

37 Automatic Transmission

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GENERAL

This section covers the 01M 4-speed, and the 09A 5-speed automatic transmissions. Both automatic transmissions are controlled electro-hydraulically and feature adaptive programming and On-Board Diagnostic (OBD) capabilities.

Transmission Types

- 01M 4-speed automatic transmission
- 09A 5-speed automatic transmission

NOTE —

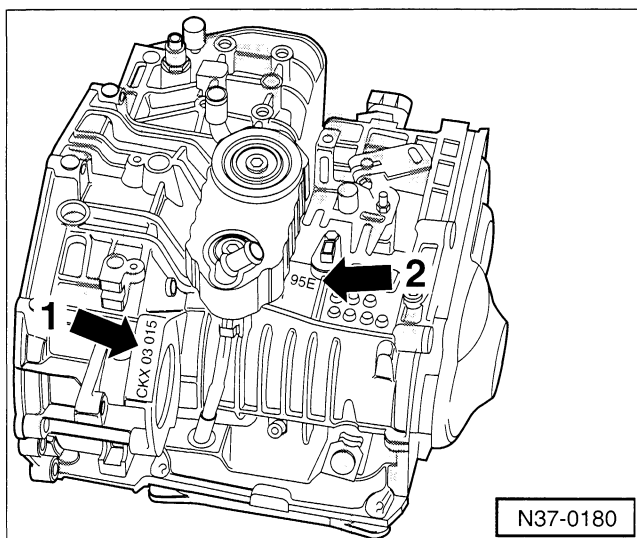
- For information on drive axles, including drive flange oil seals, see **39 Differential and Final Drive**.
- ATF draining and filling procedures, including ATF screen (filter) replacement, is covered in **0 Maintenance**.

WARNING —

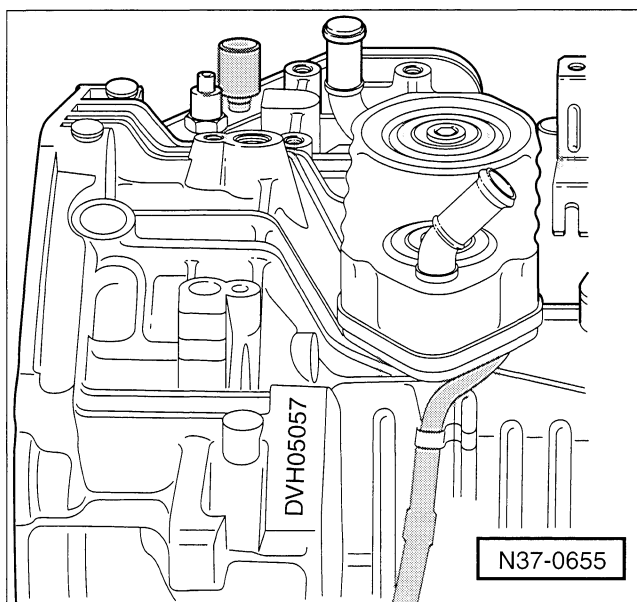
- Before working on the transmission or gear selector mechanism, disconnect the negative (–) battery cable.
- Disconnecting the negative (–) battery cable may erase fault codes and basic settings in the engine management and automatic transmission control modules. Some driveability problems may be noticed until the system re-adapts to operating conditions. OBD II readiness codes, which may be required for emissions testing, may also be erased. Convenience electronics (alarm system, interior light control, power locks, mirrors, and windows) will need to be re-set using a VAG 1551/1552, VAS 5051/5052 or equivalent scan tool or scan tool computer program.

Transmission code location

The transmission code and production number can be found stamped on the transmission case for both types of transmissions. See the following illustrations. The transmission code letters can also be found on the vehicle data stickers located in the luggage compartment and attached to the Vehicle Maintenance Manual.

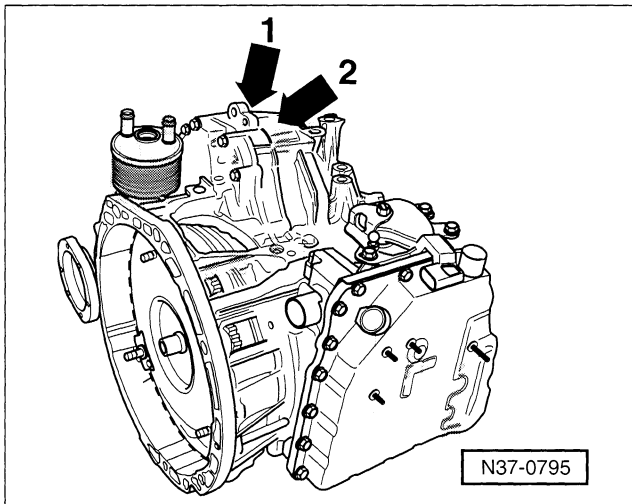


- ◀ **01M:** Transmission code letters and date of manufacture for the 01M are stamped into machined area on the forward part of the transmission housing (1) near the starter motor mounting. Transmission type designation, 01M, is cast into transmission housing near the ATF cooler (2) and at several other locations.

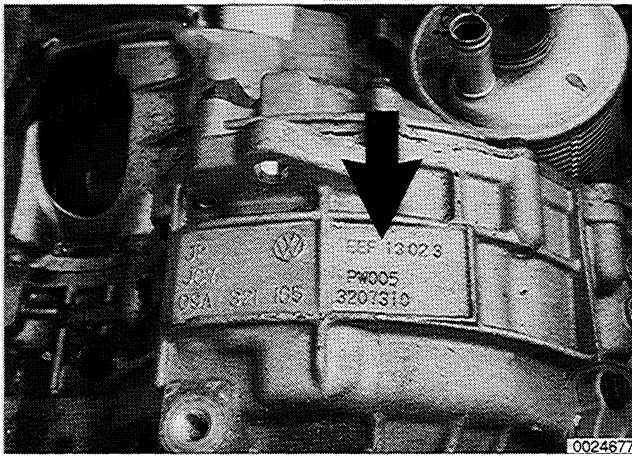


- ◀ **01M:** Transmission code letters and date of manufacture can be decoded for this **DVH 05057** transmission as follows: transmission is code **DVH**, manufactured on the 5th day of the 5th month in 1997 (very early production).

AUTOMATIC TRANSMISSION 37-3



◀ **09A:** Transmission code letters and date of manufacture for the 09A are stamped into machined area on top of the transmission housing (1). Transmission type designation, 09A, is cast into transmission housing (2) near the type designation and at several other locations.



◀ **09A:** Transmission code letters and date of manufacture can be decoded for this **EEF 13023** transmission as follows: transmission is code **EEF**, manufactured on the 13th day of the 02nd month in 2003.



Automatic transmission fluid

Volkswagen requirements for ATF depend on the transmission type.

Automatic Transmission Fluid (VW ATF)

- 01M transmission (4-speed) G 052 162 A2
- 09A transmission (5-speed) G 052 990 A2

◀ Volkswagen supplies two different types of ATF for automatic transmissions. G 052 990 A2 (**left**) is specified for the 09A 5-speed and G 052 162 A2 (**right**) is specified for the 01M 4-speed transmission. See **0 Maintenance** for additional information.

37-4 AUTOMATIC TRANSMISSION

Tables a lists the transmission applications, gear ratios, and other data for the different versions on the 01M 4-speed automatic transmission. **Table b** covers the same data for the 09A 5-speed.

Table a. 01M 4-speed automatic transmission specifications

Code letters	DVH	ECP	ELU	EPC
Engine application, horsepower	1.8L, 150 hp	1.8L, 150 hp	1.8L, 150 hp	1.8L, 150 hp
Ratio: pinion:ring				
Final drive	15:68 = 4.533	15:68 = 4.533	15:68 = 4.533	15:68 = 4.533
Intermediate drive	45:44 = 0.978	45:44 = 0.978	45:44 = 0.978	45:44 = 0.978
1st gear	2.714	2.714	2.714	2.714
2nd gear	1.441	1.441	1.441	1.441
3rd gear	1.000	1.000	1.000	1.000
4th gear	0.742	0.742	0.742	0.742
Reverse gear	2.884	2.884	2.884	2.884
Torque converter code (for turbine shaft with sleeve bushing as applicable, see 32 Torque Converter)	QCDC	QCDC	QCDC	n/a
Torque converter code (for turbine shaft without sleeve bushing)	QCDD	QBDD	QCDD	QCDD
Valve body code	QFB	QFB	QFB	QFB
Clutch plates: inner/outer				
Clutch K1	5/5	5/5	5/5	5/5
Clutch K2	5/5	5/5	5/5	5/5
Clutch K3	6/5	6/5	6/5	6/5
Brake B1	6/6	6/6	6/6	6/6
Brake B2	5/6	5/6	5/6	5/6
Lubricant:				
Automatic section (initial filling, lifetime fill; no change required)	5.3 liters (5.6 qt.) VW/Audi special ATF (VW/Audi G052 162 A1 or G 052 162 A2)			
Final drive (initial filling, lifetime fill; no change required)	0.75 liters (0.8 qt.) synthetic oil, SAE 75W/90 (VW/Audi G 052 045 A1 or G 052 145 A2)			
Driveshaft flange	Triple roller	Triple roller	Triple roller	Triple roller
ATF cooler	Pressure side 6-row	Pressure side 6-row	Pressure side 6-row	Pressure side 6-row

AUTOMATIC TRANSMISSION 37-5

Table a. (continued) 01M 4-speed automatic transmission specifications

Code letters	FDC	DMP	ECN	ELT
Engine application, horsepower	1.8L, 150 hp	1.9L, 90 hp TDI	1.9L, 90 hp TDI	1.9L, 90 hp TDI
Ratio: pinion:ring				
Final drive	15:68 = 4.533	20:74 = 3.700	20:74 = 3.700	20:74 = 3.700
Intermediate drive	45:44 = 0.978	45:44 = 0.978	45:44 = 0.978	45:44 = 0.978
1st gear	2.714	2.714	2.714	2.714
2nd gear	1.441	1.441	1.441	1.441
3rd gear	1.000	1.000	1.000	1.000
4th gear	0.742	0.742	0.742	0.742
Reverse gear	2.884	2.884	2.884	2.884
Torque converter code (for turbine shaft with sleeve bushing as applicable, see 32 Torque Converter)	n/a	QCDC	QCDC	QCDC
Torque converter code (for turbine shaft without sleeve bushing)	QCDD	QCDD	QCDD	QCDD
Valve body code	QFB	QFB	QFB	QFB
Clutch plates: inner/outer				
Clutch K1	5/5	5/5	5/5	5/5
Clutch K2	5/5	5/5	5/5	5/5
Clutch K3	6/5	6/5	6/5	6/5
Brake B1	6/6	5/5	5/5	5/5
Brake B2	5/6	5/6	5/6	5/6
Lubricant:				
Automatic section (initial filling, lifetime fill; no change required)	5.3 liters (5.6 qt.) VW/Audi special ATF (VW/Audi G052 162 A1 or G 052 162 A2)			
Final drive (initial filling, lifetime fill; no change required)	0.75 liters (0.8 qt.) synthetic oil, SAE 75W/90 (VW/Audi G 052 045 A1 or G 052 145 A2)			
Driveshaft flange	Triple roller	Triple roller	Triple roller	Triple roller
ATF cooler	Pressure side 6-row	Pressure side 6-row	Pressure side 6-row	Pressure side 6-row

37-6 AUTOMATIC TRANSMISSION

Table a. (continued) 01M 4-speed automatic transmission specifications

Code letters	EPB	EPP	FDB	DMN
Engine application, horsepower	1.9L, 90 hp TDI	1.9L, 90 hp TDI	1.9L, 90 hp TDI	2.0L, 115 hp
Ratio: pinion:ring				
Final drive	20:74 = 3.700	22:72 = 3.273	20:74 = 3.700	16:78 = 4.875
Intermediate drive	45:44 = 0.978	45:44 = 0.978	45:44 = 0.978	45:44 = 0.978
1st gear	2.714	2.714	2.714	2.714
2nd gear	1.441	1.441	1.441	1.441
3rd gear	1.000	1.000	1.000	1.000
4th gear	0.742	0.742	0.742	0.742
Reverse gear	2.884	2.884	2.884	2.884
Torque converter code (for turbine shaft with sleeve bushing as applicable, see 32 Torque Converter)	n/a	n/a	n/a	QADC
Torque converter code (for turbine shaft without sleeve bushing)	QCDD	QCDD	QCDD	QADD
Valve body code	QFB	QFA	QFB	QFB
Clutch plates: inner/outer				
Clutch K1	5/5	5/5	5/5	5/5
Clutch K2	5/5	5/5	5/5	4/4
Clutch K3	6/5	6/5	6/5	5/4
Brake B1	5/5	5/5	5/5	5/5
Brake B2	5/6	5/6	5/6	4/5
Lubricant:				
Automatic section (initial filling, lifetime fill; no change required)	5.3 liters (5.6 qt.) VW/Audi special ATF (VW/Audi G 052 162 A1 or G 052 162 A2)			
Final drive (initial filling, lifetime fill; no change required)	0.75 liters (0.8 qt.) synthetic oil, SAE 75W/90 (VW/Audi G 052 045 A1 or G 052 145 A2)			
Driveshaft flange	Triple roller	Triple roller	Triple roller	Triple roller
ATF cooler	Pressure side 6-row	Pressure side 6-row	Pressure side 6-row	Pressure side 6-row

AUTOMATIC TRANSMISSION 37-7

Table a. (continued) 01M 4-speed automatic transmission specifications

Code letters	DYQ	ECV	EFB	ELY
Engine application, horsepower	2.0L, 115 hp	2.0L, 115 hp	2.0L, 115 hp	2.0L, 115 hp
Ratio: pinion:ring				
Final drive	16:78 = 4.875	16:78 = 4.875	15:68 = 4.533	16:78 = 4.875
Intermediate drive	61:63 = 1.033	61:63 = 1.033	45:44 = 0.978	61:63 = 1.033
1st gear	2.714	2.714	2.714	2.714
2nd gear	1.551	1.551	1.441	1.551
3rd gear	1.000	1.000	1.000	1.000
4th gear	0.679	0.679	0.742	0.679
Reverse gear	2.111	2.111	2.884	2.111
Torque converter code (for turbine shaft with sleeve bushing as applicable, see 32 Torque Converter)	QBDC	QBDC	QBDC	QBDC
Torque converter code (for turbine shaft without sleeve bushing)	QBDD	QADD	QBDD	QBDD
Valve body code	QFB	QFB	QFB	QFB
Clutch plates: inner/outer				
Clutch K1	5/5	5/5	5/5	5/5
Clutch K2	4/4	4/4	4/4	4/4
Clutch K3	5/4	5/4	5/4	5/4
Brake B1	5/5	5/5	5/5	5/5
Brake B2	4/5	4/5	4/5	4/5
Lubricant:				
Automatic section (initial filling, lifetime fill; no change required)	5.3 liters (5.6 qt.) VW/Audi special ATF (VW/Audi G052 162 A1 or G 052 162 A2)			
Final drive (initial filling, lifetime fill; no change required)	0.75 liters (0.8 qt.) synthetic oil, SAE 75W/90 (VW/Audi G 052 045 A1 or G 052 145 A2)			
Driveshaft flange	Triple roller	Triple roller	Triple roller	Triple roller
ATF cooler	Pressure side 6-row	Pressure side 6-row	Pressure side 6-row	Pressure side 6-row

37-8 AUTOMATIC TRANSMISSION

Table a. (continued) 01M 4-speed automatic transmission specifications

Code letters	ELZ	EPG	EPH	FDF
Engine application, horsepower	2.0L, 115 hp	2.0L, 115 hp	2.0L, 115 hp	2.0L, 115 hp
Ratio: pinion:ring				
Final drive	15:68 = 4.533	16:78 = 4.875	15:68 = 4.533	16:78 = 4.875
Intermediate drive	45:44 = 0.978	61:63 = 1.033	45:44 = 0.978	61:63 = 1.033
1st gear	2.714	2.714	2.714	2.714
2nd gear	1.441	1.551	1.441	1.551
3rd gear	1.000	1.000	1.000	1.000
4th gear	0.742	0.679	0.742	0.679
Reverse gear	2.884	2.111	2.884	2.111
Torque converter code (for turbine shaft with sleeve bushing as applicable, see 32 Torque Converter)	n/a	n/a	n/a	n/a
Torque converter code (for turbine shaft without sleeve bushing)	QBDC	QBDD	QBDD	QBDD
Valve body code	QFB	QFB	QFB	QFB
Clutch plates: inner/outer				
Clutch K1	5/5	5/5	5/5	5/5
Clutch K2	4/4	4/4	4/4	4/4
Clutch K3	5/4	5/4	5/4	5/4
Brake B1	5/5	5/5	5/5	5/5
Brake B2	4/5	4/5	4/5	4/5
Lubricant:				
Automatic section (initial filling, lifetime fill; no change required)	5.3 liters (5.6 qt.) VW/Audi special ATF (VW/Audi G052 162 A1 or G 052 162 A2)			
Final drive (initial filling, lifetime fill; no change required)	0.75 liters (0.8 qt.) synthetic oil, SAE 75W/90 (VW/Audi G 052 045 A1 or G 052 145 A2)			
Driveshaft flange	Triple roller	Triple roller	Triple roller	Triple roller
ATF cooler	Pressure side 6-row	Pressure side 6-row	Pressure side 6-row	Pressure side 6-row

AUTOMATIC TRANSMISSION 37-9

Table a. (continued) 01M 4-speed automatic transmission specifications

Code letters	FDG	DVG	ECM	ENZ
Engine application, horsepower	2.0L, 115 hp	2.8L, 174 hp	2.8L, 174 hp	2.8L, 174 hp
Ratio: pinion:ring				
Final drive	15:68 = 4.533	15:64 = 4.267	15:64 = 4.267	15:64 = 4.267
Intermediate drive	45:44 = 0.978	45:44 = 0.978	45:44 = 0.978	45:44 = 0.978
1st gear	2.714	2.714	2.714	2.714
2nd gear	1.441	1.441	1.441	1.441
3rd gear	1.000	1.000	1.000	1.000
4th gear	0.742	0.742	0.742	0.742
Reverse gear	2.884	2.884	2.884	2.884
Torque converter code (for turbine shaft with sleeve bushing as applicable, see 32 Torque Converter)	n/a	QCDR	QDDT	QDDT
Torque converter code (for turbine shaft without sleeve bushing)	QBDD	QADD	QCDH	QDDJ
Valve body code	QFB	QFB	QGA	QGA
Clutch plates: inner/outer				
Clutch K1	5/5	5/5	5/5	5/5
Clutch K2	4/4	5/5	5/5	5/5
Clutch K3	5/4	6/5	6/5	7/6
Brake B1	5/5	5/5	5/5	6/6
Brake B2	4/5	5/6	5/6	6/7
Lubricant:				
Automatic section (initial filling, lifetime fill; no change required)	5.3 liters (5.6 qt.) VW/Audi special ATF (VW/Audi G052 162 A1 or G 052 162 A2)			
Final drive (initial filling, lifetime fill; no change required)	0.75 liters (0.8 qt.) synthetic oil, SAE 75W/90 (VW/Audi G 052 045 A1 or G 052 145 A2)			
Driveshaft flange	Triple roller	Triple roller	Triple roller	Triple roller
ATF cooler	Pressure side 6-row	Pressure side 6-row	Pressure side 6-row	Pressure side 6-row

37-10 AUTOMATIC TRANSMISSION

Table a. (continued) 01M 4-speed automatic transmission specifications

Code letters	EPJ	FCZ		
Engine application, horsepower	2.8L, 174 hp	2.8L, 174 hp		
Ratio: pinion:ring				
Final drive	15:64 = 4.267	15:64 = 4.267		
Intermediate drive	45:44 = 0.978	45:44 = 0.978		
1st gear	2.714	2.714		
2nd gear	1.441	1.441		
3rd gear	1.000	1.000		
4th gear	0.742	0.742		
Reverse gear	2.884	2.884		
Torque converter code (for turbine shaft with sleeve bushing as applicable, see 32 Torque Converter)	n/a	n/a		
Torque converter code (for turbine shaft without sleeve bushing)	QDDJ	QDDJ		
Valve body code	QGA	QGA		
Clutch plates: inner/outer				
Clutch K1	5/5	5/5		
Clutch K2	5/5	5/5		
Clutch K3	7/6	7/6		
Brake B1	6/6	6/6		
Brake B2	6/7	6/7		
Lubricant:				
Automatic section (initial filling, lifetime fill; no change required)	5.3 liters (5.6 qt.) VW/Audi special ATF (VW/Audi G052 162 A1 or G 052 162 A2)			
Final drive (initial filling, lifetime fill; no change required)	0.75 liters (0.8 qt.) synthetic oil, SAE 75W/90 (VW/Audi G 052 045 A1 or G 052 145 A2)			
Driveshaft flange	Triple roller	Triple roller		
ATF cooler	Pressure side 6-row	Pressure side 6-row		

AUTOMATIC TRANSMISSION 37-11

Table b. 09A 5-speed automatic transmission specifications

Code letters	EYN	EYP	EEB	EEF
Engine application, horsepower	1.8L, 170 hp	1.8L, 170 hp	2.8L, 200 hp	2.8L, 200 hp
Ratio: pinion:ring				
Final drive	20:69 = 3.450	20:69 = 3.450	20:69 = 3.450	24:65 = 2.708
Intermediate drive	52:67 = 1.288	52:67 = 1.288	52:67 = 1.288	52:67 = 1.288
1st gear	3.801	3.801	3.801	3.801
2nd gear	2.131	2.131	2.131	2.131
3rd gear	1.364	1.364	1.364	1.364
4th gear	0.935	0.935	0.935	0.935
5th gear	0.685	0.685	0.685	0.685
Reverse gear	2.970	2.970	2.970	2.970
Torque converter codes	AAA/DCD	AAA/DCD	EFJ/BBJ	EFJ/BBJ
Clutch plates: inner/outer				
Clutch K1	7/7	7/7	7/7	7/7
Clutch K2	2/2	2/2	2/2	2/2
Clutch K3	5/5	5/5	5/5	5/5
Clutch K4	4/4	4/4	4/5	4/5
Brake B1	7/6	7/6	7/6	7/6
Brake B2	3/3	3/3	3/3	3/3
Brake band piston diameter:				
Brake B3	58 mm	58 mm	58 mm	58 mm
Lubricant:	7.0 liters (7.4 qt.) VW special ATF (VW/Audi G052 990 A2)			
Automatic section <i>and</i> Final drive (initial filling, lifetime fill; no change required)				
Driveshaft flange	Triple roller	Triple roller	Triple roller	Triple roller
ATF cooler	external	external	external	external

AUTOMATIC TRANSMISSION ELEC- TRONIC AND ELECTRIC COMPONENTS

The 01M and 09A automatic transmissions are electronically controlled. Because of the different design elements, the electronic and electrical components are completely different and not interchangeable in spite of similar functionality.

Most diagnostic and repair procedures will require the use of a scan tool such as the VAG 1551, VAG 1552, VAS 5051, VAS 5052 or equivalent aftermarket scan tool or scan tool program. In addition, some adjustment procedures will require special tools.

