

621C/721C Loaders Service Manual

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NOTE: Case Corporation reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

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Section 1001

STANDARD TORQUE SPECIFICATIONS

CASE CORPORATION
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CASE CANADA CORPORATION
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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

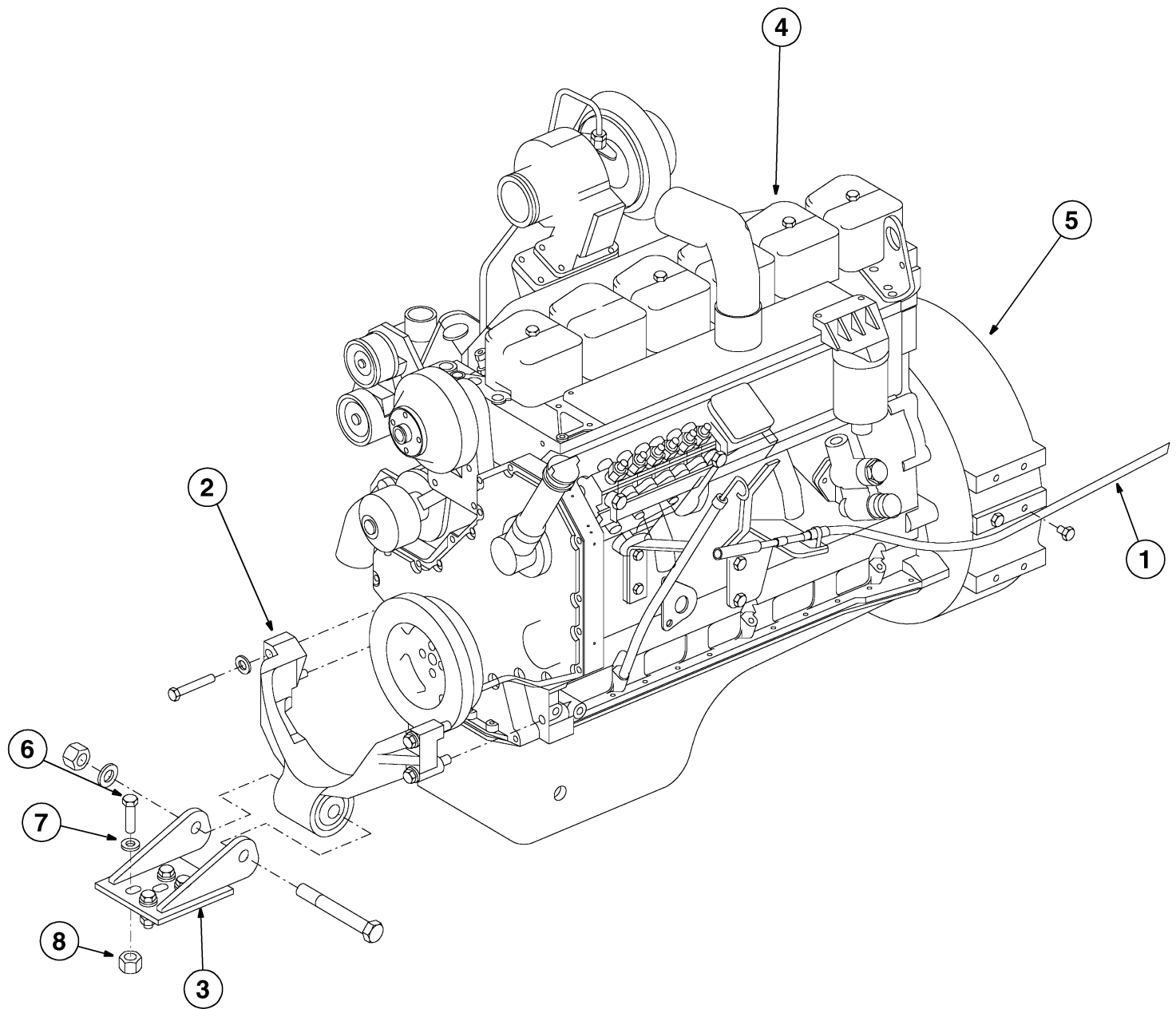
ENGINE

Removal

1. Park the machine on a level surface and lower the loader bucket to the floor. Stop the engine and apply the parking brake.
2. Let the engine cool. Loosen and remove the radiator cap. Drain the cooling system. The drain valve is located at the right front side of the radiator. The cooling system holds 26.5 litres (28 U.S. quarts) of coolant.
3. Open the access door on each side of the engine compartment.
4. Turn the battery disconnect switch to the OFF position.
5. Open the grille.
6. Loosen and remove the precleaner. If the air cleaner is equipped with a cap, loosen the clamp and remove the cap.
7. Remove the plugs and loosen and remove the cap screws, lock washers, and flat washers that fasten the hood.
8. Connect suitable lifting equipment to the hood and remove the hood.
9. Loosen and remove the nuts, lock washers, flat washers, and carriage bolts that fasten the lower side panels. Remove both lower side panels.
10. Disconnect the ground cable from the batteries.
11. Disconnect the positive cable from the batteries.
12. If equipped with a backup alarm, disconnect the wires from the backup alarm.
13. Loosen and remove the nut, lock washer, and bolt that fasten the clamp for the wire harness to the top right side of the radiator shroud.
14. Cut the tie strap that fastens the wire harness for the lamps at the right side of the radiator shroud. Disconnect both connectors.
15. Repeat Steps 13 and 14 for the left side of the radiator shroud.
16. If equipped with ether injection, disconnect the wire harness and disconnect the tube from the valve assembly.
17. Cut the tie strap that fastens the hoses and wire harness.
18. Loosen and remove the nuts and lock washers that fasten the clamps for the wire harness and hose to the left side of the radiator shroud.
19. Disconnect the hose from the bottom of the coolant reservoir and drain the coolant reservoir.
20. Loosen and remove the hardware that fastens the rear of each side of the radiator shroud to the frame.
21. Loosen and remove the nuts, lock washers, and flat washers that fasten each side of the baffle for the battery compartment to the frame.
22. Loosen and remove the nut, lock washer, flat washer, and bolt that fasten the right side of the battery cover to the support. Remove the support.
23. Loosen and remove the self-locking nut, flat washers, and bolt that fasten the brace to the left side of the battery cover. Loosen and remove the remaining hardware that fastens the support to the left side of the battery cover. Remove the support.
24. Loosen and remove the cap screws, lock washers, and flat washers that fasten the battery cover to the baffle. Remove the battery cover.
25. Remove the baffle. If necessary, loosen the J-bolts for the clamp on the front battery and move the front battery toward the rear to remove the baffle.
26. Disconnect the hose from each side of the bottom of the radiator. Install a plug in each hose and a cap on each fitting.
27. Loosen and remove the thumb screws and flat washers at the right side of the hydraulic oil cooler.
28. Loosen and remove the cap screws, lock washers, and flat washers that fasten the clamp for the hose and the hinge for the hydraulic oil cooler to the radiator.
29. Lower the hydraulic oil cooler.

