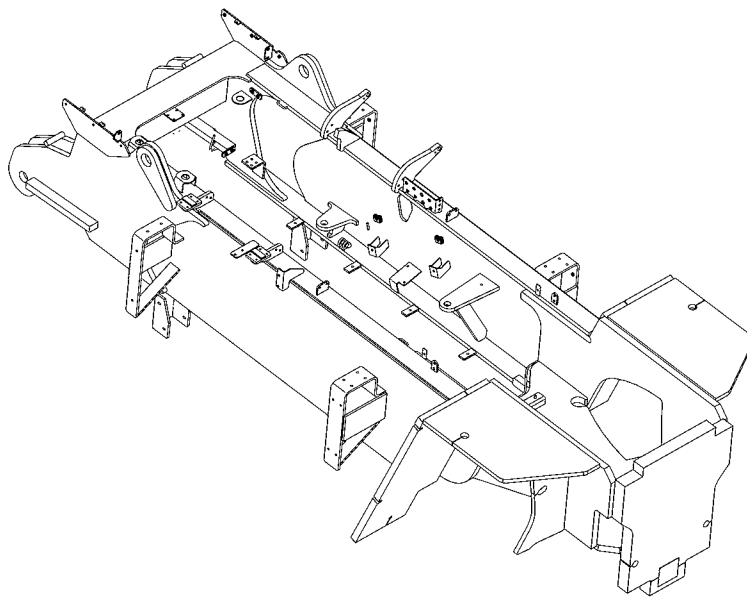


FRAME

H16.00-18.00XM/XMS-12 (H400-450HD/HDS)
[A236];

H16XM-12, H18XM-12, H20XM-12, H22XM-12
(H400HD, H450HD, H500HD, H550HD) [B236]



HYSTER

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 Hyster® 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 **HYSTER 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
Description	1
Counterweight Repair	2
General	2
Remove	3
Install	3
Air Cleaner Repair	4
Remove	4
Install	4
Hoods	5
Remove	5
Install	6
Floor Plates and Covers	6
Hydraulic Tank Repair	7
Remove	7
Repair	9
Small Leaks	9
Large Leaks	10
Clean	10
Steam Method	10
Chemical Solution Method	10
Other Methods of Preparation for Repair	11
Install	11
Fuel Tank Repair	12
Remove	12
Repair	14
Install	14
Exhaust System Repair	14
Remove	14
Install	14
Cab Repair	16
Rear Cab Assembly	16
Bottom Cab Assembly	16
Raising and Lowering Cab	17
Raise Cab	17
Lower Cab	18
Cab Repair	18
Remove	18
Install	19
Engine Repair	22
Remove	22
Install	24
Label Replacement	25

This section is for the following models:

H16.00-18.00XM/XMS-12 (H400-450HD/HDS) [A236];
H16XM-12, H18XM-12, H20XM-12, H22XM-12 (H400HD, H450HD, H500HD,
H550HD) [B236]

