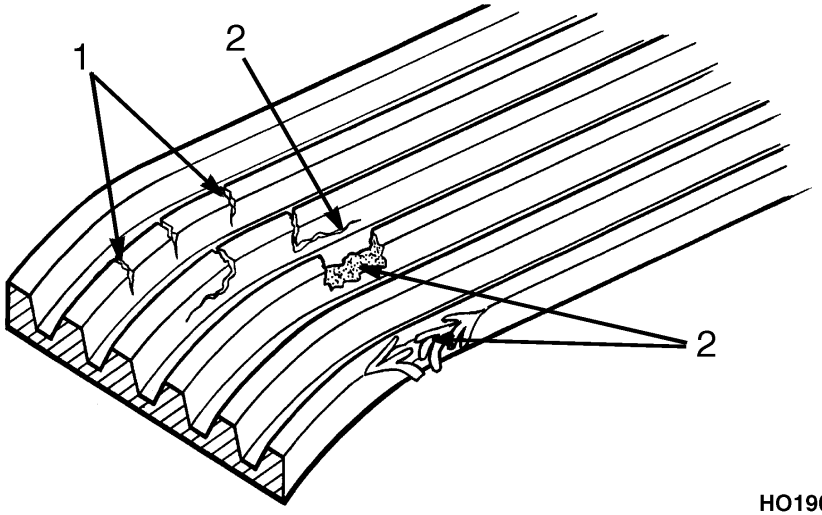


Figure 19. Engine Air Intake Piping

Drive Belts

Check the drive belts for wear and damage. Small cracks that run across the belts are acceptable. Cracks that run the length of the belts or missing pieces of the belts are not acceptable. Replace when necessary. See Figure 20.



1. ACCEPTABLE CRACKS
2. NOT ACCEPTABLE CRACKS AND DAMAGE

Figure 20. Drive Belt

Radiator Sections for Engine Coolant, Charge Air Cooler, and Hydraulic Oil

Clean the radiator with compressed air or water as needed. Be careful not to bend the radiator fins.

Inspect the radiator sections for leakage, loose hose clamps, hose connections, and fin damage.

Replace damaged sections and hoses. Tighten clamps.

Engine Compartment

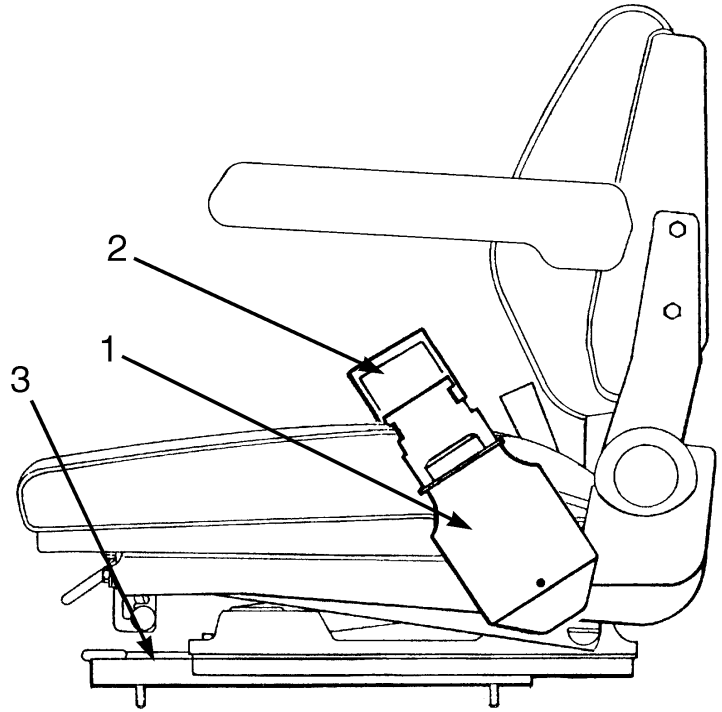
Inspect the engine compartment for any foreign materials and clean the inside of the engine compartment. Pay special attention to remove combustible materials near hot surfaces.

Operator Restraint System (Seat Belt and Seat Rails)

The seat belt, seat, and mounting are all part of the operator restraint system. Each item must be checked to make sure it is attached securely, functions correctly and is in good condition. See Figure 21.

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

The end of the seat belt must fasten correctly in the latch. Make sure the seat belt pulls from the retractor assembly and retracts smoothly. The seat belt must be in good condition. A seat belt that is damaged or torn will not give protection when it is needed. If the seat belt can not be pulled from the retractor assembly, replace the seat belt assembly.



1. SEAT BELT RETRACTOR
2. SEAT BELT LATCH
3. SEAT RAIL

Figure 21. Safety Belt and Seat Rails

Steering Column Latch

Make sure the latch for the steering column operates correctly. The latch must **NOT** allow the column to move unless the latch is released. Repair when necessary.

Hydraulic System Oil

⚠ WARNING

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

⚠ CAUTION

Before removing the hydraulic filter head, thoroughly clean the surrounding area. DO NOT permit dirt to enter the hydraulic system. When adding hydraulic oil to the hydraulic system, ascertain that the oil is clean and without contamination.

Use Hyster approved filters only.

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

⚠ CAUTION

Additives in the hydraulic system oil may damage the hydraulic system. Before using additives, contact your local Hyster dealer.

NOTE: Add hydraulic oil only as needed. Hydraulic oil level is correct when it is in the green area. Add hydraulic oil if the oil level is in the red area. When hydraulic oil level is in the yellow area when the oil is cold, there is a risk that during operation hydraulic oil will leak from the breather. See Figure 22.

Before reading of the hydraulic oil level on the tank gauge make sure of the following:

1. The truck is on a flat and level surface.
2. The hoist cylinders are in lowered position.
3. The engine is shutdown.

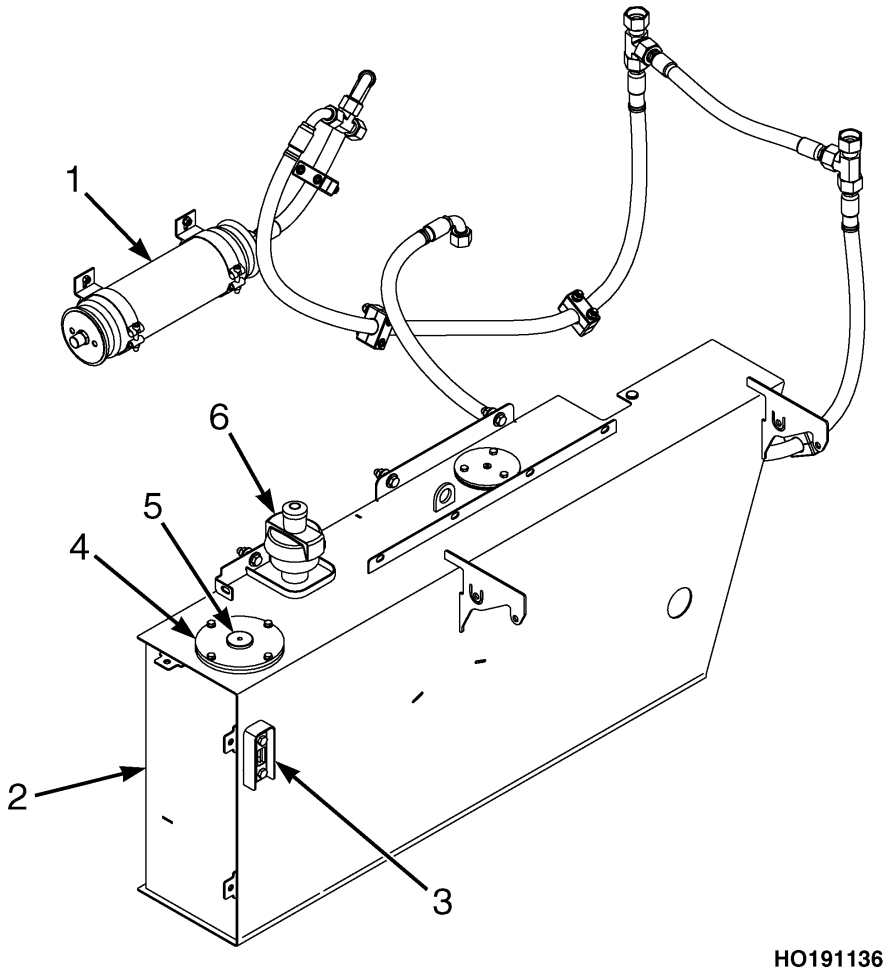


Figure 22. Hydraulic Tank Maintenance Points

Legend for Figure 22

1. ACCUMULATOR (OPTIONAL)
2. HYDRAULIC TANK
3. HYDRAULIC OIL LEVEL GAUGE
4. HYDRAULIC SYSTEM OIL FILTER
5. HYDRAULIC OIL FILL/SOCKET-HEAD SCREW
6. HYDRAULIC TANK BREATHER WITH INDICATOR

To add hydraulic oil, remove the socket-head plug and add hydraulic oil through the opening with the return filter installed. When adding large volumes of oil, use a pump with a filter assembly. The filter assembly should filter to at least 3 microns (0.0001 in.). To insert the filler hose of the pump with the filter assembly into the hydraulic tank, the hydraulic return filter must be removed.

Check the hydraulic system for leaks and damaged or loose components.

Windshield Washer Fluid

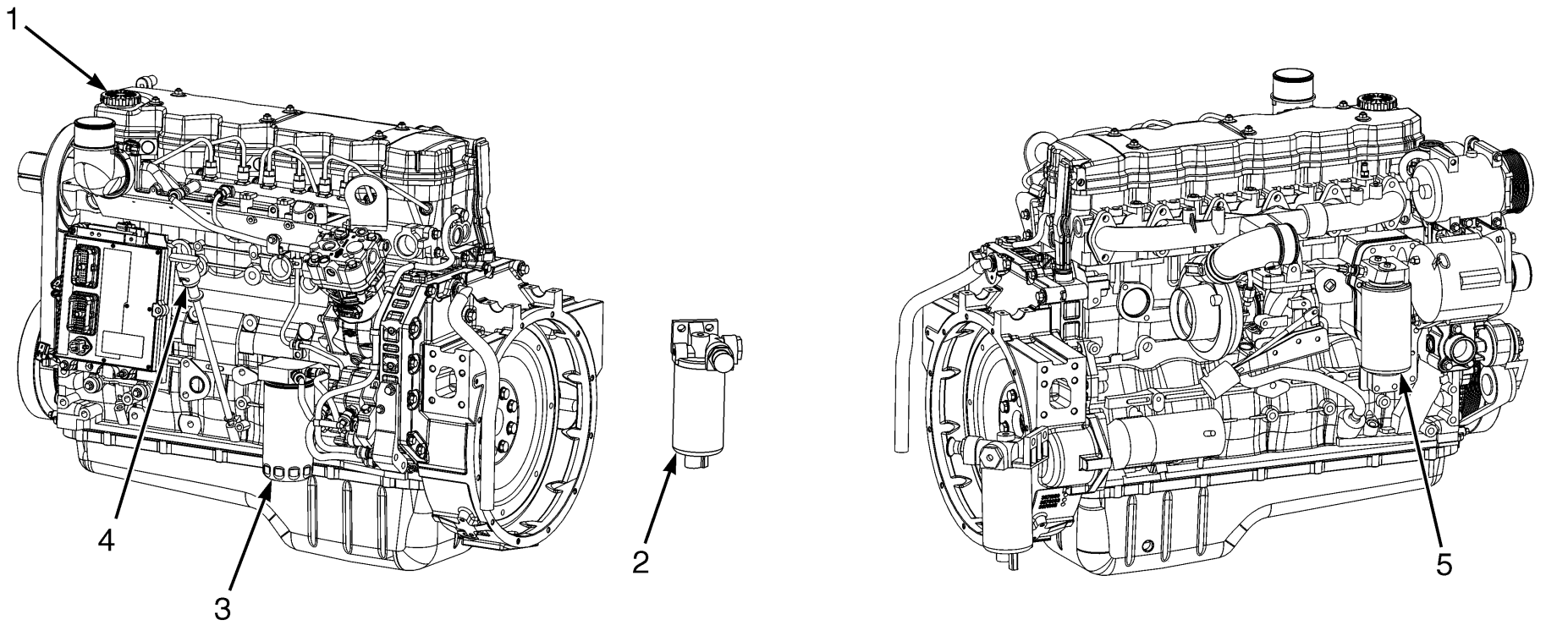
The reservoir is located at the left rear corner of the operators cab. Check level in the reservoir through the three holes in the operators cab frame. Add fluid if needed by using the fill opening located outside the operators cab.

Engine Oil

⚠ WARNING

Long-term exposure to used engine oil can cause skin irritation or cancer. Use caution when checking or adding oil to the engine. If oil comes in contact with skin, wash with detergent and water.

After the engine has stopped, wait one minute before checking the oil level. Keep the oil at the correct level as indicated on the dipstick. See Figure 23 for correct location of the engine oil dipstick. Use the correct oil as shown in Table 21 and Table 22.



1. ENGINE OIL FILL
2. FUEL FILTER/WATER SEPARATOR
3. FUEL FILTER
4. ENGINE OIL DIPSTICK
5. ENGINE OIL FILTER

Figure 23. Cummins Diesel Engine Maintenance Points

How to Make Checks With the Engine Running

⚠ 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.

