TRANSMISSION

5 Spd. Automatic Transmission 01V

00 - GENERAL, TECHNICAL DATA

TRANSMISSION IDENTIFICATION

The 5-speed automatic transmission 01V is installed in the Audi A4 2002 and up in conjunction with the 4 and 6-cylinder engines. Allocation --> **Code letters, allocation, ratios, equipment**.

Code letter allocation at transmission

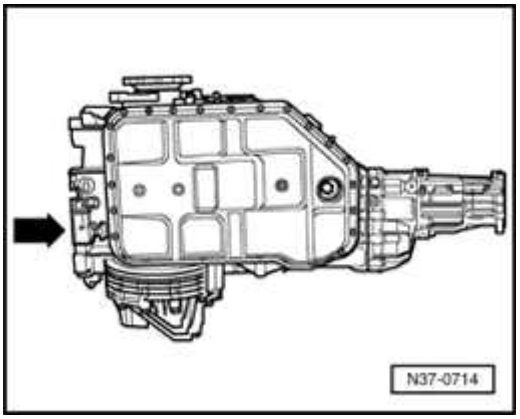


Fig. 1: Location Of Code Letters On Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Transmission code letters are located on the data plate under the transmission (arrow).

There is another identical data plate on side of transmission which is not accessible with the transmission installed.

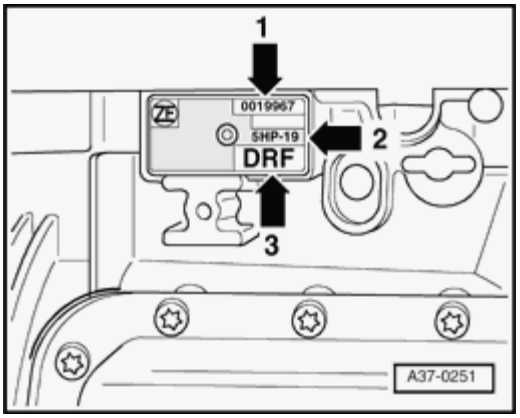


Fig. 2: Location Of Transmission Code Number And Transmission Serial Number
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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Transmission code number and transmission serial number.

Transmission serial number (arrow 1)

Transmission identification (arrow 2)

Code letter (arrow 3)

The transmission code letters are also listed on the vehicle data plates.

NOTES ON 5-SPEED AUTOMATIC TRANSMISSION 01V

Notes on 5-speed automatic transmission 01V

Self-study program number. 180 informs extensively about the function of this transmission.

Torque converter

The torque converter is equipped with a lock-up clutch. The lock-up clutch is closed load- and speed-dependant with minimum pulsations and mechanically drives all forward gears independent of slip.

Transmission

5-speed automatic transmission 01V is equipped with 5 hydraulically activated forward gears. By passing the torque converter slip, these forward gears become mechanically driven gears if the lock-up clutch is closed.

On Board Diagnostic (OBD)

Before performing service work on the automatic transmission, cause of damage must be exactly determined via "Guided Fault Finding".

"Guided Fault Finding" is performed using the tester VAS5051.

Transmission Control Module (TCM) J217 with driving situation shifting (fuzzy logic)

Driving situation- and driving resistance dependent shift point determination is performed automatically.

Advantages:

- It is shifted depending on consumption
- Highest engine performance is always available
- Individual adaptation of shift points in all driving situations
- Arbitrarily changed shift points

Shift point change when driving up- or downhill ranges

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At uphill or downhill ranges, the shifts are automatically selected dependent on the accelerator pedal position and vehicle speed via additional shift characteristics maps.

- Shift characteristics map for extreme uphill driving is adapted to the engine performance.
- Shift characteristics map for extreme downhill driving is adapted to the braking effect of the engine.

CODE LETTERS, ALLOCATION, RATIOS, EQUIPMENT

Code letters, allocation, ratios, equipment

All Wheel Drive (AWD)

Automatic transmission			01V.4	01V.4	
Transmission	Code letters		FEP	FEQ	
	Manufactured	From to	27.01	27.01	
Torque converter	Code letters		A33	F35	
Allocation	Model		Audi A4 2002 --> USA	Audi A4 2002 --> USA	
	Engine		1.8 L 5VT - 125 kW	3.0 L 5V - 162 kW * See note	
Ratios	1. Gear		3.665	3.665	
	2. Gear		1.999	1.999	
	3. Gear		1.407	1.407	
	4. Gear		1.000	1.000	
	5. Gear		0.742	0.742	
	Reverse gear		4.096	4.096	

*11 mm intermediate plate is installed between engine and transmission.

Transmission	Code letters		FEP	FEQ	
Intermediate drive-Va	Number of teeth	Drive gear	29	29	
		Output gear	35	35	
	Ratio		1.207	1.207	
Final drive-VA	Number of teeth	Drive pinion	11	11	
		Ring gear	34	34	
	Ratio		3.091	3.091	
Intermediate drive-HA	Number of teeth	Drive gear	41	41	
		Output	37	37	

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		gear			
	Ratio		0.902	0.902	
Final drive-HA	Number of teeth	Drive pinion	9	9	
		Ring gear	37	37	
	Ratio		4.111	4.111	
CAN-bus			with CAN-bus	with CAN-bus	
E-Gas			with E-Gas	with E-Gas	
Hydraulic control			Rear Fog Light Switch E18/2	Rear Fog Light Switch E18/2	

REAR FINAL DRIVE, IDENTIFICATION

Rear final drive, identification

Vehicles with all wheel drive automatic transmission 01V are equipped with rear final drive 01R.

Allocation:

-->

- **00 GENERAL, TECHNICAL DATA** for REAR FINAL DRIVE
- **00 - GENERAL, TECHNICAL DATA** for REAR FINAL DRIVE 0AR

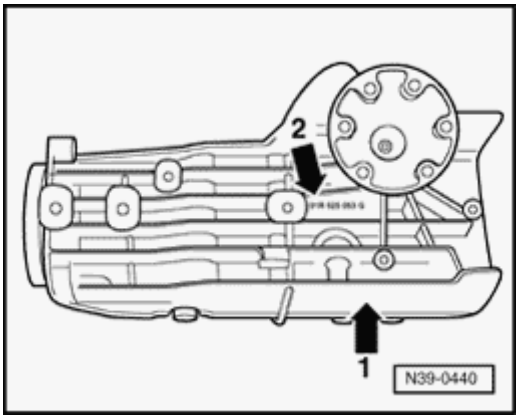


Fig. 3: Locations Of Final Drive Identification
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Location on rear final drive

Code letters and date of manufacture (arrow 1)

Rear final drive 01R (arrow 2)

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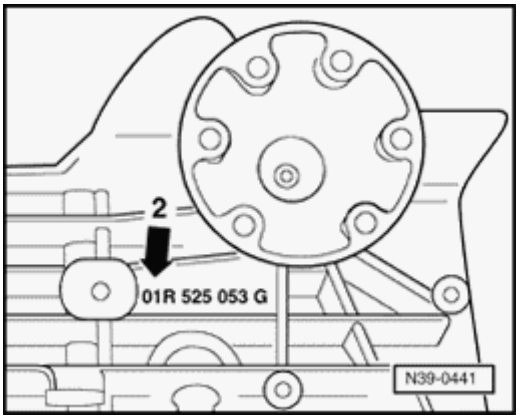


Fig. 4: Final Drive 01R
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Rear final drive 01R (arrow 2)

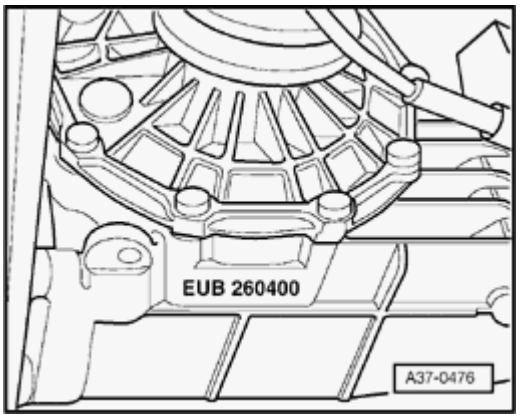


Fig. 5: Locating Code Letters And Date Of Manufacture Of Final Drive
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Code letters and date of manufacture of final drive.

Example:	EUB	26	04	00
	I	I	I	I
	I	I	I	I
	Code letters	Day	Month	Year (2000) of manufacture

Additional information depends on manufacturing.

CODE LETTERS, ALLOCATION, RATIOS

Code letters, allocation, ratios

Rear final drive	01R

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Code letters		ETQ
Manufactured	From	09.00
	To	-
Allocation	Model	Audi A4 2002 --> USA
	Engine	1.8 L 5VT - 125 kW 3.0 L 5V - 162 kW
Ratio	Final drive Z2:Z1 = i	37 : 9 = 4.111
Capacity		1.5 Liter
Specification		Gear oil GL 5 SAE 90
Drive axle flange		75.5 mm
Allocation of automatic transmission 01V all wheel drive Code letters		FEP FEQ

CAPACITY

Capacity

Planet gear

Capacity	Planet gear	Automatic transmission
New filling	9.0 L	01V
Change	approx. 2.6 - 3.0 L * See note	
Lubricant	ATF	

*Filled for life: Replacement only after repair, when oil pan is removed, up to 3 liters.

ATF is available as a replacement part (is also referred to as VW ATF).

Container size 0.5 L -part number G 052 162 A1

Container size 1.0 L -part number G 052 162 A2

Container size 20 L -part number G 052 162 A6

Only ATF available as a replacement part must be used in the planetary gear of the automatic transmission 01V.

Checking ATF level or replacing ATF --> **Automatic Transmission Fluid (ATF), checking and changing**.

Final drive-front

Capacity	Final drive-front	Automatic transmission
New filling	0.8 L	01V
Change	Filled for life, no replacement	
Lubricant	Gear oil SAE75 W90 (synthetic-oil)	

Gear oil SAE 75 W 90 (synthetic oil) is available as a replacement part in the following container sizes:

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Container size 0.5 L -part number G 052 145 A1

Container size 1.0 L -part number G 052 145 A2

Checking oil level in front final drive --> **Gear oil in front final drive, checking**.

Center differential

Capacity	Center differential	Automatic transmission
New filling	0.8 L	01V
Change	Filled for life, no replacement	
Lubricant	Gear oil SAE75 W90 (synthetic-oil)	

Gear oil SAE 75 W 90 (synthetic oil) is available as a replacement part in the following container sizes:

Container size 0.5 L -part number G 052 145 A1

Container size 1.0 L -part number G 052 145 A2

Filling transfer housing with gear oil and checking oil level --> **Gear oil in center differential, checking and topping off**.

Rear final drive

Capacity

-->

- **00 GENERAL, TECHNICAL DATA** for REAR FINAL DRIVE
- **00 - GENERAL, TECHNICAL DATA** for REAR FINAL DRIVE 0AR

ROLL STARTING AND TOWING NOTES

Roll starting and towing notes

CAUTION: When towing the vehicle, selector lever must be in position N and the vehicle must not be towed for more than 50 km and no faster than 50 km/h, since the transmission will otherwise be destroyed.

NOTE:

- **Tow starting for starting engine, e.g. if the battery is too weak or the starter does not work is not possible.**

SERVICING NOTES

Servicing notes

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The maximum possible care, cleanliness and proper tools are essential to ensure satisfactory and successful transmission repairs. The usual basic safety precautions also apply when carrying out vehicle repairs.

A number of generally applicable instructions for individual repair procedures, which are otherwise mentioned at various points in the article, are summarized here. They apply to this article.

Special tools and workshop equipment

For a complete list of special tools used in this article: see "Special tools and equipment" or "Special tools".

Transmission

- Rules of cleanliness for working on automatic transmissions --> **Rules of cleanliness for working on automatic transmissions**.
- Do not run engine with the oil pan removed or without ATF filling and do not tow vehicle.
- Clean ATF lines and ATF cooler when replacing automatic transmission --> **ATF lines and ATF cooler, cleaning**.
- Secure torque converter on removed transmission to keep it from falling out.

- Thoroughly clean all connections and the surrounding area before disconnecting.
- Check installation dimension of torque converter before installing transmission --> **Torque converter, installing**
- When installing transmission, make sure centering sleeves are correctly seated in engine.
- Place parts that have been removed on a clean surface and cover. Use foils and paper. Use lint-free cloths only!

- Carefully cover over opened components or seal, if repairs are not carried out immediately.
- Only install clean components: Only unpack replacement parts immediately prior to installation.
- Check, and if necessary correct amount of the following fluids when replacing the automatic transmission. ATF in planetary gear --> **ATF level, checking** , gear oil in front final drive --> **Gear oil in front final drive, checking** , gear oil in center differential --> **Gear oil in center differential, checking and topping off**. Capacities and specifications --> **Capacity** onward.
- When replacing the rear final drive, check and if necessary, correct oil level in rear final drive. Capacities and specifications --> **Capacity**. -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

O-rings, gaskets, seals

- Always replace O-rings, gaskets and sealing rings.
- After removing gaskets and seals, always inspect the contact surfaces at housing or shaft for burrs resulting from removal or for other signs of damage.
- Thoroughly clean housing sealing surfaces before assembling.

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- Lightly lubricate O-rings before installing, this prevents the rings from being pinched when inserting.

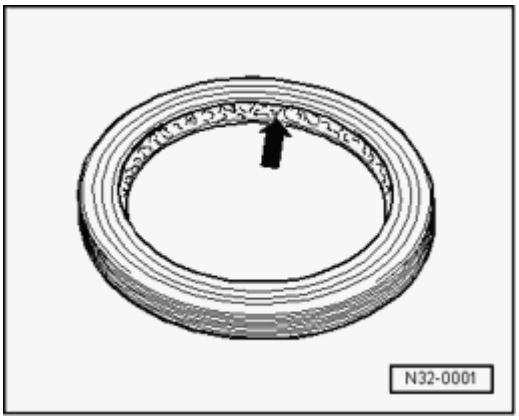


Fig. 6: Identifying Space Between Oil Seal Sealing Lips
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Before installing, fill gap between sealing lips (arrow) of radial-shaft seals half way with sealing grease 052 128 A1.
- The open side of the seals face toward the fluid to be sealed in.
- For installation, lightly coat outer circumference and sealing lip with ATF or transmission oil, depending on the installation location.
- Use only ATF in areas near ATF. Other lubricating substances cause functional problems in the hydraulic transmission control.

- When pressing in new seals, make sure the sealing lip does not run on the same point as the sealing lip of the old seal (use insertion depth tolerances).
- After installing, check and if necessary correct fluid levels in the affected area. ATF in planetary gear --> **ATF level, checking** , gear oil in front final drive --> **Gear oil in front final drive, checking** , gear oil in center differential --> **Gear oil in center differential, checking and topping off** , gear oil in rear final drive -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

Capacities and specifications --> **Capacity** onward.

Nuts, bolts

- Loosen bolts in reverse order of tightening sequence.
- Tighten and loosen bolts or nuts for securing covers and housings without tightening sequence in diagonal sequence in stages.
- Do not cant, and loosen and tighten especially sensitive parts - e.g. valve body - in diagonal manner in stages.
- The tightening torques stated apply to non-oiled nuts and bolts.

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- Always replace self-locking nuts and bolts.
- Using a wire brush, clean threads of bolts which are secured with locking compound. Next, insert bolts using AMV 185 101 A1.
- Threaded bores into which self-locking bolts or bolts with locking compound are threaded in, must be cleaned (e.g. using threaded tap). Otherwise there is danger that the bolts may shear when removed again.

Circlips

- Do not over-stretch circlips.
- Always replace damaged or over-stretched circlips.
- Circlips must be fully seated in groove.

Mount

- Install needle bearings with the lettering on the bearing (the side with thicker metal) facing the drift.
- Insert bearing with transmission oil or ATF, depending on installation location.

Valve body

- Replace transmission if shift members are burnt.

Guided Troubleshooting, Vehicle On Board Diagnostic (OBD) and Test Instruments

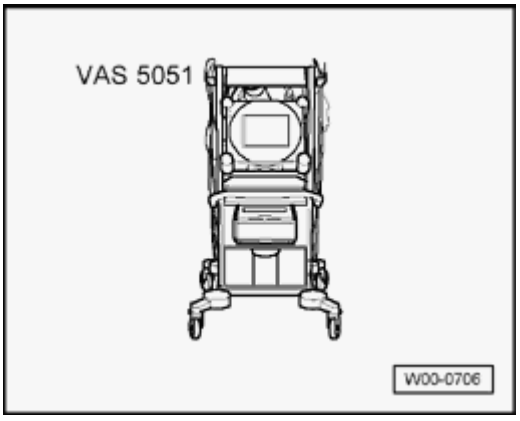


Fig. 7: Identifying Vehicle Diagnosis, Testing And Information System VAS 5051
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Before performing repairs on the automatic transmission, the malfunction cause must be determined as exact as possible via the tester VAS5051 in the operating modes "Guided Fault Finding ", " Vehicle Self-Diagnosis " and " Test Instruments."

32 - TORQUE CONVERTER

TORQUE CONVERTER

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Torque converter

CAUTION: Check installation dimension of torque converter before installing transmission --> Torque converter, installing

NOTE:

- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**
- **General repair notes --> Servicing notes.**
- **Lightly coat sealing ring with ATF. Other lubricating substances lead to functional problems in the hydraulic transmission control.**

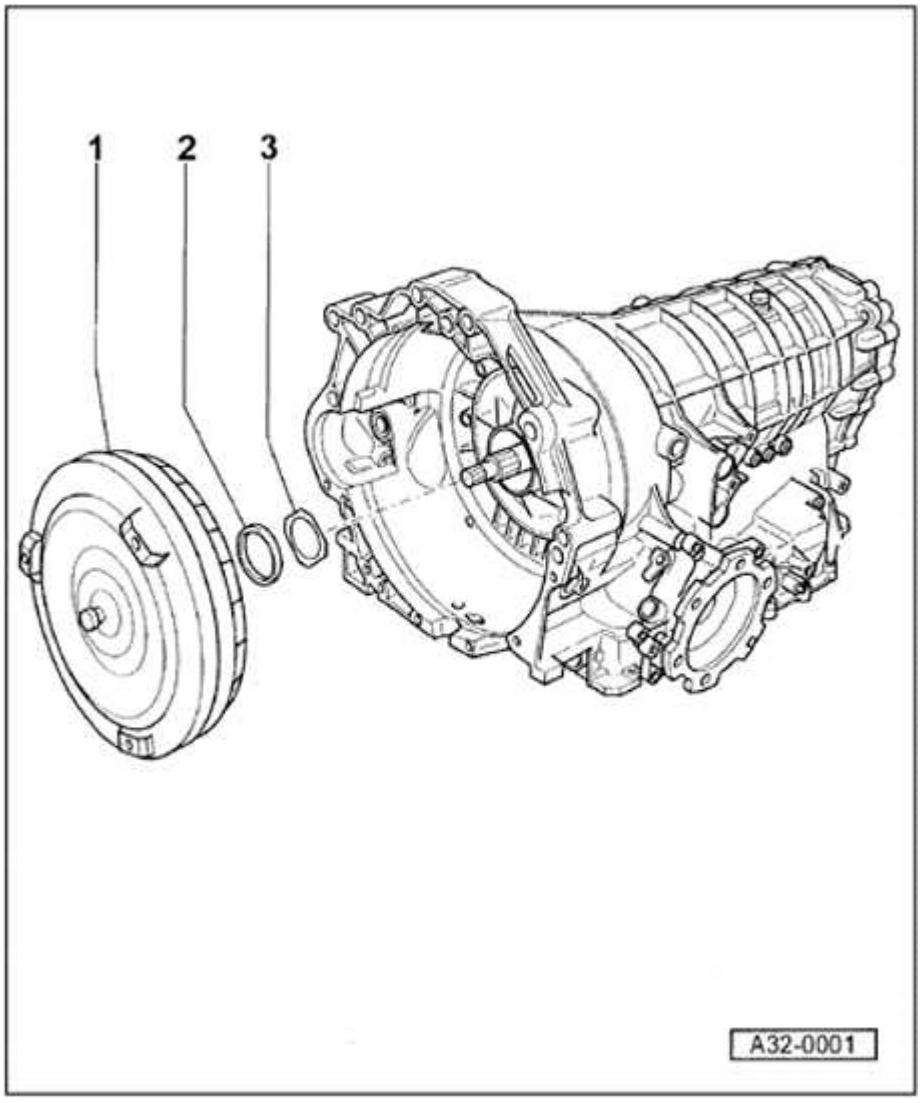


Fig. 8: Identifying Torque Converter, Seal & Contact Ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Torque converter

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- Secure on removed transmission to keep it from falling out.
- Identification --> **Torque converter, identification**
- Installing --> **Torque converter, installing**

2 - Seal

- Always replace --> **Torque converter oil seal, replacing**

3 - Contact ring

- Behind sealing ring
- Replace if damaged

Torque converter, identification

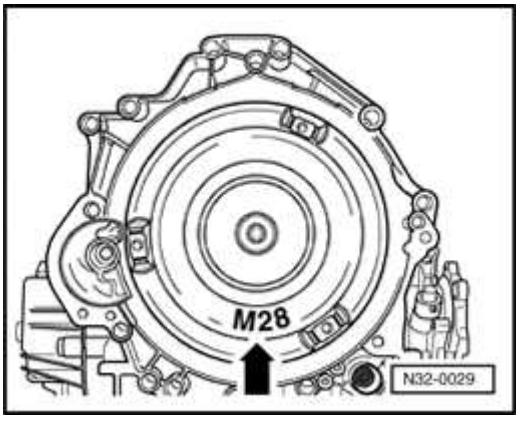


Fig. 9: Torque Converter, Identification
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Different types of torque converters exist. Identification is performed via code letters (arrow).

Allocation of torque converter/transmission --> **Code letters, allocation, ratios, equipment**.

Torque converter, checking

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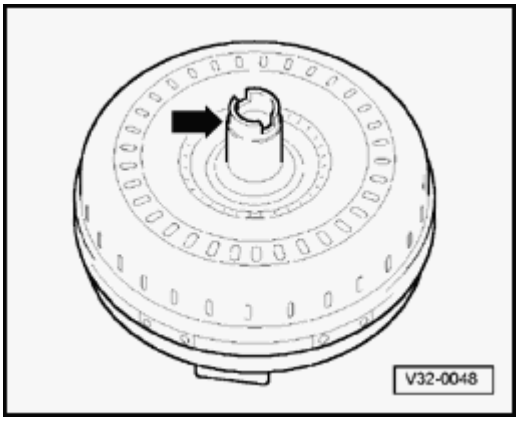


Fig. 10: Inspect Torque Converter Hub For Irregular Grooves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Checking converter hub for wear grooves (arrow).

NOTE:

- **The torque converter is welded in and must be completely replaced if damaged or in case of malfunctions.**

Torque converter, draining

Special tools, testers and auxiliary items required

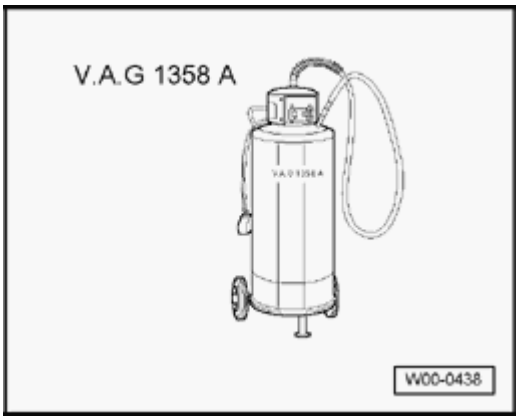


Fig. 11: Special Tool - Oil Extraction Unit V.A.G 1358 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Oil siphoning unit VAG1358A
- Oil siphoning probe VAG1358 A/1

In case of soiling of the ATF via shavings, torque converter must be drained:

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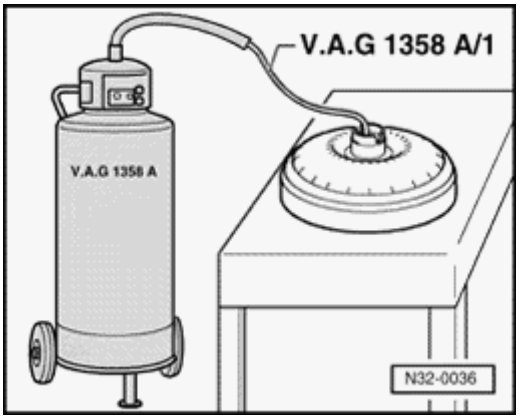


Fig. 12: Extracting ATF From Torque Converter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drain ATF from torque converter using oil siphoning unit VAG1358A and Oil siphoning probe VAG1358 A/1.

Torque converter oil seal, replacing

Special tools, testers and auxiliary items required

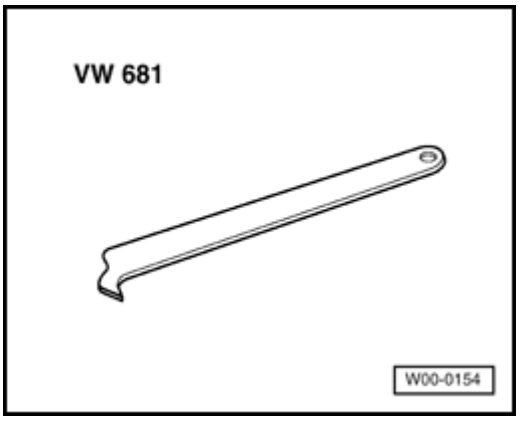


Fig. 13: Special Tool - Oil Seal Extractor Lever VW 681
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Extractor lever VW681

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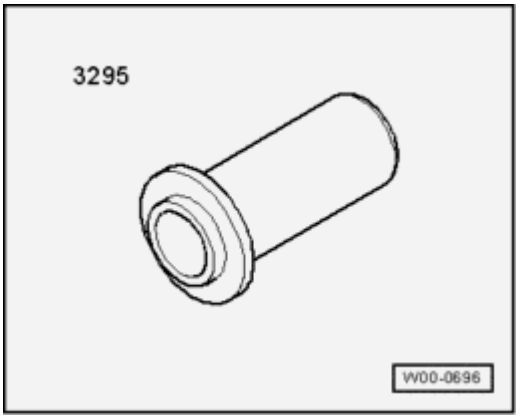


Fig. 14: 3295 Thrust Piece
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Thrust piece 3295

Removing

- Removing transmission --> **Transmission, removing and installing**.
- Secure transmission to assembly stand --> **Transmission, attaching to assembly stand**.

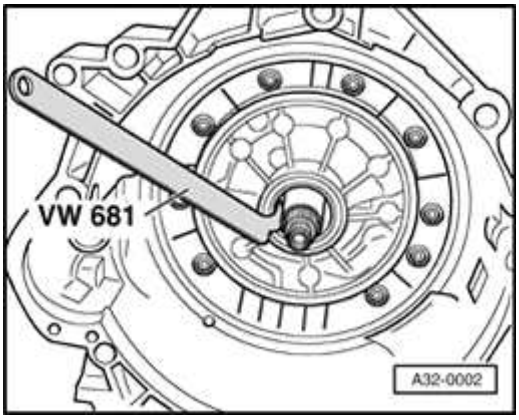


Fig. 15: Applying Extractor Lever VW 681 Directly Behind Sealing Lip Of Oil Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert extractor lever VW681 directly behind the sealing lip of the sealing ring, so that the contact ring which is behind it is not damaged.

Installing

- Insert contact ring.
- Coat outer circumference and sealing lips of sealing ring with ATF.

- Installation position: The open side of the sealing ring faces the transmission.

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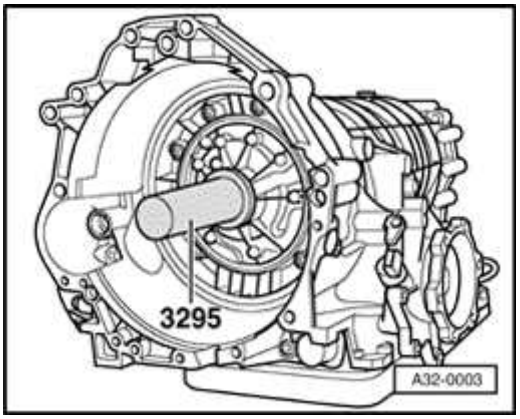


Fig. 16: Driving In Torque Converter Oil Seal Until Stop Of Thrust Piece 3295
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Using thrust piece 3295 , drive in sealing ring for torque converter up to thrust piece stop.

Torque converter, installing

Special tools, testers and auxiliary items required

- Depth gauge

- Slide in converter hub through the sealing ring up to the first stop.
- Rotate torque converter inward with light pressure, until the groove of the torque converter hub engages in the coupling plate of the pump wheel and the torque converter slides inward noticeably.

Installation dimension for torque converter, checking

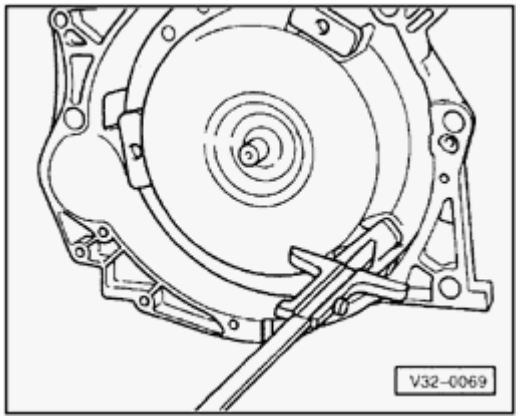


Fig. 17: Checking Torque Converter Is Correctly Positioned
Courtesy of VOLKSWAGEN UNITED STATES, INC.

When torque converter is installed correctly, distance between lower contact surface of threaded holes at torque converter and contact surface of converter housing on Automatic Transmission 01V is approx. 23 mm.

If the torque converter is not inserted completely, this distance will be approx. 11 mm.

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CAUTION: In case of an incorrectly inserted torque converter, the coupling plate of the torque converter or the ATF-pump will be destroyed, if the transmission is flanged to the engine.

Pay particular attention to the following when installing the transmission.

CAUTION: Keep checking to make sure the torque converter behind the drive plate can be turned before and during tightening the bolts at the engine/transmission flange.

If the torque converter cannot be turned, it must be assumed that it has not been inserted properly and that the coupling plate of the torque converter or the ATF pump will be destroyed during final tightening of the bolts.

37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING

ELECTRICAL/ELECTRONIC COMPONENTS AND INSTALLED LOCATIONS

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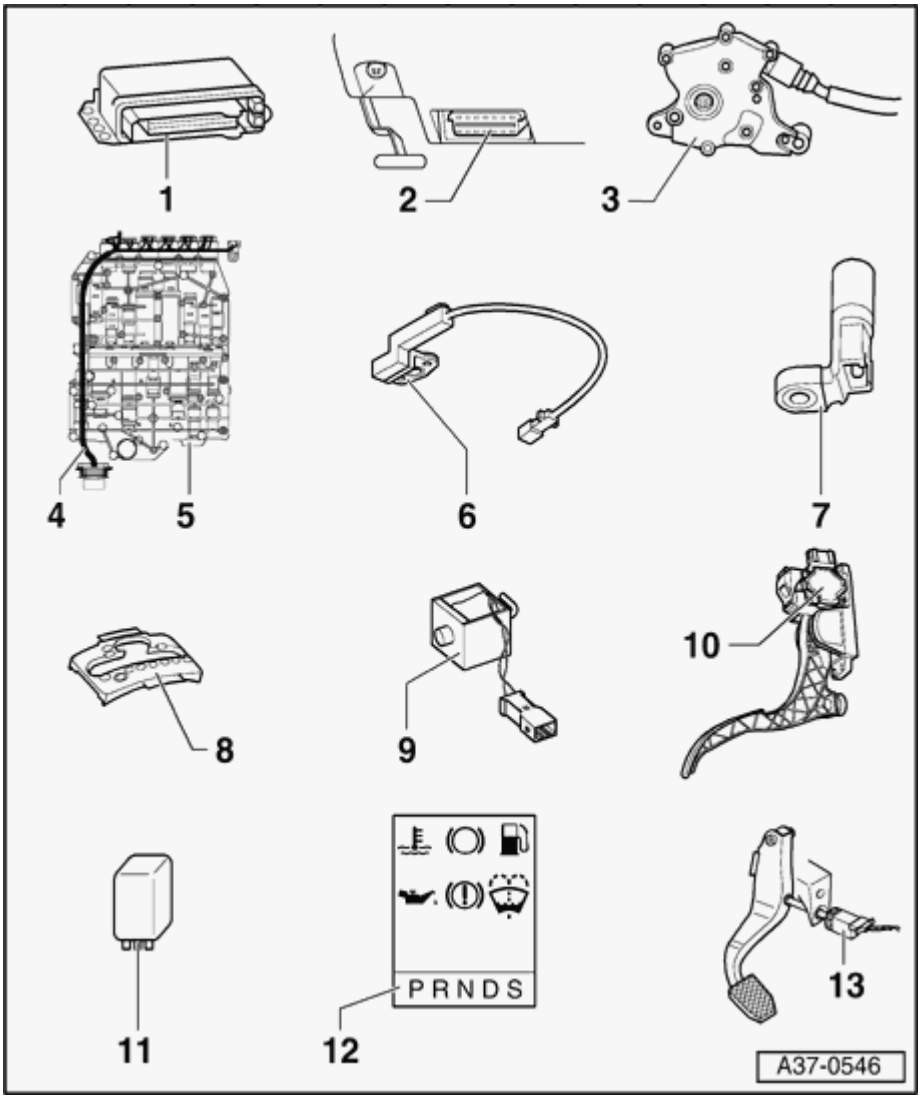


Fig. 18: Electrical/Electronic Components And Installed Locations
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Transmission Control Module J217

- Component location and removing and installing --> **Component location of Transmission Control Module (TCM) J217**
- Disconnecting multi-pin connector --> **Disconnecting Transmission Control Module (TCM) J217 from multi-pin harness connector**
- May be checked using tester VAS5051 in "Guided Fault Finding"

2 - Data Link Connector (DLC)

- Installation location **Data Link Connector (DLC)**

3 - Multi-Function Transmission Range (TR) Switch F125

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- Component location and removing and installing --> **Multi-Function Transmission Range (TR) Switch F125**
- May be checked using tester VAS5051 in "Guided Fault Finding"

4 - Internal transmission wiring harness with integrated Transmission Fluid Temperature Sensor G93 (ATF)

- Component location and removing and installing --> **Internal transmission wiring harness with integrated Transmission Fluid Temperature Sensor G93 (ATF)**
- May be checked using tester VAS5051 in "Guided Fault Finding"

5 - Valve body

- Component location and removing and installing **Valve body**
- May be checked using tester VAS5051 in "Guided Fault Finding"

6 - Sensor for transmission RPM G182

- Calculates transmission RPM
- Component location and removing and installing --> **Sensor for transmission RPM G182**
- May be checked using tester VAS5051 in "Guided Fault Finding"

7 - Transmission Vehicle Speed Sensor (VSS) G38 (also designated as Sender for transmission output RPM G195)

- Calculates transmission output RPM
- Component location and removing and installing --> **Transmission Vehicle Speed Sensor (VSS) G38**
- May be checked using tester VAS5051 in "Guided Fault Finding"

8 - Tiptronic Switch F189

- Component location and removing and installing --> **Tiptronic Switch F189**
- May be checked using tester VAS5051 in "Guided Fault Finding"

9 - Shift Lock Solenoid N110

- Component location and removing and installing --> **Shift lock solenoid N110**
- May be checked using tester VAS5051 in "Guided Fault Finding"

10 - Throttle Position (TP) Sensor G79 and G185

- Component location and removing and installing **and** under **Throttle Position (TP) sensor G79 and G185**
- May be checked using tester VAS5051 in "Guided Fault Finding"

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11 - Starting Interlock Relay J207

- Installation location --> **Starting Interlock Relay J207**

12 - Transmission Range (TR) Selector Lever Display Y6

- Component location and removing and installing --> **Transmission Range (TR) Selector Lever Display Y6**
- Unlit selected gear display indicates emergency mode with inactive Transmission Control Module (TCM).
- Completely lit selected gear display indicates emergency mode with active Transmission Control Module (TCM).

13 - Brake light switch F

- Component location and removing and installing --> **Brake light switch F**
- May be checked using tester VAS5051 in "Guided Fault Finding"

Component location of Transmission Control Module (TCM) J217

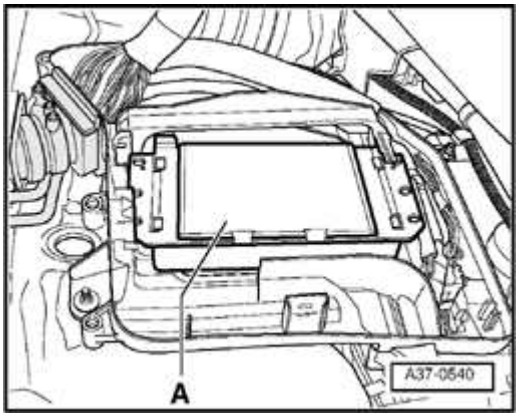


Fig. 19: Component Location Of Transmission Control Module (TCM) J217
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Control module is located in left plenum chamber in e-box under Engine Control Module (ECM).

Removing and installing the control module

-->

- **97 WIRING**
- **97 WIRING** for ELECTRICAL EQUIPMENT, CABRIOLET

If control module for engine or transmission is replaced, the system must be put into basic setting.

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- Perform basic setting in "Vehicle Self-Diagnosis" using the tester VAS5051.

Disconnecting Transmission Control Module (TCM) J217 from multi-pin harness connector

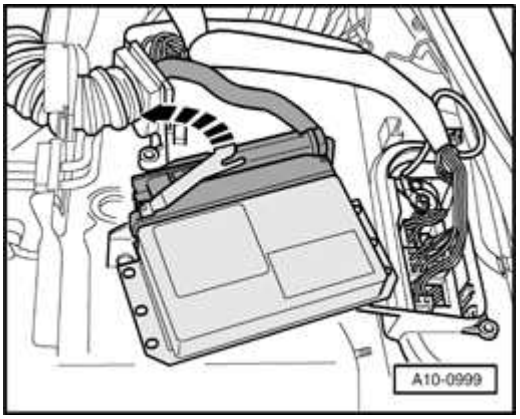


Fig. 20: Disconnecting Transmission Control Module (TCM) J217 From Multi-Pin Harness Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disengage harness connector (arrow) and disconnect it from Transmission Control Module (TCM).

Installation is the reverse of removal.

Data Link Connector (DLC)

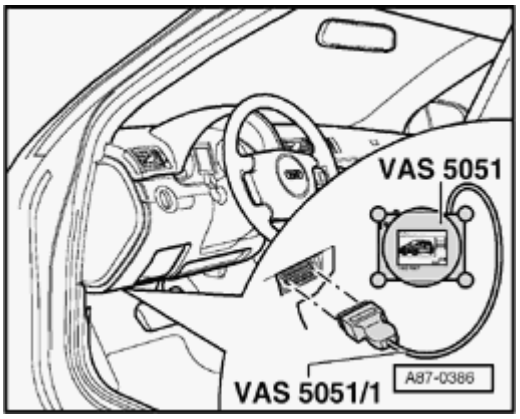


Fig. 21: Data Link Connector (DLC)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Data Link Connector (DLC) is located under driverside storage compartment.

- Connect tester VAS5051 to Data Link Connector (DLC) using diagnostic cable VAS5051/1 and adapter VAS6017 with ignition switched off.

Valve body

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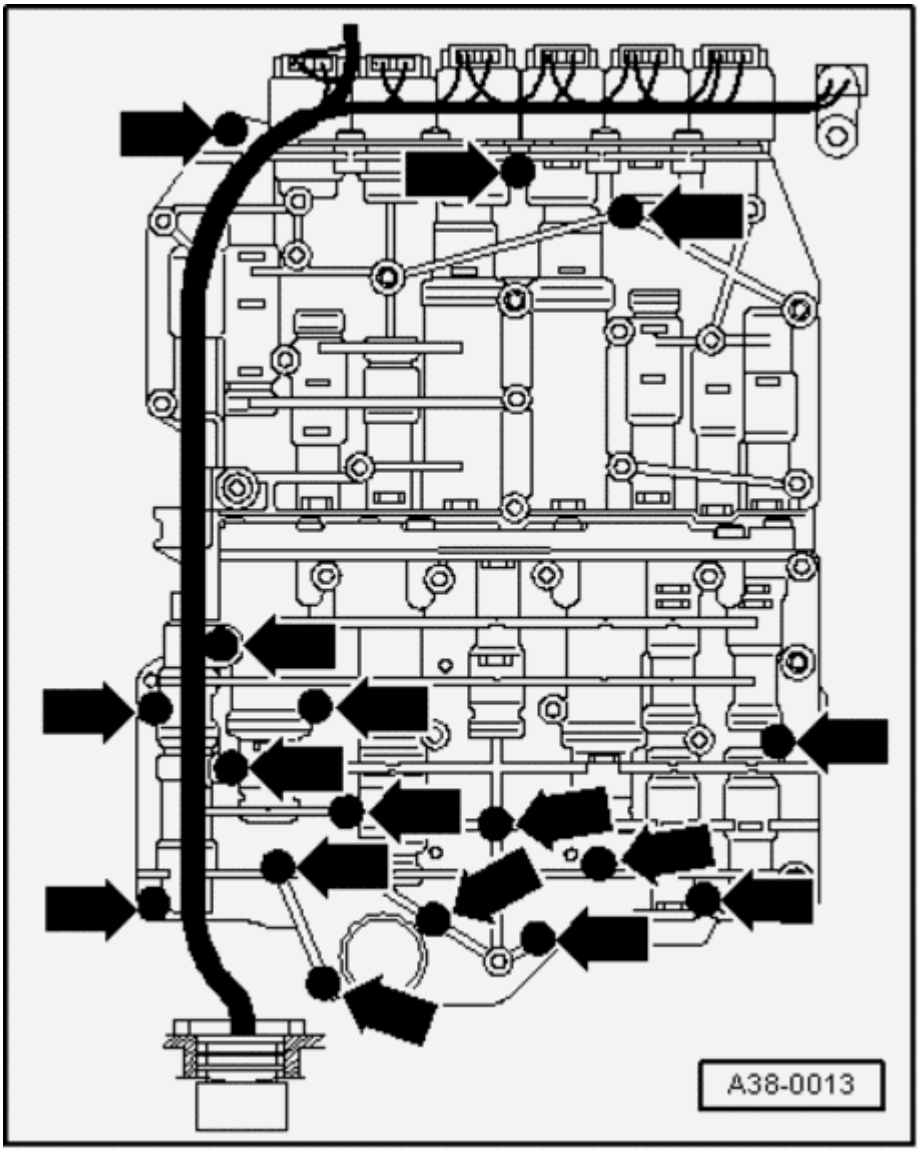


Fig. 22: Locating Valve Body Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Valve body is bolted on to transmission housing below and covered by transmission oil pan.

Solenoid valves N88 , N89 , N90 , and pressure control valves N215 , N216 , N217 , N218 are fastened to valve body.

Removing and installing valve body

--> **Valve body, removing and installing**

Internal transmission wiring harness with integrated Transmission Fluid Temperature Sensor G93 (ATF)

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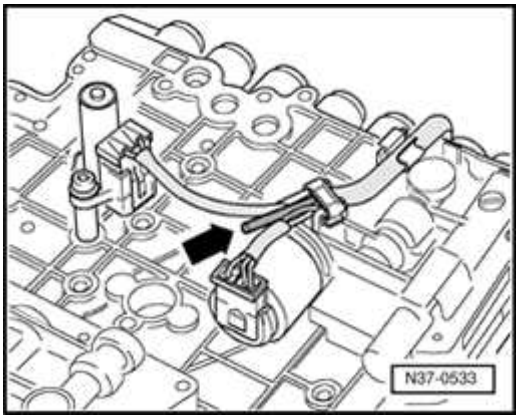


Fig. 23: Internal Transmission Wiring Harness With Integrated Transmission Fluid Temperature Sensor G93 (ATF)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Transmission Fluid Temperature Sensor (arrow) is located in the wiring harness on valve body.

Wiring harness may be replaced with transmission installed and valve body removed.

Wiring harness in transmission, removing and installing

--> **Wiring harness inside transmission, removing and installing**

Transmission Vehicle Speed Sensor (VSS) G38

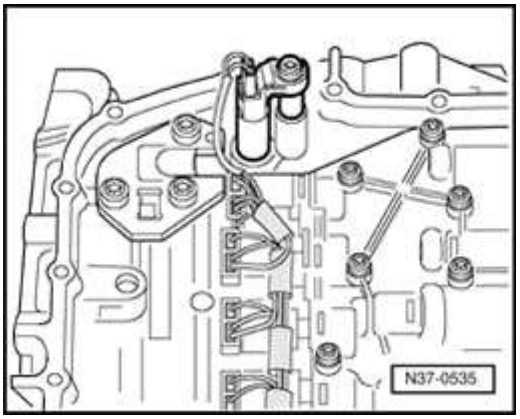


Fig. 24: Transmission Vehicle Speed Sensor -G38-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Transmission Vehicle Speed Sensor is located on rear right of transmission. Also referred to as the sender for transmission output RPM G195.

Removing and installing Transmission Vehicle Speed Sensor (VSS)

--> **Transmission Vehicle Speed Sensor (VSS) G38 , removing and installing**

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Sensor for transmission RPM G182

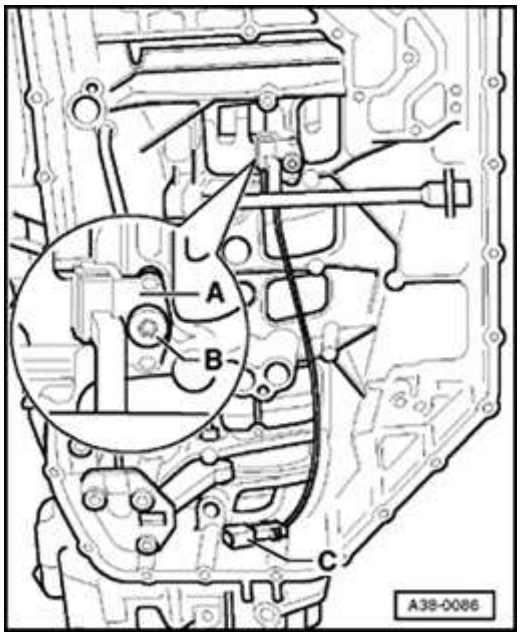


Fig. 25: Sensor For Transmission RPM (Transmissions With Hydraulic Regulation -E18/2-)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Sensor for transmission RPM - **A** - is fastened to transmission housing behind valve body. This sensor is a Hall sensor.

Removing and installing Sensor for transmission RPM G182

--> **Sensor for transmission RPM G182 , removing and installing**

Multi-Function Transmission Range (TR) Switch F125

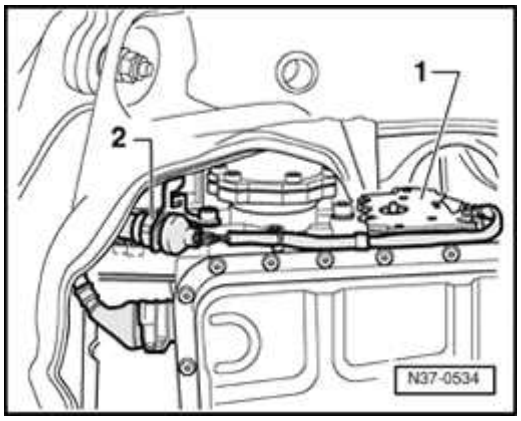


Fig. 26: Location Of Multi-Function Transmission Range (TR) Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Multi-Function Transmission Range (TR) Switch - **1** - is located at left on transmission;

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multi-pin connector for Multi-Function Transmission Range (TR) Switch - **2** -.

Removing and installing Multi-Function Transmission Range (TR) Switch

--> **Multi-Function Transmission Range (TR) Switch F125 , removing and installing**

Tiptronic Switch F189

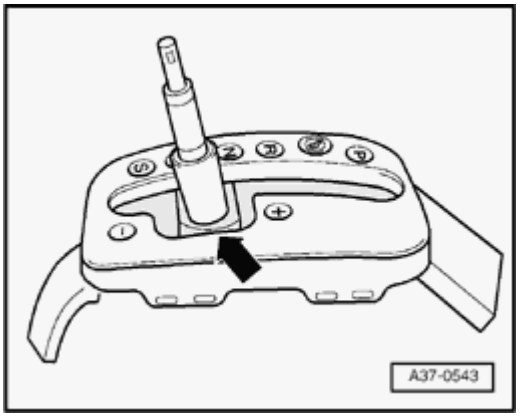


Fig. 27: Tiptronic Switch F189
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Tiptronic switch is integrated into circuit board of symbol insert, which is located in shift mechanism cover.

Tiptronic Switch F189 , removing and installing

--> **Tiptronic Switch F189 , removing and installing**

Shift lock solenoid N110

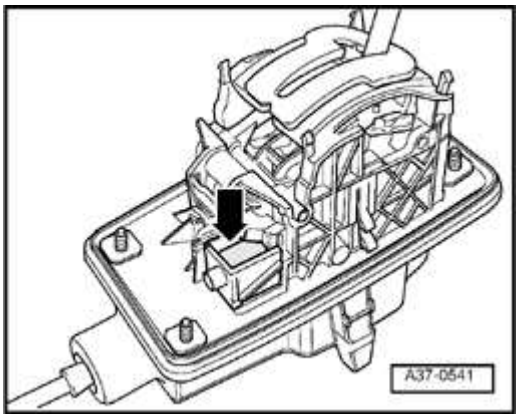


Fig. 28: Shift Lock Solenoid N110
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Shift lock solenoid is located in the shift mechanism - **arrow** -.

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Shift lock solenoid, removing and installing

--> **Shift Lock Solenoid N110 , removing and installing**

Starting Interlock Relay J207

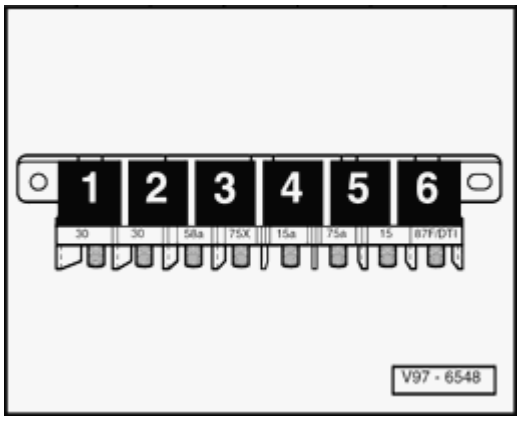


Fig. 29: Starting Interlock Relay J207
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Relay is located in central electronics.

Assignment

--> Electrical Wiring Diagrams, Troubleshooting and Component Locations

Throttle Position (TP) sensor G79 and G185

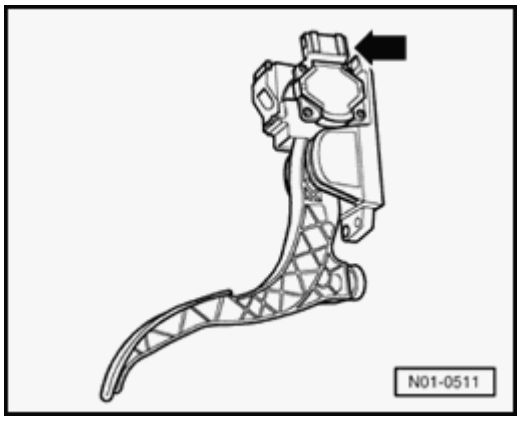


Fig. 30: Throttle Position (TP) Sensors -G69- and -G79- Accelerator Pedal Position Sensor and Kickdown Switch -F8- For Vehicles With EPC
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Throttle Position (TP) sensor G79 and G185 (arrow), component of electronic engine power control (E-Gas), is located at pedal assembly.

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The kick down function is performed (controlled) via Throttle Position (TP) sensor G79 and G185.

Checking, removing and installing Throttle Position (TP) sensor:

--> **20 - FUEL SUPPLY SYSTEM**

Brake light switch F

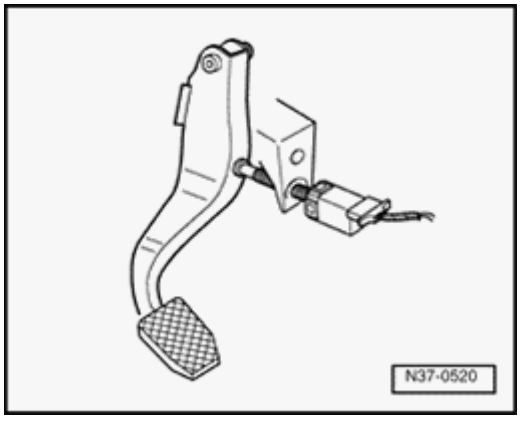


Fig. 31: Brake Light Switch F
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Brake light switch (arrow) is located in foot pedal assembly.

Brake light switch, removing and installing

--> **46 - BRAKES - MECHANICAL COMPONENTS**

Transmission Range (TR) Selector Lever Display Y6

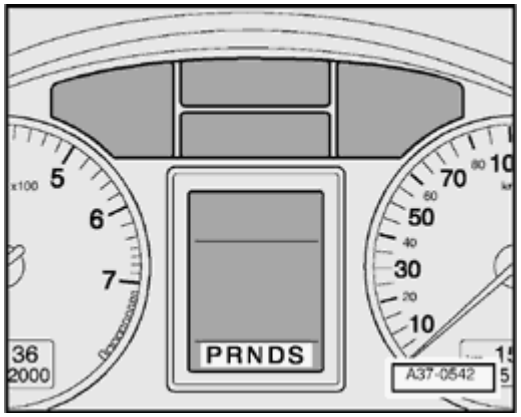


Fig. 32: Transmission Range (TR) Selector Lever Display Y6
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: in instrument cluster

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Removing and installing Transmission Range (TR) Selector Lever Display

-->

- **90 INSTRUMENTS**
- **90 INSTRUMENTS** for ELECTRICAL EQUIPMENT, CABRIOLET

SELECTOR LEVER MECHANISM, SERVICING

Selector lever mechanism, servicing

CAUTION: Before beginning repairs on the electrical system:

- **Obtain the anti-theft radio security code.**
- **Switch the ignition off.**
- **Disconnect the battery Ground (GND) strap.**
- **On vehicles equipped with Audi Telematics by OnStar, switch-off the emergency (back-up) battery for the Telematic/Telephone Control Module prior to disconnecting vehicle battery -->**
  - **91 - COMMUNICATION**
  - **91 RADIO, TELEPHONE, NAVIGATION, TRIP COMPUTER for COMMUNICATION, CABRIOLET**

  .
- **After reconnecting vehicle battery, re-code and check operation of anti-theft radio. Also check operation of clock and power windows according to article and/or Owners Manual.**
- **After reconnecting vehicle battery on vehicles equipped with Audi Telematics by OnStar, switch-on the emergency (back-up) battery for the Telematic/Telephone Control Module -->**
  - **91 - COMMUNICATION**
  - **91 RADIO, TELEPHONE, NAVIGATION, TRIP COMPUTER for COMMUNICATION, CABRIOLET**

  .

CAUTION: Shift selector lever into position "P" and engage parking brake before working with the engine running.

Ignition key removal lock, checking

- Switch ignition key to driving position (ignition on).
- Depress brake pedal and hold.

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- Shifting selector lever out of position "P" must be possible with the button at shift lever depressed without "sticking".
- It must not be possible to remove ignition key with selector lever in any position other than "P".

  - Shift selector lever into position "P".

- It must be possible to move ignition key into removal position without "sticking".

  - Remove ignition key.

- It must only be possible to remove ignition key in "P" position.
- Selector lever cannot be shifted out of position "P" with the button pressed and foot brake operated.

Shift mechanism, checking

Selector lever in position "P" and ignition switched on:

- Brake pedal is not being operated:

Selector lever is locked and cannot be shifted out of position "P" with the button at selector lever pressed. Shift lock solenoid is locking the selector lever.

- Brake pedal is being operated:

Shift lock solenoid enables the selector lever. Selecting a driving mode must be possible with the button at shift handle pressed without "sticking".

Slowly shift selector lever from "P" through "R, N, D, S" checking whether selector lever position in dash panel insert agrees with selector lever position.

Selector lever in position "N" and ignition switched on:

- Brake pedal is not being operated:

Selector lever is locked and cannot be shifted out of position "N" with the button at selector lever handle pressed. Shift lock solenoid is locking the selector lever.

- Brake pedal is being operated:

Shift lock solenoid enables the selector lever. Selecting a driving mode must be possible with the button at shift handle pressed without "sticking".

Selector lever in position "D" , ignition and lights switched on:

Move selector lever in Tiptronic gate. The "D" symbol must no longer be illuminated and "+" and "-" symbols must illuminate.

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- Start engine and let run at idle
- Engage parking brake and operate brake pedal

The selector lever display in dash panel insert must change from "PRNDS" to "54321" when selector lever is moved in Tiptronic gate.

NOTE:

- **The starter must not operate in the selector lever positions "D" , "S" and "R".**
- **For speeds exceeding 5 km/h and shifting into selector lever position "N" , the shift lock solenoid must not engage to lock the selector lever. Selector lever can be shifted into a driving mode.**
- **For speeds below 2 km/h (almost standstill) and shifting into selector lever position "N" , the shift lock solenoid must only engage after approx. 1 second. Selector lever can only be shifted out of position "N" with the brake pedal operated.**

Shift mechanism cover and selector lever knob, exploded view

NOTE:

- **Lubricate bearing areas and slide surfaces with polycarbamide grease G 052 142 A2.**

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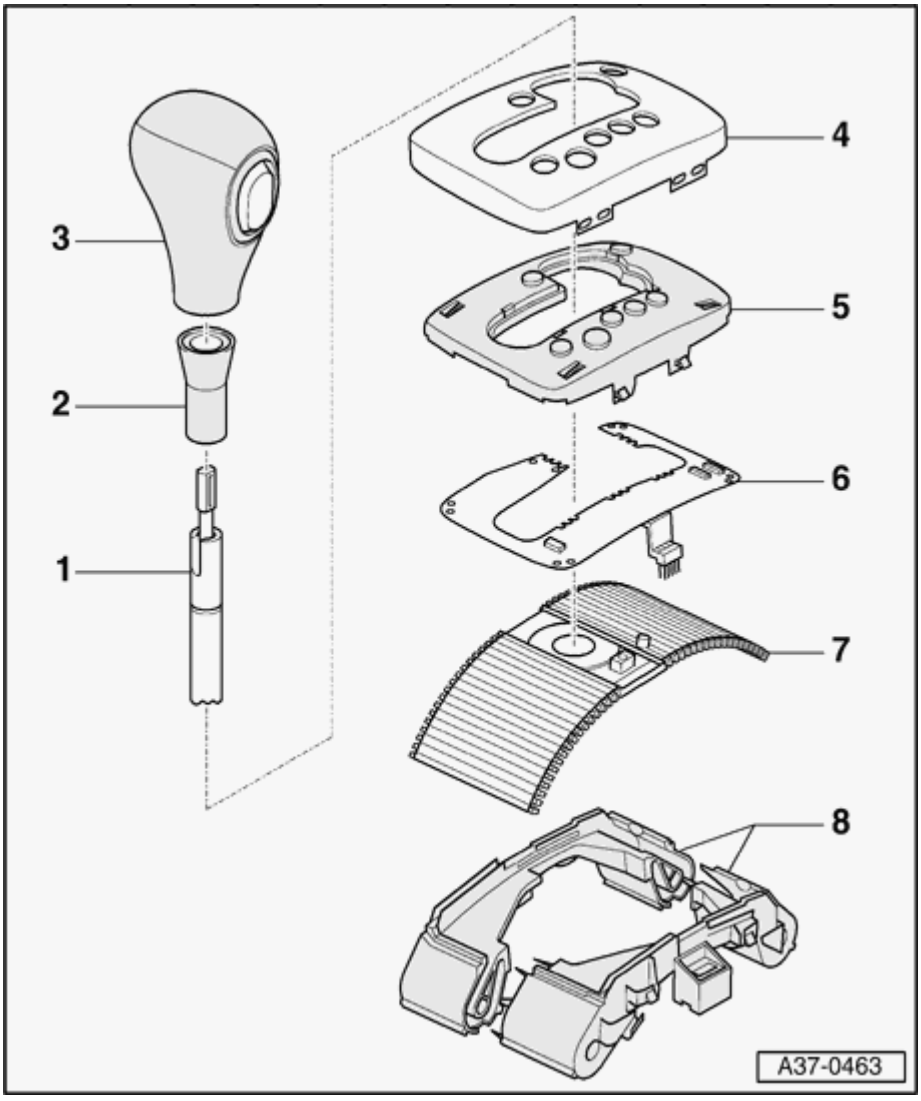


Fig. 33: Shift Mechanism Cover And Selector Lever Knob, Exploded View
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Selector lever

2 - Shaft piece for selector lever

- Removing and installing selector lever knob --> **Selector lever handle, removing and installing**

3 - Selector lever handle

- Removing and installing --> **Selector lever handle, removing and installing**

4 - Cover

- With selector scale and Tiptronic gate and selector lever lock indicator

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- Removing and installing Tiptronic switch F189 --> **Tiptronic Switch F189 , removing and installing** and additionally unclipping cover

5 - Symbol insert

- Clipped in cover

6 - Printed circuit board

- with integrated Tiptronic Switch F189
- Removing and installing --> **Tiptronic Switch F189 , removing and installing**

7 - Masking panel

- With solenoid for Tiptronic switch F189 on reverse slide
- Removing and installing Tiptronic Switch F189 --> **Tiptronic Switch F189 , removing and installing**

8 - Guide

- For masking panel
- Separate both halves by applying careful levering movements

Selector lever handle, removing and installing

Removing

- Shift selector lever into position "D".

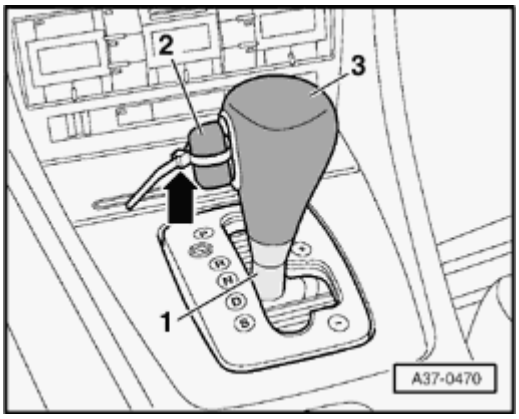


Fig. 34: Selector Lever Handle, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn sleeve - **1** - to left and push downward as far as stop.
- Carefully pull switch - **2** - just enough out of selector lever knob - **3** - until a cable tie can be inserted between button and selector lever.

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NOTE:

- **Do not remove button further under any circumstances, otherwise the selector lever knob will be damaged.**

- Secure button in pulled-out position using cable tie - **arrow** - as shown in illustration.
- Remove selector lever knob upward.

Installing

Installation is reverse of removal, noting the following:

- Shift selector lever into position "D".

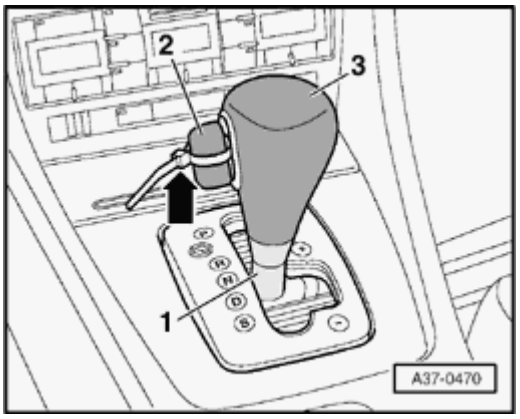


Fig. 35: Selector Lever Handle, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **To install new selector lever knob - 3 - , button 2 must be pulled out as far as stop and secured with a cable tie - arrow - or using assembly aid included with new knob.**
- **If the button was accidentally not secured, then it must not be pulled from selector lever knob using mechanical tools. Apply compressed air gun to bottom of knob and carefully press button out with compressed air.**

- Position complete selector lever knob - **3** - on selector lever - button 2 faces driver. During this, the knob must engage into ring groove of the selector lever.
- Remove cable tie - **arrow** - or assembly aid, then button actuation engages in vertical groove of selector lever. If necessary press button into selector lever knob.
- Pull sleeve - **1** - upward and engage by turning clockwise.

Shift mechanism cover, removing and installing

Removing

- Selector lever handle, removing --> **Selector lever handle, removing and installing**.

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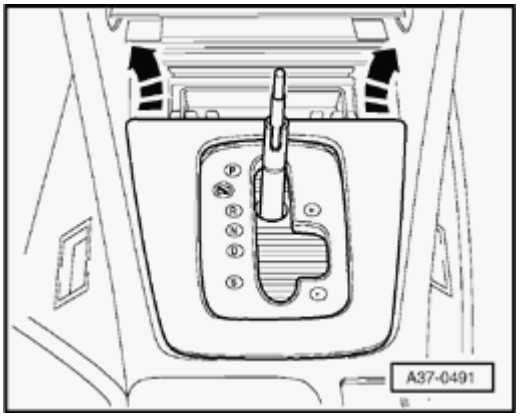


Fig. 36: Opening Ashtray In Center Console And Removing Trim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Open ashtray in center console and remove trim (arrows).
- Remove ashtray in center console: -->
  - **68 - INTERIOR EQUIPMENT**
  - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

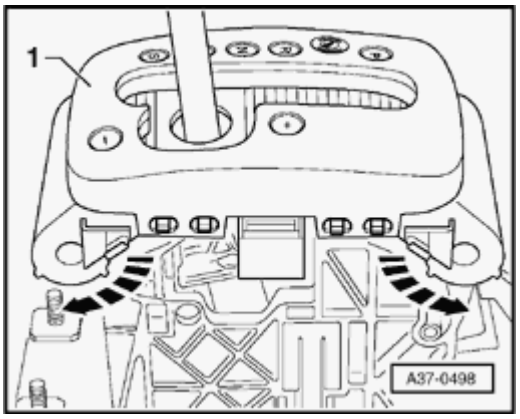


Fig. 37: Releasing Clips And Pulling Cover With Guide Upward To Remove
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release all 4 clips (arrows) and pull cover - **1** - with guide upward to remove.
- Disconnect electrical harness connector on side of guide.

Installing

Installation is reverse of removal, noting the following:

- Remove selector lever handle.

Tiptronic Switch F189 , removing and installing

Tiptronic switch is integrated into circuit board ( ), which is located in shift mechanism cover.

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It consists of 3 camshaft position sensors, which are activated by a magnet on the cross slide masking panel.

To replace Tiptronic switch, circuit board ( ) must be replaced.

Check also whether solenoid is correctly fixed on transverse slide of masking panel, replace masking panel with guide if necessary.

Removing

- Remove shift mechanism cover --> **Shift mechanism cover, removing and installing**.

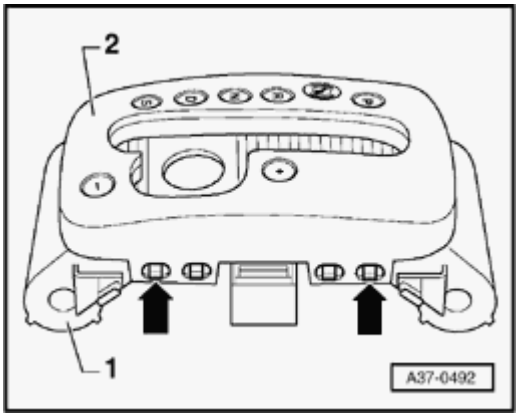


Fig. 38: Pressing Lugs Inward And Removing Cover From Guide
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press the 4 lugs (arrows) inward and remove cover - **2** - from guide - **1** -.
- Remove circuit board with integrated Tiptronic Switch F189 from cover - **2** -.

NOTE:

- **If necessary, masking panel with solenoid for Tiptronic Switch F189 can be removed as described below. As replacement part the masking panel is only available together with guide.**

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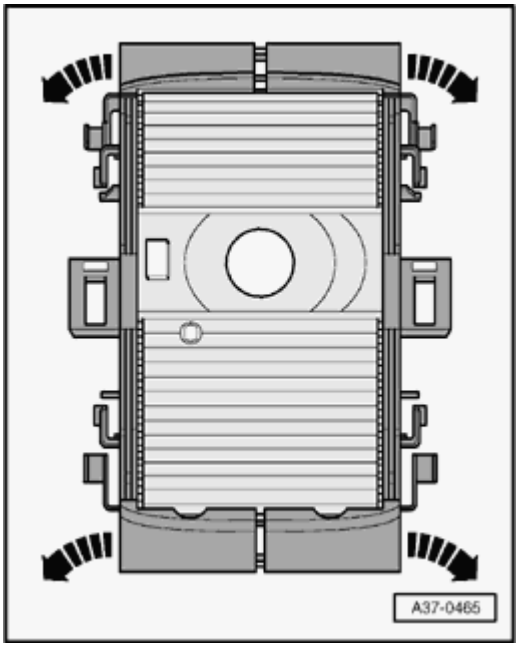


Fig. 39: Separating Both Guide Parts By Applying Careful Levering Movements
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Separate both guide parts by applying careful levering movements (arrows).
- Remove masking panel with solenoid for Tiptronic Switch F189.

Installing

Installation is reverse of removal, noting the following:

- Install shift mechanism cover --> **Shift mechanism cover, removing and installing**.
- Remove selector lever handle.

Shift mechanism, overview

NOTE:

- **Lubricate bearing areas and slide surfaces with polycarbamide grease G 052 142 A2.**

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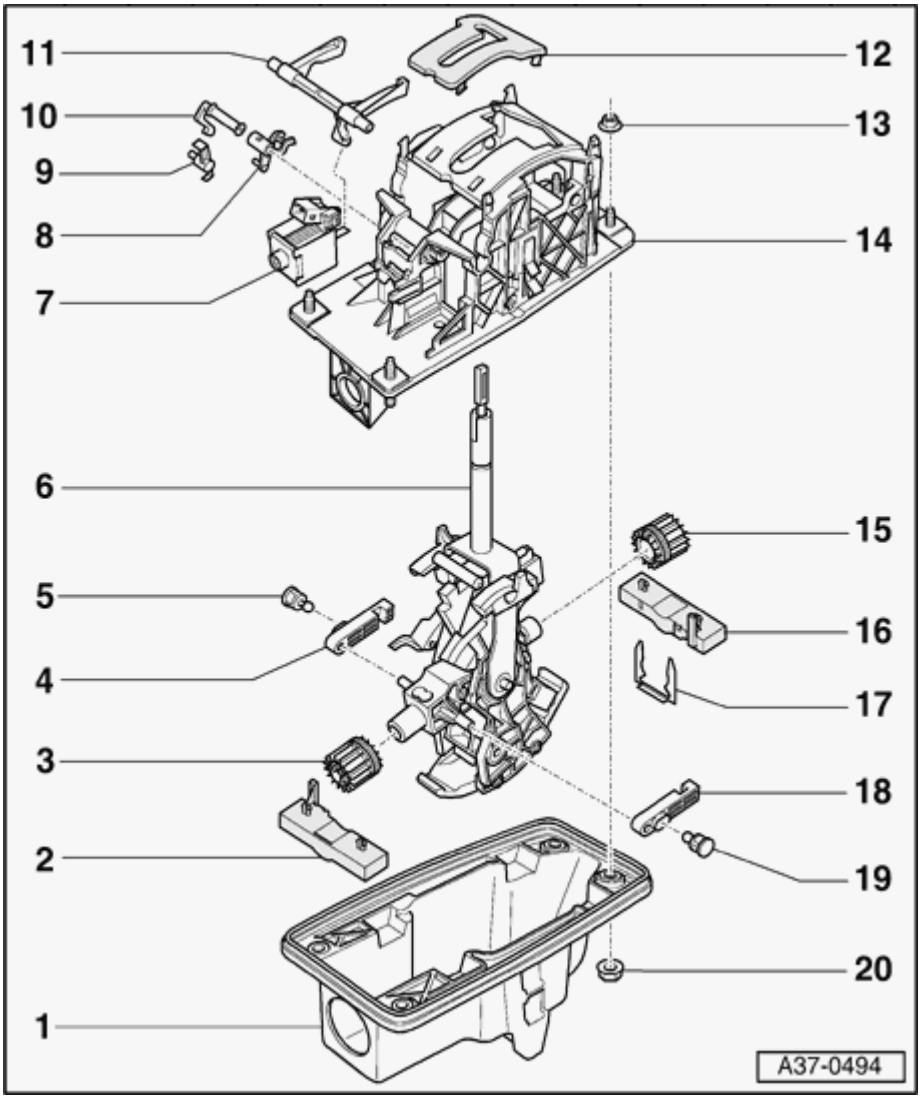


Fig. 40: Shift Mechanism, Disassembling And Assembling (Sequence)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Shift mechanism bottom cover

2 - Retaining bracket

- For selector lever

3 - Bearing bushing

4 - Tiptronic locking lever

5 - Pivot pin

6 - Selector lever

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7 - Shift lock solenoid N110

- Removing and installing --> **Shift Lock Solenoid N110 , removing and installing**

8 - Actuating lever

- For locking cable

9 - Lock

- For locking cable

10 - Lever

- For locking cable

11 - Catch lever

12 - Gate

13 - 10 Nm

14 - Selector housing

15 - Bearing bushing

16 - Retaining bracket

- For selector lever

17 - Retaining clip

- Always replace

18 - Tiptronic locking lever

19 - Pivot pin

20 - 10 Nm

Shift mechanism, removing and installing

Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**

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- **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
- **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
- **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
- **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
- **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

- **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
- **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

Removing

- Selector lever handle, removing --> **Selector lever handle, removing and installing**.

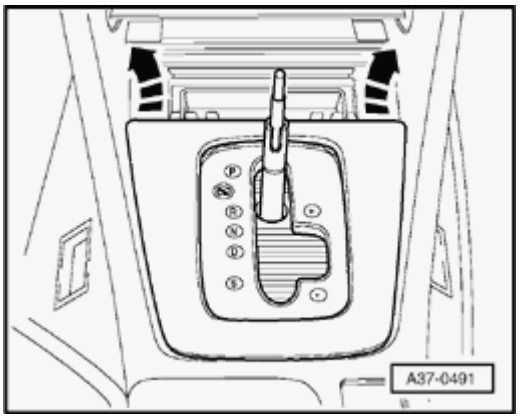


Fig. 41: Opening Ashtray In Center Console And Removing Trim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Open ashtray in center console and remove trim (arrows).
- Remove air conditioning operating unit: --> **87 AIR CONDITIONING**
- Remove ashtray in center console: -->
  - **68 - INTERIOR EQUIPMENT**
  - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

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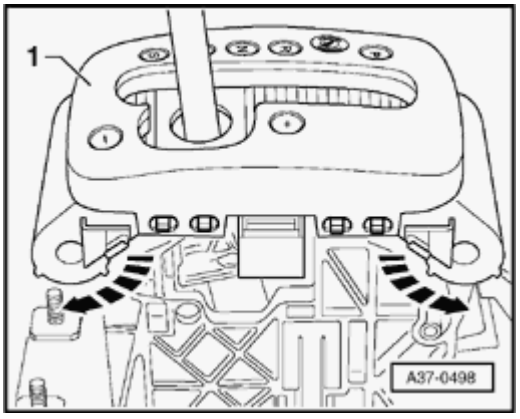


Fig. 42: Releasing Clips And Pulling Cover With Guide Upward To Remove
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release all 4 clips (arrows) and pull cover - **1** - with guide upward to remove.
- Disconnect electrical harness connector on side of guide.
- Disconnect electrical harness connector on Shift Lock Solenoid N110.

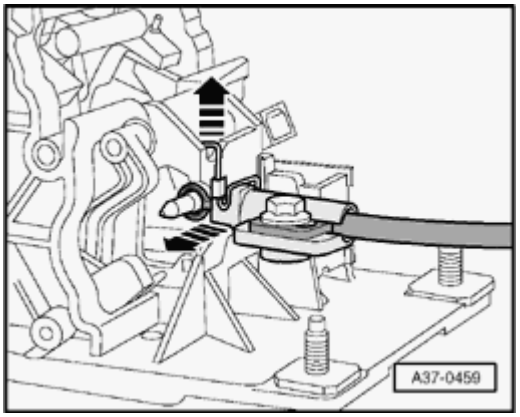


Fig. 43: Disengaging Locking Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disengage locking cable (arrows).
- Shift selector lever into position "S".
- Remove front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE

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MECHANICAL, ENGINE CODE(S): BNS

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

- Remove heat shield for driveshaft from body of the vehicle.

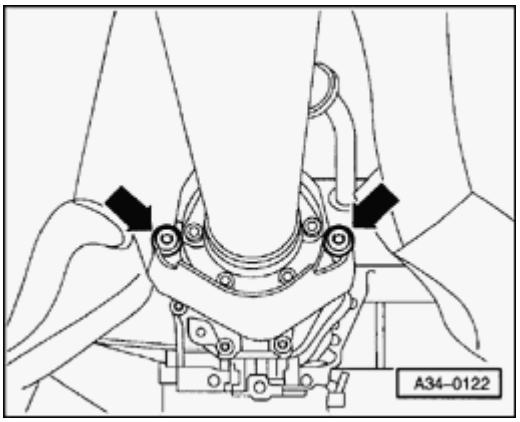


Fig. 44: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for driveshaft from cover for Torsen differential (arrows).
- Unbolt driveshaft from transmission and hang or support. -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Unbolt front heat shield, if installed, from below shift mechanism housing.

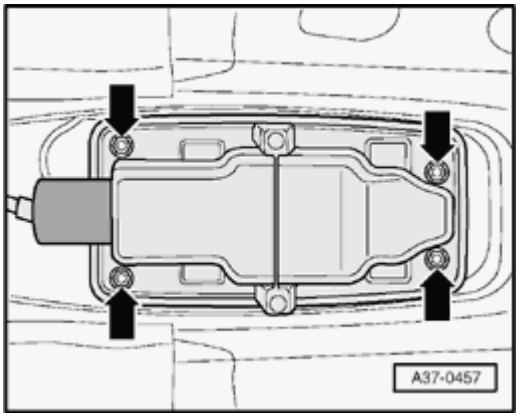


Fig. 45: Removing Lower Cover From Shift Mechanism
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove lower cover from shift mechanism (arrows).
- Remove boot of selector lever cable from lower shift mechanism cover and slide back.

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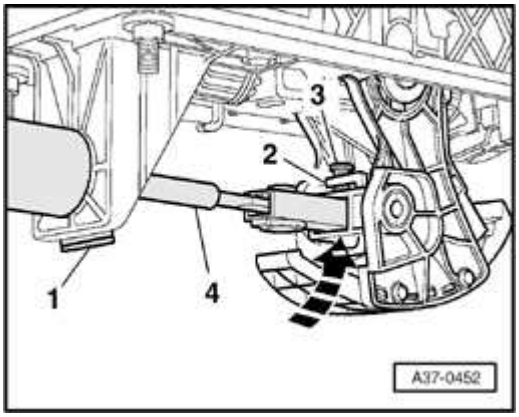


Fig. 46: Identifying Retaining Clip, Securing Spring, Push Pin & Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove retaining clip - **1** - for selector lever cable on shift mechanism downward.
- Pull plastic securing spring - **2** - slightly to front and push pin - **3** - up only as far as necessary (arrow).
- Pull selector lever cable - **4** - out of shift mechanism at the same time, and do not bend.

NOTE:

- **Do not bend or kink selector lever cable.**

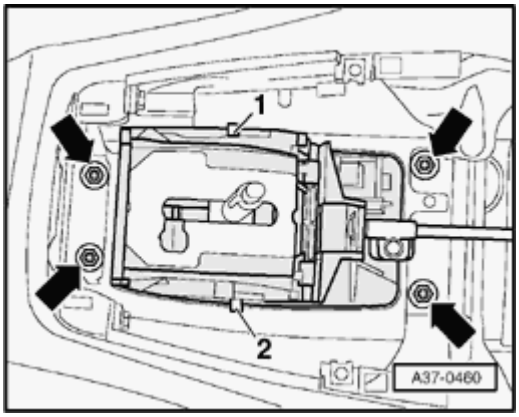


Fig. 47: Unscrewing Nuts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unscrew nuts (arrows).

NOTE:

- **A second mechanic is required when detaching shift mechanism below vehicle.**

- Press holder clips - **1** - and - **2** - inward, at the same time pushing shift mechanism downward.

Installing

Installation is reverse of removal, noting the following:

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- Install selector lever cable.

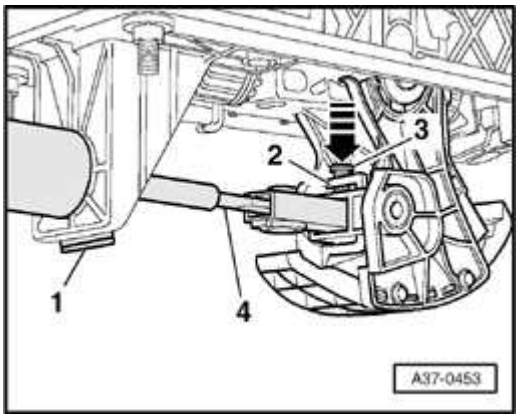


Fig. 48: Inserting End Of Selector Lever Cable Into Joint Of Selector Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Fit new retaining clip - **1** - for selector lever cable on shift mechanism.

Installation position:

Angled end of retaining clip faces to inside of shift mechanism.

- Install locking cable **Installing**.
- Adjust locking cable --> **Locking cable, adjusting**.
- Fit driveshaft to transmission. -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Install front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

Tightening torques

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Component	Nm
Shift mechanism to body	10
Bottom cover to shift mechanism	10

Shift mechanism, disassembling and assembling (sequence)

NOTE:

- **Removing and installing securing spring for locking cable Securing spring for locking cable, removing and installing.**

Disassembly of suspension strut

- Move selector lever into position "S".
- Remove selector lever lock solenoid - **7** - --> **Shift Lock Solenoid N110 , removing and installing**.
- Carefully unbolt gate - **12** -.

NOTE:

- **If gate - 12 - or selector housing - 14 - is damaged, complete selector housing with gate must be replaced.**

- Release pivot pins - **5** - and - **19** - and pull them out from the side.
- Unclip retainers - **2** - and - **16** -.
- Remove retaining clip - **17** -.
- Swing locking lever - **11** - fully upward.

- Pull selector lever - **6** - with bushes - **3** - and - **15** - together with locking levers for Tiptronic - **4** - and - **18** - downward out of selector housing - **14** -.

Assembly of suspension strut

- Check whether selector lever is still in position "S".
- Swing locking lever - **11** - fully upward.
- Insert selector lever - **6** - into selector housing - **14** - from below.
- Push locking levers for Tiptronic - **4** - and - **18** - along with bushes - **3** - and - **15** - onto selector lever.

- Press selector lever - **6** - with bushes into selector housing and position it with retaining clip - **17** -.
- Engage retainers - **2** - and - **16** - to selector housing.
- Press pivot pins - **5** - and - **19** - into mounting bracket until they engage.
- Check whether pivot pins engage in locking lever for Tiptronic.

- Install selector lever lock solenoid - **7** - --> **Shift Lock Solenoid N110 , removing and installing**.
- Tighten gate - **12** - to selector housing - **14** - with the 3 securing bolts to 0.4 Nm.

NOTE:

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- **If gate - 12 - or selector housing - 14 - is damaged by tightening too much, complete selector housing with gate must be replaced.**
- **Gate is matched to selector housing and cannot be replaced separately.**

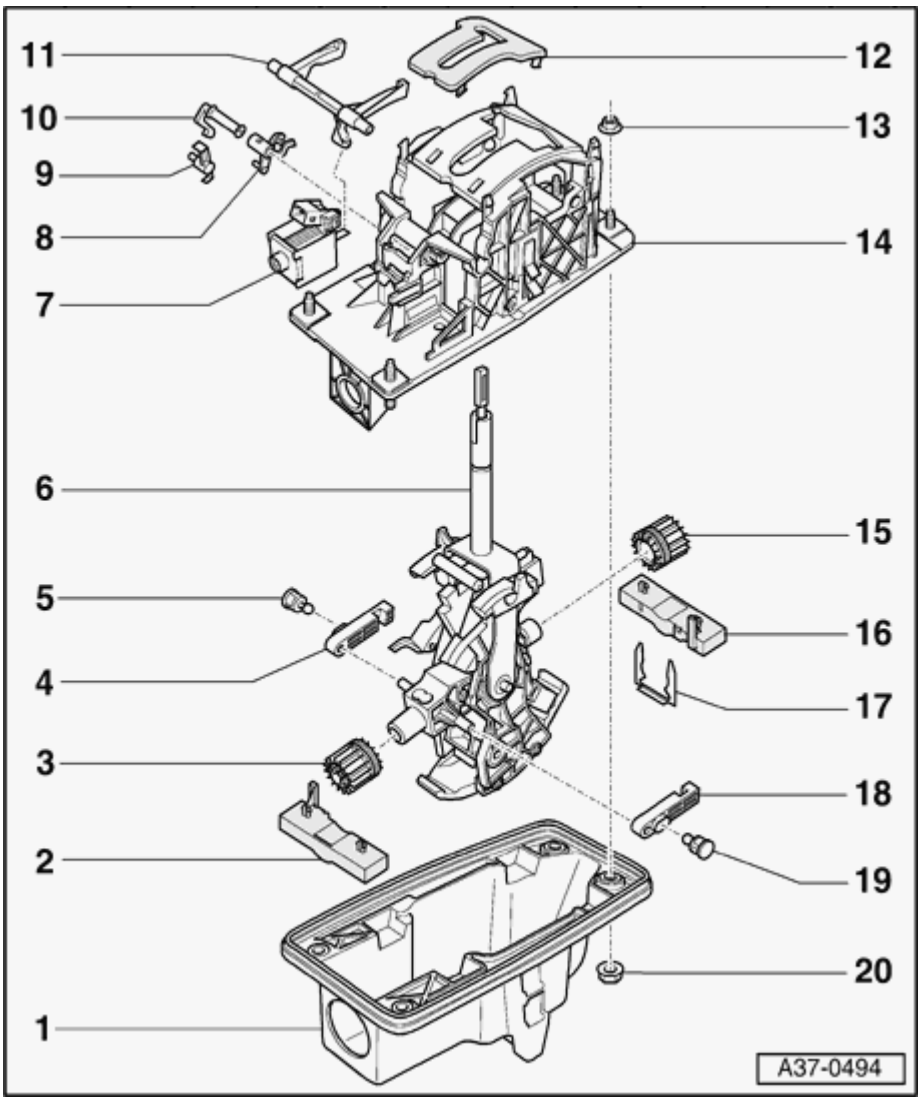


Fig. 49: Shift Mechanism, Disassembling And Assembling (Sequence)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Securing spring for locking cable, removing and installing

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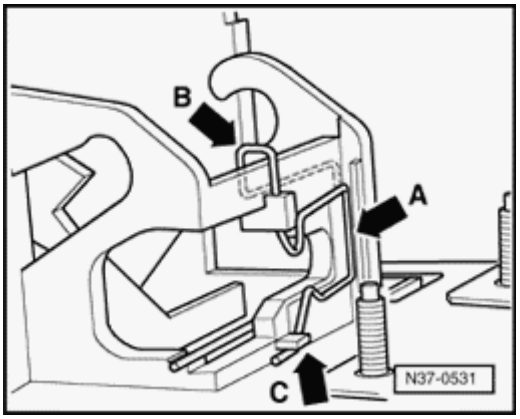


Fig. 50: Securing Spring For Locking Cable, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Removing

- Slightly lift spring at top (arrow B) and remove locking cable from shift mechanism.
- Unhook spring (arrow A) at retaining clip (arrow C) and remove toward top.

Installing

- Insert spring (arrow B) from top and hook in at retaining clip (arrow C).
- Align spring so that it is seated evenly in groove (arrow A).
- Slightly lift spring at top (arrow B) and insert locking cable into shift mechanism.

Shift Lock Solenoid N110 , removing and installing

Removing

- Remove shift mechanism cover --> **Shift mechanism cover, removing and installing**.
- Disconnect electrical harness connector on Shift Lock Solenoid N110.

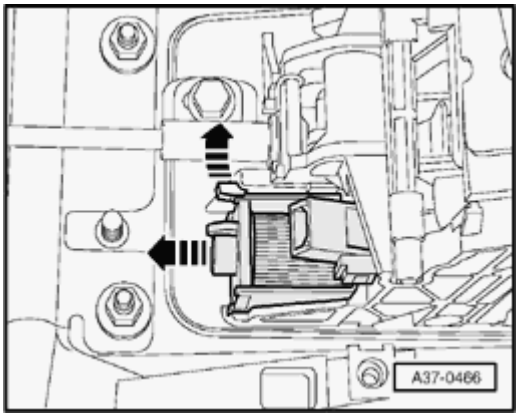


Fig. 51: Releasing Lugs And Selector Lever Lock Solenoid Forward
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Release lugs and remove selector lever lock solenoid forward (arrows).

Installing

Installation is reverse of removal, noting the following:

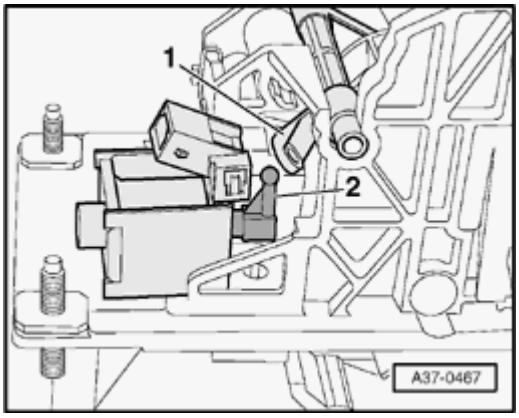


Fig. 52: Pressing Selector Lever Lock Solenoid Into Guide Until It Engages
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press selector lever lock solenoid into guide until it engages; actuating lever - **2** - of solenoid must engage in locking lever - **1** - on shift mechanism.
- Install shift mechanism cover --> **Shift mechanism cover, removing and installing**.

Selector lever cable and locking cable, assembly overview

NOTE:

- **Do not bend or kink selector lever cable.**
- **Lubricate pull ring and ball socket with polycarbamide grease, part no. G 052 142 A2.**

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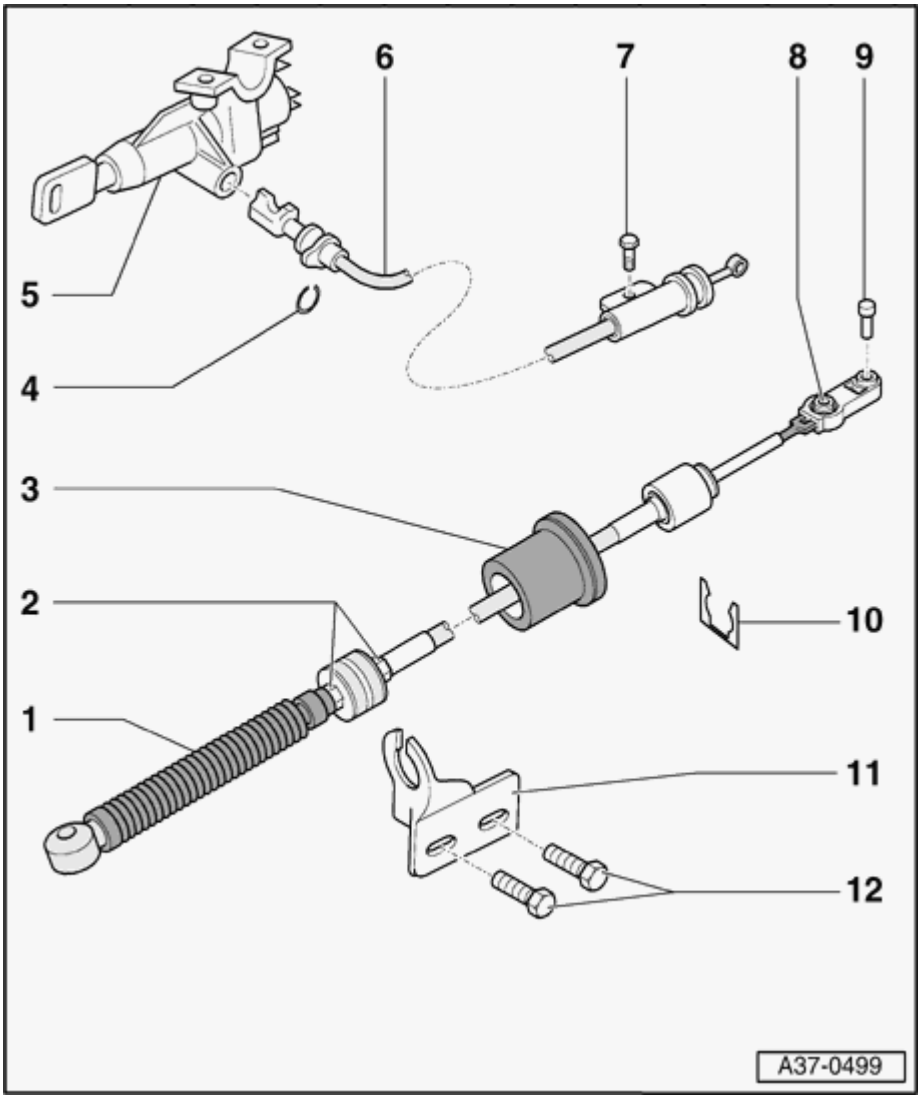


Fig. 53: Selector Lever Cable And Locking Cable, Assembly Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Selector lever cable

- Must not be kinked
- Removing and installing --> **Selector lever cable, removing and installing**
- Adjusting --> **Selector lever cable, checking and adjusting**

2 - Lock nuts - 12 Nm

3 - Boot

- For selector lever cable
- Fasten into bottom cover of shift mechanism

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4 - Locking clamp

5 - Ignition/Starter Switch

- With ignition key removal lock

6 - Locking cable

- For ignition key removal lock
- Must not be kinked
- Removing and installing --> **Locking cable, removing and installing**
- Adjusting --> **Locking cable, adjusting**

7 - Hex-bolt - 9 Nm

8 - Clamping screw - 13 Nm

- For selector lever cable
- To adjust, loosen by approx. 1 turn, do not fully remove

9 - Pin

- For selector lever cable
- To remove selector lever cable, pull plastic securing spring on shift mechanism slightly forward and push pin up only as far as necessary

10 - Retaining clip

- For selector lever cable
- Always replace

11 - Pivot

- For selector lever cable to transmission

12 - Hex-bolt, 23 Nm

Selector lever cable, removing and installing

Special tools, testers and auxiliary items required

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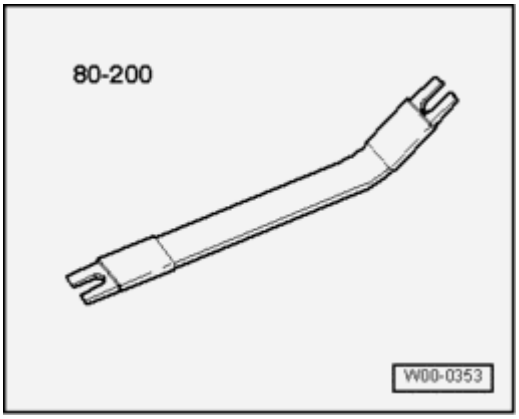


Fig. 54: Identifying Pry Lever 80-200
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry lever 80-200

Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**
-
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

Removing

- Shift selector lever into position "S".
- Raise vehicle.
- Remove front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE

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MECHANICAL, ENGINE CODE(S): BNS

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

- Remove heat shield for driveshaft from body of the vehicle.

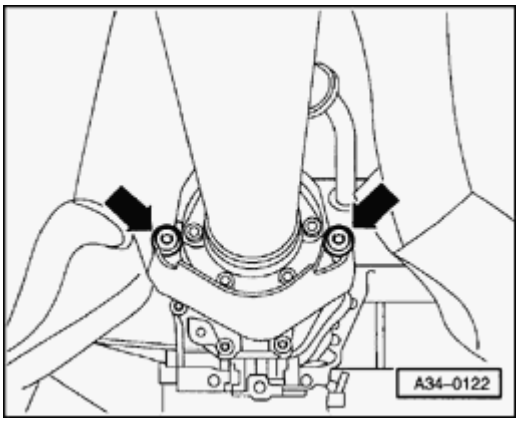


Fig. 55: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for driveshaft from cover for Torsen differential (arrows).
- Unbolt driveshaft from transmission and hang or support. -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Remove shielding plate/selector lever cable, if installed.

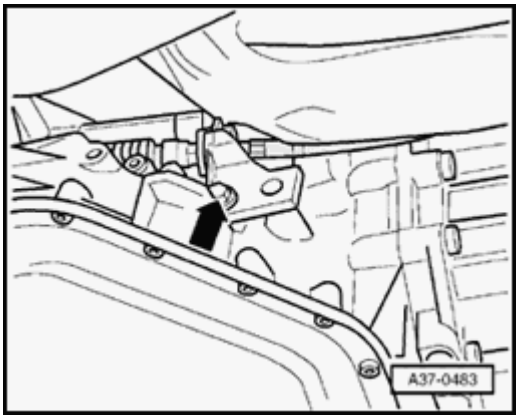


Fig. 56: Location Of Support Bracket For Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove mounting bracket for selector lever cable (arrow).
- Removing left transmission support --> **Right and left transmission mounts, removing and installing**.

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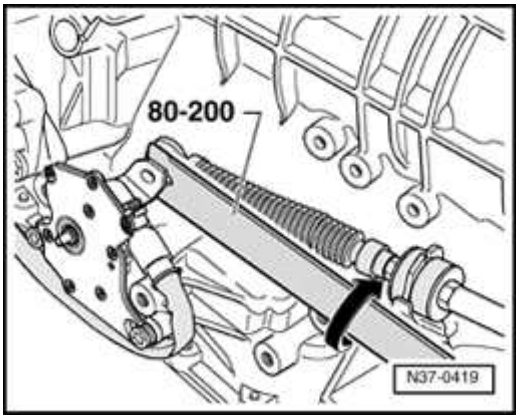


Fig. 57: Removing Selector Lever Cable From Selector Shaft Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry off selector lever cable from lever/shift rod using prying lever 80-200 (arrows).
- Unbolt front heat shield, if installed, from below shift mechanism housing.

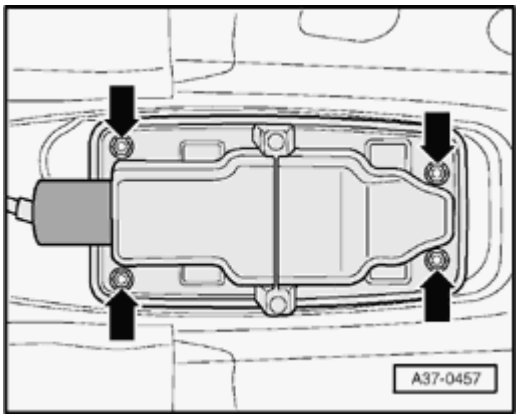
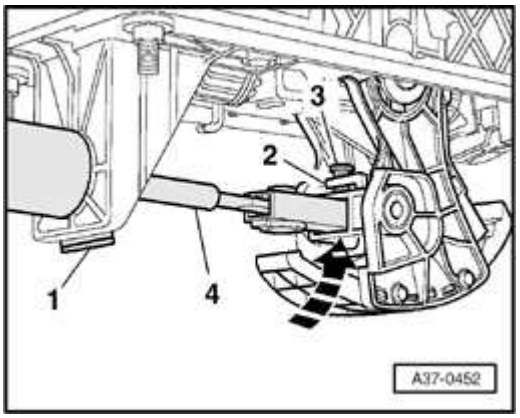


Fig. 58: Removing Lower Cover From Shift Mechanism
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove lower cover from shift mechanism (arrows).
- Remove boot of selector lever cable from lower shift mechanism cover and slide back.



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Fig. 59: Identifying Retaining Clip, Securing Spring, Push Pin & Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove retaining clip - **1** - for selector lever cable on shift mechanism downward.
- Pull plastic securing spring - **2** - slightly to front and push pin - **3** - up only as far as necessary (arrow).

NOTE:

- **Make sure that pin is not pushed fully out.**

- Remove selector lever cable - **4** - from shift mechanism.

NOTE:

- **Do not bend or kink selector lever cable.**

Installing

Installation is reverse of removal, noting the following:

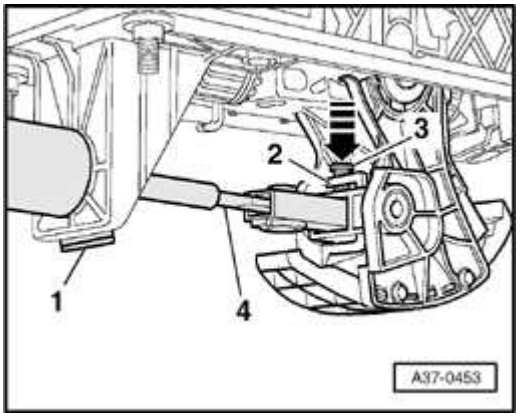


Fig. 60: Inserting End Of Selector Lever Cable Into Joint Of Selector Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Fit new retaining clip - **1** - for selector lever cable on shift mechanism.

Installation position:

Angled end of retaining clip faces to inside of shift mechanism.

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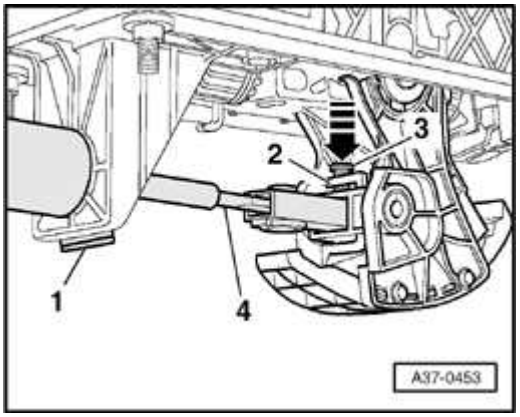


Fig. 61: Inserting End Of Selector Lever Cable Into Joint Of Selector Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert end of selector lever cable - **4** - into selector lever joint.
- Press pin - **3** - downward (arrow)
- Check whether plastic securing spring - **2** - has locked pin.
- Fasten selector lever cable boot into lower cover of shift mechanism.

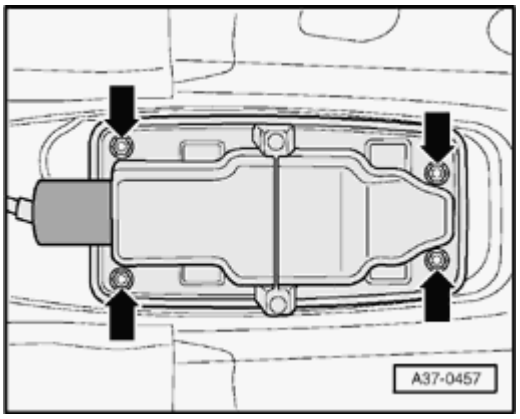


Fig. 62: Removing Lower Cover From Shift Mechanism
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt lower cover to shift mechanism (arrows).

NOTE:

- **Do not bend or kink selector lever cable.**

- Install front heat shield, if present, under shift mechanism housing.

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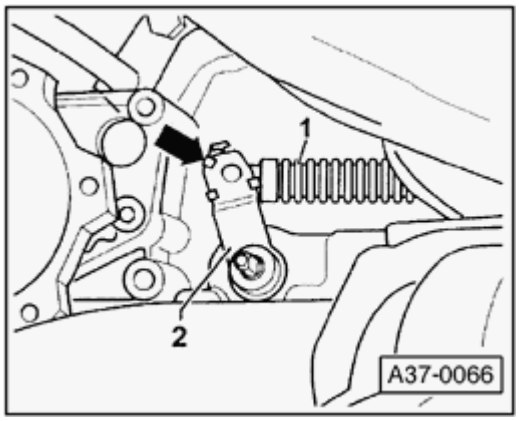


Fig. 63: Pushing Lever/Selector Shaft On Transmission Fully Forward Into Position "S"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Push lever/selector shaft - **2** - on transmission fully forward into position "S" - **arrow** -.
- Shift selector lever into "S" and carefully press up ball head of selector lever cable - **1** - on lever/shift rod - **2** - using a pair of pliers.

NOTE:

- **Do not deform lever/shift rod when pressing up or else shifting cannot be precisely adjusted any more.**

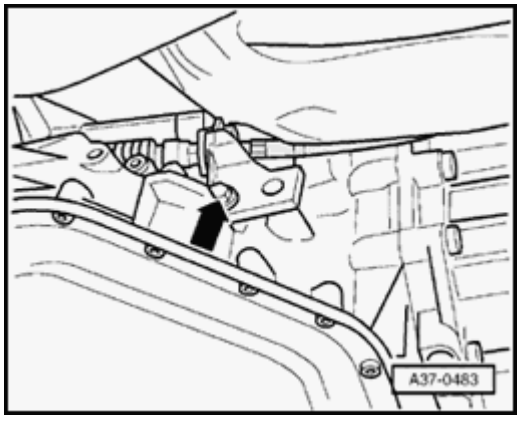


Fig. 64: Location Of Support Bracket For Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt on mounting bracket for selector lever cable in this position (arrow).
- Install shielding plate/selector lever cable, if present.
- Install left transmission support with transmission mount --> **Right and left transmission mounts, removing and installing**
- Fit driveshaft to transmission. -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

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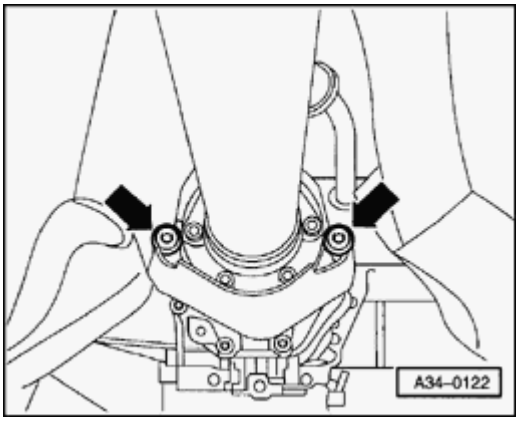


Fig. 65: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt heat shield for driveshaft onto transfer box (arrows).
- Install front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Adjust selector lever cable --> **Selector lever cable, checking and adjusting**.

Tightening torques

Component	Nm
Bottom cover to shift mechanism	10
Selector lever cable to mounting bracket	12
Mounting bracket to transmission (2 x M8)	23 Nm
Heat shield/selector lever cable to transmission, M8	23 Nm

Selector lever cable, checking and adjusting

Special tools, testers and auxiliary items required

- Special tool T40031

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Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

Procedure

- Shift selector lever into position "S".

For 6 cylinder gasoline engines:

- Remove left front exhaust pipe. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Remove shielding plate/selector lever cable.

All:

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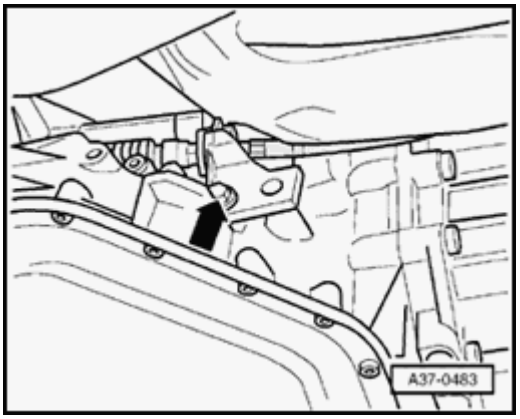


Fig. 66: Location Of Support Bracket For Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove mounting bracket for selector lever cable (arrow).
- Removing left transmission support --> **Right and left transmission mounts, removing and installing**.

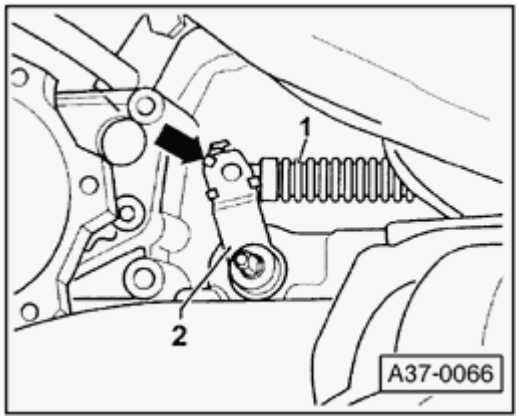
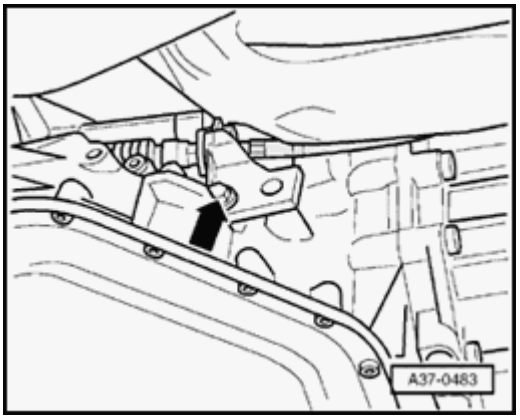


Fig. 67: Pushing Lever/Selector Shaft On Transmission Fully Forward Into Position "S"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Grasp selector lever cable - **1** - and push lever/selector shaft - **2** - fully forward into position "S" - **arrow** - .



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Fig. 68: Location Of Support Bracket For Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt on mounting bracket for selector lever cable in this position (arrow).
- Remove shift mechanism cover --> **Shift mechanism cover, removing and installing**.

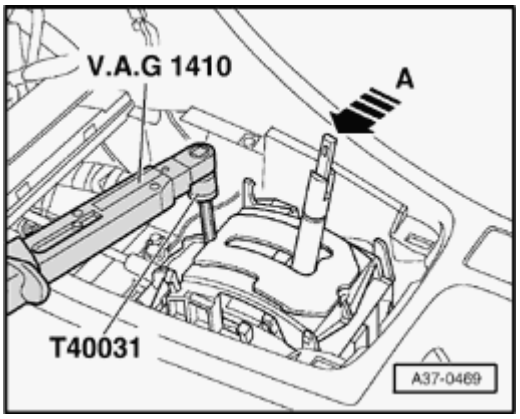


Fig. 69: Loosening Rear Clamping Screw On Selector Lever Cable Approx. 1 Turn Through Hole In Shift Mechanism Using Special Tool T40031
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen rear clamping screw on selector lever cable approx. 1 turn through the hole in shift mechanism using special tool T40031.

NOTE:

- **Loosen clamping screw approx. 1 turn. Do not remove.**
- **Clamping screw is only accessible in selector lever position "S".**
- **Selector lever must remain in position "S" while clamping screw is loose.**

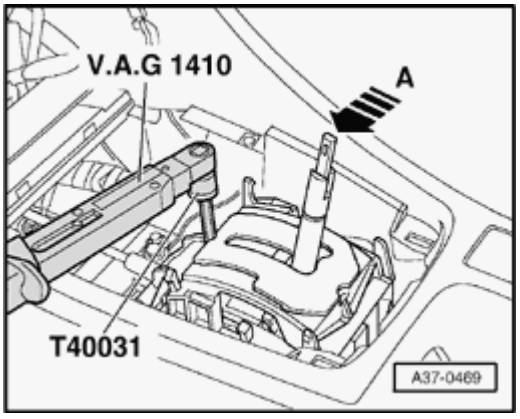


Fig. 70: Checking Exact Position Of Selector Lever In Position "S" By Pushing Selector Lever Lightly Toward Drivers Seat
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check exact position of selector lever in position "S" by pushing selector lever lightly toward drivers seat

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(arrow - **A** -).

NOTE:

- **When adjusting, do not move selector lever backward or forward, or adjustment will be falsified.**

- Tighten clamping screw to 13 Nm in this position using special tool T40031.
- Install shift mechanism cover --> **Shift mechanism cover, removing and installing**.
- Installing left transmission support --> **Right and left transmission mounts, removing and installing**.

For 6 cylinder gasoline engines:

- Install shielding plate/selector lever cable.
- Install left front exhaust pipe. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

Tightening torques

Component	Nm
Clamping screw to selector lever cable	13
Mounting bracket to transmission (2 x M8)	23 Nm
Heat shield/selector lever cable to transmission, M8	23 Nm

Locking cable, removing and installing

Removing

NOTE:

- **Locking cable must not be kinked.**

- Shift selector lever into position "S".
- Note radio code (for vehicles equipped with coded anti-theft radio/radio navigation system).

See Caution before beginning repairs on electrical system --> **Selector lever mechanism, servicing**

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- Disconnect Ground (GND) strap from battery.
- Remove storage compartment on drivers side -->
  - **68 - INTERIOR EQUIPMENT**
  - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET
- Remove steering column cover: -->
  - **68 - INTERIOR EQUIPMENT**
  - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET
- Remove air conditioning operating unit: --> **87 AIR CONDITIONING**
- Remove ashtray in center console: -->
  - **68 - INTERIOR EQUIPMENT**
  - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET
- Remove shift mechanism cover --> **Shift mechanism cover, removing and installing**.
- Switch ignition key to driving position (ignition on).
- Shift selector lever into position "P".
- Lift retaining clip - **2** - from interlock lever and pull locking cable - **1** - out of ignition/starter switch.
- Lift securing spring - **4** - for locking cable and pull locking cable support bracket - **5** - on shift mechanism sideways and disengage locking cable eye.

Installing

Installation is reverse of removal, noting the following:

- Route locking cable kink-free behind dash panel strut (arrow).
- Switch ignition key to driving position (ignition on).
- Insert locking cable - **1** - into ignition/starter switch.
- Check that interlock lever - **2** - is locked.
- Bring ignition/starter switch into locking position (ignition off).
- Check whether selector lever is still in position "P".
- Engage locking cable eye in pin - **3** -.
- Slightly lift securing spring - **4** -.
- Push locking cable support bracket - **5** - into shift mechanism from the right until securing spring - **4** - engages.
- Adjusting locking cable --> **Locking cable, adjusting**.

See Caution for connecting Telematics battery --> **Selector lever mechanism, servicing**

NOTE:

- **Be sure to activate vehicle features (radio/radio-navigation system, clock,**

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electric window regulators) according to owners manual when the battery is reconnected.

- **Further measures after re-connecting power supply: -->**
  - **24 MULTIPORT FUEL INJECTION (MFI) for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **24 - MULTIPORT FUEL INJECTION (MFI) for 2.0 LITER 4-CYL. 4V TURBO FUEL INJECTION IGNITION, ENGINE CODE(S): BPG, BWT**
  - **24 MULTIPORT FUEL INJECTION (MFI) for 3.0 LITER 6-CYL. 5V FUEL INJECTION & IGNITION, ENGINE CODE(S): AVK, BGN**
  - **24 - FUEL INJECTION SYSTEM for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **24 - MULTIPORT FUEL INJECTION (MFI) for 4.2 LITER V8 4V FUEL INJECTION AND IGNITION, ENGINE CODE(S): BNS**
  - **24 MULTIPORT FUEL INJECTION (MFI) for 4.2 LITER V8 5V FUEL INJECTION AND IGNITION, ENGINE CODE(S): BHF**

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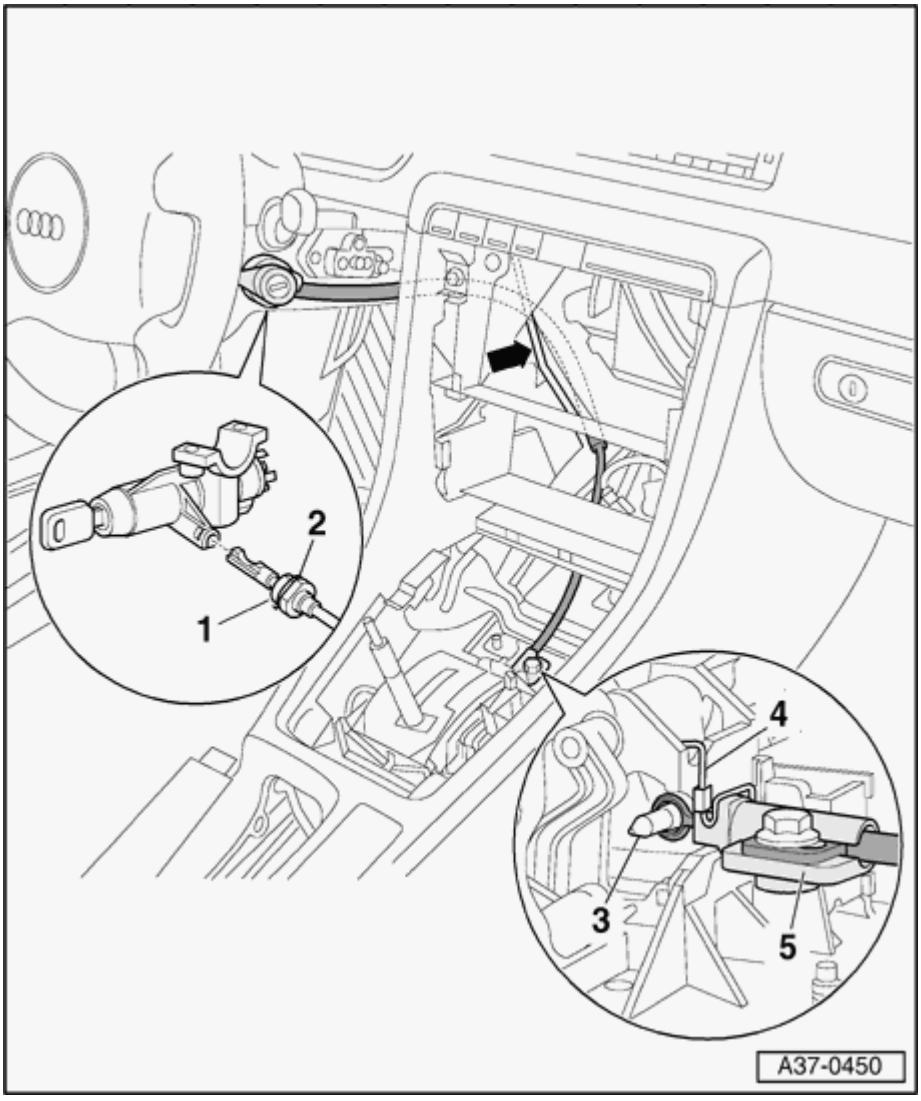


Fig. 71: Locking Cable Remove/Install Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Locking cable, adjusting

Special tools, testers and auxiliary items required

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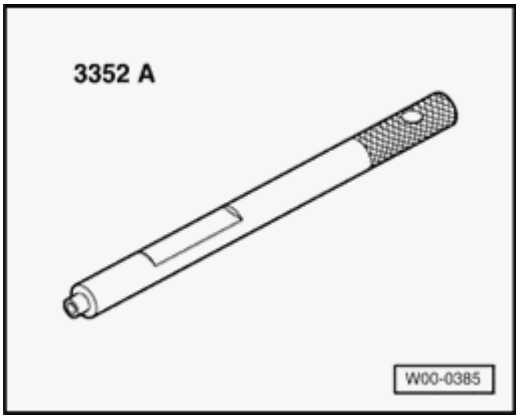


Fig. 72: Identifying Special Tools - Adjustment Pin For Shiftlock 3 3352A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Adjusting gauge 3352A for locking cable
- Protective glasses

Preliminary work

NOTE:

- **The following described procedure saves the work of removing center console.**

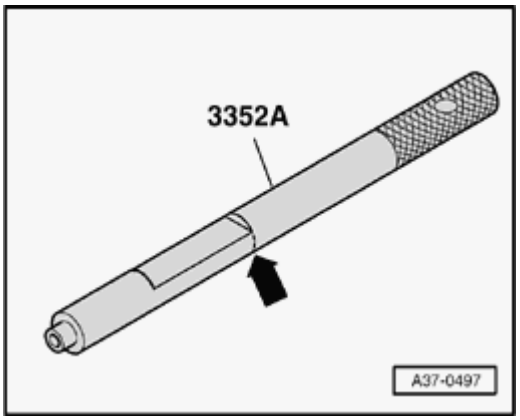


Fig. 73: Identifying Cutting Area Of Adjusting Gauge 3352A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Cut through adjusting gauge 3352A at rear end of flat area - **arrow** - using a parting grinder.

  CAUTION: Wear protective glasses.

- Order a new adjusting gauge 3352A for locking cable as replacement for later use.

Procedure

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- Remove center console trim --> **Shift mechanism cover, removing and installing**.

NOTE:

- **Selector lever knob and cover can remain installed.**

- Remove ashtray in center console: -->
  - **68 - INTERIOR EQUIPMENT**
  - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

Adjustment requirements:

- Locking cable in installation position
- Selector lever in position "P".
- Ignition key in removal position.

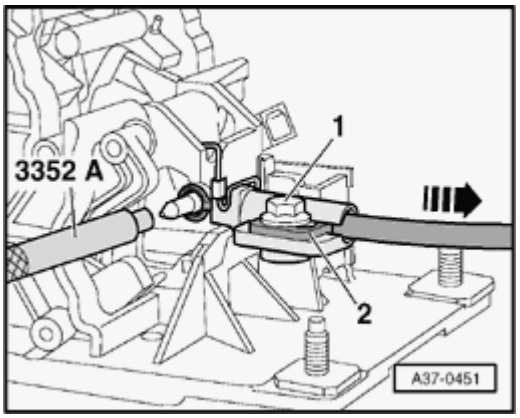


Fig. 74: Removing Adjusting Gauge
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen bolt - **1** -.

- Support bracket - **2** - of locking cable must be movable by hand

- Push modified adjusting gauge 3352A between pin on lever for locking cable and locking cable eye.
- Move locking cable in direction of arrow to stop and tighten bolt - **1** - to 9 Nm.
- It must be possible to easily remove and insert adjusting gauge 3352A in this position.
- Remove adjusting gauge.

- Check ignition key removal lock after every adjustment of the locking cable --> **Ignition key removal lock, checking**.

Tightening torque

Component	Nm

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Locking cable to support bracket	9

TRANSMISSION, REMOVING AND INSTALLING

Transmission, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Obtain the anti-theft radio security code.**
- **Switch the ignition off.**
- **Disconnect the battery Ground (GND) strap.**
- **On vehicles equipped with Audi Telematics by OnStar, switch-off the emergency (back-up) battery for the Telematic/Telephone Control Module prior to disconnecting vehicle battery -->**
  - **91 - COMMUNICATION**
  - **91 RADIO, TELEPHONE, NAVIGATION, TRIP COMPUTER for COMMUNICATION, CABRIOLET**

  .
- **After reconnecting vehicle battery, re-code and check operation of anti-theft radio. Also check operation of clock and power windows according to article and/or Owners Manual.**
- **After reconnecting vehicle battery on vehicles equipped with Audi Telematics by OnStar, switch-on the emergency (back-up) battery for the Telematic/Telephone Control Module -->**
  - **91 - COMMUNICATION**
  - **91 RADIO, TELEPHONE, NAVIGATION, TRIP COMPUTER for COMMUNICATION, CABRIOLET**

  .

Transmission, removing and installing

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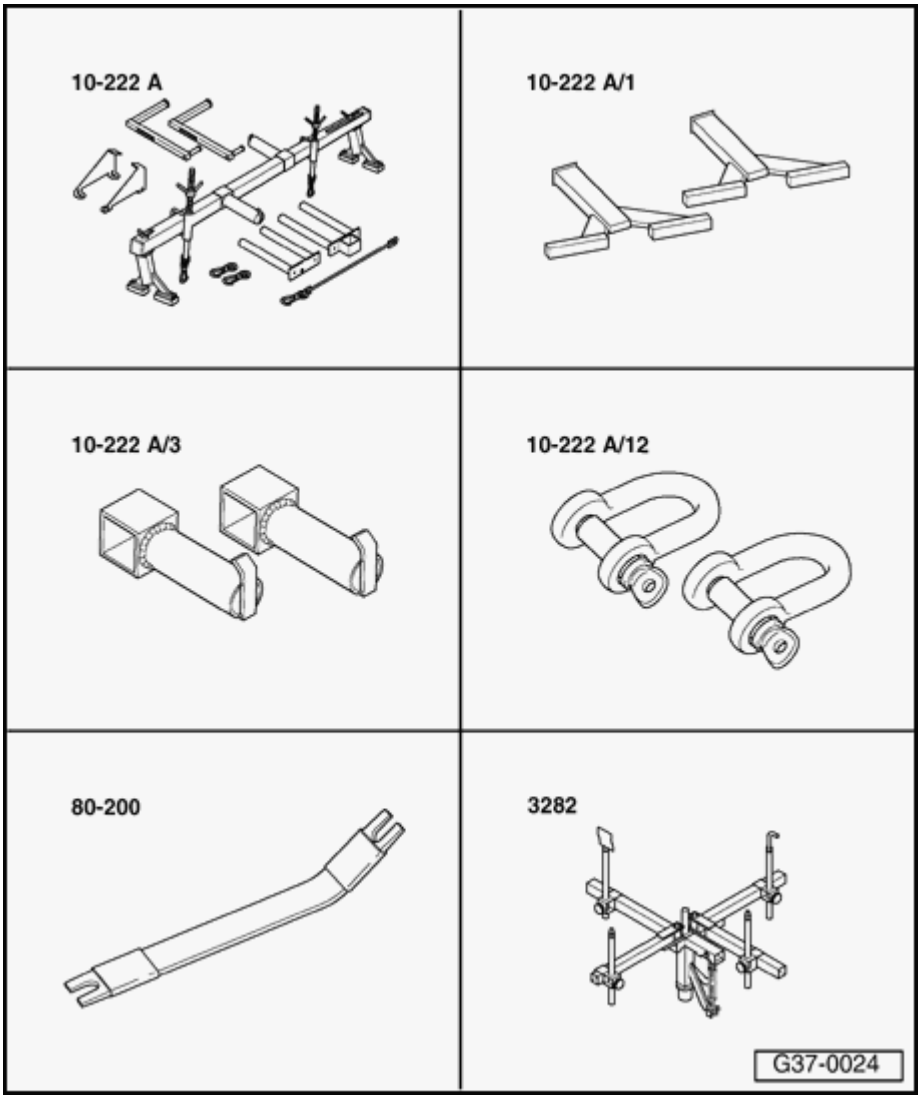


Fig. 75: Identifying Special Tools - Transmission, Removing And Installing (1 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Engine support bridge 10-222A
- Support 10-222A/1
- Adapter 10-222A/3
- Shackle 10-222A/12

- Pry lever 80-200 for removing outside mirror
- Transmission support 3282

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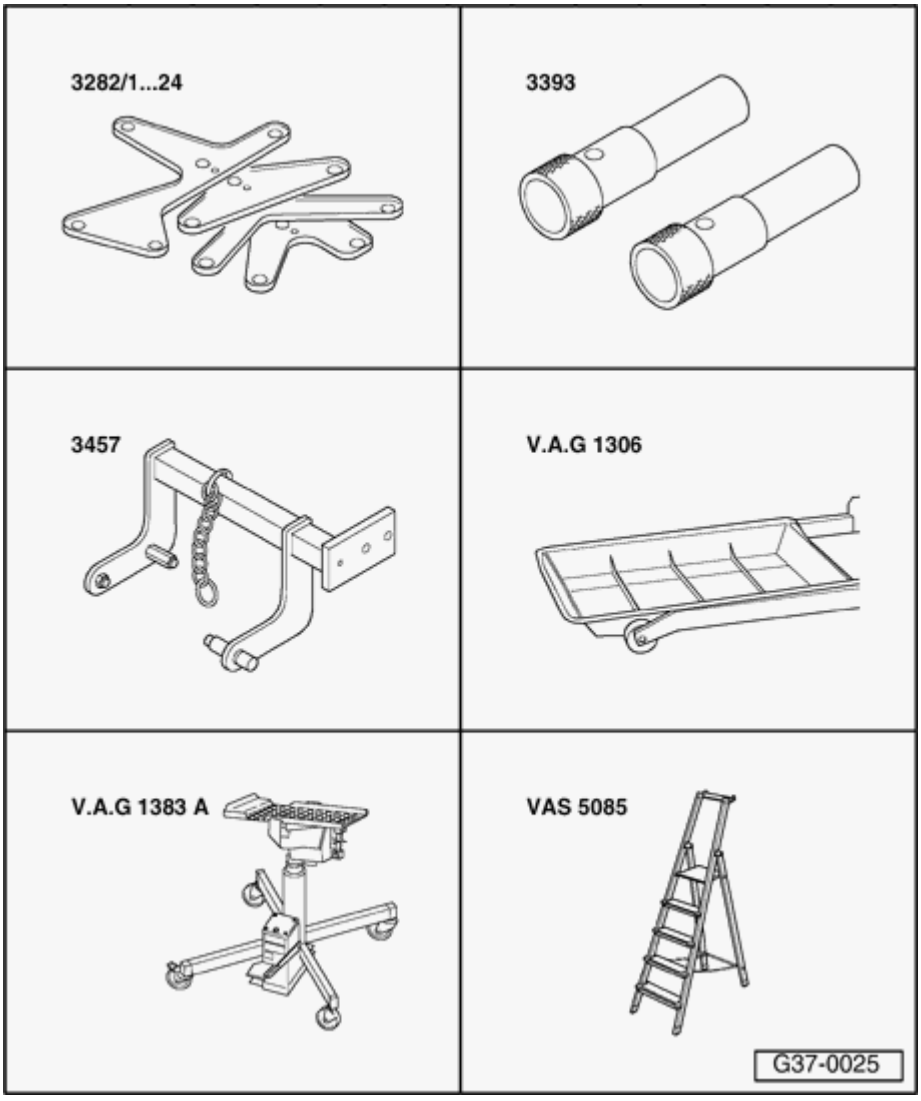


Fig. 76: Identifying Special Tools - Transmission, Removing And Installing (2 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Adjustment plate 3282/19
- Testing Mandrels 3393
- Transport device 3457
- Drip tray VAG1306

- Engine/transmission support VAG1383A engine/gearbox jack
- Ladder VAS5085

Removing

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NOTE:

- **All cable ties opened or cut during engine removal must be reinstalled at the same locations.**

- First determine whether a coded radio is installed. If so, determine the correct coding.

See Caution before beginning repairs on the electrical system --> **Transmission, removing and installing**

- Switch ignition off and disconnect battery Ground (GND) strap.

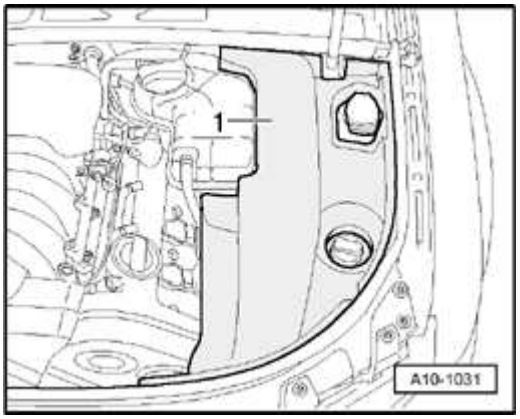


Fig. 77: Removing Cover In Engine Compartment (Left Side)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover - **1** - in engine compartment (left side).

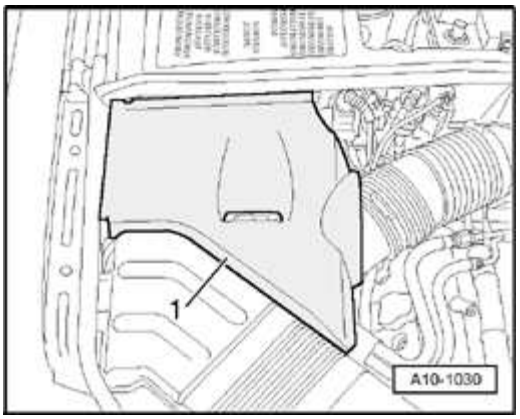


Fig. 78: Removing Cover In Engine Compartment (Right Side)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover - **1** - in engine compartment (right side).

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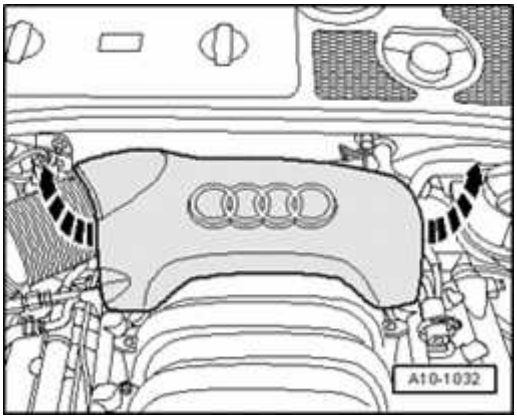


Fig. 79: Removing Rear Engine Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove engine cover (arrows).
- Remove intake air duct from intake manifold.

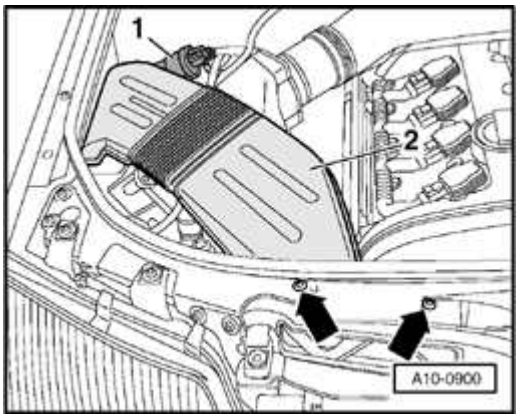


Fig. 80: Evaporative Emission Canister Purge Regulator Valve N80 And Air Duct
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disengage Evaporative Emission (EVAP) Canister Purge Regulator Valve N80 - **1** -.
- Remove bolts (arrows) and remove intake air guide - **2** -.

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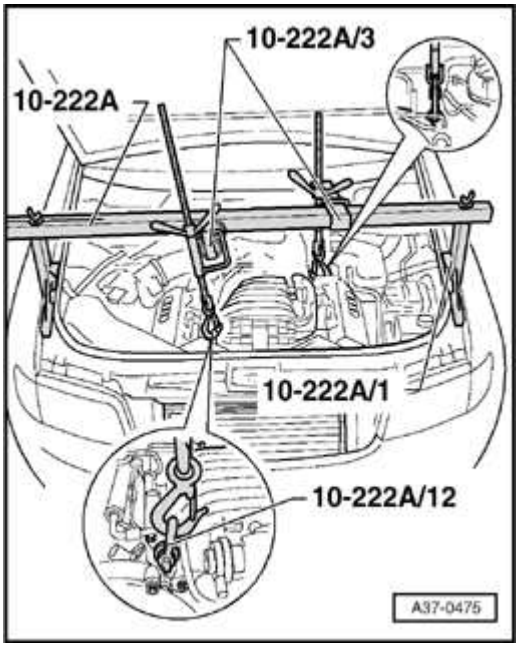


Fig. 81: Fitting Support Bar 10-222A Together With Supports 10-222A/1 And Fit Adapters 10-222A/3
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Fit support bar 10-222A together with supports 10-222A/1 and fit adapters 10-222A/3.
- Secure spindles to engine. To do so, additionally use a shackle 10-222A/12 at the front side of the engine to avoid damage.
- Take up weight of engine/transmission assembly on spindles.
- Loosen wheel bolts.

- Raise vehicle.
- Remove front wheels.

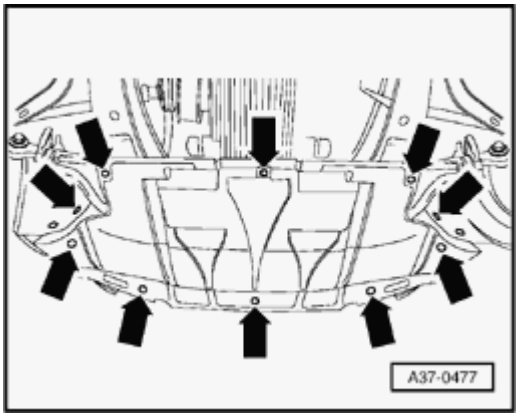


Fig. 82: Identifying Noise Insulation Panel Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove noise insulation panel (arrows).

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- Remove front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

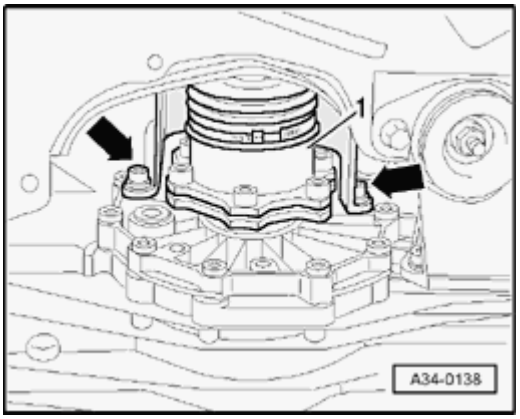


Fig. 83: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shields for left, if installed, and right drive axles (arrows).

Third bolt is not visible in the illustration.

- Unbolt left and right drive axles - **1** - from transmission flanges and tie up. --> **40 - FRONT SUSPENSION**

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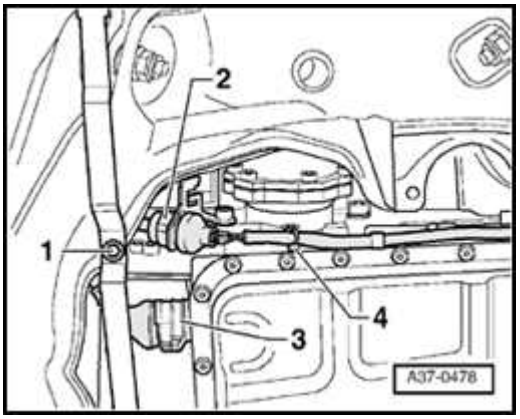


Fig. 84: Identifying Noise Insulation Tray Bracket, Multi-Function Switch Connector, Locking Lever And Cable Tie
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove noise insulation bracket - **1** -.
- Disconnect connector - **2** - of wire for multi-function switch.
- Swing securing lever - **3** - , disconnect connector for transmission wiring harness.
- Cut cable ties - **4** -.

Make sure the wire for multi-function switch is not damaged when doing this.

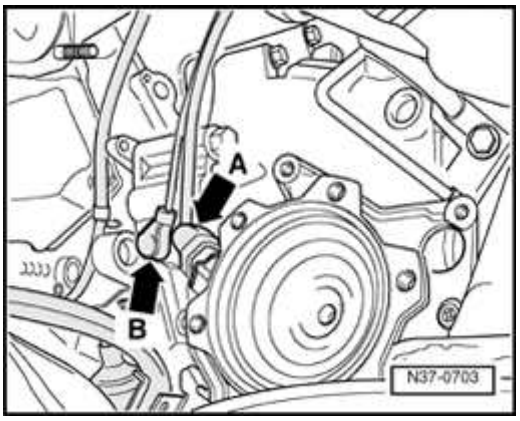


Fig. 85: Location of Speedometer Vehicle Speed Sensor (VSS) G22, and Engine Speed (RPM) Sensor G28
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect connector from Speedometer Vehicle Speed Sensor (arrow - **A** -).
- Unbolt Engine Speed (RPM) Sensor G28 (arrow - **B** -) from transmission.

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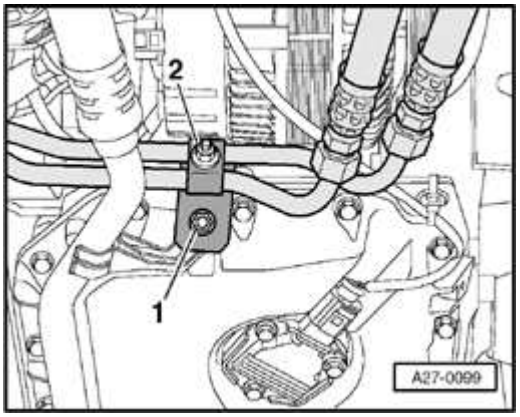


Fig. 86: Unscrewing Nut For Clamp For ATF Lines
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unscrew nut - **2** - for clamp for ATF lines.
- Place drip tray VAG1306 underneath.
- Always clean area of ATF line/transmission connection.
- Mark ATF lines if no color markings are present.

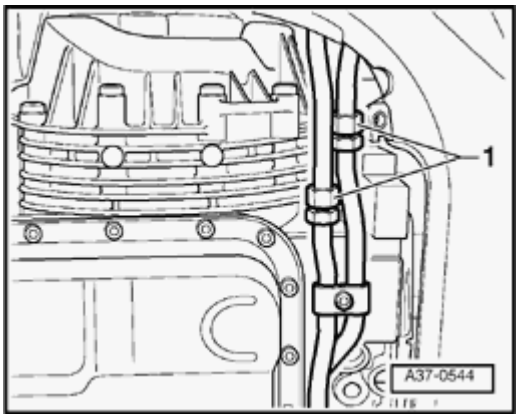


Fig. 87: Disconnecting ATF Lines
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect ATF lines - **1** -.
- Plug ATF lines with clean plug.
- Remove starter. -->
  - **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL**
  - **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL** for ELECTRICAL EQUIPMENT, CABRIOLET

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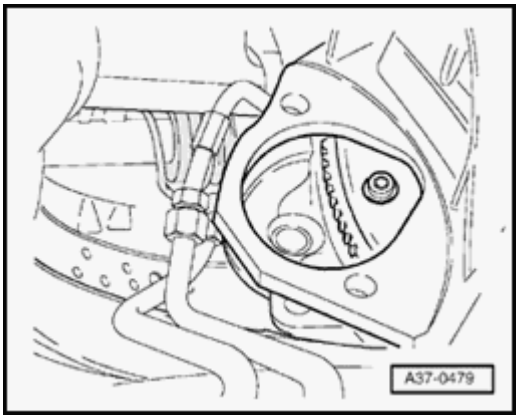


Fig. 88: Identifying Torque Converter To Drive Plate Bolts (3 Total)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt 3 torque converter bolts from drive plate (turn crank shaft an additional 1/3 turn every time).

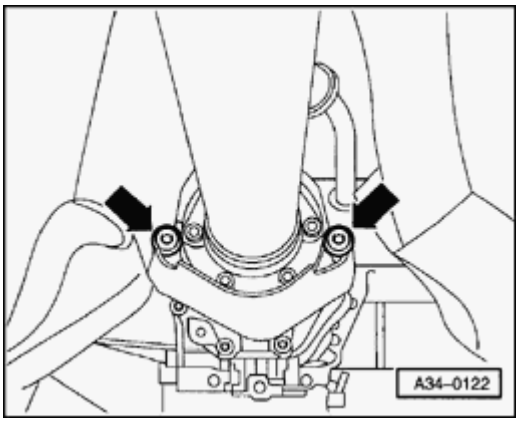


Fig. 89: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for driveshaft at transmission (arrows).

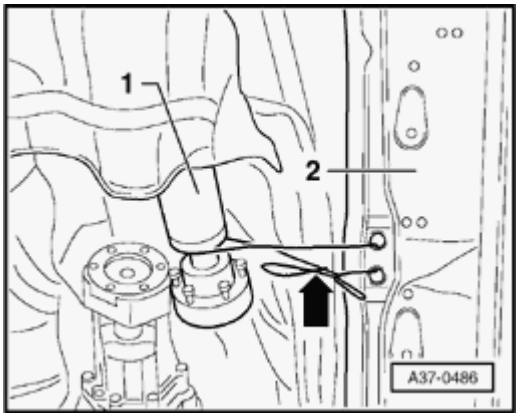


Fig. 90: Unbolting Driveshaft On Transmission And Securing To Panel With Wire
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Unbolt driveshaft - **1** - on transmission and secure to panel - **2** - with wire (arrow). -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Remove shielding plate/selector lever cable, if installed.

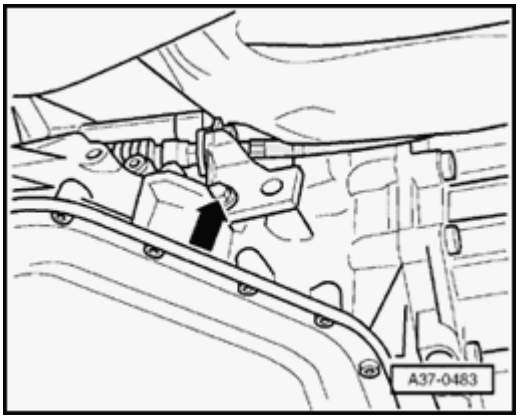


Fig. 91: Location Of Support Bracket For Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Mark position of mounting bracket for selector lever cable to transmission housing for re-installation, unbolt mounting bracket (arrow).
- Remove left transmission support with transmission mount --> **Right and left transmission mounts, removing and installing**.

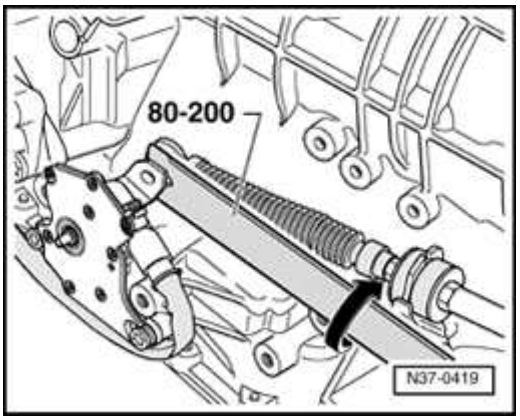


Fig. 92: Removing Selector Lever Cable From Selector Shaft Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry off selector lever cable from lever/shift rod using prying lever 80-200 (arrows).

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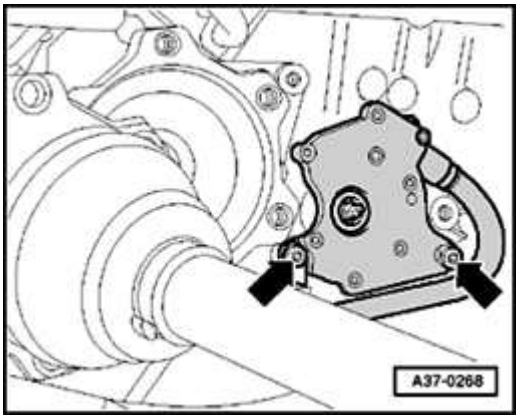


Fig. 93: Unbolting Multi-Function Transmission Range (TR) Switch F125 For Protection Against Damage
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt multi-function Transmission Range (TR) switch F125 for protection against damage (arrows) and expose wiring harness.

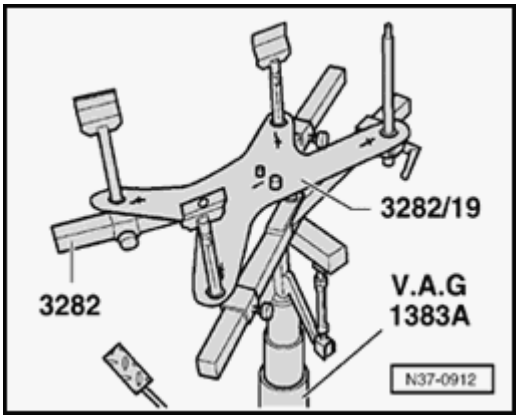


Fig. 94: Setting Up Transmission Support 3282
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Prepare transmission support 3282 for Automatic Transmission 01V with adjustment plate 3282/10 and place it on the engine/transmission hoist VAG1383A.

NOTE:

- **The symbols on the adjustment plate indicate the necessary mounts for Automatic Transmission 01V and the arrow points toward front of vehicle.**

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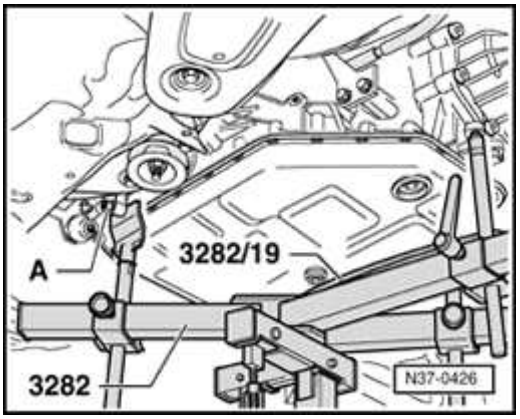


Fig. 95: Supporting Transaxle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Roll engine/transmission hoist VAG1383A with transmission support 3282 under transmission, align adjustment plate parallel to transmission and support transmission.
- Secure transmission on transmission support 3282 using bolt - **A** -.
- Fill space between gearbox support and sump with washers.

Automatic Transmission 01V with All Wheel Drive is supported at the same positions as the Front Wheel Drive version.

- Remove right transmission support with transmission mount --> **Right and left transmission mounts, removing and installing**.

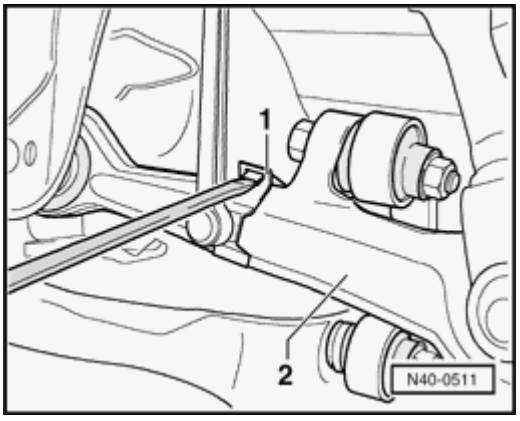


Fig. 96: Unclipping Clamp For Coupling Rod For Left Front Level Control System Sensor G78 From Control Arm
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip retaining clip for coupling rods - **1** - of Left Front Level Control System Sensor G78 from left front control arm - **2** -.

Vehicles with six-cylinder engine:

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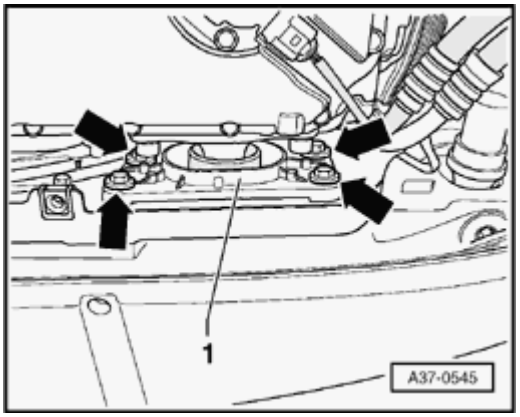


Fig. 97: Unbolting Bolts For Stop/Torque Support
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt bolts (arrows) for stop/torque support - **1** -.

All:

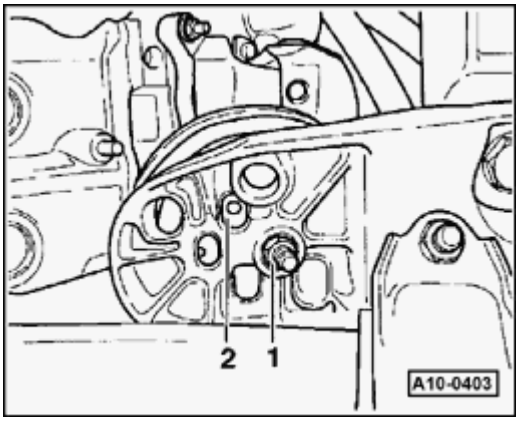


Fig. 98: Identifying Engine Mount Bolts and Positioning Sleeves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Mark installation positions for threaded assemblies - **1** - and positioning sleeves - **2** -.
- Remove nuts - **1** - on left and right engine mounts.

NOTE:

- **When installing, make sure that locating sleeves - 2 - engage again.**

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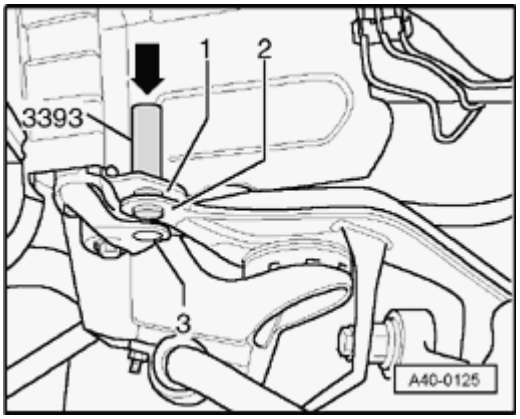


Fig. 99: Checking Holes Align Using Testing Mandrel 3393
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Before loosening subframe, check on both sides of vehicle, using testing Mandrels 3393 , that at least holes - **1** - and - **2** - align.

If this is not the case, axle alignment must be carried out after tightening of subframe.

Hole - **3** - is not applicable here.

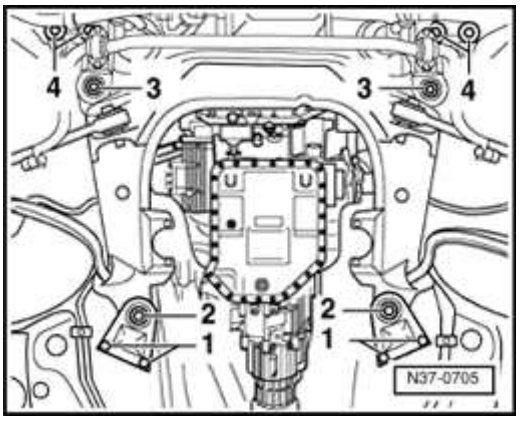


Fig. 100: Identifying Fasteners Requiring Removing To Lower Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **1** - and - **2** - at rear of subframe on both sides of vehicle.
- Remove bolts - **3** - at front of subframe on both sides of vehicle.
- Remove bolts - **4** - (2 bolts at each vehicle side).
- Remove lower connecting bolts for engine/transmission.

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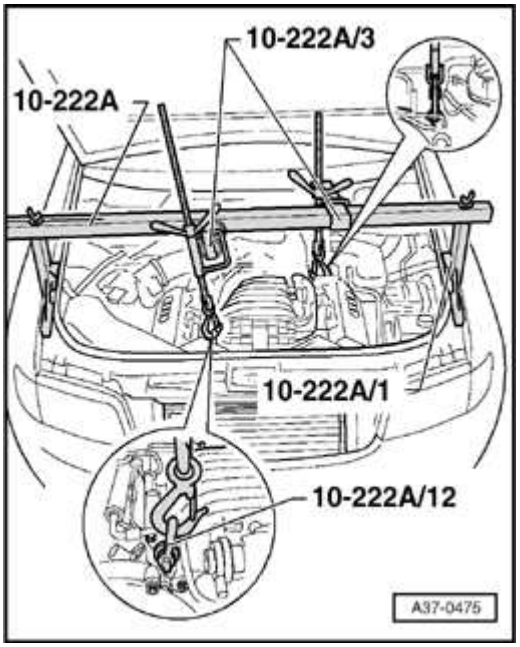


Fig. 101: Fitting Support Bar 10-222A Together With Supports 10-222A/1 And Fit Adapters 10-222A/3
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lower engine-transmission-subframe using the spindles approx. 4 turns. To do this use Support VAS5058.
- To do this lower engine/gearbox assembly using spindles in turn, 2 turns at a time.
- At the same time lower engine-transmission-subframe using lifter VAG1383A (second mechanic).

NOTE:

- **When lowering transmission, ensure that no components are damaged.**

- Remove upper connecting bolts for engine/transmission.
- Press transmission off engine, while pressing torque converter out of drive plate.

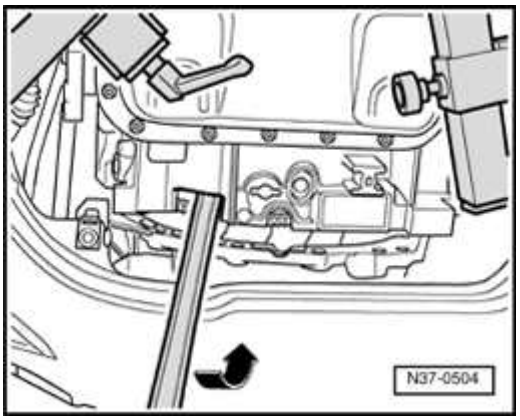


Fig. 102: Press Torque Converter Against ATF Pump
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Press torque converter against the ATF pump (arrow).
- Lower transmission.

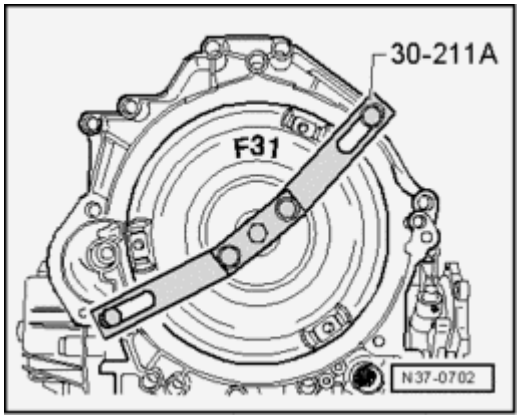


Fig. 103: Securing Torque Converter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure converter so it does not fall out.

For disassembly and assembly, secure transmission to assembly stand using Transport device 3457 and Holding plate VW309 --> **Transmission, attaching to assembly stand**.

Installing

Installation of transmission is the reverse of removal. The following points must also be observed:

Before installing:

- Clean threads in output flange/driveshaft flange using a tap.
- Clean ATF lines --> **ATF lines and ATF cooler, cleaning**.
- Insert torque converter correctly into transmission

CAUTION: In case of an incorrectly inserted torque converter, the coupling plate of the torque converter or the ATF-pump will be destroyed, if the transmission is flanged to the engine.

Installation dimension for torque converter, checking

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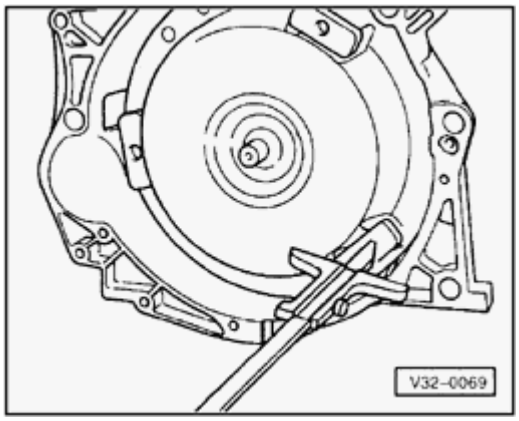


Fig. 104: Checking Torque Converter Is Correctly Positioned
Courtesy of VOLKSWAGEN UNITED STATES, INC.

When torque converter is installed correctly, distance between lower contact surface of threaded holes at torque converter and contact surface of converter housing on Automatic Transmission 01V is approx. 23 mm.

If the torque converter is not inserted completely, this distance will be approx. 11 mm.

- Make sure bushings are correctly seated.

NOTE:

- **If the bushings get stuck in the transmission housing, they must be removed and new bushings must be installed on the engine.**

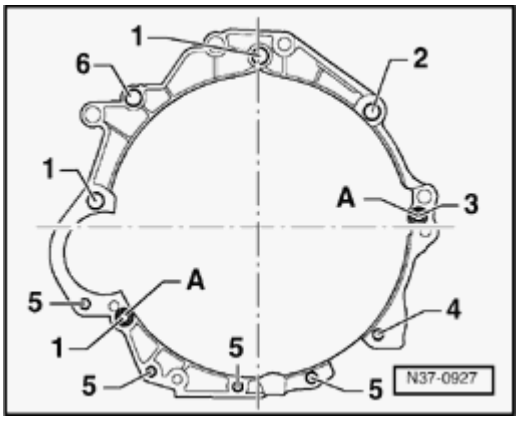


Fig. 105: Engine Cover Bolt Location And Tightening Torque
Courtesy of VOLKSWAGEN UNITED STATES, INC.

For 4 cylinder engines:

Item A = bushings

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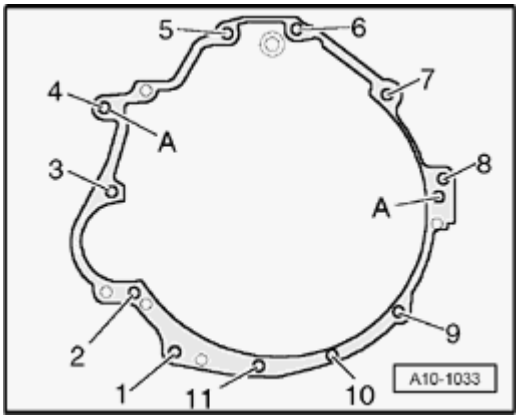


Fig. 106: Identifying Engine/Transmission Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

For 6 cylinder engines:

Item A = bushings

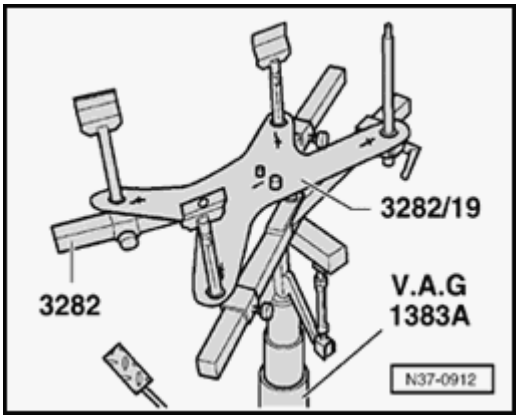


Fig. 107: Setting Up Transmission Support 3282
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Prepare transmission support 3282 for Automatic Transmission 01V with adjustment plate 3282/10 and place it on the engine/transmission hoist VAG1383A.

NOTE:

- **The symbols on the adjustment plate indicate the necessary mounts for Automatic Transmission 01V and the arrow points toward front of vehicle.**

- Place transmission onto transmission support.

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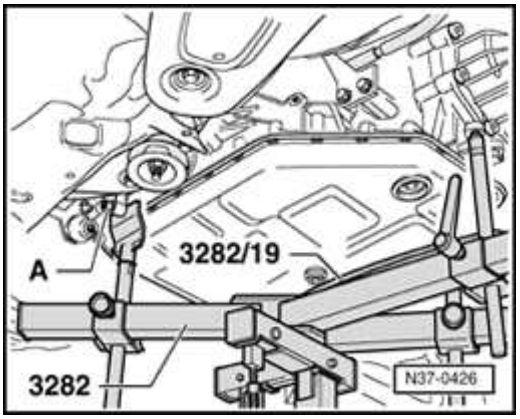


Fig. 108: Supporting Transaxle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure transmission on transmission support 3282 using bolt - **A** -.
- Move transmission into position between the lowered subframe and vehicle floor.
- Align transmission properly to engine.
- Tighten one engine/transmission connecting bolt at either side by hand.
- Make sure that wires do not get pinched as transmission is docked at engine.

CAUTION: Keep checking whether the torque converter behind the drive plate can be turned before and during tightening of the bolts at engine/transmission flange. If the torque converter cannot be turned, it must be assumed that it has not been inserted properly and that the coupling plate of the torque converter or the ATF pump will be destroyed during final tightening of the bolts.

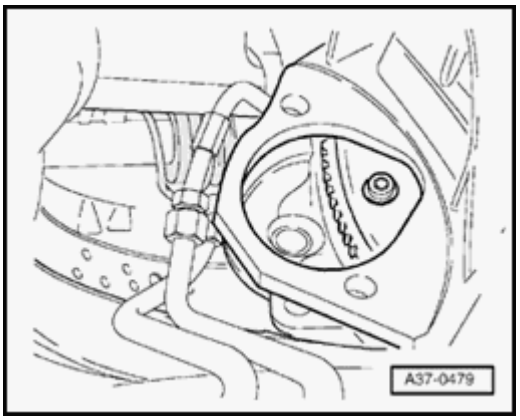


Fig. 109: Identifying Torque Converter To Drive Plate Bolts (3 Total)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt together torque converter and drive plate.
- To do this insert bolts by hand and tighten to tightening torque.

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- Insert top engine/transmission connecting bolts and tighten to tightening torque.

NOTE:

- **Some bolts also have a bracket or a Ground (GND) connection attached refer to tightening torque tables starting on --> --> Tightening torques.**

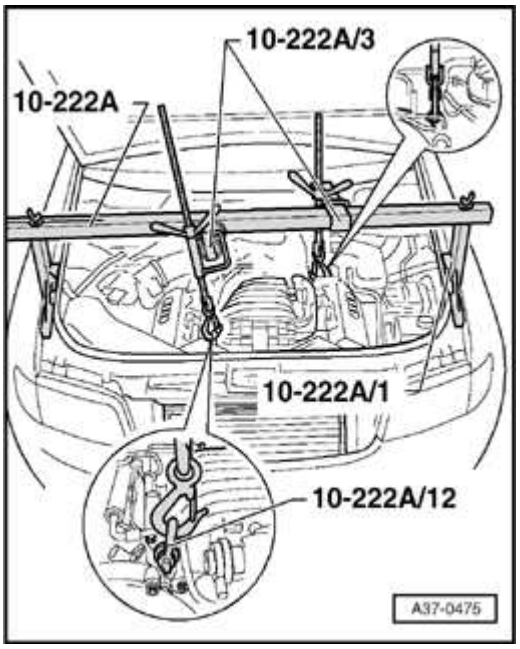


Fig. 110: Fitting Support Bar 10-222A Together With Supports 10-222A/1 And Fit Adapters 10-222A/3
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Raise engine-transmission-subframe using the spindles approx. 4 turns. To do this use Support VAS5058.
- To do this raise engine/gearbox assembly using spindles in turn, 2 turns at a time.
- At the same time raise engine-transmission-subframe using lifter VAG1383A (second mechanic).
- Insert remaining engine/transmission connecting bolts and tighten to tightening torque

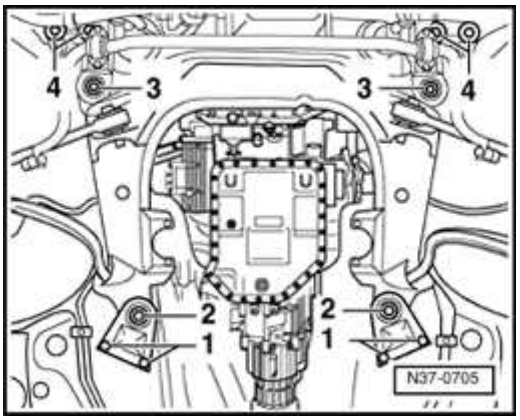


Fig. 111: Identifying Fasteners Requiring Removing To Lower Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Install subframe, observe tightening sequence and alignment with master bore hole. --> **40 - FRONT SUSPENSION**
- Only perform vehicle alignment if necessary. --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**
- Install right transmission support with transmission mount --> **Right and left transmission mounts, removing and installing**

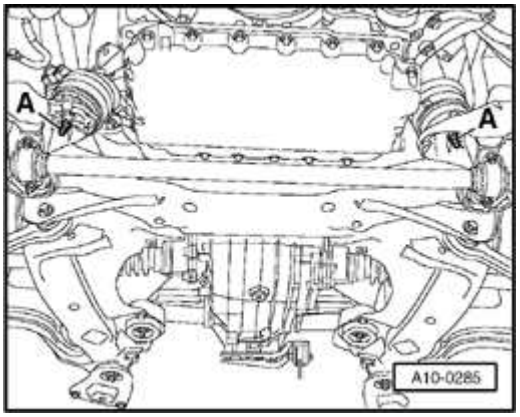


Fig. 112: Screwing On Lower Nuts On Left And Right Engine Mounts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Screw on lower nuts - **A** - on left and right engine mounts. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

Vehicles with six-cylinder engine:

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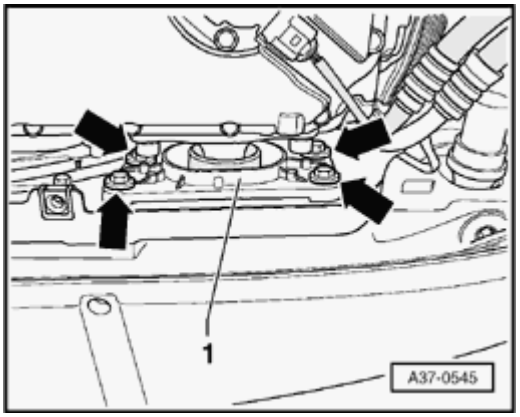


Fig. 113: Unbolting Bolts For Stop/Torque Support
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt on torque support stop - **1** - (arrows). -->
  - **10 - ENGINE - ASSEMBLY** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **10 - ENGINE - ASSEMBLY** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **10 ENGINE - ASSEMBLY** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **10 - ENGINE - ASSEMBLY** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **10 - ENGINE - ASSEMBLY** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE (S): BNS
  - **10 - ENGINE - ASSEMBLY** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE (S): BHF

All:

- Attach retaining clip for coupling rods of Left Front Level Control System Sensor G78 to left front control arm, if present. --> **40 - FRONT SUSPENSION**

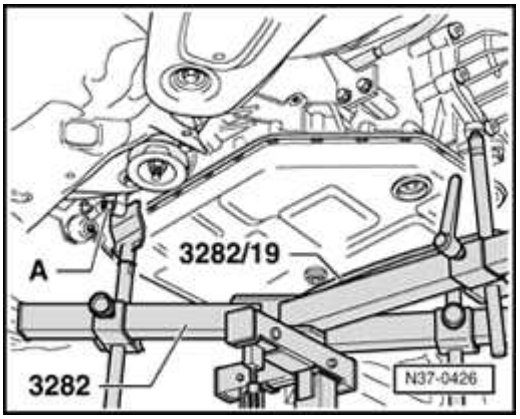


Fig. 114: Supporting Transaxle

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- After subframe is installed, remove bolt - **A** - and remove transmission jack VAG1383A.
- Apply corrosion protection to contact surface between bolt - **A** - and oil pan.

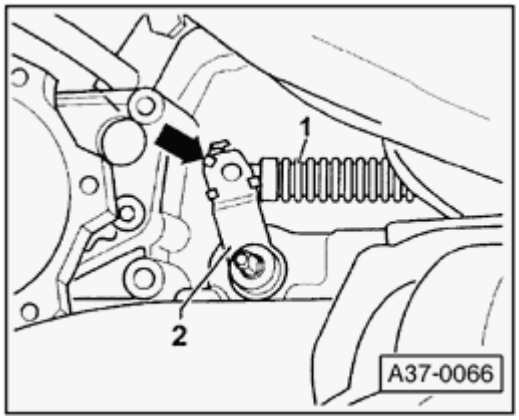


Fig. 115: Pushing Lever/Selector Shaft On Transmission Fully Forward Into Position "S"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Push lever/selector shaft - **2** - on transmission fully forward (on illustration fully left).
- Shift selector lever into "S" and carefully press up ball head of selector lever cable - **1** - on lever/shift rod - **2** - using a pair of pliers.

NOTE:

- **Do not deform lever/shift rod when pressing up or else shifting cannot be precisely adjusted any more.**

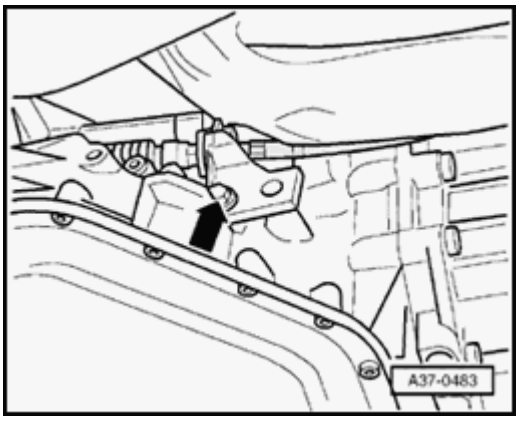


Fig. 116: Location Of Support Bracket For Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt on mounting bracket for selector lever cable to transmission corresponding to marking for re-installation of transmission.
- Install shielding plate/selector lever cable, if present.

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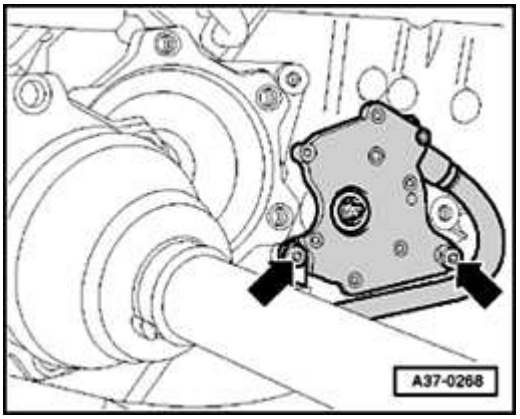


Fig. 117: Unbolting Multi-Function Transmission Range (TR) Switch F125 For Protection Against Damage
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install Multi-Function Transmission Range (TR) Switch F125 --> **Multi-Function Transmission Range (TR) Switch F125 , removing and installing** ; removing and installing Multi-Function Transmission Range (TR) Switch F125
- Install left transmission support with transmission mount --> **Right and left transmission mounts, removing and installing**.
- Bolt driveshaft to transmission. -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

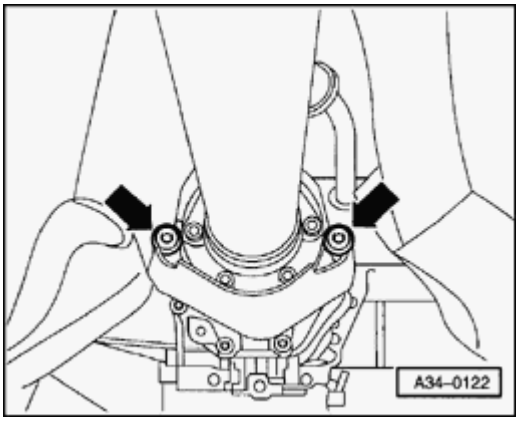


Fig. 118: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install heat shield for driveshaft at transmission (arrows).
- Install starter. -->
  - **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL**
  - **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL** for ELECTRICAL EQUIPMENT, CABRIOLET

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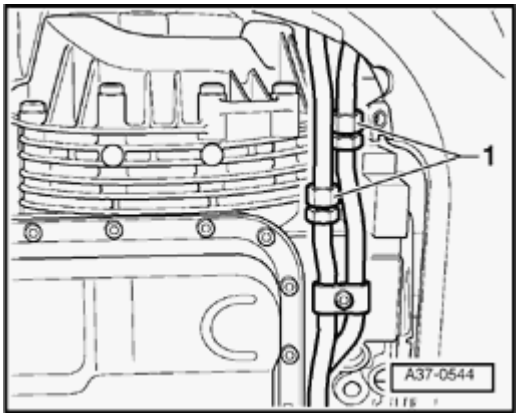


Fig. 119: Disconnecting ATF Lines
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect ATF lines - **1** - according to the respective color markings.

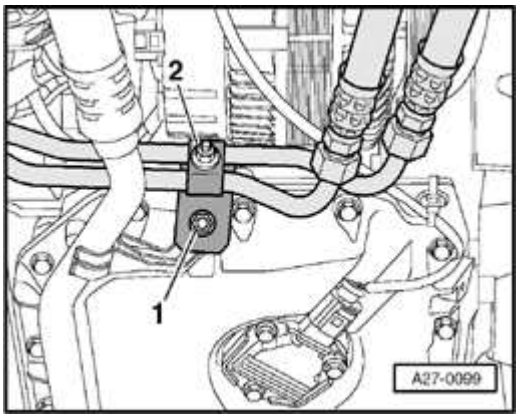


Fig. 120: Unscrewing Nut For Clamp For ATF Lines
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engage clamp for ATF lines and tighten nut - **2** -.

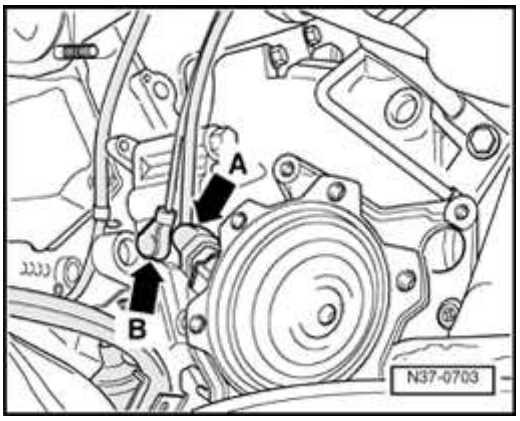


Fig. 121: Location of Speedometer Vehicle Speed Sensor (VSS) G22, and Engine Speed (RPM) Sensor G28

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect connector of Speedometer Vehicle Speed Sensor (arrow A-).
- Bolt Engine Speed (RPM) Sensor G28 (arrow - **B** -) to transmission.

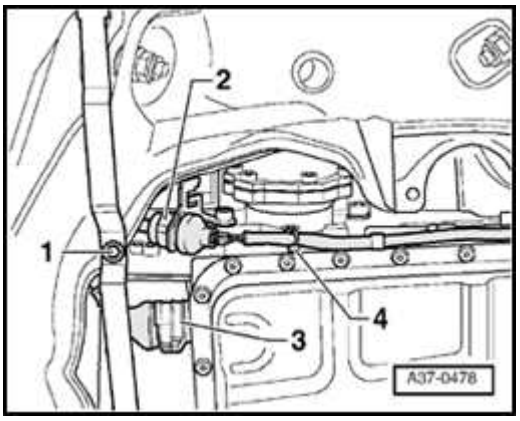


Fig. 122: Identifying Noise Insulation Tray Bracket, Multi-Function Switch Connector, Locking Lever And Cable Tie
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install noise insulation bracket - **1** -.
- Connect connector - **2** - of wire for multi-function switch.
- Connect connector for transmission wiring harness and swivel securing lever - **3** -.
- Replace cable ties - **4** -.

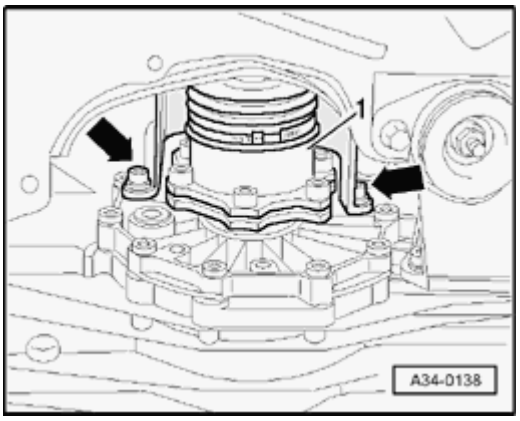


Fig. 123: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt on left and right driveshafts - **1** - to transmission flanges. --> **40 - FRONT SUSPENSION**
- Install heat shields for left, if present, and right drive axles (arrows).

Third bolt is not visible in the illustration.

