

Measure Between	Correct Voltage	For Diagnosis
A (LT GRN) & Ground	Battery	See 1
B (LT GRN) & Ground	Battery	See 1

- If voltages are correct, have A/C Cutout Relay disconnected and go to Table 2.

- If voltage is incorrect at only one terminal, check for an open in the LT GRN (66) wire to the terminal affected. If voltage is incorrect at both terminals do Test C.

Jumper Between	Correct Action	For Diagnosis
B (LT GRN) & D (LT GRN/BLK)	Clutch engages	Do Test B

Measure Between	Correct Voltage	For Diagnosis
J on Conn C2 (LTGRN) & Ground	Battery	See 1
19 on Conn C1 (BRN) & Ground	Battery	See 2



Jumper Between	Correct Action	For Diagnosis
19 on Conn C1 (BRN) & Ground	A/C Cutout Relay operates and disengages A/C Compressor Clutch	See 1

- If action is correct but the Compressor Clutch does not operate normally, condition is due to ECM. Refer to Section 6E for ECM diagnostic procedures.

- Replace the A/C Cutout Relay

(Continued on next page)

(Continued from previous page)

B: A/C COMPRESSOR CLUTCH TEST

Measure: VOLTAGE At: COMPRESSOR CLUTCH (Disconnected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN (Engine not running) • A/C Mode: NORM • Temperature Outside Car: Above 60°F (16°C) • A/C Cutout Relay disconnected • A/C Cutout Relay Terminals B and D jumpered 		
Measure Between	Correct Voltage	For Diagnosis
A (LTGRN/BLK) & Ground	Battery	See 1
A (LTGRNI BLK) & B (BLK)	Battery	See 2

C: A/C COMPRESSOR FUNCTION CONTROL TEST

Measure: VOLTAGE At: A/C CONTROL HEAD Conditions: <ul style="list-style-type: none"> • Ignition Switch: Run • A/C Mode: NORM • Temperature Outside Car: Above 60°F (16°C) 		
Measure Between	Correct Voltage	For Diagnosis
E (BRN) & Ground	Battery	See 1
C (LT GRN) & Ground	Battery	Replace A/C Control Head
<ul style="list-style-type: none"> • If voltages are correct, check for an open in the LT GRN (66) wire. <p>1. Check for an open A/C Fuse or open BRN (50) wire.</p>		

CIRCUIT OPERATION

The compressor for the air conditioning system is belt driven by the engine through the Compressor Clutch. The clutch allows the compressor to be disengaged when air conditioning is not required or to remove the air conditioning load from the engine when needed!

Operation of the compressor depends on the particular A/C mode selected by the driver. When the A/C Mode Selector Switch is in MAX, NORM, BI-LEVEL or DEF, battery voltage is applied through the A/C Fuse and A/C Function Switch to the remaining circuits.

TURBO VIN 7

From the A/C Control Head voltage is applied to the A/C Cutout Relay through the Pressure Cycling Switch which is normally closed. The Pressure Cycling Switch opens when refrigerant pressure drops below 172 kPa (25 psi). It closes again when refrigerant pressure rises enough so that additional cooling is required. This action causes A/C Compressor to cycle on and off so that the evaporator temperature does not drop low enough to cause icing.

The A/C Cutout Relay is operated by the ECM. When the ECM receives the A/C ON input at Terminal B8, it grounds Terminal A2 energizing the A/C Cutout Relay. When the relay is energized, voltage is applied to the A/C Compressor Clutch through the contacts of the relay and the normally closed contact of the High Pressure Cutout Switch. If the ECM determines that engine load should be reduced such as during full throttle, the A/C Cutout Relay is de-energized to remove voltage from the compressor clutch thus removing the air conditioning load from the engine.

The normally closed A/C High Pressure Cutout Switch opens if refrigerant pressure becomes too high for normal operation.

V6 VIN A

From the A/C Control Head voltage is applied to the A/C Compressor Clutch through the Pressure Cycling Switch. The Pressure Cycling Switch is normally closed but opens when refrigerant pressure drops below 172 kPa (25 psi). It closes again when refrigerant pressure rises enough so that additional cooling is required. This action causes the A/C Compressor to cycle on and off so that the evaporator temperature does not drop low enough to causing icing.

AIR CONDITIONING: COMPRESSOR CONTROLS

When voltage is applied to the compressor clutch it is also applied to the ECM at Terminal J on Connector C2. The ECM will then increase the engine idle speed while the A/C Compressor Clutch is engaged.

V8 VIN Y

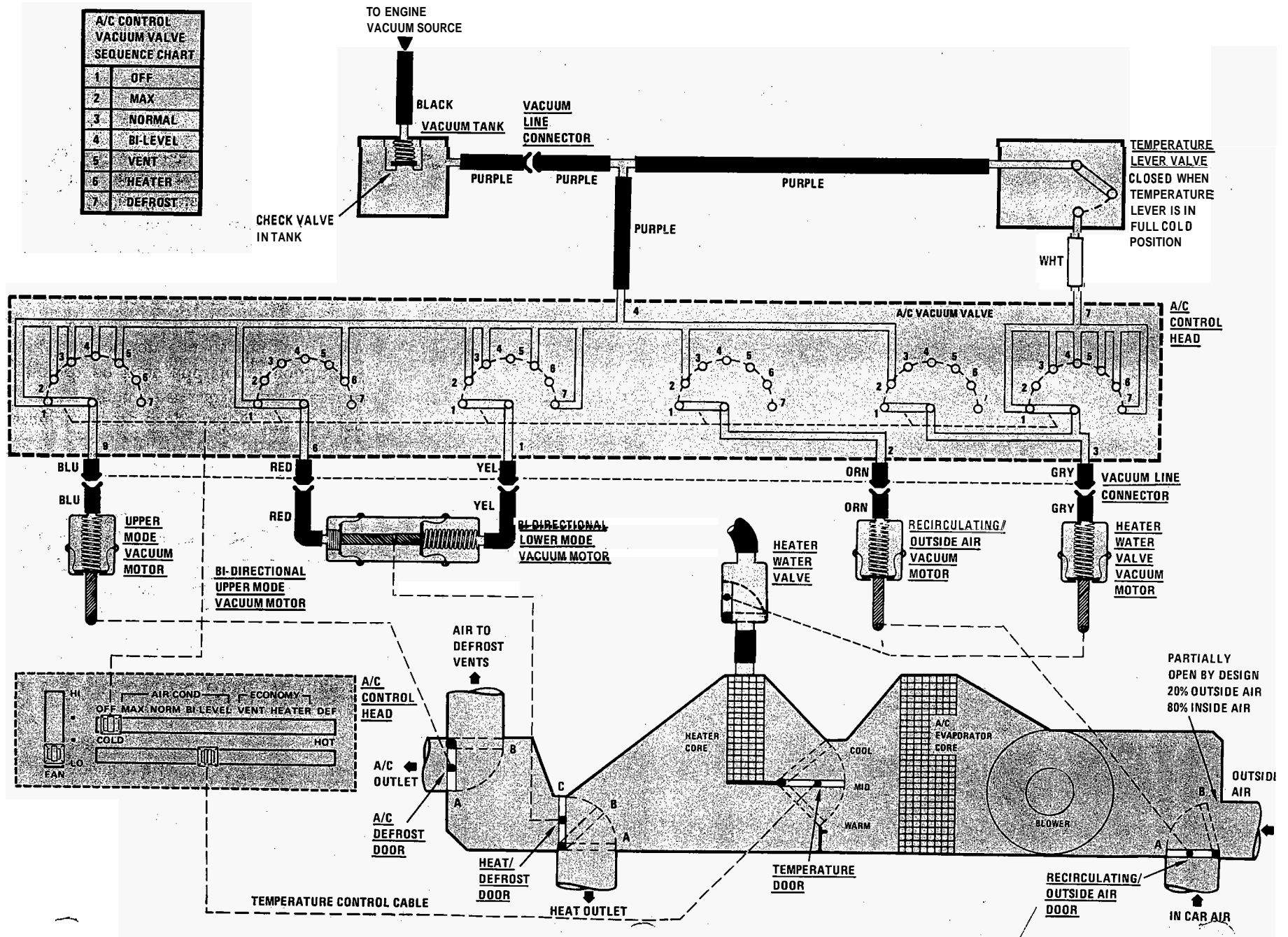
From the AIC Control Head, voltage is applied to the A/C Cutout Relay and Terminal J on Connector C2 of the ECM. The ECM will then increase the engine idle speed to compensate for the additional load of the A/C Compressor. Battery voltage at the AIC Cutout Relay is applied to the A/C Compressor Clutch through the normally closed contacts of the A/C Cutout Relay and to ground through the normally closed Pressure Cycling Switch. The Pressure Cycling Switch opens when refrigerant pressure drops below 172 kPa (25 psi). It closes again when refrigerant pressure rises enough so that additional cooling is required. This action causes the A/C Compressor to cycle on and off so that evaporator temperature does not drop low enough to cause icing.

If the ECM determines that the engine load should be reduced, such as during wide open throttle, the A/C Cutoff Relay is energized which opens the relay contacts removing voltage from the A/C Compressor Clutch.

AIR CONDITIONING: AIR DELIVERY CONTROLS

C60, MANUAL

A/C CONTROL VACUUM VALVE SEQUENCE CHART	
1	OFF
2	MAX
3	NORMAL
4	BI-LEVEL
5	VENT
6	HEATER
7	DEFROST



AIR CONDITIONING: AIR DELIVERY CONTROLS

C60, MANUAL

TROUBLESHOOTING HINTS

- Try the following checks before doing the System Diagnosis.
1. If air flow does not come from the proper outlets under one or more operating modes, at least one of the air doors is not moving to the proper position. Check for manifold vacuum to the vacuum tank at the BLACK hose from the engine.
 - If a vacuum is not present, check the hose back to the engine vacuum source.
 - If a vacuum is present at the vacuum tank, check for a vacuum at the VIOLET hose at the A/C Control Head. If there is no vacuum, check the VIOLET hose. If the hose is OK, replace the Vacuum Tank.
2. Check the operation of the Temperature Door by moving the Temperature Lever rapidly back and forth several times. Listen for the door to strike the stop at each end of its travel. If the sound indicates that the door is not fully closing or opening, check the mechanical linkage between the door and the Temperature Lever.
- Go to the A/C System Check in 8A-62 for a guide to normal operation and diagnostic references.
 - Go to System Diagnosis to isolate Air Delivery conditions.

SYSTEM DIAGNOSIS

- Check the operation of the air doors using the following chart. Put Blower Switch in HI for strong air flow.

COMPONENT LOCATION

Page-Figure

Bi-Directional Lower & Upper Mode Vacuum Motor		LH side of A/C module	
Heater Water Valve	.....	RH rear part of engine, on heater line hose	.... 201-18-E
Heater Water Valve Vacuum Motor	.....	RH rear of engine compartment, under heater hoses	..... 201-18-E
Recirculating/Outside Air Vacuum Motor		Under I/P, top RH side of A/C module	
Temperature Lever Valve	.....	LH rear of A/C control head	
Upper Mode Vacuum Motor	.....	Behind I/P, on RH front of A/C plenum	
Vacuum Line Connector	.....	Behind I/P, near center of A/C plenum	..... 201-19-D
Vacuum Tank (VIN 7)(Manual A/C, Without Cruise Control)	.....	RH rear of engine compartment, ahead of blower motor	..... 201-19-B
Vacuum Tank (VIN A)(VIN Y)(Without Cruise Control)	.....	RH rear of engine compartment, ahead of blower motor	..... 201-19-C

AIR DOOR POSITIONS

Conditions:

- Ignition Switch: RUN (Engine Running)
- Blower Switch: HI

Function Switch	A/C Defrost Door	Heat/Defrost Door	Recirculating/Outside Air Door
OFF	B	C	A
MAX	B	A	B
NORM	B	A	A
BI-LEVEL	B	B	A
VENT	B	A	A
HEATER	A	C	A
DEF	A	A	A

CIRCUIT OPERATION

The air doors and vents in the air conditioning system are operated by mechanical and vacuum controls. There are no electrical circuits. The functions of the air doors, Heater Water Valve, and A/C Evaporator Core are described below.

Temperature Door

The Temperature Door is controlled by the temperature selector in the A/C Control Head. With the selector in COLD, the door is in the COOL position. This prevents air from blowing across the Heater Core. With the selector in any position but COLD, the Temperature Door is open. According to the selector position, some or all of the air blows across the Heater Core.

AIR CONDITIONING: AIR DELIVERY CONTROLS

C60, MANUAL

Heater Water Valve

The Heater Water Valve is controlled by the Heater Water Valve Vacuum Motor. With the temperature selector in COLD, the Temperature Lever Valve closes and connects the PURPLE hose to the WHITE hose. This applies vacuum from the Vacuum Tank to the motor. The motor operates, closing the valve. The closed valve blocks hot water from flowing to the Heater Core.

Heat/Defrost Door

With the Selector Switch in Bi-Level (position **4**), no vacuum is applied to either side of the Bi-Directional Lower Mode Vacuum Motor. Both bellows extend part way. The Heat/Defrost Door moves to position B. Part of the air flows out of the Heat Outlets. The rest of the air flows out the A/C Outlets.

A/C Defrost Door

The A/C Defrost Door is controlled by the Upper Mode Vacuum Motor. With the Selector Switch in any position but HEATER and DEF (position **6** and **7**), vacuum is applied to the motor. The bellows contracts and the A/C Defrost Door is pulled to position B. All air flows out the A/C Outlets.

No vacuum is applied to the A/C Defrost Vacuum Motor with the Selector Switch in DEF or HEATER. The bellows extends and the A/C Defrost Door moves to position A. All air passes out the Defrost Outlets.

Recirculating/Outside Air Door

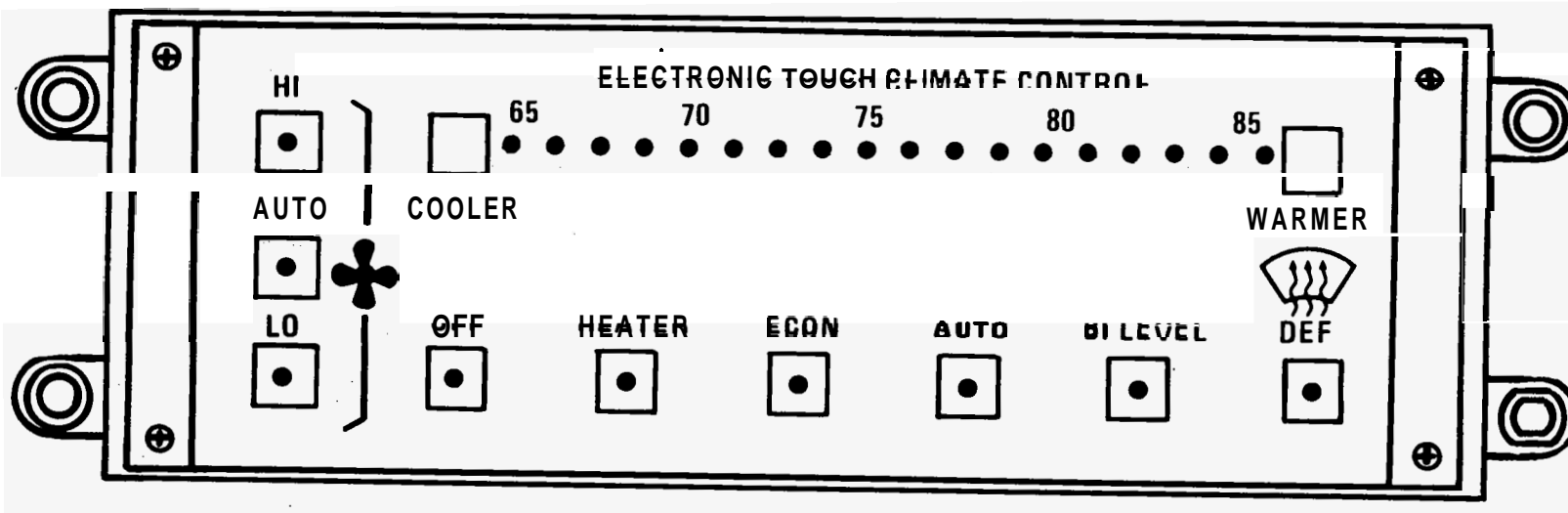
The Recirculating/Outside Air Vacuum Motor has no vacuum applied for any Selector Switch position except MAX (position **2**). The motor bellows are expanded.

