
1991

BMW 318i/is/ic

Electrical

Troubleshooting

Manual

PRELIMINARY EDITION

**BMW of North America, Inc.
Woodcliff Lake, New Jersey**

FOREWORD

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PN 91 00 0 000 005

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The purpose of this manual is to show electrical schematics in a manner that makes electrical troubleshooting easier. Electrical components which work together are shown together on one schematic. The Wiper-Washer schematic, for example, shows all of the electrical components in one diagram. At the top of the page is the fuse (positive) that powers the circuit. The flow of current is shown through all wires, connectors, switches, and motors to ground (negative) at the bottom of the page.

Within the schematic, all switches and sensors are shown "at rest," as though the Ignition Switch were off. For identification, component names are underlined and placed next to or above each component. Notes are included, describing how switches and other components work.

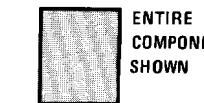
The power distribution schematic shows the current feed through all the connections from the Battery and Alternator to each fuse and the Ignition and Light Switches. If the Power Distribution schematic is combined with any other circuit schematic, a complete picture is made of how that circuit works. The Ground Distribution schematics show how several circuits are connected to common grounds.

All wiring between components is shown exactly as it exists in the vehicle; however, the wiring is not drawn to scale. To aid in understanding electrical operation, wiring inside complicated components has been simplified. The "Solid State" label designates electronic components.

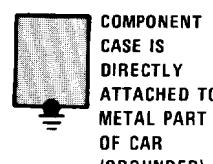
WIRE SIZE CONVERSION CHART	
METRIC (CROSS-SECTIONAL AREA IN MM ²)	AWG (AMERICAN WIRE GAUGE)
.5	20
.75	18
1	16
1.5	14
2	14
2.5	12
4	10
6	8
8	8
16	4
20	4
25	2
32	2

WIRE INSULATION	
ABBREVIATIONS	COLOR
BK	BLACK
BR	BROWN
RD	RED
YL	YELLOW
GN	GREEN
BU	BLUE
VI	VIOLET
GY	GRAY
WT	WHITE
PK	PINK
OR	ORANGE

4 SYMBOLS



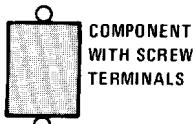
ENTIRE
COMPONENT
SHOWN



COMPONENT
CASE IS
DIRECTLY
ATTACHED TO
METAL PART
OF CAR
(GROUNDED)



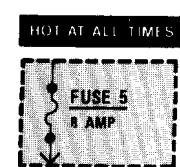
PART OF A
COMPONENT
SHOWN



COMPONENT
WITH SCREW
TERMINALS



SOLID STATE
(INCLUDES ONLY
ELECTRONIC PARTS)



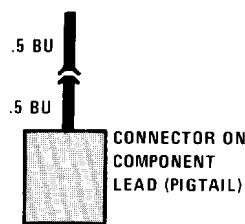
HOT AT ALL TIMES

INDICATES THAT FUSE 5
IS ALWAYS SUPPLIED
WITH POWER

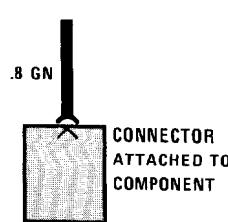


HOT IN RUN OR START

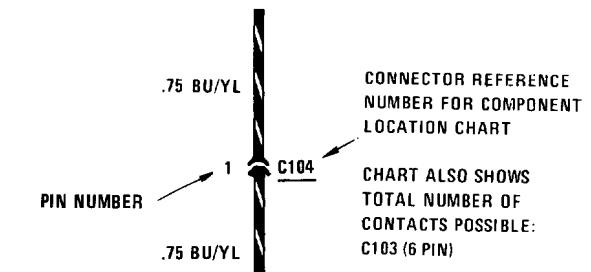
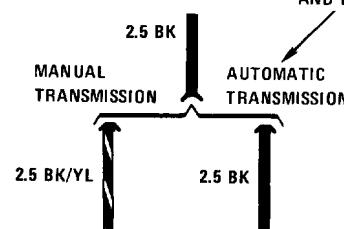
INDICATES THAT FUSE 6
IS SUPPLIED WITH POWER
WITH THE IGNITION
SWITCH IN THE RUN OR
START POSITIONS



.5 BU
.5 BU
CONNECTOR ON
COMPONENT
LEAD (PIGTAIL)

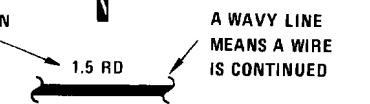


.8 GN
CONNECTOR
ATTACHED TO
COMPONENT

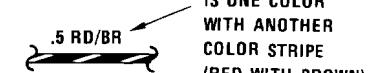


CONNECTOR REFERENCE
NUMBER FOR COMPONENT
LOCATION CHART

CHART ALSO SHOWS
TOTAL NUMBER OF
CONTACTS POSSIBLE:
C103 (6 PIN)

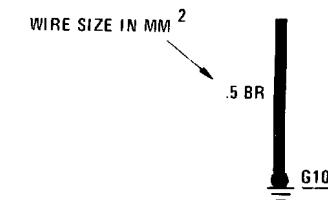


WIRE INSULATION
IS ONE COLOR



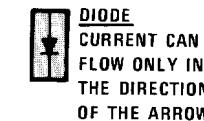
A WAVY LINE
MEANS A WIRE
IS CONTINUED

WIRE INSULATION
IS ONE COLOR
WITH ANOTHER
COLOR STRIPE
(RED WITH BROWN)



WIRE IS ATTACHED TO
METAL PART OF CAR
(GROUNDED)
GROUND IS NUMBERED
FOR REFERENCE ON
COMPONENT LOCATION CHART

OTHER CIRCUITS THAT SHARE
A GROUND ARE SHOWN
IN GROUND DISTRIBUTION



DIODE
CURRENT CAN
FLOW ONLY IN
THE DIRECTION
OF THE ARROW

CIRCUIT REFERENCE –
A WIRE WHICH CONNECTS
TO ANOTHER CIRCUIT



ACTIVE CHECK CONTROL

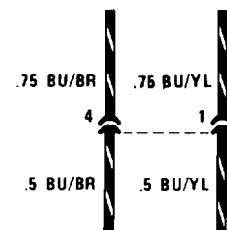


ONE POLE,
TWO POSITION
SWITCH



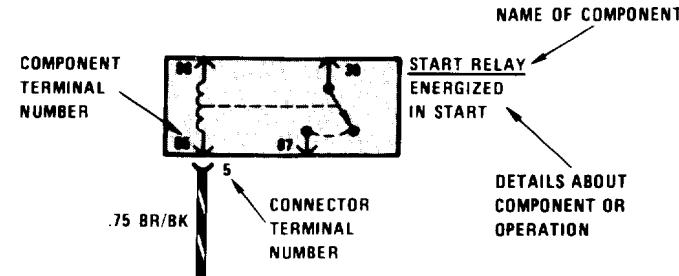
SWITCHES THAT
MOVE TOGETHER

DASHED LINE SHOWS
A MECHANICAL
CONNECTION
BETWEEN SWITCHES

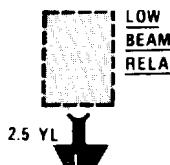


TWO CONNECTIONS
(PINS) IN THE SAME
CONNECTOR

DASHED LINE SHOWS
PARTS OF THE
SAME CONNECTOR

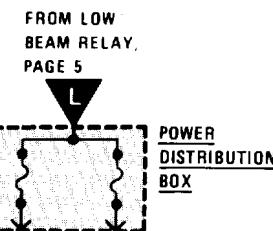
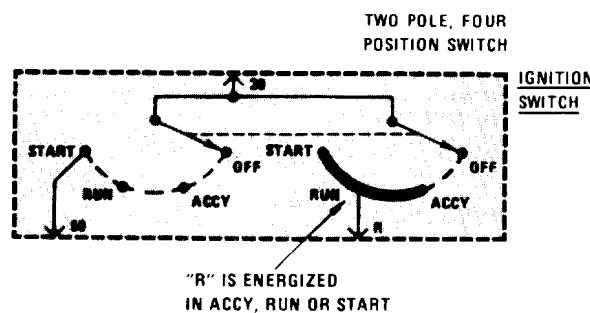


DETAILS ABOUT
COMPONENT OR
OPERATION



2.5 YL
TO POWER
DISTRIBUTION
BOX, PAGE 1

CURRENT PATH
IS CONTINUED
AS LABELED.
THE ARROW SHOWS
DIRECTION OF CURRENT
FLOW AND IS REPEATED
WHERE CURRENT
PATH CONTINUES.

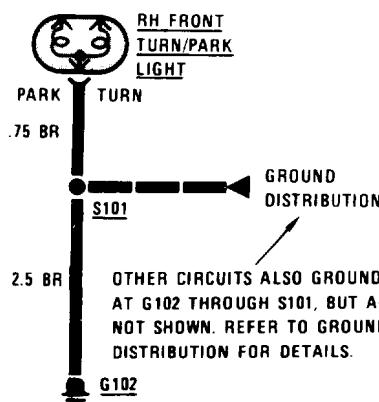


WHEN COIL IS
ENERGIZED, SWITCH
IS PULLED CLOSED

RELAY SHOWN
WITH NO
CURRENT
FLOWING
THROUGH
COIL



RESISTOR ACROSS COIL
IS FOR NOISE
SUPPRESSION



LIGHT
EMITTING
DIODE



INDUCTIVE
SENSOR

6 SYSTEMATIC TROUBLESHOOTING

TROUBLESHOOTING PROCEDURE

1. Verify the Problem

Operate the problem circuit to check the accuracy of the complaint. Note the symptoms of the inoperative circuit.

2. Analyze the Problem

Refer to the schematic of the problem circuit in the ETM. Determine how the circuit is supposed to work by tracing the current path(s) from the power feed through the circuit components to ground. Then based on the symptoms you noted in step 1 and your understanding of circuit operation, identify one or more possible causes of the problem.

3. Isolate the Problem

Make circuit tests to prove or disprove the preliminary diagnosis made in step 2. Keep in mind that a logical simple procedure is the key to efficient troubleshooting. Test for the most likely cause of failure first. Try to make tests at points which are easily accessible.

4. Repair the Problem

Once the specific problem is identified, make the repair using the proper tools and safe procedures.

5. Check the Problem

Operate the circuit to check for satisfactory circuit operation. Good repair practice calls for rechecking all circuits you have worked on.

TROUBLESHOOTING TOOLS

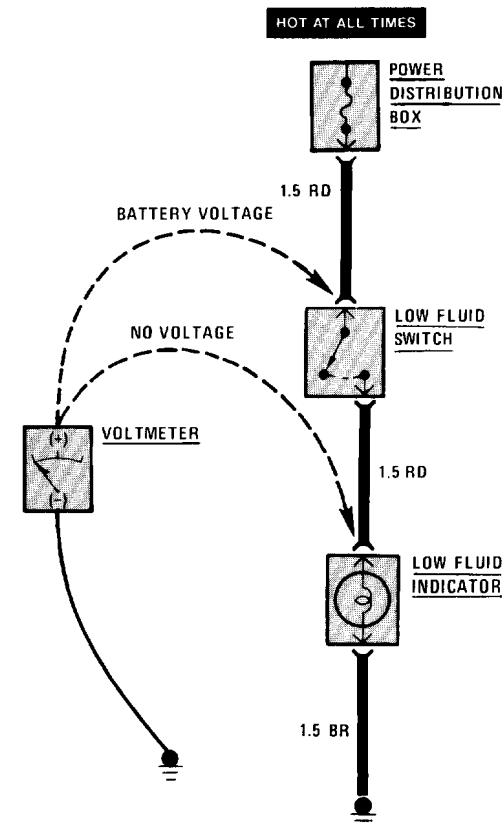
Isolating the problem (Step 3 of TROUBLESHOOTING PROCEDURES) requires the use of a **voltmeter** and/or **ohmmeter**. A voltmeter measures voltage at selected points in a circuit. An ohmmeter measures a circuit's resistance to current flow. It has an internal battery that provides current to the circuit under test. Disconnect the car battery when using an ohmmeter because the battery voltage will cause the ohmmeter to give false readings. Also, do not use an ohmmeter on solid-state components. The voltage that the ohmmeter applies to the circuit could damage these components.

TROUBLESHOOTING TESTS

Voltage Test

This test measures voltage in a circuit. By taking measurements at several points (terminals or connectors) along the circuit, you can isolate the problem.

To take a voltage measurement, connect the negative lead of the voltmeter to the battery's negative terminal or other known good ground. Then connect the positive lead of the voltmeter to the point you want to test. The voltmeter will measure the voltage present at that point in the circuit.

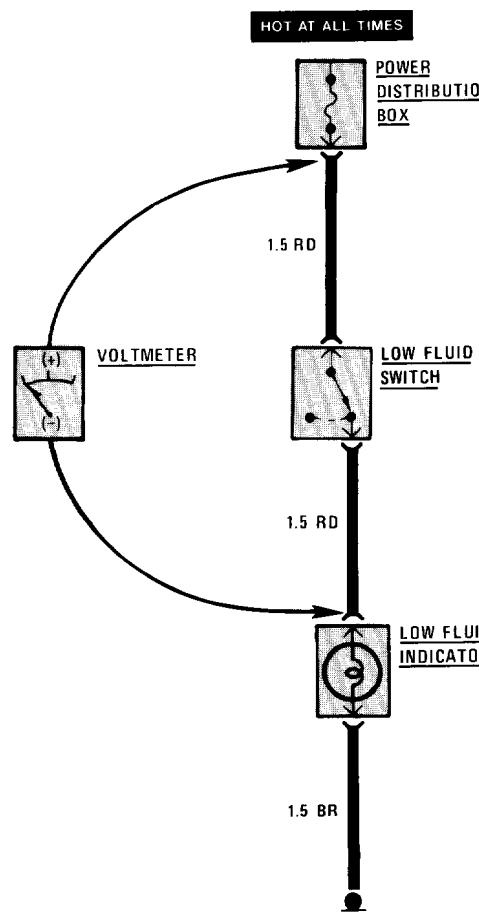


Voltage Test

Voltage Drop Test

Wires, connectors, and switches are designed to conduct current with a minimum loss of voltage. A voltage drop of more than one volt indicates a problem.

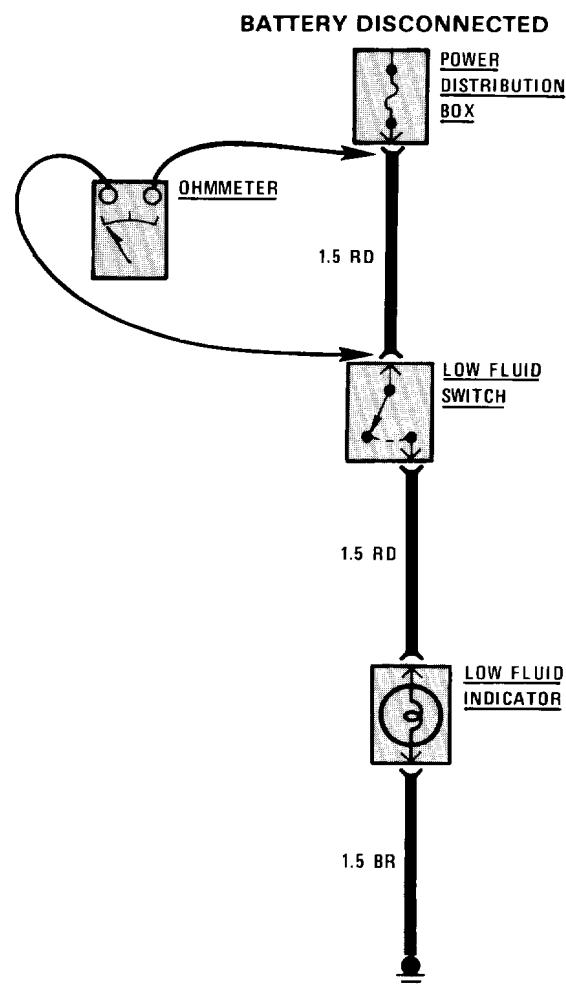
To test for voltage drop, connect the voltmeter leads to connectors at either end of the circuit's suspected problem area. The positive lead should be connected to the connector closest to the power source. The voltmeter will show the voltage drop between these two points.



Voltage Drop Test

Continuity Test

To perform a continuity test, first disconnect the car battery. Then adjust the ohmmeter to read zero while holding the leads together. Connect the ohmmeter leads to connector or terminals at either end of the circuit's suspected problem area. The ohmmeter will show the resistance across that part of the circuit.

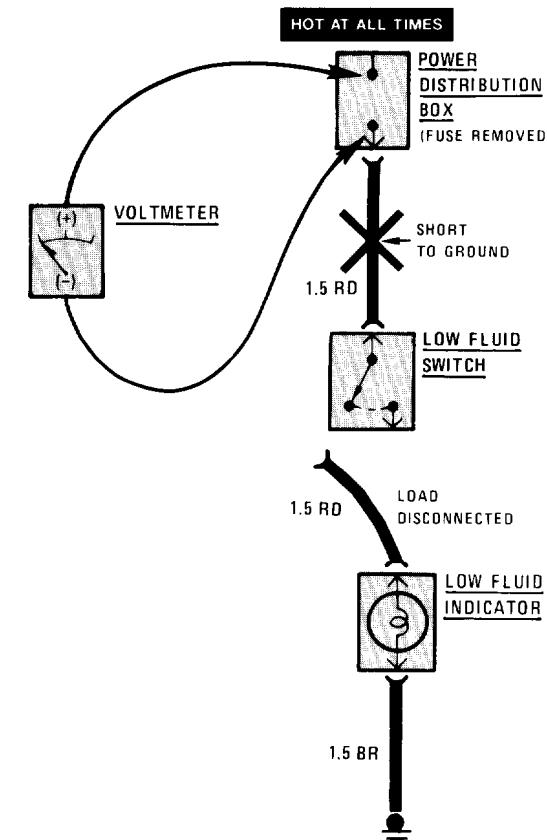


Continuity Test

Short Test Using Voltmeter

Remove the blown fuse and disconnect the load. Connect the voltmeter leads to the fuse terminals. The positive lead should be connected to the terminal closest to the power source.

Starting near the **POWER DISTRIBUTION BOX**, move the wire harness back and forth and watch the voltmeter reading. If the voltmeter registers a reading, there is a short to ground in the wiring. Somewhere in the area of the harness being moved, the wire insulation is worn away and the circuit is grounding.



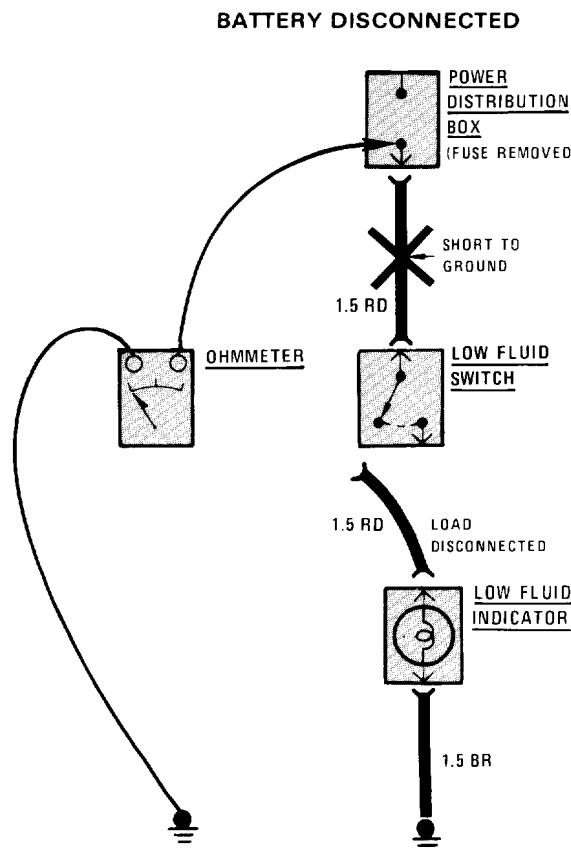
Short Test Using Voltmeter

8 SYSTEMATIC TROUBLESHOOTING

Short Test Using Ohmmeter

Disconnect the battery. Adjust the ohmmeter to read zero while holding the leads together. Remove the blown fuse and disconnect the load. Connect one lead of the ohmmeter to the fuse terminal that is closest to the load. Connect the other lead to a known good ground.

Starting near the POWER DISTRIBUTION BOX, move the wire harness back and forth and watch the ohmmeter reading. Low or no resistance indicates a short to ground in the wiring. Infinitely high resistance indicates no short.



