

2100/2300 Series Combines

Service Manual No.7-88436

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Section 1001

STANDARD TORQUE SPECIFICATIONS

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Rac 8-71601

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TORQUE SPECIFICATIONS - DECIMAL HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers dry, or when lubricated with engine oil. Not applicable if special graphities, Molydisulfide greases, or other extreme pressure lubricants are used.

Grade 5 Bolts, Nuts, and Studs		
		
Size	Pound-Inches	Newton metres
1/4 inch	108 to 132	12 to 15
5/16 inch	204 to 252	23 to 28
3/8 inch	420 to 504	48 to 57
Size	Pound-Feet	Newton metres
7/16 inch	54 to 64	73 to 87
1/2 inch	80 to 96	109 to 130
9/16 inch	110 to 132	149 to 179
5/8 inch	150 to 180	203 to 244
3/4 inch	270 to 324	366 to 439
7/8 inch	400 to 480	542 to 651
1.0 inch	580 to 696	787 to 944
1-1/8 inch	800 to 880	1085 to 1193
1-1/4 inch	1120 to 1240	1519 to 1681
1-3/8 inch	1460 to 1680	1980 to 2278
1-1/2 inch	1940 to 2200	2631 to 2983

Grade 8 Bolts, Nuts, and Studs		
		
Size	Pound-Inches	Newton metres
1/4 inch	144 to 180	16 to 20
5/16 inch	288 to 348	33 to 39
3/8 inch	540 to 648	61 to 73
Size	Pound-Feet	Newton metres
7/16 inch	70 to 84	95 to 114
1/2 inch	110 to 132	149 to 179
9/16 inch	160 to 192	217 to 260
5/8 inch	220 to 264	298 to 358
3/4 inch	380 to 456	515 to 618
7/8 inch	600 to 720	814 to 976
1.0 inch	900 to 1080	1220 to 1465
1-1/8 inch	1280 to 1440	1736 to 1953
1-1/4 inch	1820 to 2000	2468 to 2712
1-3/8 inch	2380 to 2720	3227 to 3688
1-1/2 inch	3160 to 3560	4285 to 4827
NOTE: Use thick nuts with Grade 8 bolts.		

TORQUE SPECIFICATIONS - METRIC HARDWARE

Use the following torques when specifications are not given.

These values apply to fasteners with coarse threads as received from supplier, plated or unplated, or when lubricated with engine oil. These values do not apply if graphite or Molydisulfide grease or oil is used.

Grade 8.8 Bolts, Nuts, and Studs		
		
Size	Pound-Inches	Newton metres
M4	24 to 36	3 to 4
M5	60 to 72	7 to 8
M6	96 to 108	11 to 12
M8	228 to 276	26 to 31
M10	456 to 540	52 to 61
Size	Pound-Feet	Newton metres
M12	66 to 79	90 to 107
M14	106 to 127	144 to 172
M16	160 to 200	217 to 271
M20	320 to 380	434 to 515
M24	500 to 600	675 to 815
M30	920 to 1100	1250 to 1500
M36	1600 to 1950	2175 to 2600

Grade 10.9 Bolts, Nuts, and Studs		
		
Size	Pound-Inches	Newton metres
M4	36 to 48	4 to 5
M5	84 to 96	9 to 11
M6	132 to 156	15 to 18
M8	324 to 384	37 to 43
Size	Pound-Feet	Newton metres
M10	54 to 64	73 to 87
M12	93 to 112	125 to 150
M14	149 to 179	200 to 245
M16	230 to 280	310 to 380
M20	450 to 540	610 to 730
M24	780 to 940	1050 to 1275
M30	1470 to 1770	2000 to 2400
M36	2580 to 3090	3500 to 4200

Grade 12.9 Bolts, Nuts, and Studs



Usually the torque values specified for grade 10.9 fasteners can be used satisfactorily on grade 12.9 fasteners.

TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS

Tube OD Hose ID	Thread Size	Pound- Inches	Newton metres
37 Degree Flare Fitting			
1/4 inch 6.4 mm	7/16-20	72 to 144	8 to 16
5/16 inch 7.9 mm	1/2-20	96 to 192	11 to 22
3/8 inch 9.5 mm	9/16-18	120 to 300	14 to 34
1/2 inch 12.7 mm	3/4-16	180 to 504	20 to 57
5/8 inch 15.9 mm	7/8-14	300 to 696	34 to 79
Tube OD Hose ID	Thread Size	Pound- Inches	Newton metres
3/4 inch 19.0 mm	1-1/16-12	40 to 80	54 to 108
7/8 inch 22.2 mm	1-3/16-12	60 to 100	81 to 135
1.0 inch 25.4 mm	1-5/16-12	75 to 117	102 to 158
1-1/4 inch 31.8 mm	1-5/8-12	125 to 165	169 to 223
1-1/2 inch 38.1 mm	1-7/8-12	210 to 250	285 to 338