Automatic transmission electronic and electrical components (01M)

1. Transmission Control Module, TCM (J217)

- Located in air plenum, center/right
- Factory coded, no user changes possible
- Removing and installing, see **TCM removing and installing**

2. Engine Control Module, ECM

- Located in air plenum, center
- Removing and installing, see **23 Fuel Injection–Diesel** or **24 Fuel Injection–Motronic** (for appropriate engine code)

3. Data Link Connector (DLC)

- Located under dashboard on driver's side

4. Valve body

- Located above oil pan, bolted to interior of transmission housing
- Solenoid valves (N88, N89, N90, N91, N92, N93, N94) are attached to the valve body
- Valves are checked by On-Board Diagnostics (OBD)

5. Conductor strip (printed circuit foil) with integrated Automatic Transmission Fluid, (ATF) temperature sensor (G93)

- Located in oil pan, attached to valve body
- Checked by OBD
- Can be replaced without removing valve body or transmission

6. Multi-function Transmission Range, TR switch (F125)

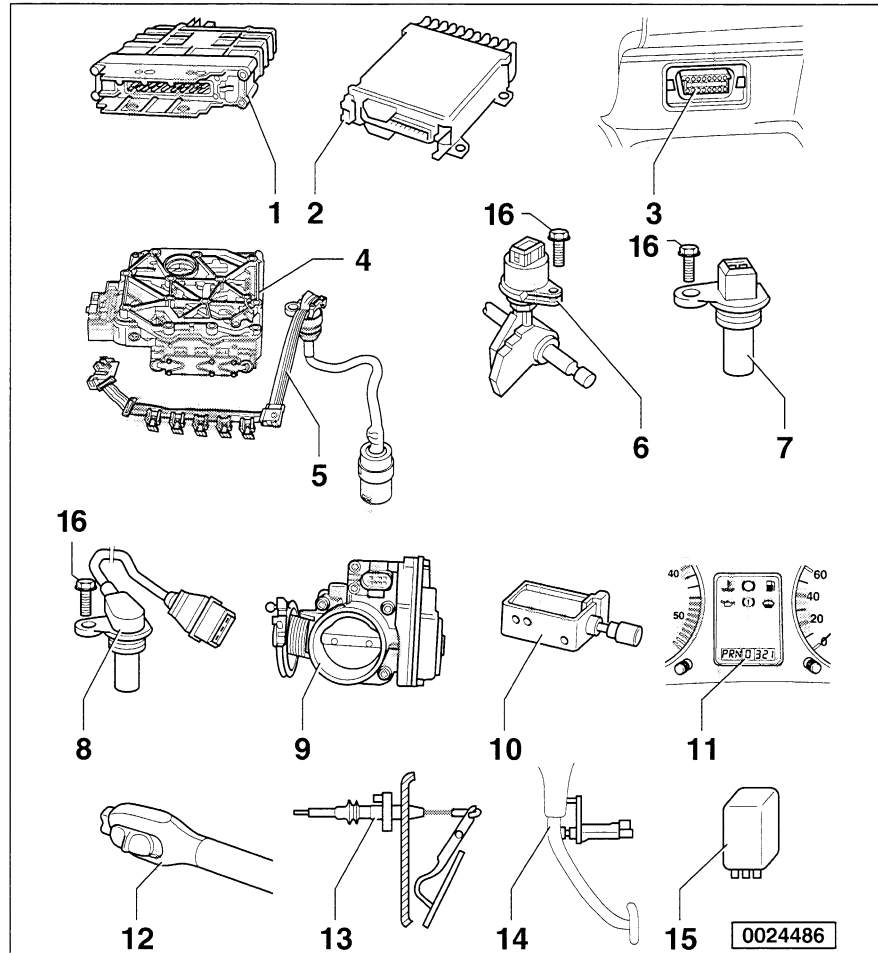
- Location, see **Transmission Range switch, location**
- Removing, installing, and adjusting, see **Transmission Range (TR) switch, removing, installing, and adjusting (01M)**.
- Checked by OBD

7. Transmission vehicle speed sensor (G38)

- Located on top of transmission closer to engine
- Signal used by TCM only
- Removing and installing, see **Transmission VSS (G38) removing and installing**
- Checked by OBD

8. Vehicle speed sensor (G68)

- Located on top of transmission, farther from engine



- Signal used by TCM only
- Removing and installing, see **VSS (G68) removing and installing**
- Checked by OBD

9. Throttle position sensor (G69)

- Gasoline engines with cable operated throttle: located on throttle valve housing, integral with throttle valve control module
- Gasoline engines with Electronic Power Control, EPC: located on accelerator pedal, integral with Throttle Position Sensor, TPS
- Diesel engines: located on accelerator pedal, integral with Throttle Position Sensor, TPS
- Function, see **TP sensor function**
- Checked by OBD

10. Shift lock solenoid (N110)

- Location, see **Shift mechanism, assembly (01M)**.
- Checked by OBD

11. Instrument cluster with OBD data bus (J533)

- With transmission selector lever position display (Y5)

12. Cruise control switch (E45)

13. Kick down switch (F8)

- Gasoline engines with cable operated throttle: integral with throttle cable and located on bulkhead in engine compartment
- Gasoline engines with Electronic Power Control, EPC: not a separate component, function is integral with Throttle Position Sensor, TPS
- Diesel engines: not a separate component, function is integral with Throttle Position Sensor, TPS

14. Brake light switch (F)

- Located on brake pedal bracket

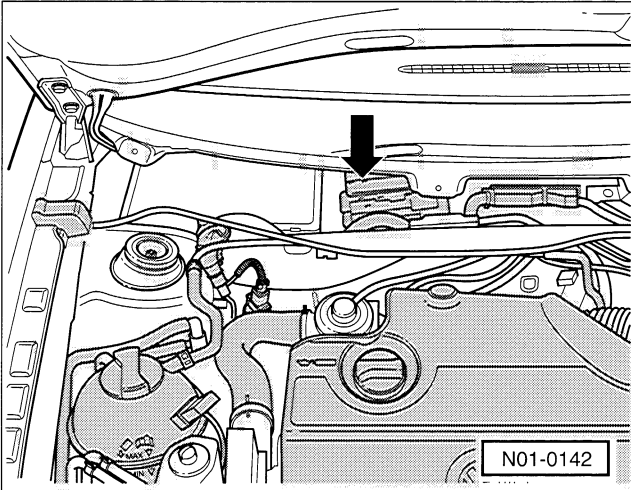
15. Park/Neutral Position, PNP relay (J226)

- Located on additional relay panel under instrument panel, left side
- Marked with production number "175"

16. Bolt

- Tighten to 10 Nm (7 ft-lb)

AUTOMATIC TRANSMISSION 37-13

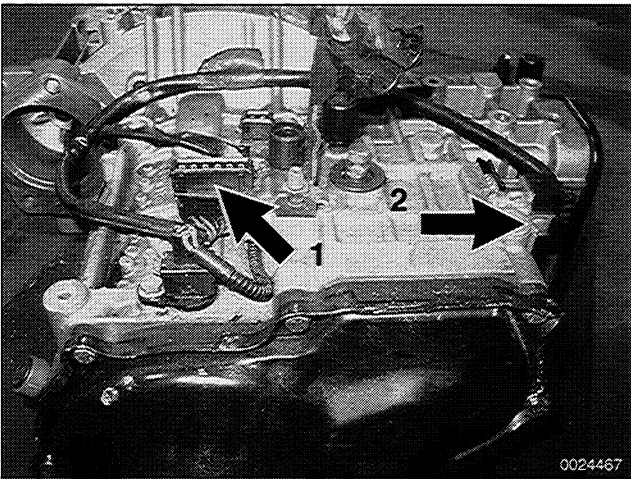


TCM removing and installing

- Same position (**arrow**) and removal as for 09A TCM
- Switch off ignition.
- Remove wiper arms, rubber plenum seals, and inner plenum cover.
- Release multi-pin connector lock and slide connector off toward center of vehicle.
- Remove TCM mounting screws that are below connector.
- Installation is the reverse.

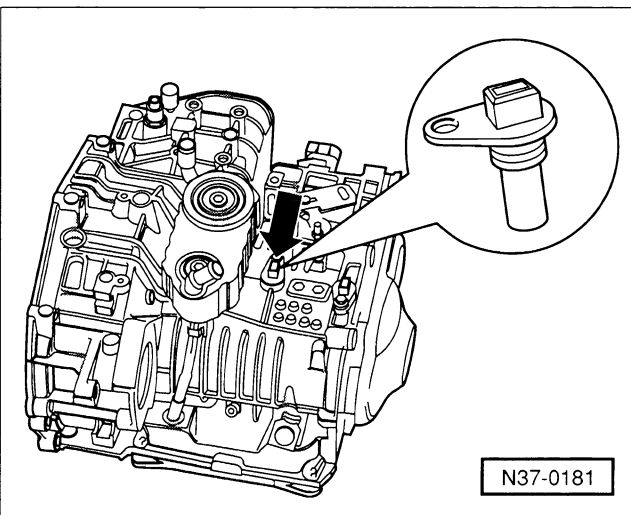
NOTE —

Use extra care when working around edges of windshield during plenum cover removal.



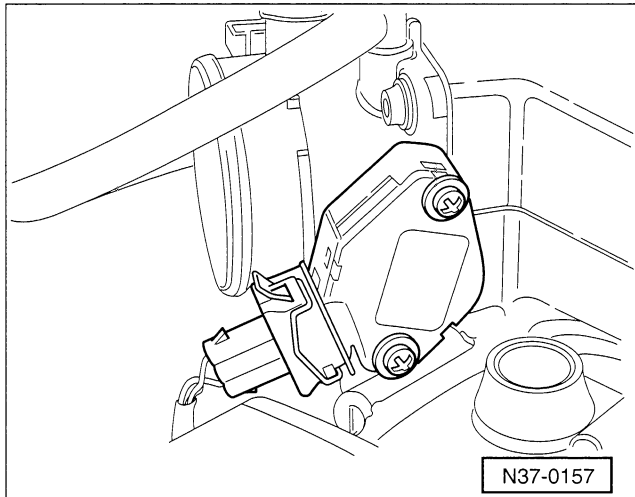
TR switch, location

- On rear of transmission in cavity on transmission housing (2).
- Attached to extension wiring harness (1) running to connector on upper transmission housing.
- TR switch can be disconnected at either point.



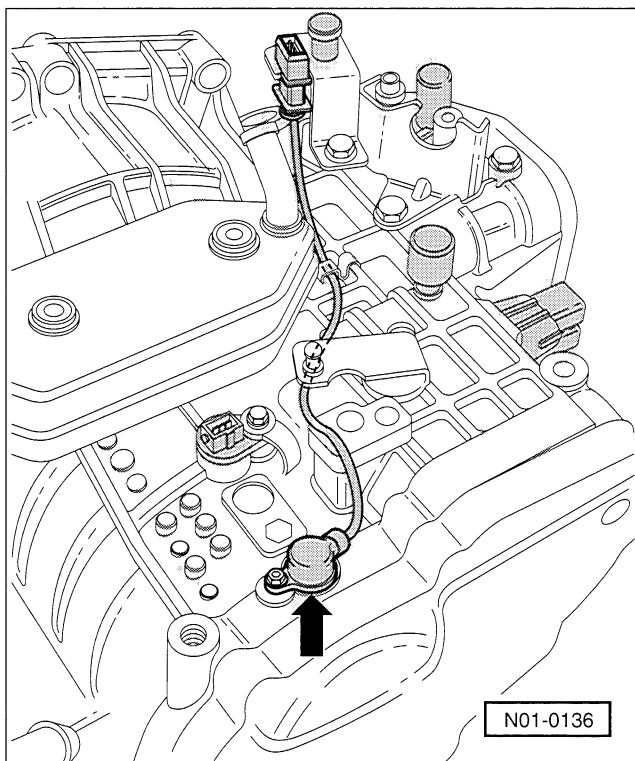
Transmission VSS (G38) removing and installing

- Switch off ignition, remove harness connector and retaining bolt. Pull straight out.
- When installing, replace seal.
- Tighten retaining clamp bolt to 10 Nm (7 ft-lb).
- Signal used by transmission electronics only.



TP sensor function

- On vehicles with cable operated throttle, signal is sent to ECM which sends signal to the TCM via dedicated wiring.
- On drive-by-wire vehicles with CAN-bus system, the TCM receives the TP sensor signal from the CAN-bus.
- The on-board diagnostics of the transmission only checks the signal, not the TP sensor. On vehicles without CAN-bus the wiring for the signal is also checked.
- Early version shown.



VSS, (G68) removing and installing

- When transmission is installed the sensor is covered by left transmission mount.
- Transmission must be unbolted from mounts and lowered approximately 2.5 in. to access sensor, see **Transmission, Removing and Installing**.
- Switch off ignition, remove harness connector and retaining bolt. Pull straight out.
- When installing, replace seal.
- Tighten retaining clamp bolt to 10 Nm (7 ft-lb).
- Signal used by transmission electronics only.

Automatic transmission electronic and electrical components (09A)

1. Transmission Control Module, TCM (J217)

- Located in air plenum, center/right
- Factory coded, no user changes possible
- Removing and installing, see **TCM removing and installing**

2. Engine Control Module, ECM

- Located in air plenum, center
- Removing and installing, see **24 Fuel Injection-Motronic** (for appropriate engine code)

3. Instrument cluster with OBD data bus (J533)

- With transmission selector lever position display (Y5)

4. Data Link Connector (DLC)

- Located under dashboard on driver's side

5. Multi-function Transmission Range, TR switch (F125)

- Location, see **Transmission Range switch, location**
- Removing, installing, and adjusting, see **Transmission Range (TR) switch, removing, installing, and adjusting (09A)**.
- Checked by OBD

6. Intermediate shaft speed sensor (G265)

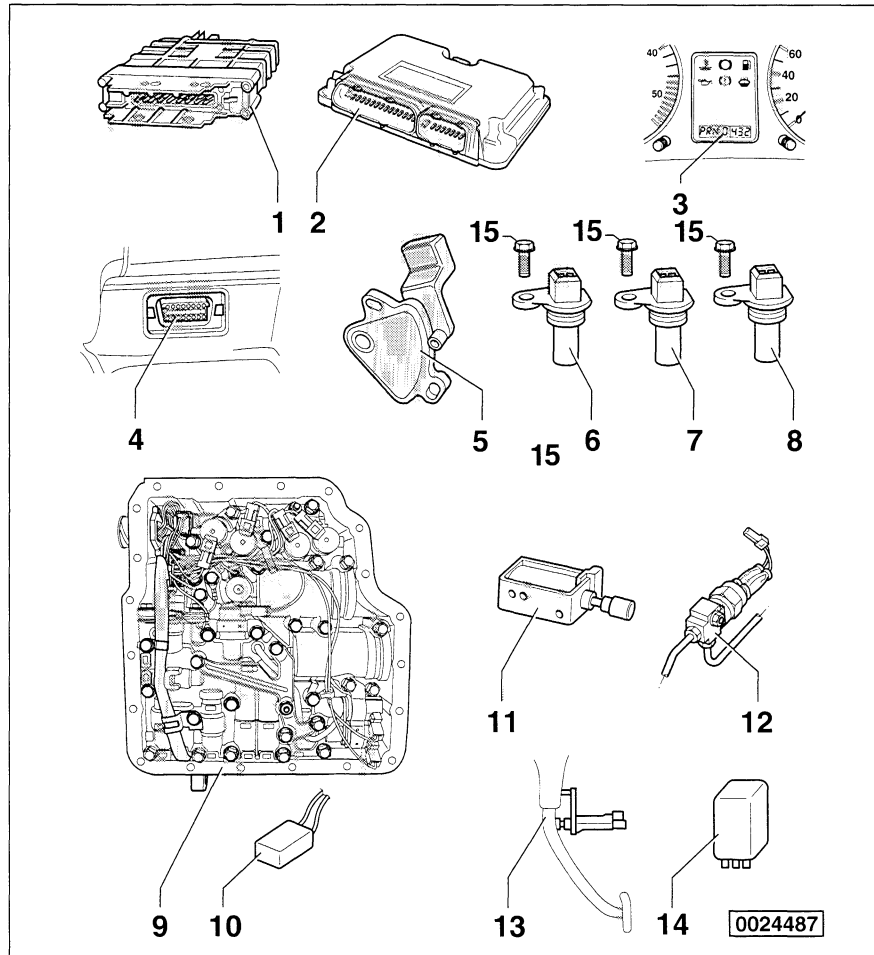
- Signal pickup from spur gear A
- Located inside transmission near spur gear section
- Not accessible from outside
- Inductive sensor
- Checked by OBD

7. Vehicle speed sensor (G68)

- Signal pickup for transmission output (road) speed
- Located inside transmission near parking lock gear
- Not accessible from outside
- Inductive sensor
- Signal used by speedometer
- Checked by OBD

8. Transmission speed, RPM sensor (G182)

- Signal pickup for transmission input (turbine shaft) speed
- Located inside transmission near clutch K2
- Not accessible from outside
- Inductive sensor
- Checked by OBD



9. Valve body (hydraulic control unit)

- Located in front of transmission, vertically bolted to transmission housing
- 9 Solenoid valves (N88, N89, N90, N91, N92, N93, N281, N282, N283) are attached to the valve body
- Valves are checked by On-Board Diagnostics (OBD)

10. ATF temperature sensor (G93)

- Located inside transmission near spur gear section
- Checked by OBD

11. Shift lock solenoid (N110)

- Location, see **Shift mechanism, assembly (09A)**
- Checked by OBD

12. Brake pressure switch (F270)

- Located on bulkhead in brake line to R/F wheel brakes
- Checked by OBD

13. Brake light switch (F)

- Located on brake pedal bracket
- Checked by OBD

14. Park/Neutral Position, PNP relay (J226)

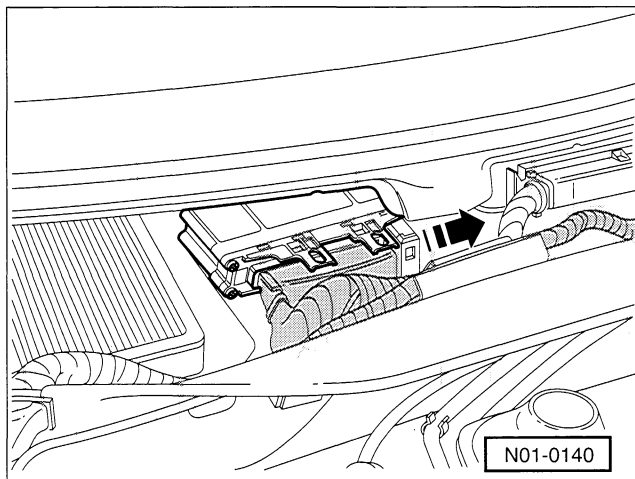
- Located on additional relay panel under instrument panel, left side
- Marked with production number "175"

15. Bolt

- Tighten to 10 Nm (7 ft-lb)

* Tiptronic switch (F189) (not shown)

- Located on the printed circuit foil of the symbol insert within the selector mechanism cover
- Includes three Hall sensors
- Integral with printed circuit foil and symbol insert
- See **Tiptronic switch**

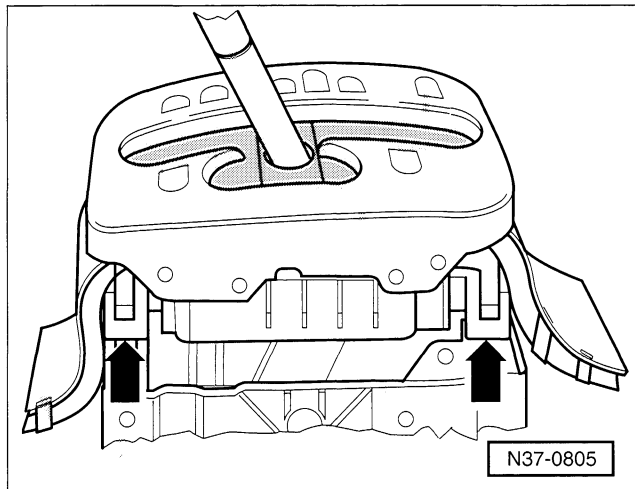


TCM removing and installing

- Same position and removal as for 01M TCM
- Switch off ignition.
- Remove wiper arms, rubber plenum seals, and inner plenum cover.
- Release multi-pin connector lock and slide connector off toward center of vehicle (**arrow**).
- Remove TCM mounting screws that are below connector.
- Installation is the reverse.

NOTE —

Use extra care when working around edges of windshield during plenum cover removal.



Tiptronic switch

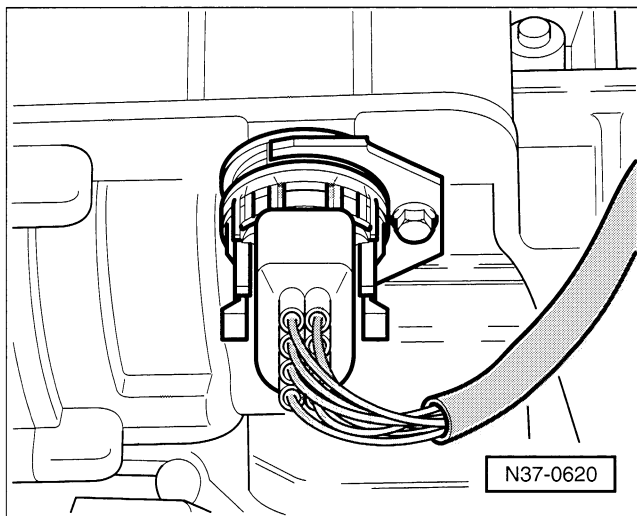
- Located on the printed circuit foil of the symbol insert within the selector mechanism cover.
- Requires cover removal (**arrows**).



Transmission Range (TR) switch, location

- On top of transmission housing (**arrow**).
- Transmission selector shaft passes through TR switch.

Transmission range (TR) switch, removing, installing, adjusting (01M)



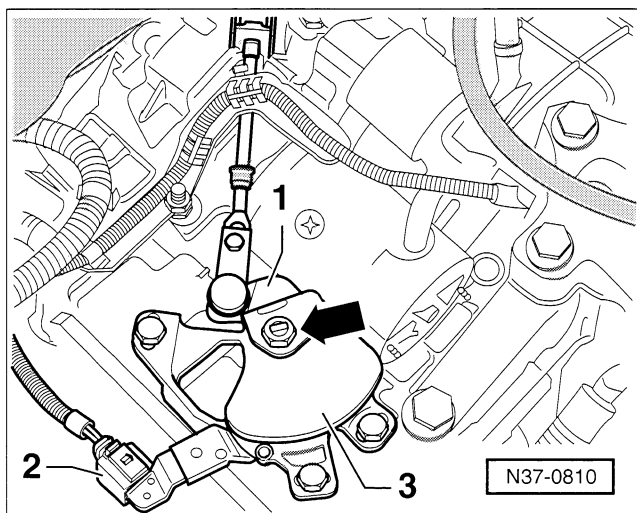
TR switch, removing and installing

- Switch off ignition, remove harness connector, bolt, and retaining bracket. Pull straight out.
 - When installing, replace seal.
 - Tighten retaining clamp bolt to 10 Nm (7 ft-lb).
- TR switch is adjusted correctly when properly installed. No separate adjust is possible.

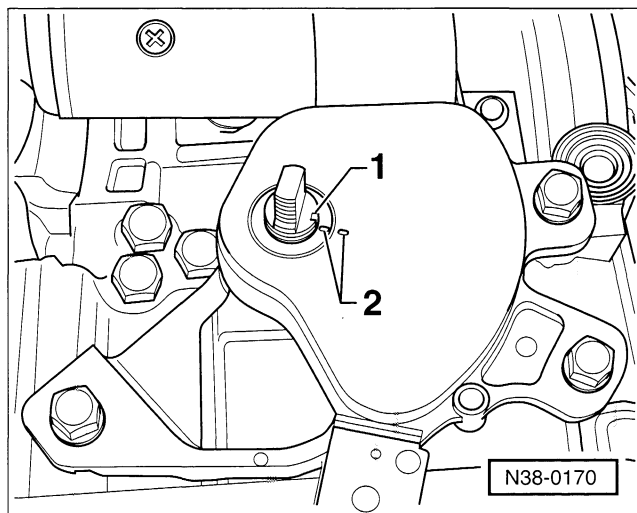
Transmission range (TR) switch, removing, installing, adjusting (09A)

NOTE —

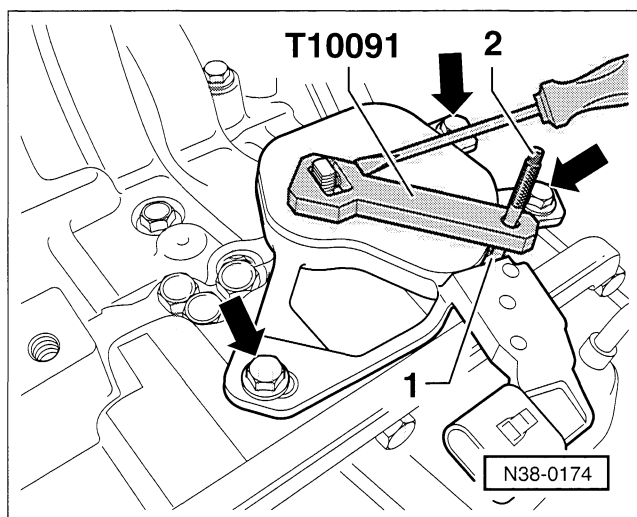
Installation of TR switch requires special tool T10091 for adjustment.



- Obtain anti-theft radio coding.
- Move selector lever into "P" position.
- Switch ignition off and disconnect battery ground strap.
- Remove battery for access.
- Remove battery carrier.
- Remove nut (arrow) from selector shaft.
- Pull lever (1) off selector shaft.
- Pull off multi-function TR switch connector (2).
- Remove three hex head securing bolts.
- Slide Multi-function TR switch F125 (3) up and off selector shaft.



- To install, slide TR switch onto transmission selector shaft and align groove (1) in selector shaft with index markings (2) on TR switch.



- Screw in three hex head securing bolts (arrows) finger tight only.
- Position adjusting device T10091 onto machined flats of selector shaft and secure with attached set screw.
 - Move selector shaft on transmission to neutral position.
 - Turn TR switch until hole on switch housing (1) aligns with hole of adjusting tool.
 - Insert pin (2) from adjusting tool through hole in tool and into hole in TR switch.
 - Tighten 3 TR switch securing bolts.

