Technical Service Information

NAVISTAR®

TSI–13–12–11

Date: NOVEMBER 2013

Subject File: ENGINE

Subject: Replacement Procedure for High-Pressure Turbocharger Center Section on MaxxForce® DT, 9, and 10 (EPA 10) and MaxxForce® DT, 9, and 10 (EPA 10) with HD-OBD Engines

Engine Family: MaxxForce® DT, 9, and 10 (EPA 10)

Engine Family: MaxxForce® DT, 9, and 10 (EPA 10) with HD-OBD

DESCRIPTION

This procedure provides instructions for replacing the High-Pressure (HP) turbocharger center section (cartridge).

PARTS INFORMATION

Table 1. Tools Required.

Tool Number	Description
ZTSE4937	Interstage Cooler (ISC) Seal Tool Kit

Table 2. Parts Information.

Part Number	Description	Quantity
2512354C91	Kit, Turbo Super Cartridge	1
1881990C1	Seal, LP Turbo (If not equipped with ISC)	1
1858048C2	Seal, Lip Crossover Tube (If equipped with ISC)	1

2512354C91 contains the following parts:

Table 3. Kit Information.

Part Number	Description	Quantity
7095290C1	Turbo Assy I334 SC	1
7095497C1	Clamp, Turbine V-Band	1
1889328C92	Kit, Turbo Oil Line Seals	1
1887474C1	O-Ring, HP Turbo Oil Drain	1
1817953C1	Bolt, M6 X 1MM X 16MM	1

PARTS INFORMATION (CONT.)

Table 3. Kit Information. (cont.)

Part Number	Description	Quantity
1885691C1	Seal, HP Turbo Inlet (face)	1
1891062C1	Clamp, V-Band	1
1891063C1	Nut, 1/4-28 Straight Line	2

REMOVAL

WARNING: Park vehicle on hard flat surface, turn the engine off, set the parking brake, and install wheel chocks to prevent the vehicle from moving in both directions. Failure to do so may result in property damage, personal injury, and / or death.

WARNING: If the vehicle must be raised, do not work under the vehicle supported only by jacks. Jacks can slip or fall over, potentially resulting in property damage, personal injury, and / or death.

WARNING: Always wear safe eye protection when performing vehicle maintenance. Failure to do so may result in personal injury and / or death.

WARNING: Keep flames or sparks away from vehicle and do not smoke while servicing the vehicle's batteries. Batteries expel explosive gases. Failure to do so may result in property damage, personal injury, and / or death.

WARNING: Remove the ground cable from the negative terminal of the battery box before disconnecting any electrical components. Always connect the ground cable last. Failure to do so may result in property damage, personal injury, and / or death.

1. Bring truck into shop and park on flat surface with wheels turned fully to the right.
2. Shift transmission to Park or Neutral, set parking brake, and install wheel chocks.
3. Unlatch and open hood.
4. Open battery box and disconnect negative battery cable.

REMOVAL (CONT.)

NOTE: Draining of the cooling system and removal of the oil soot centrifuge is not required to perform this procedure.

5. Remove four bolts, washers, and right-side inner fender.

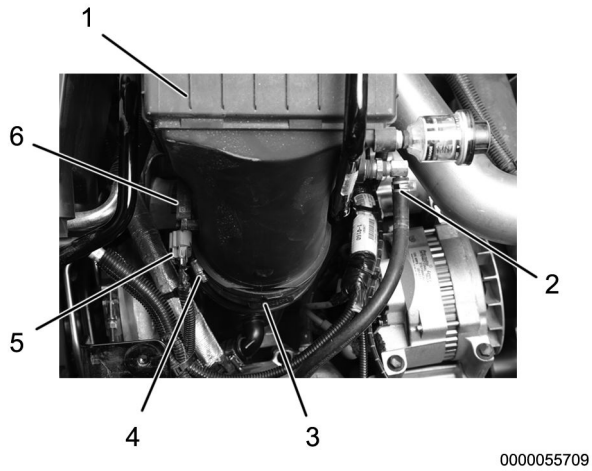

Figure 1. Mass Air Flow (MAF) Sensor and Air Compressor Inlet Hose.

