
INSTALLATION INSTRUCTIONS

Original Issue Date: **11/95**

Model: **80/100ROZJ**

Market: **Industrial**

Subject: **Emission Kit PA-336698, Best Available Control Technology (B.A.C.T.)**

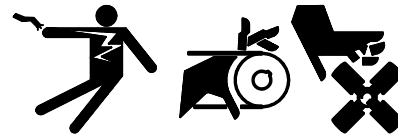
The B.A.C.T. emission kit provides the components necessary to satisfy emission standards in localities that require aftercoolers and turbochargers on generator sets over 50 hp. This kit includes an aftercooler and necessary mounting hardware.

If the generator set is equipped with a block heater, order the substitute kit listed in the chart below to accommodate the installation of the B.A.C.T. kit.

To simplify installation, this instruction refers to all part numbers in the B.A.C.T. kit by the part number of the kit's manufacturer. To order any of the B.A.C.T. kit parts from Kohler, use the B.A.C.T. kit parts list on the last page of this instruction to find the Kohler part number.

Kit Description	Standard Kit Part Number	B.A.C.T.-Compatible Kit Part Number
Block Heater 120V	336182	336762
Block Heater 240V	336183	336763

WARNING

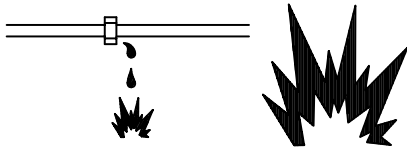


Accidental starting.
Can cause severe injury or death.

Disconnect battery cables before working on generator set (negative lead first and reconnect it last).

Accidental starting can cause severe injury or death. Turn generator set master switch to OFF position, disconnect power to battery charger, and remove battery cables (remove negative lead first and reconnect it last) to disable generator set before working on any equipment connected to generator set. The generator set can be started by automatic transfer switch or remote start/stop switch unless these precautions are followed.

⚠ WARNING



Explosive fuel vapors.
Can cause severe injury or death.

Use extreme care when handling, storing, and using fuels.

Explosive fuel vapors can cause severe injury or death. All fuels are highly explosive in a vapor state. Use extreme care when handling and storing fuels. Store fuel in a well-ventilated area away from spark-producing equipment and out of the reach of children. Never add fuel to the tank while the engine is running since spilled fuel may ignite on contact with hot parts or from ignition spark. Do not smoke or permit flame or spark to occur near potential sources of spilled fuel or fuel vapors. Keep fuel lines and connections tight and in good condition. Do not replace flexible fuel lines with rigid lines. Flexible sections are used to avoid breakage due to vibration. If any fuel leakage, fuel accumulation, or electrical sparks are noted, **DO NOT OPERATE GENERATOR SET.** Repair systems before resuming generator set operation

Explosive fuel vapors can cause severe injury or death. Spilled fuel can cause an explosion. Use a container to catch fuel when draining fuel system. Wipe up all spilled fuel after draining system.

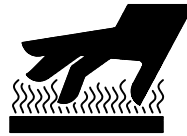
⚠ WARNING



Hot coolant and steam.
Can cause severe injury or death.

Before removing pressure cap, stop generator set and allow it to cool. Then loosen pressure cap to relieve pressure.

⚠ WARNING



Hot engine and exhaust system.
Can cause severe injury or death.

Do not work on generator set until it is allowed to cool.

Hot coolant can cause severe injury or death. Allow engine to cool and release pressure from cooling system before opening pressure cap. To release pressure, cover the pressure cap with a thick cloth; then slowly turn it counterclockwise to the first stop. Remove cap after pressure has been completely released and the engine has cooled. Check coolant level at tank if generator set is equipped with a coolant recovery tank.

Hot parts can cause severe injury or death. Do not touch hot engine parts. An engine gets hot while running and exhaust system components get extremely hot.

Installation

1. Place the generator set master switch in the OFF position.
2. Disconnect generator set engine starting battery, negative (-) lead first.

