

2013 Chevrolet Colorado

Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

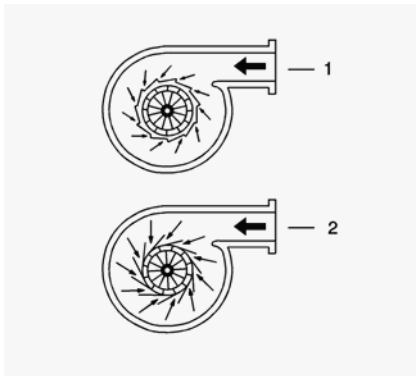
The turbocharger increases engine power by pumping compressed air into the combustion chambers, allowing a greater quantity of fuel to combust at the optimal air/fuel ratio.

[Turbocharger Pressure Sensor](#)

The intake air (boost) pressure and temperature sensor is mounted on the intake manifold and measures boost pressure and air temperature.

[Turbocharger Boost Pressure Actuator](#)

The turbocharger for this system uses a rotary electric vane position actuator provided, with a contactless position sensor, to control the turbocharger vane angle. The electric actuator uses ignition voltage, a ground circuit and a pulse width modulation (PWM) low side drive control circuit provided by the engine control module (ECM). The turbocharger vane angles are varied to control the amount of boost pressure, independent of engine speed. The turbocharger has 11 controllable vanes mounted to a drive ring that can be rotated by the electric actuator to change the vane angle. The ECM varies the boost dependent upon the load requirements of the engine.



The turbocharger vanes (2) are normally open when the engine is not under a load. The ECM commands the boost pressure actuator to close the turbocharger vanes (1) to increase engine power and to create a high pressure.

The ECM will often close the vanes (1) to create back pressure to drive exhaust gas through the exhaust gas recirculation (EGR) valve as required. At extreme cold temperatures, the ECM may close the vanes (1) at low load conditions in order to accelerate engine coolant heating. The ECM may also close the vanes (1) under exhaust braking conditions.

[The Charged Air Cooler or Turbocharger Intercooler](#)

The charged air cooler or turbocharger intercooler is located in front of the radiator. The turbocharger supplies hot compressed air from the turbine to the engine to increase power. The airflow through the radiator cools the hot compressed air from the turbocharger.

[Engine Control Module \(ECM\)](#)

The ECM controls all turbocharger control functions. The ECM monitors information from various sensor inputs that include the following:

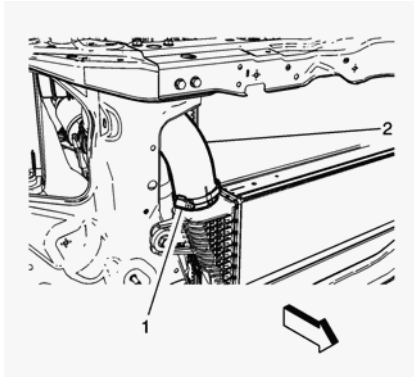
- The accelerator pedal position sensor
- The engine coolant temperature (ECT) sensor
- The mass air flow (MAF) sensor
- The intake air pressure and temperature sensor
- The vehicle speed sensor (VSS)
- The transmission gear position or range information sensors

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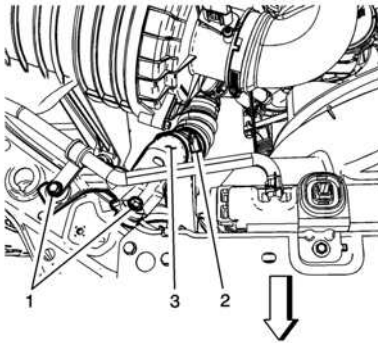
Submodel: | Engine Type: | Liters:
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[Removal Procedure](#)

1. Remove the right side radiator air side baffle. Refer to Radiator Air Side Baffle Replacement - Right Side.

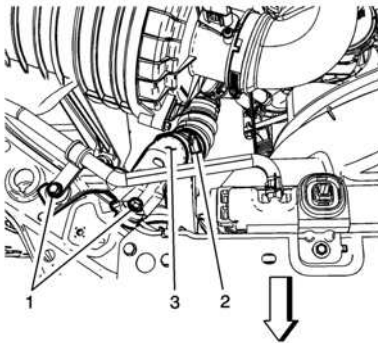


2. Remove the charge air cooler inlet air hose clamp (1) from the charge air cooler inlet air hose (2).



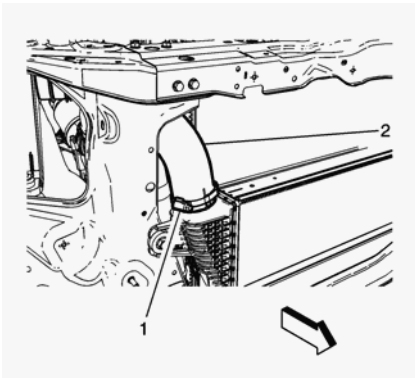
3. Remove the charge air cooler inlet air hose bolts (1) from the charge air cooler inlet air hose (3).
4. Remove the charge air cooler inlet air hose clamp (2) from the charge air cooler inlet air hose (3).
5. Remove the charge air cooler inlet air hose (3) from the vehicle.

