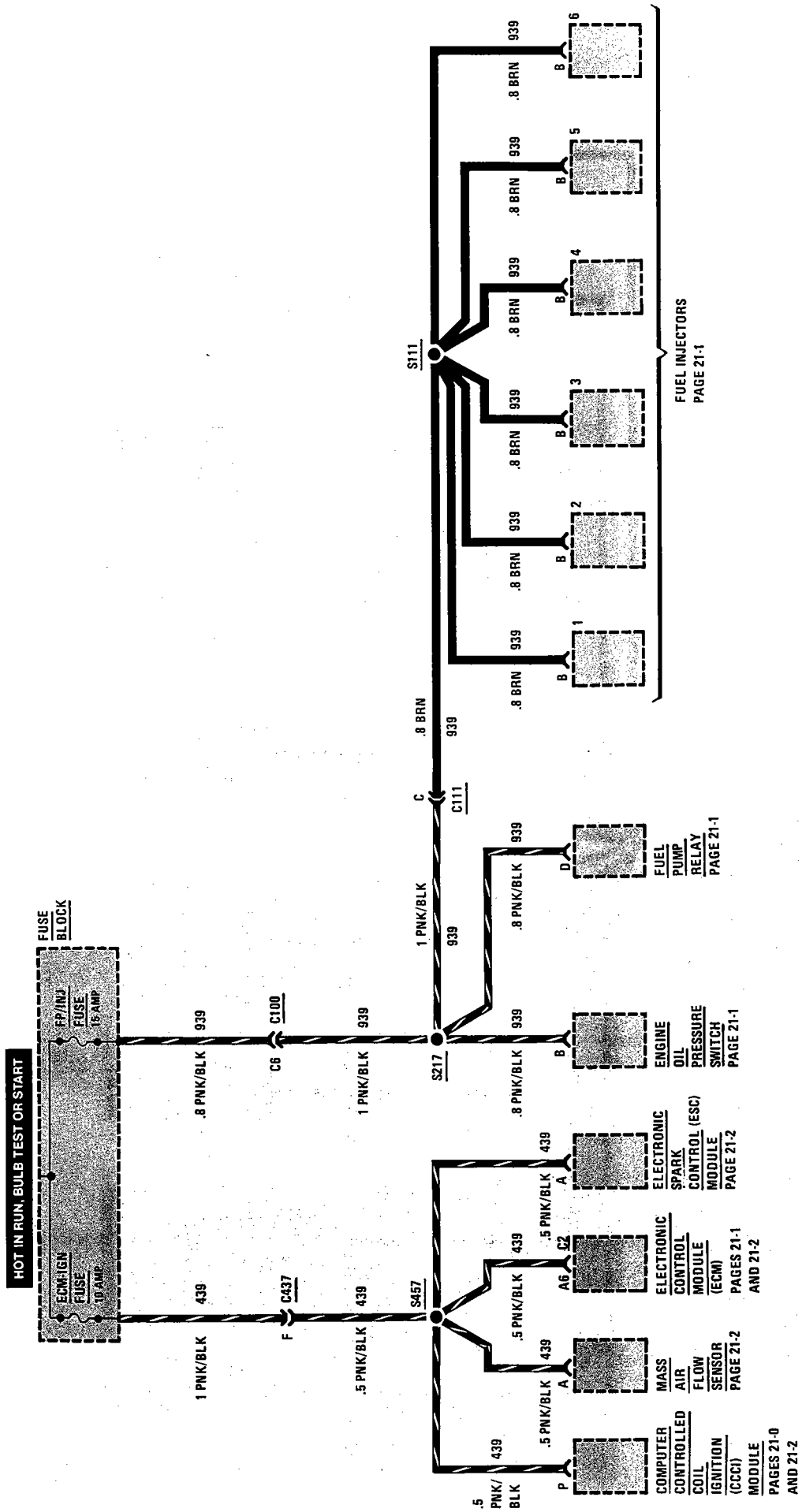


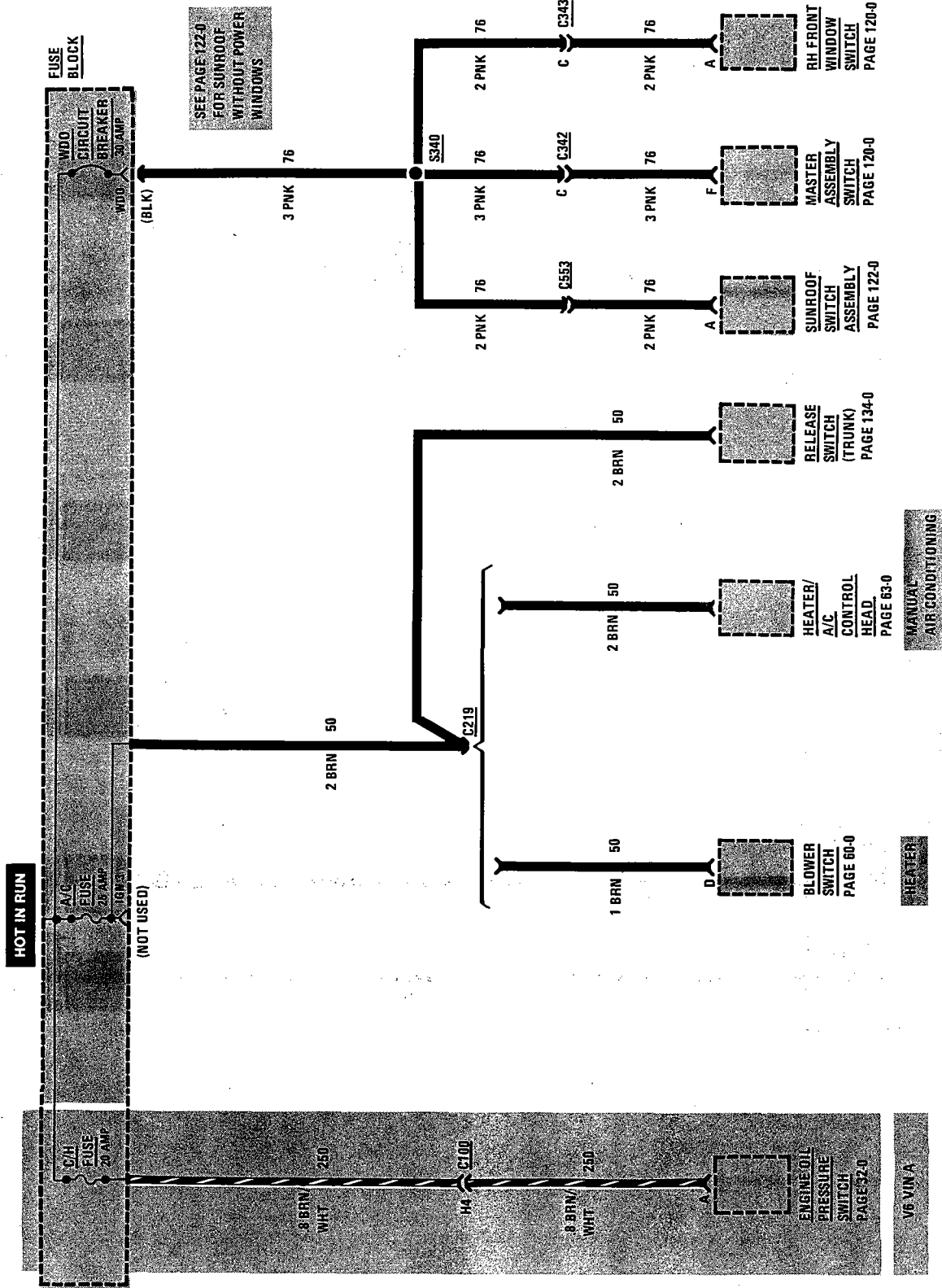
FUSE BLOCK DETAILS: ECM/IGN FUSE AND FP/INJ FUSE - TURBO VIN 7





FUSE BLOCK DETAILS: WDO CIRCUIT BREAKER, A/C FUSE, AND C/H FUSE

B



SEE PAGE 122-0 FOR SUNROOF WITHOUT POWER WINDOWS

PAGE 120-0

PAGE 120-0

PAGE 122-0

PAGE 134-0

PAGE 63-0

PAGE 60-0

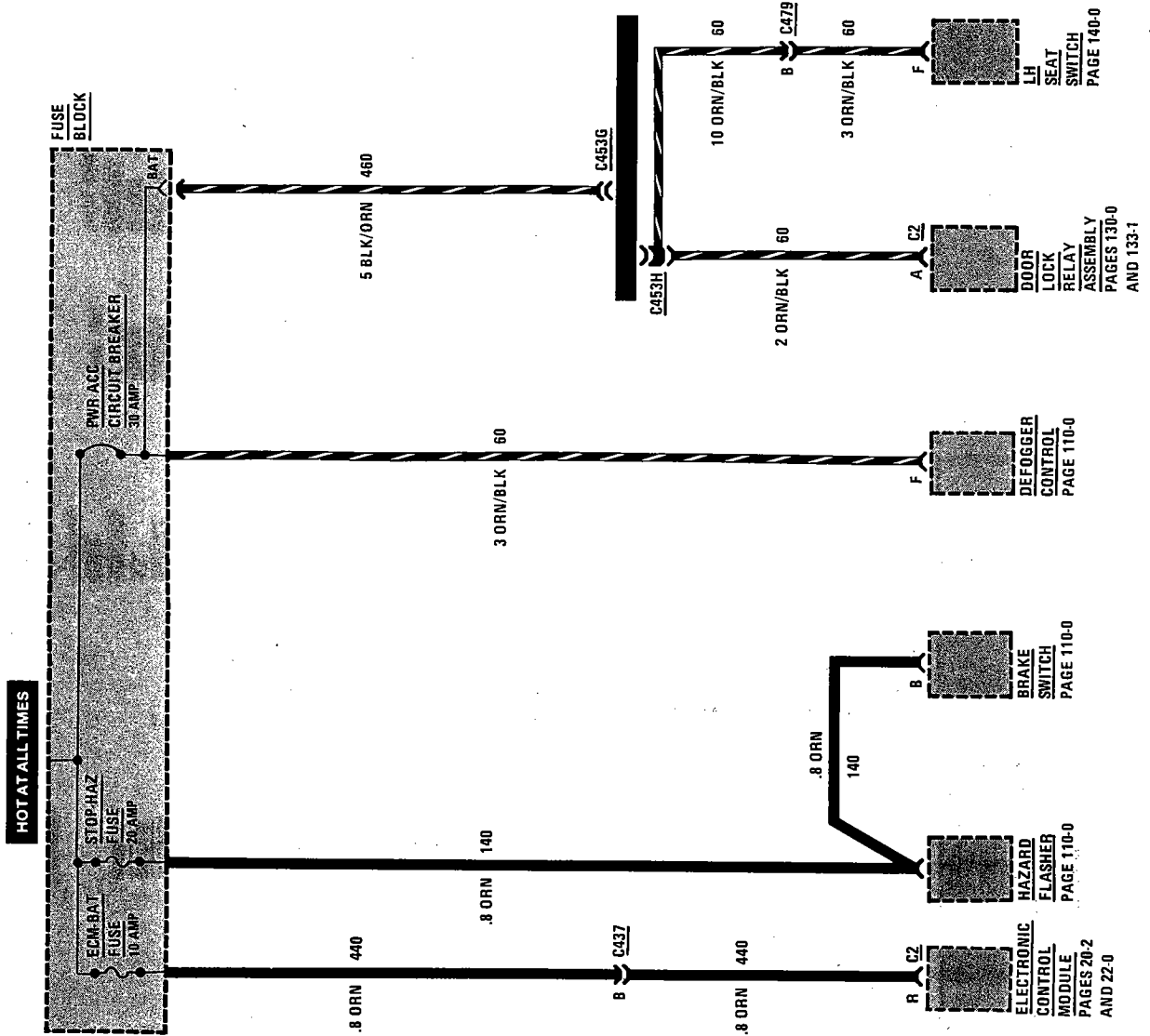
PAGE 72-0

MANUAL AIR CONDITIONING

HEATER

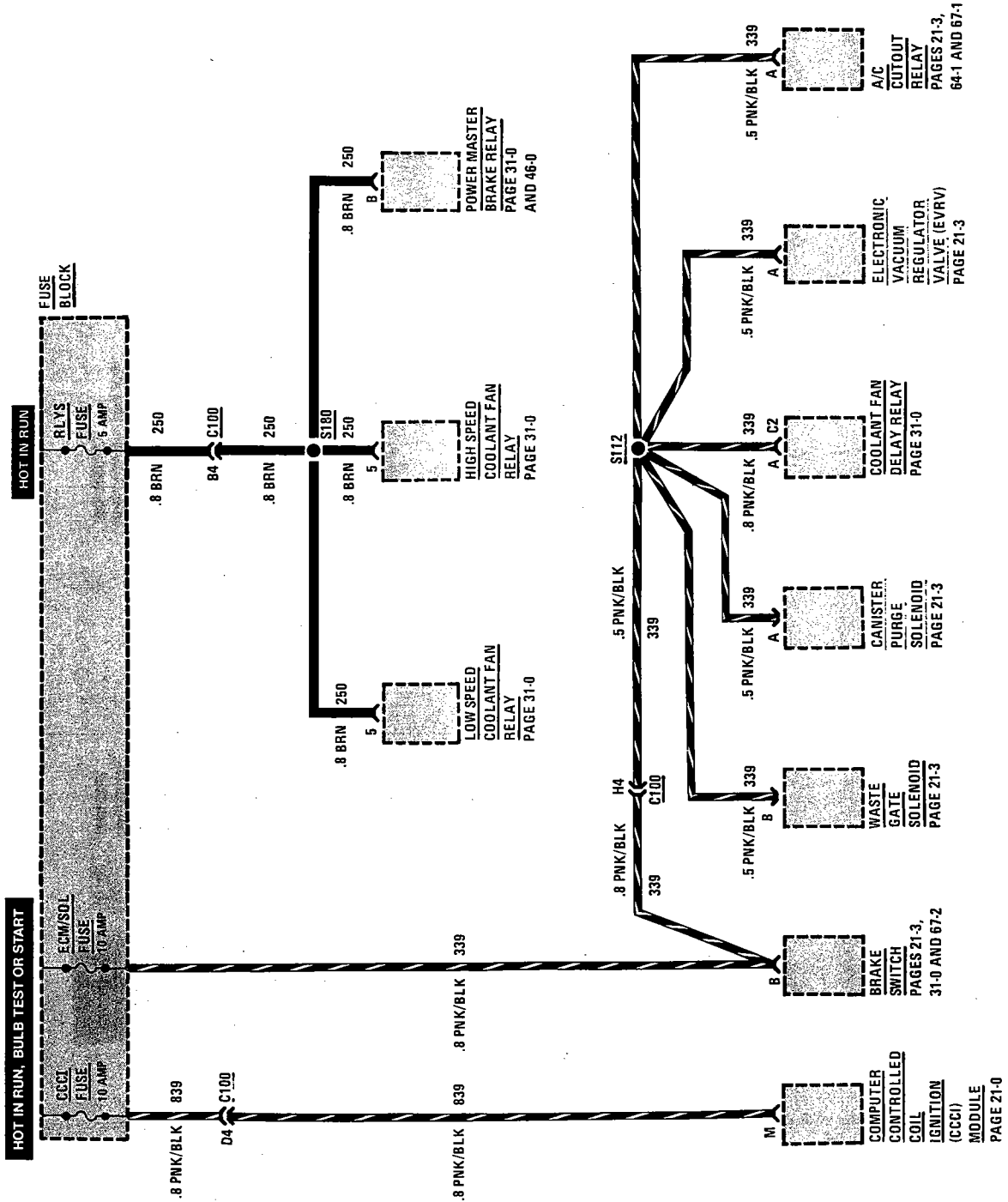
V6 VIN A

FUSE BLOCK DETAILS: PWR ACC CIRCUIT BREAKER, ECM-BAT FUSE, AND STOP-HAZ FUSE



# FUSE BLOCK DETAILS: CCC FUSE, ECM/SOL FUSE AND RLYS FUSE

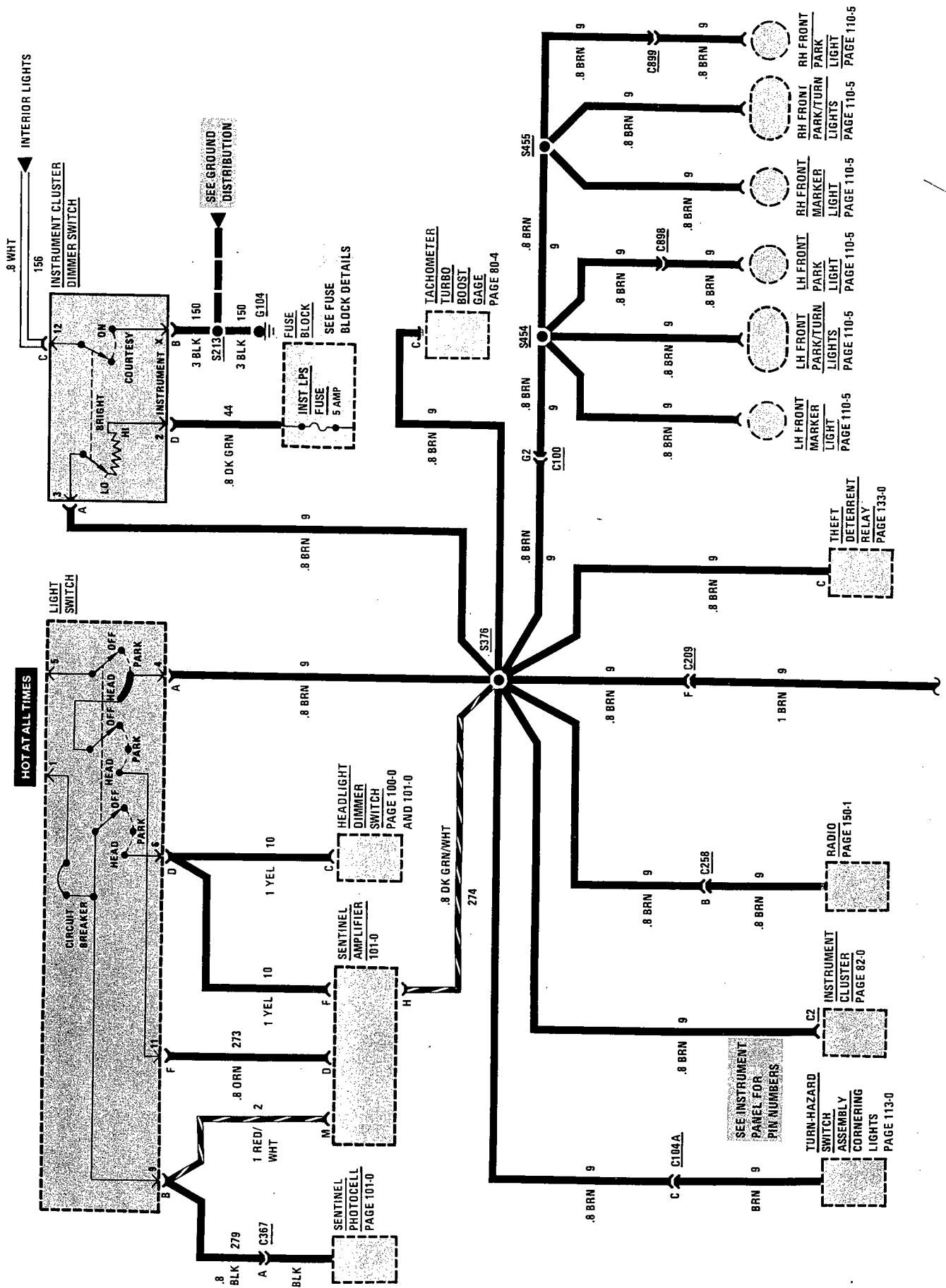