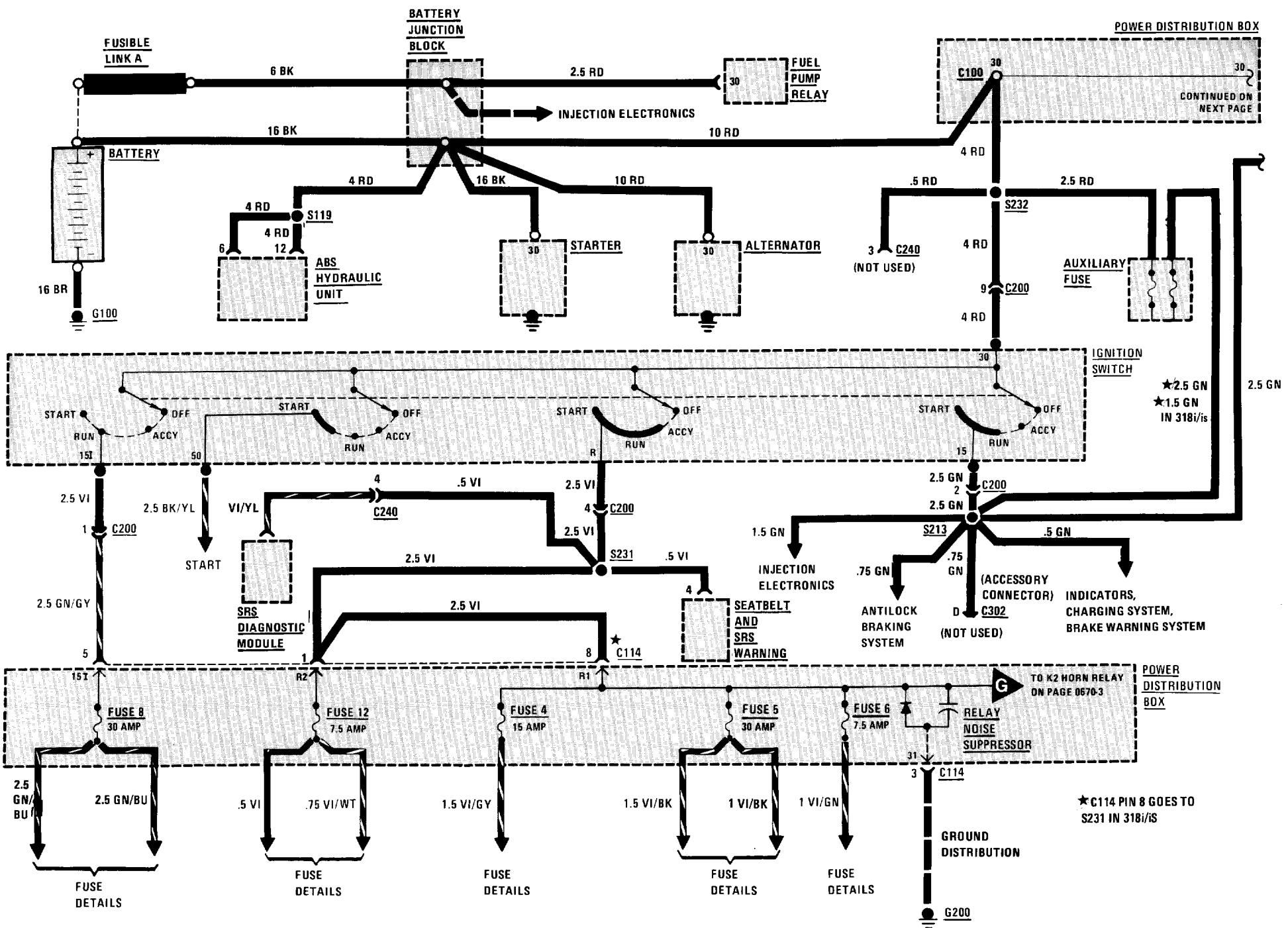
Short Test Using Ohmmeter

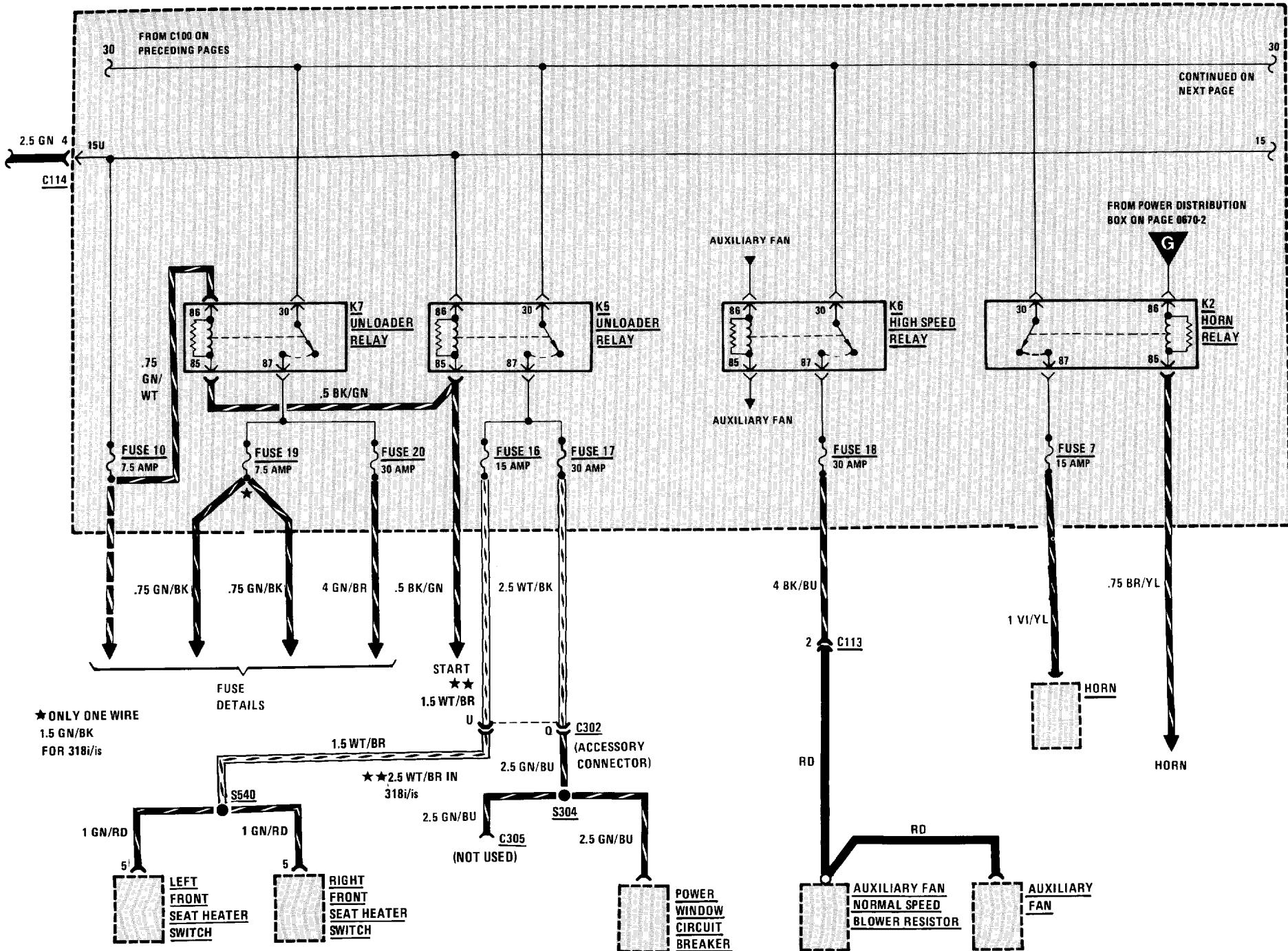
FUSE DATA CHART

FUSE NO.	SIZE	CIRCUIT NAME
1	7.5A	Headlights (also fuses 2, 13, 14).
2	7.5A	Headlights (also fuses 1, 13, 14).
3	15A	Auxiliary Fan (also fuses 18, 19, 20).
4	15A	Glove Box Light; Lights: Turn/Hazard Warning (also fuse 24).
5	30A	Wiper/Washer.
6	7.5A	Stop Lights; Map Reading Light; Antilock Braking System.
7	15A	Horn.
8	30A	Rear Defogger (also fuse 23).
9	15A	Diagnosis Connector.
10	7.5A	Ignition Key Warning; Seatbelt Warning (also fuse 21); Service Interval Indicator (also fuse 21); Tachometer/Fuel Economy Gauges; Gauges/Indicators; Brake Warning System; Back Up Lights; Start; Injection Electronics (also fuse 11).
11	7.5A	Injection Electronics (also fuse 10).
12	7.5A	Radio/Antenna (also fuses 21, 27, 28); Speedometer/Indicators; Multi-Function Clock (also fuses 21, 23).
13	7.5A	Headlights (also fuses 1, 2, 14).
14	7.5A	Headlights (also fuses 1, 2, 13).
15		Not Used.
16	15A	Heated Seats.
17	30A	Power Windows.
18	30A	Auxiliary Fan (also fuses 3, 19, 20).
19	7.5A	Auxiliary Fan (also fuses 3, 18, 20); Interior Lights (also fuses 21, 27); Power Mirrors; A/C Compressor.

FUSE NO.	SIZE	CIRCUIT NAME
20	30A	Heater/Air Conditioning; Auxiliary Fan (also fuses 3, 18, 19).
21	7.5A	Auto-Charging Flashlight; Ignition Key Warning/Seatbelt Warning (also fuse 10); Interior Lights (also fuses 19, 27); Radio/Antenna (also fuses 12, 27, 28); Trunk Light; Multifunction Clock (also fuses 12, 23); Service Interval Indicator (also fuse 10).
22	7.5A	Lights: Front Park/Tail (also fuse 23); Lights: Front Side Marker (also fuse 23).
23	7.5A	Lights: Dash; Lights: Front Park/Tail (also fuse 22); Lights: Front Side Marker (also fuse 22); Lights: Rear Marker/License; Multifunction Clock (also fuses 12, 21); Rear Defogger (also fuse 8).
24	15A	Lights: Turn/Hazard Warning (also fuse 4).
25		Not Used.
26		Not Used.
27	30A	Interior Lights (also fuses 19, 21); Radio/Antenna (also fuses 12, 21, 28).
28	30A	Cigar Lighter; Radio/Antenna (also fuses 12, 21, 27).
29	7.5A	Fog Lights (also fuse 30).
30	7.5A	Fog Lights (also fuse 29).
POWER WINDOW CIRCUIT BREAKER		25A Power Windows

