

**1993**

**BMW  
850i  
(E31)**

**Electrical**

**Troubleshooting  
Manual**

Vehicles Produced 7/92 to 8/93

PN 01 00 1 468 775



## ELECTRICAL TROUBLESHOOTING MANUAL

**8 SERIES – E31 (850i)**

### **SCHEMATICS**

### **MODEL YEAR 1993**

0100.0	INDEX	3450.2	SLIP CONTROL (ABS/ASC+T)
0110.0	INTRODUCTION	3715.1	ELECTRONIC SHOCK ABSORBER CONTROL (EDC III+)
0140.0	SYMBOLS	5116.0	POWER MIRRORS
0670.0	POWER DISTRIBUTION CHART	5120.0	ZKE DOOR LOCK HEATING (TSH)
0670.1	FUSE CHART	5126.0	ZKE CENTRAL LOCKING (ZV)
0670.2	POWER DISTRIBUTION	5133.0	ZKE POWER WINDOWS (FH)
0670.3	FUSE DETAILS	5146.0	POWER SUN SHADES
0670.4	GROUND DISTRIBUTION	5200.0	POWER SEATS
0670.5	DATA LINK	5200.1	SEAT/MIRROR MEMORY SYSTEM (SM/SPM)
1210.6	ENGINE CONTROL SYSTEM (DME M1.7, 12-CYLINDER M70)	5203.0	HEATED SEATS
1230.0	CHARGING SYSTEM	5212.0	LUMBAR SUPPORT
1240.0	START	5410.0	ZKE SUNROOF (SHD)
1270.1	ELECTRONIC THROTTLE CONTROL (EML 12-CYLINDER)	6100.0	CENTRAL BODY ELECTRONICS (ZKE)
1290.0	E-BOX FAN	6133.0	HORN
2460.0	ELECTRONIC TRANSMISSION CONTROL (EGS 4HP-22)	6160.0	ZKE WIPER/WASHER CONTROL
3231.0	ELECTRIC STEERING COLUMN ADJUSTMENT	6164.0	ZKE WINDSHIELD WIPER PRESSURE CONTROL (ADV)
3231.1	STEERING COLUMN MEMORY (LSM)	6167.0	ZKE HEADLIGHT WASHER (SRA)
3234.0	SUPPLEMENTAL RESTRAINT SYSTEM (AIRBAG)	6169.0	WINDSHIELD WASHER JET HEATERS
3240.0	POWER ASSIST STEERING (SERVOTRONIC)	6210.0	BODY ELECTRONICS MODULE (EKM)
		6211.0	INSTRUMENT CLUSTER

## **SCHEMATICS**

6300.0	LIGHT SWITCH DETAILS	6424.0	REAR WINDOW DEFOGGER
6301.0	LAMP MONITOR (LKM)	6450.0	AUTOMATIC HEATING/AC CONTROL (IHKA)
6312.0	HEADLIGHTS/FOG LIGHTS	6454.0	AUXILIARY FAN
6313.0	TURN/HAZARD LIGHTS	6510.1	RADIO/HIFI
6314.0	PARK/TAIL/UNDERHOOD LIGHTS	6561.0	CELLULAR TELEPHONE (PROVISIONS)
6320.0	LICENSE PLATE/LUGGAGE COMPARTMENT LIGHTS	6575.1	ANTI-THEFT SYSTEM III (DWA III)
6322.0	BACK UP LIGHTS	6581.0	ON-BOARD COMPUTER (BCIV)
6325.0	BRAKE LIGHTS	7000.0	COMPONENT LOCATION CHART
6330.0	ZKE INTERIOR LIGHTS CONTROL (IB)	7100.0	COMPONENT LOCATION VIEWS
6332.0	INTERIOR ACCESSORIES	8000.0	SPLICE LOCATION VIEWS
6350.0	CRASH CONTROL MODULE	8500.0	CONNECTOR VIEWS
6412.2	PARK VENTILATION WITH IHKA		





