



December, 1994

To: All Chevrolet Dealers

Attached is a Customer Satisfaction Campaign Bulletin 94-C-57(a) which addresses several driveability concerns on 1994 C/K and P trucks, and G vans equipped with the new EFI 6.5L diesel engine. These driveability concerns include stalling, misfire, poor hot or cold starting, poor throttle response, and extended hot cranking. This letter is being included with the bulletin to give all Chevrolet dealers an overview of how Chevrolet anticipates addressing customer concerns with the 1994 trucks equipped with the 6.5L diesel.

Certain owners of 1994 C/K and P trucks, and G vans equipped with 6.5L engines and either manual or automatic transmissions, will be notified by letter that certain driveability concerns they may have can now be addressed by their Chevrolet dealer. Included with the notification letter will also be a brochure that highlights why GM adapted electronic injection on the 1994 6.5L diesel and what this means to the operator in the way of driving characteristics.

The owner notification will be rolled out in three phases, at approximately one month intervals. Dealers will be notified via DCS one week prior to the owner notification mailing.

PHASE 1

Alaska
Colorado
Idaho
Maine
Michigan

Minnesota
Montana
New Hampshire
North Dakota

Rhode Island
South Dakota
Utah
Wyoming

PHASE 2

Alabama
Hawaii
Illinois
Indiana
Iowa
Kentucky

Mississippi
Missouri
Nebraska
New Jersey
New Mexico
Ohio

Oklahoma
Texas
Vermont
West Virginia
Wisconsin

PHASE 3

Arizona
Arkansas
California
Connecticut
Delaware
Florida
Georgia

Kansas
Louisiana
Maryland
Massachusetts
Nevada
New York
North Carolina

Oregon
Pennsylvania
South Carolina
Tennessee
Virginia
Washington
Washington D.C.

This roll out schedule is necessary due to parts availability even though all efforts have been made to procure the needed quantities as soon as possible.

The enclosed video tape provides a complete walk-through of the repair procedure. It is very important that the video is viewed and understood by the technicians prior to attempting servicing of a vehicle.

NOTE: Injection pump timing is extremely critical! Adjust only according to the procedure in this bulletin.

The video follows the procedure written in the bulletin. The preliminary checks of wiring connections, cranking r.p.m.'s, lift pump pressure, and glow plug operation are critical prior to the service procedure to assure customer satisfaction with the entire repair. The need for the preliminary checks and the video were the result of communications with dealers involved with the early development of the repair procedure. A diagnostic sheet is included in the bulletin that is to be reproduced locally and attached to the warranty copy of the repair order.

When the campaign service procedure is completed, each owner should be provided a complimentary engine oil change, oil filter replacement and complete chassis lubrication. This maintenance should be clearly noted on the repair order and marked "NO CHARGE". This should then be presented to the owner as a gesture of appreciation from the dealership for their cooperation and inconvenience. This service can be charged as part of the campaign expense by using the labor operation shown in the claim matrix.

If performed correctly, we are confident that this repair will address the driveability issues for which it was intended. However, if problems exist after this repair, please call Chevrolet Technical Assistance. They may be able to offer special help on particular situations.

It is imperative that dealers cooperate in the orderly roll out of this customer satisfaction campaign. The ordering of parts from GMSPO, prior to the notification of owners in your phase, will only delay and confuse the roll out timing.

If it is necessary to schedule repairs, for owner convenience, after normal business hours or on weekends, allowance has been made to provide you with reimbursement (see Warranty Information Section of Campaign Bulletin).

R. F. Sobrero
General Sales and Service Manager

Attachments



CHEVROLET MOTOR DIVISION
General Motors Corporation
Service Department

Dealer
Product
Campaign
Bulletin

94-C-57(a)
Number:
6A
Section:
Dec., 1994
Date:

Subject: **PRODUCT CAMPAIGN 94-C-57(a) - POOR THROTTLE RESPONSE, STALLING, MISFIRE, POOR COLD OR HOT START, EXTENDED CRANK HOT, START THEN STALL HOT**

Model and Year: **--- REISSUE ---**

1994 C/K AND P TRUCKS, AND G VANS WITH 6.5L DIESEL ENGINES

To: All Chevrolet/Geo Dealers

THIS REISSUE REPLACES 94C57 ISSUED OCTOBER, 1994. THE "VEHICLES INVOLVED", "PARTS INFORMATION", "SERVICE PROCEDURE" AND "CLAIM INFORMATION" SECTIONS HAVE BEEN REVISED. IN ADDITION, ATTACHMENTS "1" AND "9" HAVE ALSO BEEN CHANGED. THE REVISED INFORMATION IS SHOWN IN BOLD AND ITALIC TYPE.

General Motors has determined that certain 1994 Chevrolet C/K and P trucks, and G vans equipped with 6.5L diesel engines (RPO's L65, L56 and L49) may experience poor throttle response, stalling, misfire, poor cold or hot starting, extended cranking of the starter with a hot engine, and/or your vehicle will start and then stall when the engine is hot. Vehicles with manual transmissions may also experience deceleration stall and poor acceleration performance.

- Poor cold starting includes an extended crank time (more than 4 seconds at temperatures of 0° degrees Fahrenheit and above), rough idle, white smoke and/or start then stall. A cold start is defined as starting the engine after having shut down for more than three hours.
- No start or extended cranking of the starter with a hot engine, starting then stalling when the engine is hot, is defined as starting the engine within three hours of shutdown (extended cranking time with a hot engine is defined as more than 4 seconds cranking time).

To correct these conditions, dealers are to update involved vehicles with a service parts kit and a Powertrain Control Module PROM.

VEHICLES INVOLVED

Involved are certain 1994 Chevrolet C/K and P trucks, and G vans equipped with 6.5L diesel engines (RPO's L65, L56 and L49) built within the following VIN breakpoints:

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Chevrolet bulletins are intended for use by professional technicians, NOT a "do-it-yourselfer". They are written to inform these technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do a job properly and safely. If a condition is described, DO NOT assume that the bulletin applies to your vehicle, or that your vehicle will have that condition. See your Chevrolet dealer for information on whether your vehicle may benefit from that information.

GSD145D Rev.10/91

VEHICLES INVOLVED (Con't)

YEAR	MODEL	PLANT	PLANT CODE	FROM	THROUGH
1994	Crew Cab w/L65	Janesville	"J"	SOP	RJ420038
1994	Suburban w/L65	Janesville	"J"	SOP	RJ432698
1994	C/K Blazer w/L56	Janesville	"J"	SOP	RJ433173
1994	C/K Pickup w/L65	Janesville	"J"	SOP	RJ115874
1994	C/K Pickup w/L65	Pontiac East	"E"	SOP	RE294189
1994	C/K Pickup w/L56	Pontiac East	"E"	SOP	RE294131
1994	C/K Pickup w/L49	Pontiac East	"E"	SOP	RE294185
1994	C/K Pickup w/L56	Oshawa	"1"	SOP	R1310457
1994	C/K Pickup w/L49	Oshawa	"1"	SOP	R1310440
1994	G Van w/L49	Flint	"F"	SOP	EOP
1994	F30 Motorhomes	Detroit	"3"	SOP	R3328990

Involved vehicles have been identified by Vehicle Identification Number Computer Listings. Computer listings contain the complete Vehicle Identification Number, owner name and address data, and are furnished to involved dealers with the campaign bulletin. Owner name and address data furnished will enable dealers to follow-up with owners involved in this campaign.

