



1985

BMW 735i

Electrical

Troubleshooting

Manual

BMW of North America, Inc.
Montvale, New Jersey

FOREWORD

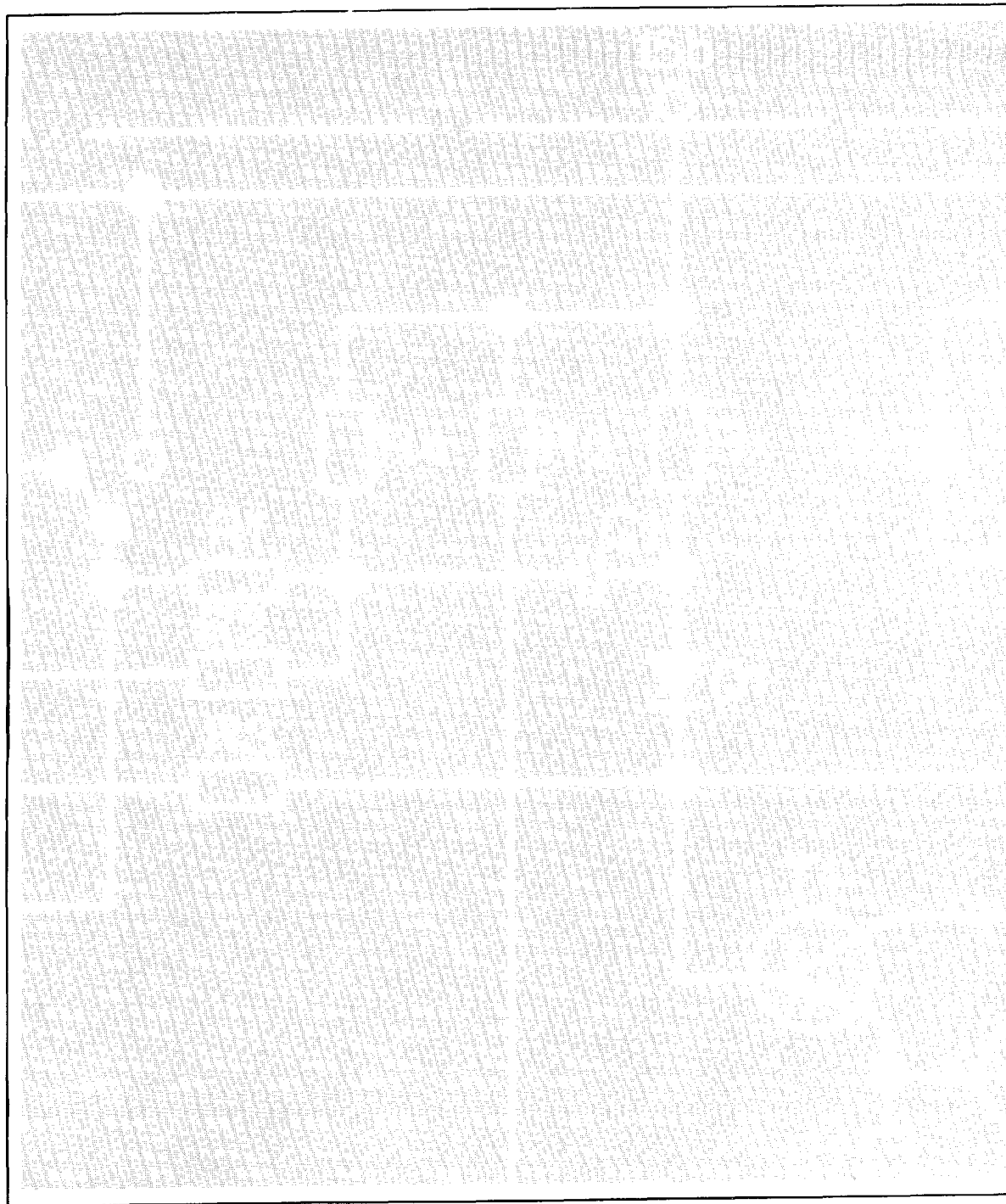
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CONTENTS

