

**Magnum™ 180 PST**  
**Magnum™ 200 PST**  
**Magnum™ 220 PST**  
**Powershift Transmission (PST)**  
**Tractor**  
*PIN ZFRH05001 and above*

**SERVICE MANUAL**

**Part number 48015888**

1<sup>st</sup> edition English

July 2016

**CASE IH**  
AGRICULTURE



## **SERVICE MANUAL**

**Magnum™ 180 PST TIER 4B [ZFRH05001 - ]**

**Magnum™ 200 PST TIER 4B [ZFRH05001 - ]**

**Magnum™ 220 PST TIER 4B [ZFRH05001 - ]**

# Link Product / Engine

<b>Product</b>	<b>Market Product</b>	<b>Engine</b>
Magnum™ 180 PST TIER 4B [ZFRH05001 - ]	Australia New Zealand	F4HFE613K*B002
Magnum™ 180 PST TIER 4B [ZFRH05001 - ]	North America	F4HFE613K*B002
Magnum™ 200 PST TIER 4B [ZFRH05001 - ]	Australia New Zealand	F4HFE613J*B005
Magnum™ 200 PST TIER 4B [ZFRH05001 - ]	North America	F4HFE613J*B005
Magnum™ 220 PST TIER 4B [ZFRH05001 - ]	North America	F4HFE613H*B003
Magnum™ 220 PST TIER 4B [ZFRH05001 - ]	Australia New Zealand	F4HFE613H*B003

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## INTRODUCTION

## Safety rules


### Personal safety





This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual and on machine decals, you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

 **DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury. The color associated with DANGER is RED.

 **WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury. The color associated with WARNING is ORANGE.

 **CAUTION**, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. The color associated with CAUTION is YELLOW.

### **FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.**

### Machine safety

**NOTICE:** Notice indicates a situation which, if not avoided, could result in machine or property damage. The color associated with Notice is BLUE.

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

### Information

**NOTE:** Note indicates additional information which clarifies steps, procedures, or other information in this manual.

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

## Safety rules - General maintenance safety

### General maintenance safety

Keep the area used for servicing the machine clean and dry. Clean up spilled fluids.

Service the machine on a firm, level surface.

Install guards and shields after you service the machine.

Close all access doors and install all panels after servicing the machine.

Do not attempt to clean, lubricate, clear obstructions, or make adjustments to the machine while it is in motion or while the engine is running.

Always make sure that working area is clear of tools, parts, other persons and pets before you start operating the machine.

Unsupported hydraulic cylinders can lose pressure and drop the equipment, causing a crushing hazard. Do not leave equipment in a raised position while parked or during service, unless the equipment is securely supported.

Jack or lift the machine only at jack or lift points indicated in this manual.

Incorrect towing procedures can cause accidents. When you tow a disabled machine follow the procedure in this manual. Use only rigid tow bars.

Stop the engine, remove the key, and relieve pressure before you connect or disconnect fluid lines.

Stop the engine and remove the key before you connect or disconnect electrical connections.

Scalding can result from incorrect removal of coolant caps. Cooling systems operate under pressure. Hot coolant can spray out if you remove a cap while the system is hot. Allow the system to cool before you remove the cap. When you remove the cap, turn it slowly to allow pressure to escape before you completely remove the cap.

Replace damaged or worn tubes, hoses, electrical wiring, etc.

The engine, transmission, exhaust components, and hydraulic lines may become hot during operation. Take care when you service such components. Allow surfaces to cool before you handle or disconnect hot components. Wear protective equipment when appropriate.

When welding, follow the instructions in the manual. Always disconnect the battery before you weld on the machine. Always wash your hands after you handle battery components.



## **SERVICE MANUAL**

### **Engine**

**Magnum™ 180 PST TIER 4B [ZFRH05001 - ]**

**Magnum™ 200 PST TIER 4B [ZFRH05001 - ]**

**Magnum™ 220 PST TIER 4B [ZFRH05001 - ]**

## Engine - Remove

**Prior operation:**

**Battery - Disconnect (55.302)**

**Prior operation:**

**Air intake lines Air scoop - Remove (10.202)**

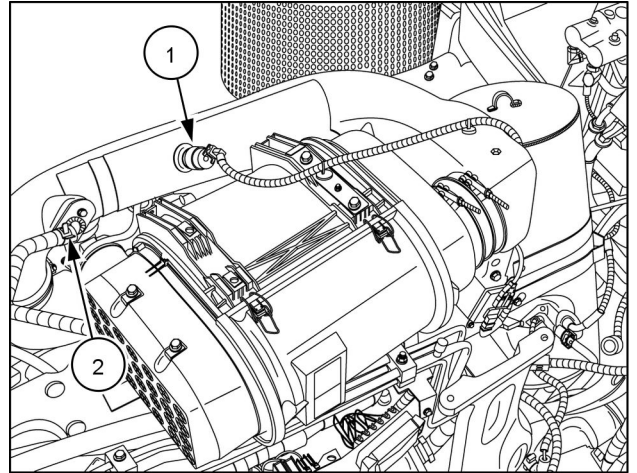
**Prior operation:**

**Engine cooling system - Remove (10.400)**

**Prior operation:**

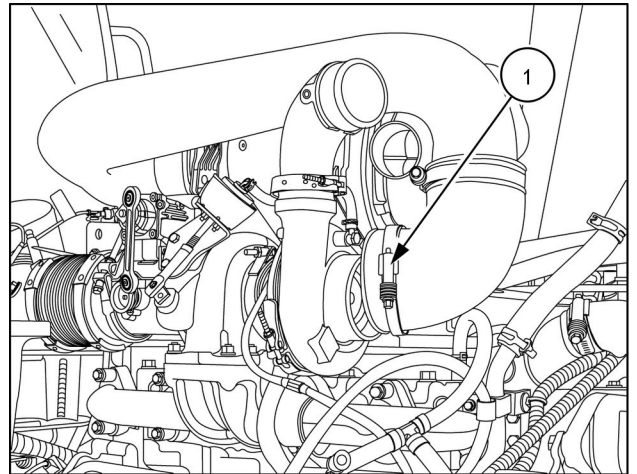
**Air conditioning - Recover - Refrigerant (50.200)**