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- Install front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

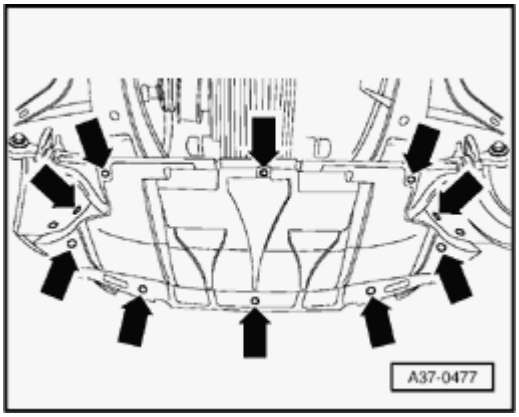


Fig. 124: Identifying Noise Insulation Panel Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install noise insulation panel (arrows).
- Install front wheels. --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**
- Remove engine support bridge 10-222A.
- Fit intake air duct to intake manifold.

- Install intake air guides.
- Install engine cover.
- Install left and right covers in engine compartment.

See Caution for connecting Telematics battery --> **Transmission, removing and installing**

- After connecting battery, enter anti-theft code for radio operating manual.
- Check adjustment of selector lever cable --> **Selector lever cable, checking and adjusting**.
- Check gear oil in front final drive with transmission installed --> **Gear oil in front final drive, checking**.

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- Then check ATF level and top off onward --> **Automatic Transmission Fluid (ATF), checking and changing**.

- Fully close power windows to stop.
- Then activate all power window switches ("up") for at least one second to activate automatic window raising/lowering.
- Set clock to correct time.

Tightening torques

NOTE:

- **Tightening torques are valid only for nuts and bolts that are lightly greased, oiled, covered with a thin coat of phosphate or blackened.**
- **Other lubricants are permitted, e.g. engine oil or transmission fluid, however they may not contain graphite.**
- **Do not use any degreased parts.**

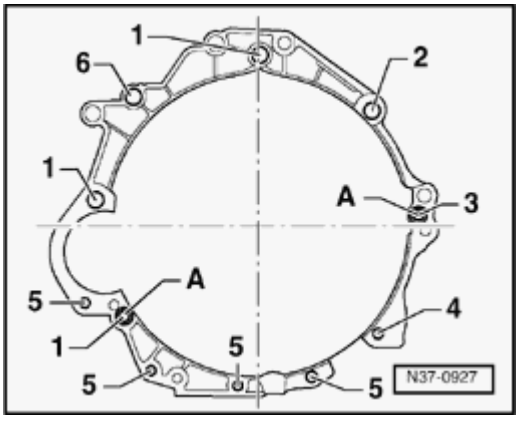


Fig. 125: Engine Cover Bolt Location And Tightening Torque
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Engine/transmission mount for 4-cylinder gasoline engines

Item no.	Bolt	Nm
1	M12 X 67	65
2 * See note	M12 x 110	65
3	M12 x 90	65
4 * See note	M10 x 60	45
5	M10 X 45	45
6 * See note	M12 X 67	65

*with nut

*with bracket for wiring harness

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*with cable bracket

Item A = bushings

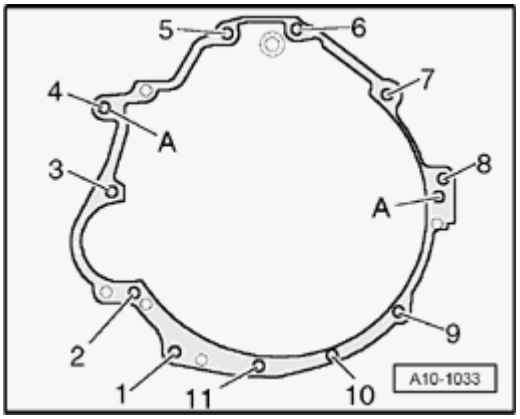


Fig. 126: Identifying Engine/Transmission Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Engine/transmission mount for 6-cylinder gasoline engines

Item no.	Bolt	Nm
1	M10 x 60	45
2	M10 x 90	65
3	M12 x 110	65
4	M12 x 80	65
5	M12 x 90	65
6	M12 x 90	65
7	M10 x 100	45
8	M12 x 90	65
9 * See note	M10 x 70	45
10	M10 x 60	45
11	M10 x 60	45

*with nut

Item A = bushings

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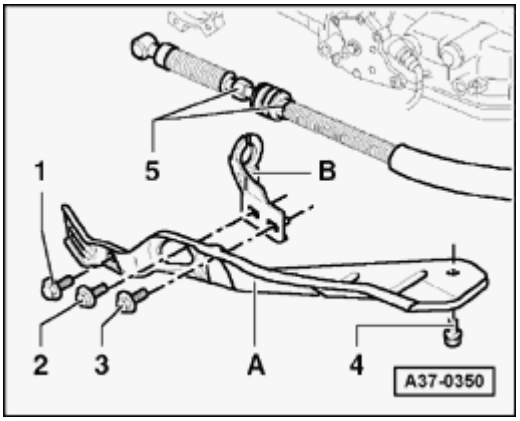


Fig. 127: Identifying Noise Insulation And Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Valid for all engine/transmission types:

Components	Tightening torques
Support bracket -B- to transmission (2x M8), item no. 2 and 3	23 Nm
Heat shield/selector lever cable -A- to transmission, M8, item no. 1 and 4	23 Nm

Component		Nm
Nuts/Bolts	M6	10
	M8	20
	M10	45
	M12	65
Except for the following:		
Drive plate to		
Torque converter	M10 x1	85
Installing ATF lines		--> **ATF lines, removing and installing (overview)** onward
Multi-function Transmission Range (TR) switch F125 to transmission		onward
Bracket for noise insulation to subframe		10

Transmission, transporting

Special tools, testers and auxiliary items required

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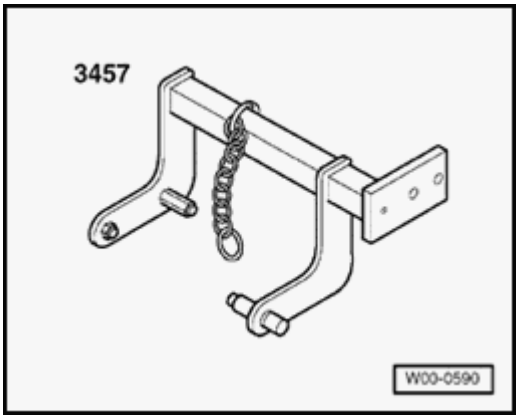


Fig. 128: Identifying Special Tools - Automatic Transmission, Transporting
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attachment and holding rig 3457

The attachment and holding rig 3457 can be used when transporting the transmission and for setting up the transmission support 3282.

- Remove ATF lines from transmission (only for vehicles with 6-cylinder engine).
- Plug ATF connections with plugs.
- Unbolt left and right transmission supports.

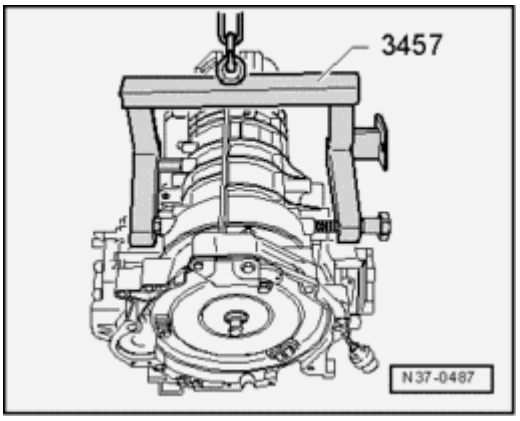


Fig. 129: Special Tool 3457 Attachment To Transmission Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach the attachment and holding rig 3457 at the transmission housing mounts and secure.

Transmission, attaching to assembly stand

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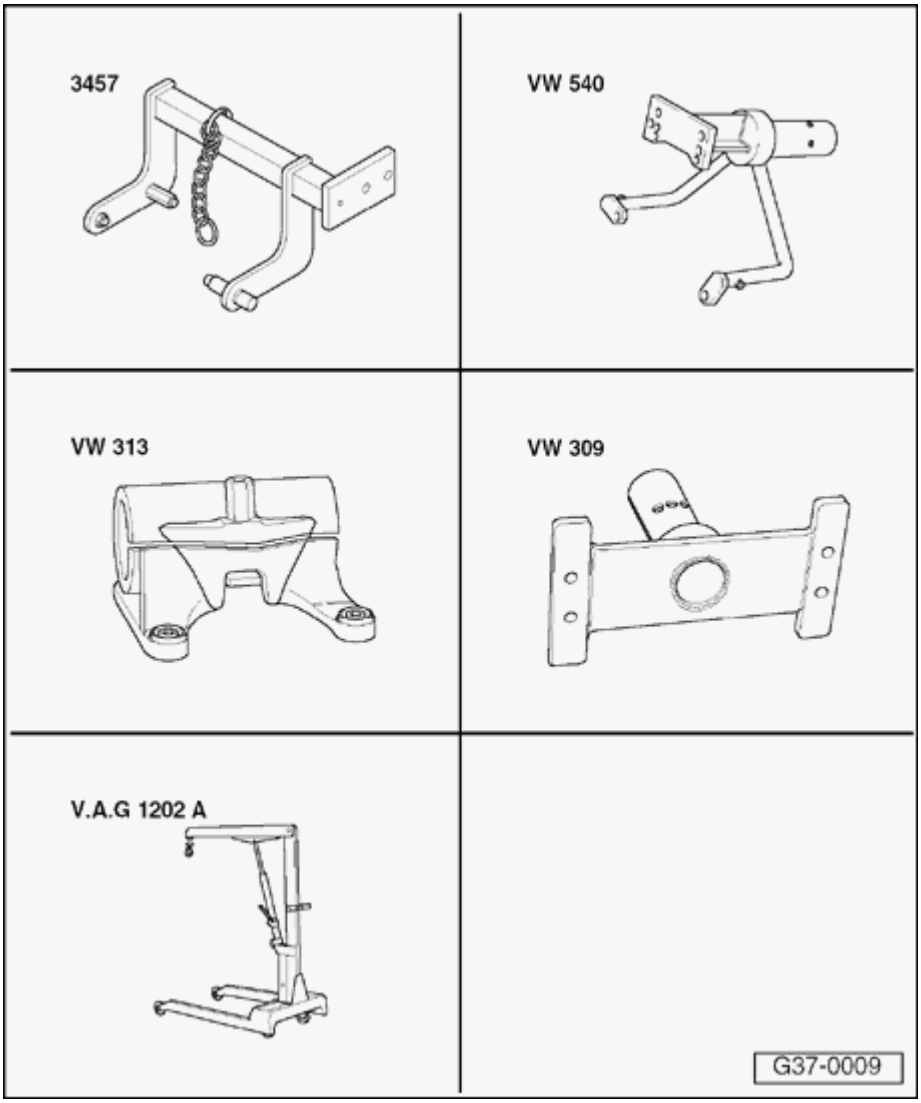


Fig. 130: Identifying Special Tools - Transmission, Attaching To Assembly Stand
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Attachment and holding rig 3457
- Holding fixture VW540 (only for FWD transmissions) (Not for US/Canada)
- Holding fixture VW313
- Holding plate VW309

- Engine Hoist VAG1202A

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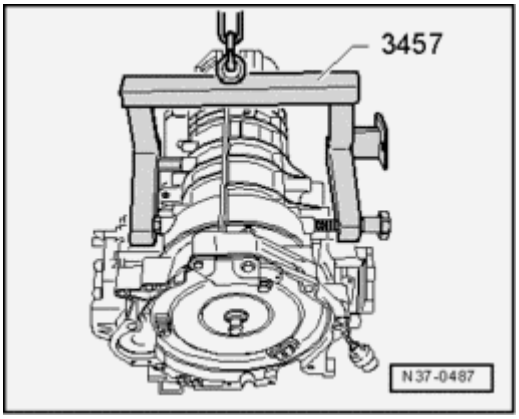


Fig. 131: Special Tool 3457 Attachment To Transmission Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach the attachment and holding rig 3457 at the transmission housing mounts and secure.
- Bolt the attachment and holding rig to the holding plate VW309 and place this into the holding fixture VW313 using a workshop crane.

For transmissions with Front Wheel Drive (FWD), the holding fixture VW540 can also be used to secure the transmission to the holding fixture VW313 (Not for US/Canada).

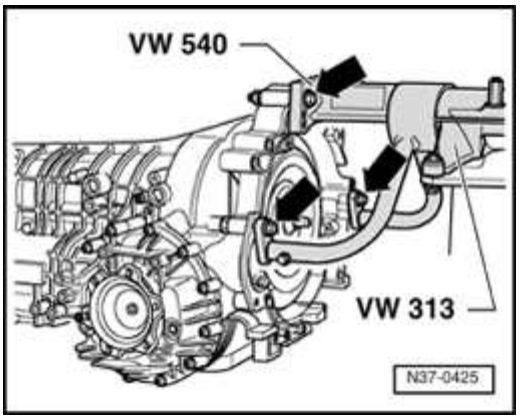


Fig. 132: Securing Transmission To Holding Fixture VW540 And Inserting In Holding Fixture VW313
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure transmission to holding fixture VW540 (arrows) and insert in holding fixture VW313.

CAUTION: The center of gravity of the transmission is located outside the turning center at holding fixture. To turn the transmission, a second technician must hold the transmission housing to prevent back-swing.

NOTE:

- **Vents for the transmission housing and final drive must be closed before turning a filled transmission on the assembly stand so that the oil pan faces upward.**

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Right and left transmission mounts, removing and installing

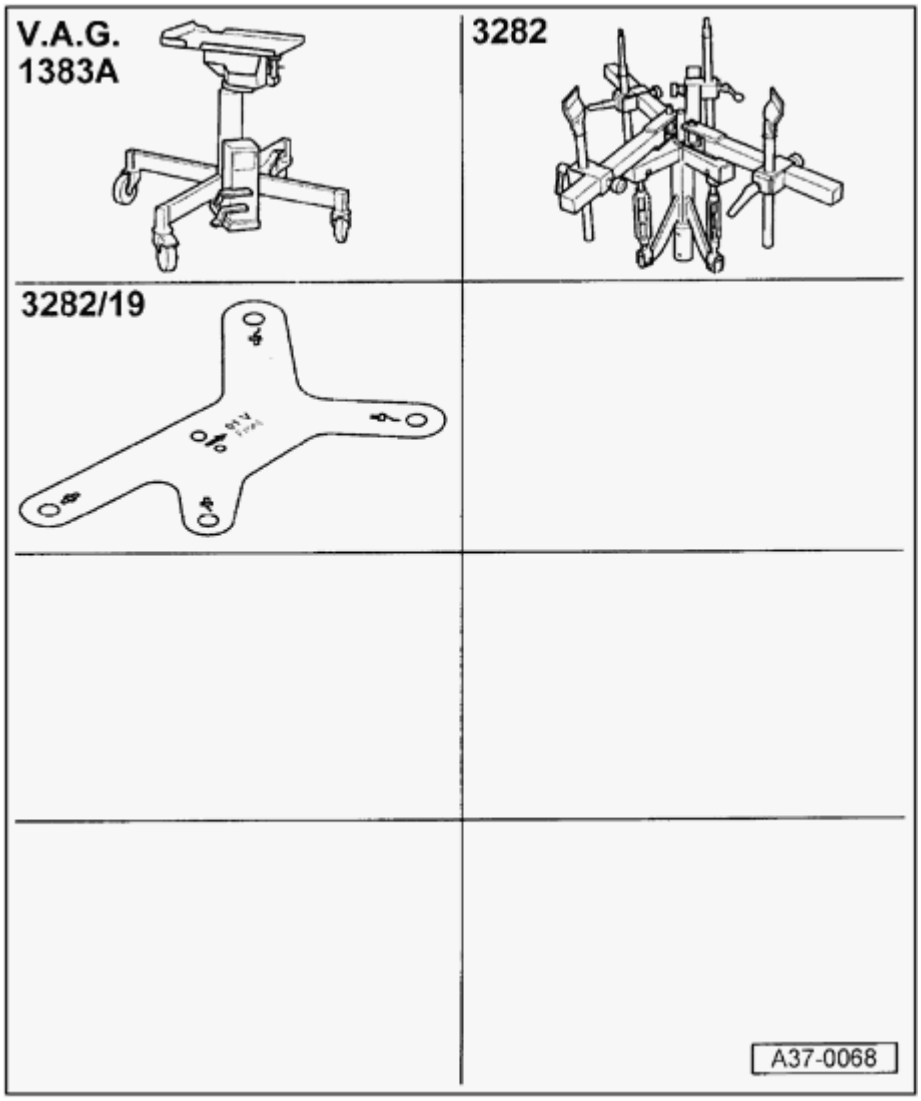


Fig. 133: Identifying Special Tools - Right And Left Transmission Mounts, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Transmission support 3282
- Adjustment plate 3282/19
- Engine/transmission support VAG1383A engine/gearbox jack

Removing

NOTE:

- **Transmission must be supported as indicated when both transmission supports are removed. Transmission does not need to be supported this**

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way when only one of the transmission supports is being removed.

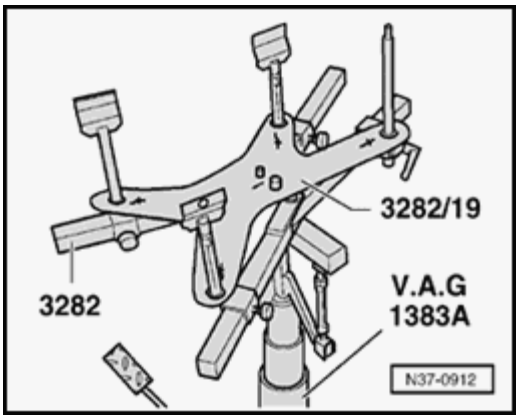


Fig. 134: Setting Up Transmission Support 3282
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Prepare transmission support 3282 for Automatic Transmission 01V with adjustment plate 3282/10 and place it on the engine/transmission hoist VAG1383A.

NOTE:

- **The symbols on the adjustment plate indicate the necessary mounts for Automatic Transmission 01V and the arrow points toward front of vehicle.**

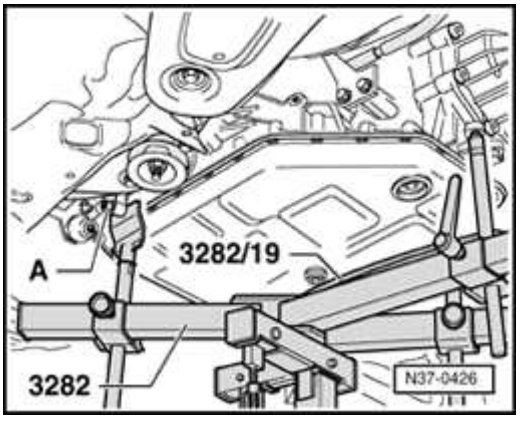


Fig. 135: Supporting Transaxle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Roll engine/transmission hoist VAG1383A with transmission support 3282 under transmission, align adjustment plate parallel to transmission and support transmission.
- Secure transmission on transmission support 3282 using bolt - **A** -.

NOTE:

- **If transmission support 3282 is not available, transmission can be supported using the transmission lift VAG1383A and the 1359/2 universal mount.**

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Right transmission support

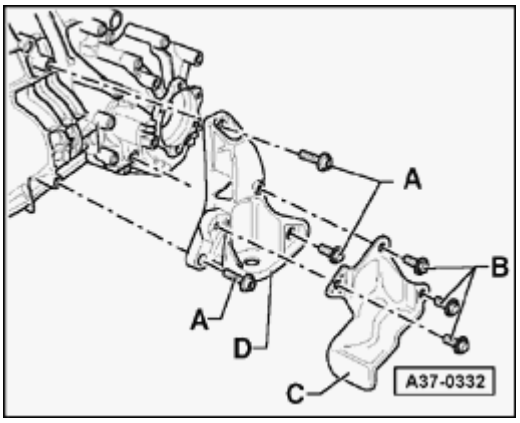


Fig. 136: Identifying Right-Hand Transmission Bracket And Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **B** -.
- Remove heat shield - **C** -.
- Remove right heat shield -D- by removing bolts - **A** - from transmission.

Left transmission support

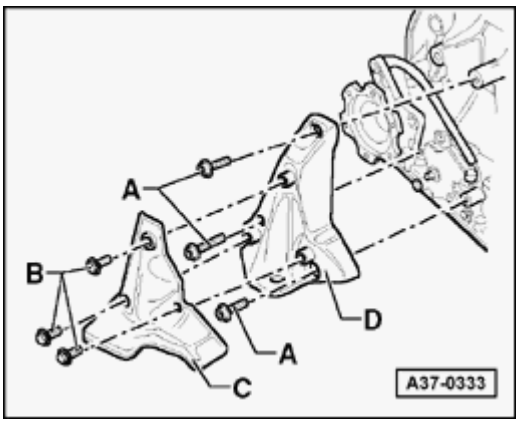


Fig. 137: Identifying Left-Hand Transmission Bracket And Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **B** -.
- Remove heat shield - **C** -.

NOTE:

- **The left heat shield is not installed on 4 cylinder gasoline engines.**

- Remove left heat shield -D- by removing bolts - **A** - from transmission.

Left and right transmission supports

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- Unscrew nuts - **A** - on subframe.

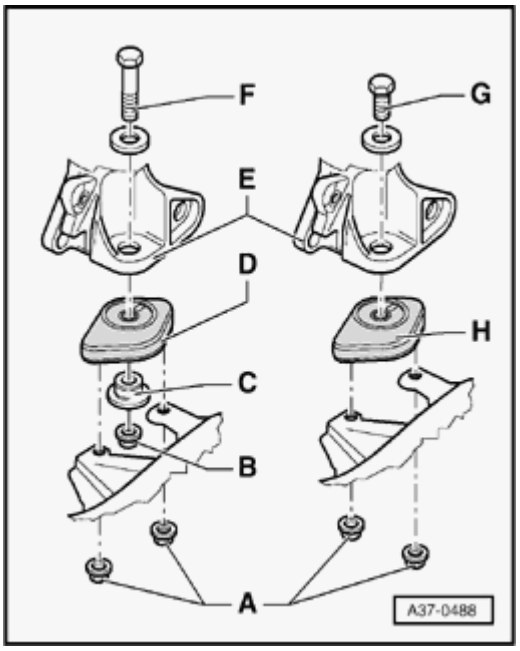


Fig. 138: Removing Transmission Supports
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove transmission supports -E-.

NOTE:

- **Items - C - and - B - are not installed on vehicles with hydraulic transmission bearing H, because bolt G is threaded directly into the transmission bearing.**

Installing

Installation is the reverse of removal.

Tightening torques for left and right transmission supports

Item no.	Nut/Bolt	Number of pieces	Nm
A	M 8	2 each	23
B to F	M 10 x 70	1	50
G	M 10 x 35	1	50

Tightening torques for left transmission support

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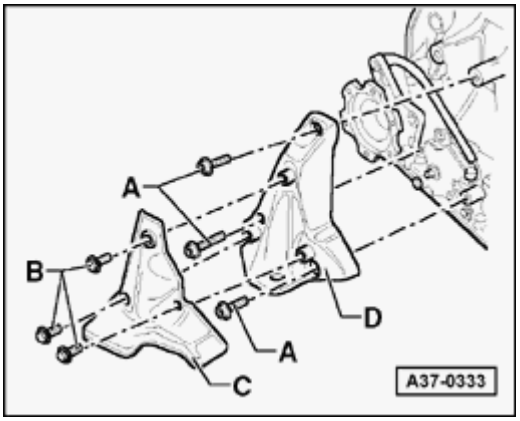


Fig. 139: Identifying Left-Hand Transmission Bracket And Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Item no.	Bolt	Number of pieces	Nm
A	M 10 x 30 M 10 x 50	2 1	40
B	M 6 x 22	3	10

Tightening torques for right transmission support

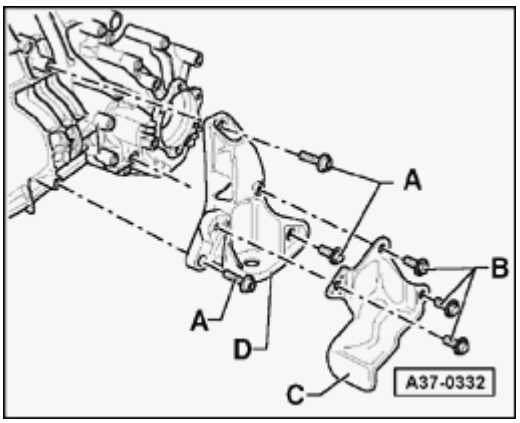


Fig. 140: Identifying Right-Hand Transmission Bracket And Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Item no.	Bolt	Number of pieces	Nm
A	M 10 x 30	3	40
B	M 6 x 22	3	10

AUTOMATIC TRANSMISSION FLUID (ATF), CHECKING AND CHANGING

ATF level, checking

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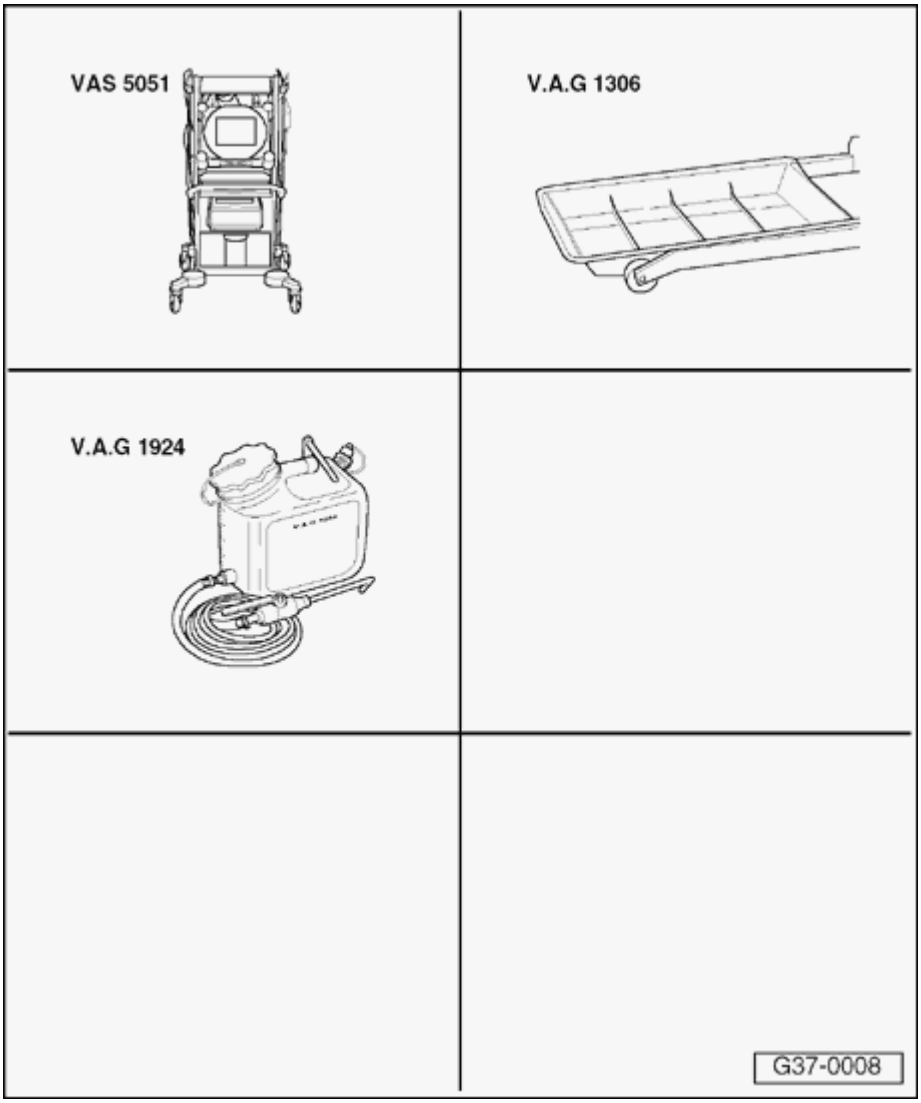


Fig. 141: Identifying Special Tools - ATF Level, Checking
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Tester VAS5051
- Diagnostic cable VAS5051/1 or VAS5051/3
- Drip tray VAG1306
- ATF filler tool VAG1924
- Protective glasses

Test requirements:

- Transmission must not be in emergency running mode.

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- Vehicle on level ground.
- Selector lever in "P" , let engine run at idle.
- A/C system and heating switched off.

NOTE:

- **ATF level changes with ATF temperature.**
- **Performing ATF level check when ATF temperature is too low causes overfilling.**
- **Performing ATF level check when ATF temperature is too high causes insufficient filling.**
- **Excess filling and insufficient filling both affect the function of the transmission.**
- **ATF temperature is read off using the tester VAS5051.**

Procedure

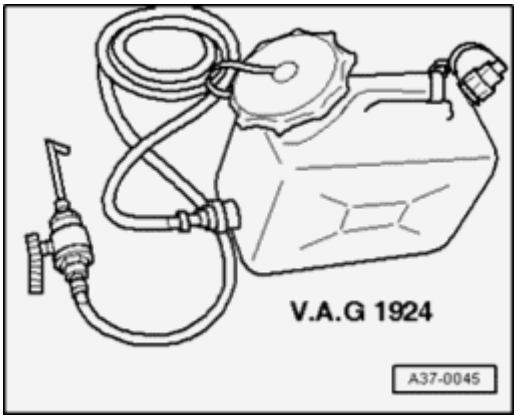


Fig. 142: Securing Container Of ATF Filler Tool VAG1924 As High Up On Vehicle As Possible
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure container of ATF filler tool VAG1924 as high up on vehicle as possible.

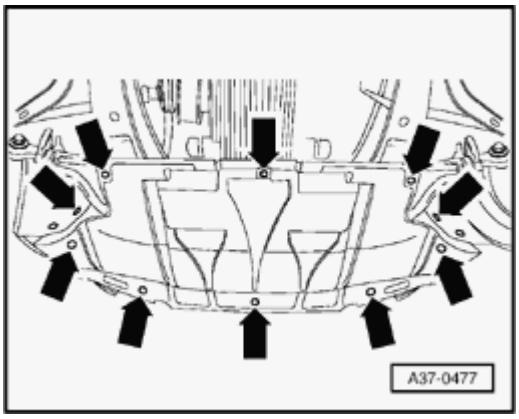


Fig. 143: Identifying Noise Insulation Panel Retainers

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove noise insulation panel (arrows).

Connect tester VAS5051

All functions previously performed with the VAG1551 can also be performed using the new tester VAS5051 in operating mode "Vehicle On Board Diagnostic (OBD)" :

Checking ATF temperature

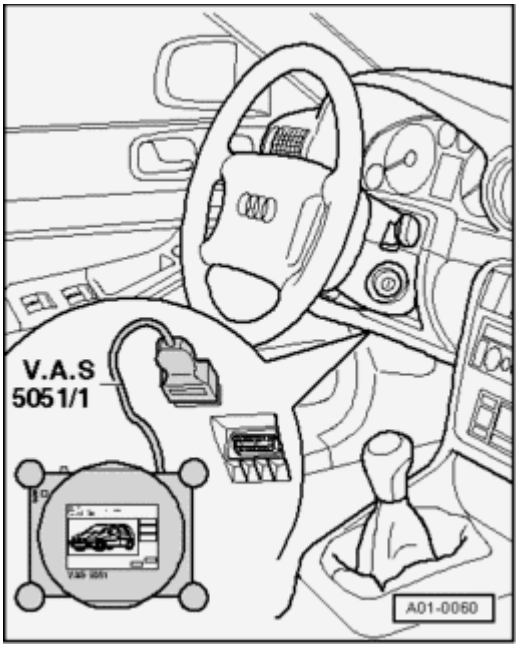
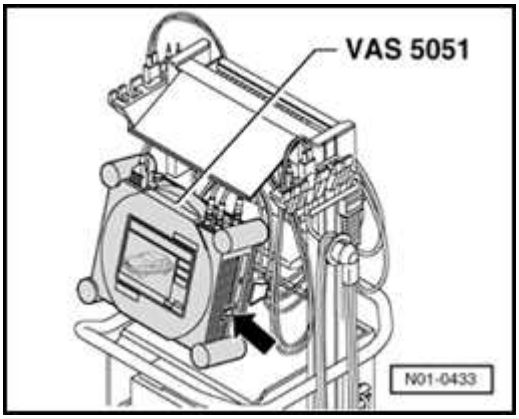


Fig. 144: Identifying Vehicle Diagnosis, Testing and Information System VAS 5051 and Data Link Connector (DLC)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect tester VAS5051 to Data Link Connector (DLC) using diagnostic cable VAS5051/1 with ignition switched off.



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Fig. 145: Special Tool - VAS 5051 & On Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Switch on tester (arrow).

The tester now requires up to 3 minutes to finish booting.

- Switch on ignition.
- Select operating mode: Press "Vehicle Self-Diagnosis" selection on display.
- Press "02 - Transmission electronics" on display.
- Perform dialog to confirm control module number belonging to selected system.

- Select "08 - Read Measuring Value Block" on display.
- Choose Display Group 4 via the "Read Measuring Value Block" and "Change Display Group" touch screen displays.

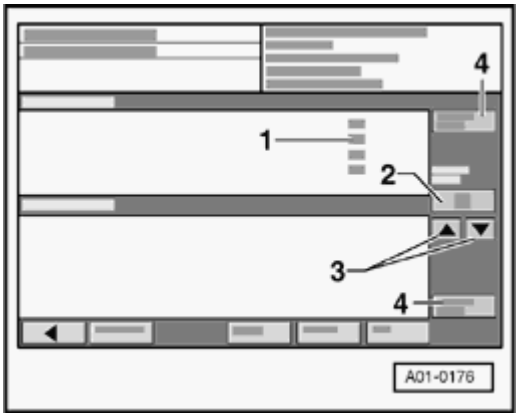


Fig. 146: Display On VAS5051 (ATF Temperature)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS5051 :

The first line of display field - **1** - displays ATF temperature.

Checking and correcting ATF level

NOTE:

- **ATF level is checked at the ATF check plug.**
- **ATF level is correct if a little bit of fluid still escapes at the ATF check plug between 35 ° and 45 ° C * See note (dependent on the fluid level when warming up).**

* For warm countries 50 ° C

- Start engine.

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- Raise vehicle.
- Place drip tray VAG1306 under transmission.

CAUTION: Wear protective glasses.

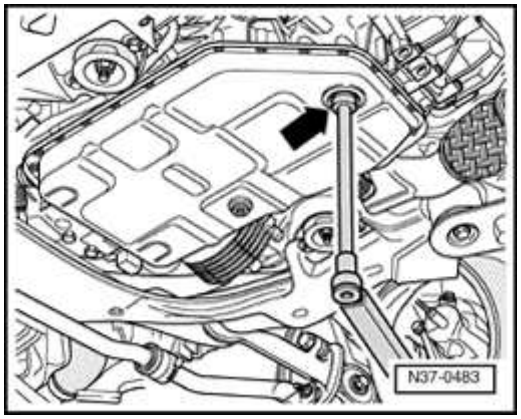


Fig. 147: Removing And Installing ATF Inspection Plug From Oil Pan
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Once an ATF temperature of 35 ° C is reached, remove ATF check plug (arrow) and drain excess ATF if necessary.

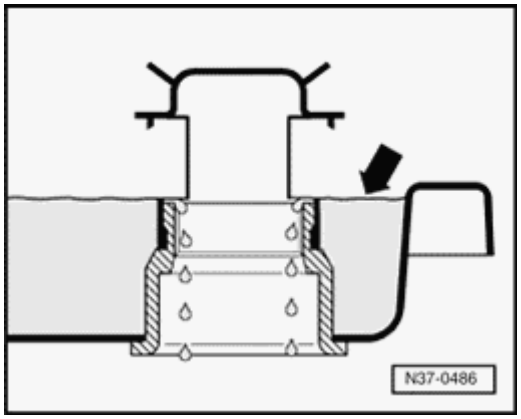


Fig. 148: Correct ATF Level
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If ATF flows out from the ATF filler plug hole before the ATF reaches 40 ° C, the ATF level (arrow) is OK.

NOTE:

- **ATF check plug must be closed again by 45 ° C * See note at the latest.**

* For warm countries 50 ° C

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- Add ATF if no ATF has escaped from the ATF check plug hole by 40 ° C.
- ATF specification --> **Capacity**

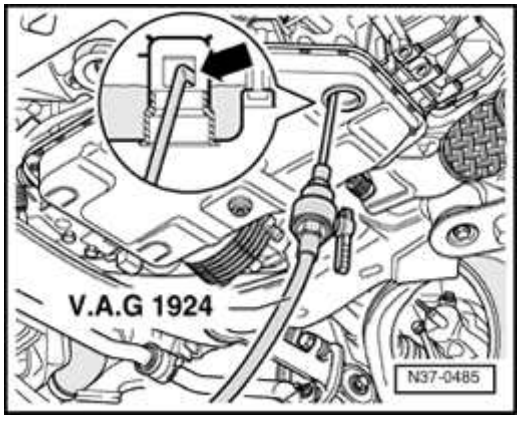


Fig. 149: Inserting ATF Filler Tool VAG1924 Into An Opening In Protective Cap
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert ATF filler tool VAG1924 into an opening (arrow) in the protective cap, but do not knock cap upward.

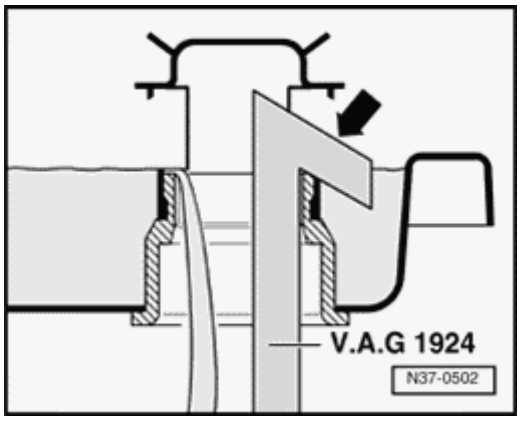


Fig. 150: Fill With ATF Using V.A.G 1924
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Fill with ATF using ATF filler tool VAG1924 until ATF exits from the check hole.

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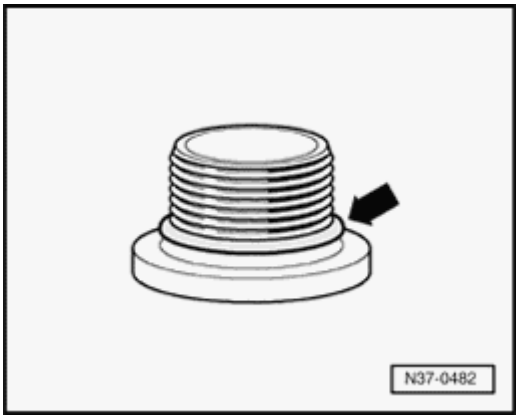


Fig. 151: Replacing Seal For ATF Check Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Always replace seal (arrow) for ATF check plug.
- Tighten ATF check plug to 80 Nm.
- Switch off motor.
- Select diagnostic function "06 - end output" in selection.

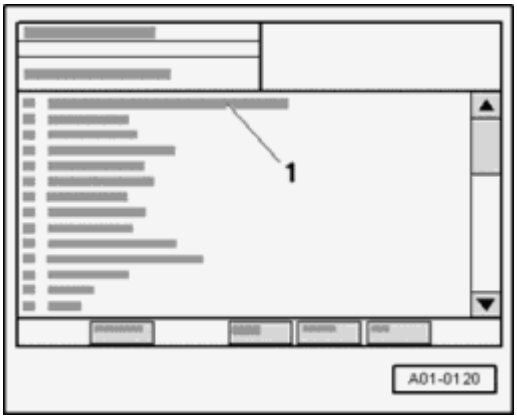


Fig. 152: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS5051 :

- Switch off ignition and disconnect diagnostic connector after this indication is displayed.
- Install noise insulation.

ATF, changing or topping off after repairs

Special tools, testers and auxiliary items required

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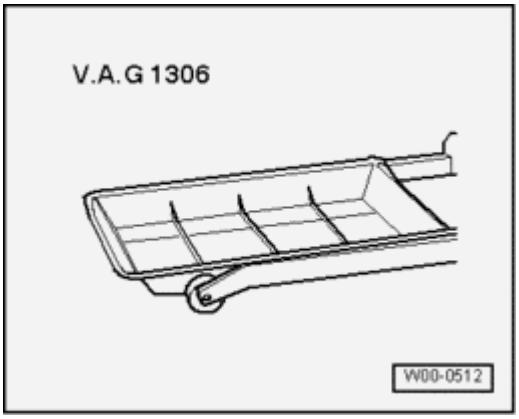


Fig. 153: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

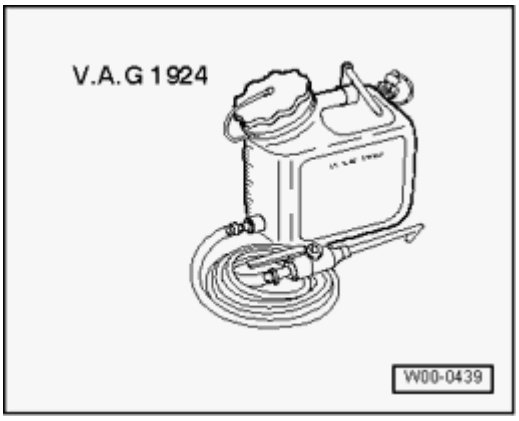


Fig. 154: V.A.G 1924 Reservoir
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- ATF filler tool VAG1924
- Engine switched off.

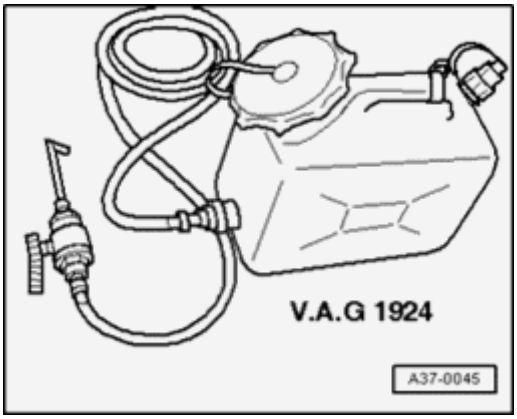


Fig. 155: Securing Container Of ATF Filler Tool VAG1924 As High Up On Vehicle As Possible

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure container of ATF filler tool VAG1924 as high up on vehicle as possible.
- Raise vehicle.

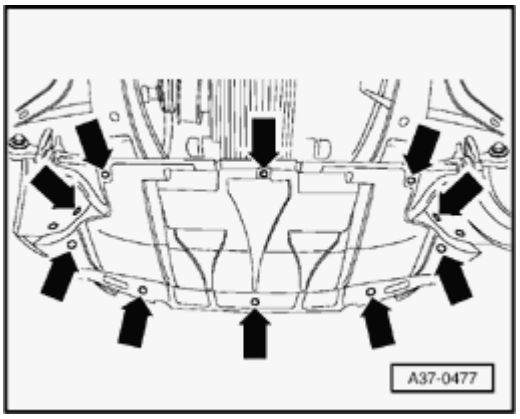


Fig. 156: Identifying Noise Insulation Panel Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove noise insulation panel (arrows).

NOTE:

- **Observe disposal regulations.**
- **Engine must not be started without ATF and vehicle must not be towed!**

- Place Drip tray VAG1306 under transmission.

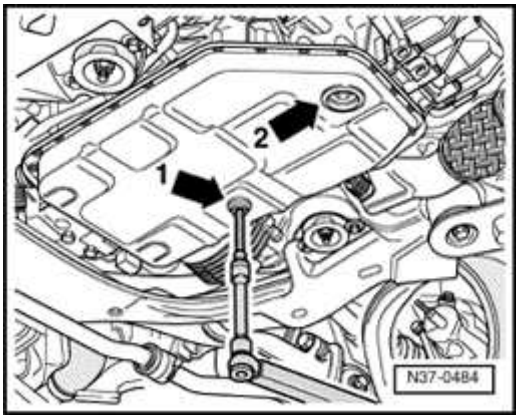


Fig. 157: Identifying ATF Drain Plug and ATF Inspection Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove drain plug (arrow - **1** -).
- Let ATF drain.
- Tighten new drain plug (arrow - **1** -) to 40 Nm.

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NOTE:

- **Drain plug and oil seal must both be replaced.**

- Remove ATF check plug (arrow - **2** -).

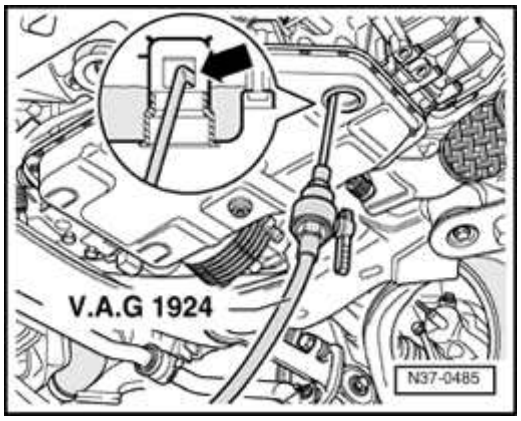


Fig. 158: Guiding V.A.G 1924 In Through An Opening In Deflector Cap
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert ATF filler tool VAG1924 into an opening (arrow) in the protective cap, but do not knock cap upward.

- ATF specification --> **Capacity**

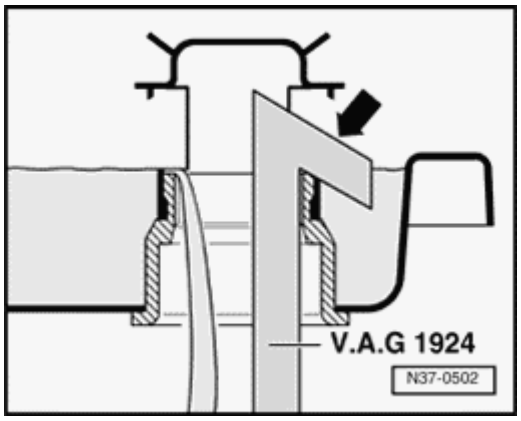


Fig. 159: Fill With ATF Using V.A.G 1924
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Fill with ATF using ATF filler tool VAG1924 until ATF exits from the check hole.
- Shift selector lever into position "P".
- Start engine.
- Keeping the brake pedal depressed, shift into all selector lever positions at idle speed. Each position must remain selected for at least 10 seconds.

- Shift selector lever into position "P".

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- Check ATF level and top off --> **ATF level, checking** onward.
- Install noise insulation.

NOTE:

- **Observe all notes and test requirements for "Checking ATF level".**

POWER TRANSFER, OVERVIEW

Transmission diagram (All Wheel Drive (AWD) vehicles)

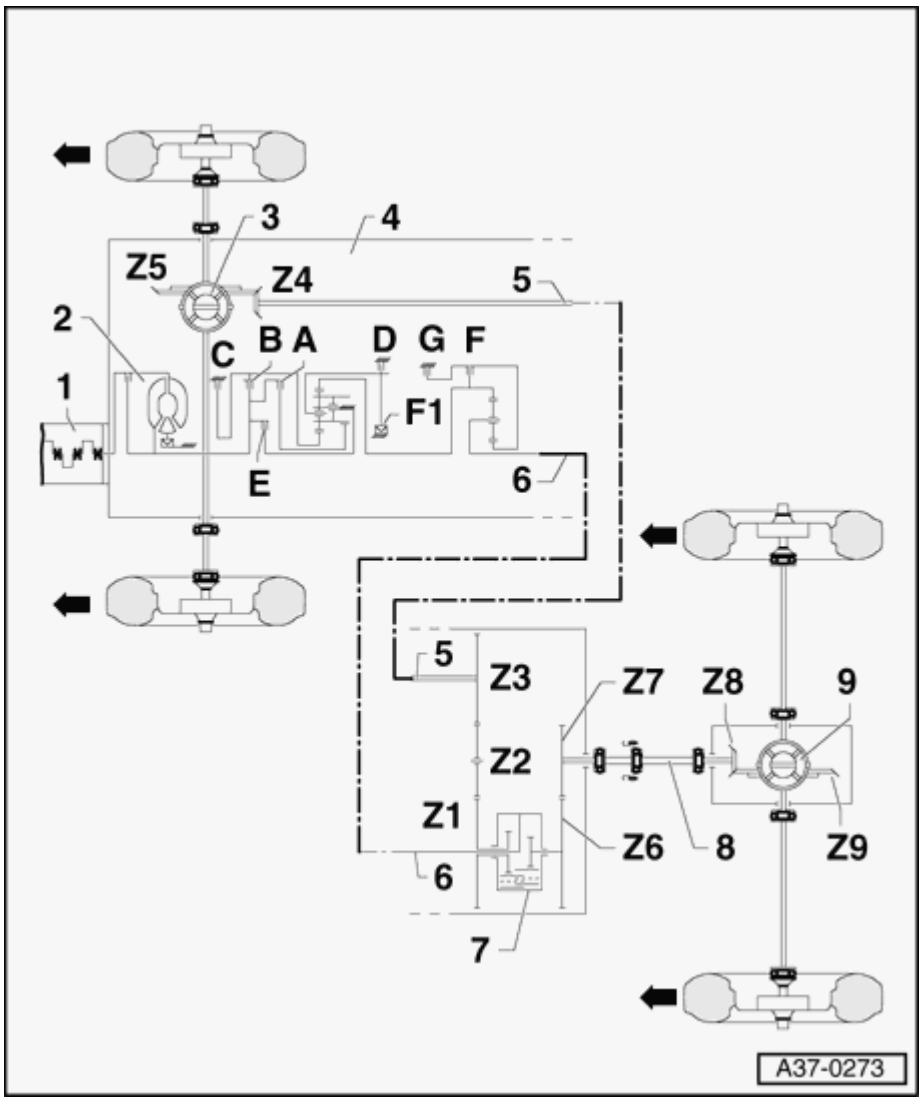


Fig. 160: Transmission Diagram (All Wheel Drive (AWD) Vehicles)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Clutch A

B - Clutch B

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E - Clutch E

F - Clutch F

C - Brake C

D - Brake D

G - Brake G

F1 - Freewheel 1

1 - Engine

2 - Torque converter with lock-up clutch

3 - Front differential

4 - Automatic transmission

5 - Drive pinion

6 - Output shaft

7 - Center differential

8 - Driveshaft

9 - Rear differential

Z1, Z2 and Z3 = spur gears of front intermediate drive; ratio --> **Code letters, allocation, ratios, equipment**

Z4, Z5 = front gear set; ratio --> **Code letters, allocation, ratios, equipment**

Z6, Z7 = spur gears of rear intermediate drive; ratio **All Wheel Drive (AWD)**

Z8, Z9 = rear ring gear, ratio **All Wheel Drive (AWD)**

NOTE:

- **Arrows point in direction of travel.**

Shift element positions

- When dealing with problems relating to poor acceleration and performance or general malfunctions, the following chart indicates which selector elements are actuated in the various gears. This should help to identify the selector elements that are not working properly.

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	Solenoid valves							Clutches							
	Solenoid valves			Pressure regulation valves				Clutch				Brake			Freewheel
Position/gear	N88	N89	N90	N215	N216	N217	N218	A	B	E	F	C	D	G	1. Gear
R = Reverse	x			x		x			x				x	x	
N = Neutral	x	x		x		x								x	
D, 1st gear	x	x		x		x		x						x	x
D, 2nd gear	x	x		x	x	x		x				x		x	
D, 3rd gear		x	x - x	x	x			x			x	x			
D, 4th gear			x - x	x				x		x	x				
D, 5th gear	x		x - x	x	x					x	x	x			
2, 1. Gear	x			x		x		x					x	x	x
D, 5th to 4th gear	x		x	x	x		x	(x)		x	x	(x)			

x = Component is actuated

- = Component is not actuated

(x) = Component actuation is dependent on driving condition

TRANSMISSION, DISASSEMBLING AND ASSEMBLING

Transmission, disassembling and assembling

- Observe general repair instructions --> **Servicing notes**.

Rules of cleanliness for working on automatic transmissions

- Thoroughly clean all connections and the surrounding area before disconnecting.
- Place parts that have been removed on a clean surface and cover. Use foils and paper. Use lint-free cloths only!
- Carefully cover over opened components or seal, if repairs are not carried out immediately.
- Only install clean components: Only unpack replacement parts immediately prior to installation.

- Always replace O-rings, gaskets and sealing rings.
- Lightly lubricate O-rings before installing, this prevents the rings from being pinched when inserting.
- Use only ATF in areas near ATF. Other lubricating substances cause functional problems in the hydraulic transmission control.
- Check the following fluid levels after installing, top off if necessary. ATF in planetary gear --> **ATF level, checking** , gear oil in front final drive --> **Gear oil in front final drive, checking** , gear oil in center differential --> **Gear oil in center differential, checking and topping off**. Capacities and specifications --> **Capacity** onward.

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ATF lines, removing and installing (overview)

Special tools, testers and auxiliary items required

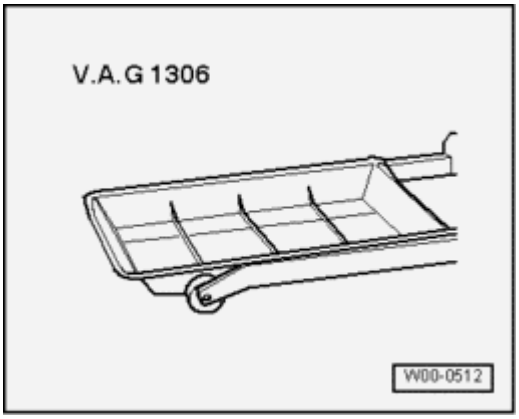


Fig. 161: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

Removing and installing ATF lines for 4 cylinder gasoline engines --> **ATF lines, removing and installing, (vehicles with 4 cyl. engine)**

Removing and installing ATF lines for 6 cylinder gasoline engines --> **ATF lines, removing and installing, (vehicles with 6 cyl. engine)**

ATF lines, removing and installing, (vehicles with 4 cyl. engine)

NOTE:

- **Place drip tray VAG1306 underneath.**

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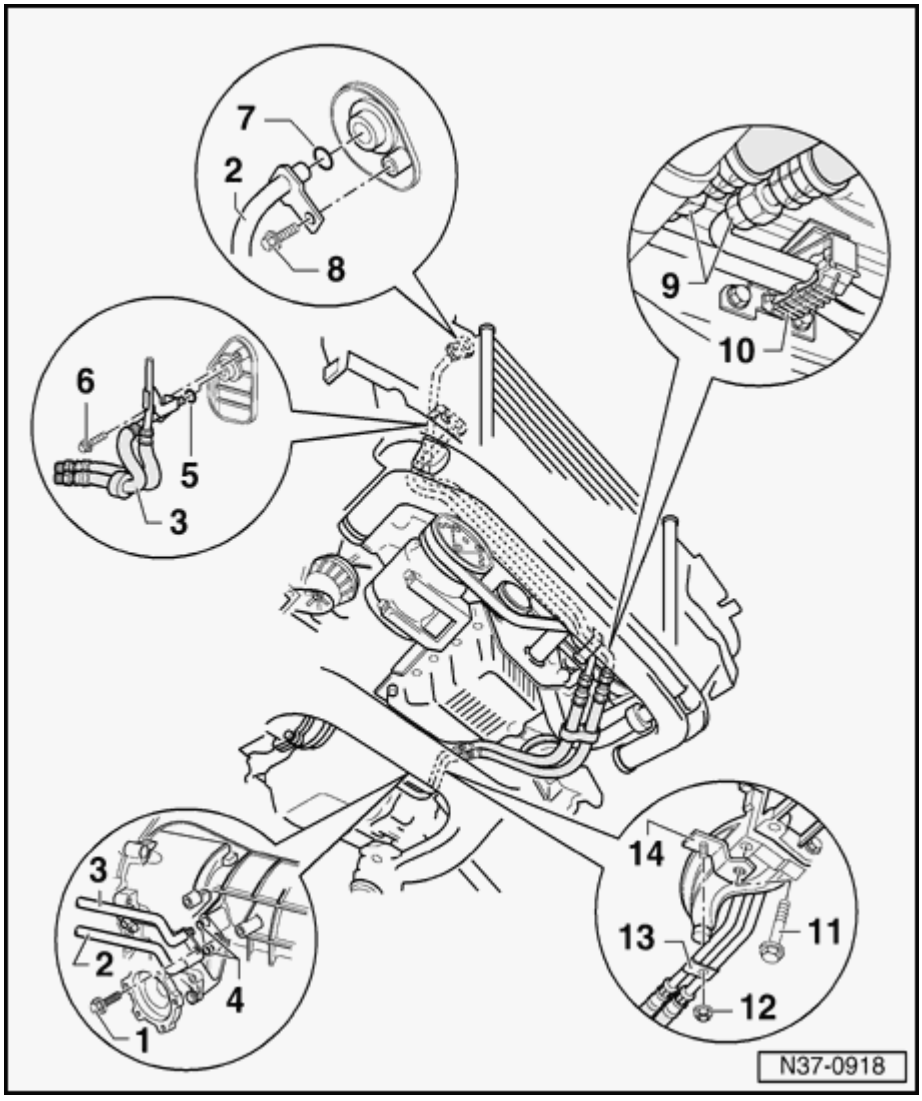


Fig. 162: ATF Lines, Removing And Installing, Overview (Vehicles With 4-Cylinder Engine)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Bolt (21Nm)

- Insert line until impact by hand before tightening

2 - Oil line to cooler

- Note marking on transmission housing

3 - Oil line from cooler

- Note marking on transmission housing

4 - O-ring

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- Apply ATF when inserting
- Always replace

5 - O-ring

- Apply ATF when inserting
- Always replace

6 - Bolt (5Nm)

- Insert line until impact by hand before tightening

7 - O-ring

- Apply ATF when inserting
- Always replace

8 - Bolt (5Nm)

- Insert line until impact by hand before tightening

9 - Union nut - 29 Nm

10 - Bracket

11 - Hex bolt

- Does not need to be removed when removing and installing ATF lines.

12 - Nut - 5 Nm

13 - Clamp

14 - Bracket

- On engine/transmission support

ATF lines, removing and installing, (vehicles with 6 cyl. engine)

NOTE:

- **Place drip tray VAG1306 underneath.**

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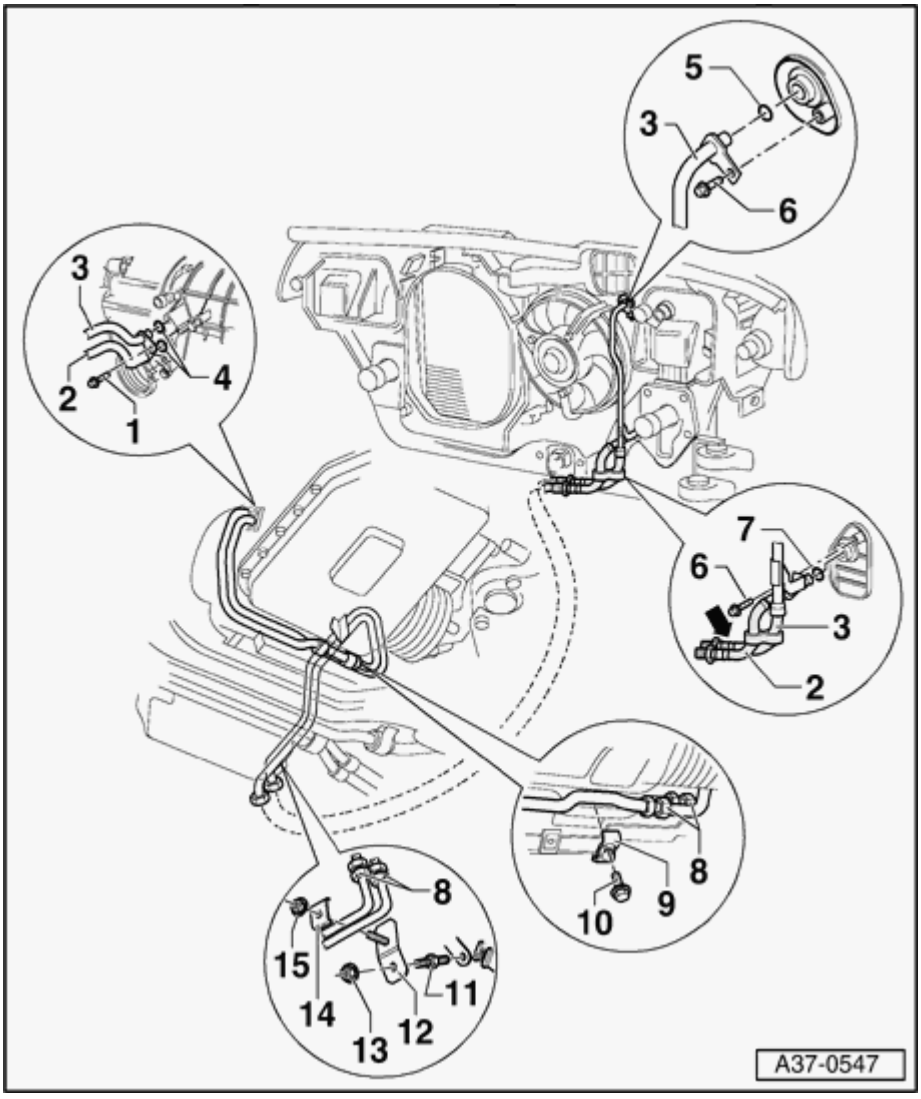


Fig. 163: ATF Lines, Removing And Installing Overview (Vehicles With 6 Cyl. Engine)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Bolt (21Nm)

- Insert line until impact by hand before tightening

2 - Oil line to cooler

- Note marking on transmission housing
- Note color identification (arrow)

3 - Oil line from cooler

- Note marking on transmission housing
- Note color identification (arrow)

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4 - O-ring

- Apply ATF when inserting
- Always replace

5 - O-ring

- Apply ATF when inserting
- Always replace

6 - Bolt (5Nm)

- Insert line until impact by hand before tightening

7 - O-ring

- Apply ATF when inserting
- Always replace

8 - Union nut - 29 Nm

9 - Bracket

10 - Bolt (5Nm)

11 - Double bolt - 10 Nm

12 - Bracket

13 - Combination nut - 10 Nm

14 - Clamp

15 - Combination nut - 5 Nm

ATF lines and ATF cooler, cleaning

Special tools, testers and auxiliary items required

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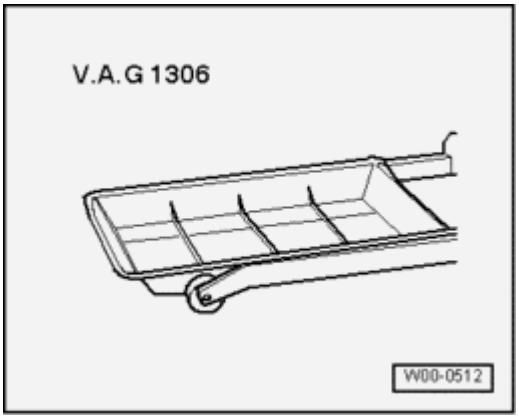


Fig. 164: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306
- Hose, approx. 18 mm
- Compressed air gun, standard
- Protective glasses

NOTE:

- **Always blow compressed air through oil cooler and ATF lines (max. 10 mbar) before installing a replacement transmission.**
- **When installing ATF lines, insert into transmission or cooler by hand until impact first and then tighten bolts.**

CAUTION: Wear protective glasses.

- Place drip tray VAG1306 underneath.

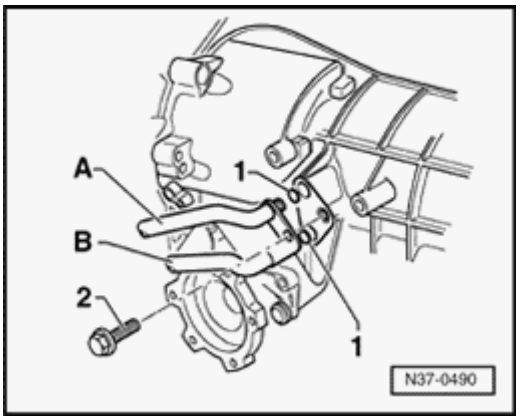


Fig. 165: Location Of ATF Lines At Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Remove bolt - **2** -.
- Disconnect ATF lines from transmission.
- Slide a hose with approx. 18 mm diameter onto ATF line - **A** - and secure with hose clamp. Place the other end of the hose into an appropriate container.
- Blow through ATF line - **B** - with compressed air gun.

- Change hose from ATF line - **A** - to ATF line - **B** - and repeat procedure.
- Replace O-ring - **1** -.
- Coat O-ring with ATF.
- Insert ATF lines completely into transmission by hand until stop.

- Re-secure ATF lines.
- Then check ATF level and top off --> **ATF level, checking** onward.

38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS

OIL PAN, OIL STRAINER AND VALVE BODY, REMOVING AND INSTALLING

Oil pan, oil strainer and valve body, removing and installing

CAUTION: Do not run engine with the oil pan removed or without ATF filling and do not tow vehicle.

NOTE:

- **Always replace a soiled or faulty valve body.**
- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**
- **General repair notes --> Servicing notes.**
- **Coat O-rings and sealing rings with ATF. Other lubricating substances lead to functional problems in the hydraulic transmission control.**

Removed parts for transmission with hydraulic control E18/2, overview

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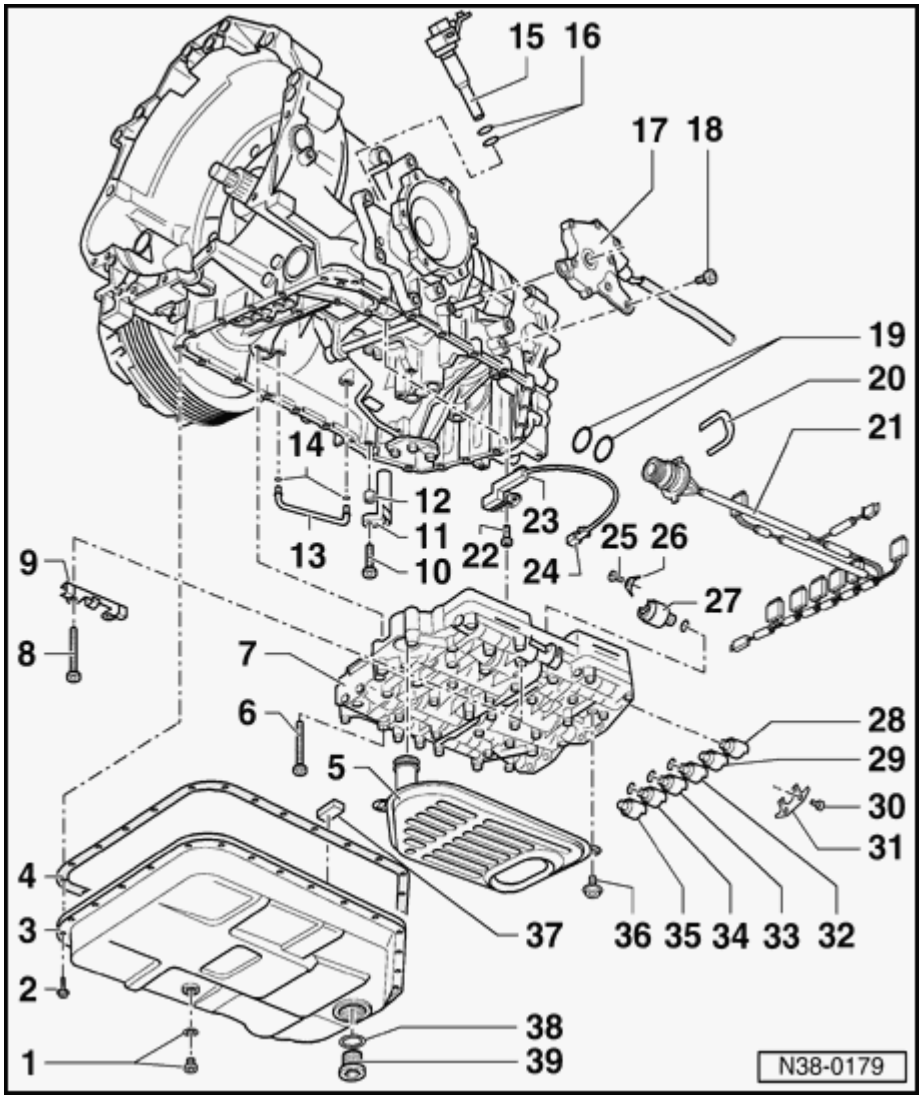


Fig. 166: Valve Body For Transmissions With Hydraulic Control Type E18/2, Assembly Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Drain plug - 40 Nm

- With seal
- Always replace
- 5 mm socket-head bolt
- Remove to drain ATF

2 - Bolt - 10 Nm

- Tighten bolts for oil pan in several stages in diagonal sequence

3 - Oil pan

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- Removing and installing --> **Oil pan, removing and installing**

4 - Gasket

- Always replace

5 - Oil strainer

- Removing and installing --> **Oil strainer, removing and installing**

6 - Bolt - 8 Nm

- For mounting valve body: 16 bolts M6 x 60
- Observe tightening sequence --> **Fig. 177**

7 - Valve body

- Removing and installing --> **Valve body, removing and installing**

8 - Bolt - 8 Nm

9 - Bracket

- For wiring harness
- Hook in wiring harness
- Mounted with valve body bolts

10 - Bolt - 6 Nm

11 - Transmission Vehicle Speed Sensor (VSS) G38 (also designated as Sender for transmission output RPM G195)

- Removing and installing --> **Transmission Vehicle Speed Sensor (VSS) G38 , removing and installing**

12 - Spacer sleeve

- Height: 8 mm

13 - Inner oil line

- Always replace
- Removing and installing --> **Oil line inside transmission, removing and installing**

14 - O-ring

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- Always replace

15 - Speedometer Vehicle Speed Sensor (VSS) G22

- Removing and installing --> **Speedometer Vehicle Speed Sensor (VSS) G22 , removing and installing**

16 - O-ring

- Always replace
- Coat with gear oil and insert

17 - Multi-Function Transmission Range (TR) Switch F125

- Removing and installing --> **Multi-Function Transmission Range (TR) Switch F125 , removing and installing**
- Replacing shift rod sealing ring --> **Shift rod seal, replacing**

18 - Bolt - 8 Nm

19 - O-ring

- Always replace
- Coat with ATF and insert

20 - Locking clamp

- Always replace

21 - Wiring harness in transmission

- Always replace --> **Wiring harness inside transmission, removing and installing**
- Transmission Fluid Temperature Sensor G93 is integrated into the wiring harness
- Remove and install valve body to replace --> **Valve body, removing and installing**
- Unhook from bracket for wiring harness, item 10

- Installation position wiring harness connector: Flat part of rear collar points toward oil pan, the tabs at collar are horizontal

22 - Bolt - 9 Nm

23 - Sensor for transmission RPM G182

- Removing and installing --> **Sensor for transmission RPM G182 , removing and installing**

24 - Connector

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- Is connected at wiring harness in transmission
- Must be disconnected before removing the valve body

25 - Bolt - 6 Nm

26 - Bracket

- For solenoid valve

27 - Pressure Control Valve 1 for Auto. Transmission N215

- With O-ring
- Remove and install valve body to replace --> **Valve body, removing and installing**

28 - Solenoid valve 3 N90

- Without O-ring
- Remove and install oil pan to replace --> **Oil pan, removing and installing**

29 - Solenoid valve 2 N89

- Without O-ring
- Remove and install oil pan to replace --> **Oil pan, removing and installing**

30 - Bolt - 6 Nm

31 - Bracket

- For solenoid valves

32 - Pressure Control Valve 3 for Auto. Transmission N217

- With O-ring
- Remove and install oil pan to replace --> **Oil pan, removing and installing**

33 - Pressure Control Valve 4 for Auto. Transmission N218

- With O-ring
- Remove and install oil pan to replace --> **Oil pan, removing and installing**

34 - Pressure Control Valve 2 for Auto. Transmission N216

- With O-ring
- Remove and install oil pan to replace --> **Oil pan, removing and installing**

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35 - Solenoid valve 1 N88

- Without O-ring
- Remove and install oil pan to replace --> **Oil pan, removing and installing** and unbolt guide plate for park locking mechanism
- When installing, do not tighten bolts for guide plate (23 Nm) in selector lever position "P".

36 - Bolt - 6 Nm

37 - Magnet

- 4 pieces in the oil pan recesses
- Clean after every removal of oil pan
- Ensure full surface contact in oil pan

38 - O-ring

- Always replace

39 - ATF check plug - 80 Nm

- 17 mm socket-head bolt

Oil pan, removing and installing

Special tools, testers and auxiliary items required

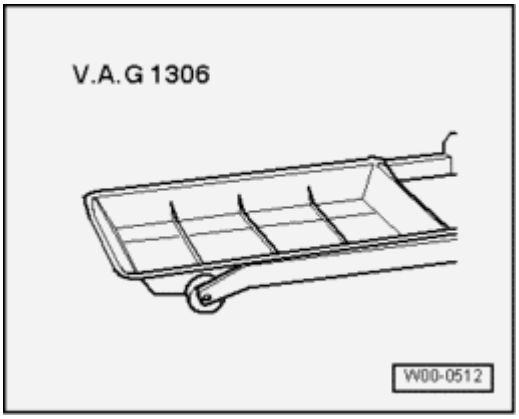


Fig. 167: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

Removing

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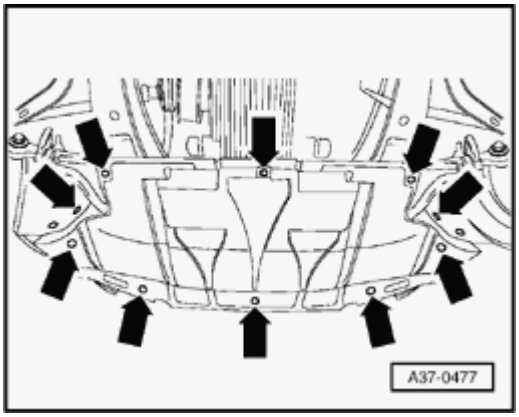


Fig. 168: Identifying Noise Insulation Panel Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove noise insulation panel (arrows).
- Place drip tray VAG1306 under transmission.

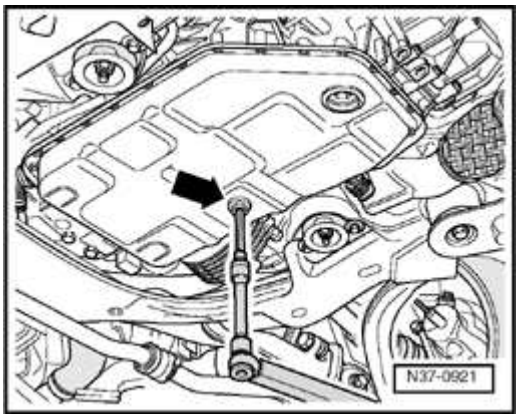


Fig. 169: Identifying ATF Drain Plug And ATF Inspection Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove ATF drain plug (arrow) and drain ATF.
- Loosen oil pan bolts diagonally and remove oil pan.

Installing

Installation is reverse of removal, noting the following:

- Clean all 4 magnets in oil pan recesses. Ensure full surface contact of the magnets on the oil pan.
- Replace gaskets.

NOTE:

- **Drain plug and oil seal must both be replaced.**

- Fill up ATF --> **ATF, changing or topping off after repairs**.

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Tightening torques

Component	Nm
Drain plug to oil pan	40
Oil pan to transmission housing (diagonally in sequence)	10

Oil strainer, removing and installing

Removing

- Removing oil pan --> **Oil pan, removing and installing**.

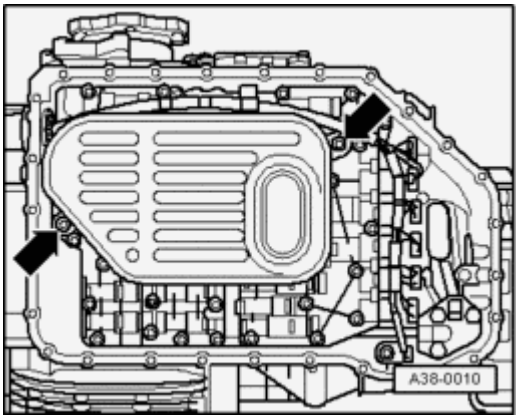


Fig. 170: ATF Screen Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Removing oil strainer bolts (arrows).
- Pull oil strainer off of valve body.

Installing

- Lightly coat seal on suction collar of oil strainer with ATF.
- Carefully press suction collar of oil strainer into the opening at valve body up to stop.
- Bolt on oil strainer.
- Installing oil pan.

- Fill up ATF --> **ATF, changing or topping off after repairs**.

Tightening torque

Component	Nm
Oil strainer to valve body	6

Valve body, removing and installing

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NOTE:

- **Always replace a soiled or faulty valve body.**
- **General repair notes --> Servicing notes.**
- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**

Removing

- Removing oil pan --> **Oil pan, removing and installing**.
- Removing oil strainer --> **Oil strainer, removing and installing**.

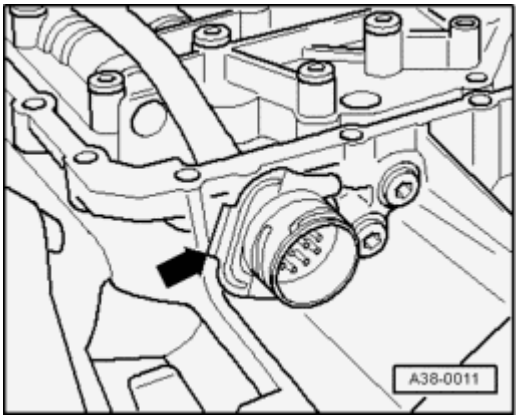


Fig. 171: Location Of Wiring Harness/Harness Connector Securing Circlip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect clip for wiring harness connectors (arrow).

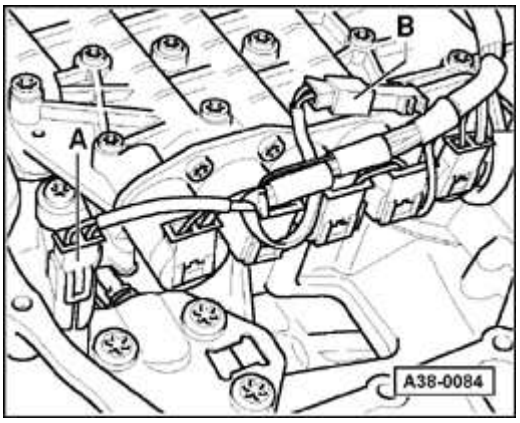


Fig. 172: Identifying Connector Transmission Vehicle Speed Sensor -G38- And Connector transmission RPM Sensor -G182-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect harness connector from Transmission Vehicle Speed Sensor (VSS) G38 (- **A** -).
- Disconnect harness connector from Sensor for transmission RPM G182 (- **B** -).

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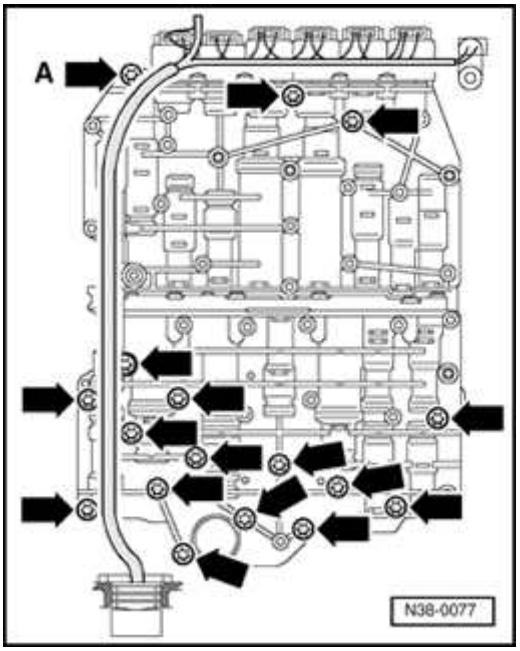


Fig. 173: Remove/Install Bolts From Valve Body Which Are Marked With An Arrow (Bolt Is Shorter Than The Other Bolts)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen mounting bolts (arrows) of valve body and remove valve body with wiring harness.

NOTE:

- **Only the marked mounting bolts (arrows) must be loosened.**
- **When loosening other bolts, the function of the valve body can be influenced or the valve body splits up.**
- **The bolt (arrow A) is not installed on transmissions with hydraulic control E18/2 and can therefore be disregarded.**

- Remove valve body from transmission while advancing the wiring harness connector.

Installing

- Lightly coat O-rings of wiring harness connector with ATF.
- Insert wiring harness connector into transmission housing.

- Installation position: Flat part of rear collar points downward, the tabs at collar are horizontal

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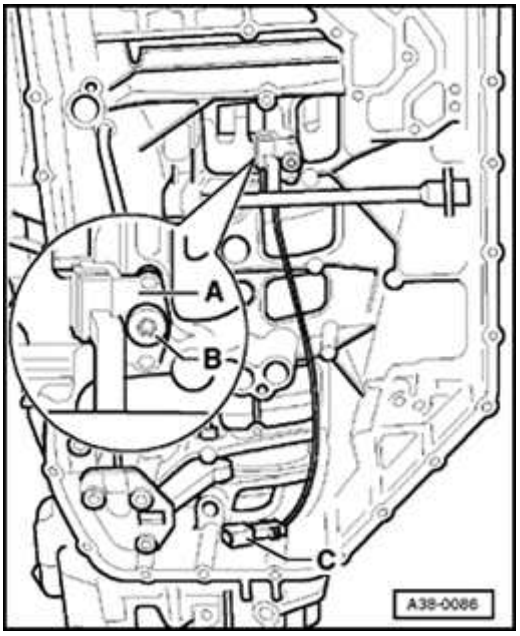


Fig. 174: Sensor For Transmission RPM (Transmissions With Hydraulic Regulation -E18/2-)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Route wire with connector - **C** - according to illustration, so that the wire is not pinched when installing the valve body.

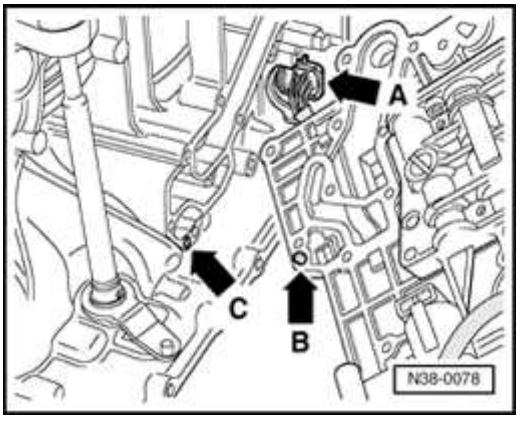


Fig. 175: Installing Valve Body, Note Position Of A, B And C
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert connector with flat part (arrow - **A** -) facing toward oil pan into transmission housing.
- Align valve body to hole in transmission housing (arrow - **C** -) using alignment pin (arrow - **B** -).

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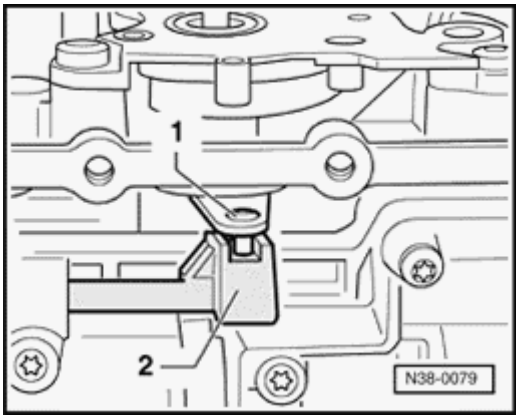


Fig. 176: Installing Valve Body, Note Position Of Pin Of Detent Plate And Selector Slide
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Set valve body in place without force while placing bolt of notched disc - **1** - into the groove of the selector register - **2** -.

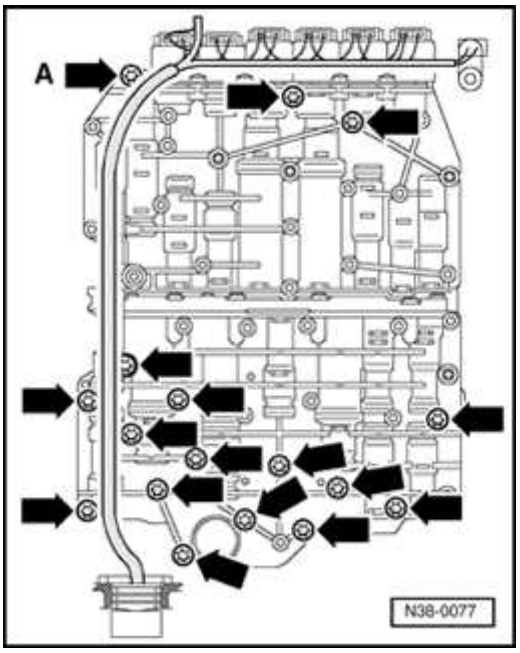


Fig. 177: Remove/Install Bolts From Valve Body Which Are Marked With An Arrow (Bolt Is Shorter Than The Other Bolts)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Next, tighten valve body bolts (arrows) by hand.

NOTE:

- **The bolt (arrow A) is not installed on transmissions with hydraulic control E18/2 and can therefore be disregarded.**

- Then tighten valve body bolts from inside out to final tension.

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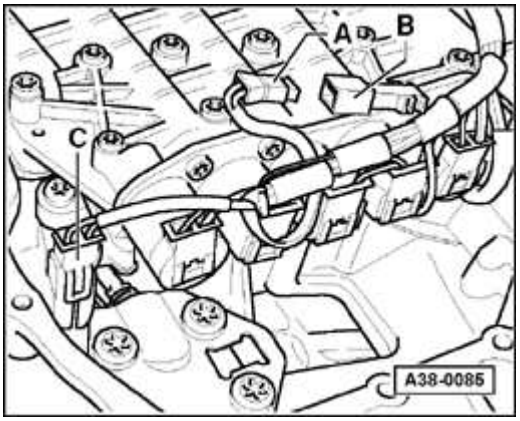


Fig. 178: Connecting Connector To Connector At Wiring Harness
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull wiring with connector - **B** - of Sensor for transmission RPM G182 between valve body and wiring harness upward.
- Connect connector - **B** - to connector - **A** - at wiring harness.
- Connect connector - **C** - to Transmission Vehicle Speed Sensor (VSS) G38.

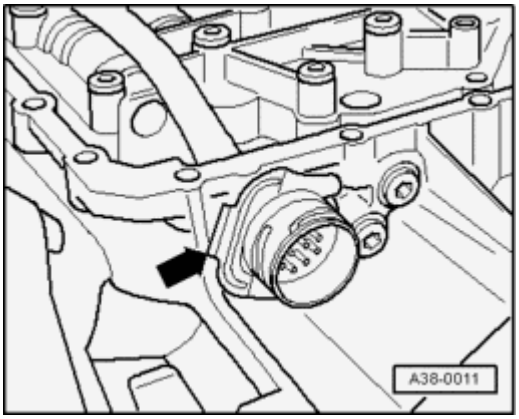


Fig. 179: Location Of Wiring Harness/Harness Connector Securing Circlip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect clip to wiring harness connector (arrow).
- Installing oil strainer --> **Oil strainer, removing and installing**.
- Installing oil pan.
- Fill up ATF --> **ATF, changing or topping off after repairs**.

Tightening torque

Component	Nm
Valve body to transmission housing (from inside out)	8

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Oil line inside transmission, removing and installing

Special tools, testers and auxiliary items required

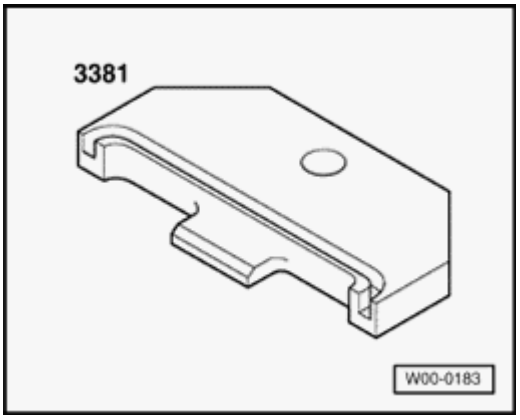


Fig. 180: 3381 Fitting tool
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 3381oil line installer

NOTE:

- **Faulty O-rings at inner oil line allow ATF to enter the differential, which becomes over-filled and oil escapes at differential vent.**
- **A removed oil line generally must be replaced.**
- **The oil line must only be inserted using 3381oil line installer. Otherwise there is a risk of leaks because of bending of the oil line.**

Removing

- Removing valve body --> **Valve body, removing and installing**.

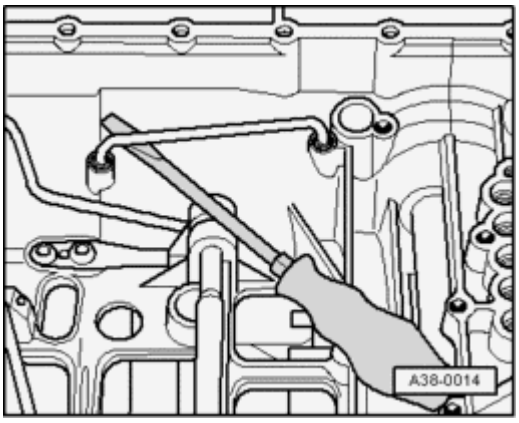


Fig. 181: Pry Internal Oil Line Off Transmission Housing Using Screwdriver
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lever off inner oil line evenly from transmission housing.

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Installing

Installation is reverse of removal, noting the following:

- Replace O-rings.

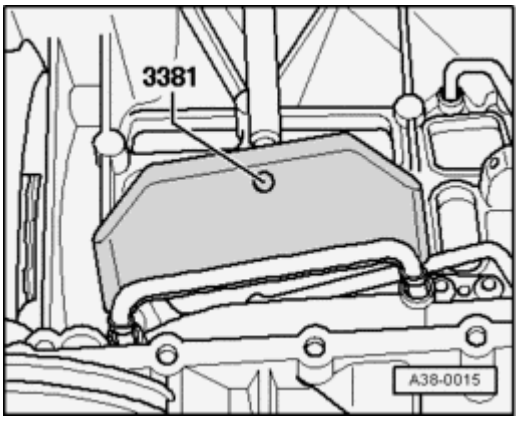


Fig. 182: Open Side Of Fitting Tool 3381 Faces Toward Outside Of Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert oil line into oil line installer 3381.
- Drive oil line into transmission housing by lightly tapping on the oil line installer 3381 up to stop using a plastic mallet.

NOTE:

- **The open side of oil line installer 3381 faces toward the outer wall of the transmission.**
- **Do not cant oil line. Drive in both line ends uniformly.**

- Installing valve body.
- Fill up ATF --> **ATF, changing or topping off after repairs**.
- Check oil level in front final drive --> **Gear oil in front final drive, checking**.

Shift rod seal, replacing

Special tools, testers and auxiliary items required

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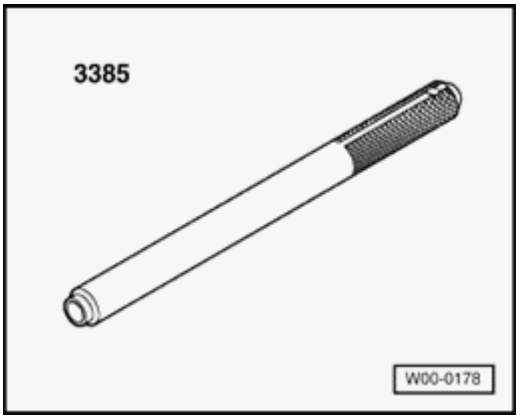


Fig. 183: 3385 Thrust piece
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Sealing ring installer 3385

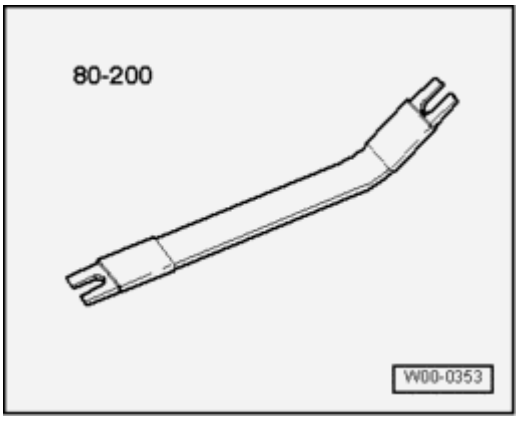


Fig. 184: Identifying Pry Lever 80-200
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry lever 80-200

Removing

- Removing left transmission support --> **Right and left transmission mounts, removing and installing**.
- Removing Multi-Function Transmission Range (TR) Switch F125 --> **Multi-Function Transmission Range (TR) Switch F125 , removing and installing**.

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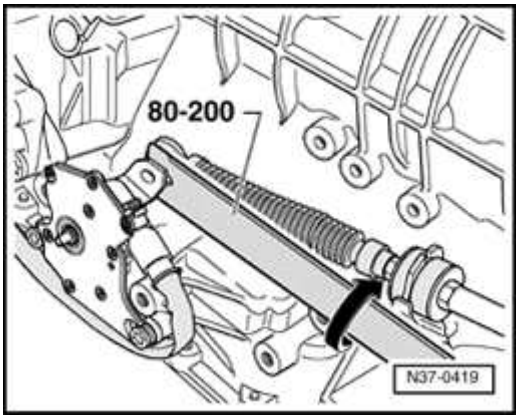


Fig. 185: Removing Selector Lever Cable From Selector Shaft Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry off selector lever cable from lever/shift rod (arrow).

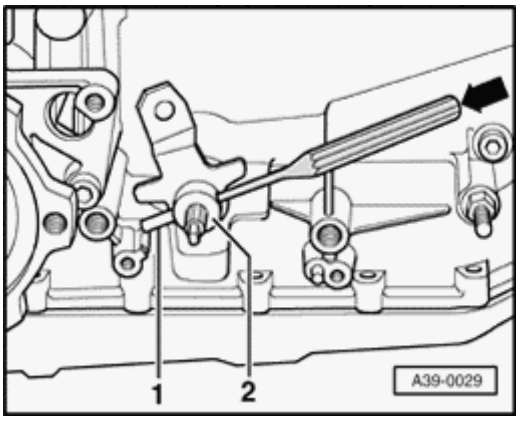


Fig. 186: Driving Out Spring Dowel Sleeve At Lever/Shift Rod Of Travel Toward Front
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive out spring dowel sleeve - **1** - at lever/shift rod - **2** - in direction of travel toward the front (arrow), until the lever/shift rod can be pulled off the shift rod.

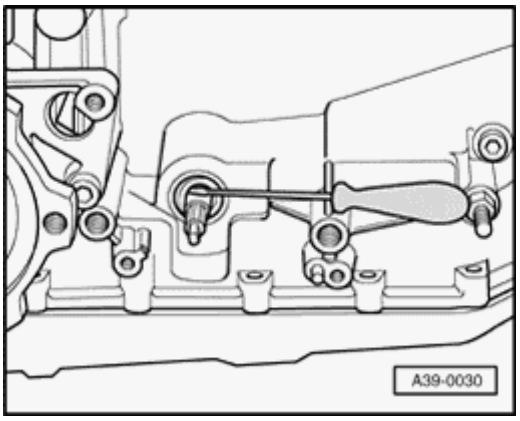


Fig. 187: Prying Seal Out With A Screwdriver

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pierce sealing ring using a small screwdriver and pull out.

Installing

- Coat outer circumference and gap between sealing lips with ATF.
- Installation position: The open side of the sealing ring faces the transmission.

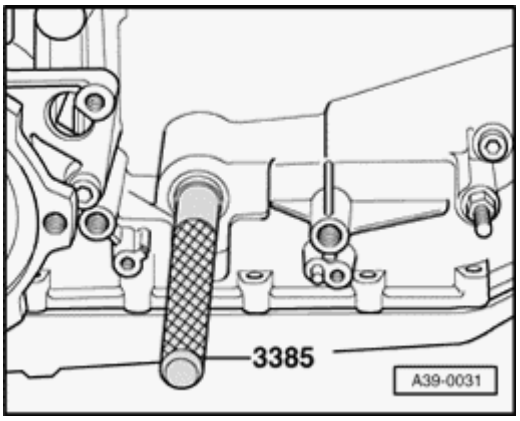


Fig. 188: Drive In New Seal Until Using Thrust Piece 3385
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide new sealing ring onto sealing ring installer 3385 without canting and drive in up to stop of pressure piece.
- Installing Multi-function switch --> **Multi-Function Transmission Range (TR) Switch F125 , removing and installing**.
- Drive back spring dowel sleeve with transmission not yet removed in opposite direction through the lever.
- Slide transmission shift lever onto shift rod and drive in spring dowel sleeve.

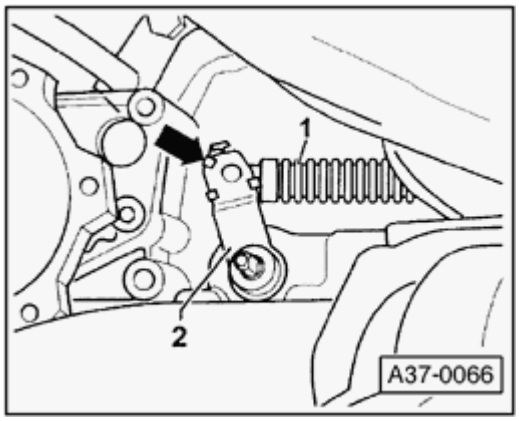


Fig. 189: Pushing Lever/Selector Shaft On Transmission Fully Forward Into Position "S"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Push lever/selector shaft - **2** - on transmission fully forward (on illustration fully left).
- Shift selector lever into "S" and carefully press up ball head of selector lever cable - **1** - on lever/shift rod - **2** - using a pair of pliers.

NOTE:

- **Do not deform lever/shift rod when pressing up or else shifting cannot be precisely adjusted any more.**

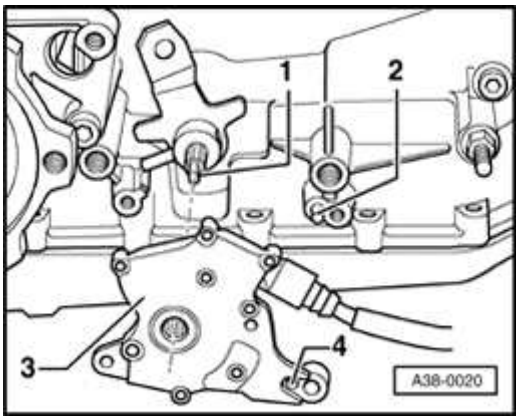


Fig. 190: Location Of 10 Pin Harness Connector & Multi-Function Transmission Range (TR) Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Rotate multi-function switch - **3** - until the alignment bore - **4** - at switch housing can be fitted on the alignment pin - **2** - at transmission housing.
- Installing left transmission support --> **Right and left transmission mounts, removing and installing**.

Tightening torques

Component	Nm
Multi-function Transmission Range (TR) switch F125 to transmission	8

Multi-Function Transmission Range (TR) Switch F125 , removing and installing

Removing

- Removing left transmission support --> **Right and left transmission mounts, removing and installing**.
- Unbolt Multi-Function Transmission Range (TR) Switch F125 from transmission and pull off from shift rod.

Installing

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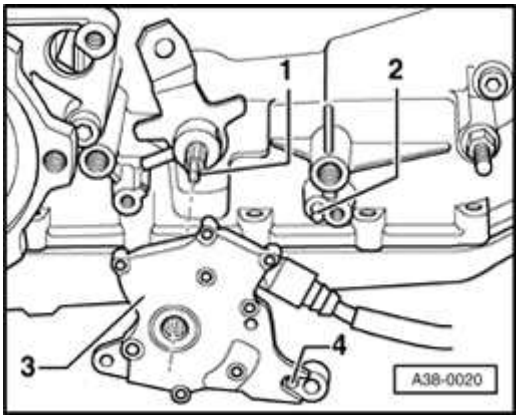


Fig. 191: Location Of 10 Pin Harness Connector & Multi-Function Transmission Range (TR) Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect Multi-Function Transmission Range (TR) Switch F125 to shift rod. Flap part at splines in switch - **3** - must align with flat part of shift rod - **1** -.

NOTE:

- **Set Multi-Function Transmission Range (TR) Switch F125 onto shift rod in centered manner. Do not cant and do not set with force. Risk of damage at switch terminals.**

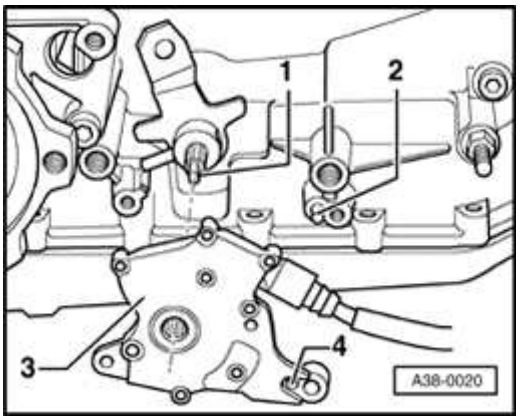


Fig. 192: Location Of 10 Pin Harness Connector & Multi-Function Transmission Range (TR) Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Rotate switch until the alignment bore - **4** - at switch housing can be fitted on the alignment pin - **2** - at transmission housing.
- Installing left transmission support --> **Right and left transmission mounts, removing and installing**.

Tightening torques

Component	Nm
Multi-function Transmission Range (TR) switch F125 to transmission	8

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Speedometer Vehicle Speed Sensor (VSS) G22 , removing and installing

Removing

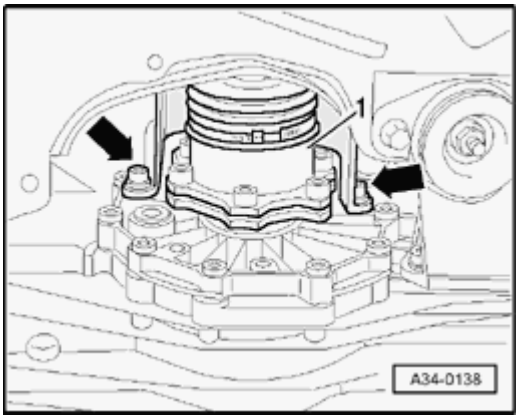


Fig. 193: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield - **1** - for left drive axle (arrows), if installed.

Third bolt is not visible in the illustration.

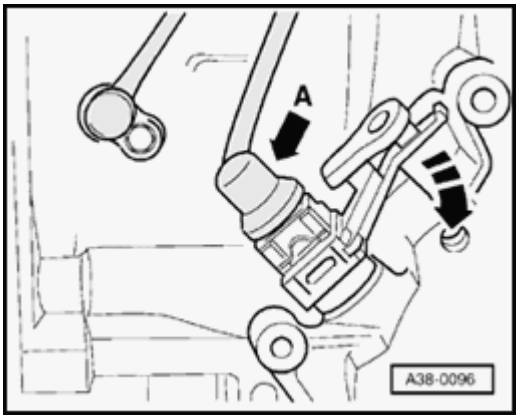


Fig. 194: Removing Speedometer Vehicle Speed Sensor -G22- And Vehicle Speed Sensor -G68-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect harness connector from Speedometer Vehicle Speed Sensor (VSS) G22 (arrow - **A** -).
- Push retaining bracket of sensor downward, and turn (arrow).
- Remove sensor.

Installing

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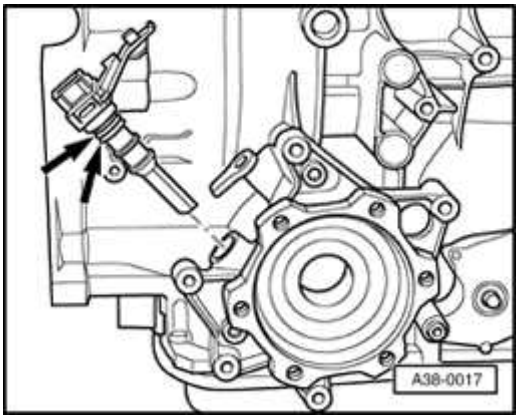


Fig. 195: Installing Speedometer Vehicle Speed Sensor -G22- And Vehicle Speed Sensor -G68-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace sealing rings (arrows).
- Insert O-rings with gear oil.
- Insert sensor.
- Engage retaining bracket at mounting bracket for flange shaft.

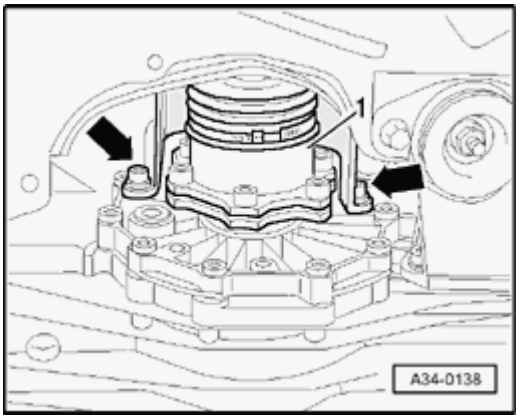


Fig. 196: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install heat shield - **1** - for left drive axle (arrows), if present.

Third bolt is not visible in the illustration.

Sensor for transmission RPM G182 , removing and installing

Removing

- Removing valve body --> **Valve body, removing and installing**.

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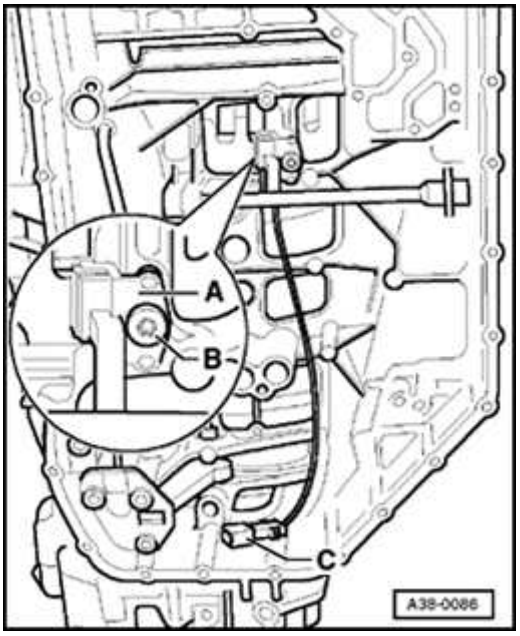


Fig. 197: Sensor For Transmission RPM (Transmissions With Hydraulic Regulation -E18/2-)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt Sensor for transmission RPM - **A** - from transmission.

Installing

- Bolt on Sensor for transmission RPM - **A** - at transmission via bolt - **B** -. Tightening torque is 9 Nm.
- Route wire with connector - **C** - according to illustration, so that the wire is not pinched when installing the valve body.
- Installing valve body.
- Fill up ATF --> **ATF, changing or topping off after repairs**.

Transmission Vehicle Speed Sensor (VSS) G38 , removing and installing

Also referred to as Sender for transmission output RPM G195.

Removing

- Removing oil pan --> **Oil pan, removing and installing**.

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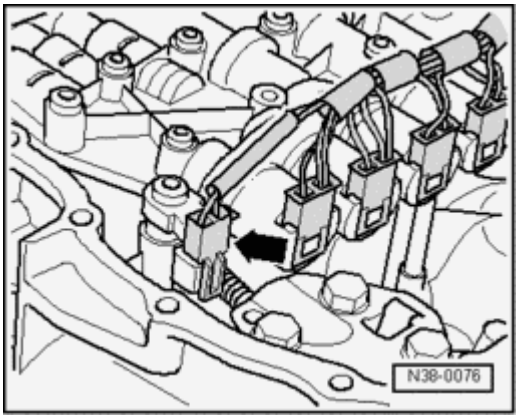


Fig. 198: Transmission Vehicle Speed Sensor -G38- Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect harness connector from Transmission Vehicle Speed Sensor (VSS) G38 (arrow).

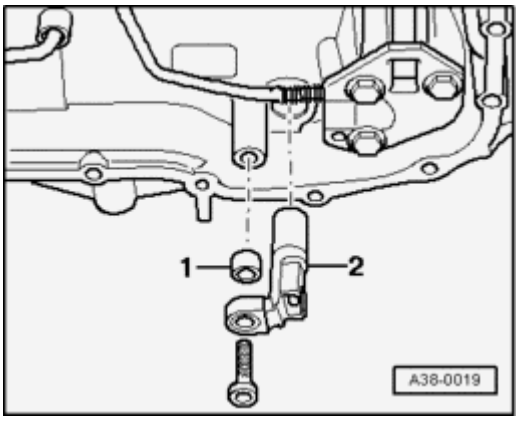
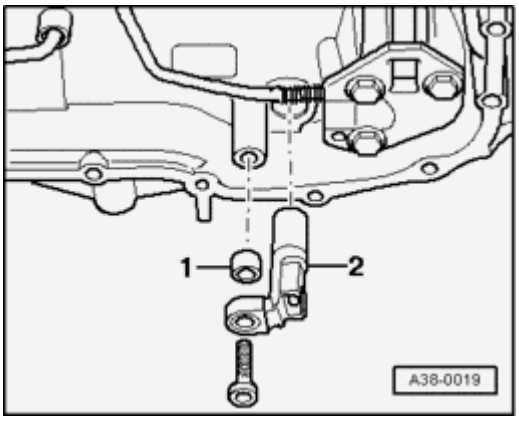


Fig. 199: Identifying Transmission Vehicle Speed Sensor (VSS) And Spacer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove Transmission Vehicle Speed Sensor (VSS) - **2** -.

Installing



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Fig. 200: Identifying Transmission Vehicle Speed Sensor (VSS) And Spacer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install and tighten Transmission Vehicle Speed Sensor (VSS) - **2** - using spacer sleeve - **1** - (height: 8 mm) to 6 Nm.

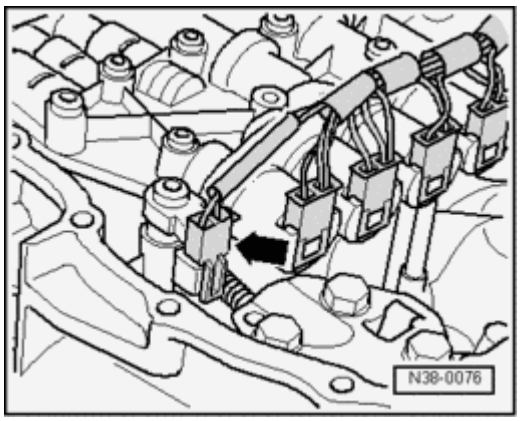


Fig. 201: Transmission Vehicle Speed Sensor -G38- Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect connector at Transmission Vehicle Speed Sensor (VSS) G38.
- Installing oil pan.
- Fill up ATF --> **ATF, changing or topping off after repairs**.

Wiring harness inside transmission, removing and installing

Removing

- Removing valve body --> **Valve body, removing and installing**.

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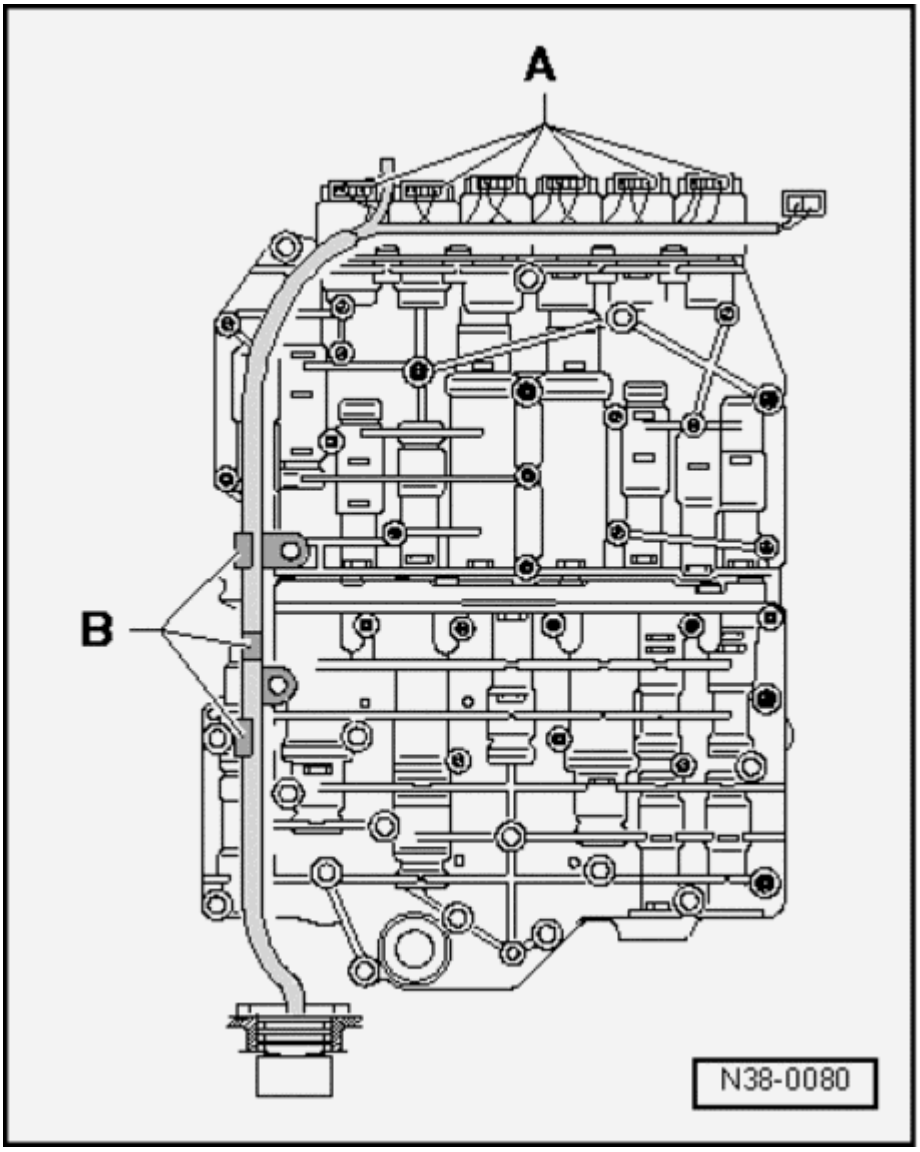


Fig. 202: Identifying Solenoid Valve Connectors And Wiring Harness Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lever out retainer straps of connectors at solenoid valves and pressure control valves using a small screwdriver and disconnect connectors - **A** - in sequence.
- Unhook wiring harness at side retainer straps **- B -** of valve body.

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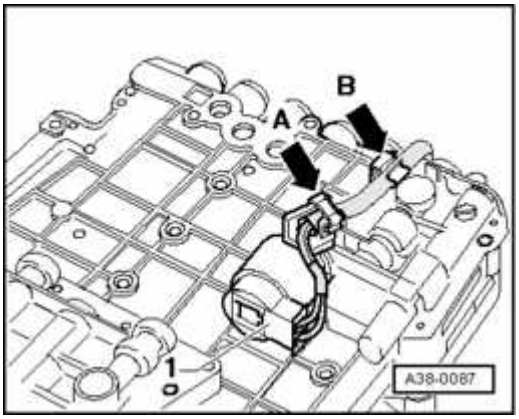


Fig. 203: Identifying Pressure Control Valve 1 (-N125-) And Wiring Harness Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn valve body on its back side and loosen connector - **1** - at Pressure Control Valve 1 for Auto. Transmission N215.
- Remove retaining clip (arrow A) and unclip wiring harness from retaining clip (arrow B).

Installing

Installation is reverse of removal, noting the following:

- When installing, connect connectors of wiring harness to the corresponding solenoid valves and pressure control valves.
- Clip wiring harness into the respective retaining clips. In case of deviations, the wiring harness can be pinched during installation of the valve body.
- Installing valve body.
- Fill up ATF --> **ATF, changing or topping off after repairs**.

Transmission Fluid Temperature Sensor G93 , replacing

NOTE:

- **Transmission Fluid Temperature Sensor G93 is integrated in the transmission wiring harness.**

Removal

- Remove wiring harness in transmission --> **Wiring harness inside transmission, removing and installing**.

Installing

Installation is the reverse of removal. Also carry out the following procedure.

- Replace wiring harness with a new one.
- Install new wiring harness in transmission --> **Wiring harness inside transmission, removing and**

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installing.

39 - FINAL DRIVE, DIFFERENTIAL

GEAR OIL IN FRONT FINAL DRIVE, CHECKING

Special tools, testers and auxiliary items required

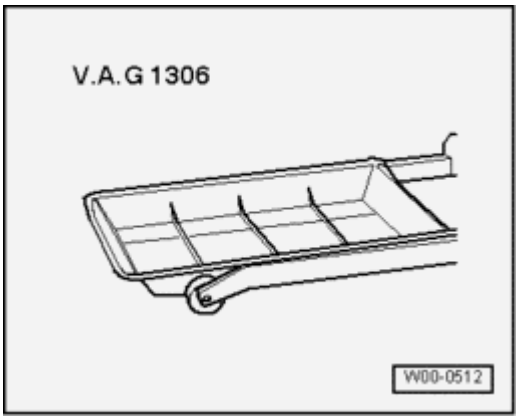


Fig. 204: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

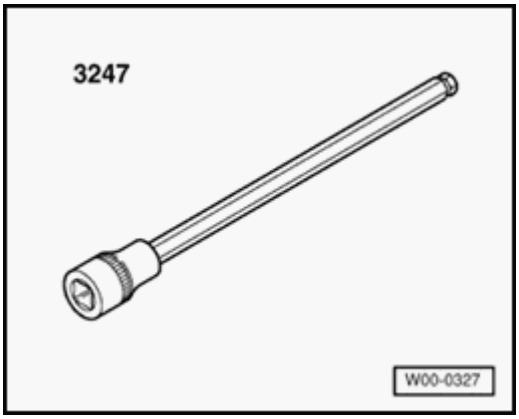


Fig. 205: 3247 Socket AF 8
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Plug insert 3247 (8mm)

Procedure

- Warm up gear oil in front final drive to approx. 60 ° C by performing a short road test.
- Drive vehicle onto a 4-column lift or over a work pit.

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NOTE:

- **The vehicle must be on a level surface.**

- Place drip tray VAG1306 underneath.

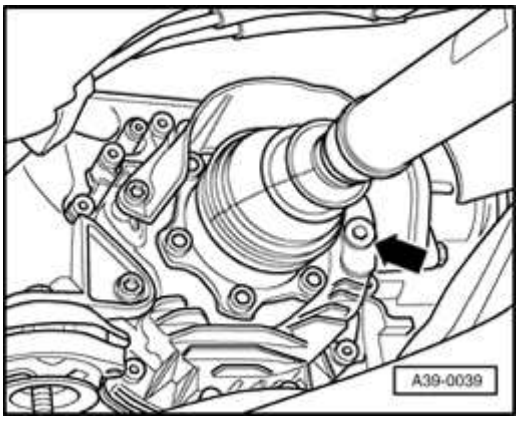


Fig. 206: Locating Sealing Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove locking screw (arrow).

NOTE:

- **Loosen locking bolt using an angled socket-head wrench, but do not use hex ball socket 3247. For improved accessibility it may be necessary to remove the heat shield and drive axle and to set them aside.**
- **If hex ball socket 3247 is used for loosening the bolt, it could be destroyed.**

- With engine switched off, allow gear oil to drip out for approx. 2 minutes.

Oil level is correct when the front final drive is filled up to lower edge of oil filler hole.

- Let excessive gear oil drain or top up gear oil --> **Gear oil in front final drive, filling up after servicing**.

NOTE:

- **Replace locking screw with seal.**

- When the oil level is correct, tighten locking bolt using hex ball socket 3247 (8mm socket) to 30 Nm.

GEAR OIL IN FRONT FINAL DRIVE, FILLING UP AFTER SERVICING

Gear oil in front final drive, filling up after servicing

Special tools, testers and auxiliary items required

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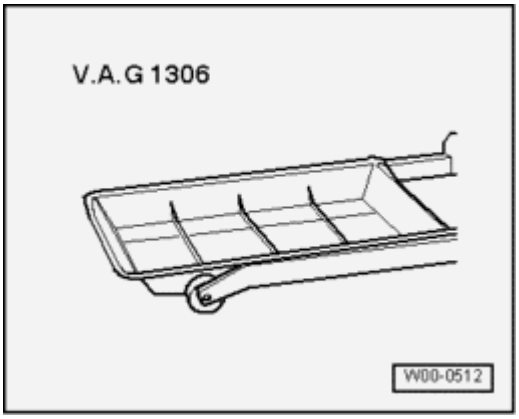


Fig. 207: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

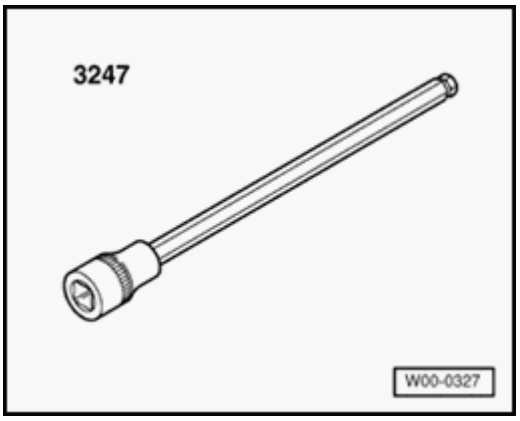


Fig. 208: 3247 Socket AF 8
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Plug insert 3247 (8mm)

Procedure

- Drive vehicle onto a 4-column lift or over a work pit.

NOTE:

- **The vehicle must be on a level surface.**

- Place drip tray VAG1306 underneath.

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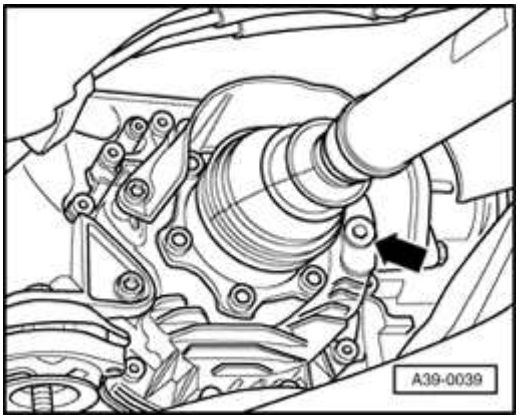


Fig. 209: Locating Sealing Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove locking screw (arrow).

NOTE:

- **Loosen locking bolt using an angled socket-head wrench, but do not use hex ball socket 3247. For improved accessibility it may be necessary to remove the heat shield and drive axle and to set them aside.**
- **If hex ball socket 3247 is used for loosening the bolt, it could be destroyed.**

- Slowly and uniformly fill front final drive over a time period of at least 5 minutes until gear oil escapes at lower edge of oil filler hole.

- Specification --> **Capacity**

NOTE:

- **Filling time of at least 5 minutes is essential, so that the internal oil level compensation between differential and retaining area can occur.**

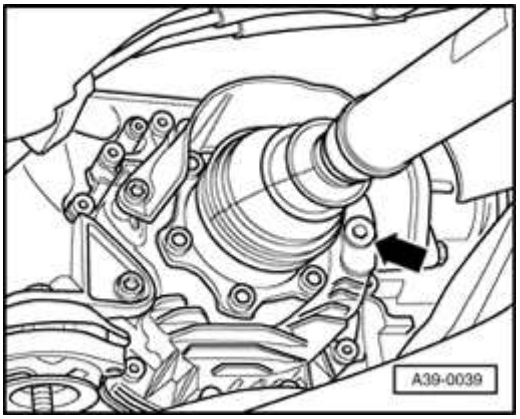


Fig. 210: Locating Sealing Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Screw in old locking screw (arrow).
- Perform a short test drive to warm gear oil to approx. 60 ° C.
- Check front final drive oil level --> **Gear oil in front final drive, checking**.

NOTE:

- **Replace locking screw with seal.**

- When the oil level is correct, tighten locking bolt using hex ball socket 3247 (8 mm socket) to 30 Nm.

FRONT FINAL DRIVE, SERVICING

Front final drive, servicing

- Transmission installed

NOTE:

- **General repair notes --> Servicing notes.**
- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**

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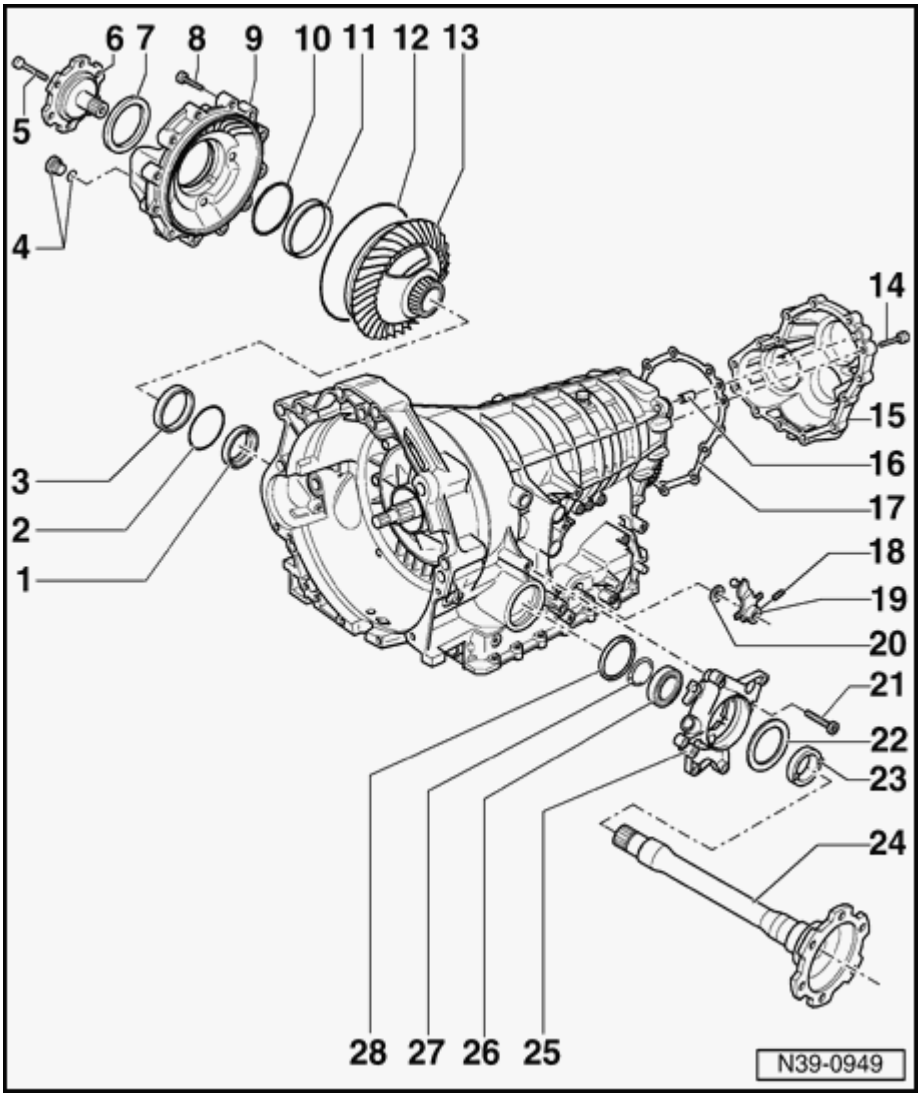


Fig. 211: Front Final Drive, Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Seal

- Between final drive and transmission housing
- Always replace --> **Final drive sealing ring/transmission housing, replacing**

2 - Adjustment shim

- Behind tapered roller bearing outer race

3 - Tapered roller bearing outer race

4 - Locking screw - 30 Nm

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- With seal
- Always replace

5 - Bolt - 23 Nm

6 - Right drive flange

7 - Right drive flange seal

- Always replace --> **Sealing ring for right drive flange, replacing**

8 - Bolt - 23 Nm

- Observe tightening sequence

9 - Cover for final drive

10 - Adjustment shim

- Behind tapered roller bearing outer race

11 - Tapered roller bearing outer race

12 - O-ring

- Always replace --> **O-ring at cover for final drive, replacing**

13 - Differential

14 - Bolt - 23 Nm

- Observe tightening sequence **Tightening sequence:**

15 - Cover for front final drive

- Front wheel drive version shown

16 - Bushing

17 - Gasket

- Always replace --> **Seal for front final drive, replacing**

18 - Spring dowel sleeve

19 - Lever

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- For shift rod

20 - Seal

- For shift rod
- Always replace --> **Shift rod seal, replacing**

21 - Bolt - 23 Nm

22 - Left drive flange seal

- Always replace --> **Sealing ring and grooved ball bearing for left drive flange, replacing**

23 - Drive gear

- For speedometer Vehicle Speed Sensor (VSS) G22
- Installation position --> **Fig. 231**

24 - Left drive flange

- Removing and installing --> **Sealing ring and grooved ball bearing for left drive flange, replacing** onward

25 - Mounting bracket for drive flange

26 - Grooved ball bearing for drive flange

- Always replace --> **Sealing ring and grooved ball bearing for left drive flange, replacing**

27 - Snap ring

28 - O-ring

- Square cross section
- Remove and install left drive flange to replace --> **Sealing ring and grooved ball bearing for left drive flange, replacing**

Sealing ring for right drive flange, replacing

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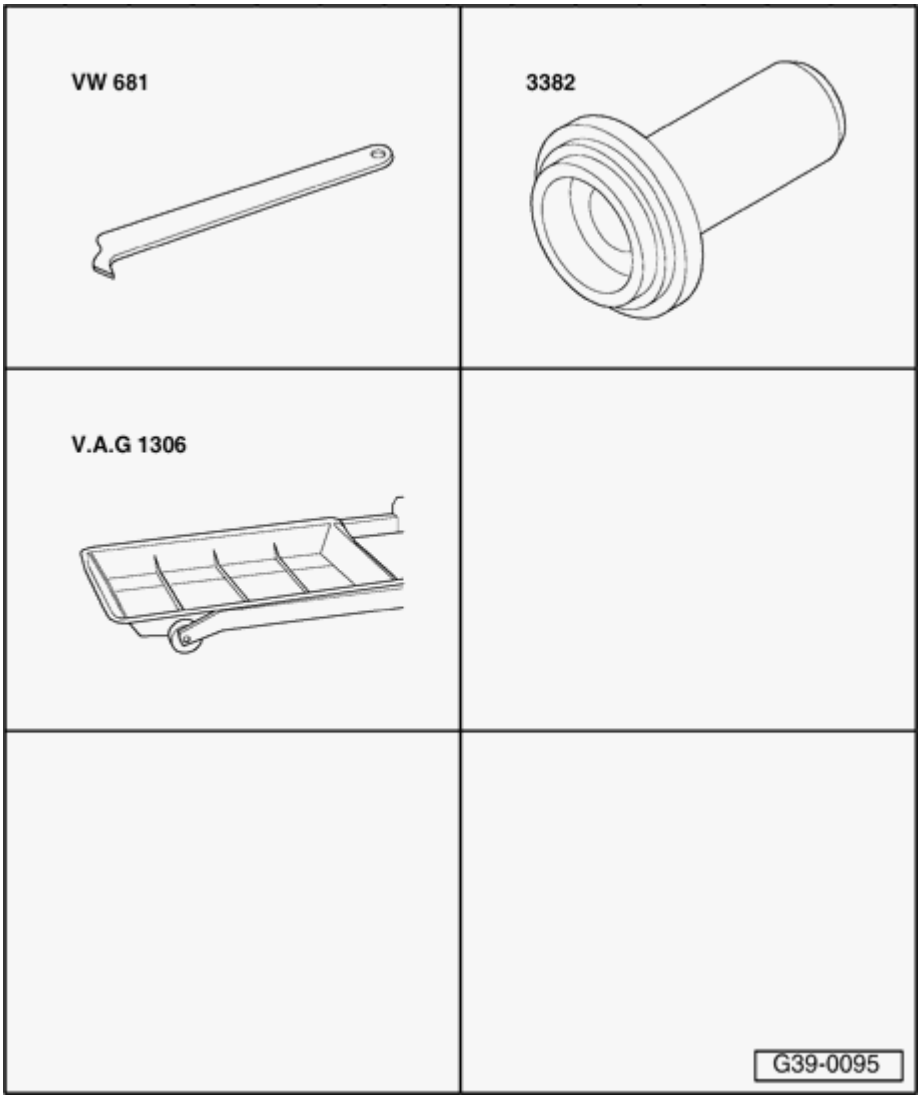


Fig. 212: Identifying Special Tools - Sealing Ring For Right Drive Flange, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Extractor lever VW681
- Right sealing ring installer 3382
- Drip tray VAG1306

Additional information

- **SUSPENSION, WHEELS, STEERING**

Removing

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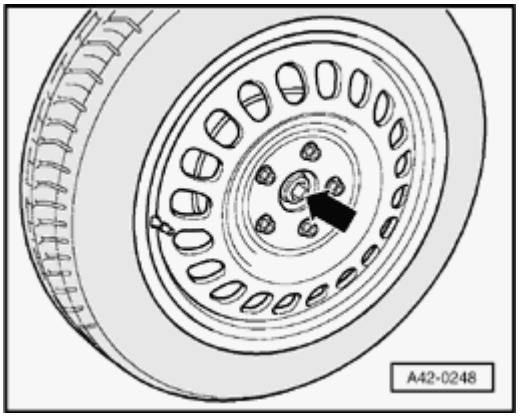


Fig. 213: Wheel Hex Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen bolt drive axle/wheel hub while the vehicle is still standing on its wheels. --> **40 - FRONT SUSPENSION**
- Remove wheel.

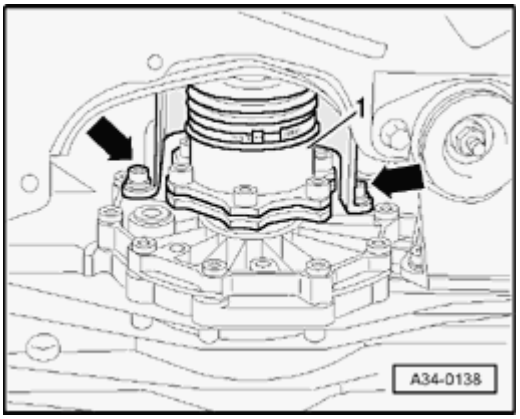


Fig. 214: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for right drive axle (arrows).

Third bolt is not visible in the illustration.

- Unbolt right drive axle - **1** - from transmission flange and remove. --> **40 - FRONT SUSPENSION**

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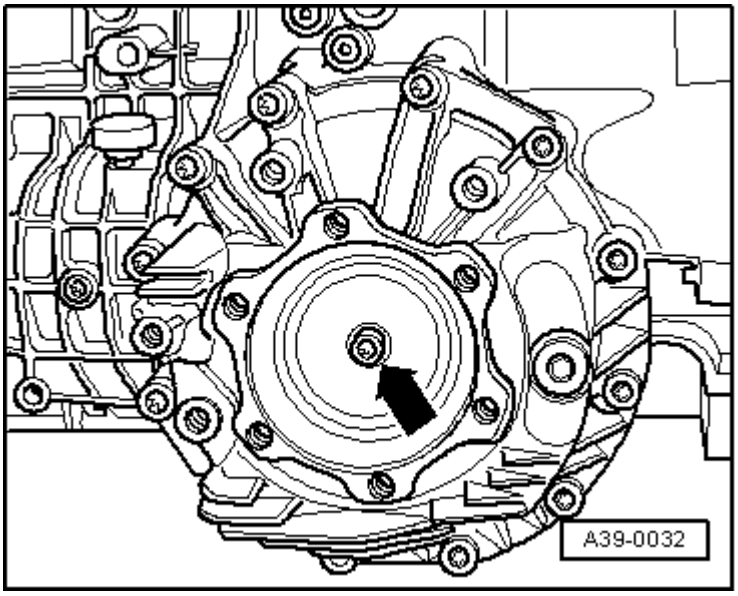


Fig. 215: Flange Shaft Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt for flange shaft (arrow) while securing against turning using a drift.
- Place drip tray VAG1306 underneath.
- Remove right drive flange.

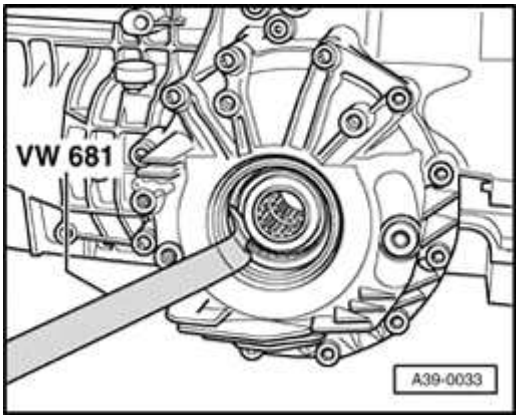


Fig. 216: Removing Flange Shaft Oil Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull out drive flange seal.

Installing

- Coat outer edge of oil seal with gear oil.

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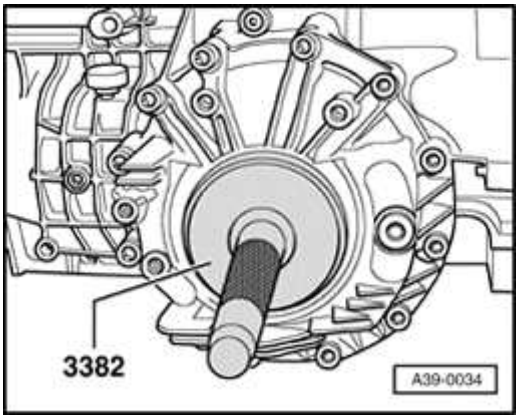


Fig. 217: Driving New Seal Using Drift 3382
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive in new seal to stop, without canting seal.
- Installation position: The open side of the sealing ring faces the transmission.
- Fill area between sealing lip and dust lip halfway with sealing grease G 052 128 A1.
- Install right drive flange.

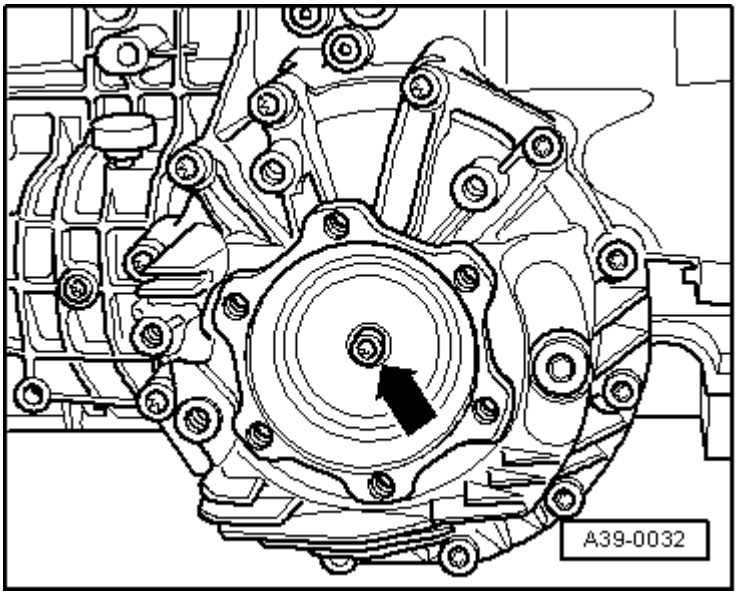


Fig. 218: Flange Shaft Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install bolt for drive flange (arrow, 23 Nm) while securing drive flange against turning, using a drift.

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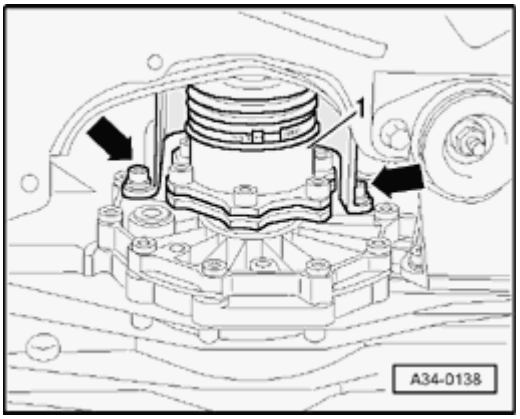


Fig. 219: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install right drive axle **- 1 -**. --> **40 - FRONT SUSPENSION**
- Install heat shield for right drive axle (arrows).

Third bolt is not visible in the illustration.

- Install front wheel. --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**
- Check oil level in front final drive --> **Gear oil in front final drive, checking**.

Tightening torques

Component	Nm
Drive flange to transmission	23
Heat shield for driveshaft to transmission	23

Sealing ring and grooved ball bearing for left drive flange, replacing

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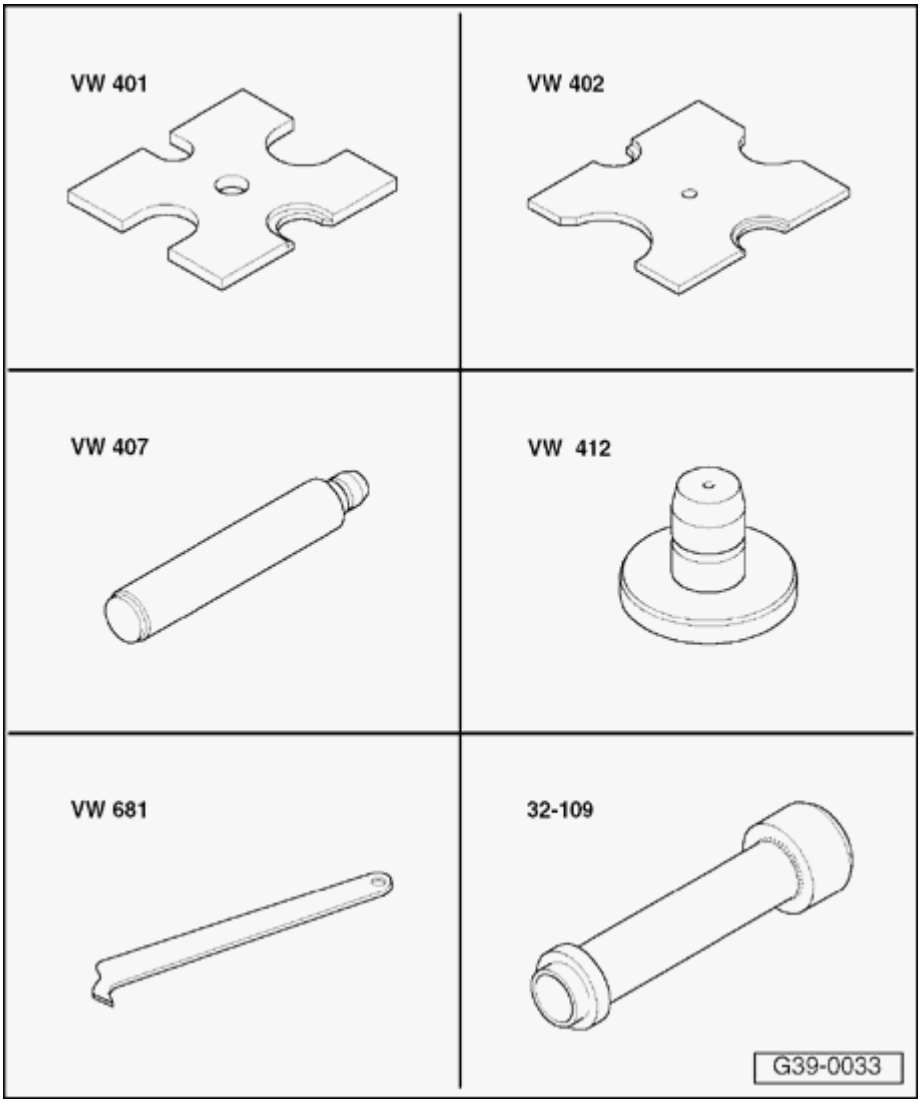


Fig. 220: Identifying Special Tools - Sealing Ring And Grooved Ball Bearing For Left Drive Flange, Replacing (1 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Thrust plate VW401
- Thrust plate VW402
- Punch VW407
- Punch VW412

- Extractor lever VW681
- Driving sleeve 32-109

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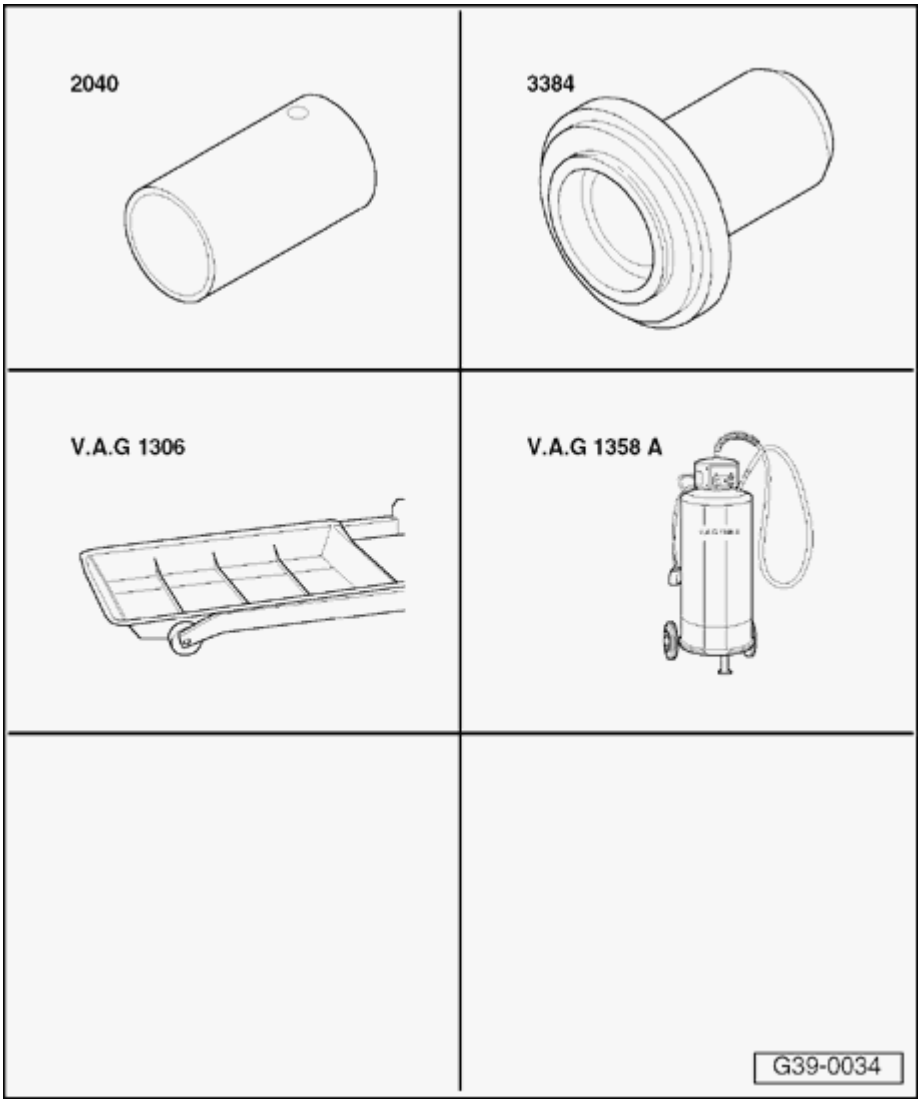


Fig. 221: Identifying Special Tools - Sealing Ring And Grooved Ball Bearing For Left Drive Flange, Replacing (2 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Press tube 2040
- Assembly mandrel 3384
- Drip tray VAG1306
- Oil siphoning unit VAG1358A

Additional information

- **SUSPENSION, WHEELS, STEERING**

Remove left drive flange

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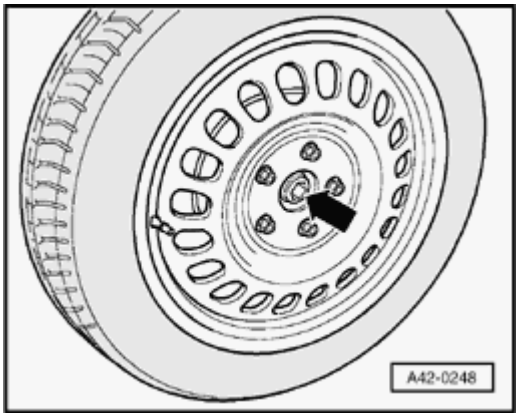


Fig. 222: Wheel Hex Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen bolt drive axle/wheel hub while the vehicle is still standing on its wheels. --> **40 - FRONT SUSPENSION**
- Remove wheel.

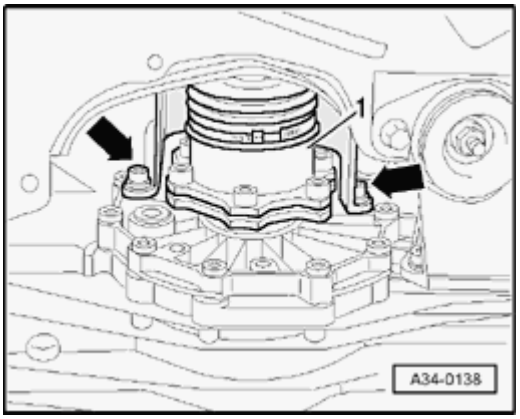


Fig. 223: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for left drive axle (arrows), if installed.

Third bolt is not visible in the illustration.

- Unbolt left drive axle - **1** - from transmission flange and remove. --> **40 - FRONT SUSPENSION**
- Place drip tray VAG1306 underneath.

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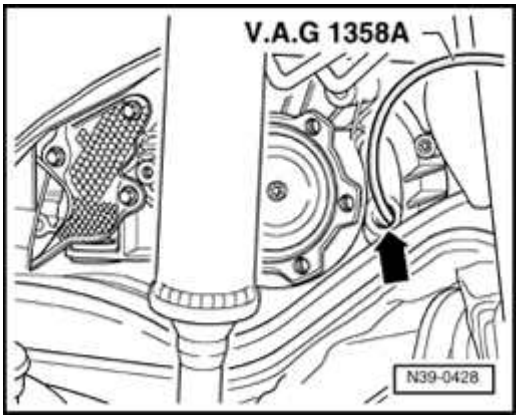


Fig. 224: Extracting Gear Oil From Front Final Drive Using VAG 1358 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove oil filler plug (arrow) and siphon off at least 0.5 L gear oil from front final drive using oil siphoning unit VAG1358A

NOTE:

- **Oil must be siphoned from final drive, otherwise there is a risk that the gear oil could mix with the ATF.**

- Remove Speedometer Vehicle Speed Sensor (VSS) --> **Speedometer Vehicle Speed Sensor (VSS) G22 , removing and installing**.
- Remove harness connector bracket from mounting bracket for drive flange.

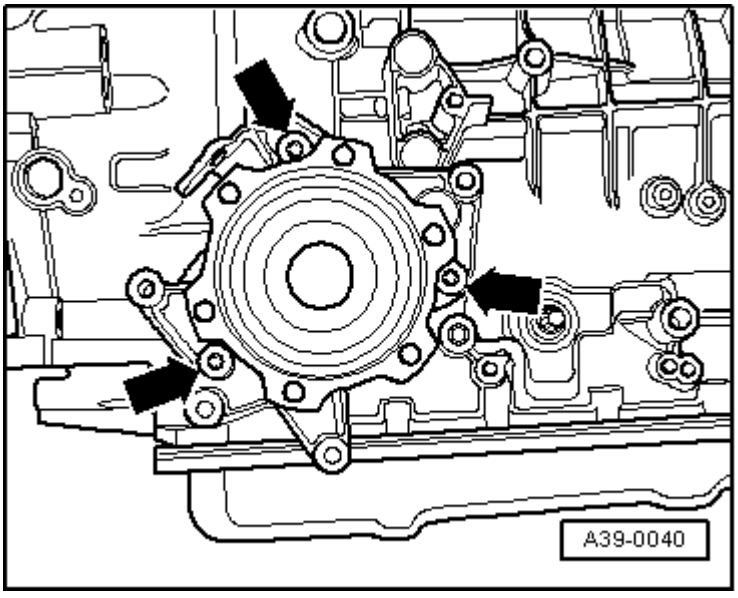


Fig. 225: Removing/Installing Left Drive Flange Mounting Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove drive flange mounting bracket (arrows).
- Pull out drive flange.

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NOTE:

- **The left drive flange can be pulled out between body and subframe with the transmission installed if the mounting bracket for drive flange is turned approx. 60 ° to the right against the installation position.**

Removing seal

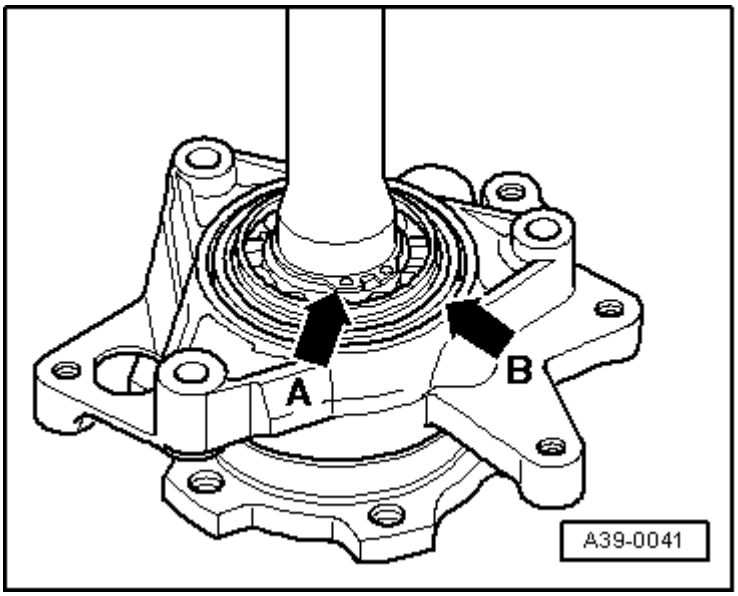


Fig. 226: Removing/Installing Circlip And Seal At Grooved Ball Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip (arrow A) for grooved ball bearing.

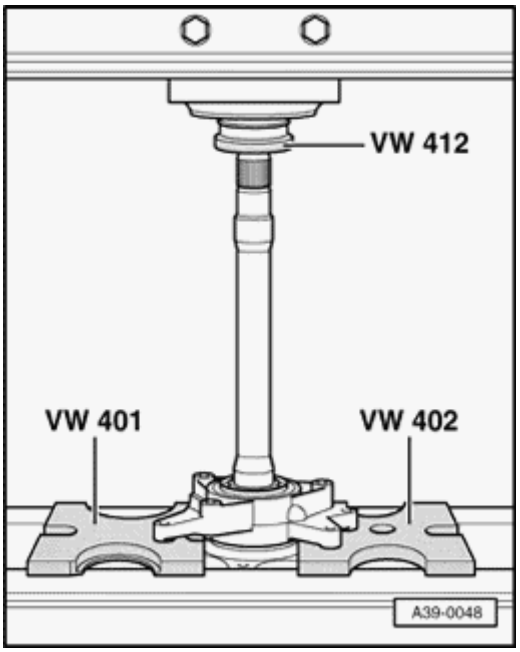


Fig. 227: Pressing Flange Shaft Out Of Flange Shaft Bearing Bracket

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press drive flange out of drive flange mounting bracket.
- Remove drive flange seal using extractor lever VW681.

Removing grooved ball bearing

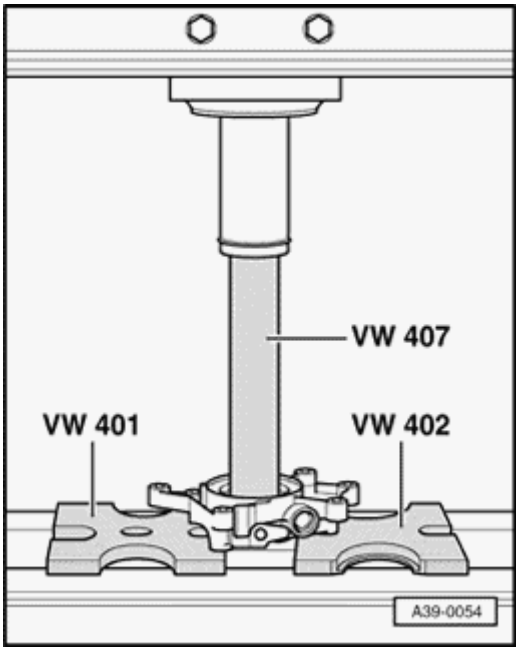


Fig. 228: Pressing Grooved Ball Bearing Out Of Bearing Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press grooved ball bearing out of mounting bracket.

Installing grooved ball bearing

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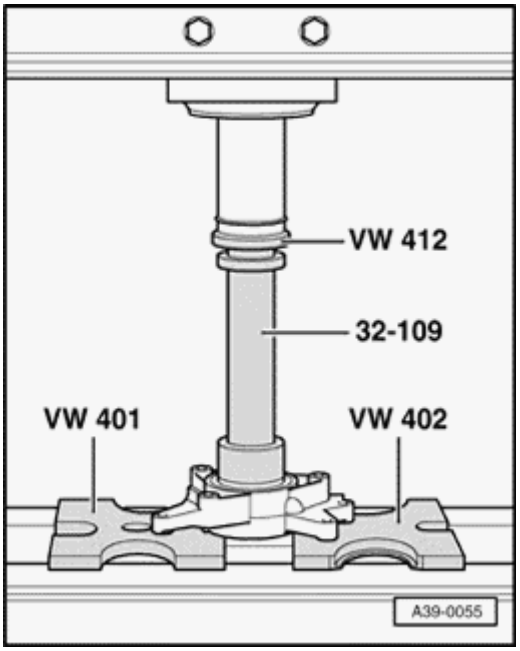


Fig. 229: Pressing New Grooved Ball Bearing Into Bearing Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press new grooved ball bearing into mounting bracket.

Installing sealing ring

- Coat outer edge and sealing lip of oil seal with gear oil.

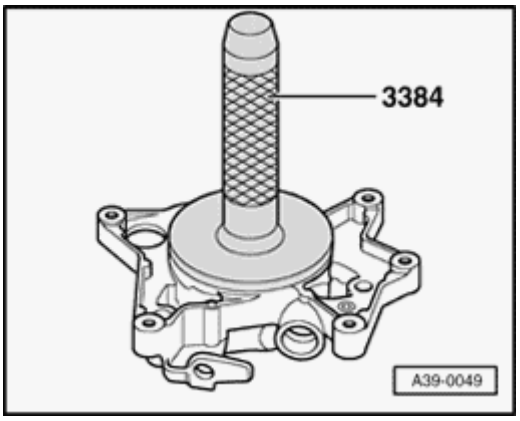


Fig. 230: Driving In New Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive in new sealing ring to stop, without canting.
- Installation position: The open side of the sealing ring faces the transmission.
- Fill area between sealing lip and dust lip halfway with sealing grease G 052 128 A1.

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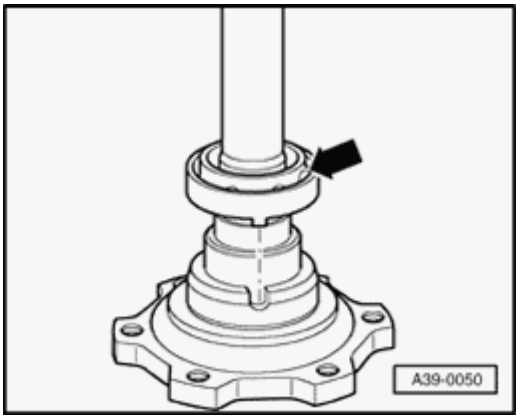


Fig. 231: Installation Position Of Speedometer Drive Gear On Flange Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Set drive gear for Speedometer Vehicle Speed Sensor (VSS) G22 on drive flange (arrow).
- Installation position: The carriers at drive wheel must engage in grooves of drive flange

NOTE:

- **If necessary, coat contact surface with grease to affix drive wheel in installation position.**

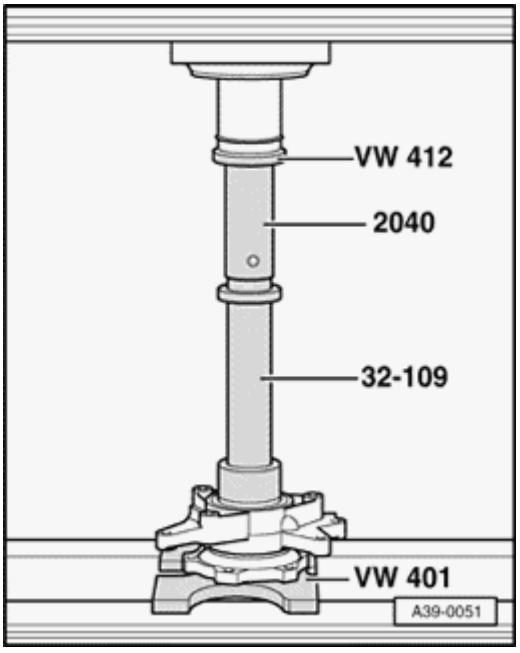


Fig. 232: Pressing Bearing Bracket With Grooved Ball Bearing Onto Flange Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press mounting bracket with grooved ball bearing onto drive flange.

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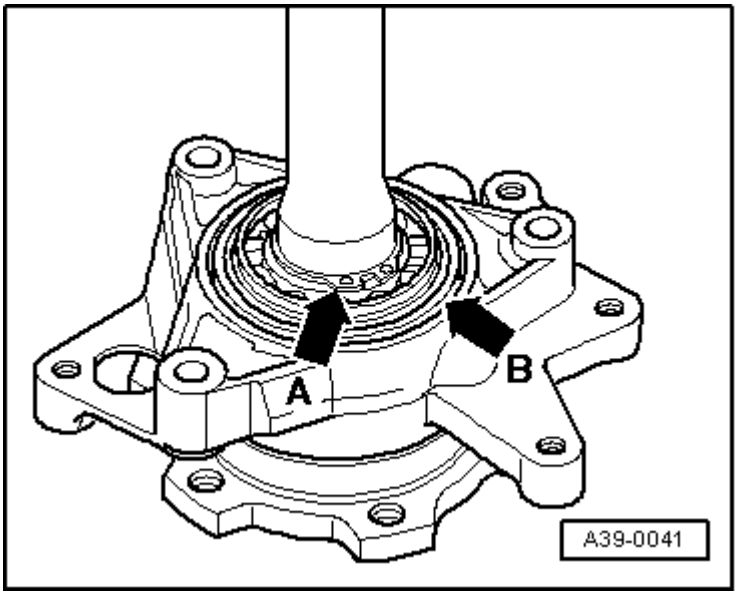


Fig. 233: Removing/Installing Circlip And Seal At Grooved Ball Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert circlip (arrow - **A** -).

Installing left drive flange

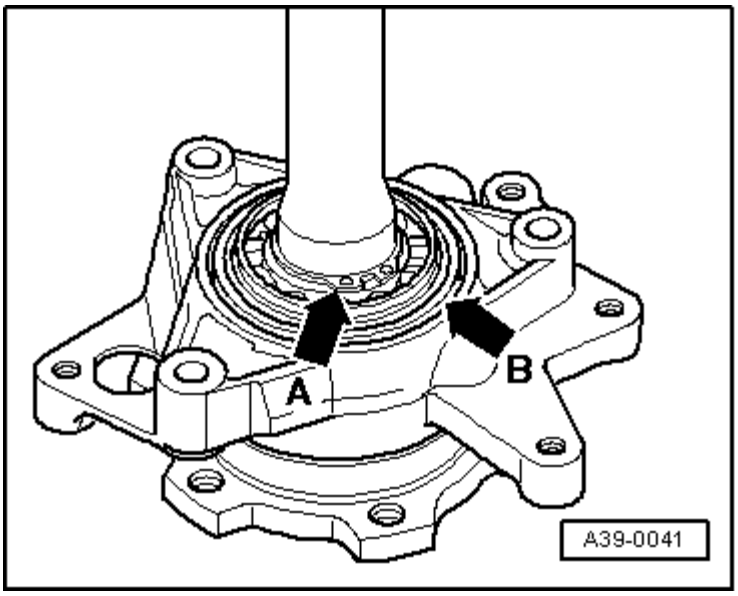


Fig. 234: Removing/Installing Circlip And Seal At Grooved Ball Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace sealing ring (arrow B) in mounting bracket for drive flange.

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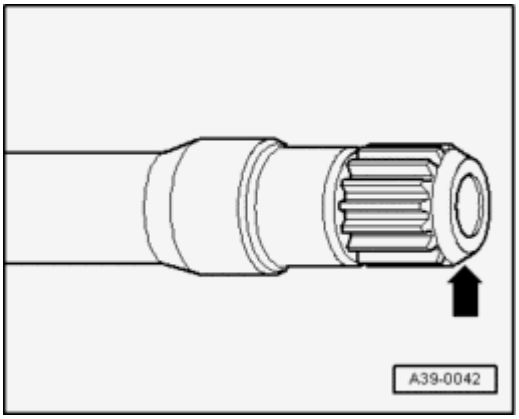


Fig. 235: Checking That There Are No Sharp Edges On Transmission End Of Flange Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check drive flange for sharp edges on transmission side of flange end (arrow) and if necessary, deburr.
- Insert left drive flange into transmission.

NOTE:

- **When sliding in, left drive flange must be carefully guided by hand to prevent damage to the double sealing ring in transmission.**

- Secure mounting bracket for drive flange.
- Bolt on harness connector bracket to mounting bracket for drive flange.
- Install speedometer Vehicle Speed Sensor (VSS) G22 --> **Speedometer Vehicle Speed Sensor (VSS) G22 , removing and installing**.

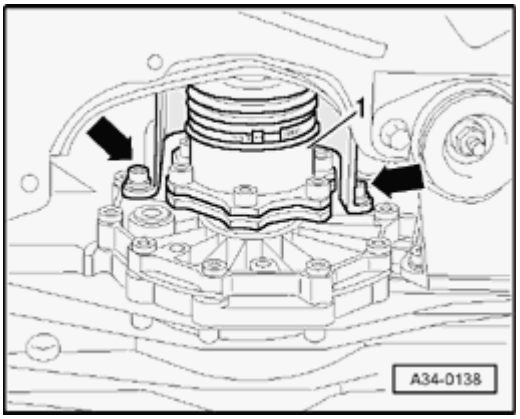


Fig. 236: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install left drive axle - **1** -. --> **40 - FRONT SUSPENSION**
- Install heat shield for left drive axle (arrows).

Third bolt is not visible in the illustration.

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- Install left front wheel. --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**
- Check oil level in front final drive --> **Gear oil in front final drive, checking**.

Tightening torques

Component	Nm
Mounting bracket for left drive flange at transmission	23
Heat shield for driveshaft to transmission	23

O-ring at cover for final drive, replacing

Special tools, testers and auxiliary items required

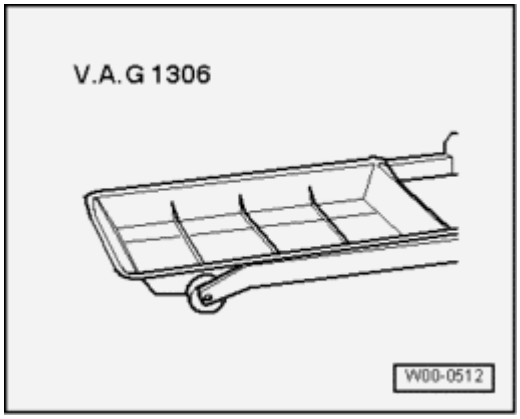


Fig. 237: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

Additional information

- **SUSPENSION, WHEELS, STEERING**
-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

Removing

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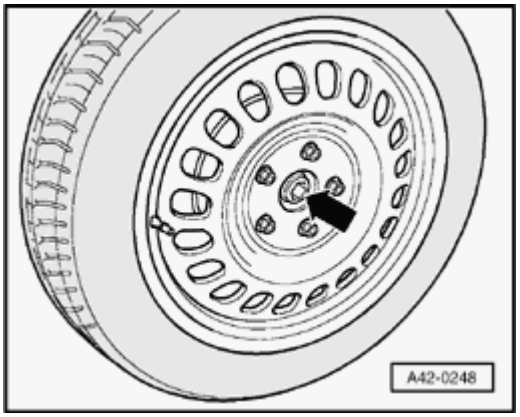


Fig. 238: Wheel Hex Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen bolt drive axle/wheel hub while the vehicle is still standing on its wheels. --> **40 - FRONT SUSPENSION**
- Remove right wheel.
- Remove heat shield for right drive axle.
- Remove right drive axle: --> **40 - FRONT SUSPENSION**
- Remove right front exhaust pipe. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Remove right transmission support --> **Right and left transmission mounts, removing and installing**.

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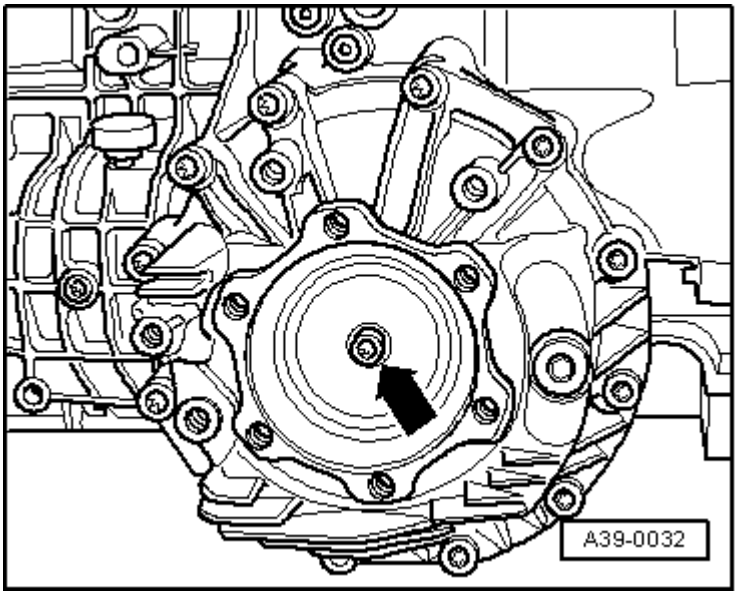


Fig. 239: Flange Shaft Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt for flange shaft (arrow) while securing against turning using a drift.
- Place drip tray VAG1306 underneath.
- Remove right drive flange.

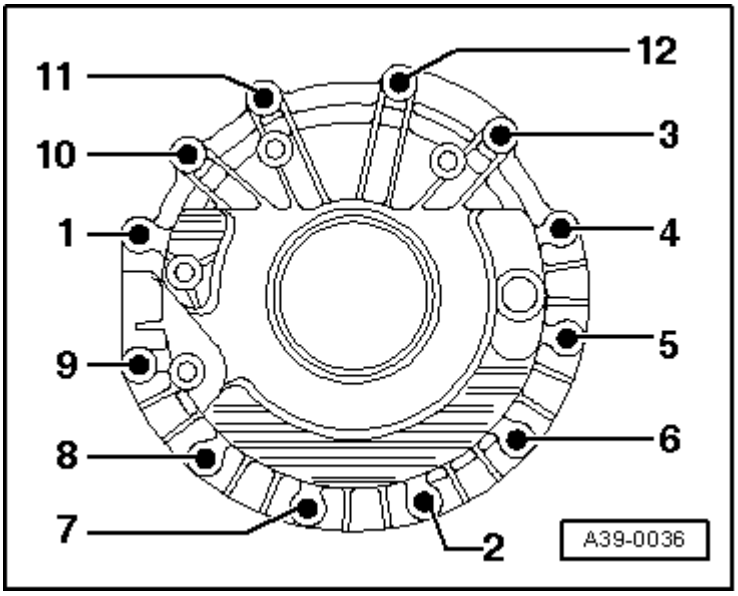


Fig. 240: Installing Cover For Front Final Drive, Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts for final drive cover opposite of shown tightening sequence and remove cover.

Installing

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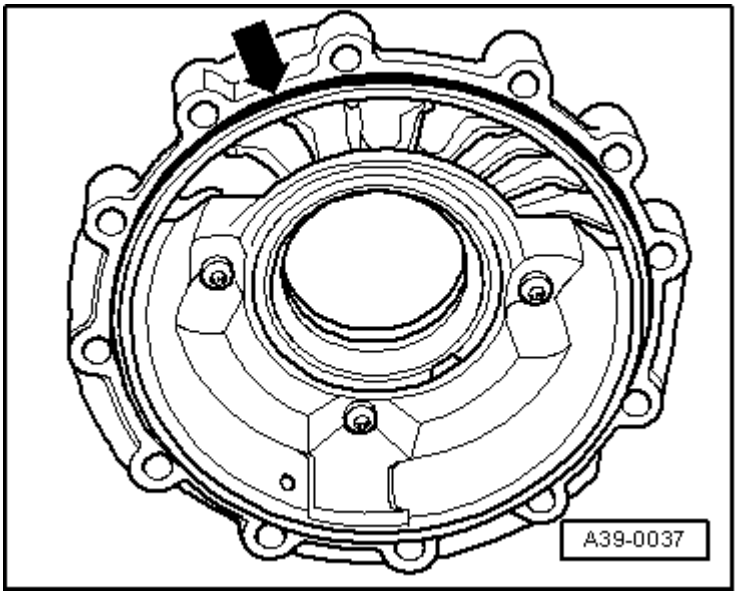


Fig. 241: Identifying Cover For Front Final Drive And O-Ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace sealing ring (arrow).

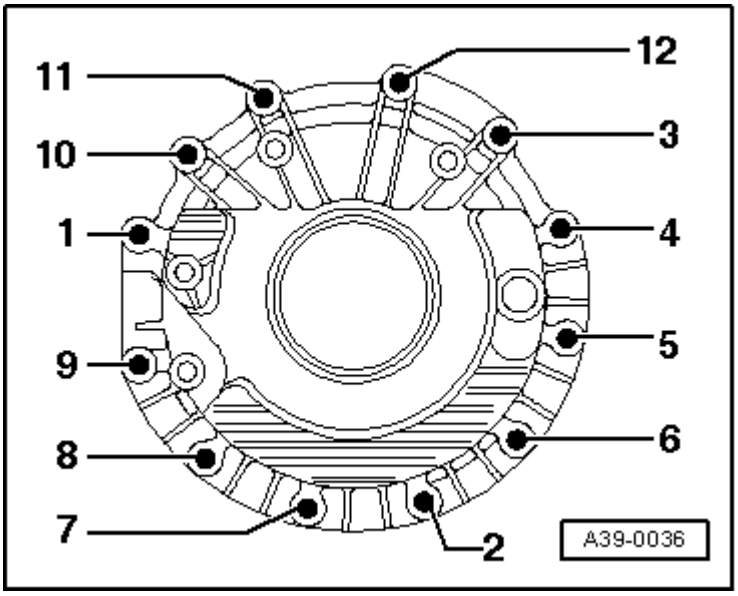


Fig. 242: Installing Cover For Front Final Drive, Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install cover for final drive.

Tightening sequence:

- 1. Stage: Tighten bolts - **1** - to - **3** - by hand
- 2. Stage: Tighten bolts - **1** - to - **12** - in specified sequence to tightening torque

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- Install right drive flange.
- Install transmission support --> **Right and left transmission mounts, removing and installing**.
- Install right front exhaust pipe. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Install drive axle. --> **40 - FRONT SUSPENSION**
- Top-up and check gear oil in front final drive --> **Gear oil in front final drive, checking**.

Tightening torques

Component	Nm
Cover for front final drive to transmission housing	23
Drive flange to transmission	23
Heat shield for driveshaft to transmission	23

Final drive sealing ring/transmission housing, replacing

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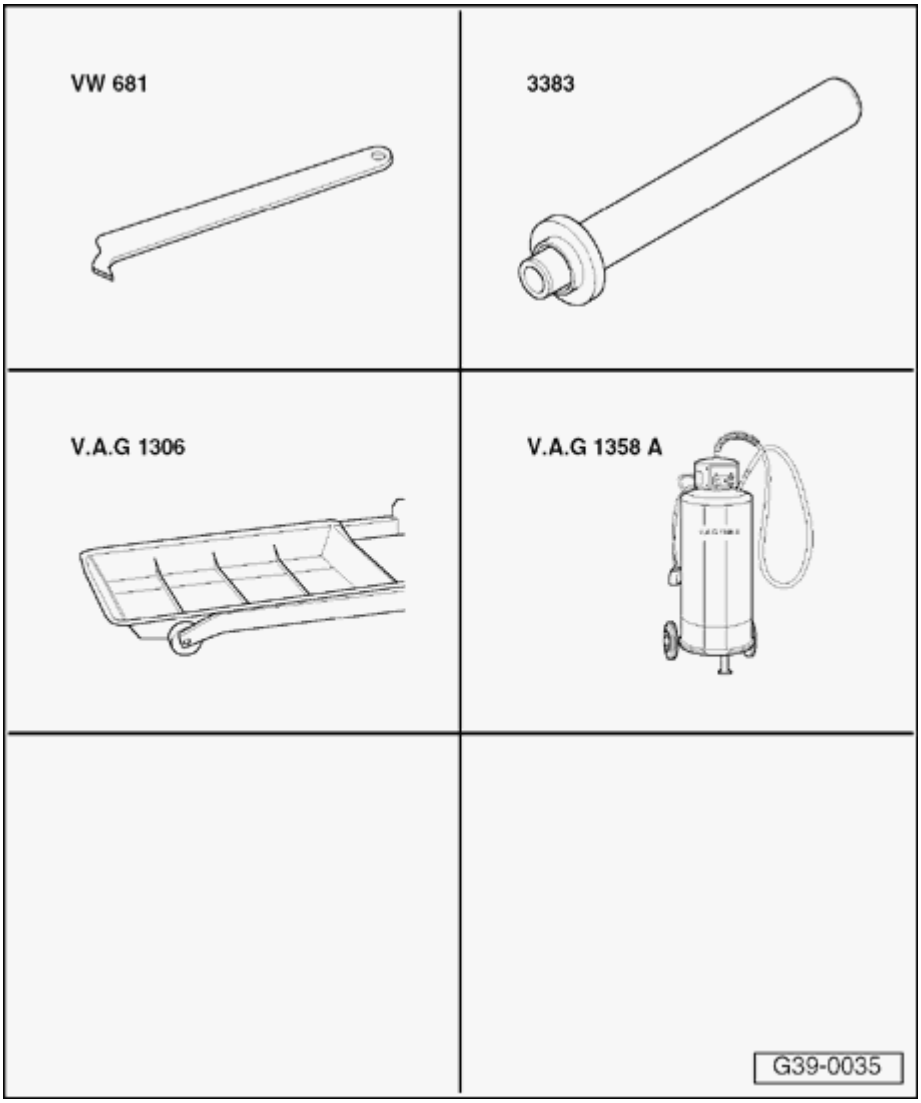


Fig. 243: Identifying Special Tools - Final Drive Sealing Ring/Transmission Housing, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Extractor lever VW681
- Double sealing ring installer 3383
- Drip tray VAG1306
- Oil siphoning unit VAG1358A

NOTE:

- **A faulty sealing ring lets ATF or gear oil escape into the converter housing via the center vent of the shaft seal (between the two sealing lips).**
- **In addition, a faulty sealing ring can let ATF escape into the center differential. It over-fills and oil escapes at the differential vent.**

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Removing

- Remove cover for front final drive --> **O-ring at cover for final drive, replacing**.
- Pull out differential and remove.