Tube OD Hose ID	Thread Size	Pound- Inches	Newton metres
Straight Threads with O-ring			
1/4 inch 6.4 mm	7/16-20	144 to 228	16 to 26
5/16 inch 7.9 mm	1/2-20	192 to 300	22 to 34
3/8 inch 9.5 mm	9/16-18	300 to 480	34 to 54
1/2 inch 12.7 mm	3/4-16	540 to 804	57 to 91
Tube OD Hose ID	Thread Size	Pound- Inches	Newton metres
5/8 inch 15.9 mm	7/8-14	58 to 92	79 to 124
3/4 inch 19.0 mm	1-1/16-12	80 to 128	108 to 174
7/8 inch 22.2 mm	1-3/16-12	100 to 160	136 to 216
1.0 inch 25.4 mm	1-5/16-12	117 to 187	159 to 253
1-1/4 inch 31.8 mm	1-5/8-12	165 to 264	224 to 357
1-1/2 inch 38.1 mm	1-7/8-12	250 to 400	339 to 542

Split Flange Mounting Bolts		
Size	Pound- Inches	Newton metres
5/16-18	180 to 240	20 to 27
3/8-16	240 to 300	27 to 34
7/16-14	420 to 540	47 to 61
Size	Pound- Feet	Newton metres
1/2-13	55 to 65	74 to 88
5/8-11	140 to 150	190 to 203

Section

2020

ENGINE REMOVAL AND INSTALLATION

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Rac 7-67440

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2020

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SPECIAL TOOLS 2

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ENGINE INSTALLATION 13

SPECIFICATIONS

Cooling System Capacity

2144 Combine.....40 U.S. Quarts (37.8 Litres)

2166 Combine

 Prior to P.I.N. JJC018000040 U.S. Quarts (37.8 Litres)

 P.I.N. JJC0180000 and After.....42 U.S. Quarts (39.7 Litres)

2188 Combine

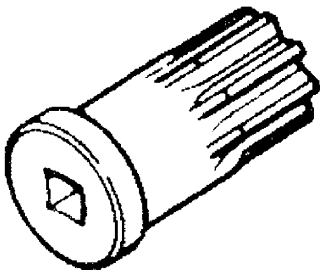
 Prior to P.I.N. JJC019148340 U.S. Quarts (37.8 Litres)

 P.I.N. JJC0191483 and After.....42 U.S. Quarts (39.7 Litres)

SPECIAL TORQUES

Bolts that hold the engine mounts to the frame..... 100 to 120 lb ft (137 to 163 Nm)

SPECIAL TOOLS



ST-06

CAS-1690 Engine Turn Over Tool

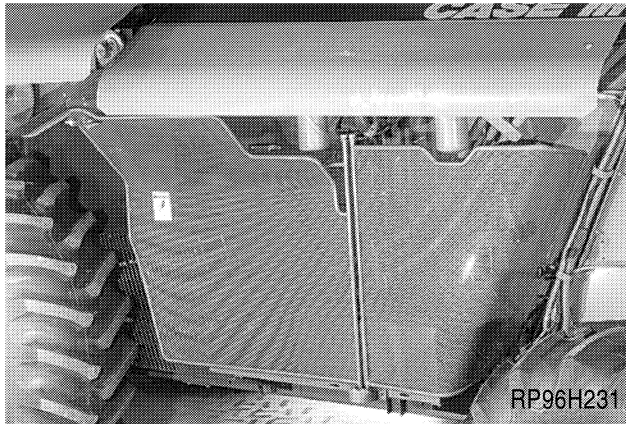
ENGINE REMOVAL

STEP 1



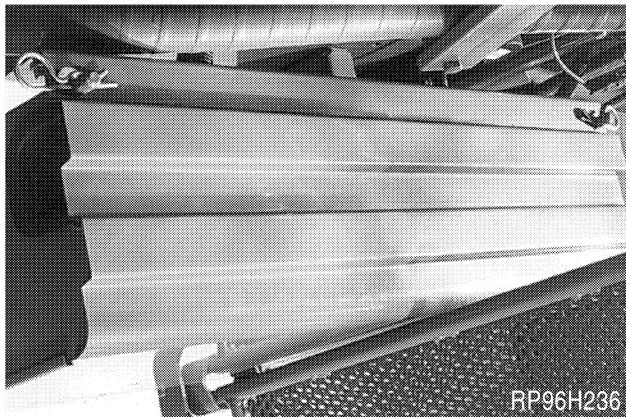
Park the combine on a hard, level surface and turn the engine off. Put blocks in front of and behind the drive wheels.

STEP 2



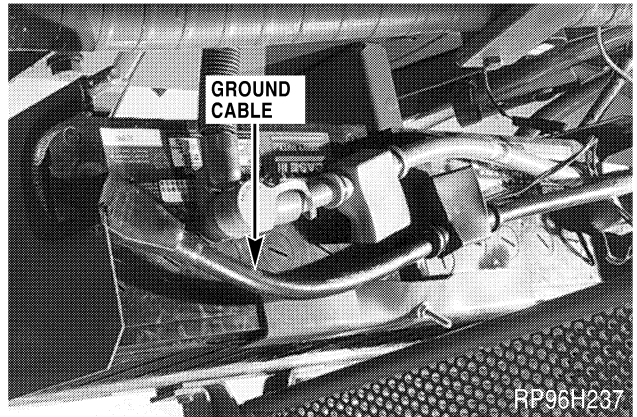
At the left side of the combine, raise the front and rear panels and open the front screen to gain access to the batteries.

