

621F
721F
Tier 4

Wheel Loader

from PIN NBF213602 and above

SERVICE MANUAL

Part number 84605841

1st edition English

May 2012



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INTRODUCTION

Torque – 621F Torque Specifications

621F WE, 621F NA

Axle

Wheel mounting nuts	640 - 720 N·m (472 - 531 lb ft)
Front axle mounting bolts	651 - 678 N·m (480 - 500 lb ft)
Rear axle trunnion pin bolts	325 - 353 N·m (240 - 260 lb ft)

Chassis

Cab mounts	773 - 854 N·m (570 - 630 lb ft)
Exhaust stack to hood	36 - 44 N·m (27 - 32 lb ft)
Counterweight mounting bolts	955 - 1075 N·m (704 - 793 lb ft)
Articulation pivot pin bolts	224 - 278 N·m (165 - 205 lb ft)
Articulation mount pin retainer bolts	69 N·m (51 lb ft)
Seat mounting bolts	73 - 87 N·m (54 - 64 lb ft)
Steering wheel retaining nut	50 N·m (37 lb ft)
Hydraulic oil filter mounting bolts	23 - 27 N·m (17 - 20 lb ft)
Steering cylinder base end pin retaining bolt	290 - 375 N·m (214 - 277 lb ft)
Steering cylinder rod end pin retaining bolt	Bolts must turn freely
Horn mounting bolt	53 - 62 N·m (39 - 46 lb ft)
Hood - rear grill bolts	9 - 11 N·m (7 - 8 lb ft)
Hood hinge bolts	65 - 79 N·m (48 - 58 lb ft)
Steps - lower entry strap bolts	27 - 31 N·m (20 - 23 lb ft)

Cooling

Fan to fan hub	40 - 48 N·m (30 - 35 lb ft)
Fan hub to motor shaft (no impact tools)	67 - 74 N·m (49 - 55 lb ft)
Radiator hose clamps	10.1 - 11.3 N·m (7.4 - 8.3 lb ft)
Hydraulic tank cover nuts	14 - 18 N·m (10 - 13 lb ft)
Hydraulic tank sight gauge	2.7 - 5.5 N·m (2.0 - 4.1 lb ft)

Diesel Exhaust Fluid (DEF) System

Heater valve bolts	17 - 19 N·m (13 - 14 lb ft)
Dosing module bolts	7 - 8 N·m (58 - 68 lb in)
DEF control module/pump assembly mounting bolts	20 - 28 N·m (15 - 21 lb ft)

Driveshafts

Coupling to flywheel	53 - 62 N·m (39 - 46 lb ft)
Driveshaft to coupling	53 - 62 N·m (39 - 46 lb ft)
Front driveshaft yoke nut	339 - 373 N·m (250 - 275 lb ft)
Carrier bearing mounting bolts	99 - 128 N·m (73 - 94 lb ft)
550R U-joints	75 - 81 N·m (55 - 60 lb ft)
410R U-joints	61 - 81 N·m (45 - 60 lb ft)
Dust cover mounting bolts	20 - 27 N·m (15 - 20 lb ft)

INTRODUCTION

Engine

Engine mounting brackets	118 - 133 N·m (87 - 98 lb ft)
Engine rubber isolator mounts (Qty 4)	244 - 298 N·m (180 - 220 lb ft)
Brake pump to engine mounting	57 - 65 N·m (42 - 48 lb ft)
Brake pump gear nut (no impact tools)	70 - 79 N·m (52 - 58 lb ft)
Turbo to turbo exhaust elbow clamp	5 N·m (4 lb ft)
Muffler to turbo elbow exhaust clamp	20 - 25 N·m (15 - 18 lb ft)
Front muffler bracket to engine block	118 - 133 N·m (87 - 98 lb ft)
Muffler brackets to muffler	114 - 128 N·m (84 - 94 lb ft)
Charge Air Cooler (CAC) hose clamps (Qty 8)	10.1 - 11.3 N·m (7.4 - 8.3 lb ft)
Air cleaner to turbo hose clamp	10.1 - 11.3 N·m (7.4 - 8.3 lb ft)
Alternator pulley (no impact tools)	60 - 70 N·m (44 - 52 lb ft)
Starter mounting nuts	40 - 50 N·m (30 - 37 lb ft)

Loader

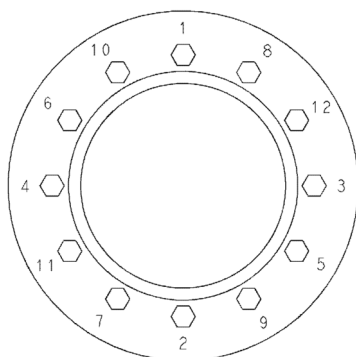
XT loader linkage bolts	650 - 732 N·m (479 - 540 lb ft)
XT guide link nuts	240 - 305 N·m (177 - 225 lb ft)
Loader link pin keeper	325 - 373 N·m (240 - 275 lb ft)

Transmission

Transmission rubber isolator mounts (Qty 3)	890 - 1000 N·m (656 - 738 lb ft)
Transmission upper mounting bracket bolts	251 - 319 N·m (185 - 235 lb ft)
Transmission lower mounting bracket bolts (Qty 2)	481 - 590 N·m (355 - 435 lb ft)
Hydraulic pump to transmission mounting	335 - 375 N·m (247 - 277 lb ft)
Cooler clamps	10.1 - 11.3 N·m (7.4 - 8.3 lb ft)
Hydraulic pump suction hose clamp flange	73 - 90 N·m (54 - 66 lb ft)
Steering priority manifold to pump	37 - 48 N·m (27 - 35 lb ft)
Transmission fill tube bolts	17 - 33 N·m (13 - 24 lb ft)
Transmission sight gauge bolts	2.7 - 5.5 N·m (2 - 4 lb ft)

Wheels

Wheel nuts	Initial torque: 298 N·m (220 lb ft) Final torque: 640 - 720 N·m (472 - 531 lb ft)
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RCPH10WHL320AAH 1

Do the following initial and final torque procedures:

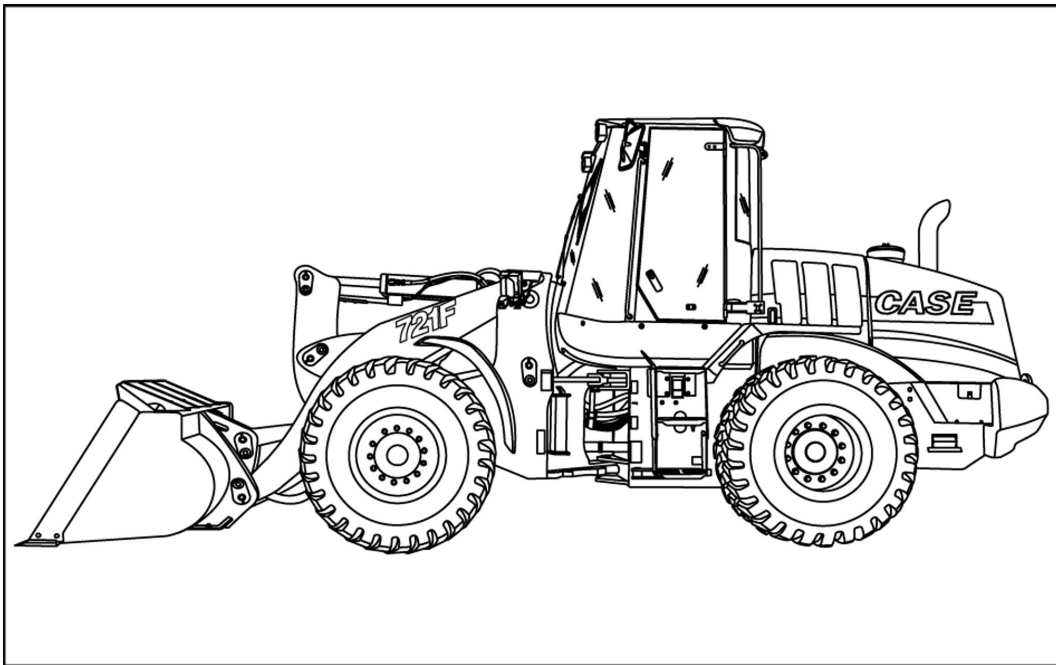
1. Tighten wheel nuts to an initial torque of **298 N·m (220 lb ft)** in sequence shown in figure
 2. Tighten wheel nuts to a final torque of **640 - 720 N·m (472 - 531 lb ft)** in sequence shown in figure
-

CASE

CONSTRUCTION

SERVICE MANUAL

Engine

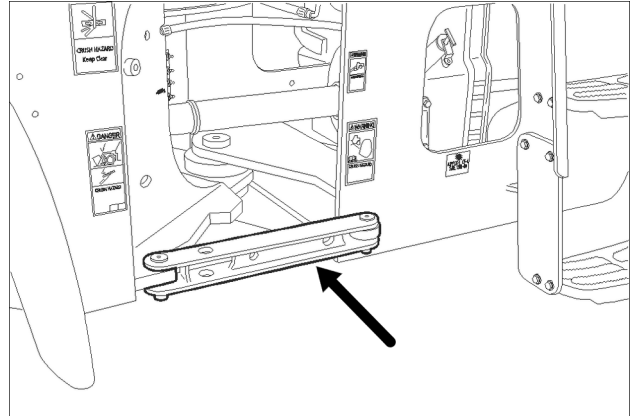


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Engine - Remove

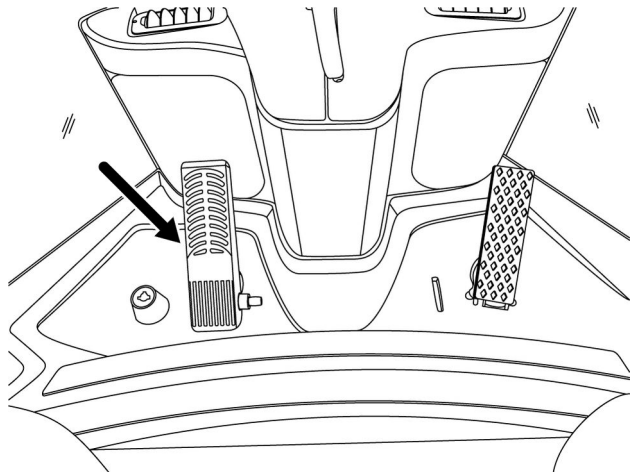
NOTE: Emissions sensors mounted in the exhaust stream are sensitive to extreme vibrations. Use of tools that generate extreme vibrations, such as impact wrenches and hammers, will result in damage to emission sensors. Avoid using these tools during any service procedure in close proximity of emission sensors. If the use of these tools cannot be avoided, remove the sensors using extreme caution prior to performing any service procedure.

