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This section is for the following models:

H8.00-12.00XM (H170-280HD) [F007, G007];
H13.00-16.00XM (H300-360HD) [E019, F019];
H10.00-12.00XM-12EC (H360HD-EC) [E019, F019]

General

This section has the description and repair procedures for the frame and connected parts. Included in this section are the frame, counterweight, fenders, hood, hydraulic and fuel tanks, radiator/cooling section, operator compartment, and cab. The instructions for removal and installation of the engine are included in this section.

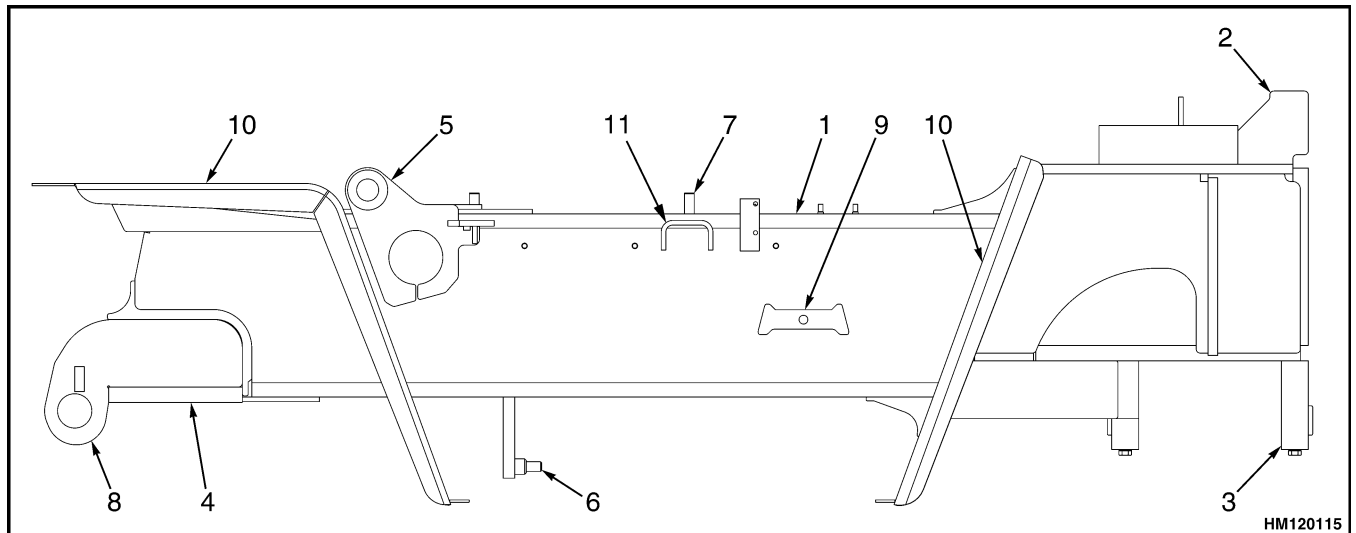
If the lift truck is fitted with a battery disconnect switch, open the switch if welding on the engine and remove the ECM (Engine Control Module). If welding on the lift truck chassis, verify the ground clamp

is placed as close to the welding point as possible and **NOT** near the ECM. If it is necessary to weld near the ECM, remove the ECM from the engine to avoid damage from welding arc radiation.

Description

The frame is a one-piece weldment and has mounts for the counterweight, fenders, engine, transmission,

axles, hydraulic and fuel tanks, operator's compartment, and other parts. See Figure 1.



