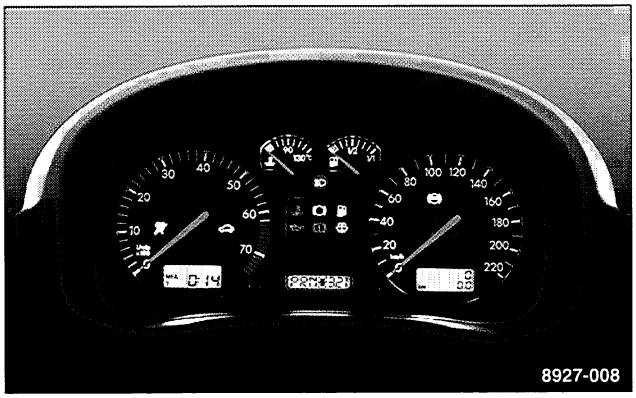
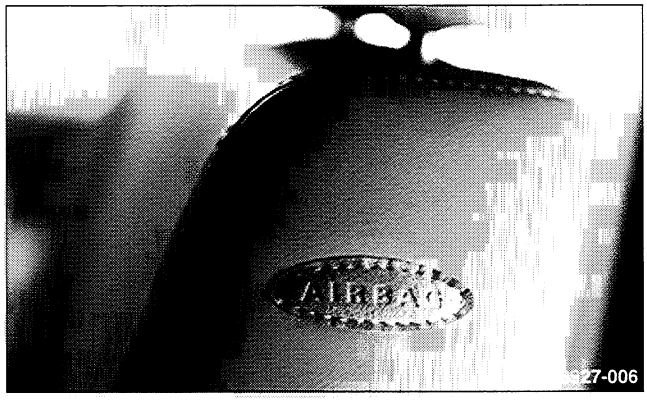
Feature Overview

Instrument cluster illumination



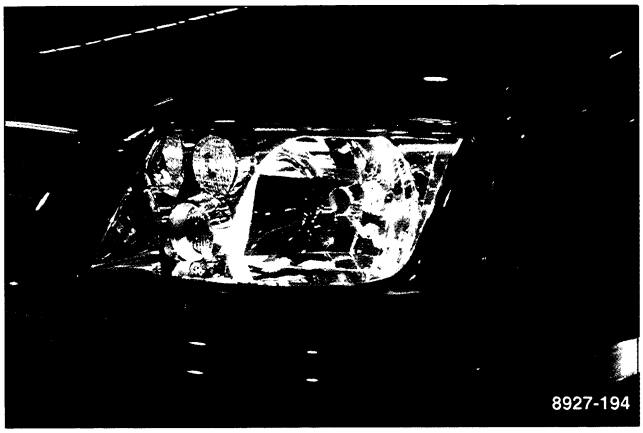
Front seat side airbags



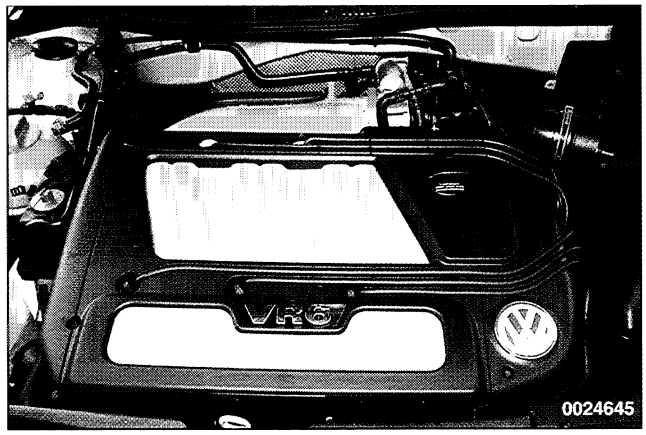
New headlight design, Golf

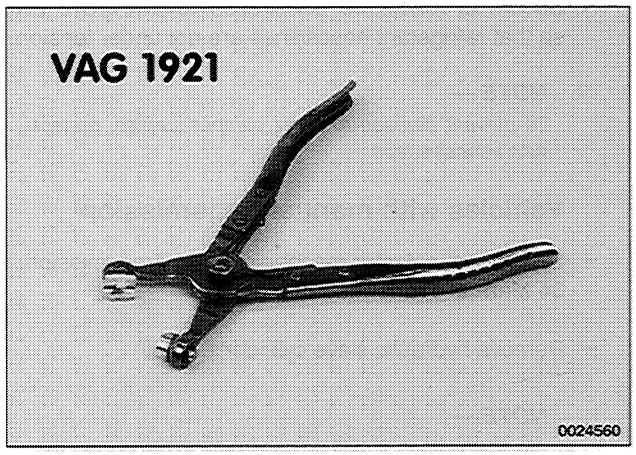
Power windows

New headlight design, Jetta



VR6 engine





– Drain coolant, see **19 Cooling System**.

> ***WARNING —***
> *Hot coolant can scald! Drain the coolant only with engine cold.*

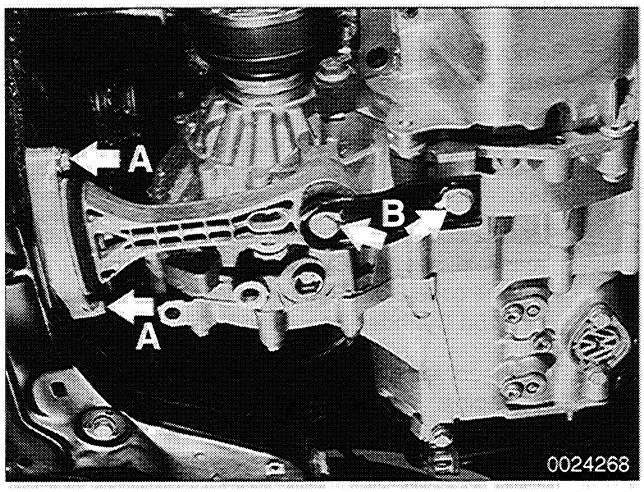
➢ Disconnect coolant hoses at radiator or engine using spring-type pliers or "quick-disconnect" couplings where equipped.

> ***NOTE —***
> *Spring-type hose clamps are used from the factory. Special pliers such as VAG 1921 or VAS 5024 or equivalent are recommended for ease of removal and installation.*

– Remove right side inner CV joint protective cover from engine if equipped.

– Remove right side drive shaft and disconnect left side driveshaft at the transmission. See **40 Front Suspension and Drive Axles**.

– Remove front exhaust pipe, see **26 Exhaust System and Emission Controls.**

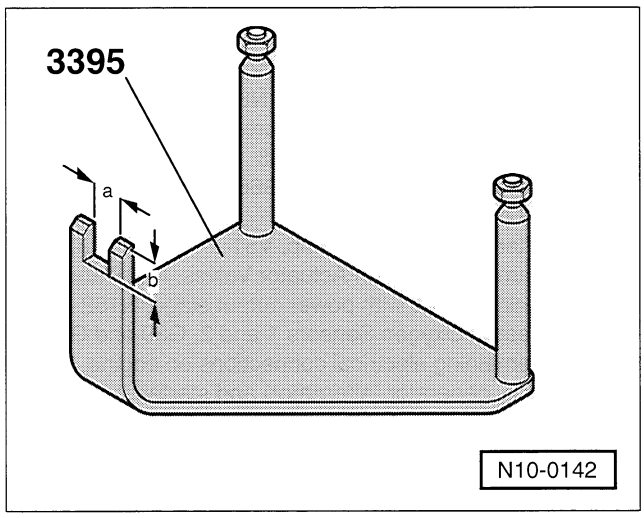


➢ Unbolt mounting bolts (**arrows A** and **B**) and remove pendulum support.