1. Park machine on a level surface and lower the bucket to the ground. Put articulation lock in LOCKED position and stop the engine.



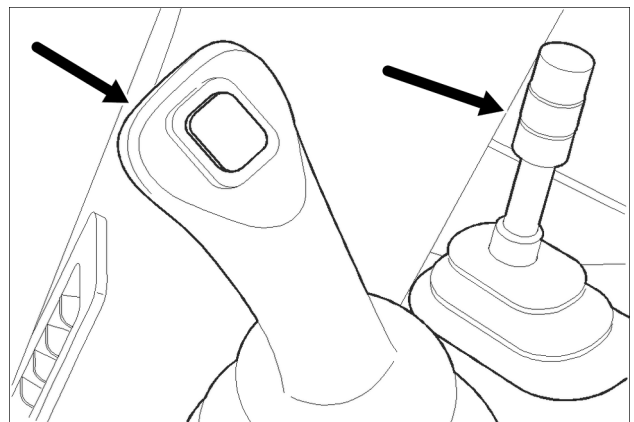
RCPH10WHL063BAL 1

2. Actuate the brake pedal several times to discharge brake accumulators.



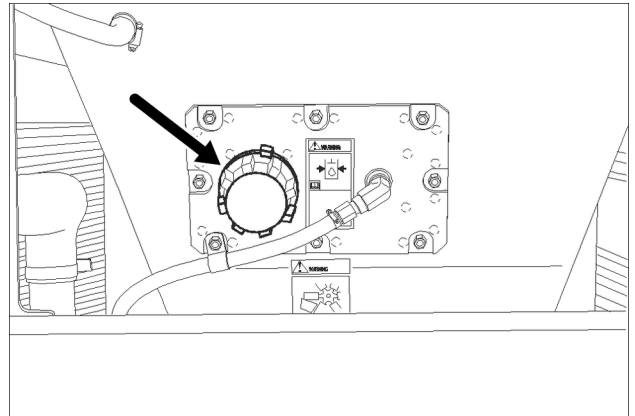
RCPH10WHL435AAH 2

3. Put key switch in ON position. Pilot control switch must be in the ON position and then move loader control lever(s) back and forth at least 30 times to release any pressure from hydraulic circuit. Put key switch in OFF position.



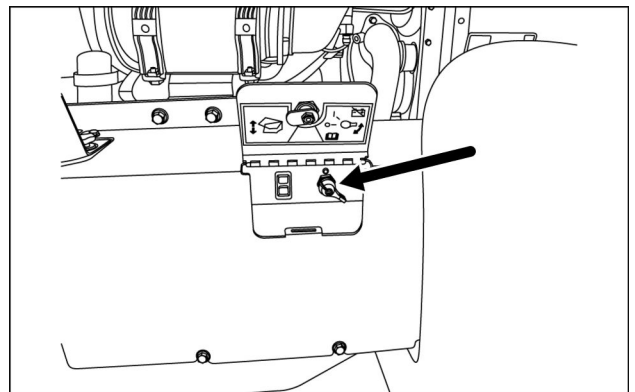
RCPH10WHL119BAL 3

4. Raise grill located above the cooler box just behind the cab. Then slowly loosen the hydraulic reservoir filler cap to release pressure in the reservoir.



RCPH10WHL099BAL 4

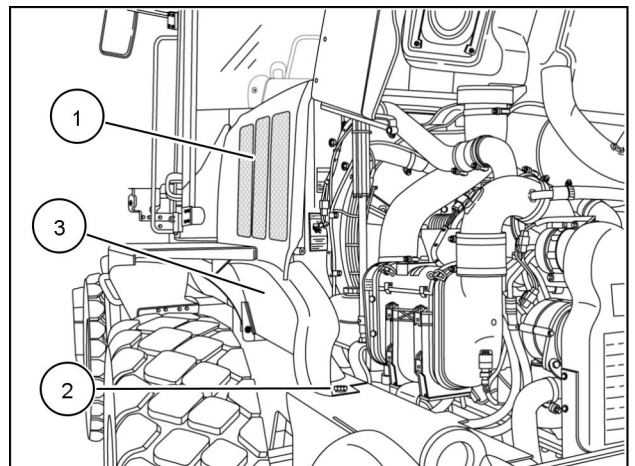
5. Locate the master and hood raise switch by the battery box. Then raise the hood and put the master disconnect switch in the OFF position.



RCPH10WHL106AAH 5

6. Raise both side panels (1). Then remove the thumb screws (2) and inner fender panels (3).

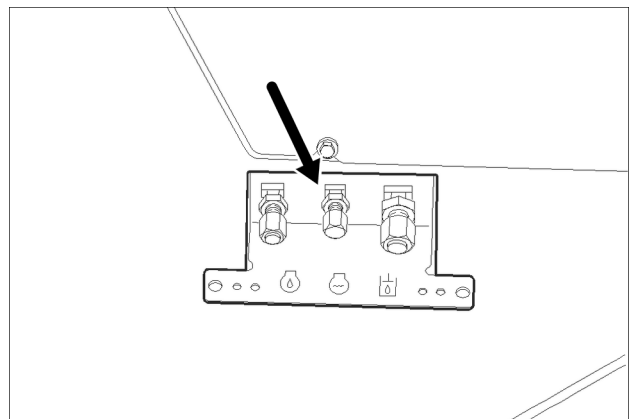
NOTE: Left side of the machine is shown. The operation is similar for the right side.



RAPH12WEL0597AA 6

7. Place a suitable container below radiator drain, remove radiator cap and coolant drain plug (arrow) to drain engine coolant. Then reinstall drain plug and radiator cap after coolant has drained.

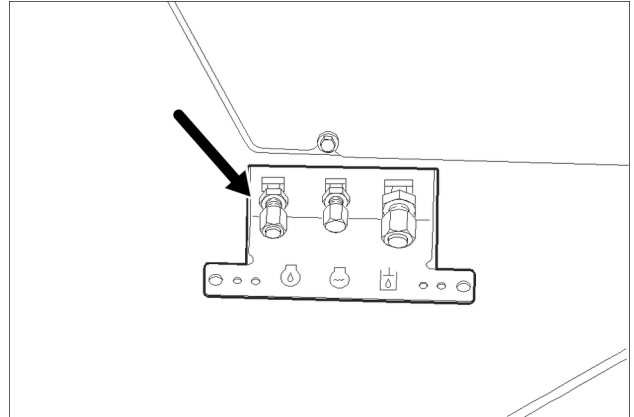
NOTE: See machine specifications for cooling system volume.



RCPH10WHL054BAL 7

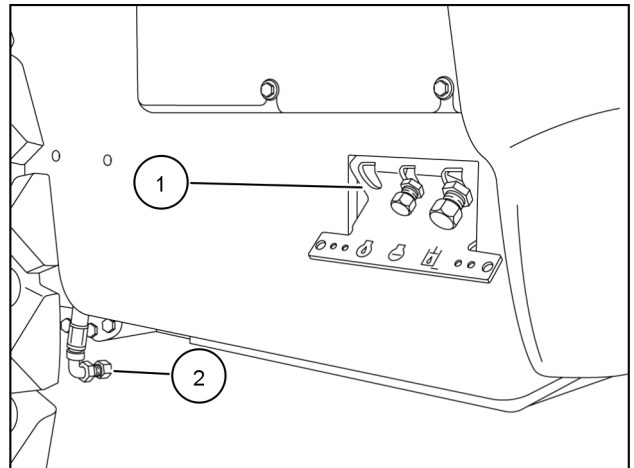
- Place a suitable container below engine oil drain. Remove drain plug and drain oil into container. Then reinstall drain plug.

NOTE: See machine specifications for engine oil sump volume.



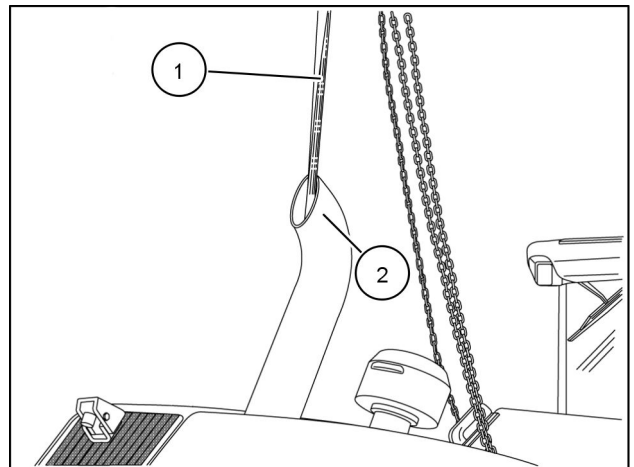
RCPH10WHL054BAL 8

- After oil drains, disconnect drain hose from frame by removing jam nut (1). Then pull hose from frame in preparation for engine removal. (2)



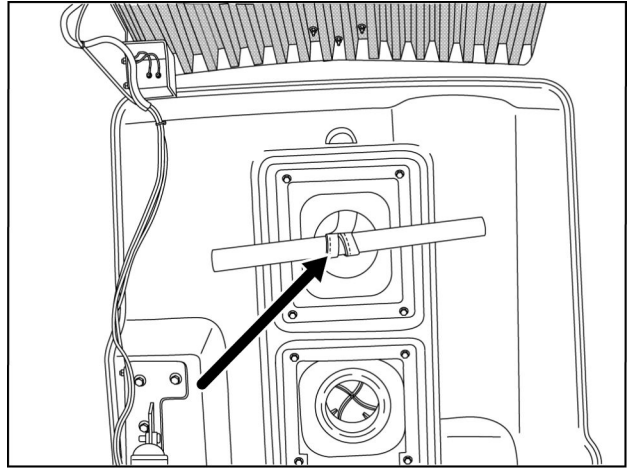
RAPH12WEL0598AA 9

- Double up a nylon lifting strap (1) and slide through the exhaust stack (2) on the hood.



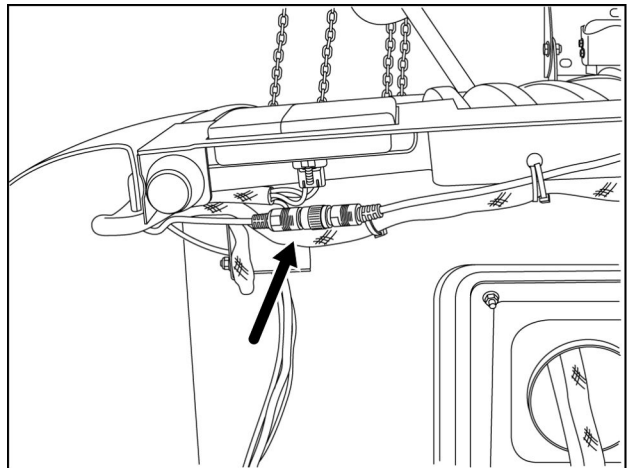
RAPH12WEL0599AA 10

11. Place a bar or pipe through the strap loop inside the hood and attach the strap to a suitable lifting device. Then raise the hood with the strap to release tension on the lifting motor.



