

4.2L V8 & 5.6L V8

Article Text

1988 Mercedes-Benz 560SEL

For 1

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Saturday, July 14, 2012 11:33AM

ARTICLE BEGINNING

1988 ENGINES

Mercedes-Benz 4.2L & 5.6L V8

420SEL, 560SEC, 560SEL, 560SL

*** PLEASE READ THIS FIRST ***

NOTE: For engine repair procedures not covered in this article, see ENGINE OVERHAUL PROCEDURES - GENERAL INFORMATION article in the GENERAL INFORMATION section.

ENGINE CODING

ENGINE IDENTIFICATION

The engine family designation is shown on the emission control information plate (attached to radiator crossmember). The 1st character identifies the model year ("J" for 1988) while the 4th and 5th characters identify the engine displacement.

ENGINE IDENTIFICATION CODES TABLE

Application	(1) Engine Designation	Engine Code
4.2L V8		
420SEL	116.965	JMB4.2V6FA14
5.6L V8		
560SEC	117.968	JMB5.6V6FA13
560SEL	117.968	JMB5.6V6FA13
560SL	117.967	JMB5.6V6FA24

(1) - The engine designation code must be used when ordering parts.

ENGINE, MANIFOLDS & CYLINDER HEADS

ENGINE

Removal

1) On 560SL remove engine hood. Remove complete exhaust system. On other models, move engine hood to vertical position. Remove exhaust pipe at manifolds.

2) Drain cooling system, using both left and right engine block drains. Disconnect and remove battery and bracket. Discharge air conditioning system and disconnect hose lines at compressor.

3) Disconnect coolant hoses. Remove radiator and engine cooling fan. Remove all vacuum, fuel and electrical lines leading to engine. Remove right drag link end from ball stud.

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WATER PUMP

Removal

Disconnect necessary water hoses and components from water pump housing. Remove distributor and 8 water pump mounting bolts. Remove pump from vehicle.

Installation

To install, reverse removal procedure.

NOTE: For more information, see ENGINE COOLING SYSTEMS article in this section.

TORQUE SPECIFICATIONS TABLE

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Camshaft Bracket Bolts	36 (49)
Camshaft Sprocket Bolts	75 (100)
Chain Tensioner Nut	80 (109)
Connecting Rod Bolts	
Step 1	33 (45)
Step 2	Angle Tighten 90 Degrees
Crankshaft Pulley Bolt	295 (400)
Cylinder Head Bolts (Engine Cold)	
Step 1	22 (30)
Step 2	43 (58)
Step 3	(1)
Flywheel (Drive Plate) Bolts	
Step 1	25 (35)
Step 2	Angle Tighten 90 Degrees
Hydraulic Valve Lifters	36 (49)
Main Bearing Caps	
Large Bolts	37 (50)
Small Bolts	22 (30)
Oil Pressure Relief Valve	29 (39)

(1) - After torque values are achieved, run engine at normal operating temperature. Let engine set for 10 minutes then loosen and retighten cylinder head bolts to specification shown.

ENGINE SPECIFICATIONS

GENERAL ENGINE SPECIFICATIONS

GENERAL SPECIFICATIONS TABLE

O	Oxygen
O.D.	Outside Diameter
O/S	Oversize
O2	Oxygen
OC	Oxidation Catalyst
OCC	Output Circuit Check
OD	Overdrive
ODO	Odometer
OHC	Overhead Camshaft
ORG	Orange
OSC	Output State Check
Opt.	Option or Optional
oz.	Ounce
ozs.	Ounces

"P" ABBREVIATION TABLE

"P" ABBREVIATION TABLE

ABBREVIATION	DEFINITION
"P"	Park
P/C	Printed Circuit
P/N	Park/Neutral
P/S	Power Steering
PAV	Pulse Air Valve
PC-SOL	Purge Control Solenoid
PCM	Powertrain Control Module
PCS	Purge Control Solenoid
PCSDM	Passenger Compartment Sensor/Diagnostic Module
PCV	Positive Crankcase Ventilation
PFE	Pressure Feedback EGR sensor or circuit
PFI	Port Fuel Injection (see MA SEFI)
PGM-CARB	Programmed Carburetor
PGM-FI	Programmed Fuel Injection
PIP	Profile Ignition Pickup
PNK	Pink
PPL	Purple
PRNDL	Park Reverse Neutral Drive Low
PROM	Programmable Read-Only Memory
psi	Pounds Per Square Inch
PSPS	Power Steering Pressure Switch
PTC	Positive Temperature Coefficient
PTO	Power Take-Off
PWR GND	Power Ground circuit
Pkg.	Package
Press.	Pressure
Prog.	Programmed or Programmable
Pts.	Pints
Pwr.	Power

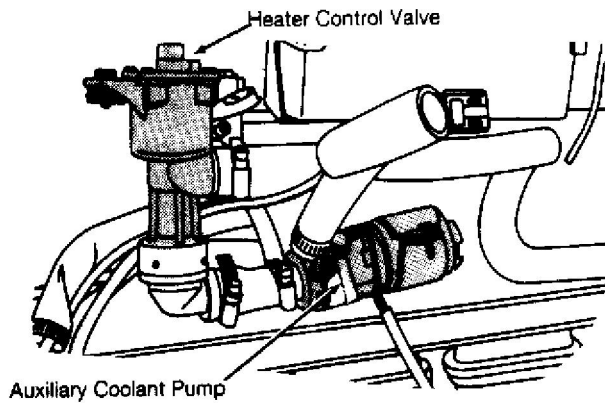


Fig. 4: Heater Control Valve & Auxiliary Coolant Pump

Cold Engine Lock-Out Switch

Switch is located in coolant passage on engine block (on cylinder head on 560SL). It prevents blower operation if heating mode is selected when coolant temperature is below 95 °F (35 °C).

ELECTRONIC CONTROL UNIT (ECU)

Electronic signals from sensor and from temperature dial settings are processed in ECU. See Fig. 5. It controls coolant flow through heater valve, mode change (heating to cooling), position of fresh/recirculated air door, and signals to blower speed control unit. The control unit also activates the compressor engagement.

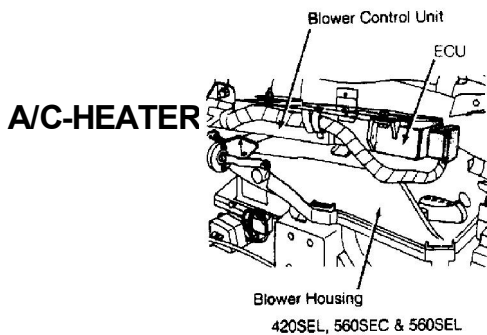
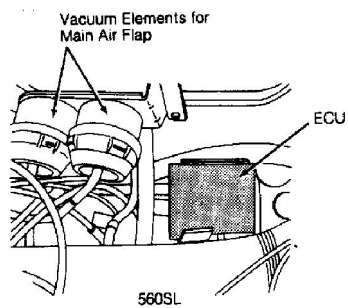


Fig. 5: Electronic Control Unit Locations
 Courtesy of Mercedes-Benz of North America.

main air flap.

18) Pry clips holding main flap housing and remove. Pry remaining clips around A/C-heater (evaporator-to-heater core) housing. Remove screws holding vacuum switchover valve to case. Remove left side panel.

19) Remove main air flap shaft. Separate A/C-heater housing and remove evaporator.

Installation

To install, reverse removal procedure. Make sure evaporator housing joining surfaces are well sealed during reassembly.

HEATER TEMPERATURE SENSOR

Removal & Installation

Remove radio. Remove ashtray. Detach 2-pin connector from sensor. Pull sensor from heater housing. On 420SEL and 560SL use a screwdriver to remove sensor from guide tube. Make sure the screwdriver is inserted between guide tube and sensor, not between guide tube and center air duct. See Fig. 3. To install, reverse removal procedure.

IN-CAR TEMPERATURE SENSOR

Removal & Installation

Disconnect battery. Remove instrument cluster. Detach electrical connector from in-car temperature sensor. Detach air hose. Pull lower half of sensor downward while lifting retaining tongs. Pull sensor out through top of instrument panel. To install, reverse removal procedure.

A/C SYSTEM SPECIFICATIONS

A/C SYSTEM SPECIFICATIONS TABLE

Application	Specification
System Type	Cycling Clutch
Compressor Type	Nippondenso 10-Cyl.
Refrigerant Capacity	39 oz.
Compressor Oil Capacity	4.1 oz.
System Pressures	
Low Side	24-34 psi (1.7-2.4 kg/cm ²)
High Side	230-275 psi (16.2-19.3 kg/cm ²)

VACUUM DIAGRAMS

Noisy 2 (2) Further inspection required.

Plies separated A Require replacement.

Serpentine belt routed incorrectly B Require repair.

Tension out of specification B Require adjustment or replacement.

Worn beyond adjustment range B Require replacement.

Worn so it contacts bottom of pulley A Require replacement.

(1) - Determine cause of incorrect alignment and require repair.
 (2) - Determine cause of noise and suggest repair.

BLEND DOORS

See PLENUMS.

BLOWER FANS (BLOWER WHEEL OR SQUIRREL CAGE)

BLOWER FAN (BLOWER WHEEL OR SQUIRREL CAGE) INSPECTION

Condition	Code	Procedure
Attaching hardware broken	A ...	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A ...	Require repair or replacement of hardware.
Application incorrect ...	B ..	Require repair or replacement.
Broken	A	Require replacement.
Cracked	A	Require replacement
Distorted	A	Require replacement.
Fins missing	C	Require replacement.
Hub separated	A	Require replacement.
Inoperative	A	(1) Require replacement.
Mounting loose	A ..	Require repair or replacement.
Noisy	2	Suggest replacement.
Out of balance	A ..	Require repair or replacement.

(1) - Inoperative includes intermittent operation or out of OEM specification.

replacement.
Type incorrect B Require replacement.

- (1) - Determine source of contamination and require correction prior to coolant replacement.
- (2) - Determine source of incorrect level and suggest repair.
- (3) - The system should be drained and/or flushed and refilled with correct coolant according to OEM recommended service interval and procedures.

COOLING FAN BLADES

COOLING FAN BLADE INSPECTION

Condition	Code	Procedure
Application incorrect ...	B	Require replacement.
Attaching hardware broken	A ...	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A ...	Require repair or replacement of hardware.
Bent	A	Require replacement.
Broken	A	Require replacement.
Cracked	A	Require replacement.
Loose	A ..	Require repair or replacement.
Missing	C	Require replacement.

COOLING FAN CLUTCHES

NOTE: Some lateral movement, measured at the fan blade tip, may be normal.

COOLING FAN CLUTCH INSPECTION

Condition	Code	Procedure
Application incorrect ...	B	Require replacement.
Attaching hardware broken	A ...	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A ...	Require repair or replacement

transparent 2 ... Suggest replacement of drier.
 Threads damaged A .. Require repair or replacement.
 Threads stripped (threads
 missing) A Require replacement.
 Tubing connection
 leaking A .. Require repair or replacement.

(1) - Inspect system to determine effects of dessicant bag deterioration.

REFRIGERANT

NOTE: Refrigerants include any SNAP (Significant New Alternative Policy)-approved blends.

REFRIGERANT INSPECTION

Condition	Code	Procedure
Contaminated (other than refrigerant blends)	B	Require service to remove contamination.
Different types of refrigerants in the same system (other than refrigerant blends)	B	Require repair.
Overcharged	B	Require repair.
Refrigerant type does not match fittings and label	B	Require repair.
Undercharged	B	Require repair.

REFRIGERANT OIL

REFRIGERANT OIL INSPECTION

Condition	Code	Procedure
Contaminated	1 ..	Require repair or replacement.
Overfilled	B	Require repair.
Underfilled	B	Require repair.

RELAYS

RELAY INSPECTION

Condition	Code	Procedure
Attaching hardware	*	A/C-HEATER SYSTEM UNIFORM INSPECTION GUIDELINES *Article Text (p. 36)

5000	24.92	+5.0
6000	23.92	+6.0
7000	23.02	+6.9
8000	22.22	+7.7
9000	21.32	+8.6
10,000	20.52	+9.4

(1) - Add correction shown to gauge readings.

PREPARATION FOR TESTING

- 1) Attach Low and High pressure gauges.
- 2) Start engine and allow to warm up.
- 3) Set system to "COOL" and blower to "HIGH".
- 4) Open car doors and hood.
- 5) Run engine at fast idle for 2-3 minutes.

AIR CONDITIONING SYSTEM PERFORMANCE CHECK TABLE

PERFORM TESTS:	SHOULD BE:	IF:
Temperature Check	Temperature Check Is	
* Switch to "LOW" blower.		
* Close doors.		
* Check outlet temperature.	35-45° F	Too warm - Check control lever operation, heater water valve, cooling system and gauge readings.

Visual Check	Visual Check Shows:	
* Compressor	Quiet, No Leaks	Noisy - Check belts, oil level, seals, gaskets, reed valves.
* Condenser	Free of Obstructions	Blocked - Clean off. Plugged - Flush or replace.
* Receiver-Drier	Dry & warm to touch	Frosty - Check for restriction, replace desiccant.
* Sight Glass	Clear or few bubbles	Bubbly, foamy or streaks - Check gauge readings.
* High Side Lines	Dry & warm to touch	Frosty or very hot - Check for restriction or overcharge.
* Low Side Lines	Dry & cool to touch	Frosty or warm - Check for restriction, low charge or bad valve.
* Expansion Valve	Dry	Frosty - Check for

normal power source (battery voltage) is interrupted at any time.

ELECTRICAL SYSTEM

SRS wiring harness outside housing is Yellow. The SRS connectors are Red or White. SRS connectors between air bag module and SRS control unit have gold-plated terminals for maximum conductivity. When these colored 2-wire plug connectors are disconnected, they contain a safety shorting spring inside each plug connector. Safety shorting spring spreads open to touch both terminals, preventing accidental operation of system by static electricity or careless handling.

PASSENGER'S AIR BAG MODULE

Passenger's air bag module consists of the following: inflatable air bag, 2 gas generators, and 2 ignitors. The air bag module is mounted in place of glove box, and on some vehicles, it includes a knee bolster. The 2 gas generators are not ignited together. They are ignited 15 milliseconds apart to achieve a slower inflation of air bag and a slower increase of vehicle's interior air pressure. After about 35 milliseconds, the air bag will be inflated fully. The gas is then released by a filtered ventilation area on windshield side of air bag, and air bag collapses.

A 2-terminal plug connector with gold-plated terminals is mounted to inflator unit at rear of air bag module. If plug connector is disconnected for any reason, a safety shorting spring inside connector spreads open to touch both terminals, preventing accidental operation of system by static electricity or careless handling. Passenger's air bag volume is about 170L. The entire sequence of passenger's air bag inflation and collapse takes about 35-45 milliseconds.

SRS WARNING LIGHT

When ignition is turned on, SRS warning light illuminates along with other instrument panel lights. If no faults are in SRS, warning light will go out after about 4-10 seconds with engine off, or will go out immediately when engine is started. If warning light remains on, this indicates a fault in system. When SRS detects a fault, warning light will remain on until fault is corrected and memory is cleared. If warning light fails to illuminate when ignition is turned on, bulb is faulty, and/or wire to bulb is shorted to ground.

ENERGY ACCUMULATOR (CAPACITOR)

Energy accumulator is also known as energy capacitor. Energy accumulator is used to supply power to SRS control unit if normal power source (battery voltage) is interrupted. If capacitor fails, SRS warning light on instrument cluster will remain on.

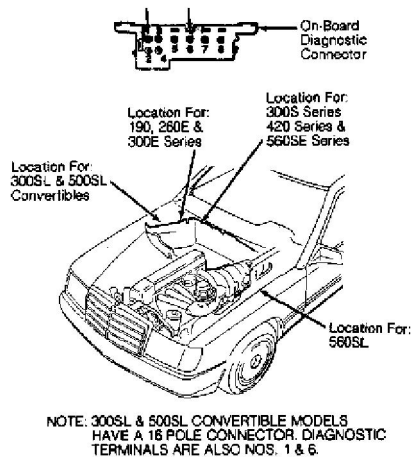
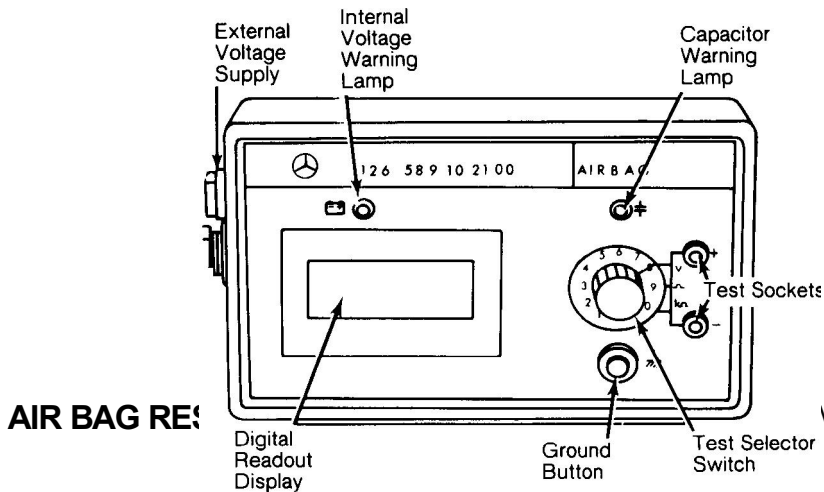


Fig. 5: Locating SRS Diagnostic Connectors
Courtesy of Mercedes-Benz of North America

SRS TESTER PREPARATION

WARNING: Follow air bag service precautions to prevent accidental air bag deployment and personal injury. See SERVICE PRECAUTIONS. DO NOT use ohmmeter or other self-powered meter to test resistance of air bag module, or any SRS component, while system is activated. Use only approved SRS test equipment to perform tests. Perform the following test procedures using SRS Tester (126-589-10-21-00).

NOTE: After component replacement, check system for proper operation. See SYSTEM OPERATION CHECK.



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Fig. 6: SRS Tester (126-589-10-21-00)
Courtesy of Mercedes-Benz of North America.

1) Turn ignition off. Disable the SRS system. Refer to DISABLING & ACTIVATING AIR BAG SYSTEM. Connect SRS Tester (126-589-10-

	Light Defective	* Open In SRS Light Circuit	
		* Open In Control Unit Circuit	
10	Control Unit Was Activated	* Control Unit MUST Be Replaced	

SRS SELF-DIAGNOSTIC CHECK (300SL & 500SL)

NOTE: Perform the following test procedures using SRS Tester (126-589-10-21-00). Testing procedures for SRS components are included in DIAGNOSTIC TEST CHARTS.

Retrieving Trouble Codes

- 1) Connect Impulse Counter (013) to 16-pin diagnosis connector See Figs. 9 and 10. The display U-BATT should appear on impulse counter display. This display indicates impulse counter and voltage supply for impulse counter are okay.
- 2) Turn ignition switch to ON position. To read impulse display, depress START button for 2-4 seconds. Observe and note impulse displays. See TROUBLE CODE IDENTIFICATION table. The number "1" on impulse display indicates there are no fault codes stored in the system. All other numbers (2-10) indicate a specific malfunction.
- 3) If more than one fault is present, fault with the lowest number will appear first. If first impulse display reappears during a system test, it indicates there are no further fault codes stored in the system.

Clearing Trouble Codes

To erase an impulse display, depress START button for 6-8 seconds. A 3-second interval must be observed between reading and erasing an impulse display. Each impulse display must be erased individually. If display does not reappear, it is erased.

ON-BOARD DIAGNOSTIC CONNECTOR LOCATION (300SL & 500SL)

Model	Location
300SL & 500SL Convertibles (1)	Right Rear Corner Of Engine Compartment, On Engine Side Of Component Wall

(1) - These 2 models have a 16-pole diagnostic connector.

DIAGNOSTIC TEST CHART DIRECTORY

Test Steps	Go To Figure:
1 - 5	See Fig. 12
6 - 9	See Fig. 13
9 (Cont.) - 11	See Fig. 14

resistance is incorrect, stator has open or shorted windings and must be replaced.

2) Place ohmmeter on X 1000 scale. Connect ohmmeter between stator core and stator lead. No continuity should exist. If continuity exists, stator is grounded and must be replaced.

Rotor

1) Place ohmmeter on lowest scale. Connect ohmmeter across slip rings. Resistance should be 3.4-3.8 ohms for 55-amp alternator and 2.8-3.1 ohms for 65 through 90-amp alternators.

2) If resistance is too low, rotor has short circuit and must be replaced. If resistance is infinity (no continuity), rotor has open circuit and must be replaced.

3) Place ohmmeter on x1000 scale. Connect ohmmeter between either slip ring and rotor core. No continuity should exist. If continuity exists, rotor is grounded and must be replaced.

4) Clean slip rings using fine sandpaper. Rings which are worn or pitted should be turned on lathe. Minimum ring diameter is 1 1/16". If slip rings are beyond repair, replace slip rings as outlined in steps 5) and 6).

5) Remove rear bearing from slip ring end of rotor. Unsolder wires from slip rings and bend up ends of rotor winding. Pull off slip rings. Ensure ends of rotor winding are not damaged.

6) Insert ends of rotor winding into slip ring and press new slip ring onto rotor. Slip ring end must be 9/64" from end of collar. Solder rotor winding to slip ring terminals. Turn rings on lathe and retest rotor. Maximum slip ring run-out is .0012" (.03 mm).

Bearings

Always replace bearings. If replacement front bearing is sealed on one side only, open side must face rotor. If replacement rear bearing is sealed on one side only, open side must face away from rotor.

Brushes

Ensure brushes are longer than 7/32". Replace if necessary. Unsolder brushes from voltage regulator. Solder new brushes. Do not allow solder to run into strands of brush leads. Brushes must be free to slide in brush holder with normal spring tension of 10-14 ozs. (283-397 g).

NO metal is on magnetic edges of sensor. Coat sensor and steering knuckle bore with Molykote Longterm 2 lubricant.

3) Remove protective tube from cover plate. As they may be used once, remove hex head socket bolt and discard. Pull speed sensor out of steering knuckle bore.

Installation

1) Replace "O" ring on sensor. Mount unit on steering knuckle. Ensure "O" ring is not damaged. Do not force. Attach sensor to knuckle with new bolt. Tighten to 72 INCH lbs. (8 N.m).

2) Attach protective tube to cover plate. Clip cable to holder. Pull through grommet into engine compartment. Replace "O" ring. Connect coaxial cable. Mount front wheel and tire. Complete test program.

REAR AXLE SPEED SENSOR

Removal

Remove rear seat and backrest. With ignition off, remove cable at connector. Remove clips from cable to sensor. Pull cable down through grommets in frame floor and axle carrier. Remove hex head bolt and discard. Remove sensor from rear axle housing.

Installation

To install, reverse removal procedure. Replace "O" ring on sensor. Do not damage "O" ring. Insert sensor into rear axle housing. Using new bolt, attach sensor to rear axle housing and tighten.

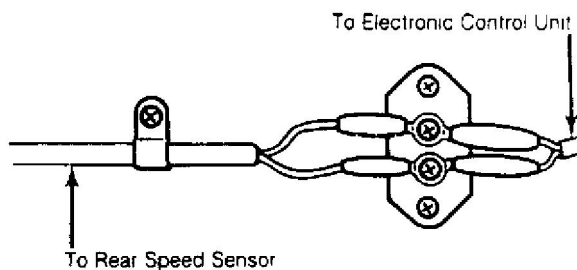


Fig. 3: Rear Speed Sensor Harness Connector (Under Rear Seat)
Courtesy of Mercedes-Benz of North America.

