

Technical Service Information

NAVISTAR®

TSI-13-12-17R1

Date: NOVEMBER 2013

Subject File: ENGINE

Subject: Charge Air Cooler Cleaning Procedure

Model: ALL

Engine Family: ALL

DESCRIPTION

Some Charge Air Coolers (CACs) may experience internal contamination and will require cleaning. The following procedure demonstrates cleaning CACs on a bench 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	ZTSE4341

Table 2. Parts Information.

Part Number	Description	Quantity
2512460C1	Fluid, EGR Cleaning	5 gal

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.

SERVICE PROCEDURE PREPARATION (CONT.)



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 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.

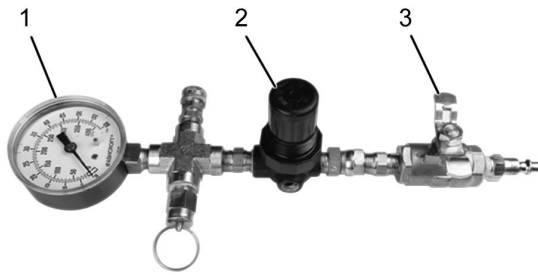
NOTE: This procedure applies to High Pressure (HP) Charge Air Coolers (CAC) only. Low Pressure (LP) CACs will be addressed at a later date.

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.
4. Remove CAC from vehicle. Refer to the following:
 - [S12059 Service Manual Radiator / Cooling System - FE Bus - 3100 Bus](#)
 - [S12049 Service Manual Section Radiator / Cooling System Service Manual - Model: LoneStar® with EPA 10 1998 Federal Emissions Only](#)
 - [S12043 Service Manual Section Radiator / Cooling System Service Manual - Model: RE Bus with Side-Mounted Cooling Package](#)

SERVICE PROCEDURE PREPARATION (CONT.)

- [S12041 Service Manual Section Radiator / Cooling System Service Manual - Model: LoneStar® with EPA 10 Emissions](#)
- [S12039 Service Manual Radiator / Cooling System - AC Bus](#)
- [S12037 Service Manual Radiator / Cooling System Service Manual - TerraStar®](#)
- [S12036 Service Manual Section Radiator / Cooling System Service Manual - Model: WorkStar® and Model: TranStar®](#)
- [S12034 Service Manual Section Radiator / Cooling System Service Manual - Model: 9800](#)
- [S12029 Service Manual Section Radiator / Cooling System Service Manual - Model: DuraStar® with EPA 2010 Federal Emissions Only](#)
- [S12023 Service Manual Side Mount Cooling Package - RE Bus](#)
- [S12022 Service Manual Radiator / Cooling System - WorkStar®](#)
- [S12021 Service Manual Radiator / Cooling System - ProStar®](#)
- [S12019 Service Manual Section Radiator, Remove and Replace - Model: MXT](#)
- [S12015 Service Manual Section CF 500, CF 600 Cooling System - Truck Model: CF 500, Truck Model: CF 600, Unit Code: 12THU, Unit Code: 12UWR, Unit Code: 12890](#)
- [S12014 Service Manual Section CF 500, CF 600 Intake Air Distribution / Filtering and Charge Air Cooler - Truck Model: CF 500, Truck Model: CF 600](#)
- [S12011 Service Manual Radiator / Cooling System - TranStar®](#)
- [S12010 Service Manual Section Radiator, Remove and Replace - 7300, 7400, 7500, 7600, 7700 Models](#)
- [S12008 Radiator, Remove and Replace for 3200, 4200, 4300, 4400, 8500 models](#)
- [S12006 Service Manual Section Air-To-Air Charge Air Cooler](#)
- [0000002881 Service Manual Radiator / Cooling System - LoneStar®](#)
- [0000002222 Service Manual Radiator / Cooling System TranStar®](#)
- [0000001844 Service Manual Radiator / Cooling System WorkStar®](#)
- [0000001843 Service Manual Radiator / Cooling System PayStar® and 9900](#)
- [0000001601 Service Manual Radiator / Cooling System with SCR ProStar®+](#)

OFF VEHICLE PRESSURE TEST



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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.

NOTE: This procedure pressure tests CAC on bench only when CAC is internally contaminated. Any other pressure testing should be done on vehicle.

1. Visually inspect CAC for cracks and holes. If cracks or holes are present, replace CAC.



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.

2. Install CAC Pressure Test Kit per instructions included with ZTSE4341, using appropriate hoses and clamps from CAC Adapter Flushing Kit 09-925-01.



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.