**"THE
QUALITY
KEEPERS"**

**HYSTER
APPROVED
PARTS**

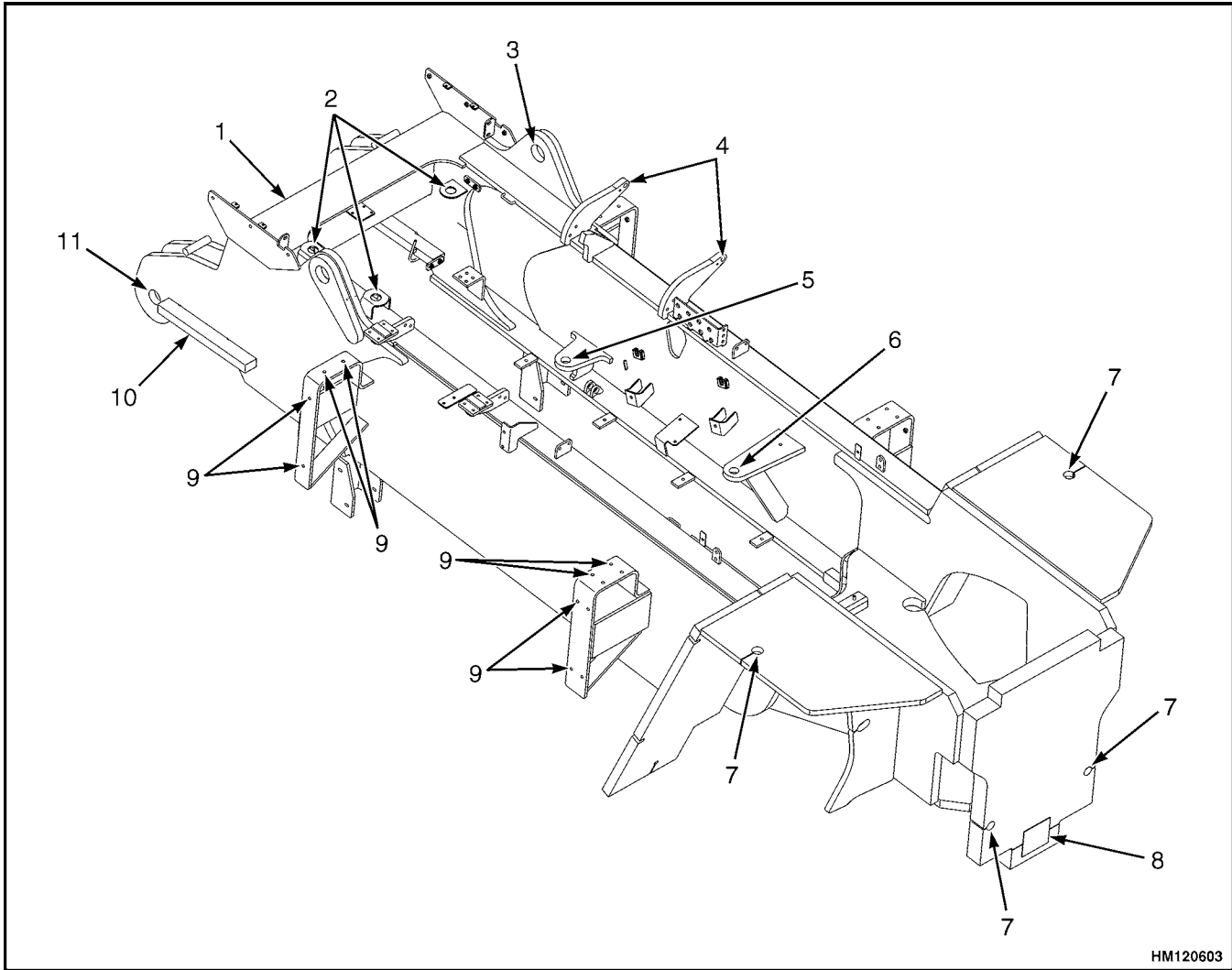
General

This section has the description and repair procedures for the lift truck frame and connected parts. Included in this section are the frame, counterweight, air cleaner, hood, floor plate and covers, hydraulic tank, and fuel tank. The

instructions for removal and installation of the exhaust system and engine are also included in this section.

Description

The frame is a one-piece weldment and has mounts for the main counterweight, engine, transmission, axles, hydraulic and fuel tanks, operator's compartment, and other parts. See Figure 1.



HM120603

- | | |
|-------------------------|------------------------------|
| 1. MAIN FRAME | 7. MAIN COUNTERWEIGHT MOUNT |
| 2. VALVE-PLATE MOUNT | 8. STEER AXLE MOUNT |
| 3. TILT CYLINDERS MOUNT | 9. FUEL/HYDRAULIC TANK MOUNT |
| 4. SIDE TILT CAB MOUNT | 10. DRIVE AXLE MOUNT |
| 5. TRANSMISSION MOUNT | 11. MAST MOUNT |
| 6. ENGINE MOUNT | |

Figure 1. Frame

Counterweight Repair

GENERAL

The shape of the main counterweights is the same, however, the weight will be different for each model. The model weights are shown in Table 1.

Table 1. Counterweight Weights

Model	Weight
H16.00XM-12	8,300 kg (18,298 lb)
H16.00XMS-12	9,000 kg (19,842 lb)
H18.00XM-12	9,630 kg (21,231 lb)
H18.00XM-12	9,630 kg (21,231 lb)

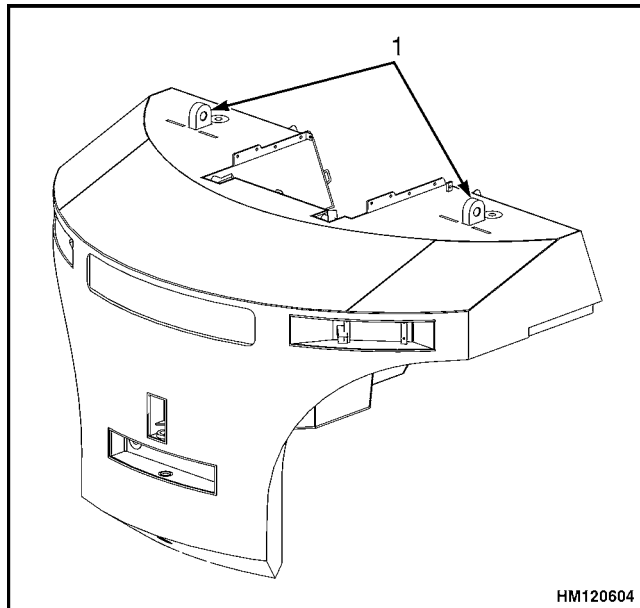
Table 1. Counterweight Weights (Continued)

Model	Weight
H400HD	8,300 kg (18,298 lb)
H400HDS	9,000 kg (19,842 lb)
H450HD	9,630 kg (21,231 lb)
H450HDS	9,630 kg (21,231 lb)

REMOVE**WARNING**

The counterweight is very heavy. Verify that the lifting device has the capacity to lift the main counterweight. See Table 1 for counterweight weights.