ELECTRONIC CONTROL UNIT

NOTE: Turn ignition off before removing or installing electronic control unit. Unit is located on front wall in engine compartment.

Removal & Installation

Push back holding springs. Remove electronic control unit from bracket. Actuate lock. Pull plug from unit. To install, reverse removal procedure. When mounting on unit, ensure plug engages audibly in lock.

Parking Lock Will Not Engage

Check rear engine mount. Replace engine mount (if necessary).
Check adjustment of selector rod. Adjust selector rod (if necessary).

Selector Lever Cannot Engage "R" Or "P"

With engine running, clean centrifugal governor and ensure correct operation. With engine not running, check operation of detent piston in lower cover.

Engine Cannot Be Started In Selector Lever Position "P" & "N"

Adjust shift rod and starter lock-out switch. Replace starter lock-out switch (if necessary).

Oil Loss With Smoke In Exhaust

Diaphragm in vacuum control unit defective. Transmission oil is being drawn from engine through vacuum line. Replace vacuum control unit (if necessary).

Oil Loss Between Torque Converter & Primary Pump

Seal torque converter oil drain plug. If leak continues, replace radial sealing ring and "O" ring on primary pump. Check primary pump "O" ring groove for porosity. Replace primary pump (if necessary).

Howling Noise When Changing Gears (Under Full Load)

Replace transmission oil filter.

Howling Noise Which Increases As Engine RPM Increases

Check primary pump and replace if necessary.

1st Gear & Reverse Too Loud

Replace front planetary gear set. Reverse and 1st gear are louder than forward (driving) gears due to gear reduction. If noise seems too loud, or if in doubt, a similar vehicle should be used for comparison.

3rd Gear Too Loud

Replace rear planetary gear set.

Rattling Noise at 1500 RPM In All Selector Lever Positions Except "R"

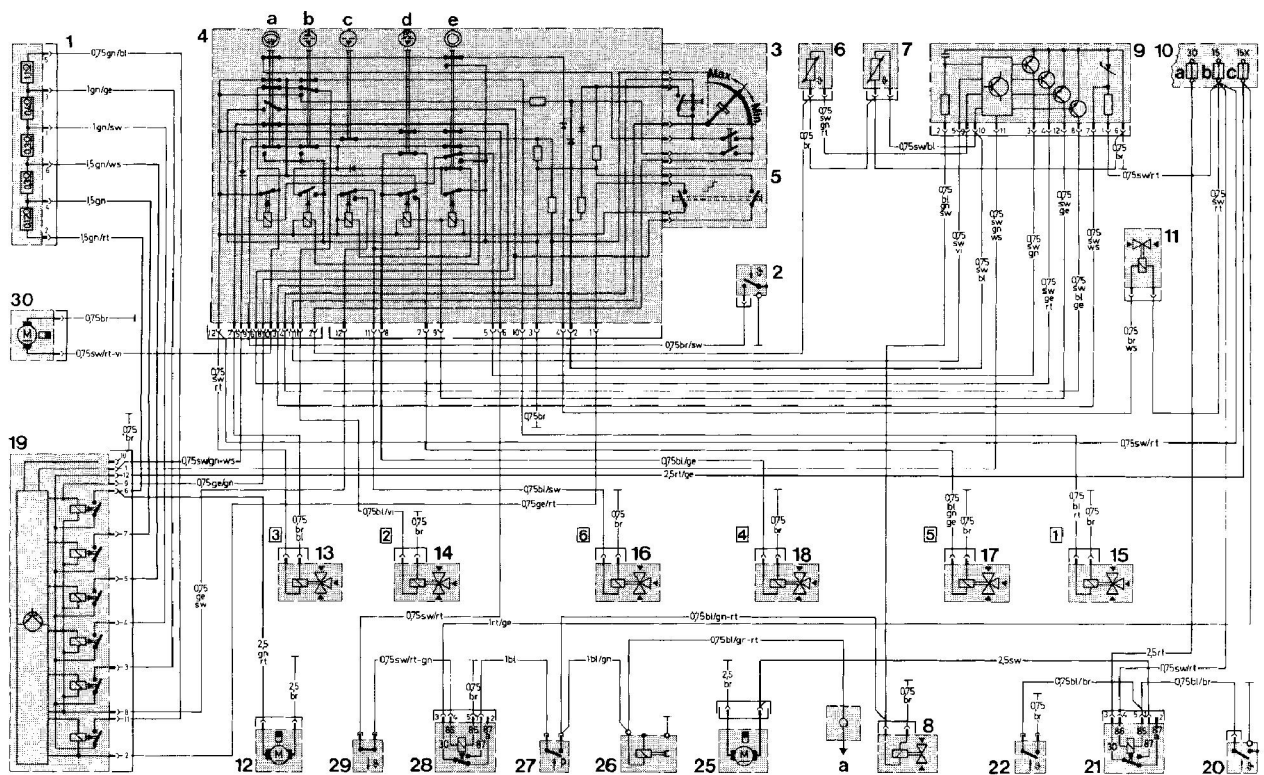
Disc brake B-3 plates are vibrating in transmission housing. Replace plates of disc brake B-3, install damper spring and set release clearance to minimum value.

Light Grinding Noise In "P" & "N" Selector Lever Positions

This condition is normal if a "rolling" noise of front planetary gear set is heard. If noise seems too loud, or if in doubt, a similar vehicle should be used for comparison.

"Rolling" Noises When Driving In Reverse

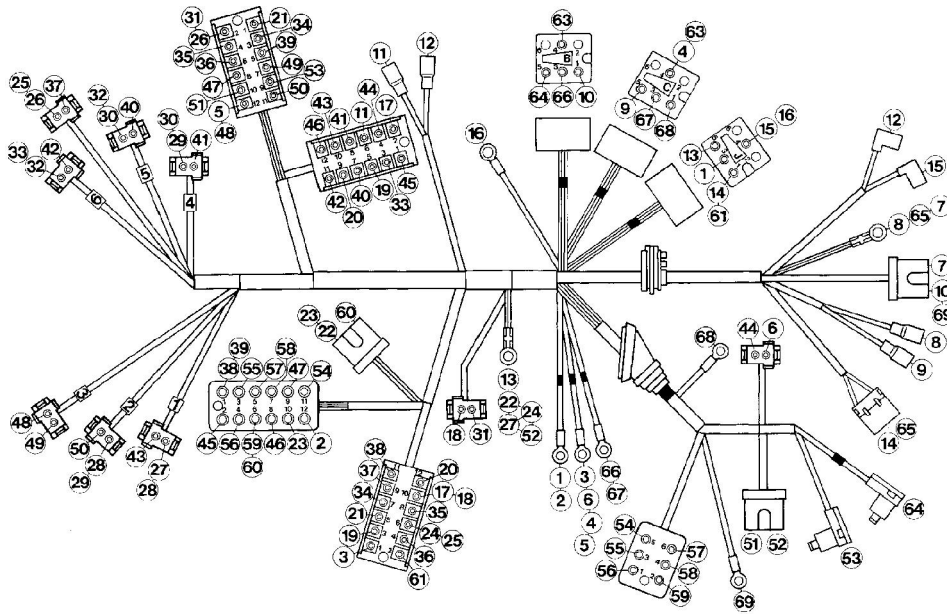
1988 Mercedes-Benz 560SEL For 1 Co



Electric wiring diagram automatic climate control (6-cylinder engine starting 09/81)

- | | |
|---|--|
| <ul style="list-style-type: none"> 1 Pre-resistor group 2 Temperature switch (cold engine lock) 3 Temperature dial 4 Pushbutton switch unit <ul style="list-style-type: none"> a Defrosting b Top and bottom c Normal adjustment (air-conditioning system on) d Normal adjustment (air-conditioning system off) e Off 5 Blower switch 6 Temperature sensor (heat exchanger) 7 In-car temperature sensor 8 Switchover valve rpm increase 9 Electronic switching unit for temperature control 10 Fusebox 11 Monovalve 12 Blower motor 13 Switchover valve for center nozzle flap 14 Switchover valve for legroom flaps 15 Switchover valve for defroster nozzle flaps 16 Switchover valve for fresh air-recirculating air flap and main air flap (small stroke) | <ul style="list-style-type: none"> 17 Switchover valve for fresh air-recirculating air flap and main air flap (large stroke) 18 Switchover valve for scoop air flap 19 Electronic switching unit for blower control 20 Temperature switch 100 °C for auxiliary fan (coolant) 21 Relay auxiliary fan 22 Temperature switch 52 °C auxiliary fan (refrigerant) 25 Auxiliary fan 26 Electromagnetic clutch – refrigerant compressor 27 Pressure switch refrigerant compressor 28 Relay refrigerant compressor 29 ETR-switch 30 Recirculating pump a Lug main harness, signal refrigerant compressor for decel shutoff |
|---|--|
- Fuses:
 Fuse a, terminal 30: 16 amps.
 Fuse b, terminal 15: 8 amps.
 Fuse c, terminal 15x: 25 amps

G00054805
Fig. 14: E: Temperature & Blower Control Electronic Control
AUTOMATIC CLIMATE CONTROL (Article Text (p.12) 1988) Mercedes-Benz 560SELFor 1 Copyright © 1998 Mit
 Courtesy of Mercedes-Benz of North America.



Electric additional harness
Starting 09/81 engine 116, 117

Color code of additional harness

Line no.	Electric line from	to	Color code	Cross section mm ²
1	Fuse 11 terminal 15 X	Relay refrigerant compressor terminal 30	red/yellow	1.0
2	Fuse 11 terminal 15 X	Switching unit blower terminal 12	red/yellow	2.5
3	Fuse 10 terminal 15	Switching unit temperature control terminal 1	black/red	0.75
4	Fuse 10 terminal 15	Relay auxiliary fan pre-resistor terminal 86	black/red	0.75
5	Fuse 10 terminal 15	Pushbutton switch left terminal 12	black/red	0.75
6	Fuse 10 terminal 15	Monovalve	black/red	0.75
7	Ground	Auxiliary fan	brown	2.5
8	Ground	Temperature switch 52 °C	brown	0.75
9	Temperature switch 52 °C	Relay auxiliary fan pre-resistor terminal 85	blue/brown	0.75
10	Relay auxiliary fan terminal 87	Auxiliary fan	black	2.5
11	Pushbutton switch right terminal 6	ETR-switch	black/red	0.75
12	ETR-switch	Pushbutton switch refrigerant compressor	black/red/green	0.75
13	Ground	Relay refrigerant compressor terminal 85	brown	0.75
14	Relay refrigerant compressor terminal 87	Magnetic clutch refrigerant compressor	blue	1.0
15	Pressure switch refrigerant compressor	Relay refrigerant compressor terminal 86	black/red	0.75
16	Signal refrigerant compressor for idle speed regulation	Relay refrigerant compressor terminal 86	blue/green/red	0.75
17	Pushbutton switch right terminal 2	Switching unit temperature control	black/blue	0.75
18	Switching unit temperature control terminal 10	In-car temperature sensor	black/blue	0.75
19	Switching unit temperature control terminal 3	Pushbutton switch right terminal 5	black/green	0.75

AUTOMATIC

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Fig. 27: E: Temperature & Blower Control Electronic Identification - Harness Identification & Color Codes (09/1981 & Later, Engine 116, 117) - Test 1-19 (16 Of 18)
Courtesy of Mercedes-Benz of North America.


G00054817

Impulse Display

Impulse readout Model 126

Note: Fuse no. 5 must be checked first.




Troubleshooting chart

Test scope	Test connection:  Multimeter Test condition	Nominal value	Possible cause/remedy
------------	--	---------------	-----------------------

Impulse display 1

-	-	-	No malfunction can be detected
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Impulse display 2/3

In-car temperature sensor B10/4, short/open circuit	 on temperature sensor B10/4	Ambient temperature $^{\circ}\text{F}/^{\circ}\text{C}$ 50/10 59/15 68/20 77/25 86/30 95/35 104/40 113/45	Resistance value In-car temperature sensor k Ω 18.3-21.5 15.2-17.2 11.5-13.5 9.5-10.5 7.5-8.5 6.0-7.0 4.5-5.5 3.5-4.5	In-car temperature sensor defective
Wiring to in-car temperature sensor	Remove pushbutton control unit  on right connector socket 2 socket 12  on right connector socket 2 and on connector B10/4 socket gy/yl	$\infty \Omega$ $< 1 \Omega$		Wiring to in-car temperature sensor is shorted to ground Wire to in-car temperature sensor has an open circuit

G00055750

Fig. 41: Impulse Display 1-3 (1 Of 10)
 Courtesy of Mercedes-Benz of North America.

Location of components

In-car temperature sensor and aspirator blower

The in-car temperature sensor (B 10/4) is located in the front dome lamp housing.

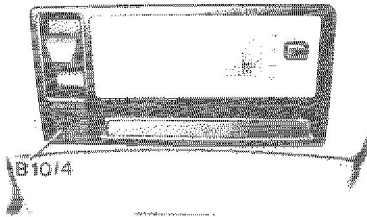


Fig. 83/5

With the ignition switched on, the aspirator blower (M9) runs continuously and is connected with a hose to the in-car temperature sensor. This increases the accuracy of temperature control inside of the vehicle.



Fig. 83/6 Aspirator blower (M9) under dash, right

Heat exchanger temperature sensor

The temperature sensor (B10/1) is located inside the heat exchanger housing and accessible after removing the pushbutton unit.

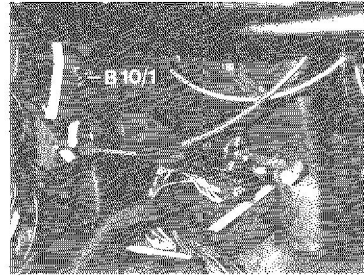


Fig. 83/7

Evaporator temperature sensor

This sensor (B10/6) is located in the evaporator housing on the left side above the accelerator pedal.

The sensor probes the evaporator in air temperature and transmits its resistance to the electronic system of the pushbutton switch unit. This sensor value provides input for temperature regulation and evaporator freeze protection. As a result, the outlet temperature at the air outlets (nozzles) will fluctuate only slightly. The sensor also prevents icing-up of the evaporator.



Fig. 83/8

00000728

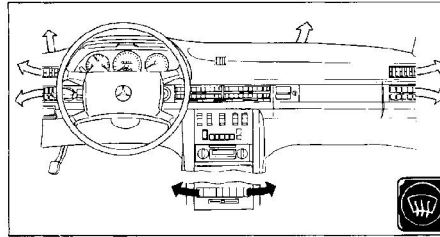
Fig. 54: Model 124 (1986) - Component Locations (1 Of 5)
Courtesy of Mercedes-Benz of North America.

Test 10:

Selector dial	Function button	Blower
At will	"a"	At will

- Blower running at max. speed (6th stage).
- Monovalve open (no – connected).
- Recirculating pump running.
- Compressor switched on at outside temperatures $>4\text{ }^{\circ}\text{C}$.
- Main air flap open (fresh air).

Also refer to vacuum function diagram 1, 83–604.



1832-9670/1

Air conditions

Outside air



Cooled air



Heated air



Leak air (warm)



1824-980A

Test 11:

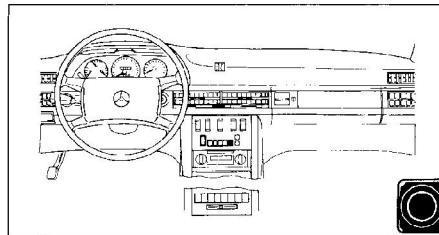
Selector dial	Function button	Blower
MIN	"b"	"f"

- After switching to "b", cold air should come immediately out of center nozzle: Scoop air flap open.

Test 12:

Selector dial	Function button	Blower
22 °C	"e"	"g"

- Monovalve closed (+ and – connected).
- Recirculating pump not running.
- Compressor not switched on.
- Main air flap closed.
- Blower not running.



1832-9677/1

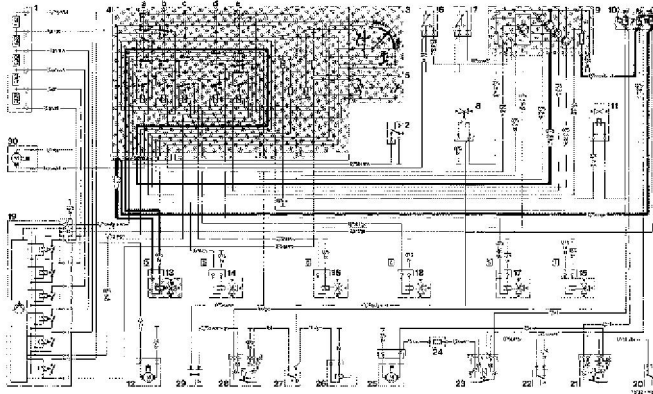
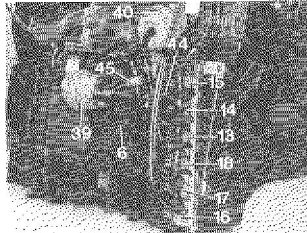
G00054834

Fig. 67: System Test - Test 10-12 (9 Of 11)

Courtesy of Mercedes-Benz of North America.

Testing switchover valve for center nozzle flap and connecting lines 1 and 4	
Disconnect battery, switch on ignition. Push function selection button "c".	
Position of adaptor switch	Nominal value $\pm 20 \Omega$
9	45 Ω
Nominal value correct	Nominal value wrong

1. Check electric lines for correct connection.
2. Test switchover valve for center nozzle flap and replace, if required.
3. Replace pushbutton switch unit.



Wiring diagram for test step 9 with adaptor

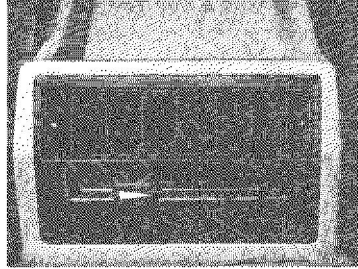
- | | |
|---|---|
| 4 Pushbutton switch unit | 9 Electronic switchgear for temperature control |
| a Defrosting | 10 Fusebox |
| b Overall ventilation | 13 Switchover valve for center nozzle flap |
| c Normal setting (air conditioning and EC (air conditioning off)) | |
| d Off | |

00094848

Fig. 80: Function Test - Step 9 & Wiring Diagram (10 Of 21)
Courtesy of Mercedes-Benz of North America.

4 Mount a thermometer for outside air temperature (ambient temperature) approx. 2 m from driver's side.

5 Place a hygrometer into tray of center console.

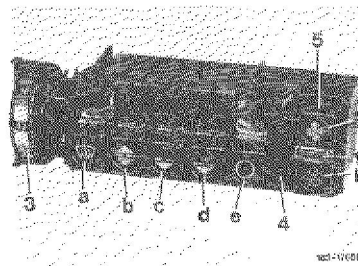


6 Connect suction and pressure gauges to service valves.

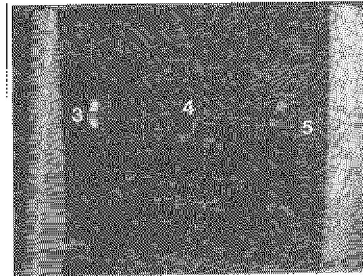
7 Plug one thermometer each into center jet and lateral jet at left.

8 Open windows and rear passenger compartment vent. Close vehicle doors and engine hood.

9 Temperature dial engaged in "MIN" position. Push blower switch (f) 6th stage.



10 Push function selection button "c" and run engine at approx. 2000/min.



AUTOMATIC

560SEFor 1 Copyright © 1998 Mit

Layout control unit
3 Temperature dial
4 Pushbutton switch with 5 function
5 Blower switch

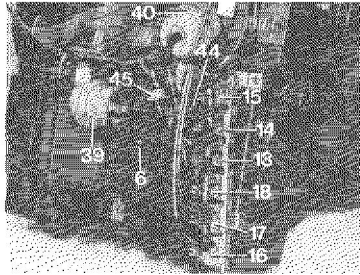
00005487

Fig. 93: A: Refrigerant Capacity - Function Test - Steps 4-10 (2 Of 4)

Courtesy of Mercedes-Benz of North America.

Preparation for test

- 1 Remove righthand cover under instrument panel.
- 2 Remove righthand lateral lining of center console.
- 3 Pull six-point distributor and vacuum line from switchover valve (13, 14, 15, 16, 17, 18).
- 4 Pull electric couplings (2-point) from switchover valves.



Individual test

- 5 Connect tester to connection A of switchover valve and evacuate.

The permissible values of vacuum must be maintained if tester shows a pressure increase, the switchover valve is defective.

- 6 Test electric function of valve, apply external voltage for this purpose. The valve will then open. Readout on tester returns to zero.

- 7 Connect tester to connection B. Close connection A with blind plug, apply voltage and evacuate.

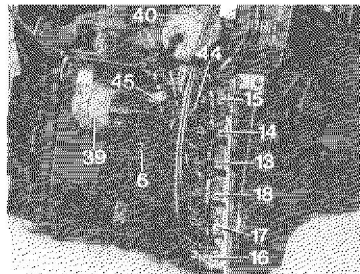
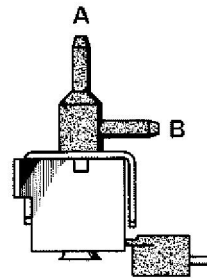
Permissible values of vacuum should remain.

- 8 Remove voltage on switchover valve. Readout on tester should return to zero.

- 9 Reconnect vacuum lines according to function diagram.

- 10 Plug-on electric couplings (2-point) 1 to 6.

- 11 For installation of righthand lateral lining and covering proceed vice versa (68-150, 68-200).



G00066679

Fig. 111: Switchover Valves - Steps 1-11
Courtesy of Mercedes-Benz of North America.

PROTECTIVE CUTOUT - MODEL 126 (1986)

A: Testing Compressor Clutch

Test step 10		
Fresh/recirculation air switch (S24) signal		
Voltmeter to sockets	switch (S24)	Nominal value in volts
(-) 21 (+) 13	"ON"	above 11
OK		Not OK

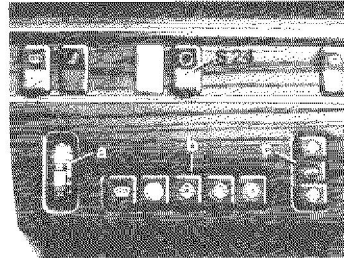


Fig. 83/38

1. Check wire (grey/violet) from terminal 6 of the right connector for an open circuit.
2. Replace fresh/recirculation air switch (S24).

Test step 11		
Monovalve (Y19) signal		
Voltmeter to sockets	pushbutton depressed	nominal value in volts
(-) 9 (+) 13		above 11
OK		Not OK

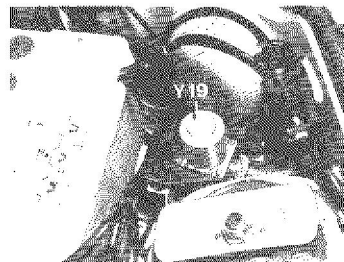


Fig. 83/39

Test step 12		
Auxiliary coolant pump (M13) signal		
Voltmeter to sockets	pushbutton depressed	nominal value in volts
(-) 10 (+) 13		above 11
OK		Not OK

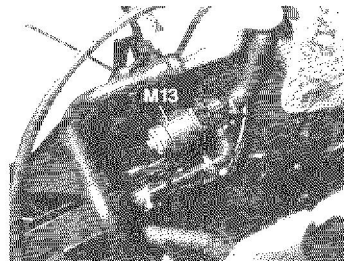


Fig. 83/40

Touch aux. coolant pump to verify operation.

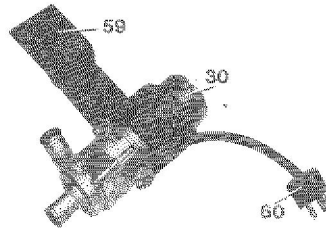
00005722

Fig. 124: Test Preparations - Steps 10-12 (7 Of 11)

Courtesy of Mercedes-Benz of North America.