NOTE

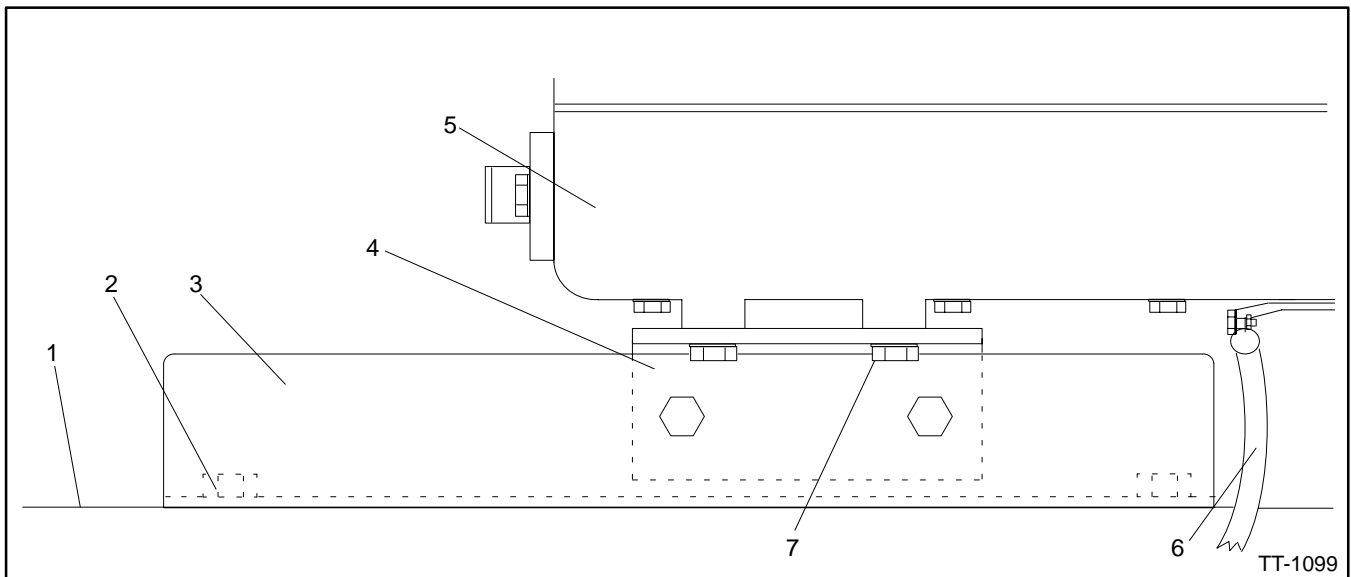
Dispose of all waste materials (engine oil, fuel, coolant, etc.) in an environmentally safe manner. Contact your local authorities for correct procedures and location.

3. Drain radiator coolant into a suitable container. Keep coolant clean for reuse.
4. Disconnect turbocharger oil supply line clamp from cylinder head.
5. Remove air intake from cylinder head. Save the hose clamps and intake hose. Mounting hardware and air intake tube will not be reused.

NOTE

Use caution when disconnecting fuel lines. Fuel from factory testing may be in the fuel lines.

6. Disconnect and remove the fuel line between the fuel pump and fuel filter assembly. Fuel line will not be reused.
7. Disconnect and remove the clamp and fuel line between the injector pump and the fuel filter assembly. The fuel line and clamp will not be reused. Save the mounting hardware.
8. Remove the fuel filter assembly from the engine block. The mounting hardware will not be reused.
9. Disconnect the fuel filter assembly from the mounting bracket. Discard the mounting bracket and save the mounting hardware.
10. Bolt the fuel filter assembly to the engine block where the mounting bracket was secured. Use hardware removed in step 9. Do not final tighten mounting hardware.
11. Remove the 90-degree brass elbow from the outlet side of the fuel filter assembly. Replace with o-ring (R26286) and fitting (R27272).
12. Connect fuel line (RE64612) to the inlet side of the fuel filter assembly and fuel pump. Torque fuel line fittings to 22 ft. lbs. (29.8 Nm).
13. Connect fuel line (RE64613) to the outlet side of the fuel filter assembly and injector pump. Torque fuel line fittings to 22 ft. lbs. (29.8 Nm).
14. Connect clamp (R109872) to fuel line. Attach fuel line to engine block using hardware saved in step 6
15. Final tighten fuel filter to engine block. Torque mounting bolts to 37 ft. lbs. (50.2 Nm).
16. Bolt the aftercooler support bracket (R110239) to the engine block using 5/16 x 1 in. bolts (19H1905), flat washers (24H1822), and lock washers (12H303). See Figure 1.