1. Air box
2. Air compressor inlet hose
3. Low Pressure (LP) turbocharger inlet elbow duct
4. LP turbocharger inlet elbow duct clamp
5. MAF sensor connector
6. MAF sensor

6. Disconnect MAF sensor connector (Figure 1, Item 5) from MAF sensor (Figure 1, Item 6).

7. Disconnect air compressor inlet hose (Figure 1, Item 2) from air box (Figure 1, Item 1).

8. Loosen air box to LP turbocharger inlet elbow duct clamp (Figure 1, Item 4) on LP turbocharger inlet elbow duct (Figure 1, Item 3).

9. Remove bolt, two nuts, and air box with bracket from vehicle.

REMOVAL (CONT.)

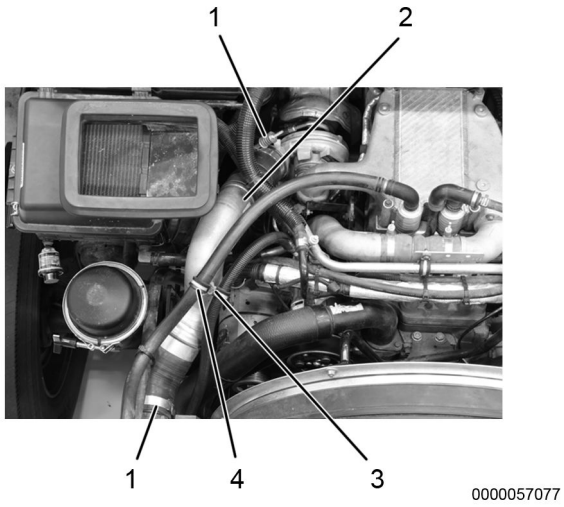

Figure 2. HP Charge Air Cooler (HPCAC) Duct.

1. Clamp (2)
2. HPCAC duct
3. Bolt
4. P-clamp

10. Remove bolt (Figure 2, Item 3) from P-clamp (Figure 2, Item 4) on HPCAC duct (Figure 2, Item 2).

11. Loosen two clamps (Figure 2, Item 1) and remove HPCAC duct (Figure 2, Item 2).

REMOVAL (CONT.)

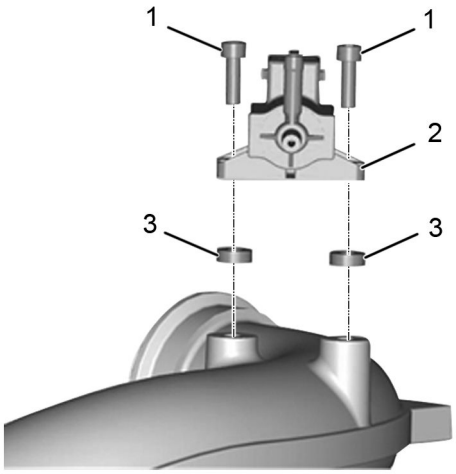

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Figure 3. Turbocharger 2 Wastegate Control (TC2WC) Valve.

1. Bolt (2)
2. TC2WC
3. Insulator (2)

NOTE: Perform Steps 12 and 13 if engine is not equipped with Interstage Cooler (ISC).

12. Remove two bolts (Figure 3, Item 1) and insulators (Figure 3, Item 3) from TC2WC valve (Figure 3, Item 2) and position for access to High-Pressure (HP) turbocharger.

REMOVAL (CONT.)

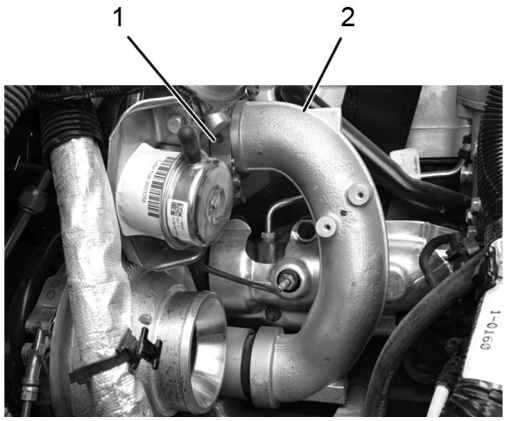

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Figure 4. Crossover Tube.