30. Loosen and remove the nuts, lock washers, and flat washers that fasten the bracket for the battery disconnect switch to the radiator shroud. Lower the bracket out of the way.
 31. Loosen and remove the cap screws, lock washers, and flat washers that fasten the clamps for the hose and the guard to the fan shroud.
 32. Remove the guard.
 33. Disconnect the bottom radiator hose from the water pump.
 34. Disconnect the top radiator hose from the radiator.
 35. Disconnect the low coolant indicator wire and the radiator frame ground wire.
 36. Loosen and remove the hardware that fastens the front of each side of the radiator shroud to the frame.
 37. Connect suitable lifting equipment to the radiator shroud.
 38. Make sure that the hydraulic oil cooler, the hoses, and the wire harness are free of the radiator shroud. Raise the radiator shroud until the radiator shroud is free of the frame and remove the radiator shroud from the machine.
 39. Lower the radiator shroud so that the radiator touches the bench. Put blocks under each side of the radiator shroud to hold the radiator shroud in place.
 40. Loosen the nut on the bolt for the muffler clamp.
 41. Loosen and remove the nuts, lock washers, flat washers, and bolts that fasten the bracket for the muffler to the bracket on the engine.
 42. Remove the muffler. Cover the opening in the exhaust elbow.
 43. Disconnect the wires from the switch for the air cleaner indicator.
 44. Disconnect the hose from the air cleaner.
 45. Loosen and remove the nuts and bolts that fasten the straps for the air cleaner.
 46. Remove the air cleaner from the bracket.
 47. Loosen and remove the cap screw that fastens the clamp for the wire harness.
 48. Disconnect the heater hose. Install a plug in the hose.
 49. Loosen and remove the cap screw, lock washer, and external tooth washer that fasten the ground cable to the engine.
 50. Loosen and remove the nut and lock washer that fasten the wire to the battery terminal on the alternator. Remove the wire.
 51. Loosen and remove the nut and lock washer that fasten the small wire to the alternator. Remove the small wire.
 52. Loosen and remove the cap screw that fastens the clamp for the heater hose to the engine.
 53. Disconnect the wire from the switch terminal of the starter solenoid.
 54. Disconnect the cables from the battery terminal of the starter solenoid.
 55. Loosen and remove the copper nut and copper flat washer that fasten the wires to the stud in the left side of the flywheel housing. Remove the wires. Loosen and remove the cap screw and lock washer that fasten the clamp for the wire harness to the side of the flywheel housing.
 56. Disconnect the wire from the temperature sender.
- NOTE:** *If the machine is equipped with air conditioning, do Steps 57 through 62. If the machine is not equipped with air conditioning, go to Step 63.*
57. Make a mark on one of the connectors for correct assembly.
 58. Disconnect the connectors for the compressor and cut the tie strap that fastens the wire harness to the fuel line.

59. Loosen and remove the cap screw, lock washer, and flat washer that fasten the adjusting strap for the compressor. Push the compressor toward the engine and remove the belt from the pulley of the compressor.
60. Loosen and remove the nut from the bolt at the base of the compressor.
61. Remove the bolt, lock washer, and flat washer that fasten the compressor to the mounting bracket.
62. Use a piece of wire to tie the compressor so that the compressor is out of the way.
63. If equipped with ether injection, disconnect the tube fitting from the intake manifold.
64. If equipped with optional gauges, disconnect the wire at the sender for the oil pressure gauge. Disconnect the wire from the fuel shutoff solenoid.
65. Disconnect the wire harness from the oil pressure switch.
66. Loosen and remove the cap screw and lock washer that fasten the clamp for the wire harness to the engine.
67. Disconnect the wire harness.
68. Disconnect the throttle cable (1) from the fuel injection pump, refer to Figure 1.
69. Loosen and remove the nuts, lock washers, flat washers, and bolts that fasten the clamp for the throttle cable. Move the throttle cable out of the way.
70. Disconnect the fuel supply hose from the hand primer pump. Install a plug in the hose. Disconnect the hose from the fuel return line. Install a plug in the hose.
71. Disconnect the heater hose. Install a plug in the hose.
72. Loosen and remove the cap screw and lock washer that fasten the clamp for the wire harness to the right side of the flywheel housing (5).
73. Connect acceptable lifting equipment to the engine.
74. Loosen the bottom cap screw and loosen and remove the top cap screw that fastens the cover to the flywheel housing (5).
75. Remove the plastic plug from the flywheel housing (5).
76. There are four 10 mm Allen head screws that fasten the flex plates to the flywheel. Only one Allen head screw at a time can be removed. The flywheel must be rotated to align each Allen head screw with the hole. Do the following procedure to remove the four Allen head screws.
77. Install the CAS-1690 tool and rotate the flywheel to align an Allen head screw with the hole below.
78. Loosen and remove the Allen head screw.
79. Repeat Steps 77 and 78 until all four Allen head screws are removed.
80. Loosen and remove the cap screws that fasten the panels under each side of the cab.
81. Remove the panels.
82. Put a floor jack under the transmission.
83. Loosen and remove the cap screws and lock washers that fasten the clamps for the wire harness and the bracket for the heater hose to the flywheel housing. Loosen and remove the remaining cap screws and lock washers and nuts and lock washers that fasten the transmission to the flywheel housing.
84. Remove the cap from the hydraulic reservoir and attach a vacuum pump to reservoir.
85. Start the vacuum pump.
86. Disconnect the brake pump inlet and outlet lines at the brake pump. Cap and plug the hoses and fittings.
87. Stop the vacuum pump.
88. Loosen and remove the nuts, lock washers, and bolts that fasten the filler pipe to the frame. Loosen the bottom clamp at the hose and remove the filler pipe and the hose.