– Engine code **BDF**:

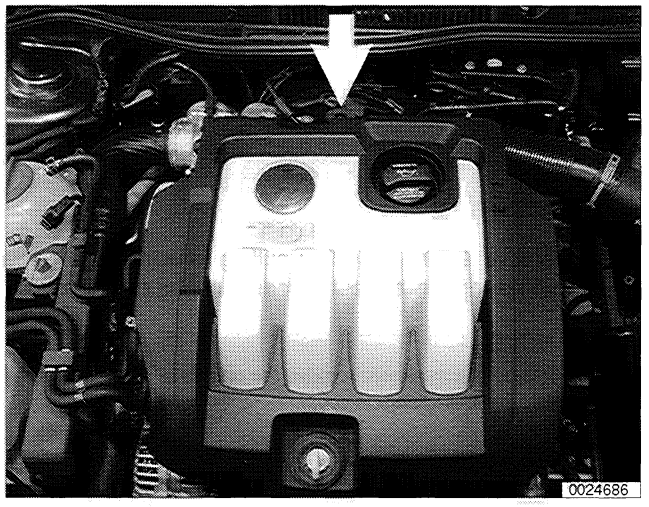
- Remove generator (alternator) and mounting bracket.
- Remove Secondary Air Injection pump motor bracket from oil pan and cylinder block.

> ***NOTE —***
> *The above step may also be needed for engine code AFP to obtain needed clearance.*



➢ Engine code: **AFP**:

- Modify Volkswagen engine support tool 3395 to fit the bottom of the engine block.
- Deepen and widen slot to the following dimensions:
  a = 32 mm (1.26 in)
  b = 27 mm (1.06 in)

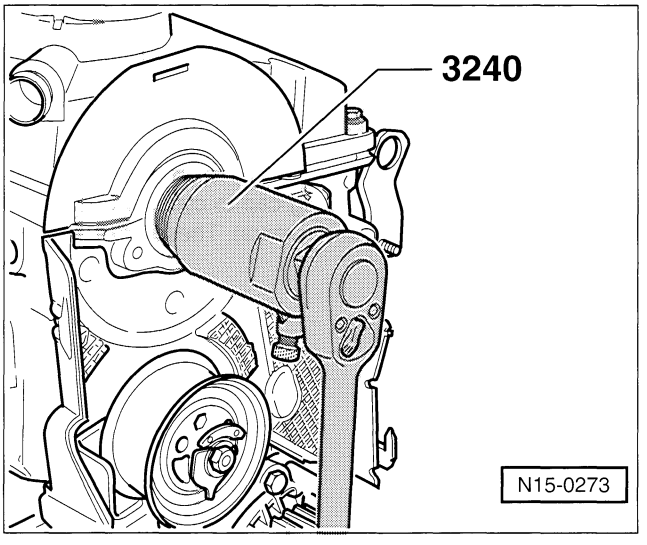


Camshaft oil seal, replacing

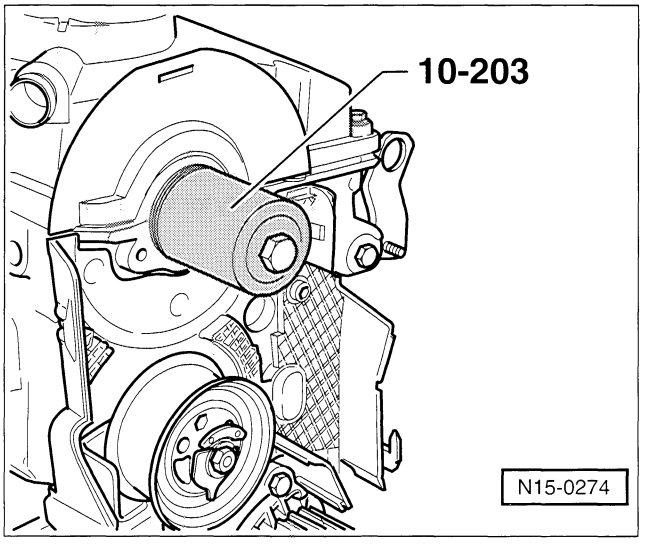
- Remove engine cover by pulling forward edge upward and pulling forward out of rear securing clip (**arrow**).

NOTE —
It is not necessary to remove the engine oil dipstick before removing engine cover.

- Remove timing belt.
- Remove camshaft sprocket, outer and hub.



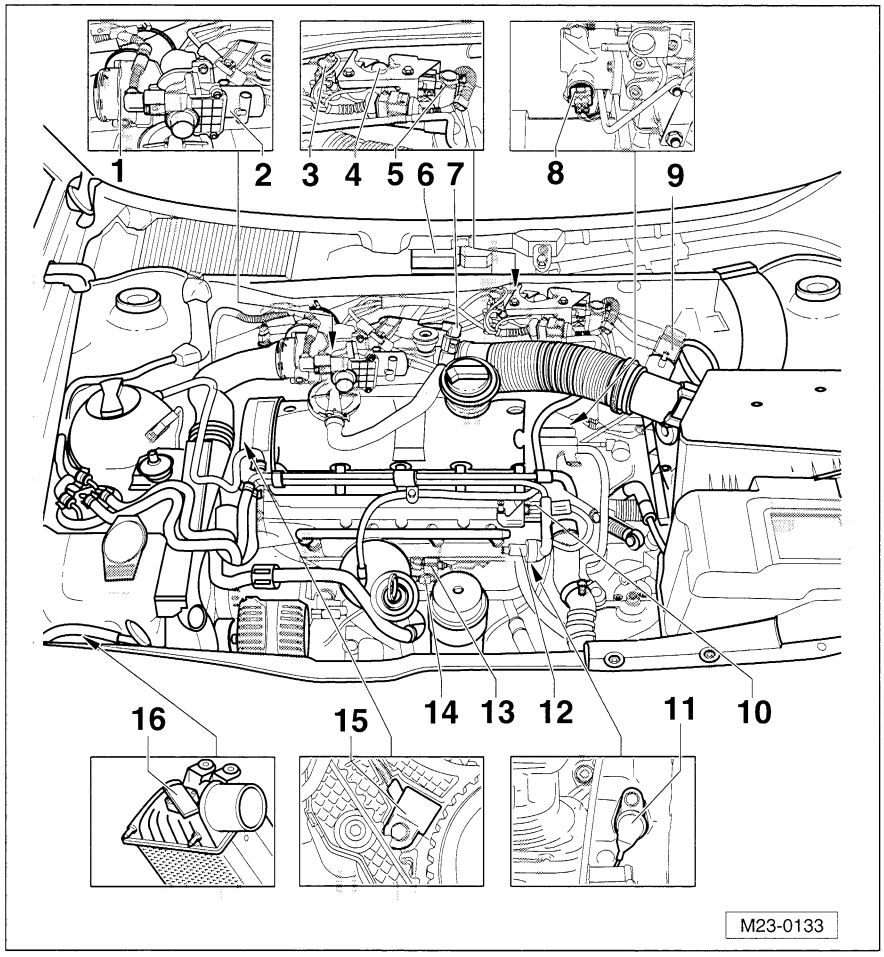
- Prepare oil seal extractor tool 3240 by unscrewing inner part of tool two full turns, approx. 3 mm ($^1/_8$ in) from outer part and lock with knurled screw.
- Lubricate threaded tapered end of oil seal extractor. Place it in position and exerting firm pressure, screw it as far as possible into oil seal.
- Loosen knurled screw and turn inner part against camshaft until oil seal is pulled out.
- When installing new seal, do not additionally oil or grease the inner oil seal sealing lip.
- Before installing, remove oil remains from camshaft journals with a clean cloth
- Tape over (for example, with cellophane tape) the groove in the taper of the camshaft to protect the sealing lip.
- Carefully position seal on camshaft and push against cylinder head.



