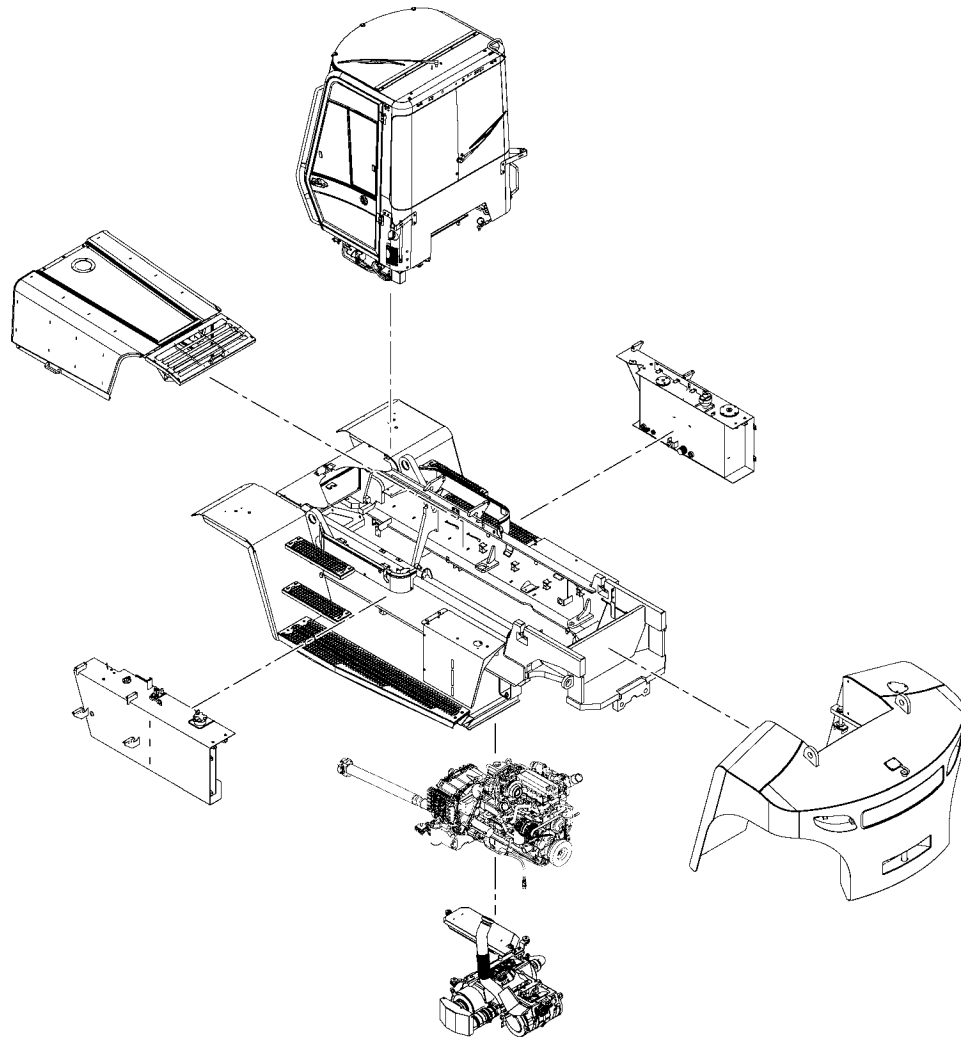


FRAME AND MAIN COMPONENTS



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.

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<p>This section is for the following models:</p>
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Series Code / Model Designation Reference Table

This section is for the following models:

Series Code	Model Designation Europe	Model Designation America
B238	H16XM-9, H16XM-12, H18XM-7.5, H18XM-9	H360-36HD, H360-48HD

General

This manual contains the procedures for removal and installation of main components mounted on the frame of the B238 lift truck series. The manual includes air filter assembly, exhaust system, hood assembly, handrails and steps, hydraulic tank, fuel tank, engine, transmission, operator's cab and counterweight.

For information on the drive axle, steering axle and mast refer to:

- Kessler Drive Axle 1400SRM1667

- Steering System 1600SRM1932
- Mast 4000SRM1664

For information on torque values, see the section Metric & Inch Fasteners 8000SRM0231.

