

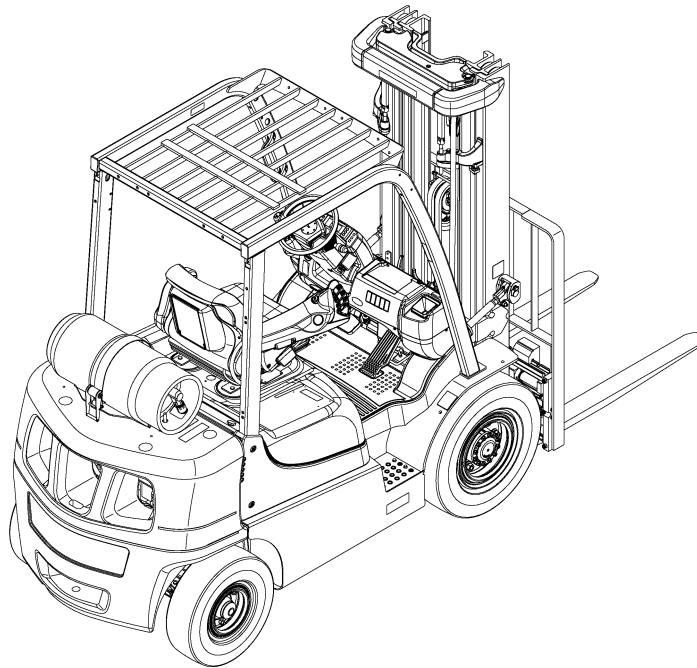


**Maintenance**

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# **PERIODIC MAINTENANCE**

**GP20-30MX [A390]**



# SAFETY PRECAUTIONS

## MAINTENANCE AND REPAIR

- The Service Manuals are updated on a regular basis, but may not reflect recent design changes to the product. Updated technical service information may be available from your local authorized Yale® dealer. Service Manuals provide general guidelines for maintenance and service and are intended for use by trained and experienced technicians. Failure to properly maintain equipment or to follow instructions contained in the Service Manual could result in damage to the products, personal injury, property damage or death.
- When lifting parts or assemblies, make sure all slings, chains, or cables are correctly fastened, and that the load being lifted is balanced. Make sure the crane, cables, and chains have the capacity to support the weight of the load.
- Do not lift heavy parts by hand, use a lifting mechanism.
- Wear safety glasses.
- DISCONNECT THE BATTERY CONNECTOR before doing any maintenance or repair on electric lift trucks. Disconnect the battery ground cable on internal combustion lift trucks.
- Always use correct blocks to prevent the unit from rolling or falling. See HOW TO PUT THE LIFT TRUCK ON BLOCKS in the **Operating Manual** or the **Periodic Maintenance** section.
- Keep the unit clean and the working area clean and orderly.
- Use the correct tools for the job.
- Keep the tools clean and in good condition.
- Always use **YALE APPROVED** parts when making repairs. Replacement parts must meet or exceed the specifications of the original equipment manufacturer.
- Make sure all nuts, bolts, snap rings, and other fastening devices are removed before using force to remove parts.
- Always fasten a DO NOT OPERATE tag to the controls of the unit when making repairs, or if the unit needs repairs.
- Be sure to follow the **WARNING** and **CAUTION** notes in the instructions.
- Gasoline, Liquid Petroleum Gas (LPG), Compressed Natural Gas (CNG), and Diesel fuel are flammable. Be sure to follow the necessary safety precautions when handling these fuels and when working on these fuel systems.
- Batteries generate flammable gas when they are being charged. Keep fire and sparks away from the area. Make sure the area is well ventilated.

**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 and word are on orange background. The **CAUTION** symbol and word are on yellow background.

## TABLE OF CONTENTS

General.....	1
Serial Number Data.....	1
How to Move Disabled Lift Truck.....	1
How to Tow Lift Truck.....	1
How to Put Lift Truck on Blocks.....	2
How to Raise Drive Tires.....	2
How to Raise Steering Tires.....	2
How to Clean a Lift Truck.....	3
Maintenance Schedule.....	4
Maintenance Procedures Every 8 Hours or Daily.....	16
How to Make Checks With Engine Stopped.....	16
Tires and Wheels.....	16
Safety Labels.....	16
Mast, Carriage, Lift Chains, Header Hoses, Attachment.....	16
Operator Restraint System.....	17
Emergency Locking Retractor (ELR).....	18
Adjust Seat - Semi-Suspension.....	19
Adjust Seat - Premium Full Suspension.....	19
Adjust Seat - Standard Full Suspension.....	19
Hood and Seat Latches.....	20
Engine Compartment.....	21
Fuel, Oil, and Coolant Leaks, Check.....	21
Hydraulic Hoses.....	21
Coolant Hoses.....	21
Steering Column.....	21
Transmission.....	21
Hydraulic System Oil.....	21
Engine Oil.....	22
Air Filter.....	24
Forks.....	24
Remove.....	24
Inspect.....	26
Install.....	27
Adjust.....	27
Brake Fluid.....	28
How to Make Checks With Engine Running.....	28
Indicator Lights, Horn, Fuses, and Relays.....	29
Service Brakes.....	30
Operation, Check.....	30
Parking Brake.....	30
Engine Oil Pressure.....	31
Cooling System.....	31
Steering System.....	32
Control Levers and Pedals.....	32
Lift System, Operate.....	32
First Service After First 100 Hours of Operation.....	33
PSI Engine Oil and Oil Filter.....	33
Yanmar Engine Oil and Oil Filter.....	34
Maintenance Procedures Every 300 Hours.....	34
Tie Rod Lubrication.....	34
King Pin Lubrication.....	34
Maintenance Procedures Every 500 Hours or 1 Year.....	35

**TABLE OF CONTENTS (Continued)**

Hydraulic System Oil.....	35
Battery.....	36
Yanmar Engine Oil and Oil Filter Change.....	36
Drive Belt.....	36
Yanmar Diesel Engine.....	36
Fan and Alternator Drive Belt.....	36
Clean Debris From Radiator Core.....	37
Transmission Oil Level.....	38
Forks.....	38
Mast Lubrication.....	39
Header Hose Checks.....	41
Lift Chain Lubrication.....	41
Tilt Cylinder Lubrication.....	41
Master Brake Cylinder Rod End Pin Lubrication.....	43
Manual Hydraulic Levers Lubrication.....	43
Brake Fluid.....	43
Differential and Drive Axle Oil.....	44
Maintenance Procedures Every 1000 Hours or 1 Year.....	45
Valve Clearance, Check and Adjust, Yanmar Engines.....	45
PCV Valve, PSI Engines.....	45
Drive Belt Check, PSI Engines.....	45
LPG Fuel Filter Replace, PSI Engines.....	45
Remove.....	45
Clean/Inspect.....	46
Install.....	46
Gasoline Fuel System, PSI 2.4L Bi-Fuel Engine.....	47
Remove and Disassemble.....	47
Assembly and Install.....	51
Fuel Filter Replacement, Yanmar Engines.....	52
Priming the Fuel System, Yanmar.....	53
Ignition System.....	54
PSI 2.4L Engines.....	54
Lift Chains Wear Check.....	54
Lift Chain Lubrication.....	54
Integral Sideshift Carriage, Check Bearings.....	55
Integral Sideshift Carriage, Check Lower Mounting Hooks.....	55
Control Levers, Pedals, and Parking Brake.....	56
Maintenance Procedures Every 2000 Hours or 1 Year.....	56
Hydraulic System.....	56
Return Filter, Replace.....	56
Air Filter Element, Replace.....	58
Air Filter Without Silencer.....	58
Air Filter With Silencer.....	59
PCV Valve.....	61
PSI LPG and Bi-Fuel Engines.....	61
Oxygen Sensor.....	61
Fuel Injector, Yanmar Engines.....	61
Forks, Inspect.....	62
Integral Sideshift Carriage.....	62
Bearings, Replace.....	62
Service Brakes (Dry Brake).....	62
Differential.....	63

## TABLE OF CONTENTS (Continued)

Transmission Oil and Filter, Replace.....	64
Brake Fluid Change, Master Cylinder.....	65
Brake Fluid, Remove.....	65
Maintenance Procedures Every 4000 Hours or 2 Years.....	66
Hydraulic Oil, Replace.....	66
Cooling System.....	67
Replace Throttle (Accelerator) Cable, Yanmar Diesel Engine.....	68
Maintenance Procedures Every 5000 Hours.....	68
Fuel Injectors, PSI Engine.....	68
Maintenance Procedures Every 6000 Hours.....	69
Timing Belt Change, PSI Engine.....	69
Safety Procedures When Working Near Mast.....	69
Hood Lock Assembly Check.....	70
Lift Chain Adjustments.....	72
Lift Trucks Equipped With Forks.....	72
Lift Trucks Equipped with Hook-Type Carriage and Attachment Without Forks.....	72
Jump-Starting the Lift Truck.....	73
Jump-Starting Using a Battery Charger.....	73
Jump-Starting a Lift Truck Using Another Lift Truck.....	73
Welding Repairs.....	74
Wheel and Tire Replacement.....	74
General.....	74
Pneumatic Tire With Tube, Repair.....	74
Remove Wheels From Lift Truck.....	74
Remove Tire From Wheel.....	75
Remove Tire From Two-Piece Wheel.....	75
Remove Tire From Three- and Four-Piece Wheels.....	76
Install Wheel in Tire.....	77
Install Three-Piece or Four-Piece Wheel in Tire.....	78
Install Tire on Two-Piece Wheel.....	79
Install Two-Piece Wheel in Tire.....	80
Add Air to Pneumatic Tires With Tube.....	80
Install the Wheels.....	81
Pneumatic Tubeless Tire, Repair.....	81
Remove Wheels From Lift Truck.....	81
Remove Tire From Wheel.....	82
Install Tire on Wheel.....	83
Add Air to Pneumatic Tubeless Tire.....	86
Wheels, Install.....	87
Solid Rubber Tires on Pneumatic Wheels, Change.....	87
Remove Tire From Wheel.....	87
Install Tire on Wheel.....	89
Snap-On-Tire, Change.....	91
Easy Mounting Style Solid Rubber Tires on Pneumatic Wheels, Change.....	91
Remove Easy Mounting Tire From Wheel.....	92
Install Easy Mounting Tire on Wheel.....	94
Overhead Guard Changes.....	97
Adhesives and Sealants.....	97

**Yale**<sup>®</sup> 

## General



### WARNING

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



### 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.



### CAUTION

Disposal of lubricants and fluids must meet local environmental regulations.

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

The Maintenance Schedule has time intervals for inspection, lubrication, and maintenance of your lift truck. Service intervals are provided in both operating hours recorded on lift truck hourmeter and in calendar time. Recommendation is to use the interval that comes first.

Recommendations for time intervals provided is for eight hours of operation per day. Time intervals must be decreased from recommendations in Maintenance Schedule for the following conditions:

- Lift truck is used more than eight hours per day.
- Lift truck must work in dirty operating conditions.
- Poor ground conditions.
- Intensive usage at high performance levels or other abnormal conditions will require more frequent servicing.

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

Some users have service personnel and equipment to do inspection, lubrication, and maintenance shown in Maintenance Schedule. Service manuals are available

from your dealer for Yale lift trucks to help users who do their own maintenance.

### SERIAL NUMBER DATA

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

### HOW TO MOVE DISABLED LIFT TRUCK

#### How to Tow 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 stop. If the lift truck uses power from the engine to help apply the brakes, the application of the brakes will be more difficult. Poor traction can cause the disabled lift truck or towing vehicle to slide. A slope will also make the lift truck more difficult to stop.

**Never lift and move a disabled lift truck unless the disabled lift truck MUST be moved and cannot be towed. A lift truck used to move a disabled lift truck MUST have a capacity rating equal to or greater than the weight of the disabled lift truck. The capacity of the lift truck used to move a disabled lift truck must have a load center equal to half the width of the disabled lift truck. See the Nameplate of the disabled lift truck for the approximate total weight. The forks must extend the full width of the disabled lift truck. Put the weight center of the disabled lift truck on load center of the forks. Be careful to not damage the underside of the lift truck.**

1. The towed lift truck must have an operator.
2. Tow truck slowly.

3. Using a lift truck or a lifting device that could be attached to mast (I.E. come-a-long), raise carriage and forks approximately 30 cm (12 in.) from surface. Install chain around a mast crossmember and carriage to prevent carriage and mast channels from moving.
4. If another lift truck is used to tow the disabled lift truck, that lift truck must have an equal or larger capacity than the disabled lift truck. Install approximately ½ of a capacity load on forks of lift truck that is being used to tow disabled lift truck. This ½ capacity load will increase traction of lift truck. Keep load as low as possible.
5. Use a towing link made of steel that fastens to tow pins in counterweights of both lift trucks.

## HOW TO PUT LIFT TRUCK ON BLOCKS

### How to Raise Drive Tires



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

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

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



#### CAUTION

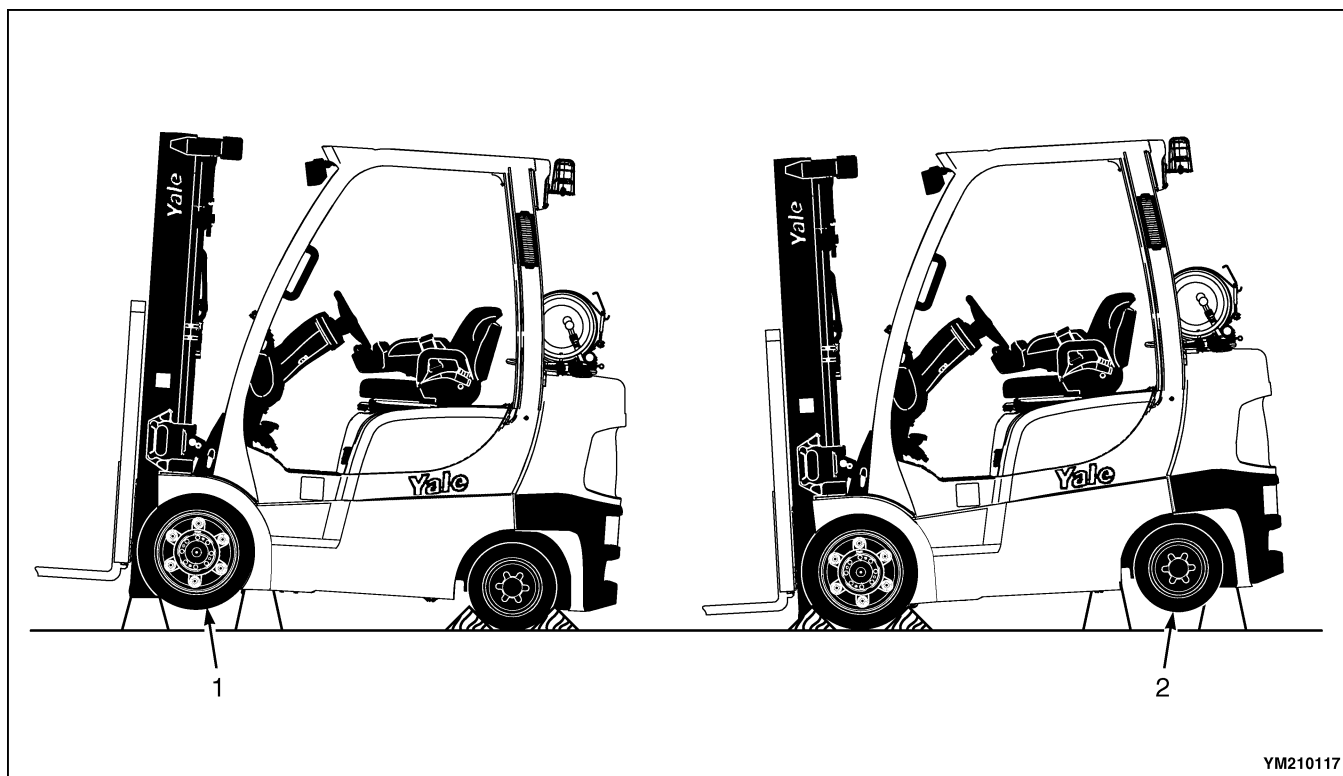
**These lift trucks are equipped with cowl lifting eyes. The cowl lifting eyes are to be used to lift the front of the lift truck only. Lifting more than the front of the lift truck with the cowl lifting eyes will damage the cowl section.**

1. Put blocks on each side (front and back) of steering tires to prevent movement of lift truck. See Figure 1.
2. Put mast in vertical position. Put a block under each outer mast channel.
3. Tilt mast fully forward until drive tires are raised from surface.
4. Put additional blocks under frame behind drive tires.
5. If hydraulic system will not operate, use a hydraulic jack under the side of the frame near the front. Make sure jack has a capacity equal to at least half the weight of the lift truck. See Nameplate.

### How to Raise Steering Tires

1. Apply parking brake. Put blocks on both sides (front and back) of drive tires to prevent movement of lift truck. See Figure 1.
2. Use hydraulic jack to raise steering tires. Make sure jack has a capacity of at least 2/3 of total weight of lift truck as shown on the Nameplate.
3. Put jack under steering axle or frame to raise lift truck. Put blocks under frame to support lift truck.





1. DRIVE TIRES

2. STEERING TIRES

**Figure 1. Put Lift Truck on Blocks****HOW TO CLEAN A LIFT TRUCK****WARNING**

Engine, exhaust system components and other components are hot to the touch. Be sure lift truck components are cool before starting inspection and cleaning, or personal injury may occur.

**WARNING**

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

**CAUTION**

Units 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.

**NOTE:** Lift trucks used in paper applications may need cleaning beyond what is described here. Please refer to Paper Application section in the applicable **Operating Manual** and to available Service Gram/Bulletin for more detail.

If it becomes necessary to clean the fork lift, follow the guidelines listed below.

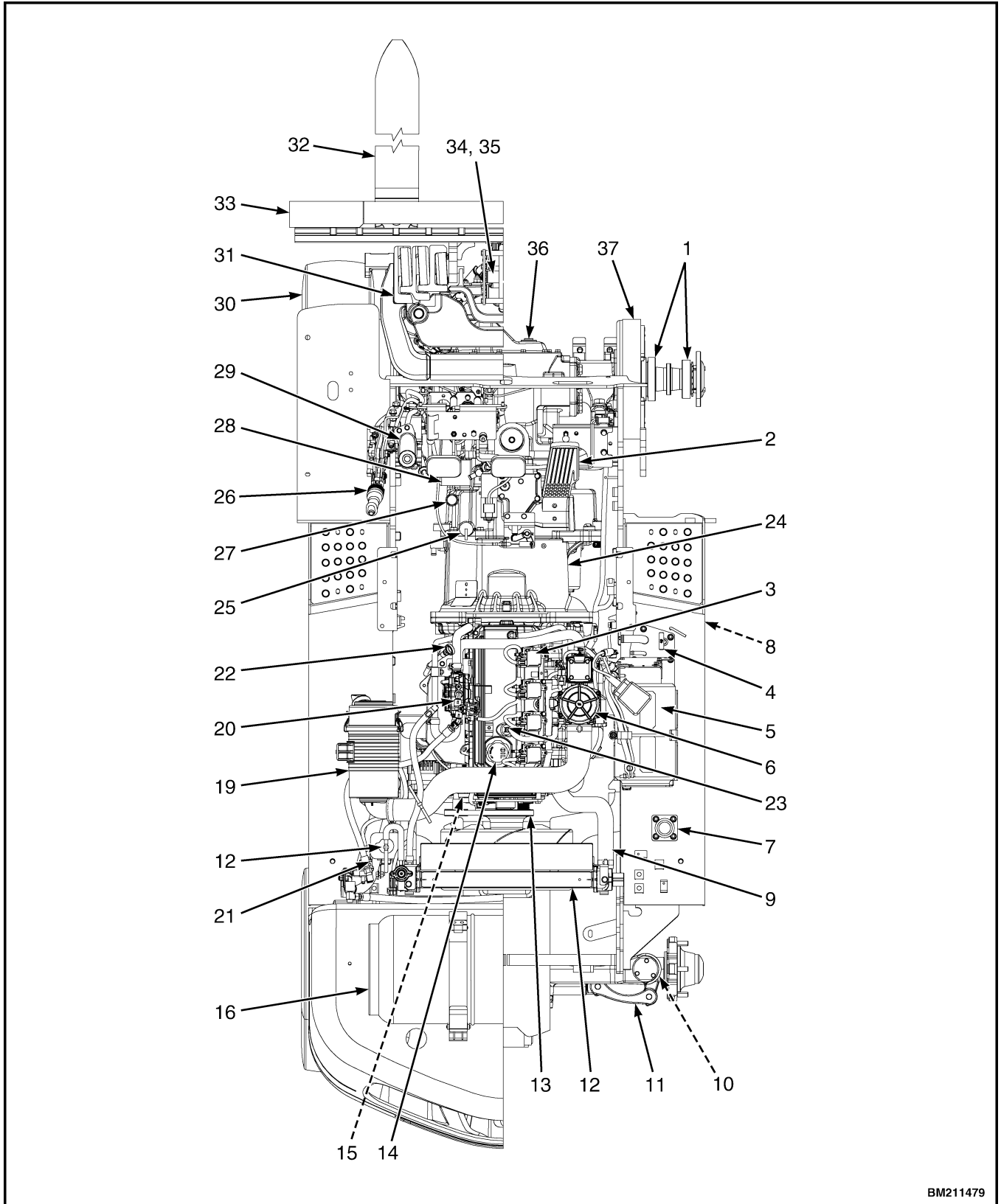
1. Assure truck components are cool before starting the cleaning procedure.
2. Disconnect the battery. If an electric truck, remove the traction battery.
3. Remove accumulated debris using a compressed air line and nozzle.
4. Lightly spray a non-corrosive cleaning agent onto the areas to be cleaned. This will help loosen grime, so close contact direct spraying will not be necessary.

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5. Be sure to avoid directing the spray into electrical panel compartment. Ensure overspray does not come in contact with electrical components; do not spray water directly at electrical components, wiring connectors or electrical enclosures. Even sealed connectors may allow water egress under pressure or if connector is damaged.
6. Avoid spraying in areas containing electrical components such as:
  - Floor Plates
  - Battery Compartment
  - Dash/cowl assembly
  - Armrests with electrical components
7. Clean the battery compartment by using a clean cloth to wash the battery with water. Dry with compressed air. Care should be taken to keep moisture at a minimum as some units have a traction or hydraulic motor directly below the battery compartment.
8. DO NOT pressure wash the battery. Do not use hot water. For cleaning traction batteries, refer to the Battery section of the **Service Manual**.
9. DO NOT pressure wash lift chains, sheaves or load rollers in the mast assembly. Refer to the Chains, Sheaves and Load Rollers maintenance section in the **Service Manual** for proper cleaning procedures.
10. After cleaning, immediately start and run the lift truck to dry out components.

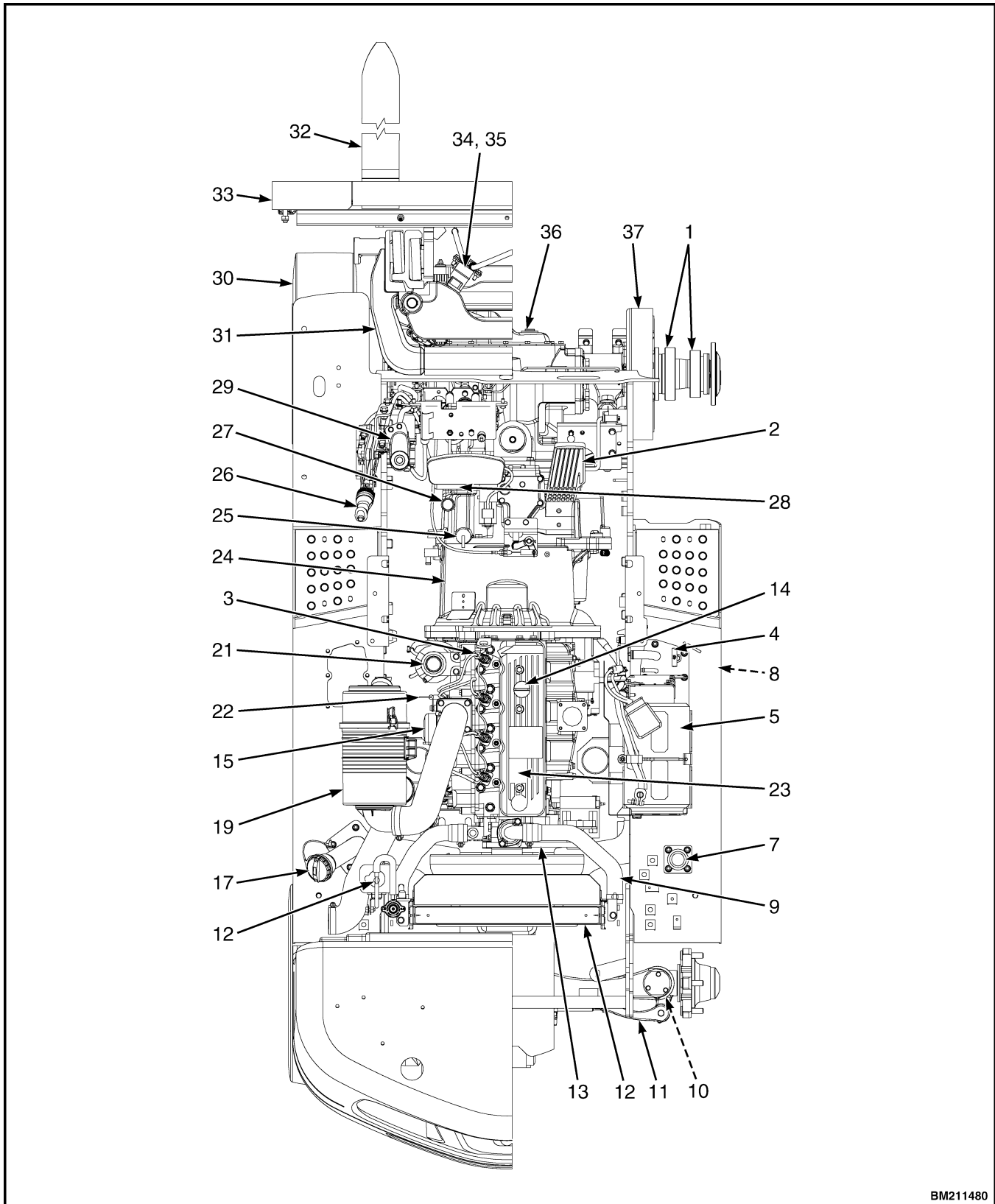
## Maintenance Schedule

**NOTE:** The 500-hour and 1000-hour/1 year maintenance services are performed either at the specified hours or at 1 year whichever occurs first.



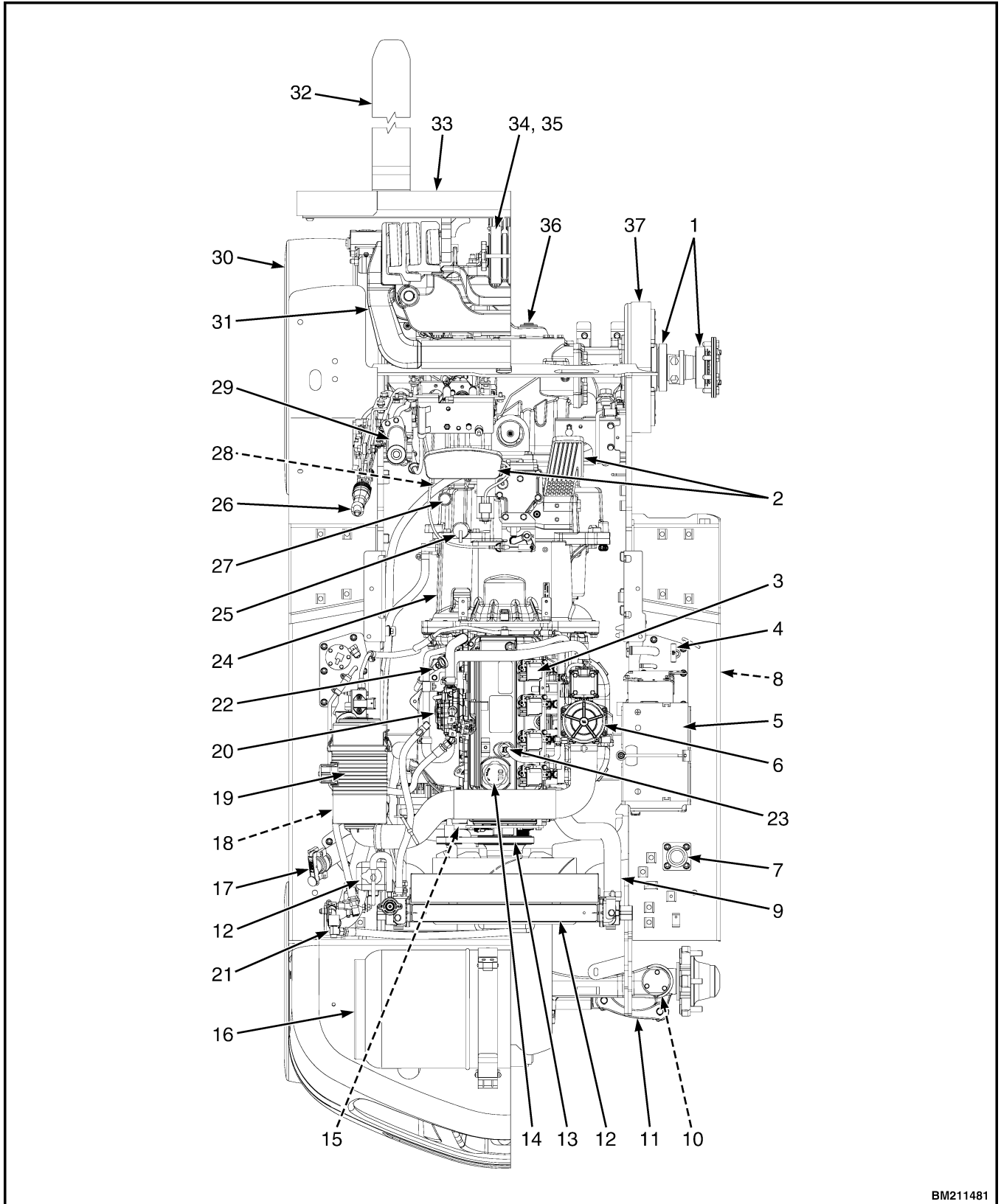
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Figure 2. Maintenance and Lubrication Points, PSI 2.4L LPG Trucks



BM211480

Figure 3. Maintenance and Lubrication Points, Yanmar Diesel Trucks



BM211481

Figure 4. Maintenance and Lubrications Points, PSI 2.4L Bi-Fuel Trucks

**Table 1. Maintenance Schedule**

Item No.	Item	8 hr/ 1 day	500 hr/ 1 yr	1000 hr/ 1 yr	2000 hr/ 1 yr	4000 hr/ 2 yr	Procedure or Quantity	Specification
30	Tires and Wheels	X					Check Condition	See Nameplate
	Safety Labels	X					Replace as Necessary	See <b>Parts Manual</b>
31, 33, 34, 35	Mast, Carriage, Header Hoses, Lift Chains, Attachment	X					Check Condition and Lubrication	See <b>Parts Manual</b>
	Seat Belt, Hip Restraints, and Seat Rails	X					Check Condition and Operation	
	Hood and Seat Latches	X					Check Condition and Operation	
	Engine Compartment	X					Remove Combustible Materials See <b>NOTE 5</b> and <b>NOTE 15</b> .	
	Check for Leaks - Fuel, Oil, Water	X					Check for Leaks See <b>NOTE 1</b> .	
	Hydraulic Hoses	X					Check Condition. See <b>NOTE 15</b> .	See <b>Parts Manual</b>
9	Coolant Hoses	X					Check Condition. See <b>NOTE 15</b> .	See <b>Parts Manual</b>
16	Fuel Tank PSI 2.4L LPG Engine	CIL					29.9 liter (7.9 gal) 15.2 kg (33.5 lb)	LPG - HD 5
17	Fuel Tank Yanmar Diesel Engines	CIL					69 liter (18.2 gal)	Diesel No. 2
17	Fuel Tank Gasoline - PSI 2.4L Bi-Fuel Engine	CIL					69 liter (18.2 gal)	86 Octane Gasoline Minimum
	Horn, Lights, Alarms, Fuses, and Relays	X					Check Operation	
37	Service Brakes	X					Check Operation	
37	Service Brakes				X		Check Lining Thickness	1.0 mm (0.04 in.)
26	Parking Brake	X					Check Operation	
	Accelerator Cable					C	1 Cable	See <b>Parts Manual</b>

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

Table 1. Maintenance Schedule (Continued)

Item No.	Item	8 hr/ 1 day	500 hr/ 1 yr	1000 hr/ 1 yr	2000 hr/ 1 yr	4000 hr/ 2 yr	Procedure or Quantity	Specification
36	Drive Axle	X					Check for Leaks. Check Operation.	
36	Differential and Drive Axle Oil		X		C		6.5 liter (6.9 qt) See <b>NOTE 14</b> .	80W-90 API GC5
	Steering Controls	X					Check Condition and Operation	
24	Transmission	X					Check for Leaks. Check Operation.	
24	Transmission Oil Dipstick		X				Check Oil Level. See <b>NOTE 15</b> .	John Deere JDM J20C
25	Transmission Oil				C		8.3 liter (8.8 qt) See <b>NOTE 15</b> .	John Deere JDM J20C
28	Transmission Oil Filter				C		1 Filter. See <b>NOTE 4</b> and <b>NOTE 15</b> .	See <b>Parts Manual</b>
27	Transmission Oil Breather			C			1 Breather See <b>NOTE 15</b> .	See <b>Parts Manual</b>
4	Hydraulic Oil	X	X			C	1-2 ton (COMPACT) 26 liter (27 qt) 2-3.5 ton 30 liter (32 qt) See <b>NOTE 2</b> , <b>NOTE 3</b> , <b>NOTE 13</b> , <b>NOTE 15</b> , and <b>NOTE 18</b> .	ISO VG 46 Hydraulic Oil -20°C (-4°F) and Above
8	Hydraulic Oil Return Filter				C		1 Filter See <b>NOTE 13</b> and <b>NOTE 15</b> .	See <b>Parts Manual</b>
7	Hydraulic Tank Breather		X			C	Inspect and Replace as Required. See <b>NOTE 13</b> and <b>NOTE 15</b> .	See <b>Parts Manual</b>
5	Battery and Cable Terminals		X				Clean.	
14, 22	Engine Oil PSI 2.4L Engine	X CIL	C				4.9 liter (5.2 qt) See <b>NOTE 4</b> , <b>NOTE 5</b> , and <b>NOTE 15</b> .	-20 to 30°C (20°F) and Below SAE 5W-20 16°C (60°F) and Below SAE 5W-30 -18°C (0°F) and Above SAE 10W-30 API SL ILSAC GF3 SAE J2362
X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation								

**Table 1. Maintenance Schedule (Continued)**

Item No.	Item	8 hr/ 1 day	500 hr/ 1 yr	1000 hr/ 1 yr	2000 hr/ 1 yr	4000 hr/ 2 yr	Procedure or Quantity	Specification
15	Engine Oil Filter PSI 2.4L Engine		C				1 Filter See <b>NOTE 4</b> , <b>NOTE 5</b> , and <b>NOTE 15</b> .	See <b>Parts Manual</b>
14, 22	Engine Oil Yanmar Diesel Engines	X CIL	C				10.2 liter (10.8 qt) See <b>NOTE 4</b> , <b>NOTE 5</b> , and <b>NOTE 15</b> .	20°C (68°F) and Over SAE 40 10 to 30°C (50 to 86°F) SAE 30 0 to 20°C (32 to 68°F) SAE 20 -16 to 40°C (3 to 103°F) SAE 15W-40 -20 to 30°C (-4 to 86°F) SAE 10W-30 -10 to 10°C (14 to 50°F) SAE 20W -20 to 10°C (-4 to 50°F) SAE 10W API CG-4 or Better
15	Engine Oil Filter Yanmar Diesel Engines		C				1 Filter See <b>NOTE 4</b> , <b>NOTE 5</b> , and <b>NOTE 15</b> .	See <b>Parts Manual</b>
19	Air Filter	X CIL			C		1 Filter See <b>NOTE 5</b> , <b>NOTE 6</b> , and <b>NOTE 11</b> .	See <b>Parts Manual</b>
13	Drive Belt PSI Engine		X				Check for Wear and Damage. Adjust as Needed.	
13	Drive Belt Yanmar Diesel Engines		X				Check for Wear and Damage. Adjust as Needed.	
6	LPG Regulator PSI Engine		X				Drain Tar. See <b>NOTE 5</b> .	
20	LPG Vaporizer PSI Engine		X					
	Engine Idle Speed PSI Engine		X					850 ± 25 rpm

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



Table 1. Maintenance Schedule (Continued)

Item No.	Item	8 hr/ 1 day	500 hr/ 1 yr	1000 hr/ 1 yr	2000 hr/ 1 yr	4000 hr/ 2 yr	Procedure or Quantity	Specification
	Engine Governed Speed PSI Engine		X					2700 ± 25 rpm
	Engine Idle Speed Yanmar Diesel Engines		X					850 ± 25 rpm
	Engine Governed Speed Yanmar Diesel Engine		X					2625 ± 25 rpm
20	PCV Valve PSI 2.4L Engine				C		Replace as Necessary	See <b>Parts Manual</b>
23	Valve Adjustment PSI 2.4L Engine						Not Adjustable	
23	Valve Adjustment Yanmar Diesel Engines			X			Adjust as Required	Intake 0.20 mm (0.008 in.) Cold Exhaust 0.20 mm (0.008 in.) Cold
	Timing Yanmar 2.6L Diesel Engine				X		Adjust as Required	Preset at 4° ATDC
	Timing Yanmar 3.3L Diesel Engine				X		Adjust as Required	Preset at 6° ATDC
21	LPG Fuel Filter PSI Engines			C			1 Filter	See <b>Parts Manual</b>
18	Gasoline Fuel Filter PSI Bi-Fuel Engines			C			1 Filter	See <b>Parts Manual</b>
21	Fuel Water Separator Yanmar Diesel Engines	CIL	C				1 Filter Drain Water from Filter as Required.	See <b>Parts Manual</b>

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

**Table 1. Maintenance Schedule (Continued)**

Item No.	Item	8 hr/ 1 day	500 hr/ 1 yr	1000 hr/ 1 yr	2000 hr/ 1 yr	4000 hr/ 2 yr	Procedure or Quantity	Specification
21	In-Line Fuel Strainer Yanmar Diesel Engine			C			1 Filter	See <b>Parts Manual</b>
3	Fuel Injectors PSI LPG Engines					X	Check and Replace if Required. 4 Injectors See <b>NOTE 7</b> and <b>NOTE 15</b> .	See <b>Parts Manual</b>
3	Fuel Injectors Yanmar Diesel Engine				X		Check and Replace if Required. 4 Injectors See <b>NOTE 15</b> .	See <b>Parts Manual</b>
3	Spark Plugs PSI Bi-Fuel Engine			C			Change Spark Plugs 4 Spark Plugs	Torch P/N DK7RTC 0.9 mm (0.035 in.)
12	Cooling System PSI Engine	X CIL				C	11.0 liter (11.6 qt)	See <b>NOTE 12</b> .
12	Cooling System Yanmar 2.6L, 3.0L and 3.3L Diesel Engine	X CIL			C		11.5 liter (12.2 qt)	See <b>NOTE 12</b> .
	Clean Debris From Radiator Core		X				See <b>NOTE 5</b> .	
32	Forks	X	X		X		Check Condition Replace as Necessary	
32	Fork Latches		L				Lubricate as Necessary.	Multipurpose Grease See <b>NOTE 8</b> .
	Lift System Operate	X					Check Operation	
31	Mast Sliding Surfaces and Load Roller Surfaces		L				Lubricate As Required See <b>NOTE 9</b> .	Multipurpose Grease See <b>NOTE 8</b> .
35	Header Hoses		X				Check Condition	
34	Lift Chain	X	L	X, L			Check for Wear. Lube as Required. See <b>NOTE 10</b> .	Engine Oil SAE 30W
X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation								

Table 1. Maintenance Schedule (Continued)

Item No.	Item	8 hr/ 1 day	500 hr/ 1 yr	1000 hr/ 1 yr	2000 hr/ 1 yr	4000 hr/ 2 yr	Procedure or Quantity	Specification
	Mast Pivots		L				2 Fittings	Multipurpose Grease See <b>NOTE 8</b> .
	Mast Sideshift Carriage (Upper and Lower Bearing Strips)	X	L	X	C		Lube as Required. 2 Fittings for Upper Bearings and 2 Lower Bearing Strips. Check Lower Bearing Strips for Wear	Multipurpose Grease See <b>NOTE 8</b> . 0 mm (0 in.)
	Mast Fork Positioner	X	L	X			Lube as Required 2 Fittings	Multipurpose Grease See <b>NOTE 8</b> .
	Mast Fork Positioner Cylinder Rod Anchors	X	L	X			Lube as Required 2 Anchors	Multipurpose Grease See <b>NOTE 8</b> .
	Mast Fork Positioner and Lower Hook Capscrews			X			Check Torque 8 Capscrews	
	Tilt Cylinder Ends		L				4 Fittings	Multipurpose Grease See <b>NOTE 8</b> .
	Brake Master Cylinder Rod End Pin		L					Use Silicon Spray Yale Part No. 504236201
	Manual Hydraulic Hand Levers		L					API SM ILSAC GF4 SAE J2362
29	Brake Fluid Master Cylinder	X	X		C		0.2 liter (0.21 pt)	SAE J-1703 DOT-3
1	Drive Axle Wheel Bearings				L		Check Grease	Multipurpose Grease See <b>NOTE 8</b> .
11	Steering Axle Tie Rod Ends		L				4 Fittings	Multipurpose Grease See <b>NOTE 8</b> and <b>NOTE 17</b> .
10	Steering Axle King Pins		L				2 Fittings	Multipurpose Grease See <b>NOTE 8</b> and <b>NOTE 17</b> .

