TABLE OF CONTENTS

Steering System

Application	1.4L DOHC	1.6L DOHC	1.8L DOHC
Gear Type	Power Rack and Pinion	←	←
Overall Gear Ratio			
Power Steering	16 : 1	←	←
Wheel Diameter			
W/ Air Bag	380 mm (15.0 in.)	←	←
W/O Air Bag	370 mm (14.5 in.)	←	←
Wheel Alignment :			
Front :			
Toe–In	0˚ ± 10’	←	←
Caster	4˚ ± 45’	←	←
Camber	20’ ± 45’	←	←
Rear :			
Toe–In	12’ ± 10’	←	←
Camber	–1˚ ± 45’	←	←
Oil Capacity	1.1L (1.2 qts)	←	←

Suspension

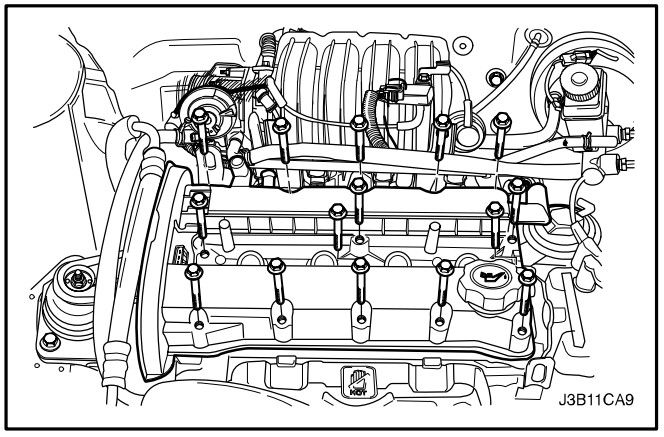
Application	1.4L DOHC	1.6L DOHC	1.8L DOHC
Front Type	Macpherson Strut	←	←
Rear Type	Dual Link	←	←

Fuel System

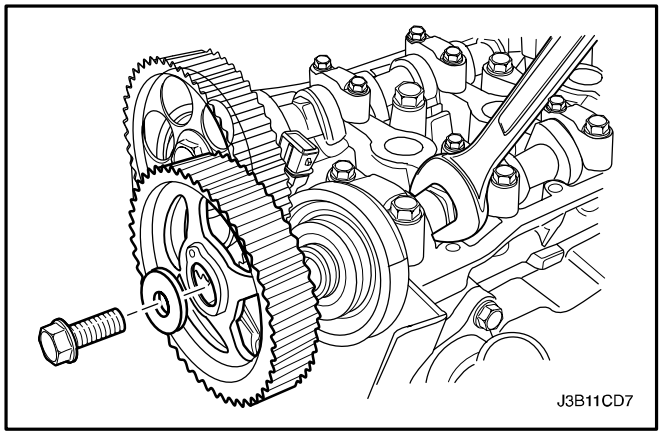
Application	1.4L DOHC	1.6L DOHC	1.8L DOHC
Fuel Delivery	MPI	←	←
Fuel Pump Type	Electric Motor Pump	←	←
Fuel Filter Type	Cartridge	←	←
Fuel Capacity	60L (15.85 gal)	←	←

Lubricating System

Application	1.4L DOHC	1.6L DOHC	1.8L DOHC
Lubricating Type	Forced Feed	←	←
Oil Pump Type	Rotary (Trochoid)	←	←
Oil Filter Type	Cartridge (Full Flow)	←	←
Oil Pan Capacity			
Including Oil Filter	3.75L (4 qts)	←	4.0L (4.2 qts)

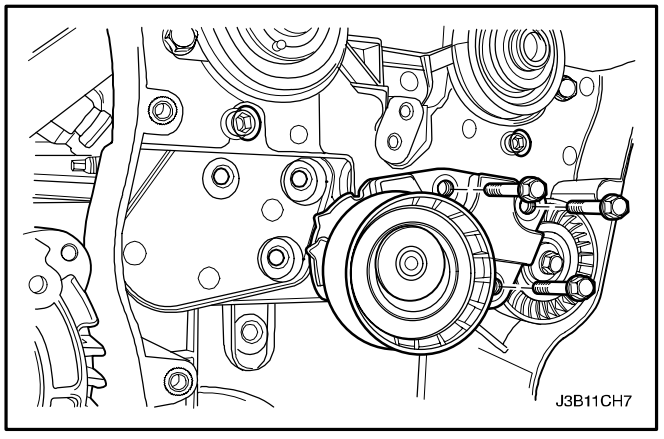


11. Disconnect the engine ventilation hoses from the camshaft cover.
12. Disconnect the oil filler cap.
13. Remove the spark plug cover bolts.
14. Remove the spark plug cover.
15. Disconnect the ignition wires from the spark plugs.
16. Remove the camshaft cover nuts.
17. Remove the camshaft cover washers.
18. Remove the camshaft cover and the camshaft cover gasket.

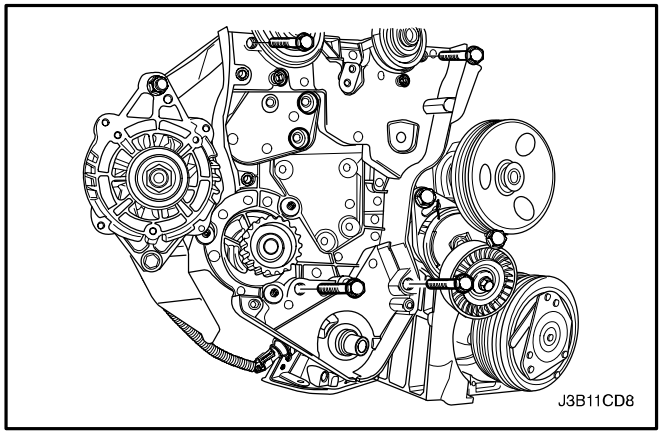


Notice : Take extreme care to prevent any scratches, nicks or damage to the camshafts.

19. While holding the intake camshaft firmly in place, remove the intake camshaft bolt.
20. Remove the intake camshaft gear.
21. While holding the exhaust camshaft firmly in place, remove the exhaust camshaft bolt.
22. Remove the exhaust camshaft gear.