TURBO VIN 7





**BLANK**

LIGHT SWITCH DETAILS

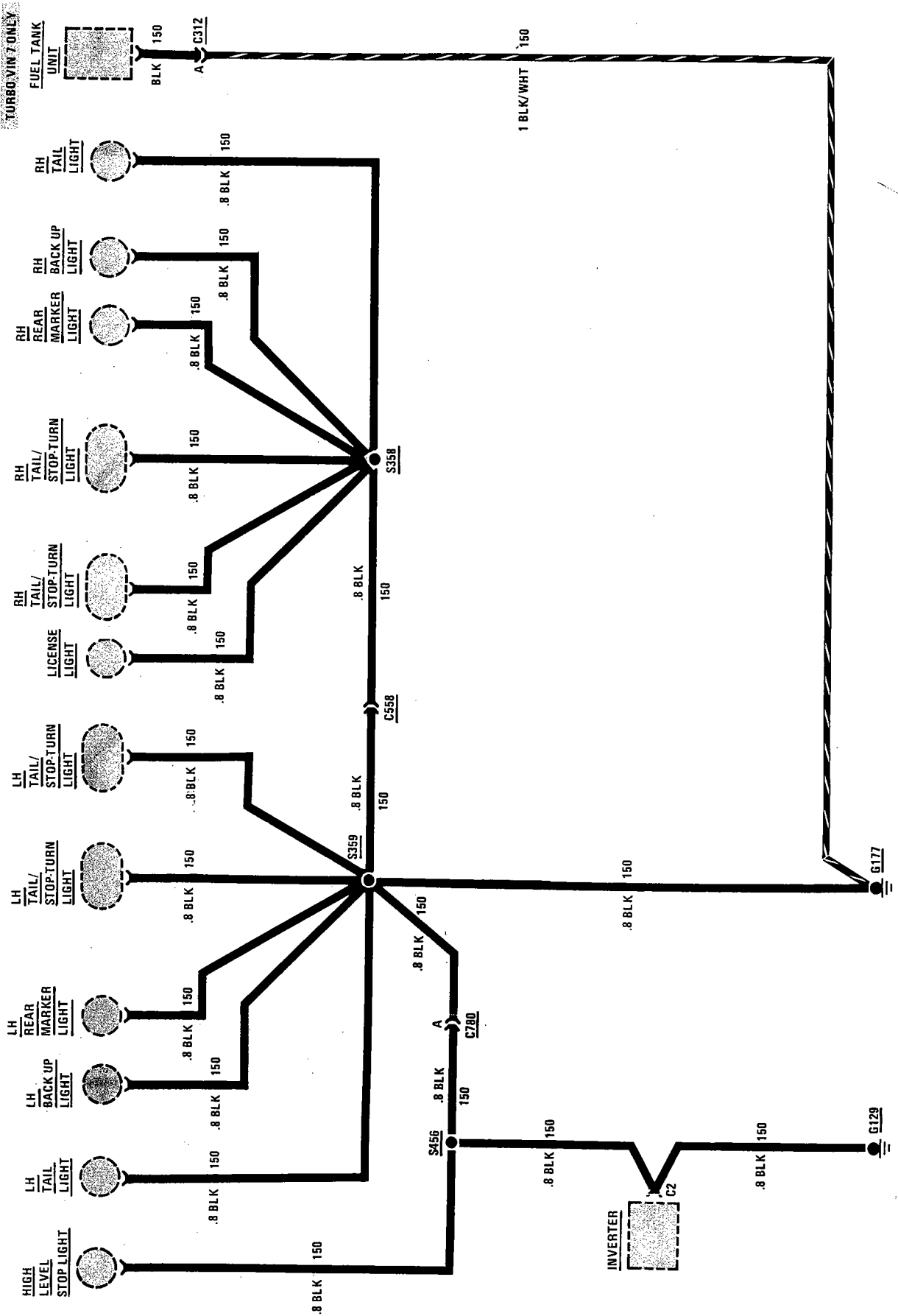






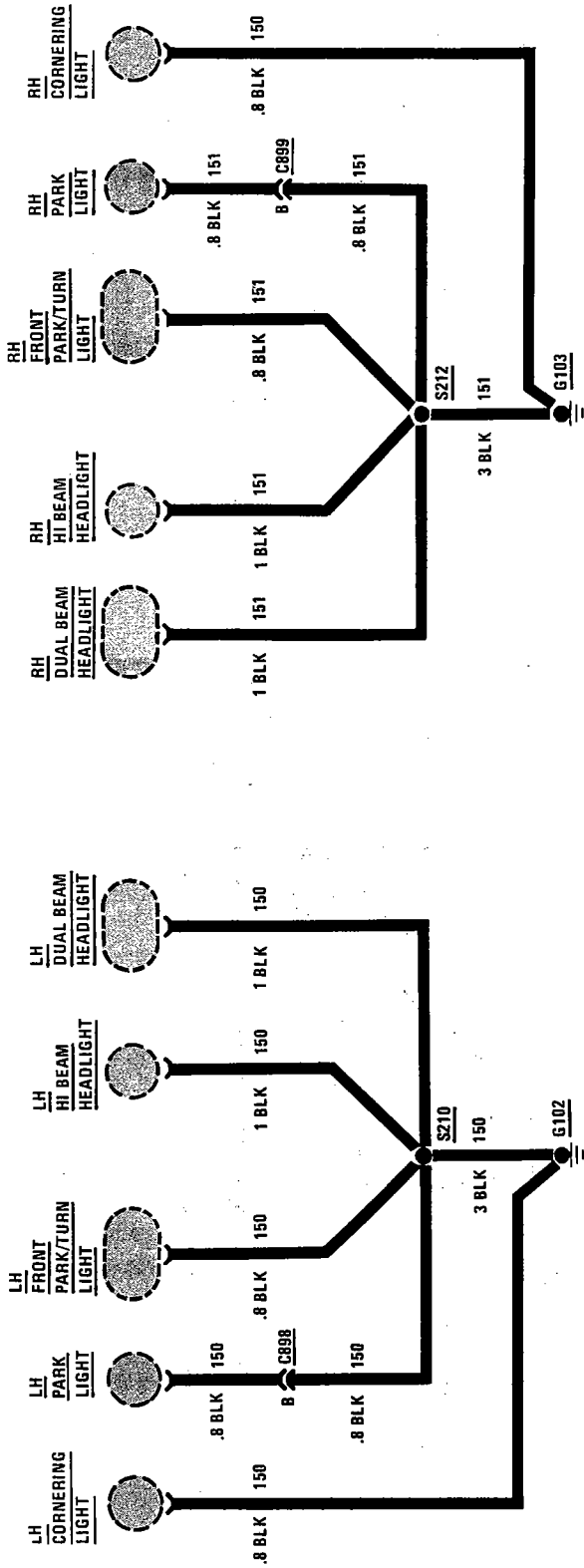
GROUND DISTRIBUTION: G177

REAR LIGHTS GROUND

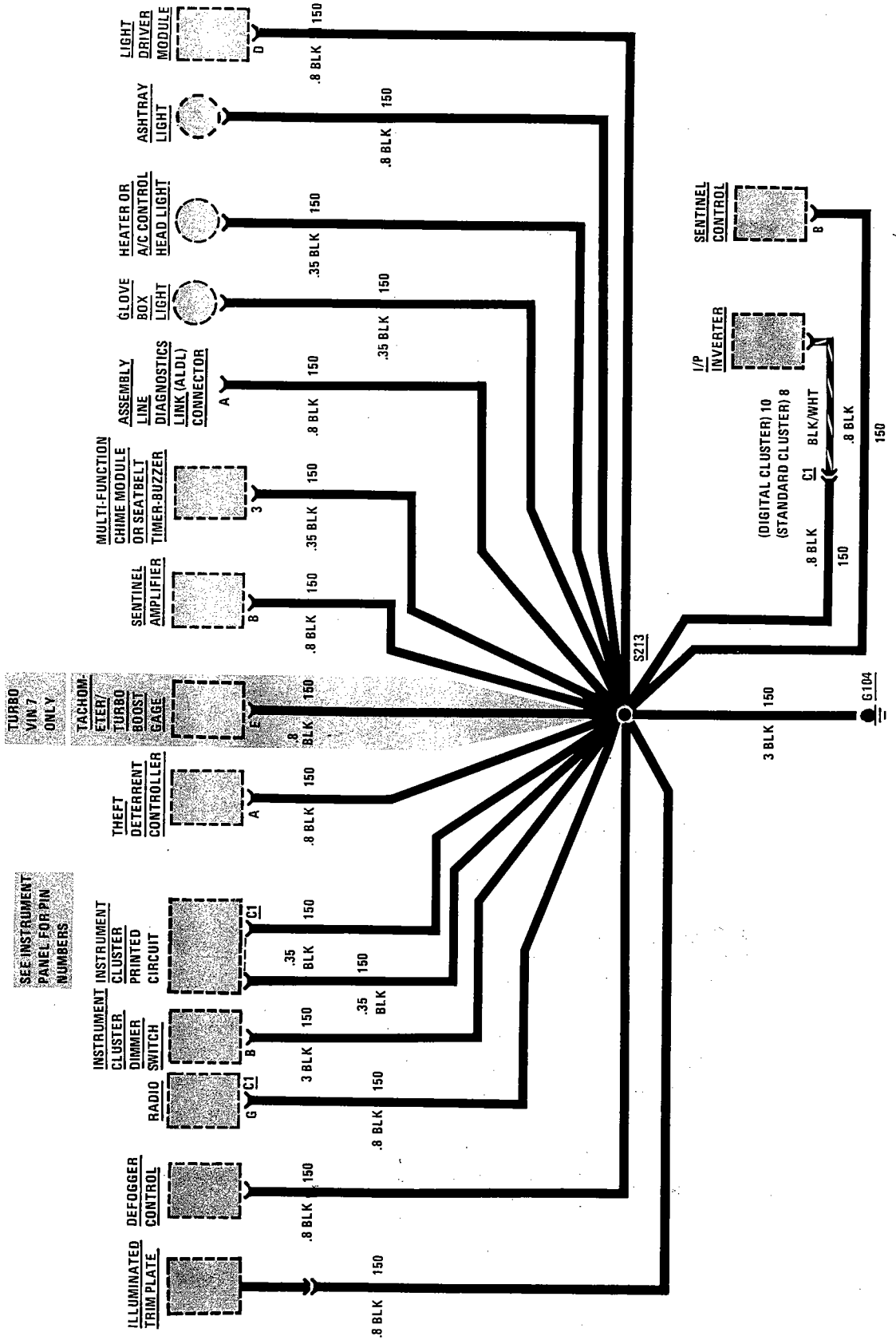


GROUND DISTRIBUTION: G102, AND G103

FRONT LIGHTS: DUAL HEADLIGHTS

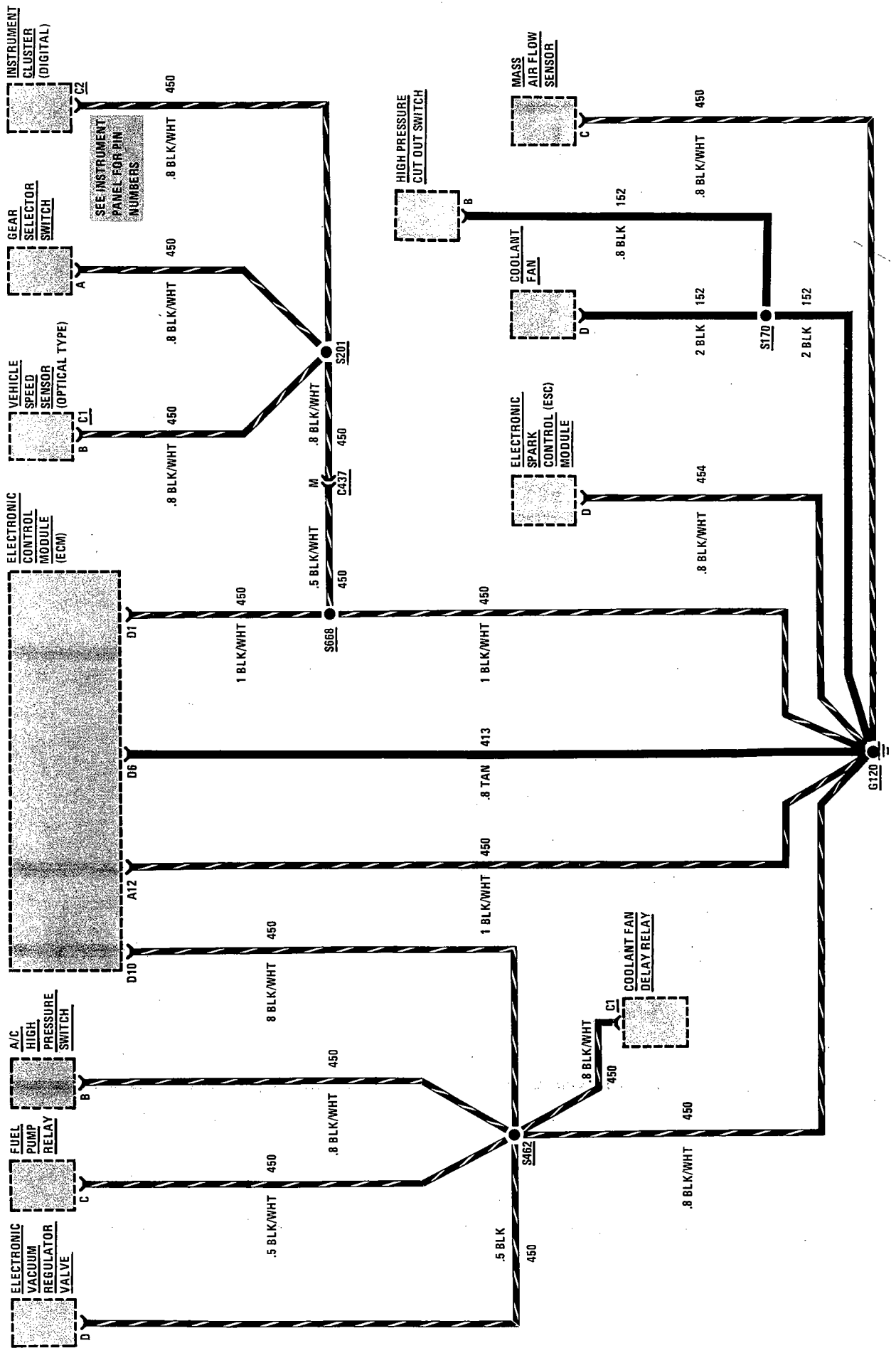


**GROUND DISTRIBUTION: G104**  
**INSTRUMENT PANEL GROUND**



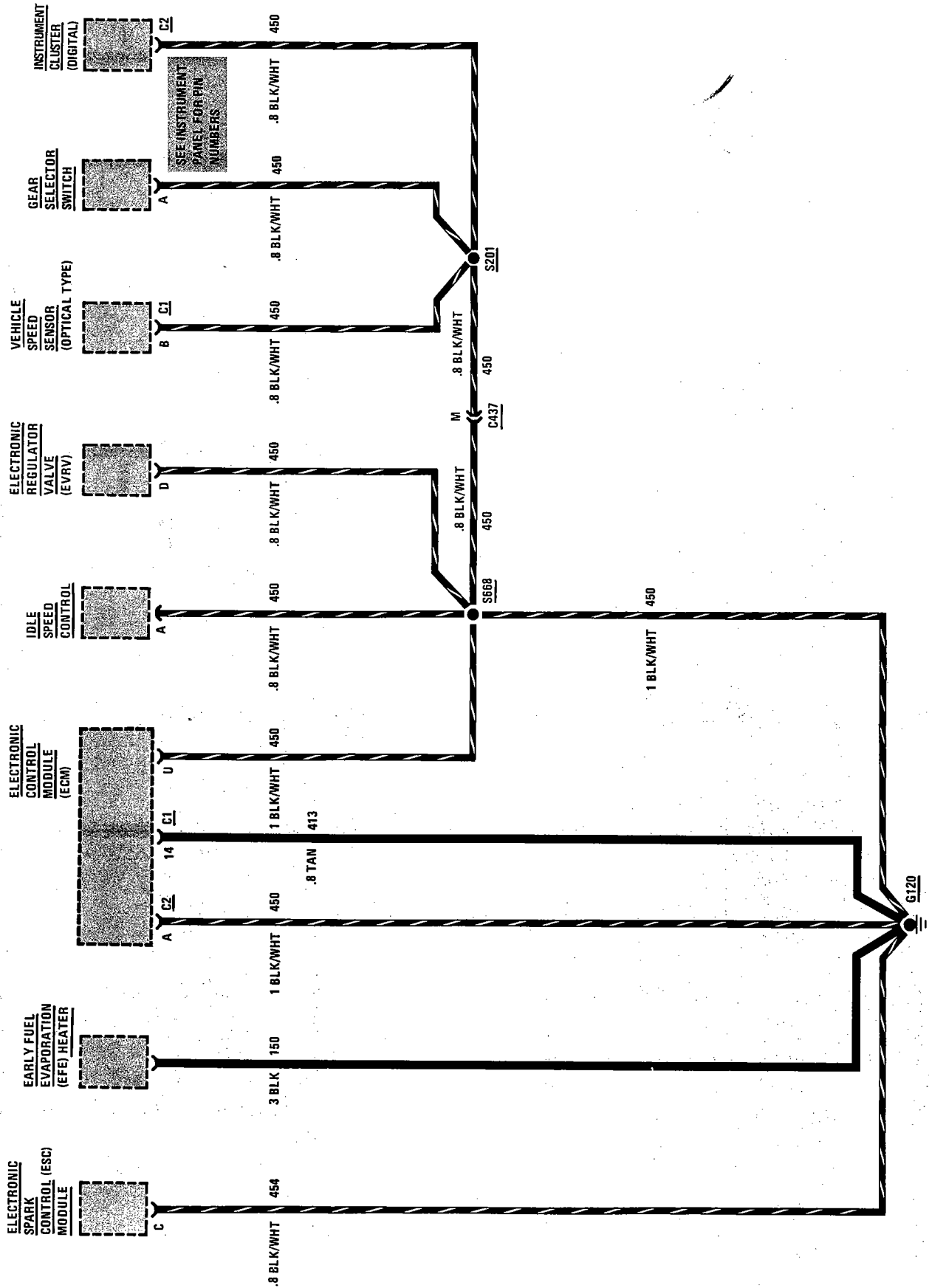
**GROUND DISTRIBUTION: G120**  
**ENGINE GROUND: TURBO VIN 7**

8



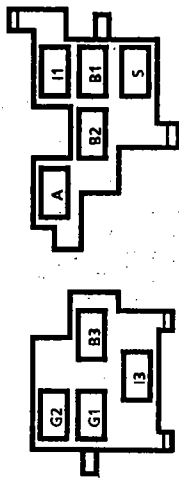
GROUND DISTRIBUTION: G120

ENGINE GROUND V6 VIN A



COMPUTER COMMAND CONTROL: V6 VIN A

HARNESS CONNECTOR FACES