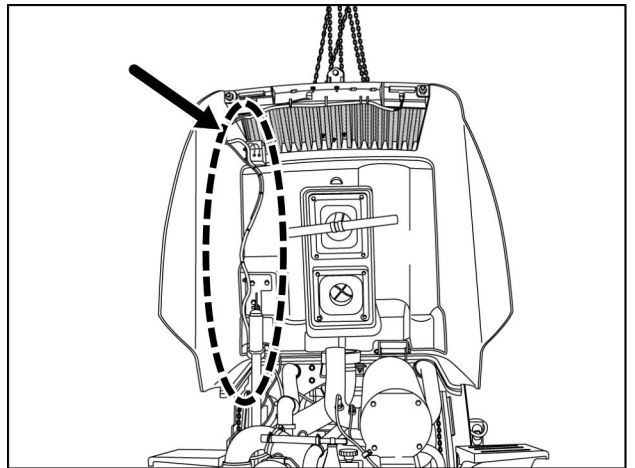
RAPH12WEL0600AA 11

12. Tag and disconnect the camera wire harness (if machine is equipped with a camera.)



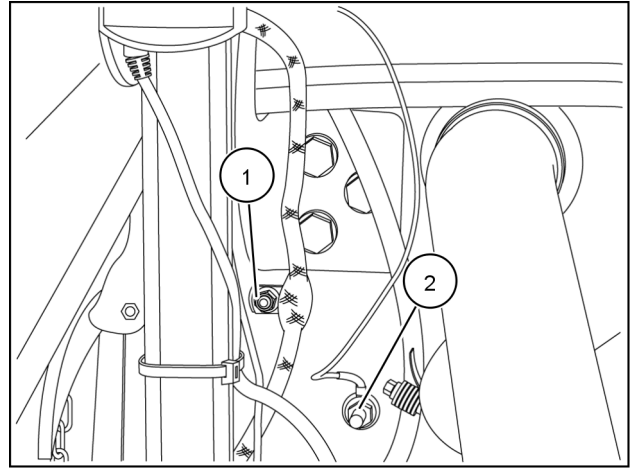
RAPH12WEL0601AA 12

13. Cut wire ties and remove camera wire harness from hood. Then place it off to the side in a safe location. (If machine is equipped with a camera.)



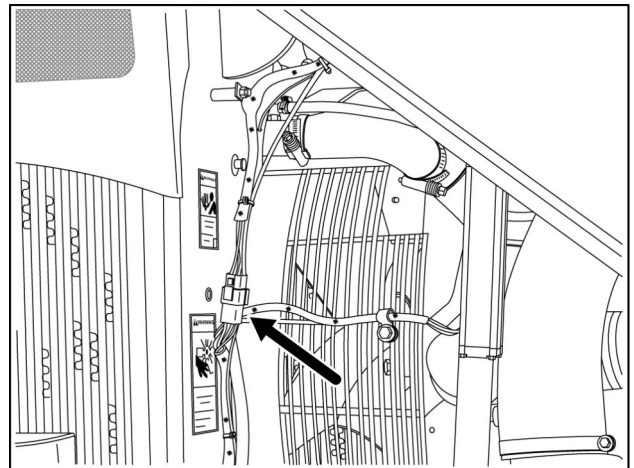
RAPH12WEL0602AA 13

14. Remove mount bolt (1) and backup alarm wiring harness clamp from cooler housing. Then tag and remove hood ground wire (2) from cooler housing.



RAPH12WEL0603AA 14

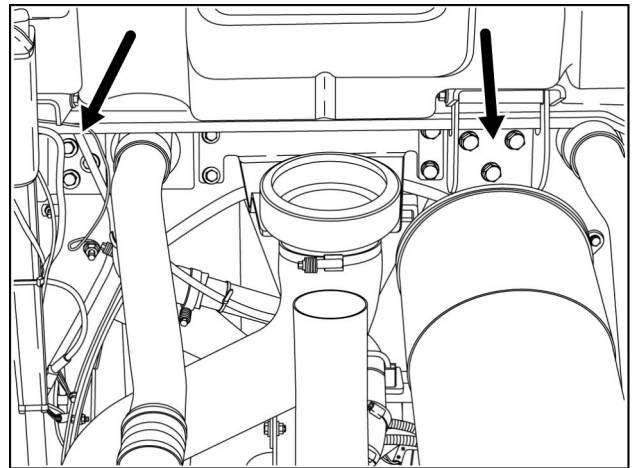
15. Tag and disconnect hood wiring harness connector from rear chassis wiring harness connector.



RAPH12WEL0604AA 15

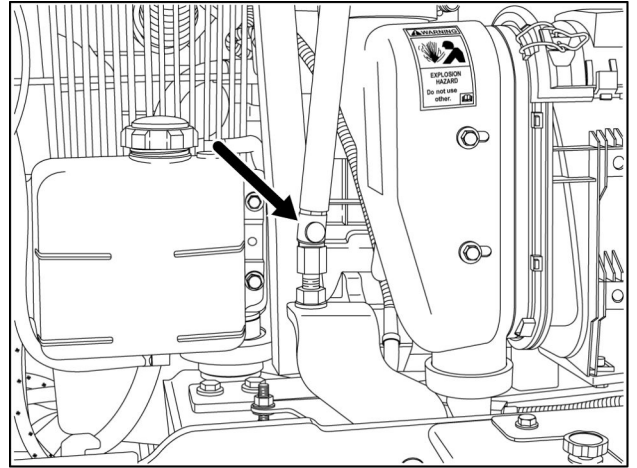
16. Have another person balance the hood and LOOSEN the hood hinge mounting bolts (arrows) from the cooler frame.

NOTE: Do not remove the hood hinge mounting bolts at this time.



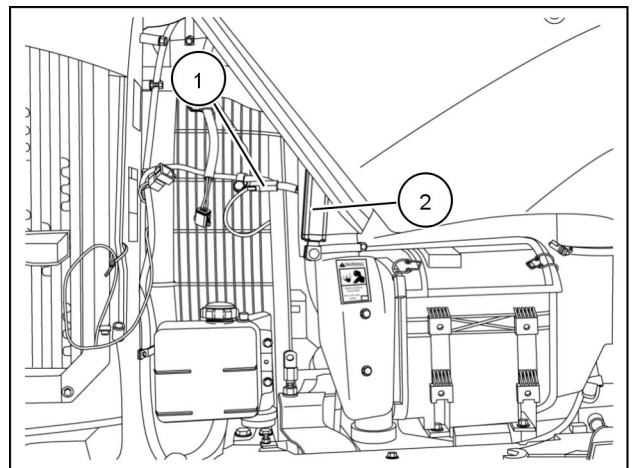
RAPH12WEL0605AA 16

17. Remove the pin from the bottom of the lifting motor cylinder where it attaches to the loader frame.



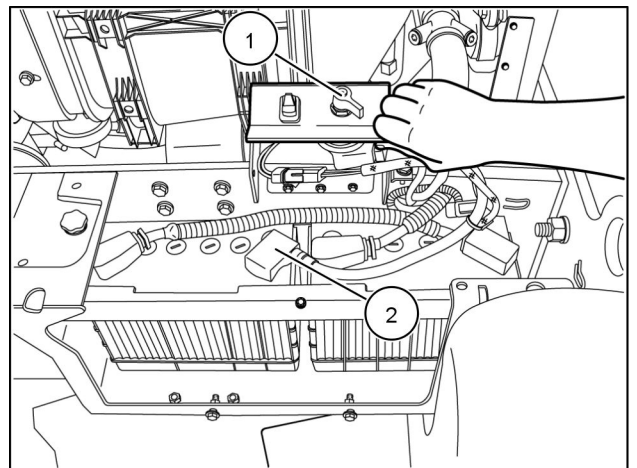
RAPH12WEL0606AA 17

18. Put the master disconnect switch in the ON position. Then, retract the lifting motor cylinder (2), replace pin and disconnect wiring harness (1).



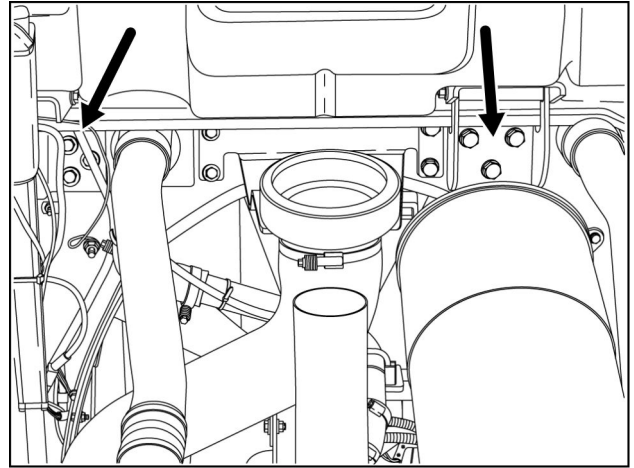
RAPH12WEL06062AA 18

19. Put master disconnect switch (1) in OFF position. Remove the battery cover and disconnect ground lead from the batteries (2). You may replace battery cover if desired to give you a place to stand.



RAPH12WEL0608AA 19

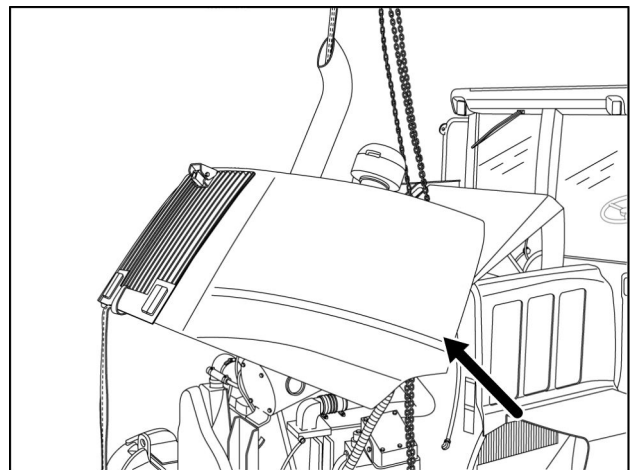
20. Have another person balance the hood and remove the hood hinge mounting bolts (arrows) from the cooler frame.