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

**Table 1. Maintenance Schedule (Continued)**

Item No.	Item	8 hr/ 1 day	500 hr/ 1 yr	1000 hr/ 1 yr	2000 hr/ 1 yr	4000 hr/ 2 yr	Procedure or Quantity	Specification
	Steering Axle Wheel Bearings				L		Check Grease.	Multipurpose Grease See <b>NOTE 8</b> .
2	Pedals, Levers, Seat Rails, Cables, Hinges, Linkages	X		L			Lubricate as Necessary	Use Yale Part No. 504236201
26	Parking Brake Adjustment		X				Adjust as Necessary	Must Hold a Full Capacity Load on a 15% Grade
26	Parking Brake			L			Lubricate as Necessary	Use Yale Part No. 504236201
	Wheel Nuts Drive Wheels	X					Check Torque	450 to 500 N•m (332 to 369 lbf ft)
	Wheel Nuts Steer Wheels	X					Check Torque	155 to 175 N•m (114 to 129 lbf ft)
	Timing Belt PSI Engine					C See <b>NOTE 5</b> . See <b>NOTE 15</b> .	Replace. See <b>NOTE 16</b> .	See <b>Parts Manual</b>
	Inspect Engine Electrical System, Connectors			X				
	Inspect Engine Vacuum and Fuel Lines and Fittings				X			
	Inspect Lock-off for Leaks and Ensure Lock- off Closing				X			
	Test LPG/Gas Regulator Pressure				X			
	Check Air Induction System for Leaks				X			
	Check Manifold for Vacuum Leaks				X			
	Check Throttle Shaft for Sticking				X			
X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation								

Table 1. Maintenance Schedule (Continued)

Item No.	Item	8 hr/ 1 day	500 hr/ 1 yr	1000 hr/ 1 yr	2000 hr/ 1 yr	4000 hr/ 2 yr	Procedure or Quantity	Specification
	Check Injectors and Rails for Leaks				X			
	Check Exhaust Manifold and Piping for Leaks				X			
	Inspect Catalyst Inlet and Outlet				X			
	Inspect Muffler Inlet and Outlet				X		Replace as Required	
<b>NOTE 1:</b> Check fuel system for leaks prior to any service or maintenance activity.								
<b>NOTE 2:</b> Heavy-duty or high-temperature operations require more frequent checks.								
<b>NOTE 3:</b> Heavy-duty or contaminated applications will require hydraulic oil change at 2000 hours.								
<b>NOTE 4:</b> Change engine oil and filter after first 100 hours of operation. Change transmission oil filter after first 500 hours of operation.								
<b>NOTE 5:</b> Recommended service intervals are based on a normal application in a clean environment. Applications involving contaminated environments such as high levels of air borne debris (dust and waste paper); chemical or abrasive compounds; poor ground conditions; intensive usage at high performance levels; or other abnormal conditions will require more frequent servicing. At your request your Yale dealer will advise you of the appropriate service intervals based on an application survey.								
<b>NOTE 6:</b> In dirty or dusty environments, replace at 1000 hours or as needed.								
<b>NOTE 7:</b> Check fuel injectors at 5000 hours or 7 years. See <b>PSI 2.4L Engine 0600YRM1755</b> for procedures.								
<b>NOTE 8:</b> Multipurpose grease with 2 to 4% Molybdenum Disulfide.								
<b>NOTE 9:</b> Lubricate mast every three months if unit has less than 1000 hours.								
<b>NOTE 10:</b> Lubricate at first sign of visible surface rust.								
<b>NOTE 11:</b> Do not open the air filter canister except to change the air filter element. See Maintenance Procedures Every 2000 Hours or 1 Year to change air filter element.								
<b>NOTE 12:</b> Use Ethylene Glycol Boron-free Antifreeze. Purchase a pre-diluted 50/50 solution; or mix 50% concentrate with 50% distilled water or deionized water.								
<b>NOTE 13:</b> Hydraulic oil sampling and analysis is a recommended practice. See <b>Hydraulic Cleanliness Procedures 1900YRM1620</b> for oil cleanliness and water content guidelines. For lift trucks operating in heavy duty applications or highly contaminated environments, take oil samples every 500 hours. Normal Operating conditions may allow for less frequent oil sampling. Oil sampling should be done just prior to all oil and filter changes.								
<b>NOTE 14:</b> Change differential/drive axle oil at 2400 hours. Use hour interval only.								
<b>NOTE 15:</b> Turn lift truck engine <b>OFF</b> prior to performing maintenance or checks in engine compartment.								
<b>NOTE 16:</b> Change timing belt at 6000 hours. Use hour interval only. Use <i>Kit-Service 6000 hours</i> specified in the <b>Parts Manual</b> for your lift truck.								
<b>NOTE 17:</b> Lubricate tie rod ends and king pins at 300 hours. Use hour interval only.								
<b>NOTE 18:</b> Check and clean hydraulic oil strainer screen, every time hydraulic oil is changed.								
X=Check C=Change L=Lubricate CIL=Check Indicator Light during operation								

## Maintenance Procedures Every 8 Hours or Daily

### HOW TO MAKE CHECKS WITH ENGINE STOPPED

#### WARNING

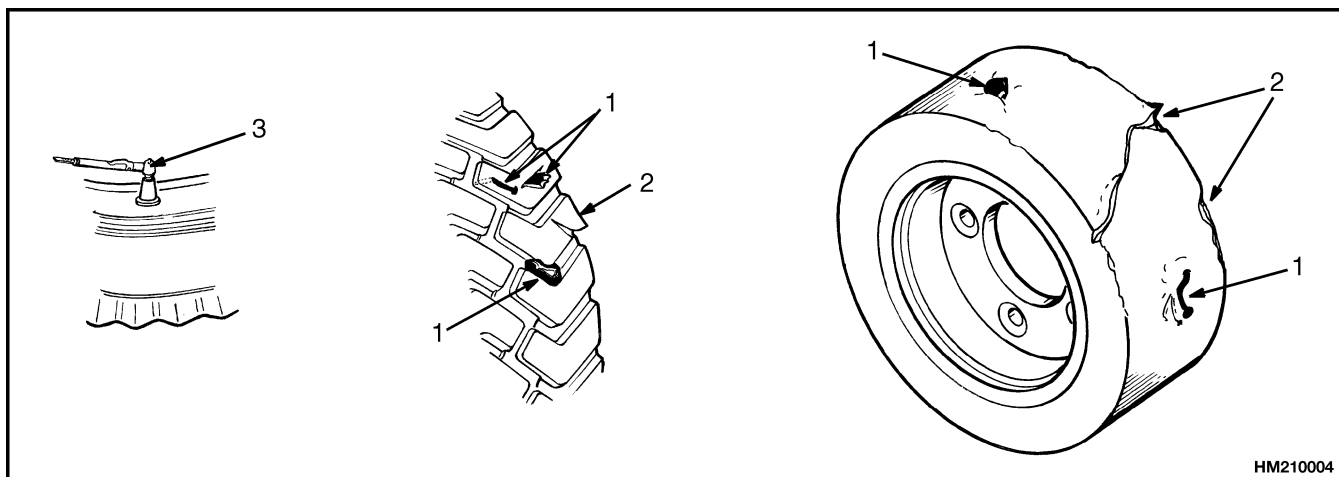
**DO NOT** operate a lift truck that needs repairs. Report the need for repairs immediately. If repair is necessary, put a **DO NOT OPERATE** tag in the operator's area. If the lift truck is equipped with a key switch, remove the key from the key switch.

Put lift truck on a level surface. Lower carriage and forks, stop the engine, and apply parking brake. Open

hood and check for leaks and conditions that are not normal. Clean any oil or fuel spills. Ensure all surfaces are free of oils, lubricants, fuel, and organic dust or fibers (paper, wood, cotton, agricultural grass/grain, etc.).

### Tires and Wheels

Check tires for damage. Check tread and remove any objects that will cause damage. Check for bent or damaged rims. Check for loose or missing hardware. Remove any wire, strapping, or other material that is wrapped around the axle. See Figure 5.



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

*Figure 5. Tire Check*

### Safety Labels

#### WARNING

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

Check that all safety labels are installed in the correct location on lift truck. See the **Parts Manual, Model Description** section in the **Operating Manual** or **Frame 0100YRM1984** for correct location of safety labels. See **Parts Manual** for part numbers of the safety labels.

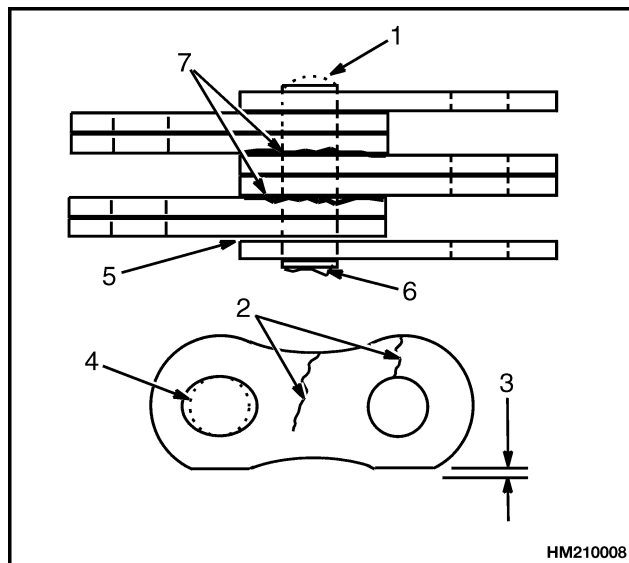
### Mast, Carriage, Lift Chains, Header Hoses, Attachment

#### WARNING

Lower the lift mechanism completely. Never allow any person under a raised carriage. **DO NOT** put any part of your body in or through the lift mechanism unless all parts of the mast are completely lowered and the engine is **STOPPED**. **DO NOT** try to correct the alignment of the fork tips by bending the forks or adding shims. Never repair damaged forks by heating or welding. Forks

are made of special steel using special procedures. If either fork is damaged, replace the forks as a set.

1. Inspect welds on mast and carriage for cracks. Make sure that capscrews and nuts are tight.
2. Inspect channels for wear in areas where the rollers travel. Inspect rollers for wear or damage.
3. Inspect load backrest extension for cracks and damage.
4. If lift truck is equipped with an integral sideshift carriage or attachment, inspect the parts for cracks and wear. Make sure the parts that fasten the integral sideshift carriage or attachment to carriage are in good condition.
5. Visually inspect hoses/fittings for hydraulic leaks; hose cover for cuts, cracks or exposed reinforcement; defective/broken clamping devices or sheaves; proper tracking during operation. Adjust/repair/replace hose/components as necessary. For quick disconnect procedures, see **Mast Repair (S/N A387, A389, A397, A399) 4000YRM1999.**
6. Check that lift chains are correctly lubricated. Use SAE 30W engine oil as necessary to lubricate lift chains.
7. Inspect lift chains for cracks or broken links, and worn or turned pins. See Figure 6.
8. Inspect chain anchors and pins for cracks and damage.
9. Make sure lift chains are adjusted so that they have equal tension. **Adjustments or replacement of the lift chains must be done by authorized personnel.**



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

*Figure 6. Lift Chain Check*

## Operator Restraint System

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

The seat belt, hip restraint, seat, hood, and hood lock assembly are all part of the operator restraint system. Each item must be checked to make sure it is fastened correctly, functions correctly, and is in good condition. See Figure 7.

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

- Seat belt with no operation interlock.
- Seat belt with operation interlock. Seat belt must be fastened for the lift truck to start or to travel.

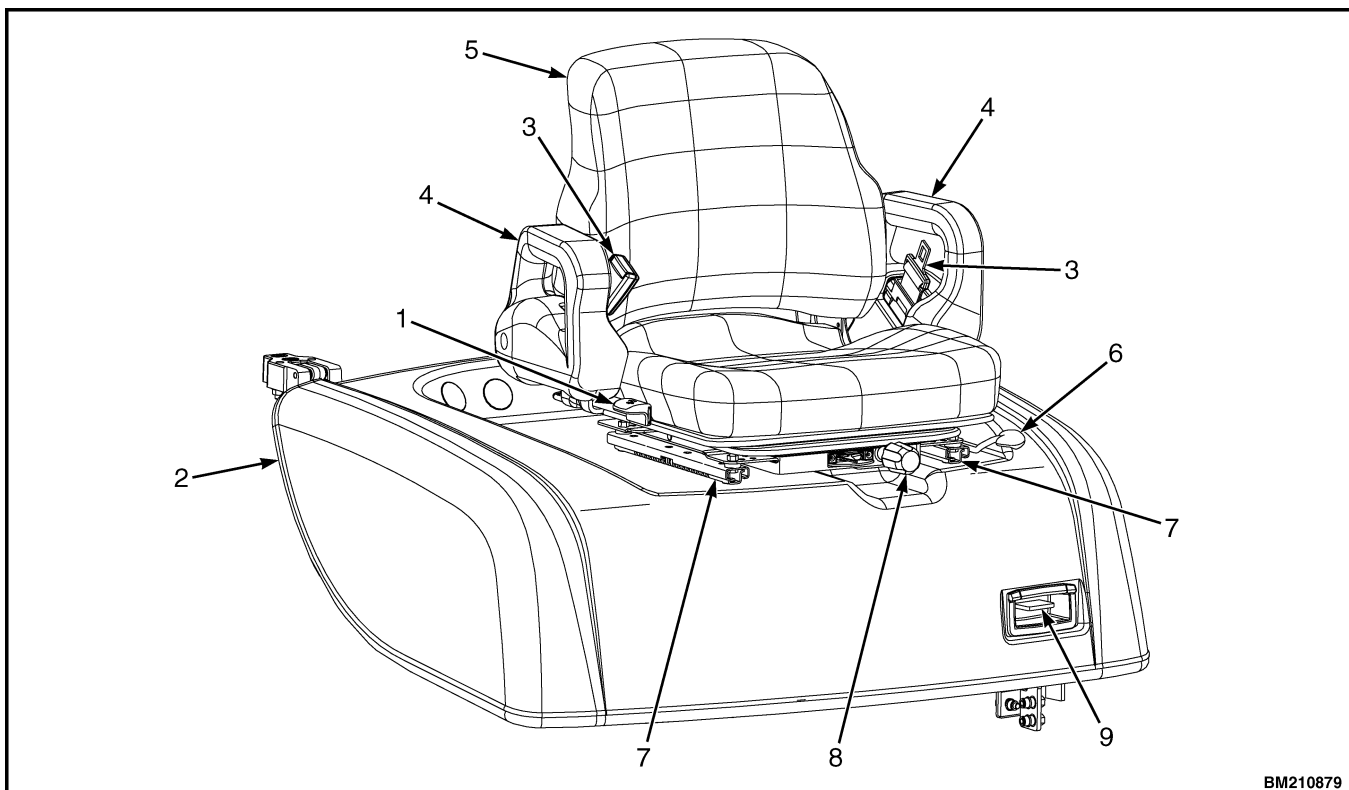
### Emergency Locking Retractor (ELR)

When the ELR style seat belt is properly buckled across the operator, the belt will permit slight operator repositioning without activating the locking mechanism. If 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.

A seat belt that is damaged, worn, or does not operate properly will not provide protection when it is needed. The end of the belt must fasten correctly in the latch. The seat belt must be in good condition. Replace the seat belt if damage or wear is seen. See Figure 7.

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

- With the hood closed and in the locked position, pull the seat belt slowly from the retractor assembly. Make sure the seat belt pulls out and retracts smoothly. If the seat belt cannot be pulled from the retractor assembly or the belt will not retract, replace the seat belt assembly.
- With the hood closed and in the locked position, pull the seat belt with a sudden jerk. Make sure the seat belt will not pull from the retractor assembly. If the seat belt can be pulled from the retractor, when it is pulled with a sudden jerk, replace the seat belt assembly.
- With the hood in the open position, make sure the seat belt will not pull from the retractor assembly. If the seat belt can be pulled from the retractor, with the hood in the open position, replace the seat belt assembly.



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- |                                    |                                      |
|------------------------------------|--------------------------------------|
| 1. BACKWARD ANGLE ADJUSTMENT LEVER | 6. FORWARD/BACKWARD ADJUSTMENT LEVER |
| 2. HOOD                            | 7. SEAT RAIL                         |
| 3. SEAT BELT                       | 8. OPERATOR WEIGHT ADJUSTMENT        |
| 4. HIP RESTRAINTS                  | 9. HOOD LATCH                        |
| 5. SEAT                            |                                      |

**Figure 7. Hood and Seat Check**



### ***Adjust Seat - Semi-Suspension***

#### Seat Position Adjustment

- Fore and aft adjustment - It is recommended that the seat be adjusted so that the thigh is horizontal to the ground so that the best ergonomic position is achieved. See Figure 7.

#### Seat Adjustment for Operator Weight



#### **CAUTION**

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

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

**NOTE:** The seat is designed for maximum weight of 130 kg (287 lb) for semi-suspension seat.

- The weight adjustment knob can be turned left or right to increase or decrease the weight resistance. As the weight adjustment knob is turned the "stiffness" of the suspension can be felt to increase or decrease on which way the weight adjustment knob is turned. See Figure 8.

### ***Adjust Seat - Premium Full Suspension***

#### Seat Position Adjustment

- Fore and aft adjustment - It is recommended that the seat be adjusted so that the thigh is horizontal to the ground so that the best ergonomic position is achieved. See Figure 7.

#### Seat Adjustment for Operator Weight



#### **CAUTION**

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

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

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

- The target is for the "ride indicator" to fall between the arrows when the operator sits upright in the seat with the feet positioned on the pedals. This ensures that the operator is set at the midpoint of the 80 mm (3.15 in.) suspension. See Figure 8.
- The handle can be turned as shown to increase or decrease the weight resistance. Pull handle out before turning. As the handle is turned the "stiffness" of the suspension can be felt to increase or decrease on which way the handle is turned. See Figure 8.

### ***Adjust Seat - Standard Full Suspension***

#### Seat Position Adjustment

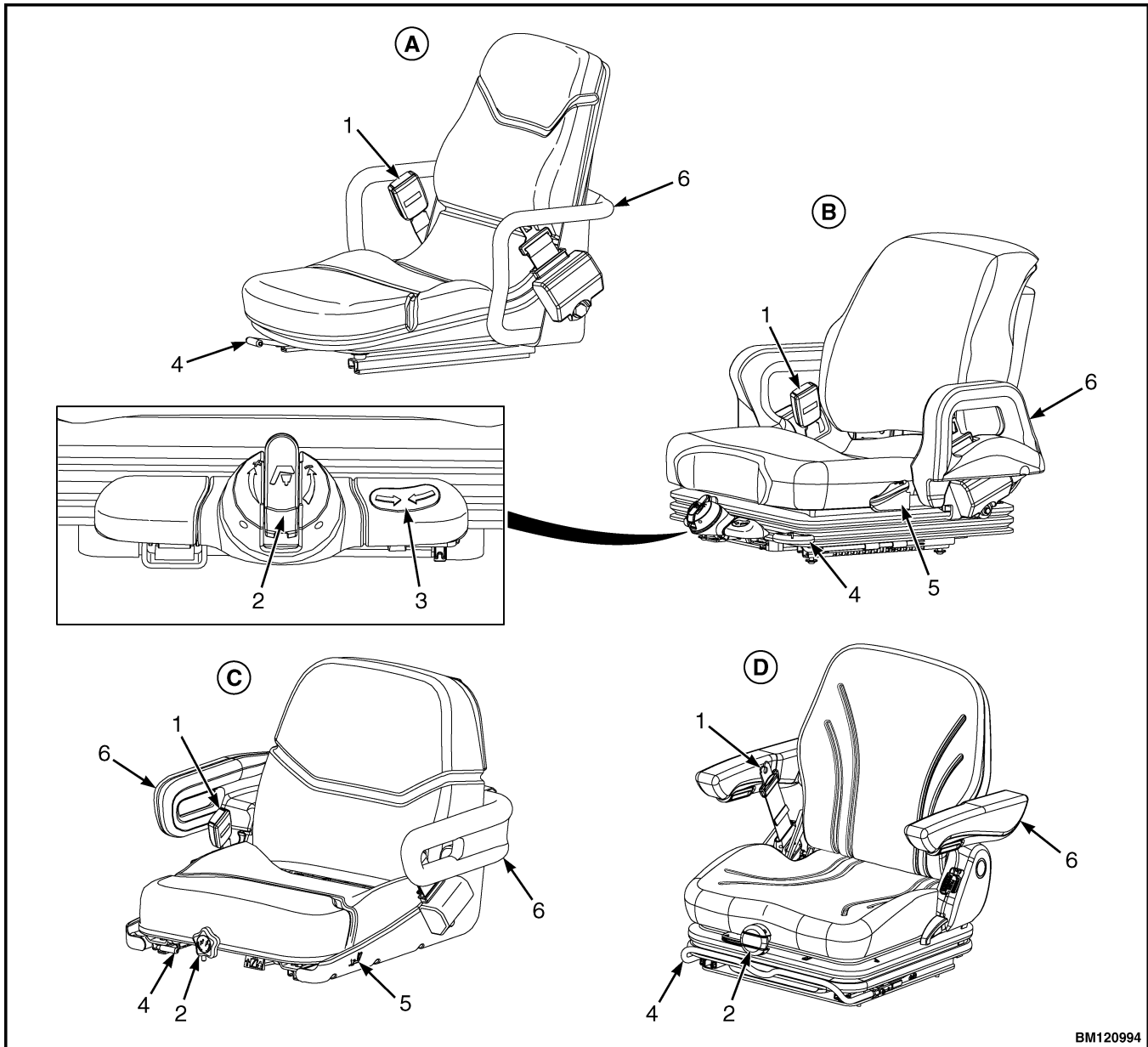
- Fore and aft adjustment - It is recommended that the seat be adjusted so that the thigh is horizontal to the ground so that the best ergonomic position is achieved. See Figure 8.

#### Seat Adjustment for Operator Weight

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

**NOTE:** The seat is designed for a maximum weight of 145 kg (320 lb) for standard full suspension, premium seat, and 130 kg (287 lb) for semi-suspension seat.

- The weight adjustment knob handle can be turned as shown to increase or decrease the weight resistance, pull handle out before turning. As the handle is turned, the "stiffness" of the suspension can be felt to increase or decrease depending on which way the handle is turned. Seat should be adjusted as low as possible without deflating completely. See Figure 8.



- A. STANDARD NON-SUSPENSION SEAT
- B. PREMIUM FULL SUSPENSION SEAT

- C. SEMI-SUSPENSION SEAT
- D. STANDARD FULL SUSPENSION SEAT

- 1. SEAT BELT
- 2. WEIGHT ADJUSTMENT KNOB
- 3. RIDE POSITION INDICATOR

- 4. FORWARD/BACKWARD ADJUSTMENT LEVER
- 5. BACKREST ANGLE ADJUSTMENT LEVER
- 6. HIP RESTRAINT

**Figure 8. Seat Adjustment Controls**

**Hood and Seat Latches**

Make sure seat rails and latch striker are not loose. Seat rails must lock tightly in position, but move freely when unlocked. See Figure 7. Seat rails must be correctly fastened to the hood and the hood fastened

to hinges on frame. Try to lift the hood to make sure it is fastened correctly and will not move. If adjustment is required, go to Hood Lock Assembly Check.

## Engine Compartment

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

## Fuel, Oil, and Coolant Leaks, Check



### WARNING

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

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

Check fuel system for leaks and the condition of parts. When fuel is added to lift truck, see section **HOW TO ADD FUEL TO THE LIFT TRUCK** in the **Operating Manual**.

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

## Hydraulic Hoses

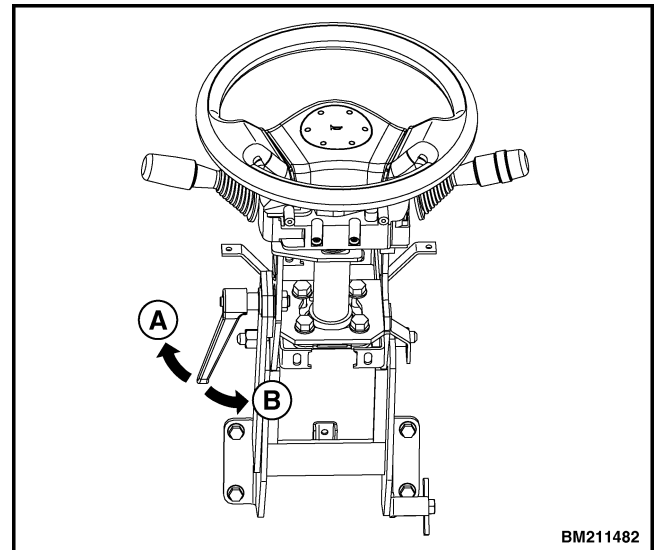
Check condition of hydraulic hoses for serviceability by inspecting for cracks or other obvious damage. Check to ensure that the hydraulic hoses are not leaking. If any hose is leaking, report it to maintenance for repair.

## Coolant Hoses

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

## Steering Column

Make sure tilt mechanism for steering column operates correctly. Tilt mechanism must **NOT** allow steering column to move unless the lever is released. See Figure 9.



- A. LOCK
- B. RELEASE LOCK

*Figure 9. Steering Column Tilt Lever*

## Transmission

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

## Hydraulic System Oil



### WARNING

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



### CAUTION

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

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

After engine has stopped, wait one minute before checking the oil level. Keep hydraulic oil at the correct level as indicated on dipstick. Use correct oil as shown in Maintenance Schedule.

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

## Engine Oil

After engine has stopped, wait one minute before checking oil level. Keep oil at correct level as indicated on the dipstick. Use the correct oil as shown in Maintenance Schedule.

See Figure 10 for lift trucks equipped with a PSI 2.4L LPG engine.

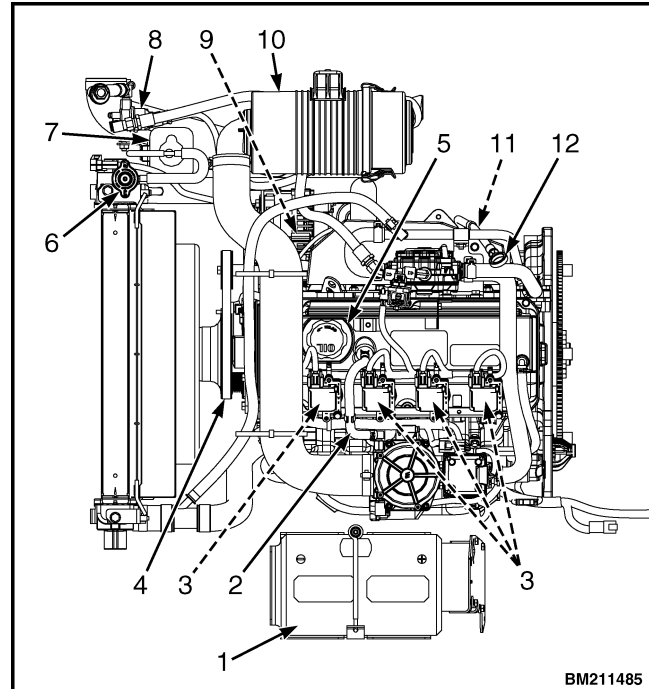
See Figure 11 for lift trucks equipped with a Yanmar 2.6L diesel engine.

See Figure 12 for lift trucks equipped with a Yanmar 3.3L diesel engine.

See Figure 13 for lift trucks equipped with a PSI 2.4L Bi-Fuel engine.

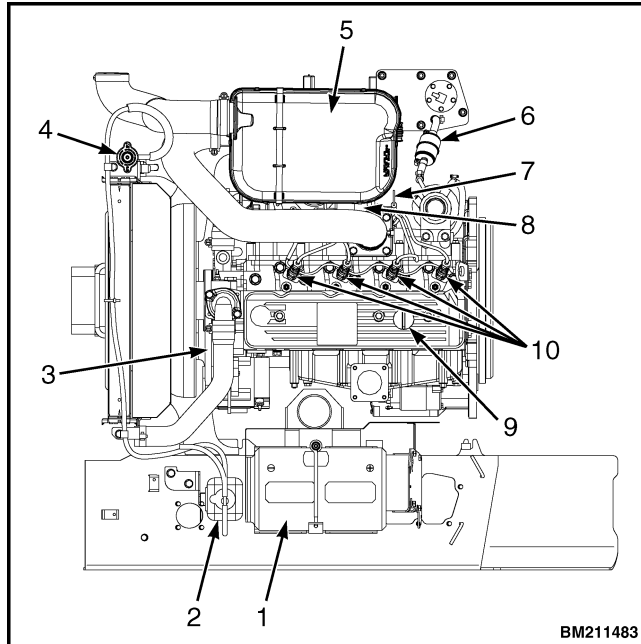
There is an indicator light for the engine oil pressure on the Dash Display. During normal operation, the red indicator light will illuminate when the key switch is turned to **ON**, if the truck is equipped with a key switch, or when the Power **ON/OFF** button is pressed, if the truck is equipped with a Power **ON/OFF** option, and will stay illuminated until correct oil pressure is obtained, at which time the light will go **OFF**.

If the light continues to stay on when engine is running, the engine oil pressure is low. Stop the engine and check the oil level. Do not restart the engine until the low pressure condition has been corrected.



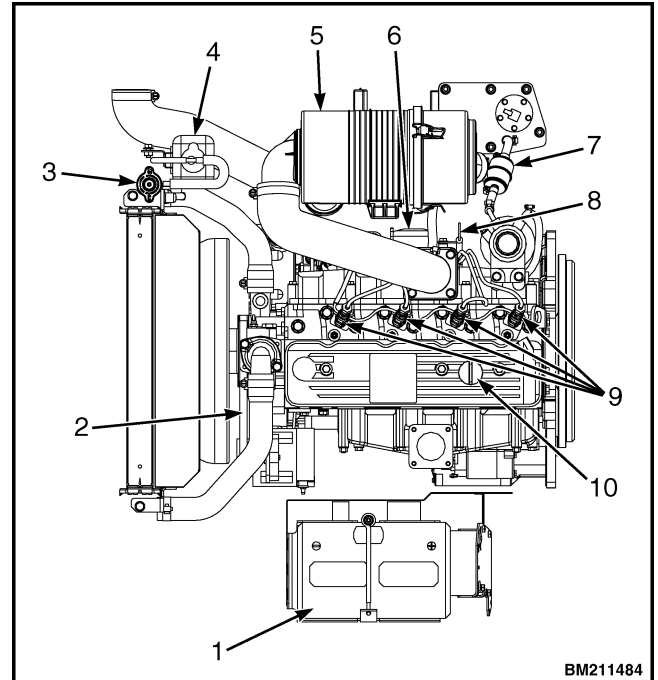
1. BATTERY
2. PCV VALVE
3. SPARK PLUGS
4. DRIVE BELT
5. ENGINE OIL FILL
6. RADIATOR CAP
7. AUXILIARY COOLANT RESERVOIR
8. FUEL FILTER
9. ENGINE OIL FILTER
10. AIR FILTER
11. ENGINE OIL DRAIN PLUG
12. DIPSTICK ENGINE OIL

**Figure 10. PSI 2.4L LPG Engine Maintenance Points**



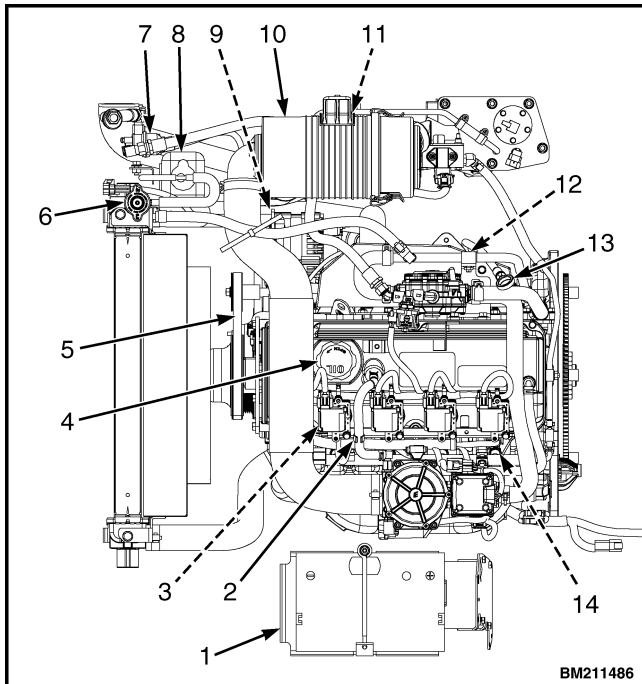
1. BATTERY
2. AUXILIARY COOLANT RESERVOIR
3. DRIVE BELT
4. RADIATOR CAP
5. AIR FILTER
6. FUEL FILTER
7. DIPSTICK ENGINE OIL
8. ENGINE OIL FILTER
9. ENGINE OIL FILL
10. SPARK PLUGS

**Figure 11. Yanmar 2.6L Diesel Engine Maintenance Points**



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

**Figure 12. Yanmar 3.3L Diesel Engine Maintenance Points**



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

**Figure 13. PSI 2.4L Bi-Fuel Engine Maintenance Points**

## Air Filter

The air filter canister should not be opened until an air filter element replacement is required. Check air filter canister to ensure hoses are attached, all seals are tight, and no cracks are apparent. An air filter element replacement is required when one of the following occurs:

- If equipped, the manual air flow indicator is red.

- The specified number of hours has passed since the last filter element replacement.
- DO NOT operate lift truck until the air filter element has been replaced.

## Forks

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

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

## Remove



### WARNING

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



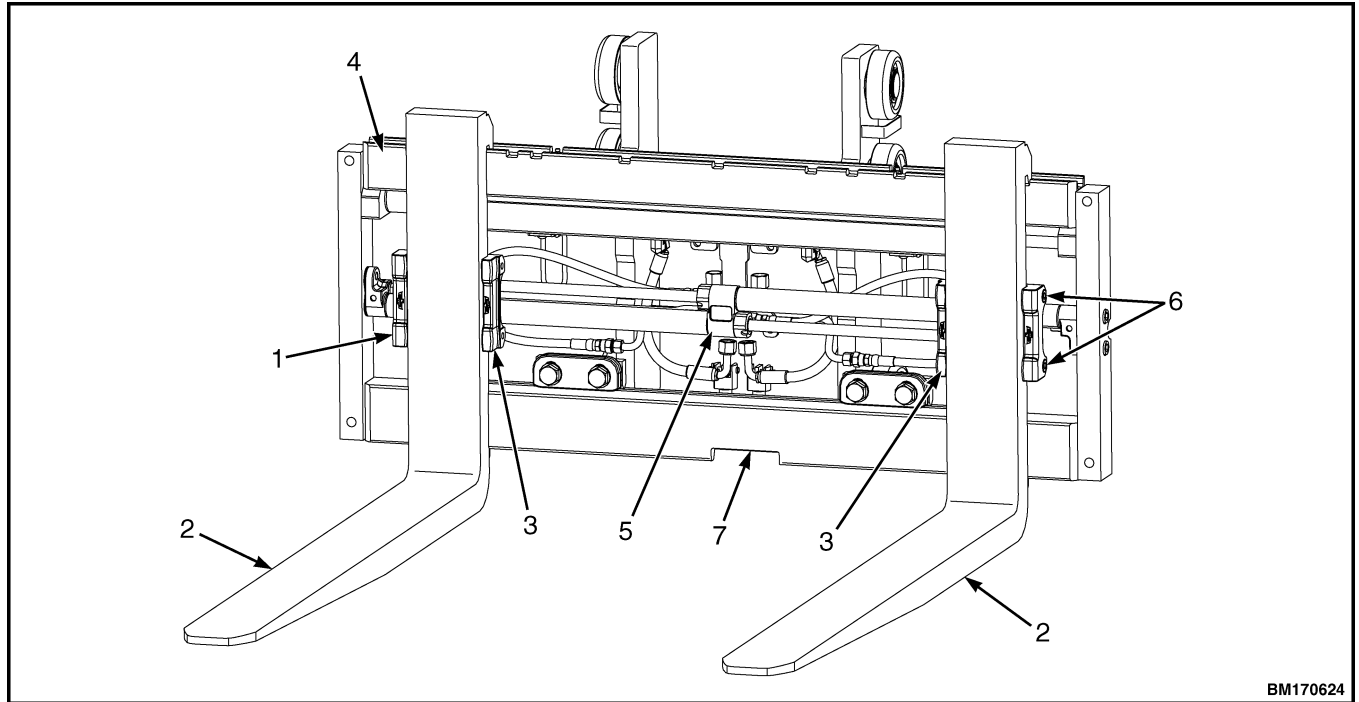
### CAUTION

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

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

**NOTE:** If lift truck is equipped with a fork positioner attachment, perform Step 1 through Step 3. If lift truck is not equipped with a fork positioner attachment, go to Step 4.