1. Cylinder head
2. Bolts (2) and washers (2)
3. Bracket (R110239)
4. Bracket (R110240)

5. Air intake manifold
6. Turbocharger oil supply line
7. Bolts (2) and washers (2)

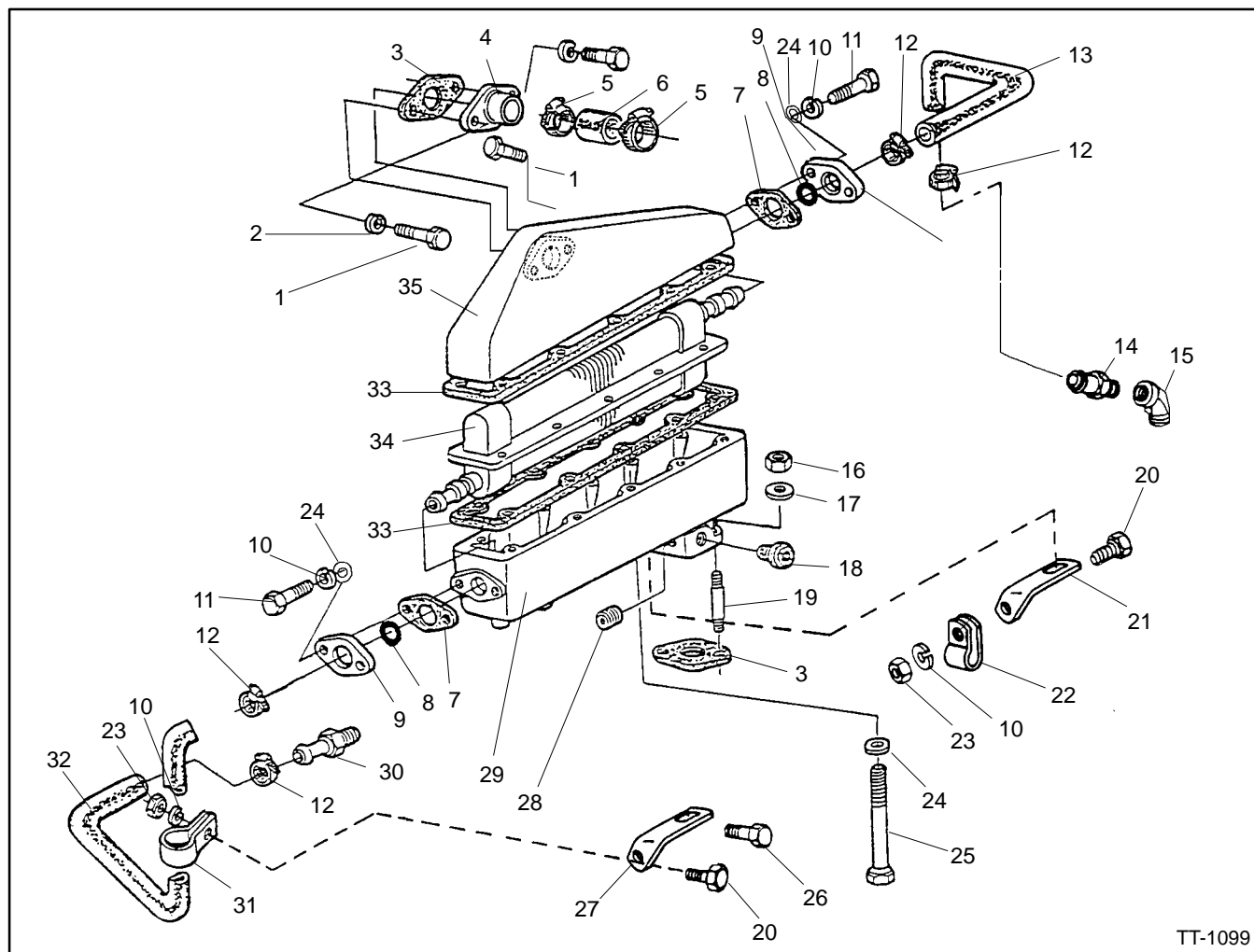
Figure 1. Aftercooler Support Bracket Installation

17. Assemble the aftercooler's three major parts: air intake manifold (R89815), aftercooler (RE29201), and air intake manifold cover (R89814). For steps 26-43 see Figure 2.

