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Coding Information

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Title: Crankcase Breather (Engine Mounted) Service**Applies To: 2010 MaxxForce 11, 13L and N13 Engines**

CHANGE LOG

2015/03/09 - Initial Article Release

DESCRIPTION

This document will guide the user through replacing the CCOS housing and inspecting the jet plate without draining the engine coolant.

This document replaces/retires:
- TSI-13-12-04

SYMPTOMS

Diagnostic Trouble Code(s) & Dashboard Indicator Light(s):

Not Applicable

Customer Observations or Concerns:

Oil leaking from the road draft tube.

SPECIAL TOOLS / SOFTWARE

No special tools required

SERVICE PARTS INFORMATION

Kit Description	Part Number	Quantity Required	Notes
KIT, BREATHER HOUSING	2512067C91	1	
TUBE, ASSY TURBO OIL SUPPLY	3018397C93	1	If Needed

KIT, BREATHER JET PLATE	2512660C91	1	If Needed
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DIAGNOSTIC STEPS

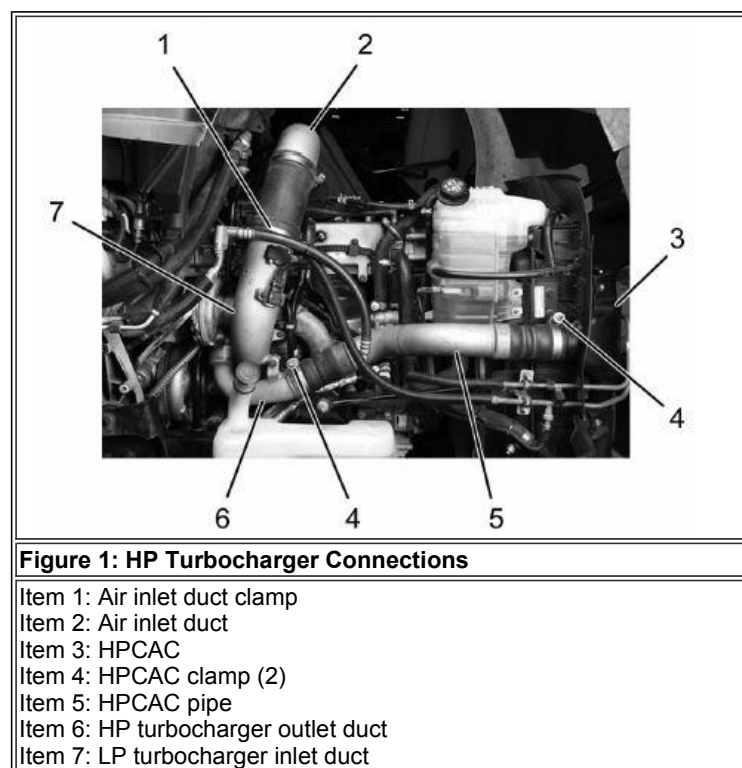
No diagnostic steps required for this procedure

REPAIR STEPS

NOTE: If engine is equipped with updated turbocharger oil supply tube, order part number 3018397C91. Removal of updated turbocharger oil supply tube is necessary, as it is routed in front of CCOS breather housing and is a **ONE-TIME** use.

1. Bring truck into shop and park on flat surface.
2. Shift transmission to Park or Neutral, set parking brake, and install wheel chocks.
3. Unlatch and open hood.

REMOVAL PROCEDURE:



4. Remove air inlet duct clamp (Figure 1, Item 1) and remove air inlet duct (Figure 1, Item 2) from Low-Pressure (LP) turbocharger inlet duct (Figure 1, Item 7).

5. Remove two High-Pressure Charge Air Cooler (HPCAC) clamps (Figure 1, Item 4) and remove HPCAC pipe (Figure 1, Item 5) from HPCAC (Figure 1, Item 3) and HP turbocharger outlet duct (Figure 1, Item 6).

