

Service

# **Electrical Troubleshooting Manual**

Models 450SL/450SLC • Model Year 1974

Mercedes-Benz of North America, Inc. Mercedes-Benz Canada, Ltd. Service and Parts Literature

### SECTION I - INTRODUCTION

This third issue of the Mercedes-Benz Electrical Troubleshooting Manual includes information for 1974 models 450 SL and 450 SLC.

The format is similar to the 230/240D/280 issue with only minor changes incorporated. The component location index has been repositioned such that components on a given page are indexed on the page opposite the schematic. For example, the components shown on schematic page 4-4 are listed, in left to right order, on page 4-5. Components whose locations are obvious, such as headlights, etc., have been dropped from the index.

A new feature of the schematic has been added on page 4-11, Power Bus Details. This section shows individual wires that make up both the Battery Bus and the Start-Run Bus. For example, if you wish to know where power originates for the window Relay, terminal 3, (see 4-7, A5) refer to the Power Bus Details on page 4-11, C25. As before, power buses are drawn at the top of the sheet and ground buses near the bottom. Care has been taken to arrange circuit components such that the operation of a circuit can be easily and correctly understood. Ample notes are included to assure understanding of the intended circuit operation.

Two power buses are used on the Schematic/Wiring Diagram. The "Battery Bus" is connected directly to the battery and is "hot" or energized at all times, regardless of position of the key switch. See page 4-3, B18 and 4-11, C23 and notice that the battery plus terminal is connected to the Battery Bus permanently. The second bus used is the "Start-Run Bus". This bus is "hot" only when the key switch is in the start or run positions. Refer to 4-3, B11 and trace power from the Battery Bus through the key switch to the Start-Run Bus.

All switches and other components are shown as they exist when the vehicle is "at rest." At rest means doors closed, seats unoccupied, engine off, shift lever in park or neutral, temperature stabilized at 20°C/59°F, key out of ignition, light switch off, etc. The manner in which each component operates is explained in notes on the Schematic/Wiring Diagram. See page 4-8, G16. The Engine Temperature Switch is closed when the engine coolant temperature is above 100°C/212°F.

When a component is shown in its entirety in one location on the Schematic/Wiring Diagram, it is outlined with a solid heavy line. When a component is used in more than one location, it is outlined with a dash-dot heavy line. For example, the key switch is shown with a dash-dot outline indicating that component is shown in more than one location. See 4-3, B10 and 4-4, B17. On the other hand, fuse 13 (4-4, D17) is outlined with a solid line because all wire connections to it are shown in this one schematic location.

All wiring between components is shown exactly as it actually exists on the vehicle. Wiring internal to complicated components (for example, the Ignition Switch or the Light Switch) has been modified to aid in understanding electrical operation. In these cases, multiple pole, multiple throw switches are shown. To properly use the Schematic/Wiring Diagram, mentally position all switch poles to the same position and then trace the current paths through the component. It is important to remember that the switches actually function precisely as shown when measured from the switch terminals. For example, the Key Switch page 4-3, B10 and page 4-4, B17 is drawn as a four pole switch, each pole with four throws or positions, one each corresponding to the actual four Ignition Switch positions, Off, 1, 2, and Start. By mentally positioning all four poles to, say, Start, you see the only circuits through the Ignition Switch that are completed when the switch is actually in the Start position are terminal 30 to 50 and terminal 30 to R. Circuits which involve transistorized parts require special troubleshooting procedures. For example, if the Safety Interlock Circuit (page 4-3, D5) does not function, first check all circuits external to the relay logic unit. Using a voltmeter, check for power at terminals 7 and 8. Be sure the Key Switch is turned to the Run position before checking for voltage on terminal 7. Ground terminal 1 and with the Iqnition Key in the Start position, check that the AC/Starter Relay picks up. Using an ohmmeter, check that the Seat Switches, Buckle Switches and Starter Lockout Switch, terminals 2, 5, 6, 9, 10 on the Logic Relay connector, all show shorts to ground when the switches are operated. If all external circuits operate properly, the fault lies within the transistorized Logic Relay and it is replaced.

### PROCEDURE FOR SYSTEMATIC TROUBLESHOOTING

Systematic troubleshooting should proceed through the following five steps:

### ■ VERIFY THE COMPLAINT

Check the complaint to be sure the pro- one failure to occur at a time. For example, blem is real. If the customer is available, ask you are troubleshooting a 450 SL. The cushim to demonstrate the problem to you. tomer has complained that 1) the turn signal Road test the vehicle if necessary but in any does not work, 2) the windows and sliding case, get first hand knowledge of the com- roof are inoperative, 3) the backup lights are plaint. If there are several symptoms, note out and 4) all instrument gauges except the them all and then look for one failure that clock do not work. could cause them all. It is rare for more than

### LOCATE THE FAULT ON THE SCHEMATIC

Lise the circuit index at the beginning of window circuit on page 4-7, D5, the sliding the turn signal circuit on page 4-4, D6, the page 4-7, D22.

Section IV to locate on the schematic the in-roof on page 4-11, D10, the backup lights on operative circuits. In this example you find page 4-11, D18 and the instrument gauges on

### ANALYZE THE CIRCUIT

Since the customer stated that all of the fuse 12. Circuit analysis requires much complaints seemed to occur at one time, you thought. No two cases are alike. You can save design that is common to all of the complaints. In this example, you notice that all electrical measurement on the vehicle or rethe faulty circuits are supplied with power by placing suspected components.

should look for some feature of the electrical troubleshooting time by carefully examining

### CORRECT THE FAILURE

the failure. In most cases, fuses fail because Run Bus) and operate the Window Switches they have been overloaded, not from old age and Sliding Roof Switches, Similarly the Turn or some other reason. To correct the reason Signals Switch is turned to both left and right for the fuse failure, you must isolate and test turn positions and verified to not contain the each circuit which is fed through fuse 12. short. After replacing fuse 12, all faulty circuits Good procedure is to check the easy circuits The short is therefore beyond C104.