Tightening torques

- TR switch securing bolts 6 Nm (53 in-lb)
- Selector lever shaft nut. 20 Nm (15 ft-lb)

- Install selector shaft lever and nut and tighten.
- Remaining installation is the reverse of removal.
- Check selector cable adjustment,

BASIC SETTINGS

The Transmission Control Module (TCM) and the Engine Control Module (ECM) share data concerning engine and transmission operation. Data that the TCM may not always precisely "know" is throttle range and full throttle position. The acquisition of this data is known as basic setting. The basic setting influences automatic transmission shifting and is set at the time that the vehicle is new.

The basic setting will be lost and should be initiated after completion of the following repairs:

- Engine removing and installing (replacement).
- Transmission removing and installing.
- Replacing or coding the Engine Control Module (ECM).
- Replacing the Transmission Control Module (TCM).
- Removing, installing, adjusting, and/or replacing electronic throttle components at pedal or throttle housing.
- If the battery is disconnected or runs down.
- If the TCM is disconnected.

In these circumstances, the basic settings must be restored to insure proper automatic transmission operation.

Basic settings, initiating

Basic settings can be initiated or restored using a suitable scan tool. Follow the scan tool manufacturer's instructions and/or use the procedure outlined below. In either case, the kickdown switch on the accelerator cable (where applicable) must function properly. 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.

- Advance scan tool to address word menu and enter **02** for transmission electronics.

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

- Advance scan tool to display group menu and enter **000**.

- Advance scan tool until system confirms that it is in basic setting mode as shown.

```
Rapid Data Transfer      HELP
Enter Address Word  XX
```

0024490

```
Rapid Data Transfer      HELP
Select Function    XX
```

0024491

```
Basic setting            HELP
Enter display group XXX
```

0024492

```
System in basic setting  -->
                        000
```

0024493

- Push accelerator pedal all the way to the floor (past kick-down) and hold it there for a minimum of 3 seconds.

NOTE —

Most scan tools and scan tool programs will not confirm completion of basic settings by any on-screen display.

- Release accelerator pedal.
- Exit program and disconnect scan tool.
- Switch off the ignition.

Basic requirements

If transmission problems are experienced, the following points should be considered before proceeding with in-depth troubleshooting.

- Check ATF. Ensure that the level is correct and that the fluid is clean and of correct type, see **0 Maintenance**.
- Make a visual inspection of the components shown for the appropriate transmission system. Check the wiring and harness connectors for loose, damaged or corroded connections. Check that all related grounds are firmly connected and in good condition. Consult the appropriate wiring diagram, see **97 Wiring Diagrams, Fuses and Relays**.
- Check the shift mechanism for proper function, see **Shift Mechanism**.

Review the conditions listed under **Basic Settings**. If any of the conditions are met, the TCM must be reset to the basic setting using an appropriate scan tool. If the TCM basic settings are not re-established, driveability problems may be encountered. It may also be advantageous to reset the basic settings even if the listed repairs have not been done. This will assure that it is not a factor affecting driveability.

- If no faults are found up to this point, the next logical step is to check for faults using the a scan tool, or scan tool computer program. If the transmission problem is electrical/electronic in nature, specific DTCs will most likely be stored in memory.

SHIFT MECHANISM

The selector lever handle and shift mechanism components for both the 01M and 09A automatic transmissions are different due, in part, to the addition of Tiptronic® controls for the 09A.

Shift mechanism assembly (01M)

NOTE —

Lubricate all mountings and sliding surfaces with Polyurea grease (VW/Audi part no. G 052 142 A2 or G 000 450 A or equivalent).

1. Selector lever handle and release button

- Removing: push sleeve (item 2) down while depressing release button and pull handle up and off.
- Installing: while depressing release button, push handle onto lever until lock engages. Slide sleeve up to lock.

2. Locking sleeve

- Locks selector lever handle
- Prevents selector lever handle from being pulled off

3. Cover

- With selector indicator
- Snapped into bracket (item 7)

4. Cover strip

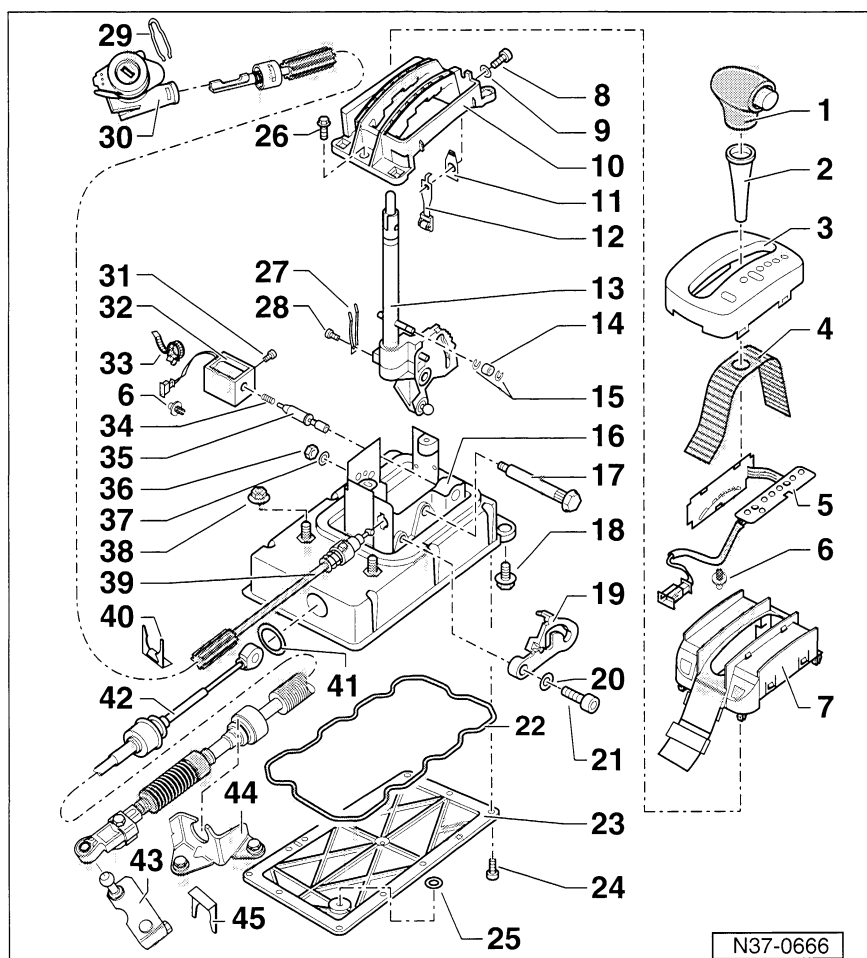
- Slides into bracket (item 7)
- Use care to avoid kinking during installation

5. Selector lever position display

- Printed circuit for selector lever position display lighting clipped in position.
- Contacts for selector lever position face towards selector lever contact springs (item 27).
- Insert fiber optic light guide and wiring to connector housing in the mountings on the frame
- Note harness routing when installing.

6. Retainer

- Positions connector and wiring in bracket (item 7)



7. Bracket

- Carefully pry off at corners
- Cover strip (item 4) slides in tracks
- Installation position: ribs must face down
- Note position of printed circuit and wiring (item 5).
- When installing use care to avoid damage to contact springs (item 27) for selector lever position display

8. Bolt, hex

- Attaches locating spring (item 12) and plate (item 11) to bracket (item 7).
- Tighten to 7 Nm (62 in-lb)

9. Washer

10. Locking segment

- Place on centering pins of selector lever housing

11. Plate

12. Detent spring with roller

- Engages detent in selector lever (item 13).

13. Selector lever

- With pull rod, spring, detent, and contact spring for selector lever position and shift lock cable release
- See **Selector lever cable checking and adjusting (01M)**
- See **Selector lever assembly**

14. Roller

- For releasing shift lock cable

15. Circlip

16. Selector lever housing

- Does not need not be removed to replace most individual parts, except for selector lever and shift lock solenoid
- See **Selector lever assembly**

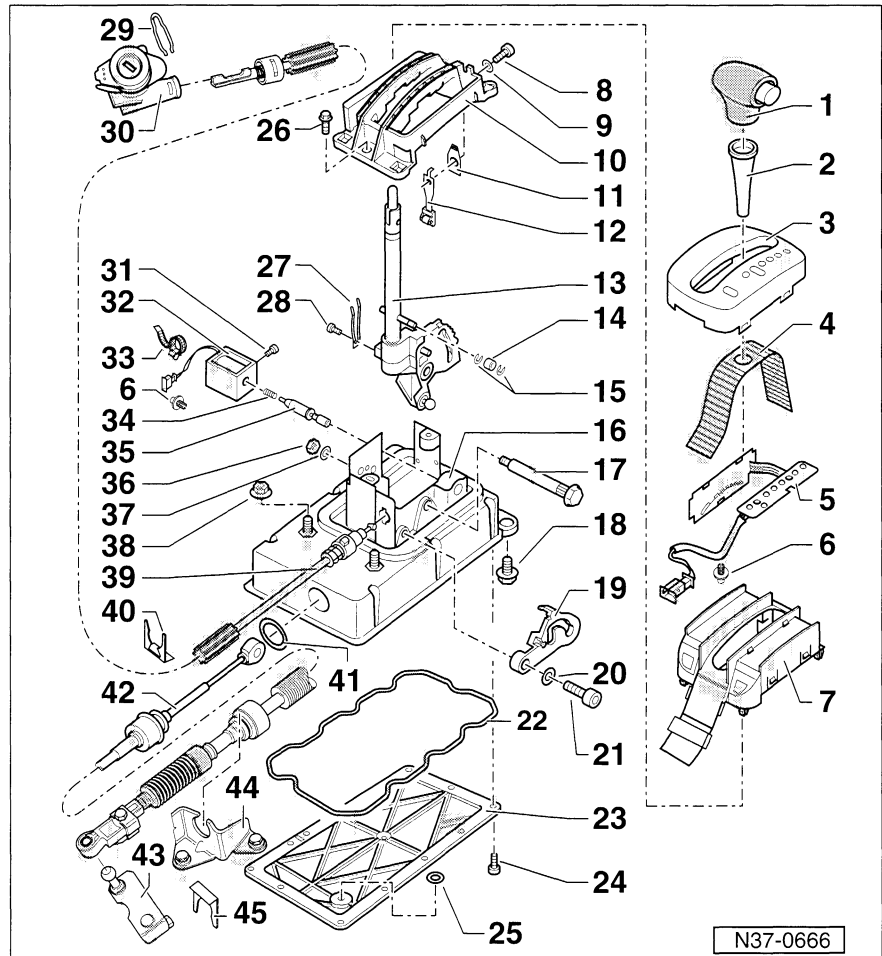
17. Splined fulcrum pin

- Lubricate with polyurea grease when installing and as otherwise needed
- Do not turn when installing selector lever

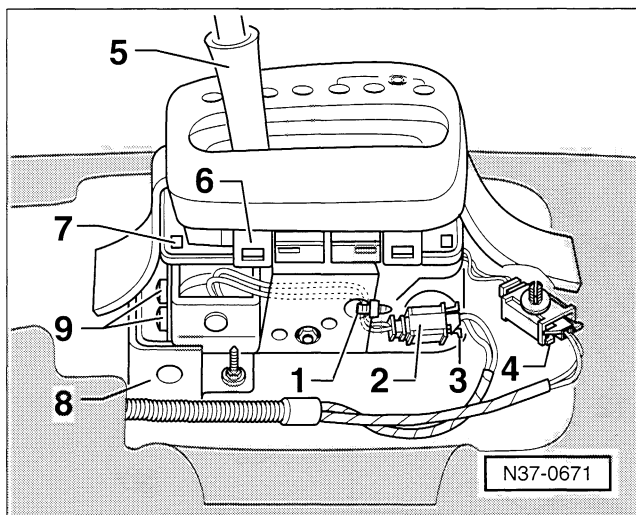
(continued on following page)

Shift mechanism assembly (01M) (continued)

18. Bolt, hex
 - Tighten to 25 Nm (18 ft-lb)
19. Locking lever
 - For shift lock cable
 - Allows locking selector lever in park (P) position
20. Washer
21. Bolt
22. Gasket
 - Always replace
23. Cover
 - For selector lever housing
24. Bolt
 - Quantity 14
25. O-ring
 - Always replace
26. Bolt
 - Quantity 2
 - Tighten to 8 Nm (71 in-lb)
27. Contact spring
 - For selector lever position display
28. Bolt
 - Tighten to 4 Nm (35 in-lb)
 - Place selector lever in park (P) position to loosen and tighten
29. Clip
 - Installing: push clip on from above, angled ends of clip face steering lock
30. Steering column lock (on steering column)
31. Bolt
 - Quantity 2
 - Attaches solenoid to selector lever housing
32. Shift lock solenoid (N110)
 - Remove/install only with selector lever in first gear (1) position
 - Note position of spring and locking pin when removing
 - Remove together with locking pin and spring; move selector lever slightly back and forth slightly to ease removal.
 - Route wiring harness to give sufficient clearance when installing
 - Checked via OBD



33. Cable tie
 - Attaches solenoid wiring to selector lever housing
 - Always replace
34. Spring
35. Locking pin
36. Nut, hex
 - Always replace
 - Tighten to 13 Nm (10 ft-lb)
37. Washer
38. Nut, hex
 - Quantity 2
 - Always replace
 - Tighten to 25 Nm (18 ft-lb)
39. Shift lock cable
 - Allows ignition key to be removed with shifter lever locked in park (P) position.
 - Do not bend or kink
 - See **Shift lock cable adjusting, (01M)**
 - See **Shift lock operation, functional checking**
40. Clip
 - Always replace
 - Secures selector lever cable to selector lever housing
 - Install angled end toward inside of selector housing
41. Gasket
 - Always replace
42. Selector lever cable
 - Do not bend or kink
 - If outer cable sleeve is damaged, entire selector lever cable must be replaced.
 - Lightly grease ball socket and cable ends before installing.
 - See **Selector lever cable checking and adjusting (01M)**
43. Lever
 - For selector shaft
44. Support bracket
 - For securing selector lever cable on transmission
45. Clip
 - Always replace



◀ Selector lever assembly

1. Cable tie
2. Connector, shift lock solenoid
3. Connector, shift lock solenoid, harness end
4. Connector, selector lever position display
5. Locking sleeve, selector lever handle
6. Cover retaining tabs (quantity 4)
7. Bracket retainers
8. Retaining bracket (housing) nuts
9. Shift lock solenoid, (N110)

Shift mechanism assembly (09A)

NOTE —

Lubricate all mountings and sliding surfaces with Polyurea grease (VW/Audi part no. G 052 142 A2 or G 000 450 A or equivalent).

1. Selector lever handle and release button

- Two different versions identified by colour. See **Selector lever handle identification**.
- See, **Selector lever handle removing and installing, early**
- See, **Selector lever handle removing and installing, late**

2. Locking sleeve

- Locks selector lever handle
- Prevents selector lever handle from being pulled off

3. Cover

- With selector indicator
- Snapped into bracket 5

4. Selector lever position display

- Printed circuit for selector lever position display lighting clipped in position.
- Note harness routing when installing.
- Checked via OBD

5. Bracket

- Cover strip slides in tracks

6. Cable clip

7. Bracket

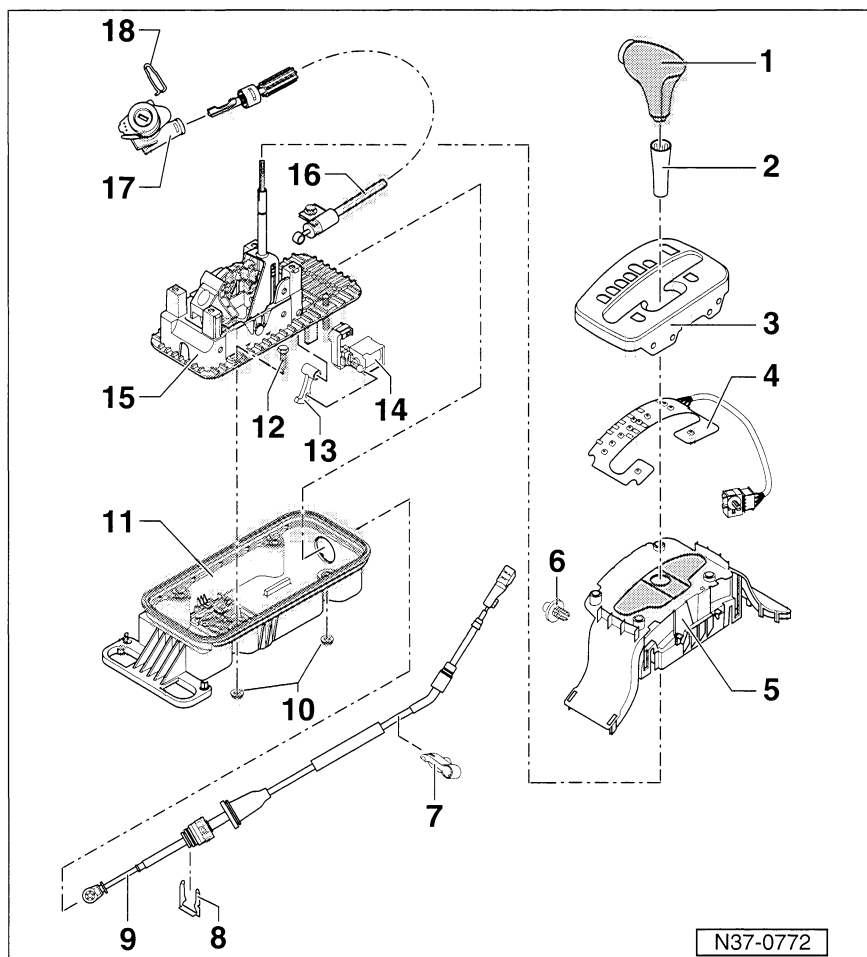
- For selector lever cable.
- Attached to front tunnel heat shield.

8. Locking plate

- Secures selector lever cable to mounting bracket
- Always replace

9. Selector lever cable

- Do not bend or kink
- If outer cable sleeve is damaged, entire selector lever cable must be replaced.
- Do not grease cable eye and ball socket.
- See **Selector lever cable checking and adjusting (09A)**



N37-0772

10. Nut, self locking collared

- Quantity 4
- Attaches to bolt 12
- Always replace
- Tighten to 10 Nm (7 ft-lb)

11. Cover

- For mounting bracket
- With bonded seal

12. Bolt, hex

- Quantity 4
- Attaches to nut 10

13. Locking pawl

- For shift lock
- Locks into cable lever of mounting bracket.

14. Shift lock solenoid (N110)

- Can be replaced with selector mechanism installed.
- Route wiring harness to give sufficient clearance when installing
- Checked via OBD

15. Mounting bracket assembly

- Mounting point for selector lever, detents and linkage.

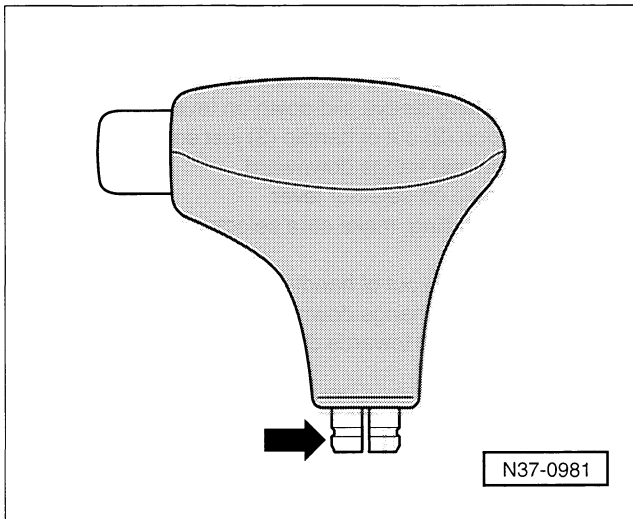
16. Shift lock cable

- Allows ignition key to be removed with shifter lever locked in park (P) position.
- Do not bend or kink
- See **Shift lock cable adjusting, (09A)**
- See **Shift lock operation, functional checking**

17. Steering column lock (on steering column)

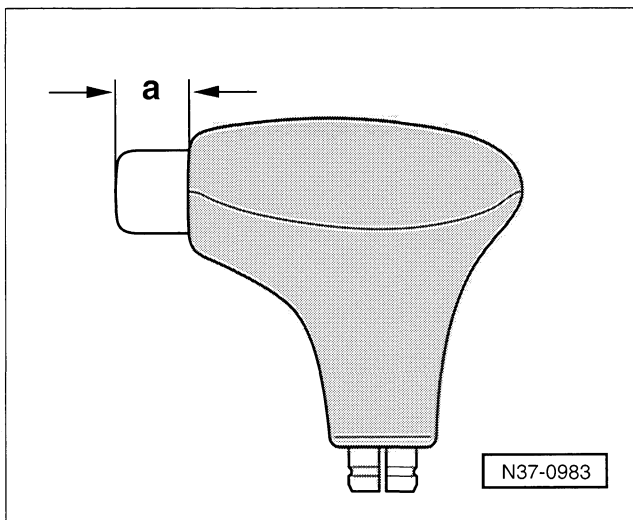
18. Clip

- Installing: push clip on from above, angled ends of clip face steering lock.



Selector lever handle identification

- Push locking sleeve down.
- Locking area (**arrow**) colour identifies version.
- Black plastic: early version
- Red-brown plastic: late version



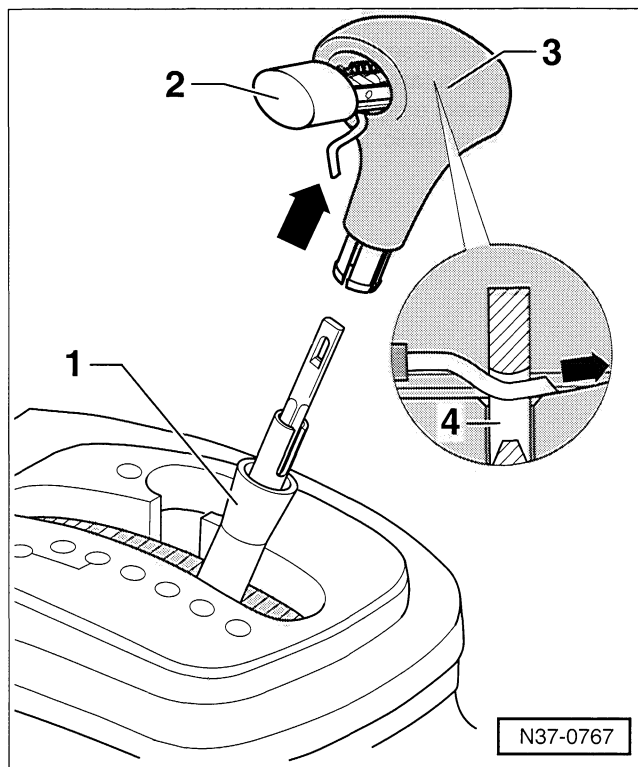
Selector lever handle removing and installing, late (red-brown plastic) version

- With locking sleeve slid down on lever, pull upward on handle.
- Do not press button.

NOTE —

If button is pushed in while removing, it will probably stick in the depressed position. Use a carefully controlled blast of compressed air in the handle opening to push button back out.

- When installing, make sure that button projects at least 10 mm (dimension **a**) from handle.
- Carefully pull button out by hand past perceptible dent so that it will not slid back in.
- Push handle on to selector lever.
- This version can be used in place of earlier black plastic version.



Selector lever handle removing and installing, early (black plastic) version

- Move selector lever to position **R**.
- Slide locking sleeve (1) down on lever.
- Pull button (2) out of handle (3) just enough so that pull lever (**arrow**) hangs downward.
- Pull handle off selector lever.
- When installing, make sure selector lever is still in position **R**.
- Pull button (2) out of handle (3) just enough so that pull lever (**arrow**) hangs downward.
- With button (2) towards driver, press handle down onto stop.
- Pull button (2) out further and guide pull lever (**arrow**) into handle.
- Press button (2) so that lever engages pull rod (4).
- Button must now spring back to the stop.
- Slide locking sleeve (1) upward in a twisting motion until the two wide tabs of the sleeve fit into the slots of the handle (3). The handle is locked when the sleeve can be felt clipping into place.
- Move selector lever through all positions to check for proper operation and return to the park position.
- This version can be replaced by the red-brown plastic version.

Selector lever cable, checking and adjusting (01M)

- Move selector lever into **P** position, switch ignition off and set parking brake.
- Open hood and locate selector lever cable and selector shaft lever on transmission.

- ◀ Use a screwdriver to pry selector lever cable (1) off selector shaft lever (4) and move cable aside so that the end is free to move.

NOTE —

Do not bend or kink selector lever cable.

- Move selector lever from **P** to 1 to fully extend cable.
- Check protective boot at front of selector cable for damage. If boot is damaged, replace selector cable
- Move selector lever from 1 to **P** and check that shift mechanism and selector lever cable move freely. If necessary replace selector lever cable or service shift mechanism as required.
- Press selector cable (1) back onto selector shaft (4).
- To adjust cable, move selector lever into **P** position, switch ignition off and set parking brake.
- Ensure that retaining clip (3) is properly seated and selector lever cable is secured on selector shaft lever.
- Loosen adjustment bolt (2) at selector cable mount.
- Ensure that selector shaft lever (4) is in position **P** on transmission.