ABS HYDRAULIC UNIT, Y1 .....	3450.2-02	BODY ELECTRONICS MODULE (EKM) .....	6210.0-00
ACCELERATION SENSOR, FRONT, B41z .....	3715.1-01	BRAKE FLUID LEVEL SWITCH, B18 .....	6210.0-06
ACCELERATION SENSOR, RIGHT REAR, B48 .....	3715.1-01	BRAKE LIGHT SWITCH, S30 .....	6325.0-00
ACOUSTIC DEVICE, H10z .....	6210.0-08	BRAKE LIGHTS .....	6325.0-00
AIR BAG GENERATOR, DRIVER'S, G5 .....	3234.0-01	BRAKE LIGHT, LEFT, H24 .....	6325.0-00
AIR BAG GAS GENERATOR I, PASSENGER'S G6 .....	3234.0-02	BRAKE LIGHT, RIGHT, H31 .....	6325.0-00
AIR CONDITIONING COMPRESSOR (IHKA), Y3 .....	6450.0-13	BRAKE PAD SENSOR, LEFT FRONT, B16 .....	6210.0-05
AIR CONDITIONING PRESSURE SWITCH, S96 .....	6450.0-12	BRAKE PAD SENSOR, RIGHT REAR, B17 .....	6210.0-05
AIR CONDITIONING RELAY, K33 .....	6454.0-01	BRAKE PRESSURE REGULATING SWITCH, B19 .....	6210.0-06
ANTENNA AMPLIFIER AM/FM, N8 .....	6424.0-00	BRAKE PRESSURE SWITCH, B20 .....	6210.0-06
ANTI-THEFT CONTROL MODULE (DWA), N1 .....	6575.1-00	CASSETTE BOX LIGHT, E45y .....	6300.0-04
ANTI-THEFT HORN (DWA), H1 .....	6575.1-00	CD CHANGER, N22 .....	6510.1-04
ANTI-THEFT SYSTEM III (DWA III) .....	6575.1-00	CELLULAR TELEPHONE (PROVISIONS) .....	6561.0-00
ASC -SWITCH, S6 .....	3450.2-01	CENTRAL BODY ELECTRONICS (ZKE) .....	6100.0-00
AUTOMATIC AIR RECIRCULATION CONTROL MODULE, A417 ..	6450.0-15	CENTRAL LOCKING TRUNK LID MOTOR RELAY (ZV), K70 .....	5126.0-02
AUTOMATIC AIR RECIRCULATION SENSOR, B414 .....	6450.0-15	CHARGING SOCKET, X779 .....	6332.0-00
AUTOMATIC HEATING/AC CONTROL (IHKA) .....	6450.0-00	CHARGING SYSTEM .....	1230.0-00
AUTOMATIC HEATING/AC CONTROL MODULE (IHKA), A11 .....	6450.0-00	CLUTCH SWITCH, S32 .....	1270.1-09
AUTOMATIC HEATING .....		COMBINATION SWITCH, S7 .....	6301.0-00
AND AIR CONDITIONING SWITCH (IHKA), S28 .....	6450.0-01	COMPONENT LOCATION CHART .....	7000.0-00
AUTOMATIC TRANSMISSION RANGE SWITCH, S8515 .....	2460.0-05	COMPONENT LOCATION VIEWS .....	7100.0-00
AUXILIARY FAN .....	6454.0-00	COMPRESSOR CONTROL RELAY, K19 .....	6450.0-12
AUXILIARY FAN MOTOR, M9 .....	6454.0-00	COMPRESSOR CUT-OFF RELAY, K60 .....	6450.0-12
AUXILIARY FUSE BOX, P95 .....	0670.2-00	CONCEALING HEADLIGHT MOTOR, LH, M18 .....	6312.0-06
AUXILIARY TURN LIGHT, LEFT FRONT, H9 .....	6313.0-02	CONCEALING HEADLIGHT MOTOR, RH, M19 .....	6312.0-06
AUXILIARY TURN LIGHT, RIGHT FRONT, H8 .....	6313.0-02	CONCEALING HEADLIGHTS RELAY, K39 .....	6312.0-06
AUXILIARY WATER PUMP, M37a .....	6450.0-11	CONNECTOR VIEWS .....	8500.0-00
AUXILIARY WATER PUMP RELAY, K8z .....	6450.0-11	CONSUMER CUT-OFF RELAY I, K72 .....	6330.0-02
BACK UP LIGHT, LEFT, H27 .....	6322.0-00	CONSUMER CUT-OFF RELAY II, K73 .....	6330.0-02
BACK UP LIGHT, RIGHT, H28 .....	6322.0-00	CONTACT RING, C100 .....	3234.0-01
BACK UP LIGHTS .....	6322.0-00	CRASH CONTROL MODULE .....	6350.0-00
BACK-UP SWITCH, S302 .....	6322.0-00	CRASH CONTROL MODULE, N17 .....	6350.0-01
BATTERY I, RIGHT, G1z .....	0670.2-00	CRUISE CONTROL SWITCH (EML), S11 .....	1270.1-02
BATTERY II, LEFT, G4 .....	0670.2-06	CYL. 1 FUEL INJECTION VALVE, Y6101 .....	1210.6-02
BLOWER MOTOR, M30 .....	6450.0-01	CYL. 1-6 AIR TEMPERATURE SENSOR, B6215 .....	1210.6-08
BLOWER RELAY, K4 .....	6450.0-00	CYL. 1-6 CRANKSHAFT POSITION/RPM SENSOR, B6212 .....	1210.6-05
BODY ELECTRONICS MODULE, A25 .....	6210.0-00	CYL. 1-6 CYLINDER IDENTIFICATION SENSOR, B6211 .....	1210.6-05



# INDEX

CYL. 1-6 ENGINE CONTROL MODULE (DME), A6010	1210.6-00	DAYTIME RUNNING LIGHTS RELAY, K111	6314.0-02
CYL. 1-6 ENGINE CONTROL MODULE RELAY, K6310	1210.6-01	DEFROSTER FLAP MOTOR, M35	6450.0-10
CYL. 1-6 EVAPORATIVE EMISSION VALVE, Y6121	1210.6-03	DIMMER, N3	6300.0-02
CYL. 1-6 FUEL PUMP, M2z	1210.6-04	DOME LIGHT/MAP READING ASSEMBLY, FRONT, E34	6330.0-03
CYL. 1-6 FUEL PUMP RELAY, K6311	1210.6-04	DOOR HANDLE SWITCH, DRIVER'S, S48	5120.0-00
CYL. 1-6 HEATED OXYGEN SENSOR, B6210	1210.6-05	DOOR HANDLE SWITCH, PASSENGER'S, S79	6100.0-03
CYL. 1-6 IGNITION COIL, T6151z	1210.6-00	DOOR JAMB SWITCH, DRIVER'S, S14	6330.0-00
CYL. 1-6 MASS AIR FLOW SENSOR, B6216	1210.6-03	DOOR JAMB SWITCH, PASSENGER'S, S13	6330.0-00
CYL. 1-6 THROTTLE BODY (EML), M6360	1270.1-05	DOOR LOCK HEATER, E48	5120.0-00
CYL. 10 FUEL INJECTION VALVE, Y6110	1210.6-12	DOOR LOCK MOTOR, DRIVER'S, M12	5126.0-03
CYL. 11 FUEL INJECTION VALVE, Y6111	1210.6-12	DOOR LOCK MOTOR, PASSENGER'S, M13	5126.0-03
CYL. 12 FUEL INJECTION VALVE, Y6112	1210.6-12	DOOR LOCK SWITCH, DRIVER'S, S47	5126.0-00
CYL. 2 FUEL INJECTION VALVE, Y6102	1210.6-02	DOOR LOCK SWITCH, PASSENGER'S, S49	5126.0-00
CYL. 3 FUEL INJECTION VALVE, Y6103	1210.6-02	DOOR MODULE, DRIVER'S, A23	6100.0-00
CYL. 4 FUEL INJECTION VALVE, Y6104	1210.6-02	DOOR MODULE, PASSENGER'S, A24	6100.0-00
CYL. 5 FUEL INJECTION VALVE, Y6105	1210.6-02	DOOR PANEL LIGHT, DRIVER'S, E78	6300.0-04
CYL. 6 FUEL INJECTION VALVE, Y6106	1210.6-02	DOOR PANEL LIGHT, PASSENGER'S, E79	6300.0-04
CYL. 7-12 AIR TEMPERATURE SENSOR, B6225	1210.6-16	DWA LED, V5	6575.1-00
CYL. 7-12 CRANKSHAFT POSITION/RPM SENSOR, B6222	1210.6-15	E-BOX FAN	1290.0-00
CYL. 7-12 CYLINDER IDENTIFICATION SENSOR, B6221	1210.6-15	E-BOX FAN, M6506	1290.0-00
CYL. 7-12 ENGINE CONTROL MODULE RELAY, K6320	1210.6-11	EDC RELAY, K67	3715.1-00
CYL. 7-12 ENGINE CONTROL MODULE (DME), A6020	1210.6-10	EDC SWITCH, S105	3715.1-00
CYL. 7-12 EVAPORATIVE EMISSION VALVE, Y6122	1210.6-13	EDC VALVES, LEFT FRONT, Y401z	3715.1-02
CYL. 7-12 FUEL PUMP, M11	1210.6-14	EDC VALVES, LEFT REAR, Y403z	3715.1-02
CYL. 7-12 FUEL PUMP RELAY, K6321	1210.6-14	EDC VALVES, RIGHT FRONT, Y402z	3715.1-02
CYL. 7-12 HEATED OXYGEN SENSOR, B6220	1210.6-15	EDC VALVES, RIGHT REAR, Y404z	3715.1-02
CYL. 7-12 IGNITION COIL, T6152z	1210.6-10	ELECTRIC POWER PROTECTION RELAY, K15	5126.0-02
CYL. 7-12 MASS AIR FLOW SENSOR, B6226	1210.6-13	ELECTRIC POWER PROTECTION RELAY II, K30	5126.0-02
CYL. 7-12 THROTTLE BODY (EML), M6370	1270.1-06	ELECTRIC STEERING COLUMN ADJUSTMENT	3231.0-00
CYL. 7 FUEL INJECTION VALVE, Y6107	1210.6-12	ELECTRO-HYDRAULIC CONVERTER (SERVOTRONIC), B15	3240.0-00
CYL. 8 FUEL INJECTION VALVE, Y6108	1210.6-12	ELECTROCHROMIC REAR VIEW MIRROR, A22z	5116.0-02
CYL. 9 FUEL INJECTION VALVE, Y6109	1210.6-12	ELECTRONIC SHOCK ABSORBER CONTROL (EDC III+)	3715.1-00
DASH LIGHT, E41	6450.0-07	ELECTRONIC SHOCK ABSORBER CONTROL	
DASH VENT MIXING FLAP MOTOR, M34	6450.0-08	MODULE (EDC), A413	3715.1-00
DATA LINK	0670.5-00	ELECTRONIC THROTTLE CONTROL (EML 12-CYLINDER)	1270.1-00
DATA LINK CONNECTOR, D100	0670.5-01	ELECTRONIC TRANSMISSION CONTROL (EGS)	2460.0-00
DAYTIME RUNNING LIGHTS CODING DIODE, V4	6314.0-02	ENGINE CONTROL SYSTEM (DME M1.7, 12-CYLINDER M70)	1210.6-00