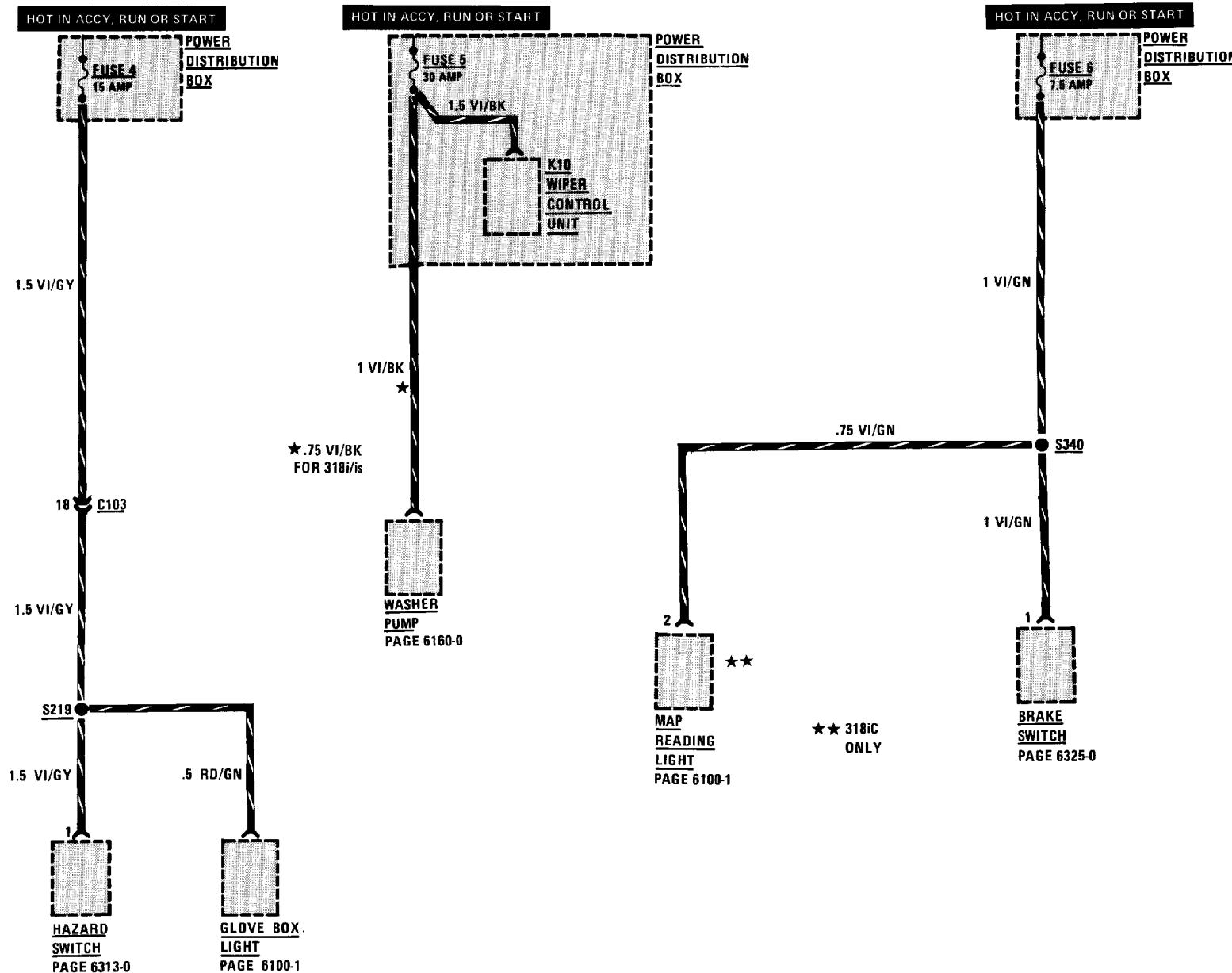
0670-2 POWER DISTRIBUTION



POWER DISTRIBUTION BOX

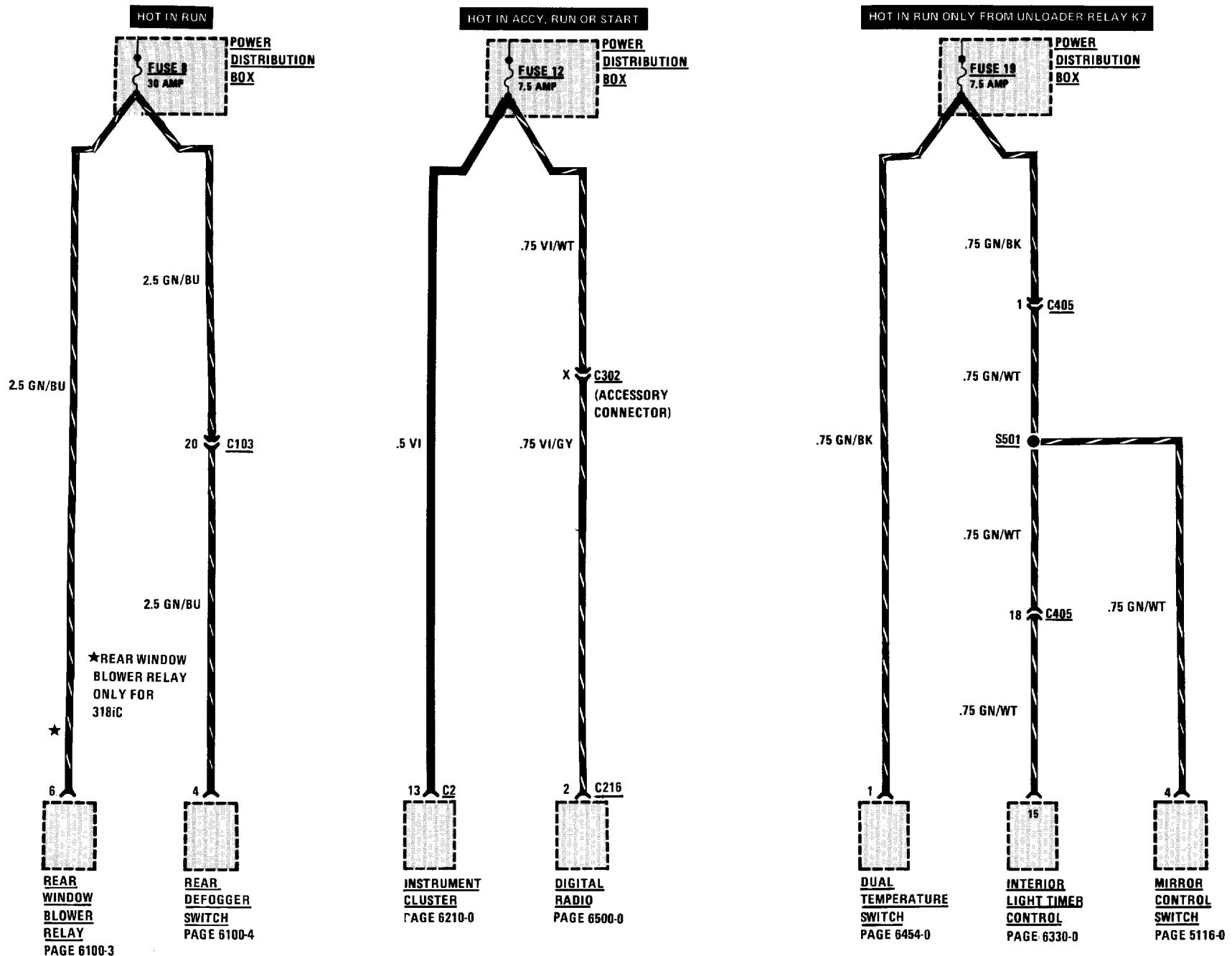
0670-6 POWER DISTRIBUTION

FUSE DETAILS: FUSES 4, 5, AND 6



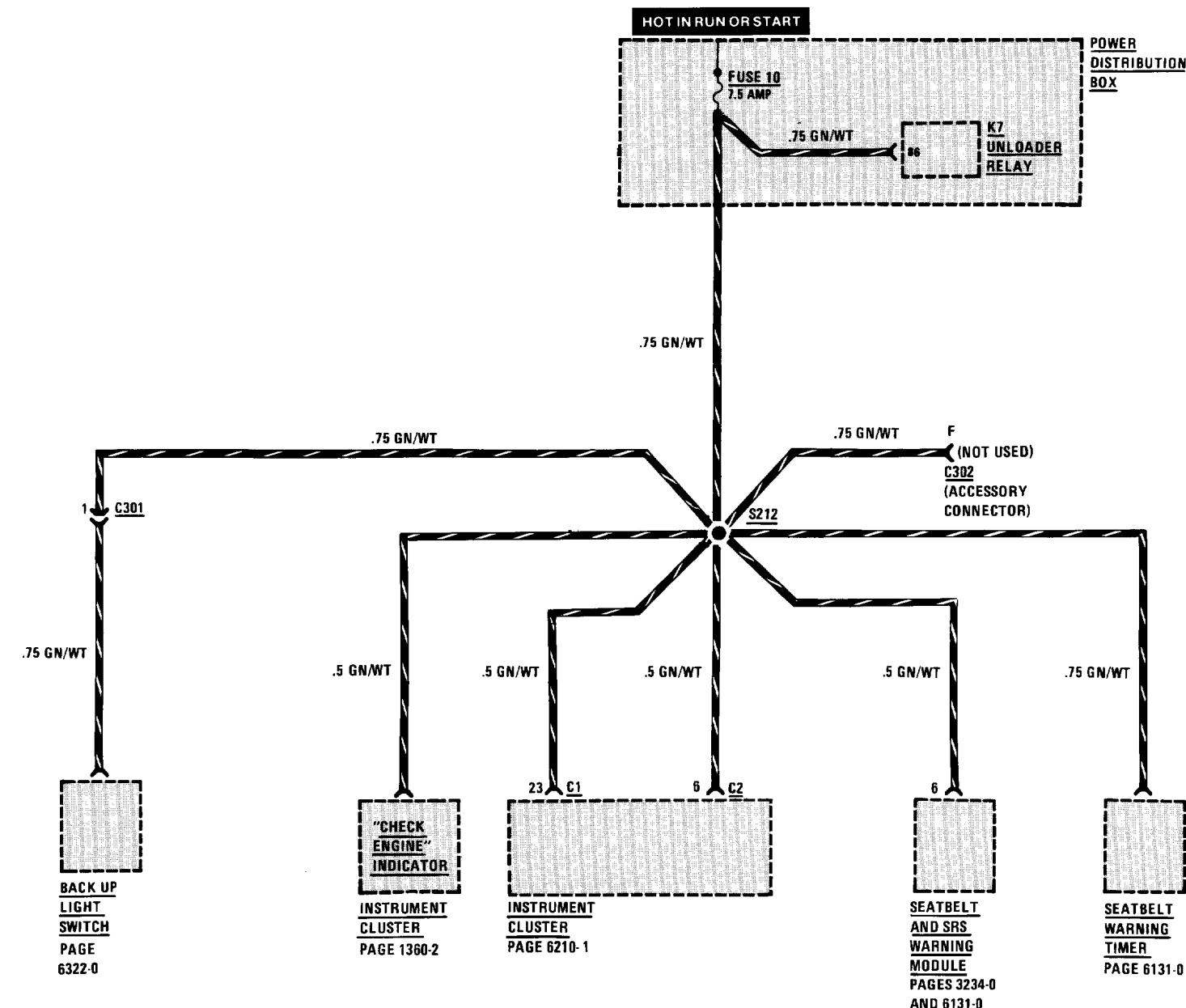
FUSE DETAILS: FUSES 8, 12 AND 19

318iC



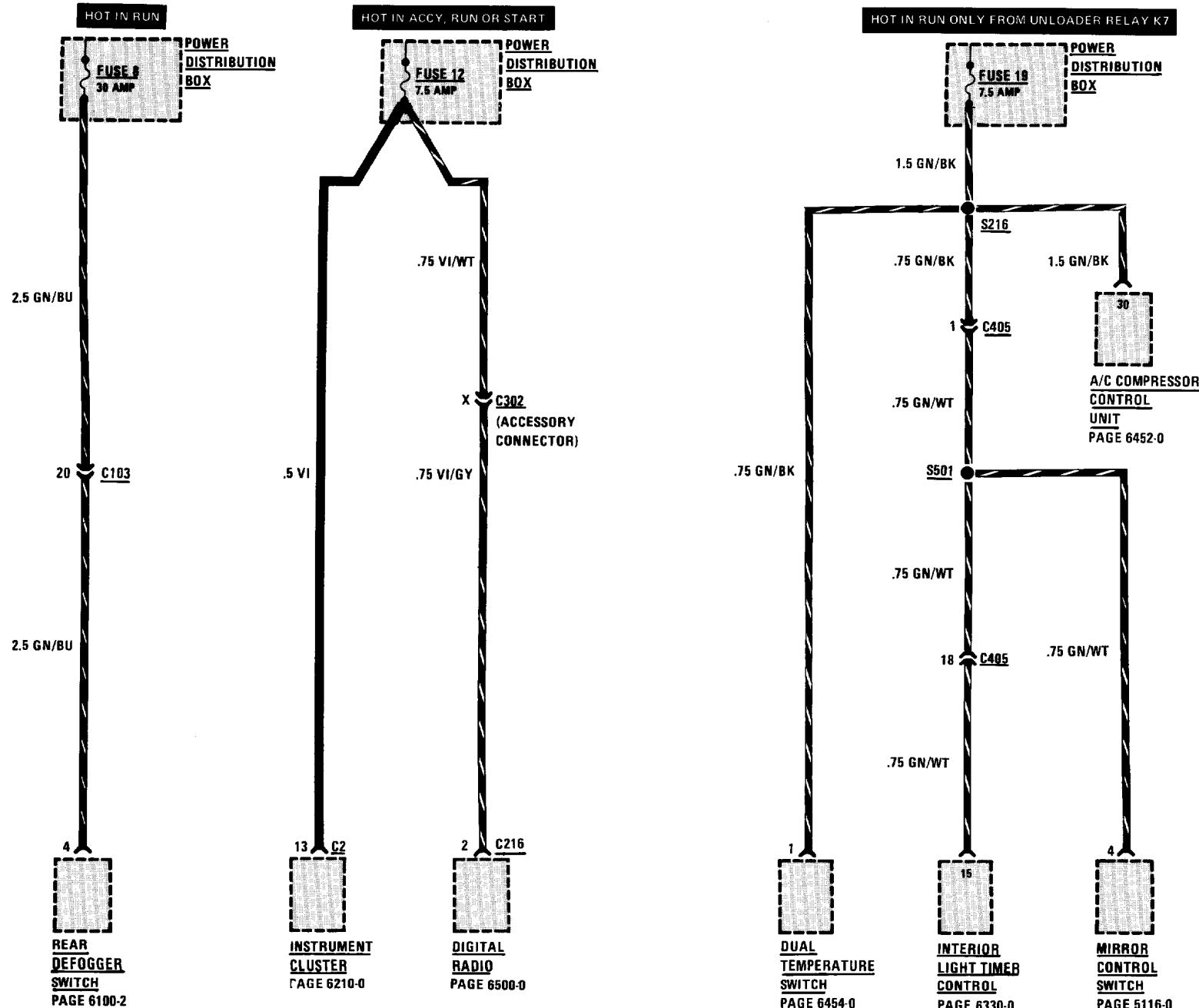
0670-8 POWER DISTRIBUTION

FUSE DETAILS: FUSE 10

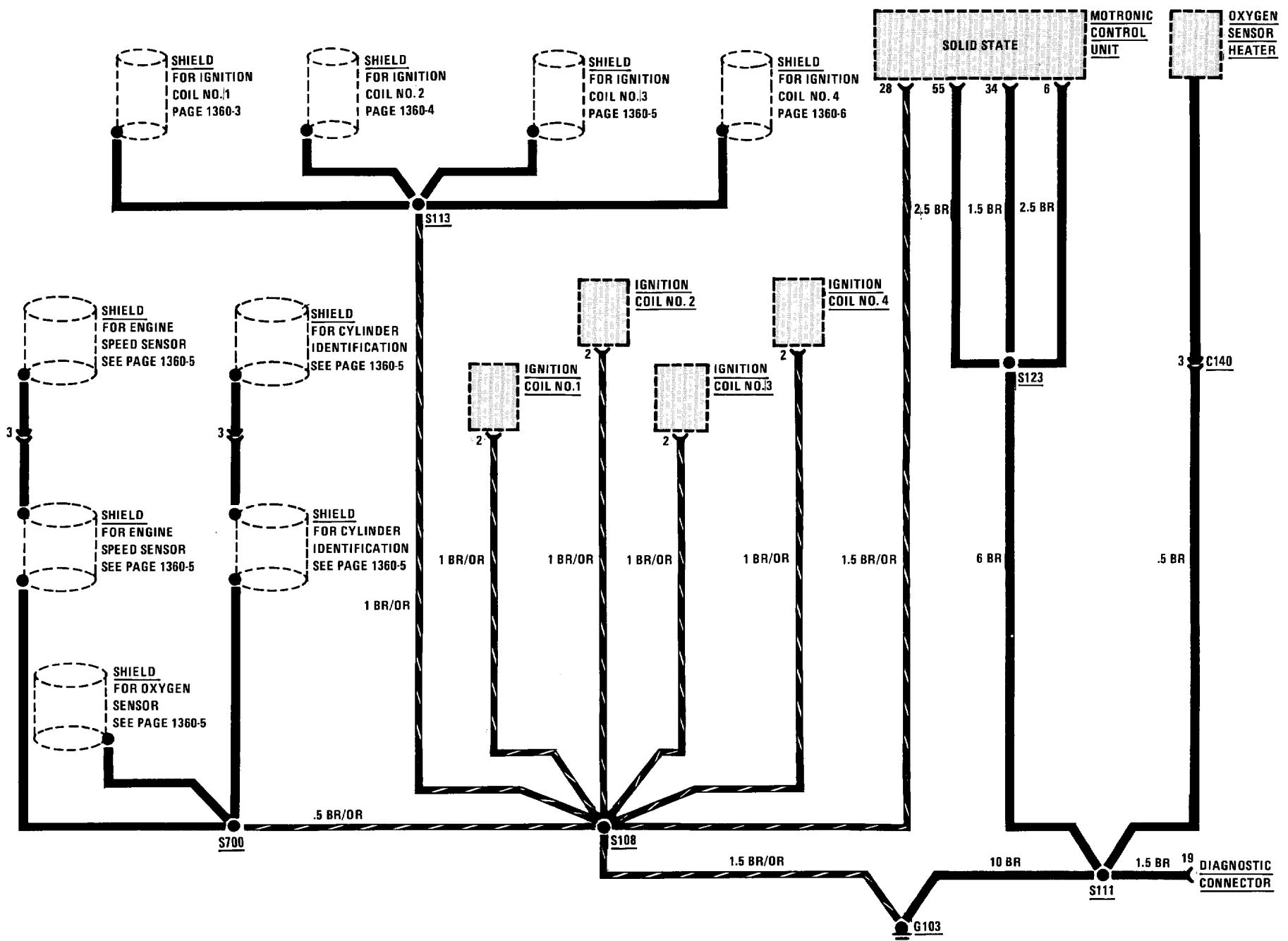


0670-12 POWER DISTRIBUTION

FUSE DETAILS: FUSE 8, 12 AND 19 318i/is

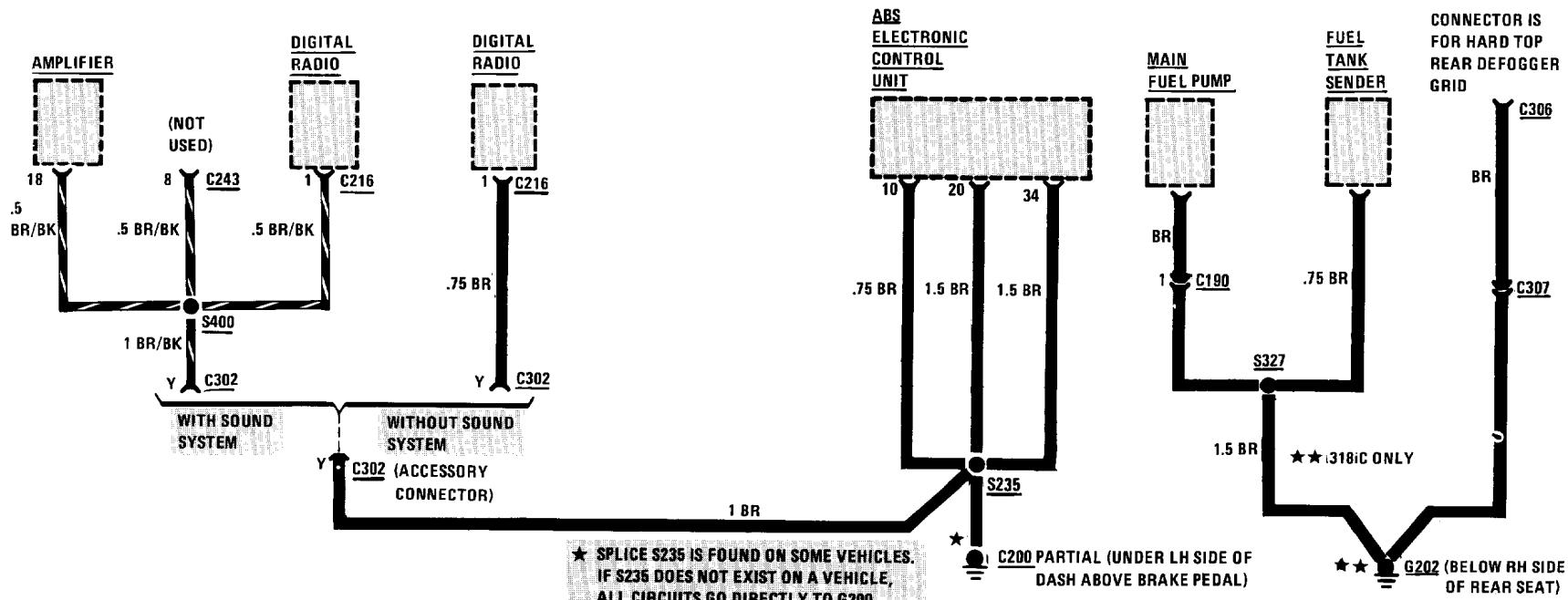
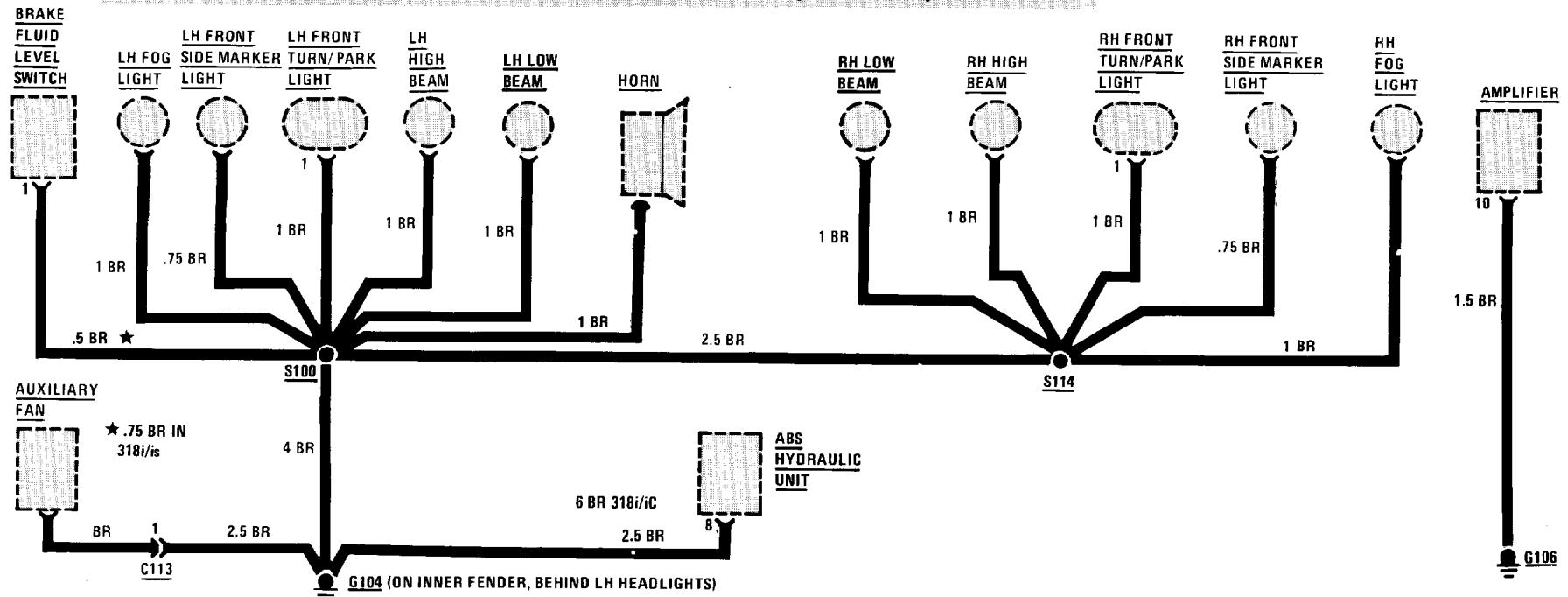


GROUND DISTRIBUTION: G103

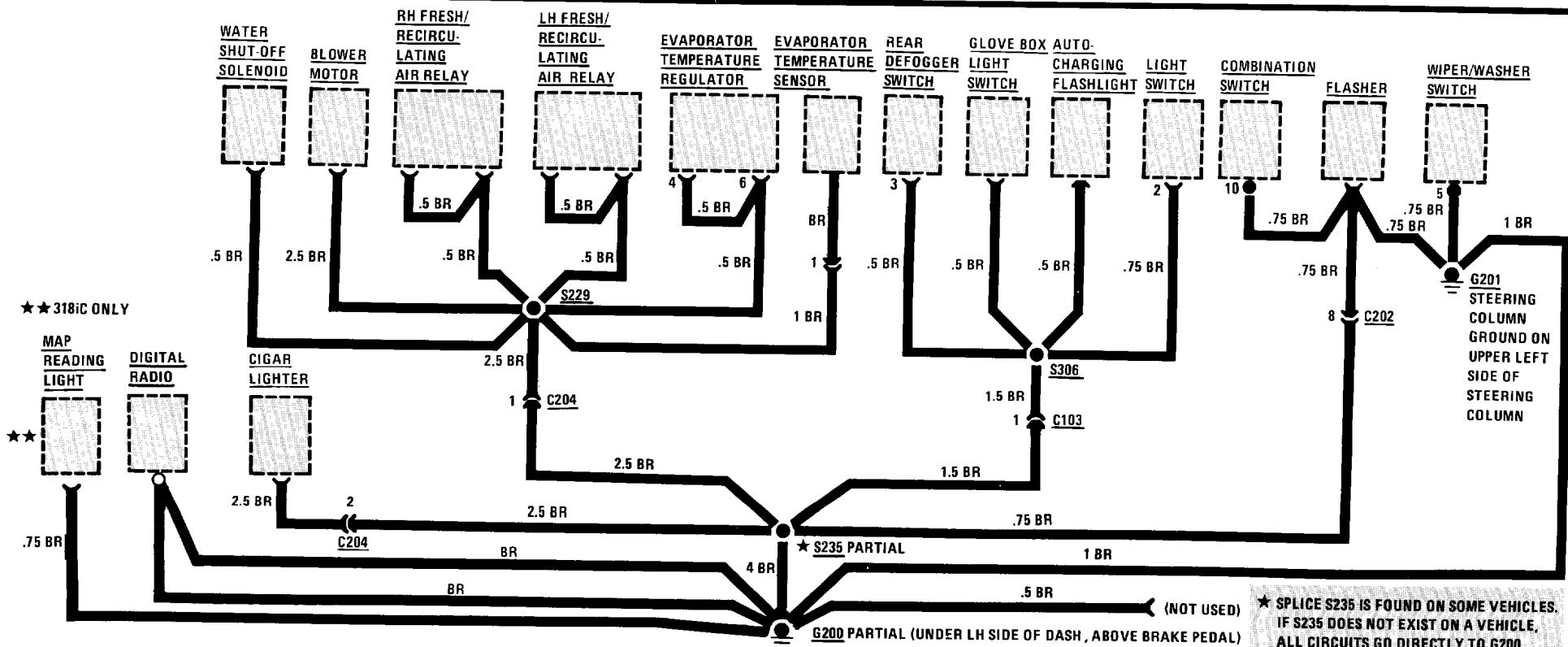
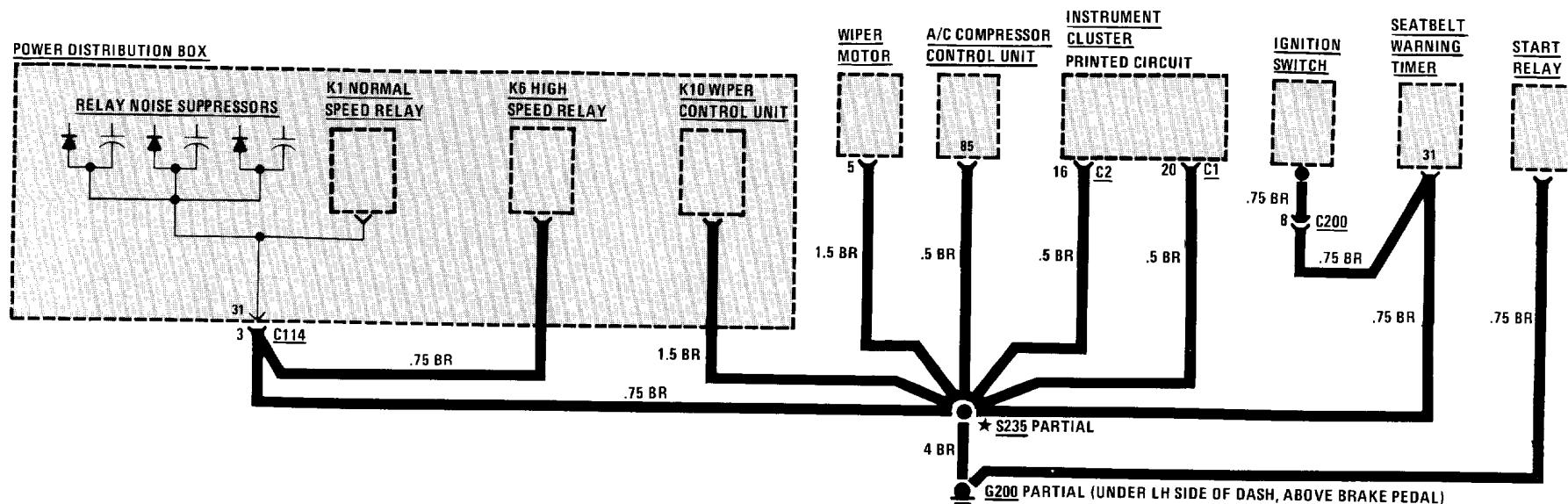


0670-14 POWER DISTRIBUTION

GROUND DISTRIBUTION: G104, G106 AND G200 (PARTIAL) AND G202

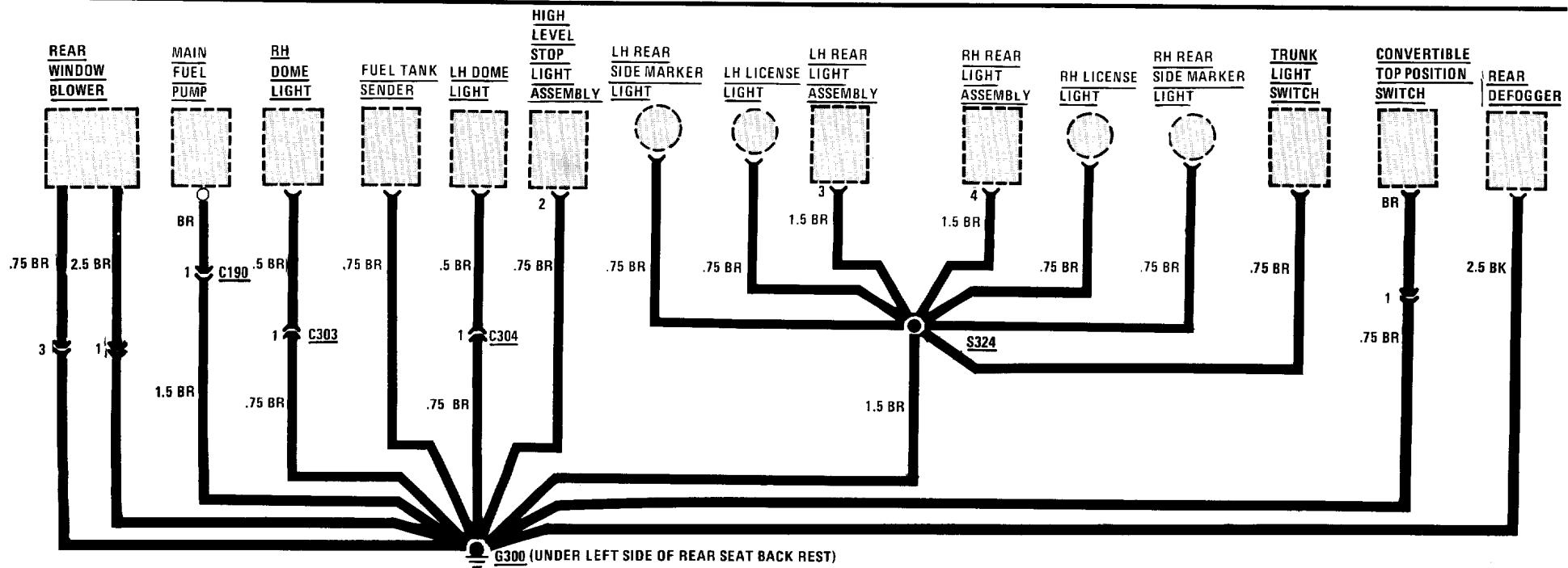
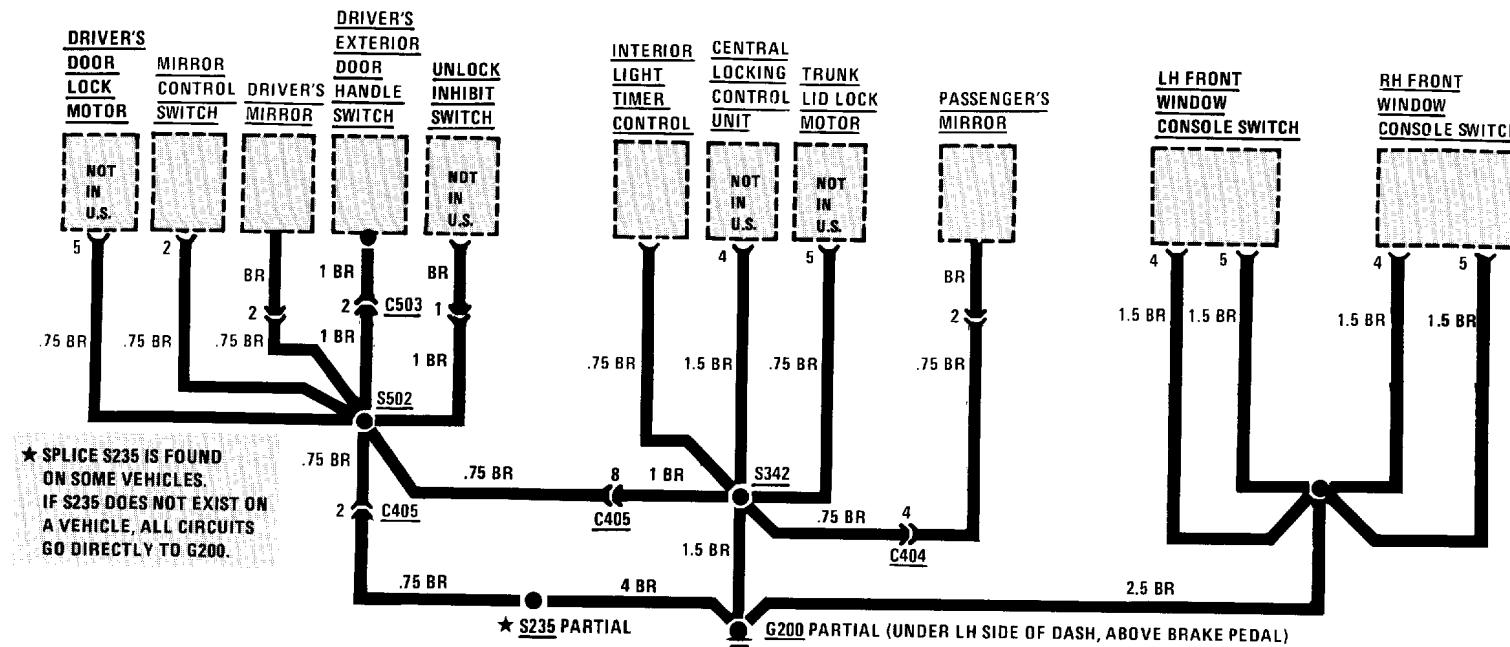


