1411L–02

REPLACEMENT

1. REMOVE HOOD SUB–ASSY

2. REMOVE ENGINE UNDER COVER SUB–ASSY NO.1

(a) Remove the 4 bolts and engine under cover No.1.

3. REMOVE TRANSMISSION UNDER COVER

(a) Remove the 4 bolts and transmission under cover.

4. REMOVE ENGINE UNDER COVER ASSY REAR

(a) Remove the 4 bolts and engine under cover rear.

5. DRAIN ENGINE COOLANT (SEE PUB. NO. RM990E, PAGE 16–50)

6. REMOVE BATTERY

7. REMOVE RADIATOR ASSY (SEE PUB. NO. RM990E, PAGE 16–55)

8. REMOVE FAN SHROUD

(a) Remove the fan shroud from the engine room.

9. REMOVE FAN AND GENERATOR V BELT (SEE PUB. NO. RM990E, PAGE 14–189)

HINT:

Loosen the 4 nuts for the fan w/ fluid coupling assy in advance.

10. REMOVE FAN W/ FLUID COUPLING

(a) Remove the 4 nuts and fan w/ fluid coupling.

11. REMOVE FAN PULLEY

12. REMOVE INTERCOOLER PROTECTOR (SEE PAGE 13–18)

13. REMOVE INTERCOOLER ASSY (SEE PAGE 13–18)

14. REMOVE INTAKE AIR CONNECTOR

(a) Loosen the hose clamp, and disconnect the intake air connector and remove the air hose No.2.

15. REMOVE AIR CLEANER ASSY

(a) Disconnect the mass air flow meter S/A connector, and remove the wire harness clamp.

(b) Loosen the hose clamp, and remove the air cleaner cap w/ air cleaner hose No.1.

(c) Remove the air cleaner filter element.

(d) Remove the 3 bolts and air cleaner case sub–assy.

16. REMOVE COMPRESSOR AND MAGNETIC CLUTCH (W/ AIR CONDITIONING)

(a) Disconnect the connector, and remove the 4 bolts and cooler compressor assy w/ magnet clutch assy.

HINT:

It is not necessary to remove the hose from the cooler compressor assy when you remove that assembly. Also, for the following removal process, put and hang the removed cooler compressor assy with a rope to an appropriate location of the vehicle.

17. REMOVE VANE PUMP OIL RESERVOIR ASSY

(a) Remove the 3 bolts and vane pump oil reservoir assy.

HINT:

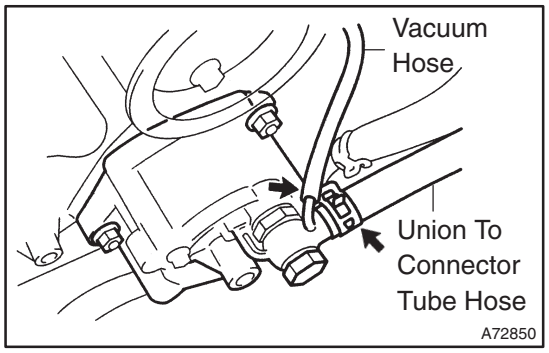
It is not necessary to remove the hose from the vane pump oil reservoir assy when you remove that assembly. Also, for the following removal process, put and hang the removed oil reservoir assy with a rope to an appropriate location of the vehicle.

18. REMOVE VANE PUMP ASSY

(a) Remove the 2 bolts, vane pump assy and O–ring.

HINT:

It is necessary to remove the hose from the vane pump assy when you remove that assembly. Also, for the following removal process, move the removed vane pump assy aside to an appropriate location.



19. DISCONNECT VACUUM HOSES

(a) Disconnect the vacuum hose from the vacuum pump assy.

(b) Disconnect the union to connector tube hose from the vacuum pump assy (w/ VSC).