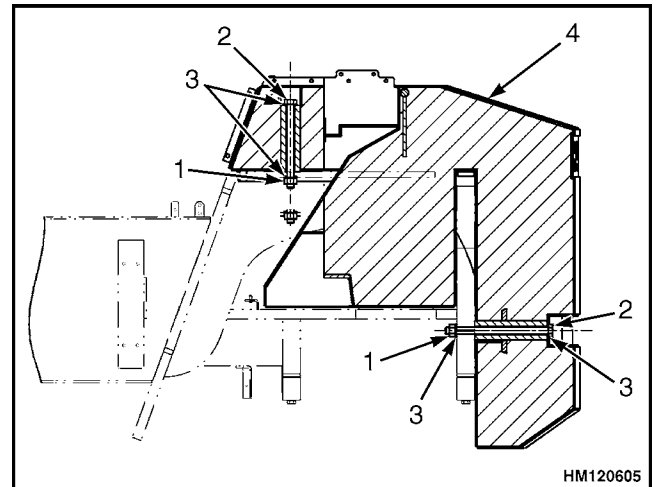
1. Place truck on solid, level surface.
2. Lower the mast completely.
3. Shut down the engine.
4. Apply parking brake.
5. Attach a lifting device to the two lift points of the counterweight. See Figure 2.



1. LIFT POINTS

Figure 2. Lift Points

6. Remove four capscrews, washers, and nuts that hold the counterweight to the frame. See Figure 3.



1. NUT
2. CAPSCREW
3. WASHER
4. COUNTERWEIGHT

Figure 3. Counterweight Mounting Capscrews, Washers, and Nuts**WARNING**

Never lift the counterweight straight up. This will cause damage to the frame and may cause personal injury.

7. Raise and move backward the counterweight slowly at the same time.
8. Lower counterweight to the floor.

INSTALL

1. Attach a lifting device to the two lift points of the counterweight. See Figure 2.
2. Install the counterweight on the frame by aligning the flange over the frame member.
3. Install the four capscrews, washers, and nuts. Tighten the capscrews to 1500 N·m (1106 lbf ft).

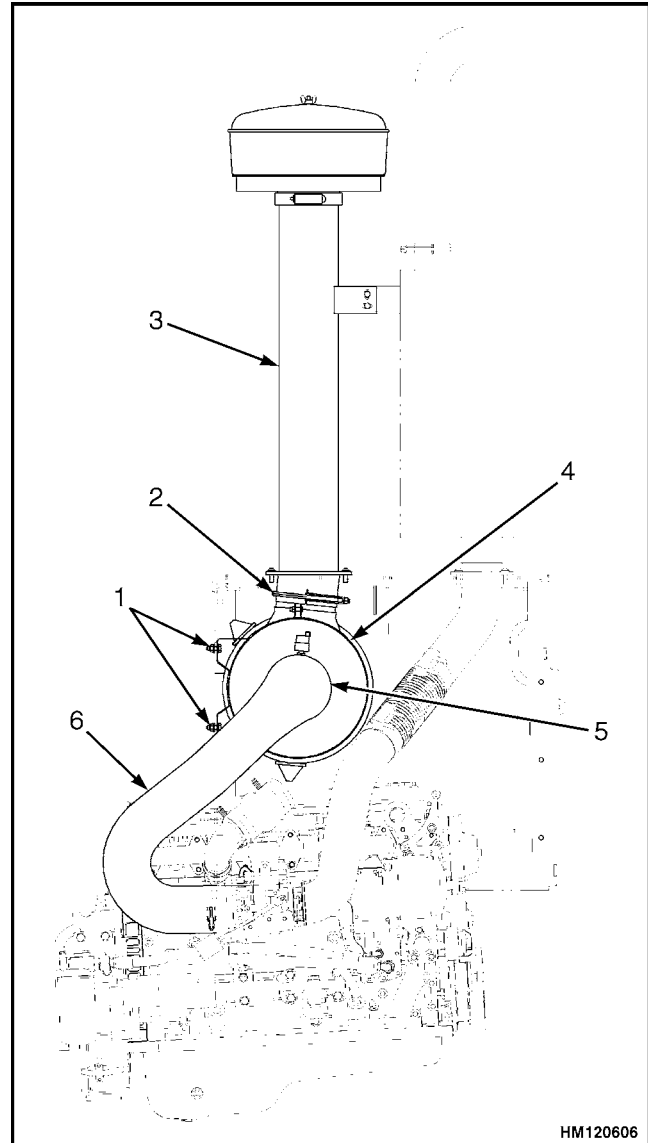
Air Cleaner Repair

REMOVE

1. Open the left and right door weldment.
2. Remove the exhaust clamp from the air duct weldment. See Figure 4.
3. Remove the clamp from the air filter hose.
4. Remove the four capscrews, washers and nuts.
5. Remove the air filter hose and air duct weldment from the air cleaner assembly.
6. Remove the air cleaner assembly from the hood.

INSTALL

1. Position the air cleaner assembly on the hood.
2. Connect the air cleaner assembly to the air filter hose and air duct weldment.
3. Install the four capscrews, washers and nuts that hold the air cleaner assembly to the hood.
4. Tighten the clamp to the air filter hose.
5. Tighten the exhaust clamp to the air duct weldment.
6. Close the left and right door weldment.