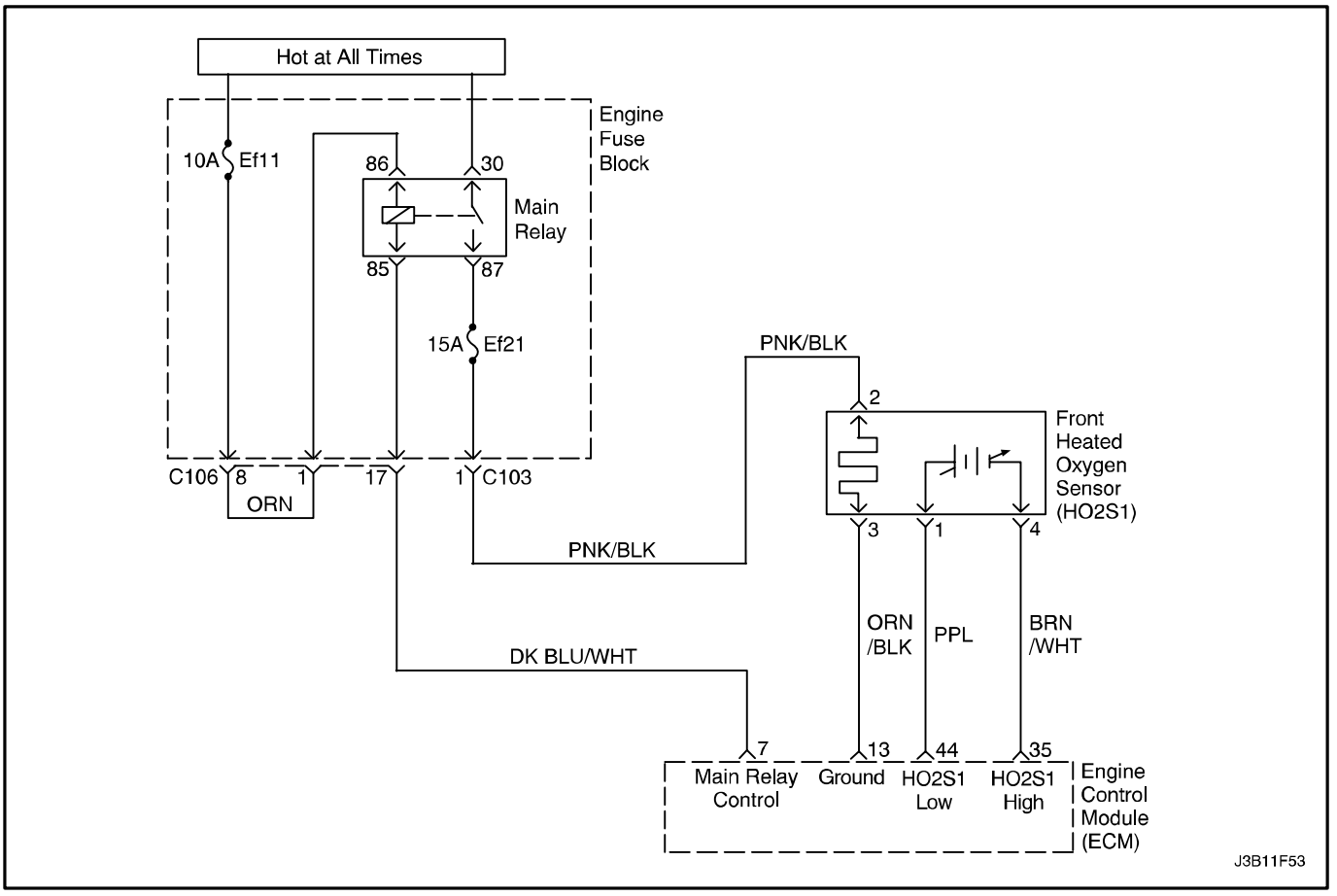
23. Remove the timing belt automatic tensioner bolts.
24. Remove the timing belt automatic tensioner.
25. Remove the timing belt idler pulley bolt.
26. Remove the timing belt idler pulley.



27. Remove the crankshaft timing belt gear.
28. Remove the rear timing belt cover bolts.
29. Remove the rear timing belt cover.

FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb–Ft	Lb–In
Camshaft Position Sensor Bolts (1.4L/1.6L DOHC)	7	–	62
Camshaft Position Sensor Bolts (1.8 DOHC)	8	–	71
Crankshaft Position Sensor Retaining Bolt (1.4L/1.6L DOHC)	6.5	–	58
Crankshaft Position Sensor Retaining Bolt (1.8 DOHC)	8	–	71
Electronic Ignition System Ignition Coil Retaining Bolts	10	–	89
Exhaust Gas Recirculation Valve Retaining Bolts	30	22	–
Engine Control Module Bolts	12	–	106
Engine Coolant Temperature Sensor Bolt (1.4L/1.6L DOHC)	17.5	13	–
Engine Coolant Temperature Sensor Bolt (1.8 DOHC)	20	15	–
Evaporative Emission Canister Flange Bolt	4	–	35
Evaporative Emission Canister Purge Solenoid Bracket Bolt	5	–	44
Fuel Filter Mounting Bracket Assembly Bolt	4	–	35
Fuel Tank Retaining Bolts	20	15	–
Fuel Rail Retaining Bolts	25	18	–
Idle Air Control Valve Retaining Bolts (1.8 DOHC)	3	–	27
Intake Air Temperature Sensor	22	16	–
Knock Sensor Bolt	20	15	–
Manifold Absolute Pressure Sensor Bolts (1.4L/1.6L DOHC)	8	–	71
Manifold Absolute Pressure Sensor Bolts (1.8 DOHC)	4	–	35
Oxygen Sensor Bolt	42	31	–
Throttle Body Retaining Nuts (1.4L/1.6L DOHC)	15	11	–
Throttle Body Retaining Nuts (1.8 DOHC)	10	–	89
Throttle Position Sensor Retaining Bolts (1.8 DOHC)	2	–	18