When the Mode Selector is moved to MAX, vacuum is applied to the Recirculating/Outside Air Vacuum Motor. The bellows are drawn in and the door is moved to position B. Air from inside the car is pulled into the plenum.

BLANK

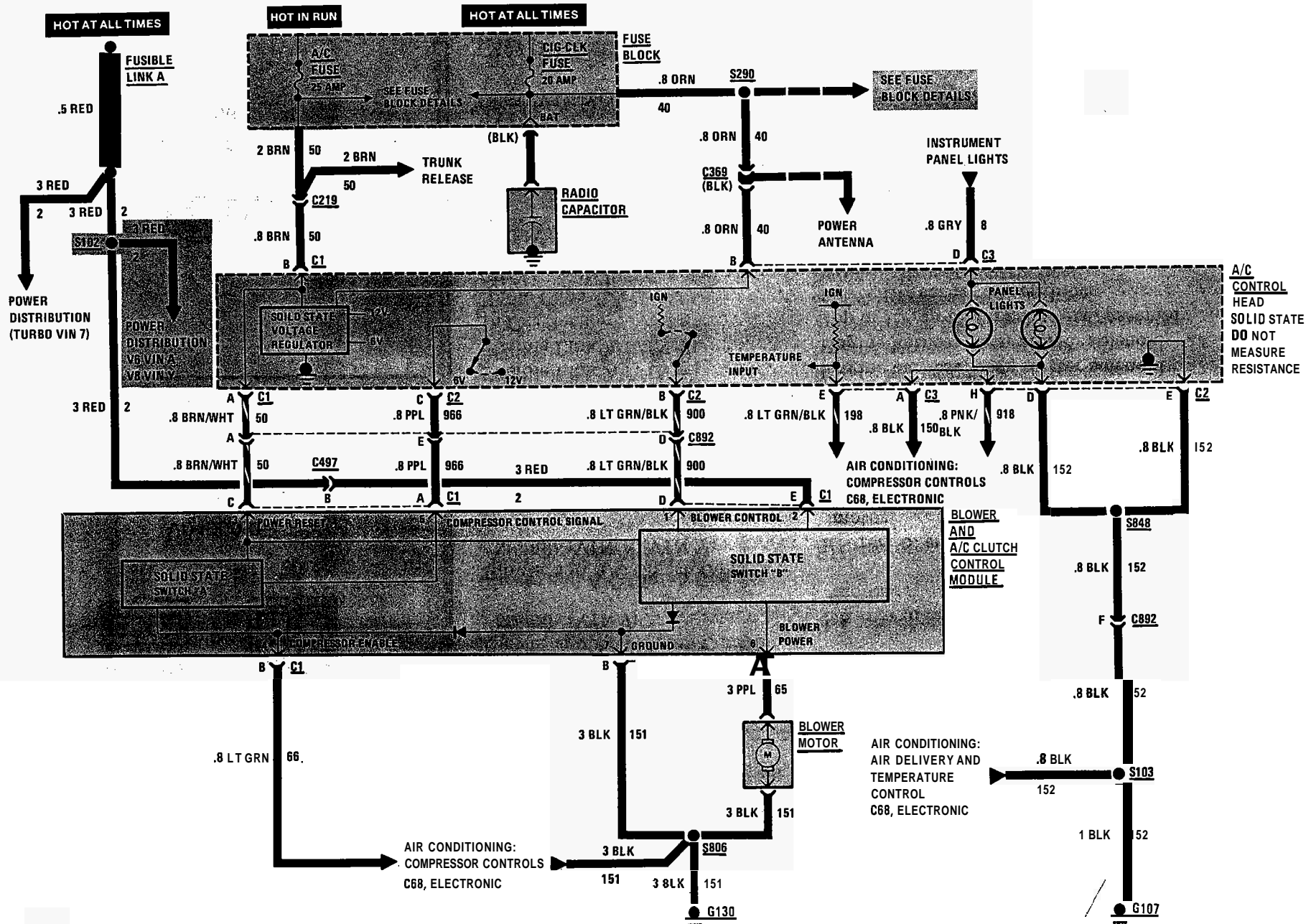
AIR CONDITIONING: BLOWER CONTROLS

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AIR CONDITIONING: BLOWER CONTROLS

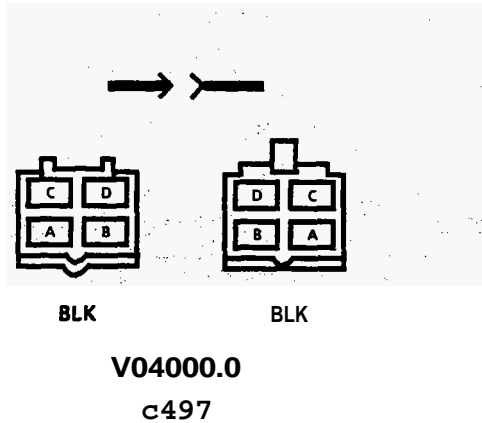
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AIR CONDITIONING: BLOWER CONTROLS

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HARNESS CONNECTOR FACES



COMPONENT LOCATION

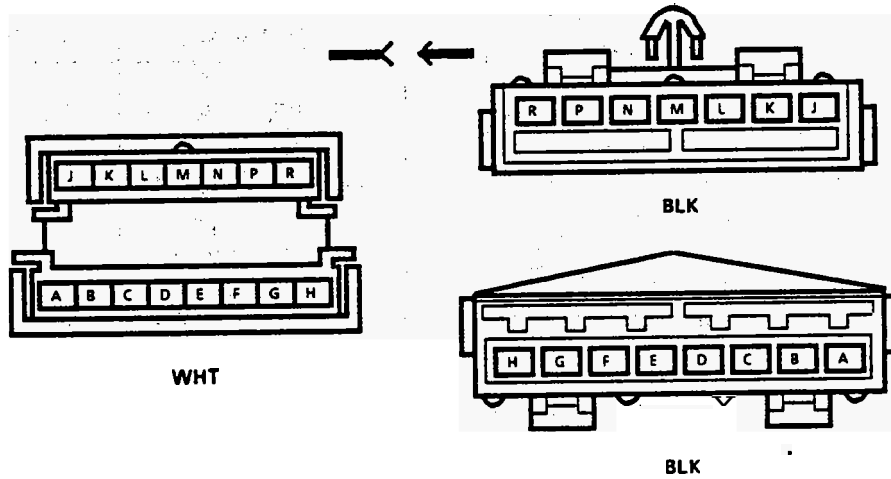
Page-Figure

A/C Compressor Clutch (VIN 7) . . .	LH front of engine, part of A/C compressor. . .	201- 7-B
A/C Compressor Clutch (VIN A) . . .	RH front of engine, part of A/C compressor. . .	201- 2-A
A/C Compressor Clutch (VIN Y) . . .	RH front of engine, part of A/C compressor. . .	201- 5-C
Ambient Sensor (VIN 7)	RH rear of engine compartment, right of blower motor.	201-19-A
Ambient Sensor (VIN A) (VIN Y) . .	RH rear of engine compartment, above blower motor.	201-19-C
Blower and A/C Clutch Control Module (VIN 7)	RH rear of engine compartment, left of blower motor.	201-19-A
Blower and A/C Clutch Control Module (VIN A)(VIN Y)	RH rear of engine compartment, left of blower motor.	201-19-C
Blower Motor (VIN 7)	RH rear of engine compartment.	201-19-B
Blower Motor (VIN A) (VIN Y) . . .	RH rear of engine compartment.	201-20-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
Fusible Link A (VIN 7)	Engine harness, near starter solenoid	201- 6-B
Fusible Link A (VIN A)	Engine harness, near starter solenoid	201- O-A
Fusible Link A (VIN Y)	Engine harness, near starter solenoid	201- 5-A
In-Car Sensor	Top of I/P, in RH speaker grill assembly	201-15-C
Radio Capacitor	Lower LH corner of fuse block	201-13-C
C219 (1cavity)	Behind I/P, near control head.	201-17-A
C369 (1cavity)	Behind I/P, near RH shroud.	201-1642
C497 (VIN 7) (4 cavities)	RH rear of engine compartment, near blower motor.	201- 7-C
C497 (VIN A) (4 cavities)	RH rear of engine compartment, below valve cover	201- 2-A
C497 (VIN Y) (4 cavities)	Behind RH side of I/P, right of radio	201-16-B
C661 (VIN Y) (3 cavities)	RH rear of engine compartment, above valve cover.	201- 4-A
C892 (15 cavities)	Behind I/P, center of glove box.	201-17-A
G107	Below RH side of I/P, near shroud	201-17-A
G130	On RH front fender, near blower motor	201-19-C
S103.	A/C harness, behind glove box.	201-17-A
S290.	I/P harness, above steering column	201-15-A

AIR CONDITIONING: BLOWER CONTROLS

C68, ELECTRONIC

HARNESS CONNECTOR FACES



V15003.0
C892

AIR CONDITIONING: BLOWER CONTROLS

C68, ELECTRONIC

TROUBLESHOOTING HINTS

- Try the following checks before doing the System Diagnosis.
 1. Check the A/C Fuse and CIG-CLK Fuse by visual inspection.
 2. Check that G107 and G130 are clean and tight.
 3. Check that Blower Motor connectors are mated correctly and firmly seated.
- Go to the A/C System Check in OA-62 for a guide to normal operation. Refer to the diagnosis if other results occur.
- Go to System Diagnosis for diagnostic tests.

SYSTEM DIAGNOSIS

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

SYSTEM TABLE

SYMPTOM	DO TEST
Blower runs all the time	B: Blower and A/C Clutch Control Module Voltage Test C: A/C Control Head Blower Test
Blower will not run in any mode	A: Blower Motor Test.
Blower runs in high speed only	B: Blower and A/C Clutch Control Module Voltage Test.
LED Indicators don't light	D: Control Head Panel Light Test
Symptom other than those listed	A, B, C and D

A: BLOWER MOTOR TEST

Measure: VOLTAGE At: BLOWER MOTOR CONNECTORS (Disconnected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN • A/C Mode: VENT • Blower Switch: HI 		
Measure Between	Correct Voltage	For Diagnosis
PPL (65) & Ground	Battery	See 1
PPL (65) & BLK (151)	Battery	See 2
<ul style="list-style-type: none"> • If the voltages are correct but the blower does not run, install a new Blower Motor <ol style="list-style-type: none"> 1. Check the PPL (65) wire for an open. If wire is good do Test B. 2. Check the BLK (150) wire for an open and that G130 is clean and tight. 		

B: BLOWER AND A/C CLUTCH CONTROL MODULE VOLTAGE TEST

Measure: VOLTAGE At: BLOWER AND A/C CLUTCH MODULE CONNECTORS (Connected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN • A/C Mode: ECON • Blower Mode: HI 		
Measure Between	Correct Voltage	For Diagnosis
E (RED) Conn C1 & Ground	Battery	See 1

(Continued in next column)

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D (LT GRN/ BLK) Conn C1 & Ground	Greater than 10 Volts	See 2
E (RED) Conn C1 & B (BLK) Conn C2	Battery	See 3
A (PPL) Conn C2 & Ground	Greater than 10 Volts	See 5
<ul style="list-style-type: none"> • Blower Mode: LO 		
D (LT GRN/ BLK & Ground	Less than 7 Volts	See 4
A (PPL) Conn C2 & Ground	Less than 7 Volts	See 5

(Continued on next page)

AIR CONDITIONING: BLOWER CONTROLS

C68, ELECTRONIC

(Continued from previous page)

C: A/C CONTROL HEAD BLOWER VOLTAGE TEST

Measure: VOLTAGE

At: A/C CONTROL HEAD CONNECTORS C1, C2 and C3 (Connected)

Conditions:

- Ignition Switch: RUN
- A/C Mode: ECON
- Blower Mode: HI

Measure Between	Correct Voltage	For Diagnosis
3 (BRN) Conn C1 & Ground	Battery	See 1
3 (ORN) Conn C3 & Ground	Battery	See 2
B (BRN) Conn C1 & E (BLK) Conn C2	Battery	See 3
B (BRN) Conn C1 & D (BLK) Conn C2	Battery	See 3
B (LT GRN/BLK) Conn C2 & Ground	Greater than 10 Volts	See 4
◦ Blower Mode: LO		
B (LT GRN/BLK) & Ground	Less than 7 Volts	See 4
<ul style="list-style-type: none"> • If voltages are correct but blower does not run, check for an open in LT GRN/BLK (900) wire. If wire is good, recheck measurements made in Tests A and B. 		
1. Check BRN (50) wire for an open.		

(Continued in next column)

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2. Check ORN (40) wire for an open.
3. Check BLK (152) wire for an open.
4. Check LT GRN/BLK (900) wire for a short to ground. If wire is good, replace the A/C Control Head.

D: A/C CONTROL HEAD PANEL LIGHT TEST

Measure: VOLTAGE

At: A/C CONTROL HEAD CONNECTORS C2 and C3 (Connected)

Conditions:

- Ignition Switch: RUN
- A/C Mode: ECON
- Light Switch: PARK
- Light Dimmer Setting: FULL BRIGHTNESS

Measure Between	Correct Voltage	For Diagnosis
D (GRY) Conn C3 & Ground	Battery	See 1
D (GRY) Conn C3 & D (BLK) Conn C2	Battery	See 2
D (GRY) Conn C3 & D (BLK) Conn C2	Minimum Panel Lamp Voltage	See 3
<ul style="list-style-type: none"> ◦ If voltages are correct but Panel indicators do not light or dim, replace the A/C Control Head. 		
1. Check for open in GRY (8) wire.		
2. Check for open in BLK (152) wire.		
3. Go to 8A-12, Light Switch Details, for diagnostics.		