GROUND DISTRIBUTION: G200 (PARTIAL) AND G201

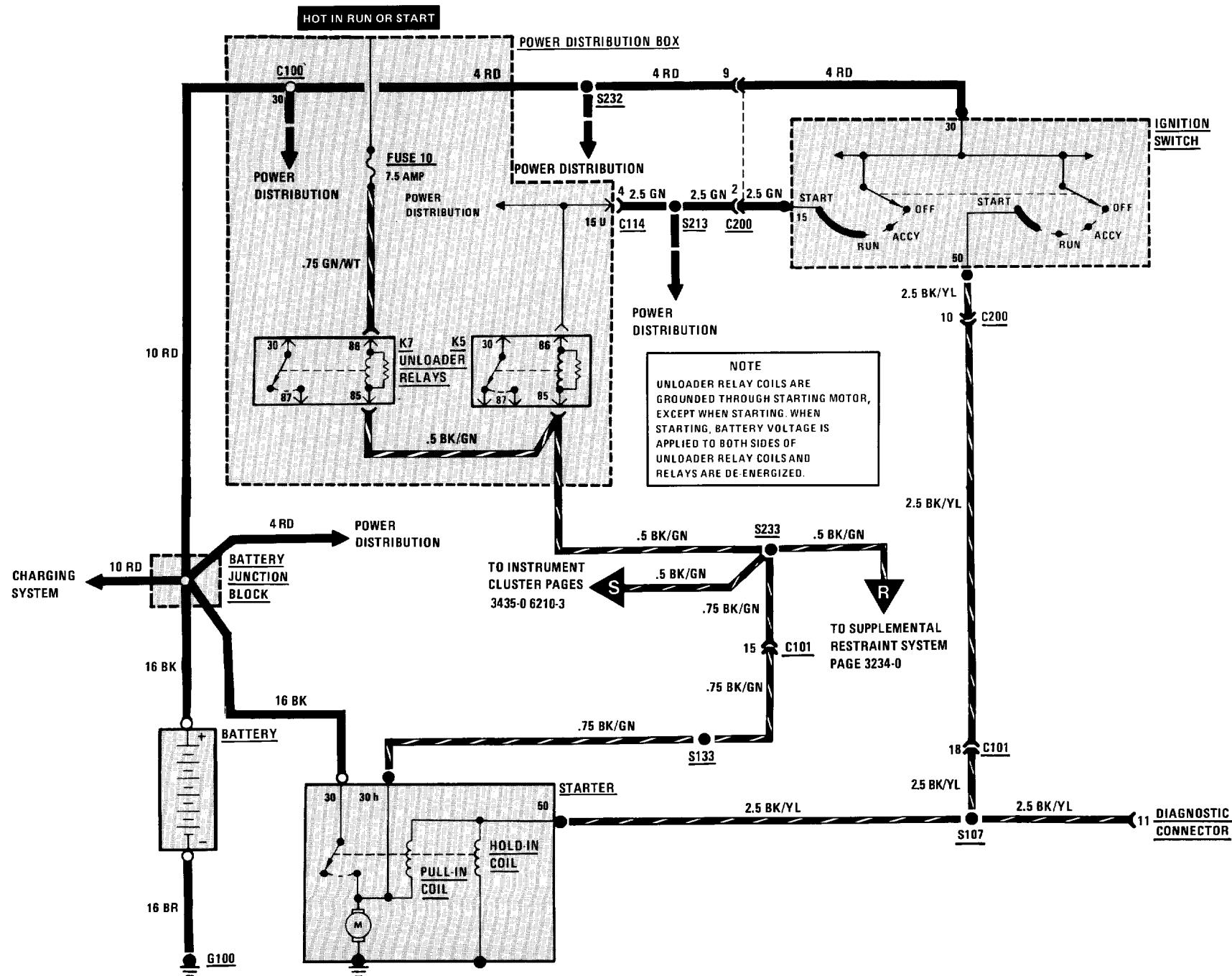


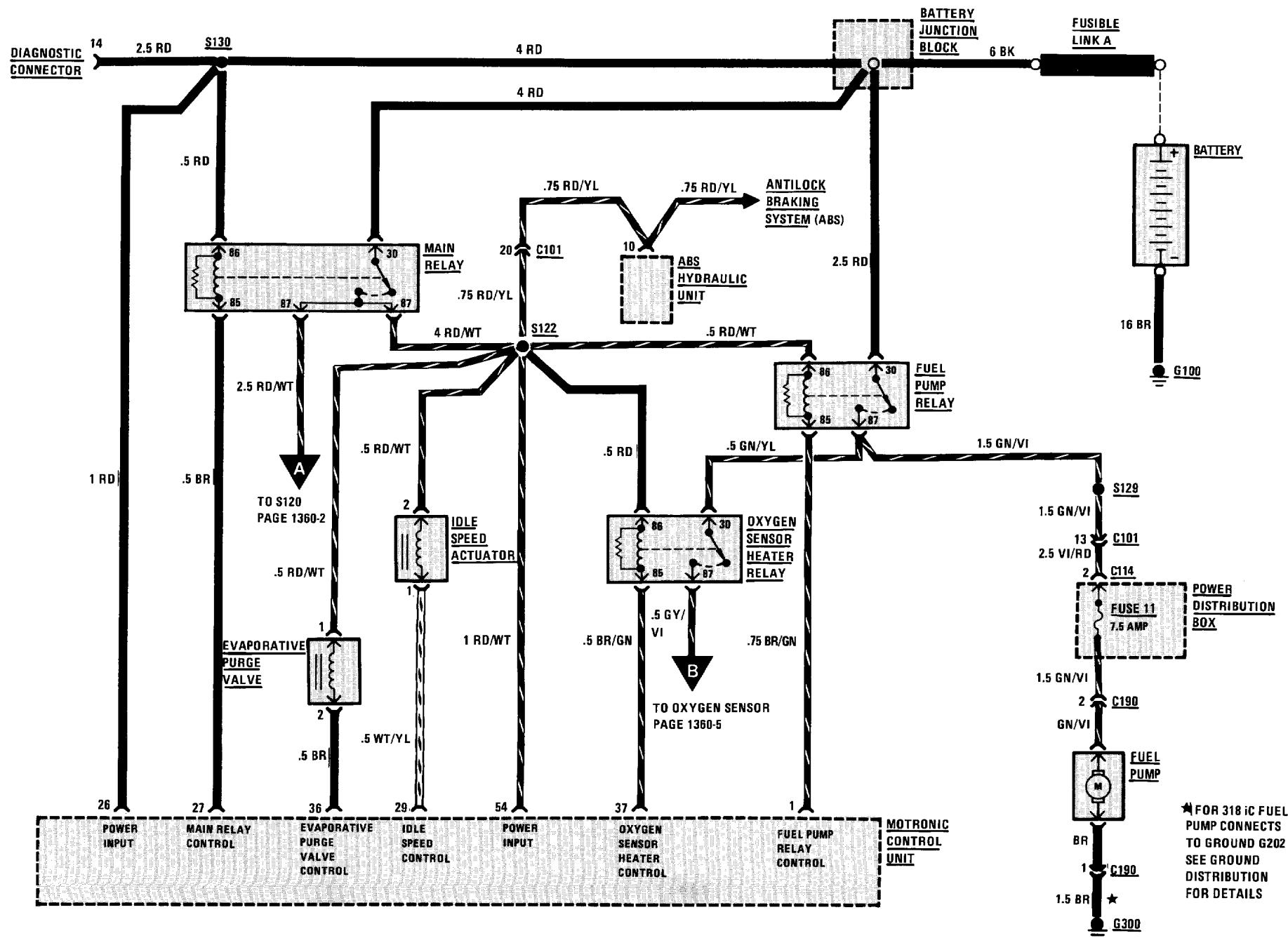
0670-16 POWER DISTRIBUTION

GROUND DISTRIBUTION: G200 (PARTIAL) AND G300

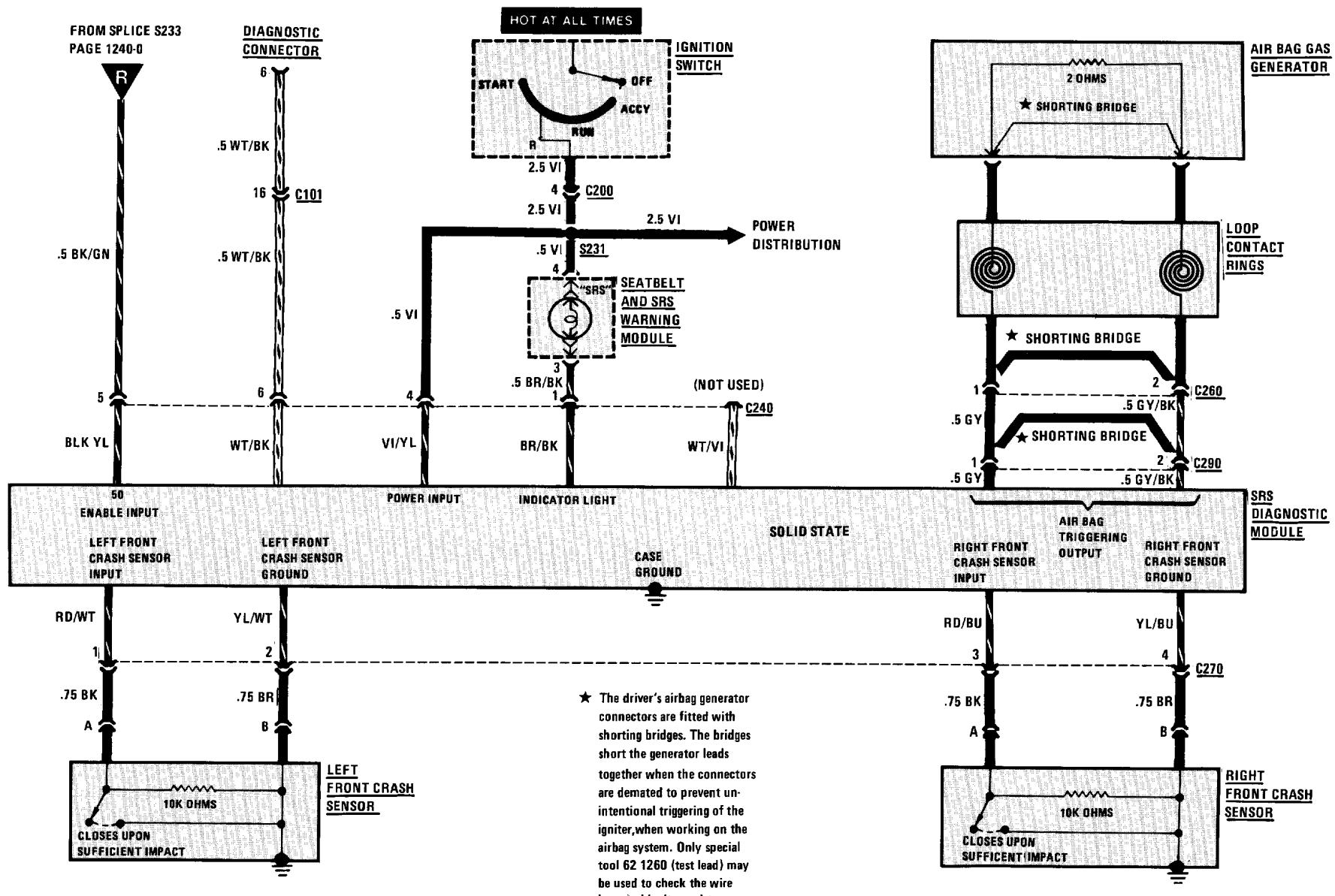


1240-0 START

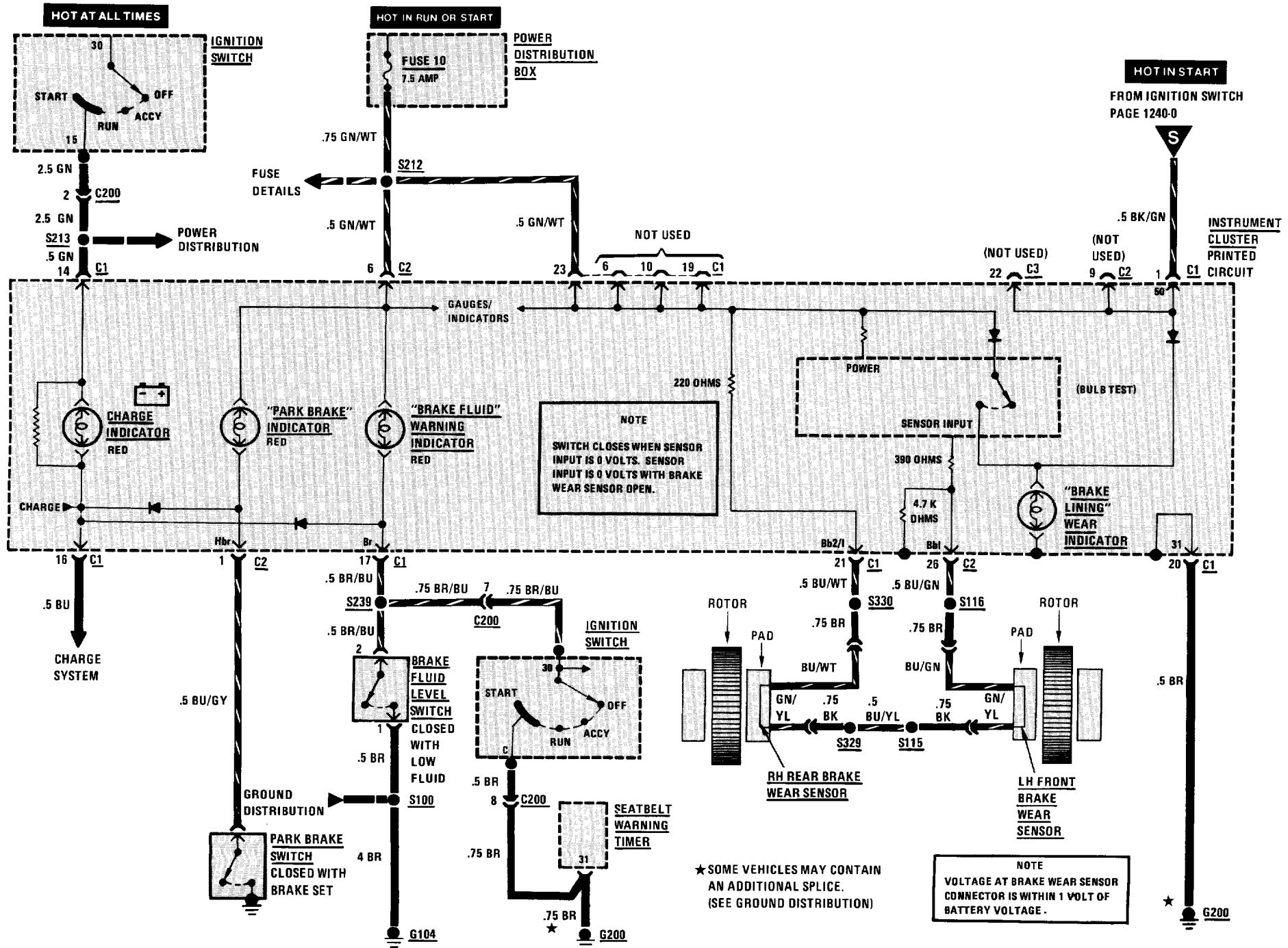




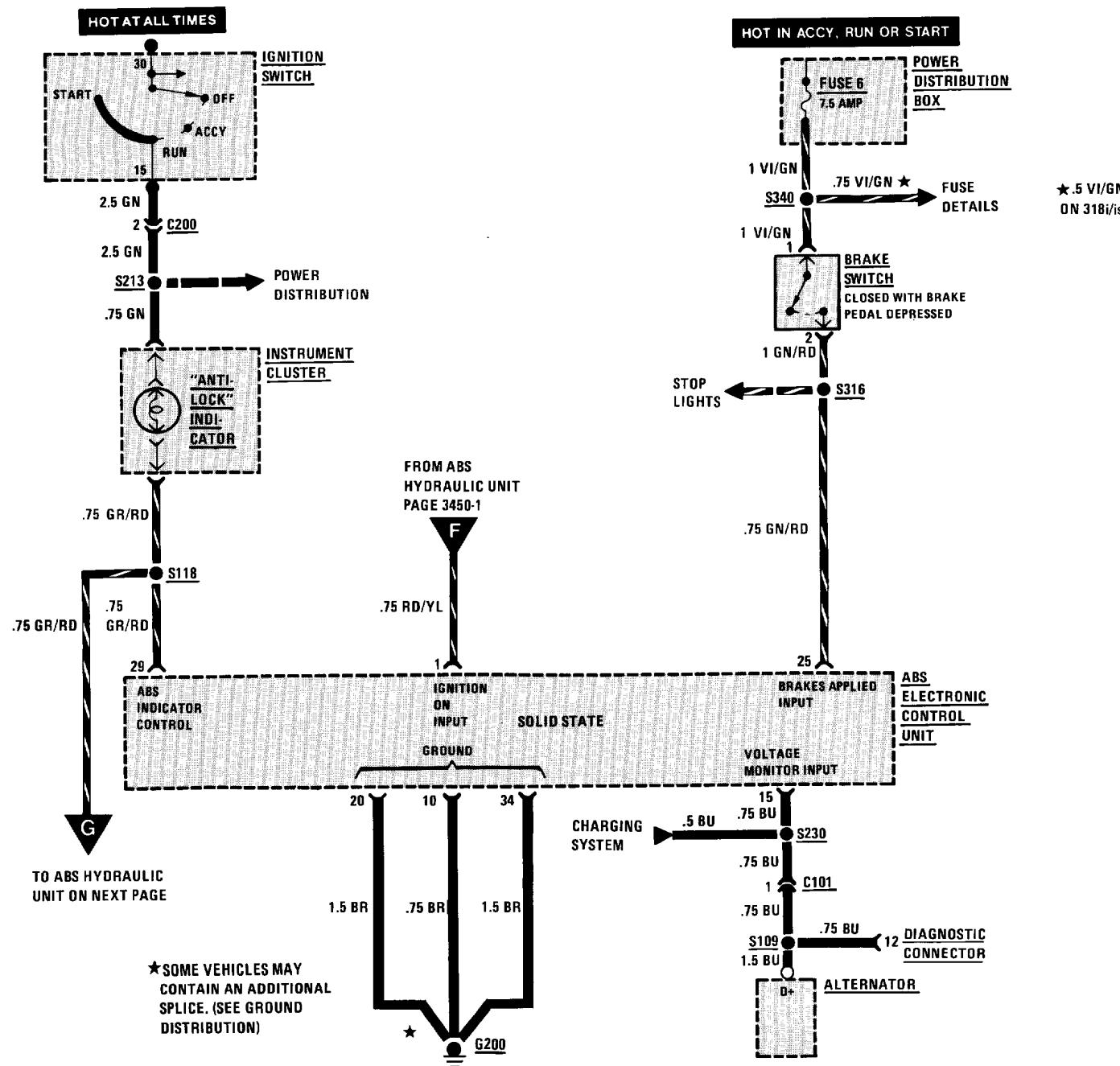
3234-0 SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