# INDEX

ENGINE COOLANT TEMP. SENSOR (EML), B6234	1270.1-03
ENGINE COOLANT TEMPERATURE SENSOR, B6232	6210.0-07
ENGINE COOLANT TEMPERATURE SENSOR, B6236	1210.6-08
ENGINE HOOD SWITCH (DWA), S21	6575.1-02
EVAPORATOR TEMPERATURE SENSOR, B14	6450.0-03
FINAL STAGE UNIT, N2	6450.0-01
FLASHER LIGHT RELAY, K52z	6312.0-05
FM AMPLIFIER HLO, N444	6424.0-02
FM AMPLIFIER/SUPPRESSION FILTER, C900z	6424.0-02
FOG LIGHT, LEFT, E26	6312.0-03
FOG LIGHT, RIGHT, E27	6312.0-03
FOG LIGHT SWITCH, S10	6312.0-02
FOOTWELL FLAP MOTOR, LEFT, M31	6450.0-09
FOOTWELL FLAP MOTOR, RIGHT, M32	6450.0-08
FOOTWELL LIGHT, LEFT FRONT, E61	6330.0-03
FOOTWELL LIGHT, RIGHT FRONT, E62	6330.0-03
FRESH AIR FLAP MOTOR, M36	6450.0-10
FRONT CIGAR LIGHTER, E28	6332.0-03
FRONT CIGAR LIGHTER LIGHT, E29	6332.0-03
FRONT MARKER LIGHT, LEFT, E21	6314.0-04
FRONT MARKER LIGHT, RIGHT, E22	6314.0-04
FRONT POWER DISTRIBUTION BOX, P90	0670.2-00
FUEL LEVEL SENSOR I, B6z	6210.0-08
FUEL LEVEL SENSOR II, B25	6210.0-08
FUSE CHART	0670.1-00
FUSE DETAILS	0670.3-00
FUSIBLE LINK, F0	0670.2-06
FUSIBLE LINK (50A), F99	0670.2-00
GAS FILLER LOCK MOTOR, M16	5126.0-03
GENERAL MODULE, A1	6100.0-00
GENERATOR, G6509	1230.0-00
GLOVE BOX CENTRAL LOCKING SWITCH, S118	5126.0-01
GLOVE BOX LIGHT, E42	6332.0-00
GLOVE BOX LIGHT SWITCH I, S37z	6332.0-01
GLOVE BOX LIGHT SWITCH II, S113	6332.0-01
GRADIENT MONITOR (DWA), B28	6575.1-04
GROUND DISTRIBUTION	0670.4-00

