

93/94
BMW 740i/L/750iL (E32)
Electrical
Troubleshooting
Manual
Vehicles Produced 9/92 - 7/94

CONTENTS

Index	0100-00
Introduction	0110-00
Systematic Troubleshooting	0130-00
Symbols	0140-00
Power Distribution Chart.	0660-00
Fuse Chart	0661-00
Power Distribution	0670-00
Fuse Details.	0671-00
Ground Distribution	0672-00
Component Location Chart.	7000-00
Component Location Views	7100-00
Splice Location Views	8000-00
Connector Views	8500-00





INDEX

ADAPTIVE TRANSMISSION CONTROL	2466-00
ANTENNA	6420-00
ANTITHEFT SYSTEM (ALPINE)	6575-00
AUTOMATIC AIR RECIRCULATION CONTROL (AUC)	6430-00
AUTOMATIC HEATING/AC CONTROL	6450-00
AUTOMATIC REAR HEADREST	5205-00
AUXILIARY FAN	6454-00
BRAKE LINING WARNING	3435-00
CELLULAR TELEPHONE (PROVISIONS)	6501-00
CENTRAL BODY ELECTRONICS (ZKE)	6100-00
CENTRAL LOCKING SYSTEM (ZKE)	5126-00
CHARGING PLUG	6331-00
CHARGING SYSTEM	1230-00
CHECK CONTROL	6200-00
CIGAR LIGHTER	6331-00
COMPONENT LOCATION CHART	7000-00
COMPONENT LOCATION VIEWS	7100-00
CONNECTOR VIEWS	8500-00
CRASH CONTROLLER	6312-01
CRUISE CONTROL (EML)	6572-00
CRUISE CONTROL (TEMPOMAT)	6571-00
DATA LINK	0680-00
DOOR LOCK HEATING (ZKE)	5120-00
E-BOX FAN	0690-00
ELECTRIC SUN BLIND	5146-00
ELECTRONIC MIRROR	5116-00
ELECTRONIC THROTTLE CONTROL (EML 1.7)	1375-00
ELECTRONIC TRANSMISSION CONTROL (EGS: GS 9.20/A5S 560Z)	2462-00
ELECTRONIC TRANSMISSION CONTROL (EGS/EML)	2465-00
ENGINE CONTROL SYSTEM (DME/EML 1.7)	1367-00
ENGINE CONTROL SYSTEM (DME M3.3, 8-CYL. M60)	1362-00
FOG LIGHT WASHER (ZKE)	6167-00
FUSES	
- FUSE 1	0671-00
- FUSE 2 (CANADA)	0670-03

- FUSE 2 (USA)	0670-01
- FUSE 3 (CANADA)	0670-02
- FUSE 3 (USA)	0670-01
- FUSE 4 (CANADA)	0670-03
- FUSE 4 (USA)	0670-04
- FUSE 5 (CANADA)	0670-03
- FUSE 5 (USA)	0670-04
- FUSE 6 (CANADA)	0670-03
- FUSE 6 (USA)	0670-04
- FUSE 7 (CANADA)	0670-03
- FUSE 7 (USA)	0670-04
- FUSE 9	0670-05
- FUSE 10 WITH XENON LIGHTS (CANADA)	0670-03
- FUSE 10 WITH XENON LIGHTS (USA)	0670-04
- FUSE 10 WITHOUT XENON LIGHTS	0670-06
- FUSE 11 WITH XENON LIGHTS (CANADA)	0670-03
- FUSE 11 WITH XENON LIGHTS (USA)	0670-04
- FUSE 11 WITHOUT XENON LIGHTS	0670-06
- FUSE 12	0670-09
- FUSE 13	0670-06
- FUSE 14	0670-06
- FUSE 15	0670-08
- FUSE 16	0670-09
- FUSE 17	0671-04
- FUSE 18	0670-08
- FUSE 19	0670-07
- FUSE 20	0670-06
- FUSE 21	0670-07
- FUSE 22	0670-06
- FUSE 23	0670-06
- FUSE 24	0670-06
- FUSE 25	0670-05
- FUSE 26	0670-05
- FUSE 27	0670-05
- FUSE 28	0671-08
- FUSE 29	0670-01



INDEX

- FUSE 30	0670-11	- X493	0672-13
- FUSE 31	0670-11	- X494	0672-15
- FUSE 32	0670-11	- X497	0672-17
- FUSE 33	0670-10	- X498	0672-20
- FUSE 40	0670-11	- X814	0672-22
- FUSE 41	0670-11	- X818	0672-26
- FUSE 42	0670-11	- X905	0672-26
- FUSE 43	0670-11	- X944	0670-26
- FUSE 44	0670-10	- X6097	0672-26
- FUSE 45	0670-11	- X6452	0672-29
- FUSE 46	0670-10	- X6453	0672-32
- FUSE 47	0670-10	- X8508	0672-35
- FUSE 48	0670-10	- X18170	0672-35
- FUSE 49	0670-10	- X18287	0672-35
- FUSE 51	0670-10	HEADLIGHT WASHER (ZKE)	6167-00
- FUSE 60	0671-13	HEATED SEATS	5203-00
- FUSE 61	0671-13	HORN	6133-00
- FUSE 62	0671-13	IHKA AIR DELIVERY	6450-10
- FUSE 63	0671-13	IHKA AUXILIARY WATER PUMP	6450-24
GAUGES		IHKA BLOWER CONTROL	6450-04
- FUEL	6200-06	IHKA COMPRESSOR CONTROL	6450-20
- FUEL ECONOMY	6200-04	IHKA DATA LINK AND STARTER INPUT	6450-27
- SPEEDOMETER	6200-04	IHKA FRONT WINDOW DEFOGGER	6450-23
- TACHOMETER	6200-08	IHKA GROUND	6450-03
- TEMPERATURE	6200-08	IHKA POWER	6450-00
GROUND DISTRIBUTION		IHKA TEMPERATURE CONTROL	6450-07
- X165	0672-01	IHKA WATER VALVES	6450-25
- X165 (CANADA)	0672-02	INDICATORS	
- X166	0672-04	- "ABS"	3450-02
- X166 A/B	0672-03	- ADAPTIVE TRANSMISSION	2466-03
- X167	0672-05	- "AIR BAG"	3234-00
- X172	0672-06	- "ASC"	3452-02
- X173	0672-07	- "BRAKE"	6200-02
- X490	0672-09	- "BRAKE LINING" WEAR	3435-00
- X491	0672-10	- "CHECK ENGINE"	6200-00
- X492	0672-11	- "CHARGE"	1230-00
		- ELECTRONIC TRANSMISSION (EGS)	2462-02