STEP 3



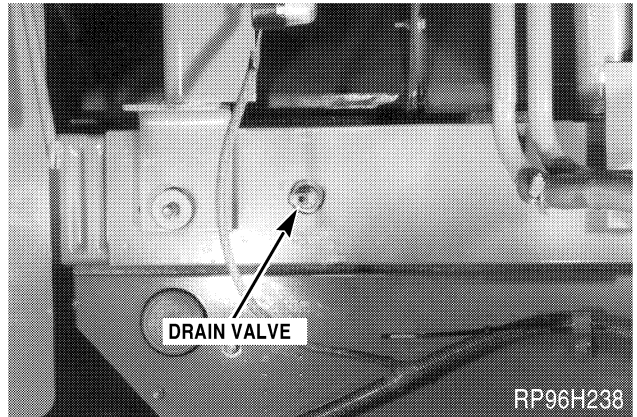
Remove the two clips and remove the battery box cover.

STEP 4



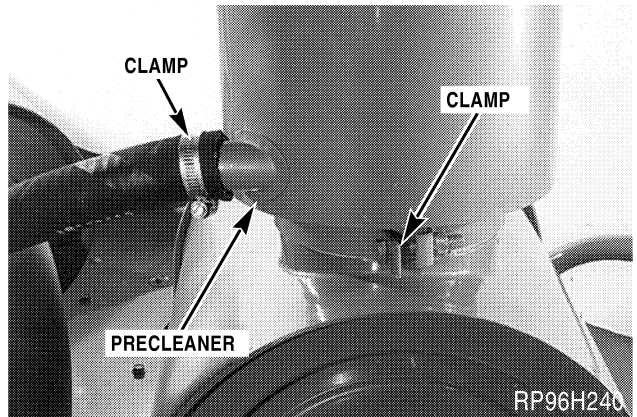
Disconnect the battery ground cable and ground wires from the negative terminal of each battery.

STEP 5

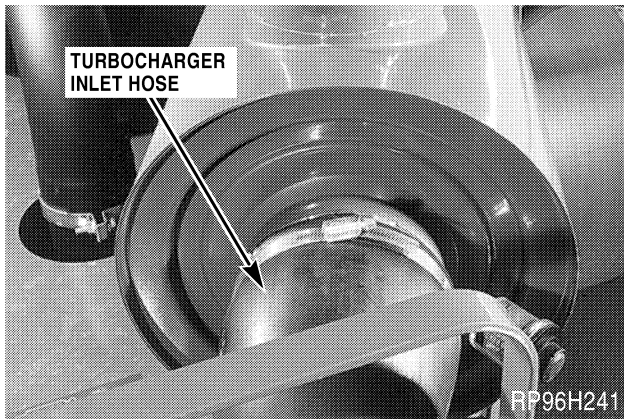


At the right side of the combine, remove the rear screen. Open the radiator drain valve and drain the coolant. Close and securely tighten the drain valve after the coolant has drained from the radiator.

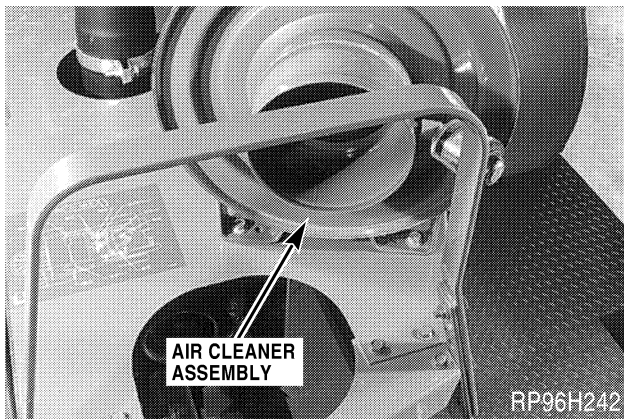
STEP 6



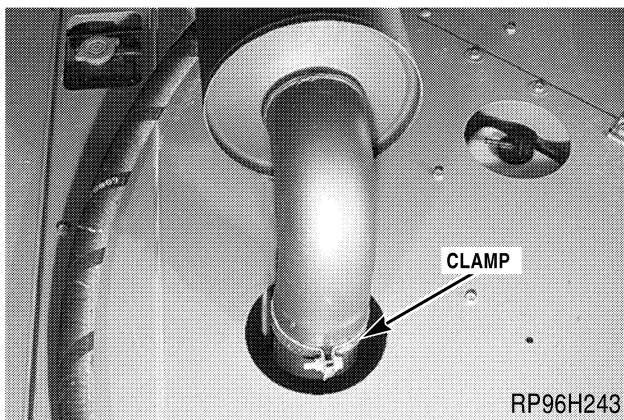
Loosen the hose clamp and disconnect the hose from the precleaner. Loosen the clamp on the precleaner and remove the precleaner.

STEP 7

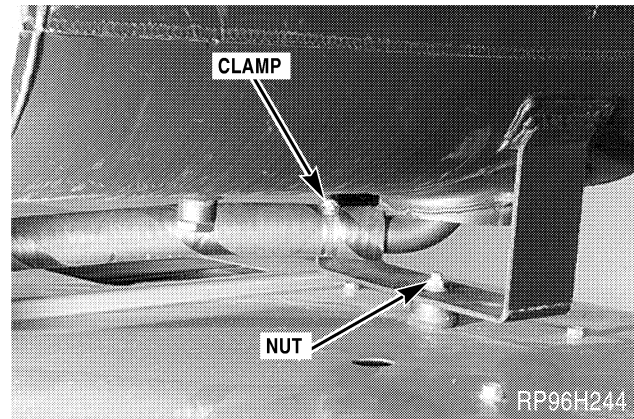
Loosen the two clamps on the turbocharger inlet hose. Disconnect and remove the turbocharger inlet hose from the machine.