HAZARD FLASHER RELAY, K16	6313.0-00
HAZARD SWITCH, S18	6313.0-01
HEADLIGHT/FOG LIGHT WASHER PUMP, M7	6167.0-02
HEADLIGHT/FOGLIGHT CLEANING MODULE (SRA), N6	6167.0-02
HEADLIGHTS/FOG LIGHTS	6312.0-00
HEAT EXCHANGER TEMPERATURE SENSOR, LH, B11	6450.0-03
HEAT EXCHANGER TEMPERATURE SENSOR, RH, B12	6450.0-03
HEATED SEATS	5203.0-00
HIFI AMPLIFIER, A18	6510.1-00
HIGH BEAM FLASHER LIGHT, LEFT, E69	6312.0-05
HIGH BEAM FLASHER LIGHT, RIGHT, E70z	6312.0-05
HIGH BEAM LIGHT, LEFT, E11	6312.0-05
HIGH BEAM LIGHT, RIGHT, E12	6312.0-05
HIGH BEAM LIGHT RELAY, K46	6312.0-05
HIGH LEVEL STOP LIGHT, H34	6325.0-00
HIGH RANGE SPEAKER, LEFT FRONT, H59	6510.1-01
HIGH RANGE SPEAKER, LEFT REAR, H56	6510.1-03
HIGH RANGE SPEAKER, RIGHT FRONT, H50	6510.1-02
HIGH RANGE SPEAKER, RIGHT REAR, H53	6510.1-03
HIGH SPEED RELAY, K22	6454.0-00
HORN	6133.0-00
HORN, LEFT, H2	6133.0-00
HORN, RIGHT, H3	6133.0-00
HORN RELAY, K2	6133.0-00
HORN SWITCH, S4	6133.0-00
IGNITION SWITCH, S2	0670.2-02
IMPACT SENSOR, LEFT FRONT, S71	3234.0-01
IMPACT SENSOR, RIGHT FRONT, S72	3234.0-01
INDEX	0100.0-00
INERTIA SWITCH, S27	6350.0-01
INSIDE DOOR HANDLE SWITCH, DRIVER'S, S89	5120.0-01
INSIDE DOOR HANDLE SWITCH, PASSENGER'S, S90	6100.0-03
INSTRUMENT CLUSTER	6211.0-00
INSTRUMENT CLUSTER, A2w	6211.0-00
INTENSIVE WASH PUMP, M5	6160.0-02
INTENSIVE WASH RELAY, K42	6160.0-02
INTERIOR ACCESSORIES	6332.0-00



# INDEX

INTERIOR LIGHT, LEFT REAR, E39	6330.0-03
INTERIOR LIGHT, RIGHT REAR, E40	6330.0-03
INTERIOR LIGHT RELAY, K29	6330.0-03
INTRODUCTION	0110.0-00
JET HEATER THERMOSWITCH, S198	6169.0-00
JUMPER PLUG, B900	1240.0-01
JUMPER PLUG FOR HORN/TELEPHONE, K51	6133.0-00
LAMP CONTROL MODULE, A3	6301.0-01
LAMP MONITOR (LKM)	6301.0-00
LICENSE PLATE LIGHT, LEFT, E43	6320.0-01
LICENSE PLATE LIGHT, RIGHT, E44	6320.0-01
LICENSE PLATE/LUGGAGE COMPARTMENT LIGHTS	6320.0-00
LIGHT ASSEMBLY I, LEFT REAR, E46z	0670.4-12
LIGHT ASSEMBLY I, RIGHT REAR, E47z	0670.4-12
LIGHT BAND, LEFT, E9046	0670.4-01
LIGHT BAND, RIGHT, E9047	0670.4-02
LIGHT SWITCH, S8	6300.0-01
LIGHT SWITCH DETAILS	6300.0-00
LOCK-SENSOR CONTROL MODULE, A26	6450.0-13
LONGITUDINAL ACCELERATION SENSOR, B49	3715.1-01
LOW BEAM LIGHT, LEFT, E13	6312.0-00
LOW BEAM LIGHT, RIGHT, E14	6312.0-00
LOW RANGE SPEAKER, LEFT FRONT, H58	6510.1-01
LOW RANGE SPEAKER, LEFT REAR, H57	6510.1-03
LOW RANGE SPEAKER, RIGHT FRONT, H51	6510.1-02
LOW RANGE SPEAKER, RIGHT REAR, H52	6510.1-03
LUMBAR SUPPORT	5212.0-00
LUMBAR SUPPORT MOTOR/VALVE, DRIVER'S SEAT, M55z	5212.0-00
LUMBAR SWITCH, DRIVER'S SEAT, S52	5212.0-00
MAKEUP MIRROR LIGHT, DRIVER'S, E35	6332.0-01
MAKEUP MIRROR LIGHT, PASSENGER'S, E36	6332.0-01
MAKEUP MIRROR SWITCH, DRIVER'S, S77	6332.0-01
MAKEUP MIRROR SWITCH, PASSENGER'S, S78	6332.0-01
MEMORY MIRRORS CONTROL SWITCH, S12	5200.1-06
MEMORY MIRROR, DRIVER'S SIDE, Y9	5200.1-07
MEMORY MIRROR, PASSENGER'S SIDE, Y10	5200.1-08
MEMORY SEAT ADJUSTMENT SWITCH, DRIVER'S, S50	5200.1-00

MEMORY SEAT MIRRORS SWITCH, S57	5200.1-01
MICROPHONE, B400	6561.0-00
MIDRANGE SPEAKER, LEFT FRONT, H55	6510.1-01
MIDRANGE SPEAKER, RIGHT FRONT, H54	6510.1-02
MID-HIGH RANGE SPEAKER, LEFT, H42	6510.1-01
MID-HIGH RANGE SPEAKER, RIGHT, H43	6510.1-02
MID-HIGH RANGE SPEAKER, REAR LEFT, H55z	6510.1-08
MID-HIGH RANGE SPEAKER, REAR RIGHT, H54z	6510.1-08
MIRROR, DRIVER'S SIDE, Y5	5116.0-01
MIRROR, PASSENGER'S SIDE, Y6	5116.0-01
MIRROR CONTROL SWITCH, S17	5116.0-00
MIXING ACTUATOR, R1	6450.0-04
MIXING FLAP MOTOR, LEFT, M39	6450.0-09
MULTI-INFORMATION DISPLAY (MID), N4z	6581.1-00
NORMAL SPEED RELAY, K21	6454.0-00
OIL LEVEL SENSOR, B6230	6210.0-07
OIL PRESSURE SWITCH, B206	6210.0-06
ON-BOARD COMPUTER (BCIV)	6581.0-00
ON-BOARD COMPUTER HORN RELAY, K91	6575.1-00
OUTSIDE TEMPERATURE SENSOR, B13	6450.0-03
PARK BRAKE SWITCH, S31	6210.0-04
PARK HEATING/VENTILATION RELAY BOX, A15	6412.2-02
PARK LIGHT, LEFT, E15	6314.0-01
PARK LIGHT, RIGHT, E19	6314.0-01
PARK LIGHT RELAY, LEFT, K26	6314.0-02
PARK LIGHT/LICENSE PLATE LIGHT RELAY, RIGHT, K25	6314.0-02
PARK/TAIL/UNDERHOOD LIGHTS	6314.0-00
PARK VENTILATION WITH IHKA	6412.2-00
PEDAL POSITION SENSOR, R10	1270.1-03
POWER ASSIST STEERING (SERVOTRONIC)	3240.0-00
POWER DISTRIBUTION	0670.2-00
POWER DISTRIBUTION CHART	0670.0-00
POWER MIRRORS	5116.0-00
POWER SEATS	5200.0-00
POWER SUN SHADES	5146.0-00
POWER WINDOW MOTOR/INCREMENT SENSOR, DRIVER'S, M21z	5133.0-01