1. Disconnect the air sensor connector (1) and the crankcase vent hose (2) from the air cleaner outlet tube.



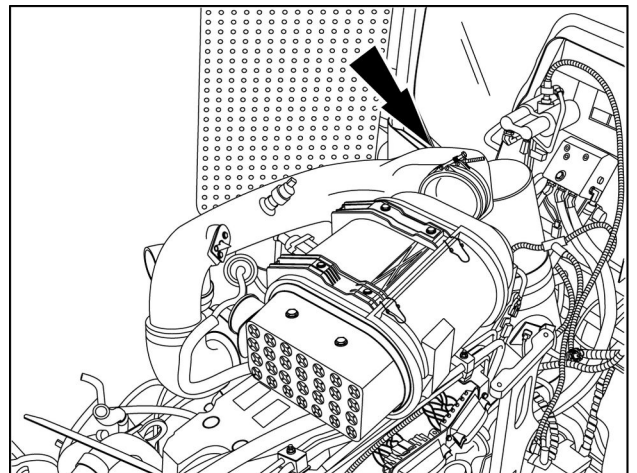
RAIL13TR01577AA 1

2. Disengage the clamp and remove the air cleaner outlet hose (1) from the turbocharger.



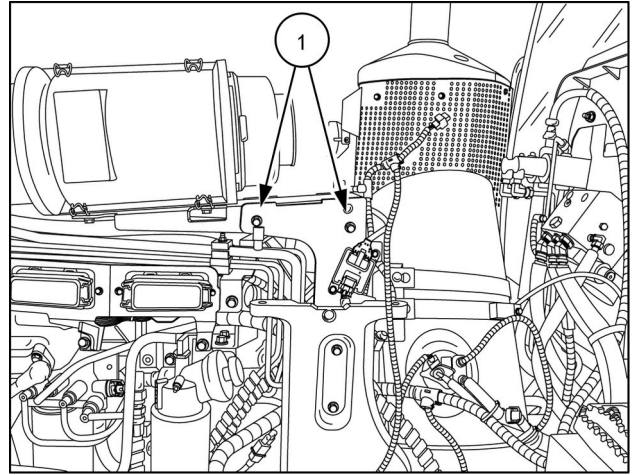
RAIL13TR01582AA 2

3. Disengage the clamp at the air cleaner and remove the air outlet tube.



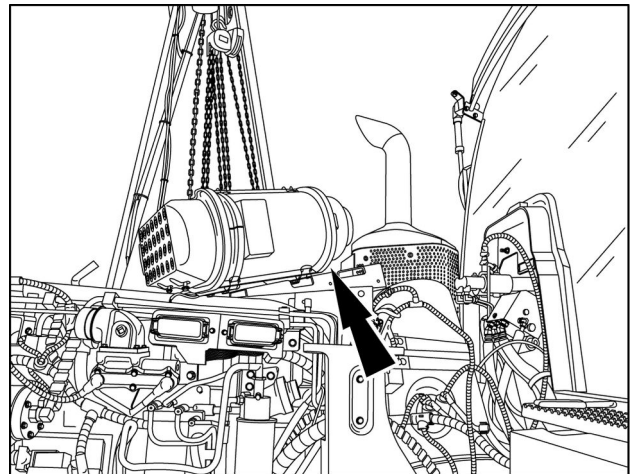
RAIL13TR01583AA 3

4. Remove the air cleaner mounting bolts (1) from each side of the air cleaner bracket (left side shown).



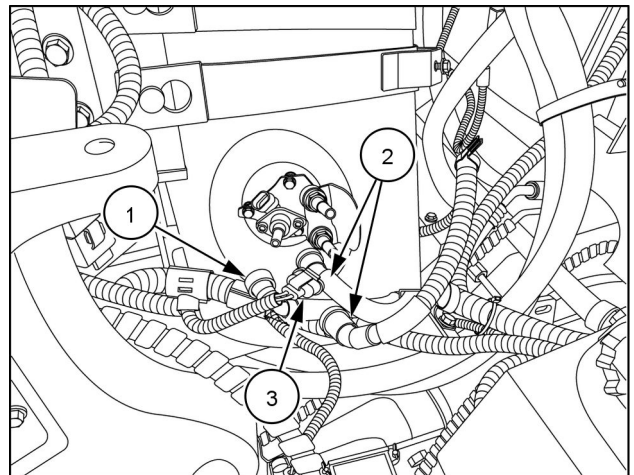
RAIL13TR01585AA 4

5. Remove the air cleaner along with the mounting bracket.



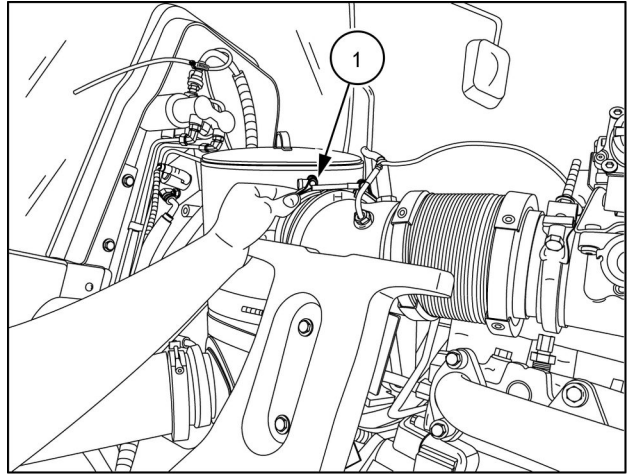
RAIL13TR01587AA 5

6. Disconnect the Diesel Exhaust Fluid (DEF)/AdBlue® line (1), the coolant supply and return lines (2) and the electrical connector (3) from the dosing module. Squeeze the tabs together and lift the hose straight off of the fitting.



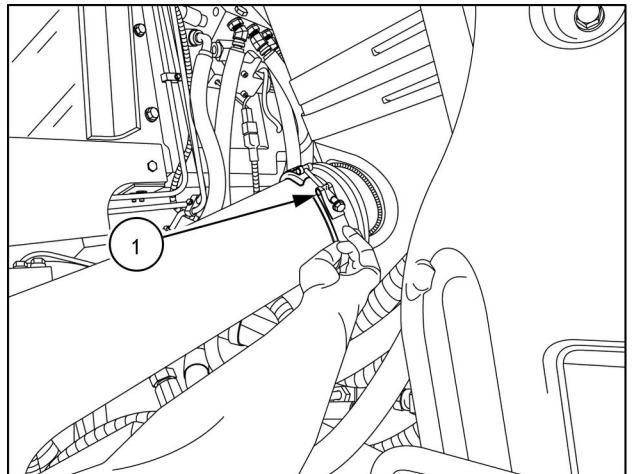
RAIL13TR01586AA 6

7. Disengage the clamp **(1)** from the input side of the Diesel Exhaust Catalyst (DOC).



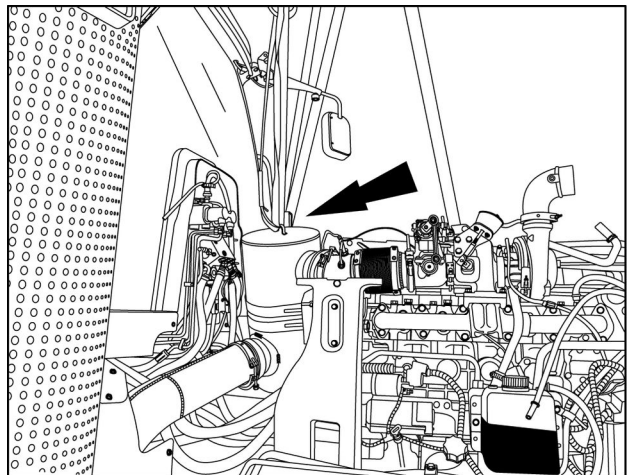
RAIL13TR01589AA 7

8. Disengage the clamp **(1)** from the output side of the DOC.



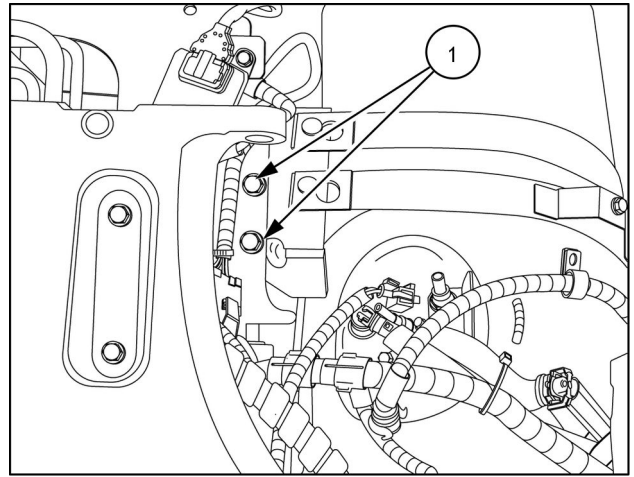
RAIL13TR01590AA 8

9. Using proper lifting equipment, secure a strap to the lifting bracket on the DOC.



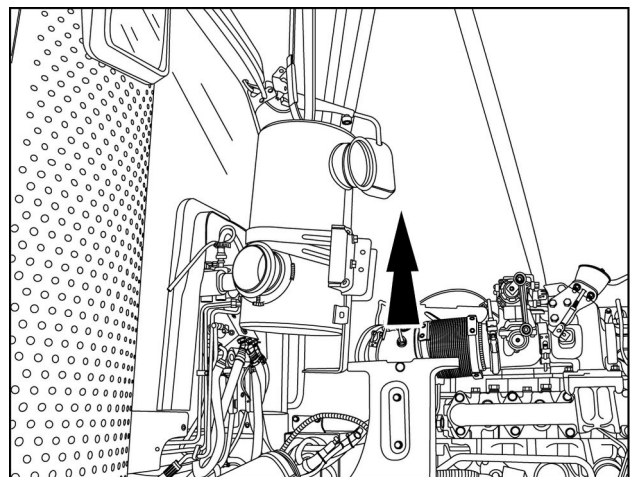
RAIL13TR01592AA 9

10. With tension on the lifting strap, remove the mounting bracket bolts (1) for the DOC from both sides of the bracket (left hand side is shown).