DIAGNOSTIC TROUBLE CODE (DTC) P0133

FRONT HEATED OXYGEN SENSOR NO ACTIVITY

Circuit Description

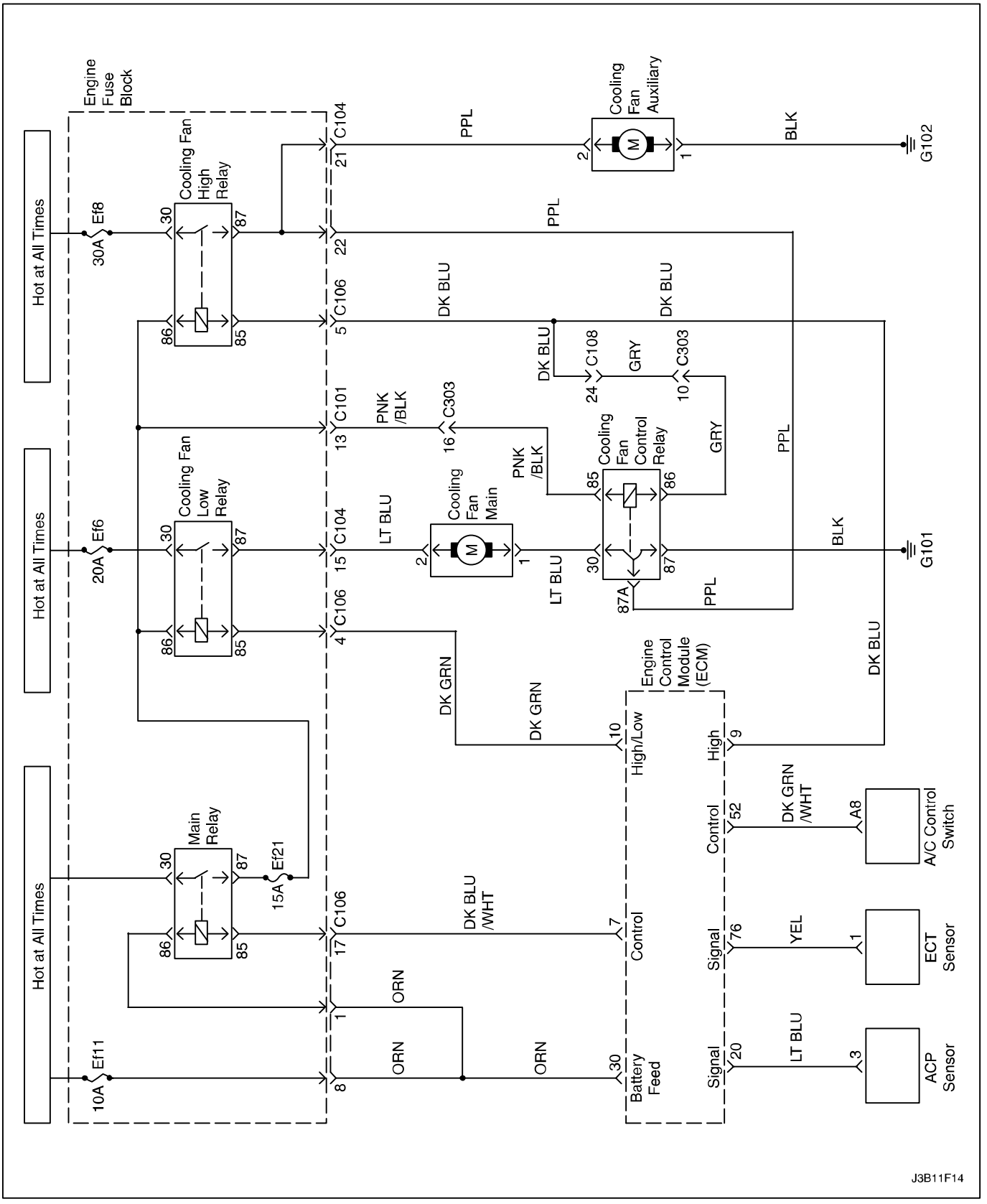
The engine control module (ECM) supplies a voltage of about 450mm volts between the ECM terminals 44 and 13. The oxygen (O2) sensor varies the voltage within a range of about 1volt if the exhaust is rich, down to about 100mm volts if the exhaust is lean. The O2 sensor is like an open circuit and produces no voltage when it is below 360˚C(600˚F). An open O2 sensor circuit or a cold O2 sensor causes ”open loop” operation.

Conditions for Setting the DTC

- The engine controls system is in closed loop.
- Engine Coolant Temperature is higher than 70˚C(158˚F). (1.4L DOHC)
- Engine Coolant Temperature is higher than 60˚C(140˚F). (1.6L DOHC)
- The mass air flow (MAF) is between 100mg/tdc and 250mg/tdc. (1.4L DOHC)
- The mass air flow (MAF) is between 60mg/tdc and 160mg/tdc. (1.6L DOHC)
- The engine speed is between 1,700 rpm and 2,200 rpm. (1.4L DOHC)
- The engine speed is between 1,800 rpm and 2,900 rpm. (1.6L DOHC)
- The vehicle speed is between 40 km/h (24.9 mph) and 60 km/h (37.3 mph). (1.4L DOHC)
- The vehicle speed is between 45 km/h (28.0 mph) and 55 km/h (34.2 mph). (1.6L DOHC)
- The manifold air pressure is higher than 700hPa.
- The ignition is at 10 volts.
- The upstream O2 sensor periods higher than 1.6 seconds.
- A number of glitches higher than 5 during the test.
- DTCs P0107, P0108, P0112, P0113, P0117, P0118, P0122, P0123, P0131, P0132, P0137, P0138, P1671, P0300, P0335, P0336, P0341, P0400, P0404, P0405, P0444, P0445 are NOT SET.

Action Taken When the DTC Sets

- The Malfunction Indicator Lamp (MIL) will illuminate.
- The ECM will record operating conditions at the time the diagnostic fails. This information will be stored in the Freeze Frame and Failure Records buffers.
- A history DTC is stored.
- The coolant fan turns ON.
- The vehicle will operate in Open Loop.


Engine Fuse Block
Hot at All Times
Hot at All Times
Hot at All Times
Ef8
30A
Ef6
20A
Ef11
10A
Ef21
15A
Cooling Fan High Relay
Cooling Fan Low Relay
Main Relay
Cooling Fan Auxiliary
Cooling Fan Main
Cooling Fan Control Relay
C104
C106
C101
C303
C108
PPL
DK BLU
PNK /BLK
LT BLU
GRY
BLK
DK GRN
ORN
DK BLU /WHT
DK GRN /WHT
YEL
G102
G101
Engine Control Module (ECM)
High/Low
High
Control
Signal
Battery Feed
A/C Control Switch
ECT Sensor
ACP Sensor
J3B11F14

1. The On–Board Diagnostic (EOBD) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on the scan tool if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is then stored on the scan tool for later reference.
2. This step will determine if DTC P0107 is the result of a hard failure or an intermittent condition.
3. Jumpering harness terminals 2 to 1 (signal circuit to 5 volts) will determine if the sensor is malfunctioning or if there is a problem with the ECM or wiring.
6. The scan tool may not display 5 volts. The Important thing is that the ECM recognizes the voltage as more than 4 volts, indicating that the ECM and the signal circuit are OK. A test light that illuminates indicates a short to ground in the signal circuit.
7. A short to ground in the 5 volt reference circuit could also set additional DTCs.
11. The replacement ECM must be programmed. Refer to the latest Techline procedure for the ECM reprogramming.