1. MOUNTING PARTS
2. EXHAUST CLAMP
3. AIR DUCT WELDMENT
4. AIR CLEANER ASSEMBLY
5. CLAMP
6. AIR FILTER HOSE

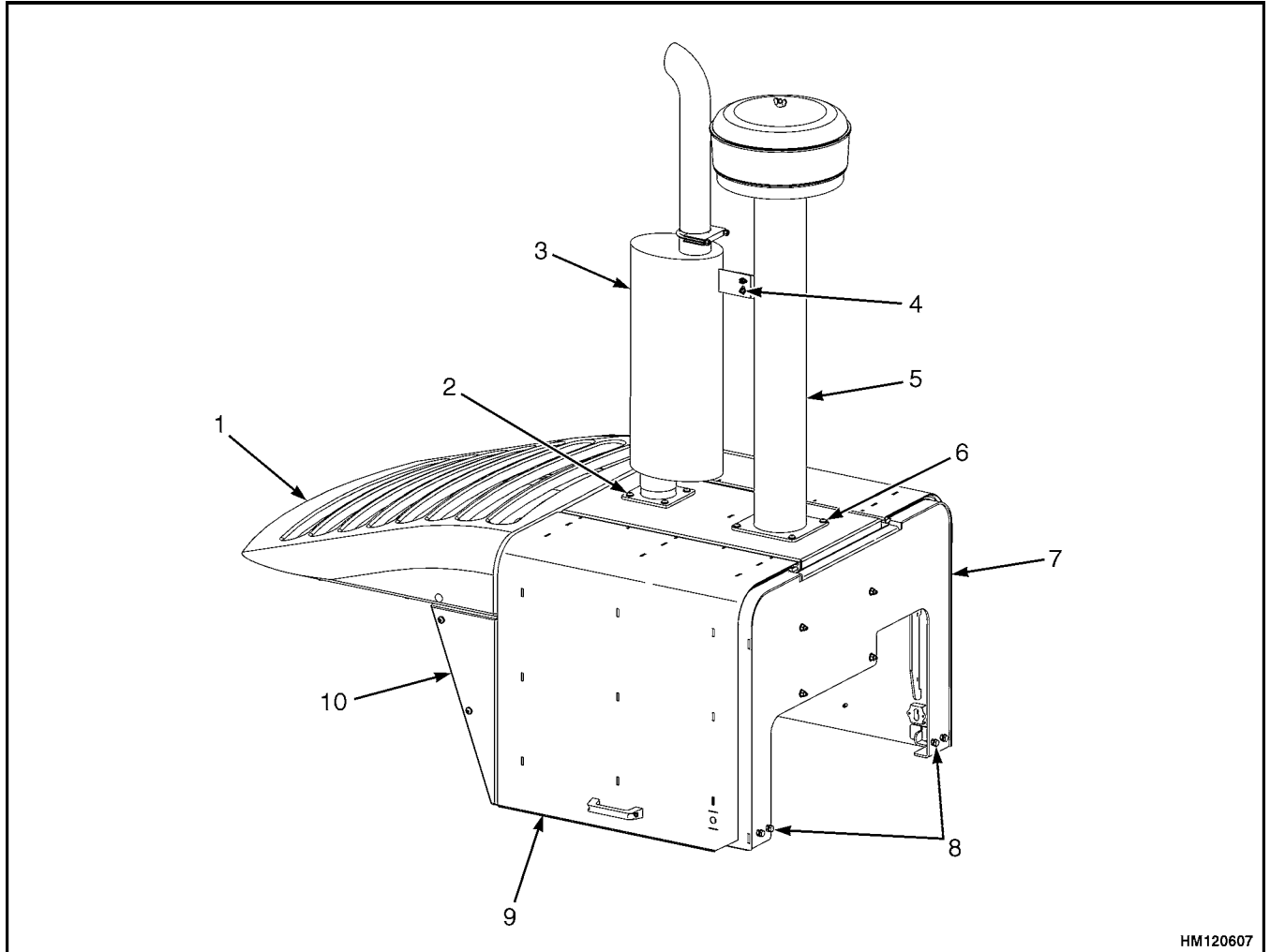
Figure 4. Air Cleaner

Hoods

REMOVE

1. Open the left and right door weldment.

2. Remove the cowl frame assembly. See Figure 5



- | | |
|---|-------------------------------------|
| 1. COWL FRAME ASSEMBLY | 6. AIR DUCT WELDMENT MOUNTING PARTS |
| 2. MUFFLER WELDMENT MOUNTING PARTS | 7. HOOD |
| 3. MUFFLER WELDMENT | 8. HOOD MOUNTING PARTS |
| 4. MUFFLER/AIR DUCT WELDMENT MOUNTING PARTS | 9. DOOR WELDMENT |
| 5. AIR DUCT WELDMENT | 10. COVER |

