Gentech DEF Coolant-Flow Solenoid, Testing and Replacement

49-10

> Constellation
> Heritage
> 4700 Models
> 4800 Models
> 4900 Models
> 5900 Models
> 6900 Models

Western Star Service Bulletin

Description of Revisions: *This bulletin replaces the version dated September 2012. Any Gentech DEF coolant-flow control solenoid related fault codes are now acceptable. The "Solenoid Test" instructions are also clarified.*

General Information

NOTE: This bulletin pertains to vehicles with Cummins engines and aftertreatment systems only.

NOTE: The test procedure should be performed with the header unit installed in the DEF tank.

The Gentech diesel exhaust fluid (DEF) coolant-flow-control solenoid is an electric 12V solenoid that controls the flow of coolant through stainless steel tubes in the DEF tank. The solenoid is checked every time the truck is started and is used when the DEF temperature drops to its freezing point, 12°F (-11°C) or below. The command is controlled by the Cummins engine controller. Several different fault codes may indicate a problem with the DEF tank temperature data. See **Table 1** for the most common examples. If any Gentech DEF coolant-flow control solenoid related fault codes are shown, perform the following test to determine if the solenoid valve functions correctly.

Gentech DEF Coolant-Flow-Solenoid, Common Fault Codes (Typical)	
Fault Code	**Description**
1679	Aftertreatment DEF tank temperature – data erratic, intermittent, or incorrect.
1683	Aftertreatment DEF tank heater – voltage above normal, or shorted to high source.
1684	Aftertreatment DEF tank heater – voltage below normal, or shorted to low source.

Table 1, Gentech DEF Coolant-Flow-Solenoid, Common Fault Codes (Typical)

If the solenoid valve is functioning correctly, test the rest of the system for the problem.

If the solenoid valve is not functioning correctly, replace the solenoid valve assembly only. Do not replace the complete header.

Solenoid Test

NOTE: Wear protective gloves when working on the DEF system to protect from crystallized DEF.

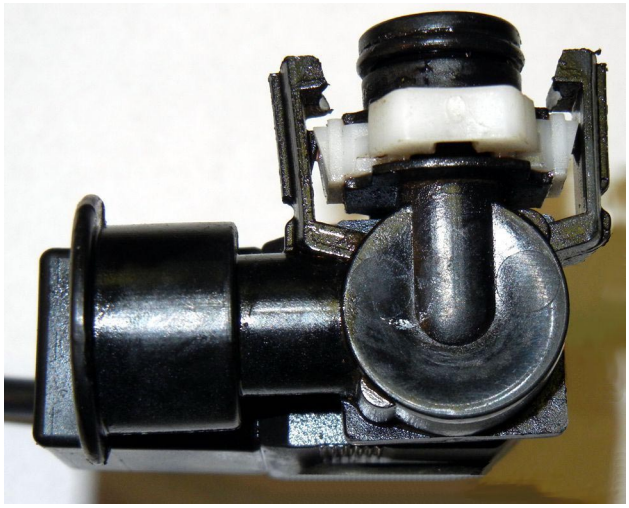
1. Park the vehicle on a level surface, shut down the engine, and set the parking brakes. Chock the tires.

IMPORTANT: Gentech changed the design of the coolant flow control solenoid in March 2011. There are two different solenoids with the same part number but different resistance values. Refer to **Fig. 1** and **Fig. 2** to see the differences in the solenoid housings. The tag on the solenoid will say, "7W" or "10W".

2. Determine which style of solenoid is installed on the vehicle. See **Fig. 1** and **Fig. 2**.
3. Disconnect the 2-pin solenoid connector from the harness.
4. Measure the resistance of the solenoid. The solenoid resistance should be 20±1 Ω for the 7-watt unit, or 13.5±0.7 Ω for the 10-watt unit. Wiggle the solenoid pigtail to test for an intermittent condition.

   If the reading is within specification, remove the Phillips screw from the solenoid, separate the two parts of the solenoid, and check for corrosion on or around the solenoid terminals. See **Fig. 3**.

   If the solenoid resistance is out of range, or if there is corrosion, replace the solenoid valve assembly only. Do not replace the complete header.



03/22/2012 f490466

Fig. 1, 7-Watt Solenoid Valve (20±1 Ω)

03/22/2012 f490465

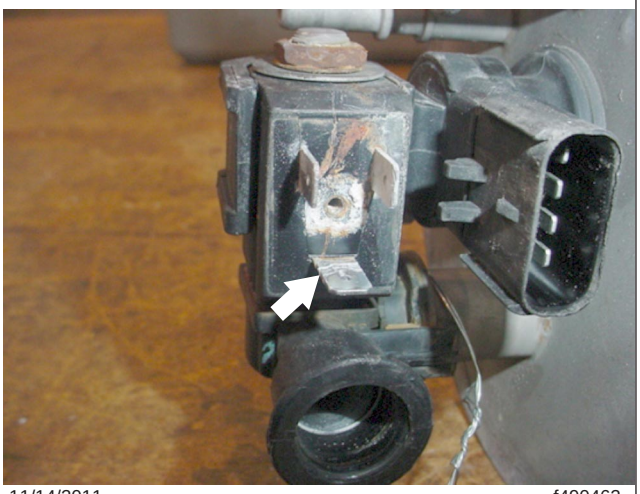
Fig. 2, 10-Watt Solenoid Valve (13.5±0.7 Ω)

If the solenoid resistance is not out of range, or if there is no corrosion, troubleshoot the rest of the system.