DTC P0107 Manifold Absolute Pressure Low Voltage

Step	Action	Value(s)	Yes	No
1	Perform an On–Board Diagnostic (EOBD) System Check. Was the check performed?	–	Go to *Step 2*	Go to ”On–Board Diagnostic System Check”
2	1. Install a scan tool to the Data Link Connector (DLC). 2. Start the engine. 3. Read the Manifold Absolute Pressure (MAP). Does the scan tool display a MAP below the specified value?	12 kPa	Go to *Step 3*	Go to *Step 4*
3	1. Turn the ignition switch OFF. 2. Disconnect the MAP sensor electrical connector. 3. Jumper the MAP signal circuit at terminal 2 to the 5 volt reference circuit at terminal 1. 4. Turn the ignition switch ON. Does the MAP read more than the specified value?	96 kPa	Go to *Step 5*	Go to *Step 6*
4	1. Turn the ignition switch ON with the engine OFF, review the Freeze Frame data, and note the parameters. 2. Operate the vehicle within the freeze frame conditions and Conditions For Setting the DTC as noted. Does the scan tool display MAP below the specified value?	12 kPa	Go to *Step 3*	Go to ”Diagnostic Aids”
5	Inspect the MAP sensor harness electrical connector terminals for the following conditions: • Poor connections. • Proper contact tension. • Poor terminal to wire connection. Is a problem found?	–	Go to *Step 8*	Go to *Step 9*
6	1. Turn the ignition switch OFF. 2. Remove the jumper wire. 3. Probe the MAP sensor signal circuit terminal 2 with a test light to B+. 4. Turn the ignition switch ON. Does the scan tool read over the specified value?	90 kPa	Go to *Step 7*	Go to *Step 12*
7	Check the MAP sensor 5 volt reference circuit at terminal 1 for an open or short to ground. Is a problem found?	–	Go to *Step 10*	Go to *Step 11*

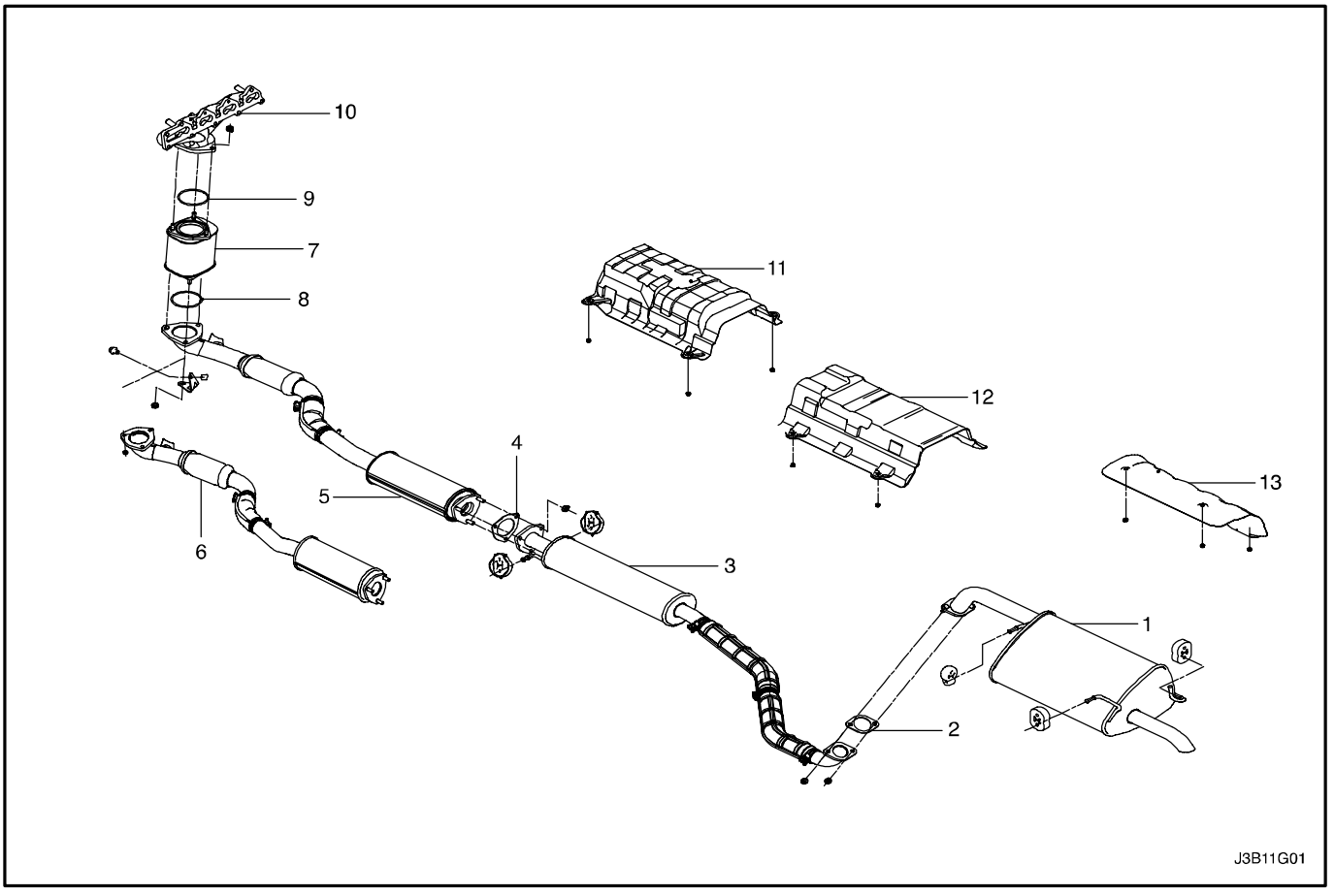
1. The On–Board Diagnostic (EOBD) System Check prompts the technician to complete some basic checks and to store the freeze frame and failure records data on the scan tool if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is then stored on the scan tool for later reference.
2. This step determines if DTC P0342 is the result of a hard failure or an intermittent condition.
4. Determines if voltage is available to the CMP.
7. This step checks for a voltage supplied by the ECM to the CMP.
12. The replacement ECM must be reprogrammed. Refer to the latest Techline procedure for ECM re-programming.

