

**1994**

**BMW**

**840Ci, 850Ci,  
850CSi (E31)**

**Electrical**

**Troubleshooting  
Manual**

Vehicles Produced 9/93 to 5/94



## ELECTRICAL TROUBLESHOOTING MANUAL

8 SERIES – E31 (840Ci, 850Ci, 850CSi)

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### MODEL YEAR 1994

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## Schematics

The schematics divide the entire vehicle electrical system into individual circuits. Interacting electrical components are shown on one common schematic.

Switches and other components are represented in such a way that their general layout and function are self-explicit. They are arranged on the sheet such that the current path can be followed from positive (top) to negative (bottom).

**Important:** The components and wires are not drawn to scale. For instance, a lead with a length of over 1m can be shown as a lead that is only a few cm long. To ensure clear arrangement, all connectors, line branches and connected components from the fuses to the component and from the component to ground connection are not shown within the individual cells. If required, reference can be made to cells **0670.3 Fuse Details** and **0670.4 Ground Distribution** where all lines are illustrated with all plug connections, line branches and connected components.

All circuit symbols used are listed and explained in cell **0140.0 Symbols**.

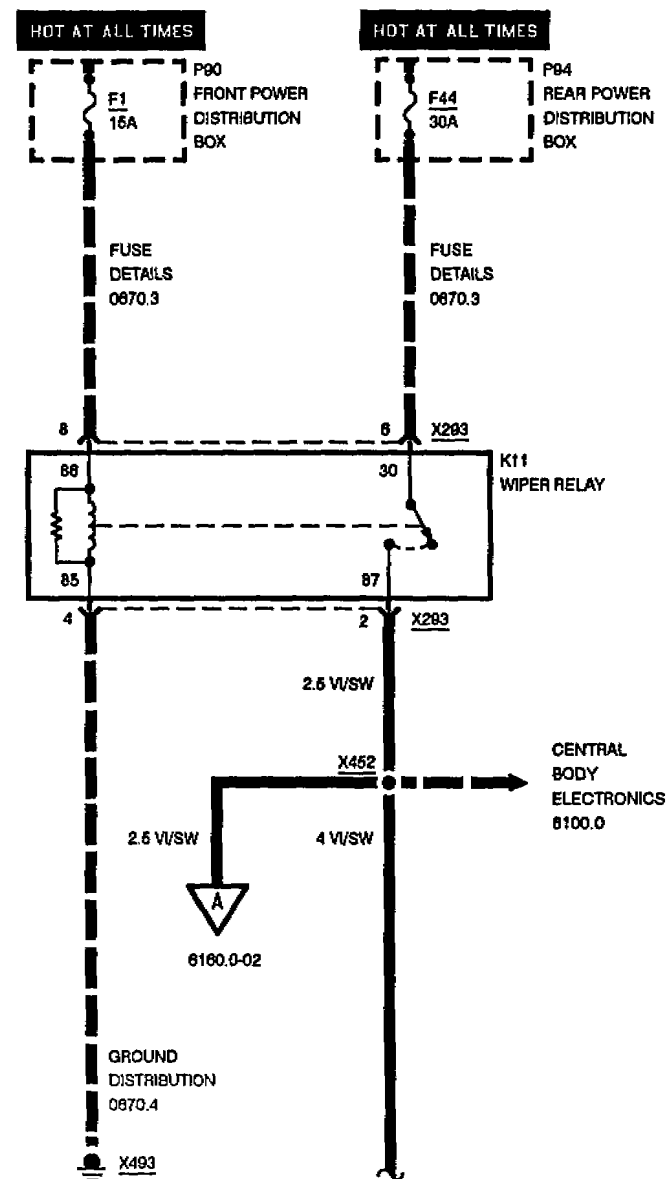
In cell **7000.0 Component Location Chart** all important connectors, ground points and components are listed in tabular form. It provides a precise description of the component locations in the vehicle.

In cell **7100.0 Component Location Views** the location of connectors and components which are difficult to locate are shown in line arts or illustrations. In cell **8500.0 Connector Views** diagrams of connectors with more than 2 pins are illustrated.

