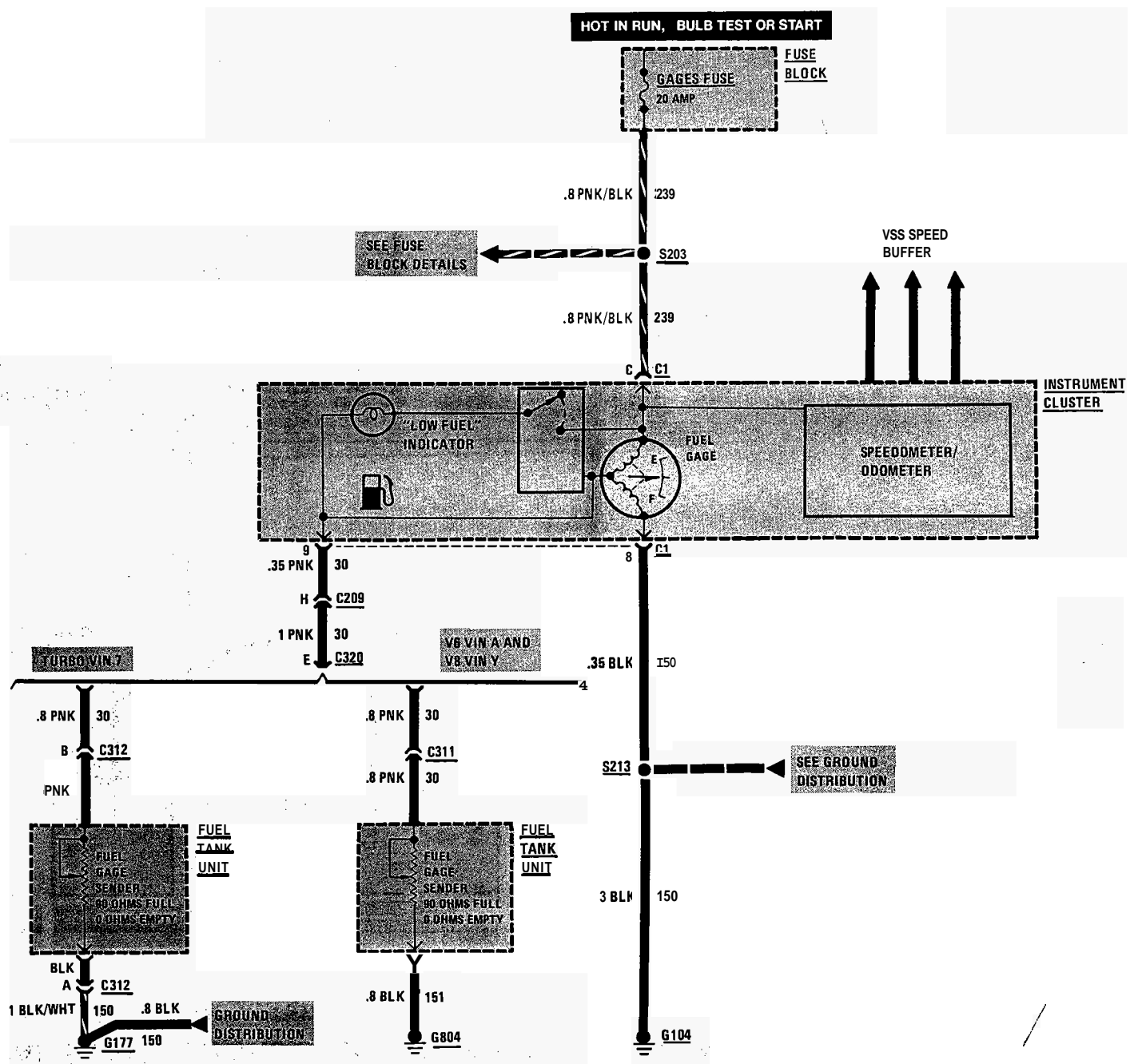


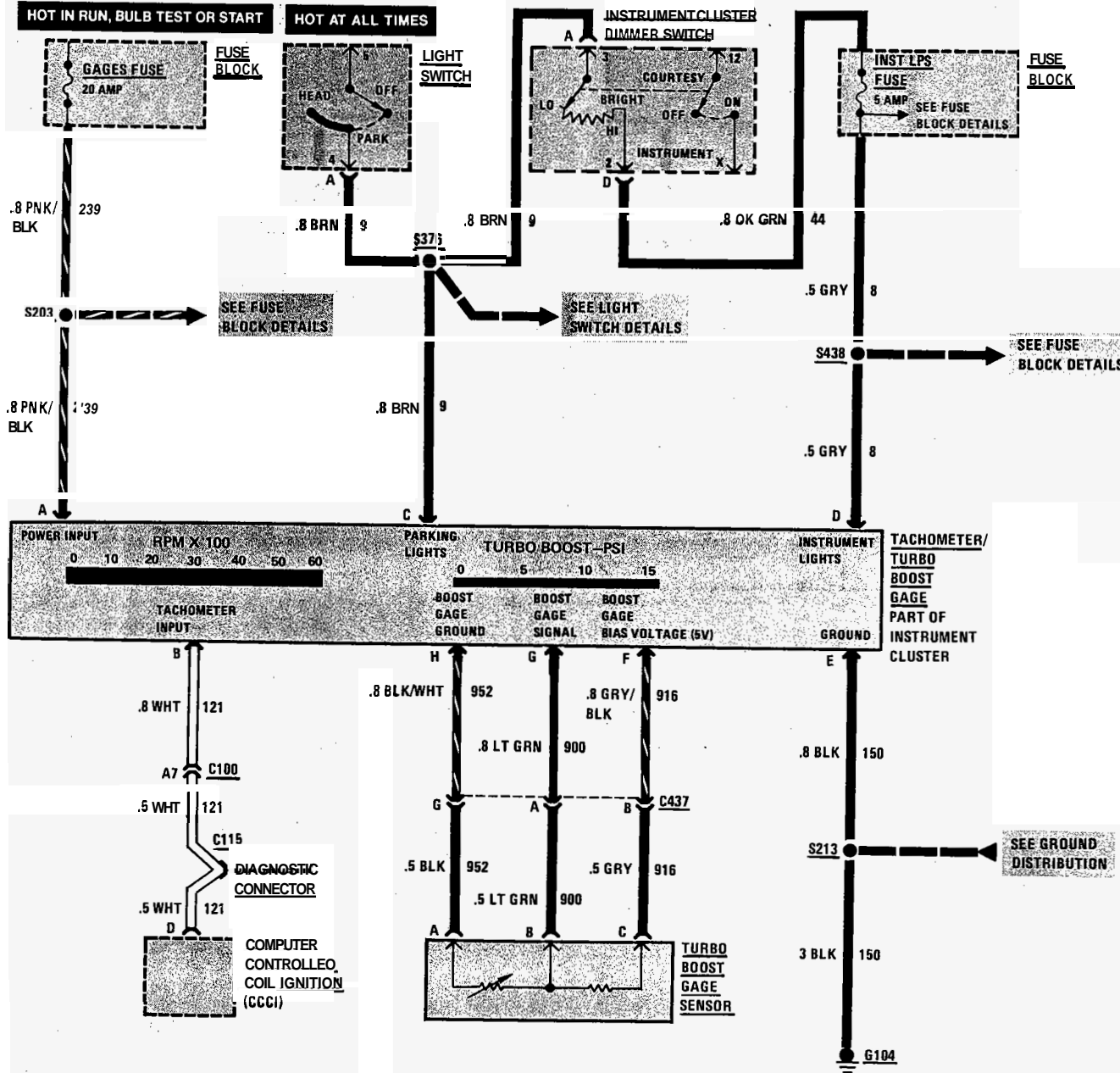
INSTRUMENT PANEL: INDICATORS CLUSTER

FUEL GAGE



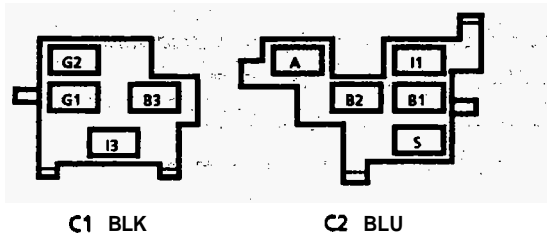
INSTRUMENT PANEL: INDICATORS CLUSTER

TURBO BOOST GAGE AND TACHOMETER



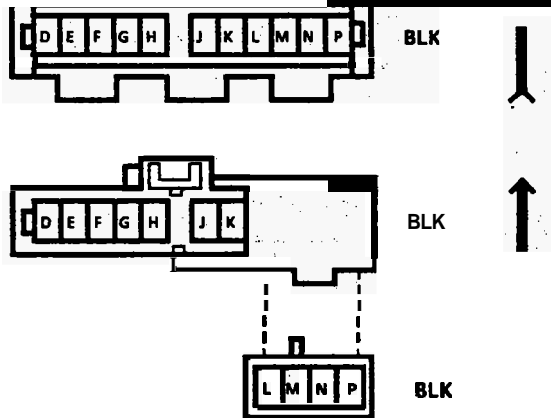
INSTRUMENT PANEL: INDICATORS CLUSTER

HARNESS CONNECTOR FACES



V00019.0
Ignition Switch

C100. See Page 202-0



v11002.0
C209

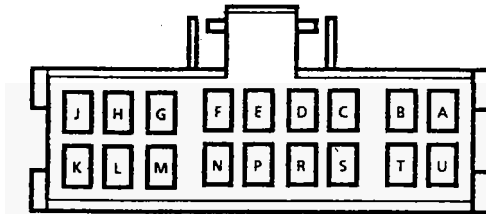
COMPONENT LOCATION

Page-Figure

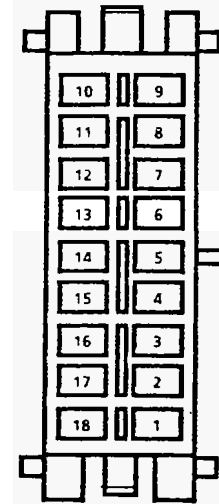
Computer Controlled Coil Ignition (CCCI) Module.....	Rear of engine. above intake manifold	201- 7-A
Coolant Temperature Switch (VIN 7).....	Front of engine. right of coolant outlet	201- 6-A
Coolant Temperature Switch (VIN A).....	Top of engine. behind water pump	201- 0-A
Coolant Temperature Switch (VIN Y).....	Top LH side of engine. behind generator	201- 2-C
Engine Oil Pressure Switch (VIN 7).....	RH front of engine. below turbocharger.....	201- 5-D
Engine Oil Pressure Switch (VIN A).....	Lower RH front of engine	201- 0-A
Engine Oil Pressure Switch (VIN Y).....	RH top rear of engine	201- 2-C
Fuel Tank Unit	Inside fuel tank	201-22-D
Fuse Block	Under LH side of IIP	201-12-A
Ignition Switch.....	Base of steering column.....	201-13-A
Turbo Boost Gage Sensor	On RH front fender. above wheel well	201- 8-C
C100 (45 cavities).....	LH rear of engine compartment	201- 9-B
C115 (VIN 7) (1 cavity).....	Taped to engine harness. behind generator	201- 8-A
C209 (11 cavities).....	Attached to LH side of fuse block	201-13-C
C311 (1 cavity)	Behind center of rear bumper	201-21-B
C312 (3 cavities).....	Behind center of rear bumper	201-21-B
C320 (6 cavities).....	Rear LH corner of trunk	201-22-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
G177	Rear LH corner of trunk	201-22-A
G804	Behind fuel tank. left of license plate	201-22-D
S203.....	I/P harness, above steering column	201-13-B
S213.....	IIP harness, above radio	201-16-A
S290.....	IIP harness, above steering column	201-15-A
S376.....	IIP harness, above fuse block	201-13-B
S438.....	IIP harness, above fuse block	201-15-A

INSTRUMENT PANEL: INDICATORS CLUSTER

HARNESS CONNECTOR FACES

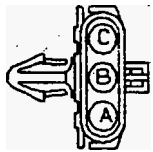


C2 BLK

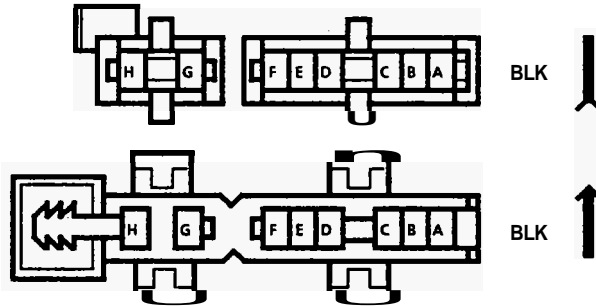


C1 BLK

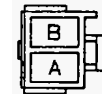
V00017.0
Instrument Cluster



BLK 12033852
Fuel Tank Unit
C312



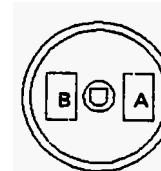
V08002.0
C320



BLK 12033709
Coolant Temperature Switch (V8 VIN Y)



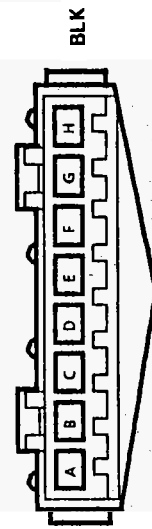
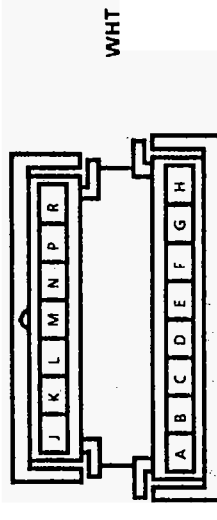
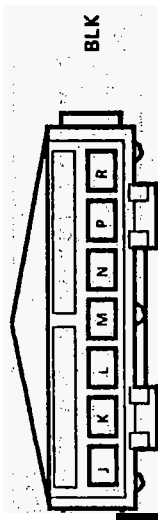
BLK 12034163
Computer Controlled Coil Ignition



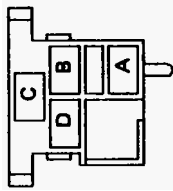
BLK 12004275
Engine Oil Pressure Switch

INSTRUMENT PANEL: INDICATORS CLUSTER

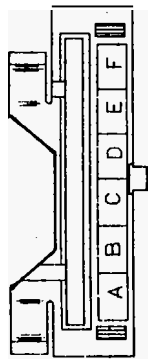
HARNESS CONNECTOR FACES



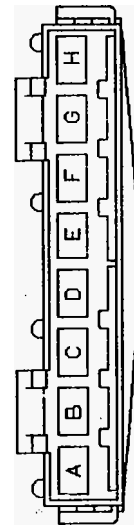
V15001.0
C437



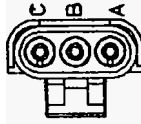
BLK 8917693
Instrument Cluster Dimmer Switch



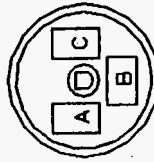
WHT 12020031
Light Switch



BLK 12041 255
Tachometer/Turbo Boost Gage



BLK 12015796
Turbo Boost Gage Sensor



BLK 12020585
Engine Oil Pressure Switch (V6 VIN 7)

TROUBLESHOOTING HINTS

- For Instrument Cluster removal and replacement procedures see Body Service Manual Section 8C.
 - Try the following checks before doing the System Check.
1. Check the Gages Fuse by Inspection.
 2. Check the CIG-CLK Fuse by operating the Cigar Lighter.

3. Check the INST LPS Fuse by observing the Instrument Panel Lights.
4. Check the suspect Indicator Bulbs.
 - Go to System Check for a guide to normal operation.
 - Go to System Diagnosis for diagnostic tests.

SYSTEM CHECK

- For Instrument Cluster removal and replacement procedures see Body Service Manual Section 8C.
- Use the System Check Table as a guide to normal operation. Refer to the diagnosis given if other results occur.
- Tests follow in System Diagnosis.
- Refer to System Diagnosis for a list of symptoms.