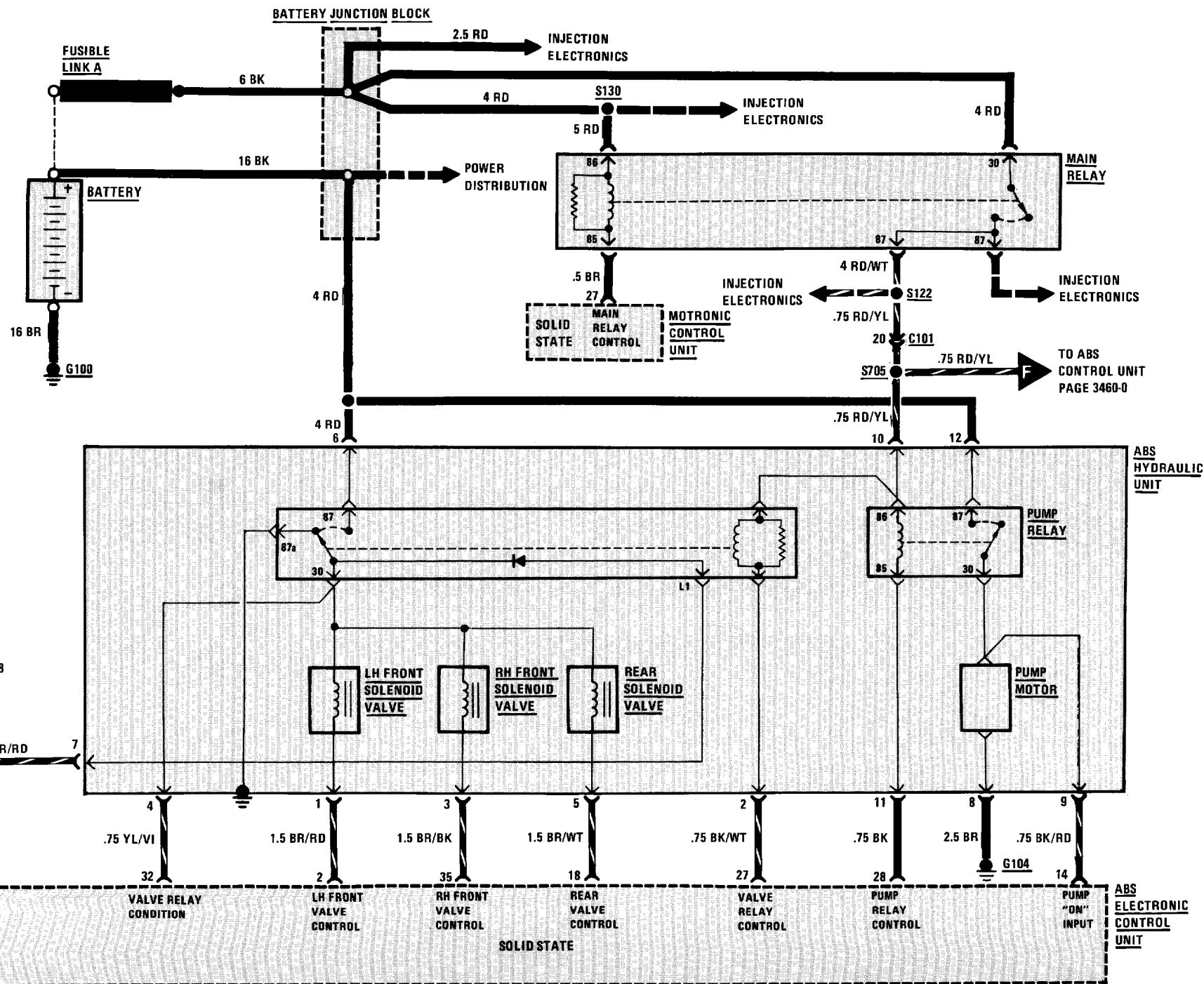


3435-0 BRAKE WARNING SYSTEM



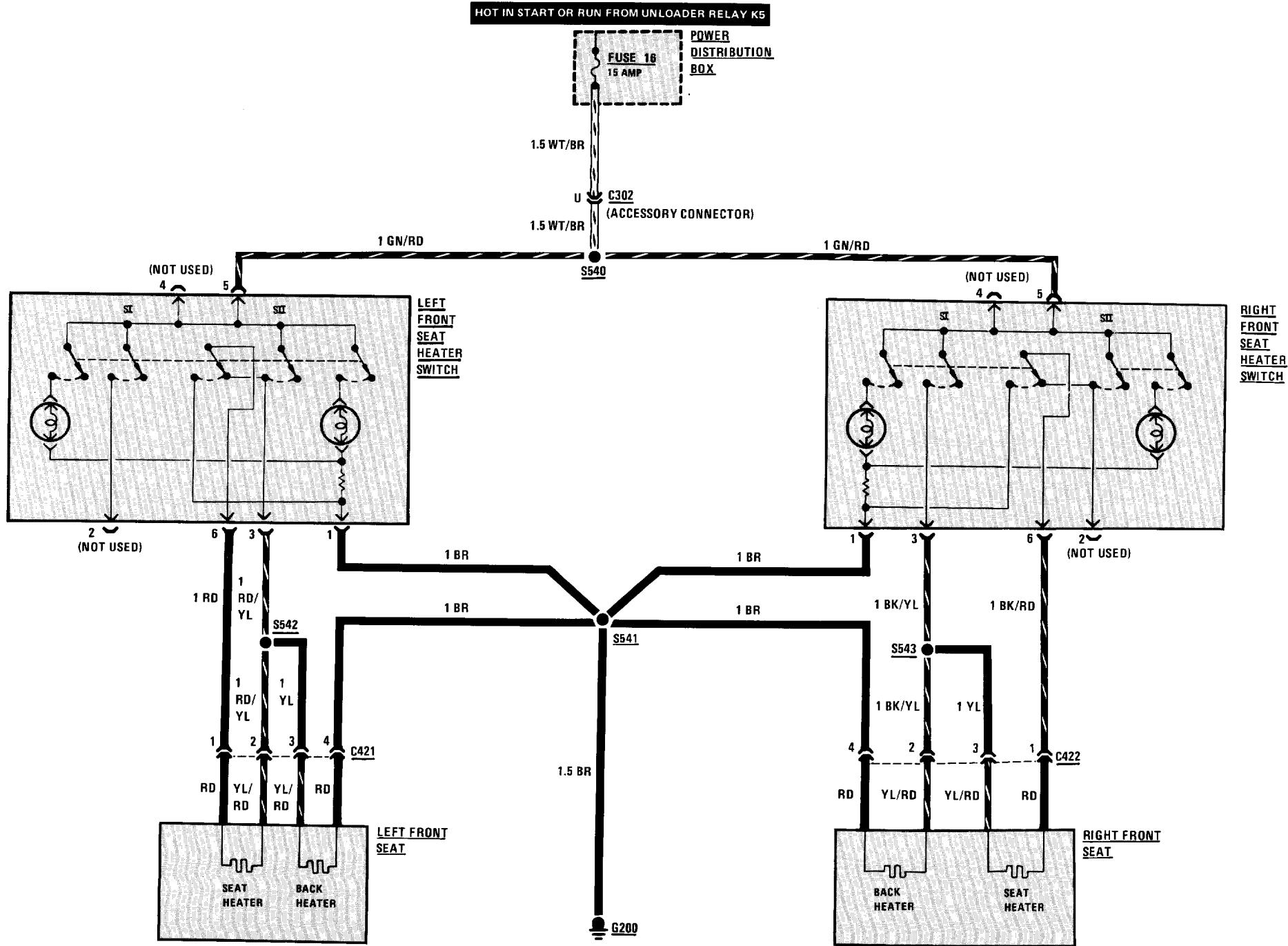
3450-0 ANTILOCK BRAKING SYSTEM (ABS)

