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Coding Information

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Title: Charge Air Cooler Cleaning Procedure for I-6, V-6 & V-8 Engines

Applies To: All MaxxForce DT, 9, 10, V-6 & V-8 Engines

CHANGE LOG

- 2/12/2019 - Added new heater instructions
- 11/7/2018 - Changed cleaner P/N based on feedback
- 03/06/2018 - Forwarded feedback to SRT Manager to address Op Code Step Concern.
- 08/21/2014 - Initial article release.
- 10/01/2014 - Update note & image to not clean CAC's that have a sharp bend on vehicle.

Subject: Charge Air Cooler Cleaning Procedure

Model: ALL

Engine Family: MaxxForce DT, 9, 10, V-6 & V-8 Engines

DESCRIPTION

The following procedure demonstrates cleaning High Pressure (vehicle mounted) CACs on vehicle utilizing the Cleaning Management System (CMS), CAC Pressure Test Kit, and new CAC Adapter Flushing Kit.

PARTS INFORMATION

Table 1. Tools Information.

Description	Tool Number / Type
Cleaning Management System (CMS)	12-353-01
Charge Air Cooler (CAC) Adapter Flushing Kit	09-925-01
Charge Air Cooler (CAC) Pressure Test Kit	ZTSE 4341

Table 2. Parts Information.

Part Number	Description	Quantity
2514295C92	ENGINE SYSTEM CLEANER	1

SERVICE PROCEDURE PREPARATION



GOVERNMENT REGULATION:

Engine fluids (oil, fuel, and coolant) may be a hazard to human health and the environment. Handle all fluids and other contaminated materials (such as filters or rags) in accordance with applicable regulations. Recycle or dispose of engine fluids, filters, and other contaminated materials according to applicable regulations.



WARNING: Park vehicle on hard flat surface, turn the engine off, set the parking brake, and block the wheels to prevent the vehicle from moving in both directions. Failure to comply 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 comply may result in personal injury and / or death.



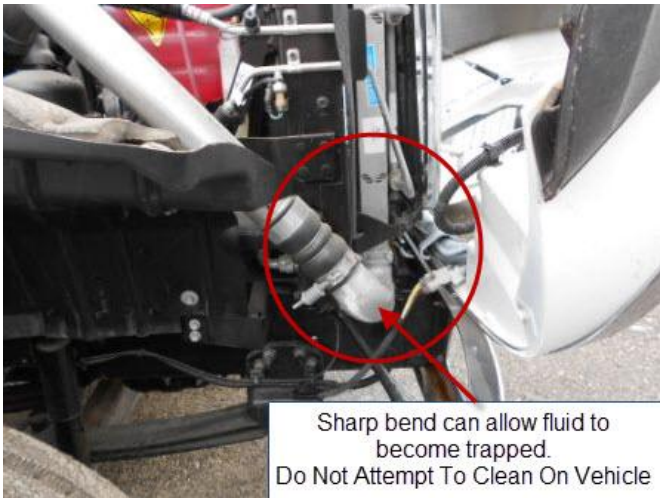
WARNING: Keep flames or sparks away from vehicle and do not smoke while servicing the vehicle's batteries. Batteries expel explosive gases. Failure to comply may result in property damage, personal injury, and / or death.



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 comply may result in property damage, personal injury, and / or death.

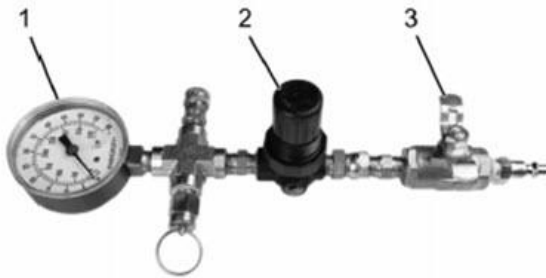
NOTE: This procedure applies to High Pressure (HP) Charge Air Coolers (CAC) only.

NOTE: Some vehicles have Charge Air Coolers (CAC) with a sharp bend on the inlet/outlet as shown below. This can allow fluid to become trapped during cleaning on vehicle. Units with this type of configuration should have the CAC removed for cleaning. Use the procedure below on vehicles with horizontal inlets/outlets only.



ON VEHICLE PRESSURE TEST

1. Bring vehicle 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.



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Figure 1. Gauge / Regulator Assembly.