Figure 5. Hoods

3. Remove the left and right cover.

4. Disconnect the wire from the horn.

5. Disconnect the vacuum switch wire from the hood.

6. Disconnect the coolant level sensor wire from the hood.

7. Remove the two capscrews, nuts, washers, and isolators that hold the cooling system to the hood.

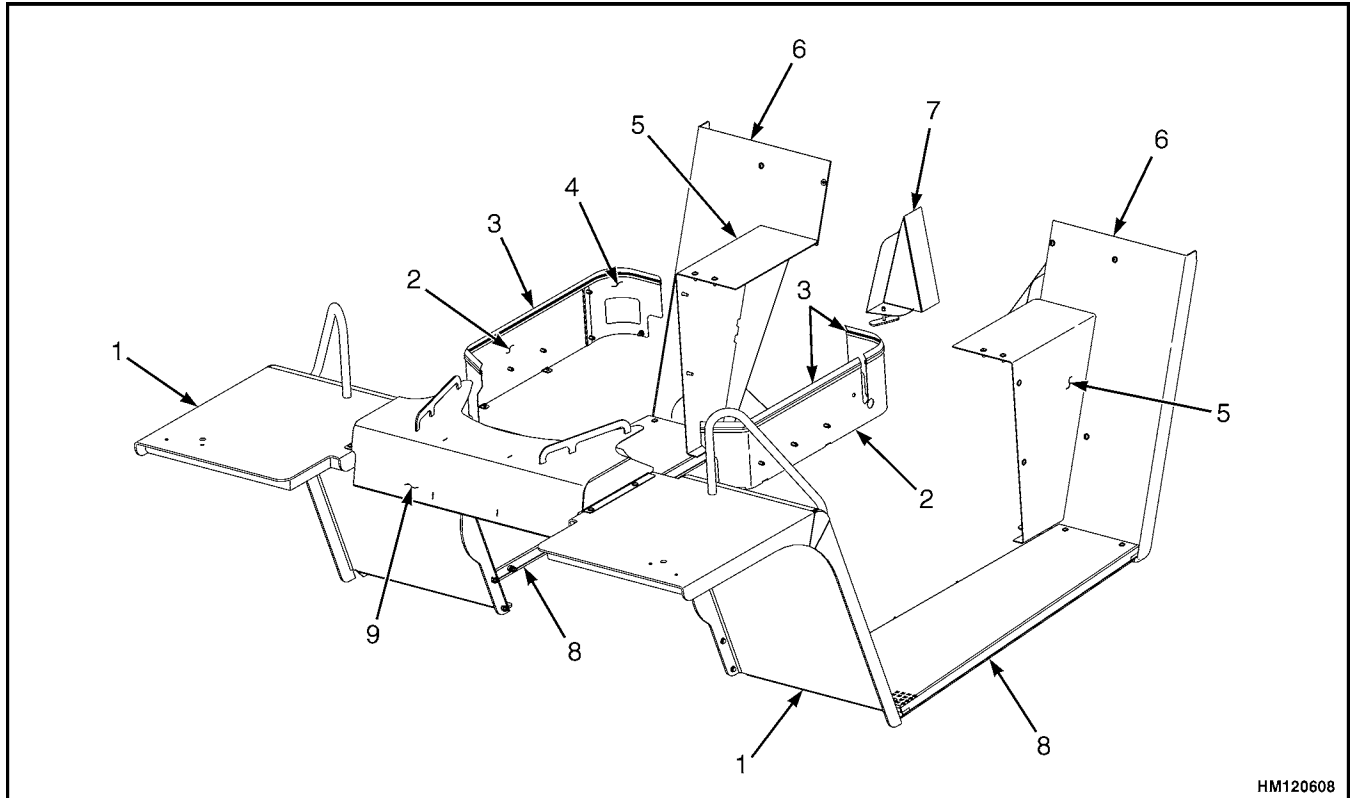
8. Remove the air cleaner assembly. See the section Air Cleaner Repair.
9. Remove the two capscrews, nuts, and the four washers that connects the air duct weldment to the muffler weldment.
10. Remove the four capscrews and washers and remove the air duct weldment from the hood.
11. Disconnect the clamp between the muffler weldment and the flex tube.
12. Remove the flex tube from the muffler weldment.
13. Remove the four capscrews and washers and remove the muffler weldment from the hood.
14. Remove the capscrews at the bottom of the hood.
15. Remove the hood.
4. Connect the flex tube to the muffler weldment.
5. Place the air duct weldment on the hood and tighten with four capscrews and washers.
6. Install the two capscrews and nuts and the four washers that connects the air duct weldment and muffler weldment together.
7. Install the air cleaner assembly. See the section Air Cleaner Repair.
8. Install the two isolators, capscrews, washers, and nuts that hold the cooling system to the hood.
9. Reroute and tighten the coolant level switch wire to the hood.
10. Reroute and tighten the vacuum switch wire to the hood.
11. Connect the wire to the horn.

INSTALL

1. Carefully position the hood.
2. Install the capscrews at the bottom of the hood to the frame.
3. Place the muffler weldment on the hood and tighten with four capscrews and washers.
12. Install the left and right cover.
13. Install the cowl frame assembly.
14. Close the left and right door weldment.