CIRCUIT OPERATION

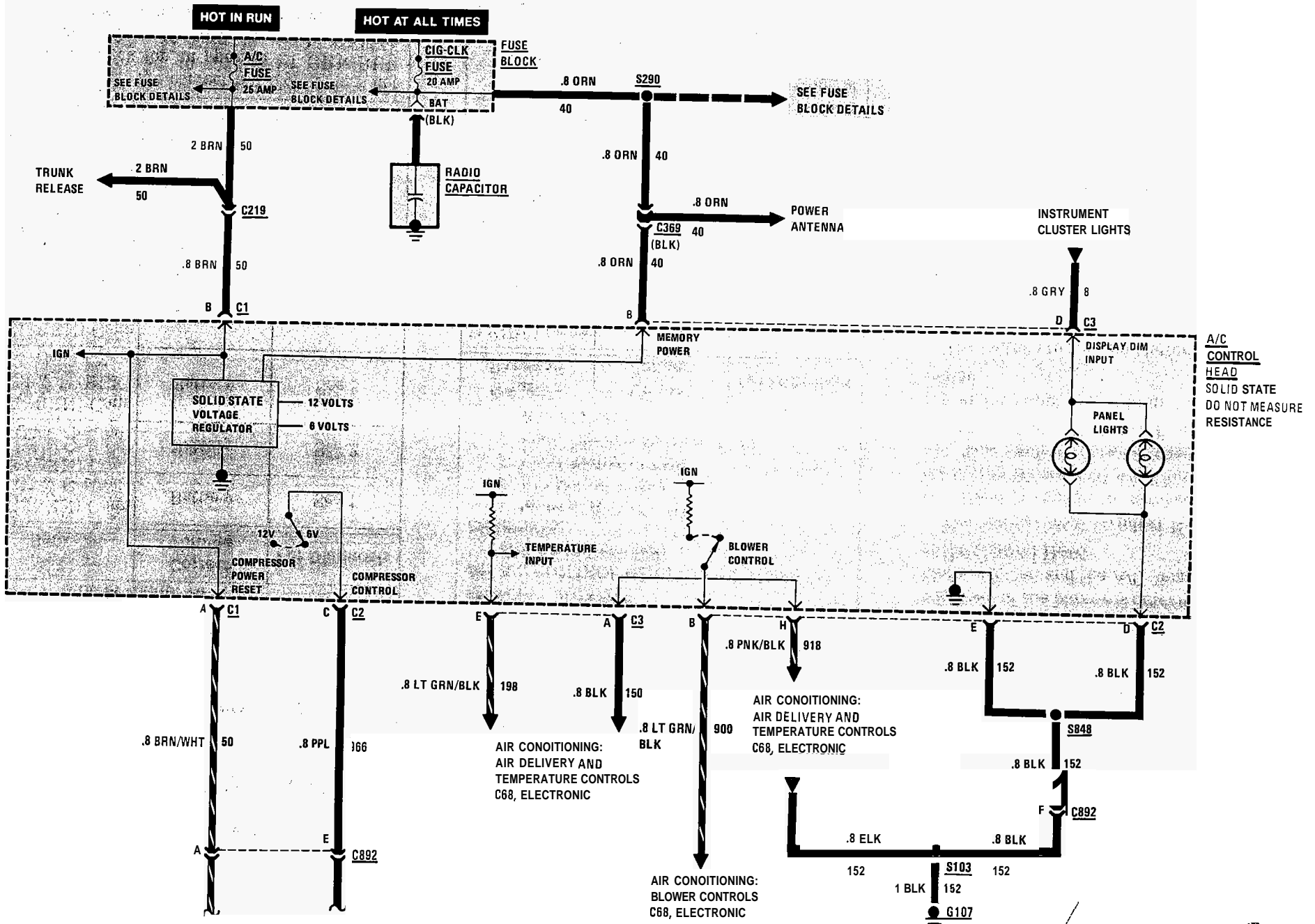
The Blower Motor speed is determined by the voltage level at terminal B of connector C2 on the A/C Control Head. The voltage at terminal B is a Pulse Width Modulated Signal (PWM) with a duty cycle proportional to the blower speed. When the average voltage at terminal B is high (greater than 10 volts), the blower runs at maximum speed. When the voltage is low (less than 7 volts), the blower runs at low speed. The particular speed of the blower is determined by the A/C Mode selected and the A/C Temperature Setting of the Control Head.

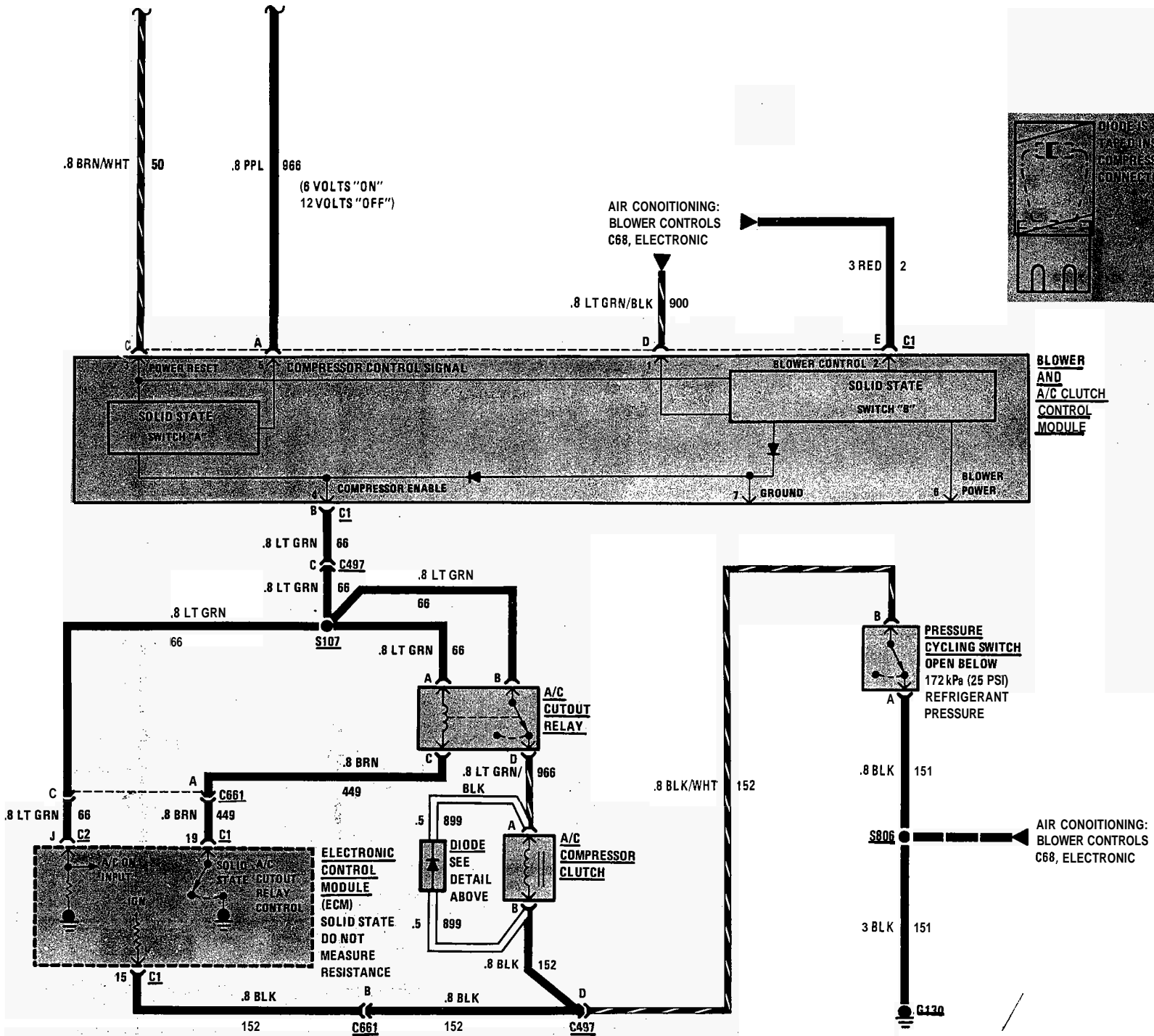
The voltage from terminal B of the A/C Control Head is applied to terminal D of connector C1 on the Blower and A/C Clutch Control Module. This module contains circuits for averaging the PWM input at terminal B, and a current amplifier for supplying voltage to run the blower motor.

The voltage to run the blower motor is applied to the motor through the PPL (65) wire. At maximum blower speed, the voltage applied to the blower motor is approximately 12 volts and at minimum blower speed the voltage is approximately 4 volts.

AIR CONDITIONING: COMPRESSOR CONTROLS

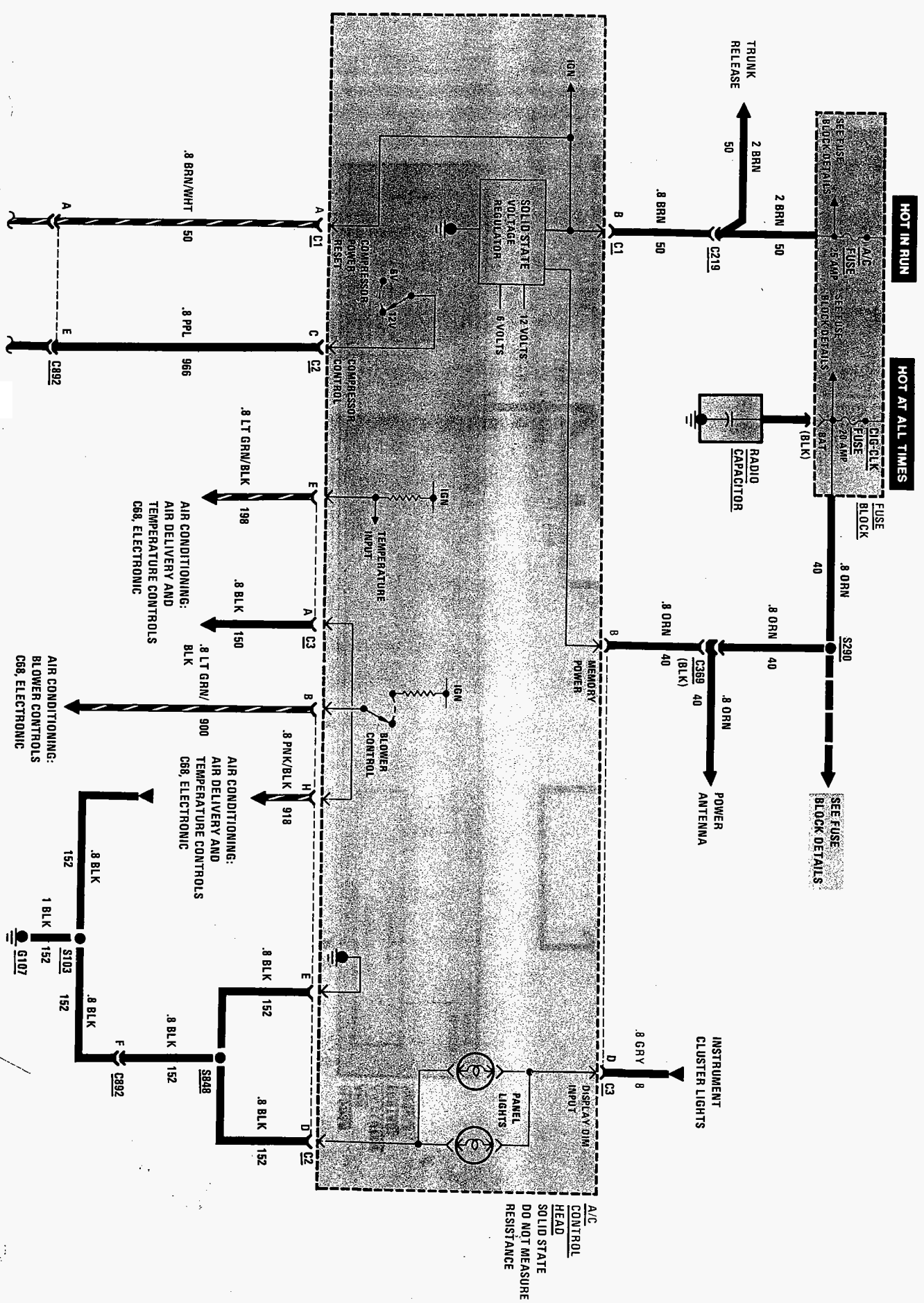
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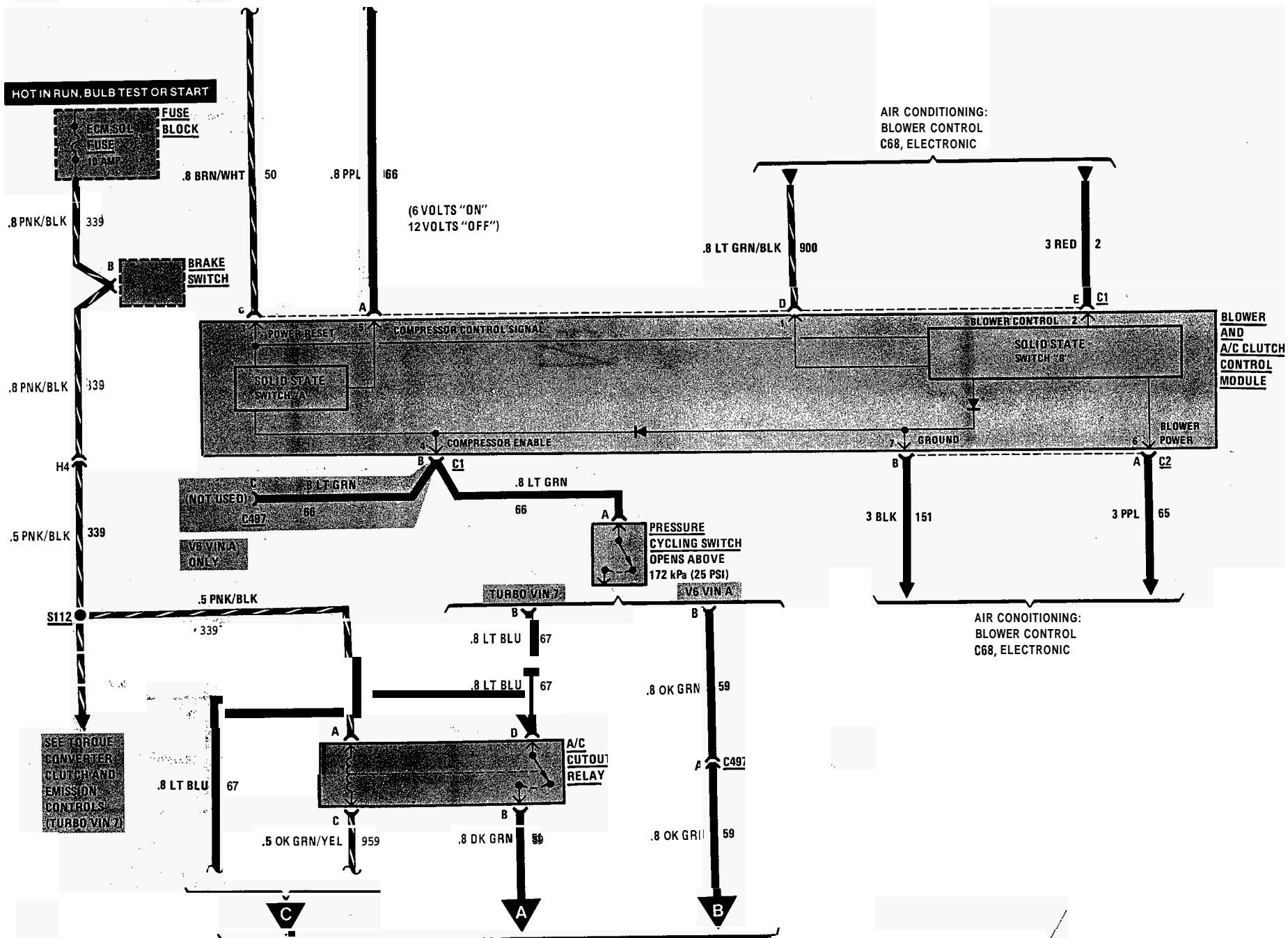




