Mercedes-Benz

Service

Electrical Troubleshooting Manual (USA)

Models 450SL/450SLC • Model Year 1974

Mercedes-Benz of North America, Inc.
Mercedes-Benz Canada, Ltd.
Service and Parts Literature

SECTION I - INTRODUCTION

This third issue of the Mercedes-Benz Electrical Troubleshooting Manual includes information for 1974 models 450 SL and 450SLC.

The format is similar to the 230/240D/280 issue with only minor changes incorporated. The component location index has been repositioned such that components on a given page are indexed on the page opposite the schematic. For example, the components shown on schematic page 4-4 are listed, in left to right order, on page 4-5. Components whose locations are obvious, such as headlights, etc., have been dropped from the index.

A new feature of the schematic has been added on page 4-11, Power Bus Details. This section shows individual wires that make up both the Battery Bus and the Start-Run Bus. For example, if you wish to know where power originates for the window Relay, terminal 3, (see 4-7, A5) refer to the Power Bus Details on page 4-11, C25. As before, power buses are drawn at the top of the sheet and ground buses near the bottom. Care has been taken to arrange circuit components such that the operation of a circuit can be easily and correctly understood. Ample notes are included to assure understanding of the intended circuit operation.

Two power buses are used on the Schematic/Wiring Diagram. The "Battery Bus" is connected directly to the battery and is "hot" or energized at all times, regardless of position of the key switch. See page 4-3, B18 and 4-11, C23 and notice that the battery plus terminal is connected to the Battery Bus permanently. The second bus used is the "Start-Run Bus". This bus is "hot" only when the key switch is in the start or run positions. Refer to 4-3, B11 and trace power from the Battery Bus through the key switch to the Start-Run Bus.

All switches and other components are shown as they exist when the vehicle is "at rest." At rest means doors closed, seats unoccupied, engine off, shift lever in park or neutral, temperature stabilized at 20°C/59°F, key out of ignition, light switch off, etc. The manner in which each component operates is explained in notes on the Schematic/Wiring Diagram. See page 4-8, G16. The Engine Temperature Switch is closed when the engine coolant temperature is above 100°C/212°F.

When a component is shown in its entirety in one location on the Schematic/Wiring Diagram, it is outlined with a solid heavy line. When a component is used in more than one location, it is outlined with a dash-dot heavy line. For example, the key switch is shown with a dash-dot outline indicating that component is shown in more than one location. See 4-3, B10 and 4-4, B17. On the other hand, fuse 13 (4-4, D17) is outlined with a solid line because all wire connections to it are shown in this one schematic location.

All wiring between components is shown exactly as it actually exists on the vehicle. Wiring internal to complicated components (for example, the Ignition Switch or the Light Switch) has been modified to aid in understanding electrical operation. In these cases, multiple pole, multiple throw switches are shown. To properly use the Schematic/Wiring Diagram, mentally position all switch poles to the same position and then trace the current paths through the component. It is important to remember that the switches actually function precisely as shown when measured from the switch terminals. For example, the Key Switch page 4-3, B10 and page 4-4, B17 is drawn as a four pole switch, each pole with four throws or positions, one each corresponding to the actual four Ignition Switch positions, Off, 1, 2, and Start. By mentally positioning all four poles to, say, Start, you see the only circuits through the Ignition Switch that are completed when the switch is actually in the Start position are terminal 30 to 50 and terminal 30 to R. Circuits which involve transistorized parts require special troubleshooting procedures. For example, if the Safety Interlock Circuit (page 4-3, D5) does not function, first check all circuits external to the relay logic unit. Using a voltmeter, check for power at terminals 7 and 8. Be sure the Key Switch is turned to the Run position before checking for voltage on terminal 7. Ground terminal 1 and with the Ignition Key in the Start position, check that the AC/Starter Relay picks up. Using an ohmmeter, check that the Seat Switches, Buckle Switches and Starter Lockout Switch, terminals 2, 5, 6, 9, 10 on the Logic Relay connector, all show shorts to ground when the switches are operated. If all external circuits operate properly, the fault lies within the transistorized Logic Relay and it is replaced.