ACTION	NORMAL RESULT	FOR DIAGNOSIS
Turn the Ignition Switch to RUN	SERVICE ENGINE SOON Indicator lights OIL/CHOKE Indicator lights VOLTS Indicator lights FASTEN BELTS Indicator lights for 6 to 8 seconds Fuel Gage indicates the correct fuel level (LOW FUEL Indicator lights if fuel is low)	See Section 6 of the Service Manual Do Test E (also see Test H pin 2) See Starter and Charging System 8A-30 (also see Test H pin 3) See 8A-75 to 77 (also see Test H pin 6) See Symptom Table (also see Test H pin 9)
Turn the Ignition Switch to BULB TEST	WATER TEMP Indicator lights	Do Test D (also see Test H pin 4)
With the Ignition Switch in RUN, apply the Park Brake'	BRAKE Indicator lights	See Brake Warning System 8A-41 (also see Test H pin 5)
Turn the Headlights and HI Beams on	HI BEAM Indicator lights	See Headlights 8A-100 and 101 (also see Test H pin 18)
With the Headlights on, adjust the Instrument Panel Dimmer Control	Instrument Panel illumination varies as the control is adjusted	See Interior Lights Dimming, 8A-117 (also see Test H pin 10)
With Ignition in RUN, operate the Turn signals and Hazard lights	LH & RH Turn Indicators light	See Exterior Lights, 8A-110 (also see Test H pins 17 and 7)

INSTRUMENT PANEL: INDICATORS CLUSTER

(Continued from facing page)

SYSTEM DIAGNOSIS

- For Instrument Panel removal and replacement procedures see **Body Service Manual Section 8C**.
- Do the tests listed for your symptom in the **Symptom Table** below or when directed by the **System Check**.
- Tests follow the **Symptom Table**.
- Refer to **System Diagnosis** for a list of symptoms.

SYMPTOM	FOR DIAGNOSIS
FUEL Gage always indicates full	Do Test A (also see Test H Din 9)
FUEL Gage always indicates empty	Do Test A (also see Test H pin 9)
FUEL Gage is inaccurate	Do Test B (also see Test H Din 9)
LOW FUEL Indicator does not work properly (Fuel Gage is OK)	Replace the Fuel Gage Unit (see Body Service Manual Section 8C)
WATER TEMP Indicator does not light in BULB TEST	Do Test C (also see Test H pin 4)
WATER TEMP Indicator is always on	Do Test D (also see Test H pin 4)
OIL/CHOKE Indicator does not light with the Ignition Switch in RUN	Do Test E (also see Test H pin 2)

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OIL/CHOKE Indicator lights continuously with the oil pressure OK	Do Test E (also see Test H pin 2)
Security Indicator does not operate	See Theft Deterrent, 8A-133
HIGH BEAM Indicator does not work properly	See Headlights, 8A-100 and 101 (also see Test H pin 18)
TURN Indicators do not work properly	See Turn/Hazard, 8A-110 (also see Test H pins 17 and 7)
SERVICE ENGINE SOON Indicator does not work properly	See Section 6 of the Service Manual
VOLTS Indicator does not work properly	See Starter and Charging System, 8A-30 (also see Test H Din 3)
BRAKE Indicator does not work properly	See Brake Warning System, 8A-41 (also see Test H pin 5)
FASTEN BELTS Indicator does not work properly	See Warnings and Alarms, 8A-75 to 77 (also see Test H pin 6)
CRUISE Indicator does not work properly	See Cruise Control, 8A-34 (also see Test H pin 16)
Speedometer does not work properly but the Odometer works	Replace the Instrument Cluster (see Body Service Manual Section 8C)
Odometer does not work but the Speedometer works	Replace the Instrument Cluster (see Body Service Manual Section 8C)

(Continued in next column)

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Speedometer and Odometer do not work	See Section 7A of the Service Manual
Instrument Panel Illumination will not vary with the Instrument Panel Dimmer Switch position	See Interior Lights Dimming, 8A-117 (also see Test H pin 10)
Tachometer does not work properly	Do Test F (also see Test I pin B)
Turbo Boost Gage does not work properly	Do Test G (also see Test I pins F, G, H)

A: FUEL GAGE SENDER TEST

Connect: FUSED JUMPER
At: FUEL TANK UNIT CONNECTOR HARNESS HALF (Disconnected)

Conditions:

- Ignition Switch: RUN
- Recycle Ignition Switch after each jumper connection

Connect Between	Correct Results	For Diagnosis
PNK (30) & Ground	Fuel Gage Reads Empty	See 1
PNK 30 & BLK (150)	Fuel Gage Reads Empty	See 2
Do Not Connect	Fuel Gage Reads Full	See 3

INSTRUMENT PANEL: INDICATORS CLUSTER

A: FUEL GAGE SENDER TEST (Continued from previous page)

- If all three Fuel Gage Indications are correct, replace Fuel Gage Sender.
1. Check the PNK/BLK (239) wire for an open (see schematic). If OK, replace the Fuel Gage.
 2. Check the BLK (150) wire for an open (see schematic).
 3. Check the PNK/BLK (239) wire for an open (see schematic). If OK, replace the Fuel Gage (see Body Service Manual Section 8C).

B: INACCURATE FUEL GAGE TEST

1. Temporarily replace the Fuel Gage Sender with a known good unit. Move float up and down.
- If the Fuel Gage responds properly, replace the Fuel Gage Sender.
 - If the Fuel Gage does not respond properly, check for clean and tight Fuel Gage connections. Replace the Fuel Gage if the connections are OK.

Measure Between	Correct Results	For Diagnosis
G1 & Ground	Ohmmeter Reads 0 ohms	See 1

(Continued in next column)

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- If the resistance is correct, check/repair the DK GRN (35) wire (see schematic) for an open. Check Instrument Panel printed circuit.
1. Repair/replace Ignition Switch.

D: TEMPERATURE INDICATOR SWITCH TEST

Connect: FUSED JUMPER
At: COOLANT TEMPERATURE SWITCH CONNECTOR (Disconnected)
Conditions:

- Ignition Switch: RUN

Connect Between	Correct Result	For Diagnosis
B (DK GRN) & Ground	WATER TEMP Indicator lights	See 1
Do Not Connect	WATER TEMP Indicator is OFF	See 2

- If both Indicator responses are correct, repair/replace Temperature Indicator Switch.

1. Check the DK GRN (35) or (112) wire and the Instrument Cluster printed circuit for an open (see schematic) and see Body Service Manual section 8C).
2. Check the DK GRN (35) or (112) wire (see schematic) for a short to ground. Check Instrument Cluster printed circuit. If OK, do Test C: Ignition Switch Test.

E: ENGINE OIL PRESSURE SWITCH TEST

Connect: FUSED JUMPER
At: ENGINE OIL PRESSURE SWITCH CONNECTOR (Disconnected)
Conditions:

- Ignition Switch: RUN

Connect Between	Correct Result	For Diagnosis Of Incorrect Results
TAN (31) & Ground	Oil Indicator lights	See 1
Do Not Connect	Oil Indicator does not light	See 2

- If both test results were correct, replace the Engine Oil Pressure Switch.

1. Check the TAN (31) wire and the Instrument Cluster Printed Circuit for an open (see schematic).
2. Check the TAN (31) wire and the Instrument Cluster Printed Circuit for a short to ground (see schematic).

Measure Between	Correct Voltage	For Diagnosis
B (WHT) & Ground	1 to 7 Volts varies with Engine RPM	See 1

F: TACHOMETER INPUT TEST (Continued on next page)

INSTRUMENT PANEL: INDICATORS CLUSTER

F: TACHOMETER INPUT TEST (Continued from previous page)

- If the voltage readings are correct, replace the Instrument Cluster (see Body Service Manual Section 8C).
- 1. Check the WHT (121) wire for an open. If OK the Computer Controlled Coil Ignition (CCCI) is at fault (see Section 6D of the Service Manual).

G: TURBO BOOST GAGE TEST

Measure Between	Correct Voltage	For Diagnosis
C (GRY) & Ground	5 volts	See 1
C (GRY) & A (BLK)	5 volts	See 2

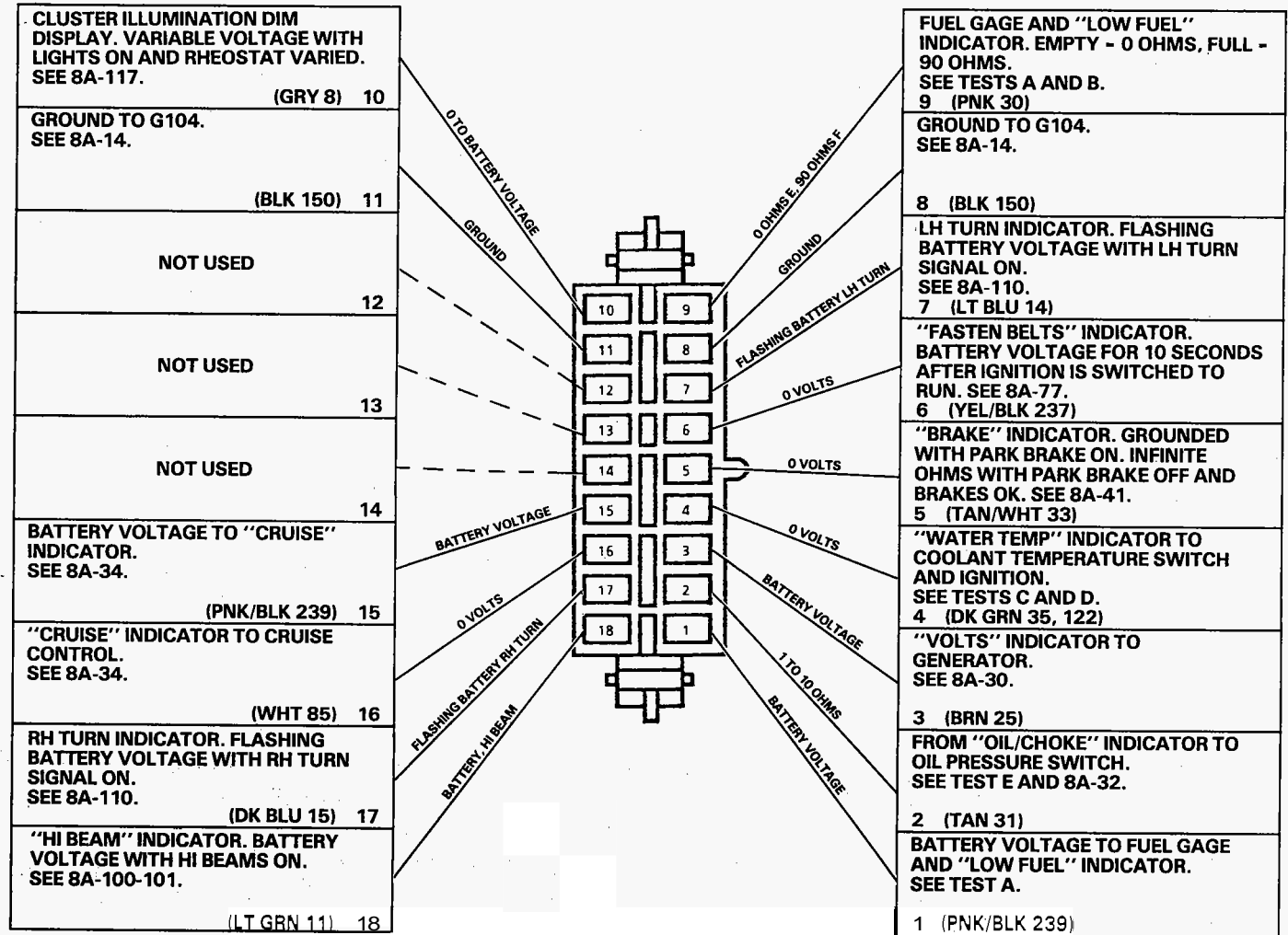
- If both tests give the correct voltage, check the LT GRN (900) wire for an open (see schematic), then go to G1.
- 1. Check the GRY and GRY/BLK (916) wires for an open (see schematic).
- 2. Check the BLK and BLK/WHT (952) wires for an open (see schematic).

G1. REPLACE THE TURBO BOOST GAGE SENSOR WITH A KNOWN GOOD UNIT

- If the Turbo Boost Gage does not work properly replace the Instrument Cluster (see Body Service Manual Section 8C). Reinstall the original Turbo Boost Gage Sensor.
- If the Turbo Boost Gage now works properly, permanently replace the Turbo Boost Gage Sensor.

H: C1 PINOUT TEST

- IGNITION SWITCH IN RUN EXCEPT FOR RESISTANCE MEASUREMENTS
- MEASURE TO GROUND UNLESS ANOTHER TERMINAL IS GIVEN
- CLUSTER CONNECTOR C1 AS SEEN FROM THE DRIVER'S SEAT WITH THE DIGITAL CLUSTER REMOVED
- IF THE CORRECT VOLTAGE OR RESISTANCE IS FOUND AT THE TERMINALS, AND THE CLUSTER FUNCTION THAT USES THOSE TERMINALS DOES NOT OPERATE, REPLACE THE INSTRUMENT CLUSTER. (CHECK BULBS AND PRINTED CIRCUIT FIRST)
- IF THE CORRECT VOLTAGE OR RESISTANCE IS NOT FOUND AT A TERMINAL, DO THE TEST GIVEN OR GO TO THE PAGE REFERRED

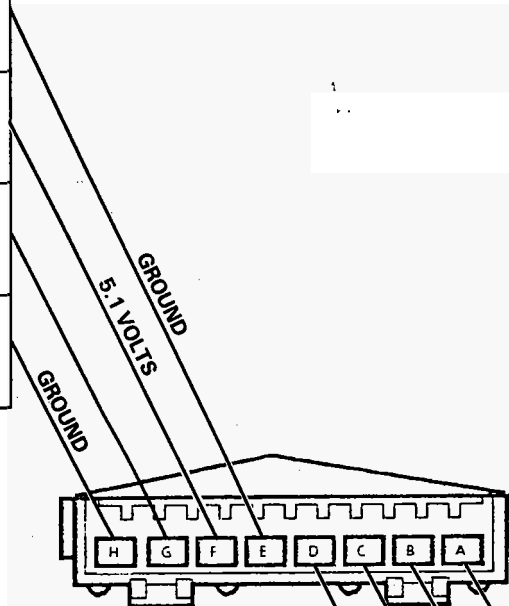


INSTRUMENT PANEL: INDICATORS CLUSTER

I: C2 PINOUT TEST

- IGNITION SWITCH IN RUN EXCEPT FOR RESISTANCE MEASUREMENTS
- MEASURE TO GROUND UNLESS ANOTHER TERMINAL IS GIVEN
- CLUSTER CONNECTOR C2 AS SEEN FROM THE DRIVER'S SEAT WITH THE DIGITAL CLUSTER REMOVED
- IF THE CORRECT VOLTAGE OR RESISTANCE IS FOUND AT THE TERMINALS, AND THE CLUSTER FUNCTION THAT USES THOSE TERMINALS DOES NOT OPERATE. REPLACE THE INSTRUMENT CLUSTER. (CHECK BULBS AND PRINTED CIRCUIT FIRST)
- IF THE CORRECT VOLTAGE OR RESISTANCE IS NOT FOUND AT A TERMINAL, DO THE TEST GIVEN OR GO TO THE PAGE REFERRED

GROUND TO G104. SEE 8A-14.	(BLK 150) E
TURBO BOOST GAGE BIAS VOLTAGE. SEE TEST G.	(GRY/BLK 916) F
TURBO BOOST GAGE SIGNAL VOLTAGE. SEE TEST G.	(LT GRN 900) G
TURBO BOOST GAGE GROUND IN THE INSTRUMENT CLUSTER. SEE TEST G.	(BLK/WHT 952) H



IGNITION VOLTAGE TO TACHOMETER.
SEE 8A-11.

A (PNK/BLK 239)

TACHOMETER INPUT TO IGNITION COIL. MEASURE WITH ENGINE RUNNING. USE A DC VOLTMETER. SEE TEST F.

B (WHT 121)

PARKING LIGHTS. BATTERY VOLTAGE WHEN PARK OR HEADLIGHTS ARE ON. 0 VOLTS OTHERWISE.

SEE 8A-110.

C (BRN 9)

DISPLAY DIM INPUT. VARIABLE VOLTAGE WHEN LIGHTS ARE ON AND DIMMER RHEOSTAT IS ADJUSTED. SEE 8A-117.

D (GRY 8)

CIRCUIT OPERATION

The operation of an indicator is explained in the operation of its circuit. See the circuit referred to for the complete operation of an indicator and the other components that work with it. Only the gages and indicators that do not appear in other schematics are described in this section.