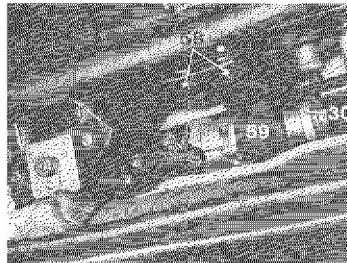
Installation

6 Slip holder (59) on recirculating pump (30).



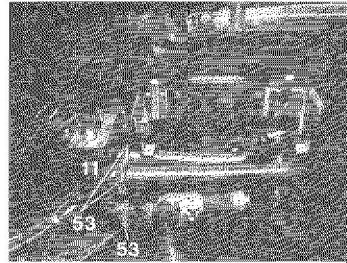
7 Screw recirculating pump (30) with holder (59) to front wall.

8 Connect electric plug (60) and attach with clip.



9 Plug-on hoses and attach by means of hose clamps (53).

10 Fill in coolant and check cooling system for leaks.



11 Install partition center-top in engine compartment and, if applicable, install ABS control unit.

12 Check recirculating pump and automatic climate control for function.

600268881

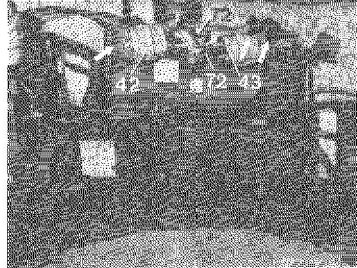
Fig. 137: Recirculating Pump Removal & Installation - Steps 6-12
(2 Of 2)

Courtesy of Mercedes-Benz of North America.

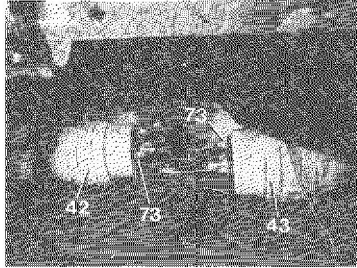
E: Main Air Flap Removal & Installation

Removal

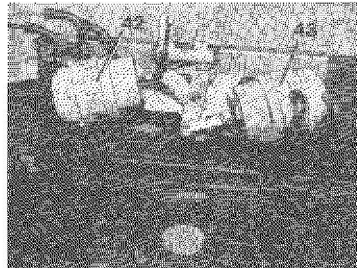
- 1 Remove glove box.
- 2 Pull vacuum line (refer to arrow) from vacuum element (42 or 43) and disconnect actuating rod (72).



- 3 To remove vacuum element (42 or 43) for main air flap, 1st version, lift off locks (73) by means of a screwdriver. On 2nd version, remove vacuum elements (42 or 43) from bayonet lock by a turning motion.



Vacuum element for main air flap
(1st version)

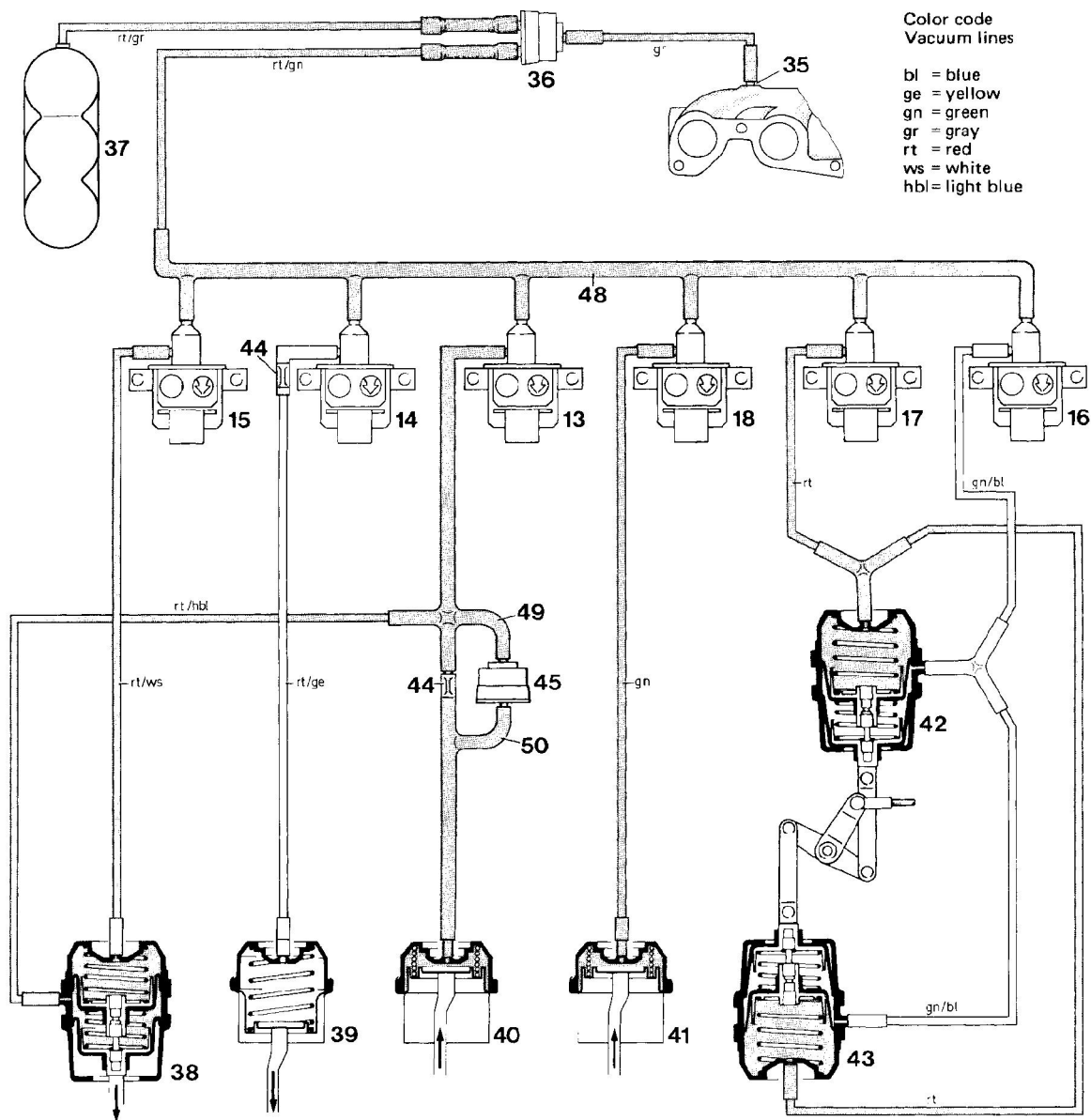


Vacuum element for main air flap
(2nd version)

000058702

Fig. 158: E: Main Air Flap Removal & Installation - Steps 1-3 (1
Of 2)

Courtesy of Mercedes-Benz of North America.



Function diagram 3 b, function selection "c", max. cooling ("MIN" in detent position)

- | | |
|--|--|
| <ul style="list-style-type: none"> 13 Switchover valve for center nozzle flap 14 Switchover valve for leg room flaps 15 Switchover valve for defroster nozzle flaps 16 Switchover valve for vacuum elements of fresh air-recirculated air flap and main air flap (small stroke) 17 Switchover valve for vacuum elements of fresh air-recirculated air flap and main air flap (large stroke) 18 Switchover valve for scoop air flap 35 Vacuum connection on intake pipe 36 Check valve 37 Vacuum reservoir 38 Vacuum element for defroster nozzle flaps (flaps "closed") 39 Vacuum element for leg room flaps (flaps "closed") | <ul style="list-style-type: none"> 40 Vacuum element for center nozzle flap (flap "open") 41 Vacuum element for scoop air flap (flap "open") 42 Vacuum element for fresh air-recirculated air flap and main air flap (flap "open", 20 % fresh air supply and 80 % ambient air) 43 Vacuum element for fresh air-recirculated air flap and main air flap (flap "open", 20 % fresh air supply and 80 % ambient air) 44 Orifice 45 Check valve 48 7-point distributor 49 4-point distributor 50 3-point distributor |
|--|--|

Fig. 172: Vacuum Diagram - Function 3B Selection "C" ("MIN" In Detent Position)

satisfied with a repair transaction, the Motorist Assurance Program offers mediation and arbitration through MAP/BBB-CARE and other non-profit organizations. MAP conducted pilot programs in twelve states before announcing the program nationally in October, 1998. During the pilots, participating repair shops demonstrated their adherence to the Pledge and Standards and agreed to follow the UICS in communicating the results of their inspection to their customers. To put some "teeth" in the program, an accreditation requirement for shops was initiated. The requirements are stringent, and a self-policing method has been incorporated which includes the "mystery shopping" of outlets.

We welcome you to join us as we continue our outreach... with your support, both the automotive repair industry and your customers will reap the benefits. Please visit MAP at our Internet site www.motorist.org or contact us at:

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Bethesda, MD 20814

Phone: (301) 634-4955
Fax: (202) 318-3078
E-mail: map@motorist.org

January 2002

MAP UNIFORM INSPECTION GENERAL GUIDELINES

OVERVIEW OF SERVICE REQUIREMENTS AND SUGGESTIONS

It is MAP policy that all exhaust, brake, steering, suspension, wheel alignment, drive-line, engine performance and maintenance, and heating, ventilation and air conditioning, and electrical services be offered and performed under the standards and procedures specified in these sections.

Before any service is performed on a vehicle, an inspection of the appropriate system must be performed. The results of this inspection must be explained to the customer and documented on an inspection form. The condition of the vehicle and its components will indicate what services/part replacements may be "Required" or "Suggested". In addition, suggestions may be made to satisfy the requests expressed by the customer.

When a component is suggested or required to be repaired or replaced, the decision to repair or replace must be made in the customer's best interest, and at his or her choice given the options available.

This section lists the various parts and conditions that indicate a required or suggested service or part replacement. Although this list is extensive, it is not fully inclusive. In addition to this list, a technician may make a suggestion. However, any suggestions must be based on substantial and informed experience, or the vehicle manufacturer's recommended service interval and must be documented.

*** BRAKE SYSTEM UNIFORM INSPECTION GL**

Tapered, affecting performance A Require reconditioning or replacement.

(1) - Only applies to vehicles for which OEM "machine to" specifications exist. If OEM does not supply "machine to" specifications, the drum may be worn to discard specifications.

(2) - If OEM does not supply "machine to" specifications, you may machine to discard specifications.

ELECTRICAL PUMPS AND MOTORS

Copied fuel pump conditions from engine UIGs & deleted pulsator from leaking conditions.

ELECTRICAL PUMP AND MOTOR INSPECTION

Condition	Code	Procedure
Attaching hardware broken	A ...	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A ...	Require repair or replacement of hardware.
Connector broken	A ..	Require repair or replacement.
Connector (Weatherpack type) leaking	A ..	Require repair or replacement.
Connector melted	A	(1) Require repair or replacement.
Connector missing	C	Require replacement.
Contaminated	A	(2) Require replacement.
Inoperative	A	(3) Require repair or replacement.
Leaking externally	A ..	Require repair or replacement.
Leaking internally	A ..	Require repair or replacement.
Noisy	2 ..	Suggest repair or replacement.
Terminal broken	A ..	Require repair or replacement.
Terminal burned, affecting performance	A	(1) Require repair or replacement.
Terminal burned, not affecting performance ..	2 ..	Suggest repair or replacement.
Terminal corroded, affecting performance ..	A ..	Require repair or replacement.
Terminal corroded, not affecting performance ..	2 ..	Suggest repair or replacement.

Condition	Code	Procedure
Bent	A ...	Require repair or replacement of bent part.
Broken	A ...	Require repair or replacement of broken part.
Inoperative	A	(1) Require repair or replacement of inoperative parts.
Missing	C	Require replacement of missing part.
Star wheel does not turn freely	A ..	Require repair or replacement.

(1) - Inoperative includes intermittent operation.

SHOE HARDWARE

See BRAKE SHOE HARDWARE.

SHOES

See FRICTION MATERIAL.

SOCKETS

See BULB SOCKETS.

SPEED SENSORS (ELECTRONIC WHEEL AND VEHICLE)

NOTE: Copied Vehicle Speed Sensors from Engine UIGs & added Air Gap incorrect, loose, and wire lead misrouted. For "contaminated" removed coolant & fuel examples from note.

SPEED SENSOR INSPECTION

Condition	Code	Procedure
Air gap incorrect	B	(1) Require adjustment or replacement.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware threads damaged	A ...	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A ..	Require repair or replacement of hardware.

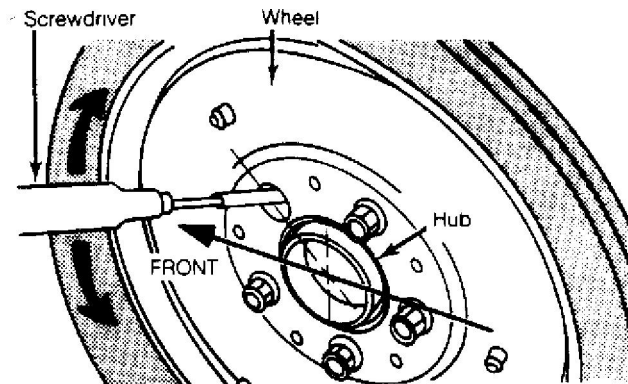


Fig. 1: Adjusting Parking Brake Mechanism
 Courtesy of Mercedes-Benz of North America.

NOTE: Parking brake must be adjusted if brake pedal can be depressed by more than 2 steps (of 6) without any braking effect. DO NOT alter adjusting screw on parking brake intermediate lever. Screw is for balancing cable lengths only.

2) Using screwdriver inserted through lug bolt hole, turn adjuster until rear wheel cannot be turned. Back off adjuster until wheel can be turned without drag.

WHEEL BEARINGS

Front

1) Remove caliper bolt and wire out of way. Remove grease cap off of hub. Remove contact spring for radio interference. Loosen hex head bolt of bushing clamp. Tighten clamping nut while simultaneously turning hub. Tighten until hub can barely be turned.

2) Loosen clamping nut about 1/3 turn. Relieve tension by striking stub axle with a plastic hammer. Install dial indicator on front hub. Adjust dial indicator with a preload of .08" (2.0 mm).

3) Check end play of hub by pulling and pushing hard on hub flange. Turn wheel several times before each measurement. During measurement wheel hub must not turn. Tighten hex head bolt on hub clamp and check end play.

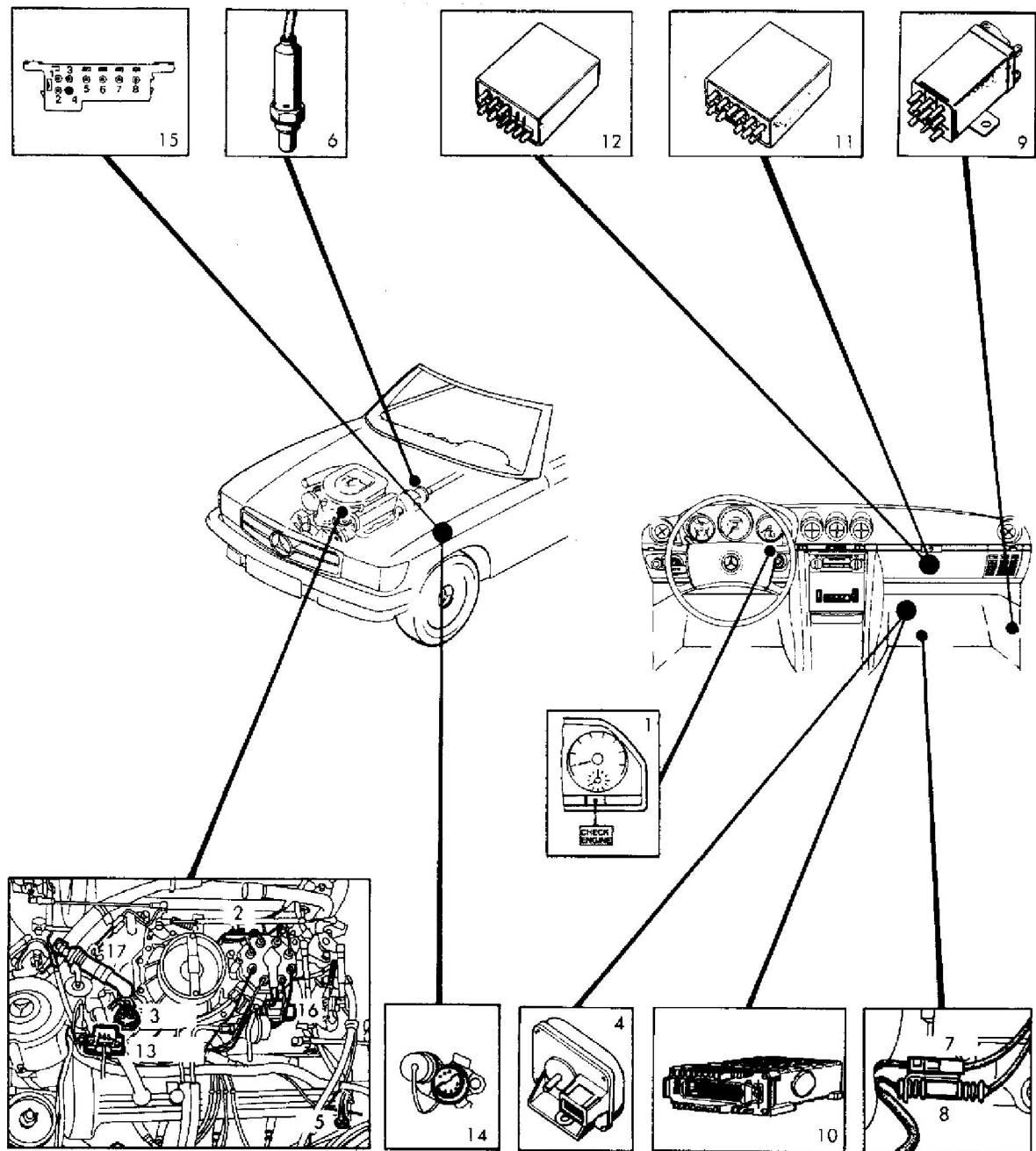
4) End play is .0004-.0008" (.01-.02 mm) on 420 and 560 series. On all others, end play is correct when washer between outer tapered roller bearing and clamping nut is just able to turn under finger pressure. Reassemble front hub and brake unit. Ensure front hub is filled with high temperature bearing grease.

Rear

Rear wheel bearings are nonadjustable.

REMOVAL & INSTALLATION

DISC BRAKE PADS



- | | |
|--|--|
| <ul style="list-style-type: none"> 1. "Check Engine" Light 2. Airflow Sensor Position Indicator 3. Coolant Temperature Sensor 4. Altitude Correction Capsule 5. EGR Temperature Sensor 6. Heated O₂ Sensor 7. O₂ Sensor Heating Filament Connector 8. O₂ Sensor Signal Connector 9. Overtolerance Protection Relay | <ul style="list-style-type: none"> 10. CIS-E Control Unit 11. Idle Speed Control Unit 12. Fuel Pump Relay 13. Throttle Valve Switch Connector 14. Diagnostic Socket (Circuit TD) 15. On-Board Diagnostic Connector 16. Electro-Hydraulic Actuator (EHA) 17. Idle Speed Air Valve |
|--|--|

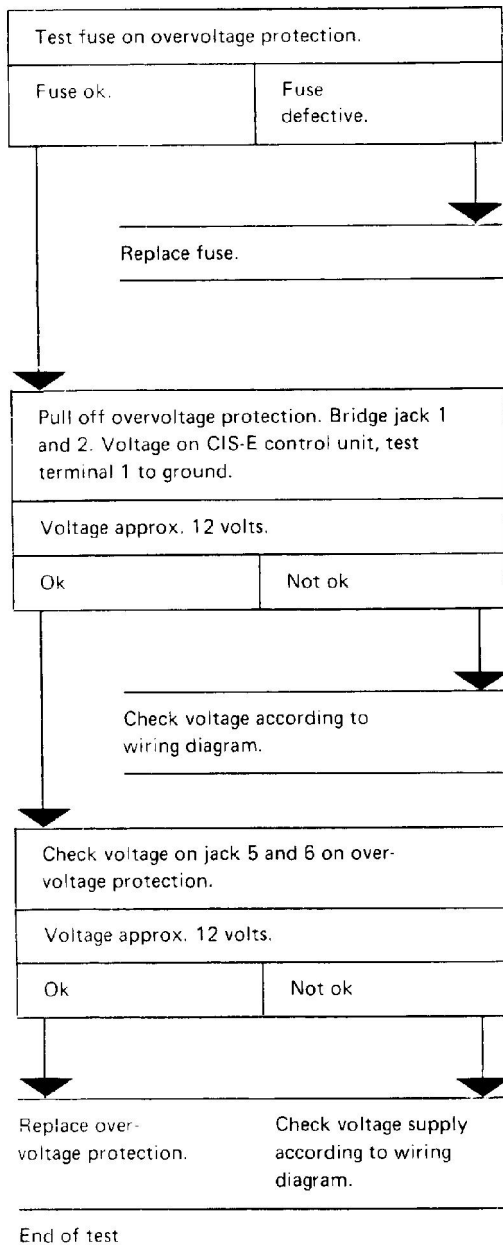
Fig. 5: 560SL Component Locations

Courtesy of Mercedes-Benz of North America.

PLEASE READ THIS FIRST

NOTE: Not every component listed in the testing applies to all models.

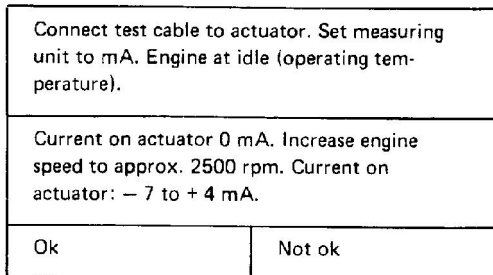
TESTING OVERVOLTAGE PROTECTION



50F01808

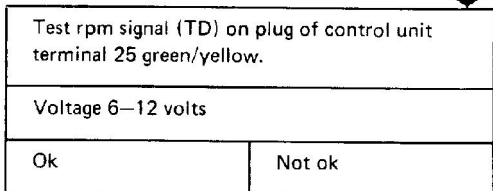
Fig. 10: Testing Overvoltage Protection, Flow Chart
Courtesy of Mercedes-Benz of North America

g) Testing partial load mixture adaptation, RUF only



CIS-E SYSTE

-Benz 560SELFor 1 Copyright © 1998 Mitchell Repair Information Co



Replace control unit (CIS-E).

Repair interruption according to wiring diagram.

