

PERIODIC MAINTENANCE

GENERAL

This section contains a MAINTENANCE SCHEDULE and the instructions for maintenance and inspection.

The MAINTENANCE SCHEDULE has time intervals for inspection, lubrication and maintenance for your lift truck. The service intervals are given in both operating hours recorded on the lift truck hour meter, and in calendar time. The recommendation is to use the interval that comes first.

The recommendation for the time intervals are for eight hours of operation per day. The time intervals must be decreased from the recommendations in the MAINTENANCE SCHEDULE for the following conditions:

- a. If the lift truck is used more than eight hours per day.
- b. If the lift truck must work in dirty operating conditions.

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

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

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.

Serial Number Data

The serial number for the lift truck is found on the nameplate and also on the right-hand side of the frame near the counterweight. The serial number indicates the design series, manufacturing plant, and the year manufactured.

Example: **B177** **B** **4369** **L**
 (1) **(2)** **(3)** **(4)**

(1) The first letter and number of the serial number indicates the design series and the serial code of the lift truck.

Examples: A177 indicates the serial code for this series of lift trucks and includes the H2.00–3.00XL (H40–60XL) models.

B177 indicates the serial code for this series of lift trucks made after April 1990.

C177 indicates the serial code for this series of lift trucks made after June 1990.

A187 indicates the serial code for this series of lift trucks and includes the S2.00–3.00XL (S40–60XL) models.

B/C187 indicates the serial code for later production for this series of lift trucks.

B10 indicates the serial code for this series of lift trucks and includes the S1.25–1.75XL (S25–35XL) models.

C1 indicates the serial code for this series of lift trucks and includes the H1.25–1.75XL (H25–35XL) models.

(2) The second letter identifies the manufacturing plant.
Examples:

- A = Scotland
- B = Northern Ireland
- D = Danville, IL U.S.A.
- E = Nijmegen, The Netherlands
- S = Australia
- V = Berea, KY U.S.A.

(3) The number series indicates the sequence of manufacture where the lift truck was made.

(4) The letter indicates the year of manufacture starting with A = 1980. The letter L = 1990, M = 1991, and N = 1992. (The letters I, O, and Q are not used.)

HOW TO MOVE A DISABLED LIFT TRUCK

WARNING

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

- a. Brakes do not operate correctly.
- b. Steering does not operate correctly.
- c. Tires are damaged.
- d. Traction conditions are bad.
- e. 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 under side of the lift truck.

How To Tow the Lift Truck

1. The towed lift truck must have an operator.
2. Tow the lift truck slowly.
3. Raise the carriage and forks approximately 30 cm (12 inches) from the surface. Install a chain to prevent the carriage and mast channels from moving.

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

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

HOW TO PUT A LIFT TRUCK ON BLOCKS

WARNING

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

- a. Before removing the mast and drive axle, put blocks under the counterweight so that the lift truck can not fall backward.
- b. Before removing the counterweight, put blocks under the mast assembly so that the lift truck can not fall forward.

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

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

How To Raise the Drive Tires (See FIGURE 1.)

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

sure that the jack has a capacity equal to at least half the weight of the lift truck. See the nameplate.

How To Raise the Steering Tires (See FIGURE 1.)