RAPH12WEL0605AA 20

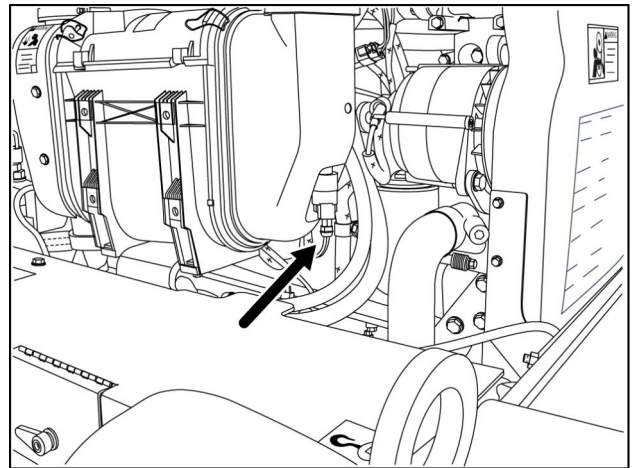
21. Carefully raise and remove hood from loader. Lower hood onto suitable platform and disconnect lifting equipment.

NOTE: Radiator overflow hose may interfere with left hand hood hinge movement and hood removal.



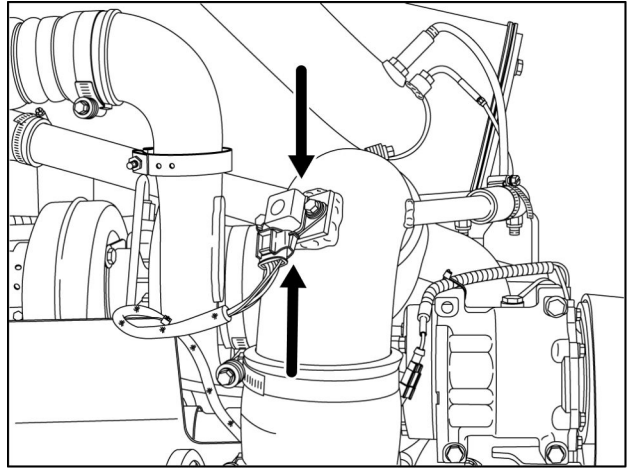
RAPH12WEL0609AA 21

22. Tag and disconnect engine wiring harness connector from air filter restriction switch.



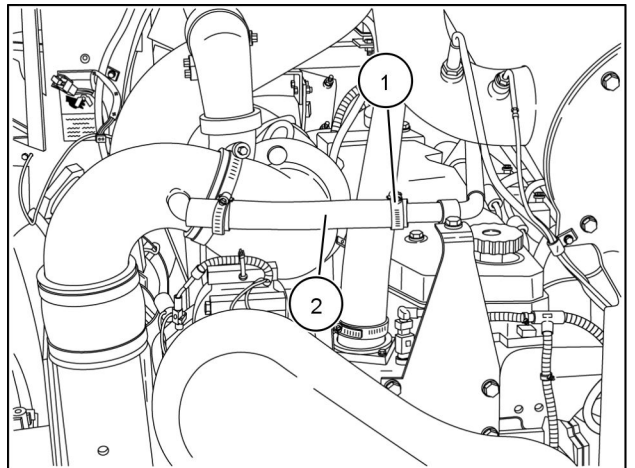
RAPH12WEL0610AA 22

23. Tag and disconnect engine wiring harness connector from air inlet humidity sensor.



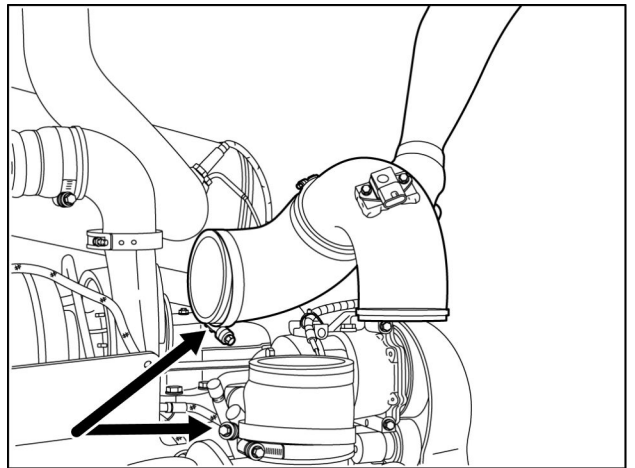
RAPH12WEL0611AA 23

24. Loosen clamp (1) on the crankcase ventilation hose (2) and disconnect hose.



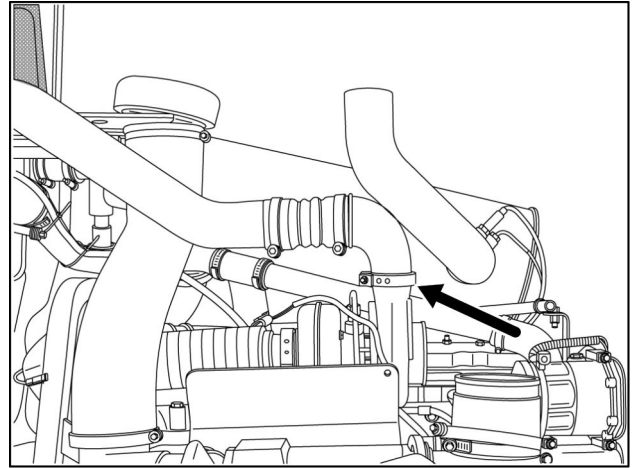
RAPH12WEL0612AA 24

25. Loosen clamps on turbocharger and air filter housing. Then remove the intake air hose. Cover turbocharger inlet to prevent debris entry.



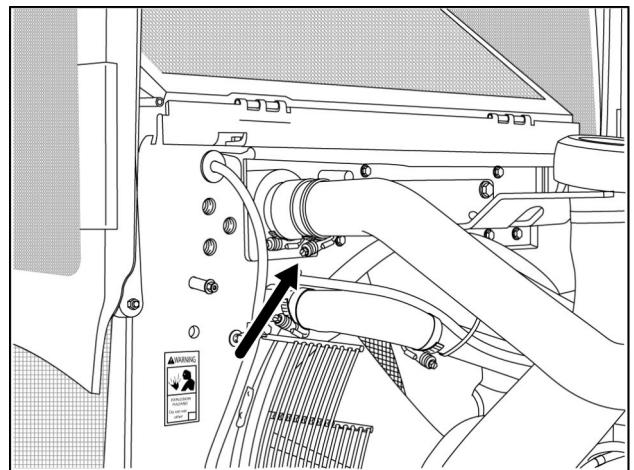
RAPH12WEL0613AA 25

26. Loosen the clamp on the turbocharger for the after cooler inlet elbow.



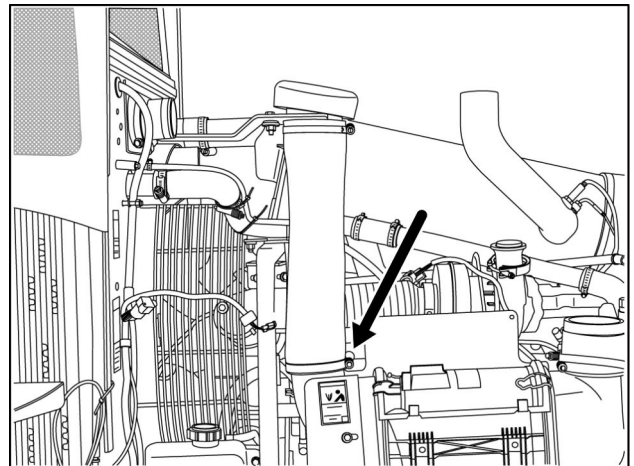
RAPH12WEL0614AA 26

27. Loosen the clamp on the hose at the after cooler inlet and remove the tube.



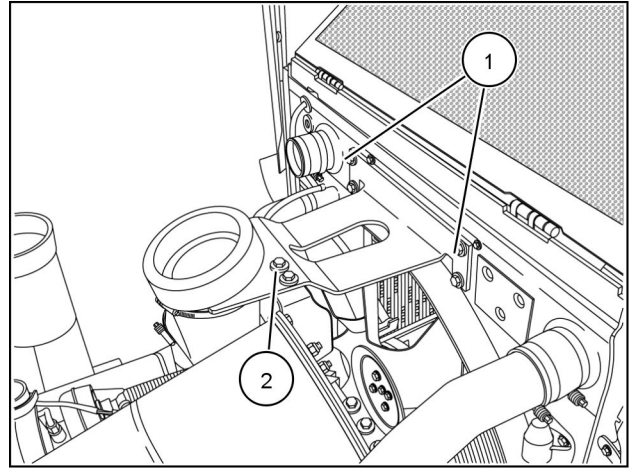
RAPH12WEL0615AA 27

28. Loosen clamp on the air inlet hose at the air filter housing.



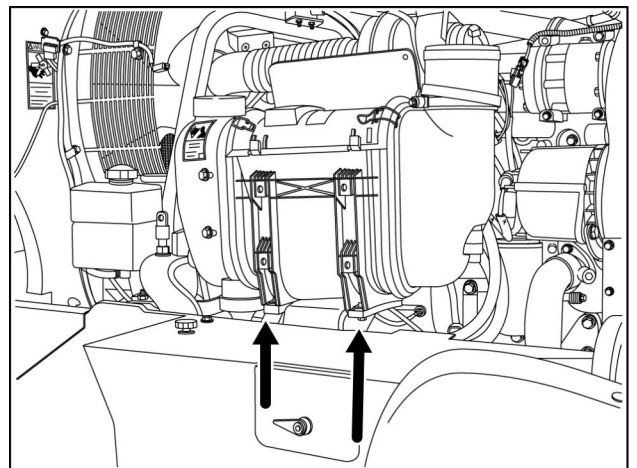
RAPH12WEL0616AA 28

29. Remove bolts from the cooler box (1) and the center support bracket (2) securing the air inlet hose bracket. Then remove air inlet hose and bracket.



RAPH12WEL0617AA 29

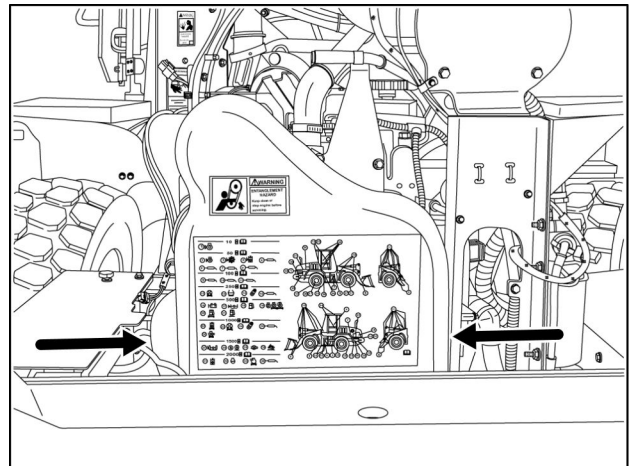
30. Remove four the bolts securing the air filter housing to the mounting support bracket. Then remove air filter housing.