- | | |
|-------------------------|-----------------------------|
| 1. MAIN MOUNT | 7. CAB HINGE |
| 2. COUNTERWEIGHT MOUNT | 8. MAST MOUNT |
| 3. STEERING MOUNT | 9. SIDE COUNTERWEIGHT MOUNT |
| 4. DRIVE AXLE MOUNT | 10. FENDERS |
| 5. TILT CYLINDERS MOUNT | 11. CAB LATCH MOUNT |
| 6. CAB CYLINDER MOUNT | |

Figure 1. Frame

Counterweight Repair

REMOVE



WARNING

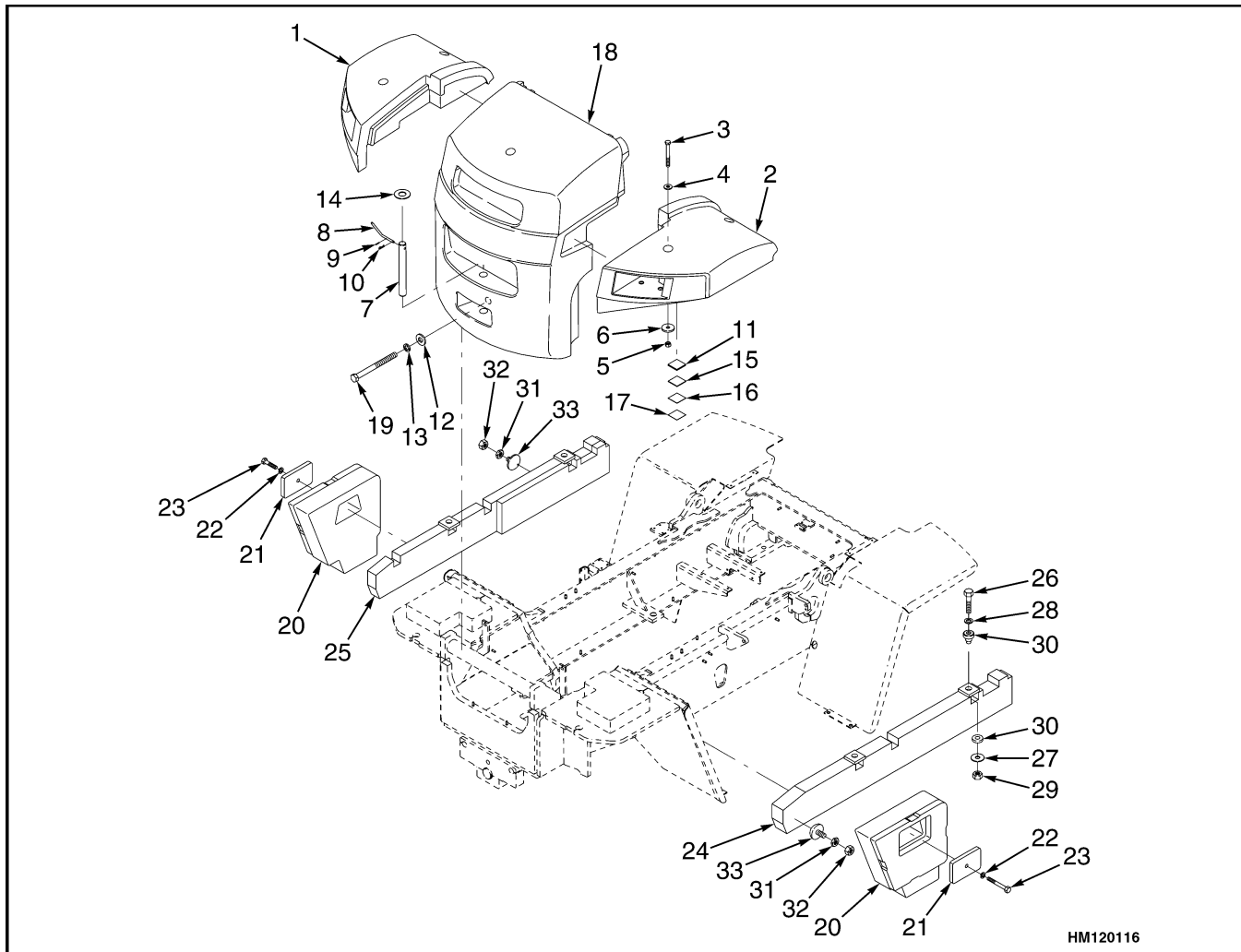
The counterweight is heavy. Make sure that the crane and lifting devices have the capacity to lift 4600 kg (10,141 lb).