POWER WINDOW MOTOR/INCREMENT	
SENSOR, PASSENGER'S, M23z	5133.0-03
PRESSURE SENSOR/PLUNGER, Y16	3450.2-07
PRESSURE SWITCH, B9508	6450.0-12
PROGRAM SWITCH, S8517	2460.0-03
RADIO, N9	6510.1-00
RADIO ANTI-THEFT SWITCH (DWA), S20	6575.1-02
RADIO/HIFI	6510.1-00
REAR DEFOGGER/ANTENNA, E10	6424.0-01
REAR DEFOGGER I, E9	6424.0-01
REAR DEFOGGER RELAY, K13	6424.0-00
REAR POWER DISTRIBUTION BOX, P94	0670.2-07
REAR SPEAKER, LEFT, H46	6510.1-03
REAR SPEAKER, RIGHT, H45	6510.1-03
REAR WINDOW DEFOGGER	6424.0-00
REAR WINDOW DEFOGGER SWITCH, S76	6450.0-07
RECIRCULATION FLAP MOTOR, M40	6450.0-10
RELAY MODULE, A5	6100.0-01
SEATBACK HEATER, PASSENGER'S, E59	5203.0-00
SEATBACK HEATER, DRIVER'S, E58	5203.0-00
SEATBACK POTENTIOMETER, R7	5200.1-03
SEATBACK RECLINER MOTOR, DRIVER'S, M53	5200.0-00
SEATBACK RECLINER MOTOR, PASSENGER'S, M58	5200.0-01
SEATBACK SWITCH, LH DRIVER'S, S104	6210.0-04
SEATBACK SWITCH, LH PASSENGER'S, S122	6210.0-04
SEATBACK SWITCH, RH DRIVER'S, S103	6210.0-04
SEATBACK SWITCH, RH PASSENGER'S, S121	6210.0-04
SEAT BELT SWITCH, DRIVER'S, S58	6210.0-04
SEAT CONTROL SWITCH, DRIVER'S SEAT, S51	5200.0-00
SEAT CONTROL SWITCH, PASSENGER'S SEAT, S56	5200.0-01
SEAT CUSHION MOVEMENT POTENTIOMETER, R9	5200.1-02
SEAT CUSHION REAR HEIGHT POTENTIOMETER, R8	5200.1-02
SEAT CUSHION TILT MOTOR, DRIVER'S, M50	5200.0-00
SEAT CUSHION TILT MOTOR, PASSENGER'S, M61	5200.0-01
SEAT HEATER, DRIVER'S, E57	5203.0-00
SEAT HEATER, PASSENGER'S, E58	5203.0-00
SEAT HEATER SWITCH, DRIVER'S SEAT, S53	5203.0-00

SEAT HEATER SWITCH, PASSENGER'S SEAT, S54	5203.0-00
SEAT HEIGHT MOTOR, DRIVER'S, M52	5200.0-00
SEAT HEIGHT MOTOR, PASSENGER'S, M59	5200.0-01
SEAT HEIGHT POTENTIOMETER, R6	5200.1-03
SEAT LUMBAR SUPPORT MOTOR/VALVE, PASSENGER'S, M56z	5212.0-00
SEAT LUMBAR SUPPORT SWITCH, PASSENGER'S, S55	5212.0-00
SEAT/MIRROR MEMORY CONTROL MODULE, A21	5200.1-00
SEAT/MIRROR MEMORY SYSTEM (SM/SPM)	5200.1-00
SEAT MOVEMENT MOTOR, DRIVER'S, M51	5200.0-00
SEAT MOVEMENT MOTOR, PASSENGER'S, M60	5200.0-01
SERVOTRONIC CONTROL MODULE, A17	3240.0-00
SHIFT LOCK, S8522	2460.0-01
SIDE MARKER LIGHT, LEFT REAR, E9021	0670.4-12
SIDE MARKER LIGHT, RIGHT REAR, E9022	0670.4-11
SLIP CONTROL (ABS/ASC + T)	3450.2-00
SLIP CONTROL MODULE (ABS/ASC + T), A9070	3450.2-00
SPEED SENSOR - ABS, LEFT FRONT, B2	3450.2-04
SPEED SENSOR - ABS, LEFT REAR, B4	3450.2-04
SPEED SENSOR - ABS, RIGHT FRONT, B1	3450.2-04
SPEED SENSOR - ABS, RIGHT REAR, B3	3450.2-04
SPLICE LOCATION VIEWS	8000.0-00
START	1240.0-00
STARTER, M6510	1240.0-01
STARTER RELAY, K1	1240.0-01
STEERING ANGLE SENDER, B40	3715.1-01
STEERING COLUMN ADJUSTMENT CONTROL MODULE, A34w	3231.0-00
STEERING COLUMN ANGLE ADJUST MOTOR, M83	3231.0-00
STEERING COLUMN ANGLE ADJUST POTENTIOMETER, R19z	3231.1-00
STEERING COLUMN LENGTH ADJUST MOTOR, M82	3231.0-00
STEERING COLUMN LENGTH ADJUST POTENTIOMETER, R18z	3231.1-00
STEERING COLUMN MEMORY (LSM)	3231.1-00
STEERING COLUMN MEMORY CONTROL MODULE, A34z	3231.1-00
STEERING COLUMN POSITION SWITCH, S119z	3231.0-00
SUN BLIND CONTROL MODULE, A82	5146.0-00
SUN BLIND MOTOR, M74	5146.0-00
SUN BLIND SWITCH, S110	5146.0-00