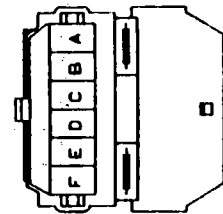


C1 BLK

C2 BLU

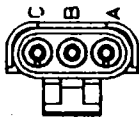
V00019.0

Ignition Switch



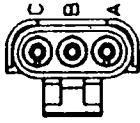
BLK 12010488

Light Driver Module



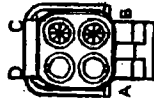
RED 12015795

Manifold Absolute Pressure (MAP) Sensor



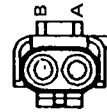
BLK 12015793

Throttle Position Sensor



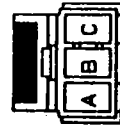
BLU 12015390

Transmission Converter  
Clutch Solenoid



BLK 12020132

Mixture Control Solenoid



BLK 12015686

Vehicle Speed Sensor Buffer

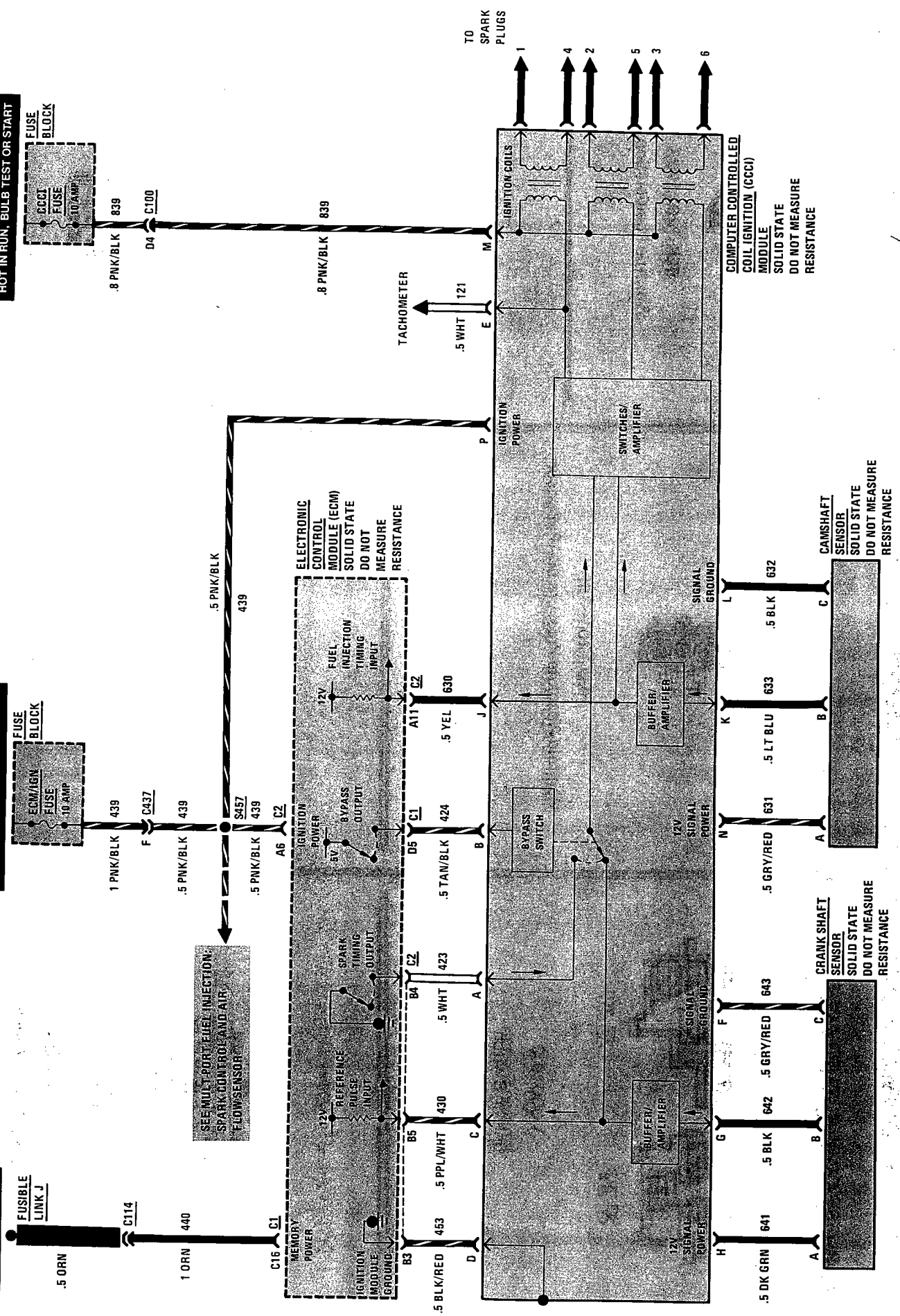
# MULTI-PORT FUEL INJECTION: TURBO VIN 7