20. DISCONNECT HEATER WATER OUTLET HOSE B

21. DISCONNECT HEATER WATER INLET HOSE A

22. DISCONNECT INJECTION PUMP TO FUEL PIPE FUEL HOSE

23. DISCONNECT INJECTION PUMP TO FUEL FILTER FUEL HOSE OR PIPE

24. DISCONNECT ENGINE WIRE

25. REMOVE TRANSMISSION ASSY

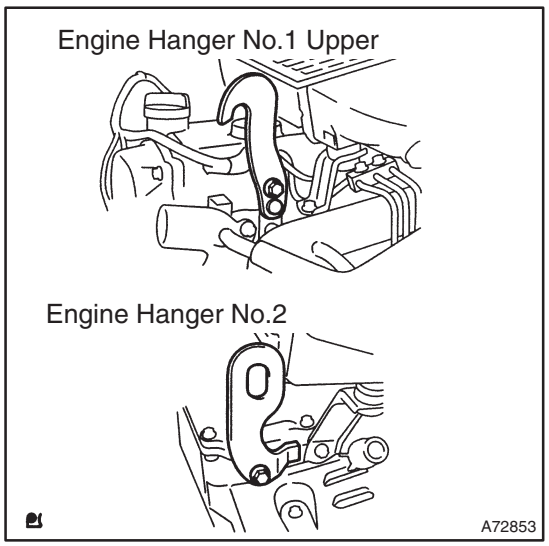
HINT:

M/T TRANSMISSION (RA61F): See page 41–26.

A/T TRANSMISSION (A750F): See page 40–38.

26. REMOVE CLUTCH COVER ASSY (MANUAL TRANSMISSION) (SEE PAGE 42–5)

27. REMOVE CLUTCH DISC ASSY (MANUAL TRANSMISSION)



28. REMOVE ENGINE ASSEMBLY

(a) Set the engine hanger No.1 upper and engine hanger No.2 to the locations shown in the illustration.

Torque:

25 N·m (255 kgf·cm, 18 ft·lbf) for Engine hanger No.1

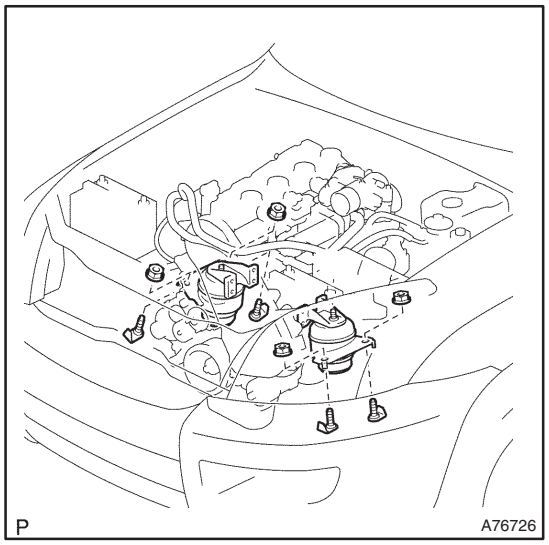
68 N·m (693 kgf·cm, 50 ft·lbf) for Engine hanger No.2

Part No.:

Parts name	Parts No.
Engine hanger No.1 upper bolt	12284–30020 91512–61014
Engine hanger No.2 bolt	12282–67030 91642–81030

NOTICE:

Use a new bolt for the engine hanger.



(b) Hold the engine with the engine sling device and chain block.
(c) Remove the 4 nuts and 4 bolts.
(d) Remove the engine assy by operating the engine sling device and chain block.

