AUTO TRANS DIAGNOSIS - W4A020 & W4A040
Article Text
1994 Mercedes-Benz S320
For 1

Thursday, November 20, 2008 02:08PM

ARTICLE BEGINNING

AUTOMATIC TRANSMISSIONS
Mercedes-Benz W4A020 & W4A040

APPLICATION & IDENTIFICATION

Identification code is stamped on identification plate or transmission housing. Use identification code when ordering parts.

TRANSMISSION APPLICATIONS

Year/Vehicle Application	Trans. Model
1983	
240D	W4A020
300 Series	W4A040
380 Series	W4A040
1984	
240D	W4A020
300 Series	W4A040
380 Series	W4A040
1985	
190 Series	W4A020
300 Series	W4A040
380 Series	W4A040
500 Series	W4A040
1986	
190 Series	W4A020
300 Series	W4A040
380 Series	W4A040
500 Series	W4A040
1987	
190 Series	W4A020
300 Series	W4A040
420 Series	W4A040
560 Series	W4A040
1988	
190D (2.5L & 2.5L TD)	W4A020
190E (2.3L, 2.3L-16V & 2.6L)	W4A020

260E (2.6L)			W4A020
300E			W4A040
300D			W4A040
300SDL			W4A040
300TD			W4A040
420SEL			W4A040
560SEC			W4A040
560SEL			W4A040
560SL			W4A040

1989

190D (2.5L & 2.5L TD)			W4A020
190E (2.3L, 2.3L-16V & 2.6L)			W4A020
260E (2.6L)			W4A020
300E			W4A040
300D			W4A040
300SDL			W4A040
300TD			W4A040
420SEL			W4A040
560SEC			W4A040
560SEL			W4A040
560SL			W4A040

1990

190D (2.5L & 2.5L TD)			W4A020
190E (2.3L, 2.3L-16V & 2.6L)			W4A020
260E (2.6L)			W4A020
300E			W4A040
300D			W4A040
300SDL			W4A040
300TD			W4A040
420SEL			W4A040
560SEC			W4A040
560SEL			W4A040
560SL			W4A040

1991

190E (2.3L)	722.408	W4A020
190E (2.6L)	722.409	W4A020
300CE (3.0L)	722.359	W4A040
300D (2.5L Turbo)	722.418	W4A020
300E (2.6L)	722.409	W4A020
300E & 300TE (3.0L)	722.358	W4A040
300SE & 300SEL (3.0L)	722.351	W4A040
350SD & 350SDL Turbo (3.5L)	722.361	W4A040

420SEL (4.2L)	722.355	W4A040
500SL (5.0L)	722.353	W4A040
560SEC & 560SEL (5.6L)	722.350	W4A040
1992		
190E (2.3L)	722.408	W4A020
190E (2.6L)	722.409	W4A020
300CE (3.0L)	722.359	W4A040
300D (2.5L Turbo)	722.418	W4A020
300E (2.6L)	722.409	W4A020
300E & 300TE (3.0L)	722.358	W4A040
300SD Turbo (3.5L)	722.367	W4A040
300SE & 300SEL (3.2L)	722.368	W4A040
400E (4.2L)	722.354	W4A040
400SE (4.2L)	722.366	W4A040
500E (5.0L)	722.365	W4A040
500SEL (5.0L)	722.370	W4A040
1993		
190E (2.3L)	722.408	W4A020
190E (2.6L)	722.409	W4A020
300D (2.5L Turbo)	722.418	W4A020
300E (2.8L)	722.433	W4A020
300E (3.2L)	722.369	W4A040
300SD (3.5L)	722.367	W4A040
400E (4.2L)	722.354	W4A040
400SEL (4.2L)	722.366	W4A040
500E (5.0L)	722.365	W4A040
500SEL (5.0L)	722.370	W4A040
1994		
C220 (2.3L)	722.423	W4A020
C280 (2.8L)	722.424	W4A020
E320 (3.2L)		
Cabriolet	722.369	W4A020
Coupe	722.369	W4A020
Sedan	722.369	W4A020
Wagon	722.369	W4A020
E420 (4.2L)	722.366	W4A020
E500 (5.0L)	722.370	W4A040
S350 (3.5L)	722.367	W4A040
S420 (4.2L)	722.366	W4A040
S500 (5.0L)	722.370	W4A040

DESCRIPTION

TRANSMISSION

This is a fully automatic 4-speed transmission consisting of a 3-element welded torque converter, 2 compound planetary gear sets, 2 multiple-disc clutches, one overrunning clutch and 3 brake bands. Brake bands control function of planetary gear sets. A hydraulic system, pressurized by a primary gear type pump and a secondary piston type pump provide working pressure required to operate friction elements and automatic controls.

1st Gear

In 1st gear, brake band B-2 is applied and the one-way converter clutch is locked. In selector lever position "2", clutch K-2 is also engaged. Both planetary gear sets are involved in gear reduction.

2nd Gear

In 2nd gear, brake band B-1 and brake band B-2 are applied. Both planetary gear sets are involved in gear reduction.

3rd Gear

In 3rd gear, brake band B-2 is applied and clutch K-1 is engaged. Only the rear planetary gear set is involved in gear reduction.

4th Gear

In 4th gear, clutch K-1 and clutch K-2 are applied. Both planetary gear sets rotate as a locked unit.

Reverse Gear

In reverse, disc brake B-3 is applied, the one-way converter clutch is locked, and clutch K-2 is engaged. Both planetary gear sets are involved in gear reduction.

VALVE BODY

The valve body receives inputs from selector lever position, mode selector switch, accelerator pedal position (control pressure), engine torque (intake manifold vacuum), kick-down and vehicle speed. Depending on operating conditions, the oil flow is controlled to various points of demand in the transmission and the quality and pressure level are adapted to requirements.

PRIMARY & SECONDARY PUMP

Primary Pump

The primary pump is housed in the front transmission cover and is driven by the engine through the drive flange of the torque

converter. The primary pump operates as long as the engine is turning, and supplies pressurized oil to the entire hydraulic system. The drive of the secondary pump is switched off by the cut-off piston by means of primary pump pressure.

Secondary Pump

The secondary pump is required only for towing and tow-starting the vehicle. It is designed as an external gear pump and is positioned in the rear section of the transmission. If needed, the secondary pump is driven by the centrifugal governor shaft. The secondary pump operates only if the engine is not running and the vehicle is rolling (tow-starting procedure), while brake band B-2 slowly engages. Pump stops operating when vehicle comes to a stop or if transmission has shifted into 4th gear (engine running).

OPERATING PRESSURES

The working pressure control valve, basic pressure control valve, 2 two-way check balls, a modulating pressure relief valve, and a non-return (one-way) valve and restriction form the working pressure circuit. The working pressure circuit is influenced by position of accelerator pedal, vehicle speed, selector lever position, and gear engaged.

The working pressure, governed by working pressure circuit, operates disc brake B-3, brake bands and clutches. The pressure level is adapted to the particular operating condition, regardless of the quantity of oil supplied from the primary pump or secondary pump. This enables the primary pump capacity to be kept as low as possible and achieve a high transmission efficiency.

The working pressure is always the highest pressure in the hydraulic system. All other operating pressures are derived from this maximum pressure and reduced by control valves to a lower pressure level. The following governed pressures control the hydraulic system and operate shift element.

* Reduced Operating Pressure
* Governor Pressure
* Lubricating Pressure
* Modulating Pressure (Vacuum Controlled)
* Modulating Pressure (Governor Controlled)
* Full Throttle Pressure
* Load Dependent Control Pressure
* Kick-Down Control Pressure
* Boosted Governor Pressure
* Shift Pressure

DAMPER SYSTEM

The principal task of the hydraulic system (circuits) consists of controlling the working pressure during gear changes (shifts). During each gear shift transition, the engine speed increases (during a downshift) or decreases (during an upshift). In order to provide a smooth transition between gear shifts, 4 independent damper circuits are used.

The clutch K-1 damper circuit controls clutch K-1 during 2nd to 3rd gear downshifts or upshifts. The clutch K-2 damper circuit controls clutch K-2 during 3rd to 4th gear downshifts or upshifts. The brake band B-1 damper circuit controls brake band B-1 during 1st to 2nd gear downshifts or upshifts.