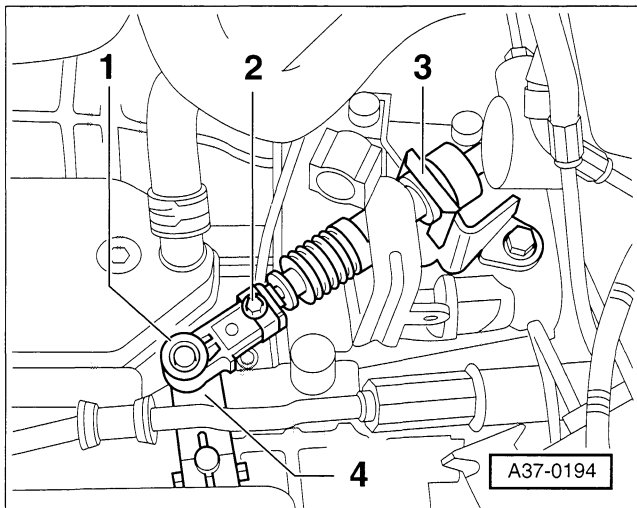
NOTE —

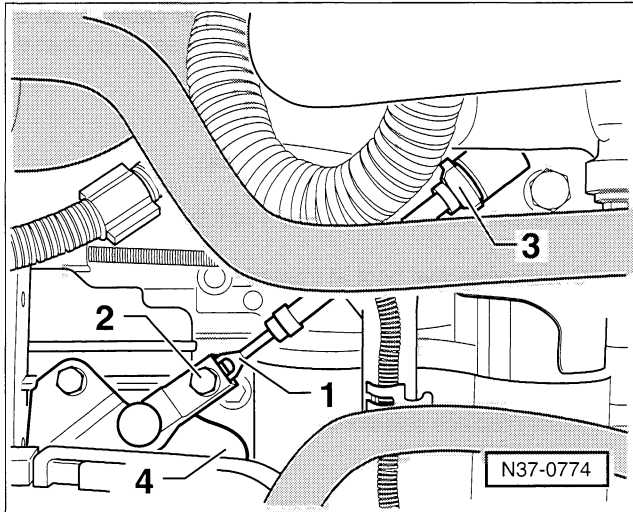
*With selector lever in **P** position, the transmission locking lever (pawl) must be engaged, locking both front wheels.*

- With selector lever in **P**, tighten adjustment bolt (2). Ensure that circlip (3) is fully seated.
- Shift through all gear positions and check for smooth operation.

Tightening torque

- Selector lever adjustment bolt 8 Nm (71 in-lb)





Selector lever cable, checking and adjusting (09A)

- Move selector lever into **P** position, switch ignition off and set parking brake.
- Open hood and locate selector lever cable and selector shaft lever on transmission.

➤ Pull selector lever cable (1) upward off selector shaft lever/selector shaft (4) and move cable aside so that the end is free to move.

NOTE —

Do not bend or kink selector lever cable.

- Move selector lever from **P** to **2** to fully extend cable.
- Check protective sleeve at front of selector cable for damage. If sleeve is damaged, replace selector cable
- Move selector lever from **2** to **P** and check that shift mechanism and selector lever cable move freely. If necessary replace selector lever cable or service shift mechanism as required.
- Press selector lever cable onto lever/selector shaft with a pair of pliers.
- To adjust cable, move selector lever into **P** position, switch ignition off and set parking brake.
- Ensure that retaining clip (3) is properly seated and selector lever cable is secured on selector shaft lever (4).
- Loosen adjustment bolt (2) at selector cable mount.
- Ensure that selector shaft lever (4) is in position **P** on transmission.

NOTE —

*With selector lever in **P** position, the transmission locking lever (pawl) must be engaged, locking both front wheels.*

- With selector lever in **P**, tighten adjustment bolt (2).
- Shift through all gear positions and check for smooth operation.

Tightening torque

- Selector lever adjustment bolt . . . 13 Nm (115 in-lb)

SHIFT LOCK

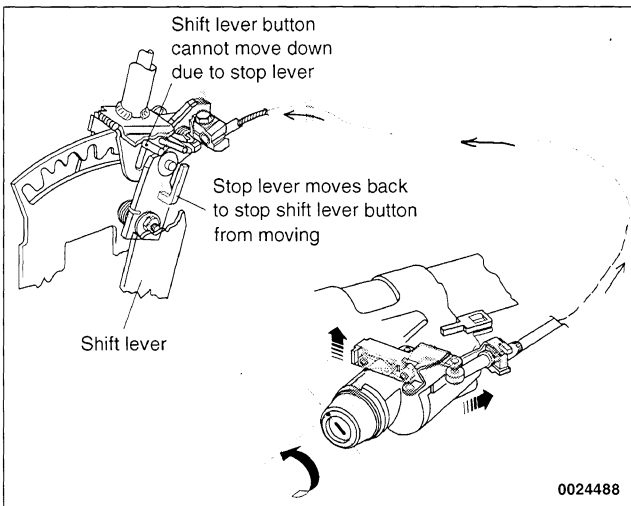
Shift lock is used on all cars with automatic transmissions. Operation is essentially the same for both the 01M and 09A transmissions. Shift lock is comprised of two main sections, mechanical via a cable, and electro-mechanical via the shift lock solenoid.

The mechanical section of this feature is independent of the shift lock solenoid. Turning the ignition key on and off operates a bowden cable to lock and unlock the selector lever to enable the following:

- Prevents removal of the ignition key from the ignition lock unless the selector lever is in the Park (**P**) position.
- Prevents movement of the shifter unless the ignition key is turned.

The electro-mechanical section of this feature is independent of the bowden cable. Turning the ignition key on operates a locking solenoid to lock and unlock the selector lever to enable the following:

- Prevents movement of the shifter out of the Park, Reverse, or Neutral positions unless the brake pedal is depressed.



Operation of shift lock is similar for both the 01M and the 09A transmissions. When the ignition key is turned to the off position (shift lever in **P**), the cable pushes the stop lever into the shift lever. This locks the lever button and also allows the ignition key to be withdrawn from the lock cylinder. The key can only be removed from the ignition with the lever in the **P** position. With the key out of the ignition, the selector lever cannot be shifted out of **P** position.

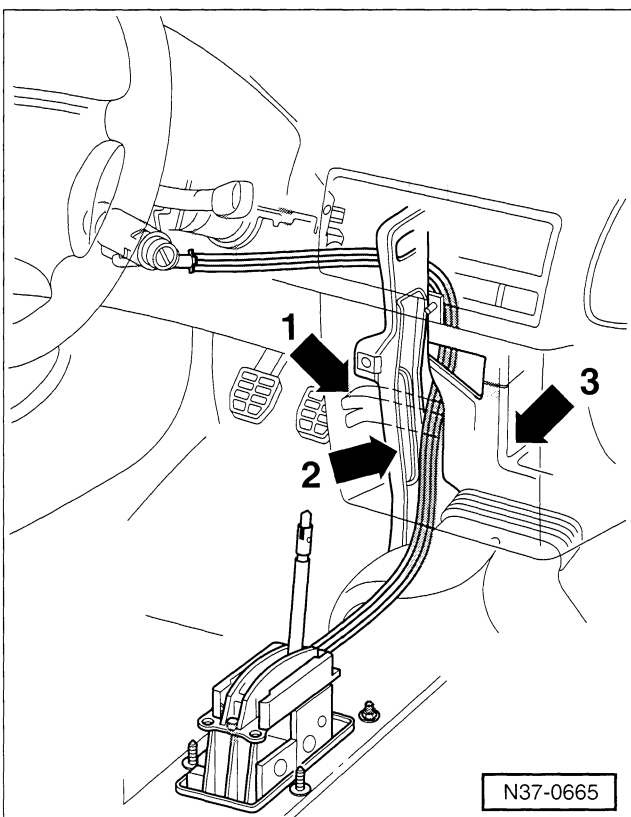
When the key is in the **ON** position, the cable pulls the stop lever away from the shift lever, allowing the shift lever to be moved out of park.

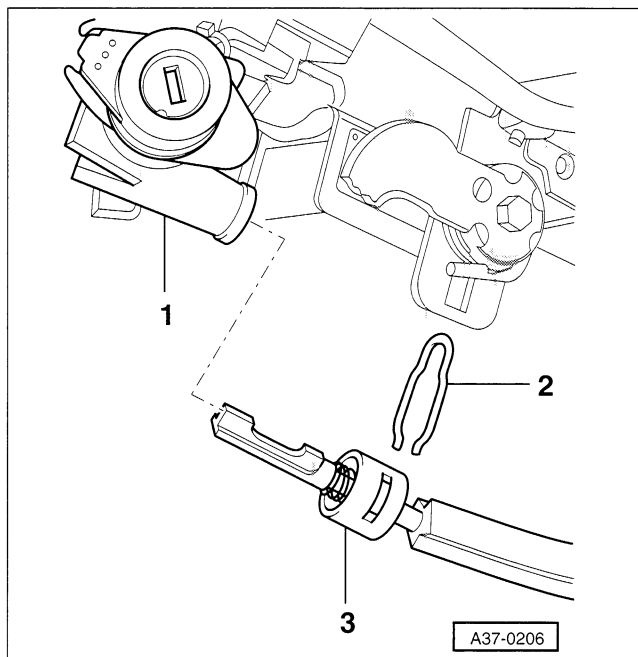
Shift lock cable, removing and installing (01M)

The shift-lock cable is routed through the dashboard and under the center console. Be sure to route the cable correctly when installing.

Installation position of shift lock cable:

1. Footwell vents
2. Instrument panel center support
3. Heater box





- Disconnect battery ground (GND) strap from battery negative (–) terminal. See the **Cautions** at the 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 driver's side airbag and steering wheel. See **48 Steering**.

- Remove trim under left side of instrument panel.

- Remove handle for steering height and telescopic adjustment and covers for ignition/starter lock.

- Turn ignition **ON** and move selector lever to **P**.

- Remove shift lock cable clip (2) and pull cable (3) out of ignition/steering lock assembly (1).

- Remove selector lever handle with release button.

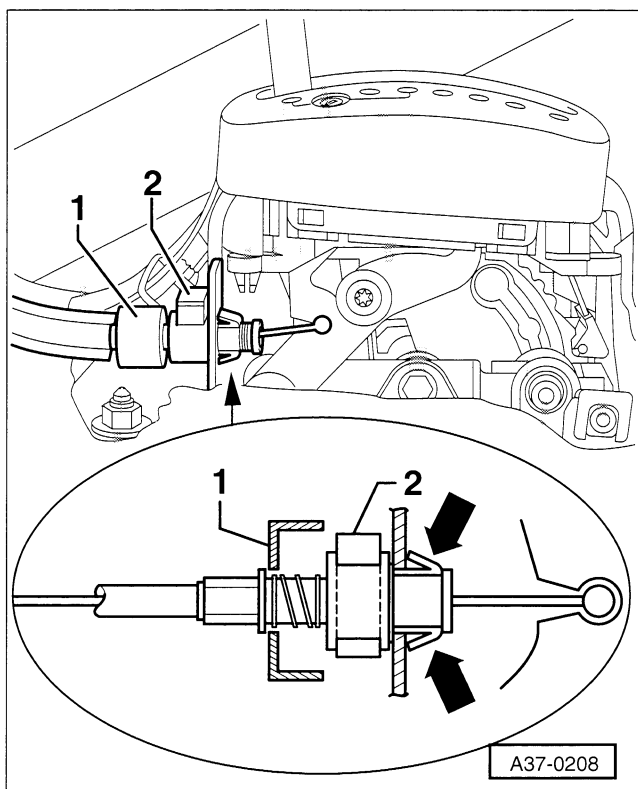
- Remove center console and extension, see **70 Trim-Interior**.

- Disconnect shift lock cable from locking lever at selector mechanism. Detach cable end from selector mechanism and press tabs (**arrows**) of shift lock cable retaining clip together while pulling locking cable out. Cable sleeve (1) and red clip (2) are utilized during adjustment procedure.

- To install, guide cable between heater box and footwell vent behind instrument panel center support.

WARNING —

- Be sure cable is routed correctly when installing.
- Do not bend or kink cable.
- Be sure to adjust cable after installation.

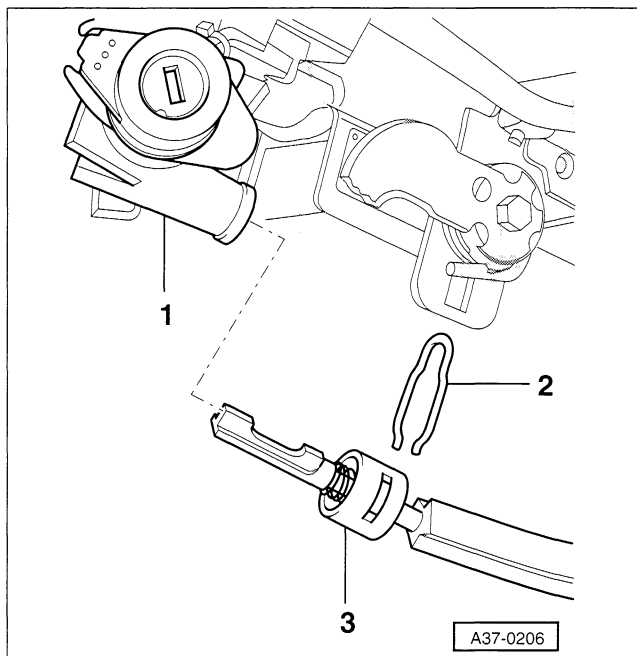


- Move selector lever to **P**.

- Press shift lock cable into support bracket on selector lever housing until tabs (**arrows**) on retaining clip spread apart.

- Attach shift lock cable end in locking lever.

AUTOMATIC TRANSMISSION 37-31



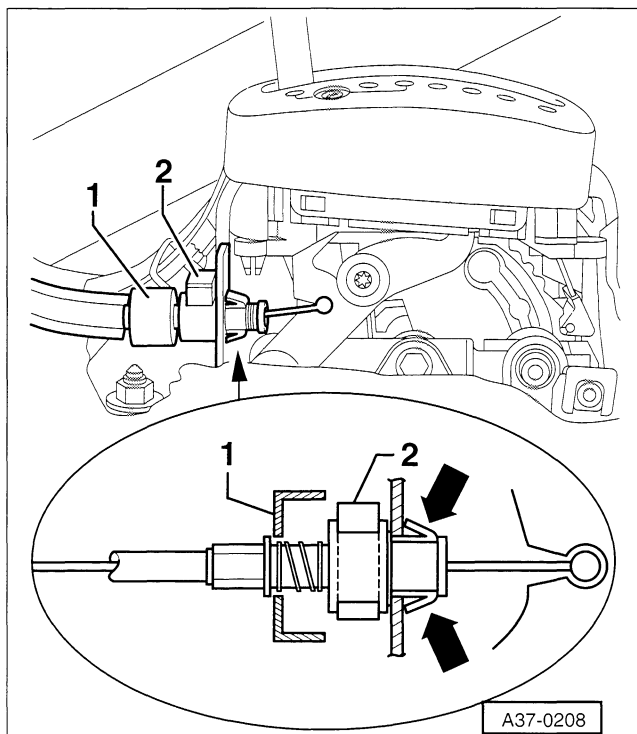
- Turn ignition on.
- Insert shift lock cable (3) into ignition lock (1) with flattened side facing down.

- Install clip onto cable.

NOTE —

Ensure that clip is properly located and seated.

- Adjust shift lock cable.
- Install covers for ignition/starter lock.
- Install handle for steering height and telescopic adjustment.
- Install trim under left side of instrument panel.
- Install driver's side airbag and steering wheel. See **48 Steering**.
- Re-connect battery. See the **Cautions** at the beginning of this repair group regarding battery.



Shift lock cable, adjusting (01M)

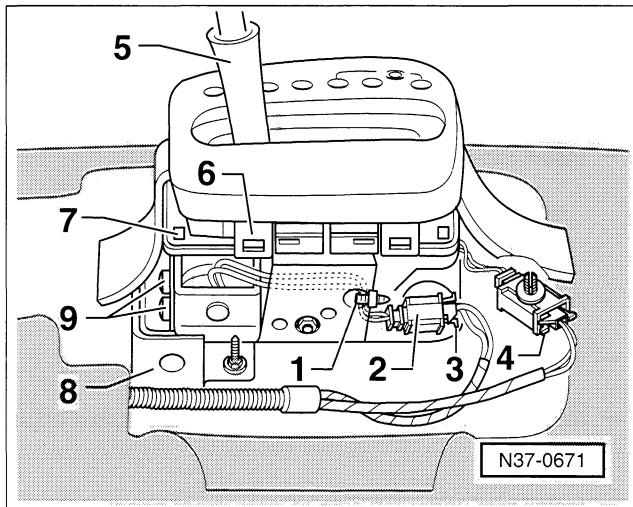
WARNING —

Follow the adjustment procedure exactly as outlined.

Before adjusting the shift lock cable the following points must be observed:

- Center console and extensions must be removed.
- Selector lever handle must be removed.
- Shift lock cable must be correctly installed and routed.
- Selector lever must be in Park position.
- Steering column must be at lowest position and most extended position.
- Ignition key must be removed from ignition lock.

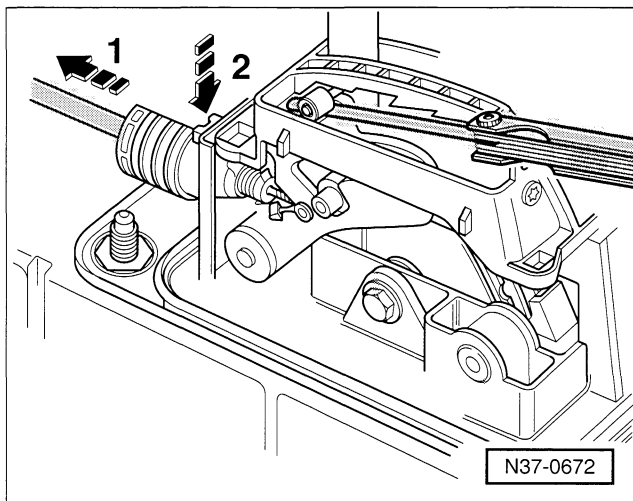
- Working at center console, slide cable sleeve (1) forward and release red clip (2) by pushing up.



- Remove selector cover and bracket: remove harness connector (4), remove selector lever sleeve (5), carefully pry up the four tabs (6) of selector cover and remove, carefully pry up at four corners of shift lever bracket (7) and remove.

NOTE —

Be careful not to damage contact spring for shift lever position indicator.



- Slide 0.8 mm (0.032 in.) feeler gauge between locking lever and selector lever roller from the rear.
- Pull outer sleeve of shift lock cable slightly forward in direction of travel (**arrow 1**) and push red clip down until it engages (**arrow 2**).
 - Push sliding sleeve back over clip.
 - Check for proper ignition key removal and selector lever function.
 - Reinstall selector lever bracket and cover components.
 - Replace center console, extension, and removed trim.
 - Check shift lock operation, see **Shift lock operation, functional checking**.

Shift lock cable, removing and installing (09A)

The shift-lock cable is routed through the dashboard and under the center console in the same manner as with the 01M version with the primary difference being at the mounting bracket assembly. Be sure to route the cable correctly when installing.

◀ Installation position of shift lock cable:

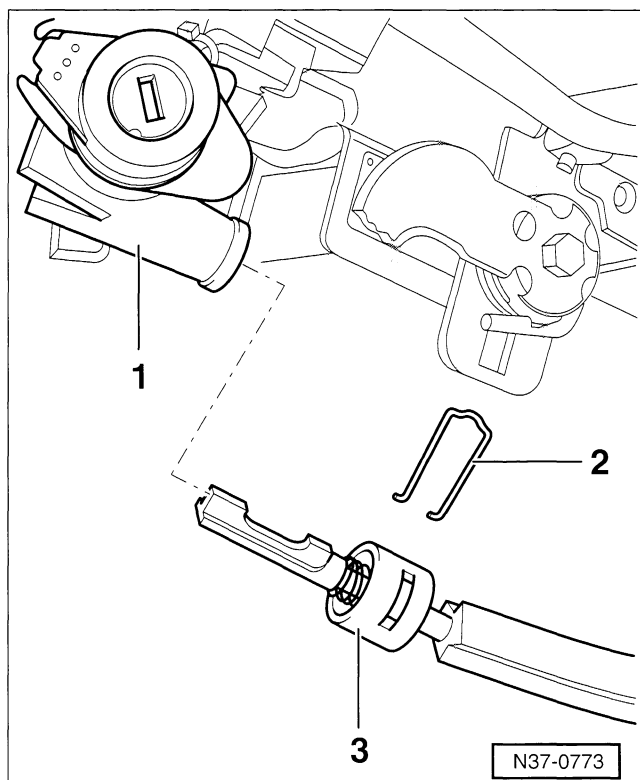
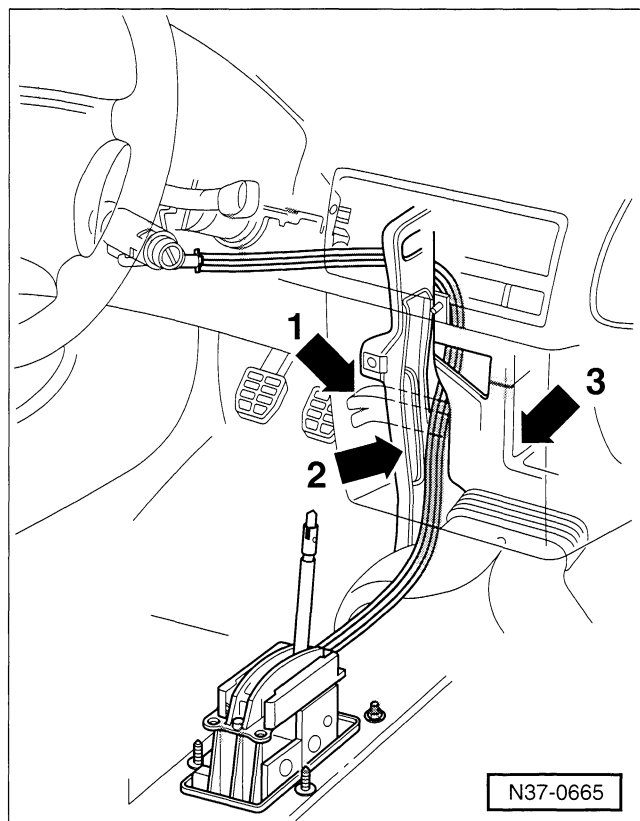
1. Footwell vents
2. Instrument panel center support
3. Heater box

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

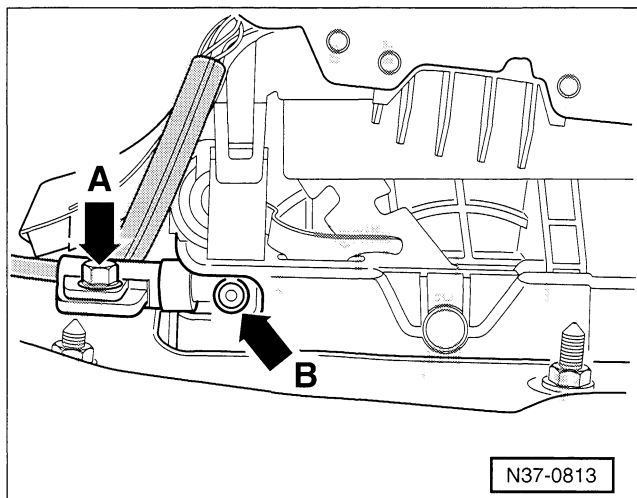
NOTE —

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

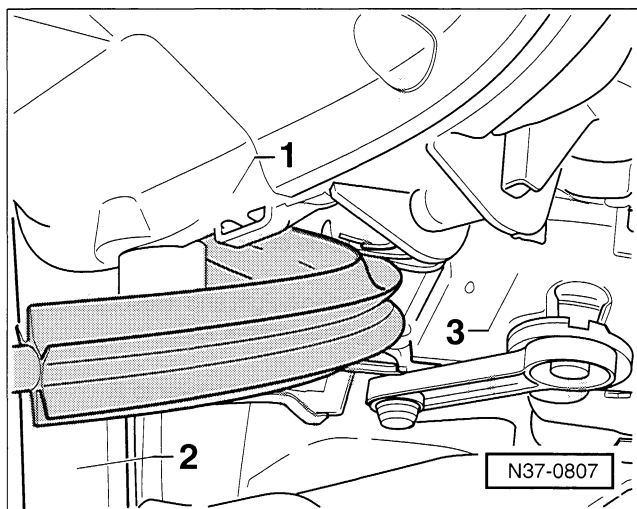
- Remove driver's side airbag and steering wheel. See **48 Steering**.
- Remove trim under left side of instrument panel.
- Remove handle for steering height and telescopic adjustment and covers for ignition/starter lock.
- Turn ignition **ON** and move selector lever to **P**.
- ◀ Remove shift lock cable clip (2) and pull cable (3) out of ignition/steering lock assembly (1).
- Remove selector lever handle with release button.
- Remove center console and extension, see **70 Trim-Interior**.