## IGNITION

HOT AT ALL TIMES

HOT IN RUN, BULB TEST OR START

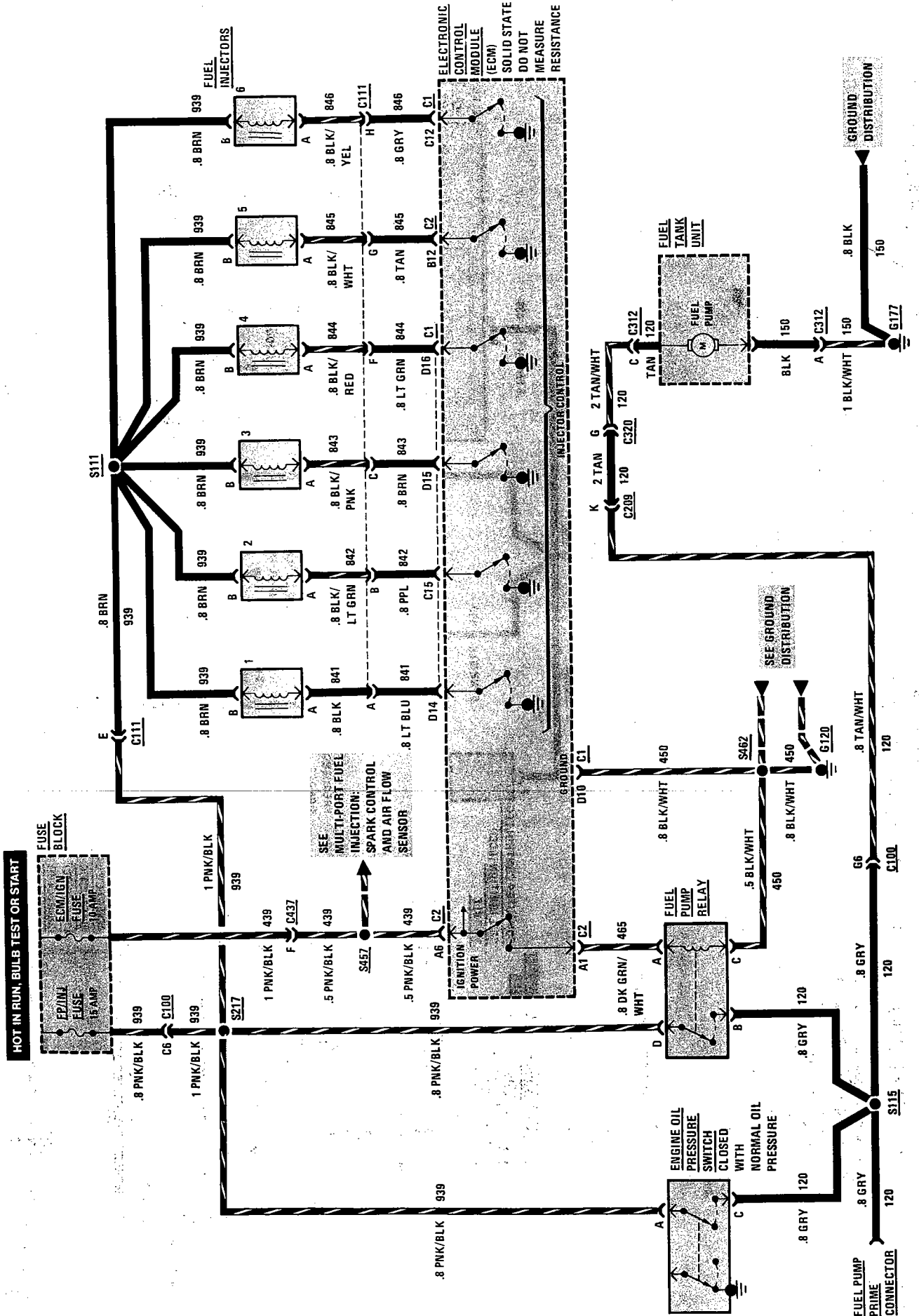
HOT IN RUN, BULB TEST OR START





# MULTI-PORT FUEL INJECTION: TURBO VIN 7

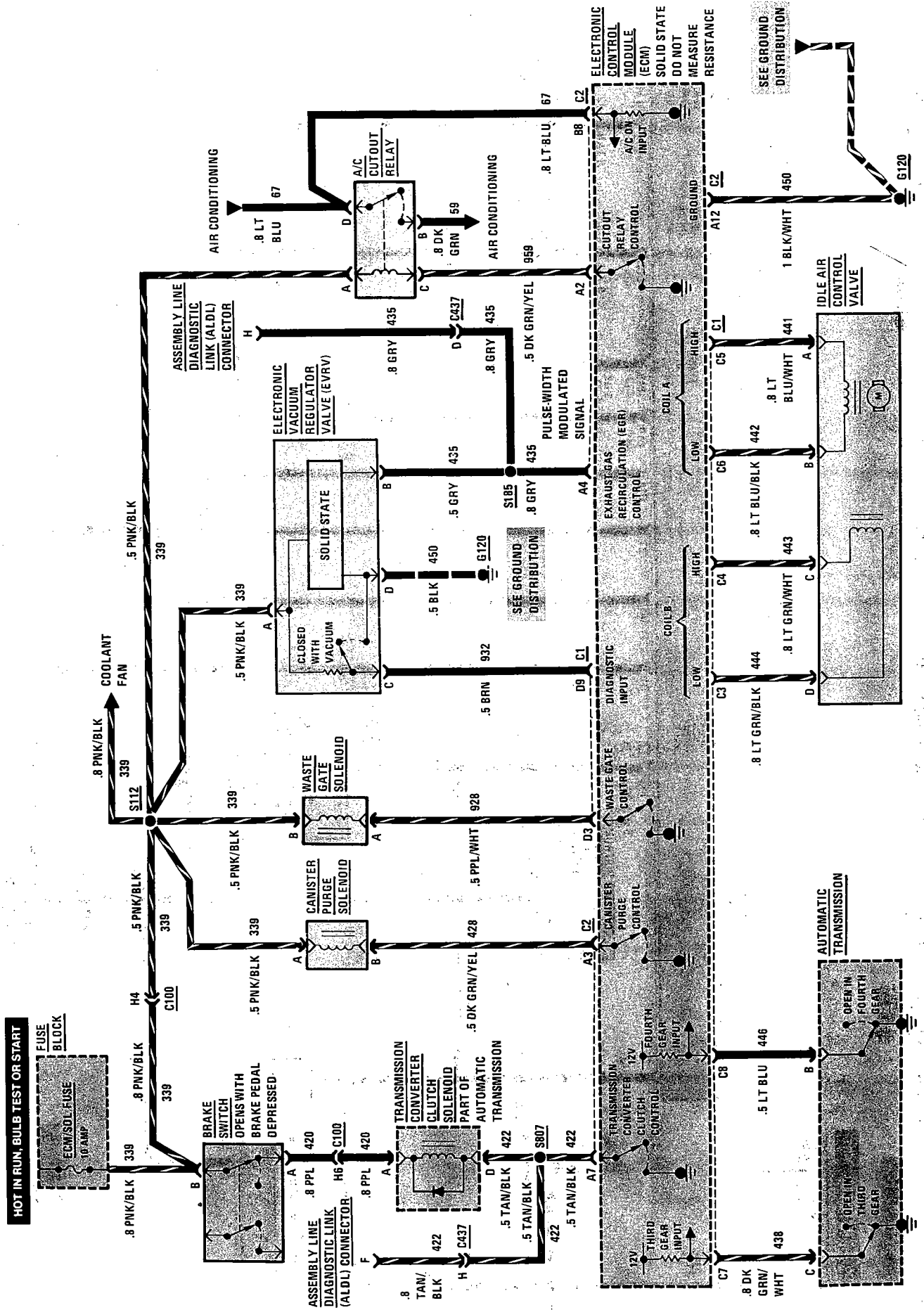
## FUEL CONTROL AND INJECTORS





MULTI-PORT FUEL INJECTION: TURBO VIN 7

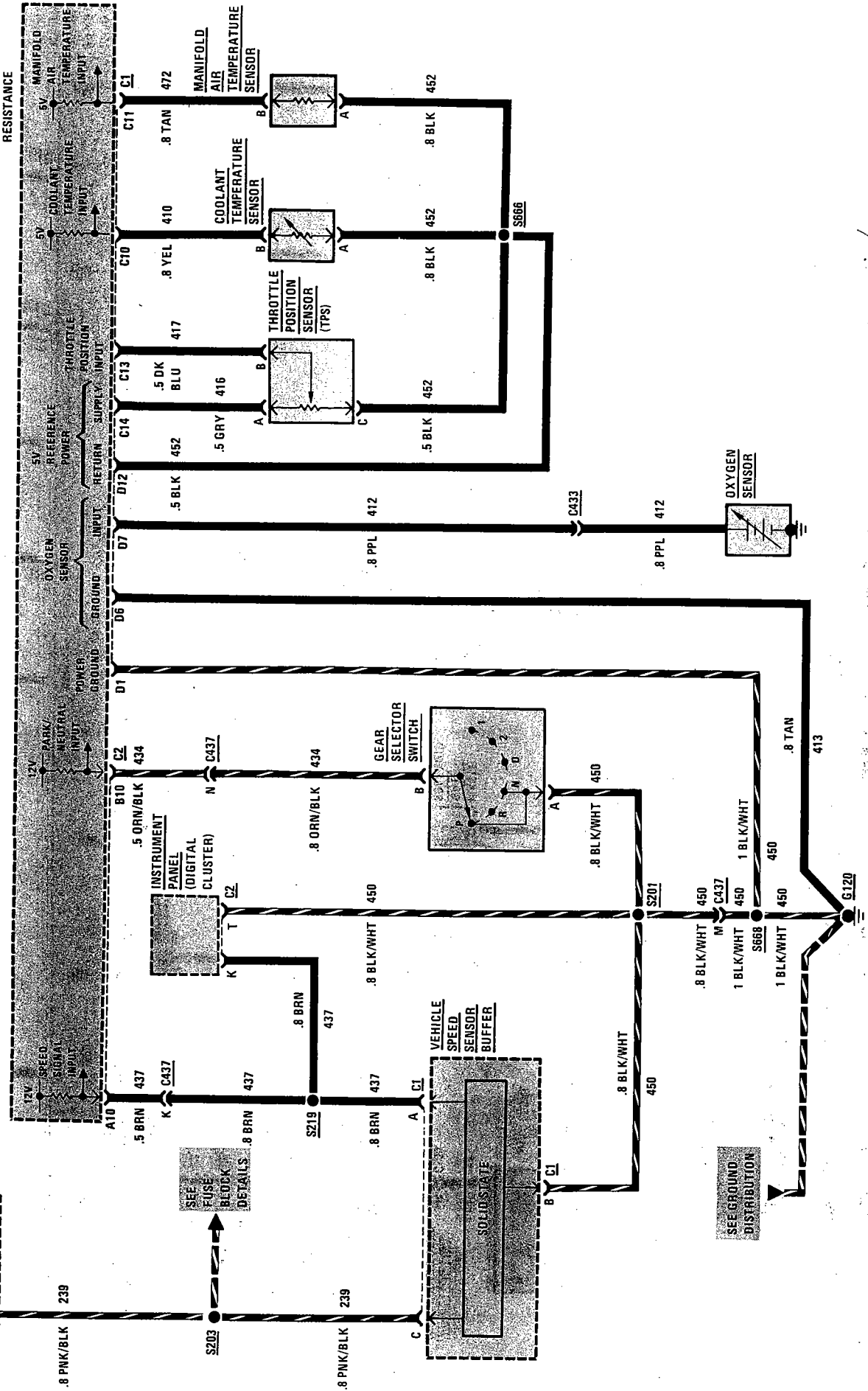
TRANSMISSION CONVERTER CLUTCH, A/C CONTROLS, AND EMISSION CONTROLS



MULTI-PORT FUEL INJECTION: TURBO VIN 7

DATA SENSORS

HOT IN RUN, BULB TEST OR START



ELECTRONIC CONTROL MODULE (ECM) SOLID STATE DO NOT MEASURE RESISTANCE

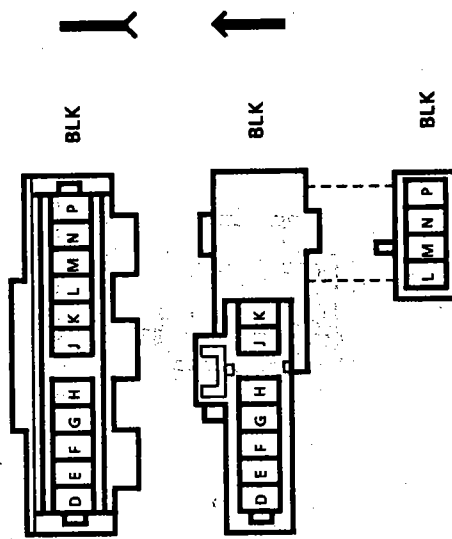
SEE FUSE BLOCK DETAILS

SEE GROUND DISTRIBUTION

**MULTI-PORT FUEL INJECTION: TURBO VIN 7**

**HARNESS CONNECTOR FACES**

C100, See Page 202-0



V11002.0

C209



BLK 12033852

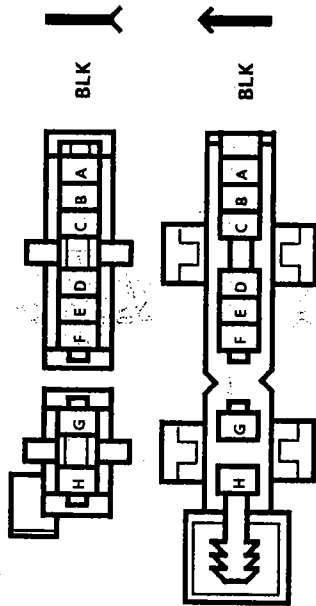
C312

**COMPONENT LOCATION**

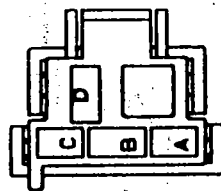
	Page-Figure
A/C Cut-Out Relay (VIN 7) . . . . .	On RH front fender, above wheel well . . . . . 201- 8-C
Assembly Line Diagnostic Link (ALDL) Connector . . . . .	On bottom of I/P, below radio . . . . . 201-14-B
Brake Switch . . . . .	Top of brake pedal support . . . . . 201-12-A
Camshaft Sensor . . . . .	LH front of engine, near water pump . . . . . 201- 6-A
Canister Purge Solenoid . . . . .	LH front of engine compartment, behind headlights . . . . . 201-10-A
Computer Controlled Coil Ignition (CCCI) Module . . . . .	Rear of engine, above intake manifold . . . . . 201- 7-A
Coolant Temperature Sensor . . . . .	Front of engine, left of coolant outlet . . . . . 201- 6-A
Crankshaft Sensor . . . . .	LH side of engine, behind harmonic balancer . . . . . 201- 6-C
Electronic Control Module (ECM) . . . . .	RH shroud, near lower access hole . . . . . 201-17-B
Electronic Spark Control (ESC) Module . . . . .	On RH front fender, above wheel well . . . . . 201- 8-C
Electronic Vacuum Regulator Valve . . . . .	LH rear of engine, above valve cover . . . . . 201- 7-A
Engine Oil Pressure Switch (VIN 7) . . . . .	RH front of engine, below turbocharger . . . . . 201- 5-D
Fuel Injectors . . . . .	At each intake manifold port
Fuel Pump Prime Connector . . . . .	LH front of engine, below generator . . . . . 201- 8-A
Fuel Pump Relay . . . . .	On RH front fender, above wheel well . . . . . 201- 8-C
Fuel Tank Unit . . . . .	Inside fuel tank . . . . . 201-22-D
Fuse Block . . . . .	Under LH side of I/P . . . . . 201-12-A
Fusible Link J (VIN 7) . . . . .	RH front of engine compartment, behind battery . . . . . 201- 5-F
Gear Selector Switch . . . . .	Attached to base of steering column . . . . . 201-13-A
Idle Air Control Valve . . . . .	Front of engine, on bottom of throttle body . . . . . 201- 6-A
Knock Sensor . . . . .	Rear of engine, near top of bell housing . . . . . 201- 7-A
Manifold Air Temperature (MAT) Sensor . . . . .	LH front of engine compartment, in intake hose . . . . . 201-10-A
Mass Air Flow (MAF) Sensor . . . . .	LH front of engine compartment, on air intake duct . . . . . 201-10-A
Oxygen Sensor . . . . .	In exhaust manifold . . . . . 201- 6-A
Throttle Position Sensor (TPS) . . . . .	Front of engine, on RH side of throttle body . . . . . 201- 6-A
Vehicle Speed Sensor Buffer . . . . .	Behind I/P, left of radio . . . . . 201-16-A

(Continued on next page)

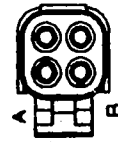
HARNESS CONNECTOR FACES



V08002.0  
C320



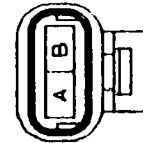
BLK 12020015  
A/C Cutout Relay



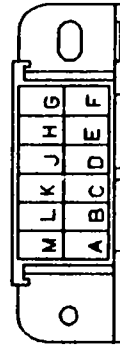
BLK 12015798  
Idle Air Control Valve

COMPONENT LOCATION

Component	Location	Page-Figure
Waste Gate Solenoid	RH side of engine, top of valve cover	201- 5-D
C100 (45 cavities)	LH rear of engine compartment	201- 9-B
C111 (7 cavities)	Top rear of engine, above bell housing	201- 7-A
C114 (1 cavity)	RH front of engine compartment, behind battery	201- 5-F
C209 (11 cavities)	Attached to LH side of fuse block	201-13-C
C312 (3 cavities)	Behind center of rear bumper	201-21-B
C320 (6 cavities)	Rear LH corner of trunk	201-22-A
C433 (1 cavity)	Front of engine, left of throttle body	201- 6-A
C437 (15 cavities)	Behind RH side of I/P, behind glove box	201-17-B
G104	Behind I/P, to left of steering column	201-15-A
G120	RH rear of engine, on cylinder head	201- 7-A
G177	Rear LH corner of trunk	201-22-A
S111	Injector harness, top of engine	
S112	Engine harness, near rear of RH cylinder head	201- 7-A
S115	Engine harness, near rear of LH valve cover	201- 7-A
S185	Engine harness, behind I/P, near ECM	201-17-C
S201	I/P harness, above radio	201-16-A
S203	I/P harness, above steering column	201-13-B
S213	I/P harness, above radio	201-16-A
S217	Engine harness, near rear of LH valve cover	201- 7-A
S219	I/P harness, behind I/P, above radio	201-16-A
S457	Engine harness, near relay bracket	201- 8-B
S462	Engine harness, near rear of LH valve cover	201- 7-A
S666	Engine harness, near front of LH valve cover	201- 6-A
S668	Engine harness, near relay bracket	201- 8-B
S807	Engine harness, behind RH side of I/P	201-17-C



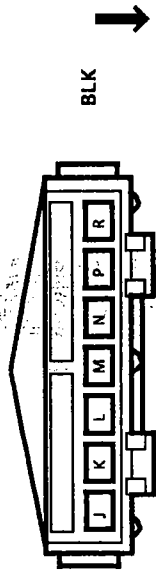
GRY 12041411  
Manifold Air Temperature Sensor



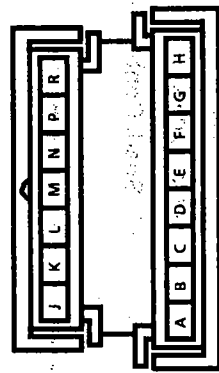
BLK 12020043  
Assembly Line Diagnostic Link