TURBO BOOST GAGE AND TACHOMETER

With the Ignition Switch in RUN, BULB TEST, or START, voltage is available to terminal A (Power Input) of the Tachometer/Turbo Boost Gage. When the Turbo System is operating, the Turbo Boost Gages Sensor signals the boost gage concerning the amount of turbo boost. The gage then displays how much turbo boost the engine is receiving.

The Tachometer/Turbo Boost Gage at the Tachometer input receives a signal from the Computer Controlled Coil Ignition (CCCI). The gage then displays engine RPM.

Voltage to light the gage displays is available at all times through the Light Switch, the Instrument Cluster Dimmer Switch and the INST LPS Fuse. The Dimmer Switch can be used to control the brightness of the gage displays.

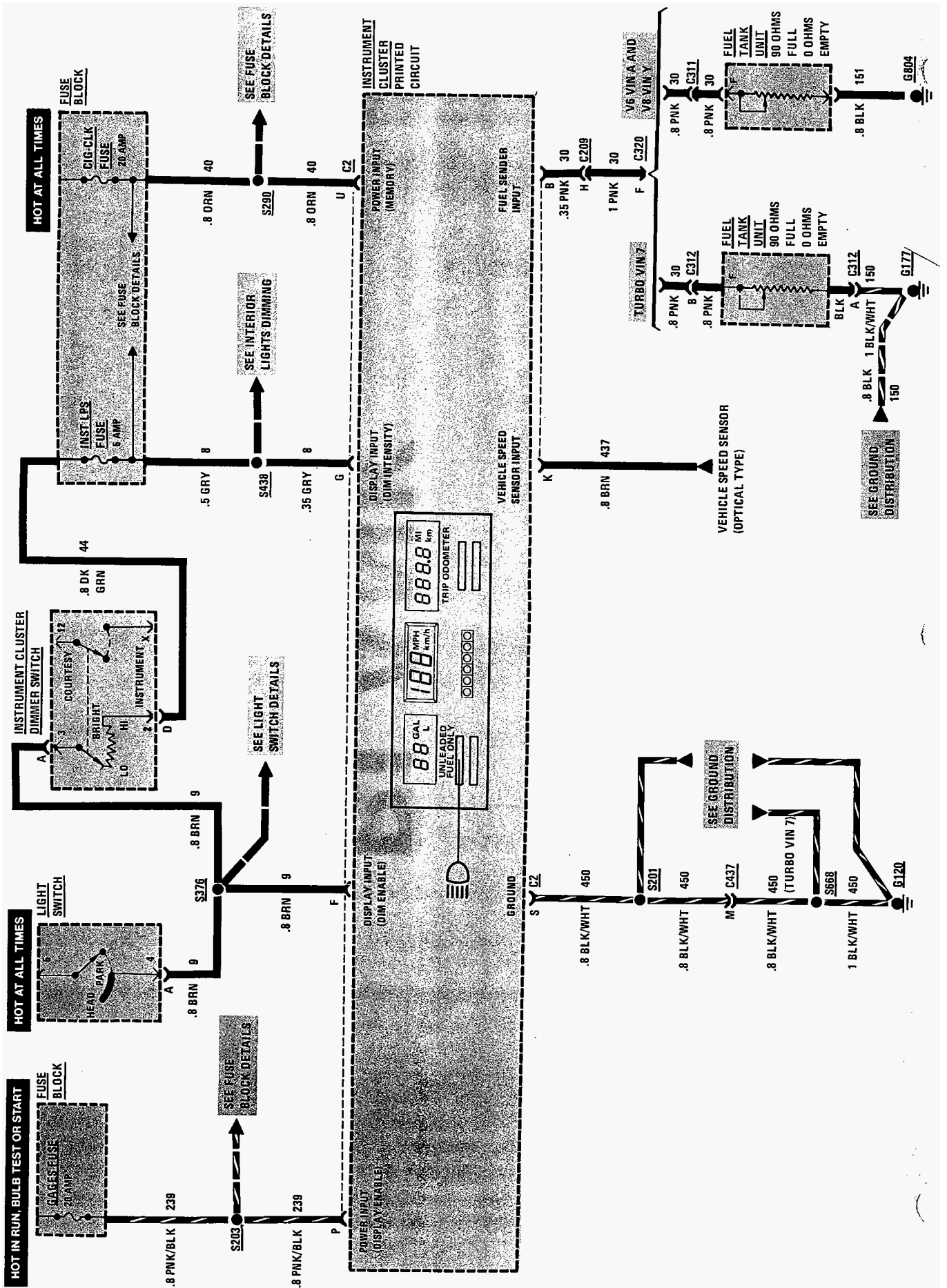
FUEL GAGE DISPLAY

The pointer of the Fuel Gage is moved by the magnetic fields of two coils. The coils are at right angles to each other. Battery voltage is applied to the E coil and the circuit divides at the opposite end of this coil. One path continues to ground through the F coil. Another goes to ground through the variable resistor of the Fuel Gage Sender.

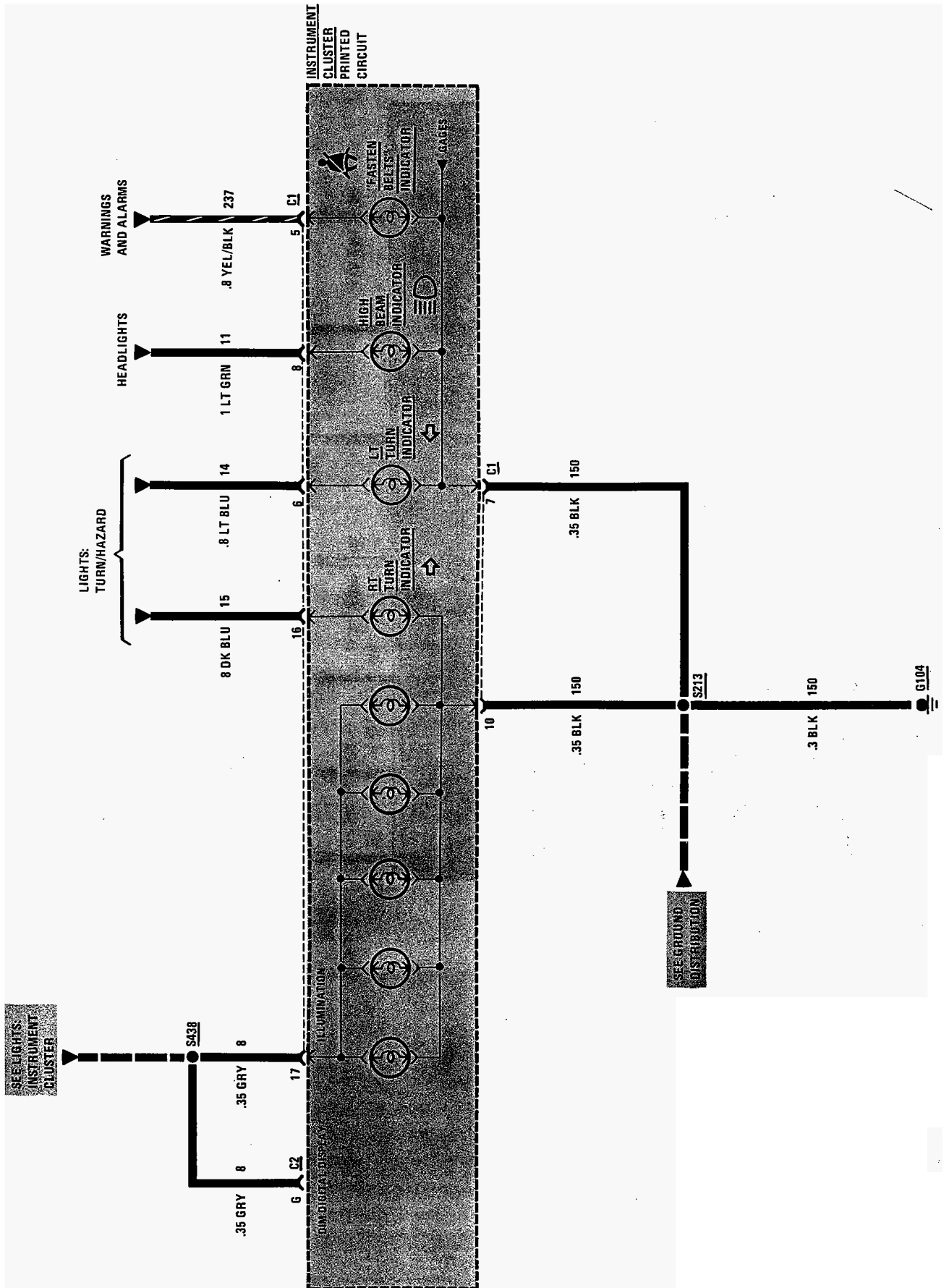
When the tank is low, the resistance of the sender is low. A large flow of current passes through the E coil and the Fuel Gage Sender resistor. This pulls the pointer toward E on the scale. At the same time more current is allowed to flow through the LOW FUEL Indicator causing it to light. When the tank is full, the sender resistance is high. More current now flows through the F coil, moving the pointer toward F on the scale.

With two coils operating the pointer, the gage is not affected by changes in the voltage of the system.

INSTRUMENT PANEL: DIGITAL CLUSTER

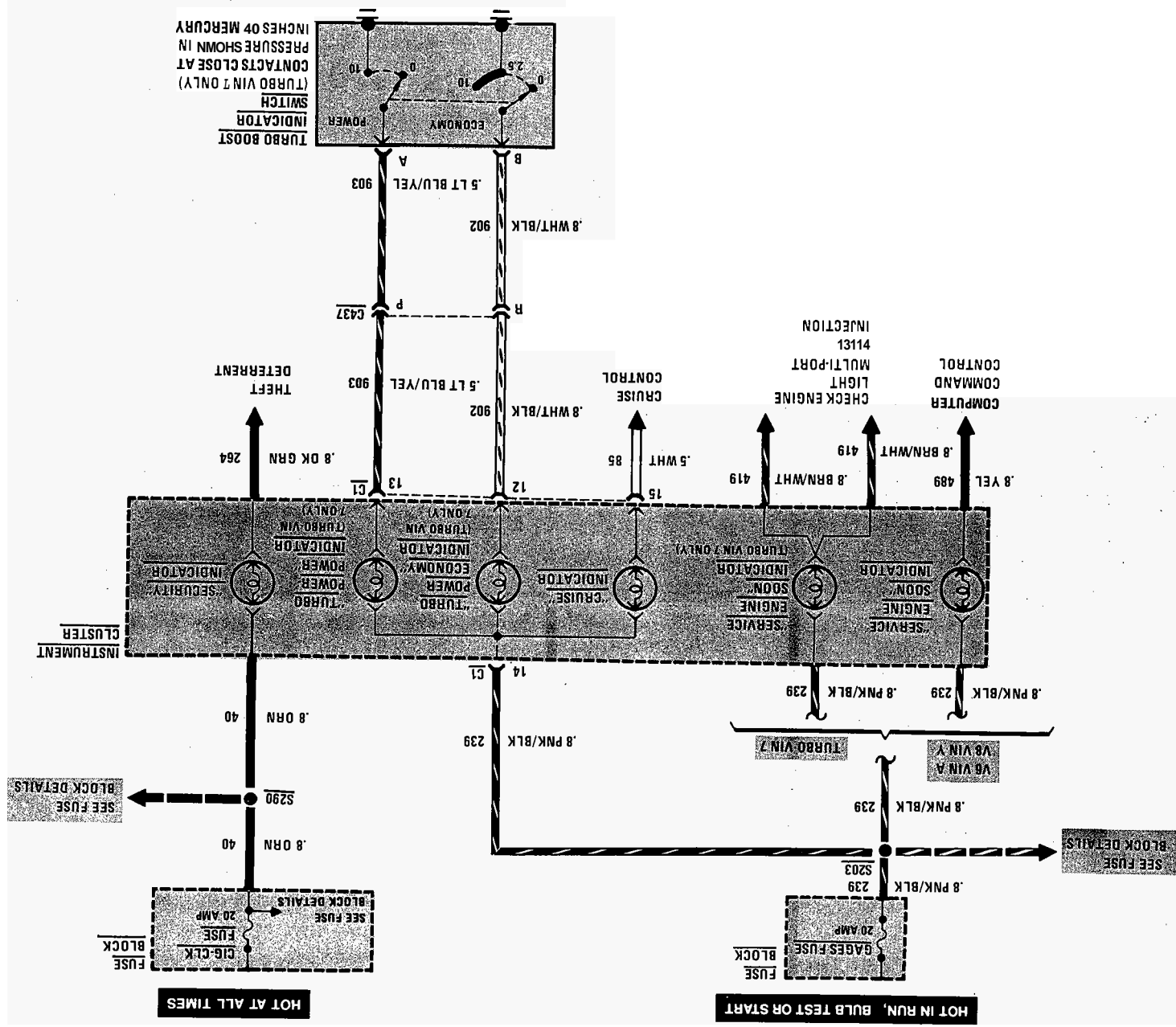


INSTRUMENT PANEL: DIGITAL CLUSTER LIGHTS AND INDICATORS



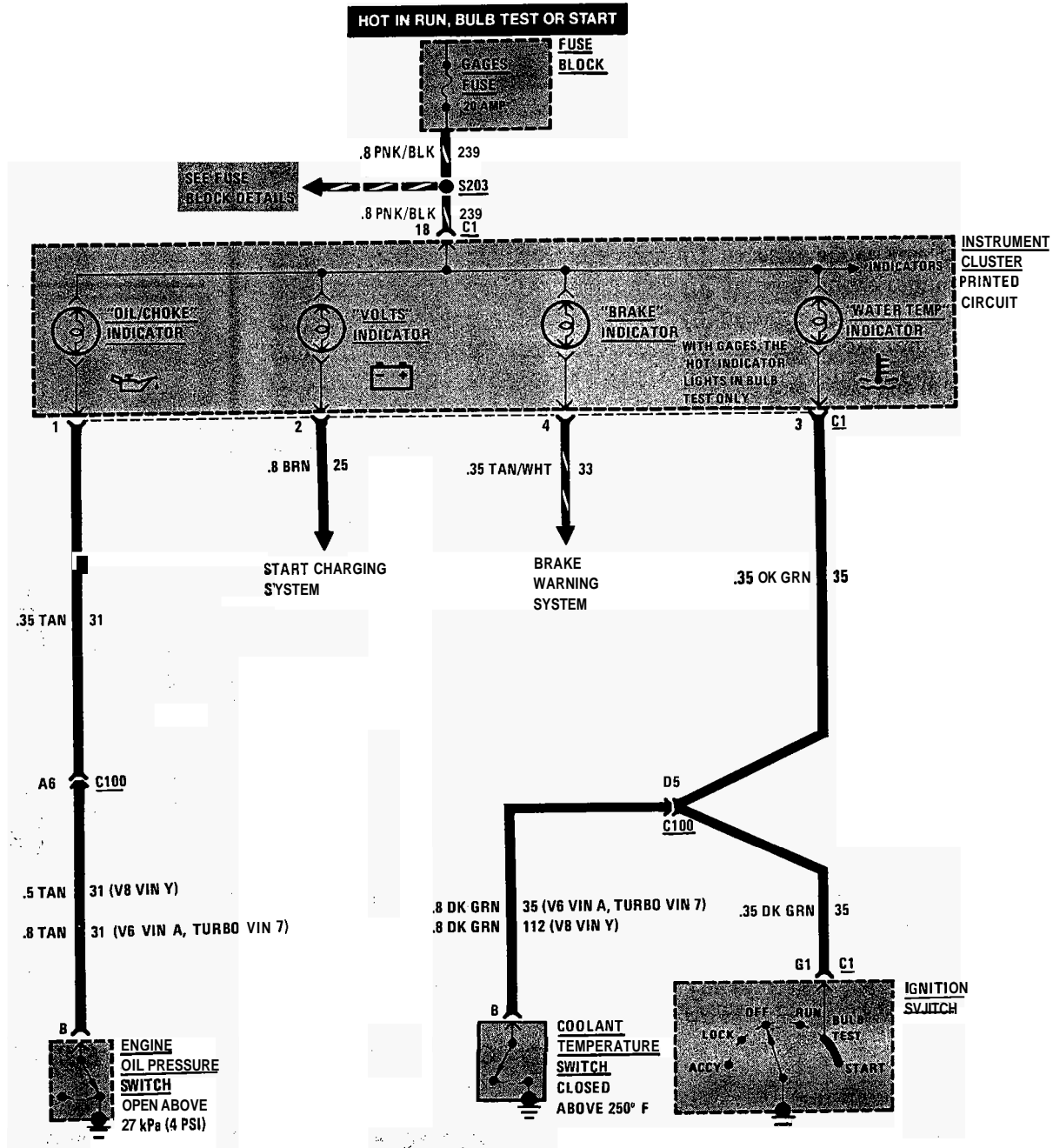
INSTRUMENT PANEL: DIGITAL CLUSTER

INDICATORS



INSTRUMENT PANEL: DIGITAL CLUSTER

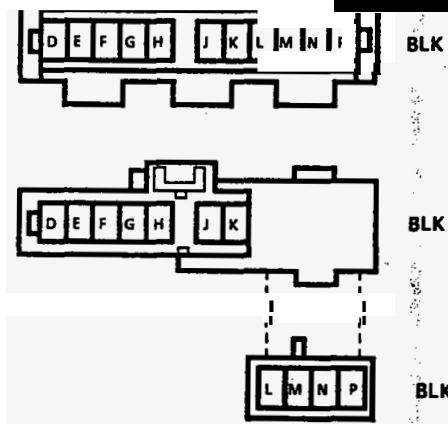
INDICATORS



INSTRUMENT PANEL: DIGITAL CLUSTER

HARNESS CONNECTOR FACES

C100, See Page 202-0



v11002.0

C209



BLK 12033852

Fuel Tank Unit

C312

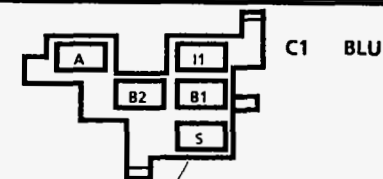
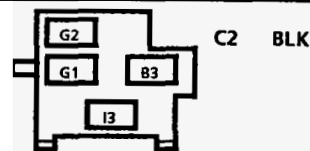
COMPONENT LOCATION