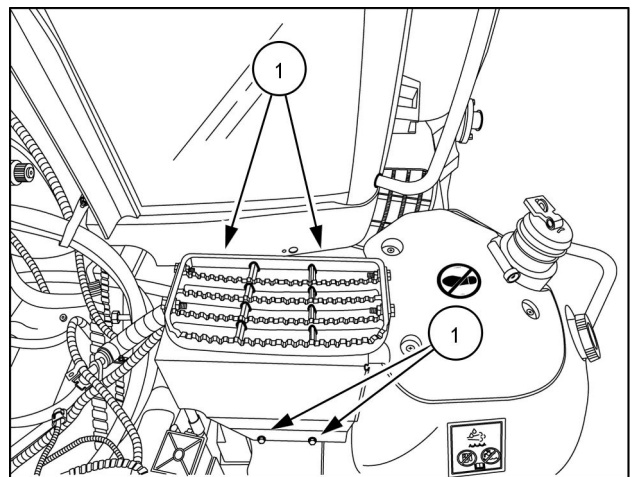
RAIL13TR01593AA 10

11. Raise the DOC and remove it from the tractor.



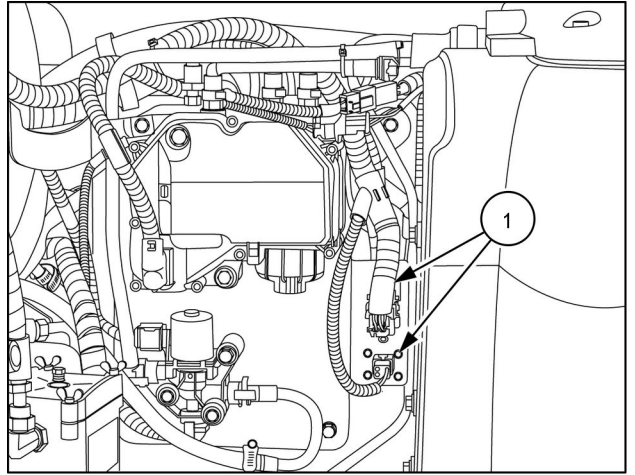
RAIL13TR01596AA 11

12. Remove the four mounting bolts (1) for the window step. Remove the step.



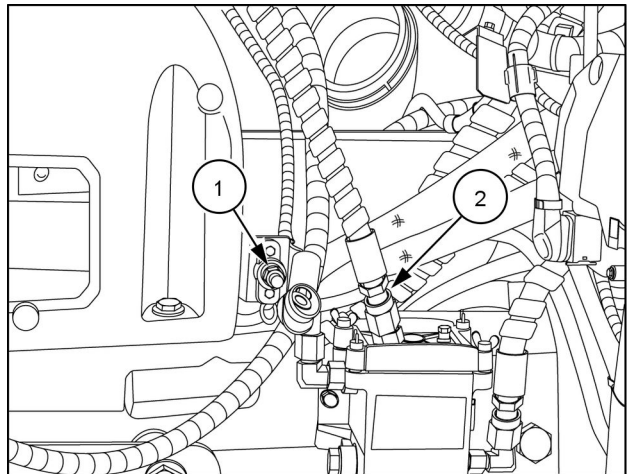
RAIL13TR01594AA 12

13. Cut the tie straps on the DEF/AdBlue® system harness. Disconnect the two harness connectors (1).



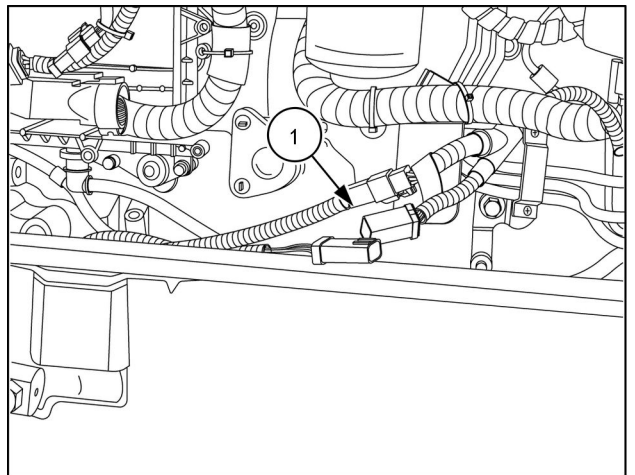
RAIL13TR01597AA 13

14. Disconnect the 12 V auxiliary connector (1) and the inlet fuel line from the fuel separator (2).



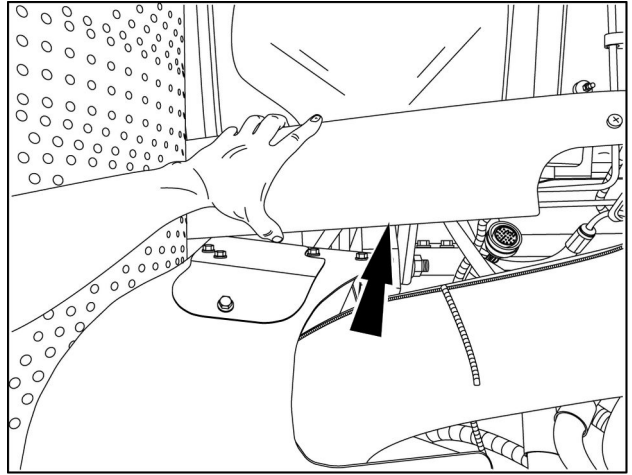
RAIL13TR01603AA 14

15. Disconnect the two connectors (1) for the front axle harness.



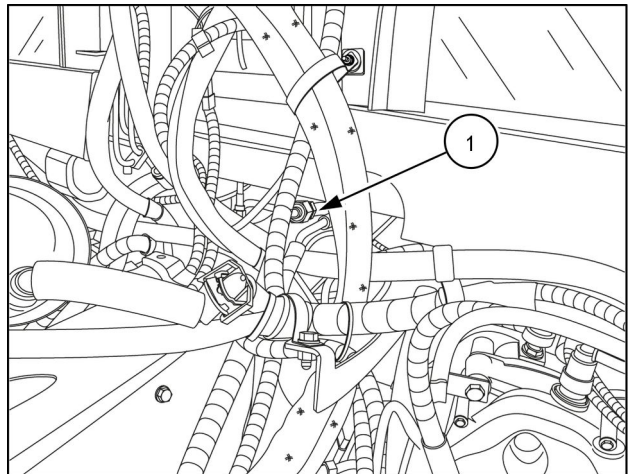
RAIL13TR01625AA 15

16. Remove the cab trim panels from both sides of the cab, (right hand side shown).



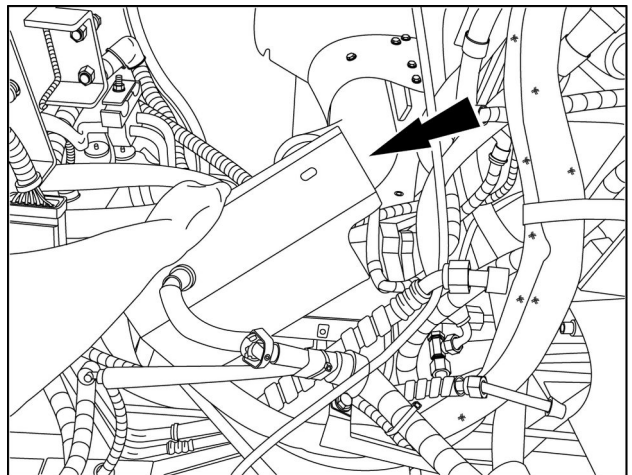
RAIL13TR01611AA 16

17. Disconnect and cap the high and low pressure air conditioning lines (1) located under the front of the cab.



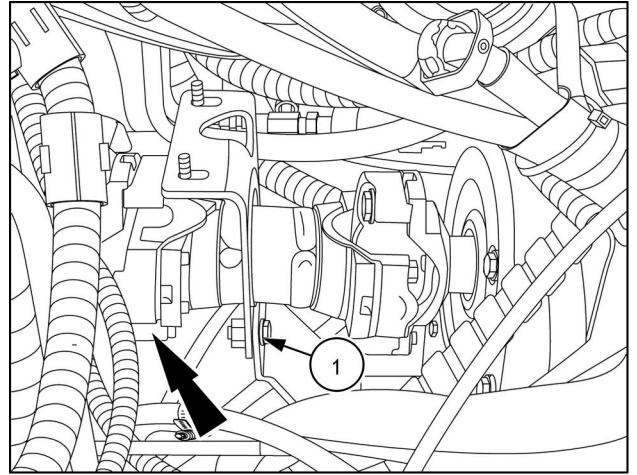
RAIL13TR01599AA 17

18. Remove the cover plate from the driveshaft (left hand side shown).



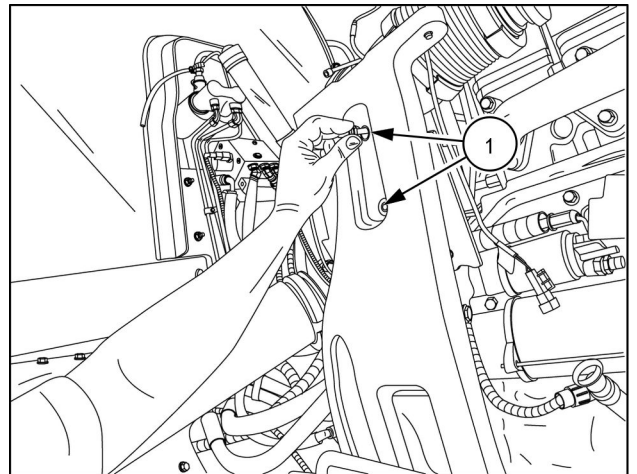
RAIL13TR01600AA 18

19. Remove the bolts (1) for the mounting bracket for the driveshaft cover plate. Disconnect the driveshaft from the engine.



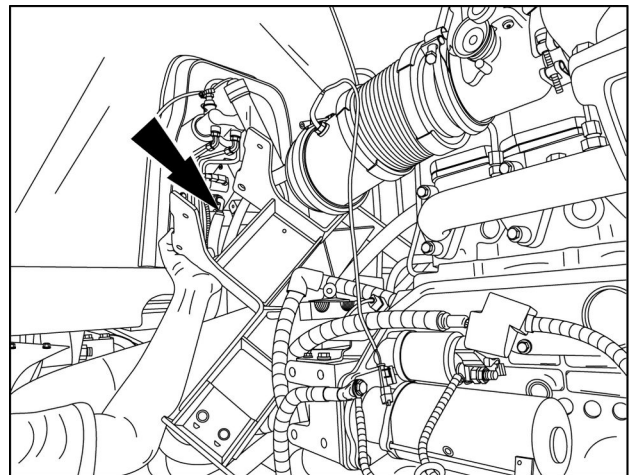
RAIL13TR01602AA 19

20. Remove the bolts (1) for the mounting bracket for the air cleaner/DOC from the hood support bracket.
21. Remove the mounting bolts (left hand side shown) which secure the hood support bracket to front frame and remove the bracket. Repeat for right hand side.



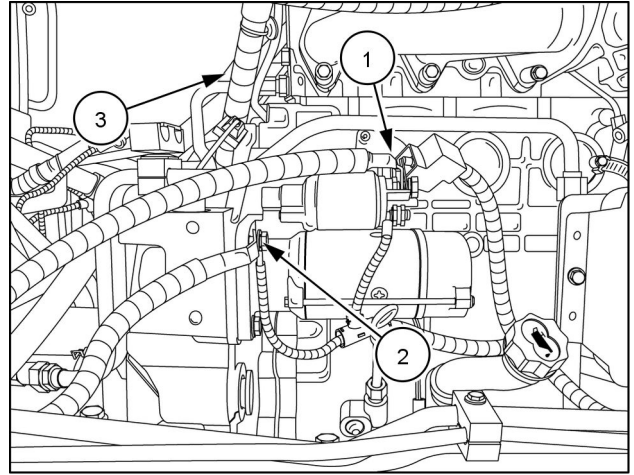
RAIL13TR01608AA 20

22. Remove the air cleaner/DOC bracket.



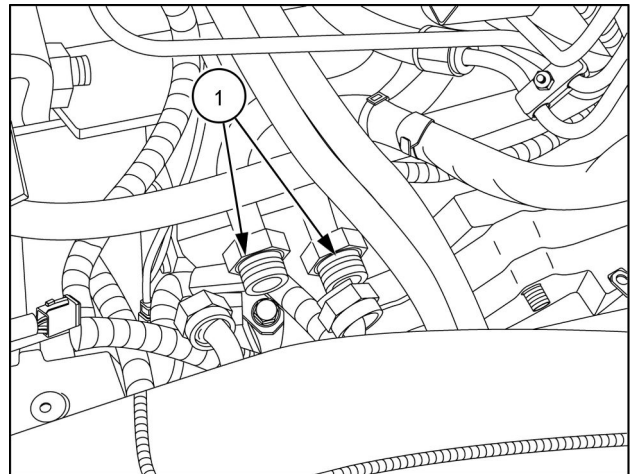
RAIL13TR01609AA 21

23. Disconnect the starter positive **(1)** and ground **(2)** cables.
24. Disconnect the chassis to engine harness connector **(3)**.