1. V-band clamp
2. Crossover tube

13. Remove V-band clamp (Figure 4, Item 1) and crossover tube (Figure 4, Item 2).

REMOVAL (CONT.)

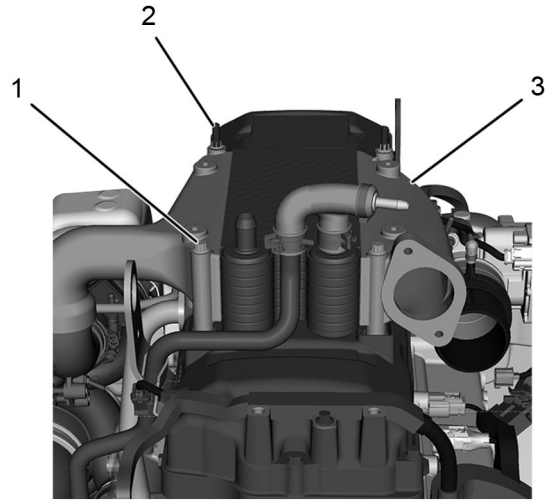

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Figure 5. Interstage Cooler (ISC).

1. M8 x 110 bolt (2)
2. M8 x 110 stud bolt (2)
3. Interstage cooler (ISC)

NOTE: Perform Steps 14 through 17 if equipped with Interstage Cooler (ISC).

14. Remove two bolts (Figure 5, Item 1) and stud bolts (Figure 5, Item 2) from Interstage Cooler (ISC) (Figure 5, Item 3).

REMOVAL (CONT.)

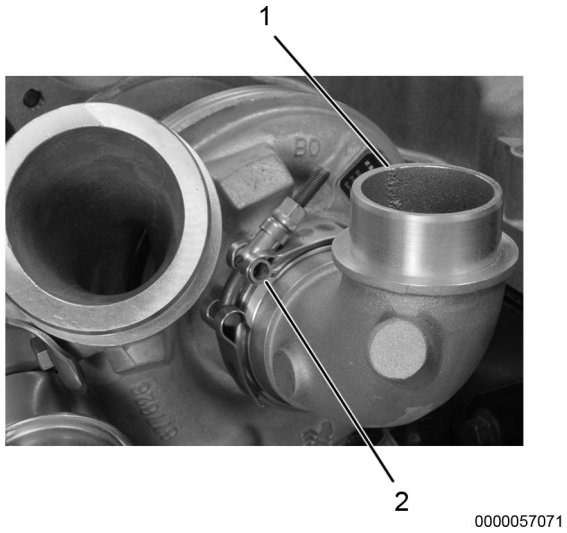

Figure 6. HP Turbocharger Inlet Elbow.

1. HP turbocharger inlet elbow
2. V-band clamp

15. Remove V-band clamp (Figure 6, Item 2) from HP turbocharger inlet elbow (Figure 6, Item 1). Discard V-band clamp.

16. Raise ISC from valve cover and remove HP turbocharger inlet elbow.

17. Using ISC Seal Tool Kit, remove crossover tube lip seal. Refer to Tool Instruction 4328194R1.

REMOVAL (CONT.)

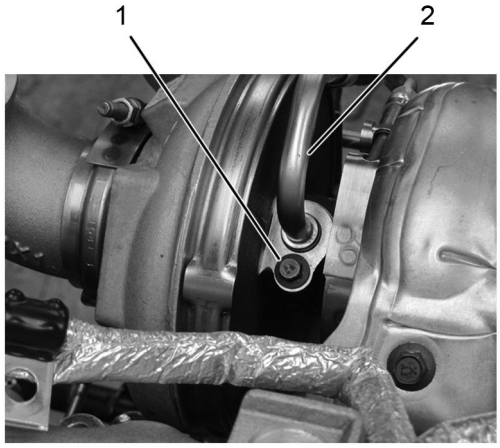

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Figure 7. HP Turbocharger Oil Supply Tube.

1. M6 x 16 bolt
2. Oil supply tube assembly

18. Remove bolt (Figure 7, Item 1) from oil supply tube (Figure 7, Item 2). Discard bolt.

19. Apply rust penetrating oil to oil supply tube (Figure 7, Item 2) and disconnect from HP turbocharger.

20. Remove and discard oil supply tube O-ring.

REMOVAL (CONT.)