In this example, replace the fuse to correct Run position (to supply power to the Start-

once again work properly. Now to the task of Turning your attention to the Backup locating the reason for the fuse failure. Basi- Light circuit, you shift into reverse and fuse cally, locating the reason for the fuse failure 12 immediately fails. Good troubleshooting requires that each circuit supplied by fuse 12 practice calls for splitting a suspected circuit be individually tested. Since fuse 12 was over- in half to quickly isolate the fault. You thereloaded, you should suspect that one of the fore disconnect C104, located in the right circuits supplied by it has a short to ground. kick panel and now fuse 12 does not blow.

An examination of the right rear backup For example, turn the Key Switch to the light shows a short within the bulb socket.

# CHECK FOR PROPER CIRCUIT OPERATION

parts of the circuit you have worked on. nals, Windows and Roof. After correcting the short, test not only the

Good practice requires that you check all backup Light circuit, but also the Turn Sig-

# SECTION II - STANDARD SYMBOLS AND DEFINITIONS

1. STANDARD SYMBOLS
The following electrical symbols are used in the Electrical Trouble-
shooting Manual.

Temperature switch	① †
Capacitor	<del></del>
Clutch, electric	E C
Coil	}
Component, shown complete in one position on Diagram	

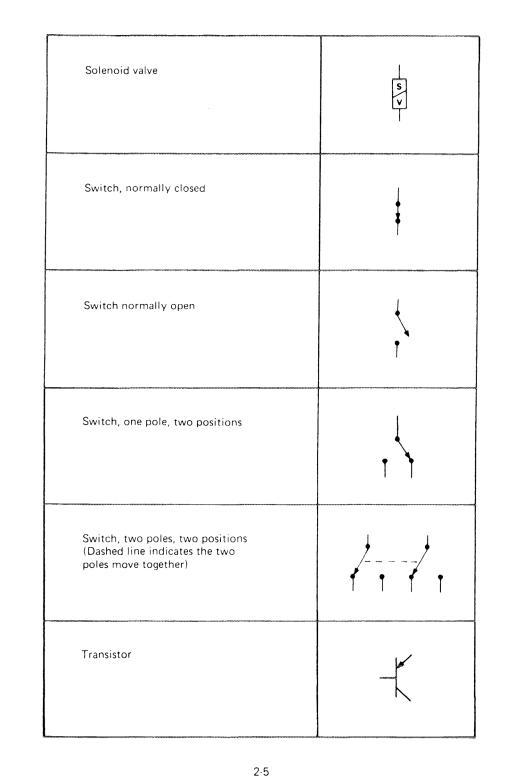
Component, shown in more than one position on Diagram	[mm = 10 mm]
Connector	FEMALE MALE
Diode	‡
Fuse	\$
Electric gauge	
Ground or chassis	<u></u>

Ground shown elsewhere	
Light bulb	$\Rightarrow$
Motor, permanent magnet	
Motor, series field	**************************************
Spark gap	4
Relay (contacts as shown with no voltage applied to coil)	4 3 85 30  86 87 87a 5 1 2

Relay coil, time delay	
Relay coil, two windings	
Switch, momentary (Returns to center off position when released)	M
Resistor, fixed value	**
Resistor, variable value	*
Screw terminal	

2-1

2-2



### 2. WIRE SIZE AND COLOR

Wire size and insulation color is shown on the Schematic/Wiring Diagram as an aid in locating specific wires. Wire size, (crossection area) is shown in millimeters square, 0.5, 0.75, 1.0, 1.5, 2.5, 4.0, 6.0, 10, 25 and 35. The first color shown on the Diagram is the base or overall insulation color. Second and third colors, if any, designate striping. Solid brown insulation is used exclusively for wires that are grounded.

The color code used in this Manual is somewhat different from the code used in Mercedes Benz documents prepared in Germany. All color codes used in the Manual are two letter, selected to closely relate to the English word they represent. Notice that lower case letters are used.

COLOR	CODE USED IN ETM	GERMAN EQUIVALENT
White	wt	ws
Green	gn	gn
Brown	br	br
Yellow	γl	ge
Gray	gy	gr
Pink	pk	rs
Blue	bu	Ы
Red	rd	rt
Black	bk	SW
lvory	iv	el
Natural	nt	nf
Violet	vi	vi

### Example:

Wire designation: 1.5 gy rd Wire size: 1.5 mm<sup>2</sup> Insulation base color: gray Insulation strip color: red

### 3. FUSE DATA

The maximum current carrying capacity of fuses is coded according to the color of the porcelain fuse body as follows: yellow - 5 amperes

white -- 8 amperes red — 16 amperes blue — 25 amperes

1 — 8a	11 — 16a
2 — 8a	12 – 8a
3 — 16a	13 - 8a
4 - 16a	14 — 8a
5 - 25a	15 - 16a
6 — 5a	16 - 8a
7 — 16a	17 — 8a
8 8a	18 – 8a
9 – 8a	19 — 8a
10 — 8a	20 - 16a

# F 1

F 2 antenna standing/parking lights glove box, trunk light, interior lights, clock

windows

windows

Proper fuse sizes are as follows:

1 — 8a	11 — 16a
2 — 8a	12 – 8a
3 — 16a	13 – 8a
4 - 16a	14 — 8a
5 — 25a	15 16a
6 — 5a	16 — 8a
7 — 16a	17 — 8a
8 8a	18 - 8a
9 – 8a	19 – 8a
10 — 8a	20 - 16a

# flasher

warning buzzer, right & left tail: parking lights: right & left

F 3 sliding roof

F 4

2.6

F 5

cigar lighter high beams high beam indicator windshield wiper washer F 6 radio

F 7 blower motor control heater control valves

F 8 not used

> F 9 AC control

F 10 kickdown coldstart circuit

brake lights cruise control

F 11

heated rear window

F 12 turn signal change-over circuit sliding roof backup lights windows instruments

F 13 gear shift light, instrument cluster lights blower switch lights heater control lights A.C. Thermostat light flasher switch light right tail/parking light right front standing/parking light

F 14 fuel injection circuit hot start circuit

F 15 not used

F 16

left tail parking left front standing parking

right high beams high beam indicator F 18 left high beams F 19 right low beam F 20

left low beam

F 17

### 4. RELAY KEY CODE DESTINATION

Since the exact position of relays varies due to manufacturing convenience, the harness leading to each relay is tagged as a means to identifying each relay. The following listing identifies the key numbering system. Key Number Function

Fuel pump Cold Start Valve Fuel Injection A. C Starter Change-over Valve

### 5. CONNECTOR LIST

C 102 Impulse trigger (Trigger points) C 103 Fuel injection circuit C 104 Rear harness circuits

C 105 Charge-start circuit (3 or 4 terminal) C 106 Combination switch

Windows/Sliding roof

C 108 Electric window circuit C 109 Front dome light C 110 Rear dome light

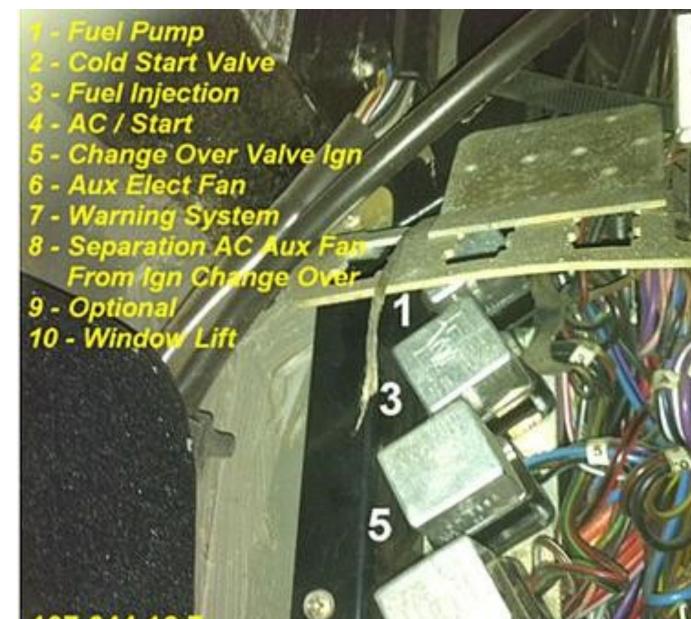
C 111 Hot start circuit C 116 Ignition points terminal block

C 117 Heater controls lights C 118 Cruise control

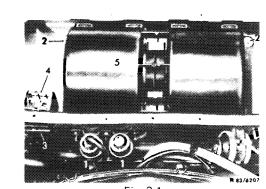
C 119 Cruise control C 120 Cruise control

C 121 Cruise control C 122 Heater control valves

C 123 Heated rear window



# SECTION III - COMPONENT LOCATION AND TERMINAL PHOTOGRAPHS



1-Heater control valves 4-Pre-resistors 3—Pre-resistor connector 5—Blower motor

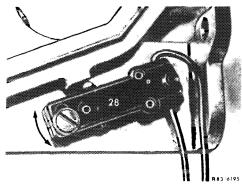


Fig. 3-2 28—Heater control switch

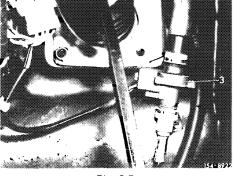
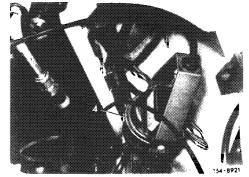
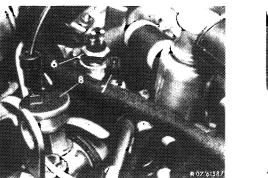


Fig. 3-7 3-Cruise control speed sensor

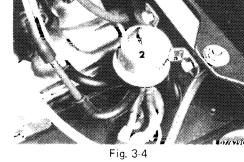


4—Cruise control throttle actuator.



8-100°C/212°F engine temperature switch

6—Thermal time switch 7—Water temperature sensor (E.F.I.)