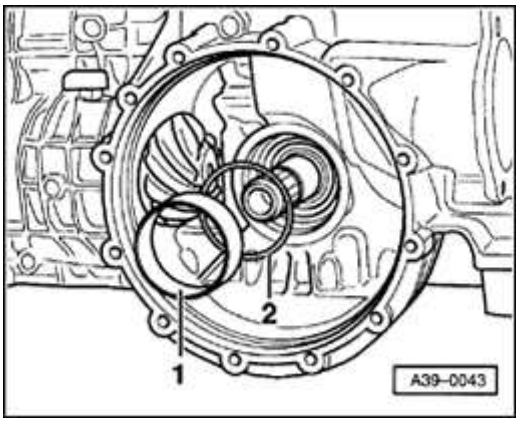


Fig. 244: Identifying Tapered Roller Bearing Outer Race For Differential And Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove tapered roller bearing outer race of differential - **1** - and shim - **2** - which is behind it from transmission housing by hand.

NOTE:

- **Shim is pre-determined and must not be exchanged for a shim with another thickness.**

- Remove left drive flange --> **Sealing ring and grooved ball bearing for left drive flange, replacing**.

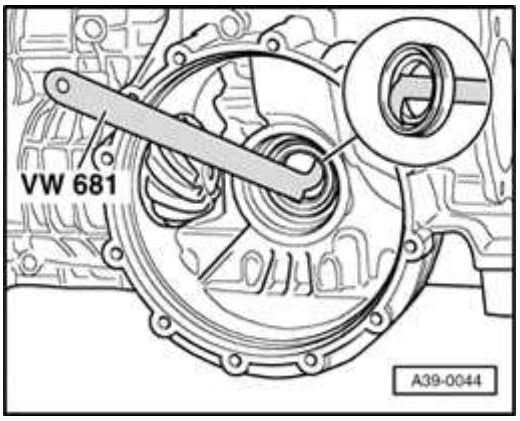


Fig. 245: Pulling Out Oil Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull out seal.

NOTE:

- **Extractor lever must be positioned behind both sealing lips of the sealing**

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ring. Do not position at outer circumference of sealing ring, otherwise the contact surface in transmission housing will be damaged. When levering out, carefully guide extractor lever.

Installing

- Check seal seat in transmission housing for damage; rework if necessary.
- Coat outer circumference and sealing lip of sealing ring with ATF.

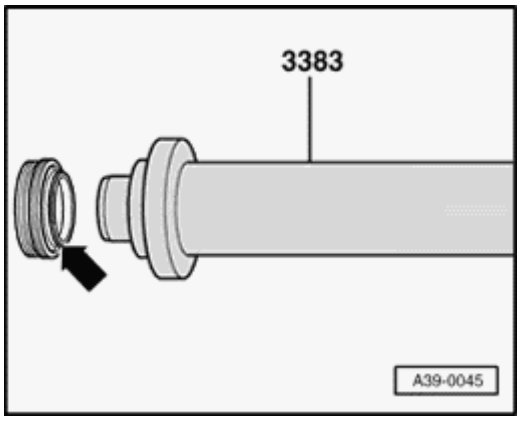


Fig. 246: Placing Seal Onto Press Piece 3383 With Protruding Sealing Lip On Seal Facing Toward Tool
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide seal onto double sealing ring installer 3383 so that the projecting sealing lip (arrow) of sealing ring faces tool.

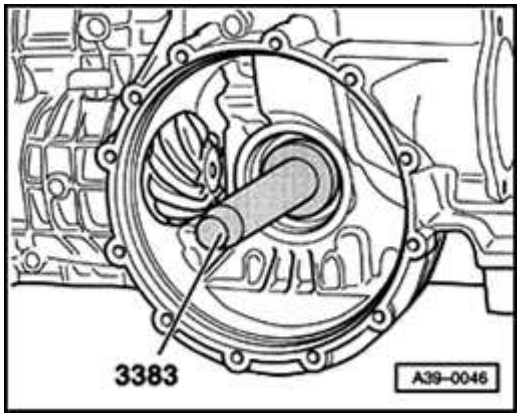


Fig. 247: Driving In New Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive in new sealing ring to stop.
- Install left drive flange --> **Sealing ring and grooved ball bearing for left drive flange, replacing**.

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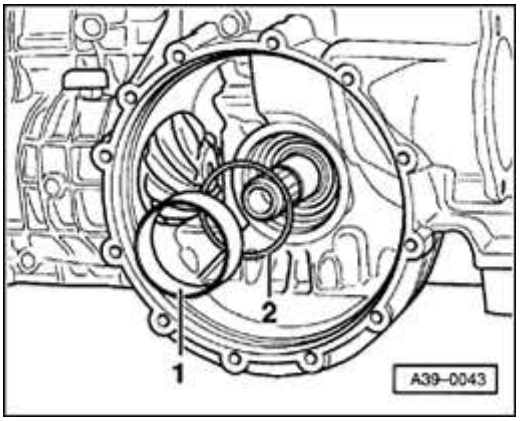


Fig. 248: Identifying Tapered Roller Bearing Outer Race For Differential And Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert adjustment shim - **2** - and tapered roller bearing outer race for differential - **1** - into transmission housing up to stop by hand.
- Insert differential into transmission housing.
- Install cover for front final drive.
- Install right drive flange.

- Install transmission support --> **Right and left transmission mounts, removing and installing**.
- Install right front exhaust pipe. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Install drive axle. --> **40 - FRONT SUSPENSION**
- Top-up and check gear oil in front final drive --> **Gear oil in front final drive, checking**.

Tightening torques

Component	Nm
Cover for front final drive to transmission housing	23
Mounting bracket for left drive flange at transmission	23

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Drive flange to transmission	23
Heat shield for driveshaft to transmission	23

Seal for front final drive, replacing

Special tools, testers and auxiliary items required

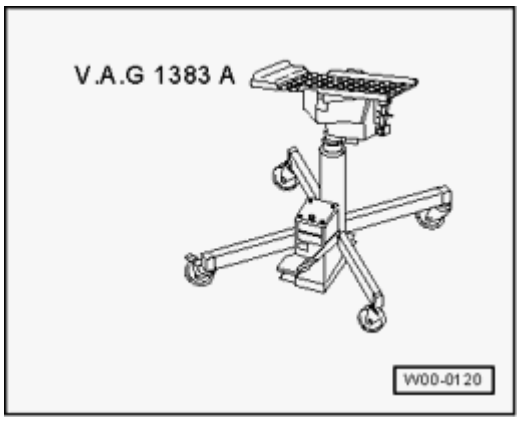


Fig. 249: Identifying Engine/Transmission Jack V.A.G. 1383 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission jack VAG1383 with plate VAG1359/2

Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

Removing

- Remove front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH

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- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

- Remove heat shield for selector lever cable, if installed.
- Remove center differential --> **Center differential, removing and installing**.

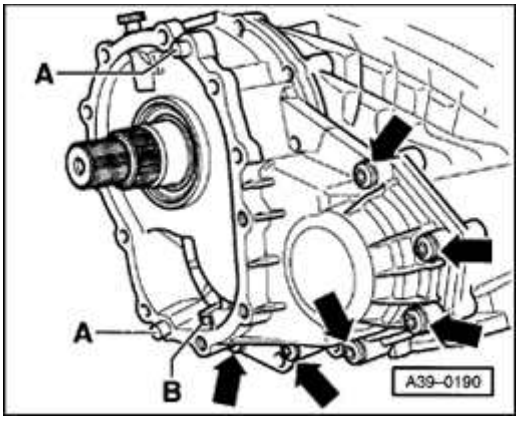


Fig. 250: Seal In Front Final Drive Intermediate Flange, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts (arrows) at intermediate flange for front final drive.

CAUTION:

- **Slowly and carefully remove cover for front final drive/intermediate flange from transmission housing. The spur gears can otherwise fall out of the transmission.**
- **Do not reinstall spur gears that have fallen to the ground. The transmission must be swapped in this case.**

- Lift off cover i.e. intermediate flange for front final drive.

NOTE:

- **Do not remove spur gears for front final drive. Secure spur gears so they do not fall out.**
- **If the spur gears for front final drive were removed, the wheel marking must face outward (away from transmission) for re installation.**

Installing

Installation is reverse of removal, noting the following:

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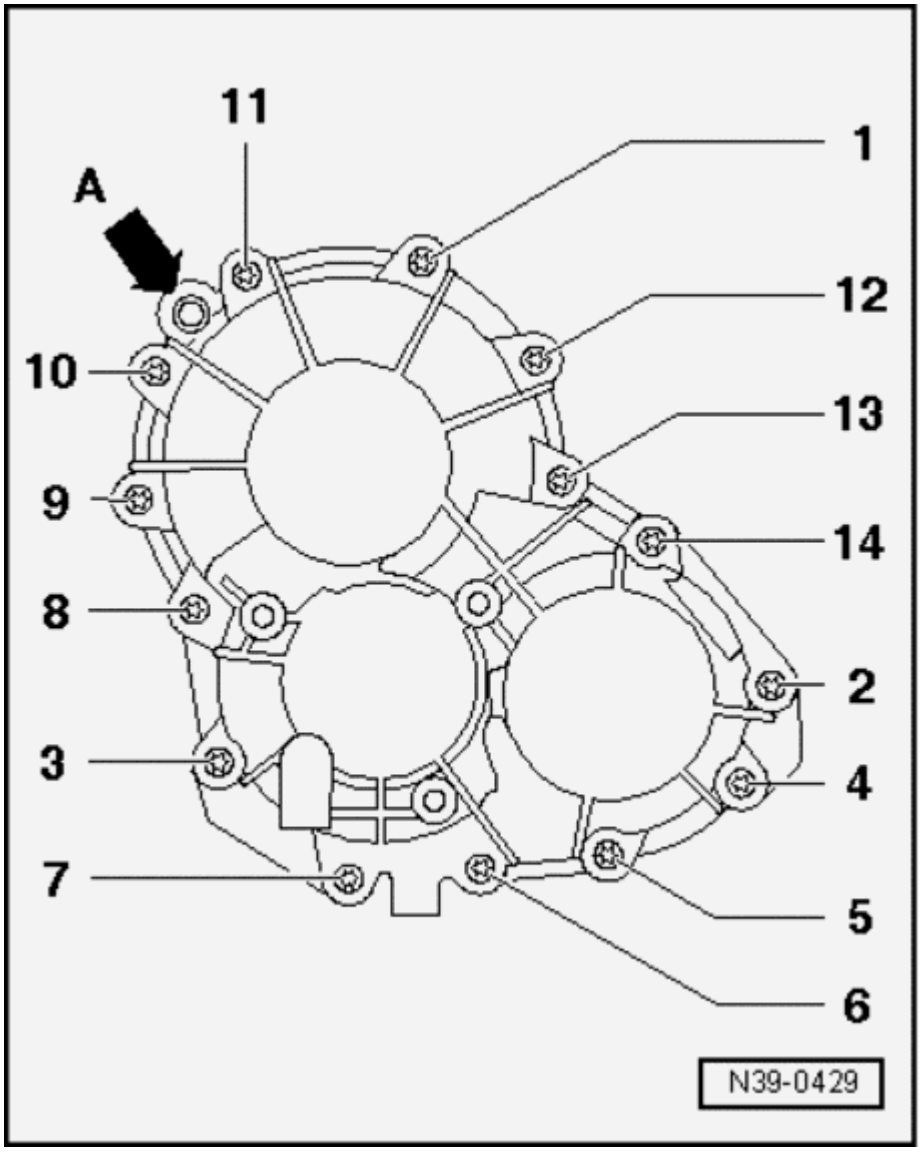


Fig. 251: Identifying Alignment Sleeve And Front Final Drive Cover Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Make sure centering sleeve - **A** - is correctly seated before installing.
- Install gasket
- Set on cover i.e. intermediate flange for front final drive.

NOTE:

- **If installing the intermediate flange to the output shaft carelessly, the sealing lips of the sealing ring can be damaged.**

Tightening sequence:

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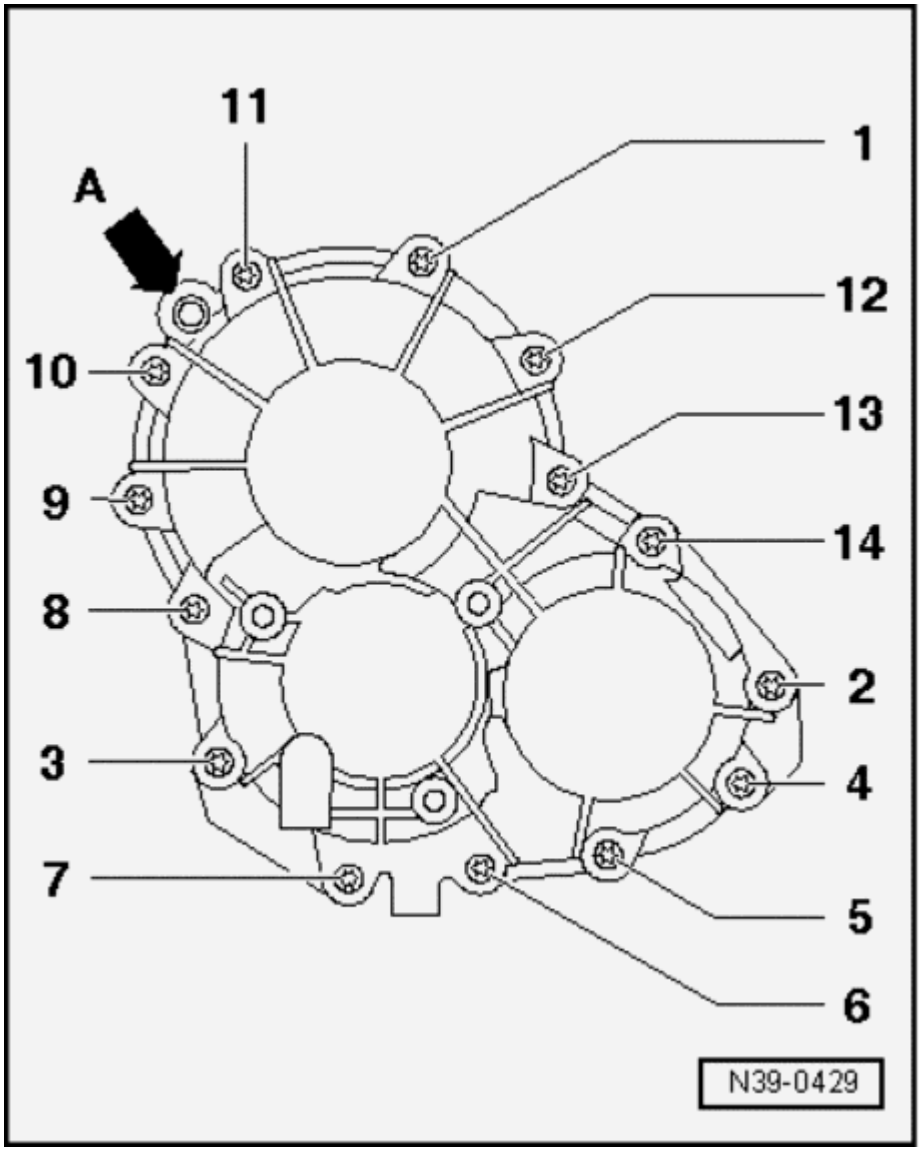


Fig. 252: Identifying Alignment Sleeve And Front Final Drive Cover Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 1. Stage: Tighten bolts - **1** - to - **3** - by hand

NOTE:

- **When tightening bolts by hand, make sure the housing gap between cover and transmission housing decreases evenly around circumference.**
- **2. Stage: Tighten bolts - 1 - to - 14 - in specified sequence to tightening torque**

- Check ATF level and top off --> **ATF level, checking** onward.
- Install center differential.

Tightening torques

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Component	Nm
Cover for front final drive to transmission housing	23
Intermediate flange for front final drive to transmission housing	23
Center differential to transmission housing	23

GEAR OIL IN CENTER DIFFERENTIAL, CHECKING AND TOPPING OFF

Gear oil in center differential, checking and topping off

Special tools, testers and auxiliary items required

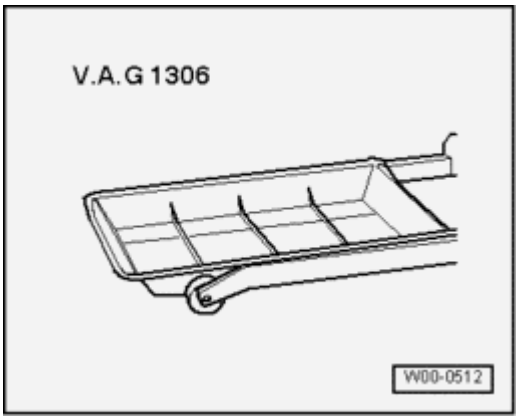


Fig. 253: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

Procedure

- Drive vehicle onto a 4-column lift or over a work pit.

NOTE:

- **The vehicle must be on a level surface.**

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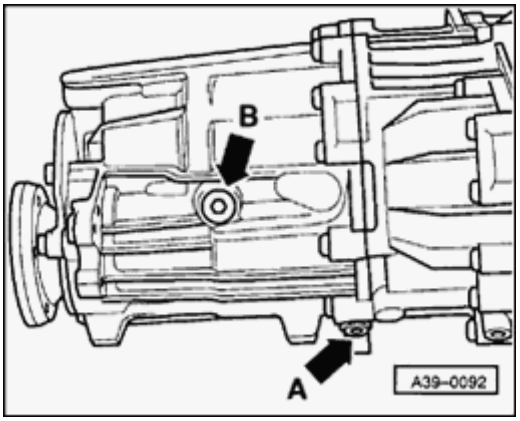


Fig. 254: Location Of Locking Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If necessary, loosen or remove relevant parts of the exhaust system to gain access to oil filler plug (arrow B). -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Place drip tray VAG1306 underneath.
- Remove oil filler plug (arrow B).

Oil level is correct when the final drive is filled up to lower edge of oil filler hole.

- Let excessive gear oil drain or top up gear oil --> **Gear oil in center differential, changing or topping up after repair**.
- Always replace oil filler plug.
- Thread in new oil filler plug and tighten to 35 Nm.
- Secure or reinstall exhaust system free of stress. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE

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MECHANICAL, ENGINE CODE(S): AVK, BGN

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

GEAR OIL IN CENTER DIFFERENTIAL, CHANGING OR TOPPING UP AFTER REPAIR

Gear oil in center differential, changing or topping up after repair

Special tools, testers and auxiliary items required

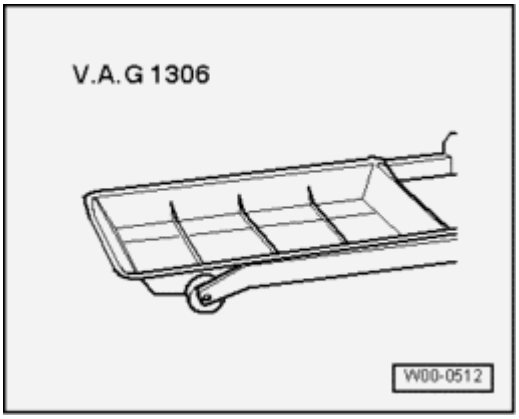


Fig. 255: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

Procedure

- Drive vehicle onto a 4-column lift or over a work pit.

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NOTE:

- **The vehicle must be on a level surface.**

Drain gear oil

- Place drip tray VAG1306 underneath.

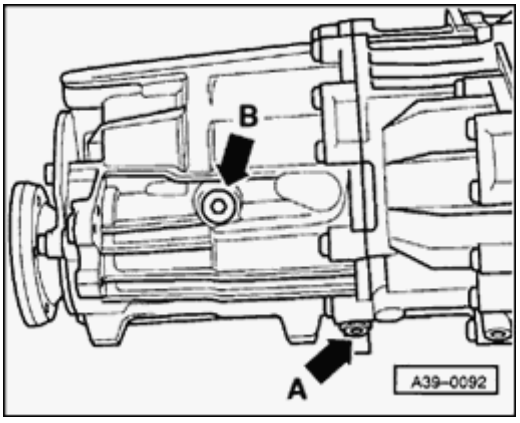


Fig. 256: Location Of Locking Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Removing drain plug (arrow A) and draining gear oil.
- Always replace drain plug.
- Thread in new drain plug (arrow A) again and tighten to 20 Nm.

Filling up gear oil

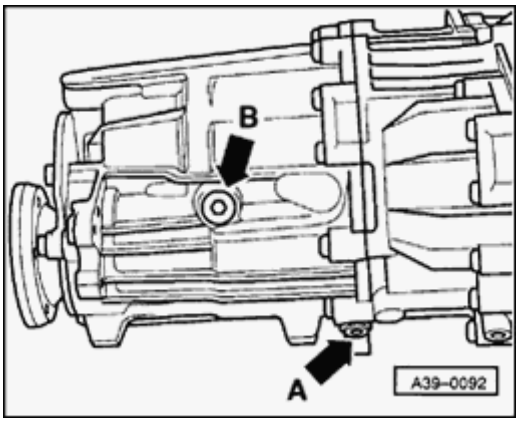


Fig. 257: Location Of Locking Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If necessary, loosen or remove relevant parts of the exhaust system to gain access to oil filler plug (arrow B). -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB

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- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
- **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

NOTE:

- **There is a distinction made between two cases:**
- **A - Center differential was not removed.**
- **B - Center differential was removed**

A - Center differential was not removed (e.g. after removing and installing drive flange/drive shaft)

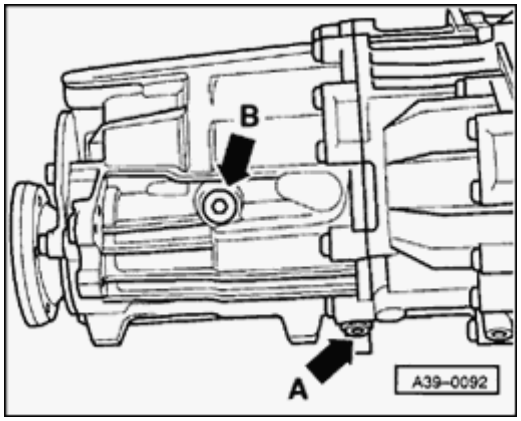


Fig. 258: Location Of Locking Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove oil filler plug (arrow B).
- Top up transmission fluid to lower edge of oil filler hole. Specification and capacity **Center differential**.
- Thread in old oil filler plug and tighten to 35 Nm.

NOTE:

- **If it was necessary to loosen or remove the exhaust system, this must be re-secured or reinstalled for the road test. It must be removed and installed again for the final oil level check.**

- Road test vehicle (15 minutes pure driving).

NOTE:

- **During road test, gear oil enters output cover and Torsen differential; oil**

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level in center differential housing will drop.

- Fill transfer housing with gear oil and check oil level --> **Gear oil in center differential, checking and topping off**.

B - Center differential was removed and disassembled

- Add 200 ml. gear oil to output cover.
- Center differential, assembling and installing.

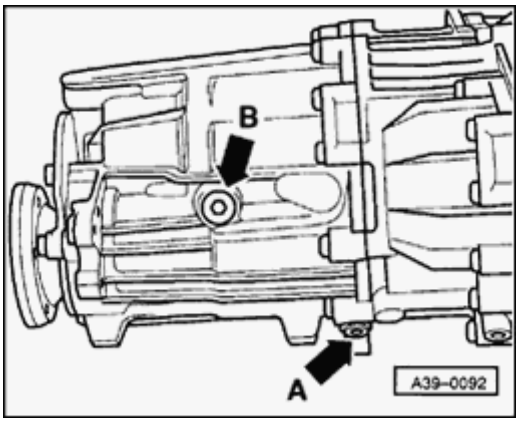


Fig. 259: Location Of Locking Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove oil filler plug (arrow B).
- Add 600 ml. gear oil to center differential housing.
- Always replace oil filler plug.
- Thread in new oil filler plug and tighten to 35 Nm.

NOTE:

- **Oil level does not need to be re-checked.**

All:

- Secure or re-install exhaust system free of stress. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE

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MECHANICAL, ENGINE CODE(S): BNS

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

CENTER DIFFERENTIAL, SERVICING

Center differential, servicing

Transmission installed

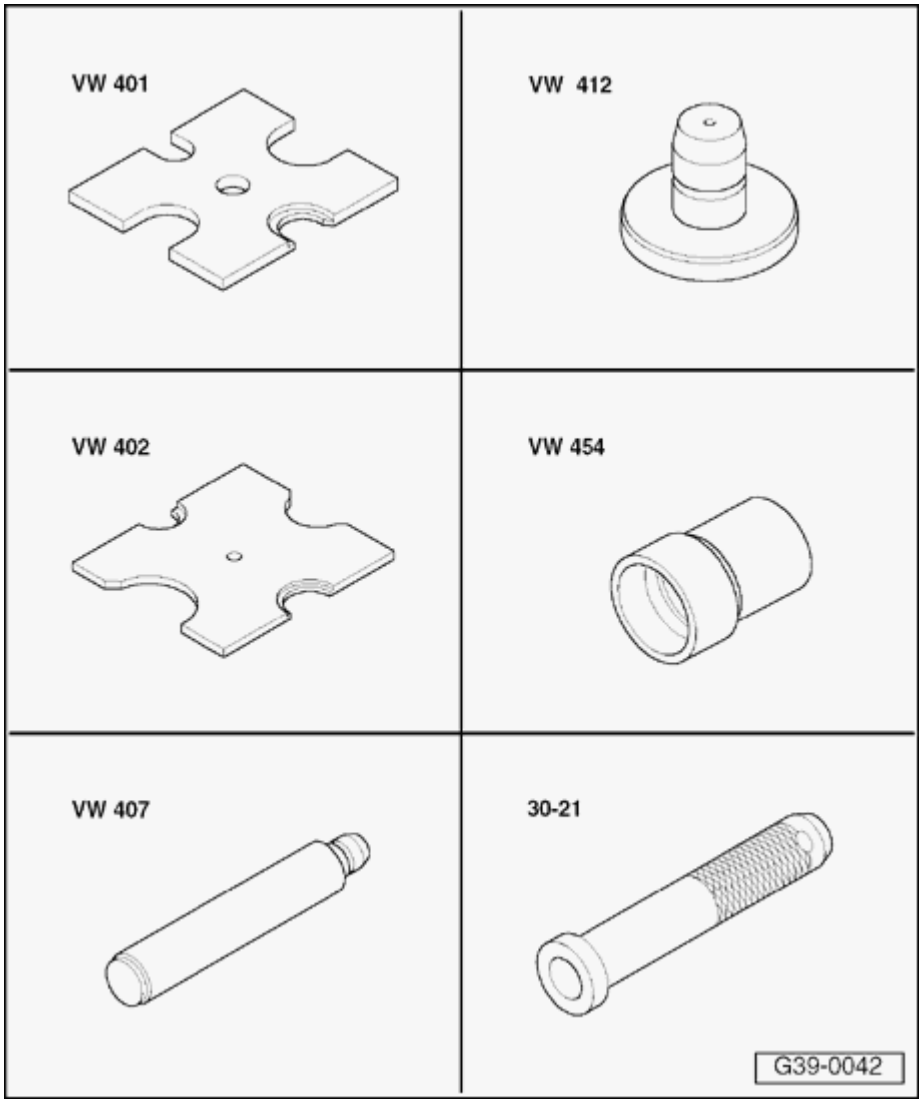


Fig. 260: Identifying Special Tools - Center Differential, Servicing (1 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Thrust plate VW401

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- Punch VW412
- Thrust plate VW402
- Thrust tube VW454

- Punch VW407
- Sleeve 3021

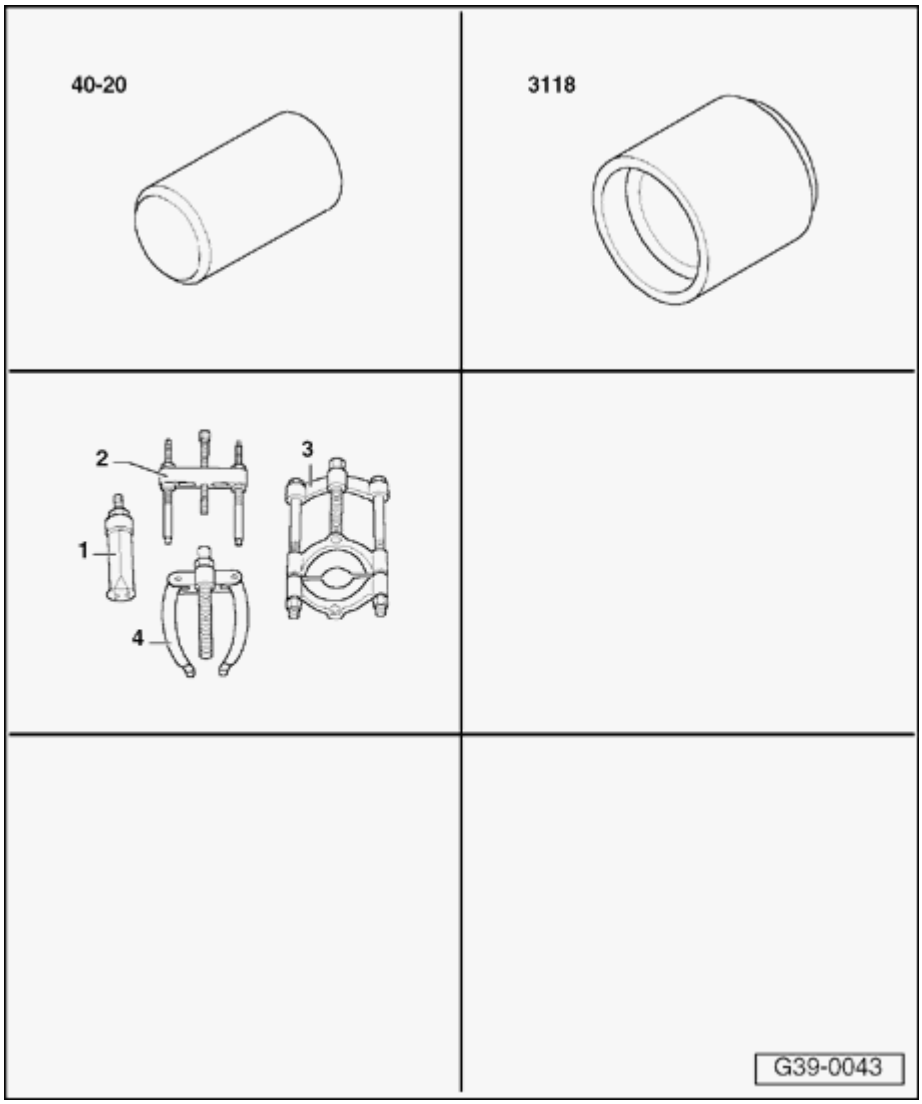


Fig. 261: Identifying Special Tools - Center Differential, Servicing (2 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Sleeve 40-20
- Press support 3118
- Item 3 Kukko 17/2 separating tool

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CAUTION: Do not run engine with the center differential removed or without gear oil and do not tow vehicle.

NOTE:

- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**
- **General repair notes --> Servicing notes.**

The parts listed in the following illustration can be removed with the transmission installed.

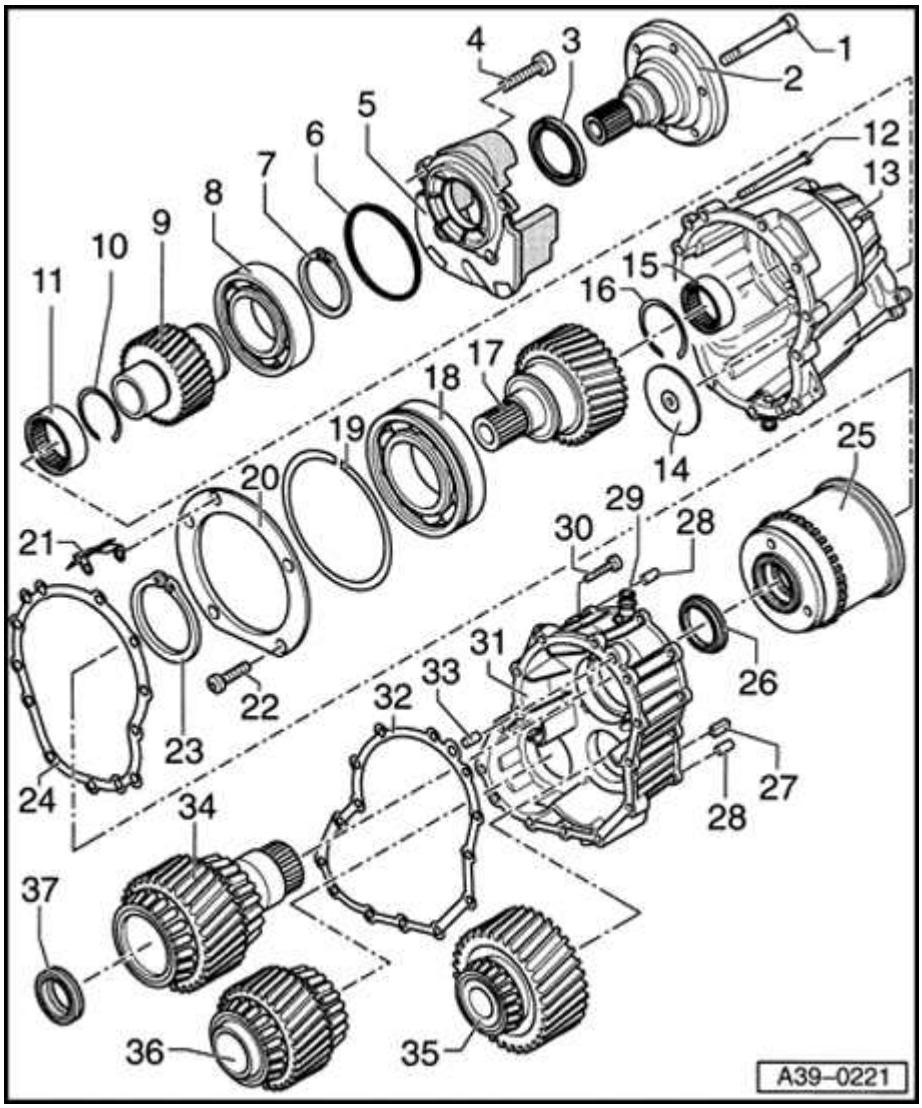


Fig. 262: Center Differential Remove/Install Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Socket head bolt- 25 Nm

2 - Output flange/driveshaft

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3 - Seal

- Always replace --> **O-ring for output flange/driveshaft, replacing**

4 - Bolt - 23 Nm

- 4x

5 - Housing cover

- With dampener

6 - O-ring

- Coat with transmission fluid

7 - Snap ring

8 - Grooved ball bearing

- Pressing off **Press off grooved ball bearing for spur gear 1**
- Pressing on **Press on grooved ball bearing for spur gear 1**

9 - Spur gear 1

- For rear gear set

10 - Snap ring

11 - Needle bearing

- Only remove for replacement
- To replace, heat up transfer gear housing to approx. 100 ° C and drive out needle bearing toward rear using drift (Warning! Wear protective gloves)
- Drive in to stop using 30-21 sleeve

12 - Bolt - 23 Nm

- Loosen or tighten in stages and in diagonal sequence

13 - Center differential housing

14 - Tension nut

15 - Needle bearing

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- Only remove for replacement
- Always replace --> **Needle bearing for spur gear 2, replacing**

16 - Snap ring

17 - Spur gear 2

- For rear gear set

18 - Grooved ball bearing

- Pressing off **Press off grooved ball bearing for spur gear 2**
- Pressing on **Press on grooved ball bearing for spur gear 2**

19 - Snap ring

20 - Washer

21 - Alignment plate

22 - Bolt - 10 Nm

23 - Snap ring

24 - Gasket

- Always replace --> **Center differential, removing and installing**

25 - Torsen differential

- If damaged replace as complete unit
- Removing and installing --> **Center differential, removing and installing**

26 - Seal

- Always replace --> **Sealing ring in intermediate flange for front final drive, replacing**

27 - Magnet

- Removing and installing --> **Center differential, removing and installing**

28 - Bushing

- 2x

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29 - Breather

- For transfer gear
- With cap installed
- Installation position: Without cover, breather must project 10 - 11 mm out of housing

30 - Bolt - 23 Nm

- Observe tightening sequence **Tightening sequence:**

31 - Intermediate flange for front final drive

32 - Gasket

- Always replace --> **Seal for front final drive, replacing**

33 - Bushing

34 - Drive pinion

- For front final drive
- Removing and installing --> **Sealing ring in drive pinion, replacing**

35 - Intermediate pinion

- For front final drive
- Installation position: gear identification faces toward transfer gear

36 - Output pinion

- For front final drive
- Installation position: gear identification faces toward transfer gear

37 - Seal

- Always replace --> **Sealing ring in drive pinion, replacing**

Press off grooved ball bearing for spur gear 1

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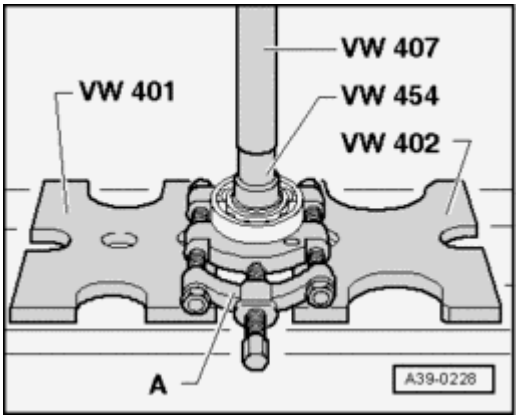


Fig. 263: Pressing Off Grooved Ball Bearing For Spur Gear 1
Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Separating device 22-115 mm, e.g. Kukko 17/2 separating tool

Press on grooved ball bearing for spur gear 1

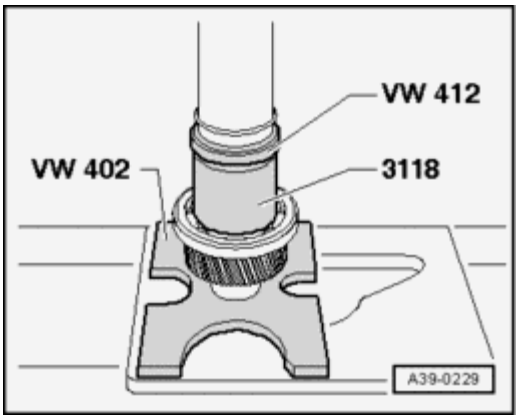
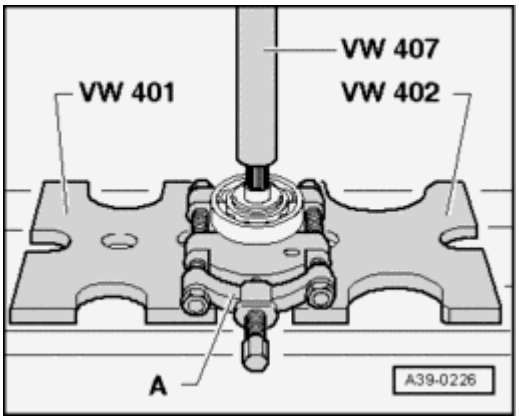


Fig. 264: Pressing On Grooved Ball Bearing For Spur Gear 1
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Press off grooved ball bearing for spur gear 2



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Fig. 265: Pressing Off Grooved Ball Bearing For Spur Gear 2
Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Separating device 22-115 mm, e.g. Kukko 17/2 separating tool

Press on grooved ball bearing for spur gear 2

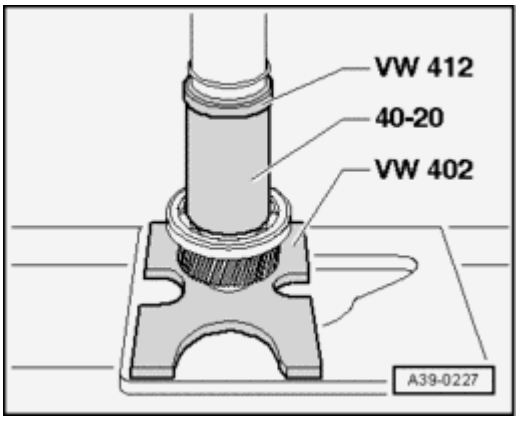


Fig. 266: Pressing On Grooved Ball Bearing For Spur Gear 2
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Center differential, removing and installing

(Transmission installed)

Special tools, testers and auxiliary items required

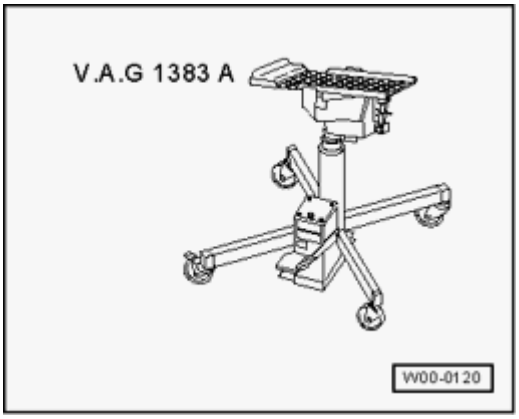


Fig. 267: Identifying Engine/Transmission Jack V.A.G. 1383 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission lifter VAG1383A with universal transmission holder VAG1359/2

Additional information

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- **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
- **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
- **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
- **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
- **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
- **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

- **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
- **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

Removing

- Remove front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

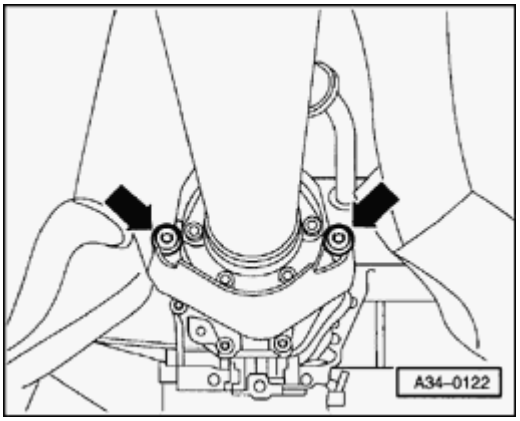


Fig. 268: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for driveshaft from cover for Torsen differential (arrows).

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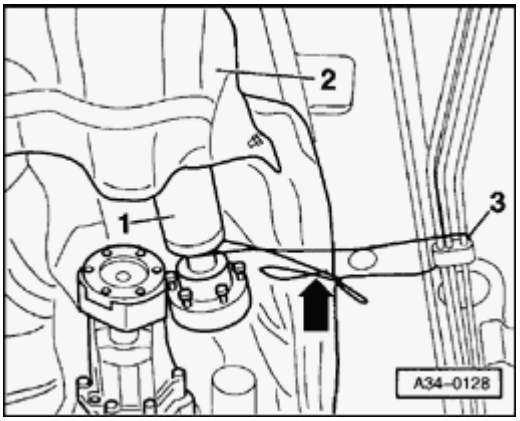


Fig. 269: Securing Driveshaft To Fuel Pipe Bracket With Wire
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt driveshaft - **1** - from transmission and let rest on heat shield - **2** - -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Secure driveshaft using wire (arrow) to bracket - **3** - of fuel lines or support driveshaft using engine/transmission hoist VAG1383A.
- Drain center differential gear oil --> **Gear oil in center differential, changing or topping up after repair**.

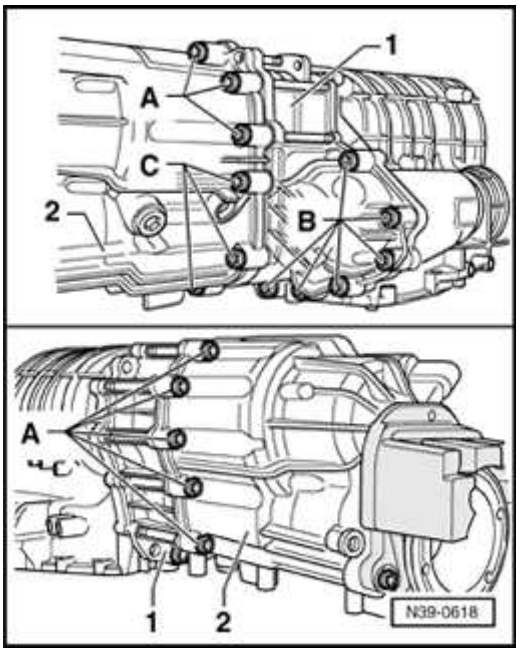


Fig. 270: Transfer Case, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen mounting bolts - **A** - and - **C** - for transfer housing - **2** - in diagonal sequence and remove.
- Do not remove bolts - **B** -.

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CAUTION: Carefully pull center differential housing off of transmission toward rear. The Torsen differential could otherwise fall out of the transmission.

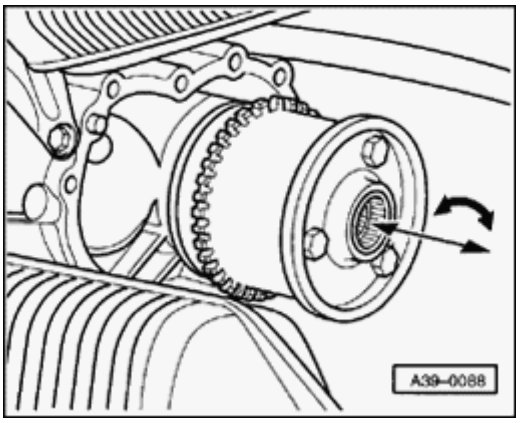


Fig. 271: Pulling Torsen Differential From Output Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull Torsen differential off output shaft toward rear.

Installing

Installation is reverse of removal, noting the following:

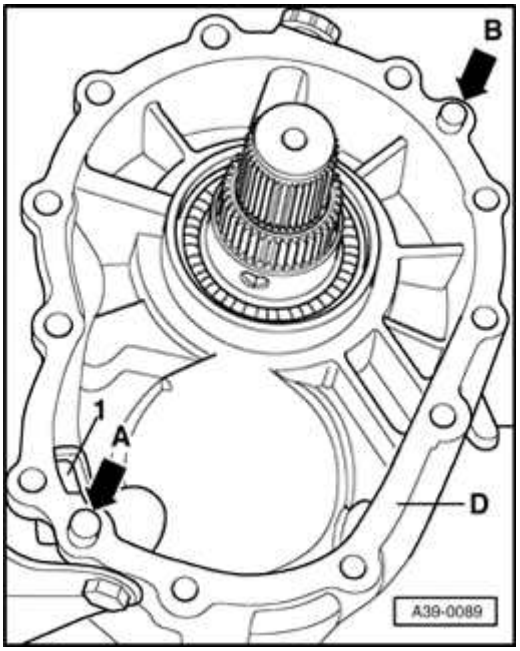


Fig. 272: Location Of Alignment Pins -A/B-, Magnet and Seal Surface
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check for presence of dowel sleeves (arrows - **A** - and - **B** -).

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- Install gasket

NOTE:

- **Lightly coat sealing surface -D- with gear oil to prevent the seal from slipping.**

- Slide cleaned magnets into cast holding pocket - **1** - in intermediate flange.
- Add 200 ml. gear oil to output housing (comparable to gear oil, topping up on removed and disassembled center differential).

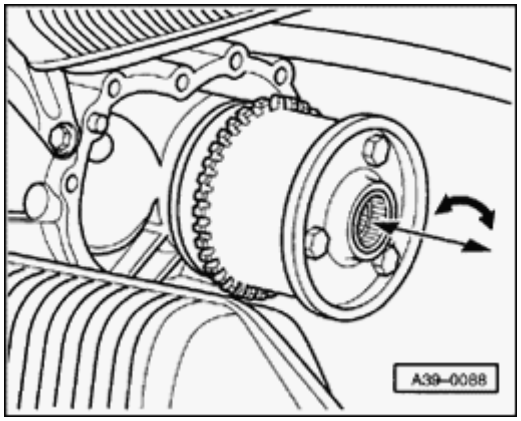


Fig. 273: Pulling Torsen Differential From Output Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install Torsen differential onto splines of output shaft and bottom spur gear while turning slowly.
- Check whether installed Torsen differential can be turned by hand.

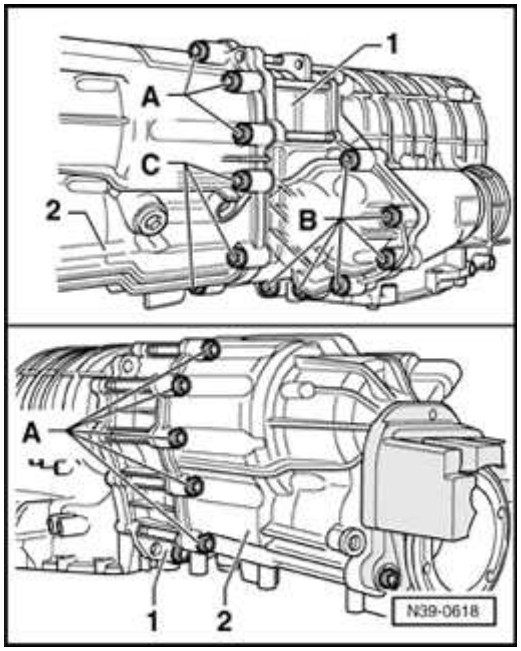


Fig. 274: Transfer Case, Removing And Installing

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install fully assembled transfer housing with installed spur gears and drive flange/drive shaft onto transmission flange.
- Insert bolts - **A** - and - **C** - for transfer housing - **2** - and tighten to final tightening torque in diagonal sequence in several stages.
- Bolt driveshaft to output flange/driveshaft -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Install front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Fill transfer housing with gear oil and check oil level --> **Gear oil in center differential, changing or topping up after repair**.

Tightening torques

Component	Nm
Center differential housing to transmission housing	23
Heat shield for driveshaft to transmission	23

O-ring for output flange/driveshaft, replacing

(Transmission installed)

Special tools, testers and auxiliary items required

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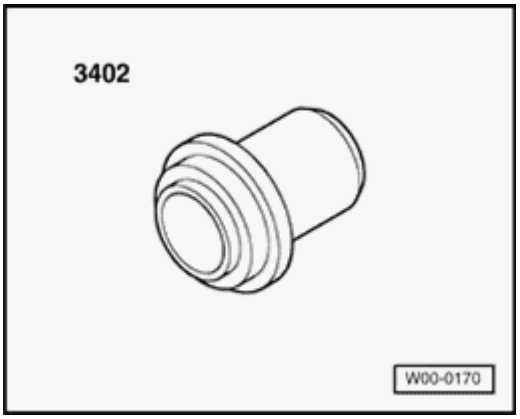


Fig. 275: Pressure Piece 3402
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pressure piece 3402

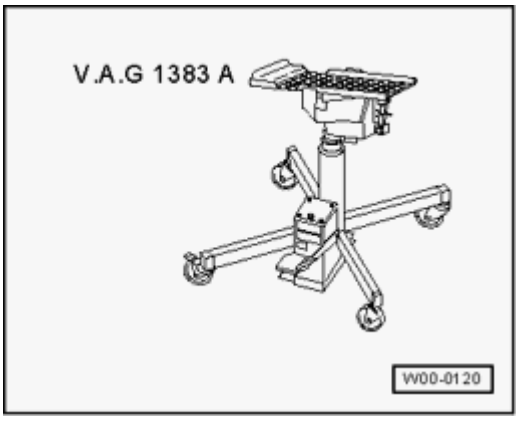


Fig. 276: Identifying Engine/Transmission Jack V.A.G. 1383 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission lifter VAG1383A with Universal transmission holder VAG1359/2

Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**
-
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

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Removing

- Remove front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

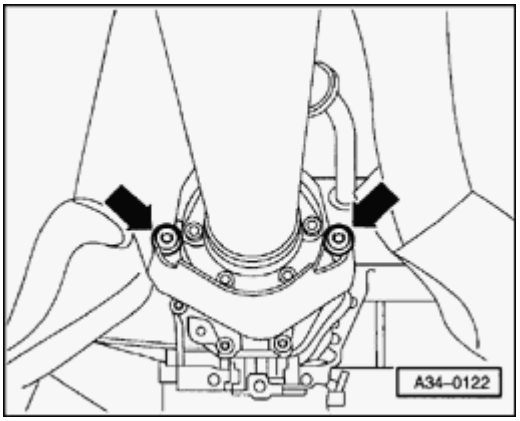


Fig. 277: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for driveshaft from cover for Torsen differential (arrows).

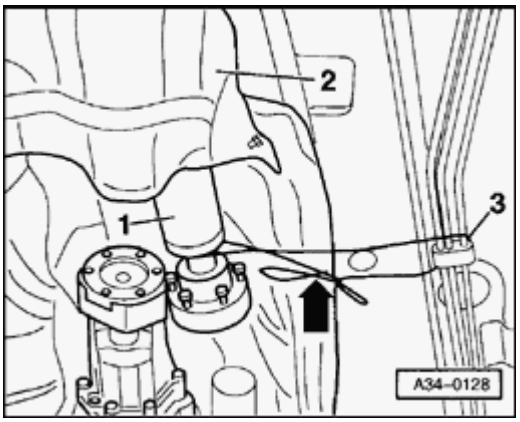


Fig. 278: Securing Driveshaft To Fuel Pipe Bracket With Wire

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt driveshaft - **1** - from transmission and let rest on heat shield - **2** - -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Secure driveshaft using wire (arrow) to bracket - **3** - of fuel lines or support driveshaft using engine/transmission hoist VAG1383A.
- Drain center differential gear oil --> **Gear oil in center differential, changing or topping up after repair**.

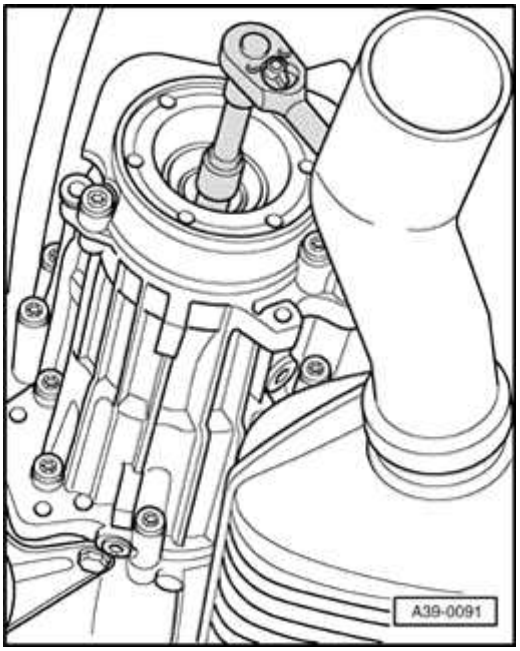


Fig. 279: Removing/Installing Flanged Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt output flange driveshaft while securing output flange/driveshaft against turning using a drift.
- Pull out output flange/driveshaft.

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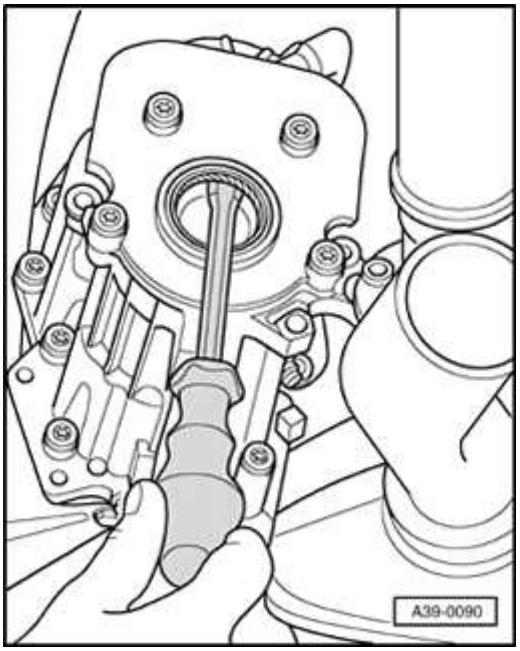


Fig. 280: Removing O-Ring Using Appropriate Screwdriver
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove O-ring using appropriate screwdriver.

Installing

Installation is reverse of removal, noting the following:

- Coat outer edge and sealing lip of oil seal with gear oil.

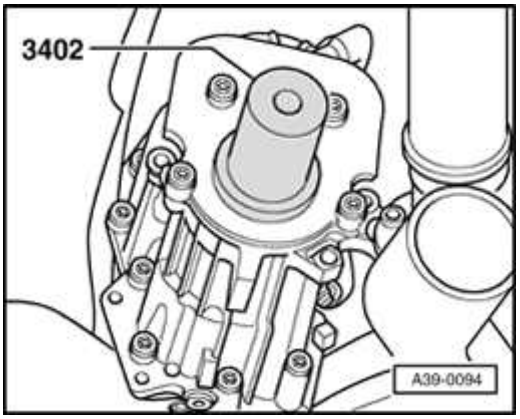


Fig. 281: Driving In Sealing Ring To Stop Using Pressure Piece 3402
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive O-ring in to stop using pressure piece 3402.
- Fill area between sealing lip and dust lip halfway with sealing grease G 052 128 A1.
- Secure output flange/driveshaft with socket-head bolt.

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- Bolt driveshaft to output flange/driveshaft -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Install front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Fill transfer housing with gear oil and check oil level --> **Gear oil in center differential, changing or topping up after repair**.

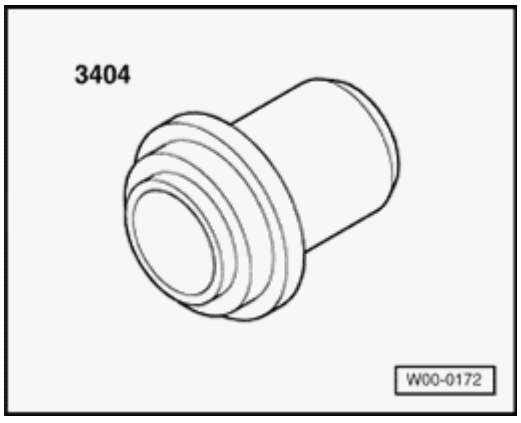
Tightening torques

Component	Nm
Socket-head bolt for output flange/driveshaft, rear	25
Heat shield for driveshaft to transmission	23

Sealing ring in intermediate flange for front final drive, replacing

(Transmission installed)

Special tools, testers and auxiliary items required



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Fig. 282: Thrust Piece 3404
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Thrust piece 3404

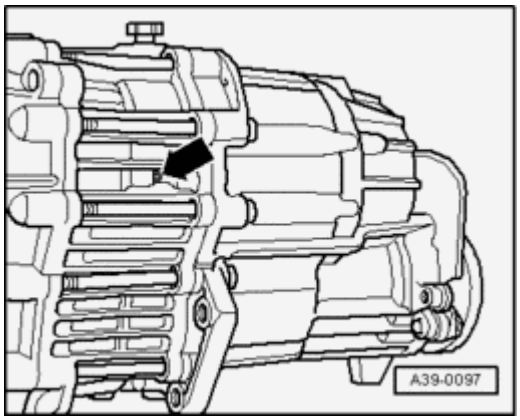


Fig. 283: Oil Leak Inspection Opening For Shaft Seal In Drive Pinion And Shaft Seal In Intermediate Flange
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **An inspection opening is provided on the left side of the intermediate flange to check for oil leaks (arrow) for the sealing ring in drive pinion and the sealing ring in intermediate flange.**
- **If oil escapes at this oil leak inspection opening, this double sealing ring must be replaced.**

Removing

- Remove center differential --> **Center differential, removing and installing**.
- Removing intermediate flange for front final drive --> **Seal for front final drive, replacing**.

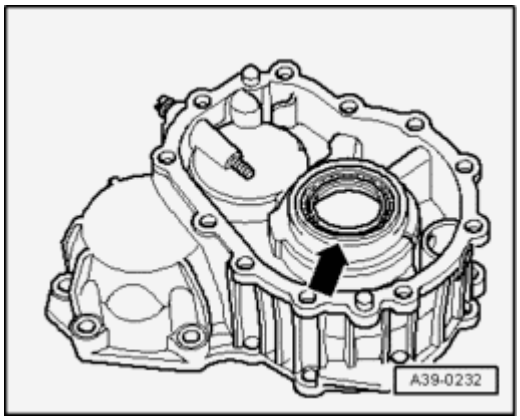


Fig. 284: Identifying Drive Shaft Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Drive out sealing ring (arrow) in direction of transfer gear using a mandrel.

Installing

Installation is reverse of removal, noting the following:

- Check seal seat in intermediate flange for damage; rework if necessary.
- Coat outer edge and sealing lip of oil seal with gear oil.

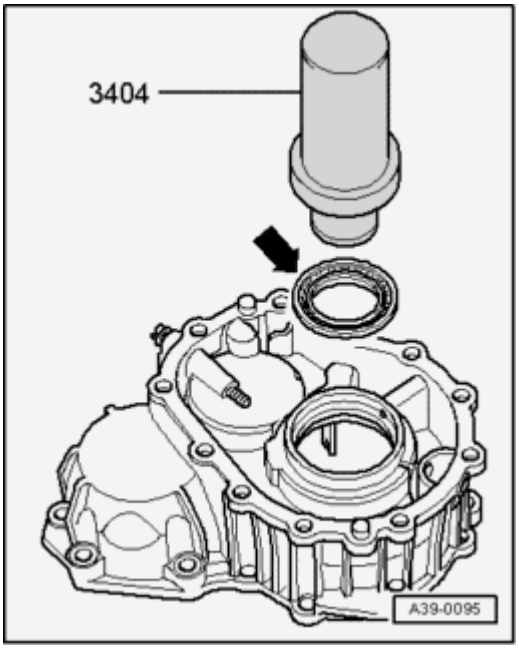


Fig. 285: Slide Shaft Seal Onto Thrust Piece 3404
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide sealing ring onto thrust piece 3404 so that the larger and projecting outer ring (arrow) of sealing ring faces tool.
- Drive in sealing ring up to thrust piece 3404 stop.

NOTE:

- **If installing the intermediate flange to the output shaft carelessly, the sealing lip of the sealing ring can be damaged.**

- Fill area between sealing lip and dust lip halfway with sealing grease G 052 128 A1.
- Installing intermediate flange for front final drive --> **Seal for front final drive, replacing**.
- Install center differential.

Sealing ring in drive pinion, replacing

(Transmission installed)

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Special tools, testers and auxiliary items required

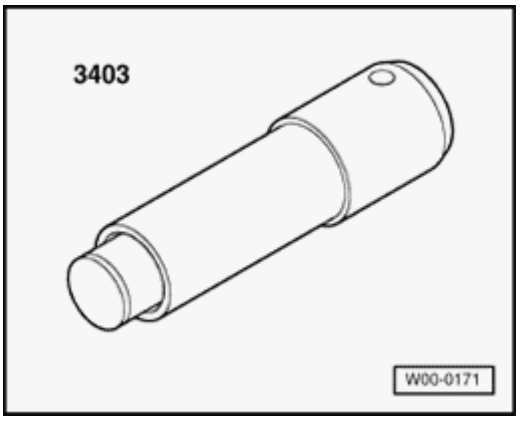


Fig. 286: Thrust Piece 3403
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Thrust piece 3403

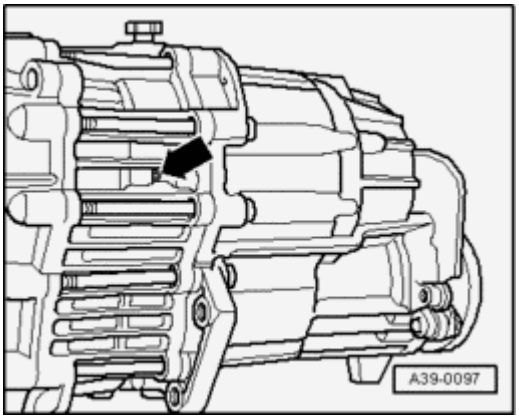


Fig. 287: Oil Leak Inspection Opening For Shaft Seal In Drive Pinion And Shaft Seal In Intermediate Flange
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **An inspection opening is provided on the left side of the intermediate flange to check for oil leaks (arrow) for the sealing ring in drive pinion and the sealing ring in intermediate flange.**
- **If oil escapes at this inspection opening, this sealing ring must be replaced.**

Removing

- Remove center differential --> **Center differential, removing and installing**.
- Removing intermediate flange for front final drive --> **Seal for front final drive, replacing**.

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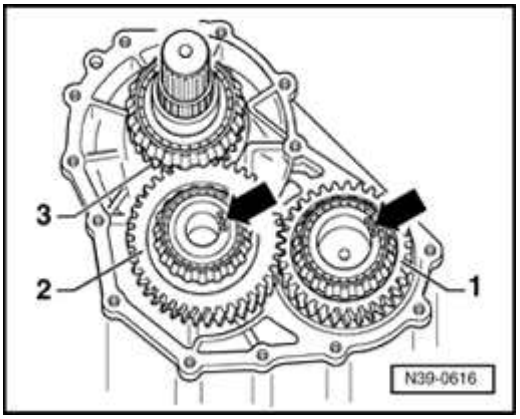


Fig. 288: Identifying Output Pinion, Intermediate Pinion And Drive Pinion
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove intermediate pinion - **2** - for front final drive from transfer housing.
- Pull drive pinion - **3** - from output shaft.

CAUTION: Do not reinstall spur gears that have fallen to the ground. The transmission must be replaced in this case.

Output pinion - **1** - remains on the drive pinion.

- Drive out sealing ring using drift.

Installing

Installation is reverse of removal, noting the following:

- Coat outer edge and sealing lip of oil seal with gear oil.

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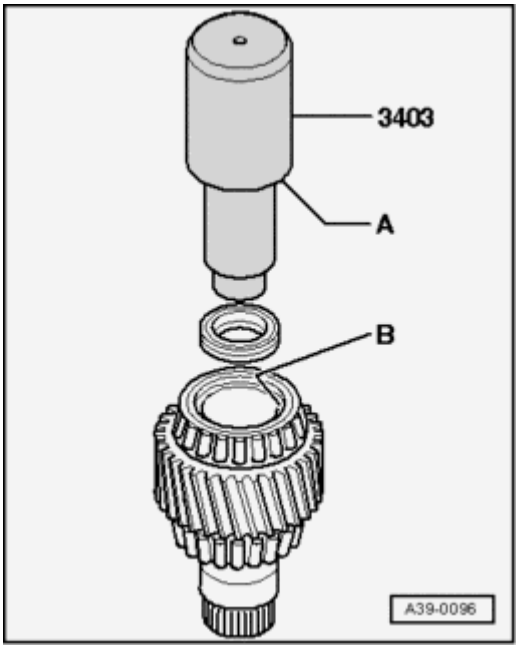


Fig. 289: Installing Driveshaft Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide sealing ring onto thrust piece 3403.
- Drive sealing ring in up to thrust piece 3403 stop.

Contact surface - **A** - of thrust piece must lie against drive pinion - **B** -.

- Fill area between sealing lip and dust lip halfway with sealing grease G 052 128 A1.

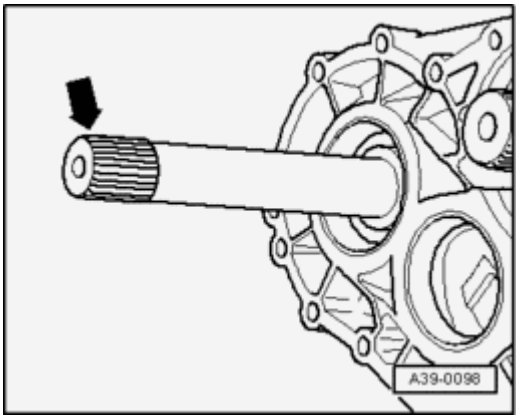


Fig. 290: Identifying Input Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Completely cover splines on end of shaft (arrow) with insulating tape without creasing or overlapping the tape, to prevent damage to sealing ring when sliding on drive pinion.
- Install drive pinion on center of output shaft. (Installation position)

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NOTE:

- **If installing the intermediate flange on the output shaft carelessly, the sealing lips of the sealing ring can be damaged.**

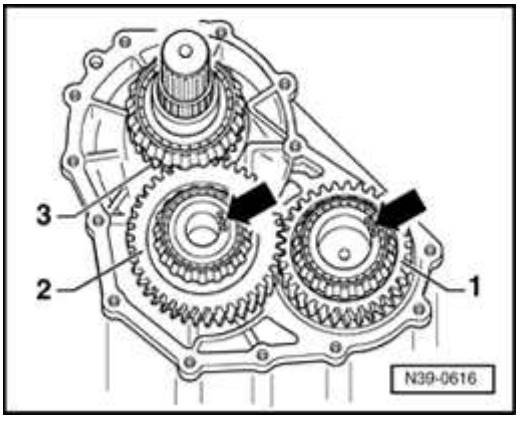


Fig. 291: Identifying Output Pinion, Intermediate Pinion And Drive Pinion
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide drive pinion - **3** - together with the intermediate pinion - **2** - into final drive housing up to stop (tapered roller bearing).

Observe installation position of spur gears (pinion):

Wheel identification (arrows) point outward, away from final drive.

- Installing intermediate flange for front final drive --> **Seal for front final drive, replacing**.
- Install center differential.

Needle bearing for spur gear 2, replacing

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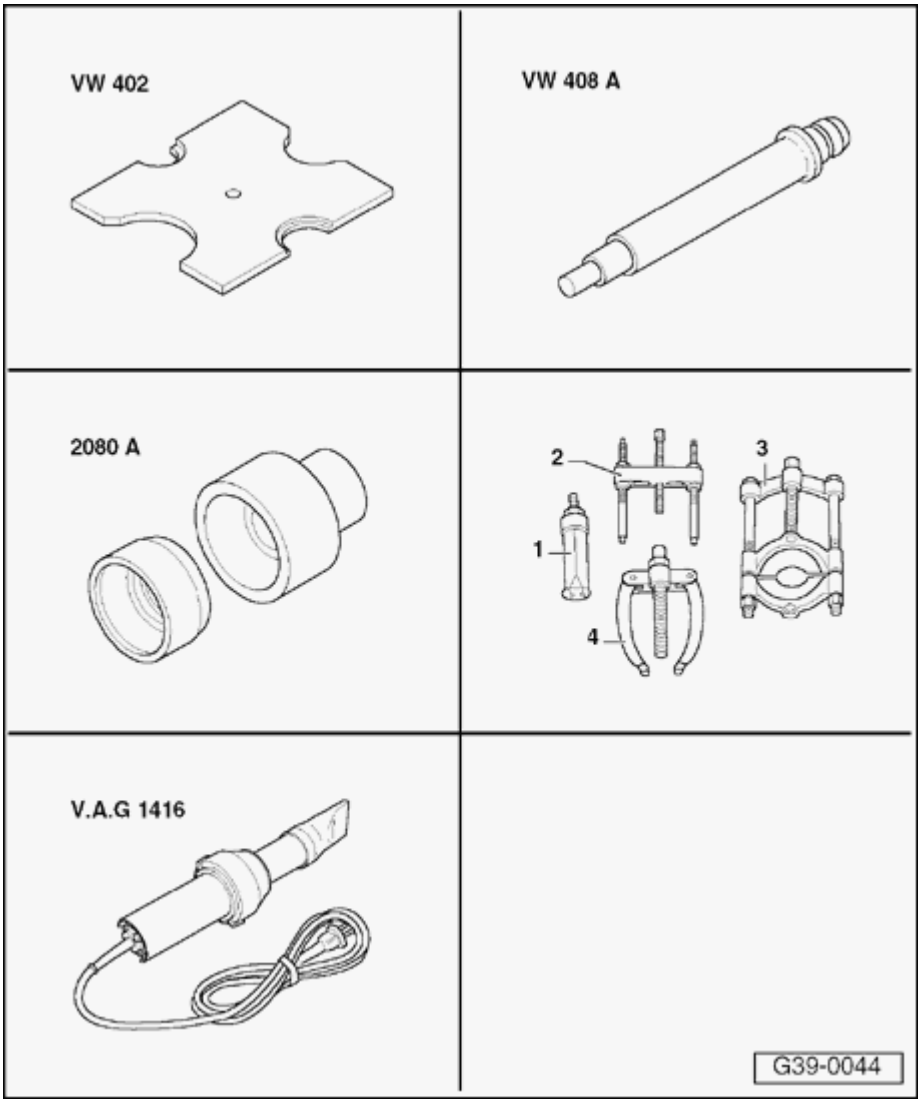


Fig. 292: Identifying Special Tools - Needle Bearing For Spur Gear 2, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Thrust plate VW402
- Punch VW408A
- Press sleeve for sleeve 2080A
- Item 1 Kukko 21/4 extractor
- Item 3 Kukko 22/1 support
- Hot air blower VAG1416

Removing

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- Remove center differential --> **Center differential, removing and installing**.

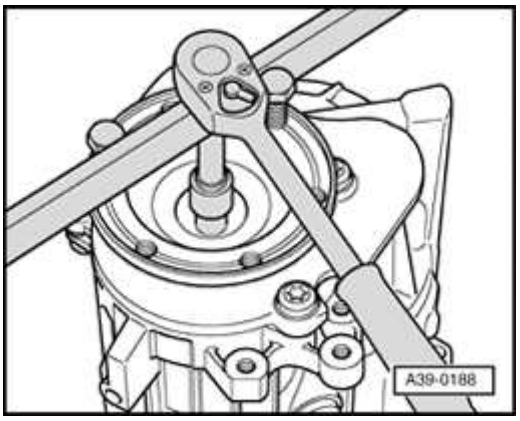


Fig. 293: Unbolting Rear Flanged Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt rear output flange/driveshaft while securing output flange/driveshaft against turning.

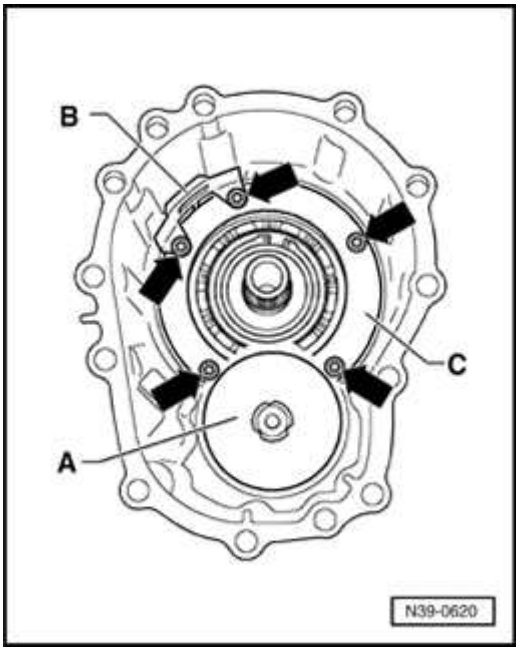


Fig. 294: Identifying Tension Nut, Guide Plate And Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull tension nut - **A** - out of spur gear shaft.
- Remove bolts (arrows).
- Remove guide plate - **B** - and shim - **C** -.
- Remove securing ring for securing grooved ball bearing in center differential housing

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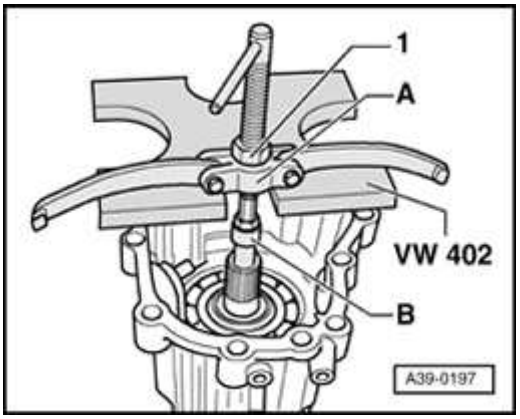


Fig. 295: Needle Bearing For Spur Gear -2, Removing (As Shown)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach support - **A** - at internal extractor - **B** - as shown and insert spur gear shaft - **2** -.

A - Support, e.g. 22/1 Kukko

B- extractor, e.g. 21/2 Kukko

- Support retainer - **A** - using thrust plate VW402 and pre-tension at nut - **1** - of retainer.
- Pull out spur gear and carefully remove upward.
- Remove needle bearing securing ring.

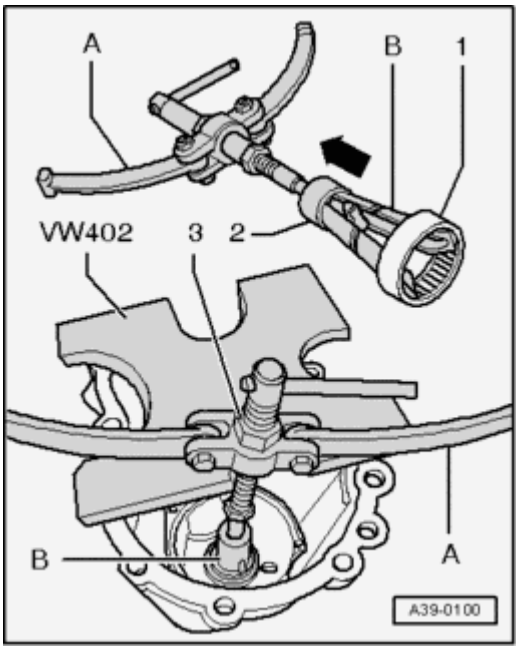


Fig. 296: Needle Bearing For Spur Gear 2, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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NOTE:

- **The upper part of the illustration shows how the pulling hooks of extractor - B - must be inserted into needle bearing.**

- Slide centering sleeve - **2** - of extractor - **B** - approx. 4 mm into direction of arrow in order to be able to open pulling hooks of extractor far enough.

A - Support, e.g. 22/1 Kukko

B- extractor, e.g. 21/2 Kukko

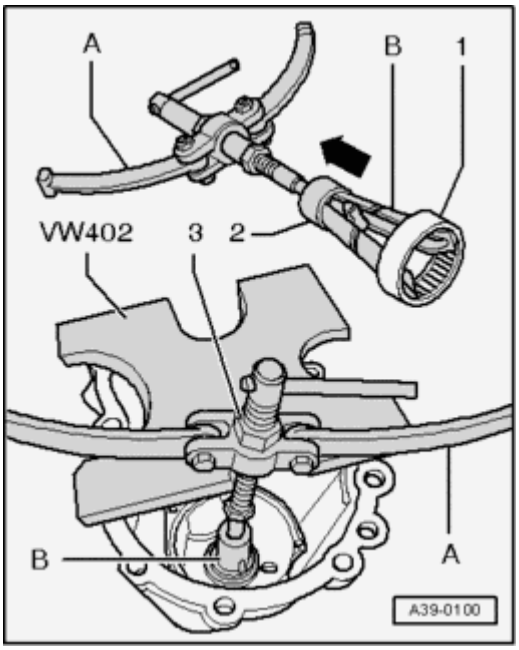


Fig. 297: Needle Bearing For Spur Gear 2, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Spread extractor - **B** - into upper lip of needle bearing - **1** - and secure extractor at nut.
- Install retainer - **A** - on extractor - **B** - as illustrated.
- Support retainer - **A** - using thrust plate VW402 and pre-tension at nut - **3** - of retainer.
- Using hot air blower, e.g. VAG141, quickly heat up outside of transfer housing in vicinity of needle bearing seat to approx. 80 to 100 ° C.

CAUTION: Wear protective gloves!

- Quickly pull out needle bearing.

Installing

Installation is the reverse of removal. Also carry out the following procedure.

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- Check needle bearing seat in transfer housing for damage, rework if necessary.
- Using hot air blower, e.g. VAG141, quickly heat up outside of transfer housing in vicinity of needle bearing seat to approx. 80 to 100 ° C.

CAUTION: Wear protective gloves!

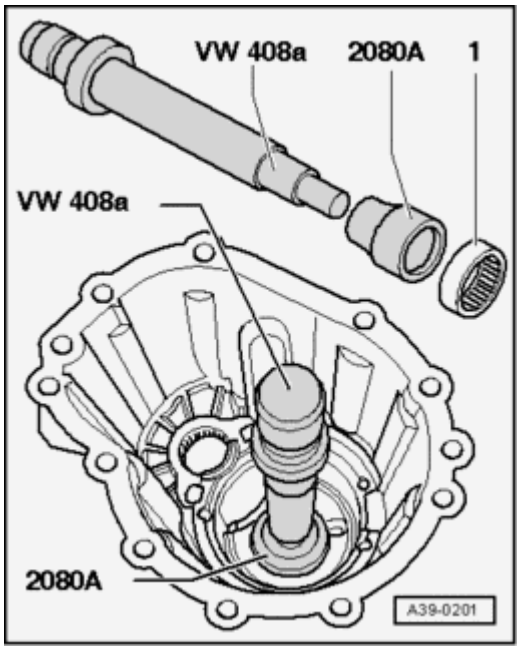


Fig. 298: Inserting New Needle Bearing And Set Sleeve 2080A Onto New Needle Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert new needle bearing and set sleeve 2080A onto new needle bearing - **1** -.

Sleeve 2080A must be centered when set onto sleeve.

- Drive needle bearing into transfer housing up to stop using punch VW408A.

DRIVESHAFT, SERVICING

Driveshaft, servicing

-->

- **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
- **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

Driveshaft, removing and installing

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-->

- **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
- **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

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TRANSMISSION

5 Spd. Automatic Transmission 01V Front and All Wheel Drive - Internal Components, Servicing

00 - GENERAL, TECHNICAL DATA

REPAIR INSTRUCTIONS

General Repair Notes

The maximum possible care and cleanliness and proper tools are essential to ensure satisfactory and successful transmission repairs. The usual basic safety precautions also, naturally apply when carrying out vehicle repairs.

A number of generally applicable instructions for individual repair procedures, which are otherwise mentioned at various points in the article, are summarized here. They apply to this article.

Transmission

- Rules of cleanliness for working on automatic transmissions --> **Rules of cleanliness for working on automatic transmissions**.

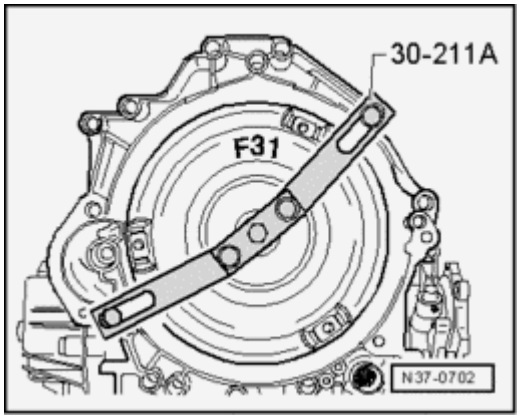


Fig. 1: Securing Torque Converter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- On removed transmission, support torque converter against falling down with Bracket 30-211 A.
- Use only ATF or Vaseline in areas near ATF. Other types of lubrication cause malfunctions to occur in the transmission hydraulics.
- After repair work on the transmission, clean ATF lines and ATF cooler, replace ATF filter.
- Check the following fluid levels after installing, top off if necessary. ATF in planetary gear --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** , axle oil for front final drive --> **39 - FINAL DRIVE, DIFFERENTIAL** , axle oil in transfer case --> **39 - FINAL DRIVE, DIFFERENTIAL** . Install driveshaft --> **00 - GENERAL, TECHNICAL DATA** .

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Impurities in ATF area

If ATF area is very soiled caused by worn friction linings:

- Disassemble transmission completely and clean, replace ATF oil tubes.
- Disassemble and check all clutches.
- Replace torque converter (cannot be cleaned).
- Replace valve body (cannot be cleaned).
- Clean ATF lines and ATF cooler, replace ATF filter.

O-rings, gaskets, shaft seals and seals.

- Always replace O-rings, gaskets, shaft seals and seals.
- After removing gaskets, examine contact surface on housing/shaft for burr resulting from removal or for other signs of damage.
- The open side of the shaft seals point toward the fluid to be sealed in.
- To install, thinly coat shaft seals along outer circumference and on sealing lip with ATF.
- Lightly lubricate O-rings with ATF or Vaseline before installing, this prevents the rings from being pinched when inserting.
- Use only ATF or Vaseline in areas near ATF. Other types of lubrication cause malfunctions to occur in the transmission hydraulics.
- Press in new shaft seal, so that the sealing lip does not run on the same point as the sealing lip of the old shaft seal (use insertion depth tolerances).
- Replace paper gaskets, thoroughly clean sealing surfaces and completely remove old seals.

Bolts and nuts

- Loosen bolts in reverse order of tightening.
- Loosen and tighten bolts and nuts for securing covers and housings in a diagonal sequence and in stages, when no tightening sequence is specified.
- The tightening torques stated apply to unoiled bolts and nuts.
- Replace self-locking bolts and nuts.

Locking elements

- Do not over-stretch circlips.
- Always replace circlips which have been damaged or over-tensioned.
- Circlips must be properly seated in the base of the groove.

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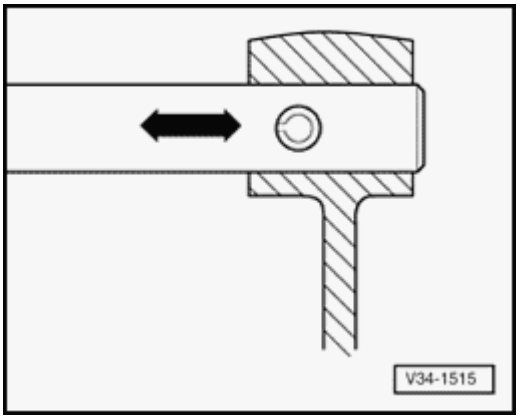


Fig. 2: Identifying Spring Pins Installation Position
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace spring pins. Installation position: Slit is longitudinal to direction of force - **arrow** -.

Bearings

- Slightly grease mount with ATF before inserting.
- Attach mount and adjustment shims only with Vaseline. Other lubricants cause malfunctions of the hydraulic transmission controls.

Oil tubes

- Once removed, oil tubes must always be replaced.
- If transmission is very dirty, oil tubes must be replaced.

Special tools

Special tools and equipment

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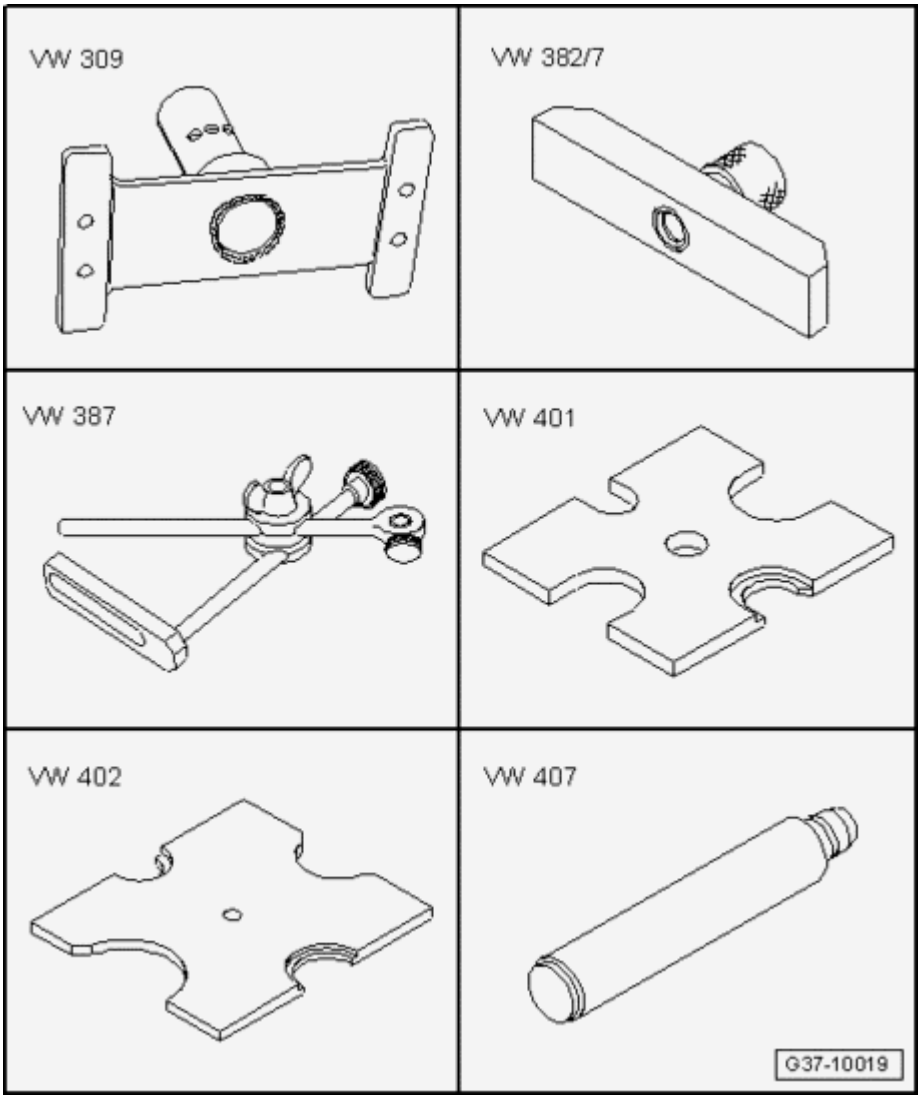


Fig. 3: Identifying Special Tools - Transmission Internal Components, Servicing (1 Of 8)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Holding plate VW 309
- Measuring bar VW 382/7 from Special socket measuring tools VW 382
- Dial gauge holder VW 387
- Thrust plate VW 401
- Thrust plate VW 402
- Punch VW 407

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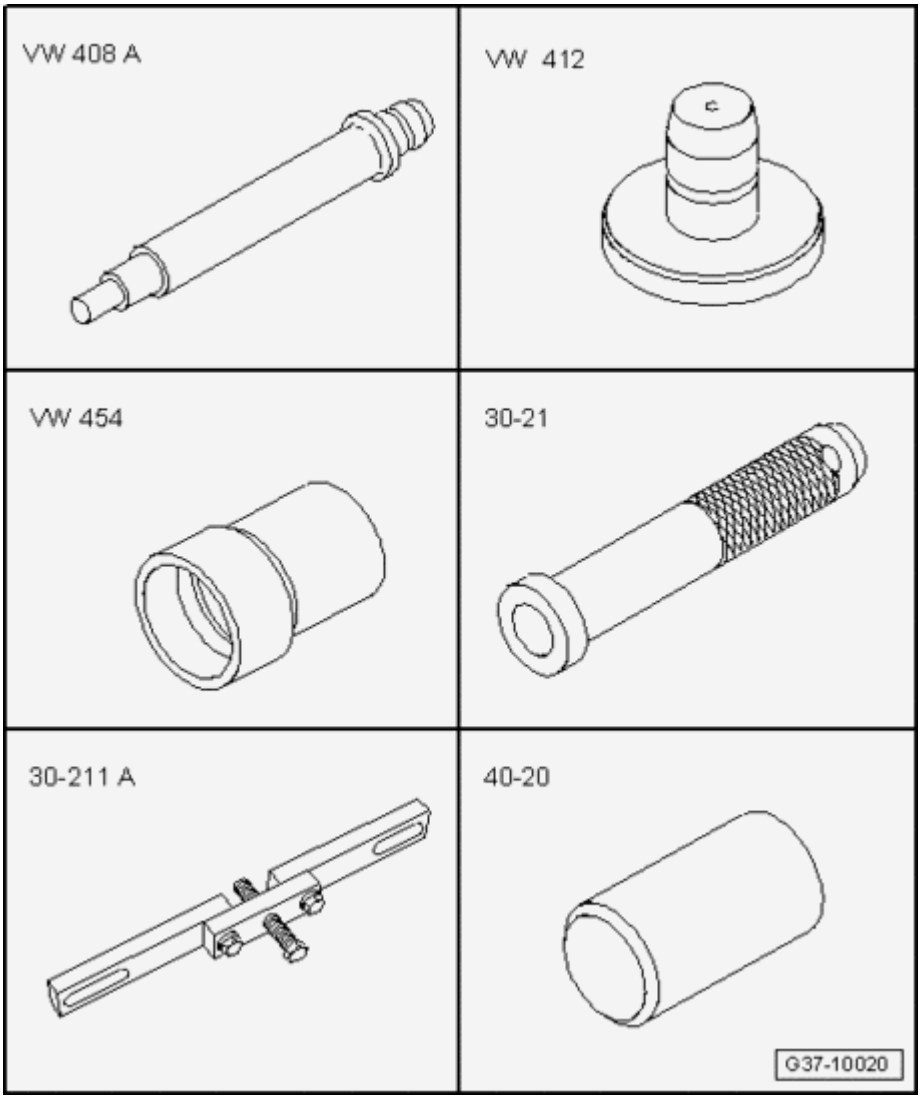


Fig. 4: Identifying Special Tools - Transmission Internal Components, Servicing (2 Of 8)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Punch VW 408 A
- Punch VW 412
- Thrust piece VW 454
- Sleeve 30-21

- Bracket 30-211 A
- Sleeve 40-20

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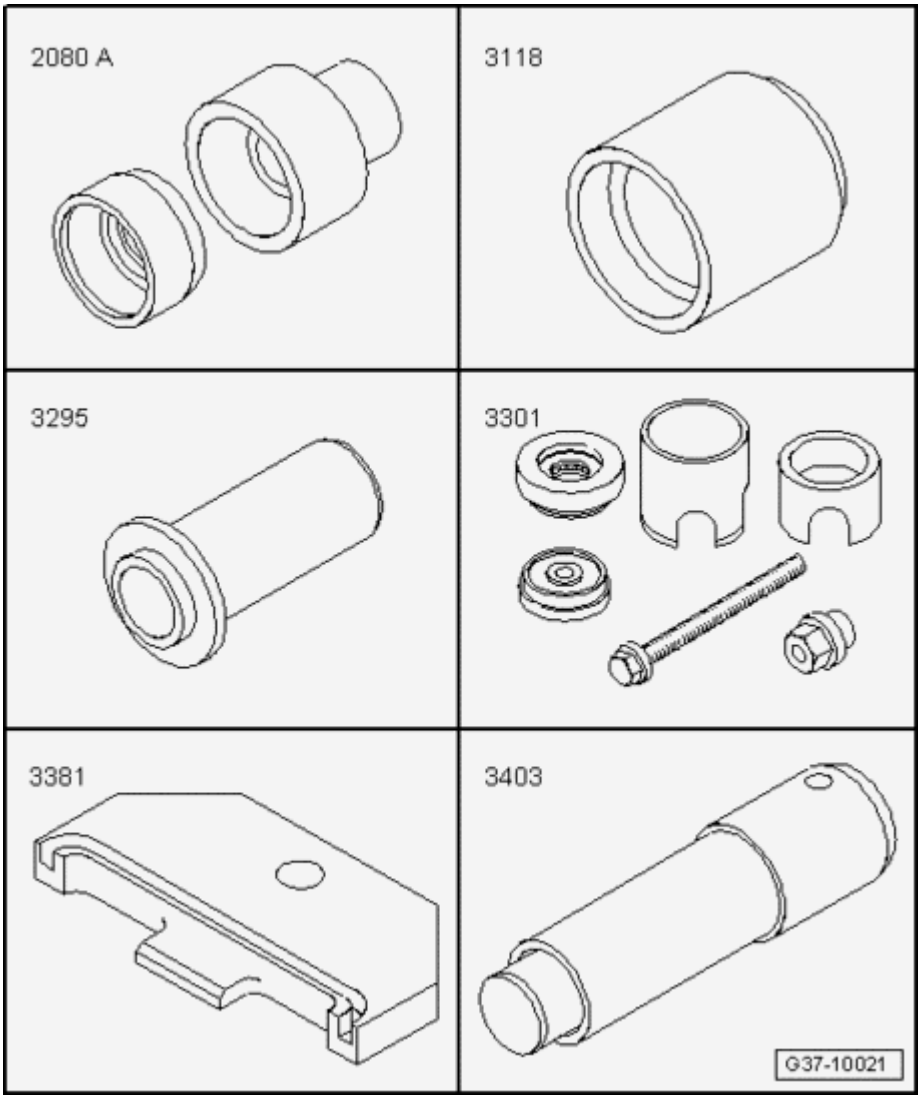


Fig. 5: Identifying Special Tools - Transmission Internal Components, Servicing (3 Of 8)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Seal installer 2080 A
- Thrust piece 3118
- Thrust piece 3295
- Thrust piece 3301/4 from assembly tool 3301

- Oil line installer 3381
- Thrust piece 3403

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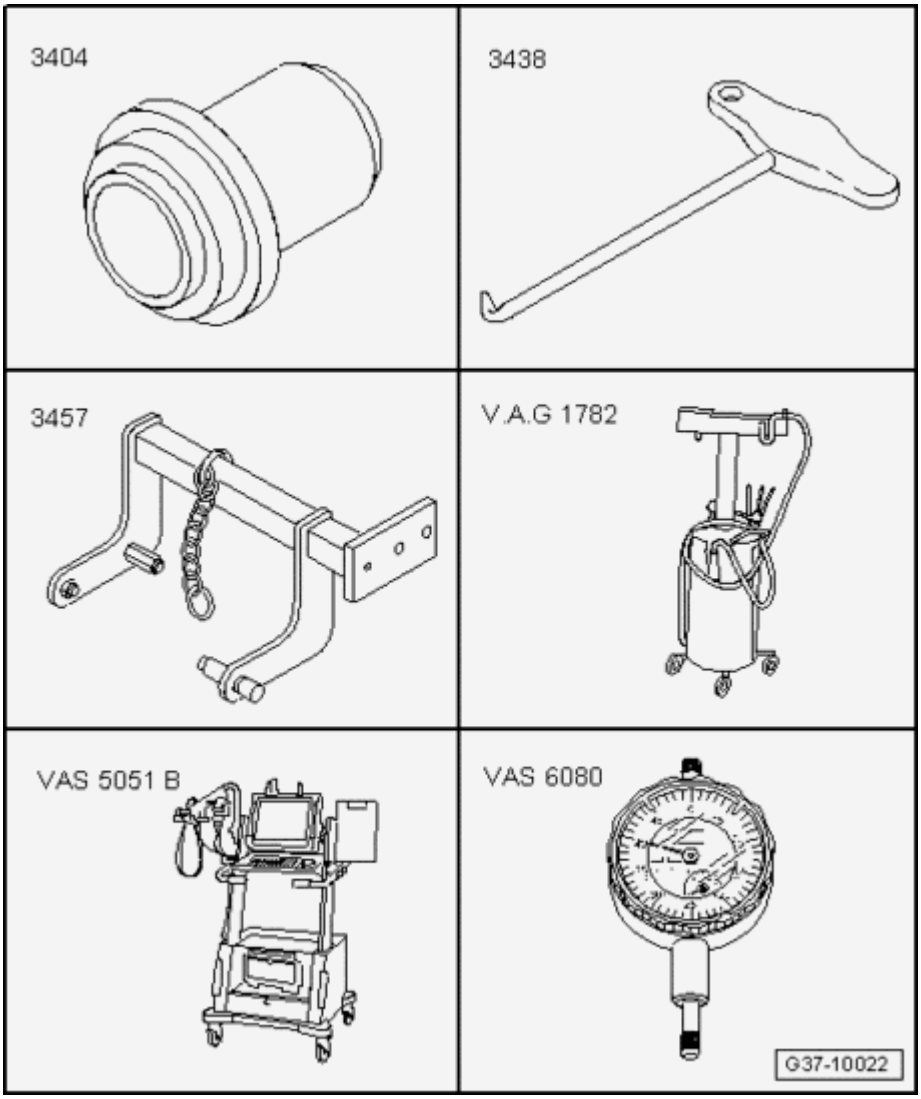


Fig. 6: Identifying Special Tools - Transmission Internal Components, Servicing (4 Of 8)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Thrust piece 3404
- Hook 3438
- Attachment and holding rig 3457
- Old oil collecting and extracting device V.A.G 1782

- Vehicle diagnostic, testing, and information system VAS 5051 (VAS 5051 B version shown as example only)
- Dial gauge VAS 6080

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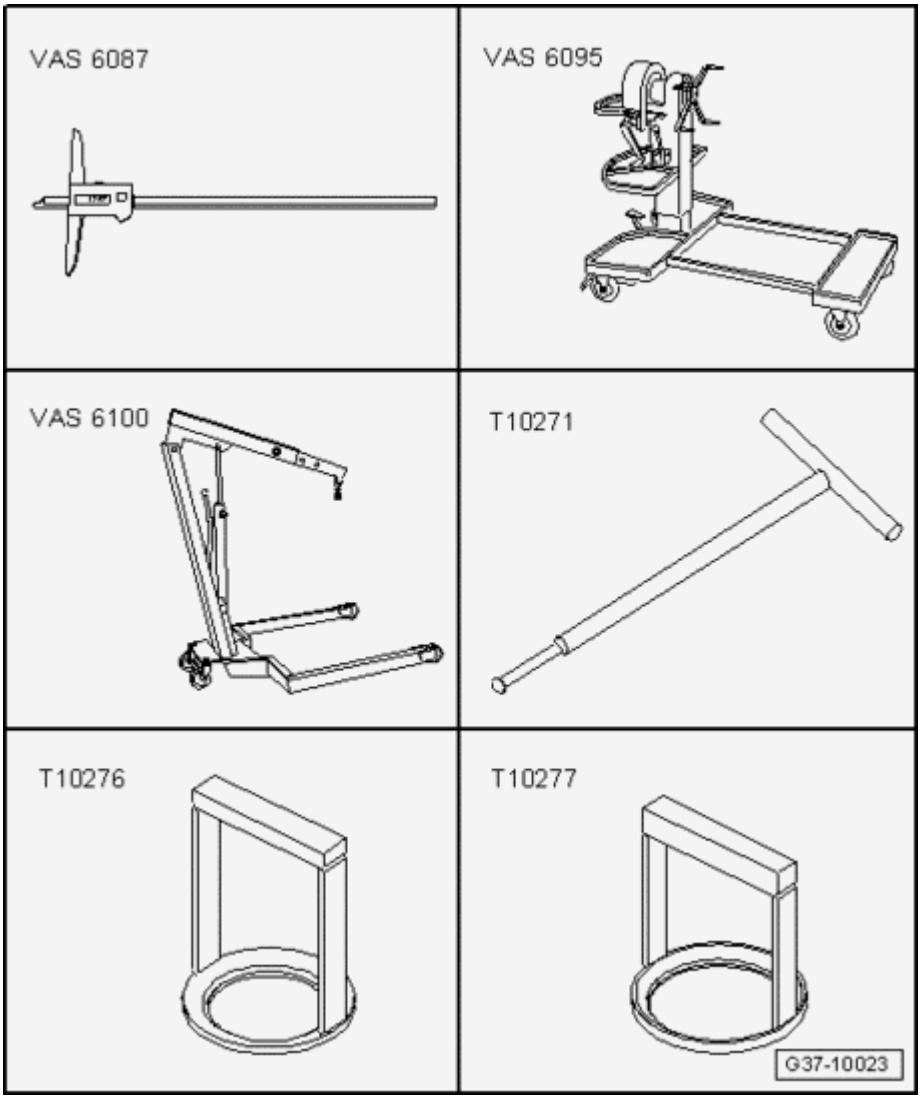


Fig. 7: Identifying Special Tools - Transmission Internal Components, Servicing (5 Of 8)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Digital depth gauge VAS 6087
- Engine and Transmission Holder VAS 6095
- Workshop crane VAS 6100
- Extracting handle T10271

- Installation bracket T10276
- Installation bracket T10277

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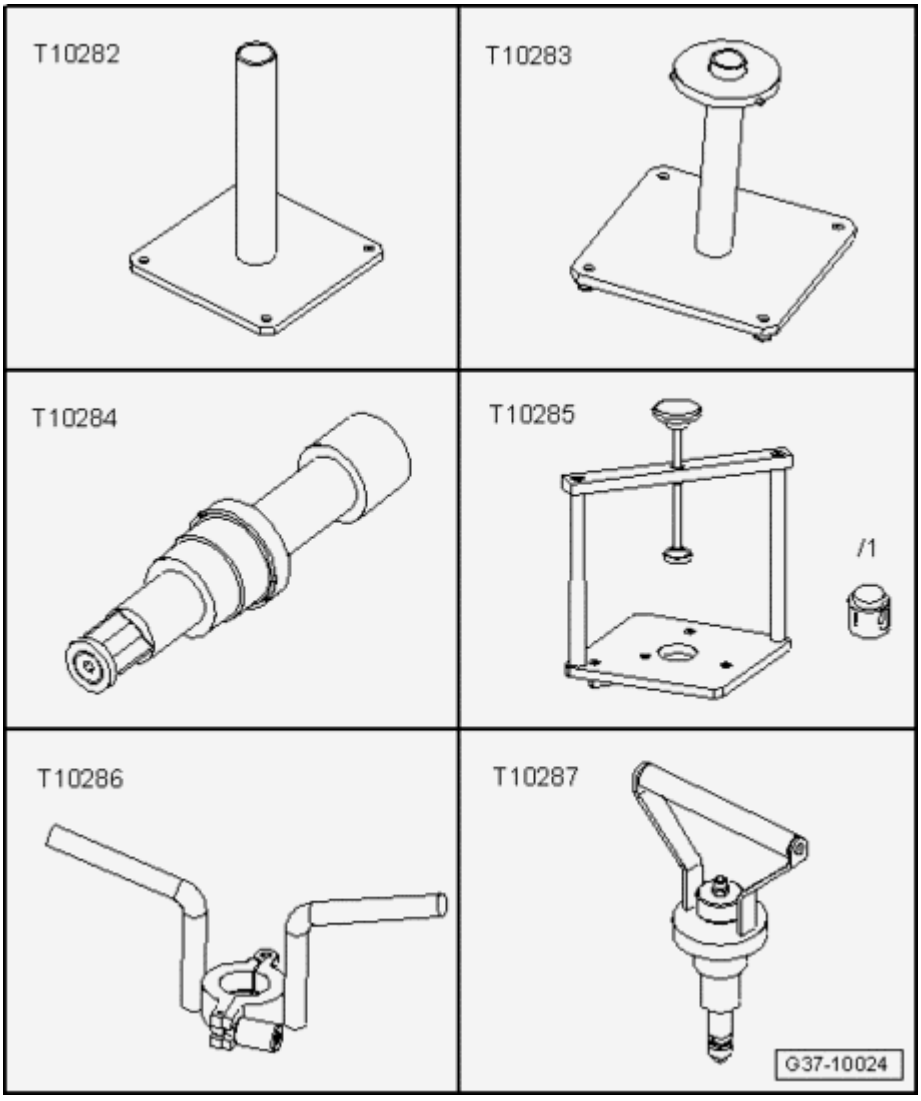


Fig. 8: Identifying Special Tools - Transmission Internal Components, Servicing (6 Of 8)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Mounting device T10282
- Mounting device T10283
- Adapter for torque converter T10284
- Pre-tensioning tool T10285

- Puller for ATF supply T10286
- Lifting device T10287

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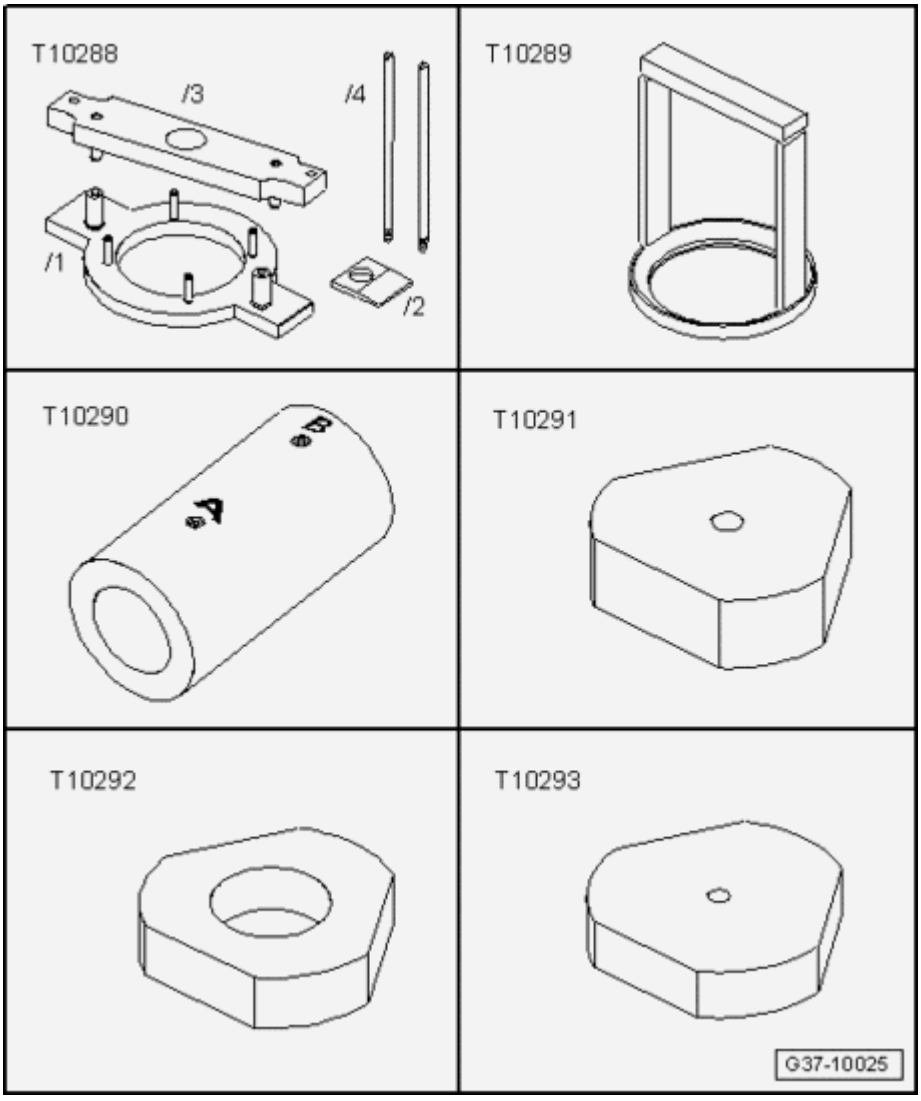


Fig. 9: Identifying Special Tools - Transmission Internal Components, Servicing (7 Of 8)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Centering tool T10288
- Installation bracket T10289
- Assembly sleeve T10290
- Plate T10291
- Plate T10292
- Plate T10293

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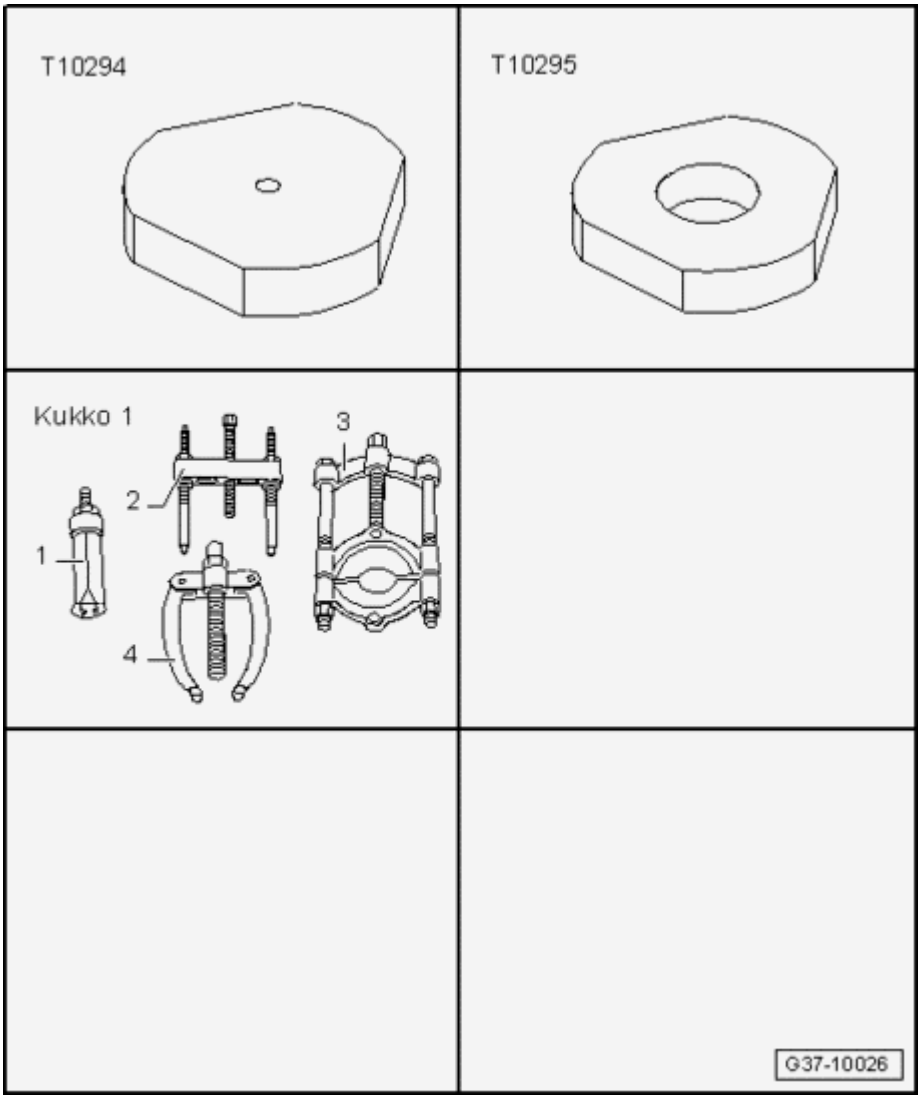


Fig. 10: Identifying Special Tools - Transmission Internal Components, Servicing (8 Of 8)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Plate T10294
- Plate T10295
- **- 1 -** Internal extractor Kukko 21/4
- **- 3 -** Separating tool 22 to 115 mm Kukko 17/2
- **- 4 -** Support Kukko 22/1
- Heat gun
- Safety glasses

RULES OF CLEANLINESS FOR WORKING ON AUTOMATIC TRANSMISSIONS

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Rules of cleanliness for working on automatic transmissions

- Carefully clean all joints and adjacent areas before disconnecting.
- Place removed parts on a clean surface and cover them. Use sheeting or paper. Use lint-free cloths only!
- Carefully cover or plug unpacked components if repairs cannot be performed immediately.
- Only install clean parts: Remove packing from replacement parts immediately prior to installation and not before.

FREQUENT DAMAGES

Frequent damages

NOTE:

- **Check DTC memory of Transmission Control Module (TCM) J217 before troubleshooting.**
- **Check also DTC memory of Engine Control Module (ECM), as DTCs of the Engine Control Module (ECM) can lead to transmission malfunctions.**
- **Check ATF level --> 37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING before troubleshooting.**

Slipping problems in all gears

- Possible damage:

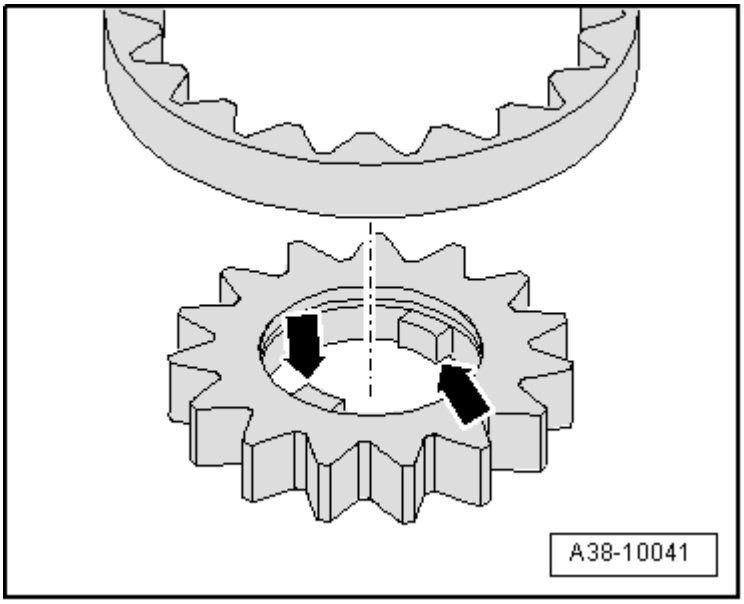


Fig. 11: Identifying ATF Pump Wheel Coupling Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Coupling plate - **arrows** - on ATF pump wheel broken off

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- Causes

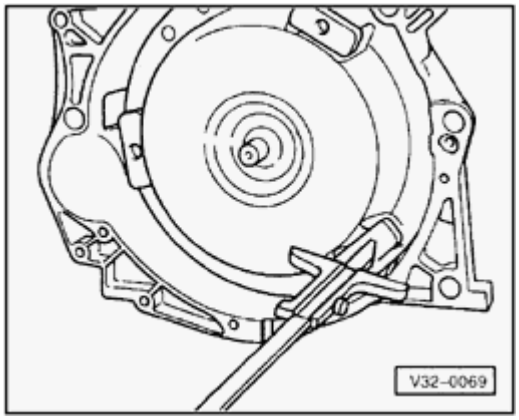


Fig. 12: Checking Torque Converter Is Correctly Positioned
Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Torque converter not completely inserted during transmission or engine installation. Check installation dimension --> **32 - TORQUE CONVERTER** .

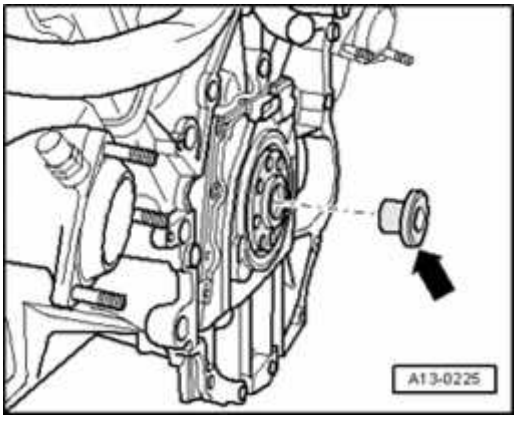


Fig. 13: Torque Converter Centering Bushing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

B - Centering bushing for torque converter - **arrow** - not properly installed in crankshaft -->

- **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
- **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
- **13 ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
- **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
- **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 4.2 LITER V8 4V ENGINE

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MECHANICAL, ENGINE CODE(S): BNS

- **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

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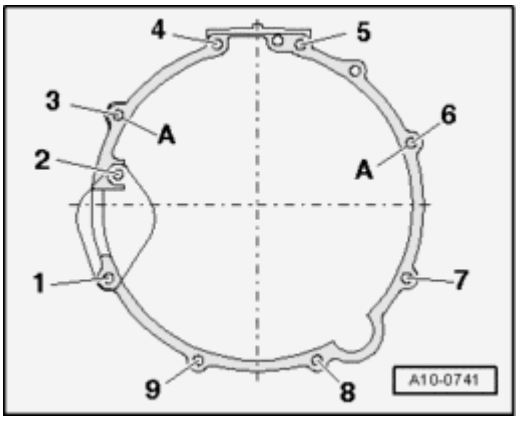


Fig. 14: Location of Alignment Sleeves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

C - One or both alignment sleeves - **A** - for centering not installed on engine/transmission flange. Alignment sleeves or bores in transmission flange damaged.

NOTE:

- **Disregard items - 1 to 9 -.**

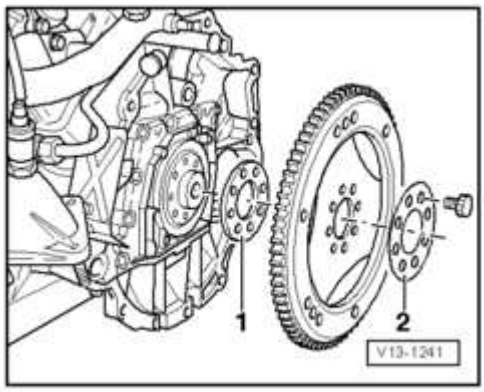


Fig. 15: Identifying Shim, Drive Plate And Washer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

D - Incorrect installation position of drive plate for torque converter, drive plate secured to engine with incorrect shim - **1** - or shim - **1** - and washer - **2** - interchanged -->

- **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
- **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 2.0 LITER 4-CYL. 4V TURBO ENGINE

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MECHANICAL, ENGINE CODE(S): BPG, BWT

- **13 ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
- **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
- **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

.

- Required actions:

  - Disassemble and check ATF pump, remove broken coupling plates.

CAUTION: Always check for broken coupling plates and remove.

Hard shifting procedures, individual gears not fully locked, shifting procedures too long

NOTE:

- **Illustration shows the damage on a disassembled valve body. Valve body must not be disassembled in customer service.**
- **Possible damage:**

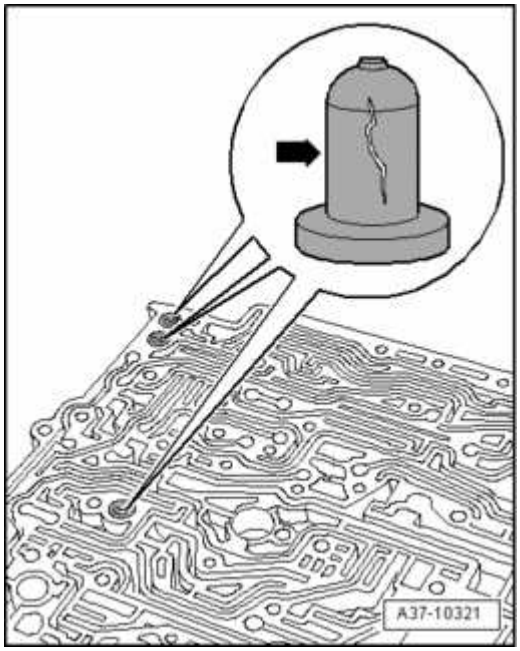


Fig. 16: Rubber Shock Absorbers (3 Total)

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

One of 3 rubber shock absorbers broken - **arrow** -.

- Required actions:
  - Check ATF level --> **Evaluating wear by evaluating ATF color and impurities**.

ATF is OK:

- Replace valve body --> **Valve body, removing and installing**.

ATF is not OK, damage was not repaired in a timely manner. In this case, clutch "G" is possibly damaged:

- Completely disassemble and clean transmission.
- Clean ATF lines and ATF cooler.
- Disassemble and check all clutches.
- Replace valve body --> **Valve body, removing and installing**.

Hard shifting, slipping in 4th and 5th gear

- Possible damage:

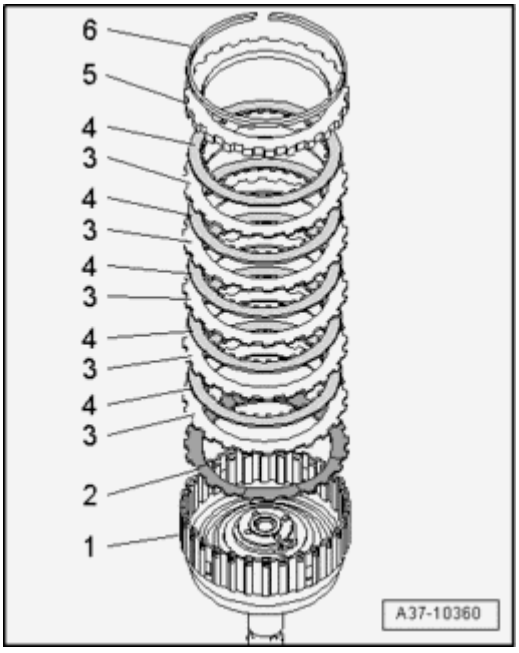


Fig. 17: Cylinder "E", Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Plates - **3** - of clutch "E" burnt out.

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- Cause:

Worn or faulty torque converter clutch

- Required actions:

- Check torque converter clutch while driving --> **Torque converter clutch, checking**.
- Completely disassemble and clean transmission.
- Clean ATF lines and ATF cooler.
- Disassemble and check all clutches.

- If there is heavy soiling --> **Evaluating wear by evaluating ATF color and impurities** , replace torque converter (cannot be cleaned).
- Replace components - **2 to 5** - of clutch "E".
- Replace overheated cylinder "E" - **1** - (blue color).
- Replace ATF filter --> **Fig. 118**.

ATF leakage between engine and transmission

- Possible damage:

The ATF pump corroded resulting in increased wear and chafing on the torque converter hub, heavy ATF leakage.

- Required actions:

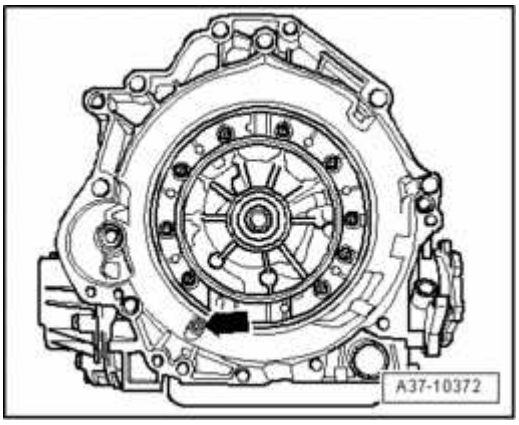


Fig. 18: Checking For ATF Escaping At Oil Leak Inspection Opening
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Make sure that no ATF escapes at oil leak inspection opening - **arrow** - after removing transmission. In this case, the final drive/transmission housing double shaft seal would be faulty.
- Replace final drive/transmission housing double shaft seal if necessary --> **39 - FINAL DRIVE, DIFFERENTIAL** .

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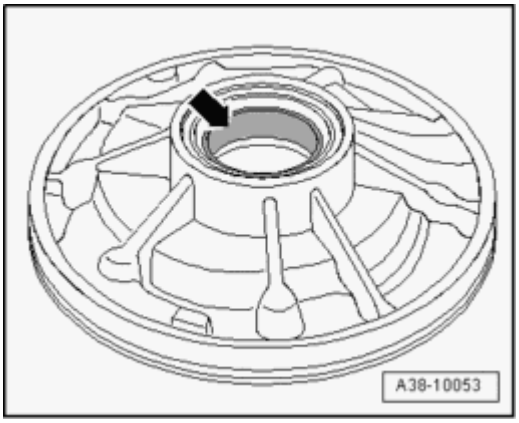


Fig. 19: Identifying Brass Sleeve
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check brass sleeve - **arrow** - for signs of wear and seizing.

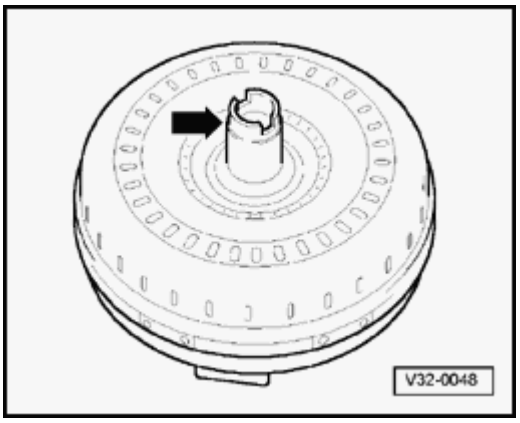


Fig. 20: Inspect Torque Converter Hub For Irregular Grooves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check hub - **arrow** - of torque converter for wear and corrosion.

If corrosion is detected:

- Replace ATF pump and torque converter.
- If there is heavy soiling --> **Evaluating wear by evaluating ATF color and impurities** , disassemble and clean transmission.
- Replace valve body --> **Valve body, removing and installing**.

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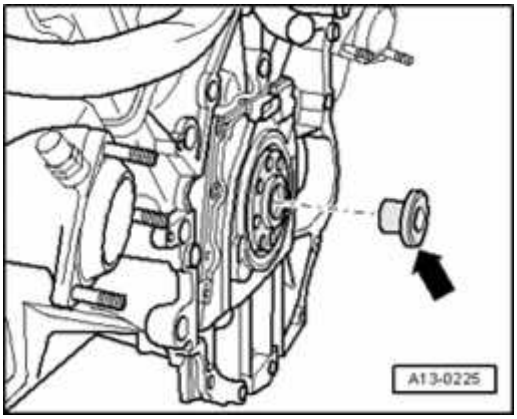


Fig. 21: Torque Converter Centering Bushing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check whether alignment sleeve - **arrow** - for torque converter is installed in crankshaft -->
  - **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **13 ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **13 - ENGINE - CRANKSHAFT, CYLINDER BLOCK** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

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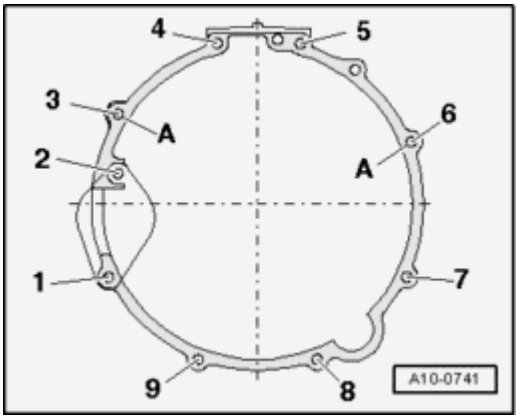


Fig. 22: Location of Alignment Sleeves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check whether both alignment sleeves - **A** - are inserted in cylinder block.

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- Check alignment sleeves for deformation and holes in transmission flange for damage.

NOTE:

- **Disregard - 1 to 9 -.**

Speed-dependent noises in driving operation

- Possible damage:

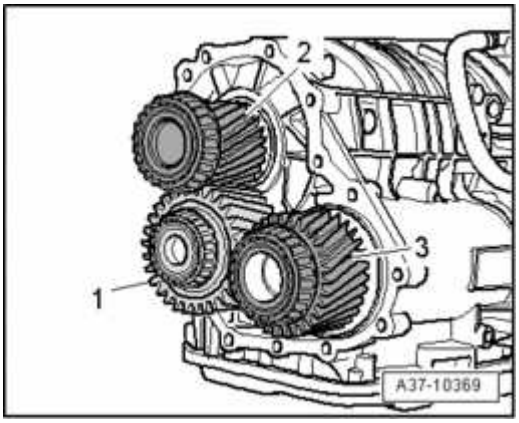


Fig. 23: Identifying Of Intermediate Pinion, Drive Pinion, And Pinion Gears
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Faulty spur gear bearings or spur gears - **1 to 3** -.

- Required action:

- Replace transmission.

32 - TORQUE CONVERTER

TORQUE CONVERTER

Torque converter clutch, checking

NOTE:

- **Check DTC memory of Transmission Control Module (TCM) J217 before troubleshooting.**
- **Check also DTC memory of Engine Control Module (ECM), as DTCs of the Engine Control Module (ECM) can lead to transmission malfunctions.**
- **Check ATF level --> 37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING before troubleshooting.**

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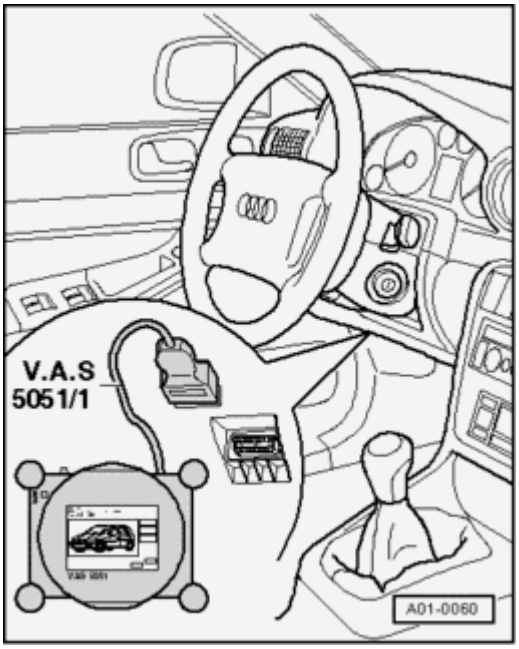


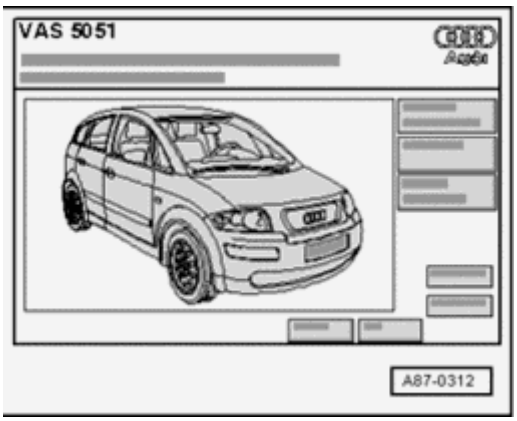
Fig. 24: Identifying Vehicle Diagnosis, Testing and Information System VAS 5051 and Data Link Connector (DLC)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Torque converter clutch can only be checked when driving in On Board Diagnostics (OBD).

CAUTION:

- **Test and measuring equipment must always be secured to the rear seat and operated from there by a second person.**
- **If test and measuring equipment is operated from the passenger seat, the person seated there could be injured in the event of an accident involving deployment of the passenger-side airbag.**

- With ignition switched off, connect Vehicle Diagnosis, Testing and Information System VAS 5051 to Data Link Connector (DLC).
- Start engine.



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Fig. 25: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051 :

- Tap Vehicle Self-Diagnosis button.

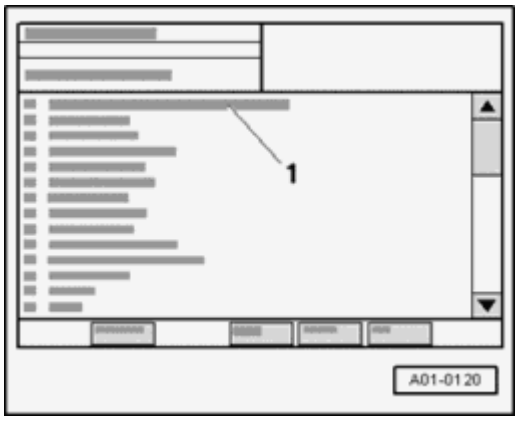


Fig. 26: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051 :

- In selection - **1** - , click on function "02 - Transmission electronics".
- Wait until the next indication appears on display.

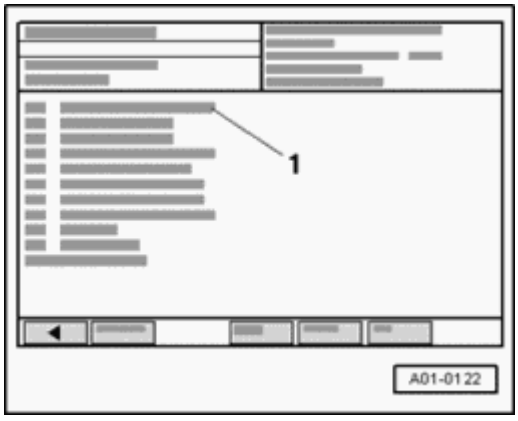


Fig. 27: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051 :

- From list - **1** - select function "08 - Reading measured value block".

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Fig. 28: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051 :

1 - Enter display group, max. input value = 255

- In button field - **2** - , tap 7 button for "display group 007" and confirm entry by tapping Q button.
- Perform a road test.

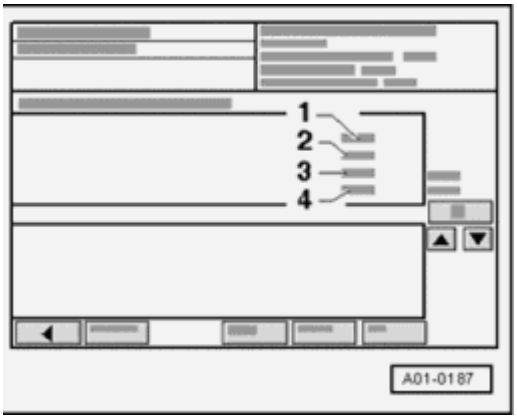


Fig. 29: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051 :

- Check indication in display fields - **3** - and - **4** -. Specified values:

3 - TC closed

4 - 0 to 20/min

If indications do not resemble description, ratio of transmission RPM to engine speed with closed torque converter clutch does not match (implausibility).

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- Causes:

  - Torque converter clutch circuit malfunctioning, worn.
  - Incorrect torque converter.
  - Automatic Transmission Pressure Regulating Valve 4 N218 mechanically malfunctioning.
  - Problems in ATF lines to Automatic Transmission Pressure Regulating Valve 4 N218.

  - Valve for torque converter pressure malfunctioning.
  - Torque converter clutch valve faulty.
  - Press <-- button to end function "08 - Read measured value block".
  - Select "06 - End output" function.

  - Switch off ignition and disconnect diagnostic connector.

Torque converter, draining

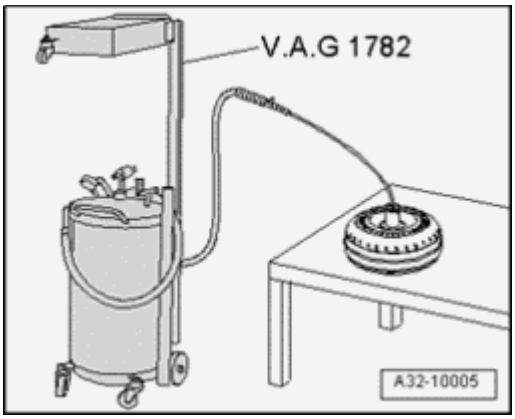


Fig. 30: Extracting ATF From Torque Converter With Used Oil Collection And Extraction Tool V.A.G 1782
Courtesy of VOLKSWAGEN UNITED STATES, INC.

In case of soiling of the ATF via shavings or during a major transmission overhaul, torque converter must be drained.

- Extract ATF from torque converter with Used Oil Collection and Extraction Tool V.A.G 1782.

Torque converter, checking

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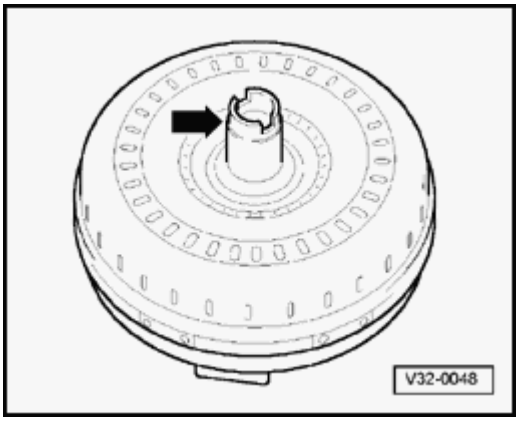


Fig. 31: Inspect Torque Converter Hub For Irregular Grooves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check hub - **arrow** - of torque converter for wear and corrosion.
- Check whether balance plates are properly seated and threads are undamaged.

If signs of wear and corrosion on torque converter, loosened balance plates or damaged threads are detected:

- Replace torque converter.

NOTE:

- **If the torque converter clutch is burnt or worn, sand-like material and residues can be found in the ATF filter.**

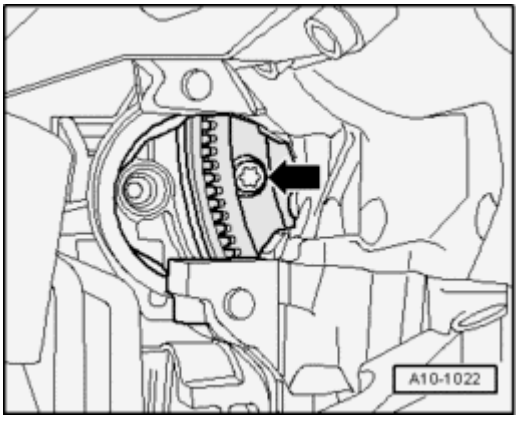


Fig. 32: Torque Converter Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If the bolts - **arrow** - for the attachment of the torque converter to the drive plate protrude only 2 mm, the torque converter can get dented and the torque converter clutch can be damaged. Therefore, only use original bolts.

37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING

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TRANSMISSION, ATTACHING ASSEMBLY STAND

Work procedure

- Torque converter secured with Bracket 30-211 A or removed.
  - Attach holding plate VW 309 onto attachment and holding rig 3457.

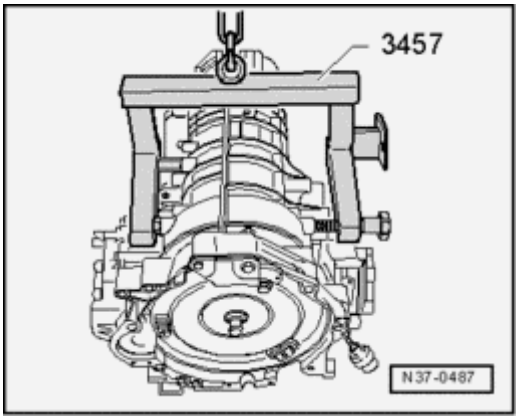


Fig. 33: Special Tool 3457 Attachment To Transmission Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

  - Attach and secure Attachment and Holding Rig 3457 at mounts on transmission housing.

NOTE:

- **Attachment and Holding Rig 3457 should only be installed by hand in transmission.**
- **If bolt is installed with pliers, transmission housing can be damaged.**

  - Insert transmission into Engine and Transmission Holder VAS 6095 using Shop Crane -Load Cap=700-1200 kg VAS 6100.

NOTE:

- **Vents for the transmission housing and final drive must be closed before turning a filled transmission with oil pan upward on the engine and transmission holder.**

PLANETARY GEAR, DISASSEMBLING AND ASSEMBLING

Planetary gear, disassembling and assembling

NOTE:

- **General repair notes --> General Repair Notes .**
- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**
- **Lubricate O-rings and gaskets with ATF or Vaseline before installing to prevent rings from being pinched when inserting.**

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- **Attach mount and adjustment shims only with Vaseline.**

- Use only ATF or Vaseline in areas near ATF. Other types of lubrication cause malfunctions to occur in the transmission hydraulics.

Planetary gear, component overview

NOTE:

- **Some of the depicted components are part of component groups and are not available separately as replacement part.**

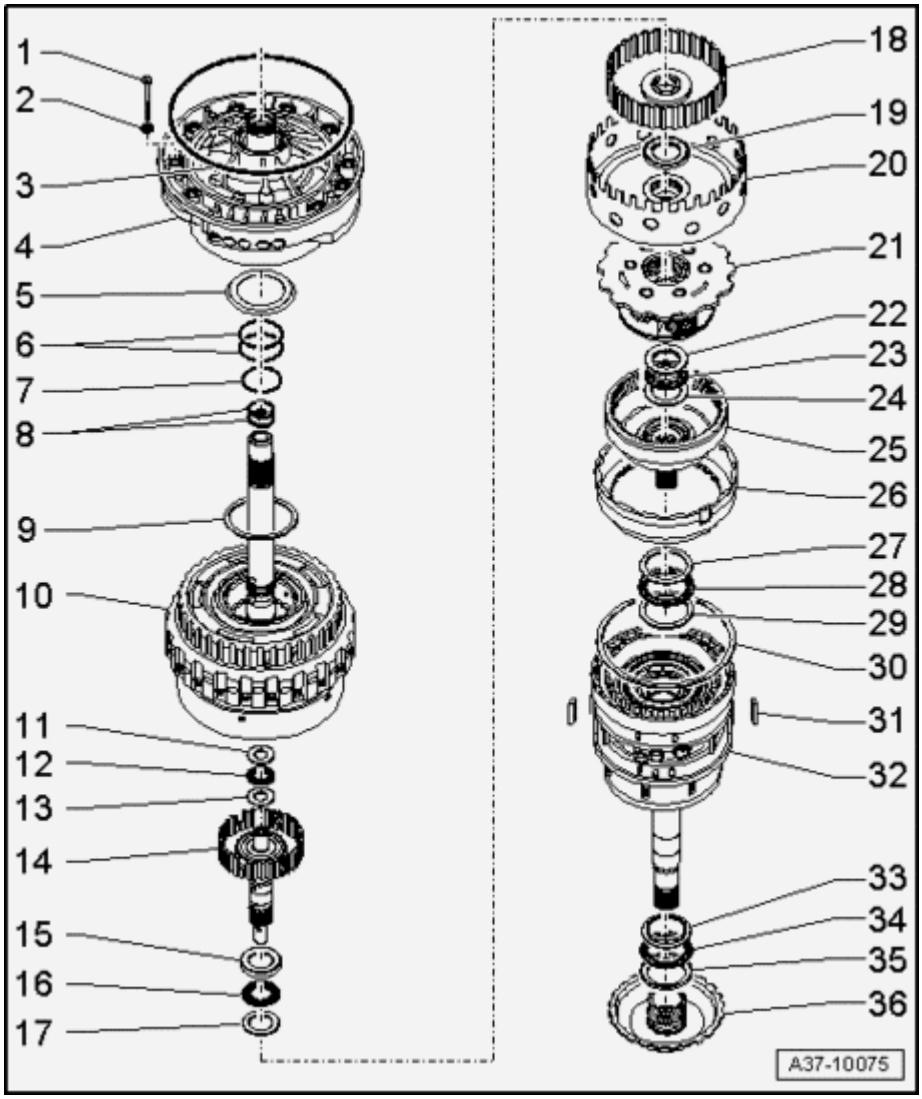


Fig. 34: Planetary Gear, Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Bolt, 10 Nm

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2 - Sealing washer

- Replace

3 - O-ring

- Replace

4 - ATF supply

- With ATF pump
- Disassembling and assembling --> **Clutch "C" , disassembling and assembling**

5 - Axial needle bearing

6 - Rectangular rings

- Replace

7 - Rectangular ring

- Replace

8 - O-rings

- Replace

9 - Adjustment shim

- Determine thickness --> **Fig. 108**

10 - Tower "II"

- Disassembling and assembling --> **Tower "II" , disassembling and assembling**

11 - Thrust washer

12 - Axial needle bearing

13 - Thrust washer

14 - Intermediate shaft with inner plate carrier

15 - Angle washer

16 - Axial needle bearing

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17 - Thrust washer

18 - Sun shaft

19 - Axial needle bearing

20 - Sun gear "I"

- Magnetic, for transmission with hydraulic control "E17" , Transmission Input Speed (RPM) Sensor G182 is then an inductive sensor
- Not magnetic, for transmission with hydraulic control "E18/2" , Transmission Input Speed (RPM) Sensor G182 is then a Hall sensor

21 - Planetary gear set "I" and "II"

22 - Angle washer

23 - Axial needle bearing

24 - Thrust washer

25 - Shaft with ring gear "I"

26 - Ribbed cup

27 - Thrust washer

28 - Axial needle bearing

29 - Angle washer

- Height 2.5 mm incl. collar

30 - Circlip

31 - Fitting key

32 - Tower "I"

- Disassembling and assembling --> **Tower "I" , disassembling and assembling**

33 - Angle washer

- Height 5 mm incl. collar

34 - Axial needle bearing

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35 - Angle washer

36 - Sun gear "III"

Planetary gear, disassembling and assembling

Disassembling

- Transmission attached to assembly stand --> **Transmission, attaching assembly stand**.

- Remove torque converter.
- Place old oil collecting and extracting device V.A.G 1782 beneath transmission.

CAUTION: Wear eye protection.

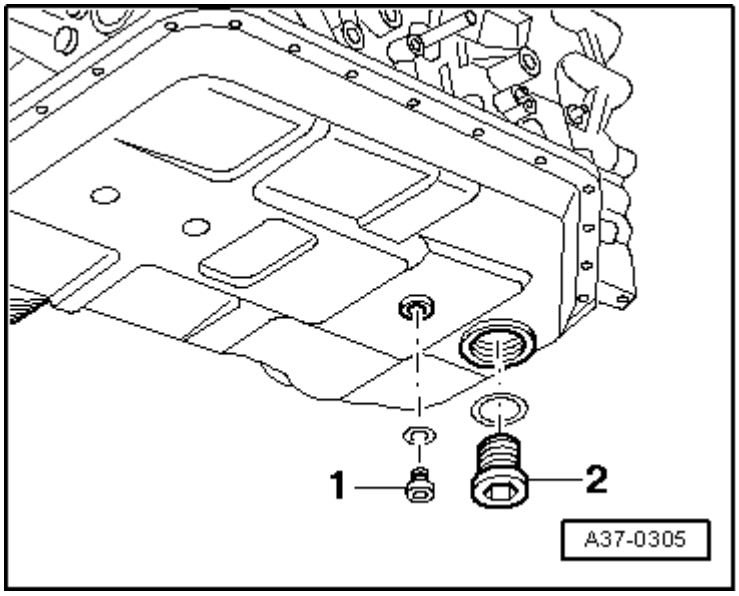


Fig. 35: Identifying ATF Drain Plug And ATF Level Inspection Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove ATF drain plug - **1** - and allow ATF to drain.

NOTE:

- **Observe disposal regulations.**
- **Rest of ATF remains in the ATF oil pan.**

Automatic transmission 01V Front Wheel Drive:

- Place old oil collecting and extracting device V.A.G 1782 beneath transmission.

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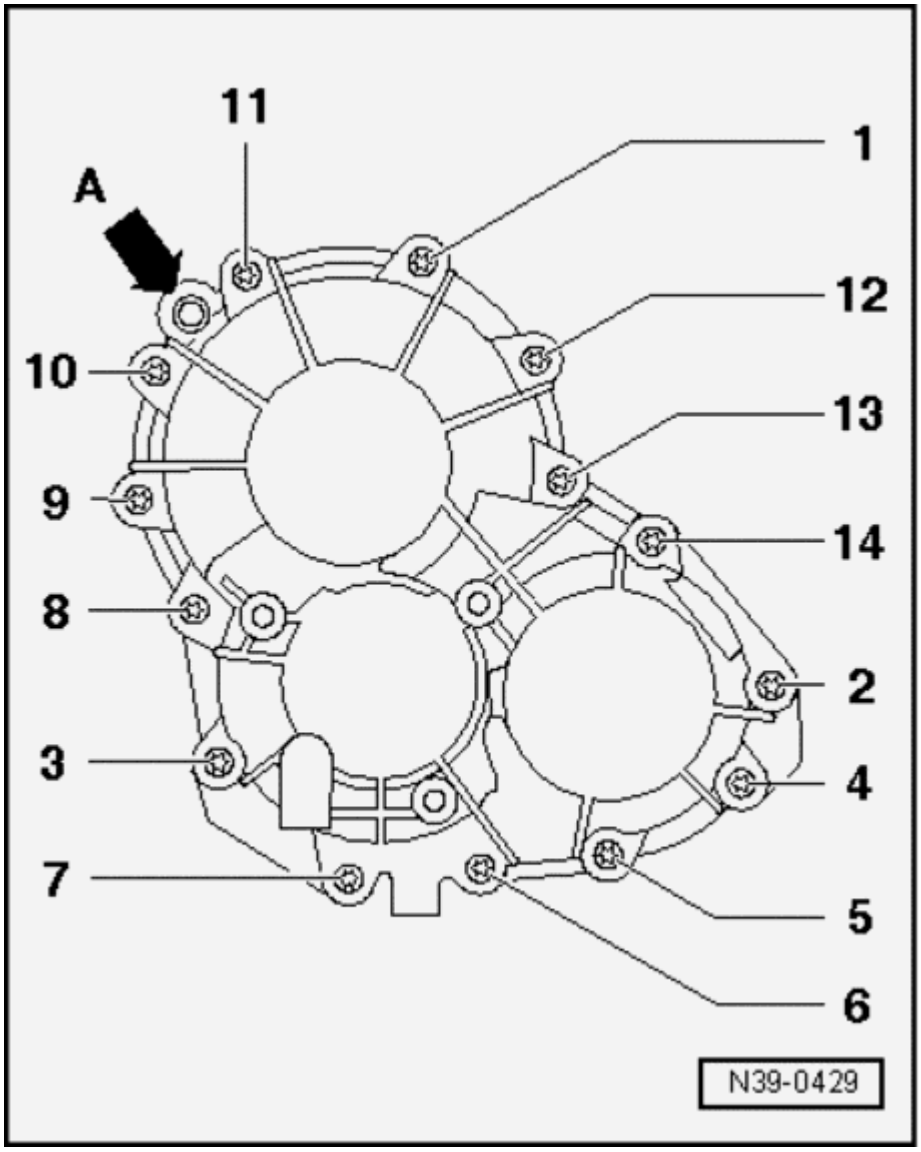


Fig. 36: Identifying Alignment Sleeve And Front Final Drive Cover Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen front final drive cover bolts in sequence - **14 to 1** - and then remove completely.
- Allow escaping oil to drain into Used Oil Collecting and Extracting Device V.A.G 1782.

CAUTION:

- **Slowly and carefully remove cover for front final drive from transmission housing. The spur gears can otherwise fall out of the transmission.**
- **Do not reinstall spur gears that have fallen to the ground. The transmission must be replaced in this case.**

- Lift off cover for front final drive.

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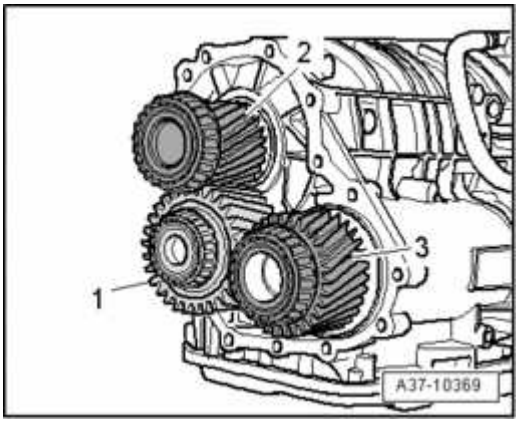


Fig. 37: Identifying Of Intermediate Pinion, Drive Pinion, And Pinion Gears
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Mark installation position of intermediate pinion - **1** - and pinion gear - **3** -.

CAUTION:

- **Intermediate pinion - 1 - and pinion gear - 3 - must be reinserted in the same position to maintain running direction.**
- **For this reason, mark installation position of intermediate pinion and pinion gear.**

- Remove pinion gear together with intermediate pinion, while doing so pull drive pinion - **2** - slightly toward rear.
- Remove drive pinion - **2** -.

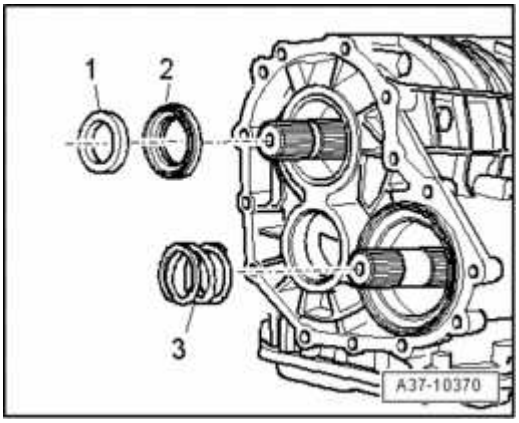


Fig. 38: Identifying Adjustment Shim, Axial Needle Bearing, And Coil Spring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove adjustment shim - **1** - and axial needle bearing - **2** - from input shaft.
- Remove coil spring - **3** - from pinion shaft.

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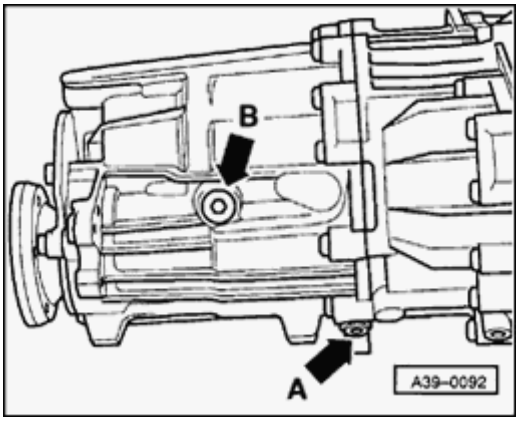


Fig. 39: Location Of Locking Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Automatic transmission 01V All Wheel Drive:

- Place old oil collecting and extracting device V.A.G 1782 beneath transmission.
- Remove locking bolt - **A** - and allow axle oil to drain from transfer case.

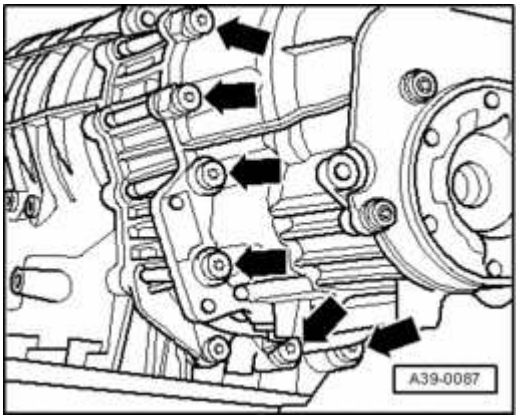


Fig. 40: Identifying Transfer Case Housing Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen transfer case housing bolts - **arrows** - in a diagonal sequence and then remove them completely.

CAUTION: Carefully and slowly pull transfer case housing off of transmission toward rear. The Torsen differential could otherwise fall out of the transmission.

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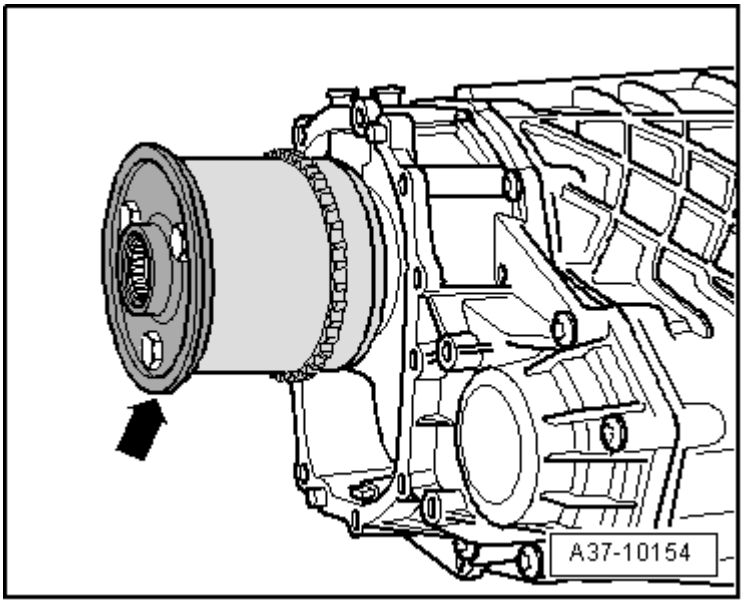


Fig. 41: Removing/Installing Torsen Differential At Input Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove Torsen differential - **arrow** - from input shaft.
- Place old oil collecting and extracting device V.A.G 1782 beneath transmission.

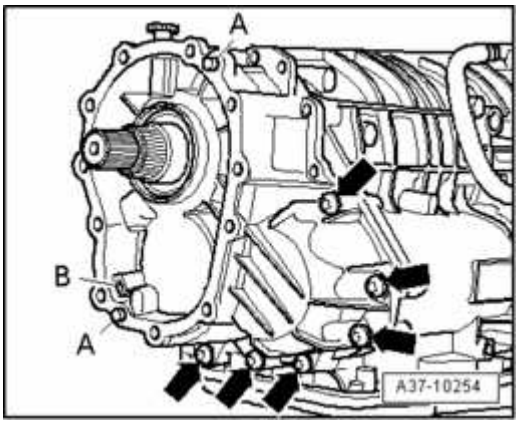


Fig. 42: Identifying Intermediate Flange For Front Final Drive Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** - at intermediate flange for front final drive.
- Allow escaping oil to drain into Used Oil Collecting and Extracting Device V.A.G 1782.

CAUTION:

- **Slowly and carefully remove intermediate flange for front final drive from transmission housing. The spur gears can otherwise fall out of the transmission.**
- **Do not reinstall spur gears that have fallen to the ground. The transmission must be replaced in this case.**

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- Lift off intermediate flange for front final drive.

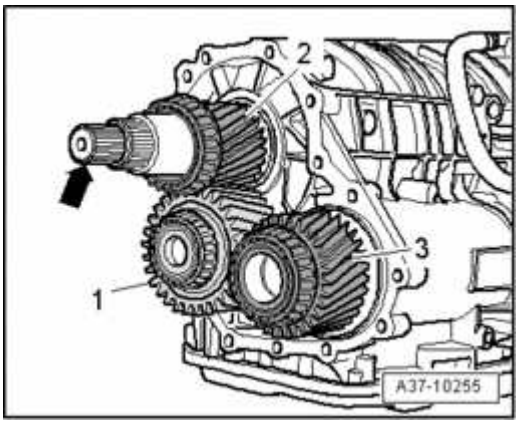


Fig. 43: Identifying Intermediate Pinion, Drive Pinion, And Pinion Gears, and Input Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Cover entire splines - **arrow** - on input shaft with insulating tape without wrinkling or overlapping to avoid damaging shaft seal in front final drive intermediate flange when removing drive pinion - **2** -.

CAUTION:
- **Intermediate pinion - 1 - and pinion gear - 3 - must be reinserted in the same position to maintain running direction.**

- Mark installation position of intermediate pinion - **1** - and pinion gear - **3** -.
- Remove pinion gear together with intermediate pinion, while doing so pull drive pinion - **2** - slightly toward rear.
- Remove drive pinion - **2** -.

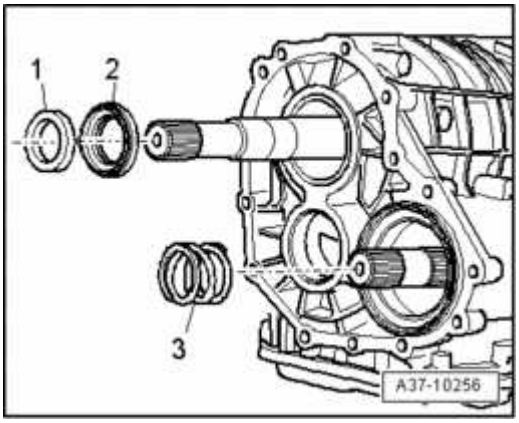


Fig. 44: Identifying Adjustment Shim, Axial Needle Bearing, And Coil Spring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove adjustment shim - **1** - and axial needle bearing - **2** - from input shaft.
- Remove coil spring - **3** - from pinion shaft.

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Automatic Transmission 01V, Front Wheel Drive and All Wheel Drive:

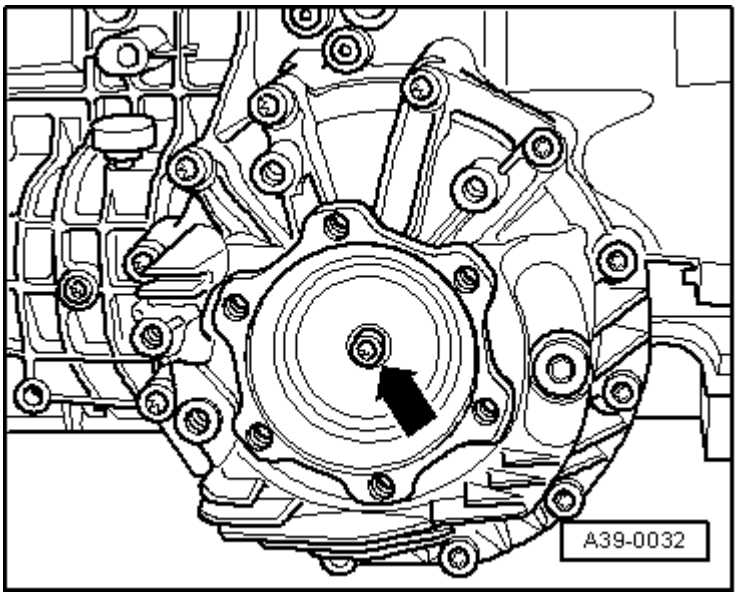


Fig. 45: Flange Shaft Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove right flange shaft bolt - **arrow** - by installing 2 bolts in flange and counterholding flange shaft using a pry bar.
- Place old oil collecting and extracting device V.A.G 1782 beneath transmission.
- Pull out right flange shaft.

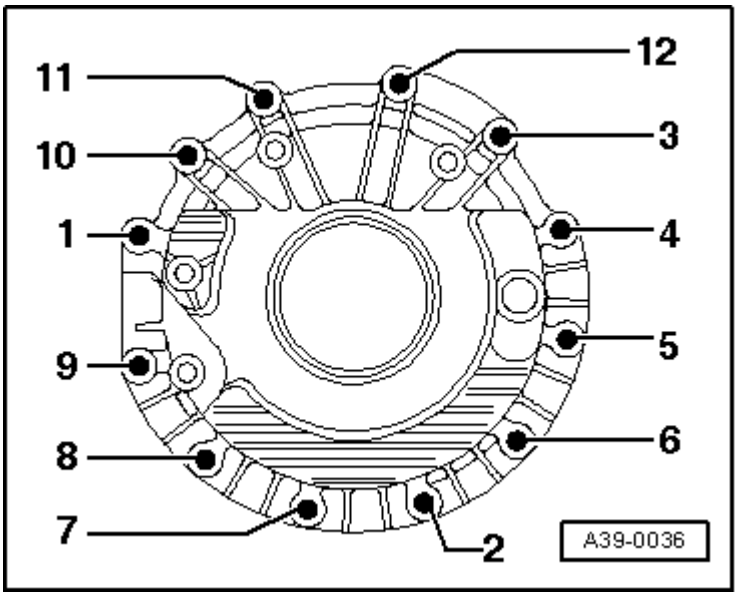


Fig. 46: Installing Cover For Front Final Drive, Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Loosen final drive cover bolts in sequence - **12 to 1** - and then remove completely.

CAUTION:

- **Slowly and carefully remove final drive cover from transmission housing. Otherwise differential can fall out of transmission.**
- **A differential that has fallen onto the floor must not be installed again. The transmission must be replaced in this case.**

- Remove final drive cover.

CAUTION:

- **Ensure tapered roller bearing outer race and differential adjusting screw do not fall out of final drive cover.**
- **Tapered roller bearing outer race must be installed in the same location.**
- **The shim must be the correct size and must not be replaced by a shim with a different thickness.**

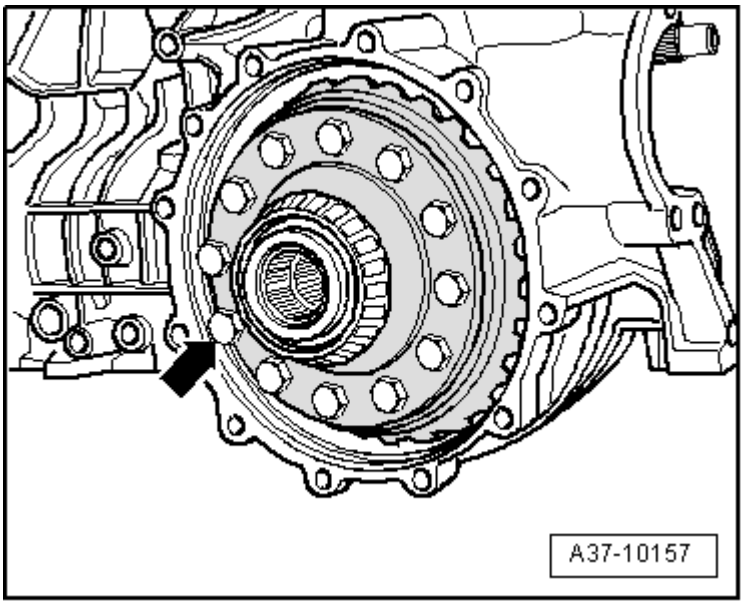


Fig. 47: Removing/Installing Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully remove differential - **arrow** -.

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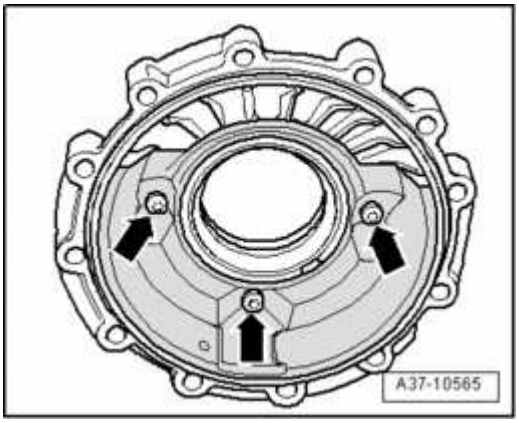


Fig. 48: Removing/Installing Baffle At Final Drive Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** - and remove baffle.

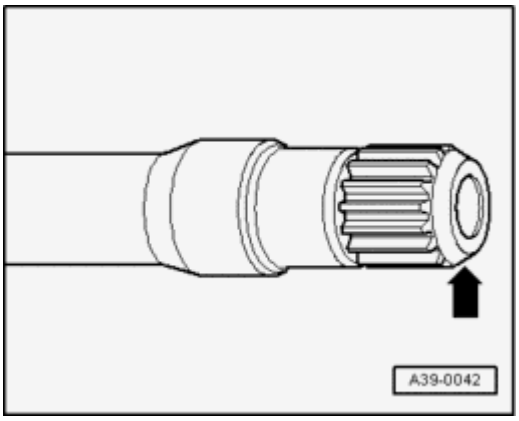


Fig. 49: Checking That There Are No Sharp Edges On Transmission End Of Flange Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Completely cover splines - **arrow** - on left flange shaft with insulating tape without wrinkling or overlapping to avoid damaging final drive/transmission housing double shaft seal when removing flange shaft.

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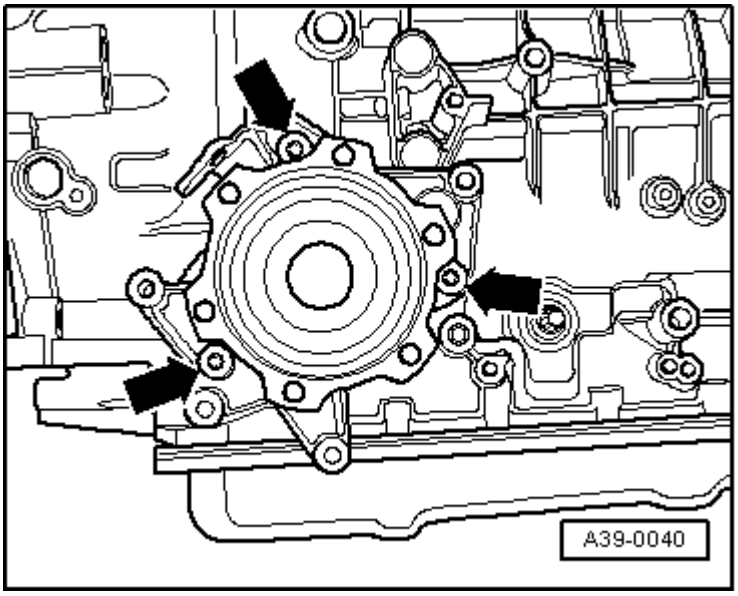


Fig. 50: Removing/Installing Left Drive Flange Mounting Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove left drive flange mounting bracket - **arrows** -.
- Pull out left drive flange.

NOTE:

- **When sliding off, left drive flange must be carefully guided by hand to prevent damage to the double seal in final drive/transmission housing.**

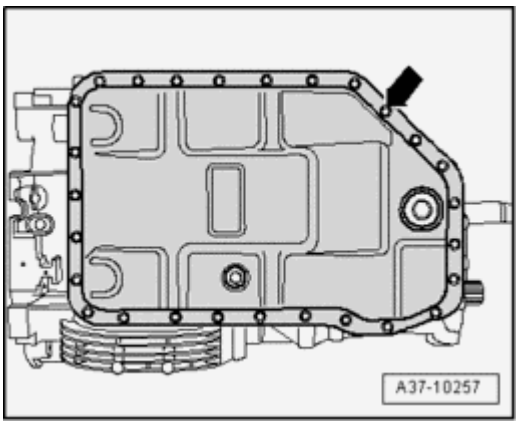


Fig. 51: Identifying Oil Pan Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen ATF oil pan bolts - **arrow** - in a diagonal sequence and then remove them completely.
- Remove ATF oil pan.

NOTE:

- **Milky green cover in ATF oil pan means there is damage to the torque converter clutch.**

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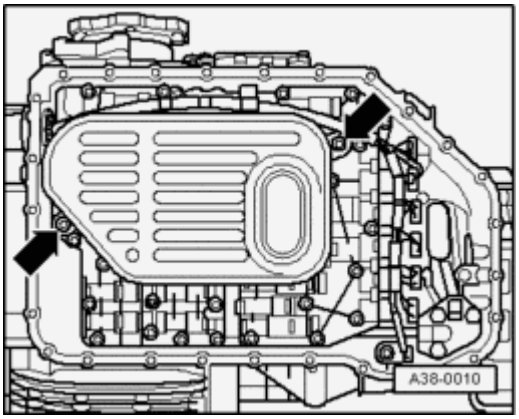


Fig. 52: ATF Screen Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove ATF screen bolts - **arrows** -.
- Pull ATF filter off of valve body.

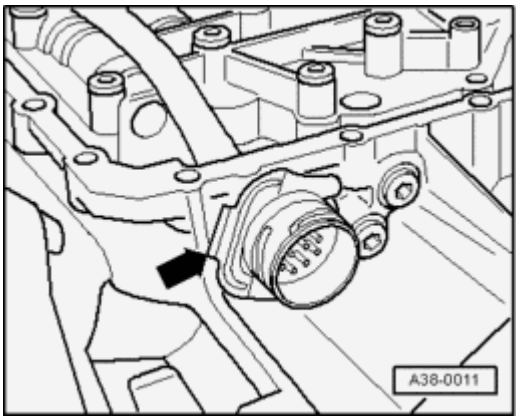
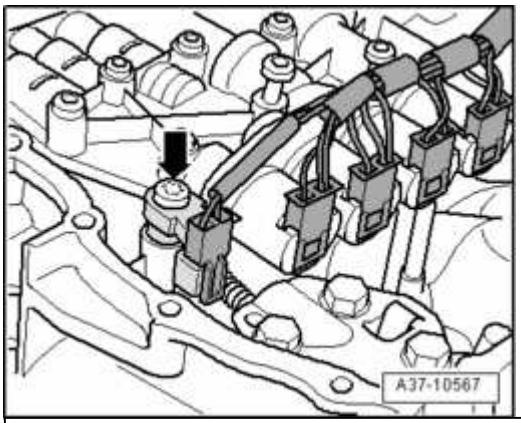


Fig. 53: Location Of Wiring Harness/Harness Connector Securing Circlip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **arrow** - for wiring harness/harness connector.
- Remove wiring harness/harness connector by pressing inward.



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Fig. 54: Identifying Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195 Harness Fastener
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt - **arrow** - and remove Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195.

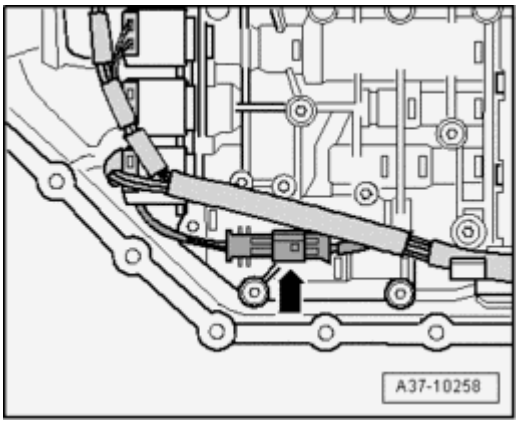


Fig. 55: Identifying Connector Transmission Input Speed (RPM) Sensor G182 At Valve Body
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- In a transmission with hydraulic control "E18/2" , disengage electrical connector to Transmission Input Speed (RPM) Sensor G182 at valve body - **arrow** - and disconnect connector.

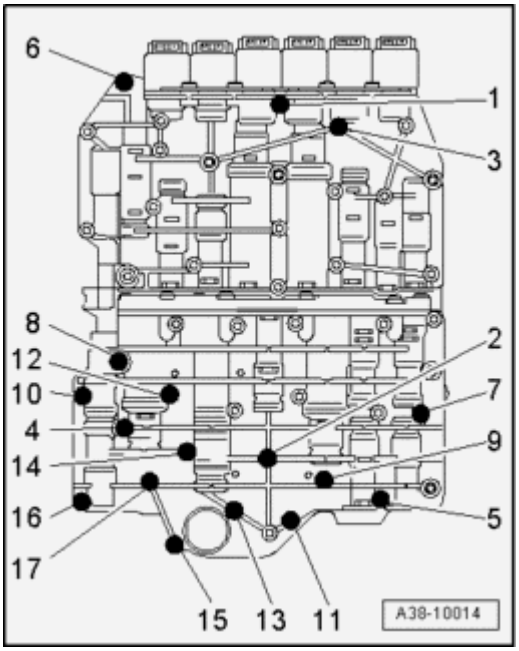


Fig. 56: Loosening or Tightening Valve Body Bolts In Sequence (As Describe)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen valve body bolts - **17 to 1** - in sequence and remove them completely.

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CAUTION:

- **Only the designated bolts must be removed; bolt - 6 - is only on transmissions with hydraulic control "E17".**
- **When removing other bolts, the function of the valve body can be influenced or the valve body splits up.**
- **Note the different lengths of the bolts.**

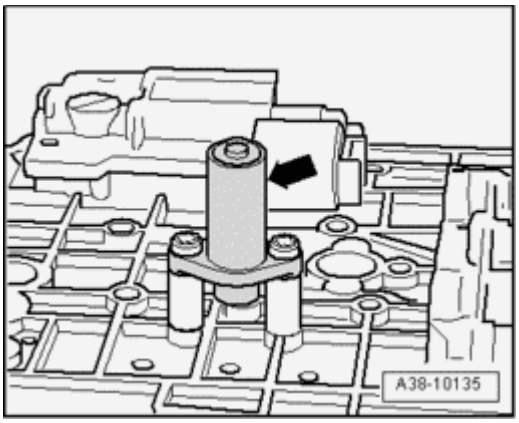


Fig. 57: Carefully Remove Valve Body From Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully remove valve body from transmission.

CAUTION: Only transmissions with hydraulic control "E17" : Do not rest valve body on Transmission Input Speed (RPM) Sensor G182 (on bottom side of valve body - arrow -) - risk of damage.