The "engaging" damper circuit controls the engagement of the clutches or brake bands, depending on selector lever position. When selector lever is moved from "N" (Neutral) to "D" (Drive) or "3" (3rd gear), brake bands B-1 and B-2 are controlled. When selector lever is moved from "N" (Neutral) to "2" (2nd gear), clutch K-2 and brake band B-2 are controlled. When selector lever is moved from "N" (Neutral) to "R" (Reverse), clutch K-2 and disc brake B-3 are controlled. The"engaging" damper controls the working pressure pattern after drive positions "R", "D", "3" and "2" are engaged.

TRANSMISSION SHIFT POINT DELAY

The 2nd to 3rd gear upshift on some models is delayed 60-80 seconds to enable the catalytic converter to more rapidly reach its operating temperature. The shift point retard solenoid is energized by the CIS-E control unit or air mass sensor control unit through the transmission shift point (upshift) retard relay.

Governor pressure is lowered through hydraulic line which is bolted to the governor pressure test port. See Fig. 1. Under certain operating conditions (coolant temperature, vehicle speed and time), the solenoid valve is de-energized and the governor pressure is dumped. The 2nd to 3rd gear upshift is delayed only when coolant temperature is 0-140øF (0-60øC). The operating time is dependent on coolant temperature when the engine is started, and is longest when coolant temperature is 68-86øF (20-30øC).

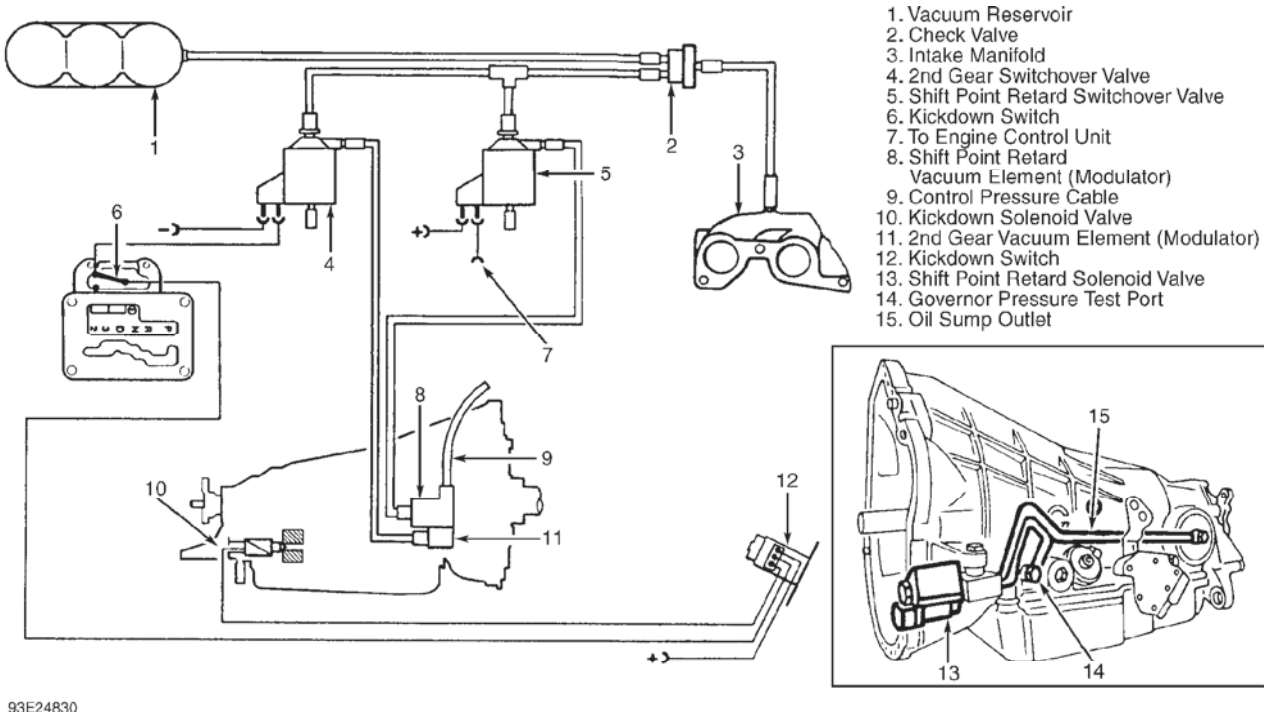


Fig. 1: Transmission Shift Point Delay Components (190E 2.3L Shown) Courtesy of Mercedes-Benz of North America.

TROUBLE SHOOTING

Transmission Slips In All Gears

Incorrect modulating pressure. Modulating pressure control valve or pressure relief valve is dirty or sticking. Vacuum line to transmission vacuum capsule clogged or leaking. Working pressure control valve dirty or sticking. Low working pressure. Defective primary pump.

Transmission Slips When Starting Off In 1st Or 2nd (Reverse Works Normally)

Band B-2 shift valve sticking. Band B-2 piston worn or damaged. Band B-2 adjusted incorrectly or worn or damaged. Adjust brake Band B-2 by installing a longer thrust pin (if necessary). If transmission operates properly with selector lever in "2", but not in "3" or "D" position, the one-way clutch may be slipping.

Transmission Slips In 2nd Gear Or Shifts From 1st To 3rd Gear

Check control valve B-1 for ease of operation. Replace valve body (if necessary). Remove and install brake band piston B-1, check sealing ring and replace (if necessary). Replace brake band B-1 and thrust body for B-1. Command valve binding.

Transmission Slips During 2-3 Upshift Or Slips Initially,

Then Grabs Hold

Check modulating pressure and adjust (if necessary). Check for temperature throttle installation (if equipped). Valve body worn or damaged. Replace valve body (if necessary). Replace inner plates of clutch K-1 or recondition clutch (if necessary). Check Teflon ring of front cover.

Transmission Slips During 3-4 Upshift

Check and adjust modulating pressure. Governor damaged or working pressure incorrect. Valve body worn or damaged. Replace valve body (if necessary) Check Teflon rings supporting clutch K-2. Replace inner plates of clutch K-2 or recondition clutch (if necessary).

No Positive Engagement In Reverse

Check plates and sealing rings on disc brake B-3 piston. Replace if necessary.

Harsh Engagement When Shifting Gears

Incorrect working pressure. Check and adjust modulating pressure. Check vacuum line and connections for leaks. On diesel engine equipped vehicles, check vacuum control valve. Coolant entering transmission oil cooler and contamination transmission fluid. Replace radiator. If necessary, replace all friction linings and/or replace transmission.

Harsh Engagement When Selecting "D" Or "R"

Idle speed too high. Check pressure receiving (pick-up) piston in valve body for ease of operation and correct installation. Replace valve body (if necessary).

NOTE: Pressure pick-up requires a running period of approximately 2 seconds. Harsh engagement may occur during repeated shifts between "N" and "D". If harshness takes place within 2 seconds, condition is considered normal.

Harshness On 4-3 Downshift

Sealing ring on release end of band B-2 worn or damaged. Band B-2 piston worn or damaged. Band B-2 thrust body damaged.

Chatter During Upshift

If upshift is not in proper order, repair or replace valve body.

Will Not Upshift

Incorrect governor pressure. Defective governor assembly. Check kickdown solenoid valve for a tendency to stick or for constant voltage to solenoid caused by a defective fuel pump relay or sticking kickdown switch. Valve body dirty or valves sticking. Repair or

replace valve body.

Upshifts At Higher Speeds Than Specified

Check pressure control cable engagement, condition and adjustment. Check kickdown solenoid valve for a tendency to stick or for constant voltage to solenoid caused by a defective fuel pump relay or sticking kickdown switch. Check governor pressure. If regulator pressure is too low, replace centrifugal governor. Ensure control pressure regulating valve is operable.

Upshifts At Lower Speeds Than Specified

Check pressure control cable engagement, condition and adjustment. Check full throttle stop by accelerating engine and ensuring that throttle valve rests against full throttle stop. Readjust throttle stop (if necessary). Check governor pressure. If governor pressure is too high, replace centrifugal governor. Repair or replace valve body.