INDEX

- ELECTRONIC TRANSMISSION (EGS/EML)	2465-02
- "EML"	6200-02
- FOG LIGHTS	6313-01
- GEAR SELECTOR	6200-10
- HIGH BEAM	6313-00
- LEFT TURN	6312-02
- LOW FUEL WARNING	6200-06
- OIL PRESSURE WARNING	6200-00
- PARK BRAKE	6200-00
- RIGHT TURN	6312-02
INSTRUMENT CLUSTER	6200-00
LAMP MONITOR (LKM)	6301-00
LIGHTS	
- ASTRAY	6331-01
- BACK UP	6322-00
- BRAKE	6325-01
- CIGAR LIGHTER	6331-01
- FOG	6313-05
- GLOVE BOX	6331-00
- HAZARD	6312-00
- HEADLIGHTS	6313-04, 05
- HEADLIGHTS (XENON)	6313-06
- INTERIOR (ZKE)	6330-00
- LICENSE	6320-01
- MARKER	6314-02
- PARK	6314-03
- TAIL	6314-01
- TRUNK	6320-02
- TURN SIGNALS	6312-00
- UNDERHOOD	6314-04
LIGHT SWITCH DETAILS	6300-00
LUMBER SUPPORT	5202-00
MAKE UP MIRROR	6331-00
MIRROR MEMORY	5119-00
MEMORY STEERING COLUMN	3231-00

ON-BOARD COMPUTER	6581-00
PARK VENTILATION	6413-00
POWER DISTRIBUTION CHARTS	0660-00
POWER DISTRIBUTION	0670-00
POWER ASSIST STEERING (SERVOTRONIC)	3240-00
POWER REAR HEADREST	5205-00
POWER SEATS	5200-00
POWER STEERING COLUMN ADJUST	3232-00
POWER WINDOWS (ZKE)	5133-00
RADIO/CD PLAYER (PROVISIONS)	6500-00
REAR WINDOW DEFOGGER (IHKA)	6420-00
SEAT MEMORY	5201-00
SHOCK ABSORBER CONTROL (EDC III+)	3715-00
SLIP CONTROL (ABS)	3450-00
SLIP CONTROL (ABS/ASC + T)	3452-00
SOFT CLOSE AUTOMATIC TRUNK LID	5124-00
SPLICE LOCATION VIEWS	8000-00
START	1240-00
SUNROOF (ZKE)	5410-00
SUPPLEMENTAL RESTRAINT SYSTEM (AIR BAG)	3234-00
SYMBOLS	0140-00
WINDSHIELD WASHER (ZKE)	6166-00
WINDSHIELD WASHER JET HEATERS	6169-00
WINDSHIELD WIPERS (ZKE)	6161-00





The purpose of this manual is to provide information to aid in electrical troubleshooting. It consists of system block diagrams, schematics, component location information, harness routing views and connector views.

The manual is divided into sections called cells. In each cell electrical components that work together are shown together on one or more schematics. 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 that describe how or when switches and other components work.

The Power Distribution schematics show the current feed through all the connections from the Battery and Alternator to each fuse and the Ignition and

Light Switches. If a 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 vehicles; however, the wiring is not drawn to scale. To aid in understanding electrical operation, wiring inside complicated components has been simplified. Further information regarding schematic symbols and references can be found in cell 0140 (Symbols).

The Central Body Electronics System incorporates the use of a single module that controls many apparently unrelated functions. For instance, the Sunroof and Windshield Wipers are controlled by the same module. However, only the portion of the module that controls the Sunroof will appear in the Sunroof schematics.



INTRODUCTION

Component Identification Information begins in cell 7000 and consists of the Component Location List, Component Location Photographs, and Harness Connector Faces. The Component Location List helps you find where the parts of the circuit are in the vehicle. A brief description of the location is given along with a reference to the photograph that shows the component and its connecting wires. The Harness Connector Faces show the cavity or terminal locations of all connectors having three or more pins. Harness Connector Faces help you locate test points. The drawings show the connector faces you see after the harness connector has been disconnected from a component.

TROUBLESHOOTING PROCEDURES

Diagnostic procedures for many of the circuits in this manual are included with the schematics. These procedures are based on a logical problem-solving procedure. The steps listed below are provided for those circuits that do not include diagnostic procedures. Following these steps will enable you to make a quick diagnosis of the problem.