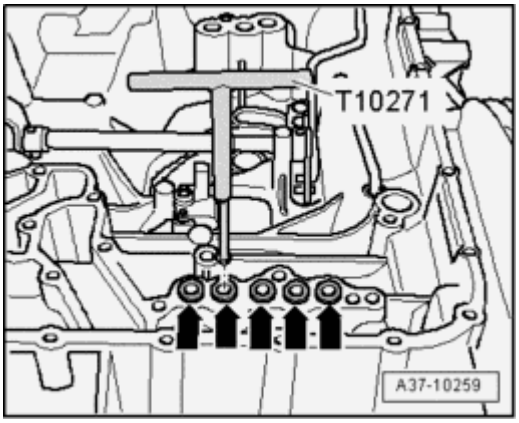


Fig. 58: Location Of Inlet Bores Sealing Sleeves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull sealing sleeves - **arrows** - in inlet bores toward clutches "C" , "A" , "B" , "E" and toward torque converter clutch using extracting handle T10271.

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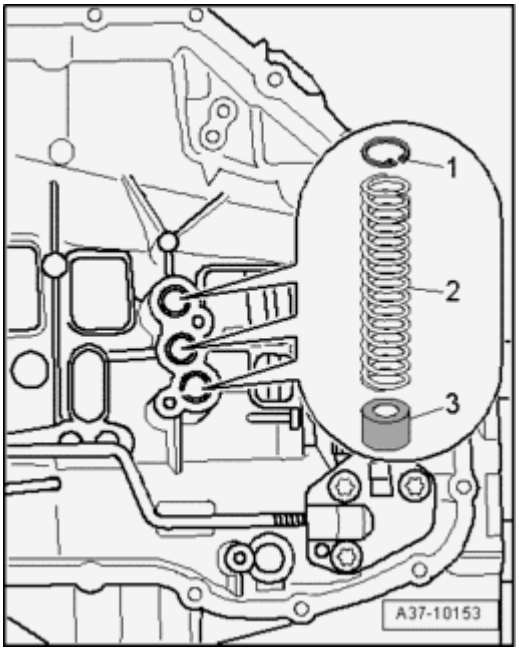


Fig. 59: Identifying Securing Rings, Coil Springs, and Sealing Sleeves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove 3 securing rings - **1** -.
- Remove coil springs - **2** -.
- Pull out sealing sleeves - **3** - , using extracting handle T10271.
- Rotate transmission on assembly stand.

- ATF pump faces upward.

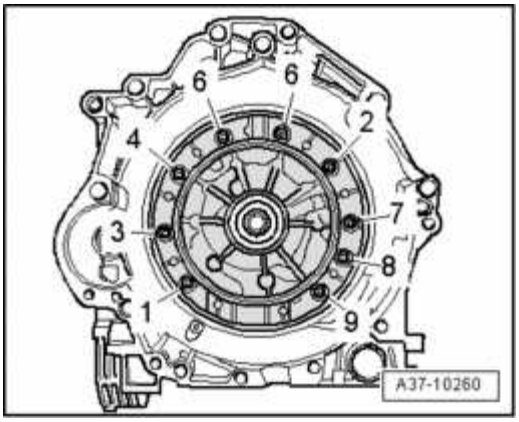


Fig. 60: Identifying ATF Pump Bolts Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen ATF pump bolts - **9 to 1** - in sequence and remove them completely.
- Remove bolts with sealing washers.

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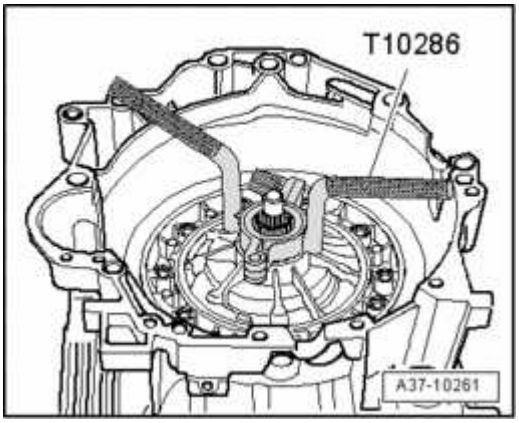


Fig. 61: Removing ATF Pump Using Puller T10286
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure puller for ATF supply T10286 to stator shaft and pull ATF supply firmly upward.

If ATF pump cannot be loosened:

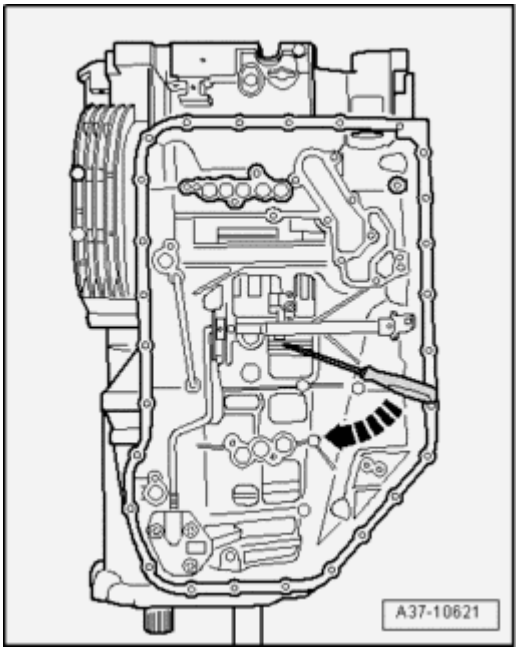


Fig. 62: If ATF Pump Cannot Be Loosened Proceed As Shown
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- On the bottom side of the transmission, place a screwdriver between sun gear "I" and ribbed cup and pry component above sun gear upward - **arrow** -.

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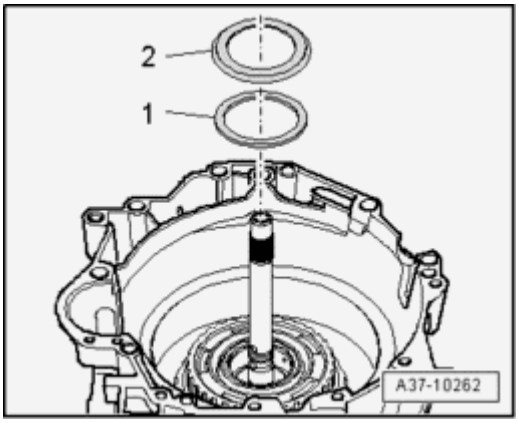


Fig. 63: Identifying Adjustment Shim and Axial Needle Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove adjustment shim - **1** - and axial needle bearing - **2** -.

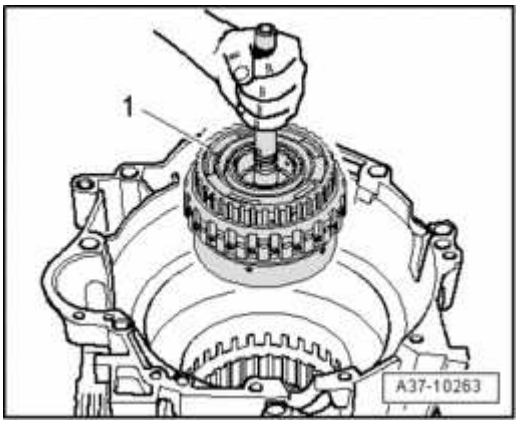


Fig. 64: Removing/Installing Tower "II" Out/In Of Transmission Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lift tower "II" - **1** - out of transmission housing.

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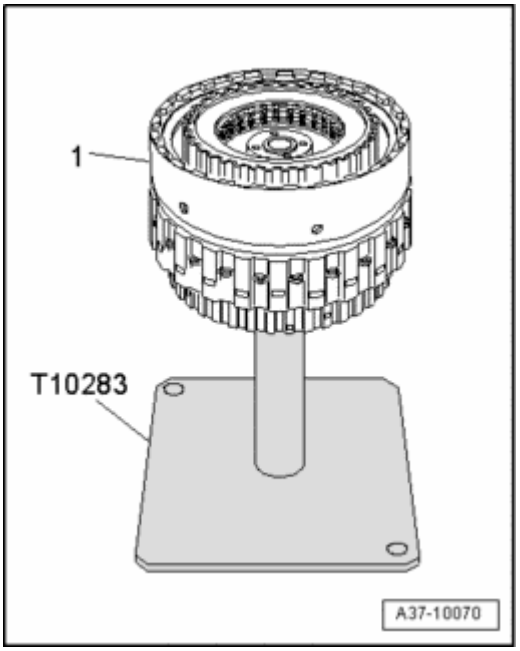


Fig. 65: Tower "II" Mounted On Device T10283Tower "II" Mounted On Device T10283
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Twist tower "II" - **1** - and place together with input shaft in mounting device T10283.

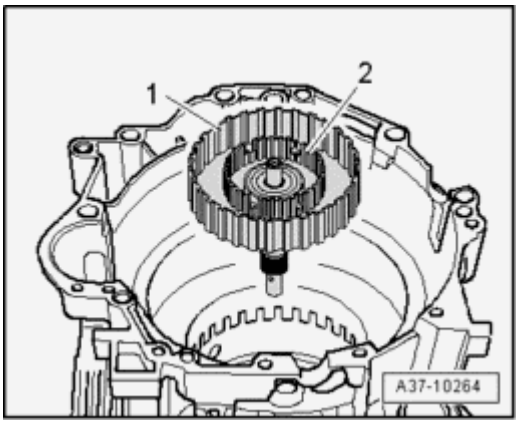


Fig. 66: Removing/Installing Sun Shaft with Intermediate Shaft Out/In Of Transmission Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove sun shaft - **1** - with intermediate shaft - **2** - with inner plate carrier.

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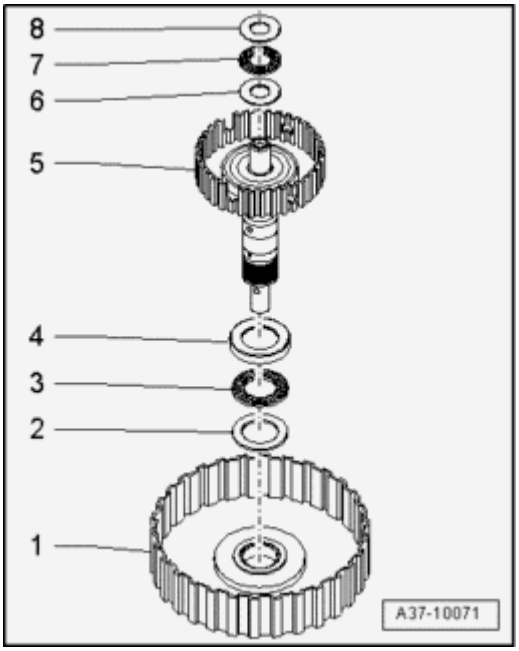


Fig. 67: Disassemble/Assemble The Following Components (As Shown)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disassemble the following components:

1. Sun shaft
2. Thrust washer
3. Axial needle bearing
4. Angle washer
5. Intermediate shaft with inner plate carrier
6. Thrust washer
7. Axial needle bearing
8. Thrust washer

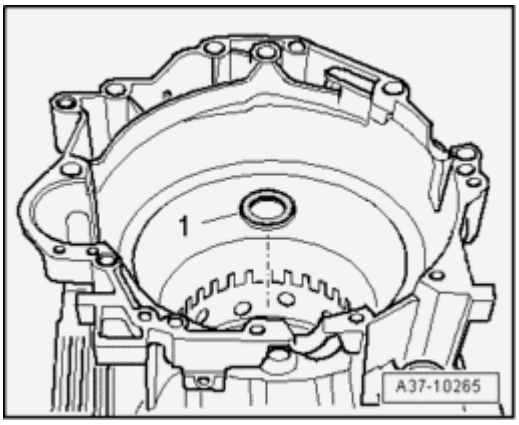


Fig. 68: Identifying Axial Needle Bearing

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove axial needle bearing - **1** -.

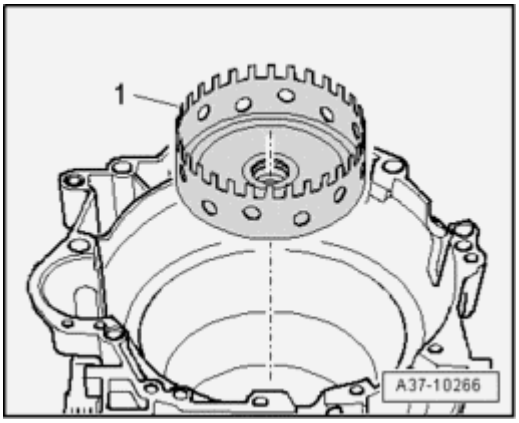


Fig. 69: Identifying Sun Gear "I"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove sun gear "I" - **1** -.

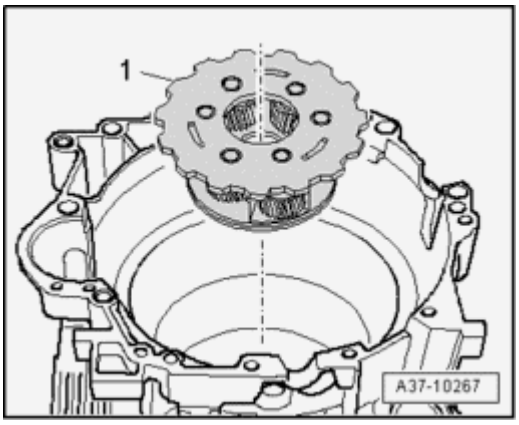


Fig. 70: Identifying Planetary Gear Set "I" And "II"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove planetary gear set "I" and "II" - **1** -.

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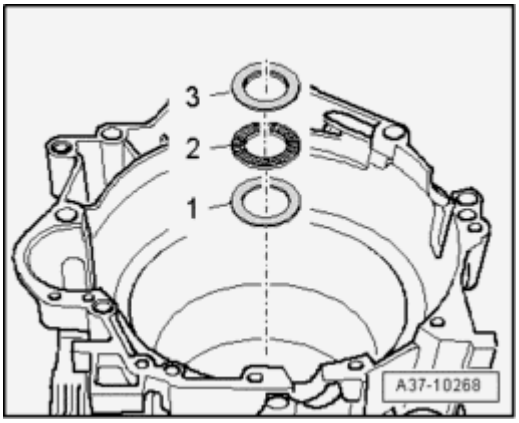


Fig. 71: Angle Washer, Axial Needle Bearing and Thrust Washer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove angle washer - **3** - , axial needle bearing - **2** - and thrust washer - **1** -.

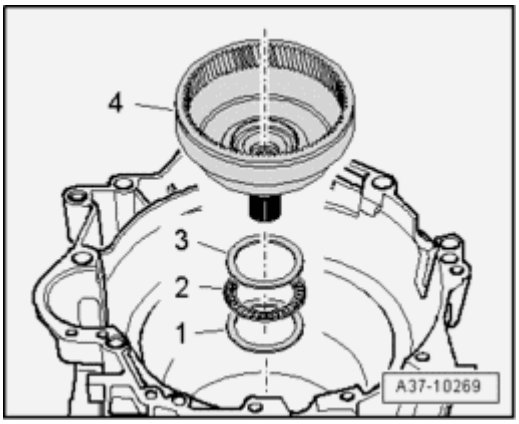


Fig. 72: Shaft With Ring Gear "I", Thrust Washer, Axial Needle Bearing and Angle Washer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove shaft with ring gear "I" - **4** - , thrust washer - **3** - , axial needle bearing - **2** - and angle washer - **1** -.

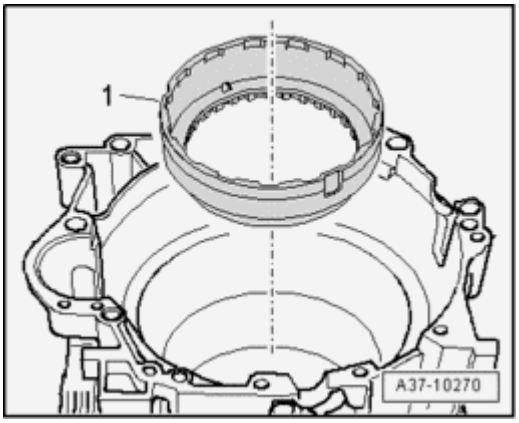


Fig. 73: Ribbed Cup

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove ribbed cup - **1** -.

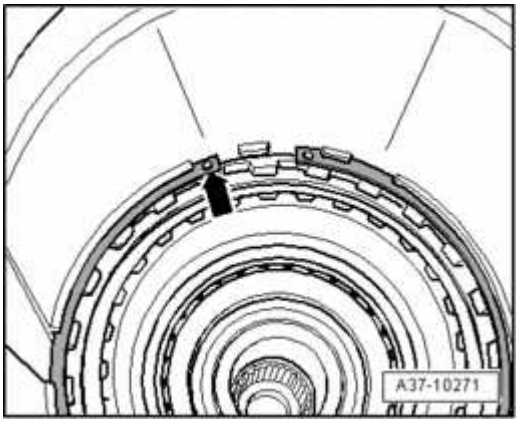


Fig. 74: Circlip For Tower "I"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **arrow** - for tower "I".

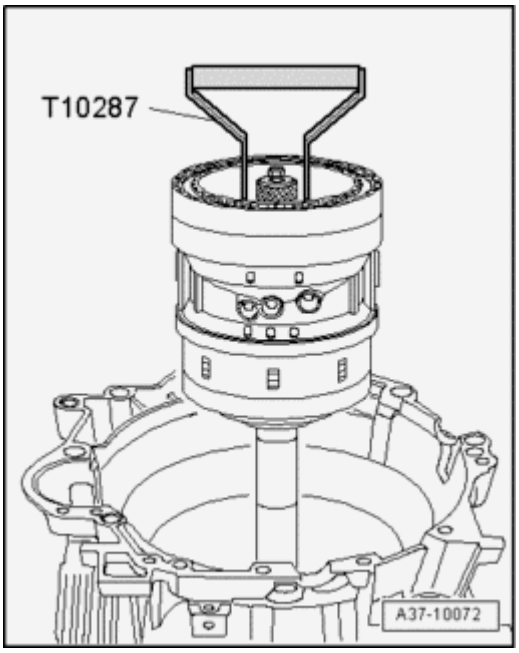


Fig. 75: Installing/Removing Lifting Device T10287
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn back knurled nut of lifting device T10287.
- Insert lifting device into tower "I" until stop.
- Tighten knurled nut of lifting device in clockwise direction.
- Check lifting device in tower "I" for proper seating.

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- Lift tower "I" out of transmission housing by hand.

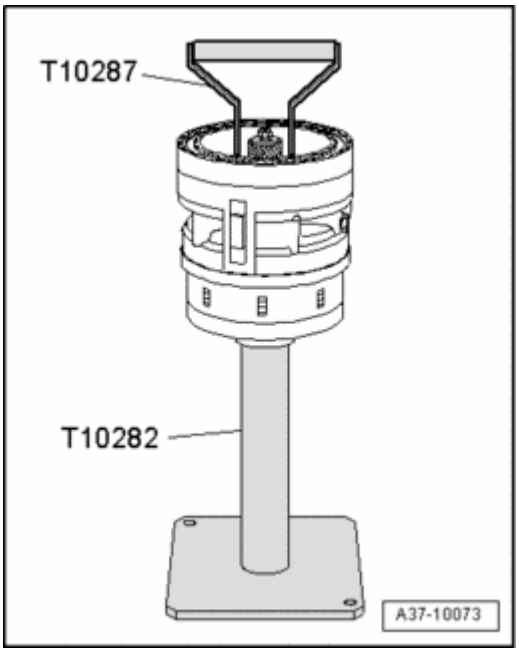


Fig. 76: Identifying Lifting Device T10287 And Mounting Device T10282
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place tower "I" in mounting device T10282.

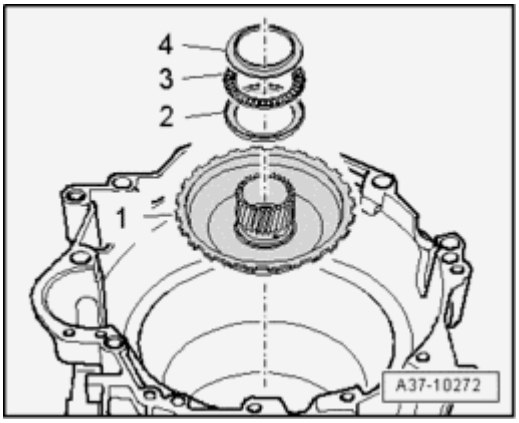


Fig. 77: Sun Gear "III" With Lower Angle Washer, Axial Needle Bearing, and Upper Angle Washer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove sun gear "III" - **1** - with lower angle washer - **2** - , axial needle bearing - **3** - and upper angle washer - **4** - from transmission housing.

NOTE:

- **Upper angle washer - 4 - possibly adheres to underside of tower "I".**

Assembling

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- Check lifting device in tower "I" for proper seating.

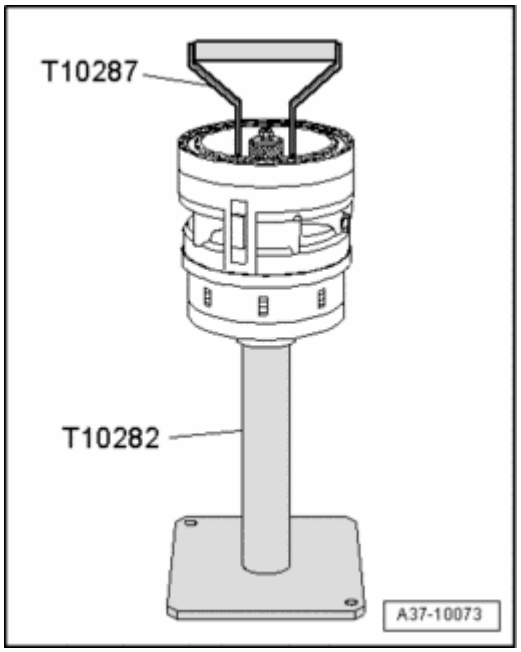


Fig. 78: Identifying Lifting Device T10287 And Mounting Device T10282
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lift tower "I" out of mounting device T10282 by hand and lay aside on workbench.

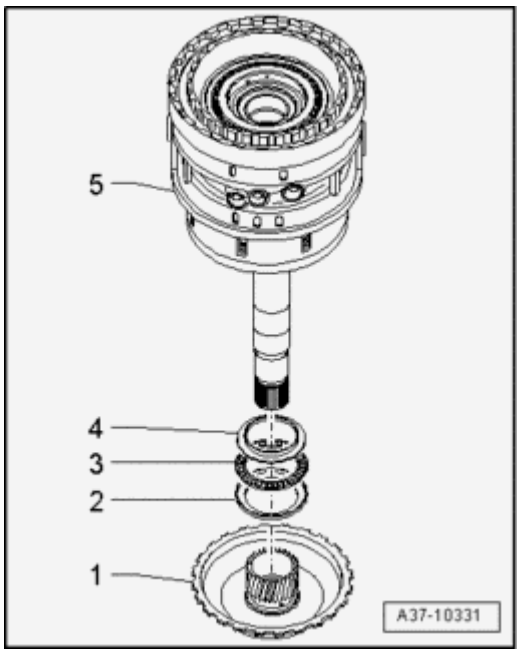


Fig. 79: Tower "I", Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach the following components to input shaft of tower "I" - **5** - :

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4 - Upper angle washer - angled edge points up toward tower "I"

3 - Axial needle bearing

2 - Lower angle washer - angled edge points toward axial needle bearing

1 - Sun gear "III" - outer splines of sun gear must engage in splines of clutch "F"

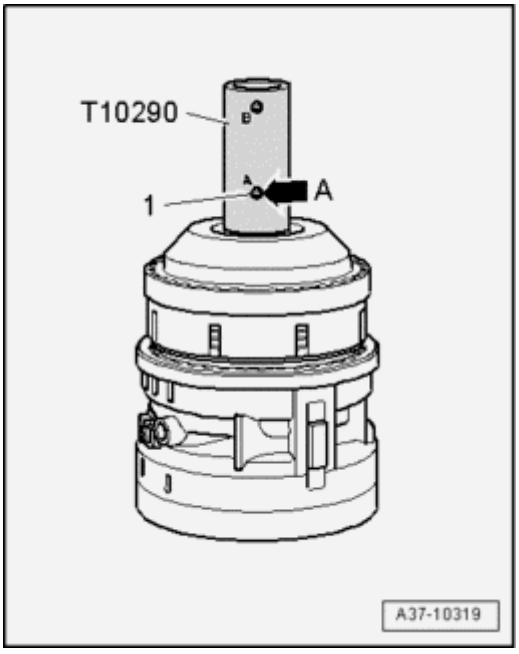


Fig. 80: Securing Sun Gear "III" On Input Shaft Without Play, Using Assembly Sleeve T10290
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Automatic transmission 01V Front Wheel Drive:

- Secure sun gear "III" on input shaft without play, using assembly sleeve T10290 , as depicted in illustration, thread stud bolt - **1** - into bore identified by "A" - **arrow A** - and hand-tighten.

CAUTION:

- **Stud bolt must not be threaded in bore identified by "B" under any circumstances, or splines will be damaged.**
- **Bore "A" faces toward sun gear "III".**

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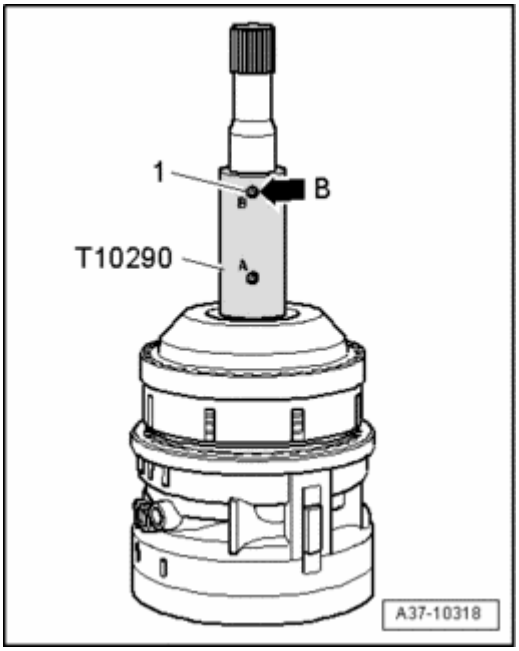


Fig. 81: Securing Sun Gear "III" On Input Shaft Without Play, Using Assembly Sleeve T10290
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Automatic transmission 01V All Wheel Drive:

- Secure sun gear "III" on input shaft without play, using assembly sleeve T10290 , as depicted in illustration, thread stud bolt - **1** - into bore identified by "B" - **arrow B** - and hand-tighten.

CAUTION:

- **Stud bolt must not be threaded in bore identified by "A" under any circumstances, or contact surface will be damaged.**
- **Bore "A" faces toward sun gear "III".**

Automatic Transmission 01V, Front Wheel Drive and All Wheel Drive:

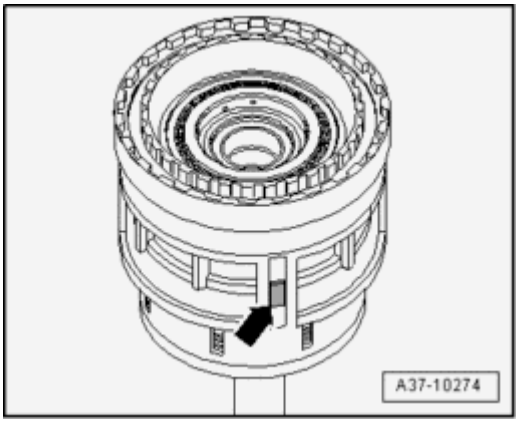


Fig. 82: Checking Fitting Keys Are Inserted Centrally On Both Sides Of Cylinder "D/G"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Check whether fitting keys - **arrow** - are inserted centrally on both sides of cylinder "D/G".

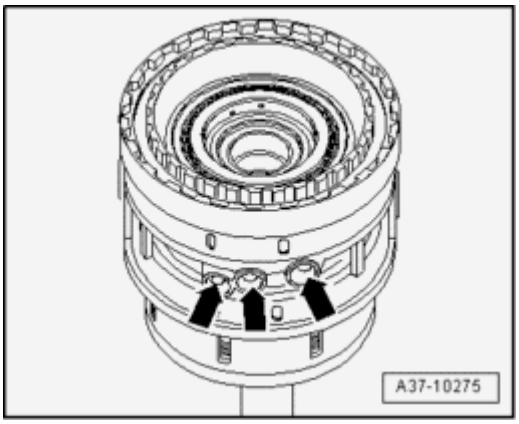


Fig. 83: Location Of Oil Bores On Cylinder "D/G"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bring tower "I" into installation position.

- Oil bores - **arrows** - on cylinder "D/G" face toward underside of transmission and must align with openings in transmission housing.

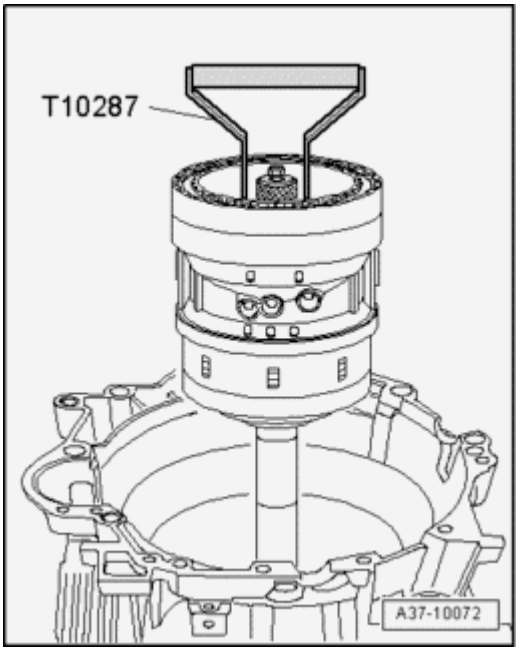


Fig. 84: Installing/Removing Lifting Device T10287
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert tower "I" completely into transmission housing.

- Tower "I" must be inserted far enough that circlip groove is free.

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- Loosen knurled nut and remove lifting device T10287.

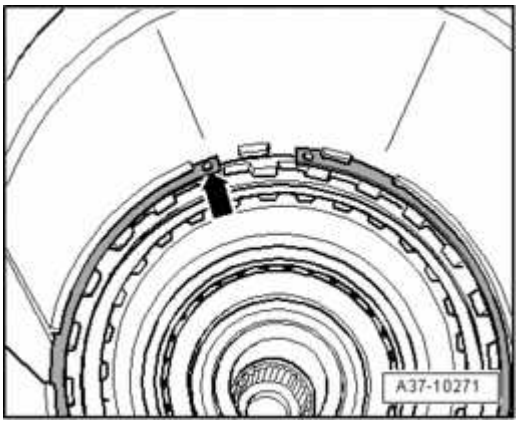


Fig. 85: Circlip For Tower "I"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully insert circlip - **arrow** - for tower "I" into transmission housing.

CAUTION: Make sure that circlip is seated evenly all around in groove of transmission housing, if necessary, drive circlip into groove all around using drift.

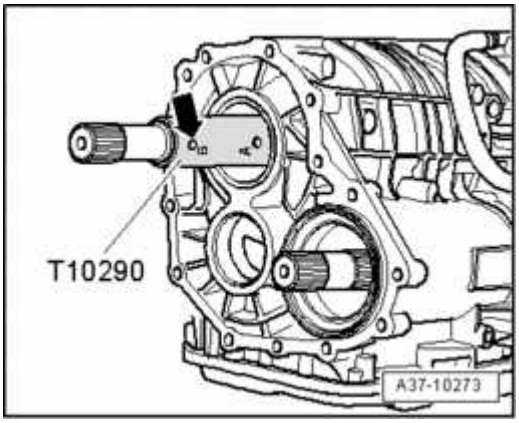


Fig. 86: Loosen Stud Bolt And Remove Assembly Sleeve T10290
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen stud bolt and remove assembly sleeve T10290.

NOTE:

- **Depicted in the illustration with Automatic Transmission 01V All Wheel Drive.**

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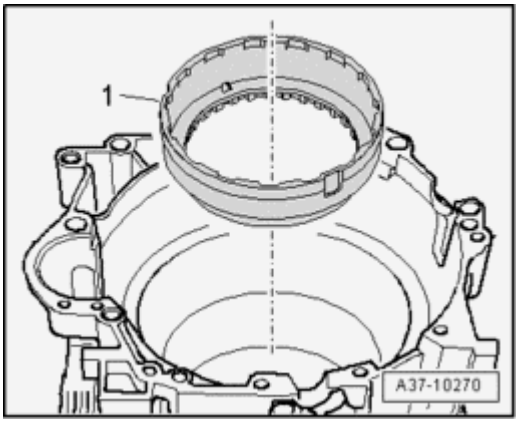


Fig. 87: Ribbed Cup
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert ribbed cup - **1** -.

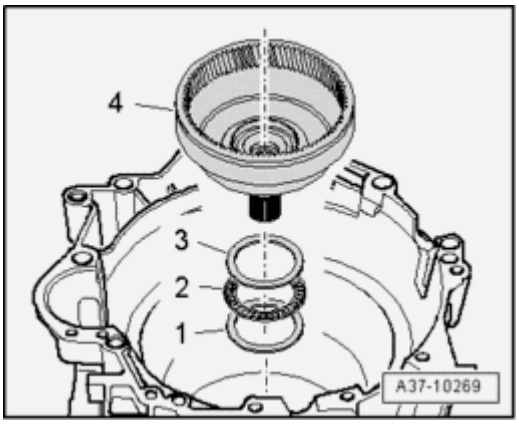


Fig. 88: Shaft With Ring Gear "I", Thrust Washer, Axial Needle Bearing and Angle Washer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach angle washer - **1** - on tower "I".

- Angled edge of angle washer faces down.

- Insert axial needle bearing - **2** -.
- Insert thrust washer - **3** -.
- Insert shaft with ring gear "I" - **4** -.

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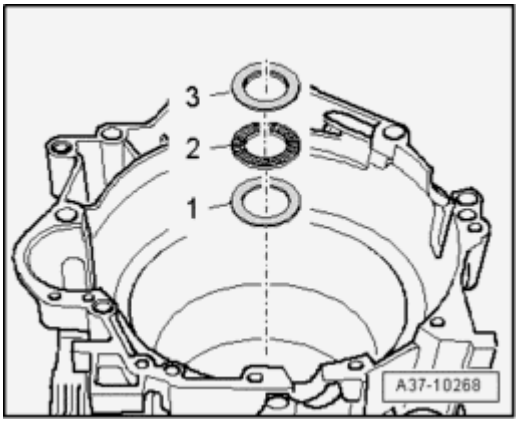


Fig. 89: Angle Washer, Axial Needle Bearing and Thrust Washer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert thrust washer - **1** - into ring gear "I".
- Insert axial needle bearing - **2** -.
- Place angled washer - **3** -.

- Angled edge of angle washer faces down.

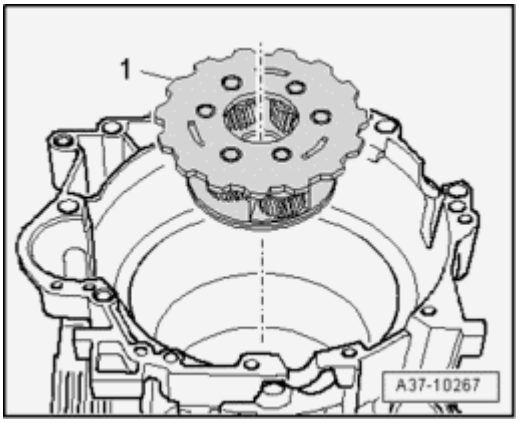


Fig. 90: Identifying Planetary Gear Set "I" And "II"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert planetary gear set "I" and "II" - **1** -.

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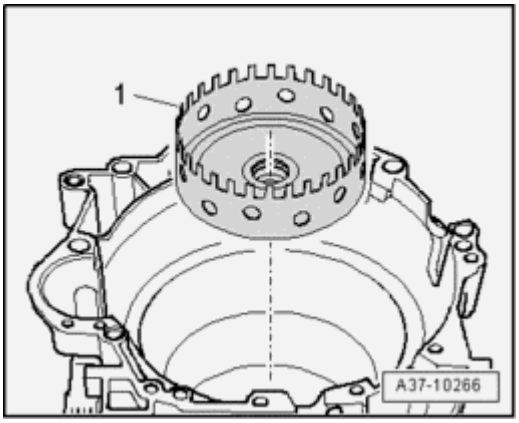


Fig. 91: Identifying Sun Gear "I"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert sun gear "I" - **1** - in planetary gear set "I" and "II".

NOTE:

- **Magnetic sun gear for transmission with hydraulic control "E17" (Transmission Input Speed (RPM) Sensor G182 as inductive sensor).**
- **Non-magnetic sun gear for transmission with hydraulic control "E18/2" (Transmission Input Speed (RPM) Sensor G182 as Hall sensor).**

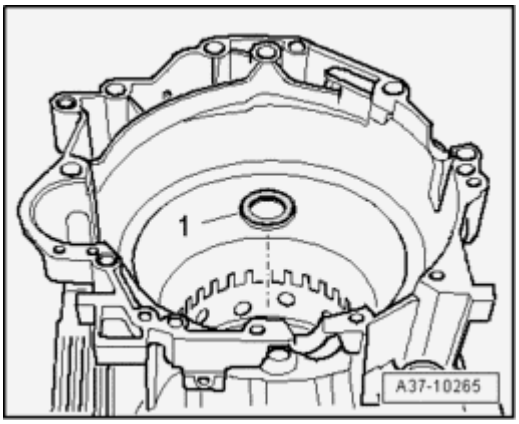


Fig. 92: Identifying Axial Needle Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert axial needle bearing - **1** -.

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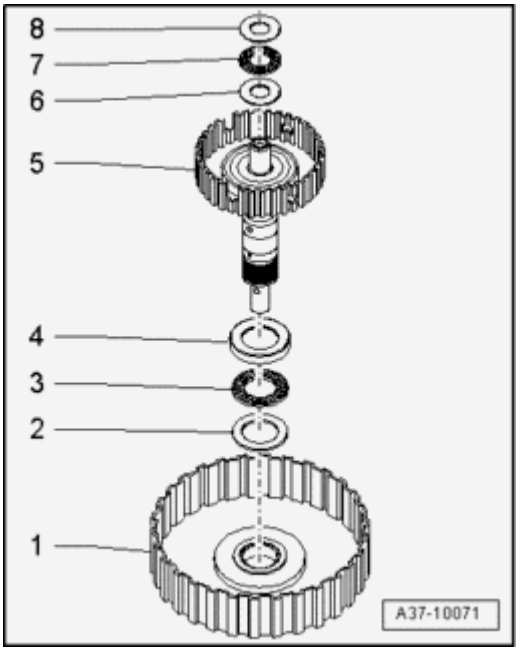


Fig. 93: Disassemble/Assemble The Following Components (As Shown)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Assemble the following components as one unit:

1. Sun shaft
2. Thrust washer
3. Axial needle bearing
4. Angle washer - angled edge points downward toward axial needle bearing
5. Intermediate shaft with inner plate carrier
6. Thrust washer
7. Axial needle bearing
8. Thrust washer

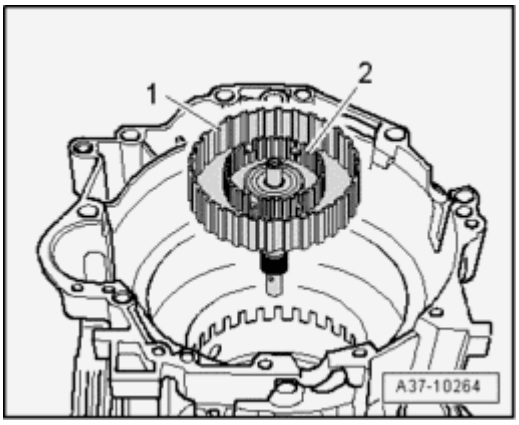


Fig. 94: Removing/Installing Sun Shaft with Intermediate Shaft Out/In Of Transmission Housing

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert sun shaft - **1** - together with intermediate shaft - **2** - with inner plate carrier.

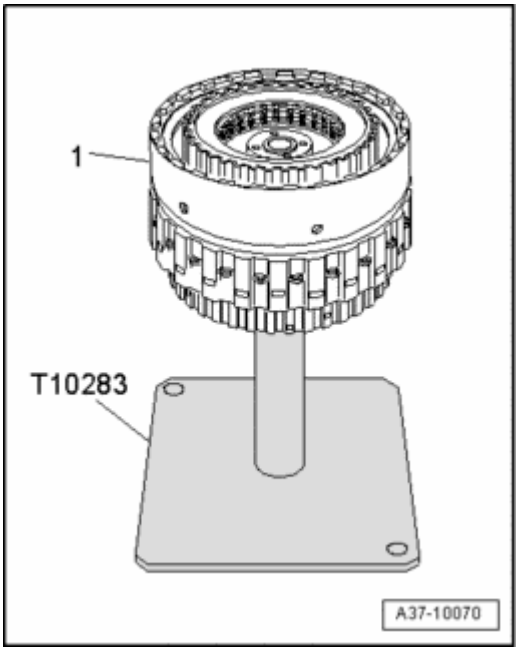


Fig. 95: Tower "II" Mounted On Device T10283Tower "II" Mounted On Device T10283
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove "tower II" - **1** - from mounting device T10283 and turn to installation position.

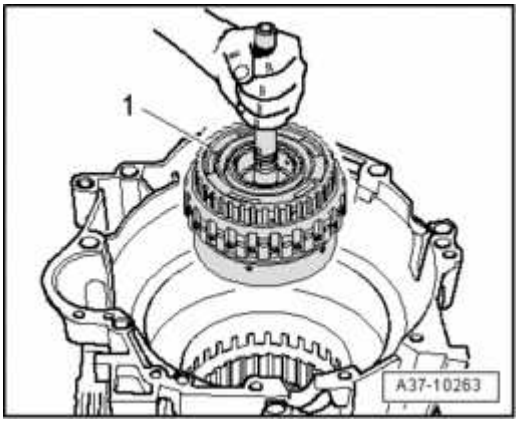


Fig. 96: Removing/Installing Tower "II" Out/In Of Transmission Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert tower "II" - **1** - into transmission housing by hand using turning motions.
- Ensure sun gear coupling plate splines "I" engage in outer splines on cylinder "B" by turning input shaft and sun gear "I".

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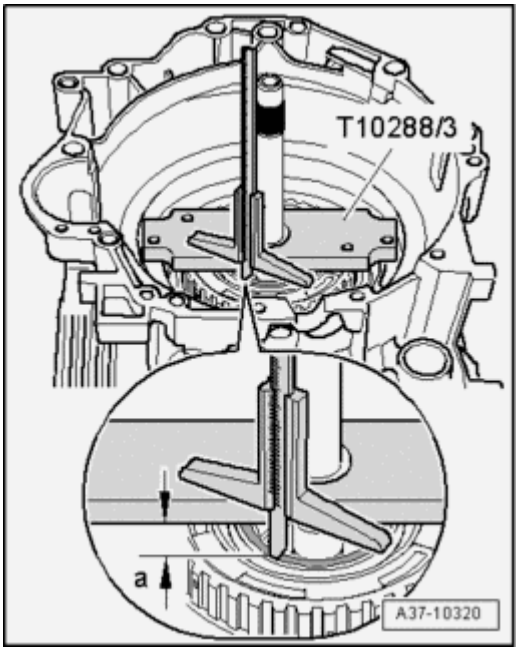


Fig. 97: Identifying Dimension
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check tower "II" for proper installation.
- Measure distance between contact surface for adjustment shim on tower "II" and contact surface for ATF pump on transmission housing.

- Dimension - **a** - = at least 6.0 mm.
- Adjustment shim may not be installed.

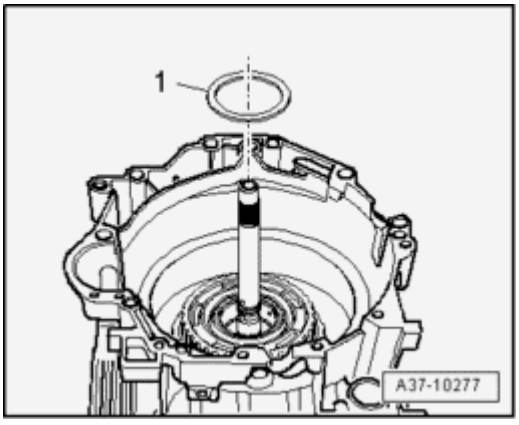


Fig. 98: Adjustment Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place previous adjustment shim - **1** - on plate carrier "C".

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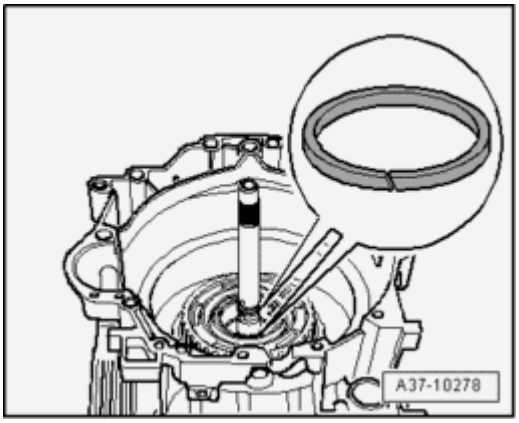


Fig. 99: Location Of Rectangular Rings
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace 2 rectangular rings on input shaft.
- Before inserting, thinly coat rectangular rings on input shaft with Vaseline. Use only Vaseline, other lubricating substances cause functional problems in hydraulic transmission control.
- Make sure that rectangular rings are fully seated all around in the input shaft groove.

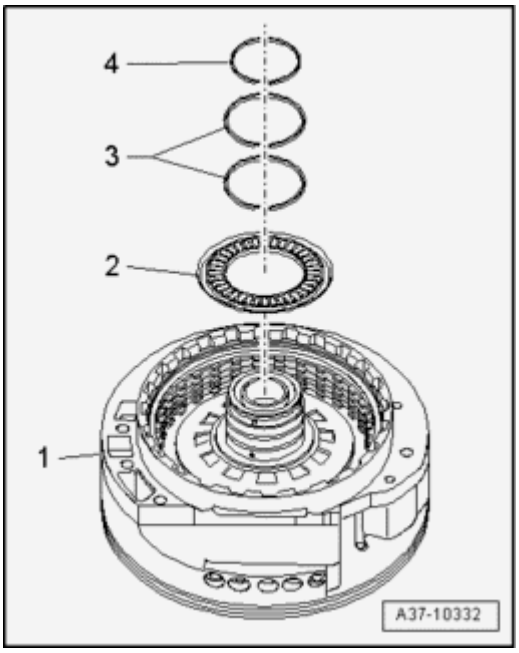


Fig. 100: ATF Pump, Axial Needle Bearing, and Rectangular Rings And
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Thinly coat back side of axial needle bearing - **2** - with Vaseline. Use only Vaseline, other lubricating substances cause functional problems in the hydraulic transmission control.
- Append axial needle bearing to ATF pump - **1** -.

- Closed side of axial needle bearing faces toward ATF pump.

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- Replace rectangular rings - **3** - and - **4** - on stator shaft.
- Before inserting, lightly coat rectangular ring with Vaseline. Use only Vaseline, other lubricating substances cause functional problems in the hydraulic transmission control.
- Make sure that rectangular rings are fully seated all around in stator shaft groove.

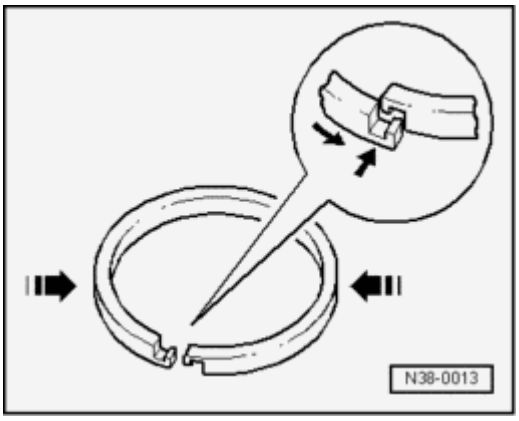


Fig. 101: Hooking Ends Of Piston Ring Together
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engage ends of installed rectangular rings - **arrows** - , as depicted in illustration.

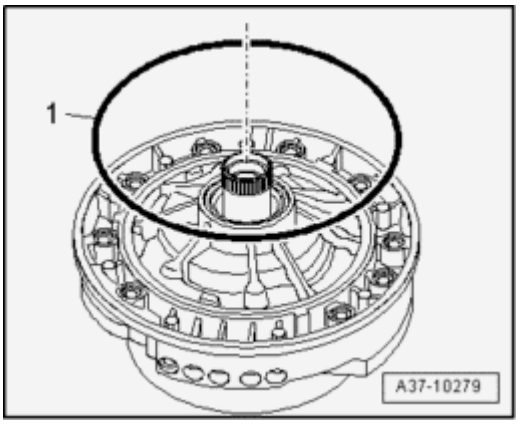


Fig. 102: ATF Pump O-ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-ring - **1** - on ATF supply.
- Thinly coat O-ring with Vaseline. Use only Vaseline, other lubricating substances cause functional problems in hydraulic transmission control.

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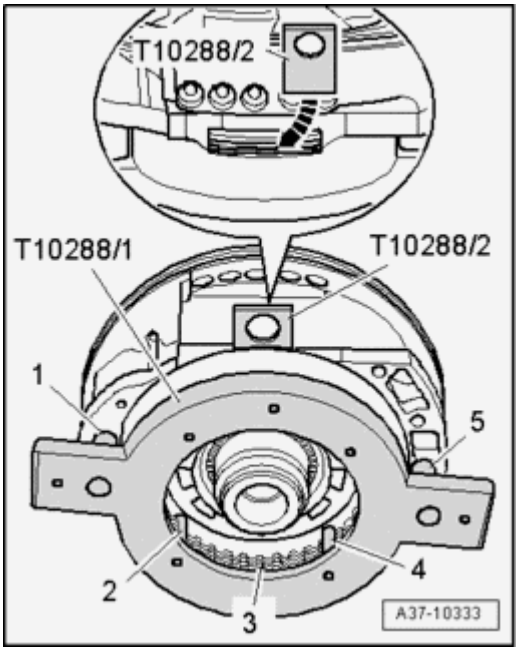


Fig. 103: Align Coated Plates Of Clutch "C" Using Centering Tool T10288/1
Courtesy of VOLKSWAGEN UNITED STATES, INC.

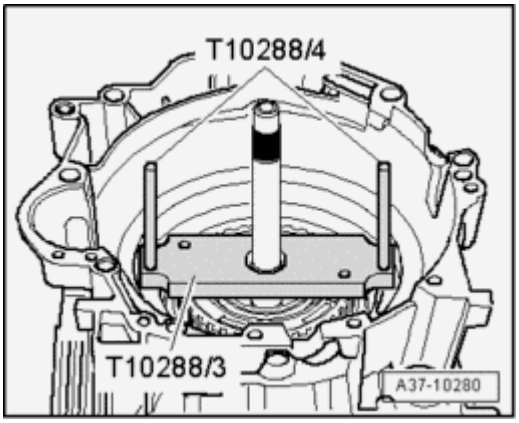
- Align coated plates - **3** - of clutch "C" using centering tool T10288/1 , to do so let pins - **2** - and - **4** - engage in splines of all coated splines.
- Align lining discs to ATF pump housing by inserting centering pins - **1** - and - **5** - into appropriate holes on ATF pump.

- Centering pins fit only in one position.

- Hold centering tool in this position and insert wedge T10288/2 from side between waved washer and piston "F" - **arrow** -.

- Wedge must secure all plates in current position.

- Remove centering tool T10288/1 , wedge T10288/2 remains inserted.



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Fig. 104: Align Plate Carrier For Clutch "C" Using Centering Tool T10288/3
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Align plate carrier for clutch "C" using centering tool T10288/3 , install guide pins T10288/4 into transmission housing.
- Holes in centering tool and transmission housing only fit in one position.
- Carefully remove centering tool T10288/3 upward, guide pins T10288/4 remain in transmission housing.
- Plate carrier for clutch "C" may no longer be turned.

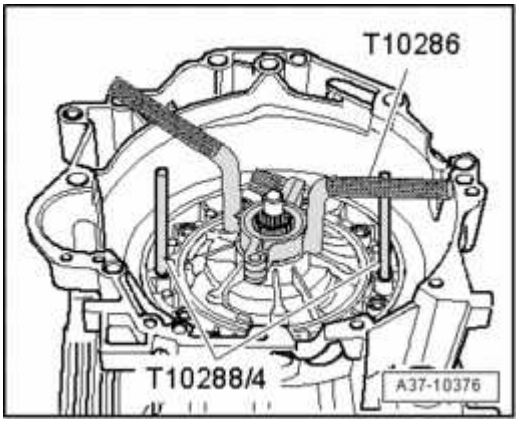


Fig. 105: Attaching Puller For ATF Pump T10286 At Stator Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach puller for ATF supply T10286 at stator shaft.
- Bring ATF supply to installation position.
- Recess for flange shaft faces toward valve body side.
- Attach ATF supply with corresponding bores onto guide pins T10288/4.
- Carefully insert ATF supply into transmission housing and push forcefully.
- Bring ATF supply to final installation position by alternately tightening two opposing attachment bolts each.

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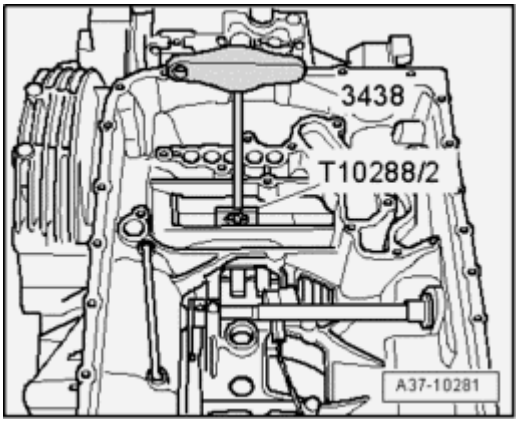


Fig. 106: Removing Wedge 10288/2 Using Hook 3438
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove wedge 10288/2 using hook 3438.
- Remove Puller for ATF supply T10286.
- Remove guide pins T10288/4.

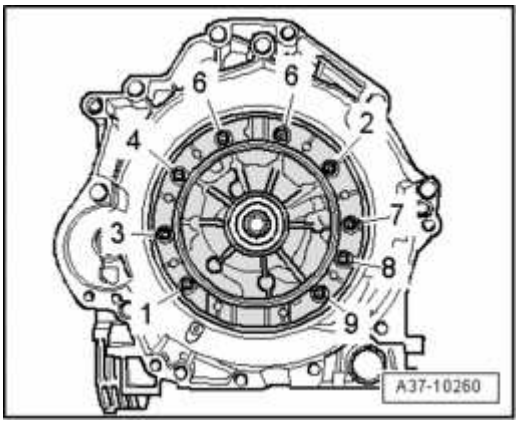


Fig. 107: Identifying ATF Pump Bolts Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert ATF pump bolts with new sealing washers into ATF pump housing.
- Tighten ATF pump bolts - **1 to 9** - in sequence.

- Tightening torque: 10 Nm.

NOTE:

- **Check for correct ATF pump installation: You must be able to rotate the input shaft. Otherwise, the last clutch plate "C" may have been pinched during installation and bent. In this case, remove ATF pump again and check discs for damage.**

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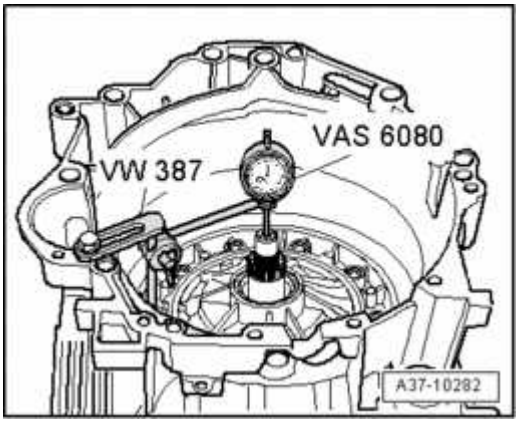


Fig. 108: Checking Input Shaft Axial Clearance
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach Dial gauge VAS 6080 with Dial gauge holder VW 387 to transmission flange.
- Insert Dial gauge VAS 6080 with dial gauge extension onto input shaft of transmission, as depicted in illustration.
- Set dial gauge to "0".
- To protect against damage, cover input shaft with insulating tape.
- Move input shaft up and down using pliers, while doing so avoid lateral movement.
- Read input shaft axial clearance on dial gauge.

- Specified value: 0.10 to 0.30 mm.

If specified value is not obtained:

- Remove ATF pump again.

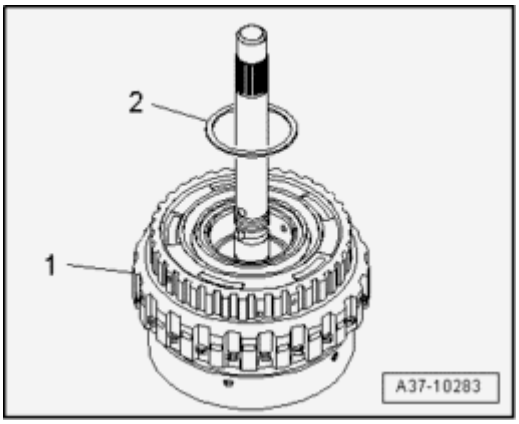


Fig. 109: Identifying Tower "II", Clutch "B" and Adjustment Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Determine correct adjustment shim - **2** - on tower "II" item - **1** - according to the following table.

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- Measured axial clearance too small: Install respectively thinner shim.
- Measured axial clearance too large: Install respectively thicker shim.

Available shims - thickness in mm		
1.6	2.0	2.4
1.8	2.2	2.6

- Reinstall ATF pump with new adjustment shim, new sealing washers and new O-ring. Refer to **Fig. 100** .
- Check axial clearance of input shaft again --> **Fig. 108** .

If specified value is again not obtained:

- Repeat adjustment.

If specified value is obtained:

- Rotate transmission on assembly stand.
- Valve body side points upward.

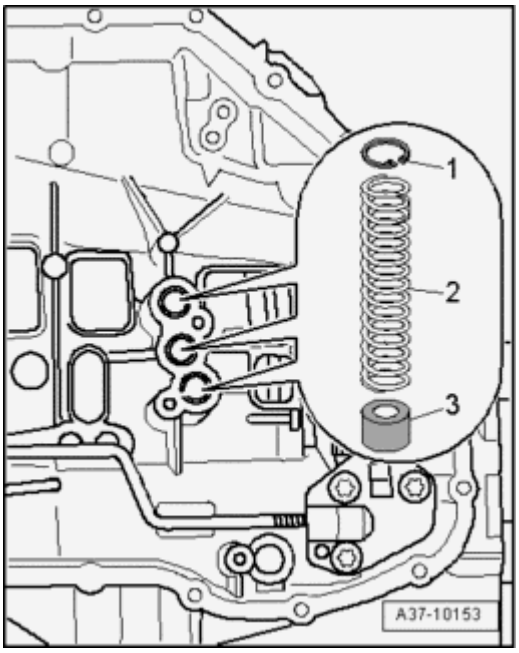


Fig. 110: Identifying Securing Rings, Coil Springs, and Sealing Sleeves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press sealing sleeves - **3** - into transmission housing holes to stop.
- Insert coil springs - **2** - and secure with circlips - **1** - by pressing circlips into hole down to shoulder.

CAUTION: Only transmissions with hydraulic control "E17" : Do not rest valve body

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on Transmission Input Speed (RPM) Sensor G182 - arrow - (on bottom side of valve body) - risk of damage.

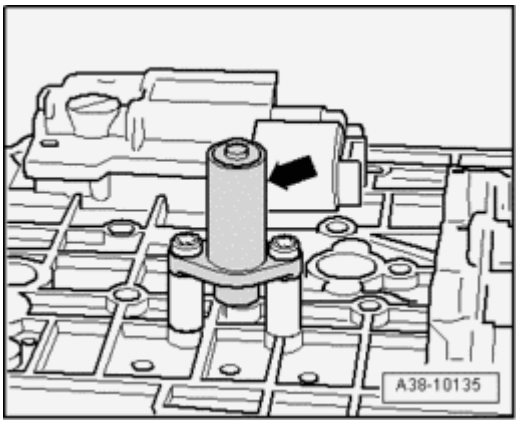


Fig. 111: Carefully Remove Valve Body From Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

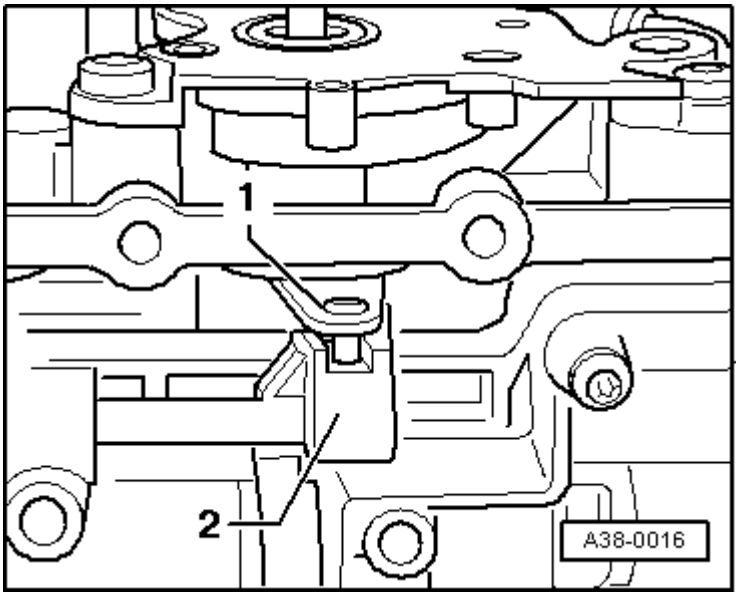


Fig. 112: Position Valve Body On Transmission Housing While Inserting Notched Disc Pins Into Selector Slide Groove
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position valve body on transmission housing without force while inserting notched disc pins - **1** - into selector slide groove - **2** -.
- Position valve body bolts.

NOTE:

- **Note different length of bolts.**

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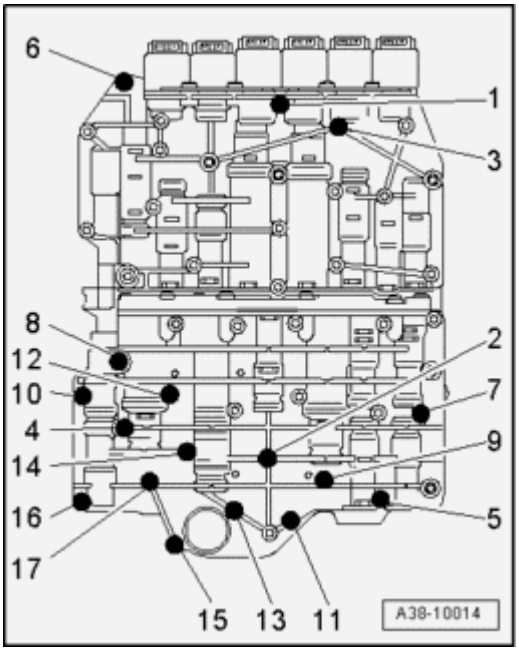


Fig. 113: Loosening or Tightening Valve Body Bolts In Sequence (As Describe)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt - **6** - is only present on transmissions with hydraulic control "E17".
- On a transmission with hydraulic control "E18/2" , ensure electrical wire to Transmission Input Speed (RPM) Sensor G182 is not pinched between transmission housing and valve body.

- Tighten valve body bolts in 2 stages as follows:

Stage	Tightening
I	- Hand-tighten bolts - **1 to 17** - in sequence.
II	- Tighten bolts - **1 to 17** - in sequence to 8 Nm.

- Replace O-rings for wiring harness/harness connector.

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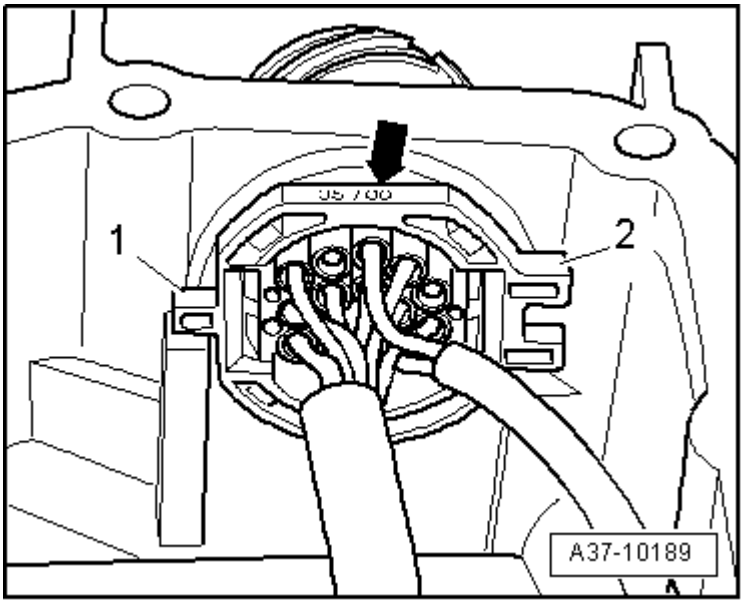


Fig. 114: Location Of Transmission Harness Connector and Connector O-ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect wiring harness connector - **arrow** - to transmission housing.

- Installation position: Retainers - **1** - and - **2** - at collar are horizontal, leveled side - **arrow** - of connector must be parallel to ATF oil pan sealing surface.

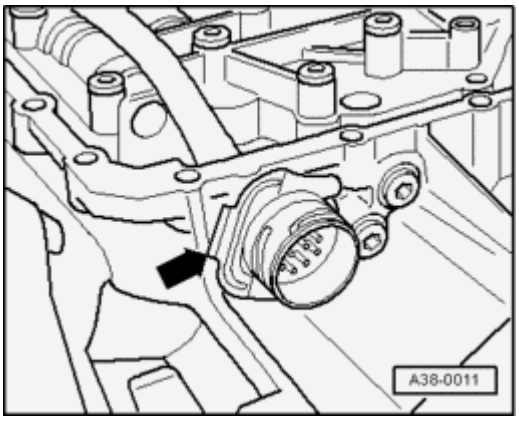


Fig. 115: Location Of Wiring Harness/Harness Connector Securing Circlip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position wiring harness connector securing clip - **arrow** - and ensure it locks securely.

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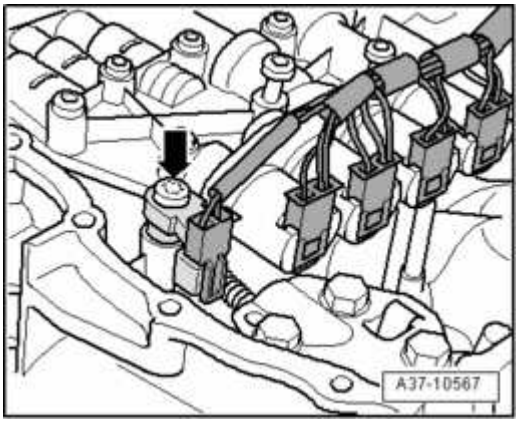


Fig. 116: Identifying Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195 Harness Fastener
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten bolt - **arrow** - for Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195.

- Tightening torque: 10 Nm.

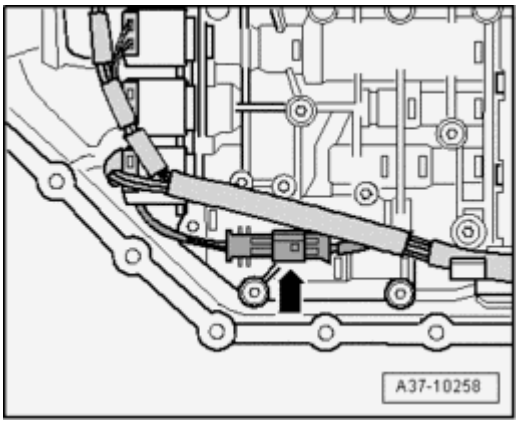


Fig. 117: Identifying Connector Transmission Input Speed (RPM) Sensor G182 At Valve Body
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- With a transmission with hydraulic control "E18/2" , connect electrical connector to Transmission Input Speed (RPM) Sensor G182.
- Clip electrical harness connector into valve body mount - **arrow** -.
- Replace ATF filter.

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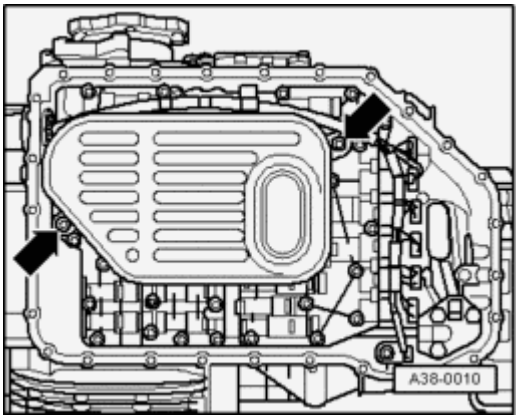


Fig. 118: ATF Screen Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position ATF filter on valve body and tighten - **arrows** -.

- Tightening torque: 5 Nm.

NOTE:

- **Clean magnets (6x) in ATF oil pan.**
- **Ensure full surface contact of the magnets in the ATF oil pan.**

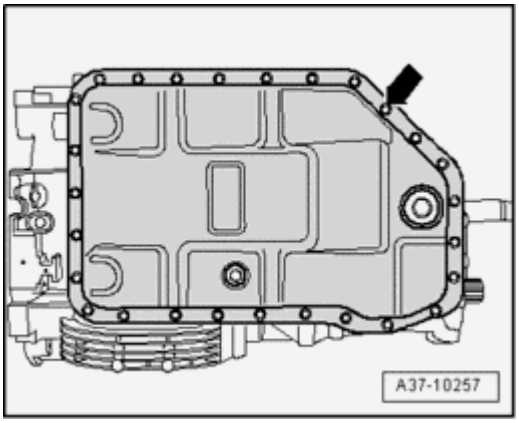


Fig. 119: Identifying Oil Pan Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install ATF oil pan - **arrow** - with new seal.
- Tighten bolts for ATF oil pan in diagonal sequence in stages.

- Tightening torque: 10 Nm.

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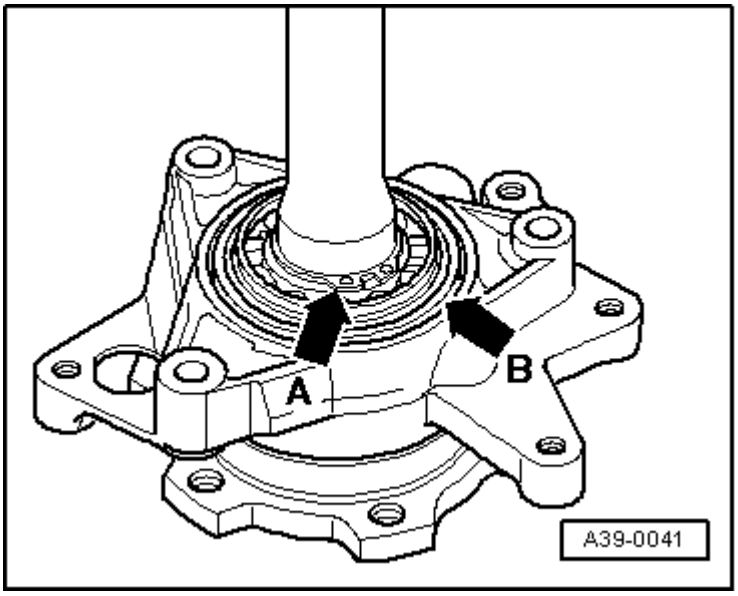


Fig. 120: Removing/Installing Circlip And Seal At Grooved Ball Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If necessary, replace flange seal for left flange shaft --> **39 - FINAL DRIVE, DIFFERENTIAL** .
- Replace O-ring - **arrow B** - in mounting bracket for left flange shaft.

NOTE:

- **Disregard - arrow A -.**

- Replace final drive/transmission housing double shaft seal if necessary --> **39 - FINAL DRIVE, DIFFERENTIAL** .

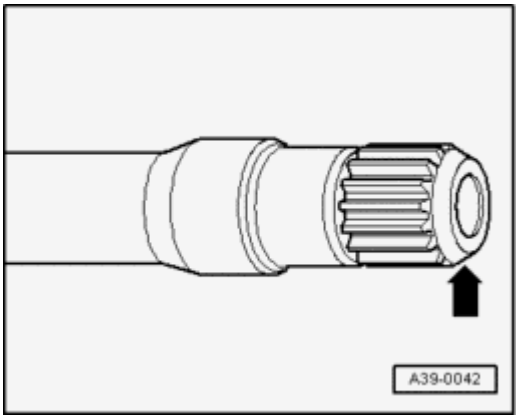


Fig. 121: Checking That There Are No Sharp Edges On Transmission End Of Flange Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Completely cover splines - **arrow** - on left flange shaft with insulating tape without wrinkling or overlapping to avoid damaging final drive/transmission housing double shaft seal when installing flange shaft.
- Insert left flange shaft into transmission.

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NOTE:

- **When sliding on, left drive flange must be carefully guided by hand to prevent damage to the double seal in final drive/transmission housing.**

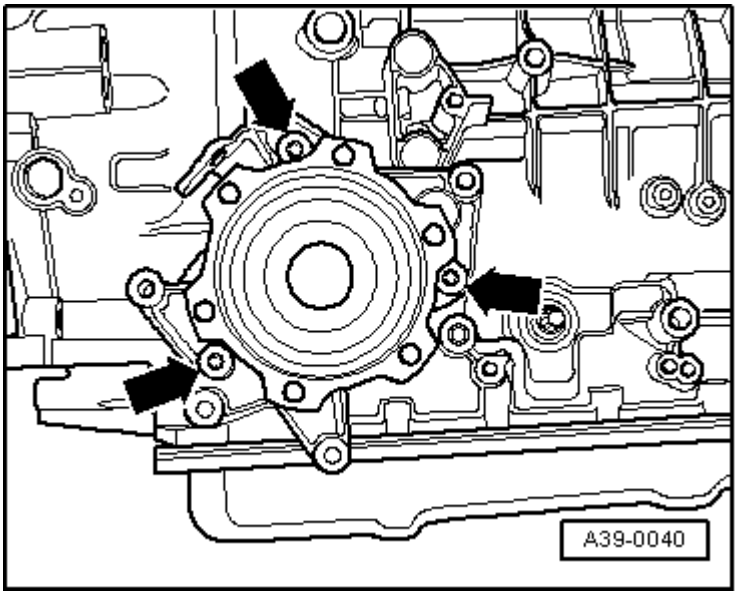
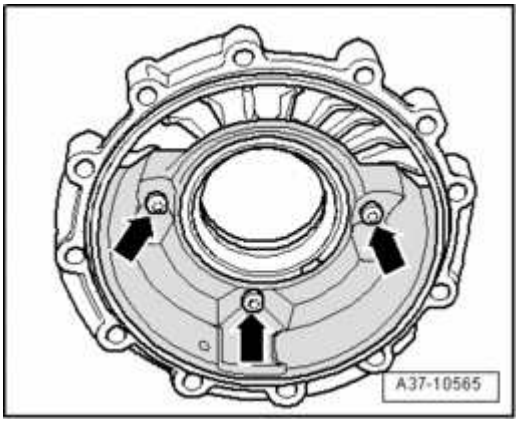


Fig. 122: Removing/Installing Left Drive Flange Mounting Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten left flange shaft mounting bracket bolts - **arrows** -.
- Tightening torque: 23 Nm.

CAUTION:

- **Ensure tapered roller bearing outer race and differential adjusting screw do not fall out of final drive cover.**
- **Tapered roller bearing outer race must be installed in the same location.**
- **The shim must be the correct size and must not be replaced by a shim with a different thickness.**



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Fig. 123: Removing/Installing Baffle At Final Drive Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Clean baffle and tighten it to final drive cover - **arrows** -.
- Tightening torque: 10 Nm.

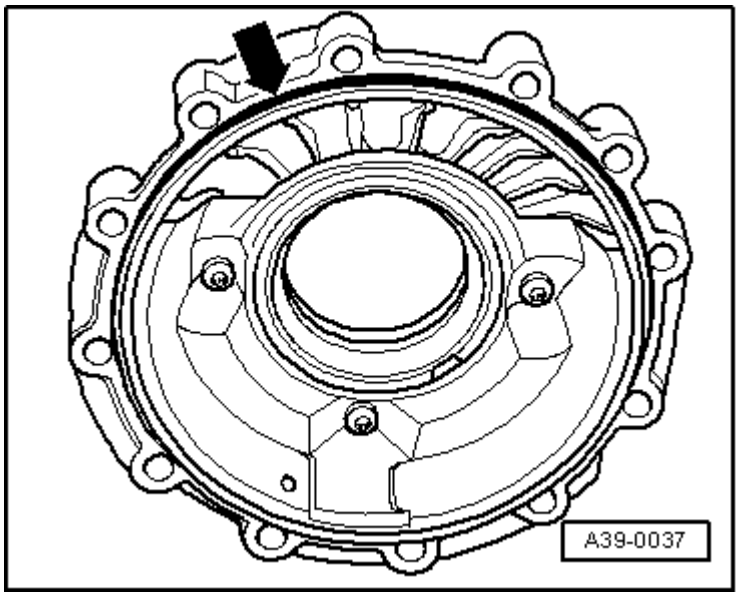
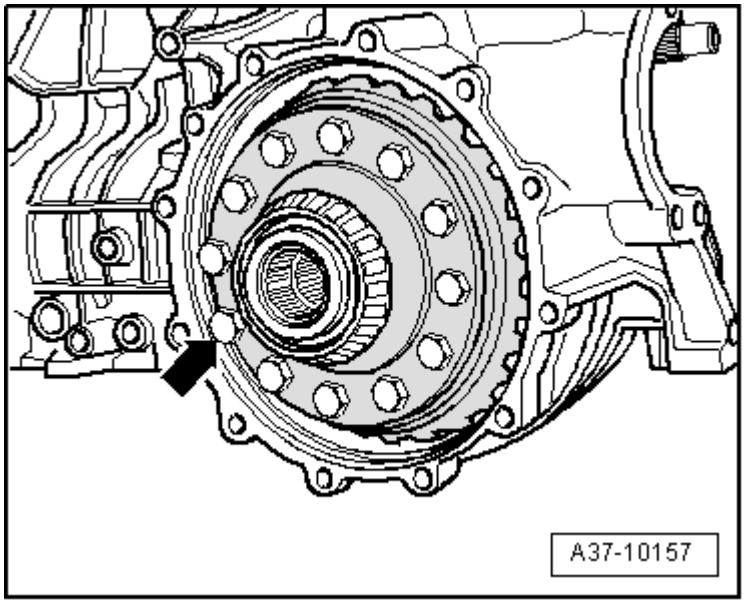


Fig. 124: Identifying Cover For Front Final Drive And O-Ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-ring - **arrow** - in final drive cover.
- If necessary, replace flange seal for right flange shaft --> **39 - FINAL DRIVE, DIFFERENTIAL** .



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Fig. 125: Removing/Installing Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully install differential - **arrow** -.

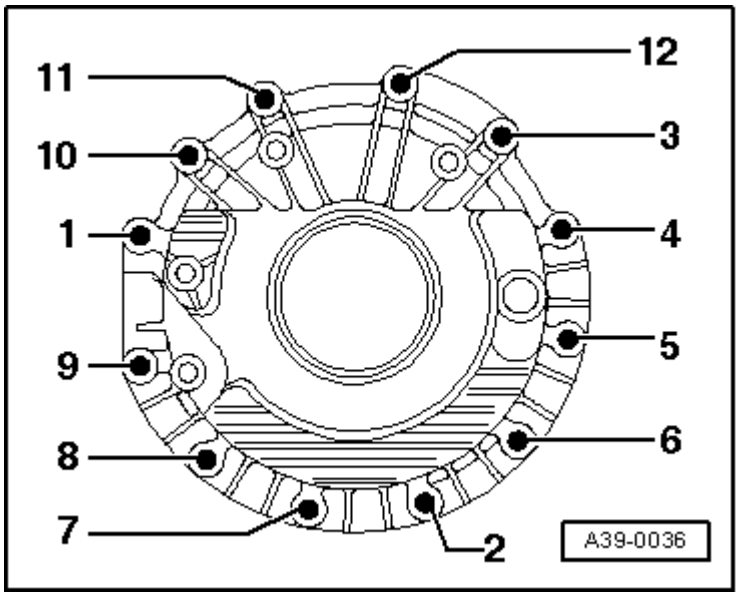


Fig. 126: Installing Cover For Front Final Drive, Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position final drive cover on transmission housing.
- Tighten final drive cover bolts in 2 stages as follows:

Stage	Tightening
I	- Hand-tighten bolts - **1 to 3** - in sequence.
II	- Tighten bolts - **1 to 12** - in sequence to 23 Nm.

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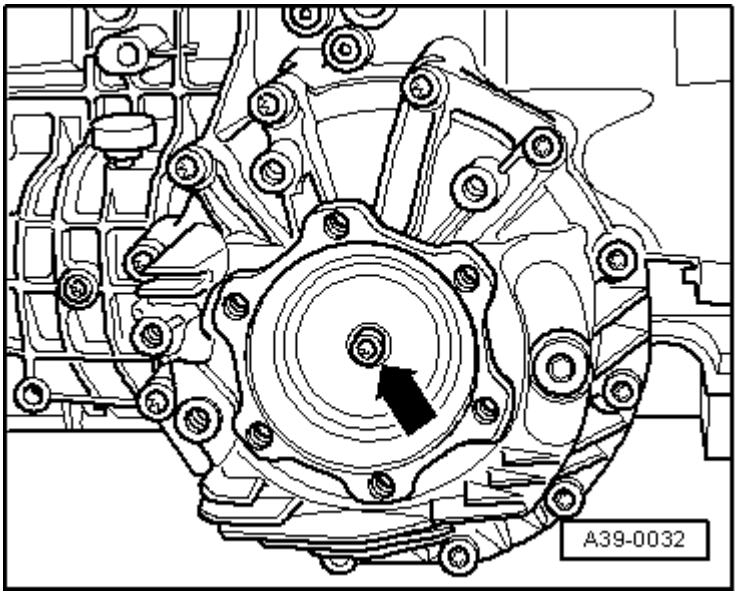


Fig. 127: Flange Shaft Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten right flange shaft bolt - **arrow** - by installing 2 bolts in flange and counterholding flange shaft using a pry bar.

- Tightening torque: 23 Nm.

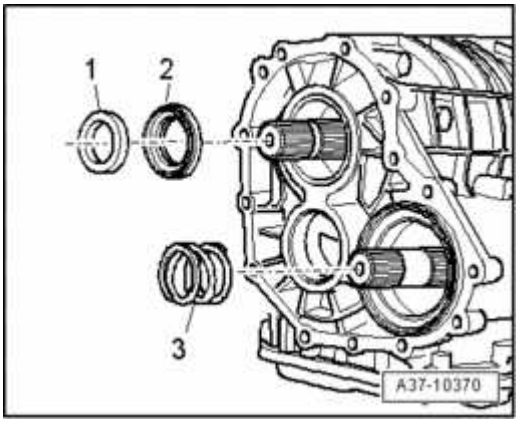


Fig. 128: Identifying Adjustment Shim, Axial Needle Bearing, And Coil Spring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Automatic transmission 01V Front Wheel Drive:

- Attach coil spring - **3** - onto pinion shaft.
- Attach axial needle bearing - **2** - and adjustment shim - **1** - onto input shaft.

- Angled edge of axial needle bearing points toward adjustment shim.

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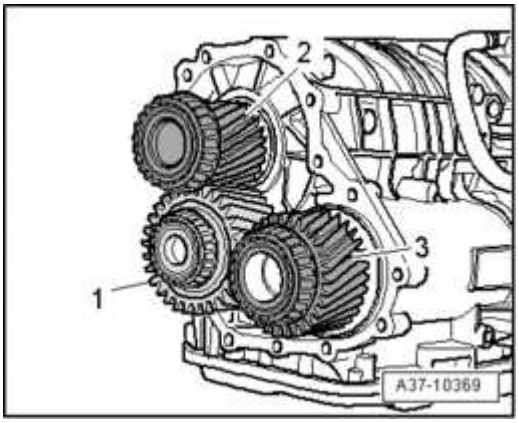


Fig. 129: Identifying Of Intermediate Pinion, Drive Pinion, And Pinion Gears
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach drive pinion - **2** - onto input shaft until stop.

CAUTION: Intermediate pinion - 1 - and pinion gear - 3 - must be reinserted in the same position to maintain running direction.

- Insert pinion gear - **3** - into transmission housing together with intermediate pinion - **1** - , as marked when removed, to do so pull back drive pinion - **2** - from input shaft approx. 20 mm.

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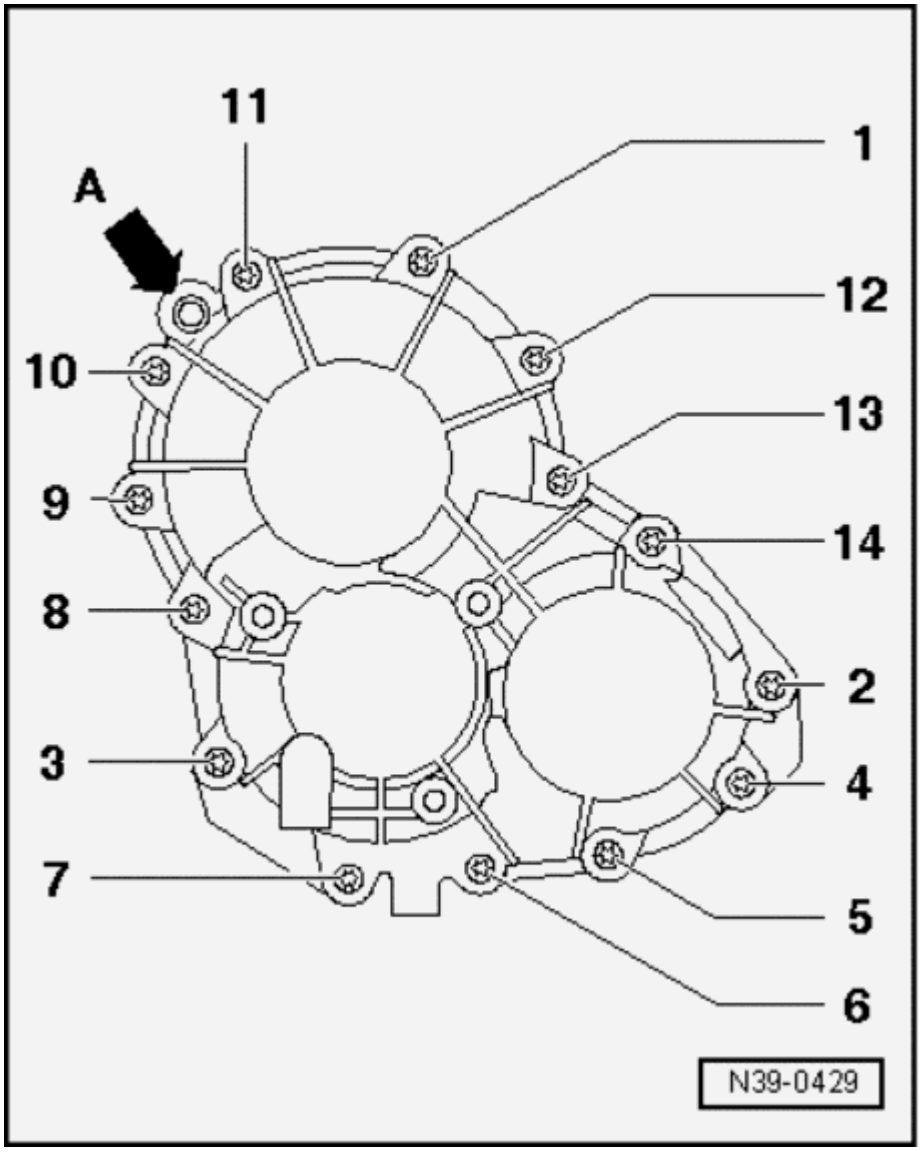


Fig. 130: Identifying Alignment Sleeve And Front Final Drive Cover Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check whether alignment sleeve - **A** - is inserted in front final drive cover.
- Install new gasket.

NOTE:

- **Apply thin coat of axle oil on sealing surface before installing gasket to avoid slipping of the gasket.**

- Tighten front final drive cover bolts in 2 stages as follows:

Stage	Tightening
I	- Hand-tighten bolts - **1 to 3** - in sequence

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	while ensuring housing gap between front final drive cover and transmission housing decreases evenly all around.
II	○ Tighten bolts - **1 to 14** - in sequence to 23 Nm.

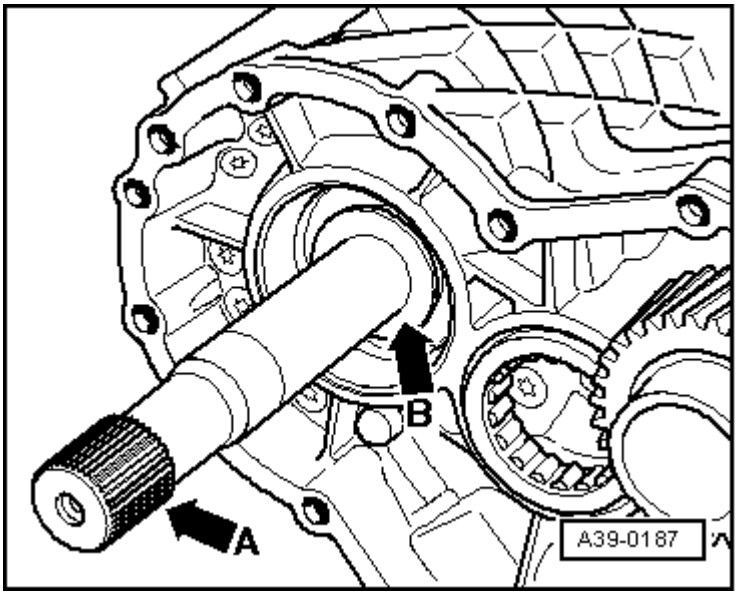


Fig. 131: Cover Splines On Input Shaft (To Prevent Damage To Gasket)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Automatic transmission 01V All Wheel Drive:

- Completely cover splines on input shaft - **arrow A** - with insulating tape without creasing or overlapping the tape to prevent damage to gasket when sliding on drive pinion.

NOTE:

- **Disregard - arrow B -.**

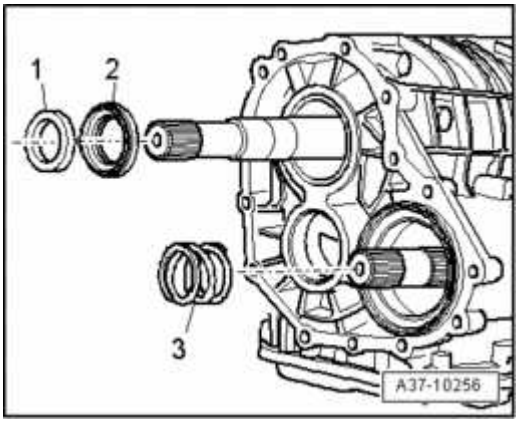


Fig. 132: Identifying Adjustment Shim, Axial Needle Bearing, And Coil Spring

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach coil spring - **3** - onto pinion shaft.
- Attach axial needle bearing - **2** - and adjustment shim - **1** - onto input shaft.

- Angled edge of axial needle bearing points toward adjustment shim.

- Replace shaft seal in drive pinion if necessary --> **Shaft seal in drive pinion, replacing**.

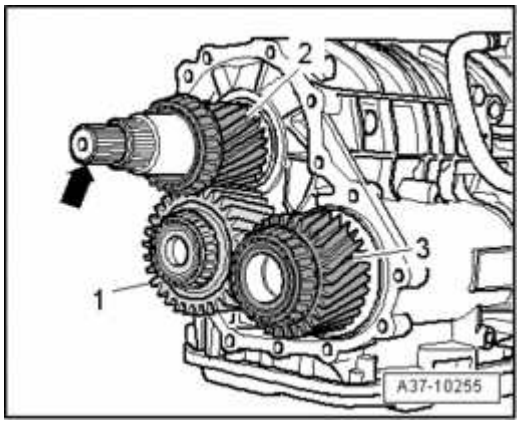


Fig. 133: Identifying Intermediate Pinion, Drive Pinion, And Pinion Gears, and Input Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach drive pinion - **2** - onto input shaft until stop.

CAUTION: Intermediate pinion - 1 - and pinion gear - 3 - must be reinserted in the same position to maintain running direction.

- Insert pinion gear - **3** - into transmission housing together with intermediate pinion - **1** - , as marked when removed, to do so pull back drive pinion - **2** - from input shaft approx. 20 mm.
- If necessary, replace shaft seal for output flange/drive shaft --> **39 - FINAL DRIVE, DIFFERENTIAL** .

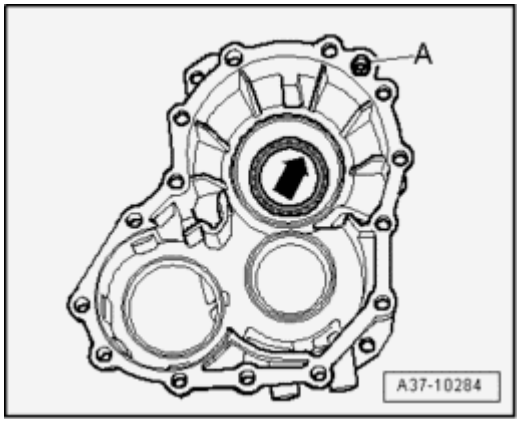


Fig. 134: Checking Alignment Sleeve Is Inserted In Intermediate Flange For Front Final Drive

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check whether alignment sleeve - **A** - is inserted in intermediate flange for front final drive.
- Install new gasket.

NOTE:

- **Apply thin coat of axle oil on sealing surface before installing gasket to avoid slipping of the gasket.**

- Carefully place intermediate flange for front final drive.

CAUTION: When installing the intermediate flange to the input shaft carelessly, the sealing lip of the shaft seal - arrow - can be damaged.

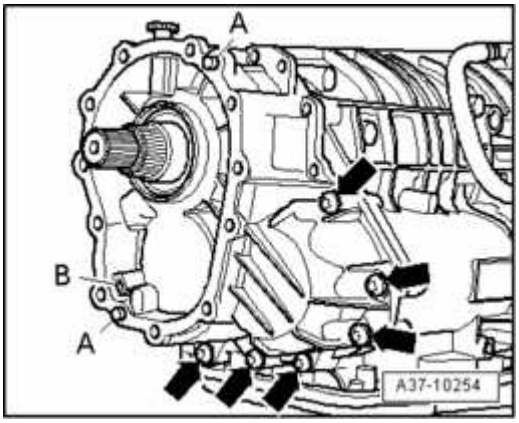


Fig. 135: Identifying Intermediate Flange For Front Final Drive Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten front final drive intermediate flange bolts in 2 stages as follows:

Stage	Tightening
I	- Hand-tighten bolts - **arrows** - in diagonal sequence while ensuring housing gap between front final drive intermediate flange and transmission housing decreases evenly all around.
II	- Tighten bolts in diagonal sequence to 23 Nm.

- Check whether alignment sleeves - **A** - are inserted in front final drive intermediate flange.
- Install new gasket.

NOTE:

- **Apply thin coat of axle oil on sealing surface before installing gasket to avoid slipping of the gasket.**

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- Slide cleaned solenoid in cast-on holding pocket - **B** - in front final drive intermediate flange.
- Add 200 ml axle oil to Torsen differential.

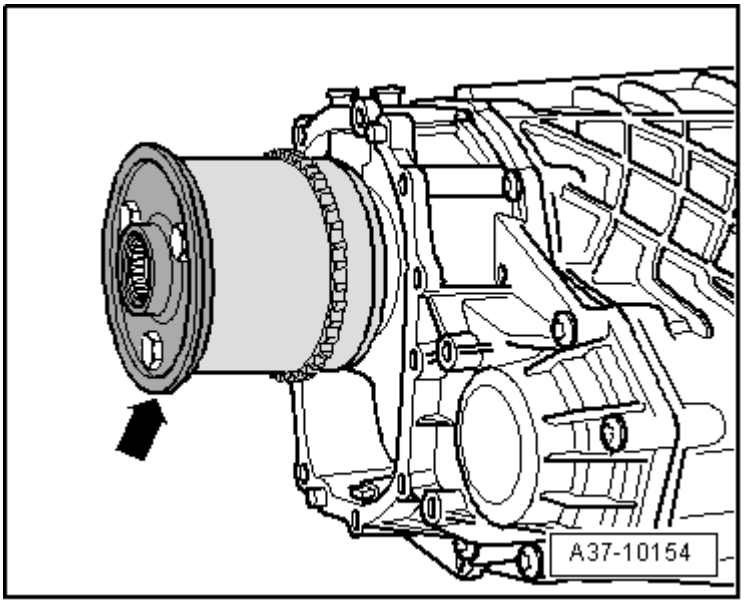


Fig. 136: Removing/Installing Torsen Differential At Input Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach Torsen differential - **arrow** - onto input shaft.

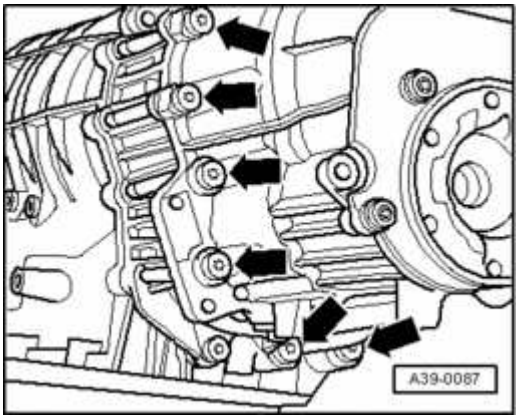


Fig. 137: Identifying Transfer Case Housing Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach transfer case housing with installed spur gears and driveshaft input flange to transmission.
- Tighten transfer case housing bolts in 2 stages as follows:

Stage	Tightening
I	- Hand-tighten bolts - **arrows** - in diagonal sequence while ensuring housing gap between

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	transfer case housing and transmission housing decreases evenly all around.
II	○ Tighten bolts in diagonal sequence to 23 Nm.

Automatic Transmission 01V, Front Wheel Drive and All Wheel Drive:

- Remove transmission from assembly stand.

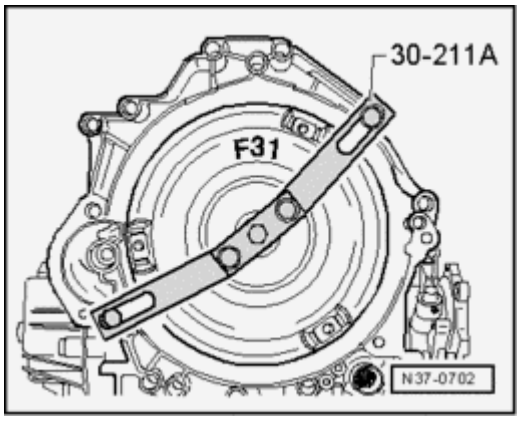


Fig. 138: Securing Torque Converter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert torque converter and secure against falling down with Bracket 30-211 A.
- Check installation dimension of torque converter --> **32 - TORQUE CONVERTER** .

CAUTION: The old transmission should be installed and put into operation as quickly as possible to prevent corrosion on the newly installed components.

- Fill ATF and check ATF level --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .
- Fill axle oil in front final drive and check oil level --> **39 - FINAL DRIVE, DIFFERENTIAL** .
- Top off axle oil in transfer case and check oil level --> **39 - FINAL DRIVE, DIFFERENTIAL** .

Torque specifications

Component	Nm
ATF supply on transmission housing	10
Valve body at transmission housing	8
ATF filter on valve body	5
ATF oil pan on transmission housing	10
Mounting bracket for left drive flange on transmission	23
Final drive cover to transmission	23
Right drive flange	25

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Front final drive cover or front final drive intermediate flange to transmission	23
Transfer case housing to transmission	23

TOWER I , DISASSEMBLING AND ASSEMBLING

Tower "I" , disassembling and assembling

NOTE:

- **General repair notes --> General Repair Notes .**
- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**
- **Lubricate O-rings and gaskets with ATF or Vaseline before installing to prevent rings from being pinched when inserting.**
- **Attach mount and adjustment shims only with Vaseline.**

- Use only ATF or Vaseline in areas near ATF. Other types of lubrication cause faults to occur in the transmission hydraulics.

Tower "I" , component overview

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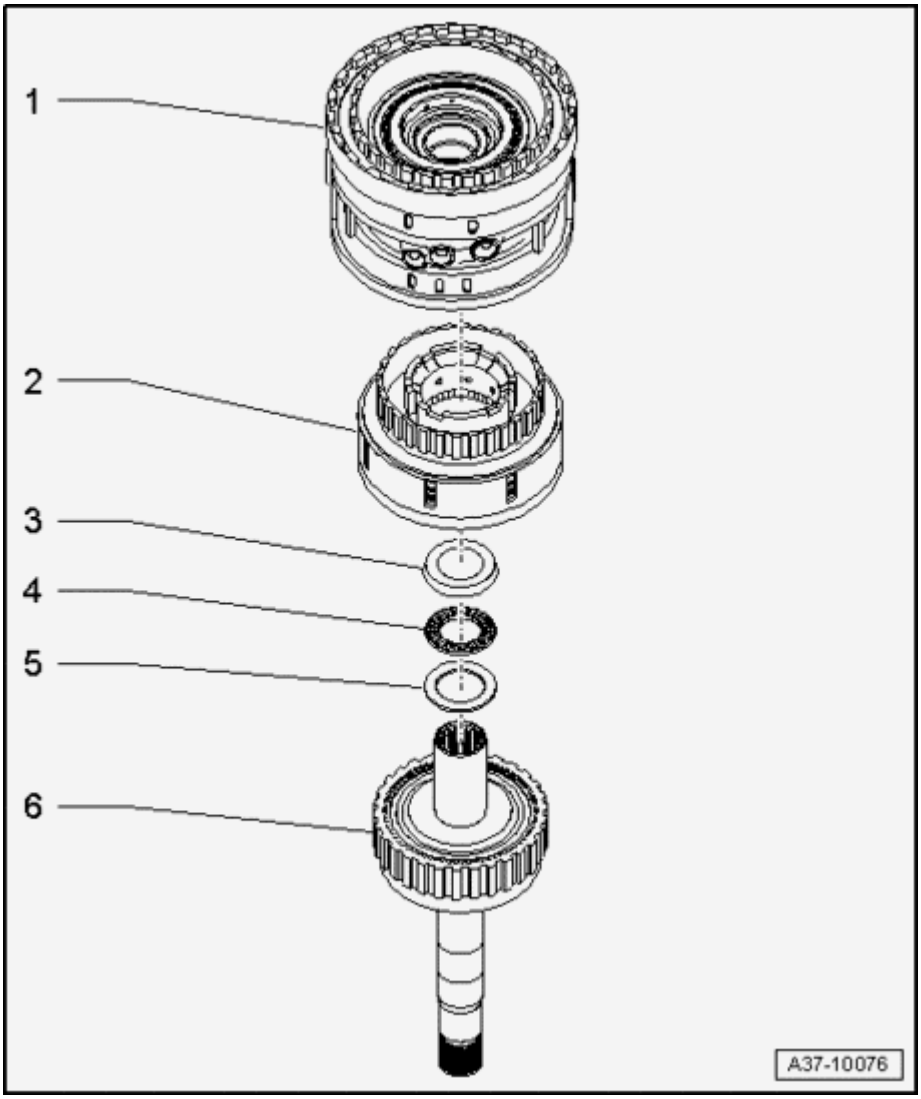


Fig. 139: Tower "I", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Clutch "D/G" with freewheel

2 - Clutch "F"

3 - Angle washer

4 - Axial needle bearing

5 - Thrust washer

6 - Planetary drive "III"

Tower "I" , disassembling

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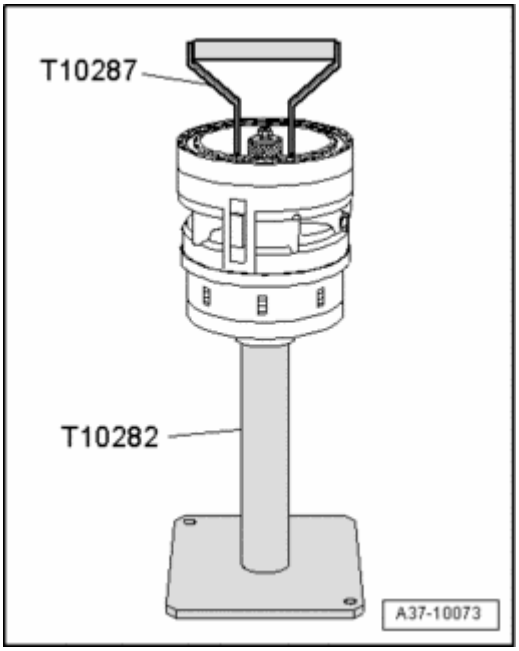


Fig. 140: Identifying Lifting Device T10287 And Mounting Device T10282
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove lifting device T10287 from tower "I".

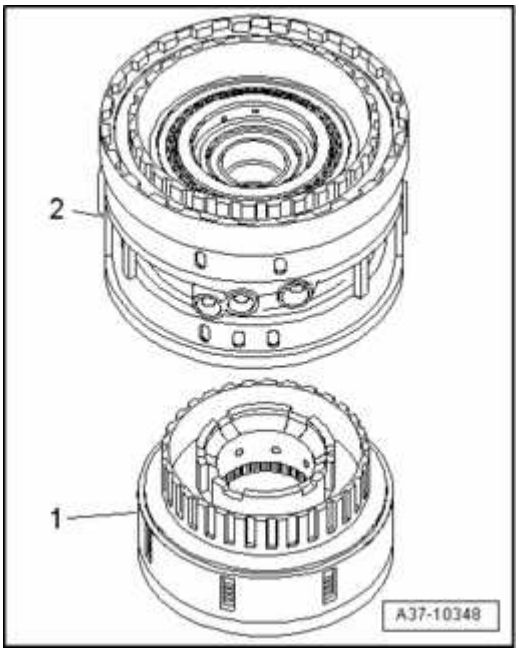


Fig. 141: Remove/Install clutch "D/G" From/To Clutch "F"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove clutch "D/G" - **2** - from clutch "F" - **1** -.

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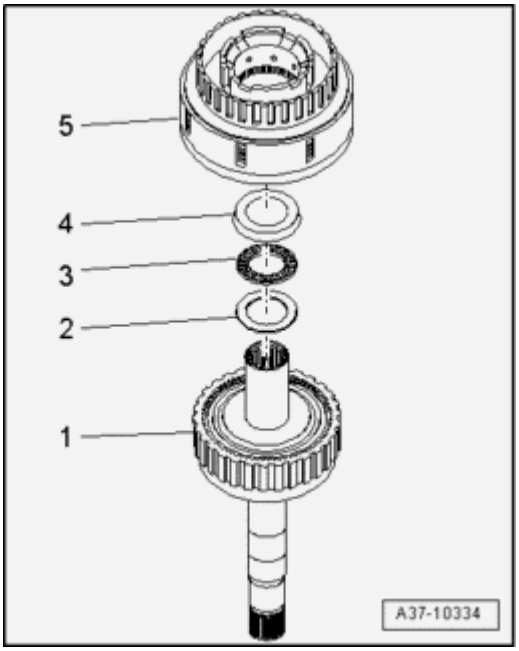


Fig. 142: Tower "I", Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove clutch "F" - **5** - from planetary gear "III" - **1** -.

NOTE:

- **Thrust washer - 2 - , axial needle bearing - 3 - and angle washer - 4 - remain on planetary drive "III".**

Clutch "F" , component overview

NOTE:

- **Clutch "F" is depicted in installed position.**
- **Some of the depicted components are part of component groups and are not available separately as replacement part .**
- **Before assembling, check clutch components "F" for wear and damage --> Clutch "F".**

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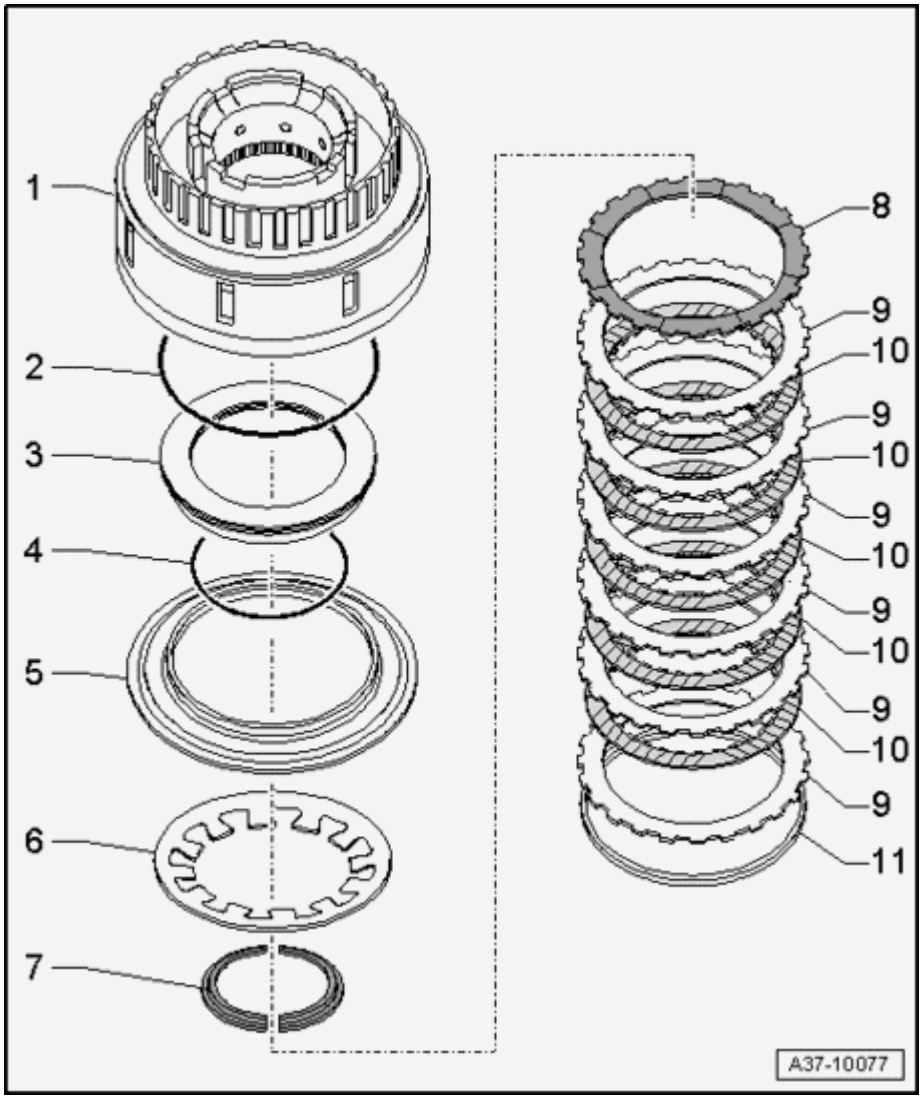


Fig. 143: Clutch "F", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Cylinder "F"

2 - O-ring

- Replace

3 - Piston "F"

4 - O-ring

- Replace

5 - Thrust piece

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6 - Plate spring

7 - Split retaining ring

8 - Waved washer

9 - Outer plate

10 - Coated plate

11 - Circlip

Clutch "F" , disassembling and assembling

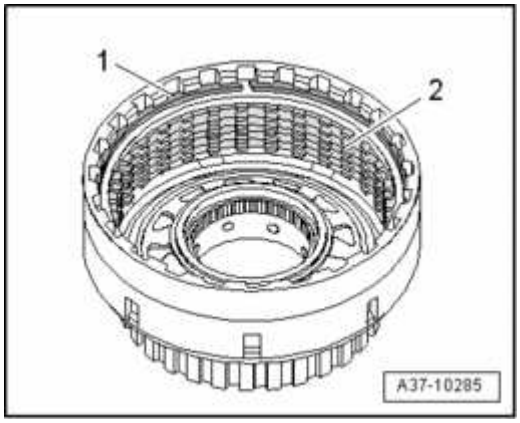


Fig. 144: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Disassembling

- Rotate clutch - **F** -.
- Remove circlip - **1** - and remove plate pack - **2** - from cylinder "F".

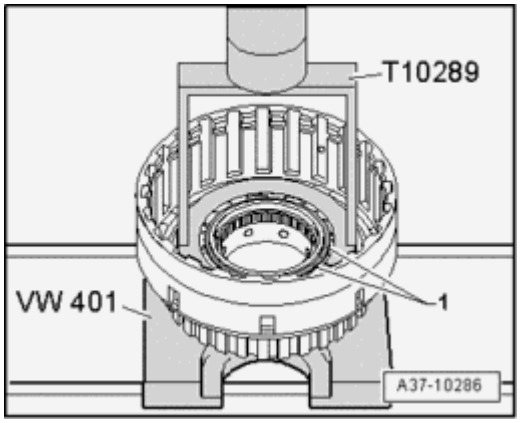


Fig. 145: Press Plate Spring Down Under Shop Press Using Installation Bracket T10289

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press plate spring down under shop press using installation bracket T10289.
- Remove split retaining ring - **1** -.
- Release shop press.
- Remove thrust piece and plate spring.

- Position cylinder "F" on clutch "D/G" with freewheel.

CAUTION: Wear eye protection.

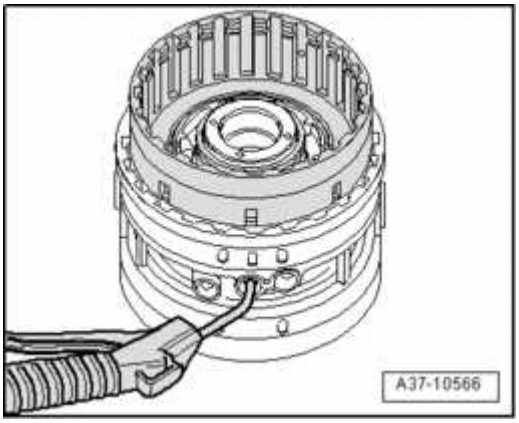


Fig. 146: Carefully Press Piston "F" With Compressed Air Out Of Cylinder "F"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully press piston "F" with compressed air out of cylinder "F" as shown in illustration.

Assembling

CAUTION: Before assembling, check clutch components "F" for wear and damage --> Clutch "F".

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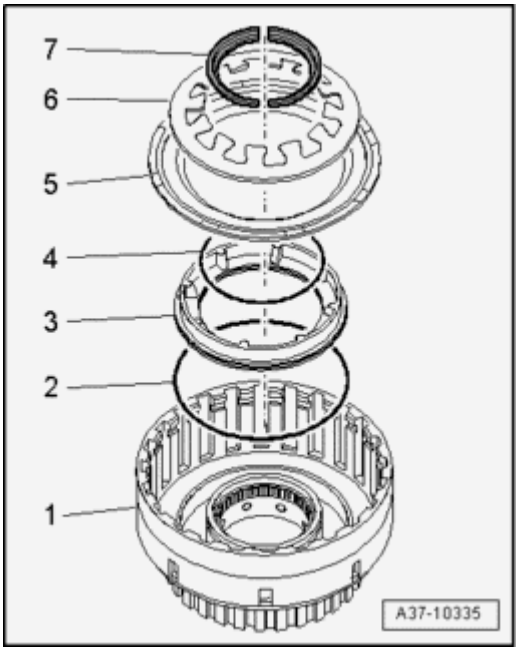


Fig. 147: Clutch "F", Assembling, Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-rings - **2** - and - **4** - for piston "F" - **3** -.
- Press piston "F" - **3** - into cylinder "F" - **1** - as far as stop.
- Place thrust piece - **5** -.
- Position plate spring - **6** -.

7 - Split retaining ring

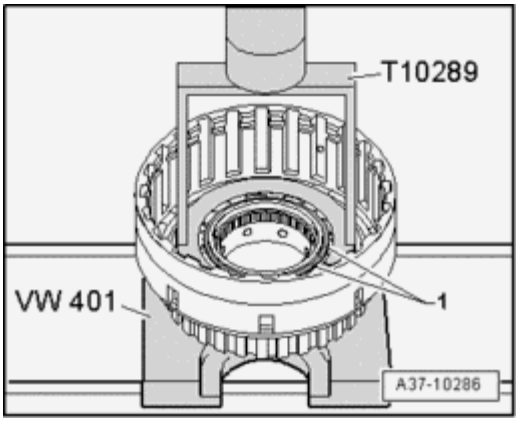


Fig. 148: Press Plate Spring Down Under Shop Press Using Installation Bracket T10289
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press plate spring down under shop press using installation bracket T10289.
- Install split retaining ring - **1** -.

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- Bent inner side at right angle of retaining ring faces downward.

- Release shop press.

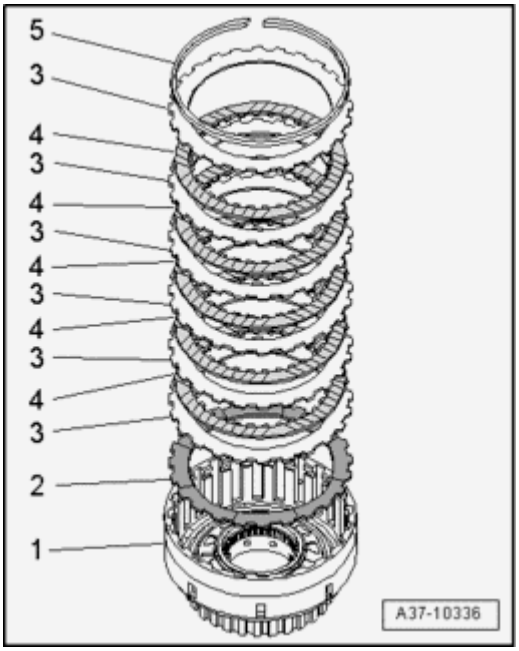


Fig. 149: Cylinder "F" Component, Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert waved washer - **2** - into cylinder "F" - **1** -.
- Install outer plate - **3** - and coated plate - **4** - alternately.

NOTE:

- **Ensure rounded edges of last outer clutch disc faces toward lining disc - 4 - and not toward circlip - 5 -. This improves circlip contact surface.**

- Insert circlip - **5** -.

Adjust clutch "F"

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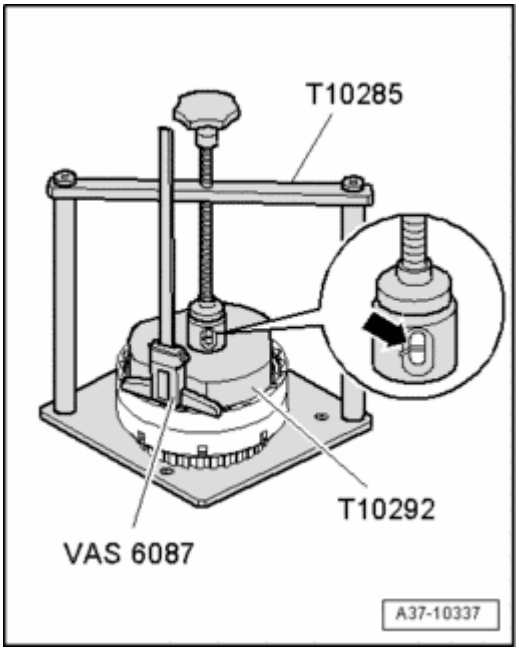


Fig. 150: Adjusting Clutch "F" "Air Gap"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place clutch "F" on pre-tensioning tool T10285.
- Place plate T10292 on outer clutch disc "F".

- Plate must not touch circlip all around.

- Insert pressure unit T10285/1 with centering pin into bore of plate.
- Align clutch "F" on plate of pre-tensioning tool.

- The pressure unit must be centrally positioned under spindle thrust piece.

- Turn spindle of pre-tensioning tool downward.

- The markings at inspection hole of pressure unit must align - **arrow** -.

- Apply Digital depth gauge VAS 6087 at upper edge of cylinder "F" , as depicted in illustration.
- Apply measuring tongue on outer plate and note measuring value.
- Mark contact point on cylinder "F".
- Repeat measurement at 2 other points of outer plate, 120° offset each, and mark contact points.

- Average over 3 measured values under load.
- Release spindle and remove plate.

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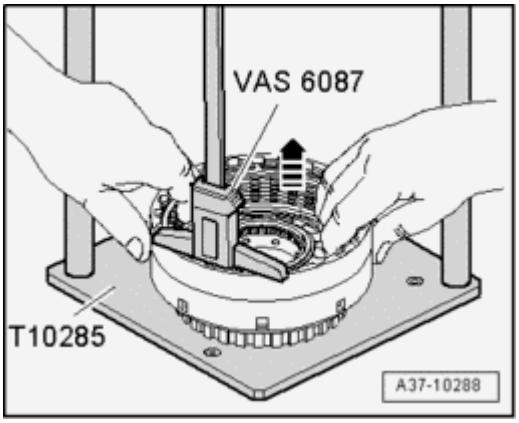


Fig. 151: Reach With Both Hands Into Clutch "F" and Pull Plate Pack Upward Until Stop
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Reach with both hands into clutch "F" and pull plate pack upward until stop.
- When disc pack is pulled up, measure distance between upper edge of cylinder "F" and outer disc (2nd technician required) at one of the marked points.
- Repeat measurement at 2 other marked points of outer plate.
- Average over 3 measured values when plate pack is pulled up.

- Determine air gap on basis of the following calculus:

	Average of measured values under load (value 1 + value 2 + value 3): 3
	Measurement when plate pack is pulled up (value 1 + value 2 + value 3): 3
=	Air gap

- Subtract average of measured values when plate pack is pulled up from average of measured values under load.

Clutch "F" air gap - Automatic Transmission 01V Front Wheel Drive

Transmission codes	Specified value
CJQ, CJU, DDS, DDT, DRF, DUL, DUM	1.50 to 1.82 mm
CJV, CJW, CJX, CJY, CJZ, DEQ, DCS, DES, DEU, DPS, DRD, DSS, EFR, ETU, ETV, ETW, EZV, FAC	1.90 to 2.20 mm
EBU, EBY, EZR, EZS, FAB, FEV	1.81 to 2.10 mm
EBV, EBW, EBX, EBZ, ECJ, EDC, EDE, EFP, EKC, EMA, ERY, ETK, ETL, ETZ, EYF, EZP, EZW, EZX, EZY, EZZ, FAD, FAE, FATF, FAH, FAJ, FAK, FED, FEE, FHV, FNL, FRT, GDE, GML	2.26 to 2.55 mm

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Clutch "F" air gap - Automatic Transmission 01V All Wheel Drive

Transmission codes	Specified value
DKB, DTV	1.50 to 1.82 mm
CJP, CJR, CJS, CJT, DEV, DEW, DEX, DEY, DPT, DRK, DRN, DST, DTU, EKX, ETX, ETY, FAN, FHD	1.90 to 2.20 mm
EFQ, FAL, FEP, GBH	1.81 to 2.10 mm
ECB, ECC, ECD, ECG, ECH, EDF, EKD, EMM, EMP, ETM, ETN, EUA, EYJ, EYK, EZB, FAM, FAP, FAQ, FAR, FAS, FAU, FAV, FAW, FAX, FAZ, FBA, FBB, FEF, FEG, FEJ, FEQ, FHF, FHG, FHH, FLC, FLV, FNM, FRU, FVE, FXL, GAK, GBF, GBG, GBJ	2.26 to 2.55 mm

If specified value is not obtained:

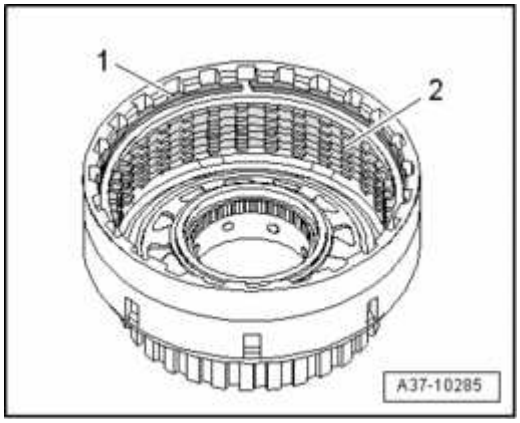


Fig. 152: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Determine new circlip - **1** - according to the following table.

NOTE:

- **Disregard - 2 -.**
- **Air gap too small: Install respectively thinner circlip.**
- **Air gap too large: Install respectively thicker circlip.**

Available circlips - thickness in mm		
1.2	1.8	2.4
1.4	2.0	2.6
1.6	2.2	2.8

- Check air gap of circlip again after inserting.

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Clutch "D/G" with freewheel, component overview

NOTE:

- **Some of the depicted components are part of component groups and are not available separately as replacement part .**
- **Before assembling, check components of freewheel, clutch "D" or clutch "G" for wear and damage --> Clutch "D/G" with freewheel.**

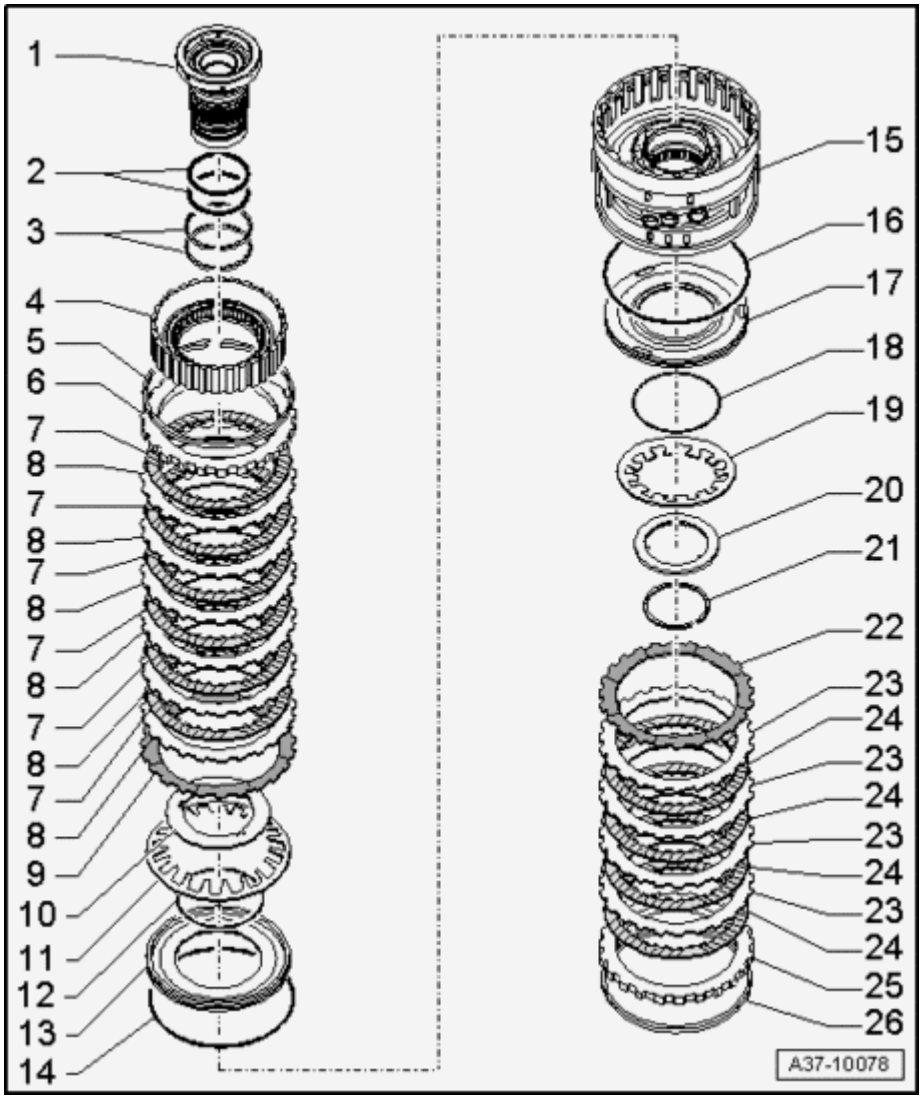


Fig. 153: Clutch "D/G" With Freewheel, Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Freewheel inner race

2 - O-rings

- Replace

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3 - Rectangular rings

- Replace

4 - Freewheel with freewheel housing

5 - Circlip

6 - Thick outer plates

7 - Coated plates

8 - Outer plates

9 - Waved washer

10 - Holding plate

11 - Plate spring

12 - O-ring

- Replace

13 - Piston "D"

14 - O-ring

- Replace

15 - Cylinder "D/G"

16 - O-ring

- Replace

17 - Piston "G"

18 - O-ring

- Replace

19 - Plate spring

20 - Thrust washer

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21 - Circlip

22 - Waved washer

23 - Outer plates

24 - Coated plates

25 - Thick outer plate

26 - Circlip

Clutch "D/G" with freewheel, disassembling and assembling

Disassembling

- Clutch "D" faces upward.

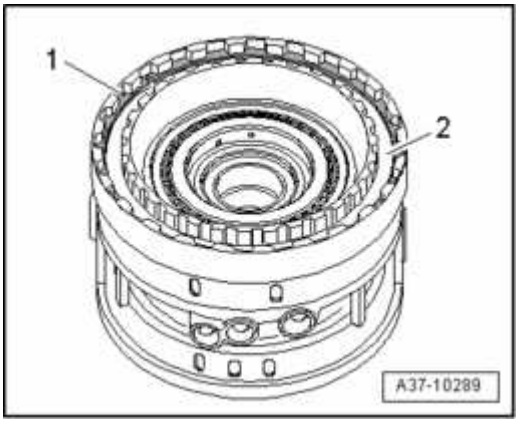


Fig. 154: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **1** - and remove plate pack - **2** - from cylinder "D/G".
- Twist cylinder "D/G".

- Clutch "G" faces upward (plate spring is visible).

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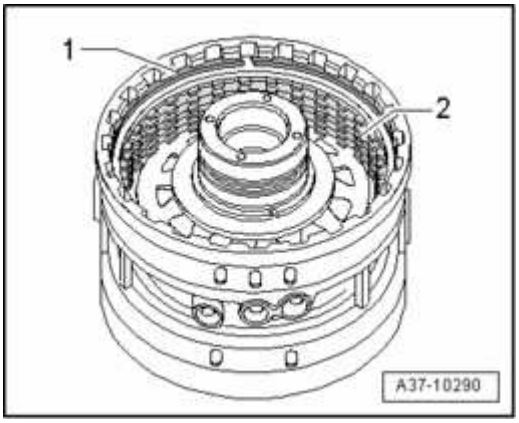


Fig. 155: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **1** - and remove plate pack - **2** - from cylinder "D/G".

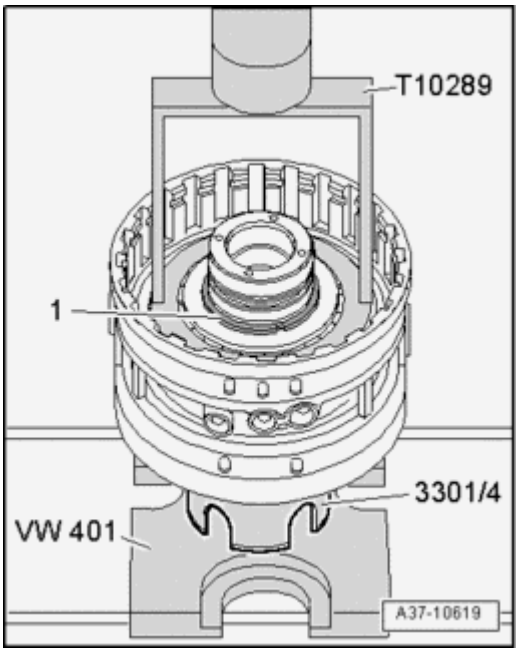


Fig. 156: Place Cylinder "D/G" On Thrust Piece 3301/4 Under Shop Press
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place cylinder "D/G" on thrust piece 3301/4 under shop press.
- Press plate spring down under shop press using installation bracket T10289.
- Remove circlip - **1** - , thrust washer and plate spring.
- Release shop press.

CAUTION: Wear eye protection.

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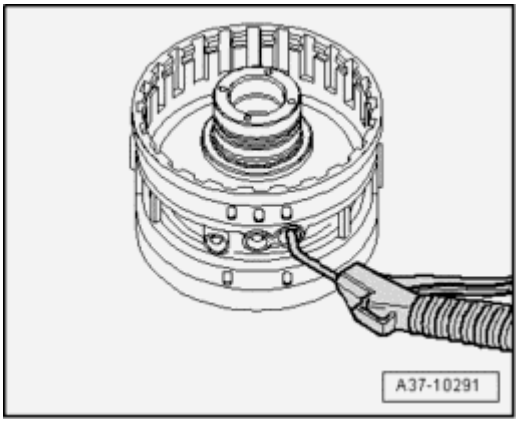


Fig. 157: Carefully Press Piston "G" Out Of Cylinder "D/G" With Compressed Air
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully press piston "G" out of cylinder "D/G" with compressed air.

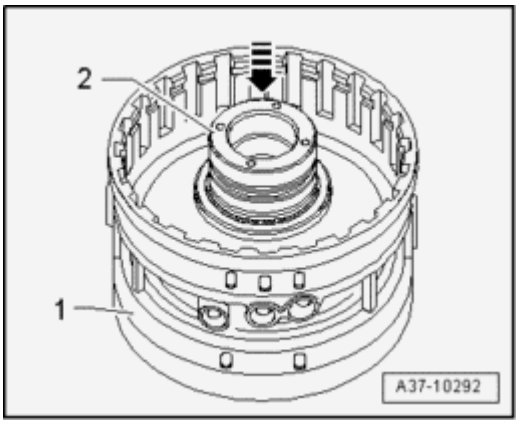


Fig. 158: Press Freewheel Inner Race Out Of Cylinder "D/G"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press freewheel inner race - **2** - out of cylinder "D/G" - **1** - - **arrow** - , loosen with light taps using a plastic hammer if necessary.
- Remove cylinder "D/G" from freewheel.
- Twist cylinder "D/G".

- Cylinder "D" faces upward.

CAUTION: Wear eye protection.

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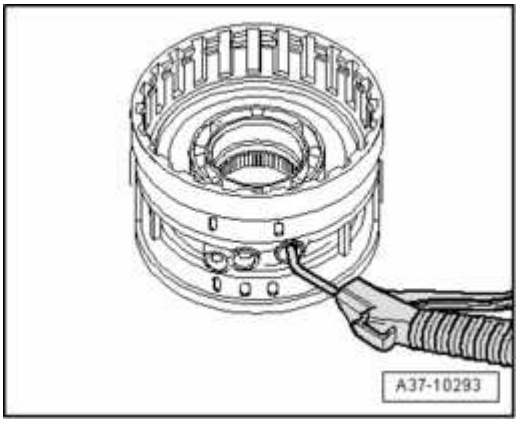


Fig. 159: Carefully Press Piston "D" Out Of Cylinder "D/G" With Compressed Air
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully press piston "D" out of cylinder "D/G" with compressed air.

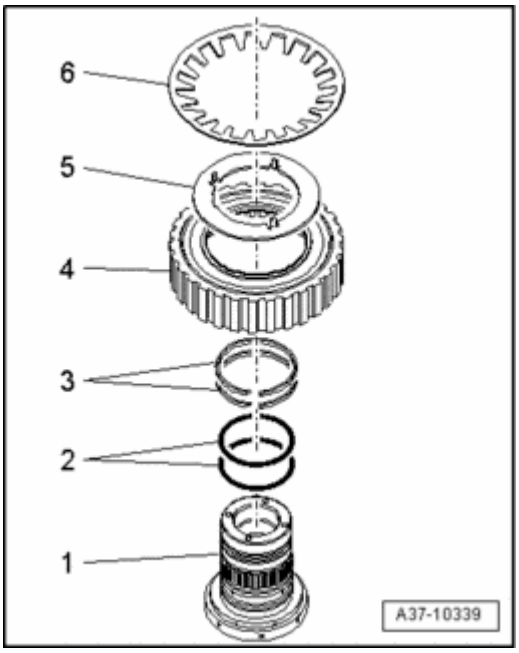


Fig. 160: Freewheel, Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disassemble freewheel:

6 - Plate spring

5 - Holding plate

4 - Freewheel with freewheel housing

3 - Rectangular rings

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2 - O-rings

1 - Freewheel inner race

Assembling

CAUTION: Before assembling, check components of freewheel, clutch "D" or clutch "G" for wear and damage --> Clutch "D/G" with freewheel.

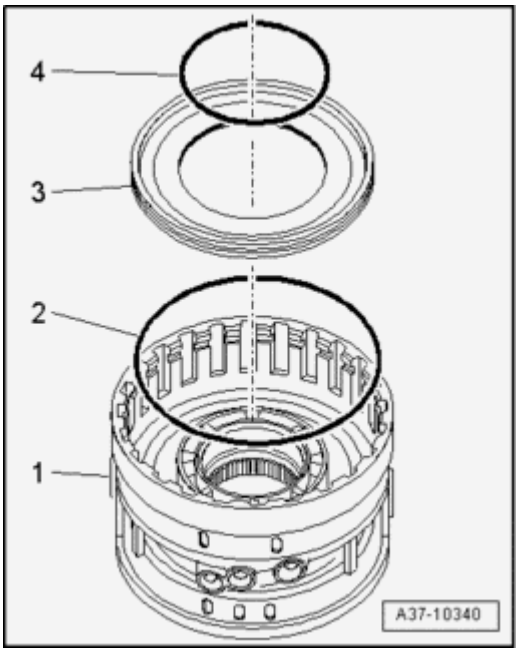


Fig. 161: Cylinder "D/G", and O-rings -2/4- for Piston "D"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-rings - **2** - and - **4** - for piston "D" - **3** -.
- Press piston "D" - **3** - into cylinder "D/G" - **1** - as far as stop.

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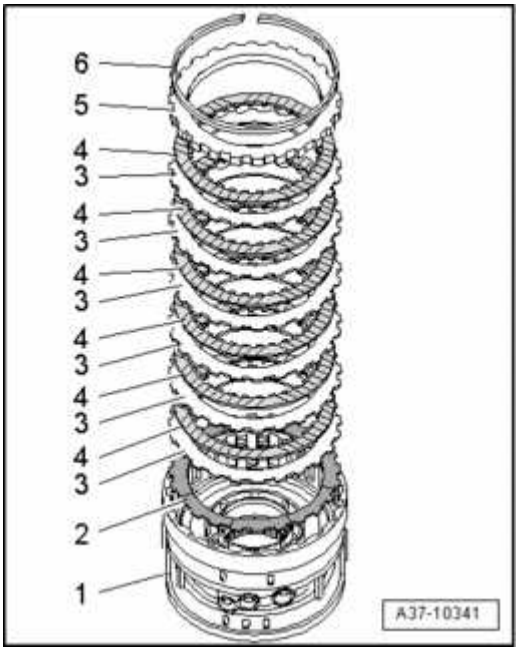


Fig. 162: Clutch "D/G", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert waved washer - **2** - into cylinder "D/G" - **1** -.
- Install outer plate - **3** - and coated plate - **4** - alternately.
- Install thick outer plate - **5** -.

NOTE:

- **Ensure rounded edges of thick outer clutch disc faces toward lining disc - 4 - and not toward circlip - 6 -. This improves circlip contact surface.**

- Insert circlip - **6** -.

Adjust clutch "D" air gap

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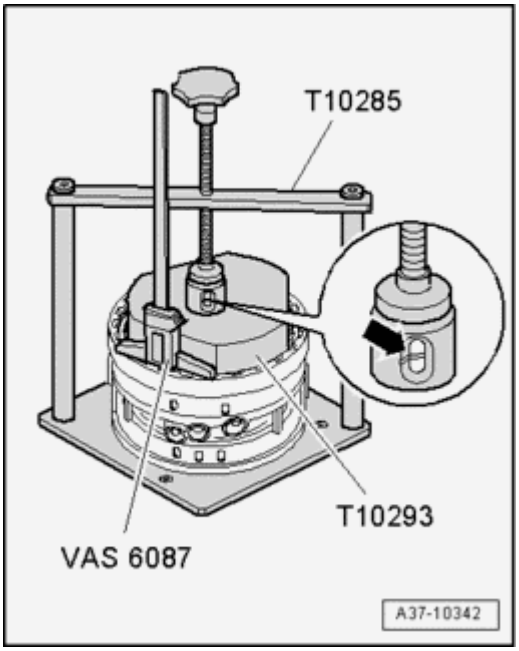


Fig. 163: Inspection Hole Markings Of Pressure Unit Must Align
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place clutch "D/G" on pre-tensioning tool T10285.
- Clutch "D" faces upward.
- Place plate T10293 on outer clutch disc "D".
- Plate must not touch circlip all around.
- Insert pressure unit T10285/1 with centering pin into bore of plate.
- Align clutch "D/G" on plate of pre-tensioning tool.
- The pressure unit must be centrally positioned under spindle thrust piece.
- Turn spindle of pre-tensioning tool downward.
- The markings at inspection hole of the pressure unit must align - **arrow** -.

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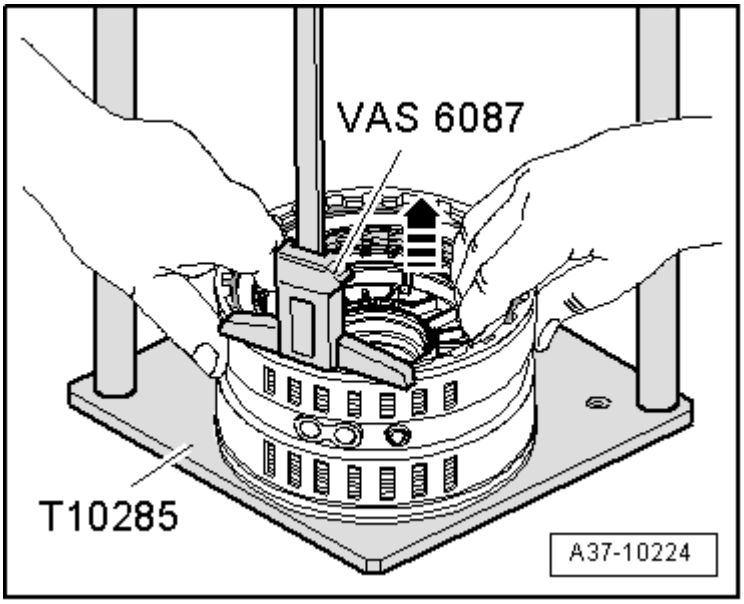


Fig. 164: Apply Digital Depth Gauge VAS 6087 At Upper Edge Of Cylinder "D/G"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Apply Digital depth gauge VAS 6087 at upper edge of cylinder "D/G" , as depicted in illustration.
- Apply measuring tongue on outer plate and note measuring value.
- Mark contact point on cylinder "D/G".
- Repeat measurement at 2 other points of outer plate, 120° offset each, and mark contact points.

- Average over 3 measured values under load.
- Release spindle and remove plate.
- Reach with both hands into clutch "D" and pull plate pack upward until stop.
- When disc pack is pulled up, measure distance between upper edge of cylinder "D/G" and outer disc (2nd technician required) at one of marked points.

- Repeat measurement at 2 other marked points of outer plate.
- Average over 3 measured values when plate pack is pulled up.
- Determine air gap on basis of the following calculations:

	Average of measured values under load (value 1 + value 2 + value 3): 3
	Measurement when lamella pack is pulled up (value 1 + value 2 + value 3): 3
=	Air gap

- Subtract average of measured values when plate pack is pulled up from average of measured values under load.

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Clutch "D" air gap - Automatic Transmission 01V Front Wheel Drive

Transmission codes	Specified value
EBV, EBW, EBX, EBZ, ECJ, EDC, EDE, EFP, EKC, EMA, ERY, ETK, ETL, ETZ, EYF, EZP, EZW, EZX, EZY, EZZ, FAD, FAE, FATF, FAH, FAJ, FAK, FED, FEE, FHV, FNL, FRT, GDE, GML	2.29 to 2.59 mm
EBU, EBY, EZR, EZS, FAB, FEV	1.92 to 2.22 mm
CJQ, CJU, CJW, CJX, CJY, CJZ, DCS, DDS, DDT, DEQ, DES, DEU, DPS, DRD, DRF, DUL, DUM, DSS, EFR, ETV, ETW, ETU, EZV, FAC	2.55 to 2.85 mm
CJV	2.60 to 2.92 mm

Clutch "D" air gap - Automatic Transmission 01V All Wheel Drive

Transmission codes	Specified value
CJP, CJR, CJS, CJT, DEV, DEW, DEX, DEY, DKB, DPT, DRK, DRN, DST, DTU, DTV, EKX, ETX, ETY, FAN, FHD	2.55 to 2.85 mm
ECB, ECC, ECD, ECG, ECH, EDF, EKD, EMM, EMP, ETM, ETN, EUA, EYJ, EYK, EZB, FAM, FAP, FAQ, FAR, FAS, FAU, FAV, FAW, FAX, FAZ, FBA, FBB, FEF, FEG, FEJ, FEQ, FHF, FHG, FHH, FLC, FLV, FNM, FRU, FVE, FXL, GAK, GBG, GBH, GBJ	2.29 to 2.59 mm
EFQ, FAL, FEP, GBF	1.92 to 2.22 mm

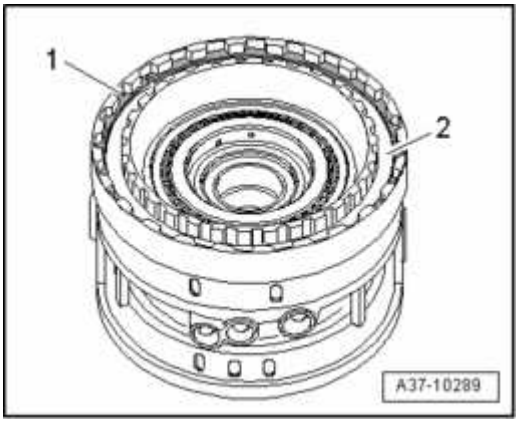


Fig. 165: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

If specified value is not obtained:

- Determine new circlip - **1** - according to the following table.

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NOTE:

- **Disregard - 2 -.**
- **Air gap too small: Install respectively thinner circlip.**
- **Air gap too large: Install respectively thicker circlip.**

Available circlips - thickness in mm		
2.2	3.0	3.8
2.4	3.2	4.0
2.6	3.4	4.2
2.8	3.6	

- Check air gap of circlip again after inserting.

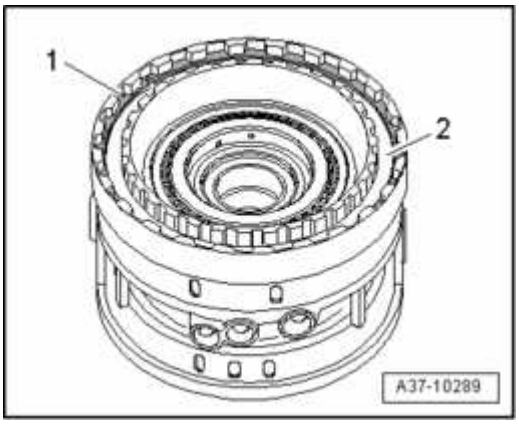


Fig. 166: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- After having determined correct circlip, remove circlip - **1** - and remove plate pack - **2** - from cylinder "D/G" again.

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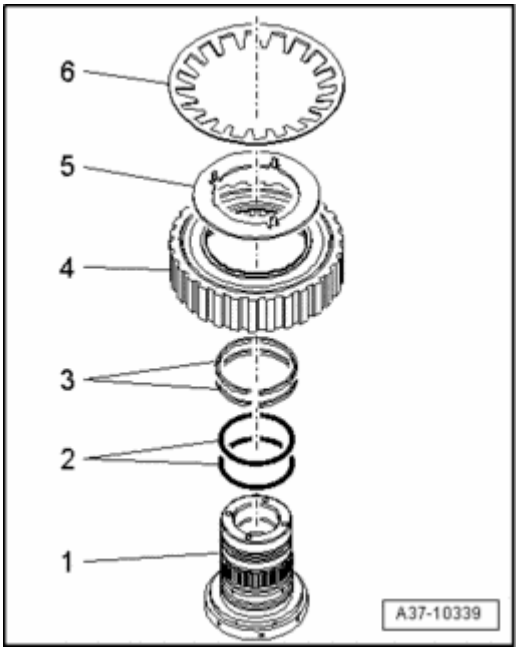


Fig. 167: Freewheel, Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-rings - **2** - and rectangular rings - **3** - on freewheel inner race - **1** -.

4 - Freewheel with freewheel housing

5 - Holding plate

6 - Plate spring

- Before inserting, thinly coat O-rings and rectangular rings with Vaseline. Use only Vaseline, other lubricating substances cause functional problems in the hydraulic transmission control.
- Make sure that rectangular rings are fully seated all around in freewheel inner race grooves.

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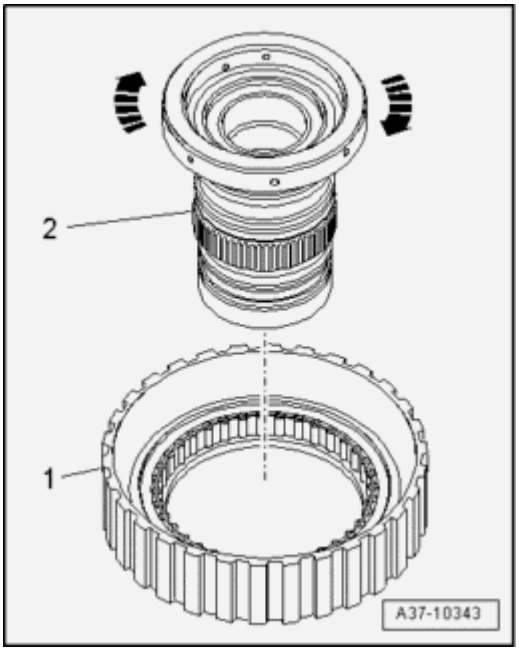


Fig. 168: Checking Rotating and Locking Direction Of Freewheel
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert freewheel inner race - **2** - with freewheel housing until stop into freewheel - **1** - using turning motions in clockwise direction **- arrows** -.

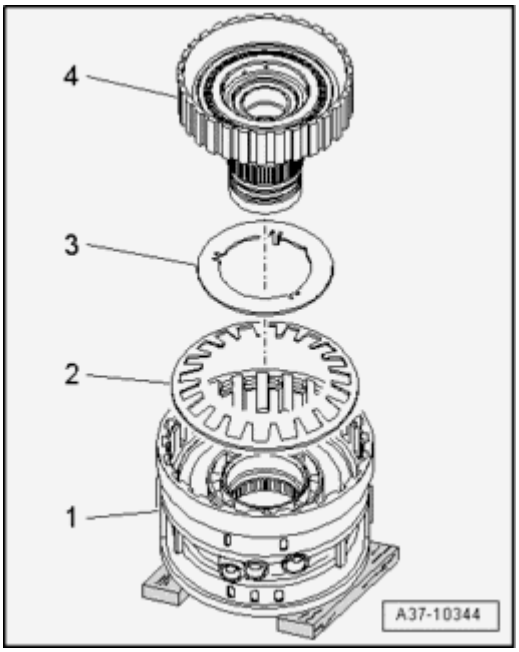


Fig. 169: Lay Cylinder "D/G" On 2 Wood Blocks For Assembly
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lay cylinder "D/G" - **1** - on 2 wood blocks in height of approx. 40 mm.

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- Cylinder "D" faces upward.

- Insert dished washer - **2** - and holding plate - **3** - into cylinder "D/G".

- Tabs on holding plate face cylinder "D/G".

- Grasp freewheel - **4** - so that the freewheel inner race can no longer slip out and press inner race splines into splines of cylinder "D/G".

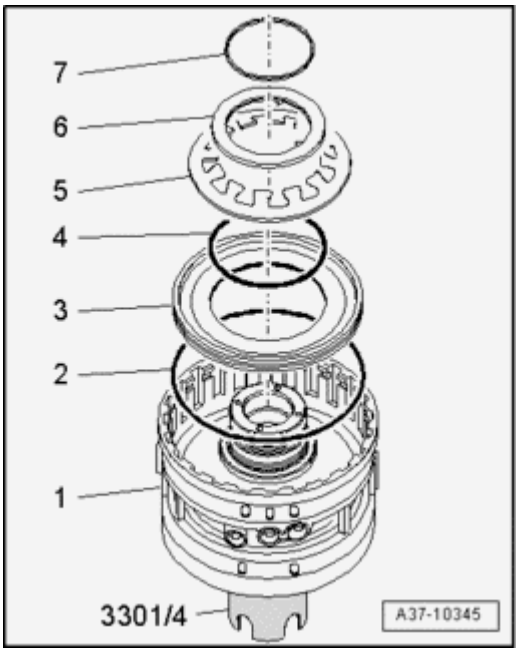


Fig. 170: Place Cylinder "D/G" On Thrust Piece 3301/4 For Assembly
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Twist cylinder "D/G" - **1** - , while doing so secure freewheel inner race against slipping out.

- Cylinder "G" faces upward.

- Place cylinder "D/G" on thrust piece 3301/4.
- Replace O-rings - **2** - and - **4** - for piston "G" - **3** -.
- Press piston "G" - **3** - into cylinder "D/G" until stop.
- Place dished washer - **5** - and thrust washer - **6** -.

- Teeth of thrust washer must engage into splines of freewheel inner race.

7 - Circlip

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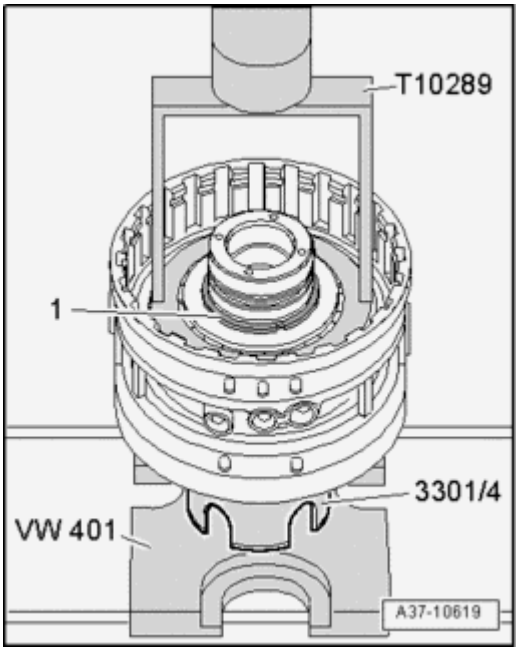


Fig. 171: Place Cylinder "D/G" On Thrust Piece 3301/4 Under Shop Press
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place cylinder "D/G" on thrust piece 3301/4 under shop press.
- Press plate spring down under shop press using installation bracket T10289.
- Push thrust washer fully downward and insert circlip **- 1 -**.
- Make sure that circlip is seated evenly all around in groove of freewheel inner race, if necessary, press circlip into groove all around using screwdriver.
- Release shop press.
- Press plate spring down again to check if freewheel is inserted correctly.

- Thrust washer **- 6 -** --> in previous illustration "A37-10345" must be able to move.

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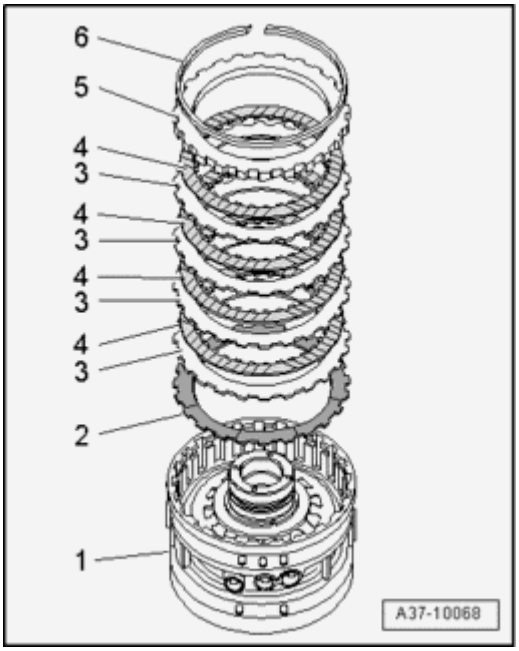


Fig. 172: Cylinder "D/G", Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert waved washer - **2** - into cylinder "D/G" - **1** -.
- Install outer plate - **3** - and coated plate - **4** - alternately.
- Install thick outer plate - **5** -.

NOTE:

- **Ensure rounded edges of thick outer clutch disc faces toward lining disc - 4 - and not toward circlip - 6 -. This improves circlip contact surface.**

- Insert circlip - **6** -.

Adjust clutch "G" air gap

- Clutch "G" faces upward.

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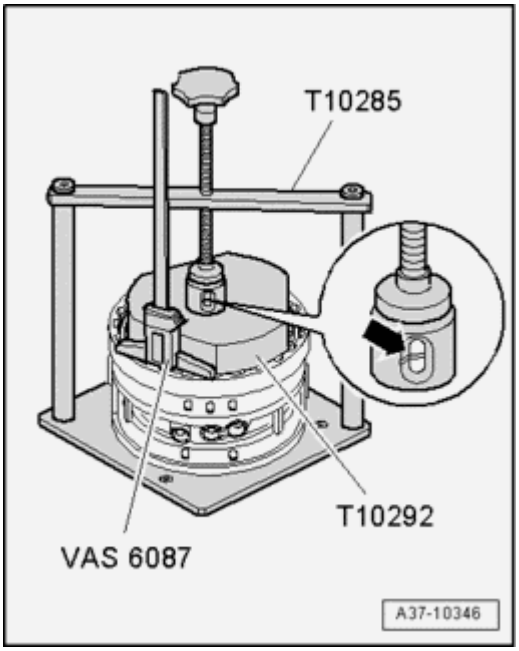


Fig. 173: Place Clutch "D/G" On Pre-Tensioning Tool T10285
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place clutch "D/G" on pre-tensioning tool T10285.
- Place plate T10292 on outer clutch disc "G".

- Plate must not touch circlip all around.

- Insert pressure unit T10285/1 with centering pin into bore of plate.
- Align clutch "D/G" on plate of pre-tensioning tool.

- The pressure unit must be centrally positioned under spindle thrust piece.

- Turn spindle of pre-tensioning tool downward.

- The markings at inspection hole of the pressure unit must align - **arrow** -.

- Apply Digital depth gauge VAS 6087 at upper edge of cylinder "D/G" , as depicted in illustration.
- Apply measuring tongue on outer plate and note measuring value.
- Mark contact point on cylinder "D/G".
- Repeat measurement at 2 other points of outer plate, 120° offset each, and mark contact points.

- Average over 3 measured values under load.
- Release spindle and remove plate.

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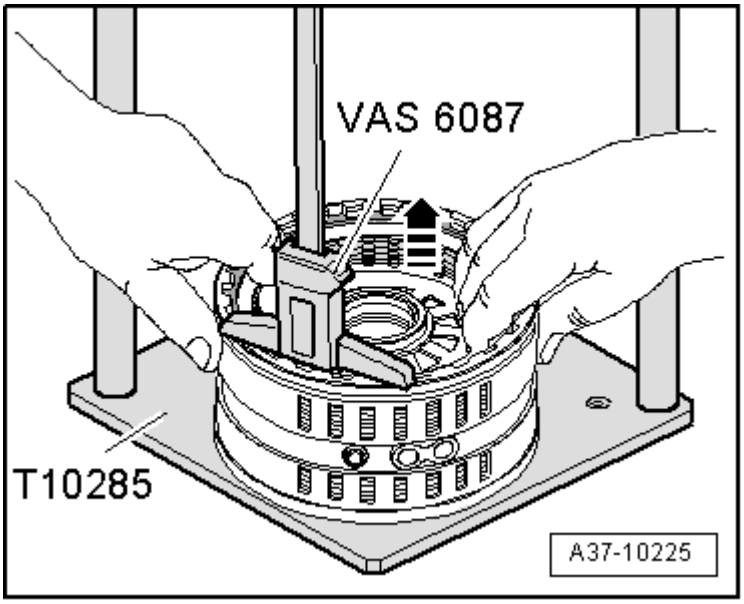


Fig. 174: Reach With Both Hands Into Clutch "G" and Pull Plate Pack Upward Until Stop
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Reach with both hands into clutch "G" and pull plate pack upward until stop.
- When disc pack is pulled up, measure distance between upper edge of cylinder "D/G" and outer disc (2nd technician required) at one of the marked points.
- Repeat measurement at 2 other marked points of outer plate.
- Average over 3 measured values when plate pack is pulled up.

- Determine air gap on the basis of the following calculations:

	Average of measured values under load (value 1 + value 2 + value 3): 3
	Measurement when lamella pack is pulled up (value 1 + value 2 + value 3): 3
=	Air gap

- Subtract average of measured values when plate pack is pulled up from average of measured values under load.

Clutch "G" air gap - Automatic Transmission 01V Front Wheel Drive

Transmission codes	Specified value
CJV, CJW, CJX, CJY, CJZ, DCS, DEQ, DES, DEU, DPS, DRD, DSS, EFR, ETU, ETV, ETW, EZV, FAC	1.52 to 1.82 mm
CJQ, CJU, DDS, DDT, DRF, DUL, DUM	1.15 to 1.45 mm
EBW, EBX, EBZ, ECJ, EDC, EDE, EFP, EKC,	

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EMA, ERY, ETK, ETL, ETZ, EYF, EZP, EZW, EZX, EZY, EZZ, FAB, FAE, FATF, FAH, FAJ, FAK, FED, FEE, FHV, FNL, FRT, GDE, GML	1.79 to 2.08 mm
EBU, EBV, EBY, EZR, EZS, FAD, FEV	1.33 to 1.62 mm

Clutch "G" air gap - Automatic Transmission 01V All Wheel Drive

Transmission codes	Specified value
CJP, CJR, CJS, CJT, DEV, DEW, DEX, DEY, DPT, DRK, DRN, DST, DTU, ECB, ECC, ECD, ECG, ECH, EDF, EKD, EKX, EMM, EMP, ETM, ETN, ETX, ETY, EUA, EYJ, EYK, EZB, FAM, FAN, FAP, FAQ, FAR, FAS, FAU, FAV, FAW, FAX, FAZ, FBA, FBB, FEF, FEG, FEJ, FHD, FHF, FHG, FHH, FLC, FLV	1.52 to 1.82 mm
DKB, DTV	1.15 to 1.45 mm
FEQ, FNM, FRU, FVE, FXL, GAK, GBG, GBH, GBJ	1.79 to 2.08 mm
EFQ, FAL, FEP, GBF	1.33 to 1.62 mm

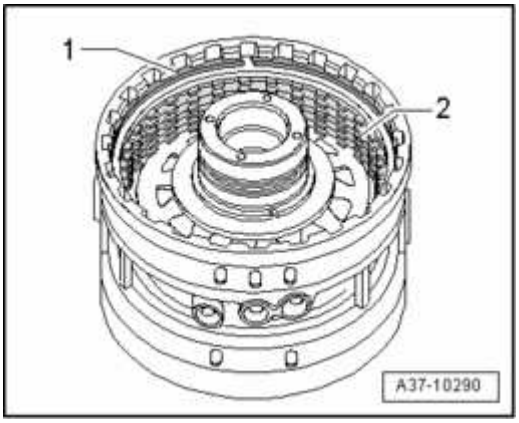


Fig. 175: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

If specified value is not obtained:

- Determine new circlip - **1** - according to the following table.

NOTE:

- **Disregard - 2 -.**
- **Air gap too small: Install respectively thinner circlip.**
- **Air gap too large: Install respectively thicker circlip.**

Available circlips - thickness in mm		

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1.8	2.4	3.0
2.0	2.6	3.2
2.2	2.8	3.4

- Twist clutch "D/G".
- Clutch "D" faces upward.
- Install plates for clutch "D" with newly determined circlip as follows:

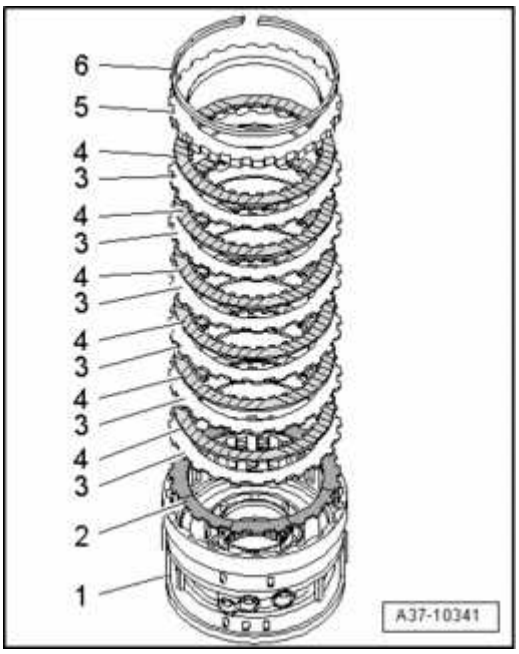


Fig. 176: Clutch "D/G", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert waved washer - **2** - into cylinder "D/G" - **1** -.
- Install outer plate - **3** - and coated plate - **4** - alternately.
- Install thick outer plate - **5** -.

NOTE:

- **Ensure rounded edges of thick outer clutch disc faces toward lining disc - 4 - and not toward circlip - 6 -. This improves circlip contact surface.**

- Insert circlip - **6** -.

Planetary drive "III" , component overview

NOTE:

- **Some of the depicted components are part of component groups and are not available separately as replacement part .**

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- **Before assembling, check components of planetary gear for wear and damage --> Planetary drive "III".**

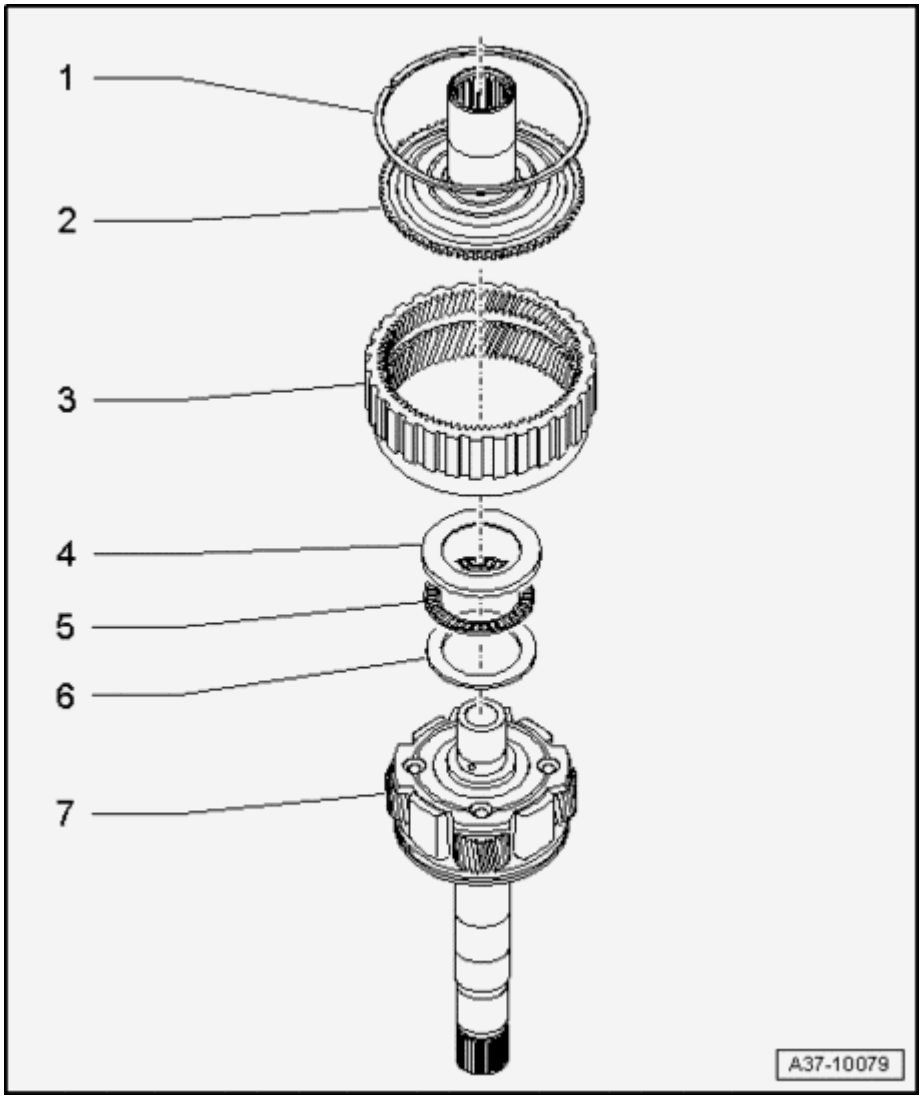


Fig. 177: Planetary Drive "III", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Circlip

2 - Shaft

3 - Ring gear "III"

4 - Angle washer

5 - Axial needle bearing

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6 - Thrust washer

7 - Planetary carrier "III"

Planetary drive "III" , disassembling and assembling

Disassembling

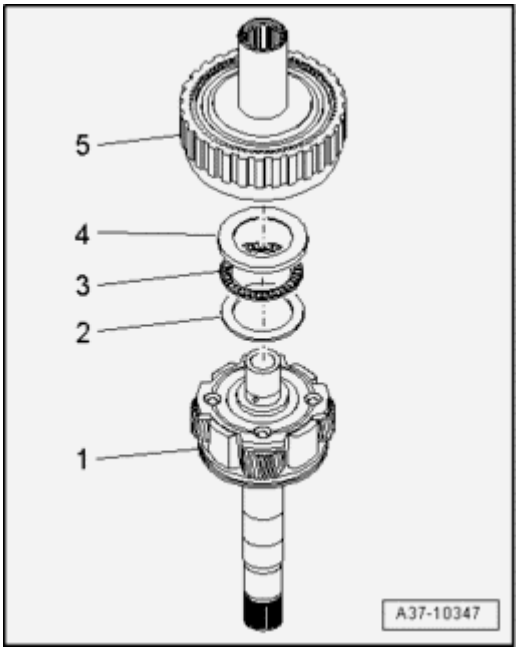


Fig. 178: Planetary Drive "III", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove ring gear "III" with shaft - **5** - from planetary carrier "III" - **1** -.
- Remove angle washer - **4** - , axial needle bearing - **3** - and thrust washer - **2** -.

Assembling

CAUTION: Before assembling, check components of planetary gear "III" for wear and damage --> Planetary drive "III".

- Attach the following components onto shaft of planetary carrier "III" - **1** - :

2 - Thrust washer

3 - Axial needle bearing

4 - Angle washer - angled edge points toward axial needle bearing

- Position ring gear "III" with shaft - **5** - on planetary carrier "III" - **1** -.

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Tower "I" , assembling

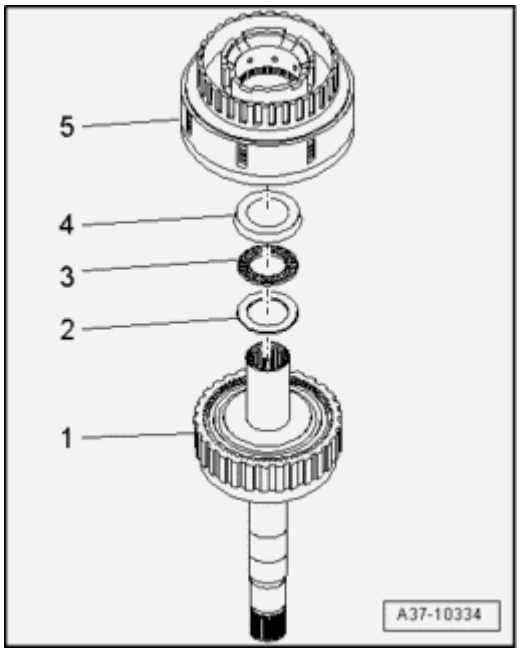


Fig. 179: Tower "I", Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place planetary drive "III" - **1** - in mounting device T10282.
- Lay thrust washer - **2** - , axial needle bearing - **3** - and angle washer - **4** - on planetary drive "III" - **item 1** -.

- Angled edge of angle washer faces planetary drive "III".

- Attach clutch "F" "item 5" onto disc carrier of planetary gear - **III** - - **1** - , using short lifting/turning motions.

- All clutch discs "F" must engage one after another in planetary drive disc carrier "III".

- Check whether all plates are engaged, to do so lift clutch "F" a few millimeters and let fall.

- If this produces a metallic sound, all plates are engaged.
- If only a muted sound is heard, not all plates are engaged.

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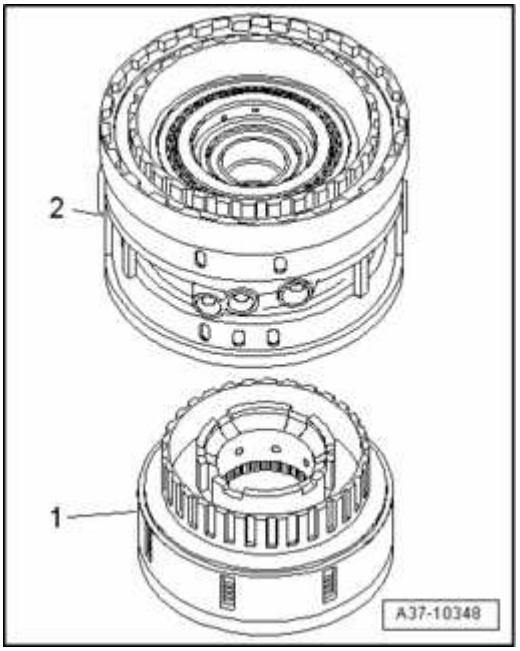


Fig. 180: Remove/Install clutch "D/G" From/To Clutch "F"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place clutch "D/G" - **2** - onto plate carrier on clutch "F" - **1** - , using short lifting/turning motions.
- All clutch discs "G" must engage in sequence in plate carrier of clutch "F".
- Check whether all plates are engaged, to do so lift clutch "D/G" a few millimeters and let fall.
- If this produces a metallic sound, all plates are engaged.
- If only a muted sound is heard, not all plates are engaged.

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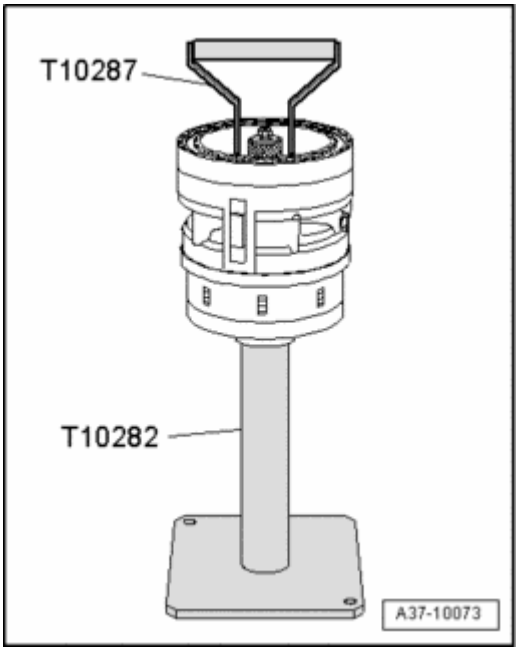


Fig. 181: Identifying Lifting Device T10287 And Mounting Device T10282
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Install lifting device T10287 as follows:

- Turn back knurled nut of lifting device.
- Insert lifting device into tower "I" until stop.
- Tighten knurled nut of lifting device in clockwise direction.
- Check lifting device in tower "I" for proper seating.

TOWER II , DISASSEMBLING AND ASSEMBLING

Tower "II" , disassembling and assembling

NOTE:

- **General repair notes --> General Repair Notes .**
- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**
- **Lubricate O-rings and gaskets with ATF or Vaseline before installing to prevent rings from being pinched when inserting.**
- **Attach mount and adjustment shims only with Vaseline.**

- Use only ATF or Vaseline in areas near ATF. Other types of lubrication cause faults to occur in the transmission hydraulics.

Tower "II" , component overview

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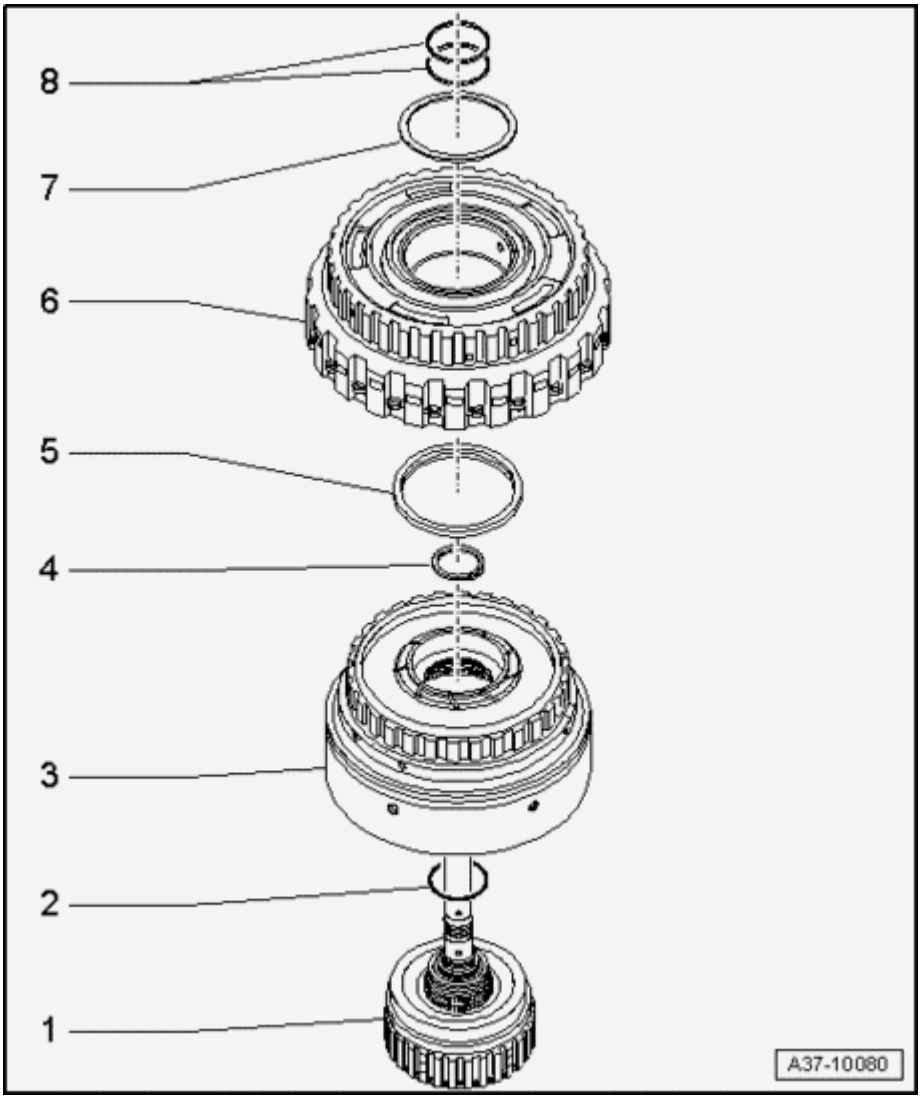


Fig. 182: Tower "II", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Clutch "E"

2 - O-ring

- Replace

3 - Clutch "A"

4 - Circlip

5 - Axial needle bearing

6 - Clutch "B"

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7 - Adjustment shim

- Determine thickness --> **Fig. 108**

8 - Rectangular rings

- Replace

Tower "II" , disassembling

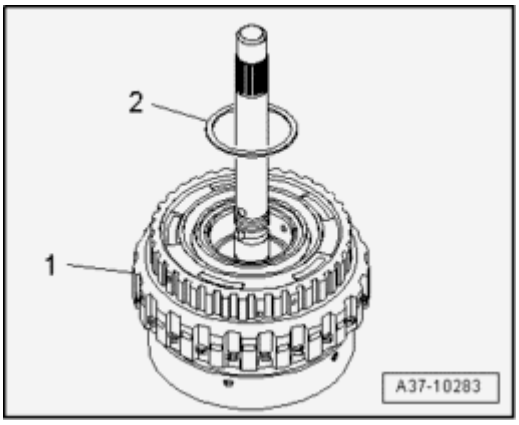


Fig. 183: Identifying Tower "II", Clutch "B" and Adjustment Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If not carried out yet, remove adjustment shim - **2** - from clutch "B" - **1** -.