STEP 8

Remove the four bolts and nuts. Remove the air cleaner assembly from the machine.

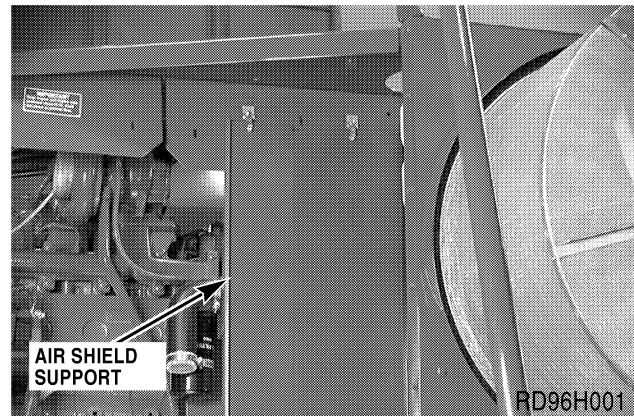
STEP 9

Loosen the clamp on the exhaust muffler (if equipped) inlet. If not equipped with a muffler, remove the exhaust pipe.

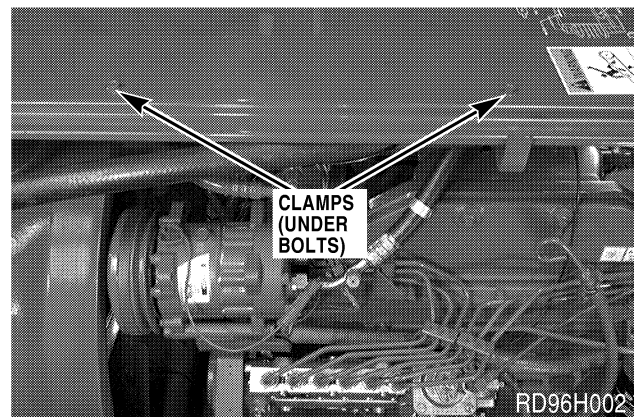
STEP 10

Loosen the clamp on the hose. Disconnect and remove the hose from the machine. Remove the nut holding the muffler to the upper rear cover. Remove the muffler from the machine.

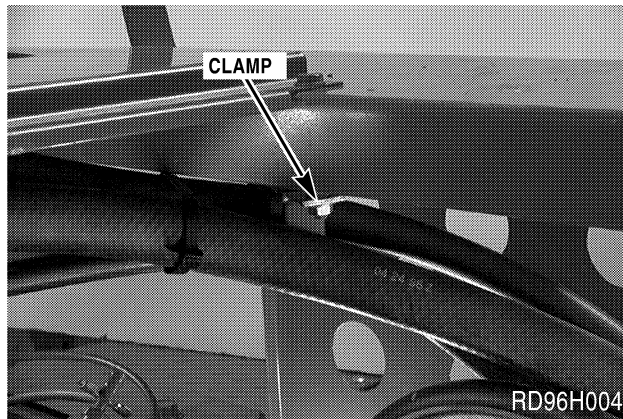
IMPORTANT: Cover the engine outlet to prevent entry of foreign matter into the engine.

STEP 11

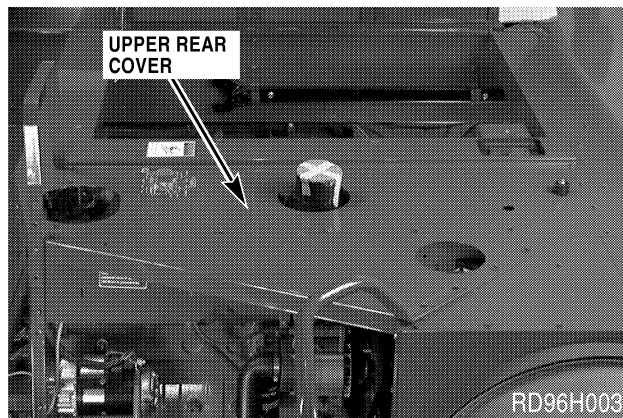
Release the two door retaining clips. Remove the air shield support from the machine.

STEP 12

Remove the two clamps holding the hoses to the upper rear cover.

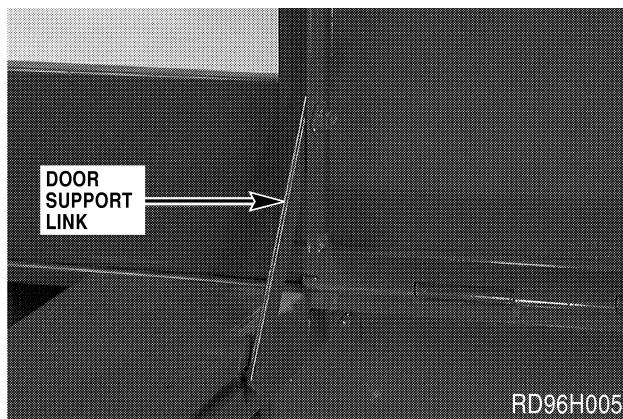
STEP 13

Remove the clamp holding the hoses to the upper rear cover.