Floor Plates and Covers

The floor plates and covers can be removed from the frame for access to components. See Figure 6.



HM120608

- | | |
|--------------------|---------------------------|
| 1. FRONT FENDER | 6. REAR FENDER |
| 2. PANEL | 7. DIVIDER PLATE ASSEMBLY |
| 3. SEAL | 8. RUNNING BOARD |
| 4. PANEL EXTENSION | 9. COVER WELDMENT |
| 5. EXTENSION | |

Figure 6. Floor Plates and Covers

Hydraulic Tank Repair

The hydraulic tank is installed on the right side of the frame. See Figure 7.

REMOVE



WARNING

The hydraulic oil tank contains 321 liter (84.8 gal) of hydraulic oil. Drain the oil from the tank before removing the hydraulic tank. Failure to drain the tank could result in an oil spill.

After use of the hydraulic system, the hydraulic oil is very hot. Do not begin any maintenance procedures until the hydraulic oil has cooled. Monitor

the temperature of the hydraulic oil by observing the temperature gauge on the outside of the hydraulic tank.

1. Place truck on solid, level surface.
2. Lower the mast completely.
3. Shut down the engine.
4. Apply the brake.
5. Use a pan to catch the oil that is in the hydraulic lines.
6. Remove the drain plug at the bottom of the tank to drain the oil into clean barrels.

7. Disconnect the hydraulic line positioned on the outside of the tank, pointing toward the center of the frame.
8. Disconnect the hydraulic return lines at the upper front of the hydraulic tank.
9. Use a pan to catch the oil that is in the hydraulic lines.
10. Put tags on the lines for identification.
11. Put caps on the open lines and fittings.

**CAUTION**

These lift trucks have a 24-volt electrical system (two 12-volt batteries in series). The higher voltage can cause an electrical shock. Always move battery disconnect switch to disconnected position (pointer to left) before working on electrical system.

For trucks with ECM (engine control module), battery disconnect should only be performed after switching OFF ignition for 30 seconds.

12. Disconnect all electrical connectors from the hydraulic tank and tag connectors to aid in the installation.

**WARNING**

Batteries are very heavy and should not be lifted without assistance or personal injury may occur.

13. Disconnect the cables from the batteries and remove the batteries through the access door.

14. Remove running board, extension, and storage box from the hydraulic tank.
15. Remove the capscrews from the upper step attached to the panel.
16. Remove the seal.
17. Remove the panel extension.
18. Remove the panel.
19. Place a forklift in front of the hydraulic tank.
20. Place wooden blocks on the forks and carefully place the forks under the hydraulic tank.
21. Remove the eight capscrews holding the hydraulic tank to the frame.