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

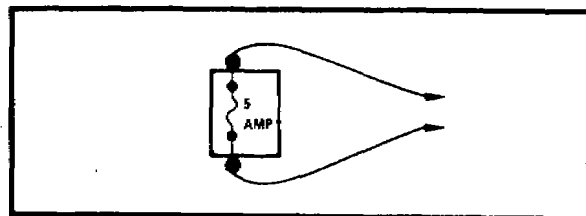
Operate the circuit to check for satisfactory circuit operation. Good repair practice calls for rechecking all circuits you have worked on.

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.

Fused Jumper Wire

A jumper wire is made up of an in-line fuse holder connected to a set of test leads. It should have a five ampere fuse. Use it for bypassing open circuits. Never use a jumper wire across any load (motors, etc.). This direct battery short will blow the fuse.



Fused Jumper Wire

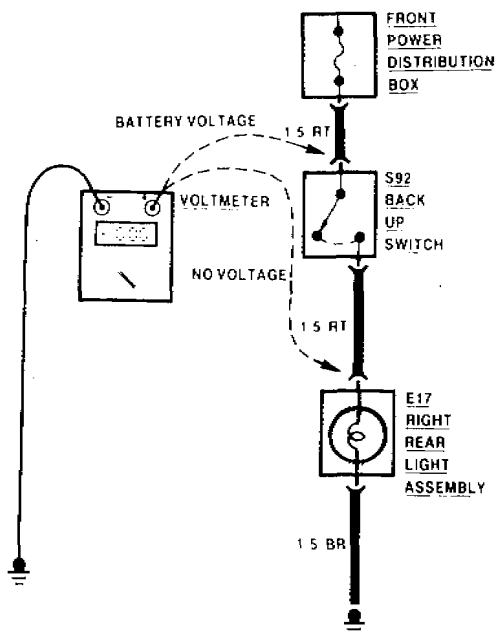


TROUBLESHOOTING TESTS

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.

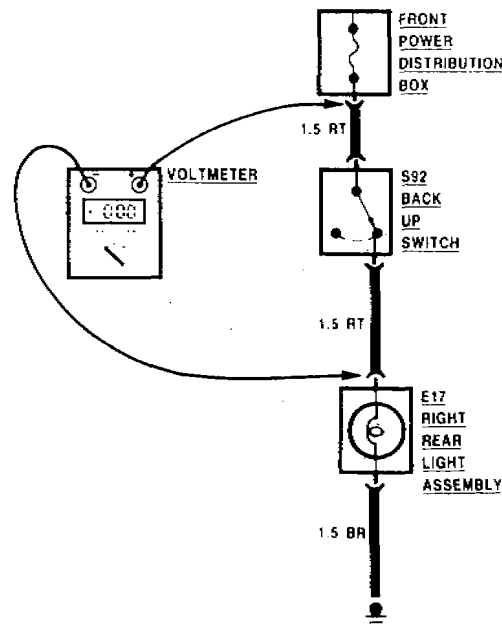


Voltage Test

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 voltage 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. Any switch in the circuit should be closed during this test.

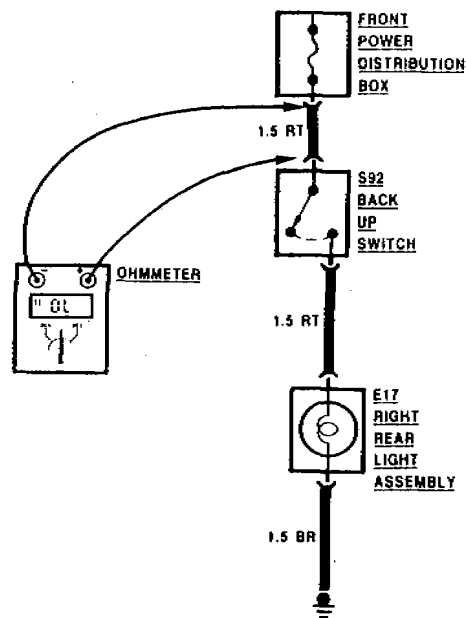


Voltage Drop Test



Continuity Test

To perform a continuity test, first disconnect the car battery. Then, while holding the leads together, adjust the ohmmeter to read zero. 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. This test can also be performed with a self-powered test light.

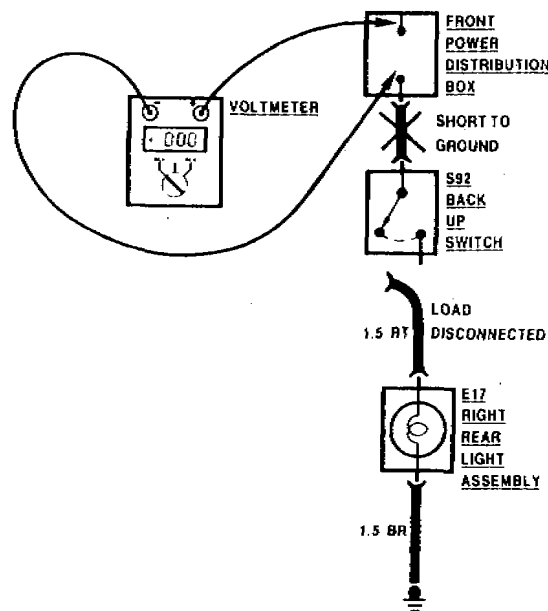


Continuity Test

Short Test Using voltmeter

To locate a wiring short to ground, 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.