RAPH12WEL0618AA 30

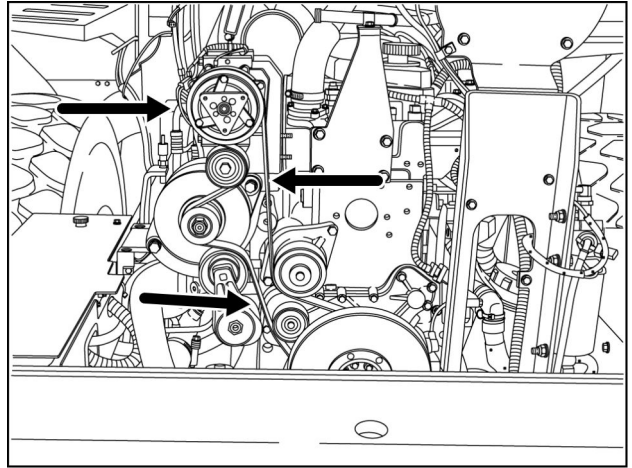
31. Remove the four mounting bolts from the belt cover. Then remove the cover.

NOTE: After removing the belt cover, remove the cover mounting bracket from the left rear side of machine frame.



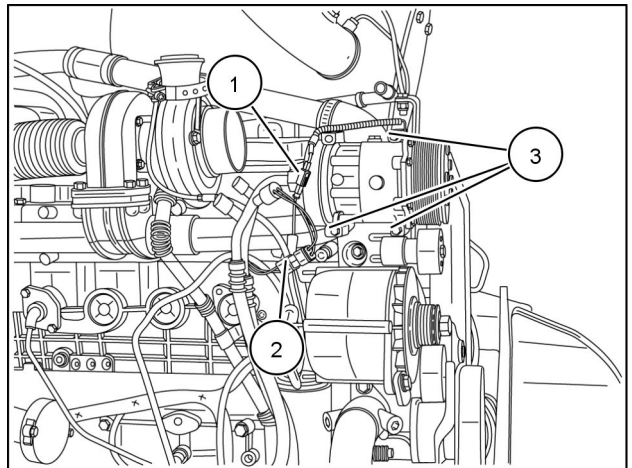
RAPH12WEL0619AA 31

32. Remove the drive belt from the engine.



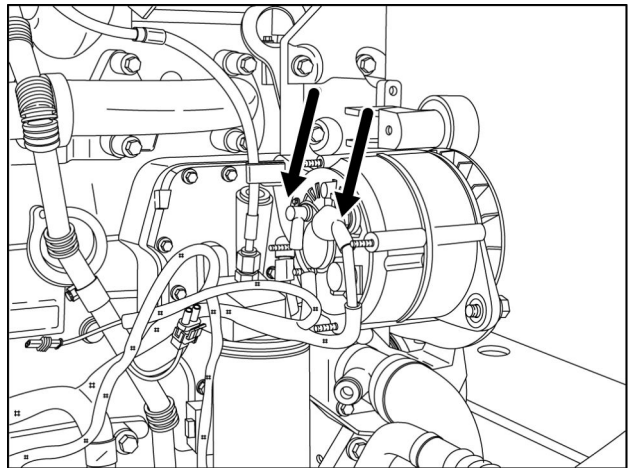
RAPH12WEL0620AA 32

33. If loader is equipped with air conditioning, identify, tag, and disconnect the engine wiring harness connectors from air compressor clutch connector (1) and high pressure switch (2). Then remove the three mounting bolts (3) for the compressor and carefully set it on the left battery cover.



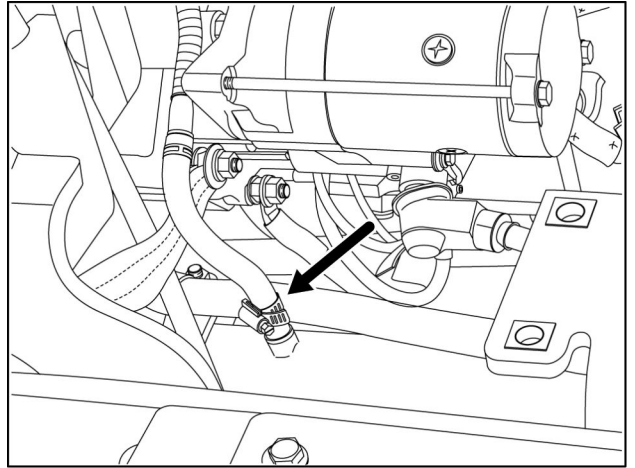
RAPH12WEL0621AA 33

34. Tag and disconnect the wiring from the alternator.



RAPH12WEL0622AA 34

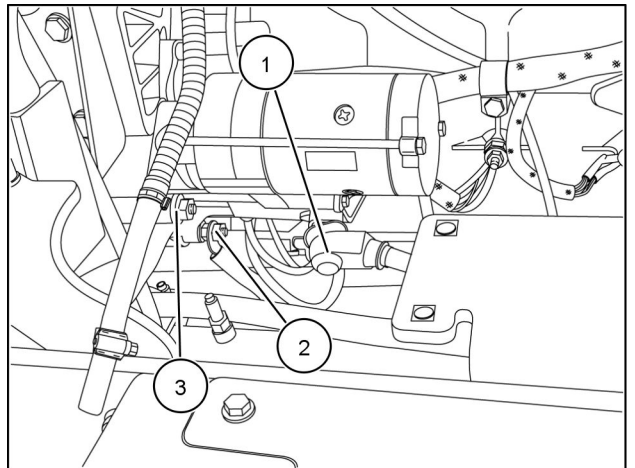
35. Remove SCR coolant return line.



RAPH12WEL0623AA 35

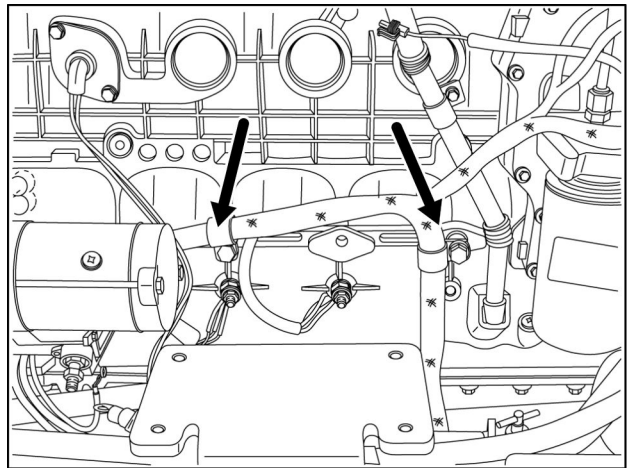
36. Tag and remove the wires from the starter solenoid (1), the ground cable (2), and ground strap (3) from the starter.

NOTE: Move the starter cables away from the engine.



RAPH12WEL0624AA 36

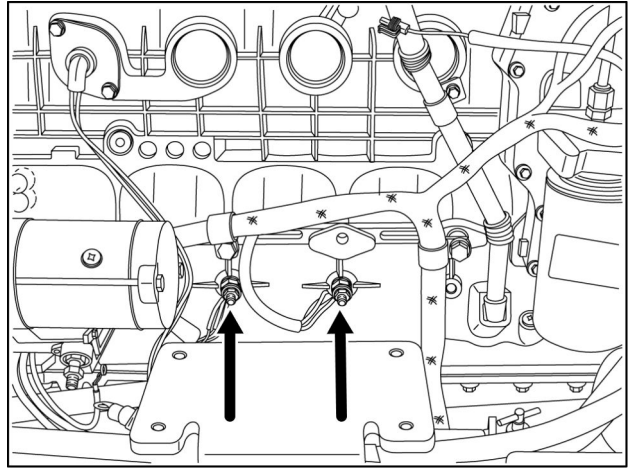
37. Remove bolts securing wiring harness clamps to engine.



RAPH12WEL0625AA 37

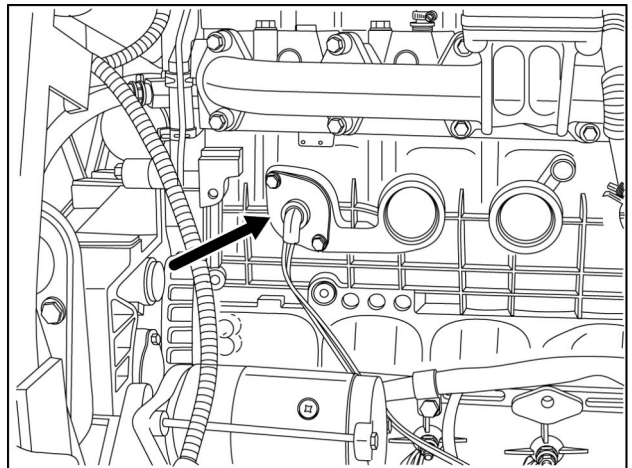
38. Remove ground wires from the engine.

NOTE: Move the wiring harness away from the engine.