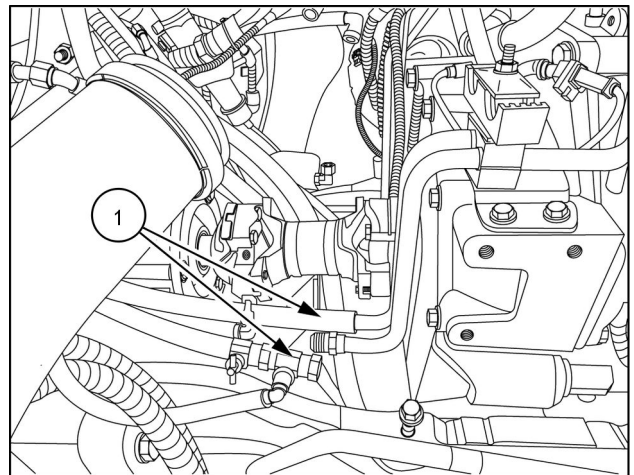
RAIL13TR01613AA 22

25. Disconnect the two hydraulic oil cooler lines **(1)**. Cap or plug all fittings and lines.



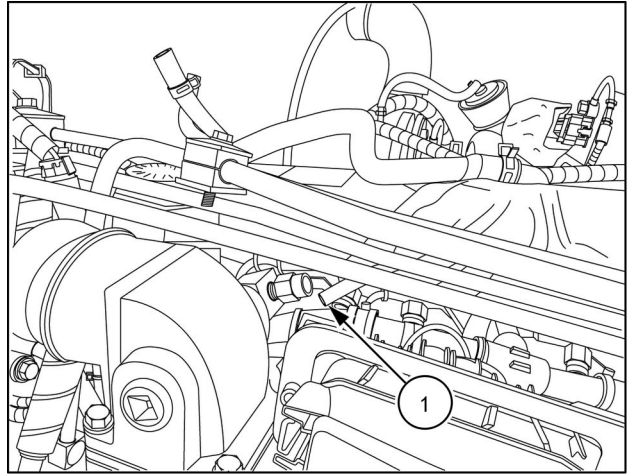
RAIL13TR01615AA 23

26. Disconnect the two coolant hoses **(1)**.



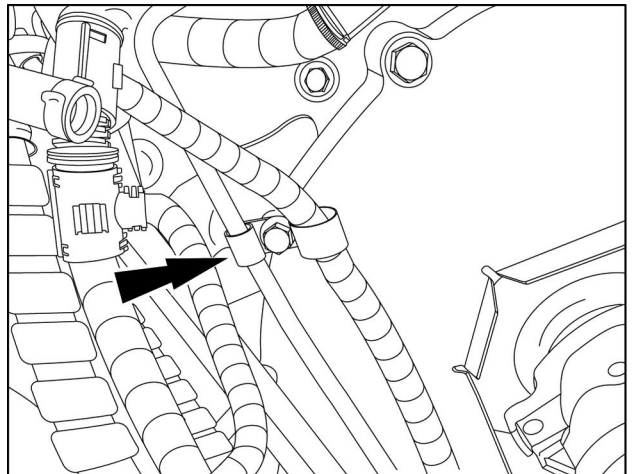
RAIL13TR01616AA 24

27. Disconnect the vacuum line (1) from the air intake collector elbow.



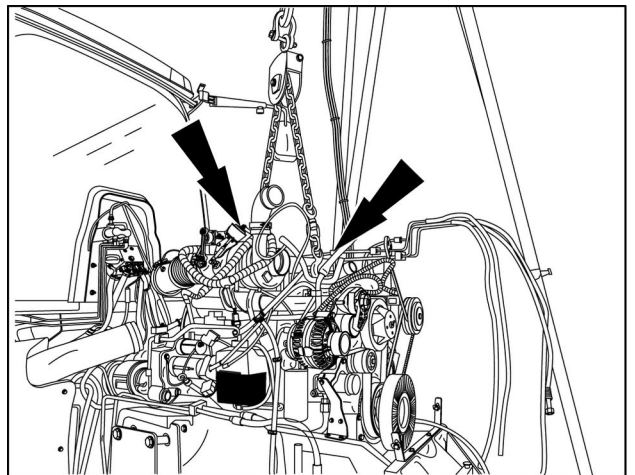
RAIL13TR01624AA 25

28. Disengage the P-clamp for the vacuum line from the fly wheel housing.



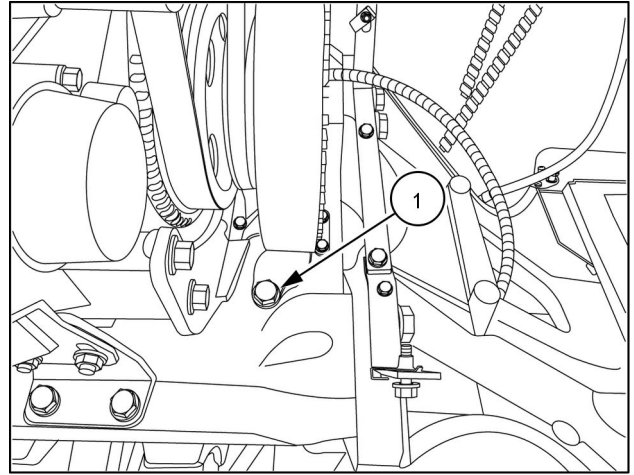
RAIL13TR01621AA 26

29. Attach appropriate lifting equipment to the front and rear engine lifting brackets.



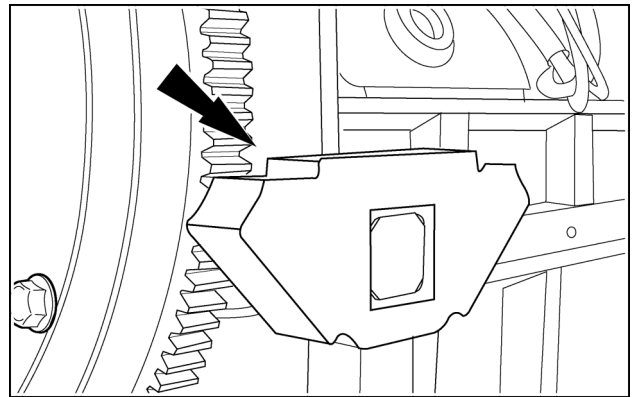
RAIL13TR01622AA 27

30. Remove the two bolts (1) from the isolation clamp for the front engine mount (right hand side shown).



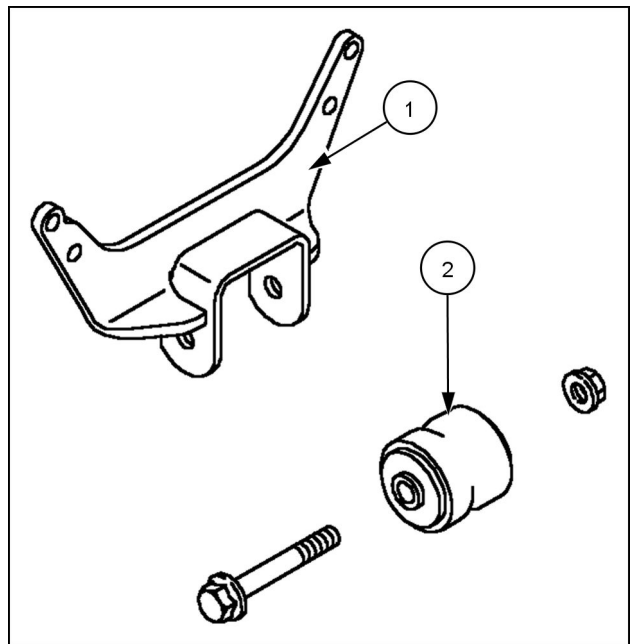
RAIL13TR01626AA 28

31. Raise the engine from the frame. Check that all harnesses and hoses are disconnected. Remove the engine from the frame.
32. Inspect the rear engine mounts for damage and/or wear. Replace as necessary.



RCPH07CCH166AAB 29

33. Inspect the front engine support (1) and isolation mount (2) for damage/and or wear. Replace as necessary.



RCPH07CCH040BAB 30

34. Refer to the engine repair manual for information on supporting the engine during repair.

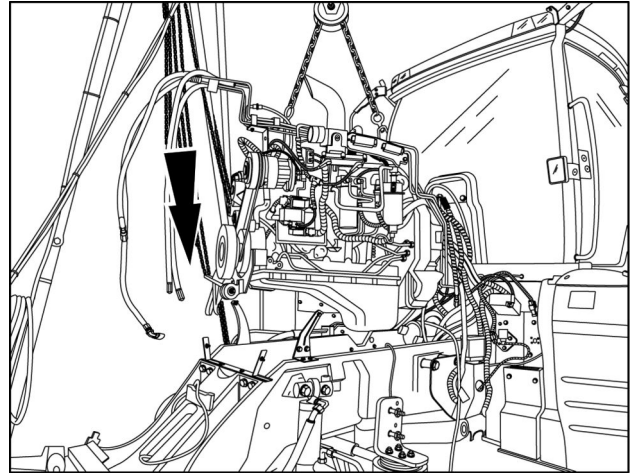
**Next operation:**

## Engine - Install

**Prior operation:**  
**Engine - Remove (10.001)**

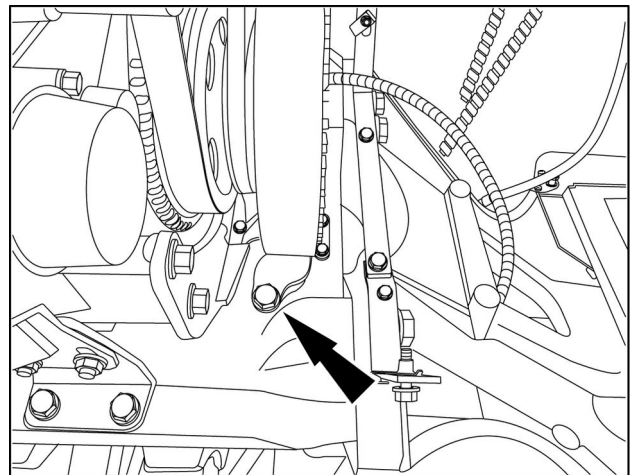
**NOTICE:** Check that all fittings are clean and free of foreign matter during assembly. Use new O-rings and lubricate them with petroleum jelly prior to installation.

1. Properly support the engine and lower the engine into the front frame.



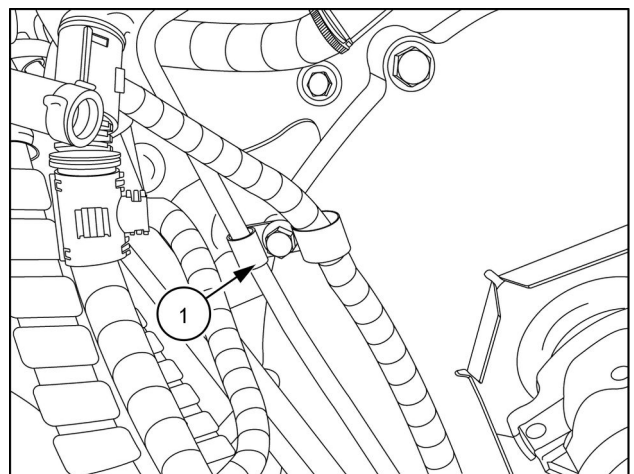
RAIL13TR01627AA 1

2. Retain tension on the lifting equipment to align the front isolation mount clamping bolts. Install the clamp and bolts. Remove the tension on the lifting equipment.
3. Torque the engine mounting bolts to **59 - 106 N·m (44 - 78 lb ft)**.
4. Remove the lifting equipment.