2—Change-over valve

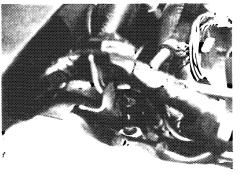


Fig. 3-9 1—Coolant temperature sensor (sending unit)

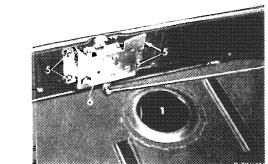
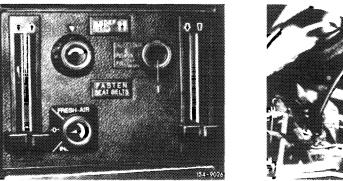


Fig. 3-10 1—Access hole in housing for soft top for fuel gauge sending unit (450 SL



3-1

Fig. 3-5 1-Cruise control switch

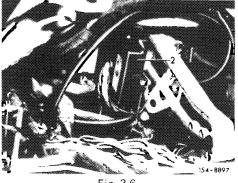


Fig. 3-6 2—Cruise control amplifier

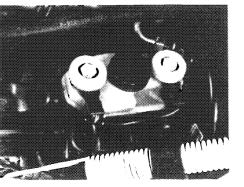


Fig. 3-11 3-Brake fluid switches

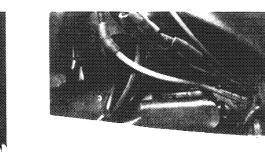


Fig. 3-12 3-Windshield wiper motor

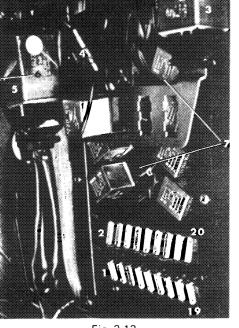


Fig. 3-13

1-2-19-20-Fuses
3-Heated rear window delay relay

4-C111 5-Hot start relay

6-Points to C104 (near) and C103 (far)

7—Relays

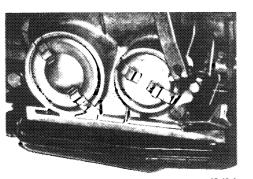


Fig. 3-16 1-Kickdown solenoid

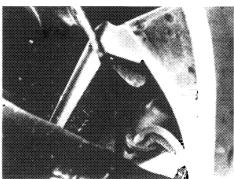
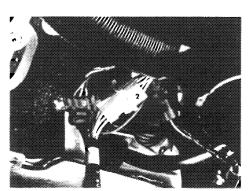


Fig. 3-14 8-Windshield washer pump



1-C119 2-C120 3-C118

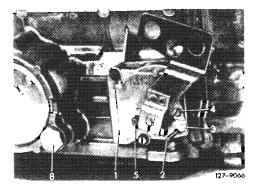


Fig. 3-17 1—Starter lockout backup light switch

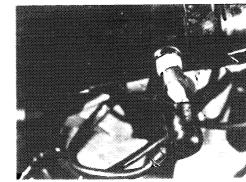


Fig. 3-18 Air temperature sensor

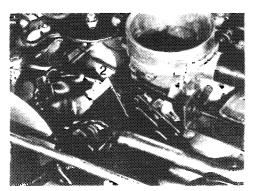
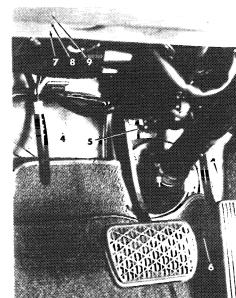


Fig. 3-19 2—Throttle valve switch



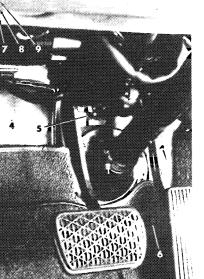


Fig. 3-20 4—Seat belt logic relay

- 5-Wiper interval relay
- 6-Kickdown switch 7-C106
- 8-Turn signal flasher
- 9-Seat belt buzzer (above air distribution tube)

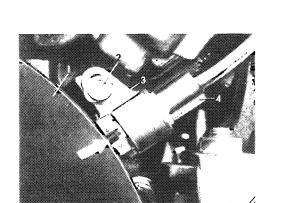
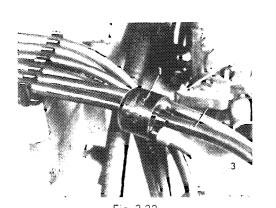


Fig. 3-21 4—Top dead center (TDC) sensor



1 -+1 Cylinder firing impulse transmitter

3-4

3-3 3-2

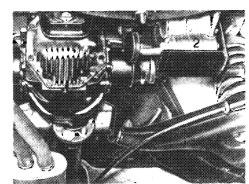


Fig. 3-23 2—Fuel pump

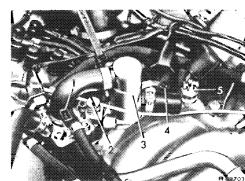
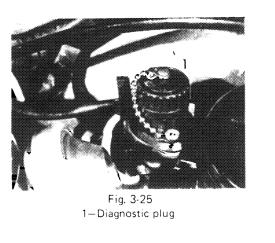


Fig. 3-24 1—Cold start valve



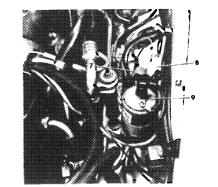
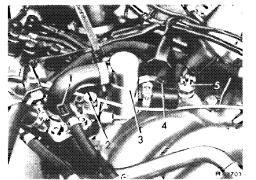


Fig. 3-27 7-0.4 ohm pre-resistor 8-0.6 ohm pre-resistor 9-Ignition coil



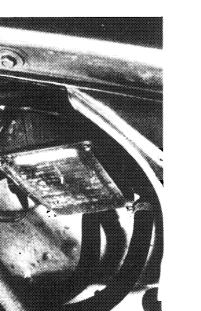


Fig. 3-26 1—Transistorized ignition switching unit

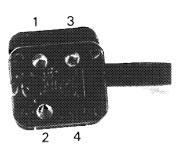
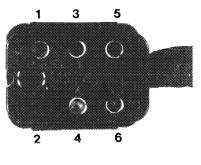