Page-Figure

Coolant Temperature Switch (VIN 7)	Front of engine, right of coolant outlet	201- 6-A
Coolant Temperature Switch (VINA)	Top of engine, behind water pump	201- 0-A
Coolant Temperature Switch (VIN Y)	Top LH side of engine, behind generator	201- 2-C
Engine Oil Pressure Switch (VIN 7)	RH front of engine, below turbocharger	201- 5-D
Engine Oil Pressure Switch (VINA)	Lower RH front of engine	201- 0-A
Engine Oil Pressure Switch (VIN Y)	RH top rear of engine	201- 2-C
Fuel Tank Unit	Inside fuel tank	201-22-D
Fuse Block	Under LH side of I/P	201-12-A
Ignition Switch	Base of steering column	201-13-A
Turbo Boost Indicator Switch	On RH front fender, above wheel well	201- 8-B
C100 (45 cavities)	LH rear of engine compartment	201- 9-B
C209 (11 cavities)	Attached to LH side of fuse block	201-13-C
C311 (1 cavity)	Behind center of rear bumper	201-21-B
C312 (3 cavities)	Behind center of rear bumper	201-21-B
C320 (6 cavities)	Rear LH corner of trunk	201-22-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 (VIN 7)	RH rear of engine, on cylinder head	201- 7-A
G120 (VINA)	LH rear of engine, on cylinder head	201- 1-A
G120 (VIN Y)	RH rear of engine, near distributor	201- 4-A
G177	Rear LH corner of trunk	201-22-A
G804	Behind fuel tank, left of license plate	201-22-D
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
S290	I/P harness, above steering column	201-15-A
S376	I/P harness, above fuse block	201-13-B
S438	I/P harness, above fuse block	201-15-A
S668 (VIN 7)	Engine harness, near relay bracket	201- 8-B
S668 (VINA)	CCC harness, near blower motor	201-20-B
S668 (VIN Y)	CCC harness near barometric pressure sensor	201-17-B

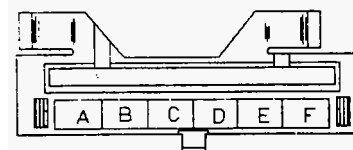
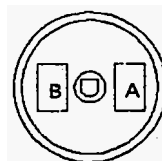
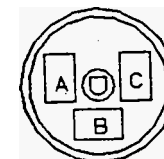
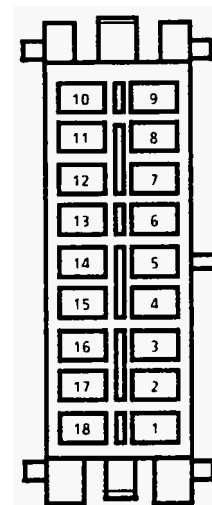
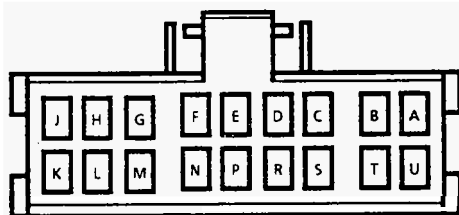
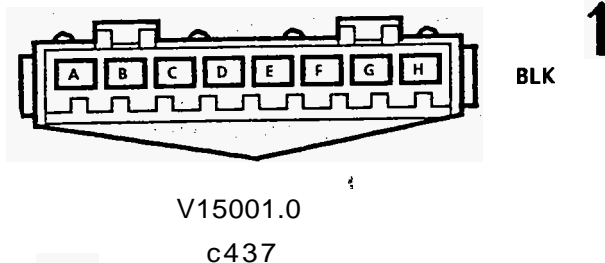
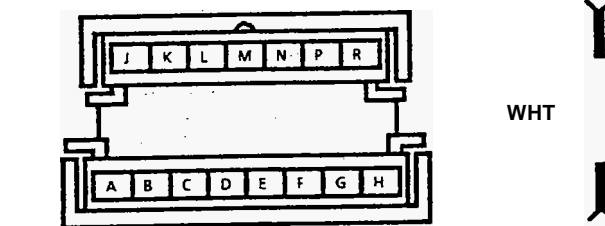
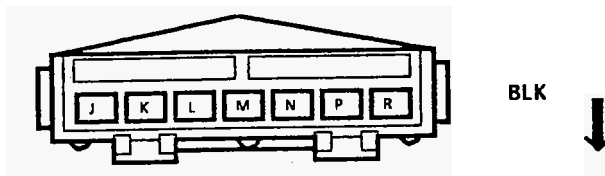
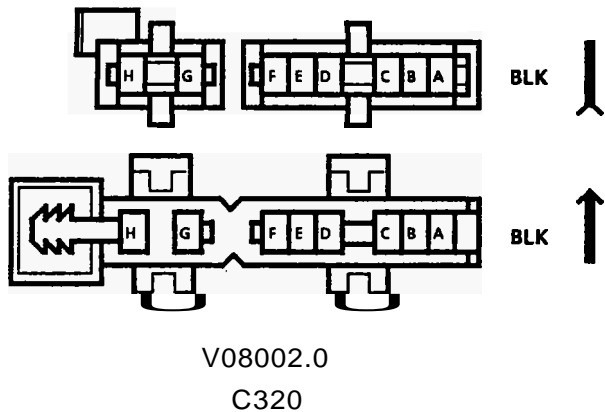
Ignition Switch

V00019.0



INSTRUMENT PANEL: DIGITAL CLUSTER

HARNES CONNECTOR FACES



TROUBLESHOOTING HINTS

- For Instrument cluster removal and replacement procedures, see section 8C of the Service Manual.
 - For a list of possible symptoms, go to System Diagnosis.
 - Try the following checks before doing the System Check.
1. If only one display in a cluster does not operate, the condition is probably in the vehicle circuit supplying that display.
 2. Check the Gages Fuse by operating the Parking Brake **and** observing the Brake Indicator Light (Ignition Switch in RUN).

3. Check the INST LPS Fuse by moving the light switch to PARK and observing the Ash Tray Light.
4. Check the CIG-CLK Fuse by observing the glove box light.
5. If an indicator light will not light, check the bulb.
6. If a group of lights will not light, check the wire common to all affected lights for an open (see schematic).

- Go to System Check for a guide to normal operation.
- Go to System Diagnosis for diagnostic tests.

SYSTEM CHECK

- For Instrument Cluster removal and replacement procedures see section 8C of the Service Manual.
- Use the System Check Table as a guide to normal operation. Refer to the diagnosis given if other results occur.
- Tests follow in System Diagnosis.
- Refer to System Diagnosis for a list of Symptoms.

(Continued on facing page)

INSTRUMENT PANEL: DIGITAL CLUSTER

SYSTEM CHECK TABLE

ACTION	NORMAL RESULT	FOR DIAGNOSIS
1. Turn the Ignition Switch to RUN	A. All display segments light for 2 seconds Display then indicates actual values B. FASTEN BELTS Indicator lights for about 5 seconds C. OIL INDICATOR lights D. VOLTS INDICATOR lights E. SERVICE ENGINE SOON Indicator lights	Refer to Symptom Diagnosis
2. Set the Parking Brake (Ignition Switch in RUN)	Brake indicator lights	Refer to Brake Warning System (8A-41)
3. Operate the Turn Signals (Ignition Switch in RUN)	Green turn indicator arrows flash on and off with the turn lights	Refer to Exterior Lights (8A-110)
4. Place the light switch in the PARK or HEAD Position	The Cluster Illumination lights come on	Refer to Interior Lights Dimming (8A-117)
5. Operate the High Beam Light Switch (Light Switch on)	High Beam Indicator comes on with the High Beams	Refer to Headlights (8A-100)
6. Turn the Reset E/M Knob on the cluster (Ignition Switch in RUN)	Readouts change between English and metric reading, this affects the Speedometer and Odometer.	Replace the cluster (see Section 8C)
7. Press the Reset E/M Knob on the cluster (Ignition Switch in RUN)	The Trip Odometer resets to zero	Replace the cluster (see Section 8C)
8. Put the Hazard Lights on	Both Turn Indicators flash on and off repeatedly	Refer to Exterior lights (8A-110)
9. Rotate the Dimmer Switch (Ignition Switch in RUN)	Digital Display brightness varies with Dimmer Switch position	Do Test A: Dimmer Test
10. Rotate the Dimmer Switch with the Light Switch in the PARK position	Illumination Light brightness varies with Dimmer Switch position	Refer to Interior Lights Dimming (8A-117)
11. Turn Ignition from RUN to OFF	Security Indicator flashes (Theft Deterrent Only)	Refer to Theft Deterrent (8A-133)

- If all results are normal, the system is OK.

Table below,

(Continued from previous page)

SYMPTOM TABLE

DISPLAYS	SYMPTOM	FOR DIAGNOSIS
CLUSTER	Illumination lights do not light Display segments are not all lit or the digits displayed are incomplete Illumination brightness does not vary with the Dimmer Switch Digital display brightness does not vary with Dimmer Switch Digital displays do not change between English and Metric Display elements do not light at all Speedometer does not operate, Trip Odometer is OK	Refer to Interior Lights Dimming (8A-117) Replace the Cluster (see Section 8C) Refer to Interior Lights Dimming (8A-117) Do Test A Replace the Instrument Cluster (see Section 8C) Do Test B Replace the Cluster (see Section 8C)
SPEEDMETERWODOMETERS	Trip Odometer does not operate, Speedometer is OK Speedometer and Trip Odometer do not operate Trip Odometer will not reset to zero Trip Odometer resets each time ignition is switched <i>off</i> Odometer does not operate or reads incorrect miles Speedometer and Trip Odometer read incorrect values	Replace the cluster (see Section 8C) Refer to Vehicle Speed Sensor (optical type) See 8A-33 Replace the cluster (see Section 8C) Do Test C Check cable connection, then replace cluster Refer to Vehicle Speed Sensor (optical type) See 8A-33
FUEL	Display always shows a flashing "E" even with a full tank Display always shows this "— —" symbol Display reading is incorrect	Do Test D Do Test E Do Test F

(Continued on facing page)

INSTRUMENT PANEL: DIGITAL CLUSTER

Continued from facing page)

<p>INDICATORS</p>	<p>OIL Indicator does not light in BULB TEST OIL Indicator lights constantly VOLTS Indicator does not light in BULB TEST VOLTS Indicator lights constantly BRAKE Indicator does not light BRAKE Indicator is on constantly WATER TEMP Indicator does not light in BULB TEST WATER TEMP Indicator lights constantly WATER TEMP Indicator does not light when Engine overheats. Indicator light lights in BULB TEST RH or LH turn signals won't light HIGH BEAM Indicator will not light FASTEN BELTS Indicator will not light SERVICE ENGINE SOON Indicator will not light during BULB TEST CRUISE Indicator does not light TURBO POWER ECONOMY or Power lights do not come on SECURITY Indicator does not light</p>	<p>Do Test G Do Test H Refer to Starter and Charging System (8A-30) Refer to Starter and Charging System (8A-30) Refer to Brake Warning System (8A-41) Refer to Brake Warning System (8A-41) Do Test J Replace the Coolant Temperature Switch Do Test I Refer to Exterior Lights (See Test L Pins 6 and 16) Refer to Headlights (See Test L Pin 8) Refer to Warnings and Alarms (See Test L Pin 5) Refer to Computer Command Control (VIN A or Y) or Multi-port Fuel Injection (VIN 7) Refer to Cruise Control (8A-34) Do Test K Refer to Theft Deterrent (8A-133)</p>
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A: DIMMER TEST

Connect: TEST LAMP At: CONNECTOR C2 (Disconnected) Conditions: <ul style="list-style-type: none"> • Light Switch in PARK • Vary the Dimmer Switch Position while making the voltage measurements 		
Connect Between	Correct Result	For Diagnosis Of Incorrect Results
G (GRY) & S (BLK/WHT)	Test Lamp brightness varies with Dimmer Switch	See 1
F (BRN) & S (BLK/WHT)	Test Lamp lights	See 2
<ul style="list-style-type: none"> • If all tests are correct, replace the Instrument Cluster (see Section 8C). <ol style="list-style-type: none"> 1. Replace the Dimmer Switch. 2. Check the BRN (9) wire for an open (see schematic). 		

B: POWER INPUT TEST

Connect: TEST LAMP At: CONNECTOR C2 (Disconnected) Condition: <ul style="list-style-type: none"> • Ignition Switch: RUN 		
Connect Between	correct Indication	For Diagnosis Of Incorrect Results
P (PNK/BLK) & Ground	Test Lamp lights	See 1
P (PNK/BLK) & S (BLK/WHT)	Test Lamp lights	See 2
<ul style="list-style-type: none"> • If all tests are correct, replace the cluster (see Section 8C). <ol style="list-style-type: none"> 1. Check the PNK/BLK (239) wire for an open (see schematic). 2. Check the BLK/WHT (450) wire for an open (see schematic). 		

C: MEMORY WIRE TEST

Connect: TEST LAMP At: CONNECTOR C2 (Disconnected)		
Connect Between	Correct Result	For Diagnosis Of incorrect Results
U (ORN) & Ground	Test Lamp lights	See 1
<ul style="list-style-type: none"> • If the lamp lights, replace the Instrument Cluster (see Section 8C). <ol style="list-style-type: none"> 1. Check the ORN (40) wire for an open (see schematic). 		

D: FUEL GAGE SHORTED SENDER TEST

Separate connector C312 (VIN7) or C311 (VIN A or Y) and switch the Ignition Switch to RUN. Observe the Fuel Gage.

- If the Fuel Gages reads " - -," replace the Fuel Gage Sending Unit.
- If the Fuel Gage displays a Flashing "E," check the PNK (30) wire for an open, If OK, replace the cluster (see Section 8C).