# INDEX

SUNROOF MODULE, A33 .....	5410.0-01	UNLOADER RELAY, TERMINAL 61, K61 .....	1230.0-00
SUNROOF MOTOR, M24 .....	5410.0-01	UNLOADER RELAY, TERMINAL R, K3 .....	0670.2-04
SUNROOF SWITCH, S38 .....	5410.0-01	UPPER LEFT TAIL LIGHT, H9025 .....	6314.0-01
SUPPLEMENTAL RESTRAINT SYSTEM (AIR BAG) .....	3234.0-00	UPPER RIGHT TAIL LIGHT, H9030 .....	6314.0-01
SUPPLEMENTAL RESTRAINT SYSTEM CONTROL MODULE, A12 .....	3234.0-00	VEHICLE SPEED SENSOR, B10 .....	6210.0-08
SUPPRESSION FILTER, C900 .....	6424.0-01	VENTILATION FLAP MOTOR, LEFT, M38 .....	6450.0-09
SYMBOLS .....	0140.0-00	VENTILATION FLAP MOTOR, RIGHT, M33 .....	6450.0-08
TAIL LIGHT, LEFT, H25 .....	6314.0-04	WASHER FLUID LEVEL SWITCH, S64 .....	6210.0-06
TAIL LIGHT, RIGHT, H30 .....	6314.0-04	WASHER FLUID LEVEL SWITCH, S136 .....	6210.0-06
TELEPHONE TRANSCEIVER, H38 .....	6561.0-00	WASHER JET HEATER, LEFT, E51 .....	6169.0-00
TEMPERATURE SENSOR, B21z .....	6210.0-07	WASHER JET HEATER, RIGHT, E52 .....	6169.0-00
TEMPERATURE SWITCH, B6235 .....	1290.0-00	WASHER PUMP, M4 .....	6160.0-02
TEMPERATURE SWITCH, S36 .....	6454.0-00	WASHER PUMP RELAY, K5 .....	6160.0-02
THIGH SUPPORT MOTOR, DRIVER'S, M65 .....	5200.0-02	WATER PUMP IN LUGGAGE COMPARTMENT, M86 .....	6167.0-02
THIGH SUPPORT MOTOR, PASSENGER'S, M66 .....	5200.0-02	WATER VALVE ASSEMBLY, Y4 .....	6450.0-02
THIGH SUPPORT POTENTIOMETER, R15 .....	5200.1-04	WINDOW LIMIT SWITCH, LEFT REAR, S45 .....	5133.0-04
THIGH SUPPORT SWITCH, DRIVER'S, S93 .....	5200.0-02	WINDOW LIMIT SWITCH, RIGHT REAR, S46 .....	5133.0-04
THIGH SUPPORT SWITCH, PASSENGER'S, S94 .....	5200.0-02	WINDOW MONITORING SWITCH (DWA), DRIVER'S, S100 .....	6575.1-05
THROTTLE CONTROL MODULE (EML), A6004 .....	1270.1-01	WINDOW MONITORING SWITCH (DWA), PASSENGER'S, S99 ..	6575.1-05
TRANSMISSION CONTROL MODULE (EGS), A8500 .....	2460.0-01	WINDOW MONITORING SWITCH (DWA), LEFT REAR, S102 .....	6575.1-05
TRANSMISSION RANGE SELECTOR LEVER LIGHT, S8518 .....	2460.0-03	WINDOW MONITORING SWITCH (DWA), RIGHT REAR, S101 .....	6575.1-05
TRANSMISSION VALVE UNIT, Y8505 .....	2460.0-02	WINDOW MOTOR, LEFT REAR, M20 .....	5133.0-04
TRUNK COMPARTMENT LIGHT, E32 .....	6320.0-03	WINDOW MOTOR, RIGHT REAR, M22 .....	5133.0-04
TRUNK LID LIGHT, LEFT, E9033 .....	6320.0-03	WINDOW SWITCH, S40z .....	5133.0-00
TRUNK LID LIGHT, RIGHT, E9133 .....	6320.0-03	WINDOW SWITCH, PASSENGER'S, S97 .....	5133.0-02
TRUNK LID LOCKING SWITCH, S117 .....	5126.0-01	WINDSHIELD WASHER JET HEATERS .....	6169.0-00
TRUNK LID SWITCH, S61 .....	6320.0-03	WIPER MOTOR, M3 .....	6160.0-01
TRUNK LOCK MOTOR, M17 .....	5126.0-02	WIPER PRESSURE CONTROL (ADV) RELAY, K12 .....	6164.0-01
TURN/HAZARD LIGHTS .....	6312.0-00	WIPER PRESSURE CONTROL MOTOR (ADV), M6 .....	6164.0-01
TURN LIGHT, LEFT FRONT, H7 .....	6313.0-02	WIPER RELAY I, K36 .....	6160.0-01
TURN LIGHT, LEFT REAR, H6 .....	6313.0-02	WIPER RELAY II, K37 .....	6160.0-01
TURN LIGHT, RIGHT FRONT, H4 .....	6313.0-02	WIPER RELAY III, K38 .....	6160.0-01
TURN LIGHT, RIGHT REAR, H5 .....	6313.0-02	WIPER/WASHER SWITCH, S5 .....	6160.0-00
UNDERHOOD LIGHT, E20 .....	6314.0-04	ZKE CENTRAL LOCKING (ZV) .....	5126.0-00
UNDERHOOD LIGHT SWITCH, S19 .....	6314.0-04	ZKE DOOR LOCK HEATING (TSH) .....	5120.0-00
UNLOADER RELAY, TERMINAL 15, K9 .....	0670.2-04	ZKE HEADLIGHT WASHER (SRA) .....	6167.0-00
		ZKE INTERIOR LIGHTS CONTROL (IB) .....	6330.0-00



# INDEX

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ZKE POWER WINDOWS (FH) .....	5133.0-00
ZKE SUNROOF (SHD) .....	5410.0-00
ZKE WINDSHIELD WIPER PRESSURE CONTROL (ADV) .....	6164.0-00