- Press in oil seal with press piece of puller 10-203 and a bolt (M12 x 65). Continue pressing into bore until completely seated.
- Install timing belt, sprockets and hub as given previously.
- Install valve cover.
- Remainder of installation is the reverse of removal.

DIESEL INJECTION SYSTEM (1.9L PD TDI DIESEL)

Diesel injection system, component overview (from 2004 m.y.)



1. **Variable intake manifold flap**
   - With Motor for intake flap (V157)
2. **Exhaust Gas Recirculation (EGR) vacuum regulator solenoid valve (N18)**
3. **Intake Manifold Runner Control (IMRC) valve (N316)**
4. **Exhaust Gas Recirculation (EGR) cooler switch-over valve (N345)**
5. **Wastegate bypass regulator valve (N75)**
6. **Diesel direct injection system ECM (J248)**
   - With BARO (altitude) sensor (F96)
7. **Positive Crankcase ventilation (PCV) heating element (N79)**
8. **Engine coolant temperature sensor (G62)**
   - Release pressure in cooling system before removing
9. **Mass air flow sensor (G70)**
10. **Harness connector**
    - For pump (unit) injectors (N240, N241, N242, N243)
11. **Engine speed sensor (G28)**
12. **Fuel temperature sensor (G81)**
13. **Harness connector**
    - For Camshaft Position (CMP) (G40)
14. **Harness connector**
    - For engine speed sensor (G28)
15. **Camshaft Position (CMP) sensor (G40)**
16. **Manifold absolute pressure sensor (G71) and intake air temperature (IAT) sensor (G72)**

A. **Brake pedal switch (F47) (not shown)**
   - Located in footwell on brake pedal bracket
   - May be in combined housing with brake light switch

B. **Brake light switch (F) (not shown)**
   - Located in footwell on brake pedal bracket
   - May be in combined housing with (F47)

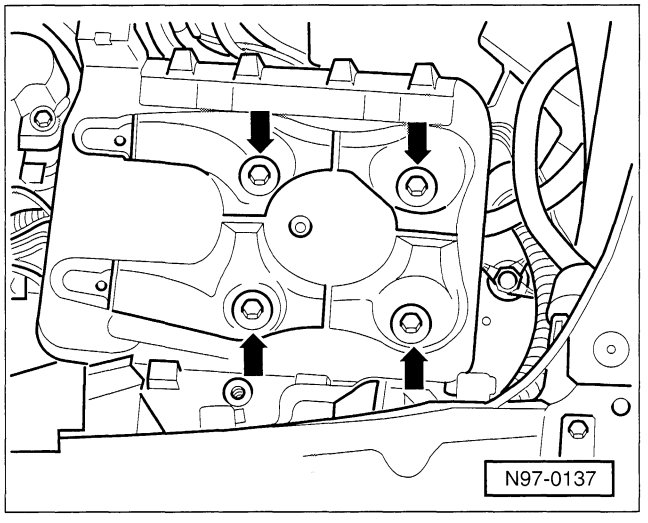
C. **Throttle position sensor (G79) (not shown)**
   - Located in footwell on throttle pedal support bracket

D. **Clutch pedal switch (F36) (not shown)**
   - Located in footwell on clutch pedal support bracket

E. **Malfunction Indicator Light, MIL (K83) and Glow plug warning light (K29)**
   - In instrument cluster

Starter, removing and installing

– Disconnect battery ground (GND) strap from battery negative (-) terminal. See **Cautions** at beginning of this repair group regarding battery disconnection.

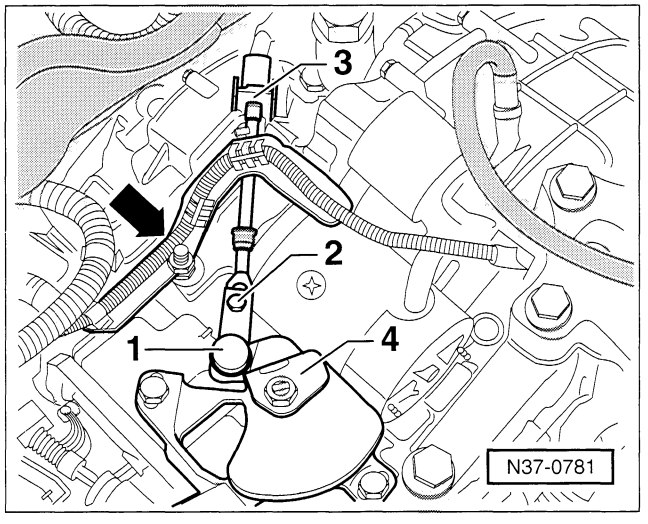


NOTE —
Be sure to have the anti-theft radio code on hand before disconnecting the battery.

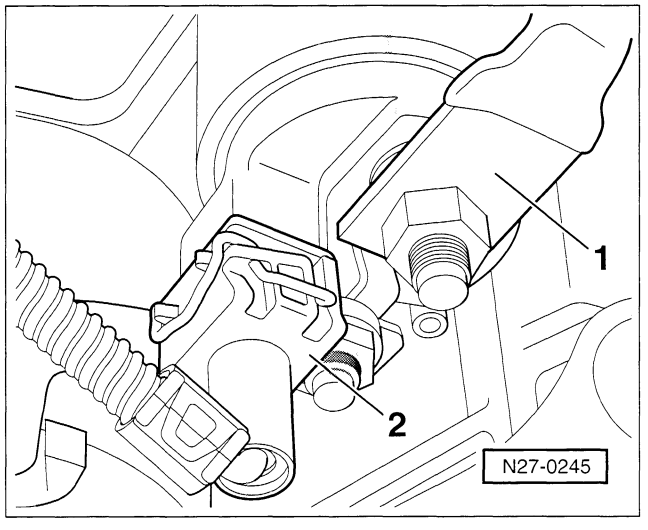
➤ Remove battery as described earlier. Remove battery tray mounting bolts (**arrows**) and battery tray.

Vehicles with 5-speed automatic transmission (code: 09A)

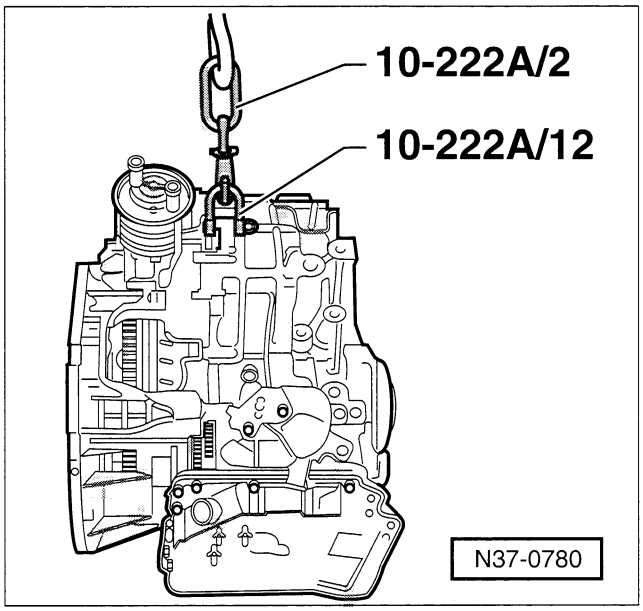
– Remove intake air hose and air filter assembly, see **24 Fuel Injection**.