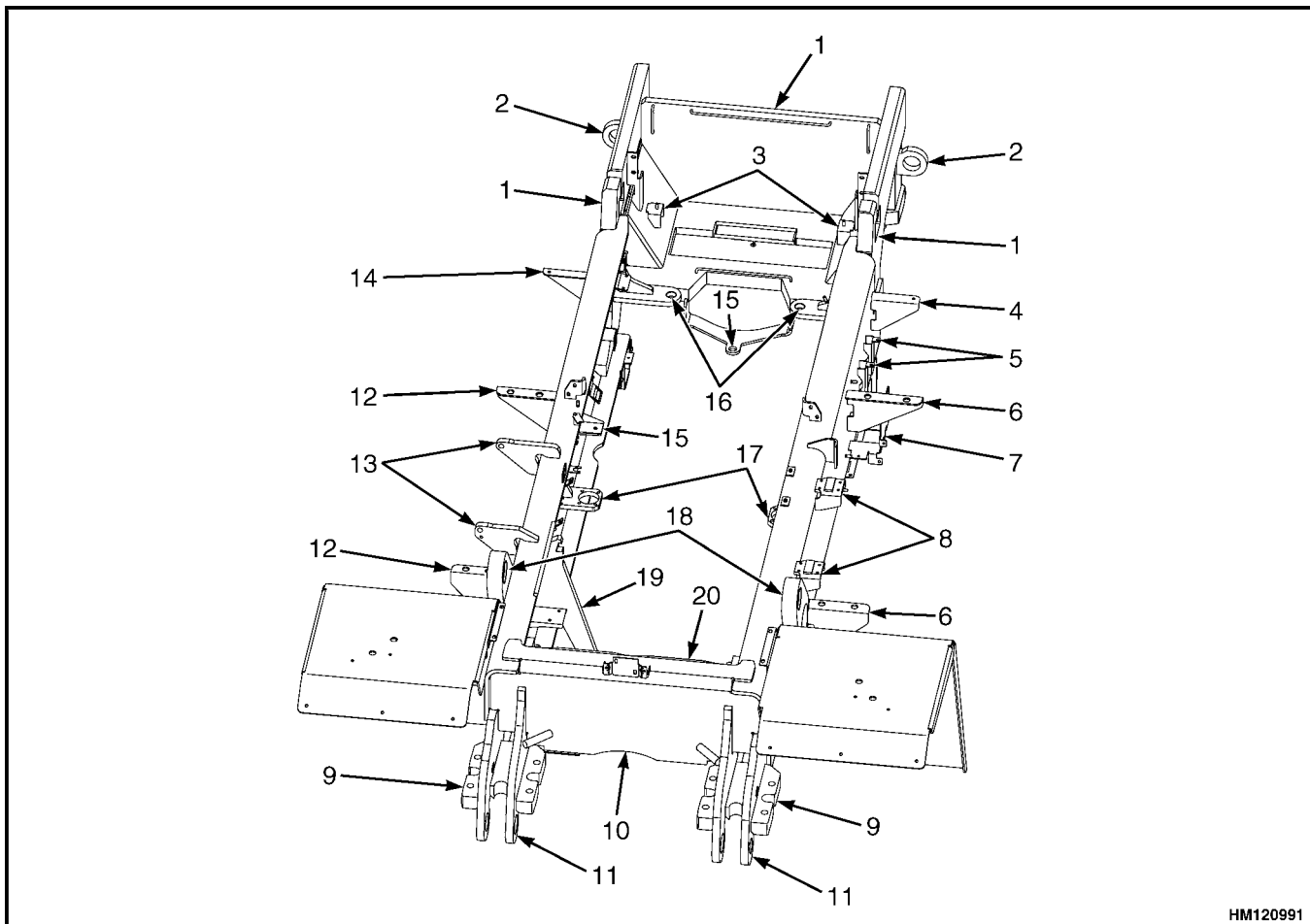
Description



CAUTION

DO NOT initiate repairs to the frame without consulting a Hyster service representative or damage to the lift truck may occur.