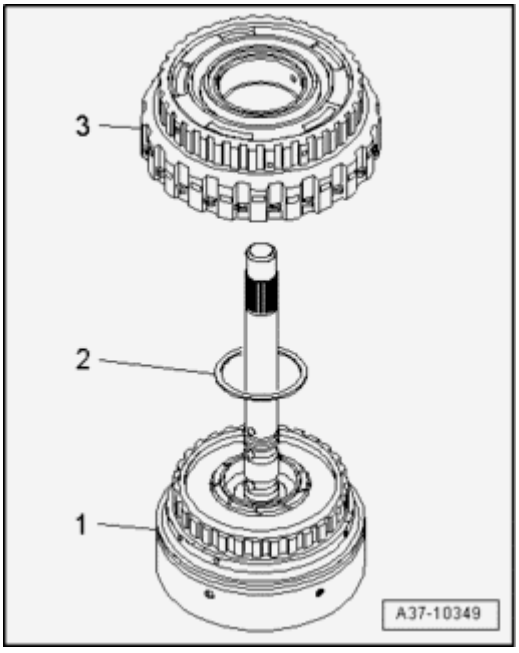


Fig. 184: Identifying Clutch "B" and Clutch "A" Axial Needle Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Remove clutch "B" - **3** - and axial needle bearing - **2** - from clutch "A" - **1** -.

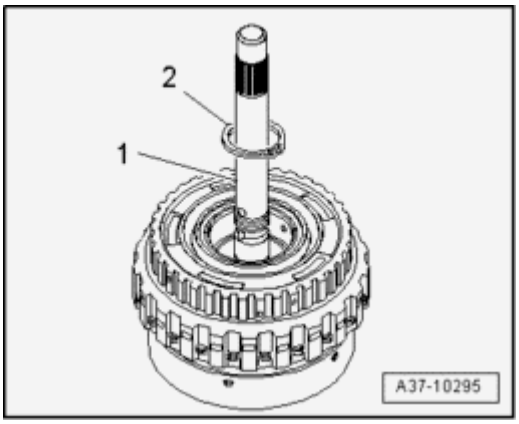


Fig. 185: Identifying Circlip and Input Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **2** - from input shaft - **1** -.

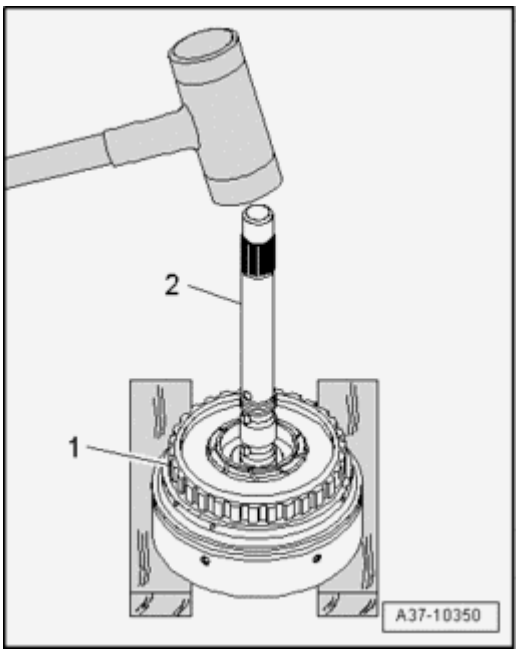


Fig. 186: Tap On Input Shaft With Clutch "E" Using Plastic Hammer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place clutch "A" - **1** - with outer edges on 2 wood blocks, approx. 40 mm high.
- Tap on input shaft - **2** - with clutch "E" using plastic hammer.
- Remove clutch "A" from clutch "E".

Clutch "B" , component overview

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NOTE:

- **Some of the depicted components are part of component groups and are not available separately as replacement part .**
- **Before assembling, check components of clutch "B" for wear and damage --> Clutch "B".**

CAUTION: Illustration depicts current construction version of clutch "B" with waved washer , 2x outer plate and 2x coated plate. Clutch "B" must be replaced on older versions without waved washer and with 3x lining and outer discs each.

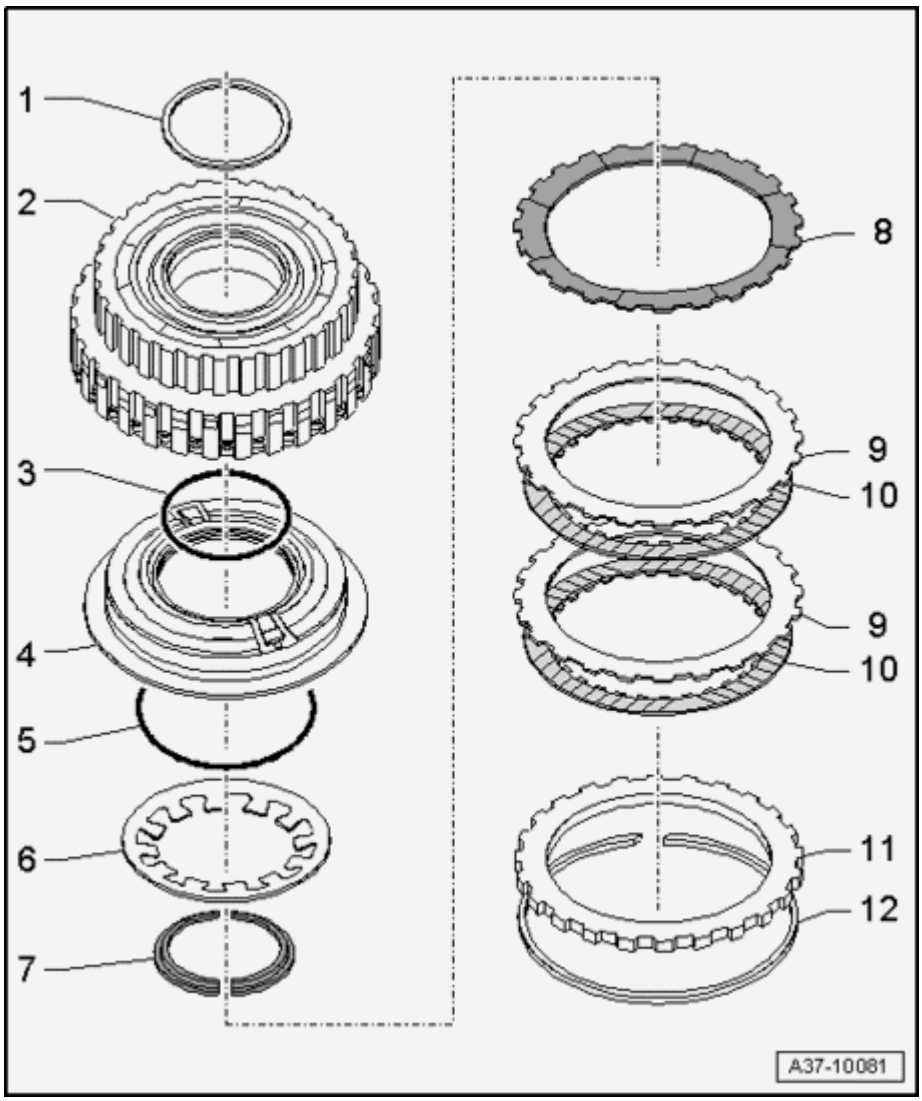


Fig. 187: Clutch "B" Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Adjustment shim

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2 - Cylinder "B"

3 - O-ring

- Replace

4 - Piston "B"

5 - O-ring

- Replace

6 - Plate spring

7 - Split retaining ring

- Bent side at right angle faces dished washer

8 - Waved washer

9 - Outer plate

10 - Coated plate

11 - Thick outer plate

12 - Circlip

- Determining thickness **Available circlips - thickness in mm**

Clutch "B" , disassembling and assembling

Disassembling

- Rotate clutch "B".

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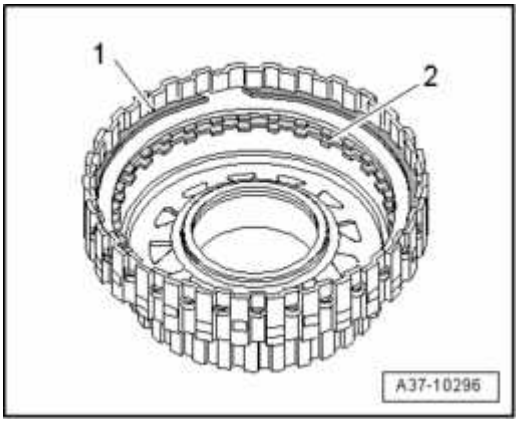


Fig. 188: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **1** - and remove disc pack - **2** - from cylinder "B".

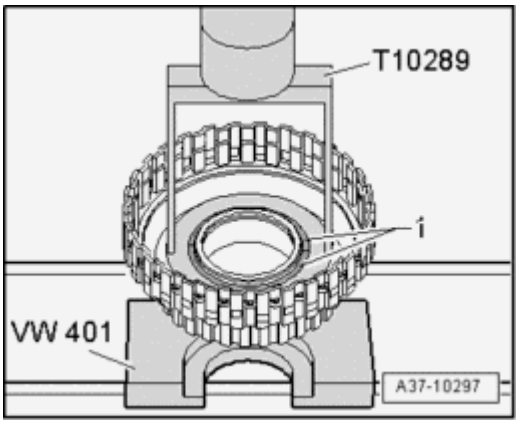


Fig. 189: Press Plate Spring Down Under Shop Press Using Installation Bracket T10289
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press plate spring down under shop press using installation bracket T10289.
- Remove split retaining ring - **1** -.

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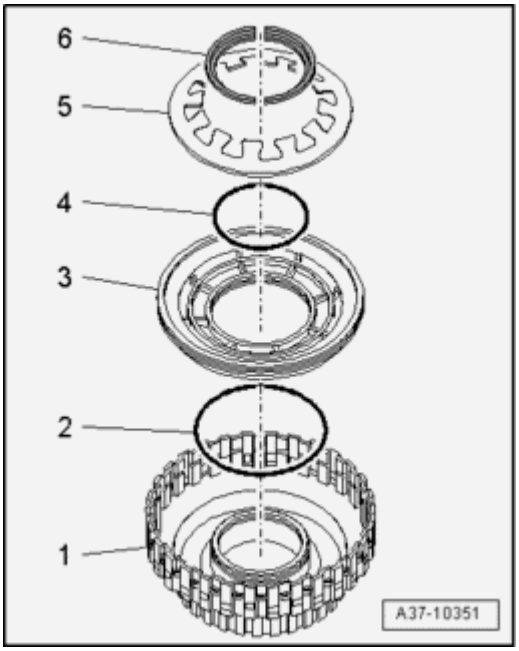


Fig. 190: Cylinder "B" Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove dished washer - **5** -.
- Release shop press.

CAUTION: Wear eye protection.

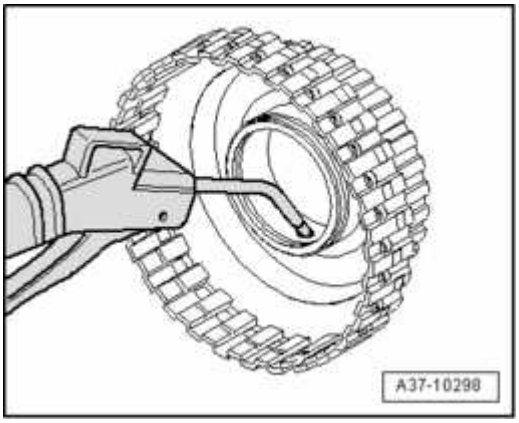


Fig. 191: Carefully Press Piston "B" Out Of Cylinder "B" With Compressed Air
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully press piston "B" out of cylinder "B" with compressed air, to do so plug free oil bore using finger.

Assembling

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CAUTION: Before assembling, check components of clutch "B" for wear and damage --> Clutch "B".

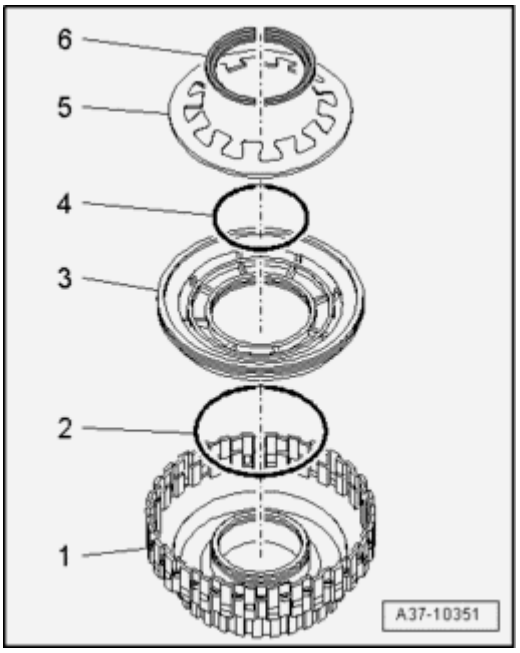


Fig. 192: Cylinder "B" Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-rings - **2** - and - **4** - for piston "B" - **3** -.
- Press piston "B" - **3** - into cylinder "B" - **1** - as far as stop.
- Position plate spring - **5** -.

6 - Split retaining ring

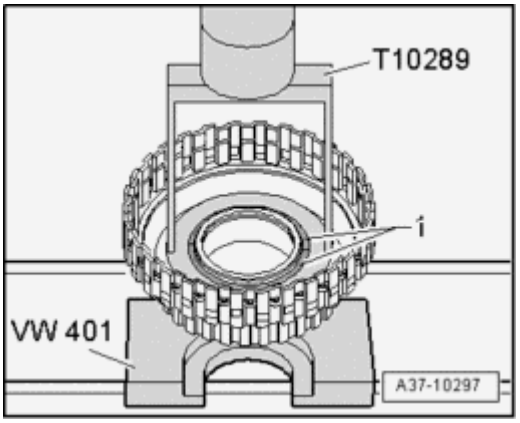


Fig. 193: Press Plate Spring Down Under Shop Press Using Installation Bracket T10289
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press plate spring down under shop press using installation bracket T10289.

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- Install split retaining ring **- 1 -**.
- Release shop press.

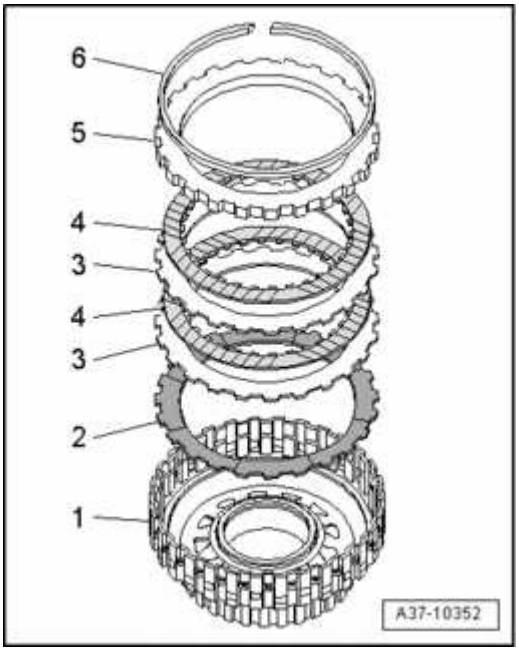


Fig. 194: Cylinder "B", Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert waved washer - **2** - into cylinder "B" - **1** -.
- Install outer plate - **3** - and coated plate - **4** - alternately.
- Install thick outer plate - **5** -.

NOTE:

- **Ensure rounded edges of thick outer clutch disc faces toward lining disc - 4 - and not toward circlip - 6 -. This improves circlip contact surface.**

- Insert circlip - **6** -.

CAUTION: Illustration depicts current construction version of clutch "B" with waved washer - 2 - , 2x outer plates - 3 - and 2x coated plates - 4 -. Clutch "B" must be replaced on older versions without waved washer and with 3x lining and outer discs each.

Adjust clutch "B" air gap

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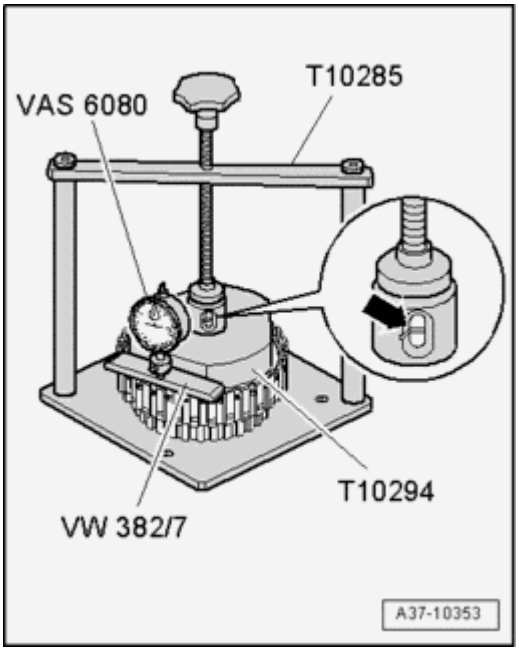


Fig. 195: Place Clutch "B" On Pre-Tensioning Tool T10285
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place clutch "B" on pre-tensioning tool T10285.
- Place plate T10294 on outer clutch disc "B".

- Plate must not touch circlip all around.

- Insert pressure unit T10285/1 with centering pin into bore of plate.
- Align clutch "B" on plate of pre-tensioning tool.

- The pressure unit must be centrally positioned under spindle thrust piece.

- Turn spindle of pre-tensioning tool downward.

- The markings at the inspection hole of the pressure unit must align - **arrow** -.

- Insert dial gauge VAS 6080 into measuring bar VW 382/7 and tighten knurled nut.
- Apply measuring bar at upper edge of cylinder "B" , as depicted in illustration.
- Check whether measuring bar makes proper contact at edge of cylinder "B".
- Position measuring tip on outer plate and note measuring value.

- Mark exact contact point on cylinder "B".
- Repeat measurement at 2 other points of outer plate, 120° offset each, and mark contact points.
- Average over 3 measured values under load.
- Release spindle and remove plate.

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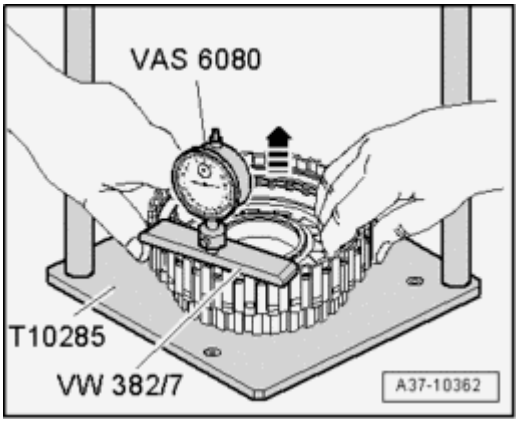


Fig. 196: Reach With Both Hands Into Clutch "B" and Pull Plate Pack Upward Until Stop
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Reach with both hands into clutch "B" and pull plate pack upward until stop.
- When disc pack is pulled up, measure exact distance between upper edge of cylinder "B" and outer disc (2nd technician required) at one of the marked points.
- Repeat measurement at 2 other marked points of outer plate.
- Average over 3 measured values when plate pack is pulled up.

- Determine air gap on the basis of the following calculations:

	Average of measured values under load (value 1 + value 2 + value 3): 3
	Measurement when plate pack is pulled up (value 1 + value 2 + value 3): 3
=	Air gap

- Subtract average of measured values when plate pack is pulled up from average of measured values under load.

Clutch "B" air gap - Automatic Transmission 01V Front Wheel Drive

Transmission codes	Specified value
CJQ, CJU, CJV, CJW, CJX, CJY, CJZ, DCS, DDS, DDT, DEQ, DES, DEU, DPS, DRD, DRF, DSS, DUL, DUM, EFR, ETU, ETV, ETW, EZV, FAC	0.99 to 1.28 mm
EBU, EBV, EBW, EBX, EBY, EBZ, ECJ, EDC, EDE, EFP, EKC, EMA, ERY, ETK, ETL, ETZ, EYF, EZP, EZR, EZS, EZW, EZX, EZY, EZZ, FAB, FAD, FAE, FATF, FAH, FAJ, FAK, FED, FEE, FEV, FHV, FNL, FRT, GDE, GML	1.37 to 1.66 mm

Clutch "B" air gap - Automatic Transmission 01V All Wheel Drive

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Transmission codes	Specified value
CJP, CJR, CJS, CJT, DEV, DEW, DEX, DEY, DKB, DPT, DRK, DRN, DST, DTU, DTV, EKX, ETX, ETY, FAN, FHD	0.99 to 1.28 mm
ECB, ECC, ECD, ECG, ECH, EDF, EFQ, EKD, EMM, EMP, ETM, ETN, EUA, EYJ, EYK, EZB, FAL, FAM, FAP, FAQ, FAR, FAS, FAU, FAV, FAW, FAX, FAZ, FBA, FBB, FEF, FEG, FEJ, FEP, FEQ, FHF, FHG, FHH, FLC, FLV, FNM, FRU, FVE, FXL, GAK, GBF, GBG, GBH, GBJ	1.37 to 1.66 mm

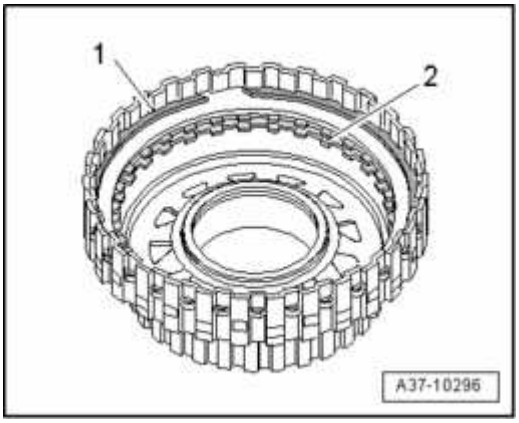


Fig. 197: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

If specified value is not obtained:

- Determine new circlip - **1** - according to the following table.

NOTE:

- **Disregard - 2 -.**
- **Air gap too small: Install respectively thinner circlip.**
- **Air gap too large: Install respectively thicker circlip.**

Available circlips - thickness in mm

0.8	1.4	2.0
1.0	1.6	
1.2	1.8	

- Check air gap of circlip again after inserting.

Clutch "A" , component overview

NOTE:

- **Some of the depicted components are part of component groups and are**

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not available separately as replacement part .

- **Before assembling, check clutch components "A" for wear and damage --> Clutch "A".**

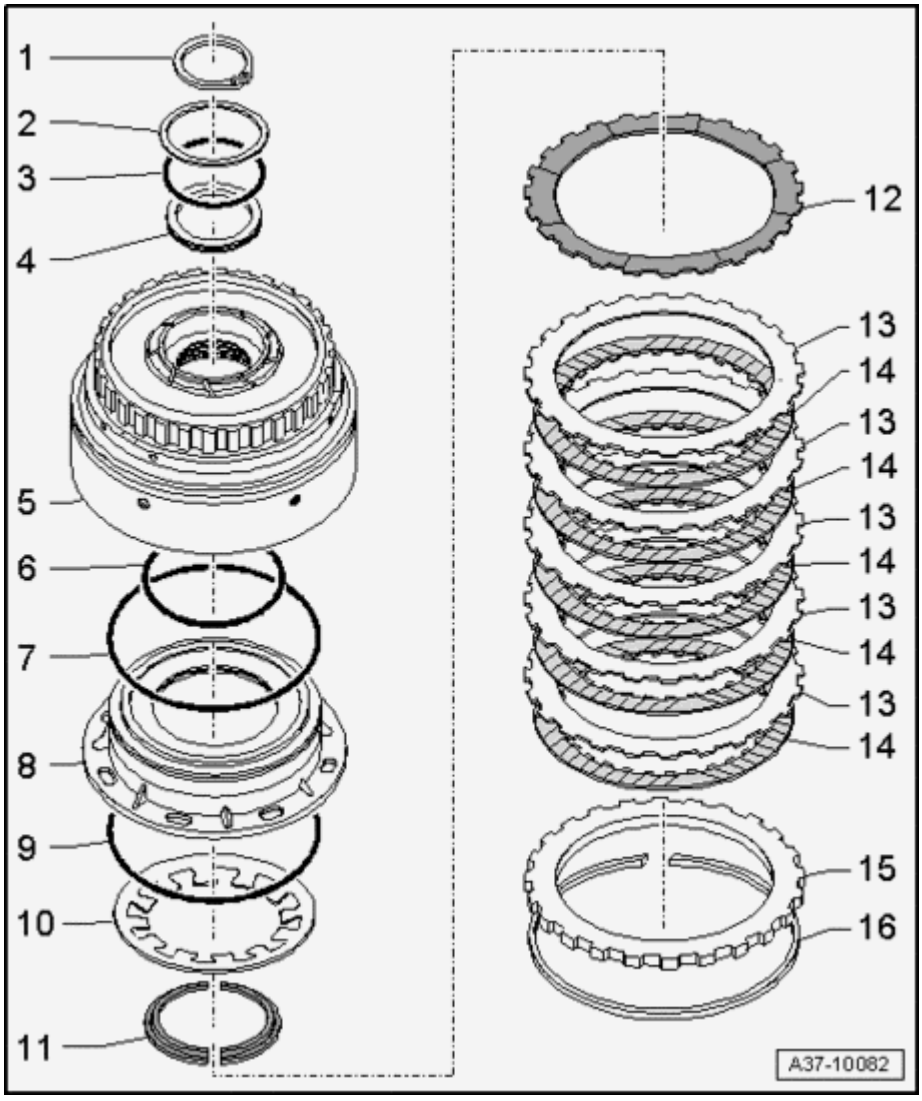


Fig. 198: Clutch "A", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Circlip

- Replace
- Do not over-stretch circlip when installing.

2 - Adjustment shim

- Determining thickness --> **Fig. 108**

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3 - O-ring

- Replace

4 - Ring

5 - Cylinder "A"

6 - O-ring

- Replace

7 - Green O-ring

- Replace

8 - Piston "A"

9 - O-ring

- Replace

10 - Plate spring

11 - Split retaining ring

- Bent side at right angle faces dished washer

12 - Waved washer

- Equipment depends on version

13 - Outer plate

14 - Coated plate

15 - Thick outer plate

16 - Circlip

- Determining thickness --> **Available circlips - thickness in mm**

Clutch "A" , disassembling and assembling

Disassembling

- Rotate clutch "A".

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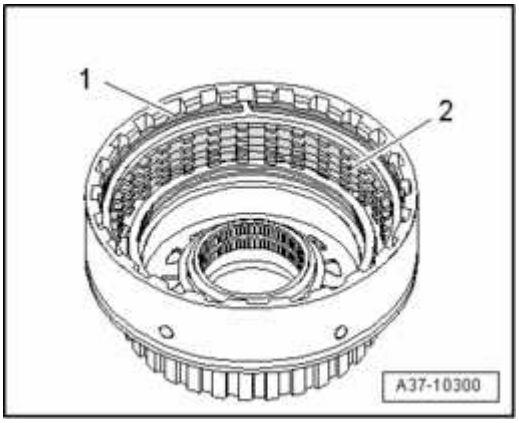


Fig. 199: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **1** - and remove plate pack - **2** - from cylinder "A".

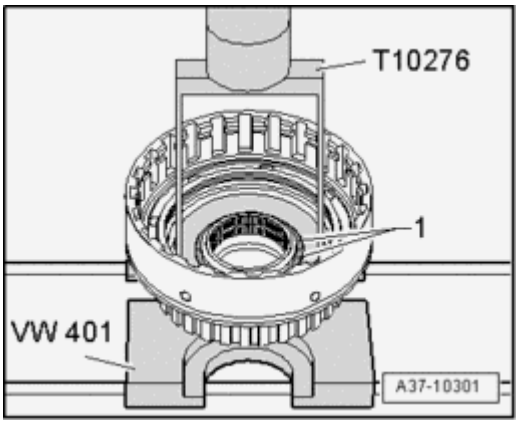


Fig. 200: Press Plate Spring Down Under Shop Press Using Installation Bracket T10276
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press plate spring down under shop press using installation bracket T10276.
- Remove split retaining ring - **1** -.
- Release shop press.
- Remove dished washer.

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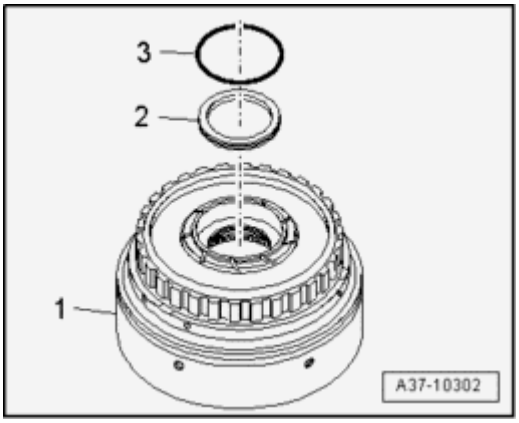


Fig. 201: Cylinder "A", Ring and O-Ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press ring - **2** - with O-ring - **3** - out of cylinder "A" - **1** -.

CAUTION: Wear eye protection.

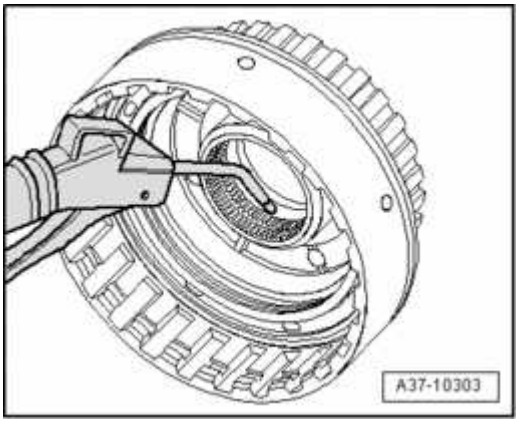


Fig. 202: Carefully Press Piston "A" Out Of Cylinder "A" With Compressed Air
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully press piston "A" out of cylinder "A" with compressed air, to do so plug two other oil bores using fingers.

Assembling

CAUTION: Before assembling, check clutch components "A" for wear and damage --> Clutch "A".

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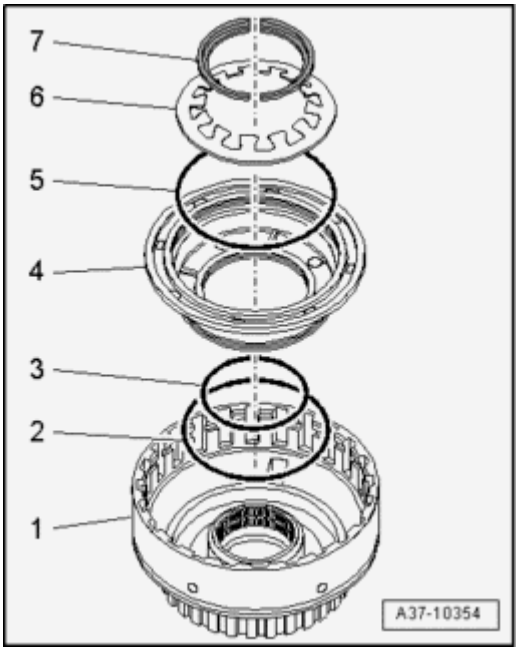


Fig. 203: Clutch "A", Components Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-rings - **2** - (green), - **3** - (black) and - **5** - (black) for piston "A" - **4** -.
- Press piston "A" - **4** - into cylinder "A" - **1** - as far as stop.
- Position plate spring - **6** -.

7 - Split retaining ring

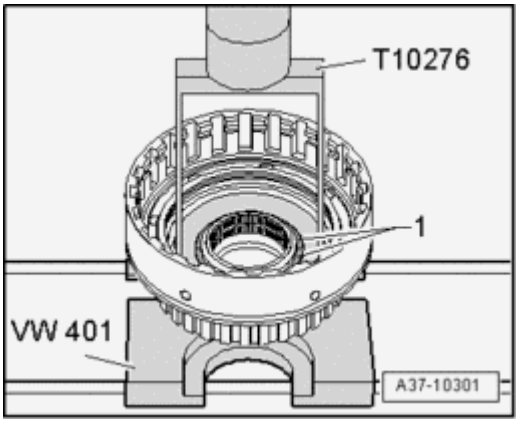


Fig. 204: Press Plate Spring Down Under Shop Press Using Installation Bracket T10276
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press plate spring down under shop press using installation bracket T10276.
- Install split retaining ring - **1** -.

- Bent inner side at right angle of retaining ring faces downward.

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- Release shop press.

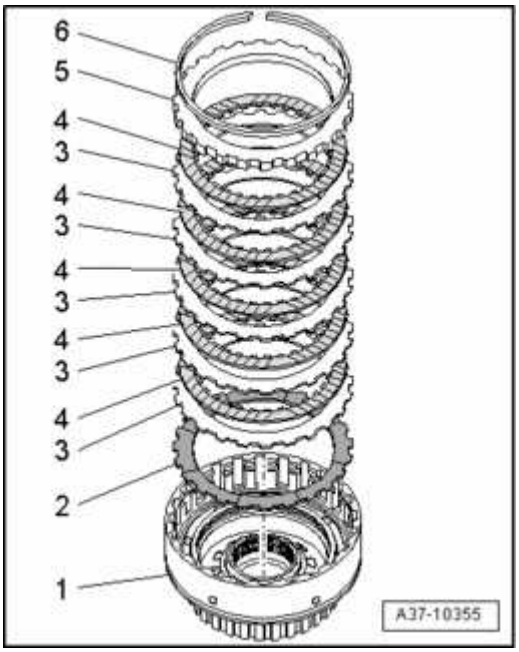


Fig. 205: Cylinder "A", Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert waved washer - **2** - into cylinder "A" - **1** -.
- Install outer plate - **3** - and coated plate - **4** - alternately.
- Install thick outer plate - **5** -.

NOTE:

- **Ensure rounded edges of thick outer clutch disc faces toward lining disc - 4 - and not toward circlip - 6 -. This improves circlip contact surface.**

- Insert circlip - **6** -.

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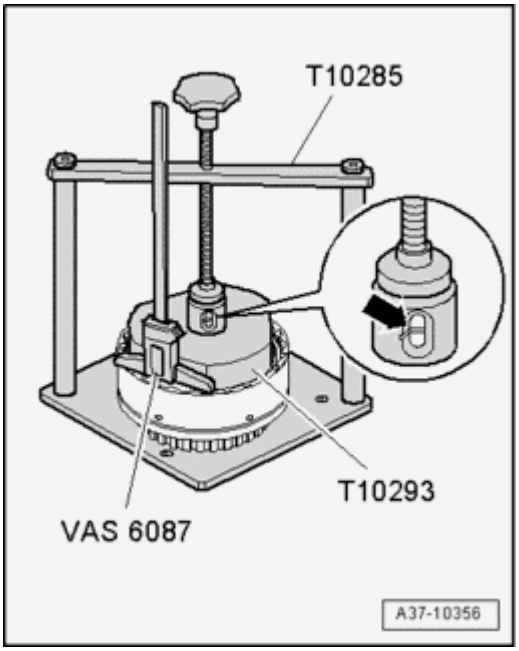


Fig. 206: Place Clutch "A" On Pre-Tensioning Tool T10285
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Adjust clutch "A" air gap

- Place clutch "A" on pre-tensioning tool T10285.
- Place plate T10293 on outer clutch disc "A".

- Plate must not touch circlip all around.

- Insert pressure unit T10285/1 with centering pin into bore of plate.
- Align clutch "A" on plate of pre-tensioning tool.

- The pressure unit must be centrally positioned under spindle thrust piece.

- Turn spindle of pre-tensioning tool downward.

- The markings at the inspection hole of the pressure unit must align **- arrow -**.

- Apply Digital depth gauge VAS 6087 at upper edge of cylinder "A" , as depicted in illustration.
- Apply measuring tongue on outer plate and note measuring value.
- Mark contact point on cylinder "A".
- Repeat measurement at 2 other points of outer plate, 120° offset each, and mark contact points.

- Average over 3 measured values under load.
- Release spindle and remove plate.

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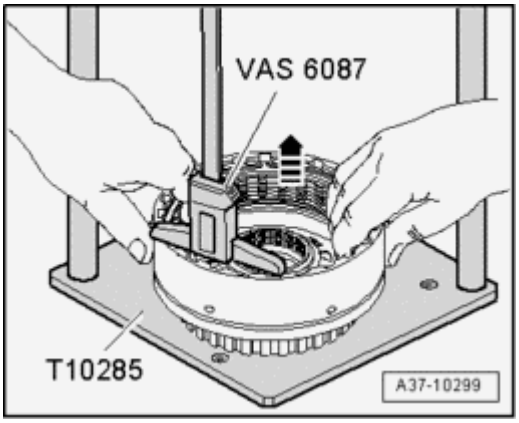


Fig. 207: Reach With Both Hands Into Clutch "A" and Pull Plate Pack Upward Until Stop
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Reach with both hands into clutch "A" and pull plate pack upward until stop.
- When disc pack is pulled up, measure distance between upper edge of cylinder "A" and outer disc (2nd technician required) at one of the marked points.
- Repeat measurement at 2 other marked points of outer plate.
- Average over 3 measured values when pate pack is pulled up.

- Determine air gap on basis of the following calculations:

	Average of measured values under load (value 1 + value 2 + value 3): 3
	Measurement when plate pack is pulled up (value 1 + value 2 + value 3): 3
=	Air gap

- Subtract average of measured values when plate pack is pulled up from average of measured values under load.

Clutch "A" air gap - Automatic Transmission 01V Front Wheel Drive

Transmission codes	Specified value
CJV, CJW, CJX, CJY, CJZ, DCS, DDT, DEQ, DES, DEU, DPS, DRD, DSS, EFR, ETU, ETV, ETW, EZV, FAC	1.73 to 2.03 mm
CJQ, CJU, DDS, DDT, DRF, DUL, DUM	1.57 to 1.87 mm
EBV, EBW, EBX, EBZ, ECJ, EDC, EDE, EFP, EKC, EMA, ERY, ETK, ETL, ETZ, EYF, EZP, EZW, EZX, EZY, EZZ, FAD, FAE, FATF, FAH, FAJ, FAK, FED, FEE, FHV, FNL, FRT, GDE, GML	2.06 to 2.35 mm
EBU, EBY, EZR, EZS, FAB, FEV	1.73 to 2.02 mm

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Clutch "A" air gap - Automatic Transmission 01V All Wheel Drive

Transmission codes	Specified value
CJP, CJR, CJS, CJT, DEV, DEW, DEX, DEY, DPT, DRK, DRN, DST, DTU, EKX, ETX, ETY, FAN, FHD	1.73 to 2.03 mm
DKB, DTV	1.41 to 1.71 mm
ECB, ECC, ECD, ECG, ECH, EDF, EKD, EMM, EMP, ETM, ETN, EUA, EYJ, EYK, EZB, FAM, FAP, FAQ, FAR, FAS, FAU, FAV, FAW, FAX, FAZ, FBA, FBB, FEF, FEG, FEJ, FEQ, FHF, FHG, FHH, FLC, FLV, FNM, FRU, FVE, FXL, GAK, GBG, GBH, GBJ	2.06 to 2.35 mm
EFQ, FAL, FEP, GBF	1.73 to 2.02 mm

If specified value is not obtained:

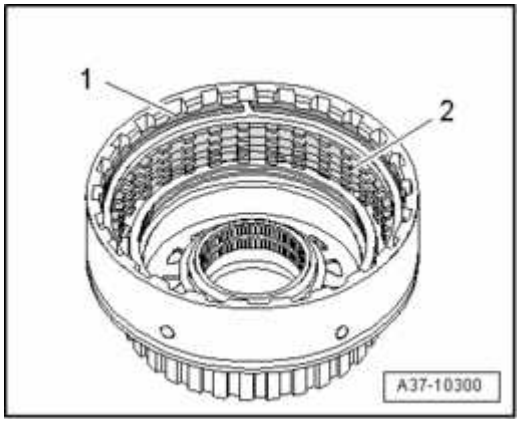


Fig. 208: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Determine new circlip - **1** - according to the following table.

NOTE:

- **Disregard - 2 -.**
- **Air gap too small: Install respectively thinner circlip.**
- **Air gap too large: Install respectively thicker circlip.**

Available circlips - thickness in mm

1.0	1.6	2.2
1.2	1.8	2.4
1.4	2.0	2.6

- Check air gap of circlip again after inserting.

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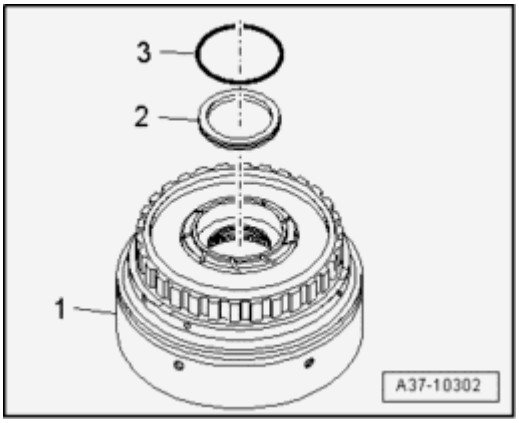


Fig. 209: Cylinder "A", Ring and O-Ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-ring - **3** - on ring - **2** -.
- Press ring into cylinder "A" - **1** - until stop.

Clutch "E" , component overview

NOTE:

- **Some of the depicted components are part of component groups and are not available separately as replacement part .**
- **Before assembling, check components of clutch "E" for wear and damage --> Clutch "E".**

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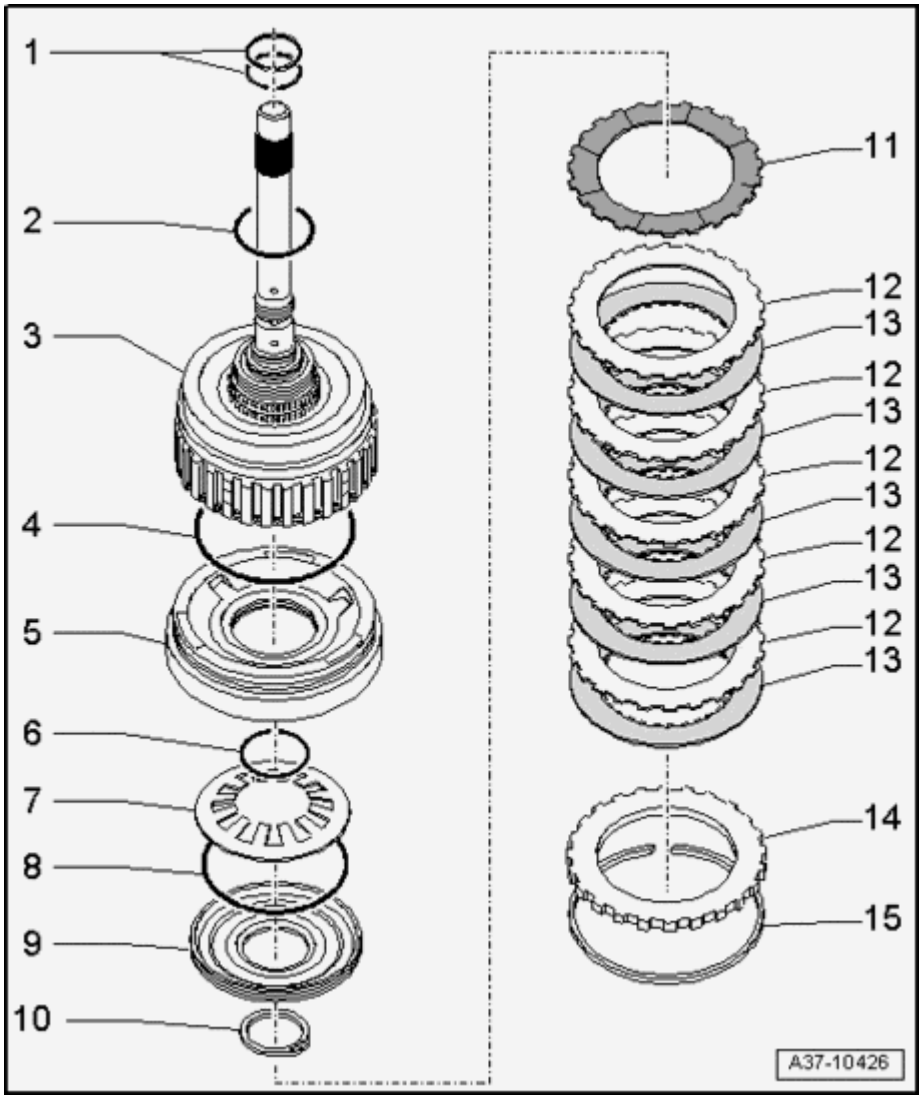


Fig. 210: Clutch "E", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Rectangular rings

- Replace

2 - O-ring

- Replace

3 - Cylinder "E"

4 - O-ring

- Replace

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5 - Piston "E"

6 - O-ring

- Replace

7 - Plate spring

8 - O-ring

- Replace

9 - Diaphragm plate

10 - Circlip

- Replace
- Do not over-stretch circlip when installing.

11 - Waved washer

12 - Outer plates

13 - Coated plates

14 - Thick outer plate

15 - Circlip

- Determining thickness --> **Available circlips - thickness in mm**

Clutch "E" , disassembling and assembling

Disassembling

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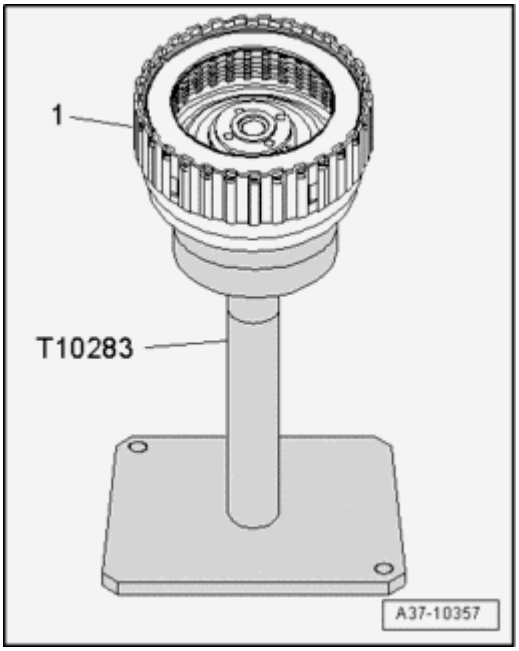


Fig. 211: Place Clutch "E" In Mounting Device T10283
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place clutch "E" - **1** - in mounting device T10283.

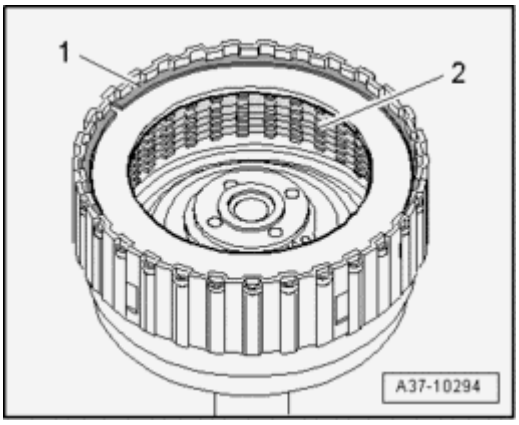


Fig. 212: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **1** - and remove plate pack - **2** - from cylinder "E".

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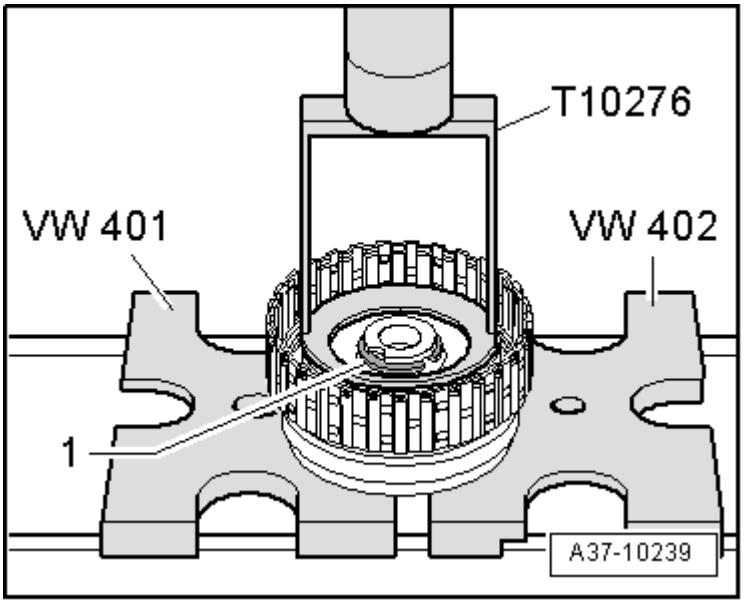


Fig. 213: Press Diaphragm Plate Down Under Shop Press Using Installation Bracket T10276
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press diaphragm plate down under shop press using installation bracket T10276.
- Remove circlip - **1** -.
- Release shop press.

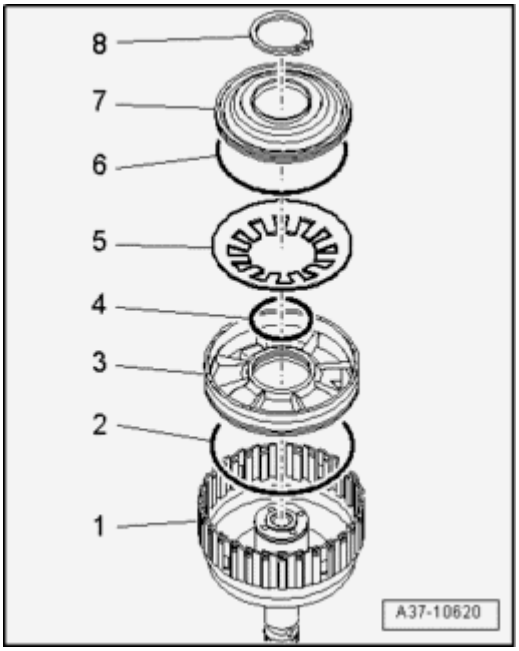


Fig. 214: Clutch "E", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove diaphragm plate - **7** -.

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- Remove dished washer - **5** -.
- Twist cylinder "E".

CAUTION: Wear eye protection.

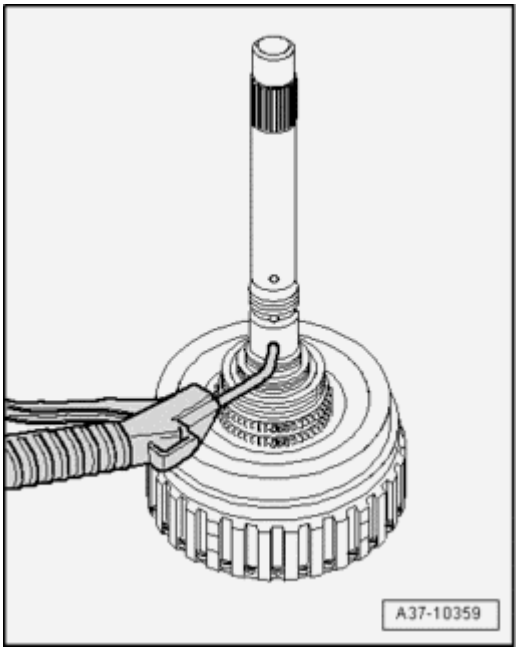


Fig. 215: Carefully Press Piston "E" Out Of Cylinder "E" With Compressed Air
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully press piston "E" out of cylinder "E" with compressed air.

Assembling

CAUTION: Before assembling, check components of clutch "E" for wear and damage --> Clutch "E".

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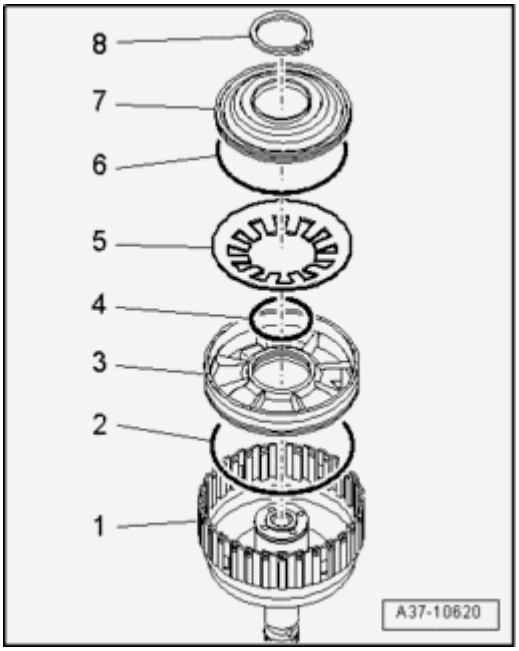
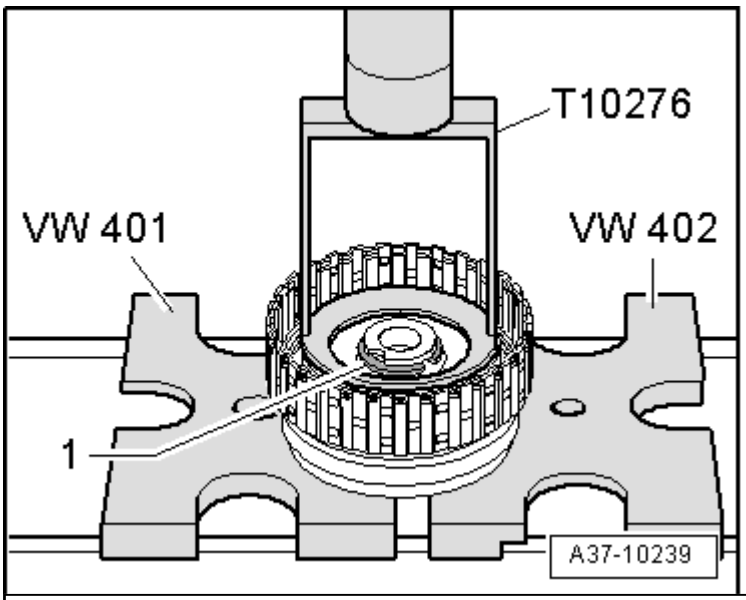


Fig. 216: Clutch "E", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-rings - **2** - and - **4** - for piston "E" - **3** -.
- Press piston "E" - **3** - into cylinder "E" - **1** - as far as stop.
- Insert dished washer - **5** -.
- Replace O-ring - **6** - on diaphragm plate - **7** -.
- Insert diaphragm plate - **7** - into cylinder "E" - **1** -.

8 - Circlip



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Fig. 217: Press Diaphragm Plate Down Under Shop Press Using Installation Bracket T10276
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press diaphragm plate down under shop press using installation bracket T10276.
- Insert new circlip - **1** -.

CAUTION: Do not over-stretch circlip. After installing, check proper seating of circlip.

- Release shop press.

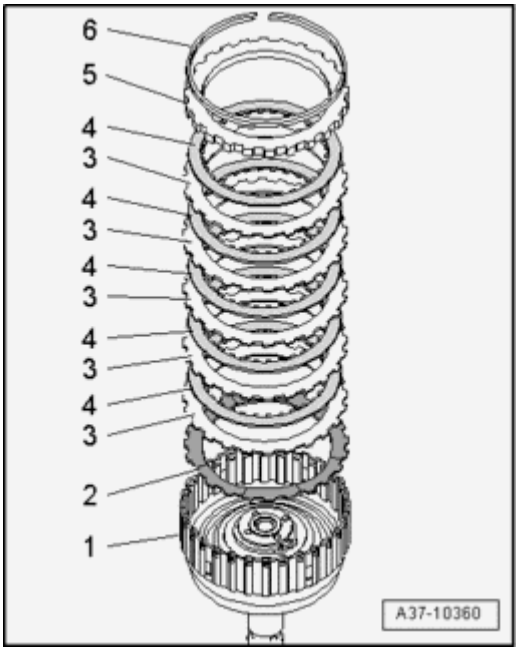


Fig. 218: Cylinder "E", Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert waved washer - **2** - into cylinder "E" - **1** -.
- Install outer plates - **3** - and coated plates - **4** - alternately.
- Install thick outer plates - **5** -.

NOTE:

- **Ensure rounded edges of thick outer clutch disc faces toward lining disc - 4 - and not toward circlip - 6 -. This improves circlip contact surface.**

- Insert circlip - **6** -.

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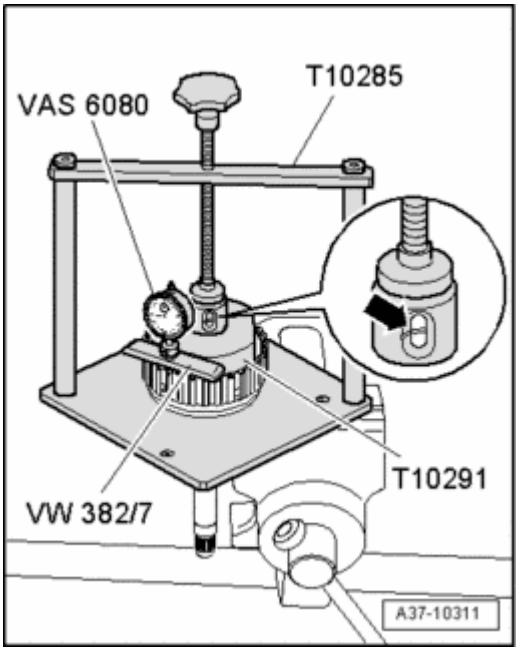


Fig. 219: Adjust Clutch "E" Air Gap Using Pre-Tensioning Tool T10285
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Adjust clutch "E" air gap

- Secure pre-tensioning tool T10285 with wide base in vise.
- Install clutch "E" in pre-tensioning tool.

- Input shaft projects through bore in base plate.

- Place plate T10291 on outer clutch disc "E".

- Plate must not touch circlip all around.

- Insert pressure unit T10285/1 with centering pin into bore of plate.
- Align clutch "E" on plate of pre-tensioning tool.

- The pressure unit must be centrally positioned under spindle thrust piece.

- Turn spindle of pre-tensioning tool downward.

- The markings at the inspection hole of the pressure unit must align - **arrow** -.

- Insert dial gauge VAS 6080 into measuring bar VW 382/7 and tighten knurled nut.
- Apply measuring bar at upper edge of cylinder "E" , as depicted in illustration.
- Check whether measuring bar makes proper contact at edge of cylinder "E".
- Position measuring tip on outer plate and note measuring value.

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- Mark exact contact point on cylinder "E".
- Repeat measurement at 2 other points of outer plate, 120° offset each, and mark contact points.
- Average over 3 measured values under load.
- Release spindle and remove plate.

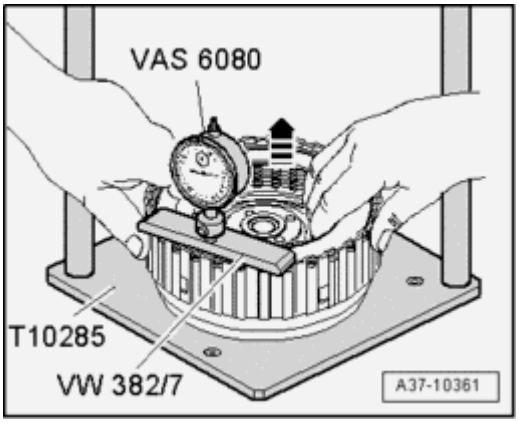


Fig. 220: Reach With Both Hands Into Clutch "E" and Pull Plate Pack Upward Until Stop
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Reach with both hands into clutch "E" and pull plate pack upward until stop.
- When disc pack is pulled up, measure distance between upper edge of cylinder "E" and outer disc (2nd technician required) at one of the marked points.
- Repeat measurement at 2 other marked points of outer plate.
- Average over 3 measured values when plate pack is pulled up.

- Determine air gap on the basis of the following calculations:

	Average of measured values under load (value 1 + value 2 + value 3): 3
	Measurement when lamella pack is pulled up (value 1 + value 2 + value 3): 3
=	Air gap

- Subtract average of measured values when plate pack is pulled up from average of measured values under load.

Clutch "E" air gap - Automatic Transmission 01V Front Wheel Drive

Transmission codes	Specified value
CJV, CJW, CJX, CJY, CJZ, DCS, DEQ, DES, DEU, DPS, DRD, DSS, EBV, EBW, EBX, EBZ, ECJ, EDC, EDE, EFP, EFR, EKC, EMA, ERY, ETK, ETL, ETU, ETV, ETW, ETZ, EYF, EZP,	1.78 to 2.08 mm

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EZV, EZW, EZX, EZY, EZZ, FAC, FAD, FAE, FATF, FAH, FAJ, FAK, FED, FEE, FHV, FNL, FRT, GDE, GML	
CJQ, CJU, DDS, DDT, DRF, DUL, DUM, EBU, EBY, EZR, EZS, FAB, FEV	1.41 to 1.71 mm

Clutch "E" air gap - Automatic Transmission 01V All Wheel Drive

Transmission codes	Specified value
CJP, CJR, CJS, CJT, DEV, DEW, DEX, DEY, DPT, DRK, DRN, DST, DTU, ECB, ECC, ECD, ECG, ECH, EDF, EKD, EKX, EMM, EMP, ETM, ETN, ETX, ETY, EUA, EYJ, EYK, EZB, FAM, FAN, FAP, FAQ, FAR, FAS, FAU, FAV, FAW, FAX, FAZ, FBA, FBB, FEF, FEG, FEJ, FEQ, FHD, FHF, FHG, FHH, FLC, FLV, FNM, FRU, FVE, FXL, GAK, GBG, GBH, GBJ	1.78 to 2.08 mm
DKB, DTV, EFQ, FAL, FEP, GBF	1.41 to 1.71 mm

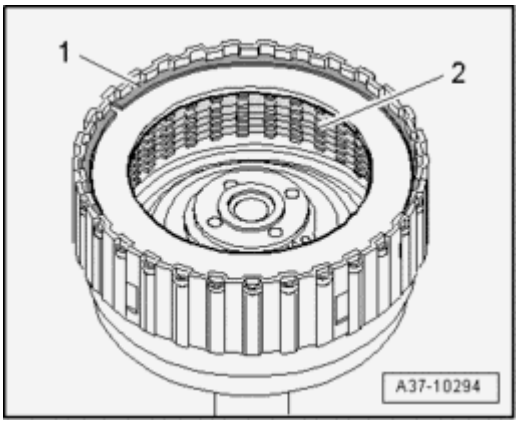


Fig. 221: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

If specified value is not obtained:

- Determine new circlip - **1** - according to the following table.

NOTE:

- **Disregard - 2 -.**
- **Air gap too small: Install respectively thinner circlip.**
- **Air gap too large: Install respectively thicker circlip.**

Available circlips - thickness in mm

1.2	1.8	2.4
1.4	2.0	2.6

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1.6	2.2	

- Check air gap of circlip again after inserting.

Tower "II" , assembling

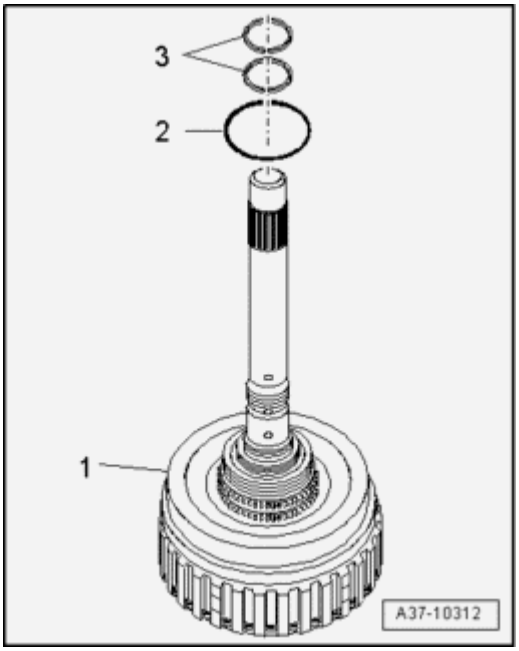


Fig. 222: Tower "II", Assembling
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace rectangular rings - **3** - and O-ring - **2** - on input shaft at clutch "E" - **1** -.
- Before inserting, thinly coat rectangular rings - **3** - and O-ring - **2** - with Vaseline. Use only Vaseline, other lubricating substances cause functional problems in the hydraulic transmission control.
- Make sure that rectangular rings - **3** - are fully seated all around in the input shaft groove.

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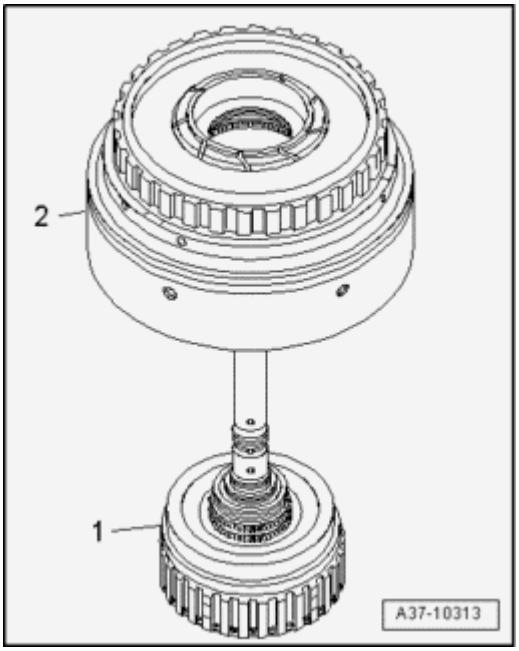


Fig. 223: Identifying Clutch "A" and Clutch "E"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press clutch "A" - **2** - onto clutch "E" - **1** - until stop.

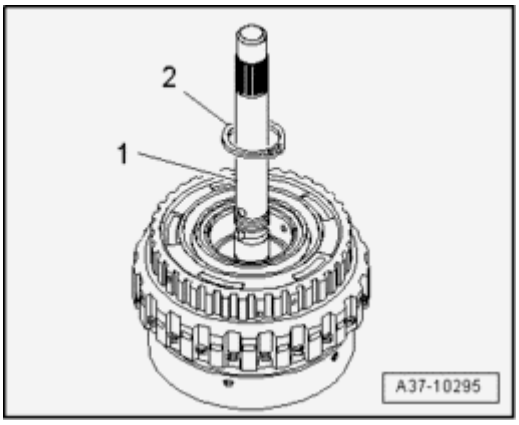


Fig. 224: Identifying Circlip and Input Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install circlip - **2** - on input shaft - **1** -.

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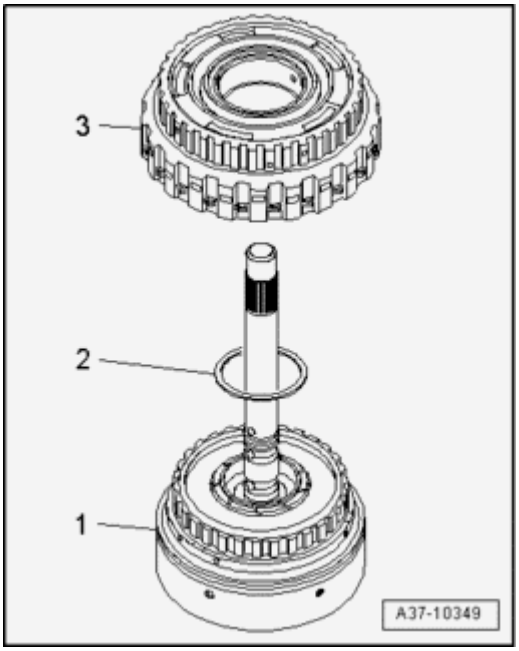


Fig. 225: Identifying Clutch "B" and Clutch "A" Axial Needle Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place axial needle bearing - **2** - onto clutch "A" - **1** -.
- Attach clutch "B" - **3** - onto disc carrier of clutch "A" , using short lifting/turning motions.

- All clutch discs "B" must engage in sequence in plate carrier of clutch "A".

- Check whether all plates are engaged, to do so lift clutch "B" a few millimeters and let fall.

- If this produces a metallic sound, all plates are engaged.
- If only a muted sound is heard, not all plates are engaged.

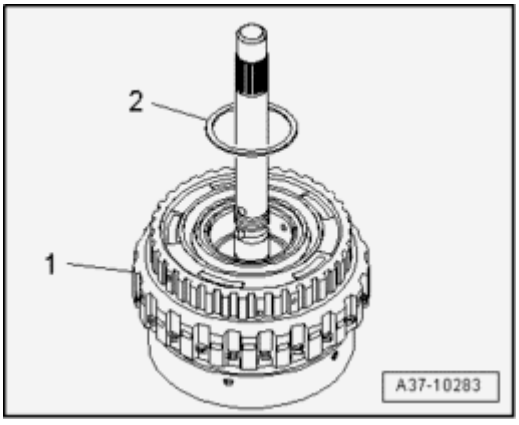


Fig. 226: Identifying Tower "II", Clutch "B" and Adjustment Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place adjustment shim - **2** - onto clutch "B" - **1** -.

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CLUTCH C , DISASSEMBLING AND ASSEMBLING

Clutch "C" , disassembling and assembling

NOTE:

- **General repair notes --> General Repair Notes .**
- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**
- **Lubricate O-rings and gaskets with ATF or Vaseline before installing to prevent rings from being pinched when inserting.**
- **Attach mount and adjustment shims only with Vaseline.**

- Use only ATF or Vaseline in areas near ATF. Other types of lubrication cause faults to occur in the transmission hydraulics.

Clutch "C" , component overview

NOTE:

- **Some of the depicted components are part of component groups and are not available separately as replacement part .**
- **Before assembling, check components of clutch "C" for wear and damage --> Clutch "C".**

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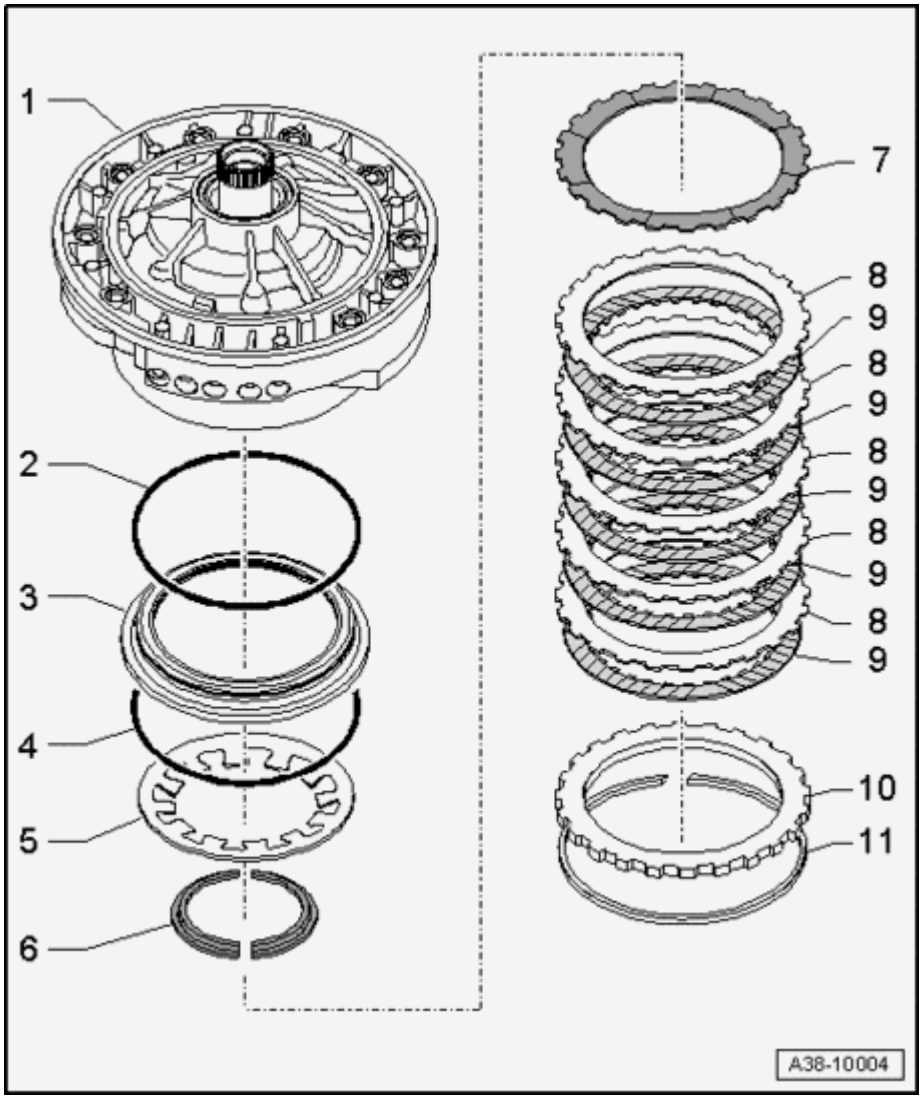


Fig. 227: Clutch "C", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - ATF pump

- Disassembling --> **ATF pump, component overview**

2 - O-ring

- Replace

3 - Piston "C"

4 - O-ring

- Replace

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5 - Plate spring

6 - Split retaining ring

7 - Waved washer

8 - Outer plates

9 - Coated plates

10 - Thick outer plate

11 - Circlip

- Determining thickness --> **Available circlips - thickness in mm**

Clutch "C" , disassembling and assembling

Disassembling

- Twist ATF pump.

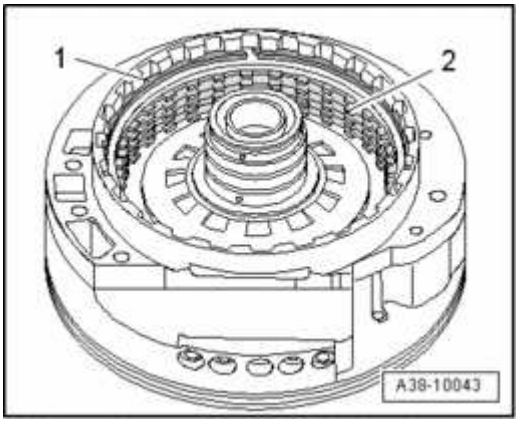


Fig. 228: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **1** - and remove plate pack - **2** - from cylinder "C".

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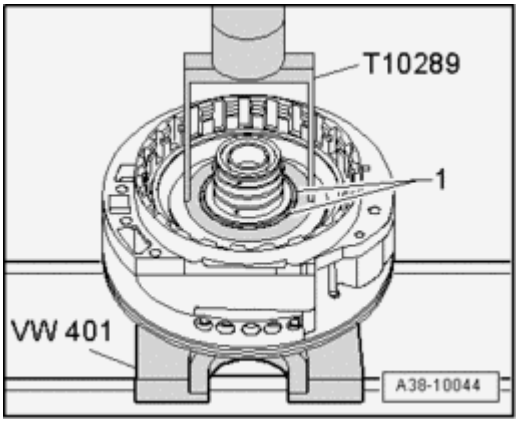


Fig. 229: Pressing Plate Spring Down Under Shop Press Using Installation Bracket T10289
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press plate spring down under shop press using installation bracket T10289.
- Remove split retaining ring - **1** -.
- Release shop press.

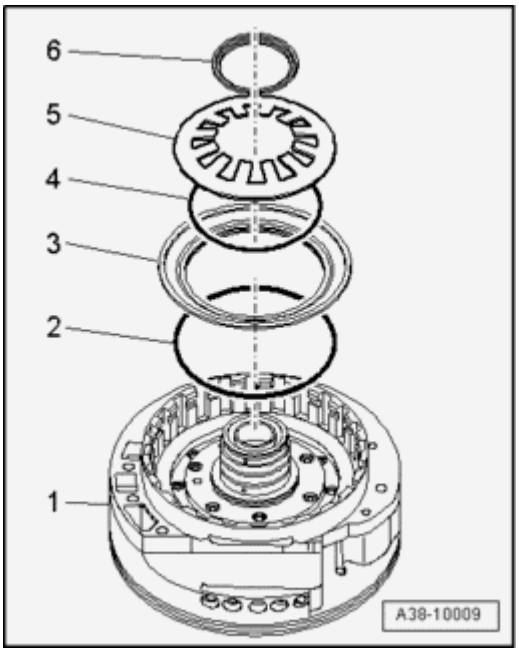


Fig. 230: Identifying Dished Washer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove dished washer - **5** -.

CAUTION: Wear eye protection.

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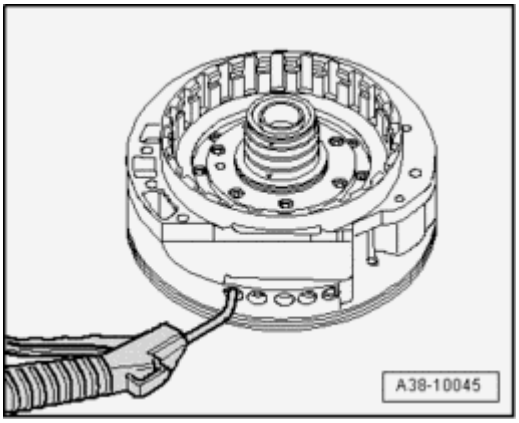


Fig. 231: Carefully Press Piston "C" Out Of ATF Pump With Compressed Air
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully press piston "C" out of ATF pump with compressed air.

Assembling

CAUTION: Before assembling, check components of clutch "C" for wear and damage --> Clutch "C".

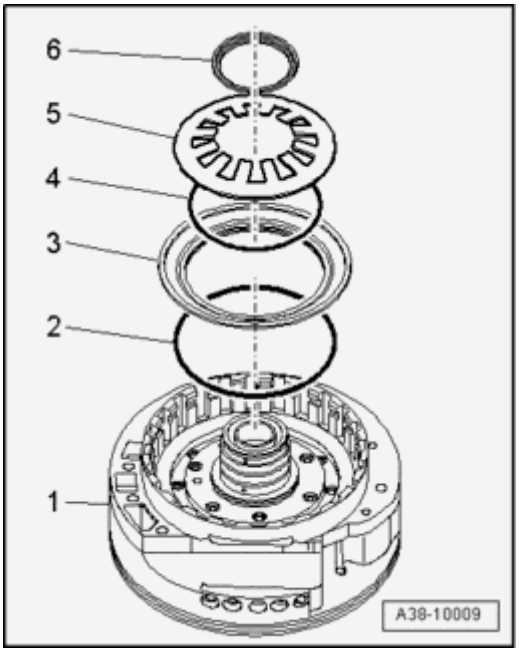


Fig. 232: Identifying Dished Washer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-rings - **2** - and - **4** - for piston "C" - **3** -.
- Press piston "C" - **3** - into ATF pump - **1** - until stop.
- Position plate spring - **5** -.

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6 - Split retaining ring

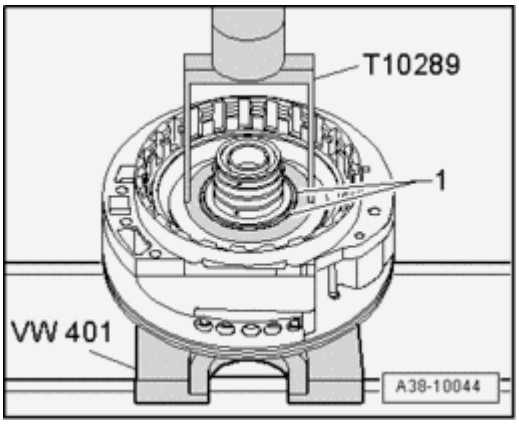


Fig. 233: Pressing Plate Spring Down Under Shop Press Using Installation Bracket T10289
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press plate spring down under shop press using installation bracket T10289.
- Install split retaining ring - **1** -.

- Bent inner side at right angle of retaining ring faces downward.

- Release shop press.

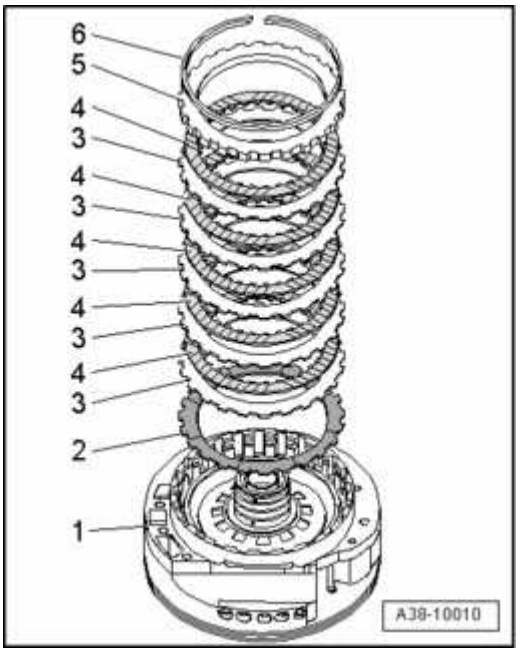


Fig. 234: Cylinder Component, Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert waved washer - **2** - into cylinder "B" - **1** -.
- Install outer plates - **3** - and coated plates - **4** - alternately.

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- Install thick outer plate - **5** -.

NOTE:

- **Ensure rounded edges of thick outer clutch disc faces toward lining disc - 4 - and not toward circlip - 6 -. This improves circlip contact surface.**

- Insert circlip - **6** -.

Adjust clutch "C" air gap

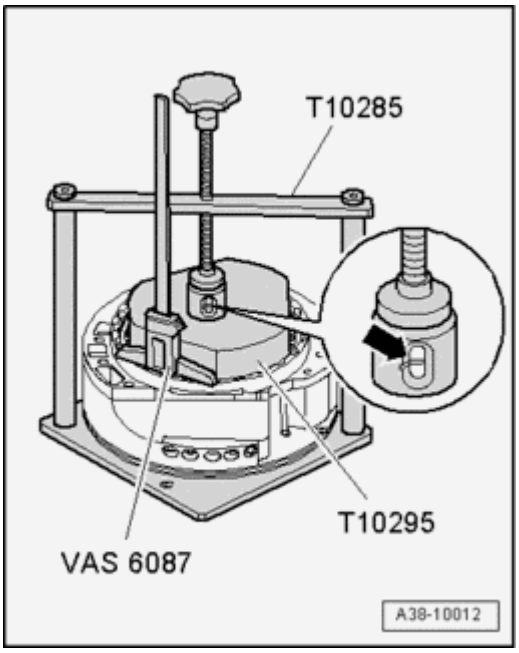


Fig. 235: Adjust Clutch "C" Air Gap Using Pre-Tensioning Tool T10285
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure pre-tensioning tool T10285 with wide base in vise.
- Place ATF pump on pre-tensioning tool.

- Stator shaft projects through bore in base plate.

- Place plate T10295 on outer clutch disc "C".

- Plate must not touch circlip all around.

- Insert pressure unit T10285/1 with centering pin into bore of plate.
- Align ATF pump on plate of pre-tensioning tool.

- The pressure unit must be centrally positioned under spindle thrust piece.

- Turn spindle of pre-tensioning tool downward.

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- The markings at inspection hole of the pressure unit must align - **arrow** -.

- Apply Digital depth gauge VAS 6087 at upper edge of outer plate carrier "C" , as depicted in illustration.
- Apply measuring tongue on outer plate and note measuring value.
- Mark contact point on outer plate carrier "C".
- Repeat measurement at 2 other points of outer plate, 120° offset each, and mark contact points.

- Average over 3 measured values under load.
- Release spindle and remove plate.

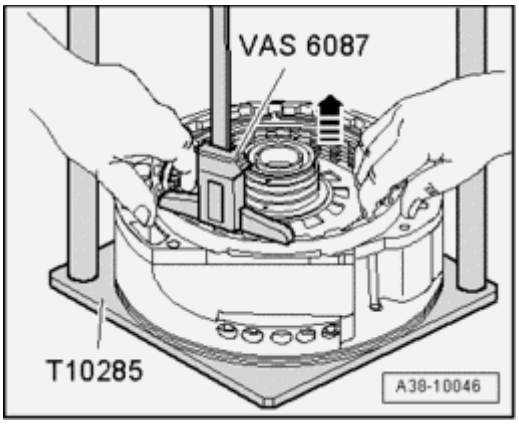


Fig. 236: Reach With Both Hands Into Clutch "C" and Pull Plate Pack Upward Until Stop
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Reach with both hands into clutch "C" and pull plate pack upward until stop.
- When disc pack is pulled up, measure distance between upper edge of outer disc carrier "C" and outer disc (2nd technician required) at one of the marked points.
- Repeat measurement at 2 other marked points of outer plate.
- Average over 3 measured values when plate pack is pulled up.

- Determine air gap on the basis of the following calculations:

	Average of measured values under load (value 1 + value 2 + value 3): 3
	Measurement when lamella pack is pulled up (value 1 + value 2 + value 3): 3
=	Air gap

- Subtract average of measured values when plate pack is pulled up from average of measured values under load.

Clutch "C" air gap - Automatic Transmission 01V Front Wheel Drive

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Transmission codes	Specified value
CJW, CJX, CJY, CJZ, DEQ, DEU, DPS, DRD, DSS, ECJ, EDE, EFR, ERY, ETK, ETL, ETU, ETV, ETW, ETZ, EYF, EZV, EZW, FAC, FAD, FATF, FAH, FAK, FED, FEE, FNL, FRT, GDE, GML	2.00 to 2.30 mm
CJQ, CJU, CJV, DCS, DDS, DDT, DES, DRF, DUL, DUM	1.63 to 1.93 mm
EBU, EBV, EBW, EBX, EBY, EBZ, EDC, EFP, EKC, EMA, EZP, EZR, EZS, EZX, EZY, EZZ, FAB, FAE, FAJ, FEV, FHV	1.25 to 1.54 mm

Clutch "C" air gap - Automatic Transmission 01V All Wheel Drive

Transmission codes	Specified value
CJR, CJS, CJT, DEW, DEX, DEY, DPT, DRK, DRN, DST, DTU, ECH, EDF, EKX, EMM, EMP, ETM, ETN, ETX, ETY, EUA, EYJ, EYK, EZB, FAN, FAP, FAQ, FAU, FAW, FAX, FAZ, FBB, FEF, FEG, FEJ, FEQ, FHD, FHG, FLC, FLV, FNM, FRU, FVE, FXL, GAK, GBH, GBJ	2.00 to 2.30 mm
CJP, DEV, DKB, DTV	1.63 to 1.93 mm
ECB, ECC, ECD, ECG, EFQ, EKD, FAL, FAM, FAR, FAS, FAV, FBA, FEP, FHF, FHH, GBF, GBG,	1.25 to 1.54 mm

If specified value is not obtained:

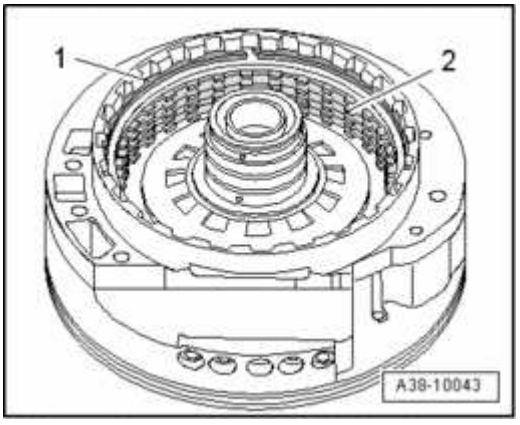


Fig. 237: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Determine new circlip - **1** - according to the following table.

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NOTE:

- **Disregard - 2 -.**
- **Air gap too small: Install respectively thinner circlip.**
- **Air gap too large: Install respectively thicker circlip.**

Available circlips - thickness in mm

1.2	1.8	2.4
1.4	2.0	2.6
1.6	2.2	2.8

- Check air gap of circlip again after inserting.

38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS

ATF PUMP, DISASSEMBLING AND ASSEMBLING

ATF pump, disassembling and assembling

NOTE:

- **General repair notes --> General Repair Notes .**
- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**
- **Lubricate O-rings and gaskets with ATF or Vaseline before installing to prevent rings from being pinched when inserting.**
- **Attach mount and adjustment shims only with Vaseline.**

- Use only ATF or Vaseline in areas near ATF. Other types of lubrication cause malfunctions to occur in the transmission hydraulics.

ATF pump, component overview

NOTE:

- **Some of the depicted components are part of component groups and are not available separately as replacement part .**
- **Before assembling, check components of ATF pump for wear and damage --> ATF supply.**
- **Before assembling, check components of clutch "C" for wear and damage --> Clutch "C".**

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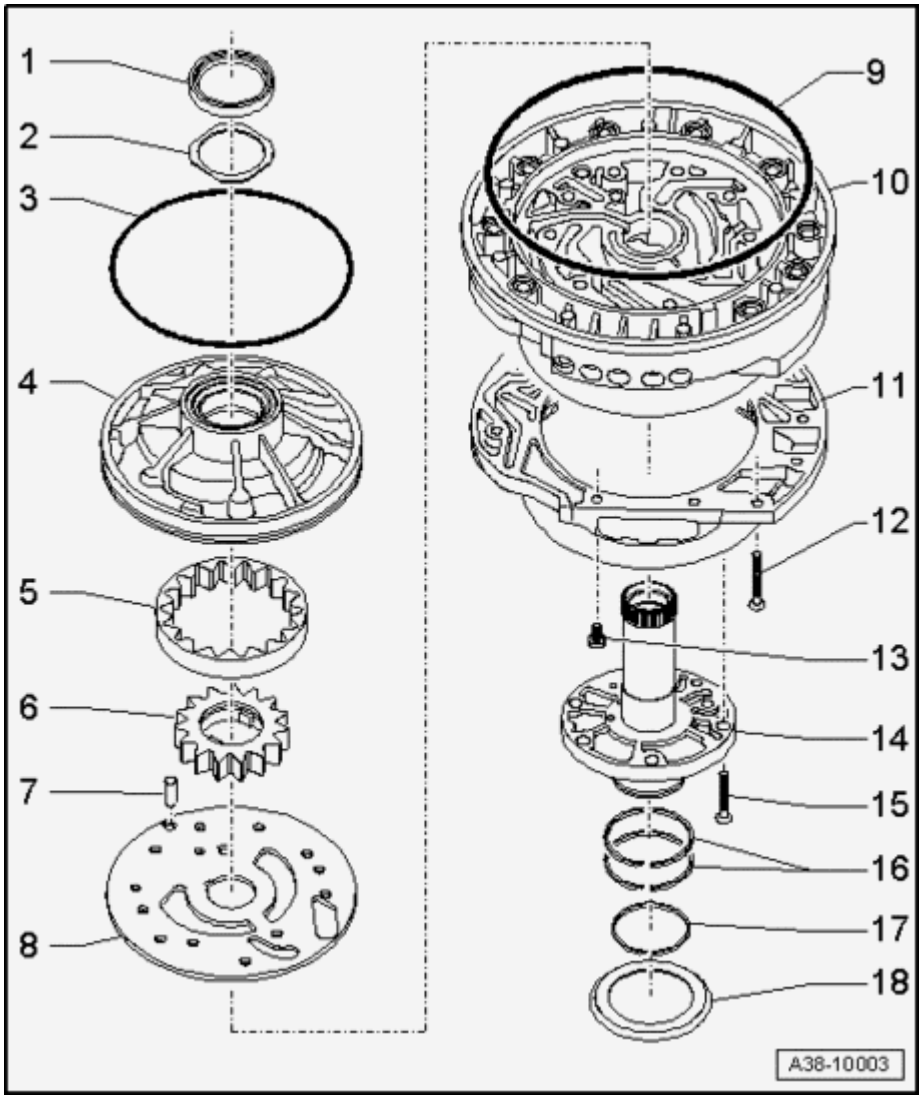


Fig. 238: ATF Pump, Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Shaft seal

- Replace

2 - Locking washer

3 - O-ring

- Replace

4 - ATF pump housing

5 - Ring gear

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6 - ATF pump wheel

7 - Positioning sleeve

8 - Intermediate panel

9 - O-ring

- Replace

10 - ATF pump housing

11 - Outer lamella carrier "C"

12 - Recessed bolt

- Tightening sequence *Tighten ATF pump screws as follows:* under **ATF supply housing with stator shaft, removing and installing**

13 - Bolt

- Tightening sequence *Tighten ATF pump screws as follows:* under **ATF supply housing with stator shaft, removing and installing**

14 - Stator shaft

- Removing and installing --> **Stator shaft, removing and installing**

15 - Recessed bolt

- Tightening sequence *Tighten ATF pump screws as follows:* under **ATF supply housing with stator shaft, removing and installing**

16 - Rectangular rings

- Replace

17 - Rectangular ring

- Replace

18 - Axial needle bearing

ATF pump (with assembled transmission), completely removing and installing

Removing

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- Transmission attached to assembly stand --> **Transmission, attaching assembly stand**.

  - Place old oil collecting and extracting device V.A.G 1782 beneath transmission.

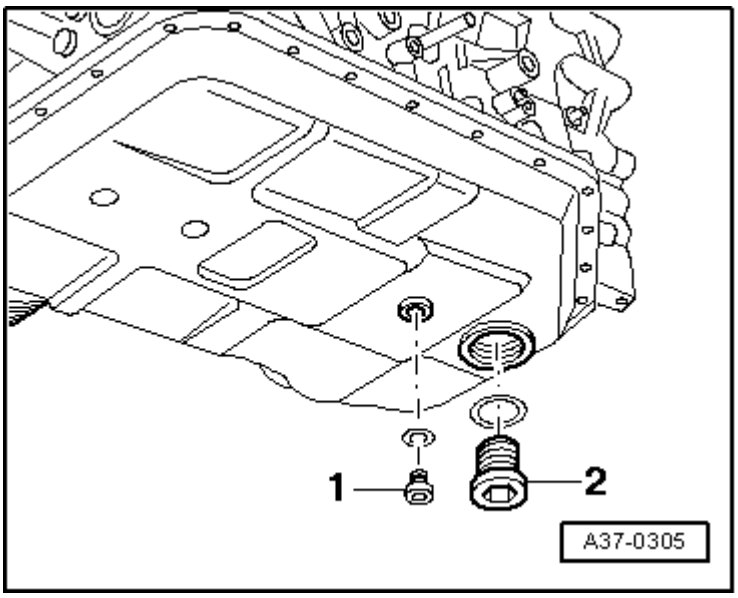


Fig. 239: Identifying ATF Drain Plug And ATF Level Inspection Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

CAUTION: Wear eye protection.

  - Remove ATF drain plug - **1** - and allow ATF to drain.

NOTE:

- **Observe disposal regulations.**
- **Rest of ATF remains in the ATF oil pan.**

  - Remove torque converter.

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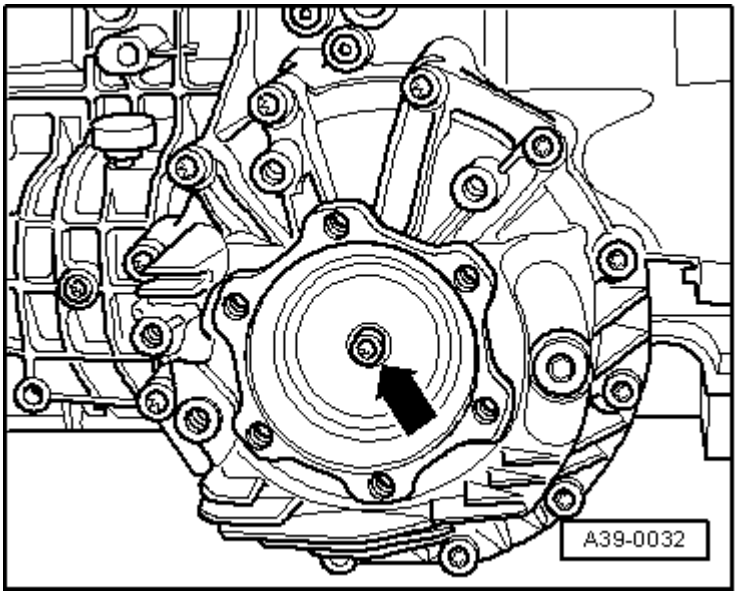


Fig. 240: Flange Shaft Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove right flange shaft bolt - **arrow** - by installing 2 bolts in flange and counterholding flange shaft using a pry bar.
- Place old oil collecting and extracting device V.A.G 1782 beneath transmission.
- Pull out right flange shaft.

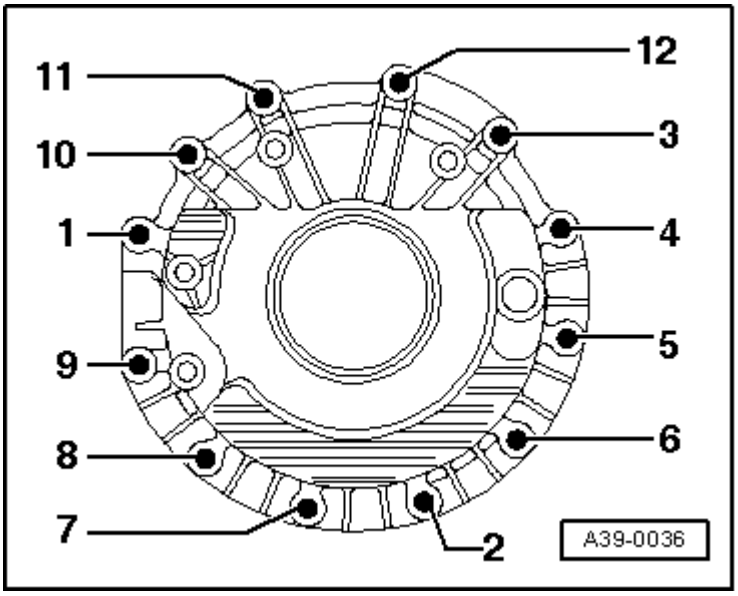


Fig. 241: Installing Cover For Front Final Drive, Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen final drive cover bolts in sequence - **12 to 1** - and then remove completely.

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CAUTION:

- **Slowly and carefully remove final drive cover from transmission housing. Otherwise differential can fall out of transmission.**
- **A differential that has fallen onto the floor must not be installed again. The transmission must be replaced in this case.**

- Remove final drive cover.

CAUTION:

- **Ensure tapered roller bearing outer race and differential adjusting screw do not fall out of final drive cover.**
- **Tapered roller bearing outer race must be installed in the same location.**
- **The shim must be the correct size and must not be replaced by a shim with a different thickness.**

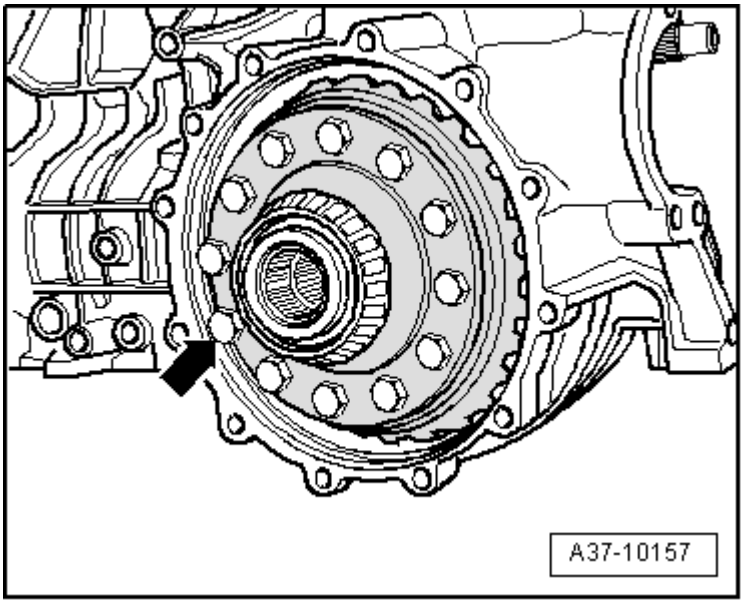


Fig. 242: Removing/Installing Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully remove differential - **arrow** -.

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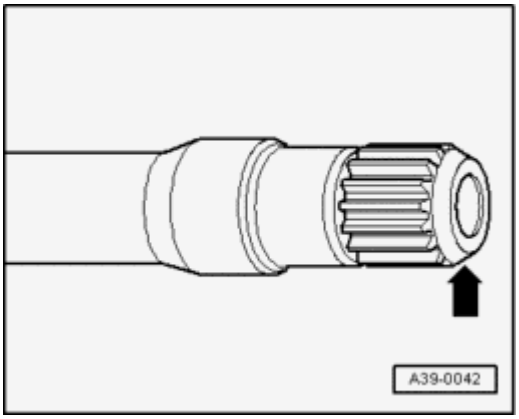


Fig. 243: Checking That There Are No Sharp Edges On Transmission End Of Flange Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Completely cover splines - **arrow** - on left flange shaft with insulating tape without wrinkling or overlapping to avoid damaging final drive/transmission housing double shaft seal when removing left flange shaft.

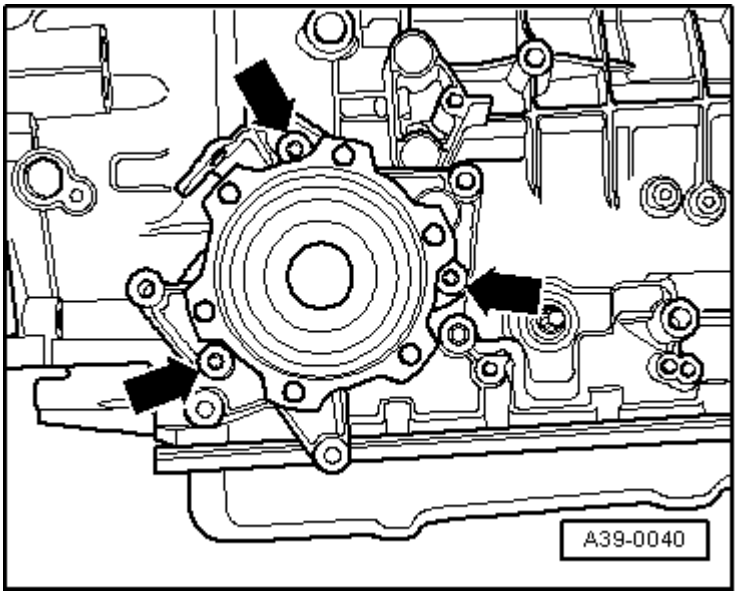


Fig. 244: Removing/Installing Left Drive Flange Mounting Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove left drive flange mounting bracket - **arrows** -.
- Pull out left drive flange.

NOTE:

- **When sliding off, left drive flange must be carefully guided by hand to prevent damage to the double seal in final drive/transmission housing.**

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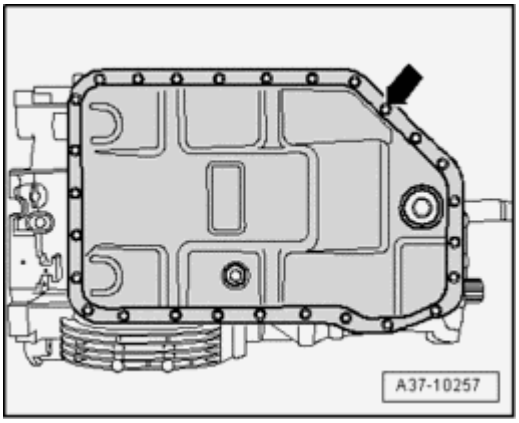


Fig. 245: Identifying Oil Pan Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen ATF oil pan bolts - **arrow** - in a diagonal sequence and then remove them completely.
- Remove ATF oil pan.

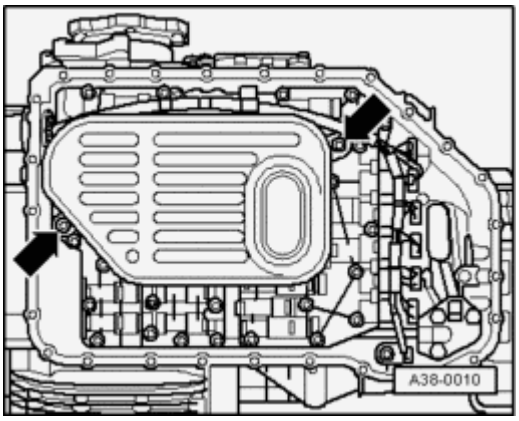
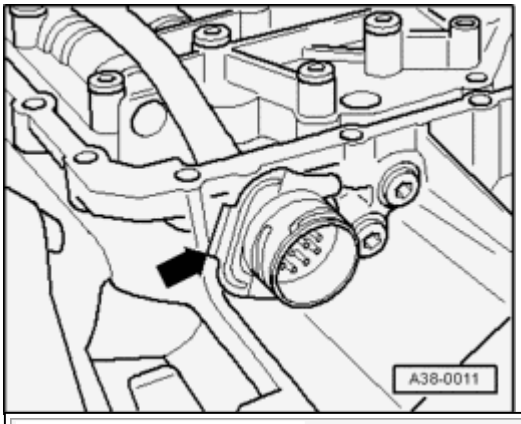


Fig. 246: ATF Screen Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove ATF screen bolts - **arrows** -.
- Pull ATF filter off of valve body.



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Fig. 247: Location Of Wiring Harness/Harness Connector Securing Circlip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **arrow** - for wiring harness/harness connector.
- Remove wiring harness/harness connector by pressing inward.

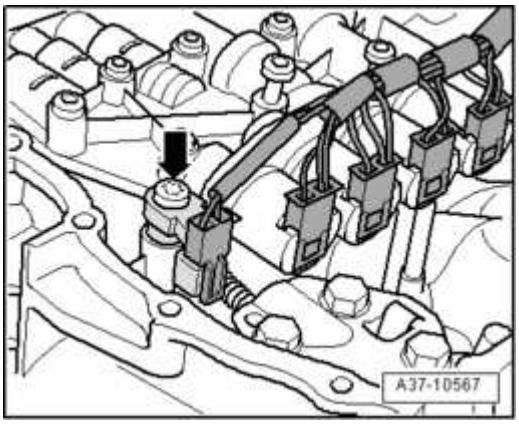


Fig. 248: Identifying Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195 Harness Fastener
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt - **arrow** - and remove Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195.

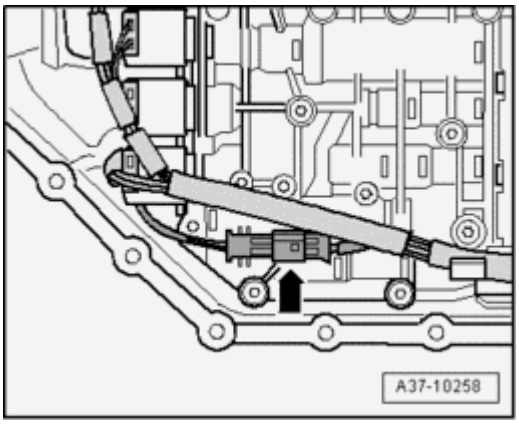


Fig. 249: Identifying Connector Transmission Input Speed (RPM) Sensor G182 At Valve Body
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- In a transmission with hydraulic control "E18/2" , disengage electrical connector to Transmission Input Speed (RPM) Sensor G182 at valve body - **arrow** - and disconnect connector.

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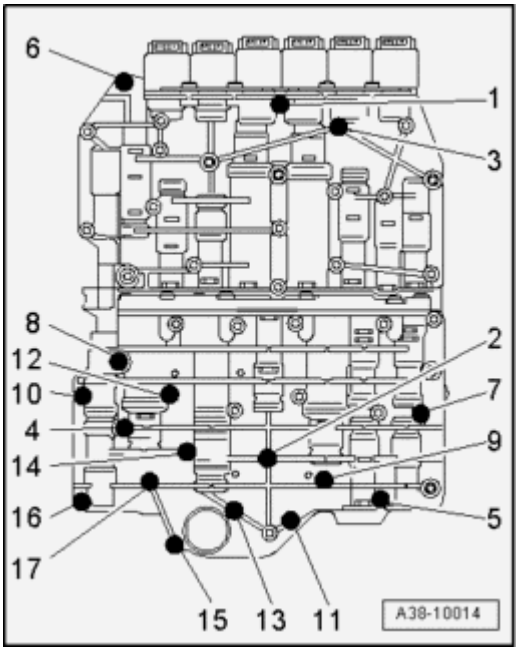


Fig. 250: Loosening or Tightening Valve Body Bolts In Sequence (As Describe)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen valve body bolts - **17 to 1** - in sequence and remove them completely.

CAUTION:

- **Only the designated bolts must be removed; bolt - 6 - is only on transmissions with hydraulic control "E17".**
- **When removing other bolts, the function of the valve body can be influenced or the valve body splits up.**
- **Note the different lengths of the bolts.**

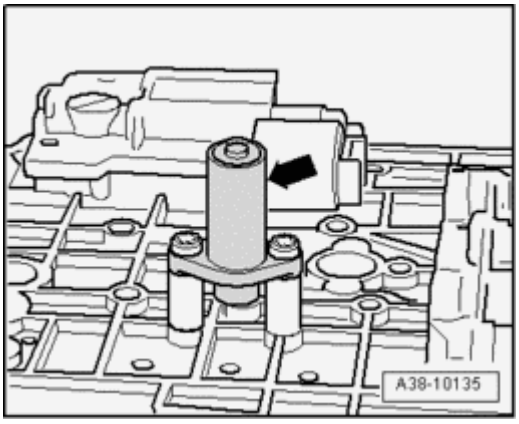


Fig. 251: Carefully Remove Valve Body From Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully remove valve body from transmission.

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CAUTION: Only transmissions with hydraulic control "E17" : Do not rest valve body on Transmission Input Speed (RPM) Sensor G182 - arrow - (on bottom side of valve body) - risk of damage.

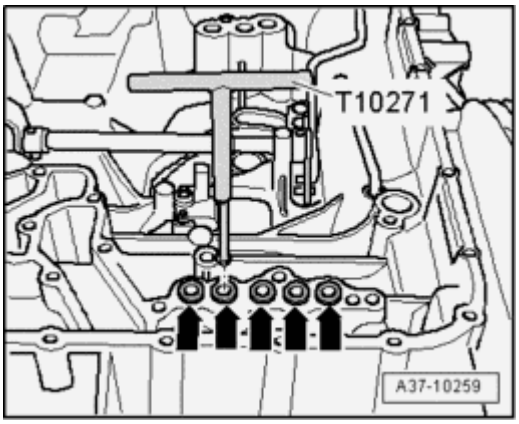


Fig. 252: Location Of Inlet Bores Sealing Sleeves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull sealing sleeves - **arrows** - in inlet bores toward clutches "C" , "A" , "B" , "E" and toward torque converter clutch using extracting handle T10271.

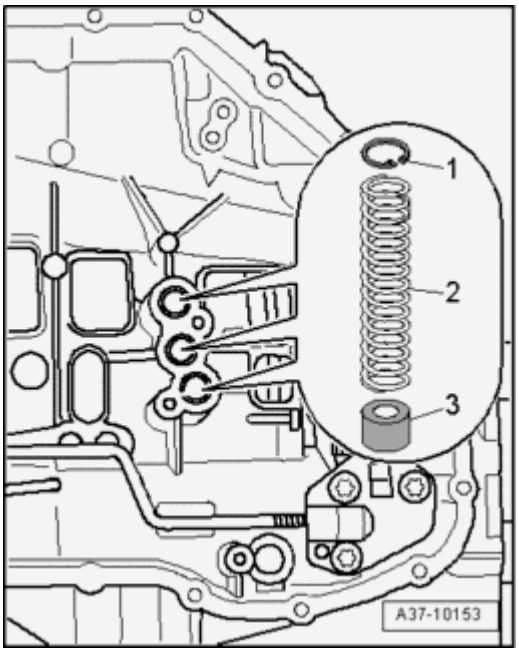


Fig. 253: Identifying Securing Rings, Coil Springs, and Sealing Sleeves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove 3 securing rings - **1** -.
- Remove coil springs - **2** -.
- Pull out sealing sleeves - **3** - , using extracting handle T10271.

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- Rotate transmission on assembly stand.

- ATF pump faces upward.

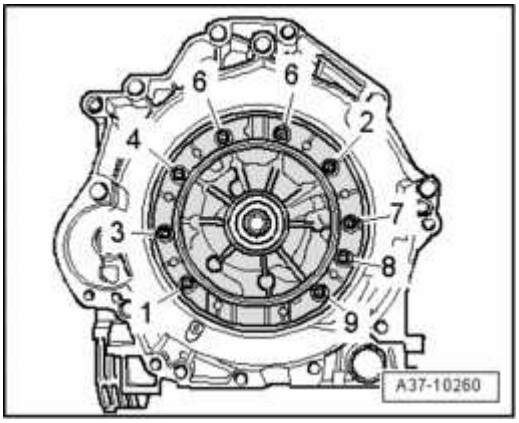


Fig. 254: Identifying ATF Pump Bolts Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen ATF pump bolts in - **9 to 1** - sequence and remove them completely.
- Remove bolts with sealing washers.

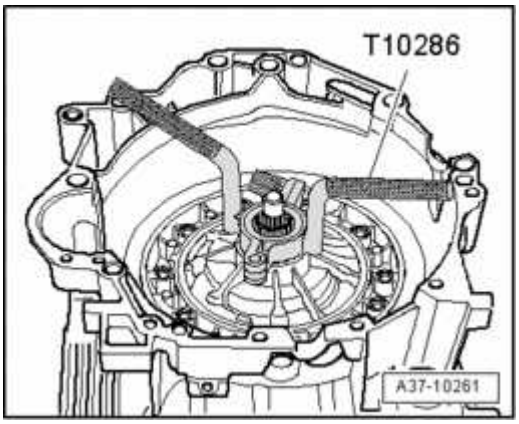


Fig. 255: Removing ATF Pump Using Puller T10286
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure puller for ATF supply T10286 to stator shaft and pull ATF supply firmly upward.

If ATF pump cannot be loosened:

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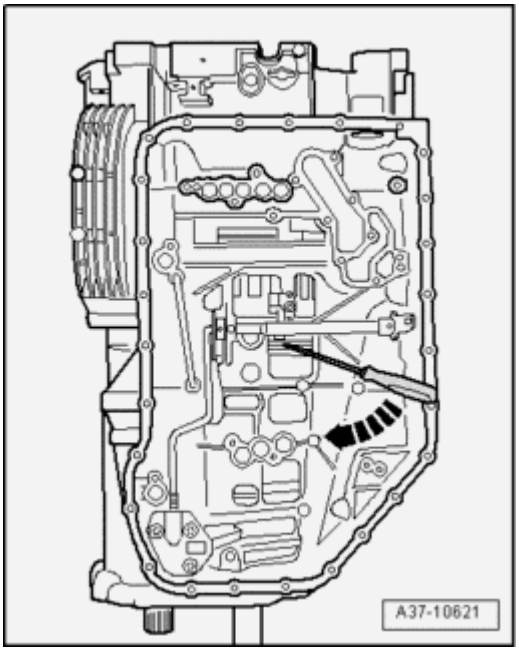


Fig. 256: If ATF Pump Cannot Be Loosened Proceed As Shown
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- On the bottom side of the transmission, place a screwdriver between sun gear "I" and ribbed cup and pry component above sun gear upward - **arrow** -.

Installing

- Check if tower "II" is still inserted correctly.
- Measure distance between contact surface for adjustment shim on tower "II" and contact surface for ATF pump on transmission housing.

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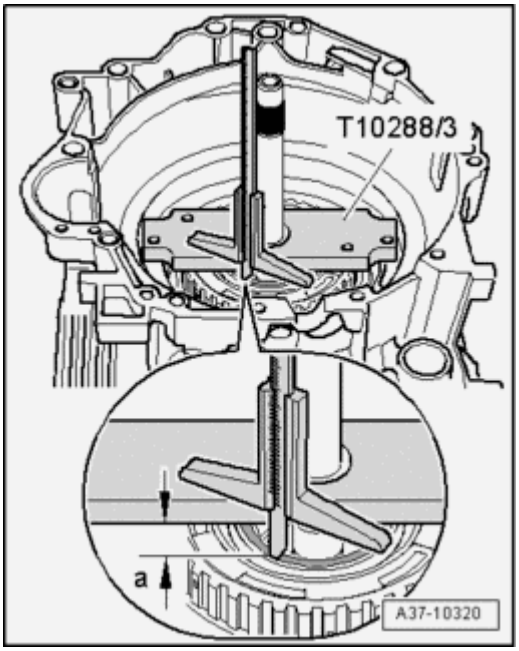


Fig. 257: Identifying Dimension
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Dimension - **a** - = at least 6.0 mm.
- Adjustment shim may not be installed.

If dimension - **a** - is exceeded, the tower "II" would be pulled out of disc contact during removal.

- Remove tower "II" and then reinstall *Lift tower* under **Planetary gear, disassembling and assembling**.

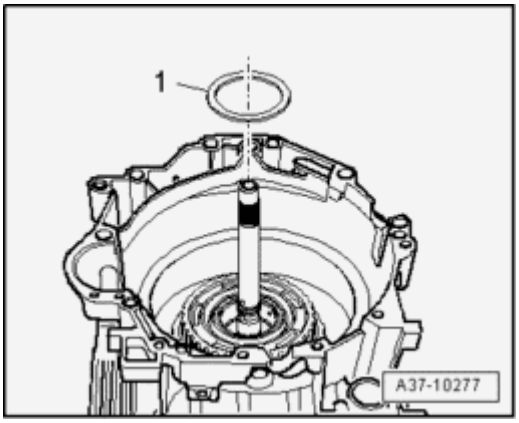


Fig. 258: Adjustment Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place previous adjustment shim - **1** - on plate carrier "C".

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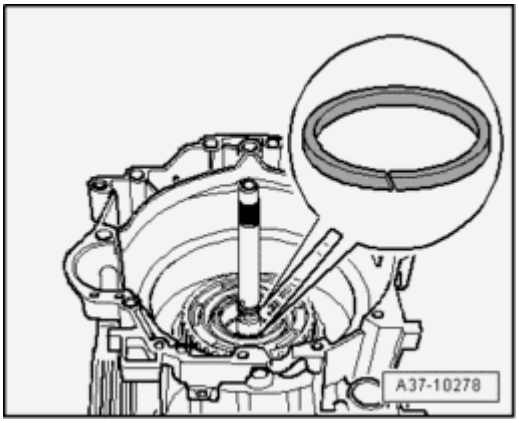


Fig. 259: Location Of Rectangular Rings
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace 2 rectangular rings on input shaft.
- Before inserting, thinly coat rectangular rings on input shaft with Vaseline. Use only Vaseline, other lubricating substances cause functional problems in the hydraulic transmission control.
- Make sure that rectangular rings are fully seated all around in the input shaft groove.

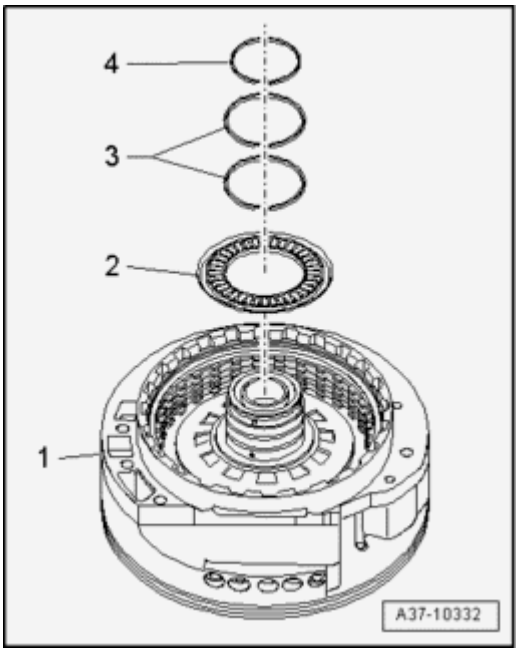


Fig. 260: ATF Pump, Axial Needle Bearing, and Rectangular Rings And
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Thinly coat back side of axial needle bearing - **2** - with Vaseline. Use only Vaseline, other lubricating substances cause functional problems in the hydraulic transmission control.
- Append axial needle bearing to ATF pump - **1** -.

- Closed side of axial needle bearing faces toward ATF pump.

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- Replace rectangular rings - **3** - and - **4** - on stator shaft.
- Before inserting, lightly coat rectangular ring with Vaseline. Use only Vaseline, other lubricating substances cause functional problems in the hydraulic transmission control.
- Make sure that rectangular rings are fully seated all around in the stator shaft groove.

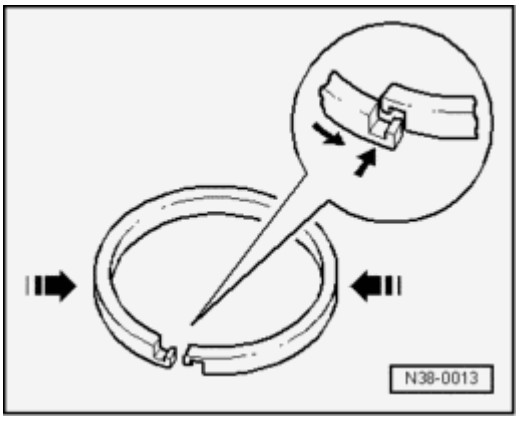


Fig. 261: Hooking Ends Of Piston Ring Together
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engage ends of installed rectangular rings - **arrows** - , as depicted in illustration.

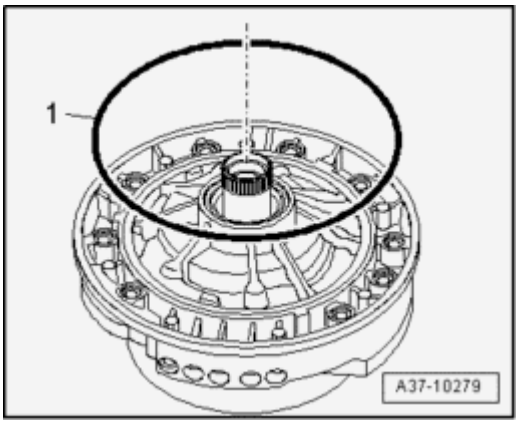


Fig. 262: ATF Pump O-ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-ring - **1** - on ATF supply.
- Thinly coat O-ring with Vaseline. Use only Vaseline, other lubricating substances cause functional problems in the hydraulic transmission control.

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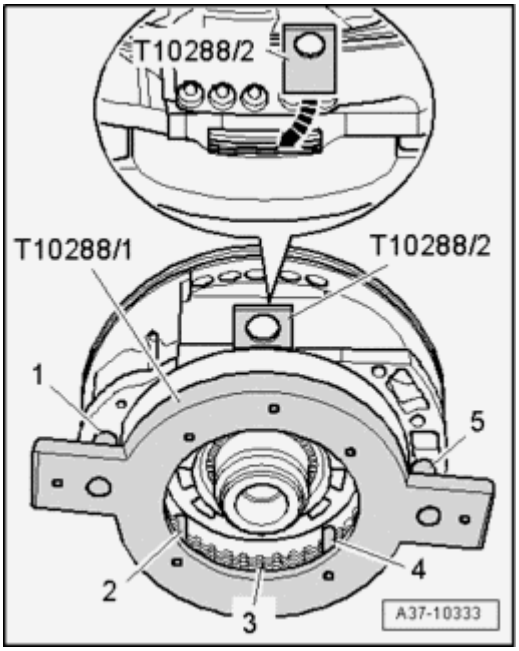


Fig. 263: Align Coated Plates Of Clutch "C" Using Centering Tool T10288/1
Courtesy of VOLKSWAGEN UNITED STATES, INC.

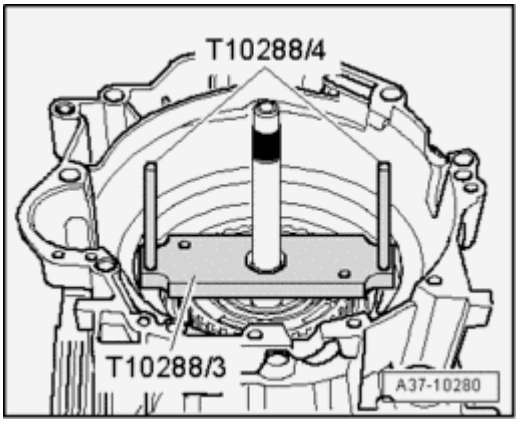
- Align coated plates - **3** - of clutch "C" using centering tool T10288/1 , to do so let pins - **2** - and - **4** - engage in splines of all coated plate.
- Align lining discs to ATF pump housing by inserting centering pins - **1** - and - **5** - into appropriate holes on ATF pump.

- Centering pins fit only in one position.

- Hold centering tool in this position and insert wedge T10288/2 from side between waved washer and piston "F" - **arrow** -.

- Wedge must secure all plates in current position.

- Remove centering tool T10288/1 , wedge T10288/2 remains inserted.



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Fig. 264: Align Plate Carrier For Clutch "C" Using Centering Tool T10288/3
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Align plate carrier for clutch "C" using centering tool T10288/3 , install guide pins T10288/4 into transmission housing.
- Bores of centering tool and transmission housing only fit in one position.
- Carefully remove centering tool T10288/3 upward, guide pins T10288/4 remain in transmission housing.
- Plate carrier for clutch "C" may no longer be turned.

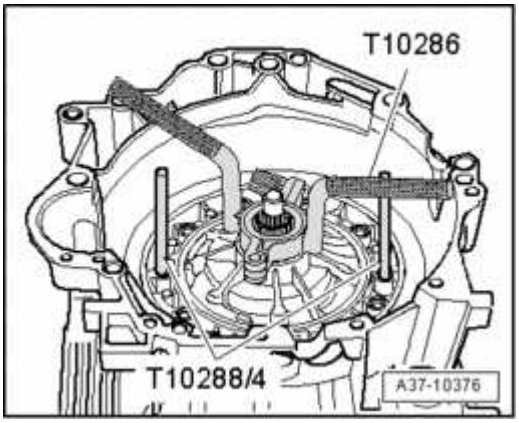


Fig. 265: Attaching Puller For ATF Pump T10286 At Stator Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach puller for ATF supply T10286 at stator shaft.
- Bring ATF supply to installation position.
- Recess for flange shaft faces toward valve body side.
- Attach ATF supply with corresponding bores onto guide pins T10288/4.
- Carefully insert ATF supply into transmission housing and push forcefully.
- Bring ATF supply to final installation position by alternately tightening two opposing attachment bolts each.

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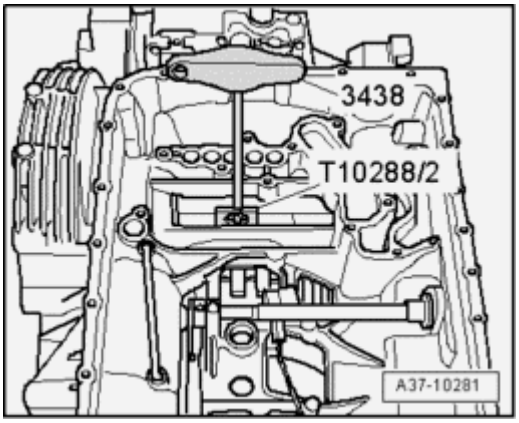


Fig. 266: Removing Wedge 10288/2 Using Hook 3438
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove wedge 10288/2 using hook 3438.
- Remove Puller for ATF supply T10286.
- Remove guide pins T10288/4.

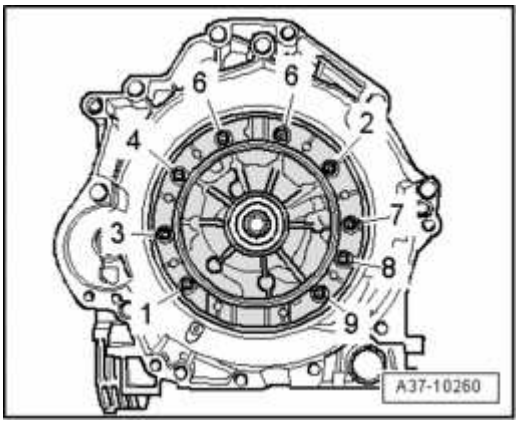


Fig. 267: Identifying ATF Pump Bolts Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert ATF pump bolts with new sealing washers into ATF pump housing.
- Tighten ATF pump bolts - **1 to 9** - in sequence.

- Tightening torque: 10 Nm.

NOTE:

- **Check for correct ATF pump installation: You must be able to rotate the input shaft. Otherwise, the last clutch plate "C" may have been pinched during installation and bent. In this case, remove ATF pump again and check discs for damage.**

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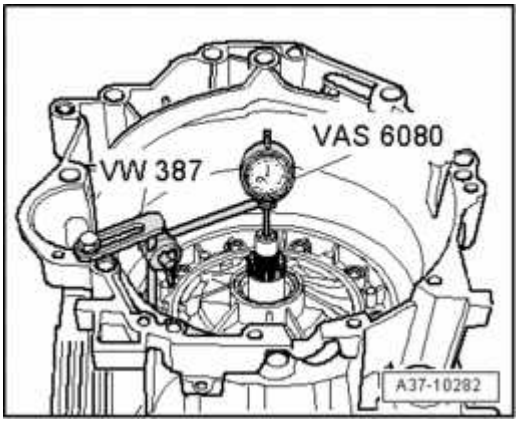


Fig. 268: Checking Input Shaft Axial Clearance
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach Dial gauge VAS 6080 with Dial gauge holder VW 387 to transmission flange.
- Insert Dial gauge VAS 6080 with dial gauge extension onto input shaft of transmission, as depicted in illustration.
- Set dial gauge to "0".
- To protect against damage, cover input shaft with insulating tape.
- Move input shaft up and down using pliers, while doing so avoid lateral movement.
- Read input shaft axial clearance on dial gauge.

- Specified value: 0.10 to 0.30 mm.

If specified value is not obtained:

- Remove ATF pump again.

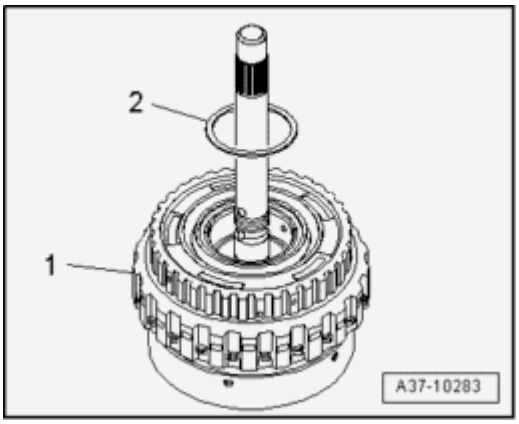


Fig. 269: Identifying Tower "II", Clutch "B" and Adjustment Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Determine correct adjustment shim - **2** - on tower "II" item - **1** - according to the following table.

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- Measured axial clearance too small: Install respectively thinner shim.
- Measured axial clearance too large: Install respectively thicker shim.

Available shims - thickness in mm		
1.6	2.0	2.4
1.8	2.2	2.6

- Reinstall ATF pump with new adjustment shim, new sealing washers and new O-ring. Refer to **Fig. 100** .
- Check axial clearance of input shaft again --> **Fig. 108** .

If specified value is again not obtained:

- Repeat adjustment.

If specified value is obtained:

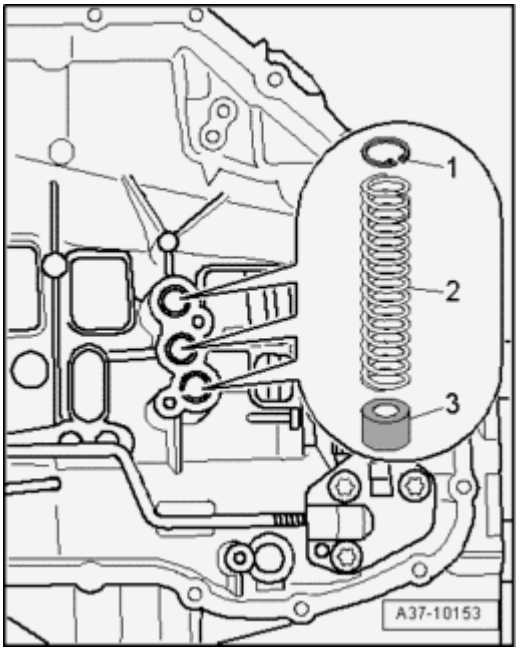


Fig. 270: Identifying Securing Rings, Coil Springs, and Sealing Sleeves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Rotate transmission on assembly stand.

- Valve body side points upward.

- Press sealing sleeves - **3** - into transmission housing holes to stop.
- Insert coil springs - **2** - and secure with circlips - **1** - by pressing circlips into hole down to shoulder.

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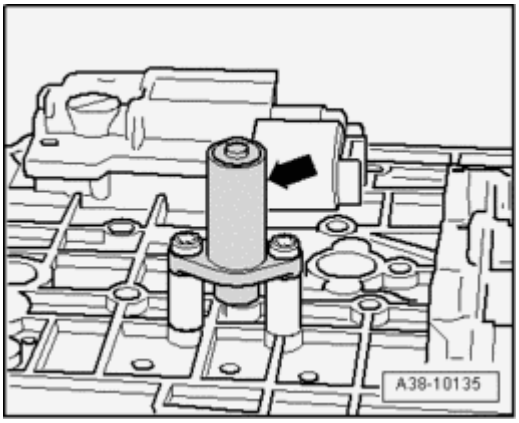


Fig. 271: Carefully Remove Valve Body From Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

CAUTION: Only transmissions with hydraulic control "E17" : Do not rest valve body on Transmission Input Speed (RPM) Sensor G182 - arrow - (on bottom side of valve body) - risk of damage.

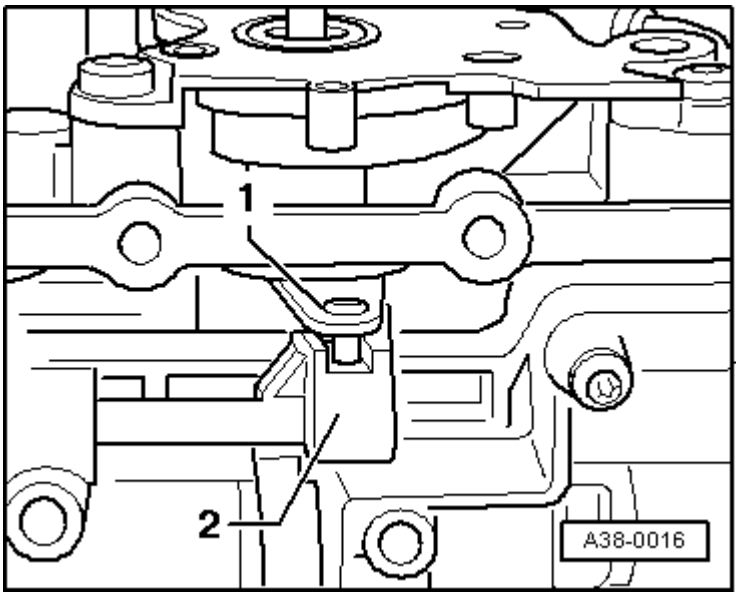


Fig. 272: Position Valve Body On Transmission Housing While Inserting Notched Disc Pins Into Selector Slide Groove
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position valve body on transmission housing without force while inserting notched disc pins - **1** - into selector slide groove - **2** -.
- Position valve body bolts.

NOTE:

- **Note different length of bolts.**

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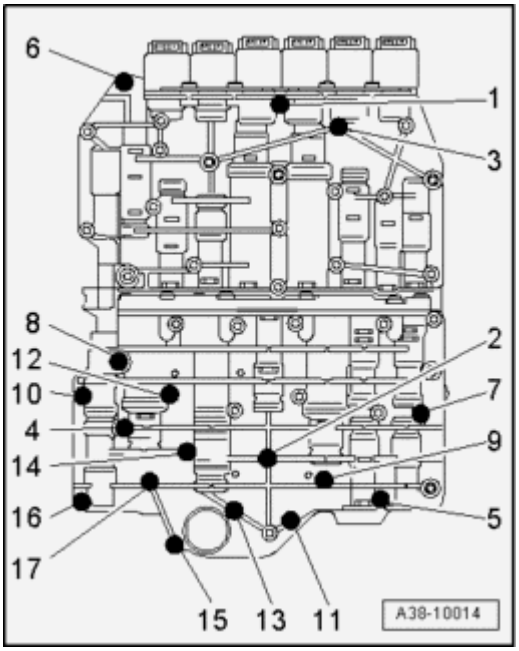


Fig. 273: Loosening or Tightening Valve Body Bolts In Sequence (As Describe)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt - **6** - is only present on transmissions with hydraulic control "E17".
- On a transmission with hydraulic control "E18/2" , ensure electrical wire to Transmission Input Speed (RPM) Sensor G182 is not pinched between transmission housing and valve body.

- Tighten valve body bolts in 2 stages as follows:

Stage	Tightening
I	○ Hand-tighten bolts - **1 to 17** - in sequence.
II	○ Tighten bolts - **1 to 17** - in sequence to 8 Nm.

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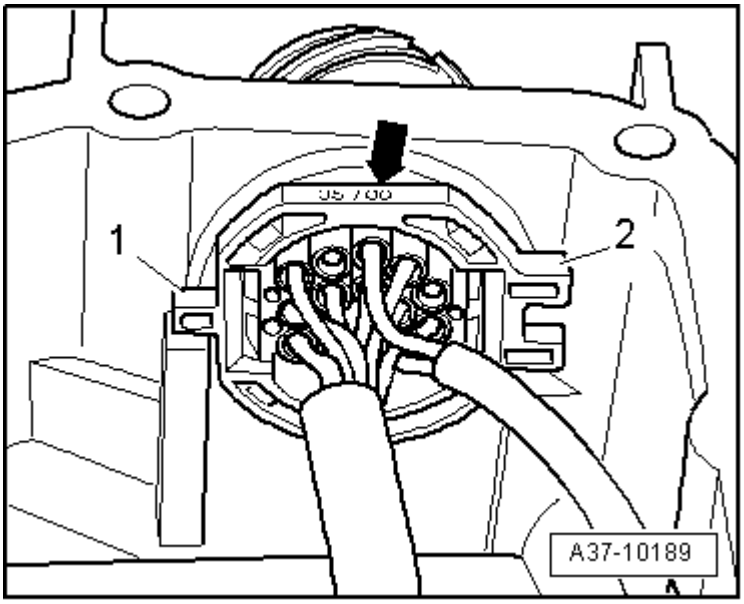


Fig. 274: Location Of Transmission Harness Connector and Connector O-ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-rings for wiring harness/harness connector.
- Connect wiring harness connector - **arrow** - to transmission housing.

- Installation position: Retainers - **1** - and - **2** - at collar are horizontal, leveled side - **arrow** - of connector must be parallel to ATF oil pan sealing surface.

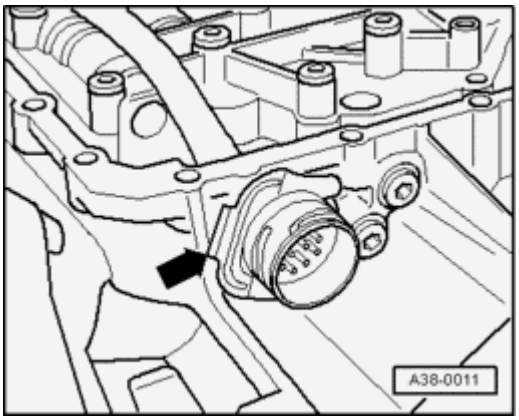


Fig. 275: Location Of Wiring Harness/Harness Connector Securing Circlip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position wiring harness connector securing clip - **arrow** - and ensure it locks securely.

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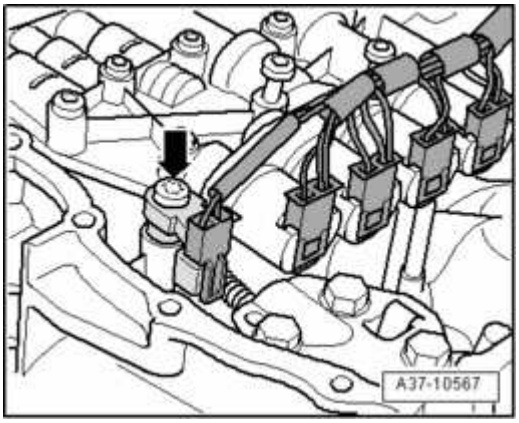


Fig. 276: Identifying Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195 Harness Fastener
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten bolt - **arrow** - for Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195.

- Tightening torque: 10 Nm.

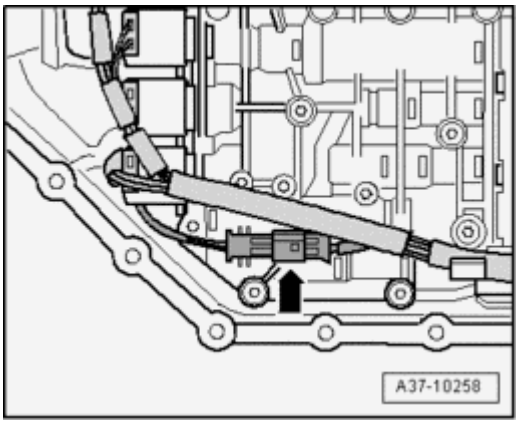


Fig. 277: Identifying Connector Transmission Input Speed (RPM) Sensor G182 At Valve Body
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- With a transmission with hydraulic control "E18/2" , connect electrical connector to Transmission Input Speed (RPM) Sensor G182.
- Clip electrical harness connector into valve body mount - **arrow** -.
- Replace ATF filter.

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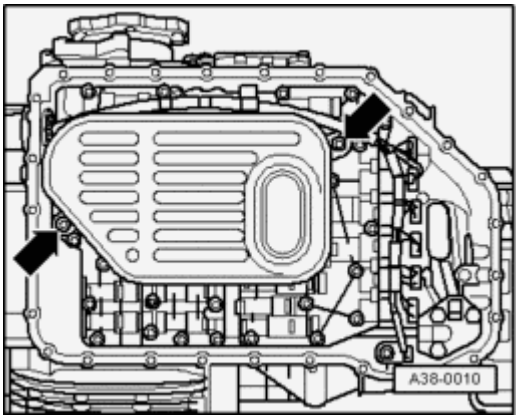


Fig. 278: ATF Screen Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position ATF filter on valve body and tighten - **arrows** -.

- Tightening torque: 5 Nm.

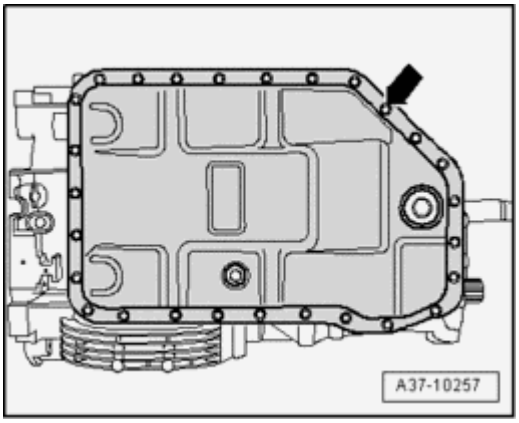


Fig. 279: Identifying Oil Pan Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **Clean magnets (6x) in ATF oil pan.**
- **Ensure full surface contact of the magnets in the ATF oil pan.**

- Install ATF oil pan - **arrow** - with new seal.
- Tighten bolts for ATF oil pan in diagonal sequence in stages.

- Tightening torque: 10 Nm.

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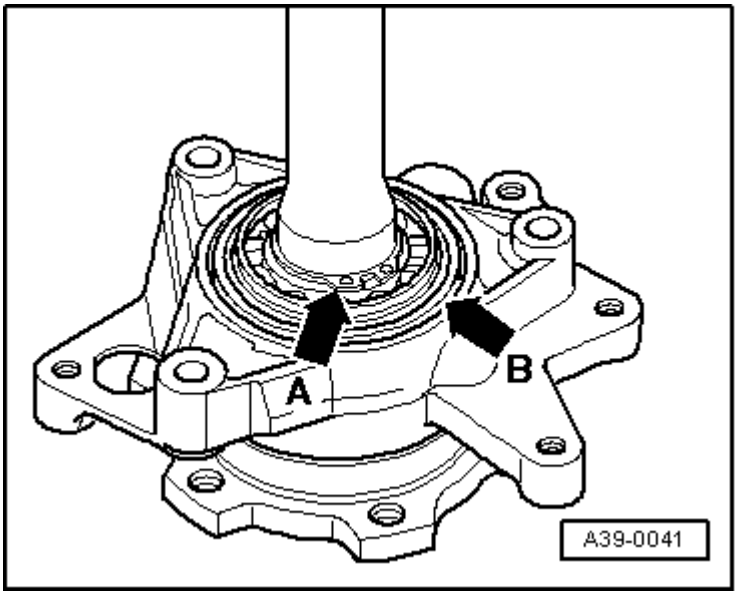


Fig. 280: Removing/Installing Circlip And Seal At Grooved Ball Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If necessary, replace flange seal for left flange shaft --> **39 - FINAL DRIVE, DIFFERENTIAL** .
- Replace O-ring - **arrow B** - in mounting bracket for left flange shaft.

NOTE:

- **Disregard - arrow A -.**

- Replace final drive/transmission housing double shaft seal if necessary --> **39 - FINAL DRIVE, DIFFERENTIAL** .

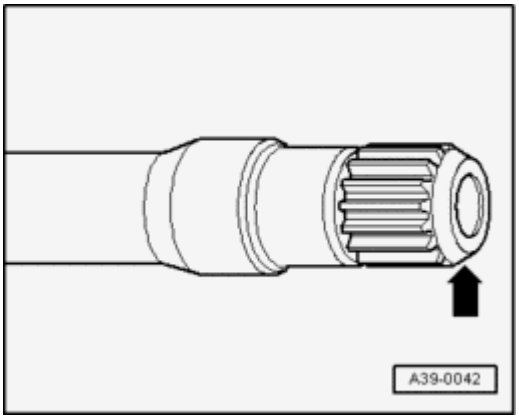


Fig. 281: Checking That There Are No Sharp Edges On Transmission End Of Flange Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Completely cover splines - **arrow** - on left flange shaft with insulating tape without wrinkling or overlapping to avoid damaging final drive/transmission housing double shaft seal when installing flange shaft.
- Insert left flange shaft into transmission.

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NOTE:

- **When sliding on, left drive flange must be carefully guided by hand to prevent damage to the double seal in final drive/transmission housing.**

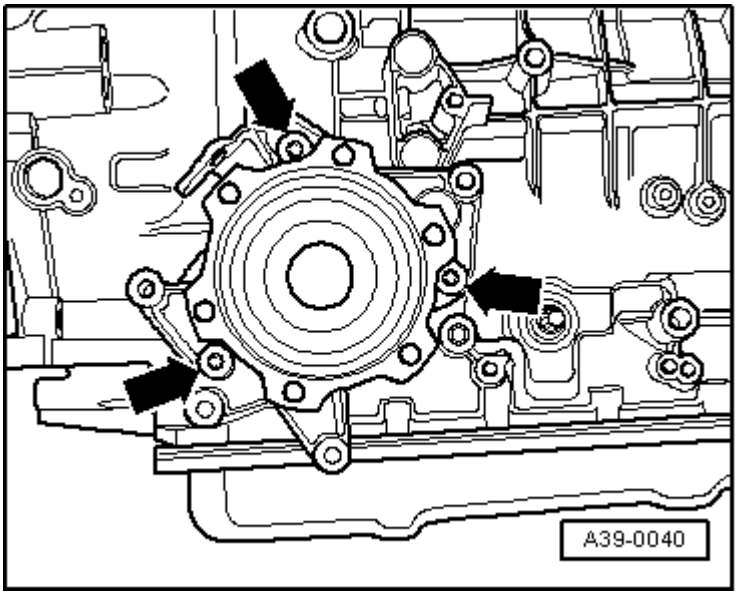


Fig. 282: Removing/Installing Left Drive Flange Mounting Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten left flange shaft mounting bracket bolts - **arrows** -.
- Tightening torque: 23 Nm.

CAUTION:

- **Ensure tapered roller bearing outer race and differential adjusting screw do not fall out of final drive cover.**
- **Tapered roller bearing outer race must be installed in the same location.**
- **The shim must be the correct size and must not be replaced by a shim with a different thickness.**

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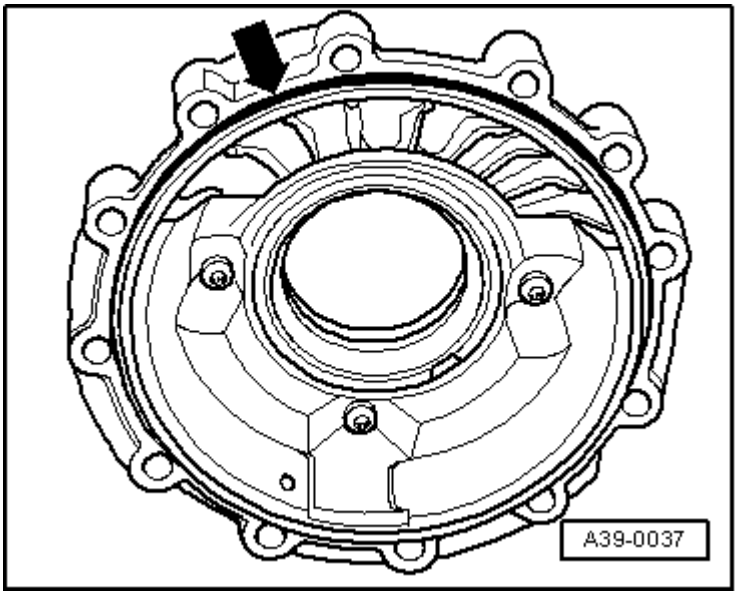


Fig. 283: Identifying Cover For Front Final Drive And O-Ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-ring - **arrow** - in final drive cover.
- If necessary, replace flange seal for right flange shaft --> **39 - FINAL DRIVE, DIFFERENTIAL** .

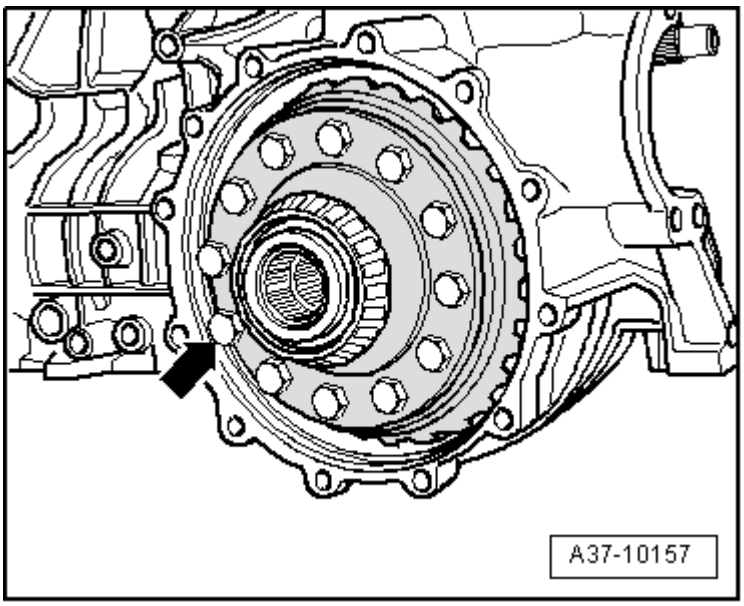


Fig. 284: Removing/Installing Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully install differential - **arrow** -.

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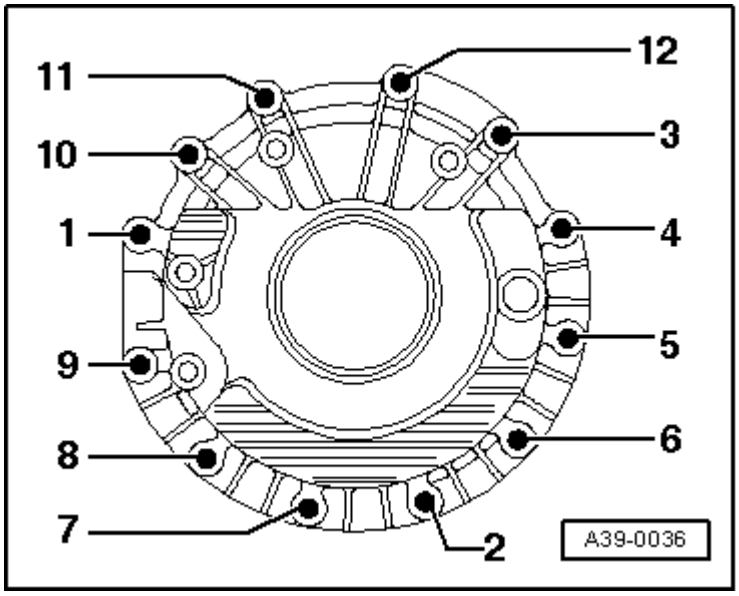


Fig. 285: Installing Cover For Front Final Drive, Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position final drive cover on transmission housing.
- Tighten final drive cover bolts in 2 stages as follows:

Stage	Tightening
I	○ Hand-tighten bolts - **1 to 3** - in sequence.
II	○ Tighten bolts - **1 to 12** - in sequence to 23 Nm.

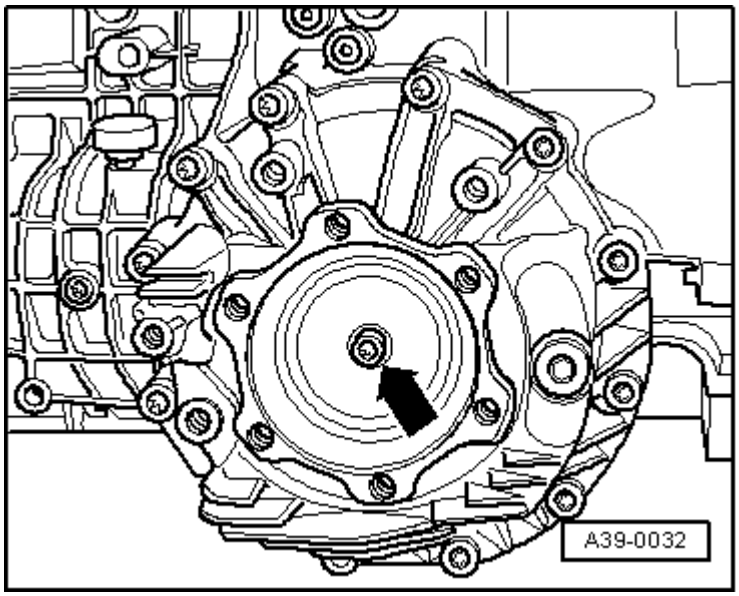


Fig. 286: Flange Shaft Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Tighten right flange shaft bolt - **arrow** - by installing 2 bolts in flange and counterholding flange shaft using a pry bar.
- Tightening torque: 23 Nm.
- Remove transmission from assembly stand.

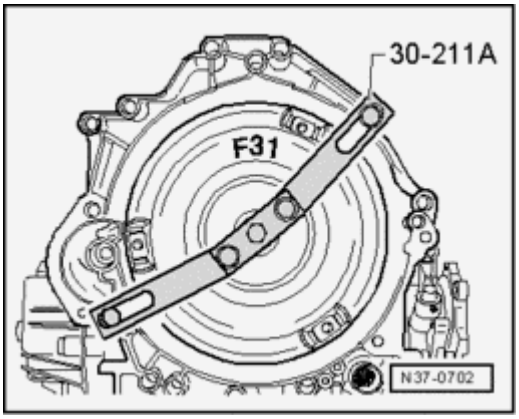


Fig. 287: Securing Torque Converter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert torque converter and secure against falling down with Bracket 30-211 A.
- Check installation dimension of torque converter --> **32 - TORQUE CONVERTER** .
- Fill ATF and check ATF level --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .
- Fill axle oil in front final drive and check oil level --> **39 - FINAL DRIVE, DIFFERENTIAL** .
- Top off axle oil in transfer case and check oil level --> **39 - FINAL DRIVE, DIFFERENTIAL** .

Torque specifications

Component	Nm
ATF supply on transmission housing	10
Valve body at transmission housing	8
ATF filter on valve body	5
ATF oil pan on transmission housing	10
Mounting bracket for left drive flange on transmission	23
Final drive cover to transmission	23
Right drive flange	25

ATF pump and ATF supply housing, removing and installing

Removing

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- ATF supply removed.

  - Twist ATF pump.

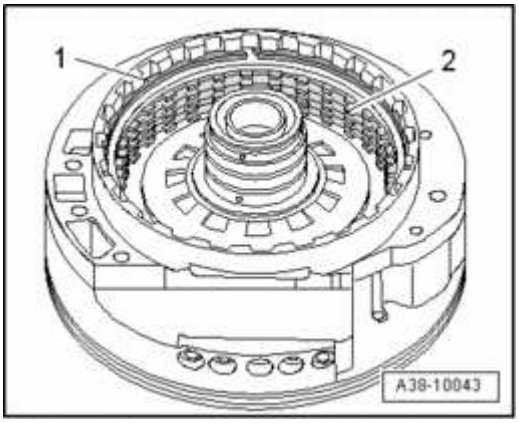


Fig. 288: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

  - Remove circlip - **1** - and remove plate pack - **2** - from cylinder "C".

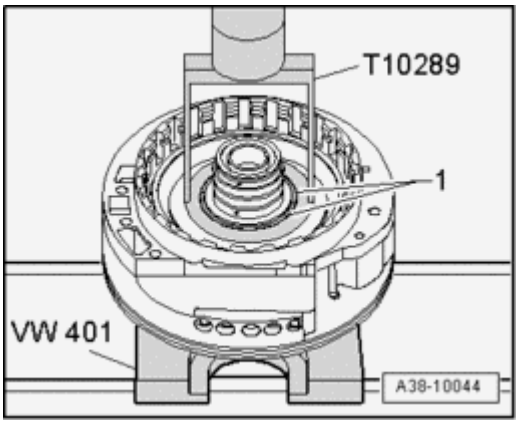


Fig. 289: Pressing Plate Spring Down Under Shop Press Using Installation Bracket T10289
Courtesy of VOLKSWAGEN UNITED STATES, INC.

  - Press plate spring down under shop press using installation bracket T10289.
  - Remove split retaining ring - **1** -.
  - Release shop press.

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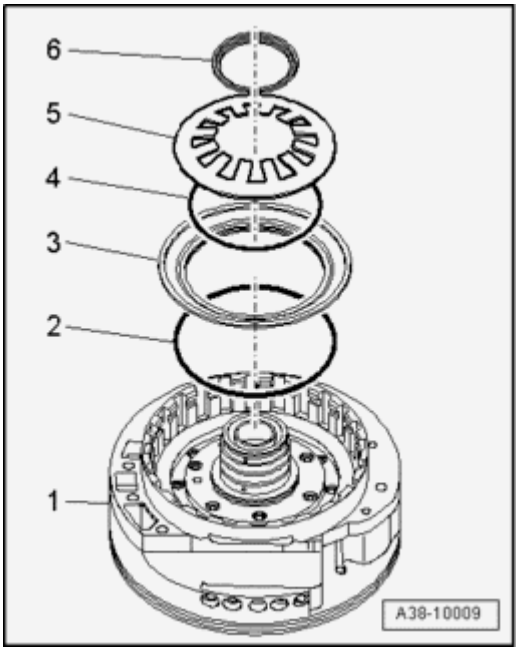


Fig. 290: Identifying Dished Washer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove dished washer - **5** -.

CAUTION: Wear eye protection.

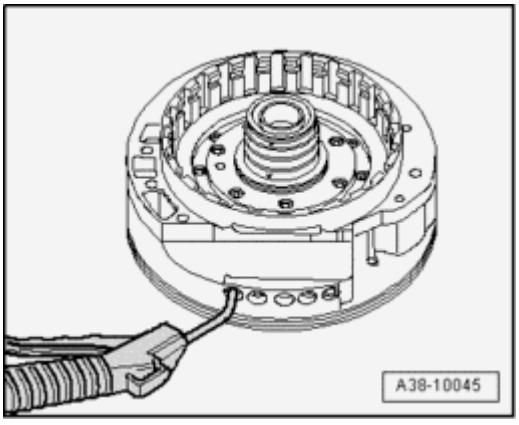


Fig. 291: Carefully Press Piston "C" Out Of ATF Pump With Compressed Air
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully press piston "C" out of ATF pump with compressed air.

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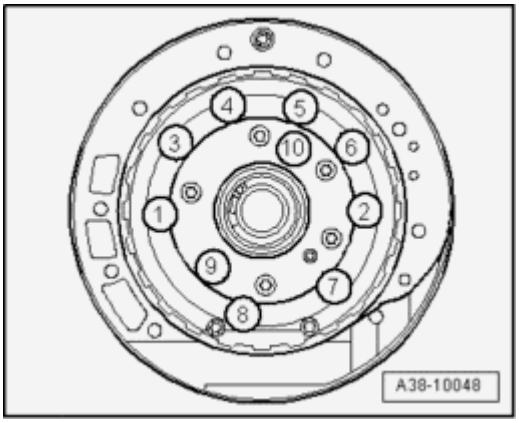


Fig. 292: ATF Pump Housing Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **3 to 10** -.
- Remove bolts - **1** - and - **2** - approx. 5 rotations.

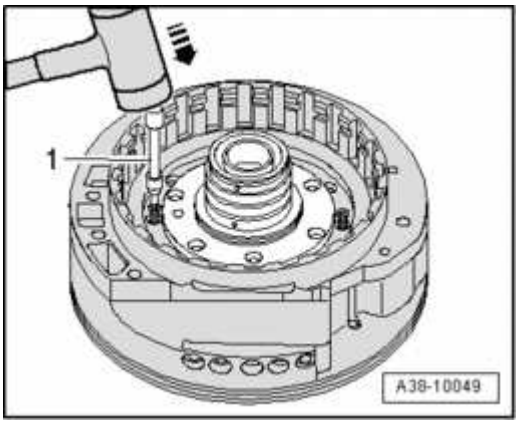


Fig. 293: Loosen ATF Pump By Lightly Tapping On Two Bolts Alternately Using A Plastic Hammer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach TORX socket with extension - **1** - onto head bolt, as depicted in illustration.
- Loosen ATF pump by lightly tapping on two bolts alternately using a plastic hammer - **arrow** -.
- Remove remaining 2 bolts.
- Remove ATF supply housing.

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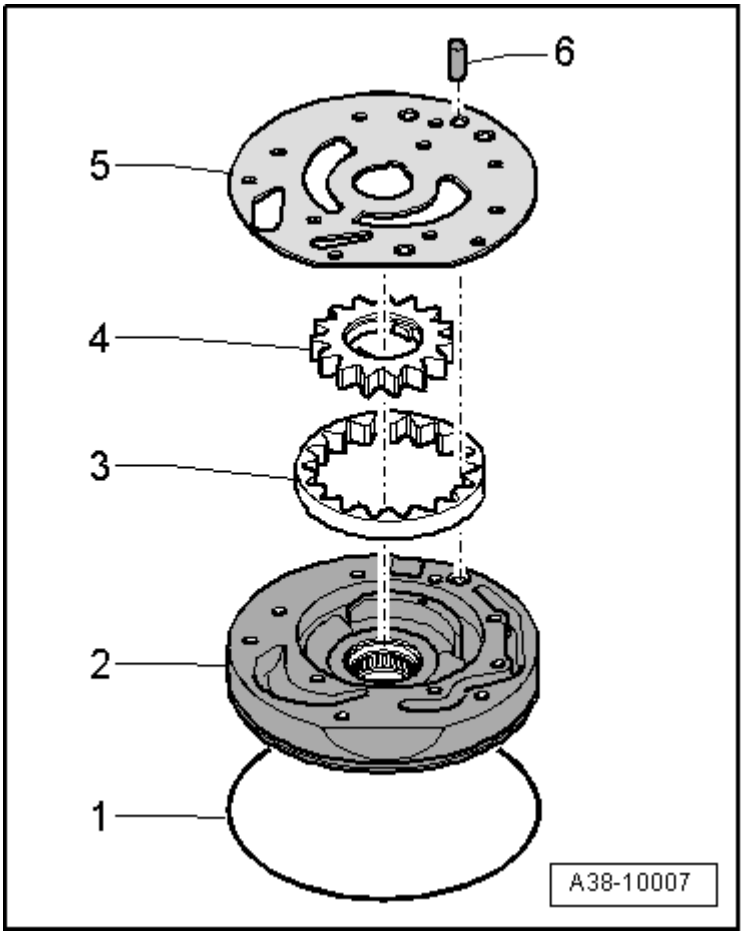


Fig. 294: ATF Pump Component, Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove intermediate plate - **5** - and positioning sleeve - **6** -.
- Remove ATF pump wheels - **3** - and - **4** - from ATF pump housing - **2** -.

1 - O-ring

Installing

CAUTION: Before assembling, check components of ATF pump for wear and damage --> ATF supply.

- Replace O-ring - **1** - on ATF pump housing.
- Install ATF pump wheels - **3** - and - **4** - in ATF pump housing - **2** -.

- Markings (points) on ATF pump wheels point toward intermediate panel - **5** -.

- Place intermediate panel and insert positioning sleeve - **6** -.

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- Positioning sleeve engages in rectangular bore on intermediate panel.

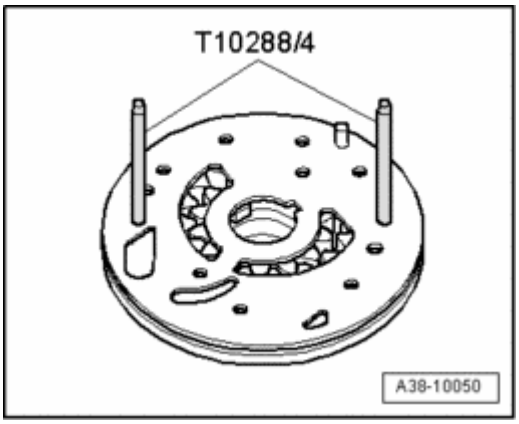


Fig. 295: Identifying Guide Pins T10288/4 and ATF Pump Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn in guide pins T10288/4 in 2 bores of ATF pump housing that are opposite to each other.
- Attach ATF pump housing onto ATF pump.

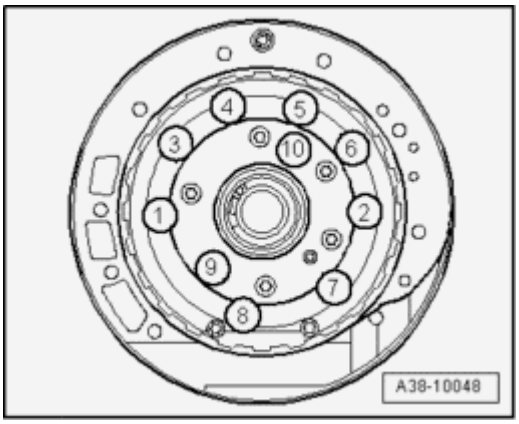


Fig. 296: ATF Pump Housing Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten ATF pump bolts in 2 stages as follows:

Stage	Tightening
I	- Tighten bolts - **1 to 10** - in sequence to 5 Nm.
II	- Tighten bolts - **1 to 10** - in sequence to 10 Nm.

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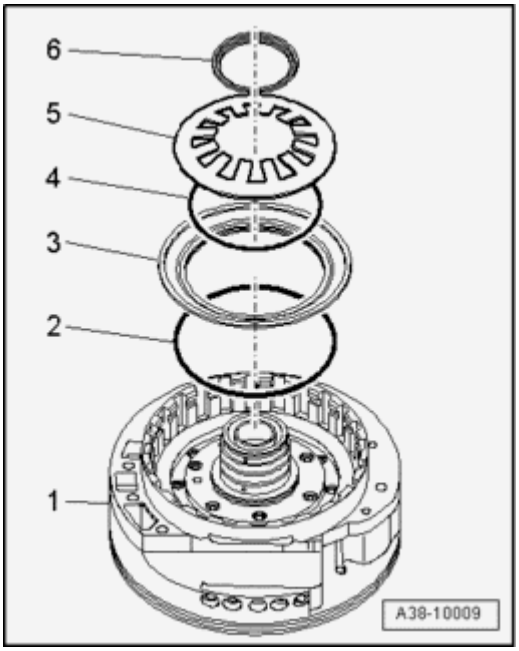


Fig. 297: Identifying Dished Washer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-rings - **2** - and - **4** - for piston "C" - **3** -.
- Press piston "C" - **3** - into ATF pump - **1** - until stop.
- Position plate spring - **5** -.

6 - Split retaining ring

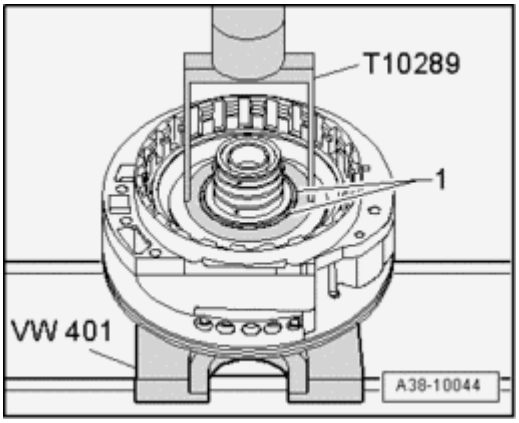


Fig. 298: Pressing Plate Spring Down Under Shop Press Using Installation Bracket T10289
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press plate spring down under shop press using installation bracket T10289.
- Install split retaining ring - **1** -.

- Bent inner side at right angle of retaining ring faces downward.

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- Release shop press.

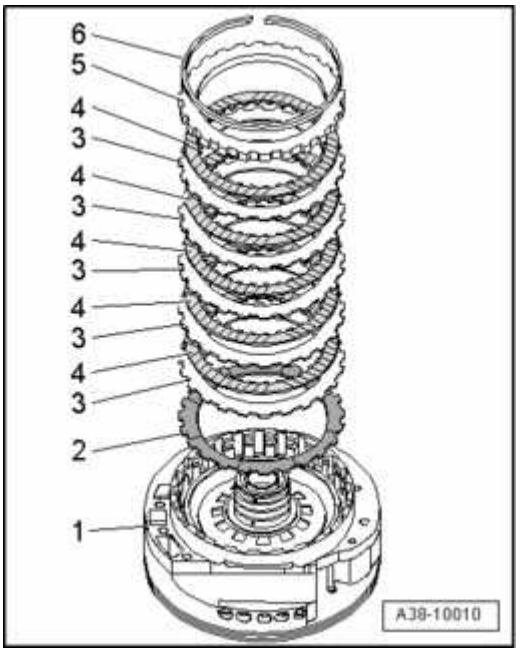


Fig. 299: Cylinder Component, Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert waved washer - **2** - into cylinder "C" - **1** -.
- Install outer plates - **3** - and coated plates - **4** - alternately.
- Install thick outer plate - **5** -.

NOTE:

- **Ensure rounded edges of thick outer clutch disc faces toward lining disc - 4 - and not toward circlip - 6 -. This improves circlip contact surface.**

- Insert circlip - **6** -.

NOTE:

- **If plate pack of clutch "C" was replaced, air gap must be adjusted again *Adjust clutch* under Clutch "C" , disassembling and assembling.**

ATF supply housing with stator shaft, removing and installing

Removing

- ATF supply removed.

- Twist ATF pump.

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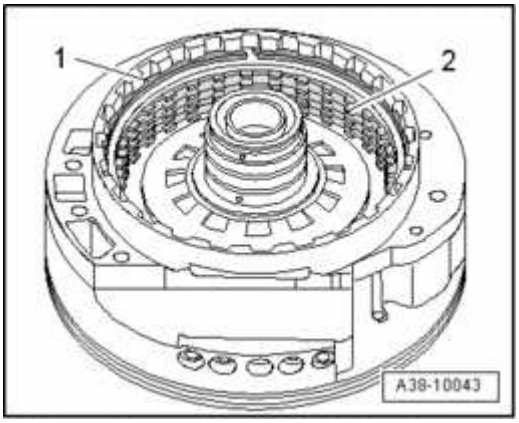


Fig. 300: Identifying Circlip and Plate Pack
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **1** - and remove plate pack - **2** - from cylinder "C".

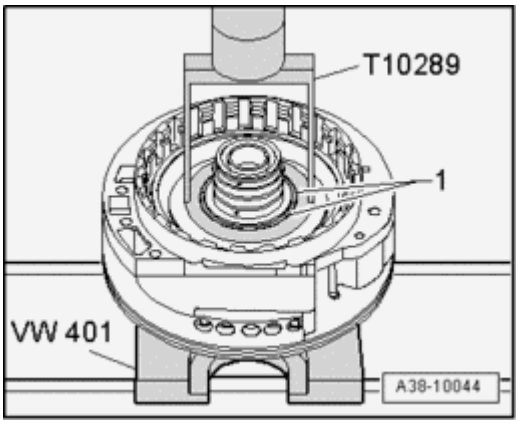


Fig. 301: Pressing Plate Spring Down Under Shop Press Using Installation Bracket T10289
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press plate spring down under shop press using installation bracket T10289.
- Remove split retaining ring - **1** -.
- Release shop press.

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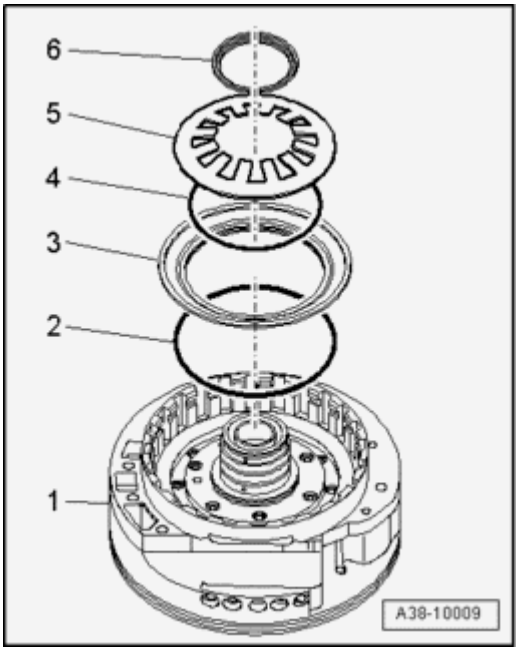


Fig. 302: Identifying Dished Washer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove dished washer - **5** -.

CAUTION: Wear eye protection.

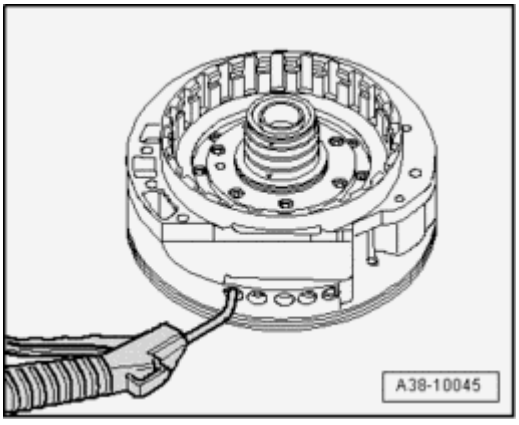


Fig. 303: Carefully Press Piston "C" Out Of ATF Pump With Compressed Air
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully press piston "C" out of ATF pump with compressed air.

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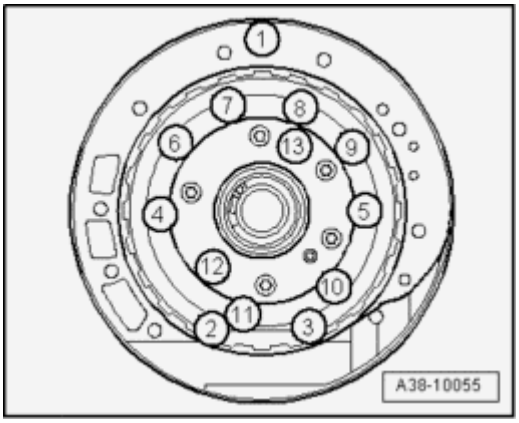


Fig. 304: Identifying ATF Pump Housing Onto ATF Pump Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **1 to 3** -.

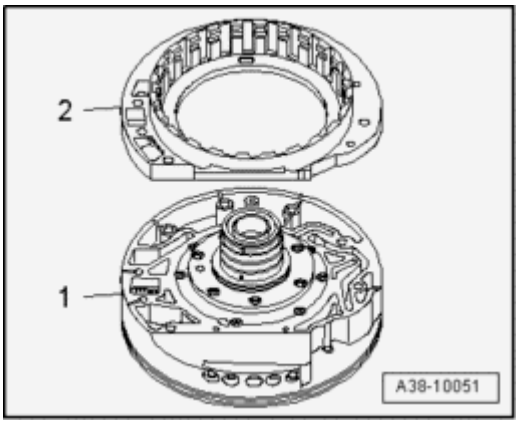


Fig. 305: Identifying Outer Disc Carrier "C" and ATF Supply Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove outer plate carrier "C" - **2** - from ATF pump housing - **1** -.