1. Remove the hood spine assembly. See Hood and Air Cleaner Repair.
2. **H8.00-12.00XM (H170-280HD) units only.** Remove the counterweight by placing an eyebolt through the hole in the top of the counterweight. See Figure 2. The eyebolt must be able to support the weight of the counterweight. Attach a lifting device to eyebolt.

H13.00-16.00XM (H300-360HD) and H10.00-12.00XM-12EC (H330-360HD-EC) units. Remove the fenders, noting shims used and location of shims. Remove the radiator fan, shroud, and hardware. Tilt the radiator away from the counterweight so there is clearance when removing the counterweight. See Figure 2. Install eyebolt

into the top of the counterweight. The eyebolt must be able to support the weight of the counterweight. Attach lifting device.

3. Remove the single capscrew from the rear of the counterweight. Remove the counterweight from the frame.



HM120116

- | | | |
|--------------|------------------------|---------------------------|
| 1. LH FENDER | 11. SHIM | 23. CAPSCREW |
| 2. RH FENDER | 12. WASHER | 24. RH SLAB COUNTERWEIGHT |
| 3. CAPSCREW | 13. LOCKWASHER | 25. LH SLAB COUNTERWEIGHT |
| 4. WASHER | 14. WASHER | 26. CAPSCREW |
| 5. NUT | 15. SHIM | 27. WASHER |
| 6. WASHER | 16. SHIM | 28. WASHER |
| 7. TOW PIN | 17. SHIM | 29. NUT |
| 8. GRIP | 18. COUNTERWEIGHT | 30. ISOLATOR |
| 9. PIN | 19. CAPSCREW | 31. LOCKWASHER |
| 10. PIN | 20. SLAB COUNTERWEIGHT | 32. NUT |
| | 21. PLATE | 33. RUBBER STOP |
| | 22. LOCKWASHER | |

Figure 2. Counterweight Mounts

INSTALL



WARNING

The counterweight is heavy. Make sure that the crane and lifting devices have the capacity to lift 4600 kg (10,141 lb).

1. Put a chain into top opening of the counterweight and attach chain to a lifting device. See Figure 2.
2. **H13.00-16.00XM (H300-360HD) and H10.00-12.00XM-12EC (H330-360HD-EC) units only.** Install the radiator hardware. Tilt the radiator ahead so there is clearance for the chain that is installed through the counterweight.
3. Install the counterweight on the frame. Install the capscrew, lockwasher, and flat washer to fasten the counterweight to the frame. Tighten the capscrew to 1140 N•m (841 lbf ft).

FENDERS

Remove



WARNING

The fenders are part of the lift truck counterweight and are very heavy. Make sure any lifting devices have the capacity to lift 1750 kg (3858 lb). Make sure the fender is balanced and supported by the chain. The fenders are not of a regular shape and can be difficult to handle.

1. Remove the capscrews, washers, and nuts that fasten the fender to the frame mount. Install eyebolts in the mount holes. Use mount holes to pick up fender from frame.
2. Fasten a lifting device to the eyebolts. Operate the lifting device and lift the fender away from the frame.

Install

1. Install eyebolts in the fenders as described in Remove, Step 1. Fasten a lifting device to the eyebolts.
2. Raise the fender to the lift truck. Align the eyebolts in the fender with the holes in the fender mount on the frame. Shim fenders to correct height. Lower the fender to the fender mount and remove the lifting device and the eyebolts.

3. Install the capscrews, washers, and nuts that hold the fender to the frame. Tighten the nuts to 320 N•m (236 lbf ft).

SIDE COUNTERWEIGHTS H13.00-16.00XM (H300-360HD)

The counterweights located on either side of the lift truck are fastened to the frame by large capscrews. Normally these counterweights will never have to be removed or replaced on the lift truck.

SIDE COUNTERWEIGHT, REPLACE

If replacement of the side counterweight is required, do the following procedure:



WARNING

The side counterweights are heavy. Each side counterweight weighs approximately 560 kg (1235 lb). Make sure that the crane and lifting devices have the capacity to lift 908 kg (2433 lb).