6. Install cap on HPCAC.



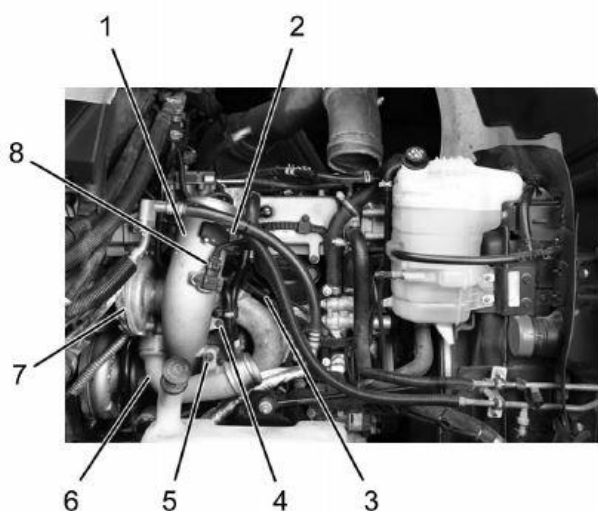


Figure 2: HP and LP Turbocharger Connections

- Item 1: LP turbocharger inlet duct
- Item 2: MAF sensor connector
- Item 3: TC2CIP sensor connector
- Item 4: LP turbocharger inlet duct bolt (2) (one not shown)
- Item 5: HP turbocharger outlet duct bolt (2) (one not shown)
- Item 6: HP turbocharger outlet duct
- Item 7: HP turbocharger
- Item 8: AIT sensor connector

7. If equipped, disconnect Mass Air Flow (MAF) sensor connector (Figure 2, Item 2).
8. Disconnect Turbocharger 2 Compressor Inlet Pressure (TC2CIP) sensor connector (Figure 2, Item 3).
9. Disconnect Air Inlet Temperature (AIT) sensor connector (Figure 2, Item 8) and position engine harness aside.
10. Remove two HP turbocharger outlet duct bolts (Figure 2, Item 5) and HP turbocharger outlet duct (Figure 2, Item 6) from HP turbocharger (Figure 2, Item 7). Remove and discard HP turbocharger outlet duct O-ring seal.
11. Remove two LP turbocharger inlet duct bolts (Figure 2, Item 4) and LP turbocharger inlet duct (Figure 2, Item 1) from LP turbocharger. Remove and discard LP turbocharger inlet duct O-ring seal.
12. Install caps in turbocharger openings.

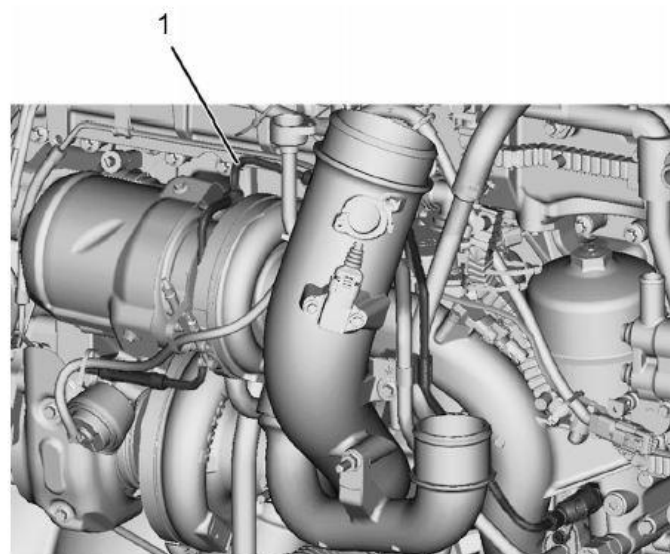
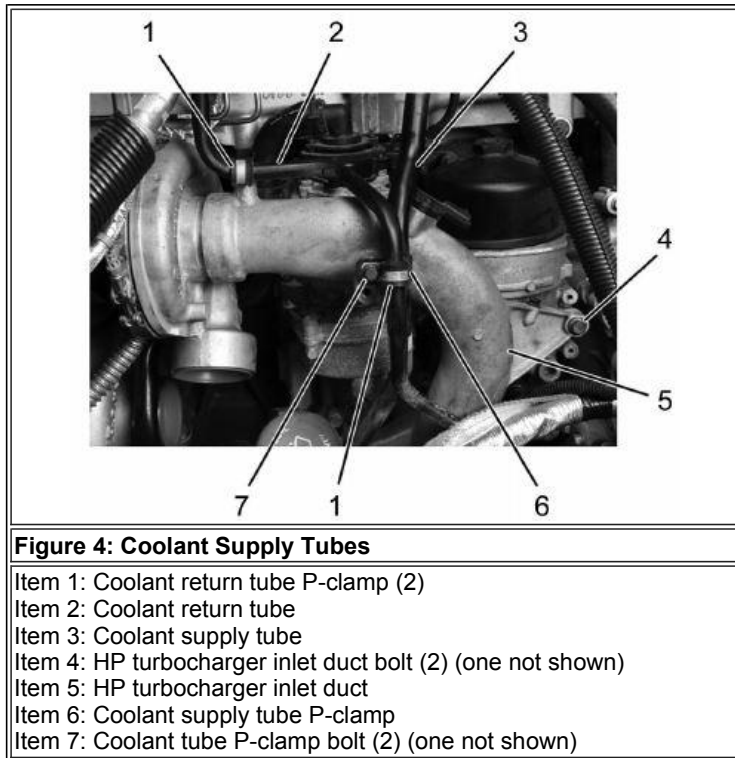