GS98K001

- | | |
|--------------------------|---------------------|
| 1. THROTTLE CABLE | 5. FLYWHEEL HOUSING |
| 2. REAR ENGINE MOUNT | 6. MOUNTING BOLT |
| 3. ENGINE WELDMENT MOUNT | 7. WASHER |
| 4. ENGINE | 8. NUT |

Figure 1. ENGINE

89. Remove the mounting bolts (6), washers (7), and nuts (8) from the front engine weldment mount (3), refer to Figure 1.
90. Move the engine rearward while raising the engine at the same time. Be sure all harnesses and hoses are disconnected and out of the way.
91. Remove the engine from the machine.

Installation

1. Make sure the torque converter is installed on the transmission. Three splined shafts must be engaged for the torque converter to be installed correctly.
2. Install a stud 70 mm (2-3/4 inches) long with 10 mm threads in one of the holes in the flex plates so the stud is to the left side. Make sure the flex plates are not bent or damaged.
3. Carry the engine over the frame. Move the engine forward and lower the engine.
4. Push the engine toward the front. Have another person align the stud with the hole in the flywheel.
5. Install the CAS-1690 tool to turn the flywheel. Remove the stud from the flex plates and install an Allen head screw.
6. Rotate the flywheel and install the remaining Allen head screws.
7. Tighten all of the Allen head screws to 43 to 49 Nm (384 to 432 pound-inches).
8. Remove the CAS-1690 tool and install the plastic plug in the flywheel housing.
9. Install the cover. Install the cap screw and tighten both cap screws.
10. Install the mounting bolts (6), washers (7), and nuts (8). Tighten the bolts to 109 to 130 Nm (80 to 96 pound-feet).
11. Install the hose and the filler pipe. Install the bolts, lock washers, and nuts. Tighten the nuts. Tighten the bottom clamp for the hose.
12. Start the vacuum pump.
13. Connect the brake pump inlet and outlet lines.
14. Stop the vacuum pump.
15. Remove the vacuum pump from the hydraulic reservoir. Replace the cap on the reservoir.
16. Install the cap screws and lock washers that fasten the clamps for the wire harness and the bracket for the heater hose to the flywheel housing. Install the remaining cap screws and lock washers and nuts and lock washers that fasten the transmission to the flywheel housing. Tighten the cap screws and nuts to 47 to 57 Nm (420 to 504 pound-inches).
17. Install the panels under each side of the cab.
18. Install and tighten the cap screws.
19. Disconnect the lifting equipment from the engine.
20. Install the cap screw, lock washer, and clamp that fasten the wire harness to the right side of the flywheel housing.
21. Remove the plug from the heater hose and connect the heater hose.
22. Remove the plug from the hose and connect the hose to the fuel return line. Remove the plug from the fuel supply hose and connect the fuel supply hose to the hand primer pump.
23. Install the clamp, bolts, flat washers, lock washers, and nuts that fasten the throttle cable to the bracket. Tighten the nuts.
24. Connect the throttle cable to the pin in the lever on the fuel injection pump.
25. Connect the wire harness.
26. Install the cap screw and lock washer that fasten the clamp for the wire harness to the engine. Tighten the cap screw.
27. Connect the wire harness to the oil pressure switch.
28. If equipped with ether injection, connect the tube fitting to the intake manifold.
29. If equipped with optional gauges, connect the wire to the sender for the oil pressure gauge.

30. Connect the wire to the fuel shutoff solenoid.

NOTE: *If the machine is equipped with air conditioning, do Steps 31 through 36. If the machine is not equipped with air conditioning go to Step 37.*

31. Remove the wire that was used to tie the compressor out of the way and install the compressor on the mounting bracket. Align the compressor with the mounting bracket and install the bolt, lock washer, and flat washer.

32. Install the nut on the bolt and tighten the nut.

33. Install the belt on the pulley for the compressor. Install the cap screw, lock washer, and flat washer that fasten the adjusting strap for the compressor. Do not tighten the cap screw all the way at this time.

34. Use a prybar to move the compressor away from the engine. Tighten the cap screw.

35. Check the tension on the belt with a tension gauge. See Section 1001 for belt tension.

36. Attach the connectors for the compressor and install a new tie strap to fasten the wire harness to the fuel line.

37. Connect the wire for the temperature sender.

38. Install the cap screw and lock washer that fasten the clamp for the wire harness to the left side of the flywheel housing. Tighten the cap screw. Install the wires on the stud. Install the copper flat washer and the copper nut on the stud and tighten the copper nut.

39. Connect the cables to the battery terminal of the starter solenoid.

40. Connect the wire to the switch terminal of the starter solenoid.

41. Install the cap screw for the clamp that fastens the heater hose to the engine.

42. Install the small wire on the alternator. Install the lock washer and nut. Tighten the nut.

43. Install the wire to the battery terminal on the alternator. Install the lock washer and nut. Tighten the nut.

44. Install the external tooth washer, the ground cable, the lock washer, and the cap screw. Tighten the cap screw.

45. Remove the plug from the heater hose and connect the heater hose.

46. Install the cap screw that fastens the clamp for the wire harness. Tighten the cap screw.

47. Install the air cleaner in the bracket.

48. Install the bolts and nuts that fasten the straps. Tighten the bolts.

49. Connect the hose and tighten the hose clamp.

50. Connect the wires to the switch for the air cleaner indicator.

51. Remove the cover or the tape from the opening in the exhaust elbow and install the muffler.

52. Install the bolts, flat washers, lock washers, and nuts that fasten the bracket for the muffler to the bracket on the engine. Tighten the nuts.