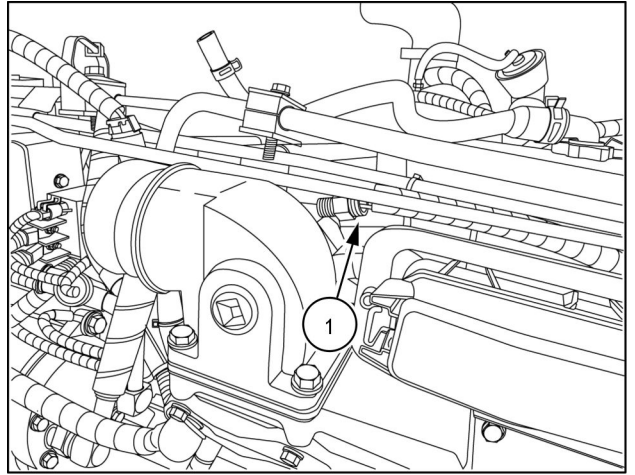
RAIL13TR01626AA 2

5. Install the P-clamp (1) for the vacuum line on the fly-wheel housing.



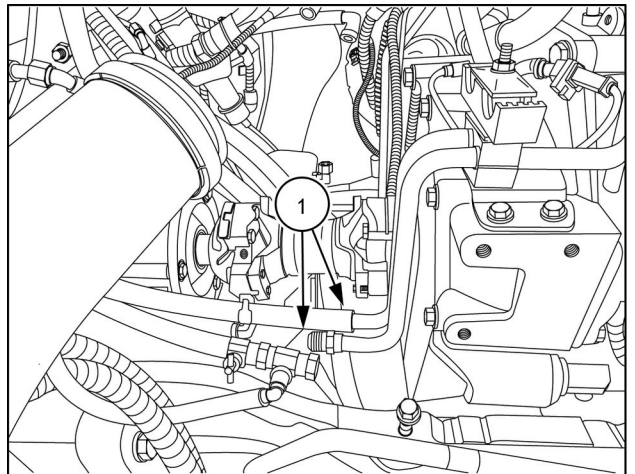
RAIL13TR01621AA 3

6. Connect the vacuum line **(1)** for the air intake collector elbow.



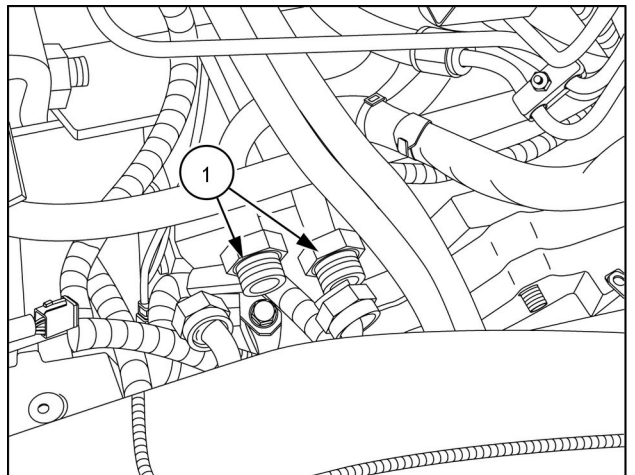
RAIL13TR01620AA 4

7. Connect the two coolant lines **(1)**



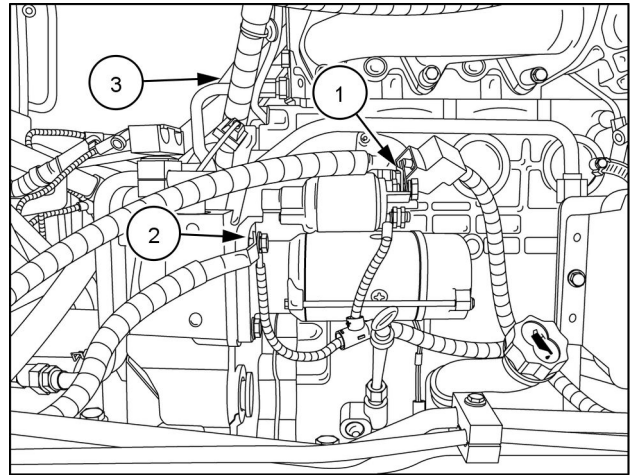
RAIL13TR01616AA 5

8. Connect the two hydraulic oil cooler lines **(1)** using new O-rings.



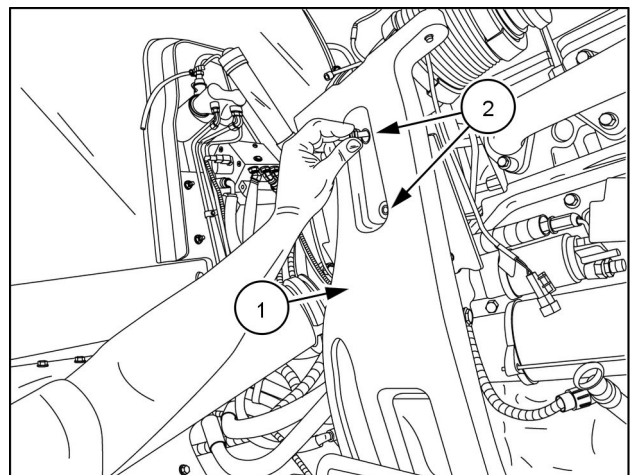
RAIL13TR01615AA 6

9. Connect the positive starter cable (1) and the ground cable (2). Reconnect the chassis to engine harness connector (3).



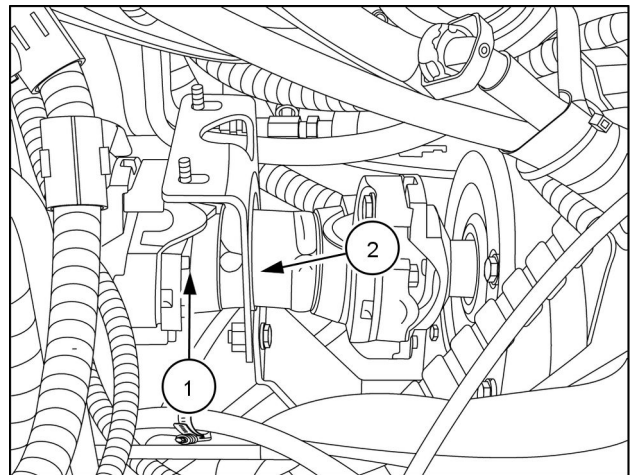
RAIL13TR01613AA 7

10. Install the hood support brackets (1) and secure the brackets to the front frame using the bolts previously removed.
11. Torque the bolts to **125 - 150 N·m (92 - 111 lb ft)**.
12. Reinstall the mounting bracket for the air cleaner/ Diesel Oxidation Catalyst (DOC). Secure the bracket to the hood support bracket with the bolts (2) previously removed.



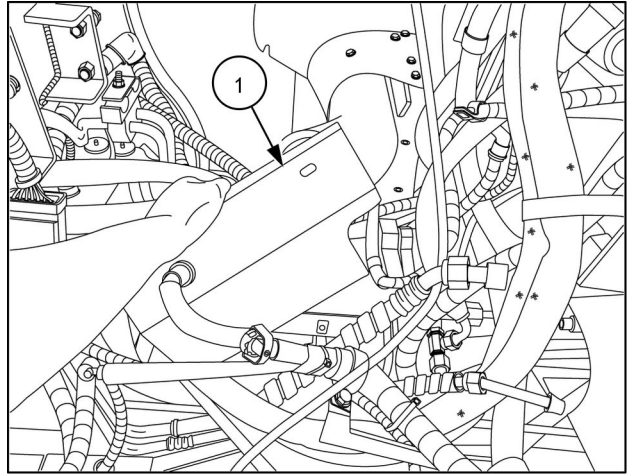
RAIL13TR01608AA 8

13. Align the yolk for the driveshaft with the flywheel adaptor plate, and install the bolts (1).
14. Torque the **101 - 113 N·m (75 - 83 lb ft)**.
15. Reinstall the mounting bracket (2) for the driveshaft cover plate, and secure with the bolts previously removed.



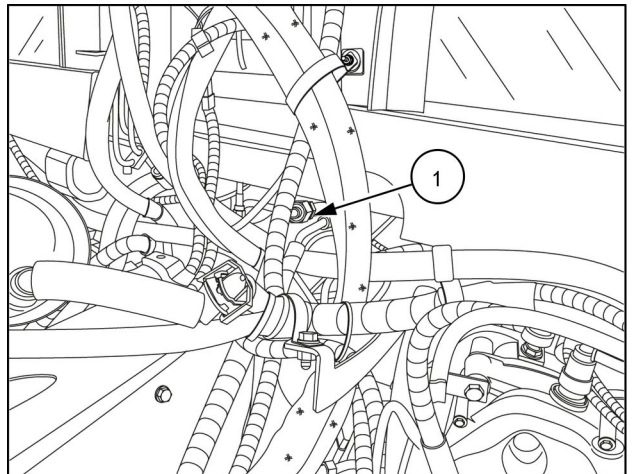
RAIL13TR01602AA 9

16. Reinstall the driveshaft cover plate and secure with the bolts previously removed.



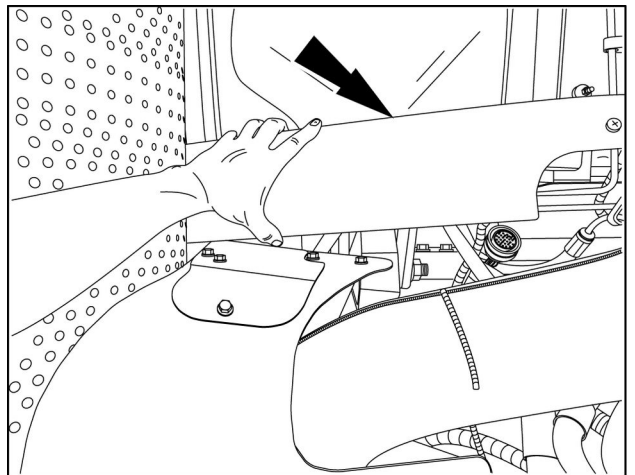
RAIL13TR01600AA 10

17. Coat new O-rings for the air conditioning system with mineral oil, and install the O-rings on the high and low pressure fittings. Connect the high and low pressure lines (1).