Fig. 3-31 Connector, 4 terminal



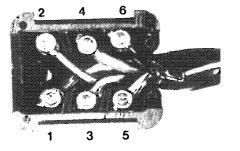
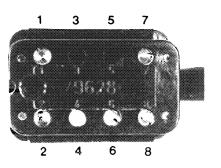


Fig. 3-32 Connector, 6 terminal



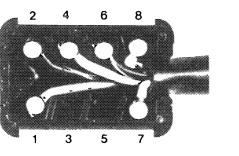


Fig. 3-33 Connector 8 terminal

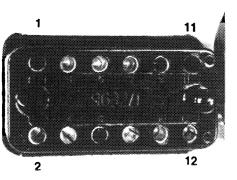
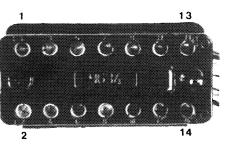


Fig. 3-34 Connector, 12 terminal



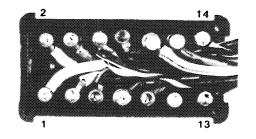


Fig. 3-35 Connector, 14 terminal

3-7

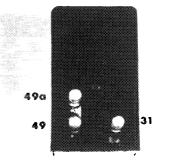
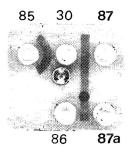


Fig. 3-36 Turn signal flasher relay



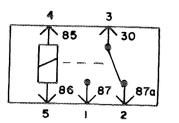


Fig. 3-37 Relay

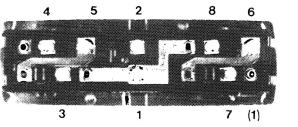
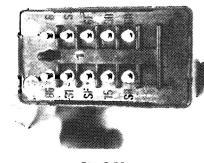
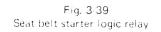


Fig. 3-38 Window switch group (the 1 terminal has two alternate positions)





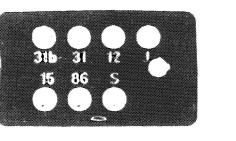


Fig. 3-40 Windshield wiper interval relay

3.8

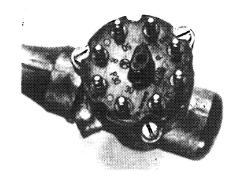


Fig. 3-41 Ignition switch

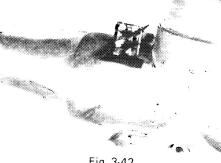


Fig. 3-42 Ignition lock warning switch

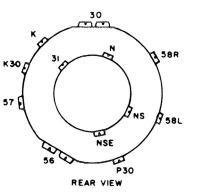


Fig. 3-43 Light switch

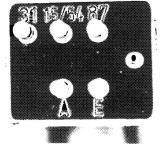


Fig. 3-44 Heated rear window delay relay

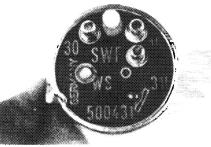


Fig. 3-45 Buzzer, warning

# SECTION IV

### 450 SL/SLC SCHEMATIC

### Click on the page number to go to schematic location

## 450 SL/SLC SCHEMATIC

SECTION IV

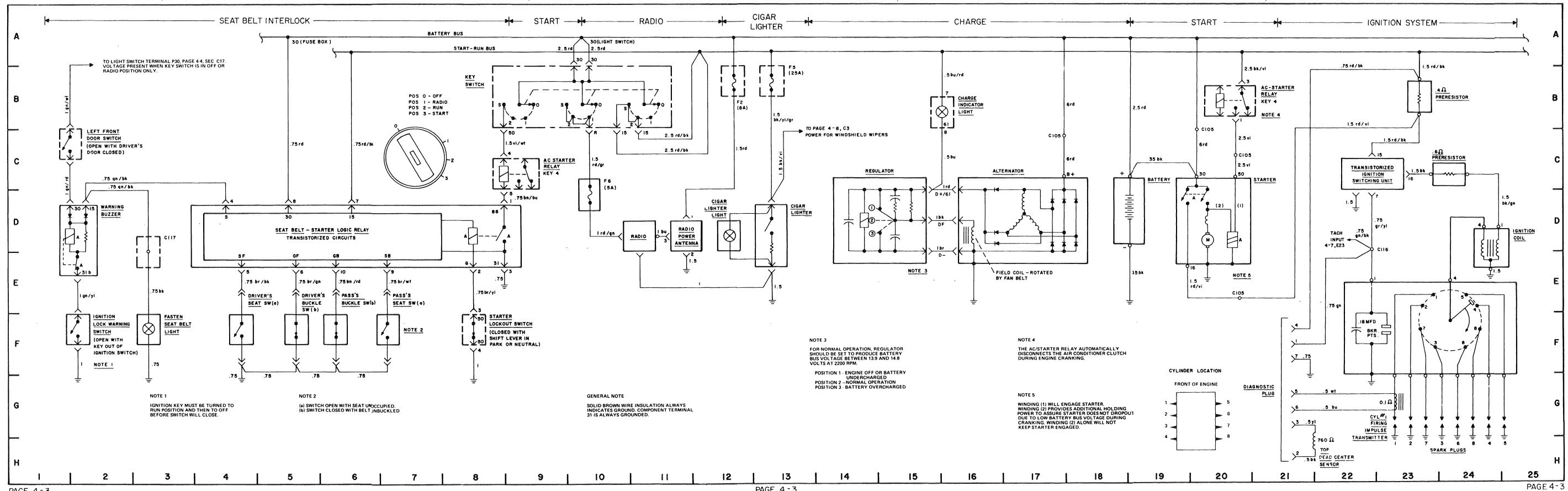
### Click on the page number to go to schematic location