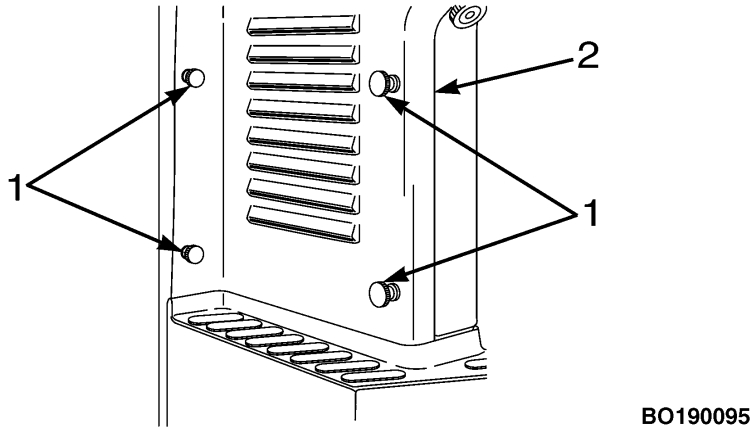
Make sure that the area around the lift truck is clear before starting the engine or making any operational checks. Be careful when making the checks. If the lift truck is stationary during a check, apply the parking brake and put the transmission in **NEUTRAL**. Make the checks carefully.

Gauges, Lights, Horn, Fuses, and Relays

Turn the ignition switch to the **ON** position. Check the lights and gauges for correct operation as described in Table 4. Check the operation of the horn and reverse warning alarm. Check functionality of the different control systems. If any of these components fail, check the fuse that protect the electrical system. Components for main electrical supply are in the engine compartment.

Fuses and relays for the various functions are located behind the cover at the left side of the instrument panel. See Figure 24, Figure 25, and Figure 26. Before replacing a failed fuse or relay, first repair the defect that caused the fuse or relay to fail. Have any failed component replaced.

Start the engine. Check that all warning lights go OFF as they should. Have the batteries checked if these have insufficient power to start the engine.



1. KNURLED KNOBS
2. COVER

Figure 24. Fuse Panel Location

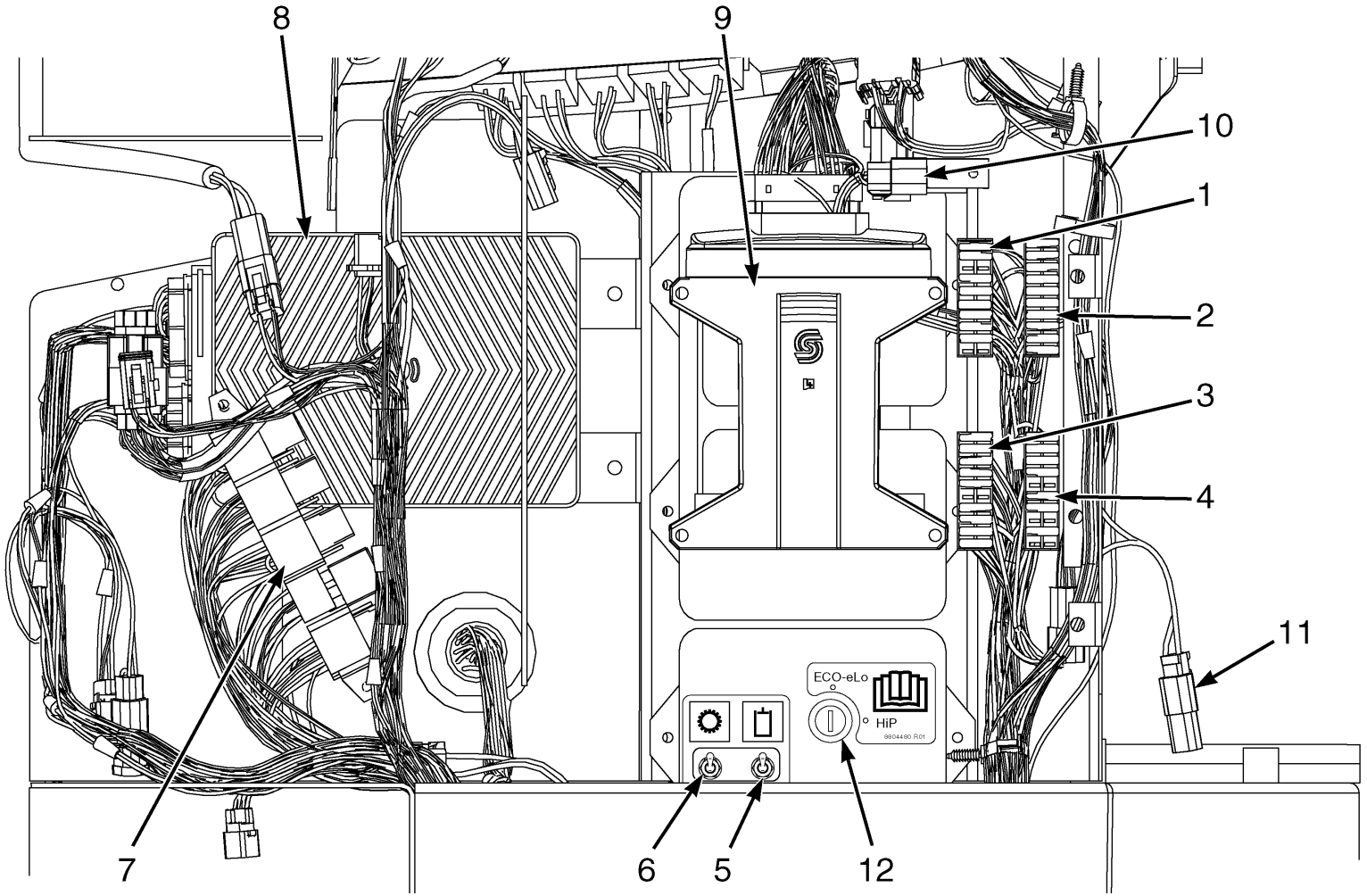


Figure 25. Fuse Panel

Legend for Figure 25

1. FUSE PANEL 1. SEE FUSE LOCATOR 1
2. FUSE PANEL 2. SEE FUSE LOCATOR 2
3. FUSE PANEL 3. SEE FUSE LOCATOR 3
4. FUSE PANEL 4. SEE FUSE LOCATOR 4
5. HYDRAULIC SERVICE SWITCH
6. TRANSMISSION CALIBRATION SWITCH
7. RELAYS. SEE FIGURE 26
8. TRANSMISSION CONTROLLER
9. HYDRAULIC CONTROLLER
10. IFAK CONNECTOR
11. 24 VOLT SERVICE CONNECTOR
12. ECO-ELO HIP SWITCH

FUSE LOCATOR

1. FUSE PANEL #1 LOCATOR

30A	TIER IV ENGINE START
5A	ECM IGNITION
30A	ECM SUPPLY
7.5A	TRANSMISSION
7.5A	TRANSMISSION B+
30A	HYDRAULIC CONTROLLER
15A	ATTACHMENT CONTROLS
5A	PARKING BRAKE SOLENOID
10A	INSTRUMENTATION
5A	OPS SWITCH