- a. Place gasket (R97358) on top of the core flange and align the holes.
- b. Slide the core end through the hole in the upper assembly. Set the upper assembly on the core flange and align the holes.
- c. Attach turbocharger oil line bracket (R82869) to

the aftercooler assembly bolt located on the left of the air inlet and closest to the engine.

- d. Place gasket (R97358) on the lower half assembly and align the holes.
- e. Slide the end of the core through the hole in the lower assembly and align the holes.
- f. Bolt the assembly together with ten 5/16-18 x 3 3/4 in. bolts (19H3300) and flat washers (24H1136).

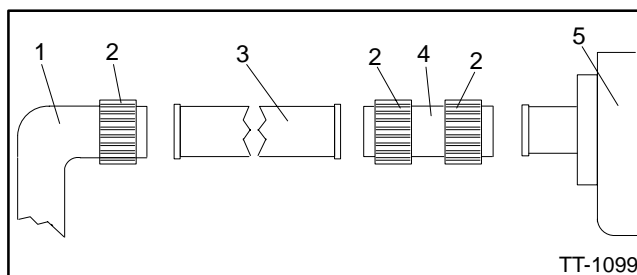


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- | | |
|---|---|
| 1. Screw, cap (3) (19H218) | 19. Stud (aftercooler to cylinder head) (2) (M1112T) |
| 2. Washer, lock (2) (12H304) | 20. Screw, cap (5/16 x 3/4) (2) (19H1900) |
| 3. Gasket (2) (R81275) | 21. Bracket (turbo oil supply line) (R82869) |
| 4. Tube, air intake (R110152) | 22. Clamp (R46414) |
| 5. Clamp, hose (turbo outlet) (2) (AR65294) | 23. Nut, hex (5/16) (2) (14H785) |
| 6. Hose (turbo to air intake tube) (R56551) | 24. Washer, flat (5/16) (14) (24H1136) |
| 7. Gasket (2) (R97346) | 25. Screw, cap (5/16 x 3 3/4) (10) (19H3300) |
| 8. O-ring (2) (R52811) | 26. Screw, cap (1/2 x 1 1/4) (R89820) |
| 9. Adapter (2) (R47314) | 27. Bracket (R89820) |
| 10. Washer, lock (5/16) (8) (12H303) | 28. Plug (15H558) |
| 11. Screw, cap (5/16 x 1 3/8) (4) (19H2661) | 29. Manifold, air intake (R89815) |
| 12. Clamp, hose (4) (AR21839) | 30. Fitting, hose (R100914) |
| 13. Hose (aftercooler to water pump) (R89816) | 31. Clamp (H85741) |
| 14. Adapter, restricted hose (R109643) | 32. Hose (aftercooler to block) (R89817) |
| 15. Elbow, 45 degree (15H627) | 33. Gasket (aftercooler to cover and manifold) (2) (R97358) |
| 16. Nut, hex (3/8) (2) (14H1076) | 34. Aftercooler (RE29201) |
| 17. Washer, flat (13/32) (2) (24H1304) | 35. Cover, air intake manifold (R89814) |
| 18. Pipe, plug (R84982) | |