AIR CONDITIONING: COMPRESSOR CONTROLS

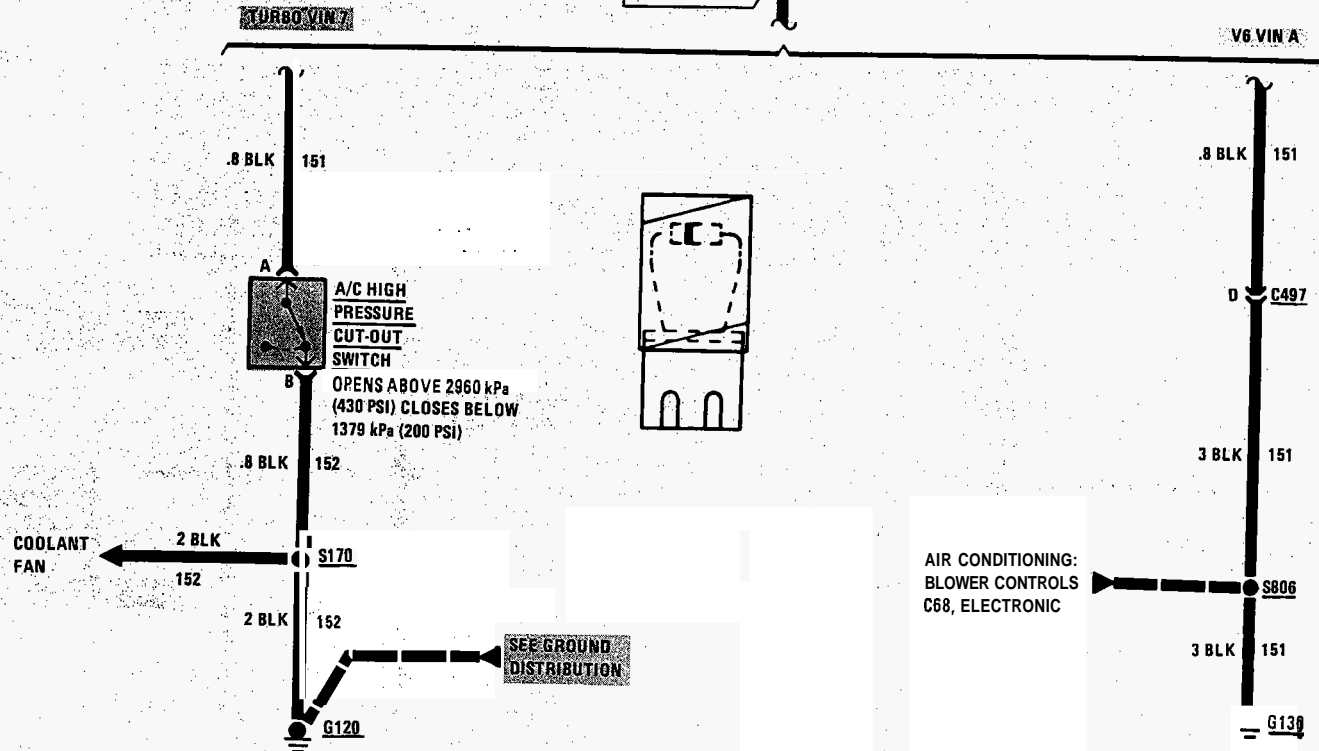
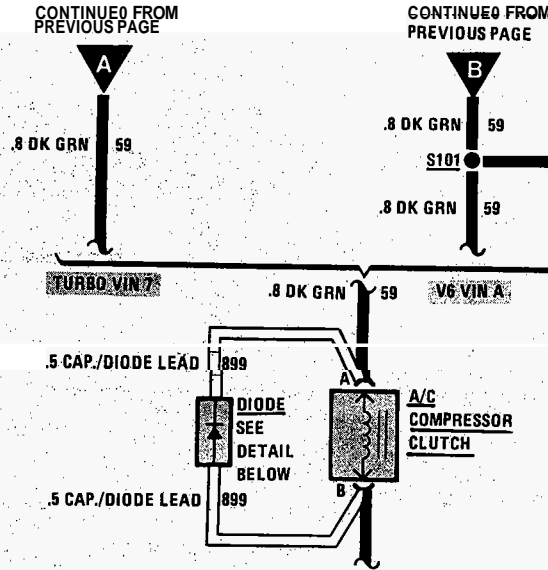
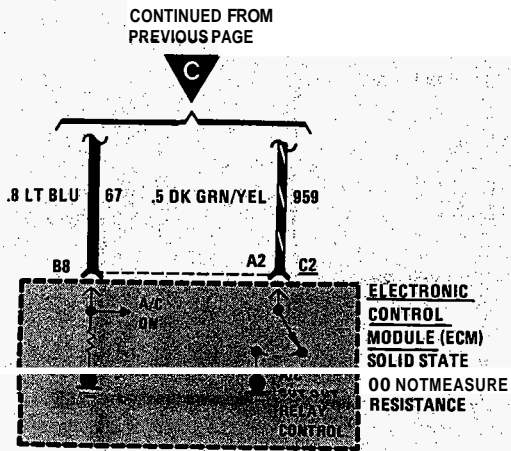
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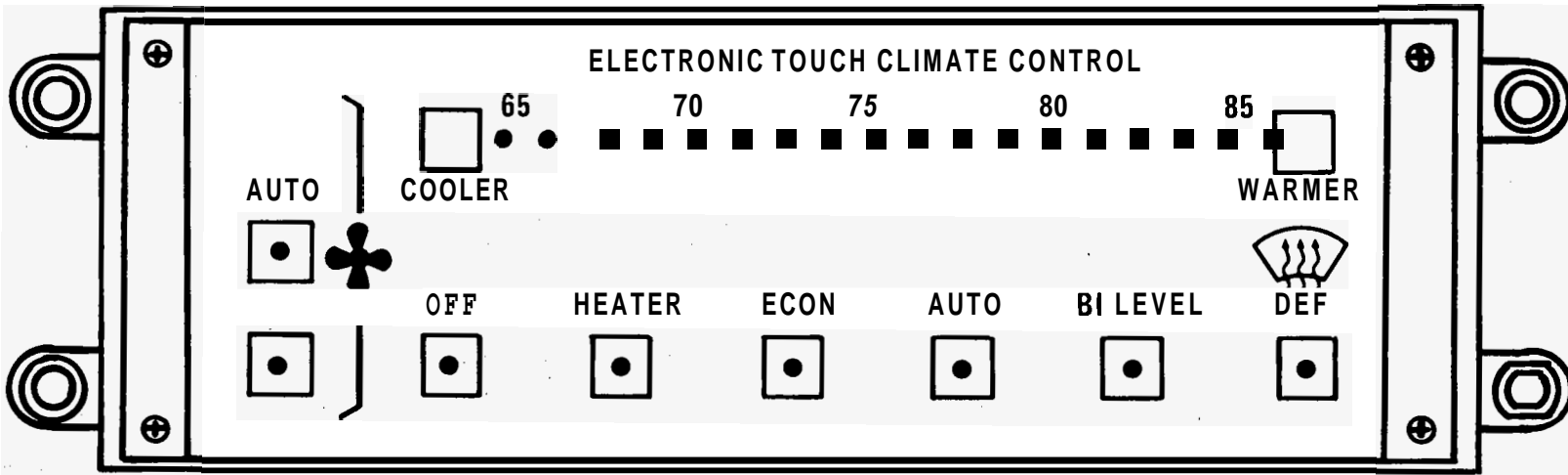
AIR CONDITIONING: COMPRESSOR CONTROLS

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AIR CONDITIONING: COMPRESSOR CONTROLS

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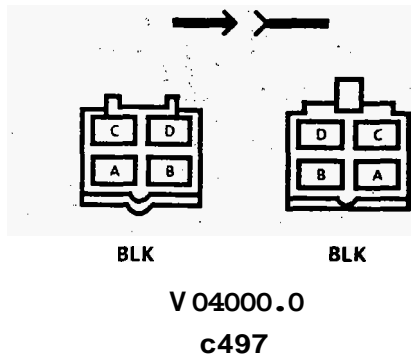


AIR CONDITIONING: COMPRESSOR CONTROLS

C68, ELECTRONIC

HARNES CONNECTOR FACES

C100, See Page 202-0



COMPONENT LOCATION

Page-Figure

A/C Compressor Clutch (VIN 7) . . .	LH front of engine, part of A/C compressor. . . .	201- 7-B
A/C Compressor Clutch (VIN A) . . .	RH front of engine, part of A/C compressor. . . .	201- 2-A
A/C Compressor Clutch (VIN Y) . . .	RH front of engine, part of A/C compressor. . . .	201- 5-C
A/C Cut-Out Relay (VIN 7)	On RH front fender, above wheel well	201- 8-C
A/C High Pressure Cut-Out Switch	In A/C line, below generator.	201- 8-A
Ambient Sensor (VIN 7)	RH rear of engine compartment, right of blower motor.	201-19-A
Ambient Sensor (VIN A) (VIN Y) . .	RH rear of engine compartment, above blower motor.	201-19-C
Blower and A/C Clutch Control Module (VIN 7)	RH rear of engine compartment, left of blower motor.	201-19-A
Blower and A/C Clutch Control Module (VIN A)(VIN Y)	RH rear of engine compartment, left of blower motor.	201-1942
Blower Motor (VIN 7)	RH rear of engine compartment.	201-19-B
Blower Motor (VIN A) (VIN Y) . . .	RH rear of engine compartment.	201-20-A
Brake Switch.	Top of brake pedal support.	201-12-A
Diode (A/C Clutch)	Taped inside A/C compressor clutch connector	
Electronic Control Module (ECM) .	RH shroud, near lower access hole.	201-17-B
Fuse Block.	Under LH side of I/P.	201-12-A
In-Car Sensor	Top of I/P, in RH speaker grill assembly	201-15-C
Pressure Cycling Switch (VIN 7) . .	RH rear of engine compartment, on A/C accumulator	201-19-B
Pressure Cycling Switch (VIN A) (VIN Y)	RH rear of engine compartment, on A/C accumulator	201-19-C
Radio Capacitor	Lower LH corner of fuse block	201-13-C
C100 (45 cavities)	LH rear of engine compartment.	201- 9-B
C219 (1cavity)	Behind I/P, near control head.	201-17-A
C369 (1cavity)	Behind I/P, near RH shroud.	201-16-C
C497 (VIN 7) (4 cavities)	RH rear of engine compartment, near blower motor.	201- 7-C
C497 (VIN A) (4 cavities)	RH rear of engine compartment, below valve cover.	201- 2-A

AIR CONDITIONING: COMPRESSOR CONTROLS

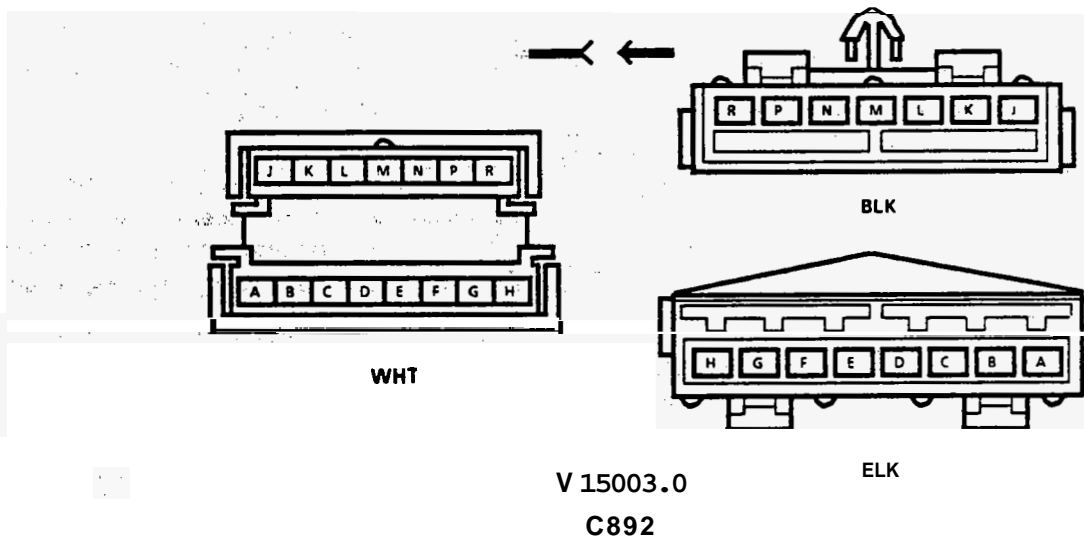
C68, ELECTRONIC

COMPONENT LOCATION

Page-Figure

C497 (VIN Y) (4 cavities)	Behind RH side of I/P, right of radio	201-16-B
C892 (15 cavities)	Behind IIP, center of glove box.	201-17-A
G107	Below RH side of I/P, near shroud	201-17-A
G120 (VIN 7).....	RH rear of engine, on cylinder head.	201- 7-A
G130	On RH front fender, near blower motor.	201-19-C
S103.	AIC harness, behind glove box.	201-17-A
S112.	Engine harness, near rear of RH cylinder head .	201- 7-A
S170.	Engine harness, near mass air flow sensor.	201-10-A
S290.	IIP harness, above steering column	201-15-A
S806 (VINA) (VIN Y)	AIC harness, forward of blower motor	201-19-C
S848.	A/C harness, right of radio	

HARNESS CONNECTOR FACES



AIR CONDITIONING: COMPRESSOR CONTROLS

C68, ELECTRONIC

TROUBLESHOOTING HINTS

- Try the following checks before doing System Check.
- 1. Check ECM-SOL Fuse and A/C Fuse by visual inspection.
- 2. Check that A/C Compressor Clutch connector is **firmly** seated.
- 3. Check that ground G130 is clean and tight.
- Go to System Check for a guide to normal compressor control operation.
- Go to System Diagnosis for compressor controls diagnostic tests.

SYSTEM CHECK

- Complete the A/C System Check in 8A-62 as a guide to normal operation of the entire A/C System. Refer to the diagnostics given if other results occur.
- Tests for Compressor Controls follow in System Diagnosis.

ACTION	EXPECTED RESULT
1. Turn Ignition Switch to RUN and start engine. Press AUTO and set Temperature to 65	<ul style="list-style-type: none"> • A click can be heard when clutch engages
2. Move Mode Selector between AUTO and ECON several times	<ul style="list-style-type: none"> • Verify that clutch engages in AUTO position • Clutch plate movement can be seen on the front of the compressor pulley • If clutch does not engage proceed to step 4. If clutch operates as expected continue to step 3
3. Press AUTO to engage clutch	<ul style="list-style-type: none"> • Check that air from cooling fan can move freely through condenser • Feel the input (cool) and output (warm) pipes to the compressor. If there is not a wide temperature difference after the compressor has run for several seconds see Section 1B for refrigerant and compressor diagnostics
4. Turn off ignition, Check refrigerant charge according to procedure in Section 1B	<ul style="list-style-type: none"> • If refrigerant charge is low, follow procedures in Section 1B for refrigerant diagnosis • If refrigerant charge is normal, isolate conditions using the procedures which follow in System Diagnosis

SYSTEM DIAGNOSIS

TURBO VIN 7

- Use the Isolation Test below to choose the proper diagnostic test.
- Tests follow the Isolation Test.

ISOLATION TEST (TABLE 1)

Measure: VOLTAGE At: A/C CUTOUT RELAY (Disconnected) Conditions <ul style="list-style-type: none"> • Ignition Switch: RUN (Engine need not be running) • A/C Mode: AUTO • A/C Temperature Setting: 65 • Temperature Outside Car: Above 60°F (16°C) 		
Measure Between	Correct Voltage	(For Diagnosis)
C (PNK/BLK) & Ground	Battery	<ul style="list-style-type: none"> • Check ECM SOL Fuse and PNK/BLK (339) wire for an open.

(Continued on facing page)

AIR CONDITIONING: COMPRESSOR CONTROLS

C68, ELECTRONIC

D (LT/BLU) & Ground	Battery	<p>.. Check LT BLU (67) wire for an open back to Pressure cycling Switch.</p> <p>l. Check that Pressure Cycling Switch is closed. If switch is open refer to Section 1B for procedure to check for low refrigerant pressure. If refrigerant pressure is normal, replace the Pressure Cycling Switch.</p> <p>}. Do Test C.</p>
<p>• If voltages are correct, leave A/C Cut-Out Relay disconnected and go to Table 2.</p>		

ISOLATION TEST (TABLE 2)

<p>Connect: JUMPER At: A/C CUT-OUT RELAY (Disconnected) Conditions</p> <ul style="list-style-type: none"> o Ignition Switch: RUN (Engine need not be running) • A/C Mode: AUTO • A/C Temperature Setting: 65 o Temperature Outside Car: Above 60°F (16°C) 		
Jumper Between	Correct Result	For Diagnosis
B (DK GRN) & D (LT BLU)	Clutch Engages	Do Test B
<p>• If result is correct, Do Test A.</p>		

A: ECM COMPRESSOR CONTROL TEST (TABLE 1)

<p>Measure: VOLTAGE At: ECM (Disconnected) Conditions</p> <ul style="list-style-type: none"> o Ignition Switch: RUN (Engine not running) • A/C Cut-Out Relay Reconnected. • A/C Mode: AUTO o Temperature Setting: 65 • A/C Temperature Outside Car: Above 60°F (16°C) 		
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Measure Between	Correct Voltage	For Diagnosis
B8 (LT BLU) & Ground	Battery	See 1
A2 (DK GRN/ YEL) & Ground	Battery	See 2

A: ECM COMPRESSOR CONTROL TEST (TABLE 2)

<p>Connect: JUMPER At: ECM (Disconnected) Conditions:</p> <ul style="list-style-type: none"> • Ignition Switch: RUN (Engine not running) • A/C Mode: AUTO • Temperature Setting: 65 • Temperature Outside Car: Above 60°F (16°C) 		
Jumper Between	Correct Result	For Diagnosis
A2 (DK GRN/ YEL & Ground	A/C cut-out Relay Operates and Compressor Clutch engages	See 1
<p>• If action is correct but A/C System does not operate under normal conditions, condition is due to ECM. Refer to Section 6E. l. Replace A/C Cut-Out Relay.</p>		

(Continued on next page)

AIR CONDITIONING: COMPRESSOR CONTROLS

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(Continued from previous page)

B: A/C COMPRESSOR CLUTCH TEST

Measure: VOLTAGE At: COMPRESSOR CLUTCH (Disconnected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN (Engine not running) • A/C Mode: AUTO • A/C Temperature Setting: 65 o Temperature Outside Car: Above 60°F (16°C) • A/C Cut-Out Relay disconnected • A/C Cut-Out Relay terminals D and B jumpered. 		
Measure Between	Correct Voltage	For Diagnosis
A (DK GRN) & Ground	Battery	See 1
A (DK GRN) & B (BLK)	Battery	See 2
<ul style="list-style-type: none"> • If voltages are correct but clutch does not engage, replace the Compressor Clutch. <ol style="list-style-type: none"> 1. Check for open in DK GRN (59) wire. 2. Check for an open in the BLK (151) wire and BLK (152) wire to ground. A/C High Pressure Cut-Out Switch should be closed. If the Switch is open, replace it. 		