37-34 AUTOMATIC TRANSMISSION



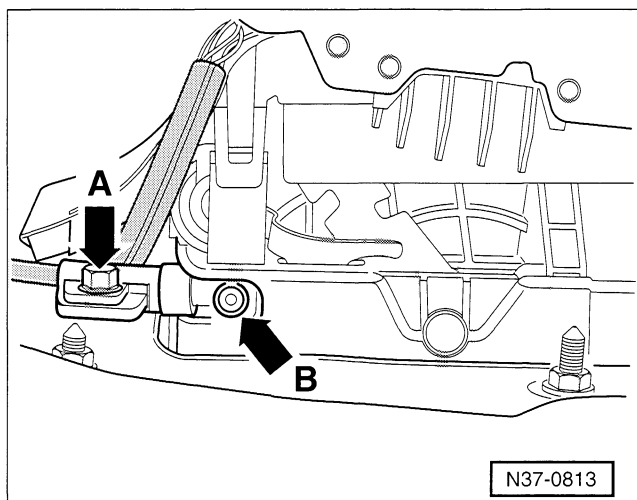
- Remove bolt (A) from shift lock cable support bracket.
- Remove shift lock cable from selector mechanism and locking lever (B).
- Pull shift lock cable out from instrument panel.



- To install, guide cable between heater box (3) and footwell vent (1) behind instrument panel center support (2).
- Move selector lever to "P".

WARNING —

- Be sure cable is routed correctly when installing.
- Do not bend or kink cable.
- Be sure to adjust cable after installation.



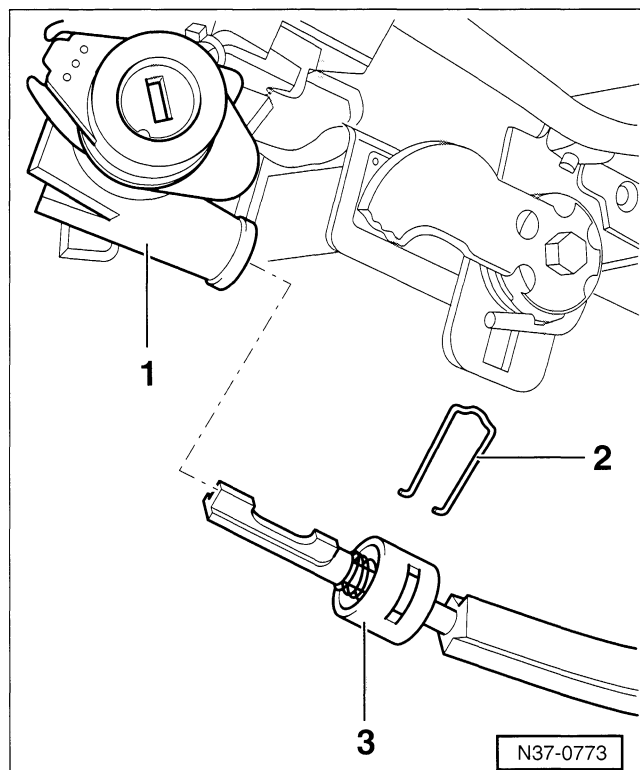
- Pull shift lock cable slightly out of outer sleeve and attach in locking lever (B).
- Attach cable support bracket to mounting bracket assembly (A).

NOTE —

Shift lock cable is adjusted at bolt A. See **Shift lock cable, adjusting (09A)**

- Turn ignition on.

AUTOMATIC TRANSMISSION 37-35



➤ Insert shift lock cable (3) into ignition lock (1) with flattened side facing down.

- Press clip (2) onto cable (3) from above. Ensure that angled ends of clip face ignition lock as illustrated.

NOTE —

Ensure that clip is properly located and seated.

- Adjust shift lock cable.
- Install covers for ignition/starter lock.
- Install handle for steering height and telescopic adjustment.
- Install trim under left side of instrument panel.
- Install driver's airbag and steering wheel. See **48 Steering**.
- Re-connect battery. See the **Cautions** at the beginning of this repair group regarding battery.

Shift lock cable, adjusting (09A)

WARNING —

Follow the adjustment procedure exactly as outlined.

Before adjusting the shift lock cable the following points must be observed:

- Center console and extensions must be removed.
- Shift lock cable must be correctly installed and routed.
- Selector lever must be in Park position.
- Steering column must be at lowest position and most extended position.
- Ignition key must be removed from ignition lock.

➤ Working at center console, loosen bolt (**at arrow**) for shift lock cable at support bracket.

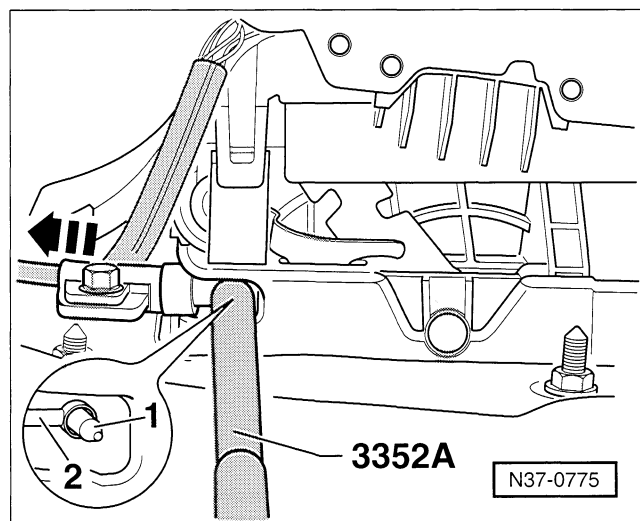
- Insert shift lock cable adjustment gauge 3352A between locking lever (1) and locking cable eye (2).
- To adjust, take up free play by gently pulling shift lock cable forward (**dashed arrow**) and tighten bolt.
- Adjustment gauge 3352A must be easy to remove and insert when adjustment is correct. Readjust if required.

Tightening torque

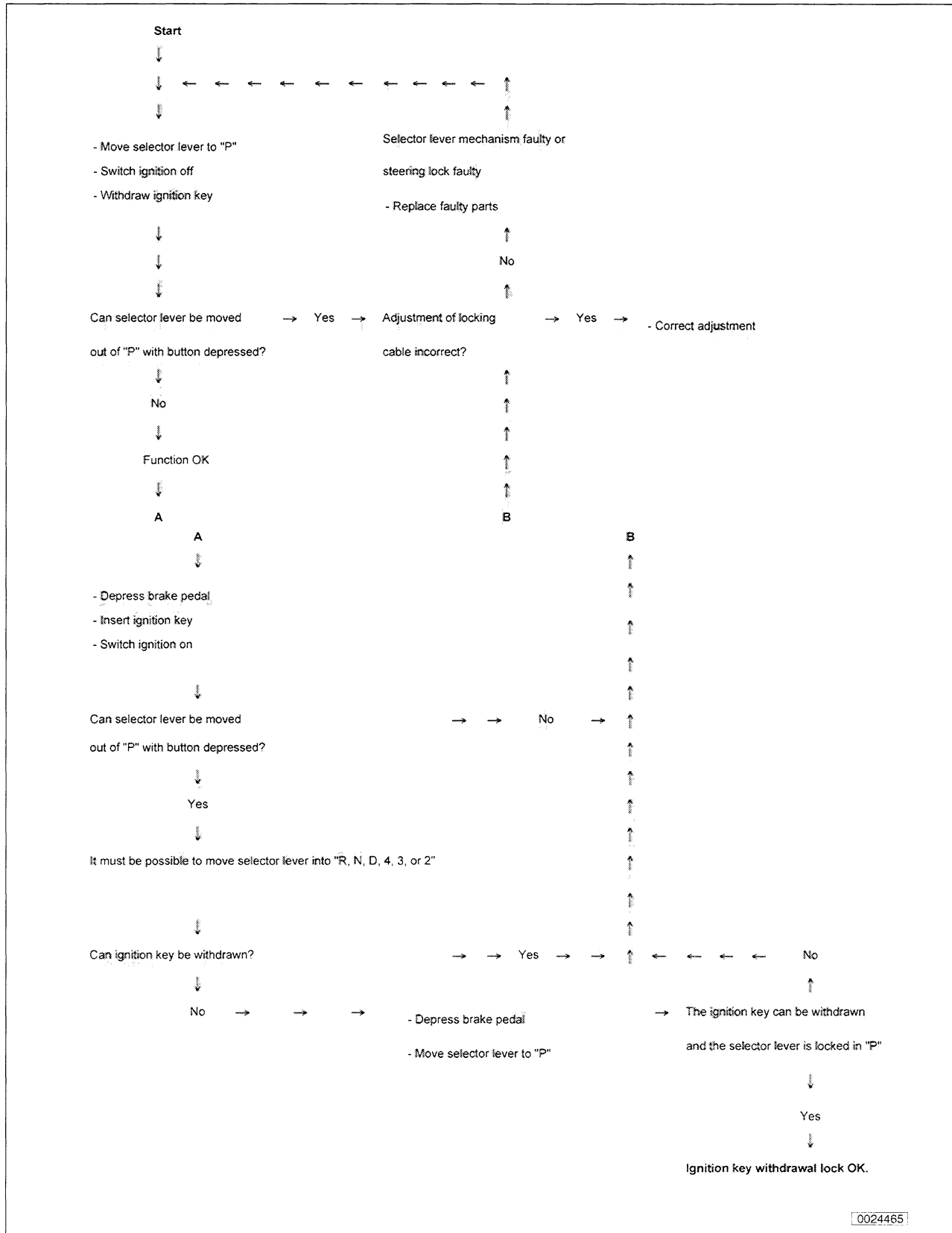
- Support bracket adjustment bolt 10 Nm (7 ft-lb)

- Replace center console, extension, and removed trim.
- Check shift lock operation, see **Shift lock operation, functional checking**

SHIFT LOCK

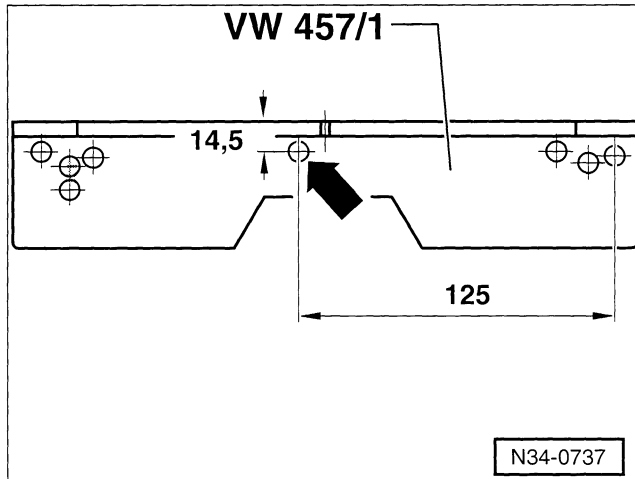


Shift lock operation, functional checking



TRANSMISSION, REMOVING AND INSTALLING

This section describes the removal and installation procedure for both automatic transmission 01M and 09A. Several special tools are required along with special engine lifting and jacking equipment. These are needed to support and reposition the engine as the transmission is removed from below.



Special tool, modifying (01M)

Volkswagen special tool 457/1 will need to be modified to allow attachment to the subframe for 01M transmissions.

➤ Modify VW 457/1 by drilling an additional hole as indicated (**arrow**).

- Drill an 8.5 mm (0.335 in.) diameter hole (**arrow**) at location shown. Dimensions shown are in mm.

NOTE —

- VW 457/1 may have been previously modified with more holes than shown.
- This modification is the same as that required for manual transmissions, see **34 Manual Transmission**.

Transmission, removing (01M)

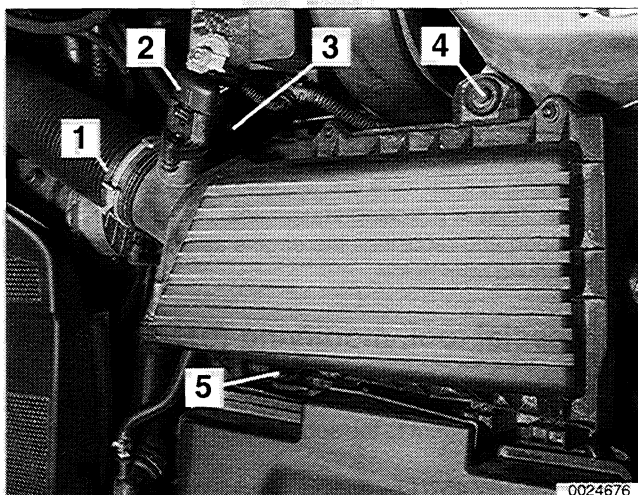
Before beginning removal, check to ensure that the required special tools or their equivalent are readily available and modified as noted.

Volkswagen recommended special tools (01M)

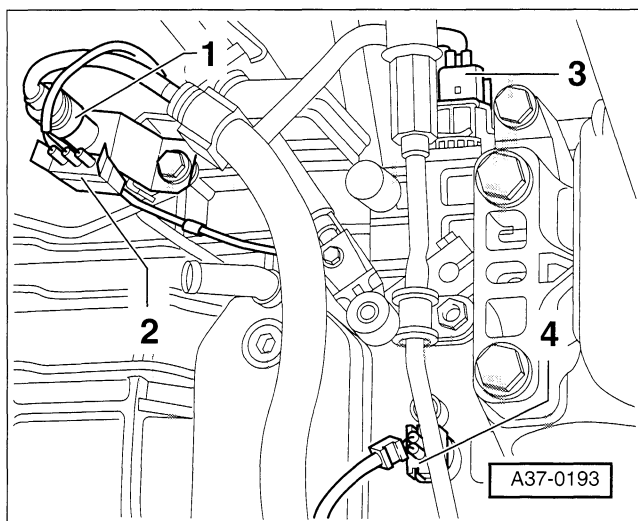
- 10-222A transmission support kit
- 10-222A/1 support legs
- 3094 hose clamps
- 3282 transmission support
- 3282/2 adjustment plate
- 3300A engine support
- 3336 transmission lifting beam
- VAG 1331 torque wrench
- VAG 1332 torque wrench
- VAG 1383A engine/transmission jack
- V/175 socket
- VW 457/1 support rails (modified)

NOTE —

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



- Remove engine cover.
- Disconnect battery ground (GND) strap from battery negative (–) terminal. See the **Cautions** at the beginning of this repair group regarding battery disconnection.
- Disconnect battery positive (+) cable and remove battery and battery tray. See **27 Engine Electrical**.
- Remove intake air hose (1), and harness connector (2), from Mass Air Flow (MAF) Sensor.
- Remove vacuum hose (3) to air cleaner near MAF, where equipped.
- Remove complete air cleaner housing assembly by unscrewing bolts (4) and (5).

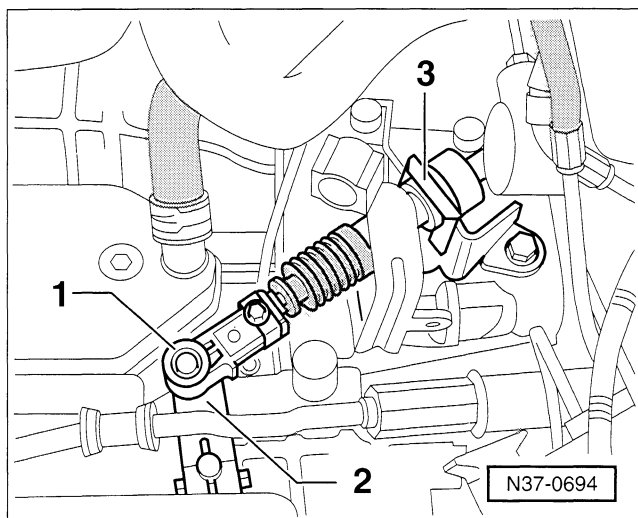


- Disconnect harness connector for solenoid valves (1), vehicle speed sensor (2), Transmission Range (TR) switch (3), and transmission Vehicle Speed Sensor (VSS) (4).

NOTE —

Disconnect TR switch and transmission VSS from extension harness connections on top of transmission if equipped and move wiring to the side.

- Remove bracket for power steering hose with retainer for wiring harness from transmission.



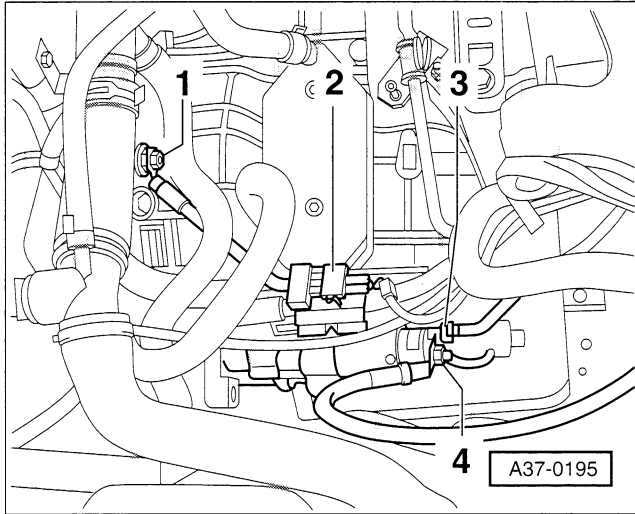
- Move selector lever to park, **P**. Using a screwdriver, pry selector lever cable (1) off selector shaft lever (4). Adjustment bolt (2) should not be loosened.

- Remove clip (3) at selector lever cable support bracket and remove selector lever cable.

NOTE —

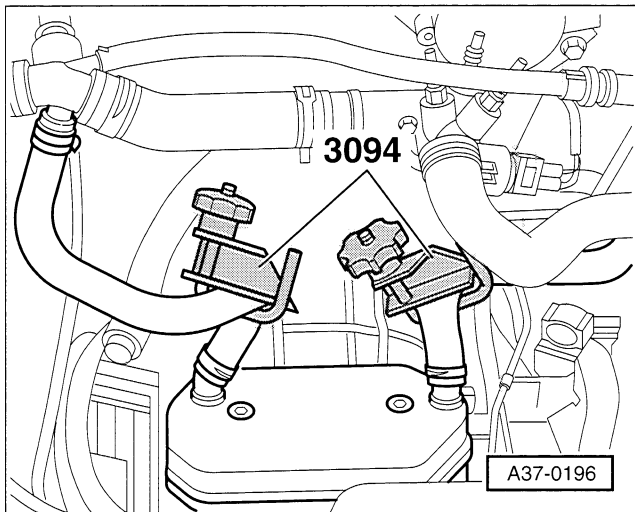
Do not bend or kink selector lever cable.

AUTOMATIC TRANSMISSION 37-39



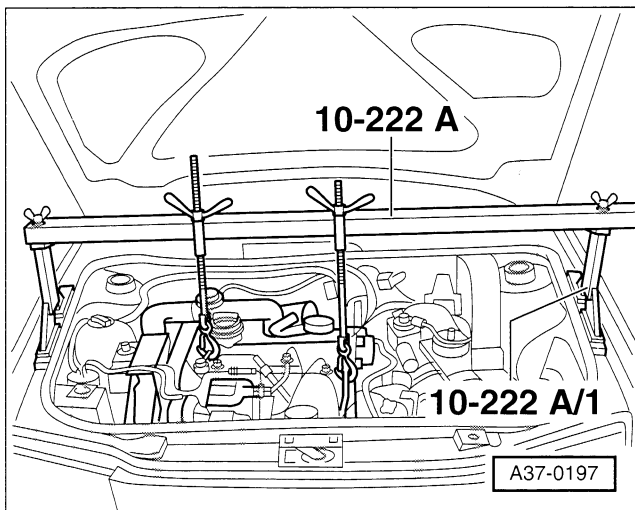
➤ For all vehicles, disconnect ground cable (1) from upper engine/transmission bolt, electrical connections at starter motor (3, 4), and harness connector on top of starter motor (2).

- Pull harness connector out of retainer on top of starter motor and remove retainer.
- Remove upper starter mounting bolt.



➤ Clamp-off ATF cooler hoses with special tool 3094 clamps or equivalent and detach at ATF cooler. Seal ATF cooler with clean plugs.

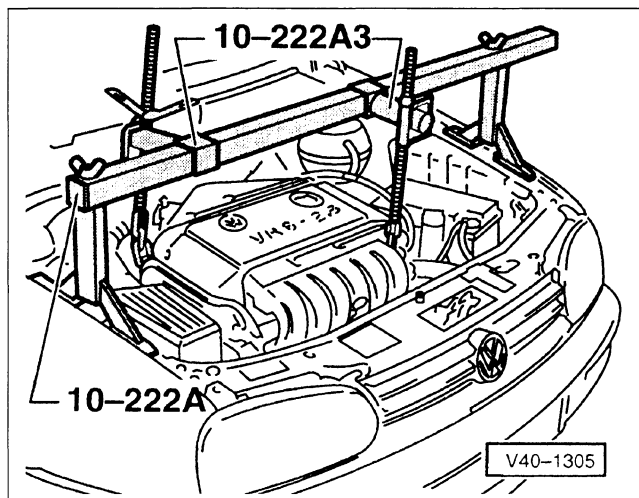
- Remove upper engine/transmission bolts.



➤ On 4-cylinder engines, attach engine support tool 10-222A with appropriate adapters and legs as shown. Adjust the support until the weight of the engine is fully supported.

WARNING —

- Before installing the engine lifting hooks, disconnect all hoses and wiring in the vicinity of the engine lifting eyes, to prevent damage.
- Do not position engine sling legs on the fender mounting bolts.



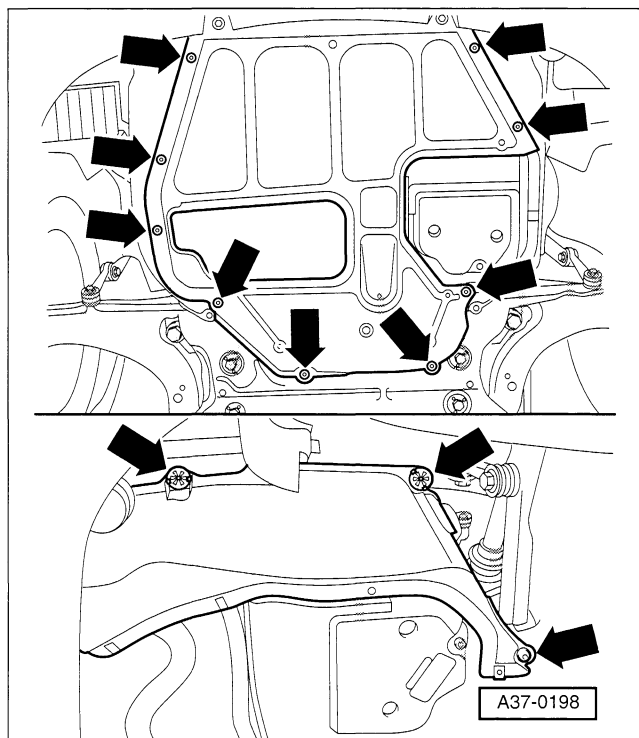
On 6-cylinder engines, attach engine support tool 10-222A with appropriate adapters and legs as shown. As with 4-cylinder engines, adjust the support until the weight of the engine is fully supported.

- Loosen left front wheel bolts.
- Raise vehicle and support with suitable jack stands or lift. See **0 Maintenance** for proper lifting procedure.

WARNING —

Observe all warnings and cautions associated with lifting vehicle in **0 Maintenance**.

- Remove left front wheel.

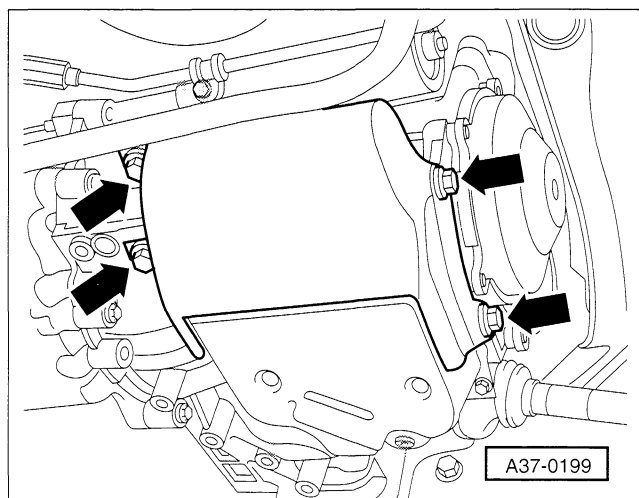


Remove left lower and center sound absorber panels (belly pans) (arrows).

