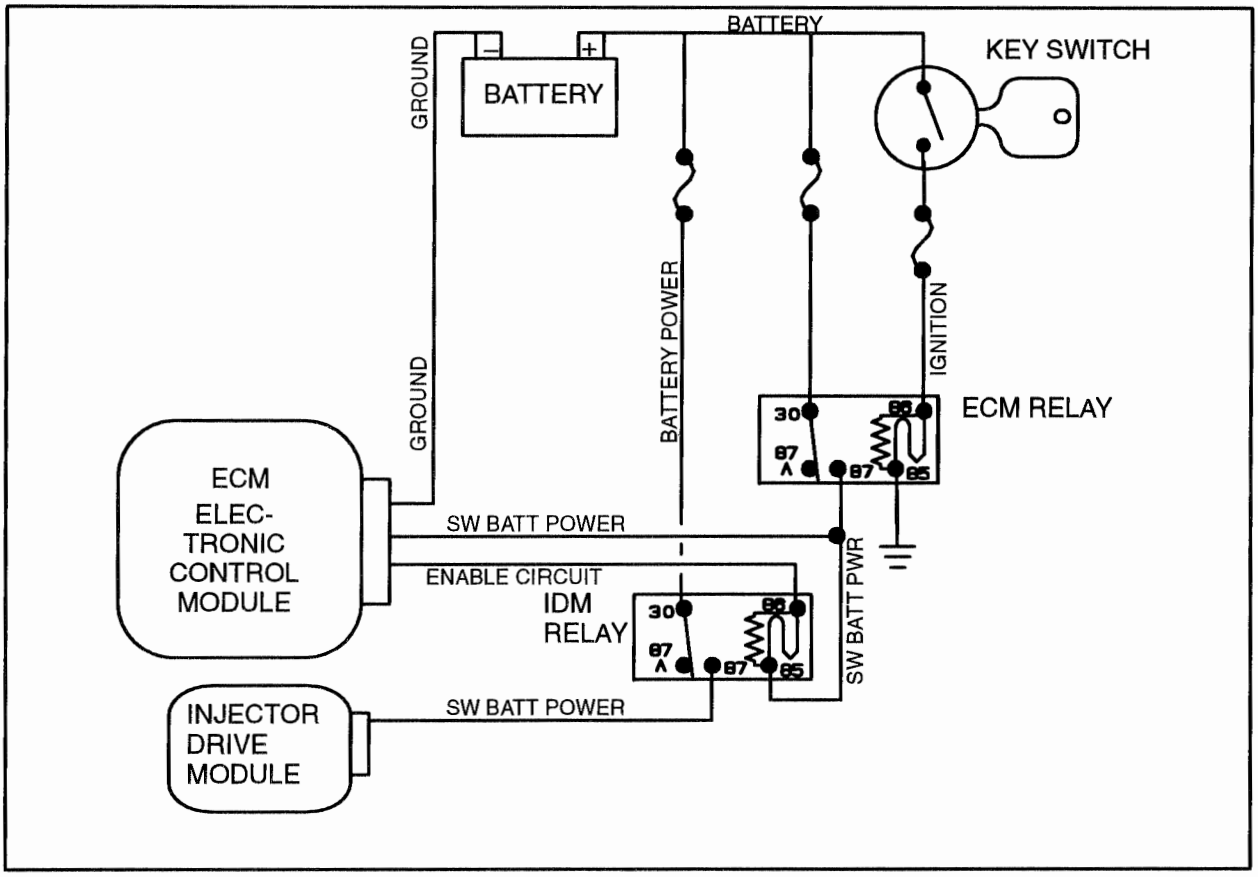
ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

INJECTOR DRIVER MODULE POWER CIRCUITS (IDM PWR)

INJECTOR DRIVE MODULE (IDM) POWER SUPPLY



CIRCUIT FUNCTIONS

The IDM receives switched 12 volt operating power with the key ON from the IDM power relay.

IDM SWITCHED POWER

Turning the key ON energizes the ECM power relay causing 12 volt battery power to be applied to the IDM relay coil. The IDM relay is enabled when the coil is grounded through ECM terminal 33. With the relay energized (enabled), battery power is applied to the IDM at terminal 14.