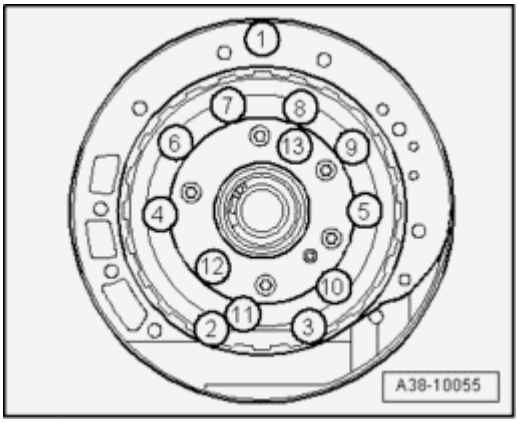


Fig. 306: Identifying ATF Pump Housing Onto ATF Pump Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Remove bolts - **6 to 13** -.
- Remove bolts - **4** - and - **5** - approx. 5 rotations.

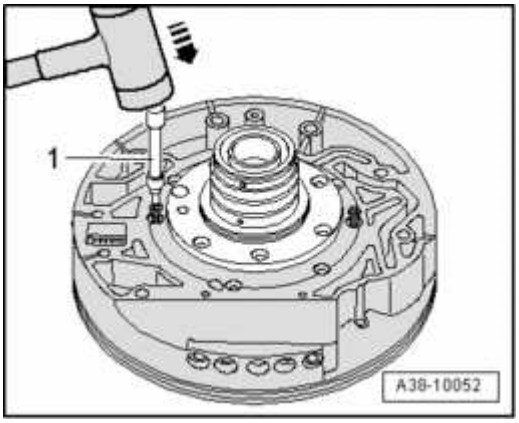


Fig. 307: Loosen ATF Pump By Lightly Tapping On Two Bolts Alternately Using A Plastic Hammer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach TORX socket with extension - **1** - onto head bolt, as depicted in illustration.
- Loosen ATF pump by lightly tapping on two bolts alternately using a plastic hammer - **arrow** -.
- Remove remaining 2 bolts.
- Remove ATF supply housing.

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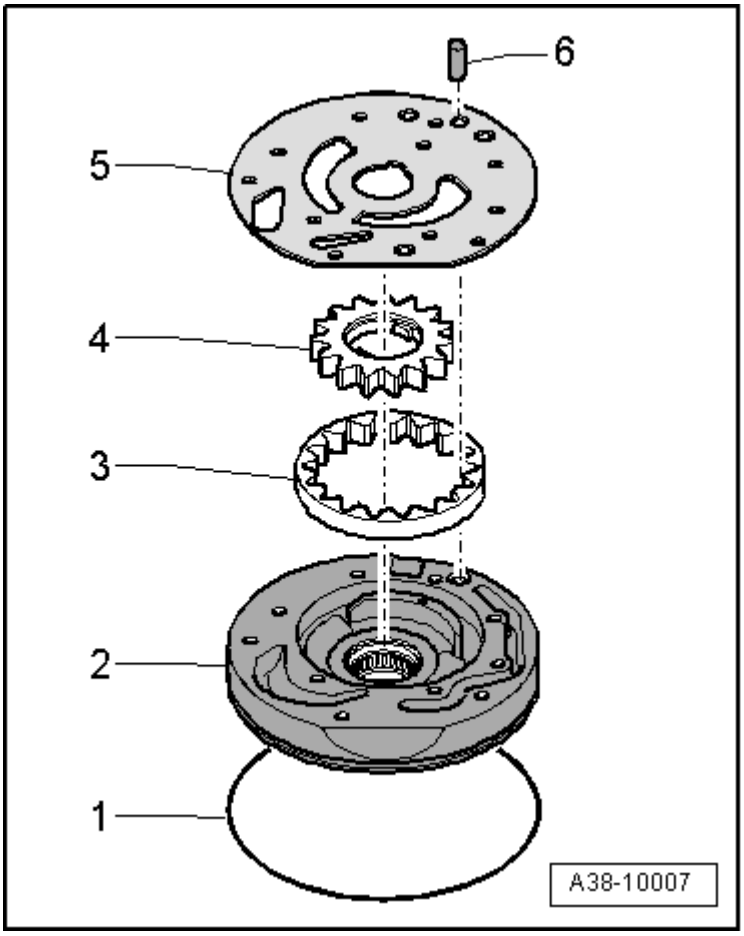


Fig. 308: ATF Pump Component, Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove intermediate plate - **5** - and positioning sleeve - **6** -.
- Remove ATF pump wheels - **3** - and - **4** - from ATF pump housing - **2** -.

1 - O-ring

Installing

- Replace O-ring - **1** - on ATF pump housing.
- Install ATF pump wheels - **3** - and - **4** - in ATF pump housing - **2** -.

- Markings (points) on ATF pump wheels point toward intermediate panel - **5** -.

- Place intermediate panel and insert positioning sleeve - **6** -.

- Positioning sleeve engages in rectangular bore on intermediate panel.

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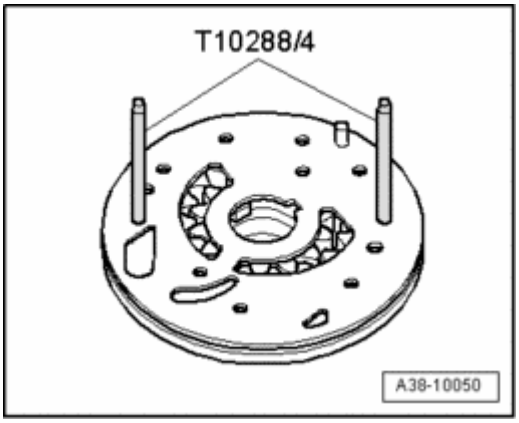


Fig. 309: Identifying Guide Pins T10288/4 and ATF Pump Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn in guide pins T10288/4 in 2 bores of ATF pump housing that are opposite to each other.

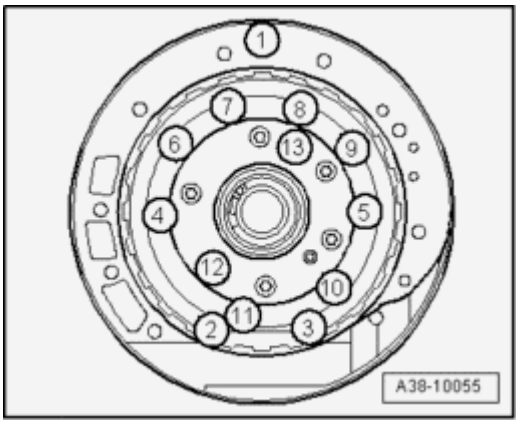


Fig. 310: Identifying ATF Pump Housing Onto ATF Pump Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach ATF pump housing onto ATF pump.
- Tighten ATF pump screws as follows:

Stage	Tightening
I	- Tighten bolts - **4 to 13** - in sequence to 5 Nm.

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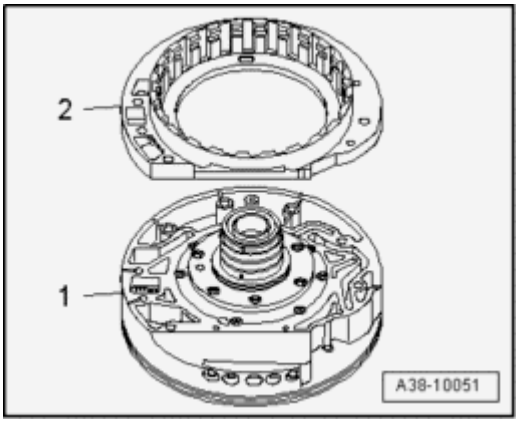


Fig. 311: Identifying Outer Disc Carrier "C" and ATF Supply Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hand-tighten outer disc carrier "C" - **2** - to ATF supply housing - **1** -.
- Outer disc carrier "C" must be able to slide onto ATF supply housing.

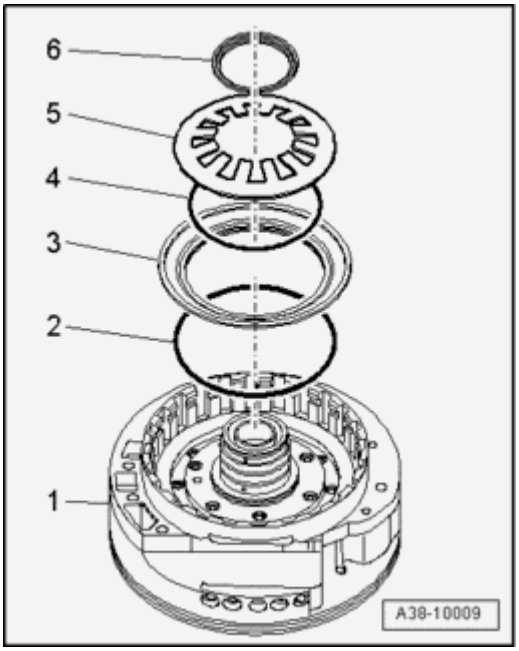


Fig. 312: Identifying Dished Washer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace O-rings - **2** - and - **4** - for piston "C" - **3** -.
- Press piston "C" - **3** - into ATF pump - **1** - until stop.

5 - Plate spring

6 - Split retaining ring

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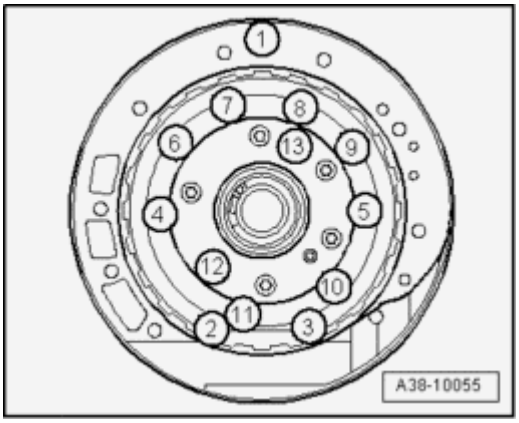


Fig. 313: Identifying ATF Pump Housing Onto ATF Pump Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten outer disc carrier bolts "C" and ATF pump with inserted piston "C" in 2 additional stages as follows:

Stage	Tightening
II	- Tighten bolts - **1 to 3** - in sequence to 5 Nm.
III	- Tighten bolts - **4 to 13** - in sequence to 10 Nm.

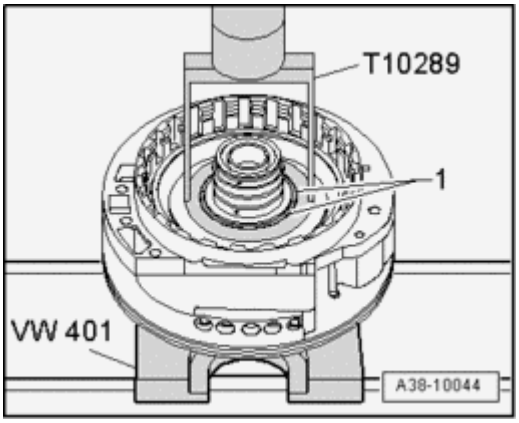


Fig. 314: Pressing Plate Spring Down Under Shop Press Using Installation Bracket T10289
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position plate spring.
- Press plate spring down under shop press using installation bracket T10289.
- Install split retaining ring - **1** -.

- Bent inner side at right angle of retaining ring faces downward.

- Release shop press.

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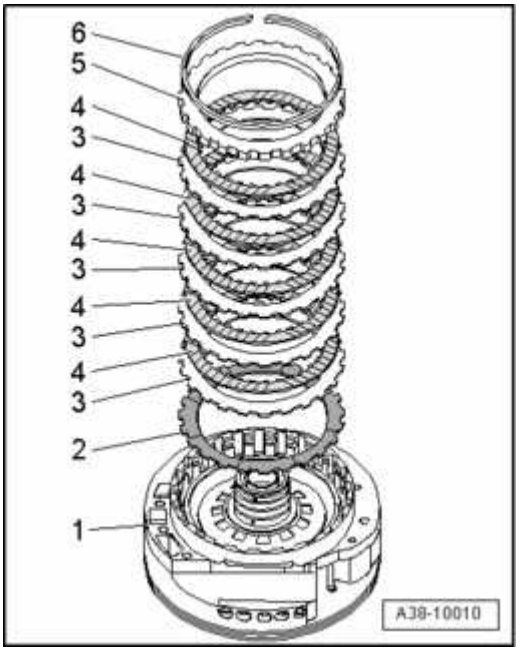


Fig. 315: Cylinder Component, Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert waved washer - **2** - into cylinder "C" - **1** -.
- Install outer plates - **3** - and coated plates - **4** - alternately.
- Install thick outer plate - **5** -.

NOTE:

- **Ensure rounded edges of thick outer clutch disc faces toward lining disc - 4 - and not toward circlip - 6 -. This improves circlip contact surface.**

- Insert circlip - **6** -.

NOTE:

- **If plate pack of clutch "C" was replaced, air gap must be adjusted again *Adjust clutch* under Clutch "C" , disassembling and assembling.**

Stator shaft, removing and installing

Removing

- ATF pump removed from ATF supply housing --> **ATF pump and ATF supply housing, removing and installing**.

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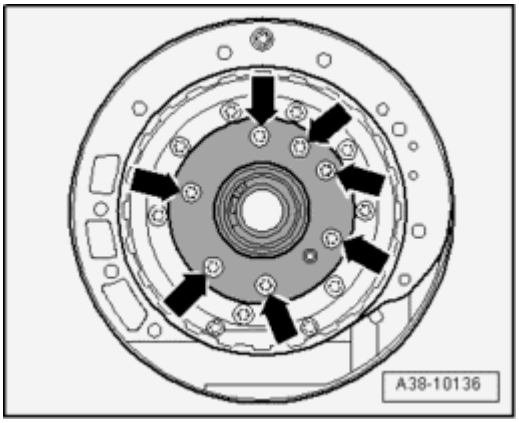


Fig. 316: ATF Supply Housing Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **arrows** -.

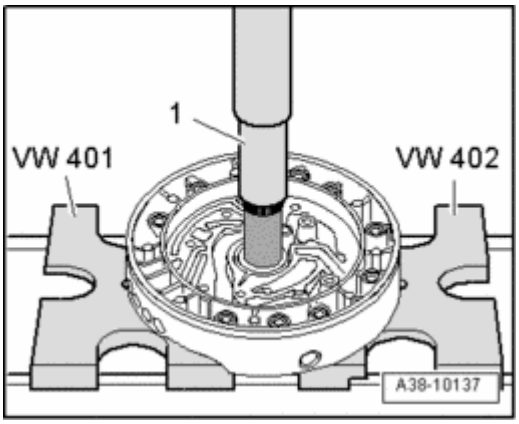


Fig. 317: Press Stator Shaft Under Shop Press With A Suitable Drift
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Warm ATF supply housing area around stator shaft to approx. 70° C with a hot air gun.
- Press stator shaft under shop press with a suitable drift - **1** -.

Installing

CAUTION: Check ATF supply components for wear and damage --> ATF supply.

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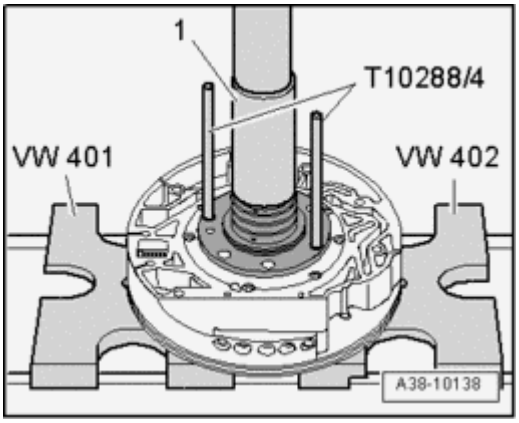


Fig. 318: Install Guide Pin M6 T10288/4 And Position Stator Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install guide pin M6 T10288/4 and position stator shaft.
- Warm ATF supply housing area around stator shaft to approx. 70° C with a hot air gun.
- Press stator shaft in under shop press using a suitable drift.

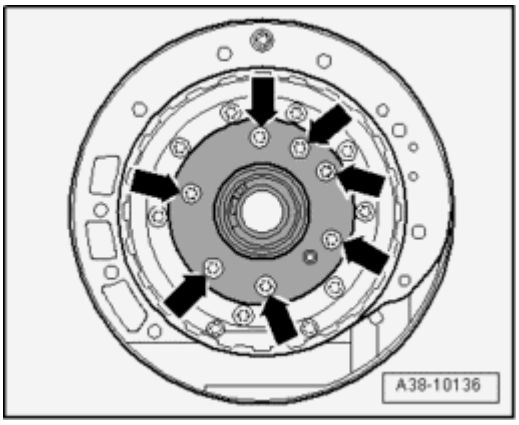


Fig. 319: ATF Supply Housing Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten bolts - **arrows** -.

- Tighten torque: 10 Nm.

ATF pump shaft seal, replacing

Work procedure

- ATF pump removed from ATF supply housing --> **ATF pump and ATF supply housing, removing and installing**.

NOTE:

- **Attach screwdriver only at shaft seal but not at locking washer lying**

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underneath.

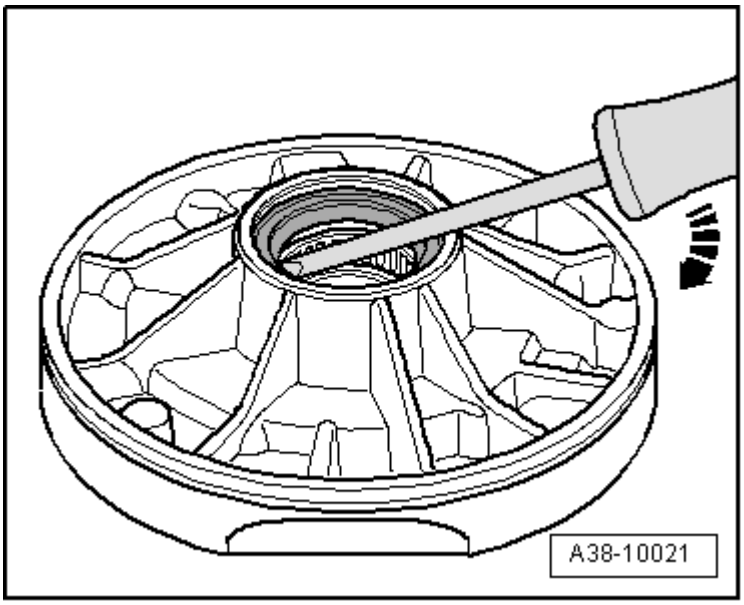


Fig. 320: Pry Off Shaft Seal Using Screwdriver
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry off shaft seal using screwdriver - **arrow** -.
- Check locking washer lying underneath for damage.

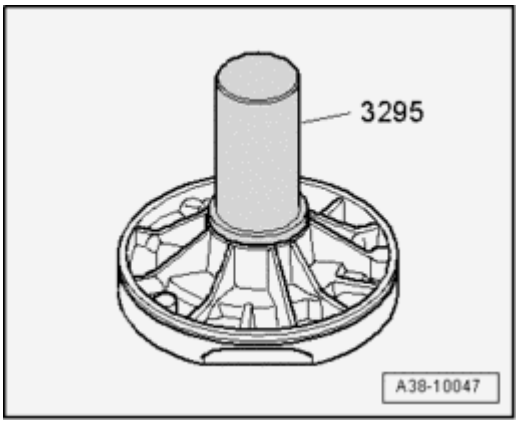


Fig. 321: Drive In New Shaft Seal To Stop Using Thrust Piece 3295
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive in new shaft seal to stop using thrust piece 3295.

INSTALLED TRANSMISSION, SERVICING

Installed transmission, servicing

NOTE:

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- **General repair notes --> General Repair Notes .**
- **Observe the rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**

Valve body, removing and installing

Removing

- Remove ATF oil pan --> **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** .

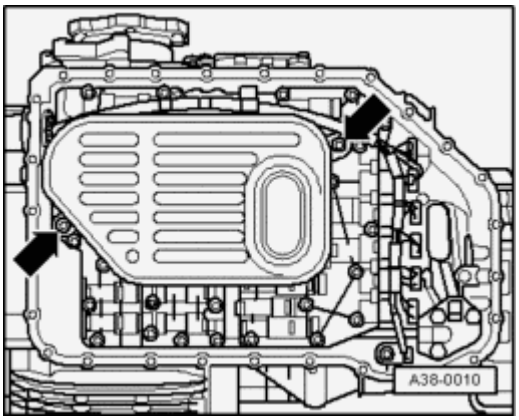


Fig. 322: ATF Screen Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove ATF filter bolts - **arrows** -.
- Pull ATF filter off of valve body.

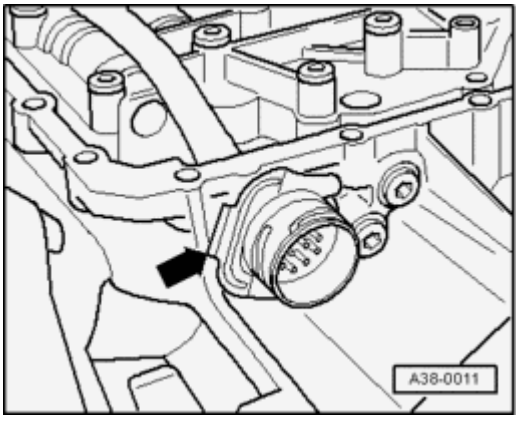


Fig. 323: Location Of Wiring Harness/Harness Connector Securing Circlip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip - **arrow** - for wiring harness/harness connector.
- Remove wiring harness/harness connector by pressing inward.

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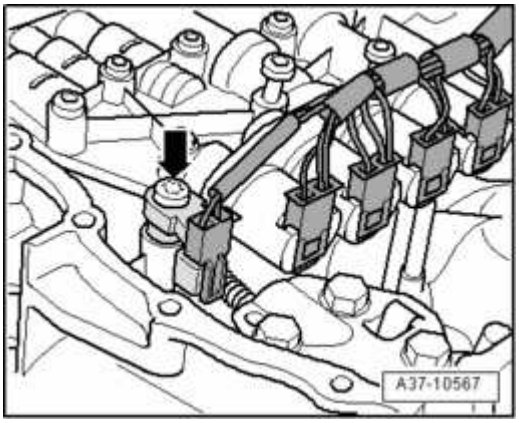


Fig. 324: Identifying Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195 Harness Fastener
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt - **arrow** - and remove Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195.

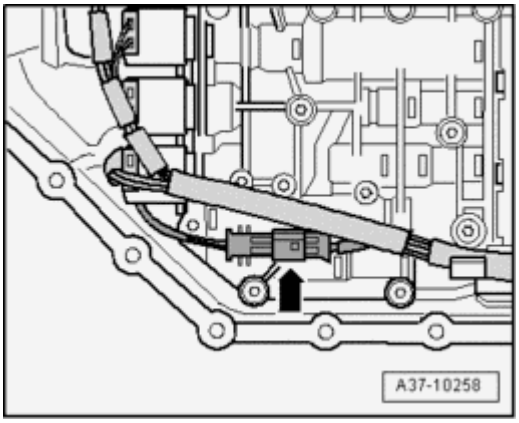


Fig. 325: Identifying Connector Transmission Input Speed (RPM) Sensor G182 At Valve Body
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- In a transmission with hydraulic control "E18/2" , disengage electrical connector to Transmission Input Speed (RPM) Sensor G182 at valve body - **arrow** - and disconnect connector.

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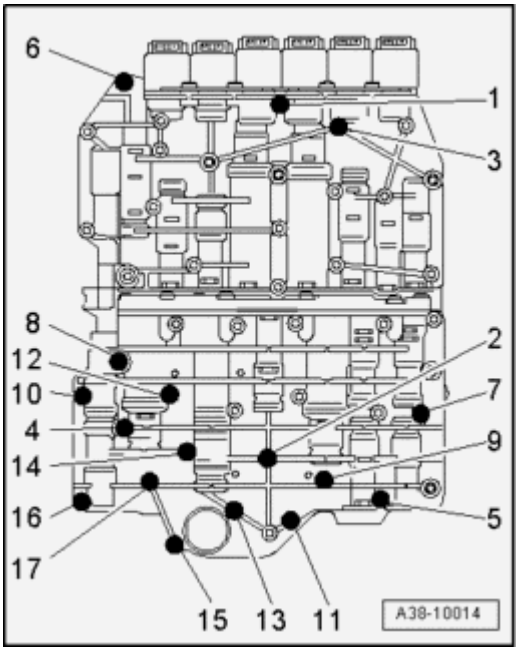


Fig. 326: Loosening or Tightening Valve Body Bolts In Sequence (As Describe)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen valve body bolts - **17 to 1** - in sequence and remove them completely.

CAUTION:

- **Only the designated screws must be removed; bolt - 6 - is only on transmissions with hydraulic control "E17".**
- **When removing other bolts, the function of the valve body can be influenced or the valve body splits up.**
- **Note the different lengths of the bolts.**

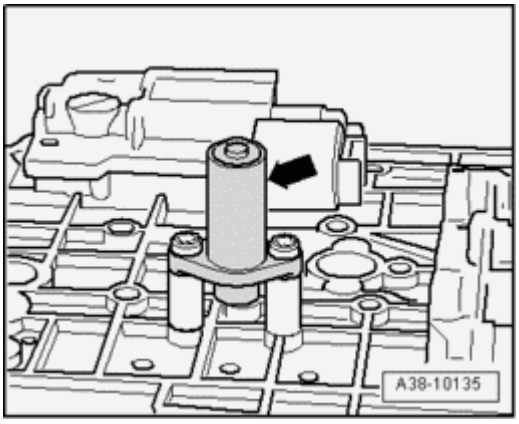


Fig. 327: Carefully Remove Valve Body From Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove valve body from transmission while guiding wiring connector back.

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CAUTION: Only transmissions with hydraulic control "E17" : Do not rest valve body on Transmission Input Speed (RPM) Sensor G182 (on bottom side of valve body - arrow -) - risk of damage.

Installing

Install in reverse order of removal, note the following:

NOTE:

- **Replace dirty or faulty valve body.**

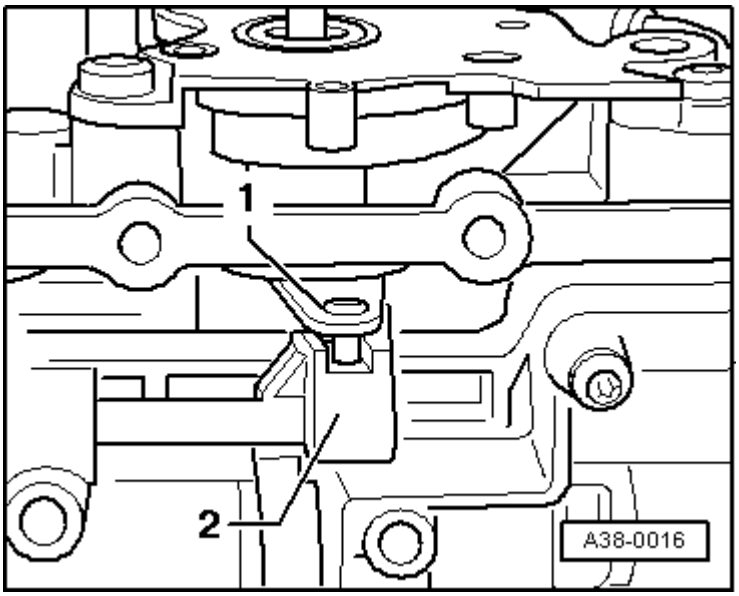


Fig. 328: Position Valve Body On Transmission Housing While Inserting Notched Disc Pins Into Selector Slide Groove
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position valve body on transmission housing without force while inserting notched disc pins - **1** - into selector slide groove - **2** -.
- Position valve body bolts.

NOTE:

- **Note different length of bolts.**

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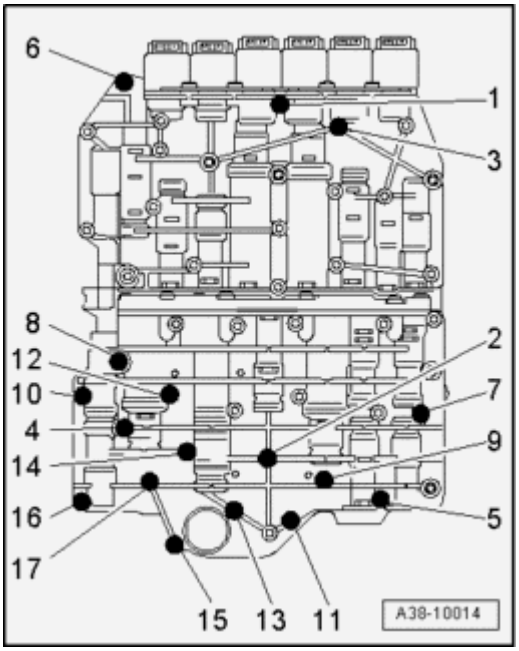


Fig. 329: Loosening or Tightening Valve Body Bolts In Sequence (As Describe)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt - **6** - is only present on transmissions with hydraulic control "E17".
- On a transmission with hydraulic control "E18/2" , ensure electrical wire to Transmission Input Speed (RPM) Sensor G182 is not pinched between transmission housing and valve body.

- Tighten valve body bolts in 2 stages as follows:

Stage	Tightening
I	- Hand-tighten bolts - **1 to 17** - in sequence.
II	- Tighten bolts - **1 to 17** - in sequence to 8 Nm.

- Replace O-rings for wiring harness/harness connector.

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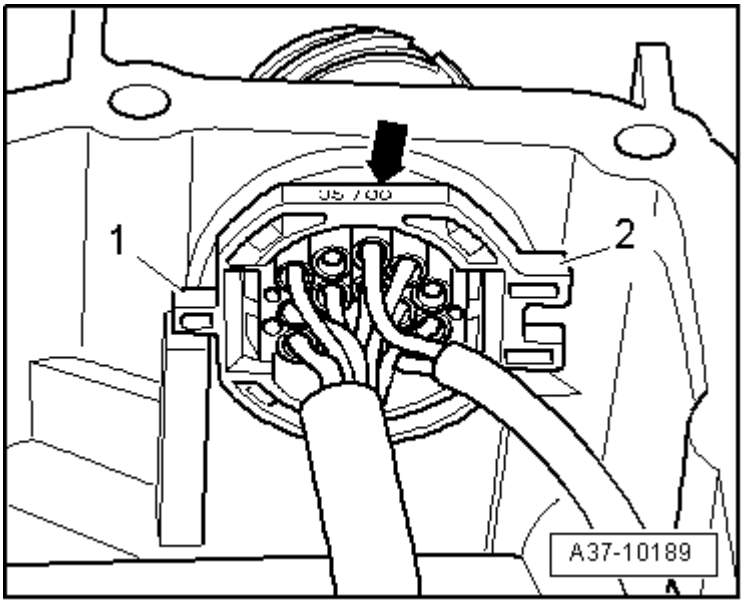


Fig. 330: Location Of Transmission Harness Connector and Connector O-ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect wiring harness connector - **arrow** - to transmission housing.

- Installation position: Retainers - **1** - and - **2** - at collar are horizontal, leveled side - **arrow** - of connector must be parallel to ATF oil pan sealing surface.

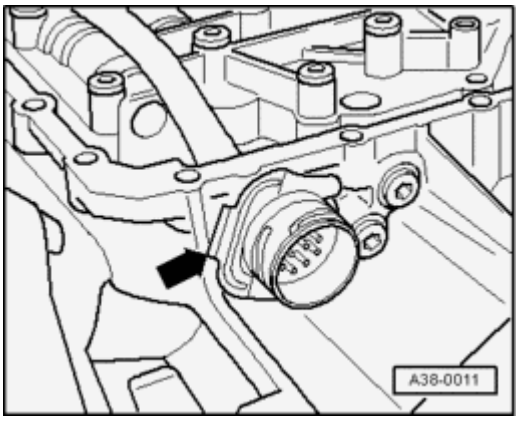


Fig. 331: Location Of Wiring Harness/Harness Connector Securing Circlip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position wiring harness connector securing clip - **arrow** - and ensure it locks securely.

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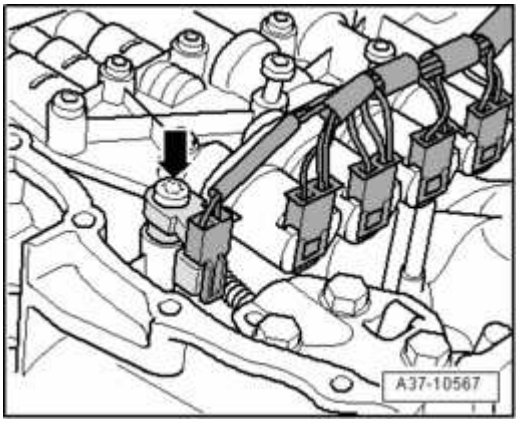


Fig. 332: Identifying Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195 Harness Fastener
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten bolt - **arrow** - for Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195.

- Tightening torque: 10 Nm.

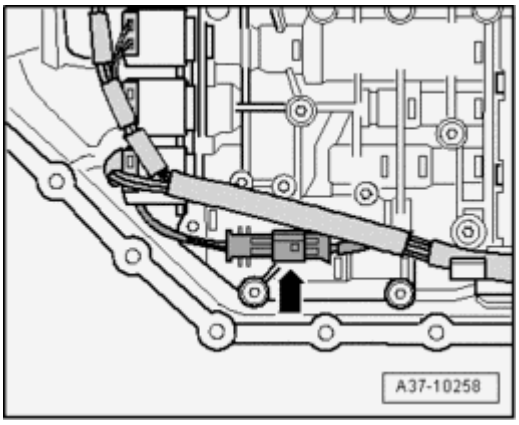


Fig. 333: Identifying Connector Transmission Input Speed (RPM) Sensor G182 At Valve Body
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- With a transmission with hydraulic control "E18/2" , connect electrical connector to Transmission Input Speed (RPM) Sensor G182.
- Clip electrical harness connector into valve body mount - **arrow** -.

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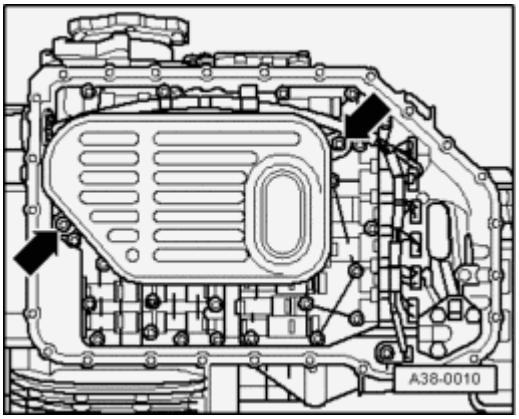


Fig. 334: ATF Screen Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position ATF filter on valve body and tighten - **arrows** -.
- Tightening torque: 5 Nm.
- Install ATF oil pan --> **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** .
- Fill ATF --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .

Torque specification

Component	Nm
Valve body at transmission housing	8

Inner oil line, removing and installing

NOTE:

- **Faulty O-rings on inner oil line allow ATF to leak into the final drive. This will lead to overfilling and oil will drip from the final drive breather hole.**

Removing

- Remove valve body --> **Valve body, removing and installing**.

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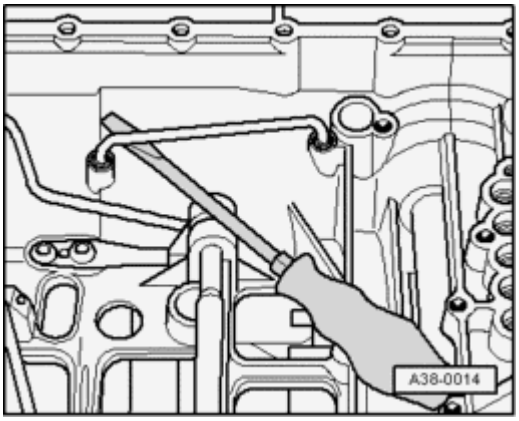


Fig. 335: Pry Internal Oil Line Off Transmission Housing Using A Screwdriver
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press inner oil line evenly off of transmission housing with a screwdriver.

NOTE:

- **Inner oil line cannot be removed without causing damage.**

Installing

Install in reverse order of removal, note the following:

NOTE:

- **Replace O-rings.**
- **Oil line may be installed with Oil Line Installer 3381. Otherwise the risk exists that the oil line may leak by bending.**

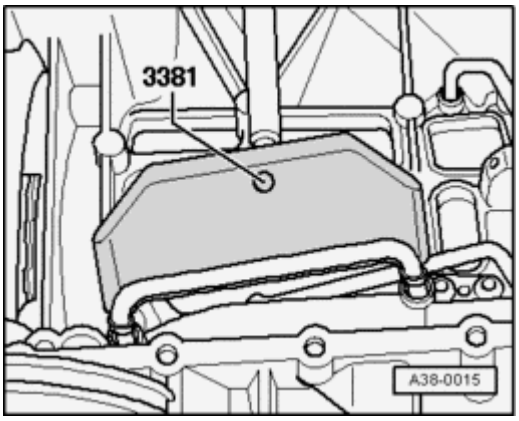


Fig. 336: Open Side Of Fitting Tool 3381 Faces Toward Outside Of Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert oil line in Oil Line Installer 3381.
- Using light blows with a plastic hammer, drive oil line on Oil Line Installer 3381 into transmission housing as far as stop on tool.

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- Open side of oil line installer 3381 faces toward outer wall of transmission.
- Do not distort oil line. Drive both line ends in equally.

- Install valve body --> **Valve body, removing and installing**.
- Fill ATF --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .
- Check oil level in front final drive --> **39 - FINAL DRIVE, DIFFERENTIAL** .

Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195 , removing and installing

Removing

- Drain ATF --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .
- Remove ATF oil pan --> **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** .

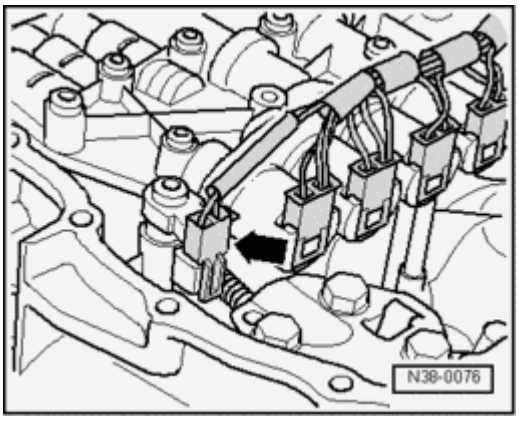


Fig. 337: Transmission Vehicle Speed Sensor -G38- Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector - **arrow** - at Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195.

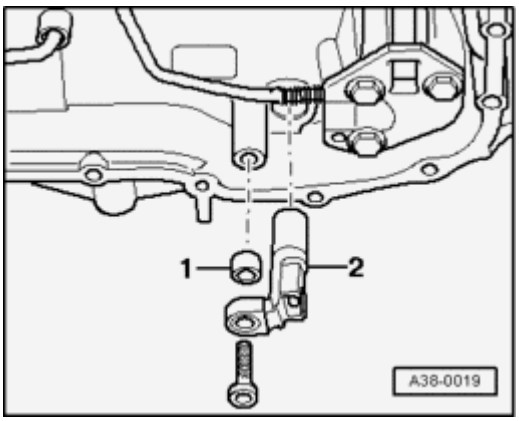


Fig. 338: Identifying Transmission Vehicle Speed Sensor (VSS) And Spacer

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt and remove Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195 - **2** - with spacer sleeve - **1** -.

Installing

Installation in reverse order of removal, note the following:

- Position Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195 - **2** - with spacer sleeve - **1** - on transmission and tighten bolt.

- Spacer sleeve height: 8 mm.

- Install ATF oil pan --> **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** .
- Fill ATF --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .

Torque specification

Component	Nm
Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195	6

Transmission Input Speed (RPM) Sensor G182 (transmission with hydraulic control "E17"), removing and installing

NOTE:

- **On a transmission with hydraulic control "E17" , Transmission Input Speed (RPM) Sensor G182 is an inductive sensor (secured on underside of valve body).**
- **The allocation of the hydraulic control can be found in Technical Data --> 00 - GENERAL, TECHNICAL DATA .**

Removing

- Remove valve body --> **Valve body, removing and installing**.
- Rotate valve body.

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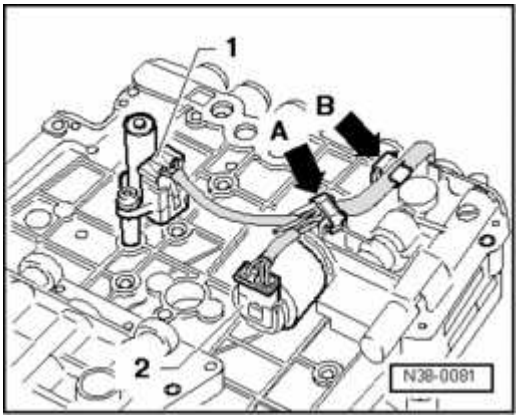


Fig. 339: Removing/Installing Sensor And Solenoid Valve Harness Connectors At Valve Body
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical harness connector at Transmission Input Speed (RPM) Sensor G182 - **1** -.

NOTE:

- **Ignore - arrows - and item - 2 -.**

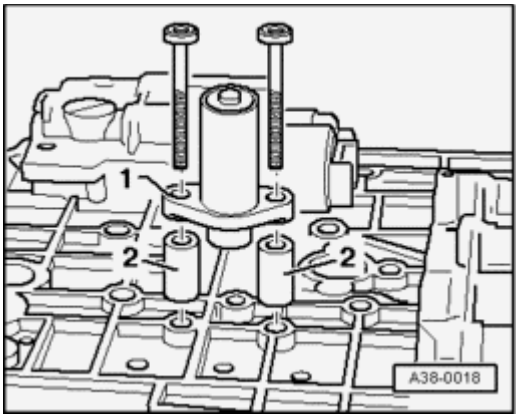


Fig. 340: Identifying Sensor For Transmission RPM And Spacer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts and remove Transmission Input Speed (RPM) Sensor G182 - **1** -.

NOTE:

- **Disregard - 2 -.**

Installing

Installation is in reverse order or removal, note the following:

- Position Transmission Input Speed (RPM) Sensor G182 - **1** - with spacer sleeves - **2** - on valve body and tighten bolts.

- Spacer sleeve height: 20 mm.

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- Installation position: Transmission Input Speed (RPM) Sensor G182 contacts face toward center of valve body.

- Install valve body --> **Valve body, removing and installing**.
- Fill ATF --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .

Torque specification

Component	Nm
Transmission Input Speed (RPM) Sensor G182 to valve body	7

Transmission Input Speed (RPM) Sensor G182 (transmission with hydraulic control "E18/2"), removing and installing

NOTE:

- **On a transmission with hydraulic control "E18/2" , Transmission Input Speed (RPM) Sensor G182 is a Hall sensor (secured behind valve body on transmission housing).**
- **The allocation of the hydraulic control can be found in Technical Data --> 00 - GENERAL, TECHNICAL DATA .**

Removing

- Remove valve body --> **Valve body, removing and installing**.

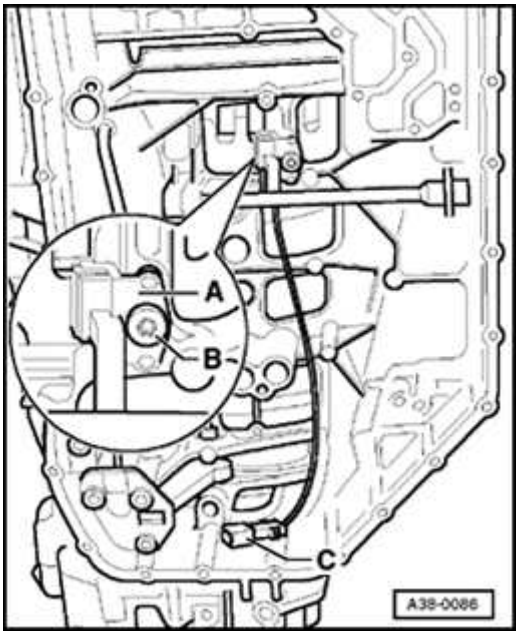


Fig. 341: Sensor For Transmission RPM (Transmissions With Hydraulic Regulation -E18/2-)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Remove bolt - **B** -.
- Remove Transmission Input Speed (RPM) Sensor G182 - **A** - from transmission.

Installing

Installation is in reverse order of removal, note the following:

- Electrical connector - **C** - for Transmission Input Speed (RPM) Sensor G182 is clipped into valve body mount after installing valve body.
- Install valve body --> **Valve body, removing and installing**.
- Fill ATF --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .

Torque specification

Component	Nm
Transmission Input Speed (RPM) Sensor G182 to transmission	9

Wiring harness in transmission, removing and installing

Removing

- Remove valve body --> **Valve body, removing and installing**.

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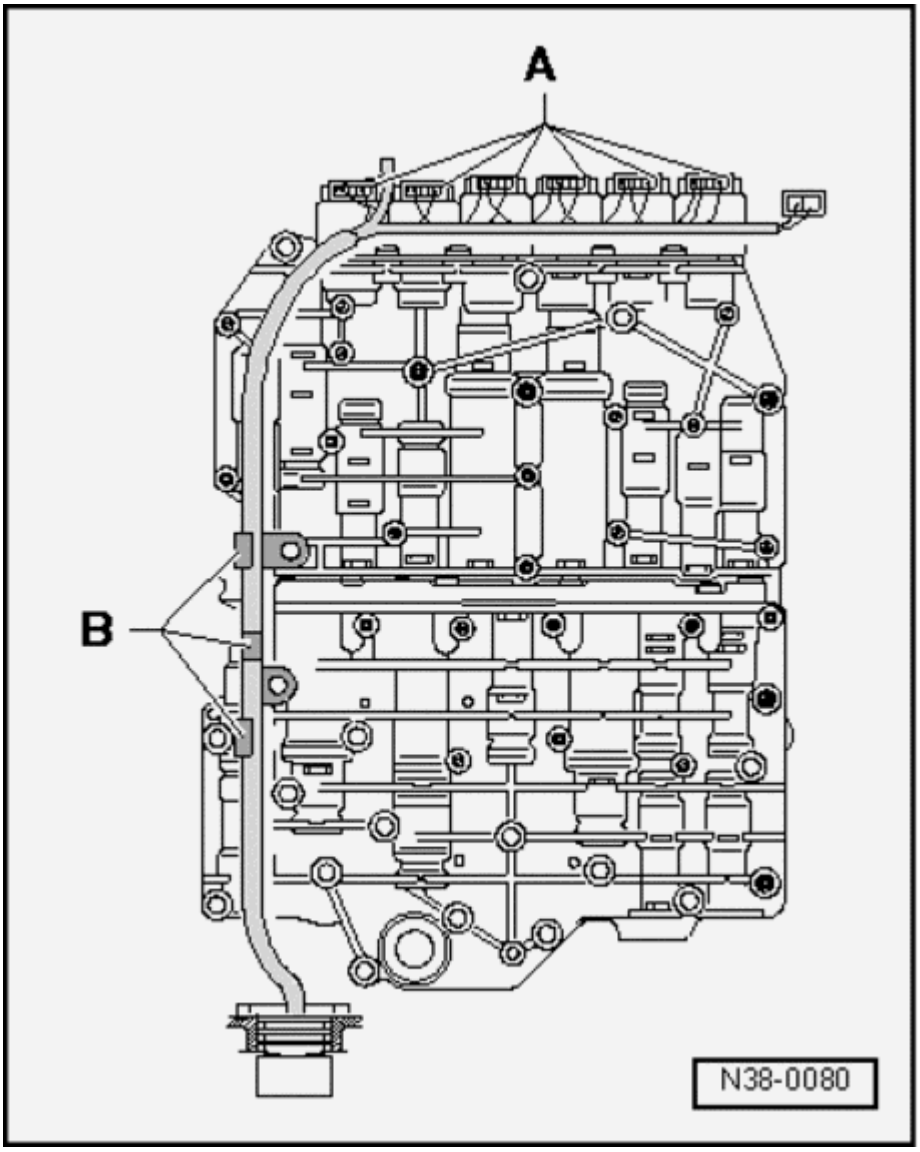


Fig. 342: Identifying Solenoid Valve Connectors And Wiring Harness Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry retaining tabs on electrical connectors on solenoid valves out with a small screwdriver and disconnect electrical connectors - **A** - one after the other.
- Disengage wiring harness at valve body side retaining tabs - **B** -.

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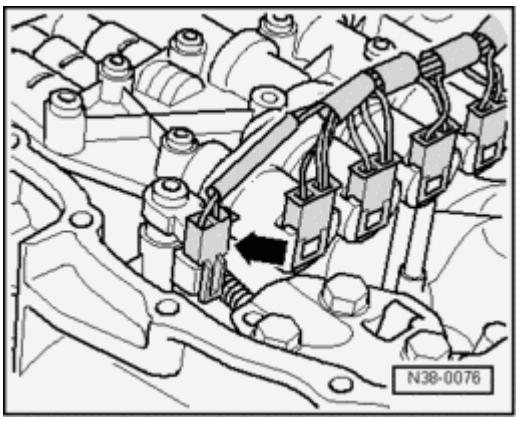


Fig. 343: Transmission Vehicle Speed Sensor -G38- Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector - **arrow** - at Transmission Vehicle Speed Sensor (VSS) G38/Transmission Output Speed (RPM) Sensor G195.

NOTE:

- **Shown with valve body installed in illustration.**

- Rotate valve body.

Transmission with hydraulic control "E17" :

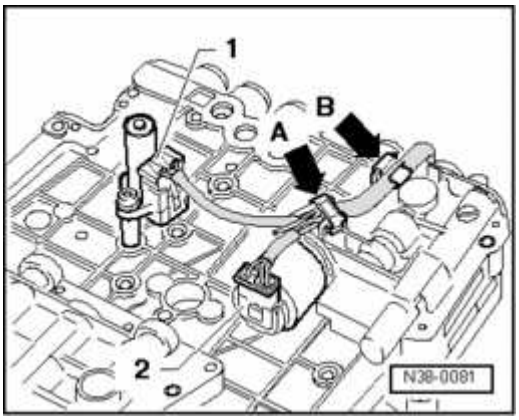


Fig. 344: Removing/Installing Sensor And Solenoid Valve Harness Connectors At Valve Body
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical harness connector at Transmission Input Speed (RPM) Sensor G182 - **1** -.
- Remove retaining clip - **arrow A** - and unclip wiring harness from retaining clip - **arrow B** -.
- Disconnect electrical connector - **2** - at Solenoid Valve 4 N91.

Transmission with hydraulic control "E18/2" :

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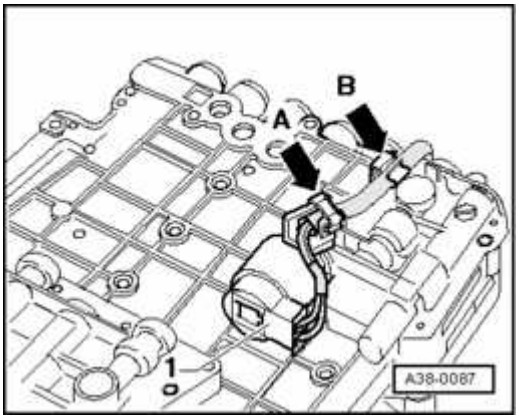


Fig. 345: Identifying Pressure Control Valve 1 (-N125-) And Wiring Harness Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical harness connector at Transmission Input Speed (RPM) Sensor G182 - **1** -.
- Remove retaining clip - **arrow A** - and unclip wiring harness from retaining clip - **arrow B** -.

Installing

Installation is in reverse order of removal, note the following:

- Connect wiring harness electrical connectors to corresponding solenoid valves and sensors.
- Clip wiring harness into intended retaining clips. If deviated, the wiring harness could be pinched when installing the valve body.
- Install valve body --> **Valve body, removing and installing**.
- Fill ATF --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .

EVALUATING WEAR ON TRANSMISSION COMPONENTS

Evaluating wear by evaluating ATF color and impurities

ATF color

- Yellow color: New ATF.
- Brown color: Used ATF (from approx. 60,000 km).
- Black, ATF smells burned: Malfunction in transmission, e.g. torque converter clutch overheated, clutch lining burned.

Shavings in ATF

- Metal shavings smaller than 0.1 mm diameter up to a maximum of 1 cm^3 at solenoid in ATF oil pan or in ATF are normal.
- Metal shavings larger than 2.0 mm diameter at solenoid in ATF oil pan or in ATF indicate a mechanical malfunction or strong wear in transmission.

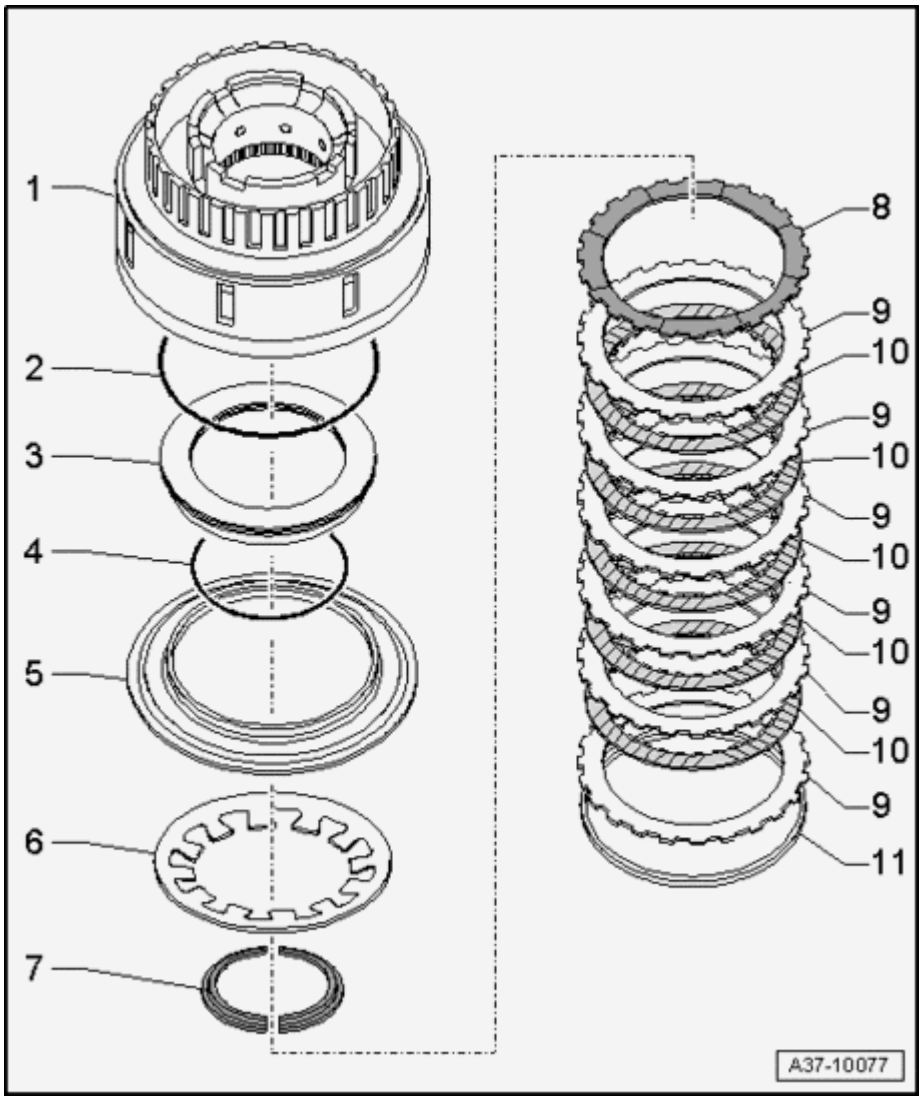
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Measures for contaminated ATF area

If ATF area is heavily soiled (ATF black or shavings **Shavings in ATF**):

- Completely disassemble and clean transmission.
- Flush ATF oil passages and blow through with pressurized air.
- Disassemble and check all clutches.
- Replace torque converter (cannot be cleaned).
- Replace valve body (cannot be cleaned).
- Replace ATF filter.
- Clean ATF lines and ATF cooler.

Clutch "F"



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Fig. 346: Clutch "F", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Cylinder "F"

- Check for scoring from lining discs on inner circumference --> **Check cylinder "F" inner circumference for scoring from lining discs**
- Check for scoring from lining discs on outer circumference --> **Check cylinder "F" outer circumference for scoring from lining discs**
- Checking splines
- Checking needle bearing and metal sleeve for wear --> **Checking needle bearing and metal sleeve in cylinder "F" for wear**

3 - Piston "F"

- Checking for wear

6 - Plate spring

- Replace in case of signs of wear or if dished washer tips are bent
- Replace broken plate spring

7 - Split retaining ring

- Replace if deformed

10 - Outer plates

- Checking for wear **Checking coated and outer plate for wear**

11 - Coated plate

- Checking for wear **Checking coated and outer plate for wear**

Check cylinder "F" inner circumference for scoring from lining discs

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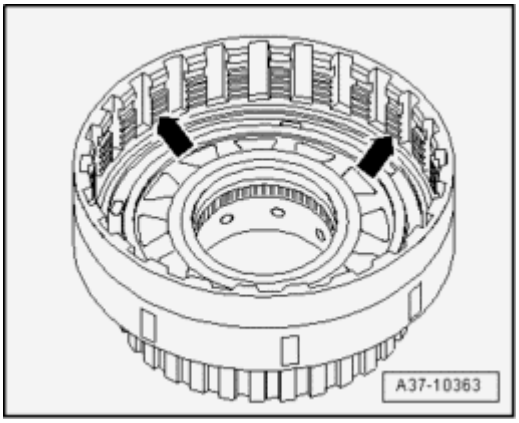


Fig. 347: Check Cylinder Inner Circumference For Scoring From Lining Discs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check cylinder "F" at inner circumference for signs of wear caused by coated plates.
- Coated plates must not get caught in scoring - **arrows** -.

If scoring - **arrows** - caused by coated plates are greater than 0.5 mm:

- Replace cylinder "F" and clutch freewheel inner race "D/G"

Check cylinder "F" outer circumference for scoring from lining discs

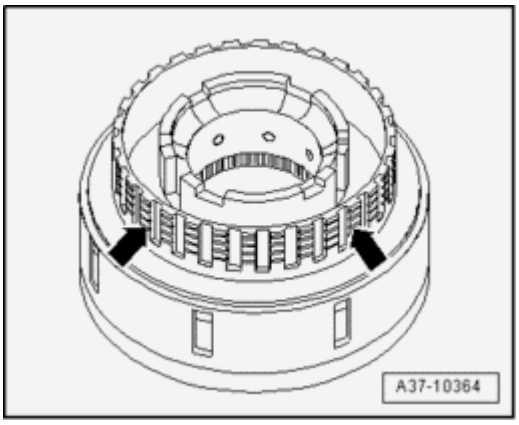


Fig. 348: Check Cylinder Outer Circumference For Scoring From Lining Discs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check cylinder "F" at outer circumference for signs of wear caused by coated plates.
- Coated plates must not get caught in scoring - **arrows** -.

If scoring - **arrows** - caused by coated plates are greater than 0.5 mm:

- Replace cylinder "F".

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NOTE:

- **This damage is always caused by a malfunctioning valve body.**

Checking needle bearing and metal sleeve in cylinder "F" for wear

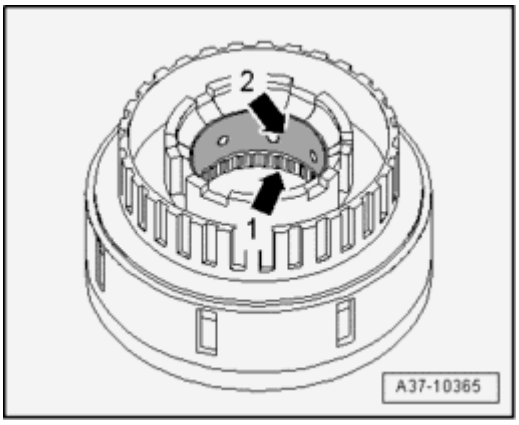


Fig. 349: Checking Needle Bearing And Metal Sleeve In Cylinder "F" For Wear
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Perform a visual check of needle bearing - **arrow 1** -.
- Needle bearing must be like new.
- Replace cylinder "F" if necessary.
- Check contact surface of metal sleeve for wear - **arrow 2** - in cylinder "F".
- Contact surface must not be heavily scored and/or show blue discoloration.

In case of deep grooves and/or blue color:

- Replace cylinder "F".

If no blue discoloration and only small grooves are detected, proceed as follows:

- Sandpaper (600 grit, oiled) contact surface 1 to 2 times.
- Carefully wipe off with a clean rag and check contact surface. Contact surface must now be like new.

If scores cannot be removed in this manner:

- Replace cylinder "F".

Checking coated and outer plate for wear

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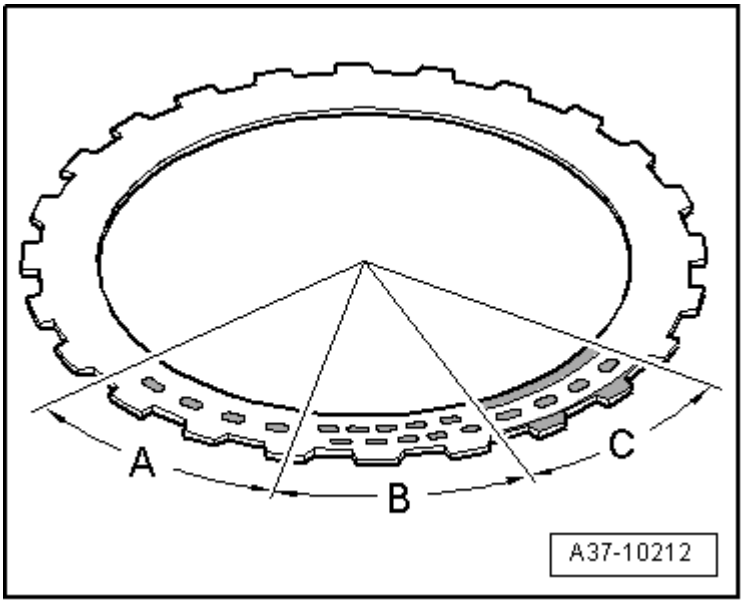


Fig. 350: Checking Coated And Outer Plate For Wear And Overheating
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Signs of overheating on outer plates point to worn coated plates. Evaluate signs of wear as follows:

A - Spots of discoloration of outer plate caused by overheating in distance of more than 20 mm: Outer and coated plate OK, can be reused.

B - Spots of discoloration of outer plate caused by overheating in distance of less than 20 mm: Outer and coated plates worn, must be replaced.

C - Tarnish blue/brown at outer and/or inner area of outer plate: Outer and coated plates overheated and worn, must be replaced.

Clutch "D/G" with freewheel

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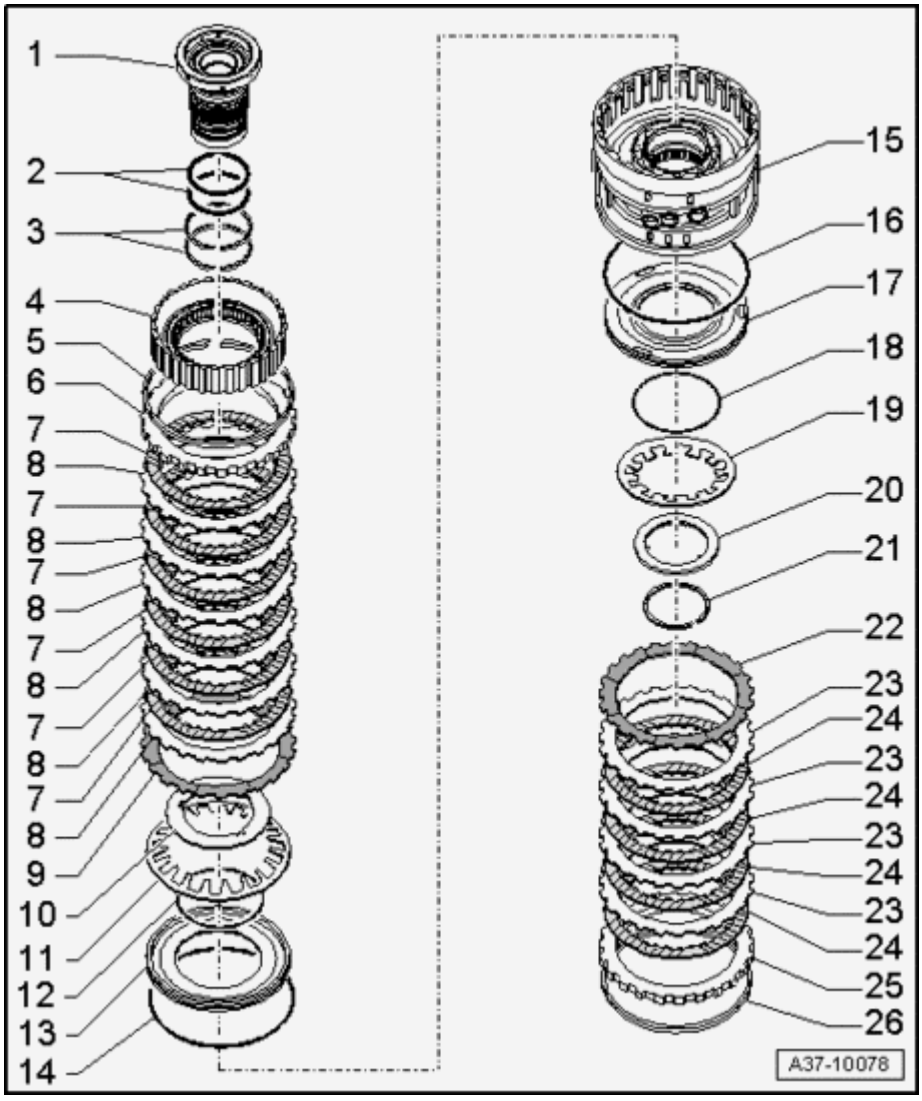


Fig. 351: Clutch "D/G" With Freewheel, Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Freewheel inner race

- Checking rotating and locking direction of freewheel **Checking rotating and locking direction of freewheel**
- Checking brass sleeves for wear **Checking upper and lower brass sleeves in freewheel inner race for wear**
- Checking splines

3 - Rectangular rings

- Checking for wear **Checking rectangular rings for wear**

4 - Freewheel with freewheel housing

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- Checking rotating and locking direction of freewheel **Checking rotating and locking direction of freewheel**

7 - Coated plates

- Checking for wear **Checking coated and outer plates for wear**

8 - Outer plates

- Checking for wear **Checking coated and outer plates for wear**

11 - Plate spring

- Replace in case of signs of wear or if dished washer tips are bent
- Check for cracks

13 - Piston "D"

- Check for cracks
- Perform sound test by striking with a screwdriver: Clear sound - pistons OK, thudding sound - cracks in pistons

15 - Cylinder "D/G"

- Check for scoring from lining discs on inner and outer circumference --> **Check cylinder "D/G" for scoring from lining discs**
- Checking splines
- Checking for cracks in area of groove for circlip

19 - Plate spring

- Replace in case of signs of wear or if dished washer tips are bent

23 - Coated plates

- Checking for wear **Checking coated and outer plates for wear**

24 - Outer plates

- Checking for wear **Checking coated and outer plates for wear**

Checking rotating and locking direction of freewheel

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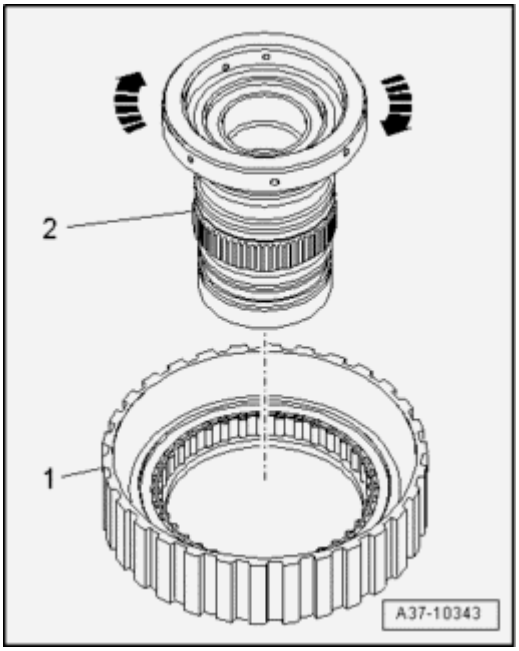


Fig. 352: Checking Rotating and Locking Direction Of Freewheel
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Freewheel inner race - **2** - must be able to turn in a clockwise direction and must lock in a counter-clockwise direction when turned.

If there is no locking effect:

- Replace freewheel with freewheel housing - **1** -.

Checking upper and lower brass sleeves in freewheel inner race for wear

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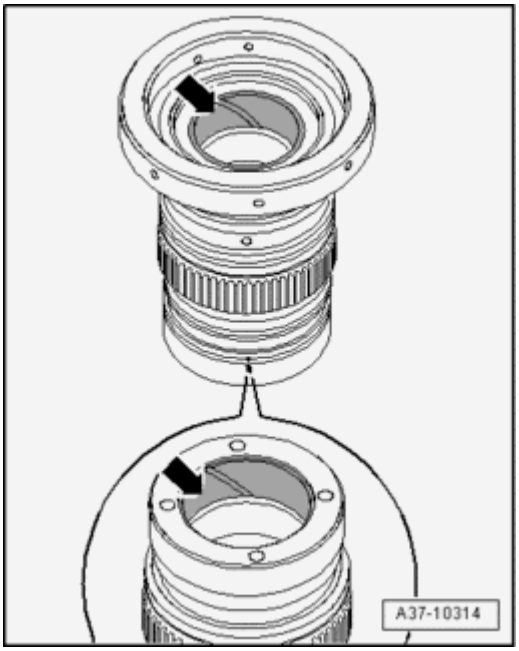


Fig. 353: Checking Upper And Lower Brass Sleeves In Freewheel Inner Race For Wear
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check contact surfaces of brass sleeves - **arrows** - at inside of freewheel inner race for wear.

- Contact surfaces must not be heavily scored and/or show blue discoloration.

In case of deep grooves and/or blue color:

- Replace freewheel inner race.

If no blue discoloration and only small grooves are detected, proceed as follows:

- Sandpaper (600 grit, oiled) contact surface 1 to 2 times.
- Carefully wipe off with a clean rag and check contact surfaces.

- Contact surfaces must now be like new.

If scores cannot be removed in this manner:

- Replace freewheel inner race.

Checking rectangular rings for wear

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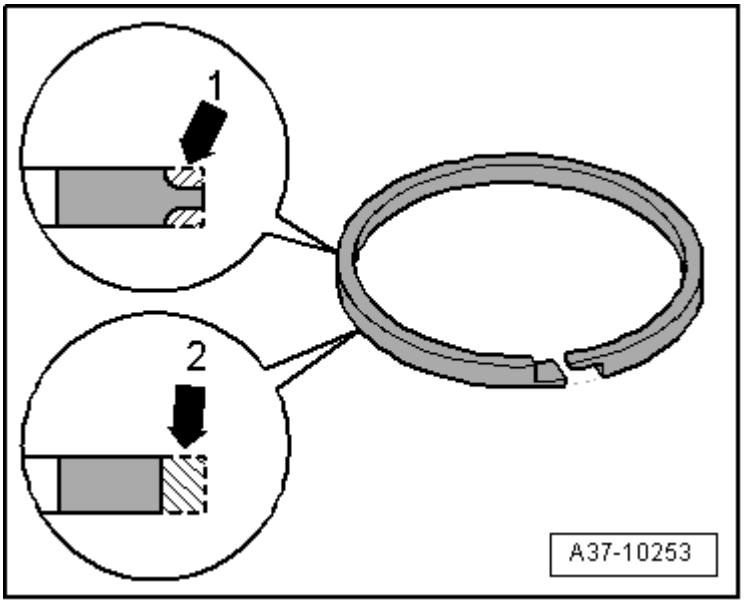


Fig. 354: Checking Rectangular Rings For Wear
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **Always replace rectangular rings. However, conclusions can be drawn from the signs of wear of the rectangular rings regarding the quality of contact surface for rectangular rings. Evaluating the rectangular rings for wear is therefore essential.**

If rectangular rings show strong axial wear of more than 0.3 mm - **arrow 1** - (slight wear of outer edges is normal):

- Replace freewheel inner race.

If rectangular rings show strong radial wear of more than 0.3 mm - **arrow 2** - (for comparison, measure thickness of new rectangular ring):

- Replace cylinder "F".

Checking coated and outer plates for wear

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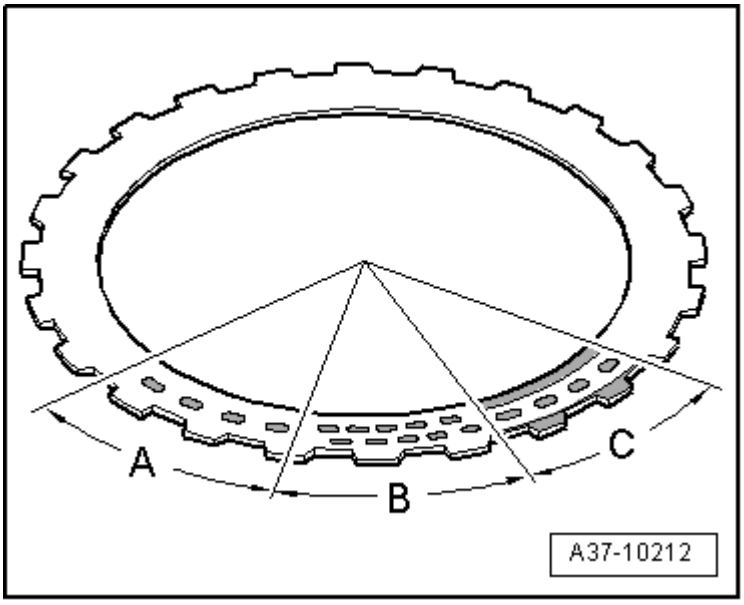


Fig. 355: Checking Coated And Outer Plate For Wear And Overheating
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Signs of overheating on outer plates point to worn coated plates. Evaluate signs of wear as follows:

A - Spots of discoloration of outer plate caused by overheating in distance of more than 20 mm: Outer and coated plates OK, can be reused.

B - Spots of discoloration of outer plate caused by overheating in distance of less than 20 mm: Outer and coated plates worn, must be replaced.

C - Tarnish blue/brown at outer and/or inner area of outer plate: Outer and coated plates overheated and worn, must be replaced.

Check cylinder "D/G" for scoring from lining discs

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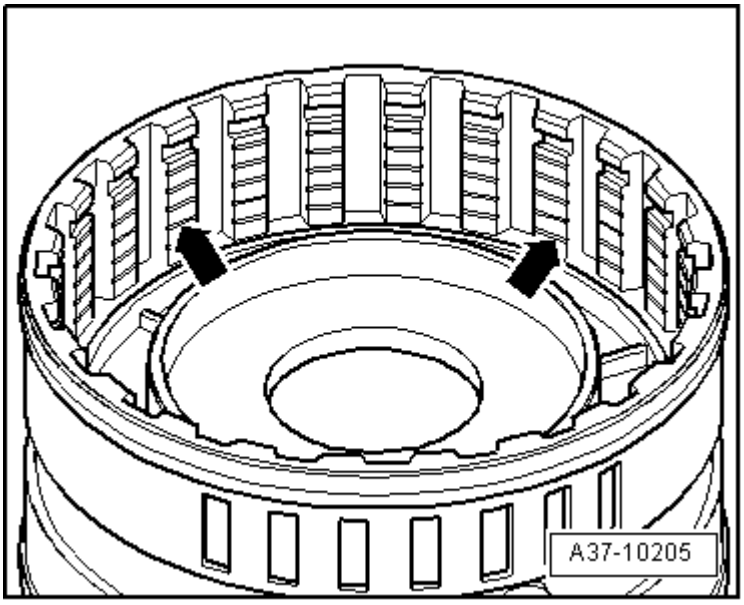


Fig. 356: Check Cylinder "D/G" For Scoring From Lining Discs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check cylinder "D/G" at inner and outer circumference for signs of wear caused by lining discs.
- Coated plates must not get caught in scoring.

If scoring - **arrows** - caused by coated plates are greater than 0.5 mm:

- Replace cylinder "D/G".

Planetary drive "III"

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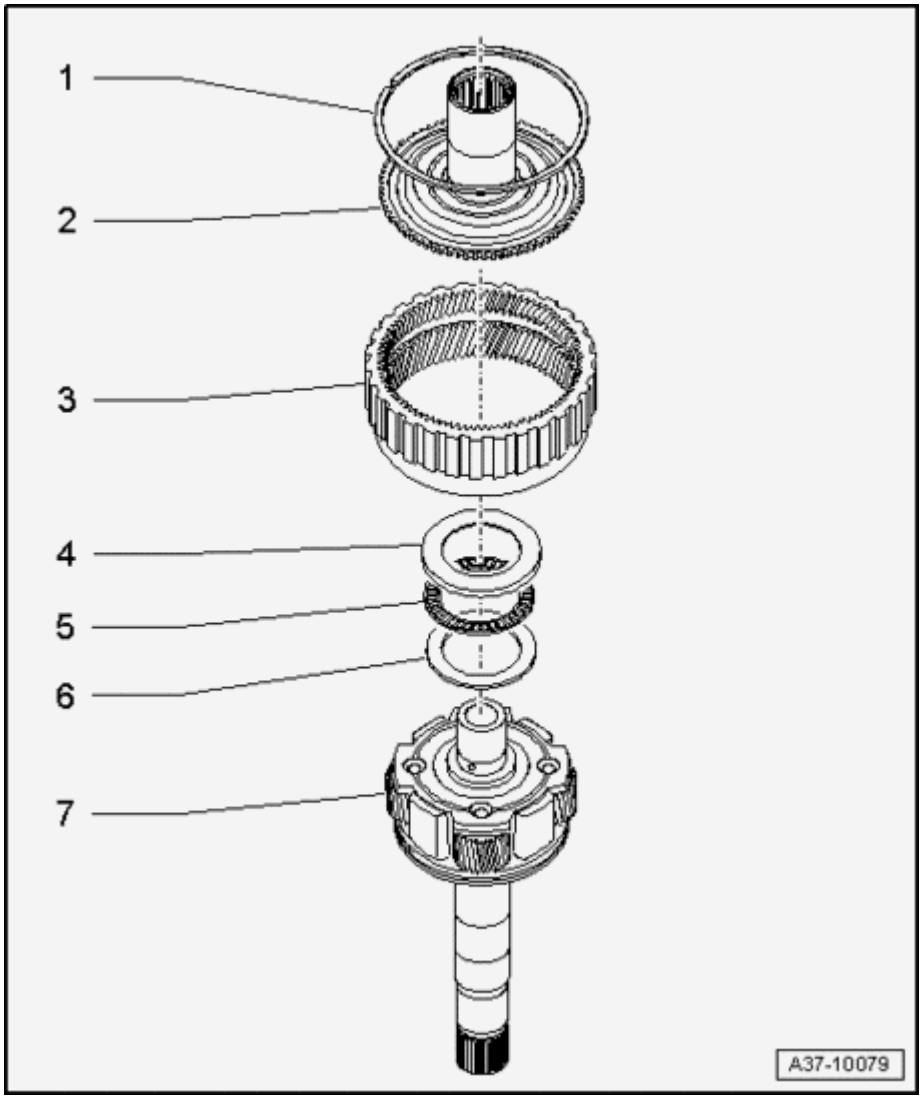


Fig. 357: Planetary Drive "III", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

2 - Shaft

- Checking contact surface and brass sleeve of shaft for wear **Checking contact surface and brass sleeve of shaft for wear**
- Checking splines

3 - Ring gear "III"

- Checking splines of planetary drive, replace planetary drive if splines are damaged

4 - Angle washer

5 - Axial needle bearing

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6 - Thrust washer

7 - Planetary carrier "III"

- Checking contact surfaces of shaft for wear --> **Checking contact surfaces of shaft planetary carrier "III" for wear**
- Checking splines of planetary drive, replace planetary drive if splines are damaged
- Checking axial and radial play of planetary gears **Checking axial and radial play of planetary gears**

Checking contact surface and brass sleeve of shaft for wear

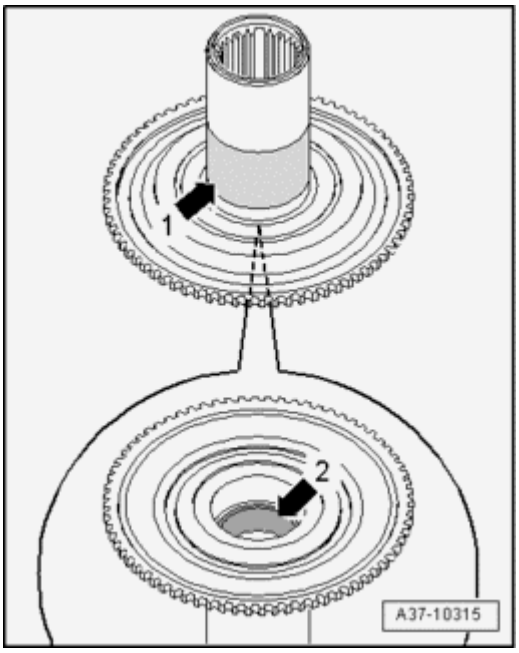


Fig. 358: Checking Contact Surface And Brass Sleeve Of Shaft For Wear
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check contact surfaces of brass sleeve - **arrow 2** - at inside of shaft and contact surface at outer circumference - **arrow 1** - for wear.

- Contact surfaces must not be heavily scored and/or show blue discoloration.

In case of deep grooves and/or blue color:

- Replace shaft.

If no blue discoloration and only small grooves are detected, proceed as follows:

- Sandpaper (600 grit, oiled) contact surface 1 to 2 times.
- Carefully wipe off with a clean rag and check contact surface.

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- Contact surfaces must now be like new.

If scores cannot be removed in this manner:

- Replace shaft.

Checking contact surfaces of shaft planetary carrier "III" for wear

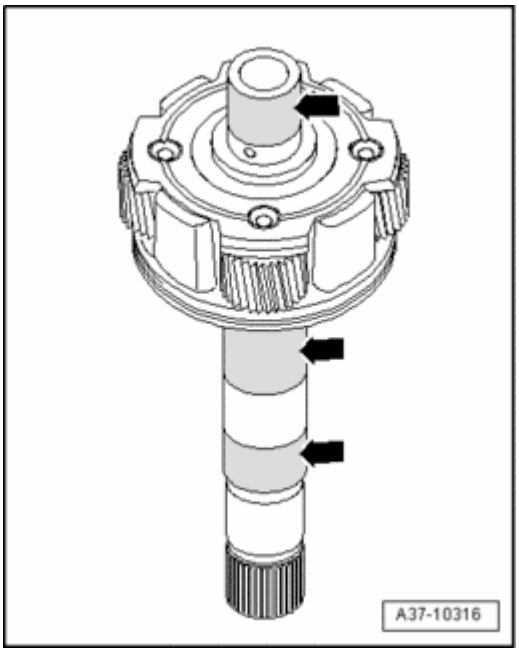


Fig. 359: Checking Contact Surfaces Of Shaft Planetary Carrier "III" For Wear
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check contact surfaces - **arrows** - of shaft for wear.

- Contact surfaces must not be heavily scored and/or show blue discoloration.

In case of deep grooves and/or blue color:

- Replace planetary drive.

If no blue discoloration and only small grooves are detected, proceed as follows:

- Sandpaper (600 grit, oiled) contact surface 1 to 2 times.
- Carefully wipe off with a clean rag and check contact surface.

- Contact surfaces must now be like new.

If scores cannot be removed in this manner:

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- Replace planetary drive.

Checking axial and radial play of planetary gears

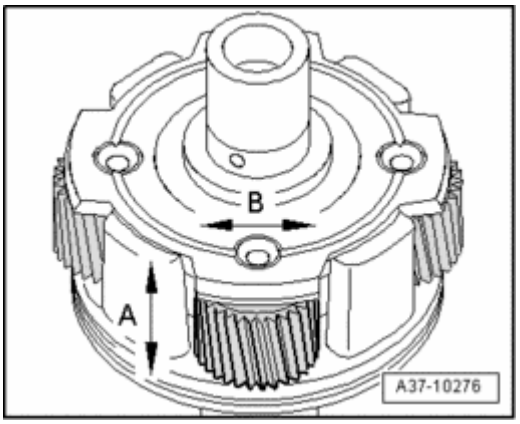


Fig. 360: Checking Axial And Radial Play Of Planetary Gears
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check axial play of planetary gears - **arrow A** -.
- Axial play wear limit: 0.4 mm.
- Check planetary gears for radial play - **arrow B** -.
- Planetary gears must not show radial play.
- Check planetary gear axles.
- Axle peening must be intact.
- Area around axles must not be blue.
- Replace planetary carrier "III" if necessary.

Clutch "B"

CAUTION: Illustration depicts current construction version of clutch "B" with waved washer , 2x outer plates and 2x coated plates. Always replace clutch "B" without waved washer, 3x coated plates and 3x outer plates on older construction versions.

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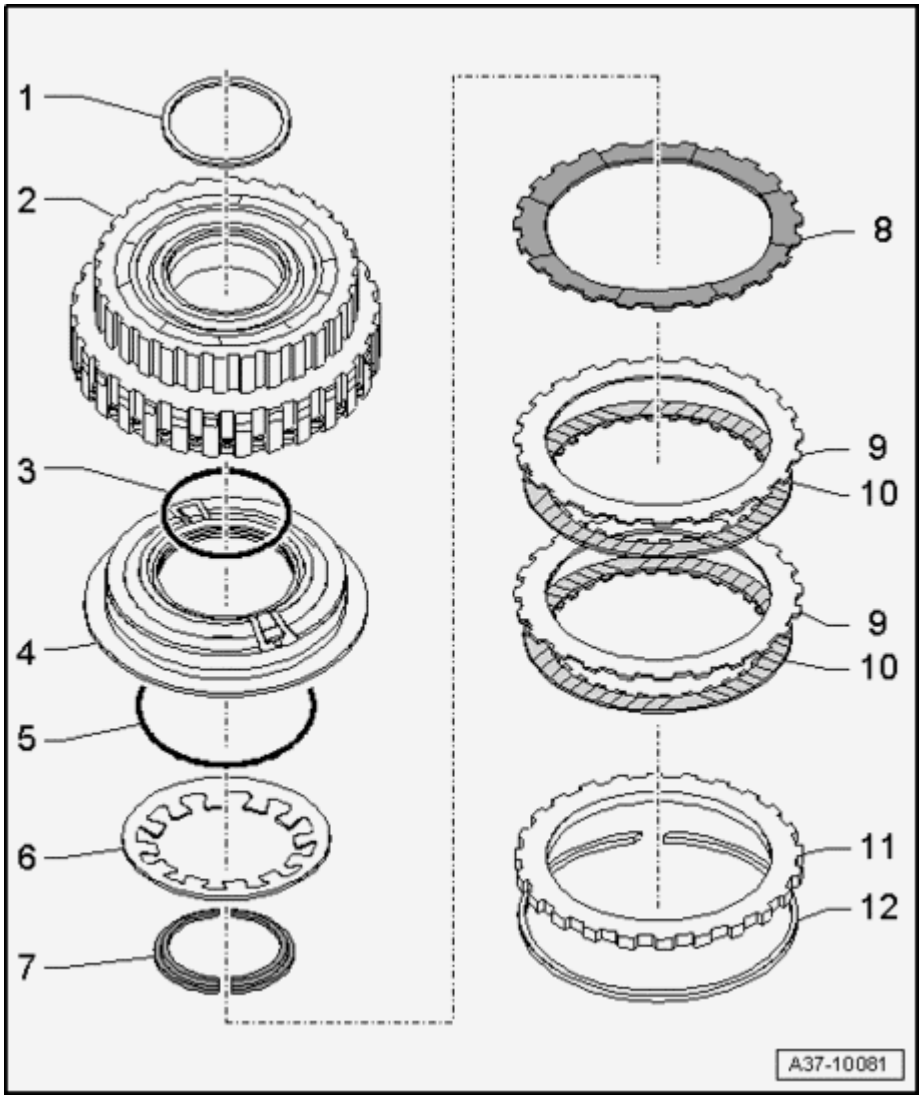


Fig. 361: Clutch "B" Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

2 - Cylinder "B"

- Checking contact surface for rectangular rings for wear --> **Checking contact surface for rectangular rings in cylinder "B" for wear**

4 - Piston "B"

- Checking freedom of movement of valve ball --> **Checking freedom of movement of valve ball in piston "B"**

6 - Plate spring

- Replace in case of signs of wear or if dished washer tips are bent

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7 - Split retaining ring

- Replace if deformed

8 - Waved washer

9 - Outer plates

- Checking for wear **Checking coated and outer plates for wear**

10 - Coated plates

- Checking for wear **Checking coated and outer plates for wear**

Checking contact surface for rectangular rings in cylinder "B" for wear

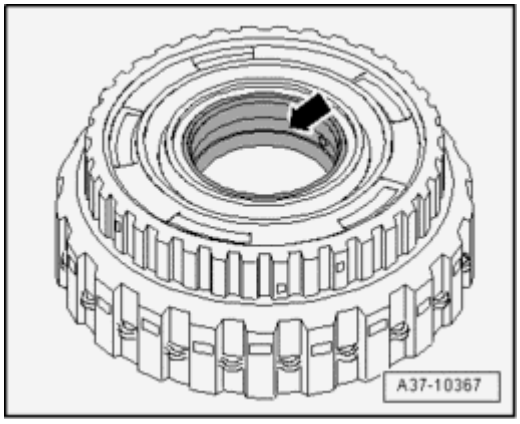


Fig. 362: Checking Contact Surface For Rectangular Rings In Cylinder For Wear
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check contact surface - **arrow** - in cylinder "B" for wear.

- Contact surface must not be heavily scored and/or show blue discoloration.

In case of deep grooves and/or blue color:

- Replace cylinder "B".
- Check rectangular rings.

If no blue discoloration and only small grooves are detected, proceed as follows:

- Sandpaper (600 grit, oiled) contact surface 1 to 2 times.
- Carefully wipe off with a clean rag and check contact surface.

- Contact surface must now be like new.

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If scores cannot be removed in this manner:

- Replace cylinder "B".

Checking freedom of movement of valve ball in piston "B"

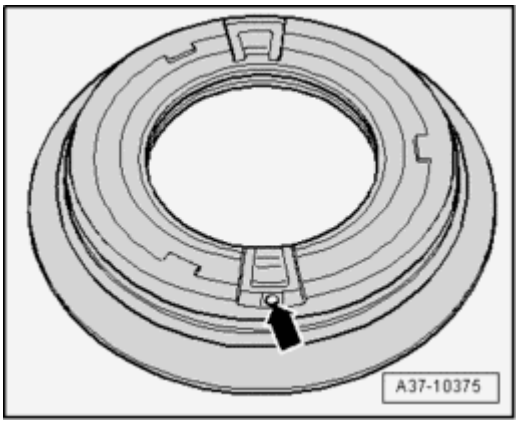


Fig. 363: Checking Freedom Of Movement Of Valve Ball In Piston "B"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lightly coat bore for valve ball - **arrow** - at front side with oil.

CAUTION: Wear eye protection.

- Charge valve ball from rear with compressed air.

- Only little ball stroke (hardly visible).
- Ball is not spring-loaded (moves back slowly).

If valve ball is stuck:

- Loosen ball with a nail or tip of a ball point pen.

If valve ball is still stuck or leaks:

- Replace piston "B".

NOTE:

- **A valve ball that does not seal properly or is stuck will cause slipping in reverse gear.**

Checking coated and outer plates for wear

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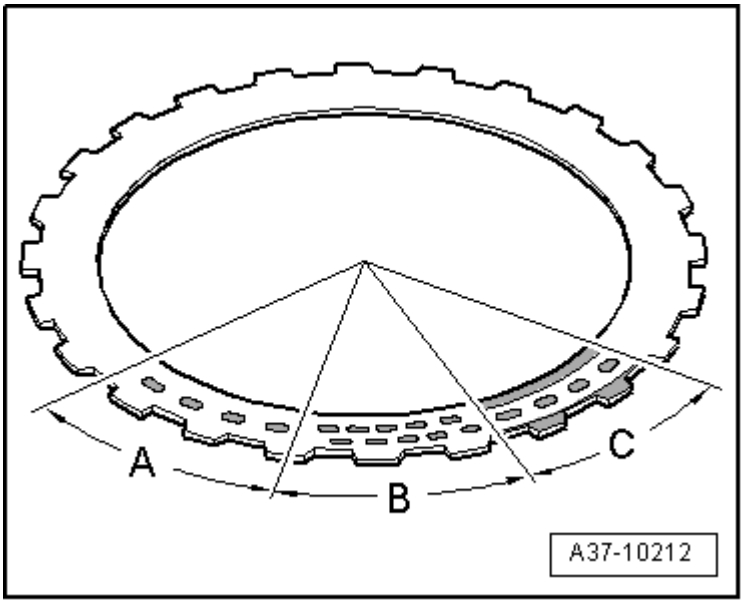


Fig. 364: Checking Coated And Outer Plate For Wear And Overheating
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Signs of overheating on outer plates point to worn coated plates. Evaluate signs of wear as follows:

A - Spots of discoloration of outer plate caused by overheating in distance of more than 20 mm: Outer and coated plates OK, can be reused.

B - Spots of discoloration of outer plate caused by overheating in distance of less than 20 mm: Outer and coated plates worn, must be replaced.

C - Tarnish blue/brown at outer and/or inner area of outer plates: Outer and coated plates overheated and worn, must be replaced.

Clutch "A"

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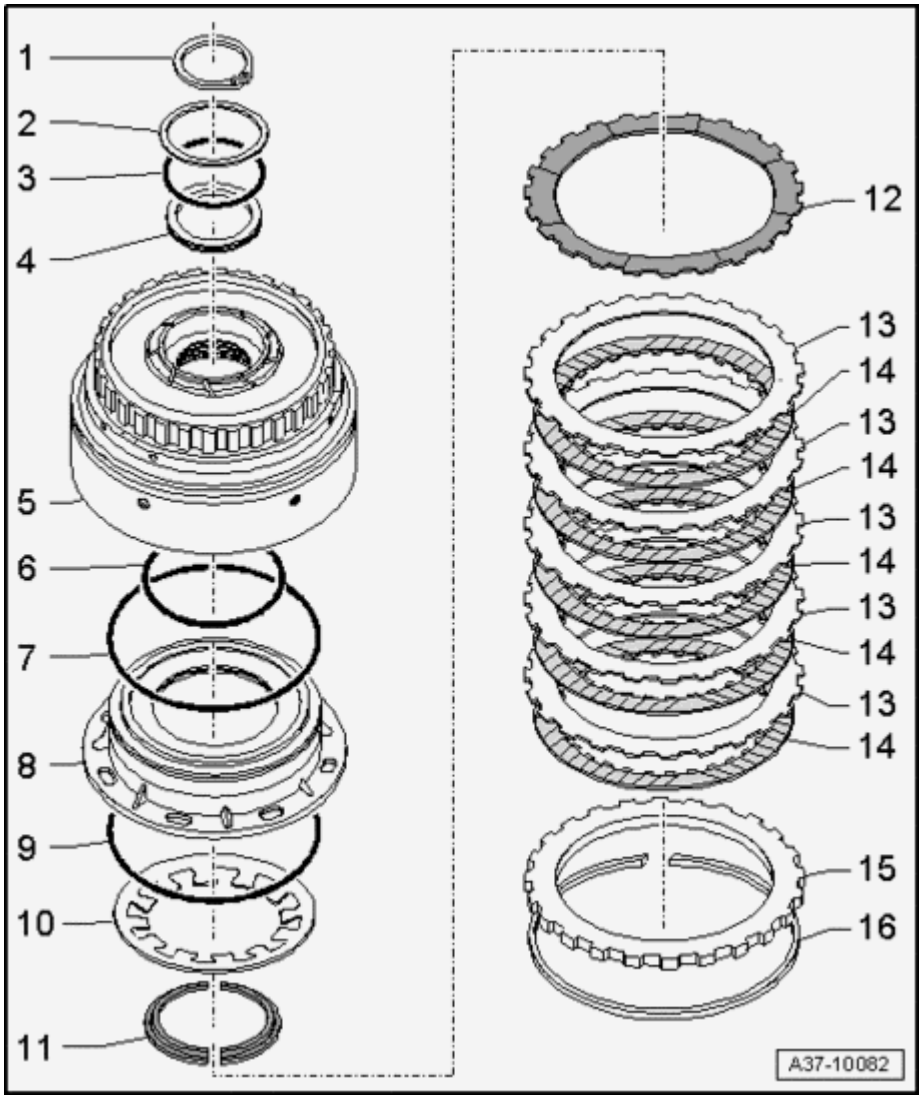


Fig. 365: Clutch "A", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

5 - Cylinder "A"

- Check for scoring from lining discs on inner circumference --> **Check cylinder "A" inner circumference for scoring from lining discs**
- Check for scoring from lining discs on outer circumference --> **Check cylinder "A" outer circumference for scoring from lining discs**
- Checking contact surface for rectangular ring in cylinder "A" for wear --> **Checking contact surface for rectangular ring in cylinder "A" for wear**
- Checking splines

10 - Plate spring

- Replace in case of signs of wear or if dished washer tips are bent

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11 - Split retaining ring

- Replace if deformed

12 - Outer plates

- Checking for wear **Checking coated and outer plates for wear**

13 - Coated plates

- Checking for wear **Checking coated and outer plates for wear**

Check cylinder "A" inner circumference for scoring from lining discs

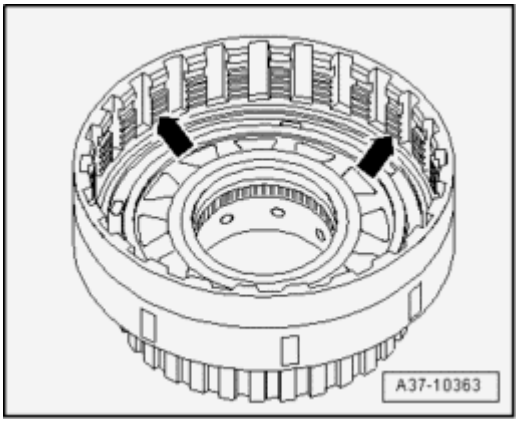


Fig. 366: Check Cylinder Inner Circumference For Scoring From Lining Discs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check cylinder "A" at inner circumference for signs of wear caused by coated plates.
- Coated plates must not get caught in scoring - **arrows** -.

If scoring - **arrows** - caused by coated plates are greater than 0.5 mm:

- Replace cylinder "A".

Check cylinder "A" outer circumference for scoring from lining discs

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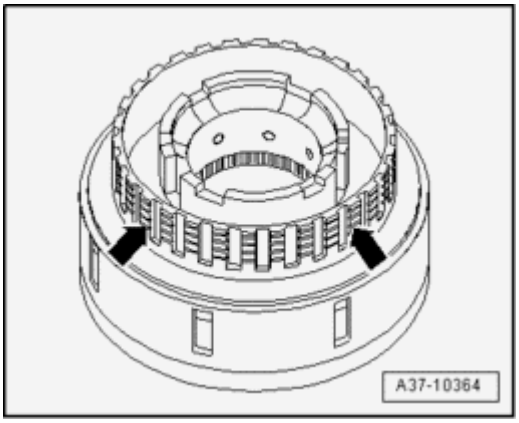


Fig. 367: Check Cylinder Outer Circumference For Scoring From Lining Discs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check cylinder "A" at outer circumference for signs of wear caused by coated plates.
- Coated plates must not get caught in scoring - **arrows** -.

If scoring - **arrows** - caused by coated plates are greater than 0.5 mm:

- Replace cylinder "A".

Checking contact surface for rectangular ring in cylinder "A" for wear

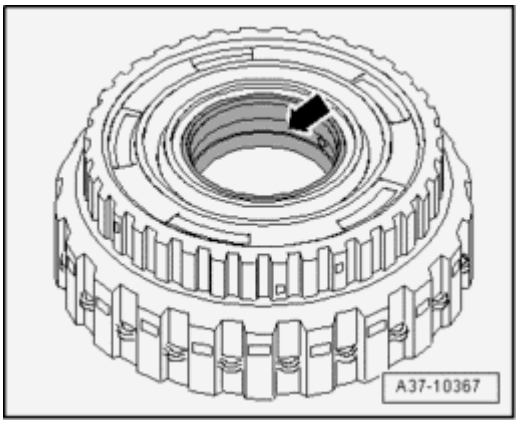


Fig. 368: Checking Contact Surface For Rectangular Rings In Cylinder For Wear
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check contact surface - **arrow** - in cylinder "A" for wear.
- Contact surface must not be heavily scored and/or show blue discoloration.

In case of deep grooves and/or blue color:

- Replace cylinder "A".

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- Check rectangular rings.

If no blue discoloration and only small grooves are detected, proceed as follows:

- Sandpaper (600 grit, oiled) contact surface 1 to 2 times.
- Carefully wipe off with a clean rag and check contact surface.

- Contact surface must now be like new.

If scores cannot be removed in this manner:

- Replace cylinder "A".

Checking coated and outer plates for wear

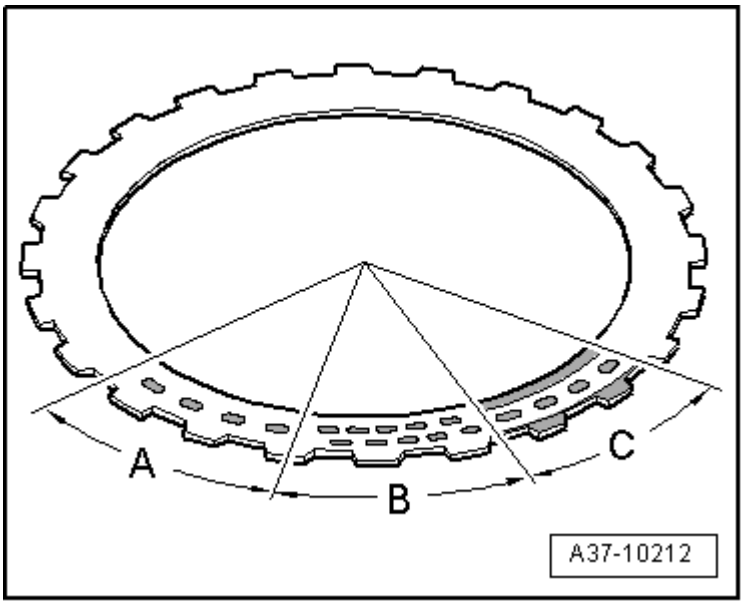


Fig. 369: Checking Coated And Outer Plate For Wear And Overheating
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Signs of overheating on outer plates point to worn coated plates. Evaluate signs of wear as follows:

A - Spots of discoloration of outer plate caused by overheating in distance of more than 20 mm: Outer and coated plates OK, can be reused.

B - Spots of discoloration of outer plate caused by overheating in distance of less than 20 mm: Outer and coated plates worn, must be replaced.

C - Tarnish blue/brown at outer and/or inner area of outer plate: Outer and coated plates seated and worn, must be replaced.

Clutch "E"

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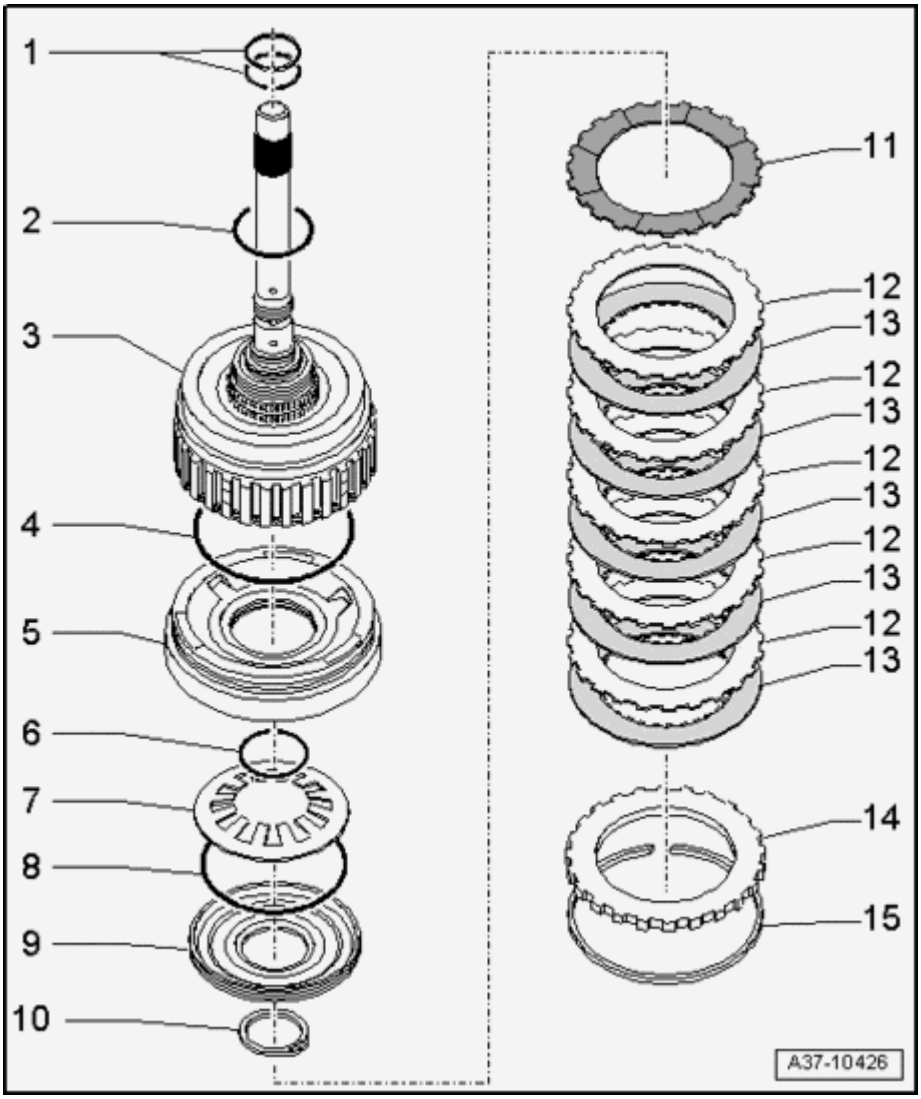


Fig. 370: Clutch "E", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Rectangular rings

- Checking for wear **Checking rectangular rings for wear**

3 - Cylinder "E"

- Checking contact surfaces of shaft and brass sleeve for wear --> **Checking contact surfaces of shaft cylinder "E" and brass sleeve for wear**
- Checking welding seam between shaft and cylinder **Checking welding seam between shaft and cylinder**
- Checking splines

7 - Plate spring

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- Replace in case of signs of wear or if dished washer tips are bent

12 - Outer plates

- Checking for wear **Checking coated and outer plates for wear**

13 - Coated plates

- Checking for wear **Checking coated and outer plates for wear**

Checking rectangular rings for wear

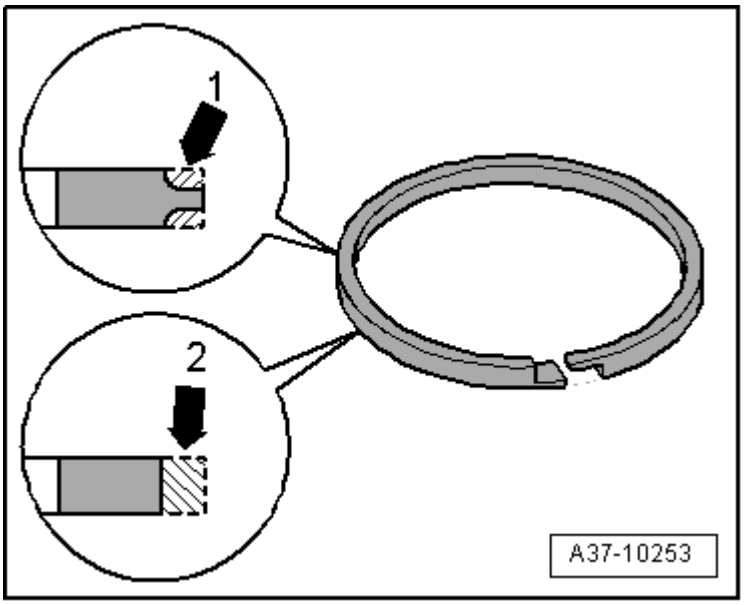


Fig. 371: Checking Rectangular Rings For Wear
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **Always replace rectangular rings. However, conclusions can be drawn from the signs of wear of the rectangular rings regarding the quality of contact surface for rectangular rings. Evaluating the rectangular rings for wear is therefore essential.**

If rectangular rings show strong axial wear - **arrow 1** - (slight wear of outer edges is normal):

- Replace cylinder "E".

If rectangular rings show strong radial wear of more than 0.3 mm - **arrow 2** - (for comparison, measure thickness of new rectangular ring):

- Replace stator shaft.

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NOTE:

- **If rectangular rings are worn, converter clutch is possibly worn out because contact pressure is too low.**

Checking contact surfaces of shaft cylinder "E" and brass sleeve for wear

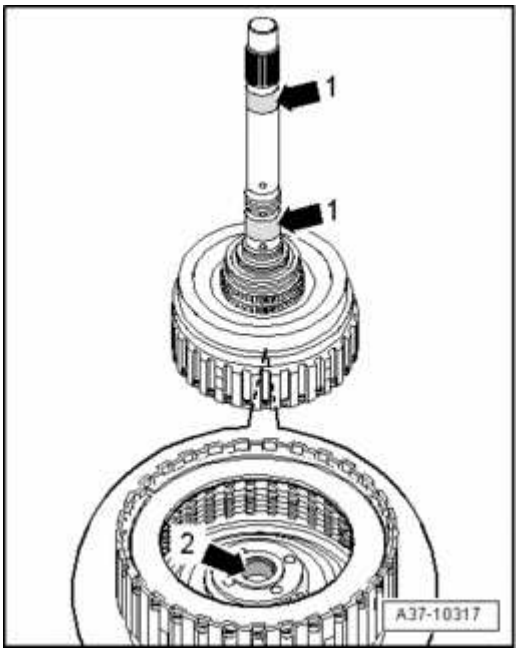


Fig. 372: Checking Contact Surfaces Of Shaft Cylinder "E" And Brass Sleeve For Wear
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check contact surfaces of brass sleeve - **arrow 2** - at inside of shaft and contact surfaces at outer circumference - **arrows 1** - for wear.

- Contact surfaces must not be heavily scored and/or show blue discoloration.

In case of deep grooves and/or blue color:

- Replace cylinder "E".

If no blue discoloration and only small grooves are detected, proceed as follows:

- Sandpaper (600 grit, oiled) contact surface 1 to 2 times.
- Carefully wipe off with a clean rag and check contact surface.

- Contact surfaces must now be like new.

If scores cannot be removed in this manner:

- Replace cylinder "E".

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Checking welding seam between shaft and cylinder

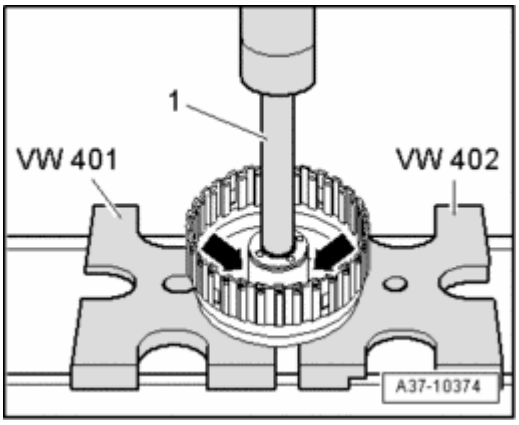


Fig. 373: Checking Welding Seam Between Shaft And Cylinder
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check seal of welding seam between shaft and cylinder "E" , place shaft under friction press with plastic piece - **1** - in between and charge shaft with very little force.

If shaft is loose or a crack is visible in the area marked with - **arrows** - :

- Replace cylinder "E".

NOTE:

- **If cylinder "E" is not properly sealed, there will be shifting from 4th to 5th gear.**

Checking coated and outer plates for wear

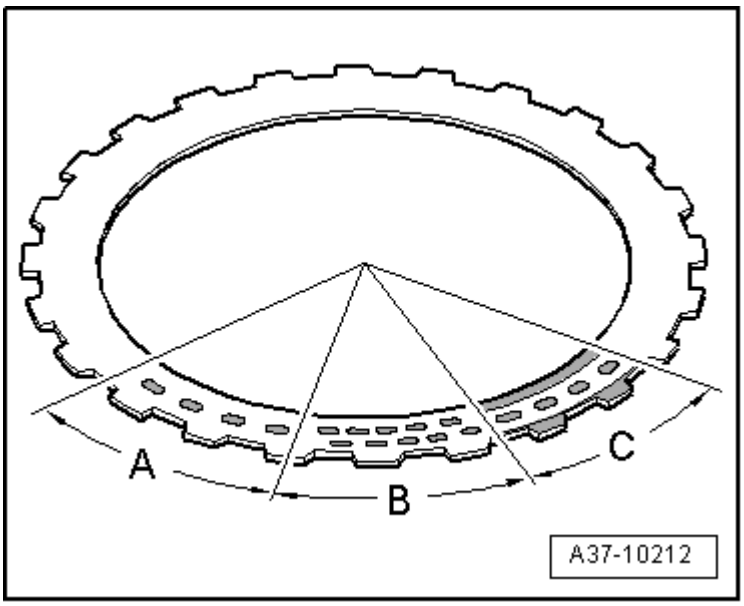


Fig. 374: Checking Coated And Outer Plate For Wear And Overheating

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

Signs of overheating on outer plates point to worn coated plates. Evaluate signs of wear as follows:

A - Spots of discoloration of outer plate caused by overheating in distance of more than 20 mm: Outer and coated plates OK, can be reused.

B - Spots of discoloration of outer plate caused by overheating in distance of less than 20 mm: Outer and coated plates worn, must be replaced.

C - Tarnish blue/brown at outer and/or inner area of outer plate: Outer and coated plates overheated and worn, must be replaced.

Clutch "C"

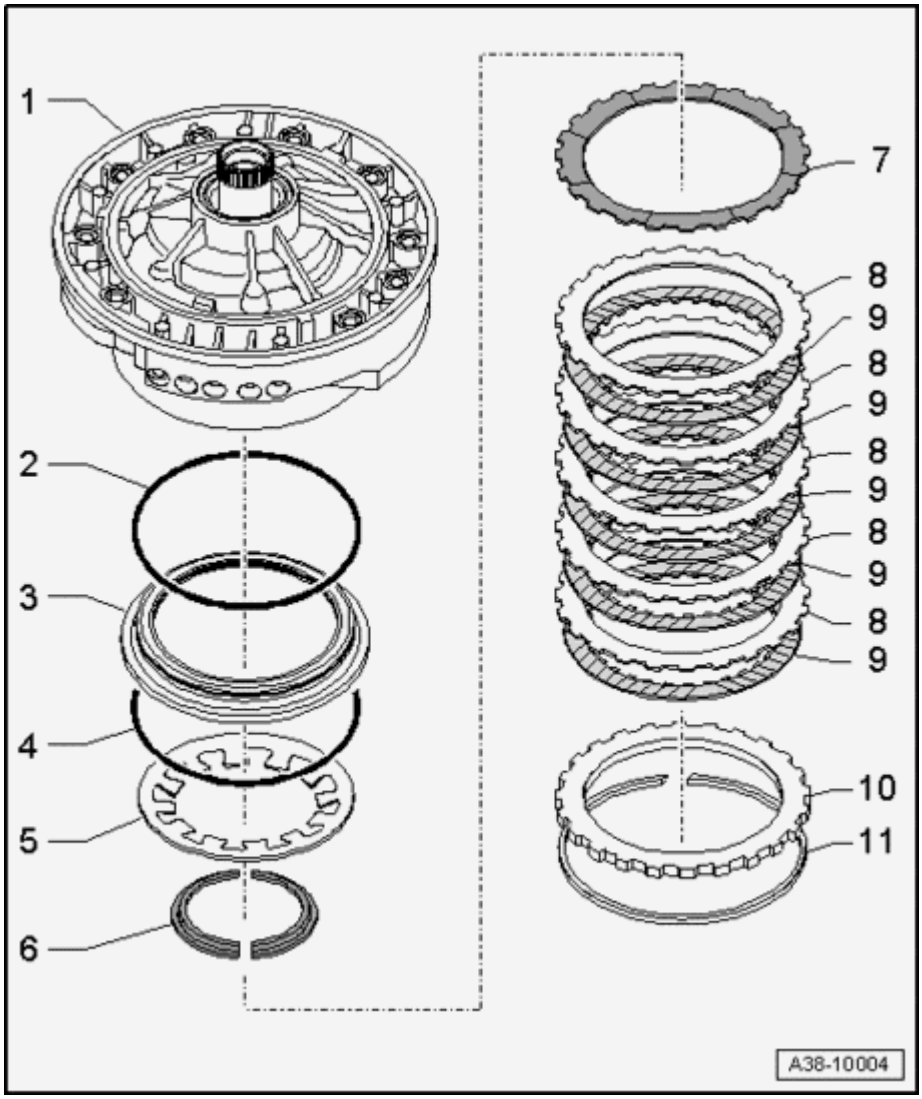


Fig. 375: Clutch "C", Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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1 - ATF pump with outer plate carrier "C"

- Check inner splines for scoring from lining discs --> **Check inner splines on ATF pump with outer disc carrier "C" for scoring from lining discs**

5 - Plate spring

- Replace in case of signs of wear or if dished washer tips are bent

6 - Split retaining ring

- Replace if deformed

8 - Coated plates

- Checking for wear **Checking coated and outer plates for wear**

9 - Outer plates

- Checking for wear **Checking coated and outer plates for wear**

Check inner splines on ATF pump with outer disc carrier "C" for scoring from lining discs

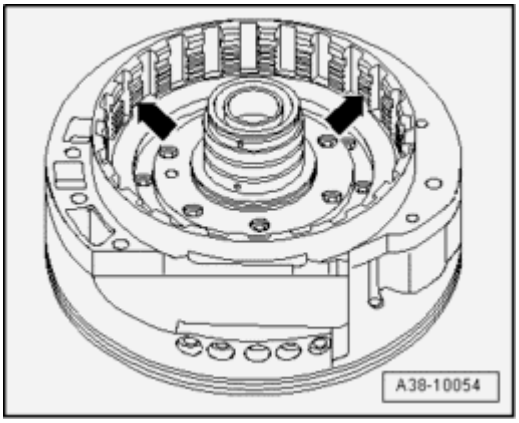


Fig. 376: Check Inner Splines On ATF Pump With Outer Disc Carrier "C" For Scoring From Lining Discs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check inner splines for signs of wear caused by coated plates.
- Coated plates must not get caught in scoring - **arrows** -.

If scoring - **arrows** - caused by coated plates are greater than 0.5 mm:

- Replace outer plate carrier "C".

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Checking coated and outer plates for wear

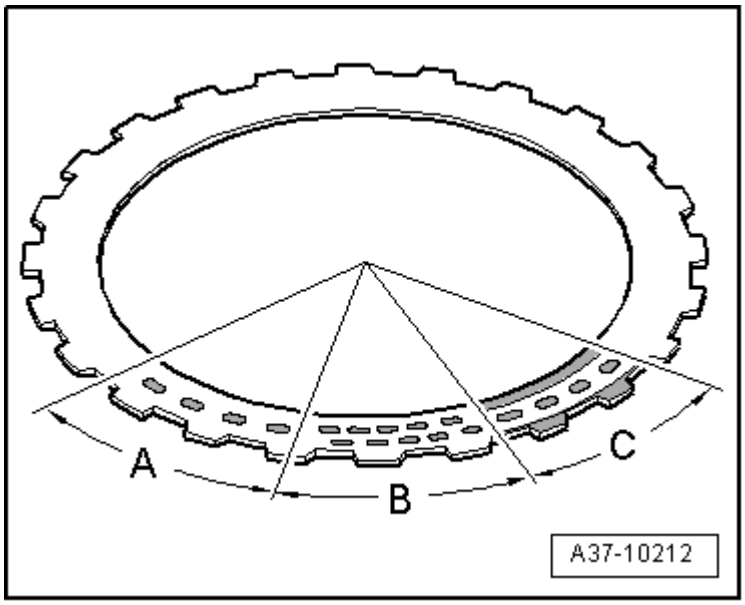


Fig. 377: Checking Coated And Outer Plate For Wear And Overheating
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Signs of overheating on outer plates point to worn coated plates. Evaluate signs of wear as follows:

A - Spots of discoloration of outer plate caused by overheating in distance of more than 20 mm: Outer and coated plates OK, can be reused.

B - Spots of discoloration of outer plate caused by overheating in distance of less than 20 mm: Outer and coated plates worn, must be replaced.

C - Tarnish blue/brown at outer and/or inner area of outer plate: Outer and coated plates overheated and worn, must be replaced.

ATF supply

CAUTION: Only the same versions of ATF pump and ATF supply may be used - they are recognized by aligning oil bores. If versions are mixed, ATF pump can not build up pressure.

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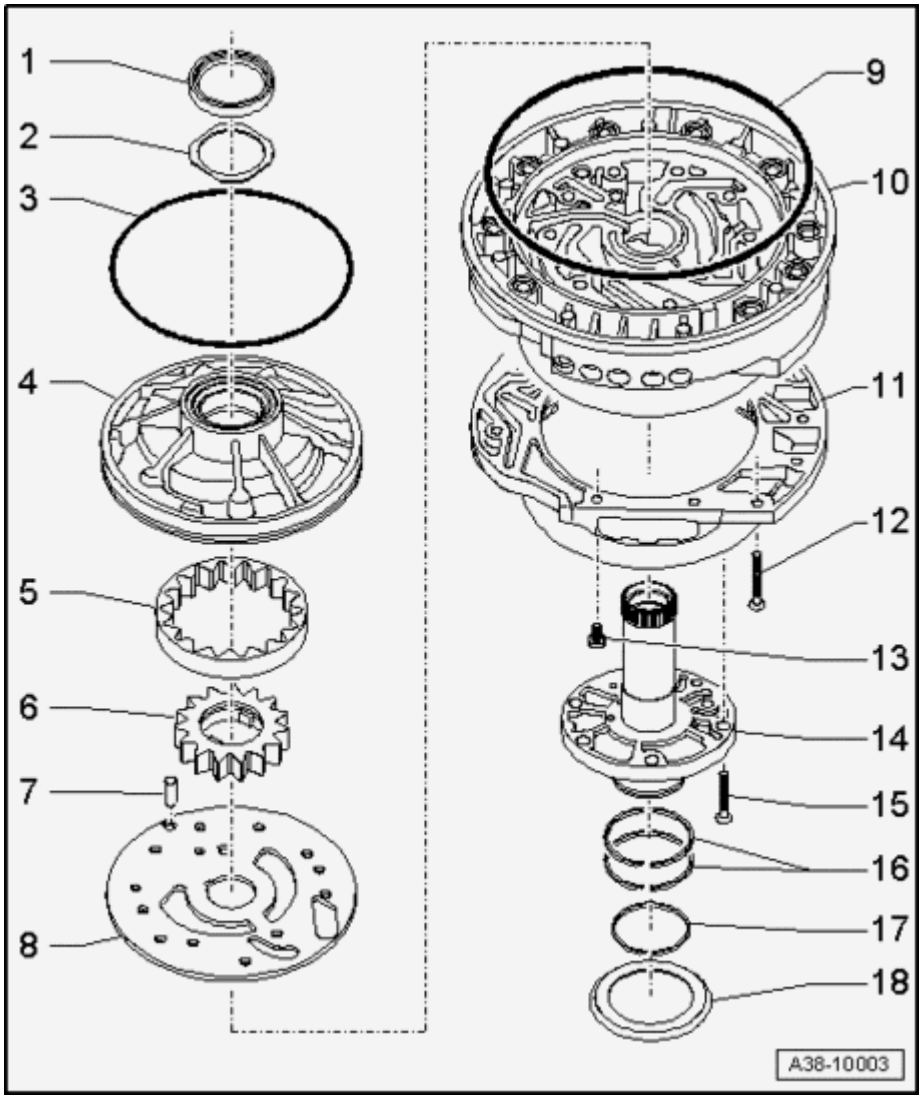


Fig. 378: ATF Pump, Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

2 - Locking washer

- Checking for deformation

4 - ATF pump housing

- Checking contact surfaces for grooves and signs of wear **Checking components of ATF pump for grooves and signs of wear**
- Checking brass sleeve for wear **Checking brass sleeve of ATF pump housing for wear**

5 - Ring gear

- Checking contact surfaces for grooves and signs of wear **Checking components of ATF pump for**

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grooves and signs of wear

6 - ATF pump wheel

- Checking contact surfaces for grooves and signs of wear **Checking components of ATF pump for grooves and signs of wear**
- Check yoke in ATF pump wheel **Check yoke in ATF pump wheel**

8 - Intermediate panel

- Checking contact surfaces for grooves and signs of wear **Checking components of ATF pump for grooves and signs of wear**

10 - ATF supply

- Checking volume controlling valve of ATF pump for freedom of movement **Checking volume controlling valve in ATF pump**

14 - Stator shaft

- Checking brass sleeves for wear **Checking brass sleeves of stator shaft for wear**
- Checking splines for wear

16 - Rectangular rings for clutch "B"

- Checking for wear --> **Checking rectangular rings item - 16 - for wear**

17 - Rectangular ring for clutch "A"

- Checking for wear --> **Checking rectangular ring item - 17 - for wear**

18 - Axial needle bearing

- Perform visual check for damage: Axial needle bearing and their contact surfaces must be like new, replace if necessary

Checking brass sleeve of ATF pump housing for wear

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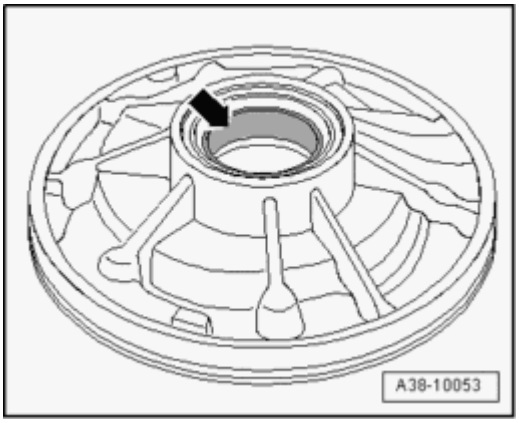


Fig. 379: Identifying Brass Sleeve
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check contact surface of brass sleeve - **arrow** - for wear.

- Contact surface must not be heavily scored and/or show blue discoloration.

In case of deep grooves and/or blue color:

- Replace ATF pump.

If no blue discoloration and only small grooves are detected, proceed as follows:

- Sandpaper (600 grit, oiled) contact surface 1 to 2 times.
- Carefully wipe off with a clean rag and check contact surface.

- Contact surface must now be like new.

If scores cannot be removed in this manner:

- Replace ATF pump.

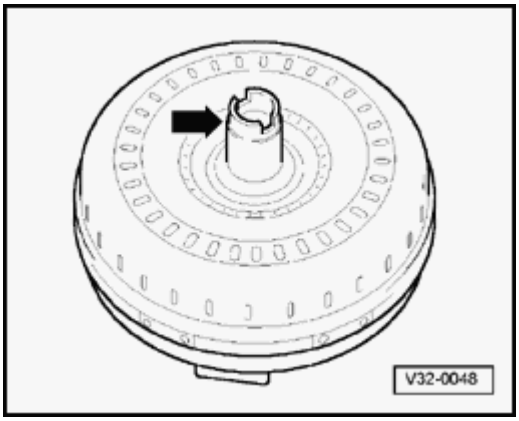


Fig. 380: Inspect Torque Converter Hub For Irregular Grooves

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check torque converter hub - **arrow** - for wear.

If wear on torque converter can be recognized:

- Replace torque converter.

Checking components of ATF pump for grooves and signs of wear

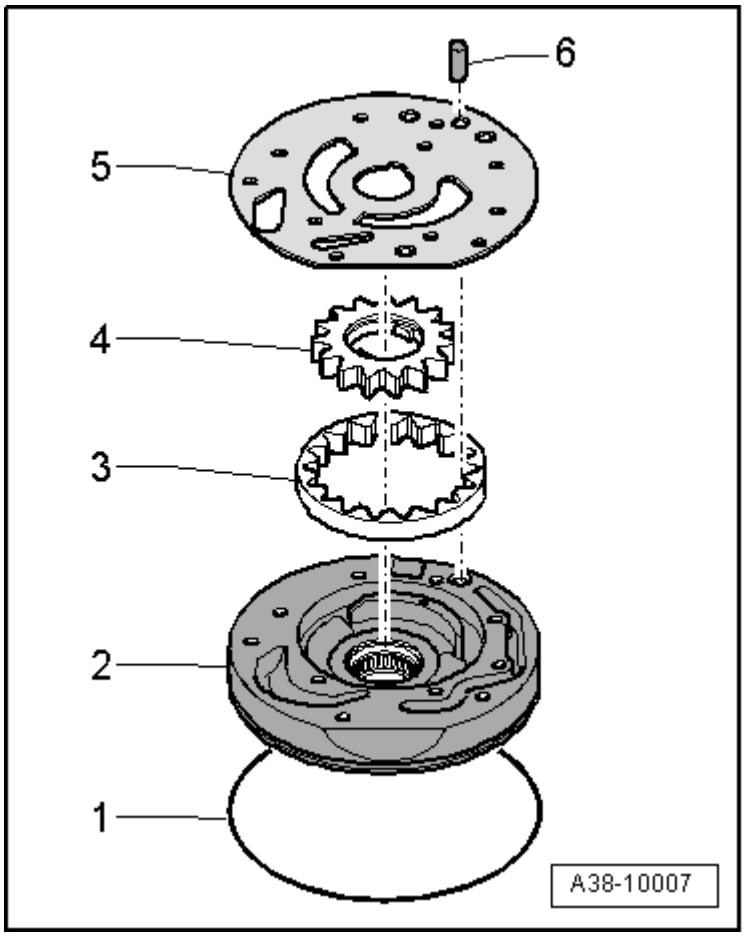


Fig. 381: ATF Pump Component, Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check contact surfaces of the following components for grooves and signs of wear:

2 - ATF pump housing

3 - Ring gear

4 - ATF pump wheel

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5 - Intermediate panel

- Surfaces of contact surfaces must be matt or shiny but without any sign of groove.

NOTE:

- **A malfunctioning ATF pump will cause delays in drive and shifting procedures.**

Check yoke in ATF pump wheel

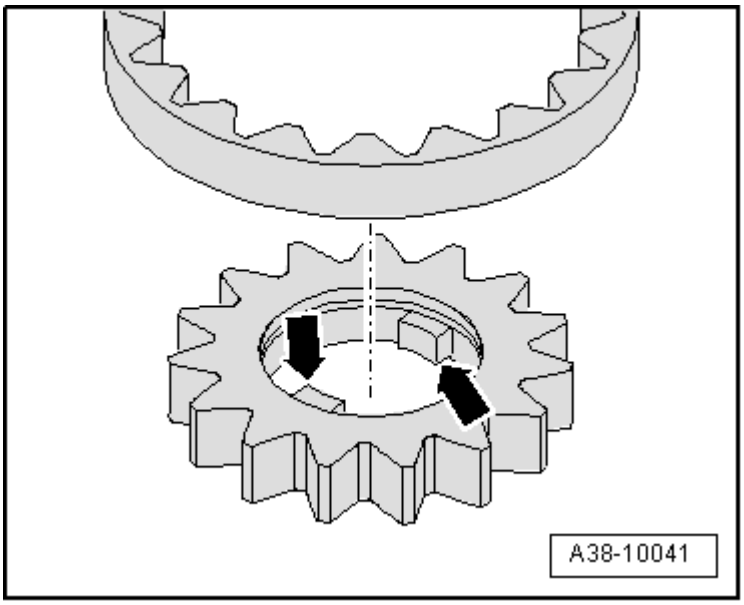


Fig. 382: Identifying ATF Pump Wheel Coupling Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check whether coupling plates - **arrows** - on ATF pump wheel show pressure marks or are broken off, replace ATF pump if necessary.

Causes:

A - Torque converter not completely inserted during transmission or engine installation

B - Centering sleeve for torque converter not inserted in crankshaft

CAUTION: Always check for broken coupling plates and remove.

Checking volume controlling valve in ATF pump

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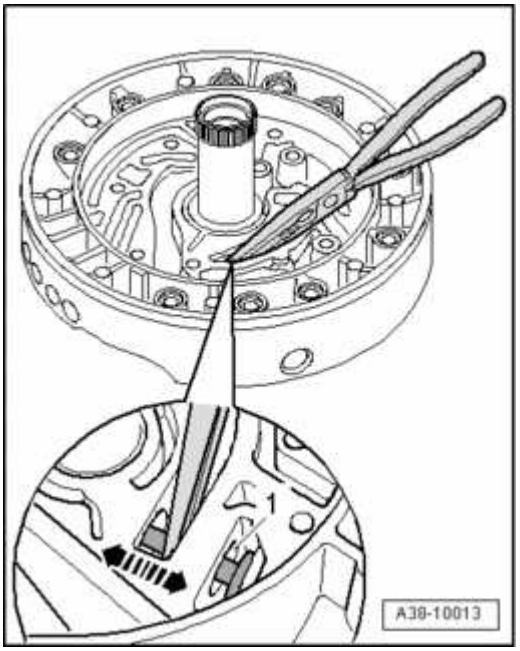


Fig. 383: Checking Volume Controlling Valve In ATF Pump
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Check volume controlling valve as follows:

- Move valve piston against spring pressure.

- Valve piston must move freely in both directions of movement - **arrow** -.
- Valve must not have grooves.
- No shavings must be jammed in opening - **1** -.

NOTE:

- **If valve piston is stuck or opening - 1 - is plugged, there will possibly be no actuation.**

Checking brass sleeves of stator shaft for wear

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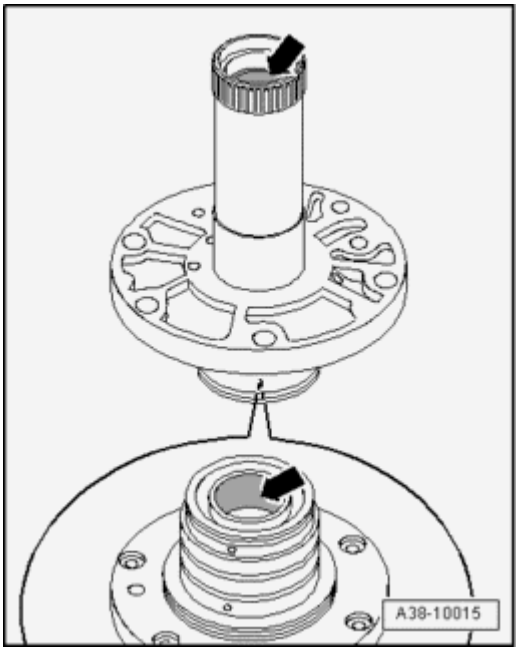


Fig. 384: Checking Brass Sleeves Of Stator Shaft For Wear
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check contact surfaces of brass sleeves - **arrows** - at inside of stator shaft for wear.

- Contact surfaces must not be heavily scored and/or show blue discoloration.

In case of deep grooves and/or blue color:

- Replace stator shaft.

If no blue discoloration and only small grooves are detected, proceed as follows:

- Sandpaper (600 grit, oiled) contact surface 1 to 2 times.
- Carefully wipe off with a clean rag and check contact surface.

- Contact surfaces must now be like new.

If scores cannot be removed in this manner:

- Replace stator shaft.

Checking rectangular rings item - 16 - for wear

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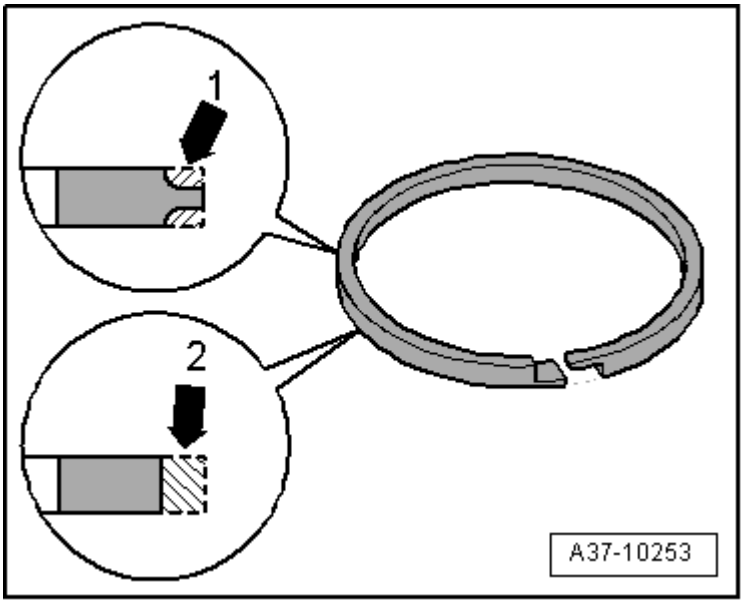


Fig. 385: Checking Rectangular Rings For Wear
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **Always replace rectangular rings. However, conclusions can be drawn from the signs of wear of the rectangular rings regarding the quality of contact surface for rectangular rings. Evaluating the rectangular rings for wear is therefore essential.**

If rectangular rings show strong axial wear of more than 0.3 mm - **arrow 1** - (slight wear of outer edges is normal):

- Replace stator shaft.

If rectangular rings show strong radial wear of more than 0.3 mm - **arrow 2** - (for comparison, measure thickness of new rectangular ring):

- Replace cylinder "B".

Checking rectangular ring item - 17 - for wear

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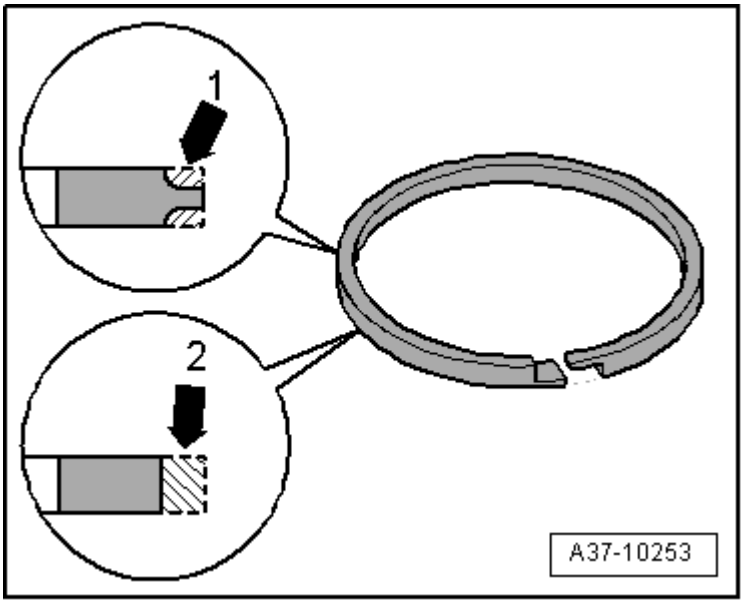


Fig. 386: Checking Rectangular Rings For Wear
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **Always replace rectangular ring. However, conclusions can be drawn from the signs of wear of the rectangular ring regarding the quality of contact surface for rectangular rings. Evaluating the rectangular ring for wear is therefore essential.**

If rectangular ring shows strong axial wear of more than 0.3 mm - **arrow 1** - (slight wear of outer edges is normal):

- Replace stator shaft.

If rectangular ring shows strong radial wear of more than 0.3 mm - **arrow 2** - (for comparison, measure thickness of new rectangular ring):

- Replace cylinder "A".

39 - FINAL DRIVE, DIFFERENTIAL

FRONT FINAL DRIVE AND TRANSFER CASE, SERVICING

Front final drive and transfer case, servicing

NOTE:

- **General repair notes --> General Repair Notes .**
- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**

Transfer case with Torsen differential, removing and installing

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Transfer case with Torsen differential, removing and installing --> **39 - FINAL DRIVE, DIFFERENTIAL** .

Front final drive and transfer case, component overview

NOTE:

- **Components shown in illustration can be removed with transmission installed.**

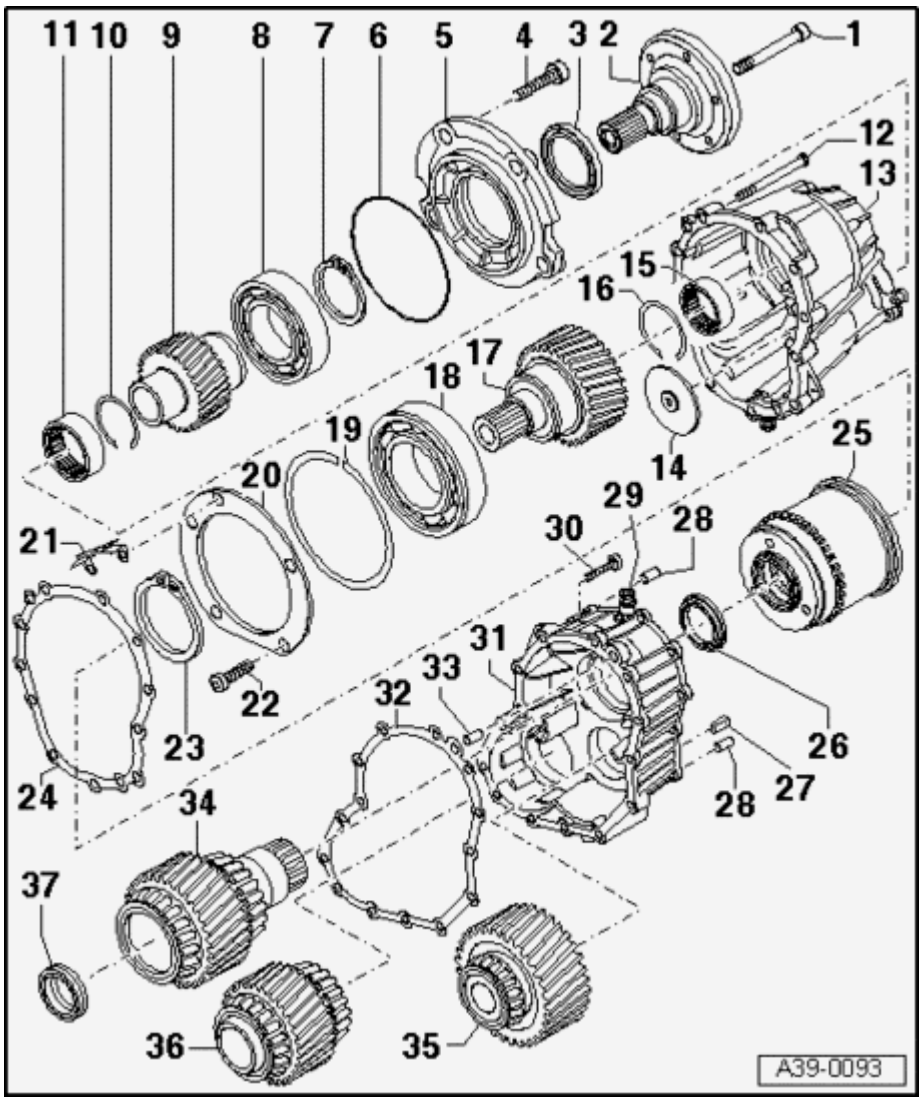


Fig. 387: Front Final Drive And Transfer Case, Component Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Internal hex bolt, 25 Nm

2 - Driveshaft output flange

3 - Shaft seal

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- Replace --> **39 - FINAL DRIVE, DIFFERENTIAL**

4 - Bolt, 23 Nm

- Qty. 4

5 - Housing cover

6 - O-ring

- Coat with axle oil

7 - Circlip

8 - Grooved ball bearing

- For spur gear 1
- Pressing off **Pressing off grooved ball bearing for spur gear 1**
- Pressing on **Pressing on grooved ball bearing for spur gear 1**

9 - Spur gear 1

- For rear ring and pinion set

10 - Circlip

11 - Needle bearing

- For spur gear 1
- Remove only to replace
- To replace transfer case housing, warm to approx. 100° C and drive needle bearing with drift towards rear (Attention! Wear protective gloves)
- Drive in with Sleeve 30-21 to stop

12 - Bolt, 23 Nm

- Loosen or tighten diagonally

13 - Transfer case housing

- Can be replaced if damaged

14 - Clamping nut

15 - Needle bearing

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- Remove only to replace
- Replace --> **Needle bearing for spur gear 2, replacing**

16 - Circlip

17 - Spur gear 2

- For rear ring and pinion set

18 - Grooved ball bearing

- For spur gear 2
- Pressing off **Pressing off grooved ball bearing for spur gear 2**
- Pressing on **Pressing on grooved ball bearing for spur gear 2**

19 - Circlip

20 - Fastening plate

21 - Guide plate

22 - Bolt, 8 Nm

23 - Circlip

24 - Gasket

- Replace --> **39 - FINAL DRIVE, DIFFERENTIAL**

25 - Torsen differential

- Replace complete unit if damaged
- Removing and installing --> **39 - FINAL DRIVE, DIFFERENTIAL**

26 - Shaft seal

- Replace --> **Shaft seal in front final drive intermediate flange, replacing**

27 - Magnet

- Replacing --> **39 - FINAL DRIVE, DIFFERENTIAL**

28 - Alignment bushing

- Qty. 2

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29 - Bleeder

- For transfer case
- With attached cover
- Installation position: Without cover, breather must project 10 to 11 mm out of housing

30 - Bolt, 23 Nm

- Loosen and tighten diagonally

31 - Intermediate flange for front final drive

- Removing and installing --> **39 - FINAL DRIVE, DIFFERENTIAL**

32 - Gasket

- Replace --> **39 - FINAL DRIVE, DIFFERENTIAL**

33 - Alignment bushing

34 - Drive pinion

- For front final drive
- Removing and installing --> **Shaft seal in drive pinion, replacing**

35 - Intermediate pinion

- For front final drive
- Installation position: gear identification faces toward differential

36 - Pinion gear

- For front final drive
- Installation position: gear identification faces toward differential

37 - Shaft seal

- Replace --> **Shaft seal in drive pinion, replacing**

Pressing off grooved ball bearing for spur gear 1

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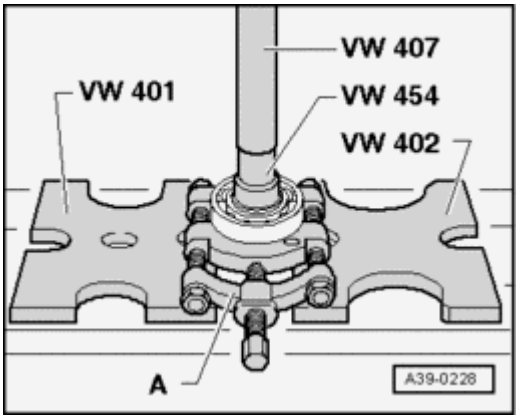


Fig. 388: Pressing Off Grooved Ball Bearing For Spur Gear 1
Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Separating device 22 to 115 mm Kukko 17/2

Pressing on grooved ball bearing for spur gear 1

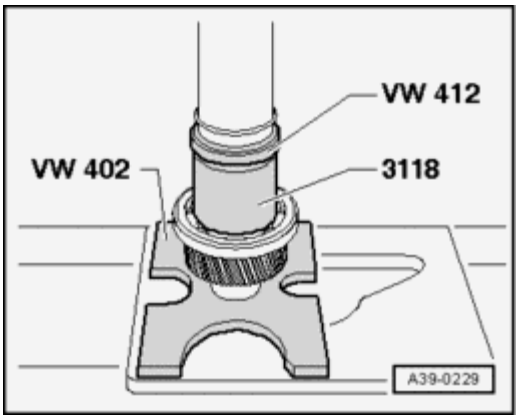
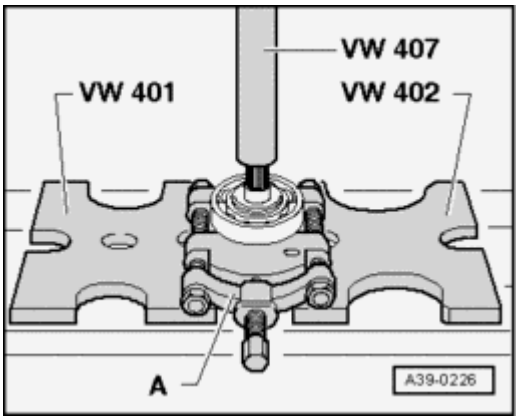


Fig. 389: Pressing On Grooved Ball Bearing For Spur Gear 1
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Pressing off grooved ball bearing for spur gear 2



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Fig. 390: Pressing Off Grooved Ball Bearing For Spur Gear 2
Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Separating device 22 to 115 mm Kukko 17/2

Pressing on grooved ball bearing for spur gear 2

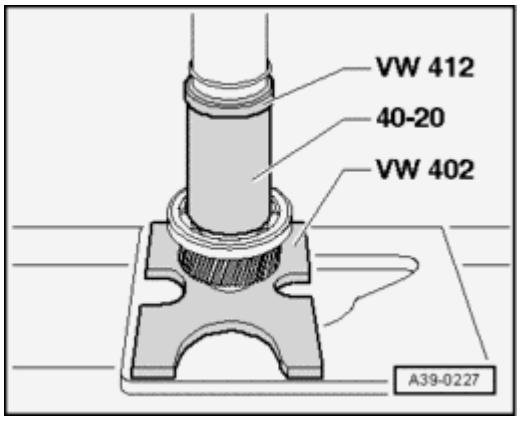


Fig. 391: Pressing On Grooved Ball Bearing For Spur Gear 2
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Driveshaft output flange shaft seal, replacing

Replace driveshaft output flange shaft seal --> **39 - FINAL DRIVE, DIFFERENTIAL** .

Shaft seal in front final drive intermediate flange, replacing

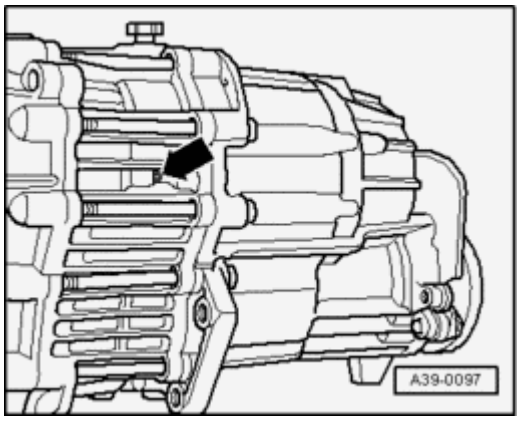


Fig. 392: Oil Leak Inspection Opening For Shaft Seal In Drive Pinion And Shaft Seal In Intermediate Flange
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **On the left side of the final drive intermediate flange there is an oil leak inspection opening - arrow - for shaft seal in drive pinion and shaft seal in front final drive intermediate flange.**

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Work procedure

- Remove transfer case --> **39 - FINAL DRIVE, DIFFERENTIAL** .
- Remove front final drive intermediate flange --> **39 - FINAL DRIVE, DIFFERENTIAL** .

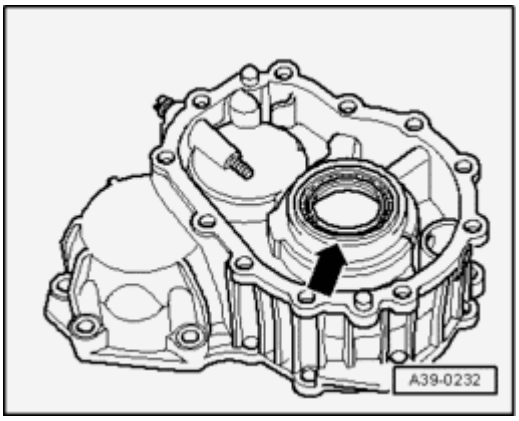


Fig. 393: Identifying Drive Shaft Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive shaft seal - **arrow** - out in toward transfer case using a drift.
- Check shaft seal seating in front final drive intermediate flange for damage, rework if necessary.

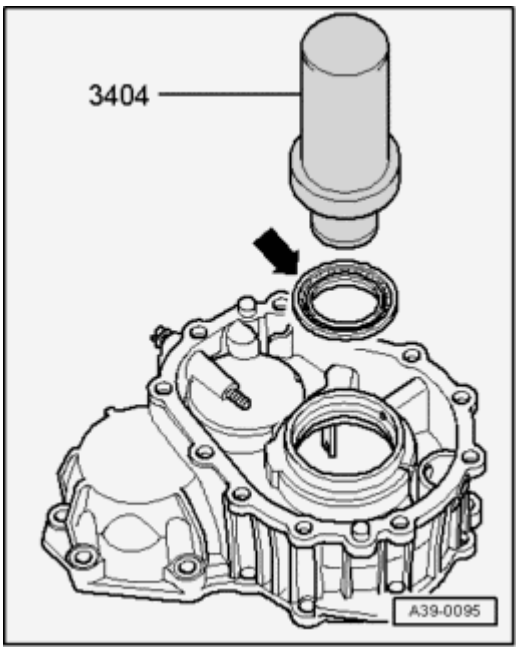


Fig. 394: Slide Shaft Seal Onto Thrust Piece 3404
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide shaft seal onto Thrust Piece 3404.

- The larger, projecting outer race - **arrow** - on shaft seal faces toward thrust piece.

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- Drive shaft seal in with Thrust Piece 3404 as far as thrust piece stop.
- Install front final drive intermediate flange --> **39 - FINAL DRIVE, DIFFERENTIAL** .
- Install transfer case --> **39 - FINAL DRIVE, DIFFERENTIAL** .
- Check and correct ATF level in planetary gearing --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .

Shaft seal in drive pinion, replacing

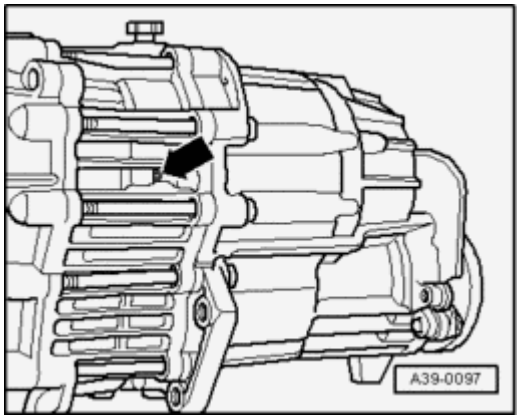


Fig. 395: Oil Leak Inspection Opening For Shaft Seal In Drive Pinion And Shaft Seal In Intermediate Flange
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **On the left side of the intermediate shaft, there is an oil leak inspection opening - arrow - for shaft seal in drive pinion and shaft seal in intermediate flange.**

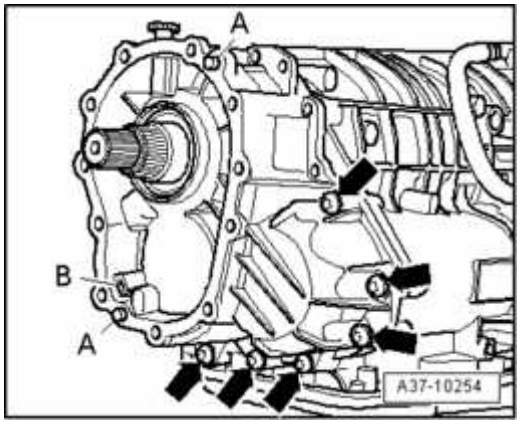


Fig. 396: Identifying Intermediate Flange For Front Final Drive Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Work procedure

- Remove transfer case --> **39 - FINAL DRIVE, DIFFERENTIAL** .

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- Remove front final drive intermediate flange --> **39 - FINAL DRIVE, DIFFERENTIAL** .

CAUTION:

- **Intermediate pinion - 1 - and pinion gear - 3 - must be reinserted in the same position to maintain running direction.**

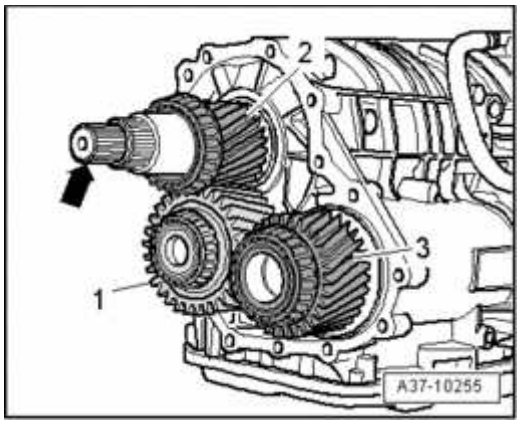


Fig. 397: Identifying Intermediate Pinion, Drive Pinion, And Pinion Gears, and Input Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Mark installation position of intermediate pinion - **1** - and pinion gear - **3** -.
- Remove pinion gear together with intermediate pinion, while doing so pull drive pinion - **2** - slightly toward rear.
- Remove drive pinion - **2** -.
- Drive out shaft seal with a drift.

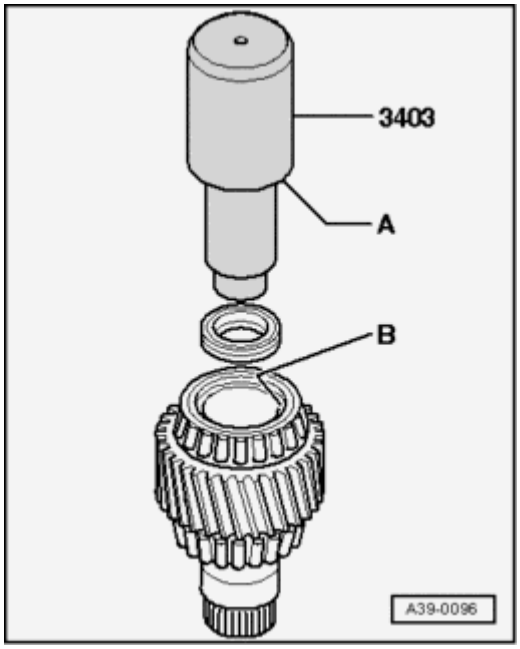


Fig. 398: Installing Driveshaft Seal

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide shaft seal onto Thrust Piece 3403.
- Drive shaft seal in with Thrust Piece 3403 as far as thrust piece stop.

NOTE:

- **Ignore - A - and - B -.**

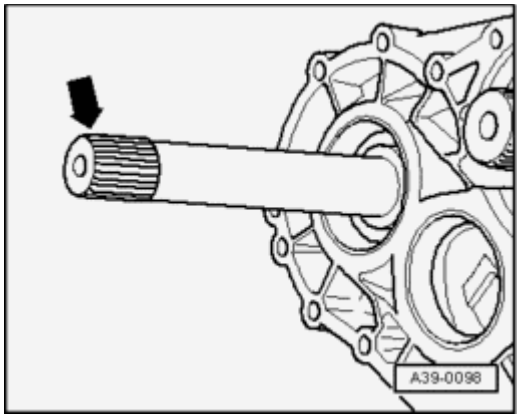


Fig. 399: Identifying Input Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Completely cover splines on input shaft - **arrow** - with insulating tape without creasing or overlapping the tape to prevent damage to gasket when sliding on drive pinion.
- Install front final drive intermediate flange --> **39 - FINAL DRIVE, DIFFERENTIAL** .
- Install transfer case --> **39 - FINAL DRIVE, DIFFERENTIAL** .
- Check and correct ATF level in planetary gearing --> **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** .

Needle bearing for spur gear 2, replacing

Work procedure

- Remove transfer case --> **39 - FINAL DRIVE, DIFFERENTIAL** .

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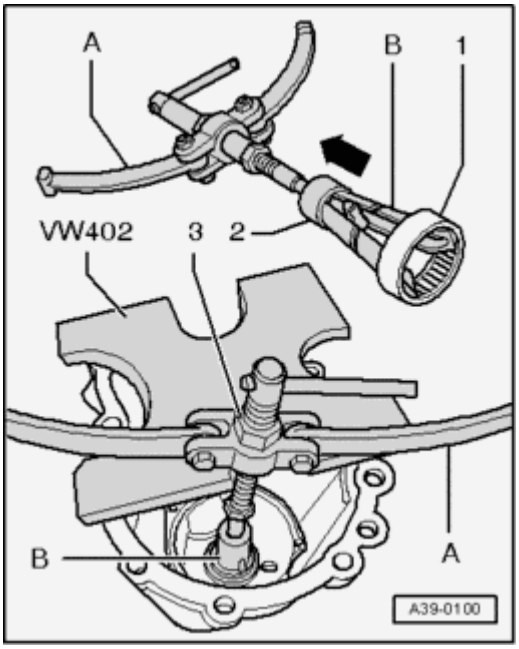


Fig. 400: Needle Bearing For Spur Gear 2, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **The upper part of the illustration illustrates how the pulling hooks of the extractor - B - must be installed in the needle bearing - 1 -.**

A - Counter support Kukko 22/1

B - Internal puller Kukko 21/4

- Slide centering sleeve - **2** - on Internal Puller Kukko 21/4 - **B** - approx. 4 mm in direction of - **arrow** - in order to be able to open the pulling hooks far enough.
- Spread extractor - **B** - into upper lip of needle bearing - **1** - and secure extractor at nut.
- Install Counter-support Kukko 22/1 - **A** - on internal puller - **B** - as show in the illustration.
- Support counter-support with Thrust Plate VW 402 and tension at counter-support nut - **3** -.

CAUTION: Wear protective gloves!

- Quickly warm outside of transfer case housing with a hot air gun in area around needle bearing seat to approx. 100° C.
- Quickly remove needle bearing.
- Check needle bearing seating in transfer case housing for damage, rework if necessary.

CAUTION: Wear protective gloves!

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- Evenly warm outside of transfer case housing with a hot air gun in area around needle bearing seat to approx. 100° C.

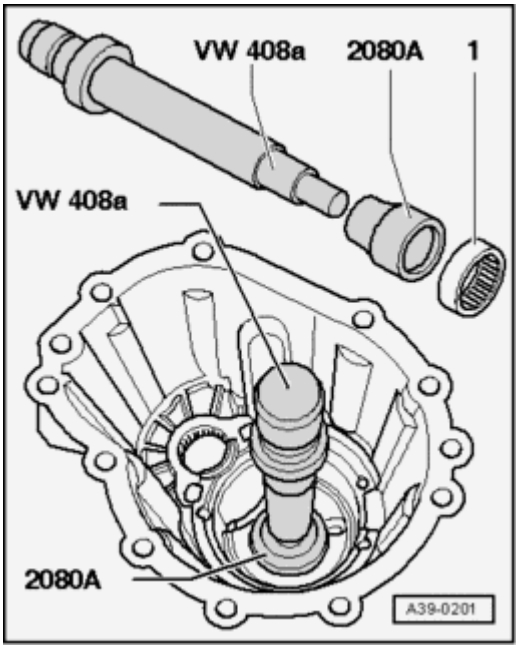


Fig. 401: Sleeve 2080 A Positioned On New Needle Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Position Sleeve 2080 A on new needle bearing - **1** -.
- Drive needle bearing into transfer case housing as far as stop using Punch VW 408 A.
- Install transfer case --> **39 - FINAL DRIVE, DIFFERENTIAL** .

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32 - TORQUE CONVERTER

TORQUE CONVERTER

Torque converter

CAUTION: Check installation dimension of torque converter before installing transmission --> Torque converter, installing

NOTE:

- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**
- **General repair notes --> Servicing notes.**
- **Lightly coat sealing ring with ATF. Other lubricating substances lead to functional problems in the hydraulic transmission control.**

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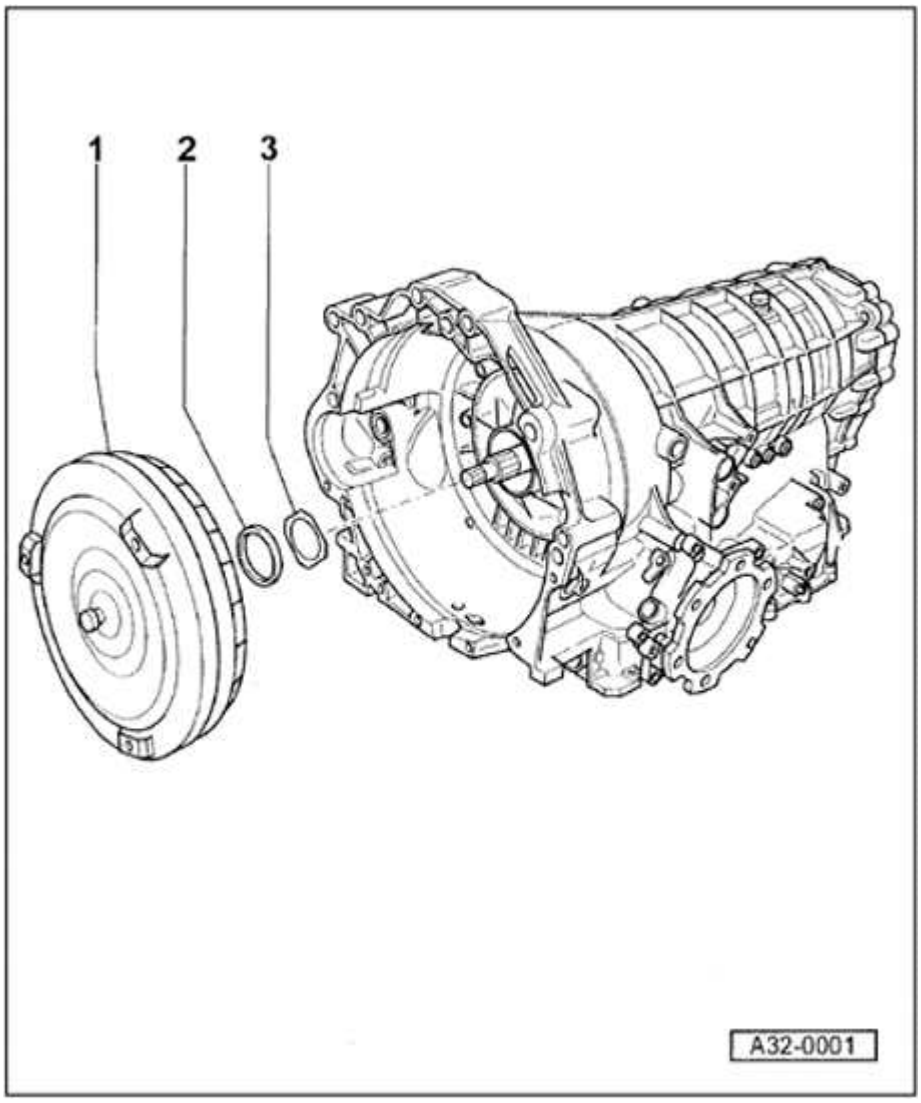


Fig. 8: Identifying Torque Converter, Seal & Contact Ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Torque converter

- Secure on removed transmission to keep it from falling out.
- Identification --> **Torque converter, identification**
- Installing --> **Torque converter, installing**

2 - Seal

- Always replace --> **Torque converter oil seal, replacing**

3 - Contact ring

- Behind sealing ring

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- Replace if damaged

Torque converter, identification

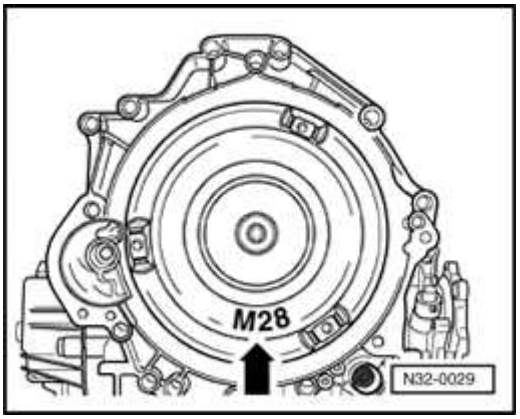


Fig. 9: Torque Converter, Identification
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Different types of torque converters exist. Identification is performed via code letters (arrow).

Allocation of torque converter/transmission --> **Code letters, allocation, ratios, equipment**.

Torque converter, checking

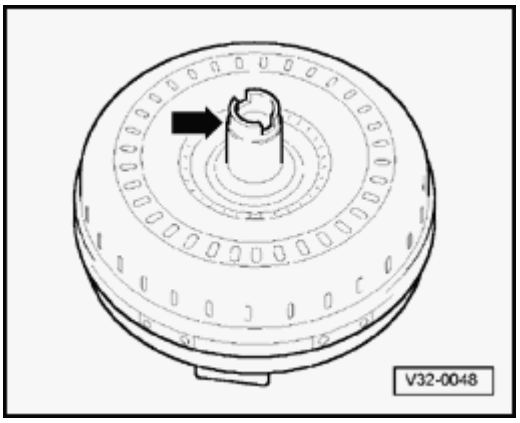


Fig. 10: Inspect Torque Converter Hub For Irregular Grooves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Checking converter hub for wear grooves (arrow).

NOTE:

- **The torque converter is welded in and must be completely replaced if damaged or in case of malfunctions.**

Torque converter, draining

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Special tools, testers and auxiliary items required

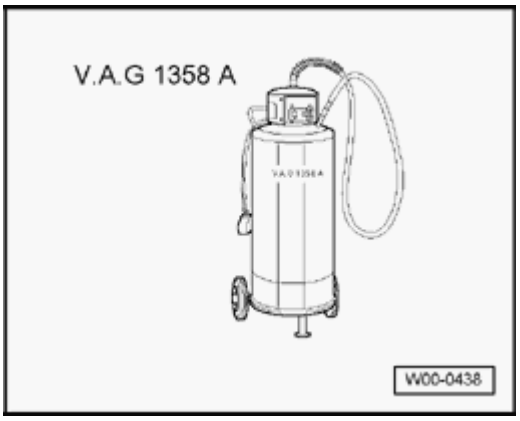


Fig. 11: Special Tool - Oil Extraction Unit V.A.G 1358 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Oil siphoning unit VAG1358A
- Oil siphoning probe VAG1358 A/1

In case of soiling of the ATF via shavings, torque converter must be drained:

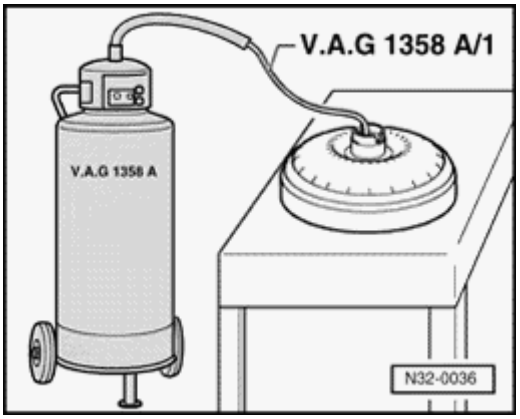


Fig. 12: Extracting ATF From Torque Converter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drain ATF from torque converter using oil siphoning unit VAG1358A and Oil siphoning probe VAG1358 A/1.

Torque converter oil seal, replacing

Special tools, testers and auxiliary items required

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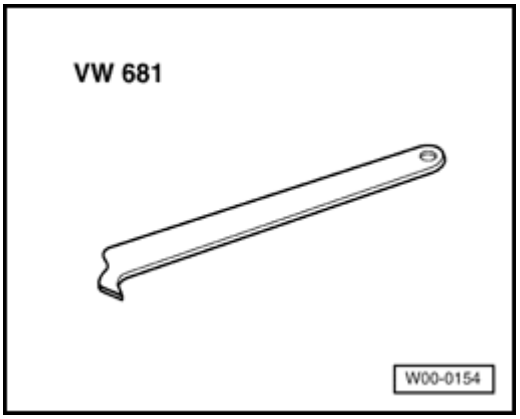


Fig. 13: Special Tool - Oil Seal Extractor Lever VW 681
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Extractor lever VW681

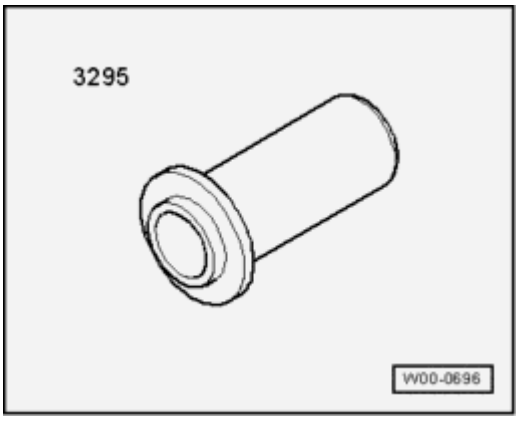


Fig. 14: 3295 Thrust Piece
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Thrust piece 3295

Removing

- Removing transmission --> **Transmission, removing and installing**.
- Secure transmission to assembly stand --> **Transmission, attaching to assembly stand**.

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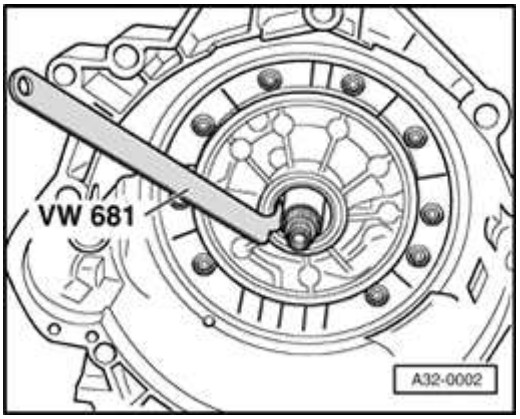


Fig. 15: Applying Extractor Lever VW 681 Directly Behind Sealing Lip Of Oil Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert extractor lever VW681 directly behind the sealing lip of the sealing ring, so that the contact ring which is behind it is not damaged.

Installing

- Insert contact ring.
- Coat outer circumference and sealing lips of sealing ring with ATF.

- Installation position: The open side of the sealing ring faces the transmission.

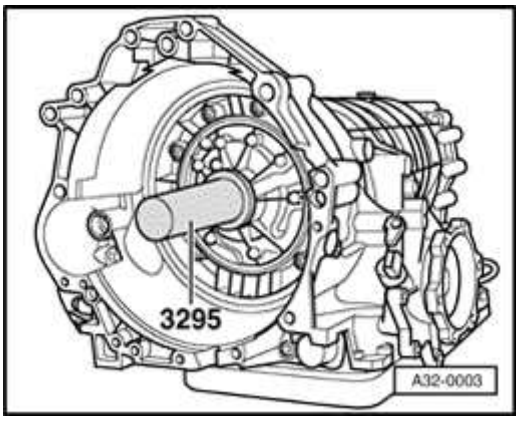


Fig. 16: Driving In Torque Converter Oil Seal Until Stop Of Thrust Piece 3295
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Using thrust piece 3295 , drive in sealing ring for torque converter up to thrust piece stop.

Torque converter, installing

Special tools, testers and auxiliary items required

- Depth gauge

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- Slide in converter hub through the sealing ring up to the first stop.
- Rotate torque converter inward with light pressure, until the groove of the torque converter hub engages in the coupling plate of the pump wheel and the torque converter slides inward noticeably.

Installation dimension for torque converter, checking

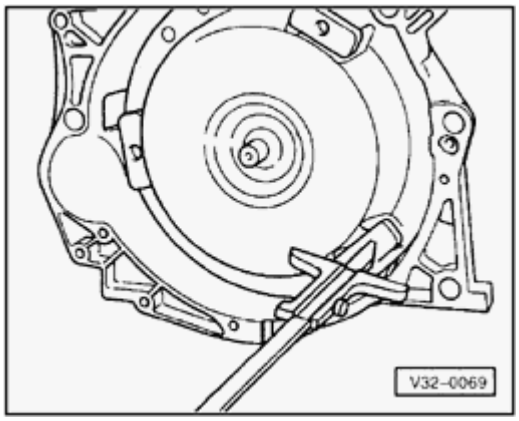


Fig. 17: Checking Torque Converter Is Correctly Positioned
Courtesy of VOLKSWAGEN UNITED STATES, INC.

When torque converter is installed correctly, distance between lower contact surface of threaded holes at torque converter and contact surface of converter housing on Automatic Transmission 01V is approx. 23 mm.

If the torque converter is not inserted completely, this distance will be approx. 11 mm.

CAUTION: In case of an incorrectly inserted torque converter, the coupling plate of the torque converter or the ATF-pump will be destroyed, if the transmission is flanged to the engine.

Pay particular attention to the following when installing the transmission.

CAUTION: Keep checking to make sure the torque converter behind the drive plate can be turned before and during tightening the bolts at the engine/transmission flange.

If the torque converter cannot be turned, it must be assumed that it has not been inserted properly and that the coupling plate of the torque converter or the ATF pump will be destroyed during final tightening of the bolts.

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TRANSMISSION

5 Spd. Automatic Transmission 01V On Board Diagnostic (OBD)

01 ON BOARD DIAGNOSTIC (OBD)

ON BOARD DIAGNOSTIC (OBD) SYSTEM, OPERATION

On Board Diagnostic (OBD) system, operation

The automatic transmission controls are electronic/hydraulic.

The Transmission Control Module (TCM) -J217- receives information from components which influence the shifts. Based on this information, the control module activates the applicable solenoid valves in the valve body. The solenoids route the fluid pressure generated by the ATF pump to the clutches or brakes to be closed.

Transmission Control Module (TCM) DTC recognition

The term "On Board Diagnostic system" refers to the electrical/electronic part of the controls.

The control module is equipped with a DTC memory so that in the event of the failure of an electrical/electronic component, or in the event of an open circuit, the cause of the fault can be determined quickly.

DTCs are recognized by means of electrical signals. If malfunctions occur in the sensors or components being monitored, they are stored in the DTC memory indicating the type and location of the DTC.

If a DTC is present, it is initially saved as a statistical DTC. If the DTC is no longer present, it first of all becomes a sporadic DTC (SP).

DTCs that are saved in the DTC memory as sporadically present are displayed as "sporadically occurring DTCs" during a DTC scan. "SP" appears on the right side of the display. With the printer switched on, "sporadically occurring DTCs" are printed out following the DTC scan.

DTCs that are saved in the DTC memory as sporadically occurring DTCs are automatically deleted after 40 engine cold starts (and subsequent transmission warm up).