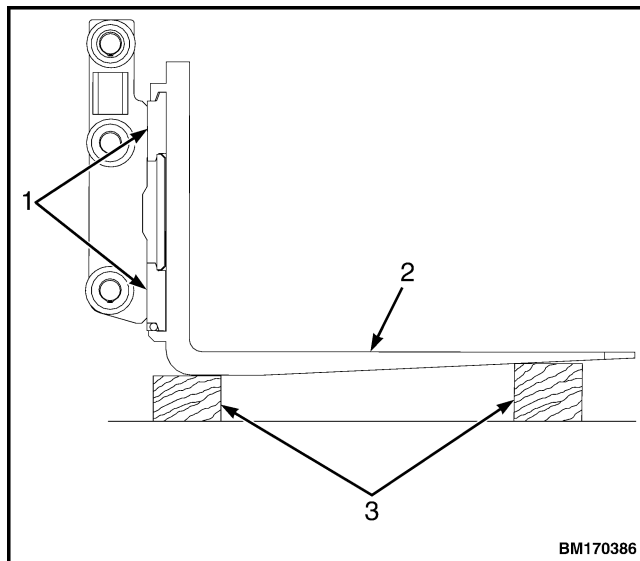
1. Lower carriage and remove four capscrews from inner fork carriers. Remove inner fork carriers from integral sideshift carriage. See Figure 14.
2. Slide fork to fork removal notch in bottom bar of carriage. See Figure 14.
3. Lower fork onto blocks so bottom hook of fork moves through fork removal notch. Lower carriage further so top hook of fork is disengaged from top carriage bar. Move carriage away from fork or use a lifting device to move fork away from carriage. See Figure 15.



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

**Figure 14. Fork Removal, Lift Trucks Equipped With Fork Positioner Attachment**

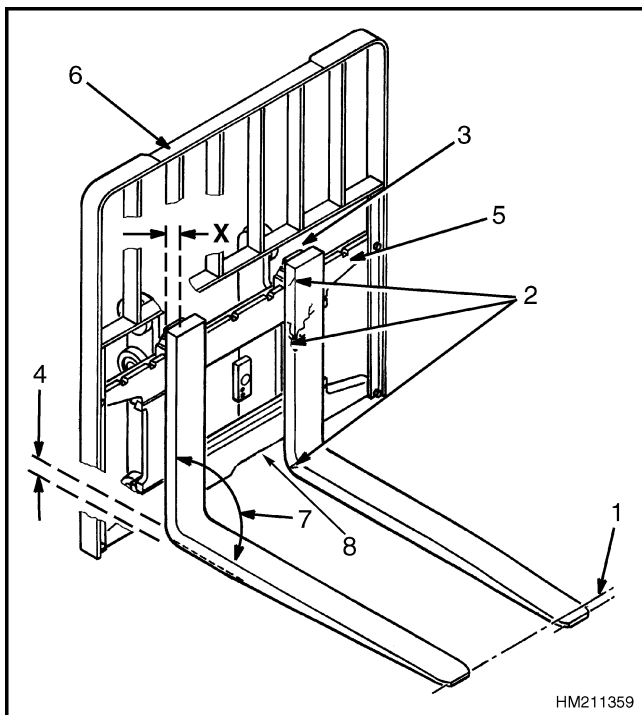


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- |                  |
|------------------|
| 1. CARRIAGE BARS |
| 2. HOOK FORK     |
| 3. BLOCKS        |

4. A fork can be removed from carriage for replacement of fork or other maintenance. Lift lock pin and slide a hook fork to the fork removal notch on carriage. See Figure 16. Lower fork onto blocks so that bottom hook of fork moves through fork removal notch. See Figure 16. Lower carriage further so that top hook of fork is disengaged from top carriage bar. Move carriage away from fork, or use a lifting device to move fork away from carriage.

**Figure 15. Hook Fork Removal**



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

1. Inspect forks for cracks and wear. Check that fork tips are aligned as shown in Figure 16. Check that bottom of fork is not worn (item 4, Figure 16).



**CAUTION**

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

2. Replace any damaged or broken parts that are used to keep the forks locked in position.
3. Inspect fork wear. Ensure heel wear is not more than 10% of original thickness. If fork wear is more than 10%, fork must be replaced or rerated. Perform fork wear inspection using a BOL256N1 caliper ruler Yale P/N 550088603 as follows. See Figure 17.

Fork Tip Alignment	
Length of Forks	3% Dimension
1000 mm (39 in.)	30 mm (1.17 in.)
1016 mm (40 in.)	30 mm (1.2 in.)
1100 mm (43 in.)	33 mm (1.29 in.)
1200 mm (47 in.)	36 mm (1.42 in.)

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

**Figure 16. Forks Check**

**Inspect**



**WARNING**

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

- a. Determine normal thickness of "N" of fork using scale or ruler portion of caliper ruler. Measurement has to be done on fork shank using caliper ruler.
- b. Position caliper at end of heel internal radius (item 4, Figure 16) with opening corresponding to measured thickness of fork shank in Step a above. (e.g. for N 1.75 use N 1.75 opening). This is typically the section of fork where wear is greatest. Note that opening distance has been reduced by 10% from nominal thickness.
- c. If fork enters opening, it is mandatory to replace it. **DANGER OF BREAKING.** Furthermore, a 10% reduction in fork blade thickness results in 20% reduction in operating capacity.



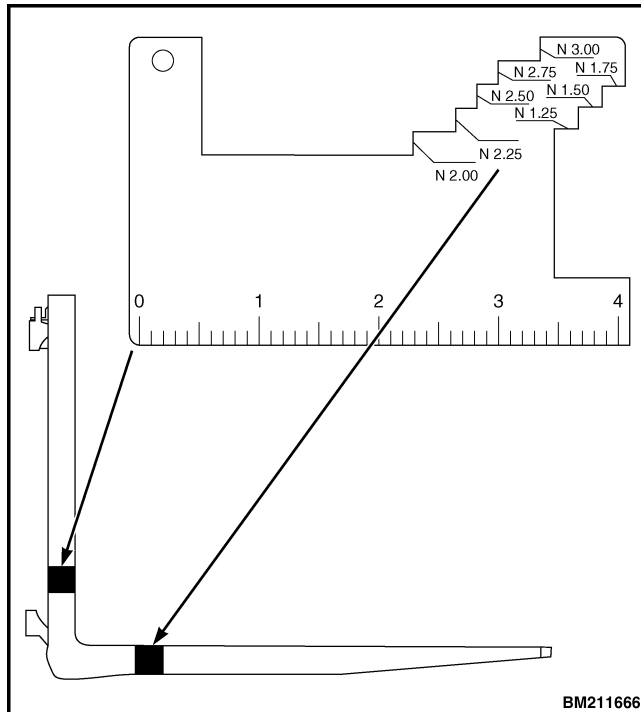


Figure 17. Forks Wear Check

### Install



#### WARNING

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



#### CAUTION

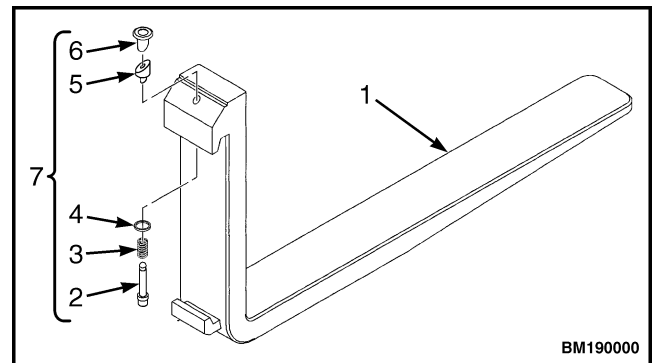
**Remove fork latch pins if adding a fork positioner attachment. Damage to forks and other carriage components can occur if fork latch pins are not removed prior to using attachment.**

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

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

1. Move fork and carriage so top hook on fork can engage upper carriage bar. Raise carriage to move lower hook through fork removal notch. Slide fork on carriage so that both upper and lower hooks engage carriage. Engage lock pin with a notch in upper carriage bar. See Figure 18.

2. If lift truck is equipped with a fork positioner attachment, install inner fork carriers using four capscrews. Tighten capscrews to 35 N•m (25 lbf ft). See Figure 14.



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

Figure 18. Fork Lock Pin Assembly

### Adjust

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

The forks are connected to the carriage by hooks and lock pins. See Figure 15. Lock pins are installed through the top fork hooks and fit into slots in the top carriage bar. If pin does not remain engaged in carriage slot, replace with new pin. Adjust forks as far apart as possible for maximum support of the load. Hook forks will slide along carriage bars to adjust for the load to be lifted. Raise the lock pin in each fork to slide the fork on the carriage bar. Make sure lock pin is engaged in the carriage bar to lock fork in position after the width adjustment is made.

## Brake Fluid

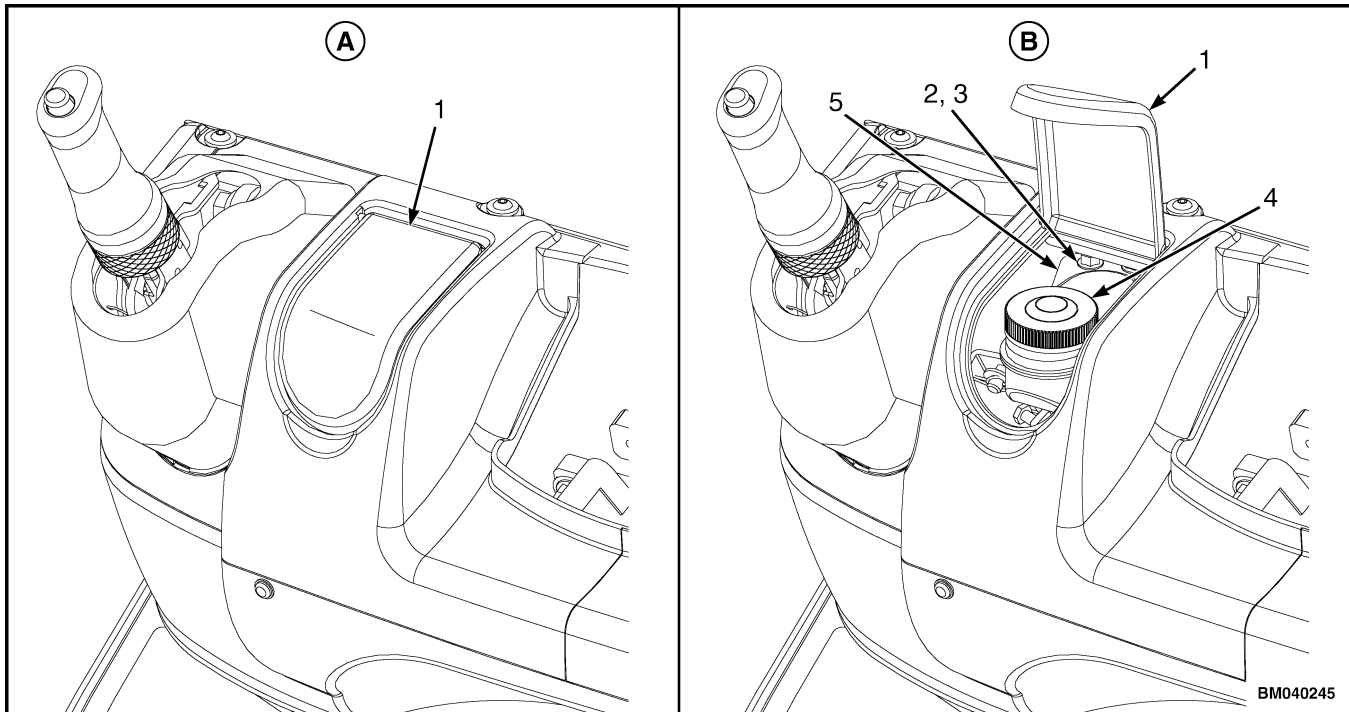
### **WARNING**

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

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

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

Open cover to brake fluid reservoir. Open reservoir and check fluid level. If fluid is low, fill to within 2.5 mm (0.1 in.) of max line on reservoir. See Figure 19.



A. COVER CLOSED

B. COVER OPEN

1. COVER
2. CAPSCREW
3. NUT

4. BRAKE FLUID RESERVOIR
5. MOUNTING BRACKET

*Figure 19. Brake Fluid Reservoir Cover*

## HOW TO MAKE CHECKS WITH ENGINE RUNNING

### **WARNING**

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

### **WARNING**

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

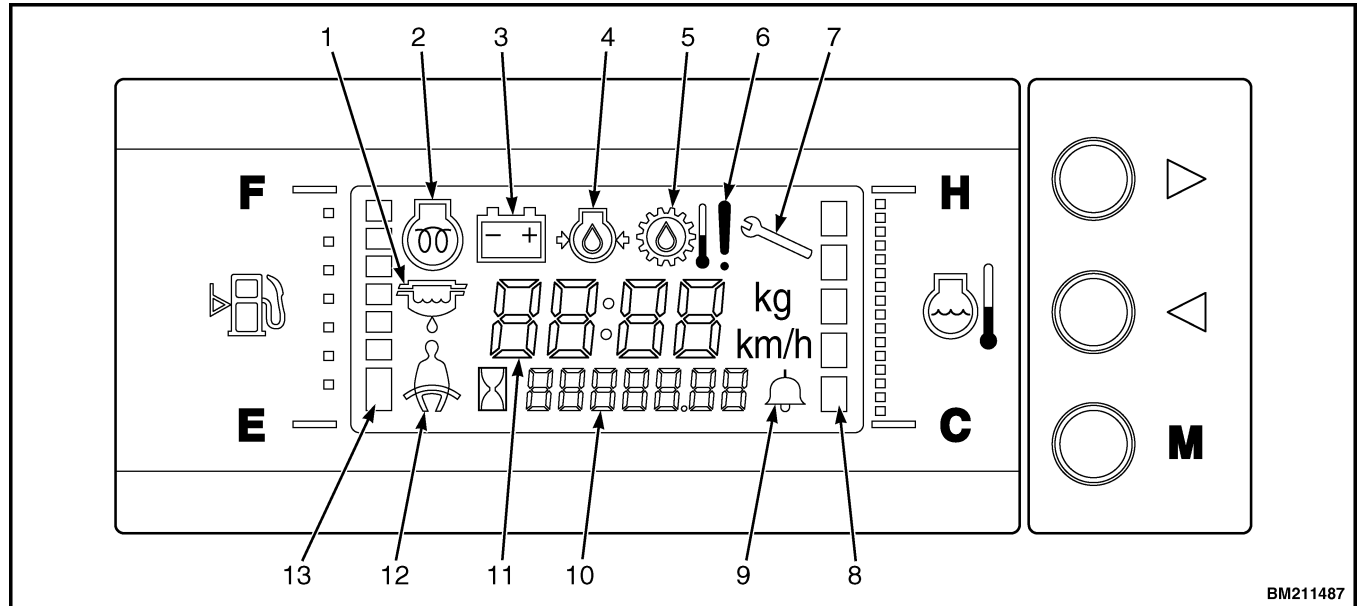
Make sure that the area around the lift truck is clear before starting the engine or making any checks of the operation. Be careful when making the checks. If the lift truck is stationary during a check, apply the parking

brake and put the transmission in **NEUTRAL**. Make the checks carefully.

**Indicator Lights, Horn, Fuses, and Relays**

If lift truck is equipped with a key switch, turn key to **ON** position. If lift truck is equipped with a Power **ON/OFF** button, press button to turn system power **ON**. All warning lights and indicator lights will light up for two seconds (start check) when system power is turned **ON**. See Figure 20. Check all indicator lights for

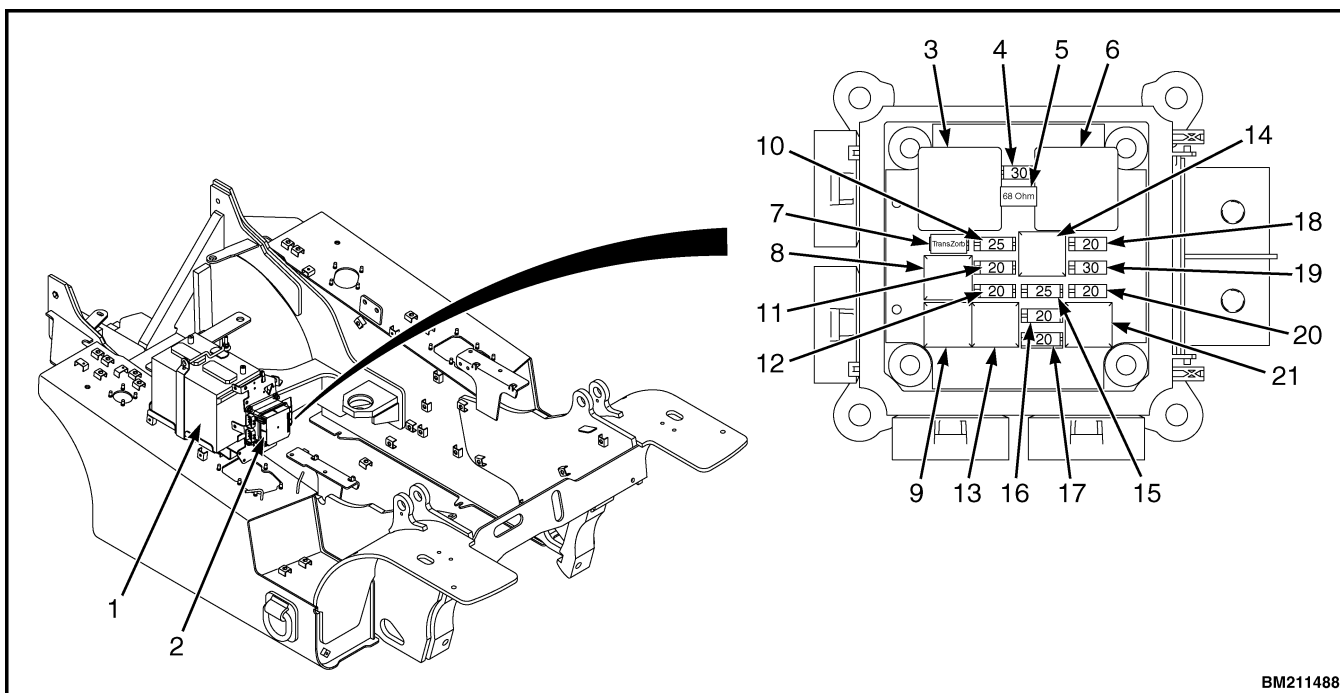
correct operation as described in the **Operating Manual**. Check the operation of the horn. Start the engine by turning the key switch to the **Start** position, if truck is equipped with a key switch, or press the engine start button, if lift truck is equipped with this button. If any indicator lights do not operate correctly, stop the engine and check the fuses. The fuses are located in the Power Distribution Module (PDM) which is under the hood and next to the battery on the right side. See Figure 21.



BM211487

Item	Warning and Indicator Light
1	Warning Light, Sedimenter Malfunction Indicator
2	Indicator Light, Cold Start (Diesel Only)
3	Warning Light, Alternator Malfunction Indicator
4	Warning Light, Engine Oil Pressure Malfunction Indicator
5	Warning Light, Torque Converter Oil Temperature Indicator
6	Indicator Light, Warning Symbol
7	Indicator Light, Maintenance Required
8	Warning Light, Engine Coolant Temperature Malfunction Indicator
9	Indicator Light, Alarm Set
10	Indicator Light, Hour Meter and Calendar
11	Indicator Light, Clock or Speedometer or Message
12	Indicator Light, Fasten Seat Belt Malfunction Indicator
13	Indicator Light, Fuel Amount

**Figure 20. Warning and Indicator Lights**



BM211488

**NOTE:** HOOD REMOVED FOR CLARITY.

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

**Figure 21. PDM Showing Fuses and Relays**

## Service Brakes

### Operation, Check

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

## Parking Brake

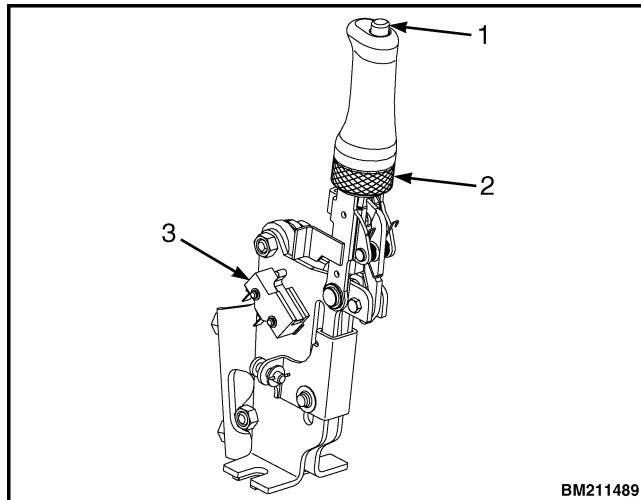
Check operation of parking brake. The lift truck with a capacity load must not move when parking brake is applied on a 15 percent grade [a slope that increases 1.5 m in 10 m (1.5 ft in 10 ft)].

Adjust parking brake by turning adjustment knob clockwise. See Figure 22.

Parking brake lever has a lock, pull lever rearward, then press lock release button when parking brake is released. See Figure 22.

### Lift trucks with aFoot Directional Control pedal.

When parking brake is applied, a switch in starting circuit is closed so engine can be started. Switch also places transmission in **NEUTRAL** when parking brake is applied.



1. LOCK RELEASE BUTTON
2. ADJUSTMENT KNOB
3. SWITCH

**Figure 22. Parking Brake**

## Engine Oil Pressure

There is an indicator light for the engine oil pressure on the Dash Display. During normal operation, the red indicator light will illuminate when the key switch is turned to **ON**, if the truck is equipped with a key switch, or when the power **ON/OFF** button is pressed, if the truck is equipped with this option, and will stay illuminated until correct oil pressure is obtained, at which time the light will go off.

If the light continues to stay on when engine is running, the engine oil pressure is low. Stop the engine and check the oil level. Do not restart the engine until the low pressure condition has been corrected.

See Figure 11 for lift trucks equipped with a Yanmar 2.6L diesel engine.

See Figure 13 for lift trucks equipped with a PSI 2.4L Bi-Fuel engine.

## Cooling System



### WARNING

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

There is a bar gauge on dash display for coolant temperature. All bars are on about 0.5 seconds when key switch is in **ON** position, and must indicate actual temp level when engine is running. As engine coolant temperature rises, bar level indicators appear in sequence from underneath. At intermediate position, coolant is at suitable temperature. If gauge indicates 5 bars when engine is running, coolant and engine are too hot. Display will show "Hi" as a warning. Display bar level indicator blinks and sounds a **WARNING** buzzer, if coolant temperature reaches 115°C (239°F) or above. See Table 2. Stop engine and check coolant level in auxiliary coolant reservoir. Make sure coolant level is between **ADD** and **FULL** marks on auxiliary coolant reservoir. See Figure 23. Coolant expands as it heats and the level in auxiliary coolant reservoir will increase.



### CAUTION

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

If coolant is added, see Maintenance Schedule for correct solution.



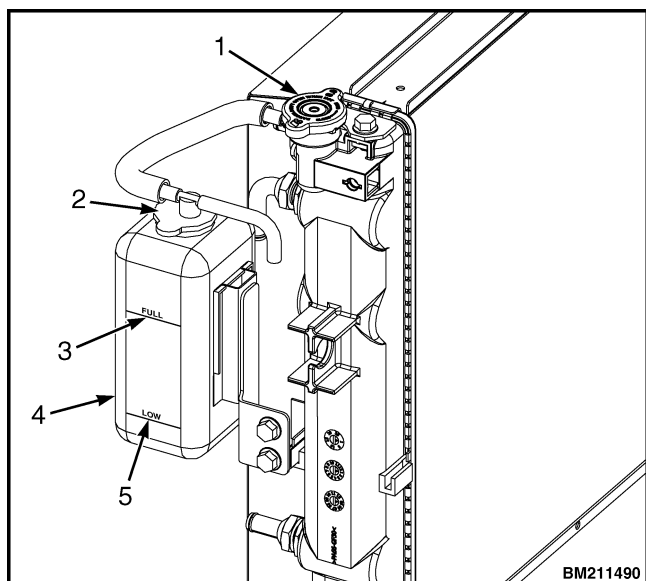
### WARNING

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

Check radiator fins. Turn engine **OFF** and clean the radiator with compressed air or water as needed. Check for and remove any debris on the radiator core. If **WARNING** buzzer sounds again after restarting, shut down lift truck and do not operate lift truck until problem is corrected.

**Table 2. Coolant Temperature Gauge**

Display and warning tone of coolant temperature gauge			
Bar level indicator	Warning condition	Warning display	Warning tone
5 blinking	Major warning	[ ! ] + [ Hi ]	Beep
5 lighted	Minor warning	[ ! ] + [ Hi ]	–
4 lighted	OK	–	–
3 lighted	OK	–	–
2 lighted	OK	–	–
1 lighted	OK	–	–



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

**Figure 23. Auxiliary Coolant Reservoir**

### Steering System

**WARNING**

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

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

### Control Levers and Pedals

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

### Lift System, Operate

**WARNING**

When working on or near the mast, see **Safety Procedures When Working Near Mast** at the end of this section.

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

If the mast cannot be lowered, use chains on the mast weldments and carriage so that they cannot move. Make sure the moving parts are attached to a part that does not move.

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

Perform the following checks and inspections:

1. Turn engine **OFF** and check for leaks in the hydraulic system. Check condition of hydraulic hoses and tubes.

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

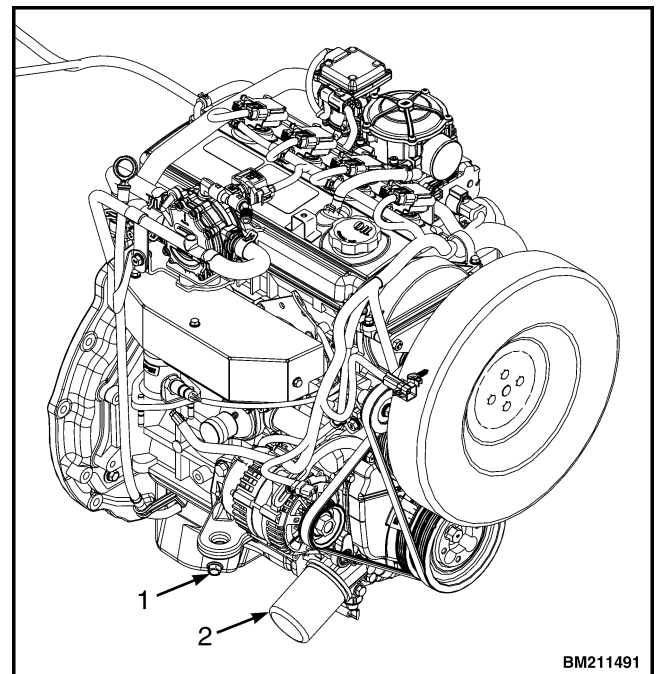
2. Slowly raise and lower mast several times without a load. Raise mast to its full height at least once. The mast components must raise and lower smoothly in the correct sequence. Hose must track properly during operation.
3. The inner weldments and the carriage must lower completely.
4. Raise the mast 1 m (3 ft) with a capacity load. The inner weldments and the carriage must raise smoothly. Lower the mast. All moving components must lower smoothly.
5. Lower the load to approximately 0.3 m (1 ft). Tilt mast forward and backward. The mast must tilt smoothly and both tilt cylinders must stop evenly.
6. Check that the controls for the attachment operate the functions of the attachment. See the symbols by each of the controls. Make sure all of the hydraulic lines are connected correctly and do not leak.

## First Service After First 100 Hours of Operation

### PSI ENGINE OIL AND OIL FILTER

**NOTE:** The engine oil and oil filter must also be changed after the first 100 hours of operation for a newly installed engine.

Start the engine and run until it reaches normal operating temperature. Shut engine off. Remove drain plug and allow the oil to drain into the container. Remove and discard oil filter and filter gasket. Coat new sealing ring on the new filter with clean engine oil; wipe the sealing surface on the filter mounting surface to remove any dust, dirt, or debris. Install and tighten filter securely. DO NOT over tighten. Check drain plug gasket for damage, replace if necessary. Wipe plug with clean rag; wipe oil pan surface with clean rag and re-install plug into oil pan. Tighten plug to 39 N•m (29 lbf ft). See Figure 24. Fill engine oil, see Maintenance Schedule for correct quantity and oil type. Start engine. Check area around oil filter for leaks.



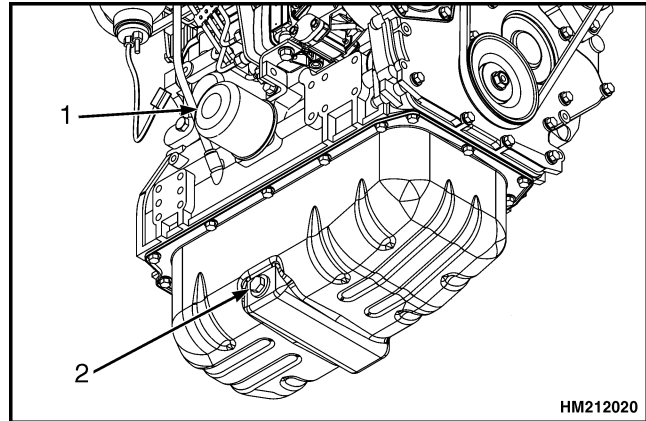
1. DRAIN PLUG
2. OIL FILTER

**Figure 24. Engine Oil Change - PSI 2.4L Engine**

## YANMAR ENGINE OIL AND OIL FILTER

**NOTE:** The engine oil and oil filter must also be changed after the first 100 hours of operation for a newly installed engine.

Turn engine **OFF** and change engine oil and oil filter. Apply clean oil to gasket of new filter. Install new filter. Turn filter until gasket touches, then tighten  $\frac{1}{2}$  to  $\frac{3}{4}$  turn with your hand. Fill engine with oil as specified in Maintenance Schedule, until full mark reached on the dipstick. Start engine. Check area around oil filter for leaks, shut engine off and check oil dipstick, if low add oil. See Figure 25.



**NOTE:** BOTTOM VIEW OF ENGINE SHOWN.

1. OIL FILTER
2. DRAIN PLUG

*Figure 25. Engine Oil Change - Yanmar Engines*

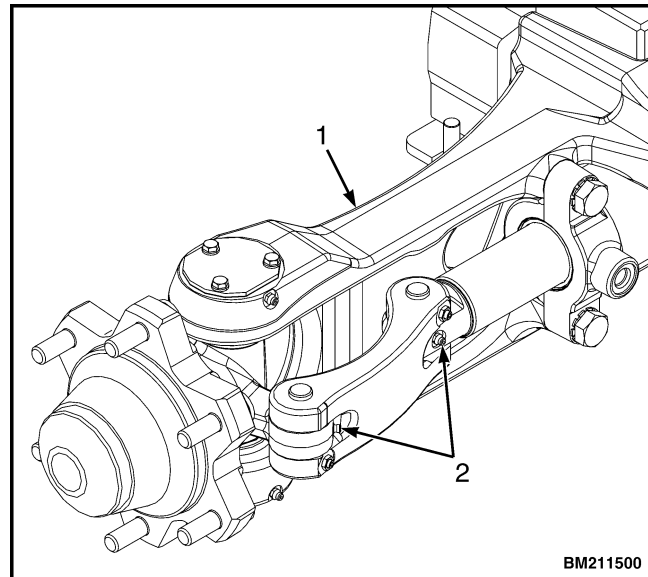
## Maintenance Procedures Every 300 Hours

### TIE ROD LUBRICATION

**NOTE:** Heavy-duty, dirty, or wet conditions will require lubrication of tie rods on a weekly basis.

Lubricate tie rods. Use multipurpose grease shown in Maintenance Schedule. There are two lubrication fittings on each tie rod. See Figure 26.

1. After initial lubrication, turn each steer wheel and lubricate again.
2. Repeat Step 1 two more times for each wheel.



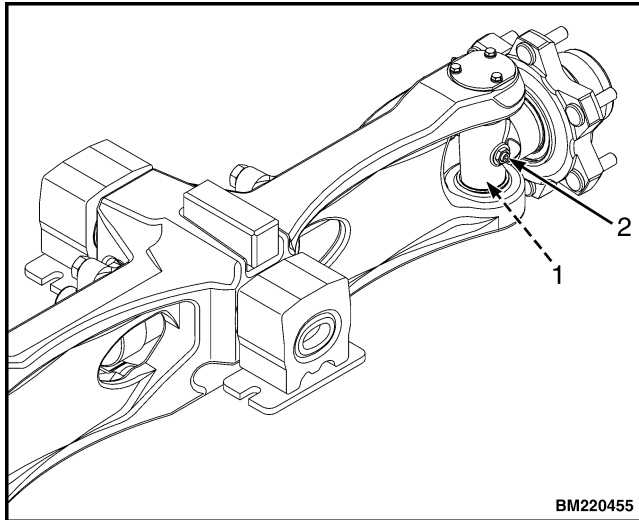
1. AXLE
2. LUBRICATION FITTING

*Figure 26. Tie Rod Lubrication*

### KING PIN LUBRICATION

Lubricate steering axle king pins. Use multipurpose grease shown in Maintenance Schedule. See Figure 27.





**Figure 27. King Pin Lubrication**

**Legend for Figure 27.**

1. KING PIN
2. LUBRICATION FITTING

## Maintenance Procedures Every 500 Hours or 1 Year

**NOTE:** Perform Maintenance Procedures Every 8 Hours or Daily and checks prior to performing procedures in this section.

### HYDRAULIC SYSTEM OIL



#### WARNING

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



#### CAUTION

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

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

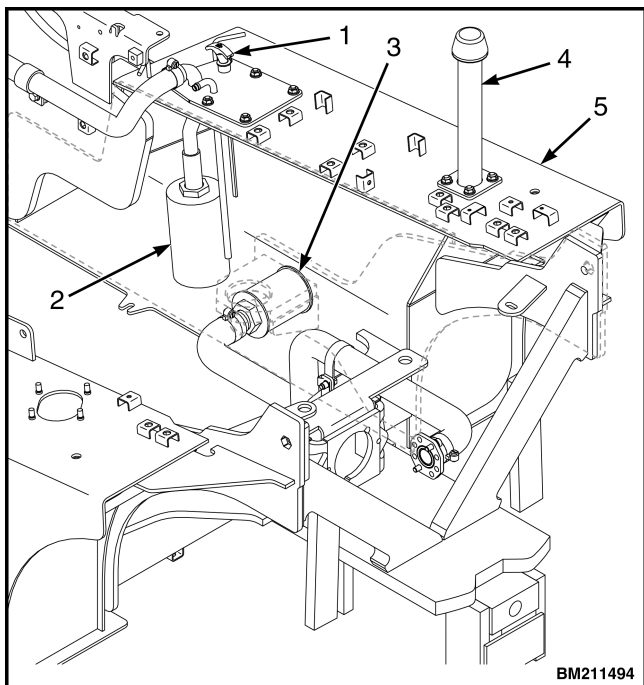


#### CAUTION

Additives may damage the hydraulic system. Before using additives, contact your local Yale dealer.

Check hydraulic oil level when oil is at operating temperature with mast in a vertical position, carriage lowered, and engine stopped. See Figure 28.

Add hydraulic oil only as needed. If hydraulic oil is above **FULL** level, hydraulic oil will leak from breather during operation. Oil level indicated by dipstick is most accurate when oil temperature is 53 to 93°C (130 to 200°F).



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

**Figure 28. Hydraulic Oil Check**

## BATTERY



### WARNING

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



### WARNING

**Batteries generate explosive fumes. Keep the vents in the caps clean. Keep sparks or open flame away from the battery area. DO NOT make sparks from the battery connections. Disconnect the battery ground cable when doing maintenance.**

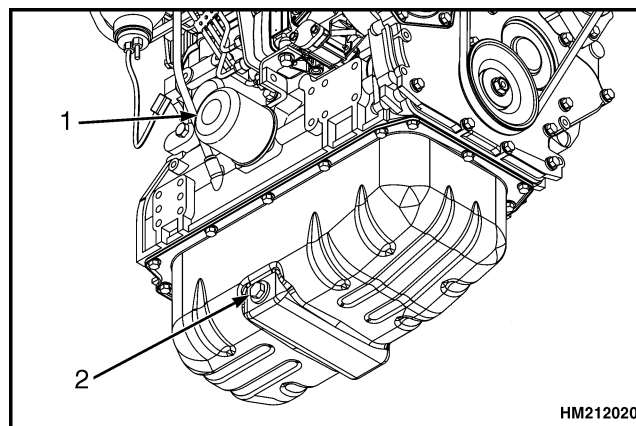
Disconnect negative and positive terminals of battery. Using a damp cloth, clean battery case. If terminals are corroded, clean terminals with a wire brush.

Connect negative and positive cables to their respective terminals.

## YANMAR ENGINE OIL AND OIL FILTER CHANGE

**NOTE:** Change oil and oil filter for engine at first 100 hours of operation on new lift trucks.

Change engine oil and engine oil filter. See Maintenance Schedule for correct oil type and amount. Apply clean oil to gasket of new filter. Install new filter. Turn filter until gasket touches, then tighten 1/2 to 3/4 turn with your hand. Start engine. Check area around oil filter for leaks. See Figure 29.