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

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

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

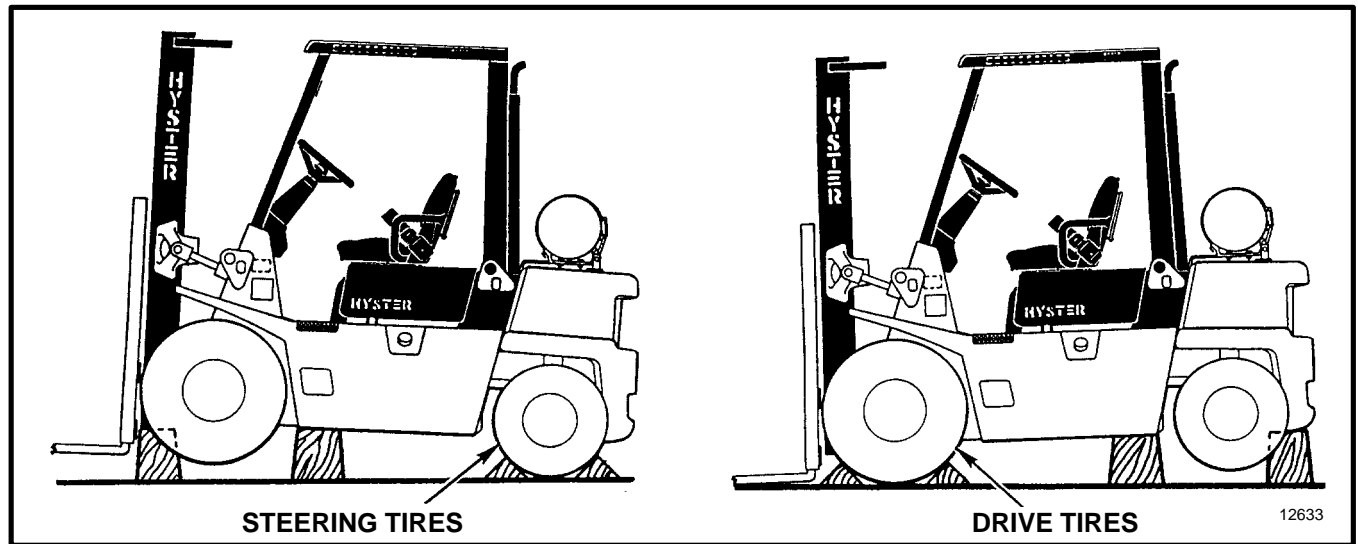


FIGURE 1. PUT A LIFT TRUCK ON BLOCKS

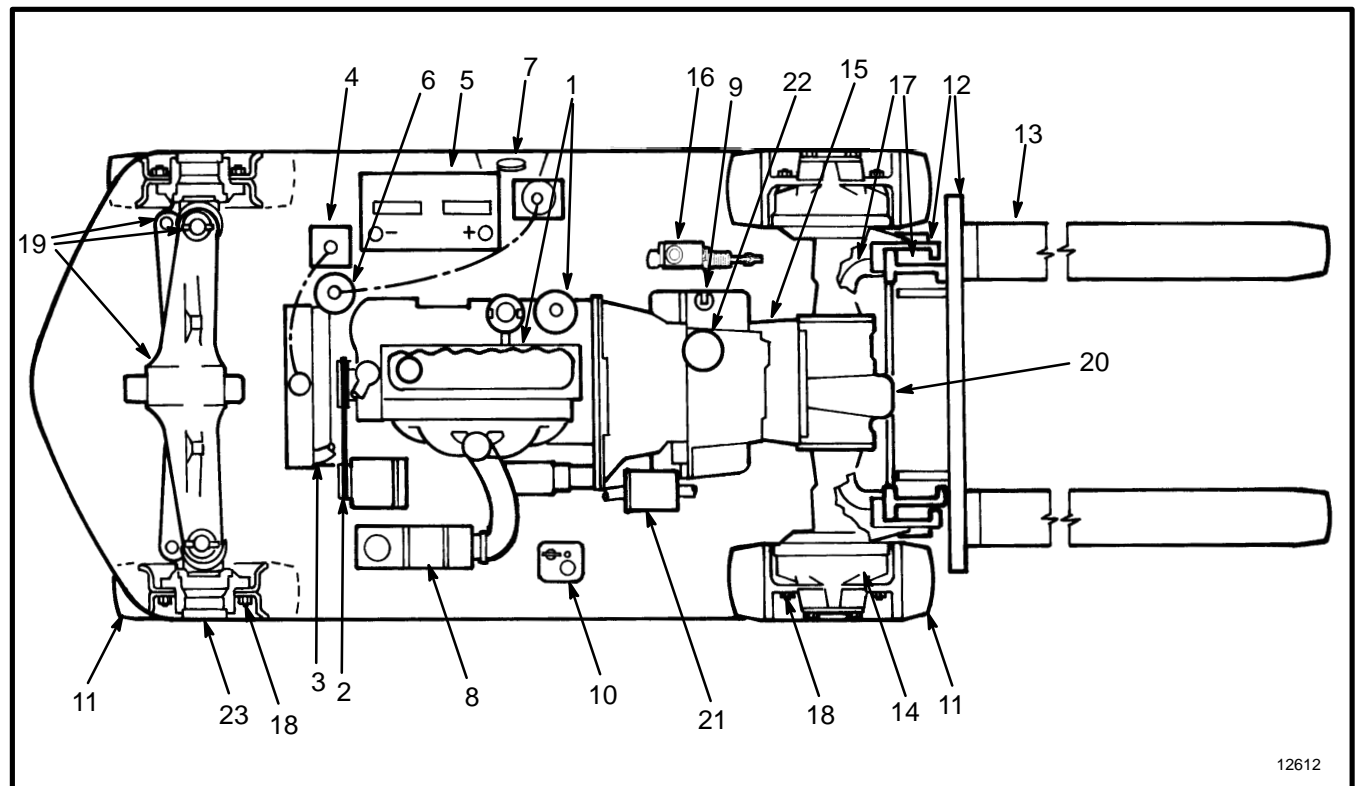


FIGURE 2. MAINTENANCE AND LUBRICATION POINTS

ITEM NO.	ITEM	8 Hr./ Daily	250 Hr./ 6 wk.	1000 Hr./ 6 mo.	2000 Hr./ 1 yr.	PROCEDURE OR QUANTITY	SPECIFICATION
1	ENGINE OIL Mazda 4-121G (Gasoline and LPG)	X	C			5.2 litre (5.5 qt)	API CC/SE/SF/SG, MIL-L-46152 30°C (85°F) and up SAE 30 15-30°C (60-85°F) SAE 30 0-15°C (32-60°F) SAE 20 less than -10°C (15°F) SAE 10W
1	ENGINE OIL GM 4-181 and GM 4-153 (Gasoline and LPG)	X	C			4.3 litre (4.5 qt)	API CC/SE/SF/SG, greater than -18°C (0°F) SAE 10W-30
1	ENGINE OIL Isuzu C240 (Diesel) Isuzu 4JB1 (Diesel)	X	C			5.2 litre (5.5 qt) 6.5 litre (6.9 qt)	API CC/SE/SF/SG, 27°C (80°F) and up SAE 40 0-32°C (32-90°F) SAE 30 less than -7°C (20°F) SAE 10W
2	DRIVE BELTS	X				Check Condition	See Parts Manual
	CHECK FOR LEAKS— FUEL, OIL, WATER	X				Check for Leaks	
3	COOLANT HOSES	X				Check Condition	See Parts Manual
4	COOLING SYSTEM S/H1.25-1.75XL (S/H25-35XL) Mazda 4-121G Isuzu C240 S2.00-3.00XL (S40-60XL) Mazda 4-121G GM 4-181 and GM 4-153 Isuzu C240 H2.00-3.00XL (H40-60XL) Mazda 4-121G GM 4-181 Isuzu C240 Isuzu 4JB1	X			C	7.8 litre (8.2 qt) 8.1 litre (8.6 qt) 7.6 litre (8.0 qt) 11.4 litre (12.0 qt) 8.5 litre (9.0 qt) 11.1 litre (11.8 qt) 11.0 litre (11.7 qt) 11.4 litre (12.0 qt) 11.0 litre (11.7 qt)	50% Water with 50% Ethylene Glycol
5	BATTERY ELECTROLYTE	X				Check Level	
6	FUEL FILTER, DIESEL	X		C		Clean or Replace See NOTE 1	See Parts Manual
7	FUEL TANK S/H1.25-1.75XL (S/H25-35XL) S2.00-3.00XL (S40-60XL) H2.00-3.00XL (H40-60XL)	X				25.0 litre (6.5 gallon) 38.6 litre (10 gallon) 43.5 litre (11.5 gallon)	85 Octane — Gasoline Diesel No. 2 LPG — HD-5
8	AIR FILTER	X				Clean or Replace See NOTE 2	See Parts Manual
9	TRANSMISSION OIL S/H1.25-1.75XL (S/H25-35XL) S2.00-3.00XL (S40-60XL) H2.00-3.00XL (H40-60XL)	X			C	9.0 litre (9.5 qt) 10.4 litre (11 qt) 9.0 litre (9.5 qt)	Hyster Part No. 336831
X= Check		C=Change		L=Lubricate		NOTE 1: Check indicator light during operation (Lift trucks with serial codes B/C177 and B187 only). NOTE 2: Very dirty conditions will require daily check and clean.	

ITEM NO.	ITEM	8 Hr./ Daily	250 Hr./ 6 wk.	1000 Hr./ 6 mo.	2000 Hr./ 1 yr.	PROCEDURE OR QUANTITY	SPECIFICATION
10	HYDRAULIC SYSTEM (TANK) S/H1.25–1.75XL (S/H25–35XL) S2.00–3.00XL (S40–60XL) H2.00–3.00XL (H40–60XL)	X			C	18.9 litre (20 qt) 30.3 litre (32.0 qt) 31.8 litre (33.6 qt)	–18°C (0°F) and Above SAE 10W API CC or CC/SE/SF/SG
11	TIRES, TIRE PRESSURE	X				See Nameplate	
12	MAST, CARRIAGE, LIFT CHAINS	X				Check Condition	See Parts Manual
13	FORKS	X	X			Check Condition	
	SAFETY LABELS	X				Replace as Necessary	See Parts Manual
	SEAT BELT AND SEAT RAILS	X				Check Condition	
	HOOD AND SEAT LATCHES	X				Check Condition	
	HORN, GAUGES, LIGHTS, ALARMS	X				Check Operation	
14	SERVICE BRAKES AND PARKING BRAKE	X			X	Check Operation Check Condition	
	STEERING & POSITION LATCH	X				Check Operation	
15	TRANSMISSION	X				Check Operation	
16	BRAKE FLUID		X			0.2 litre (0.4 pt)	SAE J–1703
2	DRIVE BELTS		X			Adjust or Replace	See Parts Manual
	BRAKE, INCHING/BRAKE PEDALS		X			Adjust as Required	
1	ENGINE OIL FILTER		C			See NOTE 3	See Parts Manual
10	HYDRAULIC TANK BREATHER		X			Clean or Replace	See Parts Manual
	GOVERNOR OIL, MAZDA 4–121G		C			200 ml (6.8 oz)	Engine Oil
17	MAST PIVOTS SLIDING SURFACES AND LOAD ROLLER SURFACES		L L			2 Fittings As Required	Multi–Purpose Grease See NOTE 4 Multi–Purpose Grease
12	LIFT CHAIN		X, L			As Required	Engine Oil
18	WHEEL NUTS DRIVE WHEELS S/H1.25–1.75XL (S/H25–35XL) S2.00–3.00XL (S40–60XL) H2.00–3.00XL (H40–60XL) STEER WHEELS H2.00–3.00XL (H40–60XL) SPACERS IF DUAL WHEELS ARE INSTALLED (ALL)		X			Check Torque	155 N.m (115 lbf ft) 240 to 305 N.m (175 to 225 lbf ft) 610 to 680 N.m (450 to 500 lbf ft) 237 to 305 N.m (175 to 225 lbf ft) 98 N.m (80 lbf ft)
X= Check		C=Change		L=Lubricate		NOTE 3: Change filters on new lift trucks after first 100 hours. NOTE 4: Multi–Purpose Grease with 2 to 4% Molybdenum Disulfide.	

ITEM NO.	ITEM	8 Hr./ Daily	250 Hr./ 6 wk.	1000 Hr./ 6 mo.	2000 Hr./ 1 yr.	PROCEDURE OR QUANTITY	SPECIFICATION
19	<p>STEERING AXLE</p> <p>S/H1.25–1.75XL (S/H25–35XL) PIVOT PIN TIE RODS</p> <p>H2.00–3.00XL (H40–60XL) PIVOT PIN TIE RODS KING PIN BEARINGS (UPPER AND LOWER)</p> <p>S2.00–3.00XL (S40–60XL) KING PIN BEARINGS (LOWER)</p>		L			<p>1 Fitting 4 Fittings</p> <p>1 Fitting 4 Fittings 2 Fittings</p> <p>2 Fittings</p>	Multi-Purpose Grease See NOTE 4
	<p>ENGINE SPEED</p> <p>IDLE SPEED Mazda & GM 4–153 GM 4–181 Isuzu C240 Isuzu 4JB1</p> <p>GOVERNED SPEED S/H1.25–1.75XL (all units) (S/H25–35XL)</p> <p>S2.00–3.00XL (S40–60XL) Mazda 4–121G GM 4–181 and GM 4–153 (B187) GM 4–181 (C187) Isuzu C240</p> <p>H2.00–3.00XL (H40–60XL) Mazda 4–121G GM 4–181 Isuzu C240 Isuzu 4JB1</p>		X			Adjust as Required	<p>600 to 650 rpm 550 to 600 rpm 600 to 650 rpm 750 to 800 rpm</p> <p>2600 to 2700 rpm</p> <p>2700 to 2800 rpm 2550 to 2650 rpm</p> <p>2700 to 2800 rpm 2500 to 2600 rpm</p> <p>2900 to 3000 rpm 2700 to 2800 rpm 2900 to 3000 rpm 2250 to 2350 rpm</p>
	PCV VALVE, GM ENGINES			X	C	Replace as Necessary	See Parts Manual
20	<p>DIFFERENTIAL OIL</p> <p>S2.00–3.00XL (S40–60XL) H2.00–3.00XL (H40–60XL)</p>			X	C	<p>3.8 litre (4.0 qt) 7.6 litre (8.0 qt)</p>	SAE 80W–90, 85W–140
	<p>TIMING</p> <p>MAXDA 4–121G</p> <p>GM 4–153 only</p> <p>GM 4–181</p> <p>ISUZU C240</p> <p>ISUZU 4JB1</p>			X		Adjust as Required	<p>Gasoline – 9° BTDC LPG – 18° BTDC at 625 rpm</p> <p>8° BTDC at 600 rpm</p> <p>Electronic Control</p> <p>14° BTDC Static</p> <p>16° BTDC Static</p>
<p>X= Check C=Change L=Lubricate NOTE 4: Multi-Purpose Grease with 2 to 4% Molybdenum Disulfide.</p>							