DTC P0342 – Camshaft Position Sensor No Signal

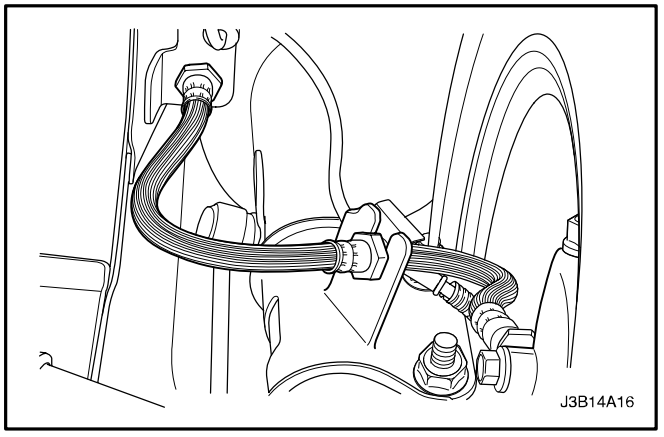
Step	Action	Value(s)	Yes	No
1	Perform an On–Board Diagnostic (EOBD) System Check. Was the check performed?	–	Go to *Step 2*	Go to ”On–Board Diagnostic System Check”
2	1. Turn the ignition OFF. 2. Install a scan tool to the Data Link Connector (DLC). 3. Idle the engine. Is the Camshaft Position (CMP) Active Count incrementing?	–	Go to *Step 3*	Go to *Step 4*
3	1. Turn the ignition ON. 2. Review the Freeze Frame data and note the parameters. 3. Start the engine and operate the vehicle within the Freeze Frame Conditions and Conditions for Setting the DTC as noted. Is the CMP Active Counter incrementing?	–	Go to *Step 13*	Go to *Step 4*
4	1. Turn the ignition OFF. 2. Disconnect the CMP sensor connector. 3. Turn the ignition ON. 4. With a test light connected to ground, probe the CMP sensor harness connector, terminal 1. Does the test light illuminate?	–	Go to *Step 5*	Go to *Step 6*
5	With a test light connected to B+, probe the CMP sensor harness connector, terminal 2. Does the test light illuminate?	–	Go to *Step 7*	Go to *Step 8*
6	Check for a poor connection or open in the CMP sensor B+ feed circuit and repair as necessary. Is the repair complete?	–	Go to *Step 13*	Go to ”Diagnostic Aids”
7	Using a Digital Voltmeter (DVM), check the voltage between the CMP sensor harness connector, terminal 3 and ground. Does the DVM display near the specified values?	5 V	Go to *Step 11*	Go to *Step 9*
8	Check for a poor connection or open in the CMP sensor ground circuit and repair as necessary. Is the repair complete?	–	Go to *Step 13*	–
9	1. Turn the ignition OFF. 2. Disconnect the engine Control Module (ECM) connector. 3. Check for the CMP signal circuit for an open or short to round or short to B+, and repair as needed. Is the repair complete?	–	Go to *Step 13*	Go to *Step 10*

COMPONENT LOCATOR

EXHAUST SYSTEM



1. Exhaust Rear Muffler
2. Muffler Gasket
3. Exhaust Front Muffler
4. Muffler Gasket
5. Exhaust Front Pipe (1.8D)
6. Exhaust Front Pipe (1.6D)
7. Catalytic Converter
8. Exhaust Pipe Front Gasket
9. Exhaust Front Pipe Gasket
10. Exhaust Manifold
11. Catalytic Converter Protective Shield
12. Front Muffler Protective Shield
13. Rear Muffler Protective Shield

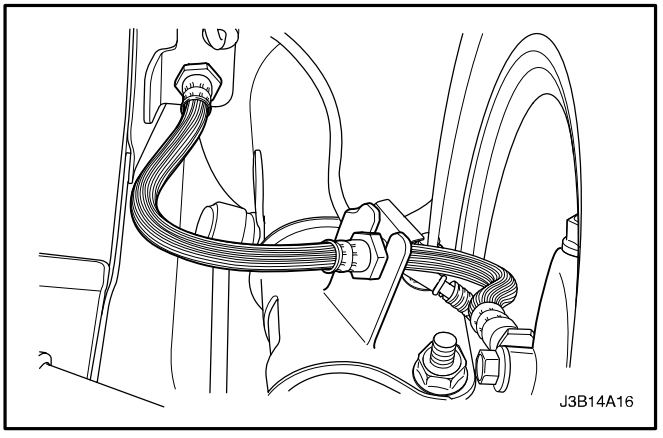


Installation Procedure

1. Install the new disc brake hose to the caliper with new seal rings and the bolt.

   Tighten

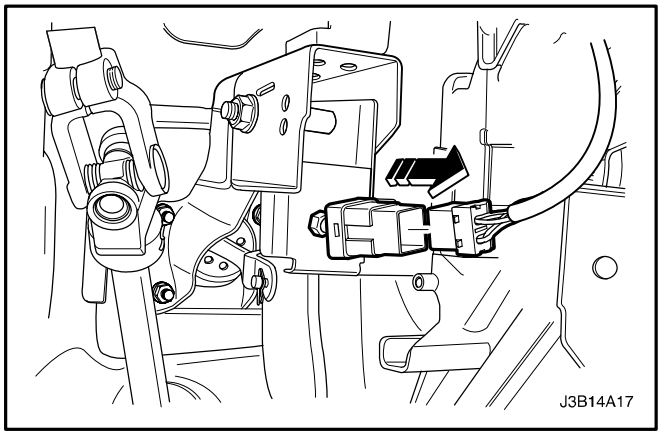
   Tighten the front disc brake hose–to–caliper bolt to 40 N•m (30 lb–ft).
2. Slide the brake hose on the steering knuckle shaft ”C” bracket.



3. Connect the brake pipe line to the brake hose on the wheel housing bracket on each side of the vehicle.

   Tighten

   Tighten the brake line to 16 N•m (12 lb–ft).
4. Lower the vehicle.
5. Bleed the brake system. Refer to ”Manual Bleeding the Brakes” in this section.
6. Check the brake system for leaks.

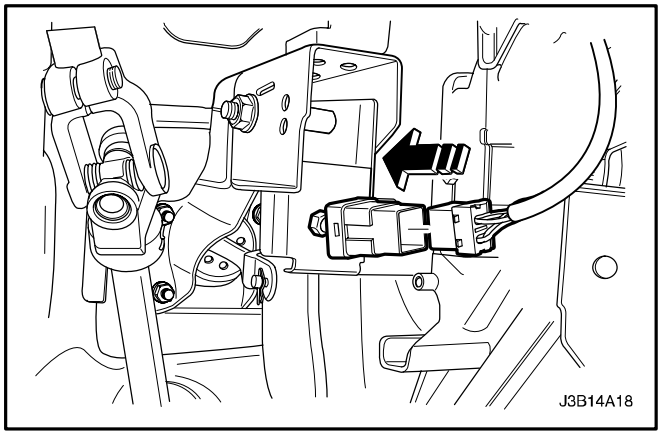


STOPLAMP SWITCH

(Left–Hand Drive Shown, Right–Hand Drive Similar)

Removal Procedure

1. Disconnect the negative battery cable.
2. Disconnect the stoplamp switch from the plug connector.
3. Turn the switch. Remove the switch from the brake pedal bracket.