Figure 3: Updated Turbocharger Oil Supply Tube

- Item 1: Updated turbocharger oil supply tube

NOTE: The new oil supply tube design will be routed from the Engine Oil Pressure (EOP) sensor, not off the engine block's main oil gallery behind the turbos.

13. If equipped, remove updated turbocharger oil supply tube (Figure 3, Item 1) from vehicle (refer to appropriate Engine Service Manual). Discard updated turbocharger oil supply tube.



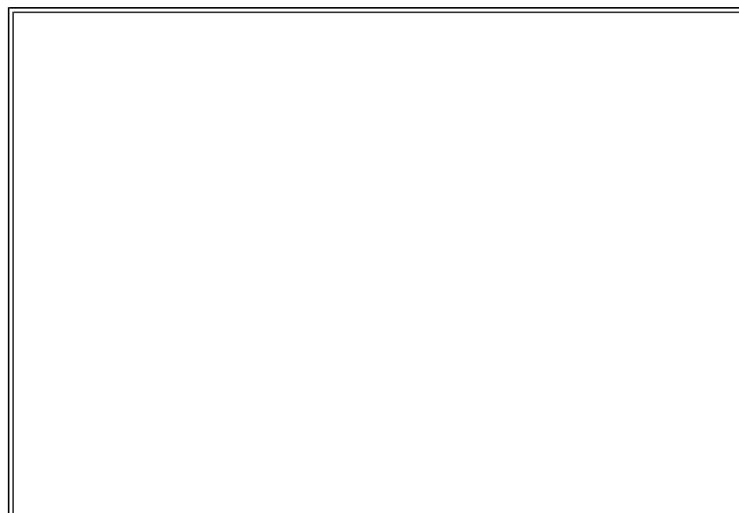
14. Remove two coolant tube P-clamp bolts (Figure 4, Item 7) from two coolant return tube P-clamps (Figure 4, Item 1), coolant supply tube P-clamp (Figure 4, Item 6), coolant return tube (Figure 4, Item 2), and coolant supply tube (Figure 4, Item 3).

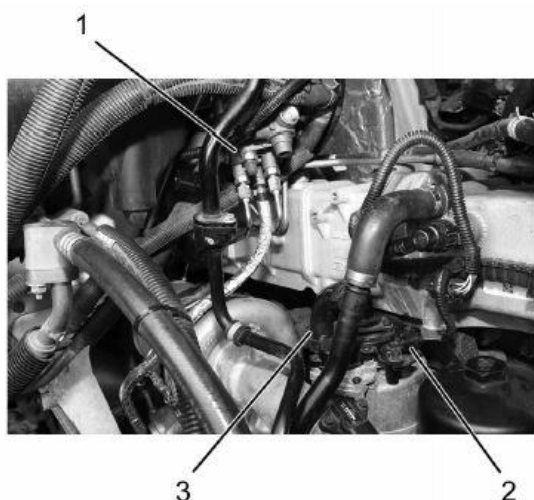
NOTE: Do not disconnect coolant tubes or drain coolant.

15. Position coolant return tube (Figure 4, Item 2) and coolant supply tube (Figure 4, Item 3) aside.

NOTE: The lower HP turbocharger inlet duct bolt may not come all the way out due to interference with the washer reservoir. Removal of the washer reservoir is not required.