FAULT DETECTION MANAGEMENT

The IDM power circuits are not continuously monitored. If the circuit is not operating the engine will not run. The ECM uses the Output Circuit Check (OCC) initiated during a Standard Test to test the IDM relay control coil circuits for opens or shorts (high and low).

On each power up the IDM performs a self check. If internal faults are detected, a fault code will be set during an Engine Standard Test.

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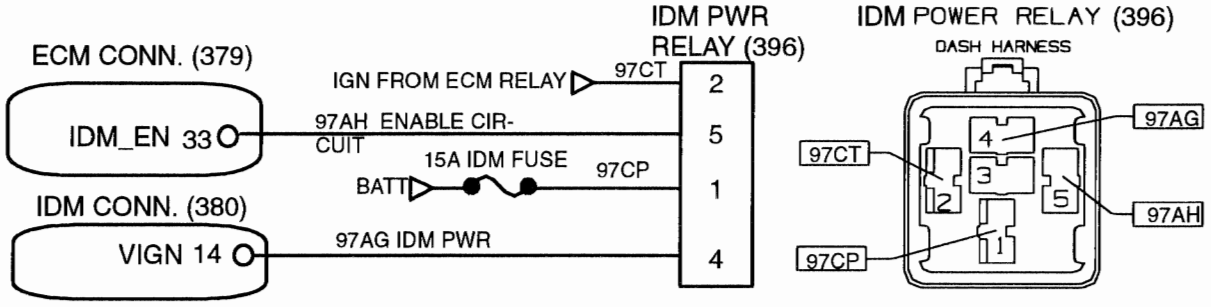
Injector Drive Module Power (IDM PWR)

Fault Codes:
243 IDM PWR Relay OCC Fault
522 IDM Internal Fault
523 IDM PWR Voltage Low

NOTE: Verify the ECM is ON (warning light turns on during self–test when key is turned on) . If the ECM is not receiving power refer to ECM Power Supply Circuits before performing this test.



Connector Checks To Chassis Ground

IDM Relay removed from (396), IDM disconnected (380) and breakout box installed at ECM connection (379)

Test Points	Spec.	Comments
KEY OFF		**At Connector (396) IDM PWR Relay**
#1 to Grd.	12 ± 1.5 volts	< less than 10.5 v check connections, if 0 volts check for open/short to ground or blown fuse
#2 to Grd.	0 volts	0 volts expected with ign. key "OFF".
#4 to Grd.	> 1000 ohms	< less than 1000 ohms, check for short to ground
#5 to Grd.	> 1000 ohms	< less than 1000 ohms, check for short to ground
KEY ON		**At Connector (396) IDM PWR Relay**
#2 to Grd.	12 ± 1.5 volts	< less than 10.5 v check connections, if 0 volts check for open/short to ground or blown fuse
KEY ON		**At Connector (379) ECM Connector**
#33 to 37	12 ± 1.5 volts	< less than 10.5 v check connections. ECM is defective or other condition is causing the ECM not to enable (ground) terminal 33.
KEY ON		**At Connector (396) IDM PWR Relay**
#1 to #5	12 ± 1.5 volts	< less than 10.5 v check connections, if 0 volts repair open enable circuit between connectors (379) and (396)
KEY OFF		**Test circuit Between Connectors (396) and (380) Relay & IDM Connector**
(396) #4 to (380) #14	< 5 ohms	Greater than 5 ohms, repair open in ignition circuit. Less than 5 ohms, replace the IDM relay or connector (396)

Fault Code Descriptions

243 = IDM relay circuit has high or low resistance detected by ECM during an Engine Off Test. {Output Circuit Test}
522 = IDM has detected an internal fault, if no other fault codes present replace IDM.
523 = IDM power has been detected low by IDM.

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INJECTOR DRIVER MODULE POWER CIRCUITS EXTENDED SYSTEM DESCRIPTION

The Injector Driver Module (IDM) Power Relay acts as an ON/OFF switch that the ECM uses to turn the IDM on and off.