These listings may contain owner names and addresses obtained from State Motor Vehicle Registration Records. The use of such motor vehicle registration data for any other purpose is a violation of law in several states. Accordingly, you are urged to limit the use of this listing to the follow-up necessary to complete this campaign. Any dealer not receiving a computer listing with the campaign bulletin has no involved vehicles currently assigned.

OWNER NOTIFICATION

Owners will be notified of this campaign on their vehicles by Chevrolet Motor Division. In addition, owners will receive a pamphlet entitled "How To Get The Most From Your EFI Diesel Truck". A copy of the owner letter and pamphlet are included with the dealers copy of this bulletin.

DEALER CAMPAIGN RESPONSIBILITY

All unsold new vehicles in dealers' possession and subject to this campaign must be held and inspected/repaired per the service procedure of this campaign bulletin before owners take possession of these vehicles.

Dealers are to service all vehicles subject to this campaign at no charge to owners, regardless of mileage, age of vehicle, or ownership, from this time forward.

DEALER CAMPAIGN RESPONSIBILITY (Con't)

Owners of vehicles recently sold from your new vehicle inventory with no owner information indicated on the dealer listing, are to be contacted by the dealer, and arrangements made to make the required correction according to the instructions contained in this bulletin. This could be done by mailing to such owners a copy of the owners letter accompanying this bulletin. Campaign follow-up cards should not be used for this purpose, since the owner may not as yet have received the notification letter.

In summary, whenever a vehicle subject to this campaign enters your vehicle inventory, or is in your dealership for service in the future, please take the steps necessary to be sure the campaign correction has been made before selling or releasing the vehicle.

PARTS INFORMATION

Parts required to complete this campaign are to be obtained from General Motors Service Parts Operations (GMSPO). To ensure these parts will be obtained as soon as possible, they should be ordered from GMSPO on a "C.I.O." order with no special instruction code, but on an advise code (2).

NOTICE:

INJECTION PUMPS ARE NOT TO BE ORDERED THROUGH GMSPO. ACQUIRE INJECTION PUMPS THROUGH STANADYNE ON AN EXCHANGE PROCEDURE (SEE GM CORPORATE SERVICE BULLETIN 376302, DATED SEPTEMBER, 1993 FOR STANADYNE DEALER NEAR YOU). TYPE 94C57 ON EXCHANGE FORM GSD-675 IN THE "DEALER COMMENTS" SECTION.

A technical assistance case is not required to obtain an exchange injection pump.

Part Number	Description	Quantity/ Vehicle
12553873	Service Kit	1
See Charts*	PROM	1
25160561	Oil Filter	1
12345634	15W30 Engine Oil	As Required

* To order correct PROM for vehicle, check current Scan I.D. with Tech 1, then cross reference the Scan I.D. using the chart listings that follow.

PARTS INFORMATION (Con't)

1994 L56 (VIN 8) WITH AUTOMATIC TRANSMISSION

Body Style/ Series	Current Scan ID	New FROM P/N	FROM Code	New FROM ID (Scan Tool)
C10-20 Pickup	6925	16211620	EMXZ	1605
K10-K20 Pickup, K10 Blazer	6935	16211623	EMYA	1615
C10-20 Pickup	3285 7415	16210063	EMRK	9935
K10-20 Pickup, K10 Blazer	3295 7425	16210068	EMRL	9945

1994 L65 (VIN F) WITH AUTOMATIC TRANSMISSION

Body Style/ Series	Current Scan ID	New FROM P/N	FROM Code	New FROM ID (Scan Tool)
C/K 20-30 Pickup, C/K 30 Chassis Cab, C/K 20 Suburban	6945 3345 7375	16210150	BMSD	0145
C30/C5B* HD Chassis Cab	6895 3305 7385	16210156	BMSF	0155
C/K 20-30 Pickup, C/K 30 Chassis Cab	3735 7325	16210072	BMRM	9955
C/K 20 Suburban	3325 7345	16210082	BMRP	9975
C30/C5B* HD Chassis Cab	3355 7335	16210078	BMRN	9965
P30 Motorhome	1025	16211628	BMYB	1625
C/K 20-30 Ambulance	3685	16210093	EMRT	0005
C30/C5B* HD Ambulance	3695	16210097	EMRU	0015
C/K 20-30 Pickup, C/K 30 Chassis Cab	6465	16210217	BMSW	0275
C/K 20 Suburban	6475	16210226	BMSY	0295
C30/C5B* HD Chassis Cab	5755	16210220	BMSX	0285

* C5B: 15,000 LB GVW

VEHICLE INFORMATION (Con't)

1994 L65 (VIN F) WITH MANUAL TRANSMISSION

Body Style/ Series	Current Scan ID	New FROM P/N	FROM Code	New FROM ID (Scan Tool)
G/R 20-30 Pickup	6905 2225 3335 7395 0165	16215261	BNTF	5175
10/C5B+ HD Chassis Cab	6915 2235 3315 7405 0175	16215263	BNTH	5185
10/C5B+ HD Chassis Cab	8605 0185	16215266	BNTJ	5195
G/R 20-30 Pickup	3365 7355 9985	16215253	BNTB	5145
10/C5B+ Chassis Cab	3375 7365 9995	16215256	BNTC	5155
10/C5B+ HD Chassis Cab	8595 0025	16215258	BNTD	5165

C5B: 15,000 LB GVW

1994 L49 (VIN P) WITH AUTOMATIC TRANSMISSION

Body Style/ Series	Current Scan ID	New FROM P/N	FROM Code	New FROM ID (Scan Tool)
G20 Van	6835 3215 7435	16210182	BMSL	0195
G20 Van	6845 3225 7445	16210187	BMSM	0205
C10 Pickup	6855 3235 7455	16210190	BMSN	0215

PARTS INFORMATION (Con't)

1994 L49 (VIN P) WITH AUTOMATIC TRANSMISSION (Con't)

Body Style/ Series	Current Scan ID	New PROM P/N	PROM Code	New PROM ID (Scan Tool)
C10 Pickup	6865 3245 7465	16210196	BMSP	0225
C20 or K10-20 Pickup	6875 3255 7475	16210199	BMSR	0235
C20 or K10-20 Pickup	6885 3265 7485	16210203	BMSS	0245

1994 L49 (VIN P) WITH MANUAL TRANSMISSION

Body Style/ Series	Current Scan ID	New PROM P/N	PROM Code	New PROM ID (Scan Tool)
C10 Pickup	6815 3275 7495 0255	16215268	BNTN	5235
C20 or K10-20 Pickup	6825 3205 7505 0265	16215271	BNTP	5245

SERVICE PROCEDURE

The following checks must be performed to qualify the engine support systems. A diagnostic check sheet (Attachment 1) has been provided to assist in this process, and must be attached to the repair order.