29. REMOVE FLYWHEEL SUB–ASSY (SEE PUB. NO. RM990E, PAGE 14–247)
SST 09213–58013, 09330–00021
30. REMOVE REAR END PLATE
(a) Remove the bolt, and remove the rear end plate.
31. REMOVE ENGINE WIRE
(a) Disconnect the engine wire from the engine assy.
32. REMOVE TIMING BELT NO.1 COVER (SEE PUB. NO. RM990E, PAGE 14–214)
33. REMOVE TIMING BELT (SEE PUB. NO. RM990E, PAGE 14–214)
34. REMOVE OIL FILTER SUB–ASSY (SEE PUB. NO. RM990E, PAGE 17–79)
SST 09228–10002
35. REMOVE FUEL INLET PIPE SUB–ASSY (SEE PAGE 11–67)
SST 09023–12701
36. REMOVE CYLINDER HEAD COVER SUB–ASSY NO.2 (SEE PAGE 14–218)
37. REMOVE INJECTION PIPE (SEE PAGE 11–52)
SST 09023–12701
38. REMOVE NOZZLE LEAKAGE PIPE ASSY NO.2 (SEE PAGE 11–67)
39. REMOVE COMMON RAIL ASSY (SEE PAGE 11–67)
40. REMOVE INJECTION OR SUPPLY PUMP ASSY (SEE PAGE 11–63)
SST 09213–58013, 09330–00021, 09950–50013 (09951–05010, 09952–05010, 09953–05020, 09954–05021)
41. REMOVE OIL COOLER COVER SUB–ASSY (SEE PAGE 17–53)
42. REMOVE EGR PIPE SUB–ASSY NO.1 (SEE PAGE 12–23)
43. REMOVE INTAKE MANIFOLD
(a) Remove the 4 bolts and 2 nuts, and remove the intake manifold w/ diesel throttle body.
44. REMOVE WATER OUTLET
(a) Remove the 2 bolts and water outlet.
45. REMOVE GLOW PLUG ASSY (SEE PUB. NO. RM990E, PAGE 19–45)
46. REMOVE ENGINE MOUNTING BRACKET FRONT NO.1 RH
(a) Remove the 4 bolts, and remove the left side of the engine mounting bracket front No.1 RH.
47. REMOVE VISCOUS W/MAGNET CLUTCH HEATER ASSY (W/ COLD AREA)
(a) Remove the 2 hoses from the viscous heater assy.
(b) Remove the 2 bolts and viscous heater bracket No.2.
(c) Remove the 2 bolts and the viscous heater assy.
48. REMOVE VISCOUS HEATER BRACKET SUB–ASSY (W/ COLD AREA)
(a) Remove the 4 bolts and viscous heater bracket.

49. REMOVE GENERATOR ASSY (SEE PUB. NO. RM990E, PAGE 19–40)

50. REMOVE GENERATOR BRACKET

(a) Remove the bolt and generator bracket.

51. REMOVE IDLE PULLEY ASSY (SEE PAGE 13–10)

52. REMOVE COMPRESSOR MOUNTING BRACKET NO.1 (SEE PAGE 13–10)

53. REMOVE VENTILATION PIPE

(a) Remove the bolt and ventilation pipe.

54. REMOVE OIL LEVEL GAUGE GUIDE

(a) Remove the oil level gauge.

(b) Remove the bolt and oil level gauge guide.

55. REMOVE TURBO INSULATOR NO.1

(a) Remove the 3 bolts and turbo insulator No.1.

56. REMOVE EXHAUST MANIFOLD HEAT INSULATOR NO.1

(a) Remove the 3 bolts and exhaust manifold heat insulator No.1.

57. REMOVE TURBOCHARGER SUB–ASSY (SEE PAGE 13–18)

58. REMOVE WATER BY–PASS PIPE SUB–ASSY NO.2

(a) Remove the 2 bolts and 2 nuts, and remove the water by–pass sub–assy No.2.

59. REMOVE WATER BY–PASS PIPE NO.2

(a) Remove the bolt and water by–pass pipe No.2.

60. REMOVE THERMOSTAT (SEE PUB. NO. RM990E, PAGE 16–52)

61. REMOVE ENGINE MOUNTING BRACKET FRONT NO.1 RH

(a) Remove the 4 bolts and the right side of the engine mounting bracket front No.1.

62. REMOVE INTERCOOLER SUPPORT BRACKET NO.2

(a) Remove the 2 bolts and intercooler support bracket No.2.

63. REMOVE TIMING BELT IDLER SUB–ASSY NO.1 (SEE PAGE 14–218)

64. REMOVE CRANKSHAFT PULLEY (SEE PUB. NO. RM990E, PAGE 14–244)

SST 09213–58013, 09330–00021, 09950–50013 (09951–05010, 09952–05010, 09953–05020, 09954–05021)

65. REMOVE VACUUM PUMP ASSY

(a) Remove the 2 nuts, vacuum pump assy, and 2 O–rings.

66. REMOVE WATER TEMPERATURE SENDER GAUGE ASSY

(a) Remove the water temperature sender gauge using a deep–socket wrench (17 mm).

67. REMOVE CRANK POSITION SENSOR

(a) Remove the bolt and crank position sensor.

68. REMOVE CRANK POSITION NO.2 SENSOR

(a) Remove the bolt and crank position sensor No.2.

69. REMOVE OIL PAN COVER SUB–ASSY NO.1

(a) Remove the 4 bolts and oil pan cover sub–assy No.1.

70. REMOVE ENGINE OIL LEVEL SENSOR

(a) Remove the 4 bolts and engine oil level sensor.