Included in this ETM are foldout block diagrams. These are overviews of the entire system (EGS, ABS, AC etc.) which helps understand the relationships between various components and control module of the system being diagnosed.

### Example

General conventions can be explained based on the following schematic example.

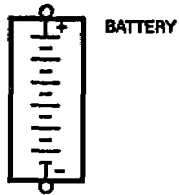




## General Conventions

1. Switches and relays are always shown in rest position (e.g. K11).
2. A component shown in a dashed frame signifies that the component is illustrated only in part (e.g. P90 and P91).
3. A component shown in a completely drawn frame signifies that the component is illustrated in full (e.g. K11).
4. The dashed line between pin 8 and pin 6 of connector X293 indicates that both pins belong to connector X293.
5. The dashed line from fuse F1 to pin 8 of connector X293 shows the positive supply of relay K11. If required, refer to cell **0670.3 Fuse Details** at fuse F1 for the complete line progressing with plug connections, line branches, wire colors and cross sections.
6. The dashed line with an arrow at splice X452 indicates that several wires lead to splice X452. All lines leading to the connection are illustrated in cell **6100.0 Central Body Electronics (ZKE)**. An interrupted line with an arrow indicates that only this one wire leads to another circuit.
7. The dashed line from pin 4 of connector X293 to ground X493 shows the ground supply for relay K11. If required, refer to cell **0670.4 Ground Distribution** at ground X493 for the complete line progression with all plug connections, line branches, wire colors and cross sections.
8. The interrupted line from splice X452 with an A in the open arrow is continued on page 6160.0-02. Termination of wire 4 VI/SW from splice X452 with a wavy line indicates that the wire is continued on the opposite page.

**SYMBOLS**



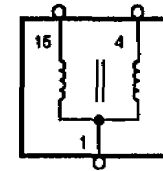
BATTERY



HEATING ELEMENT



VARIABLE RESISTANCE SENSOR  
VARIABLE CONTACT IS  
MOVED BY AN EXTERNAL  
FORCE



IGNITION COIL



FUSE



LOUDSPEAKER OR HORN



VARIABLE RESISTOR  
RESISTANCE IS CHANGED  
BY TEMPERATURE OR  
PRESSURE



CONTROL/POWER ELECTRONICS



FUSIBLE LINK



LIGHT



INDUCTIVE SENSOR



RADIO



CIRCUIT BREAKER



PERMANENT MAGNET MOTOR  
ONE SPEED



DIODE  
CURRENT CAN FLOW ONLY  
IN DIRECTION OF ARROW



TRANSISTORIZED SWITCH



SOLENOID



PERMANENT MAGNET MOTOR  
TWO SPEEDS



ZENER DIODE  
TO REGULATE VOLTAGE



OXYGEN SENSOR



SOLENOID CONTROLLED VALVE  
OR CLUTCH SOLENOID



KNOCK SENSOR



LIGHT EMITTING DIODE

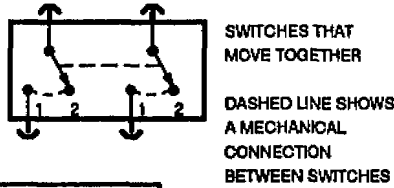
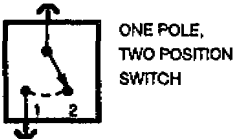
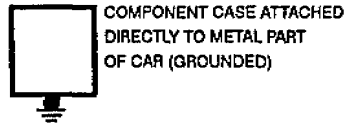
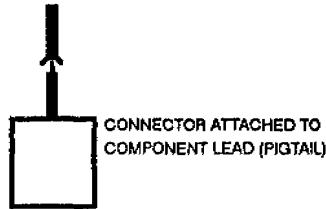
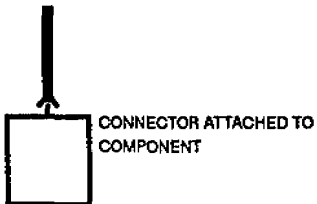