1. Check PROM ID using Tech 1. See Parts Information Section of this bulletin for ordering replacement PROM. If new PROM is currently in truck, do not replace.
2. Check for diagnostic trouble codes (DTC's), both history and current. Use the 1994 Diesel Service Manual Supplement for diagnosis and correction. Clear all current and history DTC's before proceeding.
3. Check wiring connections at batteries, relay center, engine grounds and wiring grounds (Attachment 2) for secure and complete attachment.

SERVICE PROCEDURE (Con't)

4. Check air filter, clean or replace as necessary.
5. Check cold cranking RPM, spec.=100 RPM cold engine (see Attachment 3).
6. Check fuel supply system pressure, spec: 3 psi minimum at idle (Attachment 4).
7. Check glow plugs (Attachment 5).

Once above procedures have been completed, install service kit which contains a visor label (engine starting procedure), electronic filter harness, and two stage housing pressure regulator (see Attachments 6 and 7 for installation procedure). Install replacement PROM. Refer to the "Parts Information" section for determining proper replacement PROM.

8. Check for air in fuel system (see Attachment 8) for procedure.
9. *Relearn the TDC Offset. If the released value is between +0.75 and -1.75 continue to the next step. If the value is not between +0.75 and -1.75, reset pump timing following procedure shown in Attachment 9.*
10. Check fuel rate at idle using Tech 1 (maximum spec: 13 mm for manual transmission or 15 mm for automatic transmission). If out of specification, check fuel quality using a hydrometer (see fuel section of appropriate service manual for procedure details). Empty tank and refill with known good fuel source if required.

NOTICE: IF OWNERS CONCERN WAS HOT START OR EXTENDED CRANK HOT OF MORE THAN 4 SECONDS BEFORE STARTING, CONTINUE WITH THE FOLLOWING DIAGNOSIS.

11. Block radiator and bumper holes, operate engine with A/C off at 3400 RPM in neutral/park until coolant temperature reaches 220 degrees Fahrenheit as indicated on Tech 1, or stabilizes at a lower number.

Notice: Block tires and set parking brake while performing step 11.

12. Shut off engine and let vehicle hot soak for 20-25 minutes.
13. Using a timer which accurately reads "seconds" record crank time.
14. If crank time exceeds 4 seconds check cranking speed, spec: 170-180 RPM (Attachment 3).

SERVICE PROCEDURE (Con't)

15. If crank speed is within specification and crank time exceeds 4 seconds replace injection pump.

Notice: Injection pumps are to be exchanged through Stanadyne.
DO NOT order form GMSPO.

16. Install Campaign Identification Label.
17. Change engine oil, oil filter and lubricate chassis.

CAMPAIGN IDENTIFICATION LABEL

Each vehicle corrected in accordance with the instructions outlined in this Product Campaign Bulletin will require a "Campaign Identification Label". Each label provides a space to include the campaign number and the five (5) digit dealer code of the dealer performing the campaign service. This information may be inserted with a typewriter or a ball point pen.



Each "Campaign Identification Label" is to be located on the radiator core support in an area which will be visible when the vehicle is brought in for periodic servicing by the owner. Additional "Campaign Identification Labels" can be obtained from DAC.

Apply "Campaign Identification Label" only on a clean, dry surface.

CLAIM INFORMATION

Submit a Product Campaign Claim with the information indicated below:

REPAIR PERFORMED	FC	① FAILED PART NO.	PARTS ALLOW	CC-FC	LABOR OP	LABOR HOURS	* OTHER HOURS	NET AMOUNT
Diagnostic Check - Install Kit & PROM L49 Non-Turbo	2	12553873	**	SK-00	V9330	4.4	0.1	--
Diagnostic Check - Install Kit & PROM L65 or L56 Turbo	2	12553873	**	SK-00	V9331	4.9	0.1	--
Diagnostic Check - Install Kit, PROM & Exchange Pump - C/K Truck L49 Non-Turbo	2	12553873	**	SK-00	V9332	7.5	0.3	--
Diagnostic Check - Install Kit, PROM & Exchange Pump - - C/K Truck L65 or L56 Turbo	2	12553873	**	SK-00	V9333	8.7	0.3	--
Diagnostic Check - Install Kit, PROM & Exchange Pump - C-Van L49 Non-Turbo	2	12553873	**	SK-00	V9334	8.2	0.3	--
Inspect For New Components	-	- -	- -	SK-00	V9335	0.2	0.1	--
Change Engine Oil, Oil Filter & Lube	1	25160561	**	SP-95	T2413	0.5	--	**
Extra Labor	-	- -	- -	SP-95	T2414	- -	- -	- -
Alternate Transportation	-	- -	- -	SP-95	T2412	- -	- -	***

① Labor operation T2414 is to be used for replacing any parts (i.e. filters, glow plugs, etc.) and for claiming additional labor beyond what is allowed in the claims matrix. Additional repairs should be entered with the applicable time as published in the current labor time guide. All additional parts and labor should be totaled and operation T2414 entered only once for each vehicle. Extra labor may also be used if the dealer provides extended service hours to accommodate the customer such as late night hours and Saturday hours normally not scheduled. Time in excess of one-half of the labor time allowed will require DAC authorization.

* 0.1 hours for Campaign Administrative Allowance. 0.2 hours will be added where exchanges forms are required.

** The "Parts Allowance" should be the sum total of the current GMSPC Dealer Net price plus 40% of all parts required for the repair. Engine oil for T2413 should be entered in "Net Amount".

*** Alternate transportation cost is to be entered in the "Net Amount" column. This should be entered only once at the completion of the campaign service.

Dealers will automatically receive the correct labor and material allowance based on the labor operation performed.

Refer to the Chevrolet Claims Processing Manual for details on Product Campaign Claim Submission.

Chevrolet Motor Division
General Motors Corporation

94-C-57



(Notification Used By Chevrolet Motor Division)

October, 1994

Dear Chevrolet Diesel Truck Owner:

Your complete satisfaction with your 1994 Chevrolet Truck, equipped with a 6.5L Electronic Fuel Injection (EFI) Diesel Engine, is most important to Chevrolet. We want your 6.5L diesel to satisfy all your driving needs and wish to inform you that enhancements are available to improve your engine's driveability.