53. Tighten the nut on the bolt for the muffler clamp.

54. Install the radiator shroud over the frame and carefully lower the radiator shroud over the hydraulic oil cooler.

55. Lower the radiator shroud into alignment with the frame. Disconnect the lifting equipment from the radiator shroud.

56. Install the hardware that fastens the front of each side of the radiator shroud to the frame. Tighten the hardware.

57. Connect the top radiator hose to the radiator.

58. Connect the bottom radiator hose to the water pump.

59. Install the guard.

60. Install the cap screws, lock washers, and flat washers that fasten the clamps for the hose and the guard to the fan shroud. Tighten the cap screws.

61. Install the bracket for the battery disconnect switch to the radiator shroud. Install the flat washers, lock washers, and nuts. Tighten the nuts.
62. Lift the hydraulic oil cooler into position and install the cap screws, lock washers, and flat washers that fasten the clamp for the hose and the hinge for the hydraulic oil cooler to the radiator. Tighten the cap screws.
63. Install the thumb screws and flat washers at the left side of the hydraulic oil cooler. Tighten the thumb screws.
64. Remove the plugs from the hoses and the caps from the fittings and connect the hoses to the bottom of the radiator.
65. Install the baffle for the battery compartment.
66. Install the battery cover. Install the cap screws, lock washers, and flat washers that fasten the battery cover to the baffle. Tighten the cap screws.
67. Install the support and the hardware that fastens the support to the left side of the battery cover. Install the bolt, flat washers, and self-locking nut that fasten the brace to the left side of the battery cover. Tighten the self-locking nut and the remaining hardware.
68. Install the support and install the bolt, flat washer, lock washer, and nut that fasten the right side of the battery cover to the support. Tighten the nut.
69. Install the flat washers, lock washers, and nuts that fasten each side of the baffle for the battery compartment to the frame. Tighten the nuts.
70. Install the hardware that fastens the rear of each side of the radiator shroud to the frame. Tighten the hardware.
71. Route the hose through the support and the radiator shroud and connect the hose to the bottom of the coolant reservoir.
72. Install the lock washer and nut that fasten the clamp for the wire harness to the top left side of the radiator shroud. Tighten the nut.
73. Install the lock washer and nut that fasten the clamps for the hose and the clamp for the wire harness to the left side of the radiator shroud.
74. Install a new tie strap on the hoses and wire harness.
75. If equipped with ether injection, connect the tube to the valve assembly and connect the wire harness.
76. Install the bolt, lock washer, and nut that fasten the clamp for the wire harness to the top right side of the radiator shroud. Tighten the nut.
77. Connect both connectors. Install a new tie strap to fasten the wire harness for the lamps at the right side of the radiator shroud.
78. Repeat Steps 76 through 77 for the left side of the radiator shroud.
79. If equipped with a backup alarm, connect the wires to the backup alarm.
80. Connect the positive cable to the batteries.
81. Connect the ground cable to the batteries. If necessary, tighten the J-bolts for the clamp on the front battery.
82. Make sure that the drain valve at the front right side of the radiator is closed. Fill the cooling system with coolant. If new coolant is being installed, the coolant must be at least half permanent antifreeze. The cooling system holds 26.5 litres (28 U.S. quarts) of coolant. See Section 1002. Install the radiator cap.
83. Fill the coolant reservoir with the coolant that was drained or new coolant.
84. Turn the battery disconnect switch to the ON position.
85. Start the engine and run the engine at low idle. If necessary, see Section 3410 and bleed the air from the fuel system. Check to see that the gauges show the correct indication. Check for coolant and oil leaks. Stop the engine.
86. See Section 7002 to bleed the brake system.

2000-10

87. Install each lower side panel. Install the carriage bolts, flat washers, lock washers, and nuts that fasten the lower side panels. Tighten the nuts.
88. Install the hood. Disconnect the lifting equipment from the hood.
89. Install the cap screws, lock washers, and flat washers that fasten the hood. Tighten the cap screws. Install the plugs in the hood.
90. Install the precleaner. If the air cleaner is equipped with a cap, install the cap and tighten the clamp.
91. Close the grille.
92. Close the access door on each side of the engine compartment.
93. Remove the floor jack from under the transmission.