16. Remove two HP turbocharger inlet duct bolts (Figure 4, Item 4) from HP turbocharger inlet duct (Figure 4, Item 5).



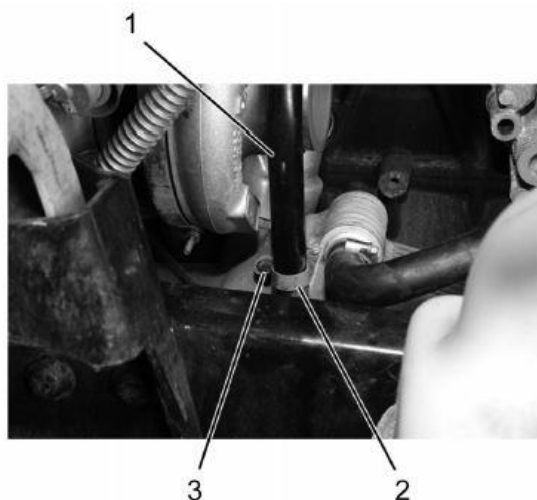
**Figure 5: Air Control Valve**

Item 1: ACV

Item 2: CCOS housing sensor connector

Item 3: CCOS housing outlet hose

17. Disconnect air supply line from Air Control Valve (ACV).
18. Remove three mounting bolts from ACV (Figure 5, Item 1) and position ACV aside.
19. Disconnect CCOS housing outlet hose (Figure 5, Item 3) from CCOS housing.
20. Disconnect CCOS housing sensor connector (Figure 5, Item 2).

**Figure 6: Crankcase Breather Tube**

Item 1: Crankcase breather tube

Item 2: Clamp

Item 3: Bolt

21. Remove bolt (Figure 6, Item 3) from clamp (Figure 6, Item 2) and position crankcase breather tube (Figure 6, Item 1) aside.

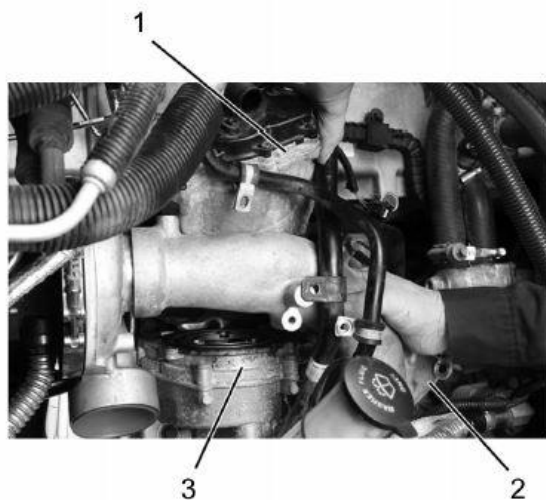


Figure 7: CCOS Housing

Item 1: CCOS housing

Item 2: HP turbocharger inlet duct

Item 3: Oil jet plate

NOTE: Do not remove the four Torx bolts for the oil jet plate. The oil jet plate will not be removed at this time.

22. Remove three CCOS housing bolts from CCOS housing (Figure 7, Item 1) and oil jet plate (Figure 7, Item 3). Discard CCOS housing bolts.

NOTE: While pulling out on the HP turbocharger inlet duct, maneuver and remove the CCOS housing up and out (Figure 7).

23. While pulling out HP turbocharger inlet duct (Figure 7, Item 2), remove CCOS housing (Figure 7, Item 1) from oil jet plate.



Figure 8: Oil Jet Size

24. With CCOS housing removed inspect the jet diameter size within the jet plate (Figure 8).

25. Use a 2.5mm or 3/32" hex key as a go/no-go gauge for measuring the diameter of the jet nozzle. If the hex key can be inserted into the jet nozzle then the jet plate needs to be removed and replaced.

26. Remove the jet plate by removing the four Torx bolts securing the jet plate to the oil module housing. Discard the jet plate and replace with part number 2512660C91.

Note: Do not discard the Torx bolts as they will be reused.

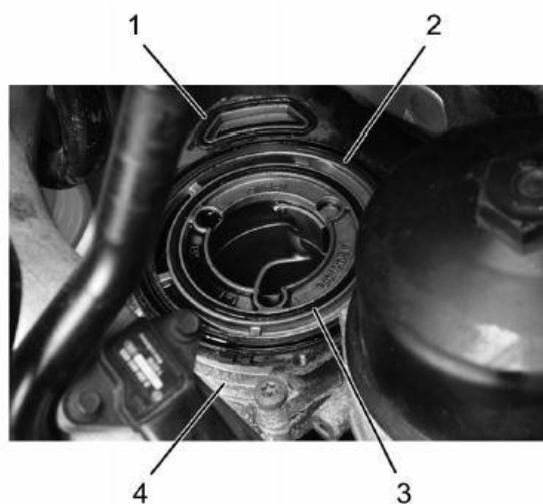


Figure 9: Oil Jet Plate Seals

Item 1: Oil jet plate seal breather-to-turbine housing O-ring
Item 2: Oil jet plate seal breather-to-turbine housing
Item 3: Oil jet plate seal breather-to-turbine housing O-ring
Item 4: Oil jet plate

27. If a new jet plate was not required; remove oil jet plate O-ring (Figure 9, Item 1), oil jet plate seal (Figure 9, Item 2), and oil jet plate O-ring (Figure 9, Item 3) from oil jet plate (Figure 9, Item 4). Discard oil jet plate O-rings and oil jet plate seal.