No Kickdown

Check throttle control and pressure control cable engagement, condition and adjustment. Connect kickdown solenoid to battery and check for proper operation. Replace solenoid (if necessary). Check kickdown valve in valve body. Replace valve body (if necessary).

No Downshift (4-3 & 3-2)

Control pressure cable out of adjustment. Leaking vacuum hoses and/or connections. Ensure brake shaft piston is operable. Replace valve body (if necessary).

Uncontrolled Downshifts Outside Range Of Kickdown Switch

Remove kickdown solenoid valve. Check "O" ring on kickdown solenoid valve for damage. Check kickdown switch for sticking in pushed-in position. Replace switch (if necessary). Check for kickdown solenoid valve stuck in opened position. Replace kickdown solenoid valve (if necessary).

Poor Acceleration When Starting Off

Check stall speed. If stall speed is 400-700 RPM less than specified value, one-way clutch in torque converter is slipping. Replace torque converter (if necessary).

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
Disc brake B-3 release clearance too great. Adjust release clearance to 0.06-0.08" (1.5-2.0 mm) or replace disc brake plates. Outside plate carrier of clutch K-1 contacts piston.

Primary Pump Bushing Loosens After A Short Operating Period
Dowel pins for centering transmission to engine are not in place.

TESTING

For vacuum control circuit tests, hydraulic pressure tests, and road tests, see the AUTO TRANS OVERHAUL - W4A020 & W4A040 article in the AUTO TRANS OVERHAUL section.

END OF ARTICLE

TRANSMISSION REMOVAL & INSTALLATION - A/T

Article Text

1994 Mercedes-Benz S320

For 1

Thursday, November 20, 2008 02:11PM

ARTICLE BEGINNING

1994 TRANSMISSION SERVICING
Mercedes-Benz Transmission Removal & Installation - Automatic

S320, S350, S420, S500

REMOVAL & INSTALLATION

CAUTION: If metal chips are present in transmission oil pan, torque converter must be replaced. Flushing will not remove all metal chips from a torque converter. Failure to replace torque converter may result in future transmission failure.

S350, S420 & S500

Removal

1) Disconnect negative battery cable. Disconnect longitudinal engine throttle control shaft. Disconnect control pressure cable. Remove front crossmember assembly.

2) Remove transmission oil pan drain plug. Remove torque converter drain plug. Drain transmission fluid. Remove starter. Remove torque converter drive plate bolts (6 bolts) through starter opening. Remove entire exhaust system assembly from exhaust manifold(s). Remove rear crossmember with mount.

3) Release cable strap and unscrew cable on kickdown solenoid valve. Unscrew retaining bolts for pulse generator. Remove pulse generator. On V8 engines, disconnect shift point retard connector located on right rear corner of engine.

4) On all models, loosen drive shaft center bearing bolts. Loosen large clamping nut on drive shaft. Clamping nut is located near center bearing. Remove drive shaft flange bolts. With clamping nut loosened, push drive shaft as far back from transmission as possible.

5) Turn starter lockout switch locking element before disconnecting starter lockout switch connector. Using 2 screwdrivers, pry off starter lockout switch connector from transmission.

6) Disconnect shift rod from range selector lever. Disconnect White vacuum line for vacuum box. Disconnect Red vacuum line for mode program. Disconnect Black/Green vacuum line for shift point retard.

7) Disconnect transmission oil cooler feed and return lines. Remove transmission dipstick tube bolt from transmission and cylinder head. Remove transmission dipstick tube.

8) On V8 engines, remove transmission mounting bolts except 2 nuts on either side of transmission. Using a transmission jack, lift transmission slightly. Remove 2 remaining transmission mounting nuts.

9) On 6-cylinder engines, remove transmission mounting bolts except 2 bolts on either side of transmission. Using a transmission

jack, lift transmission slightly. Remove 2 remaining transmission mounting bolts. On all vehicles, push transmission rearward and lower. Ensure torque converter does not fall from transmission during removal.

Installation

To install, reverse removal procedure. Tighten bolts and nuts to specification. See TORQUE SPECIFICATIONS. Use NEW transmission oil cooler feed and return line "O" rings. Adjust control pressure cable and linkages as necessary. Fill transmission with fluid. See TRANSMISSION SERVICING - A/T article in AUTOMATIC TRANSMISSION SERVICING section.

S320

Removal

1) Disconnect negative battery cable. Remove transmission dipstick tube bolt from transmission and cylinder head. Using pliers, squeeze plastic clip together and pull out control pressure cable.

2) Remove transmission oil pan drain plug. Remove torque converter drain plug. Drain transmission fluid. Remove plastic cover to access torque converter drive plate bolts. Remove torque converter drive plate bolts (6 bolts) through opening.

3) Remove crossmember with mount. Remove drive shaft flange bolts. Disconnect oxygen sensor harness on tunnel and disconnect mounting clips. Remove exhaust support bracket bolts from transmission. Remove entire exhaust system assembly from exhaust manifold.

4) Remove speedometer shaft. On vehicles equipped with an electronic speedometer, unscrew pulse generator. On all vehicles, disconnect shift point increase solenoid valve connector. Disconnect transmission overload switch connector and pull off vacuum line.

5) Turn starter lockout switch locking element before disconnecting starter lockout switch connector. Using 2 screwdrivers, pry off starter lockout switch connector from transmission.

6) Disconnect shift rod from range selector lever. Disconnect transmission oil cooler feed and return lines. Remove transmission dipstick tube bolt from transmission. Remove transmission dipstick tube. Ensure all electrical connections are disconnected from transmission.

7) Install Retainer (126 589 01 62 00) through ventilation grill cutout into torque converter drain plug. Remove transmission mounting bolts except 2 bolts on either side of transmission. Using a transmission jack, lift transmission slightly. Remove 2 remaining transmission mounting bolts. Push transmission rearward and lower.

Installation

To install, reverse removal procedure. When installing torque

converter to transmission, apply a light coat of grease to torque converter centering pin. Tighten bolts and nuts to specification. See TORQUE SPECIFICATIONS. Adjust control pressure cable and linkages as necessary. Fill transmission with fluid. See appropriate TRANSMISSION SERVICING - A/T article in AUTOMATIC TRANSMISSION SERVICING section.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Drive Plate Bolt	31 (42)
Front Crossmember Bolt (1)	33 (45)
Drive Shaft Clamping Nut	22-30 (30-40)
Transmission Mounting Bolt (2)	
10-mm	41 (55)
12-mm	48 (65)
Transmission Oil Pan Drain Plug	10 (14)
Torque Converter Drain Bolt	12 (16)

(1) - Replace self-locking bolts.
(2) - V8 engines use 2 nuts, one on each side of transmission.

END OF ARTICLE

TRANSMISSION SERVICING - A/T
Article Text
1994 Mercedes-Benz S320
For 1

Thursday, November 20, 2008 02:12PM

ARTICLE BEGINNING

1994 TRANSMISSION SERVICING
Mercedes-Benz Transmission Servicing - Automatic

S320, S350, S420, S500

IDENTIFICATION

AUTOMATIC TRANSMISSION APPLICATIONS TABLE

Model	Body	Transmission
S320 3.2L	140.032	722.508
S350 3.5L	140.043	722.367
S420 4.2L	140.043	722.366
S500 5.0L	140.051	722.370

LUBRICATION

SERVICE INTERVALS

Check fluid level at first 800-1000 miles and every 15,000 miles afterward. Change fluid and filter every 30,000 miles. Under severe service conditions, change fluid every 15,000 miles.

CHECKING FLUID LEVEL

With transmission fluid at normal operating temperature of 176øF (80øC), park vehicle on level surface. Place selector lever in the "P" position and set parking brake. Allow engine to idle for 2 minutes. Measure fluid level with dipstick completely inserted and locking lever released.

RECOMMENDED FLUID

Use Dexron-II ATF.