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



HM120991

- | | |
|---|---------------------------------|
| 1. COUNTERWEIGHT MOUNT | 11. MAST MOUNT |
| 2. TIE DOWN EYES | 12. HYDRAULIC TANK MOUNT |
| 3. COOLING ASSEMBLY MOUNT | 13. CAB SIDE TILT |
| 4. (DEF TANK) EXTENSION PLATE (TIER 4F) | 14. EXTENSION PLATE |
| 5. DEF TANK MOUNT | 15. AFTER TREATMENT FRAME MOUNT |
| 6. FUEL TANK MOUNT | 16. ENGINE MOUNT |
| 7. DEF FILTER MOUNT | 17. TRANSMISSION MOUNT |
| 8. CAB LOCK MOUNT | 18. TILT CYLINDER MOUNT |
| 9. DRIVE AXLE MOUNT | 19. CAB TILT BRACKET |
| 10. FRAME | 20. MAIN CONTROL VALVE MOUNT |

Figure 1. Frame Mounts

Remove and Install

AIR FILTER ASSEMBLY (TIER 3/STAGE IIIA)

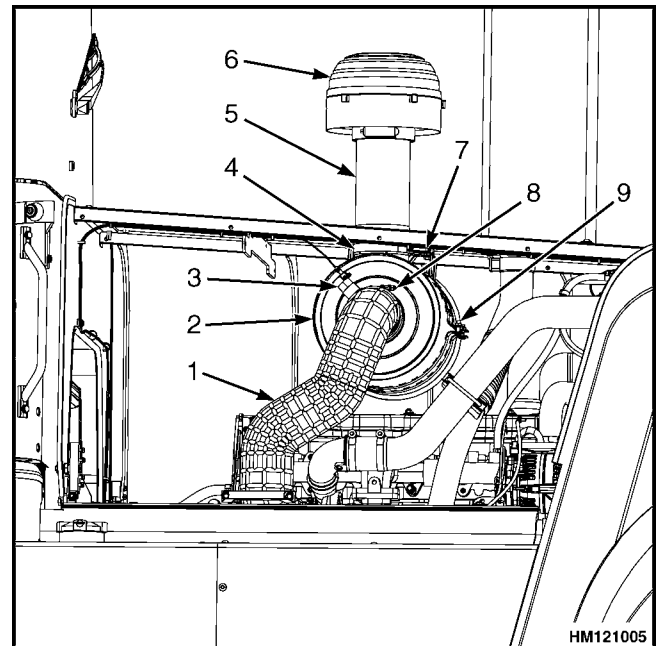
Remove

1. Open left-hand hood door. See Hood Assembly.
2. Tag and disconnect the electrical connector from vacuum switch by pressing the metal clip.
3. Loosen the air duct clamp at the filter housing. See Figure 2.
4. Close left-hand hood door to access the Precleaner.
5. Remove the Precleaner, with the air duct attached, from the air filter housing.
6. Open left-hand and right-hand hood doors.
7. Loosen the hose clamps on the air filter hose and remove the hose. See Figure 2.
8. Place a cap on the air inlet of the turbocharger to avoid dirt entering the turbocharger.
9. Place a support under the air filter assembly.
10. Remove the cap screws and washers from the mounting clamps that hold the air filter assembly.
11. Rotate the air filter until the air duct connection clears the center of the hood opening and move the air filter to the right-hand side of the truck.
12. Remove the retaining hardware from the mounting clamps and remove the clamps from the hood by removing the hardware.

Install

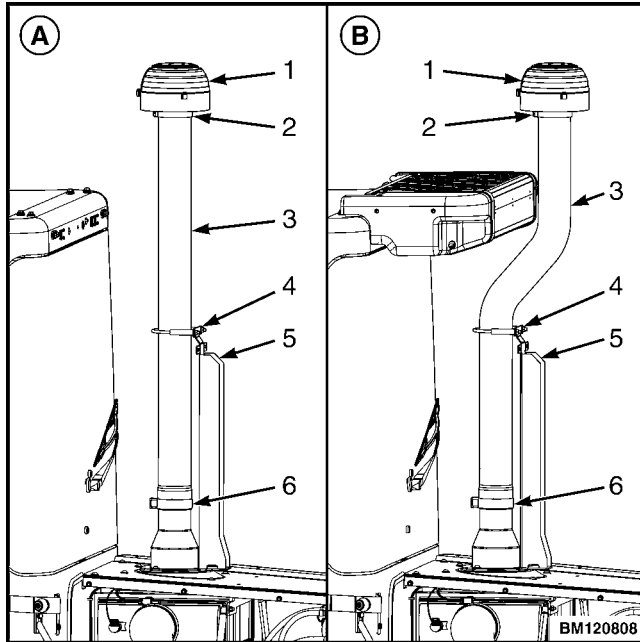
1. Install the retaining hardware to the mounting clamps and install the clamps under the hood.
2. Position the air filter housing into the mounting clamps with the air intake aligned with the hole in the mounting plate.
3. Install cap screws and washers and tighten to 38 N•m (28 lbf ft).