C: BLOWER AND A/C CLUTCH CONTROL MODULE CLUTCH VOLTAGE TEST

Measure: VOLTAGE At: BLOWER AND A/C CLUTCH CONTROL MODULE CONNECTORS (Connected) Conditions: <ul style="list-style-type: none"> o Ignition Switch: RUN • A/C Mode: AUTO o A/C Temperature Setting: 65 o Temperature Outside Car: Above 60°F (16°C) 		
Measure Between	Correct Voltage	For Diagnosis
(BRN/WHT) Conn C1 & Ground	Battery	See 1
A (PPL) Conn C1 & Ground	5 to 7 Volts	See 2
B (LT GRN) Conn C1 & Ground	Battery	See 3
A (PPL) Conn C1 & Ground	11 to 13 Volts	See 2
B (LT GRN) Conn C1 & Ground	Less than 1 Volt	See 3
<ul style="list-style-type: none"> • If voltages are correct but were incorrect at A/C Cut-Out Relay in Table 1 of Test Directory, go to C1. <ol style="list-style-type: none"> 1. Check BRN/WHT (50) wire for an open. If wire is good do test D. 2. Check PPL (966) wire for an open. If wire is good do Test D. 3. Replace Blower and A/C Clutch Control Module. 		

- C1. Measure the voltage at terminal F of the A/C Cut-Out Relay with a fused jumper connected across the terminals of the Pressure Cycling Switch connector (disconnected).
- If battery voltage is not present, check the LT GRN (66) wire and LT BLU (67) wire for an open. Pressure Cycling Switch.
 - If battery voltage is not present, check the LT GRN (66) wire and LT BLU (67) wire for an open.

D: CONTROL HEAD COMPRESSOR CONTROL TEST

Measure: VOLTAGE At: A/C CONTROL HEAD CONNECTORS C1, C2, AND C3 (Connected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN o A/C Mode: ECON o A/C Temperature Setting: 65 • Temperature Outside Car: Above 60°F (16°C) 		
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AIR CONDITIONING: COMPRESSOR CONTROLS

C68, ELECTRONIC

(Continued from facing page)

Measure Between	Correct Voltage	For Diagnosis
B (BRN) Conn C1 & Ground	Battery	See 1
A (BRN/WHT) Conn C1 & Ground	Battery	See 2
C (PPL) Conn C2 & Ground	Battery	See 2
<ul style="list-style-type: none"> • A/C Mode: AUTO 		
C (PPL) Conn C2 & Ground	5 to 7 Volts	See 2
<ul style="list-style-type: none"> • If voltages are correct but were not correct in Test C, check the PPL (966) wire and BRNIWHT (50) wire for an open. Check that connectors on A/C Control Head and Blower and A/C Clutch Control Module are mated correctly. 1. Check BRN (50) wire and A/C Fuse for an open. 2. Replace A/C Control Head. 		

SYSTEM DIAGNOSIS

V6 VIN A

- Use the Isolation Test below to choose the proper diagnostic tests.
- Tests follow the Test Directory.

ISOLATION TEST (TABLE 1)

Measure: VOLTAGE At: PRESSURE CYCLING SWITCH CONNECTOR (Disconnected) Conditions: <ul style="list-style-type: none"> ○ Ignition Switch: RUN (Engine need not be running) ○ A/C Mode: AUTO ○ A/C Temperature Setting: 65 ○ Temperature Outside Car: Above 60°F (16°C) 		
Measure Between	Correct Voltage	For Diagnosis
A (LT GRN) & Ground	Battery	See 1
<ul style="list-style-type: none"> ○ If voltage is correct, leave Pressure Cycling Switch disconnected and go to Table 2. 1. Do test A. 		

ISOLATION TEST (TABLE 2)

Connect: JUMPER At: PRESSURE CYCLING SWITCH CONNECTOR (Disconnected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN (Engine need not be running) ○ A/C Mode: NORM ○ Temperature Outside Car: Above 60°F (16°C) 		
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Jumper Between	Correct Result	For Diagnosis
A (LT GRN) & B (DK GRN)	Clutch Engages	See 1
<ul style="list-style-type: none"> ○ If action is correct, refer to Section 1B for procedure to check refrigerant pressure. If refrigerant pressure is normal, replace the Pressure Cycling Switch. 1. Do Test B. 		

A: BLOWER AND A/C CLUTCH CONTROL MODULE CLUTCH VOLTAGE TEST

Measure: VOLTAGE At: BLOWER AND A/C CLUTCH CONTROL MODULE CONNECTORS (Connected) Conditions: <ul style="list-style-type: none"> ○ Ignition Switch: RUN • A/C Mode: AUTO ○ A/C Temperature Setting: 65 ○ Temperature Outside Car: (Above 60°F (16°C) 		
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(A: BLOWER AND A/C CLUTCH CONTROL MODULE CLUTCH VOLTAGE TEST continued on next page)

AIR CONDITIONING: COMPRESSOR CONTROLS

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A: (BLOWER AND A/C CLUTCH CONTROL MODULE CLUTCH VOLTAGE TEST continued from previous page)

Measure Between	Correct Voltage	For Diagnosis
C (BRN/WHT) Conn C1 & Ground	Battery	See 1
A (PPL) Conn C1 & Ground	5 to 7 Volts	See 2
B (LT GRN) Conn C1 & Ground	Battery	See 3
o A/C Mode: ECON		
A (PPL) Conn C1 & Ground	11 to 13 Volts	See 2
B (LT GRN) Conn C1 & Ground	Less than 1 Volt	See 3
<ul style="list-style-type: none"> If voltages are correct but wire incorrect at A/C Pressure Cycling Switch Connector in Table 1 of Test Directory, check for open in LT GRN (68) wire. <ol style="list-style-type: none"> Check BRN/WHT (50) wire for an open. If wire is good, do Test C. Check PPL (966) wire for an open. If wire is good, do Test C. Replace Blower and A/C Clutch Control Module. 		

B: A/C COMPRESSOR CLUTCH TEST

Measure: VOLTAGE		
At: COMPRESSOR CLUTCH (Disconnected)		
Conditions:		
<ul style="list-style-type: none"> Ignition Switch: RUN (engine need not be running) A/C Mode: AUTO A/C Temperature Setting: 65 Temperature Outside Car: Above 60°F (16°C) Pressure Cycling Switch Connector Terminals jumpered 		
Measure Between	Correct Voltage	For Diagnosis
A (DK GRN) & Ground	Battery	See 1
A (DK GRN) & B (BLK)	Battery	See 2
<ul style="list-style-type: none"> If voltages are correct but clutch does not engage, replace the Compressor Clutch. <ol style="list-style-type: none"> Check for open in DK GRN (59) wire. Check for open in BLK (151) wire. 		

C: A/C CONTROL HEAD COMPRESSOR CONTROL TEST

Measure: VOLTAGE		
At: A/C CONTROL HEAD CONNECTORS C1, C2 AND C3 (Connected)		
Conditions:		
<ul style="list-style-type: none"> Ignition Switch: RUN A/C Mode: ECON A/C Temperature Setting: 65 Temperature Outside Car: Above 60°F (16°C) 		

(Continued from previous column)

Measure Between	Correct Voltage	For Diagnosis
B (BRN) Conn C1 & Ground	Battery	See 1
A (BRN/WHT) Conn C1 & Ground	Battery	See 2
C (PPL) Conn C2 & Ground	Battery	See 2
o A/C Mode: AUTO		
C (PPL) Conn C2 & Ground	5 to 7 Volts	See 2
<ul style="list-style-type: none"> If voltages are correct but were not correct in Test A, check the PPL (966) wire and BRN/WHT (50) wire for an open. Check that connectors on A/C Control Head and Blower and A/C Clutch Control Module are mated correctly. <ol style="list-style-type: none"> Check BRN (50) wire and A/C Fuse for an open. Replace A/C Control Head. 		

AIR CONDITIONING: COMPRESSOR CONTROLS

C68, ELECTRONIC SYSTEM DIAGNOSIS

V8 VIN Y

- Use the Isolation Test below to choose the proper diagnostic tests.
- Tests follow the isolation Test.

ISOLATION TEST (TABLE 1)

Measure: VOLTAGE At: A/C CUT-OUT RELAY (Disconnected) Conditions: <ul style="list-style-type: none"> • ignition Switch: RUN (Engine need not be running) • A/C Mode: AUTO • A/C Temperature Setting: 65 • Temperature Outside Car: Above 60°F (16°C) 		
Measure Between	Correct Voltage	For Diagnosis
A (LT GRN) & Ground	Battery	See 1
B (LT GRN) & Ground	Battery	See 1
<ul style="list-style-type: none"> • If voltages are correct, leave A/C Cut-Out Relay disconnected and go to Table 2. 1. If voltage is incorrect at only one terminal, check for an open in the LT GRN (66) wire to the terminal affected. If voltage is incorrect at both terminals, do Test C. 		

ISOLATION TEST (TABLE 2)

Connect: JUMPER At: A/C CUT-OUT RELAY (Disconnected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN (Engine need not be running) • A/C Mode: AUTO • A/C Temperature Setting: 65 • Temperature Outside Car: Above 60°F (16°C) 		
Jumper Between	Correct Result	For Diagnosis
B (LT GRN) & D (LT GRN/BLK)	Clutch Engages	Do Test B
<ul style="list-style-type: none"> • If action is correct, do Test A. 		

A: ECM COMPRESSOR CONTROL TEST (TABLE 1)

Measure: VOLTAGE At: ECM (Disconnected) Conditions: <ul style="list-style-type: none"> • ignition Switch: RUN (Engine not running) • A/C Mode: AUTO • A/C Temperature Setting: 65 • Temperature Outside Car: Above 60°F (16°C) • A/C Cut-Out Relay: Reconnected 		
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Measure Between	Correct Voltage	For Diagnosis
J on Conn C2 (LT GRN) & Ground	Battery	See 1
19 on Conn C1 (BRN) & Ground	Battery	See 2

A: ECM COMPRESSOR CONTROL TEST (TABLE 2)

Connect: JUMPER At: ECM (Disconnected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN (Engine not running) • A/C Mode: AUTO • A/C Temperature Setting: 65 • Temperature Outside Car: Above 60°F (16°C) 		
Jumper Between	Correct Result	For Diagnosis
19 on Conn C1 (BRN) & Ground	A/C Cut-Out Relay operates and disengages A/C Compressor Clutch	See 1

(A: ECM COMPRESSOR CONTROL TEST (TABLE 2) continued on next page)

AIR CONDITIONING: COMPRESSOR CONTROLS

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(A: ECM COMPRESSOR CONTROL TEST (TABLE 2) continued from previous page)

- If action is correct but air conditioning system does not operate normally, condition is due to ECM. Refer to Section 6E for ECM diagnostic procedures.

1. Replace A/C Cut-Out Relay.

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- If voltages are correct but clutch does not engage replace the Compressor Clutch.
1. Check for open in LT GRN/BLK (966) wire.
 2. Check for an open in the BLK (152) wire and BLK (151) wire to ground. Pressure Cycling Switch should be closed. If Pressure Cycling Switch is open check for low refrigerant charge according to procedures in Section 1B. If refrigerant charge is normal replace the Pressure Cycling Switch.

C: BLOWER AND A/C CLUTCH CONTROL MODULE CLUTCH VOLTAGE TEST

Measure: VOLTAGE

At: BLOWER AND A/C CLUTCH CONTROL MODULE CONNECTORS (Connected)

Conditions:

- Ignition Switch: RUN
- A/C Mode: AUTO
- A/C Temperature Setting: 65
- Temperature Outside Car: Above 60°F (16°C)

(Continued in next column)

Measure Between	Correct Voltage	For Diagnosis
A (LT GRN/BLK) & Ground	Battery	See 1
A (LT GRN/BLK) & B (BLK)	Battery	See 2

(Continued in next column)

(Continued from previous column)

Measure Between	Correct Voltage	For Diagnosis
C (BRN/WHT) Conn C1 & Ground	Battery	
A (PPL) Conn C1 & Ground	5 to 7 Volts	See 2
B (LT GRN) Conn C1 & Ground	Battery	See 3
A (PPL) Conn C1 & Ground	11 to 13 Volts	See 2
B (LT GRN) Conn C1 & Ground	Less than 1 Volt	See 3

- If voltages are correct but were incorrect at A/C Cut-Out Relay in Table 1 of Isolation Test, check for an open in LT GRN (66) wire.

1. Check BRN/WHT (50) wire for an open. If wire is good, do Test D.
2. Check PPL (966) wire for an open. If wire is good, do Test D.
3. Replace Blower and A/C Clutch Control Module.

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AIR CONDITIONING: COMPRESSOR CONTROLS

C68, ELECTRONIC

D: A/C CONTROL HEAD COMPRESSOR CONTROL TEST

Measure: VOLTAGE At: A/C CONTROL HEAD CONNECTORS C1, C2 and C3 (Connected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN • A/C Mode: ECON • A/C Temperature Setting: 65 • Temperature Outside Car: Above 60°F (16°C) 		
Measure Between	Correct Voltage	For Diagnosis
B (BRN) Conn C1 & Ground	Battery	See 1
A (BRN/WHT) Conn C1 & Ground	Battery	See 2
C (PPL) Conn C2 & Ground	Battery	See 2
<ul style="list-style-type: none"> • A/C Mode: AUTO 		
C (PPL) Conn C2 & Ground	5 to 7 Volts	See 2
<ul style="list-style-type: none"> • If voltages are correct but were not correct in Test C, check the PPL (966) wire and BRN/WHT (50) wire for an open. Check that connectors on A/C Control Head and Blower and A/C Clutch Control Module are mated correctly. <ol style="list-style-type: none"> 1. Check BRN (50) wire and A/C Fuse for an open. 2. Replace A/C Control Head. 		

CIRCUIT OPERATION

The compressor for the **air** conditioning system is belt driven by the engine through the Compressor Clutch. The clutch allows the compressor to be disengaged when **air** conditioning is not required and also to remove the **air** conditioning load from the engine when needed.

The A/C Control Head determines when the compressor is to be operating. Operation of the compressor depends on the particular mode selected by the driver and the temperature setting. When the compressor is not required, the Compressor Clutch Signal at terminal C on connector C2 of the A/C Control Head is at 12 volts. When the Compressor Clutch is to be engaged, the voltage drops to approximately 6 volts.

The Compressor Clutch Signal is applied to terminal A of the Blower and A/C Clutch Control Module where it controls an electronic switch which powers the clutch. Voltage for the switch is supplied from the A/C Control Head through the BRNIWHT (50) wire to terminal C of connector C1 of the Blower and A/C Clutch Control Module.

The output of the Blower and A/C Clutch Control Module is at 12 volts when the clutch is engaged and approximately zero volts when the clutch is disengaged.