ITEM NO.	ITEM	8 Hr./ Daily	250 Hr./ 6 wk.	1000 Hr./ 6 mo.	2000 Hr./ 1 yr.	PROCEDURE OR QUANTITY	SPECIFICATION
	VALVE ADJUSTMENT MAXDA 4-121G GM 4-181 and GM 4-153 ISUZU C240 ISUZU 4JB1			X		Adjust as Required	0.30 mm (0.012 in) Hot Not Adjustable 0.45 mm (0.018 in) Cold 0.40 mm (0.016 in) Cold
	SPARK PLUGS MAXDA 4-121G GM 4-181 and GM 4-153			C		4 4	0.7 to 0.8 mm (0.028 to 0.032 in) See Parts Manual 1.1 mm (0.045 in) See Parts Manual
	PEDALS, LEVERS, SEAT RAILS, CABLES, HINGES, LINKAGES, HOOD LATCH			L		Lubricate as Necessary	Hyster Part No. 328388
	FUEL FILTER, GASOLINE & LPG				C	1	See Parts Manual
21	HYDRAULIC OIL FILTER				C	See NOTE 5	See Parts Manual
22	TRANSMISSION OIL FILTER				C	See NOTE 5	See Parts Manual
23	WHEEL BEARINGS				L	0.5 kg (1lb)	Multi-Purpose Grease See NOTE 4
X= Check		C=Change		L=Lubricate		NOTE 4: Multi-Purpose Grease with 2 to 4% Molybdenum Disulfide. NOTE 5: Change filters on new lift trucks after first 100 hours.	

MAINTENANCE PROCEDURES

EVERY 8 HOURS OR DAILY

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.

HOW TO MAKE CHECKS WITH THE ENGINE STOPPED

Put the lift truck on a level surface. Lower the carriage and forks, stop the engine and apply the parking brake. Open the hood and check for leaks and conditions that are not normal. Clean any oil or fuel spills. Make sure that lint, dust, paper, and other materials are removed from the engine compartment.

Engine Oil (See FIGURE 4.)

After the engine has stopped, wait one minute before checking the oil level. Keep the oil at the correct level as

indicated on the dipstick. Use the correct oil as shown in the MAINTENANCE SCHEDULE.

Drive Belts

Check the drive belts for wear and damage.

Cooling System (See FIGURE 3.)

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.

Make sure the coolant level is between the “FULL” and the “ADD” mark on the auxiliary coolant reservoir. The coolant will expand as it is heated and the level in the auxiliary coolant reservoir will increase. If coolant is

added, use the correct mixture of water and ethylene glycol shown in the MAINTENANCE SCHEDULE.

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

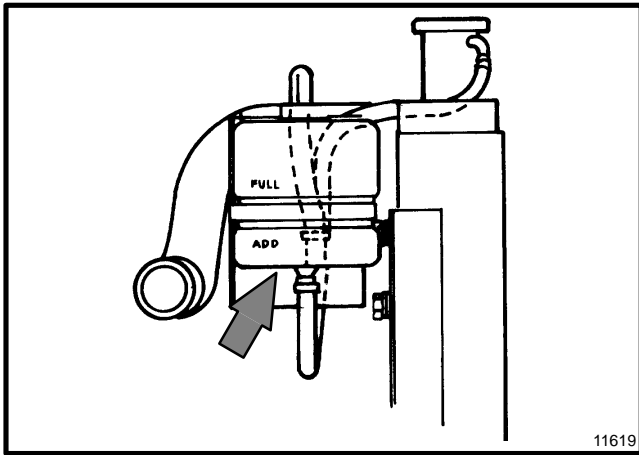


FIGURE 3. AUXILIARY COOLANT RESERVOIR

Battery (See FIGURE 4.)

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.

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.

Keep the battery and cable terminals clean. Check the electrolyte level (unless maintenance-free battery). Keep the electrolyte level above the separators and plates. Use distilled water. Do not fill the battery more than to the bottom of the internal filler neck.

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

- a. Always connect the positive jumper cable to the positive terminal of the discharged battery and the negative jumper cable to the negative terminal.
- b. Always connect the jumper cable that is the ground cable last.
- c. Always connect the jumper cables to the discharged battery before connecting them to the booster battery.

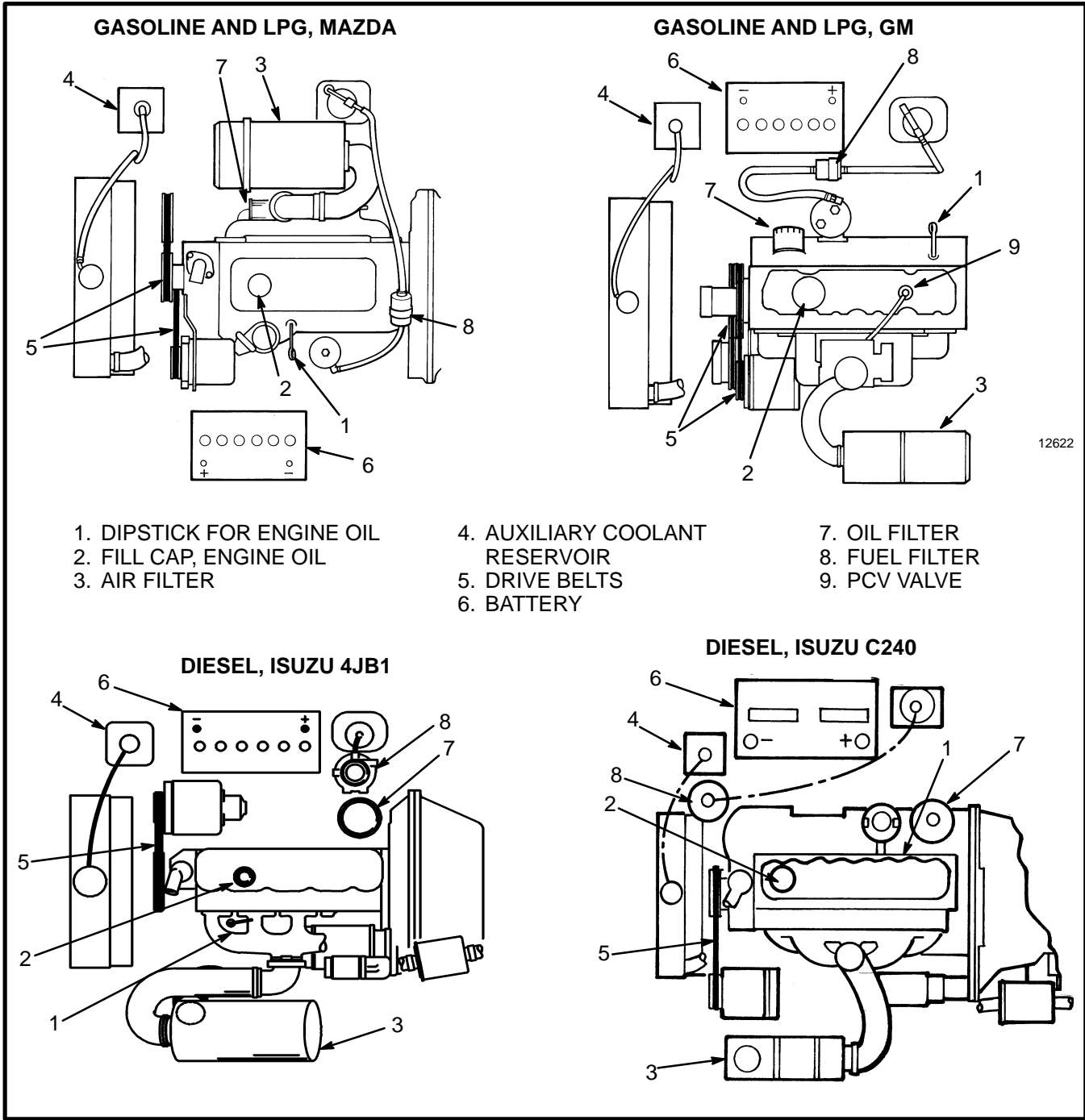


FIGURE 4. ENGINE MAINTENANCE POINTS

Fuel System

⚠ WARNING

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

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

Air Filter (See FIGURE 5.)

Clean or replace the air filter as necessary. Use compressed air to clean the filter element. Air pressure must be less than 210 kPa (30 psi). Apply the air from the inside to the outside of the filter element.

Inspect the filter element. Put a bright light inside the filter element and look for holes or other damage. If the filter element is damaged, replace it with a new filter element. Use a cloth with solvent to clean the inside of the canister when the filter element is replaced.

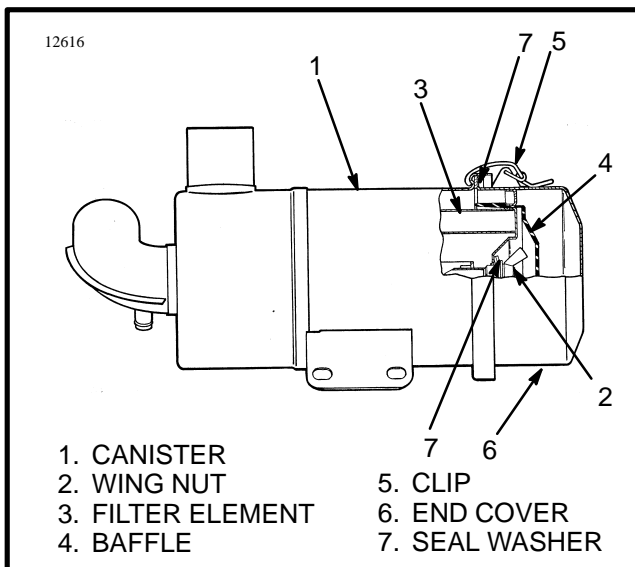


FIGURE 5. AIR FILTER

Hydraulic System Oil (See FIGURE 6.)