The potential of the On Board Diagnostic system can only be fully realized by using the Vehicle Diagnosis, Measurement and Information System VAS 5051.

Functions which the VAS 5051 Vehicle Diagnosis, Measurement and Information system can detect. Refer to **List of Selectable Functions**, Table of Selectable Functions.

Safety functions of the Transmission Control Module (TCM)

In the event of a failure of individual or multiple components or sensors, the Transmission Control Module -J217- activates replacement functions or limp-home programs. This ensures non-destructive operation of the automatic transmission with the concomitant effect on the function and quality of the shifts.

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If critical DTCs occur and with the Transmission Control Module (TCM) J217 activated, the gear currently engaged is initially held. As soon as the situation with respect to the transmission and vehicle safety permits, the Transmission Control Module -J217- activates "Mechanical Limp Home with Active Control Module".

Mechanical Limp Home with Active Control Module

- Transmission shifts out of all forward gears into the hydraulic 4th gear. Converter clutch is open. All solenoids have no power.
- Maximum shift pressure on the powertrain elements.
- Reverse gear can be engaged. Shift lock (in "P" and "N") is active.

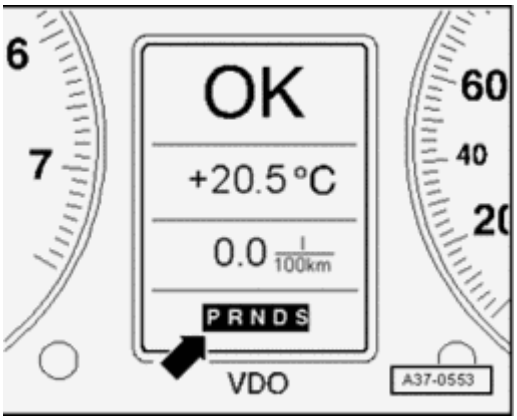


Fig. 1: Mechanical Limp Home with Active Control Module
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- All segments of the gear selector display are fully illuminated.

In the event of a Transmission Control Module (TCM) -J217- failure (e.g power supply failure or harness connector disconnected) the transmission immediately continues to operate in "Mechanical Limp Home with Non-Active Control Module".

Mechanical Limp Home with Non-Active Control Module

- Transmission shifts out of all forward gears into the hydraulic 4th gear. Converter clutch is open. All solenoids have no power.
- Maximum shift pressure on the powertrain elements.
- Reverse gear can be engaged. Shift lock (in "P" and "N") is active.

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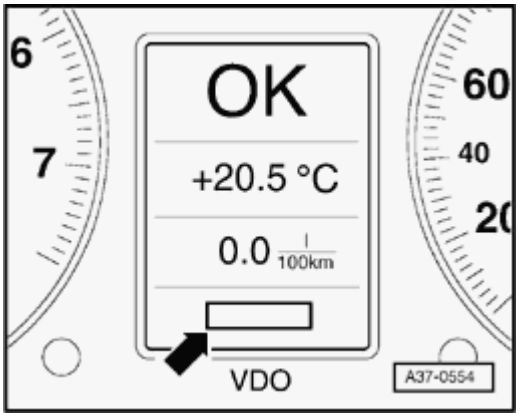


Fig. 2: Mechanical Limp Home With Non-Active Control Module
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- All segments of the gear selector display are dark.
- The Transmission Control Module (TCM) -J217- is completely inoperative, which means that On Board Diagnostic (OBD) is not possible.

Technical data for the On Board Diagnostic (OBD) system

DTC memory	
• Permanent memory	Yes
Data output	
Rapid data transmission Blink code output	Yes No
Control element diagnosis/Output Diagnostic Test Mode (DTM)	Yes
Basic setting	No 1)
Coding control module	Yes
Reading Measured Value Block	Yes
Electrical/Electronic components and component locations	Refer to **Electrical/electronic components and component locations**

1) Resetting adaptation values for Transmission Control Module (TCM). Refer to **Adaptation values for Transmission Control Module (TCM), basic setting**

ELECTRICAL/ELECTRONIC COMPONENTS AND COMPONENT LOCATIONS

Electrical/electronic components and component locations

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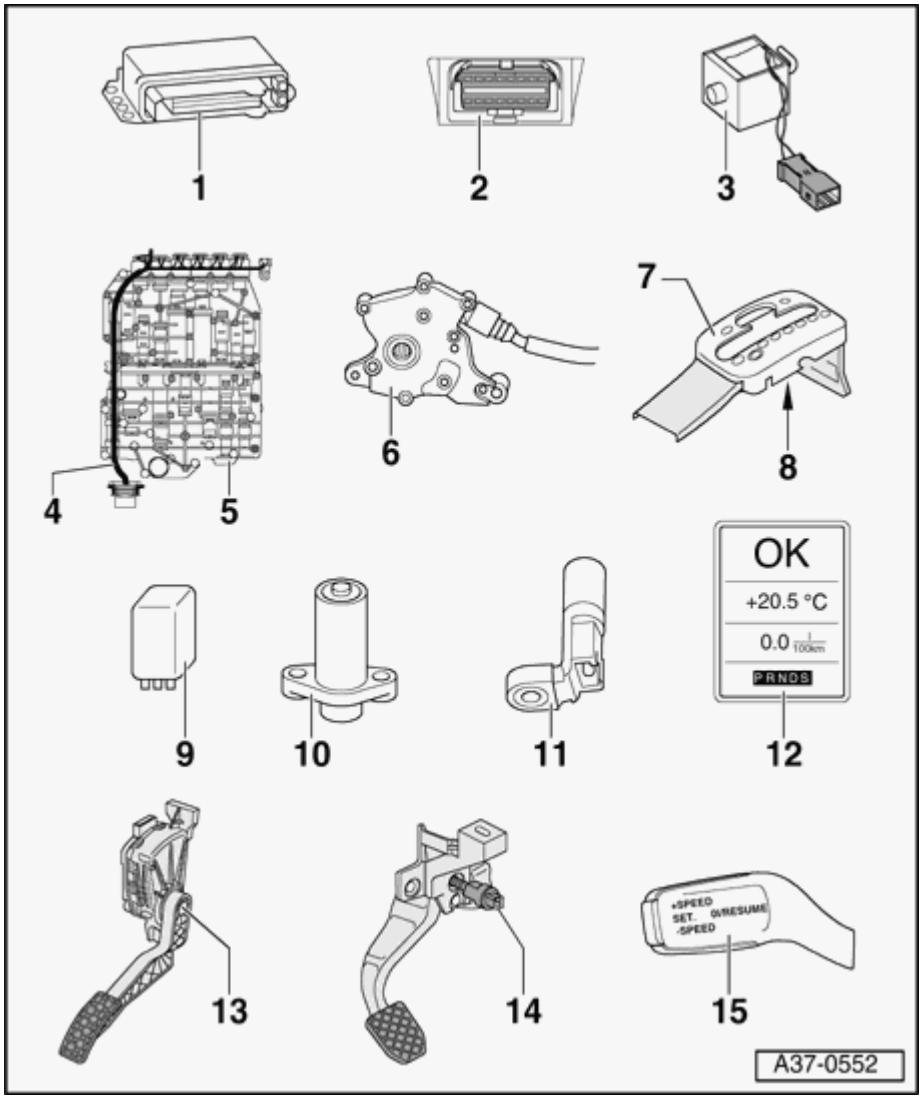


Fig. 3: Electrical/Electronic Components And Component Locations
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Transmission Control Module (TCM) -J217-

- Component location and removal and installation. Refer to **Transmission Control Module (TCM) -J217-, removing and installing**
- Loosening multiple connector. Refer to **Transmission Control Module (TCM) -J217-, removing and installing**
- Control module is tested by On Board Diagnostic (OBD)

2 - Data Link Connector (DLC)

- Component location. See **Fig. 4**

3 - Shift Lock Solenoid -N110-

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- Component location. See **Fig. 5**
- Can be tested in Measured Value Block. Refer to **Test procedure** and **Electrical Testing**
- Removal and installation:

Refer to

- **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

4 - Internal transmission wiring harness with integrated Transmission Fluid Temperature Sensor (ATF) -G93-

- Component location. See **Fig. 7**
- -G93- is tested by On Board Diagnostic
- Removing and installing wiring harness or Transmission Fluid Temperature Sensor -G93-:

Refer to

- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

5 - Valve body

- Component location. See **Fig. 6**
- Solenoid Valves -N88-, -N89-, -N90- and Pressure Control Valves -N215-, -N216-, -N217- and -N218- are attached to the valve body.
- Components are tested by On Board Diagnostic
- Removal and installation:

Refer to

- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

6 - Multi-function Transmission Range (TR) Switch -F125-

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- Component location. See **Fig. 8**
- Is tested by On Board Diagnostic
- Removal and installation:

Refer to

- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

7 - Shift control mechanism cover

- Removal and installation:

Refer to

- **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

8 - Tiptronic Switch -F189-

- Component location. See **Fig. 9**
- Can be tested in Measured Value Block. Refer to **Test procedure**
- Removal and installation:

Refer to

- **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

9 - Starter Interlock Alarm System Relay -J60-

- Component location. See **Fig. 11**
- Testing. Refer to **Starter Interlock Alarm System Relay -J60-, checking**

10 - Sensor for transmission RPM -G182-

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- Component location. See **Fig. 13**
- Is tested by On Board Diagnostic
- Removal and installation:

Refer to

- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

11 - Sender for transmission output RPM -G195-

- Measures transmission output RPM
- Component location. See **Fig. 12**
- Is tested by On Board Diagnostic
- Removal and installation:

Refer to

- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

12 - Transmission Range (TR) Selector Lever Display -Y6-

- Component location. See **Fig. 14**
- Gear display not illuminated indicates limp home operation with non-active Transmission Control Module (TCM).
- Completely illuminated gear display indicates limp home operation with active Transmission Control Module (TCM).
- Removal and installation:

Refer to

- **90 INSTRUMENTS**
- **90 INSTRUMENTS** for ELECTRICAL EQUIPMENT, CABRIOLET

13 - Kickdown Switch -F8-

- Component location. See . **Fig. 15**

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- No mechanical switch; a specific value from Throttle Position Sensor and Sender for accelerator pedal position -G79-/-G185- is stored in Engine Control Module (ECM)
- Signal transmission from ECM to TCM over CAN-bus
- Can be tested in Measured Value Block. Refer to **Test procedure**

- Accelerator pedal module removal and installation:

Refer to **20 - FUEL SUPPLY SYSTEM**

14 - Brake light switch -F-

- Component location. See **Fig. 16**
- Signal transmission from Engine Control Module (ECM) to Transmission Control Module (TCM) over CAN-bus
- Can be tested in Measured Value Block. Refer to **Test procedure**
- Removal and installation:

Refer to **46 - BRAKES - MECHANICAL COMPONENTS**

15 - Cruise Control Switch -E45-

- Component location. See **Fig. 17**
- Removal and installation:

Refer to

- **94 LIGHTS, SWITCHES - EXTERIOR**
- **94 LIGHTS, SWITCHES - EXTERIOR** for ELECTRICAL EQUIPMENT, CABRIOLET

Data Link Connector (DLC)

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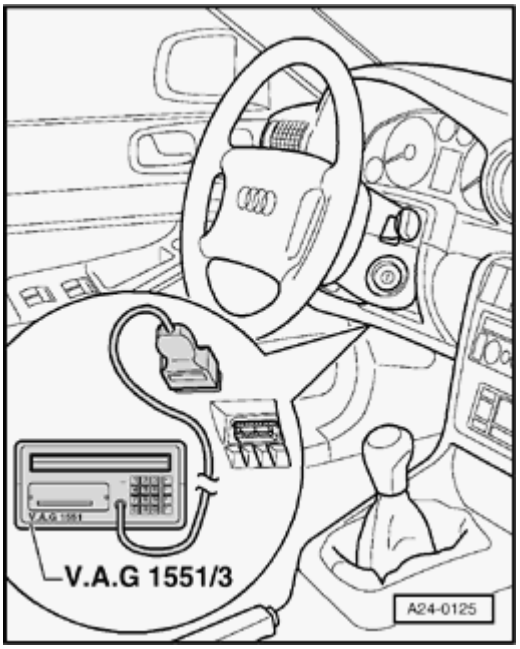


Fig. 4: Data Link Connector (DLC)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Component location: The DLC is located under the knee bolster to the left of the steering wheel.

Shift Lock Solenoid -N110-

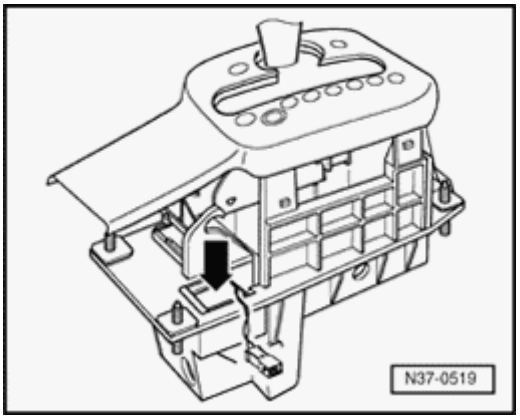


Fig. 5: Shift Lock Solenoid -N110-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Component location: The Shift Lock Solenoid is located in the shift control mechanism -arrow-.

Valve body

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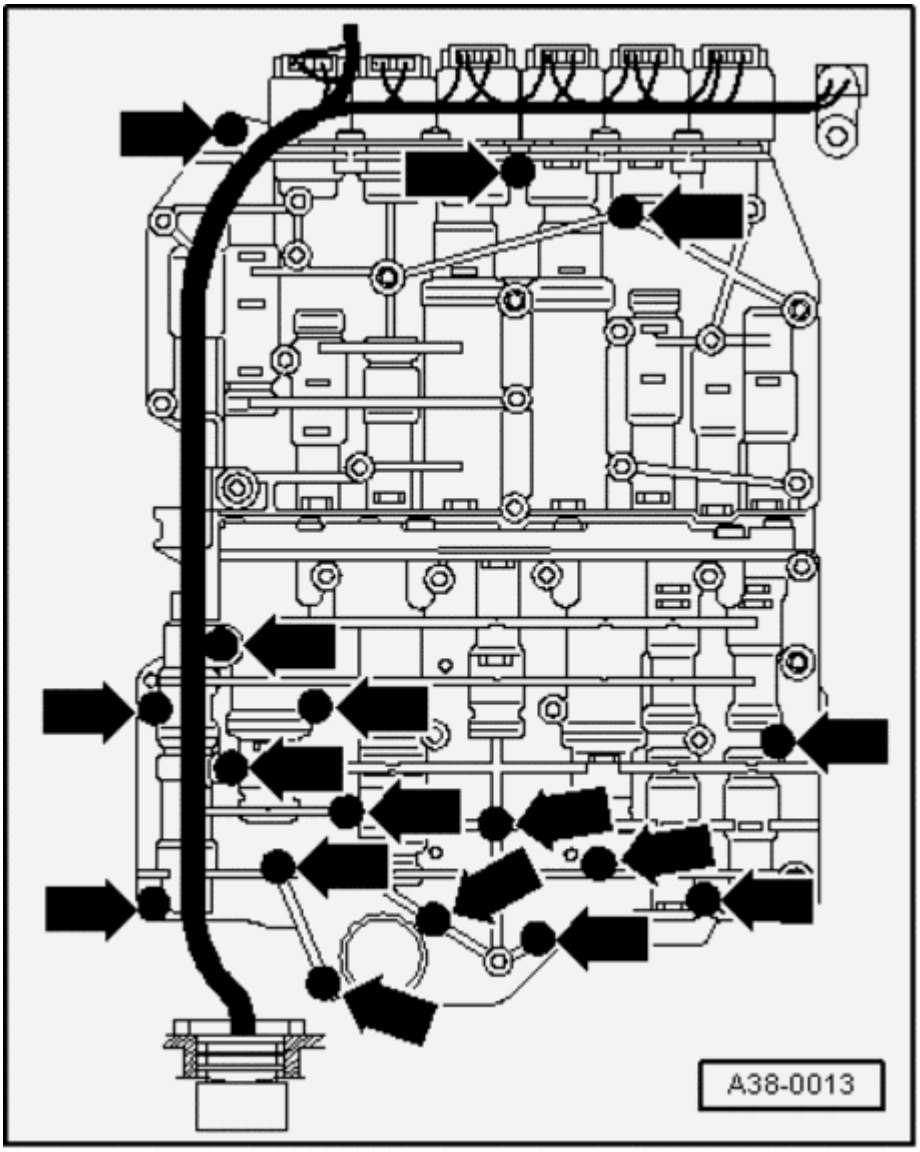


Fig. 6: Locating Valve Body Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Component location: The valve body is bolted underneath the transmission housing and is covered by the transmission oil pan.

Solenoid Valves -N88-, -N89-, -N90- and Pressure Control Valves 1 -N215-, 2 -N216-, 3 -N217- and 4 -N218- are attached to the valve body.

Internal transmission wiring harness with integrated Transmission Fluid Temperature Sensor -G93-

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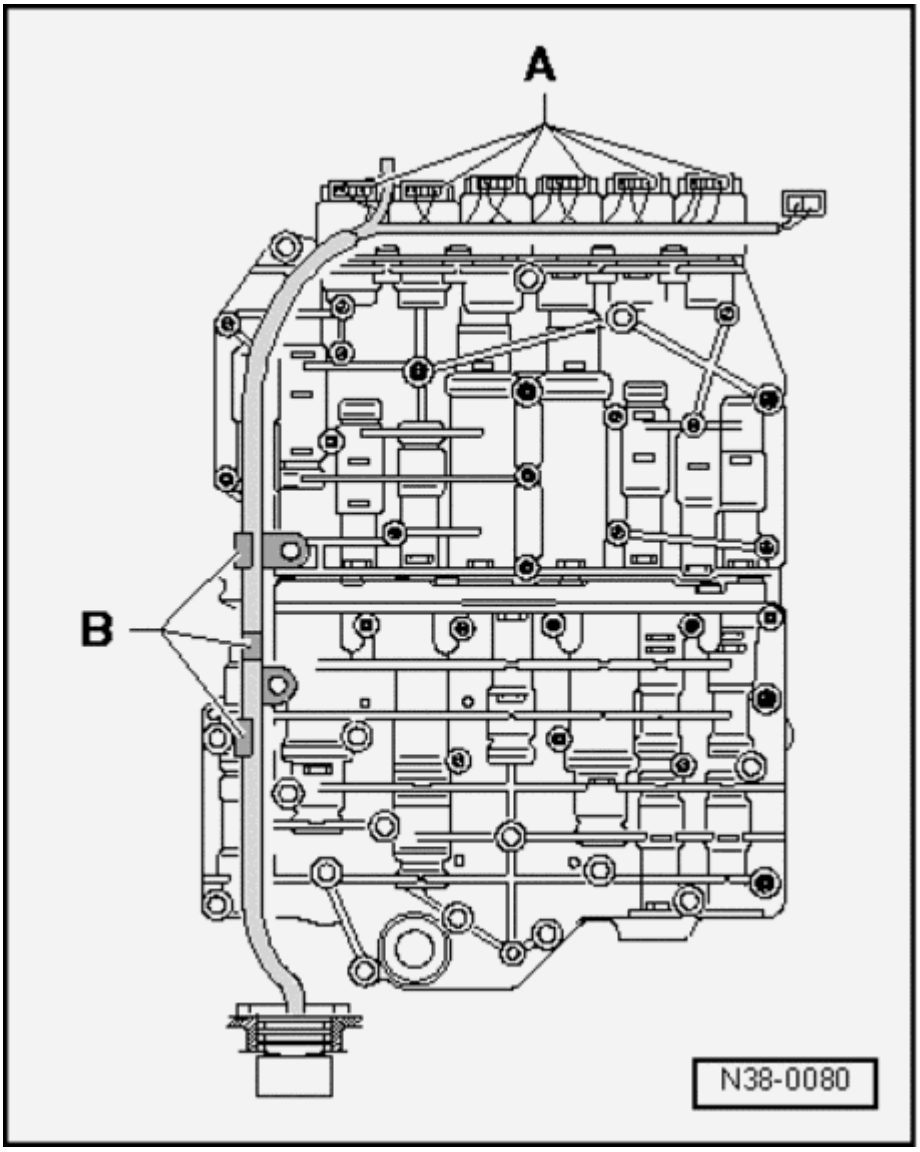


Fig. 7: Identifying Solenoid Valve Connectors And Wiring Harness Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Component location: The wiring harness is attached to the valve body.

The wiring harness can be replaced with the transmission installed and the valve body removed.

Multi-Function Transmission Range (TR) Switch -F125-

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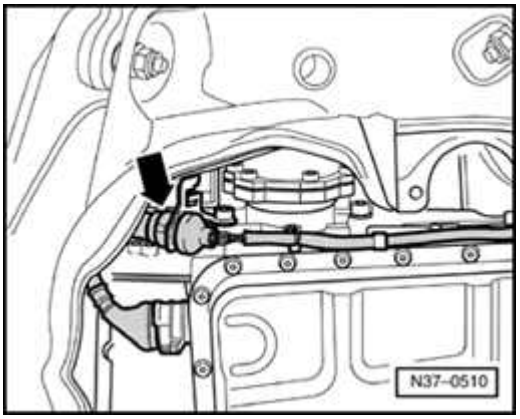


Fig. 8: Disconnecting Connector For Multi-Function Transmission Range (TR) Switch -F125- At Front Left Of Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Component location: The Multi-Function Transmission Range (TR) Switch is located on the left side of the transmission, harness connector for Multi-Function Transmission Range (TR) Switch -arrow-

Tiptronic Switch -F189-

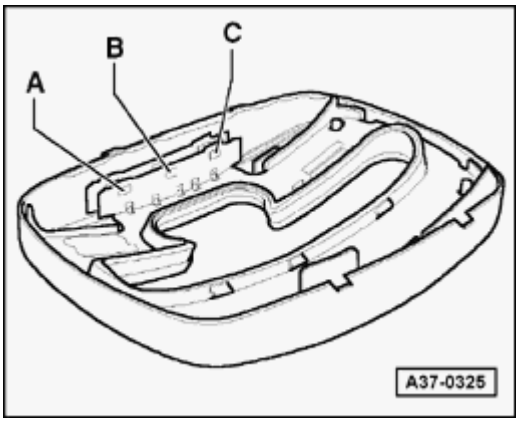


Fig. 9: Tiptronic Switch -F189-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Component location: The Tiptronic Switch is integrated into the circuit board for the icon insert which is located in the cover for the shift control mechanism.

It consists of 3 Hall sensors (A, B, C), which are energized by a solenoid on the transverse slide on the roll cover

A - Downshift switch sensor

B - Tiptronic recognition sensor

C - Upshift switch sensor

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- If malfunctions occur test Tiptronic Switch in the Measured Value Block. Refer to **Test procedure** for malfunctions.

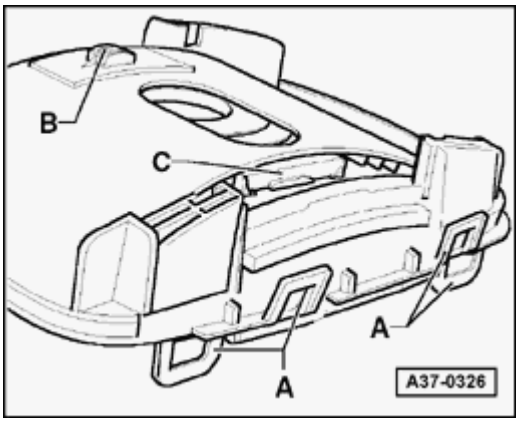


Fig. 10: Checking Whether Solenoid Is Properly Attached To Roll Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

In the event of malfunctions, first check whether the solenoid is properly attached to the roll cover -C- transverse slide, if necessary replace transverse slide. The icon insert with the integrated circuit board must not be replaced until the wiring connections have been inspected. In the case of vehicles with multi-function steering wheel, the buttons on the steering wheel and their wiring must also be inspected.

Starter Interlock Alarm System Relay -J60-

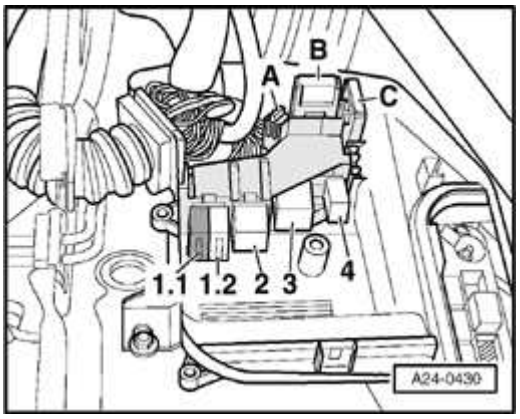


Fig. 11: Starter Interlock Alarm System Relay -J60-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Component location: On the relay carrier in the E-Box plenum.

4 - Starter Interlock Alarm System Relay -J60-

Sender for transmission output RPM -G195-

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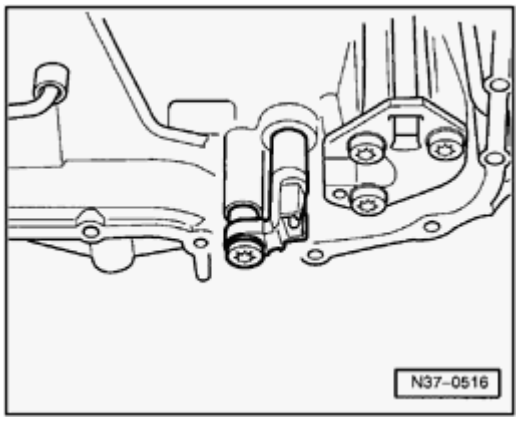


Fig. 12: Sender For Transmission Output RPM -G195-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Component location: The Sender for transmission RPM is located in the transmission at the right rear

Sensor for Transmission RPM -G182-

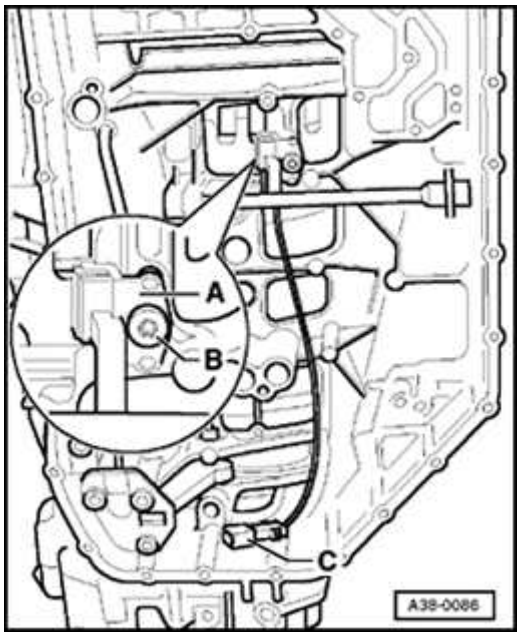


Fig. 13: Sensor For Transmission RPM (Transmissions With Hydraulic Regulation -E18/2-)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Component location: The sensor -A- is a Hall sensor and is attached behind the valve body to the transmission housing.

Transmission Range Selector Lever Display -Y6-

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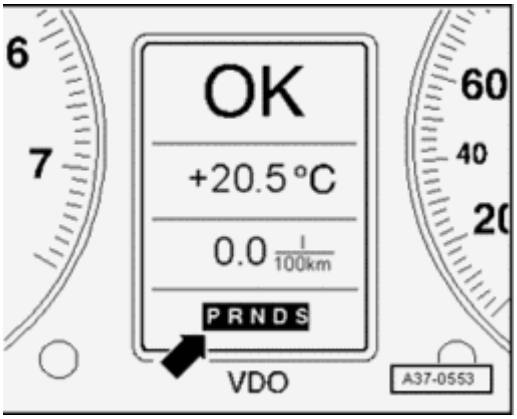


Fig. 14: Mechanical Limp Home with Active Control Module
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Component location: Integrated in the instrument cluster

NOTE: The Transmission Range (TR) Selector Lever Display can only be replaced together with the instrument cluster.

Kickdown Switch -F8-

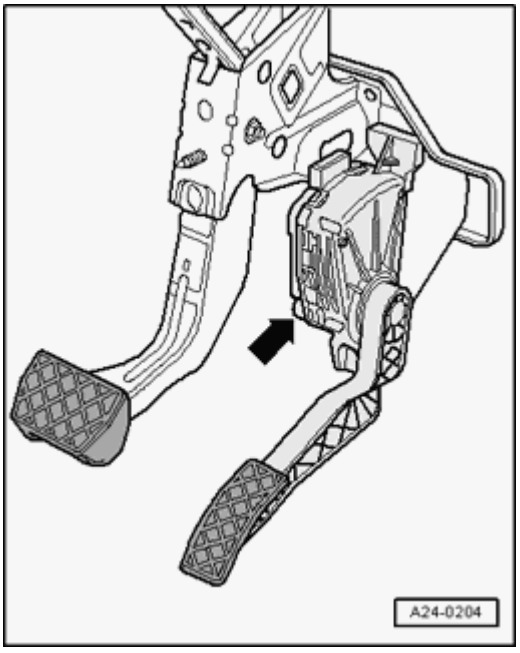


Fig. 15: Kick Down Switch F8
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- No mechanical switch; a specific value from the Throttle Position Sensor and the Sender for accelerator pedal position -G79-/-G185- is stored in the Engine Control Module (ECM)

Brake light switch F

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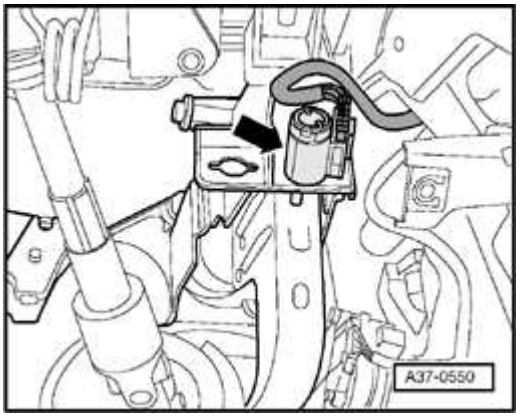


Fig. 16: Brake Light Switch F
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Component location: The brake light switch -arrow- is located on the pedal cluster.

NOTE: In order to ensure adequately tight fit the switch must be installed only one time.

Cruise Control Switch -E45-

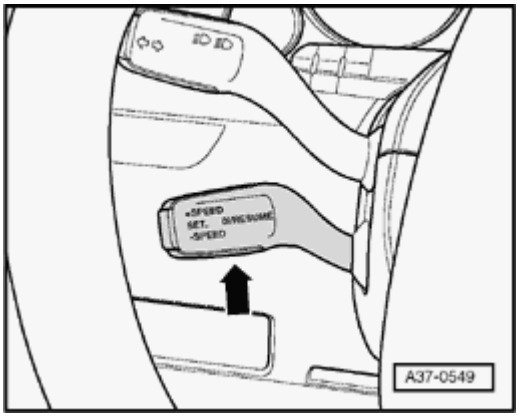


Fig. 17: Cruise Control Switch -E45-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Component location: The Cruise Control Switch is located at the steering column switch.

Transmission Control Module (TCM) -J217-, removing and installing

- Switch ignition OFF.
- Remove rubber seal from the plenum panel cover.

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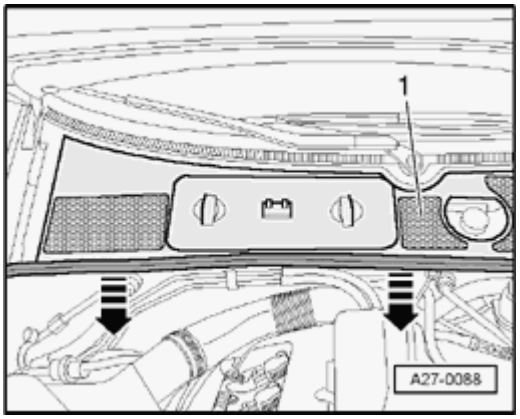


Fig. 18: Identifying Plenum Chamber Cover & Removing Rubber Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove plenum panel cover toward front -1- -arrows-.

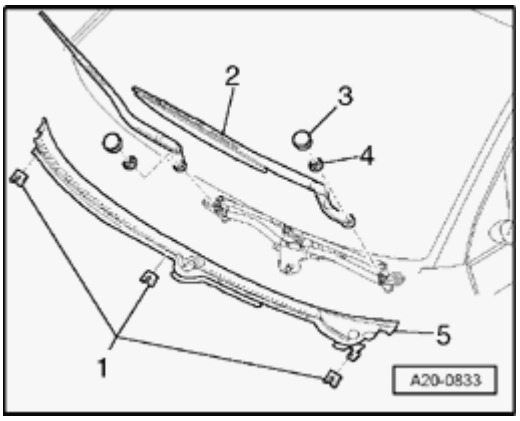


Fig. 19: Removing Securing Clips And Cowl
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry off two cover caps -3- with a screwdriver.
- Loosen hex head nuts -4- a few turns.
- Remove wiper arms -2- from wiper shaft by tilting them slightly.
- Remove hex head nuts completely and remove wiper arms.

- Remove safety clips -1- and remove cowl grille -5-.

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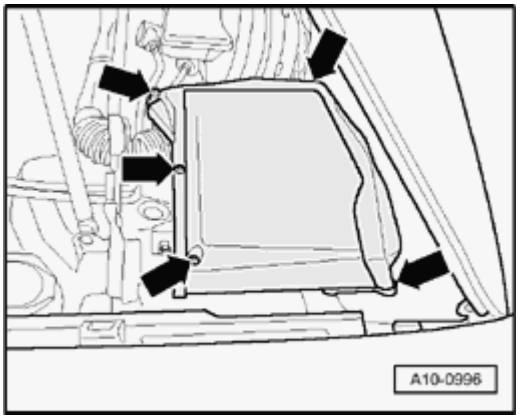


Fig. 20: Removing Screws And Cover From E-Box In Plenum Chamber
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover for plenum panel E-box -arrows-.

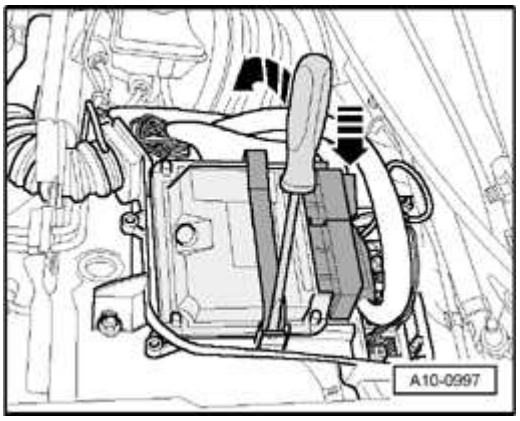


Fig. 21: Using Screwdriver To Remove Retainer Bar And Engine Control Module (ECM) J623
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry off retaining bracket with a screwdriver -arrows-.
- Place Engine Control Module (ECM) with harness connectors attached to one side.
- Unclip retaining bracket for Transmission Control Module (TCM).

NOTE: The harness connector for the control module must not removed or connected for 30 seconds after the ignition has been switched OFF.

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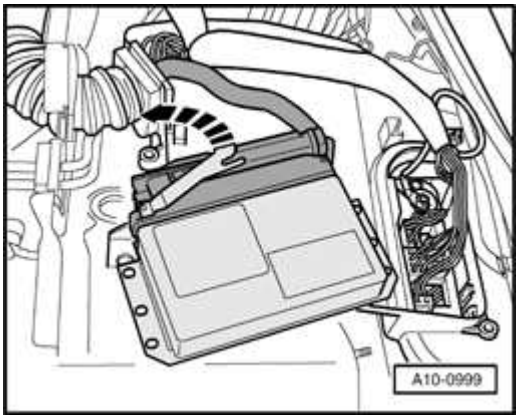


Fig. 22: Unlocking Harness Connector And Pulling It Off Transmission Control Module (TCM)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unlock harness connector -arrow- and pull it off Transmission Control Module (TCM).

NOTE: When the harness connector is removed, the adaptation values in the Transmission Control Module (TCM) are reset. The control module has to relearn these values after resumption of operation. During this "learning process" shift quality may be worse than normal.

Installation is carried out in the reverse order.

ON BOARD DIAGNOSTIC (OBD) PROGRAM

Safety Precautions

If the use of test and measuring equipment is required during test drives, the following precautions must be observed:

WARNING:

- **The test and measurement equipment must always be secured on the rear seat and operated from there by a second person.**
- **If the test and measurement equipment is operated from the passenger seat, the person sitting there could be injured in an accident as the result of deployment of the passenger side airbag.**

In order to prevent injuries to persons and/or destruction of electrical and electronic components, the following precautions must be observed:

- Attach measurement and test equipment terminals only with the ignition switched OFF.
- With some tests it may happen that the control module detects and saves a trouble code. For this reason, the DTC memory must be scanned and if necessary deleted after completing all tests and repairs.
- Disconnecting and attaching battery terminals must only be carried out with the ignition switched OFF, otherwise the Transmission Control Module (TCM) can be damaged.

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CAUTION: Observe precautions when disconnecting battery terminals.

Refer to

- **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL**
- **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL for ELECTRICAL EQUIPMENT, CABRIOLET**

Notes on towing

CAUTION: When the vehicle is towed, the transmission selector lever must be in position N, and it must not be towed more than 50 km and not above 50 km/h, otherwise the transmission will be destroyed.

NOTE: It is not possible to tow the vehicle in order to start the engine, for example when the battery is too weak or the starter is not working.

VAS 5051 Vehicle Diagnosis, Measurement and Information System, connecting and selecting functions

Test requirements:

- Parking brake applied.
- Vehicle voltage supply O.K.
- Voltage supply and fuses for particular system O.K.

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

- Ground connections for transmission O.K.

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

- Check ground connections for corrosion and damaged connection, repair as needed.

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

- Check battery ground strap and ground strap between battery and transmission.

Test procedure

- Switch ignition OFF.

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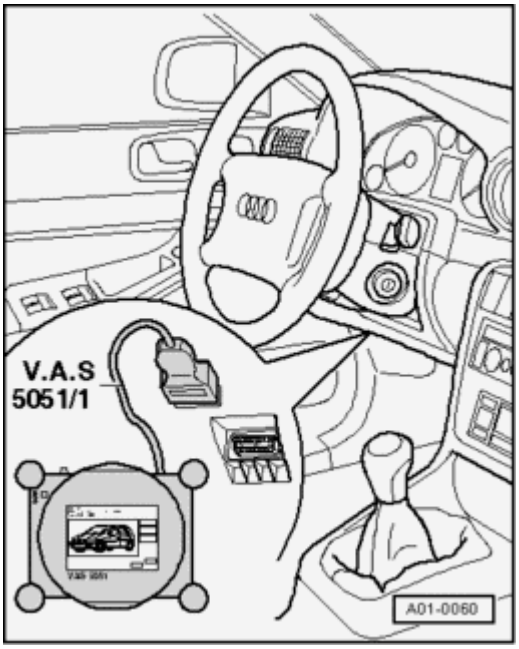


Fig. 23: Identifying Vehicle Diagnosis, Testing and Information System VAS 5051 and Data Link Connector (DLC)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

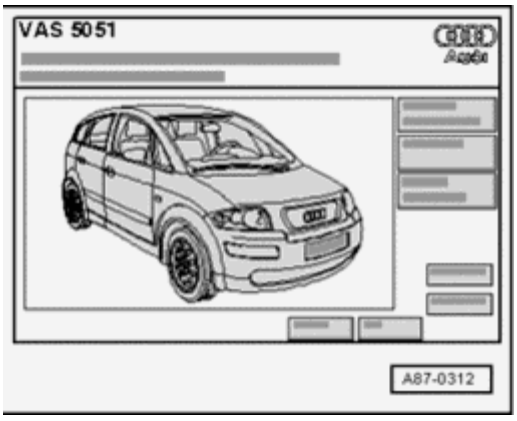
- Connect VAS 5051 Vehicle Diagnosis, Measurement and Information System with diagnostic lead VAS 5051/1.

NOTE: The Data Link Connector (DLC) is located in the left side knee bolster.

CAUTION: Please observe safety precautions. Refer to Safety Precautions

NOTE: If an error message appears in the display:

Refer to Users Manual for VAS 5051 Vehicle Diagnosis, Measurement and Information System VAS 5051



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Fig. 24: Diagnostic System VAS 5051: Display
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Display on VAS 5051:

- Touch "Vehicle On Board Diagnostic System" button.

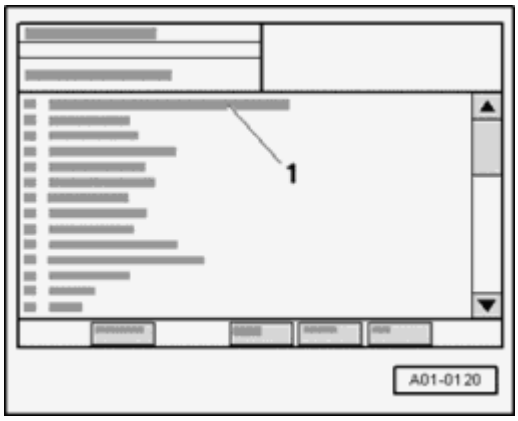


Fig. 25: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

NOTE: By touching "00 - Scan DTC Memory - Complete System" in the selection -1- the automatic test sequence is performed, i.e. a scan is performed of the DTC memory for all systems in the vehicle capable of On Board Diagnostic (OBD).

Depending on the desired function:

- Switch ignition ON.

Or

- Start engine.
- In selection -1- touch vehicle system "02 - Transmission Electronics".
- Wait until next display appears on screen.

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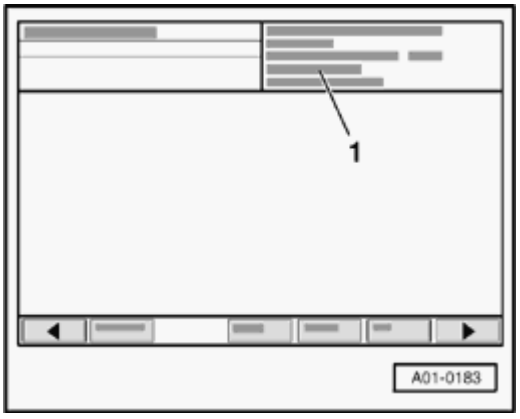


Fig. 26: Diagnostic System VAS 5051: Display - System In Basic Setting
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

1 - Control module identification number of the Transmission Control Module (TCM).

Identification number of Transmission Control Module (example)	
02 - Transmission electronics	Vehicle system
8E0927156.	Part number; application.
AG5 01V 1) 3.0l5V 2) USA 3) 0809 4)	1) Automatic 5-Speed Transmission 01V 2) Engine Version 3.0 liter 5V 3) Market, USA, Canada and Mexico 4) Control module data status (software status)
Code 1002	Control module coding (check. Refer to **Transmission Control Module (TCM), coding**)
Operating number 12345	Operating identification of the VAS 5051 with which the last coding was performed.

LIST OF SELECTABLE FUNCTIONS

List of Selectable Functions

		Refer to
02 -	Reading DTC Memory	**Diagnostic Trouble Code (DTC) memory, scanning**
03 -	Control element diagnosis/Output Diagnostic Test Mode (DTM)	**Control element diagnosis/Output Diagnostic Test Mode (DTM)**
05 -	Erasing DTC Memory	**Diagnostic Trouble Code (DTC) memory, erasing**
06 -	Ending Output	
07	Coding Control Module	**Transmission Control Module (TCM), coding**

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-		
08 -	Reading Measured Value Block	**Test procedure**

DIAGNOSTIC TROUBLE CODE (DTC) MEMORY, SCANNING

Diagnostic Trouble Code (DTC) memory, scanning

- Connect VAS 5051 Vehicle Diagnosis, Measurement and Information System. Refer to **VAS 5051 Vehicle Diagnosis, Measurement and Information System, connecting and selecting functions** and in selection touch vehicle system "02 - Transmission Electronics". Ignition must be switched ON.

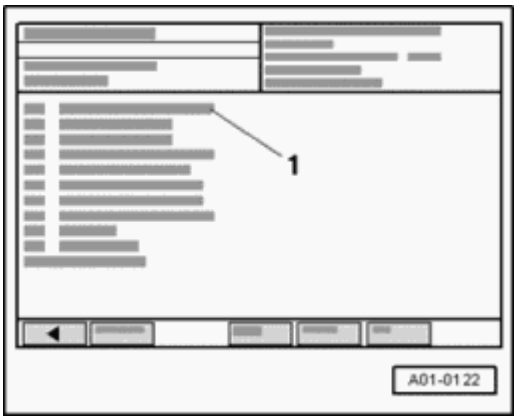


Fig. 27: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

- In selection touch -1- diagnostic function "02 - Scan DTC memory".



Fig. 28: Identifying Content Of DTC Memory & Identification Of Fault On Diagnostic System VAS 5051 Display
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Display on VAS 5051:

1 - Contents of the DTC memory:

0 DTCs detected

Or

X DTCs detected

2 - DTC

DTC number

Location of DTC

Type of DTC

A - If DTCs were recognized:

- Print out contents of screen or OBD protocol.
- End function "02 - Scan DTC memory" by touching <-- button.

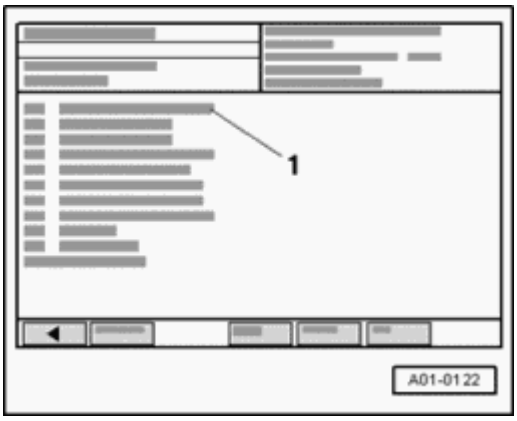


Fig. 29: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

- Repair malfunction(s) using the Test Chart. Refer to **Diagnostic Trouble Code (DTC) table**.
- In selection touch diagnostic function "02 - Scan DTC memory" again and delete DTC memory. Refer to **Diagnostic Trouble Code (DTC) memory, erasing**.
- Touch "06 - End output".

B - If no DTC was detected:

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- Touch "06 - End output".

DIAGNOSTIC TROUBLE CODE (DTC) TABLE

Diagnostic Trouble Code (DTC) table

NOTE:

- **In the following all the possible DTCs are listed by ascending order of DTC numbers. These trouble codes can be recognized by the Transmission Control Module -J217-. Then they are displayed on the Vehicle Diagnosis, Measurement and Information System VAS 5051 during scanning of the DTC memory content.**
- **If faults occur only occasionally or if the DTC memory was not deleted after the fault was corrected, these faults will be displayed for a predetermined time as "intermittently occurring faults". Refer to Transmission Control Module (TCM) DTC recognition.**
- **If faulty components are displayed when the DTC memory is read, make an additional check of wiring connections to the components for a short circuit and open circuit.**

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

DTC CHART PART 1, UP TO DIAGNOSTIC TROUBLE CODE 18112/P1704

DTC Chart Part 1, up to Diagnostic Trouble Code 18112/P1704

Output at printer	Possible cause	Repair
16987 P0603		
Control module faulty	• Transmission Control Module (TCM) -J217- faulty	○ Replacing Control Module. Refer to **Electrical/electronic components and component locations**
16989 P0605		
Control module faulty	• Transmission Control Module (TCM) -J217- faulty	○ Replacing Control Module. Refer to **Electrical/electronic components and component locations**

Notes on Diagnostic Trouble Codes 16987/P 0603 and 16989/P0605:

Only after determining the possible fault cause and correcting the following faults:

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- Mechanical faults
- Hydraulic faults
- Electrical/electronic components and wiring connections

Output at printer		Possible cause	Repair
17087 P0703			
Brake light switch -F-			
Electrical fault in circuit		• Wiring connection between brake test switch, brake light switch F and Engine Control Module (ECM) faulty	○ Read Measured Value Block. Refer to **Test procedure**; display group number 3. ○ Check wiring connections and harness connectors using wiring diagram ○ Read DTC memory for Engine Control Module (ECM) and repair fault.
		• Brake light switch F faulty	○ Replace brake light switch -F-. Refer to **46 - BRAKES - MECHANICAL COMPONENTS**

Notes on DTC 17087/P0703:

- The signal from the brake light switch -F- is transmitted by the Engine Control Module (ECM) over the CAN-bus circuit to the Transmission Control Module (TCM).
- Conditions for DTC recognition: The signals from the brake light switch and the brake test switch are transmitted over the CAN-bus circuit to the Transmission Control Module (TCM) and evaluated there. In the event of an implausibility this DTC is displayed in the Transmission Control Module (TCM).

Output at printer		Possible cause	Repair
17090 P0706			
Multi-function Transmission Range (TR) Switch. Refer to **Multi-Function Transmission Range (TR) Switch -F125-**-F125-			
	Implausible signal	• Selector lever cable wrongly	○ Adjust selector lever cable. Refer to

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		adjusted	• **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
		• Connector at the Multi-function Transmission Range (TR) Switch -F125- not attached • Open circuit or short circuit to ground or B+	○ Read Measured Value Block. Refer to **Test procedure**; display group number 4. ○ Check wiring and wiring connectors following wiring diagram 2)
		• Multi-function Transmission Range (TR) Switch -F125- faulty	○ Perform electrical test. Refer to **Electrical Testing** ○ Replace Multi-function Transmission Range (TR) Switch -F125-. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD.

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		AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

2) First check 8-pin harness connectors for corroded terminals or water entry and replace if necessary.

Output at printer		**Possible cause**	**Repair**
17094 P0710			
Transmission Fluid Temperature Sensor -G93-			
	Electrical fault in circuit	• Open circuit or short circuit to ground or B+	○ Check wiring and wiring connectors following wiring diagram 3)
		• Transmission Fluid Temperature Sensor -G93- faulty	○ Read Measured Value Block. Refer to **Test procedure**; display group number 004. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace transmission wiring harness 4). Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

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3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

4) The Transmission Fluid Temperature Sensor -G93- is integrated in the transmission wiring harness and can only be replaced as a unit with the wiring harness.

Output at printer		Possible cause	Repair
17095 P0711			
Transmission Fluid Temperature Sensor -G93-			
	Implausible signal	• Open circuit or short circuit to ground or B+	○ Check wiring and wiring connectors following wiring diagram 3)
		• Transmission Fluid Temperature Sensor -G93- faulty	○ Read Measured Value Block. Refer to **Test procedure**; display group number 004. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace transmission wiring harness 4). Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

4) The Transmission Fluid Temperature Sensor G93 is integrated in the transmission wiring harness and can only be replaced as a unit with the wiring harness.

Note on DTC 17095/P0711:

- Condition for DTC recognition: Transmission fluid temperature does not increase after the engine is started or makes erratic changes in temperature.

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Output at printer		Possible cause	Repair
17096 P0712			
Transmission Fluid Temperature Sensor -G93-			
	Signal too low	• Open circuit or short circuit to ground or B+	○ Check wiring and wiring connectors following wiring diagram 3)
		• Transmission Fluid Temperature Sensor -G93- faulty	○ Read Measured Value Block. Refer to **Test procedure**; display group number 004. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace transmission wiring harness 4). Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

4) The Transmission Fluid Temperature Sensor -G93- is integrated in the transmission wiring harness and can only be replaced as a unit with the wiring harness.

Output at printer		Possible cause	Repair
17097 P0713			
Transmission Fluid Temperature Sensor -G93-			
	Signal too high	• Open circuit or short circuit to ground or B+	○ Check wiring and wiring connectors following wiring diagram 3)
		• Transmission Fluid Temperature Sensor -G93- faulty	○ Read Measured Value Block. Refer to **Test procedure**; display group number 004 ○ Perform electrical test. Refer to **Electrical Testing**.

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		○ Replace transmission wiring harness 4). Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

4) The Transmission Fluid Temperature Sensor -G93- is integrated in the transmission wiring harness and can only be replaced as a unit with the wiring harness.

Output at printer		**Possible cause**	**Repair**
17100 P0716			
Sensor for transmission RPM -G182-			
	Implausible signal	• Open circuit or short circuit to ground or B+	○ Check wiring and wiring connectors following wiring diagram 5)
		• Sensor for transmission RPM -G182- faulty.	○ Read Measured Value Block. Refer to **Test procedure**; display group number 001. ○ Replace sensor for transmission RPM -G182-. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS,**

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		HYDRAULIC CONTROLS for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
	• Transmission RPM signal faulty	○ Correct fault according to DTC 17105/P0721
	Continued ?	

5) First check harness connectors for corroded terminals or water entry and replace if necessary.

Output at printer		**Possible cause**	**Repair**
DTC continued			
17100 P0716			
Sensor for transmission RPM -G182-			
	Implausible signal	• ATF level not O.K.	○ Check ATF level. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS,

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			SERVICING
		• Faulty or incorrect converter	○ Check converter identification.
		• Clutches or brakes slipping	○ Read Measured Value Block. Refer to **Test procedure**; display group number 005 to 007 and confirm during a drive which servos are faulty or not activated.
		• Solenoid valve or pressure control valve is sticking	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ If necessary, replace solenoid valves, pressure control valves or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS,

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			SERVICING

Note on DTC 17100/P0716:

- Condition for DTC recognition: One transmission position (D or S) has been positively engaged, not an intermediate position. Engine RPM while driving is higher than 608 RPM. Transmission output RPM while driving is higher than 416 RPM.
- The DTC is displayed when the conditions for DTC recognition are met and transmission input RPM is equal 0 RPM or higher than 8000 RPM.

Output at printer		**Possible cause**	**Repair**
17105 P0721			
Sender for transmission output RPM -G195-			
	Implausible signal	• Open circuit or short circuit to ground or B+	○ Check wiring and wiring connectors following wiring diagram 5)
		• Shielding for -G195- faulty • Sender for transmission output RPM -G195- faulty	○ Read Measured Value Block. Refer to **Test procedure**; display group number 001. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace sender for transmission output RPM -G195-. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD.

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			AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
		• Engine or transmission input RPM signal incorrect	○ Correct fault according to DTC 17100/P0716.
		Continued ?	

5) First check harness connectors for corroded terminals or water entry and replace if necessary.

Output at printer		**Possible cause**	**Repair**
DTC continued			
17105 P0721			
Sender for transmission output RPM -G195-			
	Implausible signal	• ATF level not O.K.	○ Check ATF level. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

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		• Faulty or incorrect converter	○ Check converter identification.
		• Clutches or brakes slipping	○ Read Measured Value Block. Refer to **Test procedure**; display group number 005 to 007 and confirm during a drive where servos are faulty or not activated.
		• Solenoid valve or pressure control valve is sticking	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ If necessary, replace solenoid valves, pressure control valves or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

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Output at printer		Possible cause	Repair
17114 P0730			
Gear/gear ratio monitoring			
	Wrong gear ratio	• ATF level not O.K. or ATF contaminated	○ Check ATF level. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
		• Clutch is slipping or faulty or solenoid valve contaminated/faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**.
		• Incorrect Transmission Control Module (TCM) installed or incorrectly coded	○ Verify control module identification number.
		• Sensor for transmission RPM -G182- faulty	○ Correct fault according to DTC 17100/P0716.
		• Sender for transmission output	○ Correct fault according to DTC 17105/P0721.

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		RPM -G195- faulty	

Notes on DTC 17114/P0730:

- The gear monitoring function of the Transmission Control Module checks the gear ratios by comparing transmission input and transmission output RPM, taking into consideration the gear currently engaged. This DTC is displayed when a detected, unacceptable gear ratio (implausibility) is found.
- When testing full braking RPM, transmission input RPM in the converter with the vehicle stationary and gear engaged must be almost zero. If this is not the case, this DTC is also displayed because clutch damage may be present (Read Measured Value Block. Refer to **Test procedure**; display group number 001).

Output at printer	Possible cause	Repair
17115 P0731		
1. Gear		
Wrong gear ratio	• This DTC is displayed in addition to DTC 17114/P0730	○ For correction see also DTC 17114/P0730:
	• Clutch for the gear indicated is slipping/faulty or solenoid valve for this gear is contaminated/faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ See clutch logic or solenoid valve logic. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

Note on DTC 17115/P0731:

- The gear monitoring function of the Transmission Control Module checks the gear ratios by comparing transmission input and transmission output RPM, taking into consideration the gear currently engaged. This DTC is displayed in addition to DTC 17114/P0730 when a detected, unacceptable gear ratio (implausibility) is found.

Output at printer	Possible cause	Repair
17116 P0732		
2. Gear		
Wrong gear ratio	• This DTC is	○ For correction see also

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		displayed in addition to DTC 17114/P0730	DTC 17114/P0730:
		• Clutch for the gear indicated is slipping/faulty or solenoid valve for this gear is contaminated/faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ See clutch logic or solenoid valve logic. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

Note on DTC 17116/P0732:

- The gear monitoring function of the Transmission Control Module checks the gear ratios by comparing transmission input and transmission output RPM, taking into consideration the gear currently engaged. This DTC is displayed in addition to DTC 17114/P0730 when a detected, unacceptable gear ratio (implausibility) is found.

Output at printer	Possible cause	Repair
17117 P0733		

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3. Gear			
	Wrong gear ratio	• This DTC is displayed in addition to DTC 17114/P0730	○ For correction see also DTC 17114/P0730:
		• Clutch for the gear indicated is slipping/faulty or solenoid valve for this gear is contaminated/faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ See clutch logic or solenoid valve logic. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

Note on DTC 17117/P0733:

- The gear monitoring function of the Transmission Control Module checks the gear ratios by comparing transmission input and transmission output RPM, taking into consideration the gear currently engaged. This DTC is displayed in addition to DTC 17114/P0730 when a detected, unacceptable gear ratio (implausibility) is found.

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Output at printer		Possible cause	Repair
17118 P0734			
4. Gear			
	Wrong gear ratio	• This DTC is displayed in addition to DTC 17114/P0730	○ For correction see also DTC 17114/P0730:
		• Clutch for the gear indicated is slipping/faulty or solenoid valve for this gear is contaminated/faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ See clutch logic or solenoid valve logic. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

Note on DTC 17118/P0734:

- The gear monitoring function of the Transmission Control Module checks the gear ratios by comparing transmission input and transmission output RPM, taking into consideration the gear currently engaged. This DTC is displayed in addition to DTC 17114/P0730 when a detected, unacceptable gear ratio

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(implausibility) is found.

Output at printer		Possible cause	Repair
17119 P0735			
5. Gear			
	Wrong gear ratio	• This DTC is displayed in addition to DTC 17114/P0730	○ For correction see also DTC 17114/P0730:
		• Clutch for the gear indicated is slipping/faulty or solenoid valve for this gear is contaminated/faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ See clutch logic or solenoid valve logic. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

Note on DTC 17119/P0735:

- The gear monitoring function of the Transmission Control Module checks the gear ratios by comparing

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transmission input and transmission output RPM, taking into consideration the gear currently engaged. This DTC is displayed in addition to DTC 17114/P0730 when a detected, unacceptable gear ratio (implausibility) is found

Output at printer		Possible cause	Repair
17125 P0741			
Clutch for torque converter lock up			
	No transmission of power	• ATF level not O.K. or ATF contaminated	○ Check ATF level. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
		• Faulty or incorrect converter	○ Check converter identification.
		• Pressure control valve 4 -N218- faulty • Problems in the ATF feed to the pressure control valve 4 -N218- • Torque converter pressure valve	○ Read Measured Value Block. Refer to **Test procedure**; display group number 007 and check converter clutch (closed) and permissible torque converter slippage. ○ Replace pressure control valve or valve body.

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	faulty • Torque converter clutch valve faulty	Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
	• Clutch for torque converter lock up faulty/worn	○ Replace torque converter. Refer to • **32 - TORQUE CONVERTER** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **32 - TORQUE CONVERTER** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

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		• Electrical energizing of Pressure Control Valve 4 -N218- faulty	○ Correct fault according to DTC 18237/P1829 or 18238/P1830.

Note on DTC 17125/P0741:

- The ratio of transmission input RPM -G182- to engine RPM with the torque converter clutch closed does not match (implausibility).

Output at printer		**Possible cause**	**Repair**
17135 P0751			
Shift valve 1. Refer to solenoid valve 1 N88			
	Open circuit/short circuit to ground	• Open circuit or short circuit to ground	○ Check wiring and wiring connectors following wiring diagram 3)
		• Solenoid valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 005. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace solenoid valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 -**

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		AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Note on DTC 17135/P0751:

- Short circuit to B+ is already checked with the ignition switched ON. All types of DTCs are recognized during operation.

Output at printer		**Possible cause**	**Repair**
17136 P0752			
Shift valve 1. Refer to Solenoid Valve 1 -N88-			
	Short circuit to B+	• Short circuit to B+	○ Check wiring and wiring connectors following wiring diagram 3)
		• Solenoid valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 005. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace solenoid valve

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		or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Note on DTC 17136/P0752:

- Short circuit to B+ is already checked with the ignition switched ON. All types of DTCs are recognized during operation.

Output at printer		**Possible cause**	**Repair**
17137 P0753			
Shift Valve 1. Refer to Solenoid Valve 1 -N88-			
	Electrical fault in circuit	• Open circuit or short circuit to ground or B+	○ Check wiring and wiring connectors following wiring diagram 3)
		• Solenoid valve faulty	○ Perform control element diagnosis. Refer to **Control element**

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		diagnosis/Output Diagnostic Test Mode (DTM). ○ Read Measured Value Block. Refer to **Test procedure**; display group number 005. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace solenoid valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Output at printer	Possible cause	Repair
17140 P0756		

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Shift Valve 2. Refer to Solenoid Valve 2 -N89-			
	Open circuit/short circuit to ground	• Open circuit or short circuit to ground	○ Check wiring and wiring connectors following wiring diagram 3)
		• Solenoid valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 005. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace solenoid valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

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3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Notes on DTC 17140/P0756:

- Short circuit to B+ is already checked with the ignition switched ON. All types of DTCs are recognized during operation.

Output at printer		Possible cause	Repair
17141 P0757			
Shift Valve 2. Refer to Solenoid Valve 2 -N89-			
	Short circuit to B+	• Short circuit to B+	○ Check wiring and wiring connectors following wiring diagram 3)
		• Solenoid valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 005. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace solenoid valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS,**

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		HYDRAULIC CONTROLS for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Notes on DTC 17141/P0757:

- Short circuit to B+ is already checked with the ignition switched ON. All types of DTCs are recognized during operation.

Output at printer		**Possible cause**	**Repair**
17142 P0758			
Shift Valve 2. Refer to Solenoid Valve 2 -N89-			
	Electrical fault in circuit	• Open circuit or short circuit to ground or B+	○ Check wiring and wiring connectors following wiring diagram 3)
		• Solenoid valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 005. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace solenoid valve or valve body. Refer to • **38 - AUTOMATIC**

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		TRANSMISSION - GEARS, HYDRAULIC CONTROLS for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Output at printer		**Possible cause**	**Repair**
17145 P0761			
Shift Valve 3. Refer to Solenoid Valve 3 -N90-			
	Open circuit/short circuit to ground	• Open circuit or short circuit to ground	○ Check wiring and wiring connectors following wiring diagram 3)
		• Solenoid valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 005.

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		○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace solenoid valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Note on DTC 17145/P0761:

- Short circuit to B+ is already checked with the ignition switched ON. All types of DTCs are recognized during operation.

Output at printer		**Possible cause**	**Repair**
17146 P0762			
Shift Valve 3. Refer to Solenoid Valve 3 -N90-			
	Short circuit to B+	• Short circuit to B+	○ Check wiring and wiring connectors following

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			wiring diagram 3)
		• Solenoid valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 005. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace solenoid valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

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Note on DTC 17146/P0762:

- Short circuit to B+ is already checked with the ignition switched ON. All types of DTCs are recognized during operation.

Output at printer		Possible cause	Repair
17147 P0763			
Shift Valve 3. Refer to Solenoid Valve 3 -N90-			
	Electrical fault in circuit	• Open circuit or short circuit to ground or B+	○ Check wiring and wiring connectors following wiring diagram 3)
		• Solenoid valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 005. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace solenoid valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC

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		TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Output at printer	Possible cause	Repair
17968 P1560		
Maximum engine RPM exceeded	• Signal from engine RPM sensor to Engine Control Module (ECM) faulty • Engine Speed (RPM) sensor - G28- faulty • Engine RPM signal is being falsified by incorrectly routed electrical wiring (e.g. aftermarket installation of a telephone)	○ Read Measured Value Block. Refer to **Test procedure**; display group number 001. ○ Read DTC memory for Engine Control Module (ECM) and repair fault.
	• Unacceptable transmission downshifting (e.g. as the result of a mechanically faulty valve body)	○ Read Measured Value Block. Refer to **Test procedure**; display group number 005 and determine while driving where servos are faulty or not active. ○ If necessary, replace individual solenoid valves or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION**

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			- GEARS, HYDRAULIC CONTROLS for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

Note on DTC 17968/P1560:

- Condition for DTC recognition: Engine speed higher than 7400 RPM.

Output at printer		**Possible cause**	**Repair**
18112 P1704			
Kickdown Switch -F8- 6)			
	Electrical fault in circuit	• Open circuit in CAN-bus wire	○ Read Measured Value Block. Refer to **Test procedure**; display group number 125. ○ Check CAN-bus. Refer to **Data Exchange between Transmission Control Module (TCM) and CAN-Capable Control Modules, checking**.
		• Short circuit or	○ Read DTC memory

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		open circuit between accelerator pedal module and Engine Control Module (ECM) • Accelerator pedal module faulty	for Engine Control Module (ECM) and repair fault. ○ Check wiring connections and harness connectors using wiring diagram. ○ Replace accelerator pedal module. Refer to **20 - FUEL SUPPLY SYSTEM**

6) No mechanical switch; a specific value from the throttle and accelerator position sensors -G79-/-G185- is set in the Engine Control Module (ECM). Signal transmission from Engine Control Module (ECM) to Transmission Control Module takes place over CAN-bus.

Note on DTC 18112/P1704:

- With the brake pedal depressed and simultaneous full depression of the accelerator pedal as far as Kickdown (wide-open throttle) this fault can be displayed erroneously.

DTC CHART PART 2, UP TO DIAGNOSTIC TROUBLE CODE 18269/P1861

DTC Chart Part 2, up to Diagnostic Trouble Code 18269/P1861

Output at printer		Possible cause	Repair
18141 P1733			
Tiptronic Switch, downshift -F189-			
	Short circuit to ground	• Tiptronic Switch, downshift -F189- faulty	○ Read Measured Value Block. Refer to **Test procedure**; display group number 011.
		• Short circuit to ground in the electrical wiring • Short circuit to ground in the Tiptronic buttons on the multi-function steering wheel or in the wiring	○ Check wiring connections and harness connectors using wiring diagram.

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		• Solenoid in the roll cover for shift mechanism has become detached	○ Replace printed circuit board 7) or roll cover 8) for shift mechanism. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

7) The Tiptronic Switch -F189- consists of switches for recognition, upshift and downshift. It is integrated in the shift mechanism printed circuit board, i.e. if the Tiptronic Switch -F189- is faulty, the printed circuit board has to be replaced.

8) The Tiptronic Switch -F189- receives its Tiptronic gate recognition or upshift/downshift information through the solenoid on the transverse slide on the roll cover. If the solenoid has become detached, the roll cover must be replaced.

Note on DTC 18141/P1733:

- DTC is displayed if the downshift switch 7) was detected shifting outside selector lever position D.

Output at printer		**Possible cause**	**Repair**
18147 P1739			
Tiptronic Switch, upshift -F189-			
	Short circuit to ground	• Tiptronic Switch, upshift -F189-	○ Read Measured Value Block. Refer to **Test**

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		faulty	**procedure**; display group number 011.
		• Short circuit to ground in the electrical wiring • Short circuit to ground in the Tiptronic buttons on the multifunction steering wheel or in the wiring	○ Check wiring connections and harness connectors using wiring diagram.
		• Solenoid in the roll cover for shift mechanism has become detached	○ Replace printed circuit board 7) or roll cover 8) for shift mechanism. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

7) The Tiptronic Switch -F189- consists of switches for recognition, upshift and downshift. It is integrated in the shift mechanism printed circuit board, i.e. if the Tiptronic Switch -F189- is faulty, the printed circuit board has to be replaced.

8) The Tiptronic Switch -F189- receives its Tiptronic gate recognition or upshift/downshift information through the solenoid on the transverse slide on the roll cover. If the solenoid has become detached, the roll cover must

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be replaced.

Note on DTC 18147/P1739:

- DTC is displayed if the upshift switch7) was detected shifting outside selector lever position D.

Output at printer		Possible cause	Repair
18152 P1744			
Tiptronic Switch, recognition -F189-			
	Short circuit to ground	• Tiptronic Switch, recognition -F189- 9) faulty	○ Read Measured Value Block. Refer to **Test procedure**; display group number 011.
		• Short circuit to ground in the electrical wiring • Short circuit to ground in the Tiptronic buttons on the multifunction steering wheel or in the wiring	○ Check wiring connections and harness connectors using wiring diagram.
		• Solenoid in the roll cover for shift mechanism has become detached	○ Replace printed circuit board 7) or roll cover 8) for shift mechanism. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND

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			ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

7) The Tiptronic Switch -F189- consists of switches for recognition, upshift and downshift. It is integrated in the shift mechanism printed circuit board, i.e. if the Tiptronic Switch -F189- is faulty, the printed circuit board has to be replaced.

8) The Tiptronic Switch -F189- receives its Tiptronic gate recognition or upshift/downshift information through the solenoid on the transverse slide on the roll cover. If the solenoid has become detached, the roll cover must be replaced.

9) If the transmission is shifted into the Tiptronic gate with the selector lever in D this shift procedure is recognized by the Tiptronic recognition switch -F189- and transmitted to the Transmission Control Module (TCM).

Note on DTC 18152/P1744:

- DTC is displayed if Tiptronic recognition was detected, although the selector lever is not in the Tiptronic gate.

Output at printer		**Possible cause**	**Repair**
18153 P1745			
Power supply for solenoid valves			
	Short circuit to B+	• Short-circuit of Transmission Control Module (TCM) -J217- terminals 52, 53 to B+.	○ Check power supply for Transmission Control Module (TCM) -J217-, also read Measured Value Block. Refer to **Test procedure**; display group number 003. ○ Check wiring and wiring connectors following wiring diagram 3) ○ Perform electrical test. Refer to **Electrical Testing**.
		• Transmission Control Module (TCM) -J217-	○ Replace Transmission Control Module. Refer to

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	faulty	**Electrical/electronic components and component locations**.

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Output at printer		**Possible cause**	**Repair**
18155 P1747			
Power supply for solenoid valves			
	Open circuit/short circuit to ground	• Open circuit in wiring or short circuit to ground in Transmission Control Module (TCM) -J217- terminals 52, 53	○ Check power supply for Transmission Control Module (TCM) -J217-, also read Measured Value Block. Refer to **Test procedure**; display group number 003. ○ Check wiring and wiring connectors in accordance with wiring diagram 3) ○ Perform electrical test. Refer to **Electrical Testing**.
		• Transmission Control Module (TCM) -J217- faulty	○ Replace Transmission Control Module. Refer to **Electrical/electronic components and component locations**.
18156 P1748			
Control module faulty		• Transmission Control Module (TCM) -J217- faulty	○ Replace Transmission Control Module. Refer to **Electrical/electronic components and component locations**.

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are

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displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Notes on DTC 18156/P1748:

Only after determining the possible fault cause and correcting the following faults:

- Mechanical faults
- Hydraulic faults
- Electrical/electronic components and wiring connections

Output at printer		Possible cause	Repair
18158 P1750			
Power supply			
	Voltage too low	• Open circuit or short circuit to ground • Battery monitoring detects fault	○ Check power supply for Transmission Control Module (TCM) -J217-, also read Measured Value Block. Refer to **Test procedure**; display group number 003. ○ Check wiring connections and harness connectors using wiring diagram. ○ Perform electrical test. Refer to **Electrical Testing**.
		• Open circuit/short circuit to permanent B+ in the Transmission Control Module (TCM)	○ Replace Transmission Control Module. Refer to **Electrical/electronic components and component locations**.

Notes on DTC 18158/P1750:

- Condition for DTC recognition: Battery voltage 9 volts or less. Refer to transmission goes into limp home mode. Refer to **Safety functions of the Transmission Control Module (TCM)**.
- With a loss of electrical system voltage (terminal 30) the adaptation values in the Transmission Control Module (TCM) are reset. The control module has to relearn these values after resumption of operation. During this "learning process" shift quality may be worse than normal.

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Output at printer		Possible cause	Repair
18159 P1751			
Power supply			
Voltage too high		• Generator or voltage regulator faulty • Second battery was inadvertently connected in series, for example while jump starting.	○ Check power supply for Transmission Control Module (TCM) -J217-, also read Measured Value Block. Refer to **Test procedure**; display group number 003. ○ Check wiring connections and harness connectors using wiring diagram. ○ Perform electrical test. Refer to **Electrical Testing**.
		• Voltage regulator for Generator faulty/faulty	○ Check voltage regulator for generator and replace if necessary. Refer to • **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL** • **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL** for ELECTRICAL EQUIPMENT, CABRIOLET

Notes on DTC 18159/P1751:

- Condition for DTC recognition: Battery voltage above 16 volts
- This DTC was also displayed, for example, when jump starting with a 24 volt battery.
- Battery monitoring distinguishes four ranges (U = battery voltage):

1) U less than 7 volts. Refer to transmission goes into limp home mode. Refer to **Safety functions of the Transmission Control Module (TCM)**

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2) U 7...9 volts. Refer to gear is held for about 2.5 seconds, if U is still in this range afterward, transmission goes into limp home mode. Refer to **Safety functions of the Transmission Control Module (TCM)**

3) U 9...16 volts. Refer to voltage is O.K.

4) U higher than 16 volts. Refer to transmission goes into limp home mode. Refer to **Safety functions of the Transmission Control Module (TCM)**

Output at printer		Possible cause	Repair
18161 P1753			
Tiptronic Switch -F189-			
	Implausible signal	• Individual Hall sensors are not switching to ground	○ Check adjustment of selector lever cable. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING ○ Read Measured Value Block. Refer to **Test procedure**; display group number 002. ○ Replace printed circuit board 7) for shift mechanism. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION

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			01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
		• Connector at the shift mechanism not attached • Shift mechanism has no power supply • All 3 Tiptronic wires have an open circuit	○ Check wiring connections and harness connectors using wiring diagram.

7) The Tiptronic Switch -F189- consists of switches for recognition, upshift and downshift. It is integrated in the shift mechanism printed circuit board, i.e. if the Tiptronic Switch -F189- is faulty, the printed circuit board has to be replaced.

Output at printer	**Possible cause**	**Repair**
18169 P1761		
Shift Lock. Refer to Solenoid -N110-		
Short circuit to ground	• Short circuit to ground in the electrical wiring 11) • Fuse faulty	○ Check wiring and wiring connectors in accordance with wiring diagram.
	• Shift Lock Solenoid -N110- faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**.

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			○ Read Measured Value Block. Refer to **Test procedure**; display group number 00 3. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace Shift Lock Solenoid -N110-. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
		• Short circuit on the shift mechanism printed circuit board	○ Replace shift mechanism printed circuit board. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION

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			01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
		• Transmission Control Module (TCM) -J217- faulty	○ Replace Transmission Control Module. Refer to **Electrical/electronic components and component locations**.

11) Shift Lock Solenoid -N110- cannot be switched OFF, i.e. the selector lever cannot be shifted out of selector lever positions P or D, even by actuating the brake pedal.

Output at printer	**Possible cause**	**Repair**
18170 P1762		
Shift Lock. Refer to **Shift Lock Solenoid -N110-**		
Short circuit to B+	• Short circuit to B+ in the electrical wiring 12)	○ Check wiring connections and harness connectors using wiring diagram.
	• Shift Lock Solenoid -N110- faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 003. ○ Perform electrical test. Refer to **Electrical**

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			Testing. ○ Replace Shift Lock Solenoid -N110-. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
		• Short circuit on the shift mechanism printed circuit board	○ Replace shift mechanism printed circuit board. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC

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			TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
		• Transmission Control Module - J217- faulty	○ Replace Transmission Control Module. Refer to **Electrical/electronic components and component locations**.

12) Shift Lock Solenoid -N110- cannot be activated in selector lever position P and N, i.e. it cannot be shifted out of P and N without actuating the brake pedal.

Output at printer		**Possible cause**	**Repair**
18171 P1763			
Shift Lock. Refer to **Shift Lock Solenoid -N110-**			
Open circuit		• Open circuit in the electrical wiring 12)	○ Check wiring connections and harness connectors using wiring diagram.
• Shift Lock Solenoid - N110- faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 003. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace Shift Lock Solenoid -N110-. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION -**		

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	CONTROLS, HOUSING for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING	
• Transmission Control Module -J217- faulty	○ Replace Control Module. Refer to **Electrical/electronic components and component locations**.	

12) Shift Lock Solenoid -N110- for shift lever lock cannot be activated in selector lever position P and N, i.e. it cannot be shifted out of P and N without actuating the brake pedal.

Output at printer		**Possible cause**	**Repair**
18222 P1814			
Pressure Control Valve 1 -N215-			
	Open circuit/short circuit to ground	• Open circuit or short circuit to ground	○ Check wiring and wiring connectors in accordance with wiring diagram 3)
		• Pressure control valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 006. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace pressure control valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for

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			5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Output at printer		**Possible cause**	**Repair**
18223 P1815			
Pressure Control Valve 1 -N215-			
	Short circuit to B+	• Short circuit to B+	○ Check wiring and wiring connectors in accordance with wiring diagram 3)
		• Pressure control valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 006. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace Pressure Control

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			Valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Output at printer		**Possible cause**	**Repair**
18227 P1819			
Pressure Control Valve 2 -N216-			
	Open circuit/short circuit to ground	• Open circuit or short circuit to ground	○ Check wiring and wiring connectors in accordance with wiring diagram 3)
		• Pressure control valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value

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			Block. Refer to **Test procedure**; display group number 006. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace Pressure Control Valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Output at printer		**Possible cause**	**Repair**
18228 P1820			
Pressure Control Valve 2 -N216-			
	Short circuit to B+	• Short circuit to B+	○ Check wiring and wiring connectors in accordance

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			with wiring diagram 3)
		• Pressure control valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 006. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace Pressure Control Valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body

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and the wiring harness.

Output at printer		Possible cause	Repair
18232 P1824			
Pressure Control Valve 3 -N217-			
	Open circuit/short circuit to ground	• Open circuit or short circuit to ground	○ Check wiring and wiring connectors in accordance with wiring diagram 3)
		• Pressure control valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 006. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace pressure control valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND

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			ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Output at printer		**Possible cause**	**Repair**
18233 P1825			
Pressure Control Valve 3 -N217-			
	Short circuit to B+	• Short circuit to B+	○ Check wiring and wiring connectors in accordance with wiring diagram 3)
		• Pressure control valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 006. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace pressure control valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC**

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			TRANSMISSION - GEARS, HYDRAULIC CONTROLS for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Output at printer		**Possible cause**	**Repair**
18237 P1829			
Pressure Control Valve 4 -N218-			
	Open circuit/short circuit to ground	• Open circuit or short circuit to ground	○ Check wiring and wiring connectors in accordance with wiring diagram 3)
		• Pressure control valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 007. ○ Perform electrical test. Refer to **Electrical Testing**. ○ Replace pressure control valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS,**

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			HYDRAULIC CONTROLS for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Output at printer		**Possible cause**	**Repair**
18238 P1830			
Pressure Control Valve 4 -N218-			
	Short circuit to B+	• Short circuit to B+	○ Check wiring and wiring connectors in accordance with wiring diagram 3)
		• Pressure control valve faulty	○ Perform control element diagnosis. Refer to **Control element diagnosis/Output Diagnostic Test Mode (DTM)**. ○ Read Measured Value Block. Refer to **Test procedure**; display group number 007. ○ Perform electrical test. Refer to **Electrical**

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			Testing. ○ Replace pressure control valve or valve body. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

3) First check harness connectors for corroded terminals or water entry and replace if necessary. If DTCs are displayed, pay particular attention to the 16-pin harness connector at the transmission between the valve body and the wiring harness.

Output at printer		**Possible cause**	**Repair**
18249 P1841			
Engine Control Module (ECM)/Transmission Control Module (TCM)			
	Versions do not match	• Incorrect Transmission Control Module (TCM) installed	○ Check Transmission Control Module (TCM) identification number.
		• Incorrect or faulty	○ Verify Engine

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		Engine Control Module (ECM)	Control Module (ECM) identification number and scan DTC memory.
18258 P1850			
Data bus drive 13)			
	Missing message from Engine Control Module (ECM)	• Open circuit in CAN-bus wire	○ Read Measured Value Block. Refer to **Test procedure**; display group number 125. ○ Check CAN-bus. Refer to **Data Exchange between Transmission Control Module (TCM) and CAN-Capable Control Modules, checking**.

13) The data bus is also described as a CAN-bus.

Notes on DTC 18258/P1850:

- Condition for DTC recognition: The Transmission Control Module (TCM) is not receiving a message from the Engine Control Module (ECM). However, communication with the ABS control module and the instrument cluster is working.
- The exchange of data and information between the Engine Control Module (ECM), ABS control module, Transmission Control Module (TCM) and instrument cluster is carried out over what is called a CAN-bus. All information signals are transmitted over 2 lines.

Output at printer		Possible cause	Repair
18259 P1851			
Data bus drive 13)			
	Missing message from ABS control module	• Open circuit in CAN-bus wire	○ Read Measured Value Block. Refer to **Test procedure**; display group number 125. ○ Check CAN-bus. Refer to **Data Exchange between**

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			Transmission Control Module (TCM) and CAN-Capable Control Modules, checking.

13) The data bus is also described as a CAN-bus.

Notes on DTC 18259/P1851:

- Condition for DTC recognition: The Transmission Control Module (TCM) is not receiving a signal from the ABS control module. However, communication with the Engine Control Module (ECM) and the instrument cluster is functioning.
- The exchange of data and information between the Engine Control Module (ECM), ABS control module, Transmission Control Module (TCM) and instrument cluster is carried out over what is called a CAN-bus. All information signals are transmitted over 2 lines.

Output at printer		**Possible cause**	**Repair**
18262 P1854			
Data bus drive 13)			
	Faulty	• Transmission Control Module - J217- faulty	○ Replace Transmission Control Module. Refer to **Electrical/electronic components and component locations**.
18263 P1855			
Data bus drive 13)			
	Monitoring software status	• Open circuit in CAN-bus wire	○ Read Measured Value Block. Refer to **Test procedure**; display group number 125. ○ Check CAN-bus. Refer to **Data Exchange between Transmission Control Module (TCM) and CAN-Capable Control Modules, checking**.
		• Incorrect	○ Check Transmission

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		Transmission Control Module (TCM)	Control Module (TCM) identification number.

13) The data bus is also described as a CAN-bus.

Note on DTCs 18262/P1854 and 18263/P1855:

- The exchange of data and information between the Engine Control Module (ECM), ABS control module, Transmission Control Module (TCM) and instrument cluster is carried out over what is called a CAN-bus. All information signals are transmitted over 2 lines.

Output at printer		Possible cause	Repair
18265 P1857			
Load signal			
	Error message from Engine Control Module (ECM)	• Error in the "Signal for Actual Engine Torque" diagnosed by Engine Control Module (ECM)	○ Read Engine Control Module (ECM) DTC memory and repair fault.
		• Incorrect or faulty Engine Control Module (ECM) or engine components faulty	○ Check Engine Control Module (ECM) identification number and read DTC memory.

Notes on DTC 18265/P1857:

- The signal for actual engine torque is transmitted by the Engine Control Module (ECM) over the CAN-bus circuit to the Transmission Control Module (TCM).
- Conditions for DTC recognition: The Engine Control Module (ECM) diagnoses the fault in the particular component. This fault diagnosis is transmitted over the CAN-bus circuit to the Transmission Control Module (TCM).

Output at printer		Possible cause	Repair
18269 P1861			
Throttle Position Sensor (TP) -G79- 14)			
	Error message from the Engine Control Module	• Short circuit or open circuit between accelerator pedal module and Engine Control Module (ECM)	○ Read DTC memory for Engine Control Module (ECM) and repair fault. ○ Check wiring and wiring connectors

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		• Accelerator pedal module faulty	in accordance with wiring diagram 5) ○ Replace accelerator pedal module. Refer to **20 - FUEL SUPPLY SYSTEM**

5) First check harness connectors for corroded terminals or water entry and replace if necessary.

14) The Throttle Position Sensor and sender for accelerator pedal position -G79-/-G185- are present.

Notes on DTC 18269/P1861:

- The signal for throttle position and accelerator pedal position sensors is transmitted by the Engine Control Module (ECM) over the CAN-bus circuit to the Transmission Control Module (TCM).
- Conditions for DTC recognition: The Engine Control Module (ECM) diagnoses the fault in the particular component. This fault diagnosis is transmitted over the CAN-bus circuit to the Transmission Control Module (TCM).

CONTROL ELEMENT DIAGNOSIS/OUTPUT DIAGNOSTIC TEST MODE (DTM)

Control element diagnosis/Output Diagnostic Test Mode (DTM)

NOTE:

- **Control element diagnosis can only be performed if the ignition is ON, the selector lever is in position "P", the engine is not running and the vehicle is stationary.**
- **Control element diagnosis is terminated if the engine is started.**
- **Solenoid Valve 1 -N88-, Solenoid Valve 2 -N89-, Solenoid Valve 3 -N90-, Pressure Control Valve 1 -N215- and Shift Lock Solenoid -N110- are tested acoustically during control element diagnosis. Ambient noises must be avoided during the acoustical test.**
- **Pressure Control Valve 2 -N216-, Pressure Control Valve 3 -N217- and Pressure Control Valve 4 -N218- are energized through control element diagnosis. Acoustical testing is made more difficult by the fact that these valves click very quietly, which can be heard only in the area of the ATF oil pan. However, any electrical faults that occur when the valves are energized are saved in the DTC memory by the On Board Diagnostic (OBD) system.**
- **During control element diagnosis the individual actuators are energized for approximately 45 seconds, unless the test is automatically advanced to the next actuator by pressing the delta button.**
- **To repeat control element diagnosis, switch the ignition OFF and ON again.**

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Energizing sequence	
1.	Shift Valve 1. Refer to Solenoid Valve 1 -N88-
2.	Shift Valve 2. Refer to Solenoid Valve 2 -N89-
3.	Shift Valve 3. Refer to Solenoid Valve 3 -N90-
4.	Shift Lock. Refer to Solenoid -N110-
5.	Pressure Control Valve 1 -N215-
6.	Pressure Control Valve 2 -N216-
7.	Pressure Control Valve 3 -N217-
8.	Pressure Control Valve 4 -N218-
9.	Power supply for solenoid valves

Test sequence

- Connect VAS 5051 Vehicle Diagnosis, Measurement- and Information System. Refer to **VAS 5051 Vehicle Diagnosis, Measurement and Information System, connecting and selecting functions** and in selection touch vehicle system "02 - Transmission Electronics". Ignition must be switched ON.

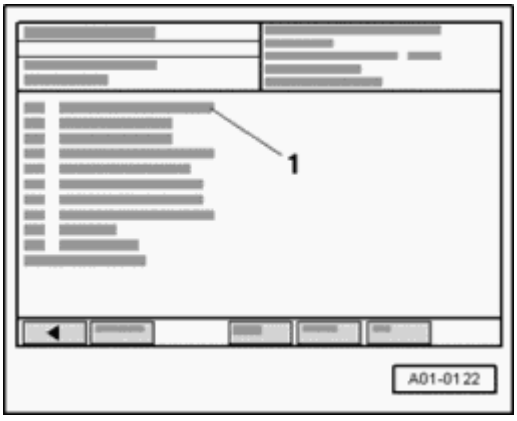


Fig. 30: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

- In selection touch -1- diagnostic function "03 - Control element diagnosis".
- Touch delta button.

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Fig. 31: Display On VAS 5051 - (Actuator Test Is Pending/Shift Valve (Solenoid Valve 1 -N88-))
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

A - Actuator test is pending - Test must be advanced

1 - Shift Valve 1. Refer to Solenoid Valve 1 -N88-

- Touch delta button.

A - Actuator test is running - Test may be advanced

- This valve is energized (clicks) for approximately 45 seconds , unless the test is automatically advanced to the next actuator by touching the delta button.

NOTE: Any electrical malfunctions are saved in the DTC memory. Refer to Diagnostic Trouble Code (DTC) table.

If the valve is not energized (does not click):

- Perform electrical test. Refer to **Electrical Testing**
- Touch delta button.

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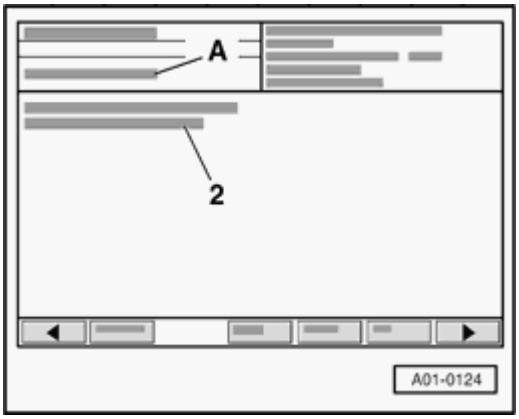


Fig. 32: Display On VAS 5051 - (Actuator Test Is Pending/Shift Valve (Solenoid Valve 2 -N89-))
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

A - Actuator test is pending - Test must be advanced

2 - Shift Valve 2. Refer to Solenoid Valve 2 -N89-

- Touch delta button.

A - Actuator test is running - Test may be advanced

- This valve is energized (clicks) for approximately 45 seconds , unless the test is automatically advanced to the next actuator by touching the delta button.

NOTE: Any electrical malfunctions are saved in the DTC memory. Refer to Diagnostic Trouble Code (DTC) table.

If the valve is not energized (does not click):

- Perform electrical test. Refer to **Electrical Testing**
- Touch delta button.

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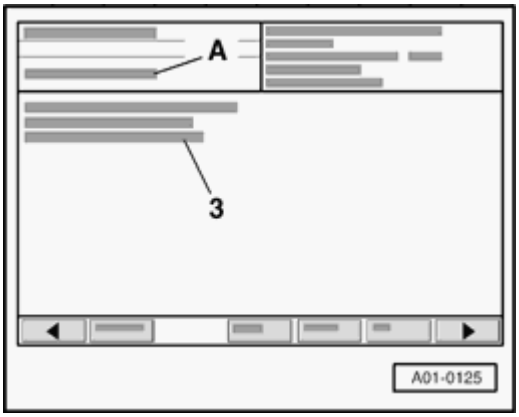


Fig. 33: Display On VAS 5051 - (Actuator Test Is Pending/Shift Valve (Solenoid Valve 3 -N90-))
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

A - Actuator test is pending - Test must be advanced

3 - Shift Valve 3. Refer to Solenoid Valve 3 -N90-

- Touch delta button.

A - Actuator test is running - Test may be advanced

- This valve is energized (clicks) for approximately 45 seconds, unless the test is automatically advanced to the next actuator by touching the delta button.

NOTE: Any electrical malfunctions are saved in the DTC memory. Refer to Diagnostic Trouble Code (DTC) table.

If the valve is not energized (does not click):

- Perform electrical test. Refer to **Electrical Testing**
- Touch delta button.

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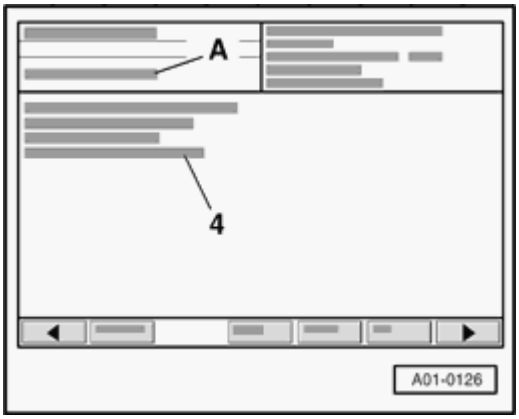


Fig. 34: Display On VAS 5051 - (Actuator Test Is Pending/Shift Lock Solenoid -N110-))
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

A - Actuator test is pending - Test must be advanced

4 - Shift Lock Solenoid -N110-

- Touch delta button.

A - Actuator test is running - Test may be advanced

- The Shift Lock Solenoid -N110- is triggered at intervals for about 45 seconds (clicks), unless control element diagnosis is terminated by touching the delta button.

NOTE: In addition, the brake symbol on the shift mechanism cover must illuminate at intervals.

If the solenoid is not energized (does not click):

- Perform electrical test. Refer to **Electrical Testing**
- Touch delta button.

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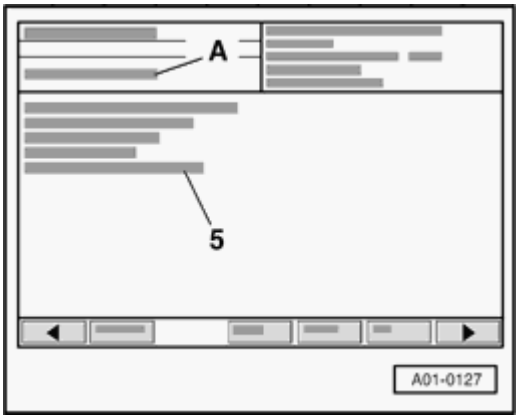


Fig. 35: Display On VAS 5051 - (Actuator Test Is Pending/Pressure Control Valve 1 -N215-))
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

A - Actuator test is pending - Test must be advanced

5 - Pressure Control Valve 1 -N215-

- Touch delta button.

A - Actuator test is running - Test may be advanced

- This valve is energized (clicks) for approximately 45 seconds , unless the test is automatically advanced to the next actuator by touching the delta button.

NOTE: Any electrical malfunctions are saved in the DTC memory. Refer to Diagnostic Trouble Code (DTC) table.

If the valve is not energized (does not click):

- Perform electrical test. Refer to **Electrical Testing**
- Touch delta button.

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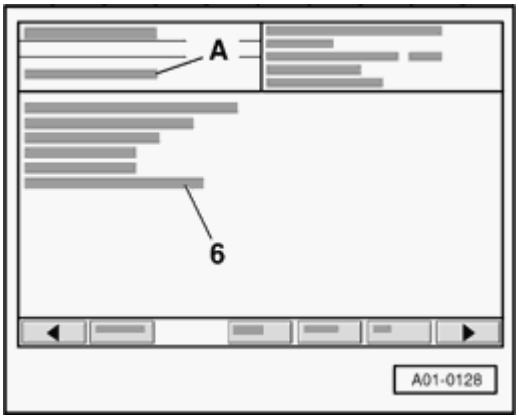


Fig. 36: Display On VAS 5051 - (Actuator Test Is Pending/Pressure Control Valve 2 -N216-))
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

A - Actuator test is pending - Test must be advanced

6 - Pressure Control Valve 2 -N216-

- Touch delta button.

A - Actuator test is running - Test may be advanced

- This valve is energized (clicks) for approximately 45 seconds , unless the test is automatically advanced to the next actuator by touching the delta button.

NOTE: The valve can be heard clicking very faintly only in the area of the ATF oil pan. Any electrical malfunctions are saved in the DTC memory. Refer to Diagnostic Trouble Code (DTC) table.

If the valve is not energized (does not click):

- Perform electrical test. Refer to **Electrical Testing**
- Touch delta button.

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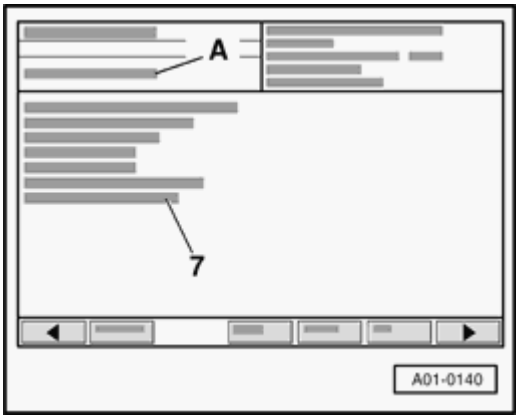


Fig. 37: Display On VAS 5051 - (Actuator Test Is Pending/Pressure Control Valve 3 -N217-))
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

A - Actuator test is pending - Test must be advanced

7 - Pressure Control Valve 3 -N217-

- Touch delta button.

A - Actuator test is running - Test may be advanced

- This valve is energized (clicks) for approximately 45 seconds , unless the test is automatically advanced to the next actuator by touching the delta button.

NOTE: The valve can be heard clicking very faintly only in the area of the ATF oil pan. Any electrical malfunctions are saved in the DTC memory. Refer to Diagnostic Trouble Code (DTC) table.

If the valve is not energized (does not click):

- Perform electrical test. Refer to **Electrical Testing**
- Touch delta button.

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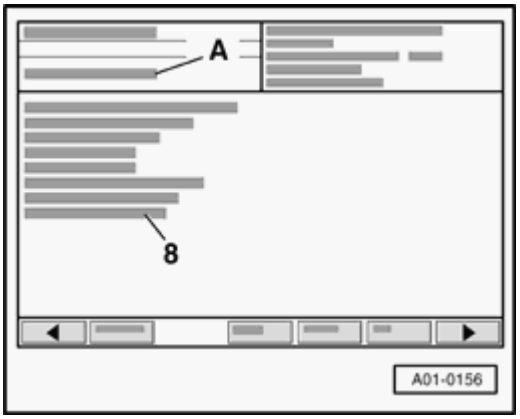


Fig. 38: Display On VAS 5051 - (Actuator Test Is Pending/Pressure Control Valve 4 -N218-))
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

A - Actuator test is pending - Test must be advanced

8 - Pressure Control Valve 4 -N218-

- Touch delta button.

A - Actuator test is running - Test may be advanced

- This valve is energized (clicks) for approximately 45 seconds , unless the test is automatically advanced to the next actuator by touching the delta button.

NOTE: The valve can be heard clicking very faintly only in the area of the ATF oil pan. Any electrical malfunctions are saved in the DTC memory. Refer to Diagnostic Trouble Code (DTC) table.

If the valve is not energized (does not click):

- Perform electrical test. Refer to **Electrical Testing**
- Touch delta button.

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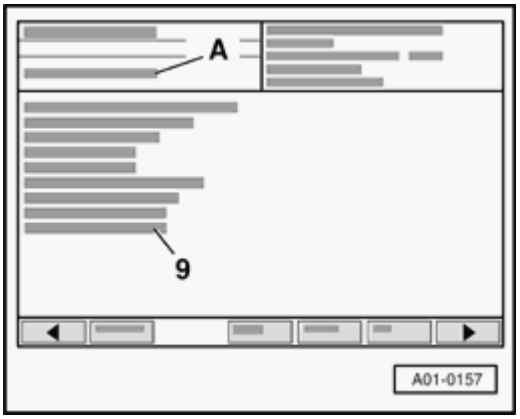


Fig. 39: Display On VAS 5051 - (Actuator Test Is Pending/Power Supply For Solenoid Valves))
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

A - Actuator test is pending - Test must be advanced

9 - Power supply for solenoid valves

- Touch delta button.

A - Actuator test is running - Test may be advanced

NOTE: This actuator can be ignored. To continue control element diagnosis, touch the delta button.



Fig. 40: Display On VAS 5051 - (Output Diagnostic Test Mode Is Completed)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

A - Actuator test is concluded

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- End function "03 - Control element diagnosis" by touching <-- button.

DIAGNOSTIC TROUBLE CODE (DTC) MEMORY, ERASING

Diagnostic Trouble Code (DTC) memory, erasing

Requirements:

- DTC memory scanned. Refer to **Diagnostic Trouble Code (DTC) memory, scanning**.
- All malfunctions corrected.

After DTC scan has been checked:

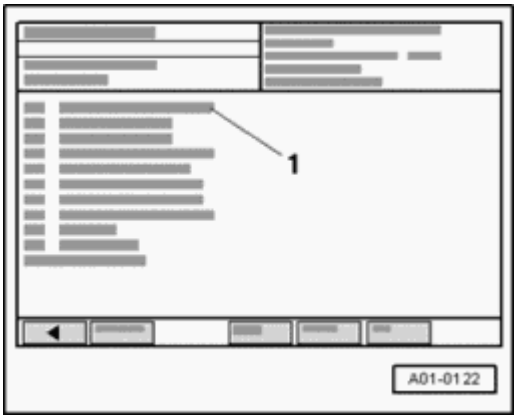


Fig. 41: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

- In selection touch -1- diagnostic function "05 - Delete DTC memory".



Fig. 42: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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Display on VAS 5051:

1 - No display (before deletion)

Or

DTC memory deleted

NOTE: If the message appears in display field -1-: "DTC memory has not been scanned yet", the test procedure was not followed exactly. The DTC memory can only be deleted if the DTC memory was scanned previously.

2 - you sure you want to do this? will be deleted!

- Touch "OK" button in display -2-.
- End function "05 - Delete DTC memory" by touching <-- button.
- After repair scan DTC memory again.

NOTE: This deletes DTCs which were stored during repair of the fault, for example by removing harness connectors.

- After scanning and deleting DTC memory, test drive vehicle and scan DTC memory again.

The scan of the DTC memory must display:

"No DTC recognized"

ADAPTATION VALUES FOR TRANSMISSION CONTROL MODULE (TCM), BASIC SETTING

Adaptation values for Transmission Control Module (TCM), basic setting

NOTE:

- **Following repairs to the valve body (e.g. replacing solenoid valves), if the valve body, the torque converter or the transmission is replaced, the adaptation values in the Transmission Control Module (TCM) should be reset. This allows the adaptation values for normal operation in the Transmission Control Module (TCM) to be learned more quickly following resumption of operation.**
- **Adaptation values in the Transmission Control Module (TCM) are reset if:**

- Multiple connector is removed from Transmission Control Module (TCM) for at least 15 minutes. Refer to **Transmission Control Module (TCM) -J217-, removing and installing**
- Battery is disconnected for at least 15 minutes

Refer to

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- **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL**
- **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL** for ELECTRICAL EQUIPMENT, CABRIOLET

TRANSMISSION CONTROL MODULE (TCM), CODING

Transmission Control Module (TCM), coding

The Transmission Control Module (TCM) can be coded.

NOTE: Coding can only be performed with the ignition ON and with the selector lever in position "P" or "N". Accelerator pedal must remain in idle position. Vehicle must be stationary and the engine must not be started.

Test procedure

- Connect VAS 5051 Vehicle Diagnosis, Measurement and Information System. Refer to **VAS 5051 Vehicle Diagnosis, Measurement and Information System, connecting and selecting functions** and in selection, touch vehicle system "02 - Transmission Electronics". Ignition must be switched ON.

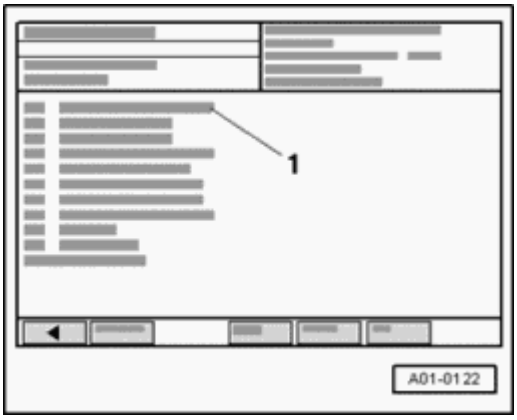


Fig. 43: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

- In selection, touch -1- diagnostic function "07 - Coding control module".

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Fig. 44: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

1 - Enter code word

- On keypad -2- enter control module coding.

Code Number	For vehicles
01002	USA, Canada, Mexico

- Confirm entry by pressing Q button.

NOTE: After coding, the Transmission Control Module DTC memory is automatically deleted.



Fig. 45: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

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1 - Coding is being carried out

- Wait until next display appears on screen.



Fig. 46: Diagnostic System VAS 5051: Display - (Coding Of Vehicle System Performed & Control Module Identification With New Coding)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

1 - Coding in the vehicle system completed

2 - Control module identification number with new coding

(previous coding in parentheses)

- Terminate function "07 - Coding Control Module" by pressing <-- button.

MEASURED VALUE BLOCK, READING

Measured Value Block, reading

CAUTION: Please observe safety precautions. Refer to Safety Precautions

Test procedure

- Connect VAS 5051 Vehicle Diagnosis, Measurement- and Information System. Refer to **VAS 5051 Vehicle Diagnosis, Measurement and Information System, connecting and selecting functions** and in selection touch vehicle system "02 - Transmission Electronics". Ignition must be switched ON.

or, depending on the desired operation:

- Start engine.

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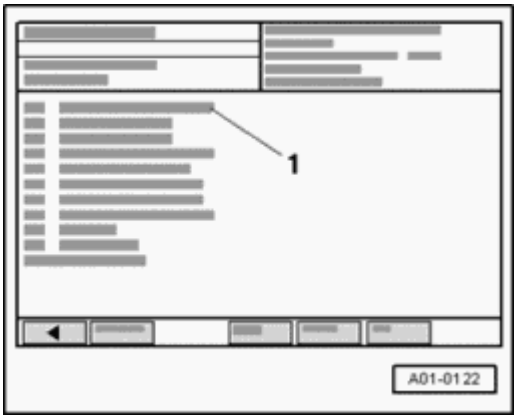


Fig. 47: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

- In selection touch -1- diagnostic function "08 - Read Measured Value Block".



Fig. 48: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

1 - Enter display group

- On key pad -2- enter desired 3-digit display group number. Refer to **List of Selectable Display Group Numbers** and confirm entry by touching Q-button.

Example:

- Entry "001" for "Display group number 001" and confirm by touching Q button.

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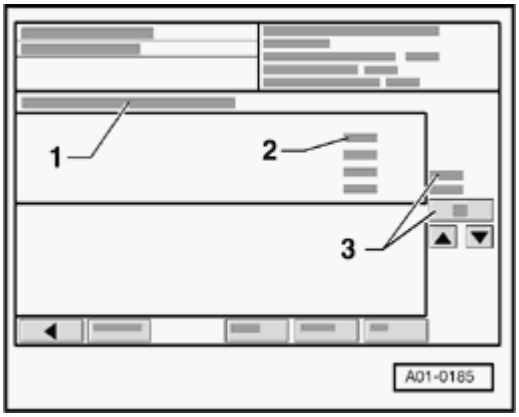


Fig. 49: Diagnostic System VAS 5051: Display Zones
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

1 - Read Measured Value Block

2 - Display field 1

Display field 2

Display field 3

Display field 4

3 - Display Group X

NOTE:

- **If a display field is not being used, there will be no display.**
- **To switch to another display field, proceed as follows:**

Display group	VAS 5051
Higher	Press button s
Lower	Press button t

- End function "08 - Read Measured Value Block" by touching <-- button.

List of Selectable Display Group Numbers

Display on screen (example)						
Display fields:				Display Group Number	Display Field	Description
1	2	3	4			

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Read Measured Value Block				001	1	Engine RPM
					2	Sensor for transmission RPM -G182-
0 RPM	0 RPM	0 RPM	4		3	Sender for transmission output RPM -G195-
					4	Gear selected
Read Measured Value Block				002	1	Current program
					2	Accelerator pedal value
DS	0 %	0 RPM	4		3	Sender for transmission output RPM -G195-
					4	Gear selected
Read Measured Value Block				003	1	Brake light switch -F-
					2	Shift Lock Solenoid -N110-
	PN active	0 kph	12.8 V		3	Speed
					4	Supply voltage terminal 15

Display on screen (example)						
Display fields:				**Display Group Number**	**Display Field**	**Description**
1	2	3	4			
Read Measured Value Block				004	1	ATF-temperature
					2	Selector lever position - Multi-function Transmission Range (TR) Switch -F125-
21.0°C	P	1000	0101		3	Multi-function Transmission Range (TR) Switch position
					4	Information for On-Board-Diagnostic System
Read Measured Value Block				005	1	Solenoid Valve 1 -N88-
					2	Solenoid Valve 2 -N89-
0	0	0	4		3	Solenoid Valve 3 -N90-
					4	Gear selected
Read Measured Value Block				006	1	Specified current for Pressure Control Valve 1 -N215-
					2	Specified current for Pressure Control Valve 2 -N216-
0.048 A	0.048 A	0.048 A	0		3	Specified current for Pressure Control Valve 3 -N217-
					4	Can be ignored

Display on screen (example)						
Display fields:				**Display Group Number**	**Display Field**	**Description**
1	2	3	4			

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Read Measured Value Block				007	1	ATF temperature
					2	Specified current for Pressure Control Valve 4 -N218-
21.0°C	0.048 A	Torque Converter clutch open	0 RPM		3	Torque converter clutch
					4	Torque converter slip RPM
Read Measured Value Block				008	1	Kick-down Switch
					2	Accelerator pedal value
	0 %	Deceleration			3	Deceleration/Power mode
					4	
Read Measured Value Block				009	1	Actual engine torque
					2	Engine RPM
176 Nm	0 RPM	0 %	0 Nm		3	Accelerator pedal value
					4	Transmission input torque

Display on screen (example)						
Display fields:				**Display Group Number**	**Display Field**	**Description**
1	2	3	4			
Read Measured Value Block				010	1	Torque increase in the torque converter
					2	Engine RPM
0.0	0 RPM	4	0.00 ms2		3	Gear selected
					4	Actual vehicle acceleration
Read Measured Value Block				011	1	Selector lever position
					2	Tiptronic recognition
D	M switch	Upshift switch			3	Tiptronic Switch, upshift/downshift -F189-
					4	
Read Measured Value Block				012	1	Type of driving, load
					2	Dynamic code number
E	56	80	45		3	Rolling resistance index
					4	Driver evaluation

Display on screen (example)						
Display fields:				**Display Group Number**	**Display Field**	**Description**
1	2	3	4			
Read Measured Value Block				013	1	CAN-bus normalizing torque
					2	CAN-bus engine code number

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420 Nm	4	0	11		3	CAN-bus transmission code number
					4	CAN-bus software status code number
Read Measured Value Block				125	1	Engine Control Module (ECM) is participant on the CAN-bus
					2	CAN-bus
Engine 1	ABS 1	Steering wheel 1			3	Steering column electronics system is participant on the CAN-bus
					4	

Test table

Display group number	Display field	Description	Test conditions		Specified Value Displayed	Steps in the events of deviations from specified value
001	1	Engine RPM	With the engine running		0... 8200 RPM	○ See DTC 17968/P1560
	2	Transmission input RPM from sensor for transmission RPM - G182-	While driving 1)	With gear engaged		○ See DTC 17100/P0716
				R	0... 8200 RPM	
				1. 1m	0... 2000 RPM	
				2	0... 8200 RPM	
				3	0... 8200 RPM	
Continued				4	0... 8200 RPM	
?				5	0... 8200 RPM	

1) While driving: A second technician is needed to read the specified values.

Display group	Display field	Description	Test conditions	Specified Value	Steps in the events of deviations from

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number					Displayed	specified value
001	3	Transmission output RPM from transmission output RPM sensor - G195-	While driving 1)	With gear engaged		○ See DTC 17105/P0721
				R	0... 2000 RPM	
				1.1 m	0... 2000 RPM	
				2	0... 4000 RPM	
				3	0... 5800 RPM	
Continued				4	0... 8200 RPM	
?				5	0... 8200 RPM	

1) While driving: A second technician is needed to read the specified values.

Note on display group number 001, display fields 2 and 3:

- Test condition: Shifting must be completed. Vehicle not decelerating (not driving downhill or engine braking).

Display group number	Display field	Description	Test conditions		Specified Value Displayed	Steps in the events of deviations from specified value
001	4	Gear selected	While driving 1)	Selector lever position		○ Check solenoid valves and pressure control valves, display group number 005, 006 and 007
				"N"	"1"..."5" 2)	
				"R"	"R"	○ Check selector lever position, display group number 004
				"D"	"1m" "2" "3" "4" "5"	

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				"S"	"1m" "2" "3" "4"	

1) While driving: A second technician is needed to read the specified values.

2) The Transmission Control Module (TCM) is equipped with automatic gear slaving. The forward gear, which the Transmission Control Module (TCM) would activate during a driving mode change with the selector lever in "D", is displayed.

Notes on display group number 001, display field 4:

- Faulty solenoid valves or other diagnosed faults can prevent a specific gear from being engaged.

Display group number	Display field	Description	Test conditions	Specified Value Displayed	Steps in the events of deviations from specified value
002	1	Current program	In normal operation 1)		Is determined by driving style and road conditions (acceleration, accelerator pedal movement, speed and load)
			Dynamic shift program is activated	DS	Shifts are avoided as much as possible
			Warm up program is activated	WL	Upshifts are made sooner in order to avoid high RPM
			Automatic Traction Control activated	AS	
Continued ?			Tiptronic recognition activated	TT	○ See DTCs 18141/P1733, 18147/P1739 and 18152/P1744

1) While driving: A second technician is needed to read the specified values.

Display group number	Display field	Description	Test conditions		Specified Value Displayed	Steps in the events of deviations from specified value
002	2	Accelerator pedal value	Engine not running	Accelerator pedal not depressed	0...1 %	When accelerating from idle to Wide Open Throttle the % value increases steadily
				Accelerator pedal fully depressed	99...100 %	○ See DTC 18269/P1861
	3	Transmission output RPM	See display group number 001, display field 3			

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	4	Gear selected	See display group number 001, display field 4

Display group number	Display field	Description	Test conditions		Specified Value Displayed	Steps in the events of deviations from specified value
003	1	Brake light switch F	Brake pedal	Actuated	Brake	○ See DTC 17087/P0703
				Not actuated	-	
	2	Shift Lock Solenoid -N110-	In selector lever position P or N			○ See DTCs 18169/P1761, 18170/P1762 and 18171/P1763
			Brake pedal	Actuated	P N inactive	
				Not actuated	P N active	
	3	Speed	While driving 1)		..km/h	The speedometer display and values on the tester can show minor divergences
	4	Supply voltage terminal 15	Stationary	min.	10.0 V	○ Check fuses and wiring following wiring diagram
				max.	16.0 V	○ Perform electrical test. Refer to **Electrical Testing**

1) While driving: A second technician is needed to read the specified values.

Display group number	Display field	Description	Test conditions		Specified Value Displayed	Steps in the events of deviations from specified value
004	1	ATF temperature	Stationary with the engine running		..°C	○ See DTCs 17094/P0710, 17095/P0711, 17096/P0712 and 17097/P0713
	2	Selector lever position - Multi-function Transmission Range (TR) Switch -F125-	Stationary	Selector lever position		○ Check conformance with Transmission Range (TR) Selector Lever Display -Y6- in the instrument cluster
				P	P	○ Check Multi-function Transmission Range (TR) Switch -F125-

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						Display group number 004, display field 3
				R	R	
				N	N	
	Continued			D	D	
	?			S	S	

Notes on ATF temperature:

- A detected temperature of -50°C indicates a short circuit to ground.
- A detected temperature of 180°C indicates a short circuit to B+ or an open circuit.

Display group number	Display field	Description	Test conditions		Specified Value Displayed	Steps in the events of deviations from specified value
004	2	Selector lever position - Multi-function Transmission Range (TR) Switch -F125-	Stationary	Selector lever position between		○ Check Multi-function Transmission Range (TR) Switch -F125- Display group number 004, display field 3
		Intermediate positions when operating the selector lever		P and R Or R and N	Z1	
Continued				N and D	Z2	
?				D and S	Z3	

Notes on the intermediate positions:

If the selector lever is shifted into one of the intermediate positions mentioned, "Z1", "Z2" or "Z3" is shown on the display. No selected gear must be shown in the display in the instrument cluster , that is to say, only PRNDS is displayed, without a gear being lit up.

Display group number	Display field	Description	Test conditions		Specified Value Displayed				Steps in the events of deviations from specified value
004	3	Selector lever position - Multi-function Transmission Range (TR) Switch -F125-	Stationary	Selector lever position	L1	L2	L3	L4	○ See DTC 17090/P0706
				P	1	0	0	0	
				R	0	1	0	0	

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					N	1	1	1	0	
Continued					D	1	0	1	1	
?					S	0	1	1	1	

Notes on display field 3 in display group number 004:

- The input signals for Multi-function Transmission Range (TR) Switch -F125- can be checked at the Transmission Control Module (TCM).

	Display field 3 (from left to right):			
	L 1	L 2	L 3	L 4
Wiring connection to Transmission Control Module (TCM) -J217-	Terminal 36 of -J217-	Terminal 8 of -J217-	Terminal 37 of -J217-	Terminal 9 of -J217-

Display group number	Display field	Description	Test conditions	Specified Value Displayed	Steps in the events of deviations from specified value
004	4	On-Board-Diagnostic System information Readout on display from left to right	While driving 1)		
		Malfunction display	Switched ON	1	
			Switched OFF	0	
		Trip	Completed	1	
			Not completed	0	Can be ignored
		Transmission warm-up	Completed	1	
			Not completed	0	
		Engine start	Detected	1	
			Not detected	0	

1) While driving: A second technician is needed to read the specified values.

Display group number	Display field	Description	Test conditions	Specified Value Displayed	Steps in the events of deviations from specified value
005	1	Solenoid Valve 1 -N88-	While driving 1) Gear selected		○ See DTCs 17135/P0751, 17136/P0752 and 17137/P0753
			R, 1, 1m,	X	

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					2, 5		
					3, 4	0	
	2	Solenoid Valve 2 -N89-		While driving 1)	Gear selected		○ See DTCs 17140/P0756, 17141/P0757 and 17142/P0758
Continued					1, 2, 3	X	
?					R, 1m, 4, 5	0	

1) While driving: A second technician is needed to read the specified values.

Note on the solenoid valves:

- Non-switched (inactive) solenoid valves are shown with "0", switched (active) solenoid valves are shown with "X".

Display group number	Display field	Description	Test conditions		Specified Value Displayed	Steps in the events of deviations from specified value
005	3	Solenoid Valve 3 -N90-	While driving 1)	Gear selected		○ See DTCs 17145/P0761, 17146/P0762 and 17147/P0763
					X 5)	
				R, 1, 1m, 2, 3, 4, 5	0	
	4	Gear selected	See display group number 001, display field 4			

1) While driving: A second technician is needed to read the specified values.

5) Solenoid Valve 3 -N90- is actuated only briefly during certain shift operations.

Note on the solenoid valves:

- Non-switched (inactive) solenoid valves are shown with "0", switched (active) solenoid valves are shown with "X".

Display group number	Display field	Description	Test conditions	Specified Value Displayed	Steps in the events of deviations from specified value
006	1	Specified current for Pressure Control Valve 1 -N215-	While driving 1)		○ See DTCs 18222/P1814 and 18223/P1815
				min. 0.0 A	
				max. 2.0	

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				A	
	2	Specified current for Pressure Control Valve 2 -N216-	While driving 1)		○ See DTCs 18227/P1819 and 18228/P1820
				min. 0.0 A	
				max. 2.0 A	
	3	Specified current for Pressure Control Valve 3 -N217-	While driving 1)		○ See DTCs 18232/P1824 and 18233/P1825
				min. 0.0 A	
				max. 2.0 A	
	4		Can be ignored		

1) While driving: A second technician is needed to read the specified values.

Note on specified current for pressure control valves:

- Faulty solenoid or pressure control valves, clutches or other faults can prevent a specific gear from being engaged.

Display group number	Display field	Description	Test conditions	Specified Value Displayed	Steps in the events of deviations from specified value
007	1	ATF temperature	See display group number 004, display field 1		
	2	Specified current for Pressure Control Valve 4 -N218-	While driving 1)		○ See DTCs 18237/P1829 and 18238/P1830
				min. 0.0 A	
				max. 2.0 A	
	3	Torque converter clutch	While driving 1)	Torque Converter clutch open	○ See DTC 17125/P0741
Continued				Torque Converter clutch control	
?				Converter clutch closed	

1) While driving: A second technician is needed to read the specified values.

Note on specified current for pressure control valves:

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- Faulty solenoid or pressure control valves, clutches or other faults can prevent a specific gear from being engaged.

Display group number	Display field	Description	Test conditions		Specified Value Displayed	Steps in the events of deviations from specified value
007	4	Torque converter slip RPM	While driving 1)	Torque converter clutch open	0...full Braking RPM	○ See DTCs 17105/P0721 and 17125/P0741
				Torque converter clutch control (last shift at least 20 seconds previously)	20...120 RPM	○ Determine which servo is faulty or not activated. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING ; Power Train Chart; Position of Shift Elements
				Converter clutch closed	0...20 RPM	○ Check plausibility between engine, transmission input RPM- and transmission RPM; display group number 001

1) While driving: A second technician is needed to read the specified values.

Test conditions for torque converter slip RPM:

- "Converter clutch closed" The shift must be completed (wait at least 1 second), the torque converter lockup clutch (WK) must be closed and accelerator pedal value must be constant.
- "Converter clutch control": The values given apply to the "adjusted condition" of the converter clutch. Under unfavorable conditions (for example, accelerating on a hill) this condition will not be reached until 20 seconds after the completion of the shift. During this adjustment phase, slip values up to 350 RPM can be reached.
- Excessive converter slip RPM figures can also indicate slipping clutches or servos not activated.

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Display group number	Display field	Description	Test conditions		Specified Value Displayed	Steps in the events of deviations from specified value
008	1	Kickdown Switch -F8-	Engine not running	Not actuated	-	○ See DTC 18112/P1704
				Kickdown actuated)	Kickdown	
	2	Accelerator pedal value	See display group number 002, display field 2			
	3	Deceleration/Power signal	While driving 1)	Deceleration mode	Deceleration	While driving downhill or slowing down (engine brake)
				Power mode	-	In normal operation, engine is delivering power

1) While driving: A second technician is needed to read the specified values.

6) Kickdown point passed at throttle pedal.

Display group number	Display field	Description	Test conditions	Specified Value Displayed	Steps in the events of deviations from specified value
009	1	Engine torque	While driving 1)	Nm	The signal for actual engine torque is transmitted by the Engine Control Module (ECM) over the CAN-bus circuit to the transmission control module (TCM) ○ See DTC 18265/P1857
	2	Engine RPM	See display group number 001, display field 1		
	3	Accelerator pedal value	See display group number 002, display field 2		
	4	Transmission input torque	While driving 1)	.. Nm	Should behave similarly to display field 1. Can be ignored at this time

1) While driving: A second technician is needed to read the specified values.

Note on display field 1

The signal for actual engine torque is transmitted by the Engine Control Module (ECM) over the CAN-bus circuit to the Transmission Control Module (TCM)

Display group	Display field	Description	Test conditions	Specified Value	Steps in the events of deviations from specified value

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number				Displayed	
010	1	Torque increase in the converter	While driving 1)	0...3.2	Is calculated by the Transmission Control Module (TCM) from converter slip RPM
	2	Engine RPM	See display group number 001, display field 1		
	3	Gear selected	See display group number 001, display field 4		
	4	Actual vehicle acceleration	While driving 1)	min. -10 m/s2	Can be ignored

1) While driving: A second technician is needed to read the specified values.

Display group number	Display field	Description	Test conditions	Specified Value Displayed	Steps in the events of deviations from specified value
011	1	Selector lever position	See display group number 004, display field 2		
	2	Tiptronic Switch, recognition -F189-	Selector lever in the Tiptronic gate	M switch	○ See DTC 18152/P1744
			Selector lever not in the Tiptronic gate	-	
	3	Tiptronic Switch, upshift/downshift -F189-	Selector lever in the Tiptronic gate		○ See DTCs 18141/P1733 and 18147/P1739
			Not actuated	-	
			Upshifting 7)	Upshift switch	
			Downshifting 8)	Downshift switch	

7) You must activate the upshift switch (+) by tapping the selector lever forward. On vehicles with multi-function steering wheel the upshift switch has to be activated by additionally tapping the upper left or right button (+) on the steering wheel.

8) You must activate the downshift switch (-) by tapping the selector lever to the rear. On vehicles with multi-function steering wheel the downshift switch has to be activated by additionally tapping the lower left or right button (-) on the steering wheel.

Display group number	Display field	Description	Test conditions	Specified Value Displayed	Steps in the events of deviations from specified value
012	1	Type of driving, load	No load driving, for example on a level road	E	
			Driving under load, for example driving uphill	B	

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	2	Dynamic code number	Is calculated from rolling resistance index and driver evaluation	0...256	Can be ignored at this time
	3	Rolling resistance index	Is required in order to calculate the dynamic code number	0...256	
	4	Driver evaluation	Is required in order to calculate the dynamic code number	0...256	

Display group number	Display field	Description	Test conditions	Specified Value Displayed	Steps in the events of deviations from specified value
013	1	CAN-bus Standardization torque	Stationary with the ignition ON	.. Nm	Can be ignored
	2	CAN-bus Engine code number		0... 63	○ See DTC 18249/P1841
	3	CAN-bus Transmission code number		1	○ Verify Engine Control Module (ECM) coding
	4	CAN-bus Software status code number		0... 63	○ See DTC 18263/P1855

Note on display group number 013:

- Display field 2 and 4: When the Engine Control Module (ECM) is replaced, the same display as on the old control module must appear after installing the new control module. If this is not the case, the wrong Engine Control Module (ECM) has been installed, or it has been incorrectly coded.

Display group number	Display field	Description	Test conditions		Specified Value Displayed	Steps in the events of deviations from specified value
125	1	Participant on CAN-bus drive: Engine Control Module (ECM)	Stationary	Participates	Engine 1	○ Check CAN-bus. Refer to **Data Exchange between Transmission Control Module (TCM) and CAN-Capable Control Modules, checking**
				Does not participate	Engine 0	
	2	Participant on CAN-bus drive:	Stationary	Participates	ABS 1	○ Check CAN-bus. Refer to

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		ABS control module				**Data Exchange between Transmission Control Module (TCM) and CAN-Capable Control Modules, checking**
				Does not participate	ABS 0	
	3	Participant on CAN-bus drive: Control module for steering column electronics	Stationary	Participates	Steering wheel 1	○ Check CAN-bus. Refer to **Data Exchange between Transmission Control Module (TCM) and CAN-Capable Control Modules, checking**
				Does not participate	Steering wheel 0	

Notes on display group number 125

- If "1" is displayed, communication from the corresponding control module to the Transmission Control Module (TCM) is O.K.
- If "0" is displayed and no fault has been set in the DTC memory, the corresponding control module does not have CAN capability (or is faulty).

ELECTRICAL TESTING

Electrical Testing

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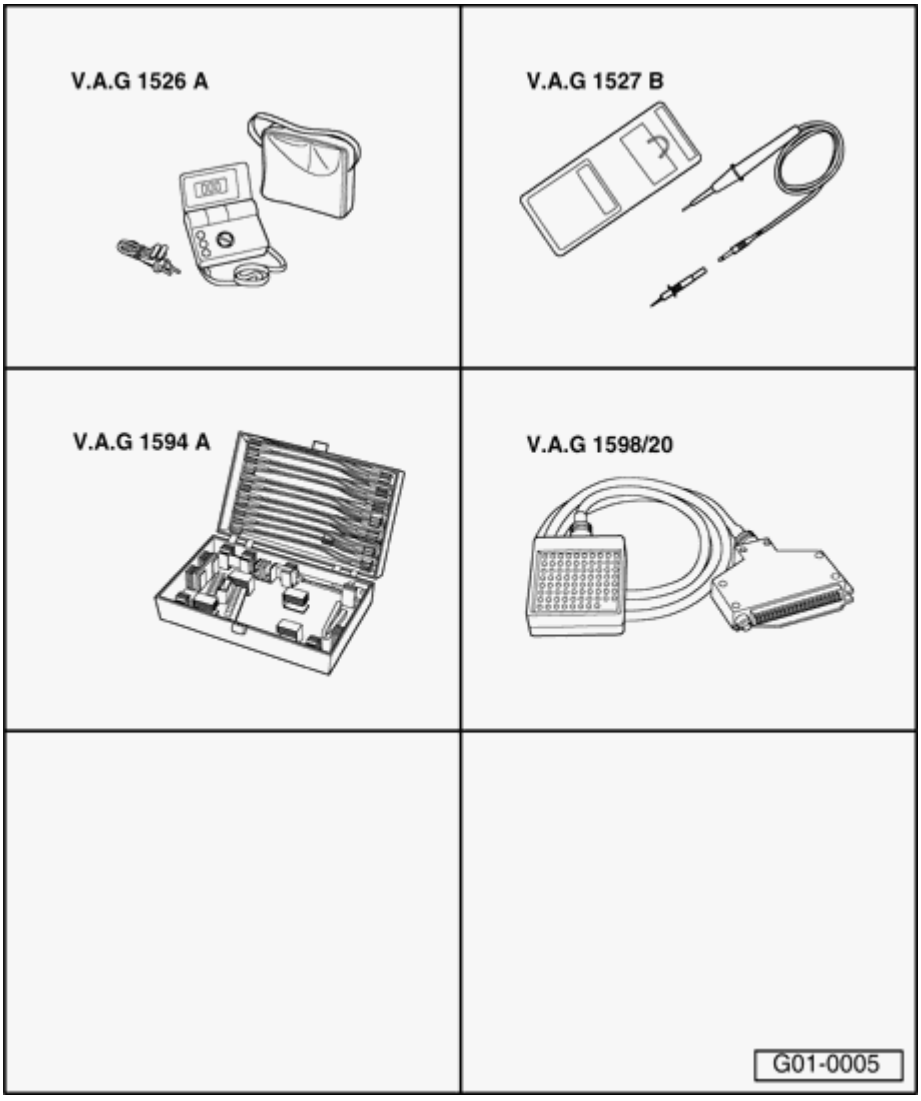


Fig. 50: Identifying Special Tools - Electrical Testing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools and equipment

- V.A.G 1526 A
- V.A.G 1527 B
- V.A.G 1594 A
- V.A.G 1598/20

NOTE:

- **For testing, use Multimeter V.A.G 1526 A or Vehicle Diagnosis, Measurement and Information System VAS 5051. The charts contain the specific measurement methods which have to be set up before the corresponding measurements.**
- **The specified values given are valid for an ambient temperature of 0°C to**

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40°C.

- **If the values measured deviate from the specified values, determine malfunctions following the wiring diagram.**
- **If the values measured show only a minor deviation from the specified values, clean cavities and connectors on the test equipment and test leads, repeat test. Before replacing the components in question, check their wires and connectors. In particular, with specified values under 10 ohms , repeat the resistance measurement on the component.**
- **The terminal numbers of the connector and the cavity numbers on the V.A.G 1598/20 test box match. Refer to Multiple harness connector (88-pin connector) of Transmission Control Module (TCM) -J217- (cavities on V.A.G 1598/20).**

CAUTION: In order to avoid destroying electronic components, the specific measurement range on the measuring equipment must be switched on before connecting the test leads.

Test requirements:

- Vehicle voltage supply O.K.
- Voltage supply and fuses for particular system O.K.

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

- Ground connections for transmission O.K.

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

- Check ground connections for corrosion and damaged connection, repair as needed.

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

- Check battery ground strap and ground strap between battery and transmission.

Test procedure

- Switch ignition OFF.
- Remove Transmission Control Module (TCM). Refer to **Transmission Control Module (TCM) -J217-, removing and installing** and separate multiple connector. Refer to **Transmission Control Module (TCM) -J217-, removing and installing**.

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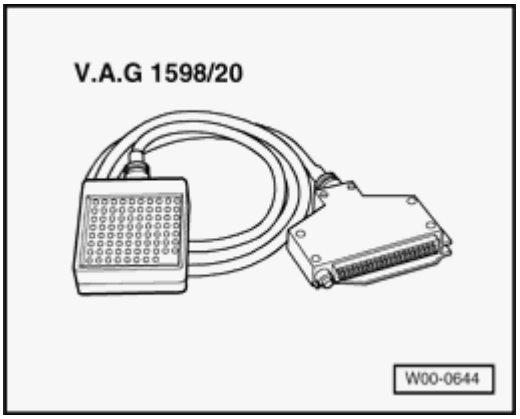


Fig. 51: V.A.G 1598/20 Test Box
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect V.A.G 1598/20 test box to control module wiring harness.
- If values measured deviate from specifications, perform "Steps in event of deviations from specified value" in right-hand column of test table. Refer to **Test table**.
- Perform all steps in column "Steps in the event of deviations from specified value"
- Perform only test steps recommended in Test table ("selective troubleshooting")

Multiple harness connector (88-pin connector) of Transmission Control Module (TCM) -J217- (cavities on V.A.G 1598/20)

1	Pressure Control Valve 2 -N216-	18	Not used
2	Shift Lock Solenoid -N110-	19	Not used
3	Not used	20	Not used
4	Pressure Control Valve 4 -N218-	21	Transmission Fluid Temperature Sensor -G93- (ATF)
5	Pressure Control Valve 1 -N215-	22	Transmission Fluid Temperature Sensor -G93- (ATF)
6	Ground for power consumers (terminal 31)	23	Not used
7	Not used	24	Not used
8	Multi-function Transmission Range (TR) Switch -F125- L2	25	Not used
9	Multi-function Transmission Range (TR) Switch -F125- L4)	26	Supply voltage (terminal 30)
10	Not used	27	Not used
11	Not used	28	Not used
12	Not used	29	Pressure Control Valve 3 -N217-
13	Tiptronic Recognition	30	Solenoid Valve 1 -N88-
14	Sender for transmission output RPM -G195-	31	Not used
15	Sender for transmission output RPM -G195- (suppression shield)	32	Solenoid Valve 3 -N90-
16	Sensor for transmission RPM -G182-	33	Solenoid Valve 2 -N89-

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17	Not used	34	Ground for power consumers (terminal 31)

35	Not used	54	Supply voltage (terminal 15)
36	Multi-function Transmission Range (TR) Switch -F125- L1	55	Supply voltage (terminal 15)
37	Multi-function Transmission Range (TR) Switch -F125- L3	56	Not used
38	Not used	-	
39	Not used	-	
40	Not used	-	
41	Not used	-	
42	Sender for transmission output RPM -G195-	-	
43	Not used	-	
44	Sensor for transmission RPM -G182-	-	Cavities 57 to 83 are not used
45	Not used	-	
46	Tiptronic upshift	-	
47	Tiptronic downshift	-	
48	Not used	-	
49	Not used	84	Not used
50	Not used	85	CAN-bus 1)
51	Not used	86	CAN-bus 1)
52	Power supply for the solenoid valves	87	Not used
53	Power supply for the solenoid valves	88	K-Diagnostic circuit

1) Signal is transmitted over the Engine Control Module (ECM) to the Transmission Control Module (TCM) and can only be checked in the Measured Value Block. Refer to **Test procedure**.

Chart of Test Steps (88-pin multiple connector)

- Perform only the test steps listed by component in the DTC Chart and the Measured Value Block.

Component Tested		Component Tested	
Power supply for control module -J217-	○ Perform test steps 1 and 5.	Pressure Control Valve 2 -N216-	○ Perform test steps 11 and 6.
Shift Lock Solenoid	○ Perform	Pressure Control	○ Perform test steps 12 and 6.

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-N110-	test steps 2 and 14.	Valve 3 -N217-	
Multi-function Transmission Range (TR) Switch -F125-	○ Perform test steps 3 and 4.	Pressure Control Valve 4 -N218-	○ Perform test steps 13 and 6.
Solenoid Valve 1 -N88-	○ Perform test steps 7 and 6.	Sender for transmission output RPM -G195-	○ Perform test step 15.
Solenoid Valve 2 -N89-	○ Perform test steps 8 and 6.	Transmission Fluid Temperature Sensor -G93- (ATF)	○ Perform test step 16.
Solenoid Valve 3 -N90-	○ Perform test steps 9 and 6.	CAN-bus	○ Check CAN-bus. Refer to **Data Exchange between Transmission Control Module (TCM) and CAN-Capable Control Modules, checking**.
Pressure Control Valve 1 -N215-	○ Perform test steps 10 and 6.		

Test table

Switch on measurement range: Voltage measurement					
Test step	**V.A.G 1598/20**	**What is being tested**	• **Test conditions** ○ Additional procedures	**Specified Value**	**Steps in the event of deviations from specified value**
1	54 + 34 54 + 6 55 + 34 55 + 6	Power supply for the Transmission Control Module (TCM) -J217-	• Ignition switched ON	Approximate battery voltage	○ Check wiring routing using wiring diagram.
	26 + 6 26 + 34	Electrical system voltage terminal 30 from Transmission Control Module (TCM) -J217-	• Ignition switched OFF	Approximate battery voltage	○ Check wiring routing using wiring diagram.
2	2 + 6	Shift Lock Solenoid -N110-	• Ignition switched ON	Approximate battery voltage	○ Check wiring routing using wiring diagram. ○ Check Multi-function Transmission Range (TR) Switch -F125- for short circuit.

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					○ Check solenoid -N110- for short circuit. ○ Perform test step 14.

Switch on measurement range: Voltage measurement					
Test step	**V.A.G 1598/20**	**What is being tested**	• **Test conditions** ○ Additional procedures	**Specified Value**	**Steps in the event of deviations from specified value**
3	36 + 34 36 + 6	Multi-function Transmission Range (TR) Switch -F125-	• Ignition switched ON ○ Selector lever in "P", "N" or "D"	Approximate battery voltage	○ Check harness connector at Multi-function Transmission Range (TR) Switch for corroded terminals.
			○ Selector lever in "R" or "S"	Less than 1 volt	○ Check Multi-function Transmission Range (TR) Switch. Refer to **Multi-function Transmission Range (TR) Switch -F125-, checking**.
	8 + 34 8 + 6		○ Selector lever in "R", "N" or "S"	Approximate battery voltage	○ Check power supply to Multi-function Transmission Range (TR) Switch. Refer to **Check power supply to Multi-function TR switch**.
			○ Selector lever in "P" or. "D"	Less than 1 volt	○ Perform test step 4.
	37 + 34 37 + 6		○ Selector lever in "N", "D" or "S"	Approximate battery voltage	
			○ Selector lever in "P" or. "R"	Less than 1 volt	
	9 + 34 9 + 6		○ Selector lever in "D" or "S"	Approximate battery voltage	
			○ Selector lever in "P", "R" or. "N"	Less than 1 volt	

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Switch on measurement range: Resistance measurement					
Test step	**V.A.G 1598/20**	**What is being tested**	• **Test conditions** ○ Additional procedures	**Specified Value**	**Steps in the event of deviations from specified value**
4	55 + 36	Multi-function Transmission Range (TR) Switch -F125-	• Ignition switched OFF ○ Selector lever in "P", "N" or "D"	Less than 1 ohms	○ Check harness connector at Multi-function Transmission Range (TR) Switch for corroded terminals.
			○ Selector lever in "R" or "S"	infinity ohms	○ Check Multi-function Transmission Range (TR) Switch. Refer to **Multi-function Transmission Range (TR) Switch -F125-, checking**.
	55 + 8		○ Selector lever in "R", "N" or "S"	Less than 1 ohms	○ Perform test step 3.
			○ Selector lever in "P" or "D"	infinity ohms	
	55 + 37		○ Selector lever in "N", "D" or "S"	Less than 1 ohms	
			○ Selector lever in "P" or "R"	infinity ohms	
	55 + 9		○ Selector lever in "D" or "S"	Less than 1 ohms	
			○ Selector lever in "P", "R" or "N"	infinity ohms	

Switch on measurement range: Resistance measurement					
Test step	**V.A.G 1598/20**	**What is being tested**	• **Test conditions** ○ Additional procedures	**Specified Value**	**Steps in the event of deviations from specified value**
5	6+ ground to battery	Ground connections for the control	• Ignition switched OFF	Less than 1 ohms	○ Check wiring routing using wiring diagram.

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		module -J217-			
	34 + ground to battery			Less than 1 ohms	
6	52 + 53	Feed wires for solenoid valves	• Ignition switched OFF	Less than 1.5 ohms	○ Check wiring routing using wiring diagram. ○ Check harness connector control module to 16-pin connector. Refer to **Harness connectors between the Transmission Control Module (TCM) and transmission, checking**. ○ Perform test step 1. ○ Check wiring harness intermissions following wiring diagram.

Switch on measurement range: Resistance measurement					
Test step	**V.A.G 1598/20**	**What is being tested**	• **Test conditions** ○ Additional procedures	**Specified Value**	**Steps in the event of deviations from specified value**
7	52 + 30	Solenoid Valve 1 - N88-	• Ignition switched OFF	25...35 ohms	○ Check 16-pin harness connector to transmission for corroded terminals.
	30 + 34			infinity ohms	○ Perform test step 6.
8	52 + 33	Solenoid Valve 2 - N89-	• Ignition switched OFF	25...35 ohms	○ Check harness connector from control module to 16-pin connector. Refer to **Harness connectors between the Transmission Control Module (TCM) and transmission, checking**.
	33 + 34			infinity ohms	○ Check wiring harness intermissions following wiring diagram, replace if necessary.
9	52 + 32	Solenoid Valve 3 - N90-	• Ignition switched OFF	25...35 ohms	○ Replace solenoid valve.
	32 + 34			infinity ohms	Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for

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					5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

Switch on measurement range: Resistance measurement					
Test step	**V.A.G 1598/20**	**What is being tested**	• **Test conditions** ○ Additional procedures	**Specified Value**	**Steps in the event of deviations from specified value**
10	52 + 5	Pressure Control Valve 1 - N215-	• Ignition switched OFF	6...8 ohms	○ Check 16-pin harness connector to transmission for corroded terminals.
	5 + 34			infinity ohms	○ Perform test step 6.
11	52 + 1	Pressure Control Valve 2 - N216-	• Ignition switched OFF	6...8 ohms	○ Check harness connector from control module to 16-pin connector. Refer to **Harness connectors between the Transmission Control Module (TCM) and transmission, checking**.
	1 + 34			infinity ohms	
12	52 + 29	Pressure Control Valve 3 - N217-	• Ignition switched OFF	6...8 ohms	○ Check wiring harness intermissions following wiring diagram, replace if necessary.
	29 + 34			infinity ohms	○ Replace pressure control valve.
13	52 + 4	Pressure Control Valve 4 - N218-	• Ignition switched OFF	6...8 ohms	Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND

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					ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
	4 + 34			infinity ohms	

Switch on measurement range: Resistance measurement					
Test step	**V.A.G 1598/20**	**What is being tested**	• **Test conditions** ○ Additional procedures	**Specified Value**	**Steps in the event of deviations from specified value**
14	2 + 54	Shift Lock Solenoid -N110-	• Ignition switched OFF ○ Selector lever in "P"	14...28 ohms	○ Check wiring routing using wiring diagram. ○ Replace Shift Lock Solenoid -N110-.. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
15	14 + 42	Sender for transmission output RPM -G195-	• Ignition switched OFF	Minimum 0.8 k ohms	○ Check wiring routing using wiring diagram.
				Maximum 1.2 k ohms	
	14 + 34 14 + 54 42 + 54 42 + 34			infinity ohms	○ Replace sender for transmission output RPM -G195-.. Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS,**

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					HYDRAULIC CONTROLS for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
	15 + 34 15 + 54	Suppression shield for -G195-		infinity ohms	○ Check wiring routing using wiring diagram.

Switch on measurement range: Resistance measurement					
Test step	**V.A.G 1598/20**	**What is being tested**	• **Test conditions** ○ Additional procedures	**Specified Value**	**Steps in the event of deviations from specified value**
16	21 + 22	Transmission Fluid Temperature Sensor -G93-	• Ignition switched OFF		○ Check harness connector from control module to 16-pin connector. Refer to **Harness connectors between the Transmission Control Module (TCM) and transmission, checking**.
			• ATF Temperature		
			Approximately 20°C	Approximately 0.83 k ohms 1)	
			Approximately 60°C	Approximately 1.28 k ohms 1)	
			Approximately 20°C	Approximately 1.88 k ohms 1)	
	21 + 34 22 + 34		• Ignition switched OFF	infinity ohms	○ Check wiring harness in transmission, replace if necessary.
	21 + 54 22 + 54			infinity ohms	Refer to • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS**

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					for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING ; Removing and Installing Valve Body

1) Permissible tolerance: ± 0.1 k ohms

Harness connectors between the Transmission Control Module (TCM) and transmission, checking

Perform this test if the control element diagnosis or the electrical test points to problems between the transmission and Transmission Control Module (TCM) -J217-.

Test procedure

- Remove Transmission Control Module (TCM). Refer to **Transmission Control Module (TCM) -J217-, removing and installing** and separate multiple connector. Refer to **Transmission Control Module (TCM) -J217-, removing and installing**.

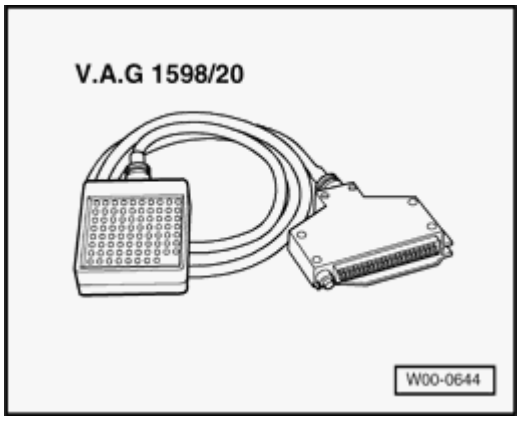


Fig. 52: V.A.G 1598/20 Test Box
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect V.A.G 1598/20 test box to control module wiring harness.

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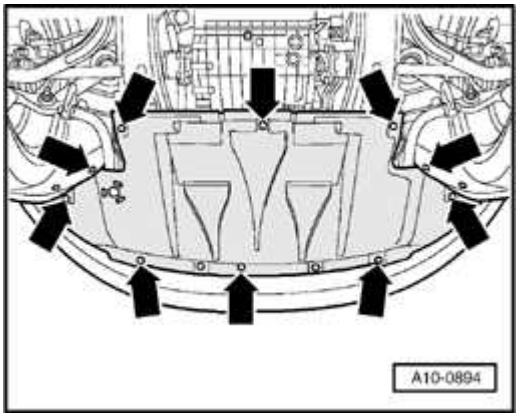


Fig. 53: Removing Sound Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove sound deadening -arrows-.

Checking harness connectors to the 16-pin connector at the transmission

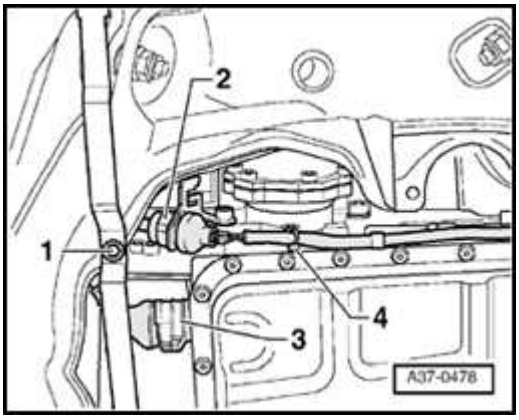


Fig. 54: Identifying Noise Insulation Tray Bracket, Multi-Function Switch Connector, Locking Lever And Cable Tie
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unscrew retainer -1- for sound deadening.
- Rotate locking lever -3- and remove connector for transmission wiring harness.

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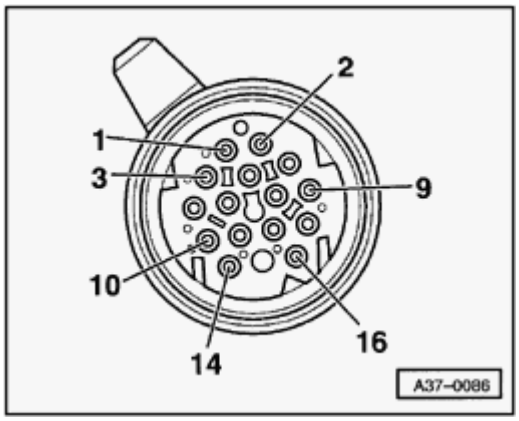


Fig. 55: Identifying 16-Pin Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect Multimeter to make a resistance measurement between terminals of 16-pin connector and cavities of test box V.A.G 1598/20, as described in following chart.

- Specified value always less than 1.5 ohms

Connector Terminal	Test box V.A.G 1598/20 Cavity	Connector Terminal	Test box V.A.G 1598/20 Cavity
1	42	9	33
2	5	10	14
3	1	11	4
4	32	12	52
5	16	13	22
6	44	14	21
7	29	15	Terminal is not used
8	30	16	53

NOTE:

- **In the event of deviations from the specified value, repair open circuit following wiring diagram and check connector for corroded terminals, water entry and leakage.**
- **If this test revealed no unacceptable deviations, the wiring harness in the transmission must be tested.**

Refer to

- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

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; Removing and Installing Valve Body

- Only if the wiring harness in the transmission is O.K. should the appropriate solenoids or pressure control valves be replaced.

Refer to

- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

; Removing and Installing Valve Body

Multi-function Transmission Range (TR) Switch -F125-, checking

NOTE:

- **Before performing the electrical test on the Multi-function Transmission Range (TR) Switch, you must first check the Measured Value Block for the multifunction switch. Refer to Test procedure, display ground number 004**
- **Make sure that the selector lever cable is correctly adjusted.**

Refer to

- **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

Functional Test

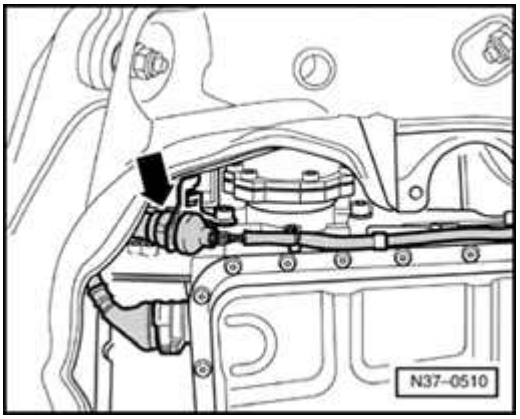


Fig. 56: Disconnecting Connector For Multi-Function Transmission Range (TR) Switch -F125- At Front Left Of Transmission

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- Disconnect connector -arrow- for Multi-function Transmission Range (TR) Switch -F125- at front left of transmission.

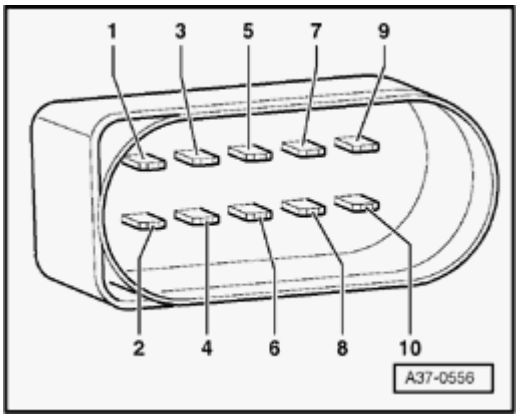


Fig. 57: Identifying Multi-Function Transmission Range (TR) Switch -F125- Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Terminal pinout at the connector for Multi-function Transmission Range (TR) Switch -F125-.

Switch on measurement range: Resistance measurement					
Test step	**Terminals for -F125- 1)**	**What is being tested**	• **Test conditions** ○ Additional procedures	**Specified Value**	**Steps in the event of deviations from specified value**
1	1 + 2	Multi-function Transmission Range (TR) Switch -F125-	• Ignition switched OFF ○ Selector lever in "P", "N" or "D"	Less than 1 ohms	○ Check connector at Multi-function TR switch for corroded terminals, water entry or a loose fit.
			○ Selector lever in "R" or "S"	infinity ohms	○ Check adjustment of selector lever cable.
	1 + 3		○ Selector lever in "R", "N" or "S"	Less than 1 ohms	Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V

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					• **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
			○ Selector lever in "P" or "D"	infinity ohms	○ Replace Multi-function TR switch.
	1 + 4		○ Selector lever in "N", "D" or "S"	Less than 1 ohms	Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
			○ Selector lever in "P" or "R"	infinity ohms	
	1 + 5		○ Selector lever in "D" or "S"	Less than 1 ohms	
			○ Selector lever in "P", "R" or "N"	infinity ohms	

1) Terminal pinout at the connector for Multi-function TR switch

Switch on measurement range: Resistance measurement					
Test Step	**Terminals at -F125-1)**	**What is being tested**	• **Test conditions** ○ Additional procedures	**Specified Value**	**Steps in the event of deviations from specified value**

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2	9 + 10	Multi-function TR switch P/N signal	• Ignition switched OFF ○ Selector lever in "R", "D" or "S"	infinity ohms	○ Check connector at Multi-function TR switch for corroded terminals, water entry or a loose fit.
			○ Selector lever in "P" or "N"	Less than 1 ohms	○ Check adjustment of selector lever cable.
3	7 + 8	Multi-function TR switch backup light signal	• Ignition switched OFF ○ Selector lever in "P", "N", "D" or "S"	infinity ohms	. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING
			○ Selector lever in "R"	Less than 1 ohms	○ Replace Multi-function Transmission Range (TR) Switch -F125-. Refer to • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V • **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

1) Terminal pinout at the connector for Multi-function TR switch

Check power supply to Multi-function TR switch

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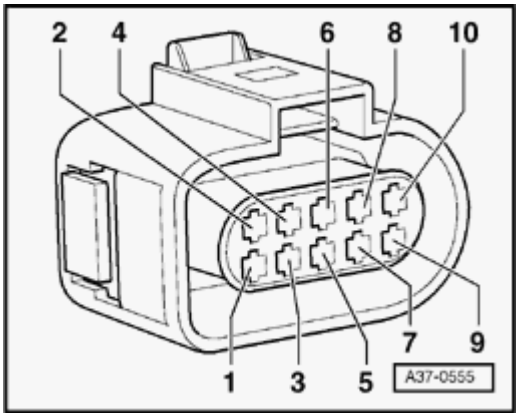


Fig. 58: Identifying 10-Pin Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach Multimeter for a voltage measurement between following terminals of 10-pin connector.
- Switch ignition ON.

Connector Terminal	Specified value
1 + 10	Approximate battery Voltage
7 + 10	Approximate battery Voltage

If a specified value is not reached:

- Repair open circuit or short circuit as necessary.

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

Check wiring connection between 10-pin connector for multi-function switch and Transmission Control Module (TCM)

- Remove Transmission Control Module (TCM). Refer to **Transmission Control Module (TCM) -J217-, removing and installing** and separate multiple connector. Refer to **Transmission Control Module (TCM) -J217-, removing and installing**.

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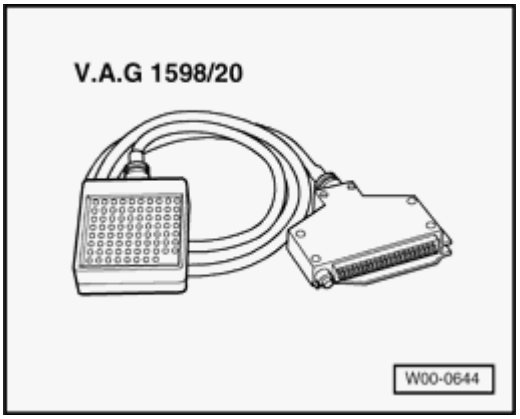


Fig. 59: V.A.G 1598/20 Test Box
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connector V.A.G 1598/20 test box to control module wiring harness.

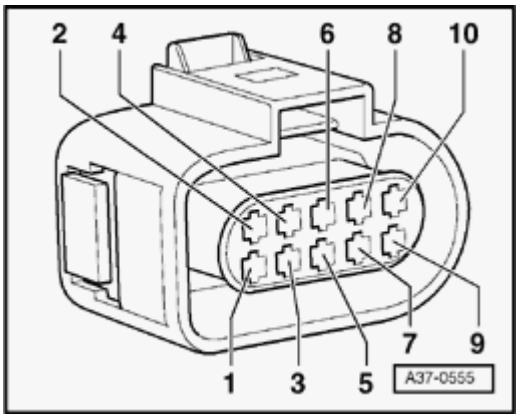


Fig. 60: Identifying 10-Pin Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect multimeter to make a resistance measurement between terminals of 10-pin connector and cavities of test box V.A.G 1598/20, as described in following chart:

Connector Terminal	Test box V.A.G 1598/20 Cavity	Specified value
1	54 or 55	< or = 1.5 ohms
2	36	< or = 1.5 ohms
3	8	< or = 1.5 ohms
4	37	< or = 1.5 ohms
5	9	< or = 1.5 ohms
6	Terminal is not used	
7	Refer to Test Step 3,	
8		
9	Refer to Test Step 2,	

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10	

NOTE:

- **In the event of deviations from the specified value, repair open circuit following wiring diagram and check connector for corroded terminals, water entry and leakage.**
- **If this test revealed no unacceptable deviations, Multi-function Transmission Range Switch -F125- must be replaced.**

Refer to

- **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

Starter Interlock Alarm System Relay -J60-, checking

- Remove Transmission Control Module (TCM). Refer to **Transmission Control Module (TCM) -J217-, removing and installing** and place it to one side with connector still attached.
- Turn ignition key to "Start" position.
- Move selector lever from "S" to "P" and back.

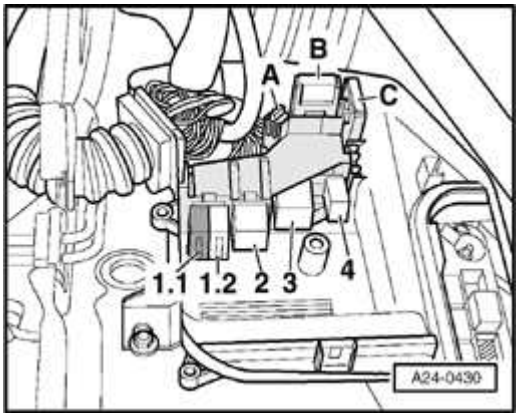


Fig. 61: Identifying Starter Interlock Alarm System Relay -J60-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- It must be possible both to hear and feel the Starter Interlock Alarm System Relay -J60- (in the relay carrier plenum panel E-box, pin location 4) engage
- As long as no malfunction is present, the starter can be operated with the selector lever in position "N" or "P"

If the relay does not engage:

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- Check Starter Interlock Alarm System Relay -J60-. Refer to **Check power supply to Starter Interlock Alarm System Relay -J60-**.

If the relay engages but the starter does not turn:

- Check wiring connections from Starter Interlock Alarm System Relay -J60- to starter terminal 50 following wiring diagram, or check starter respectively.

Check power supply to Starter Interlock Alarm System Relay -J60-

- Disconnect Starter Interlock Alarm System Relay -J60-.

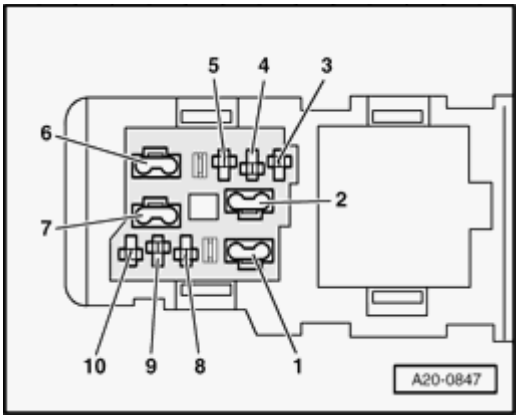


Fig. 62: Identifying Starter Interlock Alarm System Relay -J60-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect V.A.G 1527 B voltage tester as follows:

Relay carrier in the plenum panel E-Box, pin location 4 Terminal	Measure to
1	Engine ground
5	Engine ground

- Turn ignition key to "Start" position.

- LED must illuminate each time

If the LED does not illuminate:

- Repair open circuit or short circuit as necessary.

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

Check activation of Starter Interlock Alarm System Relay -J60-

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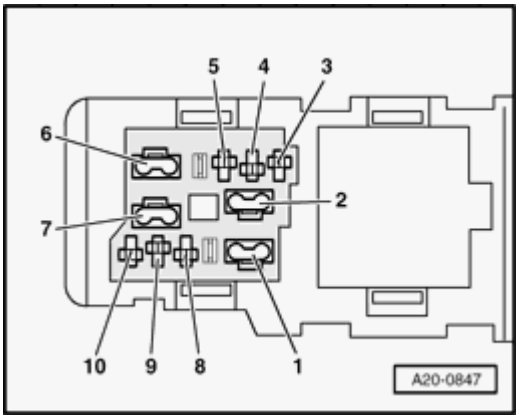


Fig. 63: Identifying Starter Interlock Alarm System Relay -J60-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect V.A.G 1527 B voltage tester as follows:

Relay carrier in the plenum panel E-Box, pin location 4 Terminal	Measure to
3	B+

- Move selector lever from "S" to "P" and back.
- With the selector lever in "N" or "P" the LED must illuminate, but not in other selector lever positions

If the LED does not illuminate:

- Check adjustment of selector lever cable.

Refer to

- **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V
- **37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING** for 5 SPD. AUTOMATIC TRANSMISSION 01V FRONT AND ALL WHEEL DRIVE - INTERNAL COMPONENTS, SERVICING

- Check Multi-function Transmission Range (TR) Switch -F125-. Refer to **Multi-function Transmission Range (TR) Switch -F125-, checking**.
- Repair open circuit or short circuit as necessary.

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

Data Exchange between Transmission Control Module (TCM) and CAN-Capable Control Modules, checking

NOTE:

- **The exchange of data between the individual control modules is carried**

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out by means of a bus system.

- **"CAN-bus" describes a system to carry and distribute data.**
- **The wiring connections between the control modules, over which the data are transmitted, are described as data lines.**
- **Data are transmitted serially, that means in sequence, over these data lines to the attached control modules (e.g. engine RPM, accelerator pedal position).**

Checking bus system

In the DTC Chart you were instructed to verify the exchange of data between the Transmission Control Module (TCM) and CAN-capable control modules.

- Connect VAS 5051 Vehicle Diagnosis, Measurement and Information System. Refer to **VAS 5051 Vehicle Diagnosis, Measurement and Information System, connecting and selecting functions** and in selection touch vehicle system "02 - Transmission Electronics". Ignition must be switched ON.

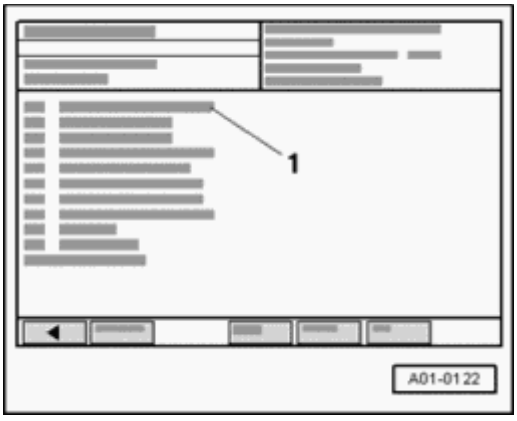


Fig. 64: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

- In selection touch -1- diagnostic function "08 - Read Measured Value Block".

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Fig. 65: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

1 - Enter display group

NOTE: Measured Value Block 125 shows the participants on the data BUS drive.

- On keypad enter -2- "125" for "Display Group Number 125" and confirm by touching Q button.



Fig. 66: Diagnostic System VAS 5051: Display - Display Fields
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

- Check display in display fields -1- to -3-.

The display shows the control modules which are CAN-capable with the Engine Control Module (ECM):

- Display 1: CAN capable control module is participant on the data bus
- Display 0 or no display: CAN-capable control module is not participant on the data bus or not CAN-capable

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- End function "08 - Read Measured Value Block" by touching <-- button.
- Touch "06 - End output".

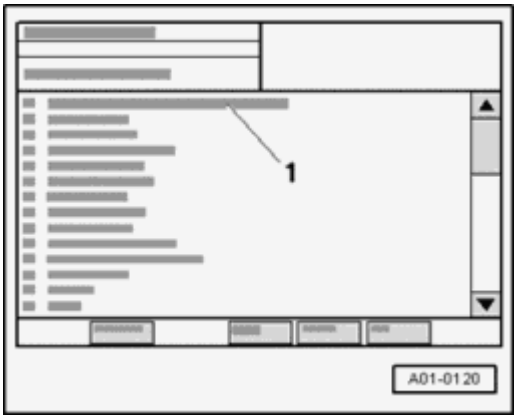


Fig. 67: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

- In selection -1- touch diagnostic function "00 - Scan DTC memory - complete system".
- Now the DTC memory of all systems in the vehicle capable of self-diagnosis is scanned.

If a control module responds and identifies itself, the number of stored trouble codes or "No trouble code" is displayed.

Any stored DTCs in a system are shown in sequence. Then the VAS 5051 sends the next address word.

If a DTC referring to "Data bus drive..." Or "...CAN-bus" is displayed:

- Check whether correct Engine Control Module (ECM) and other CAN-capable control modules have been installed (Part No. and Code).

If the correct control modules have been installed:

- Check whether multiple connectors for control modules are fully seated.

If the multiple connectors are fully seated.

- Check CAN-bus system.

Checking a "Dual-Wire-Bus System"

Communication takes place between two or more control modules over a "Dual-Wire-Bus System".

- Analyze DTCs stored in control modules.

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NOTE: The analysis helps you to pinpoint the wiring fault.

Example 1:

Based on the DTCs entered in the DTC memories, you can see that control module 1 is not connected to control modules 2 and 3.

Control module	DTCs entered in the DTC memory:
1	• Message missing from control module 2 • Message missing from control module 3
2	• Message missing from control module 1
3	• Message missing from control module 1

- Switch ignition OFF.
- Disconnect control modules connected by bus wiring and check whether one bus wiring connection has an open circuit.

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

- If no malfunction is found in bus wiring, replace control module 1.

Example 2:

Based on the DTCs entered in the DTC memories, you can see that control module 2 is not connected to control modules 1 and 3.

Control module	DTCs entered in the DTC memory:
1	• Message missing from control module 2
2	• Message missing from control module 1 • Message missing from control module 3
3	• Message missing from control module 2

- Switch ignition OFF.
- Disconnect control modules connected by bus wiring and check whether one of bus wiring connections has an open circuit.

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

- If no malfunction is found in bus wiring, replace control module 2.

Example 3:

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Based on the DTCs entered in the DTC memory, you see that no transmission or reception activity is possible in any of the control modules.

Control module	DTCs entered in the DTC memory:
1	• Data bus drive faulty
2	• Data bus drive faulty
3	• Data bus drive faulty

- Switch ignition OFF.

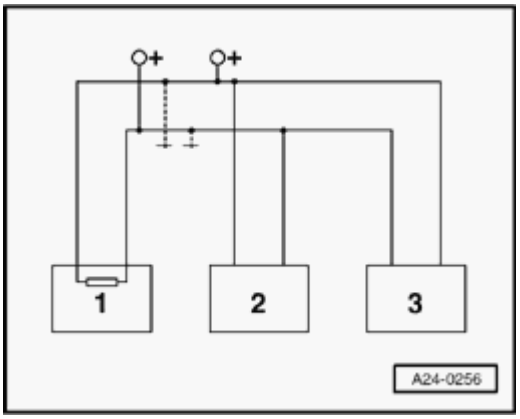


Fig. 68: Checking Bus Wires For Short Circuit To B+ Or Ground
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect control modules connected by bus wiring and inspect bus wiring for a short circuit to B+ and to ground.

Refer to Wiring Diagrams, Electrical Troubleshooting and Component Locations binder

If you are unable to determine any cause in the bus wiring for the DTC "Data bus drive faulty", check to see whether one of the control modules is responsible for this DTC.

Test requirement:

- VAS 5051 Vehicle Diagnosis, Measurement and Information System connected and Vehicle Self Diagnosis selected. Refer to **VAS 5051 Vehicle Diagnosis, Measurement and Information System, connecting and selecting functions**.

All the control modules which use the CAN-bus for communication are disconnected. The ignition is switched OFF.

- Connect one control module.

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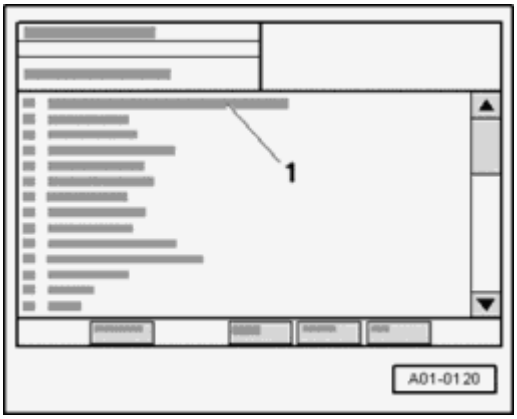


Fig. 69: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051:

- Switch ignition ON.
- Touch appropriate vehicle system in Display -1-.
- Read DTC memory of control module just connected and delete it.
- Touch delta button.

- In display touch -1- diagnostic function "06 - End output".
- Switch ignition OFF and ON again.
- Leave ignition switched ON for 10 seconds. Then, using scan tool, read DTC memory of control module just connected.
- If DTC "Data bus drive faulty" is read, control module just connected must be replaced.

- If DTC "Data bus drive not faulty" is not read, connect next control module and repeat procedure.

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37 - AUTOMATIC TRANSMISSION - CONTROLS, HOUSING

ELECTRICAL/ELECTRONIC COMPONENTS AND INSTALLED LOCATIONS

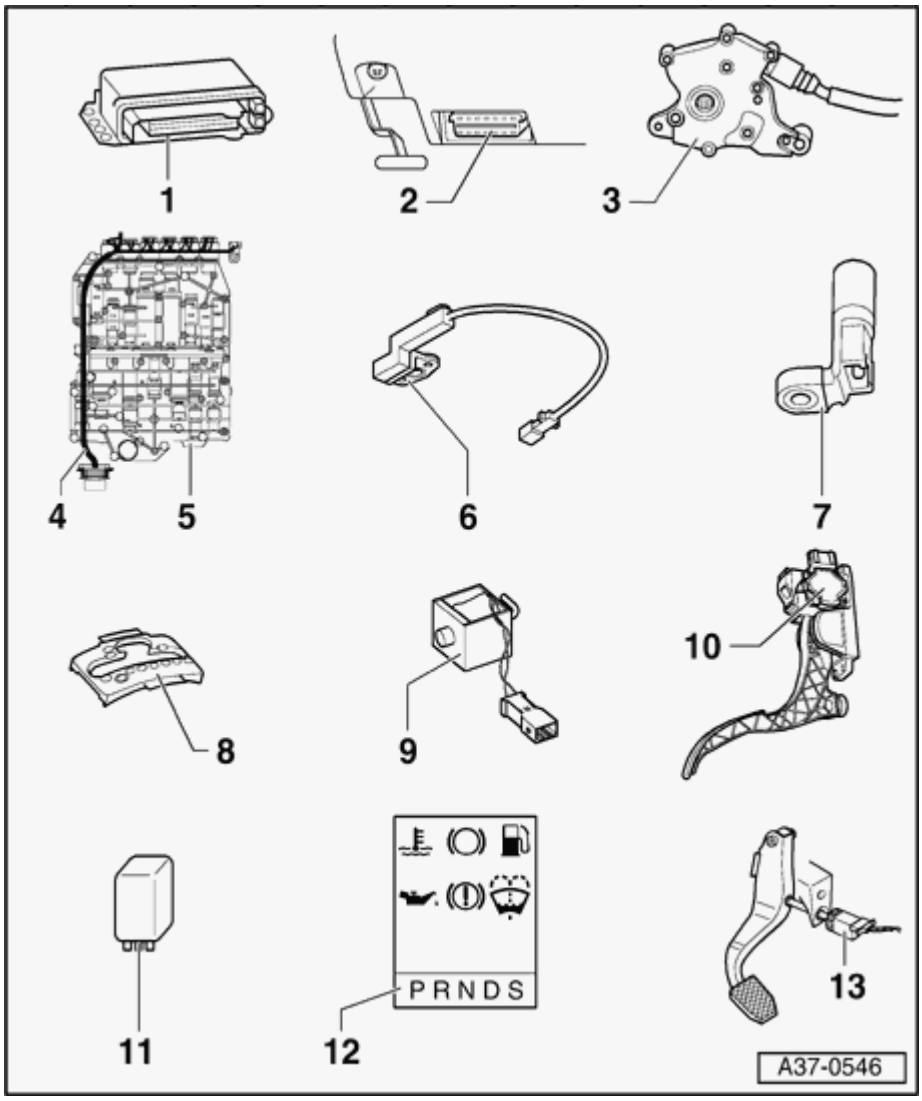


Fig. 18: Electrical/Electronic Components And Installed Locations
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Transmission Control Module J217

- Component location and removing and installing --> **Component location of Transmission Control Module (TCM) J217**
- Disconnecting multi-pin connector --> **Disconnecting Transmission Control Module (TCM) J217 from multi-pin harness connector**
- May be checked using tester VAS5051 in "Guided Fault Finding"

2 - Data Link Connector (DLC)

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- Installation location **Data Link Connector (DLC)**

3 - Multi-Function Transmission Range (TR) Switch F125

- Component location and removing and installing --> **Multi-Function Transmission Range (TR) Switch F125**
- May be checked using tester VAS5051 in "Guided Fault Finding"

4 - Internal transmission wiring harness with integrated Transmission Fluid Temperature Sensor G93 (ATF)

- Component location and removing and installing --> **Internal transmission wiring harness with integrated Transmission Fluid Temperature Sensor G93 (ATF)**
- May be checked using tester VAS5051 in "Guided Fault Finding"

5 - Valve body

- Component location and removing and installing **Valve body**
- May be checked using tester VAS5051 in "Guided Fault Finding"

6 - Sensor for transmission RPM G182

- Calculates transmission RPM
- Component location and removing and installing --> **Sensor for transmission RPM G182**
- May be checked using tester VAS5051 in "Guided Fault Finding"

7 - Transmission Vehicle Speed Sensor (VSS) G38 (also designated as Sender for transmission output RPM G195)

- Calculates transmission output RPM
- Component location and removing and installing --> **Transmission Vehicle Speed Sensor (VSS) G38**
- May be checked using tester VAS5051 in "Guided Fault Finding"

8 - Tiptronic Switch F189

- Component location and removing and installing --> **Tiptronic Switch F189**
- May be checked using tester VAS5051 in "Guided Fault Finding"

9 - Shift Lock Solenoid N110

- Component location and removing and installing --> **Shift lock solenoid N110**
- May be checked using tester VAS5051 in "Guided Fault Finding"

10 - Throttle Position (TP) Sensor G79 and G185

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- Component location and removing and installing **and** under **Throttle Position (TP) sensor G79 and G185**
- May be checked using tester VAS5051 in "Guided Fault Finding"

11 - Starting Interlock Relay J207

- Installation location --> **Starting Interlock Relay J207**

12 - Transmission Range (TR) Selector Lever Display Y6

- Component location and removing and installing --> **Transmission Range (TR) Selector Lever Display Y6**
- Unlit selected gear display indicates emergency mode with inactive Transmission Control Module (TCM).
- Completely lit selected gear display indicates emergency mode with active Transmission Control Module (TCM).

13 - Brake light switch F

- Component location and removing and installing --> **Brake light switch F**
- May be checked using tester VAS5051 in "Guided Fault Finding"

Component location of Transmission Control Module (TCM) J217

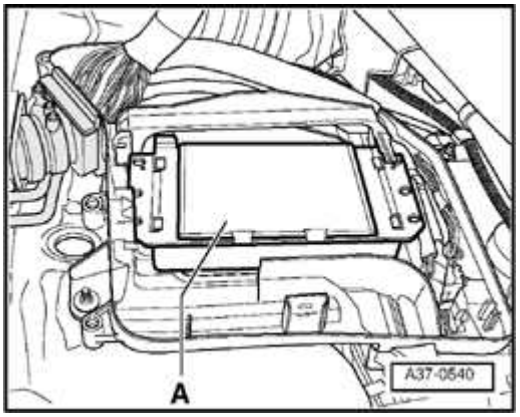


Fig. 19: Component Location Of Transmission Control Module (TCM) J217
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Control module is located in left plenum chamber in e-box under Engine Control Module (ECM).

Removing and installing the control module

-->

- **97 WIRING**

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- **97 WIRING** for ELECTRICAL EQUIPMENT, CABRIOLET

If control module for engine or transmission is replaced, the system must be put into basic setting.

- Perform basic setting in "Vehicle Self-Diagnosis" using the tester VAS5051.

Disconnecting Transmission Control Module (TCM) J217 from multi-pin harness connector

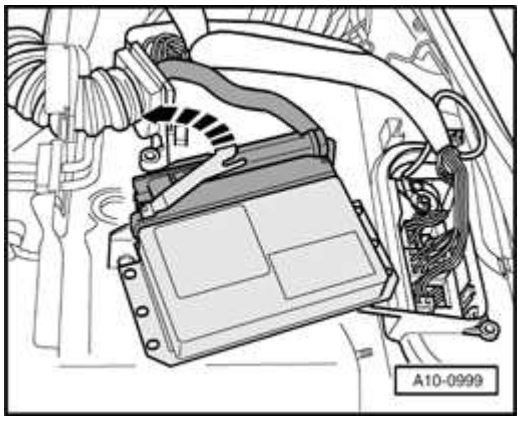


Fig. 20: Disconnecting Transmission Control Module (TCM) J217 From Multi-Pin Harness Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disengage harness connector (arrow) and disconnect it from Transmission Control Module (TCM).

Installation is the reverse of removal.

Data Link Connector (DLC)

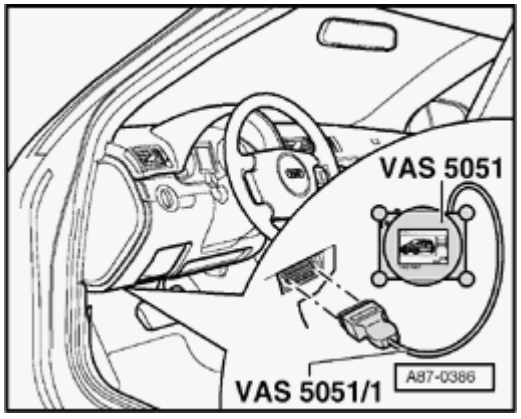


Fig. 21: Data Link Connector (DLC)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Data Link Connector (DLC) is located under driverside storage compartment.

- Connect tester VAS5051 to Data Link Connector (DLC) using diagnostic cable VAS5051/1 and adapter VAS6017 with ignition switched off.