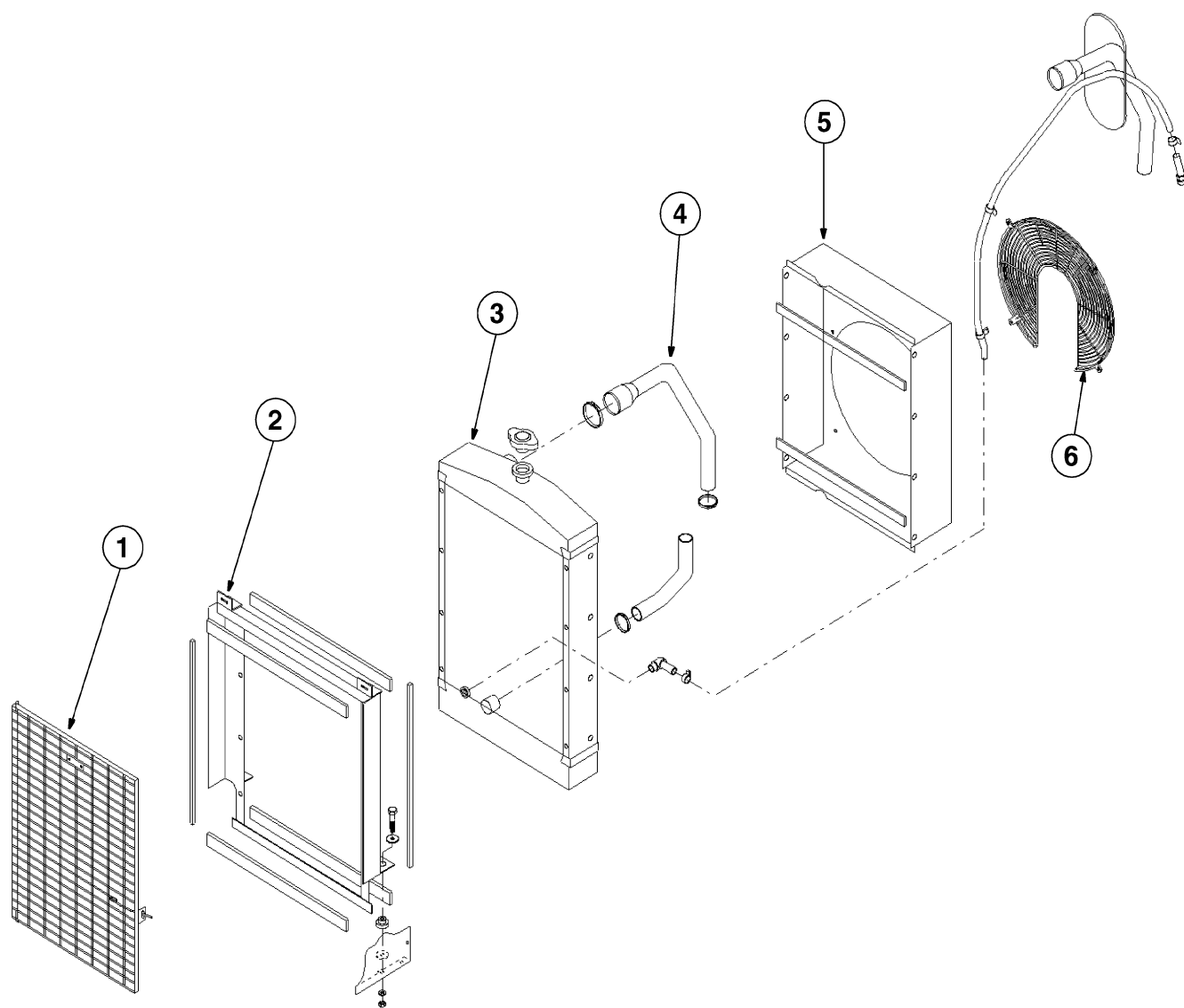
RADIATOR

Removal

1. Park the machine on a level surface and lower the loader bucket to the floor. Stop the engine and apply the parking brake.
2. Let the engine cool. Loosen and remove the radiator cap. Drain the cooling system. The drain valve is located at the right front side of the radiator. The cooling system holds 26.5 litres (28 U.S. quarts) of coolant.
3. Open the access door on each side of the engine compartment.
4. Turn the battery disconnect switch to the OFF position.
5. Open the grille (1). Refer to Figure 2.
6. Loosen and remove the precleaner. If the air cleaner is equipped with a cap, loosen the clamp and remove the cap.
7. Remove the plugs and loosen and remove the cap screws, lock washers, and flat washers that fasten the hood.
8. Connect suitable lifting equipment to the hood and remove the hood.
9. Loosen and remove the nuts, lock washers, flat washers, and carriage bolts that fasten the lower side panels. Remove both lower side panels.
10. Disconnect the ground cable from the batteries.
11. Disconnect the positive cable from the batteries.
12. Loosen and remove the nuts, lock washers, and flat washers that fasten the bracket for the battery disconnect switch to the radiator shroud. Lower the bracket out of the way.
13. Loosen and remove the cap screws, lock washers, and flat washers that fasten the clamps for the hose and the guard (6) to the fan shroud (5).
14. Remove the guard (6).
15. Disconnect the bottom radiator hose (7) from the water pump.
16. Loosen and remove the cap screws, lock washers, and flat washers that fasten the fan shroud (5) to the radiator (3). Put the fan shroud (5) over the fan.
17. Loosen and remove the cap screws and lock washers that fasten the fan and spacer to the pulley. Remove the fan and spacer and remove the fan shroud (5).
18. Loosen the hose clamp and disconnect the bottom radiator hose (7) from the radiator (3).
19. Disconnect the hose from each side of the bottom of the radiator (3). Install a plug in each hose and a cap on each fitting.
20. Disconnect the drain hose from the filler neck of the radiator (3).
21. Disconnect the low coolant indicator wire and the radiator frame ground wire.
22. Connect suitable lifting equipment to the radiator (3).
23. Loosen and remove the thumb screws and lock washers at the right side of the hydraulic oil cooler.
24. The right side of the hydraulic oil cooler is on a hinge. Move the hydraulic oil cooler to the right for access to the cap screws and lock washers that hold both sides of the radiator to the mounting bracket. Loosen and remove the cap screws, lock washers and flat washers.
25. Move the radiator (3) toward the engine. Lift the radiator (3) and remove the radiator (3) from the machine.