4. Remove the cap from the turbocharger.
5. Rotate and connect air filter hose to air filter housing and the turbocharger and tighten hose clamps to 8 N•m (6 lbf ft).
6. Close the hood doors. See Figure 15.
7. Install the Precleaner, with the air duct attached, on the air cleaner.
8. Open left-hand hood door.
9. Install and tighten the air duct clamp.
10. Connect electrical connector to vacuum switch.
11. Close the hood door.



1. AIR FILTER HOSE
2. AIR FILTER HOUSING
3. VACUUM SWITCH
4. AIR DUCT CLAMP
5. AIR DUCT
6. PRECLEANER
7. AIR FILTER BRACKETS
8. HOSE CLAMP
9. FILTER HOUSING MOUNTING CLAMP

Figure 2. Air Filter Assembly (Tier 3/Stage IIIA)



- A.** HIGH MOUNT PRECLEANER FOR CABS WITHOUT AIRCO
B. HIGH MOUNT PRECLEANER FOR CABS WITH AIRCO

1. PRECLEANER
2. PRECLEANER CLAMP
3. AIR DUCT
4. U-CLAMP
5. SUPPORT BRACKET
6. AIR DUCT CLAMP

Figure 4. Air Filter Assembly with High Mount Precleaner (Tier 4F/Stage IV)

EXHAUST SYSTEM (TIER 3/STAGE IIIA)

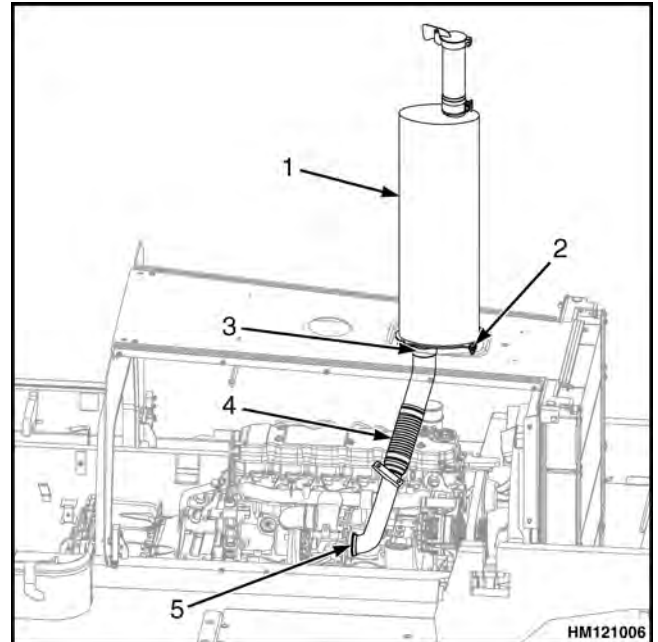
Remove



WARNING

Exhaust system must be at room temperature before starting disassembly or personal injury may occur.

1. Open left- and right-hand hood doors. See Hood Assembly.
2. Remove V-band clamp from turbocharger See Figure 5.
3. Remove V-band clamp from the muffler.
4. Remove the exhaust pipe assembly.



1. MUFFLER
2. CAP SCREW AND WASHER
3. CLAMP
4. EXHAUST PIPE ASSEMBLY
5. V-BAND CLAMP

Figure 5. Exhaust System (Tier 3/Stage IIIA)

5. Place a cap on the air inlet of the turbocharger to avoid dirt entering the turbocharger.
6. Remove the hardware that retains the muffler to the center hood and remove the muffler.

Install

1. Place the muffler on the center hood and attach the hardware.
2. Remove the cap from the air inlet of the turbocharger.
3. Install the exhaust pipe assembly.
4. Tighten the band clamp on the muffler to 54 - 81 N•m (40 - 60 lbf ft).
5. Tighten the band clamp on the turbocharger to 5.6 N•m (4 lbf ft).
6. Close the hood doors.

EXHAUST SYSTEM (TIER 4F/STAGE IV)**WARNING**

Exhaust system must be at ambient temperature before starting disassembly or personal injury may occur.

Wait at least 100 seconds after the engine has been switched off then move the battery disconnect switch to the disconnected position. Disconnect the ground cable from the batteries.