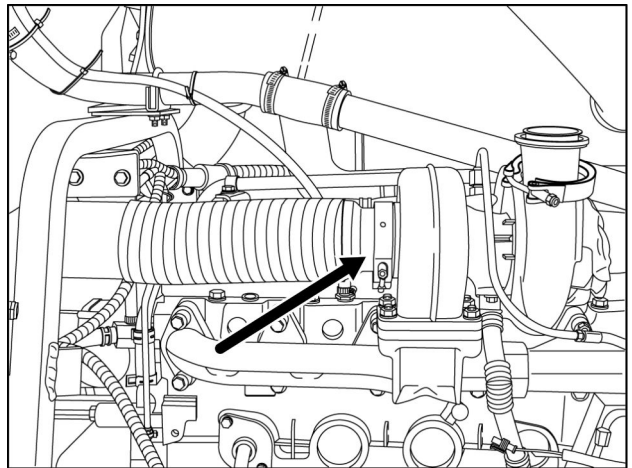
RAPH12WEL0625AA 38

39. If the machine is so equipped, unplug the engine block heater and set it aside.



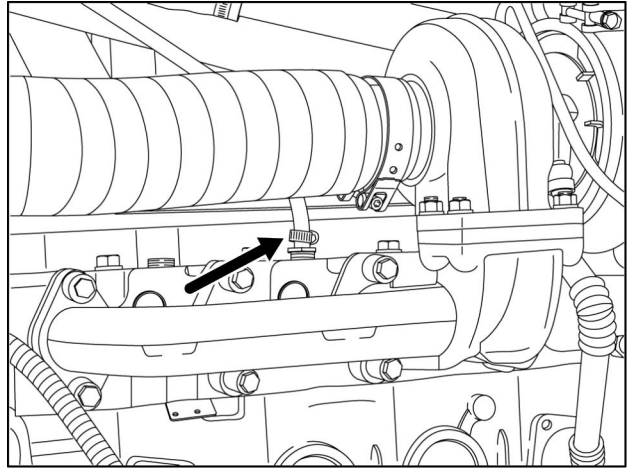
RAPH12WEL0626AA 39

40. Loosen the exhaust clamp from the turbocharger.



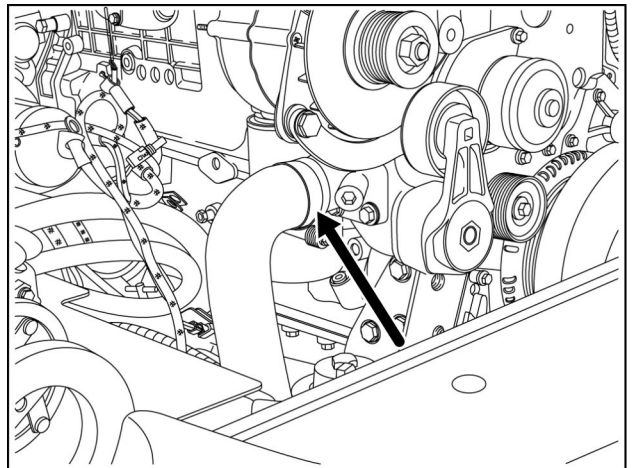
RAPH12WEL0627AA 40

41. Disconnect the engine coolant vent hose from the engine.



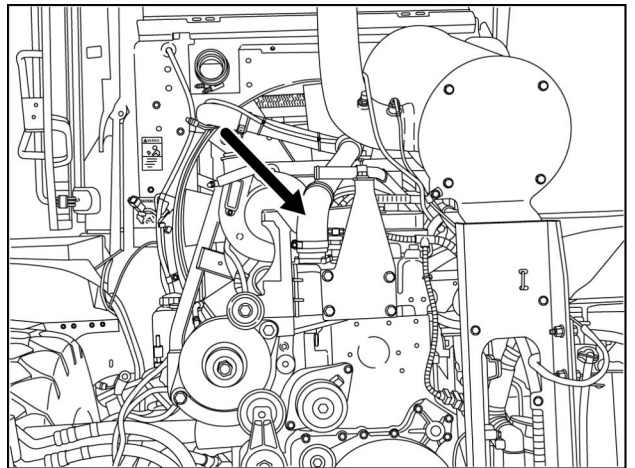
RAPH12WEL0628AA 41

42. Loosen clamps and remove lower coolant hose from the engine.



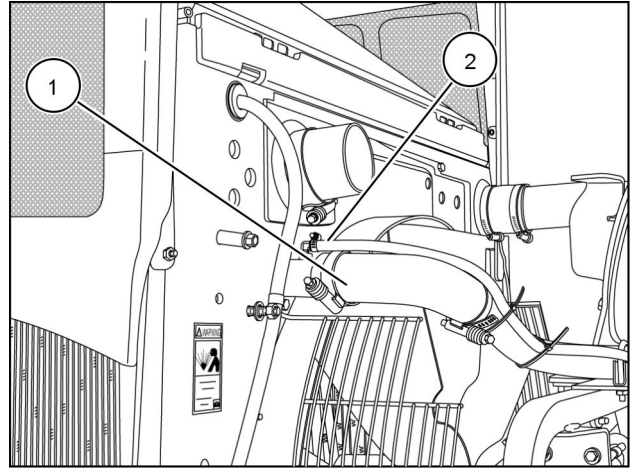
RAPH12WEL0629AA 42

43. Remove the radiator hose from the engine.



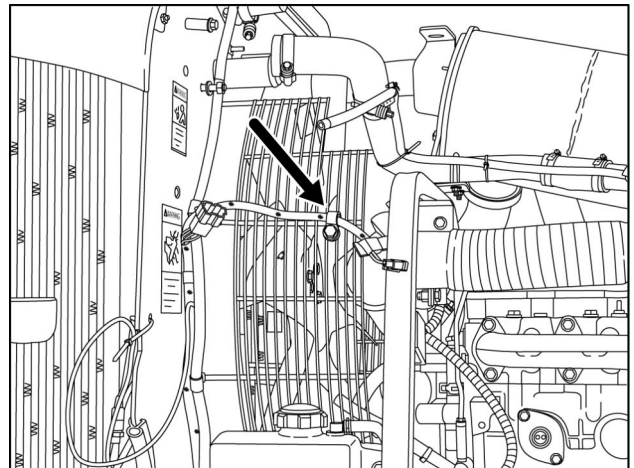
RAPH12WEL0630AA 43

44. Remove the return radiator hose (1) and the engine coolant vent hose (2) from the top of the radiator.



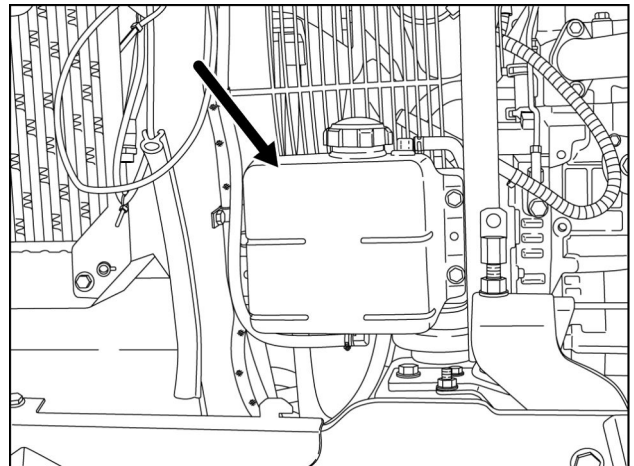
RAPH12WEL0631AA 44

45. Remove hood wire harness clamp from the fan shroud.



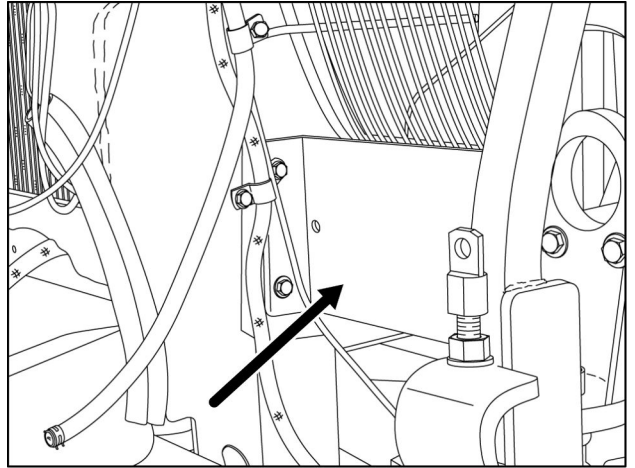
RAPH12WEL0632AA 45

46. Remove engine coolant overflow bottle.



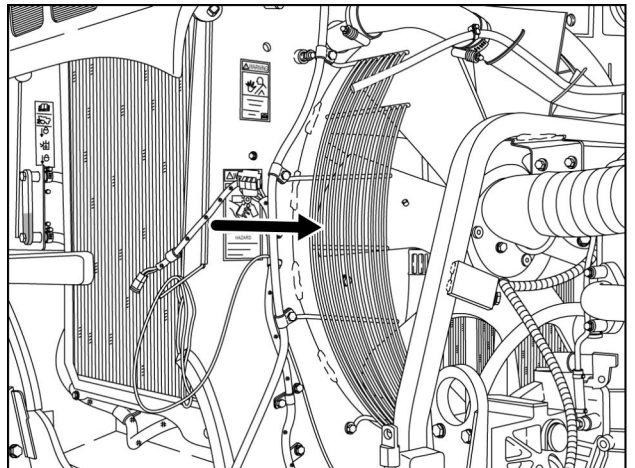
RAPH12WEL0633AA 46

47. Remove engine coolant overflow bottle support bracket.



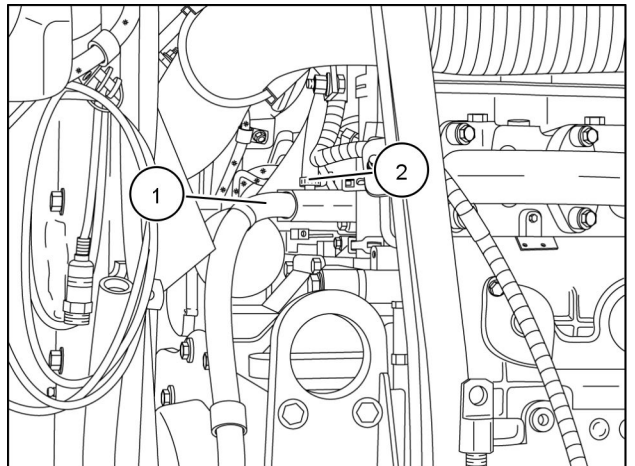
RAPH12WEL0634AA 47

48. Remove cooling fan screen.



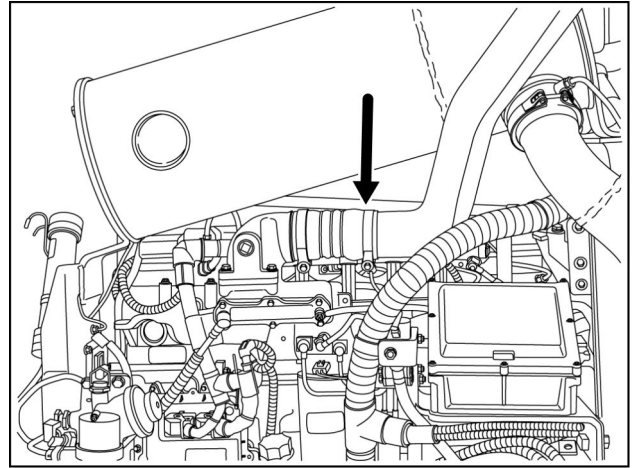
RAPH12WEL0635AA 48

49. Remove heater hose (1) and the SCR heater supply line (2) from the engine.