⚠ 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.

Check the hydraulic oil level when the oil is at operating temperature, the carriage is lowered and the engine is stopped. Add hydraulic oil only as needed. If more hydraulic oil is added than the "FULL" level, the hydraulic oil will leak from the breather during operation. The oil level indicated by the dipstick is most accurate when the oil temperature is 53 to 93°C (130 to 200°F).

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

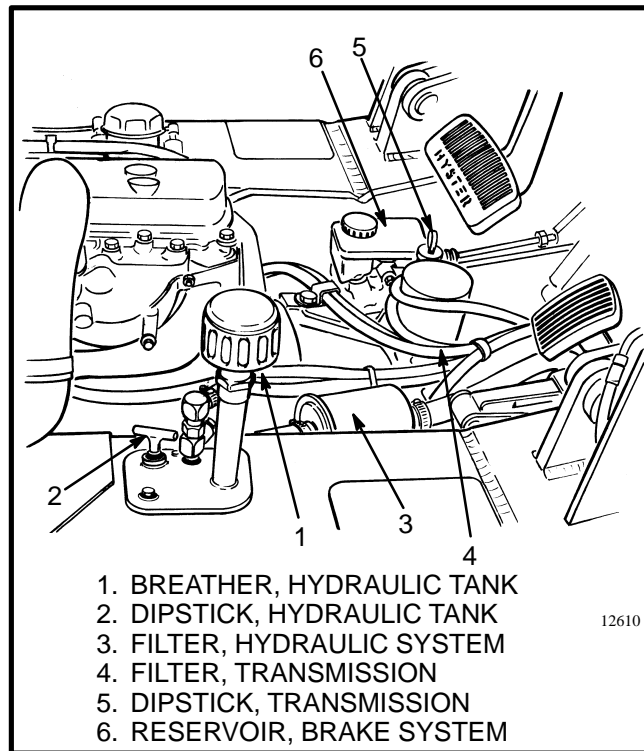


FIGURE 6. FILTERS AND SYSTEM CHECK POINTS

Tires and Wheels (See FIGURE 7.)

⚠ WARNING

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

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

If the air pressure is less than 80% of the correct air pressure, the tire must be removed before air is added. Put the tire in a safety cage when adding air pressure to the tire. Follow the procedures described in “Add Air To The Tires”.

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

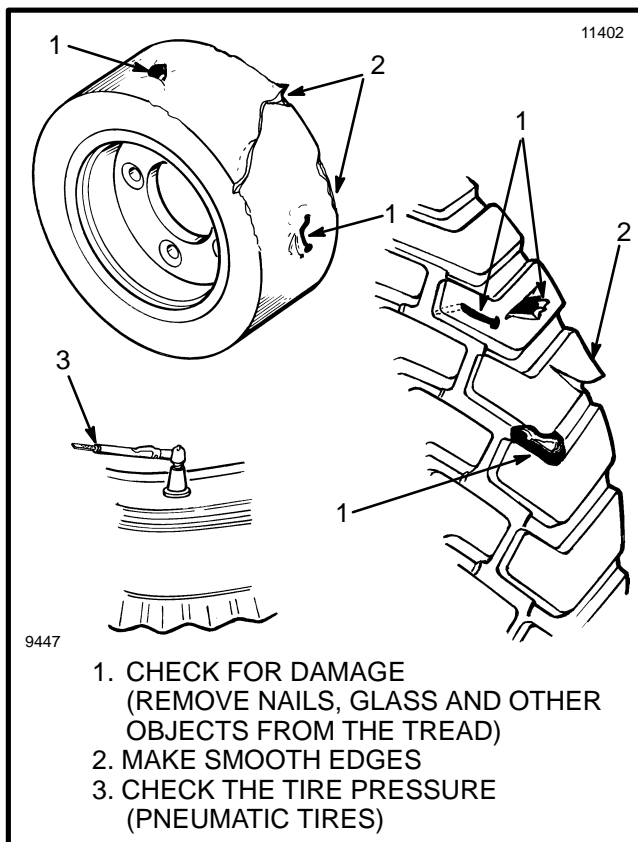


FIGURE 7. CHECK THE TIRES

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

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

Make sure the drive wheel nuts are tight. Tighten the wheel nuts in a cross pattern to the correct torque value shown in the MAINTENANCE SCHEDULE.

⚠ CAUTION

When the drive wheels have been installed check all wheel nuts after 2 to 5 hours of operation. Tighten the nuts in a cross pattern to the correct torque value shown in the MAINTENANCE SCHEDULE. When the nuts stay tight for eight hours, the interval for checking the torque can be extended to 250 hours.

Forks

The identification of a fork describes how the fork is connected to the carriage. The **S/H2.00–3.00XL** (**S/H40–60XL**) series of lift trucks normally have a hook fork. See FIGURE 8.

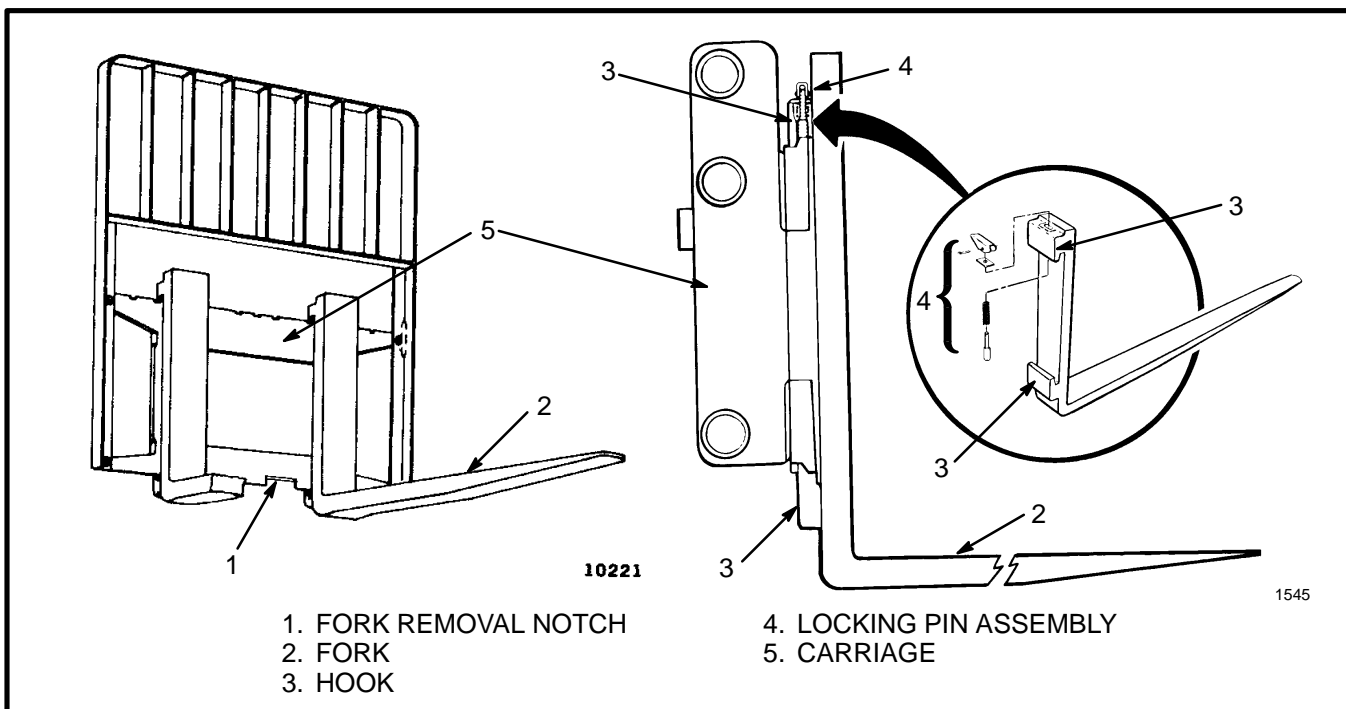


FIGURE 8. HOOK FORK

Forks, Adjustment

Hook forks are connected to the carriage by hooks and lock pins. See FIGURE 8. These lock pins are installed through the top fork hooks and fit into slots in the top carriage bar. Adjust the forks as far apart as possible for maximum support of the load. Hook forks will slide along the carriage bars to adjust for the load to be lifted. Raise the lock pin in each fork to slide the fork on the carriage bar. Make sure the lock pin is engaged in the carriage bar to lock the fork in position after the width adjustment is made.

Forks, Removal And Installation

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

WARNING

Do not try to move a fork without a lifting device. Each hook fork for these lift trucks can weigh 45 kg to 115 kg (100 to 250 lb).