[Installation Procedure](#)



1. Install the charge air cooler inlet air hose (3) to the vehicle.
 2. Install the charge air cooler inlet air hose clamp (2) to the charge air cooler inlet air hose (3).
- Caution:** Refer to Fastener Caution.
3. Install the charge air cooler inlet air hose bolts (1) to the charge air cooler inlet air hose (3) and tighten to 9 Y (80 lb in).

Charge Air Cooler Inlet Air Hose Replacement (At Cooler)



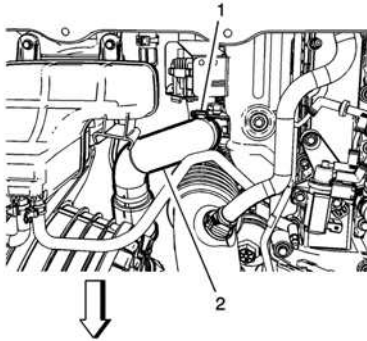
4. Install the charge air cooler inlet air hose clamp (1) to the charge air cooler inlet air hose (2).
5. Install the right side radiator air side baffle. Refer to Radiator Air Side Baffle Replacement - Right Side.

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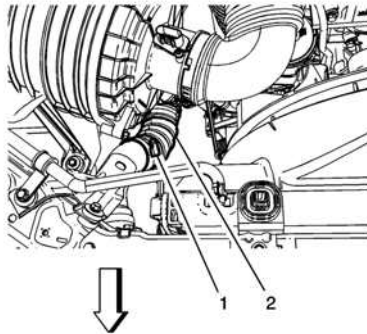
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[Removal Procedure](#)

1. Remove the power steering tank from the radiator surge tank. Refer to Power Steering Fluid Reservoir Replacement.

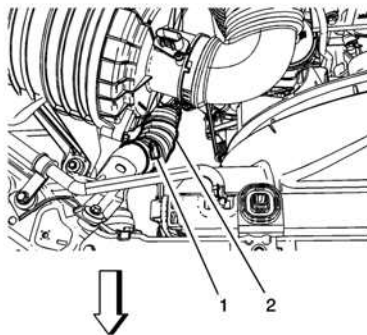


2. Remove the charge air cooler inlet air hose clamp (1) from the charge air cooler inlet air hose (2).



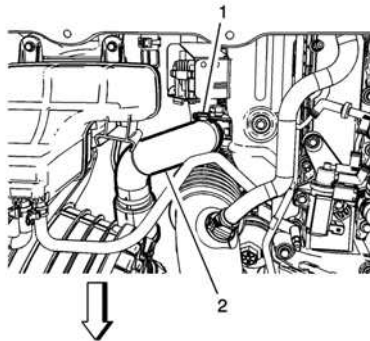
3. Remove the charge air cooler inlet air hose clamp (1) from the charge air cooler inlet air hose (2).
4. Remove the charge air cooler inlet air hose (2) from the vehicle.

[Installation Procedure](#)



1. Install the charge air cooler inlet air hose (2) to the vehicle.
2. Install the charge air cooler inlet air hose clamp (1) to the charge air cooler inlet air hose (2).

Charge Air Cooler Inlet Air Hose Replacement (At Turbo)



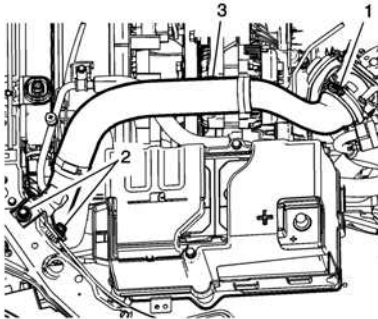
3. Install the charge air cooler inlet air hose clamp (1) to the charge air cooler inlet air hose (2).
4. Install the power steering tank to the radiator surge tank. Refer to Power Steering Fluid Reservoir Replacement.

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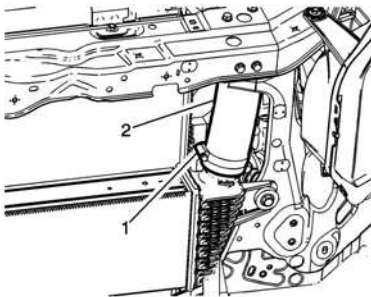
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[Removal Procedure](#)

1. Remove the intake manifold cover. Refer to Intake Manifold Cover Replacement.
2. Remove the front fascia. Refer to Front Bumper Fascia Replacement.
3. Remove radiator air side baffle from left side. Refer to Radiator Air Side Baffle Replacement - Left Side.

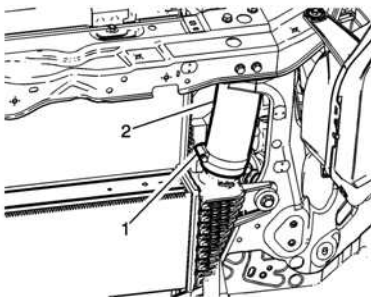


4. Loosen the clamp(1) at the throttle body and remove the charge air cooler outlet air tube bracket fasteners(2)(Qty 2).
5. Remove the charge air cooler outlet air tube(3) from the throttle body.