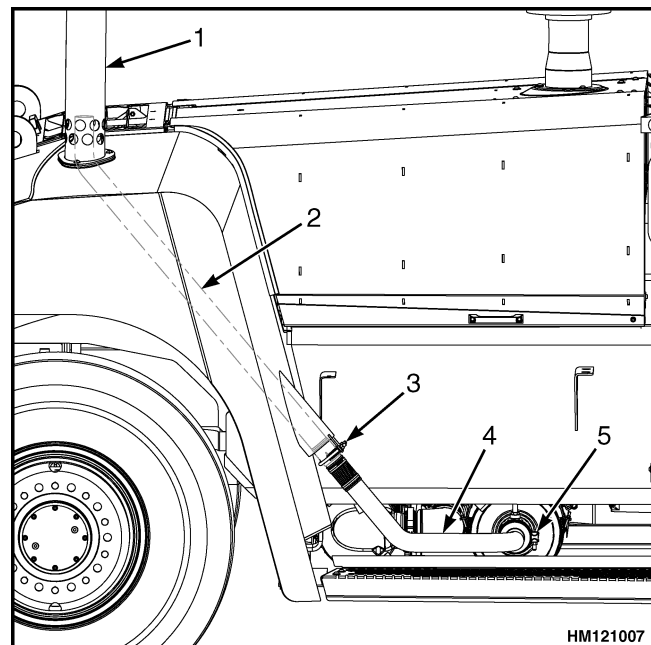
Exhaust Pipes High Mount**Remove**

1. Loosen the clamp at the connection between exhaust pipe assembly and end pipe. See Figure 6.
2. Remove the band clamp from the Selective Catalytic Reducer (SCR) outlet.
3. Remove the exhaust pipe assembly.
4. Remove the cap screws from the diluter to counterweight connection. See Figure 7.
5. Remove the diluter.
6. Remove the end pipe retainer bracket on the counterweight.
7. Remove the U-clamp from the end pipe.
8. Remove the end pipe from the counterweight tube at the top of the counterweight.

Install

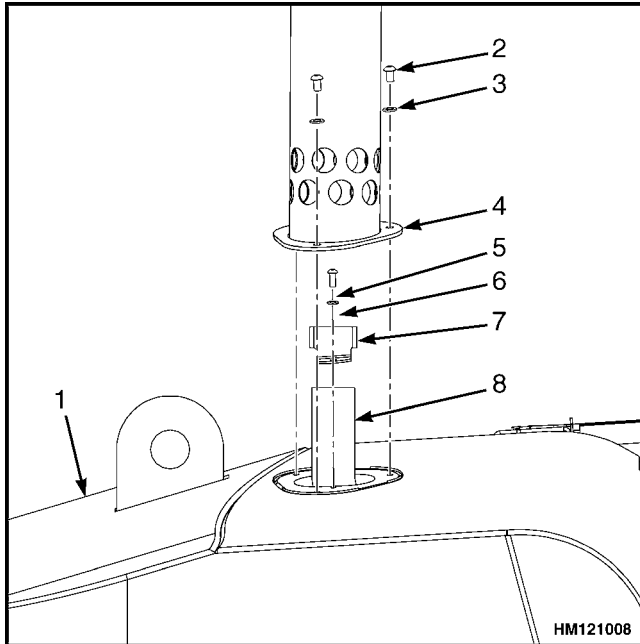
1. Insert the end pipe in the counterweight tube at the top of the counterweight. See Figure 8.

2. Install the U-clamp on the lower end of the end pipe.
3. Install the retainer bracket at the top of the end pipe.
4. Install the diluter.
5. Install the exhaust pipe assembly in the end pipe and to the outlet of the SCR. See Figure 8.
6. Tighten the band clamp that retains the exhaust frame to the SCR to 4.95 N•m (3.65 lbf ft).