The 1994 6.5L EFI Diesel Engine in your truck is equipped with an electronic fuel injection pump which is controlled by a powertrain control module (or computer). CERTAIN Trucks may exhibit some driveability concerns such as poor throttle response, stalling, misfire, poor hot or cold starting, extended cranking of a hot engine, or stalling after start. Trucks equipped with manual transmissions may exhibit poor acceleration from start characteristics or may stall during deceleration. To address these concerns, your Chevrolet dealer can install some recently developed enhancements which will improve the overall driving pleasure of your vehicle. These enhancements will be installed at no charge to you.

Instructions for performing this service have been sent to your Chevrolet dealer. Please contact your dealer to arrange a convenient service appointment. Please be prepared to describe the specific concern or symptom your vehicle exhibits. This will assist the dealer in accurately assessing the situation. Since some of the required parts are unique to your specific vehicle, a short first visit to the dealer may be necessary to determine the appropriate parts needed for your vehicle. On the second visit, the new parts will be installed and may require between 1 to 6 hours to install, depending on the repairs required.

We've also enclosed a brochure which describes some of the features of the 6.5L Diesel Engine and how it differs from diesel engines that utilize mechanical injection systems. Please take the time to read this important information.

The enclosed owner reply card identifies your vehicle. Presentation of this card to your dealer will assist in making the necessary correction in the shortest possible time. If you have sold or traded your vehicle, please let us know by completing the postage paid reply card and returning it to us.

We sincerely regret the inconvenience or concern this situation may cause you. Your satisfaction with Chevrolet products is of utmost concern to us. We have taken this action to ensure your Chevrolet truck provides years of pleasurable driving experience.

Chevrolet Motor Division
GENERAL MOTORS CORPORATION

DIAGNOSTIC CHECK SHEET

Attach to the Repair Order # _____

RECORD SCAN ID: _____ Current _____ New (for required replacement)

RECORD DIAGNOSTIC TROUBLE CODES (DTC's) AND CORRECT AS NECESSARY.

_____ Current _____ History

CHECK WIRING CONNECTIONS AT:

Batteries	_____	Tight	_____	Loose
Engine Grounds	_____	Tight	_____	Loose
Wiring Grounds	_____	Tight	_____	Loose
Relay Center	_____	Tight	_____	Loose

CHECK AIR FILTER: _____ Clean _____ Replace _____

CHECK COLD CRANKING SPEED: _____ RPM

CHECK FUEL SUPPLY SYSTEM PRESSURE: _____ PSI

CHECK GLOW PLUGS: _____ PASS _____ FAIL (Replace as necessary)

INSTALL SERVICE KIT AND PROM: _____ YES

CHECK FOR AIR IN FUEL SYSTEM: _____ YES _____ NO

PERFORM TIMING CHECKS: (Engine warm, all accessories off and vehicle in park)

A. Record TDC Offset _____

B. Activate TDC offset learn:

_____ Record new TDC offset learn (if offset is not between +0.75 and -1.75, adjust timing using procedure in Attachment 9). Use revised target zone -0.25 to -0.75.

_____ Fuel Rate at idle (if above 13mm for manual transmission, check fuel quality; if above 15mm for automatic transmission, check fuel quality)

NO START HOT or EXTENDED CRANK HOT, START THEN STALL HOT

After all checks listed above have been performed, along with installation of service kit, complete the following:

* The vehicle must be operated as instructed in bulletin for hot soak prior to completing information.

Engine idling Hot (prior to shut down for hot soak)

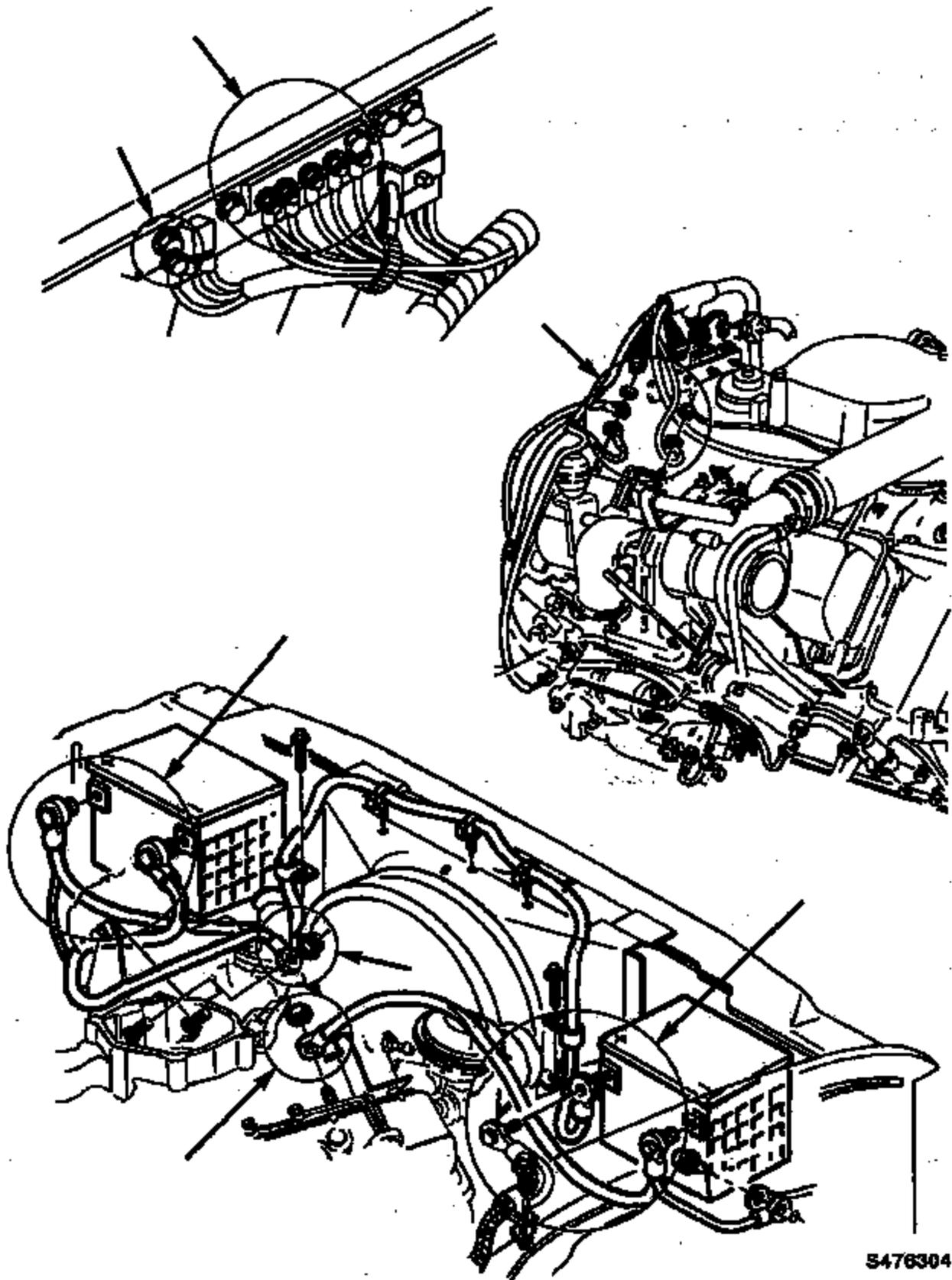
Record: _____ Coolant Temp. _____ Fuel Temp.