PROCEDURE FOR SYSTEMATIC TROUBLESHOOTING

Systematic troubleshooting should proceed through the following five steps:

1 VERIFY THE COMPLAINT

Check the complaint to be sure the problem is real. If the customer is available, ask him to demonstrate the problem to you. Road test the vehicle if necessary but in any case, get first hand knowledge of the complaint. If there are several symptoms, note them all and then look for one failure that could cause them all. It is rare for more than one failure to occur at a time. For example, you are troubleshooting a 450 SL. The customer has complained that 1) the turn signal does not work, 2) the windows and sliding roof are inoperative, 3) the backup lights are out and 4) all instrument gauges except the clock do not work.

2 LOCATE THE FAULT ON THE SCHEMATIC

Use the circuit index at the beginning of Section IV to locate on the schematic the inoperative circuits. In this example you find the turn signal circuit on page 4-4, D6, the window circuit on page 4-7, D5, the sliding roof on page 4-11, D10, the backup lights on page 4-11, D18 and the instrument gauges on page 4-7, D22.

3 ANALYZE THE CIRCUIT

Since the customer stated that all of the complaints seemed to occur at one time, you should look for some feature of the electrical design that is common to all of the complaints. In this example, you notice that all the faulty circuits are supplied with power by fuse 12. Circuit analysis requires much thought. No two cases are alike. You can save troubleshooting time by carefully examining the schematic rather than making unnecessary electrical measurement on the vehicle or replacing suspected components.

4 CORRECT THE FAILURE

In this example, replace the fuse to correct the failure. In most cases, fuses fail because they have been overloaded, not from old age or some other reason. To correct the reason for the fuse failure, you must isolate and test each circuit which is fed through fuse 12. After replacing fuse 12, all faulty circuits once again work properly. Now to the task of locating the reason for the fuse failure. Basically, locating the reason for the fuse failure requires that each circuit supplied by fuse 12 be individually tested. Since fuse 12 was overloaded, you should suspect that one of the circuits supplied by it has a short to ground. Good procedure is to check the easy circuits first.

For example, turn the Key Switch to the Run position (to supply power to the Start-Run Bus) and operate the Window Switches and Sliding Roof Switches. Similarly the Turn Signals Switch is turned to both left and right turn positions and verified to not contain the short.

Turning your attention to the Backup Light circuit, you shift into reverse and fuse 12 immediately fails. Good troubleshooting practice calls for splitting a suspected circuit in half to quickly isolate the fault. You therefore disconnect C104, located in the right kick panel and now fuse 12 does not blow. The short is therefore beyond C104.

An examination of the right rear backup light shows a short within the bulb socket.

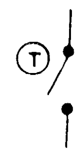
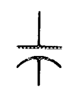
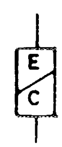
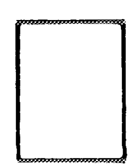
5 CHECK FOR PROPER CIRCUIT OPERATION

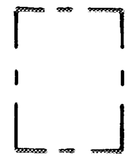
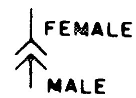
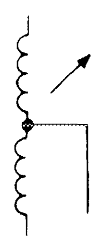
Good practice requires that you check all parts of the circuit you have worked on. After correcting the short, test not only the backup Light circuit, but also the Turn Signals, Windows and Roof.

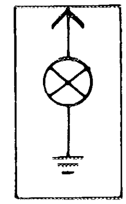
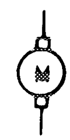
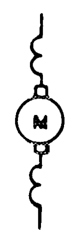
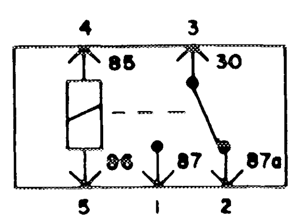
SECTION II - STANDARD SYMBOLS AND DEFINITIONS

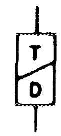
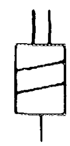
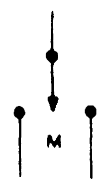
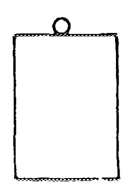
1. STANDARD SYMBOLS

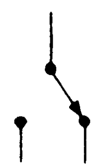
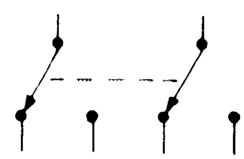
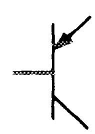
The following electrical symbols are used in the Electrical Trouble-shooting Manual.