➤ Ensure transmission is in "Park" and remove bracket (**arrow**) and pry off shift lever cable end (**1**) from shift lever (**4**) with screwdriver. Unclip shifter cable from holder (**3**) and set aside. Do not remove screw (**2**) or kink shifter cable.



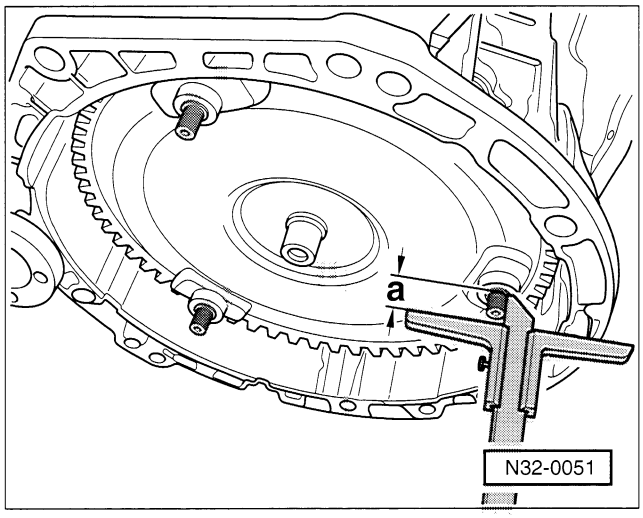
➤ Remove plastic nut cover and nut at solenoid terminal 30 (battery positive (+) and remove cable (**1**). Disconnect electrical connection at terminal 50 (**2**).



Transmission, transporting (09A)

Due to size, bulk, and especially weight, the transmission is best moved by fitting the lifting hooks, 10-222A/2 and 10-222A/12. Use of this support in conjunction with a suitable shop crane will minimize the chance of damage to the transmission.

⮜ Lift transmission with a suitable shop crane and transport to work area or shipping container to avoid personal injury and/or damage to transmission.



Transmission, installing (09A)

The transmission is installed in the reverse order of removal, noting the following:

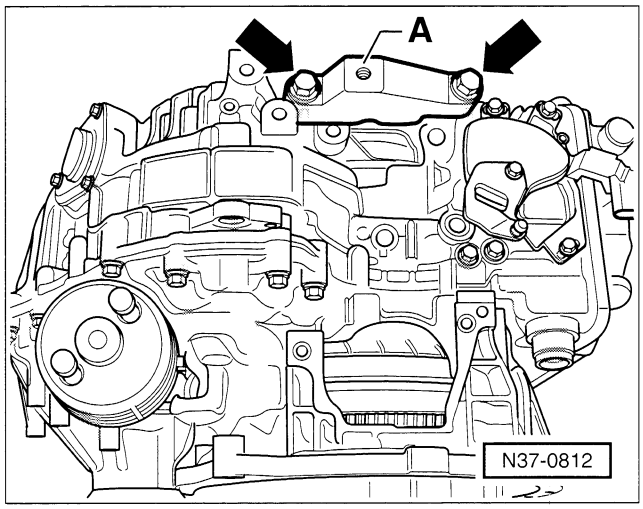
– Install torque converter.

⮜ The torque converter is installed correctly when the distance (**a**) between the transmission housing flange and the machined contact surface for the securing studs is as specified.

- 21 mm (0.827 in) for 4-cylinder engines
- 17 mm (0.669 in) for 6-cylinder engines

– If distance (**a**) is not correct, torque converter is not properly installed. Slide converter out and reposition until correct distance is obtained.

NOTE —
When installing transmission into vehicle, be sure that torque converter does not move. If torque converter slips out, installation distance may change and transmission can not be installed.



⮜ If transmission is to be replaced, unbolt (**arrows**) original mount (**A**) and transfer to new unit.

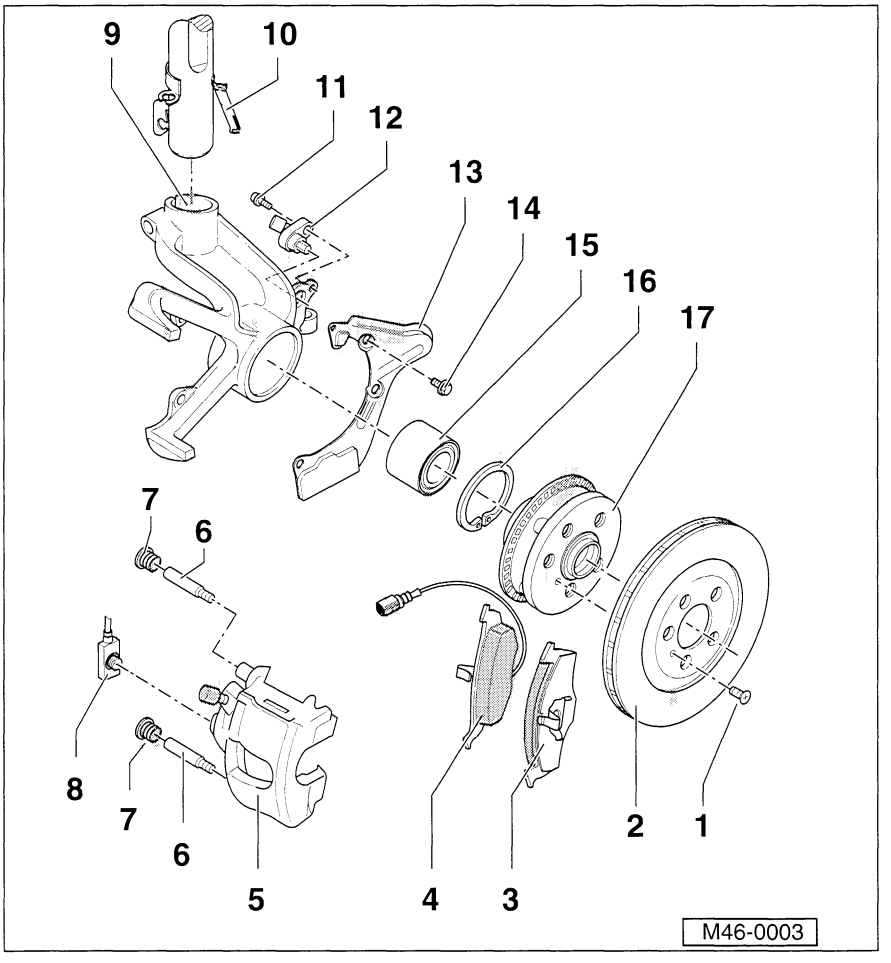
– Before installing transmission, be sure that the dowel sleeves are correctly located.

– When installing transmission, check that torque converter contact is properly positioned on drive plate.

– Replace selector cable locking circlip.

– Adjust selector lever cable, see **Selector lever cable, checking and adjusting (09A)**.

