

SERVICE MANUAL

COMPACT EXCAVATOR
45Z-1, 48Z-1, 51R-1

EN - 9813/6400 - ISSUE 2 - 07/2018

This manual contains original instructions, verified by the manufacturer (or their authorized representative).

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Foreword

The Operator's Manual



You and others can be killed or seriously injured if you operate or maintain the machine without first studying the Operator's Manual. You must understand and follow the instructions in the Operator's Manual. If you do not understand anything, ask your employer or JCB dealer to explain it.

Do not operate the machine without an Operator's Manual, or if there is anything on the machine you do not understand.

Treat the Operator's Manual as part of the machine. Keep it clean and in good condition. Replace the Operator's Manual immediately if it is lost, damaged or becomes unreadable.

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Introduction

The exhaust system is used to guide exhaust gases away from the controlled combustion inside the engine by means of an exhaust pipe. Depending on the machine design, the exhaust gas may flow through the following components:

- Cylinder head and exhaust manifold.
- Turbocharger to increase the engine power (if installed).
- A catalytic converter or EGR (Exhaust Gas Recirculation) system to reduce air pollution (if installed).
- SCR (Selective Catalytic Reduction) (if installed). In SCR system exhaust gases pass through the DEF (Diesel Exhaust Fluid) injection chamber to lower the NO_x (Nitrogen Oxide) concentration in the exhaust gases.
- A silencer or muffler to reduce noise (if installed).

The exhaust pipe carries the toxic and noxious gases away from the users of the machine. Note machines or generators that work indoors can quickly fill an enclosed space with carbon monoxide or other poisonous exhaust gases if they are not properly vented to the outdoors.

Health and Safety

Exhaust Gases

Machine exhaust gases can harm and possibly kill you or bystanders if they are inhaled. Do not operate the machine in closed spaces without making sure there is good ventilation. If possible, install an exhaust extractor. If you begin to feel drowsy, stop the machine at once and get into fresh air.

Sparks

Explosions and fire can be caused by sparks from the exhaust or the electrical system. Do not use the machine in closed areas where there is flammable material, vapour or dust.

Hazardous Atmospheres

This machine is designed for use in normal outdoor atmospheric conditions. It must not be used in an enclosed area without adequate ventilation. Do not use the machine in a potentially explosive atmosphere, i.e. combustible vapours, gas or dust, without first consulting your JCB dealer.

Hot Components

Touching hot surfaces can burn skin. The engine and machine components will be hot after the unit has been running. Allow the engine and components to cool before servicing the unit.

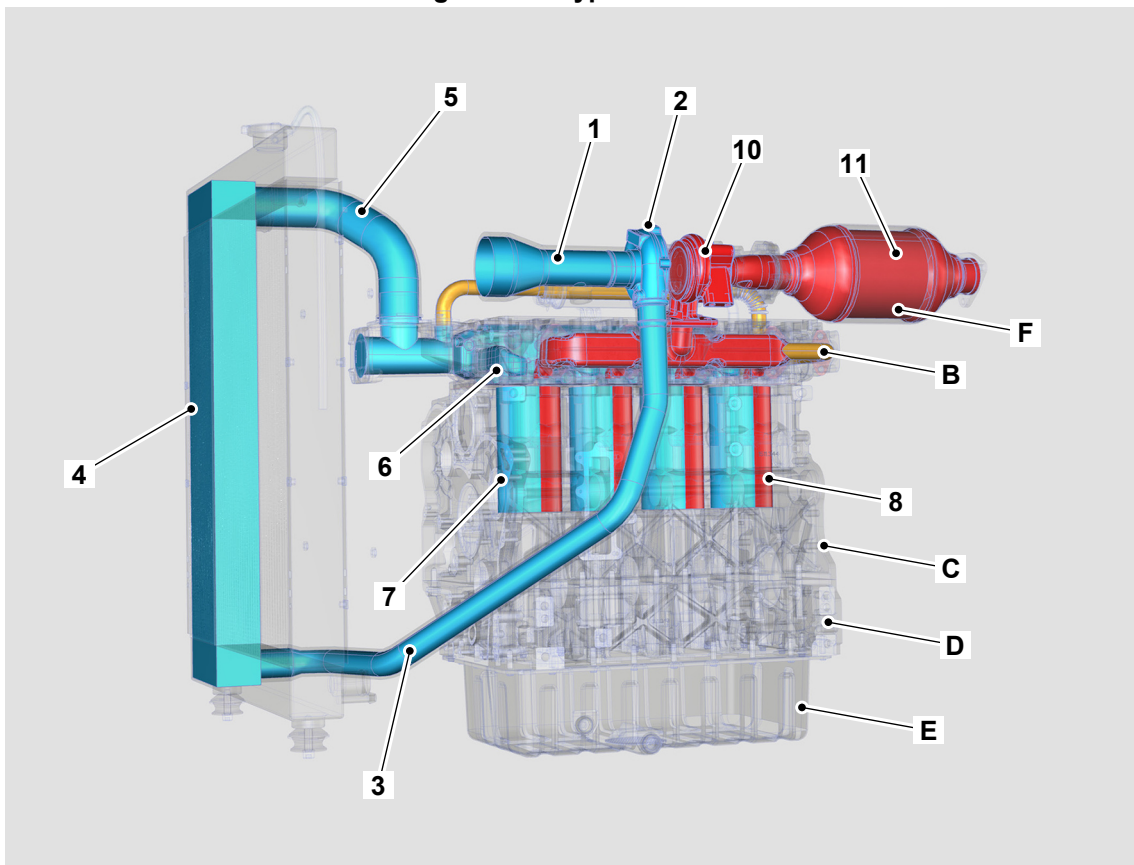
WARNING! *The engine has exposed rotating parts. Switch off the engine before working in the engine compartment. Do not use the machine with the engine cover open.*