MULTI-PORT FUEL INJECTION: TURBO VIN 7

HARNESS CONNECTOR FACES



BLK

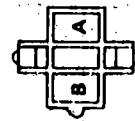


WHT

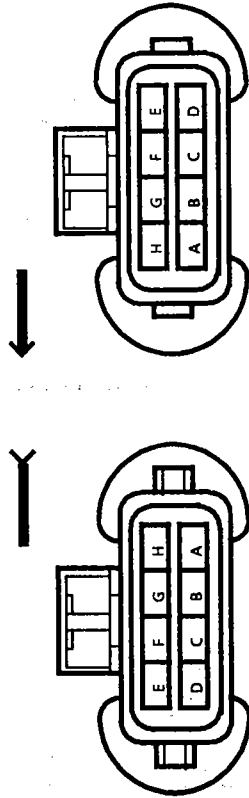


BLK

V15001.0  
C437



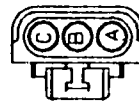
NAT 12010649  
Brake Switch



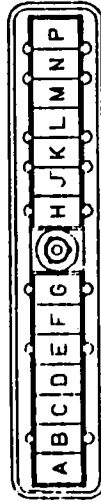
GRY

V08001.0  
C111

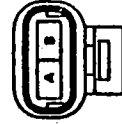
GRY



BLK 12020829  
Camshaft Sensor



BLK 12034163  
Computer Controlled Coil Ignition Module



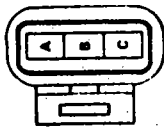
BLK 12040753  
Coolant Temperature Sensor



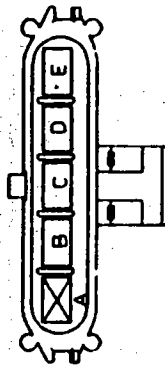
RED 12015978  
Canister Purge Solenoid

**MULTI-PORT FUEL INJECTION: TURBO VIN 7**

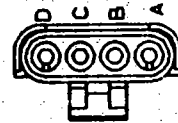
**HARNESS CONNECTOR FACES**



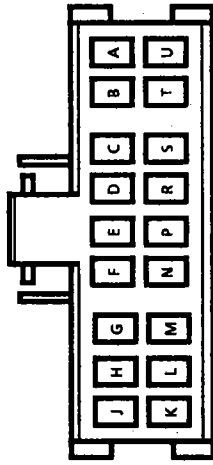
BLK 12047909  
Crankshaft Sensor



BLK 12015982  
Electronic Spark Control Module

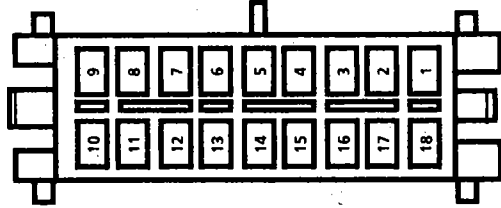


BLK 12015797  
Electronic Vacuum Regulator Valve

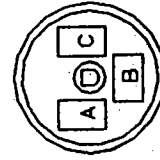


C2 BLK

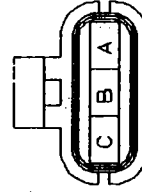
V00017.1  
Digital Cluster



C1 BLK



BLK 12020585  
Engine Oil Pressure Switch

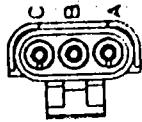


BLK 12040977  
Mass Air Flow Sensor



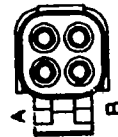
**MULTI-PORT FUEL INJECTION: TURBO VIN 7**

**HARNES CONNECTOR FACES**



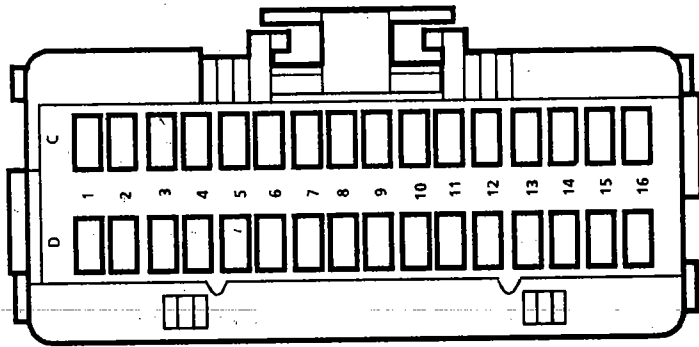
BLK 12015793

Throttle Position Sensor (TPS)

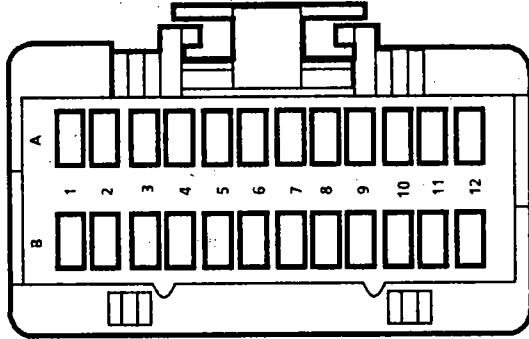


BLK 12015798

Torque Converter Clutch Solenoid  
Automatic Transmission



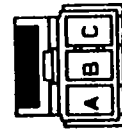
C1 BLK



C2 BLK

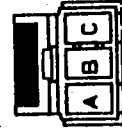
V00005.0

Electronic Control Module (ECM)



BLK 12015686

Transmission Converter Clutch  
Solenoid Automatic Transmission



BLK 12015686

Vehicle Speed Sensor

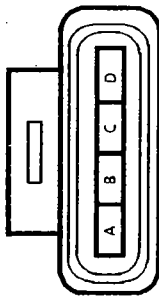




**STARTER AND CHARGING SYSTEM**

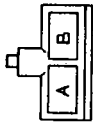
**HARNESS CONNECTOR FACES**

C100, See Page 202-0



BLK  
V00039.0

Generator (Turbo VIN 7)



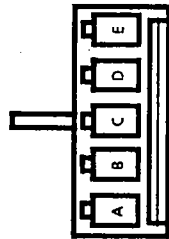
WHT 6294493

Generator (V6 VIN A, V8 VIN Y)



C1 BLK V00019.0  
C2 BLU

Ignition Switch



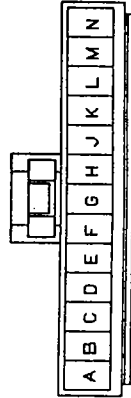
BLK  
V00013.1

Starter Interrupt Relay

**COMPONENT LOCATION**

Page-Figure

Fuse Block	Under LH side of I/P	201-12-A
Fusible Link A (VIN 7)	Engine harness, near starter solenoid	201- 6-B
Fusible Link A (VIN A)	Engine harness, near starter solenoid	201- 0-A
Fusible Link B (VIN 7)	Engine harness, near starter solenoid	201- 5-A
Fusible Link B (VIN A)	Engine harness, near starter solenoid	201- 6-B
Fusible Link B (VIN Y)	Engine harness, near starter solenoid	201- 0-A
Fusible Link D	RH front of engine, next to generator	201- 5-A
Fusible Link E (VIN 7)	RH side of engine, near starter solenoid	201- 2-A
Fusible Link J (VIN 7)	RH front of engine compartment, behind battery	201- 6-B
Ignition Switch	Base of steering column	201- 5-F
Starter Interrupt Relay	Taped to I/P harness, near fuse block	201-13-A
Starter Solenoid (VIN 7)	Lower RH side of engine	201-11-A
Starter Solenoid (VIN A)	Lower RH side of engine	201- 6-B
Starter Solenoid (VIN Y)	Lower LH side of engine	201- 0-A
Theft Deterrent Controller	Behind I/P, near LH shroud	201- 5-A
C100 (45 cavities)	LH rear of engine compartment	201-11-A
C114 (VIN 7) (1 cavity)	RH front of engine compartment, behind battery	201- 9-B
G100 (VIN 7)	RH front of engine, on cylinder head	201- 5-F
G100 (VIN A)	Front of engine, below generator	201- 5-E
G100 (VIN Y)	On LH cylinder head, behind generator	201- 0-B
G101 (Except VIN Y)	On RH front fender, near battery	201- 3-B
G101 (VIN Y)	On LH front fender, behind headlights	201- 5-F
S102 (VIN A)	Engine harness, near front of RH valve cover	201-20-E
S102 (VIN Y)	Engine harness, rear of LH valve cover	201- 2-A
S200	I/P harness, to left of steering column	201- 2-C
S203	I/P harness, above steering column	201-13-B
S826	I/P harness, near brake pedal arm	201-13-B



BLK 12015130

Theft Deterrent Controller

## STARTER AND CHARGING SYSTEM

### TROUBLESHOOTING HINTS

#### STARTER

- Try the following checks before doing the System Diagnosis.
- 1. Check the hydrometer eye that is built into the vehicle Battery before troubleshooting the Starter System.
  - Green eye - Battery is charged.
  - Dark eye - Battery is discharged. Recharge Battery.
  - Clear or yellow eye - Battery fluid is low. Replace Battery.
- 2. Check that the Starter Solenoid terminals S and B and battery connections are clean and tight.
- 3. Check that ground G100 is clean and tight.
  - Go to System Diagnosis for diagnostic tests.

### TROUBLESHOOTING HINTS

#### CHARGING

- Try the following checks before doing the System Diagnosis.
- 1. Check the hydrometer eye that is built into the vehicle Battery before troubleshooting the Charging System.
  - Green eye - Battery is charged.
  - Dark eye - Battery is discharged. Recharge Battery.
  - Clear or yellow eye - Battery fluid is low. Replace Battery.
- 2. Check Gages Fuse.

### A: ENGINE DOES NOT CRANK AND THE STARTER SOLENOID DOES NOT CLICK (TABLE 2)

Measure: VOLTAGE At: IGNITION SWITCH CONNECTORS C1 & C2 (Connected)		
Measure Between	Correct Voltage	For Diagnosis
B2 (RED) & Ground	Battery	See 1
B3 (RED) & Ground	Battery	See 1
<ul style="list-style-type: none"> <li>• Turn the Ignition Switch to START.</li> </ul>		
S (PPL) or (PPL/WHT) (With Theft Deterrent) & Ground	Battery	See 2
<ul style="list-style-type: none"> <li>• If all results are correct;                             <ul style="list-style-type: none"> <li>— With Theft Deterrent, go to Table 3.</li> <li>— Without Theft Deterrent, check/repair PPL (6) wire for an open.</li> </ul> </li> <li>1. Check/repair RED (2) wire and Fusible Link A (see schematic).</li> <li>2. Replace Ignition Switch.</li> </ul>		

3. Check the Generator belt.
4. Check that the Starter Solenoid terminal B and battery connections are clean and tight.
5. Check the vehicle voltmeter (if equipped) to assure accurate voltage readings.
  - Go to System Diagnosis for diagnostic tests.

### SYSTEM DIAGNOSIS

#### STARTER

- Diagnostic steps for the symptoms listed in the following table are listed after the table.

#### SYMPTOM TABLE

A: Engine does not crank and the Starter Solenoid does not click
B: Engine does not crank or cranks slowly, but the Starter Solenoid clicks

### A: ENGINE DOES NOT CRANK AND THE STARTER SOLENOID DOES NOT CLICK (TABLE 1)

Measure: VOLTAGE At: STARTER SOLENOID		
Condition:		
• Ignition Switch: START		
Measure Between	Correct Voltage	For Diagnosis
S (PPL) & Ground	Battery	See 1
<ul style="list-style-type: none"> <li>• If all the voltages are correct, replace the Starter Solenoid.</li> <li>1. Go to Table 2.</li> </ul>		

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**A: ENGINE DOES NOT CRANK AND THE STARTER SOLENOID DOES NOT CLICK (TABLE 3)**

Disconnect: CONNECTOR At: THEFT DETERRENT CONTROLLER Condition:		
• Ignition Switch: START		
Disconnect	Correct Result	For Diagnosis
Theft Deterrent Controller Connector	Engine Cranks	See 1
• If the engine cranks, go to 8A-133 for Theft Deterrent Controller Diagnosis.		
1. Leave connector disconnected and go to Table 4.		

**A: ENGINE DOES NOT CRANK AND THE STARTER SOLENOID DOES NOT CLICK (TABLE 4)**

Measure: VOLTAGE At: STARTER INTERRUPT RELAY Connector (Disconnected)		
Condition:		
• Theft Deterrent Controller Connector: DISCONNECTED		
• Ignition Switch: START		
Measure Between	Correct Voltage	For Diagnosis
D (PPL/WHT) & Ground	Battery	See 1
D (PPL/WHT) & C (LT/BLU)	0 Volts	See 2

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- If all results are correct, go to Table 5.
- 1. Check/repair PPL/WHT (306) wire for an open (see schematic).
- 2. Check/repair LT/BLU (965) wire for a short to ground (see schematic).

**A: ENGINE DOES NOT CRANK AND THE STARTER SOLENOID DOES NOT CLICK (TABLE 5)**

Connect: FUSED JUMPER At: STARTER INTERRUPT RELAY Connector (Disconnected)		
Condition:		
• Ignition Switch: START		
Jumper Between	Correct Result	For Diagnosis
D (PPL/WHT) & A (PPL)	Engine Cranks	See 1
• If the engine cranks, replace the Starter Interrupt Relay.		
1. Check/repair the PPL (6) wire for an open (see schematic).		

**NOTE:** The following tests are designed for engines and batteries at normal operating temperatures and assumes that there are no engine symptoms which would cause a no start symptom. To use the tests under other conditions could result in misdiagnosis.

**B: ENGINE DOES NOT CRANK OR CRANKS SLOWLY, BUT THE STARTER SOLENOID CLICKS (TABLE 1)**

Measure: VOLTAGE At: BATTERY TERMINALS Conditions:		
• Battery fully charged		
• (VIN A & VIN Y) Disconnect PINK wire from BAT terminal of the Electronic Spark Timing (EST) Distributor		
• (Turbo VIN 7) Remove the FP/INJ FUSE		
• Ignition Switch: START		
• Engine being cranked		
Measure Between	Correct Voltage	For Diagnosis
Positive & Negative Battery Terminals	Greater than 9.5 volts	See 1
• If the voltage is correct, go to Table 2.		
1. Refer to Section 6D for Battery Load Test. Remove Starter Assembly for repairs if the Battery is OK.		

**STARTER AND CHARGING SYSTEM**

**B: ENGINE DOES NOT CRANK OR CRANKS SLOWLY, BUT THE STARTER SOLENOID CLICKS (TABLE 2)**

Measure Between	Correct Voltage	For Diagnosis
Negative Battery Terminal & Engine Block	Less than .5 Volts	See 1
Positive Battery Terminal & Starter Solenoid Terminal B	Less than .5 Volts	See 2
<ul style="list-style-type: none"> <li>If both voltages are correct, remove the Starter Assembly for repairs. Refer to Section 6D.</li> <li>1. Replace Negative Battery Cable.</li> <li>2. Replace Positive Battery Cable.</li> </ul>		

**SYSTEM DIAGNOSIS**

**V6 VIN A, V8 VIN Y CHARGING**

- Diagnostic steps for the symptoms listed in the following table are listed after the table.

**SYMPTOM TABLE**

<b>A: VOLTS Indicator does not light with the Ignition Switch in RUN and the engine stopped.</b>
<b>B: VOLTS Indicator stays on when the engine is running.</b>
<b>C: Battery is undercharged or overcharged.</b>

**A: VOLTS INDICATOR DOES NOT LIGHT WITH THE IGNITION SWITCH IN RUN AND THE ENGINE STOPPED**

Connect: FUSED JUMPER		
At: GENERATOR CONNECTOR (Disconnected)		
Condition: <ul style="list-style-type: none"> <li>Ignition Switch: RUN</li> </ul>		
Jumper Between	Correct Result	For Diagnosis
B (BRN) & Ground	VOLTS Indicator lights	See 1

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- If the result is correct, reconnect the connector and go to Step 2.
- 1. Check/repair the BRN (25) wire, Indicator Bulb or the Instrument Cluster (Printed Circuit) for an open (see schematic).
- 2. Insert a screwdriver into the test hole in the rear of the Generator making sure the screwdriver is in contact with the bottom and side of the test hole. Turn the Ignition Switch to RUN.
  - If the VOLTS Indicator lights replace the Regulator. Refer to Section 6D.
  - If the VOLTS Indicator does not light, check the brushes, slippings and rotor winding for an open. Refer to Section 6D.