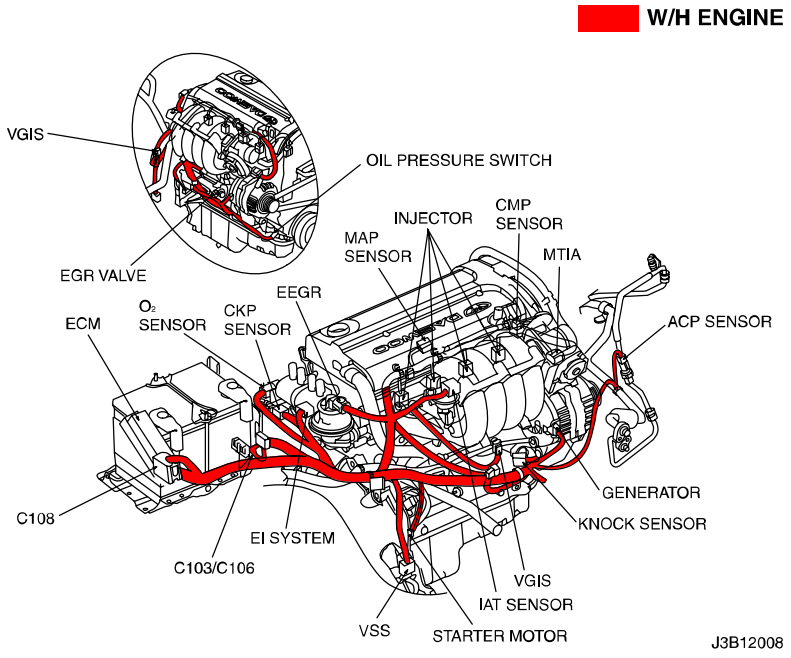


Installation Procedure

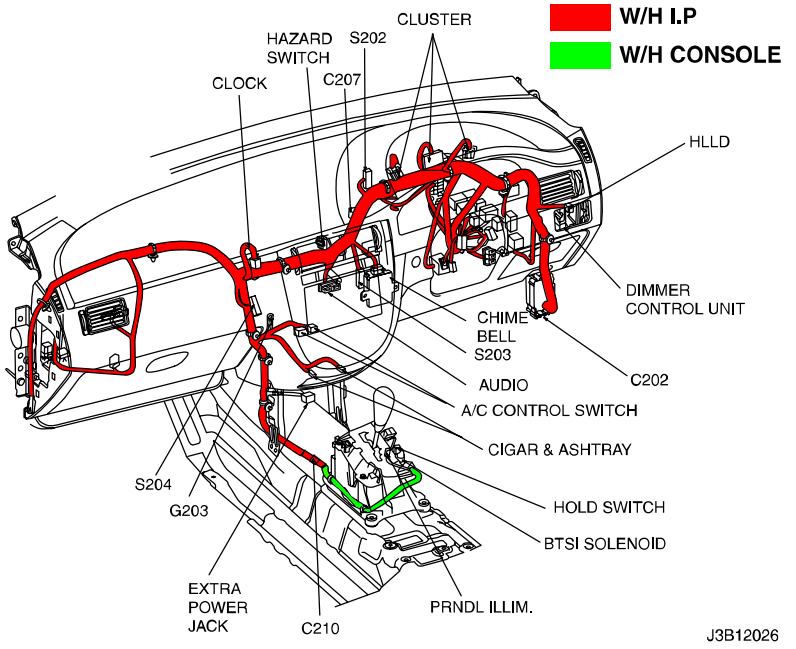
1. Place the stoplamp switch into the plug connector.
2. Twist the stoplamp switch into the brake pedal bracket hole.
3. Depress the brake pedal and pull the switch plunger to its maximum setting to adjust the switch.
4. Release the plunger and pull up on the pedal.
5. Connect the negative battery cable.