Component Identification

Table 117. Intake and exhaust circuit

	Air in intake.
	Gas in recycle.
	Gas in exhaust.

Figure 460. Typical circuit

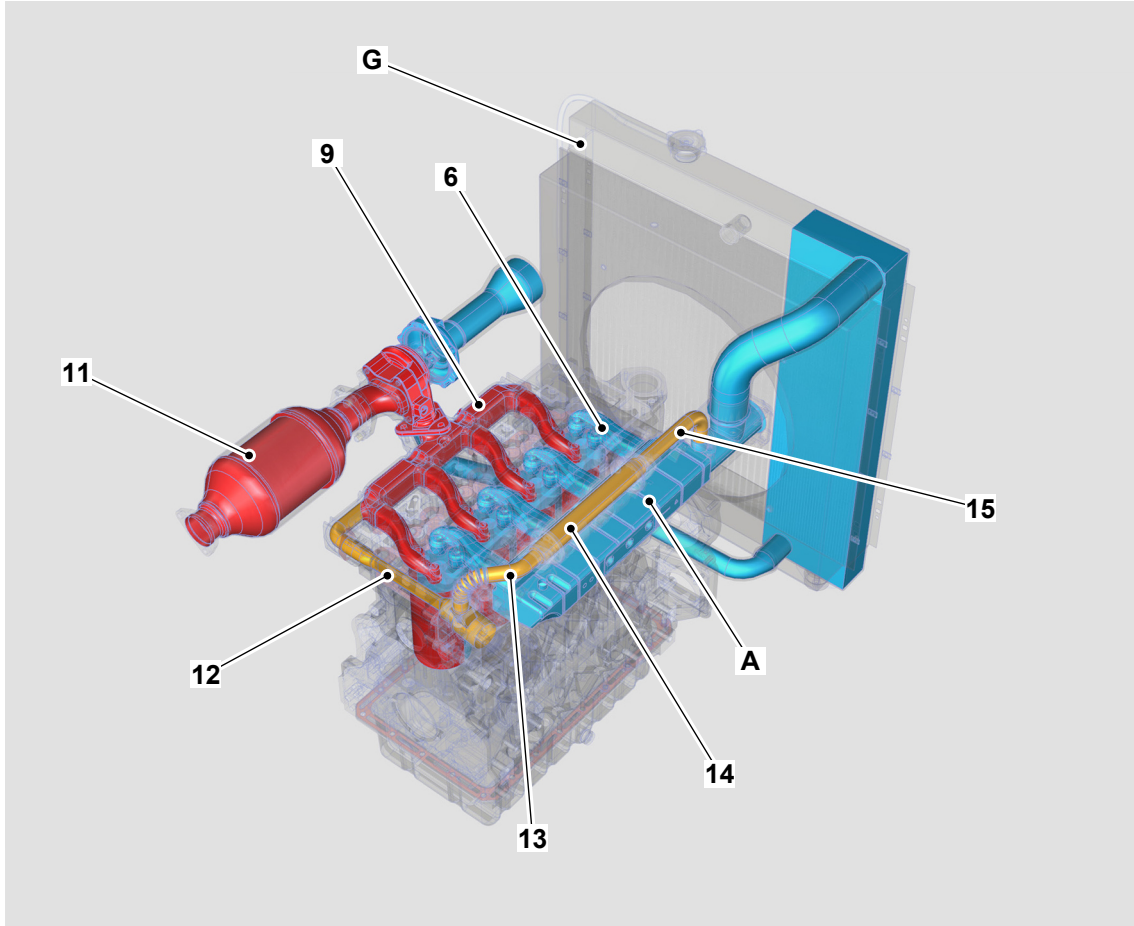


- | | |
|---|---|
| <ul style="list-style-type: none"> 1 Air in intake from air filter 3 Air in inter cooler flow 5 Air in intake manifold flow 7 Air in cylinder intake 10 Gas in outlet towards catalyst B Exhaust manifold | <ul style="list-style-type: none"> 2 Air in compression 4 Air cooling 6 Air in head intake 8 Gas in cylinder outlet 11 Gas in oxidation C Upper crankcase |
|---|---|

- D Lower crankcase
- F Catalyst

- E Oil sump

Figure 461. Typical circuit



- | | |
|--|--|
| 6 Air in head intake | 9 Gas in head outlet |
| 11 Gas in oxidation | 12 Gas in recycle towards EGR valve |
| 13 Gas in EGR valve outlet | 14 Gas cooling (in EGR cooler) |
| 15 Exhaust gas recirculation into intake manifold | A Intake manifold |
| G Radiator | |

Check (Condition)

Excessive smoke from the exhaust stack combined with a complaint of low power could be as a result of:

- Dirt or dust (unfiltered air) ingested directly into the engine, resulting in damage to the cylinder bores, there will also be a possible increase in oil consumption.
- Air leaks from the air hose connections.