FLUID CAPACITIES

TRANSMISSION REFILL CAPACITIES TABLE

Application	Refill Qts. (L)	Dry Fill Qts. (L)
S320 & S350	6.6 (6.2)	7.7 (7.3)

S420 & S500	8.1 (7.7)	9.1 (8.6)

DRAINING & REFILLING

1) Disconnect filler tube from oil pan, and drain fluid. Rotate engine until torque converter drain plug is at bottom of torque converter housing. Remove plug and drain fluid. Install plug, using a new sealing ring. Remove oil pan and filter.

2) Install filter and oil pan, using a new gasket. Attach fill tube, using new sealing rings on hollow screw. Add about 3.2 qts. (3L) of automatic transmission fluid.

3) Apply parking brake and start engine. Place selector lever in the "P" position. Run engine at idle and gradually add fluid. Momentarily place selector lever in each gear, and then return to "P" position. Check fluid level and add if necessary. DO NOT overfill.

ADJUSTMENTS

SHIFT LINKAGE

Before adjusting shift linkage, make sure neutral safety switch is properly adjusted. See NEUTRAL SAFETY SWITCH. To adjust shift linkage, disconnect control rod from gear selector lever. Place transmission lever in "N" (Neutral) position. Loosen lock nut at end of control rod. Adjust rod length so clearance is .04" (1 mm) between gear selector lever and "N" stop on gate plate. Connect control rod, and secure and tighten lock nut. See Fig. 1.

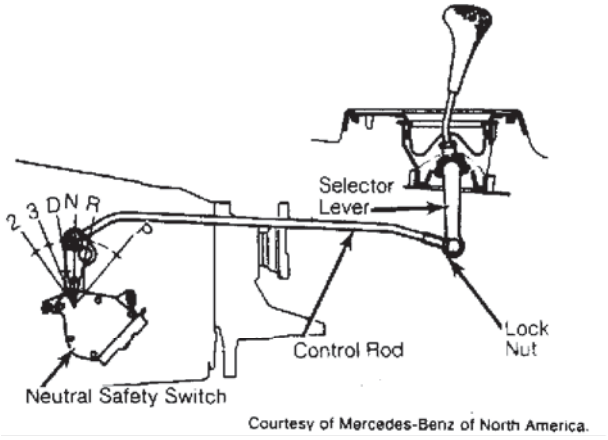


Fig. 1: Adjusting Shift Linkage (722.4 Trans. Shown; Others Similar) Courtesy of Mercedes-Benz of North America

CONTROL PRESSURE CABLE

Ensure throttle control cable is correctly adjusted. Disconnect cable ball socket. Pull control cable forward until slight resistance is felt. Holding cable in this position, check if ball socket fits on ball with no tension. If tension is felt, use adjusting nut to change cable length.

S320

Remove air cleaner. Adjust control pressure cable by turning adjusting screw until tips of needles align. Install air cleaner. See Fig. 2.

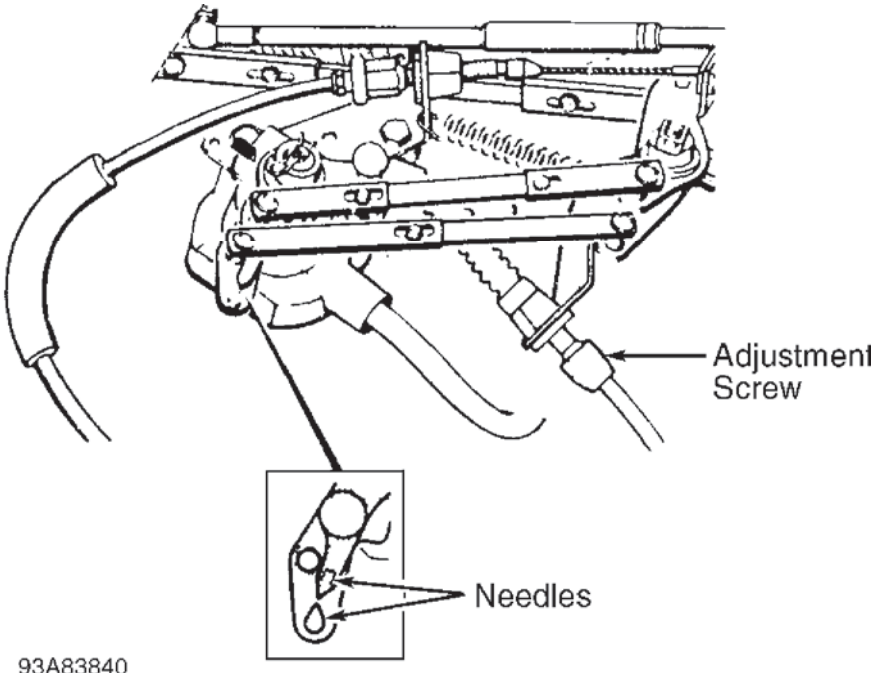


Fig. 2: Aligning Needles (S320)
Courtesy of Mercedes-Benz of North America

S420 & S500

Remove air cleaner. Loosen 2 nuts on connecting rod. Turn connecting rod until tips of needles align. See Fig. 3. Tighten 2 nuts on connecting rod. Install air cleaner.

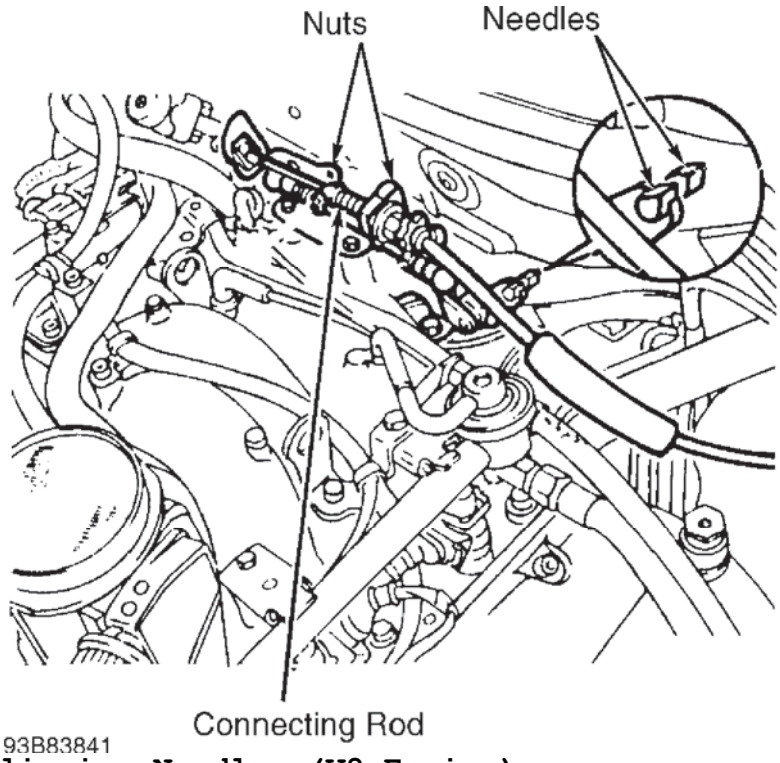


Fig. 3: Aligning Needles (V8 Engine)
Courtesy of Mercedes-Benz of North America

CONTROL PRESSURE CABLE VACUUM ELEMENT

NOTE: Not all vehicles are equipped with a control pressure cable vacuum element. Only vehicles with dual shifting modes for transmission may have this option.

1) Ensure control pressure cable is properly adjusted. See CONTROL PRESSURE CABLE. Raise and support vehicle. Disconnect vacuum hose from control pressure cable vacuum element. See Fig. 4.

2) Connect a vacuum supply to vacuum element. Pull control pressure cable up to full load stop. Measure how far piston sticks out of vacuum element (distance "A"). See Fig. 5. See VACUUM ELEMENT PISTON PROTRUSION table. If vacuum element piston protrusion is not to specification, turn adjustment screw on control pressure cable vacuum element. See Fig. 4.