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From the Blower and A/C Clutch Control Module, voltage is applied to the A/C Cut-Out Relay through the Pressure Cycling Switch which is normally closed. The Pressure Cycling Switch opens when refrigerant pressure drops below 172 kPa (25 psi). It closes again when refrigerant pressure rises enough that additional cooling is required. This action causes the A/C compressor to cycle on and off so that the evaporator temperature does not drop low enough to cause icing.

The A/C Cut-Out Relay is operated by the ECM. When the ECM receives the A/C ON input at terminal B8, it grounds terminal A2 energizing, the A/C Cut-Out Relay. When the relay is energized voltage is applied to the A/C Compressor Clutch through the contacts of the relay and the normally closed contacts of the High Pressure Cut-Out Switch. If the ECM determines that engine load should be reduced such as during **full** throttle, the A/C Cut-Out Relay is de-energized to remove voltage from the Compressor Clutch thus removing the **air** conditioning load from the engine.

The normally closed A/C High Pressure Cut-Out Switch opens if refrigerant pressure becomes too high for normal operation.

(Continued on next page)

AIR CONDITIONING: COMPRESSOR CONTROLS

C68, ELECTRONIC

(Continued from previous page)

V6 VIN A

From the Blower and A/C Clutch Control Module voltage is applied to the A/C Compressor Clutch through the Pressure Cycling Switch. The Pressure Cycling Switch is normally closed but opens when refrigerant pressure drops below 172 kPa (25 psi). It closes again when refrigerant pressure rises enough that additional cooling is required. This action causes the A/C Compressor to cycle on and off so that the evaporator temperature does not drop low enough to cause icing.

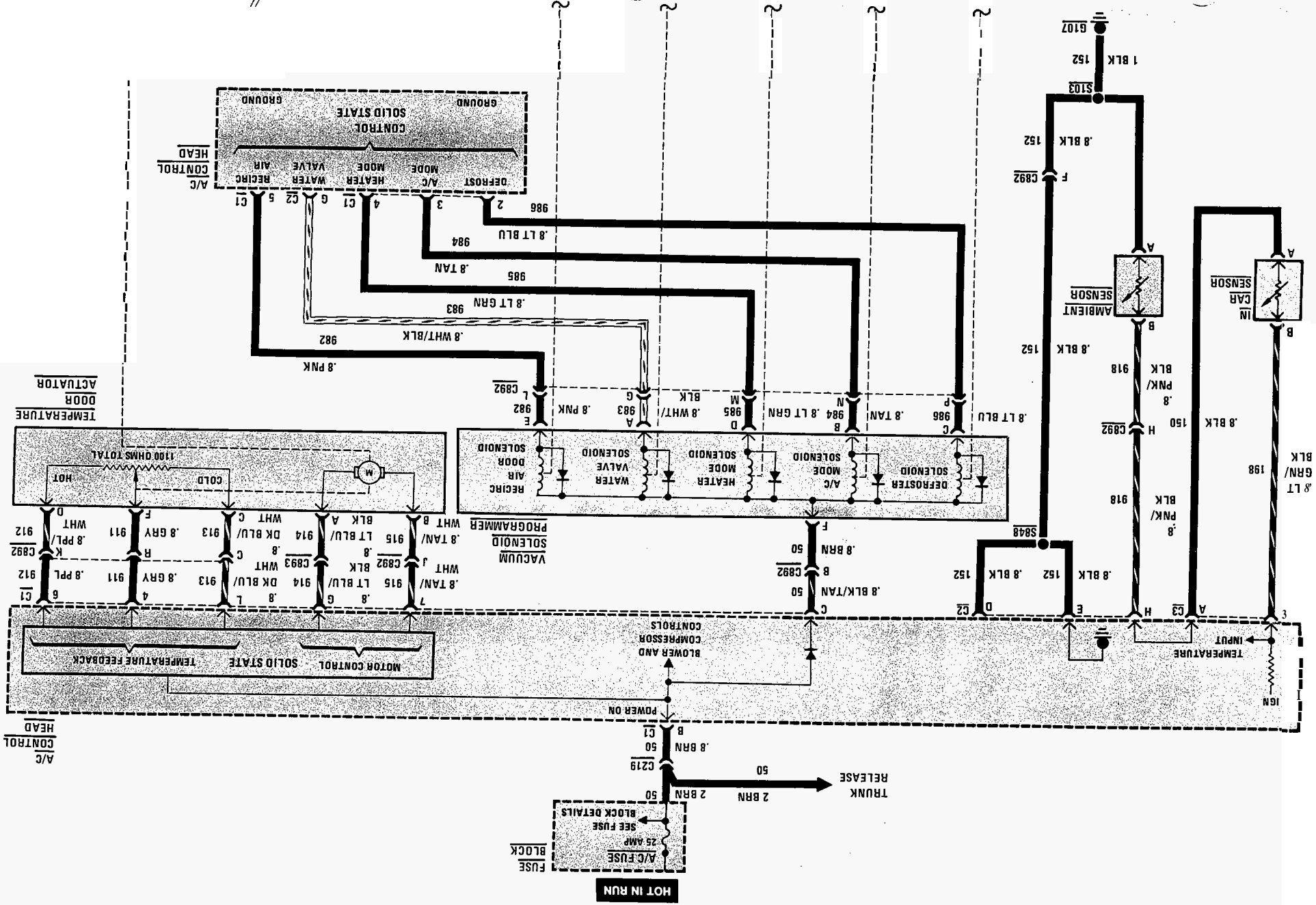
V8 VIN Y

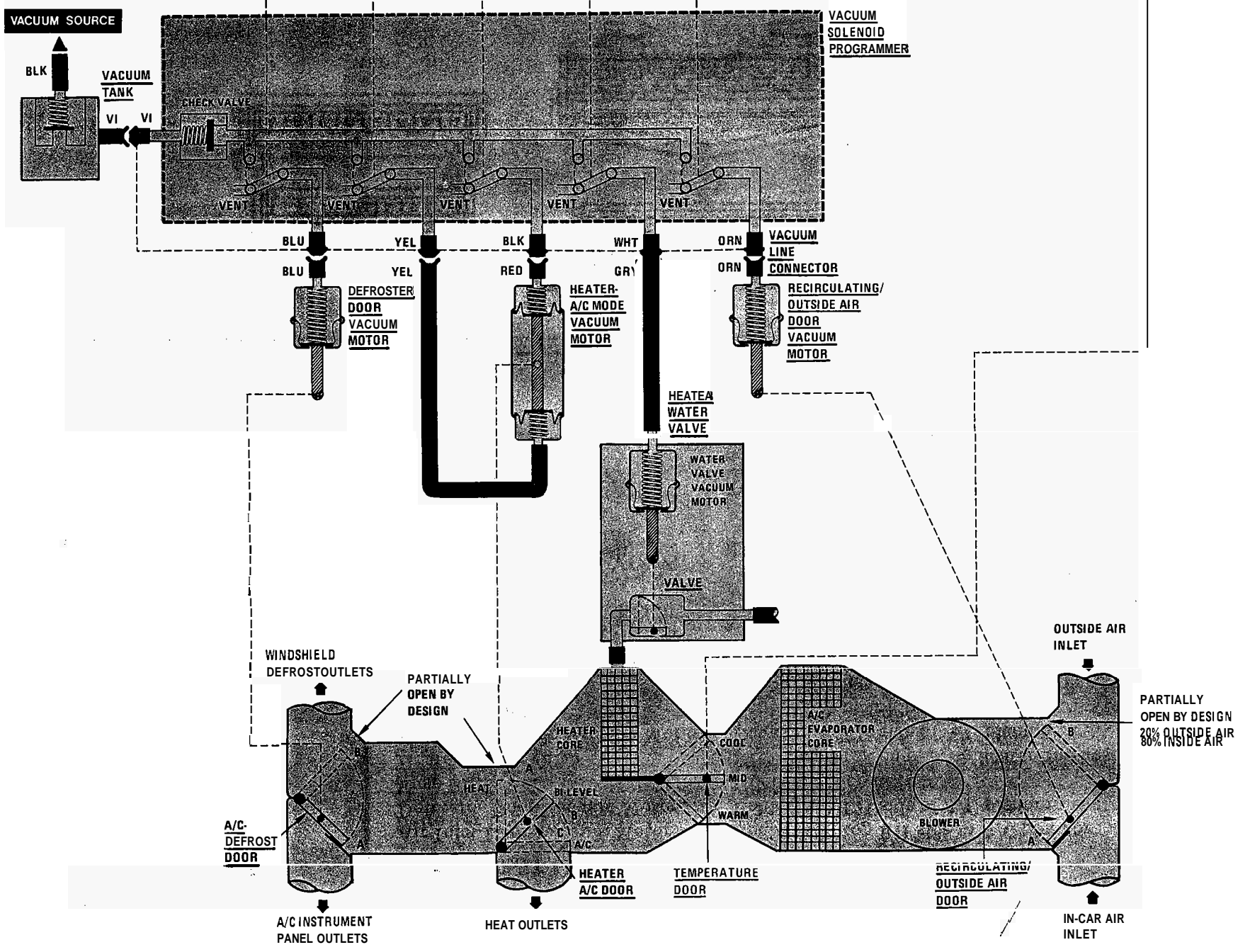
From the Blower and A/C Clutch Control Module, voltage is applied to the A/C Cut-Out Relay and terminal J on connector C2 of the ECM. The ECM will then increase the engine idle speed to compensate for the additional load of the A/C Compressor. Battery voltage at the A/C Cut-Out Relay is applied to the A/C Compressor Clutch through the normally closed contacts of the A/C Cut-Out Relay and to ground through the normally closed Pressure Cycling Switch. The Pressure Cycling Switch opens when refrigerant pressure drops below 172 kPa (25 psi). It closes again when refrigerant pressure rises enough that additional cooling is required. This action causes the A/C compressor to cycle on and off so that evaporator temperature does not drop low enough to cause icing.

If the ECM determines that the engine load should be reduced, such as during wide open throttle, the ECM grounds terminal 19 which energizes the A/C Cut-Out Relay. This action opens the relay contacts removing voltage from the A/C Compressor Clutch.

BLANK

AIR CONDITIONING: 368 ELECTRONIC AIR DELIVERY CONTROL





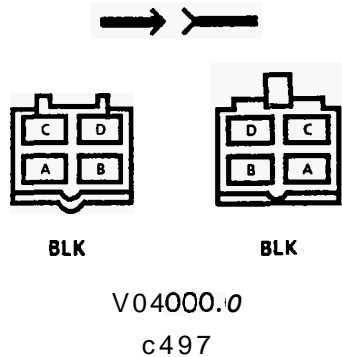
8

AIR CONDITIONING: AIR DELIVERY CONTROLS

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HARNESS CONNECTOR FACES

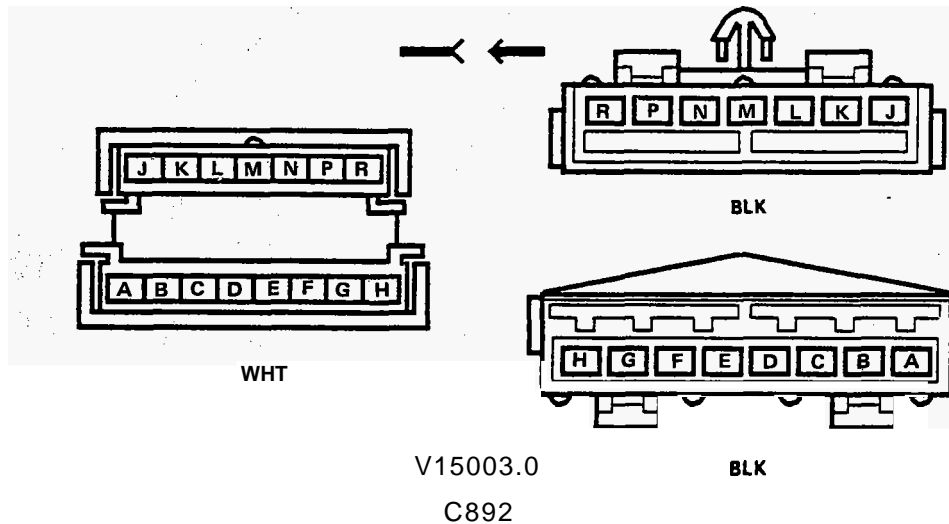
C100, See Page 202-0



COMPONENT LOCATION

Page-Figure

Air Inlet Door Vacuum Motor	Behind I/P, top RH side of A/C plenum	201-19-D
Defroster Door Vacuum Motor. . . .	Behind I/P, LH side of A/C plenum	201-19-D
Fuse Block.	Under LH side of I/P.	201-12-A
Heater Water Valve	RH rear part of engine, on heater line hose	201-18-E
Heater-A/C Mode Vacuum Motor. . .	Behind I/P, LH side of A/C plenum	201-19-D
Temperature Door Actuator.	Behind I/P, near glove box	201-17-A
Vacuum Line Connector	Behind I/P, near center of A/C plenum.	201-19-D
Vacuum Solenoid Programmer. . . .	Behind RH side of I/P.	201-17-A
Vacuum Tank (VIN 7) (Manual A/C, Without Cruise Control). . . .	RH rear of engine compartment, ahead of blower motor.	201-19-B
Vacuum Tank (VINA) (VIN Y) (Without Cruise Control).	RH rear of engine compartment, ahead of blower motor.	201-19-C
C219 (1 cavity).	Behind I/P, near control head.	201-17-A
C892 (15 cavities)	Behind I/P, center of glove box.	201-17-A
C893 (1 cavity)	Behind I/P, center of glove box.	201-17-A
G107	Below RH side of I/P, near shroud.	201-17-A
S103.	A/C harness, behind glove box	201-17-A
S848.	A/C harness, right of radio	



V15003.0
C892

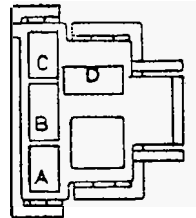
AIR CONDITIONING: AIR DELIVERY CONTROLS

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HARNES CONNECTOR FACES



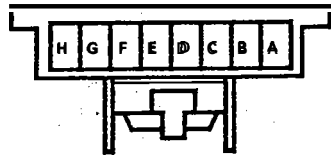
BLK 2973407
A/C Compressor Clutch



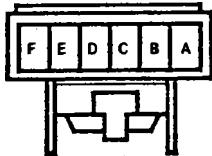
BLK 12020015
A/C Cut-Out Relay



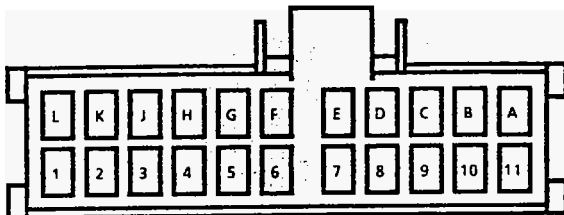
WHT 12010649
Brake Switch



C2 BLK



C3 BLK

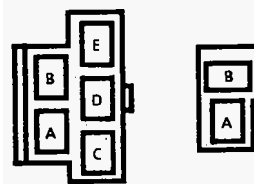


C1 BLK
V00071.0
A/C Control Head

Ambient Sensor,
See A/C Compressor Clutch

Diode, See A/C Compressor Clutch

ECM Connectors, See Pages 20-6, 21-9,
and 22-5



C1 BRN C2 BRN

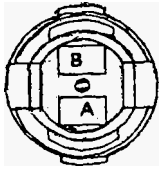
V00072.0
Blower and A/C Clutch Control Module

In Car Sensor, See A/C Compressor Clutch

AIR CONDITIONING: AIR DELIVERY CONTROLS

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HARNESS CONNECTOR FACES



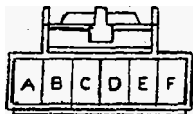
BLK 12004827

Pressure Cycling Switch



BLK 12015487

Temperature Door Actuator



BLK 12004706

Vacuum Solenoid Program

AIR CONDITIONING: AIR DELIVERY CONTROLS

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TROUBLESHOOTING HINTS

- Try the following checks before doing the System Diagnosis.
- 1. Check for vacuum at the VIO vacuum hose from the Vacuum Tank where it enters the Vacuum Solenoid Programmer and the BLK hose from the vacuum source where it enters into the Vacuum Tank.
- 2. Check that the ECC Programmer Connector is mated correctly.
- 3. Check the operation of the Temperature Door by setting the temperature first to **65°** then **85°** and back again. The Temperature Door should move through its full travel each time the temperature setting is changed.
- Go to the A/C System Check in **8A-62** for a guide to normal operation. Refer to the Diagnosis if other results occur.
- Go to System Diagnosis for Air Delivery and Temperature Control diagnostic tests.