- Exhaust manifold leaks.



03 - Inlet Manifold

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Introduction

On compression ignition (diesel) engines, the inlet manifold (also called the intake manifold) is the part of the air intake system that distributes air for combustion to the cylinders via each inlet port in the cylinder head. The design of the manifold is important to make sure that air is distributed as evenly as possible under all engine speed and load conditions.

Check (Condition)

1. Check the manifold mating faces for signs of damage and distortion.
2. Check the manifold casting for signs of cracks.
3. Renew the manifold if there are any signs of defect.

Remove and Install

NOTE: The illustrations shown are for a 4 cylinder engine however, the 3 cylinder engine also has a similar configuration.

Before Removal

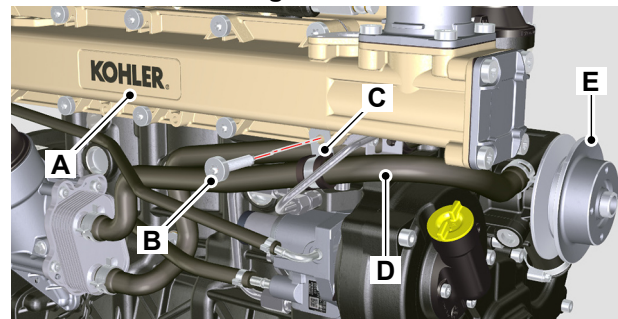
1. This procedure requires service parts. Make sure you have obtained the correct service parts before you start, refer to Parts Catalogue.
2. Make sure that the engine is safe to work on. If the engine has been running, let it cool before you start the service work.
3. Remove the EGR (Exhaust Gas Recirculation) cooler.
4. Remove the TMAP (Temperature Manifold Air Pressure) sensor.