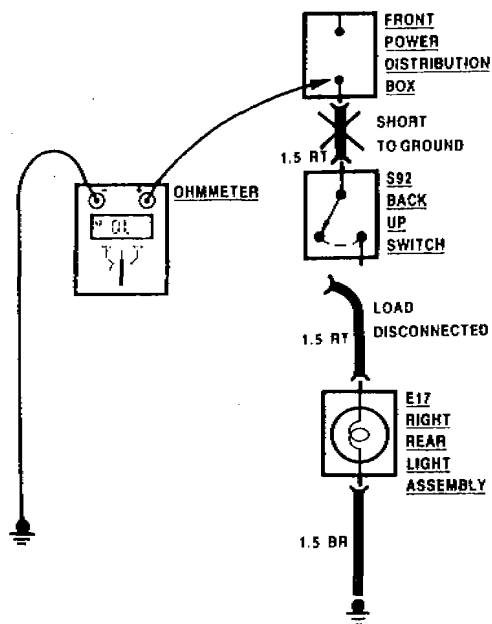
Starting near the FRONT POWER DISTRIBUTION BOX, move the wire harness back and forth and watch the voltmeter reading. If the voltmeter registers a reading, there is a short to ground in the wiring. Somewhere in the area of the harness being moved, the wire insulation is worn away and the circuit is grounding.



Short Test Using Voltmeter

Short Test Using Ohmmeter

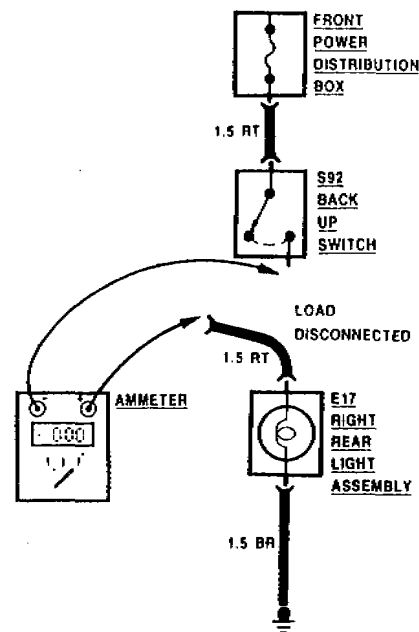
Disconnect the battery. While holding the leads together, adjust the ohmmeter to read zero. Remove the blown fuse and disconnect the load. Connect one lead of the ohmmeter to the fuse terminal that is closest to the load. Connect the other lead to a known good ground. Starting near the FRONT POWER DISTRIBUTION 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.



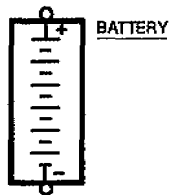
Short Test Using Ohmmeter

Current Test Using Ammeter

To measure the current, connect the ammeter leads to the connector or terminals in series with the circuit. The ammeter will show the current through the circuit.



Current Test Using Ammeter



BATTERY



FUSE



CIRCUIT
BREAKER



VARIABLE RESISTANCE
SENSOR
VARIABLE CONTACT IS MOVED
BY AN EXTERNAL FORCE



VARIABLE RESISTOR
RESISTANCE IS CHANGED
BY TEMPERATURE OR
PRESSURE



DIODE
CURRENT CAN FLOW ONLY
IN DIRECTION OF ARROW



ZENER DIODE
TO REGULATE VOLTAGE



LIGHT
EMITTING
DIODE



LIGHT



BIFILAMENT
LIGHT



PERMANENT
MAGNET
MOTOR
ONE SPEED



PERMANENT
MAGNET
MOTOR
TWO SPEEDS



HEATING
ELEMENT



LOUDSPEAKER
OR HORN



COIL OR
SOLENOID



SOLENOID
CONTROLLED
VALVE OR
CLUTCH
SOLENOID



TRANSISTORIZED
SWITCH

31

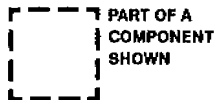


VEHICLE
SPEED
SENSOR

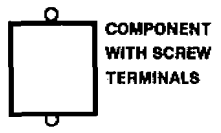
BMW
7 **SYMBOLS**



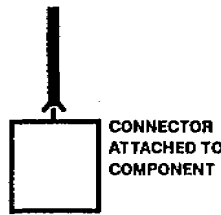
ENTIRE COMPONENT SHOWN



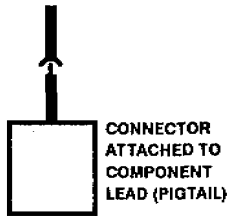
PART OF A COMPONENT SHOWN



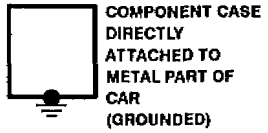
COMPONENT WITH SCREW TERMINALS



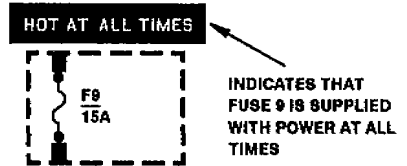
CONNECTOR ATTACHED TO COMPONENT



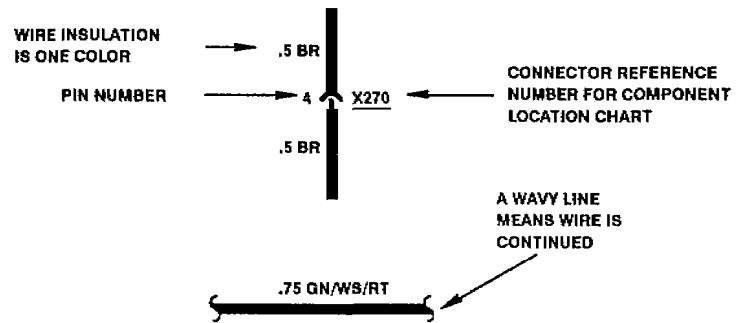
CONNECTOR ATTACHED TO COMPONENT LEAD (PIGTAIL)