**NOTE:** BOTTOM VIEW OF ENGINE SHOWN.

1. OIL FILTER
2. DRAIN PLUG

**Figure 29. Engine Oil Change - Yanmar Diesel**

## DRIVE BELT

### Yanmar Diesel Engine

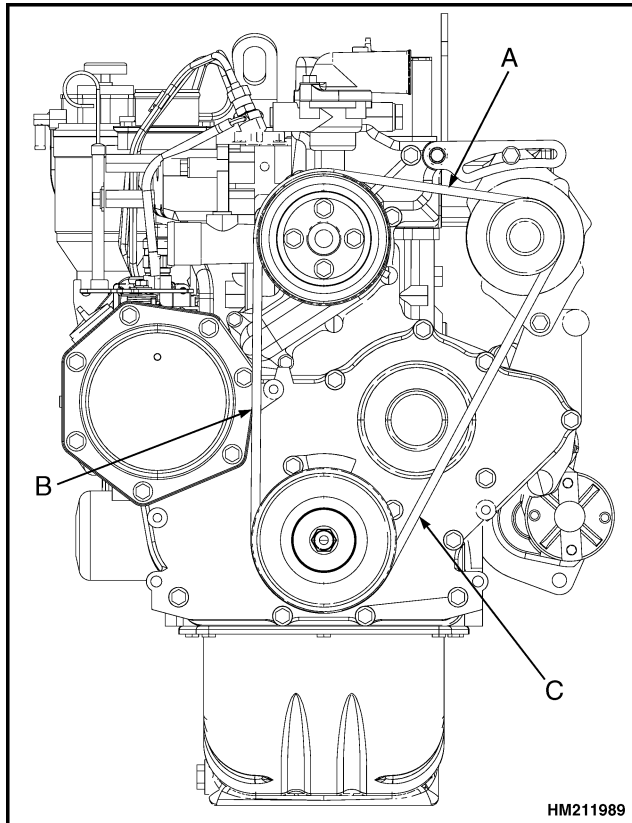
#### Fan and Alternator Drive Belt

**NOTE:** Drive belt tension may be checked at any of three positions A, B, or C shown in Figure 30 which ever is most easily accessible.

Check drive belt for fan and alternator for wear and damage. Check tension by pushing on drive belt with a force of 98 N (22 lbf) to check deflection at any one of three possible positions. See Figure 30. Check Table 3 for correct deflection of V-belt. Loosen alternator support bracket bolt to adjust tension of belt. See Figure 31. When tension of V-belt is correct, tighten alternator support bracket bolt, and check belt tension again.

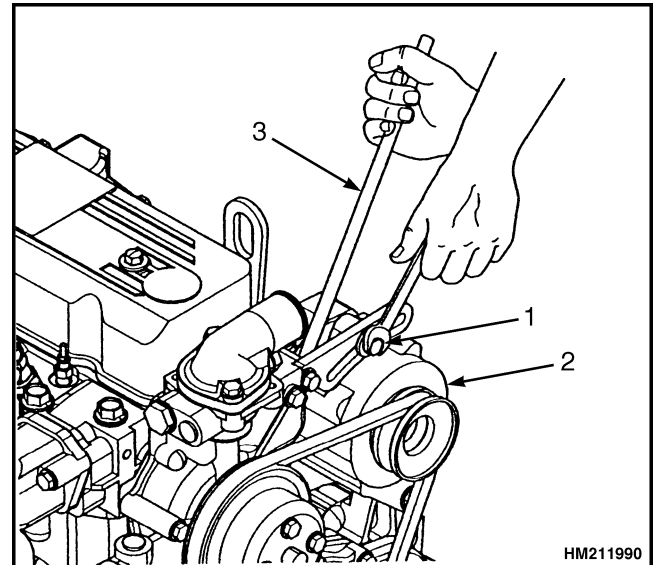
Table 3. V-Belt Deflection Table

Used V-Belt Tension			New V-Belt Tension		
A	B	C	A	B	C
10-13 mm (0.375-0.5 in.)	7-10 mm (0.250-0.375 in.)	8-13 mm (0.3125-0.5 in.)	8-11 mm (0.3125-0.4375 in.)	5-8 mm (0.1875-0.3125 in.)	7-11 mm (0.250-0.4375 in.)



**NOTE:** SEE TABLE 3 FOR DEFLECTION MEASUREMENTS A, B, AND C.

**Figure 30. Yanmar Diesel Engine Drive Belt**



1. SUPPORT BRACKET BOLT
2. ALTERNATOR
3. PRY BAR

**Figure 31. Yanmar Diesel Engine Drive Belt Adjustment**

## CLEAN DEBRIS FROM RADIATOR CORE

Check radiator core for restrictions and remove material causing radiator core to be plugged or restricted.



### WARNING

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

Clean with compressed air, adjusted to a maximum output of 103 kPa (15 psi), and blow debris from core and fan shroud.

**TRANSMISSION OIL LEVEL****WARNING**

At operating temperature, the transmission oil is **HOT**. **DO NOT** permit the hot oil to touch the skin and cause a burn.

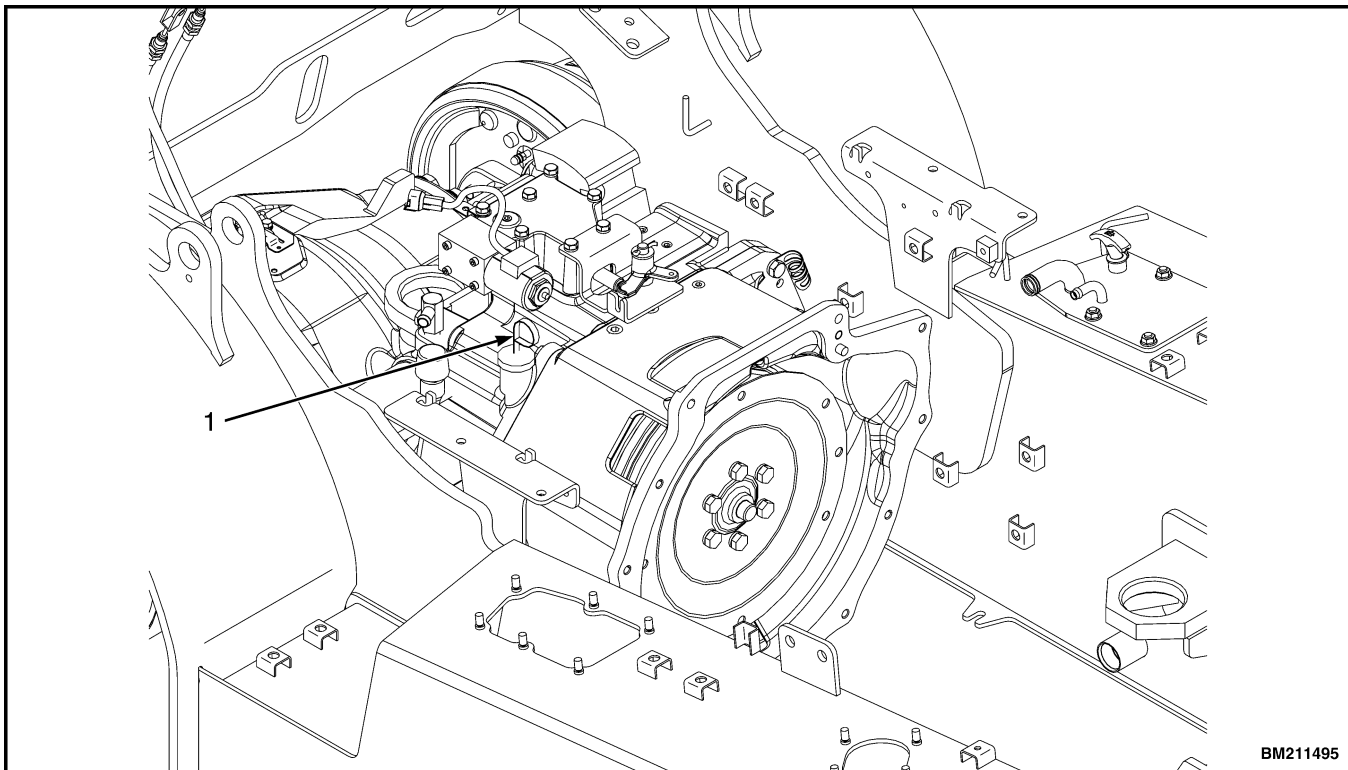
**CAUTION**

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

**NOTE:** Transmission oil temperature should be at least 50°C (120°F) when checking oil level.

If engine has been running, engine must be shut down for one minute or longer prior to checking oil level. See Figure 32.

If transmission oil is low, add oil to transmission at dipstick tube at correct level as indicated on dipstick. Use correct oil as shown in Maintenance Schedule.



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1. TRANSMISSION OIL DIPSTICK

**Figure 32. Transmission Oil Check**

**FORKS****WARNING**

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

Never repair damaged forks. **DO NOT** heat, weld, or bend the forks. Forks are made of special steel using special methods. Replace damaged forks as a complete set.

1. Inspect forks for cracks and wear. Check that fork tips are aligned as shown in Figure 16. Check that bottom of fork is not worn (item 4, Figure 16).

**CAUTION**

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

2. Replace any damaged or broken parts that are used to keep forks locked in position.
3. Inspect fork wear. Ensure heel wear is not more than 10% of original thickness. If fork wear is more than 10%, fork must be replaced or rerated. Perform fork wear inspection using a BOL256N1 caliper ruler Yale P/N 550088603 as follows. See Figure 17.
  - a. Determine normal thickness of "N" of fork using scale or ruler portion of caliper ruler. Measurement has to be done on fork shank using caliper ruler.
  - b. Position caliper at end of heel internal radius (item 4, Figure 16) with opening corresponding to measured thickness of fork shank in Step a above. (e.g. for N 1.75 use N 1.75 opening). This is typically the section of fork where wear is greatest. Note that opening distance has been reduced by 10% from nominal thickness.
  - c. If fork enters opening, it is mandatory to replace it. DANGER OF BREAKING. Furthermore, a 10% reduction in fork blade thickness results in 20% reduction in operating capacity.

## MAST LUBRICATION

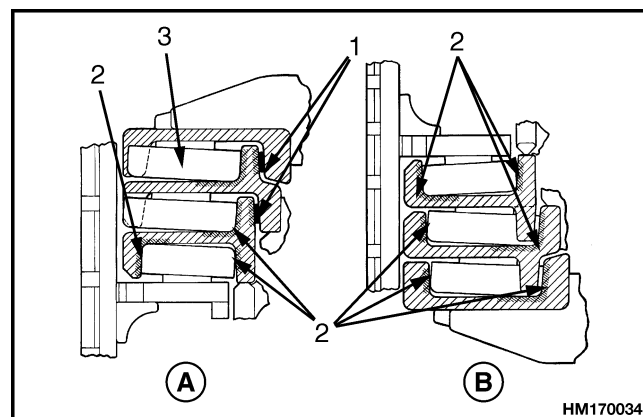


### WARNING

When working on or near the mast, see **Safety Procedures When Working Near Mast** in this section.

**NOTE:** Load rollers and sheaves have sealed bearings and do not need additional lubrication.

1. Lubricate sliding surfaces and load roller surfaces along full length of channels as shown in Figure 33.



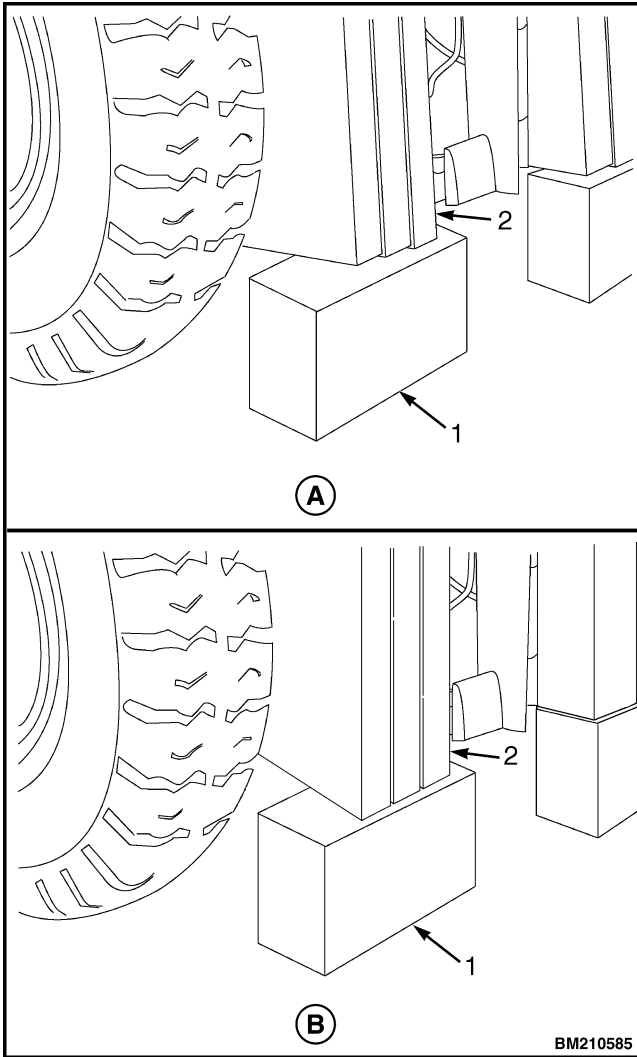
- A. UPPER LOAD ROLLERS  
B. LOWER LOAD ROLLERS

1. LUBRICATE STRIP BEARING SURFACES
2. LUBRICATE LOAD ROLLER SURFACES
3. LOAD ROLLER

**Figure 33. Mast Lubrication**

**NOTE:** When lubricating mast mounting/pivot pins, load must be removed from normal contact surface to allow grease to properly lubricate normal contact surfaces of mast bushings.

2. Raise carriage about 61 cm (2 ft), and tilt mast fully back. Place blocks under outer mast channels to within 13 mm (0.5 in.) of channels. See Figure 34.
3. Tilt mast fully forward. See Figure 34.

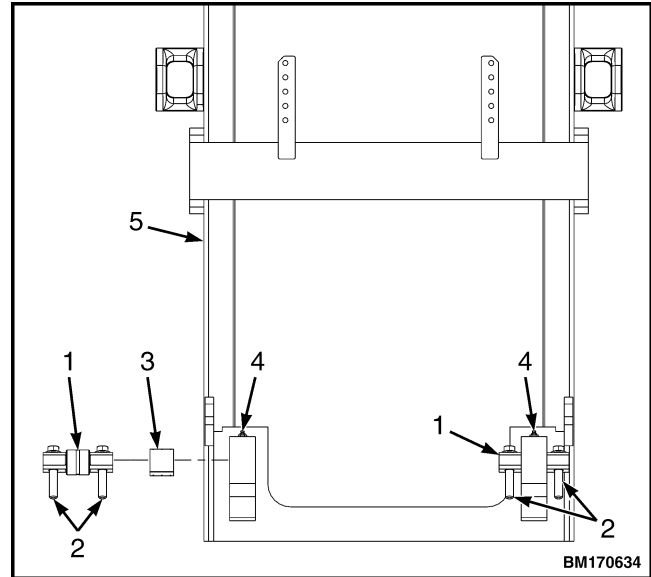


- A. MAST TILTED FULLY BACK
- B. MAST TILTED FORWARD

- 1. BLOCK
- 2. MAST

**Figure 34. Blocking the Mast**

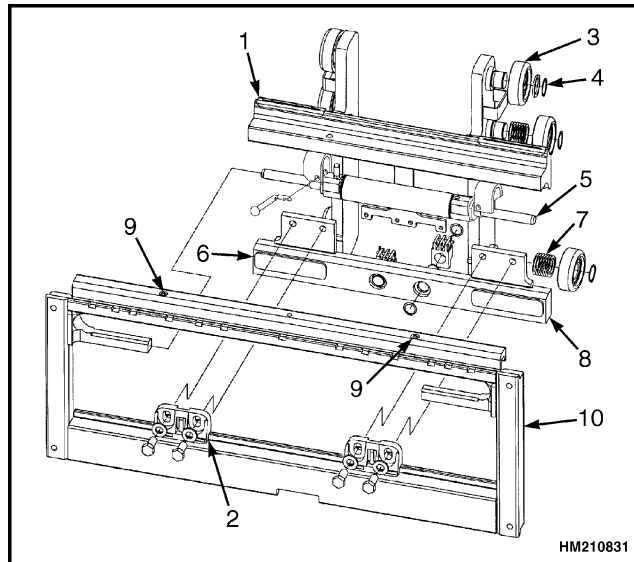
- 4. Lubricate mast pivot bushings at grease fittings on outer mast. Use multipurpose grease shown in the Maintenance Schedule. See Figure 35.



- 1. MAST PIVOT PIN
- 2. CAPSCREW
- 3. BUSHING (BRONZE)
- 4. LUBRICATION FITTING
- 5. OUTER MAST

**Figure 35. Pivot Pin Lubrication**

- 5. Tilt mast fully back. Remove blocks from under channels.
- 6. If a integral sideshift carriage is installed, lubricate sliding surfaces at grease fittings with multipurpose grease shown in the Maintenance Schedule. See Figure 36.



1. UPPER BEARINGS
2. LOWER HOOKS
3. LOAD ROLLER
4. SNAP RING
5. SIDESHIFT CYLINDER
6. LOWER BEARINGS
7. SHIMS
8. INNER CARRIAGE
9. LUBE FITTINGS
10. OUTER FRAME

**Figure 36. Integral Sideshift Carriage**

### HEADER HOSE CHECKS

Daily inspection plus; kinked, crushed, flattened or twisted hose; hard, stiff or charred hose; hose fitting

slippage; proper hose tensioning. Adjust/repair/replace hose/components as necessary. For quick disconnect procedures, see **Mast Repair (S/N A387, A389, A397, A399) 4000YRM1999**.

### LIFT CHAIN LUBRICATION



#### WARNING

When working on or near the mast, see **Safety Procedures When Working Near Mast** in this section.

**DO NOT** repair worn or damaged lift chains. If a lift chain is worn or damaged, both lift chains must be replaced.

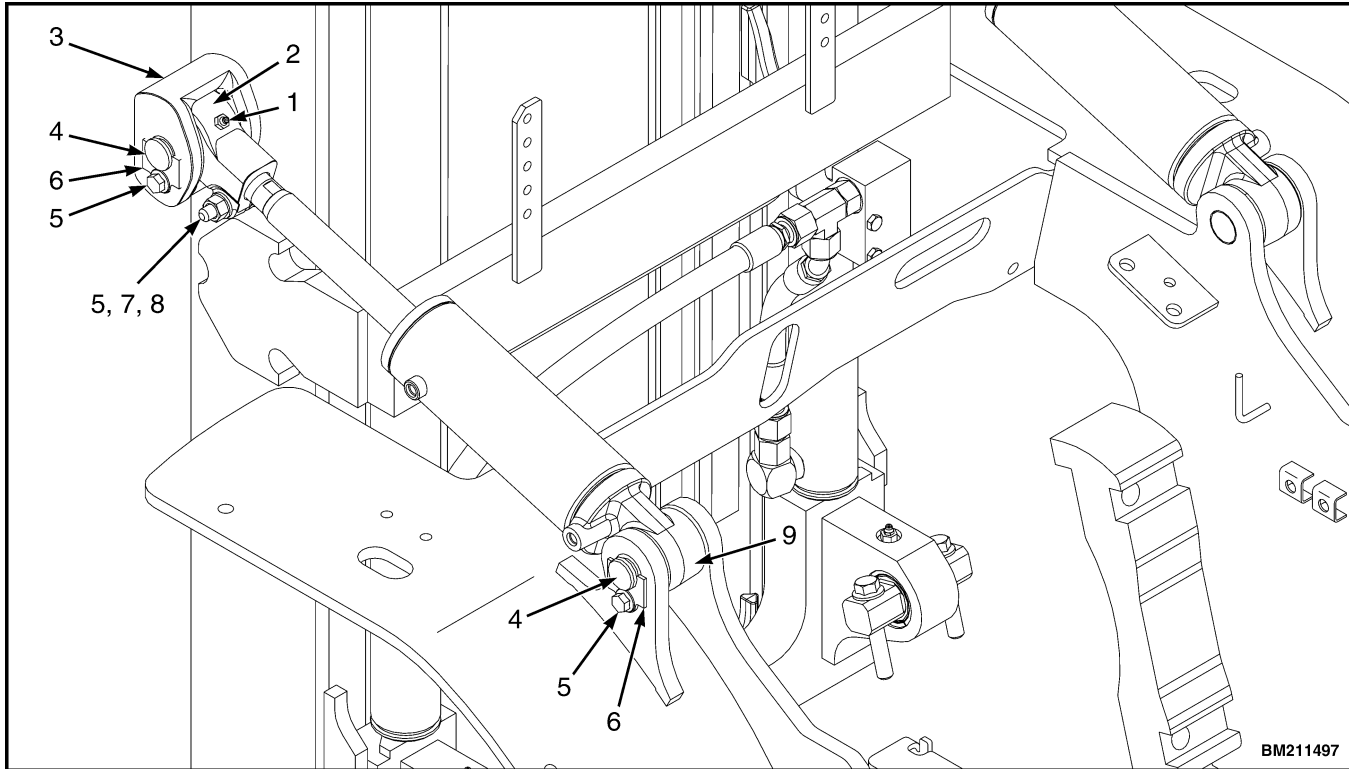
**NOTE:** The 500 Hour/1 Year lift chain lubrication should not be performed in combination with the 1000 Hour/1 Year lift chain lubrication.

Lubricate lift chains with SAE 30W engine oil. Best procedure is to remove chains from lift truck and soak them in engine oil. Be sure to clean any dirt or grease from chains before lubricating. **DO NOT USE STEAM TO CLEAN THE LIFT CHAINS.**

### TILT CYLINDER LUBRICATION

**NOTE:** Floor plate must be removed in order to lubricate rear tilt cylinder lubrication fittings.

Lubricate tilt cylinder ends. Use multipurpose grease shown in Maintenance Schedule. There are two lubrication fittings. See Figure 37.



**NOTE:** HYDRAULIC HOSES ARE NOT SHOWN FOR CLARITY.

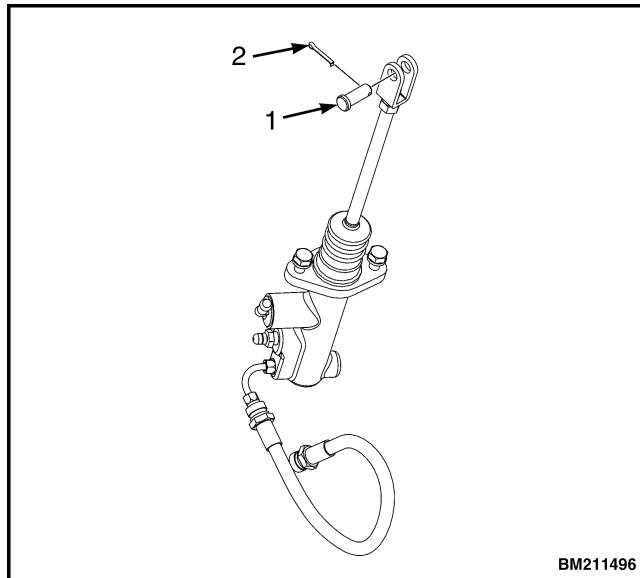
- |                                       |                         |
|---------------------------------------|-------------------------|
| 1. LUBRICATION FITTING                | 6. RETAINING PLATE      |
| 2. ROD END WITH BUSHING AND SNAP RING | 7. NUT                  |
| 3. TILT ANCHOR                        | 8. WASHER               |
| 4. TILT CYLINDER PIN                  | 9. ROD END WITH BUSHING |
| 5. CAPSCREW                           |                         |

**Figure 37. Tilt Cylinder Lubrication**



## MASTER BRAKE CYLINDER ROD END PIN LUBRICATION

Lubricate master brake cylinder rod end pin. Use engine oil as shown in the Maintenance Schedule. See Figure 38.

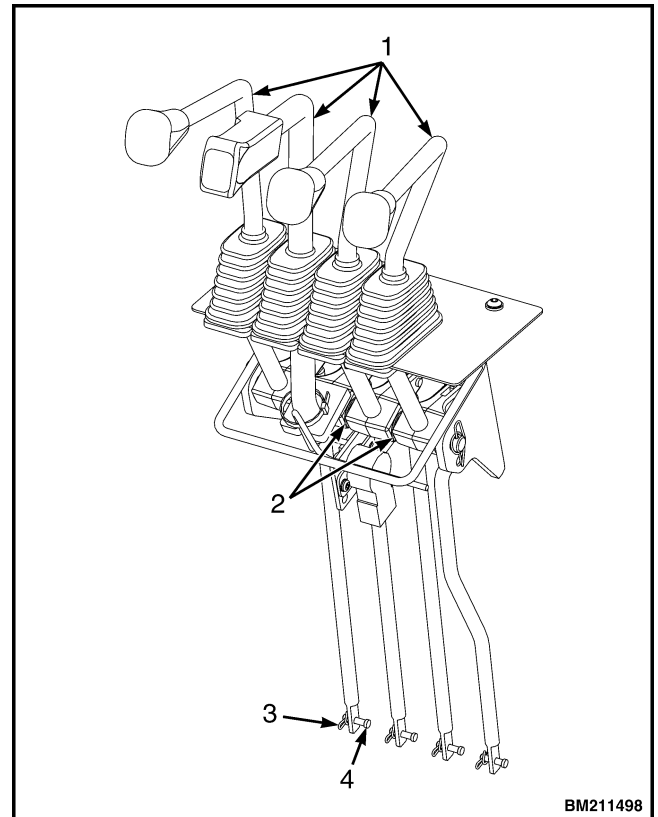


1. ROD END PIN
2. COTTER PIN (LOCKING)

*Figure 38. Master Brake Cylinder Rod End Pin Lubrication*

## MANUAL HYDRAULIC LEVERS LUBRICATION

Lubricate bushings for manual hydraulic levers. Use spray lubricant as listed in Maintenance Schedule. See Figure 39.



**NOTE:** FOUR FUNCTION LEVERS WITH RTST SHOWN.

1. HYDRAULIC LEVERS
2. BUSHINGS
3. LOCKING RING (COTTER PIN)
4. ROD END PIN

*Figure 39. Manual Hydraulic Levers Lubrication*

## BRAKE FLUID



### WARNING

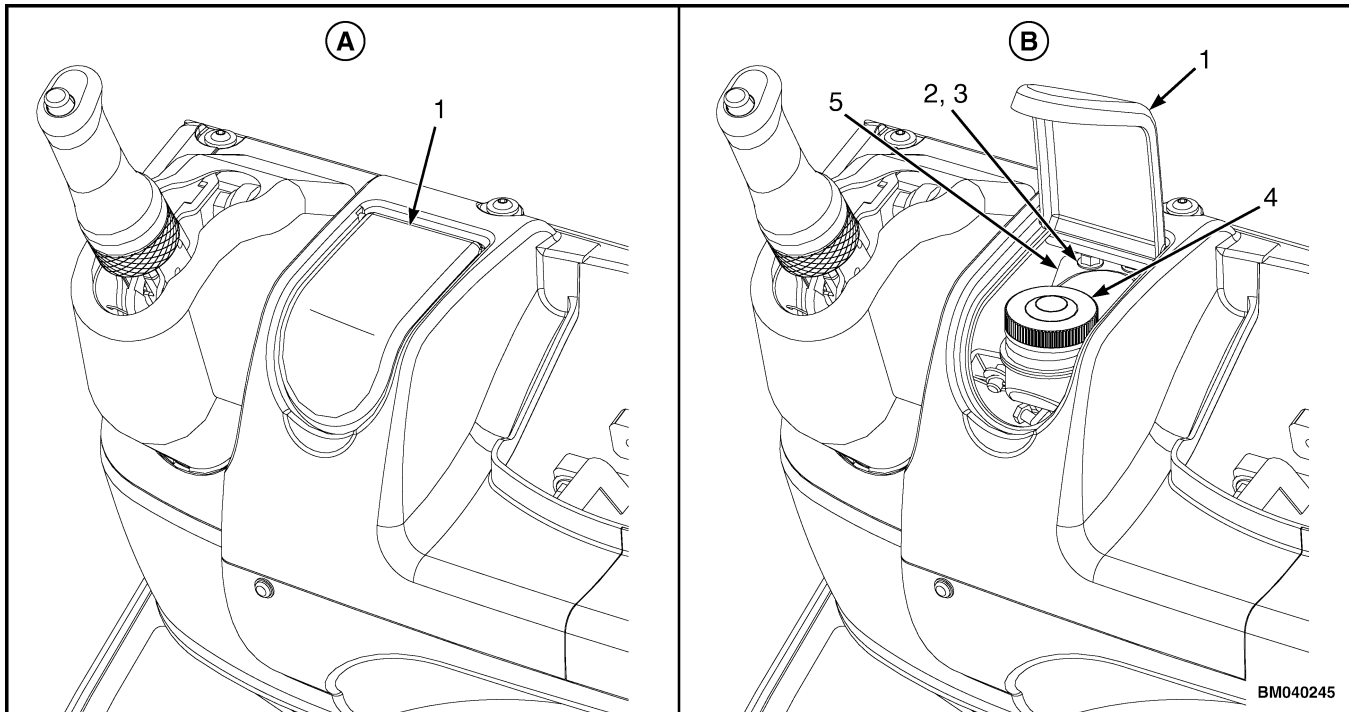
Small amounts of water in the brake system can cause reduced braking performance if the water reaches the wheel cylinder areas. **DO NOT** allow water entry. Ensure that the sealed reservoir lid is properly replaced.

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

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

Open cover to brake fluid reservoir. Brake fluid reservoir is located on cowl, at master cylinder. Add

brake fluid, as necessary. Use brake fluid shown in Maintenance Schedule. See Figure 40.



A. COVER CLOSED

- 1. COVER
- 2. CAPSCREW
- 3. NUT

B. COVER OPEN

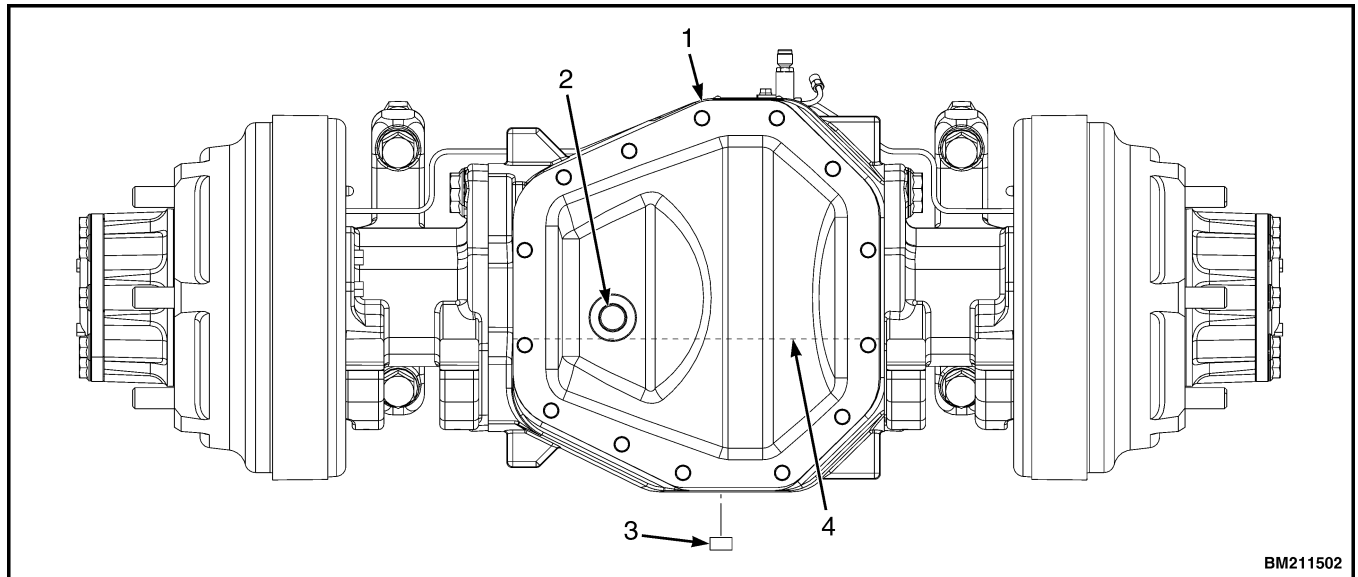
- 4. BRAKE FLUID RESERVOIR
- 5. MOUNTING BRACKET

**Figure 40. Brake Fluid Reservoir Cover**

**DIFFERENTIAL AND DRIVE AXLE OIL**

differential and drive axle use same oil supply. Oil level must be between 0 to 10 mm (0 to 0.40 in.) below bottom edge of fill hole. Fill hole for checking oil level is on front of differential housing. Remove fill plug and check fluid level by sticking a finger into fill hole to feel

if fluid level is at bottom edge of fill hole. See Figure 41. If oil is low, add oil shown in Maintenance Schedule until oil level is between 0 to 10 mm (0 to 0.40 in.) below bottom edge of fill hole. Install fill plug and check for leaks.



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- |                    |                          |
|--------------------|--------------------------|
| 1. DRIVE AXLE      | 3. DRAIN PLUG            |
| 2. CHECK/FILL PLUG | 4. FILL LINE (OIL LEVEL) |

**Figure 41. Drive Axle Fluid Fill**

## Maintenance Procedures Every 1000 Hours or 1 Year

**NOTE:** Perform Maintenance Procedures Every 8 Hours or Daily and Maintenance Procedures Every 500 Hours or 1 Year checks prior to performing procedures in this section.

### VALVE CLEARANCE, CHECK AND ADJUST, YANMAR ENGINES

Check valve clearance on Yanmar engines and make adjustment as needed. See Maintenance Schedule for valve clearances.

Additional engine information is available in the following:

- **Yanmar Diesel Engines** 0600YRM1205

### PCV VALVE, PSI ENGINES

Remove PCV Valve (positive crankcase ventilation valve) from valve cover. Check operation of the PCV Valve by shaking PCV Valve and listening for check ball rattling inside. If check ball does not rattle, replace PCV Valve.

See Figure 10 for lift trucks equipped with PSI LPG engine.

See Figure 13 for lift trucks equipped with PSI Bi-Fuel engine.

### DRIVE BELT CHECK, PSI ENGINES

See **PSI 2.4L Engine** 0600YRM1755 for belt check instructions and replacement procedures.

### LPG FUEL FILTER REPLACE, PSI ENGINES

#### Remove



#### WARNING

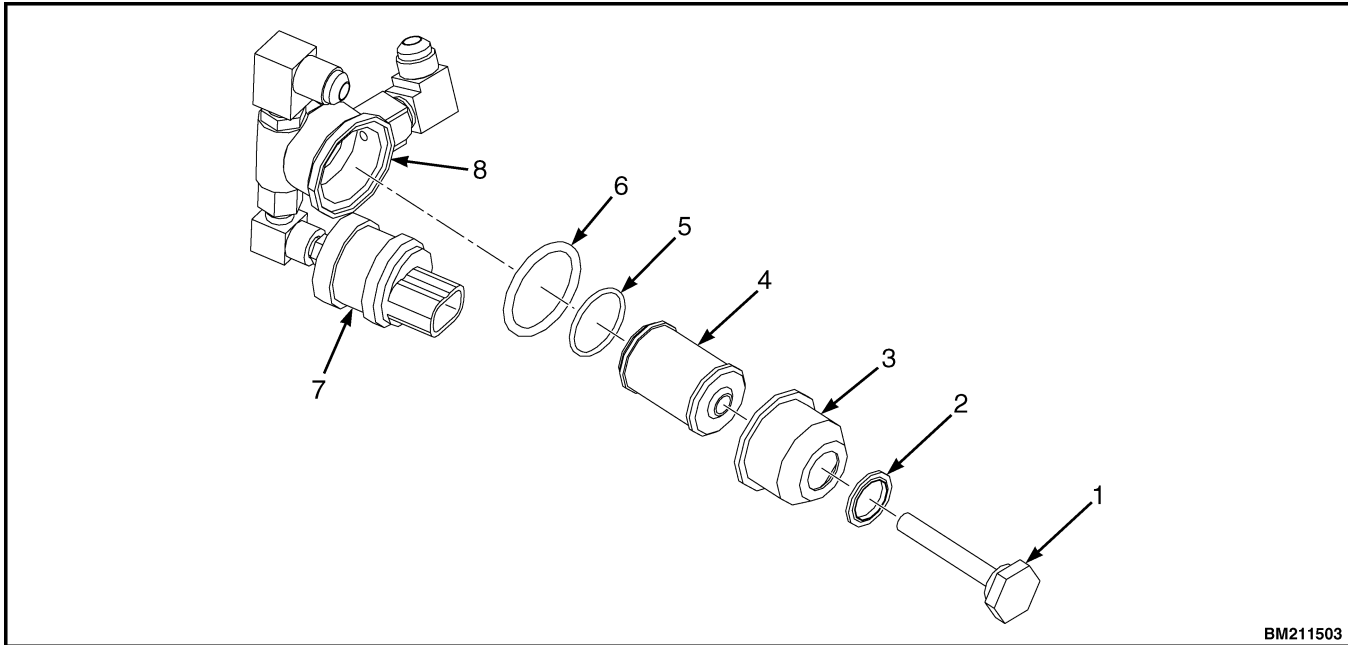
**LPG can cause an explosion. DO NOT permit any sparks or open flames in the work area.**

1. Close fuel valve on tank and run engine until it runs out of fuel and stops. Try to restart engine 2-3 times until it no longer starts.
2. Open hood and disconnect negative battery cable.

 **WARNING**

A small amount of fuel may still be present in the fuel line. Use gloves to prevent burns and wear eye protection. If liquid fuel continues to flow from the connections when loosened, check to make sure the manual valve is fully closed.

3. Remove the bolt and seal washer from the fuel filter housing top section. Discard seal washer. See Figure 42.



BM211503

- |                                     |  |
|-------------------------------------|--|
| 1. BOLT*                            | 5. FUEL FILTER O-RING                  |
| 2. SEAL WASHER                      | 6. HOUSING O-RING                      |
| 3. FUEL FILTER HOUSING TOP SECTION* | 7. FUEL FILTER HOUSING BOTTOM SECTION* |
| 4. FUEL FILTER                      | 8. LOW PRESSURE SWITCH                 |

\*not service separately

**Figure 42. PSI LPG Fuel Filter Remove/Install**

4. Remove fuel filter housing top section from fuel filter housing bottom section.
5. Remove and discard housing o-ring.
6. Remove and discard fuel filter and fuel filter o-ring.

### Clean/Inspect

1. Clean and inspect fuel filter housing top section for contamination or damage. If damaged, replace housing.
2. Clean and inspect fuel filter housing bottom section for contamination or damage. If damaged, replace housing.

### Install

1. Install new fuel filter and fuel filter O-ring. See Figure 42.
2. Install new housing O-ring.
3. Install fuel filter housing top section onto fuel filter housing bottom section.
4. Install new seal washer and bolt. Tighten bolt to 13 N•m (115 lbf in).

**NOTE:** Opening fuel valve too quickly can cause internal excess flow valve to close, restricting flow of fuel. If this happens, close fuel valve, wait a few seconds, and then slowly open fuel valve again. This will reset excess flow valve.

5. Slowly open fuel valve on tank.
6. Connect negative battery cable and close hood.
7. Turn key or keyless switch to **ON** position and back to **OFF** position to pressurize fuel system.
8. Check for leaks at connections by using soapy solution or electron leak detector. If leaks are detected, make proper repairs.

## GASOLINE FUEL SYSTEM, PSI 2.4L BI-FUEL ENGINE

### Remove and Disassemble

1. Disconnect fuel pump connector on wiring harness from fuel pump.
2. Run the engine until it runs out of fuel and stops.
3. Try to restart engine 2-3 times until it no longer starts.
4. Stop engine and allow it to cool.
5. Disconnect electrical connector from manifold assembly connector.