Remove

Front Intake Manifold

1. Remove the screw to loosen the clamp that secures the coolant hose between the oil cooler and water pump.

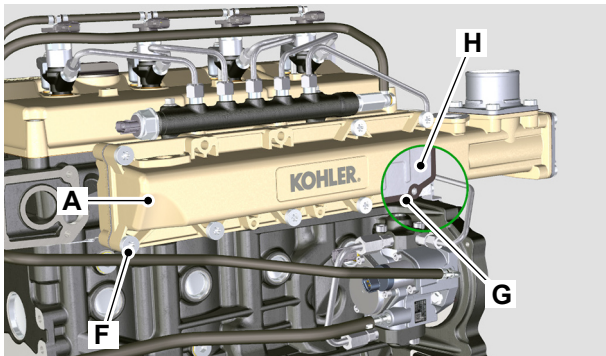
Figure 462.



- A** Front Intake manifold
- B** Screw
- C** Clamp
- D** Coolant hose
- E** Water pump

2. Remove the screws to open the front intake manifold.
3. Remove the two gaskets and the separation plate from the front intake manifold.

Figure 463.

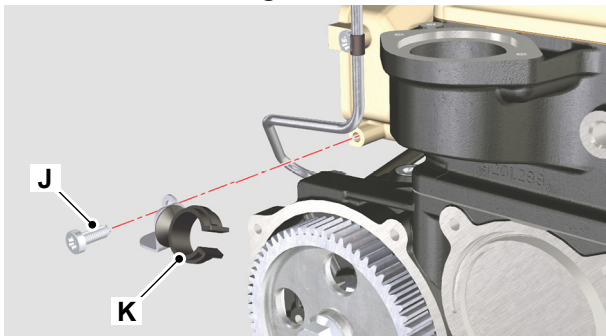


- A** Front intake manifold
- G** Gasket (x2)
- H** Separation plate

Rear Intake Manifold

1. Remove the screw that attaches the holder to the rear intake manifold.

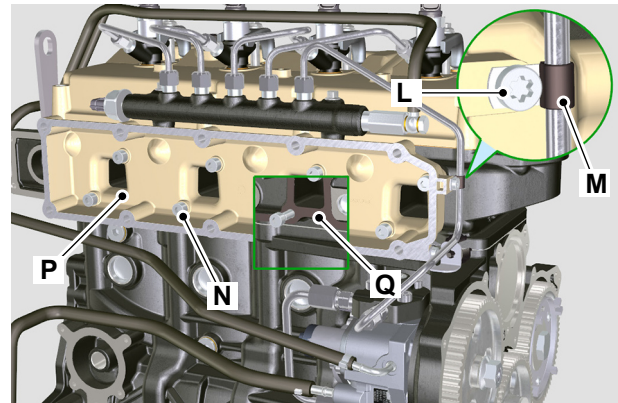
Figure 464.



- J** Screw
- K** Holder

2. Remove the screws to loosen the clamp of the high pressure fuel pipe.
3. Remove the screws that attach the rear intake manifold to the cylinder head.
4. Remove the rear intake manifold with its gasket.

Figure 465.



- L** Screw
- M** Clamp
- N** Screw
- P** Rear intake manifold
- Q** Gasket

5. Put protective covers on the open ports of the cylinder head.
6. Inspect the intake manifolds for any damage. Replace if damaged.

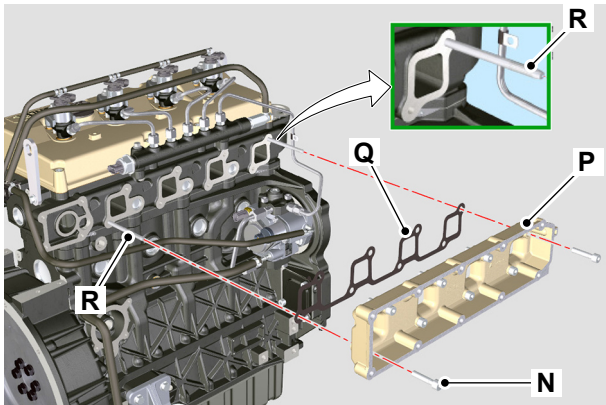
[Refer to: PIL 18-24-03.](#)

Install

Rear Intake Manifold

1. Remove the protective cover from the open ports of the cylinder head.
2. Install the intake manifold mounting studs to align the holes on the cylinder head with the rear intake manifold.
3. Put the rear intake manifold and the gasket in position against the cylinder head.
4. Install the screws to attach the rear intake manifold to the cylinder head.