1. Remove the extension covers from both side tanks.
2. Remove each counterweight capscrew and replace it in turn with a long stud. The studs must protrude about 152 mm (6 in.) beyond the counterweight.
3. Use a pry bar and carefully move the counterweight away from the frame about 50 mm (2 in.). Install a nylon lifting sling securely around the counterweight and attach it to a lifting device.



WARNING

Make sure the counterweight is balanced and cannot fall from the sling when the sling is raised.

4. Carefully lift the counterweight away from the lift truck frame and lower the counterweight to the floor.
5. For installation of the side counterweights, follow the above procedure in reverse order. Tighten the counterweight capscrews to 655 N•m (483 lbf ft).

Hood and Air Cleaner Repair

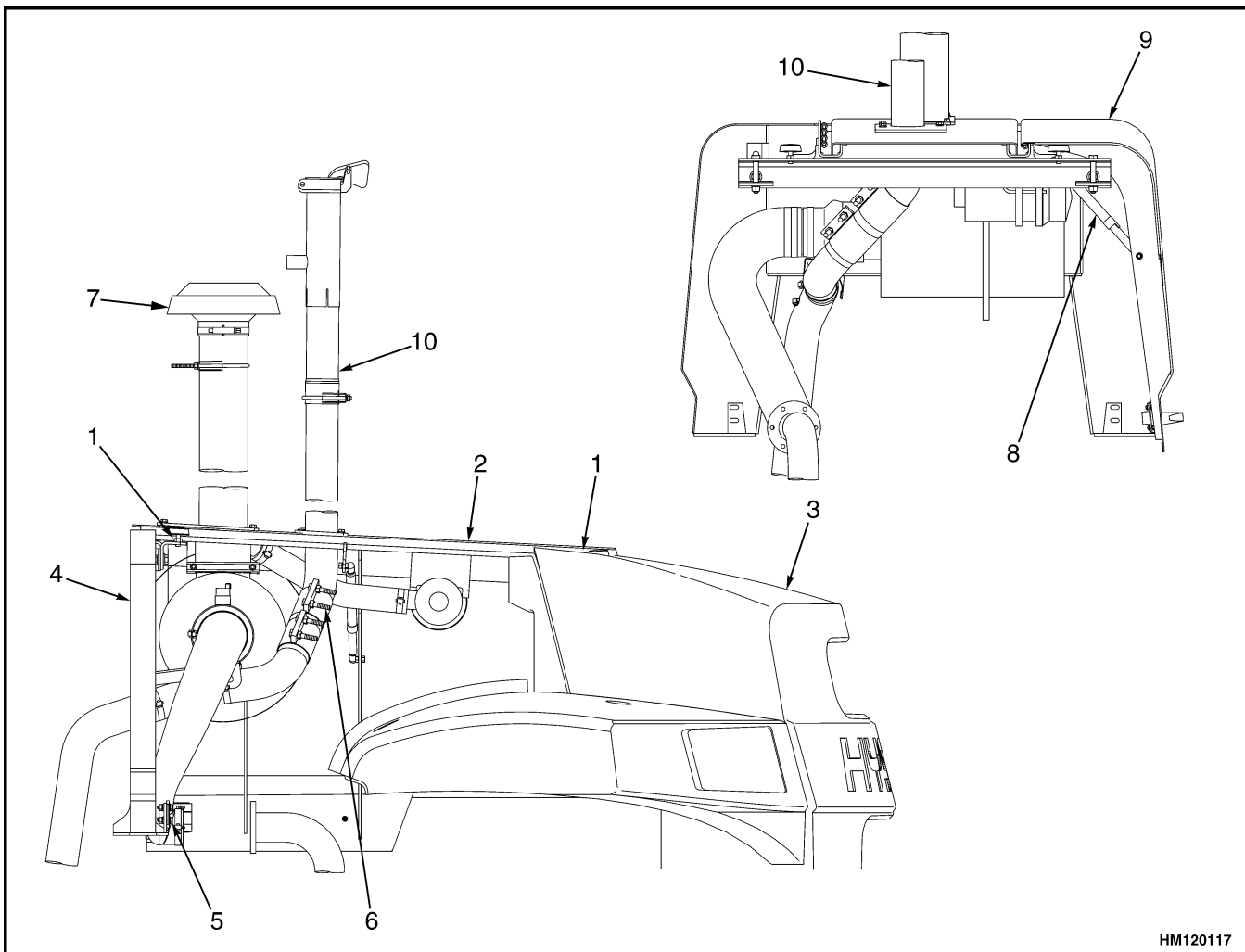
The hood and air cleaner assembly, which includes the rain cap or optional precleaner and inlet pipe, can be removed from the frame as a single unit, or pivoted out of the way for access.