Index	2
How To Use This Manual	3
Symbols	4
Wire Size Conversion Chart	5
Systematic Troubleshooting	6
Diagnostic Connector	101
Power Distribution Box	102
Fuse Data	103
Schematic Diagrams	104
Component Charts and Figures	201

Index — Alphabetical Listing of Electrical Circuits

	PAGE		PAGE		PAGE
Active Check Control	131	Heating		— Fog	136
Anti Lock Braking System	158	— Blower Control	166	— Front Park	140
Air Conditioning		— Compressor Control	164	— Glove Box	148
— Blower Control	166	— Solenoid Valves	170	— Hazard Warning	138
— Compressor Control	164	— Temperature Control	174	— Headlights	136
— Solenoid Valves	170	Horn	149	— Interior	135
— Temperature Control	174	Idle Speed Control	120	— License	141
Auto Charging Flash Light	148	Ignition	123	— Rear Marker	141
Auxiliary Fan	163	Ignition Key Warning	129	— Stop Light	142
Brake Lining Warning	134	Indicators		— Tail	140
Central Locking	152	— Active Check Control Alarm	127	— Transmission Range	144
Charging System	117	— “Brake Lights” Fault	132	— Turn	138
Cigar Lighter	148	— “Brake Lining” Wear	134	— Trunk	141
Connectors		— “Brake Warning”	128	— Underhood	140
— Accessory	103	— “Charge” Indicator	126	— Visor	144
— Diagnostic	101	— “Coolant” Level Fault	133	Light Switch Details	114
Cruise Control	142	— “Engine Oil” Fault	133	On-Board Computer	124
Engine Block Diagram	115	— Fasten Seatbelts	133	Power Antenna	155
Fuel Control	120	— Fog Lights	128	Power Distribution	104
Fuse Data	102A	— High Beam	128	Power Distribution Box	102
Fuel Delivery	120	— Inspection	130	Power Mirrors	154
Fuel Gauge	127	— LH Turn	128	Power Seats	156
Fuse Details		— “License Plate” Fault	132	Power Windows	150
— Fuse 6	111	— “Low Beam” Fault	131	Radio	155
— Fuse 9	110	— Low Fuel Warning	127	Rear Defogger	161
— Fuse 12	111	— Oil Pressure Warning	127	Service Interval Indicator	130
— Fuse 16	110	— Oil Service	130	Speedometer	126
— Fuse 17	109	— “Park Brake”	127	Start	
— Fuse 21	113	— “Rear Lights” Fault	132	— Automatic	118
— Fuse 22	114	— RH Turn	128	— Manual	119
— Fuse 23	114	— Temperature	127	Splice Location Index	181
— Fuse 26	112	— “Washer Fluid” Fault	133	Sunroof	161
— Fuse 27	112	Lights		Vacuum Pump	163
— Fuse 28	112	— Backup	147	Warning Indicators	126
Gauges	126	— Center Console	146	Windsheild Washer Jet Heaters	162
Ground Distribution	176	— Dash	144	Wiper/Washer	160
Heated Door Locks	149				

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.

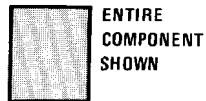
The power distribution schematic shows the current feed through all the connections from the Battery and Alternator to each fuse and the Ignition and Light Switches. If the Power Distribution schematic is combined with any other circuit schematic, a complete picture is made of how that circuit works.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

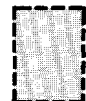
WIRE SIZE CONVERSION CHART	
METRIC (CROSSSECTIONAL AREA IN MM ²)	AWG (AMERICAN WIRE GAUGE)
.5	20
.75	18
1	16
1.5	14
2	14
2.5	12
4	10
6	8
8	8
16	4
20	4
25	2
32	2

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

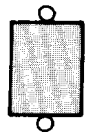
4 SYMBOLS



ENTIRE COMPONENT SHOWN



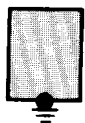
PART OF A COMPONENT SHOWN



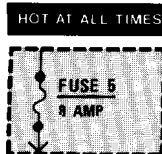
COMPONENT WITH SCREW TERMINALS



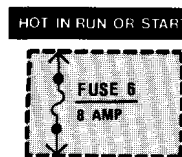
SOLID STATE (INCLUDES ONLY ELECTRONIC PARTS)