c. POSITION OF CONNECTORS AND GROUNDS

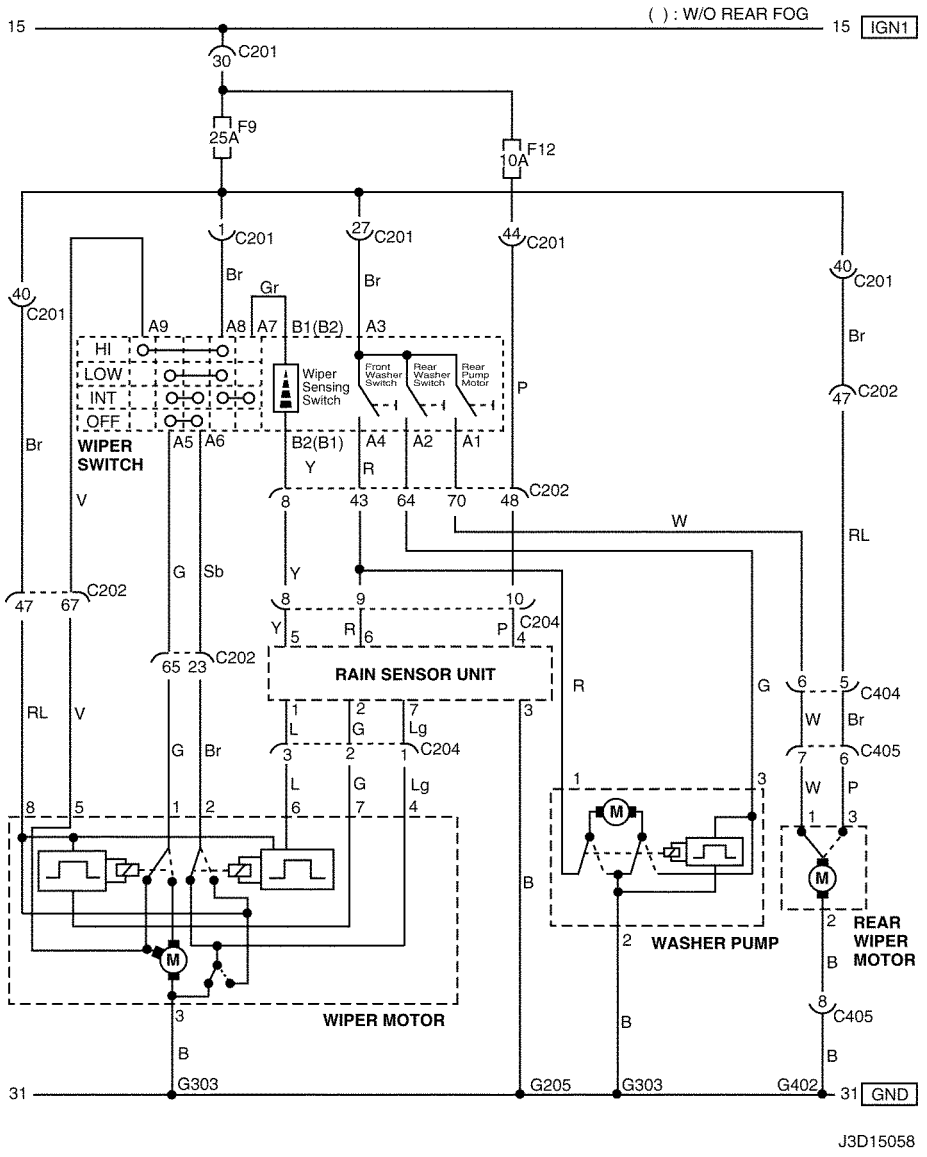
- **W/H ENGINE**



- **W/H INSTRUMENT PANEL**



4) W/ RAIN SENSOR & AIR CONDITIONER : HATCH BACK

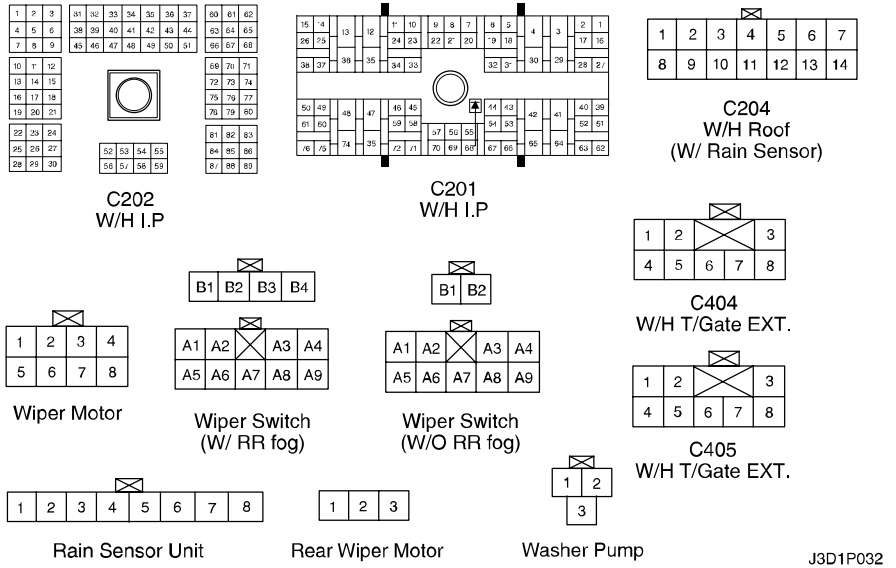


J3D15058

a. CONNECTOR INFORMATION

CONNECTOR(NO.) (PIN NO. COLOR)	CONNECTING, WIRING HARNESS	CONNECTOR POSITION
C201 (76 Pin, Black)	I.P – I.P Fuse Block	I.P Fuse Block
C202 (89 Pin, White)	I.P – Body	Left CO–Driver Leg Room
C204 (14 Pin, White)	Roof – Body (W/ Rain Sensor)	Left CO–Driver Leg Room
C204 (8 Pin, White)	Roof – Body (W/O Rain Sensor)	Left CO–Driver Leg Room
C404 (8 Pin, White)	T/Gate. EXT. – Body	Inside Left C Pillar
C405 (8 Pin, White)	T/Gate. EXT. – T/Gate	Beside Left Rear Wiper Motor
G205	Roof	Inside CO–Driver A Pillar
G303	Body	Below Left CO–Driver Leg Room
G402	T/Gate. EXT.	Inside Driver C Pillar

b. CONNECTOR IDENTIFICATION SYMBOL & PIN NUMBER POSITION



J3D1P032

DTC P0563 – System Voltage High

Step	Action	Value(s)	Yes	No
1	Perform an On–Board Diagnostic (EOBD) System Check. Is the check completed?	–	Go to *Step 2*	Go to *"On–Board Diagnostic System Check"*
2	1. Install the scan tool. 2. Turn the ignition ON and record then clear DTC(s), then turn ignition OFF. 3. Turn the ignition ON and start the engine. 4. Run the engine to 1,200 rpm. 5. Select system voltage on the scan tool. 6. Drive the vehicle and observe the scan tool for system voltage. Is the voltage within the values shown?	9–16V	Go to *Step 4*	Go to *Step 3*
3	1. Disconnect the negative battery cable. 2. Measure the voltage of the battery. Is the voltage within the values shown?	9–16V	Go to *Step 4*	Go to *"Section 1E, Engine Electrical"*
4	1. Turn the headlamp ON. 2. Turn the air conditioner ON. 3. Run the engine to 1,200rpm. 4. Observe the scan tool for system voltage. Is the voltage within the values shown?	9–16V	Go to *Step 6*	Go to *Step 5*
5	1. Turn the ignition OFF. 2. After testing the charging system, repair the alternator circuit if necessary. Is the action completed?	–	System OK	–
6	Inspect the F2, EF1 fuse for an open. Was a problem found?	–	Go to *Step 7*	Go to *Step 8*
7	Replace the fuse if necessary. Is the replacement complete?	–	System OK	–
8	1. Turn the ignition ON. 2. Measure the voltage of F2, EF1. Is the voltage within the values shown?	9–16V	Go to *Step 10*	Go to *Step 9*
9	Repair the fuse voltage supply lines for an open. Is the repair completed?	–	System OK	–
10	1. Turn the ignition OFF. 2. Disconnect the TCM wiring connector. 3. Measure the resistance between EF1 fuse and terminal B3 of the TCM wiring connector. Is the resistance within the values shown?	≈0Ω	Go to *Step 12*	Go to *Step 11*
11	Repair the circuit(between EF1 and terminal B3) for a short to ground and open. Is the repair completed?	–	System OK	–
12	1. Disconnect the C105 connector and TCM connector. 2. Turn the ignition ON. 3. Measure the voltage of the terminal B3(TCM wiring connector). Is the voltage within the values shown?	9–16V	Go to *Step 13*	Go to *Step 14*

