



1982

BMW 733i

Electrical

Troubleshooting

Manual

BMW of North America, Inc.
Montvale, New Jersey

FOREWORD

In the interests of continuing technical development work we reserve the right to modify designs and equipment.

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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

	SCHEMATIC PAGE	COMPONENT LOCATION PAGE		SCHEMATIC PAGE	COMPONENT LOCATION PAGE
Active Check Control	121	201	—Front Park.....	130	207
Air Conditioning	147	201	—Glove Box.....	137	203
Auto-Charging Flashlight.....	137	203	—Hazard Warning	128	208
Automatic Heater-Air Conditioner.	147	201	—Head.....	126	205
Auxiliary Fan	146	202	—Interior.....	125	207
Brake Lining Warning.....	124	202	—License	131	208
Central Locking	142	203	—Rear Marker.....	131	208
Charging System	108	203	—Stop.....	132	212
Cigar Lighter	137	203	—Tail	130	207
Cruise Control.....	132	212	—Turn	128	208
Diagnostic Connector.....	101		—Transmission Range	136	207
Evaporative Control.....	110	204	—Trunk	131	208
Fuel Control.....	111	204	—Underhood	130	207
Fuel Delivery	110	204	On-Board Computer	116	208
Fuel Gauge.....	119	211	Power Antenna	145	210
Fuse Data	103		Power Distribution.....	104	209
Gauges	118	211	Power Distribution Box	102	
Ground Distribution	152		Power Mirrors	144	210
Heater	147	201	Power Windows	140	210
Heated Door Lock	138	205	Radio	145	210
Horn.....	138	205	Rear Defogger.....	139	211
Idle Speed Control.....	112	206	Seatbelt Warning	115	207
Ignition	113	206	Speedometer	118	211
Ignition Key Warning	115	207	Start	109	211
Lights			Sunroof	139	211
—Backup	136	207	Vacuum Pump.....	146	202
—Dash.....	134	204	Warning Indicators	118	211
—Fog	126	205	Wiper-Washer	114	212

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.

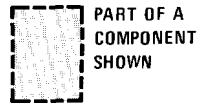
WIRE SIZE CONVERSION CHART	
METRIC (CROSSSECTIONAL AREA IN MM ²)	AWG (AMERICAN WIRE GAUGE)
.5	20
.75	18
1	16
1.5	14
2	14
2.5	12
4	10
6	8
8	8
16	4
20	4
25	2
32	2

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

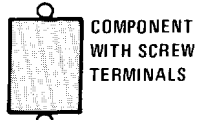
4 SYMBOLS



ENTIRE COMPONENT SHOWN



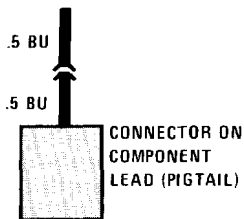
PART OF A COMPONENT SHOWN



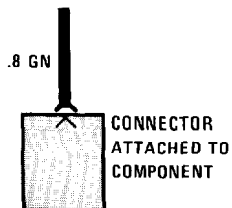
COMPONENT WITH SCREW TERMINALS



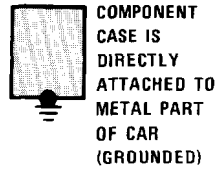
SOLID STATE (INCLUDES ONLY ELECTRONIC PARTS)



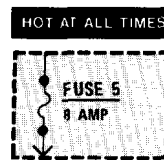
CONNECTOR ON COMPONENT LEAD (PIGTAIL)



CONNECTOR ATTACHED TO COMPONENT

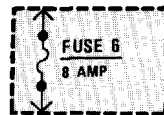


COMPONENT CASE IS DIRECTLY ATTACHED TO METAL PART OF CAR (GROUNDED)