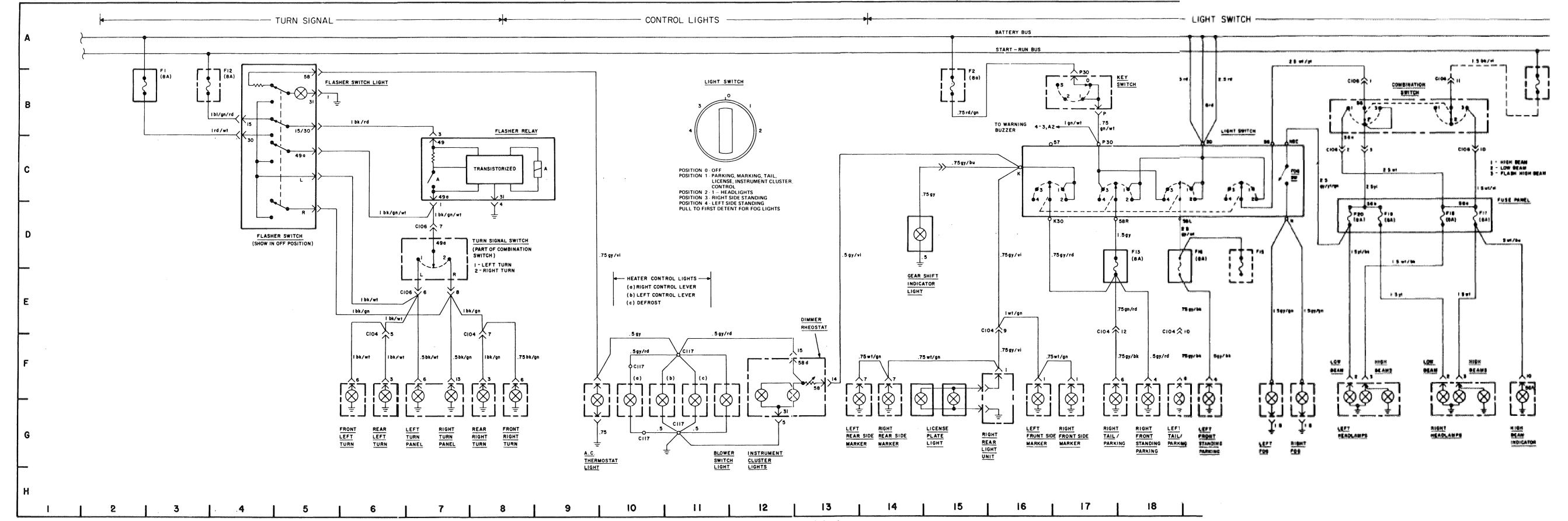
S	chematic Location		Schematic Location
Pag	e Coordinate		Page Coordinate
IR CONDITIONING CONTROL	Next Index	AIR CONDITIONING CONTROL	4·8 D13
LOWER MOTOR CONTROL	Next Index	BLOWER MOTOR CONTROL	4-8 D10
HARGE4-3	D16	CHARGE	
GAR LIGHTER	D13	CIGAR LIGHTER	
LOCK4-7		CLOCK	
DOLANT TEMPERATURE GAUGE	D22	COOLANT TEMPERATURE GAUGE	
RUISE CONTROL	Next Index	CRUISE CONTROL	
NGINE EMISSION CONTROL	Next Index	ENGINE EMISSION CONTROL	
UEL GAUGE		FUEL GAUGE.	
UEL INJECTION	Next Index	FUEL INJECTION	
EATED REAR WINDOW	Next Index	HEATED REAR WINDOW	
EATER CONTROL	Next Index	HEATER CONTROL	
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Component Locations

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CHARGE			
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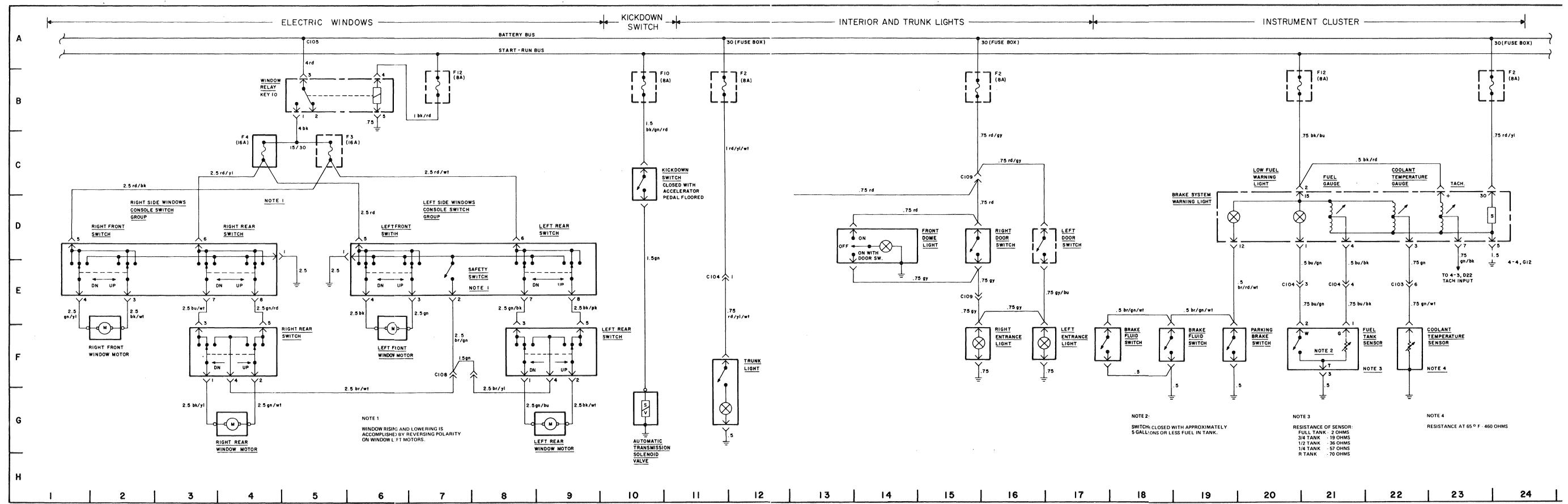