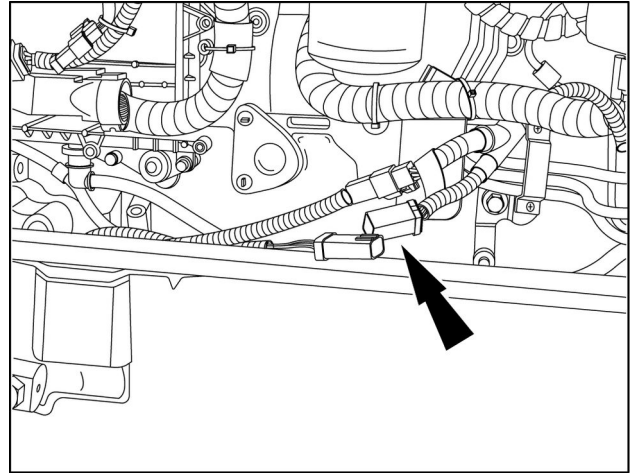
RAIL13TR01599AA 11

18. Reinstall the cab trim panels.



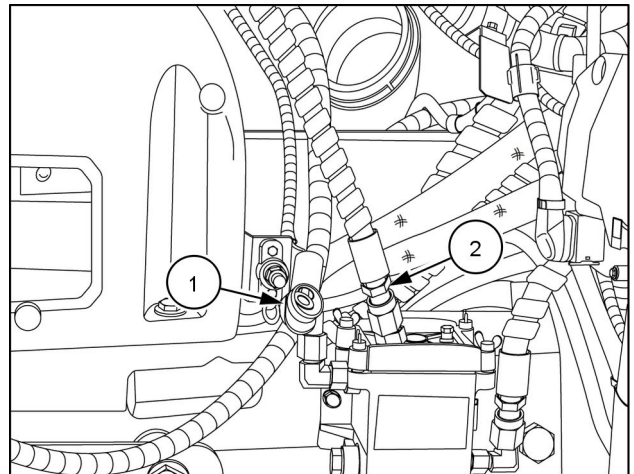
RAIL13TR01611AA 12

19. Connect the front axle harness connectors.



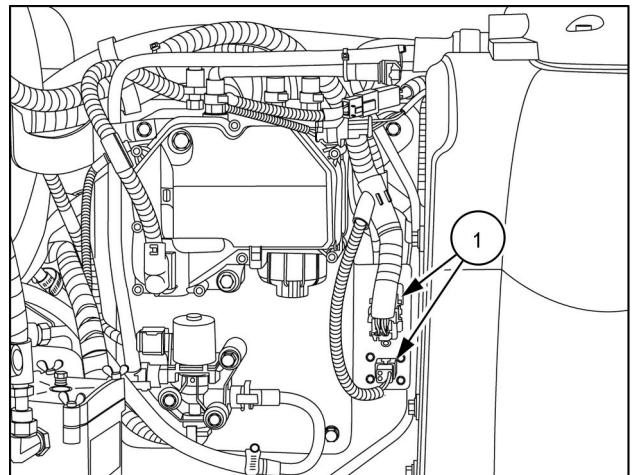
RAIL13TR01625AA 13

20. Connect the **12 V** auxiliary connector (1) and the fuel inlet line to the fuel separator (2).



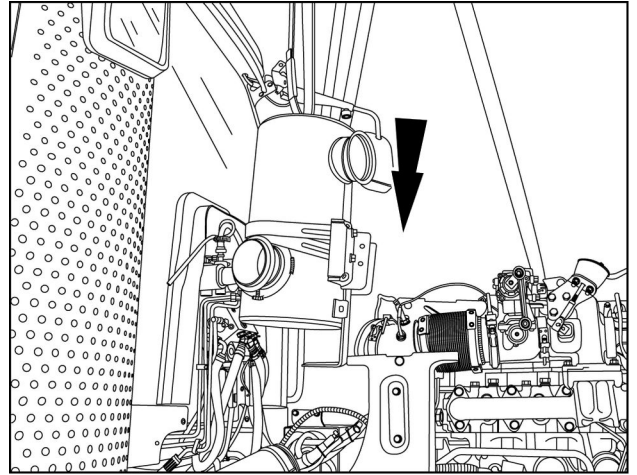
RAIL13TR01603AA 14

21. Connect the connectors (1) for the Selective Catalytic Reduction (SCR) system.



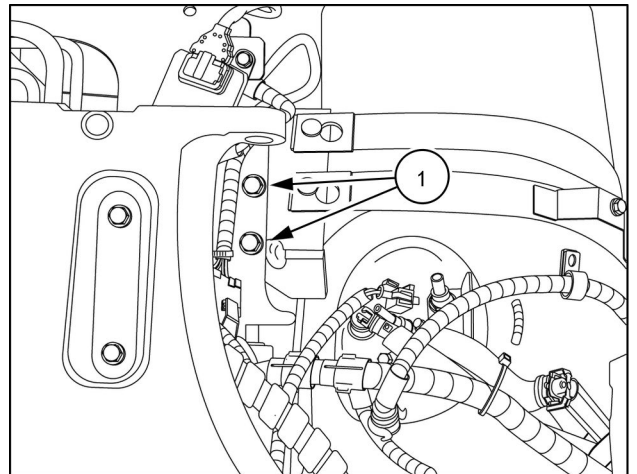
RAIL13TR01597AA 15

22. Using proper lifting equipment, lower the DOC into place.



RAIL13TR01596AA 16

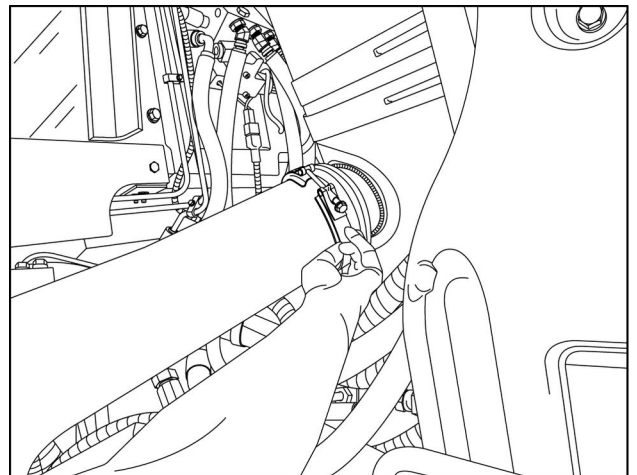
23. Secure the DOC mounting bracket with the bolts (1) previously removed (left hand side shown).



RAIL13TR01593AA 17

24. Connect the outlet pipe to the DOC, and secure with the clamp previously removed.

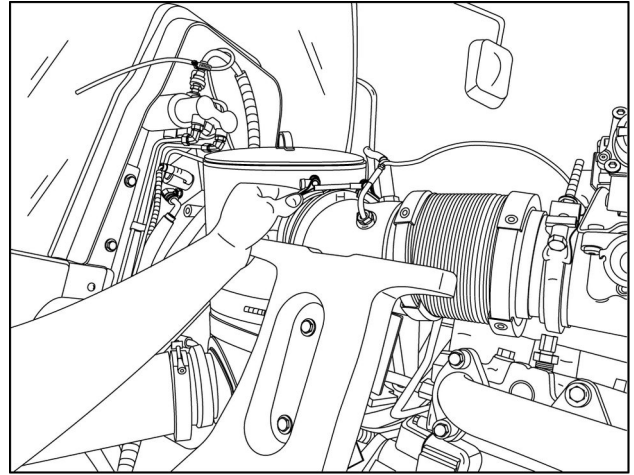
**NOTE:** The mounting straps around the DOC may need to be loosened to line up the outlet and inlet pipes.



RAIL13TR01590AA 18

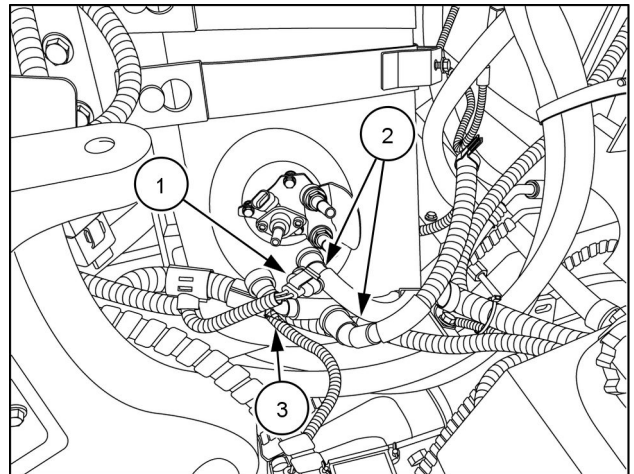
25. Connect the inlet pipe to the DOC, and secure with the clamp previously removed.

**NOTE:** If the mounting straps were loosened, make sure to tighten the straps after the inlet and outlet pipes are secure.



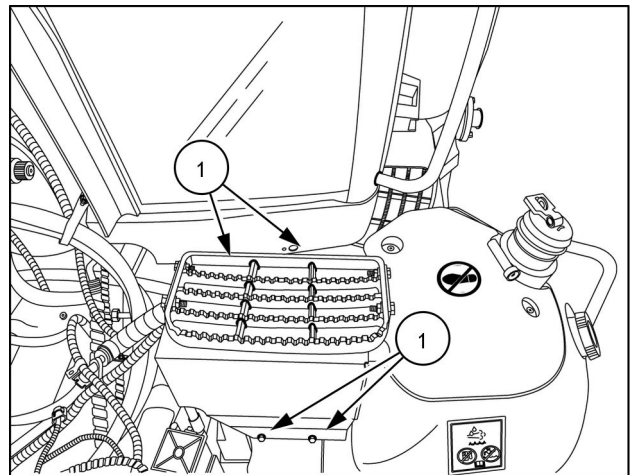
RAIL13TR01589AA 19

26. Connect the electrical connector (1) and the coolant lines (2) to the dosing module. Connect the Diesel Exhaust Fluid (DEF)/AdBlue® line (3) to the dosing module.