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

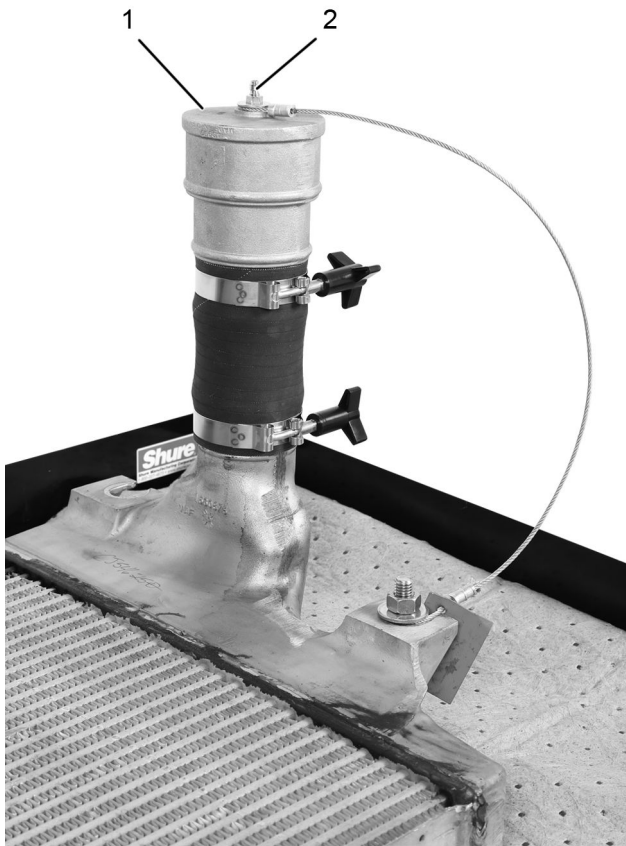
OFF VEHICLE PRESSURE TEST (CONT.)



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.

4. 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 - 221 kPa).
 - c. Push air regulator knob (Figure 1, Item 2) back into locked position.
5. 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.
6. Repeat Steps 4 and 5 three times to verify results.

OFF VEHICLE PRESSURE TEST (CONT.)



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Figure 2. Bleeding Air Pressure.

1. Bleed-off coupler
2. Bleed-off valve

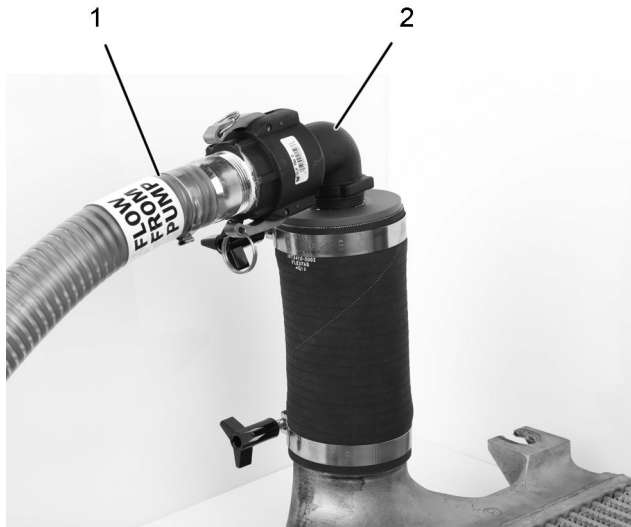
7. Slowly turn bleed-off valve (Figure 2, Item 2) on bleed-off coupler (Figure 2, Item 1) counterclockwise and release air from system.
8. Disconnect filtered air supply from air valve.
9. If air pressure drop is more than 5 psi (34 kPa) in 15 seconds, replace CAC. If air pressure drop is 5 psi (34 kPa) or less in 15 seconds, perform cleaning procedure.
10. Remove CAC Pressure Test Kit per instructions included with ZTSE4341.

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.

CLEANING PROCEDURE (CONT.)

3. Position PUMP / HEATER switch on CMS to HEATER and allow temperature to reach approximately 130°F (54.44°C) before flushing.
4. Install CAC Adapter Flushing Kit per instructions included with 09-925-01.



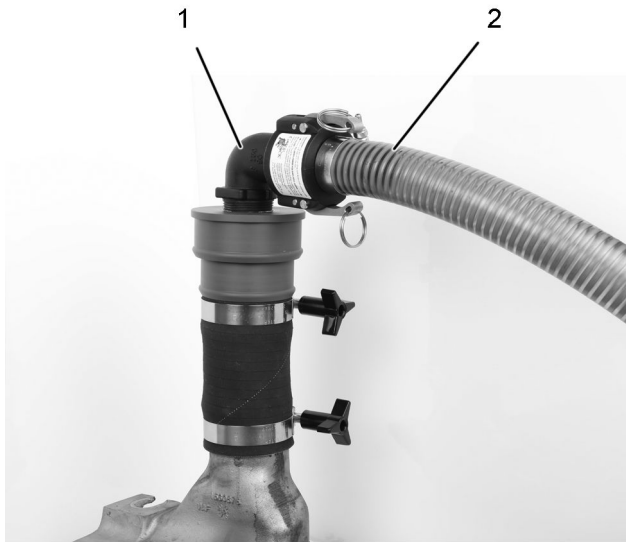
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Figure 3. Outlet Adapter.

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).

CLEANING PROCEDURE (CONT.)



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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.

CLEANING PROCEDURE (CONT.)

18. Fill CMS with 10 gallons of 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 (cold water is sufficient if hot tap water is not available).
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. Tip CAC on its side and allow water to drain.
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-ON

1. Install CAC. Refer to the following:
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2. Run engine to verify proper operation, no leaks, and no fault codes.
 3. Close and latch hood.
 4. Remove wheel chocks.