AFTER HOT SOAK RECORD: _____ Coolant Temp. _____ Fuel Temp.

_____ Time to Start in seconds (spec: less than 4 seconds)

CHECK HOT CRANKING SPEED: _____ RPM

ATTACHMENT 1



547630404

ATTACHMENT 2

CRANKING SPEED CHECK *

Tools required: J26999 Compression Gage
 J26999-30 Compression Gage Adapter

Cranking speed is critical for a diesel to start, either hot or cold. Some tachometers are not accurate at cranking speed. Below is an alternative method of checking cranking speed or determining the accuracy of a tachometer.

1. Screw J26999-30 into any cylinder and connect J26999 gage.
2. Disconnect the fuel solenoid fuse (F/SOL).
3. Install the digital tachometer to check (if desired).
4. Depress the pressure release valve on the compression gage.
5. With the aid of an assistant, crank the engine for 2 or 3 seconds to allow the starter to reach full speed; then, without stopping, count the number of "puffs" at the compression gage occurring in the 10 seconds following. Multiply the number of "puffs" in the 10 second period by 12 and the resulting number will be the engine speed.

EXAMPLE:

10 seconds	=	1/6 of a minute
1 puff	=	Engine speed of 2
Engine Speed	=	Number of puffs x 2 x 6 or
Engine Speed	=	Number of puffs x 12

Minimum cranking speed on the 6.5L diesel engine is 100 RPM cold and 170-180 RPM hot. The actual engine speed needed will vary depending on the condition of the engine (compression) and nozzles.

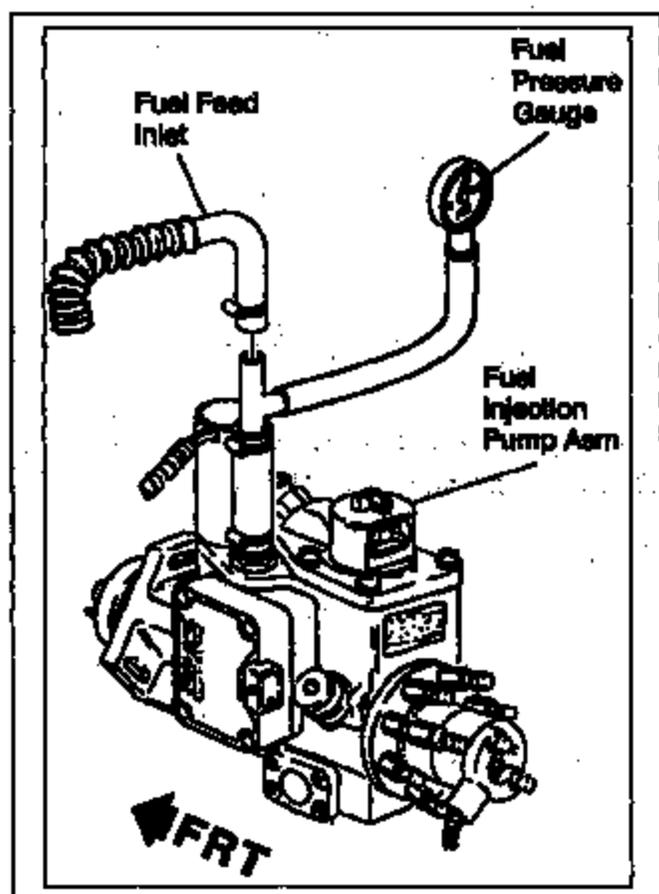
NOTICE: Refer to Section 6D2 of the Service Manual for diagnosis of cranking system if cranking speed is too low.

- * Alternative method of checking cranking speed is using the Tech 1 as indicated on the video tape that addresses campaign procedures.

FUEL SUPPLY SYSTEM CHECK

This procedure will check for plugged fuel filter and lift pump operation:

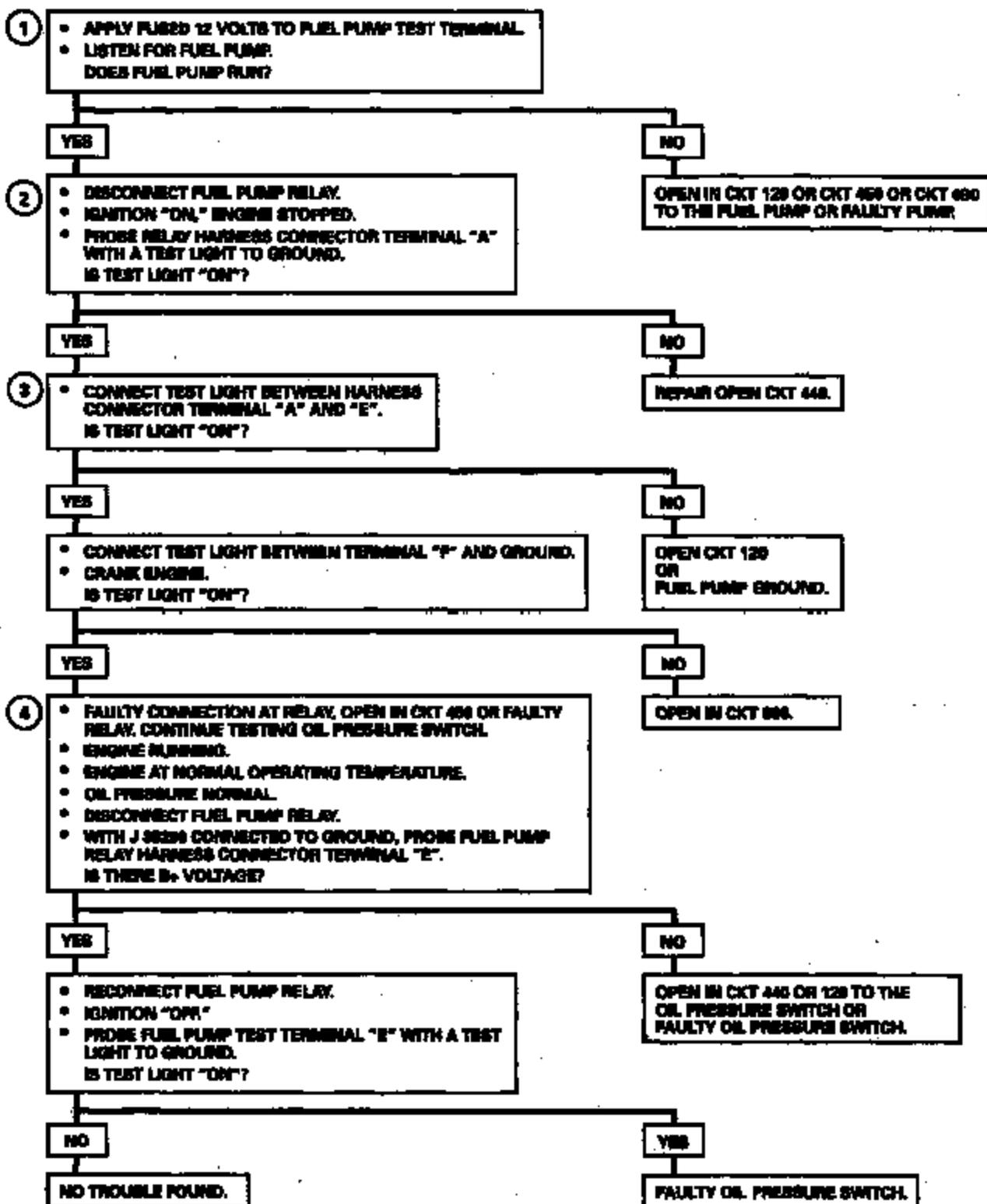
1. Install a tee adapter at the injection pump fuel inlet connection.
2. Connect a pressure gauge with a dial indication of 0 to 103 kPa (0 to 15 psi) to the tee adapter.
3. Idle engine and measure fuel pressure.
 - If pressure is 3 psi minimum, go to Step 4.
 - If pressure is less than 3 psi, check for plugged fuel filter and refer to attachment 4a before replacing lift pump.
4. Remove pressure gauge and tee adapter.
5. Reconnect the fuel feed inlet to injection pump.
6. Clean any fuel spillage.
7. Run the engine and check for fuel leakage.