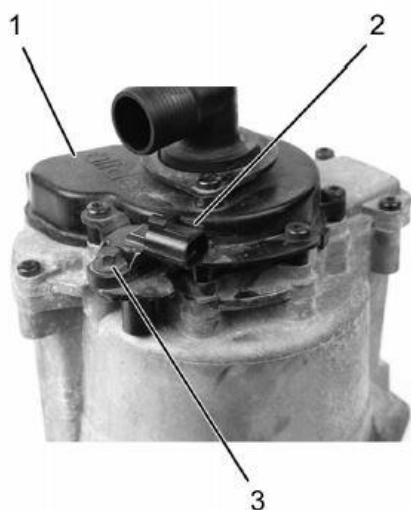


Figure 10: CCOS Housing Sensor

Item 1: CCOS housing
Item 2: CCOS housing sensor
Item 3: CCOS housing sensor bolt

28. Remove CCOS housing sensor bolt (Figure 10, Item 3) and CCOS housing sensor (Figure 10, Item 2) from CCOS housing (Figure 10, Item 1).

INSTALLATION PROCEDURE:

1. Install CCOS housing sensor (Figure 10, Item 2) on new CCOS housing (Figure 10, Item 1) with CCOS housing sensor bolt (Figure 10, Item 3). Tighten CCOS housing sensor bolt to 89 lb-in (10 N·m).
2. If removed reinstall jet plate to oil module housing, tighten four Torx bolts to 18.5 lb-ft (25 N·m).



Figure 11: Oil Jet Plate Seal

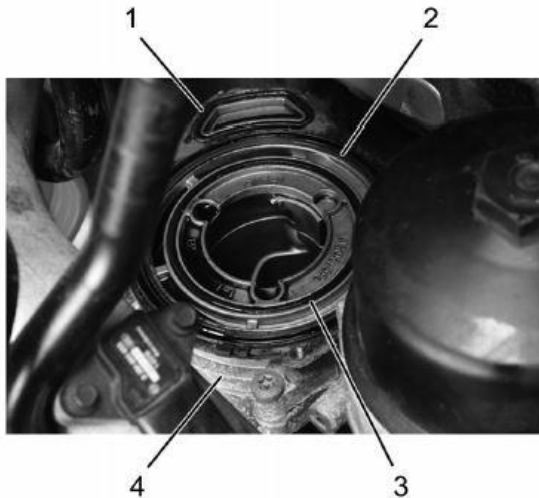


Figure 12: Oil Jet Plate Seals

- Item 1: Oil jet plate seal breather-to-turbine housing O-ring
Item 2: Oil jet plate seal breather-to-turbine housing
Item 3: Oil jet plate seal breather-to-turbine housing O-ring
Item 4: Oil jet plate

CAUTION:

Make sure to orientate the oil jet plate seal so the tangs on the oil jet plate seal match up with the slots on the oil jet plate (Figure 11). Failure to comply may cause equipment damage.

NOTE: Make sure to lubricate new rubber seals and O-rings with P-80® or equivalent lubricant.

3. Install new oil jet plate O-ring (Figure 12, Item 1), new oil jet plate seal (Figure 12, Item 2), and new oil jet plate O-ring (Figure 12, Item 3) on oil jet plate (Figure 12, Item 4).

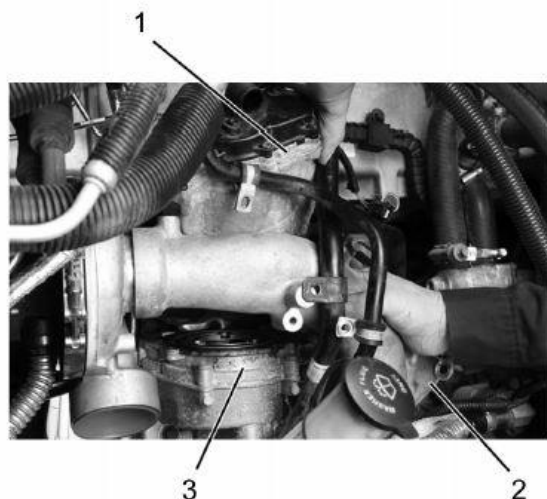


Figure 13: CCOS Housing

Item 1: CCOS housing
Item 2: HP turbocharger inlet duct
Item 3: Oil jet plate

NOTE: While the HP turbocharger inlet duct is loose, maneuver and install the CCOS housing in and down (Figure 13).