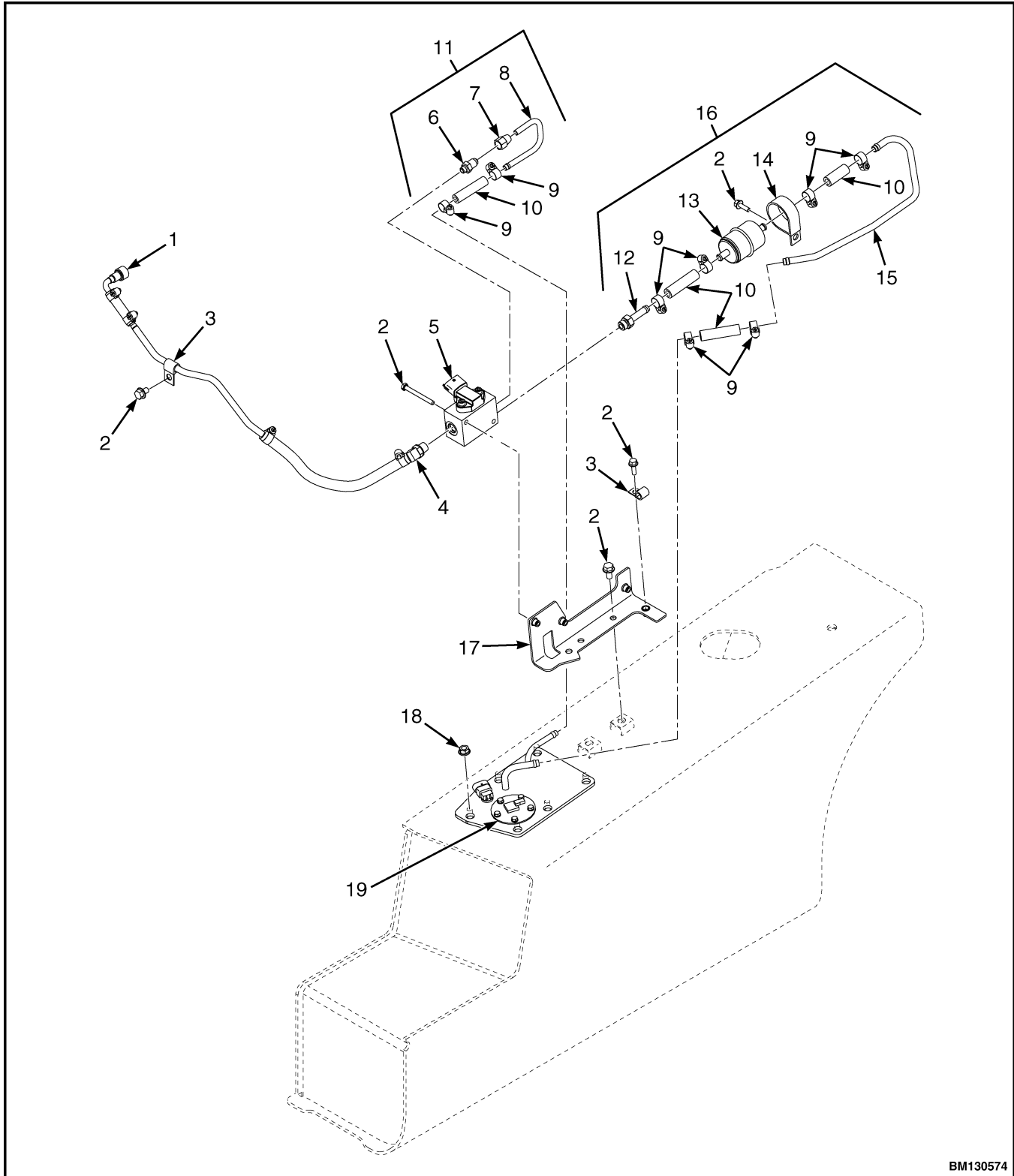
**NOTE:** See Figure 43 for Step 6 through Step 19.

6. Disconnect fitting (1) from fuel rail of bi-fuel engine.
7. Remove capscrew (2) and insulated clamp (3) from transmission adapter.
8. Disconnect fitting (4) from manifold assembly (5). Remove hoses, tubes, clamps, and fittings attached to fittings (1 and 4) from engine.
9. Disconnect supply fitting (6) from manifold assembly (5).
10. Loosen clamp (9) and remove tube assembly (11) from mounting plate (19).

11. Disconnect supply fitting (6) from fitting (7). Remove fitting (7) from fuel return tube (8). Loosen clamps (9) and remove fuel return tube (8) from hose (10).
12. Disconnect fitting (12) from manifold assembly (5).
13. Remove capscrew (2) from bracket (17) and filter clamp (14).
14. Loosen clamps (9) and remove fuel supply tube assembly (16) from mounting plate (19).
15. Loosen clamps (9) and separate fitting (12), hoses (10), fuel filter with filter clamp (13 and 14), and fuel supply tube (15).
16. Remove two capscrews (2) and manifold assembly (5) from bracket (17).
17. Remove four capscrews (2) and bracket (17) from frame.
18. Remove six nuts (18) from mounting plate (19).
19. Remove clamp (14) from fuel filter (13).

**NOTE:** See Figure 44 for Step 20 through Step 27.

20. Disconnect electrical connector from fuel pump harness jumper (1).
21. Disconnect fuel pump harness jumper (1) from fuel pump wire harness (6). Remove swivel clamp (2) from jumper. Remove pump jumper connector (3) and O-ring (4) from mounting plate (15).
22. Remove mounting plate, with pump assembly attached, from frame.
23. Remove five bolts (17), five washers (16), and pump assembly (14) from mounting plate (15).
24. Remove strap clamps (7). Disconnect fuel pump wire harness (6) from fuel pump (13).
25. Remove clamp (8) and isolator (10) from fuel pump (13).
26. Remove clamps (9) and hose (11) from fuel pump tube and fuel pump.
27. Remove fuel pump (13) from strainer (12).

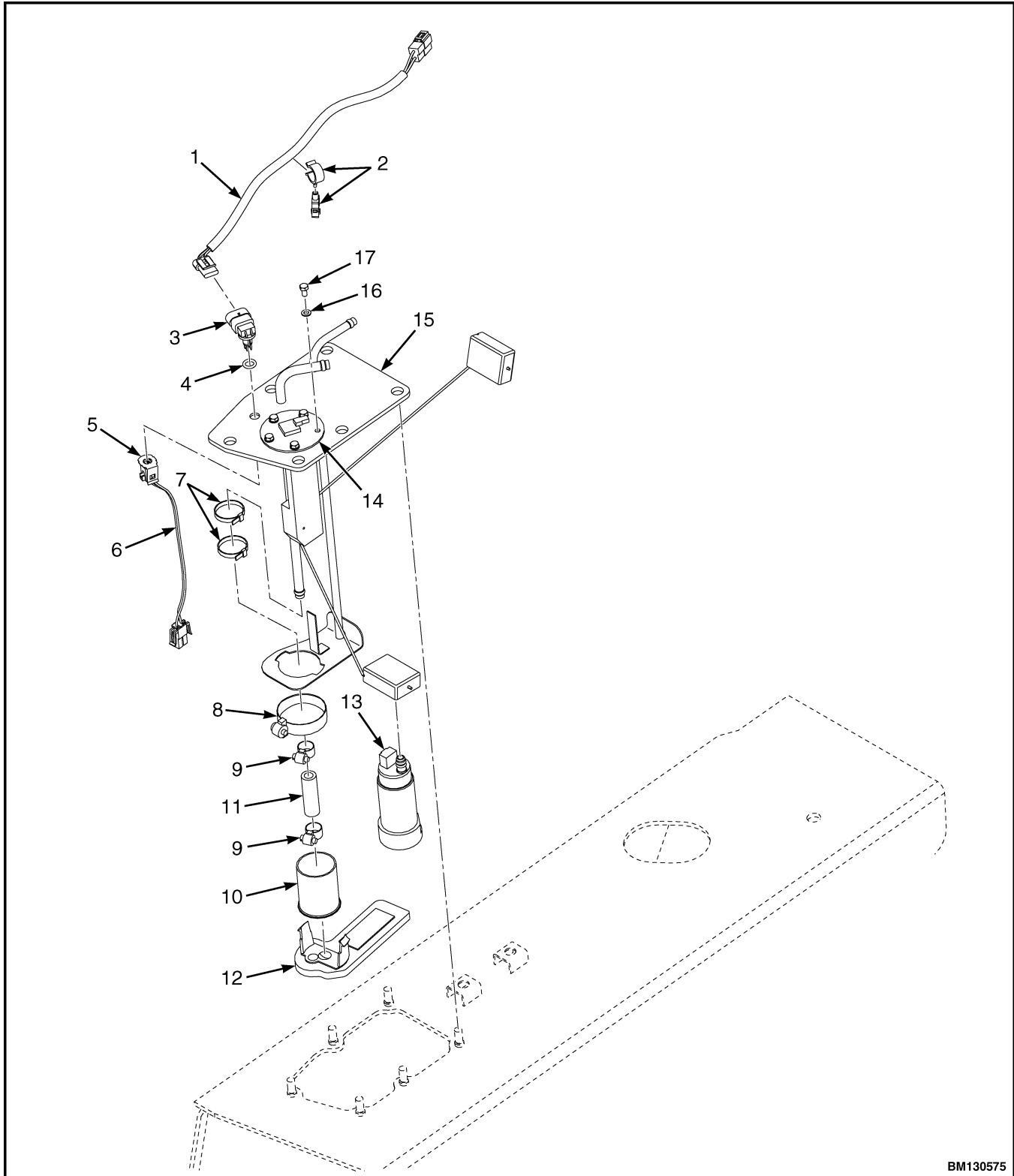


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Figure 43. Gasoline Fuel System - PSI 2.4L Bi-Fuel

***Legend for Figure 43.***

- |                      |                               |
|----------------------|-------------------------------|
| 1. FITTING           | 11. TUBE ASSEMBLY             |
| 2. CAPSCREW          | 12. FITTING                   |
| 3. INSULATED CLAMP   | 13. FUEL FILTER               |
| 4. FITTING           | 14. FILTER CLAMP              |
| 5. MANIFOLD ASSEMBLY | 15. FUEL SUPPLY TUBE          |
| 6. SUPPLY FITTING    | 16. FUEL SUPPLY TUBE ASSEMBLY |
| 7. FITTING           | 17. BRACKET                   |
| 8. FUEL RETURN TUBE  | 18. NUT                       |
| 9. CLAMP             | 19. MOUNTING PLATE            |
| 10. HOSE             |                               |



BM130575

**Figure 44. Fuel pump and Attaching Parts - PSI 2.4L Bi-Fuel**



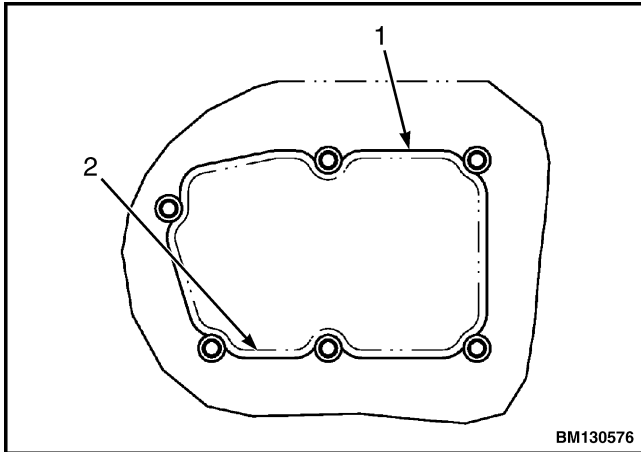
**Legend for Figure 44.**

- |                             |                    |
|-----------------------------|--------------------|
| 1. FUEL PUMP HARNESS JUMPER | 10. ISOLATOR       |
| 2. SWIVEL CLAMP             | 11. HOSE           |
| 3. PUMP JUMPER CONNECTOR    | 12. STRAINER       |
| 4. O-RING                   | 13. FUEL PUMP      |
| 5. NUT                      | 14. PUMP ASSEMBLY  |
| 6. FUEL PUMP WIRE HARNESS   | 15. MOUNTING PLATE |
| 7. STRAP CLAMP              | 16. WASHER         |
| 8. CLAMP                    | 17. BOLT           |
| 9. CLAMP                    |                    |

**Assembly and Install**

**NOTE:** See Figure 44 for Step 1 through Step 9.

1. Install fuel pump (13) on new strainer (12).
  2. Install hose (11) and clamps (9) on fuel pump tube and fuel pump.
  3. Install isolator (10) and clamp (8) on fuel pump (13).
  4. Connect fuel pump wire harness (6) to fuel pump (13). Install strap clamps (7).
  5. Install pump assembly (14) five washers (16), and five bolts (17) on mounting plate (15).
  6. Clean frame opening and apply a 3 mm (0.12 in.) bead of Loctite 5699 sealer to frame opening in pattern shown in Figure 45.
  7. Install mounting plate, with pump assembly attached, on frame.
  8. Install O-ring (4) and pump jumper connector (3) on mounting plate (15). Connect fuel pump harness jumper (1) to fuel pump wire harness (6). Install swivel clamp on jumper.
  9. Connect electrical connector to fuel pump harness jumper (1).
- NOTE:** See Figure 43 for Step 10 through Step 22.
10. Install clamp (14) on new fuel filter (13).
  11. Install six nuts (18) on mounting plate (19). Tighten nuts to 12 to 15 N•m (106 to 133 lbf in).
  12. Install bracket (17) and four capscrews (2) on frame.
  13. Install manifold assembly (5) and two capscrews (2) on bracket (17).
  14. Re-assemble fuel supply tube assembly using fuel supply tube (15), fuel filter with filter clamp (13 and 14), hoses (10), with fitting (12) and tighten clamps (9).
  15. Install fuel supply tube assembly (16) on mounting plate and tighten clamps (9).
  16. Install filter clamp and capscrew (2) on bracket (17).
  17. Install fitting (12) in manifold assembly (5).
  18. Insert fuel return tube (8) in hose (10) and tighten clamps (9). Install fitting (7) in fuel return tube (8). Connect fitting (7) to supply fitting (6).
  19. Install tube assembly (11) to mounting plate (19) and tighten clamps (9).
  20. Connect supply fitting (6) to manifold assembly (5).
  21. Connect fitting (4) to manifold assembly (5). Install hoses, tubes, clamps, and fittings attached to fittings (1 and 4) on engine. Connect fitting (1) to fuel rail.
  22. Install insulated clamp (3) and capscrew (2) to transmission adapter.
  23. Connect manifold assembly connector to electrical connector.
  24. Connect fuel pump connector on wiring harness to fuel pump.



1. SEALANT PATTERN
2. FRAME OPENING

Figure 45. Sealant Pattern for Fuel Tank Cover

## FUEL FILTER REPLACEMENT, YANMAR ENGINES

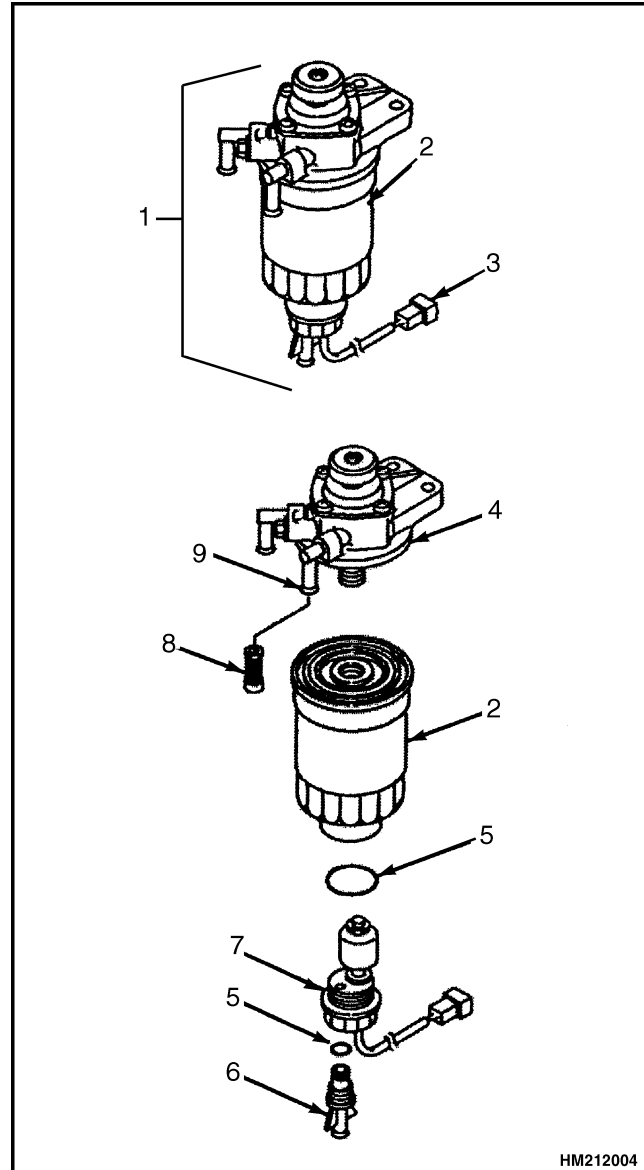


### CAUTION

Disposal of lubricants and fluids must meet local environmental regulations.

Replace fuel filter at specified intervals to prevent contaminants from adversely affecting the diesel fuel flow.

**NOTE:** See Figure 46 for all steps in the following procedure.



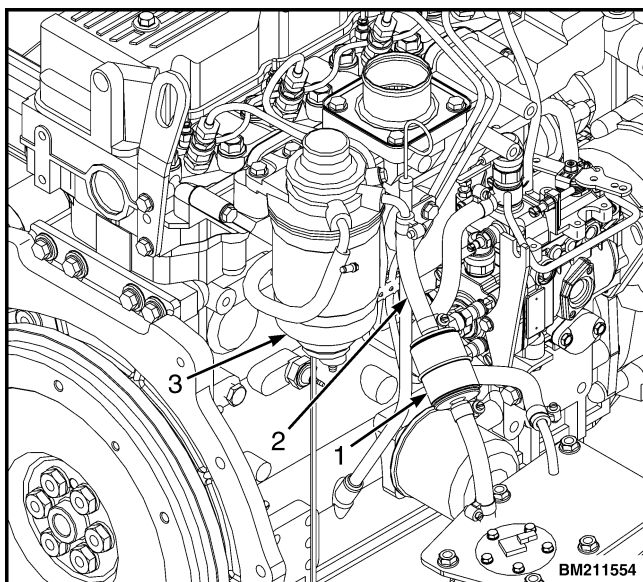
1. FUEL FILTER ASSEMBLY
2. FUEL FILTER ELEMENT
3. FUEL FILTER SENSOR CONNECTOR
4. FUEL FILTER HEAD
5. O-RING
6. DRAIN PLUG
7. FUEL FILTER SENSOR
8. INLINE FUEL FILTER
9. INLET NIPPLE

Figure 46. Yanmar Fuel Filter Replacement

1. Stop engine and allow it to cool.
2. Close all fuel cocks in line.

**NOTE:** Tag connectors prior to disconnecting to aid in reconnecting.

3. Disconnect fuel filter sensor connector.
4. Place an approved container under fuel filter.
5. Open drain plug to drain fuel from fuel filter.
6. Remove fuel filter from fuel filter head. Wipe up any spilled fuel immediately.
7. Remove drain plug from fuel filter. Discard O-ring.
8. Remove fuel filter sensor from fuel filter element and discard O-ring.
9. Remove inline fuel filter from inlet nipple that goes to fuel injection pump. See Figure 47.



1. INLINE FUEL FILTER
2. FUEL LINE
3. WATER SEPARATOR/FUEL FILTER

**Figure 47. In-Line Fuel Filter Replacement**

10. Dispose of fuel, fuel filters, and O-ring in accordance with local directives.
11. Install new inline fuel filter into inlet nipple.
12. Install fuel filter sensor assembly in new fuel filter using new O-ring supplied with fuel filter.
13. Install new O-ring on drain plug, and install drain plug on new fuel filter element. Hand tighten only.

14. Clean fuel filter head mounting surface and apply a small amount of diesel fuel to gasket on new fuel filter element.
15. Install new fuel filter element until it contacts fuel filter head mounting surface. Tighten one additional turn.
16. Open all fuel cocks in fuel line.
17. Reconnect fuel filter sensor connector.
18. Prime fuel system. See Priming the Fuel System, Yanmar.
19. Check for fuel leaks.

### PRIMING THE FUEL SYSTEM, YANMAR

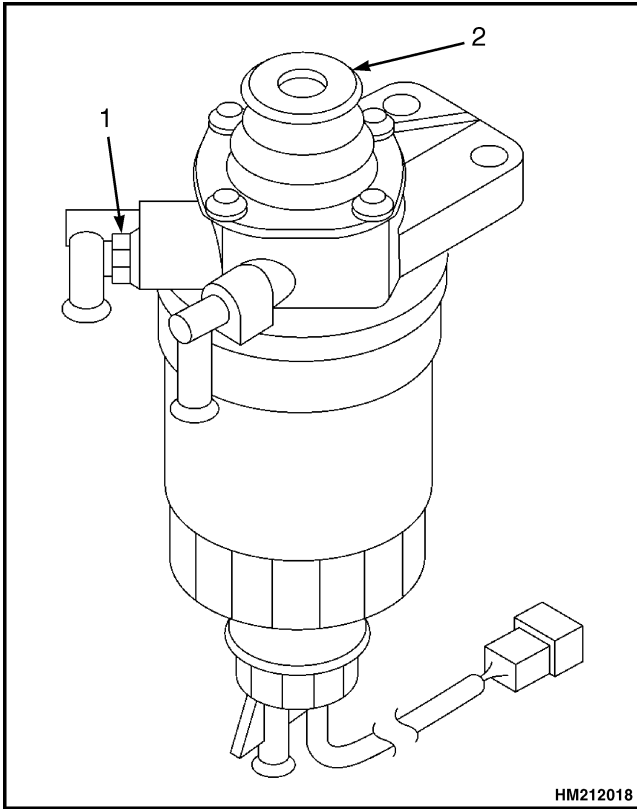
1. Place an approved container under air bleed port. See Figure 48.
2. Loosen air bleed port 2 or 3 turns.



#### CAUTION

**NEVER use the starter motor to crank the engine in order to prime the fuel system. This may cause the starter to overheat and damage the coils and/or the ring gear.**

3. Operate fuel priming pump until fuel coming out of air bleed port is free of bubbles. See Figure 48.



1. AIR BLEED PORT
2. FUEL PRIMING PUMP

**Figure 48. Priming the Fuel System**

4. Tighten air bleed port.
5. Wipe up any fuel that may have spilled, and dispose of fuel and rags in accordance with local directives.

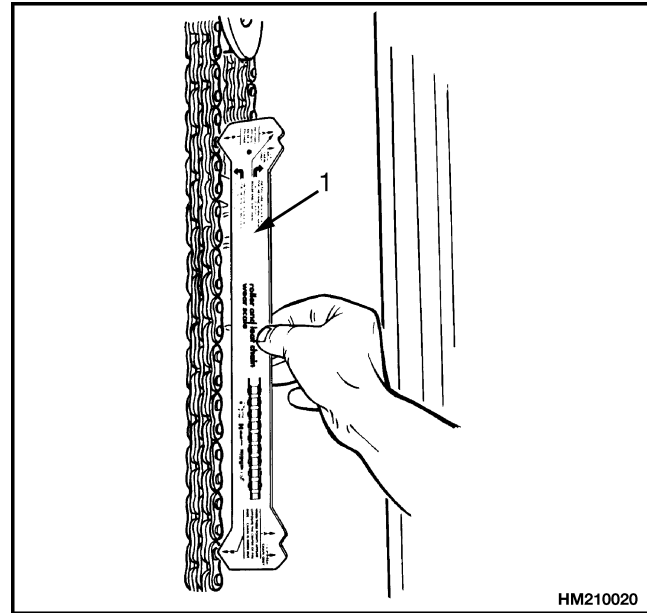
**IGNITION SYSTEM**

**PSI 2.4L Engines**

The PSI engine used on lift trucks covered in this service manual has an electronic ignition system. Change spark plugs and check timing every 1000 hours. Correct spark plug gap is shown in Maintenance Schedule.

**LIFT CHAINS WEAR CHECK**

If a section of chain is 3% longer than a similar section of new chain, chain is worn and must be replaced. Measure chain for wear where it moves over sheaves. Using a chain scale, (Yale P/N 518096869 ) check lift chains as shown in Figure 49.



Pitch	Total Length of 20 Links (Pitch) of New Chain	Wear Limit (The Maximum Length of 20 Links)
12.7 mm (0.50 in.)	254.0 mm (10.0 in.)	261.6 mm (10.3 in.)
15.9 mm (0.63 in.)	317.5 mm (12.5 in.)	327.0 mm (12.9 in.)
19.1 mm (0.75 in.)	381.0 mm (15.0 in.)	392.4 mm (15.4 in.)
25.4 mm (1.00 in.)	508.0 mm (20.0 in.)	523.3 mm (20.6 in.)

1. CHAIN WEAR SCALE

**Figure 49. Lift Chains Check**

**LIFT CHAIN LUBRICATION**



**WARNING**

Cleaning solvents can be flammable and toxic and can cause skin irritation. When using cleaning solvents, always follow the recommendations of the manufacturer.

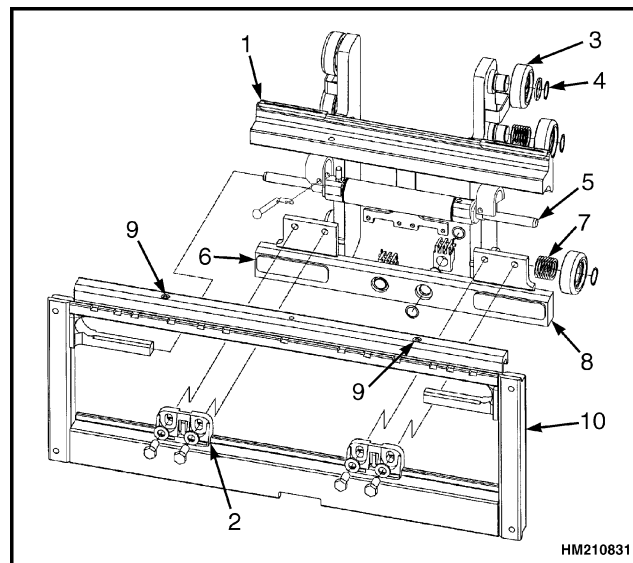
Compressed air can move particles so they cause injury to the user or to other personnel. Make sure that the path of the compressed air is away from all personnel. Wear protective goggles or a face shield to prevent injury to the eyes.

Remove lift chains. Clean lift chains by soaking them in a solvent that has a petroleum base for at least 30 minutes. Use compressed air, adjusted to a maximum output of 103 kPa (15 psi), to completely dry chains when they are clean.

Lubricate lift chains by soaking them in 30W engine oil for at least 30 minutes. Remove chains from oil. Hang chains for one hour so excess oil will drain from chains.

### INTEGRAL SIDESHIFT CARRIAGE, CHECK BEARINGS

1. Lower carriage completely and remove forks.
2. Remove backrest and the lower mounting hooks from sideshift carriage. See Figure 50.
3. Use a lifting device with a capacity of at least 450 kg (1000 lb) to lift outer frame away from inner carriage.
4. Clean bearing areas. Inspect sideshift bearings for wear as follows:
  - a. If either upper bearing is worn to less than 2.5 mm (3/32 in.) thickness, replace both upper bearings by driving upper bearings out of carriage bar.
  - b. If either lower bearing is worn to less than 2.5 mm (3/32 in.) thickness, replace both lower bearings by prying lower bearings from lower carriage bar.

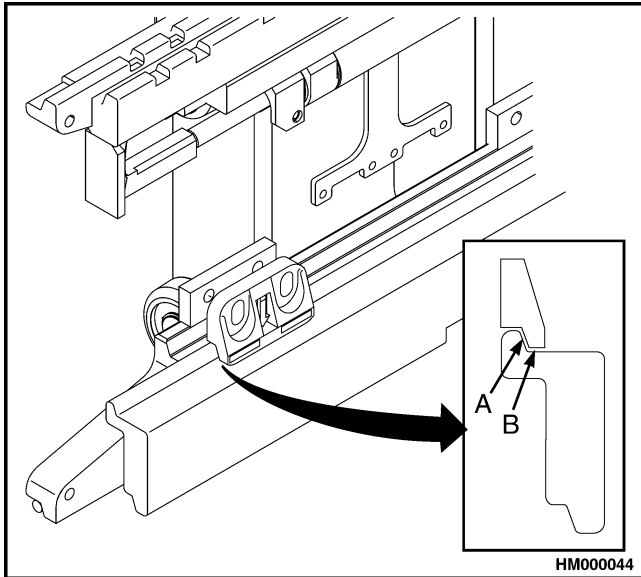


1. UPPER BEARING
2. LOWER HOOK
3. LOAD ROLLER
4. SNAP RING
5. SIDESHIFT CYLINDER
6. LOWER BEARING
7. SHIMS
8. INNER CARRIAGE
9. LUBE FITTING
10. OUTER FRAME

*Figure 50. Integral Sideshift Carriage*

### INTEGRAL SIDESHIFT CARRIAGE, CHECK LOWER MOUNTING HOOKS

Inspect lower mounting hooks for wear. Replace hooks if they are worn beyond wear limit. Wear limit clearance range is 0.76 mm (0.03 in.) minimum and 1.52 mm (0.06 in.) maximum. See **A** in Figure 51.



**Figure 51. Lower Mounting Hooks Wear Limit and Clearance Adjustment**

**Legend for Figure 51.**

- A. WEAR LIMIT - 0.76 mm (0.03 in.) MINIMUM AND 1.52 mm (0.06 in.) MAXIMUM.
- B. CLEARANCE ADJUSTMENT - 0.76 mm (0.03 in.) MINIMUM AND 1.52 mm (0.06 in.) MAXIMUM.

**CONTROL LEVERS, PEDALS, AND PARKING BRAKE**

Lubricate linkages, pedal shafts, control cables (throttle, hood, parking brake), and seat rails. Use a silicone spray lubricant, Yale Part No. 504236201 .

## Maintenance Procedures Every 2000 Hours or 1 Year

**NOTE:** Perform the Maintenance Procedures Every 8 Hours or Daily, Maintenance Procedures Every 500 Hours or 1 Year, and Maintenance Procedures Every 1000 Hours or 1 Year checks prior to performing procedures in this section.

### HYDRAULIC SYSTEM

#### Return Filter, Replace



**WARNING**

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



**CAUTION**

**DO NOT** permit dirt to enter the hydraulic system when the oil level is checked or the filter is changed. Dirt can cause damage to the components of the hydraulic system.

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



**CAUTION**

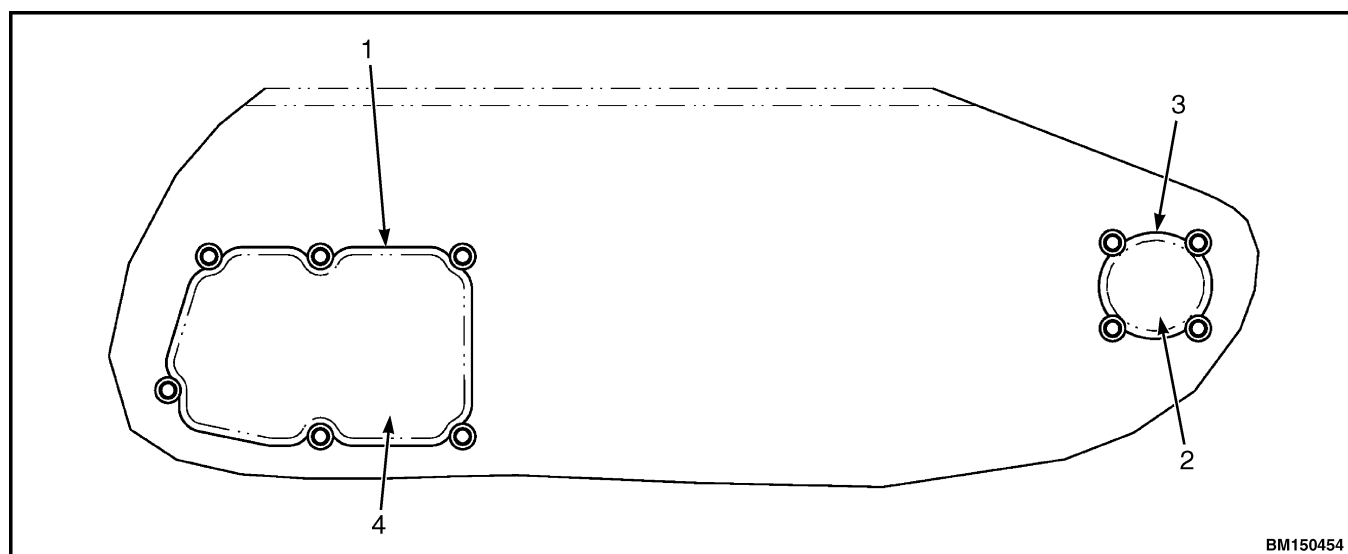
**Disposal of lubricants and fluids must meet local environmental regulations.**

**NOTE:** Turn lift truck engine **OFF** before replacing hydraulic oil filters.

**NOTE:** See Figure 53 for steps below:

1. Put lift truck on a level surface and lower carriage.
2. Place a drain pan with a capacity of approximately 30 liter (31.7 qt) under hydraulic tank.
3. Remove hydraulic oil drain plug from bottom of right frame channel. When oil has completely drained, install drain plug.
4. Open hood.
5. Remove hydraulic dipstick.
6. Loosen hose clamp and remove return hose from return pipe.
7. Remove six nuts and hydraulic tank cover from top of right frame channel.

8. Remove return pipe and return filter from right frame channel; remove return pipe from return filter and discard filter.
9. Loosen hose clamp and remove suction hose from suction pipe.
10. Remove suction filter and suction pipe from right frame channel; remove suction pipe from suction filter. Clean suction filter and inspect for damage. Replace if damaged. See **Parts Manual** for new part.
11. Install new suction filter onto suction pipe. Tighten filter to 30 to 40 N•m (22 to 29.5 lbf ft).
12. Install suction pipe in right frame channel, attach suction hose and tighten hose clamp.
13. Install new return filter onto return pipe. Tighten filter to 30 to 40 N•m (22 to 29.5 lbf ft).
14. Clean frame opening for hydraulic tank cover and apply 3 mm (0.12 in.) bead of Loctite 5699 in pattern shown in Figure 52.



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- |   |  |
|---|--|
| 1. SEALANT PATTERN - HYDRAULIC TANK COVER | 3. SEALANT PATTERN - HYDRAULIC TANK FILLER PLATE |
| 2. FRAME OPENING                          | 4. FRAME OPENING                                 |

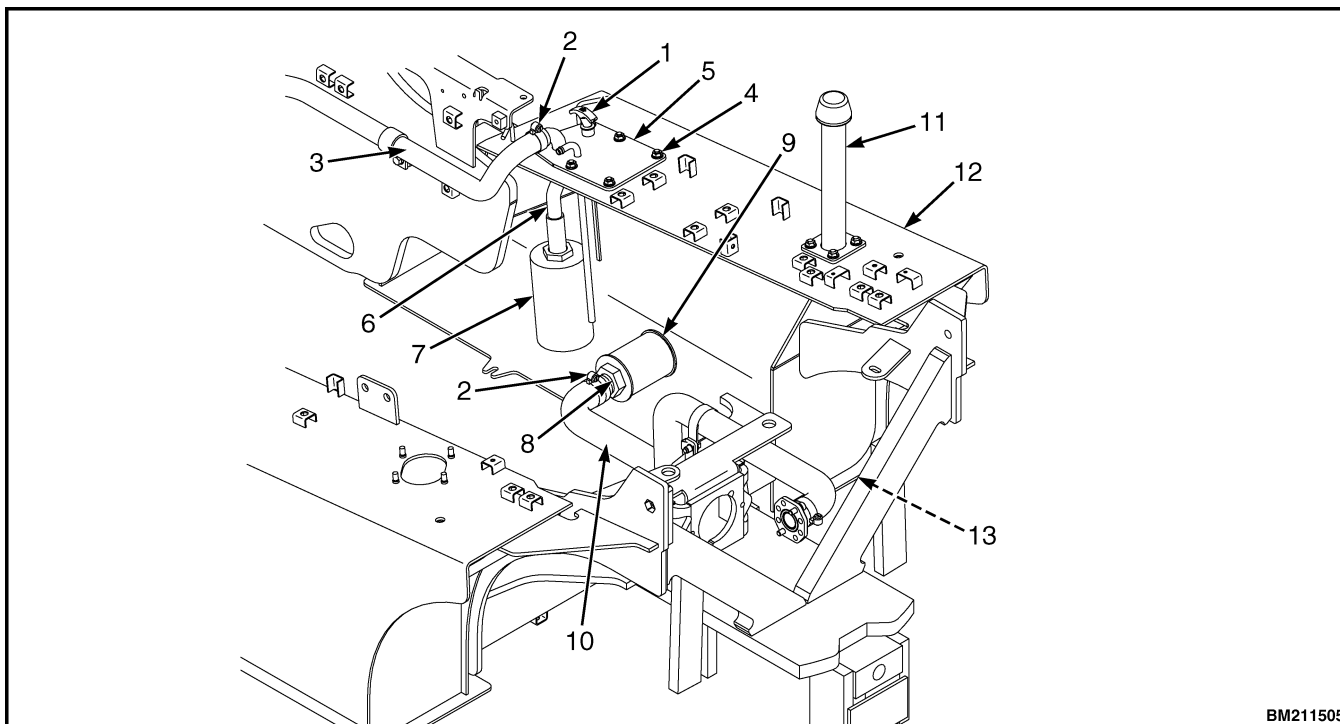
**Figure 52. Sealant Pattern for Hydraulic Tank Cover and Filler Plate**

15. Install return pipe, hydraulic tank cover, and six nuts on right frame channel. Tighten nuts to 12 to 15 N•m (106 to 133 lbf in). Install return hose onto return pipe and tighten hose clamp.
16. Remove cap from breather/fill neck and add hydraulic oil. See Maintenance Schedule for correct oil and quantity.
17. Start lift truck and allow it to run for 30 seconds. Check for leaks. Stop engine and check hydraulic oil level. Add oil, if necessary.



### CAUTION

**Additives may damage the hydraulic system. Before using additives, contact your local Yale dealer.**



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- |                         |                         |
|-------------------------|-------------------------|
| 1. DIPSTICK             | 8. SUCTION PIPE         |
| 2. HOSE CLAMP           | 9. SUCTION FILTER       |
| 3. RETURN HOSE          | 10. SUCTION HOSE        |
| 4. NUT                  | 11. BREATHER/FILL NECK  |
| 5. HYDRAULIC TANK COVER | 12. RIGHT FRAME CHANNEL |
| 6. RETURN PIPE          | 13. DRAIN PLUG          |
| 7. RETURN FILTER        |                         |

**Figure 53. Return Filter, Replace**

## AIR FILTER ELEMENT, REPLACE

Air filter canister should not be opened until an air filter element replacement is required. An air filter element replacement is required when specified number of hours has passed since last filter element replacement.