End of test

Note: If the test values on throttle valve switch are attained during adaptation of partial load mixture, full load enrichment is also effective.

h) Testing lambda control

refer to 07.3-100

i) Testing O₂ sensor

Note

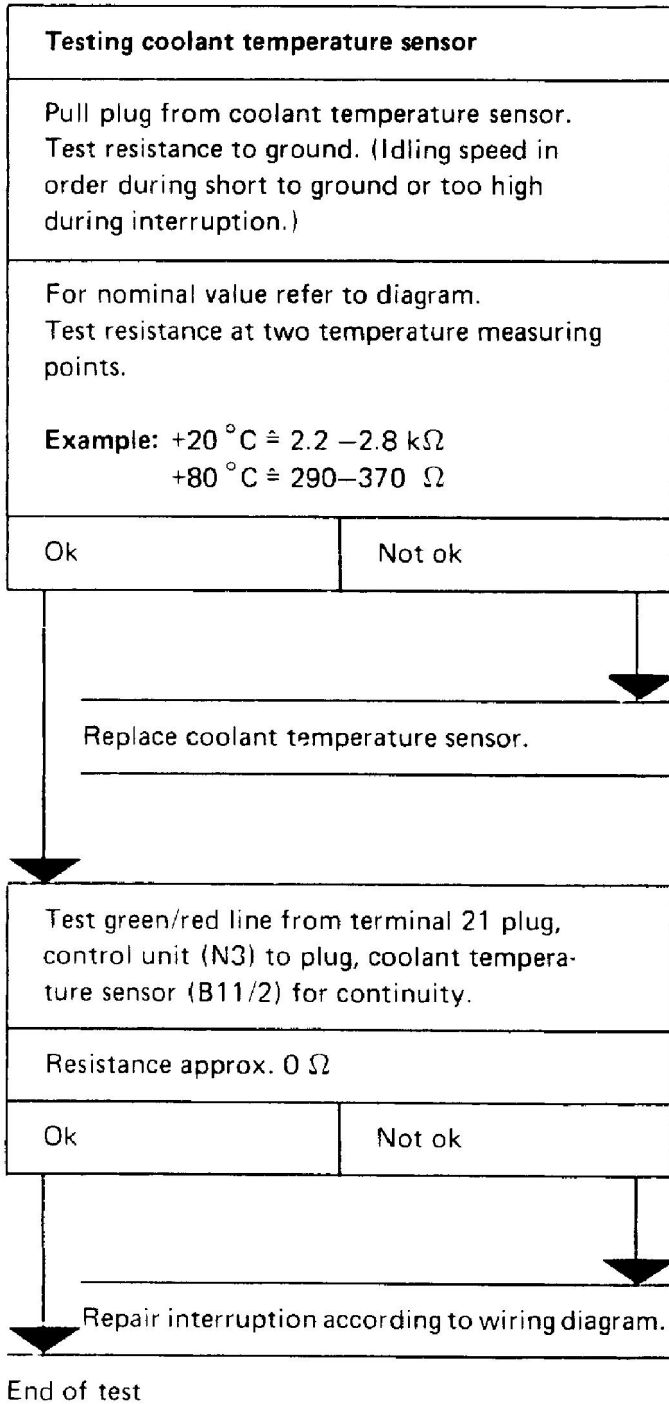
Test O₂ sensor with engine at operating temperature.

Function test: Slightly deflect air flow sensor plate manually with engine running, control range on tester should go back to lean stop. If not, perform test program.

50C01835

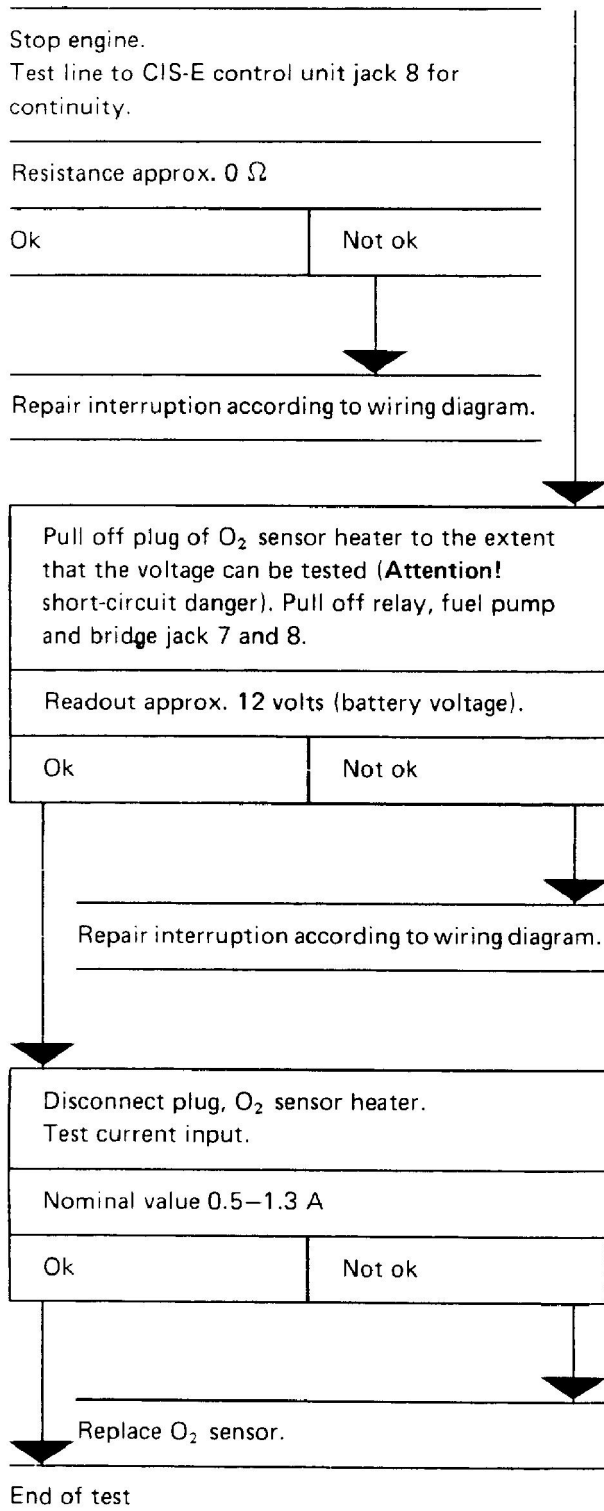
Fig. 26: Flow Chart (1 of 2) Testing Partial Load Mixture Adaptation, RUF Only
 Courtesy of Mercedes-Benz of North America

On-off ratio 30 %



50E01841

Fig. 39: Flow Chart, On-Off Ratio 30%
Courtesy of Mercedes-Benz of North America



50F01851

Fig. 52: Flow Chart (2 of 2), On-Off Ratio 100%
 Courtesy of Mercedes-Benz of North America

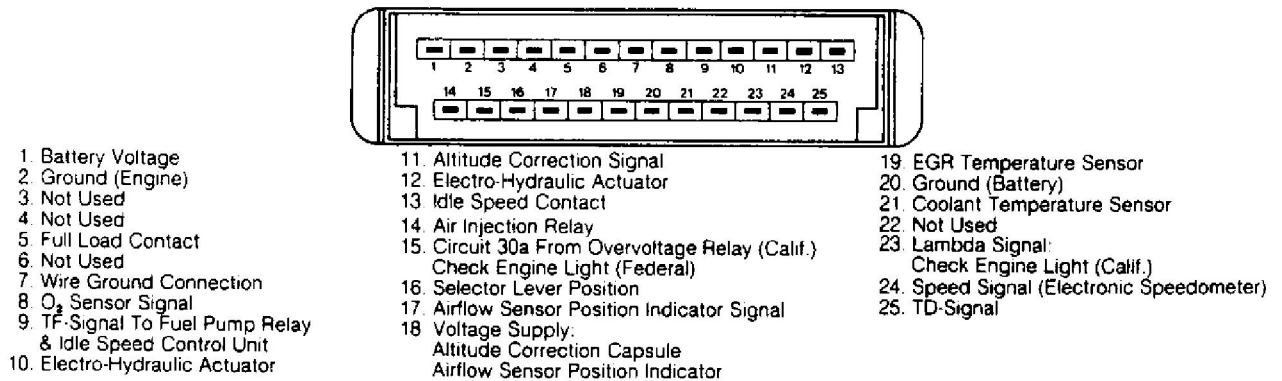


Fig. 57: 420 & 560 Series CIS-E Control Unit Terminal
 Courtesy of Mercedes-Benz of North America.

Altitude Correction

1) Connect meter adapter cable to differential pressure regulator. Set multimeter to mA scale. Disconnect O₂ sensor and turn ignition on. Disconnect wiring from altitude sensor to simulate sea level operation. Current reading should be 7-9 mA.

2) Reconnect altitude sensor wiring. Check current reading. See ALTITUDE CORRECTION FACTOR table for correct current readings at different barometric pressures and different elevations above sea level. If current readings are correct, test is complete.

3) If readings are incorrect, disconnect altitude sensor. Check that voltage between socket No. one and ground is 6 volts. Voltage between sockets No. 2 and 3 should be 8 volts. If readings are correct, replace altitude sensor. If readings are incorrect, repair wiring.

Electronic Idle Speed Control

1) Connect test cable to Bosch Lambda Control Tester (KDJE-P 600) and to idle speed air valve. Push IR 100% button. Engine should be at idle speed and operating temperature. Nominal value reading should be 27-29% at 670-770 RPM. If reading is correct, test is complete. If reading is not correct, go to next step.

2) If reading is higher or lower, adjust valve to nominal value or test microswitch. If reading is 0%, test voltage at plug of idle speed air valve. Connect multimeter between socket No. 2 and ground. If reading is not correct, repair wiring circuit. Reading should be 12 volts. If reading is correct, go to next step.

3) Measure resistances of idle speed air valve. Between terminals No. 2 and 3 or 2 and 1, reading should be 12 ohms. If not correct, replace idle speed air valve. If correct, test is complete.

NOTE: If voltage at sockets No. 1 and 3 (tested individually to ground) is 12 volts, check Brown ground wire from terminal No. 20 to ECU for continuity. Repair wiring or replace ECU as necessary.

Idle Speed Stabilization

(Automatic Transmission Engaged)

utilization of the same control unit for all models.

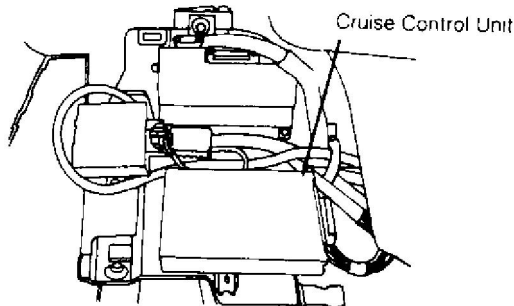


Fig. 2: Control Unit Mounting
Courtesy of Mercedes-Benz of North America.

TRANSMITTER

The speed control (Hall Effect) transmitter is located on back of the speedometer. The speed control transmitter receives actual speed signals and sends this information to the control unit. See Fig. 3.

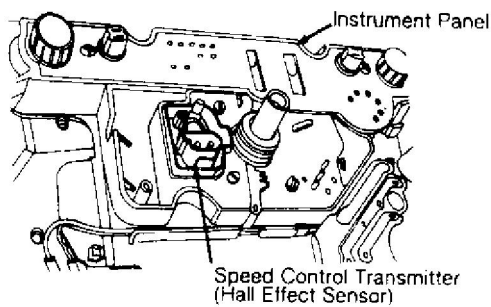


Fig. 3: Location of Speed Control Transmitter
Courtesy of Mercedes-Benz of North America.

ACTUATOR

The actuator receives control signals from the control unit and actuates regulating linkage by using a connecting rod. The actuator is comprised of an electric motor with gear unit, one-way clutch, potentiometer and an electromagnetic clutch. The actuator output shaft is driven by the electric motor, through a gear reduction and a one-way clutch.

The one-way clutch permits accelerator pedal use independent of cruise control actuator. The potentiometer relays position of output shaft to the control unit.

The electromagnetic clutch transmits power from the electric motor to the output shaft. The electromagnetic clutch interrupts shaft movement when brake or clutch pedal is depressed. Movement is also interrupted when system is switched off at control switch or when regulating linkage is at idle speed position. See Fig. 4.

2) Insert Mandrel (116 589 07 61 00) through case, pinions and spherical washers. Check torque required to rotate side gears. If necessary, change side gear thrust washers to obtain specified torque.

3) When side gear preload is correct, insert pinion shaft in place of mandrel. Install new clamping sleeve and press bearing inner races in case using press and mandrel.

DRIVE PINION DEPTH

1) Mount dial indicator in Measuring Device (116 589 00 23 00). Insert Gauge Block (116 589 07 21 00). Place dial indicator tip on top of gauge block. Allow dial indicator tip to depress about .08" (2 mm) on 190 series or .12" (3 mm) on gauge block and zero dial indicator. See Fig. 9.

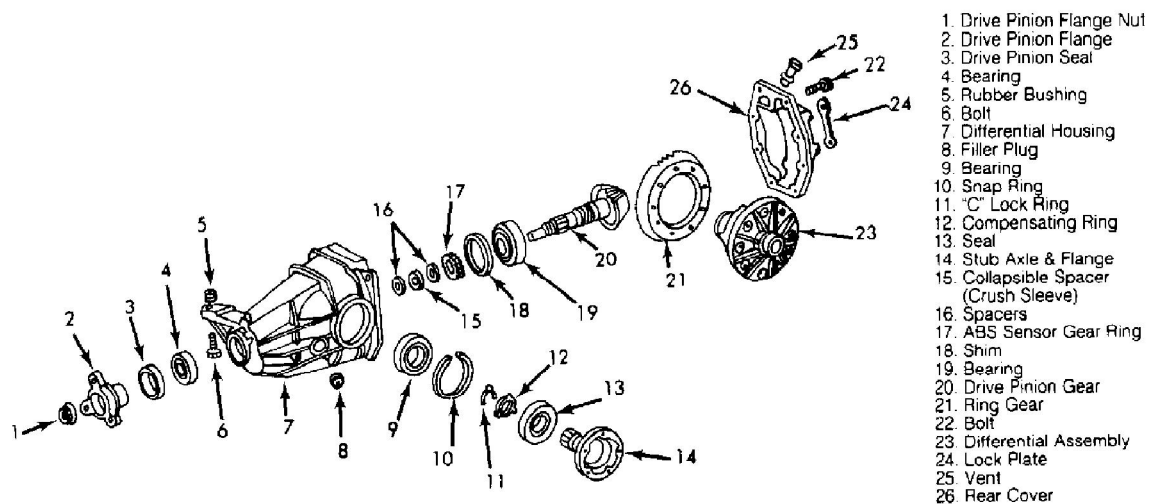


Fig. 8: Exploded View of Differential Assembly (190 Series)
Courtesy of Mercedes-Benz of North America.

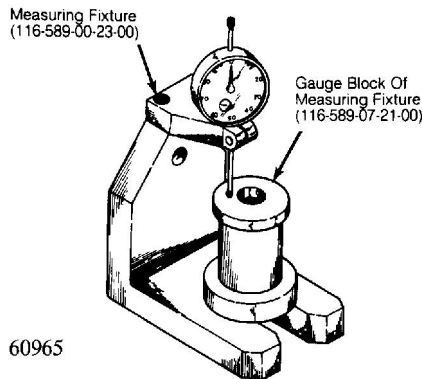
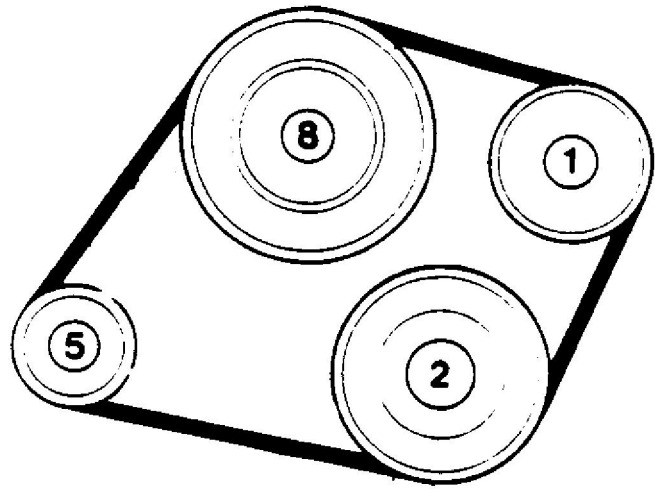


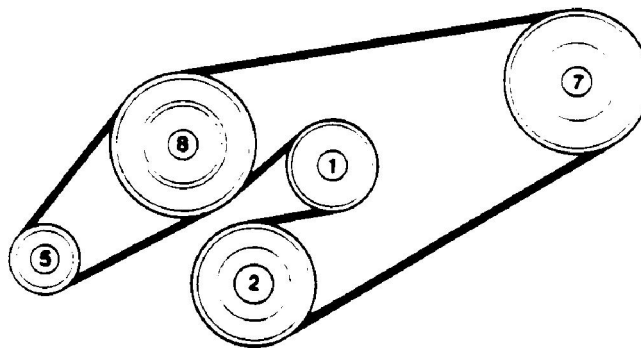
Fig. 9: Zeroing Dial Indicator For Pinion Depth Adjustment
Courtesy of Mercedes-Benz of North America.



- 1 Tensioning roller
- 2 Crankshaft
- 3 Refrigerant compressor
- 5 Alternator
- 7 Power steering pump
- 8 Coolant pump

201427

Fig. 6: Engine 601 Belt Routing (1 of 3)
 Courtesy of Mercedes-Benz of North America



- 1 Tensioning roller
- 2 Crankshaft
- 3 Refrigerant compressor
- 5 Alternator
- 7 Power steering pump
- 8 Coolant pump

201428

Fig. 7: Engine 601 Belt Routing (2 of 3)

Condition	Code	Procedure
Bent, affecting performance	A	Require replacement.
Bent, beyond specifications	B ..	Require repair or replacement.
Broken	A	Require replacement.
End play exceeds specifications	B ..	Require repair or replacement.
Flange bent	A	Require replacement.
Flange threads stripped .	A ..	Require repair or replacement.
Twisted	A	Require replacement.
Worn, affecting performance	A ..	Require repair or replacement.

BEARINGS AND RACES

NOTE: When replacing or repacking bearings, grease seal replacement is required. You are not required to replace these components in axle sets. Determine the need to replace based upon the individual component conditions that follow.

BEARING AND RACE INSPECTION

Condition	Code	Procedure
Bearing end-play exceeds specifications	B ..	Require adjustment of bearing, if possible. If proper adjustment cannot be obtained, require replacement of bearing assembly.
Bearing rollers, balls or races are worn, pitted, or feel rough when rotated as an assembly	B ..	Require replacement of bearing assembly.

BELL CRANKS

BELL CRANK INSPECTION

Condition	Code	Procedure
Attaching hardware broken	A ...	Require repair or replacement of hardware.
Attaching hardware		

DOWEL PINS, GUIDES AND PILOT HOLES

DOWEL PIN, GUIDE AND PILOT HOLE INSPECTION

Condition	Code	Procedure
Application incorrect	... B ..	Require repair or replacement.
Cracked	..... A ..	Require repair or replacement.
Distorted	..... A ..	Require repair or replacement.
Missing	..... C ..	Require replacement.
Positioned incorrectly	.. B ..	Require repair or replacement.
Stepped	..... A ..	Require repair or replacement.
Worn to the extent that it no longer performs its intended function	..... A ..	Require repair or replacement.

DRIVE SHAFT FLANGES

See COMPANION FLANGES.

DRIVE SHAFTS AND HALF SHAFTS

DRIVE SHAFTS AND HALF SHAFTS INSPECTION

Condition	Code	Procedure
Balance weight missing	.. C ..	Require repair or replacement.
Bearing cap bore distorted	..... A ..	Require repair or replacement.
Bent	..... A ..	Require replacement.
Bolt holes elongated	.... A ..	Require repair or replacement.
Bushing or seal surface worn, affecting performance	..... A ..	Require repair or replacement.
Leaking through soft yoke plug	..... A ..	Require repair or replacement of soft yoke plug.
Out of balance	..... A ..	Require repair or replacement.
Retainer strap bent	..... A ..	Require replacement of retainer strap.
Slip yoke broken	..... A ..	Require replacement.
Splines worn, affecting performance	..... A ..	Require repair or replacement.
Splines worn, not affecting performance, but close to the end of their useful life	.... 1 ..	Suggest repair or replacement.
Threads damaged	..... A ..	Require repair or replacement.
Threads stripped (threads missing)	..... A ..	Require replacement.

Connector melted A (1) Require repair or replacement.
Connector missing C Require replacement.
Inoperative A (2) Require repair or replacement.

Leaking

(vacuum/fluid/air) A Require replacement.

Out of adjustment B (3) Further inspection required.

Terminal broken A .. Require repair or replacement.

Terminal burned, affecting performance A (1) Require repair or replacement.

Terminal burned, not affecting performance .. 2 .. Suggest repair or replacement.

Terminal corroded, affecting performance .. A .. Require repair or replacement.

Terminal corroded, not affecting performance .. 2 .. Suggest repair or replacement.

Terminal loose, affecting performance B .. Require repair or replacement.

Terminal loose, not affecting performance .. 1 .. Suggest repair or replacement.

Threads damaged A .. Require repair or replacement.

Threads stripped (threads missing) A Require replacement.

- (1) - Determine cause and correct prior to repair or replacement of part.
- (2) - Inoperative includes intermittent operation or out of specification.
- (3) - Follow OEM recommended adjustment procedures. Repair or replace if out of specification.

SIDE COVERS

See TRANSMISSION PANS.

SLIP YOKES

See YOKES AND SLIP YOKES.

SOLENOIDS

See:

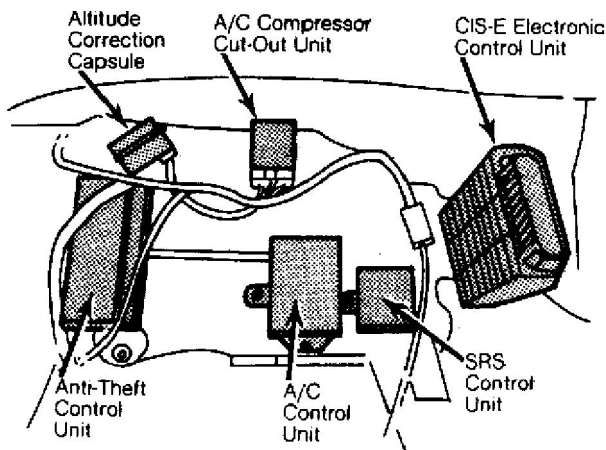
ACTUATORS (ELECTRICAL)

ACTUATORS (VACUUM)

SPEED SENSORS (ELECTRONIC WHEEL AND VEHICLE)

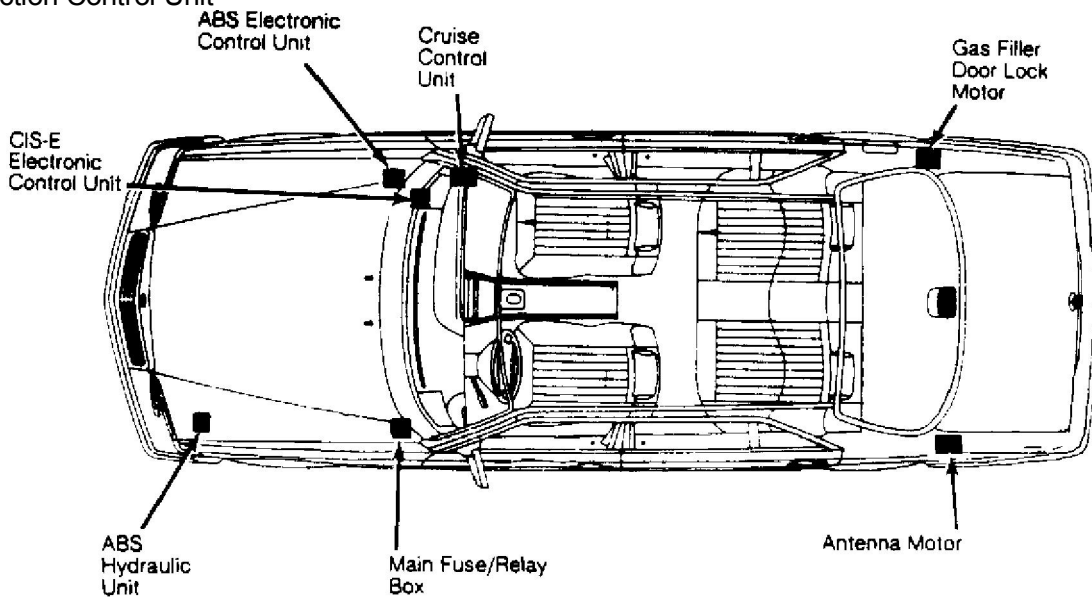
missing) A Require replacement.
U-bolt damaged, affecting
performance A Require replacement
of U-bolts.
Yoke damaged, affecting
performance A .. Require repair or replacement.