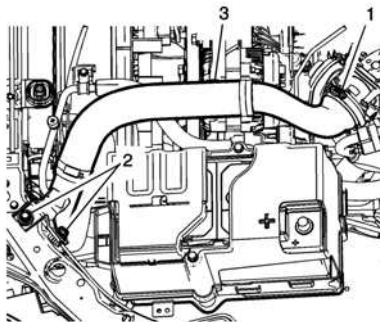
6. Loosen the lower clamp(1) and remove the charge air cooler outlet air hose(2) from the charge air cooler.
7. Remove the charge air cooler outlet air tube from the vehicle.

[Installation Procedure](#)



1. Install the charge air cooler outlet air tube(2) to the charge air cooler.

Charge Air Cooler Outlet Air Hose Replacement



2. Install the charge air cooler outlet air tube(3) to the throttle body inlet.
3. Install the clamp (1) at the throttle body.

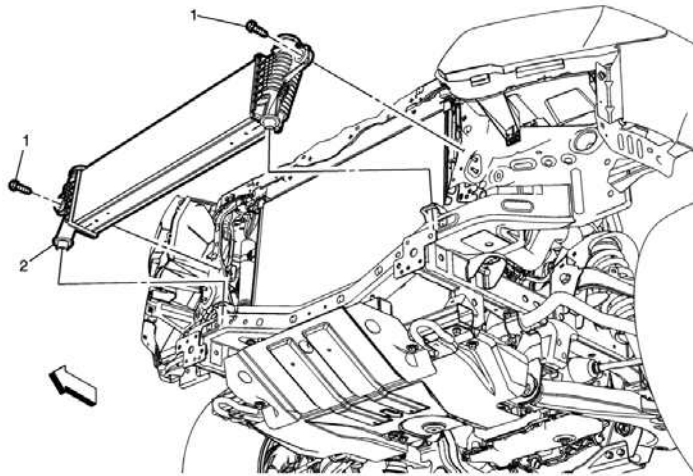
Caution: Refer to Fastener Caution.

4. Install the charge air cooler outlet air hose bracket fasteners(2)(Qty 2) and tighten the fasteners to **9 Y (80 lb in)**.
5. Tighten the upper and lower charge air cooler outer air hose clamps.
6. Install radiator air side baffle to the left side. Refer to Radiator Air Side Baffle Replacement - Left Side.
7. Install the front fascia. Refer to Front Bumper Fascia Replacement.
8. Install the intake manifold cover. Refer to Intake Manifold Cover Replacement.

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Charge Air Cooler Replacement

Callout

Component Name

Preliminary Procedure

1. Remove the charge air cooler outlet hose. Refer to Charge Air Cooler Outlet Air Hose Replacement.
2. Remove the charge air cooler inlet air hose . Refer to Charge Air Cooler Inlet Air Hose Replacement.
3. Remove the front bumper upper impact bar. Refer to Front Bumper Upper Impact Bar Replacement.
4. Remove the hood primary latch support. Refer to . Hood Primary Latch Support Replacement.

Charge Air Cooler Bracket Fastener (Qty: 2)

1

Tighten

9 Y (80 lb in)

2

Charge Air Cooler

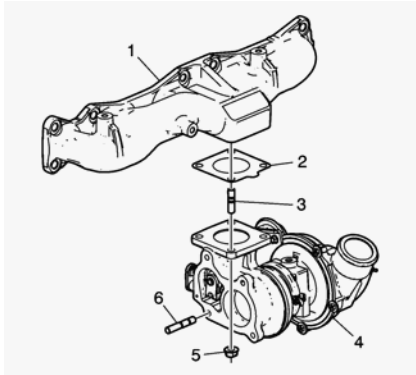
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Warning: To prevent possible injury from the coupler blowing off the charge air cooler hose during the test, connect the safety cable before applying air pressure.

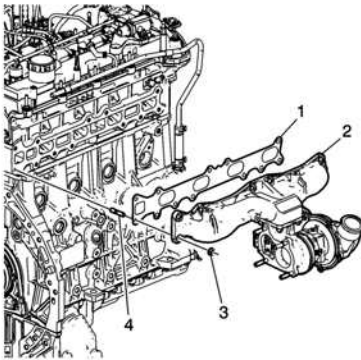
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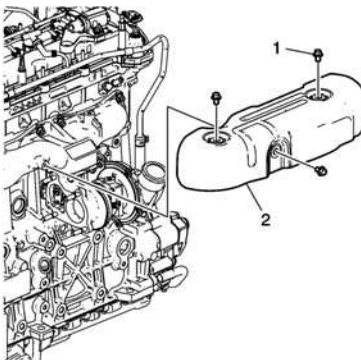


Caution: Refer to Fastener Caution.

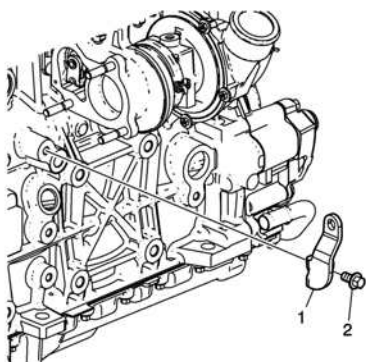
1. Install the turbocharger exhaust pipe studs (6) and tighten until fully seated.
2. Install the exhaust manifold to turbocharger studs (3) and tighten until fully seated.
3. Install the turbocharger gasket (2).
4. Install the turbocharger (4) to the exhaust manifold (1).
5. Install the exhaust manifold to turbocharger nuts (5) and tighten to **24 Y (18 lb ft)**.