MH

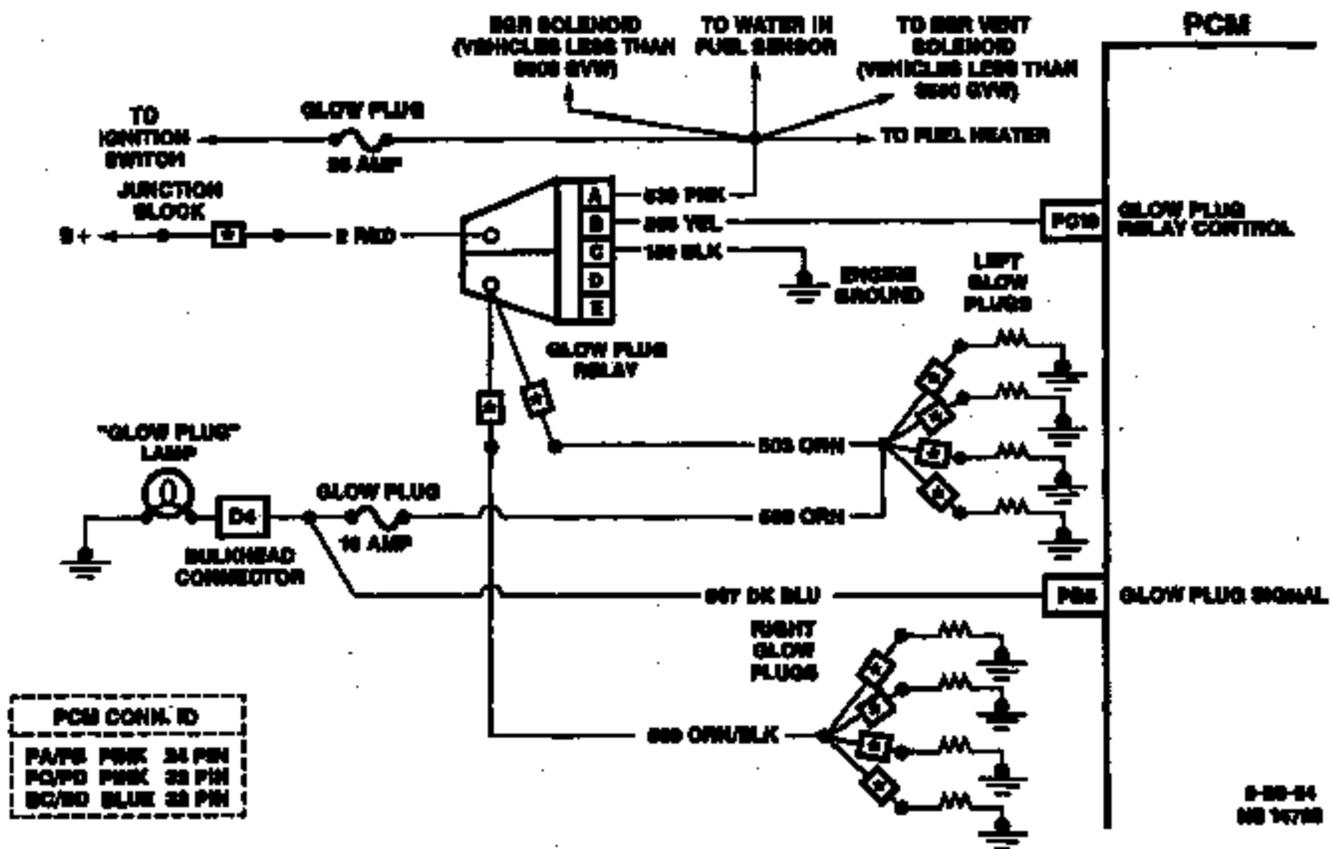
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FUEL PUMP RELAY CIRCUIT DIAGNOSIS



GLOW PLUG SYSTEM CHECK

1. Disconnect all Glow Plugs.
2. Use J39200 to measure continuity between each Glow Plug terminal and ground.
3. Replace any burned out glow plugs as necessary.
4. Reconnect all Glow Plugs.
5. With test light connected to ground, probe each Glow Plug harness terminal connector.
6. Command Glow Plugs "ON". Is test light "ON"?
7. If test light "ON", system is operating correctly.
8. If test light "OFF", check circuit 509 and 503 for an open wire.