Hook Fork (Removal). Slide a hook fork to the fork removal notch on the carriage. See FIGURE 8. Lower the fork onto blocks so that the bottom hook of the fork moves through the fork removal notch. See FIGURE 9.

Lower the carriage further so that the top hook of the fork is disengaged from the top carriage bar. Move the carriage away from the fork, or use a lifting device to move the fork away from the carriage.

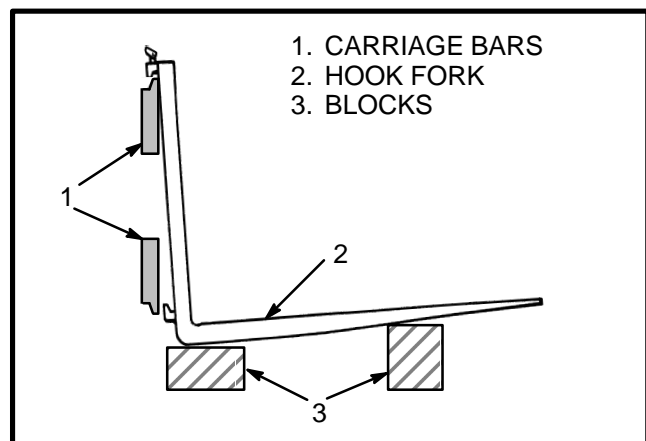


FIGURE 9. REMOVE A HOOK FORK

Hook Fork (Installation). Move the fork and carriage so that the top hook on the fork can engage the upper carriage bar. Raise the carriage to move the lower hook through the fork removal notch. Slide the fork on the carriage so that both upper and lower hooks engage the carriage. Engage the lock pin with a notch in the upper carriage bar.

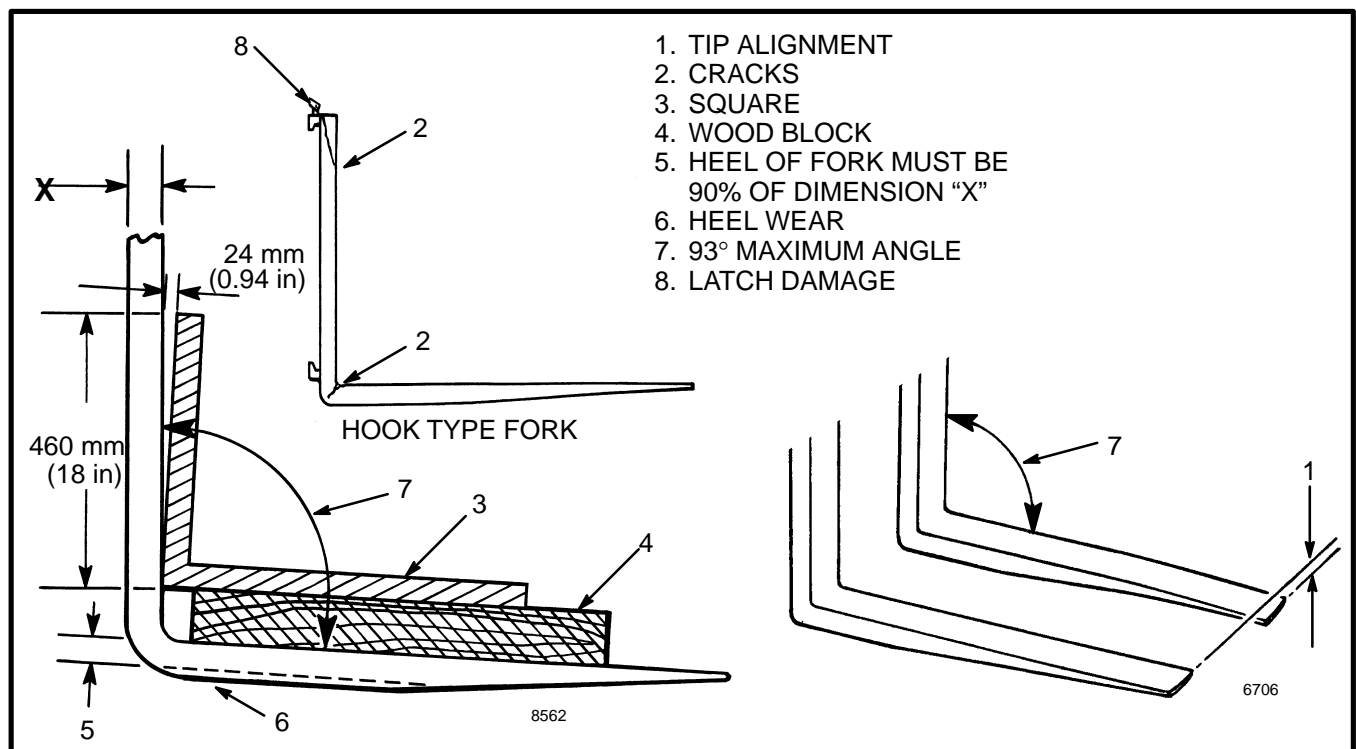


FIGURE 10. CHECK THE FORKS

Inspection Of Forks, Mast, and Lift Chains (See FIGURE 10. and FIGURE 11.)

⚠ WARNING

When working on or near the mast, see **SAFETY PROCEDURES WHEN WORKING NEAR THE MAST** in **GENERAL PROCEDURES** 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.

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

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

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

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

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

4. Inspect the forks for cracks and wear. Check that the fork tips are aligned within 13 mm (0.5 in) of each other. (See FIGURE 10.) Check that the bottom of the fork is not worn (Item 5).

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

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

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

8. Inspect the lift chains for cracks or broken links and pins. (See FIGURE 11.)

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

10. Make sure the lift chains are adjusted so that they have equal tension. **Adjustment or replacement of the lift chains must be done by authorized personnel.** See Lift Chain Adjustments described in the **GENERAL PROCEDURES** later in this section.

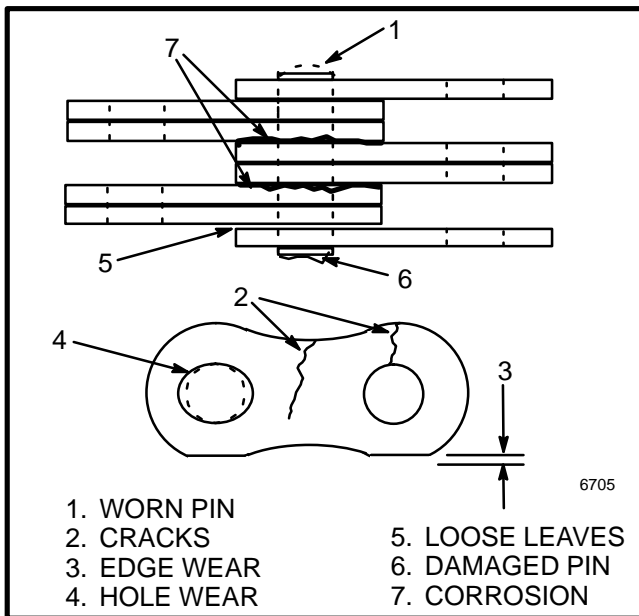


FIGURE 11. CHECK THE LIFT CHAINS

Safety Labels

⚠ WARNING

Safety labels are installed on the lift truck to give information about operation and possible hazards. It

is important that all safety labels are installed on the lift truck and can be read.

Check that all safety labels are installed in the correct location on the lift truck. See the **PARTS MANUAL** or the **FRAME** section of the **SERVICE MANUAL** for the correct location of the safety labels. See the **FRAME** section for the installation procedure.

Operator Restraint System (See FIGURE 12. and FIGURE 13.)

The seat belt, hip restraint brackets, seat and mount, hood, latches and floor plates 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 12. Make sure the seat rails and latch striker are not loose. The seat rails must lock tightly in position, but move freely when unlocked. The seat rails must be correctly fastened to the mount surface. If the mount surface is the hood, the hood must be fastened to the floor plate with the latch. The floor plate must be fastened to the lift truck frame. Try to lift the hood to make sure it is fastened correctly and will not move.