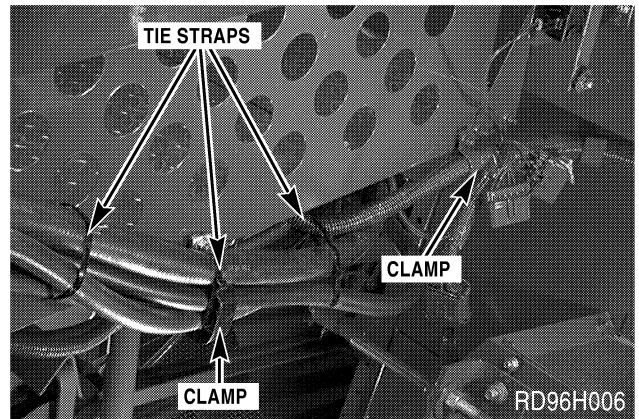
STEP 14

Remove the upper rear cover from the machine. Note the bolt, spacer, flat washer and nut located at the front left of the upper rear cover.

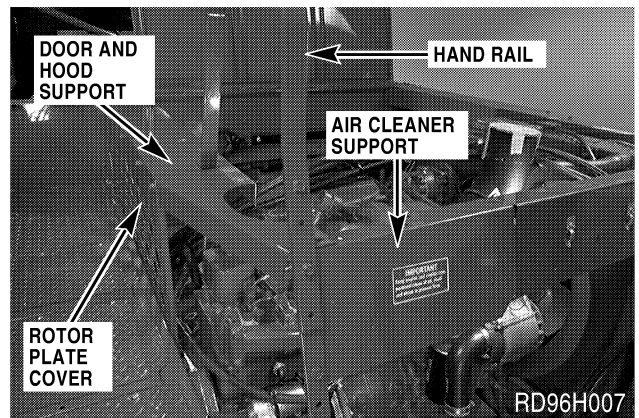
IMPORTANT: To prevent personnel injury, install the two bolts to secure the upper right hand rail to the machine after the upper rear cover is removed.

STEP 15

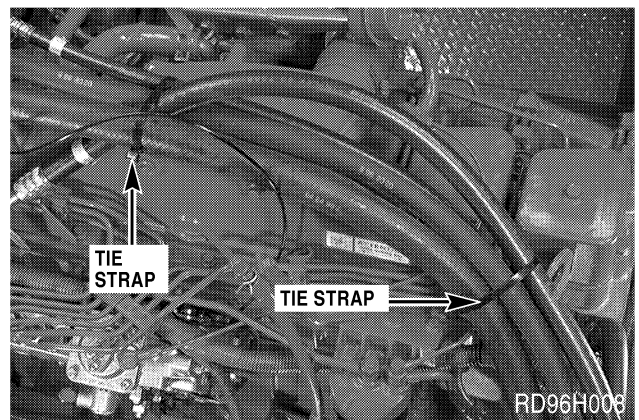
Fasten the engine and rotor drive door to the grain tank brace. Remove the nut from the door support link and pull the link from the engine and rotor drive door.

STEP 16

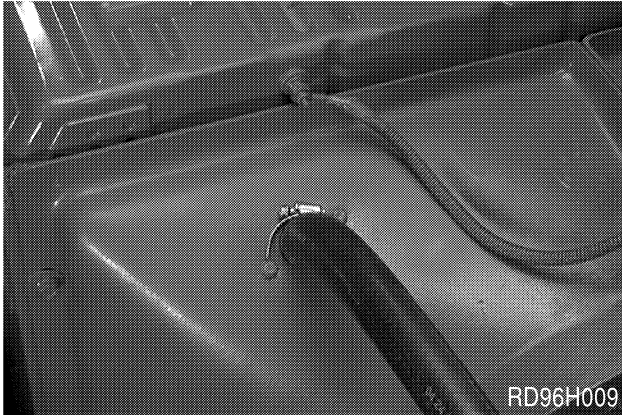
Remove the two clamps located at the bottom of the rotor plate cover. Cut, remove, and discard the three tie straps.

STEP 17

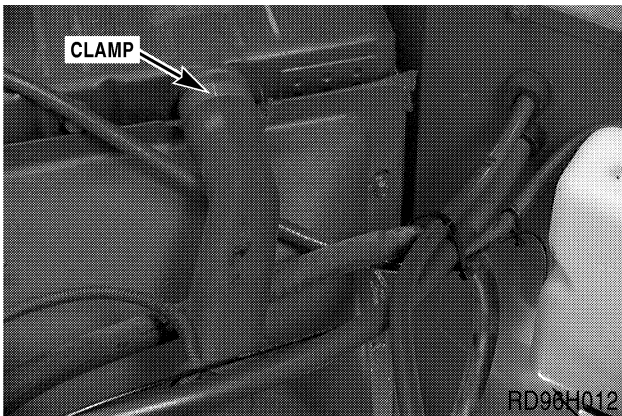
Remove the air cleaner support. Remove the rotor plate cover, door and hood support, and hand rail as an assembly from the machine.

STEP 18

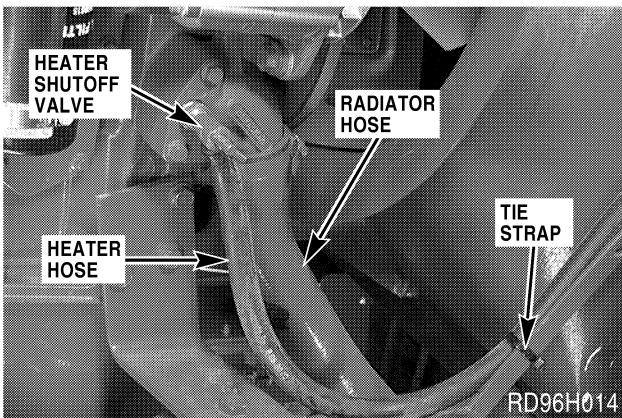
Cut, remove, and discard the two tie straps.