### Air Filter Without Silencer



#### CAUTION

**DO NOT** allow dirt to enter the engine air intake when replacing the air filter element. A small amount of dirt could cause engine damage.

1. Shut off engine. Never open air filter canister or remove filter element with engine running.
2. Unlatch and remove cover.
3. Gently pull both air filter elements from canister. Avoid dislodging contaminants from elements or knocking either against canister.
4. Remove inner filter element from outer filter element. See Figure 54.
5. With a clean, soft rag, wipe the inside surface of canister. Clean well around locking tabs to retain element. Clean tabs make new filter element installation easier. Be careful not to knock any contaminants into outlet tube to engine.
6. Inspect new filter element for voids, cuts, tears, or indentations in the urethane-sealing surfaces. DO NOT use if damaged.



**CAUTION**

The element must be properly installed to ensure adequate engine protection. An improperly installed element may allow dirt and dust to enter and damage the engine.

**NOTE:** Proper element installation is required to allow cover to be installed correctly. Never reinstall a used element. Never install a damaged element. Always use a Yale approved filter element.

7. Install new filter element into canister.

**CAUTION**

During cover installation, **DO NOT** force the cover on the canister. To do so will result in damage to the filter element, cover, and possibly the canister.

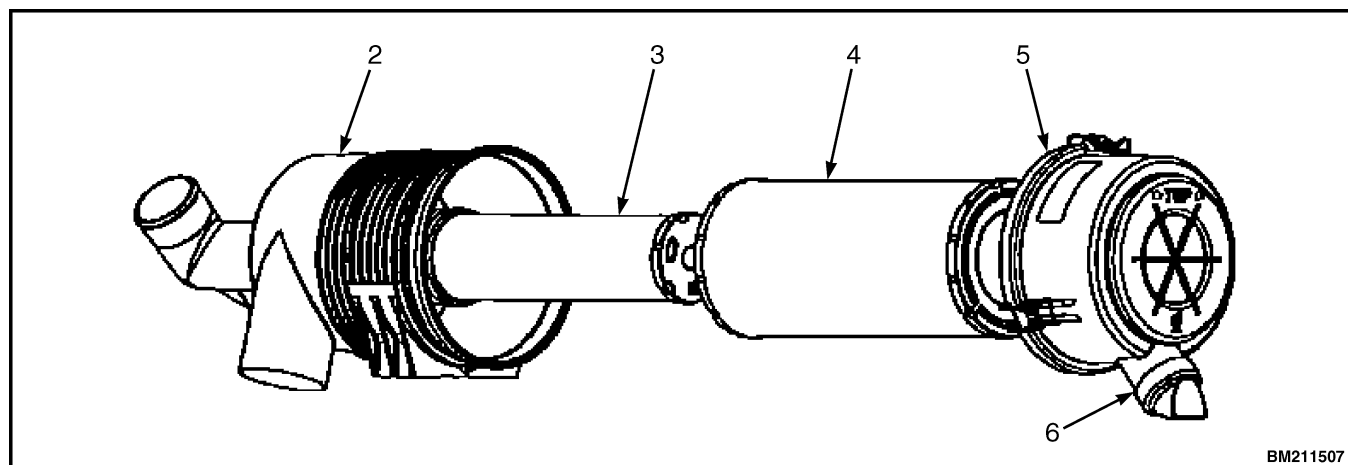
**NOTE:** If filter element is properly installed, cover will fit easily into canister with no gap between cover and

canister. If cover does not fit easily, filter element is not installed properly. Do not use a cover that is bent, damaged, or missing latches.

8. Install cover into canister and ensure **INLET** arrow is in line with canister inlet.

**NOTE:** Do not use latches to pull cover down against canister. If cover does not fit completely against canister with no gaps, element is not installed correctly.

9. Fasten latches to secure cover to canister. Make sure latches penetrate slots in both canister and cover.
10. Inspect entire air intake system for leaks. Inspect all clamps for tightness and tighten if necessary. Inspect all hoses for damage. Replace damaged hoses. Inspect dust evacuation valve for damage. If damaged, replace dust evacuation valve.



BM211507

1. CANISTER
2. INNER FILTER ELEMENT
3. OUTER FILTER ELEMENT

4. COVER
5. DUCT EVACUATION VALVE

**Figure 54. Air Filter Assembly Without Silencer**

**Air Filter With Silencer****CAUTION**

**DO NOT** allow dirt to enter the engine air intake when replacing the air filter element. A small amount of dirt could cause engine damage.

1. Shut off engine. Never open air filter canister or remove filter element with engine running.

2. Unlock and remove cover. To remove filter element, press and rotate filter element counterclockwise about  $\frac{1}{8}$  turn until filter element is free. To assist removal, gently move end back and forth to help break seal. See Figure 56.
3. Gently pull filter element from canister. Avoid dislodging contaminants from element or knocking it against canister.

4. With a clean, soft rag, wipe the inside surface of canister. Clean well around locking tabs to retain element. Clean tabs make new filter element installation easier. Be careful not to knock any contaminants into outlet tube to engine.
5. Inspect new filter element for voids, cuts, tears, or indentations in the urethane-sealing surfaces. DO NOT use if damaged.

**CAUTION**

The element must be properly installed to ensure adequate engine protection. An improperly installed element may allow dirt and dust to enter and damage the engine.

**NOTE:** Proper element installation is required to allow cover to be installed correctly. Never reinstall a used element. Never install a damaged element. Always use a Yale approved filter element.

6. Install new filter element into canister. Press and rotate filter element  $\frac{1}{8}$  turn clockwise until fully engaged in canister. See Figure 55.

**CAUTION**

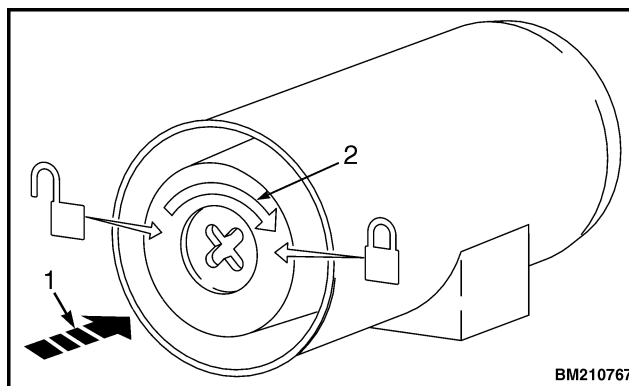
During cover installation, DO NOT force the cover on the canister. To do so will result in damage to the filter element, cover, and possibly the canister.

**NOTE:** If filter element is properly installed, cover will fit easily into canister with no gap between cover and canister. If cover does not fit easily, filter element is not installed properly. Do not use a cover that is bent, damaged, or missing latches.

7. Install cover into canister and ensure **INLET** arrow is in line with canister inlet.

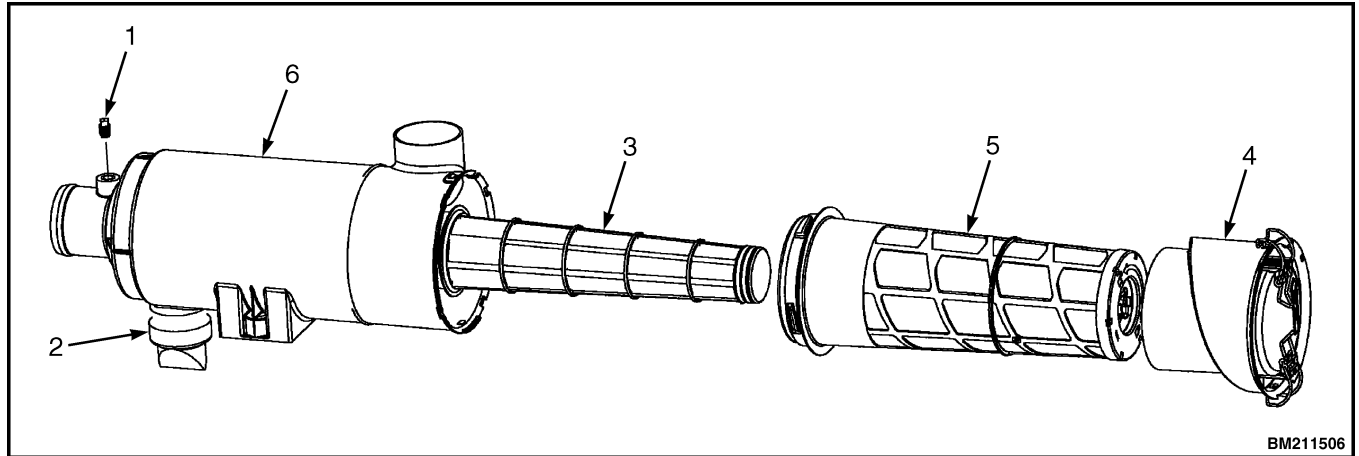
**NOTE:** Do not use latches to pull cover down against canister. If cover does not fit completely against canister with no gaps, element is not installed correctly.

8. Fasten latches to secure cover to canister. Make sure latches penetrate slots in both canister and cover.
9. Inspect entire air intake system for leaks. Inspect all clamps for tightness and tighten if necessary. Inspect all hoses for damage. Replace damaged hoses. Inspect dust evacuation valve for damage. If damaged, replace dust evacuation valve.



1. PUSH IN
2. TWIST TO LOCK

**Figure 55. Air Filter Label**



1. PLUG
2. DUST EVACUATION VALVE
3. INNER FILTER ELEMENT

4. COVER
5. OUTER FILTER ELEMENT
6. CANISTER

**Figure 56. Air Filter With Silencer**

## PCV VALVE

### PSI LPG and Bi-Fuel Engines

**NOTE:** Turn engine **OFF** before installing new PCV valve.

Install a new PCV valve.

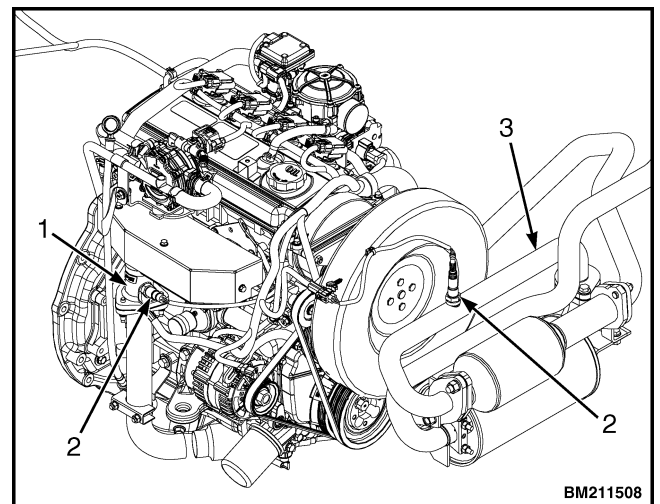
See Figure 10 for LPG engine.

See Figure 13 for Bi-Fuel engine.

## OXYGEN SENSOR

Check that the oxygen sensor electrical connector is seated and locked. Check wires for cracks, splits, chaffing, or burn through. If necessary, repair.

See Figure 57 for lift trucks equipped with a PSI engine.



1. EXHAUST MANIFOLD
2. OXYGEN SENSOR
3. EXHAUST PIPE

**Figure 57. Oxygen Sensor - PSI 2.4L Engine**

## FUEL INJECTOR, YANMAR ENGINES

For removal and cleaning instructions, see **Yanmar Diesel Engines 0600YRM1205**.

## FORKS, INSPECT



### WARNING

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

Never repair damaged forks. **DO NOT** heat, weld, cut, drill, or bend the forks. Forks are made of special steel using special methods. Replace damaged forks as a set.

1. Inspect forks for cracks and wear. Check that fork tips are aligned as shown in Figure 16. Check that bottom of fork is not worn (item 4, Figure 16).



### CAUTION

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

2. Replace any damaged or broken parts that are used to keep forks locked in position.
3. Inspect fork wear. Ensure heel wear is not more than 10% of original thickness. If fork wear is more than 10%, fork must be replaced or rerated. Perform fork wear inspection using a BOL256N1 caliper ruler Yale P/N 550088603 as follows. See Figure 17.
  - a. Determine normal thickness of "N" of fork using scale or ruler portion of caliper ruler. Measurement has to be done on fork shank using caliper ruler.
  - b. Position caliper at end of heel internal radius (item 4, Figure 16) with opening corresponding to measured thickness of fork shank in Step a above. (e.g. for N 1.75 use N 1.75 opening). This is typically the section of fork where wear is greatest. Note that opening distance has been reduced by 10% from nominal thickness.
  - c. If fork enters opening, it is mandatory to replace it. DANGER OF BREAKING. Furthermore, a 10% reduction in fork blade thickness results in 20% reduction in operating capacity.

## INTEGRAL SIDESHIFT CARRIAGE

### Bearings, Replace

Replace all four bearings regardless of wear. See Maintenance Procedures Every 1000 Hours or 1 Year, Integral Sideshift Carriage, Check Bearings for procedure.

### SERVICE BRAKES (DRY BRAKE)

Check brake lining and parts of the brake assembly for wear or damage. Minimum acceptable brake lining thickness is 1.0 mm (0.040 in.). If brake linings are worn thinner than specification, replace brake linings. See **Brake System** 1800YRM1991 for the removal and installation procedures of drive wheels and brake drums. If brake linings or brake shoes are worn or damaged, they must be replaced. Brake shoes must be replaced in complete sets. Inspect brake drums for cracks or damage. Replace any damaged parts.



### WARNING

**Brake linings can contain dangerous fibers. Breathing the dust from these brake linings is a cancer or lung disease hazard. DO NOT create dust! DO NOT clean brake parts with compressed air or by brushing. Follow the cleaning procedure in this section. When the brake drums are removed, DO NOT create dust.**

**DO NOT sand, grind, chisel, hammer, or change linings in any way that will create dust. Any changes to brake linings must be done in a restricted area with special ventilation. Protective clothing and a respirator must be used.**

Brake cleaning procedures are as follows:



### CAUTION

**DO NOT use an oil solvent to clean the wheel cylinder. Use a solvent approved for cleaning of brake parts. DO NOT permit oil or grease in the brake fluid or on the brake linings.**

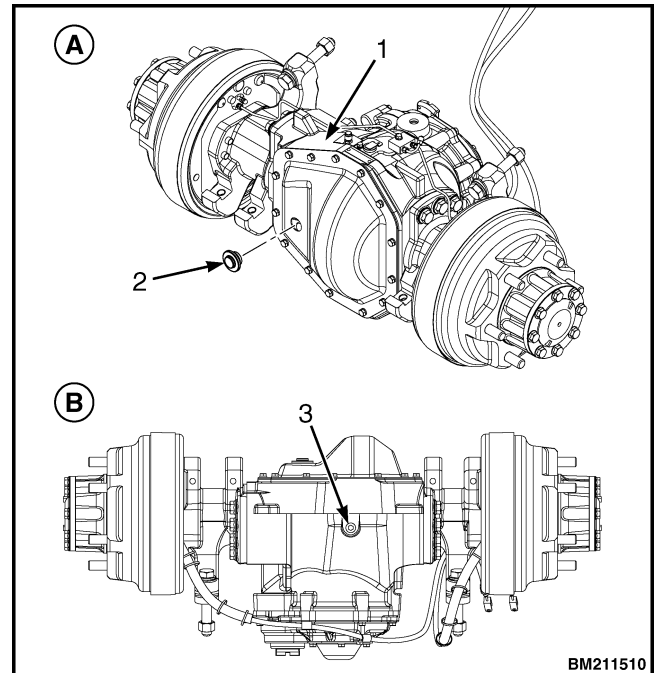
1. DO NOT release brake lining dust from brake linings into air when brake drum is removed.
2. Use a solvent approved for cleaning of brake parts to wet lining dust. Follow instructions and cautions of manufacturer for use of solvent. If a solvent spray is used, do not create brake lining dust with spray.

3. When brake lining dust is wet, clean parts. Put any cloth or towels in a plastic bag or an airtight container while they are still wet. Put a DANGEROUS FIBERS warning label on plastic bag or airtight container.
4. Any cleaning cloths that will be washed must be cleaned so that fibers are not released into air.

## DIFFERENTIAL

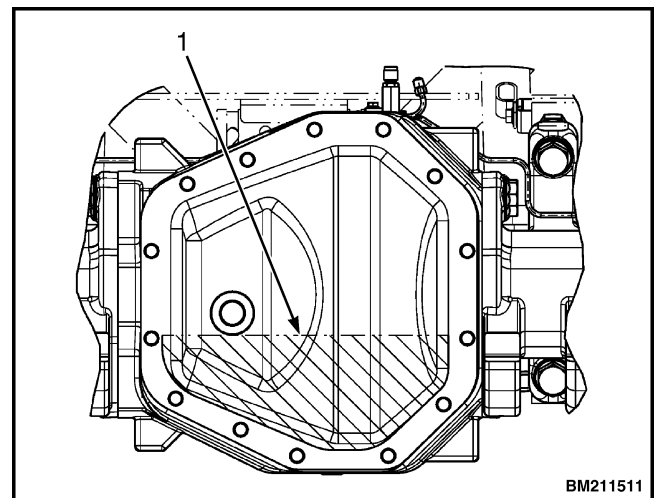
**NOTE:** Additional information on differential can be found in **Drive Axle Repair** 1400YRM1989.

1. Place lift truck on blocks. See How to Raise Drive Tires in this manual.
2. Differential and drive axle use same oil supply. Place a container with a minimum capacity of 7 liter (7.4 qt) under differential. Remove drain plug located in bottom of the differential and drain oil from differential completely. Install drain plug. See Figure 58.
3. Fill hole is on front of differential housing. Add oil shown in Maintenance Schedule until oil level is at lower edge of fill hole. Install fill plug and rotate drive wheels in order to get oil pumped into axle. See Figure 59.
4. Remove fill plug and check oil level. Add oil, as necessary. Install fill plug and check for leaks. See Figure 59.



- A. FRONT VIEW  
 B. BOTTOM VIEW
1. DIFFERENTIAL  
 2. FILL PLUG  
 3. DRAIN PLUG

**Figure 58. Differential Oil Drain/Fill**



1. FILL LINE

**Figure 59. Differential Oil Level**

## TRANSMISSION OIL AND FILTER, REPLACE

### WARNING

At operating temperature, the transmission oil is HOT. DO NOT permit the hot oil to touch the skin and cause a burn.

### CAUTION

DO NOT permit dirt to enter the transmission when the oil level is checked or the filter is changed. Dirt can cause damage to the transmission components.

### CAUTION

Disposal of lubricants and fluids must meet local environmental regulations.

**NOTE:** Change transmission oil filter at first 500 hours of operation on new lift trucks. Before removing oil filter, make a hole at the top of filter and allow five minutes for oil to drain down into transmission. This will reduce oil that will run out of filter and onto transmission when filter is removed.

**NOTE:** Transmission drain plug is on lower left side of torque converter housing.

1. Remove drain plug, spring, and screen. Drain oil into container. See Figure 60.

### WARNING

Cleaning solvents can be flammable and toxic and can cause skin irritation. When using cleaning solvents, always follow the solvent manufacturer's recommended safety procedures.

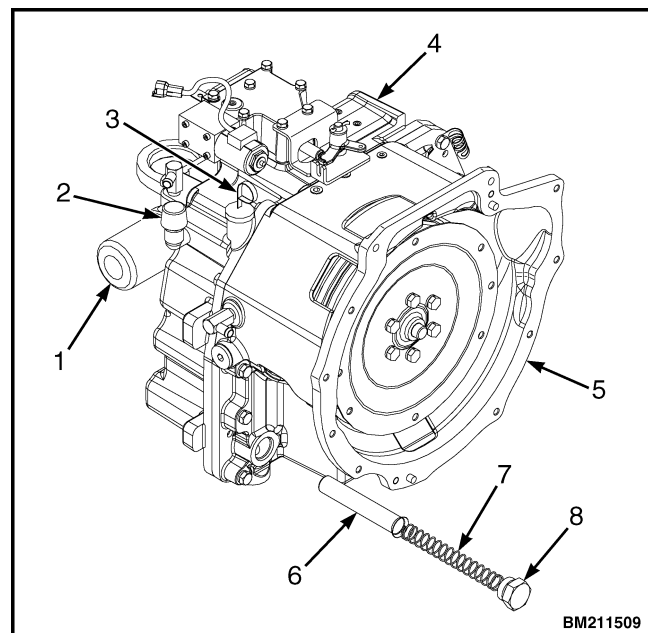
Compressed air can move particles so they cause injury to the user or to other personnel. Make sure the path of the compressed air is away from all personnel. Wear protective goggles or a face shield to prevent injury to the eyes.

2. Clean screen with cleaning solvent, and dry with compressed air, adjusted to maximum output of 103 kPa (15 psi).
3. When oil has drained, first install screen, then spring, and transmission drain plug.

4. Remove and discard transmission breather. Install new transmission breather and hand tighten.
5. Remove and discard old transmission oil filter. Apply clean oil to gasket of new transmission oil filter. Install new filter and hand tighten. See Figure 60.
6. Add oil to transmission at dipstick tube. Correct oil is shown in Maintenance Schedule.
7. Start and run engine for approximately five minutes after fill to allow oil to lubricate parts within transmission.

**NOTE:** Transmission oil temperature should be at least 50°C (120°F) when checking oil level.

8. Turn key to **OFF** position, check for leaks, and check oil level. Top off oil, if necessary.



1. TRANSMISSION OIL FILTER
2. TRANSMISSION BREATHER
3. TRANSMISSION DIPSTICK
4. TRANSMISSION
5. TORQUE CONVERTER HOUSING
6. SCREEN
7. SPRING
8. TRANSMISSION DRAIN PLUG

**Figure 60. Transmission Oil Change**

## BRAKE FLUID CHANGE, MASTER CYLINDER

1. Open brake reservoir cover. See Figure 61.

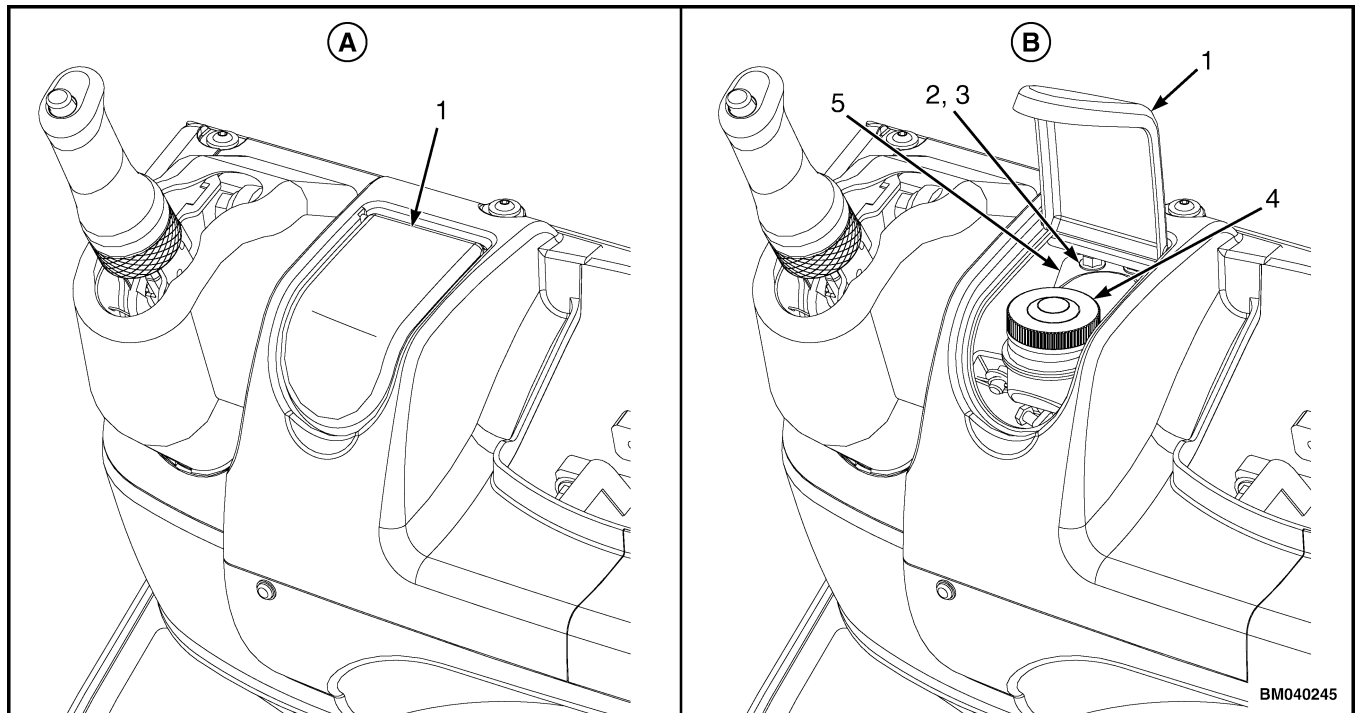


### CAUTION

Disposal of lubricants and fluids must meet local environmental regulations.

2. Remove two capscrews, two nuts, and brake fluid reservoir from mounting bracket on cowl. See Figure 61.

3. Remove brake fluid reservoir cap. Pour fluid into a suitable container with a 0.2 liter (0.42 pt) minimum capacity. Refill reservoir with clean oil from a sealed container and install cover on reservoir. Correct oil is shown in Maintenance Schedule.
4. Install brake fluid reservoir, two capscrews, and two nuts onto mounting bracket on cowl.
5. Close brake reservoir cover. See Figure 61.



#### A. COVER CLOSED

1. COVER
2. CAPSCREW
3. NUT

#### B. COVER OPEN

4. BRAKE FLUID RESERVOIR
5. MOUNTING BRACKET

**Figure 61. Brake Fluid Change**

## BRAKE FLUID, REMOVE

Perform following procedure to remove used brake fluid from remainder of brake system.

1. Ensure brake fluid reservoir is filled with brake fluid.
2. Put one end of a rubber hose on special fitting of wheel cylinder. Put other end of hose into an empty container.
3. Loosen special fitting at wheel cylinder one turn so that used brake fluid can be removed from brake system. Slowly push brake pedal and hold it at the end of its stroke. Close special fitting. Release brake pedal.

**NOTE:** New brake fluid will be easily recognized, as the color will be more clear than used fluid, with will be darker.

4. Repeat Step 1 through Step 3 until there is new brake fluid in container.

5. Check level of brake fluid in brake fluid reservoir during procedure. Make sure to keep brake fluid at correct level.

6. Repeat procedure for opposite wheel cylinder.

## Maintenance Procedures Every 4000 Hours or 2 Years

**NOTE:** Perform the Maintenance Procedures Every 8 Hours or Daily, Maintenance Procedures Every 500 Hours or 1 Year, Maintenance Procedures Every 1000 Hours or 1 Year, and Maintenance Procedures Every 2000 Hours or 1 Year checks prior to performing procedures in this section.

**NOTE:** Turn engine **OFF** before changing hydraulic oil and filter.

**NOTE:** Check and clean hydraulic oil strainer screen, every time hydraulic oil is changed.

### HYDRAULIC OIL, REPLACE



#### WARNING

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



#### CAUTION

**DO NOT** permit dirt to enter the hydraulic system when the oil level is checked or the filter is changed. Dirt can cause damage to the components of the hydraulic system.

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



#### CAUTION

Disposal of lubricants and fluids must meet local environmental regulations.

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

**NOTE:** Replace hydraulic oil filter at same time oil is changed.

1. Replace hydraulic oil as described below:
  - a. Place a container with a minimum capacity of 30 liter (31.7 qt) under drain plug at bottom of hydraulic tank. To drain oil, remove drain plug from bottom of hydraulic tank. See Figure 62.
  - b. When tank is empty, inspect inside of tank for any foreign matter or possible fungus. If necessary, clean inside of tank in accordance with instructions found in **Frame** 0100YRM1984.
  - c. When either the inspection or cleaning of tank is completed, install drain plug in bottom of hydraulic tank. Tighten drain plug to 38 N•m (28 lbf ft).

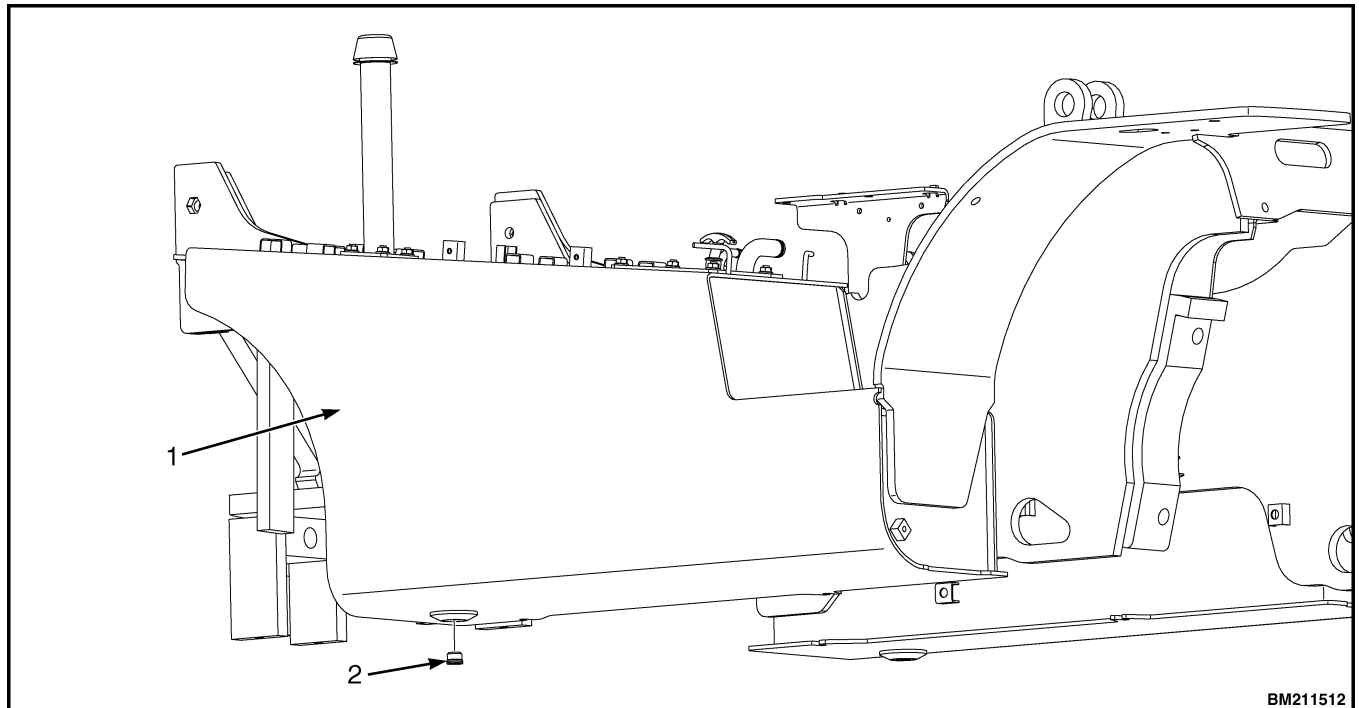


#### CAUTION

Additives may damage the hydraulic system. Before using additives, contact your local Yale dealer.

2. Fill hydraulic tank with oil specified in Maintenance Schedule.
3. When oil level is correct, operate system and check for leaks.





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1. HYDRAULIC TANK

2. DRAIN PLUG

**Figure 62. Hydraulic Oil Change****COOLING SYSTEM**

1. Put lift truck on a level surface. Stop engine. Place a container with a minimum capacity of 30.1 liter (32 qt) under radiator drain valve which could be located on either the lower left or right side of radiator on engine side of radiator.

**WARNING**

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

**CAUTION**

**Disposal of lubricants and fluids must meet local environmental regulations.**

2. Open drain valve and remove radiator cap. Drain coolant into container. Flush cooling system. Check hoses for damage. Replace with new hoses, as needed.

3. Disconnect hose leading from auxiliary reservoir to fitting at top of radiator under radiator cap, and drain reservoir into same container used for radiator coolant. Check reservoir for contaminants and flush, as necessary. Connect hose back on fitting at top of radiator.

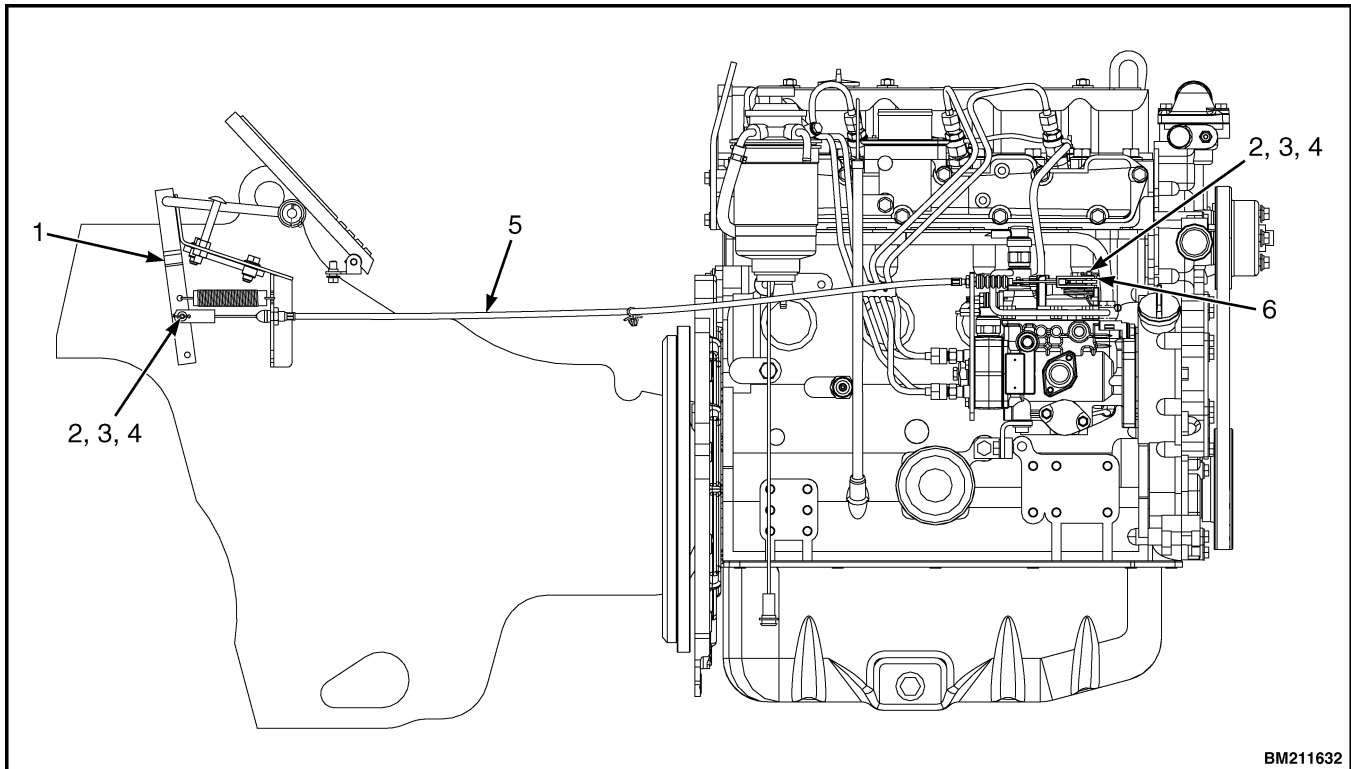
**CAUTION**

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

4. Close drain valve. Fill cooling system, use Ethylene Glycol Boron-free Antifreeze. Purchase a pre-diluted 50/50 solution; or mix 50% concentrate with 50% distilled or deionized water. Fill auxiliary reservoir to a level between **ADD** and **FULL** marks on reservoir.
5. Install radiator cap. Start engine. Check for leaks. Add coolant to auxiliary coolant reservoir as needed. Coolant level should be between **ADD** and **FULL** marks on reservoir.

**REPLACE THROTTLE (ACCELERATOR) CABLE, YANMAR DIESEL ENGINE**

1. Remove floor plate.
2. Remove cotter pin, washer, pin, and throttle cable from accelerator lever. See Figure 63.
3. Remove cotter pin, washer, pin, and throttle cable from bellcrank. See Figure 63.
4. Install throttle cable, pin, washer, and cotter pin on bellcrank. See Figure 63.
5. Install throttle cable, pin, washer, and cotter pin on accelerator lever. See Figure 63.
6. For throttle pedal and cable adjustments see **Frame 0100YRM1984**.
7. Install floor plate.



- |                      |                   |
|----------------------|-------------------|
| 1. ACCELERATOR LEVER | 4. WASHER         |
| 2. COTTER PIN        | 5. THROTTLE CABLE |
| 3. PIN               | 6. BELLCRANK      |

*Figure 63. Throttle (Accelerator) Cable, Replace*

**Maintenance Procedures Every 5000 Hours**

**FUEL INJECTORS, PSI ENGINE**

See **PSI 2.4L Engine 0600YRM1755** for injector check procedures.

## Maintenance Procedures Every 6000 Hours

### TIMING BELT CHANGE, PSI ENGINE

**NOTE:** When changing timing belt make sure **ALL** components from service kit are used and not just the timing belt.

To change timing belt, use **Kit-Service 6000 hours** specified in the **Parts Manual** for your lift truck. See **PSI 2.4L Engine 0600YRM1755** for belt check instructions and replacement procedures.