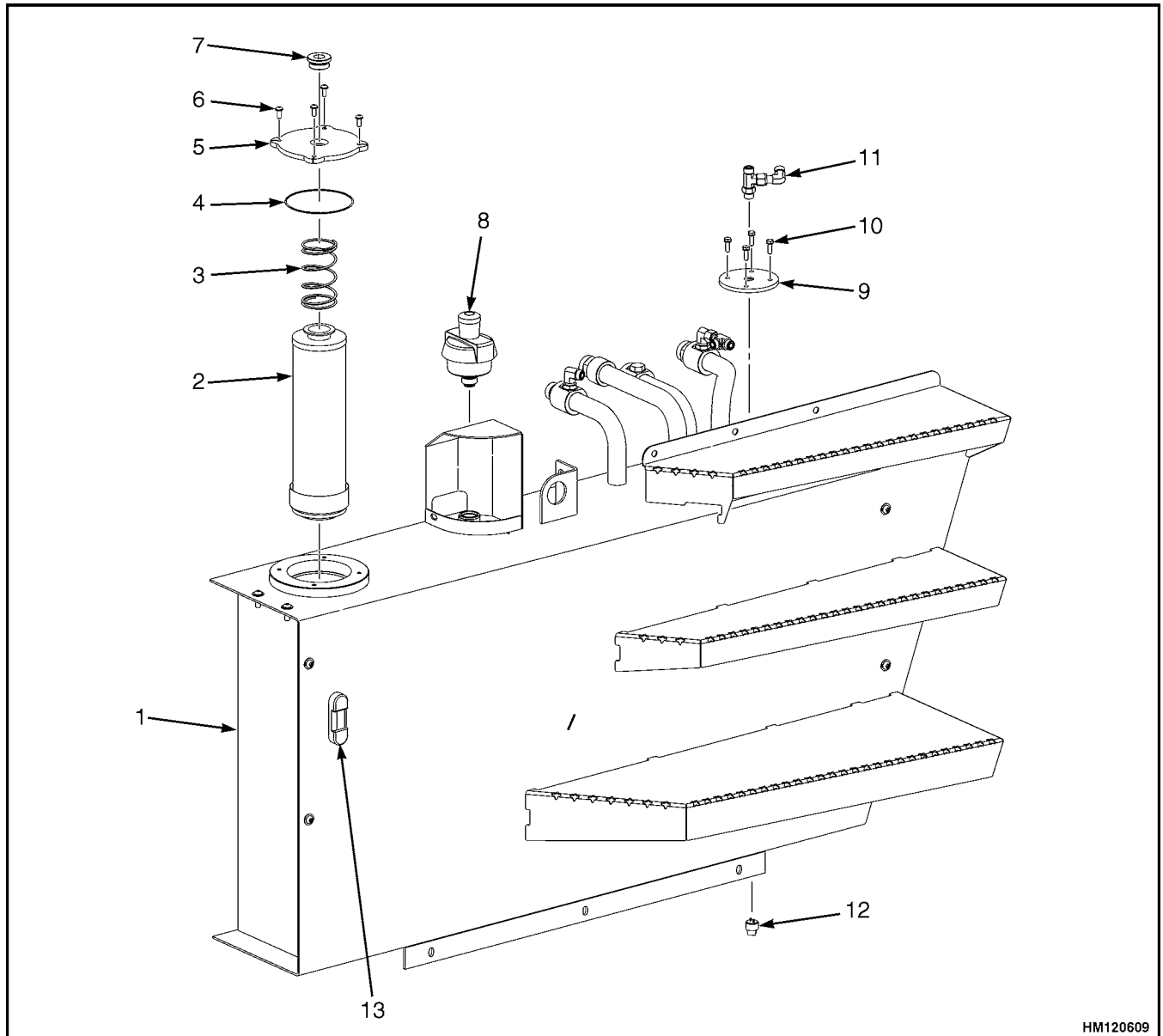
**WARNING**

The hydraulic tank weighs 153 kg (337.3 lb). Verify that the lifting device has the rated capacity to remove the hydraulic tank.

**CAUTION**

Verify the hydraulic hose and electrical cables are not damaged during the removal of the hydraulic tank.

22. Carefully lift the hydraulic tank from the lift truck frame until the hydraulic tank is free.
23. Carefully drive the forklift backwards and place the hydraulic tank on the ground.



HM120609

- | | |
|-------------------|----------------------------|
| 1. HYDRAULIC TANK | 8. BREATHER WITH INDICATOR |
| 2. FILTER | 9. COVER |
| 3. SPRING | 10. MOUNTING PARTS |
| 4. O-RING | 11. FITTING |
| 5. PLATE | 12. DRAIN PLUG |
| 6. MOUNTING PARTS | 13. OIL LEVEL INDICATOR |
| 7. PLUG | |

Figure 7. Hydraulic Tank

REPAIR

Small Leaks

NOTE: See the section Steam Method for preparations for leak repairs.



WARNING

Do not use tools that can make sparks, heat, or static electricity. The vapors in the tank can cause an explosion.

1. Use steam to clean the area around the leak. Remove all paint and dirt around the leak.
2. Apply Loctite 290® to the leak. Follow the instructions of the manufacturer.

Large Leaks

NOTE: See the section Steam Method for preparations for leak repairs.

1. Use acceptable welding practices to repair the tank. See the American National Standard Safety in Welding and Cutting AWS Z 49.1 - 1999.

CLEAN



WARNING

The power connect to the ECM (electronic control module) must be disconnected before welding on the vehicle. This is accomplished by disconnecting the 50-pin OEM interface connector. Ground for the welder must be located as near as possible to the welding location. Never attach the welder ground clamp to the ECM.

Special procedures must be followed when large leaks or other repairs need welding or cutting. All work must be done by authorized personnel. If the tank is cleaned inside of a building, make sure there is enough ventilation. See the following manuals for additional information:

- "Safe Practices for Welding and Cutting Containers That Have Held Combustibles" by the American Welding Society, F4.1 - 1999.
- "Safety In Welding and Cutting," American National Standard, AWS Z 49.1 - 1999.

When cleaning the tank, do not use solutions that make dangerous gases at normal temperatures or when heated. Wear device for the protection of the eyes. Protect the body from burns.

When cleaning with steam, use a hose with a minimum diameter of 19 mm (0.75 in.). Control the pressure of the steam by a valve installed at the nozzle of the hose. If a metal nozzle is used, it must be made of a material that does not make sparks. Make an electrical connection between the nozzle and the tank. Connect a ground wire to the tank to prevent static electricity.

Steam Method

1. Remove all the parts from the hydraulic tank, except inspection cover.
2. Install the drain plug.
3. Fill the tank 1/4 full with a solution of water and sodium bicarbonate or sodium carbonate. Mix 0.5 kg (1 lb) per 4 liter (1 gal) of water.
4. Mix the solution in the tank using compressed air. Verify all the surfaces on the inside of the tank are flushed with the solution.
5. Drain the tank.
6. Put steam into the tank until the tank does not have odors and the metal is hot. Steam vapors must come from all the openings.
7. Flush the inside of the tank with boiling water. Verify all the loose material is removed from the inside of the tank.
8. Make an inspection of the inside of the tank. If it is not clean, repeat Step 6 and Step 7 and make another inspection. When making inspections, use light that is approved for locations with flammable vapors.
9. Put plugs in all the openings in the tank. Wait 15 minutes; then remove the inlet and outlet plugs. Test a sample of the vapor with a special indicator for gas vapors. If the amount of flammable vapors is above the lower flammable limit, repeat the cleaning procedures.