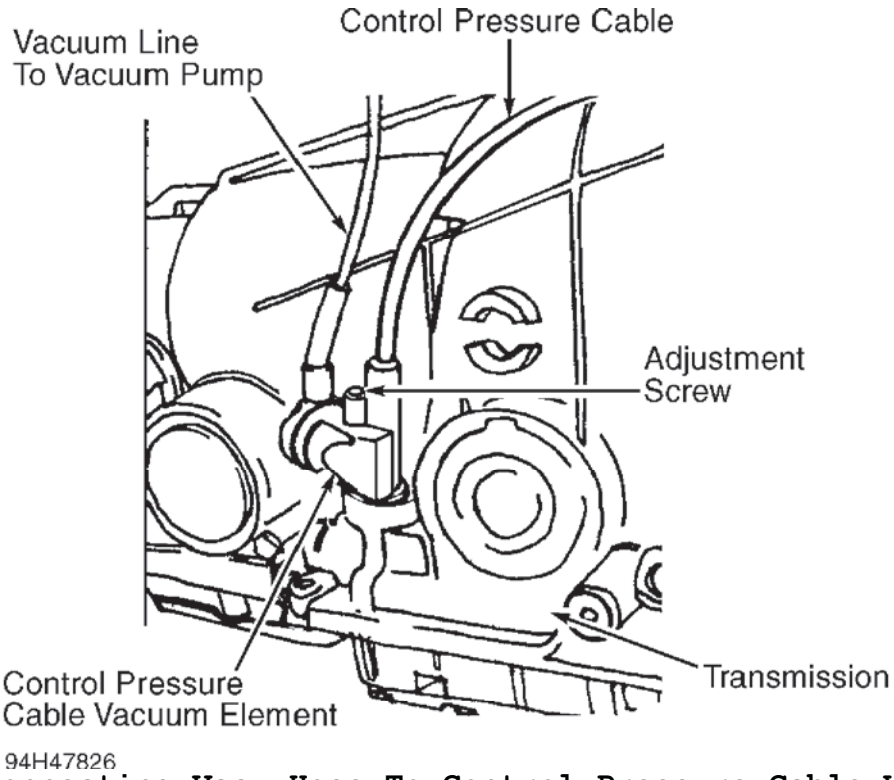


Fig. 4: Connecting Vac. Hose To Control Pressure Cable Vac. Element
Courtesy of Mercedes-Benz of North America

VACUUM ELEMENT PISTON PROTRUSION TABLE

Application	In. (mm)
6-Cyl. Engine	
With 722.3 Transmission (1)	.28 (7)
With 722.4 Transmission (1)	.24 (6)
8-Cyl. Engine	.24 (6)

(1) - See IDENTIFICATION for transmission application.

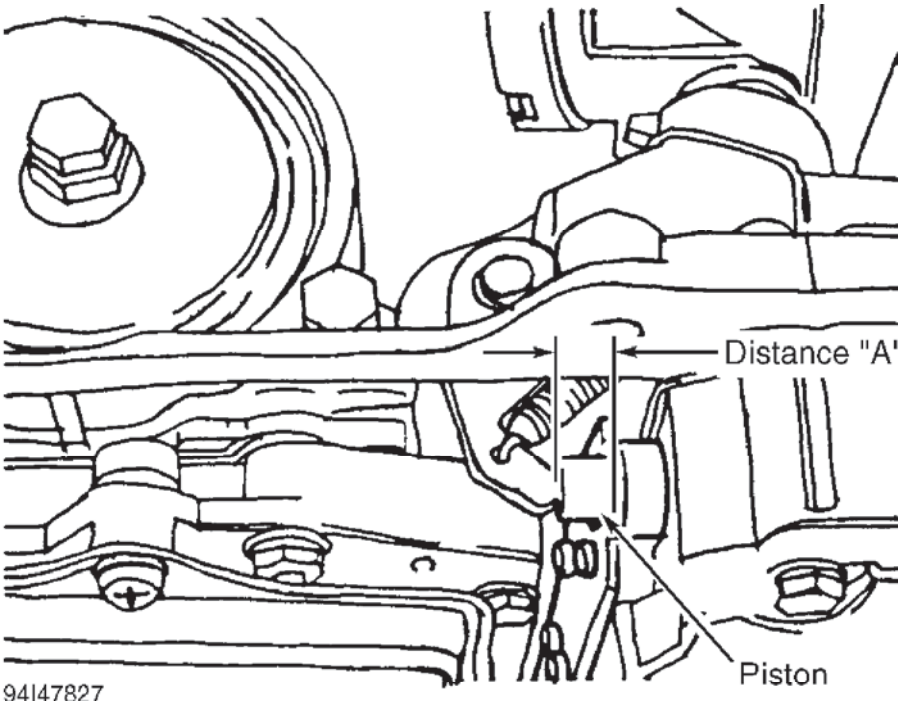


Fig. 5: Checking Vacuum Element Piston Protrusion
Courtesy of Mercedes-Benz of North America

NEUTRAL SAFETY SWITCH

1) Neutral safety switch is located behind transmission selector lever on transmission. Loosen neutral safety switch attaching screws. Ensure transmission selector lever is in "N" position.

2) Insert a 5/32" (4 mm) drill bit through select lever adjustment hole and into neutral safety switch housing. Tighten screws and remove drill bit. Ensure vehicle starts in "P" and "N" positions only. See Fig. 1.

SHIFT POINT RETARD UNIT

NOTE: Not all vehicles are equipped with shift point retard.

1) If shift point retard unit is being replaced, ensure distances "A" and "B" are transferred to replacement unit. See Fig. 6. To check shift point retard, drive vehicle in "D" range with light throttle pressure from a stop.

2) If shift point retard is functioning properly, vehicle will start moving in second gear and 2-3 shift will occur above 30 MPH. If vehicle starts in first gear, shift point retard is too high. To lower shift point retard, turn adjustment screw to the right. See Fig. 6.

3) If vehicle 2-3 shift occurs at less than 30 MPH, shift point retard is too low. To raise shift point retard, turn adjustment

screw to the left. See Fig. 6.

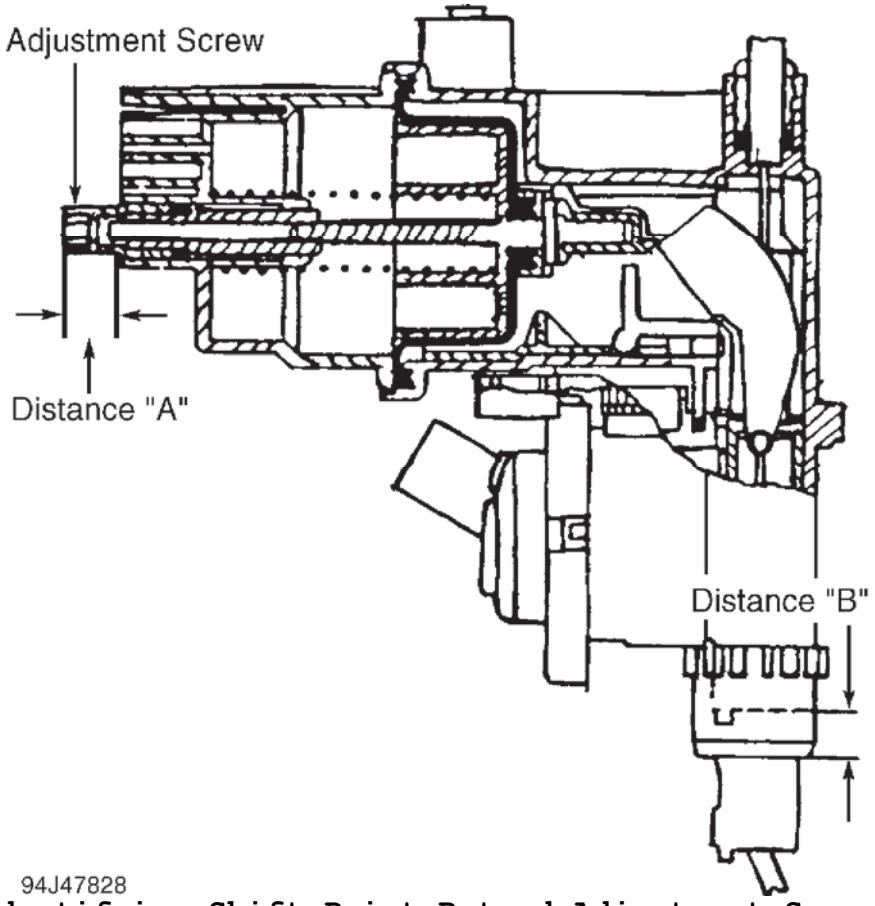


Fig. 6: Identifying Shift Point Retard Adjustment Screw
Courtesy of Mercedes-Benz of North America

END OF ARTICLE

FIXTURE FOR B-1 PISTON R & I - AUTO TRANS.722.3/4/5

Article Text

1994 Mercedes-Benz S320

For 1

Thursday, November 20, 2008 02:13PM

ARTICLE BEGINNING

TECHNICAL SERVICE BULLETIN

AUTOMATIC TRANSMISSIONS 722.3/4/5
FIXTURE FOR B-1 PISTON REMOVAL AND INSTALLATION

Model(s): All Mercedes-Benz Models With Auto. Trans. 722.3/4/5
Group: 27 - Automatic Transmission
Bulletin No.: MBNA 27/31, 58/84
Date: August 1995

SERVICE INFORMATION

A new special tool has been developed for the removal and installation of automatic transmission piston B-1 with the transmission installed in the vehicle.