2. FUSE PANEL #2 LOCATOR

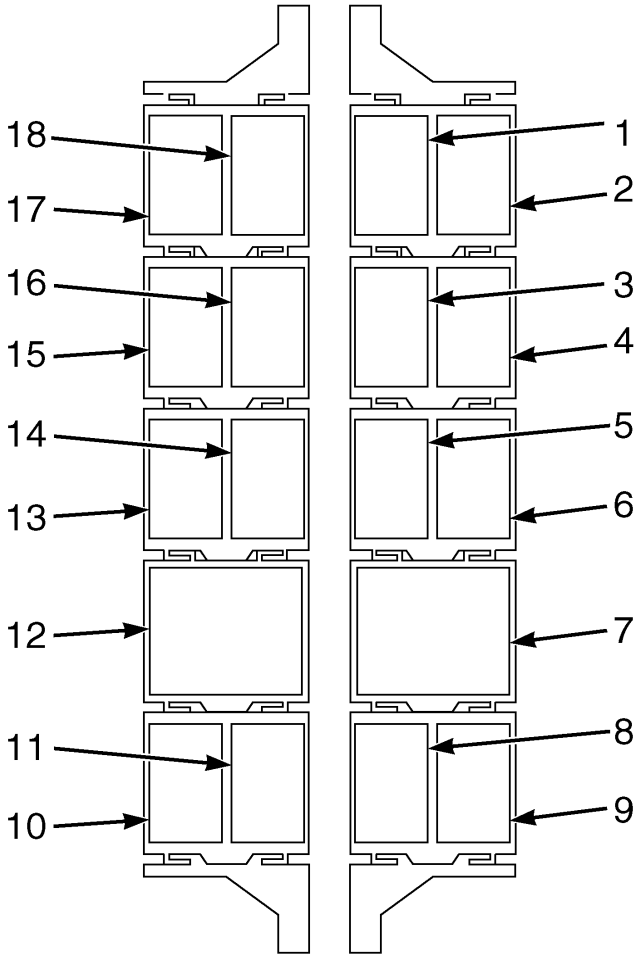
30A	FLOOD LIGHTS
5A	STROBE LIGHT B+
10A	BRAKE LIGHTS
10A	FRONT DRIVE LIGHTS
5A	INTERIOR LIGHTING
15A	MAST/ATTACHMENT LIGHTS
10A	TURN SIGNAL LIGHTS
10A	SIDE/TAIL LIGHTS
10A	REAR DRIVE LIGHTS
10A	REVERSE LIGHT/ALARM AND STROBE

3. FUSE PANEL #3 LOCATOR

10A FRONT SCREEN WASH WIPE
10A ROOF SCREEN WASH WIPE
10A REAR SCREEN WASH WIPE
10A HORN
20A CAB TILT POWER ASSIST
OPEN
15A SEAT SUSPENSION COMPRESSOR
20A HEATER/AC/VENTILATION FAN
15A AC FAN 1
15A AC FAN 2

4. FUSE PANEL #4 LOCATOR

10A POWER SOCKET 12VDC
10A RADIO/CB/INTERCOM
10A CONVERTER FOR ACCESSORIES
10A HAZARD LIGHTS
5A ALTERNATOR ON-SIGNAL
3A 12V RELAY
OPEN
OPEN
15A POWER SOCKET 24VDC
OPEN



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1. FLOOD LIGHTS
2. MAIN LIGHTS
3. START INHIBIT
4. NEUTRAL START INHIBIT
5. HYDRAULIC CONTROLLER
6. REVERSE LIGHTS
7. MAIN POWER
8. AC FAN 3
9. IGNITION
10. AC FAN 2
11. AC FAN 1
12. FLASHER UNIT (OPTIONAL)
13. STARTER ENABLE (TIER IV ONLY)
14. OPEN
15. 12V RELAY
16. OVERRIDE
17. HORN
18. SEAT SWITCH

Figure 26. Cummins Relays (Located Left of the Fuse Panel)

Operator Presence System Disable Switch

The OPS Disable Switch allows operation of hydraulic functions, without an operator being present in the seat for service purposes only. Move the switch to the spanner symbol when operation of hydraulic functions is desired during truck servicing. Do not forget to return the switch to the hydraulic symbol when putting the truck back into service. If the switch is **NOT** returned into its normal position, the OPS will remain disabled.

Transmission Calibration Switch

The Transmission Calibration Switch allows calibration of the transmission by relieving all LS pressure signals to tank. This prevents the hydraulic pumps from interfering with the calibration. Move the switch to the spanner symbol when performing transmission clutch calibration. Always return the switch to the transmission symbol when putting the truck back into service. No hydraulic pressure is available if the switch is **NOT** returned into its normal position.

ECO eLo HiP Switch

The ECO eLo HiP switch switches between HiP (High Performance) and ECO eLo (Fuel Efficiency) operating modes. Insert the key into the switch and select the desired mode by turning the key into position as indicated on the decal.

Fault Codes

When there is an engine, hydraulic or transmission fault, the instrument cluster will display a fault code on the hourmeter/fault code display. The instrument cluster logs the fault code. The engine fault code starts with a "E", hydraulic fault codes start with a"H", and the transmission fault starts with a "t" or a "tE" followed by the warning code. If a fault appears, report this problem immediately. **DO NOT** operate the lift truck until the problem is corrected.

Cooling System

⚠ WARNING

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

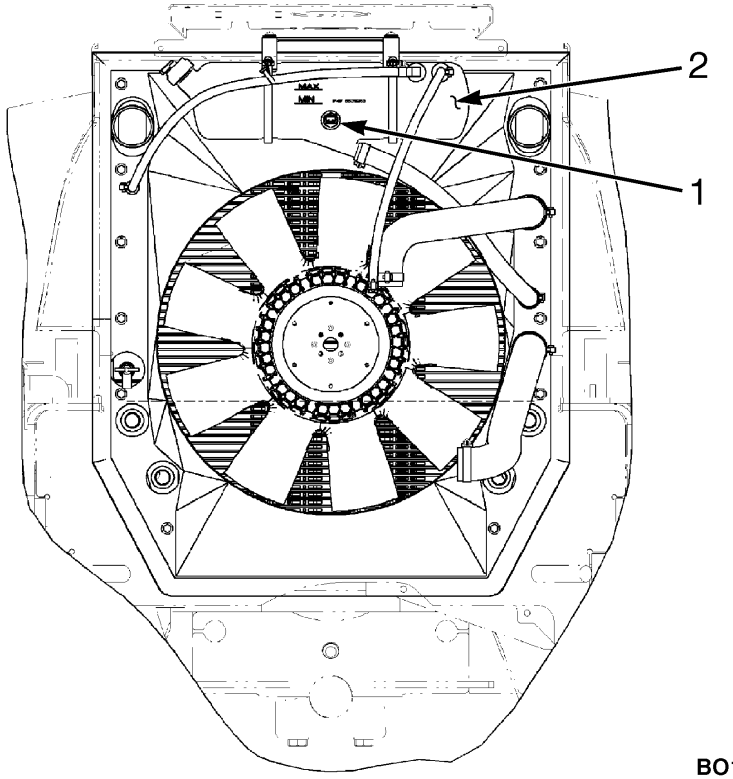
⚠ CAUTION

DO NOT operate the engine when the gauge needle is in the red area.