**B: VOLTS INDICATOR STAYS ON WHEN THE ENGINE IS RUNNING (TABLE 1)**

Disconnect: CONNECTOR		
At: GENERATOR		
Condition: <ul style="list-style-type: none"> <li>Ignition Switch: RUN</li> </ul>		
Action	Correct Result	For Diagnosis
Disconnect Generator Connector	VOLTS Indicator does not light	See 1
<ul style="list-style-type: none"> <li>If the result is correct, go to Table 2.</li> <li>1. Check/repair the BRN (25) wire, and Instrument Cluster (Printed Circuit) for a short to ground (see schematic).</li> </ul>		

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**STARTER AND CHARGING SYSTEM**

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**B: VOLTS INDICATOR STAYS ON WHEN THE ENGINE IS RUNNING (TABLE 2)**

Measure: VOLTAGE		
At: GENERATOR CONNECTOR (Disconnected)		
Measure Between	Correct Voltage	For Diagnosis
A (RED) & Ground	Battery	See 1
<ul style="list-style-type: none"> <li>If the voltage is correct, go to Symptom C: Battery is undercharged or overcharged, table 2.</li> </ul>		
<ol style="list-style-type: none"> <li>Check/repair RED (2) wires for an open (see schematic).</li> </ol>		

**C: BATTERY IS UNDERCHARGED OR OVERCHARGED (TABLE 1)**

Measure: VOLTAGE		
At: GENERATOR		
Conditions:		
<ul style="list-style-type: none"> <li>Ignition Switch: RUN</li> <li>Generator Connector Disconnected</li> </ul>		
Measure Between	Correct Voltage	For Diagnosis
BAT terminal & Ground	Battery	See 1
A (RED) & Ground	Battery	See 1
B (BRN) & Ground	Battery	See 2
<ul style="list-style-type: none"> <li>If all the voltages are correct, reconnect connector and go to Table 2.</li> </ul>		
<ol style="list-style-type: none"> <li>Check/repair the RED (2) wire for an open (see schematic).</li> <li>Check/repair BRN (25) wire, Indicator Bulb, and Instrument Cluster (Printed Circuit) for an open.</li> </ol>		

**C: BATTERY IS UNDERCHARGED OR OVERCHARGED (TABLE 2)**

Measure: VOLTAGE		
At: GENERATOR		
Conditions:		
<ul style="list-style-type: none"> <li>All accessories turned off</li> <li>Engine running at fast idle</li> </ul>		
Measure Between	Correct Voltage	For Diagnosis
Battery Terminal & Ground	13 to 16 volts	See 1
<ul style="list-style-type: none"> <li>If the voltage is correct, perform a Generator Load Test. Refer to Section 6D. Perform a Battery Load Test if the Generator is good. Refer to Section 6D.</li> </ul>		
<ol style="list-style-type: none"> <li>Remove Generator for repair. Refer to Section 6D.</li> </ol>		



# STARTER AND CHARGING SYSTEM

## SYSTEM DIAGNOSIS

TURBO VIN 7

### CHARGING

- Diagnostic steps for the symptoms listed in the following table are listed after the table.

### SYMPTOM TABLE

A. VOLTS Indicator does not light with the Ignition Switch in RUN and the engine stopped
B. VOLTS Indicator stays on when the engine is running
C. Battery is undercharged or overcharged

## A: VOLTS INDICATOR DOES NOT LIGHT WITH THE IGNITION SWITCH IN RUN AND THE ENGINE STOPPED

Connect: FUSED JUMPER		
At: GENERATOR CONNECTOR (Disconnected)		
Condition: <ul style="list-style-type: none"> <li>• Ignition Switch: RUN</li> </ul>		
Connect Between	Correct Result	For Diagnosis
L (BRN) & Ground	Volts Indicator Lights	See 1
<ul style="list-style-type: none"> <li>• If the result is correct, repair/replace the Generator. Refer to Section 6D.</li> <li>1. Check/repair the BRN (25) wire, Indicator Bulb and the Instrument Cluster (Printed Circuit) for an open (see schematic).</li> </ul>		

## B: VOLTS INDICATOR STAYS ON WHEN THE ENGINE IS RUNNING

Disconnect: CONNECTOR		
At: GENERATOR		
Condition: <ul style="list-style-type: none"> <li>• Ignition Switch: RUN</li> </ul>		
Action	Correct Result	For Diagnosis
Disconnect Generator Connector	VOLTS Indicator does not Light	See 1
<ul style="list-style-type: none"> <li>• If the result is correct, repair/replace the Generator. Refer to Section 6D.</li> <li>1. Check/repair the BRN (25) wire and Instrument Cluster (Printed Circuit) for a short to ground (see schematic).</li> </ul>		

## C: BATTERY IS UNDERCHARGED OR OVERCHARGED (TABLE 1)

Measure: VOLTAGE		
At: GENERATOR		
Conditions: <ul style="list-style-type: none"> <li>• Ignition Switch: RUN</li> <li>• Generator Connector: DISCONNECTED</li> </ul>		
Measure Between	Correct Voltage	For Diagnosis
L (BRN) & Ground	Battery	See 1
Battery terminal & Ground	Battery	See 2

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- If all the voltages are correct, reconnect connector and go to Table 2.
- 1. Check/repair the BRN (25) wire, Indicator Bulb, and Instrument Cluster (Printed Circuit) for an open (see schematic).
- 2. Check/repair RED (2) wire for an open (see schematic).

## C: BATTERY IS UNDERCHARGED OR OVERCHARGED (TABLE 2)

Measure: VOLTAGE		
At: GENERATOR		
Conditions: <ul style="list-style-type: none"> <li>• All accessories turned off</li> <li>• Engine running at fast idle</li> </ul>		
Measure Between	Correct Voltage	For Diagnosis
Battery terminal & Ground	13 to 16 Volts	See 1
<ul style="list-style-type: none"> <li>• If the voltage is correct, perform a Generator Load Test. Refer to Section 6D. Perform a Battery Load Test if the Generator is good. Refer to Section 6D.</li> <li>1. Repair/replace the Generator. Refer to Section 6D.</li> </ul>		

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## STARTER AND CHARGING SYSTEM

(Continued from previous page)

### CIRCUIT OPERATION

#### STARTER

When the Ignition Switch is moved to the START position, battery voltage is applied to the Starter Solenoid. Both solenoid windings are energized. The circuit through the Pull-In Winding is completed to ground through the Starter Motor. The windings work together magnetically to pull in and hold in the Plunger. The Plunger moves the Shift Lever. This action causes the Drive Assembly to rotate as it engages the Flywheel ring gear on the engine. At the same time, the Plunger also closes the solenoid switch contacts in the Starter Solenoid. Full battery voltage is applied directly to the Starter Motor and it cranks the engine.

As soon as the solenoid switch contacts close, voltage is no longer applied through the Pull-In Winding, since battery voltage is applied to both ends of the windings. The Hold-In Winding remains energized, and its magnetic field is strong enough to hold the Plunger, Shift Lever, and Drive Assembly solenoid switch contacts in place to continue cranking the engine.

When the Ignition Switch is released from the START position, battery voltage is removed from the PPL wire and the junction of the two windings. Voltage is applied from the Motor Contacts through both windings to ground at the end of the Hold-In Winding. However, the voltage applied to the Pull-In Winding is now opposing the voltage applied when the winding was first energized. The magnetic fields of the Pull-In and Hold-In Windings now oppose one another. This action of the windings, with the help of the Return Spring, causes the Drive Assembly to disengage and

the solenoid switch contacts to open simultaneously. As soon as the contacts open, the starter circuit is turned off.

### CIRCUIT OPERATION

#### V6 VIN A, V8 VIN Y

#### CHARGING

The Generator supplies DC voltage to operate the vehicle's electrical systems and to recharge its Battery. The output of the Generator is controlled by the built-in solid-state Regulator.

When the Ignition Switch is first moved to RUN or BULB TEST, before the Engine is started, a small current flows through the VOLTS Indicator, the Generator Field winding, and the Regulator. This current lights the VOLTS Indicator. It also produces a magnetic field around the field winding. As the engine starts, the rotation of this small field produces a voltage in the Stator. The regulator senses this voltage and takes control of the field current.

AC voltage is generated in three Stator windings in the Generator. This is charged to DC by the Rectifier Bridge. This DC output is applied to the Battery and the car's circuits at the BAT terminal of the Generator. A separate output voltage is provided by the Diode Trio to the field winding of the Rotor. In this way, some of the output of the Generator is used to supply its field excitation. The field voltage is also applied to the VOLTS Indicator bulb. This causes the bulb to go out after the engine starts and the Generator is operating. With equal voltage at both sides of the bulb, the bulb goes out.

The Regulator is connected to the battery voltage at Terminal A of the Generator. When the Battery is fully charged, its voltage is high. The Regulator then decreases the Generator field excitation. This reduces the output of the Generator to prevent overcharging the Battery. When the Battery has been discharged or is loaded heavily, its voltage is lower. The Regulator senses this and increases the output of the Generator.

### CIRCUIT OPERATION

#### TURBO VIN 7

#### CHARGING

The Generator supplies DC voltage to operate the vehicle's electrical systems and to charge its Battery. The output of the Generator is controlled by the built-in digital Regulator.

The digital Regulator directly controls the field with a Pulse Width Modulated (PWM) signal, which is valued in duty cycles. When the Ignition Switch is first turned to RUN, before the engine is started, voltage is applied to the Regulator through the VOLTS Indicator bulb. The Regulator, which is in a field strobe function, applies a small percentage of duty cycle to the field windings to produce a magnetic field. As the Generator RPM increases, the field strobe function is disabled and normal regulation occurs.

## STARTER AND CHARGING SYSTEM

(Continued from previous page)

AC voltage is generated in three Stator Windings in the Generator. This is changed to DC voltage by the Rectifier Bridges. This DC output is applied to the Battery and the vehicle's circuits at the BAT terminal of the Generator. The battery terminal also supplies voltage to the Regulator for field voltage and voltage monitoring.

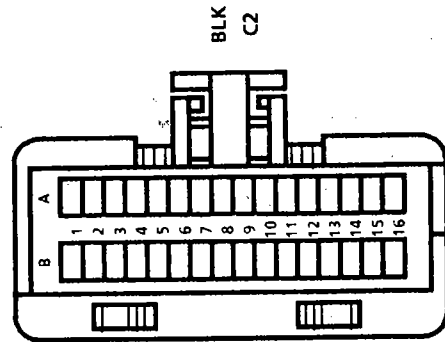
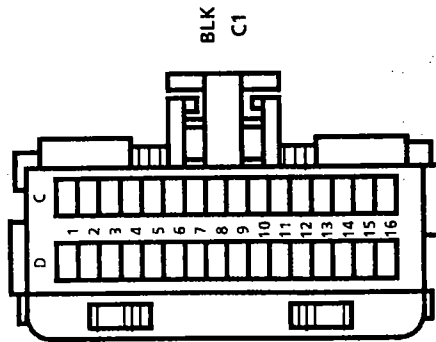
The Regulator can detect a fault within the Generator and ground the VOLTS Indicator light through a lamp driver. The indicator will light in full brilliance when there is an under or over voltage conditioning, a broken drive belt, an open or shorted field circuit, or an open Regulator.



**COOLANT FANS: TURBO VIN 7**

**HARNESS CONNECTOR FACES**

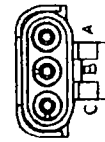
C100, See Page 202-0



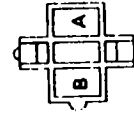
V00005.0  
Electronic Control Module

**COMPONENT LOCATION**

	Page-Figure
A/C High Pressure Cut-Out Switch	201- 8-A
Brake Switch	201-12-A
Coolant Fan Delay Relay	201- 9-A
Coolant Fan Temperature Switch	201- 6-A
Electronic Control Module (ECM)	201-17-B
Fuse Block	201-12-A
Fusible Link E (VIN 7)	201- 6-B
High Speed Coolant Fan Relay	201- 9-A
Low Speed Coolant Fan Relay	201- 9-A
Power Master Brake Relay	201- 9-A
C100 (45 cavities)	201- 9-B
G120 (VIN 7)	201- 7-A
S170	201-10-A
S175	201- 9-A
S180	201- 9-A
S462 (VIN 7)	201- 7-A



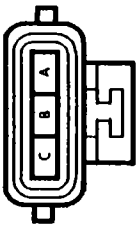
GRY 12015384  
A/C High Pressure Switch



WHT 12010649  
Brake Switch

COOLANT FANS: TURBO VIN 7

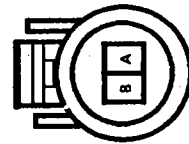
HARNESS CONNECTOR FACES



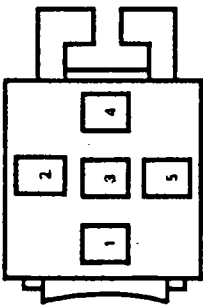
BLK 12015664  
Coolant Fan



V00025.0  
Coolant Fan Delay Relay

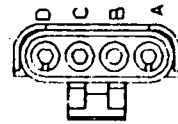


V00026.0  
High Pressure Cut-Out Switch



BLK 12034003  
High Speed Coolant Fan Relay

Low Speed Coolant Fan Relay,  
See High Speed Coolant Fan  
Relay



BLK 12015797  
Power Master Brake Relay

# COOLANT FANS: TURBO VIN 7

## TROUBLESHOOTING HINTS

- Try the following checks before doing the System Check.
- Check the ECM/SOL Fuse by operating Brake lights.
- Go to System Check for a guide to normal operation.
- Go to System Diagnosis for diagnostic tests.

## SYSTEM CHECK

- Use the System Check Table as a guide to normal operation.
- Refer to System Diagnosis for a list of symptoms and diagnostic steps.

## SYSTEM DIAGNOSIS

- Diagnostic steps for the symptoms listed in the following table are listed after the table.

### SYMPTOM TABLE

- A. Coolant Fan does not run at Low Speed
- B. Coolant Fan does not run at High Speed
- C. Coolant Fan does not turn off
- D. Coolant Fan does not run for a delay period after the Ignition Switch is turned OFF (engine coolant hot) but Fan does run when the Ignition Switch is in RUN

### SYSTEM CHECK TABLE

ACTION	NORMAL OPERATION
With the engine cold and idling, move the A/C Selector Switch to NORM (if equipped with A/C)	The Coolant Fan turns on
With engine coolant below operating temperature, move the A/C Selector Switch to OFF	The Coolant Fan turns off
Run the engine at a fast idle for several minutes	The Coolant Fan turns on and runs at low speed and then the fan will run at high speed before the Coolant Temperature Indicator in the Instrument Panel comes on or before the Coolant Temperature Gauge needle reaches H
Run the engine for a few more minutes, and then turn the engine off	The Coolant Fan continues to run at high speed until the Coolant Temperature lowers (if equipped with Coolant Fan Delay Relay)

### A: COOLANT FAN DOES NOT RUN AT LOW SPEED (TABLE 1)

Connect: FUSED JUMPER		
At: ALDL CONNECTOR		
Conditions:		
• Ignition Switch: RUN		
Connect Between	Correct Result	For Diagnosis
Terminal B & Ground	Coolant Fan runs	See 1
• If the Coolant Fan runs, refer to Section 6E for ECM diagnosis.		
1. Go to A1.		

## COOLANT FANS: TURBO VIN 7

(Continued from previous page)

- A1. With the Ignition Switch in RUN, connect a fused jumper between the DK GRN (535) wire and ground at either the ECM connector C1 terminal D2, or the A/C High Pressure Switch terminal A (see schematic).
- If the fan does not run, go to Table 2.
  - If the fan runs, replace suspect switch or refer to Section 6E for ECM diagnosis as necessary.