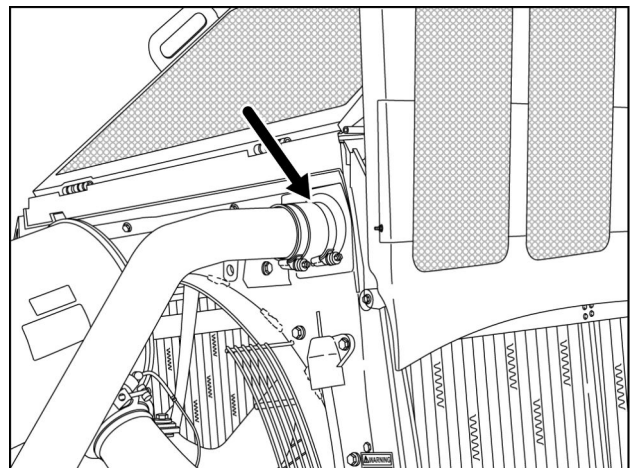
RAPH12WEL0636AA 49

50. Loosen the clamp on the intake manifold for the after cooler output hose.



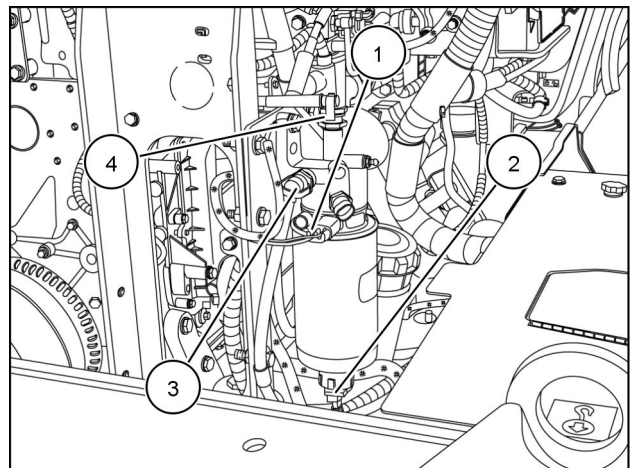
RAPH12WEL0637AA 50

51. Loosen the clamp on the after cooler, and remove the after cooler outlet tube from the machine.



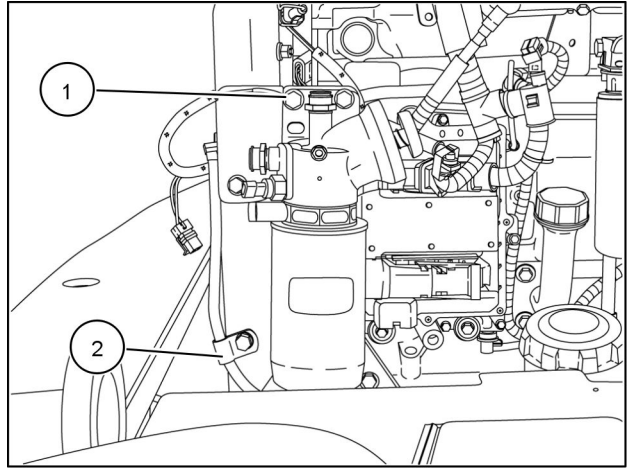
RAPH12WEL0638AA 51

52. Tag and disconnect the fuel filter heater wire (1) and water sensor (2). Then drain fuel filter and disconnect inlet (3) and outlet (4) fuel lines from the fuel filter head. Plug the lines and cap the fittings.



RAPH12WEL0639AA 52

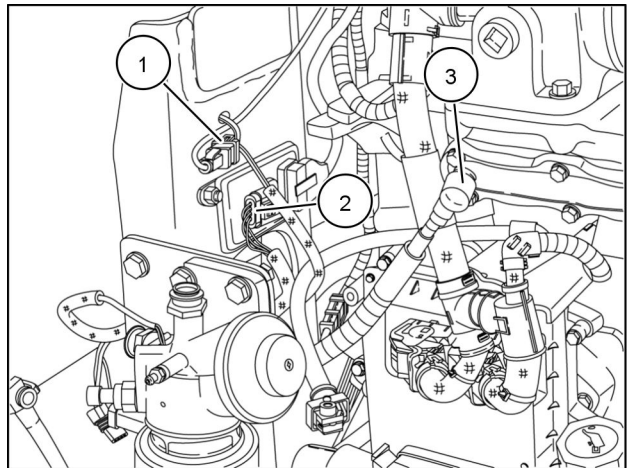
53. Remove ground wire and fuel filter head attachment bolt (1). Then remove fuel line support clamp (2).



RAPH12WEL0640AA 53

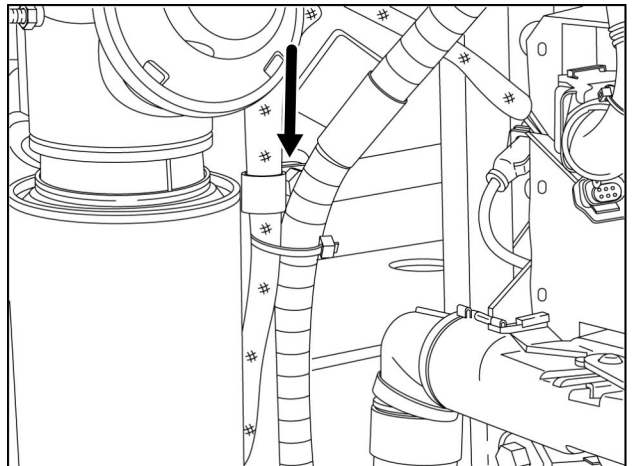
54. Tag and disconnect the post SCR catalyst EGT sensor from machine wire harness (1) and the post SCR catalyst NOx sensor (2). Then tag and remove the grid heater cable (3).

NOTE: Hold the rear nut with a second wrench to prevent grid heater damage.



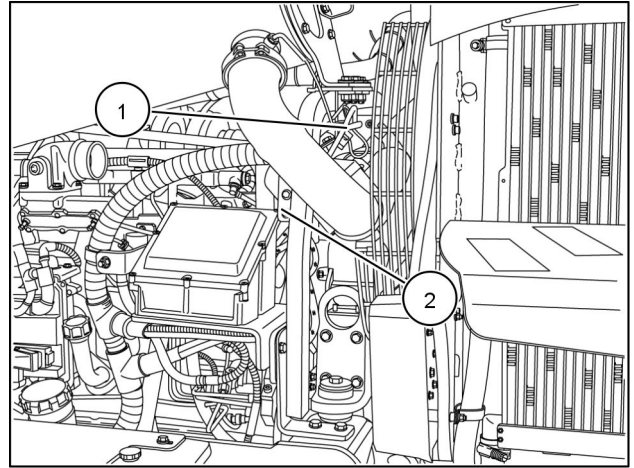
RAPH12WEL063AA 54

55. Remove wire harness support clamp.



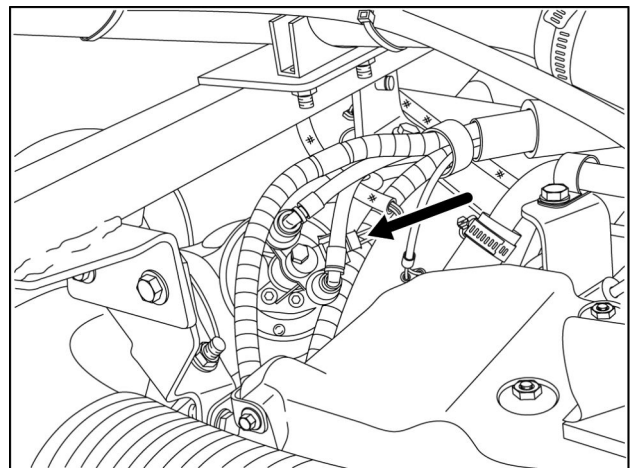
RAPH12WEL0064AA 55

56. Tag and disconnect Pre-SCR catalyst EGT sensor (1). Then remove tie wrap, wire harness bolts and wire harness support clamp (2).