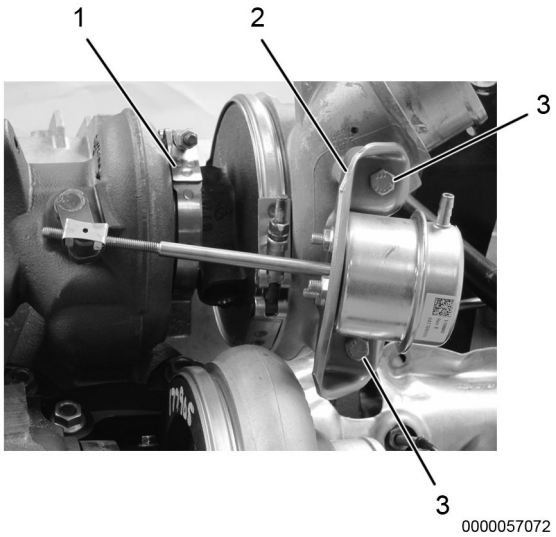

Figure 8. Wastegate Actuator.

1. Turbine V-band clamp
2. Wastegate actuator
3. M8 x 16 bolt (2)

CAUTION: When positioning wastegate actuator for access to HP turbocharger, make sure not to bend or damage wastegate actuator rod, and make sure not to position in a way that adjustment would be compromised. Failure to do so may result in damage to equipment.

21. Remove two bolts (Figure 8, Item 3) and position wastegate actuator (Figure 8, Item 2) for access to HP turbocharger.

22. Remove turbine V-band clamp (Figure 8, Item 1) from HP turbocharger. Discard turbine V-band clamp.

REMOVAL (CONT.)

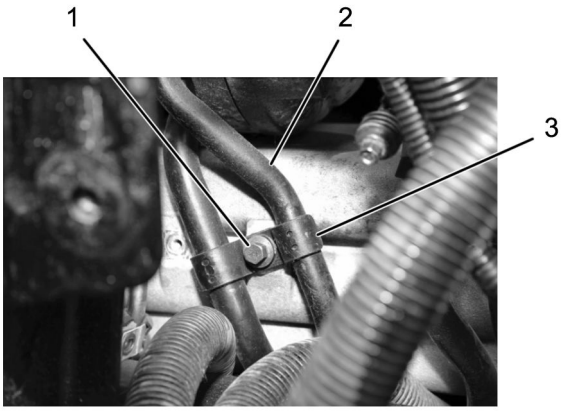

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Figure 9. Oil Drain Tube.

1. Bolt
2. Oil drain tube
3. P-clamp

23. Remove bolt (Figure 9, Item 1) from P-clamp (Figure 9, Item 3) on oil drain tube (Figure 9, Item 2).

24. Using a soft-blow mallet, tap HP turbocharger center section until loose and remove from turbine housing and oil drain tube.

25. Using a clean emery cloth, clean turbine housing and mating surfaces.

REMOVAL (CONT.)

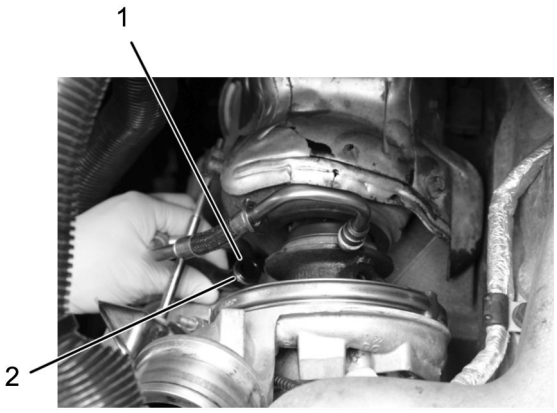

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Figure 10. Oil Drain Tube O-ring.