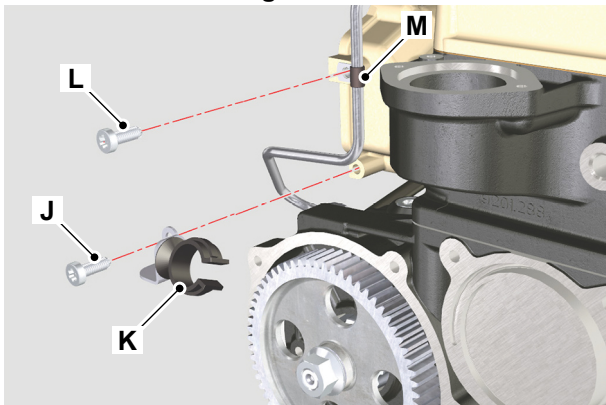
Figure 466.



- N Screw
- P Rear intake manifold
- Q Gasket
- R Mounting stud

5. Tighten the screws to the correct torque value.
6. Install the screws to attach the holder to the rear intake manifold.
7. Tighten the screws to the correct torque value.
8. Install the screws to attach the clamp of the high pressure fuel pipe.

Figure 467.



- J Screw
- K Holder
- L Screw
- M Clamp

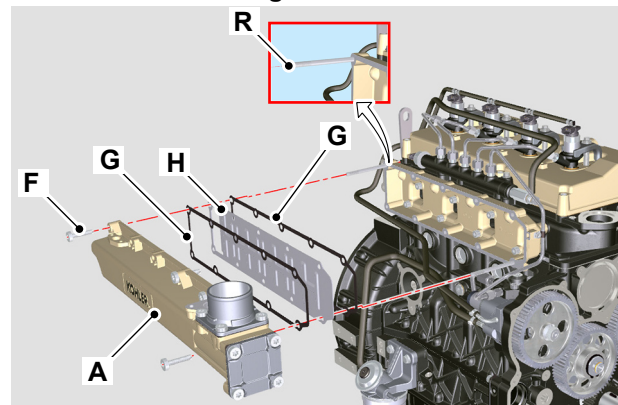
9. Tighten the screws to the correct torque value.

Front Intake Manifold

1. Put the two gaskets and the separation sheet in position on the intake manifold mounting studs.
2. Make sure you install the separation plate between the two gaskets.
3. Put the front intake manifold in position against the mounting studs.

4. Put the screws into the front intake manifold.

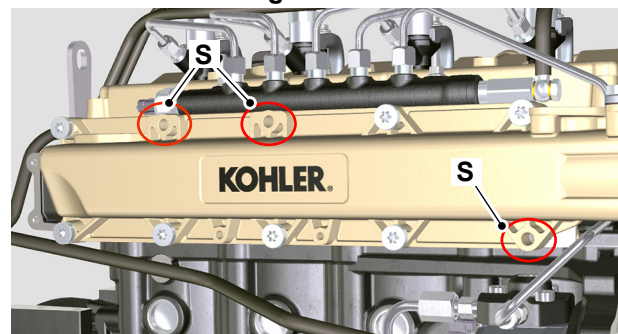
Figure 468.



- A Front intake manifold
- G Gasket
- H Separation plate
- R Mounting stud

5. Make sure that you leave the holes shown open for the EGR cooler and the coolant hose clamp.

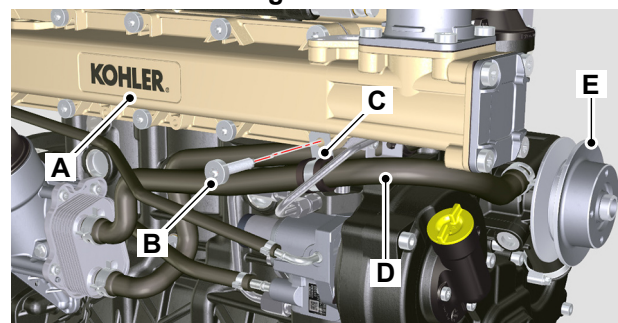
Figure 469.



- S Screw holes for EGR cooler and coolant hose clamp

6. Tighten the screws to the correct torque value.
7. Install the screw on the clamp that secures the hose between the oil cooler and water pump.