SPECIAL TOOL INFORMATION TABLE

Part Number	Description	Group/Category
900 589 27 23 00	Fixture for B-1 piston removal and installation See Fig. 1.	27/B

WORK INSTRUCTIONS FOR USE OF B-1 PISTON SPECIAL TOOL

1. Remove transmission oil pan and gasket, oil filter, valve body and large intermediate plate. See Fig. 2. (SMS Job Nos. 27-400 and 27-430).

2. Loosen closing cover of reaction valve B-1 (33) or overload protection switch S65 (33b) by approx. 3 - 4 turns. See Fig. 3.

   * Tightening torque: 70 N.m.

3. Install special tool angled bracket to transmission housing using three 8 mm hex bolts. See Fig. 4.

   * Tightening torque: 13 N.m.

4. Mount special tool compressing lever to angled bracket at side mounting eyelet that serves as pivot point. See Fig. 5.

5. Pull special tool compressing lever outward, in direction of

lower arrow to press in cover of piston B-1 allowing removal of circlip. See Fig. 6.

6. Carefully release compressing lever inward, in direction of lower arrow to remove piston B-1 from transmission housing. See Fig. 7.

7. Reassemble in reverse order.

CAUTION: During reassembly, always observe critical attention to correct installation position of B-1 piston return springs and alignment of B-1 piston pin into band 1 socket.

NOTE: An administrative message will be issued in the near future regarding time allowance.

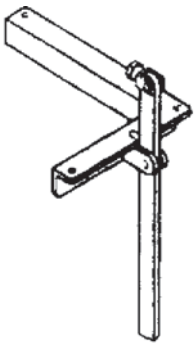
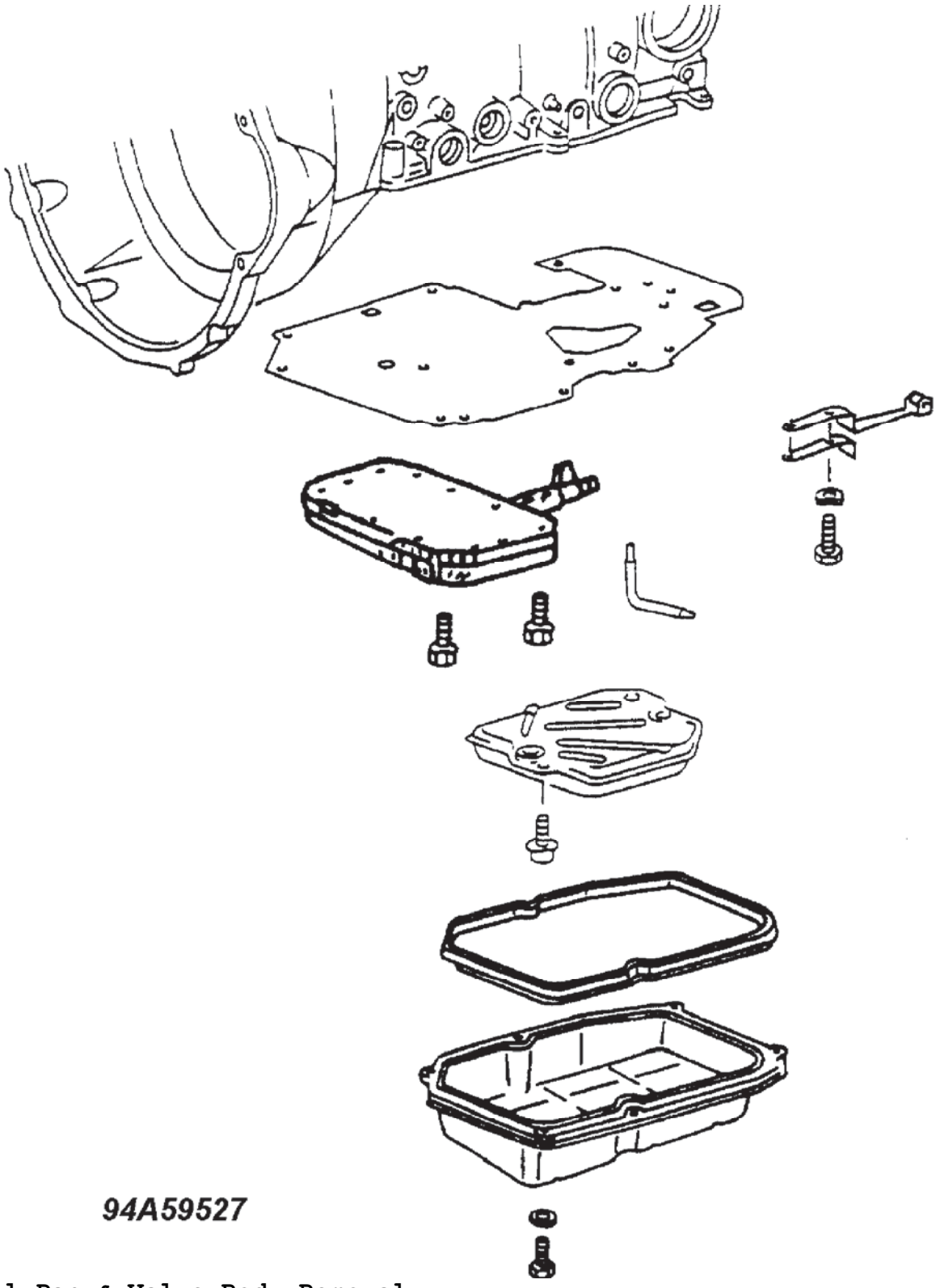