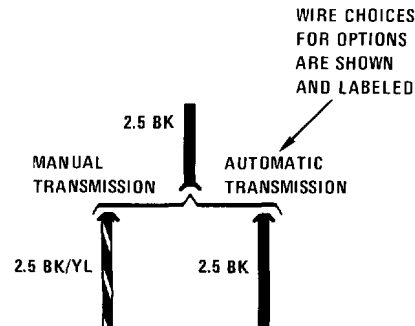
HOT AT ALL TIMES

INDICATES THAT FUSE 5 IS ALWAYS SUPPLIED WITH POWER

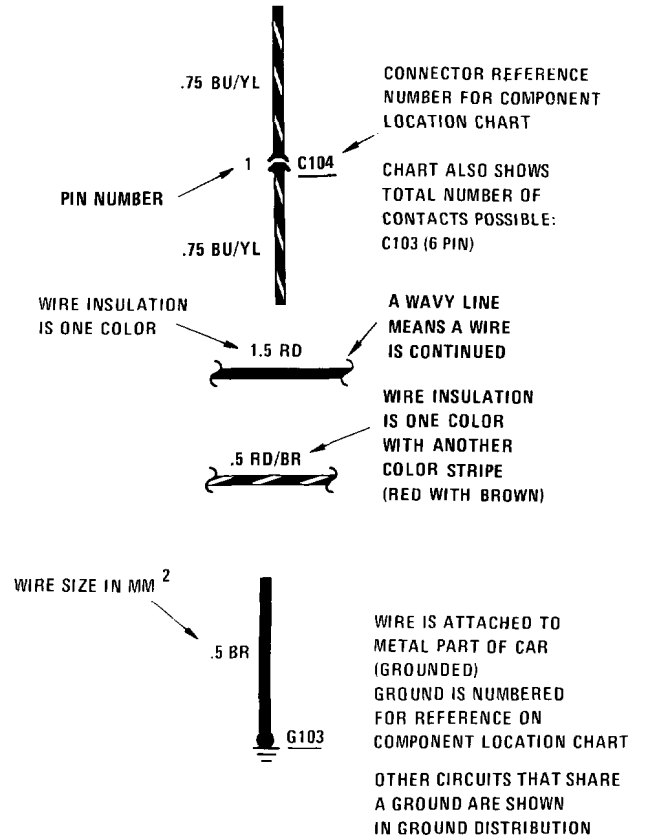


HOT IN RUN OR START

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



WIRE CHOICES FOR OPTIONS ARE SHOWN AND LABELED



PIN NUMBER

CONNECTOR REFERENCE NUMBER FOR COMPONENT LOCATION CHART

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

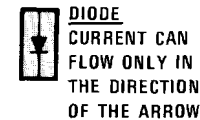
WIRE INSULATION IS ONE COLOR

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

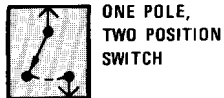


DIODE CURRENT CAN FLOW ONLY IN THE DIRECTION OF THE ARROW

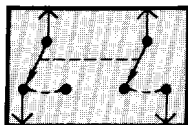
CIRCUIT REFERENCE -- A WIRE WHICH CONNECTS TO ANOTHER CIRCUIT



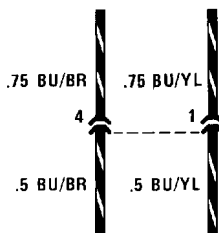
ACTIVE CHECK CONTROL



ONE POLE, TWO POSITION SWITCH



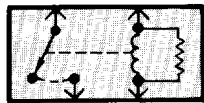
SWITCHES THAT MOVE TOGETHER
DASHED LINE SHOWS A MECHANICAL CONNECTION BETWEEN SWITCHES



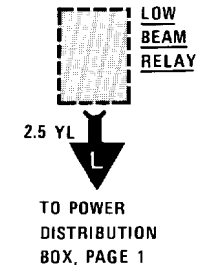
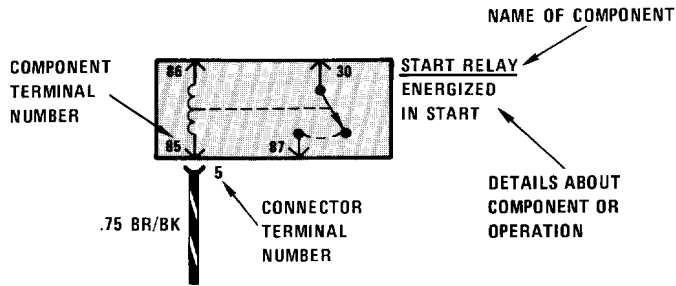
TWO CONNECTIONS (PINS) IN THE SAME CONNECTOR
DASHED LINE SHOWS PARTS OF THE SAME CONNECTOR