Installation

1. Check the condition of the insulators in the mounting bracket for the radiator. If the insulators are damaged, install new insulators.
2. Lower the radiator (3) and move the radiator (3) toward the fan shroud (5). Refer to Figure 2.
3. Align the holes in the radiator (3) with the holes in the mounting bracket and install the cap screws, lock washers and flat washers that hold both sides of the radiator (3). Tighten the cap screws.
4. Put the right side of the hydraulic oil cooler against the radiator (3) and install the thumb screws and lock washers. Tighten the thumb screws.
5. Disconnect the lifting equipment from the radiator (3).
6. Connect the drain hose to the filler neck.
7. Connect the low coolant indicator wire and the radiator frame ground wire.
8. Remove the plugs from the hoses and the caps from the fittings and connect the hoses to the bottom of the radiator (8).
9. Connect the bottom radiator hose (7) to the radiator (3).
10. Install the fan shroud (5). Install the spacer and the fan, and install the cap screws and lock washers that fasten the fan and spacer to the pulley. Tighten the cap screws to 57 Nm (504 pound-inches).
11. Install the fan shroud (5) against the radiator (3) and install the cap screws, lock washers, and flat washers. Tighten the cap screws.
12. Connect the bottom radiator hose (7) to the water pump.
13. Install the guard (6).
14. Install the cap screws, lock washers, and flat washers that fasten the clamps for the hose and the guard (6) to the fan shroud (5). Tighten the cap screws.
15. Install the bracket for the battery disconnect switch to the radiator shroud. Install the flat washers, lock washers, and nuts. Tighten the nuts.
16. Connect the positive cable to the batteries.
17. Connect the ground cable to the batteries.
18. Make sure that the drain valve at the front right side of the radiator is closed. Fill the cooling system with coolant. If new coolant is being installed, the coolant must be at least half permanent antifreeze. The cooling system holds 26.5 litres (28 U.S. quarts) of coolant. See Section 1002. Install the radiator cap.
19. Turn the battery disconnect switch to the ON position.
20. Start the engine and run the engine at low idle. Check to see that the gauges show the correct indication. Check for coolant and oil leaks. Stop the engine.
21. Install each lower side panel. Install the carriage bolts, flat washers, lock washers, and nuts that fasten the lower side panels. Tighten the nuts.
22. Install the hood. Disconnect the lifting equipment from the hood.
23. Install the cap screws, lock washers, and flat washers that fasten the hood. Tighten the cap screws. Install the plugs in the hood.
24. Install the precleaner. If the air cleaner is equipped with a cap, install the cap and tighten the clamp.
25. Close the grille (1).
26. Close the access door on each side of the engine compartment.



GS98K002

1. GRILLE
2. RADIATOR SUPPORT
3. RADIATOR

4. UPPER RADIATOR HOSE
5. FAN SHROUD
6. GUARD

7. BOTTOM RADIATOR HOSE

Figure 2. RADIATOR

SPECIFICATIONS

Number of teeth on the flywheel - 621C and 721C	127
Low idle - 621C and 721C	875 to 925 rpm
Full throttle (no load) - 621C and 721C	2375 to 2460 rpm
Temperature of the torque converter oil	82° to 104° C (180° to 220° F)
Temperature of the hydraulic oil	51° to 79° C (125° to 175° F)

Stall speeds

Torque converter - 621C (with and without unloading valve) and 721C	2040 to 2240 rpm
Hydraulic system - 621C (without unloading valve) and 721C	2110 to 2250 rpm
Hydraulic system - 621C (with unloading valve)	2260 to 2380 rpm
Torque converter and hydraulic system together - 621C (without unloading valve)	1490 to 1720 rpm
Torque converter and hydraulic system together - 621C (with unloading valve)	1720 to 1880 rpm
Torque converter and hydraulic system together - 721C	1490 to 1720 rpm

STALL TESTS

During these tests the engine runs at full throttle and works against the torque converter, the hydraulic system, or both the torque converter and the hydraulic system. The results of these tests will show if the cause of poor performance is one or more of the following: (1) engine, (2) torque converter or transmission, and (3) hydraulic system.

Procedure to Heat the Oil

Torque Converter

1. Sit in the seat.
2. Start the engine and run the engine at low idle.
3. Press the brake pedal, and shift into either Forward or Reverse.
4. Make sure the parking brake is released (OFF).
5. Push the clutch cutout switch to OFF. Put the transmission in manual mode. Push down and hold the left brake pedal for the remainder of this procedure.
6. Move the transmission control lever to Forward and turn the transmission control lever to 4th gear.
7. Increase the engine speed to full throttle and run the engine at this speed for three minutes.
8. Decrease the engine speed to low idle and move the transmission control lever to the Neutral position for 30 seconds.
9. View the oil temperature by pressing the program switch, then press the up count switch to function 007. Return the program switch to the center (OFF) position.
10. Repeat steps 4 through 7 until the temperature of the torque converter oil is between 82° to 104° C (180° to 220° F).

Hydraulic System

1. Apply the parking brake.
2. Start the engine and run at full throttle.
3. Hold the bucket control lever in the ROLLBACK position for 15 seconds. Then return the bucket control lever to neutral for 30 seconds.
4. View the oil temperature by pressing the program switch, then press the up count switch to function 008. Return the program switch to the center (OFF) position.
5. Repeat step 3 until the temperature of the hydraulic oil is between 51° to 79° C (125° to 175° F).

Test No. 1 - Torque Converter and Hydraulic Stall Together

1. Sit in the seat.
2. Start the engine and run the engine at low idle.
3. Press the brake pedal, and shift into either Forward or Reverse.
4. Make sure the parking brake is released (OFF).
5. Run engine at low idle. Push the clutch cutout switch to OFF. Put the transmission in manual mode. Push down and hold the left brake pedal for the remainder of this procedure.

6. Move the transmission control lever to Forward and turn the transmission control lever to 4th gear.
7. Increase the engine speed to 1500 r/min (rpm).
8. Hold the bucket control lever in the ROLLBACK position.
9. Increase the engine speed to full throttle.
10. Check the engine speed by pressing the program switch, left side of the program/reset switch. Press the up count switch until the display reads 01. Return the program switch to the center (OFF) position.
11. Release the bucket control lever.
12. Decrease the engine speed to low idle.
13. Stop the engine.

Understanding Results of Test No. 1

1. If the engine speed was as specified, the engine, torque converter, transmission and hydraulic system are probably good.
2. If the engine speed was not as specified, do Test No. 2 and 3.

Test No. 2 - Torque Converter Stall

1. Sit in the seat.
2. Start the engine and run the engine at low idle.
3. Press the brake pedal, and shift into either Forward or Reverse.
4. Make sure the parking brake is released (OFF).
5. Run the engine at low idle.
6. Push down and hold the brake pedal for the remainder of this test.
7. Move the transmission control lever to Forward and turn the transmission control lever to 4th gear.
8. Increase the engine speed to full throttle.
9. Check the engine speed by pressing the program switch, left side of the program/reset switch. Press the up count switch until the display reads 01. Return the program switch to the center (OFF) position.