71. REPLACE PARTIAL ENGINE ASSY

72. INSTALL ENGINE OIL LEVEL SENSOR

(a) Set a new gasket, and then install the engine oil level sensor with the 4 bolts.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

73. INSTALL OIL PAN COVER SUB–ASSY NO.1

(a) Install the oil pan cover sub–assy with the 4 bolts.

Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

74. INSTALL CRANK POSITION NO.2 SENSOR

(a) Apply engine oil to the O–ring.

(b) Install the crank position sensor No.2 with the bolt.

Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)

75. INSTALL CRANK POSITION SENSOR

(a) Apply engine oil to the O–ring.

(b) Install the crank position sensor with the bolt.

Torque: 8.5 N·m (87 kgf·cm, 75 in.·lbf)

76. INSTALL WATER TEMPERATURE SENDER GAUGE ASSY

(a) Install the water temperature sender gauge using a deep–socket wrench (17 mm).

Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

77. INSTALL VACUUM PUMP ASSY

(a) Set a new O–ring, and then install the vacuum pump assy with the 2 nuts.

Torque: 21 N·m (214 kgf·cm, 16 ft·lbf)

78. INSTALL CRANKSHAFT PULLEY (SEE PUB. NO. RM990E, PAGE 14–244)

SST 09213–58013, 09330–00021

79. INSTALL TIMING BELT IDLER SUB–ASSY NO.1

(a) Install the timing belt idler No.1 using a socket hexagonal wrench (10 mm).

Torque: 35 N·m (357 kgf·cm, 26 ft·lbf)

80. INSTALL INTERCOOLER SUPPORT BRACKET NO.2

(a) Install the intercooler support bracket No.2 with the 2 bolts.

Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)

81. INSTALL ENGINE MOUNTING BRACKET FRONT NO.1 RH

(a) Install the right side of the engine mounting bracket front No.1 with the 4 bolts.

Torque: 68 N·m (693 kgf·cm, 50 ft·lbf)

82. INSTALL THERMOSTAT (SEE PUB. NO. RM990E, PAGE 16–52)

83. INSTALL WATER BY–PASS PIPE NO.2

(a) Set a new O–ring, and then install the water by–pass pipe No.2 with the bolt.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

84. INSTALL WATER BY–PASS PIPE SUB–ASSY NO.2

(a) Set a new gasket, and then install the water by–pass pipe sub–assy No.2 with the 2 bolts and 2 nuts.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

85. INSTALL TURBOCHARGER SUB–ASSY (SEE PAGE 13–10)

86. INSTALL EXHAUST MANIFOLD HEAT INSULATOR NO.1

(a) Install the exhaust manifold heater insulator No.1 with the 3 bolts.

Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

87. INSTALL TURBO INSULATOR NO.1

(a) Install the turbo insulator No.1 with the 2 bolts.

Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

88. INSTALL OIL LEVEL GAUGE GUIDE

(a) Set a new O–ring to the oil level gauge guide.

(b) Install the oil level gauge guide with the bolt.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

89. INSTALL VENTILATION PIPE

(a) Install the ventilation pipe with the bolt.

Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

90. INSTALL COMPRESSOR MOUNTING BRACKET NO.1

(a) Install the compressor mounting bracket No.1 with the 5 bolts.

Torque: 21 N·m (214 kgf·cm, 16 ft·lbf)

91. INSTALL IDLE PULLEY ASSY

(a) Install the idle pulley assy with the bolt.
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)

92. INSTALL GENERATOR BRACKET

(a) Install the generator bracket with the bolt.
Torque: 21 N·m (214 kgf·cm, 16 ft·lbf)

HINT:
Do not tighten the bolt before attaching the generator assy.

93. INSTALL GENERATOR ASSY (SEE PUB. NO. RM990E, PAGE 19–48)

94. INSTALL VISCOUS HEATER BRACKET SUB–ASSY (W/ COLD AREA)

(a) Install the viscous heater bracket with the 4 bolts.
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)

95. INSTALL VISCOUS W/MAGNET CLUTCH HEATER ASSY (W/ COLD AREA)

(a) Install the viscous heater assy with the 2 bolts.
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)

(b) Install the viscous heater bracket No.2 with the 2 bolts.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

(c) Connect the 2 hoses to the viscous heater assy.