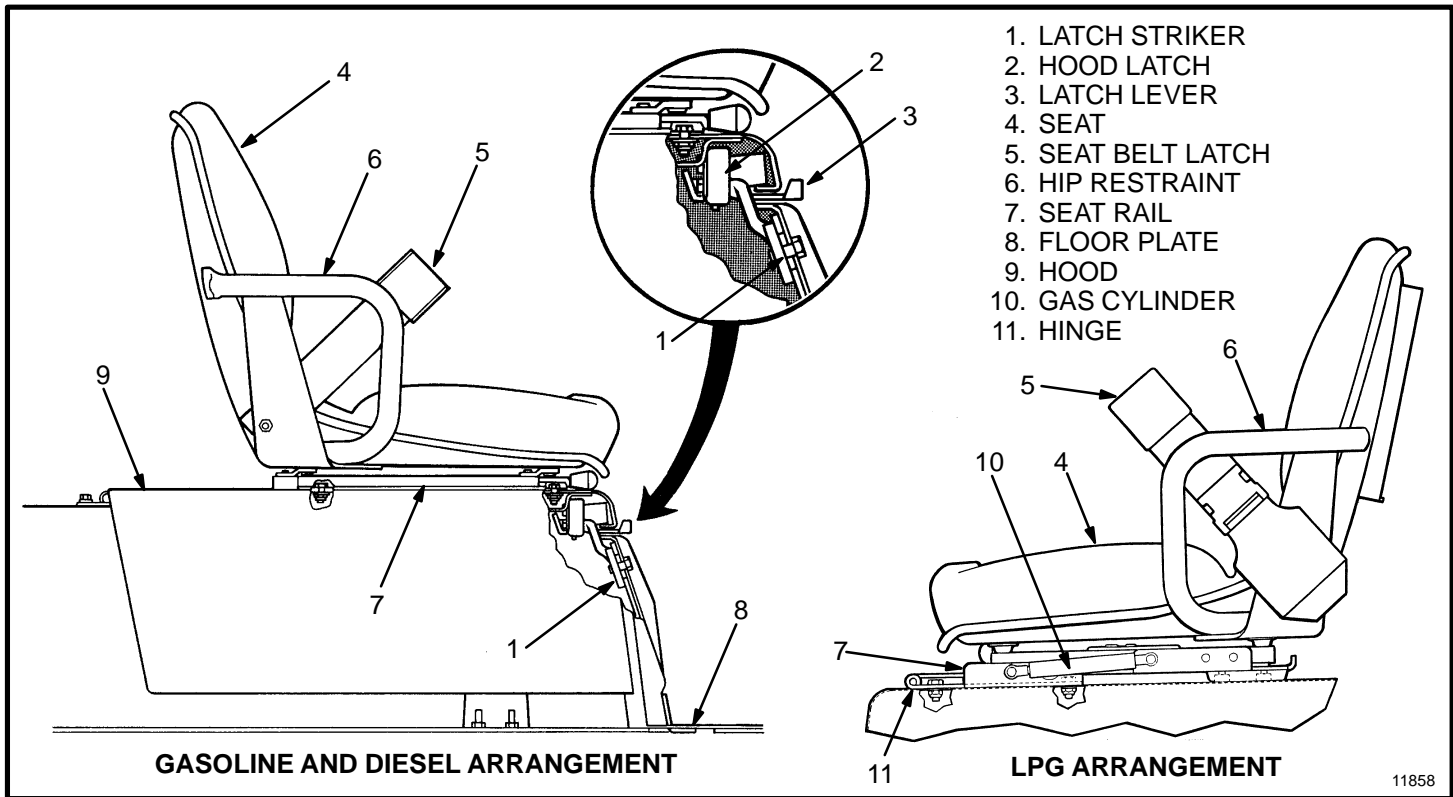


FIGURE 12. CHECK THE HOOD AND SEAT LATCHES

The end of the seat belt must fasten correctly in the latch. Make sure the seat belt pulls from the retractor assembly and retracts smoothly. The seat belt must be in good condition. A seat belt that is damaged or worn will not give protection when it is needed. If the seat belt can not be pulled from the retractor assembly, remove the screw that keeps the cover on the retractor. Push the bar to release the spool. Straighten the belt so that it will pull and retract smoothly from the retractor assembly. (See FIGURE 13.)

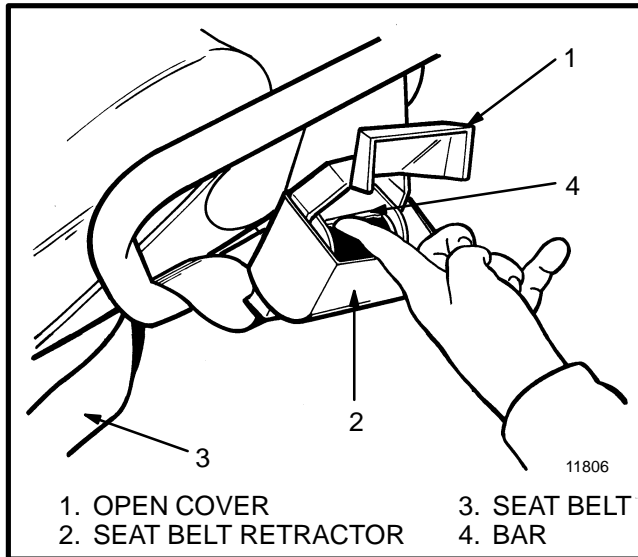


FIGURE 13. RELEASE A JAMMED SEAT BELT

HOW TO MAKE CHECKS WITH THE ENGINE RUNNING

⚠ WARNING

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

Make sure that the area around the lift truck is clear before starting the engine or making any 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.

Gauges, Lights, Horn, and Fuses

Start the engine. Check the gauges and lights for correct operation as described in the **OPERATING MAN-**

UAL. Check the operation of the horn. If any of the lights or gauges do not operate correctly, check the fuses. The fuses are under the instrument panel on the left side of the cowl. See FIGURE 14. and FIGURE 15.

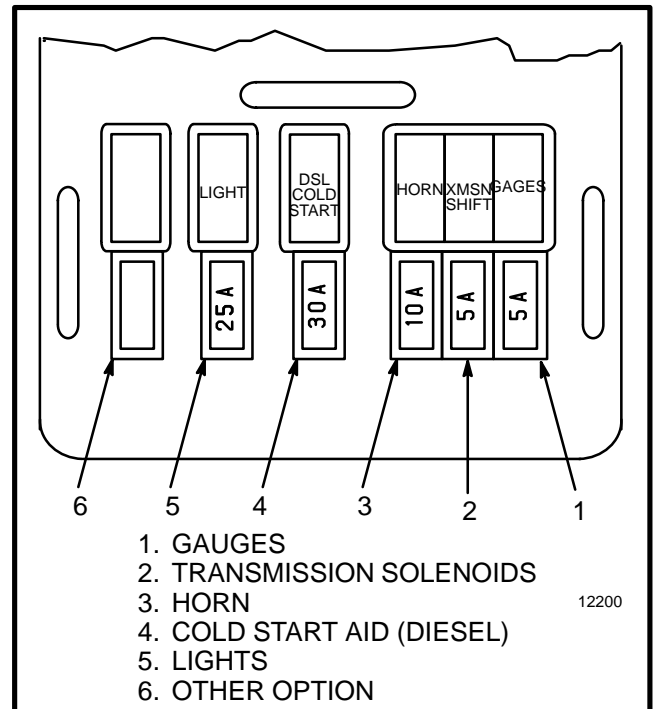


FIGURE 14. FUSES, LATER PRODUCTION

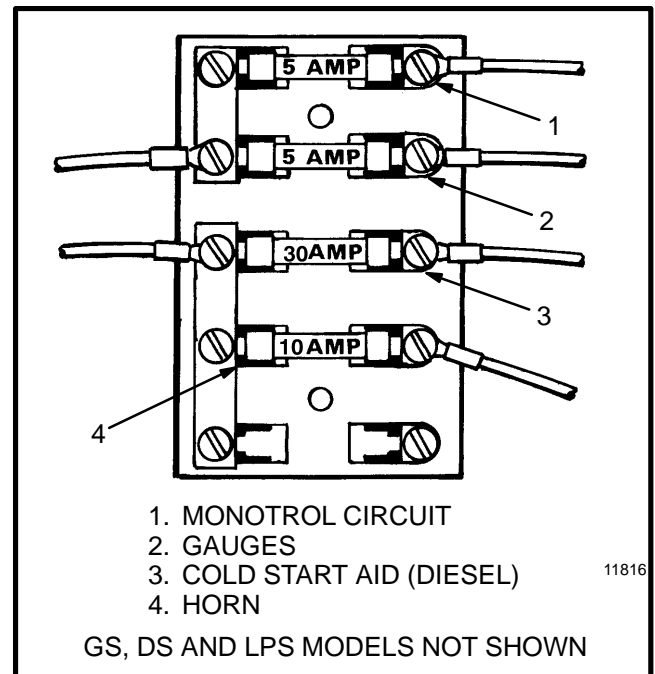


FIGURE 15. FUSES, EARLIER PRODUCTION

GS, DS AND LPS MODELS NOT SHOWN

Fuel Filter, Diesel Engine

Lift trucks with serial codes B/C177 and B/C187 only. Check the indicator light on the instrument panel. If the indicator light is illuminated, the water separator must be drained. See the procedures for How To Drain The Water From The Fuel Filter.

NOTE: Isuzu diesel engines installed in lift trucks with the following serial codes have a water separator in the bottom of the fuel filter:

B/C177 [H2.00–3.00XL (H40–60XL)] and
B/C187 [S2.00–3.00XL (S40–60XL)].

These lift trucks are manufactured after April 1990. A sender unit in the bottom of the fuel filter illuminates an indicator light on the instrument panel if there is water in the water separator.

Isuzu diesel engines installed in lift trucks with the following serial number codes do not have a water separator:

A177 [H2.00–3.00XL (H40–60XL)],
A187 [S2.00–3.00XL (S40–60XL)].

The fuel filter is replaced every 1000 hours or six months of operation. If there is a problem with water in the diesel fuel in your area, the fuel filter must be changed more frequently than 1000 hours.

How To Drain The Water From The Fuel Filter

1. This procedure only applies to lift trucks with serial codes B/C177 and B/C187. See FIGURE 34. Turn the wing nut to open the drain valve on the bottom of the fuel filter. Drain some fuel (and any water) until clean fuel flows from the filter.