Temperature switch	
Capacitor	
Clutch, electric	
Coil	
Component, shown complete in one position on Diagram	

Component, shown in more than one position on Diagram	
Connector	
Diode	
Fuse	
Electric gauge	
Ground or chassis	

Ground shown elsewhere	
Light bulb	
Motor, permanent magnet	
Motor, series field	
Spark gap	
Relay (contacts as shown with no voltage applied to coil)	

Relay coil, time delay	
Relay coil, two windings	
Switch, momentary (Returns to center off position when released)	
Resistor, fixed value	
Resistor, variable value	
Screw terminal	

Solenoid valve	
Switch, normally closed	
Switch normally open	
Switch, one pole, two positions	
Switch, two poles, two positions (Dashed line indicates the two poles move together)	
Transistor	

2. WIRE SIZE AND COLOR

Wire size and insulation color is shown on the Schematic/Wiring Diagram as an aid in locating specific wires. Wire size, (crossection area) is shown in millimeters square, 0.5, 0.75, 1.0, 1.5, 2.5, 4.0, 6.0, 10, 25 and 35. The first color shown on the Diagram is the base or overall insulation color. Second and third colors, if any, designate striping. Solid brown insulation is used exclusively for wires that are grounded.

The color code used in this Manual is somewhat different from the code used in Mercedes Benz documents prepared in Germany. All color codes used in the Manual are two letter, selected to closely relate to the English word they represent. Notice that lower case letters are used.

COLOR	CODE USED IN ETM	GERMAN EQUIVALENT
White	wt	ws
Green	gn	gn
Brown	br	br
Yellow	yl	ge
Gray	gy	gr
Pink	pk	rs
Blue	bu	bl
Red	rd	rt
Black	bk	sw
Ivory	iv	el
Natural	nt	nf
Violet	vi	vi

Example:

Wire designation: 1.5 gy/rd
Wire size: 1.5 mm^2
Insulation base color: gray
Insulation strip color: red

3. FUSE DATA

The maximum current carrying capacity of fuses is coded according to the color of the porcelain fuse body as follows:

yellow	– 5 amperes
white	– 8 amperes
red	– 16 amperes
blue	– 25 amperes

Proper fuse sizes are as follows:

1 – 8a	11 – 16a
2 – 8a	12 – 8a
3 – 16a	13 – 8a
4 – 16a	14 – 8a
5 – 25a	15 – 16a
6 – 5a	16 – 8a
7 – 16a	17 – 8a
8 – 8a	18 – 8a
9 – 8a	19 – 8a
10 – 8a	20 – 16a

F 1
flasher

F 2
antenna
warning buzzer, right & left
tail/parking lights, right & left
standing/parking lights
glove box, trunk light,
interior lights, clock

F 3
sliding roof
windows

F 4
windows

F 5
cigar lighter
high beams
high beam indicator
windshield wiper/washer
horns

F 6
radio

F 7
blower motor control
heater control valves

F 8
not used

F 9
AC control

F 10
kickdown
coldstart circuit
brake lights
cruise control

F 11
heated rear window

F 12
turn signal
change-over circuit
sliding roof
backup lights
windows
instruments

F 13
gear shift light,
instrument cluster lights
blower switch lights
heater control lights
A.C. Thermostat light
flasher switch light
right tail/parking light
right front standing/parking light

F 14
fuel injection circuit
hot start circuit

F 15
not used

F 16
left tail/parking
left front standing/parking

F 17
right high beams
high beam indicator

F 18
left high beams

F 19
right low beam

F 20
fog
left low beam

4. RELAY KEY CODE DESTINATION

Since the exact position of relays varies due to manufacturing convenience, the harness leading to each relay is tagged as a means to identifying each relay. The following listing identifies the key numbering system.

Key Number	Function
1	Fuel pump
2	Cold Start Valve
3	Fuel Injection
4	A/C Starter
5	Change-over Valve
10	Windows/Sliding roof

5. CONNECTOR LIST

C 102	Impulse trigger (Trigger points)
C 103	Fuel injection circuit
C 104	Rear harness circuits
C 105	Charge-start circuit (3 or 4 terminal)
C 106	Combination switch
C 108	Electric window circuit
C 109	Front dome light
C 110	Rear dome light
C 111	Hot start circuit
C 116	Ignition points terminal block
C 117	Heater controls lights
C 118	Cruise control
C 119	Cruise control
C 120	Cruise control
C 121	Cruise control
C 122	Heater control valves
C 123	Heated rear window