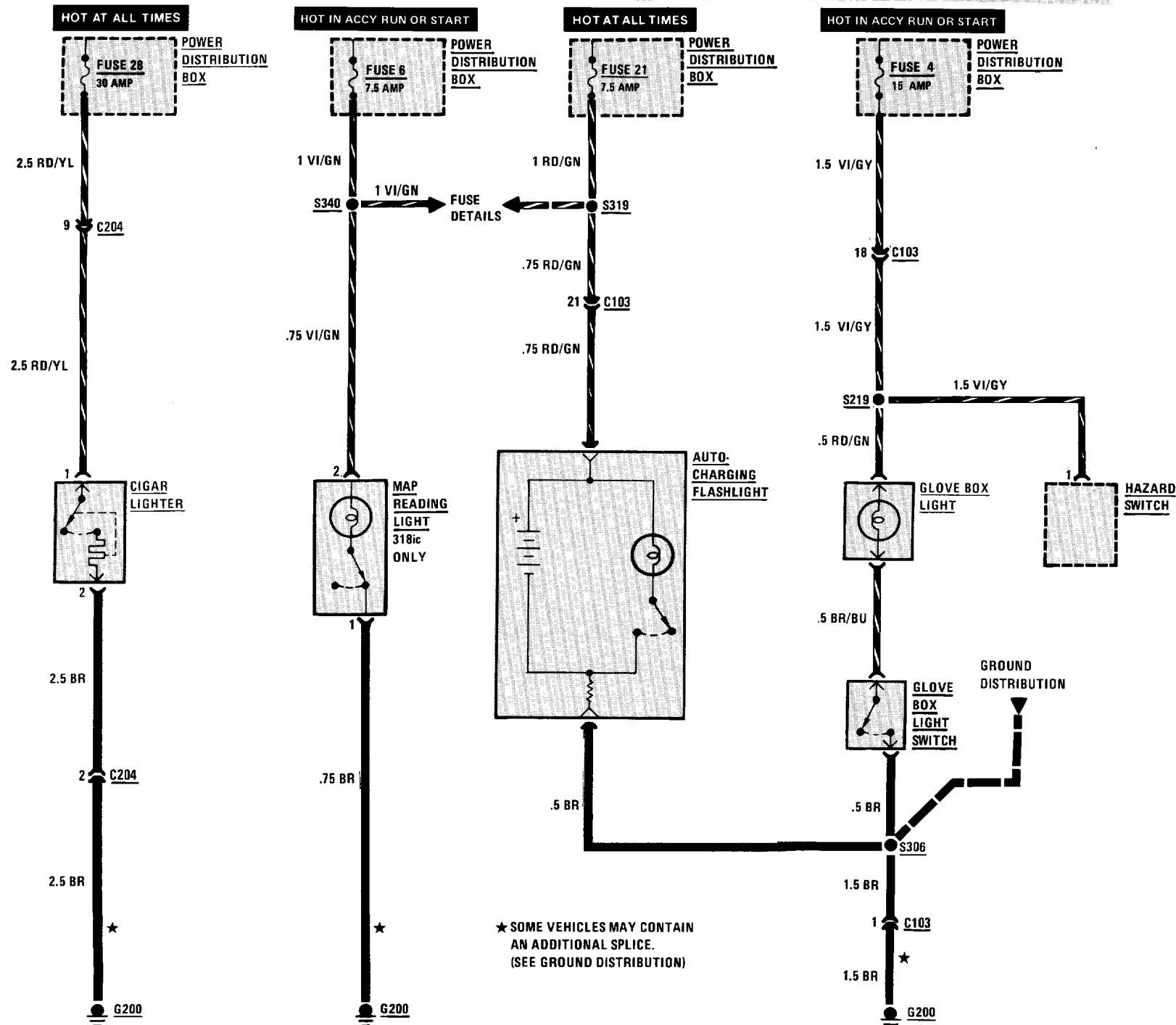




5200-0 SEATS

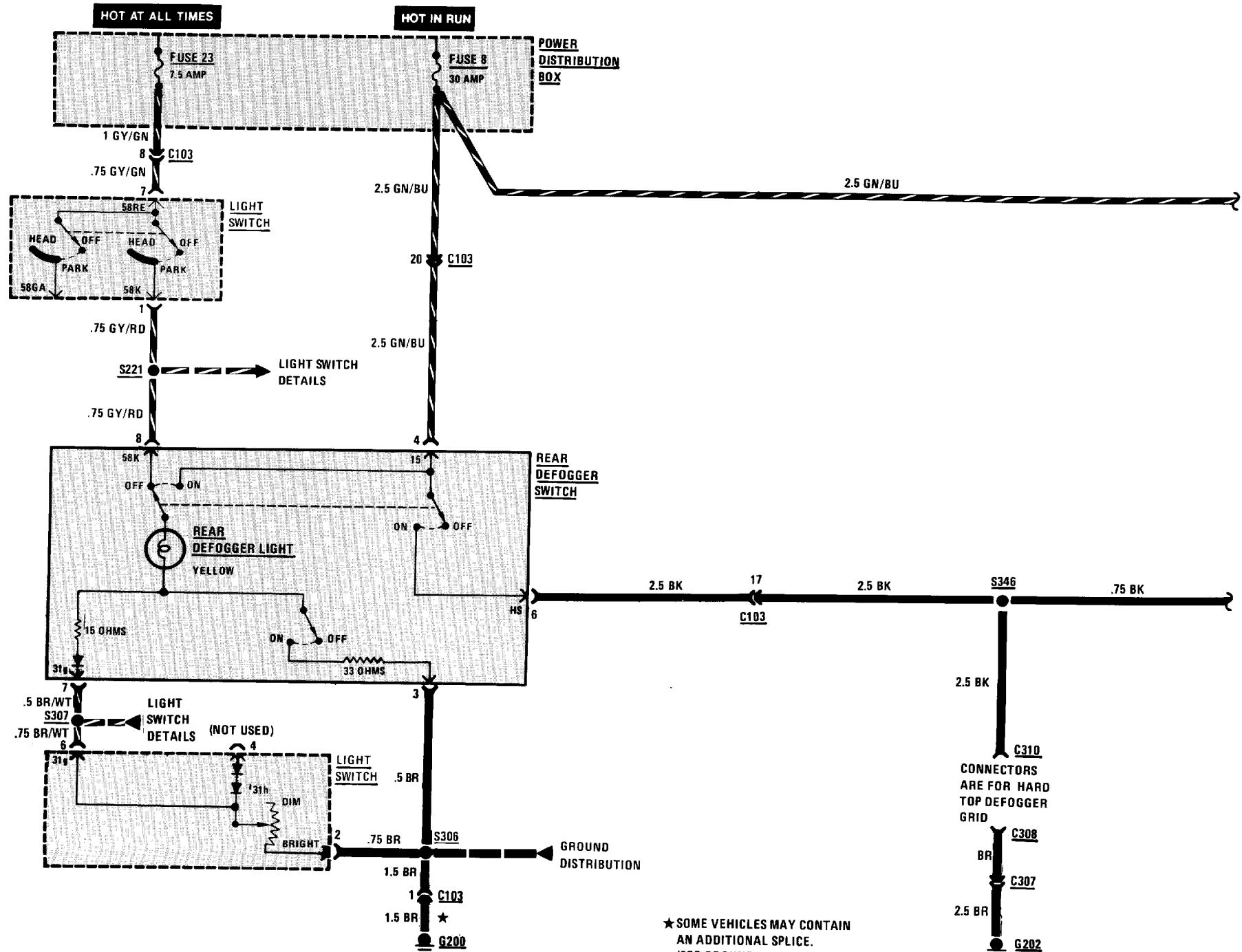
HEATED SEATS



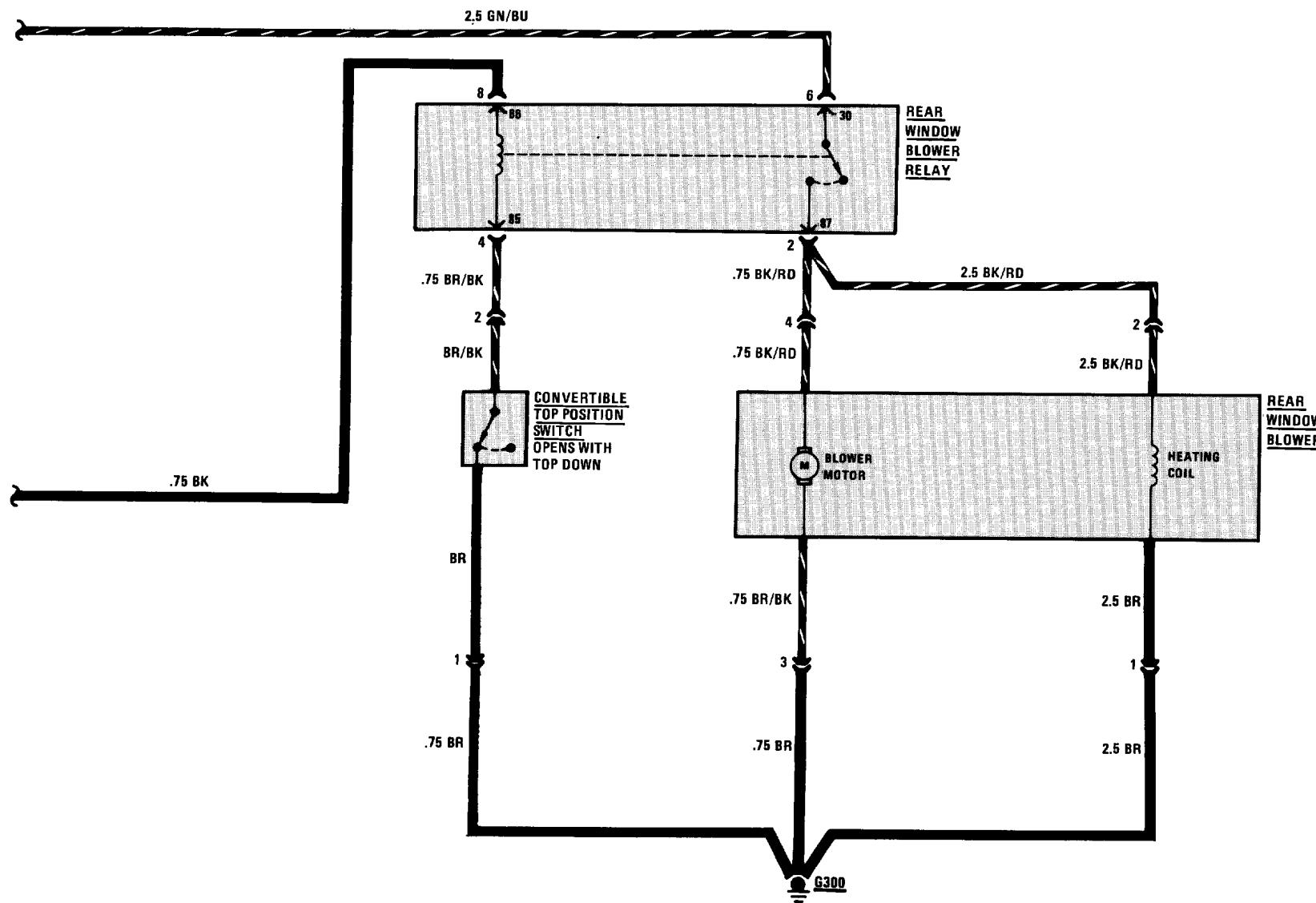
CIGAR LIGHTER/GLOVE BOX LIGHT/AUTO-CHARGING FLASHLIGHT/MAP READING LIGHT


6100-2 BODY ELECTRICAL

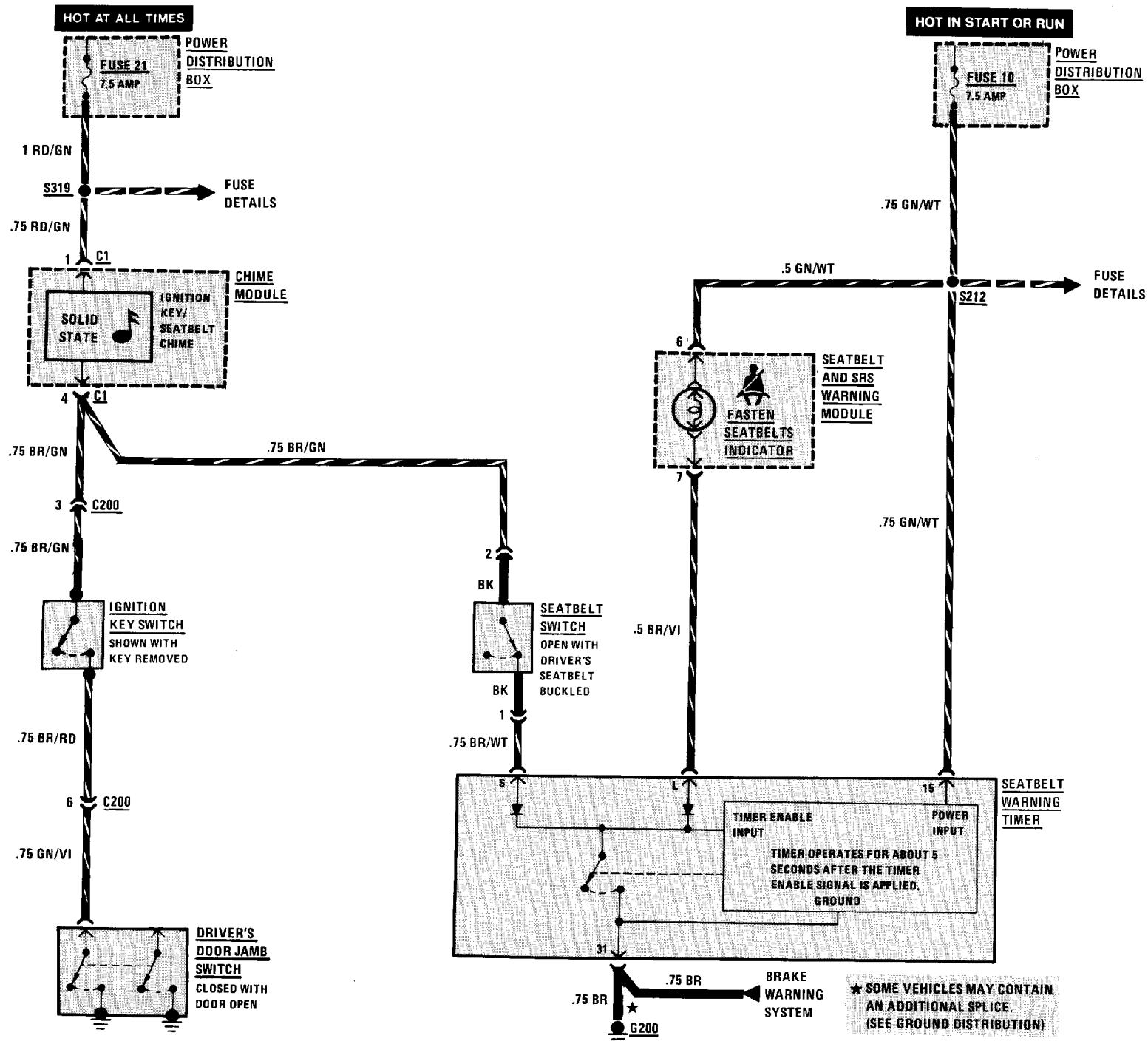
REAR DEFOGGER 318iC



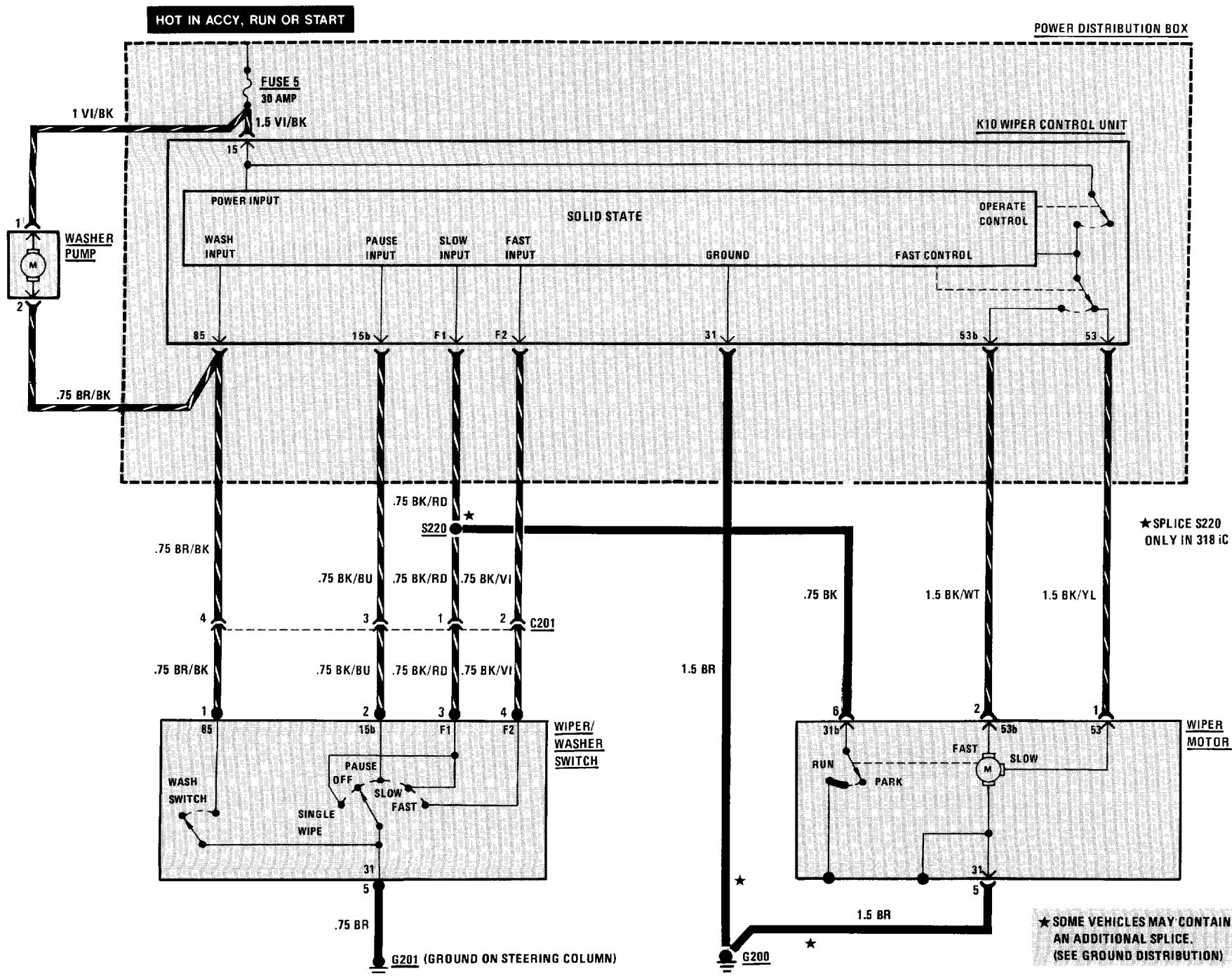
REAR DEFOGGER 318iC



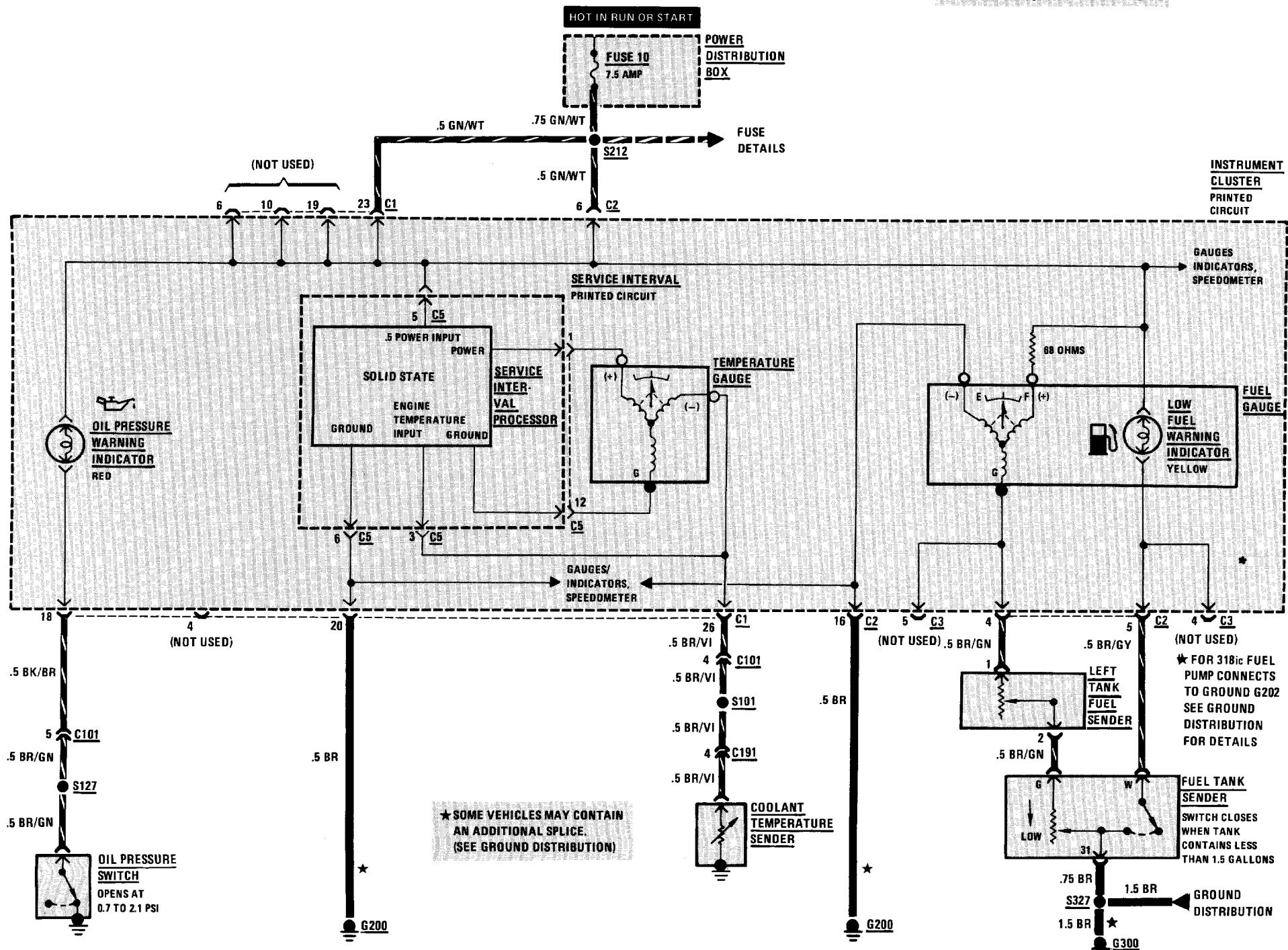
6131-0 IGNITION KEY WARNING/SEATBELT WARNING