## Safety Procedures When Working Near Mast

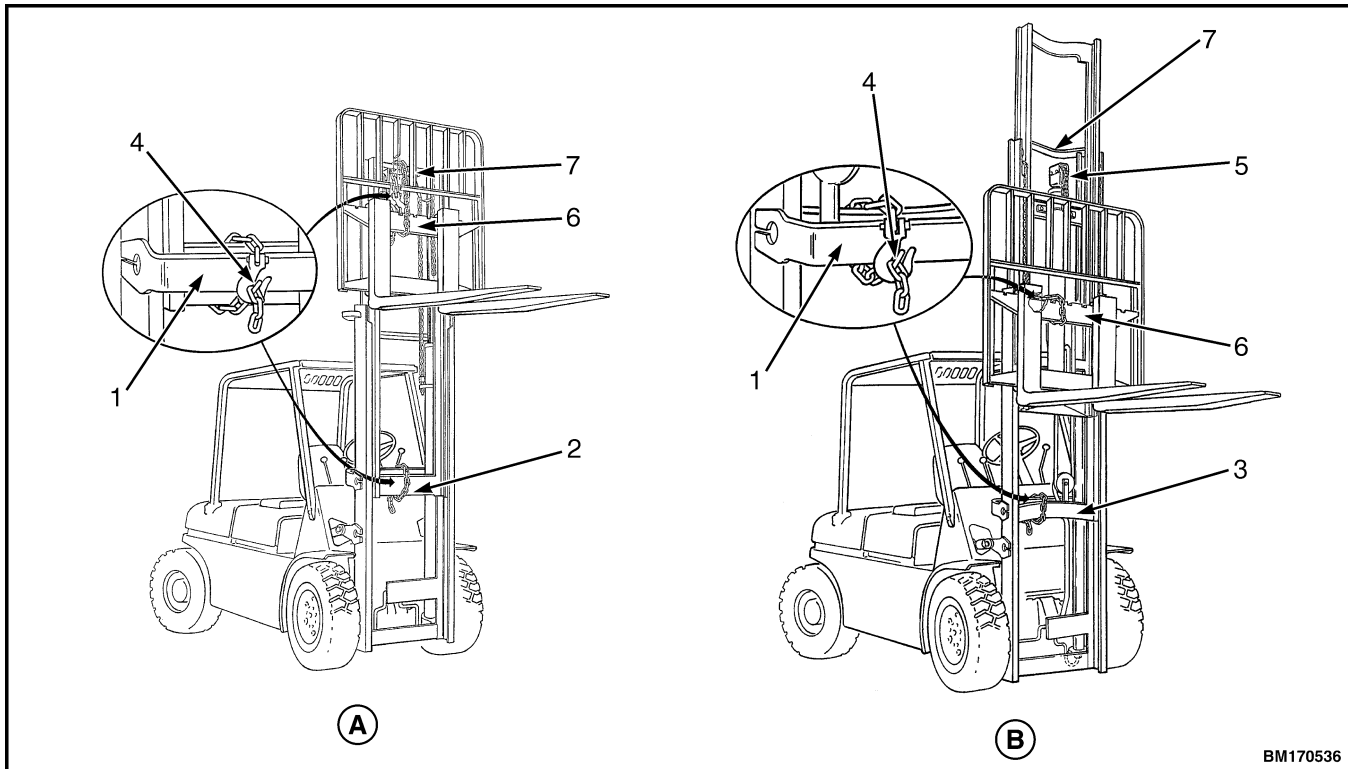
The following procedures must be used when inspecting or working near the mast. Additional precautions and procedures can be required when repairing or removing the mast. See the correct Service Manual section for the specific mast being repaired.



### WARNING

**Mast parts are heavy and can move. Distances between parts are small. Serious injury or death can result if part of the body is hit by parts of the mast or the carriage.**

- **Never put any part of the body into or under the mast or carriage unless all parts of the mast are completely lowered or a safety chain is installed. Also make sure that the power is off and the key is removed. Put a DO NOT OPERATE tag in the operator's compartment.**
  - **Be careful of the forks. When the mast is raised, the forks can be at a height to cause an injury.**
  - **DO NOT climb on the mast or lift truck at any time. Use a ladder or personnel lift to work on the mast.**
  - **DO NOT use blocks to support the mast weldments nor to restrain their movement.**
  - **Mast repairs require disassembly and removal of parts and can require removal of the mast or carriage. Follow the repair procedures in the correct Service Manual for the mast.**
1. Lower mast and carriage completely. Push lift/lower control lever forward and make sure there is no movement in the mast. Make sure all parts of the mast that move are fully lowered.
- OR**
2. If parts of the mast must be in a raised position, install a safety chain to restrain the moving parts of the mast. Connect moving parts to a part that does not move. Follow these procedures:
    - a. Put mast in vertical position.
    - b. Raise mast to align bottom crossmember of weldment that moves in outer weldment with a crossmember on outer weldment. On the two-stage and free-lift mast, the moving part is the inner weldment. On the three-stage mast, it is the intermediate weldment. See Figure 64 .
    - c. Use a 3/8-in. minimum safety chain with a hook to fasten the crossmembers together so the movable member cannot lower. Put the hook on the back side of the mast. Make sure the hook is completely engaged with a link in the chain. Make sure the safety chain does not touch lift chains or chain sheaves, tubes, hoses, fittings, or other parts on the mast.
    - d. Lower the mast until there is tension in the safety chain and the free-lift cylinder (free-lift masts only) is completely retracted. If running, stop engine. Apply parking brake. Install a **DO NOT REMOVE** tag on the safety chain(s).
    - e. Install another safety chain (3/8-in. minimum) between the top or bottom crossmember of the carriage and a crossmember on the outer weldment.
  3. Apply parking brake. After lowering or restraining the mast, shut off power and remove key. Put a **DO NOT OPERATE** tag in the operator's compartment.



BM170536

A. TWO-STAGE LFL MAST

B. THREE-STAGE FFL MAST

- 1. OUTER MAST
- 2. INNER MAST
- 3. INTERMEDIATE MAST
- 4. HOOK

- 5. FREE-LIFT CYLINDER
- 6. CROSSMEMBER
- 7. CROSSMEMBER

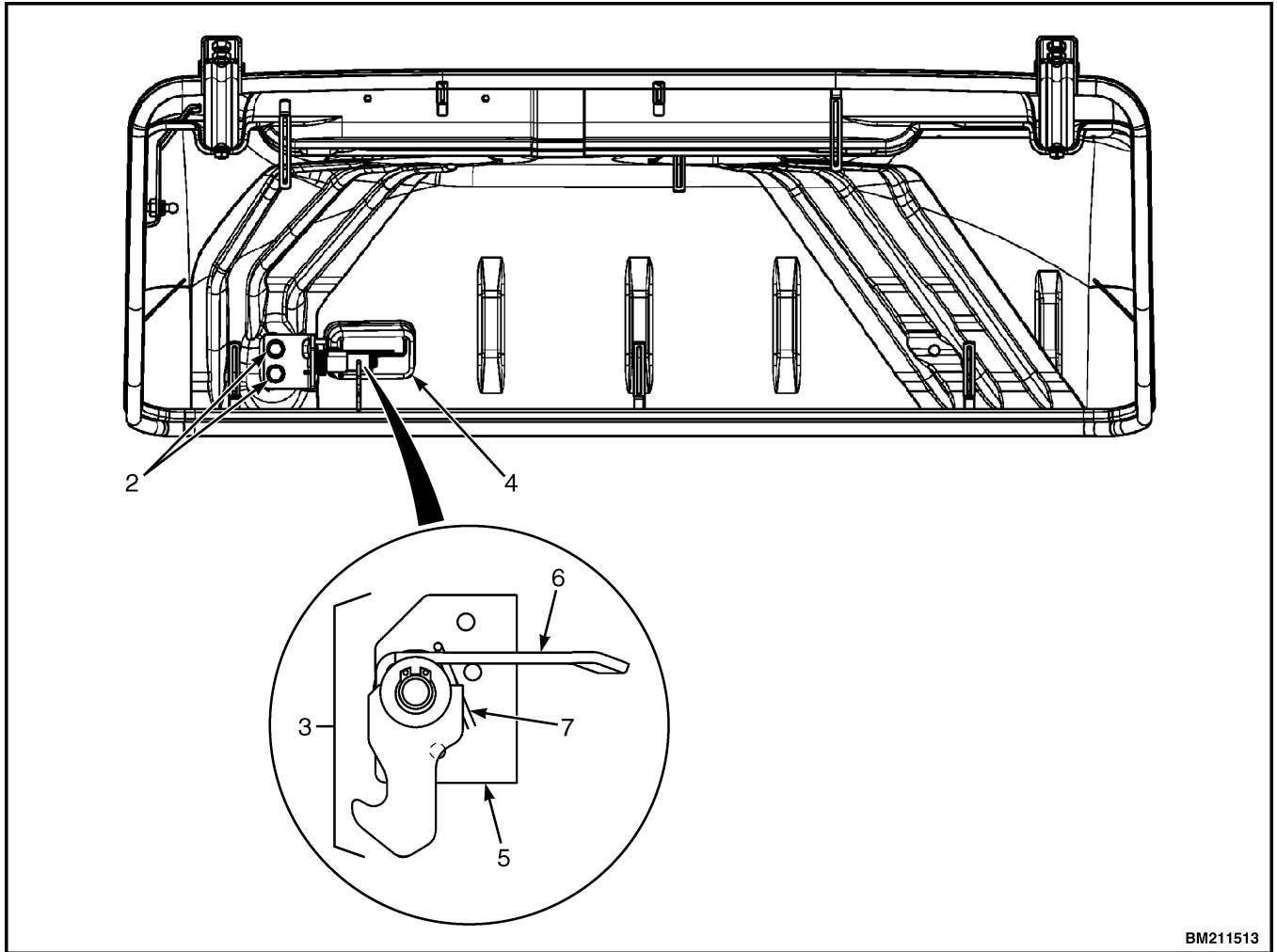
Figure 64. Two-Stage Limited Free-Lift and Three-Stage Full Free-Lift Masts

## Hood Lock Assembly Check

**WARNING**

The hood, hood latch, and latch striker must be correctly adjusted for the correct operation of the operator restraint system.

1. Install hood lock assembly on frame of hood. Tighten capscrews so that hood latch can still move when hood is closed. See Figure 65.
2. Carefully close hood to fully-closed position. The hood latch is fully closed after two clicks.
3. Push down until hood just touches rubber bumper. Make sure lock assembly is still in center of hood latch. Open hood and tighten capscrews.
4. Check operation of hood lock assembly. Have an operator sit in the seat. Make sure hood is fully closed. Also check that hood touches rubber bumper. If necessary, repeat Step 3.



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- |                       |            |
|-----------------------|------------|
| 1. HOOD               | 5. BRACKET |
| 2. CAPSCREW           | 6. LEVER   |
| 3. HOOD LOCK ASSEMBLY | 7. SPRING  |
| 4. HOOD LOCK COVER    |            |

**Figure 65. Hood Lock Assembly Check**

## Lift Chain Adjustments

**WARNING**

When working on or near the mast, see **Safety Procedures When Working Near Mast** in this section.

During test procedures for the hydraulic system, fasten the load to the carriage with chains to prevent it from falling. Keep all personnel away from the lift truck during the tests.

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**.

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

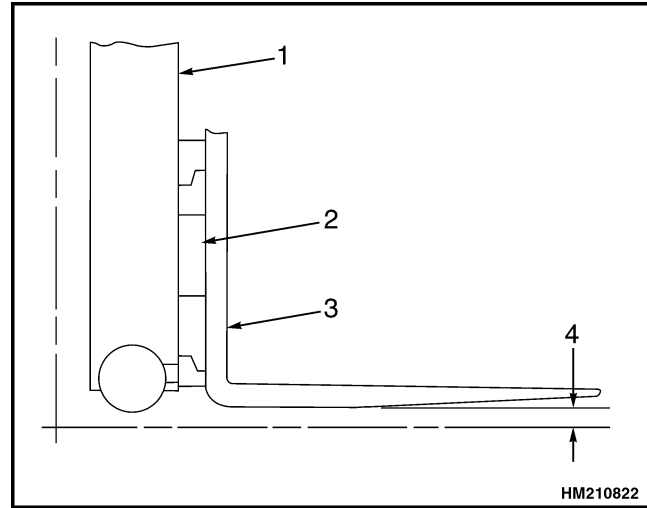
When lift chains are correctly adjusted:

- Tension will be the same on each chain of chain set. Check tension by pushing on both chains at the same time.
- Chain length will be correct.
- Chains must travel freely through complete cycle.

**NOTE:** Prior to performing adjustment procedures, make sure lift truck is parked on a level surface and mast is in vertical position.

### Lift Trucks Equipped With Forks

1. Adjust chain anchors that support carriage until bottom of fork heel is 12 +3.0/-6.0 mm (0.47 +0.12/-0.24 in.) above floor level. See Figure 66.



1. MAST
2. CARRIAGE
3. FORK
4. HEEL OF FORK IS 12 +3.0/-6.0 mm (0.47 +0.12/-0.24 in.) ABOVE FLOOR LEVEL

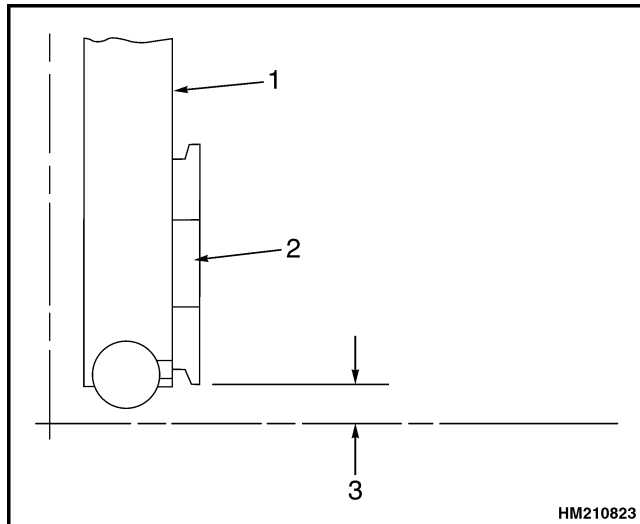
**Figure 66. Lift Chain Adjustment, With Forks**

### Lift Trucks Equipped with Hook-Type Carriage and Attachment Without Forks

1. Adjust chain anchors that support carriage until bottom of lower carriage bar is above floor level as shown in Table 4 and Figure 67.

**Table 4. Hook-Type Carriage Chain Adjustment**

Class II and III	82.5 ±3.0 mm (3.25 ±0.12 in.)
Class IV	133.5 ±3.0 mm (5.26 ±0.12 in.)



**Figure 67. Lift Chain Adjustment, Hook-Type Carriage**

**Legend for Figure 67.**

1. MAST
2. CARRIAGE
3. DISTANCE FROM FLOOR TO LOWER CARRIAGE BAR

## Jump-Starting the Lift Truck

### JUMP-STARTING USING A BATTERY CHARGER



#### CAUTION

**DO NOT** try to start the engine by pushing or towing the lift truck. Damage to the hydraulic system can occur if engine is started by pushing or towing lift truck.

If battery becomes discharged and requires a booster battery to start engine, follow these procedures carefully when connecting jumper cables.

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

### JUMP-STARTING A LIFT TRUCK USING ANOTHER LIFT TRUCK



#### WARNING

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



#### CAUTION

**DO NOT** try to start the engine by pushing or towing the lift truck. Damage to the hydraulic system can occur if engine is started by pushing or towing lift truck.

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

## Welding Repairs



### WARNING

Welding can cause a fire or an explosion. Always follow the instructions in the Frame section if a fuel or hydraulic tank must be welded. Make sure there is no fuel, oil, or grease near the weld area. Make sure there is good ventilation in the area where the welding must be done.

DO NOT heat, weld, or bend forks. Forks are made of special steel using special methods. The strength of the overhead guard can be reduced by welding or heating. Get information from your dealer for Yale lift trucks before welding on a mast.

Forklift frames and components may be painted with a catalyzed paint such as polyurethane or a two-part primer. Welding, burning, or other heat sufficient to cause thermal decomposition of the paint may release isocyanates. These chemicals are allergic sensitizers to the skin and respiratory

tract and overexposure may occur without odor warning. Should work be performed, utilize good industrial hygiene practices including removal of all paint (prime and finish coats) to the metal around the area to be welded, local ventilation, and/or supplied-air respiratory protection.



### CAUTION

When an arc welder is used, always disconnect the ground cable from the battery in the lift truck. This action will prevent damage to the alternator or the battery.

Connect the ground clamp for the arc welder as close as possible to the weld area. This action will prevent damage to a bearing from the large current from the welder.

Some repairs require welding. If an acetylene or arc welder is used, make sure procedures in previous **WARNING** and **CAUTION** are done.

## Wheel and Tire Replacement

### GENERAL

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

### PNEUMATIC TIRE WITH TUBE, REPAIR

#### Remove Wheels From Lift Truck



### WARNING

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



### WARNING

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

truck. If the truck is equipped with bias-ply tires, the ply rating listed on the Nameplate is the minimum ply rating that must be installed. Tires with ply ratings greater than or equal to the Nameplate listed ply rating may be acceptable. Check with your Yale dealer whether a specific bias-ply tire is approved for use on Yale trucks.



### WARNING

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

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

Always wear safety glasses.

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

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



**CAUTION**

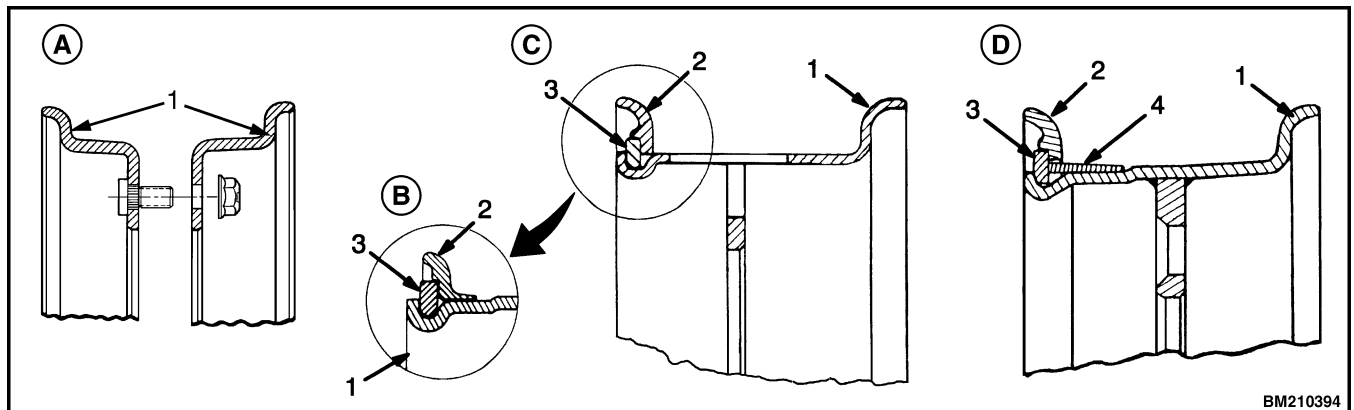
Not all makes of radial tires have sufficient sidewall strength for successful use on forklift trucks. This can affect stability and ride quality. Check with your Yale dealer whether a specific radial tire is approved for use on Yale trucks.

1. Put lift truck on blocks as described in How to Put Lift Truck on Blocks at the beginning of this section.
2. Remove air from tire. Remove valve core to make sure all air is out of inner tube. Push a wire through valve stem to make sure valve stem does not have a restriction.

3. Remove wheel nuts and remove wheel and tire from lift truck.

**Remove Tire From Wheel**

**NOTE:** When you disassemble the wheels, see Figure 68. There are several types of wheels used on this series of lift trucks.



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

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

1. WHEEL RIM  
2. SIDE FLANGE

3. LOCK RING  
4. FLANGE SEAT

*Figure 68. Types of Pneumatic Wheels*

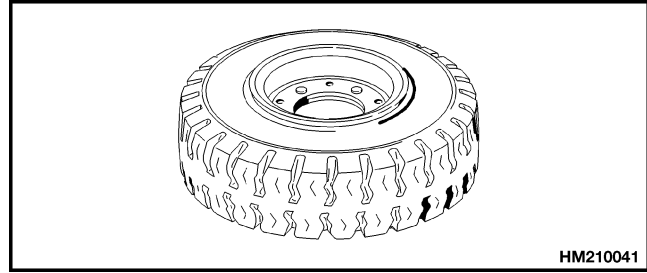
**Remove Tire From Two-Piece Wheel****WARNING**

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

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

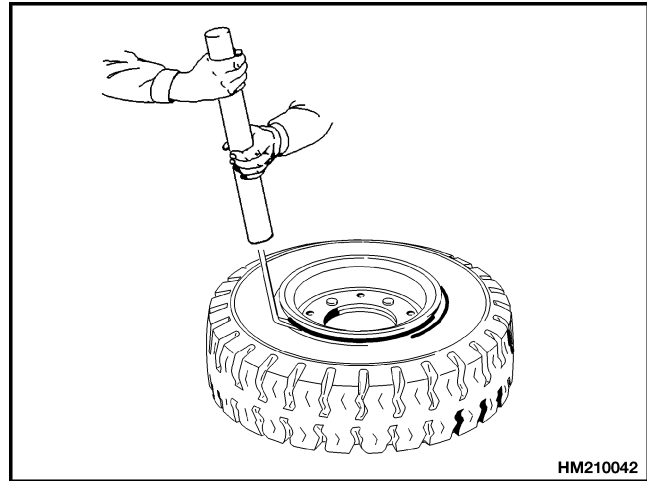
**STEP 1.**

Remove nuts that fasten wheel rims together.



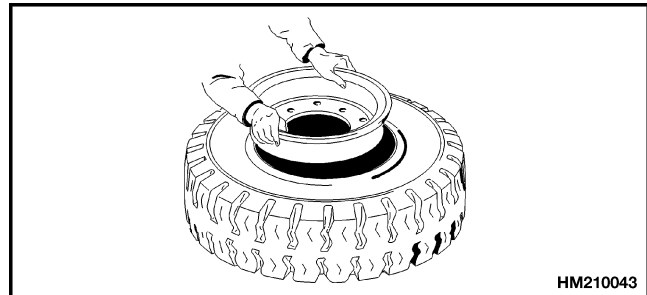
**STEP 2.**

Loosen tire bead from wheel rim.



**STEP 3.**

Remove wheel rims from tire. Remove inner tube and flap.



**Remove Tire From Three- and Four-Piece Wheels**



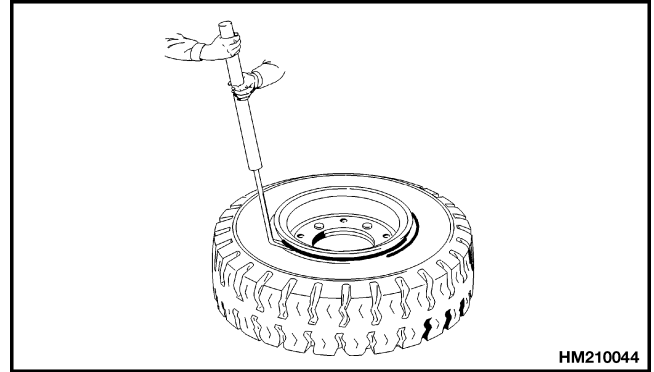
**WARNING**

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

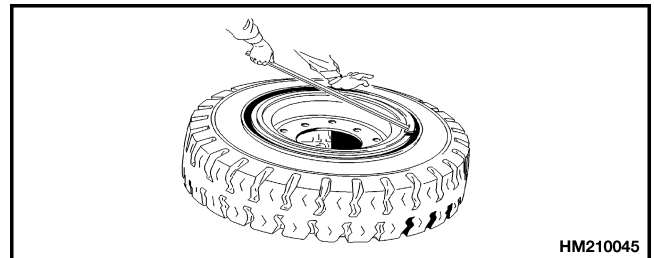
Keep tire tools in firm contact with the wheel parts. If the tool slips, it can move with enough force to cause an injury.

**STEP 1.**

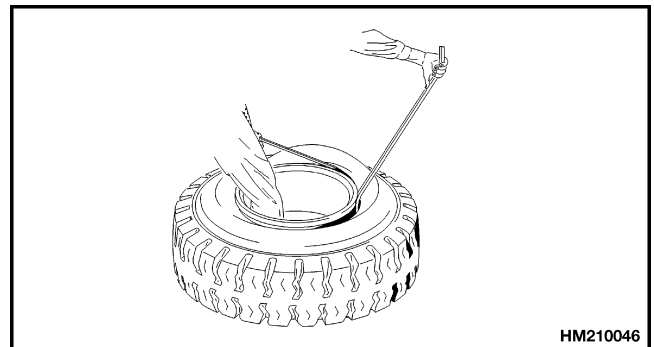
Loosen tire bead from side flange.

**STEP 2.**

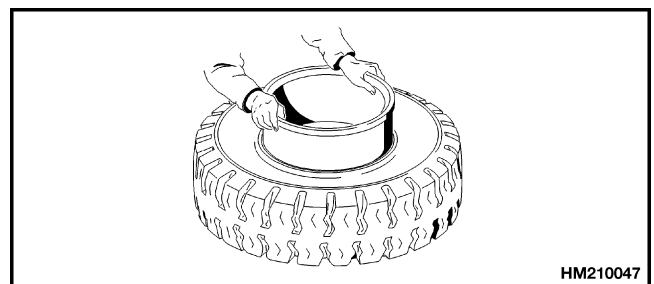
Put tire tool into slot between lock ring and wheel rim. Remove lock ring and side flange. If there is a flange seat, remove it.

**STEP 3.**

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

**STEP 4.**

Remove wheel from tire.



### Install Wheel in Tire

**WARNING**

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

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

- **DO NOT** mix types of tires, type 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 the side ring is in the correct position. The ends of the side ring must not touch. The clearance at the ends of the lock ring will be approximately 13 to 25 mm (0.5 to 1.0 in.) after it is installed. If the clearance is wrong, the wrong part has been used.

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

3. Apply a rubber lubricant or a soap solution to the tire bead and tube.
4. Install new tire flap.
5. Make sure rim is the correct size for tire. Lubricate part of wheel that contacts bead and flap.
6. Install the three-piece or four piece wheel in the tire as shown in Install Three-Piece or Four-Piece Wheel in Tire.
7. Install the two-piece wheel in the tire as shown in Install Tire on Two-Piece Wheel.



### **WARNING**

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

### ***Install Three-Piece or Four-Piece Wheel in Tire***



### **WARNING**

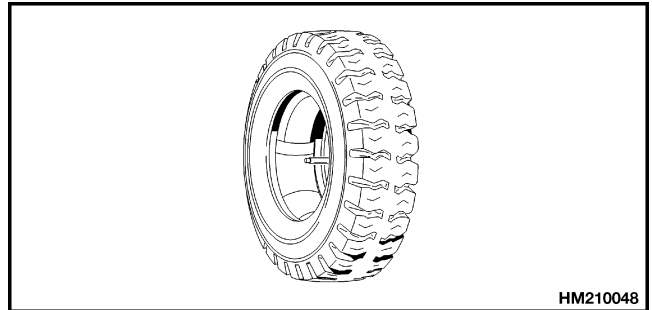
Damage to the tire and wheel assembly and injury or death can occur if you do not do the following procedures:

- Clean and inspect all parts of the wheel before installing the tire.
- **DO NOT** use any damaged or repaired wheel parts.
- Make sure all parts of the wheel are the correct parts for that wheel assembly.
- **DO NOT** mix parts between different types or manufacturers of wheels.
- **DO NOT** mix types of tires, type of tire tread, or wheel assemblies of different manufacturers on any one lift truck.

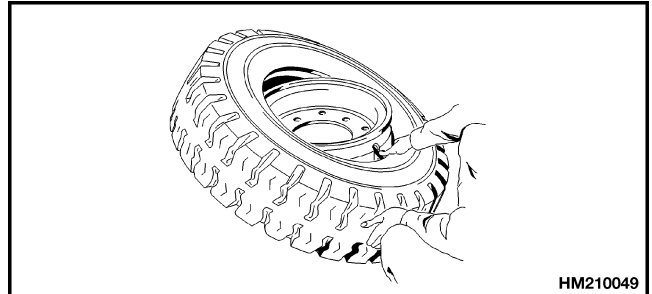
**DO NOT** use a steel hammer on the wheel. Use a rubber, lead, plastic, or brass hammer to put parts together. Make sure the side ring is in the correct position. The ends of the side ring must not touch. The clearance at the ends of the lock ring will be approximately 13 to 25 mm (0.5 to 1.0 in.) after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

**STEP 1.**

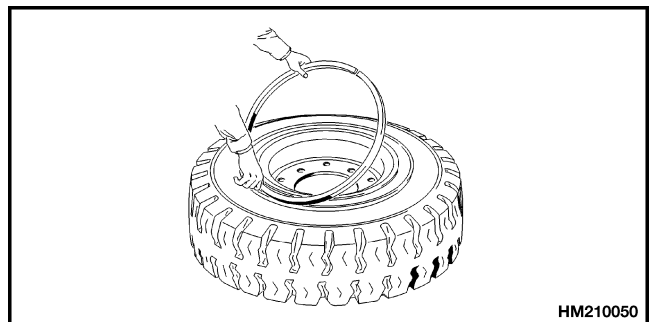
Install inner tube and rubber flap in tire.

**STEP 2.**

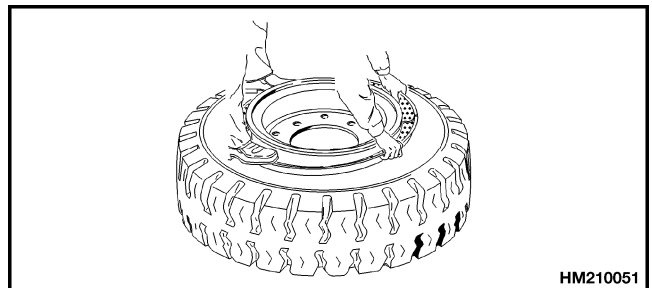
Install wheel rim in tire. Make sure stem of inner tube is aligned with slot in rim.

**STEP 3.**

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

**STEP 4.**

Put lock ring in the correct position on rim. Add air pressure to tire as described in Install Wheel in Tire.

**Install Tire on Two-Piece Wheel****WARNING**

Wheels can explode and cause injury or death if the following procedures are not followed:

- Clean and inspect all parts of the wheel before installing the tire.

- **DO NOT** use any damaged or repaired wheel parts.
- **Make sure** all parts of the wheel are the correct parts for that wheel assembly.
- **DO NOT** mix parts between different types or manufacturers of wheels.
- **DO NOT** mix types of tires, type 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 the side ring is in the correct position. The ends of the side ring must not touch. The clearance at the ends of the lock ring will be approximately 13 to 25 mm (0.5 to 1.0 in.) after it is installed. If the clearance is wrong, the wrong part has been used.

 **CAUTION**

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

1. Clean and inspect all parts of wheel. Paint any parts that have rust or corrosion.

**Install Two-Piece Wheel in Tire**

**STEP 1.**

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

**STEP 2.**

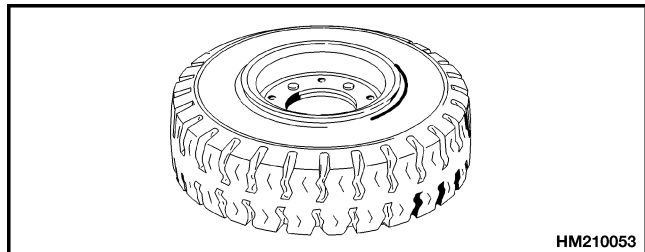
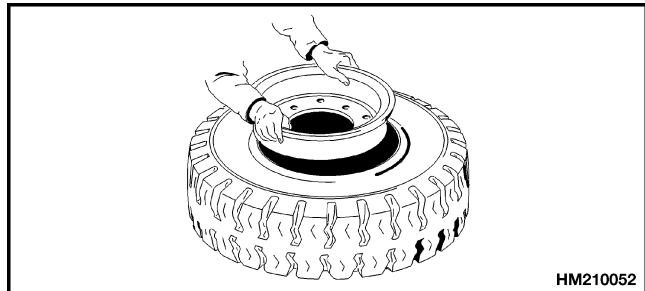
Tighten nuts that hold rim halves together to 175 N•m (130 lbf ft). Add air pressure to tire (see Nameplate).

2. Install new inner tube in tire. Used tubes and flaps can cause tire failure.

 **WARNING**

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

3. Apply a rubber lubricant or a soap solution to tire bead and tube.
4. Install new tire flap.
5. Make sure rim is the correct size for tire. Lubricate part of wheel that contacts bead and flap.



**ADD AIR TO PNEUMATIC TIRES WITH TUBE**

 **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, use a chuck that fastens onto the valve stem of the inner tube. Make sure there is enough 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 flange or lock ring when the tire has air pressure greater than 20 kPa (3 psi).

1. Put tire in a safety cage. See Figure 69.
2. Add 20 kPa (3 psi) of air pressure to tire. See Figure 69.
3. Check that all wheel parts are correctly installed. Hit lock ring lightly to make sure it is in the seat.

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

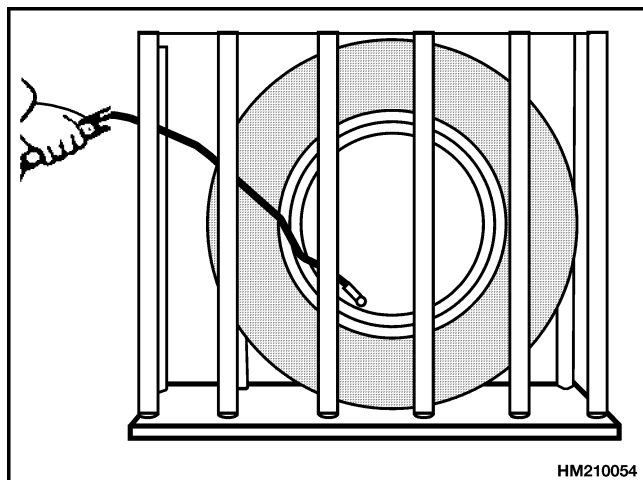


Figure 69. Add Air to Tires

## Install the Wheels



### WARNING

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

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

The steering wheels are fastened to the spindle of steering axle with a large castle nut. Make sure inner and outer bearings are correctly lubricated with grease. Install inner bearing assembly and wheel on spindle. Install outer bearing cone and castle nut. Tighten castle nut to 60 N•m (44 lbf ft) while wheel is

rotated. Loosen castle nut until hub turns freely with no end play. Tighten castle nut to 3.0 to 6.0 N•m (425 to 850 lbf in). Install cotter pin in castle nut. If cotter pin cannot be installed, loosen castle nut to first position where cotter pin can be installed. Install cap for bearings.

## PNEUMATIC TUBELESS TIRE, REPAIR

### Remove Wheels From Lift Truck



### WARNING

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

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

Always wear safety glasses.

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



### WARNING

DO NOT mix brands of rubber sealing rings and tires. Serious injury to personnel or damage to the lift truck can occur if the rubber sealing rings are not compatible with the tire brand.

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

The main component of TBS is a special rubber ring that fits inside tire between tire beads to ensure airtightness of existing wheel and tubeless tire assembly.

1. Put lift truck on blocks as described in How to Put Lift Truck on Blocks at beginning of this section.
2. Remove valve cap and core to remove all air from tire.
3. Remove wheel nuts and remove wheel and tire from lift truck. Lift truck tires and wheels are heavy.

**Remove Tire From Wheel**

 **WARNING**

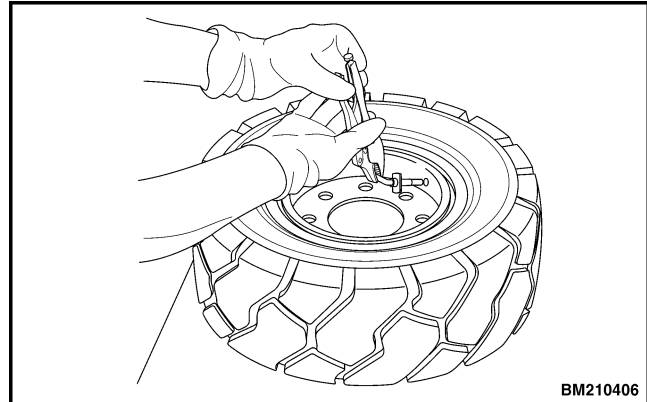
Make sure all of the air pressure is removed from the tire before a wheel is disassembled. Air pressure in the tires can cause the tire and rim parts to explode causing serious injury or death.

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

**NOTE:** There are several types of wheels used on these lift trucks. When disassembling wheels, see Figure 68.

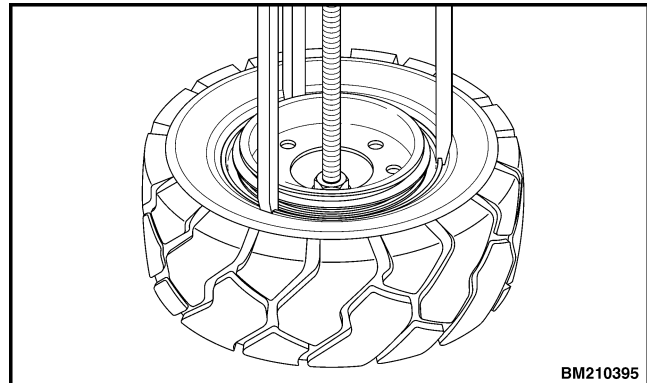
**STEP 1.**

If the tire is equipped with a Tubeless Bead Seal (TBS) style rubber sealing ring with a separate valve stem, turn the valve stem ¼ turn and remove valve stem from wheel, as shown in illustration. If the tire is equipped with a Tubeless Sealing Ring (TSR) style rubber sealing ring, the valve stem is an integral part of the rubber sealing ring and is not removable.



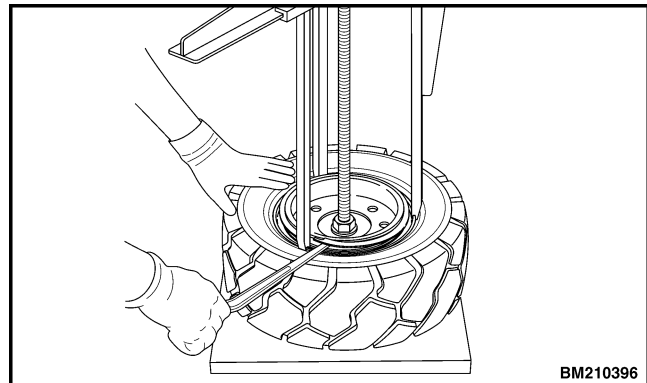
**STEP 2.**

Put wheel and tire assembly on the press. Position the feet of the press on the loose flange. Press down on loose flange to expose the locking ring.



**STEP 3.**

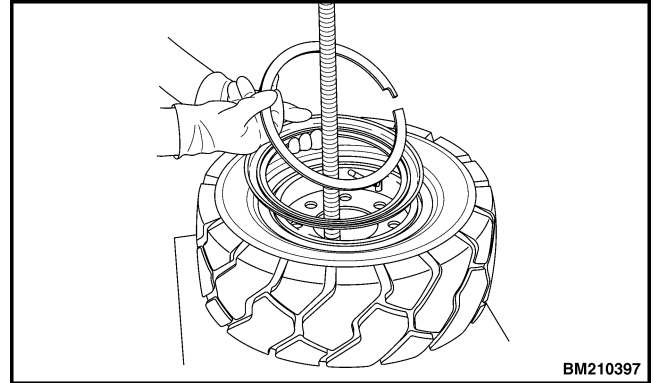
Remove the loose flange locking ring and the advance band (four-piece wheel only) using a tire tool.



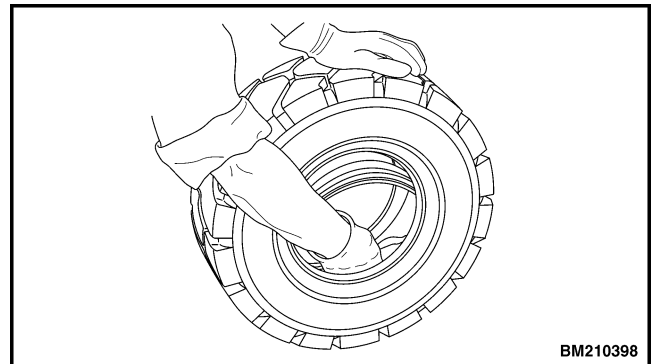


**STEP 4.**

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

**STEP 5.**

Push the TBS toward the inside of the tire to remove it.