VEHICLE SPEED SENSOR

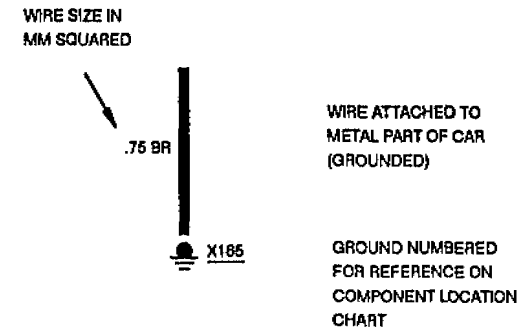
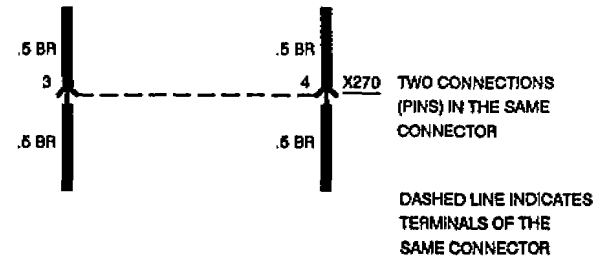
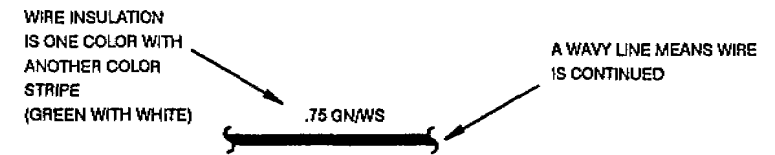
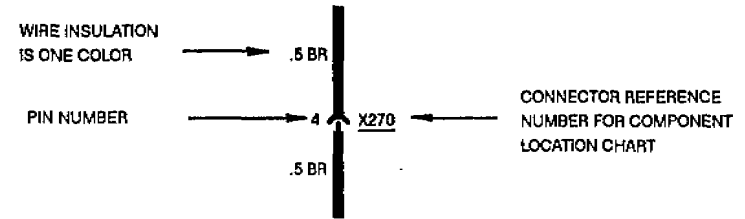


THERMO SWITCH

# SYMBOLS

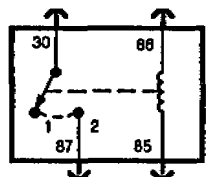


WIRE COLOR	
BL	BLUE
BR	BROWN
GE	YELLOW
GN	GREEN
GR	GRAY
OR	ORANGE
RS	PINK
RT	RED
SW	BLACK
VI	VIOLET
WS	WHITE
TR	TRANSPARENT