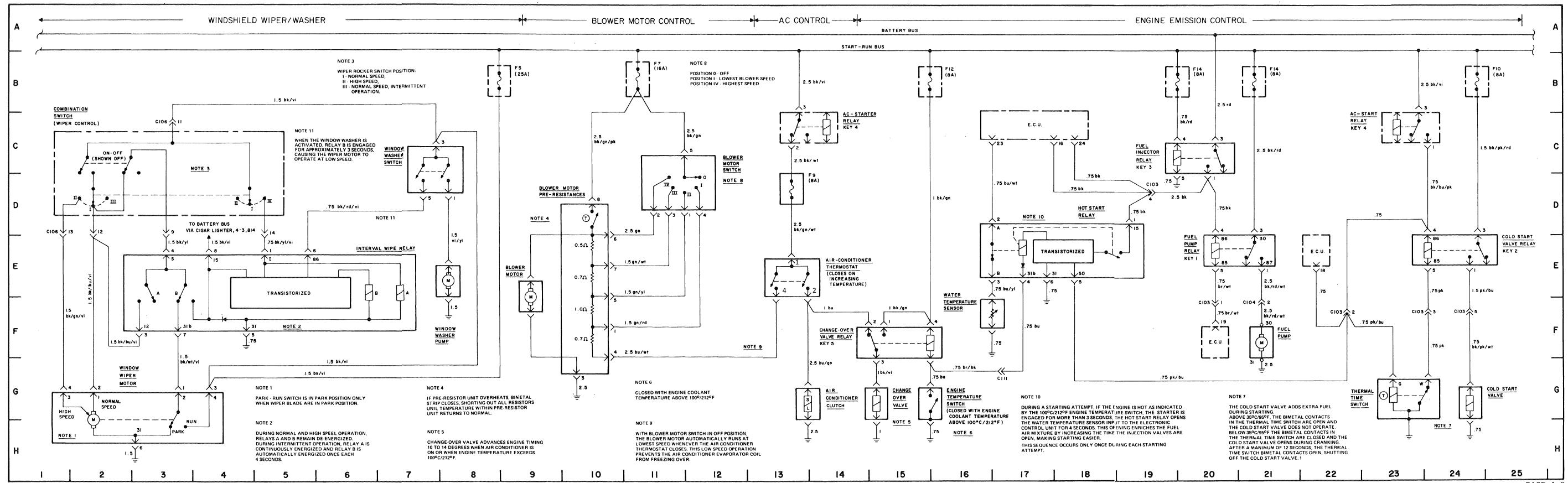


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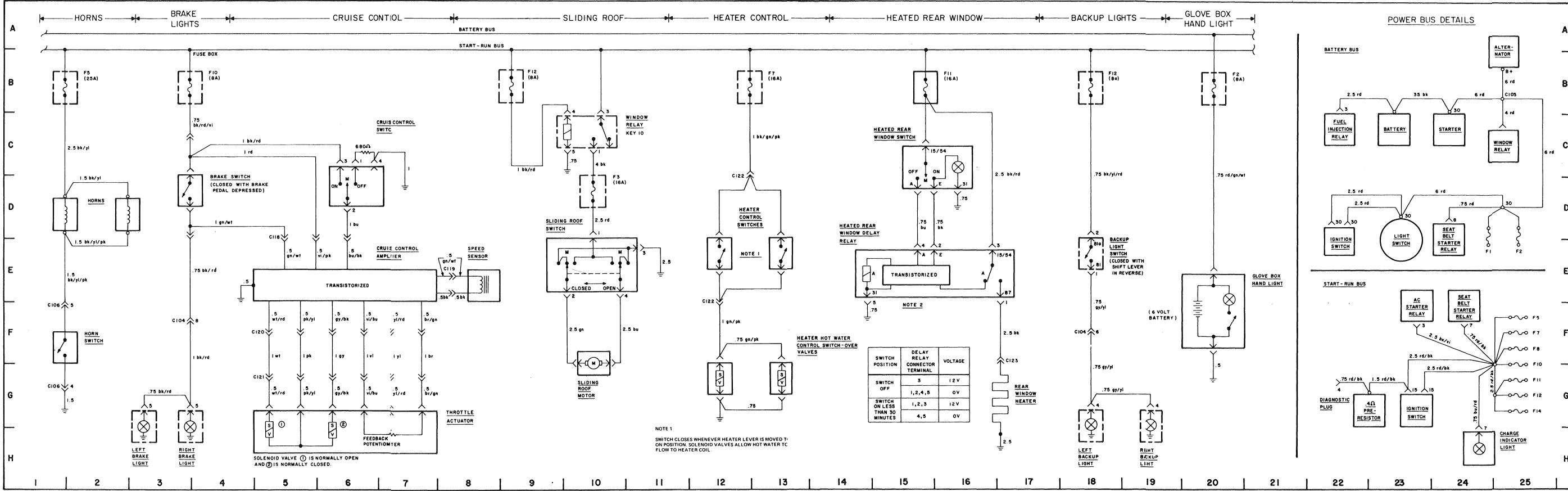