---

**Install Tire on Wheel**
**WARNING**

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

- Clean and inspect all parts of the wheel before installing the tire.
- **DO NOT** use any damaged or repaired wheel parts.
- Make sure that all parts of the wheel are the correct parts for that wheel assembly.
- **DO NOT** mix parts between different types or manufacturers of wheels.
- **DO NOT** mix types of tires, type of tire tread, or wheel assemblies of different manufacturers on any one lift truck.

**WARNING**

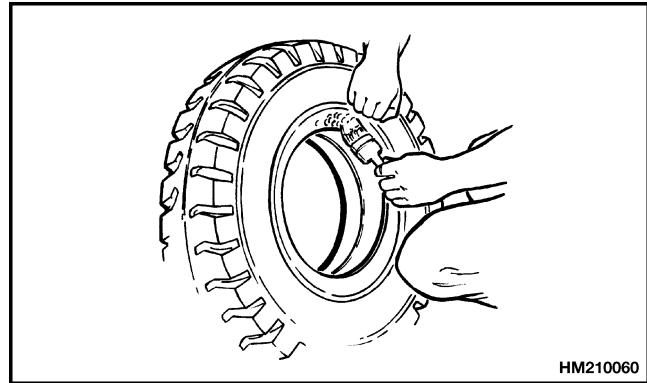
**DO NOT** use a steel hammer on the wheel. Use a rubber, lead, plastic, or brass hammer to put parts together.

**WARNING**

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

**STEP 1.**

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



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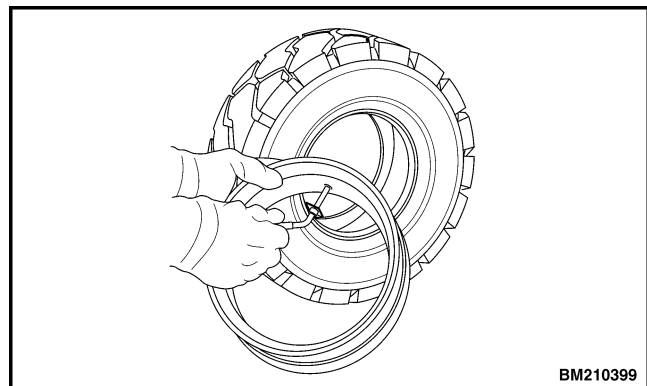
**NOTE:** If the wheel rim width is less than 152 mm (6 in.), the TBS will contain one valve hole to accommodate the needle valve. If the wheel rim width is greater than 152 mm (6 in.), the TBS will have two holes for the needle valve.

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

**STEP 2.**

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

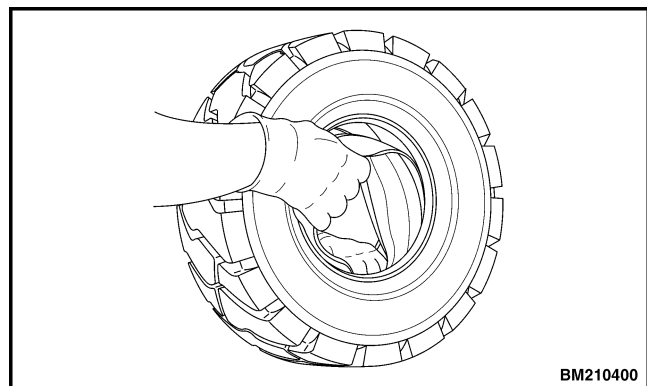
If the TBS has two-valve holes, lubricate the plastic plug and insert into valve hole that will not be used.



BM210399

**STEP 3.**

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

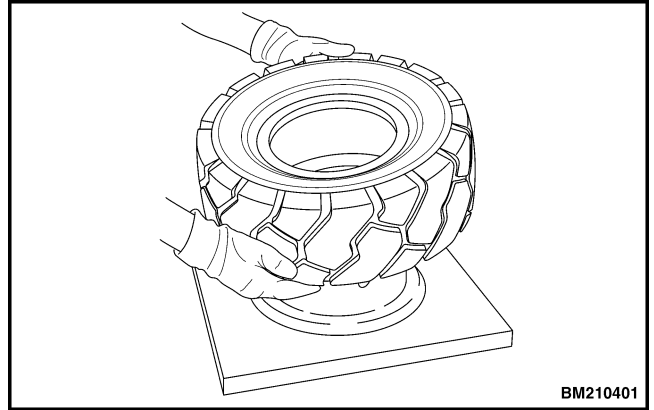


BM210400

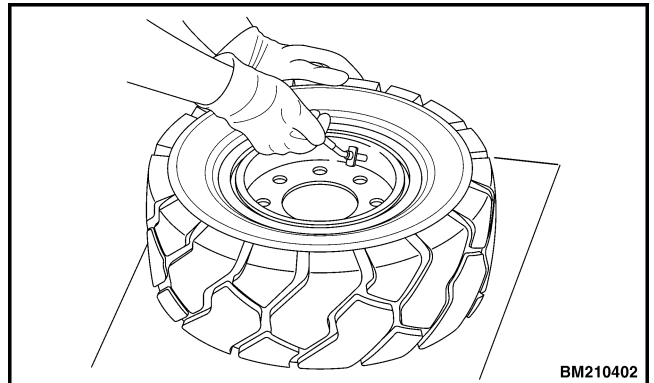
**STEP 4.**

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

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

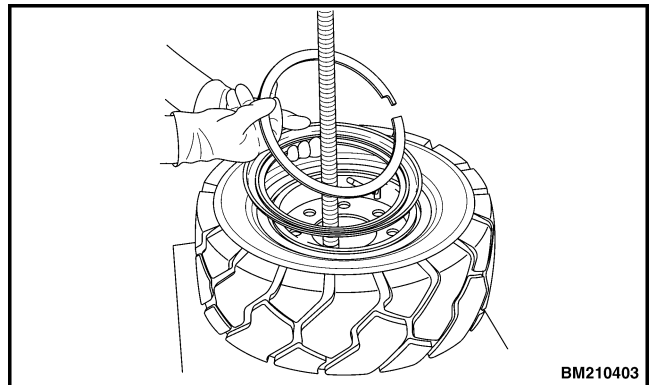
**STEP 5.**

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

**STEP 6.**

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

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



**STEP 7.**

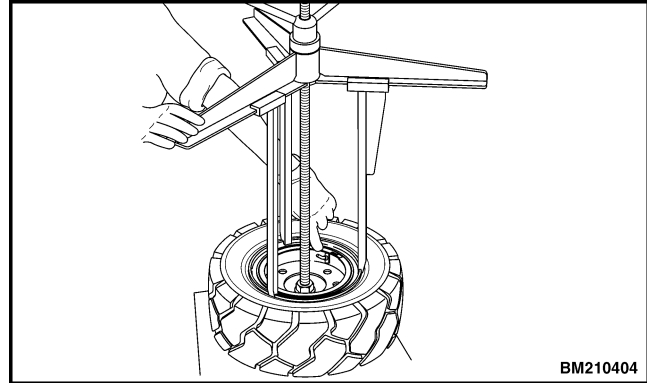
Position the advance band. Ensure that it does not go in too far and damage the valve. Position the arms of the press onto the loose flange.



**CAUTION**

**DO NOT** compress the bead too far and cause the rubber sealing ring to become dislocated and damage the valve stem.

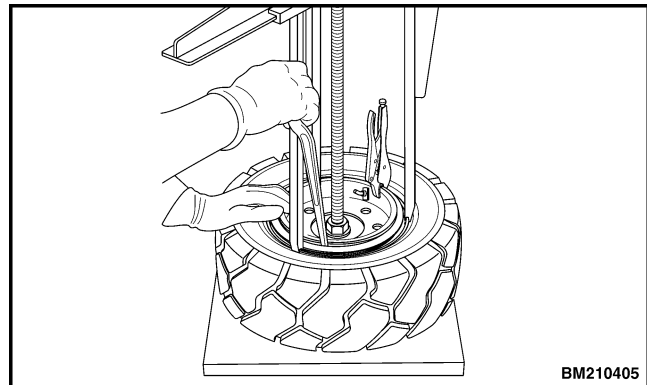
Push down on the press to depress the tire beads until locking ring groove is fully exposed.



BM210404

**STEP 8.**

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



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**STEP 9.**

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

**Add Air to Pneumatic Tubeless Tire**

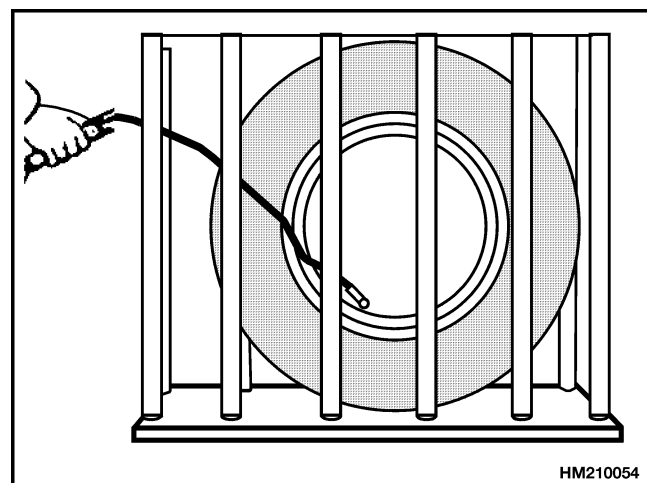


**WARNING**

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

**DO NOT** sit or stand by safety cage.

1. Put tire in safety cage. See Figure 70.
2. Add air to tire to the recommended air pressure that is shown on the Nameplate. Install valve cap to ensure air stays in the tire.



HM210054

**Figure 70. Add Air to Tires**

## Wheels, Install



### WARNING

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

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

Steering wheels are fastened to the spindle of steering axle with a large castle nut. Make sure inner and outer bearings are correctly lubricated with grease. Install inner bearing assembly and wheel on spindle. Install outer bearing cone and castle nut. Tighten castle nut to 60 N•m (44 lbf ft) while wheel is rotated. Loosen castle nut to 3.0 to 6.0 N•m (425 to 850 lbf in). Install cotter pin in castle nut. If cotter pin cannot be installed,

## Remove Tire From Wheel



### WARNING

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



### WARNING

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

Always wear safety glasses.

**NOTE:** When you disassemble the wheels, see How to Put Lift Truck on Blocks. There are several types of wheels used on these series of lift trucks.

loosen castle nut to first position where cotter pin can be installed. Install cap for bearings.

## SOLID RUBBER TIRES ON PNEUMATIC WHEELS, CHANGE



### WARNING

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

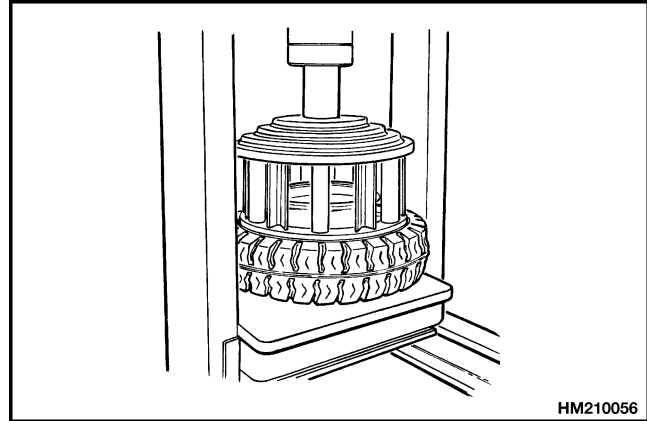
Always wear safety glasses.

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

1. Put lift truck on blocks as described in How to Put Lift Truck on Blocks at the beginning of this section.
2. Remove wheel nuts and remove wheel and tire from lift truck. Lift truck tires and wheels are heavy.

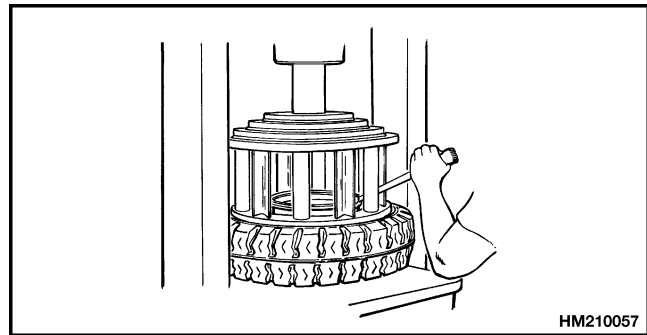
**STEP 1.**

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



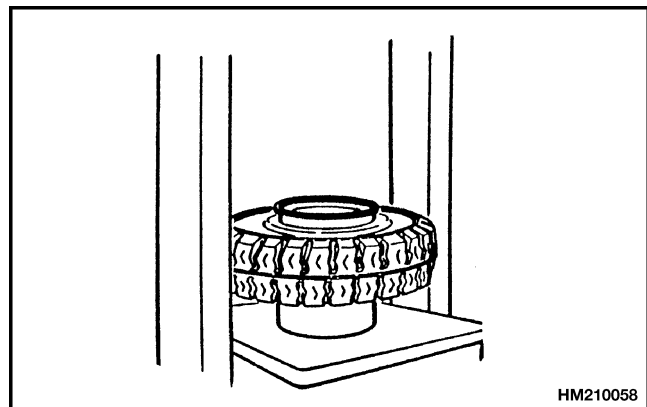
**STEP 2.**

Put tire tool into slot between lock ring and wheel rim. Remove lock ring and side flange.



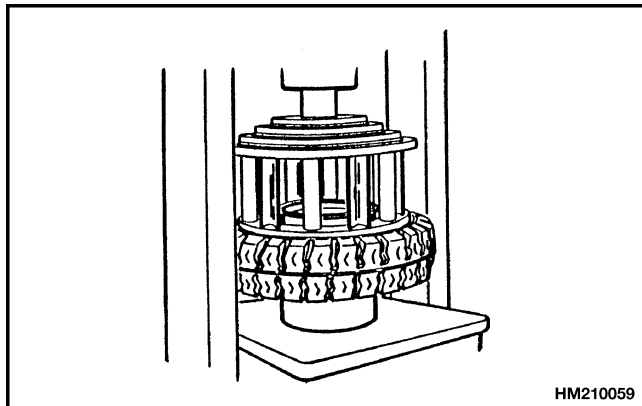
**STEP 3.**

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



**STEP 4.**

Put cage in position on tire. Use press to push tire from wheel rim.

**Install Tire on Wheel**

**NOTE:** When you assemble the wheels, see Figure 68. There are several types of wheels used on these series of lift trucks. **DO NOT** use a two-piece pneumatic wheel for solid rubber tires.

**WARNING**

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

- Clean and inspect all parts of the wheel before installing the tire.
- **DO NOT** use any damaged or repaired wheel parts.
- Make sure all parts of the wheel are the correct parts for that wheel assembly.
- **DO NOT** mix parts between different types or manufacturers of wheels.
- **DO NOT** mix types of tires, type 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 the side ring is in the correct position. The ends of the side ring must not touch. The clearance at the ends of the lock ring will be approximately 13 to 25 mm (0.5 to 1.0 in.) after it is installed. If the clearance is wrong, the wrong part has been used.

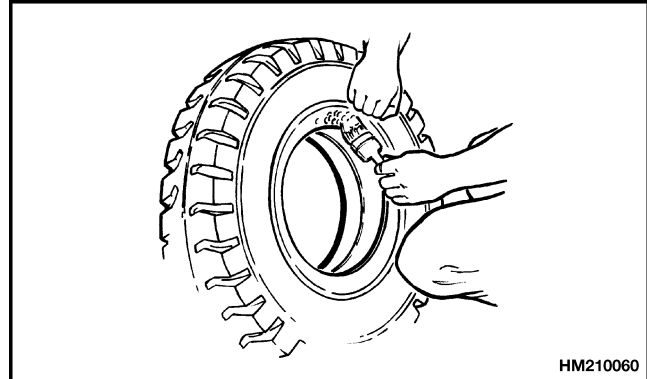
**CAUTION**

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

**NOTE:** When assembling wheels, see Figure 68. There are several types of wheels used on this series of lift trucks.

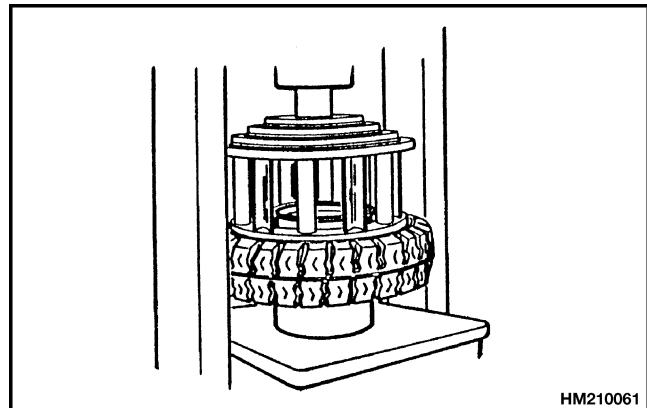
**STEP 1.**

Lubricate wheel rim and inner surface of tire with tire lubricant or soap.



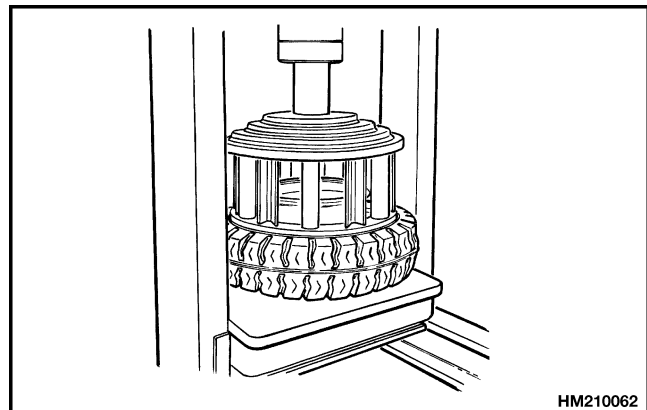
**STEP 2.**

Put wheel rim on bed of press. Put tire over wheel rim. Put cage in position on tire. Use press to install tire on wheel rim.



**STEP 3.**

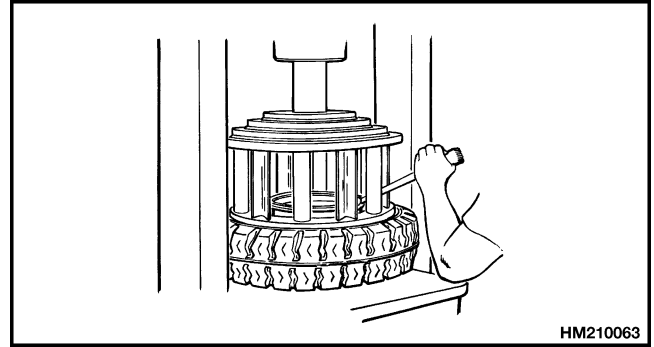
Remove cage and put flange seat (if used), side ring, and lock ring in position on wheel rim. Install cage on tire. Use press to push tire onto wheel rim so side flange and lock ring can be installed.





**STEP 4.**

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



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**SNAP-ON-TIRE, CHANGE****WARNING**

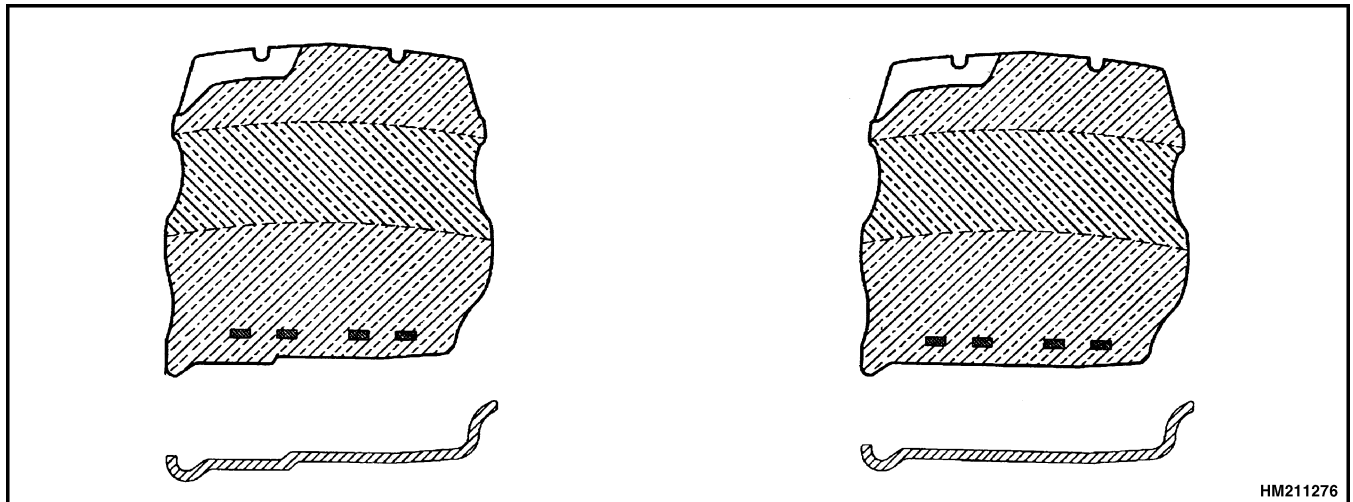
Wheels must be changed and tires repaired by trained personnel only.

Always wear safety glasses.

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

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

**NOTE:** When you disassemble the wheels, see Figure 71. There are several types of wheels used on these series of lift trucks.



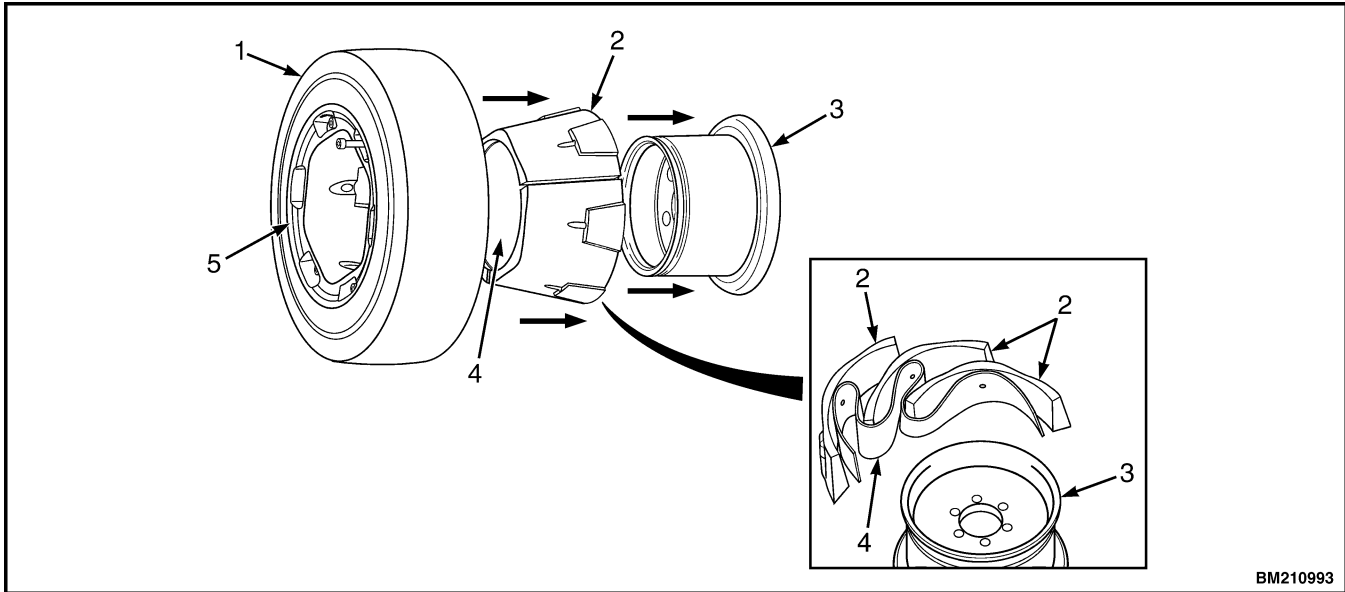
HM211276

*Figure 71. Snap-On-Tire and Rim Configurations*

### **EASY MOUNTING STYLE SOLID RUBBER TIRES ON PNEUMATIC WHEELS, CHANGE**

The lift trucks covered in this service manual may be equipped with Easy Mounting Style solid rubber tires, which do not require a press to remove and install the tire onto wheel rim. A specially created adapter fits over the wheel rim, allowing the Easy Mounting Style

solid rubber tire to be quickly bolted onto the adapter and wheel rim. The adapter is made up of three separate pieces that are held together by a compression plate. The adapter wraps around the wheel rim, then the tire is put onto the adapter, where the adapter locks into the tire brackets. When the bolts are installed and tighten, the adapter compresses against the wheel rim and holds the tire to wheel rim. See Figure 72.



BM210993

- |              |                      |
|--------------|----------------------|
| 1. TIRE      | 4. COMPRESSION PLATE |
| 2. ADAPTER   | 5. TIRE BRACKET      |
| 3. WHEEL RIM |                      |

**Figure 72. Easy Mounting Style Solid Rubber Tire Components**

**Remove Easy Mounting Tire From Wheel**

**WARNING**

Be sure lift truck is secured and on level ground. If jacks are used, be sure they meet the load requirements of the lift truck. See Nameplate. Failure to do so can result in lift truck rolling away and/or tipping, which can cause serious personal injury.

**CAUTION**

**DO NOT** use a press to remove or install an Easy Mounting Style solid rubber tire. A press will cause damage to the wheel, tire, and adapter.

If Easy Mounting style solid rubber tires are being installed for the first time, go to sections Solid Rubber Tires on Pneumatic Wheels, Change or Snap-On-Tire, Change, to remove tire from wheel rim. Once tire has been removed from wheel rim, go to section Install Easy Mounting Tire on Wheel.

If Easy Mounting Style solid rubber tires are already installed on lift truck, the wheel rim does not have to be removed from lift truck. In the steps below, the wheel rim is removed from lift truck.

**STEP 1.**

Put lift truck on blocks as described in How to Put Lift Truck on Blocks at the beginning of this manual. If jacks are used in place of blocks, use only jacks with the correct capacity. See Nameplate.

**WARNING**

When removing bolts and washers from tire, be sure tire does not slip off rim and cause an injury.

**WARNING**

Wear safety glasses and protect your hands and feet when removing and installing Easy Mounting Style solid rubber tires. Serious injury to personnel can result if eyes, hands, and feet are not protected.

**STEP 2.**

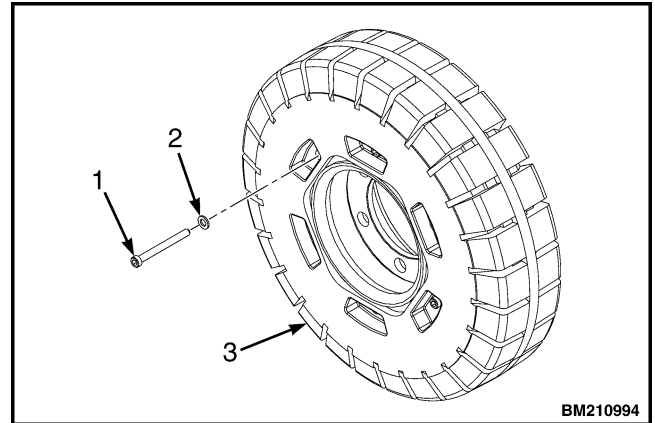
Remove six bolts and washers from tire.

**STEP 3.**

If tire is difficult to remove from wheel rim, use a rubber hammer and a driver or drift punch, and tap lightly in the area indicated by the arrows in the illustration.

**STEP 4.**

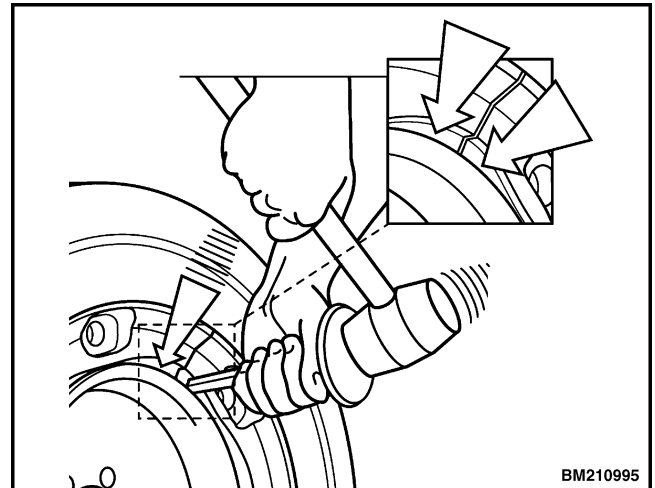
Remove tire from wheel rim.



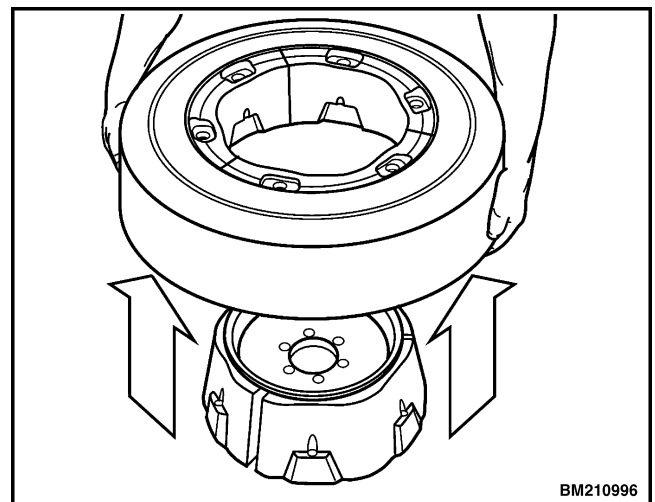
BM210994

1. CAPSCREW
2. WASHER

3. TIRE



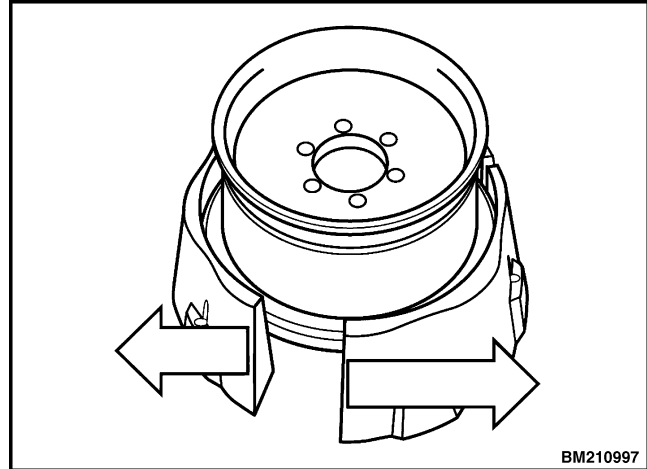
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**STEP 5.**

Pull the adapter off the wheel rim. If adapter is difficult to remove, insert a suitable tool into adapter slots and pry off wheel rim.

**Install Easy Mounting Tire on Wheel****WARNING**

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

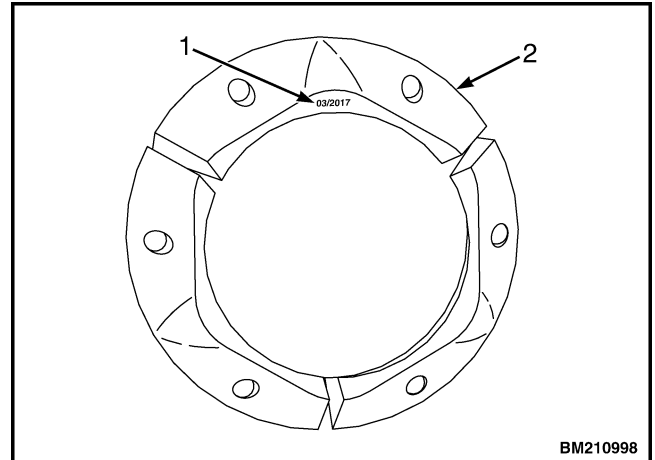
- Clean and inspect all parts of wheel before installing tire.
- Clean and inspect all parts of the adapter for wear or damage.
- **DO NOT** use any damaged or repaired wheel or adapter parts.
- Make sure that all parts of wheel are correct parts for that wheel assembly.
- **DO NOT** mix parts between different types or manufacturers of wheels.
- **DO NOT** mix types of tires, type of tire tread, or wheel assemblies of different manufacturers on any one lift truck.
- **DO NOT** use a steel hammer on the wheel, tire, or adapter parts. Use a rubber, lead, plastic, or brass hammer to put parts together if a hammer is needed.

**WARNING**

Never use plastic parts beyond their expired service life. Expired parts can fail during usage and lead to serious injury to personnel. Check the recommended service life date before using parts.

**STEP 1.**

Before installing the adapter onto the wheel assembly, check the recommended service life date on the adapter to ensure it has not expired. If date has expired, replace with new adapter. See **Parts Manual**.



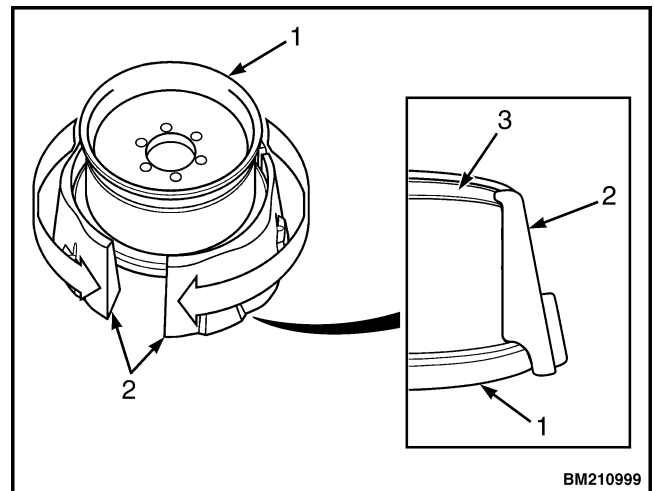
1. LOCATION OF SERVICE LIFE DATE
2. ADAPTER

**WARNING**

Wear safety glasses and protect your hands and feet when removing and installing Easy Mounting Style solid rubber tires. Serious injury to personnel can result if eyes, hands, and feet are not protected.

**STEP 2.**

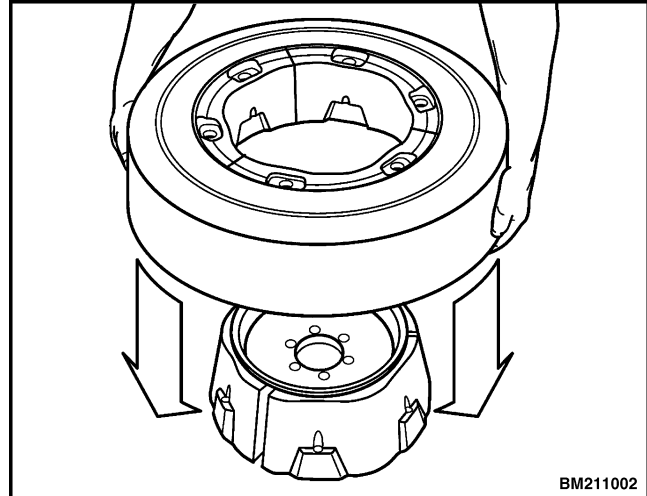
Wrap the adapter around the wheel rim. Place wheel rim on side and check that the adapter inserts into the wheel rim groove.



1. WHEEL RIM
2. ADAPTER
3. WHEEL RIM GROOVE

**STEP 3.**

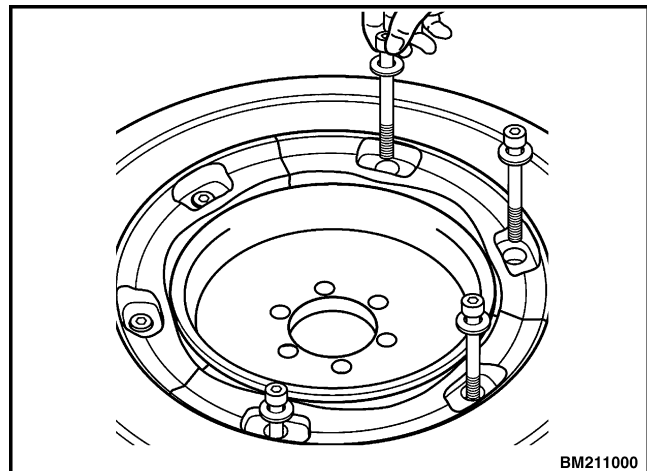
Place tire onto adapter and wheel rim.



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**STEP 4.**

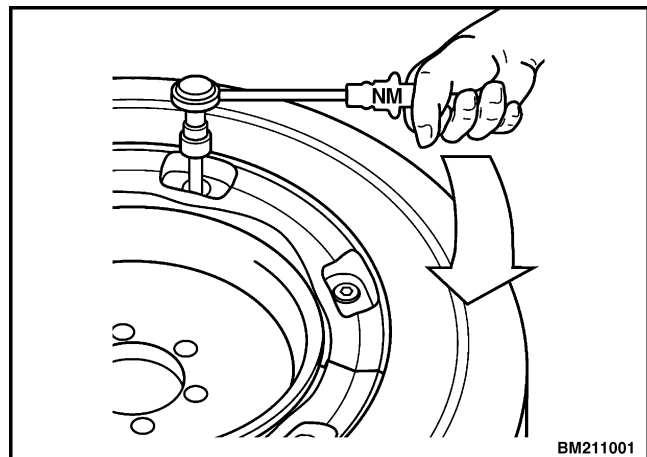
Insert six bolts and washers into tire and hand tighten.



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**STEP 5.**

Tighten bolts in a cross pattern to 85 N•m (63 lbf ft) for the drive wheels and 49 N•m (36 lbf ft) for the steer wheels.



BM211001

## Overhead Guard Changes



### WARNING

**DO NOT weld mounts for lights or accessories to the legs of the overhead guard. Changes that are made by welding or by drilling holes that are too big or in the wrong location can reduce the strength of the overhead guard.**

**See your dealer for Yale lift trucks BEFORE performing any changes to the overhead guard.**

No welding or drilling on legs of overhead guard is permitted as per previous **WARNING**.

## Adhesives and Sealants

Yale Part No.	Loctite® Part No.	Description	Size
501702901	222	Small Screw Threadlock (Purple)	50 ml
505965518	242	Removable Threadlock (Blue)	10 ml
580012519	271	High Strength Threadlock (Red)	10 ml
501702904	290	Low Viscosity Threadlock (Green)	50 ml
518806679	422	SuperBonder® Adhesive	3 ml
500009917	515	Gasket Eliminator (Purple)	50 ml
518795676	567	Pipe Sealant with Teflon®	50 ml
502058904	595	Super Flex® Silicone	100 ml
504226218	767	Antiseize Compound	1 lb
150015825		Chisel Gasket Remover (10 Aerosol cans per case)	18 oz

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Teflon® is a registered trademark of Du Pont de Nemours Co., Inc.