The ECM uses sensors to monitor Injection Control Pressure and Exhaust Back Pressure parameters. When starting the engine, if the ECM determines that any of these parameters are out of safe operating range, the ECM does not enable the IDM Power Relay, which prevents the engine from starting.

If the engine is started, and parameters are detected out of the safe operating range, the engine will derate, then disable the IDM Power Relay, which turns the IDM off, causing the engine to shut down.

With the optional Engine Protection System, the ECM also monitors Engine Oil Pressure, Coolant Level and Temperature sensor information. If these parameters are out of prescribed limits, the ECM will first derate the engine and then turn off the IDM, shutting down the engine.

Refer to the circuit diagram on page 154 for the following discussion.

The IDM PWR relay (396) controls battery power to the Injector Driver Module (IDM) through connector (380) terminal 14. Battery power is available at all times to relay connector (396) at terminal 30. The feed circuit is protected by 15A, #2 ECM PWR fuse.

When the key switch is turned ON, power from ECM PWR relay (395) is applied to the IDM PWR relay control coil at terminal 85. The IDM relay control coil ground circuit (97AH) is connected to ECM connector (379) terminal 33. The ECM switches ECM terminal 33 between 0 and 12 volts to enable or disable the IDM relay. When terminal 33 is at 0 volts, the IDM relay energizes.

When the IDM PWR relay is energized, battery power passes through the normally open relay contacts (30 to 87) and on circuit 97AG to connector (380) terminal 14 (IDM VIGN). The IDM power ground is from IDM terminal 26, through circuits 97-GM/97-GMA/ 97-GMC/97-GMD/11-G to the negative battery terminal.

If the IDM is not powered, the engine will not run.

ECM DIAGNOSTICS

The ECM uses the Output Circuit Check (OCC) to test the IDM relay control coil circuit for short circuits (high or low) and opens in the circuit. Use the Prolink EST to perform the OCC test. When the test is complete, the Prolink will indicate if there were faults detected and what the Flash Code number is.

FLASH CODE *243*
SID 37 FMI 11
ECM: *IDM_ENABLE OCC FAULT*

If the IDM detects a fault in the IDM circuit during the OCC test, Flash Code 243 will be set. This indicates that circuit 97AH is shorted (high or low) open or no power is present in circuit 97CT to energize the IDM relay.

When Flash Code 243 occurs, it can also cause Flash Codes 253, 523, 541 or 543 to be set. Flash codes 253, 523, 541, and 543 can be caused by several conditions. This section only discusses the IDM POWER RELAY circuits that could cause the codes to set.

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ECM DIAGNOSTICS (Continued)

FLASH CODE 522
SID 233 FMI 12
IDM: *IDM INTERNAL FAILURE*

FLASH CODE 523
SID 233 FMI 4
IDM: *IDM POWER VOLTAGE LOW*

Code 523 can be caused by:

A. Faulty IDM PWR Relay control circuit (will cause code 243 to set when performing an OCC test).

B. Excessive voltage drop in circuit 97AG.

C. Low voltage in 97CP to the IDM PWR Relay from #2 ECM fuse.

D. A defective IDM PWR Relay.

TROUBLESHOOTING

The test included in this section systematically checks the entire IDM Power Relay System.

If Flash Codes 243, 253, 523, 541 or 543 are active, perform the following test. Refer to the circuit diagram located in this section while using test procedure.

BEFORE TROUBLESHOOTING

Before Performing the test(s) included in this section:

A. Make sure batteries are fully charged! Check battery cables and grounds for clean, tight connections free of damage and corrosion. Voltage tests will give inaccurate readings if batteries are not fully charged.