E: FUEL GAGE OPEN SENDER TEST

Connect: FUSED JUMPER At: CONNECTOR C312 (VIN 7), C311 (VIN A or Y) HARNESS SIDE (Disconnected) Condition: <ul style="list-style-type: none"> • Ignition Switch: RUN 		
Jumper Between	Correct Result	For Diagnosis Of Incorrect Results
<ul style="list-style-type: none"> • Do for VIN 7 only 		
B (PNK) & Ground	Fuel Gage displays a Flashing "E"	See 1
<ul style="list-style-type: none"> • Do for VIN A or Y only 		
PNK & Ground	Fuel Gage displays a Flashing "E"	See 1
<ul style="list-style-type: none"> • If the Fuel Gage displays a Flashing "E," replace the Fuel Gage sending unit. <ol style="list-style-type: none"> 1. Check the PNK (30) wire for an open. If the wire is OK, replace the cluster (see Section 8C). 		

INSTRUMENT PANEL: DIGITAL CLUSTER

F: FUEL GAGE SENDER ACCURACY TEST

Replace the Fuel Gage Sender with a known good one and switch the Ignition to RUN. Observe the Fuel Gage.

- If the Fuel Gage now displays the correct fuel level, permanently replace the Fuel Gage Sender.
- If the Fuel Gage still displays an incorrect fuel level, replace the Instrument Cluster.

G: OPEN OIL PRESSURE SWITCH TEST

Connect: FUSED JUMPER At: ENGINE OIL PRESSURE SWITCH CONNECTOR (Disconnected) Condition: • Ignition Switch: RUN		
Jumper Between	Correct Result	For Diagnosis Of Incorrect Results
B (TAN) & Ground	OIL/CHOKE Indicator lights	See 1
• If the Oil Indicator lights, replace the Engine Oil Pressure Switch. 1. Check the TAN (31) wire and Flex Circuit for an open (see schematic).		

H: SHORTED OIL PRESSURE SWITCH TEST

Disconnect the TAN (31) wire from the Oil Pressure Switch and switch the Ignition to RUN. Observe the OIL/CHOKE Indicator.

- If the OIL/CHOKE Indicator is off, replace the Oil Pressure Switch.

- If the OIL/CHOKE Indicator is on, check the tan (31) wire for a short to ground (see schematic).

I: OPEN WATER TEMP WIRE

Connect: FUSED JUMPER At: COOLANT TEMPERATURE SWITCH CONNECTOR (Disconnected) Condition: • Ignition Switch: RUN		
Jumper Between	Correct Result	For Diagnosis Of Incorrect Results
B (BK GRN) & Ground	Water Temp Indicator lights	See 1

J: OPEN WIRE TEST

Connect: SELF POWERED TEST LAMP At: COOLANT TEMPERATURE SWITCH CONNECTOR (Disconnected) Condition: • Ignition Switch: BULB TEST		
Connect Between	Correct Result	For Diagnosis Of Incorrect Results
3 (DK GRN) & Battery	Test Lamp lights	See 1
1. Check the DK GRN (35) wire between C100 and Terminal G1 of C1 for an open. If the wire is OK, replace the Ignition Switch.		

K: TURBO BOOST SWITCH TEST

Connect: FUSED JUMPER At: TURBO BOOST INDICATOR SWITCH CONNECTORS (Disconnected) Condition: • Ignition Switch: RUN		
Jumper Between	Correct Result	For Diagnosis Of Incorrect Results
• Do only if the YEL Economy Light does not light.		
B (WHT/BLK) & Ground	Economy Light lights	See 1
• Do only if the ORN Power Light does not light.		
A (BLU/YEL) & Ground	Power Light lights	See 2
• If both tests yield the correct response, replace the Turbo Boost Indicator Switch with a known good one. If lights still do not operate, see section 6. 1. Check the WHT/BLK (902) wire for an open (see schematic). 2. Check the BLUNEL (903) wire for an open (see schematic).		

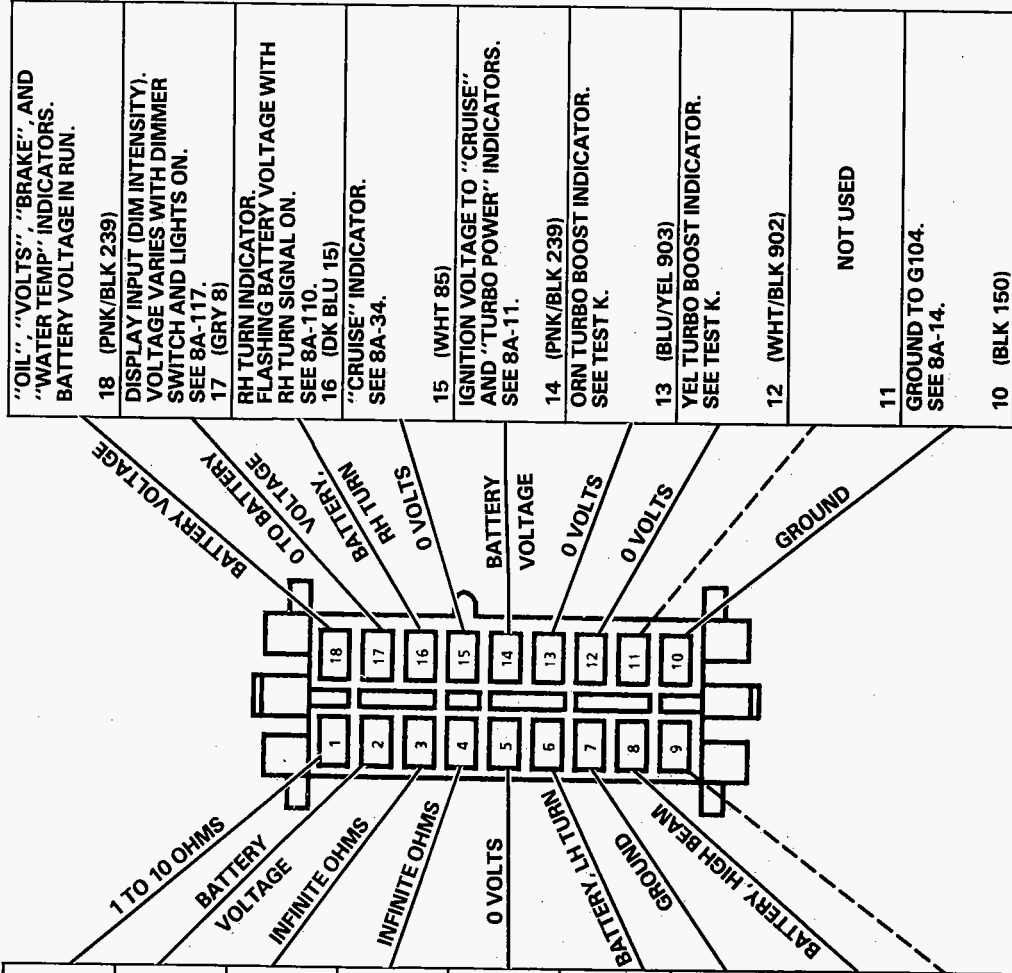
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INSTRUMENT PANEL: INDICATORS CLUSTER

L: CONNECTOR C1 PINOUT TEST

- IGNITION SWITCH IN RUN EXCEPT FOR RESISTANCE MEASUREMENTS
- MEASURE TO GROUND UNLESS ANOTHER TERMINAL IS GIVEN
- CLUSTER CONNECTOR C1 AS SEEN FROM THE DRIVER'S SEAT WITH THE DIGITAL CLUSTER REMOVED
- CONNECTOR C1 IS ON THE LEFT SIDE
- IF THE CORRECT VOLTAGE OR RESISTANCE IS FOUND AT THE TERMINALS, AND THE CLUSTER FUNCTION THAT USES THOSE TERMINALS DOES NOT OPERATE, REPLACE INSTRUMENT CLUSTER (CHECK BULBS AND PRINTED CIRCUIT FIRST.)
- IF THE CORRECT VOLTAGE OR RESISTANCE IS NOT FOUND AT A TERMINAL, DO THE TEST GIVEN OR GO TO THE PAGE REFERRED

1	"OIL/CHOKE" INDICATOR. GROUND WITH ENGINE OFF. SEE TESTS G, H. (TAN 31)
2	"VOLTS" INDICATOR. SEE 8A-30. (BRN 25)
3	"WATER TEMP" INDICATOR. GROUND WITH OVERHEATED ENGINE. SEE TEST I. (DK GRN 35)
4	"BRAKE" INDICATOR. GROUND WITH PARK BRAKE ON. SEE 8A-41. (TAN/WHT 33)
5	"FASTEN BELTS" INDICATOR. BATTERY VOLTAGE FOR 10 SECONDS AFTER IGNITION IN RUN. SEE 8A-75 OR 76. (YEL/BLK 237)
6	LH TURN INDICATOR. FLASHING BATTERY VOLTAGE WITH LH TURN SIGNAL ON. SEE 8A-110. (LT BLU 14)
7	GROUND TO G104. SEE 8A-14. (BLK 150)
8	"HIGH BEAM" INDICATOR. BATTERY VOLTAGE WITH HIGH BEAMS ON. SEE 8A-100. (LT GRN 11)
9	NOT USED

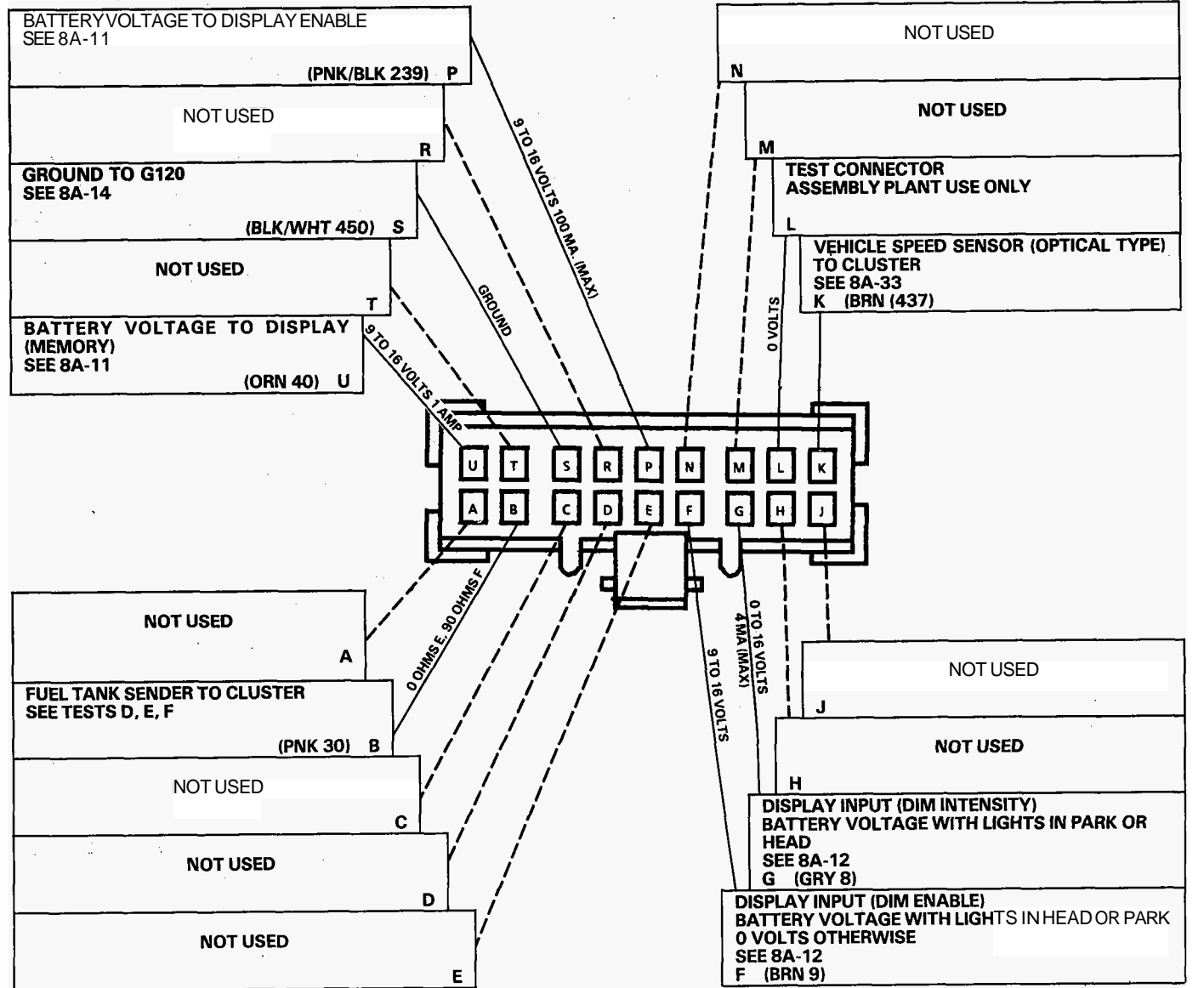


18	(PNK/BLK 239) "OIL", "VOLTS", "BRAKE", AND "WATER TEMP" INDICATORS. BATTERY VOLTAGE IN RUN.
17	(GRY 8) DISPLAY INPUT (DIM INTENSITY). VOLTAGE VARIES WITH DIMMER SWITCH AND LIGHTS ON. SEE 8A-117.
16	(DK BLU 15) RH TURN INDICATOR. FLASHING BATTERY VOLTAGE WITH RH TURN SIGNAL ON. SEE 8A-110.
15	(WHT 85) "CRUISE" INDICATOR. SEE 8A-34.
14	(PNK/BLK 239) IGNITION VOLTAGE TO "CRUISE" AND "TURBO POWER" INDICATORS. SEE 8A-11.
13	(BLU/YEL 903) ORN TURBO BOOST INDICATOR. SEE TEST K.
12	(WHT/BLK 902) YEL TURBO BOOST INDICATOR. SEE TEST K.
11	NOT USED
10	(BLK 150) GROUND TO G104. SEE 8A-14.

INSTRUMENT PANEL: DIGITAL CLUSTER

M: CONNECTOR C2 PINOUT TEST

- IGNITION SWITCH IN RUN EXCEPT FOR RESISTANCE MEASUREMENTS
- MEASURE TO GROUND UNLESS ANOTHER TERMINAL IS GIVEN
- CLUSTER CONNECTOR C2 AS SEEN FROM THE DRIVERS SEAT WITH THE DIGITAL CLUSTER REMOVED
- CONNECTOR C2 IS ON THE RIGHT SIDE
- IF THE CORRECT VOLTAGE OR RESISTANCE IS FOUND AT THE TERMINALS, AND THE CLUSTER FUNCTION THAT USES THOSE TERMINALS DOES NOT OPERATE, REPLACE INSTRUMENT CLUSTER (CHECK BULBS AND PRINTED CIRCUIT FIRST)
- IF THE CORRECT VOLTAGE OR RESISTANCE IS NOT FOUND AT A TERMINAL, DO THE TEST GIVEN OR GO TO THE PAGE REFERRED



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CIRCUIT OPERATION

The operation of an indicator is explained in the operation of its circuit. See the circuit referred to for the complete operation of an indicator and the other components that work with it. Only the gages and indicators that do not appear in other schematics are described in this section.

DIGITAL DISPLAYS

With the Light Switch in OFF, no voltage is applied to the GRY (8) wire. The Digital Display shows maximum brightness.

With the Light Switch in PARK, or HEAD, battery voltage is applied to the Display Dim Enable Input at the Instrument Cluster. Voltage also applied through the instrument cluster dimmer and the INST LPS Fuse GRY (8) wire to the Instrument Cluster. Voltage applied to the Dim Display Input varies as the dimmer is moved. The digital display dims as the voltage is reduced to this input.

SPEEDOMETER DISPLAY

Voltage is applied to the Vehicle Speed Sensor Buffer from the GAGES Fuse, with the Ignition Switch in RUN, BULB TEST, or START. Vehicle Speed Sensor input voltage is applied to the Vehicle Speed Sensor Buffer from a generator mounted in the transaxle. The number of pulses per second from the Vehicle Speed Sensor Buffer varies with the speed of rotation of the shaft.

TURBO BOOST INDICATORS

With the Ignition Switch in RUN, BULB TEST, or START, current flows through the GAGES Fuse, the two TURBO POWER Indicators and the Turbo Boost Indicator Switch to ground. At intake manifold pressure of 2.5-10 in. Hg (inches of mercury), the low boost switch closes. The yellow indicator comes on. Above 10 in. Hg, the high boost switch closes. The orange indicator comes on.

FUEL GAGE DISPLAY

Voltage from the Instrument Cluster (Digital) is applied to the Fuel Tank Unit.