Fig. 1: B-1 Piston Removal Fixture

FIXTURE FOR B



FIXTURE FC 320F

Fig. 2: Oil Pan & Valve Body Removal

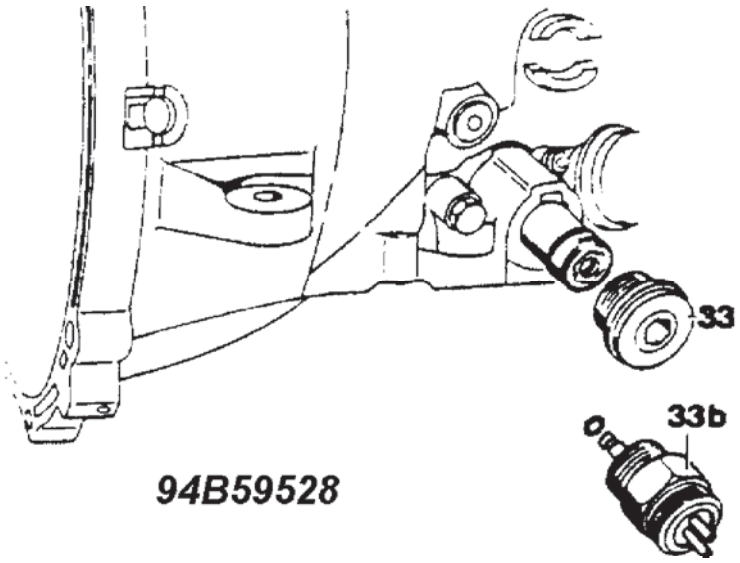


Fig. 3: Reaction Valve & Overload Protection Switch

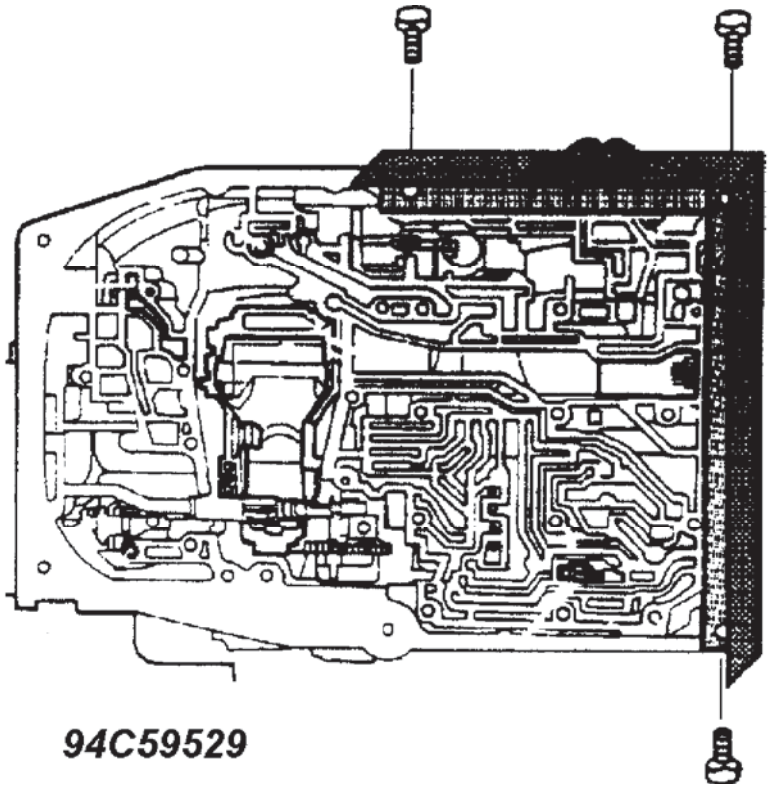


Fig. 4: Installing Angled Bracket

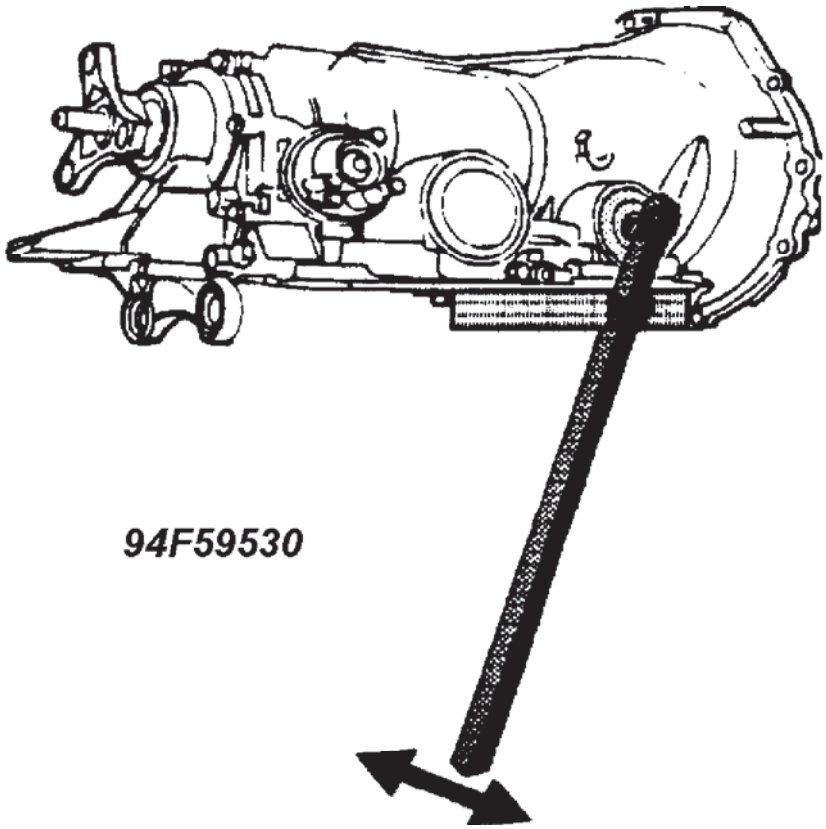


Fig. 5: Mounting Compressing Lever

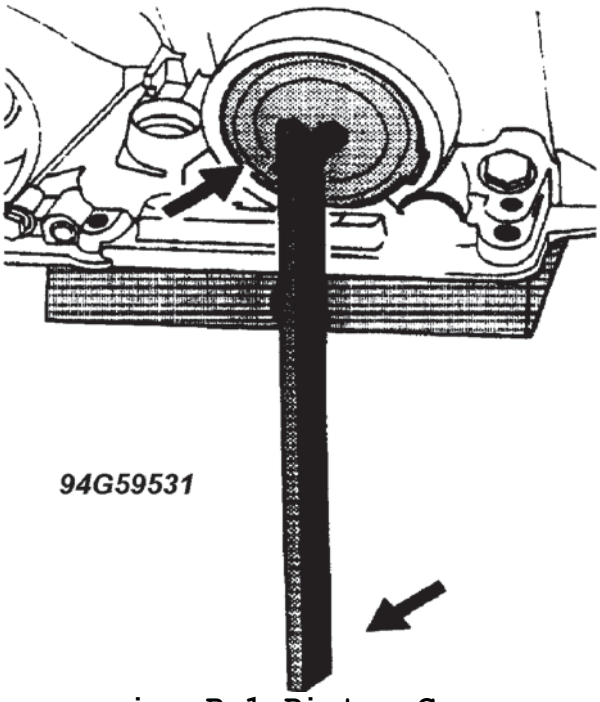


Fig. 6: Compressing B-1 Piston Cover

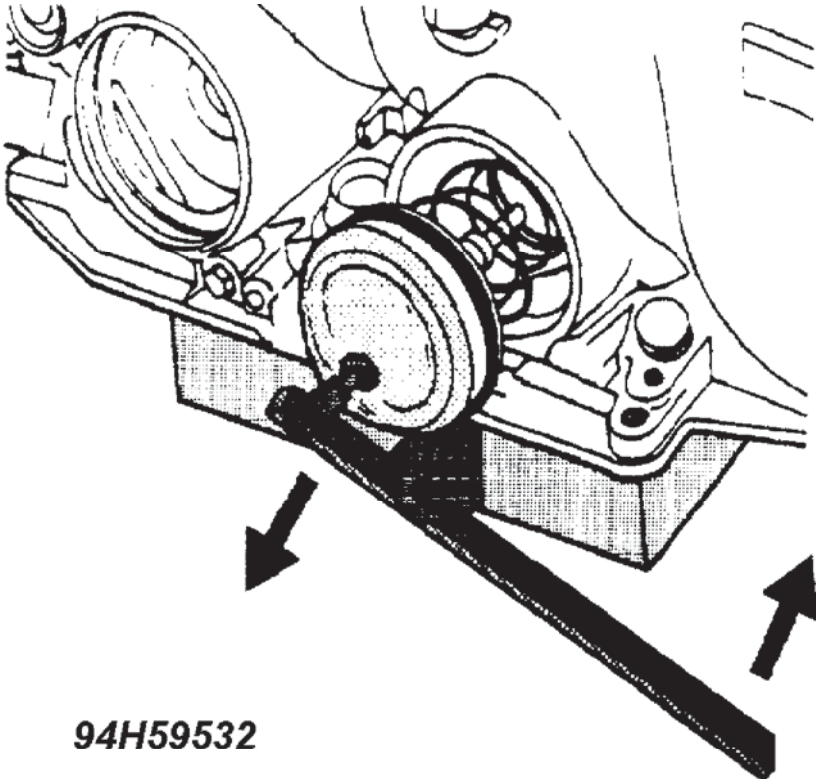


Fig. 7: Removing B-1 Piston

END OF ARTICLE

722.3/4/5 - SEALING PLUGS FOR VACUUM ACTUATORS
Article Text
1994 Mercedes-Benz S320
For 1