END OF ARTICLE

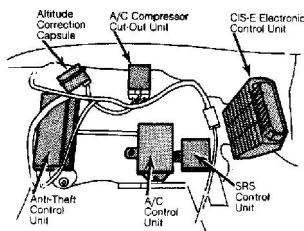


47602
Anti-Theft Control Unit On right side of blower housing.

CIS-E Fuel Injection Control Unit



33773
Top View Above right side of passenger's footwell.
420 & 560 SEL



47602
View of Control Unit Above right side of passenger's footwell

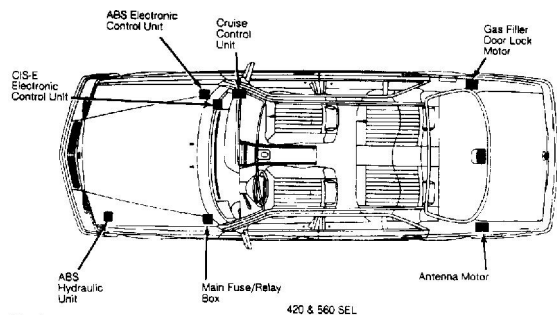
Seatback Lock Switch Valve (560 SEC) Above accelerator pedal.

SWITCHES

Component	Component Location
A/C Auxiliary Fan Temp. Switch	On engine coolant outlet.
A/C Cold Engine Lock-Out switch	In top left rear of engine.
A/C Low Pressure Cut-Out Switch	On receiver-drier, behind left headlights.
A/C Receiver-Drier Temp. Switch	On receiver-drier, behind left headlights.
Air Injection Coolant Temp. Switch	At right rear of engine.
Belt Extender Limit Switch	On extender arms.
Brake/Stoplight Switch	At top of brake pedal support.
Evaporator Temp. Regulator Switch	In left side of plenum, above driver's footwell.
Kickdown Solenoid (A/T)	Under accelerator pedal.
Starter Lock/Back-Up Light Switch	In left side of transmission.

MISCELLANEOUS

Component	Component Location
A/C Blower Motor Resistors	Below power brake booster.



ABS Hydraulic Unit On left front side of engine compartment.

For all air bag components and conditions, refer to vehicle manufacturer's specifications for diagnosis and parts replacement.

ALTERNATORS AND GENERATORS

NOTE: If components have been added that increase vehicle electrical load requirement (for example, sound systems, air conditioning, alarm systems, etc.), charging system output must meet the increased demand.

ALTERNATOR AND GENERATOR INSPECTION

Condition	Code	Procedure
Alternator output meets OEM specification but is insufficient for add-on electrical load	2	Suggest upgrade of alternator or removal of excess electrical load.
Alternator's rated output is below OEM specification	B	Require replacement.
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware non-functioning	A	Require repair or replacement of hardware.
Connector broken	A	Require repair or replacement.
Connector (Weatherpack type) leaking	A	Require repair or replacement.
Connector melted	A	(1) Require repair or replacement.
Connector missing	C	Require replacement.
Diode inoperative	A	(2) Require repair or replacement.
Housing broken, affecting performance	A	Require repair or replacement.
Housing broken, not affecting performance		No service suggested or required.
Housing cracked, affecting performance	A	Require repair or replacement.
Housing cracked, not affecting performance	1	Suggest repair or replacement.
Inoperative	A	(2) Require repair or replacement.

CRUISE CONTROL LINKAGES AND CABLES

CRUISE CONTROL LINKAGE AND CABLE INSPECTION

Condition	Code	Procedure
Attaching hardware broken	A ...	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A ...	Require repair or replacement of hardware.
Bent	A ..	Require repair or replacement.
Binding	A ..	Require repair or replacement.
Bracket bent, affecting performance	A ..	Require repair or replacement.
Bracket bent, not affecting performance .. ..	.....	No service suggested or required.
Bracket broken, affecting performance	A	Require replacement.
Bracket broken, not affecting performance .. ..	.....	No service suggested or required.
Bracket corroded, affecting performance ..	A ..	Require repair or replacement.
Bracket corroded, not affecting performance ..	2 ..	Suggest repair or replacement.
Bracket cracked, affecting performance	A ..	Require repair or replacement.
Bracket cracked, not affecting performance ..	1 ..	Suggest repair or replacement.
Bracket loose, affecting performance	A ..	Require repair or replacement.
Bracket loose, not affecting performance ..	1 ..	Suggest repair or replacement.
Bracket missing	C	Require replacement.
Broken	A	Require replacement.
Cracked	A ..	Require repair or replacement.
Disconnected	A ..	Require repair or replacement.
Kinked	A ..	Require repair or replacement.
Melted	A	(1) Require repair or replacement.
Missing	C	Require replacement.
Noisy	2 ..	Suggest repair or replacement.
Out of adjustment	B	(2) Require repair or replacement.
Routed incorrectly	*	Suggest repair or replacement.

missing C Require replacement of hardware.

Attaching hardware not functioning A ... Require repair or replacement of hardware.

Connector broken A .. Require repair or replacement.

Connector (Weatherpack type) leaking A .. Require repair or replacement.

Connector melted A (1) Require repair or replacement.

Connector missing C Require replacement.

Malfunctioning A (2) Require repair or replacement.

Terminal broken A .. Require repair or replacement.

Terminal burned, affecting performance A (1) Require repair or replacement.

Terminal burned, not affecting performance .. 2 .. Suggest repair or replacement.

Terminal corroded, affecting performance .. A .. Require repair or replacement.

Terminal corroded, not affecting performance .. 2 .. Suggest repair or replacement.

Terminal loose, affecting performance B .. Require repair or replacement.

Terminal loose, not affecting performance .. 1 .. Suggest repair or replacement.

Wire lead burned A .. Require repair or replacement.

Wire lead conductors exposed B .. Require repair or replacement.

Wire lead open A .. Require repair or replacement.

Wire lead shorted A .. Require repair or replacement.

- (1) - Determine cause and correct prior to repair or replacement of part.
- (2) - Malfunctioning includes inoperative, intermittent operation, or failure to perform all functions.

KEYLESS ENTRY TRANSMITTERS

See KEYLESS ENTRY KEYPADS AND TRANSMITTERS.

LEDS

See BULBS, SEALED BEAMS AND LEDS.

LENSES

LENSE INSPECTION

SPEEDOMETERS

See GAUGES.

STARTERS

NOTE: To prevent misdiagnosis, care should be taken to eliminate the possibilities of mechanical problems or high resistance in power and/or ground circuits.

STARTER INSPECTION

Condition	Code	Procedure
Amperage draw does not meet OEM specifications	. B ..	Require repair or replacement.
Attaching hardware broken	..... A ...	Require repair or replacement of hardware.
Attaching hardware missing	..... C	Require replacement of hardware.
Attaching hardware not functioning	..... A	(1) Require repair or replacement of hardware.
Bracket bent, affecting performance	..... A ..	Require repair or replacement.
Bracket bent, not affecting performance	.. ..	..... No service suggested or required.
Bracket broken, affecting performance	..... A	Require replacement.
Bracket broken, not affecting performance	.. ..	..... No service suggested or required.
Bracket corroded, affecting performance	.. A ..	Require repair or replacement.
Bracket corroded, not affecting performance	.. 2 ..	Suggest repair or replacement.
Bracket cracked, affecting performance	..... A ..	Require repair or replacement.
Bracket cracked, not affecting performance	.. 1 ..	Suggest repair or replacement.
Bracket holes elongated, affecting performance	.. A ..	Require repair or replacement.
Bracket holes elongated, not affecting performance) No service suggested or required.
Bracket loose, affecting performance A ..	Require repair or replacement.

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See WIPER ARMS AND BLADES.

WIPER HOSES AND NOZZLES

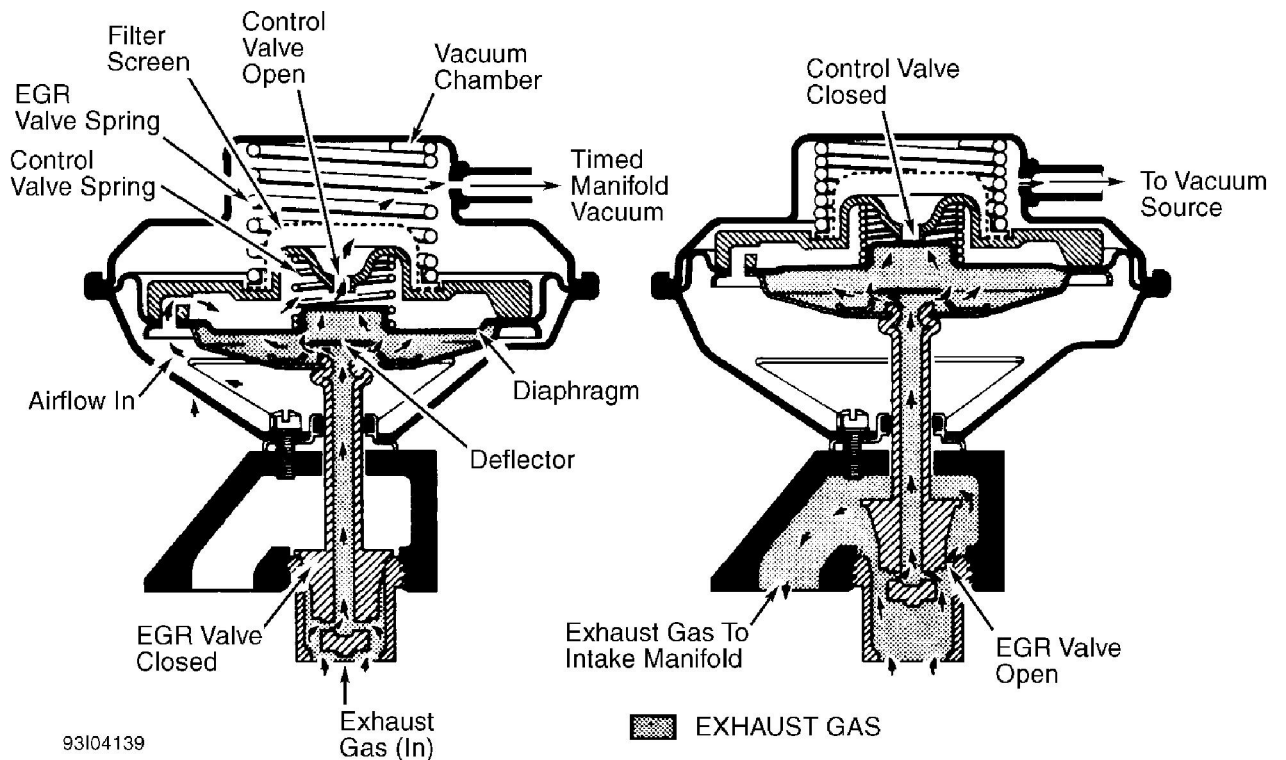
WIPER HOSE AND NOZZLE INSPECTION

Condition	Code	Procedure
Attaching hardware broken	A ...	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A ...	Require repair or replacement of hardware.
Blocked	A ..	Require repair or replacement.
Leaking	A ..	Require repair or replacement.
Missing	C	Require replacement.
Oil-soaked (spongy)	1	Suggest replacement.
Spray pattern incorrect ..	2 ..	Suggest repair or replacement.
Surface cracks (dry-rotted)	1	Suggest replacement.

WIPER LINKAGES

WIPER LINKAGE INSPECTION

Condition	Code	Procedure
Attaching hardware broken	A ...	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A ...	Require repair or replacement of hardware.
Attaching stud stripped ..	A	Require replacement.
Bent	A ..	Require repair or replacement.
Inoperative	A	(1) Require replacement.
Loose	2 ..	Suggest repair or replacement.
Missing	C	Require replacement.
Noisy	2 ..	Suggest repair or replacement.
Tension insufficient	B ..	Require repair or replacement.
Worn, affecting performance	A	Require replacement.
Worn, not affecting performance	A	Require replacement.



93104139

Fig. 9: Typical Positive Backpressure EGR Valve
Courtesy of General Motors Corp.

Negative Backpressure EGR (BP/EGR) Valve

This type has the same function as the positive BP/EGR valve except valve is designed to open with a negative exhaust backpressure. The control valve spring in the transducer is placed on the bottom side of the diaphragm. See Fig. 10.

When ported vacuum is applied to the main vacuum chamber, partially opening the valve, the vacuum signal from the manifold side (reduced by exhaust backpressure) is transmitted to the hollow stem of the valve. See Fig. 10. This enables the signal to act on the diaphragm, providing a specific flow. Thus, the EGR flow is a constant percentage of engine airflow.

Verify EGR valve is present and not modified or purposely damaged. Ensure thermal vacuum switches, pressure transducers, speed switches, etc., (if applicable) are not by-passed or modified. Ensure vacuum hose(s) to EGR valve is not plugged.

EMISSION CONTROL VISUAL INSPECTION PROCEDURES Article Text (p. 8) 1988 Mercedes-Benz 560S

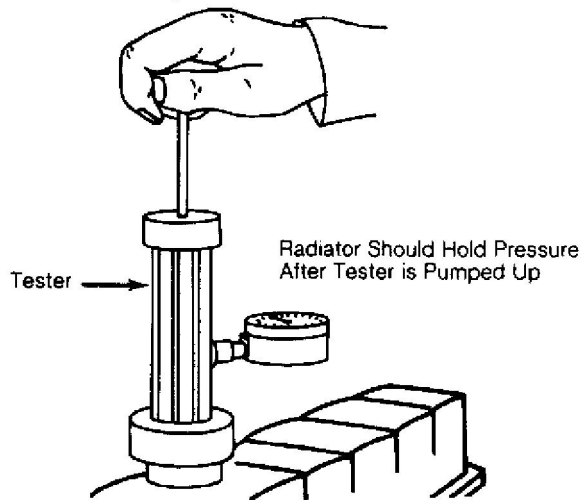


Fig. 3: Pressure Testing Cooling System
Pump up to specified pressure.

ANTI-FREEZE CONCENTRATION

NOTE: On models using aluminum engines or cooling system components, refer to Owners Manual for anti-freeze requirements and recommendations. Aluminum components require a different formulation of anti-freeze to prevent corrosion.

On all cooling systems, test anti-freeze concentration using anti-freeze tester. Tester should have a temperature-compensating feature, as failing to take temperature into consideration could cause an error as large as 30 °F (16 °C). Follow tester manufacturer's instructions for correct use of tester.

COOLANT RECOVERY SYSTEMS

DESCRIPTION

A coolant recovery system differs from other cooling systems in that an overflow bottle is connected to the radiator overflow hose. Overflow bottle is transparent or translucent to permit checking of coolant level without removing radiator cap. No adjustment or test is required except keeping vent hole or hose clean and checking pressure relief of radiator cap.

OPERATION

As coolant temperature rises and pressure in system exceeds pressure relief valve of radiator cap, excess coolant flows into overflow bottle. As engine cools and coolant contracts, vacuum is formed in the system. Vacuum draws coolant, stored in overflow

VALVES & VALVE SEATS

Valve Grinding

Valve stem O.D. should be measured in several areas to indicate amount of wear. Replace valve if not within specification. Valve margin area should be measured to ensure that valve can be grounded. See Fig. 9.

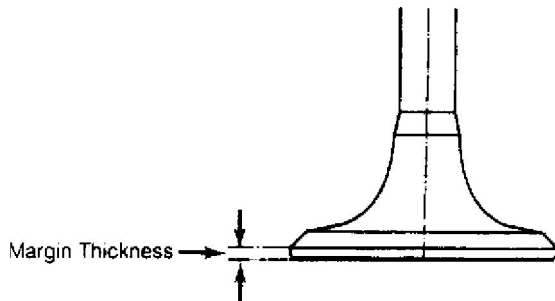


Fig. 9: Measuring Valve Head Margin - Typical
This Graphic For General Information Only

If valve margin is less than specification, this will burn the valves. Valve must be replaced. Due to minimum margin dimensions during manufacture, some new type valves cannot be reground.

Resurface valve on proper angle specification using valve grinding machine. Follow manufacturer's instructions for valve grinding machine. Specifications may indicate a different valve face angle than seat angle.

Measure valve margin after grinding. Replace valve if not within specification. Valve stem tip can be refinished using valve grinding machine.

Valve Lapping

During valve lapping of recent designed valves, be sure to follow manufacturers recommendations. Surface hardening and materials used with some valves do not permit lapping. Lapping process will remove excessive amounts of the hardened surface.

Valve lapping is done to ensure adequate sealing between valve face and seat. Use either a hand drill or lapping stick with suction cup attached.

Moisten and attach suction cup to valve. Lubricate valve stem and guide. Apply a thin coat of fine valve grinding compound between valve and seat. Rotate lapping tool between the palms or with hand drill.

Lift valve upward off the seat and change position often. This is done to prevent grooving of valve seat. Lap valve until a smooth polished seat is obtained. Thoroughly clean grinding compound from components. Valve to valve seat concentricity should be checked. See VALVE SEAT CONCENTRICITY.

CAUTION: Valve guides must be in good condition and free of carbon deposits prior to valve seat grinding. Some engines contain

INSTALLATION

Install upper main bearing in cylinder block. Ensure lock tab is properly located in cylinder block. Install bearings in main bearing caps. Ensure all oil passages are aligned. Install rear seal (if removed).

Ensure crankshaft journals are clean. Lubricate upper main bearings with clean engine oil. Carefully install crankshaft. Check each main bearing clearance using Plastigage method. See MAIN & CONNECTING ROD BEARING CLEARANCE in this article.

Once clearance is checked, lubricate lower main bearing and journals. Install main bearing caps in original location. Install rear seal in rear main bearing cap (if removed). Some rear main bearing caps require sealant to be applied in corners to prevent oil leakage.

Install and tighten all bolts except thrust bearing cap to specification. Tighten thrust bearing cap bolts finger tight only. Thrust bearing must be aligned. On most applications, crankshaft must be moved rearward then forward. Procedure may vary with manufacturer. Thrust bearing cap is then tighten to specification. Ensure crankshaft rotates freely. Crankshaft end play should be checked. See CRANKSHAFT END PLAY in this article.

CRANKSHAFT END PLAY

Dial Indicator Method

Crankshaft end play can be checked using dial indicator. Mount dial indicator on rear of cylinder block. Position dial indicator tip against rear of crankshaft. Ensure tip is resting against flat surface.

Pry crankshaft rearward. Adjust dial indicator to zero. Pry crankshaft forward and note reading. Crankshaft end play must be within specification. If end play is not within specification, check for faulty thrust bearing installation or worn crankshaft. Some applications offer oversized thrust bearings.

Feeler Gauge Method

Crankshaft end play can be checked using feeler gauge. Pry crankshaft rearward. Pry crankshaft forward. Using feeler gauge, measure clearance between crankshaft and thrust bearing surface. See Fig. 22.

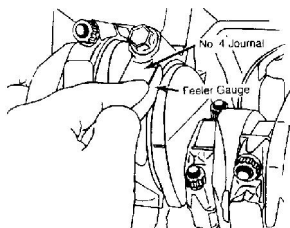


Fig. 22: Checking Crankshaft End Play - Typical
This Graphic For General Information Only

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Fax: (202) 318-3078
E-mail: map@motorist.org

January 2002

OVERVIEW OF SERVICE REQUIREMENTS AND SUGGESTIONS

It is MAP policy that all exhaust, brake, steering, suspension, wheel alignment, drive-line, engine performance and maintenance, and heating, ventilation and air conditioning, and electrical services be offered and performed under the standards and procedures specified in these sections.

Before any service is performed on a vehicle, an inspection of the appropriate system must be performed. The results of this inspection must be explained to the customer and documented on an inspection form. The condition of the vehicle and its components will indicate what services/part replacements may be "Required" or "Suggested." In addition, suggestions may be made to satisfy the requests expressed by the customer.

When a component is suggested or required to be repaired or replaced, the decision to repair or replace must be made in the customer's best interest, and at his or her choice given the options available.

This section lists the various parts and the conditions that indicate a required or suggested service or part replacement. Although this list is extensive, it is not fully inclusive. In addition to this list, a technician may make a suggestion. However, any suggestions must be based on substantial and informed experience, or the vehicle manufacturer's recommended service interval and must be documented.

Some conditions indicate that service or part replacement is

*** ENGINE SYSTEMS UNIFORM INSPECT**

Wire lead shorted A . Require repair or replacement.

- (1) - Determine cause and correct prior to repair or replacement of part.
- (2) - Inoperative includes intermittent operation or out of OEM specification. Some components may be serviceable; check for accepted cleaning procedure.

AIR PLENUMS

AIR PLENUM INSPECTION

Condition	Code	Procedure
Integrated air or fuel control components inoperative	A	(1) Require repair or replacement.
Internal air or fuel components damaged, affecting performance ..	A ...	Require repair or replacement of component.
Internal air or fuel components damaged, not affecting performance .. ..	.....	No service suggested or required.
Internal air or fuel components missing	C	Require replacement of component.
Leaking	A ..	Require repair or replacement.
Restricted	A ..	Require repair or replacement.
Threads damaged	A ..	Require repair or replacement.
Threads stripped (threads missing)	A ..	Require repair or replacement.

- (1) - Inoperative includes intermittent operation or out of OEM specification.

AIR PUMP BELTS

AIR PUMP BELT INSPECTION

Condition	Code	Procedure
Alignment incorrect	B	(1) Further inspection required.
Cracked	1	Suggest replacement.
Frayed	1	Suggest replacement.
Maintenance intervals ...	3 ...	Suggest replacement to comply with vehicle OEM recommended

CASTING CORE PLUGS AND EXPANSION PLUGS

CASTING CORE PLUG AND EXPANSION PLUG INSPECTION

Condition	Code	Procedure
Leaking	A	Require replacement.
Material type incorrect	2	Suggest replacement.

CHARGE AIR COOLERS "INTERCOOLERS" (CAC)

CHARGE AIR COOLER "INTERCOOLER" (CAC) INSPECTION

Condition	Code	Procedure
Air-to-air intercooler leaking, affecting boost performance	A ..	Require repair or replacement.
Attaching hardware broken	A ...	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A ...	Require repair or replacement of hardware.
Leaking coolant	A ..	Require repair or replacement.
Missing	C	Require replacement.
Restricted, affecting performance	A ..	Require repair or replacement.

CHECK VALVES

See ASPIRATOR, CHECK AND DECEL VALVES.

CHOKES

See CARBURETORS AND CHOKES.

CLUTCH PEDAL POSITION SWITCHES

CLUTCH PEDAL POSITION SWITCH INSPECTION

Condition	Code	Procedure
-----------	------	-----------

Attaching hardware

*** ENGINE SYSTEMS UNIFORM INSPECTION GUIDELINES * Article Te**

Spring inoperative A spring(s).
 (2) Require replacement of
 spring(s).

- (1) - Inoperative includes intermittent operation or out of OEM specification. If the inoperative diaphragm is separate from the heat riser, then require replacement of the inoperative diaphragm. If the inoperative diaphragm is part of the heat riser, then replace the heat riser.
- (2) - Inoperative includes intermittent operation or out of OEM specification.

EGR COOLERS

See EGR PLATES AND COOLERS.

EGR EXHAUST MANIFOLD PASSAGES

See EGR INTAKE AND EXHAUST MANIFOLD PASSAGES.