1. O-ring (2)
2. Oil drain tube

26. Remove O-ring (Figure 10, Item 1) from HP turbocharger oil drain tube (Figure 10, Item 2) . Discard O-ring.

INSTALLATION

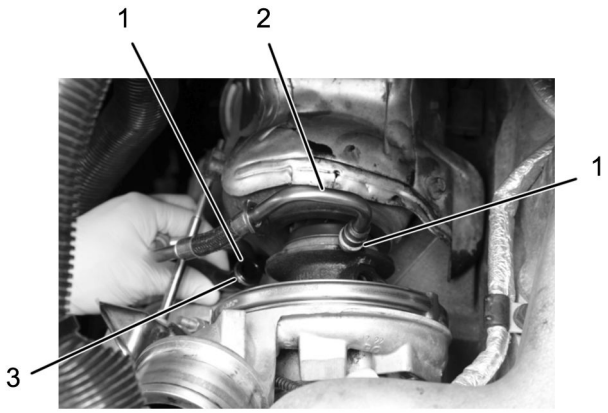

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Figure 11. Oil Drain and Oil Supply Tube O-rings.

1. O-ring (2)
2. Oil supply tube
3. Oil drain tube

NOTE: Make sure to lubricate O-rings with P-80˚ or equivalent lubricant.

1. Install new O-ring (Figure 11, Item 1) onto oil drain tube (Figure 11, Item 3).

2. Install new O-ring (Figure 11, Item 1) onto oil supply tube (Figure 11, Item 2).

INSTALLATION (CONT.)

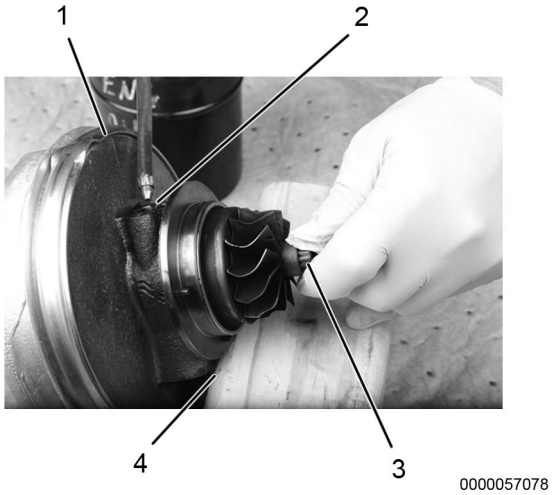

Figure 12. Priming HP Turbocharger Center Section.

1. HP turbocharger center section
2. Oil supply port
3. Turbine wheel nut
4. Oil drain port

3. Using 15W40 engine oil, prime new HP turbocharger center section (Figure 12, Item 1) oil supply port (Figure 12, Item 2) while spinning by turbine wheel nut (Figure 12, Item 3) until oil is seen seeping from oil drain port (Figure 12, Item 4).

WARNING: Make sure oil drain tube is fully seated in HP turbocharger center section while installing HP turbocharger into turbine housing. Failure to comply may result in property damage, personal injury, and / or death.

4. Install HP turbocharger center section onto HP oil drain tube while installing into turbine housing.

INSTALLATION (CONT.)

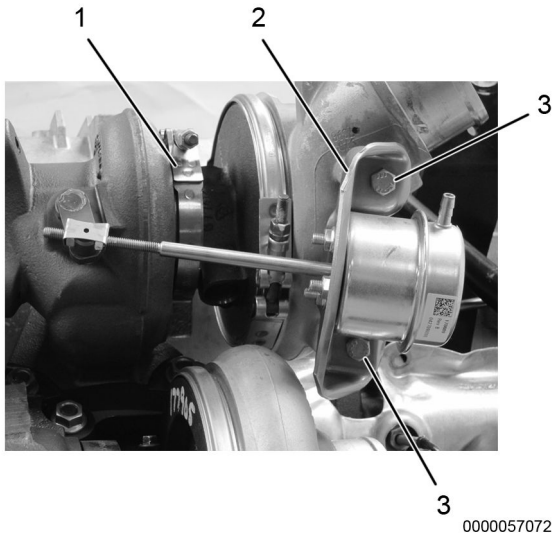

Figure 13. Wastegate Actuator.

1. Turbine V-band clamp
2. Wastegate actuator
3. M8 x 16 bolt (2)

5. Install new turbine V-band clamp (Figure 13, Item 1) and new nut on HP turbocharger.

6. Using torque wrench, torque turbine V-band clamp (Figure 13, Item 1) to 156 lb-in (17.6 N • m).

CAUTION: When installing wastegate actuator, make sure not to bend or damage wastegate actuator rod, and make sure not to position in a way that adjustment would be compromised. Failure to do so may result in damage to equipment.