Front brake assembly (FS III caliper)

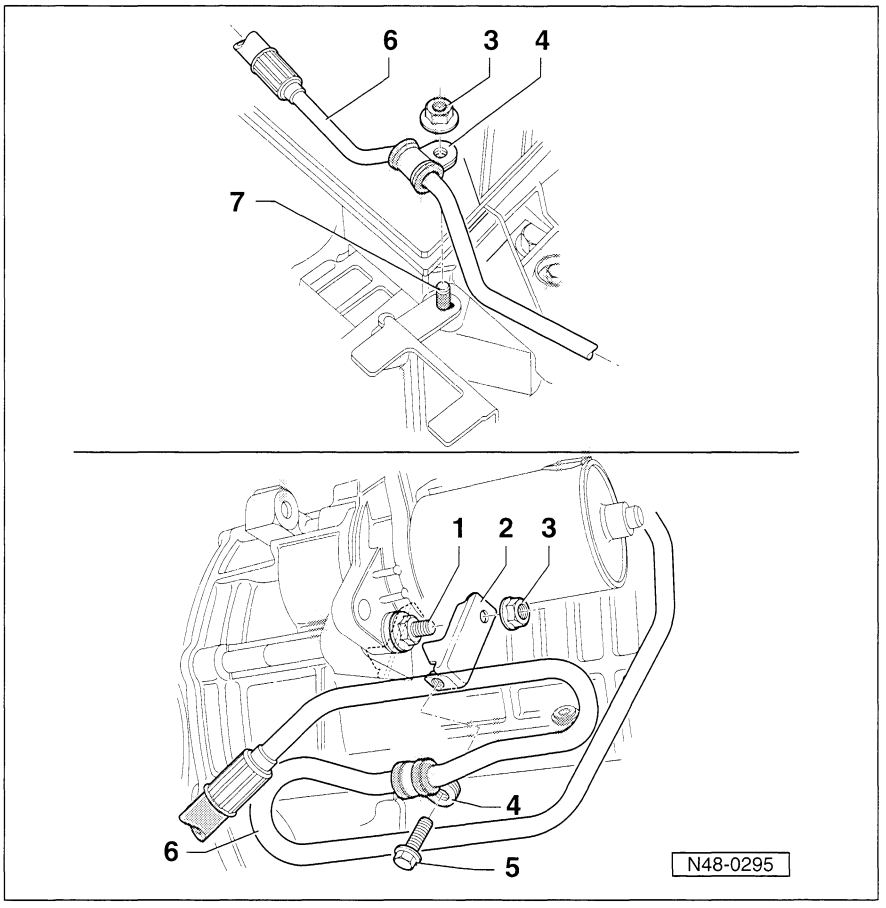


1. **Screw**
   - Tighten to 4 Nm (35 in-lb)
2. **Brake disc (rotor), vented**
   - Diameter: 280 mm (11.02 in.)
   - Thickness: 22 mm (0.866 in.)
   - Wear limit: 19 mm (0.748 in.)
   - When worn always replace on both sides
   - Remove brake caliper before removing disc
   - Never remove brake discs from hub by using force. If necessary use penetrating fluid, otherwise brake discs can be damaged.
3. **Outer brake pad**
   - Thickness: 19.7 mm (0.775 in.) including backing plate
   - Checking thickness, see **0 Maintenance**
   - Wear limit: 7 mm (0.276 in.) including backing plate
   - Always replace all pads on one axle at same time
4. **Inner brake pad**
   - Thickness: 19.7 mm (0.775 in.) including backing plate
   - Checking thickness, see **0 Maintenance**
   - Wear limit: 7 mm (0.276 in.) including backing plate
   - Always replace all pads on one axle at same time
   - With wear limit indicator, as applicable
   - Warning lamp lights up on instrument panel when lining wear limit is reached, as applicable
5. **Brake caliper**
   - Do not loosen hydraulic line when replacing pads
6. **Guide pin**
   - Tighten to 30 Nm (22 ft-lb)
7. **Protective cap**
8. **Brake hose with union and banjo bolt**
   - Tighten to 35 Nm (26 ft-lb)
9. **Wheel bearing housing**
10. **Pad wear sensor connector bracket**
    - It is not necessary to remove harness connector from bracket when replacing brake pad wear indicator
11. **Socket-head bolt**
    - Tighten to 8 Nm (71 in-lb)
12. **ABS wheel speed sensor**
    - Before inserting sensor, clean hole inner surface and coat with grease (VW part no. G 000 650)
13. **Splash shield**
14. **Bolt**
    - Tighten to 10 Nm (7 ft-lb)
15. **Wheel bearing**
    - Replace each time after removing
    - Pressing out and in, see **40 Front Suspension and Drive Axles**
16. **Circlip**
17. **Wheel hub with rotor**
    - Removing and installing, see **40 Front Suspension and Drive Axles**