STEP 19

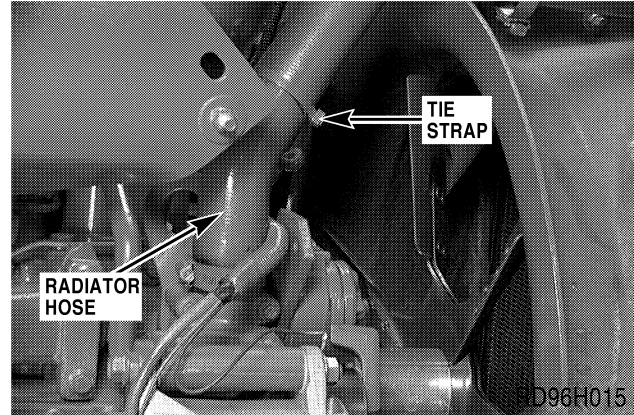
If equipped, loosen the clamp and disconnect the aspirator hose from the fan shroud. Move the aspirator hose away from the engine. Tag and disconnect the wire from the coolant level sending unit installed in the radiator.

STEP 20

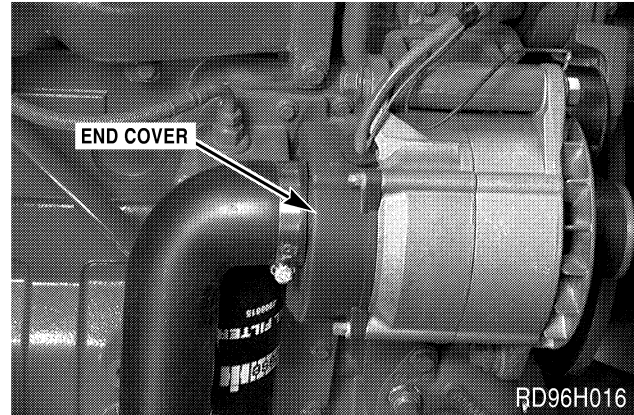
Cut, remove, and discard the two tie straps. Loosen the clamp and disconnect the radiator upper hose from the radiator.

STEP 21

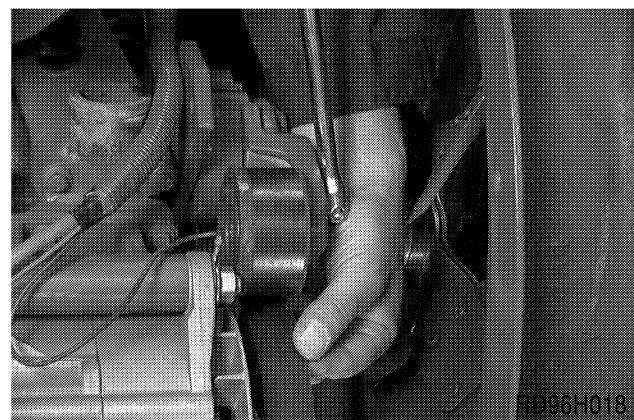
Close the heater shutoff valve. Cut, remove, and discard the tie strap holding the heater hose to the machine. Disconnect the heater hose from the heater shutoff valve. Move the hose away from engine towards the front of the machine. Loosen two clamps and remove lower radiator hose from machine.

STEP 22

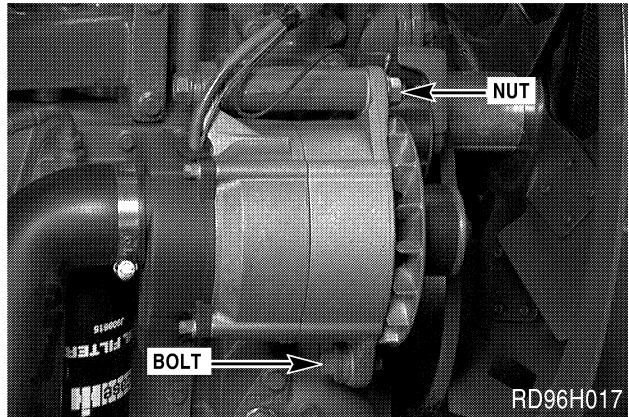
Cut, remove, and discard the tie strap holding the wiring harness to the upper radiator hose. Loosen the clamp and remove the upper radiator hose from the machine.

STEP 23

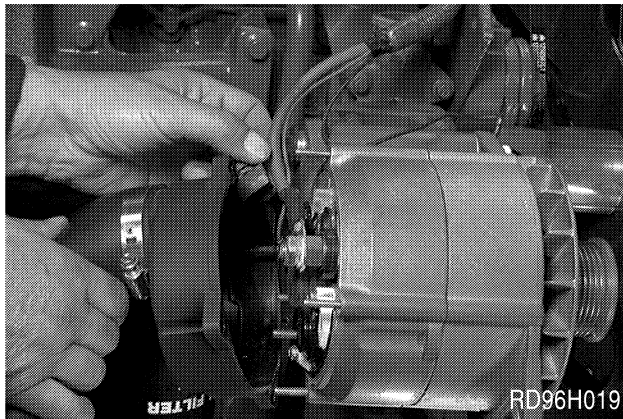
Remove the eight nuts and four washers holding the end cover to the alternator.