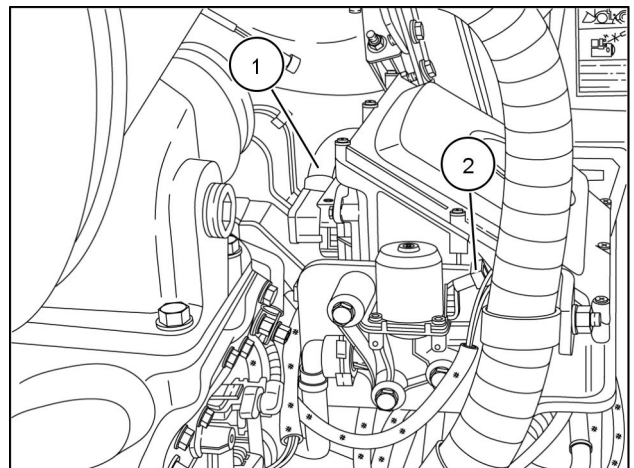
RAPH12WEL0065AA 56

57. Tag and disconnect wire harness from DEF/ AdBLUE® Dosing Module.



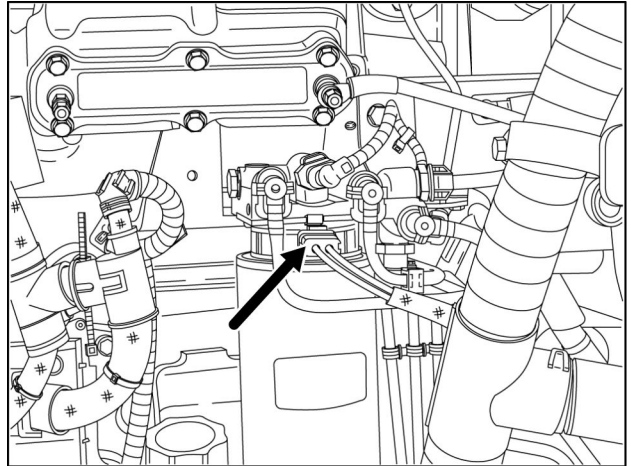
RAPH12WEL0066AA 57

58. Tag and disconnect wire harness from DEF/ AdBLUE® Control Module (1) and the coolant flow control valve (2).



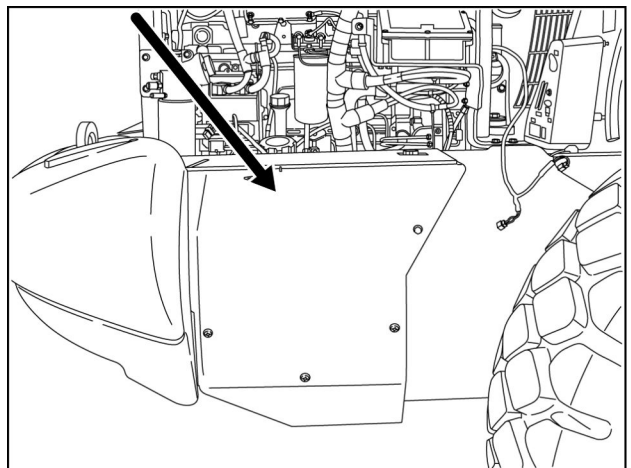
RAPH12WEL0067AA 58

59. Tag and disconnect wire harness from primary fuel filter.



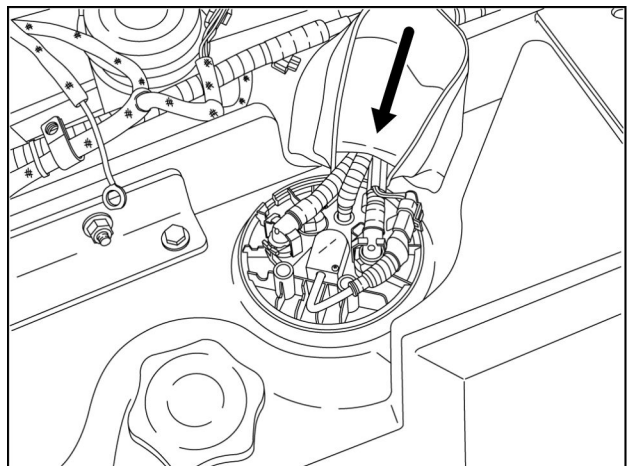
RAPH12WEL0068AA 59

60. Remove **DEF/AdBLUE®** storage tank cover located on the Right Hand side of the machine.



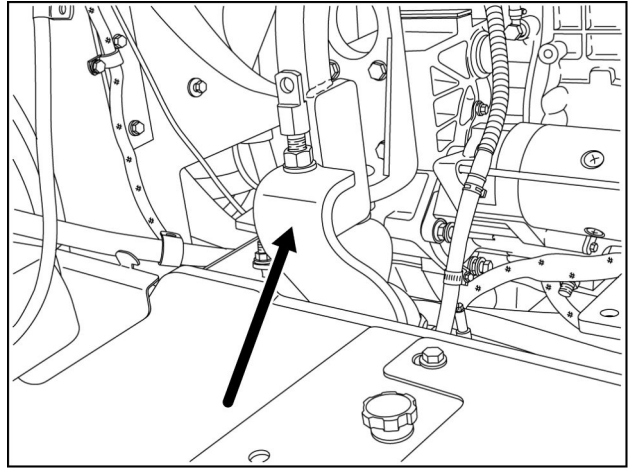
RAPH12WEL0069AA 60

61. Tag and disconnect wire harness and **DEF/AdBLUE®** supply and return lines from the **DEF/AdBLUE®** storage tank. Cap the supply lines.



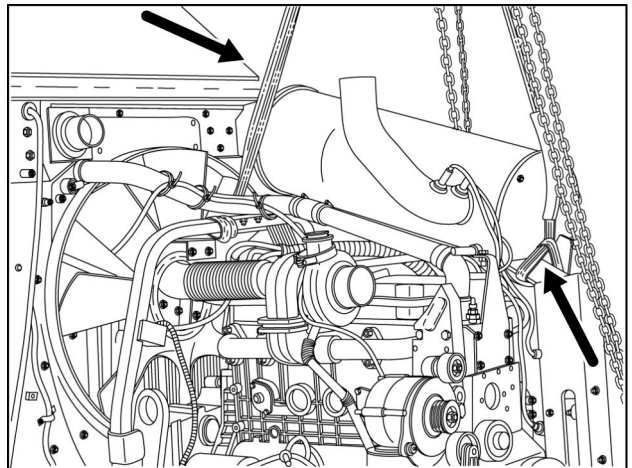
RAPH12WEL0070AA 61

62. Remove hood lift cylinder support bracket.



RAPH12WEL0071AA 62

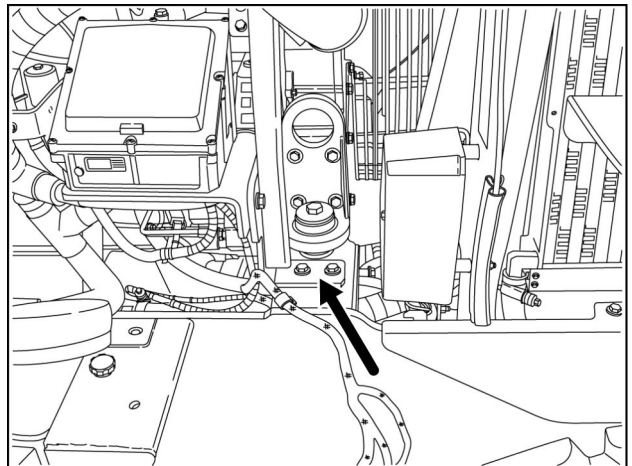
63. Attach suitable lifting straps to the SCR Catalyst support structure.



RAPH12WEL0072AA 63

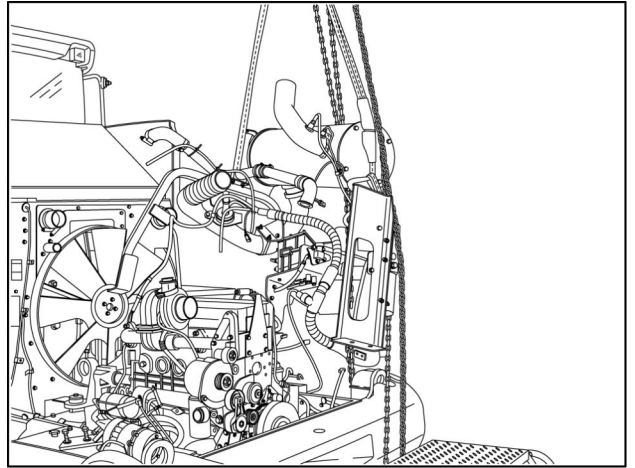
64. Remove bolts securing the SCR Catalyst support structure at the front and rear of the structure. The mounting points are positioned on the left and right side in the front of the engine compartment, and in the center at the rear of the engine compartment.

NOTE: The right front mount is shown.



RAPH12WEL0073AA 64

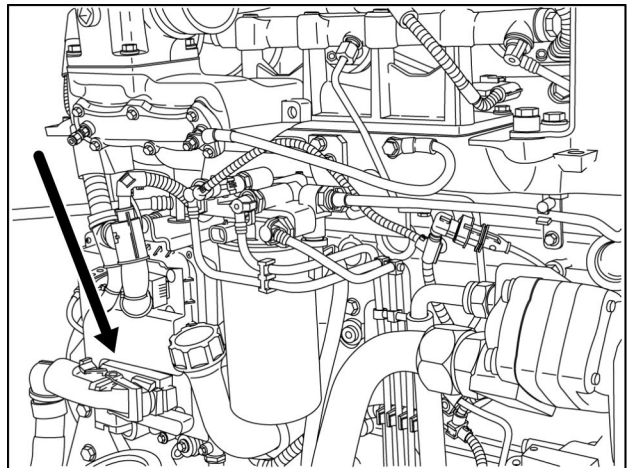
65. Using suitable lifting device, carefully lift SCR catalyst support structure (with SCR system components attached) from the machine.



RAPH12WEL0075AA 65

66. Disconnect the wiring harness from the EDC 7 controller.

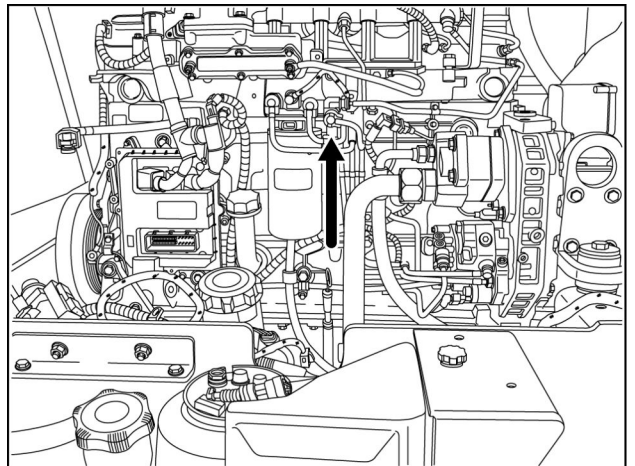
NOTE: Lifting up on the lever will release the connector from the controller.



RAPH12WEL0076AA 66

67. Remove the fuel line from the top of the primary fuel filter, plug the line and cap the fitting.

NOTE: Make note on how fuel lines are routed.



RAPH12WEL0077AA 67



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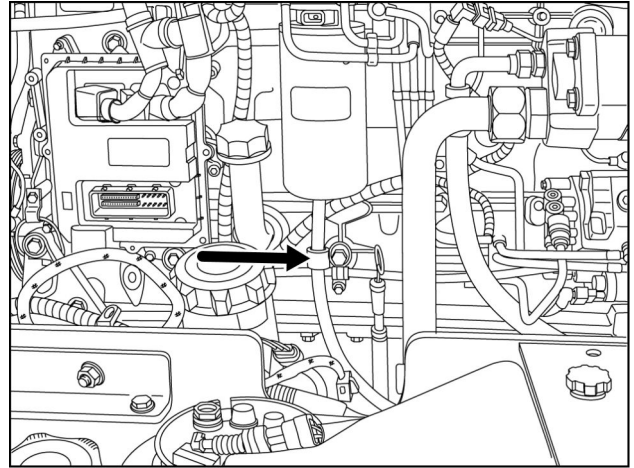
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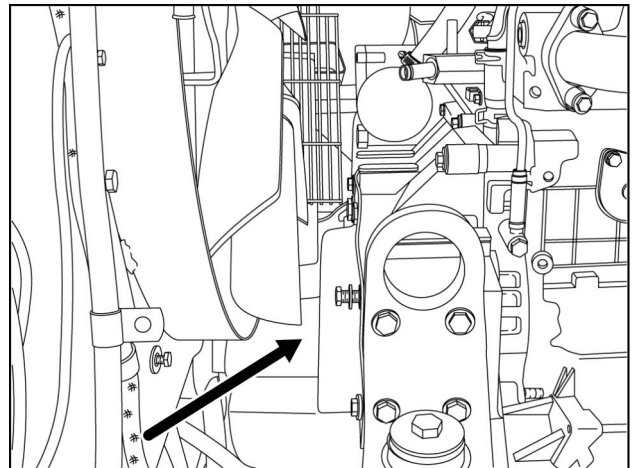
68. Remove the fuel line support clamp.

NOTE: Make note on how fuel lines are routed.



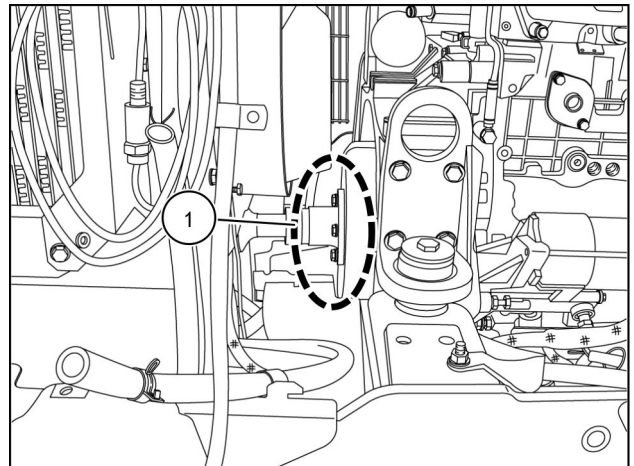
RAPH12WEL0078AA 68

69. Remove the upper and lower covers for the drive shaft.



RAPH12WEL0079AA 69

70. Remove the drive shaft bolts (1) from the flywheel. Move the drive shaft clear of the flywheel.



RAPH12WEL0080AA 70

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