EGR INTAKE AND EXHAUST MANIFOLD PASSAGES

EGR INTAKE AND EXHAUST MANIFOLD PASSAGE INSPECTION

Condition	Code	Procedure
Leaking	A ..	Require repair or replacement.
Restricted, affecting performance	A ..	Require repair or replacement.

EGR PLATES AND COOLERS

EGR PLATE AND COOLER INSPECTION

Condition	Code	Procedure
Leaking	A ..	Require repair or replacement.
Missing	C ..	Require replacement.
Restricted, affecting performance	A ..	Require repair or replacement.

ELECTRONIC SPARK CONTROL MODULES

ELECTRONIC SPARK CONTROL MODULE INSPECTION

Condition	Code	Procedure
Application incorrect ...	B ..	Require replacement*

Missing C Require replacement.
 Resistance out of specification B .. Require repair or replacement.
 Restricted, affecting performance A .. Require repair or replacement.
 Restricted, not affecting performance 1 .. Suggest repair or replacement.
 Terminal broken A .. Require repair or replacement.
 Terminal burned, affecting performance A (1) Require repair or replacement.
 Terminal burned, not affecting performance .. 2 .. Suggest repair or replacement.
 Terminal corroded, affecting performance .. A .. Require repair or replacement.
 Terminal corroded, not affecting performance .. 2 .. Suggest repair or replacement.
 Terminal loose, affecting performance B .. Require repair or replacement.
 Terminal loose, not affecting performance .. 1 .. Suggest repair or replacement.
 Threads damaged A .. Require repair or replacement.
 Threads stripped (threads missing) A Require replacement.
 Wire lead conductors exposed B .. Require repair or replacement.
 Wire lead corroded A .. Require repair or replacement.
 Wire lead open A .. Require repair or replacement.
 Wire lead shorted A .. Require repair or replacement.

- (1) - Determine cause and correct prior to repair or replacement of part.
- (2) - Determine source of contamination, such as engine coolant, fuel, metal particles, or water. Require repair or replacement.
- (3) - Inoperative includes intermittent operation or out of OEM specification. Some components may be serviceable; check for accepted cleaning procedure.

EXHAUST GAS RECIRCULATION FEEDBACK DEVICES

EXHAUST GAS RECIRCULATION FEEDBACK DEVICE INSPECTION

Condition	Code	Procedure
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware threads damaged	A ...	Require repair or replacement of hardware.

of hardware.

Cracked A Require replacement.

Dented (fluid
type only) A Require replacement.

Keyway distorted A .. Require repair or replacement.

Leaking (Fluid damper
only) A Require replacement.

Loose A Require replacement.

Noisy A Require replacement.

Outer ring slipped out of
position A Require replacement.

Positioned incorrectly .. A .. Require repair or replacement.

Rubber damping material
deteriorated 1 Suggest replacement.

Seal surface worn, causing
a leak A .. Require repair or replacement.

Threads damaged A .. Require repair or replacement.

Threads stripped (threads
missing) A Require replacement.

HEATER CONTROL VALVES

HEATER CONTROL VALVE INSPECTION

Condition	Code	Procedure
Attaching hardware broken	A ...	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A ...	Require repair or replacement of hardware.
Bypassed	A	Require replacement.
Coolant leak	A ..	Require repair or replacement.
Malfunctioning	A	(1) Require repair or replacement.
Missing	C	Require replacement.
Restricted	A ..	Require repair or replacement.
Vacuum leak	A ..	Require repair or replacement.

(1) - Includes inoperative, intermittent operation, or
failure to perform all functions.

HEATER CORES

HEATER CORE INSPECTION

Connector missing C Require replacement.
 Inoperative B (2) Require repair or replacement. Further inspection required.
 Leaking A .. Require repair or replacement.
 Missing C Require replacement.
 Resistance out of specification B .. Require repair or replacement.
 Terminal broken A .. Require repair or replacement.
 Terminal burned, affecting performance A (1) Require repair or replacement.
 Terminal burned, not affecting performance .. 2 .. Suggest repair or replacement.
 Terminal corroded, affecting performance .. A .. Require repair or replacement.
 Terminal corroded, not affecting performance .. 2 .. Suggest repair or replacement.
 Terminal loose, affecting performance B .. Require repair or replacement.
 Terminal loose, not affecting performance .. 1 .. Suggest repair or replacement.
 Threads damaged A .. Require repair or replacement.
 Threads stripped (threads missing) A Require replacement.
 Wire lead conductors exposed B .. Require repair or replacement.
 Wire lead corroded A .. Require repair or replacement.
 Wire lead open A .. Require repair or replacement.
 Wire lead shorted A .. Require repair or replacement.

- (1) - Determine cause and correct prior to repair or replacement of part.
- (2) - Inoperative includes intermittent operation or out of OEM specification. Some components may be serviceable; check for accepted cleaning procedure.

LIQUID VAPOR SEPARATORS

LIQUID VAPOR SEPARATOR INSPECTION

Condition	Code	Procedure
Inoperative	A	(1) Require repair or replacement.
Leaking	A	Require replacement.
Missing	C	Require replacement.
Restricted	A ..	Require repair or replacement.

- (1) - Inoperative includes intermittent operation or out of OEM specification.

Terminal loose, affecting performance B .. Require repair or replacement.
 Terminal loose, not affecting performance .. 1 .. Suggest repair or replacement.
 Wire lead conductors exposed B .. Require repair or replacement.
 Wire lead corroded A .. Require repair or replacement.
 Wire lead open A .. Require repair or replacement.
 Wire lead shorted A .. Require repair or replacement.

- (1) - Determine cause and correct prior to repair or replacement of part.
- (2) - Inoperative includes intermittent operation or out of OEM specification. Refer to OEM recommended service' procedures.

POWER STEERING PRESSURE SENSORS

POWER STEERING PRESSURE SENSOR INSPECTION

Condition	Code	Procedure
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware threads damaged	A ...	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A ...	Require repair or replacement of hardware.
Connector broken	A ..	Require repair or replacement.
Connector (Weatherpack type) leaking	A ..	Require repair or replacement.
Connector melted	A	(1) Require repair or replacement.
Connector missing	C	Require replacement.
Contaminated	A	(2) Require repair or replacement.
Inoperative	B	(3) Require repair or replacement. Further inspection required.
Leaking	A ..	Require repair or replacement.
Missing	C	Require replacement.
Resistance out of specification	B ..	Require repair or replacement.
Restricted, affecting performance	A ..	Require repair or replacement.
Terminal broken	A ..	Require repair or replacement.
Terminal burned, affecting		

Binding A .. Require repair or replacement.
 Leaking A .. Require repair or replacement.
 Missing C Require replacement.
 Seized A .. Require repair or replacement.

THERMOSTATS AND HOUSINGS

THERMOSTAT AND HOUSING INSPECTION

Condition	Code	Procedure
Application incorrect ...	B	Require replacement.
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware corroded	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Housing corroded	1	Suggest replacement of housing.
Inoperative	A	(1) Require replacement.
Installation incorrect ..	B	Require repair or replacement.
Leaking	A	Require repair or replacement.
Thermostat missing	C	Require replacement of thermostat.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require repair or replacement.

(1) - Inoperative includes intermittent operation or out of OEM specification.

THROTTLE BODIES

THROTTLE BODY INSPECTION

Condition	Code	Procedure
Connector broken	A	Require repair or replacement.
Connector (Weatherpack type) leaking	A	Require repair or replacement.
Connector melted	A	(1) Require repair or replacement.
Connector missing	C	Require replacement.
Contaminated	A	(2) Require

Attaching hardware missing C Require replacement of hardware.

Attaching hardware threads damaged A ... Require repair or replacement of hardware.

Attaching hardware threads stripped (threads missing) A ... Require repair or replacement of hardware.

Connector broken A .. Require repair or replacement.

Connector (Weatherpack type) leaking A .. Require repair or replacement.

Connector melted A (1) Require repair or replacement.

Connector missing C Require replacement.

Contaminated A (2) Require repair or replacement.

Inoperative B (3) Require repair or replacement. Further inspection required.

Leaking A .. Require repair or replacement.

Missing C Require replacement.

Resistance out of specification B .. Require repair or replacement.

Restricted, affecting performance A .. Require repair or replacement.

Terminal broken A .. Require repair or replacement.

Terminal burned, affecting performance A (1) Require repair or replacement.

Terminal burned, not affecting performance .. 2 .. Suggest repair or replacement.

Terminal corroded, affecting performance .. A .. Require repair or replacement.

Terminal corroded, not affecting performance .. 2 .. Suggest repair or replacement.

Terminal loose, affecting performance B .. Require repair or replacement.

Terminal loose, not affecting performance .. 1 .. Suggest repair or replacement.

Threads damaged A .. Require repair or replacement.

Threads stripped (threads missing) A Require replacement.

Wire lead conductors exposed B .. Require repair or replacement.

Wire lead corroded A .. Require repair or replacement.

Wire lead open A .. Require repair or replacement.

Wire lead shorted A .. Require repair or replacement.

HEAT SHIELD INSPECTION

Condition	Code	Procedure
Bent	B ..	Require repair or replacement.
Broken	A	Require replacement.
Corroded, affecting structural integrity ...	1	Suggest replacement.
Loose	A ..	Require repair or replacement.
Missing	C	Require replacement.

MANIFOLDS (CAST AND TUBE TYPE)

MANIFOLD (CAST AND TUBE TYPE) INSPECTION

Condition	Code	Procedure
Air injection tube in manifold broken	A ...	Require repair or replacement of injection tube or replacement of manifold.
Air injection tube in manifold corroded, affecting structural integrity	1	Suggest replacement of injection tube or manifold.
Air injection tube in manifold leaking	A ...	Require repair or replacement of injection tube or replacement of manifold.
Air injection tube in manifold loose	A	Require repair.
Air injection tube in manifold restricted	A	Require replacement of injection tube or manifold.
Air injection tube in manifold threads damaged	A	Require repair of injection tube or manifold.
Air injection tube in manifold threads stripped (threads missing)	A	Require replacement of injection tube or manifold.
Bolt broken	A ...	Require replacement of bolts.
Bolt loose	A	Require tightening or replacement of bolts.
Bolt missing	C ...	Require replacement of bolts.
Corroded, affecting sealability	A ..	Require repair or replacement.
Cylinder head threads		

To flush engine, remove thermostat and replace housing. Connect flushing gun to water outlet of engine. Flush using short air bursts until water runs clean.

Heater Core

Flush heater core as described for radiator. Ensure heater control valve is set to maximum heat position before flushing heater.

REFILLING

To prevent air from being trapped in engine block, engine should be running when refilling cooling system. After system is full, continue running engine until thermostat is open, then recheck fill level. Do not overfill system.

TESTING

THERMOSTAT

1) Visually inspect thermostat for corrosion and proper sealing of valve and seat. If okay, suspend thermostat and thermometer in a 50/50 mixture of coolant and water. See Fig. 1. Do not allow thermostat or thermometer to touch bottom of container. Heat water until thermostat just begins to open.

2) Read temperature on thermometer. This is the initial opening temperature and should be within specification. Continue heating water until thermostat is fully open and note temperature. This is the fully opened temperature. If either reading is not to specification, replace thermostat.

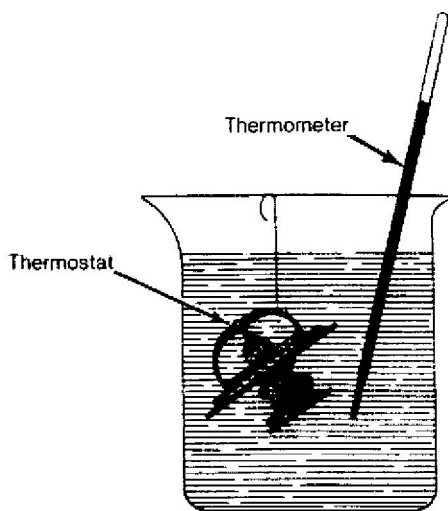


Fig. 1: Testing Thermostat in Anti-Freeze/Water Solution

PRESSURE TESTING

A pressure tester is used to check both radiator cap and complete cooling system. **GENERAL COOLING SYSTEM SERVICING Article Text (p. 2)** 1988 Mercedes-Benz 560SEL For

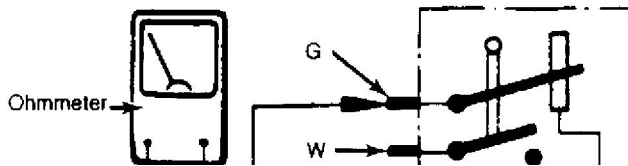


Fig. 1: Fuel Sending Unit Terminal Identification
 Courtesy of Mercedes-Benz of North America.

Production As Of September, 1988

1) Connect ohmmeter between terminal "G" and terminal No. 31 on fuel gauge sender. See Fig. 1. Resistance should be 2 +/- 1 ohms with float at "FULL" position and 76 +/- 1 ohms with float at "EMPTY" position. The higher the fuel level, the lower resistance will be.

2) Connect ohmmeter across terminal "W" and terminal No. 31. Continuity should exist only if tank is empty (low fuel warning contacts). If sending unit is functional and wire harness is good, replace fuel gauge.

VACUUM GAUGE

1) Locate vacuum source hose at 4-way connector near engine. Check for vacuum. If there is vacuum, connect directly to vacuum gauge hose and by-pass connector. If there is no vacuum, clean vacuum port or repair hose.

2) If vacuum gauge works, air conditioning system has a vacuum leak. If gauge does not work, repair vacuum line or replace gauge.

REMOVAL & INSTALLATION

INSTRUMENT CLUSTER

190 SERIES

1) Disconnect negative battery cable. Remove cover under left side of instrument panel. Remove left instrument panel vent hose from below. Unscrew speedometer cable from below.

2) Push instrument cluster out, (just a few inches), from rear. Instrument cluster is held in place by 5 spring clips located in the 2,4,8,10, and 12 O'clock positions. Alternatively, instrument cluster may be removed using the above steps, then pulling cluster out from the front using special hook tool (126 589 03 33 00), starting at the 10 O'clock position.

3) Disconnect electrical connectors and oil line, (if equipped with manual oil pressure guage), and remove instrument cluster the rest of the way.

4) To install instrument cluster, reverse removal procedure.

420SEL

1) Pry out steering wheel center cap. Remove and discard screw. Remove steering wheel. On vehicles equipped with Supplemental Restraint System (SRS), Remove bolts attaching center hub to steering wheel.

FUSES & CIRCUIT BREAKERS

FUSE PANEL LOCATION

The fuse box is located in the engine compartment. The fuse specifications are on a label on the fuse box lid.

FUSE PANEL IDENTIFICATION

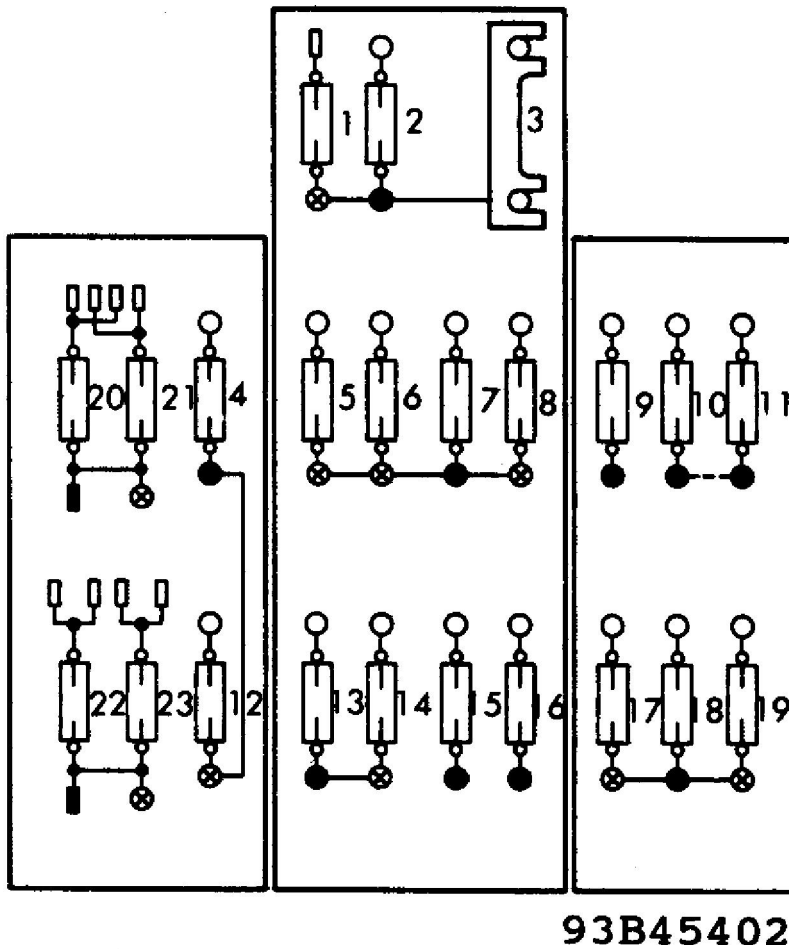


Fig. 3: Fuse Panel Identification
Courtesy of Mercedes-Benz of North America.

Fuse & Circuit Breaker Identification

- 1 - 16 Amp
Auxiliary Fan
- 2 - 8 Amp
Diagnostic Socket & Power Seat Relay, Warning Flasher &
Buzzer, Dome, Reading & Mirror Lights, Clock & Radio
- 3 - 30 Amp
Heated Rear Window

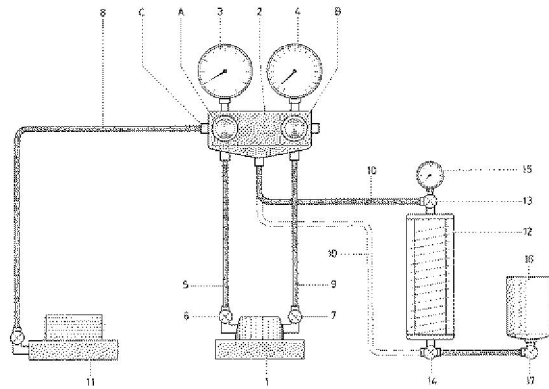
A. Filling system with filling cylinder or service unit

Note: The filling cylinder (12) serves for the accurate filling of the desired quantity by weight of refrigerant.

If the temperature of the refrigerant, which is inside the closed cylinder, is increased, the pressure and the specific volume of the liquid refrigerant will also be increased.

If an accurate quantity by weight is taken from a cylinder provided with a sight glass, it will be necessary to compensate the changes in specific weight caused by the changing temperature.

By reading the pressure on the pressure gauge (15) and by adjusting this pressure on the upper scale of the rotatable plastic cylinder (20), and with reference to refrigerant to be filled in as stated on lower rim of rotatable plastic cylinder, the changes in volume under the influence of temperature can be compensated. Since the air-conditioning system is filled with R 12, set scale for R 12 at lower rim of plastic cylinder when filling up.



Assembly tester and filling cylinder with all connections

- | | | |
|--------------------------------------|---------------------------------|----------------------------------|
| A. Valve on suction pressure gauge | 5. Hose line | 12. Filling cylinder |
| B. Valve on high pressure gauge | 6. Service valve (suction end) | 13. Upper valve |
| C. Schröder valve on assembly tester | 7. Service valve (pressure end) | 14. Lower valve |
| 1. Refrigerant compressor | 8. Hose line | 15. Pressure gauge |
| 2. Assembly tester | 9. Hose line | 16. Refrigerant bottle with R 12 |
| 3. Suction pressure gauge | 10. Hose line | 17. Valve on refrigerant bottle |
| 4. High-pressure gauge | 11. Vacuum pump | |

Attention!

When filling with the service unit, make sure that valve (16) for torr meter (vacuum meter) is closed. If the torr meter is under a pressure of above 1.2 bar, meter is defective and can no longer be used.

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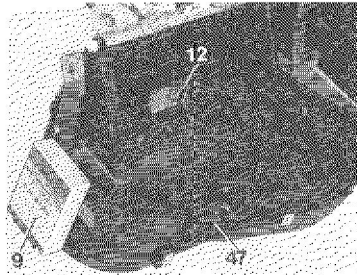
MANUAL A/C

38 Mercedes-Benz 560SEL For 1

Fig. 10: A: Filling System With Cylinder Or Service Unit (1 Of 3)
Courtesy of Mercedes-Benz of North America.

Removal

- 1 Completely remove legroom cover right (righthand steering left).
- 2 Remove blower cover below.
- 3 Remove connecting hoses from air jet nozzle.
- 4 Loosen Phillips head screw from holder for air jet nozzle (small ratchet without adaptor with Phillips head top).
- 5 Move out air jet nozzle (47).



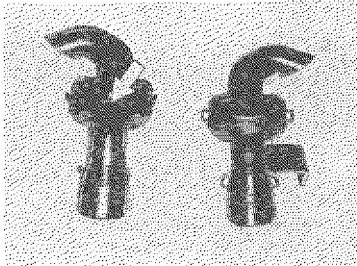
- 6 Unclip air jet nozzle and check seat of nozzle (arrow) and mount correctly, if required.
- 7 Provide sealing surfaces with glue and clip both parts together.
- 8 For installation proceed vice versa, paying attention to installing connecting hoses free of kinks and accurate plugging of hoses on nozzle connections.
- 9 Check function of heating system or automatic climate control.



Air jet nozzle (arrow) functional

Attention!

Prior to assembly of legroom cover, remove glove box for accurate connection of air duct transitions.



Air jet nozzle (arrow) not functional

MANUAL A/C

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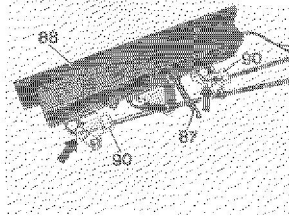
Fig. 25: Air Jet Nozzle - Steps 1-9
Courtesy of Mercedes-Benz of North America.

Pre-Resistance Group

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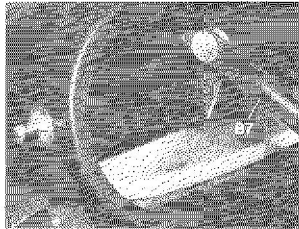
Installation

12 Install Bowden cables. Insert frame (88) with connecting hose through opening of glove box and insert connecting rod (87) (version up to 06/82) or fasten with Phillips head screw (version starting 07/82) (arrow) and adjust center nozzle flap. Make sure that the connecting hose is correctly sealed.

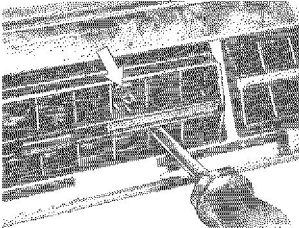


Attention!

Up to 06/82, the connecting rod is fastened to center nozzle flap with a separate spreading rivet. Starting 07/82 the spreading rivet is fastened to connecting rod.

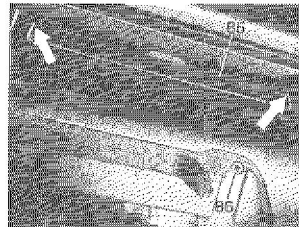


Fastening with spreading rivet up to 06/82



Fastening with screw starting 07/82

13 Fit screws (86) and insert Venetian blinds (85) from the front.



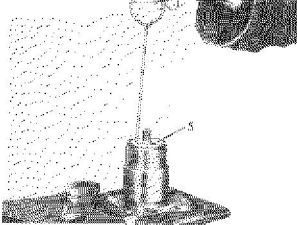
00034-708

Fig. 40: A: Venetian Blind (Outlet Vents) With Frame In Center Of Instrument Panel - Steps 12-13 (4 Of 5)

Courtesy of Mercedes-Benz of North America.