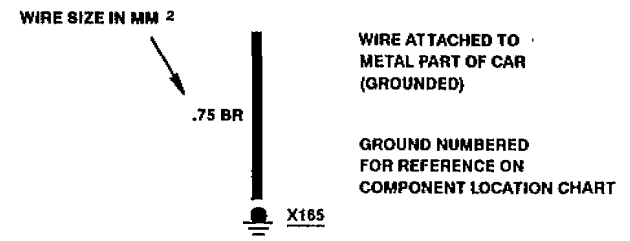
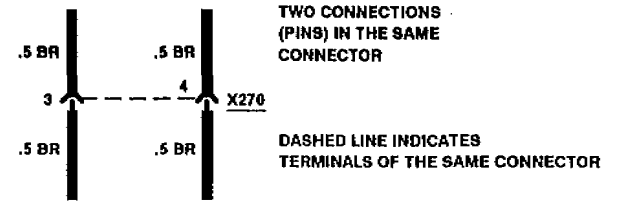
COMPONENT CASE DIRECTLY ATTACHED TO METAL PART OF CAR (GROUNDED)

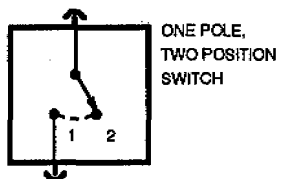


INDICATES THAT FUSE 9 IS SUPPLIED WITH POWER AT ALL TIMES

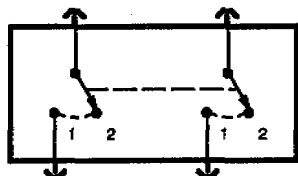


1. FIRST COLOR IS THE WIRE INSULATION.
2. SECOND COLOR IS THE "TRACER" OR "STRIPE" COLOR.
3. THIRD COLOR IS THE "DOTS" COLOR