REMOVE

NOTE: The hood and air cleaner assembly can be pivoted out of the way to gain access to many components. In order to pivot hood and air cleaner assembly, remove 2 bolts, nuts, and washers at one side

connecting hood to hood spine support and loosen the 2 bolts at opposite side.

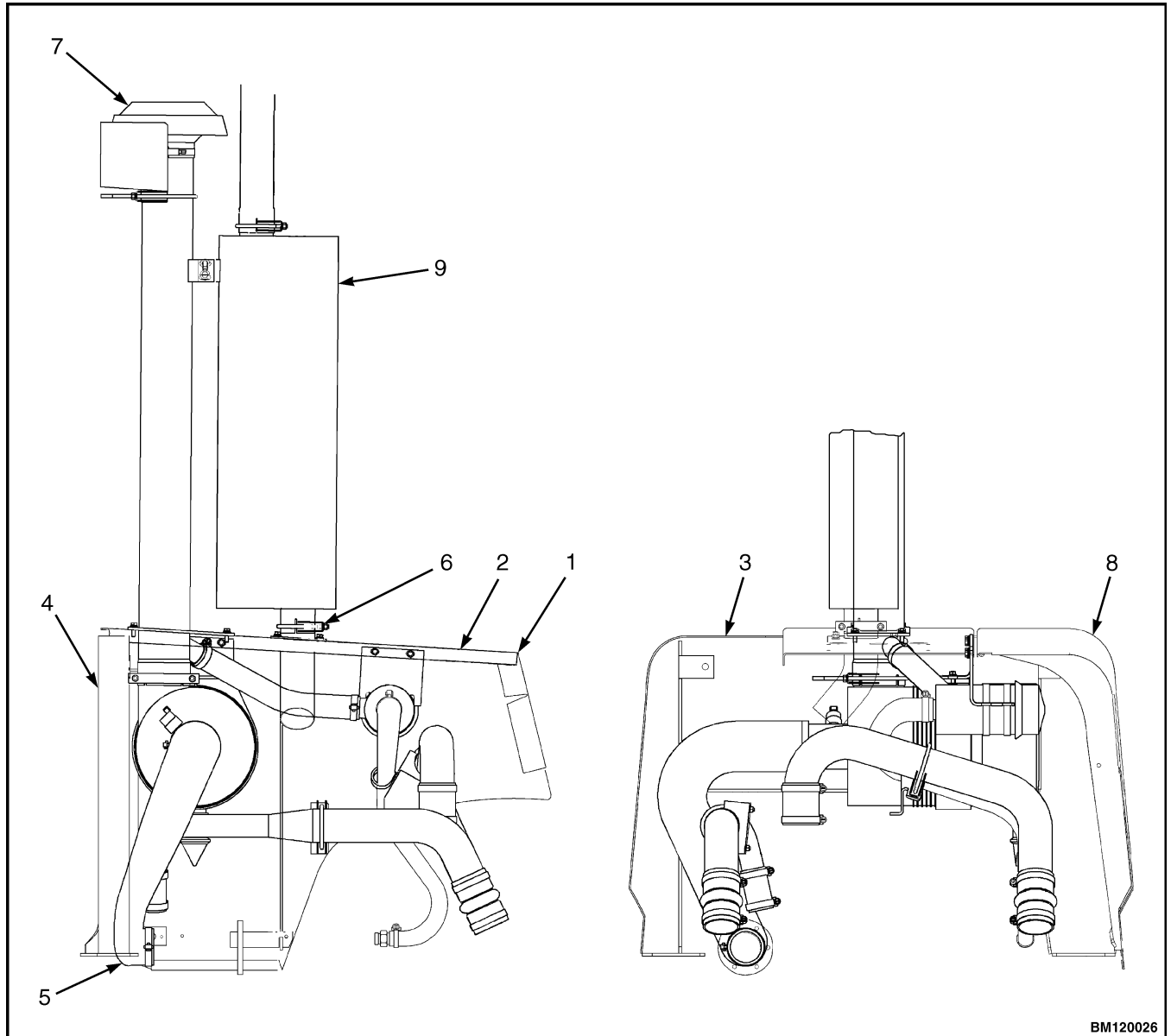
1. Unlock hood with an allen wrench.
2. Open hood panel until gas spring locks hood panel in open position.
3. Attach a lifting device and sling to support hood spine and attaching components. See Figure 3 and Figure 4.