10. Decrease the engine speed to low idle.
11. Stop the engine.

Understanding Results of Test No. 2

1. If the engine speed was as specified, the engine, torque converter and transmission are probably good.
2. If the engine speed was more than specified, the problem can be in the torque converter or the transmission. See Section 6002 for troubleshooting information.
3. If the engine speed was less than specified, do Test No. 3.

Test No. 3 - Hydraulic Stall

1. Start the engine and run at 1500 rpm.
2. Hold the bucket control lever in the ROLLBACK position.
3. Increase the engine speed to full throttle.
4. Check the engine speed by pressing the program switch, left side of the program/reset switch. Press the up count switch until the display reads 01. Return the program switch to the center (OFF) position.
5. Release the bucket control lever.
6. Decrease the engine speed to low idle.
7. Stop the engine.

Understanding Results of Test No. 3

1. If the engine speed was as specified, the engine and hydraulic system are good.
2. If the engine speed was more than specified, a component in the hydraulic system is probably the cause. See Section 8002 for troubleshooting information.
3. If the engine speed was less than specified in all tests, the engine is probably the cause.

STARTER

Removal

NOTE: The starter is located on the engine flywheel housing.

1. Turn the master disconnect switch to the OFF position.
2. Remove the nut (1) and tag and disconnect the battery positive cable (2) from the starter (5), refer to Figure 1.

NOTE: The solenoid wire (8) is located on the same side of the alternator as the battery positive cable (2).

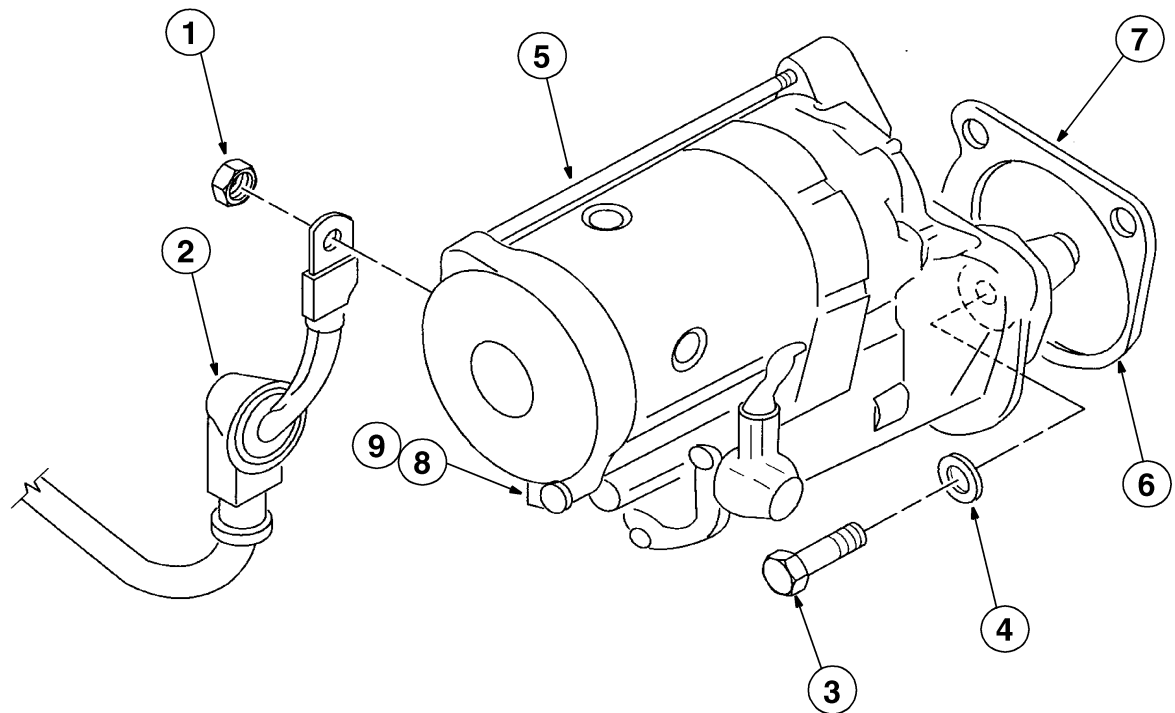
3. Remove the screw (9) and tag and disconnect the solenoid wire (8) from the starter (5).
4. Remove the bolts (3), washers (4) and the starter (5) from the machine.
5. Remove the gasket (6) from the machine.

Installation

1. Install a new gasket (6) on the machine, refer to Figure 1.
2. Install the starter (5), washers (4) and bolts (3) to the machine. Torque the bolts (3) to 41 to 74 Nm (30 to 54 pound-feet).
3. Install the battery positive cable (2) and nut (1) to the starter (5). Torque the nut (1) to 17.6 to 24.5 Nm (13 to 18 pound-feet).

NOTE: The solenoid wire (8) is located on the same side of the alternator as the battery positive cable (2).

4. Install the solenoid wire (8) and screw (9) to the starter (5). Torque the screw (9) to 2.6 to 4.6 Nm (2 to 3.4 pound-feet).
5. Turn the master disconnect switch to the ON position.



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- | | | |
|---------------------------|------------|------------------------------|
| 1. NUT | 4. WASHER | 7. TO FLYWHEEL HOUSING |
| 2. BATTERY POSITIVE CABLE | 5. STARTER | 8. SOLENOID WIRE (not shown) |
| 3. BOLT | 6. GASKET | 9. SCREW (not shown) |

Figure 1. STARTER REMOVAL AND INSTALLATION

ALTERNATOR

Removal

1. Turn the master disconnect switch to the OFF position.
2. Use a wrench to move the belt tensioner (2) and loosen the tension on the fan belt (1), refer to Figure 2.
3. Remove the fan belt (1).
4. Remove the boots (5 and 8), nuts (6 and 9), and lockwashers (7 and 10). Tag and disconnect all wires (11 and 12) from the alternator (4).
5. Remove the bolt (13), nut (14), lockwasher (15), and washers (16) from the support (17) and alternator (4).
6. Remove the bolt (18), lockwasher (19) and the alternator (4) from the machine.