6160-0 WIPER/WASHER

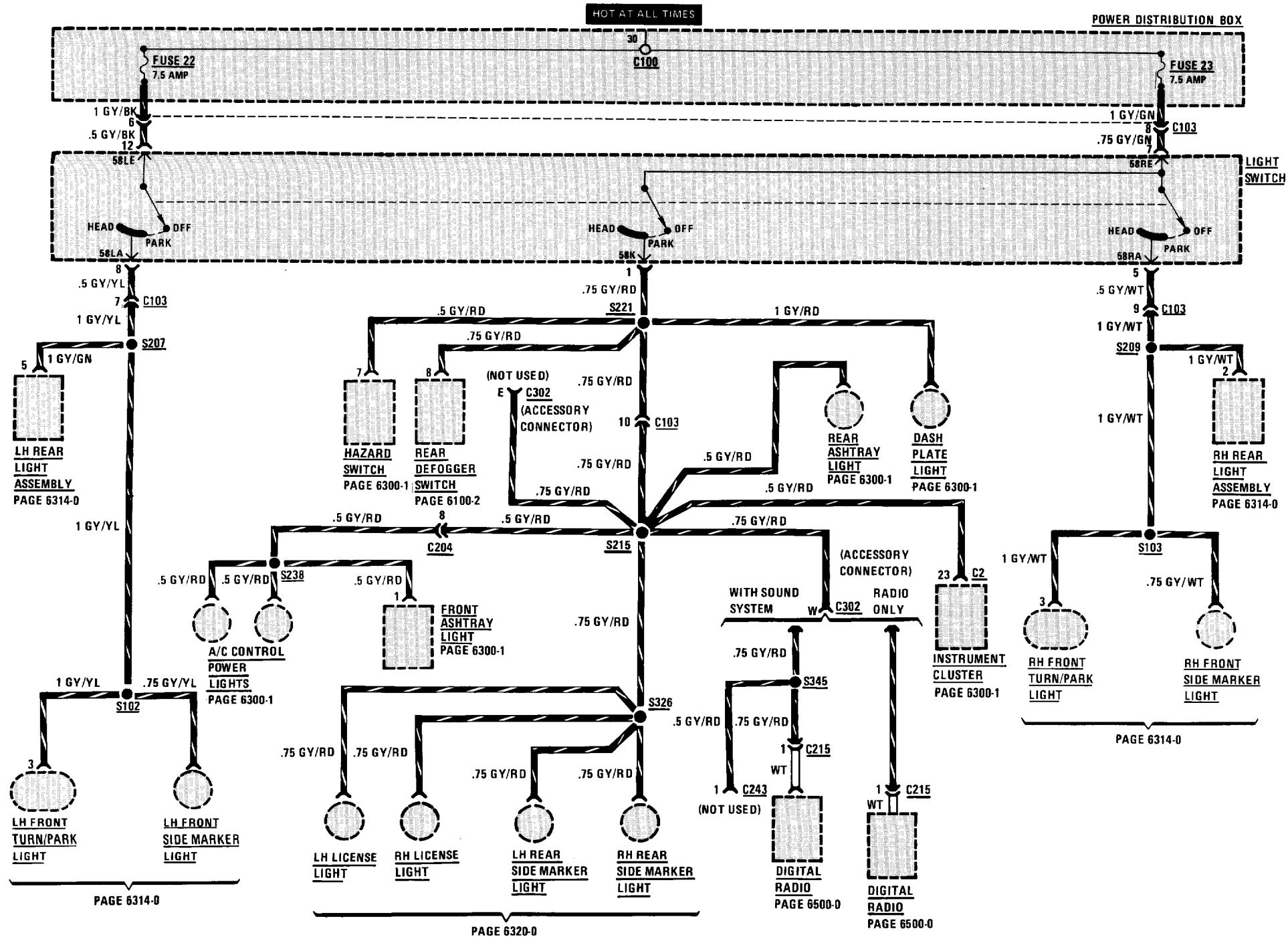


GAUGES/INDICATOR



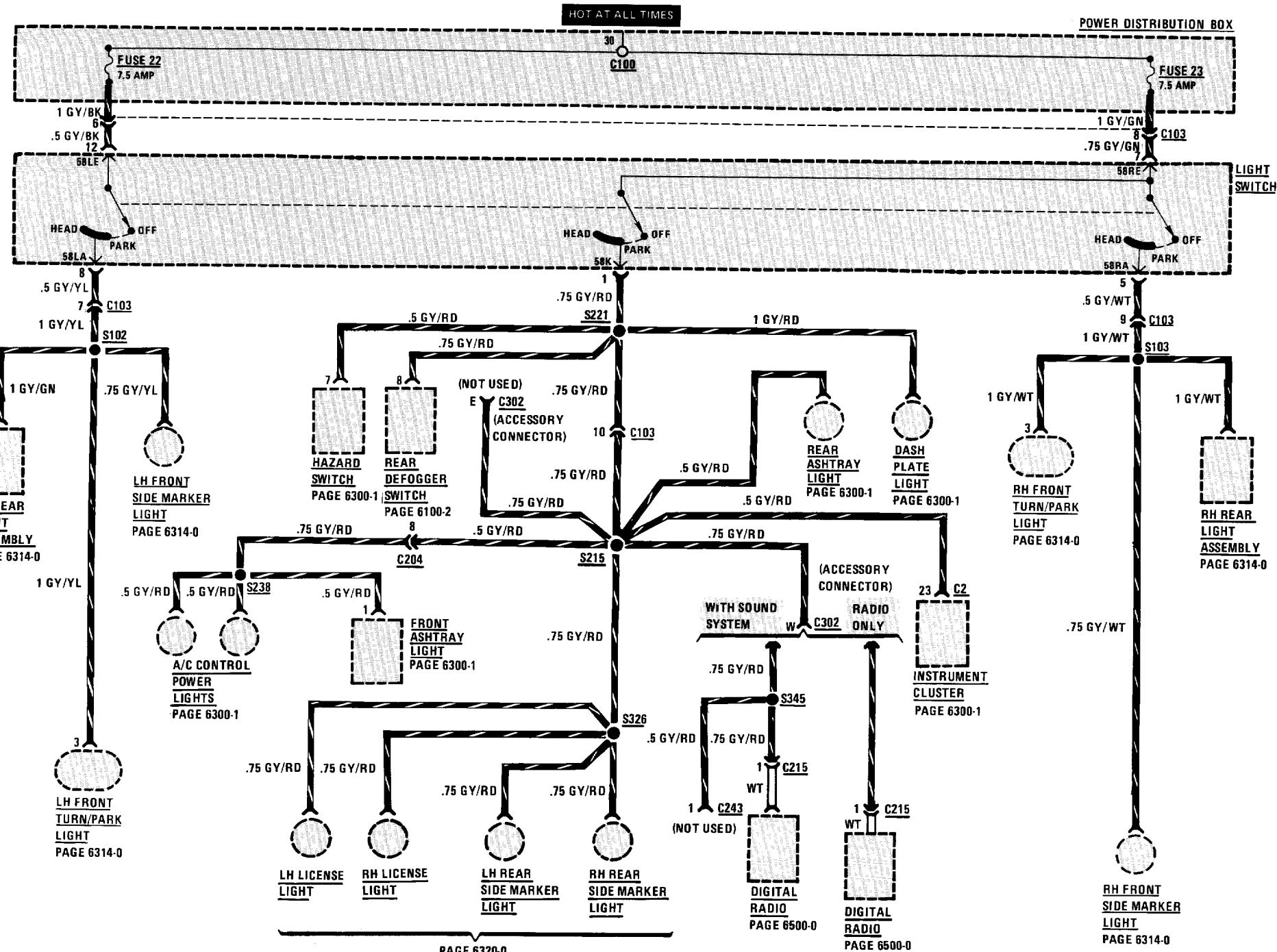
6300-0 LIGHT SWITCH DETAILS

318i/is



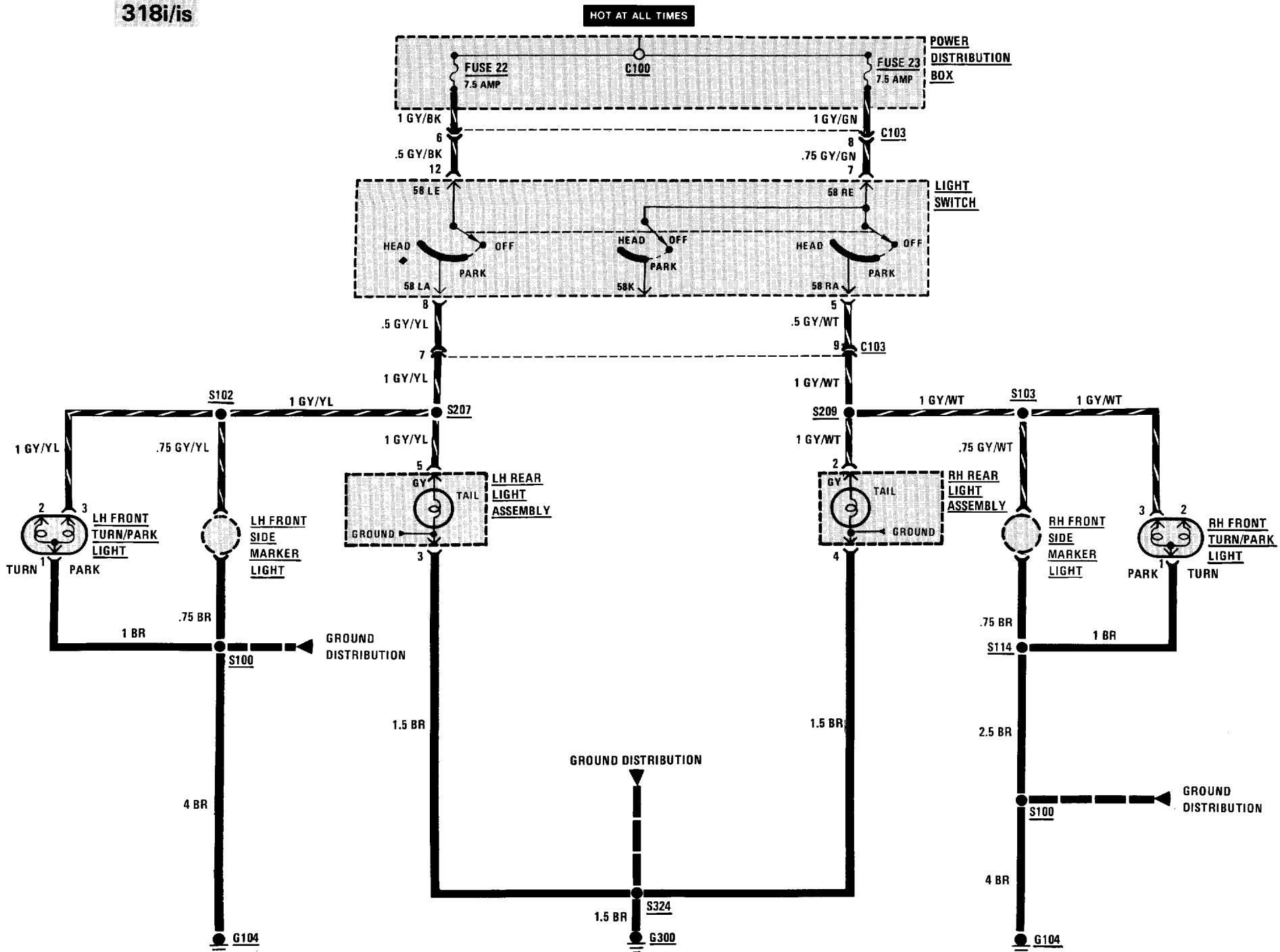
6300-2 LIGHT SWITCH DETAILS

318ic



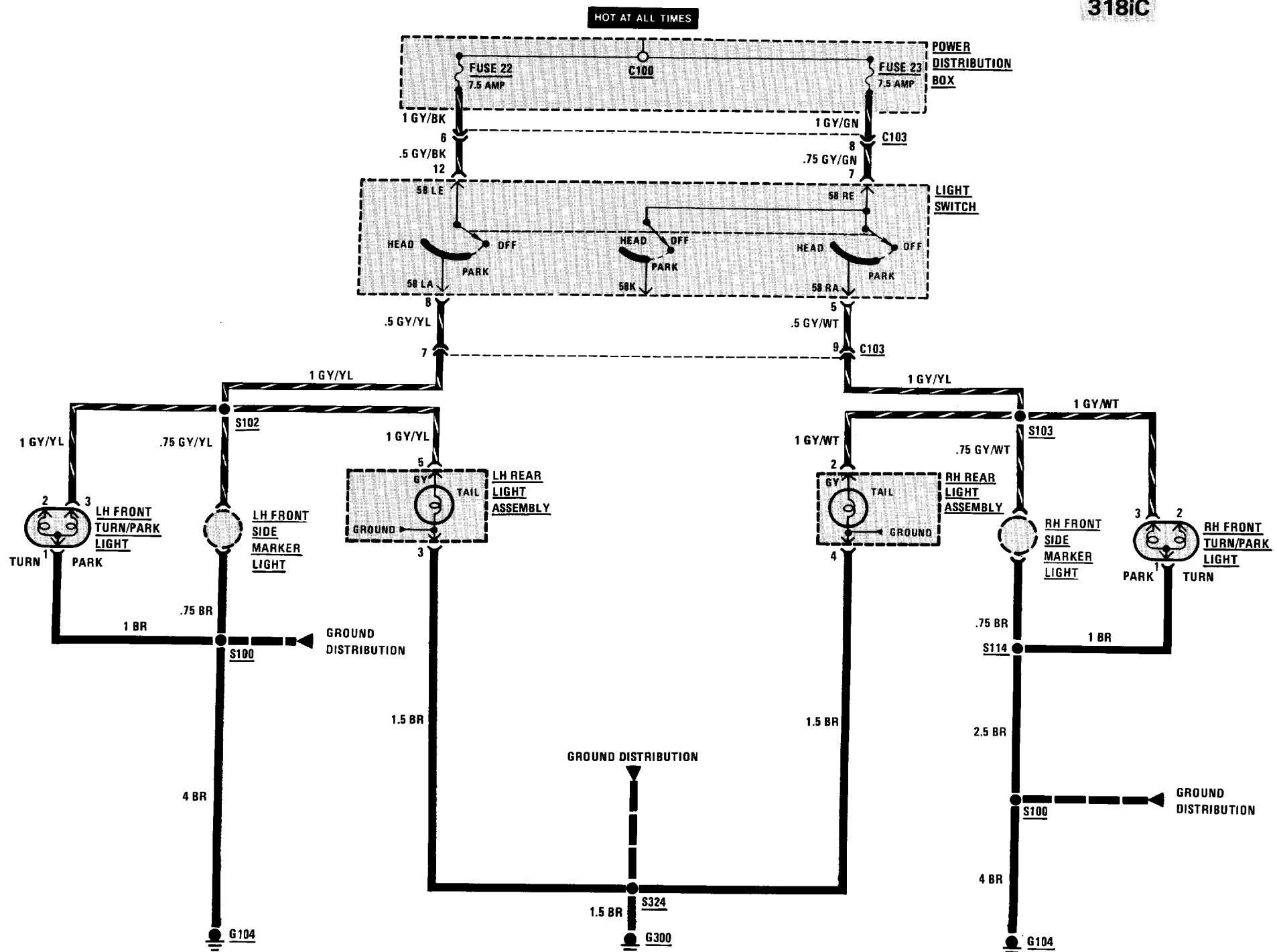
6314-0 PARK/TAIL/FRONT MARKER LIGHTS

318i/is

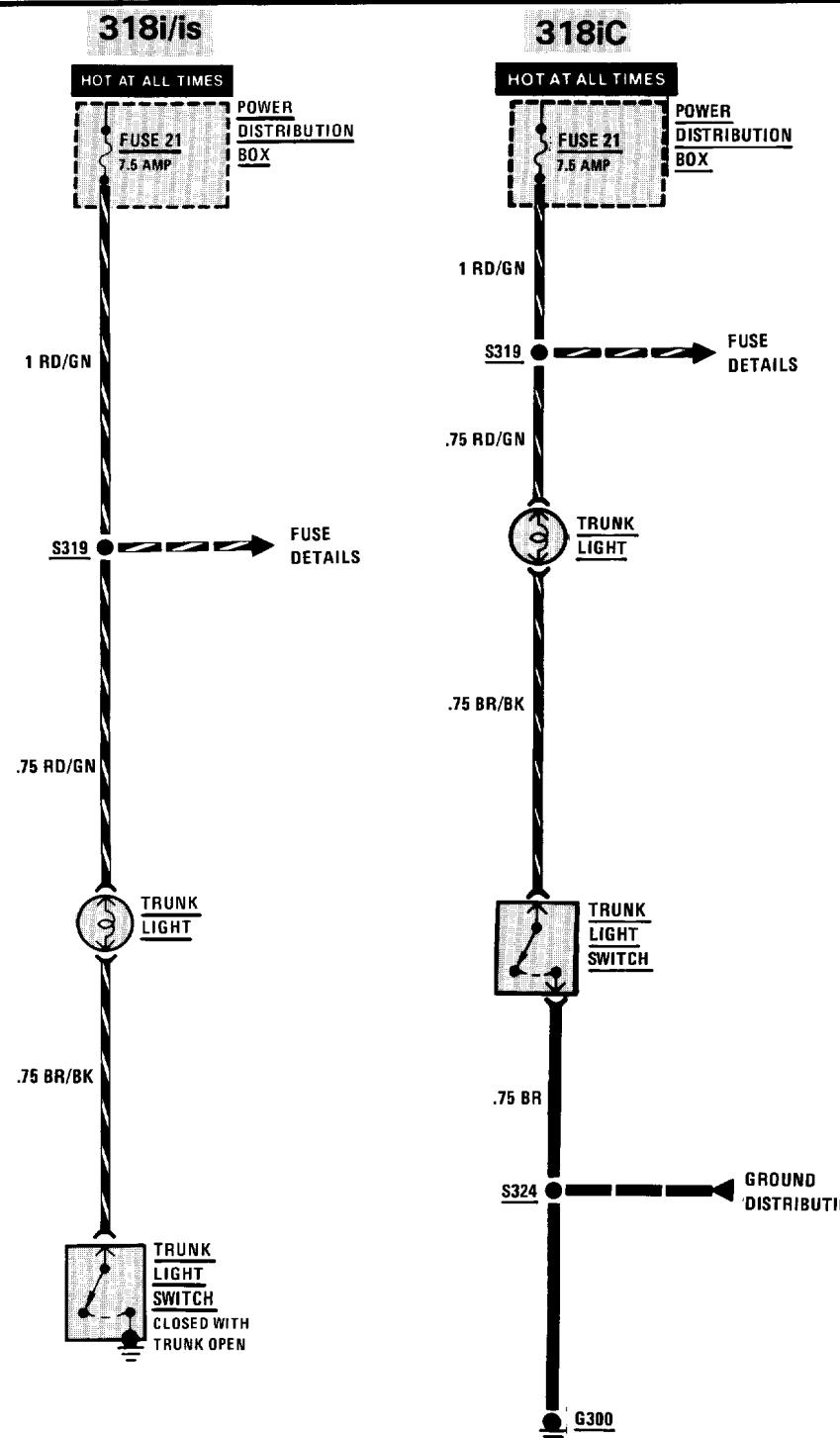
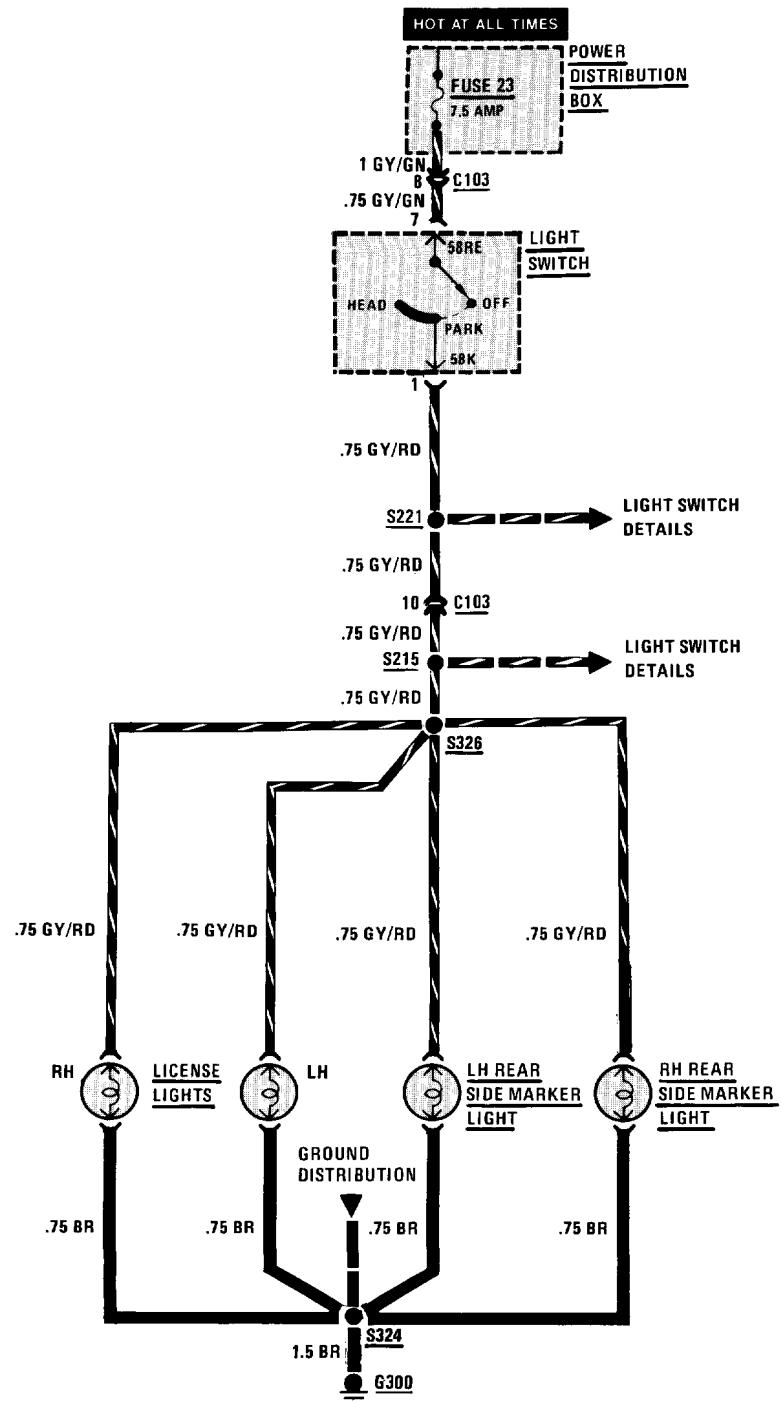