The resistance of the Fuel Sender changes with the amount of fuel in the tank. With a full tank the resistance is 90 ohms, and with an empty tank the resistance is less than 6 ohms.

The information processor is programmed to account for battery voltage changes. Therefore, changes in battery voltage do not affect the fuel gage reading.

OIL/CHOKE INDICATOR

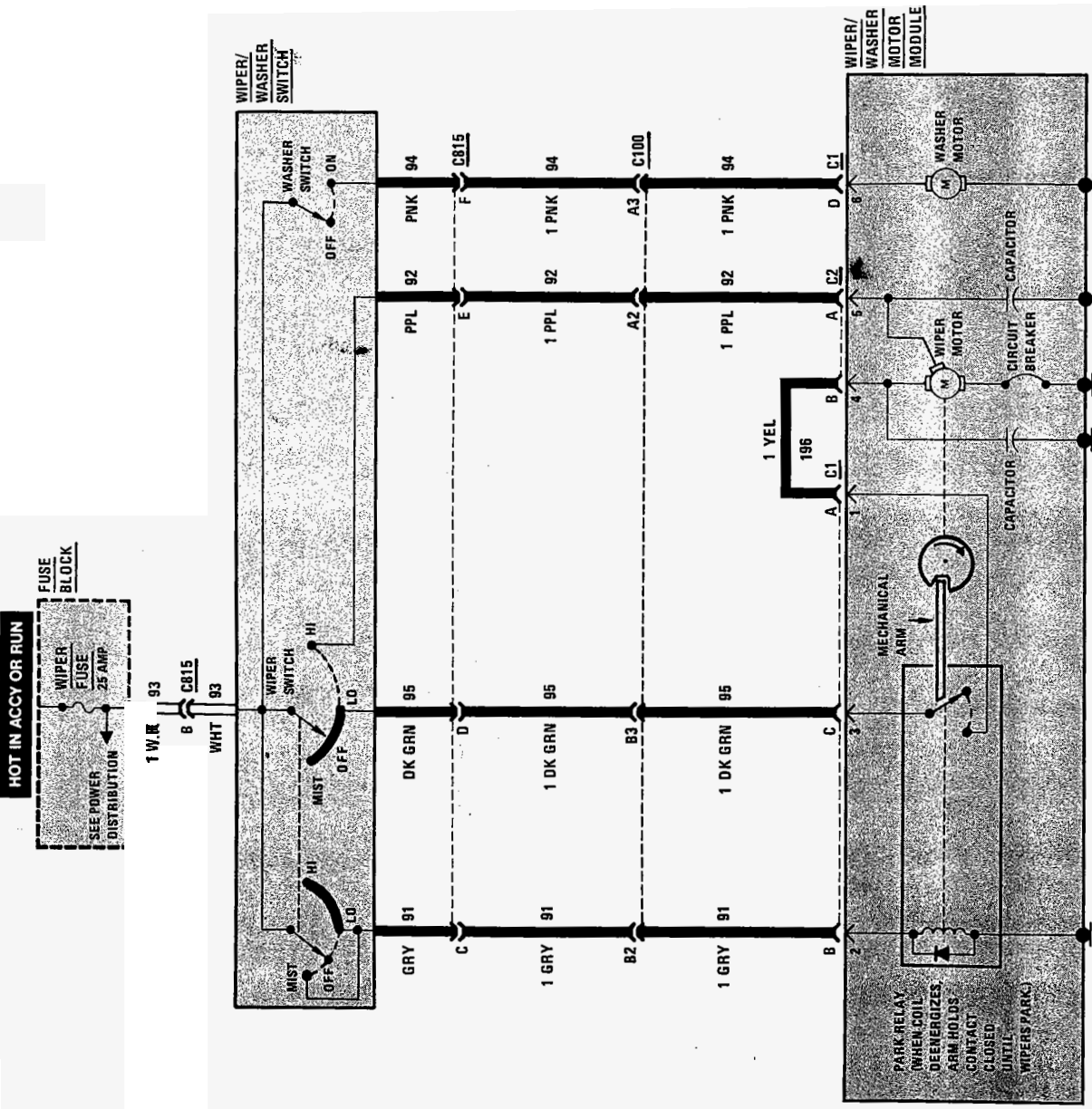
With the Ignition Switch in RUN, BULB TEST or START, battery voltage is applied to the OIL/CHOKE Indicator through the GAGES Fuse. This allows current to flow through the normally closed Engine Oil Pressure Switch and TAN (31) wire to light the OIL/CHOKE Indicator. When the engine is running, oil pressure exceeds 27kPa (4 PSI), this opens the Engine Oil Pressure Switch, causing the OIL/CHOKE Indicator to go out. Whenever the oil pressure dips below 27kPa (4PSI) the oil pressure switch closes, lighting the OIL/CHOKE Indicator.

WATER TEMP

With the Ignition Switch in BULB TEST or START, battery voltage is applied to the WATER TEMP Indicator through the GAGES Fuse. With the Ignition Switch in BULB TEST, current flows through the WATER TEMP Bulb, the DK GRN (35) wire, and the Ignition Switch to ground, causing the WATER TEMP Indicator to light. With the Ignition Switch in RUN, battery voltage is applied to the Coolant Temperature Switch Circuit. When the coolant temperature is above 250°F the Coolant Temperature switch closes, lighting the WATER TEMP Indicator.

WIPER/WASHER

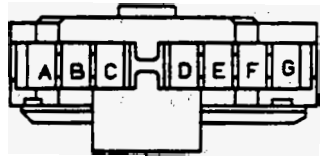
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WIPER/WASHER

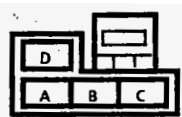
HARNESS CONNECTOR FACES

C100, See Page 202-0

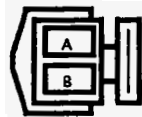


BLK 12020491

C815



C1 BLK



C2 BLK

V00008.0

Wiper/Washer Motor Module

COMPONENT LOCATION

Page-Figure

Fuse Block.	Under LH side of IIP.	201-12-A
Wiper/Washer Motor Module.	LH rear of engine compartment, near brake master cylinder.	201- 9-B
C100 (45 cavities)	LH rear of engine compartment.	201- 9-B
C815 (7 cavities)	Behind I/P, on RH side of steering column	201-13-A

TROUBLESHOOTING HINTS

- Try the following checks before doing the System Check.
- 1. Check the WIPER Fuse by visual inspection.
- 2. Check that the three Wiper Motor mounting bolts are clean and tight.
- 3. Check that the Wiper/Washer Switch connector (C815) is correctly mated.
- 4. If the Washer does not operate, check that:
 - Washer reservoir is filled.
 - Hoses are not pinched or kinked.
 - Hoses are correctly attached.
 - Nozzles are not clogged.
- 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 CHECK TABLE

ACTION	NORMAL OPERATION
Hold the Washer Switch ON for one or two seconds	Washer sprays the windshield as long as Washer Switch is held ON Wipers run at low speed and continue to run in LO after washer cycle is completed
Turn the Wiper Switch to LO	Wipers run continuously at low speed
Turn the Wiper Switch to HI	Wipers run continuously at a faster speed
Turn the Wiper Switch to MIST, and release	Wipers make one complete sweep and then Dark
Turn the Wiper Switch to OFF	Wipers complete sweep at low speed and park

- Refer to System Diagnosis when a result is not normal.

SYSTEM DIAGNOSIS

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

SYMPTOM TABLE

SYMPTOM	DO TEST
Wipers do not operate in any mode	A. Wiper/Washer Switch Battery Voltage Test B. Wiper/Washer Motor Module Input Test
Wipers run in low speed only	B. Wiper/Washer Motor Module Input Test
Wipers will not shut off	B. Wiper/Washer Motor Module Input Test
Wipers run in high speed only	B. Wiper/Washer Motor Module Input Test
Washer will not operate	C. Washer Motor Module Voltage Test
Washer runs continuously	B. Wiper/Washer Motor Module Input Test

WIPER/WASHER

A: WIPER/WASHER SWITCH BATTERY VOLTAGE TEST

Measure Between	Correct Voltage	For Diagnosis
B (WHT) & Ground	Battery	See 1
<ul style="list-style-type: none"> If voltage is correct, do Test B. 		
<ol style="list-style-type: none"> Check Wiper Fuse and WHT (93) wire for an open (see schematic). 		

Measure Between	Correct Voltage	For Diagnosis
C1: C (DK GRN) & Ground	Battery	See 1
<ul style="list-style-type: none"> Wiper Switch HI 		
1: B (GRY) & Ground	Battery	See 2
<ul style="list-style-type: none"> Washer Switch OFF 		
2: A (PPL) & Ground	Battery	See 3
<ul style="list-style-type: none"> Washer Switch OFF 		
1: D (PNK) & Ground	n Volts	See 4
<ul style="list-style-type: none"> If all the voltages are correct, but the Wiper/Washer Motor Module does not operate, remove the Wiper/Washer Motor Module for repair (see Section 8E for diagnostic procedures). 		
<ol style="list-style-type: none"> Check the DK GRN (95) wire for an open. Check that the Wiper/Washer Switch connector (C815) is correctly mated. If OK, replace the Wiper/Washer Switch. Check the GRY (91) wire for an open. Check that the Wiper/Washer Switch connector (C815) is correctly mated. If OK, replace the Wiper/Washer Switch. 		

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- Check the PPT (92) wire for an open. Check that the Wiper/Washer Switch connector (C815) is correctly mated. If OK, replace the Wiper/Washer Switch.
- Replace the Wiper/Washer Switch.

C: WASHER MOTOR MODULE VOLTAGE TEST

Measure Between	Correct Voltage	For Diagnosis
Measure: VOLTAGE At: WIPER/WASHER MOTOR MODULE CONNECTOR C1 (Connected) Conditions: <ul style="list-style-type: none"> Ignition Switch: ACCY Washer Switch: ON 		
D (PNK) & Ground	Battery	See 1
<ul style="list-style-type: none"> Remove Washer Motor (see Section 8E for procedure). 		
Motor Terminal & Ground	Battery	See 2
<ul style="list-style-type: none"> If all the voltages are correct, replace the Washer Motor (see Section 8E for procedure). 		
<ol style="list-style-type: none"> Check PNK (94) wire for an open. Check that Wiper/Washer Switch connector (C815) is correctly mated. Replace the cover assembly (see Section 8E for procedure). 		

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CIRCUIT OPERATION

LO SPEED

When the Wiper/Washer Switch is in the LO position, battery voltage is applied to the Park Relay through the GRY wire. This closes the relay contacts and supplies battery voltage to the Wiper Motor through the DK GRN and YEL wires. The wiper blades run continuously. When the Wiper/Washer Switch is turned to the OFF position, the Wiper Motor still receives battery voltage and still runs. A mechanical arm riding on a wheel attached to the Wiper Motor keeps the relay contacts closed until the wipers park or complete the last sweep. After this last sweep the mechanical arm falls into a detent permitting the relay contacts to open. This stops the Wiper Motor, and the wiper blades remain in park.

HI SPEED

When the Wiper/Washer Switch is in the HI position, the same Park Relay operation occurs. However, battery voltage is applied to the high speed brushes of the Wiper Motor through the PPL wire. The wipers run continuously at a higher speed. When the Wiper/Washer Switch is turned OFF, the wiper blades will move at low speed for the final sweep and then park.

MIST

When the Wiper/Washer Control is moved to MIST and released, the wipers make one sweep at low speed and return to park. Circuit operation is the same as that of LO.

WASHER OPERATION

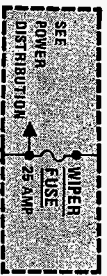
When the Washer Switch is pressed ON, battery voltage is applied to the Washer Motor as well as mechanically advancing the Wiper Switch to LO. The Washer sprays the windshield as long as its switch is held ON. The wipers must be turned off manually after the wash cycle.

The Wiper Motor is protected by a Circuit Breaker. The Circuit Breaker will open if the wiper blades are blocked, by ice on the windshield, for example. The Circuit Breaker resets automatically when it cools.

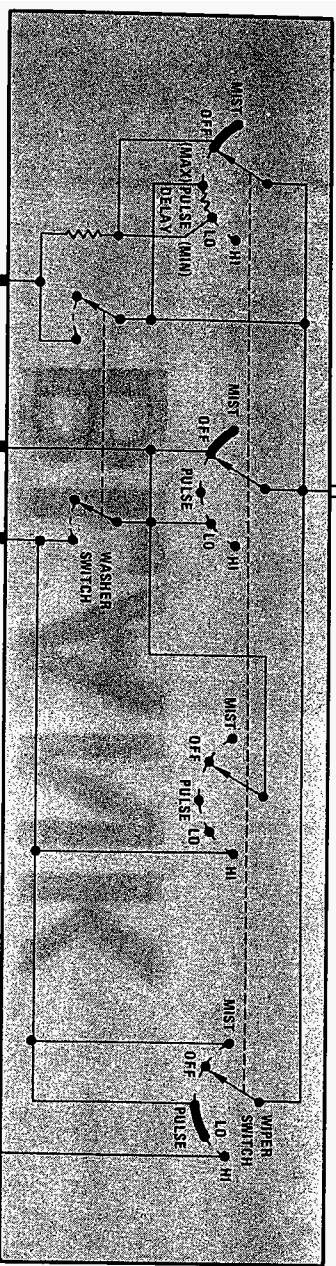
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WIPER/ WIPER: PULSE

HOT IN ACCY OR RUN

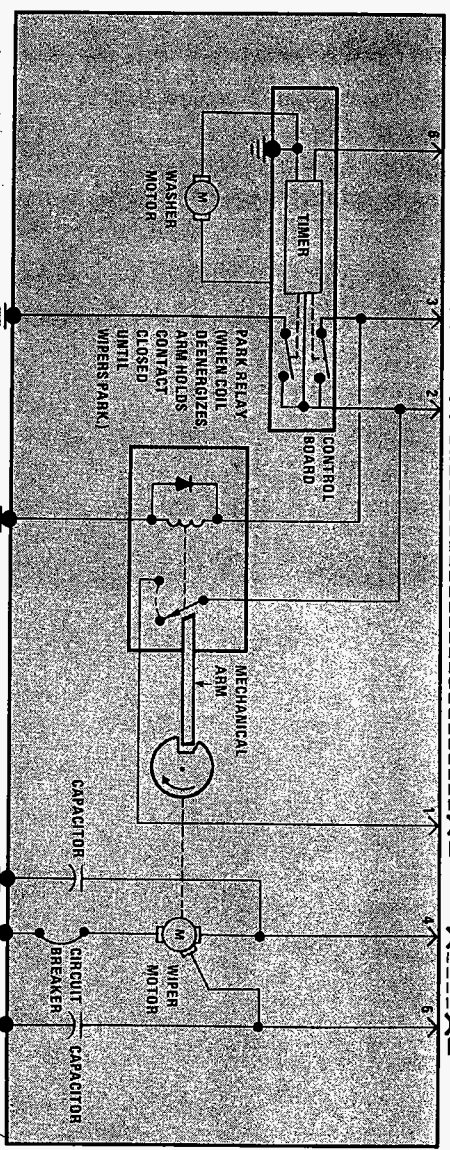


1 WHT 93
B 8B15
WHT 93



WIPER/
WIPER
SWITCH

WIPER/
WIPER
MOTOR
MODULE



WIPER/WASHER: PULSE

HARNES CONNECTOR FACES

C100, See Page 202-0

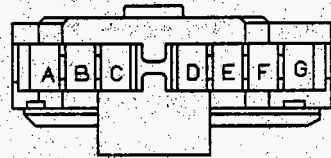


C1 BLK

C2 BLK

V00008.0

Wiper/Washer Motor Module



BLK 12020491

C815

COMPONENT LOCATION

Page-Figure

Fuse Block.	Under LH side of I/P.	201-12-A
Wiper/Washer Motor Module.	LH rear of engine compartment, near brake master cylinder.	201- 9-B
C100 (45cavities)	LH rear of engine compartment.	201- 9-B
C815 (7cavities)	Behind I/P, on RH side of steering column	201-13-A

TROUBLESHOOTING HINTS

- o Try the following checks before doing the System Check.
- 1. Check Wiper Fuse by visual inspection.
- 2. Check that the three Wiper Motor mounting bolts are clean and tight.
- 3. Check that Wiper/Washer Switch connector (C815) is mated correctly.
- 4. If Washer does not operate, check that:
 - Washer reservoir is filled
 - o Hoses are not pinched or kinked
 - Hoses are correctly attached
 - Nozzles are not clogged
- o Go to System Check for a guide to normal operation.
- Go to System Diagnosis for diagnostic tests.