MANUAL A/C & HEATING SYSTEM - 126 CHASSIS Article Text (p. 37)1988 Mercedes-Benz 560SELFor 1

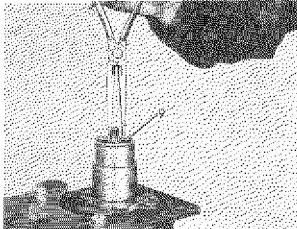
Note: Puller is self-made of 2.5 mm dia. brass wire.



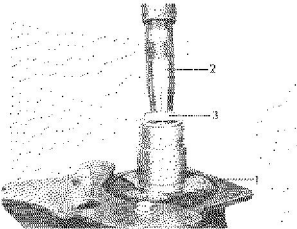
Removal of holding ring
6 Holding ring

3 Remove locking ring (9) for shaft seal.

4 Remove slip ring (3 or 8) by means of remover and installer (2)

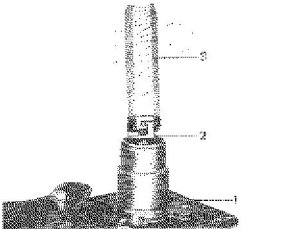


Removal of locking ring for shaft seal
9 Locking ring



Removal of ceramic slip ring
1 Refrigerant compressor
2 Remover and installer
3 Slip ring

5 Remove shaft seal (2 or 11) with assistance of tool (3). For this purpose, push down on tool, turn tool to the right to engage lugs of shaft seal and locking tongues on tool. Remove complete shaft seal by straight pulling from shaft.



Removal of shaft seal
1 Refrigerant compressor
2 Shaft seal
3 Remover and installer

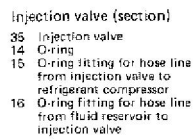
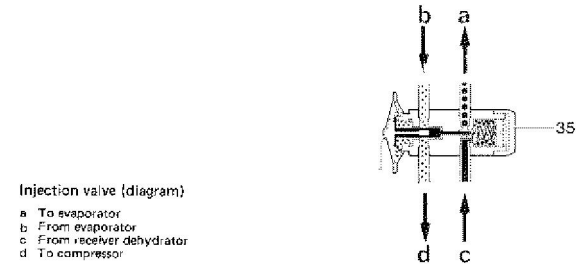
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Fig. 57: Shaft Seal - Steps 3-5 (2 Of 4)

Courtesy of Mercedes-Benz of North America.

Expansion Valve

NOTE: If expansion valve shows considerable contamination, renew receiver dehydrator and expansion valve.



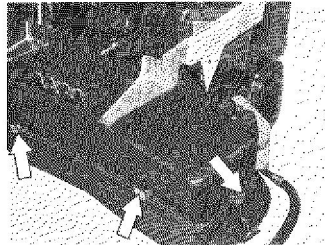
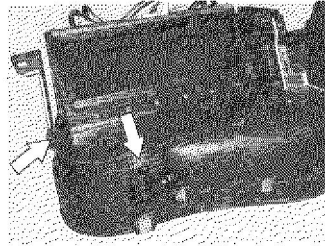
Removal

- 1 Drain air-conditioning system.
- 2 Remove cover at left (righthand steering vehicle at the right) under instrument panel.
- 3 Open housing by half (65).
- 4 Loosen all hose and pipe lines on injection valves (35) with box end wrench first and then screw off.
- 5 Remove injection valve and close connections with plugs.

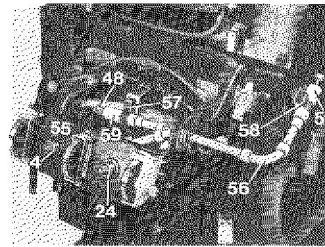
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Fig. 71: Expansion Valve - Steps 1-5 (1 Of 2)
Courtesy of Mercedes-Benz of North America.

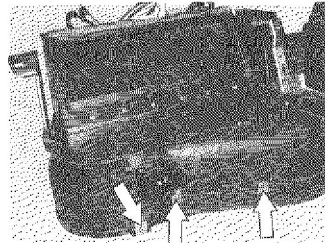
6 Remove clamps (refer to arrow) on main flap housing and lift off housing for main flap.



7 Disconnect bowden wires (48 and 56) for legroom and defroster nozzle flaps. Remove clamps (57 and 58).



8 Remove clamps (refer to arrow) on evaporator housing as well as on heater box and remove housing cover.



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Fig. 85: Evaporator - Steps 6-8 (2 Of 10)
Courtesy of Mercedes-Benz of North America.

15 Lift-off front head section and compressor housing. Inner mechanism remains on mount.

Attention!

Do not knock against end of compressor shaft to push-out inner mechanism. If inner mechanism is not sliding out of compressor housing, knock with plastic hammer against front head section.

16 Put compressor housing with front head section aside and push-out head section through compressor housing, making sure that the sealing surfaces on inside of front head section are not damaged.

17 Wipe refrigerant oil from sealing surface of front head section and check sealing surface. If damage shows up, replace head section.

18 Remove front exhaust and intake valve plate. Check leaf springs and their seats. Replace these parts, if required.

19 Check inner mechanism for damage. If essential damage (e. g. seized spots on cylinder running surface) shows up caused by a shortage of refrigerant or oil, it is recommended to install a complete exchange compressor or a new compressor.

Installation

20 Place inner mechanism on mount.

21 Insert new guide pins (2) into front cylinder half, if previously removed.

22 Mount front intake valve plate (1) on front cylinder half. Align oil return slot and overflow pipe by means of guide pins (2).

Installation of front intake valve plate

- | | |
|----------------------|-------------------|
| 1 Intake valve plate | 3 Oil return slot |
| 2 Guide pins | 4 Overflow pipe |

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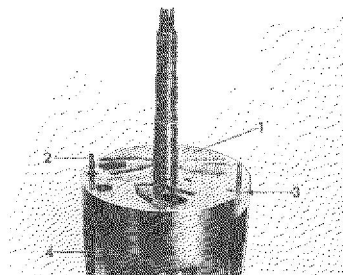


Fig. 98: B: Compressor - Engine 116 & 117 - Steps 15-22 (3 Of 7)
Courtesy of Mercedes-Benz of North America.

OUTSIDE MIRRORS - ADJUSTABLE

Article Text

1988 Mercedes-Benz 560SEL

For 1

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Saturday, July 14, 2012 01:05PM

ARTICLE BEGINNING

1985-91 ACCESSORIES & EQUIPMENT

Mercedes-Benz Adjustable Outside Mirrors - SD, SDL & SL-Class

* PLEASE READ THIS FIRST *

WARNING: Vehicles are equipped with air bag supplemental restraint system. Before attempting ANY repairs involving steering column, instrument panel or related components, see SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM in appropriate AIR BAG RESTRAINT SYSTEMS article.

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION before disconnecting battery.

CAUTION: Vehicles equipped with coded radios are susceptible to damage when battery is disconnected. Ensure ignition switch is in OFF position and radio is turned off before disconnecting battery. Have radio code available when disconnecting battery or removing radio. For coding procedures, see COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION.

IDENTIFICATION

NOTE: To identify Mercedes-Benz model, chassis and engine codes, see MERCEDES-BENZ MODEL IDENTIFICATION article in GENERAL INFORMATION.

DESCRIPTION & OPERATION

GENERAL

Mechanically adjustable outside mirrors are standard equipment. Electrically adjustable outside mirrors with electrical heating are available as special equipment. The heater is located behind rear of mirror glass and permanently connected. A thermostat is also arranged on rear of mirror glass which switches heater on and off according to temperature. The mirror glass can be separately replaced.

FUNCTION (PRODUCTION TO 9/85)

The heater is operational in key position 2 (terminal 15). The thermostat in mirror glass switches heater on at ambient temperatures below 41° F +/- 4° (5° +/- 3° C). The heater remains switched on up to an ambient temperature of 59° +/- 4° F (15° +/- 3° C). and switches off after this temperature has been reached.

	* Rear seat side pad (3)	
	* All seat belts with triggered pretensioner	
	* Moulded headliner (4)	
Inspect & If Damaged Replace Component (Even If Air Bag Did Not Deploy)	* A-pillar through D-pillar trim panels (4)	
	* Seat belts & mounting points	
	* Instrument panel	
	* Side impact air bag sensor(s) (5)	
	* Air bag control unit (6)	
Comments	If any components are damaged or bent, they must be replaced. After vehicle is repaired, ensure AIR BAG warning light is functioning properly. Manufacturer recommends replacing all components (except wire harness) every 15 years. After replacing air bag module(s) or air bag control unit, attach supplied stickers (only tear-off strips) to registration card and send to manufacturer.	
<p>(1) - On Allroad-Quattro, A4, A6, S4, and TT on or after 10-98, replace Air Bag Control Unit (ACU) if front air bags deploy or every third head, side and-or seat belt pretensioner deployment. On A8, S8 and all models before 10-98, replace ACU after any air bag deployment.</p> <p>(2) - On side of deployment.</p> <p>(3) - If equipped with rear seat side impact air bags and folding rear seat.</p> <p>(4) - On vehicles with head impact air bags.</p> <p>(5) - Replace if floor pan is deformed in sensor area.</p> <p>(6) - Replace if body tunnel is damaged within 7.87" (200 mm) of ACU.</p>		

BMW (1986-01)

AIR BAG APPLICATION

APPLICATION - BMW

Make/Model	Year	Location	Table
L7	1986-87	DS	BMW-2
M Coupe-Roadster	2000	D/P2, SI	BMW-1
	1998-99	D/P, SI	BMW-1
M3	1998-99	D/P, SI	BMW-1
	1995-97	D/P	BMW-1
	1990-91	DS	BMW-2
M5	2000	D/P2, SI, HI	BMW-1
	1990-93	DS	BMW-2
X5	2000	D/P2, SI, HI	BMW-1
Z3	2000	D/P2, SI	BMW-1

S80	1999-00	...	D/P, SI, HI	.....	VOLVO-3
S90 & V90	1998	.....	D/P	.....	VOLVO-1
240 Series	1990-93	.....	DS	.....	VOLVO-2
740 Series	1987-92	.....	DS	.....	VOLVO-2
760 Series	1987-90	.....	DS	.....	VOLVO-2
780 Series	1987-90	.....	DS	.....	VOLVO-2
850 Series	1995-96	.....	D/P, SI	.....	VOLVO-1
	1993-94	.....	D/P	.....	VOLVO-1
940 Series	1994-95	.....	D/P	.....	VOLVO-1
	1991-93	.....	DS	.....	VOLVO-1
960 Series	1996	.....	D/P, SI	.....	VOLVO-1
	1993-95	.....	D/P	.....	VOLVO-1
	1992	.....	DS	.....	VOLVO-1

D/P - Driver's & Passenger's Side.
D/P2 - Driver's & Passenger's Side (Dual-Stage).
DS - Driver's Side.
HI - Head Impact.
KI - Knee Impact.
SI - Side Impact.
PS2 - Passenger's Side (Dual-Stage).

INSPECTION PROCEDURES

VOLVO-1

Action	Component or System
Replace After Deployment	<ul style="list-style-type: none"> * Airbag module(s) * Contact reel * Ignition wiring to passenger module * Seat belt units * Sensor module (1) * Steering wheel * SIPS (sensor module, ignition circuit & bag module) (2)
Inspect & If Damaged Replace Component (Even If Air Bag Did Not Deploy)	<ul style="list-style-type: none"> * Instrument panel & frame * Instrument panel speakers * Knee bolster & brackets * Panels under instrument panel * Windshield & moulding * Seat belts & mounting points
Comments	DO NOT attempt SRS wiring repairs. Visually inspect SIPS & seats in event of minor collisions without deployment.

- (1) - Replace if fault code cannot be erased or if there is damage in the area of the sensor module.
(2) - Except C70 Coupe.

Lubrication Specifications	
Application	Specification
Engine Oil	
Minimum Temperature Greater Than 50° F (10° C)	SAE 20W-40 Or 20W-50
Temperature 14° -50° F (-10° C To 10° C)	SAE 10W-30
Maximum Temperature Less Than 14° F (-10° C)	SAE 5W-20 Or 5W-30
Fluid Capacities	
Application	(1) Quantity
Engine Oil	8.5 Qts. (8.0L)
(1) - Capacities are recommended or calculated levels. Always use dipstick (if available) to measure level.	

75,000 MILE (120,000 KM) SERVICE

75,000 MILE (120,000 KM) SERVICE

Service Or Inspect	
Verify Last Major Service Was Performed	
Belt Condition	
Spark Plugs (California Vehicles)	
Transmission Fluid Levels	
Engine Throttle Linkage	
Replace	
Engine Oil & Filter	
Lubrication Specifications	
Application	Specification
Automatic Transmission	Dexron-II ATF
Engine Oil	
Minimum Temperature Greater Than 50° F (10° C)	SAE 20W-40 Or 20W-50
Temperature 14° -50° F (-10° C To 10° C)	SAE 10W-30

comes on while driving, have the SRS serviced as soon as possible.

"CHECK ENGINE" WARNING LIGHT

If this light comes on while the engine is running, it indicates a problem with the oxygen sensor on Federal vehicles and a problem with the fuel injection system or emission control system on California vehicles. Have vehicle serviced as soon as possible.

EXTERIOR LIGHT FAILURE WARNING LIGHT

If light comes on while engine is running, there is a bulb failure in one of the exterior lights. Replace the defective bulb as soon as possible.

END OF ARTICLE

an assembly fixture. Using a hook wrench, unscrew slotted nut from bearing insert.

7) Using a spanner wrench, remove bearing insert from bearing cap. See Fig. 3. Remove steering worm and washer from bearing cap.

8) Remove roller cage from steering worm, along with seal and "O" rings. Remove bearing and disc from bearing cap. Remove bolts, clamp, and both ball guide halves from piston/steering nut.

9) Remove worm gear nut from piston/steering nut. Remove seal ring and "O" ring from worm gear nut. Remove bearings, races and "O" rings from piston/steering nut.

10) Remove lock ring, cover and control valve from housing. See Fig. 4. If necessary, remove pistons from control valve by removing lock rings.

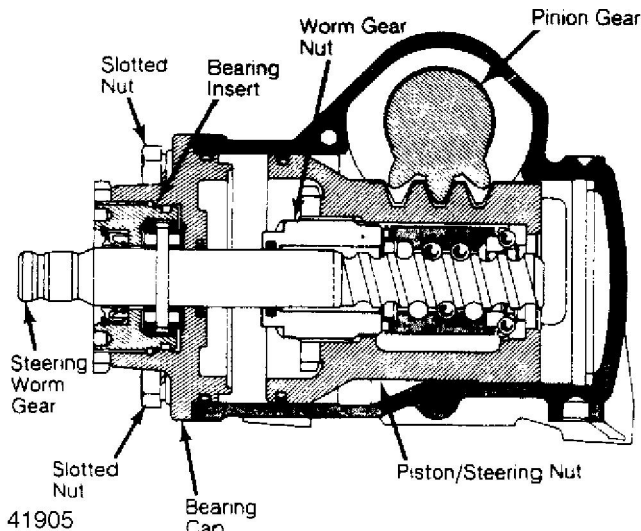


Fig. 4: Cross Sectional View of Steering Gear
Courtesy of Mercedes-Benz of North America.

Inspection

1) Check worm gear ball paths and bearing surfaces for wear and damage. Inspect worm nut and piston/steering nut for wear or damage. Check pitman shaft for wear or damage on bearing surfaces.

2) Check for bent or warped shaft. Check housing, cover, and bearing insert for wear or damage. Check reaction piston in control valve for free movement. Replace worn parts as necessary.

Reassembly

To reassemble, reverse disassembly procedure. Replace all "O" rings and sealing rings.

STEERING SPECIFICATIONS TABLE

Application	Specification
-------------	---------------

Number of Balls in Ball Circuit	24
--	----

missing) A (8) Require replacement.
 Wear exceeds
 manufacturer's
 specifications B Require replacement.

- (1) - If greaseable, grease ball joint. If problem persists or joint is non-greaseable, require replacement.
- (2) - Cracked grease boot will allow contaminants to enter the ball joint and will accelerate wear.
- (3) - Lack of grease boot will allow contaminants to enter the ball joint and will accelerate wear.
- (4) - Torn grease boot will allow contaminants to enter the ball joint and will accelerate wear.
- (5) - Some vehicles come from the factory with broken fittings. No service is suggested or required on these vehicles.
- (6) - If the greaseable ball joint still will not take grease after replacing the grease fitting, suggest replacement of ball joint.
- (7) - Check for bent stud or damaged taper hole.
- (8) - Check for damaged taper hole.

BUSHINGS

BUSHINGS

Condition	Code	Procedure
Attaching hardware broken	..... A	..... Require repair or replacement of hardware.
Attaching hardware missing	..... C	..... Require replacement of hardware.
Attaching hardware not functioning	..... A	..... Require repair or replacement of hardware.
Attaching hardware threads damaged	..... A	..... Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	..... A	..... Require replacement of hardware.
Binding	..... A	..... Require repair or replacement.
Deteriorated, affecting performance	..... A	..... (1) Require repair or replacement.
Distorted, affecting performance	..... A	..... Require repair or replacement.
Leaking (fluid-filled type)	..... A	..... Require replacement.
Missing	..... C	..... Require replacement.
Noisy	..... 2*	.....

failure is likely to occur) B Require repair or replacement.
 Secured incorrectly B Require repair.

HYDRAULIC POWER STEERING PUMPS

See POWER STEERING PUMPS.

HYDRAULIC SUSPENSION HOSES

See HYDRAULIC HOSES.

HYDRAULIC SUSPENSION PUMPS

See SUSPENSION (HYDRAULIC) PUMPS.

IDLER ARMS

IDLER ARMS

Condition	Code	Procedure
Attaching hardware broken	..... A	..... Require repair or replacement of hardware.
Attaching hardware missing	..... C	..... Require replacement of hardware.
Attaching hardware not functioning	..... A	..... Require repair or replacement of hardware.
Attaching hardware threads damaged	..... A	..... Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	..... A	..... Require replacement of hardware.
Binding	..... A	..... (1) Further inspection required. See note below.
Grease boot cracked	..... A	..... (2) Require replacement of boot.
Grease boot missing	..... C	..... (3) Require replacement of boot.
Grease boot torn	..... A	..... (4) Require replacement of boot.
Grease fitting broken	..... A	..... Require replacement of grease fitting.
Grease fitting missing	..... C	..... Require replacement of grease fitting.
Grease fitting won't seal	..... A	..... Require replacement of

Attaching hardware missing C Require replacement of hardware.

Attaching hardware not functioning A Require repair or replacement of hardware.

Attaching hardware threads damaged A Require repair or replacement of hardware.

Attaching hardware threads stripped (threads missing) A Require replacement of hardware.

Housing broken A Require replacement.

Housing cracked 2 Suggest replacement.

Inoperative A (1) Require replacement.

Missing C Require replacement.

Terminal broken A Require repair or replacement.

Terminal burned, affecting performance A (2) Require repair or replacement.

Terminal burned, not affecting performance 2 Suggest repair or replacement.

Terminal corroded, affecting performance A Require repair or replacement.

Terminal corroded, not affecting performance 2 Suggest repair or replacement.

Terminal loose, affecting performance B Require repair or replacement.

Terminal loose, not affecting performance 1 Suggest repair or replacement.

- (1) - Inoperative includes intermittent operation or out of OEM specification.
- (2) - Determine cause and correct prior to repair or replacement of part.

SENSORS

SENSORS

Condition	Code	Procedure
Attaching hardware broken	..... A	..... Require repair or replacement of hardware.
Attaching hardware missing	..... C	..... Require replacement of hardware.

Lash exceeds manufacturer's specifications	B	Require repair or replacement.
Malfunctioning	A	(4) Require repair or replacement.
Seal leaking	A	Require repair or replacement.
Splines damaged	A	Require repair or replacement.
Splines stripped (splines missing)	A	Require replacement.
Steel line blocked	A	Require repair or replacement of line.
Steel line leaking	A	Require repair or replacement of line.
Steel line missing	C	Require replacement of line.
Steel line restricted	A	Require repair or replacement of line.
Terminal burned, affecting performance	A	(1) Require repair or replacement.
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.
Terminal loose, not affecting performance	1	Suggest repair or replacement.
Threads damaged	A	Require repair or replacement of part with damaged threads.
Threads stripped (threads missing)	A	Require replacement of part with stripped threads.
Unequal power assist	A	Require repair or replacement.
Wire lead burned	A	Require repair or replacement.
Wire lead conductors exposed	B	Require repair or replacement.

Threads damaged A Require repair or replacement.

Threads stripped (threads missing) A (7) Require replacement.

Wear exceeds manufacturer's specifications B Require replacement.

- (1) - If boot is not available separately, suggest replacement of tie rod end (reason code 2). Cracked grease boot will allow contaminants to enter joint and will accelerate wear.
- (2) - If boot is not available separately, suggest replacement of track bar (reason code 2). Lack of grease boot will allow contaminants to enter joint and will accelerate wear.
- (3) - If boot is not available separately, suggest replacement of track bar (reason code 2). Torn grease boot will allow contaminants to enter joint and will accelerate wear.
- (4) - If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.

CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.

- (5) - Excessive looseness is defined as being significant enough to affect vehicle handling or structural integrity. If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.

CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.

- (6) - Check for bent stud or damaged mating hole.
- (7) - Check for damaged mating hole.

TRAILING ARM BUSHINGS

See BUSHINGS.

TRAILING ARMS

TRAILING ARMS

Condition	Code	Procedure
Attaching hardware broken	..... A	Require repair or replacement of hardware.

Attaching hardware corroded, affecting structural integrity A Require replacement of* **STEERING UNIFORM INSPECTION GUIDELINE!**

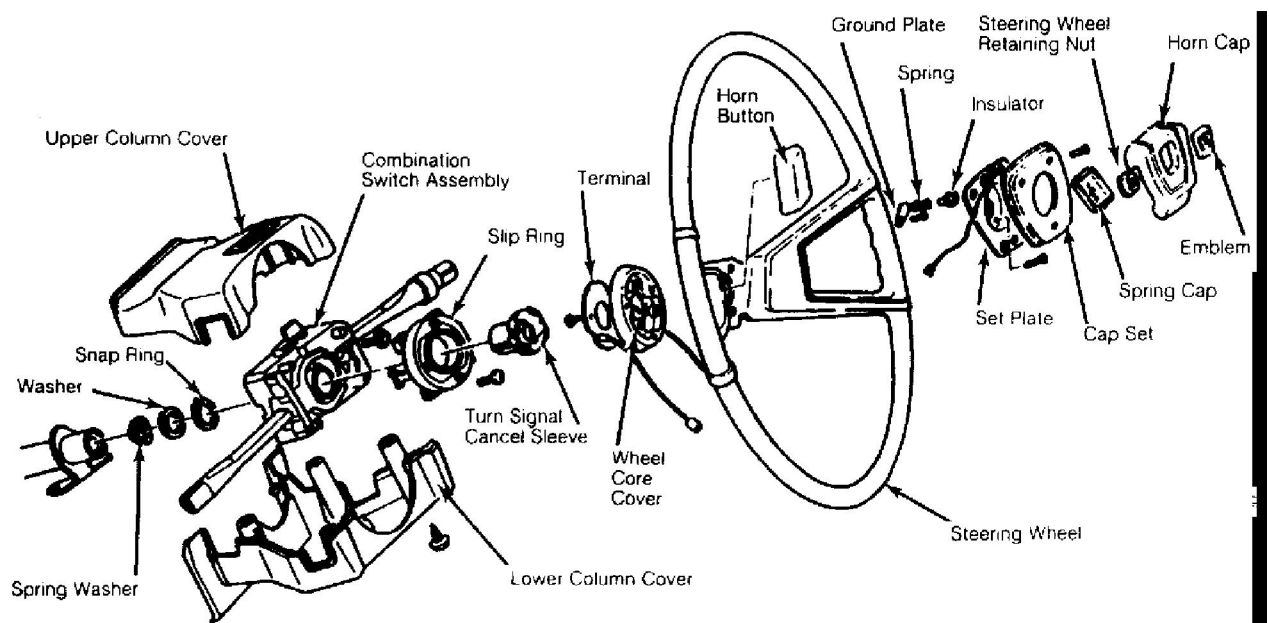


Fig. 2: Exploded View of Typical Steering Wheel Assembly

4) Remove steering wheel retaining nut and washer. Mark steering wheel and shaft for reassembly reference. Using a steering wheel puller, remove steering wheel. See Fig. 1.