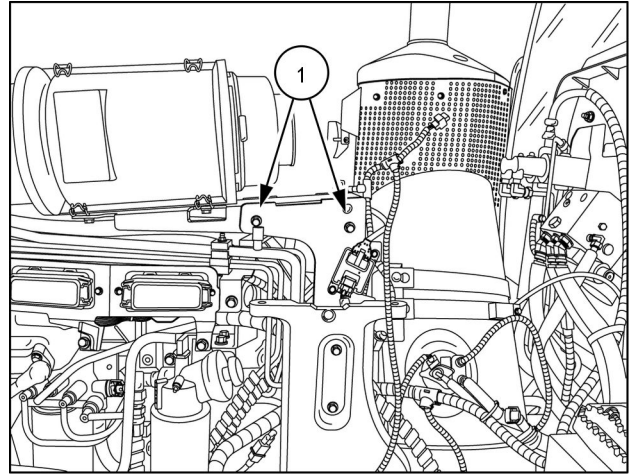
RAIL13TR01586AA 20

27. Install the window step and secure the step with the bolts (1) previously removed.



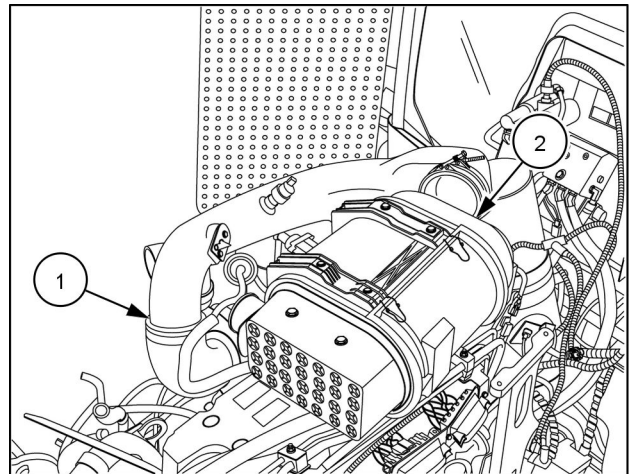
RAIL13TR01594AA 21

28. Reinstall the air cleaner along with its mounting bracket. Secure the bracket to the DOC bracket with the bolts (1) previously removed. Left hand side is shown, repeat for right hand side.



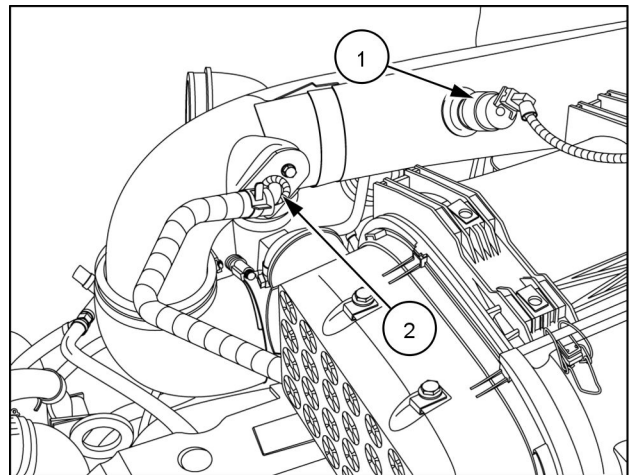
RAIL13TR01585AA 22

29. Connect the air cleaner outlet tube (1) between the turbocharger and the air cleaner (2).



RAIL13TR01583AA 23

30. Connect the air sensor connector (1) and the crankcase vent hose (2) to the air cleaner outlet tube.



RAIL13TR01578AA 24

31. Check that all connectors and hoses are connected. Use tie straps to secure loose harnesses and hoses as required.

**Next operation:**  
**Engine cooling system - Install (10.400)**  
**Next operation:**  
**Engine cooling system - Filling (10.400)**  
**Next operation:**  
**Air intake lines Air scoop - Install (10.202)**  
**Next operation:**

## Fuel tank - Remove

### Prior operation:

### Diesel Exhaust Fluid (DEF)/AdBlue® tank - Remove (10.500)

1. **⚠ WARNING**

Fuel vapors are explosive and flammable. Do not smoke while handling fuel. Keep fuel away from flames or sparks. Shut off engine and remove key before servicing. Always work in a well-ventilated area. Clean up spilled fuel immediately.

Failure to comply could result in death or serious injury.

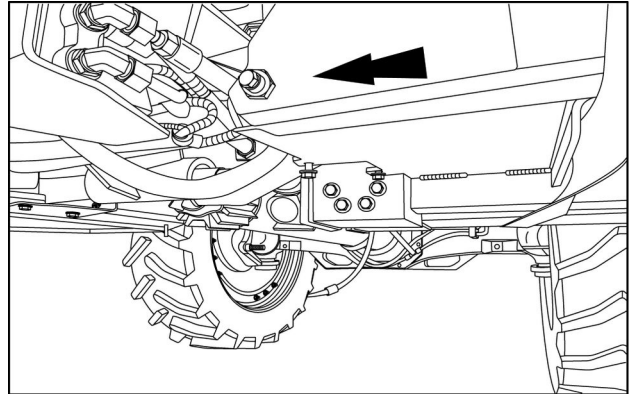
W0904A

At the rear of the fuel tank, place a clean suitable container under the drain and drain the tank. Repeat for left hand side tank.

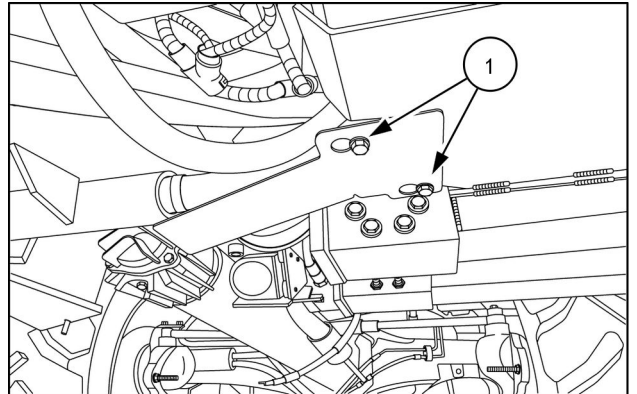
**NOTE:** Both tanks need to be drained even if only one tank is being removed.

2. Loosen the bolts (1) securing the cover plate for the crossover tube under the fuel tanks. Remove the cover plates from the tank that is being removed.

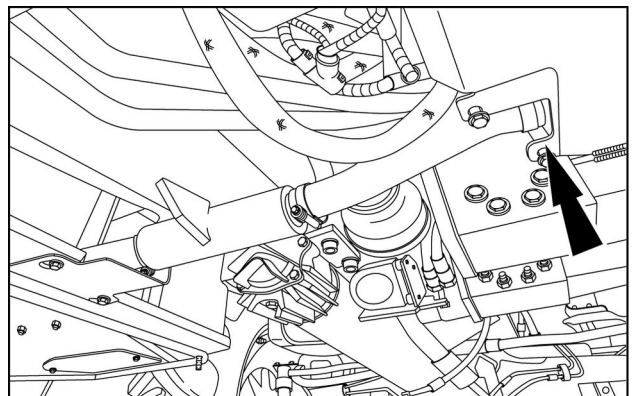
3. Disengage the hose clamps, and disconnect the crossover hoses from the tank.