### A: COOLANT FAN DOES NOT RUN AT LOW SPEED (TABLE 2)

Connect: TEST LAMP		
At: LOW SPEED COOLANT FAN RELAY (Disconnected)		
Conditions:		
<ul style="list-style-type: none"> <li>• Ignition Switch: RUN</li> <li>• Fused jumper in place from A1</li> </ul>		
Connect Between	Correct Result	For Diagnosis
5 (BRN) & Ground	Test Lamp lights	See 1
5 (BRN) & 2 (DK GRN)	Test Lamp lights	See 2
1 (RED) & Ground	Test Lamp lights	See 3
<ul style="list-style-type: none"> <li>• If all the results are correct, go to Table 3.</li> </ul>		
1. Check A/C Fuse and BRN (250) wire for an open.		
2. Check DK GRN (535) wire for an open.		
3. Check Fusible Link E and RED (2) wire for an open.		

### A: COOLANT FAN DOES NOT RUN AT LOW SPEED (TABLE 3)

Connect: FUSED JUMPER		
At: COOLANT FAN RELAY CONNECTOR (Disconnected)		
Connect Between	Correct Result	For Diagnosis
1 (RED) & 4 (BLK/RED)	Coolant Fan runs	See 1
<ul style="list-style-type: none"> <li>• If Coolant Fan runs, replace Coolant Fan Relay.</li> </ul>		
1. Go to Table 4.		

### B: COOLANT FAN DOES NOT RUN AT HIGH SPEED

Turn the Ignition Switch to RUN and connect a fused jumper between DK GRN/YEL (335) wire and ground at either the Coolant Fan Temperature Switch or the A/C High Pressure Switch terminal B (if equipped).

- If the fan does not run at high speed, go to Table 1.
- If the fan does run at high speed, replace the suspect switch.

### A: COOLANT FAN DOES NOT RUN AT LOW SPEED (TABLE 4)

Connect: TEST LAMP		
At: COOLANT FAN CONNECTOR (Disconnected)		
Conditions:		
<ul style="list-style-type: none"> <li>• Ignition Switch: RUN</li> <li>• Fused jumper connected between terminals 1 (RED) and 4 (BLK/RED) of the Low Speed Coolant Fan Relay Connector and ground.</li> </ul>		
Connect Between	Correct Result	For Diagnosis
A (BLK/RED) & Ground	Test Lamp lights	See 1
A (BLK/RED) & C (BLK)	Test Lamp lights	See 2
<ul style="list-style-type: none"> <li>• If above results are correct, replace the Coolant Fan.</li> </ul>		
1. Check BLK/RED (532) wire for an open.		
2. Check BLK (152) wire for an open.		



**COOLANT FANS: TURBO VIN 7**

**B: COOLANT FAN DOES NOT RUN AT HIGH SPEED (TABLE 1)**

Connect: TEST LAMP At: HIGH SPEED COOLANT FAN RELAY CONNECTOR (Disconnected)		For Diagnosis
Conditions: <ul style="list-style-type: none"> <li>• Ignition Switch: RUN</li> <li>• Fused jumper in place from B1.</li> </ul>		
Connect Between	Correct Result	
5 (BRN) & Ground	Test Lamp lights	See 1
5 (BRN) & 2 (DK GRN/YEL)	Test Lamp lights	See 2
1 (RED) & Ground	Test Lamp lights	See 3
<ul style="list-style-type: none"> <li>• If all above results are correct, go to Table 2.</li> <li>1. Check A/C Fuse and BRN (250) wire for an open.</li> <li>2. Check DK GRN/YEL (335) wire for an open.</li> <li>3. Check Fusible Link E and RED (2) wire for an open.</li> </ul>		

**B: COOLANT FAN DOES NOT RUN AT HIGH SPEED (TABLE 2)**

Connect: FUSED JUMPER At: HIGH SPEED COOLANT FAN RELAY CONNECTOR (Disconnected)		For Diagnosis
Connect Between	Correct Result	
1 (RED) & 4 (BLK/PNK)	Coolant Fan runs at high speed	See 1
<ul style="list-style-type: none"> <li>• If the above result is correct, replace the High Speed Coolant Fan Relay.</li> <li>1. Go to Table 3.</li> </ul>		

**B: COOLANT FAN DOES NOT RUN AT HIGH SPEED (TABLE 3)**

Connect: TEST LAMP At: COOLANT FAN CONNECTOR (Disconnected)		For Diagnosis
Conditions: <ul style="list-style-type: none"> <li>• Ignition Switch: RUN</li> <li>• Fused jumper connected between terminals 1 (RED) and 4 (BLK/PNK) of the High Speed Coolant Fan Relay Connector.</li> </ul>		
Connect Between	Correct Result	
B (BLK/PNK) & Ground	Test Lamp lights	See 1
B (BLK/PNK) & C (BLK)	Test Lamp lights	See 2
<ul style="list-style-type: none"> <li>• If all results are correct, replace High Speed Coolant Fan.</li> <li>1. Check BLK/PNK (533) wire for an open.</li> <li>2. Check BLK (152) wire for an open.</li> </ul>		

**C: COOLANT FAN DOES NOT TURN OFF**

1. Disconnect Coolant Fan Temperature Switch.
  - If Fan stops, replace Coolant Fan Switch.
  - If Fan does not stop, go to step 2.
2. Disconnect A/C High Pressure Switch (A/C only).
  - If Fan stops, replace A/C High Pressure Switch.
  - If Fan does not stop, go to step 3.
3. With Ignition Switch off, disconnect High Speed Coolant Fan Relay (if equipped).
  - If Fan stops, replace High Speed Coolant Fan Relay.
  - If Fan does not stop, proceed to Step 4.
4. With Ignition Switch off disconnect Low Speed Coolant Fan Relay.
  - If Fan stops, go to step 5.
  - If Fan does not stop, replace Coolant Fan Delay Relay.
5. Connect a Test Lamp between terminals 5 (BRN) and 2 (DK GRN) of the Low Speed Coolant Fan Relay Connector.
  - If the test lamp lights, check the DK GRN (535) wire for a short to ground. Refer to Section 6E for ECM diagnosis if wire is OK.
  - If the test lamp does not light, replace the Low Speed Coolant Fan Relay.

(Continued on next page)

**COOLANT FANS: TURBO VIN 7**

(Continued from previous page)

**D: COOLANT FAN DOES NOT RUN FOR A DELAY PERIOD AFTER THE IGNITION SWITCH IS TURNED OFF (ENGINE COOLANT HOT) BUT THE FAN DOES RUN WHEN THE IGNITION SWITCH IS IN RUN**

Connect: TEST LAMP At: COOLANT FAN DELAY RELAY CONNECTOR (Disconnected)		Correct Result	For Diagnosis
Conditions: <ul style="list-style-type: none"> <li>• Ignition Switch: RUN</li> <li>• Coolant Fan Relay: DISCONNECTED</li> <li>• Engine Coolant: HOT</li> </ul>			
C1/C (RED) & Ground	Test Lamp lights		See 1
C1/C (RED) & C2/C (BLK/WHT)	Test Lamp lights		See 2
C2/B (RED) & Ground	Test Lamp lights		See 3
C2/B (RED) & C1/A (DK GRN/YEL)	Test Lamp lights		See 4
C2/B (RED) & C1/B (BLK/PNK)	Test Lamp lights		See 5
C2/A (PNK/BLK) & Ground	Test Lamp lights		See 6
<ul style="list-style-type: none"> <li>• If all results are correct, replace Coolant Fan Delay Relay.</li> </ul>			

(Continued in next column)

(Continued from previous column)

1. Check Fusible Link E and RED (2) wire for an open.
2. Check BLK/WHT (450) wire for an open.
3. Check PWR BRK Fuse and RED (640) wire for an open.
4. Check DK GRN/YEL (335) wire for an open. If wire is OK, replace Coolant Fan Temperature Switch.
5. Check BLK/PNK (533) wire for an open.
6. Check ECM/SOL Fuse and PNK/BLK (339) wire for an open.

**CIRCUIT OPERATION**

The Coolant Fan is electrically operated and is turned on when the engine coolant becomes hot enough to require cooling.

The Low Speed Coolant Fan is controlled by the Low Speed Coolant Fan Relay. This relay is controlled by the ECM and the Low Speed contact of the A/C High Pressure Switch. The High Speed Coolant Fan is controlled by the High Speed Coolant Fan Relay. This Relay is controlled by the Coolant Fan Temperature Switch and the Hi Speed contact of the A/C High Pressure Switch. When any one of these components grounds the coil of one of the relays, that particular fan runs.

On all cars, the Coolant Fan Delay Relay operates the Coolant Fan for a short period of time after the engine is turned off. A Solid State timer relay removes the path to ground for the Coolant Fan Delay Relay coil to turn off the fan. Refer to Section 6E for conditions that will cause the ECM to turn the fan ON or OFF.

**CHOKE HEATER: V6 VIN A**

**A: OIL/CHOKE INDICATOR IS ON WITH THE ENGINE RUNNING, OIL PRESSURE IS OK (TABLE 3)**

Connect: FUSED JUMPER  
 At: ENGINE OIL PRESSURE SWITCH CONNECTOR (Disconnected)  
 Conditions:  
 • Ignition Switch: RUN  
 • C/H Fuse OK

Connect Between	Correct Result	For Diagnosis
A (BRN/ WHT) & B (LT BLU), (TAN)	OIL/CHOKE Indicator does not light, C/H Fuse does not blow	See 1
• If the result is correct, replace the Engine Oil Pressure Switch. 1. Replace Choke Heater.		

**B: OIL/CHOKE INDICATOR DOES NOT LIGHT WITH THE IGNITION SWITCH IN RUN AND THE ENGINE OFF (TABLE 1)**

Disconnect: CONNECTOR  
 At: ENGINE OIL PRESSURE SWITCH  
 Condition:  
 • Ignition Switch: RUN

Disconnect	Correct Result	For Diagnosis
Engine Oil Pressure Switch Connector	OIL/CHOKE Indicator lights	See 1
• If the result is correct, replace the Engine Oil Pressure Switch. 1. Go to table 2.		

**B: OIL/CHOKE INDICATOR DOES NOT LIGHT WITH THE IGNITION SWITCH IN RUN AND THE ENGINE OFF (TABLE 2)**

Measure: VOLTAGE  
 At: CHOKE HEATER CONNECTOR (Disconnected)  
 Condition:  
 • Ignition Switch: RUN

Measure Between	Correct Voltage	For Diagnosis
Choke Heater Connector & Ground	Battery	See 1
• If the voltage is correct, replace the Choke Heater. 1. Go to table 3.		

**B: OIL/CHOKE INDICATOR DOES NOT LIGHT WITH THE IGNITION SWITCH IN RUN AND THE ENGINE OFF (TABLE 3)**

Measure: VOLTAGE  
 At: ENGINE OIL PRESSURE SWITCH CONNECTOR (Disconnected)  
 Condition:  
 • Ignition Switch: RUN

Measure Between	Correct Voltage	For Diagnosis
B (LT BLU) & Ground	Battery	See 1
• If the voltage is correct, check/repair LT BLU (78) wire for an open. 1. Check/repair TAN (31) wire, Indicator Bulb, and Instrument Cluster Printed Circuit for an open.		

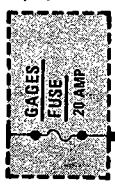
**CIRCUIT OPERATION**

When starting the engine, the Oil/Choke Indicator comes on as a bulb test. The bulb circuit is grounded through the Choke Heater. After the engine starts and the oil pressure comes up above 27 kPa (4 psi) the Engine Oil Pressure Switch closes. This applies battery voltage to the Choke Heater and also to the indicator bulb. The bulb goes out with battery voltage on both sides of it.

If the oil pressure drops, the Engine Oil Pressure Switch opens. The Oil/Choke Indicator lights since one side is again grounded through the Choke Heater.

VEHICLE SPEED SENSOR: OPTICAL TYPE

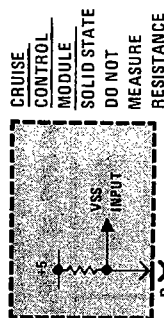
HOT IN RUN, BULB TEST OR START



.8 PNK/BLK 239

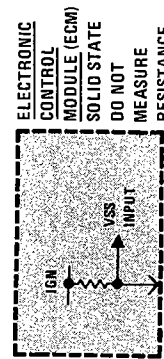
.8 PNK/BLK 239

SEE FUSE BLOCK DETAILS



D

.5 RED 381



16 C1

A10 C2 (TURBO VIN 7)

.8 BRN 437

.5 BRN 437 (TURBO VIN 7)

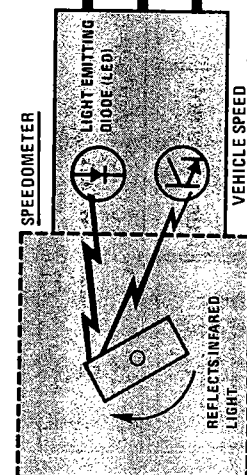
K C437

.8 BRN 437

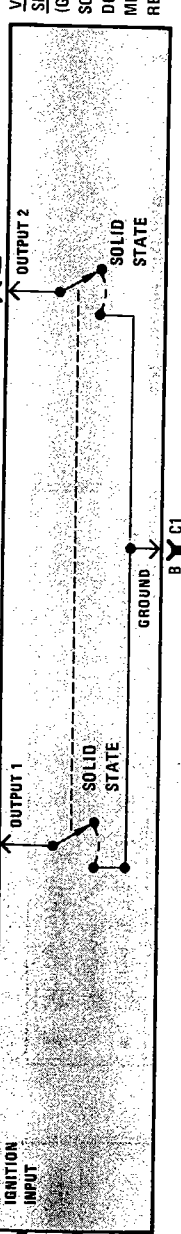
S219

.8 BRN 437

INSTRUMENT PANEL: DIGITAL CLUSTER



C C1



VEHICLE SPEED SENSOR BUFFER (GREEN CASE) SOLID STATE DO NOT MEASURE RESISTANCE

GROUND

B C1

.8 BLK/WHT 450

SEE GROUND DISTRIBUTION

S201

.8 BLK/WHT 450

M C437

1 BLK/WHT 450

SEE GROUND DISTRIBUTION

S668

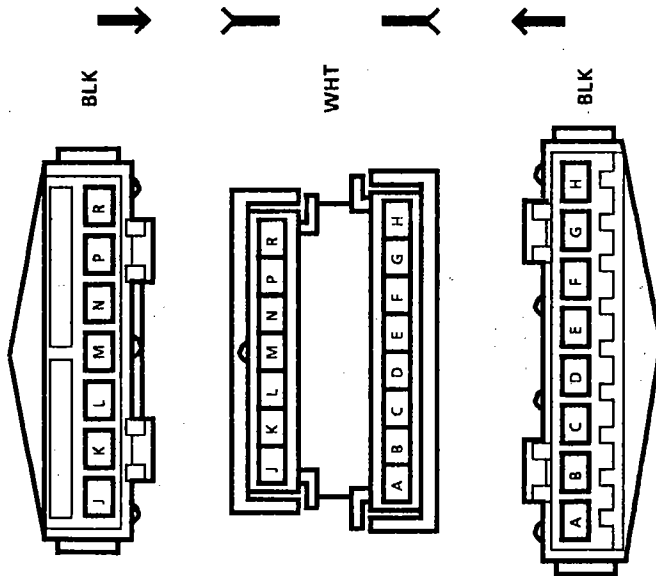
1 BLK/WHT 450

SEE GROUND DISTRIBUTION

G120

**VEHICLE SPEED SENSOR: OPTICAL TYPE**

**HARNES CONNECTOR FACES**



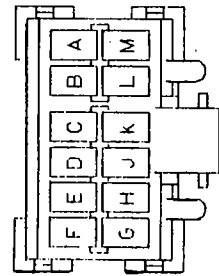
V15001.0  
C437

Electronic Control Module (ECM)  
Connector, See Pages 20-6 and 21-9

**COMPONENT LOCATION**

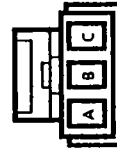
Cruise Control Module	Behind I/P, above accelerator pedal	201-12-A
Electronic Control Module (ECM)	RH shroud, near lower access hole	201-17-B
Fuse Block	Under LH side of I/P	201-12-A
Vehicle Speed Sensor (Optical Type)	In back of instrument cluster	
Vehicle Speed Sensor Buffer	Behind I/P, left of radio	201-16-A
C437 (15 cavities)	Behind RH side of I/P, behind glove box	201-17-B
G120 (VIN 7)	RH rear of engine, on cylinder head	201- 7-A
G120 (VIN A)	LH rear of engine, on cylinder head	201- 1-A
G120 (VIN Y)	RH rear of engine, near distributor	201- 4-A
S201	I/P harness, above radio	201-16-A
S203	I/P harness, above steering column	201-13-B
S219	I/P harness, behind I/P, above radio	201-16-A
S668 (VIN 7)	Engine harness, near relay bracket	201- 8-B
S668 (VIN A)	CCC harness, near blower motor	201-20-B
S668 (VIN Y)	CCC harness, near barometric pressure sensor	201-17-B

Page-Figure



BLK 12034125

Cruise Control Module



C1 BLK



C2 BLK

V00028.0

Vehicle Speed Sensor Buffer

## VEHICLE SPEED SENSOR: OPTICAL TYPE

### TROUBLESHOOTING HINTS

- Try the following checks before doing the System Diagnosis.
  1. Check GAGES Fuse by observing the SERVICE ENGINE SOON Indicator with the Ignition Switch in RUN (engine not running).
  2. If the Speedometer does not operate, there is a mechanical problem with the Speedometer cable system. See Section 7 of the Service Manual for procedures.
  3. Check that ground G120 is clean and tight.
- Go to System Diagnosis for diagnostic tests.