NOTE —

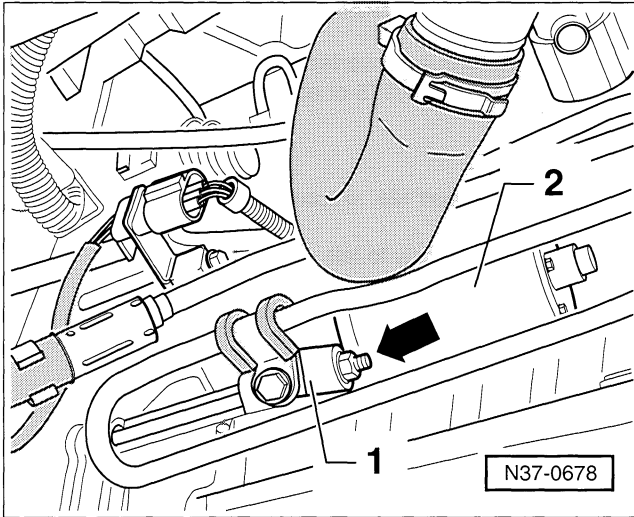
Some sound insulator fasteners are best removed and re-installed with long needle nose pliers.

- On vehicles with 1.9L TDI engine, remove intake air duct between intake air cooler and turbocharger, see **21 Turbocharger and Intercooler**.



Remove bolts (arrows) for forward transmission/ATF oil pan shield.

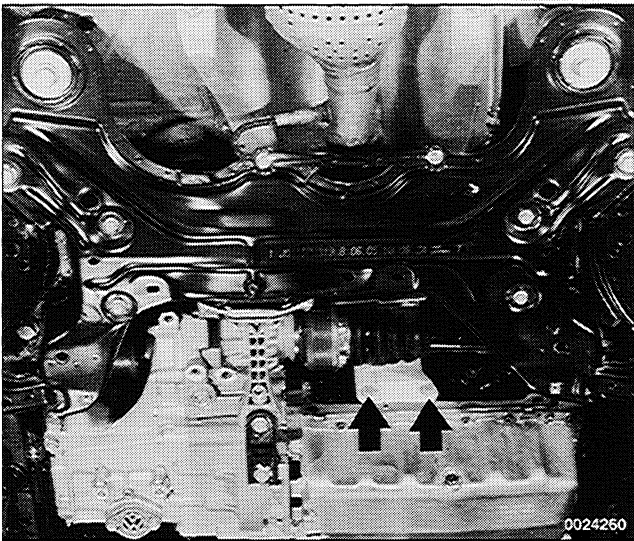
AUTOMATIC TRANSMISSION 37-41



- Remove bracket (1) for power steering pressure line near lower starter mounting bolt (arrow).
- Remove lower starter mounting bolt and starter (2).

NOTE —

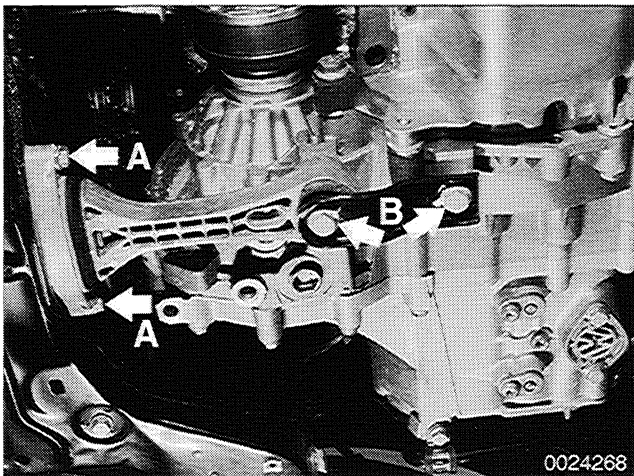
Use care not to bend, kink, or damage the power steering line.



- Remove right inner drive axle boot shield (arrows) from engine, if installed.
- Unbolt both drive shafts at transmission drive flanges and secure (tie) up as high as possible.

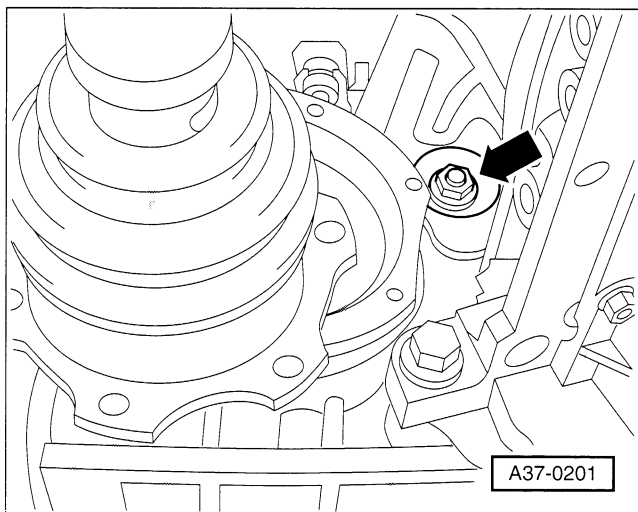
NOTE —

When tying up axle shafts use care not to damage the paint on the body panels or the axles, or the axle boots.



- Remove bolts for pendulum mount (arrows A and B).

37-42 AUTOMATIC TRANSMISSION



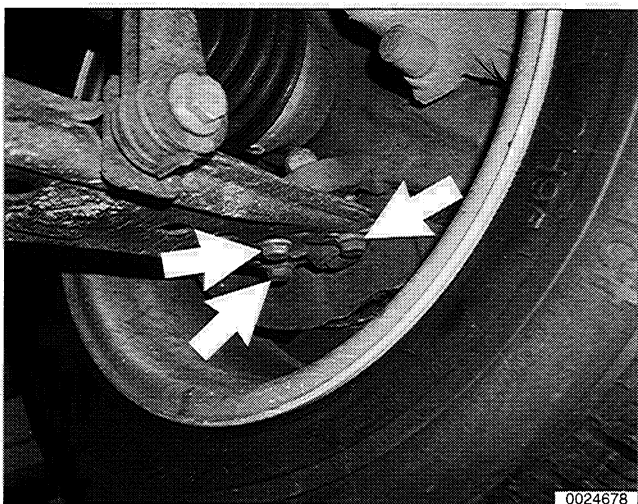
- Remove access cap for torque converter nuts.

- Remove torque converter nuts (**arrow**) (quantity 3) with special socket (V/175 or equivalent).

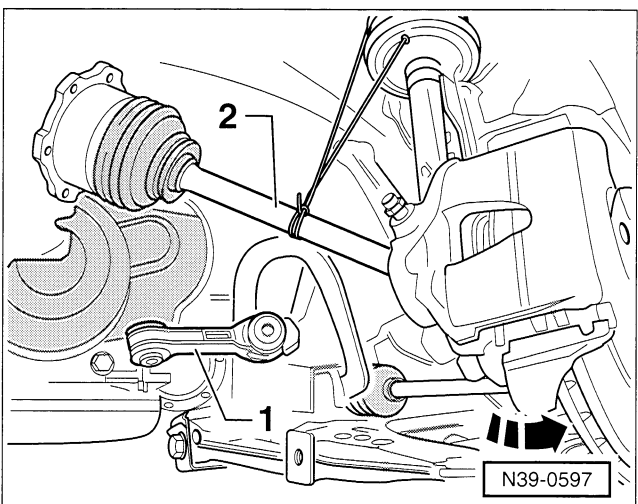
NOTE —

Turn crankshaft 120° to access each nut.

- Turn steering fully to left.



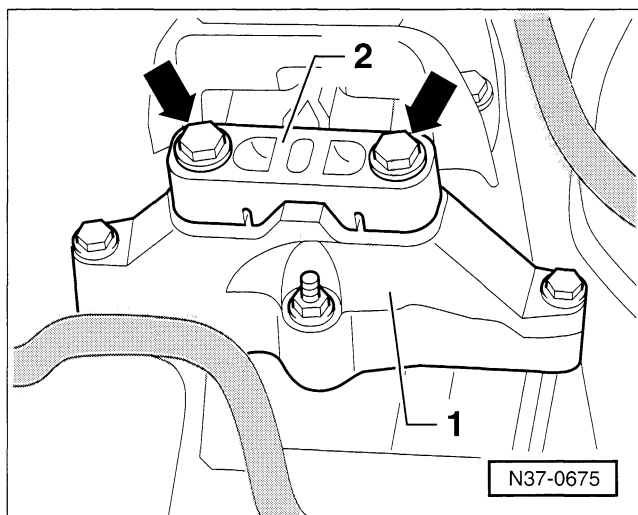
- Mark installation position of ball joint bolts (**arrows**) on left control arm and remove left control arm bolts.



- Unbolt left stabilizer connecting link (1) from control arm and turn connecting link upward. Swing wheel bearing housing outward and guide left drive shaft (2) out between subframe and transmission.

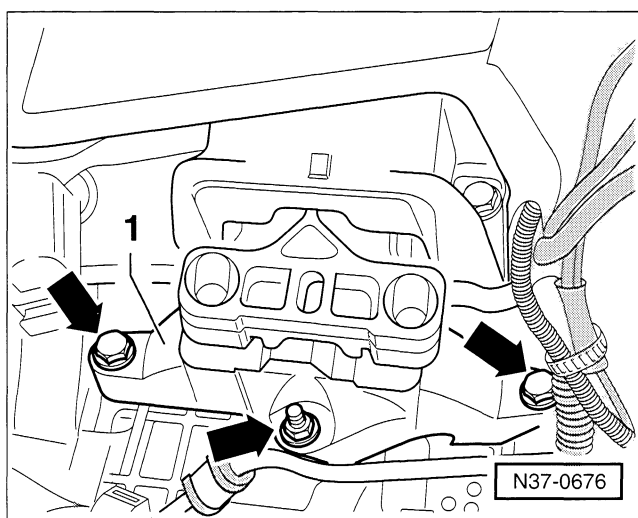
- Lift drive shaft and secure to suspension strut with wire as shown.

AUTOMATIC TRANSMISSION 37-43



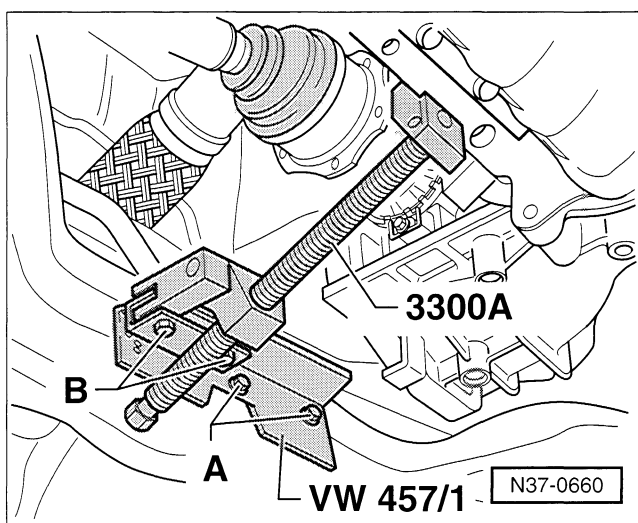
- Remove mounting bolts (**arrows**) for left engine/transmission mount (2) from support (1).

- Carefully tilt the engine/transmission assembly down by approximately 60 mm (2¼ in.) by turning the large wing nuts on the left side of the support bar.



- Remove left mount and support (1) from transmission (**arrows**).

- Disconnect exhaust at down pipe. Remove front exhaust support if necessary, see **26 Exhaust System/Emission Controls**.



- Working from underneath vehicle, bolt modified support rail VW457/1 to both pendulum support securing holes on subframe with spacers totalling 6 mm between subframe and support rail (**A**). Bolts must be M8x25.

- Secure support 3300A to support rail VW457/1 with bolts (**B**) and extend to engine as shown.

NOTE —

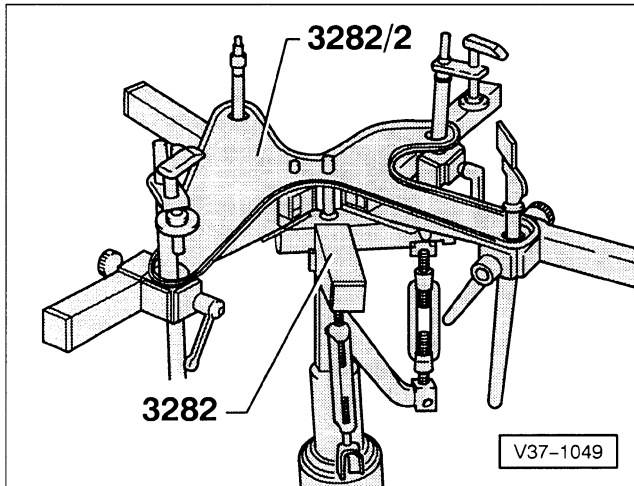
- Volkswagen special tool 457/1 must have been previously modified as described earlier under **Special tools, modifying**.

- Spacers totalling a thickness of 6 mm must be inserted between the subframe and the support rail VW 457/1.

- Carefully push engine/transmission assembly forward using a wrench on end of threaded section of 3300A.

NOTE —

- Take care to avoid damage to power steering hydraulic lines when moving engine/transmission assembly.

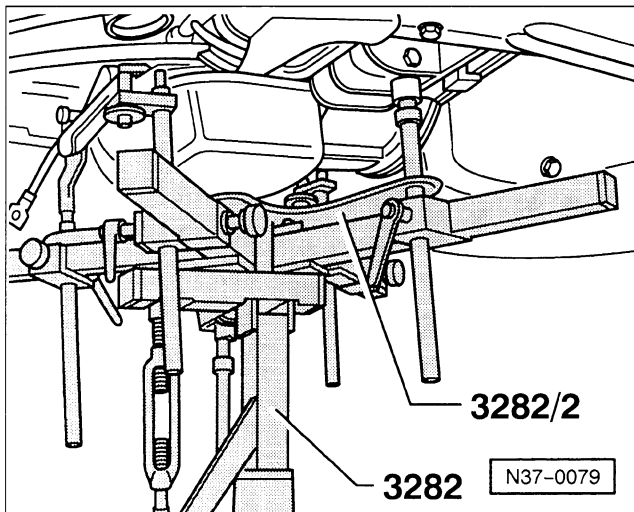


➤ Assemble transmission jack with transmission support fixture 3282, 3282/2 adjustment plate (marked 096/01M), and support/clamping elements.

- Place adjustment plate 3282/2 on support fixture 3282 noting that plate fits properly in one direction only and that embossed arrow points to the front of the vehicle.
- Align arms of support fixture with holes in adjustment plate and attach pins to arms as indicated on plate

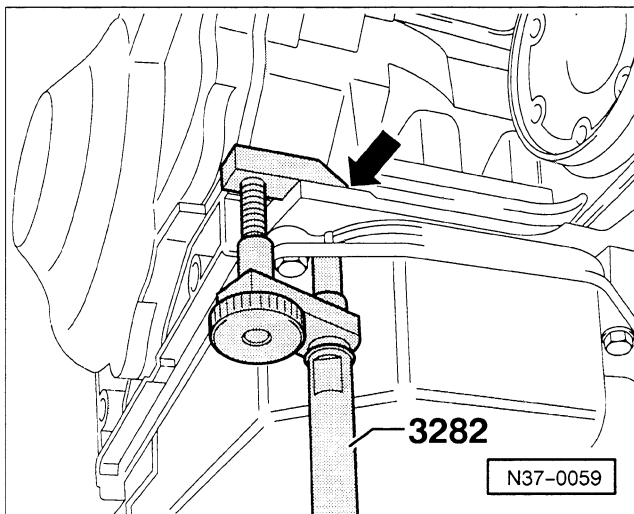
NOTE —

Arrow on adjustment plate 3282/2 must point toward front of vehicle.



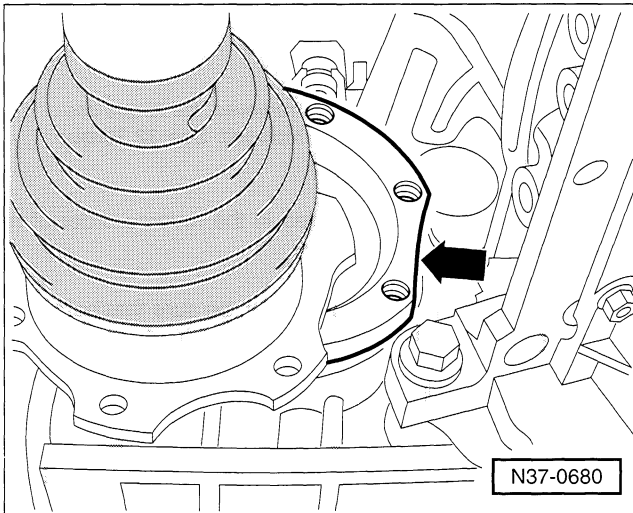
➤ Place assembled transmission jack under transmission.

- Align adjustment plate to transmission and lock safety supports on transmission jack.



➤ Place safety support pin (**arrow**) on oil pan and secure it to transmission housing.

AUTOMATIC TRANSMISSION 37-45



- Turn right side transmission drive flange until the flat section (**arrow**) is vertical.

- Remove lower engine/transmission securing bolts.

WARNING —

Before unbolting lower engine-to-transmission mounting bolts be sure to support the weight of the vehicle at all four corners with jack stands designed for that purpose. Removal of the transmission can upset the weight balance of the vehicle and cause it to fall off the lift.

- Separate transmission from engine while pushing torque converter away from drive plate so that it stays within the transmission bell housing.

WARNING —

The torque converter should come off with the transmission. Secure the torque converter to the transmission to prevent damage.

- Lower transmission slightly.

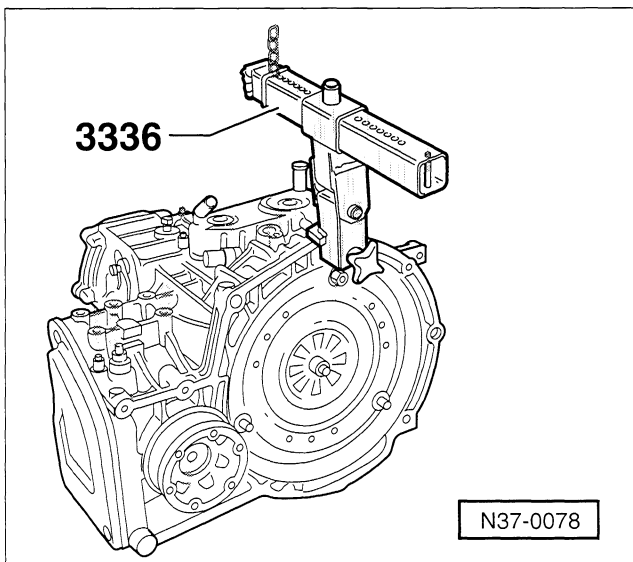
NOTE —

While lowering transmission, guide power steering hydraulic line past transmission.

- Tilt transmission by turning the large wing nuts on the left side of the support bar. While lowering, ensure transmission end cover is guided closely past wheel housing.
- Swivel transmission and carefully lower.

NOTE —

- *While lowering transmission, guide right axle joint at engine past support 3300 A.*
- *Be careful not to let multi-function switch contact engine/transmission mount.*
- *Secure torque converter to prevent it from falling out.*



Transmission, transporting (01M)

Due to size, bulk, and especially weight, the transmission is best moved by fitting the adjustable transmission lifting beam, 3336. Use of this support in conjunction with a suitable shop crane will minimize the chance of damage to the transmission.

- Position support arm on sliding piece with locking pin so that 8 holes are visible.

- Lift transmission with 3336 attached with a suitable shop crane and transport to work area or shipping container to avoid personal injury and/or damage to transmission.

Transmission, installing (01M)**NOTE —**

If torque converter has been removed, the torque converter seal will need to be replaced. See 32 Torque Converter.

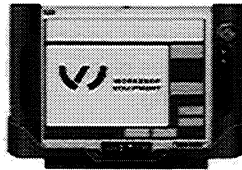
The transmission is installed in the reverse order of removal, noting the following:

- When installing torque converter, be sure that both drive pins engage in the ATF pump inner wheel recesses.
- 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 (01M)**.
- Check and top up ATF level.
- Connect scan tool VAG 1551/1552, VAS 5051/5052 or equivalent, or scan tool computer program and check diagnostic trouble code memory and initiate basic settings.
- Have the front wheels professionally aligned once installation is complete.
- When installing transmission, ensure that mounts and bolts are installed without any pre-load, tension, or stress.

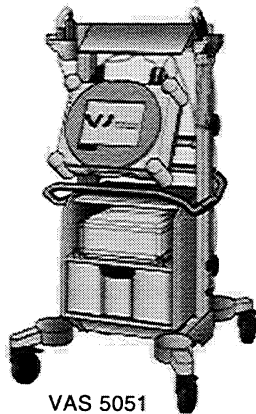
Use the following tightening torques when installing the automatic transmission. Note that some bolts are torque-to-yield, or stretch bolts and must be replaced as noted.

Tightening torques

- Drive shaft to transmission drive flange (tighten diagonally)
 - Stage I 10 Nm (7½ ft-lb)
 - Stage II (M8) 40 Nm (30 ft-lb)
 - Stage II (M10) 70 Nm (52 ft-lb)
- Torque converter to drive plate. 60 Nm (44 ft-lb)
- Transmission to engine
 - (M10) 60 Nm (44 ft-lb)
 - (M12) 80 Nm (59 ft-lb)
- Transmission to oil pan (M10) 25 Nm (18 ft-lb)
- Connecting link to control arm 45 Nm (33 ft-lb)
- Wheel bolts to wheel hub 120 Nm (89 ft-lb)
- Protective cover for drive axle boot to engine block 35 Nm (26 ft-lb)



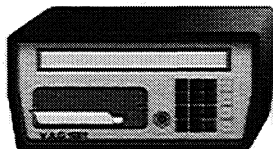
VAS 5052



VAS 5051



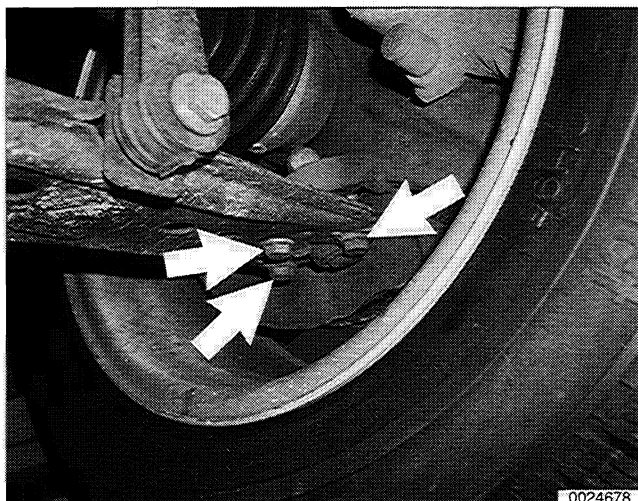
VAG 1552



VAG1551

0024463

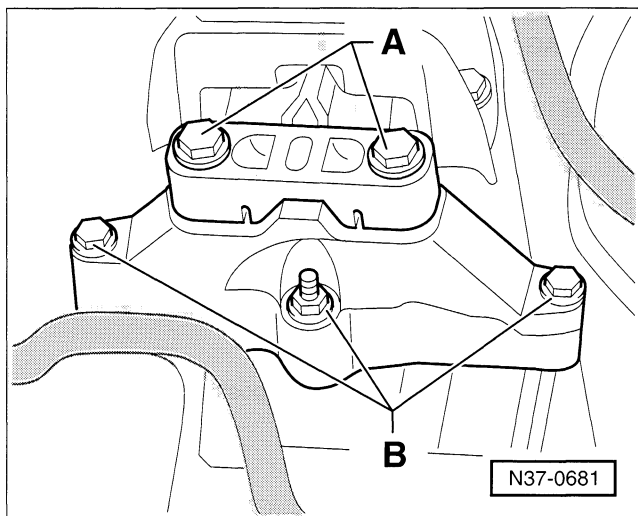
AUTOMATIC TRANSMISSION 37-47



➤ Replace bolts (**arrows**) for ball joint to control arm.

Tightening torque

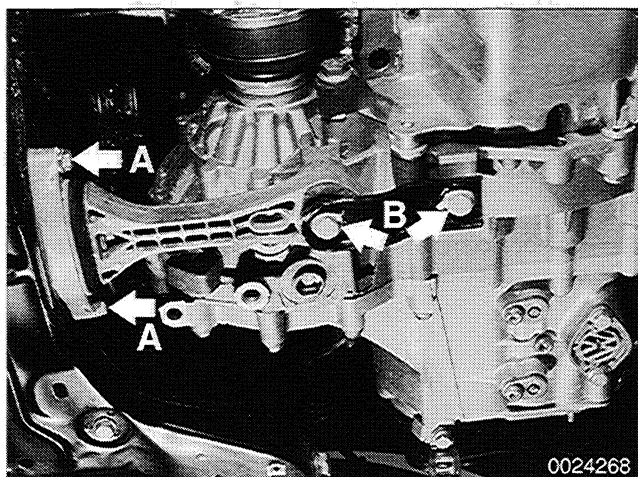
- Always replace bolts
- Ball joint to control arm 20 Nm (15 ft-lb)
plus ¼ turn (90°)



➤ Replace bolts for transmission mount (**A**) and support (**B**).