STEP 24

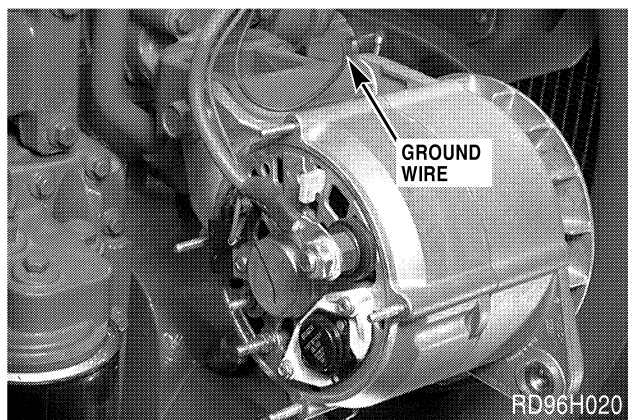
Using a 3/8 inch square drive ratchet wrench, lift the belt tensioner pulley off the fan belt and remove the fan belt from the alternator pulley.

STEP 25

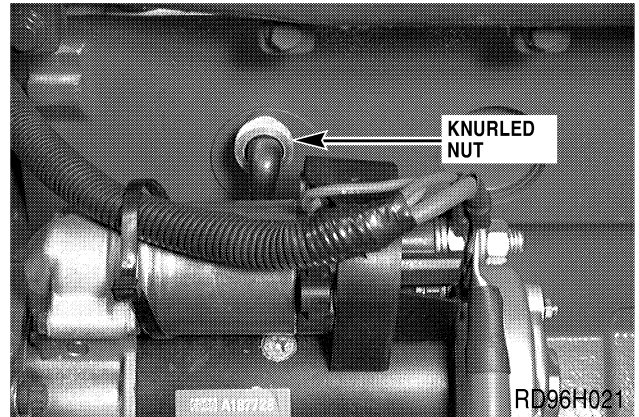
Remove the alternator bottom mounting bolt and loosen the top mounting nut.

STEP 26

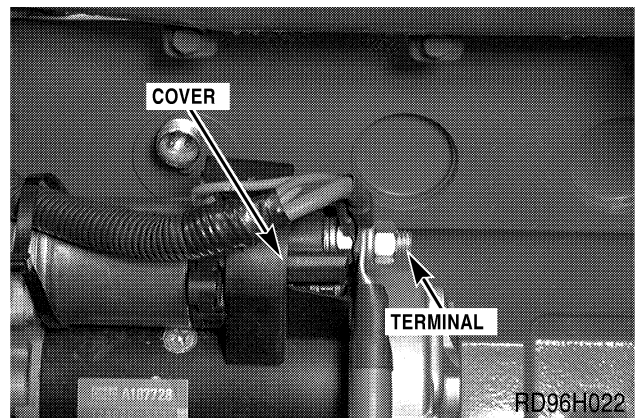
Swing the alternator up and pull the end cover away from the alternator. Remove the grommet with the wires from the end cover then remove the grommet from the wires. Remove the end cover.

STEP 27

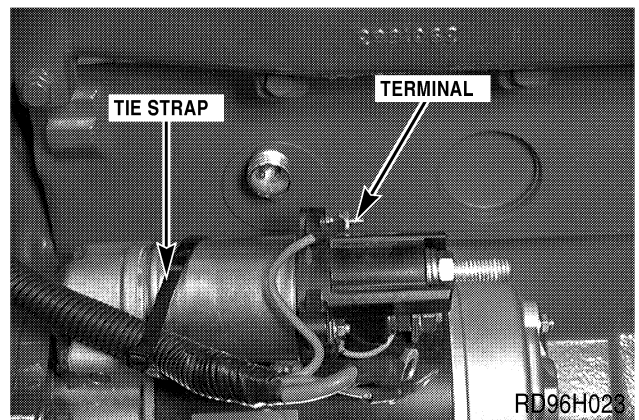
Tag and disconnect the two wires from the alternator. Remove the top mounting nut and disconnect the ground wire.

STEP 28

Loosen the knurled nut and disconnect the wire from the engine coolant heater (if equipped).

STEP 29

Tag and disconnect the positive cable and the two wires from the starter terminal. Loosen the screw securing the cover to the starter. Remove the cover and screw.

STEP 30

Tag and disconnect the wire from the solenoid assembly terminal. Cut, remove, and discard the tie strap.