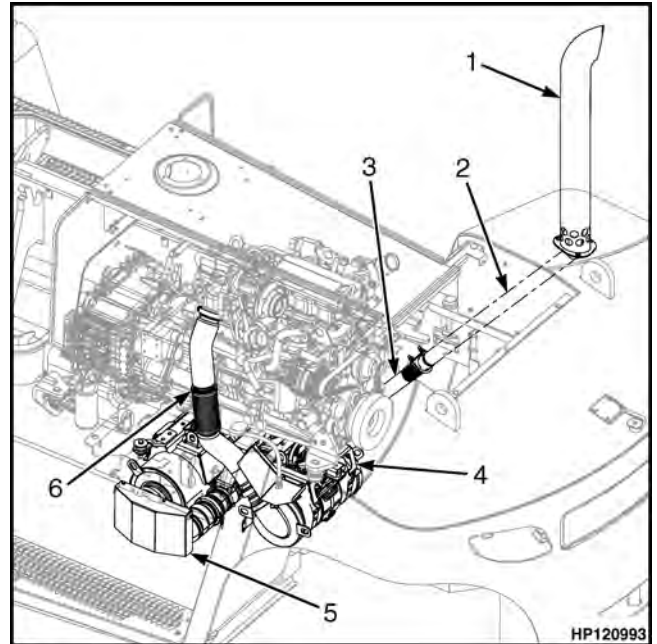
1. DILUTER ASSEMBLY
2. EXHAUST END PIPE
3. U-CLAMP
4. EXHAUST PIPE ASSEMBLY
5. V-BAND CLAMP

Figure 6. Exhaust Pipe High Mount (Tier 4F/Stage IV)



1. COUNTERWEIGHT
2. CAP SCREW
3. WASHER
4. DILLUTER
5. CAP SCREW
6. WASHER
7. END PIPE RETAINER BRACKET
8. END PIPE

Figure 7. Diluter Assembly (Tier 4F/Stage IV)



1. DILUTER
2. EXHAUST END PIPE
3. EXHAUST PIPE ASSEMBLY
4. AFTER TREATMENT SYSTEM SUBFRAME
5. HEAT SHIELD
6. INSULATION PIPE ASSEMBLY

Figure 8. Exhaust System High Mount (Tier 4F/Stage IV)

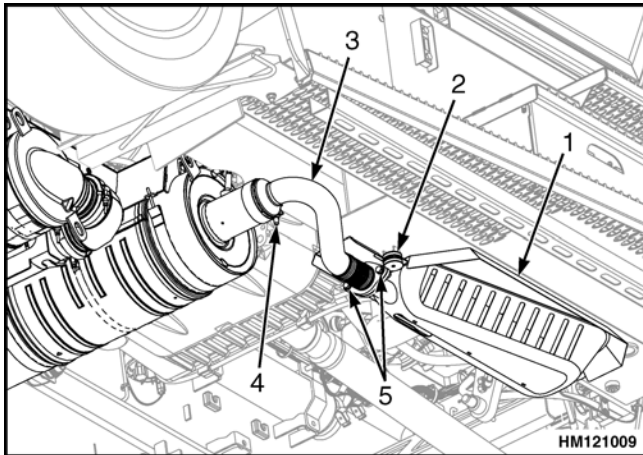
Exhaust Pipes and Diffuser Low Mount

Remove

1. Remove the clamp from the Selective Catalytic Reducer (SCR) outlet. See Figure 9.
2. Place a support under the diffuser.
3. Remove the cap screws and washers from the isolators.
4. Remove the diffuser and exhaust assembly out of the SCR outlet.

Install

1. Install the diffuser and exhaust assembly by inserting the exhaust assembly in the SCR outlet.
2. Install the isolators, washer and cap screws to the bottom side of the frame and tighten the cap screws to 35 N•m (26 lbf ft).
3. Tighten clamp to 54 - 81 N•m (40 - 60 lbf ft).



1. DIFFUSER
2. ISOLATOR MOUNTS
3. EXHAUST PIPE ASSEMBLY
4. CLAMP
5. CAP SCREW

**Figure 9. Exhaust Pipe Connections Low Mount
(Tier 4F/Stage IV)**

ENGINE AFTER TREATMENT (EAS) SYSTEM (TIER4F\STAGE IV)