Chemical Solution Method

NOTE: If the tank cannot be cleaned with steam, use the following procedure:

1. Mix a solution of water and trisodium phosphate or a cleaning compound with an alkali base. Follow the instructions given by the manufacturer.
2. Fill the tank with the cleaning solution. Use compressed air to mix the solution in the tank.
3. Drain the tank. Flush the inside of the tank with hot (boiling) water. Make sure all the cleaning compound is removed.

4. Make an inspection of the inside of the tank. If the tank is not clean, repeat Step 1, Step 2, and Step 3. Make another inspection of the tank. When making inspections, use a light that is approved for locations with flammable vapors.
5. Check the tank for flammable vapors using a special indicator for gas vapors. If the amount of flammable vapors is not below the lower flammable limit, repeat the cleaning procedures.

OTHER METHODS OF PREPARATION FOR REPAIR

If nitrogen gas or carbon dioxide gas is available, prepare the tank for welding using these gases. See the manual *Safe Practices for Welding and Cutting Containers That Have Held Combustibles* by the American Welding Society, F4.1 - 1999. If these gases are not available, another method using water can be used as follows:

1. Fill the tank with water to just below the point where the work will be done. Make sure the space above the level of the water has a vent.
2. Use acceptable welding practices to repair the tank. See the American National Standard *Safety In Welding and Cutting* AWS Z 49.1 - 1999.

INSTALL



WARNING

The hydraulic oil tank contains 321 liter (84.8 gal) of hydraulic oil. Drain the oil from the tank before removing the hydraulic tank. Failure to drain the tank could result in an oil spill.

NOTE: Verify that the drain plug is installed at the bottom of the hydraulic tank.

1. Place the hydraulic tank on forks with wooden blocks as support.
2. Place the hydraulic tank in front of the right side of the frame.
3. Raise the hydraulic tank and put the hydraulic tank in position on the frame.
4. Install the eight capscrews that hold the hydraulic tank to the frame.

5. Install the panel onto the hydraulic tank.
6. Install the tank panel extension onto the hydraulic tank.
7. Install the seal onto the panel and panel extension.
8. Install the capscrews to the upper step and attach to the panel.
9. Install extension, running board, and storage box onto hydraulic tank.
10. Connect all electrical connectors as tagged during removal.



WARNING

Batteries are heavy and should not be lifted without assistance or personal injury may occur.

11. Install the batteries through the access door and connect the battery cables.
12. Connect the hydraulic return lines located at the upper front of the hydraulic tank.
13. Connect the hydraulic line positioned on the outside of the tank, pointing toward the center of the frame.



WARNING

Before filling the hydraulic tank with hydraulic oil, replace the O-ring and gasket to avoid oil leakage. See Figure 7.

14. Fill the hydraulic tank to the correct level with the oil specified in the **Maintenance Schedule** table in the section **Periodic Maintenance** 8000SRM1313.
15. Start the engine and operate the hydraulic system. Verify all functions work correctly.



WARNING

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

16. Check for leaks.
17. Bleed the system.

Fuel Tank Repair

The fuel tank is installed on the left-hand side of the frame. See Figure 8.

REMOVE

1. Place the lift truck on solid, level surface.
2. Lower the mast completely.
3. Shut down the engine.
4. Apply the parking brake.



WARNING

When removing the fuel tank, do not use tools that can make sparks, heat, or static electricity. The vapors in the tank can cause an explosion and personal injury may occur.

5. Put a drain pan under the fuel tank.
6. Remove drain plug to drain the fuel from the tank.



WARNING

If the fuel is drained from the fuel tank, put the fuel in a can or barrel that has a sealed cap to prevent contamination.

7. Disconnect the fuel lines at the fuel tank.
8. Remove the running board, and extension from the fuel tank.
9. Disconnect the hand pump and place it at the inside of the frame.
10. Remove the capscrew from the upper step attached to the panel.
11. Remove the seal.

12. Remove the panel.



CAUTION

These lift trucks have a 24-volt electrical system (two 12-volt batteries in series). The higher voltage can cause an electrical shock. Always move battery disconnect switch to disconnected position (pointer to left) before working on electrical system.

13. Disconnect all electrical connectors from the fuel tank and tag connectors to aid in the installation.
14. Attach a lifting device to the fuel tank at the lifting eye.
15. Create tension on the chains.
16. Position the lifting device so the fuel tank will be moved a little toward the frame.
17. Remove the eight capscrews that hold the fuel tank to the frame.



WARNING

The fuel tank weighs 173 kg (381.4 lb). Verify that the lifting device has the rated capacity to lift the fuel tank.

18. Carefully lift the fuel tank from the lift truck frame until the fuel tank is free from the frame.
19. Carefully move the fuel tank from the frame until the fuel tank can be lifted upwards.
20. Carefully place the fuel tank on the ground.

Thanks for your reading.

Please click here to download complete manual instantly.

And can also choose other manuals.

Feel free --->write to me with any questions.

Our service email:

manuals007@hotmail.com