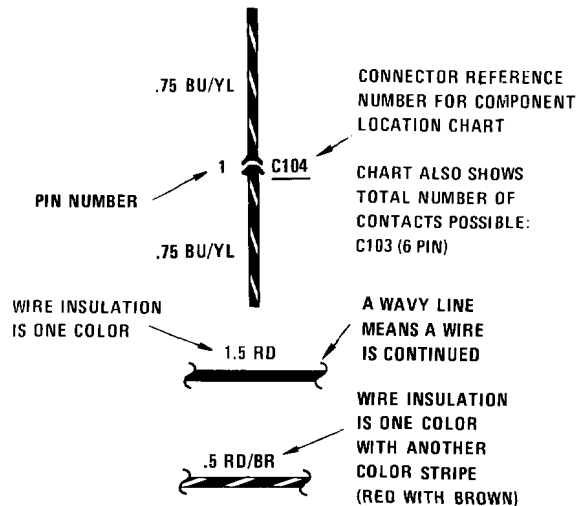
COMPONENT CASE IS DIRECTLY ATTACHED TO METAL PART OF CAR (GROUNDED)



INDICATES THAT FUSE 5 IS ALWAYS SUPPLIED WITH POWER



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



CONNECTOR REFERENCE NUMBER FOR COMPONENT LOCATION CHART

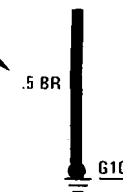
CHART ALSO SHOWS TOTAL NUMBER OF CONTACTS POSSIBLE: C103 (6 PIN)

WIRE INSULATION IS ONE COLOR

A WAVY LINE MEANS A WIRE IS CONTINUED

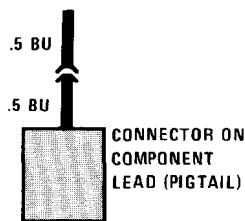
WIRE INSULATION IS ONE COLOR WITH ANOTHER COLOR STRIPE (RED WITH BROWN)

WIRE SIZE IN MM²

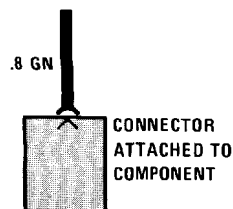


WIRE IS ATTACHED TO METAL PART OF CAR (GROUNDED) GROUND IS NUMBERED FOR REFERENCE ON COMPONENT LOCATION CHART

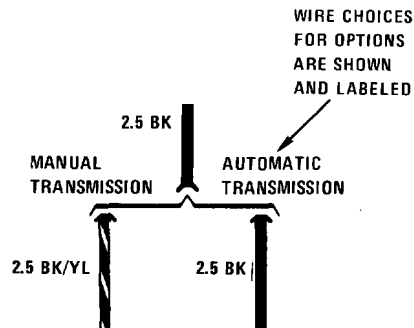
OTHER CIRCUITS THAT SHARE A GROUND ARE SHOWN IN GROUND DISTRIBUTION



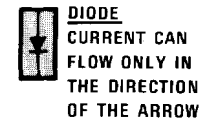
CONNECTOR ON COMPONENT LEAD (PIGTAIL)



CONNECTOR ATTACHED TO COMPONENT



WIRE CHOICES FOR OPTIONS ARE SHOWN AND LABELED

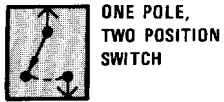


DIODE CURRENT CAN FLOW ONLY IN THE DIRECTION OF THE ARROW

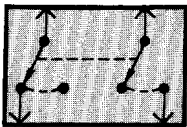
CIRCUIT REFERENCE - A WIRE WHICH CONNECTS TO ANOTHER CIRCUIT



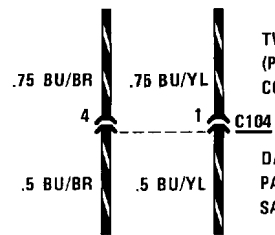
ACTIVE CHECK CONTROL



ONE POLE,
TWO POSITION
SWITCH

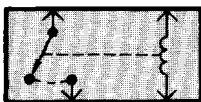


SWITCHES THAT
MOVE TOGETHER
DASHED LINE SHOWS
A MECHANICAL
CONNECTION
BETWEEN SWITCHES



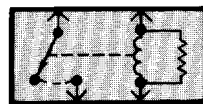
TWO CONNECTIONS
(PINS) IN THE SAME
CONNECTOR