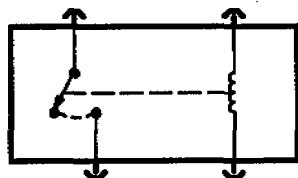




ONE POLE,
TWO POSITION
SWITCH

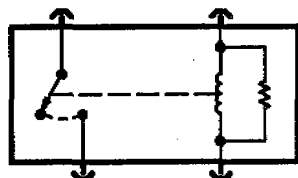


SWITCHES THAT
MOVE TOGETHER
DASHED LINE SHOWS
A MECHANICAL
CONNECTION
BETWEEN SWITCHES

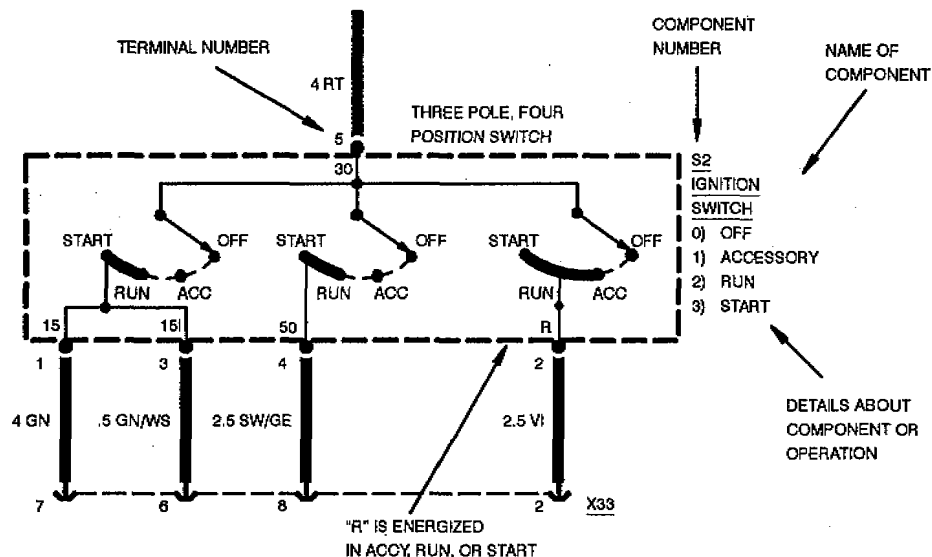


RELAY WITH NO CURRENT
FLOWING THROUGH COIL

WHEN COIL IS
ENERGIZED, SWITCH
IS PULLED CLOSED



RELAY WITH
RESISTOR ACROSS
COIL



TERMINAL
NUMBER

50

DESCRIPTION

VOLTAGE: IGNITION
SWITCH IN START

30

VOLTAGE: SUPPLIED
AT ALL TIMES

15

VOLTAGE: IGNITION SWITCH IN
RUN OR START

151

VOLTAGE: IGNITION SWITCH IN
RUN

R

VOLTAGE: IGNITION SWITCH IN
ACCESSORY, RUN, OR START

31

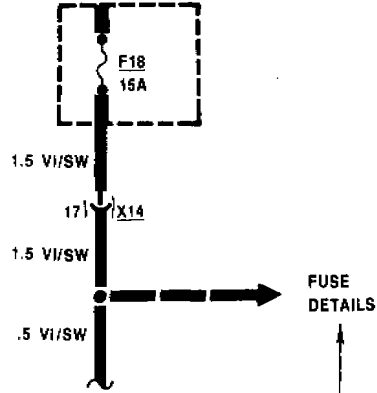
GROUND

WIRE COLORS

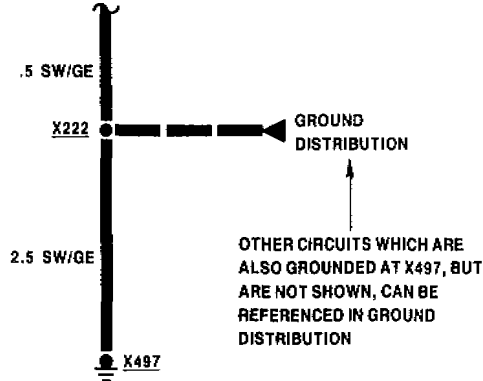
BL	BLUE
BR	BROWN
GE	YELLOW
GN	GREEN
GR	GRAY
OR	ORANGE
RS	PINK
RT	RED
SW	BLACK
VI	VIOLET
WS	WHITE

SYMBOLS

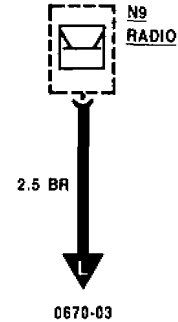
HOT IN ACC, RUN OR START



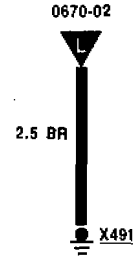
OTHER CIRCUITS WHICH SHARE FUSE 18, BUT ARE NOT SHOWN, CAN BE REFERENCED IN FUSE DETAILS



OTHER CIRCUITS WHICH ARE ALSO GROUNDED AT X497, BUT ARE NOT SHOWN, CAN BE REFERENCED IN GROUND DISTRIBUTION

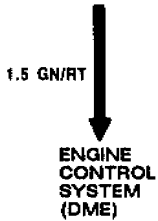


CURRENT PATH IS CONTINUED AS LABELED

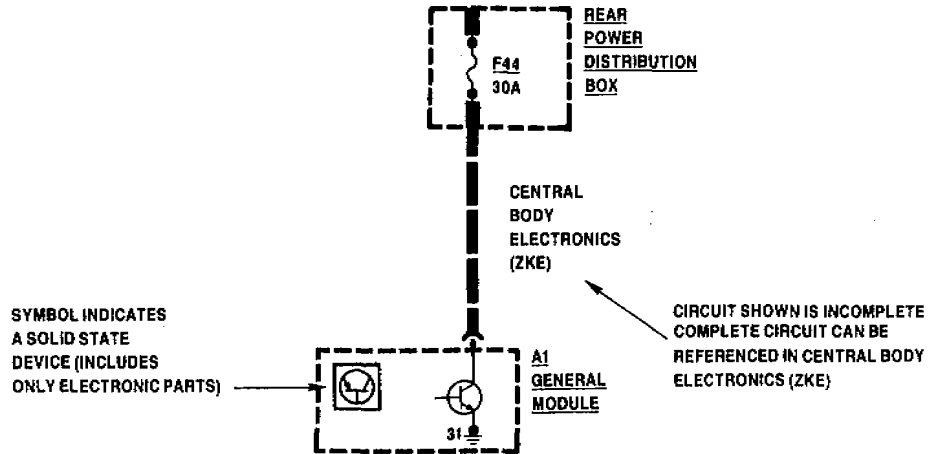


ARROW SHOWS DIRECTION OF CURRENT FLOW AND IS REPEATED WHERE CURRENT PATH CONTINUES

CIRCUIT REFERENCE — A WIRE WHICH CONNECTS TO ANOTHER CIRCUIT



HOT IN ACC, RUN OR START



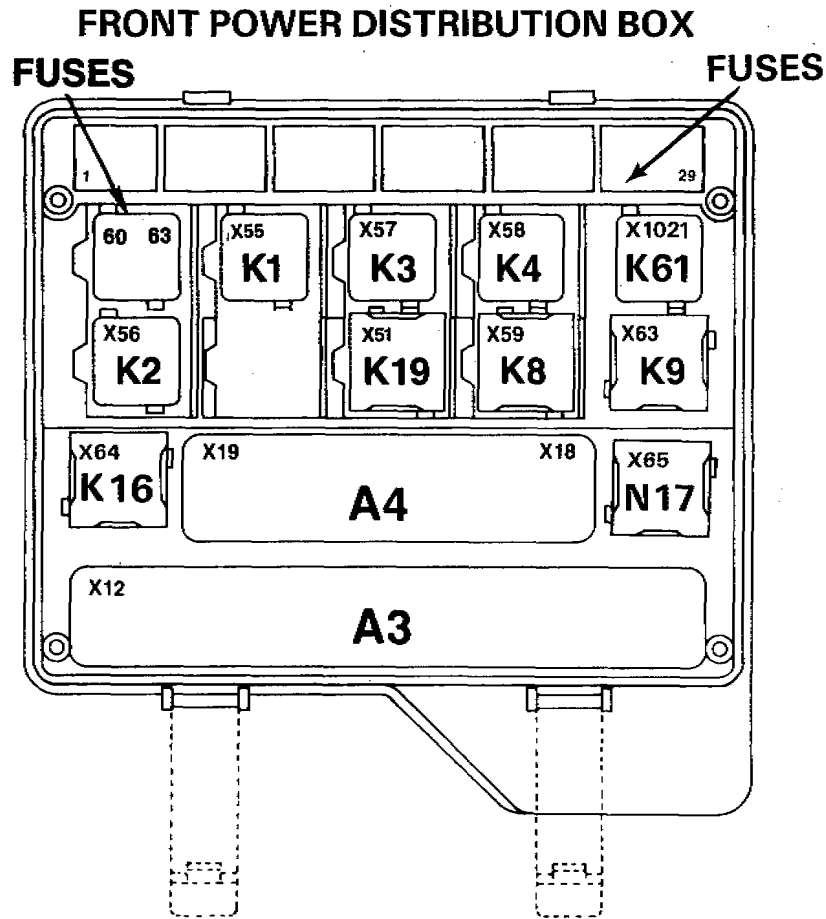
SYMBOL INDICATES A SOLID STATE DEVICE (INCLUDES ONLY ELECTRONIC PARTS)