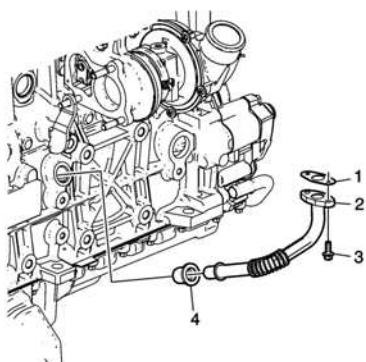
6. Install the exhaust manifold studs (4) and tighten to **32 Y (24 lb ft)**.
7. Install the exhaust manifold gasket (1).
8. Install the exhaust manifold with turbocharger (2).
9. Install the exhaust manifold nuts (3) and tighten to **36 Y (27 lb ft)**.



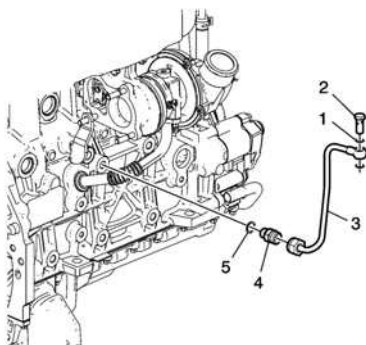
10. Install the exhaust manifold heat shield (2).
11. Install the exhaust manifold heat shield bolts (1) and tighten to **32 Y (24 lb ft)**.



12. Install the turbocharger bracket (1) and bracket bolt (2).
13. Tighten the bracket bolt (2) to **32 Y (24 lb ft)**.



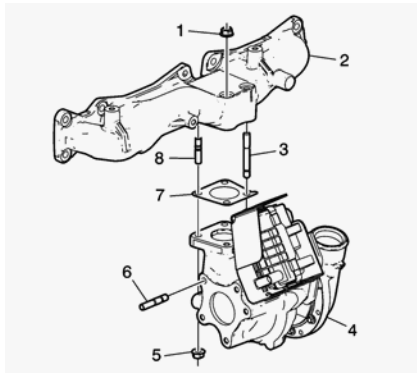
14. Install the turbo oil return pipe seal (4).
15. Install the turbo oil return pipe gasket (1) and pipe (2).
16. Install the turbo oil return pipe bolts (3) and tighten to **15 Y (11 lb ft)**.



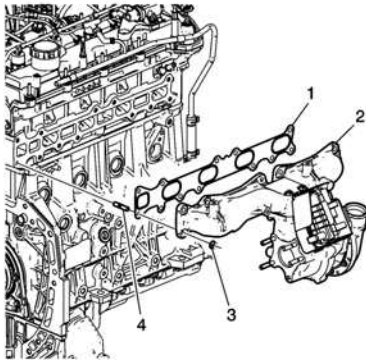
17. Install the oil feed pipe adapter (4) and washer (5). Tighten the adapter to **54 Y (40 lb ft)**.
18. Install the turbo oil feed pipe (3).
19. Install the turbo oil feed pipe bolt (2) and washers (1). Tighten the bolt to **25 Y (18 lb ft)**.

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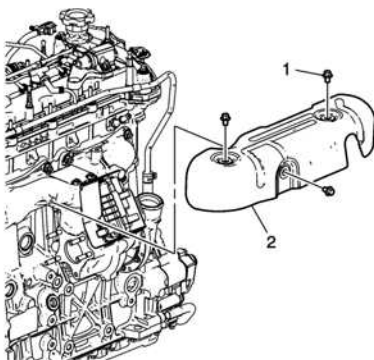
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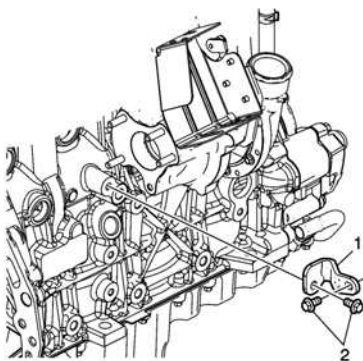
1. Install the turbocharger exhaust pipe studs (6) and tighten until fully seated.
2. Install the exhaust manifold to turbocharger studs (3 and 8) and tighten until fully seated.
3. Install the turbocharger gasket (7).
4. Install the turbocharger (4) to the exhaust manifold (2).
5. Install the exhaust manifold to turbocharger nuts and tighten to **24 Y (18 lb ft)**.



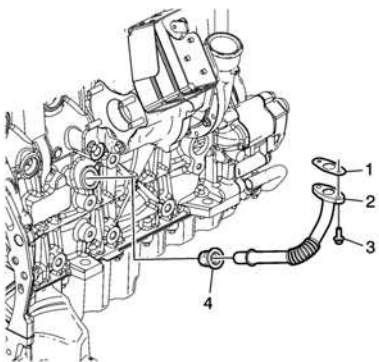
6. Install the exhaust manifold studs (4) and tighten to **32 Y (24 lb ft)**.
7. Install the exhaust manifold gasket (1).
8. Install the exhaust manifold with turbocharger (2).
9. Install the exhaust manifold nuts (3) and tighten to **36 Y (27 lb ft)**.