DASHED LINE SHOWS
PARTS OF THE
SAME CONNECTOR



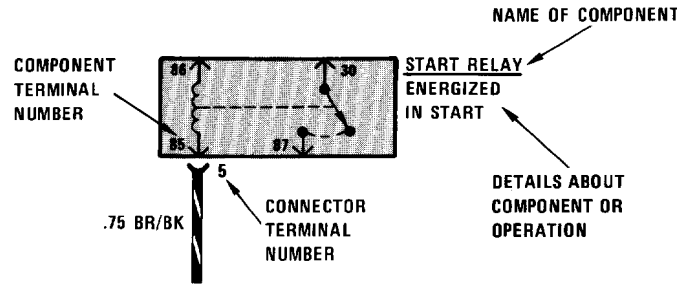
RELAY SHOWN
WITH NO
CURRENT
FLOWING
THROUGH
COIL

WHEN COIL IS
ENERGIZED,
SWITCH
IS PULLED CLOSED



RELAY SHOWN
WITH RESISTOR
ACROSS COIL

RESISTOR ACROSS COIL
IS FOR NOISE
SUPPRESSION



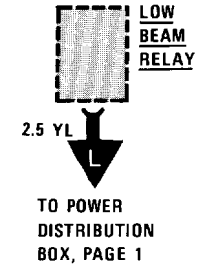
COMPONENT
TERMINAL
NUMBER

.75 BR/BK
CONNECTOR
TERMINAL
NUMBER

START RELAY
ENERGIZED
IN START

NAME OF COMPONENT

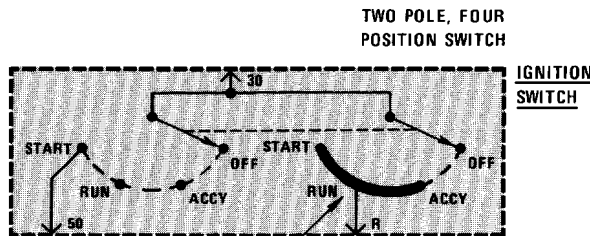
DETAILS ABOUT
COMPONENT OR
OPERATION



LOW
BEAM
RELAY

2.5 YL
TO POWER
DISTRIBUTION
BOX, PAGE 1

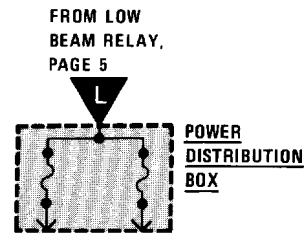
CURRENT PATH
IS CONTINUED
AS LABELED.
THE ARROW SHOWS
DIRECTION OF CURRENT
FLOW AND IS REPEATED
WHERE CURRENT
PATH CONTINUES.



TWO POLE, FOUR
POSITION SWITCH

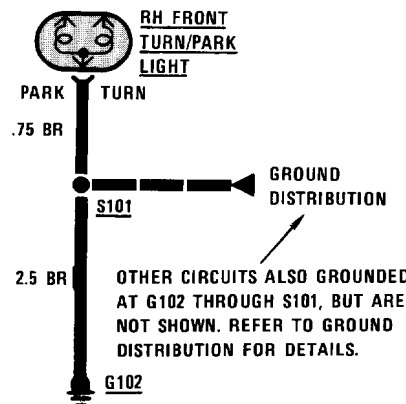
IGNITION
SWITCH

"R" IS ENERGIZED
IN ACCY, RUN OR START



FROM LOW
BEAM RELAY,
PAGE 5

POWER
DISTRIBUTION
BOX



.75 BR

2.5 BR

G102

OTHER CIRCUITS ALSO GROUNDED
AT G102 THROUGH S101, BUT ARE
NOT SHOWN. REFER TO GROUND
DISTRIBUTION FOR DETAILS.