Figure 2. Aftercooler Assembly

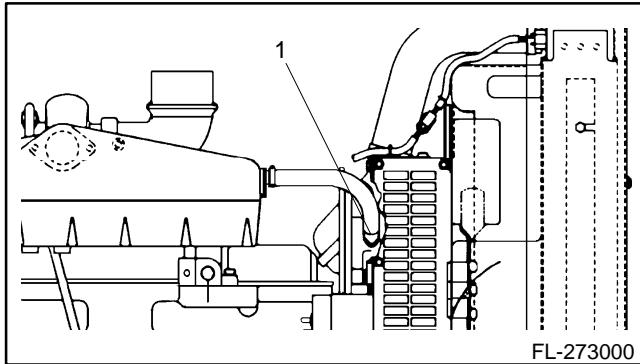
18. Bolt the aftercooler support bracket (R110240) to the bottom left of the aftercooler assembly. Position the bracket with the angle to the inside. See Figure 1.
19. Clean cylinder head mounting surface for aftercooler. Surface must be free of the old gasket, dirt, and grease.
20. Insert two studs (M1112T) into the engine cylinder head for aftercooler attachment. See Figure 2.
21. Attach the aftercooler to the cylinder head with gasket (R81275), two 3/8 in. nuts (14H1076), and flat washers (24H1304).
22. Attach clamp (R46414) to the turbocharger oil supply line.
23. Attach clamp to oil line bracket installed in step 17c using 5/16 x 3/4 in. bolt (19H1900), nut (14H785), and flat washer (12H303). Make sure oil line is not restricted or rubbing against aftercooler.
24. Remove plastic plugs from both ends of the aftercooler core.
25. Slide one rubber o-ring (R52811) over both ends of the aftercooler core into the groove provided.
26. Position new gaskets (R97346) and adapters (R47314) on aftercooler core inlet and outlet.
27. Secure adapters to aftercooler ends with four 5/16-18 x 1 3/8 in. bolts (19H2661), flat washers (24H1136), and lock washers (12H303). Position the flat washers against the adapters.
28. Connect air intake tube (R110152) to aftercooler assembly with a new gasket (R81275), two 3/8 x 1 in. bolts (19H218) and lock washers (12H304).
29. Loosen the six bolts holding the bearing section of the turbocharger to the turbine housing.
30. Rotate the turbocharger until it lines up with the air intake of the aftercooler.
31. Slide hose clamps over ends of the connecting hose saved in step 4.
32. Slide the connecting hose onto the air intake tube.
33. Slide the opposite end over the turbocharger inlet; rotate turbocharger as needed. Position hose clamps 1/4 in. (6.35 mm) from edge of hose and tighten.
34. Tighten the six bolts loosened in step 29. Torque the bolts to 100-130 in. lbs. (11.3-14.7 Nm).
35. Apply pipe sealant to pipe plug (R84982) and install in air inlet of aftercooler assembly.
36. Apply pipe sealant to pipe plug (15H558) and install on left side of air inlet.
37. Apply pipe sealant to a 3/8 x 7/8 in. bolt (19H218) and install in the open hole located on the back of the upper aftercooler assembly.
38. Remove the 1/2 in. pipe plug from the left-hand alternator end of the engine below the exhaust manifold if not equipped with an engine block heater.
39. Install fitting (R100914) where pipe plug was removed.
40. Slide hose clamps (AR21839) over connecting hose (R47091).
41. Connect one end of the connecting hose to the aftercooler and the other end to extension pipe (R109761). Position hose clamps 1/4 in. (6.35 mm) from the connecting hose ends and tighten. See Figure 3.
42. Slide hose clamps (AR21839, and H85741) over the extension pipe to engine fitting hose (R89817).
43. Connect hose to tube (R109761).
44. Connect the other end of the hose to the fitting installed in step 39. Position the hose clamps 1/4 in. (6.35 mm) from the hose ends and tighten. See Figure 3.



1. Hose (R89817)
2. Hose clamp (AR21839)
3. Tube (R109761)
4. Hose (R47091)
5. Aftercooler

**Figure 3. Aftercooler Hose Installation
(Alternator End)**

45. Remove the top belt guard. The belt guard will not be reused.
46. Remove pipe plug or thermostat fitting (if equipped with a block heater) from the side of the thermostat housing. See Figure 4.