Pressure hose, mounting to automatic transmission

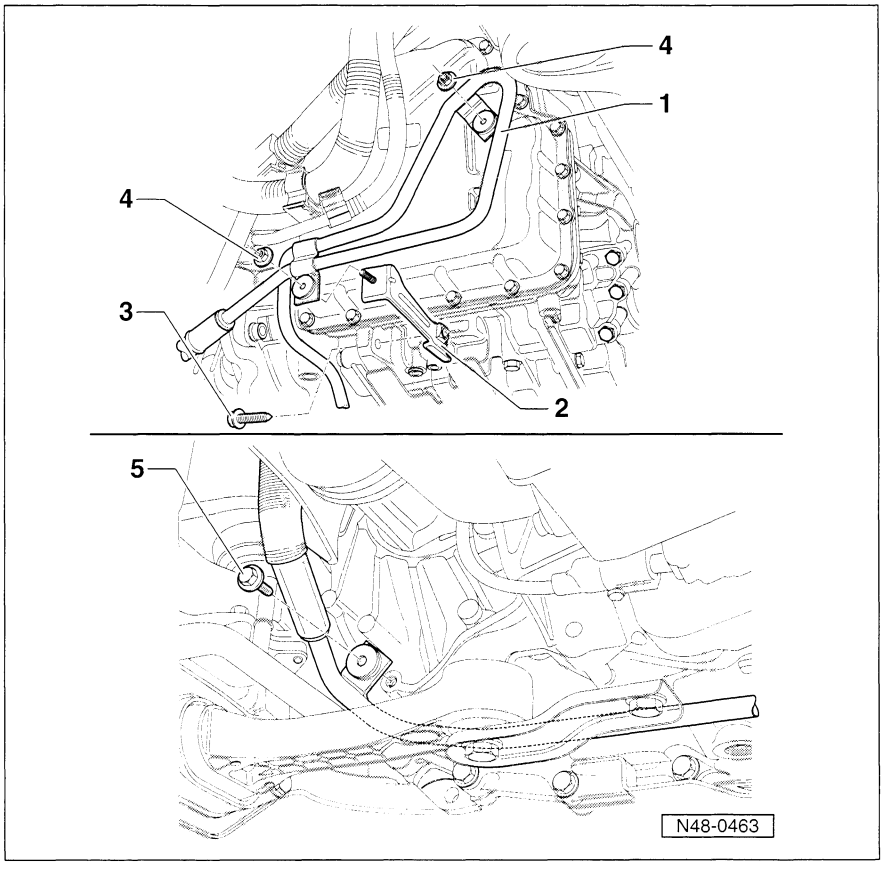
01M 4-speed transmission

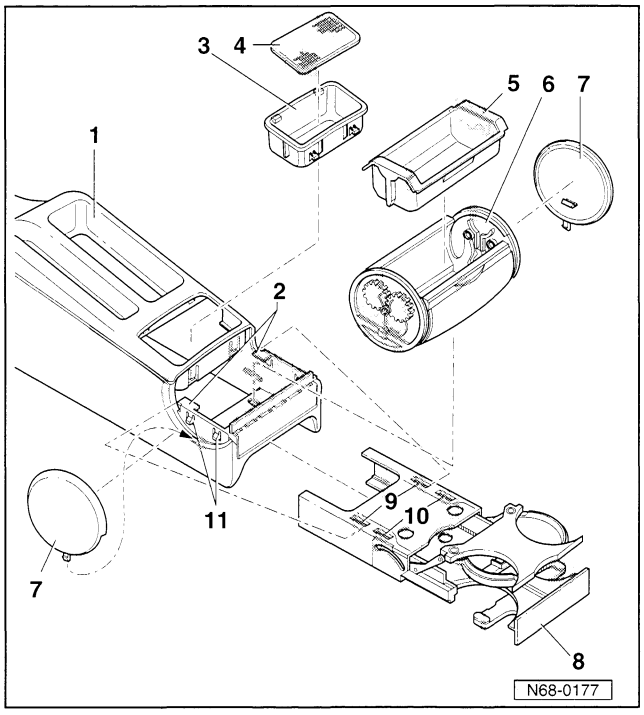
1. **Starter mounting bolt**
2. **Mounting bracket**
3. **Nut**
   - Tighten to 22 Nm (16 ft-lb)
4. **Clamp**
5. **Nut**
   - Tighten to 22 Nm (16 ft-lb)
6. **Pressure hose**
7. **Securing bolt on transmission**



09A 5-speed transmission

1. **Pressure hose**
2. **Mounting bracket**
3. **Bolt**
   - Tighten to 22 Nm (16 ft-lb)
4. **Nut**
   - Tighten to 9 Nm (6 ft-lb)
5. **Bolt**
   - Tighten to 22 Nm (16 ft-lb)





Rear cupholder, removing and installing

– Remove rear ashtray.

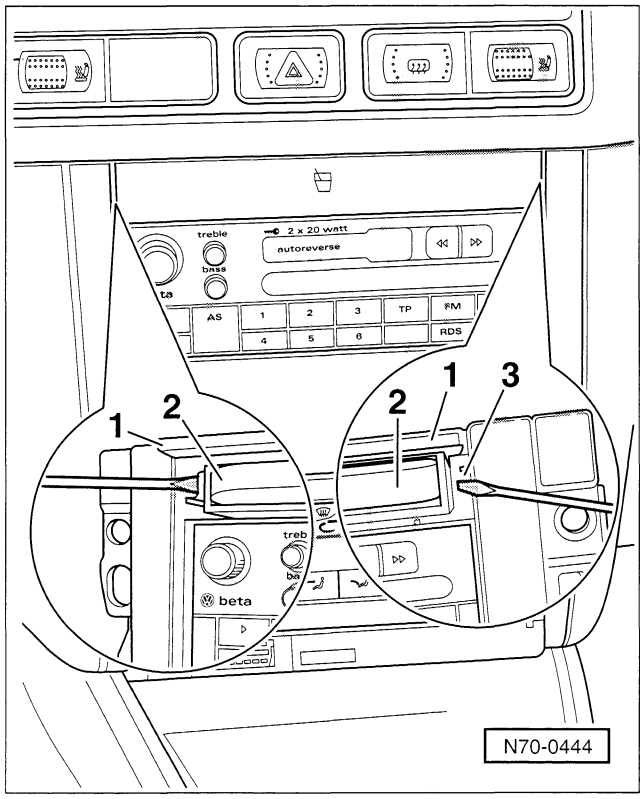
➢ Press down retaining hooks (**9**) and pull cupholder out from center console (**1**).

– To install, guide cupholder into center console until retaining hooks (**10**) meet retaining lugs (**2**).

– Bend up retaining hooks (**9**) slightly.

– Install ashtray (**6**).

INTERIOR EQUIPMENT



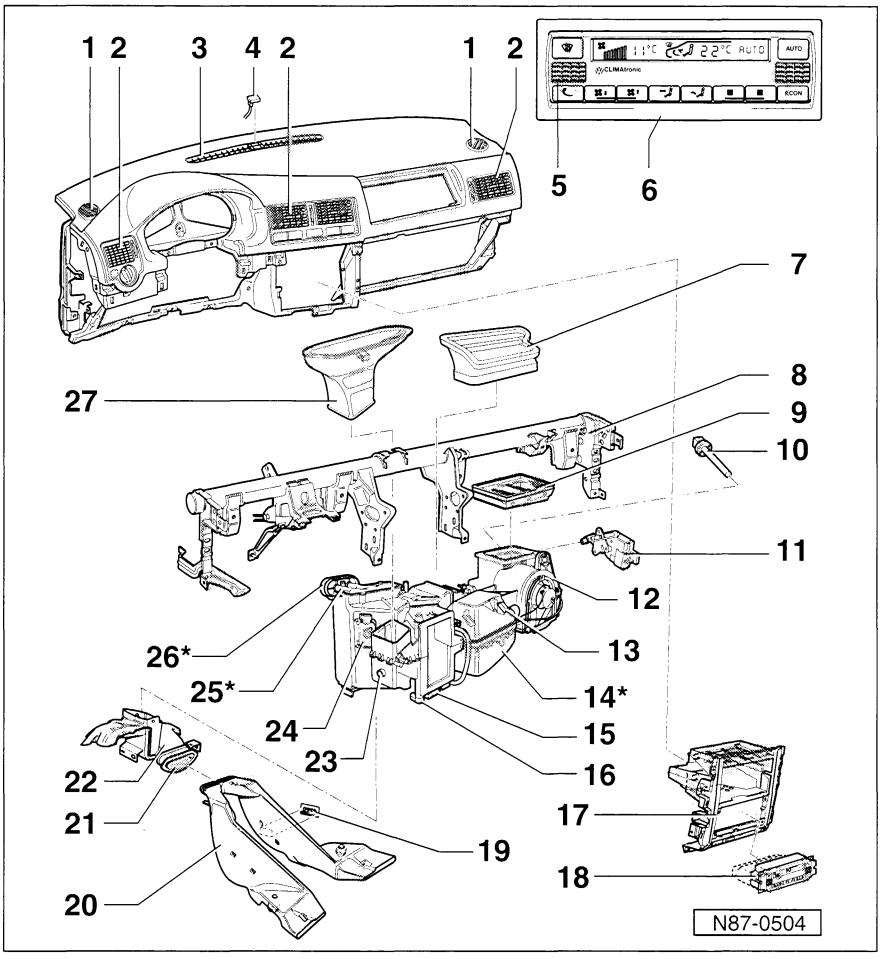
Front cup holder, removing

➢ Fold up trim panel (**1**) for front cup holder.

– Press retaining clips (**2** and **3**) at sides of cup holder assembly with flat tip screwdriver and unclip.

– Pull out cup holder.