LIGHT
EMITTING
DIODE

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

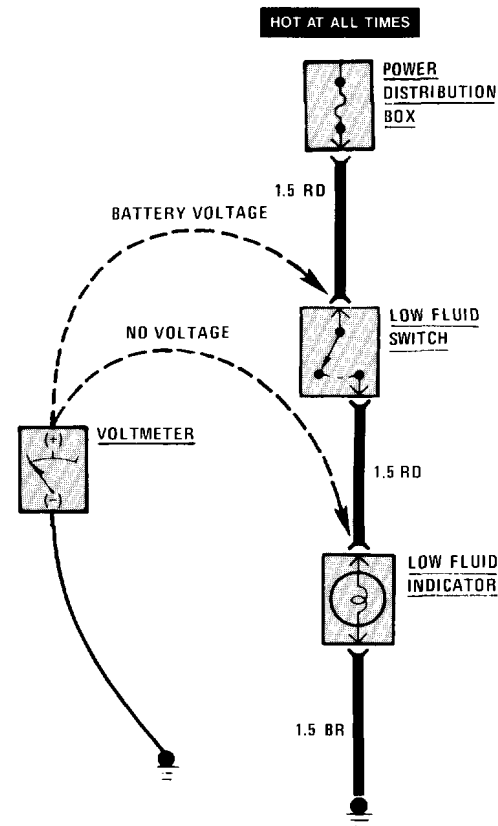
Isolating the problem (Step 3 of TROUBLESHOOTING PROCEDURES) requires the use of a **voltmeter** and/or **ohmmeter**. A voltmeter measures voltage at selected points in a circuit. An ohmmeter measures a circuit's resistance to current flow. It has an internal battery that provides current to the circuit 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.

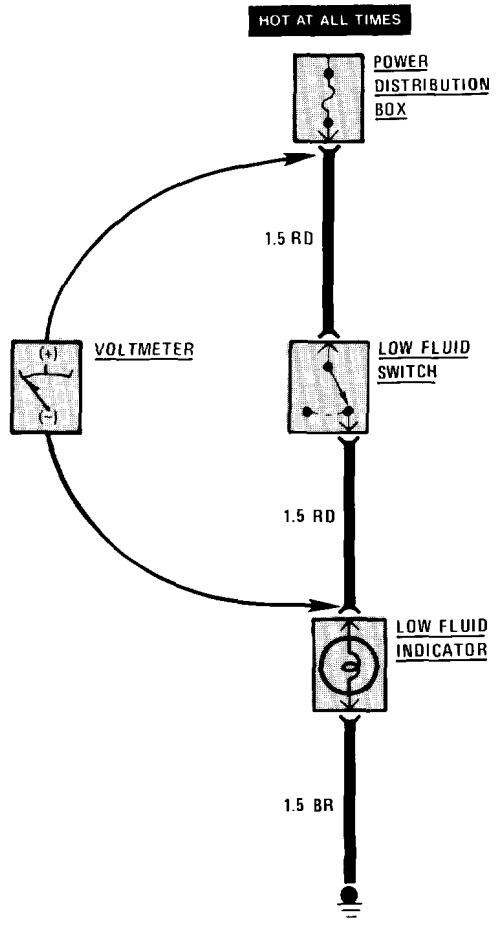


Voltage Test

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.

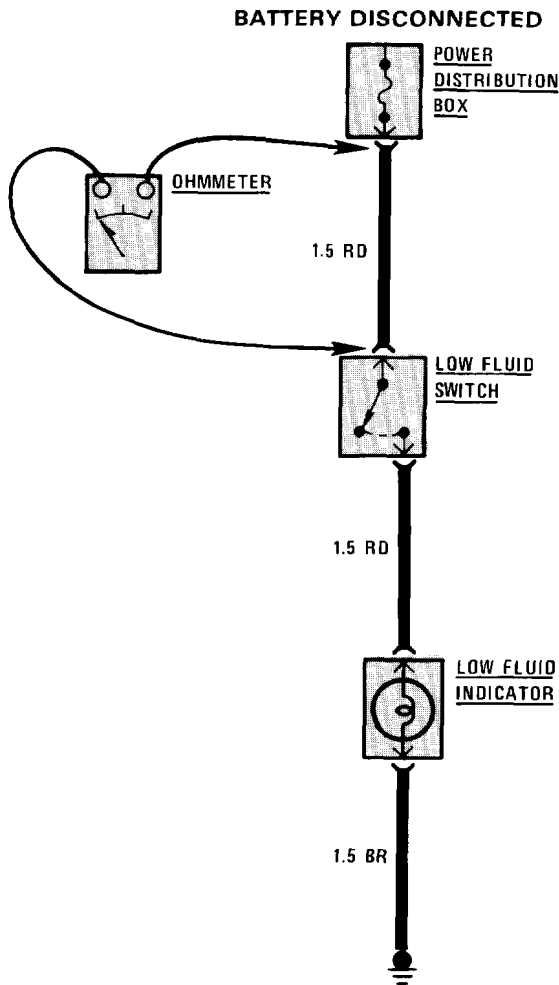
To test for voltage drop, connect the voltmeter leads to connectors at either end of the circuit's suspected problem area. The positive lead should be connected to the connector closest to the power source. The voltmeter will show the voltage drop between these two points.