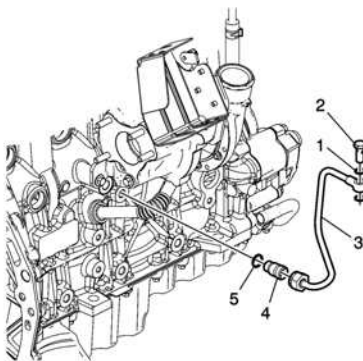
10. Install the exhaust manifold heat shield (2).
11. Install the exhaust manifold heat shield bolts (1) and tighten to **32 Y (24 lb ft)**.



12. Install the turbocharger bracket (1) and bracket bolts (2).
13. Tighten the bracket bolts (2) to **32 Y (24 lb ft)**.



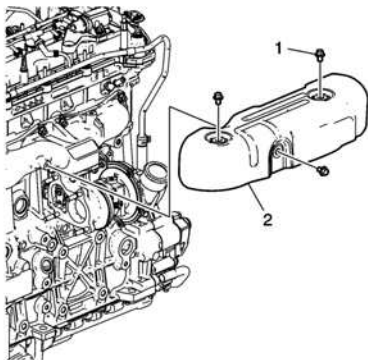
14. Install the turbo oil return pipe seal (4).
15. Install the turbo oil return pipe (2) and gasket (1).
16. Install the turbo oil return pipe retaining bolts (3) and tighten to **15 Y (11 lb ft)**.



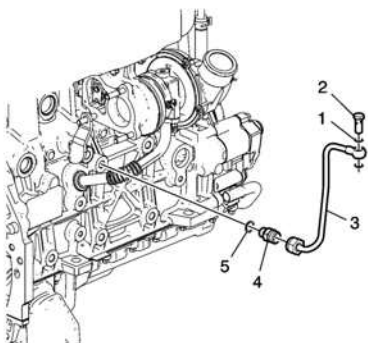
17. Install the oil feed pipe adapter (4) and washer (5). Tighten the adapter to **54 Y (40 lb ft)**.
18. Install the turbo oil feed pipe (3).
19. Install the turbo oil feed pipe bolt (2) and washers (1). Tighten the bolt to **25 Y (18 lb ft)**.

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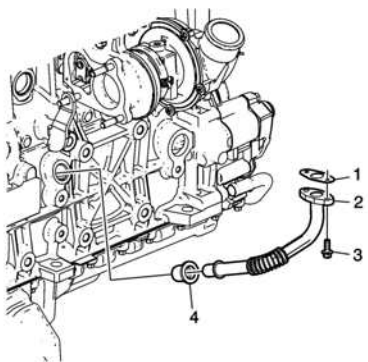
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Fuel Delivery: | Fuel:



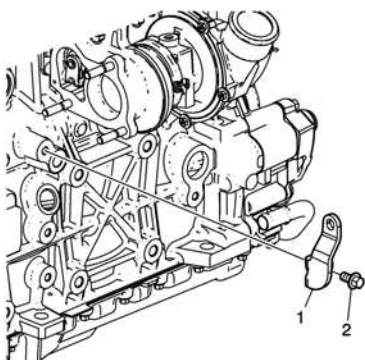
1. Remove the exhaust manifold heat shield bolts (1).
2. Remove the exhaust manifold heat shield (2).



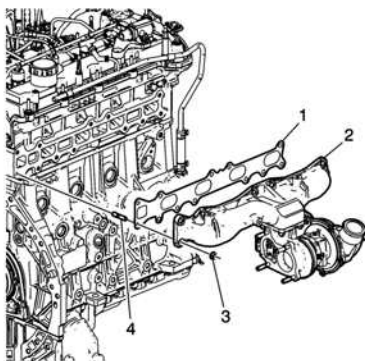
3. Remove the turbo oil feed pipe bolt (2) and washers (1).
4. Remove the turbo oil feed pipe (3).
5. Remove the oil feed pipe adapter (4) and washer (5).



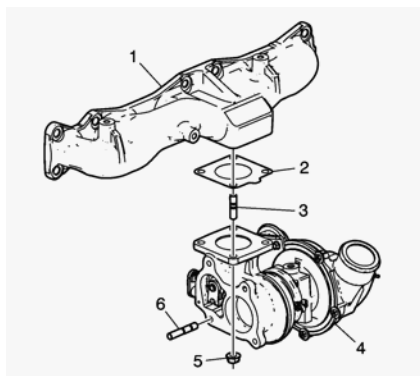
6. Remove the turbo oil return pipe retaining bolt (3).
7. Remove the turbo oil return pipe (2) and gasket (1).
8. Remove the turbo oil return pipe seal (4).



9. Remove the turbo charger bracket bolt (2) and bracket (1).



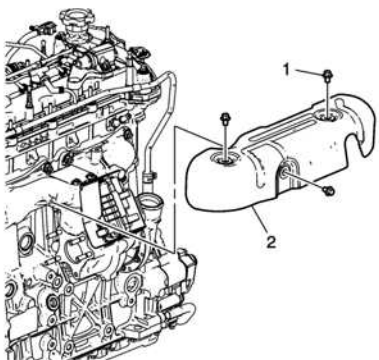
10. Remove the exhaust manifold nuts (3).
11. Remove the exhaust manifold with turbocharger (2) and gasket (1).
12. Remove the exhaust manifold studs (4).