CIRCUIT SHOWN IS INCOMPLETE COMPLETE CIRCUIT CAN BE REFERENCED IN CENTRAL BODY ELECTRONICS (ZKE)



POWER DISTRIBUTION CHARTS

FRONT POWER DISTRIBUTION BOX



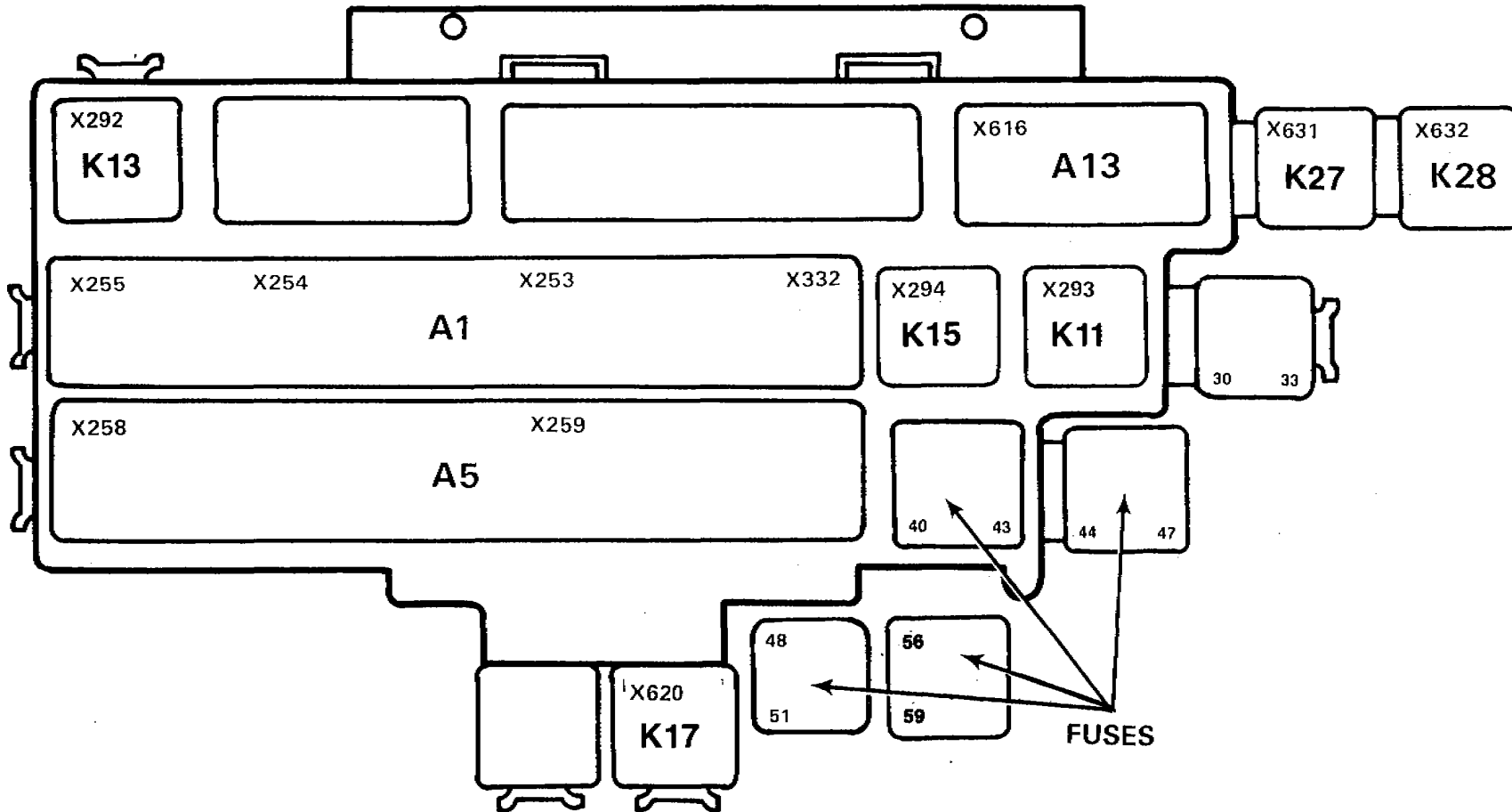
COMPONENTS IN FRONT POWER DISTRIBUTION BOX		
NUMBER	CONNECTOR	DESCRIPTION
A3	X12	LAMP CONTROL MODULE
A4	X18, X19	CHECK CONTROL MODULE
K1	X55	STARTER RELAY (AUTO)
K2	X56	HORN RELAY
K3	X57	UNLOADER RELAY, KLR
K4	X58	BLOWER RELAY
K8	X59	AUXILIARY WATER PUMP RELAY
K9	X63	UNLOADER RELAY, KL15
K16	X64	HAZARD FLASHER RELAY
K19	X51	COMPRESSOR CONTROL RELAY
K61	X1021	UNLOADER RELAY, KL61
N17	X65	CRASH CONTROL MODULE