A/C passenger compartment components, overview (Climatronic)



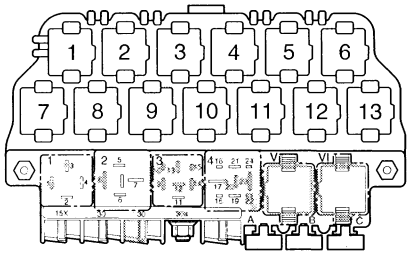
1. **Side window air outlet**
   - Removing, see **80 Heating and Ventilation**
2. **Dashboard air outlets**
   - Removing, see **80 Heating and Ventilation**
3. **Defroster air outlet**
   - Must remove instrument panel to remove, see **70 Trim –Interior**
4. **Sunlight photo sensor (G107)**
   - Controls temperature flap and fresh air blower speed depending on light intensity
   - Climatronic control module will assume a fixed value in the event of sensor failure
   - Removing, **see Sunlight photo sensor, removing**
5. **Instrument panel temperature sensor (G56) with interior temperature sensor fan (V42)**
   - Climatronic control unit, A/C control head and instrument panel temp. sensor with fan are integrated into a single unit which cannot be serviced separately
   - Controls temperature flap and fresh air blower
   - Climatronic control module will assume a fixed value of 24°C (75°F) in the event of sensor failure
6. **A/C control head unit**
   - Climatronic control unit, A/C control head and instrument panel temp. sensor with fan are integrated into a single unit which cannot be serviced separately
   - Replacing and adjusting: Code Climatronic control module, function 07 and then initiate basic setting, function 04 using VAG scan tool 1551/5051 or equivalent
7. **Intermediate duct**
8. **Instrument panel cross member**
   - Loosening and tightening, see **80 Heating and Ventilation**
9. **Dust and pollen filter**
   - With activated charcoal filter
   - Removing and installing, see **80 Heating and Ventilation**
10. **Fresh air intake duct temperature sensor (G89)**
    - Controls temperature flap and fresh air blower
    - If sensor malfunctions, outside temperature sensor value is used instead
    - Replacing: Remove glove box, see **70 Trim–Interior** Reach behind heating and A/C unit and turn sensor 90° and pull out
    - Lubricate seal with oil when installing
11. **Air flow flap motor (V71)**
    - Also operates fresh and recirculating air flap
    - Replacing and adjusting: Initiate basic setting, function 04 using VAG scan tool 1551/5051 or equivalent
12. **Fresh air blower fan (V2)**
13. **Fresh air blower control module (J126)**
    - Controls fresh air blower speed depending on voltage signal
    - Replacing, **see Control module for fresh air module, removing**
14. **Heating and A/C unit***
    - Refrigerant must be discharged before removing
    - With heater core and evaporator
15. **Central air flap motor (V70)**
    - Replacing and adjusting: Initiate basic setting, function 04 using VAG scan tool 1551/5051 or equivalent

(continued on following page)

2.8L - Engine - Motronic Multiport Fuel Injection (MFI)/130 kW, code AFP,

from December 1998

Deviate relay location and fuseplacements as well as the locations of multiple connectors see section "component locations".



Relay location on the thirteenfold auxiliary relay panel, above relay panel:

Relay panel:

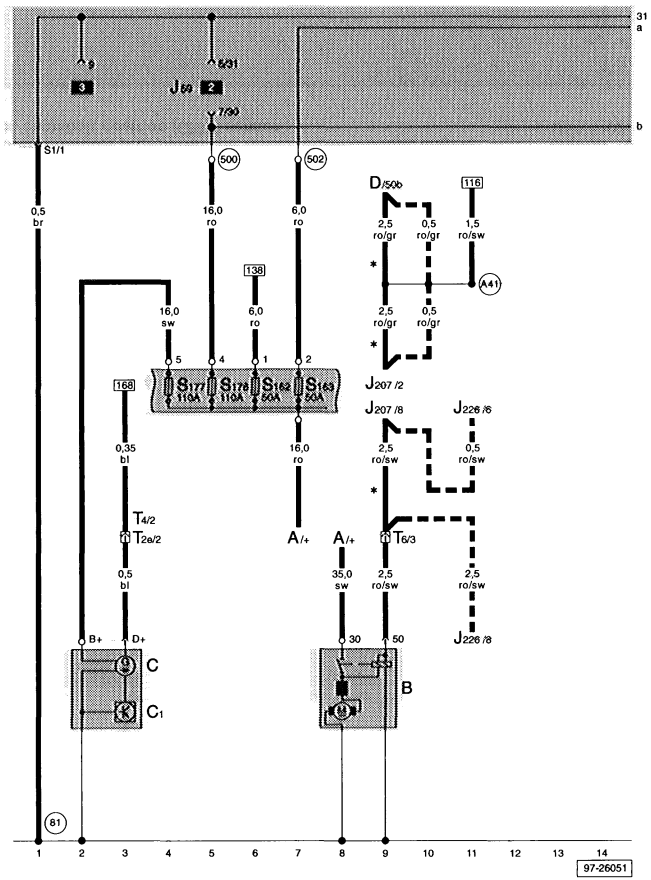
2 Load Reduction Relay (100)

4 Fuel Pump (FP) Relay (409)

Note: Number in parentheses indicates production control number stamped on relay housing.

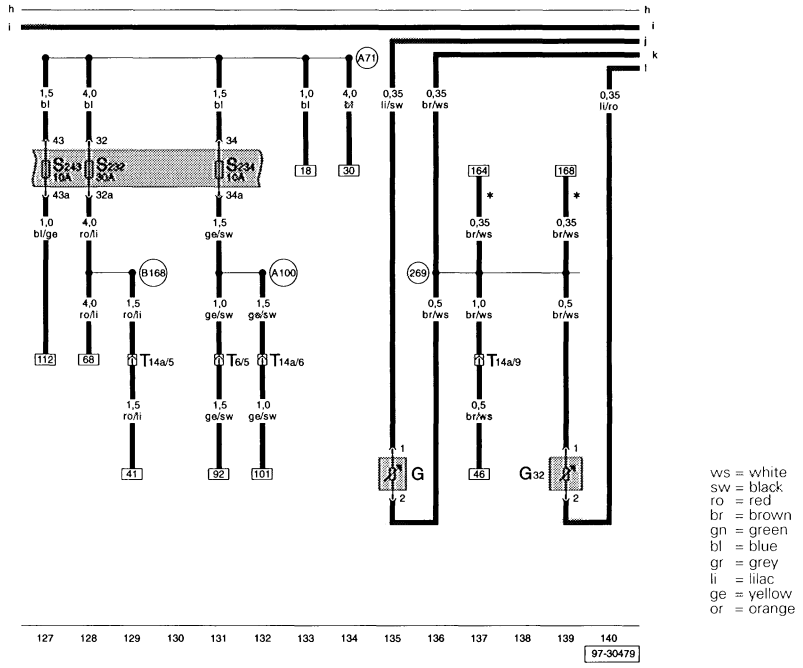
Fuse colors

30 A - green
25 A - white
20 A - yellow
15 A - blue
10 A - red
7,5 A - brown
5 A - beige
3 A - violet



ws = white
sw = black
ro = red
br = brown
gn = green
bl = blue
gr = grey
li = lilac
ge = yellow