⚠ CAUTION

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

Add coolant when the coolant level warning light is ON. Before opening the radiator cap, wait until the cooling system is cooled down. If coolant is added, use an OAT (Organic Acid Technology) type coolant. Add coolant to the MAX mark. Report the date and quantity of coolant that has been added. Check the cooling system for leaks if more than 1 liter (1 qt) of coolant must be added per 3000 running hours. For location of filler neck and expansion bottle, see Figure 27.



1. COOLANT LEVEL SWITCH
2. EXPANSION BOTTLE

Figure 27. Cooling System

Diesel Fuel Filter/Water Separator

1. Drain the water from the fuel filter/water separator when the warning light is ON.

2. Open the valve on the bottom of the filter canister. Drain some fuel (and any water) into a cup until clean fuel flows from the filter.

3. Close the valve.

Windows and Mirrors

Clean windows and mirrors and adjust as necessary.

Electrical System

There is a gauge symbol warning light for the electrical system located in the voltmeter gauge. The red gauge symbol light will be **ON** when the key switch is **ON** and the engine is not running. The light must go **OFF** when the engine is running. During normal operation the gauge needle for the voltmeter will be in the green area. When the engine is running for more than 5 minutes and the system voltage is below 22.5 VDC, the gauge symbol light will **FLASH** red. The central warning lights will be **ON** and the buzzer will sound. Shut down the engine and report the problem immediately. **DO NOT** operate the lift truck until the problem is corrected.

Engine Oil Pressure

There is an oil temperature warning light and an oil pressure gauge for the engine. The red light is **ON** when the key switch is in the **START** position and must go **OFF** when the engine is running. During normal operation the needle of the pressure gauge will be approximately in the middle of the scale. When the engine oil pressure is near the critical value, the gauge symbol will **FLASH** red. When the engine oil pressure is critical, the red engine stop light will come **ON**. Engine performance may decrease or the engine may shut down. **Immediately shut down the engine and report the problem. DO NOT** operate the lift truck until the problem is corrected.

Fuel System

⚠ 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.

Check the fuel system for leaks and the condition of parts. When adding fuel to the lift truck, refer to the Table 9 procedures in this **Operating Manual**.

Engine Air Filter

NOTE: When cleaning of the air filter container is not performed, during maintenance and/or when replacing the filter, dirt will gradually build up in the filter housing. This may cause, non-proper functioning of the filter unit. In some cases, when being installed, the filter element can only be forced into place. Over time this may cause the filter housing to crack. Dirt in the unfiltered air can damage the engine.

The orange engine air filter warning light is **ON** when the air filter is dirty or has an obstruction. The central warning lights will also be **ON**.

Replace the main element when the orange warning light is **ON**. Replace the safety element every third time the main element is replaced.

Clean the inside of the housing when changing filters.

Control Levers and Pedals

Check that the control levers for the transmission, mast, carriage and attachment operate as described in Table 9 and Table 11. Check that the pedals operate as described in Table 9.

Steering System

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

Make sure the steering system operates smoothly and has good steering control.

Parking Brake

NOTE: Always apply the parking brake when the truck is parked. A parking brake that is not applied will drain the batteries.

NOTE: The parking brake, when in good condition and correctly adjusted, will hold a lift truck with a capacity load on a 15% grade [a slope that increases 1.5 m in 10 m (1.5 ft in 10 ft)].

Check the operation of the parking brake. The parking brake must apply when the knob for the parking brake is pulled. The parking brake must release when the knob is pushed. On lift trucks with a **MONOTROL** pedal, applying the parking brake puts the transmission in **NEUTRAL**.

Service Brakes

NOTE: Slightly pushing the inching/brake pedal will apply the service brakes, further pushing will fully disengage the transmission.

Check the operation of the service brakes. The service brakes must apply when the service brake pedal or inching/brake pedal is depressed.

Lift System Operation

⚠ WARNING

Lower the lift mechanism completely. Never allow anyone 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 for your lift truck for additional information.

Do not try to locate hydraulic leaks by putting hands on pressurized hydraulic components. Hydraulic oil can be injected into the body by pressure causing injury.

Do the following checks and inspections:

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

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

3. The inner mast and the carriage must extend and lower completely.

4. The inner mast and the carriage must raise and lower smoothly.

5. The mast must tilt smoothly and all tilt cylinders must stop evenly.

6. The sideshift must operate smoothly.

7. Check that the control levers for the attachment operate as described in Table 9. See symbols by each of the controls. Make sure all of the hydraulic lines are connected correctly and do not leak.

Attachments

Check that the controls for the attachment operate the functions of the attachment correctly as described in Table 9. See the symbols by each of the controls. Make sure all of the hydraulic lines are connected correctly and do not leak.

Operator Presence System (OPS)

NOTE: The Operator Presence System (OPS) is designed to function after a slight delay (2.5 seconds) to allow the operator to reposition himself without disengaging the transmission.

The OPS feature has an electrical switch in the seat, which senses the presence of the operator. When the operator is in the seat, the transmission can be engaged and hydraulic functions can be operated. When the operator is absent, the transmission will disengage and hydraulic lift, lower, and tilt functions cannot be operated.

In order to check operation of the OPS, you must raise yourself from the seat for more than 2.5 seconds to make sure that the system will disengage the transmission and the hydraulic functions with the absence of the operator.

- To reset the OPS for the hydraulic functions, the operator must be seated.
- To reset the OPS for the transmission, the operator must be seated and reengage the transmission.

To reengage the transmission, the operator must either:

- Depress the inching brake pedal more than 75%.
- Move the gear selector into the NEUTRAL position and then move the gear selector into travel mode.
- Make a direction change using the MONOTROL® pedal.

Transmission

Inspect for leaks and the condition of the hoses. Make sure the transmission is shifting smoothly. If a problem is present, report this problem immediately. **DO NOT** operate the lift truck until the problem is corrected.