7. Install wastegate actuator (Figure 13, Item 2) with two bolts (Figure 13, Item 3). Using torque wrench, torque two bolts to 132 lb-in (14.9 N • m).

INSTALLATION (CONT.)

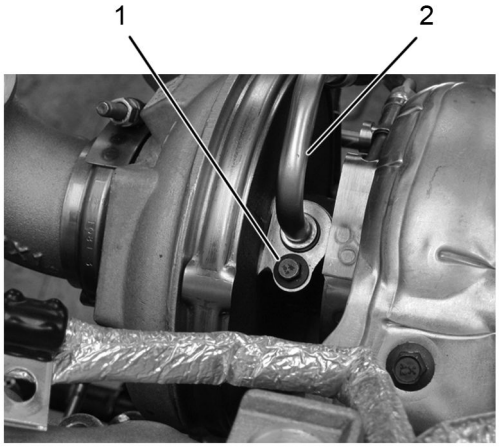

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Figure 14. Oil Supply Tube.

1. M6 x 16 bolt
2. Oil supply tube assembly

8. Connect oil supply tube (Figure 14, Item 2) to HP turbocharger.

9. Install oil supply tube (Figure 14, Item 2) with new bolt (Figure 14, Item 1).

INSTALLATION (CONT.)

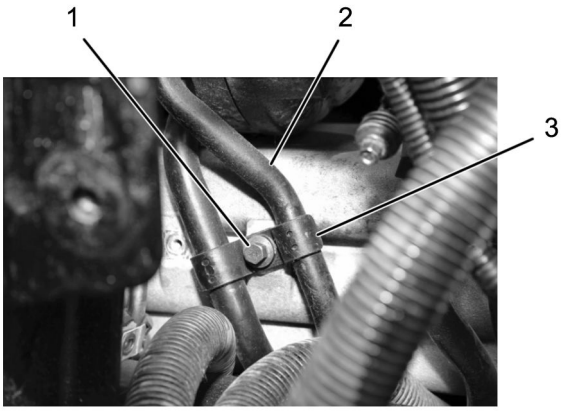

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Figure 15. Oil Drain Tube.

1. Bolt
2. Oil drain tube
3. P-clamp

10. Install bolt (Figure 15, Item 1) in P-clamp (Figure 15, Item 3) on oil drain tube (Figure 15, Item 2).

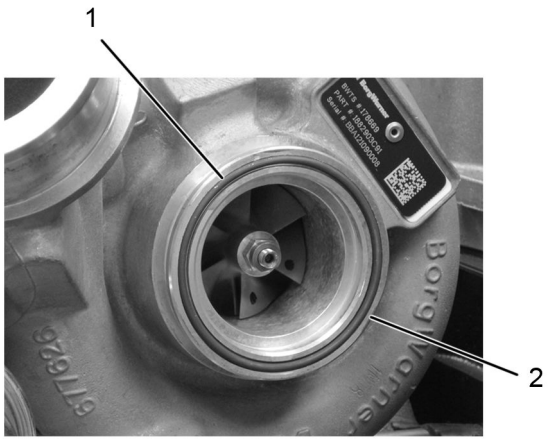

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Figure 16. HP Turbocharger O-Ring.

1. 2.62 X 61.6 ID O-ring
2. HP turbocharger

11. Install new O-ring (Figure 16, Item 1) into groove on HP turbocharger (Figure 16, Item 2).

INSTALLATION (CONT.)

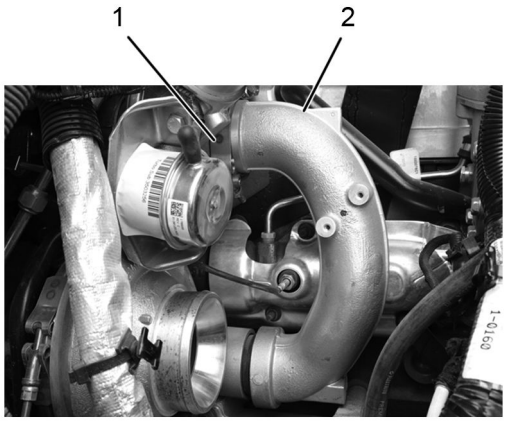

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Figure 17. Crossover Tube.