Installation

1. Install the alternator (4), lockwasher (19), and bolt (18) on the machine. Torque the bolt (18) to 60 to 104 Nm (42.5 to 76 pound-feet), refer to Figure 2.
2. Install the washers (16), lockwasher (15), nut (14), and bolt (13). Torque the bolt (13) to 60 to 104 Nm (42.5 to 76 pound-feet).
3. Use a wrench to move the belt tensioner (2) until the fan belt (1) can be installed.
4. Install the fan belt (1).
5. Install the wire (12), lockwasher (7), and nut (6) to the alternator's D+ terminal. Torque the nut (6) to 3.5 to 3.9 Nm (2.6 to 2.9 pound-feet). Install the boot (5).
6. Install the wire (11), lockwasher (10), and nut (9) to the alternator's B+ terminal. Torque the nut (9) to 15 to 27 Nm (11 to 20 pound-feet). Install the boot (8).
7. Turn the master disconnect switch to the ON position.

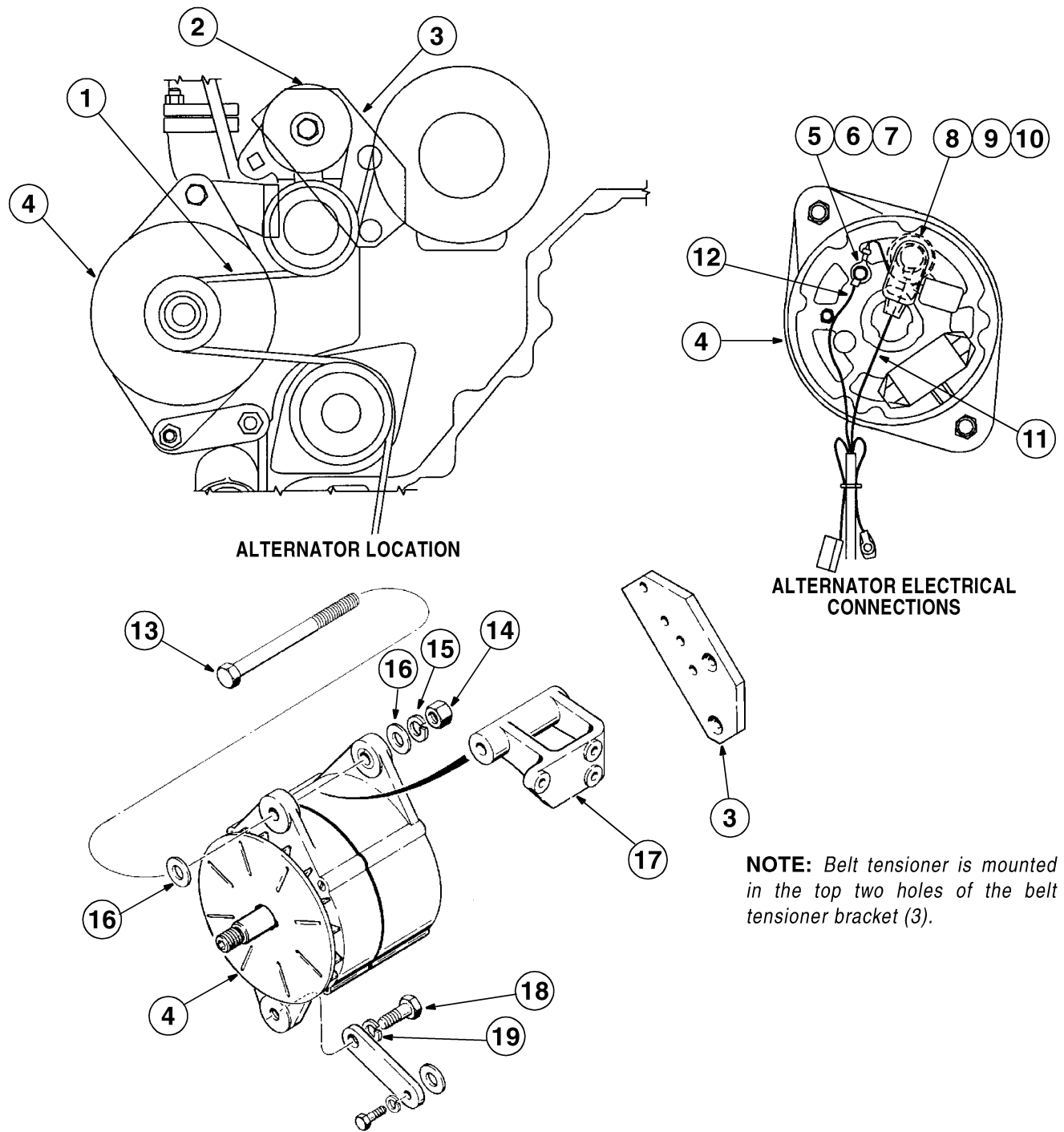


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|----------------------------|----------------|----------------|----------------|
| 1. FAN BELT | 6. NUT | 11. B+ WIRE | 16. WASHER |
| 2. BELT TENSIONER | 7. LOCKWASHER | 12. D+ WIRE | 17. SUPPORT |
| 3. BELT TENSIONING BRACKET | 8. BOOT | 13. BOLT | 18. BOLT |
| 4. ALTERNATOR | 9. NUT | 14. NUT | 19. LOCKWASHER |
| 5. BOOT (NOT SHOWN) | 10. LOCKWASHER | 15. LOCKWASHER | |

Figure 2. ALTERNATOR REMOVAL AND INSTALLATION

GS98K401

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