Transmission Oil

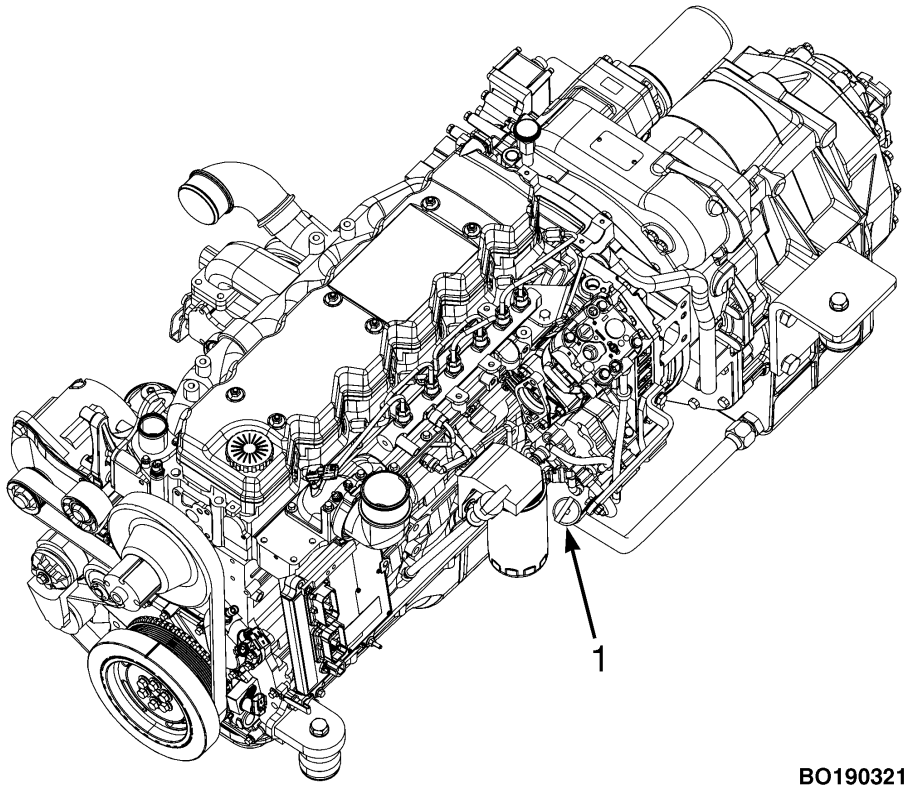
⚠ CAUTION

DO NOT operate the engine when the gauge needle is in the red area.

NOTE: Check with transmission hot.

There is an oil temperature warning light, oil temperature gauge and an oil pressure gauge for the transmission. The red light is **ON** when the key switch is in the **START** position and must go **OFF** when the engine is running. During normal operation the needle of the temperature gauge will be in the green area, the needle of the pressure gauge will be approximately in the middle of the scale.

Apply the parking brake. Check the oil level in the transmission when the engine is running at idle speed and the range selector lever is in the N (**NEUTRAL**) position. The dipstick and fill tube is on the right-hand side of the engine near the fuel filter. Use the correct oil as shown in the **Maintenance Schedule**. Keep the oil level at the FULL mark on the dipstick. See Figure 28.



1. TRANSMISSION DIPSTICK AND FILL TUBE

Figure 28. Transmission Dipstick

How to Add Fuel to the Lift Truck

⚠ WARNING

Stop the engine. Turn the key switch to OFF. The operator must be off of the lift truck while fuel is added.

No smoking.

All fuels for internal combustion engines are very flammable.

Fill the fuel tank only in a designated area with good ventilation. Have a fire extinguisher available.

Never fill the fuel tank near an open flame or near equipment that can create sparks. Never check fuel level or check for leaks with an open flame.

Diesel Fuel

⚠ WARNING

When adding fuel, 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.

⚠ WARNING

Breathing fuel vapor may cause nausea, unconsciousness or death. Long-term exposure to fuel vapors may cause liver or kidney damage and cancer. Avoid breathing vapor.

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. See Table 22 for the required fuel specification. Clean the fuel cap.

2. Install the fuel cap.

Tires and Wheels

⚠ WARNING

The type of tire and tire pressure are shown on the Nameplate. Make sure the Nameplate is correct for the type of tires on the lift truck.

Remove Wheels From the Lift Truck

⚠ WARNING

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

Always wear safety glasses.

⚠ WARNING

Completely remove the air pressure from the tire before it is removed from the lift truck. When dual wheels are installed, remove the air pressure from both tires. Air pressure in the tires can cause the tire and wheel parts to explode causing serious injury or death.

⚠ CAUTION

Lift truck wheels are very heavy, use caution when removing wheels or personal injury may occur.

1. Raise the lift truck as described in**How to Put a Lift Truck on Blocks** in this manual.

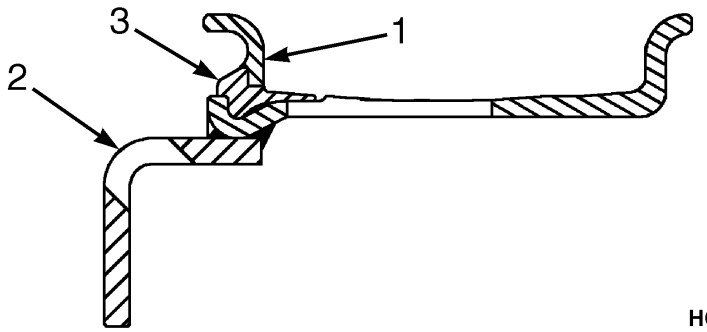
2. Remove the air from the tire. Remove the valve core to make sure that all of the air is out of the inner tube. Push a wire through the valve stem to make sure that the valve stem does NOT have a restriction. When dual tires are installed, remove the air pressure from both tires.

⚠ WARNING

Lift truck wheels are heavy and can cause personal injury.

3. Remove the wheel nuts and remove the wheel from the lift truck. Be careful NOT to damage the studs when removing the wheels.

Remove Tire From the Wheel



1. SIDE RING
2. WHEEL RIM FOR PNEUMATIC TIRE
3. LOCK RING

Figure 29. Types of Wheels

⚠ WARNING

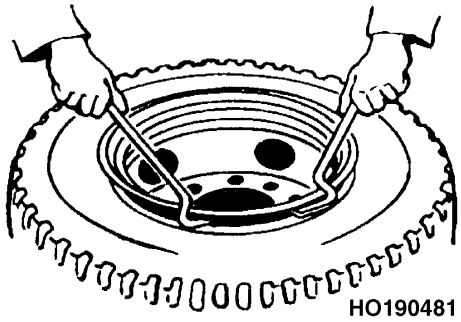
Completely remove the air pressure from the tire before it is removed from the lift truck. If dual wheels are installed, remove the air from both tires. Air pressure in the tires can cause the tire and rim to explode causing serious injury or death.

⚠ WARNING

Keep tire tools in firm contact with the wheel parts. If the tool slips, it can move with enough force to cause serious injury. See Tire Removal From the Wheel.