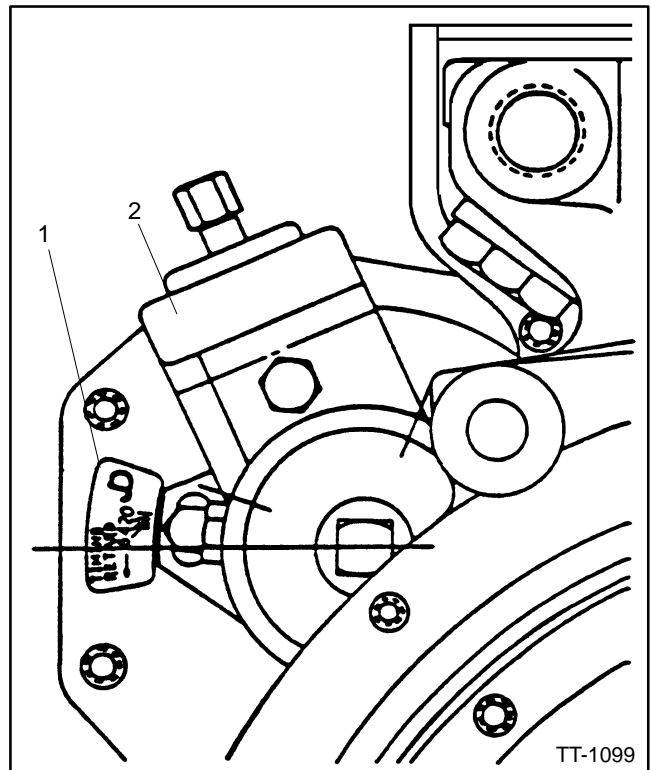


1. Pipe plug or thermostat fitting location

Figure 4. Water Pump

47. Apply pipe sealant to the threads of 45 degree elbow (15H627) and install into water pump.
48. Apply pipe sealant to the threads of restricted pipe adapter (R109643) and install into 45 degree elbow.
49. Cut the hose to fit from the aftercooler to the restricted hose adapter.
50. Slide hose clamps (AR21839) over hose (R89816). Connect the hose to the radiator end of aftercooler. Connect other end of hose to restricted pipe adapter installed in step 48. Locate hose clamps 1/4 in. (6.35 mm) from ends of hose and tighten.
51. Install the top belt guard (336702) included in the kit.
52. For 80 kW generator sets proceed to step 53. 100 kW generator sets proceed to step 58.
53. Clean the plate surface beside the injection pump mounting screws. See Figure 5.

54. Place label (R109936) on plate beside the injection pump mounting screws. See Figure 5.



1. Label (R109936)

2. Injection pump

Figure 5. Injection Pump Timing

55. Scribe a line on pump flange at the zero mark.
56. Loosen screws on injection pump and rotate in direction of arrow on label. Rotate injection pump 1 1/2 marks (3 degrees).
57. Tighten injection pump mounting screws and leave label in place.
58. Refill engine cooling system.
59. Reconnect generator set engine starting battery, negative (-) lead last.

B.A.C.T. Emission Kit

Parts List			
Kit: PA-336698			
Qty.	Description	Ref. Number	Part Number
4	Clamp, hose	AR21839	336705
1	Clamp	H85741	336708
2	Stud	M1112T	336709
1	Tube, air intake	R110152	276996
1	Intercooler	RE29201	336712
1	Fitting, hose	R100914	336715
1	Bracket, intercooler support	R110239	276997
1	Connector, special	R109643	336718
1	Label, timing retard	R109936	336719
1	Adapter	R43724	223464
1	Clamp	R46414	336721
2	Packing, o-ring	R52811	336723
2	Gasket, air inlet	R81275	336727
1	Bracket	R82869	336728
1	Plug, cap	R84982	336729
1	Cover, air intake manifold	R89814	336730
1	Manifold, air intake	R89815	336731
1	Hose, aftercooler to engine block	R89817	336732
1	Bracket	R89820	336733
4	Gasket, exhaust manifold	R90658	223547
2	Gasket, aftercooler inlet and outlet	R97346	336736
1	Bracket, support	R110240	276998
2	Gasket, aftercooler assembly	R97358	336737
12	Washer, lock	12H304	336738
2	Nut, hex 3/8	14H1076	336739
2	Nut, hex 5/16	14H785	336740
7	Nut, hex 3/8	14H812	336726
1	Plug	15H558	336750
1	Elbow, street 45 degree	15H627	336752
1	Screw, 1/2 x 1 1/4	19H1815	336753
2	Screw, 5/16 x 3/4	19H1900	336754
2	Screw, 5/16 x 1	19H1905	336755
3	Screw, 3/8 x 1	19H218	336756
4	Screw, 5/16 x 1 3/8	19H2661	336757
10	Screw, 5/16 x 3 3/4	19H3300	336758
16	Washer, flat 5/16	24H1136	336759
10	Washer, flat 13/32	24H1304	336760
7	Washer, flat	24H1305	336770
2	Washer, flat 5/16	24H1822	336761
1	Fitting	R27272	336741
1	O-ring	R26286	336742
1	Line, fuel	RE64612	336774
1	Line, fuel	RE64613	336775
1	Hose, aftercooler to water pump	R89816	336745
6	Washer, lock	12H303	336748
4	Screw, 3/8-16 x 1 3/4	19H246	336768
1	Clamp	R109872	336749
1	Spacer		336772
1	Guard, belt		336702