Range	Park/ Neutral	Reverse	D				3			2		1
Gear	**N**	**R**	**1st**	**2nd**	**3rd**	**4th**	**1st**	**2nd**	**3rd**	**1st**	**2nd**	**1st**
Solenoid Valve 1	ON	ON/ OFF	ON/ OFF	ON/ OFF	ON/ OFF	ON/ OFF	ON/ OFF	ON/ OFF	ON/ OFF	ON/ OFF	ON/ OFF	ON/ OFF
Solenoid Valve 2	ON	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	ON
Line Pressure Control Solenoid Valve 3 (EDS 3)	OFF	OFF	OFF	ON	ON/ OFF	ON/ OFF	OFF	ON	ON/ OFF	OFF	ON	OFF
Line Pressure Control Solenoid Valve 4 (EDS 4)	ON	OFF	ON	ON	ON	OFF	ON	ON	ON	ON	ON	ON
Line Pressure Control Solenoid Valve 5 (EDS 5)	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	ON	ON	ON
Line Pressure Control Solenoid Valve 6 (EDS 6)	ON	OFF	ON	ON	ON	OFF	ON	ON	ON	ON	ON	ON
Brake B	A	A	A		A		A		A	A		A
Brake C						H						
Brake D		H										
Clutch E				A	A	A		A	A		A	
Brake F			H	H			H	H		H	H	H
Lock–up Clutch						A						

A = Applied
H = Holding
ON = The solenoid is energized.
OFF = The solenoid is de–energized.
** = Manual Second–Third gear is only available above approximately 100 km/h (62 mph).
*** = Manual First–Second gear is only available above approximately 60 km/h (37 mph).
Note : Manual First–Third gear is also possible at high vehicle speed as a safety feature.

DIAGNOSTIC TROUBLE CODE(DTC) P1886

4–2 SHIFT MALFUNCTION

Circuit Description

The special feature of 4HP 16 Auto Transaxle is that it operates without freewheels. Shifting between individual gears takes place by means of overlapping clutch engagement and release.

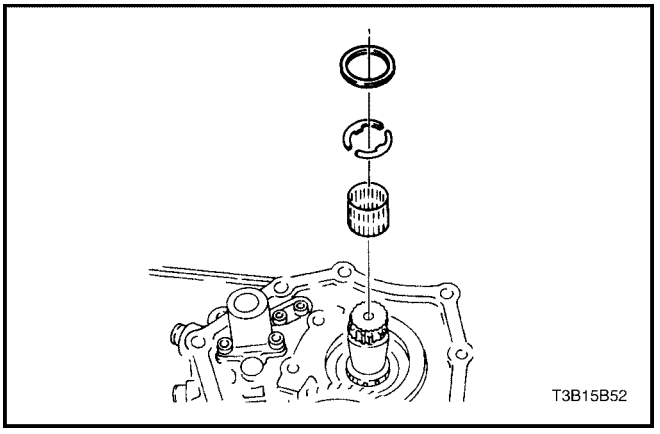
The advantage of overlap shifting are as follows:

– The transaxle can be of more compact design and is lighter on account of the absence of freewheels and the lower number of shift elements.
– Lower drag losses, i.e. higher efficiency.
– Lower peak torque acting on the components and driveline.

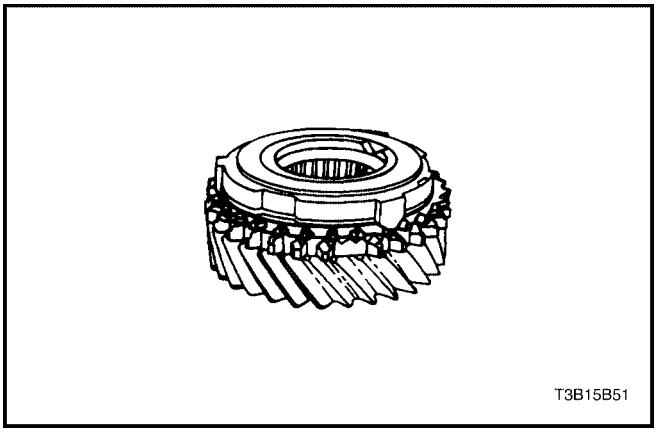
However, overlap shifting necessitates high–performance hardware and software, and precision engine signals.

Conditions for Setting the DTC

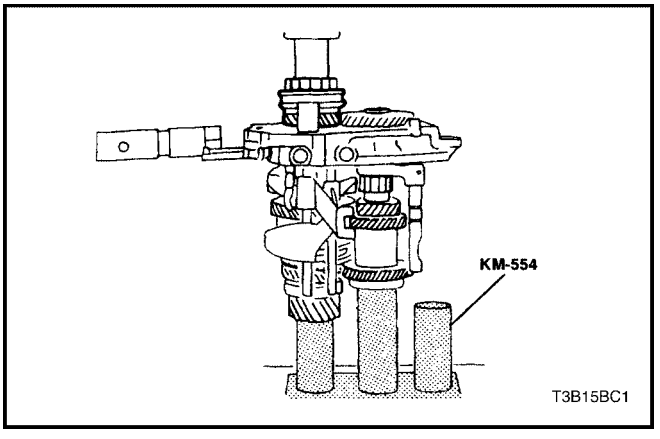
- Transmission oil temperature is greater than –10˚C (14˚F).
- Selector lever is not in N(Neutral), P(Park) position.
- System voltage is greater than 9 volts.



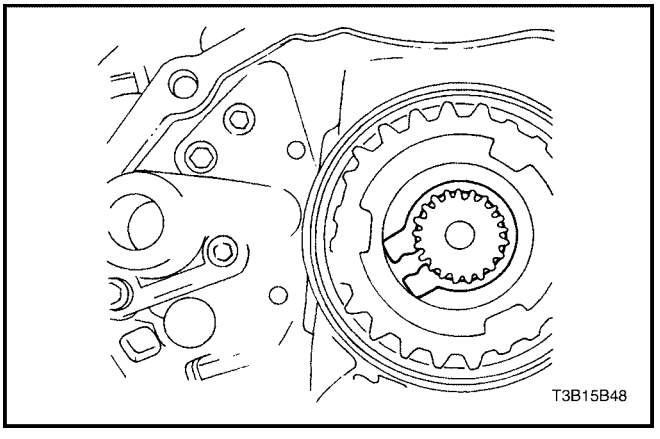
20. Install the thrust washers, the retaining ring, and the needle bearing into the mainshaft–driven fifth–gear assembly.



21. Install the brass synchronizer ring onto the mainshaft– driven fifth–gear assembly.



22. Install the mainshaft–driven fifth–gear assembly.
23. Install the fifth–drive gear synchronizer gear and the synchronizer sleeve using installer KM–554.



24. Install the snap ring holding the fifth speed–driven assembly.