2. Turn the wing nut to close the drain valve.

Oil Level, Powershift Transmission (See FIGURE 16.)

Apply the parking brake. Check the oil level in the powershift transmission when the engine is running at idle speed. If the lift truck has a direction control lever, put the direction control lever in the Neutral (N) position. Use the correct oil shown in the MAINTENANCE SCHEDULE. Keep the oil level at the “FULL” mark on the dipstick. The most accurate check of the oil level is when the transmission is at operating temperature.

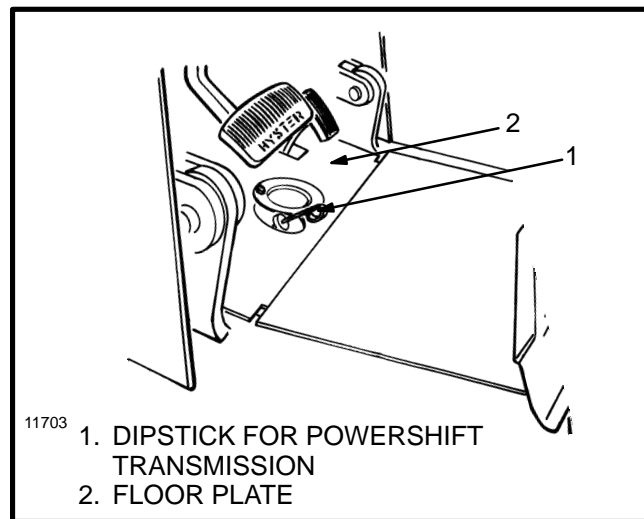


FIGURE 16. CHECK THE OIL LEVEL FOR THE POWERSHIFT TRANSMISSION

Control Levers and Pedals

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

Lift System Operation

WARNING

When working on or near the mast, see SAFETY PROCEDURES WHEN WORKING NEAR THE MAST in GENERAL PROCEDURES 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.

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.

Do the following checks and inspections:

- Check for leaks in the hydraulic system. Check the condition of the hydraulic hoses and tubes.
- Slowly raise and lower the mast several times without a load. Raise the mast to its full extension height at least once. The mast components must raise and lower smoothly in the correct sequence.

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

- c. The inner weldments and the carriage must lower completely.
- d. Raise the mast one metre (three feet) with a capacity load. The inner weldments and the carriage must raise smoothly. Lower the mast. All moving components must lower smoothly.
- e. Lower the load to approximately 0.3 metre (one foot). Tilt the mast forward and backward. The mast must tilt smoothly and both tilt cylinders must stop evenly.
- f. 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.

Inching/Brake Pedal

If the lift truck has an inching/brake pedal, push on the inching/brake pedal. The service brakes must be applied before the inching/brake pedal reaches the floor plate. Full application of the inching/brake pedal applies the service brakes and puts the transmission in Neutral.

Lift trucks with a MONOTROL pedal: when the inching/brake pedal is fully applied, a switch in the starting circuit is closed so that the engine can be started.

Service Brakes

Check the operation of the service brakes. Push on the brake pedal. The brake 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 brakes are applied and the lift truck changes direction.

▲ WARNING

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

Some lift trucks have a brake booster. When the engine is not running, the brake booster is not operating and the brakes will be more difficult to apply. The brakes will still operate if the engine is not running.

Parking Brake

Check the operation of the parking brake. The operator must adjust the parking brake so that the lift truck does not move if it is parked on an incline. The parking brake, when in good condition and correctly adjusted, will hold a lift truck with a capacity load on a 15% grade [a slope that increases 1.5 metres in 10 metres (1.5 ft increase in 10 ft)].

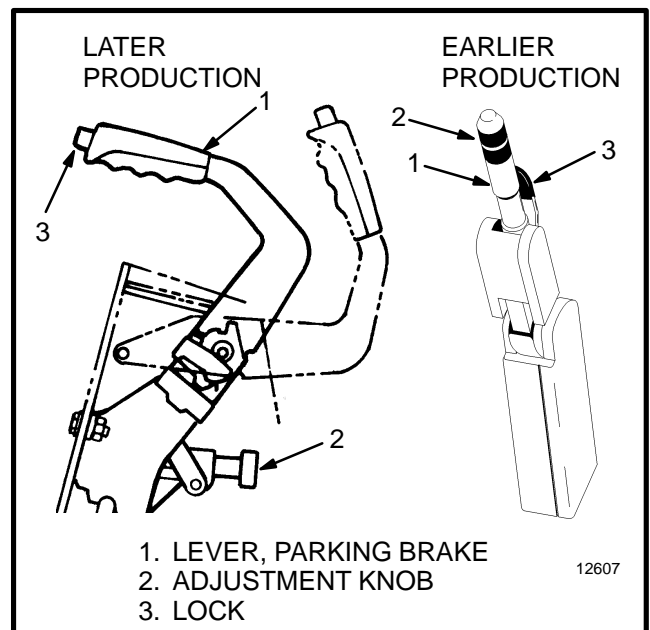


FIGURE 17. PARKING BRAKE ADJUSTMENT (S/H2.00–3.00XL)

To adjust the parking brake, turn the adjustment knob on the lever that applies the parking brake. See FIGURE 17. Do not tighten the adjustment so that the brake is applied when the lever is released. The lever for the parking brake has a lock. Use your thumb or finger to release the lock on the lever when the parking brake is released.

Lift trucks with a MONOTROL pedal: when the parking brake is applied, a switch in the starting circuit is closed so that the engine can be started. The switch also puts the transmission in Neutral.

Steering System

WARNING

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

Make sure the steering system operates smoothly and gives good steering control. Make sure the steering column can be adjusted and the latch function is correct.

EVERY 250 HOURS OR TWO MONTHS

Do these procedures in addition to the 8 hour checks.

ENGINE OIL AND FILTER

NOTE: Change the oil filter for the engine after the first 100 hours on new lift trucks.

CAUTION

Never run the engine without oil.

Mazda, GM, And Later Production Isuzu Engines (See FIGURE 18. And FIGURE 19.)

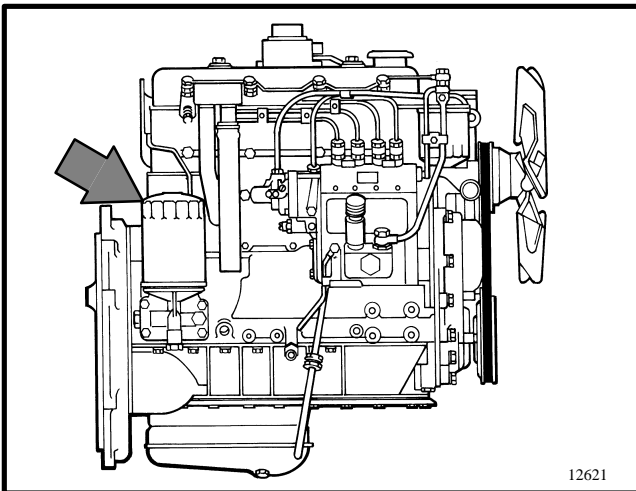


FIGURE 18. OIL FILTER ASSEMBLY, LATER PRODUCTION ISUZU C240 ENGINES

Change the oil filter at the same time engine oil is changed. Use the correct oil according to the specifications. Install a new filter. Apply clean oil to the gasket of

the new filter. Turn the filter until the gasket touches, then tighten 1/2 to 3/4 turn with your hand. Start the engine. Check the area around the oil filter for leaks.

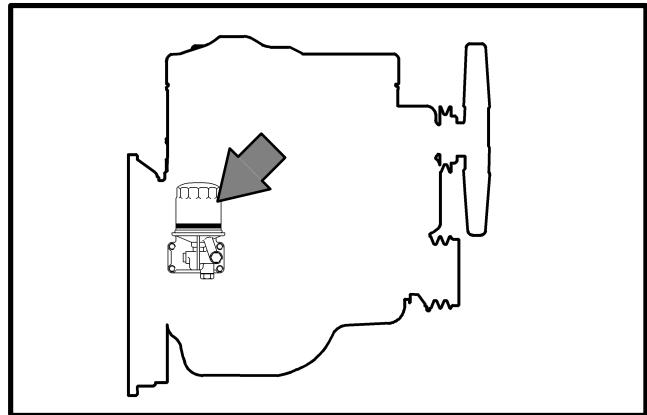


FIGURE 19. OIL FILTER ASSEMBLY, ISUZU 4JB1 ENGINES

Earlier Production Isuzu C240 Engines

Change the oil filter at the same time engine oil is changed. Use the correct oil according to the specifications. See FIGURE 20. Remove the drain plug (14) in the mount for the filter and drain the oil. Loosen the center bolt and remove the filter cover (3) and filter element (9). Clean the filter cover and install a new filter element. Make sure the O-rings and other parts are in their correct positions. Tighten the center bolt for the filter cover. Check for leaks when the engine can be operated.