5) Place steering wheel, cruise control set/resume switch (if equipped), canceling cams, springs and slip rings in order for reassembly reference.

Installation

1) Coat slip ring contact surfaces with a light electrical grease. Assemble horn button assembly (if disassembled). Ensure wheels are in a straight-ahead position.

2) Aligning marks made during removal, place slip ring, springs, canceling cams, steering wheel, washer and steering wheel retaining nut on shaft.

3) Tighten nut to specification. See STEERING WHEEL TORQUE SPECIFICATIONS table at the end of this article. To complete reassembly, reverse removal procedure.

COMBINATION SWITCH

Removal

Remove steering wheel. Remove upper and lower steering column covers. Disconnect combination switch harness connectors. Remove snap ring and washer from steering shaft (if equipped). Remove combination switch attaching screws. Remove combination switch.

STEERING WHEEL & COLUMN SWITCHES Article Text (p. 2) 1988 Mercedes-Benz 560SEL For 1 Copyright

Installation

To install, reverse removal procedure. Ensure all electrical connections are tight. Check canceling operation of turn signal switch.

*** SUSPENSION UNIFORM INSPECTION GUIDELINES ***

Article Text

1988 Mercedes-Benz 560SEL

For 1

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Saturday, July 14, 2012 11:32AM

ARTICLE BEGINNING

GENERAL INFORMATION

STEERING AND SUSPENSION, WHEEL ALIGNMENT, AND WHEELS & TIRES
January 2002 Motorist Assurance Program Standards For
Automotive Repair

All Makes and Models

INTRODUCTION TO MOTORIST ASSURANCE PROGRAM (MAP)

OVERVIEW

The Motorist Assurance Program is the consumer outreach effort of the Automotive Maintenance and Repair Association, Inc. (AMRA). Participation in the Motorist Assurance Program is drawn from retailers, suppliers, independent repair facilities, vehicle manufacturers and industry associations.

Our organization's mission is to strengthen the relationship between the consumer and the auto repair industry. We produce materials that give motorists the information and encouragement to take greater responsibility for their vehicles through proper, manufacturer-recommended, maintenance. We encourage participating service and repair shops (including franchisees and dealers) to adopt (1) a Pledge of Assurance to their Customers and (2) the Motorist Assurance Program Standards of Service. All participating service providers have agreed to subscribe to this Pledge and to adhere to the promulgated Standards of Service demonstrating to their customers that they are serious about customer satisfaction.

These Standards of Service require that an inspection of the vehicle's (problem) system be made and the results communicated to the customer according to industry standards. Given that the industry did not have such standards, the Motorist Assurance Program successfully promulgated industry inspection communication standards in 1994-95 for the following systems: Exhaust, Brakes, ABS, Steering and Suspension, Engine Maintenance and Performance, HVAC, Electrical Systems, and Drive Train and Transmissions. Further, revisions to all of these inspection communication standards are continually re-published. Participating shops utilize these Uniform Inspection & Communication Standards as part of the inspection process and for communicating their findings to their customers.

The Motorist Assurance Program continues to work cooperatively and proactively with government agencies and consumer groups toward solutions that both benefit the customer and are mutually acceptable to both regulators and industry. We maintain the belief that industry must retain control over how we conduct our business, and we must be viewed as part of the solution and not part of the problem. Meetings with state and other government officials (and their representatives), concerned with auto repair and/or

boot.

Grease fitting broken A Require replacement of grease fitting.

Grease fitting missing C Require replacement of grease fitting.

Grease fitting won't seal A Require replacement of grease fitting.

Grease seal missing C (5) Require replacement.

Grease seal torn A (6) Require replacement.

Greaseable center link will not take grease 2 (7) Suggest replacement of grease fitting.

Looseness (perceptible horizontal movement) 1 (8) Suggest replacement.

Looseness that is excessive B (9) Require replacement.

Seized A Require replacement.

Stud bent B (10) Require replacement.

Stud broken A (10) Require replacement.

Stud loose in taper hole A (10) Require repair or replacement.

Taper hole elongated A (11) Require replacement.

Threads damaged A Require repair or replacement.

Threads stripped (threads missing) A (10) Require replacement.

Wear exceeds manufacturer's specifications B Require replacement.

- (1) - If greaseable, grease joint. If problem persists or joint is non-greaseable, require replacement.
- (2) - If boot is not available as a separate component, suggest replacement of center link (reason code 2). Cracked grease boot will allow contaminants to enter the joint and will accelerate wear.
- (3) - If boot is not available as a separate component, suggest replacement of center link (reason code 2). Lack of grease boot will allow contaminants to enter the joint and will accelerate wear.
- (4) - If boot is not available as a separate component, suggest replacement of center link (reason code 2). Torn grease boot will allow contaminants to enter the joint and will accelerate wear.
- (5) - If seal is not available as a separate component, suggest replacement of center link (reason code 2). Lack of grease seal will allow contaminants to enter the joint and will accelerate wear.
- (6) - If seal is not available as a separate component, suggest replacement of center link (reason code 2). Torn grease seal will allow contaminants to enter the joint and will accelerate wear.
- (7) - If greaseable center link still will not take grease after

procedures and specifications; otherwise, use an approved inspection method such as the dry park check. Looseness is defined as movement that creates excessive toe change.

- (9) - If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.

CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.

- (10) - Excessive looseness is defined as significant enough to affect vehicle handling or structural integrity. If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.

CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.

- (11) - Check for bent stud or damaged taper hole.
- (12) - Check for damaged stud.

INTERMEDIATE SHAFT U-JOINTS

See STEERING COUPLERS.

KING PINS

You are not required to replace king pins in axle sets. However, when replacing a king pin due to wear exceeding manufacturer's specifications, you may suggest replacement of the other king pin on the axle if its measurement shows it is close to the end of its useful life.

KING PINS

Condition	Code	Procedure
Bearing balls pitted	A	Require replacement.
Bearing balls worn	A	Require replacement.
Bearing races pitted	A	Require replacement.
Bearing races worn	A	Require replacement.
Bearing rollers pitted	A	Require replacement.
Bearing rollers worn	A	Require replacement.
Bearing seal bent	2	Suggest replacement of seal or bearing.
Bearing seal missing	C	Require replacement of seal if available separately or bearing and seal together.
Bearing seal torn	A	Require replacement of

Wire lead open A replacement.
 Require repair or replacement.

Wire lead shorted A replacement.
 Require repair or replacement.

- (1) - Determine cause and correct prior to repair or replacement of part.
- (2) - Inoperative includes intermittent operation or out of specification.
- (3) - Follow OEM recommended adjustment procedures. Repair or replace if out of specification.

SHOCK ABSORBERS, STRUT CARTRIDGES, AND STRUT ASSEMBLIES

You are not required to replace shocks or struts in axle sets. However, when replacing a shock or strut due to the conditions that follow, you may suggest replacement of the other shock or strut on the same axle for improved performance or preventive maintenance.

- * part is close to the end of its useful life
- * to extend tire life
- * to balance ride and handling
- * to improve stopping distance

When replacing steering and/or suspension components which may affect an alignment angle, you are required to check and adjust alignment as needed. Refer to the OEM specifications.

Under no circumstances should a technician bend struts or strut housings.

A vehicle's load-carrying and handling abilities are limited by its suspension, tires, brakes, and driveline. Installing coil over shocks or any other load assist device does not increase the vehicle's load capacity. See the vehicle owner's manual for more details.

NOTE: If vehicle is equipped with original equipment coil over shocks, apply the conditions for coil springs from the SPRINGS: COIL, LEAF, AND TORSION BAR section of the Steering and Suspension guidelines. If the vehicle is equipped with add-on coil over shocks, you may suggest replacing the shocks with standard shocks for any spring-related condition.

SHOCK ABSORBERS, STRUT CARTRIDGES, AND STRUT ASSEMBLIES

Condition	Code	Procedure
Attaching hardware broken	..... A	Require repair or replacement of hardware. * SUSPENSION UNIFORM INSPECTION GUIDELINES

Taper hole elongated A (2) Require replacement.
 Threads damaged A Require repair or replacement.
 Threads stripped (threads missing) A Require replacement.

(1) - Steering knuckle deformation can cause pinch bolt breakage.
 (2) - Check for damaged stud.

STRIKE OUT BUMPERS

STRIKE OUT BUMPERS

Condition	Code	Procedure
Attaching hardware broken	..... A	..... Require repair or replacement of hardware.
Attaching hardware corroded, affecting structural integrity	..... A	..... Require replacement of hardware.
Attaching hardware missing	..... C	..... Require replacement of hardware.
Attaching hardware not functioning	..... A	..... Require repair or replacement of hardware.
Attaching hardware threads damaged	..... A	..... Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	..... A	..... Require replacement of hardware.
Missing	..... C	..... Require replacement.
Split	..... 1	..... Suggest replacement.

STRUT BEARING PLATE ASSEMBLIES

NOTE: When the following guidelines indicate replacement of bearing, only the bearing should be replaced if it is available separately; otherwise, replace the bearing plate assembly.

STRUT BEARING PLATE ASSEMBLIES

Condition	Code	Procedure
Attaching hardware broken	..... A	..... Require repair or replacement of hardware.
Attaching hardware missing	..... C	..... Require replacement.

required to determine
cause.

WHEEL BEARINGS, RACES, AND SEALS

NOTE: When replacing or repacking wheel bearings, grease seal replacement is required. You are not required to replace these components in axle sets. Determine the need to replace based upon the individual component conditions that follow.

WHEEL BEARINGS, RACES, AND SEALS

Condition	Code	Procedure
Axle seal on drive axle leaking	A	Require replacement of seal and inspection of axle, bearing, housing, and vent tube.
Bearing end-play exceeds specifications	B	Require adjustment of bearing, if possible. If proper adjustment cannot be obtained, require replacement of bearing and race assembly.
Bearing rollers, balls or races are worn, pitted, or feel rough when rotated as an assembly	B	Require replacement of bearing and race assembly.
Seal leaking	A	(1) Require replacement of seal and inspection of bearings.
Seal missing	C	Require replacement.
Spindle worn	B	Require replacement of spindle and bearings.

(1) - Require inspection of mating and sealing surface and repair or replace as necessary. Check vent. A plugged vent may force fluid past the seal.

WIRING HARNESSES AND CONNECTORS

WIRING HARNESSES AND CONNECTORS

Condition	Code	Procedure
-----------	------	-----------

Application incorrect

B	Require repair of	SUSPENSION UNIFORM INSPECTION GUIDELINE
---------	-------------------	--

PRESSURE RESERVOIR

NOTE: This test can be performed only on a ready-to-drive vehicle.

1) Disconnect connecting bar at leveling valve. Push leveling valve lever down to extent of travel (emptying position). Release pressure in system by opening bleed screw.

2) Remove bleed screw from leveling valve and connect pressure gauge capable of at least 3600 psi (250 bar). Disconnect pressure line from left and right pressure reservoirs (near spring shocks). Plug pressure lines with couplings and bleed screws.

3) Attach pressure hose from gauge to right pressure reservoir. Push leveling valve lever down to full extent of travel (emptying). Run engine at idle speed. Push leveling valve lever up to full extent of travel (filling) and observe pressure gauge.

4) Gas pressure in reservoir is indicated at point where pressure gauge needle changes from indication of a gradual pressure increase to an indication of rapid increase. This increase is caused when oil pressure exceeds gas pressure.

5) Gas pressure should be 304-363 psi (21.4-25.5 bar) for new pressure reservoirs, and a minimum of 217 psi (15.2 bar) for used pressure reservoirs. Repeat this test for the other reservoir.

6) Disconnect pressure tester and test line, install bleed screw and reconnect pressure lines to pressure reservoirs. Run engine at medium RPM. Push leveling valve lever up to filling position for approximately 30 seconds to fill control system.

7) Turn off engine. Reconnect connecting bar at leveling valve lever. With engine off, check oil reservoir oil level. Oil level should be between "MAX" and "MIN" for unloaded vehicle and "MIN" for loaded vehicle.

REMOVAL & INSTALLATION

For removal and installation of components not covered in the article, refer to appropriate Suspension article in this section.

LEVEL CONTROLLER R & I

REMOVAL

Drain pressure oil system. Loosen line connections at the following: oil pump, level controller, pressure reservoir and oil supply tank. Unscrew connecting rod from lever of level controller. Loosen both hex screws for attaching level controller to bracket and remove controller.

INSTALLATION

1) To install, reverse removal procedure. The 4 bolts for housing halves of level controller should be tightened when level controller is energized with oil pressure.

ELECTRICAL - RADIO - TAPE/CD PLAYER

SYMPTOM - MUSIC SYSTEM

- Does not work
- Controls do not work
- Noisy
- Static
- Blows fuse
- Won't load
- Won't eject
- Poor reception
- Other (explain below)

SYSTEM AFFECTED

- Radio only
- Tape player
- Speakers
- Antenna
- AM
- CD player
- Front
- Clock
- FM
- Whole system
- Rear
- Radio or player controls
- FM stereo
- Steering wheel buttons
- Left
- Right
- Rear seat controls
- Graphic equalizer
- Phone

ALL OTHER ELECTRICAL ITEMS OR ACCESSORIES

Please list the complaint accessory or item and check any applicable symptom(s) from the list that follows:

- _____ Inoperable
- _____ Check light on or flashing
- _____ Blows fuse
- _____ Inoperable
- _____ Check light on or flashing
- _____ Blows fuse
- _____ Inoperable
- _____ Check light on or flashing
- _____ Blows fuse
- Noisy
- Intermittent
- Noisy
- Intermittent
- Noisy
- Intermittent
- No control
- Works improperly (explain below)
- Related system affected (explain below)
- No control
- Works improperly (explain below)
- Related system affected (explain below)
- No control
- Works improperly (explain below)
- Related system affected (explain below)
- Erratic
- Erratic
- Erratic

WHEN DOES IT OCCUR?

- All the time
- Intermittent
- Other (explain below)
- Hot
- After runs for _____ minutes
- Cold
- Just after starting - malfunctions for a while
- Rough roads or bumps only

* SYMPTOM

EXPLAIN: _____

CUSTOMER NAME:

PHONE NO.:

REPAIR ORDER NO:

SHOP USE ONLY:

VIN#:

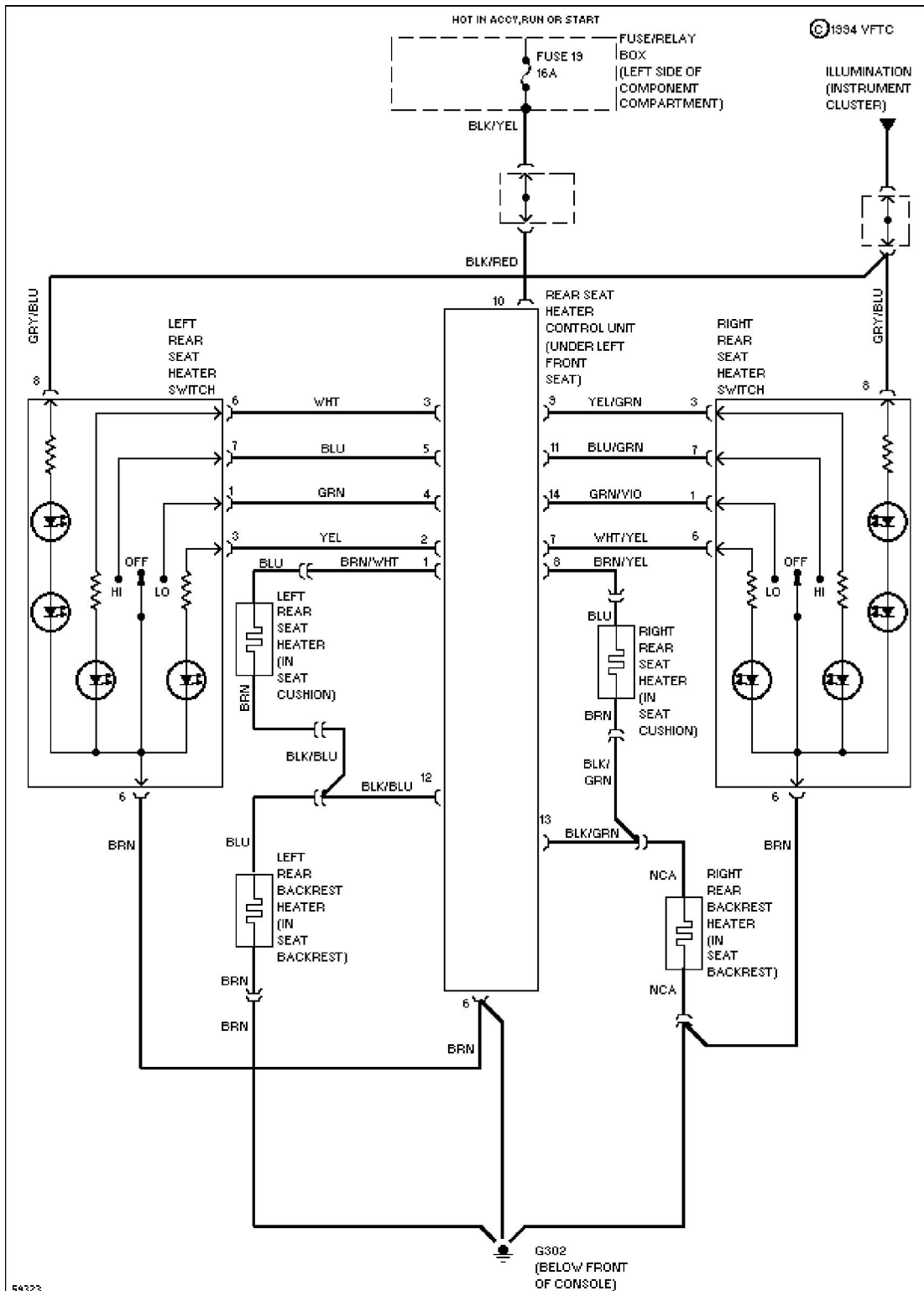
MILES:

TECHNICIAN:

ADVISOR#:

50B15058

Fig. 9: Electrical, Radio & Tape/CD Player



Rear Seat Heater Circuit

o'clock position. Disconnect vacuum line and measure while driving at about 30 MPH.

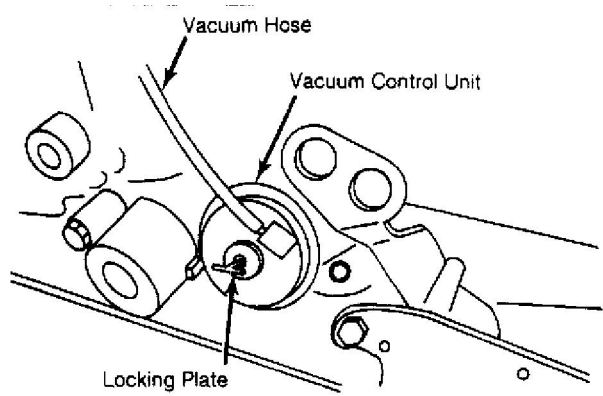
1) Disconnect vacuum hose and remove rubber cap from vacuum control unit. Pull locking plate out of locking slots to permit rotation. See Fig. 6. Turning adjustment screw in vacuum control results in pressure change of about 6 psi (.414 Bar). Adjust to correct value. See MODULATING PRESSURE SPECIFICATIONS table.

2) After turning adjusting screw, push locking plate back into locking slots. Put rubber cap back on vacuum control unit. Connect vacuum hose and check modulating pressure again. Install screw on vacuum line holder (if equipped).

NOTE: Modulating pressure port is next to vacuum control unit at 4 o'clock position. Disconnect vacuum line and measure while driving at about 30 MPH.

MODULATING PRESSURE SPECIFICATIONS

Model	Psi (Bar)
190D	41 (2.8)
190D	47 (3.25)
190E 2.3L	56 (3.9)
190E 2.6L	48 (3.3)
260E	48 (3.3)
300 Series	51 (3.5)
420SEL	52 (3.6)
560 Series	58 (4.0)



Courtesy of Mercedes-Benz of North America

Fig. 6: Adjusting Modulating Pressure
 Courtesy of Mercedes-Benz of North America.

Insufficient, Erratic,
or No Heat

- Low Coolant Level
- Incorrect thermostat.
- Restricted coolant flow through heater core.
- Heater hoses plugged.
- Misadjusted control cable.
- Sticking heater control valve.
- Vacuum hose leaking.
- Vacuum hose blocked.
- Vacuum motors inoperative.
- Blocked air inlet.
- Inoperative heater blower motor.
- Oil residue on heater core fins.
- Dirt on heater core fins.

Too Much Heat

- Improperly adjusted cables.
- Sticking heater control valve.
- No vacuum to heater control valve.
- Temperature door stuck open.

Air Flow Changes During
Acceleration

- Vacuum system leak.
- Bad check valve or reservoir.

Air From Defroster At All
Times

- Vacuum system leak.
- Improperly adjusted control cables.
- Inoperative vacuum motor.

Blower Does Not Operate
Correctly

- Blown fuse.
 - Blower motor windings open.
 - Resistors burned out.
 - Motor ground connection loose.
 - Wiring harness connections loose.
 - Blower motor switch inoperative.
 - Blower relay inoperative.
 - Fan binding or foreign object in housing.
 - Fan blades broken or bent.
-

BRAKES

BRAKE SYSTEM TROUBLE SHOOTING

NOTE: This is GENERAL information. This article is not intended to be specific to any unique situation or individual vehicle configuration. The purpose of this Trouble Shooting information is to provide a list of common causes to

Incorrect hot fast idle speed RPM Reset fast idle RPM, see TUNE-UP

Engine Starts, Runs Up, Then Idles, Slowly Choke vacuum kick set too narrow Reset vacuum kick, see FUEL SYSTEMS

With Black Smoke Fast idle cam index incorrect Reset fast idle cam index, see FUEL SYSTEMS

Hot fast idle RPM too low Reset fast idle RPM, see TUNE-UP

BASIC HOT START SYMPTOMS TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
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Engine Won't Start	Engine flooded evaporate	Allow fuel to
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BASIC COLD ENGINE DRIVEABILITY SYMPTOMS TROUBLE SHOOTING CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
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Engine Stalls in Gear	Choke vacuum kick setting incorrect	Reset choke vacuum kick, see FUEL SYSTEMS
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	Fast idle RPM incorrect	Reset fast idle RPM, see TUNE-UP
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	Fast idle cam index incorrect	Reset fast idle cam see FUEL SYSTEMS
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Acceleration Sag or Stall	Defective choke control switch	Replace choke control switch
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	Choke vacuum kick setting incorrect	Reset choke vacuum kick see, FUEL SYSTEMS
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	Float level incorrect (too low)	Adjust float level, FUEL SYSTEMS
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	Accelerator pump defective	Repair or replace pump see FUEL SYSTEMS
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	Secondary throttles not closed	Inspect lockout adjustment see FUEL SYSTEMS
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