1. Gauge
2. Air regulator knob
3. Air valve

NOTE: CACs are not required to be leak proof. Do NOT test CAC for leakage by submerging it in a radiator test tank. Almost all CACs will show leakage if they are submerged.

! WARNING: Clean all rubber collars and other pressure test components of any oil, grease, or other lubricants. Serious injury or death can occur if metal couplers are forced out during pressure testing.

! WARNING: Using appropriate fasteners, attach safety cables to CAC mounting holes or to a stationary object. Serious injury or death can occur if couplers blow out of coupling collars during pressure testing.

! WARNING: Adjust air regulator valve to minimum setting before connecting air supply. Accidentally applying high pressure can damage tool components or CAC resulting in flying objects, serious injury, or death.

1. Install CAC Pressure Test Kit per instructions included with ZTSE4341, using appropriate hoses and clamps from CAC Adapter Flushing Kit [09-925-01](#).

2. Connect a filtered air supply to air valve (Figure 1, Item 3) on gauge / regulator assembly.



WARNING: Increase air pressure slowly to prevent adapters from blowing off during testing. After testing, relieve pressure slowly through bleed valve before removing test equipment. Failure to do so may result in property damage, personal injury, and / or death.



WARNING: When applying air pressure, watch for movement on the hoses and / or clamps. If any movement is noticed, stop immediately and relieve any pressure, tighten the clamps, and / or reposition the hoses and clamps if necessary. Failure to comply may result in property damage, personal injury, and / or death.

3. Open air valve (Figure 1, Item 3) slightly, and slowly increase air pressure until gauge (Figure 1, Item 1) reads 30 psi (205 kPa). If required, adjust air regulator (Figure 1, Item 2) until gauge reads 30 psi (205 kPa) as follows:

- A. Pull air regulator knob (Figure 1, Item 2) outward to unlock.
- B. Turn air regulator knob (Figure 1, Item 2) to adjust pressure to 28 - 32 psi (193 - 221kPa).
- C. Push air regulator knob (Figure 1, Item 2) back into locked position.

4. Close air valve (Figure 1, Item 3) and monitor gauge (Figure 1, Item 1) with stop watch for 15 seconds. Note any decrease in air pressure.

5. Repeat Steps 3 and 4 three times to verify results.

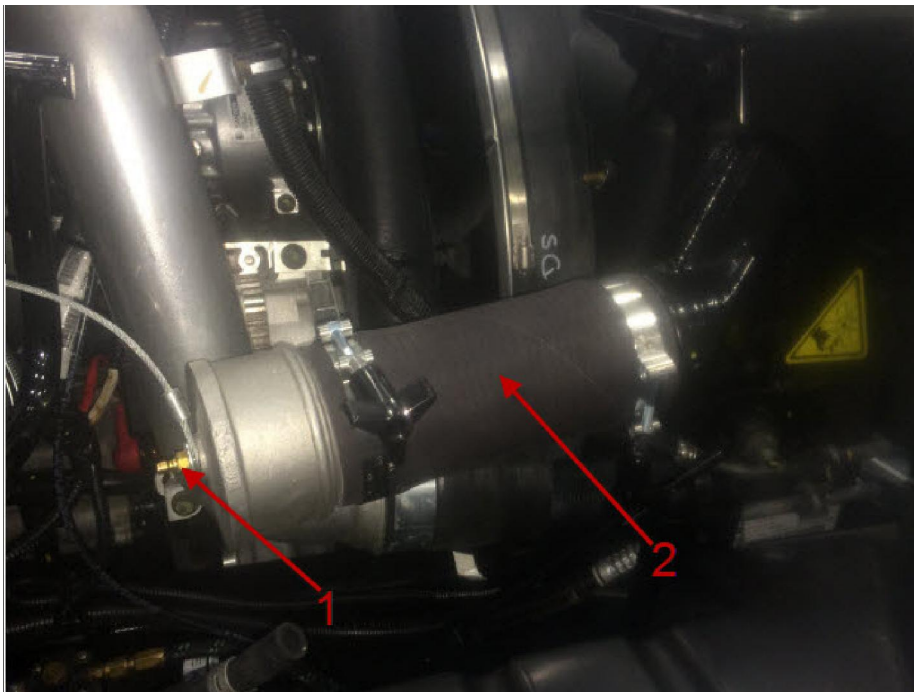


Figure 2. Bleeding Air Pressure.