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.

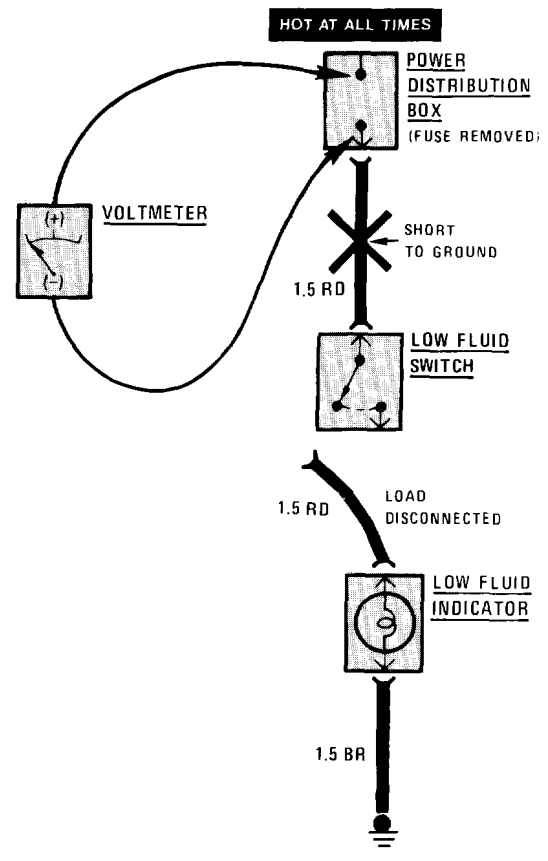


Continuity Test

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.

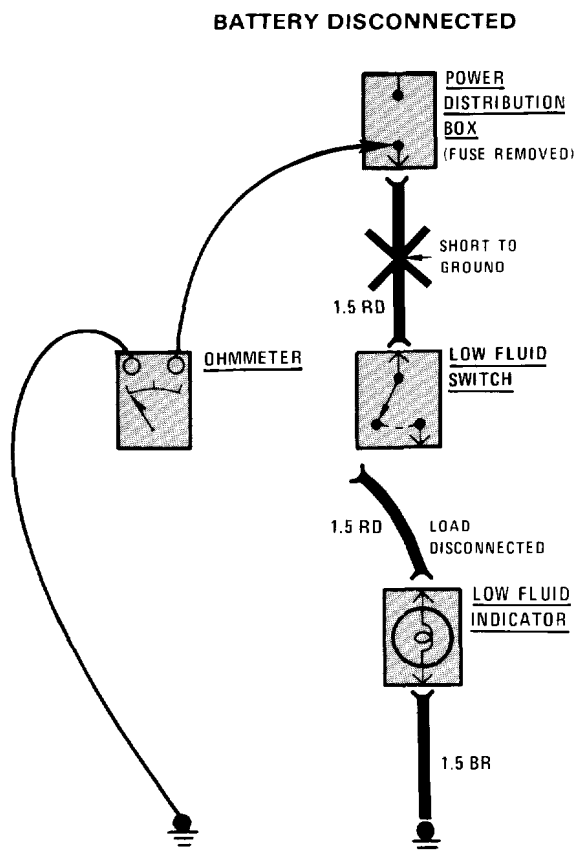


Short Test Using Voltmeter

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