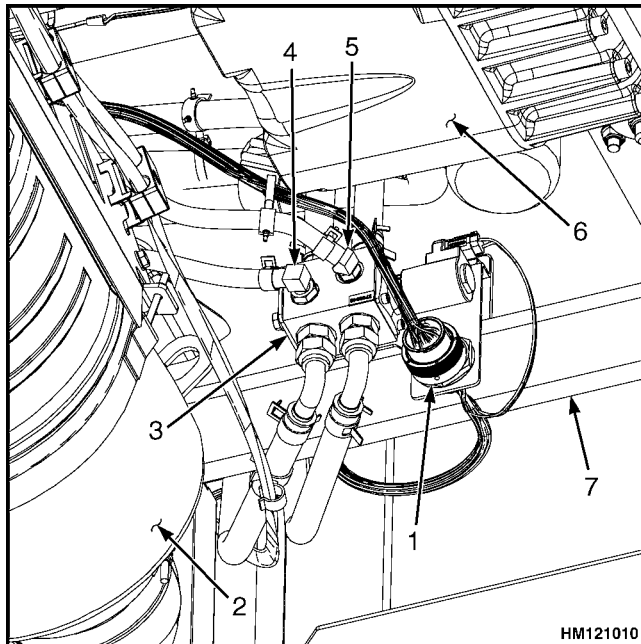
NOTE: Due to difficult accessibility of wire and hose connections it is advised to first remove the entire EAS assembly, followed by the replacement of individual EAS components. When replacing components of the EAS make sure to replace the exhaust seals and obtain the correct and final assembly position, before tightening clamps.

Preparation

1. Place the truck on a solid, level surface.
2. Lower the mast completely.
3. Apply the parking brake.
4. Switch the engine OFF.
5. Put the lift truck on blocks. See Periodic Maintenance 8000SRM1983.
6. Remove the V-band clamps from the flanges of the insulated exhaust pipe. See Figure 13, Item 8 and 9.
7. Remove the insulation pipe from the engine and remove the flange seals.
8. Remove the exhaust pipes.
 - a. For High Mount System, see Exhaust Pipes High Mount.
 - b. For Low Mount System, see Exhaust Pipes and Diffuser Low Mount.

Remove

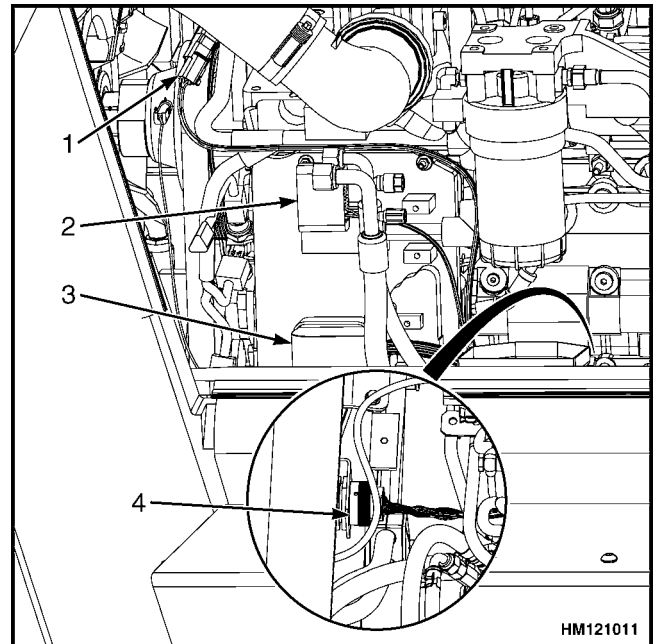
1. Disconnect the electrical connections from the After Treatment System, mounted on the frame, on the left-hand side:
 - a. Disconnect the ECM/EAS Harness connector from the Frame Harness connector. See Figure 10.
 - b. Disconnect the ECM/EAS Harness connectors from the engine. See Figure 11.
2. Put caps on the connectors to prevent from damage.



1. ECM/EAS HARNESS CONNECTOR
2. SELECTIVE CATALYTIC REDUCER (SCR)
3. COOLANT SOLENOID VALVE
4. INJECTOR COOLING SUPPLY HOSE
5. INJECTOR COOLING RETURN HOSE
6. TRANSMISSION
7. FRAME

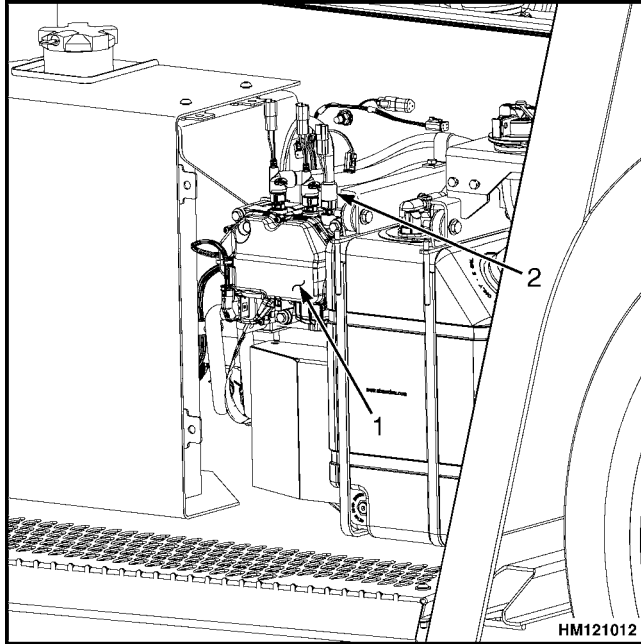
Figure 10. Coolant Solenoid Valve Connections (Tier 4F/Stage IV)