PARK/TAIL/FRONT MARKER LIGHTS 6314-1

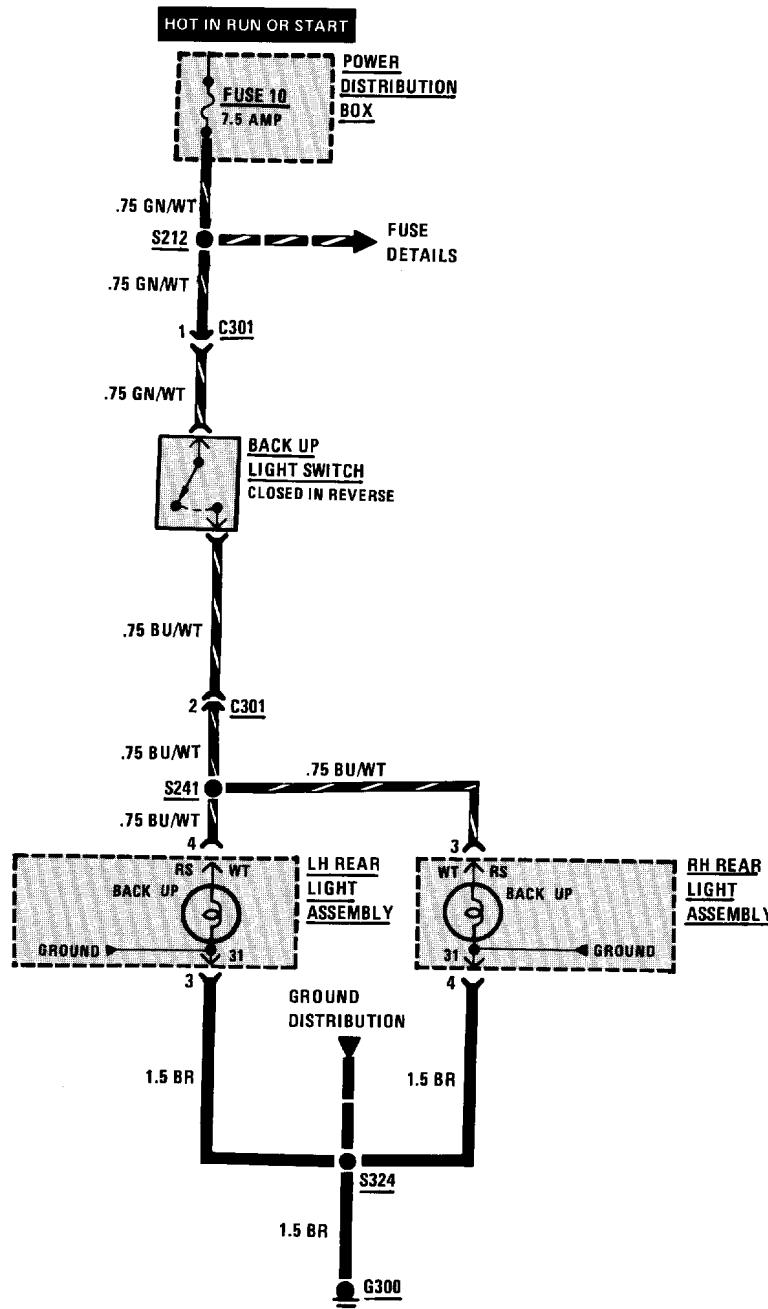
318iC



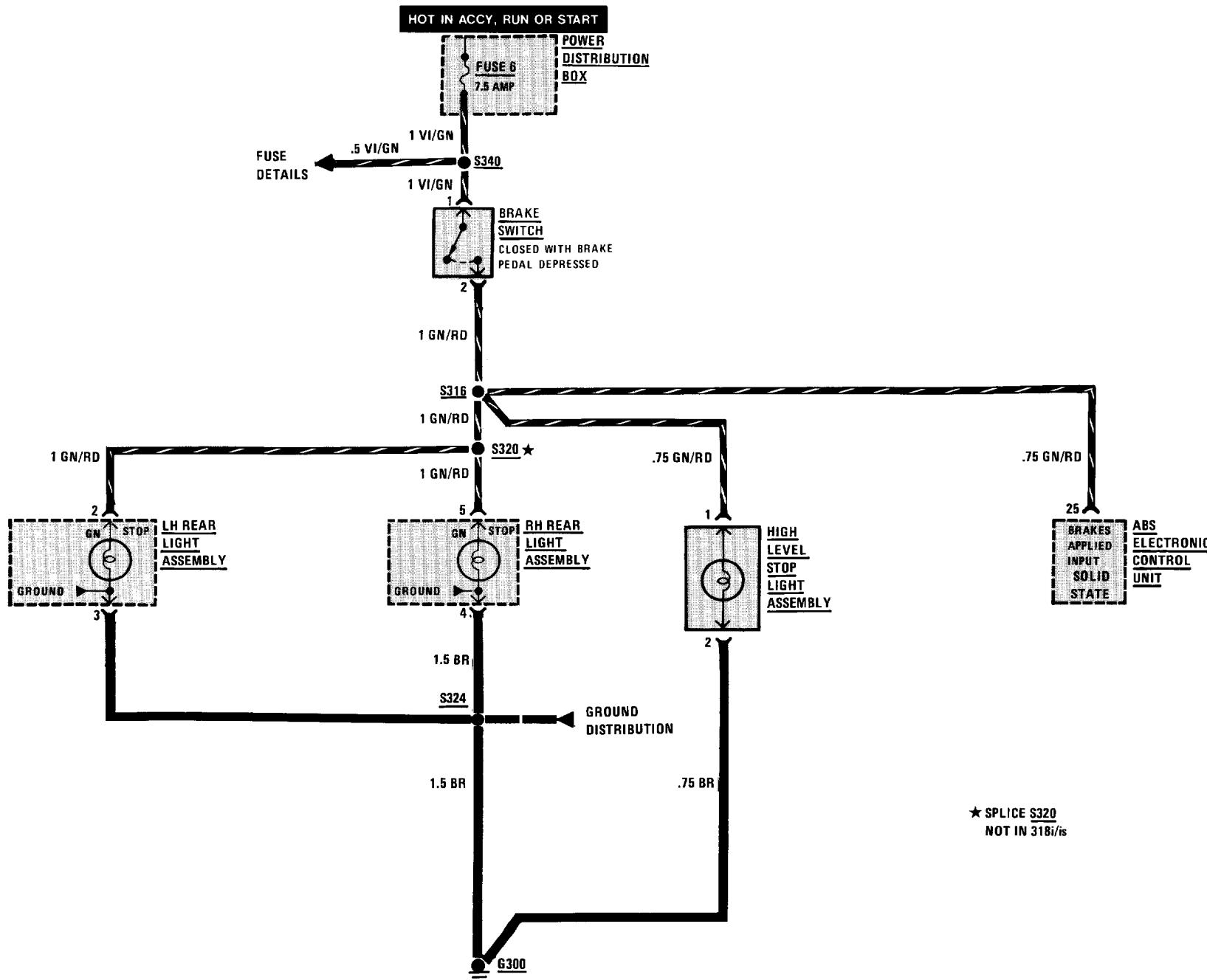
6320-0 REAR MARKER/LICENSE/TRUNK LIGHTS



6322-0 BACK UP LIGHTS

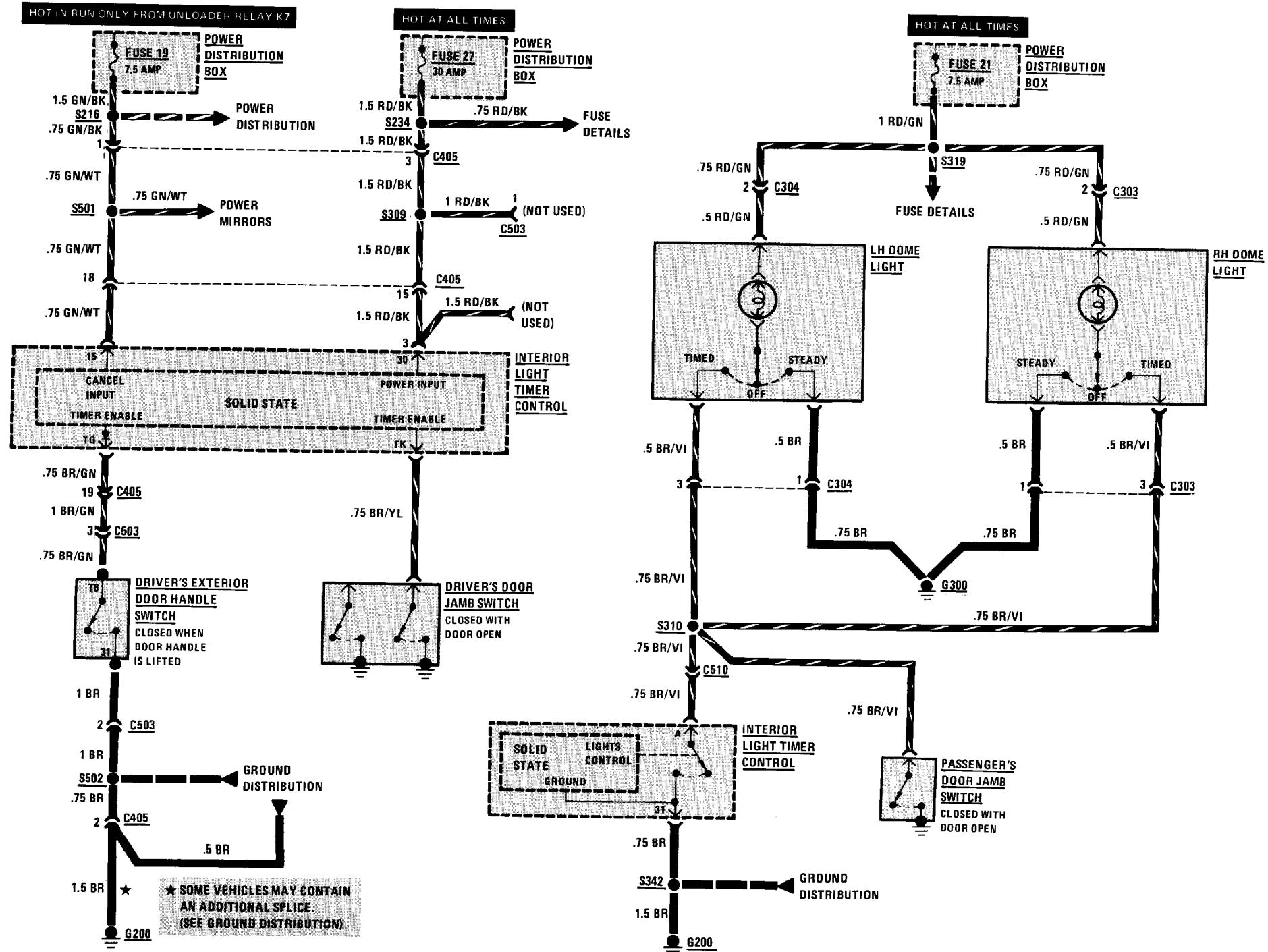


6325-0 STOP LIGHTS

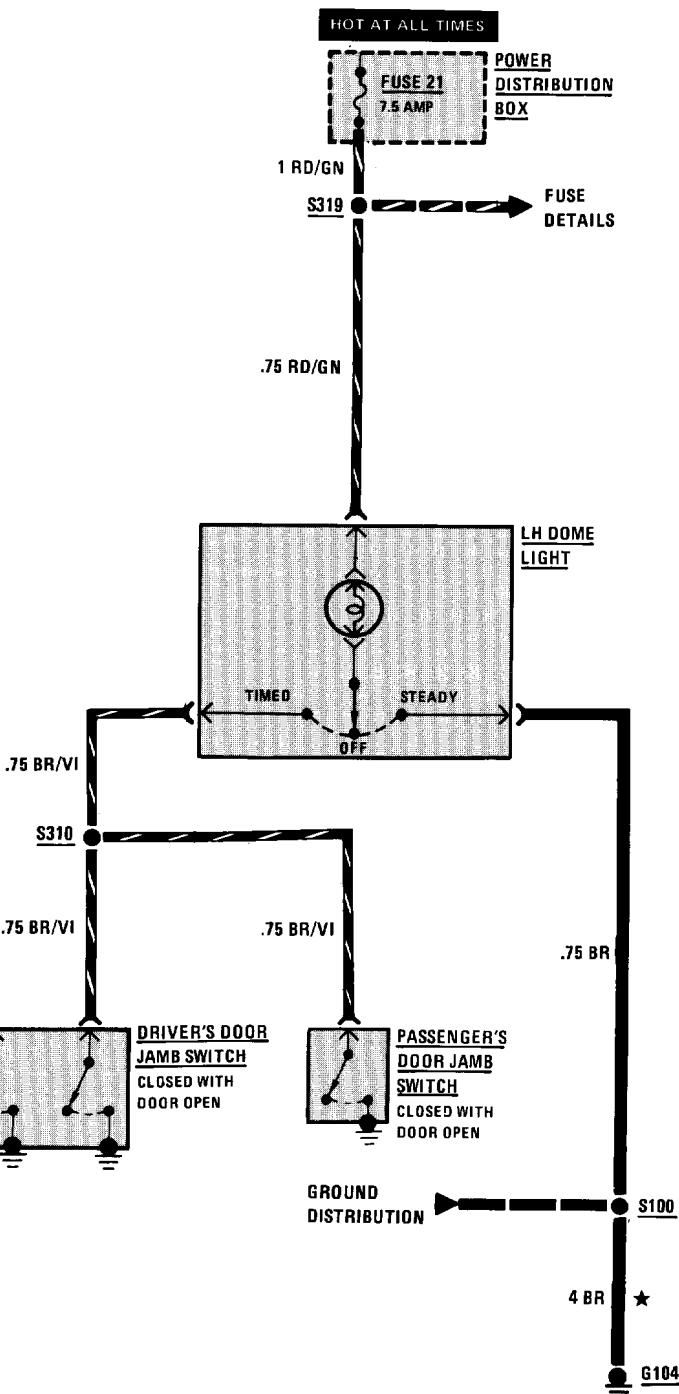


6330-0 INTERIOR LIGHTS

WITH INTERIOR LIGHT TIMER CONTROL

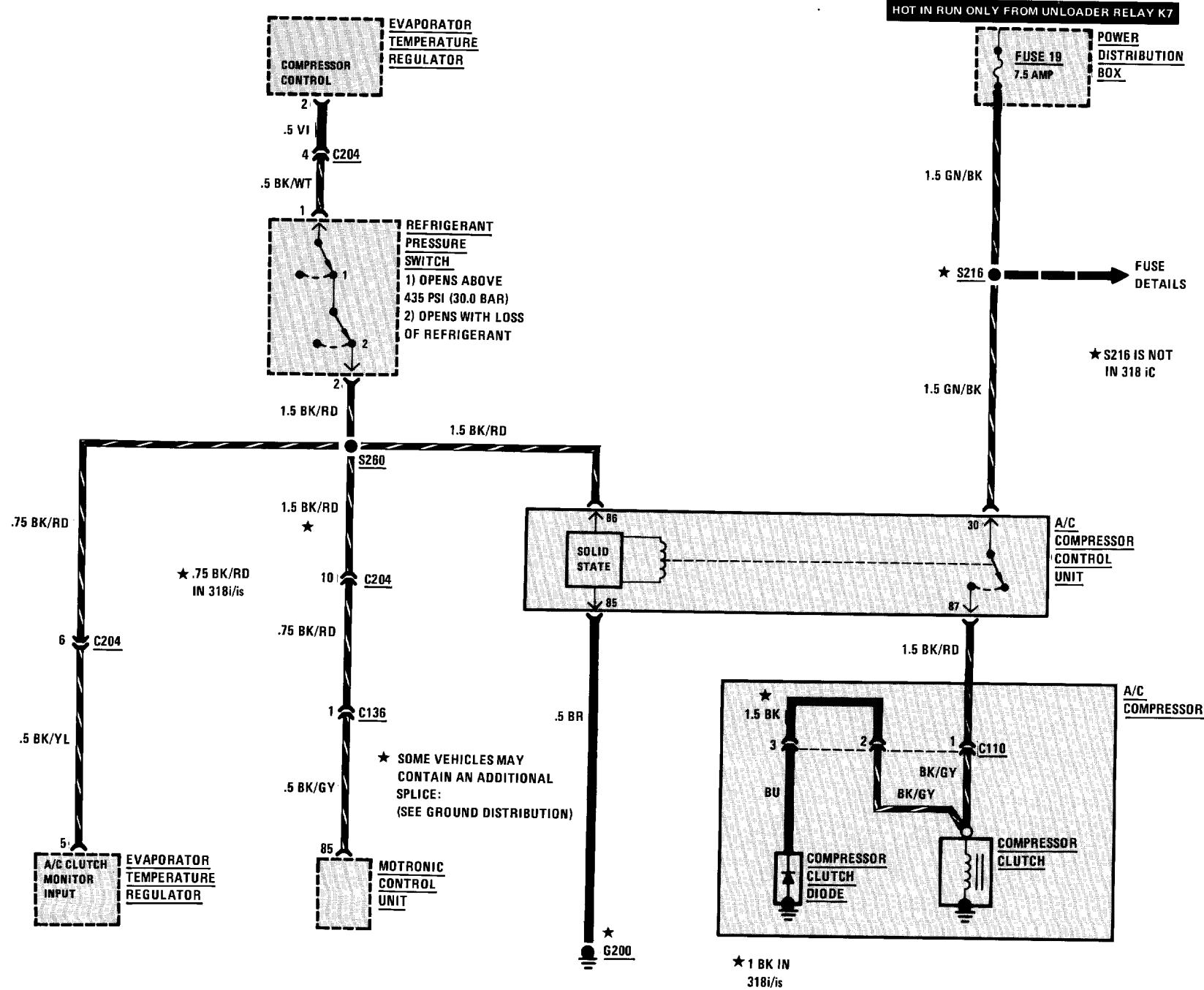


WITHOUT INTERIOR LIGHT TIMER CONTROL

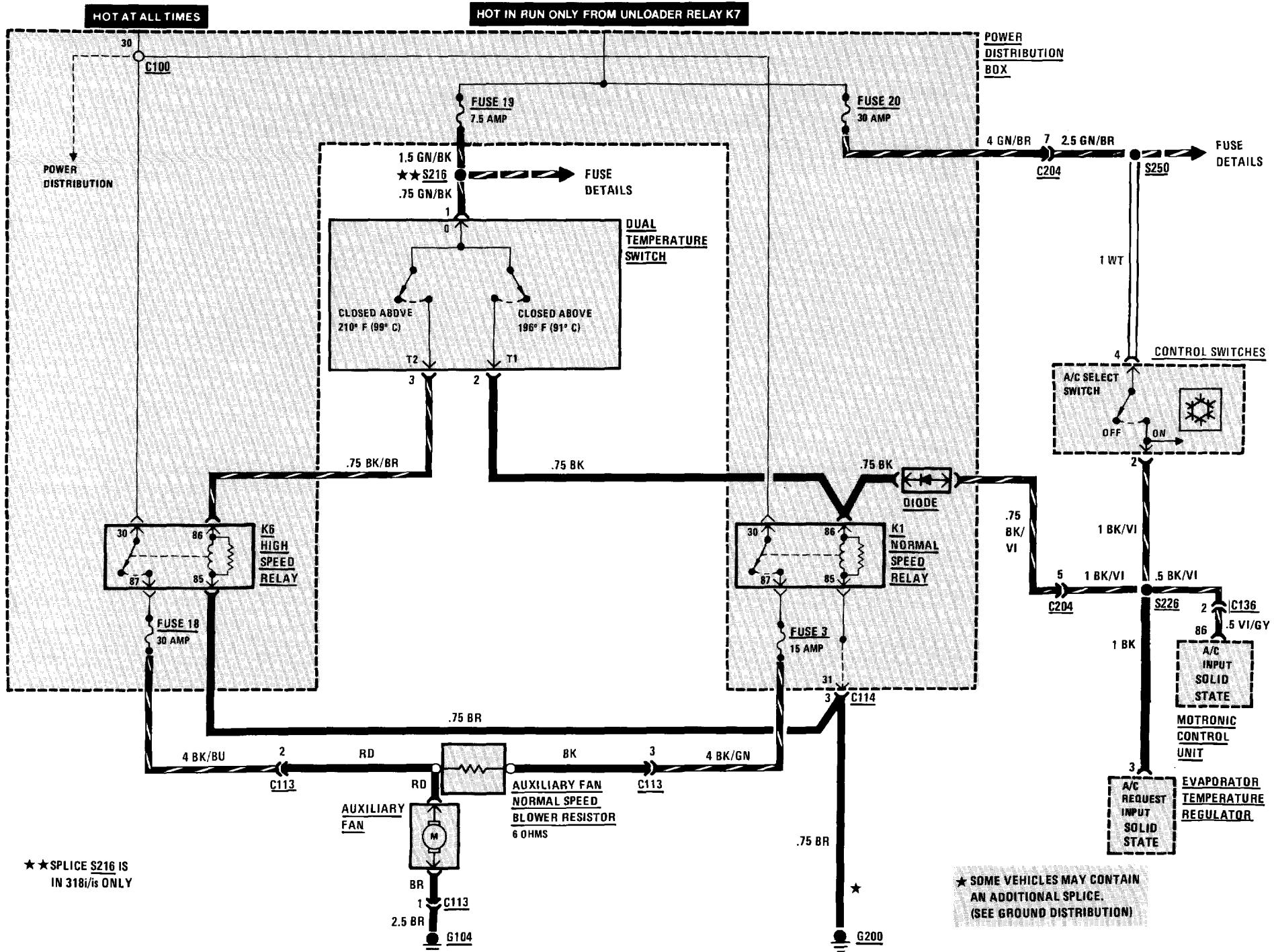


★ SOME VEHICLES MAY CONTAIN
AN ADDITIONAL SPLICING
POINT
(SEE GROUND DISTRIBUTION)

HEATING AND AIR CONDITIONING (COMPRESSOR CONTROLS)



6454-0 AUXILIARY FAN



8000-0 SPLICE LOCATION VIEWS

INDEX

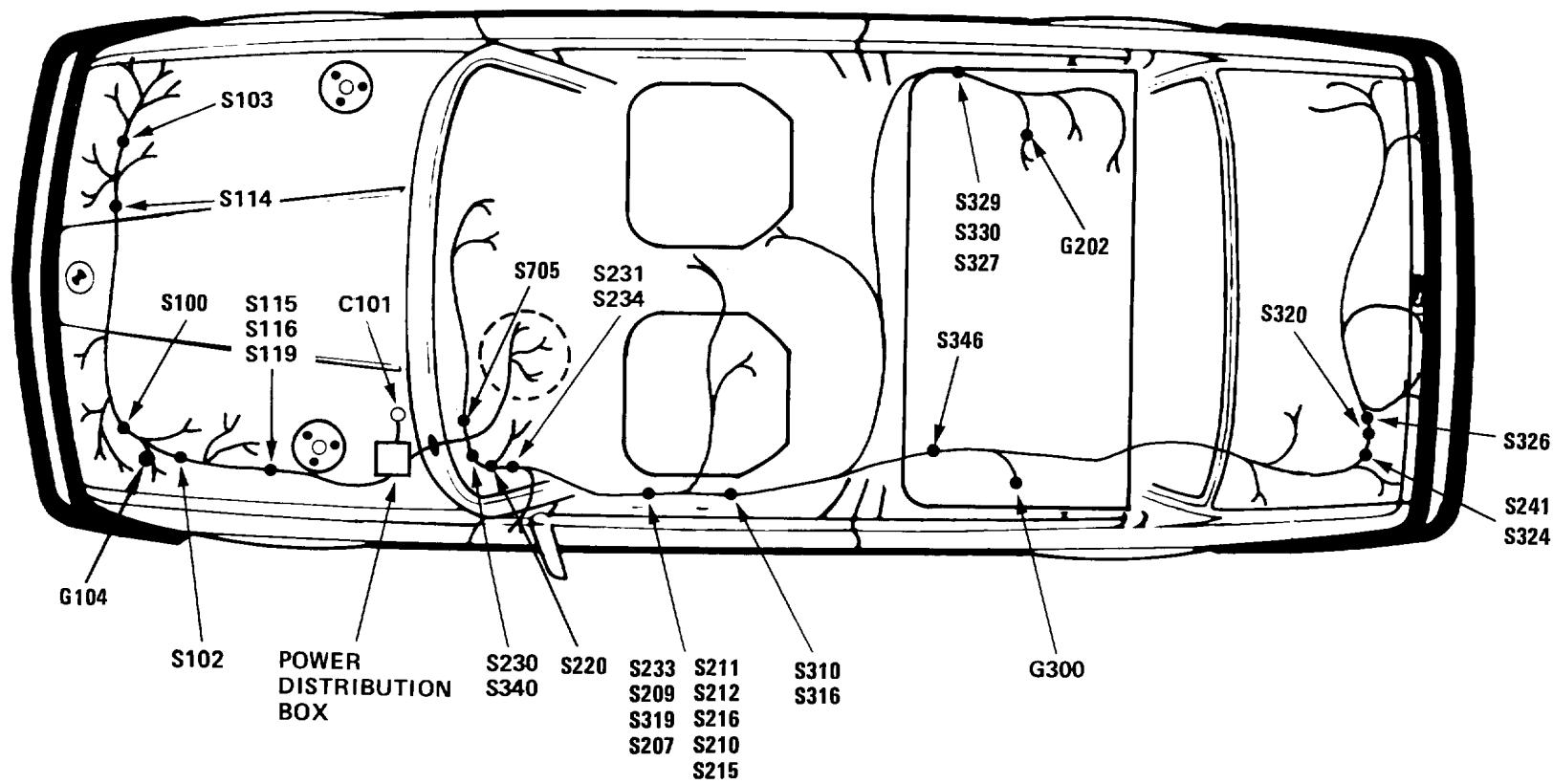
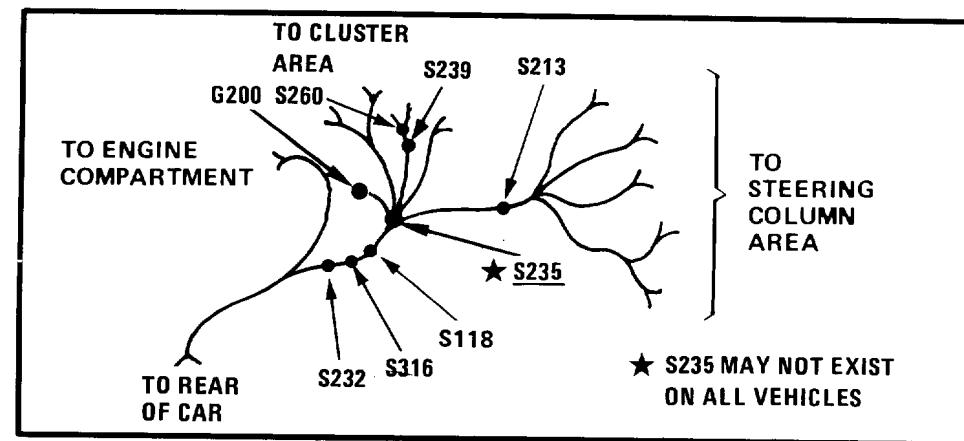
This index lists all the splices in the vehicle, the harness location of each splice, and the page on which each splice appears. The drawings after the index show how the harnesses are routed through the vehicle and the location of the splices on the harnesses.

SPLICE	HARNESS	PAGE NUMBER	SPLICE	HARNESS	PAGE NUMBER
S100	MAIN	8000-2	S219	INSTRUMENT	8000-5
S101	ENGINE	8000-3		PANEL	
S102	MAIN	8000-2	S220	MAIN	8000-2
S103	MAIN	8000-2	S221	INSTRUMENT	8000-5
S104	ENGINE	8000-3		PANEL	
S106	ENGINE	8000-3	S224	MULTI- FUNCTION	NOT SHOWN
S107	ENGINE	8000-3		CLOCK	
S108	ENGINE	8000-3	S225	MULTI- FUNCTION	NOT SHOWN
S110	A/C	NOT SHOWN		CLOCK	
S111	ENGINE	8000-3	S226	A/C	NOT SHOWN
S113	ENGINE	8000-3	S229	A/C	NOT SHOWN
S114	MAIN	8000-2	S230	MAIN	8000-2
S115	MAIN	8000-2	S231	MAIN	8000-2
S116	MAIN	8000-2	S232	MAIN	8000-2
S118	MAIN	8000-2	S233	MAIN	8000-2
S119	MAIN	8000-2	S234	MAIN	8000-2
S120	ENGINE	NOT SHOWN	S235	MAIN	8000-2
S122	ENGINE	NOT SHOWN	S238	MAIN	NOT SHOWN
S123	ENGINE	NOT SHOWN	S239	MAIN	8000-2
S124	ENGINE	NOT SHOWN	S240	A/C	NOT SHOWN
S127	ENGINE	NOT SHOWN	S241	MAIN	8000-2
S128	ENGINE	NOT SHOWN	S250	A/C	NOT SHOWN
S129	ENGINE	NOT SHOWN	S251	A/C	NOT SHOWN
S130	ENGINE	NOT SHOWN	S252	A/C	NOT SHOWN
S133	ENGINE	NOT SHOWN	S260	MAIN	8000-2
S207	MAIN	8000-2	S300	DOOR	8000-4
S209	MAIN	8000-2	S301	DOOR	8000-4
S210	MAIN	8000-2	S302	DOOR	8000-4
S211	MAIN	8000-2	S303	DOOR	8000-4
S212	MAIN	8000-2	S304	DOOR	8000-4
S213	MAIN	8000-2	S305	DOOR	8000-4
S215	MAIN	8000-2			
S216	MAIN	8000-2			

SPLICE	HARNESS	PAGE NUMBER	SPLICE	HARNESS	PAGE NUMBER
S306	INSTRUMENT PANEL	8000-5	S504	DOOR	8000-4
S307	INSTRUMENT PANEL	8000-5	S540	HEATED SEATS	NOT SHOWN
S309	DOOR	8000-4	S541	HEATED SEATS	NOT SHOWN
S310	MAIN	8000-2	S542	HEATED SEATS	NOT SHOWN
S313	RADIO	NOT SHOWN	S543	HEATED SEATS	NOT SHOWN
S316	MAIN	8000-2	S700	ENGINE	8000-3
S319	MAIN	8000-2	S701	ENGINE	8000-3
S320	MAIN	8000-2	S705	MAIN	8000-2
S322	DOOR	8000-4			
S323	DOOR	8000-4			
S324	MAIN	8000-2			
S326	MAIN	8000-2			
S327	MAIN	8000-2			
S329	MAIN	8000-2			
S330	MAIN	8000-2			
S332	DOOR	8000-4			
S333	DOOR	8000-4			
S340	MAIN	8000-2			
S341	MAIN	8000-2			
S342	DOOR	8000-4			
S345	RADIO	NOT SHOWN			
S346	MAIN	8000-2			
S400	RADIO	NOT SHOWN			
S402	DOOR	8000-4			
S403	RADIO	NOT SHOWN			
S404	RADIO	NOT SHOWN			
S420	RADIO	NOT SHOWN			
S501	DOOR	8000-4			
S502	DOOR	8000-4			
S503	DOOR	8000-4			

8000-2 SPLICE LOCATION VIEWS

MAIN HARNESS SPLICE LOCATIONS



ACCESSORY CONNECTOR

CIRCUITS USING C302 (ACCESSORY CONNECTOR)

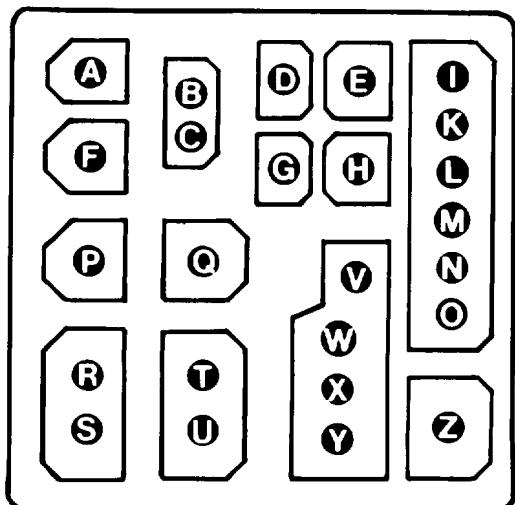


Figure 1-C302 (Accessory Connector)
Front View—Under LH Side
of Dash Ahead of Pedal Assembly

TERMINAL	CIRCUIT	TERMINAL	CIRCUIT
A	Not Used	N	Not Used
B	Not Used	O	Not Used
C	Anti-Lock Braking 318is	P	Not Used
D	Central Lock 318is	Q	Power Windows
E	Not Used	R	Sunroof 318i/is
F	Not Used	S	Anti-Lock Braking
G	Anti-Lock Braking 318is	T	318i/is
H	Radio/Amplifier On Board Computer Multifunction Clock 318i/is	U	Cruise Control 318i/is
I	Not Used	V	Not Used
K	Not Used	W	Heated Seats
L	Not Used	X	Radio
M	Not Used	Y	Radio
		Z	Radio/Ground Power Antenna