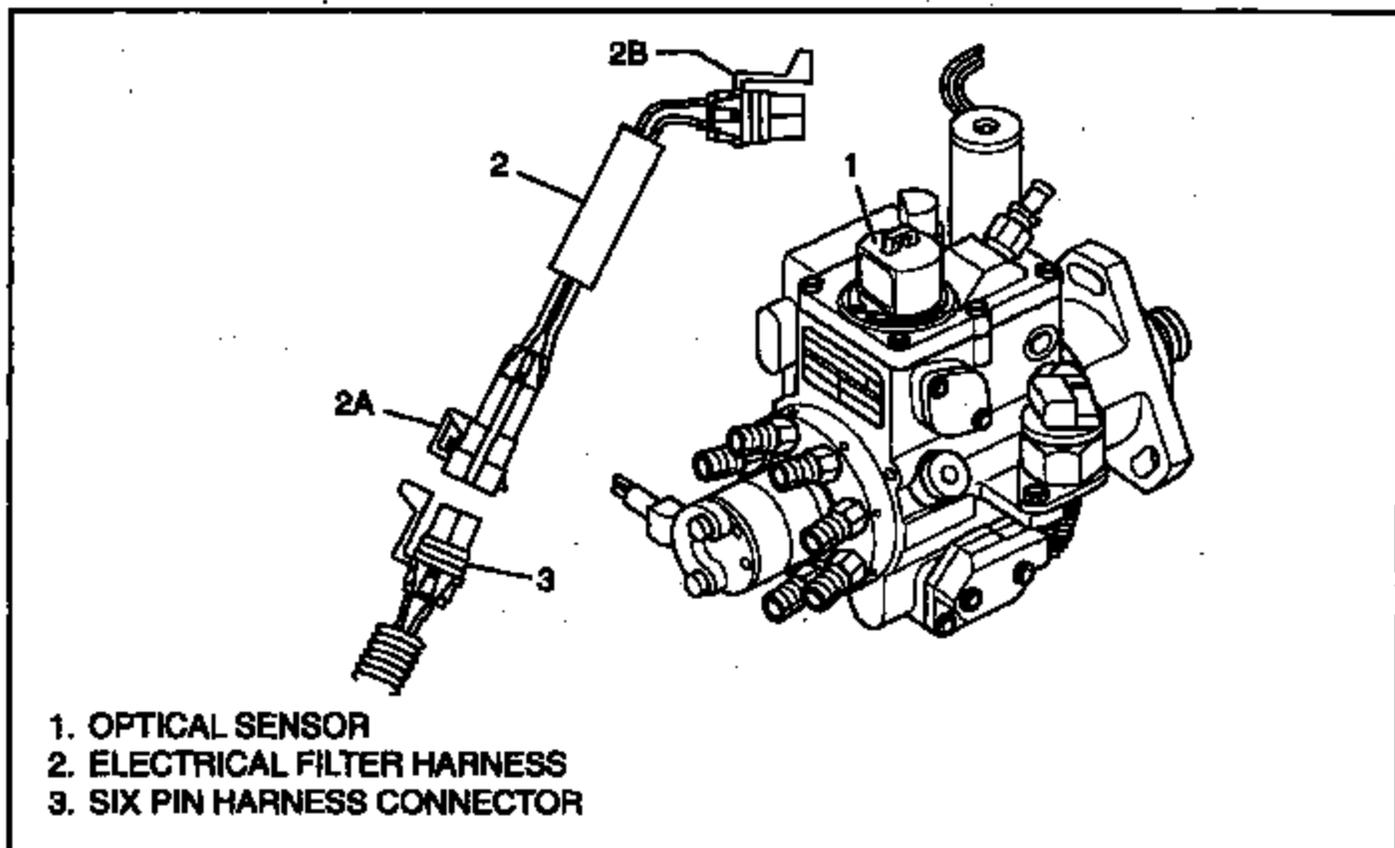


ELECTRONIC FILTER HARNESS

1. Remove engine cover, if equipped.
2. Disconnect six pin harness connector from the optical sensor at fuel injection pump.
3. Connect electronic filter harness (2a) to six pin harness connector (3).
4. Connect electronic filter harness (2b) to optical sensor at fuel injection pump (1).

NOTICE: The electronic filter harness wires will have to be twisted and bent to a 90 degree angle for proper fit.

5. Install engine cover, if equipped.



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TWO STAGE HOUSING PRESSURE REGULATOR

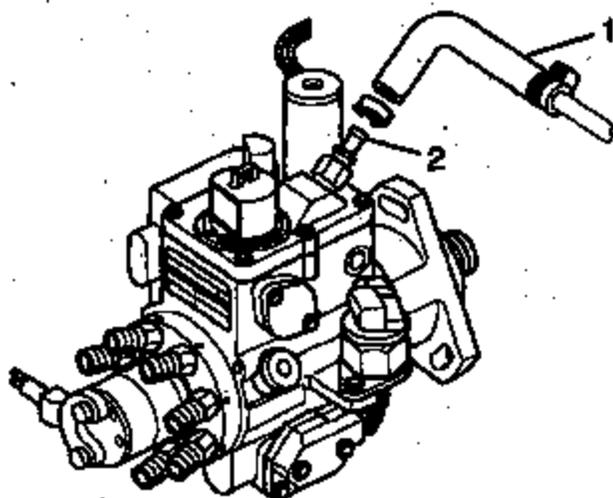
1. Loosen fuel tank cap to release any pressure.
2. Remove engine cover, if equipped.

NOTE: Clean fuel hose connections and surrounding areas before disconnecting any fuel lines to avoid possible contamination of the fuel system.

3. Remove fuel return hose (1) from return fitting (2) at front of fuel injection pump.
4. Remove return fitting (2) with O-ring from front of fuel injection pump.
5. Lubricate o-ring on the two stage housing pressure regulator with clean engine oil.

NOTE: Do not install any thread sealer on the two stage housing pressure regulator.

6. Install two stage housing pressure regulator (part of service kit) where return fitting (2) was removed and tighten to 4.9 to 6.0 Nm (43-53 in. lb.).
7. Install fuel return hose (1) to the two stage housing pressure regulator.
8. Install engine cover, if equipped.
9. Tighten fuel tank cap.
10. Check for fuel leaks.



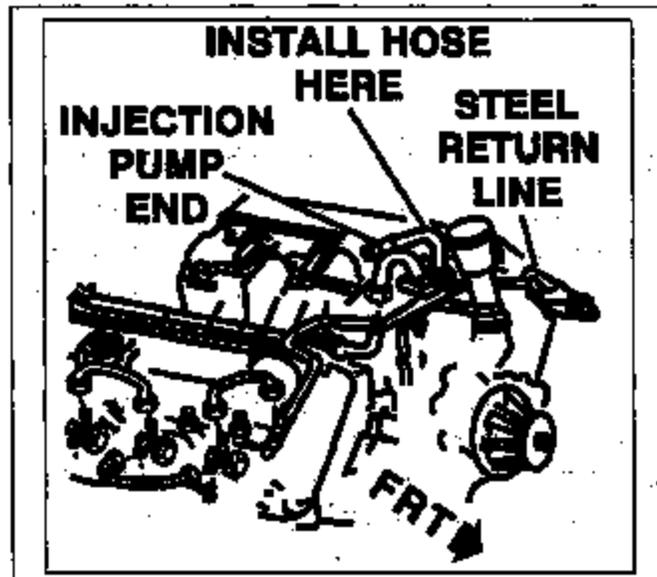
1. FUEL RETURN HOSE
2. RETURN FITTING

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DIAGNOSING AIR IN FUEL LINES

Tool Required: 1/4" I.D. Clear Plastic hose

1. To check for air in fuel system, install a 1/4" I.D. clear plastic hose to the fuel return fitting on top of injection pump and connect the other end to the steel return line.
 - The conditions where the driveability problem occurred may need to be reproduced, i.e. vehicle may need to sit overnight to reproduce a hard start cold condition.
2. Start engine and observe the clear return line. Air bubbles will be evident if there is air in fuel system.
3. If air is found, locate source using Section 4 of driveability and emissions service manual.