1. V-band clamp
2. Crossover tube

NOTE: Perform Steps 12 through 15 if not equipped with ISC.

12. Inspect crossover tube (Figure 17, Item 2) lip seal for damage. If damaged, discard seal.

13. Apply P-80 or equivalent to outside of crossover tube seal and inside of interstage inlet duct. Push crossover tube onto crossover tube seal until it pops into place.

14. Install crossover tube (Figure 17, Item 2) onto HP turbocharger with new V-band clamp (Figure 17, Item 1) and new nut.

INSTALLATION (CONT.)

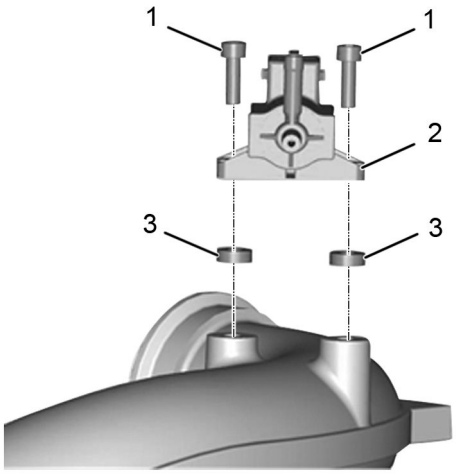

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Figure 18. TC2WC Valve.

1. Bolt (2)
2. TC2WC valve
3. Insulator (2)

15. Install TC2WC valve (Figure 18, Item 2) onto crossover tube with two insulators (Figure 18, Item 3) and bolts (Figure 18, Item 1).

INSTALLATION (CONT.)

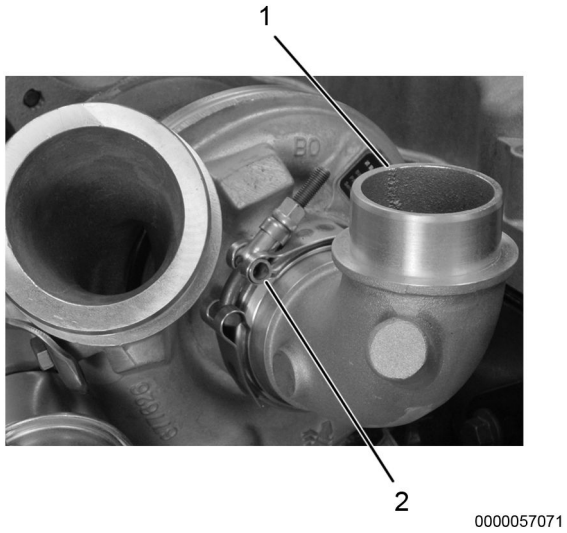

Figure 19. HP Turbocharger Inlet Elbow.

1. HP turbocharger inlet elbow
2. V-band clamp

NOTE: Perform Steps 16 through 20 if engine is equipped with an ISC.

16. Using ISC Seal Tool Kit, install crossover tube lip seal. Refer to Tool Instruction 4328194R1.

17. Position new inlet O-ring and HP turbocharger inlet elbow (Figure 19, Item 1) onto HP turbocharger with new V-band clamp (Figure 19, Item 2) hand tight.

INSTALLATION (CONT.)

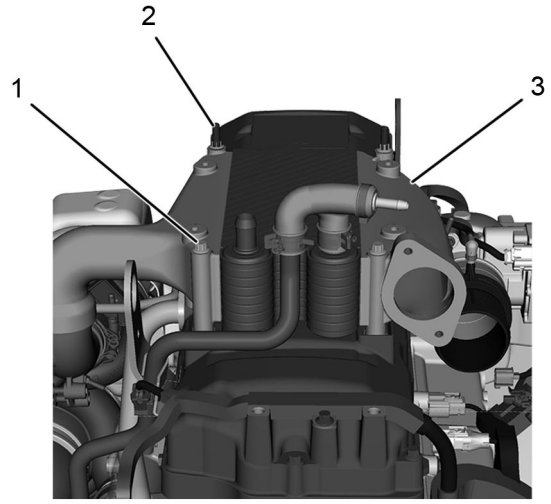

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Figure 20. Interstage Cooler (ISC).