Thursday, November 20, 2008 02:18PM

ARTICLE BEGINNING

TECHNICAL SERVICE BULLETIN

ALL MODELS WITH AUTOMATIC TRANSMISSION 722.3/4/5
SEALING PLUGS FOR VACUUM ACTUATORS

Model(s):	**1981**	**Mercedes-Benz 380 SLC**
	1981-83	**Mercedes-Benz 380 SEL**
	1981-85	**Mercedes-Benz 300 TD, 300 SD, 380 SL**
	1982-83	**Mercedes-Benz 380 SEC**
	1982-85	**Mercedes-Benz 300 D, 300 CD**
	1984-85	**Mercedes-Benz 380 SE, 500 SEC, 500 SEL**
	1984-98	**Mercedes-Benz 190 D**
	1984-93	**Mercedes-Benz 190 E**
	1986-87	**Mercedes-Benz 300 SDL**
	1986-89	**Mercedes-Benz 560 SL**
	1986-91	**Mercedes-Benz 420 SEL, 560 SEC, 560 SEL**
	1986-93	**Mercedes-Benz 300 E**
	1987	**Mercedes-Benz 300 D, 300 TD**
	1987-89	**Mercedes-Benz 260 E**
	1988-91	**Mercedes-Benz 300 SEL**
	1988-93	**Mercedes-Benz 300 CE, 300 SE, 300 TE**
	1990-91	**Mercedes-Benz 350 SD, 350 SDL**
	1990-93	**Mercedes-Benz 300 D, 300 E 4MATIC, 300 TE 4MATIC, 300 SL, 500 SL**
	1992	**Mercedes-Benz 400 SE**
	1992-93	**Mercedes-Benz 300 SD, 400 E, 500 E, 500 SEL, 600 SEL**
	1993	**Mercedes-Benz 400 SEL, 500 SEC, 600 SEC, 600 SL**
	1994-on	**Mercedes-Benz E 320, E 420, E 500, SL 320, SL 500, SL 600. S 320, S 350, S420, S 500, S 600, C 220, C 280**
Group:	**27 - Automatic Transmission**	
Bulletin No.:	**27/94**	
Date:	**October 1993**	

SERVICE INFORMATION

To reduce the number of transmission variants, automatic transmissions will be equipped in the future with a control pressure cable of a standardized design that has two vacuum actuators.

The control pressure cable with two vacuum actuators in the plastic housing is also used for transmissions which do not need either or both of these vacuum actuators.

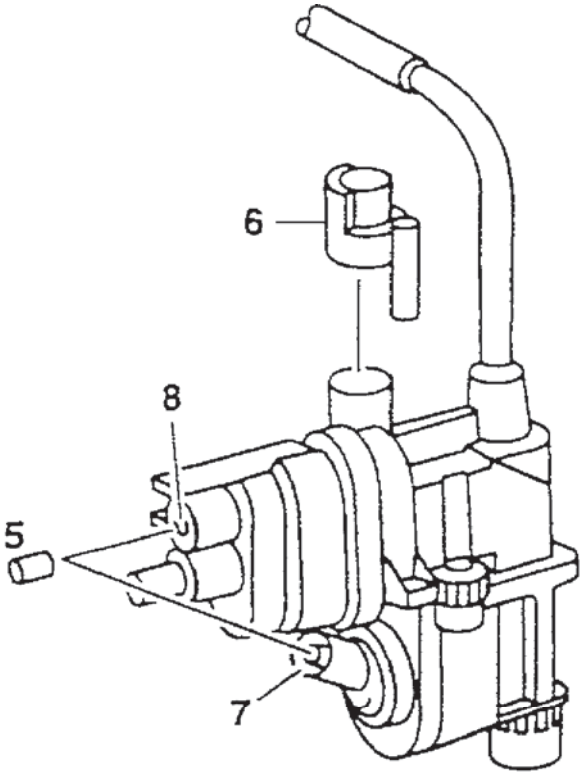
The redundant vacuum connections are to be sealed against dirt with a dummy plug (5, Fig. 1).

Please note that the breather connection on the vacuum actuator is provided with a cap (6, Fig. 1).

PARTS INFORMATION

PARTS INFORMATION TABLE

Part Name	Part Number
Dummy plug (5)	000 987 11 45
Cap (6)	140 997 00 20



98I50920

Fig. 1: Control Pressure Cable With Two Vacuum Actuators

END OF ARTICLE

HAND-HELD TESTER MODULE UPDATES - NEW 4 MBYTE MODULE
Article Text
1994 Mercedes-Benz S320
For 1

Thursday, November 20, 2008 02:28PM

ARTICLE BEGINNING

TECHNICAL SERVICE BULLETIN

A. HAND-HELD TESTER (HHT) MODULE PLANNING OVERVIEW
B. INTRODUCTION OF 4 MBYTE MODULE

Model(s):	**1986-93**	**Mercedes-Benz**	**300 E**
	1987	**Mercedes-Benz**	**300 D, 300 TD**
	1987-89	**Mercedes-Benz**	**260 E**
	1987-93	**Mercedes-Benz**	**300 CE, 300 TE**
	1990-93	**Mercedes-Benz**	**300 D, 300 SL, 500 SL 300 E 4MATIC, 300 TE 4MATIC**
	1992	**Mercedes-Benz**	**400 SE**
	1992-93	**Mercedes-Benz**	**400 E, 500 E, 300 SD, 300 SE, 500 SEL, 600 SEL**
	1993	**Mercedes-Benz**	**400 SEL, 500 SEC, 600 SEC, 600 SL**
	1994	**Mercedes-Benz**	**E 500**
	1994-on	**Mercedes-Benz**	**E 320, E 420, SL 320, SL 500, SL 600, S 320, S 350, S 420, S 500, S 600, C 220, C 280**
	1995-on	**Mercedes-Benz**	**E 300, C 36**
Group:	**58 - Special Tools**		
	99 - Service Literature		
Bulletin No.:	**58/69B, 99/154B**		
Date:	**January 1995**		

NOTE: This bulletin supersedes Service Information No. MBNA 58/69A, 99/154A, dated June 1994.

A. HAND-HELD TESTER (HHT) MODULE PLANNING OVERVIEW

Periodic updates to HHT Modules and the introduction of new HHT Modules ensure that the dealer technician is provided with the very latest diagnostic information concurrent to production changes and the introduction of new modules. Therefore, it is very important to use the latest HHT Module available when performing diagnosis. The following table provides an overview of HHT Module planning.

MODULE PLANNING OVERVIEW

Issue	Model	Comments
	Application	
1/94	124, 129	Obsolete (replaced by 12/94 issue, see below).
3/94	140	Obsolete (replaced by 12/94 issue, see below).

6/94	202	Obsolete (replaced by 12/94 issue, see below).
12/94	124, 129, 140, 202	New issue (replacement for 1/94, 3/94, 6/94 issues).

IMPORTANT NOTE: Obsolete module 1/94, 3/94 and 6/94 are NOT to be returned at this time. Please store these modules with the new module in the HHT carrying case. Do not discard these obsolete modules as you will forfeit their core charge ($ 400.00 ea.)! Dealer will be informed as to handling procedures regarding these modules in the future.

For further details regarding the HHT Module Program Update Service, please refer to S.I. MBNA 58/77A, 99/162A. January 1995.

B. INTRODUCTION OF 4 MBYTE MODULE

The release of the 12/94 HHT module marks the introduction of a 4 MByte module which provides diagnostic coverage for all models including models 124, 129, 140 and 202. The integration of the three previously valid modules into one module will allow the user to quickly determine the status of modules on hand and will allow for easier updating, currently planned to take place approx. 4 times per year.

The past, often confusing practice of including updated diagnostic information for a particular model on a module labeled for use only with a different model should no longer occur.

The timeliness of future module updates is also scheduled for improvement with the decision to perform the update service locally at the Customer Assistance Center (CAC) in Montvale. New Jersey. Further details regarding revisions to the update service will be released at the modules next update.

END OF ARTICLE