SYSTEM DIAGNOSIS

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

SYMPTOM	DO TEST
No operation of air doors	A: Vacuum Solenoid Programmer Voltage Test B: Vacuum Solenoid Programmer Control Voltage Test
Temperature always hot or cold	C: Temperature Sensors Resistance Test D: Temperature Door Control Test
System does not hold temperature that has been set	C: Temperature Sensors Resistance Test
Air flow from wrong outlets in one or more operating modes	B: Vacuum Solenoid Programmer Control Voltage Test

A: VACUUM SOLENOID PROGRAMMER VOLTAGE TEST

Measure: VOLTAGE At: VACUUM SOLENOID PROGRAMMER CONTROL (Connected) Conditions: • Ignition Switch: RUN • A/C Mode: OFF • Temperature Outside Car: Above 60°F (16°C)		
Measure Between	Correct Voltage	For Diagnosis
F (BRN) & Ground	Battery	See 1
<ul style="list-style-type: none"> • If voltage is correct return to Symptom Table. 1. Check BRN (50) wire for an open. If wire is good replace A/C Control Head. 		

B: VACUUM SOLENOID PROGRAMMER CONTROL VOLTAGE TEST

Connect: SELF-POWERED TEST LAMP At: A/C CONTROL HEAD Conditions: • Ignition Switch: RUN • A/C Mode: OFF • A/C Temperature Setting: 65 • Temperature Outside Car: Above 60°F (16°C)		
Measure Between	Correct Result	For Diagnosis
2 (LTBLU) on C1 & Ground	Test Lamp does not light	See 1
3 (TAN) on C1 & Ground	Test Lamp does not light	See 1
4 (LTGRN) on C1 & Ground	Test Lamp does not light	See 1
G (WHT/BLK) on C2 & Ground	Test Lamp lights	See 1

(B: VACUUM SOLENOID PROGRAMMER CONTROL VOLTAGE TEST continued on next page)

AIR CONDITIONING: AIR DELIVERY CONTROLS

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5 (PNK) on C1 & Ground	Test Lamp does not light	See 1
2 (LTBLU) on C1 & Ground	Test Lamp lights	see 1
3 (TAN) on C1 & Ground	Test Lamp lights	see 1
4 (LTGRN) on C1 & Ground	Test Lamp does not light	see 1
G (WHT/BLK) on C2 & Ground	Test Lamp lights	see 1
5 (PNK) on C1 & Ground	Test Lamp does not light	see 1
2 (LTBLU) on C1 & Ground	Test Lamp lights	see 1
3 (TAN) on C1 & Ground	Test Lamp does not light	see 1
4 (LTBLU) on C1 & Ground	Test Lamp does not light	see 1
G (WHT/BLK) on C2 & Ground	Test Lamp lights	See 1
5 (PNK) on C1 & Ground	Test Lamp lights	See 1

Continued from previous column)

- If all responses are correct but air does not flow from the correct outlets in all modes, check the wires for opens. Make the check between the terminal at the Control Head and the Vacuum Solenoid Programmer (see schematic). If wires are good, replace the Vacuum Solenoid Programmer.
1. If test lamp gives incorrect response, replace the A/C Control Head.

C: TEMPERATURE SENSORS RESISTANCE TEST (TABLE 1)

Measure: RESISTANCE
At: A/C CONTROL HEAD CONNECTOR C3 (Disconnected)
Condition:
 • Ignition Switch: OFF

Measure Between	Correct Resistance	For Diagnosis
E (LTGRN/BLK) & A (BLK)	Approximately 10,000 ohms	See 1

- If resistance is correct, go to Table 2.

1. Check LT GRNIBLK (198) wire and BLK (150) wire for an open. If wires are good replace In-Car Sensor.

C: TEMPERATURE SENSORS

Measure Between	Correct Resistance	For Diagnosis
H (PNK/BLK) & E (BLK)	Approximately 5000 ohms	See 1

- If resistance is correct but temperature regulation is unstable, replace the A/C Control Head.

1. Check PNK/BLK (918) wire and BLK (150) wire for an open. If wires are good, replace the Ambient Sensor.

AIR CONDITIONING: AIR DELIVERY CONTROLS

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D: TEMPERATURE DOOR CONTROL TEST (TABLE 1)

Measure: VOLTAGE At: TEMPERATURE DOOR ACTUATOR CONNECTOR (Connected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN • A/C Mode: ECON • Fan Mode: LO • A/C Temperature Setting: 60 • Temperature Outside Car: Above 60°F (16°C) 		
Measure Between	Correct Voltage	For Diagnosis
B (TAN/WHT) & Ground	12 volts	See 1
A (LT BLU/BLK) & Ground	12 volts	See 1
<ul style="list-style-type: none"> • A/C Temperature Setting 90 (Measure voltage while Temperature Door is changing position) 		
B (TAN/WHT) & Ground	Less than 0.5 volts	See 2
A (LT BLU/BLK) & Ground	8 to 9 volts	See Table 2

(Continued in next column)

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B (TAN/WHT) & Ground	8 to 9 volts	See Table 2
A (LT BLU/BLK) & Ground	Less than 0.5 volts	See 2
<ul style="list-style-type: none"> • If all voltages are correct return to Symptom Table. <ol style="list-style-type: none"> 1. If voltage is less than 0.5 volts, check the TAN/WHT (915) wire (terminal B) or LT BLU/BLK (914) wire (terminal A) for an open or short to ground. If voltage is between 0.5 and 8 volts, check for mechanical binding of Temperature Door. If wire is good and door is not binding, replace the A/C Control Head. 2. Replace A/C Control Head 		

D: TEMPERATURE DOOR CONTROL TEST (TABLE 2)

Measure: RESISTANCE At: TEMPERATURE DOOR ACTUATOR (Disconnected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: OFF • Temperature moved to COLD position 		
Measure Between	Correct Resistance	For Diagnosis
C & D	1100 ohms	See 1
C & F	340 ohms	See 1
C & F	1000 ohms	See 1
<ul style="list-style-type: none"> • If resistance measurements are correct, the actuator feedback resistor is good. If actuator does not move through its full travel, check the wires at terminals C, D, and F on the Temperature Door Actuator for an open or short to ground. If wires are good, replace the A/C Control Head. <ol style="list-style-type: none"> 1. Replace the Temperature Door Actuator. 		

(Continued on next page)

AIR CONDITIONING: AIR DELIVERY CONTROLS

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(Continued from previous page)

CIRCUIT OPERATION

The **air** doors that control the heating and **air** conditioning **air** flow are operated by vacuum motors. The valves that apply or vent vacuum to these motors are solenoid operated. The valves are located in the Vacuum Solenoid Programmer and are powered by a solid state **ci**rcuit in the A/C Control Head. Pushbutton switches in the A/C Control Head determine which doors should operate.

Two temperature-variable resistors are connected to the control head to provide temperature information. The In-Car Sensor indicates the inside **air** temperature. Circuits within the A/C Control Head use this information to determine whether the **air** should be heated or cooled to bring the inside of the car to the selected temperature. The Ambient Sensor indicates the outside **air** temperature. The voltage signal from this sensor is **used** to determine how much the **air** should be heated or cooled to bring the **temperat**ure in the car to the selected value as quickly as possible.

The functions of the vacuum valves and **air** doors are described below.

TEMPERATURE DOOR

The **Air** Temperature door is controlled by the Temperature Door Actuator. With the door in the COOL position, **air** is blocked from passing through the Heater Core. This door can be placed by the motor in any position between COOL and WARM. In the WARM position all **air** is directed through the Heater Core.

RECIRCULATING/OUTSIDE AIR DOOR

The Recirculating/Outside **Air** Door is open, permitting outside **air** to enter, in **all** mode positions except AUTO mode with 60° temperature setting. The In-Car Inlet is then opened, recirculating the inside **air** to get maximum cooling. When the Recirculating/Outside **Air** Vacuum Valve is energized, vacuum is applied to the Vacuum Motor through a porous plug. This plug has a high resistance to **air** flow so that the motor and door move slowly.

HEATER-A/C DOOR

The Heater-A/C Door is moved by the Heater-A/C Mode Vacuum Motor. This motor has two vacuum chambers and can select three positions. In the BI-LEVEL pushbutton position, neither valve is energized, and the Door is in its middle position, sending **air** to both the A/C Outlets and the Heater Outlets. If the up valve is operated, the vacuum motor moves the door to position A. This is the position of the door after the HEATER pushbutton has been pressed. In A/C Operation (except BI-LEVEL) the down valve is operated, which moves the door to position B.

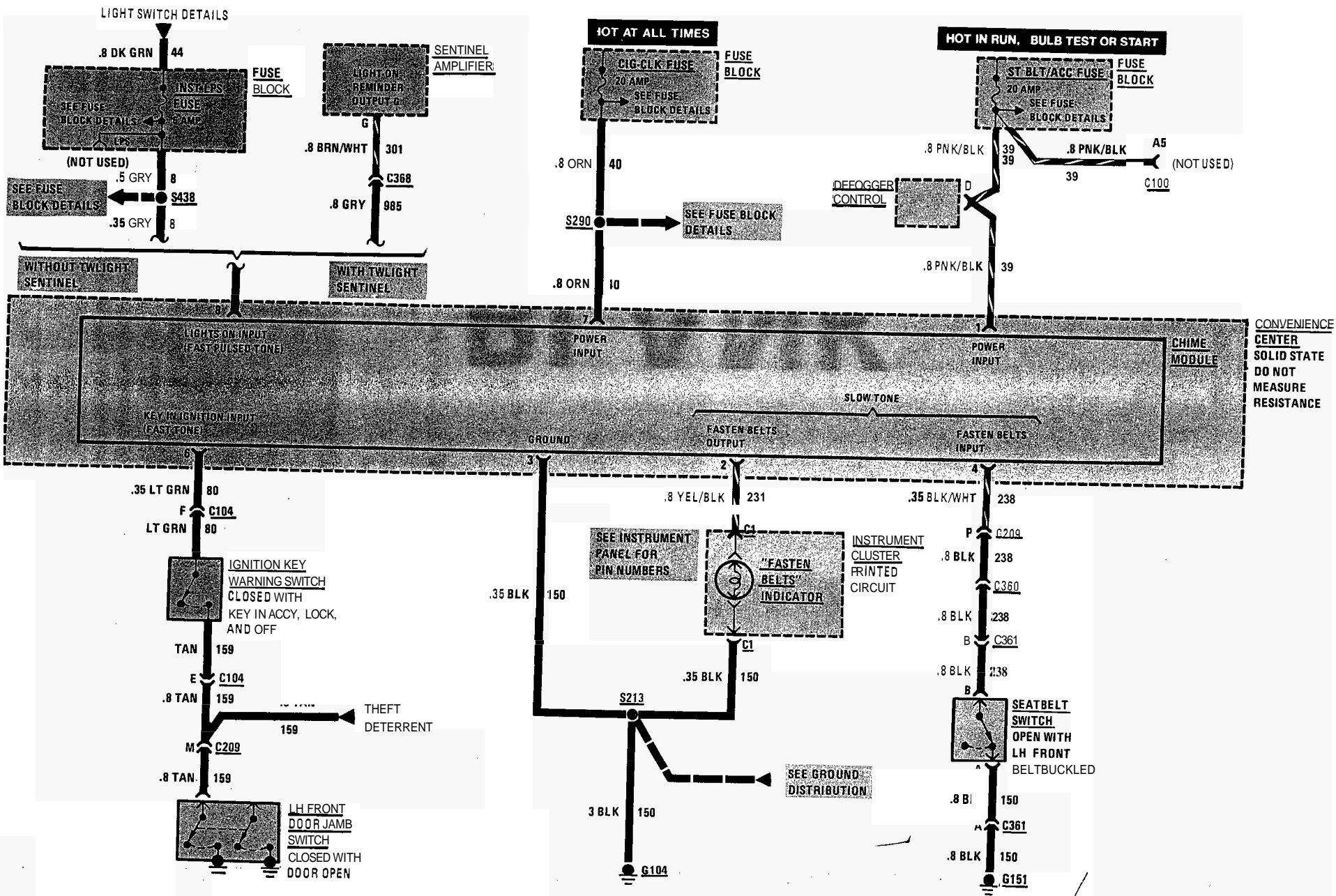
A/C DEFROST DOOR

The A/C Defrost Door is in position B for **all** the cooling functions. In these modes the A/C Defrost Door Vacuum Valve is energized and vacuum is applied to its vacuum motor. When the DEF pushbutton is depressed the valve is de-energized. It vents vacuum to the atmosphere and the door moves to position A. This directs the **air** flow to the Defrost outlets and the windshield.

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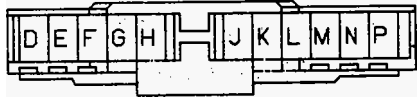
WARNINGS AND ALARMS: CHIME

IGNITION KEY/LIGHTS ON/SEATBELT

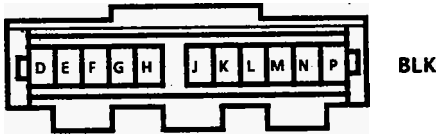


**WARNING AND ALARMS: CHIME
LIGHTS-ON, IGNITION KEY, SEATBELT
HARNESS CONNECTOR FACES**

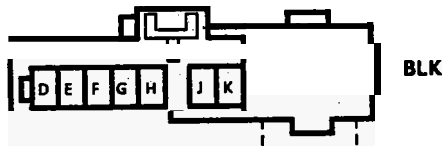
C100, See Page 202-0



BLK 12004147
C104



BLK



BLK



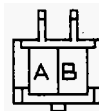
BLK

v11002.0
C209

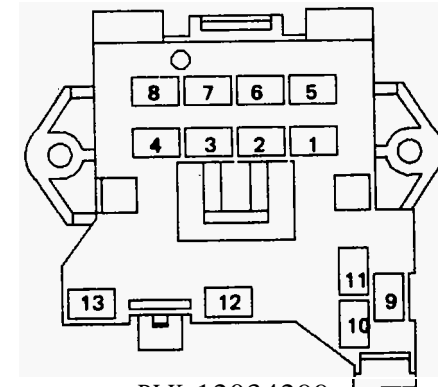
COMPONENT LOCATION

Page-Figure

Convenience Center.	Behind I/P, left of radio	201-15-A
Fuse Block.	Under LH side of I/P.	201-12-A
Ignition Key Warning Switch.	In top of steering column, beside key tumbler. .	201-13-A
Seatbelt Switch.	Part of driver's seatbelt assembly	201-24-B
Sentinel Amplifier.	Behind I/P, right of radio	201-13-D
C100 (45 cavities)	LH rear of engine compartment.	201- 9-B
C104 (11 cavities)	Attached to RH side of steering column	201-13-A
C209 (11 cavities)	Attached to LH side of fuse block	201-13-C
C360 (1cavity)	On floor pan, near LH front door sill	201-24-C
C361 (2 cavities)	Under LH front seat.	201-24-C
C368 (1cavity)	Behind I/P, right of radio	201-13-D
G104	Behind IIP, to left of steering column.	201-15-A
G151	Under LH front seat	
S213.	I/P harness, above radio.	201-16-A
S290.	IIP harness, above steering column	201-15-A
S438.	IIP harness, above fuse block.	201-15-A

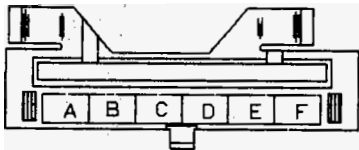


BLK 08911773
C361



BLK 12034299
Convenience Center

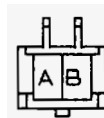
**WARNINGS AND ALARMS: CHIME
LIGHTS-ON, IGNITION KEY, SEATBELT
HARNESS CONNECTOR FACES**



WHT 12020031
Defogger Control

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

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



BLK 8911773
Seatbelt Switch



BLK 8911258
Sentinel Amplifier

WARNINGS AND ALARMS: CHIME LIGHTS-ON, IGNITION KEY, SEATBELT TROUBLESHOOTING HINTS

- Try the following checks before doing the System Check.