## 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, lines 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.

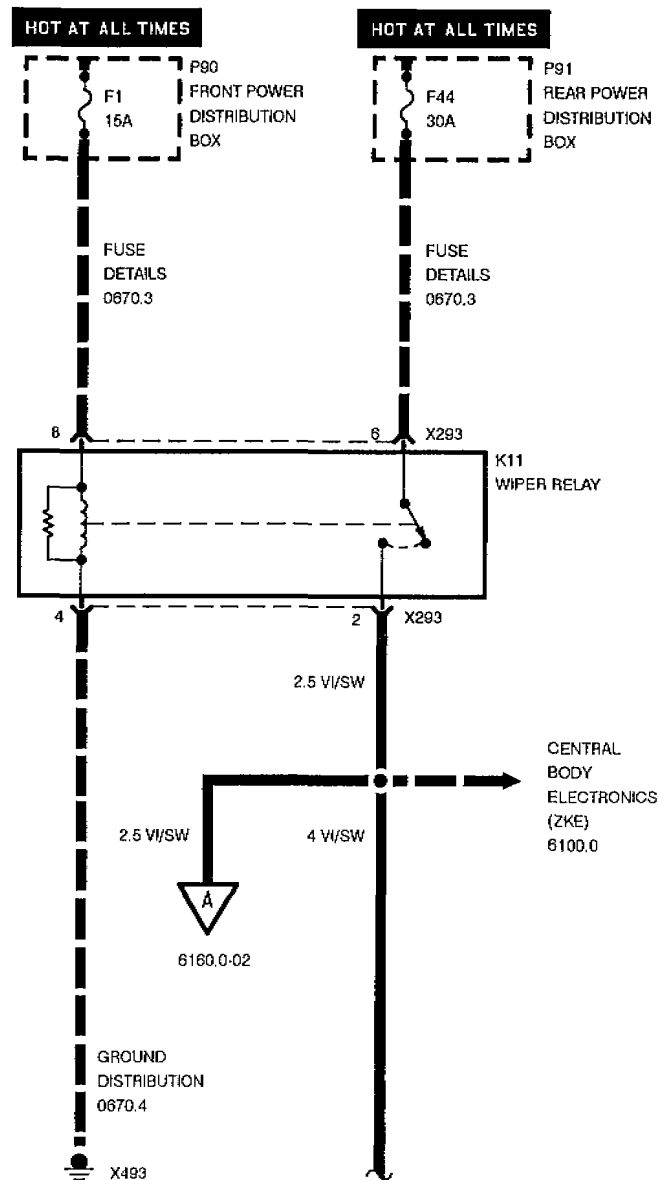
All circuit symbols used are listed and explained in cell **0140.0 Symbols**.

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.

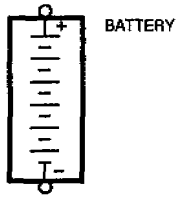
## Example

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

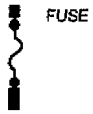


## General Conventions

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.



BATTERY



FUSE



FUSIBLE LINK



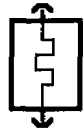
CIRCUIT BREAKER



SOLENOID



SOLENOID CONTROLLED VALVE  
OR CLUTCH SOLENOID



HEATING ELEMENT



LOUDSPEAKER OR HORN



LIGHT



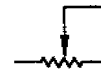
PERMANENT MAGNET MOTOR  
ONE SPEED



PERMANENT MAGNET MOTOR  
TWO SPEEDS



KNOCK SENSOR



VARIABLE RESISTANCE  
SENSOR  
VARIABLE CONTACT IS  
MOVED BY AN EXTERNAL  
FORCE



VARIABLE RESISTOR  
RESISTANCE IS CHANGED  
BY TEMPERATURE OR  
PRESSURE



INDUCTIVE SENSOR



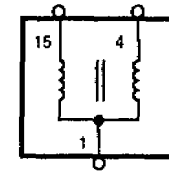
DIODE  
CURRENT CAN FLOW ONLY  
IN DIRECTION OF ARROW



ZENER DIODE  
TO REGULATE VOLTAGE



LIGHT EMITTING DIODE



IGNITION COIL



CONTROL/POWER ELECTRONICS



RADIO



TRANSISTORIZED SWITCH



OXYGEN SENSOR



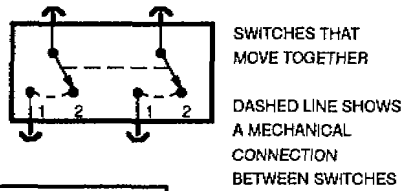
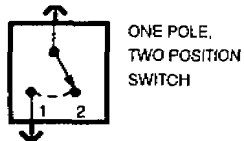
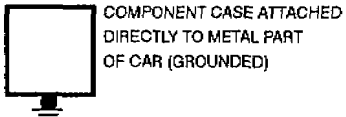
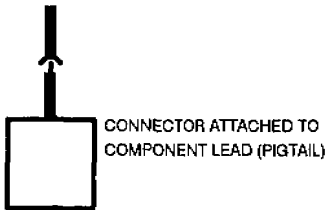
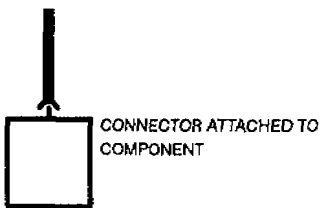
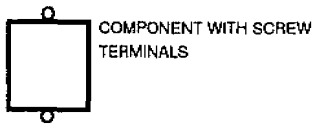
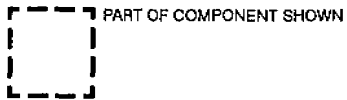
VEHICLE SPEED SENSOR



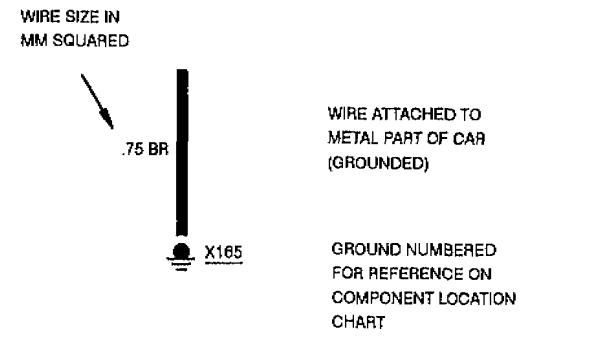
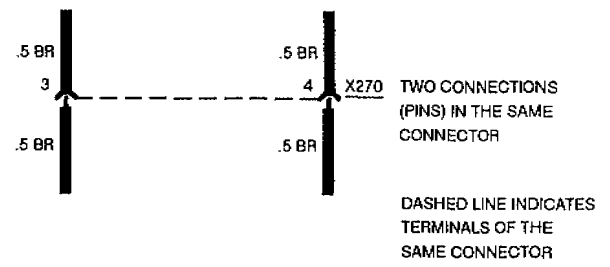
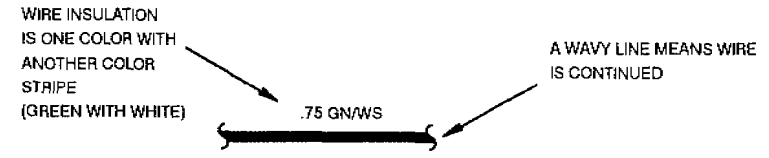
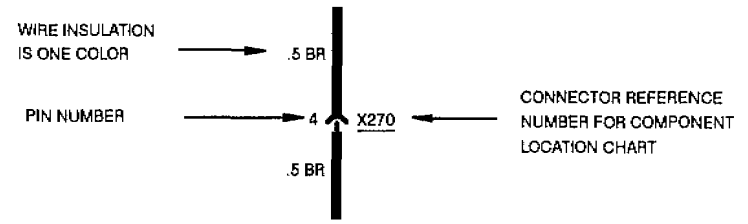
THERMO SWITCH