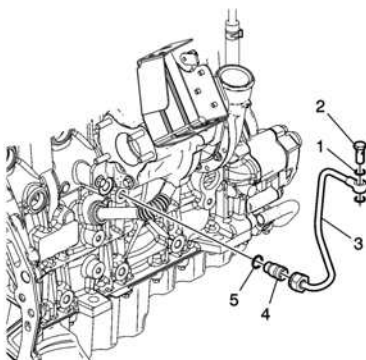
13. Remove the exhaust manifold to turbocharger nuts (5).
14. Separate the exhaust manifold (1) from the turbocharger (4).
15. Remove the turbocharger gasket (2).
16. Remove the exhaust manifold to turbocharger stud (3).
17. Remove the turbocharger exhaust pipe studs (6).

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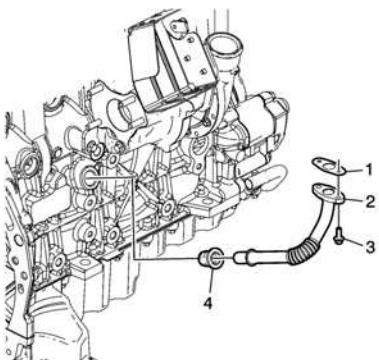
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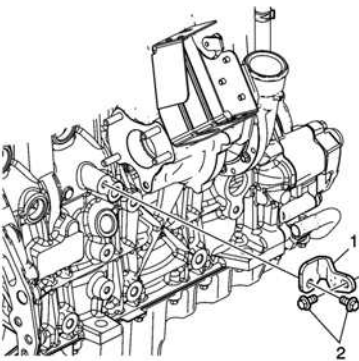
1. Remove the exhaust manifold heat shield bolts (1).
2. Remove the exhaust manifold heat shield (2).



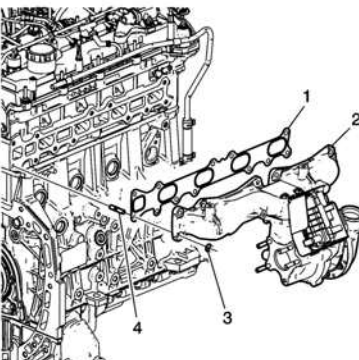
3. Remove the turbo oil feed pipe bolt (2) and washers (1).
4. Remove the turbo oil feed pipe (3).
5. Remove the oil feed pipe adapter (4) and washer (5).



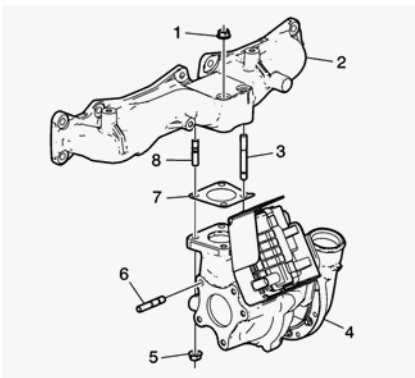
6. Remove the turbo oil return pipe retaining bolt (3).
7. Remove the turbo oil return pipe (2) and gasket (1).
8. Remove the turbo oil return pipe seal (4).



9. Remove the turbo charger bracket bolts (2) and bracket (1).



10. Remove the exhaust manifold nuts (3).
11. Remove the exhaust manifold with turbocharger (2) and gasket (1).
12. Remove the exhaust manifold studs (4).

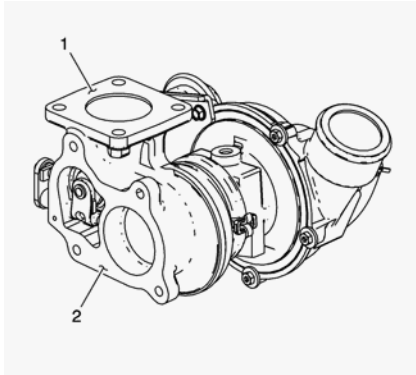


13. Remove the exhaust manifold to turbocharger nuts (1 and 5).
14. Separate the exhaust manifold (2) from the turbocharger (4).
15. Remove the turbocharger gasket (7).
16. Remove the exhaust manifold to turbocharger stud (3 and 8).
17. Remove the turbocharger exhaust pipe studs (6).

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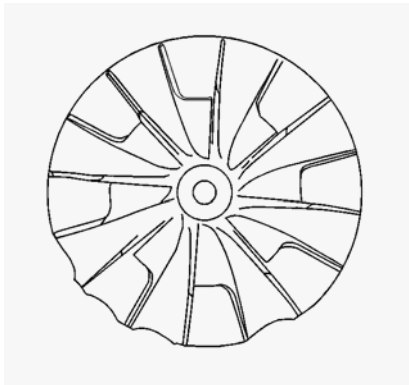
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Completely inspect the turbocharger and all other engine components that may cause similar conditions before replacing the turbocharger. Use the following information to diagnose problems. The turbocharger is serviced as a complete unit.