3. Disconnect the cooling hoses from the Coolant Solenoid valve.
4. Put plugs on the hoses and caps on the hose connections.
5. Disconnect the DEF pressure hose from the DEF pump. See Figure 12.
6. Use a forklift truck with a pallet to support the after treatment system.
7. Remove the cap screws that retain the after treatment system to the frame.
8. Gently lower the pallet with the after treatment system and move it away from the truck.



1. CPS133 FAN CLUTCH
2. CRP12 ECM CROSS OVER
3. CRP03 ECM TIER 4
4. CPP03 ENGINE ECM SIGNALS

Figure 11. ECM/EAS Harness Connectors (Tier 4F/Stage IV)



1. DEF PUMP
2. DEF PRESSURE HOSE TO INJECTOR

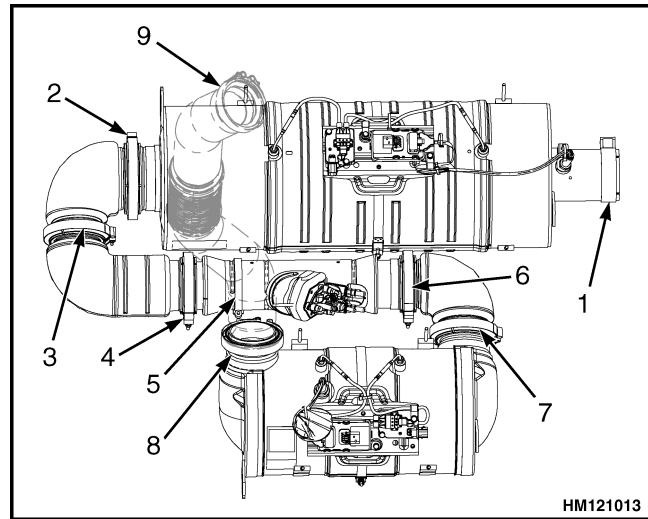
Figure 12. DEF Supply Hose (Tier 4F/Stage IV)

Install

1. Move the pallet with the after treatment system under the truck.
2. Install the cap screws that retain the after treatment system to the frame.
3. Re-connect the hoses and electrical connections.
4. Install a new seal and move the flanges of the insulated exhaust pipe and the Diesel Oxidation Catalyst (DOC) against each other. See Figure 13, item 8 and 9.
5. Tighten the V-band clamp to 13.5 ± 1.5 N•m (10 ± 1 lbf ft).
6. Install the flange seals and install the insulation pipe to the engine.
7. Tighten the V-band clamp to 7 ± 1 N•m (5 ± 0.7 lbf ft).
8. Install the exhaust system.
 - a. For High Mount System, see Exhaust Pipes High Mount.
 - b. For Low Mount System, see Exhaust Pipes and Diffuser Low Mount.

Exhaust Seal Rings

In the high pressure part of the exhaust system, the tubes and pipes are sealed by means of metal seal rings. These seal rings deform when V-band clamps are tightened and will stick to one of the exhaust components at disassembly. Remove the used seal and replace by a new one at re-assembly. Pay attention to the different sizes and shapes of seals at the different locations. Pay attention to the different torque value of the V-band clamp at the connection with the turbo. See Figure 13.



1. BAND CLAMP
2. V-BAND CLAMP AND SEAL RING 5" – SPHERICAL
3. V-BAND CLAMP AND SEAL RING 4" – SPHERICAL
4. V-BAND CLAMP AND SEAL RING 4" – SPHERICAL
5. BAND CLAMP
6. V-BAND CLAMP AND SEAL RING 4" – SPHERICAL
7. V-BAND CLAMP AND SEAL RING 4" – SPHERICAL
8. V-BAND CLAMP AND SEAL RING 4" – STANDARD
9. V-BAND CLAMP AND SEAL RING 3.5" – 70°

Figure 13. Exhaust Seal Rings

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