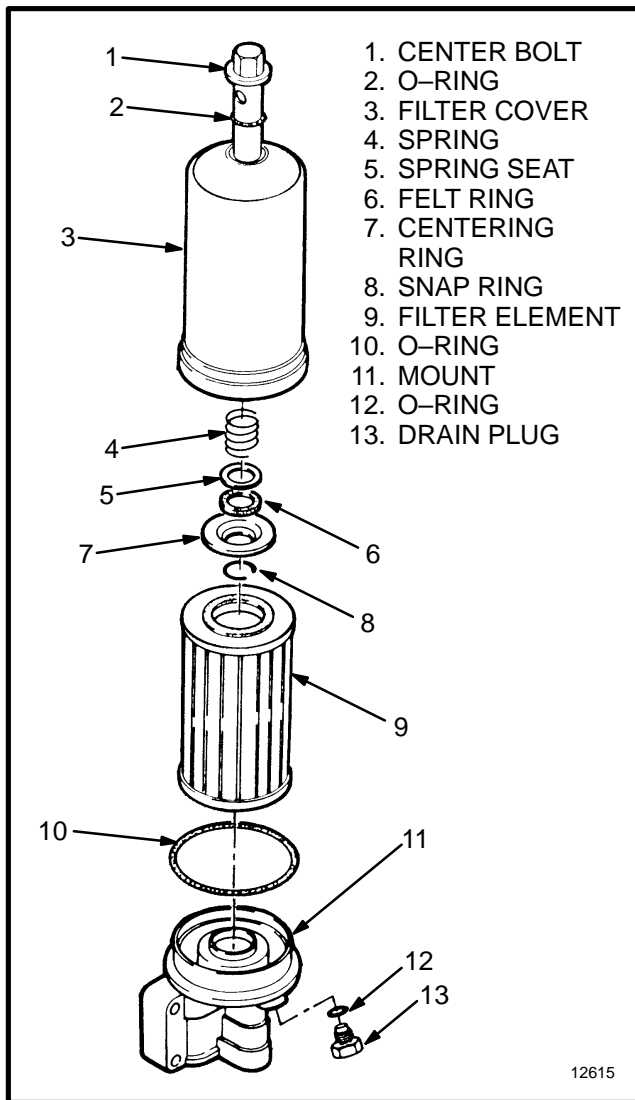


FIGURE 20. OIL FILTER, EARLIER PRODUCTION ISUZU C240 ENGINES

GOVERNOR, MAZDA ENGINE

Change the oil in the governor. Use the drain plug to drain the oil. Remove the fill plug and breather. Add oil until the oil level is even with the bottom of the hole for the breather. Install the fill plug and breather.

DRIVE BELTS

Check the drive belts for wear and damage.

A gauge is available that will indicate the tension in the drive belt. Fit the gauge at the center of the longest length of the drive belt and measure the tension. See FIGURE 21. The correct tension is approximately 355 N (80 lbf)

Many service people press on the drive belt with their thumb at the center of the longest length of the drive belt and check the deflection. When the thumb pressure is 100 N (20 lbf), the correct deflection is approximately 13 mm (0.50 in).

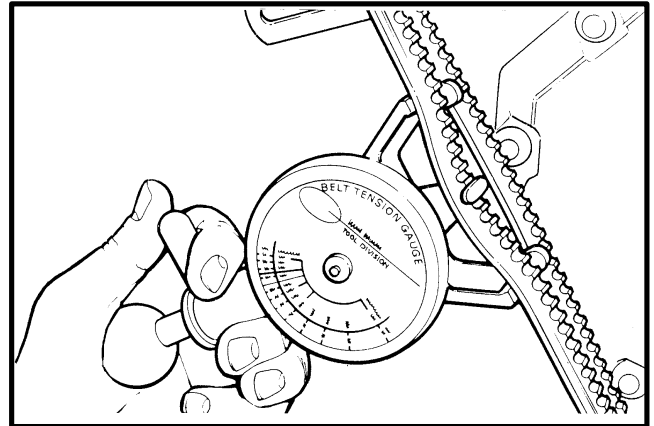


FIGURE 21. GAUGE TO CHECK DRIVE BELT TENSION

Mazda Engine (See FIGURE 22.)

Drive belt for the coolant pump and alternator. Loosen the alternator support bracket to adjust the tension of the belt.

Drive belt for the fan. Loosen the mount for the idler pulley to adjust the tension of the belt.

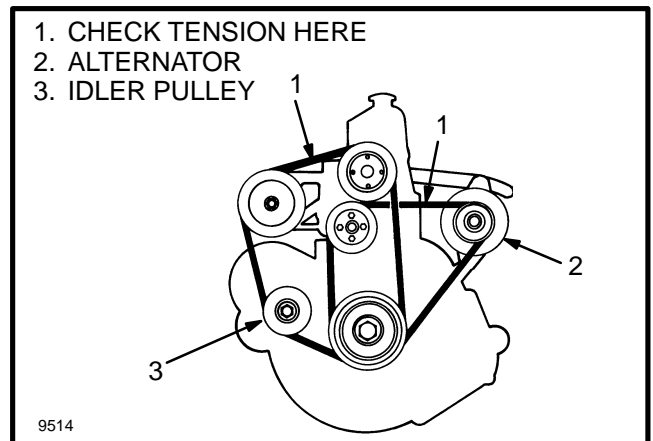


FIGURE 22. CHECK AND ADJUST DRIVE BELT TENSION (MAZDA ENGINE)

Isuzu, GM 4-181, And GM 4-153 Engines (See FIGURE 23.)

Drive belt for the coolant pump and alternator. Loosen the alternator support bracket to adjust the tension of the belt.

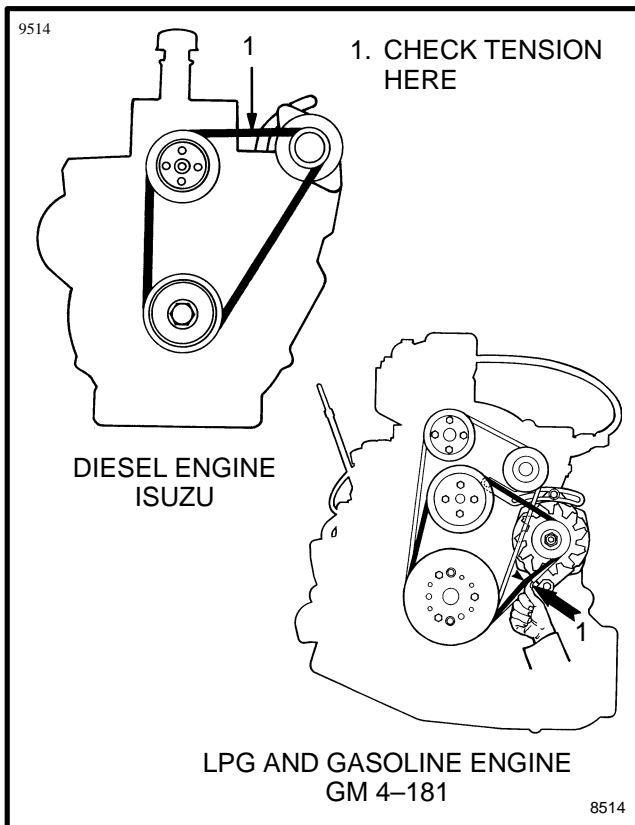


FIGURE 23. DRIVE BELTS

BRAKE FLUID (See FIGURE 6.)

Check the fluid level in the reservoir for the master cylinder. The brake fluid reservoir is in the engine compartment. Add brake fluid as necessary. Use the brake fluid shown in the MAINTENANCE SCHEDULE.

⚠ WARNING

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

HYDRAULIC TANK BREATHER, CLEAN AND CHECK

Clean the hydraulic tank breather in solvent. Replace the breather element if air will not flow through it easily. (See the location of the hydraulic tank breather in FIGURE 6.)

FORKS, CHECK FOR WEAR AND DAMAGE (See FIGURE 10.)

⚠ WARNING

Never repair damaged forks. Do not heat, weld, or bend the forks. Forks are made of special steel using special methods. Replace damaged forks.

1. Check the heel and attachment points of the forks with a penetrant or magnetic particle inspection.
2. Measure the thickness of the forks at a vertical section where there is no wear. This thickness is dimension X. Now measure the thickness at the heel (5) of the fork. If the thickness of the heel is less than 90% of dimension X, replace the fork.

LIFT CHAINS

Lubrication

Lubricate the lift chains with SAE 30 engine oil. The best procedure is to remove the chains from the lift truck and soak them in engine oil.

⚠ WARNING

When working on or near the mast, see SAFETY PROCEDURES WHEN WORKING NEAR THE MAST in GENERAL PROCEDURES in this section.

Do not repair a worn or damaged lift chain. Replace a worn or damaged lift chain with a new chain. If a pair of lift chains is used in the mast, both lift chains must be replaced.

Check For Wear

If a section of chain is 3% longer than a similar section of new chain, the chain is worn and must be replaced. Measure the chain for wear where it moves over the sheaves. If a chain scale is available, check the lift chains as shown in FIGURE 24. If a chain scale is not available, measure 20 links of chain. Measure from the center of a pin to the center of another pin 20 pitches away. Compare the length with the chart in FIGURE 24. Replace the chain if the length of 20 links of the worn section is more than the WEAR LIMIT.

(More Content includes: Brake system, Capacities, and specifications, Frame, Hydraulic, System, Industrial battery, Main control, Valve, Mast repair, Fasteners, Schematics diagrams, Steering axle, Steering system, Wire harness repair And more)

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