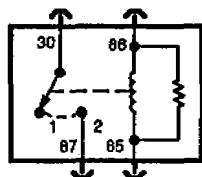




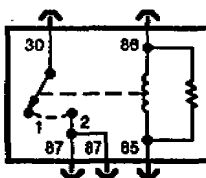
**BMW**  
**8** **SYMBOLS**



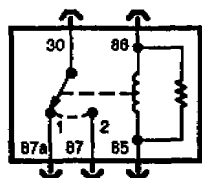
CONTACT RELAY



RELAY WITH RESISTOR ACROSS WINDING



CONTACT RELAY WITH TWO OUTPUTS



CHANGEOVER RELAY WITH TWO OUTPUTS

TERMINAL NUMBER DESCRIPTION

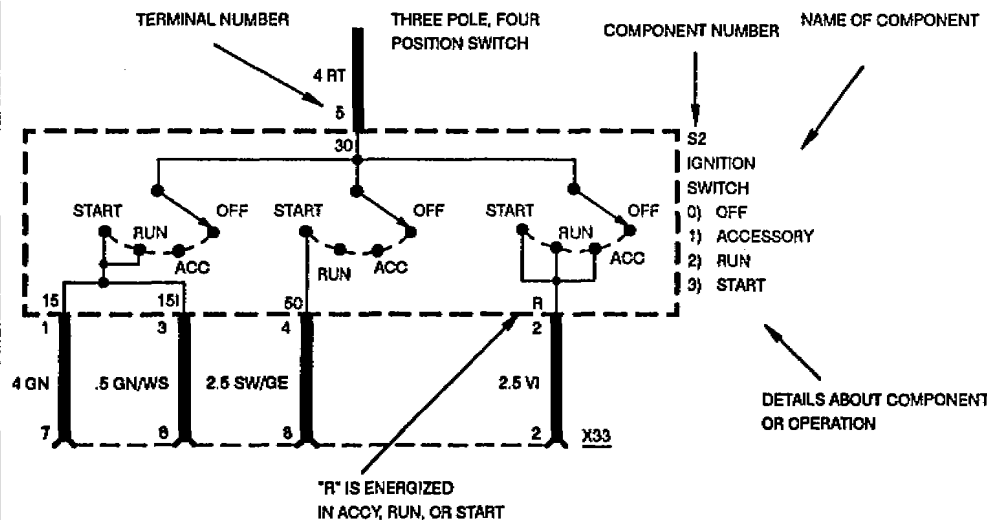
30 RELAY INPUT

85 RELAY OUTPUT (WINDING)

86 RELAY INPUT (WINDING)

87 RELAY OUTPUT (ENERGIZED)

87a RELAY OUTPUT (AT REST)



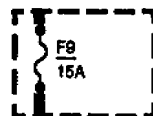
TERMINAL NUMBER DESCRIPTION TERMINAL NUMBER DESCRIPTION

50 VOLTAGE: IGNITION SWITCH IN START 15i VOLTAGE: IGNITION SWITCH IN RUN

30 VOLTAGE: SUPPLIED AT ALL TIMES R VOLTAGE: IGNITION SWITCH IN ACCESSORY, RUN OR START

15 VOLTAGE: IGNITION SWITCH IN RUN OR START 31 GROUND

**HOT AT ALL TIMES**



INDICATES THAT FUSE 9 IS SUPPLIED WITH POWER AT ALL TIMES

POWER STATUS

**HOT AT ALL TIMES**

**HOT IN RUN AND START**

**HOT IN ACCY, RUN AND START**

DESCRIPTION

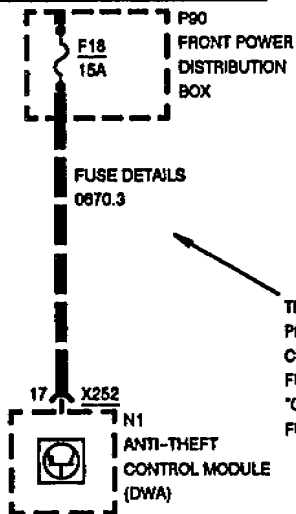
VOLTAGE: SUPPLIED AT ALL TIMES

VOLTAGE: IGNITION SWITCH IN RUN OR START

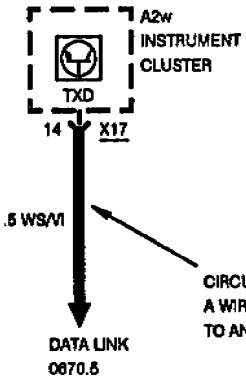
VOLTAGE: IGNITION SWITCH IN ACCESSORY, RUN OR START

# SYMBOLS

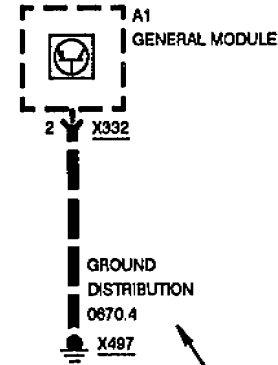
**HOT IN ACCY, RUN AND START**



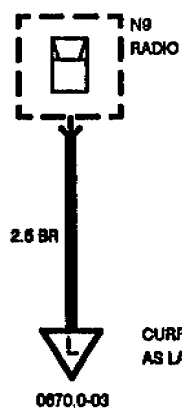
THE COMPLETE WIRE PROGRESSION AND FURTHER CIRCUITS CONNECTED TO FUSE 18 ARE SHOWN IN CELL '0670.3 FUSE DETAILS' AT FUSE 18



CIRCUIT REFERENCE- A WIRE WHICH CONNECTS TO ANOTHER CIRCUIT



THE COMPLETE WIRE PROGRESSION AND FURTHER CIRCUITS CONNECTED TO GROUND X497 ARE SHOWN IN CELL '0670.4 GROUND DISTRIBUTION' AT GROUND X497



CURRENT PATH IS CONTINUED AS LABELED



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



# SYMBOLS

## BLOCK DIAGRAM