A - Battery
B - Starter
C - Generator (GEN)
C1 - Voltage Regulator (VR)
D - Ignition/Starter Switch
J59 - Load Reduction Relay
J207 - Starting Interlock Relay
J226 - Park/Neutral Position (PNP) Relay
S162 - Fuse -1- (30) in fuse bracket/battery
S163 - Fuse -2- (30) in fuse bracket/battery
S176 - Fuse -4- (30) in fuse bracket/battery
S177 - Fuse -5- (30) in fuse bracket/battery
T2e - Double Connector, near starter (vehicles without air conditioning)
T4 - 4-Pin Connector, near starter (vehicles with air conditioning only)
T6 - 6-Pin Connector, brown, in protective housing for connectors, in plenum chamber, left
(81) - Ground connection -1-, in instrument panel wiring harness
(500) - Threaded connection -1- (30) on the relay plate
(502) - Threaded connection -1- (30a) on the relay plate
(A41) - Plus connection (50), in instrument panel wiring harness
* - Manual transmission only
--- Automatic transmission only



ws = white
sw = black
ro = red
br = brown
gn = green
bl = blue
gr = grey
li = lilac
ge = yellow
or = orange

G - Fuel Level Sensor
G32 - Engine Coolant Level (ECL) Sensor
S232 - Fuse 32 in fuse holder
S234 - Fuse 34 in fuse holder
S243 - Fuse 43 in fuse holder
T6 - 6-Pin Connector, brown, in protective housing for connectors, in plenum chamber, left
T14a - 14-Pin Connector, near battery

(269) - Ground connection (sensor ground) -1-, in instrument panel wiring harness
(A71) - Connector (86), in instrument panel wiring harness
(A100) - Connector -2- (87), in instrument panel wiring harness
(B168) - Connection (86) in passenger compartment wiring harness
* - Vehicles with Multi-Function Indicator (MFI) only

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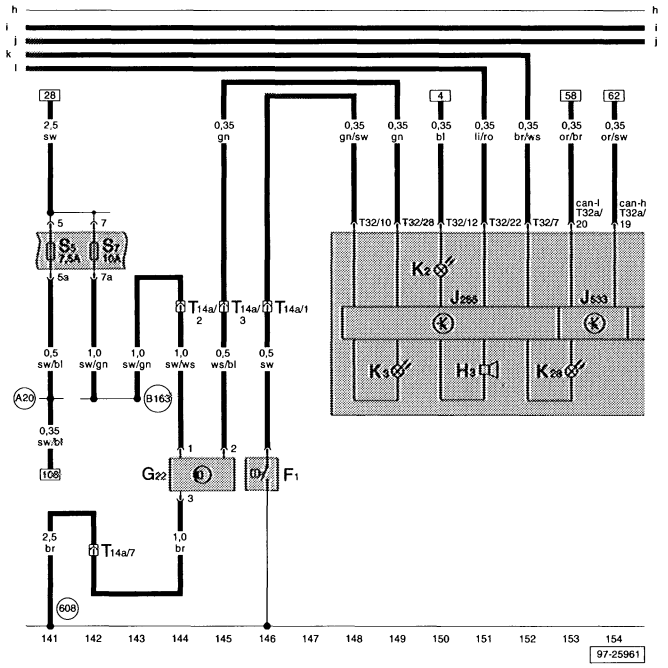
Fuel level sensor, engine coolant level (ECL) sensor



ws = white
sw = black
ro = red
br = brown
gn = green
bl = blue
gr = grey
li = lilac
ge = yellow
or = orange

F1 - Oil Pressure Switch
G22 - Speedometer Vehicle Speed Sensor (VSS)
H3 - Warning Buzzer
J285 - Control module with indicator unit in instrument panel insert
J533 - Data Bus On Board Diagnostic Interface
K2 - Generator (GEN) Warning Light
K3 - Oil Pressure Warning Light
K28 - Engine Coolant Level/Temperature (ECL/ECT) Warning Light
S5 - Fuse 5 in fuse holder
S7 - Fuse 7 in fuse holder
T14a - 14-Pin Connector, near battery
T32 - 32-Pin Connector, blue
T32a - 32-Pin Connector, green

(608) - Ground Connection (in center plenum chamber)
(A20) - Wire connection (15a), in instrument panel wiring harness
(B163) - Plus connector -1- (15) in wiring harness interior

Instrument cluster, oil pressure switch, speedometer vehicle speed sensor, generator (GEN) warning light, engine coolant level/temperature (ECL/ECT) warning light

Edition 09/01
USA.5102.11.21

2003 m.y. additional electrical wiring diagrams

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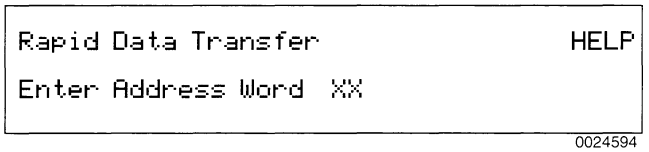
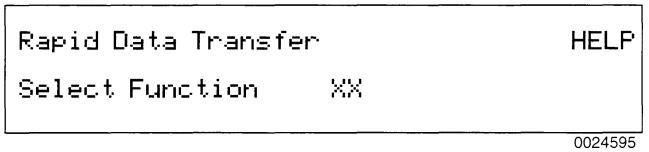
Adaptation can be initiated or restored using a suitable scan tool. Follow the scan tool manufacturer's instructions and/or use the procedure outlined below. Shown here is the display from the VAG 1551. Others scan tool displays are similar.

– Connect scan tool to DLC and switch on ignition, but **do not** start engine and **do not** depress accelerator pedal.



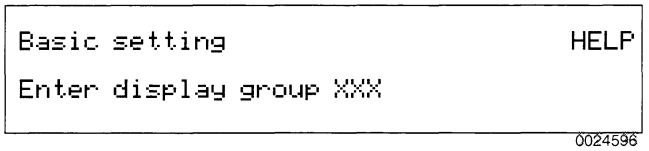
0024594

➤ Advance scan tool to address word menu and enter **01** for engine electronics.



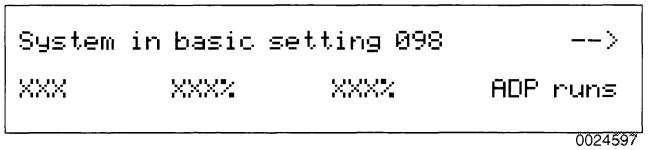
0024595

➤ Advance scan tool to function menu and enter **04** for basic setting.



0024596

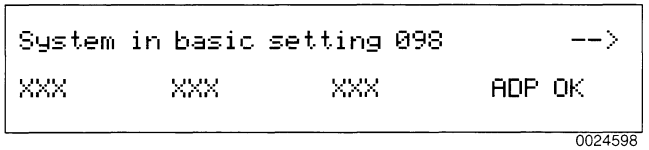
➤ Advance scan tool to display group menu and enter **098.**



0024597

➤ Advance scan tool until system confirms that it is in basic setting mode with four display fields as shown. Display field four should indicate that adaptation is running.

– Depress the **Q** button to confirm the display. During this time, the ECM switches off the voltage to the throttle valve control module to take a measurement and then switches back on to take additional measurements. Voltage will again be switched off allowing a spring to pull the throttle back to a previously measured position.



0024598

➤ At the conclusion of this procedure, the ECM will confirm proper stored values from the throttle position sensors in the throttle valve control module with the value in the fourth display field as shown. Display field four should indicate that adaptation is OK.

– Advance scan tool with **-->** button to function menu and enter **06** to end output.

– Switch off ignition to store values in ECM.

– Remove scan tool.

NOTE —

If display reads ADP ERROR, test conditions may not have been met or procedure was interrupted while running. Confirm proper test conditions and rerun procedure.