HM120117

- | | |
|------------------------|------------------------|
| 1. HOOD SPINE HARDWARE | 6. EXHAUST STACK CLAMP |
| 2. HOOD SPINE | 7. RAIN CAP |
| 3. COUNTERWEIGHT | 8. GAS SPRING |
| 4. HOOD SPINE SUPPORT | 9. HOOD PANEL |
| 5. AIR INTAKE HOSE | 10. EXHAUST STACK |

Figure 3. Hood and Air Cleaner Assembly (E019 and F007)



1. HOOD SPINE HARDWARE
2. HOOD SPINE
3. COUNTERWEIGHT
4. HOOD SPINE SUPPORT
5. AIR INTAKE HOSE

6. EXHAUST STACK CLAMP
7. RAINCAP
8. HOOD PANEL
9. EXHAUST STACK

Figure 4. Hood and Air Cleaner (F019 and G007)

4. Loosen air intake hose to turbocharger at inlet side of turbocharger.
5. Loosen clamps at upper exhaust stack.
6. Remove bolts, nuts, washers, and bar washers that fasten hood spine to counterweight and hood support.
7. Disconnect washer hoses from washer container and mark for reconnecting.
8. Disconnect the washer hoses from hood and air cleaner assembly.
9. Using lifting device, lift hood assembly from frame. Air filter assembly and exhaust stack will remain attached to hood and spine assembly.

INSTALL

Install the hood and air cleaner assembly in the reverse procedure of removal and align the hood as

necessary during installation. Make sure the hood side panels close completely and that the cushioned screw stops (bumpers) are located correctly.

Hydraulic Tank Repair

The hydraulic tank is installed on the right side of the frame between the front and rear fenders.

oil that is in the hydraulic lines. Put tags on the lines for identification. Put caps on the open lines and the fittings.

REMOVE

1. Remove the side cover between the bottom of the operator compartment and the top of the hydraulic tank. See Figure 5. If necessary, remove the drain plug at the bottom of the tank to drain the oil. See Figure 6 and Figure 7.