4. While installing HP turbocharger inlet duct (Figure 13, Item 2), install CCOS housing (Figure 13, Item 1) on oil jet plate (Figure 13, Item 3).
5. Secure CCOS housing (Figure 13, Item 1) with three new CCOS housing bolts. Tighten CCOS housing bolts to 79 lb-in (8.9 N•m).

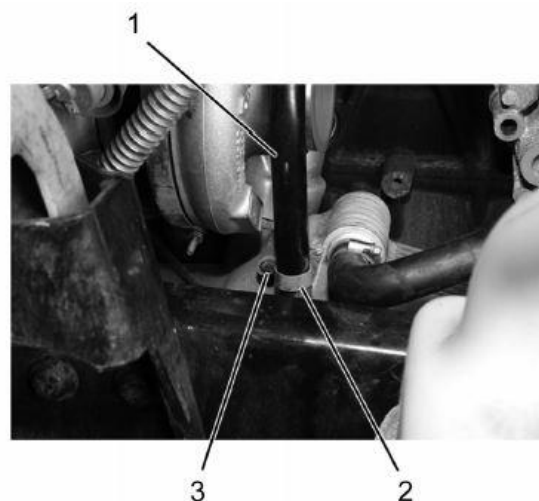


Figure 14: Crankcase Breather Tube

Item 1: Crankcase breather tube
Item 2: Clamp
Item 3: Bolt

6. Secure crankcase breather tube (Figure 14, Item 1) with bolt (Figure 14, Item 3) and clamp (Figure 14, Item 2).

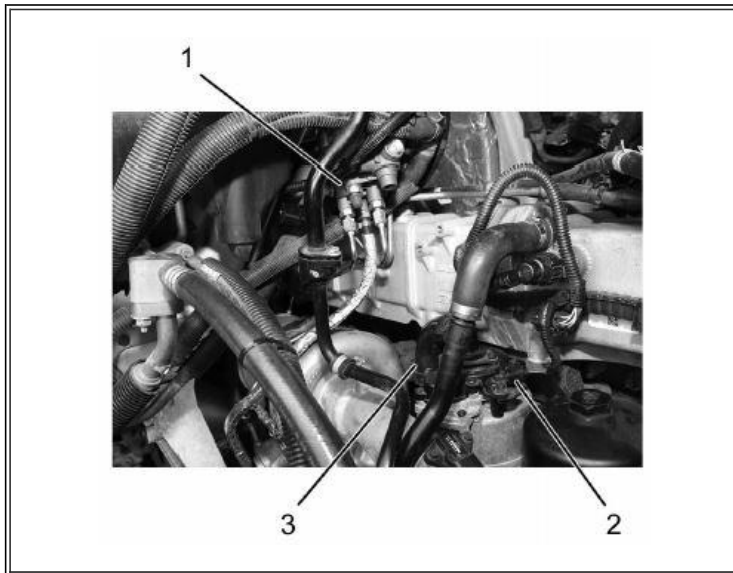


Figure 15: Air Control Valve

Item 1: ACV

Item 2: CCOS housing sensor connector

Item 3: CCOS housing outlet hose

7. Connect CCOS housing sensor connector (Figure 15, Item 2).

8. Connect CCOS housing outlet hose (Figure 15, Item 3) on CCOS housing.

9. Secure ACV (Figure 15, Item 1) with three mounting bolts.

10. Connect air supply line to ACV.

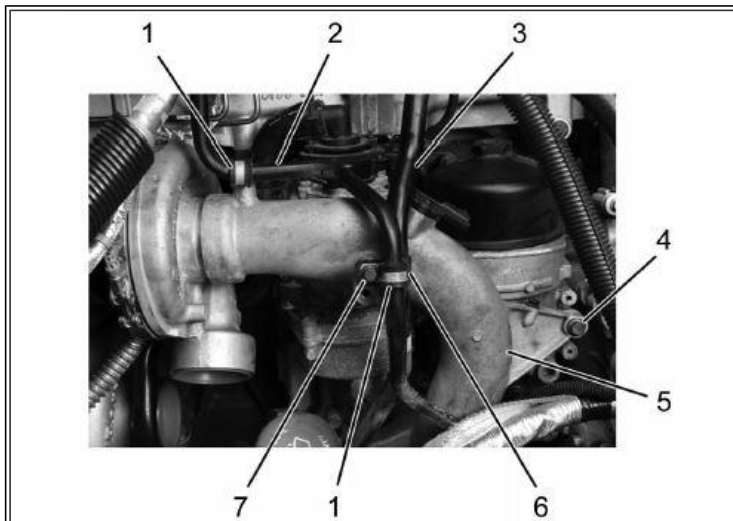