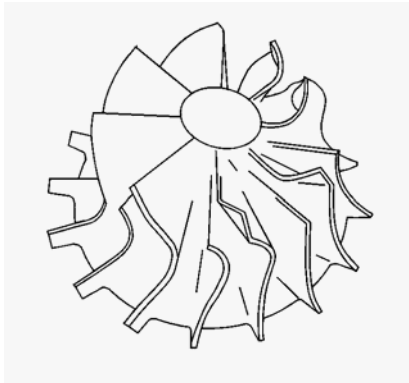


Note: Oil residue on the turbocharger compressor wheel is normal with a closed PCV system.

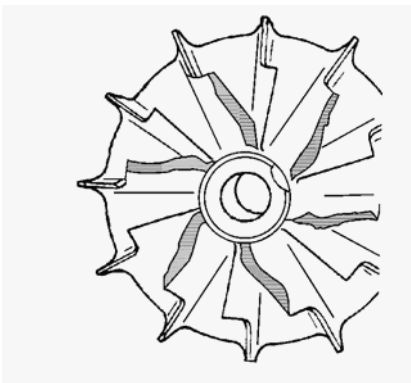
1. Clean the turbocharger mating surfaces (1, 2).



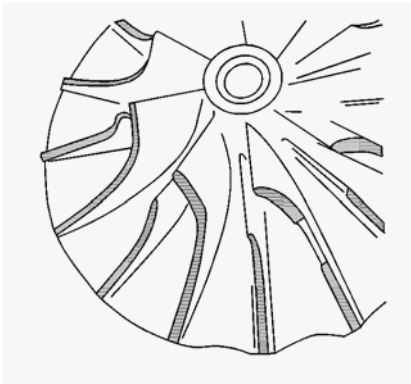
2. Inspect for damage to the compressor wheel, compared to a normal compressor wheel.



3. Inspect for damage to the compressor wheel, by a soft object.



4. Inspect for damage to the compressor wheel, by a hard object.



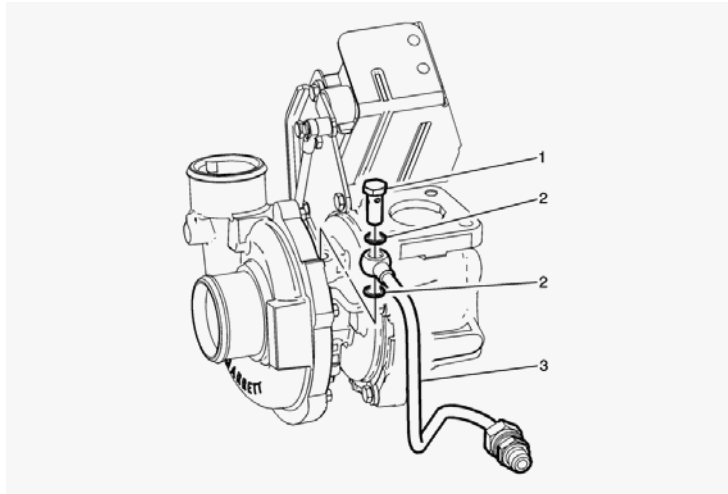
5. Inspect compressor blades for heavy rubbing.
6. Ensure that the following conditions do not exist on the compressor wheel blades:

- Cracks
 - Bends
 - Erosion of the blades
 - Broken blades
- Check the housing for signs of rubbing.
- Clean the turbocharger inlet duct.
- Clean the turbocharger inlet duct mating surfaces.
- Inspect the turbocharger inlet duct for cracks.
- Inspect the turbocharger inlet duct mating surfaces for damage.

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Turbocharger Oil Feed Pipe Replacement

Callout

Component Name

Preliminary Procedure

Remove the turbocharger. Refer to Turbocharger Replacement.

Turbocharger Oil Feed Pipe Fastener (Qty: 2)

Caution: Refer to Fastener Caution.

1

Tighten

25 Y (18 lb ft)

Turbocharger Oil Feed Pipe Seal

2

Procedure

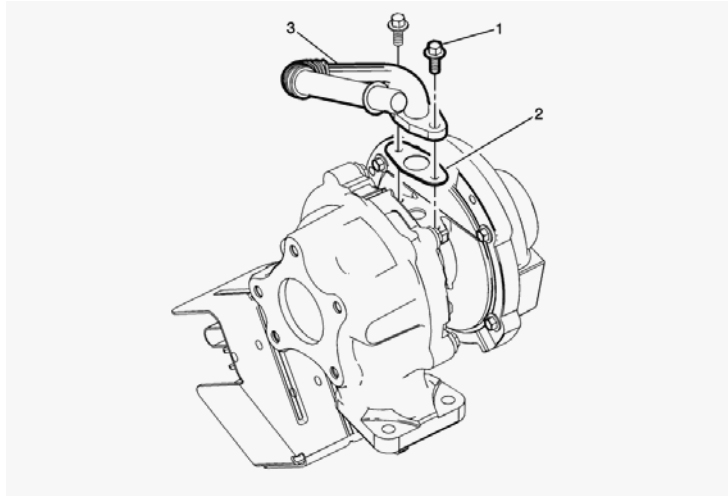
Ensure to replace turbocharger oil feed seal whenever the pipe is removed.