Figure 470.



- A Front Intake manifold
- B Screw
- C Clamp
- D Coolant hose
- E Water pump

**After Installation**

1. Install the TMAP sensor.
2. Install the EGR cooler.

Table 118. Torque Values

Item	Nm
F	23
J	6
L	6
N	23



04 - Outlet Manifold

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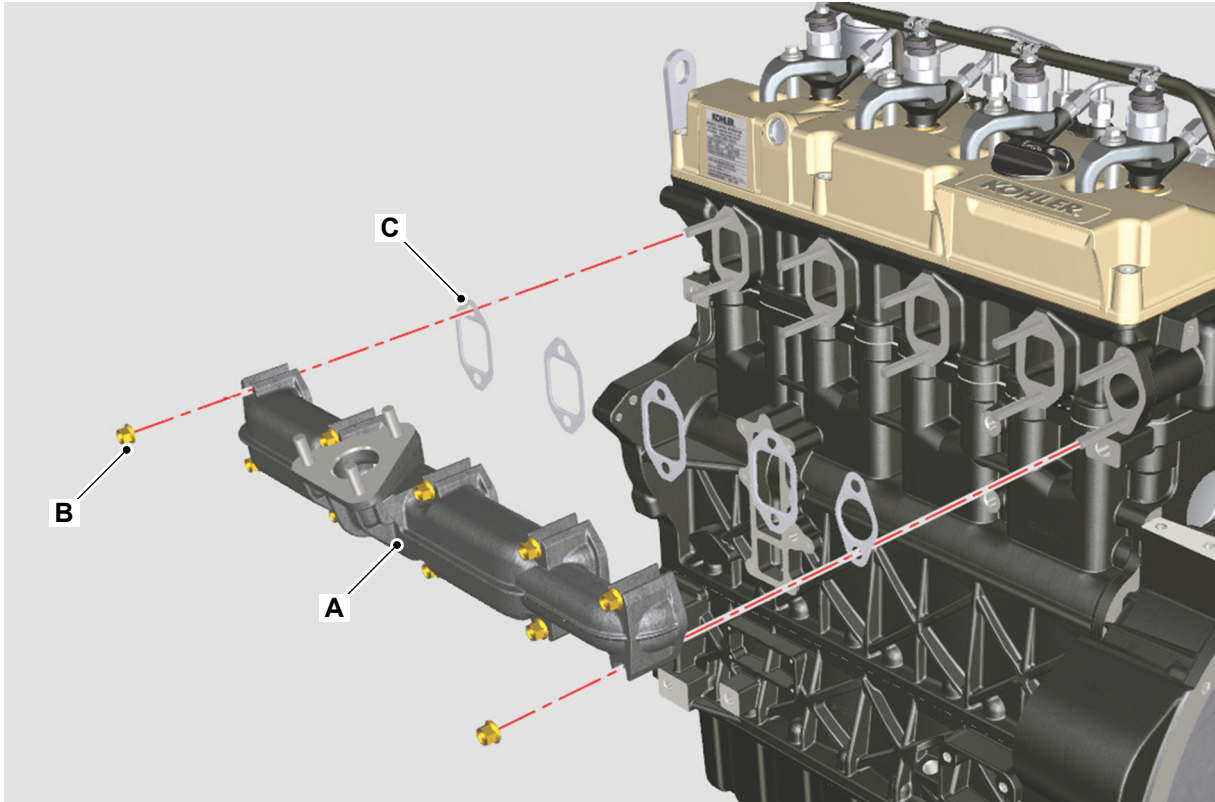
Introduction

The exhaust outlet manifold collects the exhaust gases from the multiple cylinders and delivers it to the turbocharger or the exhaust pipe.

Component Identification

The exhaust manifold collects the exhaust gases from the multiple cylinders and deliver it to the exhaust pipe.

Figure 471.



A Outlet manifold
C Manifold gasket

B Fixing bolts

Check (Condition)

1. Check the manifold mating faces for signs of damage and distortion.
2. Check the manifold casting for signs of cracks.
3. Renew the manifold if there are any signs of defect.
4. Visually inspect for leaks at the exhaust manifold. Make sure all gaskets are in good condition, replace as required.

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