### SYSTEM DIAGNOSIS

- Do the tests listed for your symptom in the Symptom Table below.
- Tests follow the Symptom Table.

### SYMPTOM TABLE

SYMPTOM	FOR DIAGNOSIS
Speedometer works properly, other speed functions do not work	Do Test A
Speedometer and Odometer do not work properly, other speed functions do not work	See Section 7 of the Service Manual for diagnostic procedures

### A: VEHICLE SPEED SENSOR BUFFER TEST

Measure: VOLTAGE		Correct Voltage	For Diagnosis
At: VEHICLE SPEED SENSOR BUFFER (Disconnected)			
Conditions:			
• Ignition Switch: RUN			
• Cruise Control: ON			
Measure Between	Correct Voltage		
C1-C (PNK/BLK) & Ground	Battery		See 1
C1-C (PNK/BLK) & C1-B (BLK/WHT)	Battery		See 2
C1-A (BRN) & Ground	Battery		See 3
C2-D (RED) & Ground	5 Volts		See 4
• If all voltages are correct, repair/replace the Vehicle Speed Sensor Buffer circuit.			
1. Check/repair PNK/BLK (239) wire for an open (see schematic).			
2. Check/repair BLK/WHT (450) wire for an open (see schematic).			
3. Check/repair BRN (437) wire for an open (see schematic). Replace Electronic Control Module if the BRN wire is OK.			
4. Check/repair RED (381) wire for an open (see schematic). Replace Cruise Control Module if the RED wire is OK.			

### CIRCUIT OPERATION

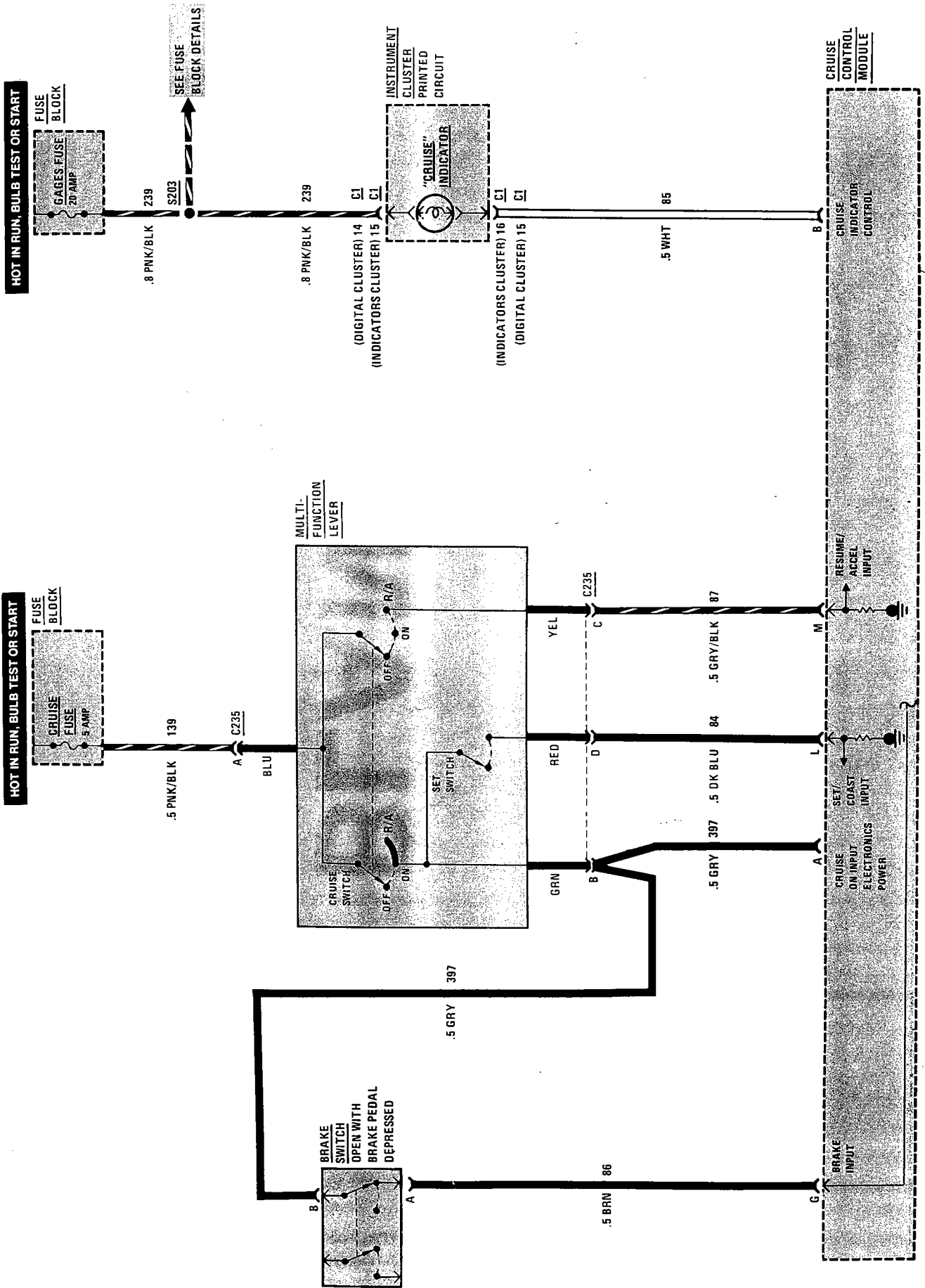
The Vehicle Speed Sensor (VSS) generates a signal that indicates the speed of the vehicle. This signal is processed by the solid-state Vehicle Speed Sensor Buffer to supply inputs to the Electronic Control Module (ECM) and the Cruise Control Module.

The Vehicle Speed Sensor is mounted in the back of the Speedometer. The speedometer cable rotates a disk in the Speedometer. The disk has two reflecting surfaces. Light from an infra-red source in the sensor reflects back to a solid-state detector there. As the speedometer cable turns, pulses of light are returned to the detector and electrical pulses are sent by the sensor to the buffer. The frequency of these pulses depends on the speed of the vehicle. As the speed increases, so does the number of voltage pulses produced each second. There are 2000 pulses for each mile that the car travels.

The Vehicle Speed Sensor Buffer takes the voltage pulses from the sensor, and uses them to close two solid-state switches. Each sensor pulse closes these switches once. The output terminals are switched to ground at a rate that indicates the speed of the vehicle. The output switches in the Vehicle Speed Sensor Buffer are solid-state switches, not mechanical ones. Self-powered test lights or ohmmeters should not be used to test them. Do not measure the resistance at the outputs of the buffer.

**BLANK**

# CRUISE CONTROL



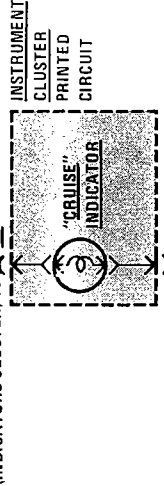
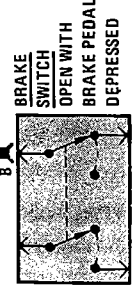
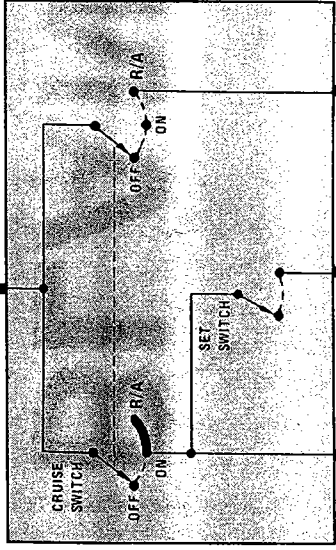
HOT IN RUN, BULB TEST OR START



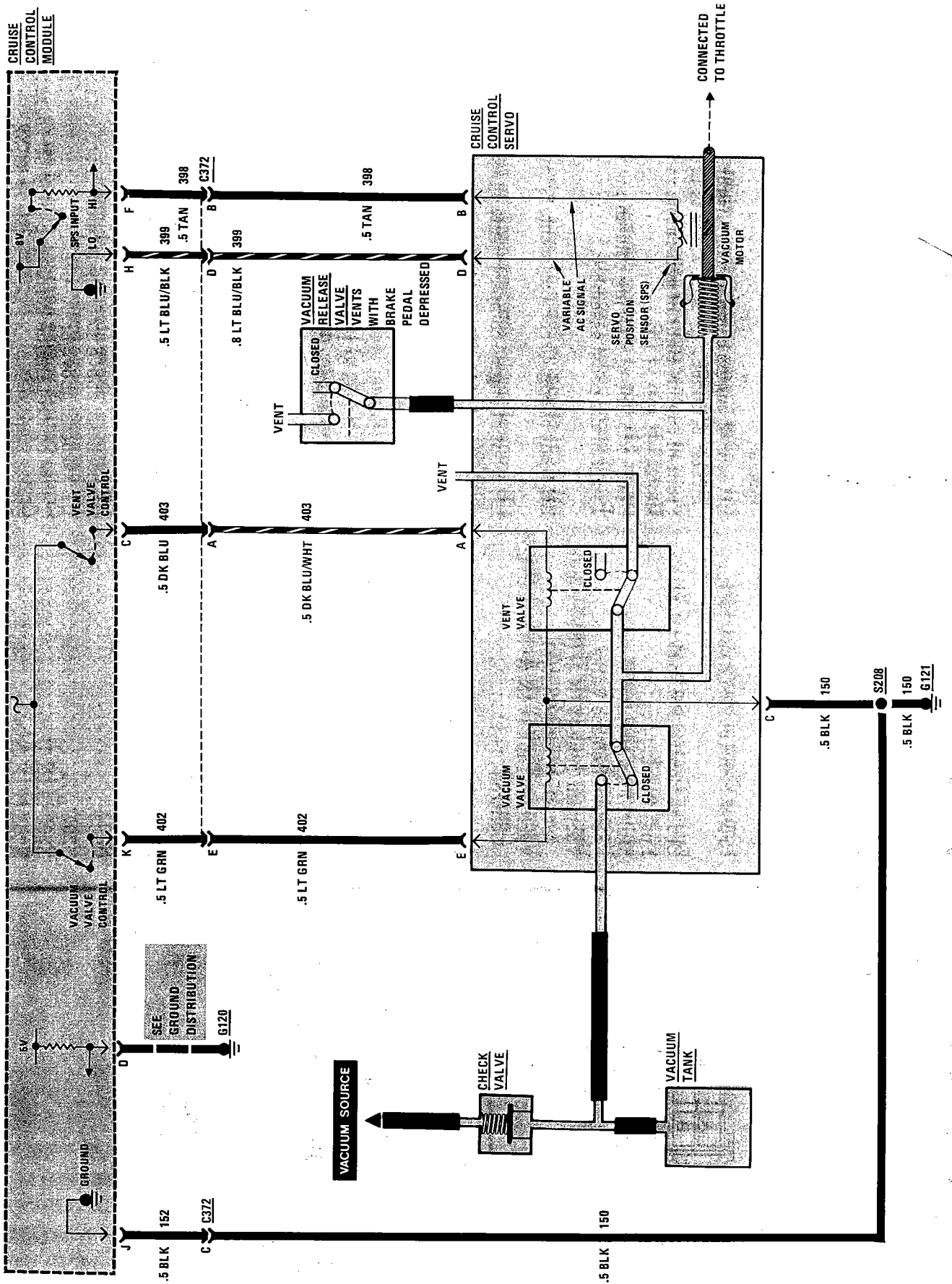
.8 PNK/BLK 239

SEE FUSE BLOCK DETAILS

MULTI-FUNCTION LEVER

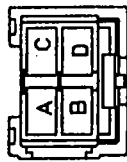






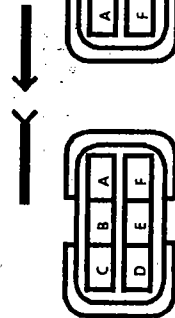
**CRUISE CONTROL**

**HARNES CONNECTOR FACES**



BLK 12020651

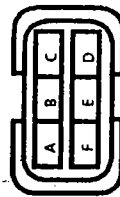
C235



BLK

V06002.1

C372



BLK

**COMPONENT LOCATION**

Page-Figure

Brake Switch	Top of brake pedal support	201-12-A
Check Valve	Above rear of engine, near plenum	201-18-B
Cruise Control Module	Behind I/P, above accelerator pedal	201-12-A
Cruise Control Servo (VIN 7)	LH front of engine compartment, on inner fender	201-18-C
Cruise Control Servo (VIN A)	LH rear of engine compartment, right of brake master cylinder	201-18-B
Cruise Control Servo (VIN Y)	Front of engine, right of generator	201-5-B
Fuse Block	Under LH side of I/P	201-12-A
Multi-Function Lever	Upper LH side of steering column	201-11-C
Vacuum Release Valve	Top of brake pedal assembly	201-12-A
Vacuum Tank (VIN 7) (Electronic A/C Or Cruise Control)	LH front of engine compartment, below battery	201-18-D
Vacuum Tank (VIN A) (With Cruise Control)	LH front of engine compartment, on radiator support	201-18-B
Vacuum Tank (VIN Y) (With Cruise Control)	LH front of engine compartment, below battery	201-18-D
C235 (4 cavities)	Middle of steering column	201-11-C
C372 (5 cavities)	Behind I/P, near steering column	201-12-A
C437 (15 cavities)	Behind RH side of I/P, behind glove box	201-17-B
G120 (VIN 7)	RH rear of engine, on cylinder head	201-7-A
G120 (VIN A)	LH rear of engine, on cylinder head	201-1-A
G120 (VIN Y)	RH rear of engine, near distributor	201-4-A
G121 (VIN 7)	LH side of inner fender, behind cruise control servo	201-18-C
G121 (VIN A)	Rear of engine compartment, right of cruise control servo	201-18-A
G121 (VIN Y)	Front of engine, on generator bracket	201-5-B
S201	I/P harness, above radio	201-16-A
S203	I/P harness, above steering column	201-13-B
S205	I/P harness, above brake pedal	201-12-A
S208 (VIN 7)	Cruise control engine harness, behind servo	201-18-C
S208 (VIN A)	Cruise control engine harness, left of servo	201-18-A
S208 (VIN Y)	Cruise control engine harness, left of servo	201-5-B