3

Turbocharger Oil Feed Pipe

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Turbocharger Oil Return Pipe Replacement

Callout

Component Name

Preliminary Procedure

Remove the turbocharger. Refer to Turbocharger Replacement.

Turbocharger Oil Return Pipe Fastener (Qty: 2)

Caution: Refer to Fastener Caution.

1

Tighten

15 Y (11 lb ft)

Turbocharger Oil Return Pipe Gasket

2

Procedure

Ensure to replace turbocharger oil return gasket whenever the pipe is removed.

3

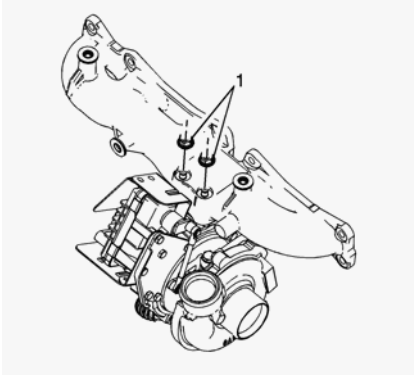
Turbocharger Oil Return Pipe

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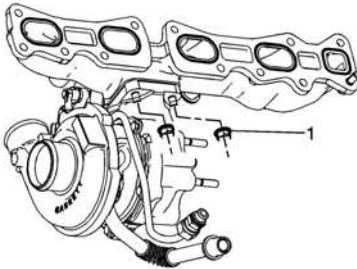
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[Removal Procedure](#)

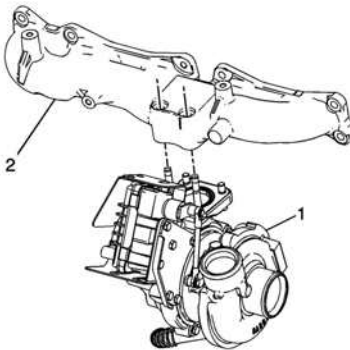
1. Remove the exhaust manifold. Refer to Exhaust Manifold Replacement.



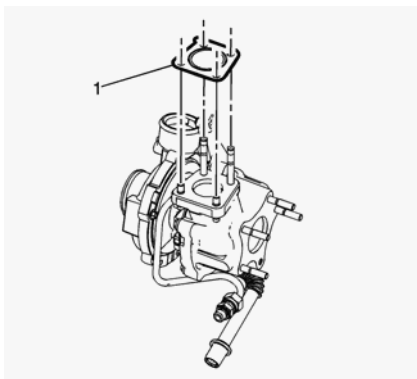
2. Remove the exhaust manifold to turbocharger nuts (1).



3. Remove the exhaust manifold to turbocharger nuts (1).

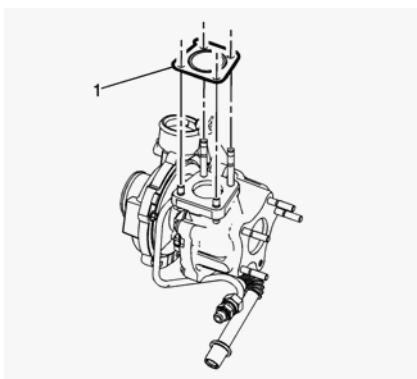


4. Separate the exhaust manifold (2) from the turbocharger (1).

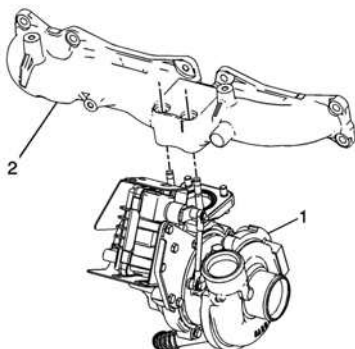


5. Remove the turbocharger gasket (1).
6. For cleaning and inspection. Refer to Turbocharger Cleaning and Inspection.

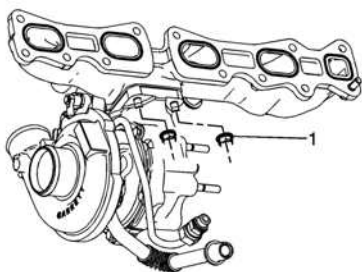
[Installation Procedure](#)



1. Install the turbocharger gasket (1).



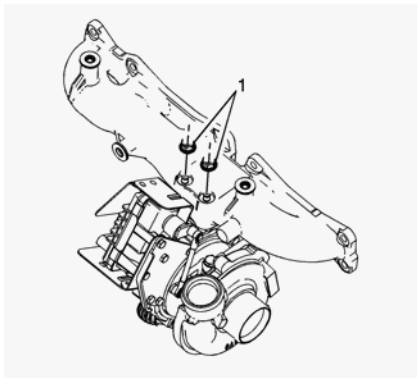
2. Install the exhaust manifold (2) to turbocharger (1).



Caution: Refer to Fastener Caution.

3. Install the exhaust manifold to turbocharger nuts (1) and tighten to **32 Y(24 lb ft)**.

Turbocharger Replacement



4. Install the exhaust manifold to turbocharger nuts (1) and tighten to **32 Y(24 lb ft)**.
5. Install the exhaust manifold. Refer to Exhaust Manifold Replacement.