1. Bleed-off coupler
2. Adaptor hose

6. If air pressure drop is more than 5 psi (34 kPa) in 15 seconds, replace CAC. If air pressure drop is 5 psi (34 kPa) or less in 15 seconds, perform cleaning procedure.

7. Slowly turn bleed-off valve (Figure 2, Item 2) on bleed-off coupler (Figure 2, Item 1) counterclockwise and release air from system.

8. Disconnect filtered air supply from air valve.
9. Remove CAC Pressure Test Kit per instructions included with ZTSE 4341.

CLEANING PROCEDURE

1. Make sure reservoir of Cleaning Management System (CMS) is clean and filter has been replaced.
2. Add 5 gallons (18.93 liters) of tap water to CMS reservoir first, followed by 5 gallons (18.93 liters) of cleaning fluid.
3. Position PUMP / HEATER switch on CMS to HEATER and ensure heater is working & liquid is warmer than room temperature before flushing.
4. Install CAC Adapter Flushing Kit per instructions included with [09-925-01](#).

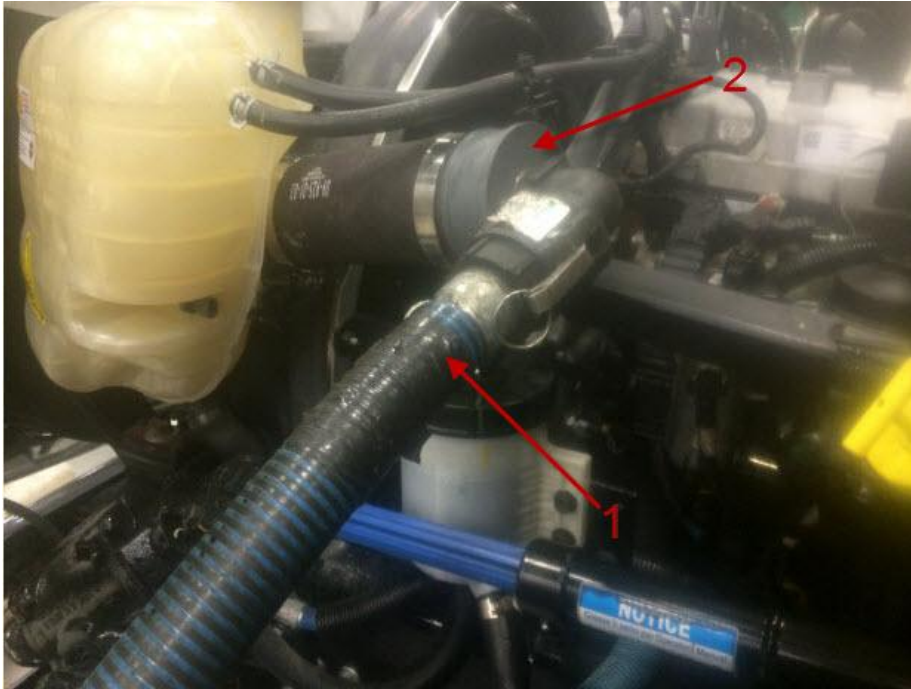


Figure 3. Outlet Adapter.