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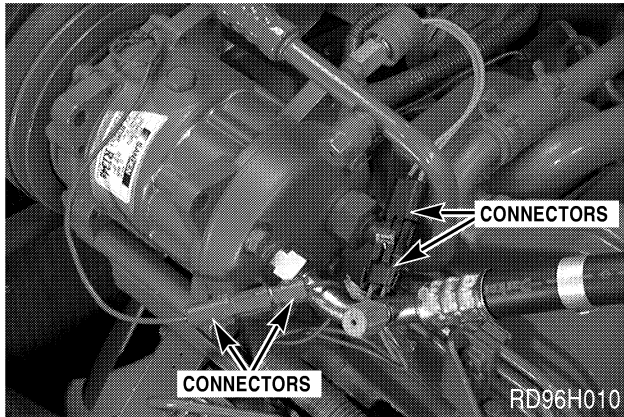
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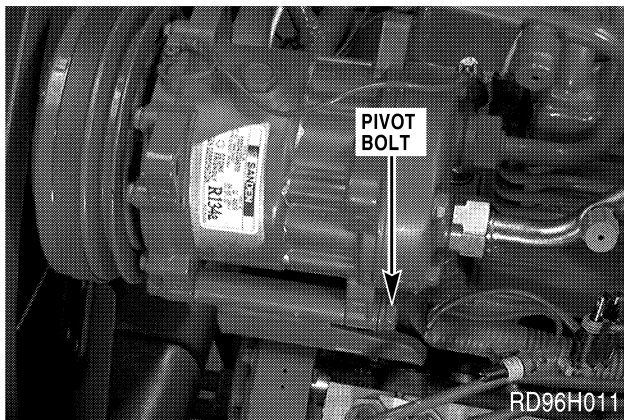
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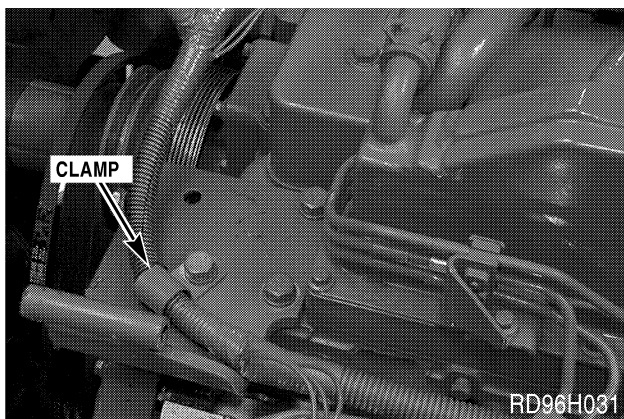
Thank you so much for reading.

STEP 31

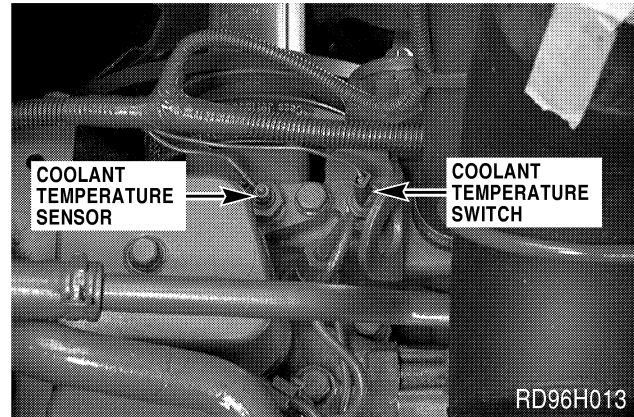
Disconnect the air conditioner compressor assembly two connectors from the wiring harness connectors.

STEP 32

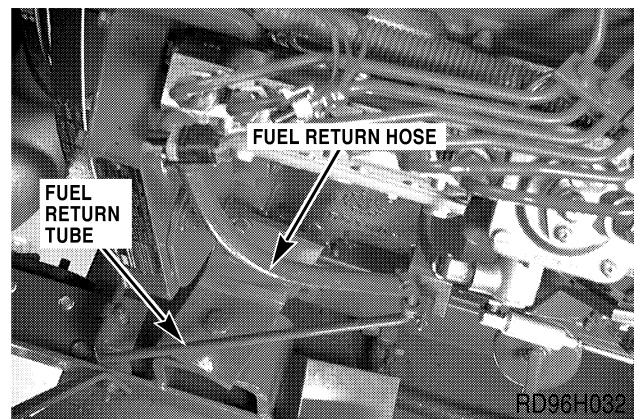
Remove the air conditioner compressor assembly pivot and adjustment bolts. Remove the drive belt from the compressor assembly drive pulley and remove the compressor assembly from the engine. Move the compressor assembly towards the front right of the radiator and tie the compressor assembly to the side of the machine.

STEP 33

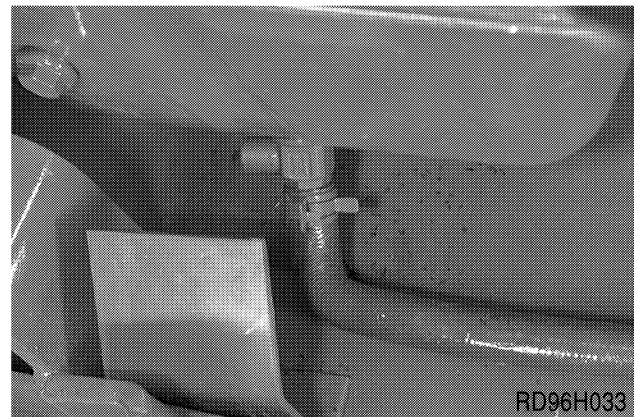
Remove the clamp holding the wiring harness to the engine.

STEP 34

Disconnect the wiring harness from the coolant temperature sensor and the coolant temperature switch installed in the cylinder head.

STEP 35

Loosen the clamp on the fuel return hose and disconnect the fuel return hose from the tube. Remove the clamp holding the tube to the engine. Remove the clamp holding the fuel return tube to the machine.

STEP 36

Disconnect the oil drain hose from the engine oil pan.