1. M8 x 110 bolt (2)
2. M8 x 110 stud bolt (2)
3. Interstage cooler (ISC)

18. Install ISC (Figure 20, Item 3) onto turbocharger inlet elbow and valve cover with two bolts (Figure 20, Item 1) and two stud bolts (Figure 20, Item 2).

19. Using torque wrench, torque bolts and stud bolts to 23 lb-ft (31 N • m).

20. Using torque wrench, torque V-band clamp to 156 lb-in (17.6 N • m).

INSTALLATION (CONT.)

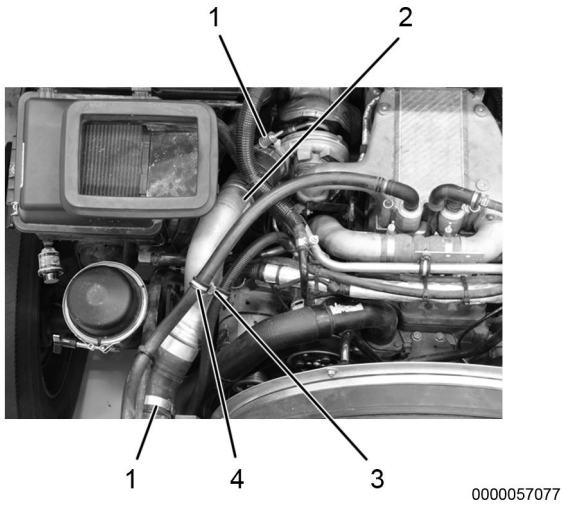

Figure 21. HPCAC Duct.

1. Clamp (2)
2. HPCAC duct
3. Bolt
4. P-clamp

21. Install HPCAC duct (Figure 21, Item 2) with two clamps (Figure 21, Item 1) .

22. Install bolt (Figure 21, Item 3) in P-clamp (Figure 21, Item 4) on HPCAC duct (Figure 21, Item 2).

23. Install air box and bracket with bolt and two nuts.

INSTALLATION (CONT.)

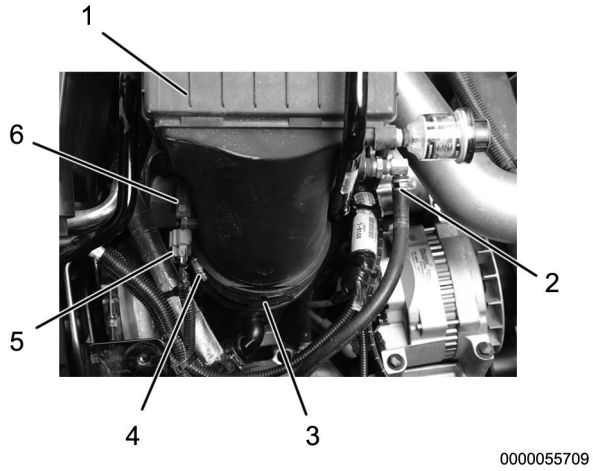

Figure 22. MAF Sensor and Air Compressor Inlet Hose.

1. Air box
2. Air compressor inlet hose
3. LP turbocharger inlet elbow duct
4. LP turbocharger inlet elbow duct clamp
5. MAF sensor connector
6. MAF sensor

24. Install air box outlet into LP turbocharger inlet elbow duct (Figure 22, Item 3) with clamp (Figure 22, Item 4). Using torque wrench, torque clamp to 40 - 49 lb-in (4.5 - 5.5 N • m).

25. Connect air compressor inlet hose (Figure 22, Item 2) to air box (Figure 22, Item 1).

26. Connect MAF sensor connector (Figure 22, Item 5) to MAF sensor (Figure 22, Item 6).

27. Install right side inner fender with four washers and bolts.

28. Connect negative battery cable and close battery box.

29. Run engine to verify proper operation, no leaks, and no fault codes.

30. Perform MAF Calibration Procedure - Using ServiceMaxx™ Software. Refer to Diagnostic Manual 2010 MaxxForce® DT, 9, and 10 Engines.

31. Close and latch hood.

32. Remove wheel chocks.