96. INSTALL ENGINE MOUNTING BRACKET FRONT NO.1 RH

(a) Install the left side of the engine mounting bracket front No.1 with the 4 bolts.
Torque: 68 N·m (693 kgf·cm, 50 ft·lbf)

97. INSTALL DIESEL ENGINE ENGINE COOLANT TEMPERATURE SENSOR

98. INSTALL GLOW PLUG ASSY

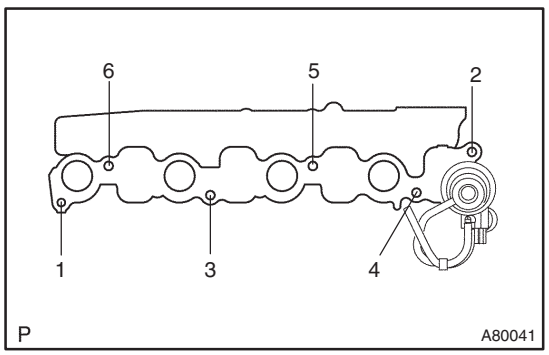
(a) Install the glow plug assy using a deep–socket wrench (12 mm).
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)

(b) Temporarily install the glow plug connector No.1 with the 4 bolts, and then install it securely.
Torque: 2.2 N·m (22 kgf·cm, 19 in.·lbf)

(c) Install the 4 screw grommets.

99. INSTALL WATER OUTLET

(a) Set a new gasket, and then install the water outlet with the 2 bolts.
Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)



100. INSTALL INTAKE MANIFOLD

(a) Set a new gasket, and then install the intake manifold w/ diesel throttle body.

(b) Tighten the 4 bolts and 2 nuts in the order described in the illustration.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

101. INSTALL EGR PIPE SUB–ASSY NO.1 (SEE PAGE 12–23)

102. INSTALL OIL COOLER COVER SUB–ASSY (SEE PAGE 17–53)

103. INSTALL INJECTION OR SUPPLY PUMP ASSY (SEE PAGE 11–63)

SST 09213–58013, 09330–00021

104. INSTALL COMMON RAIL ASSY

(a) Install the common rail with the 3 bolts.
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

105. INSTALL NOZZLE LEAKAGE PIPE ASSY NO.2 (SEE PAGE 11–67)

106. INSTALL INJECTION PIPE (SEE PAGE 11–52)
SST 09023–12701

107. INSTALL CYLINDER HEAD COVER SUB–ASSY NO.2 (SEE PAGE 14–218)

108. INSTALL FUEL INLET PIPE SUB–ASSY (SEE PAGE 11–67)
SST 09023–12701

109. INSTALL OIL FILTER SUB–ASSY (SEE PUB. NO. RM990E, PAGE 17–79)
SST 09228–10002

110. INSTALL TIMING BELT (SEE PUB. NO. RM990E, PAGE 14–214)

111. INSTALL TIMING BELT NO.1 COVER

(a) Install the timing belt No.1 cover with the 6 bolts.
Torque: 6.0 N·m (61 kgf·cm, 53 in.·lbf)

(b) Install the water hose clamp with the bolt.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

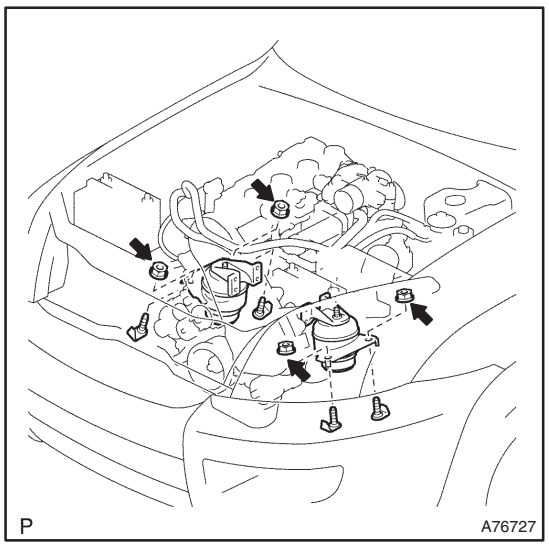
112. INSTALL ENGINE WIRE

(a) Connect the engine wire to the engine assy.

113. INSTALL REAR END PLATE

(a) Install the rear end plate with the bolt.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

114. INSTALL FLYWHEEL SUB–ASSY (SEE PUB. NO. RM990E, PAGE 14–247)
SST 09213–58013, 09330–00021



115. INSTALL ENGINE ASSEMBLY

(a) Install the engine assy by operating the engine sling device and chain block.