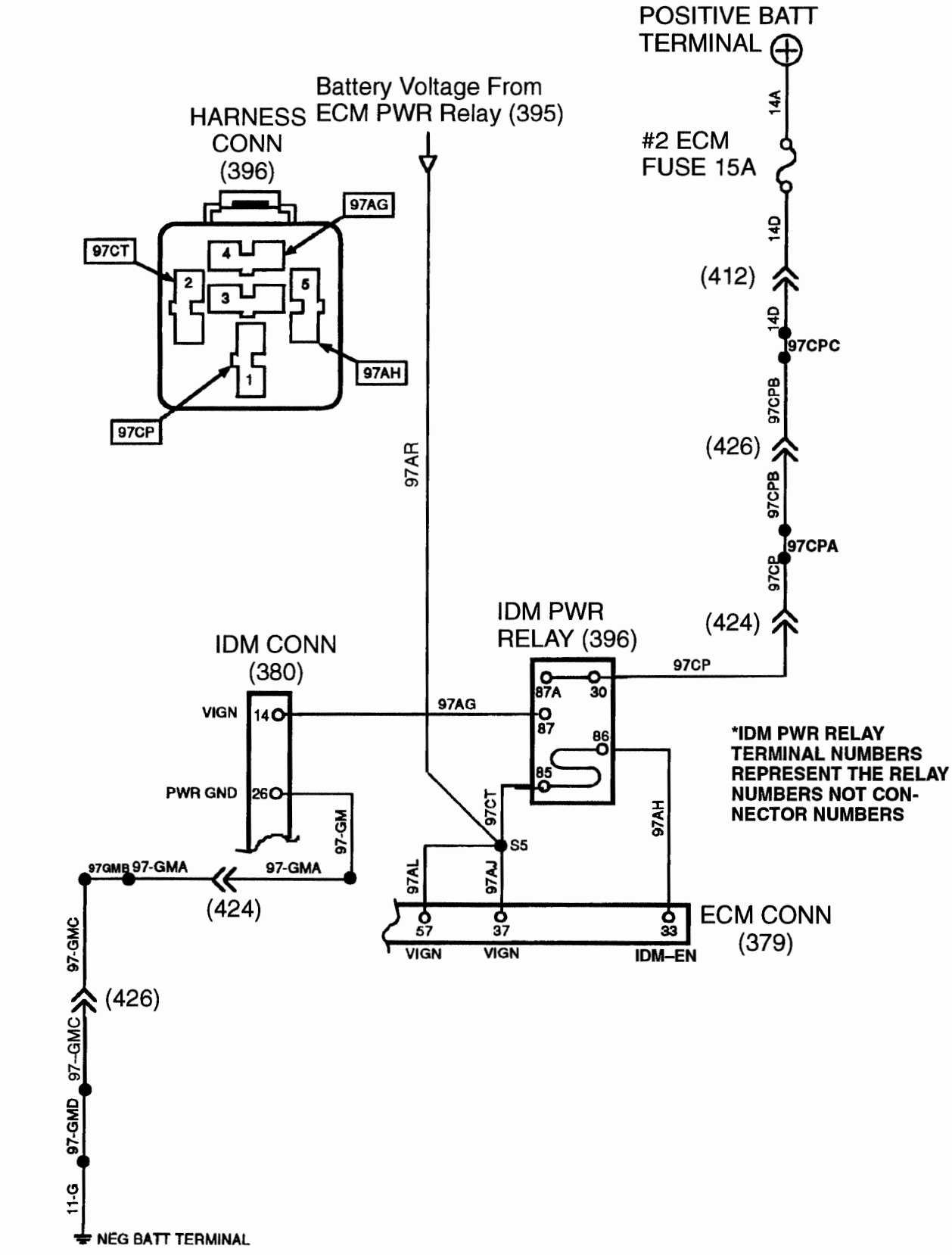
B. Inspect connectors for pushed back, loose or damaged (spread or bent) terminals, or wires with cut strands, etc. the wires and connections must be free of damage or corrosion. When some connectors corrode, a light white residue is present that must be removed.

C. Inspect suspect circuit grounds for clean, tight connections, free of damage.

ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

INJECTOR DRIVER MODULE POWER CIRCUITS (IDM PWR)

INJECTOR DRIVER MODULE POWER SUPPLY CIRCUIT DIAGRAM



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TESTING IDM PWR RELAY AND RELATED CIRCUITS

Begin

Verify that the ECM is powered. If the ECM is powered, the Engine Warning Light comes on during the Self–Test when the key is turned ON.

ECM is powered?

No → Refer to (ECM PWR) Section and diagnose the ECM Power Circuits.

Yes

Check 15A, #2 ECM Power fuse for open condition (located at batteries).

Fuse is OK?