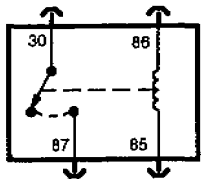
# SYMBOLS



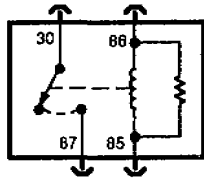
WIRE COLOR	
BL	BLUE
BR	BROWN
GE	YELLOW
GN	GREEN
GR	GRAY
OR	ORANGE
RS	PINK
RT	RED
SW	BLACK
VI	VIOLET
WS	WHITE
TR	TRANSPARENT



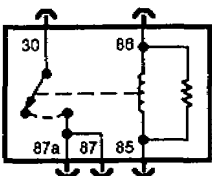




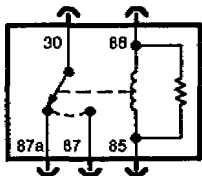
CONTACT RELAY



RELAY WITH RESISTOR ACROSS WINDING

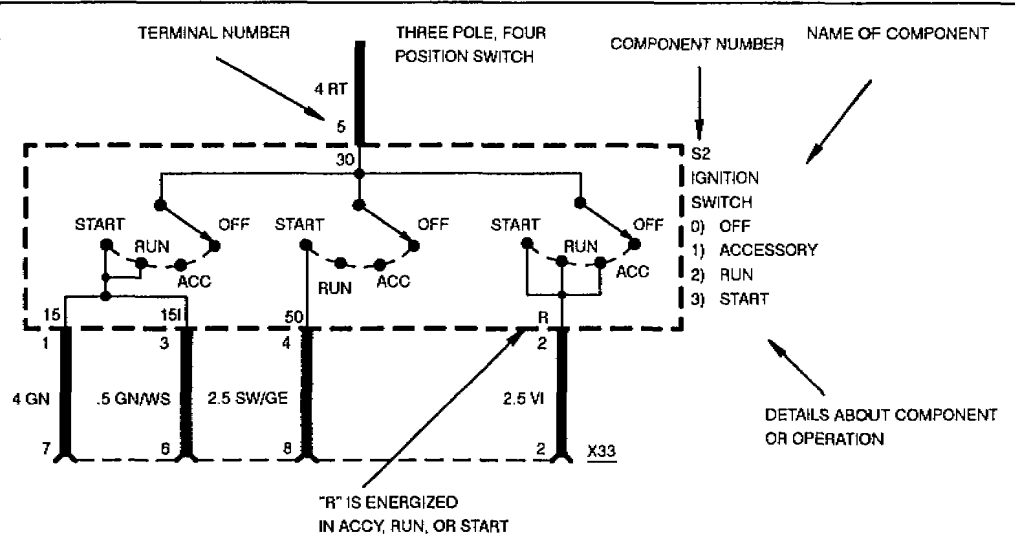


CONTACT RELAY WITH TWO OUTPUTS



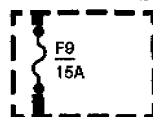
CHANGEOVER RELAY WITH TWO OUTPUTS

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

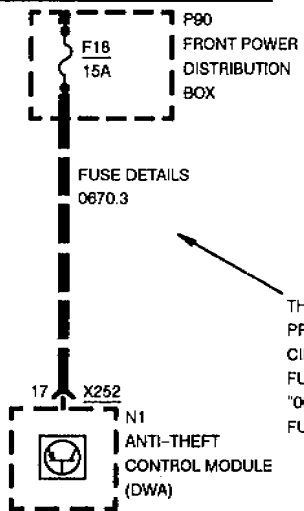
VOLTAGE: IGNITION SWITCH IN RUN OR START

VOLTAGE: IGNITION SWITCH IN ACCESSORY, RUN OR START

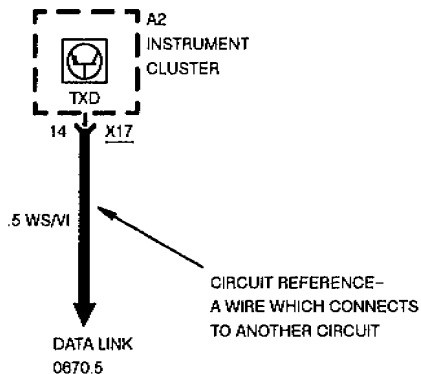


# SYMBOLS

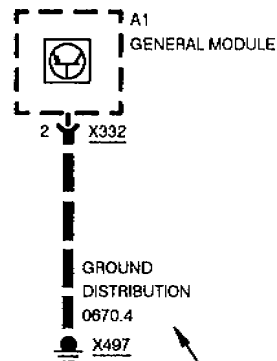
## HOT IN ACCY, RUN AND START



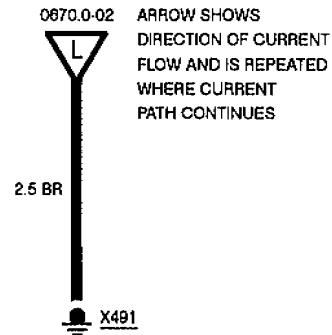
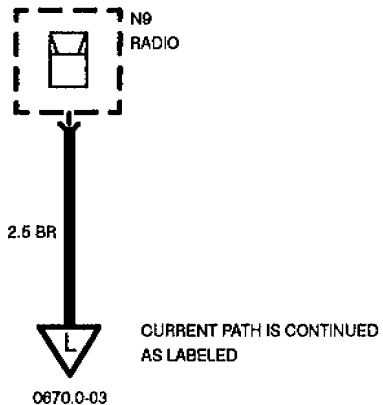
THE COMPLETE WIRE PROGRESSION AND FURTHER CIRCUITS CONNECTED TO FUSE 18 ARE SHOWN IN CELL "0670.3 FUSE DETAILS" AT FUSE 18



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





# SYMBOLS

## BLOCK DIAGRAM