SH

SPROM2

TIMING PROCEDURE

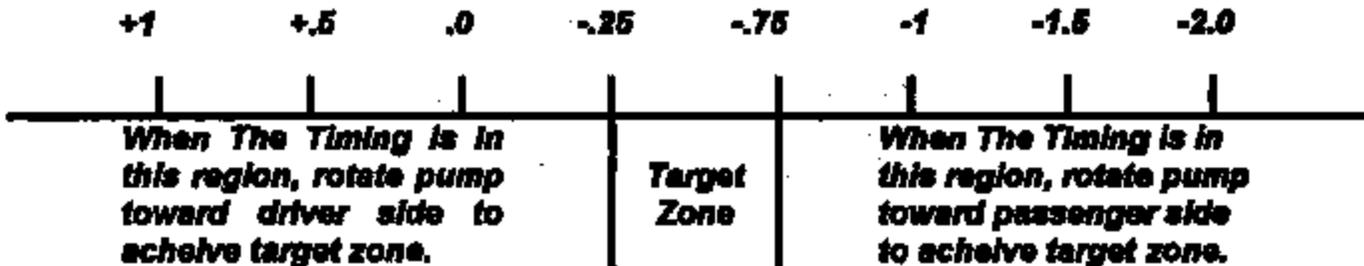
1. Start and idle engine until warm.
2. Install Tech 1 scan tool.
3. Activate "TDC OFFSET LEARN" in "OUTPUT TEST" / "INJ. PUMP" section of Tech 1 scan tool.

NOTICE: If engine stalls during TDC offset activation, loosen pump mounting nuts, * slightly rotate pump toward the driver side of the vehicle, tighten mounting nuts and repeat Step 3.

4. If the learned "TDC OFFSET" is between -0.25 and -0.75 degrees, procedure is complete; if not, * slightly rotate pump * and retighten mounting nuts. Repeat Steps 3 and 4 until "TDC OFFSET" value is between -0.25 and -0.75 degrees.

NOTICE: To achieve a negative (-) number, rotate pump toward driver side; a positive (+) number, rotate toward passenger side 1mm pump movement = approximately 2 degrees

Engine **MUST** be shut off prior to rotating the pump, scribe the pump housing and flange before loosening the bolts for a point of reference.



Notice: *The manufacturing process for injection pump timing is different than the procedure available to the field. Learned affects between +0.75 to -1.75 on production built engines are normal. Because a different technique is used for service injection pump timing, a different target zone is required (-0.25 to -0.75).*

DIAGNOSTIC CHECK SHEET

Attach to the Repair Order # _____

RECORD SCAN ID: _____ Current _____ New (for required replacement)

RECORD DIAGNOSTIC TROUBLE CODES (DTC's) AND CORRECT AS NECESSARY.

_____ Current _____ History

CHECK WIRING CONNECTIONS AT:

Batteries	_____	Tight	_____	Loose
Engine Grounds	_____	Tight	_____	Loose
Wiring Grounds	_____	Tight	_____	Loose
Relay Center	_____	Tight	_____	Loose

CHECK AIR FILTER: _____ Clean _____ Replace _____

CHECK COLD CRANKING SPEED: _____ RPM

CHECK FUEL SUPPLY SYSTEM PRESSURE: _____ PSI

CHECK GLOW PLUGS: _____ PASS _____ FAIL (Replace as necessary)

INSTALL SERVICE KIT AND PROM: _____ YES

CHECK FOR AIR IN FUEL SYSTEM: _____ YES _____ NO

PERFORM TIMING CHECKS: (Engine warm; all accessories off and vehicle in park)

A. Record TDC Offset _____

B. Activate TDC offset learn:

_____ Record new TDC offset learn (if offset is not between +0.75 and -1.75, adjust timing using procedure in Attachment 9). Use revised target zone -0.25 to -0.75.

_____ Fuel Rate at idle (if above 13mm for manual transmission, check fuel quality; if above 15mm for automatic transmission, check fuel quality)

NO START HOT or EXTENDED CRANK HOT, START THEN STALL HOT

After all checks listed above have been performed, along with installation of service kit, complete the following:

* The vehicle must be operated as instructed in bulletin for hot soak prior to completing information.

Engine idling Hot (prior to shut down for hot soak)

Record: _____ Coolant Temp. _____ Fuel Temp.

AFTER HOT SOAK RECORD: _____ Coolant Temp. _____ Fuel Temp.

_____ Time to Start in seconds (spec: less than 4 seconds)

CHECK HOT CRANKING SPEED: _____ RPM

DIAGNOSTIC CHECK SHEET

Attach to the Repair Order #

RECORD SCAN ID: Current New (for required replacement)

RECORD DIAGNOSTIC TROUBLE CODES (DTC's) AND CORRECT AS NECESSARY.

Current History

CHECK WIRING CONNECTIONS AT:

Batteries Tight Loose
Engine Grounds Tight Loose
Wiring Grounds Tight Loose
Relay Center Tight Loose

CHECK AIR FILTER: Clean Replace

CHECK COLD CRANKING SPEED: RPM

CHECK FUEL SUPPLY SYSTEM PRESSURE: PSI

CHECK GLOW PLUGS: PASS FAIL (Replace as necessary)

INSTALL SERVICE KIT AND PROM: YES

CHECK FOR AIR IN FUEL SYSTEM: YES NO

PERFORM TIMING CHECKS: (Engine warm, all accessories off and vehicle in park)

A. Record TDC Offset

B. Activate TDC offset learn:

Record new TDC offset learn (if offset is not between +0.75 and -1.75, adjust timing using procedure in Attachment B). Use revised target zone -0.25 to -0.75.

Fuel Rate at idle (if above 13mm for manual transmission, check fuel quality; if above 15mm for automatic transmission, check fuel quality)

NO START HOT or EXTENDED CRANK HOT, START THEN STALL HOT

After all checks listed above have been performed, along with installation of service kit, complete the following:

* The vehicle must be operated as instructed in bulletin for hot soak prior to completing information.

Engine Idling Hot (prior to shut down for hot soak)

Record: Coolant Temp. Fuel Temp.

AFTER HOT SOAK RECORD: Coolant Temp. Fuel Temp.

Time to Start in seconds (spec: less than 4 seconds)

CHECK HOT CRANKING SPEED: RPM