Tire Removal From the Wheel

1. Loosen the tire bead from the side ring and/or lock ring.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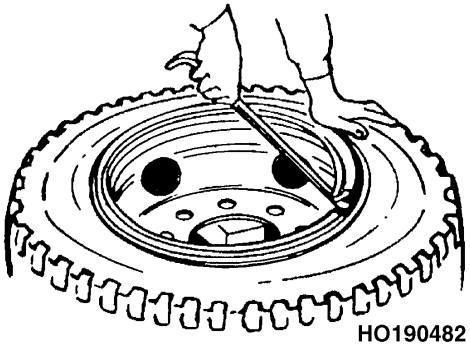
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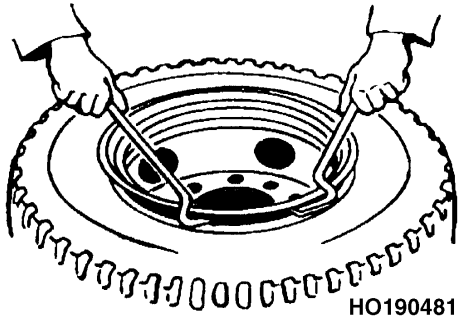
2. Put the tire tool into the slot between the side ring and/or lock ring and the wheel rim. Remove the side ring and/or lock ring.

3. Turn the tire over. Separate the tire from the wheel rim.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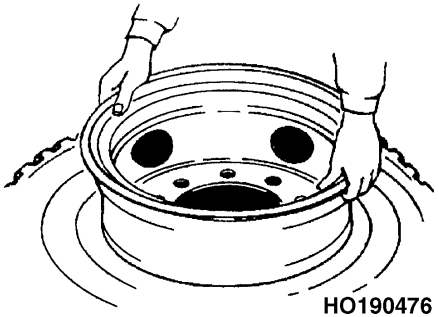
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4. Remove the wheel rim from the tire. Remove the inner tube and flap.

Install Tire on the Wheel

NOTE: There are two types of wheels used on this series of lift trucks. If pneumatic shaped solid rubber tires are installed, the four-piece wheel assemblies must be used. If pneumatic tires are installed, the three-piece wheel assemblies must be used. See Figure 29.

⚠ WARNING

Failure to follow the procedures can cause the wheel assembly to explode and cause injury or death.

Clean and inspect all parts of the wheel before installing the tire. DO NOT use any damaged or repaired wheel parts. Wheels that have been repaired can explode when air pressure is added to the tire or during operation. 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 types of tires, types of tire 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 must be 2.5 to 6.5 mm (0.098 to 0.256 in.) after air pressure is added to the tire. If the clearance is wrong, the wrong part has been used.

1. Clean and inspect all parts of the wheel. If the wheel has rust or corrosion, remove loose rust and corrosion and paint the parts.

2. Install a new inner tube and flap in the tire. Used tubes and flaps can cause tire failure. Some inner tubes also require a backup washer on the valve stem. See **Tire Installation on the Wheel**.

⚠ WARNING

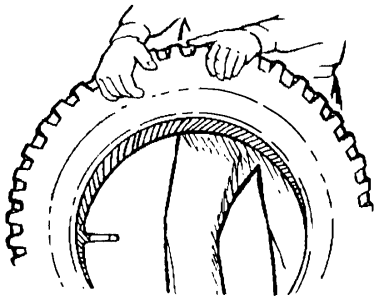
DO NOT lubricate the tire bead with antifreeze or petroleum-based liquid. Vapors from these liquids can cause an explosion when air pressure is added or when the tire is in use.

3. Apply a rubber lubricant or a soap solution to the tire bead and tube.

4. Make sure that the wheel is the correct size for the tire. Lubricate the part of the wheel that is in contact with the bead and flap.

Tire Installation on the Wheel

1. Install the inner tube and the flap in the tire.



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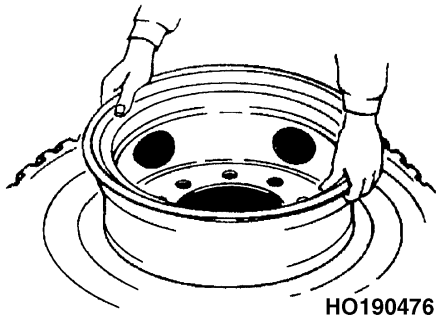
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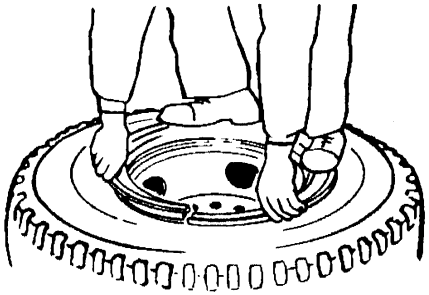
2. Install the wheel rim in the tire. Make sure the stem of the inner tube is aligned with the slot in the rim.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3. Turn over the rim and tire. Put a block under the rim so that the rim is 8 to 10 cm (3.15 to 3.94 in.) above the floor. Install the side ring and/or the lock ring. When correctly installed, there will be a 2.5 to 6.5 mm (0.098 to 0.256 in.) clearance between the ends of the side ring and/or the lock ring.

⚠ WARNING

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

Add Air to the Tires

⚠ WARNING

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

DO NOT sit or stand by the safety cage. DO NOT use a hammer to try and correct the position of the side ring and/or lock ring when the tire has air pressure greater than 20 kPa (2.9 psi).

1. Put the tire in a safety cage. See Figure 30.

2. Add 20 kPa (2.9 psi) of air pressure to the tire.

3. Check that all wheel parts are correctly installed. Hit the side ring and/or lock ring lightly to make sure that it is in the seat.

4. If installation is correct, add air pressure to the tire. The correct pressure is shown on the Nameplate.

5. Check that all wheel parts are correctly installed. If installation is NOT correct, remove all of the air pressure from the tire. Remove the valve core to make sure all of the air pressure has been removed and make adjustments. The clearance at the ends of the side ring and/or lock ring will be 2.5 to 6.5 mm (0.098 to 0.255 in.) when the tire has the correct air pressure.