Tightening torque

- Always replace bolts
- Transmission mount (**A**) 60 Nm (44 ft-lb)
plus ¼ turn (90°)
 - Transmission support (**B**) 40 Nm (30 ft-lb)
plus ¼ turn (90°)



➤ Replace bolts for pendulum mount to body and pendulum mount bracket (**A**) and support (**B**).

Tightening torque

- Always replace bolts
- Pendulum mount to body (**A**) 20 Nm (15 ft-lb)
plus ¼ turn (90°)
 - Pendulum mount bracket (**B**) 40 Nm (30 ft-lb)
plus ¼ turn (90°)

Transmission, removing (09A)

Before beginning removal, check to ensure that the required special tools or their equivalent are readily available and modified as noted.

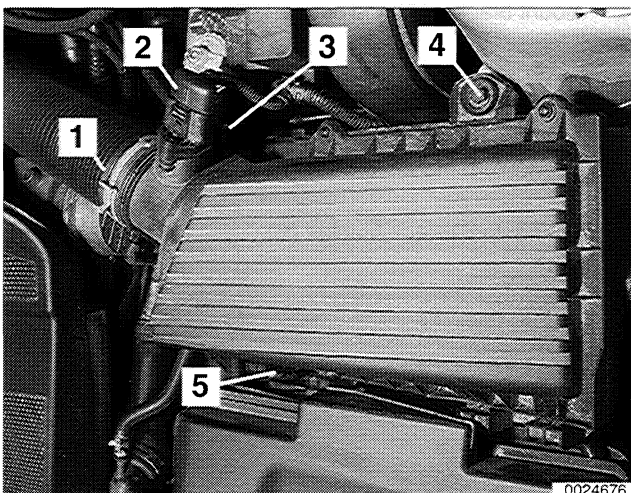
Volkswagen recommended special tools (01M)

- 10-222A transmission support kit
- 10-222A/2 hooks
- 10-222A/3 supports
- 10-222A/8 support legs
- 10-222A/12 shackles
- 3094 hose clamps
- 3282 transmission support
- 3282/32 adjustment plate
- 3300A engine support
- 3336 transmission lifting beam
- VAG 1331 torque wrench
- VAG 1332 torque wrench
- VAG 1383A engine/transmission jack
- V/175 socket
- T10099 multi-point bit, 12 mm
- T10099/1 multi-point bit, 14 mm
- T10036 support rails

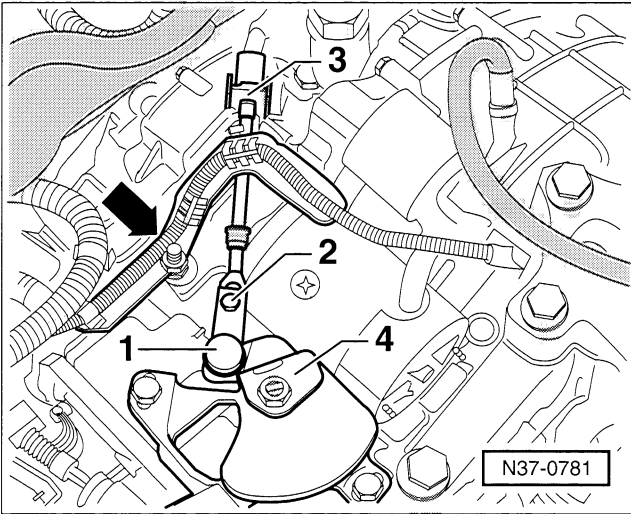
NOTE —

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

- Place selector lever into the P position.
- Remove engine cover.
- Disconnect battery ground (GND) strap from battery negative (–) terminal. See the **Cautions** at the beginning of this repair group regarding battery disconnection.
- Disconnect battery positive (+) cable and remove battery and battery tray. See **27 Engine Electrical**.
- Remove intake air hose (1), and harness connector (2), from Mass Air Flow (MAF) Sensor.
- Remove vacuum hose (3) to air cleaner near MAF, where equipped.
- Remove complete air cleaner housing assembly by unscrewing bolts (4) and (5).



AUTOMATIC TRANSMISSION 37-49

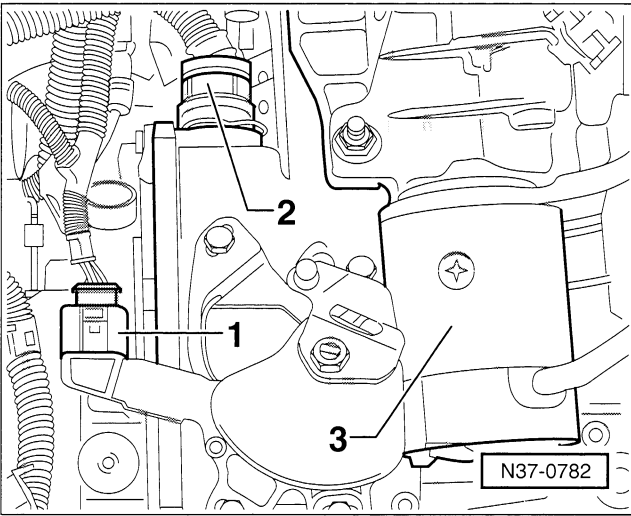


Remove harness retainer (arrow) from transmission.

- Move selector lever to park, **P**. Using a screwdriver, pry selector lever cable (1) off selector shaft lever (4). Adjustment bolt (2) should not be loosened.
- Remove clip (3) at selector lever cable support bracket and remove selector lever cable.

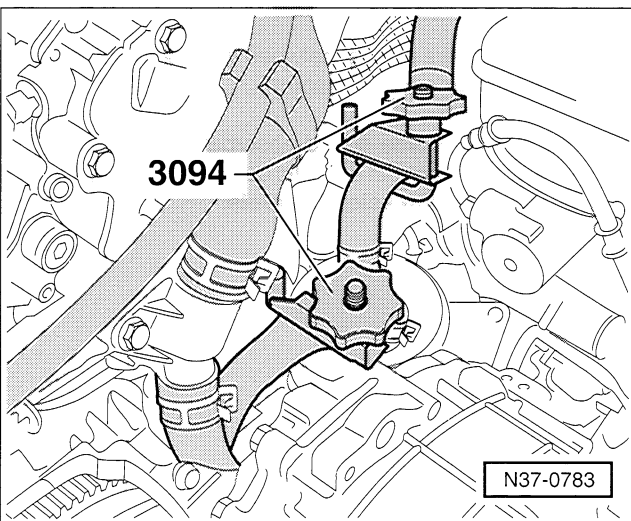
NOTE —

Do not bend or kink selector lever cable.



Disconnect harness connector for Transmission Range (TR) switch (1).

- Turn locking lever (2) and disconnect harness connector for transmission wiring harness.
- Disconnect electrical connections on starter motor.
- Remove starter (3). See **27 Engine Electrical**.



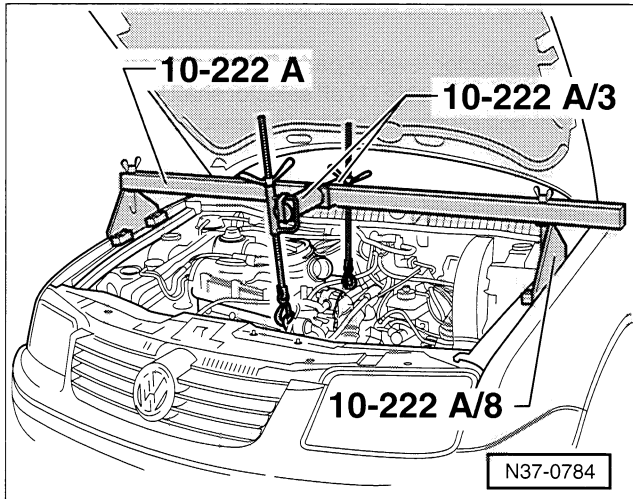
Clamp-off ATF cooler hoses with special tool 3094 clamps or equivalent and detach at ATF cooler. Seal ATF cooler with clean plugs.

- Remove upper engine/transmission bolts with multi-point bit T10099/1 or equivalent.
- Disconnect fuel line/fuel hose from cylinder head cover.
- Check for interference with hose and cable connections in area of engine mounting eye near attaching point for support 10-222A. Remove or reposition as required.

WARNING —

• Before installing the engine lifting hooks, disconnect all hoses and wiring in the vicinity of the engine lifting eyes, to prevent damage.

• Do not position engine sling legs on the fender mounting bolts.

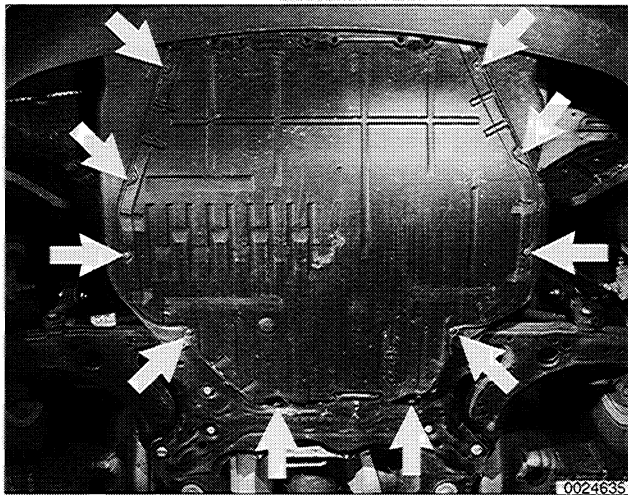


Attach engine support tool 10-222A with appropriate adapters and legs as shown. Adjust the support until the weight of the engine is fully supported.

- Remove left front wheel bolts.
- Raise vehicle and support with suitable jack stands or lift. See **0 Maintenance** for proper lifting procedure.

WARNING —

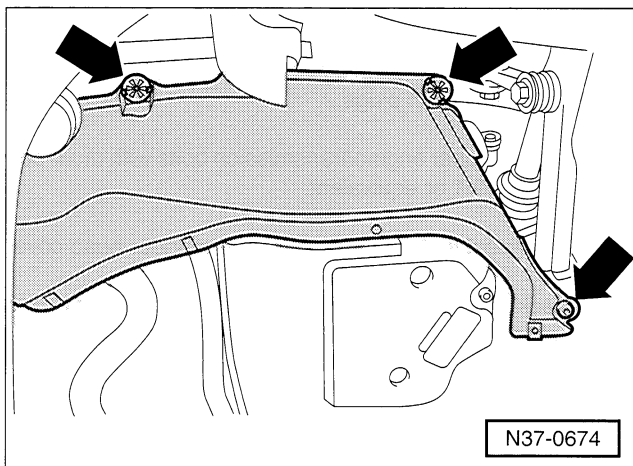
Observe all warnings and cautions associated with lifting vehicle in **0 Maintenance**.



Remove center sound absorber panels (belly pans) (arrows).

NOTE —

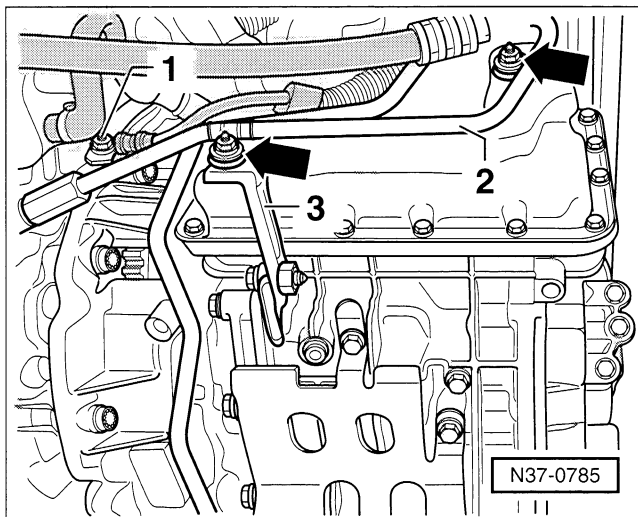
Some sound insulator fasteners are best removed and re-installed with long needle nose pliers.



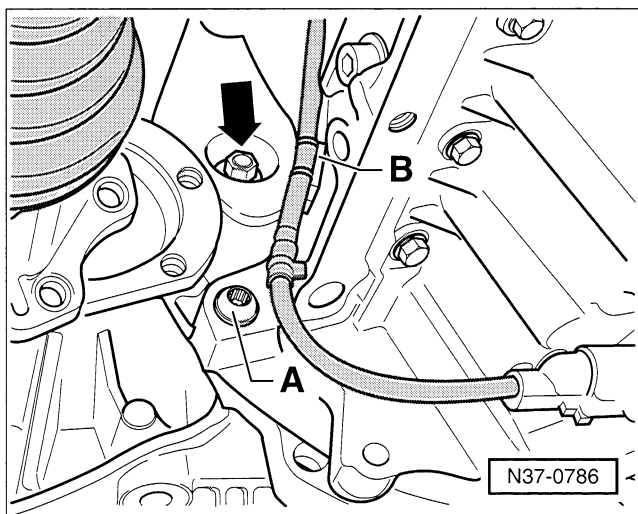
Remove left sound absorber panel (belly pan) (arrows).

- Remove intake air duct between intake air cooler and turbocharger from body support.
- Remove right side sound absorber panel. remove front exhaust system with catalytic converter. See **26 Exhaust System and Emission Controls**.

AUTOMATIC TRANSMISSION 37-51



- Remove ground strap (1) from retainer on transmission.
- Remove power steering hydraulic line (2) from rear of transmission (**arrows**).
- Remove retainer (3).
- Remove power steering hydraulic line from rear of transmission (in area of pendulum support) and secure (tie) out of the way with wire.
- Remove retaining bracket from valve body cover.
- Unbolt both drive shafts at transmission drive flanges and secure (tie) up as high as possible.

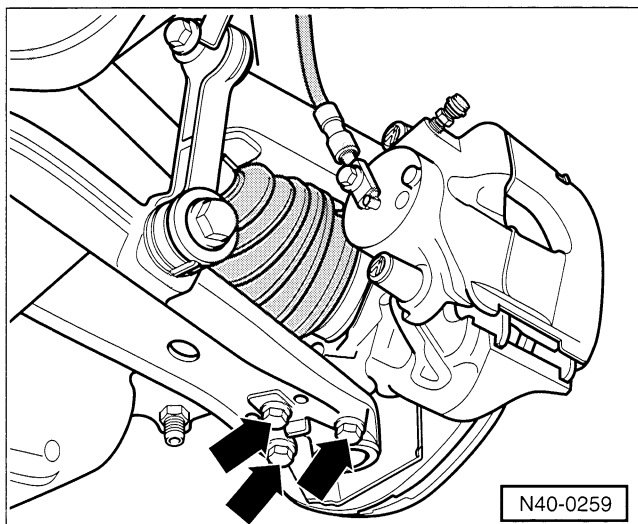


- Remove lower rear engine/transmission securing bolt (A).
- Remove access cap for torque converter nuts.
- Remove torque converter nuts (**arrow**) (quantity 3) with special socket (V/175 or equivalent).

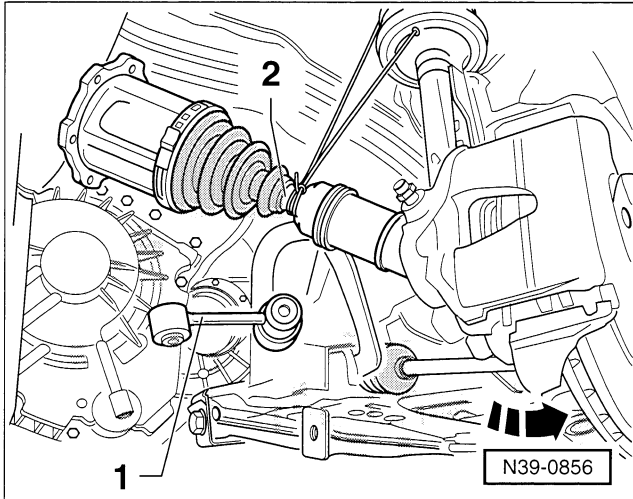
NOTE —

Turn crankshaft 120° to access each nut.

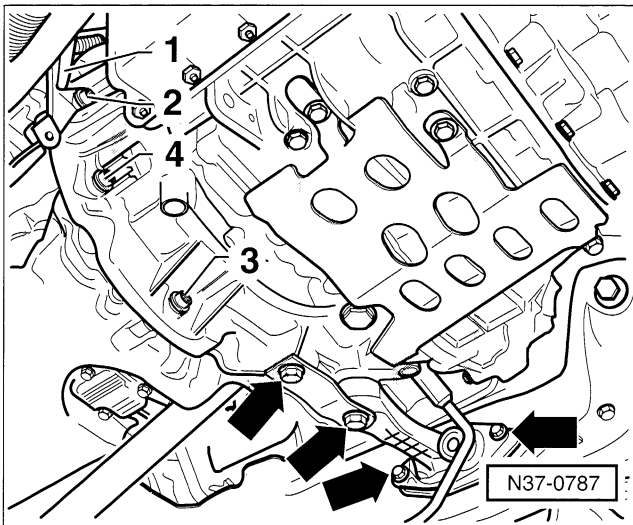
- Loosen retainer (B) for oil level/temperature sensor cable and turn to the side.
- Turn steering fully to left.



- Mark installation position of ball joint bolts (**arrows**) on left control arm and remove left control arm bolts.



- Unbolt left stabilizer connecting link (1) from control arm and turn connecting link upward. Swing wheel bearing housing outward and guide left drive shaft (2) out between subframe and transmission.
- Lift drive shaft and secure (tie) to suspension strut with wire as shown.

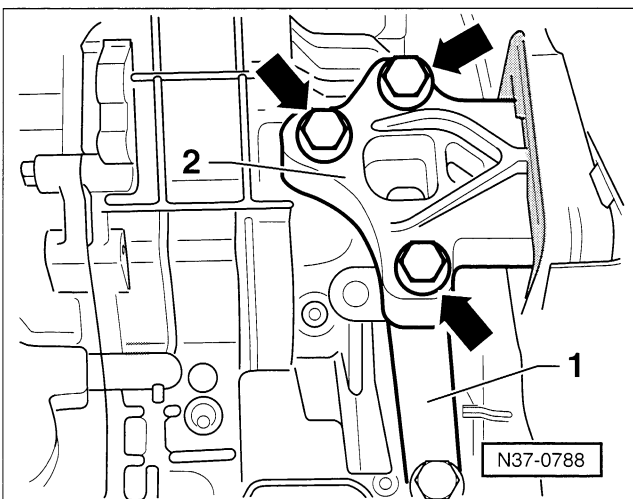


- Remove lower engine/transmission bolts (2, 3).
- Remove ground strap retainer (1) from transmission.
- Remove transmission shield/

NOTE —

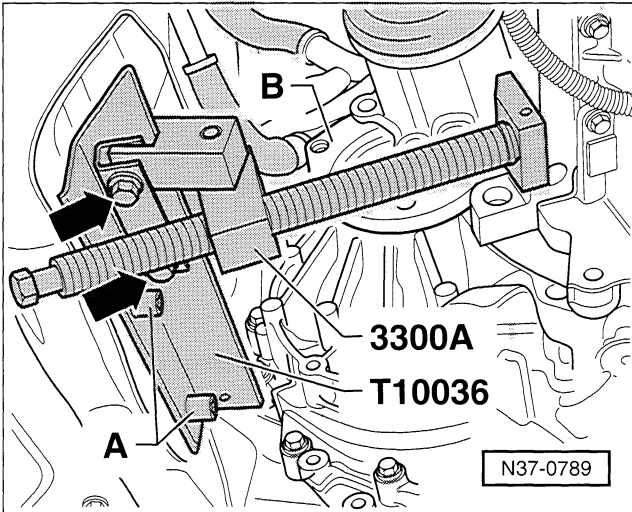
Do not remove bolt (4) at this time.

- Remove pendulum support.



- Remove left assembly (2) mounting bolts (**arrows**) from left mount (1).
- Carefully tilt the engine/transmission assembly down by approximately 90 mm (3 5/8 in.) by turning the large wing nuts on the left side of the support bar.

AUTOMATIC TRANSMISSION 37-53

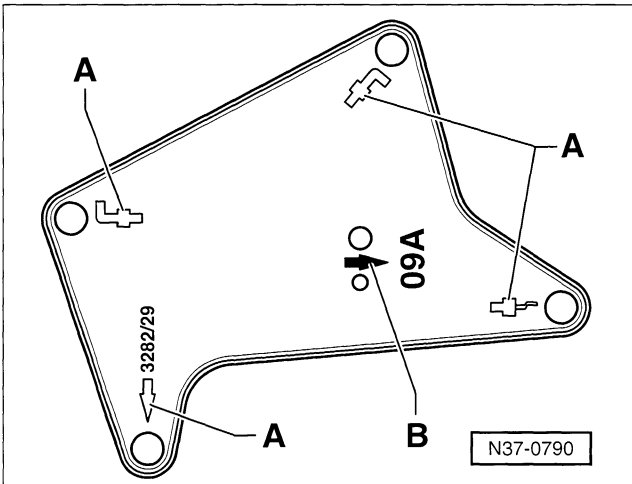


Turn right side transmission drive flange (B) until the flat section is vertical.

- Bolt support rail T10036 to both pendulum support securing holes on subframe (A) and tighten.
- Secure support 3300A to support rail T10036 with bolts (arrows) and extend to engine as shown.
- Carefully push engine/transmission assembly forward using a wrench on end of threaded section of 3300A.

NOTE —

Take care to avoid damage to power steering hydraulic lines when moving engine/transmission assembly.

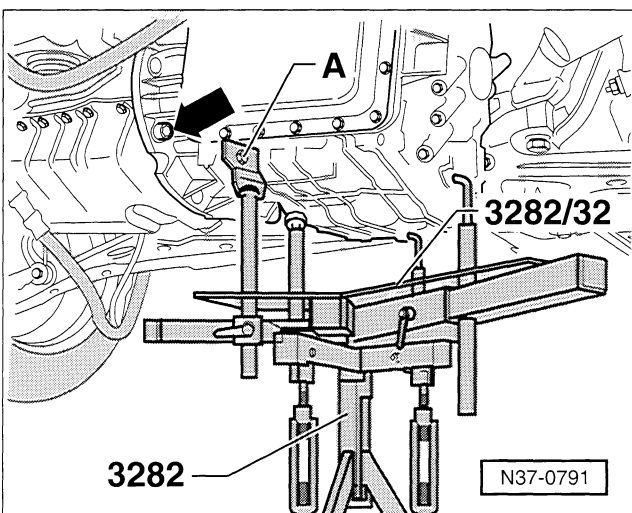


Assemble transmission jack with transmission support fixture 3282, 3282/32 adjustment plate (marked 09A), and support/clamping elements.

- Place adjustment plate 3282/32 on support fixture 3282 noting that plate fits properly in one direction only and that embossed arrow points to the front of the vehicle.
- Align arms of support fixture with holes in adjustment plate and attach pins to arms as indicated on plate
- Symbols on plate (A, B) indicate type of clamps required.

NOTE —

Arrow on adjustment plate 3282/32 must point toward front of vehicle.

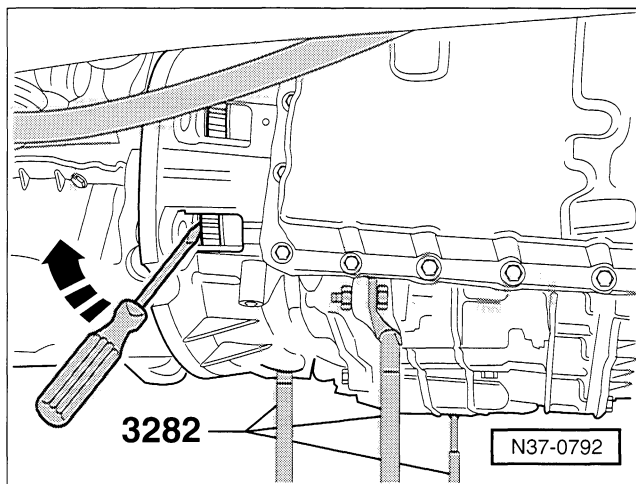


Place assembled transmission jack under transmission.

- Align adjustment plate to transmission and lock safety supports on transmission jack.
- Secure transmission to support 3282 with bolt (A).
- Remove engine/transmission bolt (arrow).

WARNING —

Before unbolting lower engine-to-transmission mounting bolts be sure to support the weight of the vehicle at all four corners with jack stands designed for that purpose. Removal of the transmission can upset the weight balance of the vehicle and cause it to fall off the lift.