Figure 16: Coolant Supply Tubes

Item 1: Coolant return tube P-clamp (2)

Item 2: Coolant return tube

Item 3: Coolant supply tube

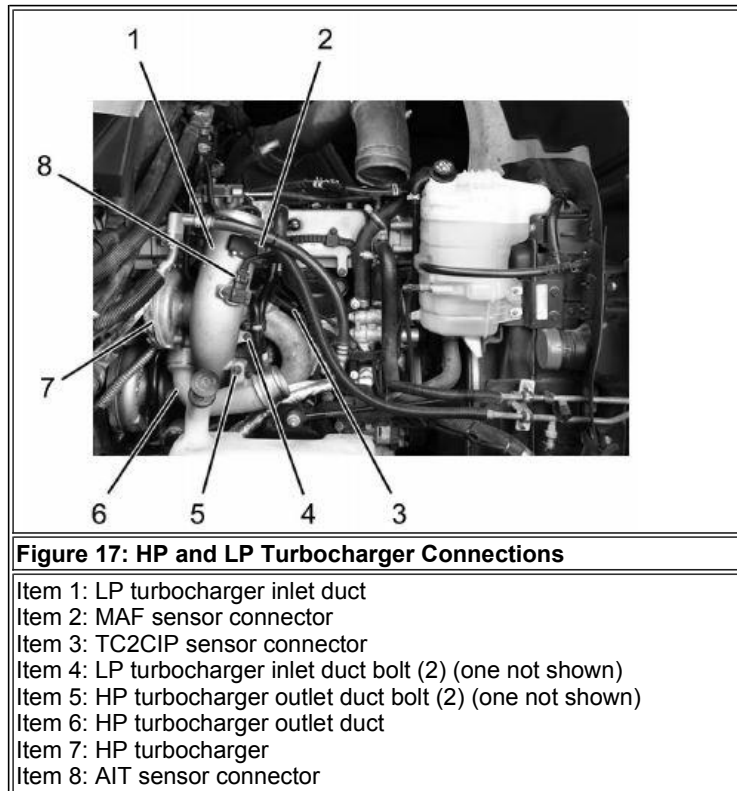
Item 4: HP turbocharger inlet duct bolt (2) (one not shown)

Item 5: HP turbocharger inlet duct

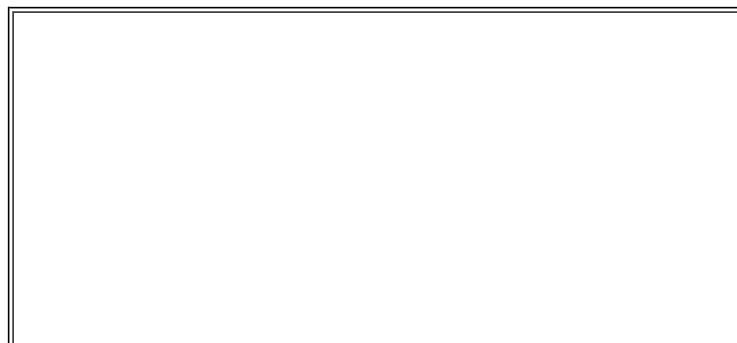
Item 6: Coolant supply tube P-clamp

Item 7: Coolant tube P-clamp bolt (2) (one not shown)

11. Secure HP turbocharger inlet duct (Figure 16, Item 5) with two HP turbocharger inlet duct bolts (Figure 16, Item 4).
12. Position coolant return tube (Figure 16, Item 2), coolant supply tube (Figure 16, Item 3), two coolant return tube P-clamps (Figure 16, Item 1), and coolant supply tube P-clamp (Figure 16, Item 6) on HP turbocharger inlet duct (Figure 16, Item 5), and secure with two coolant tube P-clamp bolts (Figure 16, Item 7).
13. If removed, install new updated turbocharger oil supply tube (refer to appropriate Engine Service Manual).