1. Check CIG-CLK Fuse by observing the Glove Box Light.
2. Check ST BLT/ACC Fuse by operating the Defogger, if equipped.
3. Check that grounds G151 and G104 are clean and tight.
4. Check INST LPS Fuse by observing Instrument Panel illumination.
5. If FASTEN BELTS Indicator lights, but chime alarm does not sound, replace the chime module.

- 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 RESULT
1. Sit in driver's seat and close the driver's door Turn the Ignition Switch to RUN. Do not buckle the seatbelt	A slow chime alarm sounds FASTEN BELTS Indicator lights in the Instrument Cluster Chime stops and indicator goes out after 4 to 8 seconds
2. With the Ignition Switch in ACCY, LOCK, or OFF and the key still in the ignition, open the LH front door	Fast chime alarm sounds (faster than the seatbelt chime)
3. Remove the key from the Ignition Switch	Alarm stops
4. With the key removed from the ignition, turn the Light Switch to PARK and if equipped, the Twilight Sentinel OFF	Fast pulsed chime alarm sounds (faster than key chime)
5. Turn Light Switch OFF	Alarm Stops

- For complete diagnosis and a list of symptoms, go to System Diagnosis.

SYSTEM DIAGNOSIS

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

- Tests follow the Symptom Table.

SYMPTOM DIRECTORY

SYMPTOM	DO TEST
None of the Chime alarms operate	A: Chime Module Test
Only the Key in Ignition warning does not operate	B: Key In Ignition Input Test
Key in Ignition warning operates when it should not	B: Key In Ignition Input Test
Fasten Belts chime reminder and indicator do not operate	C: Fasten Belts Input Test
Fasten Belts Chime reminder and indicator operate when they should not	C: Fasten Belts Input Test
FASTEN BELTS Indicator does not operate, but Fasten Belts chime operates	D: FASTEN BELTS Indicator Test
FASTEN BELTS Indicator is always on, but chime is operating properly	D: FASTEN BELTS Indicator Test
Only Lights-On reminder does not operate	E: Lights-On Input Test
Only Lights-On reminder operates when it should not	E: Lights-On Input Test

(Continued on next page)

WARNINGS AND ALARMS:CHIME LIGHTS-ON,IGNITIONKEY,SEATBELT

A: CHIME MODULE TEST

Measure: VOLTAGE At: CHIME MODULE (Disconnected)		
Measure Between	Correct Voltage	For Diagnosis
7 (ORN) & Ground	Battery	See 1
7 (ORN) & 3 (BLK)	Battery	See 2
• Ignition Switch: RUN		
1 (PNK/BLK) & Ground	Battery	See 2
<ul style="list-style-type: none"> If all three voltages are correct and all chime functions were not working, replace Chime Module. <ol style="list-style-type: none"> Check/repair ORN wire (40). Check/repair BLK wire (150). Check/repair PNK/BLK wire (39). 		

Connect Between	Correct Result	For Diagnosis
3 (LT GRN) & Ground	Test Lamp lights	See 1
<ul style="list-style-type: none"> Ignition Switch (key in): ACCY, LOCK, or OFF LH Front Door: CLOSED 		
3 (LT GRN) & Ground	Test Lamp off	See 2
<ul style="list-style-type: none"> Ignition Switch: KEY OUT LH Front Door: OPEN 		
3 (LT GRN) & Ground	Test Lamp off	See 3
<ul style="list-style-type: none"> If all of the test lamp responses are correct, replace Chime Module. <ol style="list-style-type: none"> Check/repair Ignition Key Warning Switch, LH Front Door Jamb Switch, LT GRN (80) and TAN (159) wires for short to ground (see schematic). Check/repair LH Front Door Jamb Switch and TAN (159) wire for short to ground (see schematic). Check/repair the LT GRN wire (80) for a short to ground. Replace the Ignition Key Warning Switch if the LT GRN wire is OK. 		

C: FASTEN BELTS INPUT TEST

Connect: SELF-POWERED TEST LAMP At: CHIME MODULE (Disconnected) Condition: • LH Front Seatbelt: UNBUCKLED		
Connect Between	Correct Result	For Diagnosis
4 (BLK/WHT) & Ground	Test Lamp lights	See 1
• LH Front Seatbelt: BUCKLED		
4 (BLK/WHT) & Ground	Test Lamp off	See 2
<ul style="list-style-type: none"> If both tests are correct, replace the Chime Module. <ol style="list-style-type: none"> Check for an open in the Seatbelt Switch or an open in the BLK (238) or BLK (150) wires (see schematic). Check that the Seatbelt Switch is open or for a ground in the BLK (238) wire (see schematic). 		

WARNINGS AND ALARMS: CHIME LIGHTS-ON, IGNITION KEY, SEATBELT

D: FASTEN BELTS INDICATOR TEST

Connect Jumper Between	Correct Result	For Diagnosis
7 (ORN)& 2 YEL/BLK)	Indicator Lights	See 1 & 2

E: LIGHTS-ON INPUT TEST

Measure: VOLTAGE At: CHIME MODULE (Disconnected) Conditions: <ul style="list-style-type: none"> • Ignition Switch: RUN • Twilight Sentinel: OFF • Instrument Panel Dimmer: BRIGHT 		
Measure Between	Correct Voltage	For Diagnosis
8 (GRY) & Ground	0 Volts	See 1

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<ul style="list-style-type: none"> • Light Switch: PARK or HEAD 		
8 (GRY) & Ground	Battery	See 1
<ul style="list-style-type: none"> • If both voltages are correct, replace Chime Module. <ol style="list-style-type: none"> 1. Check/repair the GRY wire. If equipped with Twilight Sentinel, see 8A-101, Headlights with Sentinel for further diagnosis. If not equipped with Twilight Sentinel, see 8A-114, Interior Lights: Instrument Panel Lights for further diagnosis. 		

CIRCUIT OPERATION

The Warnings and Alarm System sounds a chime to bring attention to one or more of several conditions. These conditions are: 1) the lights are on and the Ignition Switch is set to LOCK, OFF, or ACCY; 2) the Ignition Key is in the Ignition Switch when the driver's door is open and 3) the seatbelt is unbuckled when the Ignition Switch is in any position but OFF.

Voltage is applied at all times through the CIG-CLK Fuse to terminal 7 to power the solid state Chime Module.

IGNITION KEY WARNING

Voltage is applied to the Chime Module by the CIG-CLK Fuse. Whenever the key is in the Ignition Switch and the Ignition Switch is in LOCK, OFF, or ACCY, and the driver's door is open, terminal 6 of the module is grounded. This sounds the alarm.

SEATBELT WARNING

With the Ignition Switch in RUN, BULB TEST, or START, voltage is applied through the ST BLT/ACC Fuse to the Multi-Function Chime (MFC) Module. With the driver's seatbelt not buckled, terminal 4 of the module is grounded through the Seat Belt Switch. The FASTEN BELTS Indicator always goes on for about 5 seconds when the Ignition Switch is set to RUN, BULB TEST, or START.

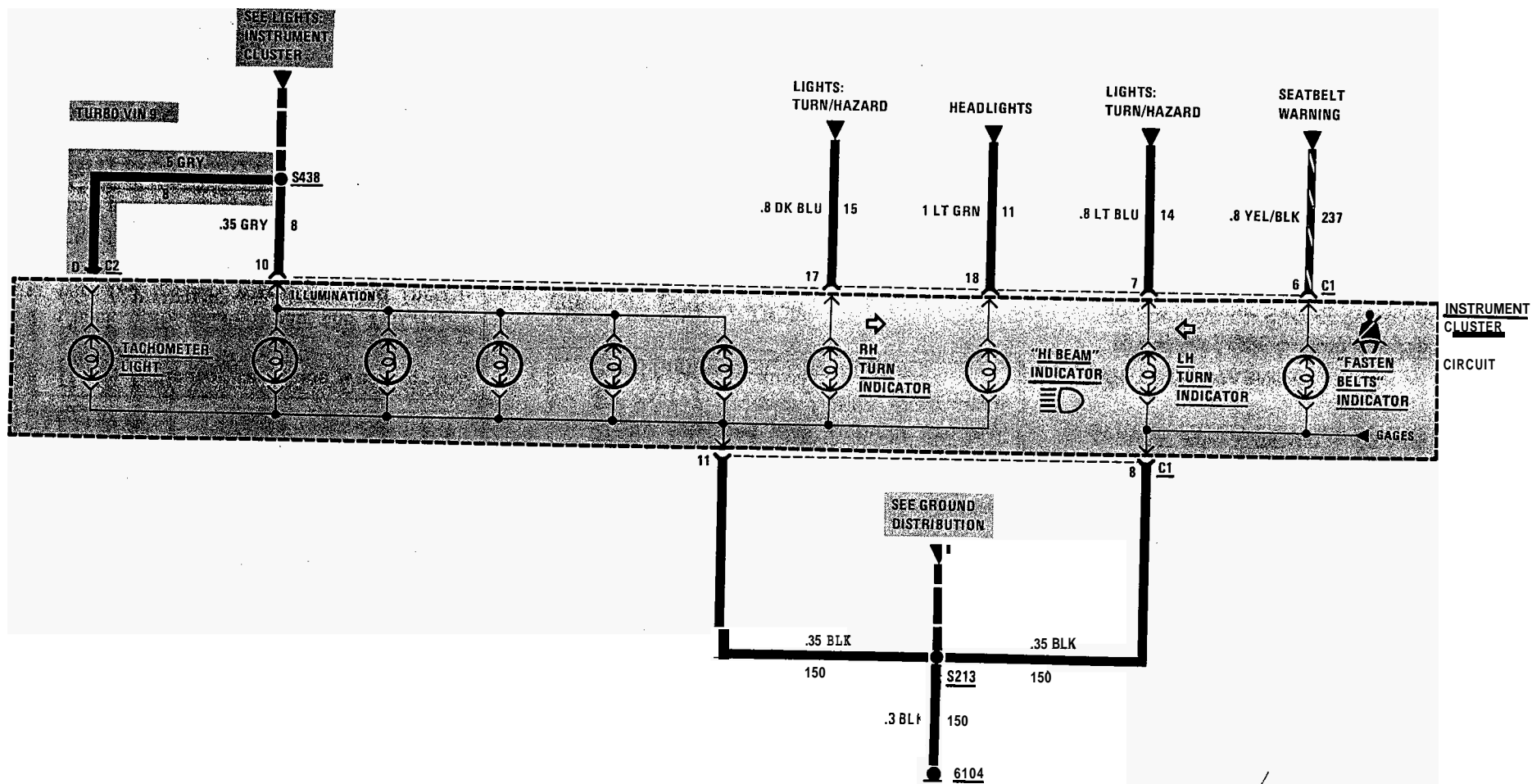
LIGHTS-ON WARNING

When the Light Switch is in HEAD or PARK and the Dimmer Switch Rheostat is not at the dimmest setting, voltage is applied through the INST PLS Fuse to the Multi-Function Chime (MFC) Module. When the Ignition Switch is in RUN, BULB TEST, or START, voltage is applied through the ST BLT/ACC Fuse to the Module. These two voltages are sensed and the alarm is not sounded.

When the Ignition Switch is turned to LOCK, OFF, or ACCY, the ST BLT/ACC Fuse loses voltage. The Multi-Function Chime (MFC) Module senses the change. If voltage is still available from the INST LPS Fuse, voltage from the CIG-CLK Fuse is applied to sound the alarm. The alarm can be turned off by turning the Light Switch to the OFF setting. The Module no longer senses voltage from the Light Switch, so the alarm does not sound. If the Twilight Sentinel System is operating and the Light Switch is in OFF, the alarm is not sounded.

INSTRUMENT PANEL: INDICATORS CLUSTER

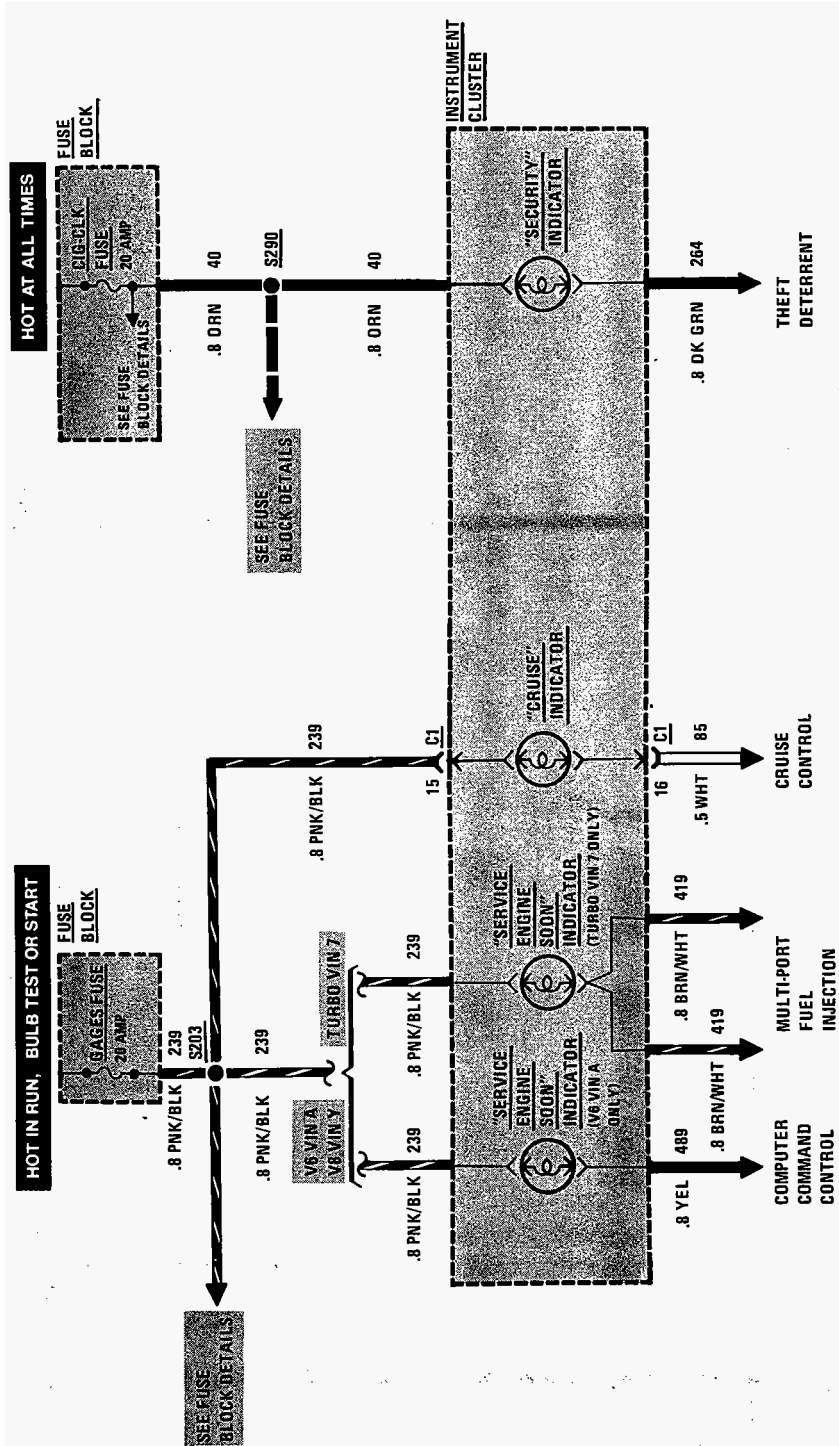
LIGHTS AND INDICATORS



INSTRUMENT PANEL: INDICATORS CLUSTER

INDICATORS

8



INSTRUMENT PANEL: INDICATORS CLUSTER

INDICATORS