Solenoid Valve Assembly Replacement

Refer to **Fig. 4** for this procedure.

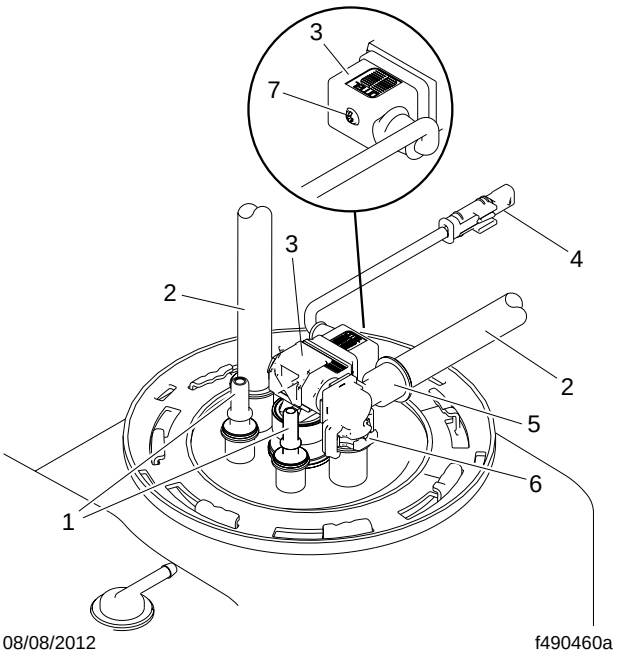
1. Park the vehicle on a level surface, shut down the engine, and set the parking brakes. Chock the tires.
2. Using hose-pinch pliers, pinch off the rubber coolant lines connected to the DEF tank.
3. Remove the DEF tank cover, if equipped.
4. Place a catch pan under the DEF tank to catch any lost coolant.
5. Remove the retaining clip, and disconnect the coolant line at the solenoid valve.
6. Disconnect the solenoid pigtail connector.
7. Remove the retaining clip.
8. Rotate the solenoid valve out of the retainer, and pull it from the header.
9. Push the the new solenoid valve into the header, and rotate it into the retainer.
10. Install the retaining clip.
11. Connect the wire harness.
12. Connect the coolant lines at the valve.
13. Remove the pinch pliers from the coolant lines.
14. Install the DEF tank cover, if equipped.
15. Check the coolant level, and add coolant as needed.



11/14/2011 f490462

Remove the pigtail cable and check this area for corrosion.

Fig. 3, Checking for Corrosion



08/08/2012 f490460a

Test the solenoid resistance at the 2-pin connector.

1. DEF Line Connections (lines not shown for clarity)
2. Coolant Line
3. Retainer, Solenoid Valve
4. 2-Pin Connector, Solenoid
5. Solenoid Valve
6. Retaining Clip, Solenoid Valve to Header
7. Phillips Screw

Fig. 4, DEF Coolant Flow Solenoid Installation (DEF lines not shown for clarity)

Parts

Parts are available through the PDC. See **Table 2** for part numbers.

Replacement DEF Solenoid Valves		
Part Number	**Description**	**Where Used**
04-28039-000	Solenoid Valve, LH	13- and 23-Gallon Tanks
04-28039-001	Solenoid Valve, RH	6-Gallon Tank

Table 2, Replacement DEF Solenoid Valves

Warranty

This procedure is warrantable only if the described condition exists and the repair is performed within the applicable base or extended coverage warranty period. If a failure is not found, this procedure is considered preventive and warranty does not apply.

Normal warranty applies. See **Table 3** for QuickClaim damage code and labor allowance information. Refer to this service bulletin by number at the beginning of the claim comments. See **Table 4** for OWL VMRS codes and labor allowance information. Enter this service bulletin number in the *Service Bulletin #* field.

QuickClaim Damage Code and Labor Allowance			
Damage Code	**SRT Code**	**Description**	**Time: Hours**
23U-007-059	234-5005B	DEF, Coolant Flow, Solenoid, Test	0.2
23U-007-059	234-5005A	DEF, Coolant Flow, Solenoid/Valve, R/R	0.8

Table 3, QuickClaim Damage Code and Labor Allowance

OWL VMRS Codes and Labor Allowance					
Primary Failed Part	**Component Code**	**Cause Code**	**SRT Code**	**Description**	**Time: Hours**
04-28039-000 or 04-28039-001	043-007-018	12	234-5005B	DEF, Coolant Flow, Solenoid, Test	0.2
04-28039-000 or 04-28039-001	043-007-018	12	234-5005A	DEF, Coolant Flow, Solenoid/Valve, R/R	0.8

Table 4, OWL VMRS Codes and Labor Allowance