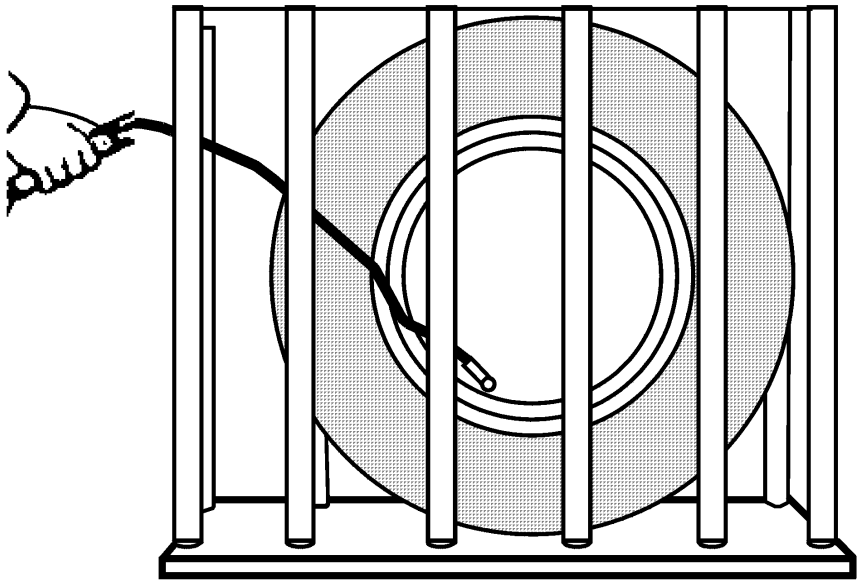

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Figure 30. Add Air to the Tires

Install the Wheels

⚠ CAUTION

Check all wheel nuts after 2 to 5 hours of operation: when new lift trucks begin operation and on all lift trucks when wheels have been removed and installed. Tighten the nuts in a cross pattern to the correct torque value shown in Figure 31. When the nuts stay tight for 8 hours, the interval for checking the torque can be extended to 250 hours.

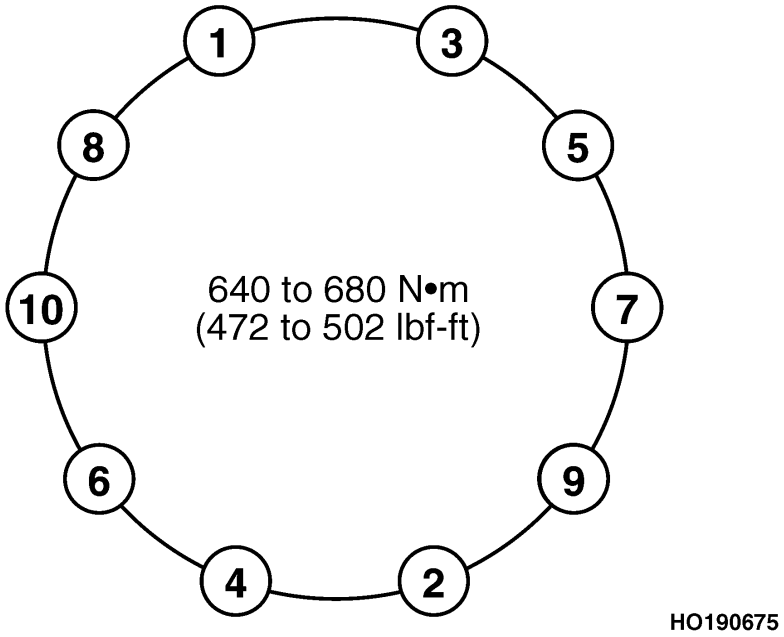

Figure 31. Wheel Nut Tightening Sequence

1. Install the wheel on the hub. When dual wheels are used, install the inner wheel so that it is tight against the brake drum (dry brakes) or the planetary housing (wet brakes). Install the outer wheel. Be careful NOT to damage the threads on the studs.

2. Start with the wheel nut at the top and tighten the nuts to 68 to 136 N•m (50 to 100 lbf ft) in the sequence shown in Figure 31. Check to make sure that the wheel(s) is tight against the hub, then tighten the nuts to 615 to 710 N•m (454 to 524 lbf ft).

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 contaminates. 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.

- 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. Change engine oil. 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 downhill 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 tire pressure, if applicable. Make sure the tires 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.

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.

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 °C (18 °F). A fully-charged battery with a specific gravity of 1.280 will freeze at −66 °C (87 °F).

This "self-discharge" 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.

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, or perform oil analysis to determine condition of lubricant and replace, if necessary. 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 **Recommended Schedule of Maintenance.**

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.

WARNING

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 the lift truck is moved on transport, check the selected route to make sure there is enough clearance for the lift truck as loaded on the transport vehicle. Bridges, overpasses, power lines, and natural barriers can prevent clearance. Removal of the mast can be necessary.

If a trailer is the method of transportation, use blocks in front and back of the trailer tires to prevent movement of the trailer when the lift truck is loaded and unloaded. If a loading ramp is used, make sure that the ramp is the correct design and capacity.

A crane can only be used to load or unload the lift truck if the lift truck is equipped with lifting eyes. Otherwise, the lift truck must be driven on or off the transport.

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 or 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 powershift transmission in **NEUTRAL** (N). If the lift truck has a manual transmission, leave the gears of the transmission engaged. DO NOT leave a manual transmission in **NEUTRAL** (N).

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

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

6. 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

When the lift truck is to be unloaded from the transport, perform the following operations:

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. If the lift truck is equipped with lifting eyes and a crane is to be used to unload, check that all switches and accessories are turned **OFF**.

6. If lift truck is to be driven off transport, follow starting procedures.

7. Unload the lift truck.

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 percent of the truck capacity, a simulated work condition must be used during the first 4 hours of operation. Operate the lift truck with a minimum load of 75 percent 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.

4. Have your dealer perform the necessary checks and adjustments on the engine.

Maintenance Register

Protect your investment in materials handling equipment! Keep a high-residual value in your **Hyster** lift truck! Do the maintenance according to the **Maintenance Schedule** in this **Operating Manual**.

Your dealer for **Hyster** lift trucks has the equipment and trained service personnel to do a complete program of inspection, lubrication, and maintenance.

This **Maintenance Register** is used to record the time of each periodic inspection and maintenance. The dealer's stamp or authorized signature confirms that maintenance and inspection was done at regular intervals by authorized personnel.

1. Operating Hours _____ Date _____	2. Operating Hours _____ Date _____	3. Operating Hours _____ Date _____	4. Operating Hours _____ Date _____
5. Operating Hours _____ Date _____	6. Operating Hours _____ Date _____	7. Operating Hours _____ Date _____	8. Operating Hours _____ Date _____
9. Operating Hours _____ Date _____	10. Operating Hours _____ Date _____	11. Operating Hours _____ Date _____	12. Operating Hours _____ Date _____
13. Operating Hours _____ Date _____	14. Operating Hours _____ Date _____	15. Operating Hours _____ Date _____	16. Operating Hours _____ Date _____

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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 _____

NOTES

NO MATTER HOW YOU SAY IT . . .

La Sécurité Ça Se Paye
La Seguridad Compensa
Betriebssicherheit Macht Sich Bezahlt
Passaa Oll Huolellinen
Veiligheid Voor Alles
Säkerhet Först
Essere Sicuro Paga
Seguranca Paga
Sikkerhet Først
Pinter Be Awas

सावधान और जिन्दा रहो !

في التأني السلامة

安全第一

SAFETY PAYS!

OPERATING MANUAL

Challenger

H16XM-9, H16XM-12, H18XM-7.5, H18XM-9 (A238)

DO NOT REMOVE THIS MANUAL FROM THIS UNIT

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