(b) Tighten the 4 nuts and 4 bolts for the left and right sides of the engine mounting insulator front.
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

(c) Remove the engine hanger No.1 upper and No.2.

116. INSTALL CLUTCH DISC ASSY (MANUAL TRANSMISSION) (SEE PAGE 42–5)
SST 09301–00110

117. INSTALL CLUTCH COVER ASSY (MANUAL TRANSMISSION) (SEE PAGE 42–5)

118. INSTALL TRANSMISSION ASSY

HINT:
M/T TRANSMISSION (RA61F): See page 41–26.
A/T TRANSMISSION (A750F): See page 40–38.

119. CONNECT ENGINE WIRE

120. CONNECT INJECTION PUMP TO FUEL FILTER FUEL HOSE OR PIPE

121. CONNECT INJECTION PUMP TO FUEL PIPE FUEL HOSE

122. CONNECT HEATER WATER INLET HOSE A
123. CONNECT HEATER WATER OUTLET HOSE B
124. CONNECT VACUUM HOSES
(a) Connect the vacuum hose to the vacuum pump assy.
(b) Connect the union to connector tube hose to the vacuum pump assy (w/ VSC).
125. INSTALL VANE PUMP ASSY
(a) Set a new O–ring, and install the vane pump assy with the 2 nuts.
Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)
126. INSTALL VANE PUMP OIL RESERVOIR ASSY
(a) Install the vane pump reservoir with the 3 bolts.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)
127. INSTALL COMPRESSOR AND MAGNETIC CLUTCH (W/ AIR CONDITIONING)
(a) Install the compressor and magnetic clutch with the 4 bolts.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)
128. INSTALL AIR CLEANER ASSY
(a) Install the air cleaner case sub–assy with the 3 bolts.
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)
(b) Install the air cleaner filter element.
(c) Install the air cleaner cap w/ air cleaner hose No.1.
(d) Connect the mass air flow meter S/A connector as well as the wire harness.
129. INSTALL INTAKE AIR CONNECTOR
(a) Connect the intake air connector, and install a new air hose No.2.
(b) Fasten the hose clamp.
Torque: 6.5 N·m (66 kgf·cm, 57 in.·lbf)
130. INSTALL INTERCOOLER ASSY (SEE PAGE 13–18)
131. INSTALL INTERCOOLER PROTECTOR
(a) Install the intercooler protector with the 5 bolts.
Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)
132. INSTALL FAN PULLEY
133. INSTALL FAN W/ FLUID COUPLING
(a) Install the fan w/ fluid coupling with the 4 nuts.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)
134. INSTALL FAN AND GENERATOR V BELT (SEE PUB. NO. RM990E, PAGE 14–189)
135. INSTALL FAN SHROUD
(a) Temporarily place the fan shroud in the engine room.
136. INSTALL RADIATOR ASSY (SEE PUB. NO. RM990E, PAGE 16–55)
137. INSTALL BATTERY
138. ADD ENGINE OIL
139. ADD ENGINE COOLANT (SEE PUB. NO. RM990E, PAGE 16–50)
140. CHECK FOR ENGINE OIL LEAKS
141. CHECK FOR ENGINE COOLANT LEAKS
142. CHECK FOR FUEL LEAKS (SEE PAGE 11–46)
143. INSPECT AUTOMATIC TRANSMISSION FLUID (AUTOMATIC TRANSMISSION) (SEE PAGE 40–2)
144. CHECK FOR EXHAUST GAS LEAKS
145. CHECK ENGINE IDLE SPEED AND MAXIMUM SPEED (SEE PUB. NO. RM990E, PAGE 14–186)
SST 09843–18030
146. INSTALL ENGINE UNDER COVER ASSY REAR
(a) Install the engine under cover rear with the 4 bolts.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

147. INSTALL TRANSMISSION UNDER COVER

(a) Install the transmission under cover rear with the 4 bolts.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

148. INSTALL ENGINE UNDER COVER SUB–ASSY NO.1

(a) Install the engine under cover No.1 with the 4 bolts.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

149. INSTALL HOOD SUB–ASSY (SEE PUB. NO. RM990E, PAGE 75–4)

150. ADJUST HOOD SUB–ASSY (SEE PUB. NO. RM990E, PAGE 75–2)