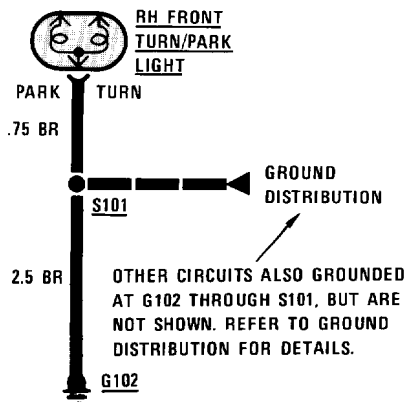
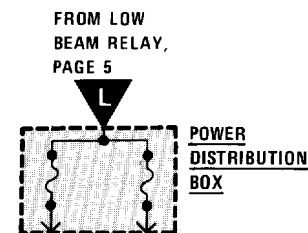
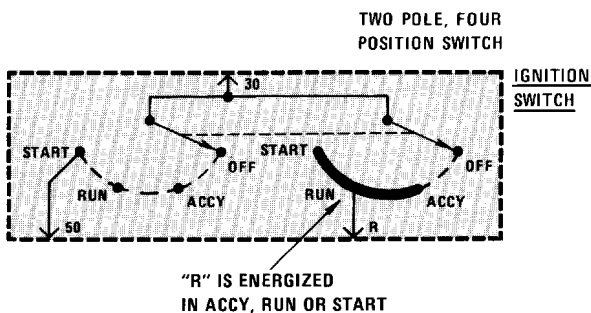
RELAY SHOWN WITH NO CURRENT FLOWING THROUGH COIL
WHEN COIL IS ENERGIZED, SWITCH IS PULLED CLOSED



RELAY SHOWN WITH RESISTOR ACROSS COIL
RESISTOR ACROSS COIL IS FOR NOISE SUPPRESSION



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



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

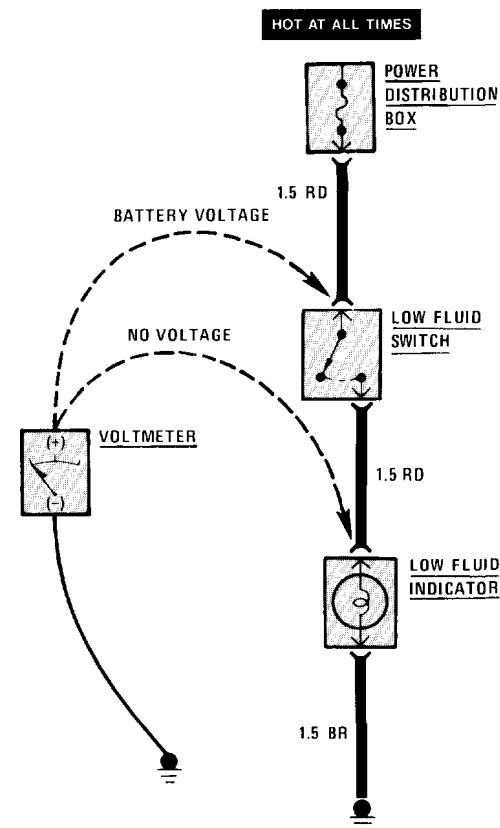
Isolating the problem (Step 3 of TROUBLESHOOTING PROCEDURES) requires the use of a **voltmeter** and/or **ohmmeter**. A voltmeter measures voltage at selected points in a circuit. An ohmmeter measures a circuit's resistance to current flow. It has an internal battery that provides current to the circuit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