POWER DISTRIBUTION CHARTS

REAR POWER DISTRIBUTION BOX

REAR POWER DISTRIBUTION BOX





POWER DISTRIBUTION CHARTS

REAR POWER DISTRIBUTION BOX

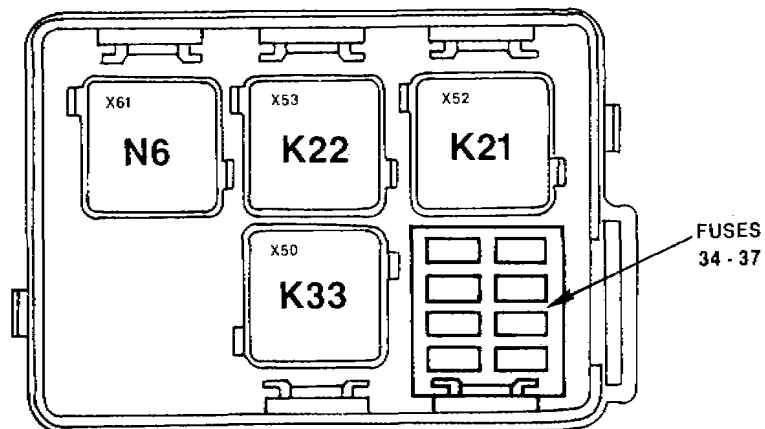
COMPONENTS IN REAR POWER DISTRIBUTION BOX		
NUMBER	CONNECTOR	DESCRIPTION
A1	X253, X254, X255, X332	GENERAL MODULE
A5	X258, X259	RELAY MODULE
A13	X616	REAR HEADREST CONTROL MODULE
K11	X293	WIPER RELAY
K13	X292	REAR DEFOGGER RELAY
K15	X294	ELECTRIC POWER PROTECTION RELAY
K17	X620	REAR SEAT HEATING RELAY
K27	X631	LEFT REAR SEAT HEATING/ POSITION RELAY (WITH POWER REAR SEAT)
K28	X632	RIGHT REAR SEAT HEATING/ POSITION RELAY (WITH POWER REAR SEAT)



POWER DISTRIBUTION CHARTS

AUXILIARY RELAY BOX

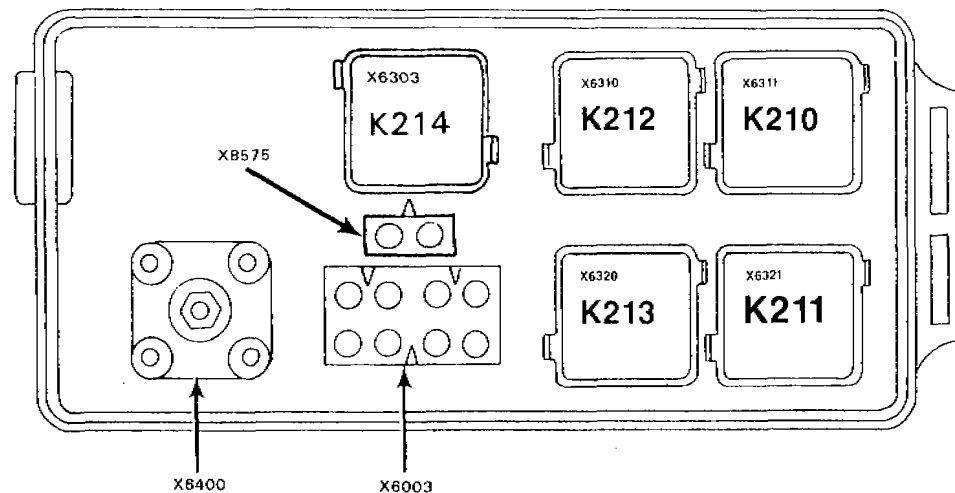
AUXILIARY RELAY BOX 1



COMPONENTS IN AUXILIARY RELAY BOX		
NUMBER	CONNECTOR	DESCRIPTION
K21	X52	NORMAL SPEED RELAY
K22	X53	HIGH SPEED RELAY
K33	X50	AIR CONDITIONING RELAY (FOR ENGINE CONTROL MODULE)
N6	X61	HEADLIGHT/FOG LIGHT CLEANING SYSTEM MODULE (SRA)

AUXILIARY RELAY BOX 2

750iL



COMPONENTS IN AUXILIARY RELAY BOX, 750iL ONLY		
NUMBER	CONNECTOR	DESCRIPTION
K210	X6311	CYL. 1-6 FUEL PUMP RELAY
K211	X6321	CYL. 7-12 FUEL PUMP RELAY
K212	X6310	CYL. 1-6 ENGINE CONTROL MODULE RELAY
K213	X6320	CYL. 7-12 ENGINE CONTROL MODULE RELAY
K214	X6303	OXYGEN SENSOR RELAY
—	X6003	CONNECTOR (8 PINS)
X6400	—	B + JUNCTION POST
	X8575	BRAKE LIGHT SWITCH (2 PINS)