No → Locate cause of overload condition, then correct. Replace 15A fuse.

Yes

Remove relay from connector (396) and perform TESTING HELLA RELAY.

Relay is OK?

No → Replace relay.

Yes (Do not install relay)

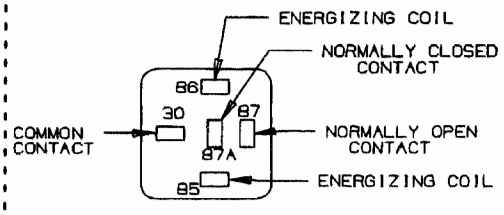
With key OFF, measure voltage to ground at connector (396) terminal 1 (97CP).

Battery voltage?

No → Locate cause of NO or LOW voltage in circuit 97CP, then correct.

Yes

See next page



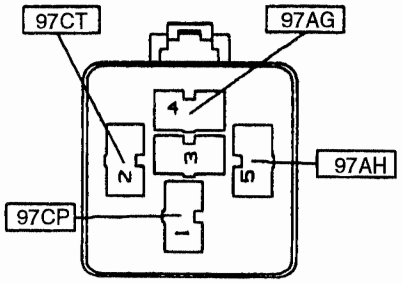
TYPICAL RELAY (INSERTION END)

TESTING HELLA RELAY

With relay removed:

1. Connect (+) battery lead to terminal 85 and (–) lead to terminal 86.
   A. If relay energizes making an audible click sound, go to step 2. Otherwise replace the relay.
2. With relay energized, measure resistance between terminals 30 and 87.
   A. If resistance is less than 2 ohms, go to step 3. Otherwise replace the relay.
3. Disconnect battery leads from relay and measure resistance between terminals 30 and 87.
   A. If resistance is 100K ohms or more, the relay is good. Otherwise replace the relay.

IDM PWR RELAY
DASH CONN (396)



ELECTRONIC CONTROL SYSTEM DIAGNOSTICS

INJECTOR DRIVER MODULE POWER CIRCUITS (IDM PWR)

TESTING IDM PWR RELAY AND RELATED CIRCUITS (Continued)

KEY OFF – Remove connectors (379) from ECM and (380) from IDM. Turn key ON and measure voltage to ground at connector (396) terminals 4 and 5.

Less than 1 volt?

No

Locate short to "HOT" wire in any circuit with more than 1 volt, then correct.

Yes

KEY OFF– At connector (396) measure resistance to ground at terminals 4 & 5.

100K ohms or more?

No

Locate short to ground in circuit where resistance is less than 100K ohms, then repair.

Yes

KEY ON– At connector (396) measure voltage to ground at terminal 2.

10–12 volts?

No

Locate cause of NO or LOW voltage in circuit 97CT from ECM power relay, then repair.

Yes

KEY OFF– Measure resistance between connectors (396) terminal 4 and (380) terminal 14.

Less than 2 ohms?

No

Locate open or cause of high resistance in circuit 97AG, then repair.

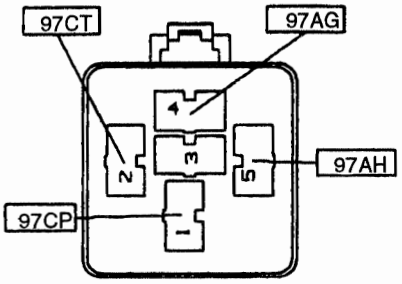
Yes

KEY OFF– At IDM connector (380), measure resistance to ground at terminal 26.

See next page

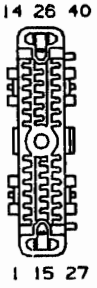
IDM POWER RELAY (396)

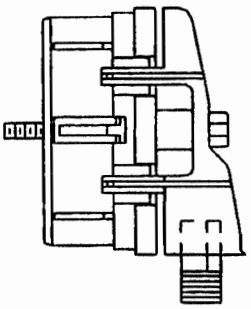
DASH HARNESS



CONNECTOR - 1661747C91
TERMINAL - 1661627C1

IDM CONNECTOR (380)





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TESTING IDM PWR RELAY AND RELATED CIRCUITS (Continued)