2. Remove the extension panel.

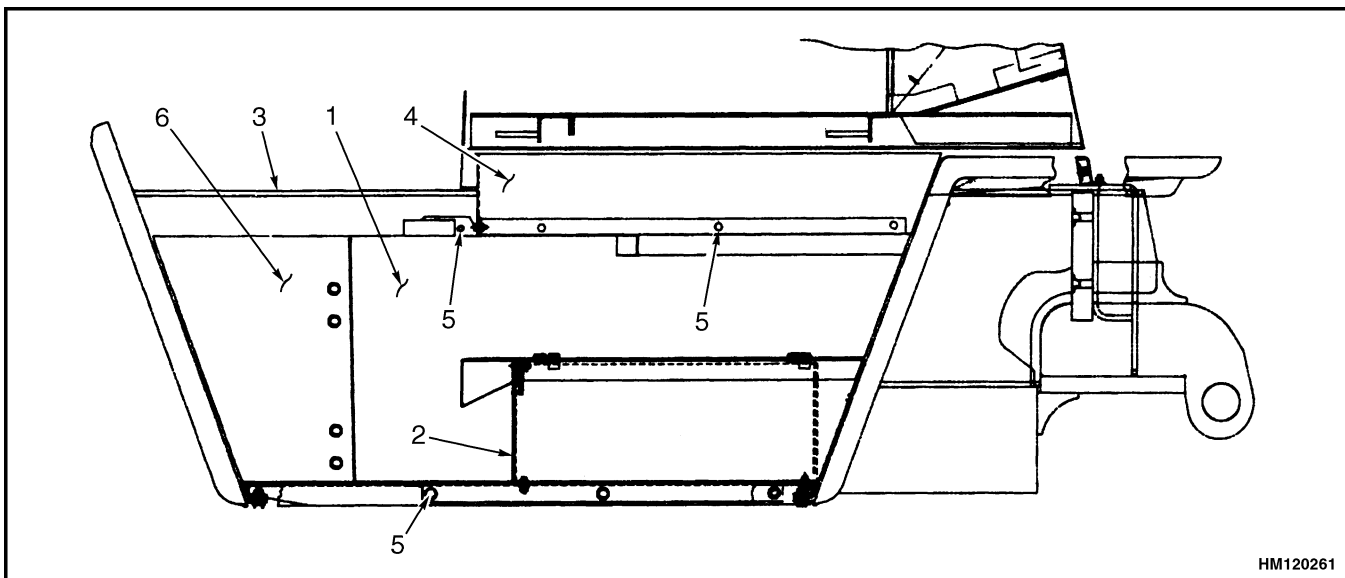
NOTE: Do not remove items 14, 15, 16, and 17 from the tank.

3. Disconnect the hoses at the top elbow connection and at the side connection to the tank located on the inside of the frame. Use a pan to catch the

WARNING

Make sure that the tank is supported by blocks before removing the nuts and washers from the top of the tank.

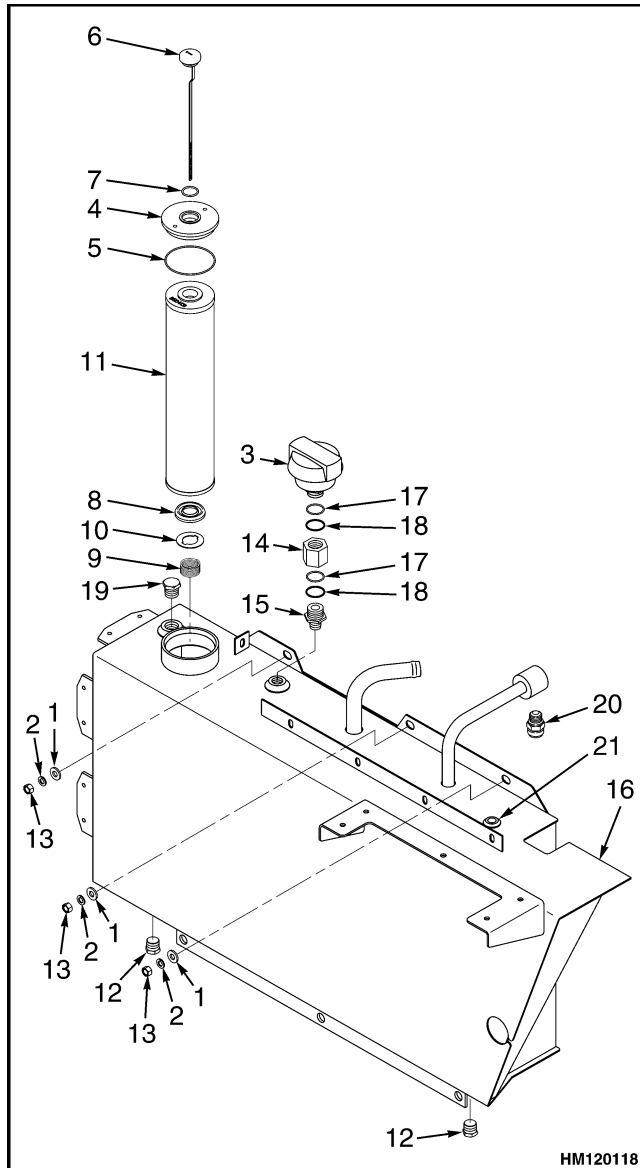
4. Support the fuel tank with blocks from beneath. First, remove the three capscrews that fasten the bottom of the tank to the running board. Remove the three nuts and washers that hold the top of the tank to the frame. Install two lifting eyes at the outer holes. Attach a lifting device and support the tank. Lift the tank from the frame.