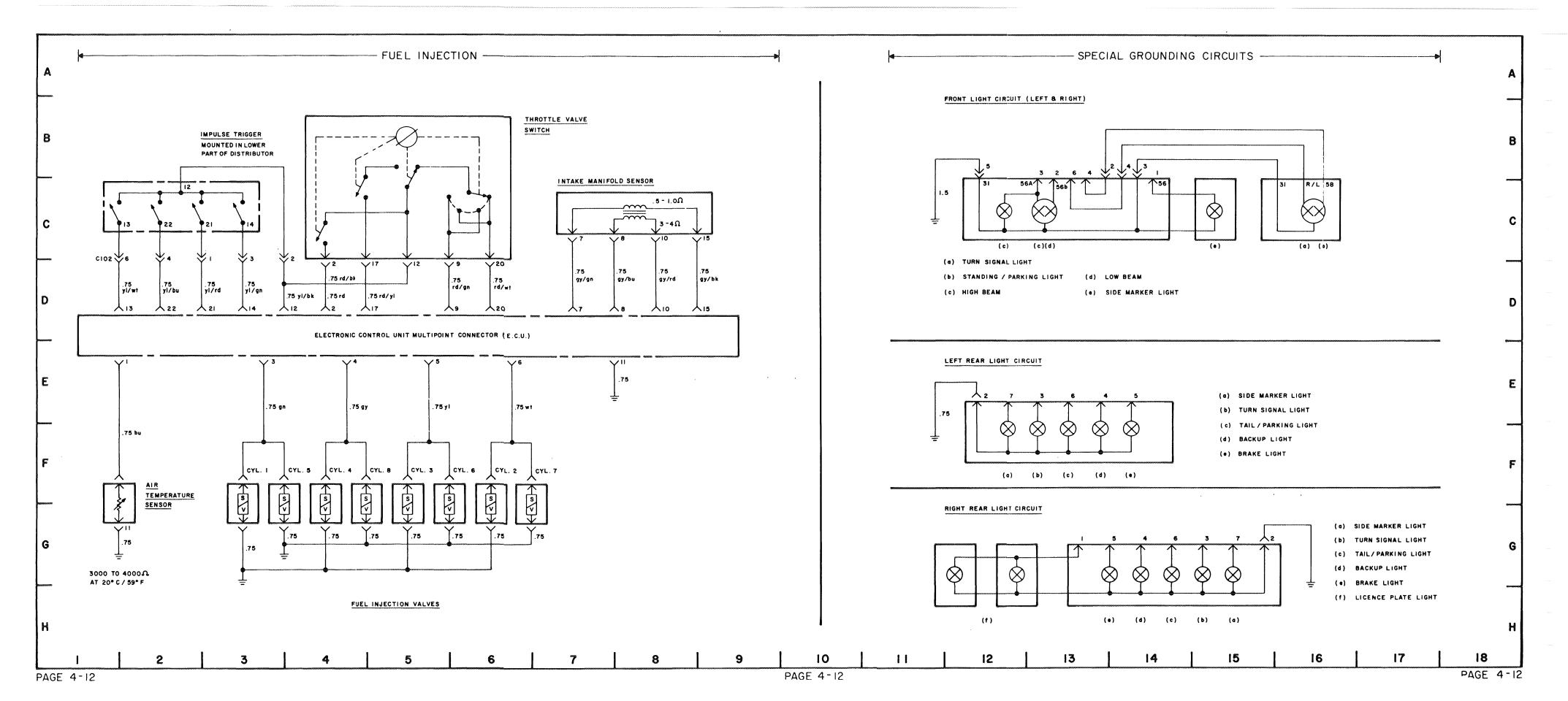


Washer pump Washer switch Wiper motor C 106 (14 pins)  BLOWER MOTOR CONTROL  Blower motor Blower motor switch Pre-resistances  AC CONTROL  AC Clutch AC starter relay AC thermostat Change over relay Change over valve  ENGINE EMISSION CONTROL  AC-starter relay Change over valve  Change over valve  Change over valve  Change over valve Change over valve Change over valve Change over valve Change over valve Change over valve Change over valve Change over valve Change over valve Change over valve Cold start valve Cold start valve Cold start valve relay E.C.U. Engine temp. switch (100°C) Fuel injection relay Fuel pump Fuel pump Fuel pump relay Hot start relay Thermal time switch	er's side-under dash nt fender interskirt or board of brake booster er's side-under dash ine side firewall sole ne side firewall nt of compressor nt kick panel sole t firewall-engine	3-20 3-14 3-12 3-20 3-1 3-13 3-13 3-13	3-40 3-35 3-37 3-37
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C 104 (12 pins)	Right kick panel	3-13	3-34
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Switch Throttle actuator C 118 C 119 C 120	Center dash Right fender interskirt Driver's side-under dash Driver's side-under dash Driver's side-under dash	3-5 3-8 3-15 3-15 3-15	
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Motor Switch	Right side trunk Center dash		
HEATER CONTROL Switches Valves	Behind heater levers Engine side firewall	3-2 3-1	
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Intake manifold sensor Throttle valve switch C 102 (6 pins)	Below master cylinder Right side throttle housing Top front engine	3-19	