1. CMS FLOW FROM PUMP hose
2. Outlet adapter

5. Connect CMS FLOW FROM PUMP hose (Figure 3, Item 1) to outlet adapter (Figure 3, Item 2).

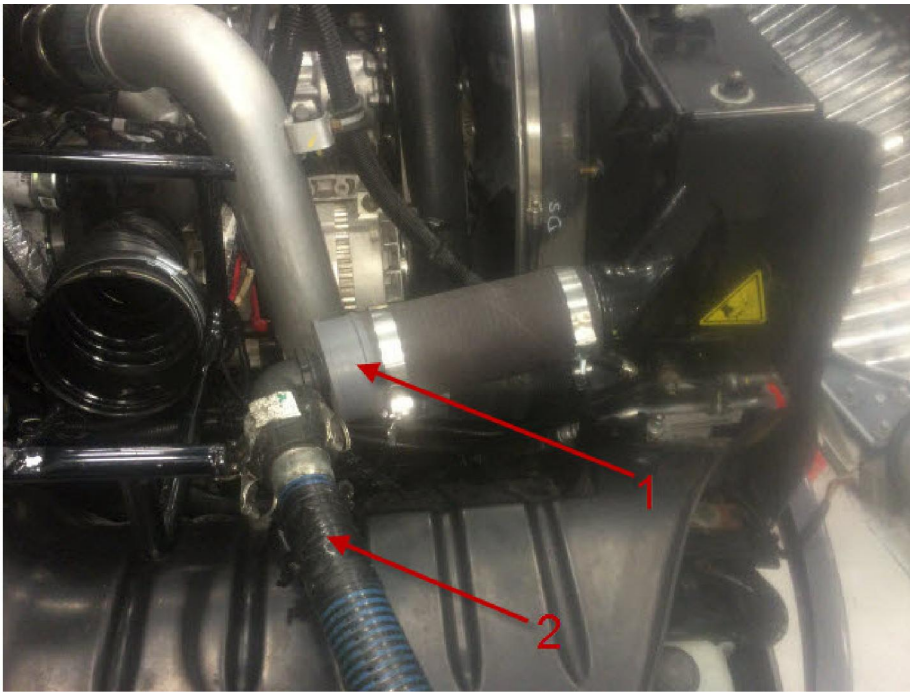


Figure 4. Inlet Adapter.

1. Inlet adapter
2. CMS FLOW RETURN hose

6. Connect CMS FLOW RETURN hose (Figure 4, Item 2) to inlet adapter (Figure 4, Item 1).
7. Set and start timer on CMS for 20 minutes, position PUMP / HEATER switch on CMS to PUMP, and perform 20-minute back-flush.
8. Position PUMP / HEATER switch on CMS to OFF.
9. Disconnect CMS FLOW RETURN hose (Figure 4, Item 2) from inlet adapter (Figure 4, Item 1).
10. Disconnect CMS FLOW FROM PUMP hose (Figure 3, Item 1) from outlet adapter (Figure 3, Item 2).
11. Connect CMS FLOW RETURN hose to outlet adapter.
12. Connect CMS FLOW FROM PUMP hose to inlet adapter.
13. Set and start timer on CMS for 20 minutes, position PUMP / HEATER switch on CMS to PUMP, and perform 20-minute forward-flush.
14. Position PUMP / HEATER switch on CMS to OFF.
15. Disconnect CMS FLOW FROM PUMP hose from inlet adapter.
16. Disconnect CMS FLOW RETURN hose from outlet adapter.
17. Drain and clean CMS.
18. Fill CMS with 10 gallons of hot tap water.
19. Connect CMS FLOW FROM PUMP hose to outlet adapter.
20. Connect CMS FLOW RETURN hose to inlet adapter.
21. Set and start timer on CMS for 10 minutes, position PUMP / HEATER switch on CMS to PUMP, and perform 10-minute rinse with hot tap water.
22. Position PUMP / HEATER switch on CMS to OFF.

23. Disconnect CMS FLOW FROM PUMP hose from outlet adapter.
24. Disconnect CMS FLOW RETURN hose from inlet adapter.
25. Blow dry CAC with compressed air.
26. Drain and clean CMS.
27. Fill CMS with 10 gallons of tap water.
28. Connect CMS FLOW FROM PUMP hose to inlet adapter.
29. Connect CMS FLOW RETURN hose to outlet adapter.
30. Set and start timer on CMS for 10 minutes, position PUMP / HEATER switch on CMS to PUMP, and perform 10-minute rinse with hot tap water (cold water is sufficient if hot tap water is not available).
31. Position PUMP / HEATER switch on CMS to OFF.
32. Disconnect CMS FLOW FROM PUMP hose from inlet adapter.
33. Disconnect CMS FLOW RETURN hose from outlet adapter.
34. Remove CAC Adapter Flushing Kit per instructions included with [09-925-01](#).
35. Drain and clean CMS.
36. Blow dry CAC with compressed air.

SERVICE PROCEDURE FOLLOW-UP

1. Run engine to verify proper operation, no leaks, and no fault codes.
2. Close and latch hood.
3. Remove wheel chocks.

WARRANTY INFORMATION

Warranty Claim Coding:

Refer to the [Warranty Coding Manual](#) for Group and Noun Codes.

Standard Repair Time(s):

Refer to the [SRT Manual](#) for Repair Times

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