14. Remove caps from turbocharger openings.
15. Install new LP turbocharger inlet duct O-ring seal on LP turbocharger inlet duct (Figure 17, Item 1).
16. Install LP turbocharger inlet duct (Figure 17, Item 1) on LP turbocharger with two LP turbocharger inlet duct bolts (Figure 17, Item 4).
17. Install new HP turbocharger outlet duct O-ring seal on HP turbocharger outlet duct (Figure 17, Item 6).
18. Install HP turbocharger outlet duct (Figure 17, Item 6) on HP turbocharger (Figure 17, Item 7) with two HP turbocharger outlet duct bolts (Figure 17, Item 5).
19. Connect AIT sensor connector (Figure 17, Item 8).
20. Connect TC2CIP sensor connector (Figure 17, Item 3).
21. If equipped, connect MAF sensor connector (Figure 17, Item 2).



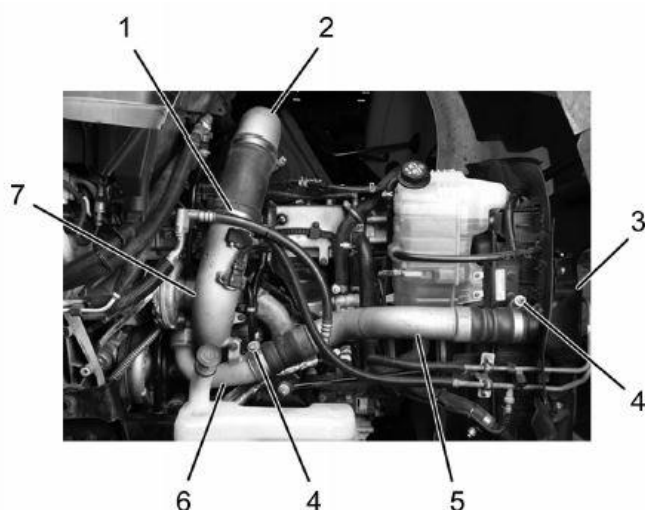


Figure 18: HP Turbocharger Connections

- Item 1: Air inlet duct clamp
- Item 2: Air inlet duct
- Item 3: HPCAC
- Item 4: HPCAC clamp (2)
- Item 5: HPCAC pipe
- Item 6: HP turbocharger outlet duct
- Item 7: LP turbocharger inlet duct

22. Remove cap from HPCAC.

23. Install HPCAC pipe (Figure 18, Item 5) on HPCAC (Figure 18, Item 3) and HP turbocharger outlet duct (Figure 18, Item 6), and secure with two HPCAC clamps (Figure 18, Item 4).

24. Install air inlet duct (Figure 18, Item 2) on LP turbocharger inlet duct (Figure 18, Item 7), and secure with air inlet duct clamp (Figure 18, Item 1).

25. Start vehicle to verify proper operation and no leaks or no fault codes are present.

26. Close and latch hood.

27. Remove wheel chocks.

WARRANTY INFORMATION

Warranty Claim Coding:

Group:	12000 - Engine
Noun:	215 - Filter, Oil Separator, Crankcase Vent

Standard Repair Time(s):

Step	Description	Chassis	Engine	SRT	Hours
All	CRANKCASE BREATHER, REPLACE	ProStar	EPA 10 Maxx 11, 13	R12-9215U	0.9
All	CRANKCASE BREATHER, REPLACE	ProStar	N13	R12-9215US	0.9
All	CRANKCASE BREATHER, REPLACE	TranStar	EPA 10 Maxx 11, 13	Q12-9215U	0.9
All	CRANKCASE BREATHER, REPLACE	TranStar	N13	Q12-9215US	0.9
All	CRANKCASE BREATHER, REPLACE	WorkStar	EPA 10 Maxx 11, 13	N12-9215U	0.9
All	CRANKCASE BREATHER, REPLACE	WorkStar	N13	N12-9215US	0.9
All	CRANKCASE BREATHER, REPLACE	PayStar	EPA 10 Maxx 11, 13	T12-9215U	0.9
All	CRANKCASE BREATHER, REPLACE	LoneStar	EPA 10 Maxx 11, 13	S12-9215U	0.9
All	CRANKCASE BREATHER, REPLACE		EPA 10 Maxx 11, 13	TC12-9215U	0.9

		CAT CT660			
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