SYSTEM CHECK

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

SYSTEM CHECK TABLE

ACTION	NORMAL OPERATION
1. Hold Washer Switch ON for one or two seconds.	Washer sprays windshield as long as Washer Switch is held ON. It continues to spray for 2% seconds after switch is released. Wipers run at low speed and continue for approximately 6 seconds after washer cycle is completed and then return to park.
2. Turn Wiper Switch to PULSE (Delay Mode).	Wipers make one complete stroke then pause for 0 to 25 seconds before making the next stroke. The wait time is adjusted by turning Wiper Switch through the delay range.

(Continued in next column)

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3. With Wiper Switch in PULSE, push Washer Switch to ON for one or two seconds.	Washer sprays windshield as long as Washer Switch is held ON. Wipers run at low speed during spray period and continue running for approximately 6 seconds after washer stops. Wipers return to PULSE operation.
4. Turn Wiper Switch to LO.	Wipers run continuously at low speed.
5. Turn Wiper Switch to HI.	Wipers run at fast speed.
6. Turn Wiper Switch to OFF.	Wipers return to park position at low speed.
7. Turn Wiper Switch to MIST.	Wipers make one complete stroke and then park.

- o Refer to System Diagnosis when a result is not normal.

SYSTEM DIAGNOSIS

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

WIPER/WASHER: PULSE

SYMPTOM TABLE

SYMPTOM	DO TEST
Wipers do not operate in any mode.	A. Wiperwasher Battery Voltage Test B: Wiperwasher Motor Module Input Voltage Test
No delay in Pulse Mode.	C: Wiperwasher Pulse Control Resistance Test
Wipers will not shut off. Wipers run at high speed only (low speed inoperative).	B: Wiperwasher Motor Module Input Voltage Test
Washer will not operate, but Wipers run.	B: Wiperwasher Motor Module Input Voltage Test D: Washer Motor Voltage Test
Wipers run at low speed only (high speed inoperative).	B: Wiper Motor Module Input Voltage Test

A: WIPEWASHER BATTERY VOLTAGE TEST

Measure: VOLTAGE At: WIPEWASHER SWITCH CONNECTOR C815 (Disconnected) Conditions: <ul style="list-style-type: none"> o Ignition Switch: ACCY

(Continued in next column)

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Measure Between	Correct Voltage	For Diagnosis
B (WHT) & Ground	Battery	See 1
<ul style="list-style-type: none"> • If voltage is correct, return to Symptom Table. 1. Check Wiper Fuse and WHT (93) wire for an open. 		

B: WIPEWASHER MOTOR MODULE INPUT VOLTAGE TEST

Measure: VOLTAGE At: WIPEWASHER MOTOR MODULE CONNECTORS C1 & C2 (Connected) Conditions: <ul style="list-style-type: none"> o Ignition Switch: ACCY
--

Measure Between	Correct Voltage	For Diagnosis
C1/C (DK GRN) & Ground	Battery	See 1
<ul style="list-style-type: none"> • Wiper Switch: HI 		
C2/A (PPL) & Ground	Battery	See 3
<ul style="list-style-type: none"> • Wiper Switch: OFF o Washer Switch: ON 		
C1/D (PNK) & Ground	Battery	See 4

(Continued in next column)

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o Wiper Switch in OFF, LO, & MIST		
C1/D (PNK) & Ground	10-12 V	See 4
<ul style="list-style-type: none"> • If all voltages are correct but Wiper/Washer Motor Module does not operate normally, remove the Wiperwasher Motor Module for repair. See Section 8E for diagnostic procedures. 1. Check the DK GRN (95) wire for an open. If wire is good, replace the Wiperwasher Switch. 2. Check the GRY (91) wire for an open. If wire is good, replace the Wiperwasher Switch. 3. Check the PPL (92) wire for an open. If wire is good, replace the Wiperwasher Switch. 4. Check the PNK (94) wire for an open. If wire is good, replace the Wiperwasher Switch. 		

C: WIPEWASHER PULSE CONTROL RESISTANCE TEST

Measure: RESISTANCE At: WIPEWASHER MOTOR MODULE CONNECTOR C1 (Disconnected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: OFF • Negative Battery Terminal Disconnected o Wiper Switch: LO

(Continued on next page)

WIPER WASHER: PULSE

(Continued from previous page)

Measure Between	Correct Resistance	For Diagnosis
C (DK GRN) & D (PNK)	Approximately 24 K ohms	See 1
<ul style="list-style-type: none"> Move Wiper Switch through delay range to maximum delay position. 		
C (DK GRN) & D (PNK)	Resistance increases to approximately 1.2 Megohms	See 1
<ul style="list-style-type: none"> If resistance are correct but Pulse Mode does not operate, remove the Wiper Motor Module for repair. (See Section 8E for diagnostic instructions). <ol style="list-style-type: none"> Check PNK (94) and DK GRN (95) wires for opens. If wires are good, replace the Wiper/Washer Switch. 		

D: WASHER MOTOR VOLTAGE TEST

Measure: **VOLTAGE**

At: **WIPER/WASHER MOTOR MODULE**

Conditions:

- Remove Washer Motor (see Section 8E for procedure)
- Ignition Switch: **ACCY**
- Washer Switch: **ON**

(Continued from previous column)

Measure Between	Correct Voltage	For Diagnosis
Positive Washer Motor Terminal & Ground	Battery	See 1
<ul style="list-style-type: none"> If voltage is correct, replace the Washer Motor (see Section 8E for procedure). <ol style="list-style-type: none"> Replace Wiper Cover and solid-state Control Board. 		

CIRCUIT OPERATION

PULSE

With the Wiper/Washer Switch in PULSE, voltage is applied to the PNK and GRY wires to the Wiper/Washer Motor Module and the solid-state Control Board. The Control Board momentarily supplies battery voltage to the coil of the Park Relay to start the Wiper Motor.

After the wipers have started, the contacts of the Park Relay are held closed by a mechanical arm until wipers have completed their stroke and have parked. They remain parked until the Control Board again applies a battery voltage pulse to start another sweep cycle.

The length of delay time between sweeps is controlled by the variable PULSE Delay resistor. The delay is adjustable from 0 to 25 seconds.

LO SPEED

In the LO position, the Wiper/Washer Switch supplies voltage to the DK GRN as well as the PNK and GRY wires. The Park Relay is energized continuously. Battery voltage is applied to the relay contacts and the Wiper Motor. It runs continuously.

HI SPEED

With the Wiper/Washer Switch in the HI position, battery voltage is supplied directly to the Wiper Motor, without passing the Park Relay contacts. The PPL wire is connected to a separate armature terminal for high speed operation. When turned off from HI, the wipers complete the last sweep at low speed and park. To do this, the Wiper Motor receives battery voltage in the OFF position of the Wiper Switch. This is applied through the GRY wire to terminal B of C1.

The Wiper Motor is protected by a Circuit Breaker. If the wipers are obstructed by snow or ice, the Circuit Breaker will sense the high current through the motor and open the circuit. The Circuit Breaker resets automatically when it cools.

WIPER/WASHER: PULSE

WASHER

When the Washer Switch is turned on, battery voltage is applied to the Control Board through the PNK and GRY wires. The Control Board turns on the Washer Motor for approximately 2½ seconds. The voltage on the GRY wire also operates the Park Relay. The Control Board turns on the Wiper Motor at low speed, which continues for approximately 6 seconds after the washer stops. If the wipers have been OFF or in PULSE, LO, or HI, they would revert to that operation after the wash cycle.

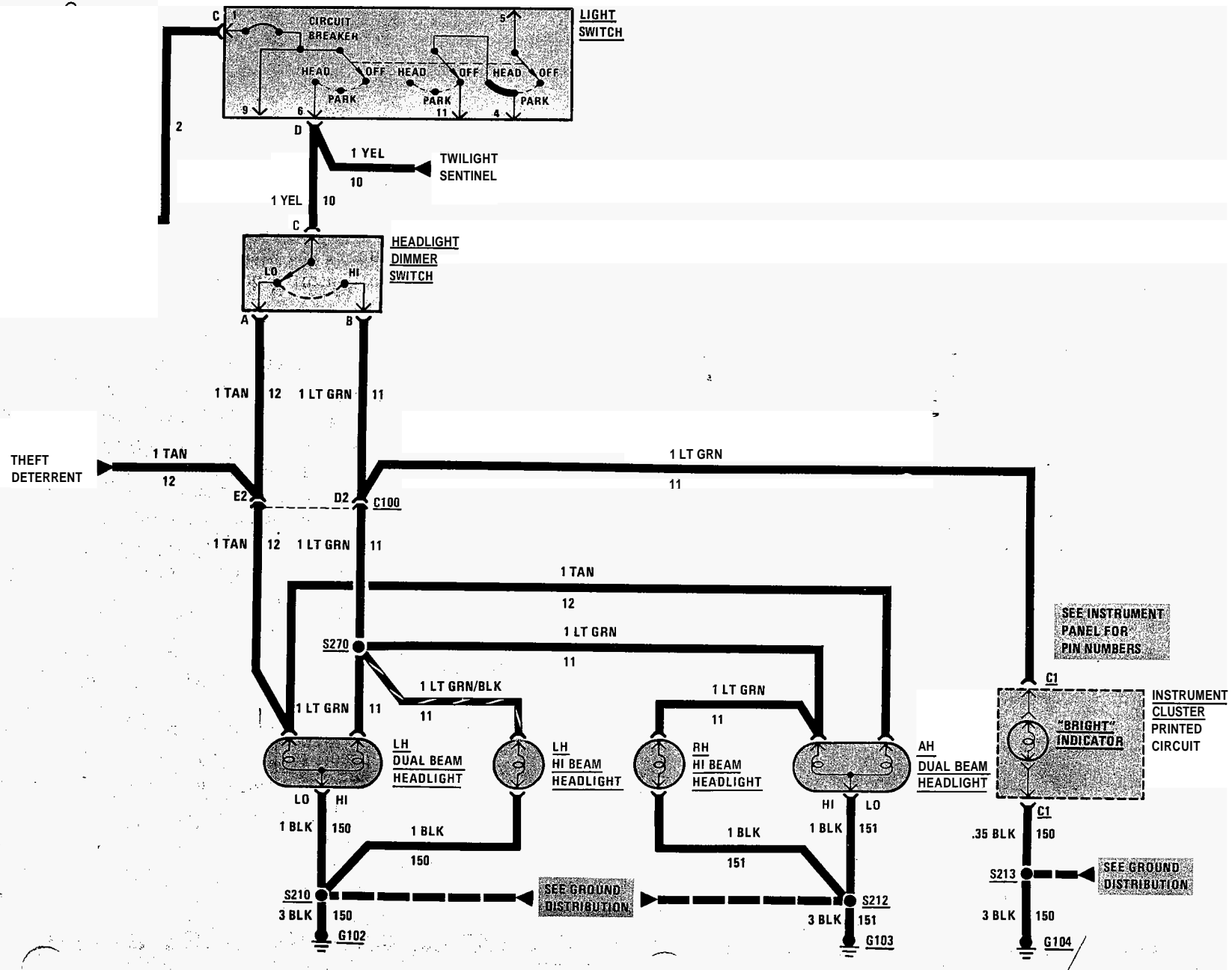
If the Washer Switch is held for more than 1 second, this is noted by circuits on the Control Board which then keeps the Washer Motor on only as long as the Switch is held. The wipers also come on at low speed and continue for approximately 6 seconds after the Washer Switch is released. Then they return to park position.

MIST

When the Wiper/Washer Switch is turned to MIST and released, the wipers make one sweep at low speed and return to park. The circuit operation is the same as that of LO or MIN **DELAY**.



HOT AT ALL TIMES



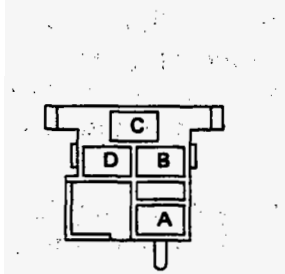
HEADLIGHTS

HARNES CONNECTOR FACES

C100, See Page 202-0



Placeholder for connector face diagram



BLK 8917693
Headlight Dimmer Switch



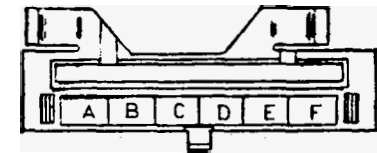
COMPONENT LOCATION

Page-Figure

Fusible Link B (VIN7)	Engine harness, near starter solenoid	201- 6-B
Fusible Link B (VIN A)	Engine harness, near starter solenoid	201- 0-A
Fusible Link B (VIN Y)	Engine harness, near starter solenoid	201- 5-A
Headlight Dimmer Switch	On LH side of steering column.	201-11-B
C100 (45 cavities)	LH rear of engine compartment.	201- 9-B
G102	On front fender, behind LH front lights.	201-20-E
G103	On RH front fender, behind headlights	201-21-C
G104	Behind I/P, to left of steering column.	201-15-A
S210	Front lights harness, behind LH front lights. ..	201-20-C
S212	Front lights harness, behind RH front lights. ..	201-21-A
S213	I/P Harness, above radio	201-16-A
S270	Front lights harness, behind LH front lights. ..	201-20-C

Instrument Cluster Connector
(Digital), See Page 82-5

Instrument Cluster Connector
(Indicators), See Page 80-6



WHT 12020031
Light Switch

TROUBLESHOOTING HINTS

- Try the following checks before doing the System Diagnosis.
- 1. If Headlights on one side are on dimly, check the ground on that side.
- 2. If Hi Beams do not light, but the BRIGHT Indicator lights, check LT GRN (11) wire for an open.
- 3. If one Headlight doesn't work, check the connections, Headlight, and wires to the Headlight.
- 4. If Headlights do not turn off, without Twilight Sentinel, replace Light Switch; with Twilight Sentinel, go to Page 8A-101.
- Go to System Diagnosis for diagnostic tests.

SYSTEM DIAGNOSIS

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

SYMPTOM TABLE

A: All Headlights inoperative or intermittent
B: Lo Beams on both sides are inoperative or Hi Beams and BRIGHT Indicator are inoperative

A: ALL HEADLIGHTS INOPERATIVE OR INTERMITTENT (TABLE 1)

Connect Between	Correct Result	For Diagnosis
C (RED) & Ground	Lights	See 1
D (YEL) & Ground	Lights	Go to Table 2
<ul style="list-style-type: none"> • If both results are correct, go to Test B. 1. Check Fusible Link B and RED (2) wire for an open. 		