- Separate transmission from engine while pushing torque converter away from drive plate (**dashed arrow**) so that it stays within the transmission bell housing.

WARNING —

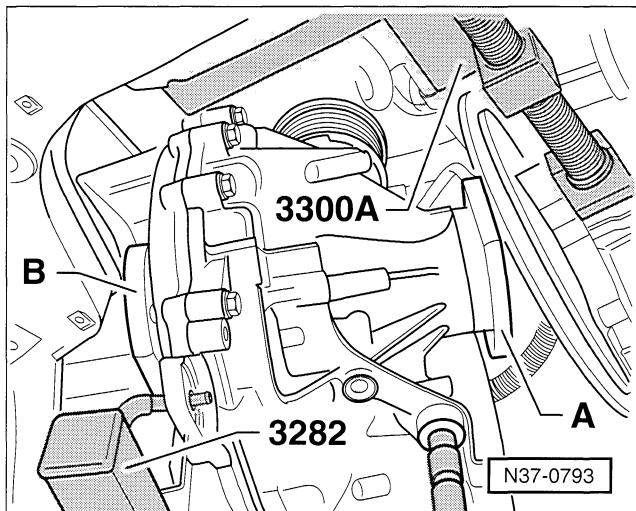
The torque converter should come off with the transmission. Secure the torque converter to the transmission to prevent damage.

- Lower transmission slightly.

NOTE —

While lowering transmission, guide power steering hydraulic line past transmission.

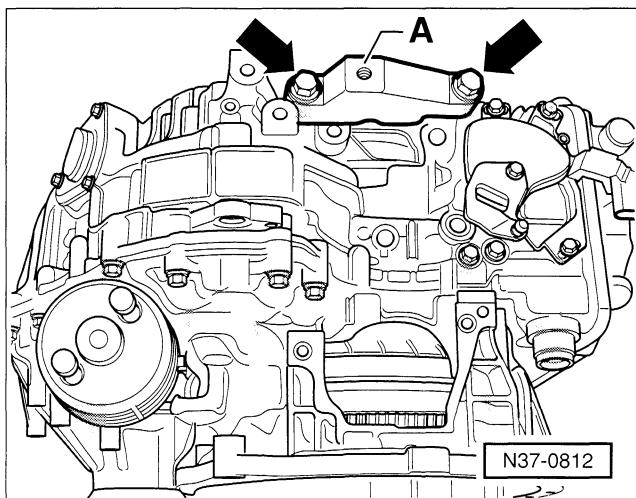
- Swing transmission towards subframe.



- Lower transmission carefully and guide right side drive flange shaft (**A**) in area of engine drive plate and left side drive flange (**B**) out past subframe.

NOTE —

- While lowering transmission, use transmission support 3282 to change tilt angles.
- Secure torque converter to prevent it from falling out.

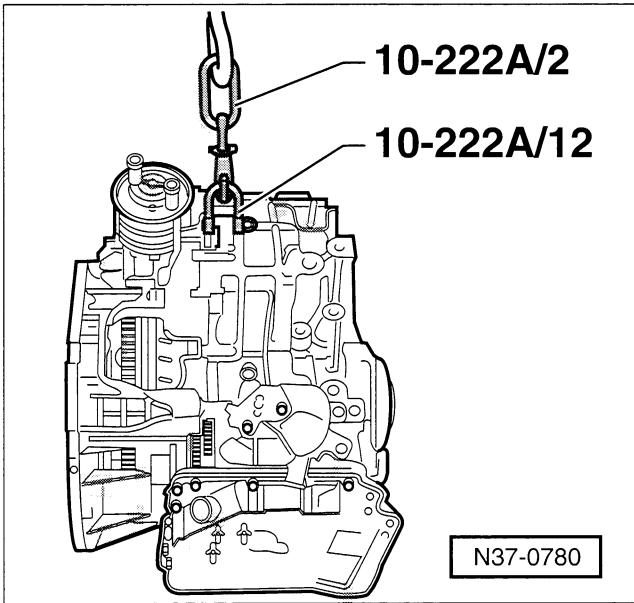


- If transmission is to be replaced, unbolt (**arrows**) original mount (**A**) and transfer to new unit.

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)

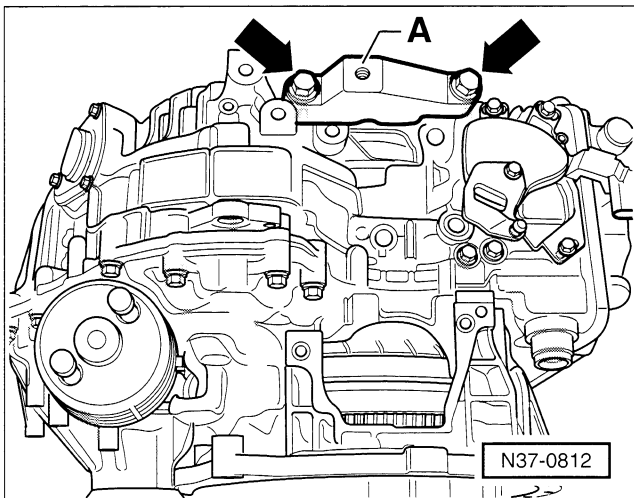
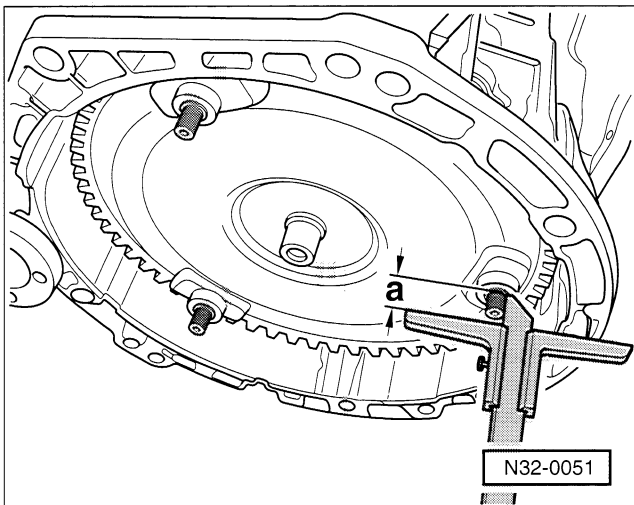
The transmission is installed in the reverse order of removal, noting the following:

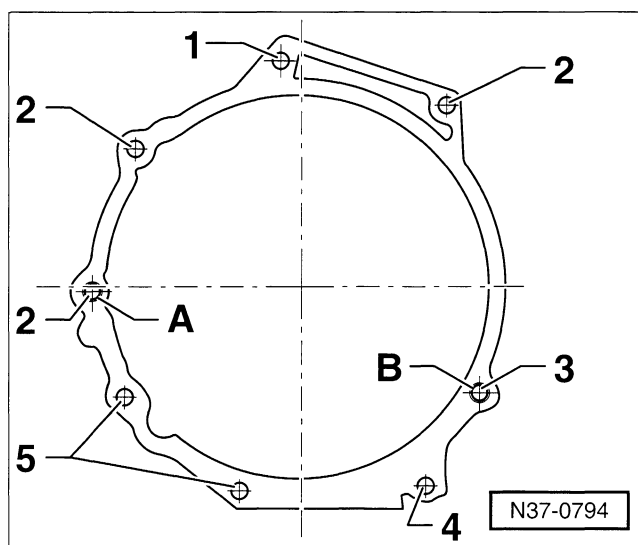
- Install torque converter.
- The torque converter is installed correctly when the distance (a) between the transmission housing flange and the machined contact surface for the securing studs is as specified.
 - 21 mm (0.827 in) for 4-cylinder engines
 - 17 mm (0.669 in) for 6-cylinder engines
- If distance (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)**.





- Check and top up ATF level.
- Connect scan tool VAG 1551/1552, VAS 5051/5052 or equivalent, or scan tool computer program and check diagnostic trouble code memory and initiate basic settings.
- It is usually advisable to have the front wheels professionally aligned once installation is complete.
- When installing transmission, ensure that mounts and bolts are installed without any pre-load, tension, or stress.

Use the following tightening torques when installing the automatic transmission. Note that some bolts are torque-to-yield, or stretch bolts and must be replaced as noted.

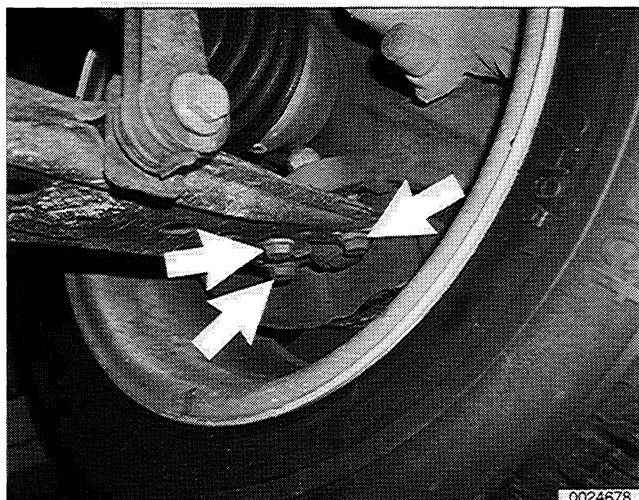
Transmission-to-engine bolt specifications and tightening torques for 4-cylinder engines are listed below in.

Fastener	Size	Qty.	Tightening torque
1	M12 X 40	1	80 Nm (59 ft-lb)
2	M12 X 60	3	80 Nm (59 ft-lb)
3	M12 X 70	1	80 Nm (59 ft-lb)
4	M10 X 70	1	45 Nm (33 ft-lb)
5	M10 X 55	2	45 Nm (33 ft-lb)
A & B	Dowel sleeves	2	

Tightening torques

- Drive shaft to transmission drive flange (tighten diagonally)
 - Stage I 10 Nm (7½ ft-lb)
 - Stage II (M8) 40 Nm (30 ft-lb)
 - Stage II (M10) 70 Nm (52 ft-lb)
- Torque converter to drive plate. 60 Nm (44 ft-lb)
- Transmission to engine
 - (M10) 60 Nm (44 ft-lb)
 - (M12) 80 Nm (59 ft-lb)
- Transmission to oil pan (M10) 25 Nm (18 ft-lb)
- Connecting link to control arm 45 Nm (33 ft-lb)
- Wheel bolts to wheel hub 120 Nm (89 ft-lb)
- Power steering hydraulic line clamp nut to transmission, starter . . 25 Nm (18 ft-lb)
- Power steering hydraulic line clamp bolt to transmission 22 Nm (16 ft-lb)
- Protective cover for drive axle boot to engine block 35 Nm (26 ft-lb)

AUTOMATIC TRANSMISSION 37-57

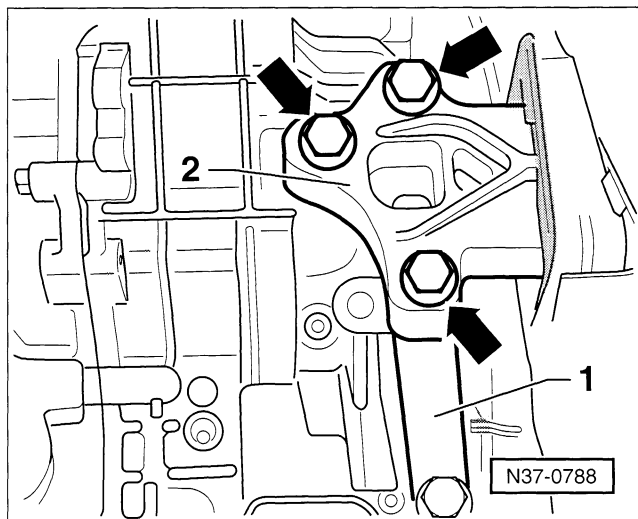


➤ Replace bolts (**arrows**) for ball joint to control arm.

Tightening torque

Always replace bolts

- Ball joint to control arm 20 Nm (15 ft-lb)
plus ¼ turn (90°)

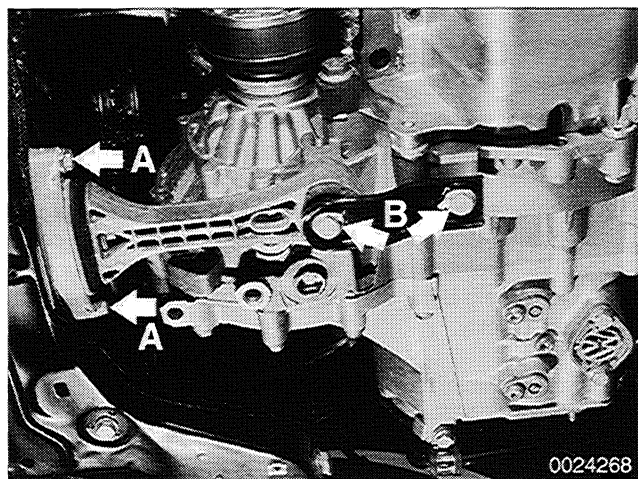


➤ Replace bolts (**arrows**) for transmission mount (1, 2).

Tightening torque

Always replace bolts

- Transmission mount (**arrows**) 50 Nm (37 ft-lb)
plus ¼ turn (90°)

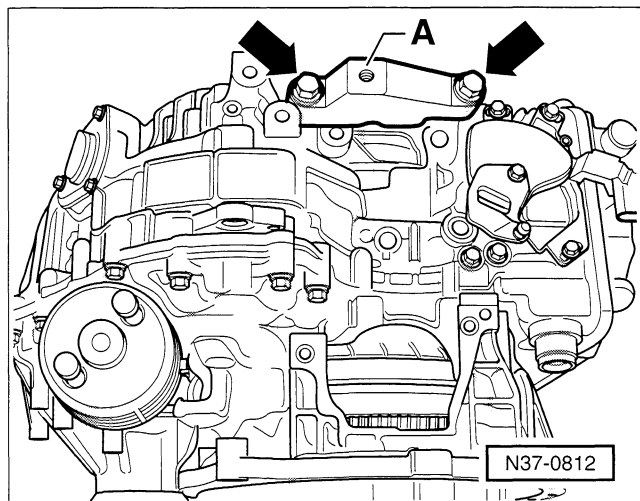


➤ Replace bolts for pendulum mount to body and pendulum mount bracket (**A**) and support (**B**).

Tightening torque

Always replace bolts

- Pendulum mount to body (**A**) 20 Nm (15 ft-lb)
plus ¼ turn (90°)
- Pendulum mount bracket (**B**) 40 Nm (30 ft-lb)
plus ¼ turn (90°)

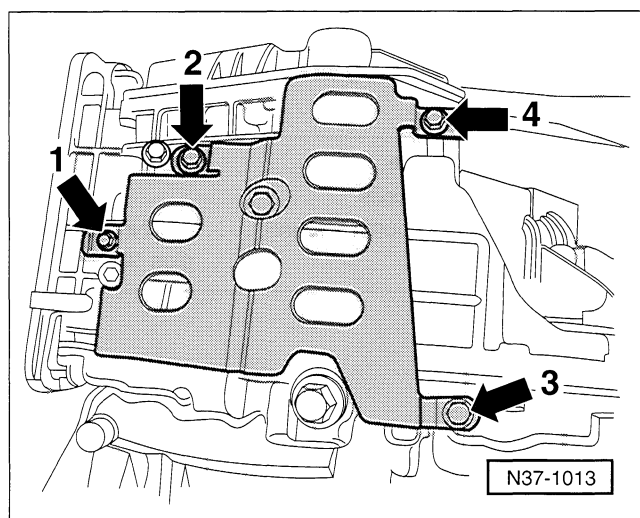


- Replace bolts (**arrows**) for transmission mount (**A**) to transmission.

Tightening torque

Always replace bolts

- Transmission mount (**A**) 50 Nm (37 ft-lb)
plus ¼ turn (90°)



- Torque bolts (**arrows**) for transmission shield in sequence (**1,2,3,4**).

Tightening torque

Torque in sequence

- Transmission shield 22 Nm (16 ft-lb)

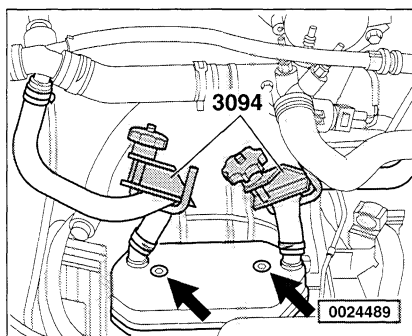
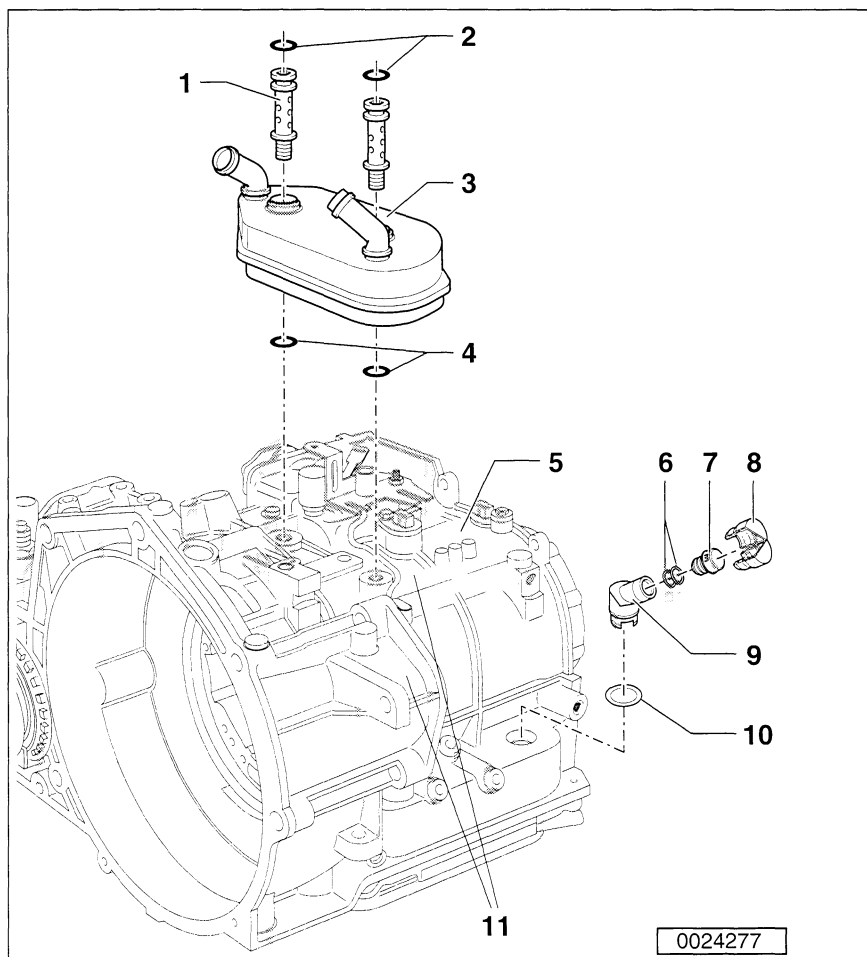
ATF COOLER

The 01M and 09A transmissions both use a cooler to control the temperature of the fluid. Hot, pressurized fluid is supplied to one section of the cooler. The heat is then transferred to the engine coolant through the other section and dissipated through the radiator. The cooler works in reverse when the engine and transmission are cold to help bring the ATF up to operating temperature more quickly.

If the vehicle has ATF in the cooling system, always check the ATF cooler. If the ATF shows evidence of engine coolant contamination, also check the cooler for internal leakage. Engine coolant contamination of the ATF will result in serious internal transmission problems, particularly with the friction materials.

ATF cooler (01M)

1. **Banjo bolts**
 - Hollow bolts
 - Tighten to 35 Nm (26 ft-lb)
2. **O-ring, upper**
 - Always replace
3. **ATF cooler**
 - See **Removing**
 - See **Installing**
4. **O-ring, lower**
 - Always replace
5. **Transmission housing**
6. **Seal**
 - Always replace
7. **Sealing/ level plug**
8. **Cap**
 - To secure ATF sealing/level plug after checking ATF level
 - Always replace
9. **ATF filler tube**
10. **O-ring**
 - Always replace
11. **Location of transmission code and production numbers**



Removing

- Clamp-off ATF cooler hoses with special tool 3094 clamps or equivalent and detach at ATF cooler.
- Seal ATF cooler with clean plugs.
- Remove banjo bolts (**arrows**) and lift cooler out.

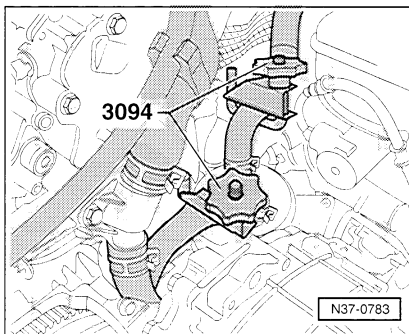
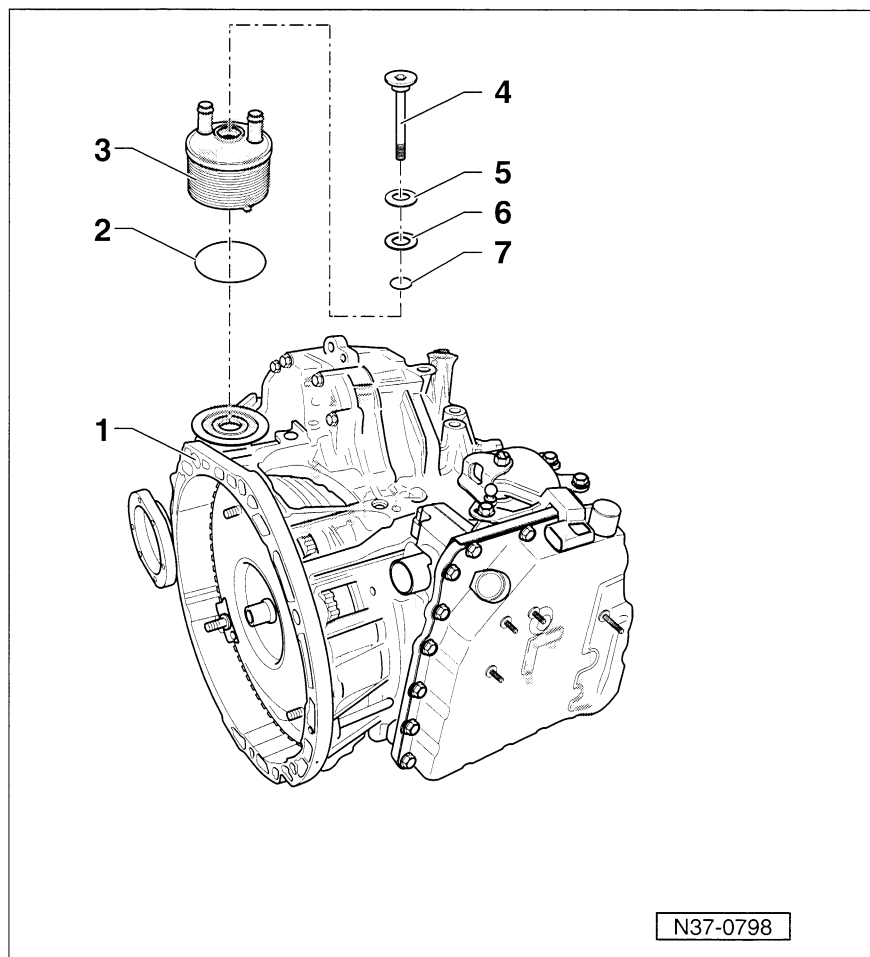
Installing

- Install in reverse order.
- Always replace O-rings.

37-60 AUTOMATIC TRANSMISSION

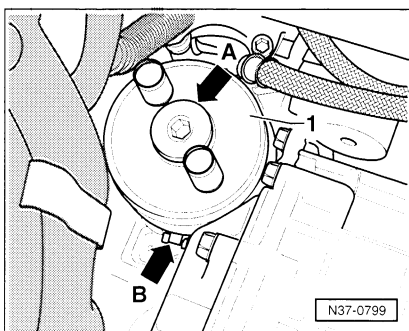
ATF cooler (09A)

1. Transmission housing
2. O-ring, large
 - Always replace
3. ATF cooler
 - See **Removing**
 - See **Installing**
4. Special bolt
 - Tighten to 40 Nm (35 ft-lb)
5. Dished washer
 - When properly installed, outer circumference touches washer, item 6 below.
6. Washer
7. O-Ring
 - Always replace



Removing

- Remove air cleaner assembly.
- Clamp-off ATF cooler hoses with special tool 3094 clamps or equivalent.
- Detach hoses at ATF cooler.
- Seal ATF cooler with clean plugs.
- Remove center special bolt and lift cooler out.



Installing

- Install in reverse order.
- Always replace O-rings.
- Install cooler (1) so that locating tab aligns with slot in transmission housing (B).
- Torque special bolt (A) to specification.