RAIL13TR01800AA 1



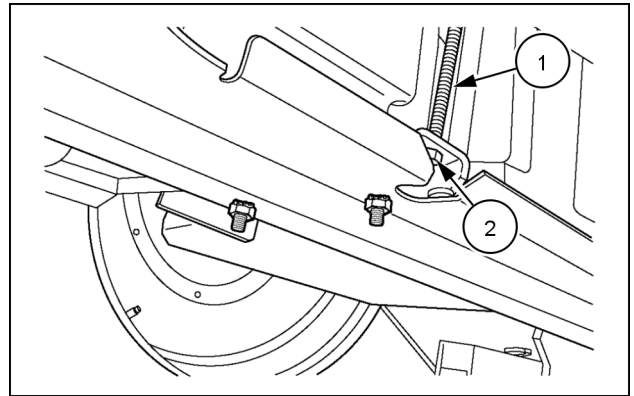
RAIL13TR01795AA 2



RAIL13TR01796AA 3

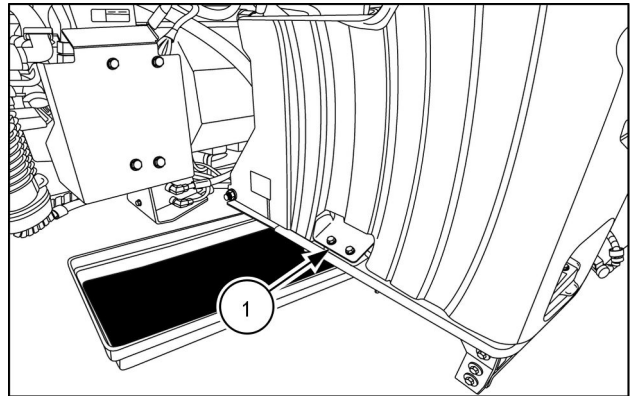
**For left hand side tank**

4. At the tank holding strap (1), remove the adjustment nut (2).



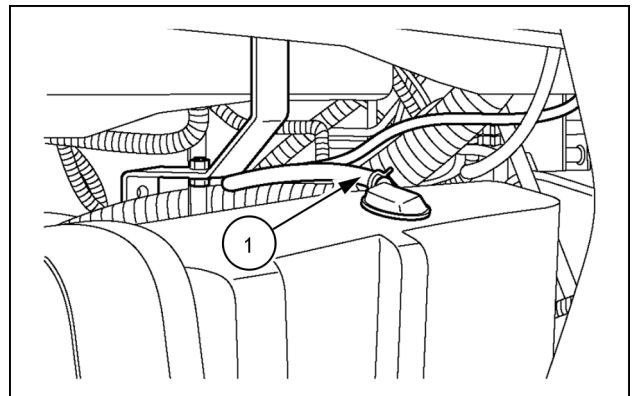
RCPH09CCH132AAB 4

5. Remove the bolts and tank hold-down bracket (1).



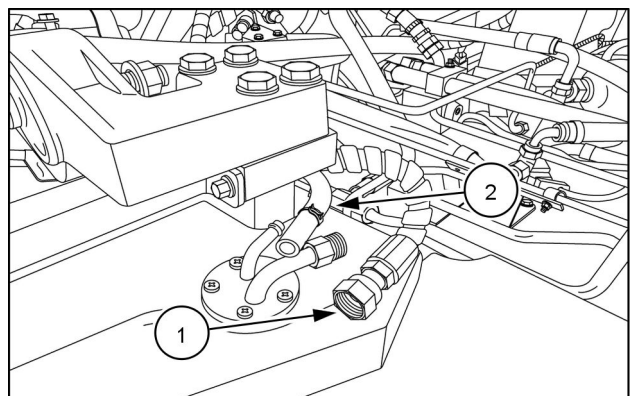
RAIL13TR01794AA 5

6. Disengage the fuel vent hose clamp and disconnect the hose (1).



RCPH09CCH131AAB 6

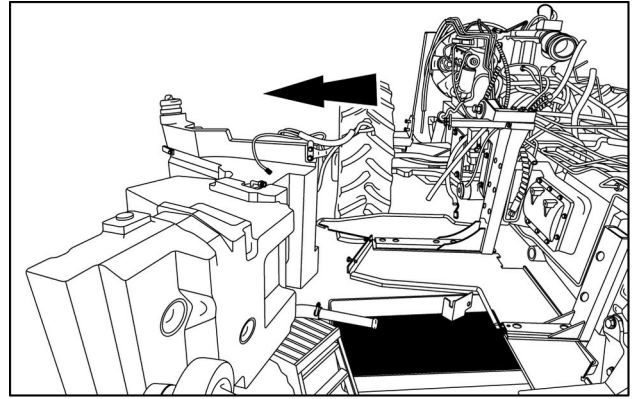
7. Disconnect the fuel supply fitting (1) and the return hose (2).



RAIL13TR01823AA 7

8. With the help of an assistant, remove the tank from its support.

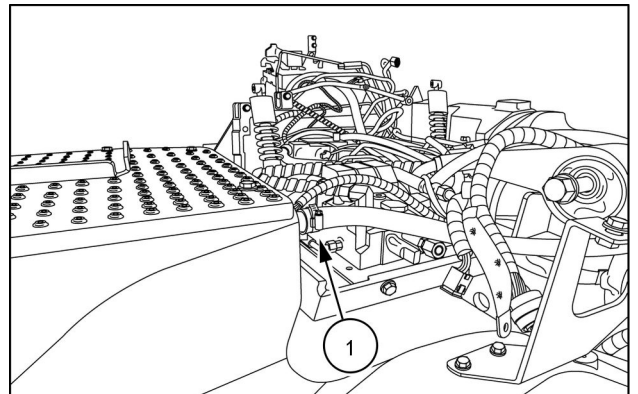
**NOTE:** The rear tire may have to be moved outward to remove the tank.



RAIL13TR01822AA 8

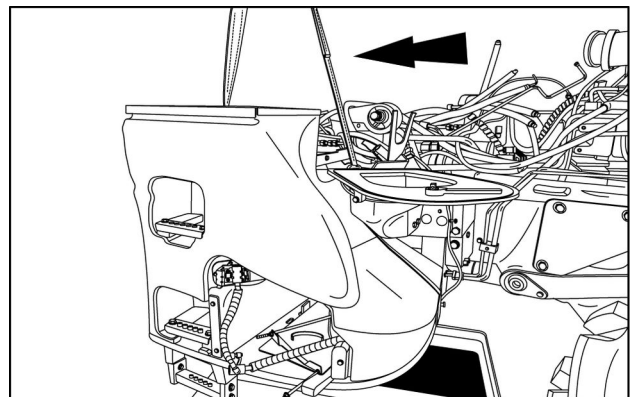
### Right hand side tank

9. If the right hand side tank needs to be removed, the battery must be removed, see **Battery - Remove (55.302)**.
10. Disengage the hose clamp (1) for the crossover vent hose, and disconnect the hose.



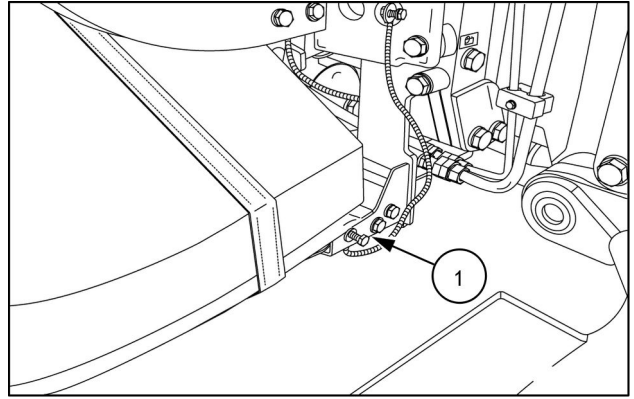
RAIL13TR01797AA 9

11. Wrap a lifting strap around the tank and the tank support bracket.



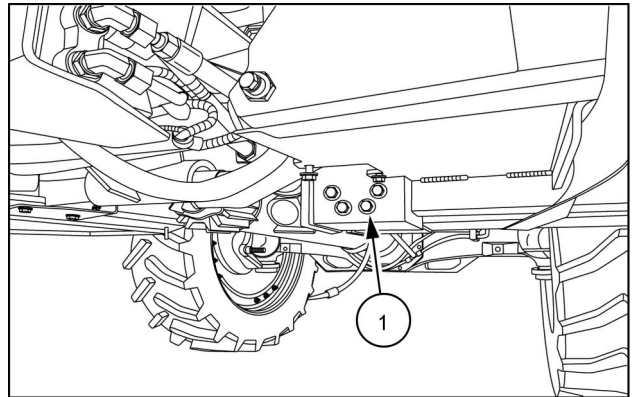
RAIL13TR01798AA 10

- Using proper lifting equipment, apply tension on the lifting strap and remove the four bolts (1) from the front fuel tank support bracket.



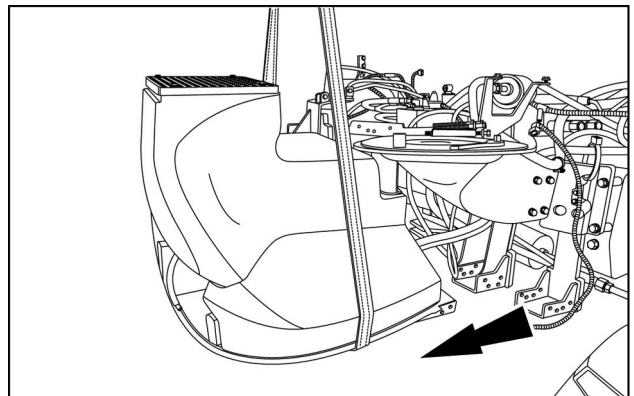
RAIL13TR01799AA 11

- Remove the four bolts (1) from the rear tank support bracket.



RAIL13TR01800AA 12

- Remove the left hand fuel tank along with the support bracket.



RAIL13TR01801AA 13

**Next operation:**  
**Fuel tank - Install (10.216)**



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## Fuel tank - Install

Prior operation:

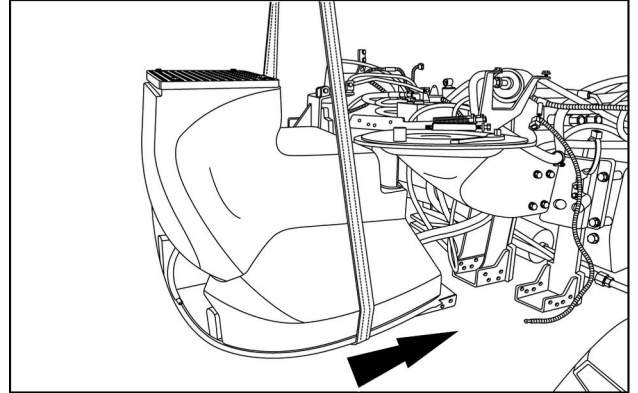
Battery - Remove (55.302)

Prior operation:

Fuel tank - Remove (10.216)

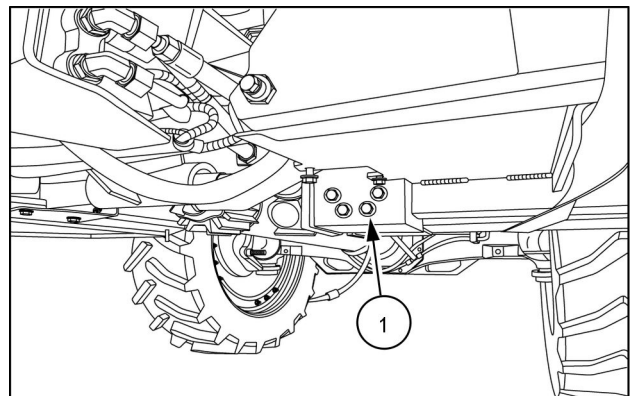
### Right hand side tank

1. Move the fuel tank along with the support bracket into position.



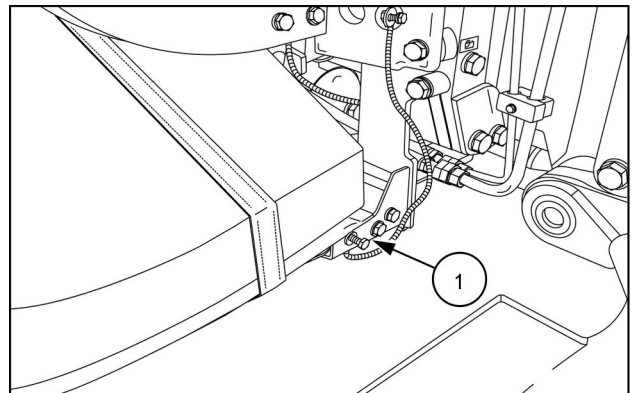
RAIL13TR01801AA 1

2. Install the four bolts (1) to secure the tank at the rear mounting bracket.



RAIL13TR01800AA 2

3. Install the four bolts (1) to secure the tank support at the front mounting bracket.



RAIL13TR01799AA 3

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