1. HYDRAULIC TANK
2. BATTERY BOX
3. FRAME

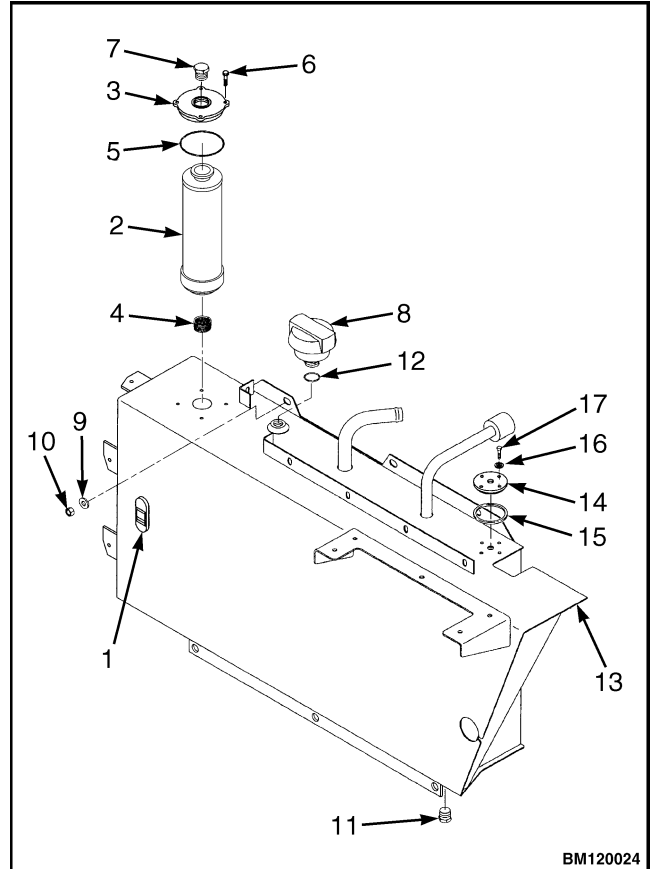
4. SIDE COVER
5. NUT AND WASHER
6. EXTENSION PANEL

Figure 5. Hydraulic Tank and Battery Box



- | | |
|-------------------|--------------------|
| 1. WASHER (3) | 12. DRAIN PLUG |
| 2. LOCKWASHER (3) | 13. NUT (3) |
| 3. BREATHER | 14. ADAPTER |
| 4. FILTER HEAD | 15. ADAPTER |
| 5. O-RING | 16. HYDRAULIC TANK |
| 6. DIPSTICK | 17. O-RING |
| 7. O-RING | 18. RETAINING RING |
| 8. SEAL | 19. FITTING |
| 9. SPRING | 20. FITTING |
| 10. WASHER | 21. PLUG |
| 11. FILTER | |

Figure 6. Hydraulic Tank (F007 and E019)



- | | |
|----------------|--------------------|
| 1. SIGHT GLASS | 10. NUT |
| 2. FILTER | 11. DRAIN PLUG |
| 3. FILTER HEAD | 12. O-RING |
| 4. SPRING | 13. HYDRAULIC TANK |
| 5. O-RING | 14. COVER |
| 6. CAPSCREW | 15. SEAL |
| 7. PLUG | 16. WASHER |
| 8. BREATHER | 17. CAPSCREW |
| 9. WASHER | |

Figure 7. Hydraulic Tank (G007 and F019)

REPAIRS, ALL UNITS

Small Leaks

Use the following procedures to repair small leaks:

1. Use steam to clean the area around the leak. Remove all paint and dirt around the leak.

WARNING

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

2. Apply Loctite® 290 to the leak. Follow the instructions of the manufacturer.

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