A: ALL HEADLIGHTS INOPERATIVE OR INTERMITTENT (TABLE 2)

Jumper Between	Correct Result	For Diagnosis
C (RED) & D (YEL)	Headlights light	See 1
C (RED) & D (YEL)	Hi Beams light	See 1

B: LO BEAMS ON BOTH SIDES ARE INOPERATIVE, OR HI BEAMS AND BRIGHT INDICATOR ARE INOPERATIVE

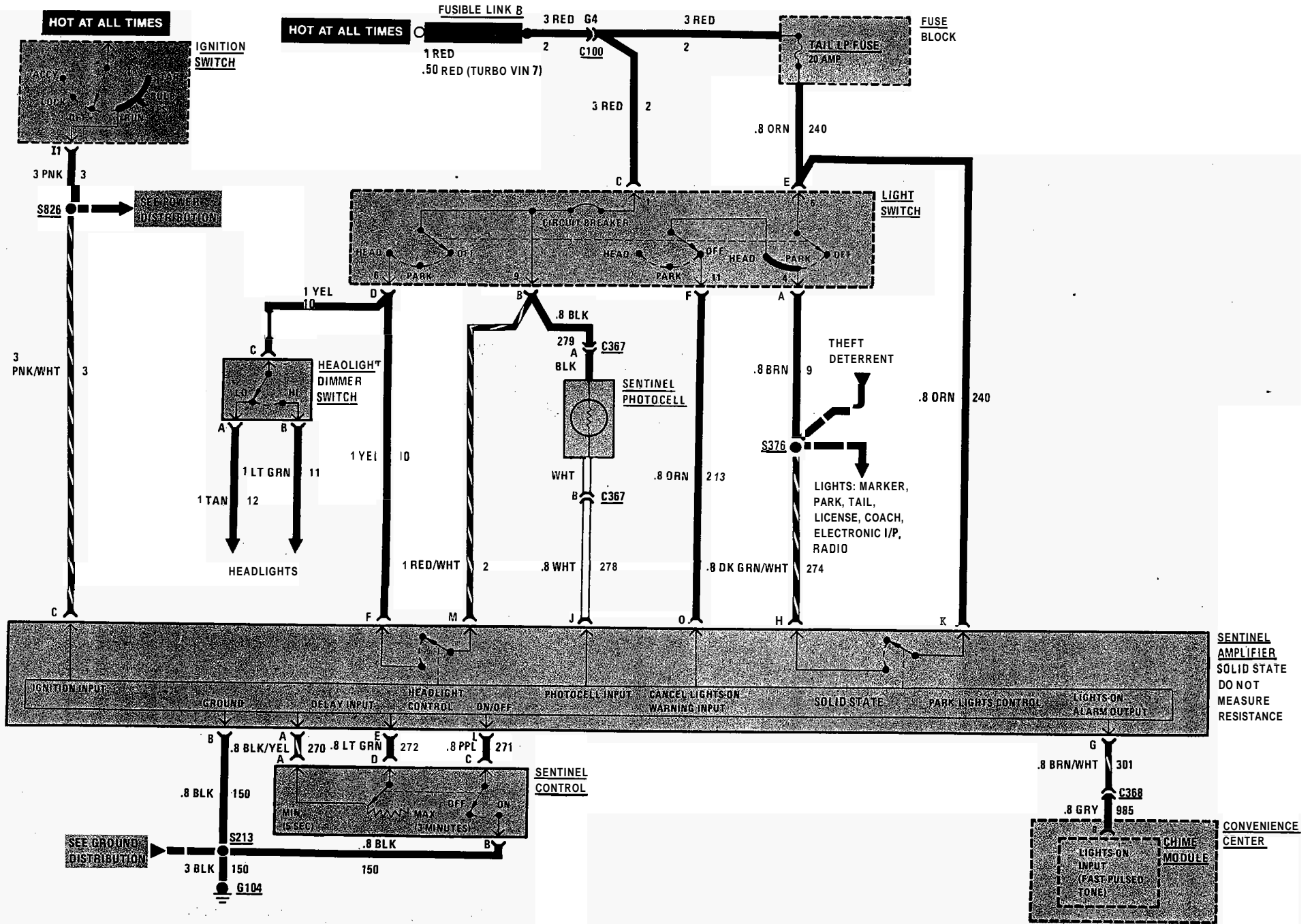
Connect Between	Correct Result	For Diagnosis
Connect: A TEST LAMP At: HEADLIGHT DIMMER SWITCH CONNECTOR (Connected) Conditions: <ul style="list-style-type: none"> • Light Switch: HEAD • Dimmer Switch: LO 		
C (YEL) & Ground	Lights	See 1
A (TAN) & Ground	Lights	See 2
<ul style="list-style-type: none"> • Put Dimmer Switch in HI 		
B (LT GRN) & Ground	Lights	See 2
If all results are correct, check wiring to lights for an open. <ol style="list-style-type: none"> 1. Check YEL (10) wire for an open. 2. Replace Dimmer Switch. 		

CIRCUIT OPERATION

Voltage is applied to the Light Switch at all times. The Light Switch includes a self resetting circuit breaker. When the Headlight circuit draws too much current, the circuit breaker opens, and interrupts the current flow. With no current flow, the circuit breaker cools off and resets automatically. When the Light Switch is in HEAD, the Dimmer Switch directs voltage to either the Lo Beams or the Hi Beams. The BRIGHT Indicator receives voltage along with the Hi Beams.

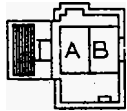
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HEADLIGHTS WITH TWILIGHT SENTINEL

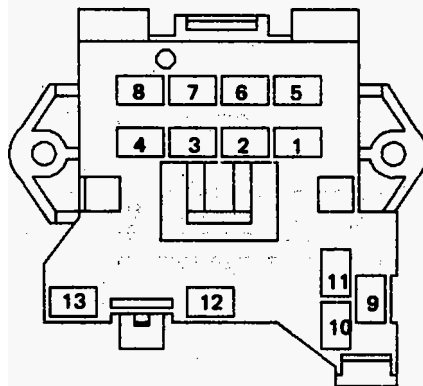


HARNESS CONNECTOR FACES

C100, See Page 202-0



BLK 8917545
C367

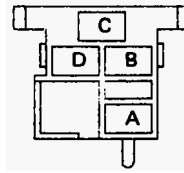


BLK 12034299
Convenience Center
(Chime Module)

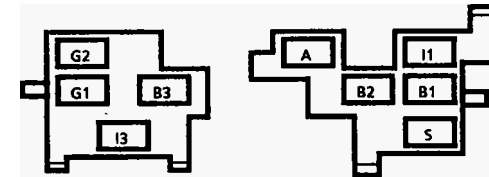
COMPONENT LOCATION

Page-Figure

Convenience Center.	Behind I/P, left of radio	201-15-A
Fuse Block.	Under LH side of I/P.	201-12-A
Fusible Link B (VIN 7)	Engine harness, near starter solenoid	201- 6-B
Fusible Link B (VIN A).	Engine harness, near starter solenoid	201- 0-A
Fusible Link B (VIN Y).	Engine harness, near starter solenoid	201- 5-A
Headlight Dimmer Switch	On LH side of steering column.	201-11-B
Ignition Switch.	Base of steering column	201-13-A
Sentinel Amplifier.	Behind I/P, right of radio	201-13-D
Sentinel Photocell.	Top center of I/P.	201-13-D
C100 (45 cavities)	LH rear of engine compartment.	201- 9-B
C367 (2 cavities)	Behind I/P, left of heater-A/C control head	201-13-D
C368 (1cavity)	Behind I/P, right of radio	201-13-D
G104	Behind I/P, to left of steering column.	201-15-A
S213.	I/P harness, above radio.	201-16-A
S376.	I/P harness, above fuse block.	201-13-B
S826.	I/P harness, near brake pedal arm	201-12-A



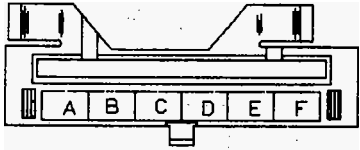
BLK 8917693
Headlight Dimmer Switch



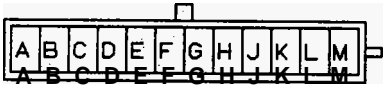
C2 BLK C1 BLU

V00019.0
Ignition Switch

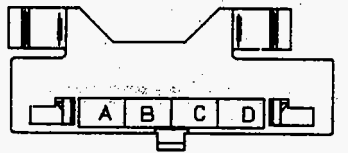
HARNES CONNECTOR FACES



WHT 12020031
Light Switch



BLK 8911258
Sentinel Amplifier



BLK 12020034
Sentinel Control

HEADLIGHTS WITH TWILIGHT SENTINEL

TROUBLESHOOTING HINTS

- Try the following checks before doing the System Diagnosis.
1. If the lights stay **on** with Ignition Switch OFF and in daylight, check for a disconnected or open BLK (151) wire to terminal B of the Sentinel Amplifier connector.
 2. If the lights turn **on** in daylight when Ignition Switch is turned **on**, check if the Sentinel Photocell has fallen from its mounting position.

3. If either the Headlights or the park lights, but not both, will not turn off, disconnect the Sentinel Amplifier.
 - If lights go **off**, replace the Amplifier.
 - If lights don't go off, replace the Light Switch.
- Go to the 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 the Diagnosis given if other results occur.
- Tests follow in System Diagnosis.

SYSTEM CHECK TABLE

ACTION	NORMAL RESULT	FOR DIAGNOSIS
With Sentinel Control OFF, put Light Switch in PARK.	Park and taillights go on .	See 8A-110.
Put Light Switch in HEAD, Dimmer Switch in LO.	Headlights go on .	See 8A-100
Put Light Switch in OFF.	Headlights and park lights go off.	Do Test A
Turn Sentinel Control ON, cover Sentinel Photocell with a dark cloth, and put Ignition in RUN.	Headlights and park lights go on within 60 seconds.	No lights go on : Do Test B. Headlights or Park lights go on : Do Test A.
Remove cloth and shine bright light on Photocell.	Lights turn off after 10 and before 60 seconds	Do Test C
Cover Photocell and wait for lights to turn on . Wait 15 seconds, then turn Ignition Switch OFF.	Lights turn off after a time delay, a few seconds with control is minimum delay position and 1 112 to 4 112 minutes in MAX	Do Test A
Open Driver's Door	Chime does not sound	Do Test C
Put Light Switch in PARK	Warning chime sounds.	Do Test C.

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HEADLIGHTS WITH TWILIGHT SENTINEL

(Continued from previous page)

SYSTEM DIAGNOSIS

- Do the tests listed for your symptom in the Symptom Table below, or when directed by the System Check.
- Tests **follow** the Symptom Table.

SYMPTOM TABLE

SYMPTOM	FOR DIAGNOSIS
Lights turn on and off at wrong light levels when operated with Twilight Sentinel:	Do Test D
Lights do not turn on in darkness:	Do Test B
Lights do not go off in bright light:	Do Test A
Lights do not stay on for adjustable time after Ignition is turned OFF:	Do Test A
Lights-on warning does not operate, or sounds when it should not; all other Twilight Sentinel functions operate normally :	Do Test C

A: AMPLIFIER TEST (TABLE 1)

Measure: RESISTANCE		
At: TWILIGHT SENTINEL CONNECTOR (Disconnected)		
Conditions:		
<ul style="list-style-type: none"> • Light Switch: OFF • Negative Battery Cable: DISCONNECTED • Twilight Sentinel Control: ON 		
Measure Between	Correct Voltage	For Diagnosis
L (PPL) & 0	0	See 1
<ul style="list-style-type: none"> • Turn Twilight Sentinel Control OFF 		
L (PPL) & Ground	Open	See 2
H (DK GRN/ WHT) & D (ORN)	0	See 3
<ol style="list-style-type: none"> 1. Check Sentinel Control, PPL wire, and BLK wire (150) for an open (see schematic). 2. Check Sentinel Control and PPL (271) wire for short (see schematic). 3. Check Light Switch and ORN (273) wire for an open (see schematic). 4. Check Sentinel Control, BLK/YEL (270) wire, and LT GRN (272) wire for an open (see schematic). 		

A: AMPLIFIER TEST (TABLE 2)

Connect: A FUSED JUMPER		
At: TWILIGHT SENTINEL AMPLIFIER CONNECTOR (Connected)		
Conditions:		
<ul style="list-style-type: none"> • Ignition Switch: RUN • Light Switch: OFF • Twilight Sentinel Control: ON 		
Jumper Between	Correct Result	For Diagnosis
J (WHT) & M (RED/WHT)	Headlights go off within 60 seconds	Go To Table 3.
<ul style="list-style-type: none"> • If Headlights go off within 60 seconds and do not go off normally in daylight, check the WHT (278) and BLK (279) wires for an open, then replace the Photocell as necessary. 		

HEADLIGHTS WITH TWILIGHT SENTINEL

A: AMPLIFIER TEST (TABLE 3)

Measure: VOLTAGE At: SENTINEL AMPLIFIER CONNECTOR (Disconnected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN • Light Switch: OFF 		
Measure Between	Correct Voltage	For Diagnosis
M (RED/WHT) & Ground	Battery	See 1
M (RED/WHT) & B (BLK)	Battery	See 2
K (ORN) & Ground	Battery	See 3
J (PNK/WHT) & Ground	Battery	See 4
<ul style="list-style-type: none"> • Turn Ignition Switch OFF. 		
J (PNK/WHT) & Ground	0	See 5
H (DK GRN/WHT) & Ground	0	See 6
F (YEL) & Ground	0	See 6
<ul style="list-style-type: none"> • Turn Light Switch to PARK 		
F (YEL) & Ground	0	See 6
H (DK GRN/WHT) & Ground	Battery	See 7
<ul style="list-style-type: none"> • Turn Light Switch to HEAD 		

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H (DK GRN/WHT) & Ground	Battery	See 7
F (YEL) & Ground	Battery	See 8
<ul style="list-style-type: none"> • If all the voltages are correct, replace Twilight Sentinel Amplifier. <ol style="list-style-type: none"> 1. Check Light Switch and RED/WHT (2) wire for open or short (see schematic) 2. Check BLK (150) wire for an open (see schematic). 3. Check TAIL LP Fuse and ORN (240) wire for an open (see schematic). 4. Check PNK/WHT (3) wire for an open and check Ignition Switch (see schematic). 5. Replace Ignition Switch. 6. Replace Light Switch. 7. Check Light Switch and ORN (240), BRN (9), and DK GRN/WHT (274) wires for an open (see schematic). 8. Check Light Switch and YEL (10) wire for an open (see schematic). 		

B: PHOTOCELL TEST

Separate: CONNECTOR At: PHOTOCELL CONNECTOR C367 (Disconnected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN • Twilight Sentinel Control: ON • Light Switch: OFF 		
Action	Correct Result	For Diagnosis
Separate Photocell connector	Lights go on within 60 seconds	Do Test A
<ul style="list-style-type: none"> • If the lights go on within 60 seconds but they did not go with the Photocell connected and in darkness, replace the Photocell. 		

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C: CHIME TEST

Measure: VOLTAGE At: TWILIGHT SENTINEL AMPLIFIER CONNECTOR (Connected) Conditions: <ul style="list-style-type: none"> • Turn Light Switch OFF • Set Twilight Sentinel to turn Lights ON 		
Measure Between	Correct Voltage	For Diagnosis
D (ORN) & Ground	0	DoTestA
<ul style="list-style-type: none"> • Turn Ignition Switch OFF • Turn Light Switch to PARK HEAD 		
D (ORN) & Ground	Battery	DoTestA
G (BRNI WHT) & Ground	Battery	see 1
G (BRNI WHT) & Ground	0	Do Test A

D: PHOTOCCELL SUBSTITUTION TEST

Connect a **known** good Photocell in place of the suspect Photocell, and operate Twilight Sentinel.

- If lights turn on and off at proper light levels, replace the old Photocell.
- If lights still turn on and off at improper levels, replace Sentinel Amplifier.

CIRCUIT OPERATION

The Twilight Sentinel system automatically turns the driving lights on and off according to light conditions. The system also keeps the lights on for a selected amount of time after the driver has parked and left the car.

The system can be turned off to give the driver manual control over the lights.

Voltage is applied at **all** times through a hot circuit breaker and the Light Switch to the Sentinel Photocell and Sentinel Amplifier at terminal M.

Voltage is **also** applied at **all** times through the TAIL LP Fuse to both Light Switch terminal **5** and Sentinel Amplifier terminal K.

With the Light Switch OFF, voltage is applied from the Light Switch to terminal D when the Sentinel Amplifier is powering the park/turn/marker lights and Instrument Cluster lights. This cancels the Lights-On Warning. When the Light Switch is in HEAD or PARK, no voltage is applied to terminal D and the Lights-On Warning **will** function normally.

The Twilight Sentinel System is triggered by a control voltage from the Ignition Switch and current through the Sentinel Photocell. With the Ignition Switch in RUN, BULB TEST, or START, a control voltage is applied through the PNK and PNK/WHT wires to terminal C of the Sentinel Amplifier. When the Photocell senses darkness outside the car, voltage at terminal J changes, and the Sentinel Amplifier turns on the exterior lights. Voltage at terminal M is applied to terminal F, and feeds the Headlight circuit. Voltage through terminals K and H feeds the other exterior lights.

The Amplifier turns the lights off if the Photocell senses light. If the Ignition Switch is moved to OFF, the Sentinel Control will cause a delay of five (**5**) seconds to three (**3**) minutes and then turn the lights off. **This** delay is set by changing the resistance of the Delay Rheostat (in the Sentinel Control).

When the Delay Rheostat is turned to OFF, the path to **ground** at terminal L of the Sentinel Amplifier is opened. The system is turned off.

The Sentinel Amplifier does not react instantly to photocell signals. Turn-on or turn-off is delayed about **30** seconds. This avoids needless operation for short periods of time.