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Valve body

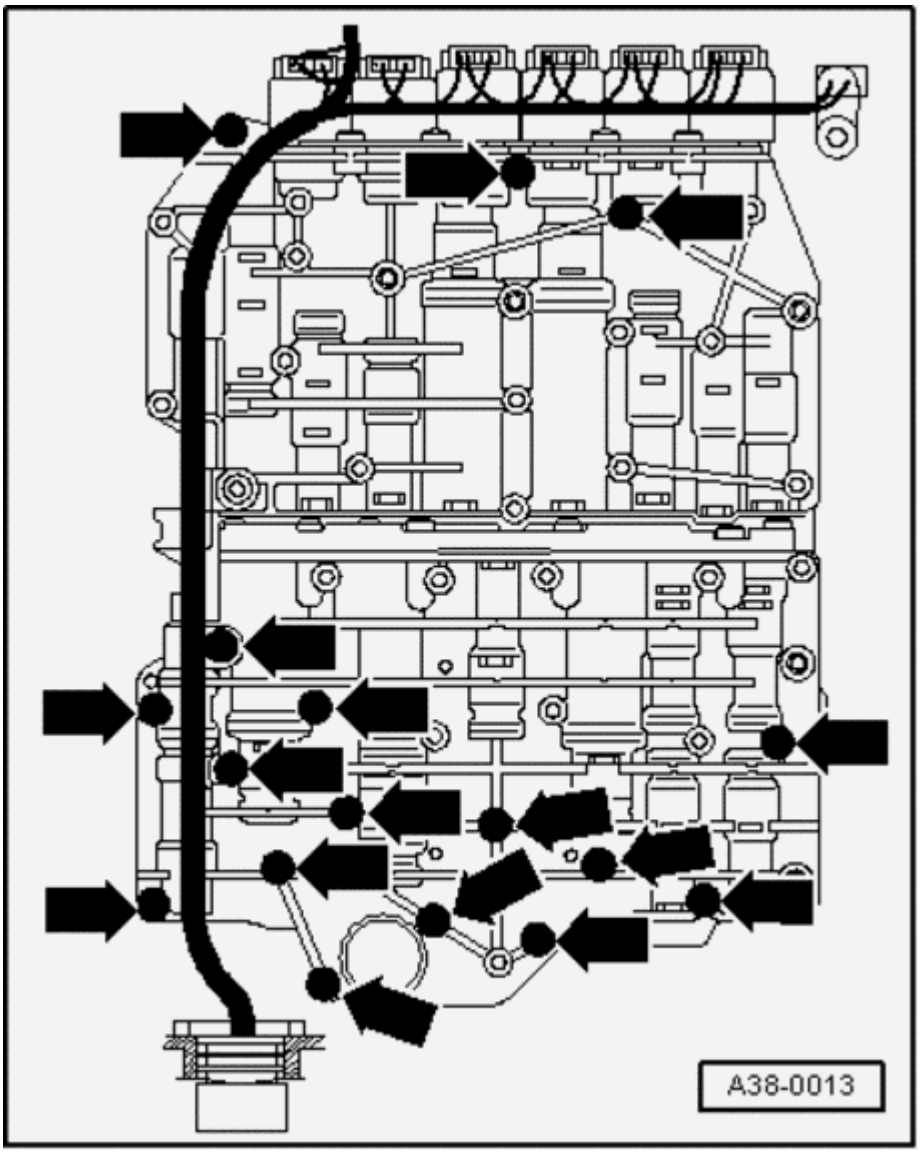


Fig. 22: Locating Valve Body Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Valve body is bolted on to transmission housing below and covered by transmission oil pan.

Solenoid valves N88 , N89 , N90 , and pressure control valves N215 , N216 , N217 , N218 are fastened to valve body.

Removing and installing valve body

--> **Valve body, removing and installing**

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Internal transmission wiring harness with integrated Transmission Fluid Temperature Sensor G93 (ATF)

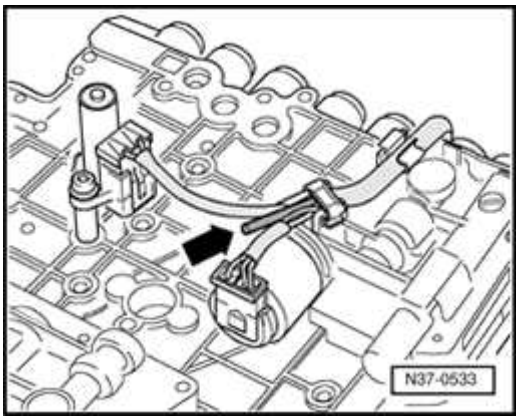


Fig. 23: Internal Transmission Wiring Harness With Integrated Transmission Fluid Temperature Sensor G93 (ATF)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Transmission Fluid Temperature Sensor (arrow) is located in the wiring harness on valve body.

Wiring harness may be replaced with transmission installed and valve body removed.

Wiring harness in transmission, removing and installing

--> **Wiring harness inside transmission, removing and installing**

Transmission Vehicle Speed Sensor (VSS) G38

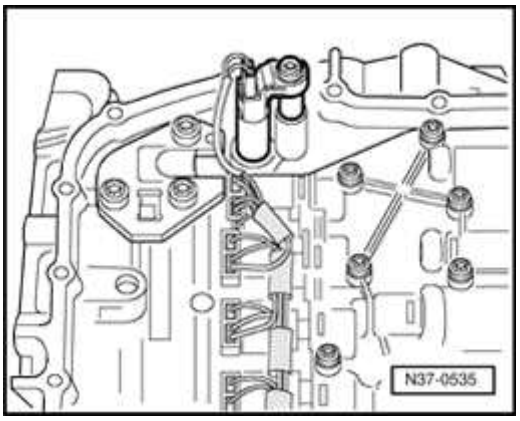


Fig. 24: Transmission Vehicle Speed Sensor -G38-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Transmission Vehicle Speed Sensor is located on rear right of transmission. Also referred to as the sender for transmission output RPM G195.

Removing and installing Transmission Vehicle Speed Sensor (VSS)

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--> **Transmission Vehicle Speed Sensor (VSS) G38 , removing and installing**

Sensor for transmission RPM G182

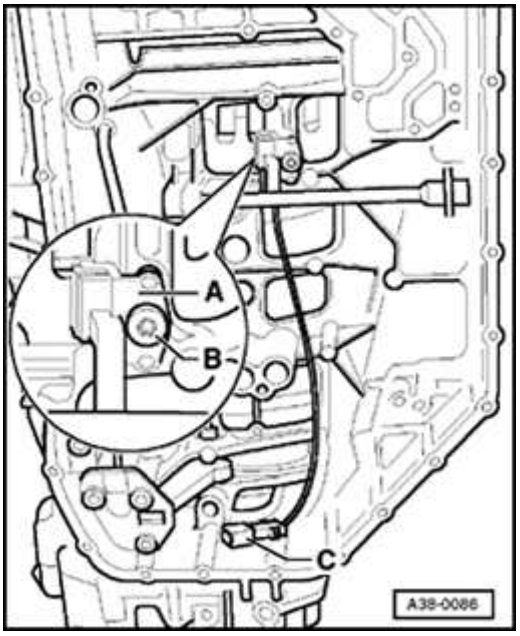


Fig. 25: Sensor For Transmission RPM (Transmissions With Hydraulic Regulation -E18/2-)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Sensor for transmission RPM - **A** - is fastened to transmission housing behind valve body. This sensor is a Hall sensor.

Removing and installing Sensor for transmission RPM G182

--> **Sensor for transmission RPM G182 , removing and installing**

Multi-Function Transmission Range (TR) Switch F125

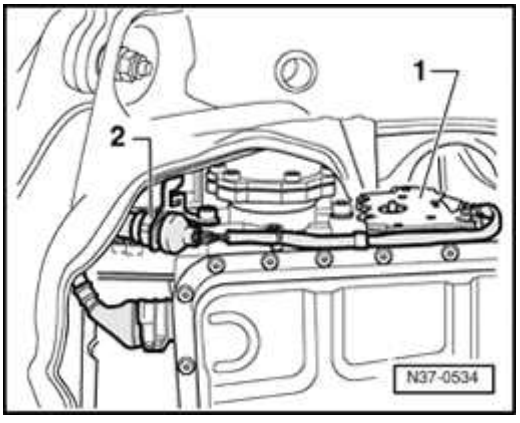


Fig. 26: Location Of Multi-Function Transmission Range (TR) Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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Installation location: Multi-Function Transmission Range (TR) Switch - **1** - is located at left on transmission; multi-pin connector for Multi-Function Transmission Range (TR) Switch - **2** -.

Removing and installing Multi-Function Transmission Range (TR) Switch

--> **Multi-Function Transmission Range (TR) Switch F125 , removing and installing**

Tiptronic Switch F189

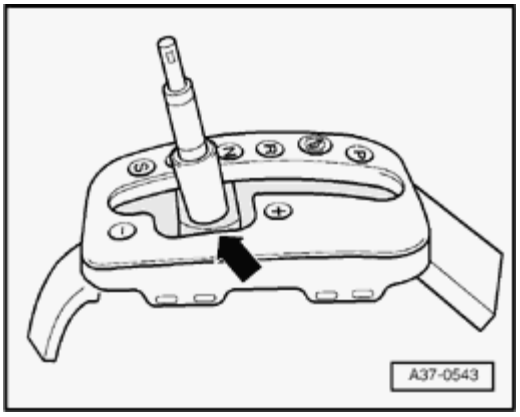


Fig. 27: Tiptronic Switch F189
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Tiptronic switch is integrated into circuit board of symbol insert, which is located in shift mechanism cover.

Tiptronic Switch F189 , removing and installing

--> **Tiptronic Switch F189 , removing and installing**

Shift lock solenoid N110

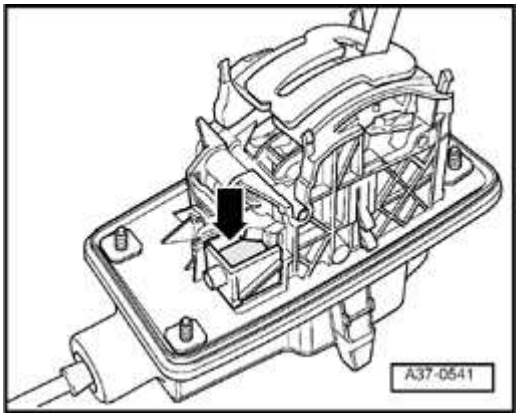


Fig. 28: Shift Lock Solenoid N110
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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Installation location: Shift lock solenoid is located in the shift mechanism - **arrow** -.

Shift lock solenoid, removing and installing

--> **Shift Lock Solenoid N110 , removing and installing**

Starting Interlock Relay J207

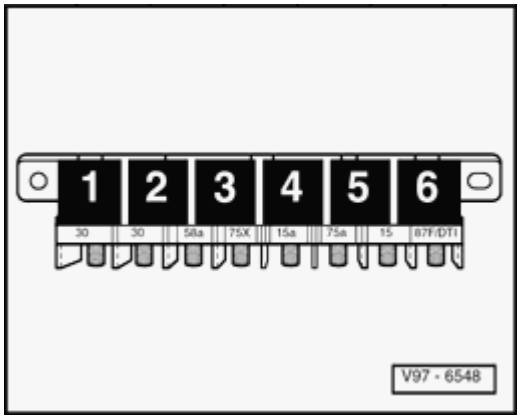


Fig. 29: Starting Interlock Relay J207
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Relay is located in central electronics.

Assignment

--> Electrical Wiring Diagrams, Troubleshooting and Component Locations

Throttle Position (TP) sensor G79 and G185

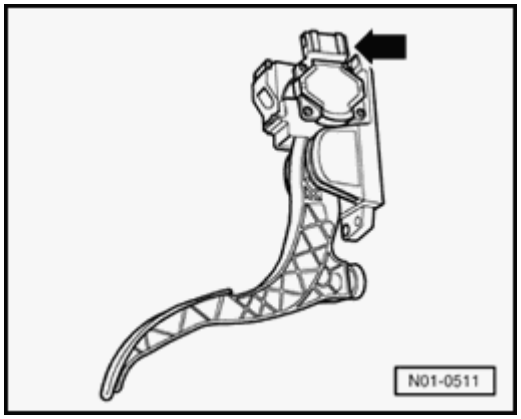


Fig. 30: Throttle Position (TP) Sensors -G69- and -G79- Accelerator Pedal Position Sensor and Kickdown Switch -F8- For Vehicles With EPC
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Throttle Position (TP) sensor G79 and G185 (arrow), component of electronic engine power control (E-Gas), is

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located at pedal assembly.

The kick down function is performed (controlled) via Throttle Position (TP) sensor G79 and G185.

Checking, removing and installing Throttle Position (TP) sensor:

--> **20 - FUEL SUPPLY SYSTEM**

Brake light switch F

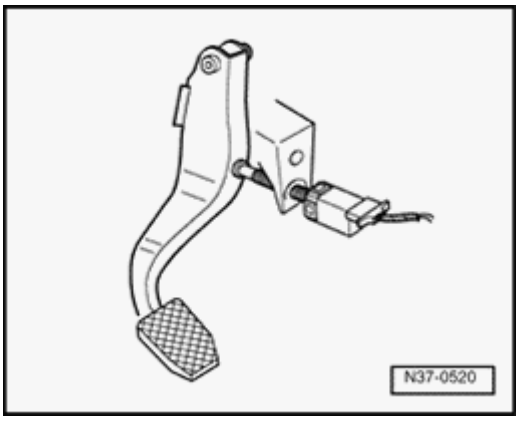


Fig. 31: Brake Light Switch F
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation location: Brake light switch (arrow) is located in foot pedal assembly.

Brake light switch, removing and installing

--> **46 - BRAKES - MECHANICAL COMPONENTS**

Transmission Range (TR) Selector Lever Display Y6

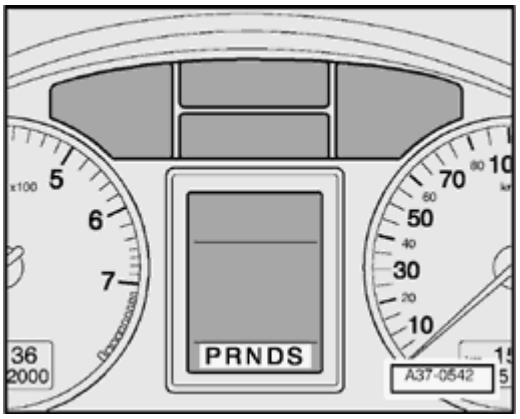


Fig. 32: Transmission Range (TR) Selector Lever Display Y6
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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Installation location: in instrument cluster

Removing and installing Transmission Range (TR) Selector Lever Display

-->

- **90 INSTRUMENTS**
- **90 INSTRUMENTS** for ELECTRICAL EQUIPMENT, CABRIOLET

SELECTOR LEVER MECHANISM, SERVICING

Selector lever mechanism, servicing

CAUTION: Before beginning repairs on the electrical system:

- **Obtain the anti-theft radio security code.**
- **Switch the ignition off.**
- **Disconnect the battery Ground (GND) strap.**
- **On vehicles equipped with Audi Telematics by OnStar, switch-off the emergency (back-up) battery for the Telematic/Telephone Control Module prior to disconnecting vehicle battery -->**
  - **91 - COMMUNICATION**
  - **91 RADIO, TELEPHONE, NAVIGATION, TRIP COMPUTER for COMMUNICATION, CABRIOLET**

  .
- **After reconnecting vehicle battery, re-code and check operation of anti-theft radio. Also check operation of clock and power windows according to article and/or Owners Manual.**
- **After reconnecting vehicle battery on vehicles equipped with Audi Telematics by OnStar, switch-on the emergency (back-up) battery for the Telematic/Telephone Control Module -->**
  - **91 - COMMUNICATION**
  - **91 RADIO, TELEPHONE, NAVIGATION, TRIP COMPUTER for COMMUNICATION, CABRIOLET**

  .

CAUTION: Shift selector lever into position "P" and engage parking brake before working with the engine running.

Ignition key removal lock, checking

- Switch ignition key to driving position (ignition on).

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- Depress brake pedal and hold.

- Shifting selector lever out of position "P" must be possible with the button at shift lever depressed without "sticking".
- It must not be possible to remove ignition key with selector lever in any position other than "P".

- Shift selector lever into position "P".

- It must be possible to move ignition key into removal position without "sticking".

- Remove ignition key.

- It must only be possible to remove ignition key in "P" position.
- Selector lever cannot be shifted out of position "P" with the button pressed and foot brake operated.

Shift mechanism, checking

Selector lever in position "P" and ignition switched on:

- Brake pedal is not being operated:

Selector lever is locked and cannot be shifted out of position "P" with the button at selector lever pressed. Shift lock solenoid is locking the selector lever.

- Brake pedal is being operated:

Shift lock solenoid enables the selector lever. Selecting a driving mode must be possible with the button at shift handle pressed without "sticking".

Slowly shift selector lever from "P" through "R, N, D, S" checking whether selector lever position in dash panel insert agrees with selector lever position.

Selector lever in position "N" and ignition switched on:

- Brake pedal is not being operated:

Selector lever is locked and cannot be shifted out of position "N" with the button at selector lever handle pressed. Shift lock solenoid is locking the selector lever.

- Brake pedal is being operated:

Shift lock solenoid enables the selector lever. Selecting a driving mode must be possible with the button at shift handle pressed without "sticking".

Selector lever in position "D" , ignition and lights switched on:

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Move selector lever in Tiptronic gate. The "D" symbol must no longer be illuminated and "+" and "-" symbols must illuminate.

- Start engine and let run at idle
- Engage parking brake and operate brake pedal

The selector lever display in dash panel insert must change from "PRNDS" to "54321" when selector lever is moved in Tiptronic gate.

NOTE:

- **The starter must not operate in the selector lever positions "D" , "S" and "R".**
- **For speeds exceeding 5 km/h and shifting into selector lever position "N" , the shift lock solenoid must not engage to lock the selector lever. Selector lever can be shifted into a driving mode.**
- **For speeds below 2 km/h (almost standstill) and shifting into selector lever position "N" , the shift lock solenoid must only engage after approx. 1 second. Selector lever can only be shifted out of position "N" with the brake pedal operated.**

Shift mechanism cover and selector lever knob, exploded view

NOTE:

- **Lubricate bearing areas and slide surfaces with polycarbamide grease G 052 142 A2.**

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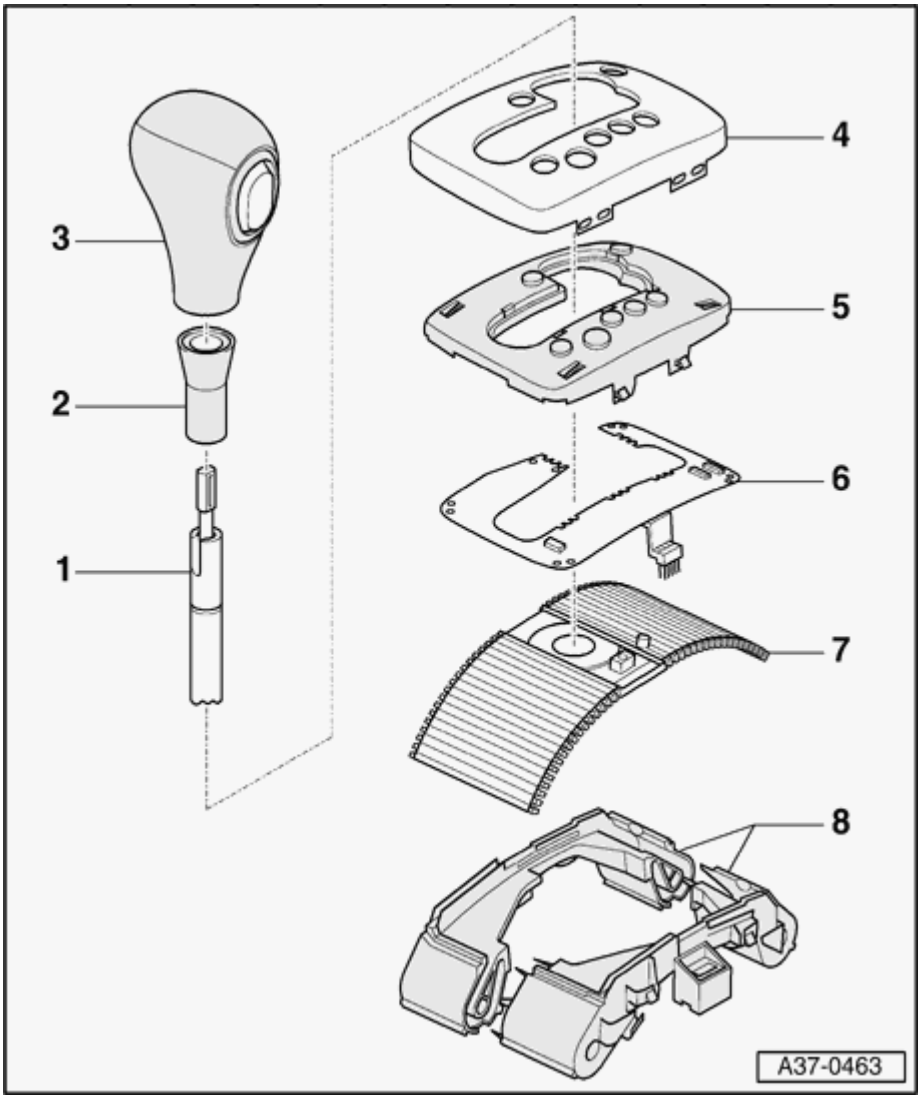


Fig. 33: Shift Mechanism Cover And Selector Lever Knob, Exploded View
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Selector lever

2 - Shaft piece for selector lever

- Removing and installing selector lever knob --> **Selector lever handle, removing and installing**

3 - Selector lever handle

- Removing and installing --> **Selector lever handle, removing and installing**

4 - Cover

- With selector scale and Tiptronic gate and selector lever lock indicator

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- Removing and installing Tiptronic switch F189 --> **Tiptronic Switch F189 , removing and installing** and additionally unclipping cover

5 - Symbol insert

- Clipped in cover

6 - Printed circuit board

- with integrated Tiptronic Switch F189
- Removing and installing --> **Tiptronic Switch F189 , removing and installing**

7 - Masking panel

- With solenoid for Tiptronic switch F189 on reverse slide
- Removing and installing Tiptronic Switch F189 --> **Tiptronic Switch F189 , removing and installing**

8 - Guide

- For masking panel
- Separate both halves by applying careful levering movements

Selector lever handle, removing and installing

Removing

- Shift selector lever into position "D".

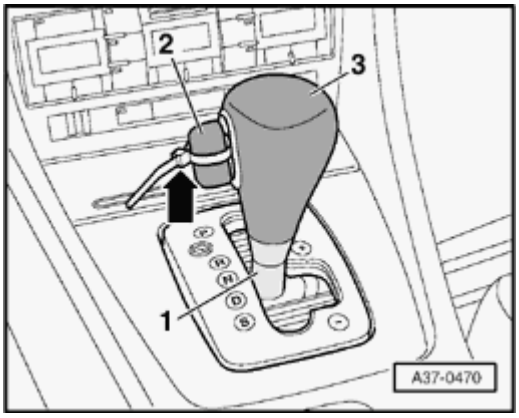


Fig. 34: Selector Lever Handle, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn sleeve - **1** - to left and push downward as far as stop.
- Carefully pull switch - **2** - just enough out of selector lever knob - **3** - until a cable tie can be inserted between button and selector lever.

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NOTE:

- **Do not remove button further under any circumstances, otherwise the selector lever knob will be damaged.**

- Secure button in pulled-out position using cable tie - **arrow** - as shown in illustration.
- Remove selector lever knob upward.

Installing

Installation is reverse of removal, noting the following:

- Shift selector lever into position "D".

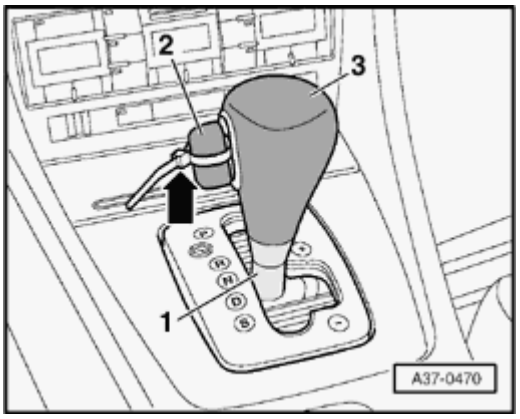


Fig. 35: Selector Lever Handle, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **To install new selector lever knob - 3 - , button 2 must be pulled out as far as stop and secured with a cable tie - arrow - or using assembly aid included with new knob.**
- **If the button was accidentally not secured, then it must not be pulled from selector lever knob using mechanical tools. Apply compressed air gun to bottom of knob and carefully press button out with compressed air.**

- Position complete selector lever knob - **3** - on selector lever - button 2 faces driver. During this, the knob must engage into ring groove of the selector lever.
- Remove cable tie - **arrow** - or assembly aid, then button actuation engages in vertical groove of selector lever. If necessary press button into selector lever knob.
- Pull sleeve - **1** - upward and engage by turning clockwise.

Shift mechanism cover, removing and installing

Removing

- Selector lever handle, removing --> **Selector lever handle, removing and installing**.

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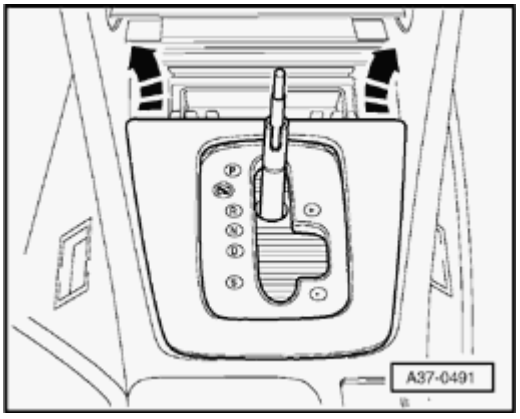


Fig. 36: Opening Ashtray In Center Console And Removing Trim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Open ashtray in center console and remove trim (arrows).
- Remove ashtray in center console: -->
  - **68 - INTERIOR EQUIPMENT**
  - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

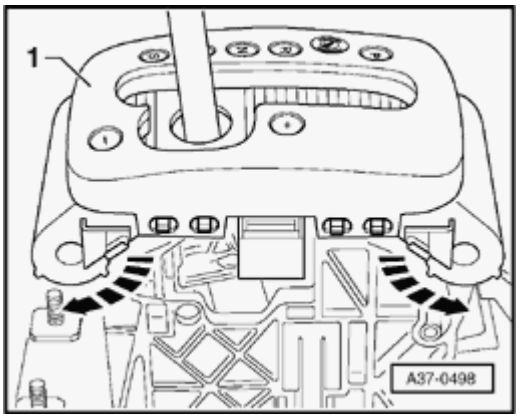


Fig. 37: Releasing Clips And Pulling Cover With Guide Upward To Remove
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release all 4 clips (arrows) and pull cover - **1** - with guide upward to remove.
- Disconnect electrical harness connector on side of guide.

Installing

Installation is reverse of removal, noting the following:

- Remove selector lever handle.

Tiptronic Switch F189 , removing and installing

Tiptronic switch is integrated into circuit board ( ), which is located in shift mechanism cover.

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It consists of 3 camshaft position sensors, which are activated by a magnet on the cross slide masking panel.

To replace Tiptronic switch, circuit board ( ) must be replaced.

Check also whether solenoid is correctly fixed on transverse slide of masking panel, replace masking panel with guide if necessary.

Removing

- Remove shift mechanism cover --> **Shift mechanism cover, removing and installing**.

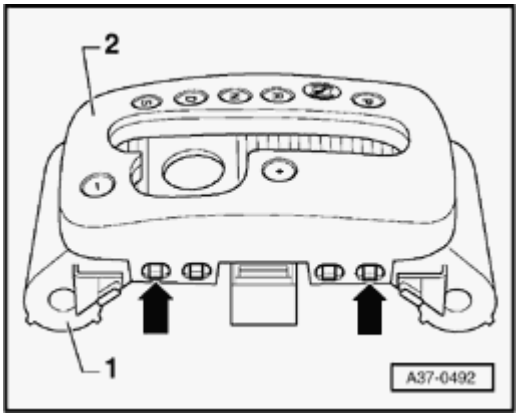


Fig. 38: Pressing Lugs Inward And Removing Cover From Guide
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press the 4 lugs (arrows) inward and remove cover - **2** - from guide - **1** -.
- Remove circuit board with integrated Tiptronic Switch F189 from cover - **2** -.

NOTE:

- **If necessary, masking panel with solenoid for Tiptronic Switch F189 can be removed as described below. As replacement part the masking panel is only available together with guide.**

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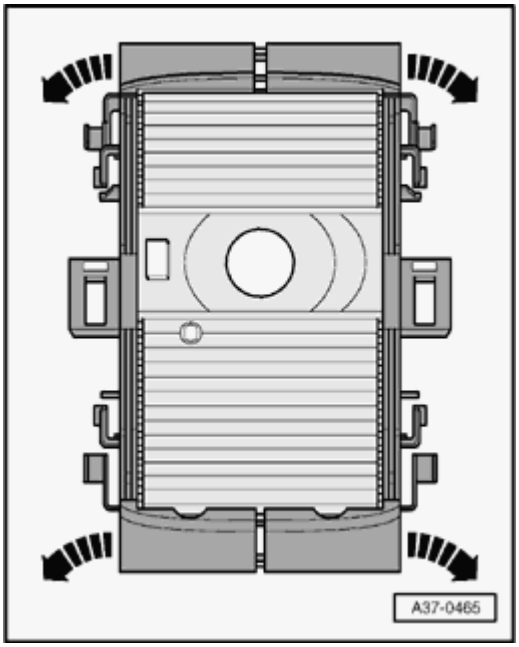


Fig. 39: Separating Both Guide Parts By Applying Careful Levering Movements
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Separate both guide parts by applying careful levering movements (arrows).
- Remove masking panel with solenoid for Tiptronic Switch F189.

Installing

Installation is reverse of removal, noting the following:

- Install shift mechanism cover --> **Shift mechanism cover, removing and installing**.
- Remove selector lever handle.

Shift mechanism, overview

NOTE:

- **Lubricate bearing areas and slide surfaces with polycarbamide grease G 052 142 A2.**

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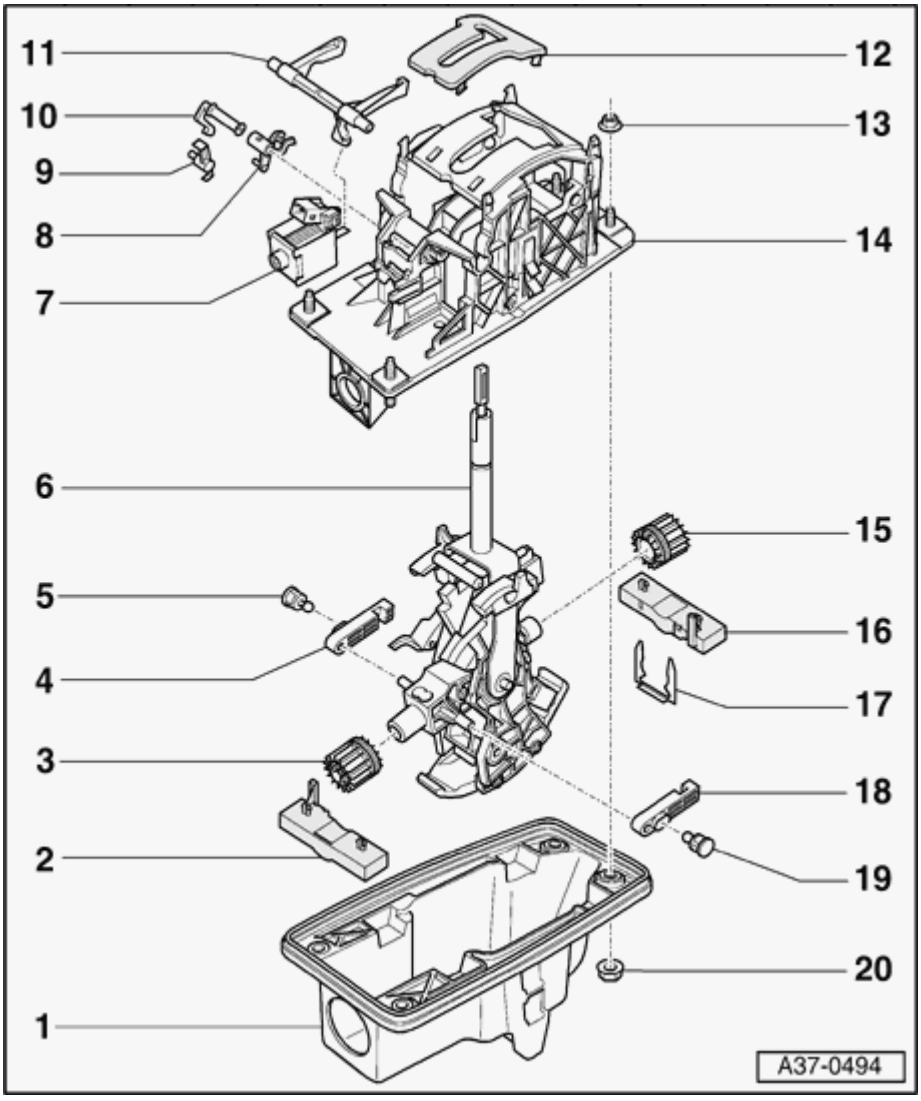


Fig. 40: Shift Mechanism, Disassembling And Assembling (Sequence)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Shift mechanism bottom cover

2 - Retaining bracket

- For selector lever

3 - Bearing bushing

4 - Tiptronic locking lever

5 - Pivot pin

6 - Selector lever

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7 - Shift lock solenoid N110

- Removing and installing --> **Shift Lock Solenoid N110 , removing and installing**

8 - Actuating lever

- For locking cable

9 - Lock

- For locking cable

10 - Lever

- For locking cable

11 - Catch lever

12 - Gate

13 - 10 Nm

14 - Selector housing

15 - Bearing bushing

16 - Retaining bracket

- For selector lever

17 - Retaining clip

- Always replace

18 - Tiptronic locking lever

19 - Pivot pin

20 - 10 Nm

Shift mechanism, removing and installing

Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**

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- **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
- **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
- **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
- **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
- **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

- **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
- **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

Removing

- Selector lever handle, removing --> **Selector lever handle, removing and installing**.

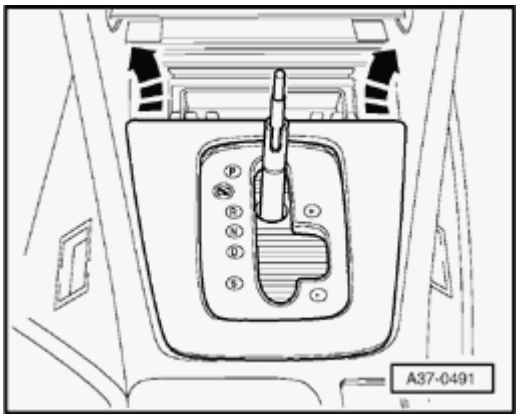


Fig. 41: Opening Ashtray In Center Console And Removing Trim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Open ashtray in center console and remove trim (arrows).
- Remove air conditioning operating unit: --> **87 AIR CONDITIONING**
- Remove ashtray in center console: -->
  - **68 - INTERIOR EQUIPMENT**
  - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

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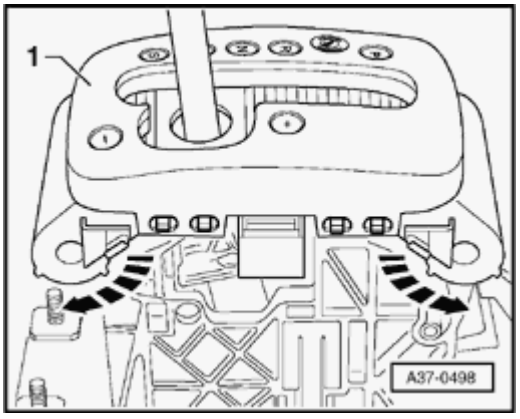


Fig. 42: Releasing Clips And Pulling Cover With Guide Upward To Remove
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release all 4 clips (arrows) and pull cover - **1** - with guide upward to remove.
- Disconnect electrical harness connector on side of guide.
- Disconnect electrical harness connector on Shift Lock Solenoid N110.

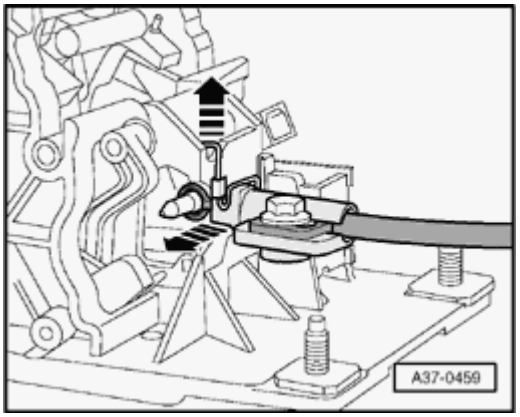


Fig. 43: Disengaging Locking Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disengage locking cable (arrows).
- Shift selector lever into position "S".
- Remove front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE

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MECHANICAL, ENGINE CODE(S): BNS

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

- Remove heat shield for driveshaft from body of the vehicle.

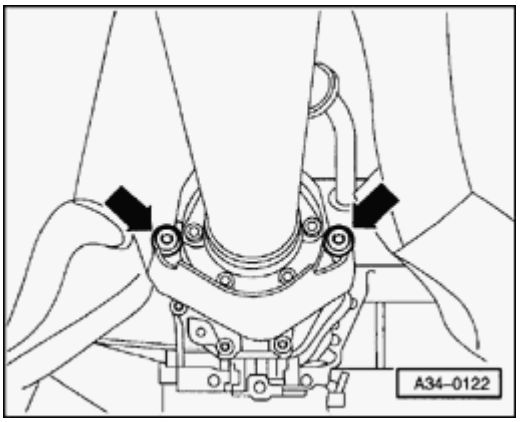


Fig. 44: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for driveshaft from cover for Torsen differential (arrows).
- Unbolt driveshaft from transmission and hang or support. -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Unbolt front heat shield, if installed, from below shift mechanism housing.

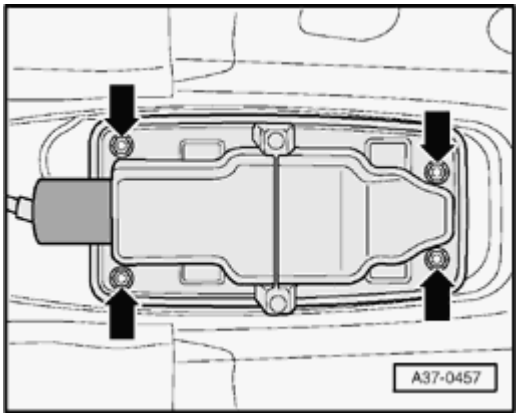


Fig. 45: Removing Lower Cover From Shift Mechanism
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove lower cover from shift mechanism (arrows).
- Remove boot of selector lever cable from lower shift mechanism cover and slide back.

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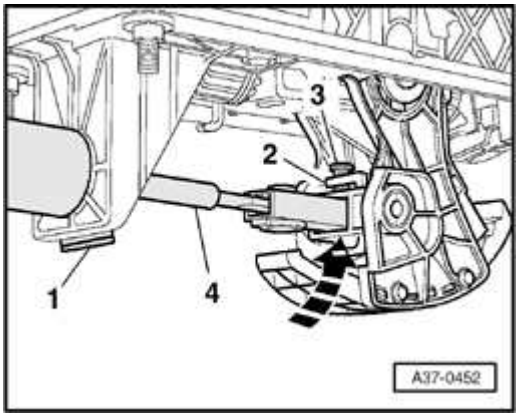


Fig. 46: Identifying Retaining Clip, Securing Spring, Push Pin & Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove retaining clip - **1** - for selector lever cable on shift mechanism downward.
- Pull plastic securing spring - **2** - slightly to front and push pin - **3** - up only as far as necessary (arrow).
- Pull selector lever cable - **4** - out of shift mechanism at the same time, and do not bend.

NOTE:

- **Do not bend or kink selector lever cable.**

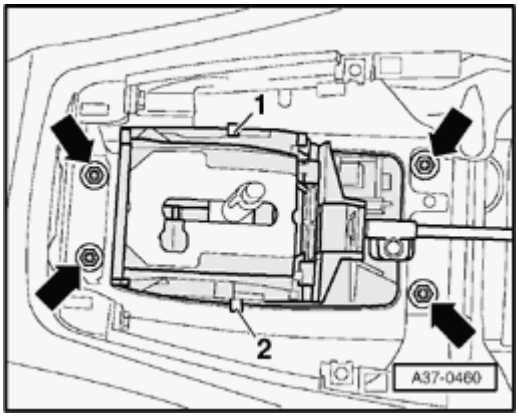


Fig. 47: Unscrewing Nuts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unscrew nuts (arrows).

NOTE:

- **A second mechanic is required when detaching shift mechanism below vehicle.**

- Press holder clips - **1** - and - **2** - inward, at the same time pushing shift mechanism downward.

Installing

Installation is reverse of removal, noting the following:

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- Install selector lever cable.

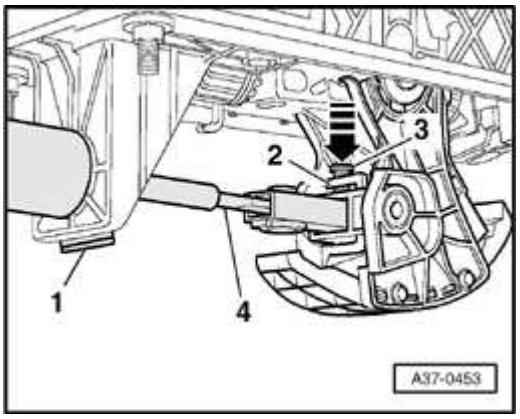


Fig. 48: Inserting End Of Selector Lever Cable Into Joint Of Selector Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Fit new retaining clip - **1** - for selector lever cable on shift mechanism.

Installation position:

Angled end of retaining clip faces to inside of shift mechanism.

- Install locking cable **Installing**.
- Adjust locking cable --> **Locking cable, adjusting**.
- Fit driveshaft to transmission. -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Install front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

Tightening torques

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Component	Nm
Shift mechanism to body	10
Bottom cover to shift mechanism	10

Shift mechanism, disassembling and assembling (sequence)

NOTE:

- **Removing and installing securing spring for locking cable Securing spring for locking cable, removing and installing.**

Disassembly of suspension strut

- Move selector lever into position "S".
- Remove selector lever lock solenoid - **7** - --> **Shift Lock Solenoid N110 , removing and installing**.
- Carefully unbolt gate - **12** -.

NOTE:

- **If gate - 12 - or selector housing - 14 - is damaged, complete selector housing with gate must be replaced.**

- Release pivot pins - **5** - and - **19** - and pull them out from the side.
- Unclip retainers - **2** - and - **16** -.
- Remove retaining clip - **17** -.
- Swing locking lever - **11** - fully upward.

- Pull selector lever - **6** - with bushes - **3** - and - **15** - together with locking levers for Tiptronic - **4** - and - **18** - downward out of selector housing - **14** -.

Assembly of suspension strut

- Check whether selector lever is still in position "S".
- Swing locking lever - **11** - fully upward.
- Insert selector lever - **6** - into selector housing - **14** - from below.
- Push locking levers for Tiptronic - **4** - and - **18** - along with bushes - **3** - and - **15** - onto selector lever.

- Press selector lever - **6** - with bushes into selector housing and position it with retaining clip - **17** -.
- Engage retainers - **2** - and - **16** - to selector housing.
- Press pivot pins - **5** - and - **19** - into mounting bracket until they engage.
- Check whether pivot pins engage in locking lever for Tiptronic.

- Install selector lever lock solenoid - **7** - --> **Shift Lock Solenoid N110 , removing and installing**.
- Tighten gate - **12** - to selector housing - **14** - with the 3 securing bolts to 0.4 Nm.

NOTE:

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- **If gate - 12 - or selector housing - 14 - is damaged by tightening too much, complete selector housing with gate must be replaced.**
- **Gate is matched to selector housing and cannot be replaced separately.**

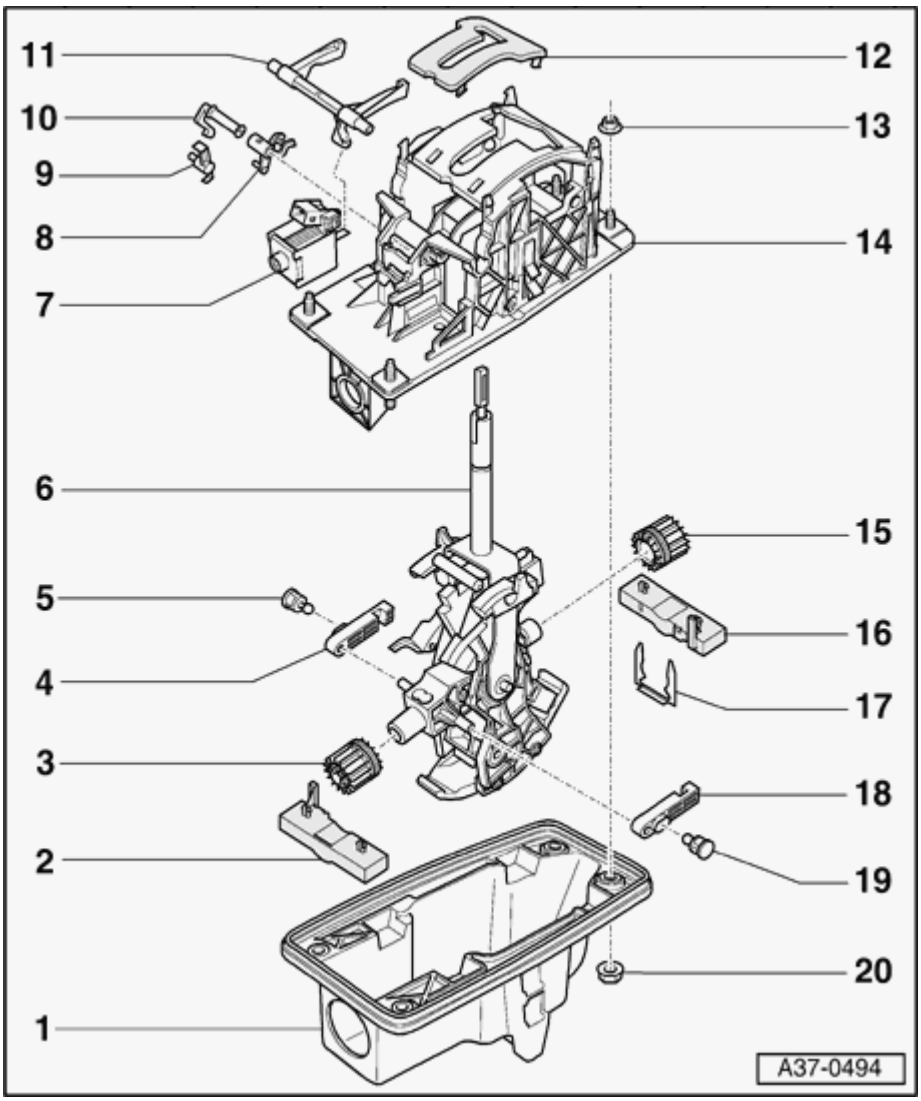


Fig. 49: Shift Mechanism, Disassembling And Assembling (Sequence)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Securing spring for locking cable, removing and installing

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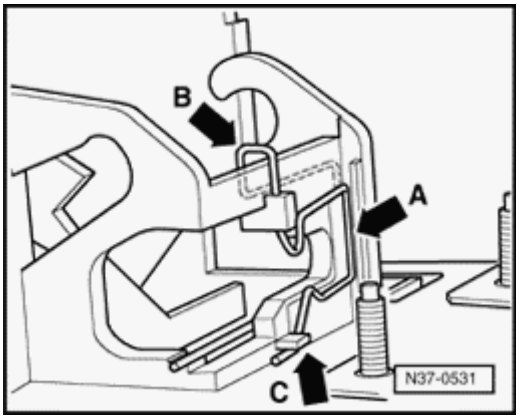


Fig. 50: Securing Spring For Locking Cable, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Removing

- Slightly lift spring at top (arrow B) and remove locking cable from shift mechanism.
- Unhook spring (arrow A) at retaining clip (arrow C) and remove toward top.

Installing

- Insert spring (arrow B) from top and hook in at retaining clip (arrow C).
- Align spring so that it is seated evenly in groove (arrow A).
- Slightly lift spring at top (arrow B) and insert locking cable into shift mechanism.

Shift Lock Solenoid N110 , removing and installing

Removing

- Remove shift mechanism cover --> **Shift mechanism cover, removing and installing**.
- Disconnect electrical harness connector on Shift Lock Solenoid N110.

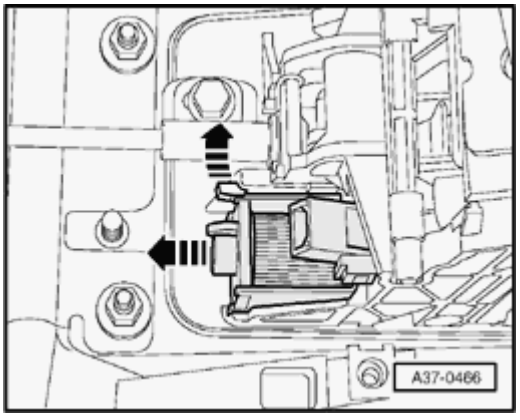


Fig. 51: Releasing Lugs And Selector Lever Lock Solenoid Forward
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Release lugs and remove selector lever lock solenoid forward (arrows).

Installing

Installation is reverse of removal, noting the following:

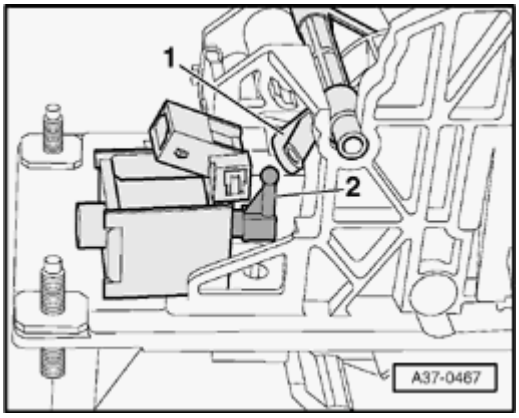


Fig. 52: Pressing Selector Lever Lock Solenoid Into Guide Until It Engages
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press selector lever lock solenoid into guide until it engages; actuating lever - **2** - of solenoid must engage in locking lever - **1** - on shift mechanism.
- Install shift mechanism cover --> **Shift mechanism cover, removing and installing**.

Selector lever cable and locking cable, assembly overview

NOTE:

- **Do not bend or kink selector lever cable.**
- **Lubricate pull ring and ball socket with polycarbamide grease, part no. G 052 142 A2.**

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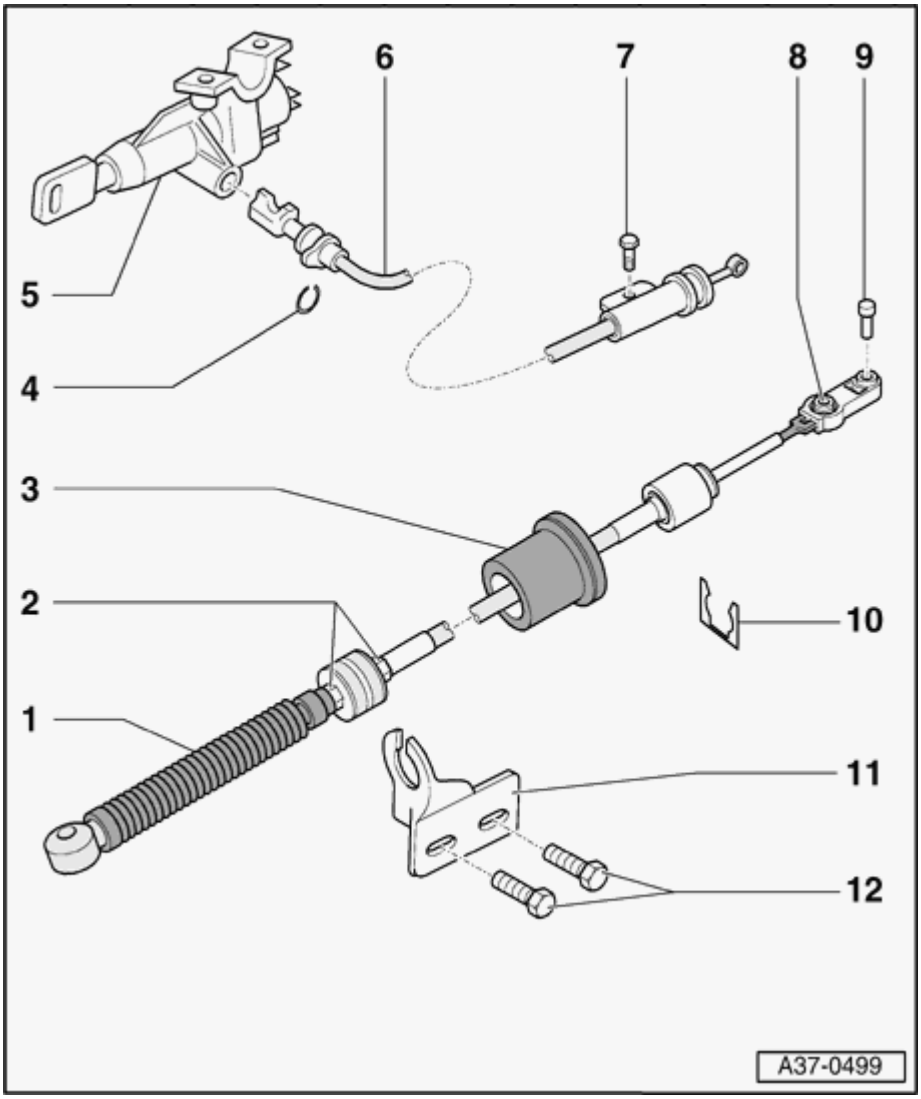


Fig. 53: Selector Lever Cable And Locking Cable, Assembly Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Selector lever cable

- Must not be kinked
- Removing and installing --> **Selector lever cable, removing and installing**
- Adjusting --> **Selector lever cable, checking and adjusting**

2 - Lock nuts - 12 Nm

3 - Boot

- For selector lever cable
- Fasten into bottom cover of shift mechanism

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4 - Locking clamp

5 - Ignition/Starter Switch

- With ignition key removal lock

6 - Locking cable

- For ignition key removal lock
- Must not be kinked
- Removing and installing --> **Locking cable, removing and installing**
- Adjusting --> **Locking cable, adjusting**

7 - Hex-bolt - 9 Nm

8 - Clamping screw - 13 Nm

- For selector lever cable
- To adjust, loosen by approx. 1 turn, do not fully remove

9 - Pin

- For selector lever cable
- To remove selector lever cable, pull plastic securing spring on shift mechanism slightly forward and push pin up only as far as necessary

10 - Retaining clip

- For selector lever cable
- Always replace

11 - Pivot

- For selector lever cable to transmission

12 - Hex-bolt, 23 Nm

Selector lever cable, removing and installing

Special tools, testers and auxiliary items required

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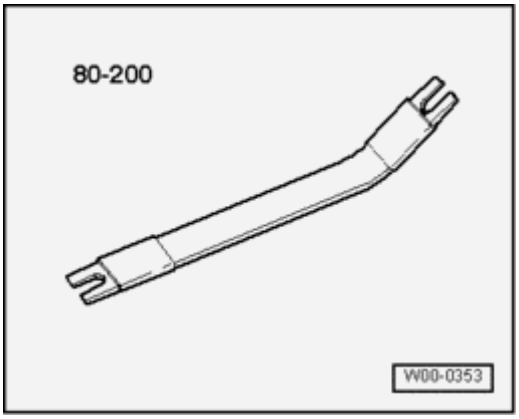


Fig. 54: Identifying Pry Lever 80-200
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry lever 80-200

Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**
-
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

Removing

- Shift selector lever into position "S".
- Raise vehicle.
- Remove front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE

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MECHANICAL, ENGINE CODE(S): BNS

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

- Remove heat shield for driveshaft from body of the vehicle.

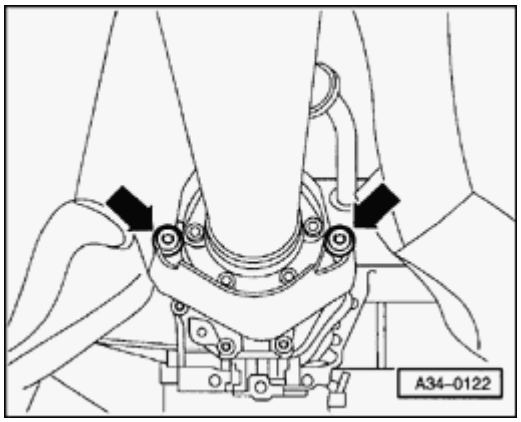


Fig. 55: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for driveshaft from cover for Torsen differential (arrows).
- Unbolt driveshaft from transmission and hang or support. -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Remove shielding plate/selector lever cable, if installed.

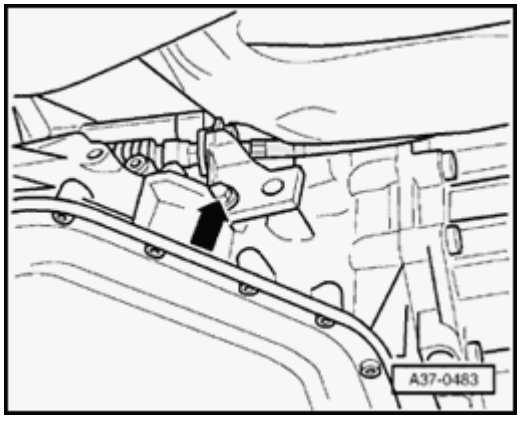


Fig. 56: Location Of Support Bracket For Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove mounting bracket for selector lever cable (arrow).
- Removing left transmission support --> **Right and left transmission mounts, removing and installing**.

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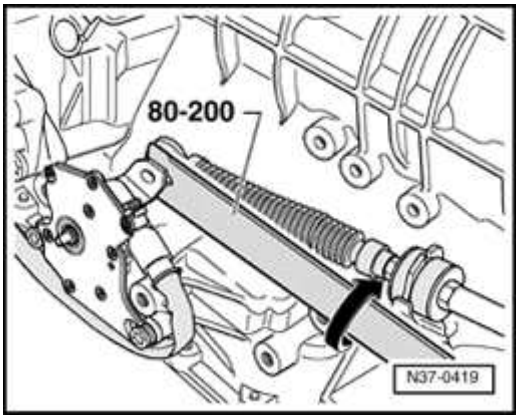


Fig. 57: Removing Selector Lever Cable From Selector Shaft Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry off selector lever cable from lever/shift rod using prying lever 80-200 (arrows).
- Unbolt front heat shield, if installed, from below shift mechanism housing.

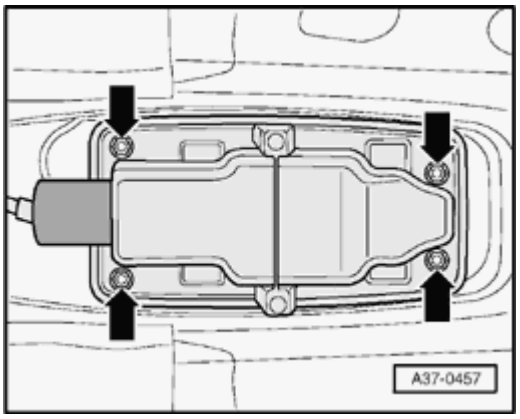
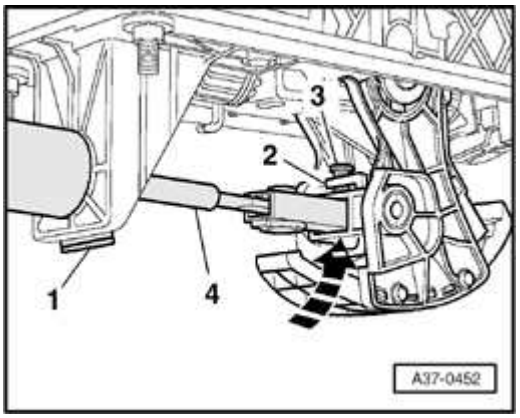


Fig. 58: Removing Lower Cover From Shift Mechanism
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove lower cover from shift mechanism (arrows).
- Remove boot of selector lever cable from lower shift mechanism cover and slide back.



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Fig. 59: Identifying Retaining Clip, Securing Spring, Push Pin & Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove retaining clip - **1** - for selector lever cable on shift mechanism downward.
- Pull plastic securing spring - **2** - slightly to front and push pin - **3** - up only as far as necessary (arrow).

NOTE:

- **Make sure that pin is not pushed fully out.**

- Remove selector lever cable - **4** - from shift mechanism.

NOTE:

- **Do not bend or kink selector lever cable.**

Installing

Installation is reverse of removal, noting the following:

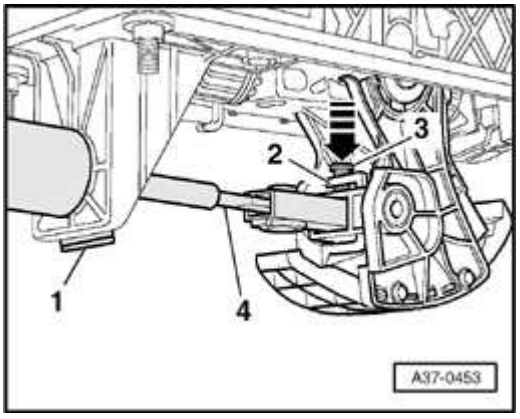


Fig. 60: Inserting End Of Selector Lever Cable Into Joint Of Selector Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Fit new retaining clip - **1** - for selector lever cable on shift mechanism.

Installation position:

Angled end of retaining clip faces to inside of shift mechanism.

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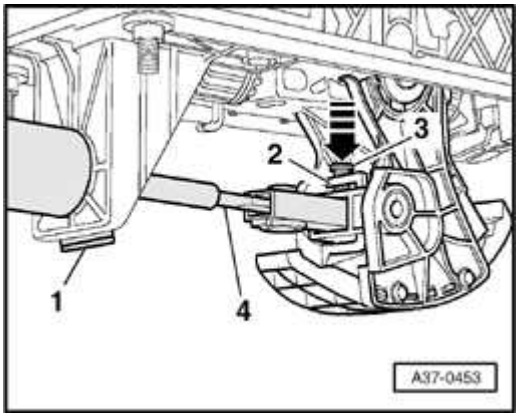


Fig. 61: Inserting End Of Selector Lever Cable Into Joint Of Selector Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert end of selector lever cable - **4** - into selector lever joint.
- Press pin - **3** - downward (arrow)
- Check whether plastic securing spring - **2** - has locked pin.
- Fasten selector lever cable boot into lower cover of shift mechanism.

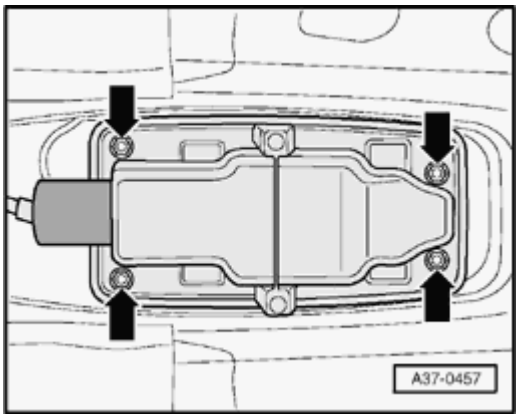


Fig. 62: Removing Lower Cover From Shift Mechanism
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt lower cover to shift mechanism (arrows).

NOTE:

- **Do not bend or kink selector lever cable.**

- Install front heat shield, if present, under shift mechanism housing.

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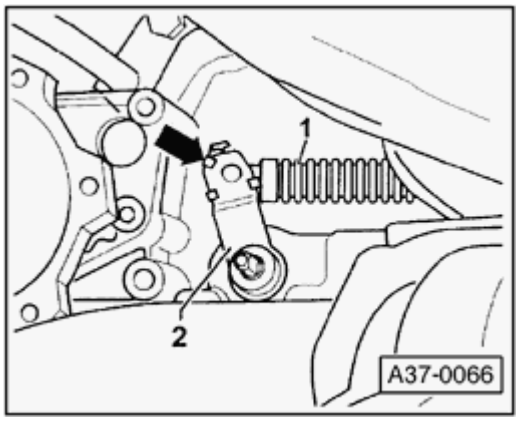


Fig. 63: Pushing Lever/Selector Shaft On Transmission Fully Forward Into Position "S"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Push lever/selector shaft - **2** - on transmission fully forward into position "S" - **arrow** -.
- Shift selector lever into "S" and carefully press up ball head of selector lever cable - **1** - on lever/shift rod - **2** - using a pair of pliers.

NOTE:

- **Do not deform lever/shift rod when pressing up or else shifting cannot be precisely adjusted any more.**

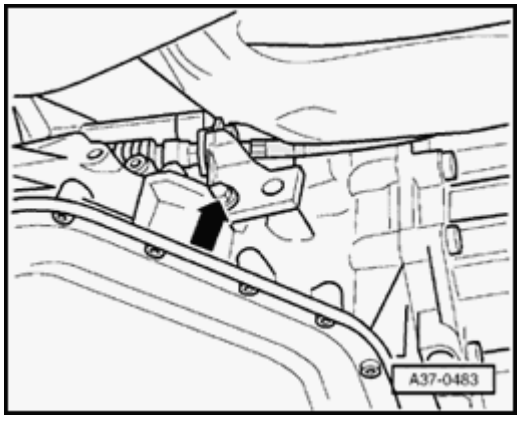


Fig. 64: Location Of Support Bracket For Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt on mounting bracket for selector lever cable in this position (arrow).
- Install shielding plate/selector lever cable, if present.
- Install left transmission support with transmission mount --> **Right and left transmission mounts, removing and installing**
- Fit driveshaft to transmission. -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

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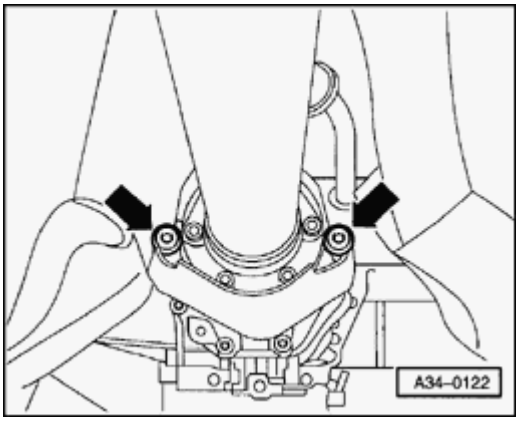


Fig. 65: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt heat shield for driveshaft onto transfer box (arrows).
- Install front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Adjust selector lever cable --> **Selector lever cable, checking and adjusting**.

Tightening torques

Component	Nm
Bottom cover to shift mechanism	10
Selector lever cable to mounting bracket	12
Mounting bracket to transmission (2 x M8)	23 Nm
Heat shield/selector lever cable to transmission, M8	23 Nm

Selector lever cable, checking and adjusting

Special tools, testers and auxiliary items required

- Special tool T40031

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Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

Procedure

- Shift selector lever into position "S".

For 6 cylinder gasoline engines:

- Remove left front exhaust pipe. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Remove shielding plate/selector lever cable.

All:

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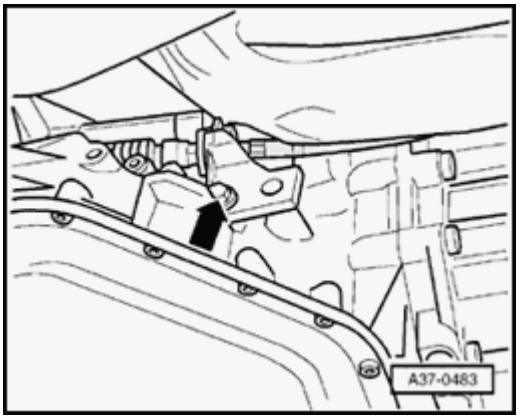


Fig. 66: Location Of Support Bracket For Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove mounting bracket for selector lever cable (arrow).
- Removing left transmission support --> **Right and left transmission mounts, removing and installing**.

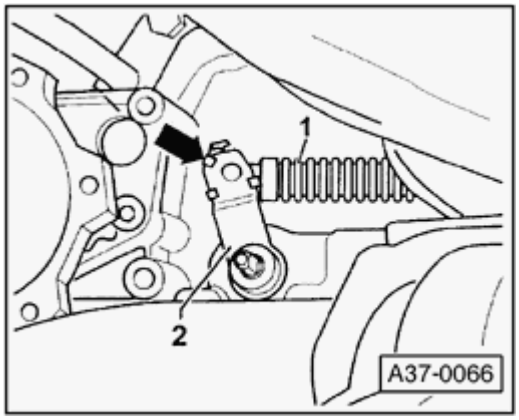
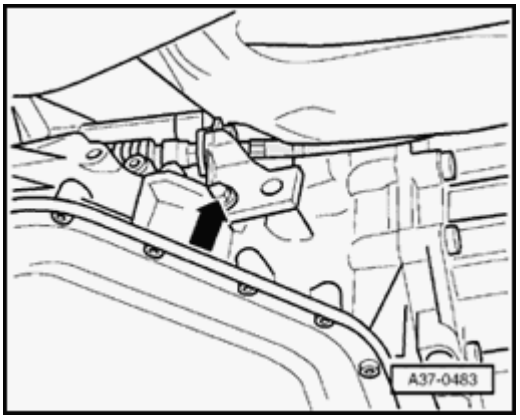


Fig. 67: Pushing Lever/Selector Shaft On Transmission Fully Forward Into Position "S"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Grasp selector lever cable - **1** - and push lever/selector shaft - **2** - fully forward into position "S" - **arrow** - .



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Fig. 68: Location Of Support Bracket For Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt on mounting bracket for selector lever cable in this position (arrow).
- Remove shift mechanism cover --> **Shift mechanism cover, removing and installing**.

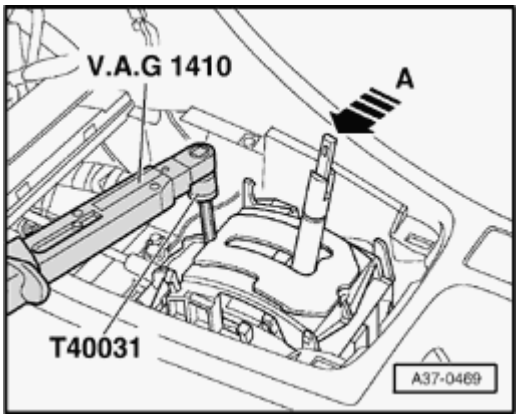


Fig. 69: Loosening Rear Clamping Screw On Selector Lever Cable Approx. 1 Turn Through Hole In Shift Mechanism Using Special Tool T40031
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen rear clamping screw on selector lever cable approx. 1 turn through the hole in shift mechanism using special tool T40031.

NOTE:

- **Loosen clamping screw approx. 1 turn. Do not remove.**
- **Clamping screw is only accessible in selector lever position "S".**
- **Selector lever must remain in position "S" while clamping screw is loose.**

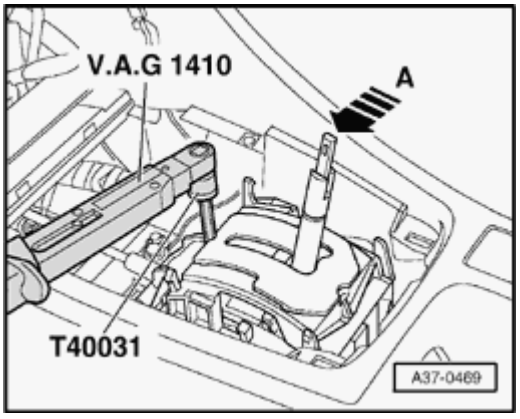


Fig. 70: Checking Exact Position Of Selector Lever In Position "S" By Pushing Selector Lever Lightly Toward Drivers Seat
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check exact position of selector lever in position "S" by pushing selector lever lightly toward drivers seat

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(arrow - **A** -).

NOTE:

- **When adjusting, do not move selector lever backward or forward, or adjustment will be falsified.**

- Tighten clamping screw to 13 Nm in this position using special tool T40031.
- Install shift mechanism cover --> **Shift mechanism cover, removing and installing**.
- Installing left transmission support --> **Right and left transmission mounts, removing and installing**.

For 6 cylinder gasoline engines:

- Install shielding plate/selector lever cable.
- Install left front exhaust pipe. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

Tightening torques

Component	Nm
Clamping screw to selector lever cable	13
Mounting bracket to transmission (2 x M8)	23 Nm
Heat shield/selector lever cable to transmission, M8	23 Nm

Locking cable, removing and installing

Removing

NOTE:

- **Locking cable must not be kinked.**

- Shift selector lever into position "S".
- Note radio code (for vehicles equipped with coded anti-theft radio/radio navigation system).

See Caution before beginning repairs on electrical system --> **Selector lever mechanism, servicing**

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- Disconnect Ground (GND) strap from battery.
- Remove storage compartment on drivers side -->
  - **68 - INTERIOR EQUIPMENT**
  - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET
- Remove steering column cover: -->
  - **68 - INTERIOR EQUIPMENT**
  - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET
- Remove air conditioning operating unit: --> **87 AIR CONDITIONING**
- Remove ashtray in center console: -->
  - **68 - INTERIOR EQUIPMENT**
  - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET
- Remove shift mechanism cover --> **Shift mechanism cover, removing and installing**.
- Switch ignition key to driving position (ignition on).
- Shift selector lever into position "P".
- Lift retaining clip - **2** - from interlock lever and pull locking cable - **1** - out of ignition/starter switch.
- Lift securing spring - **4** - for locking cable and pull locking cable support bracket - **5** - on shift mechanism sideways and disengage locking cable eye.

Installing

Installation is reverse of removal, noting the following:

- Route locking cable kink-free behind dash panel strut (arrow).
- Switch ignition key to driving position (ignition on).
- Insert locking cable - **1** - into ignition/starter switch.
- Check that interlock lever - **2** - is locked.
- Bring ignition/starter switch into locking position (ignition off).
- Check whether selector lever is still in position "P".
- Engage locking cable eye in pin - **3** -.
- Slightly lift securing spring - **4** -.
- Push locking cable support bracket - **5** - into shift mechanism from the right until securing spring - **4** - engages.
- Adjusting locking cable --> **Locking cable, adjusting**.

See Caution for connecting Telematics battery --> **Selector lever mechanism, servicing**

NOTE:

- **Be sure to activate vehicle features (radio/radio-navigation system, clock,**

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electric window regulators) according to owners manual when the battery is reconnected.

- **Further measures after re-connecting power supply: -->**
  - **24 MULTIPORT FUEL INJECTION (MFI) for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **24 - MULTIPORT FUEL INJECTION (MFI) for 2.0 LITER 4-CYL. 4V TURBO FUEL INJECTION IGNITION, ENGINE CODE(S): BPG, BWT**
  - **24 MULTIPORT FUEL INJECTION (MFI) for 3.0 LITER 6-CYL. 5V FUEL INJECTION & IGNITION, ENGINE CODE(S): AVK, BGN**
  - **24 - FUEL INJECTION SYSTEM for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **24 - MULTIPORT FUEL INJECTION (MFI) for 4.2 LITER V8 4V FUEL INJECTION AND IGNITION, ENGINE CODE(S): BNS**
  - **24 MULTIPORT FUEL INJECTION (MFI) for 4.2 LITER V8 5V FUEL INJECTION AND IGNITION, ENGINE CODE(S): BHF**

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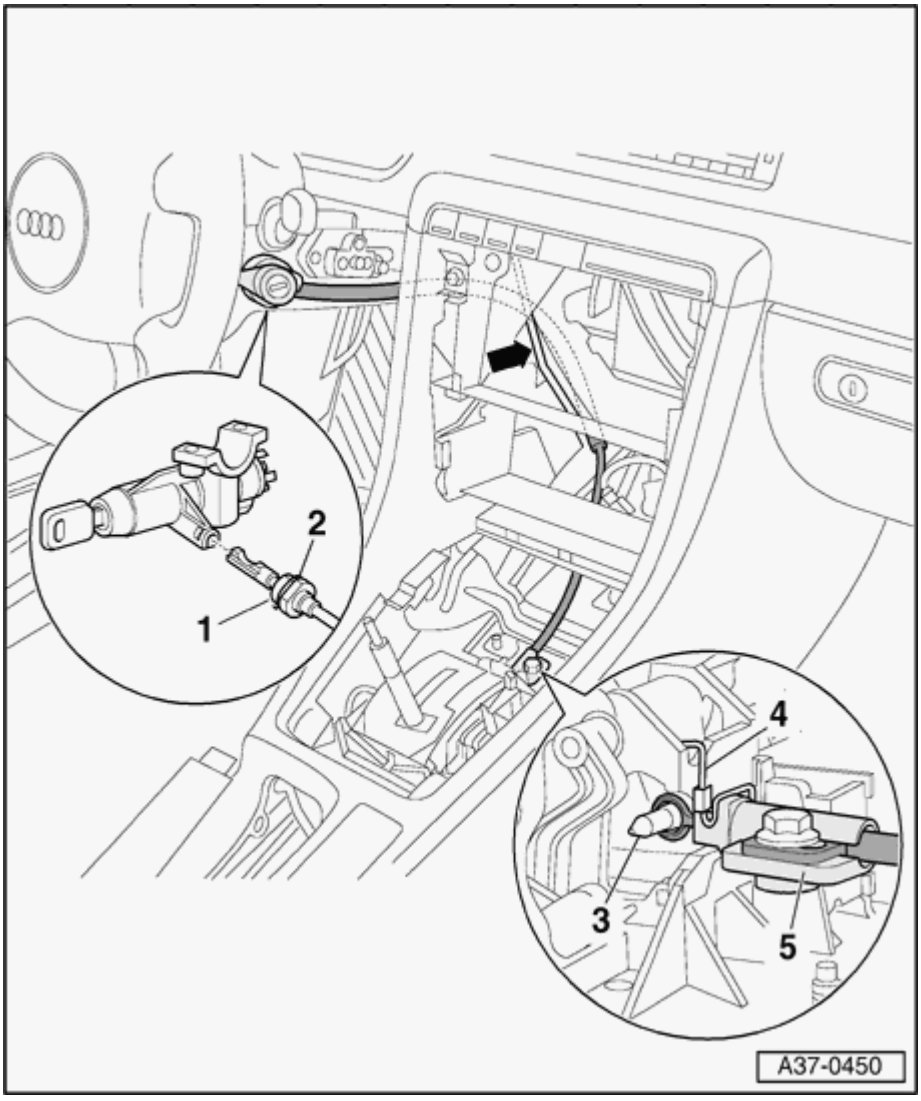


Fig. 71: Locking Cable Remove/Install Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Locking cable, adjusting

Special tools, testers and auxiliary items required

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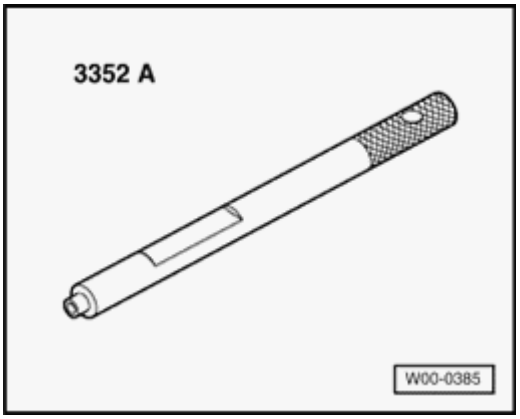


Fig. 72: Identifying Special Tools - Adjustment Pin For Shiftlock 3 3352A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Adjusting gauge 3352A for locking cable
- Protective glasses

Preliminary work

NOTE:

- **The following described procedure saves the work of removing center console.**

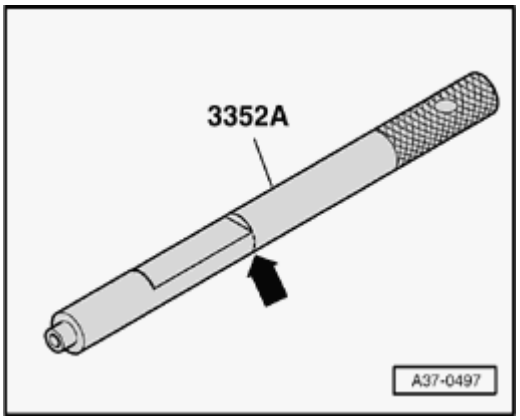


Fig. 73: Identifying Cutting Area Of Adjusting Gauge 3352A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Cut through adjusting gauge 3352A at rear end of flat area - **arrow** - using a parting grinder.

  CAUTION: Wear protective glasses.

- Order a new adjusting gauge 3352A for locking cable as replacement for later use.

Procedure

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- Remove center console trim --> **Shift mechanism cover, removing and installing**.

NOTE:

- **Selector lever knob and cover can remain installed.**

- Remove ashtray in center console: -->
  - **68 - INTERIOR EQUIPMENT**
  - **68 - INTERIOR EQUIPMENT** for BODY INTERIOR - CABRIOLET

Adjustment requirements:

- Locking cable in installation position
- Selector lever in position "P".
- Ignition key in removal position.

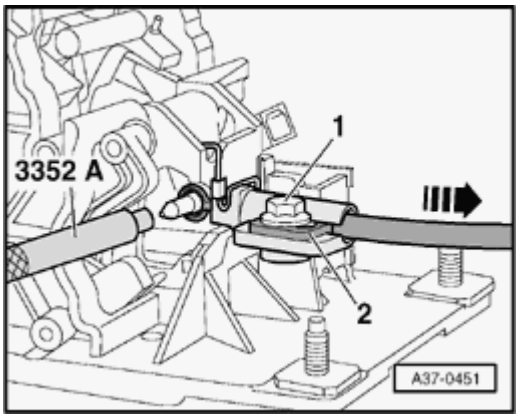


Fig. 74: Removing Adjusting Gauge
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen bolt - **1** -.

- Support bracket - **2** - of locking cable must be movable by hand

- Push modified adjusting gauge 3352A between pin on lever for locking cable and locking cable eye.
- Move locking cable in direction of arrow to stop and tighten bolt - **1** - to 9 Nm.
- It must be possible to easily remove and insert adjusting gauge 3352A in this position.
- Remove adjusting gauge.

- Check ignition key removal lock after every adjustment of the locking cable --> **Ignition key removal lock, checking**.

Tightening torque

Component	Nm

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Locking cable to support bracket	9

TRANSMISSION, REMOVING AND INSTALLING

Transmission, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Obtain the anti-theft radio security code.**
- **Switch the ignition off.**
- **Disconnect the battery Ground (GND) strap.**
- **On vehicles equipped with Audi Telematics by OnStar, switch-off the emergency (back-up) battery for the Telematic/Telephone Control Module prior to disconnecting vehicle battery -->**
  - **91 - COMMUNICATION**
  - **91 RADIO, TELEPHONE, NAVIGATION, TRIP COMPUTER for COMMUNICATION, CABRIOLET**

  .
- **After reconnecting vehicle battery, re-code and check operation of anti-theft radio. Also check operation of clock and power windows according to article and/or Owners Manual.**
- **After reconnecting vehicle battery on vehicles equipped with Audi Telematics by OnStar, switch-on the emergency (back-up) battery for the Telematic/Telephone Control Module -->**
  - **91 - COMMUNICATION**
  - **91 RADIO, TELEPHONE, NAVIGATION, TRIP COMPUTER for COMMUNICATION, CABRIOLET**

  .

Transmission, removing and installing

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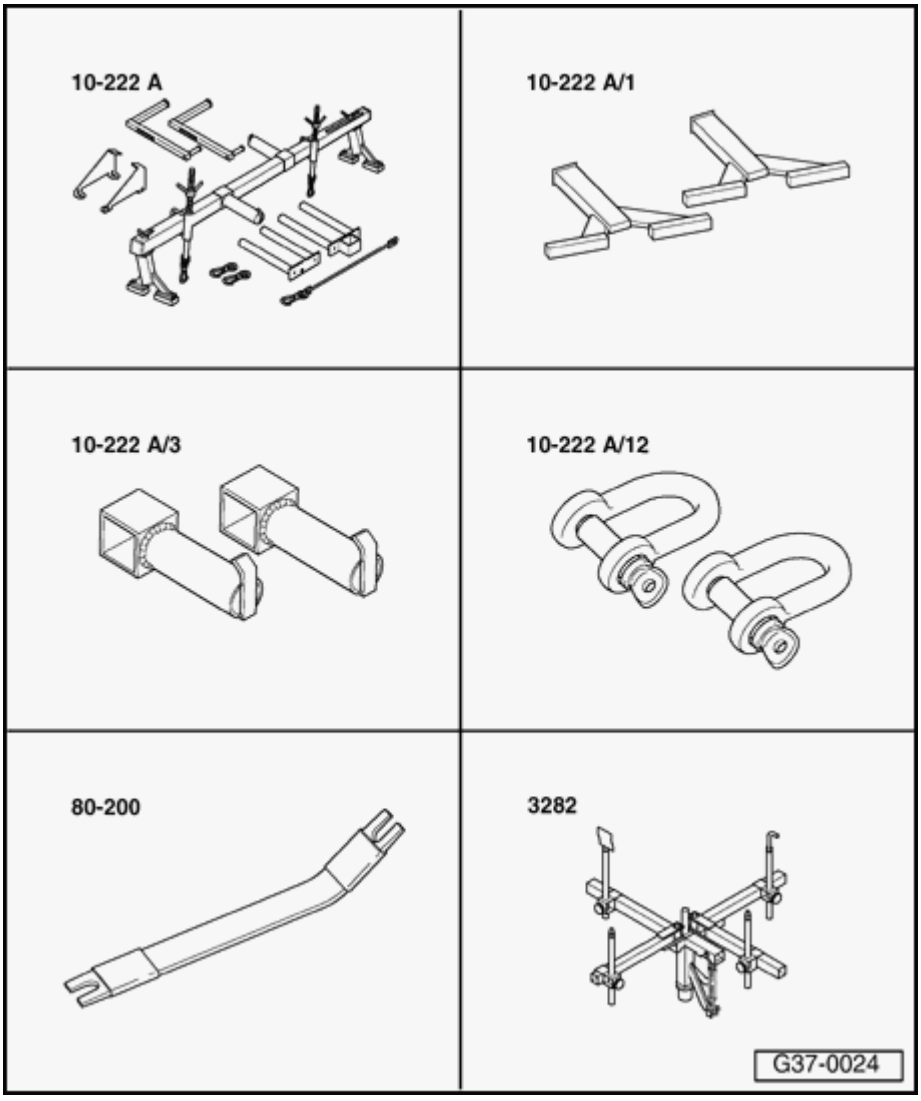


Fig. 75: Identifying Special Tools - Transmission, Removing And Installing (1 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Engine support bridge 10-222A
- Support 10-222A/1
- Adapter 10-222A/3
- Shackle 10-222A/12

- Pry lever 80-200 for removing outside mirror
- Transmission support 3282

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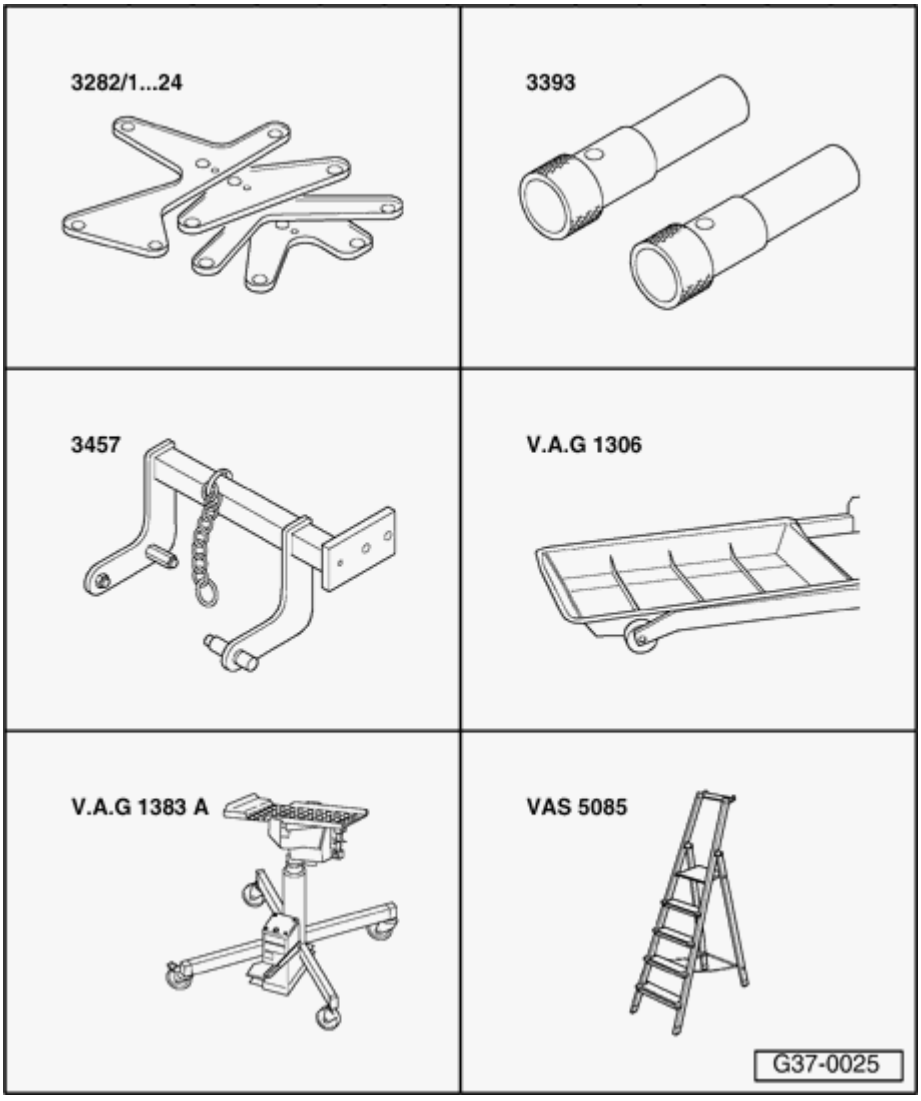


Fig. 76: Identifying Special Tools - Transmission, Removing And Installing (2 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Adjustment plate 3282/19
- Testing Mandrels 3393
- Transport device 3457
- Drip tray VAG1306

- Engine/transmission support VAG1383A engine/gearbox jack
- Ladder VAS5085

Removing

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NOTE:

- **All cable ties opened or cut during engine removal must be reinstalled at the same locations.**

- First determine whether a coded radio is installed. If so, determine the correct coding.

See Caution before beginning repairs on the electrical system --> **Transmission, removing and installing**

- Switch ignition off and disconnect battery Ground (GND) strap.

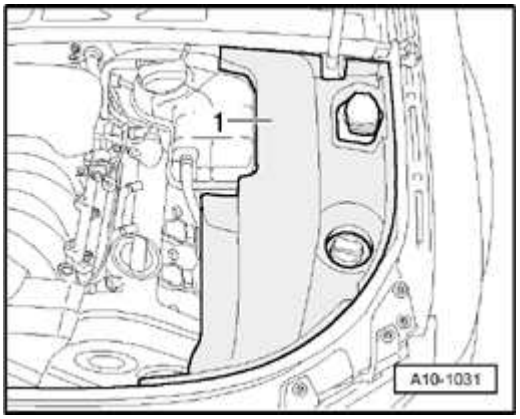


Fig. 77: Removing Cover In Engine Compartment (Left Side)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover - **1** - in engine compartment (left side).

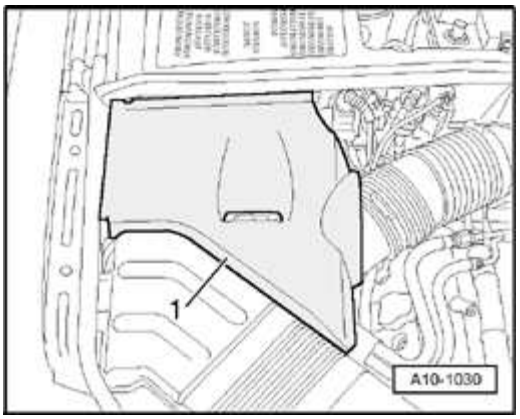


Fig. 78: Removing Cover In Engine Compartment (Right Side)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover - **1** - in engine compartment (right side).

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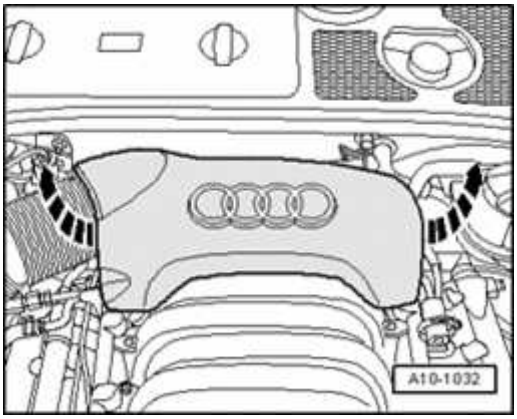


Fig. 79: Removing Rear Engine Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove engine cover (arrows).
- Remove intake air duct from intake manifold.

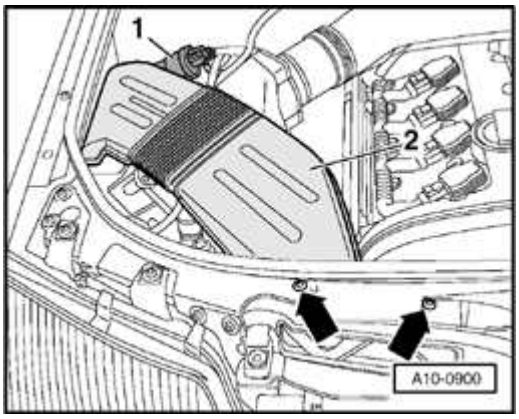


Fig. 80: Evaporative Emission Canister Purge Regulator Valve N80 And Air Duct
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disengage Evaporative Emission (EVAP) Canister Purge Regulator Valve N80 - **1** -.
- Remove bolts (arrows) and remove intake air guide - **2** -.

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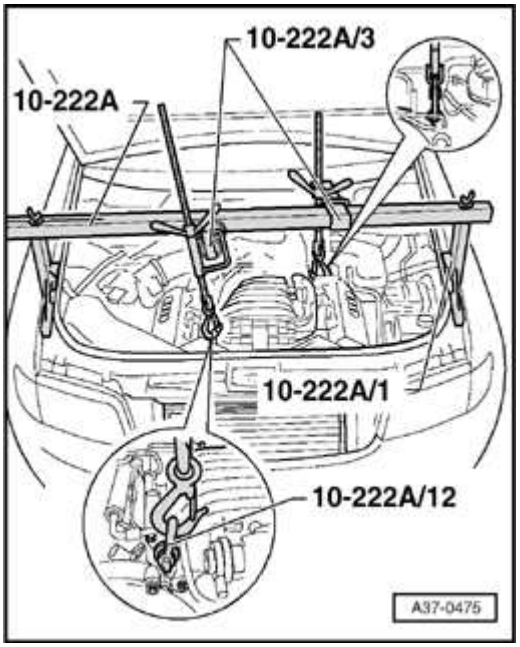


Fig. 81: Fitting Support Bar 10-222A Together With Supports 10-222A/1 And Fit Adapters 10-222A/3
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Fit support bar 10-222A together with supports 10-222A/1 and fit adapters 10-222A/3.
- Secure spindles to engine. To do so, additionally use a shackle 10-222A/12 at the front side of the engine to avoid damage.
- Take up weight of engine/transmission assembly on spindles.
- Loosen wheel bolts.

- Raise vehicle.
- Remove front wheels.

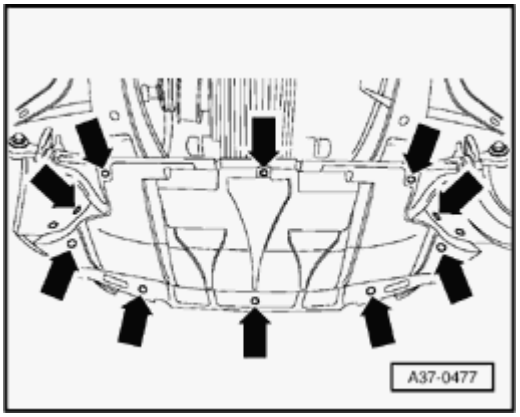


Fig. 82: Identifying Noise Insulation Panel Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove noise insulation panel (arrows).

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- Remove front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

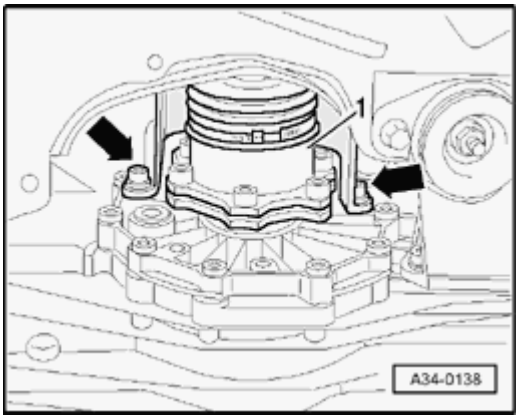


Fig. 83: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shields for left, if installed, and right drive axles (arrows).

Third bolt is not visible in the illustration.

- Unbolt left and right drive axles - **1** - from transmission flanges and tie up. --> **40 - FRONT SUSPENSION**

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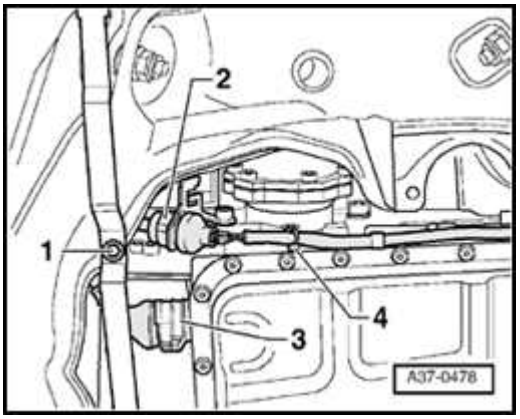


Fig. 84: Identifying Noise Insulation Tray Bracket, Multi-Function Switch Connector, Locking Lever And Cable Tie
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove noise insulation bracket - **1** -.
- Disconnect connector - **2** - of wire for multi-function switch.
- Swing securing lever - **3** - , disconnect connector for transmission wiring harness.
- Cut cable ties - **4** -.

Make sure the wire for multi-function switch is not damaged when doing this.

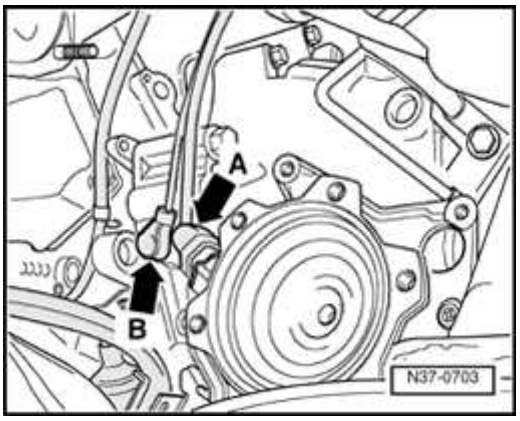


Fig. 85: Location of Speedometer Vehicle Speed Sensor (VSS) G22, and Engine Speed (RPM) Sensor G28
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect connector from Speedometer Vehicle Speed Sensor (arrow - **A** -).
- Unbolt Engine Speed (RPM) Sensor G28 (arrow - **B** -) from transmission.

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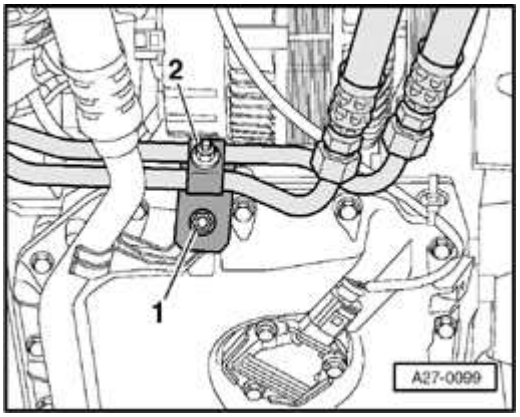


Fig. 86: Unscrewing Nut For Clamp For ATF Lines
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unscrew nut - **2** - for clamp for ATF lines.
- Place drip tray VAG1306 underneath.
- Always clean area of ATF line/transmission connection.
- Mark ATF lines if no color markings are present.

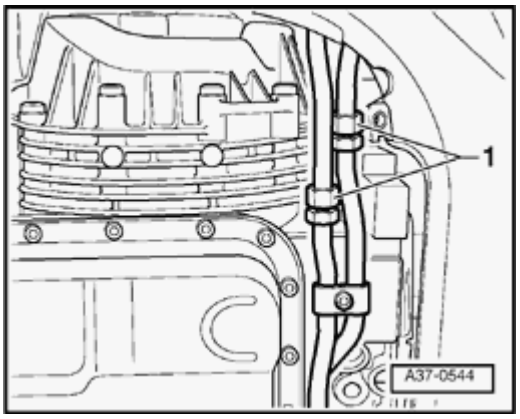


Fig. 87: Disconnecting ATF Lines
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect ATF lines - **1** -.
- Plug ATF lines with clean plug.
- Remove starter. -->
  - **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL**
  - **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL** for ELECTRICAL EQUIPMENT, CABRIOLET

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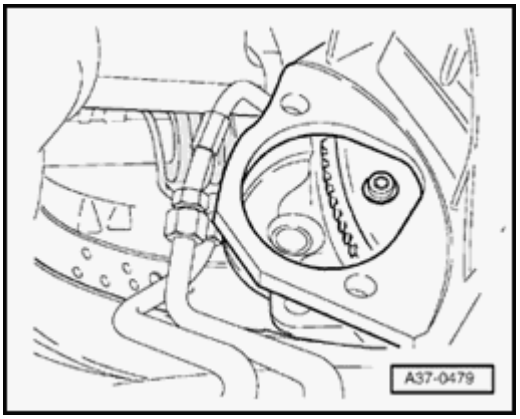


Fig. 88: Identifying Torque Converter To Drive Plate Bolts (3 Total)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt 3 torque converter bolts from drive plate (turn crank shaft an additional 1/3 turn every time).

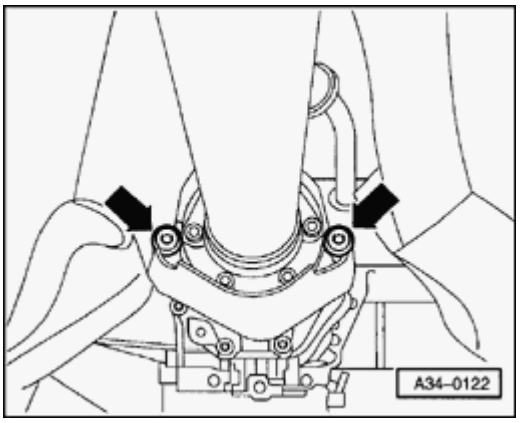


Fig. 89: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for driveshaft at transmission (arrows).

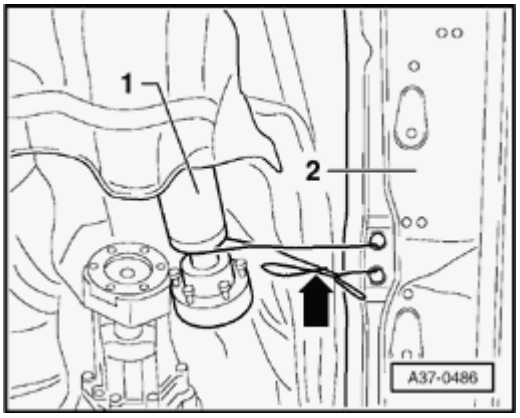


Fig. 90: Unbolting Driveshaft On Transmission And Securing To Panel With Wire
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Unbolt driveshaft - **1** - on transmission and secure to panel - **2** - with wire (arrow). -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Remove shielding plate/selector lever cable, if installed.

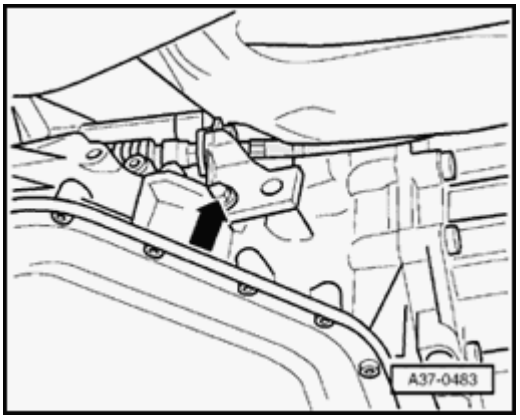


Fig. 91: Location Of Support Bracket For Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Mark position of mounting bracket for selector lever cable to transmission housing for re-installation, unbolt mounting bracket (arrow).
- Remove left transmission support with transmission mount --> **Right and left transmission mounts, removing and installing**.

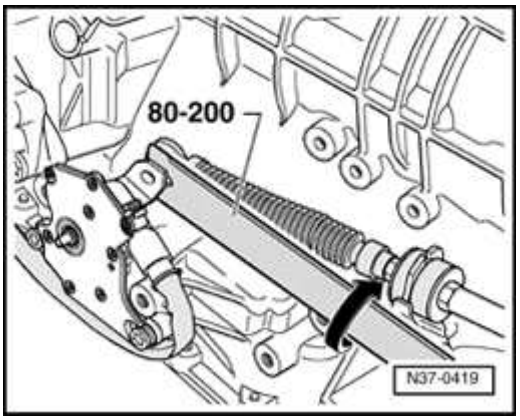


Fig. 92: Removing Selector Lever Cable From Selector Shaft Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry off selector lever cable from lever/shift rod using prying lever 80-200 (arrows).

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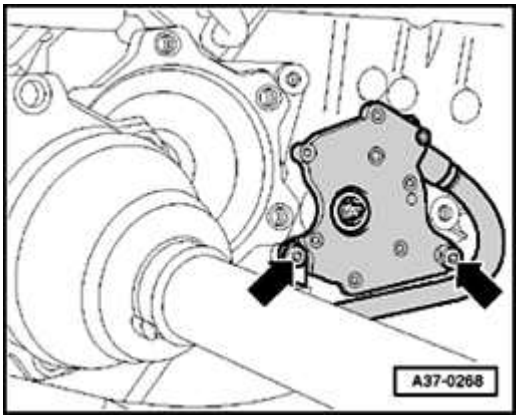


Fig. 93: Unbolting Multi-Function Transmission Range (TR) Switch F125 For Protection Against Damage
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt multi-function Transmission Range (TR) switch F125 for protection against damage (arrows) and expose wiring harness.

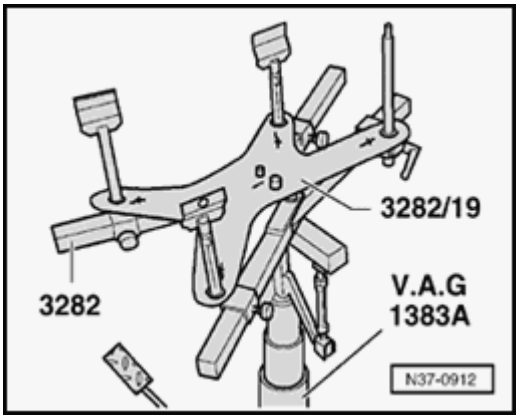


Fig. 94: Setting Up Transmission Support 3282
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Prepare transmission support 3282 for Automatic Transmission 01V with adjustment plate 3282/10 and place it on the engine/transmission hoist VAG1383A.

NOTE:

- **The symbols on the adjustment plate indicate the necessary mounts for Automatic Transmission 01V and the arrow points toward front of vehicle.**

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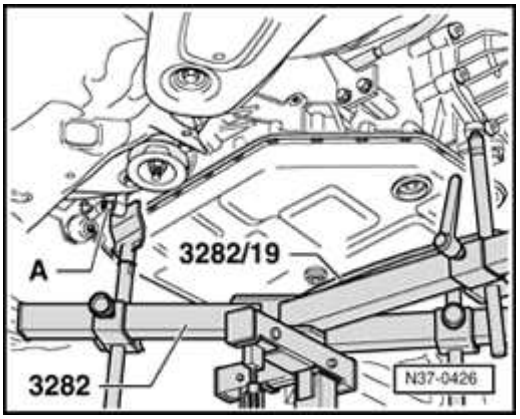


Fig. 95: Supporting Transaxle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Roll engine/transmission hoist VAG1383A with transmission support 3282 under transmission, align adjustment plate parallel to transmission and support transmission.
- Secure transmission on transmission support 3282 using bolt - **A** -.
- Fill space between gearbox support and sump with washers.

Automatic Transmission 01V with All Wheel Drive is supported at the same positions as the Front Wheel Drive version.

- Remove right transmission support with transmission mount --> **Right and left transmission mounts, removing and installing**.

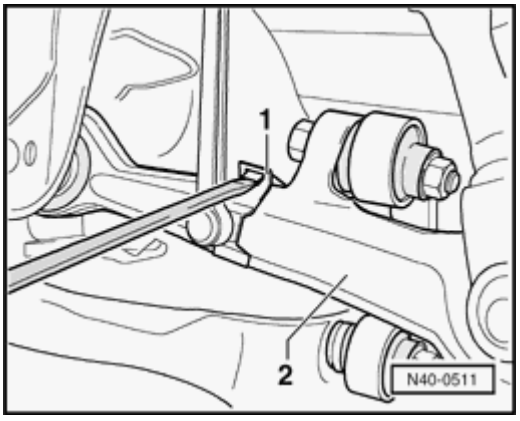


Fig. 96: Unclipping Clamp For Coupling Rod For Left Front Level Control System Sensor G78 From Control Arm
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip retaining clip for coupling rods - **1** - of Left Front Level Control System Sensor G78 from left front control arm - **2** -.

Vehicles with six-cylinder engine:

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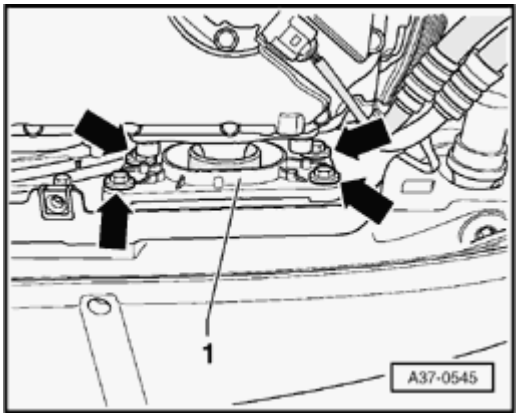


Fig. 97: Unbolting Bolts For Stop/Torque Support
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt bolts (arrows) for stop/torque support - **1** -.

All:

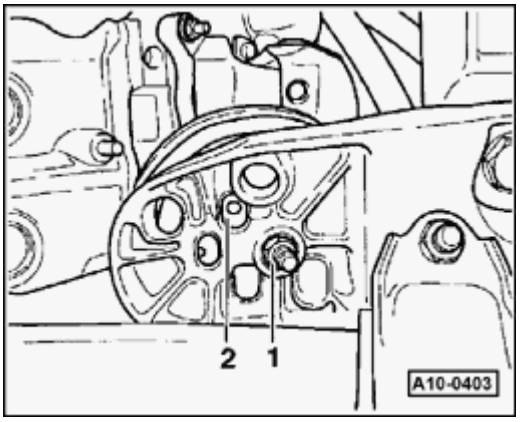


Fig. 98: Identifying Engine Mount Bolts and Positioning Sleeves
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Mark installation positions for threaded assemblies - **1** - and positioning sleeves - **2** -.
- Remove nuts - **1** - on left and right engine mounts.

NOTE:

- **When installing, make sure that locating sleeves - 2 - engage again.**

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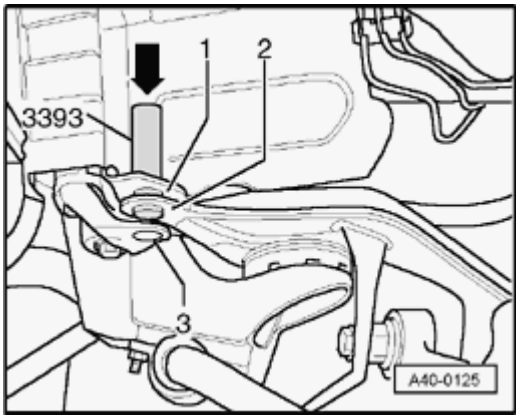


Fig. 99: Checking Holes Align Using Testing Mandrel 3393
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Before loosening subframe, check on both sides of vehicle, using testing Mandrels 3393 , that at least holes - **1** - and - **2** - align.

If this is not the case, axle alignment must be carried out after tightening of subframe.

Hole - **3** - is not applicable here.

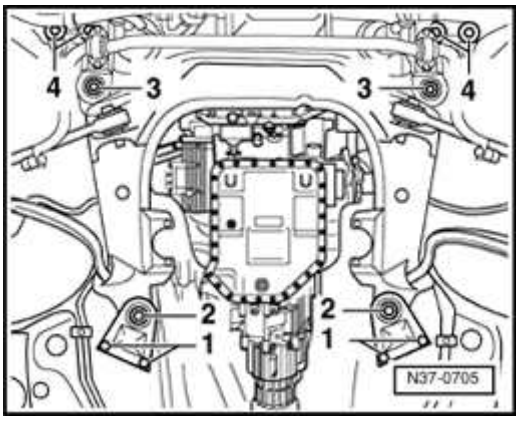


Fig. 100: Identifying Fasteners Requiring Removing To Lower Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **1** - and - **2** - at rear of subframe on both sides of vehicle.
- Remove bolts - **3** - at front of subframe on both sides of vehicle.
- Remove bolts - **4** - (2 bolts at each vehicle side).
- Remove lower connecting bolts for engine/transmission.

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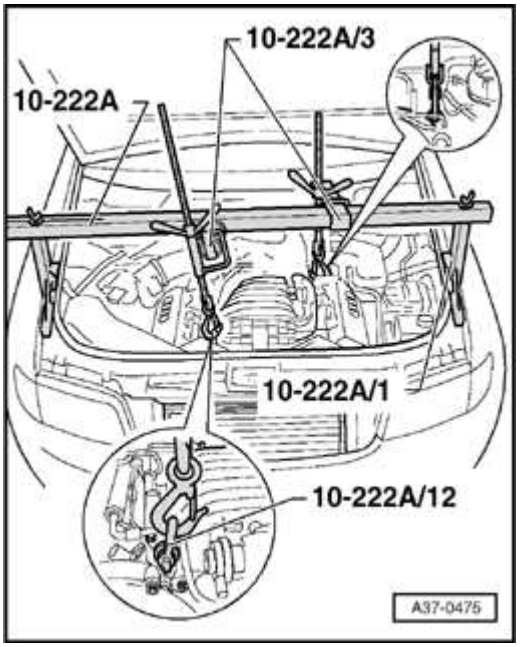


Fig. 101: Fitting Support Bar 10-222A Together With Supports 10-222A/1 And Fit Adapters 10-222A/3
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lower engine-transmission-subframe using the spindles approx. 4 turns. To do this use Support VAS5058.
- To do this lower engine/gearbox assembly using spindles in turn, 2 turns at a time.
- At the same time lower engine-transmission-subframe using lifter VAG1383A (second mechanic).

NOTE:

- **When lowering transmission, ensure that no components are damaged.**

- Remove upper connecting bolts for engine/transmission.
- Press transmission off engine, while pressing torque converter out of drive plate.

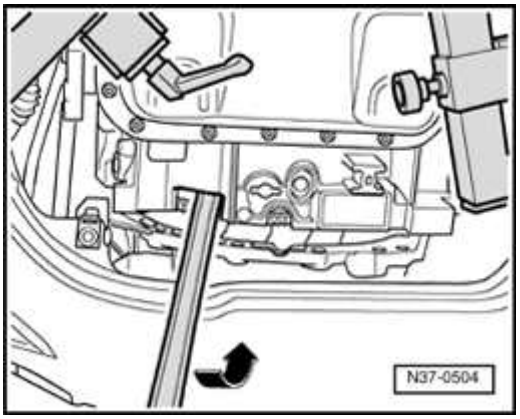


Fig. 102: Press Torque Converter Against ATF Pump
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Press torque converter against the ATF pump (arrow).
- Lower transmission.

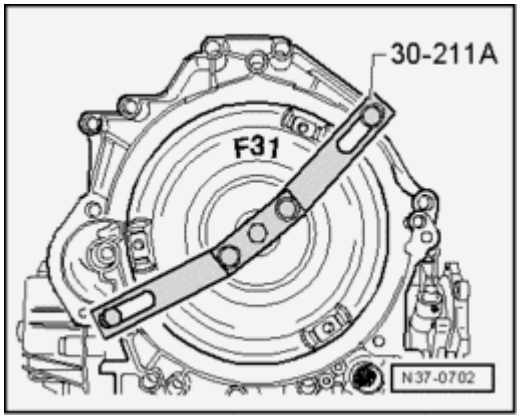


Fig. 103: Securing Torque Converter
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure converter so it does not fall out.

For disassembly and assembly, secure transmission to assembly stand using Transport device 3457 and Holding plate VW309 --> **Transmission, attaching to assembly stand**.

Installing

Installation of transmission is the reverse of removal. The following points must also be observed:

Before installing:

- Clean threads in output flange/driveshaft flange using a tap.
- Clean ATF lines --> **ATF lines and ATF cooler, cleaning**.
- Insert torque converter correctly into transmission

CAUTION: In case of an incorrectly inserted torque converter, the coupling plate of the torque converter or the ATF-pump will be destroyed, if the transmission is flanged to the engine.

Installation dimension for torque converter, checking

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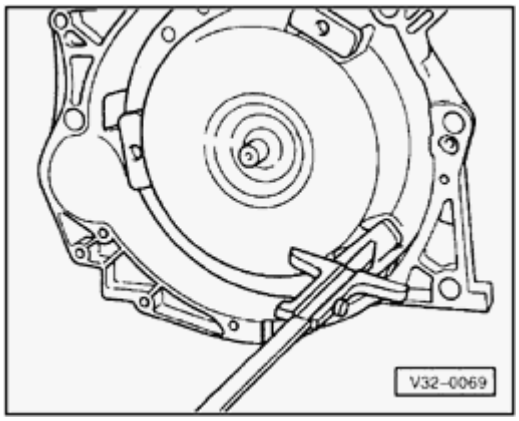


Fig. 104: Checking Torque Converter Is Correctly Positioned
Courtesy of VOLKSWAGEN UNITED STATES, INC.

When torque converter is installed correctly, distance between lower contact surface of threaded holes at torque converter and contact surface of converter housing on Automatic Transmission 01V is approx. 23 mm.

If the torque converter is not inserted completely, this distance will be approx. 11 mm.

- Make sure bushings are correctly seated.

NOTE:

- **If the bushings get stuck in the transmission housing, they must be removed and new bushings must be installed on the engine.**

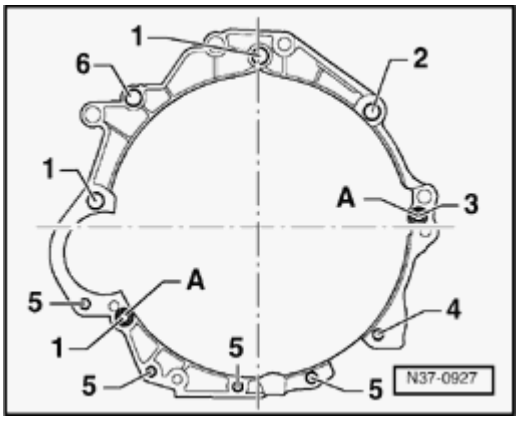


Fig. 105: Engine Cover Bolt Location And Tightening Torque
Courtesy of VOLKSWAGEN UNITED STATES, INC.

For 4 cylinder engines:

Item A = bushings

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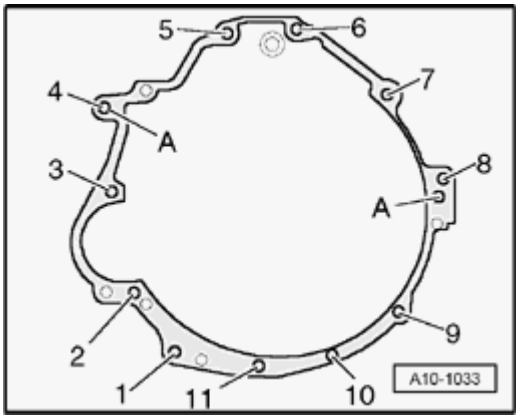


Fig. 106: Identifying Engine/Transmission Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

For 6 cylinder engines:

Item A = bushings

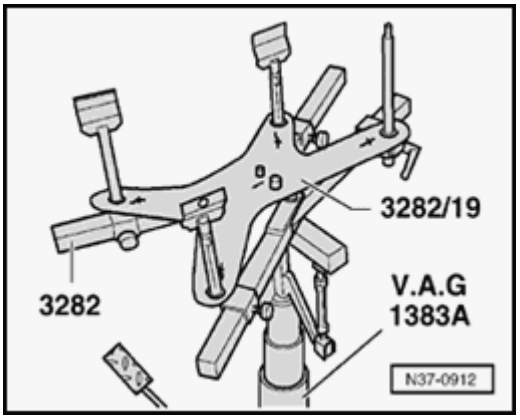


Fig. 107: Setting Up Transmission Support 3282
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Prepare transmission support 3282 for Automatic Transmission 01V with adjustment plate 3282/10 and place it on the engine/transmission hoist VAG1383A.

NOTE:

- **The symbols on the adjustment plate indicate the necessary mounts for Automatic Transmission 01V and the arrow points toward front of vehicle.**

- Place transmission onto transmission support.

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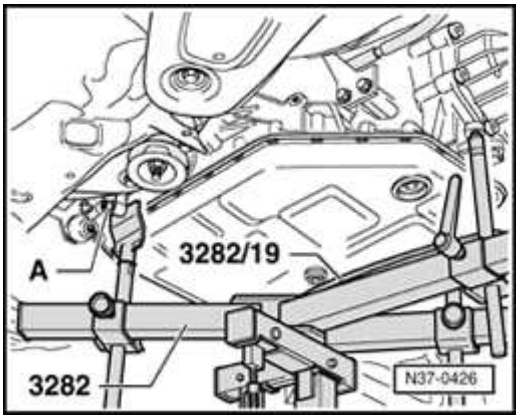


Fig. 108: Supporting Transaxle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure transmission on transmission support 3282 using bolt - **A** -.
- Move transmission into position between the lowered subframe and vehicle floor.
- Align transmission properly to engine.
- Tighten one engine/transmission connecting bolt at either side by hand.
- Make sure that wires do not get pinched as transmission is docked at engine.

CAUTION: Keep checking whether the torque converter behind the drive plate can be turned before and during tightening of the bolts at engine/transmission flange. If the torque converter cannot be turned, it must be assumed that it has not been inserted properly and that the coupling plate of the torque converter or the ATF pump will be destroyed during final tightening of the bolts.

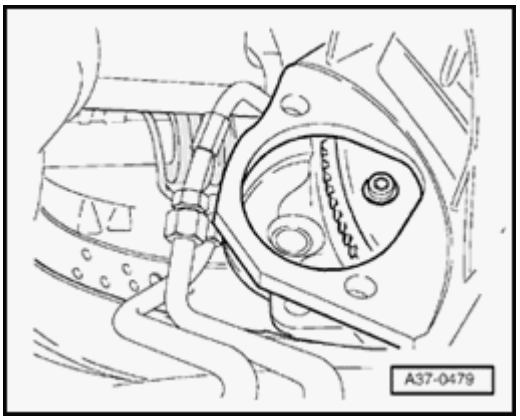


Fig. 109: Identifying Torque Converter To Drive Plate Bolts (3 Total)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt together torque converter and drive plate.
- To do this insert bolts by hand and tighten to tightening torque.

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- Insert top engine/transmission connecting bolts and tighten to tightening torque.

NOTE:

- **Some bolts also have a bracket or a Ground (GND) connection attached refer to tightening torque tables starting on --> --> Tightening torques.**

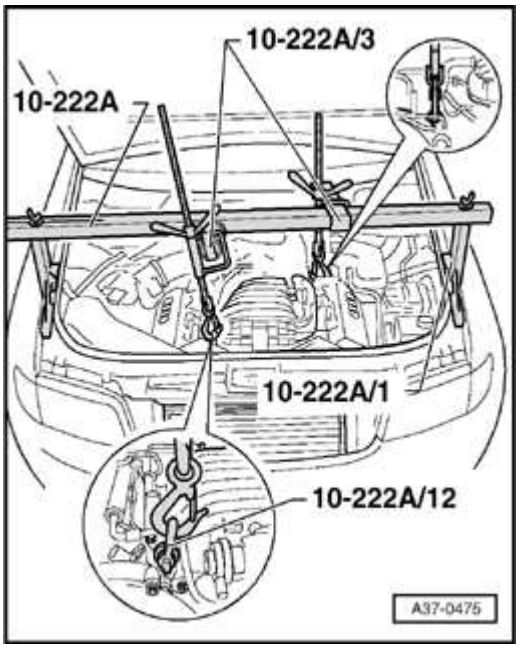


Fig. 110: Fitting Support Bar 10-222A Together With Supports 10-222A/1 And Fit Adapters 10-222A/3
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Raise engine-transmission-subframe using the spindles approx. 4 turns. To do this use Support VAS5058.
- To do this raise engine/gearbox assembly using spindles in turn, 2 turns at a time.
- At the same time raise engine-transmission-subframe using lifter VAG1383A (second mechanic).
- Insert remaining engine/transmission connecting bolts and tighten to tightening torque

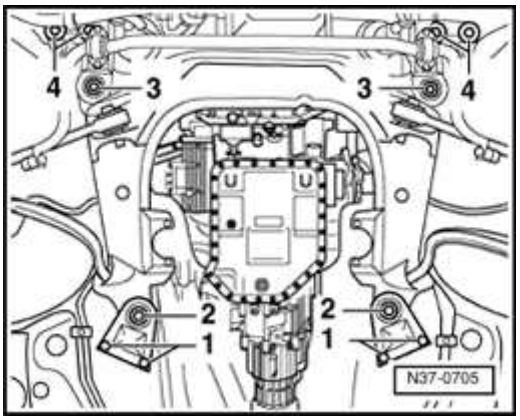


Fig. 111: Identifying Fasteners Requiring Removing To Lower Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Install subframe, observe tightening sequence and alignment with master bore hole. --> **40 - FRONT SUSPENSION**
- Only perform vehicle alignment if necessary. --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**
- Install right transmission support with transmission mount --> **Right and left transmission mounts, removing and installing**

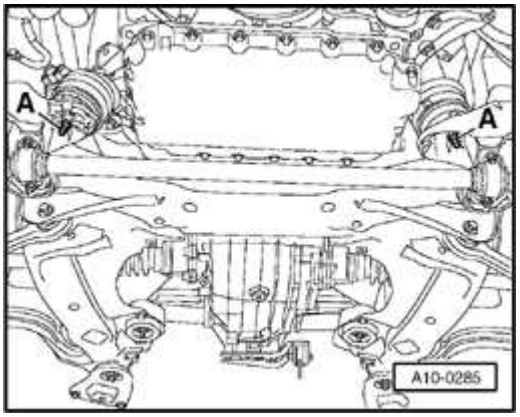


Fig. 112: Screwing On Lower Nuts On Left And Right Engine Mounts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Screw on lower nuts - **A** - on left and right engine mounts. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

Vehicles with six-cylinder engine:

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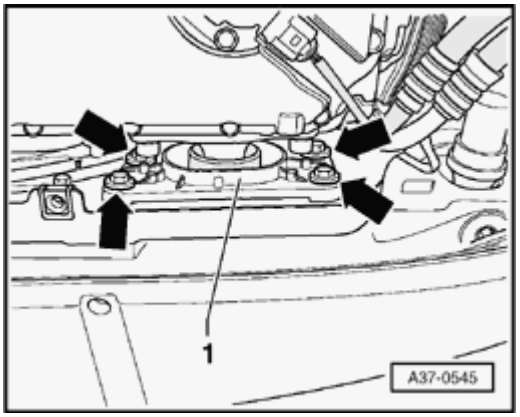


Fig. 113: Unbolting Bolts For Stop/Torque Support
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt on torque support stop - **1** - (arrows). -->
  - **10 - ENGINE - ASSEMBLY** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **10 - ENGINE - ASSEMBLY** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **10 ENGINE - ASSEMBLY** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **10 - ENGINE - ASSEMBLY** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **10 - ENGINE - ASSEMBLY** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE (S): BNS
  - **10 - ENGINE - ASSEMBLY** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE (S): BHF

All:

- Attach retaining clip for coupling rods of Left Front Level Control System Sensor G78 to left front control arm, if present. --> **40 - FRONT SUSPENSION**

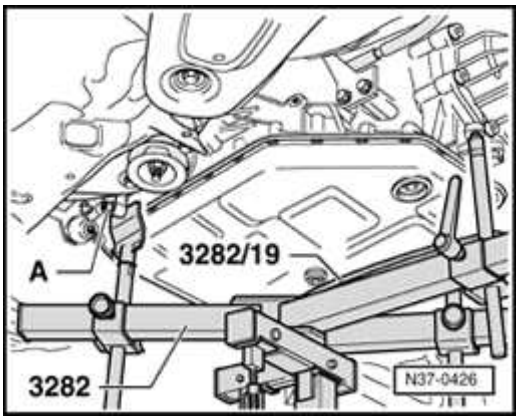


Fig. 114: Supporting Transaxle

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- After subframe is installed, remove bolt - **A** - and remove transmission jack VAG1383A.
- Apply corrosion protection to contact surface between bolt - **A** - and oil pan.

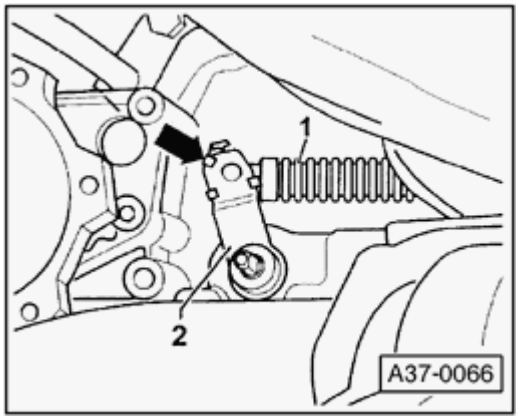


Fig. 115: Pushing Lever/Selector Shaft On Transmission Fully Forward Into Position "S"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Push lever/selector shaft - **2** - on transmission fully forward (on illustration fully left).
- Shift selector lever into "S" and carefully press up ball head of selector lever cable - **1** - on lever/shift rod - **2** - using a pair of pliers.

NOTE:

- **Do not deform lever/shift rod when pressing up or else shifting cannot be precisely adjusted any more.**

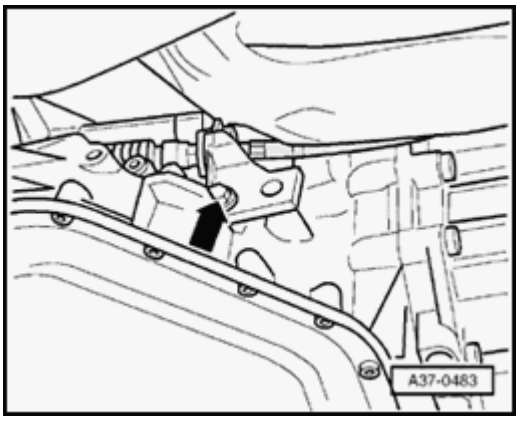


Fig. 116: Location Of Support Bracket For Selector Lever Cable
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt on mounting bracket for selector lever cable to transmission corresponding to marking for re-installation of transmission.
- Install shielding plate/selector lever cable, if present.

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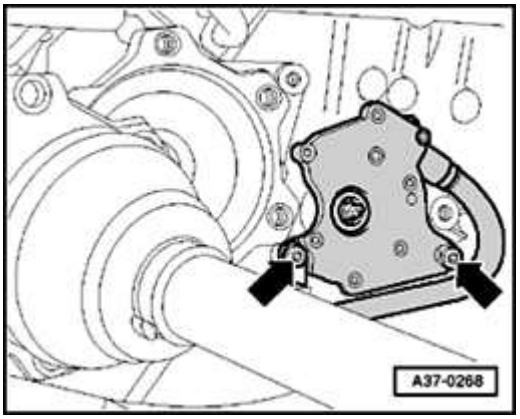


Fig. 117: Unbolting Multi-Function Transmission Range (TR) Switch F125 For Protection Against Damage
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install Multi-Function Transmission Range (TR) Switch F125 --> **Multi-Function Transmission Range (TR) Switch F125 , removing and installing** ; removing and installing Multi-Function Transmission Range (TR) Switch F125
- Install left transmission support with transmission mount --> **Right and left transmission mounts, removing and installing**.
- Bolt driveshaft to transmission. -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

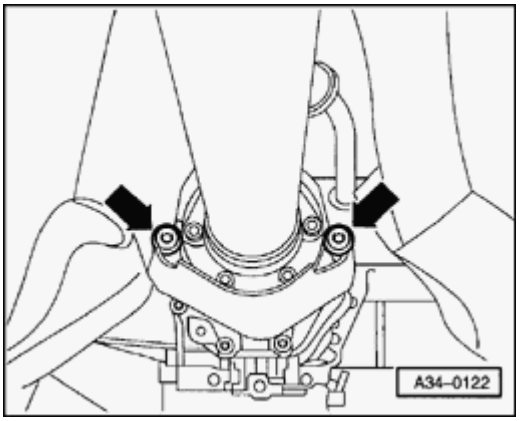


Fig. 118: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install heat shield for driveshaft at transmission (arrows).
- Install starter. -->
  - **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL**
  - **27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL** for ELECTRICAL EQUIPMENT, CABRIOLET

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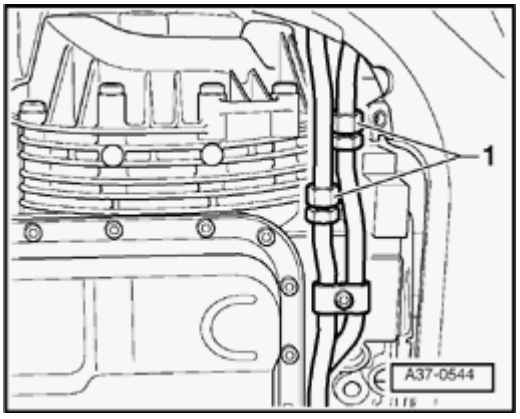


Fig. 119: Disconnecting ATF Lines
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect ATF lines - **1** - according to the respective color markings.

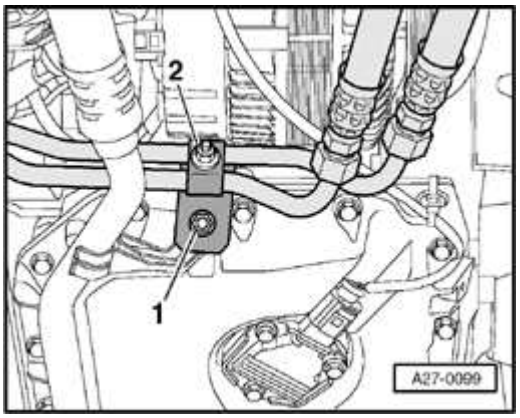


Fig. 120: Unscrewing Nut For Clamp For ATF Lines
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engage clamp for ATF lines and tighten nut - **2** -.

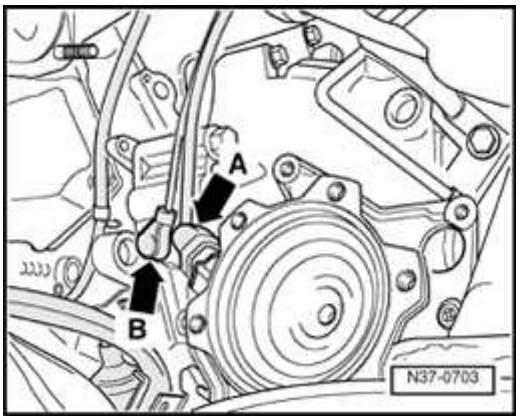


Fig. 121: Location of Speedometer Vehicle Speed Sensor (VSS) G22, and Engine Speed (RPM) Sensor G28

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect connector of Speedometer Vehicle Speed Sensor (arrow A-).
- Bolt Engine Speed (RPM) Sensor G28 (arrow - **B** -) to transmission.

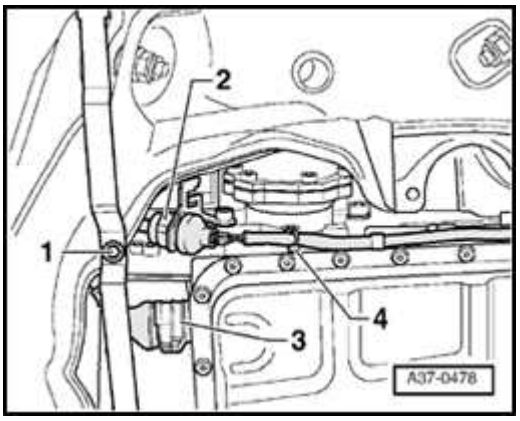


Fig. 122: Identifying Noise Insulation Tray Bracket, Multi-Function Switch Connector, Locking Lever And Cable Tie
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install noise insulation bracket - **1** -.
- Connect connector - **2** - of wire for multi-function switch.
- Connect connector for transmission wiring harness and swivel securing lever - **3** -.
- Replace cable ties - **4** -.

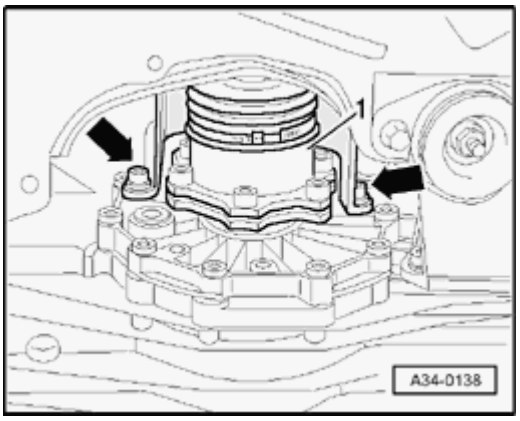


Fig. 123: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt on left and right driveshafts - **1** - to transmission flanges. --> **40 - FRONT SUSPENSION**
- Install heat shields for left, if present, and right drive axles (arrows).

Third bolt is not visible in the illustration.

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- Install front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

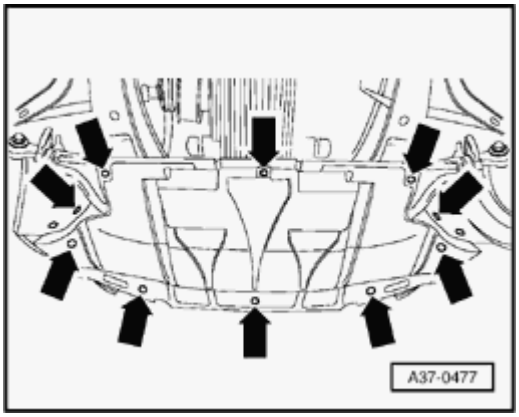


Fig. 124: Identifying Noise Insulation Panel Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install noise insulation panel (arrows).
- Install front wheels. --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**
- Remove engine support bridge 10-222A.
- Fit intake air duct to intake manifold.

- Install intake air guides.
- Install engine cover.
- Install left and right covers in engine compartment.

See Caution for connecting Telematics battery --> **Transmission, removing and installing**

- After connecting battery, enter anti-theft code for radio operating manual.
- Check adjustment of selector lever cable --> **Selector lever cable, checking and adjusting**.
- Check gear oil in front final drive with transmission installed --> **Gear oil in front final drive, checking**.

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- Then check ATF level and top off onward --> **Automatic Transmission Fluid (ATF), checking and changing**.

- Fully close power windows to stop.
- Then activate all power window switches ("up") for at least one second to activate automatic window raising/lowering.
- Set clock to correct time.

Tightening torques

NOTE:

- **Tightening torques are valid only for nuts and bolts that are lightly greased, oiled, covered with a thin coat of phosphate or blackened.**
- **Other lubricants are permitted, e.g. engine oil or transmission fluid, however they may not contain graphite.**
- **Do not use any degreased parts.**

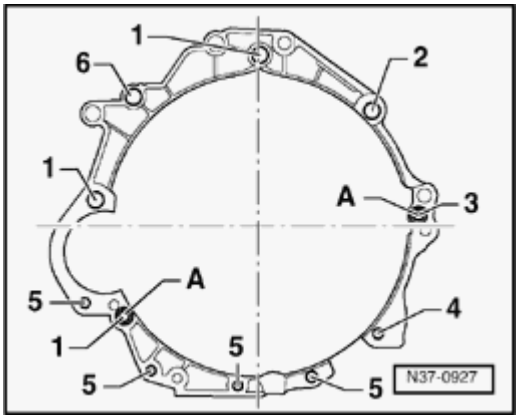


Fig. 125: Engine Cover Bolt Location And Tightening Torque
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Engine/transmission mount for 4-cylinder gasoline engines

Item no.	Bolt	Nm
1	M12 X 67	65
2 * See note	M12 x 110	65
3	M12 x 90	65
4 * See note	M10 x 60	45
5	M10 X 45	45
6 * See note	M12 X 67	65

*with nut

*with bracket for wiring harness

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*with cable bracket

Item A = bushings

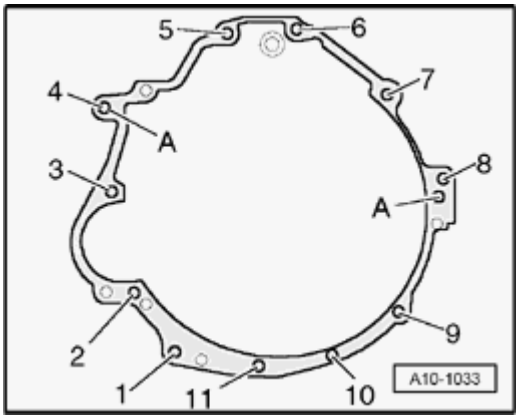


Fig. 126: Identifying Engine/Transmission Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Engine/transmission mount for 6-cylinder gasoline engines

Item no.	Bolt	Nm
1	M10 x 60	45
2	M10 x 90	65
3	M12 x 110	65
4	M12 x 80	65
5	M12 x 90	65
6	M12 x 90	65
7	M10 x 100	45
8	M12 x 90	65
9 * See note	M10 x 70	45
10	M10 x 60	45
11	M10 x 60	45

*with nut

Item A = bushings

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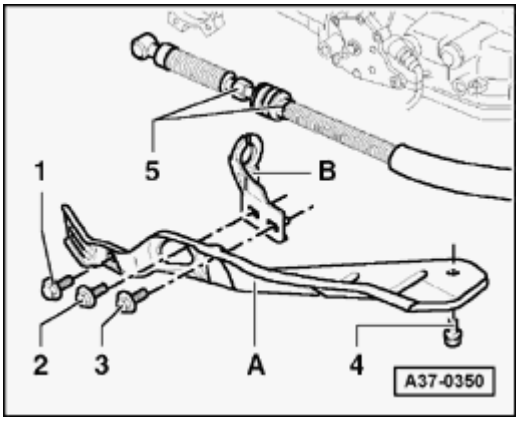


Fig. 127: Identifying Noise Insulation And Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Valid for all engine/transmission types:

Components	Tightening torques
Support bracket -B- to transmission (2x M8), item no. 2 and 3	23 Nm
Heat shield/selector lever cable -A- to transmission, M8, item no. 1 and 4	23 Nm

Component		Nm
Nuts/Bolts	M6	10
	M8	20
	M10	45
	M12	65
Except for the following:		
Drive plate to		
Torque converter	M10 x1	85
Installing ATF lines		--> **ATF lines, removing and installing (overview)** onward
Multi-function Transmission Range (TR) switch F125 to transmission		onward
Bracket for noise insulation to subframe		10

Transmission, transporting

Special tools, testers and auxiliary items required

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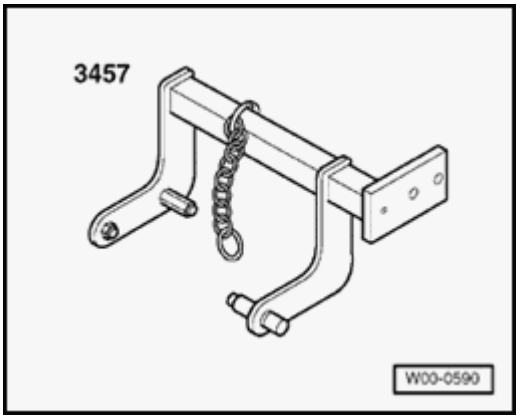


Fig. 128: Identifying Special Tools - Automatic Transmission, Transporting
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attachment and holding rig 3457

The attachment and holding rig 3457 can be used when transporting the transmission and for setting up the transmission support 3282.

- Remove ATF lines from transmission (only for vehicles with 6-cylinder engine).
- Plug ATF connections with plugs.
- Unbolt left and right transmission supports.

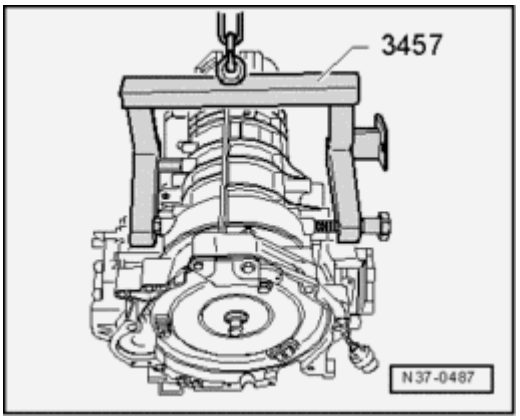


Fig. 129: Special Tool 3457 Attachment To Transmission Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach the attachment and holding rig 3457 at the transmission housing mounts and secure.

Transmission, attaching to assembly stand

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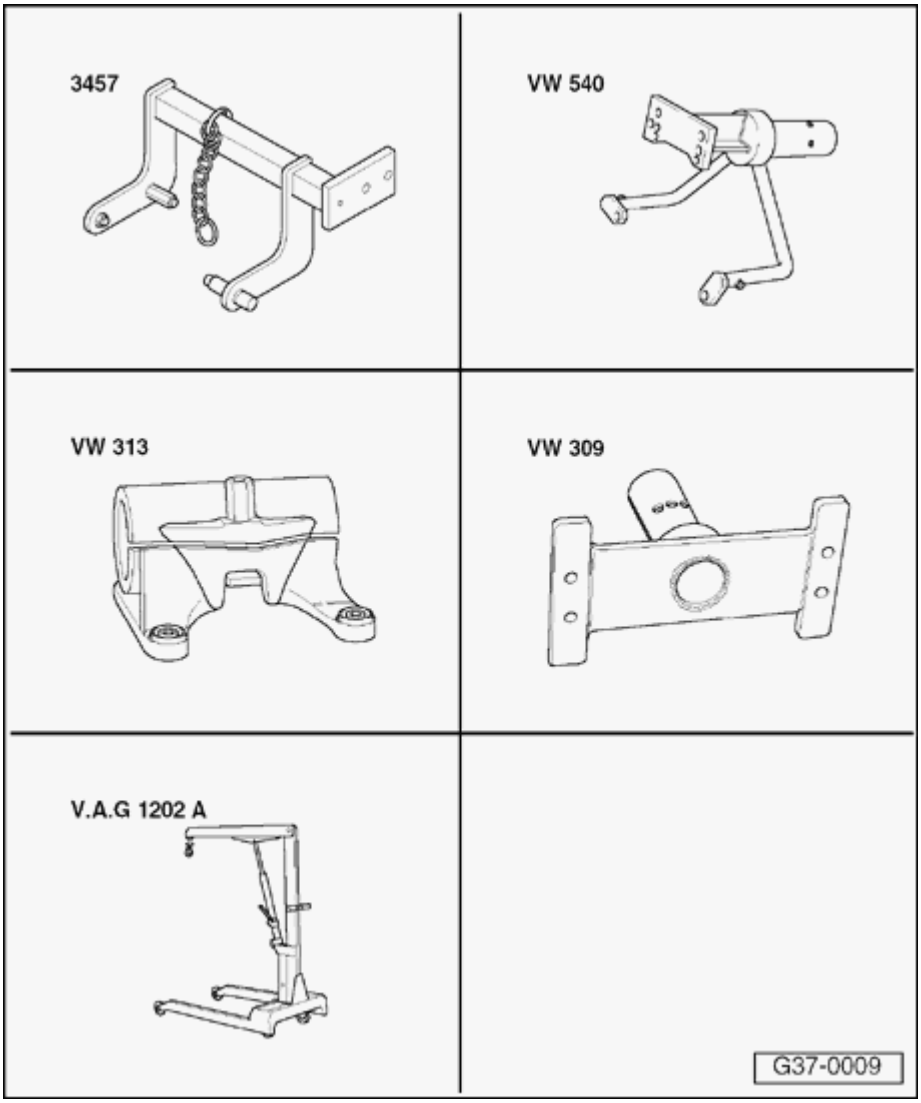


Fig. 130: Identifying Special Tools - Transmission, Attaching To Assembly Stand
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Attachment and holding rig 3457
- Holding fixture VW540 (only for FWD transmissions) (Not for US/Canada)
- Holding fixture VW313
- Holding plate VW309

- Engine Hoist VAG1202A

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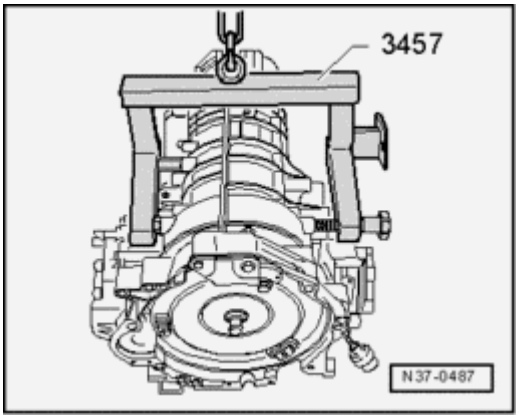


Fig. 131: Special Tool 3457 Attachment To Transmission Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach the attachment and holding rig 3457 at the transmission housing mounts and secure.
- Bolt the attachment and holding rig to the holding plate VW309 and place this into the holding fixture VW313 using a workshop crane.

For transmissions with Front Wheel Drive (FWD), the holding fixture VW540 can also be used to secure the transmission to the holding fixture VW313 (Not for US/Canada).

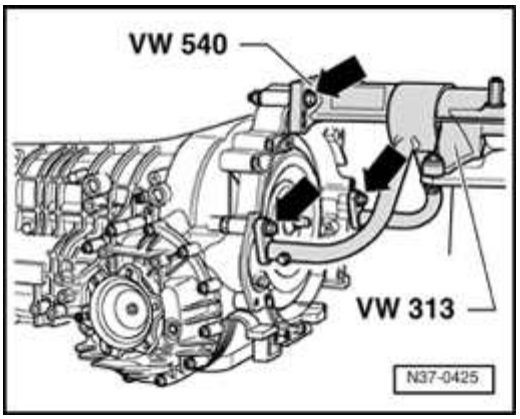


Fig. 132: Securing Transmission To Holding Fixture VW540 And Inserting In Holding Fixture VW313
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure transmission to holding fixture VW540 (arrows) and insert in holding fixture VW313.

CAUTION: The center of gravity of the transmission is located outside the turning center at holding fixture. To turn the transmission, a second technician must hold the transmission housing to prevent back-swing.

NOTE:

- **Vents for the transmission housing and final drive must be closed before turning a filled transmission on the assembly stand so that the oil pan faces upward.**

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Right and left transmission mounts, removing and installing

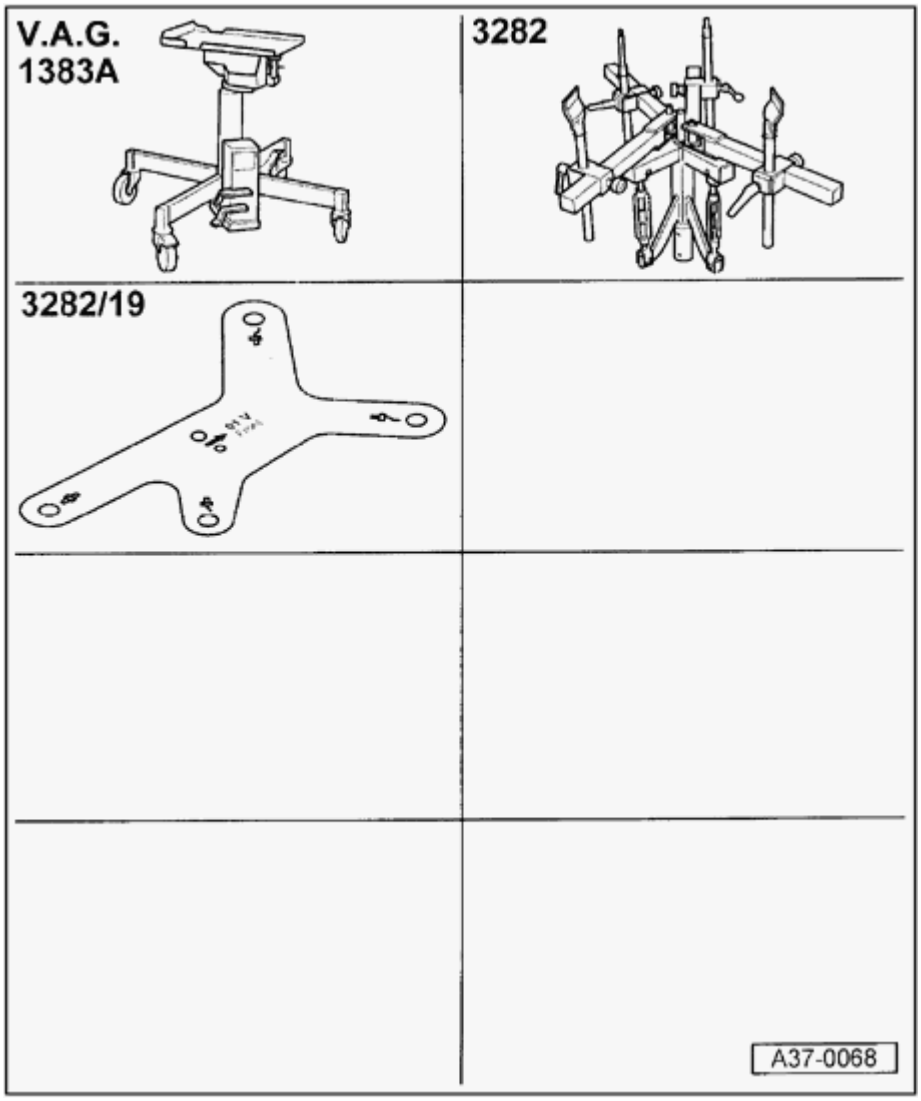


Fig. 133: Identifying Special Tools - Right And Left Transmission Mounts, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Transmission support 3282
- Adjustment plate 3282/19
- Engine/transmission support VAG1383A engine/gearbox jack

Removing

NOTE:

- **Transmission must be supported as indicated when both transmission supports are removed. Transmission does not need to be supported this**

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way when only one of the transmission supports is being removed.

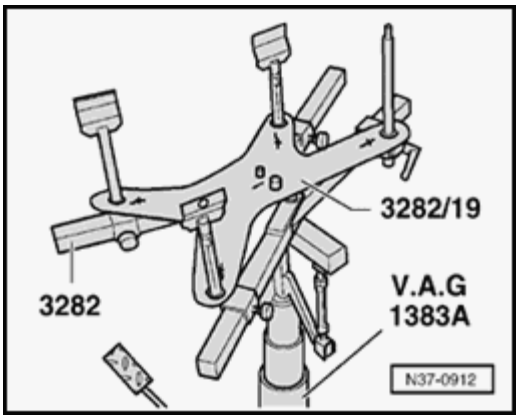


Fig. 134: Setting Up Transmission Support 3282
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Prepare transmission support 3282 for Automatic Transmission 01V with adjustment plate 3282/10 and place it on the engine/transmission hoist VAG1383A.

NOTE:

- **The symbols on the adjustment plate indicate the necessary mounts for Automatic Transmission 01V and the arrow points toward front of vehicle.**

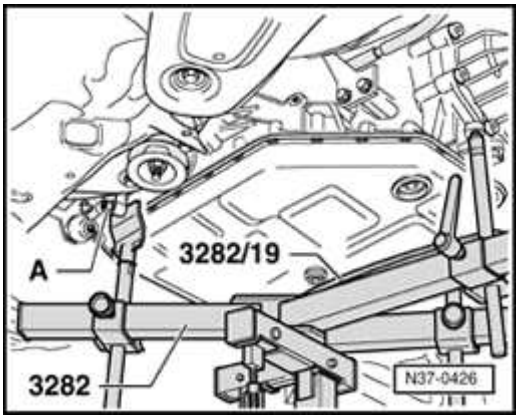


Fig. 135: Supporting Transaxle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Roll engine/transmission hoist VAG1383A with transmission support 3282 under transmission, align adjustment plate parallel to transmission and support transmission.
- Secure transmission on transmission support 3282 using bolt - **A** -.

NOTE:

- **If transmission support 3282 is not available, transmission can be supported using the transmission lift VAG1383A and the 1359/2 universal mount.**

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Right transmission support

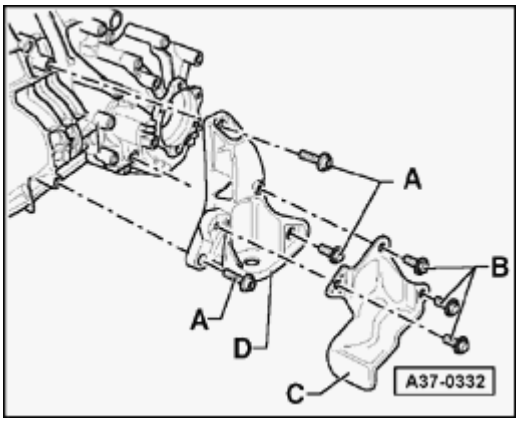


Fig. 136: Identifying Right-Hand Transmission Bracket And Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **B** -.
- Remove heat shield - **C** -.
- Remove right heat shield -D- by removing bolts - **A** - from transmission.

Left transmission support

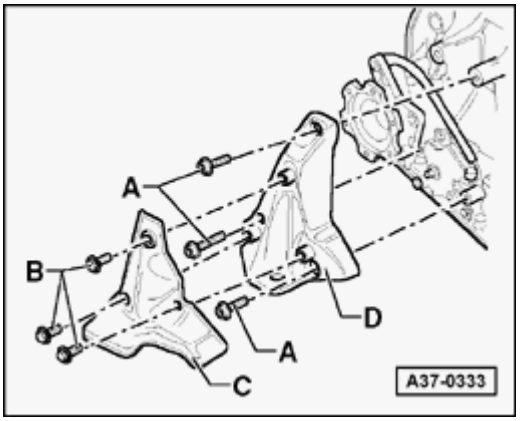


Fig. 137: Identifying Left-Hand Transmission Bracket And Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts - **B** -.
- Remove heat shield - **C** -.

NOTE:

- **The left heat shield is not installed on 4 cylinder gasoline engines.**

- Remove left heat shield -D- by removing bolts - **A** - from transmission.

Left and right transmission supports

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- Unscrew nuts - **A** - on subframe.

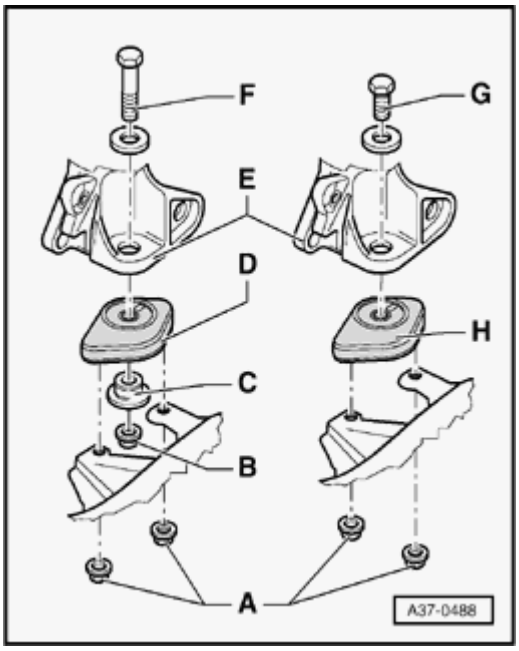


Fig. 138: Removing Transmission Supports
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove transmission supports -E-.

NOTE:

- **Items - C - and - B - are not installed on vehicles with hydraulic transmission bearing H, because bolt G is threaded directly into the transmission bearing.**

Installing

Installation is the reverse of removal.

Tightening torques for left and right transmission supports

Item no.	Nut/Bolt	Number of pieces	Nm
A	M 8	2 each	23
B to F	M 10 x 70	1	50
G	M 10 x 35	1	50

Tightening torques for left transmission support

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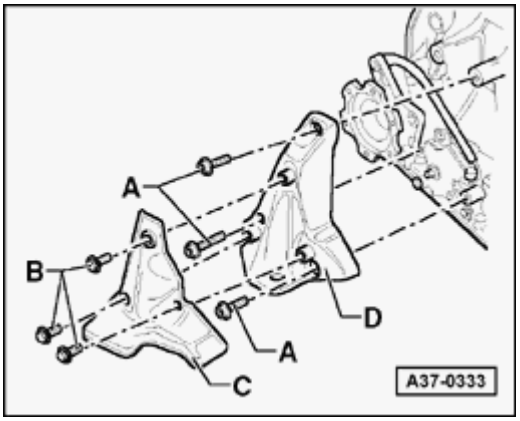


Fig. 139: Identifying Left-Hand Transmission Bracket And Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Item no.	Bolt	Number of pieces	Nm
A	M 10 x 30 M 10 x 50	2 1	40
B	M 6 x 22	3	10

Tightening torques for right transmission support

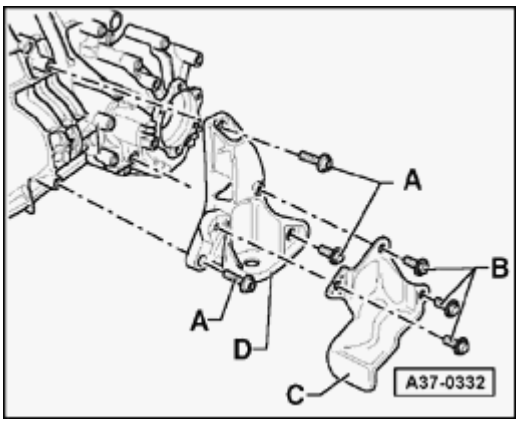


Fig. 140: Identifying Right-Hand Transmission Bracket And Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Item no.	Bolt	Number of pieces	Nm
A	M 10 x 30	3	40
B	M 6 x 22	3	10

AUTOMATIC TRANSMISSION FLUID (ATF), CHECKING AND CHANGING

ATF level, checking

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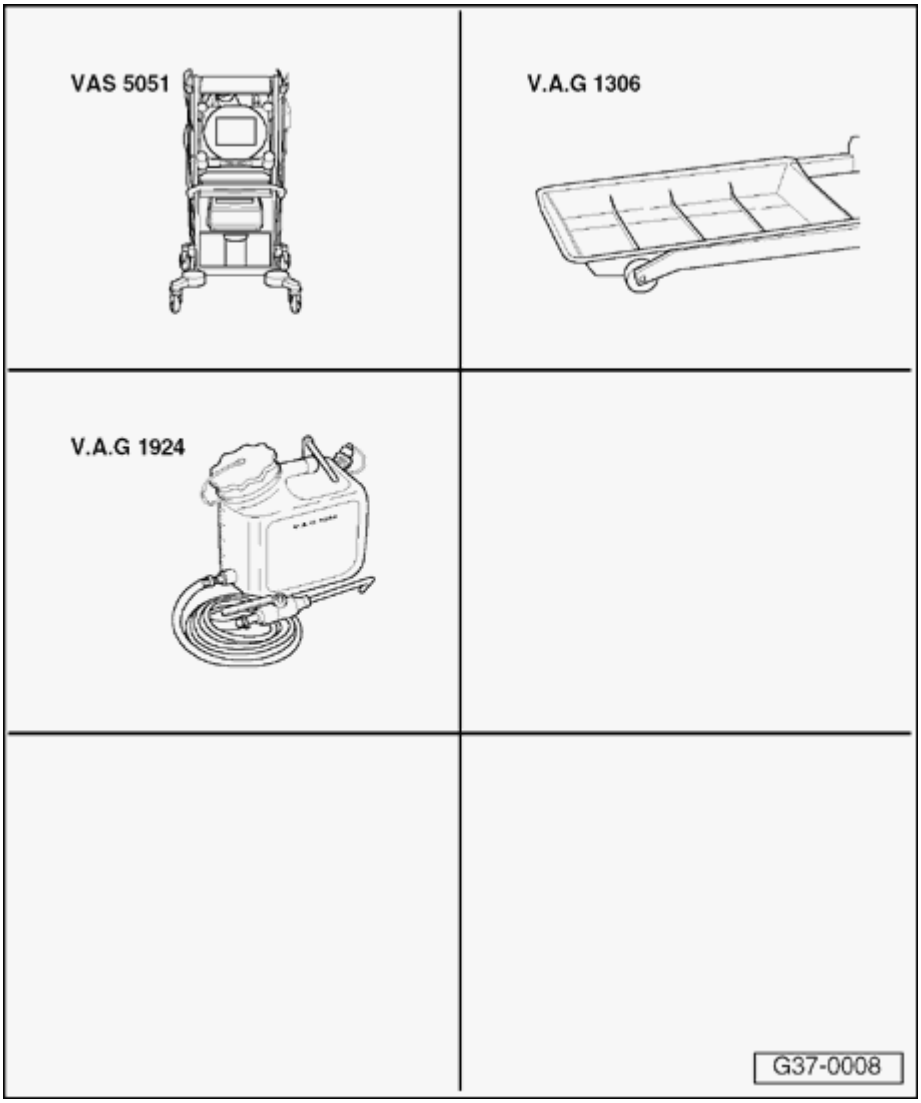


Fig. 141: Identifying Special Tools - ATF Level, Checking
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Tester VAS5051
- Diagnostic cable VAS5051/1 or VAS5051/3
- Drip tray VAG1306
- ATF filler tool VAG1924
- Protective glasses

Test requirements:

- Transmission must not be in emergency running mode.

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- Vehicle on level ground.
- Selector lever in "P" , let engine run at idle.
- A/C system and heating switched off.

NOTE:

- **ATF level changes with ATF temperature.**
- **Performing ATF level check when ATF temperature is too low causes overfilling.**
- **Performing ATF level check when ATF temperature is too high causes insufficient filling.**
- **Excess filling and insufficient filling both affect the function of the transmission.**
- **ATF temperature is read off using the tester VAS5051.**

Procedure

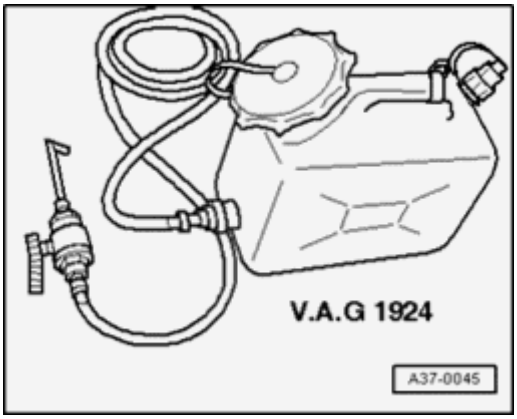


Fig. 142: Securing Container Of ATF Filler Tool VAG1924 As High Up On Vehicle As Possible
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure container of ATF filler tool VAG1924 as high up on vehicle as possible.

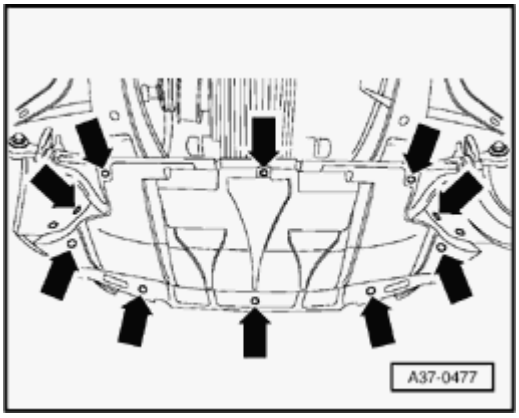


Fig. 143: Identifying Noise Insulation Panel Retainers

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove noise insulation panel (arrows).

Connect tester VAS5051

All functions previously performed with the VAG1551 can also be performed using the new tester VAS5051 in operating mode "Vehicle On Board Diagnostic (OBD)" :

Checking ATF temperature

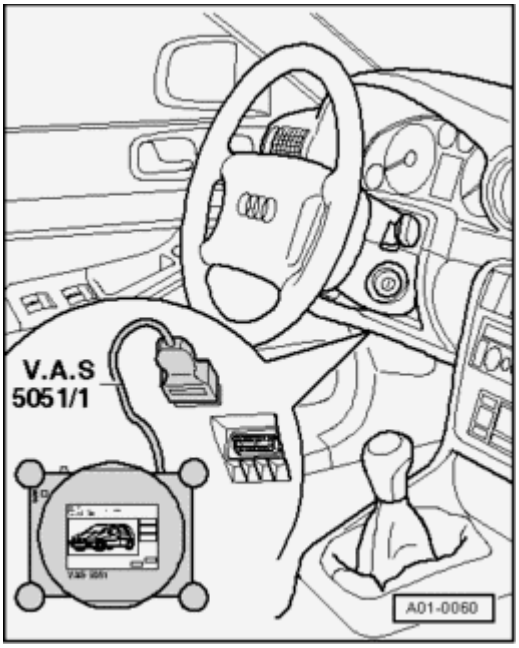
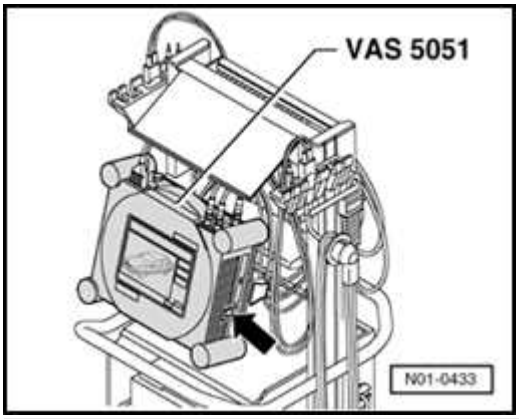


Fig. 144: Identifying Vehicle Diagnosis, Testing and Information System VAS 5051 and Data Link Connector (DLC)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect tester VAS5051 to Data Link Connector (DLC) using diagnostic cable VAS5051/1 with ignition switched off.



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Fig. 145: Special Tool - VAS 5051 & On Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Switch on tester (arrow).

The tester now requires up to 3 minutes to finish booting.

- Switch on ignition.
- Select operating mode: Press "Vehicle Self-Diagnosis" selection on display.
- Press "02 - Transmission electronics" on display.
- Perform dialog to confirm control module number belonging to selected system.

- Select "08 - Read Measuring Value Block" on display.
- Choose Display Group 4 via the "Read Measuring Value Block" and "Change Display Group" touch screen displays.

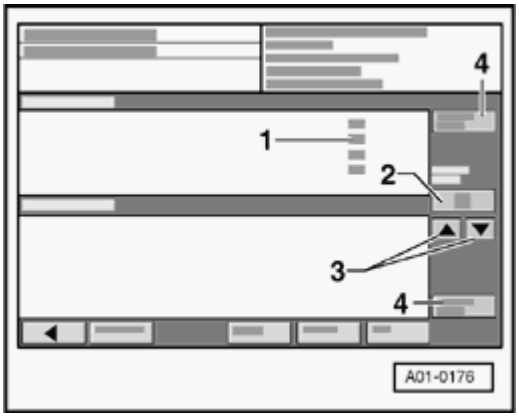


Fig. 146: Display On VAS5051 (ATF Temperature)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS5051 :

The first line of display field - **1** - displays ATF temperature.

Checking and correcting ATF level

NOTE:

- **ATF level is checked at the ATF check plug.**
- **ATF level is correct if a little bit of fluid still escapes at the ATF check plug between 35 ° and 45 ° C * See note (dependent on the fluid level when warming up).**

* For warm countries 50 ° C

- Start engine.

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- Raise vehicle.
- Place drip tray VAG1306 under transmission.

CAUTION: Wear protective glasses.

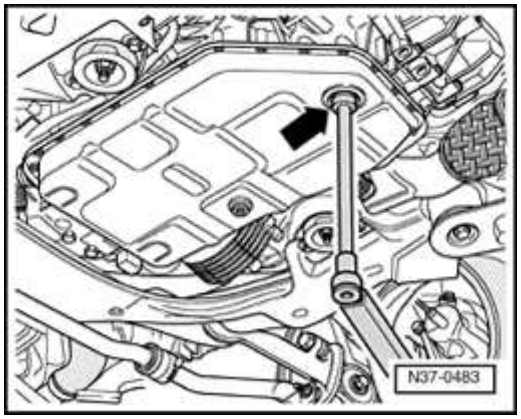


Fig. 147: Removing And Installing ATF Inspection Plug From Oil Pan
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Once an ATF temperature of 35 ° C is reached, remove ATF check plug (arrow) and drain excess ATF if necessary.

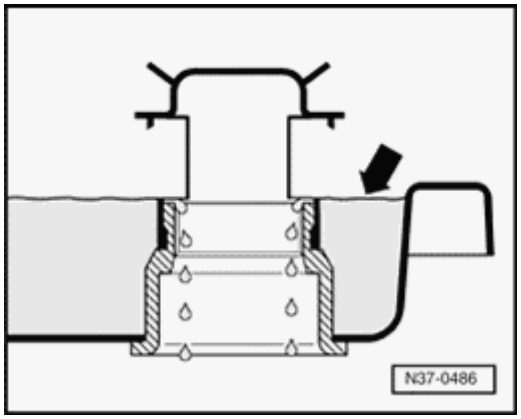


Fig. 148: Correct ATF Level
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If ATF flows out from the ATF filler plug hole before the ATF reaches 40 ° C, the ATF level (arrow) is OK.

NOTE:

- **ATF check plug must be closed again by 45 ° C * See note at the latest.**

* For warm countries 50 ° C

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- Add ATF if no ATF has escaped from the ATF check plug hole by 40 ° C.
- ATF specification --> **Capacity**

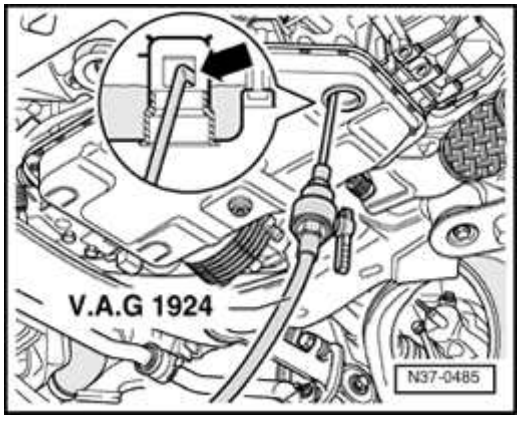


Fig. 149: Inserting ATF Filler Tool VAG1924 Into An Opening In Protective Cap
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert ATF filler tool VAG1924 into an opening (arrow) in the protective cap, but do not knock cap upward.

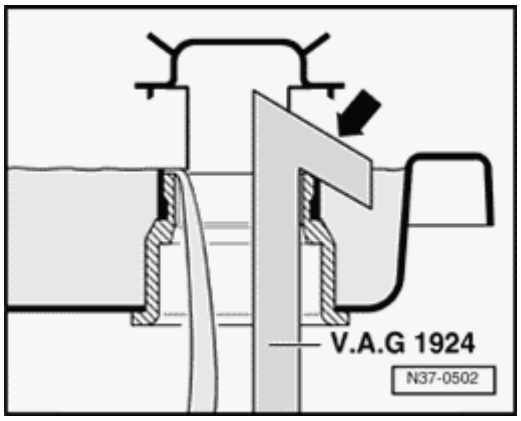


Fig. 150: Fill With ATF Using V.A.G 1924
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Fill with ATF using ATF filler tool VAG1924 until ATF exits from the check hole.

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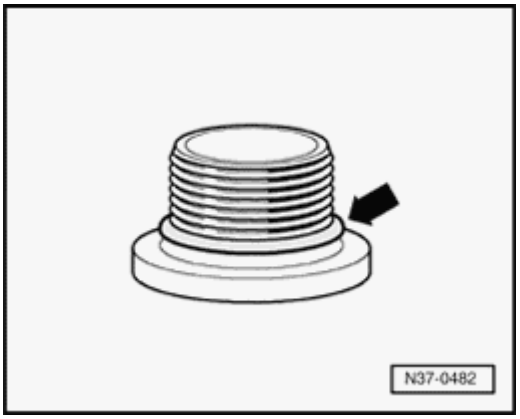


Fig. 151: Replacing Seal For ATF Check Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Always replace seal (arrow) for ATF check plug.
- Tighten ATF check plug to 80 Nm.
- Switch off motor.
- Select diagnostic function "06 - end output" in selection.

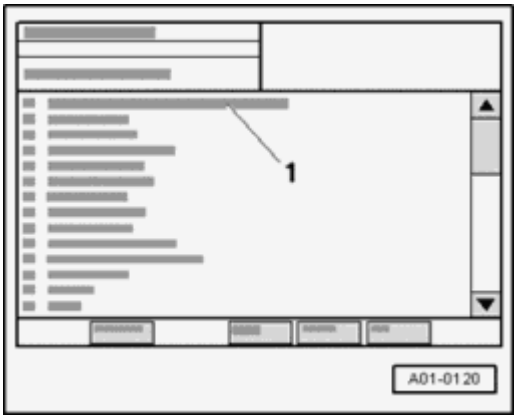


Fig. 152: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS5051 :

- Switch off ignition and disconnect diagnostic connector after this indication is displayed.
- Install noise insulation.

ATF, changing or topping off after repairs

Special tools, testers and auxiliary items required

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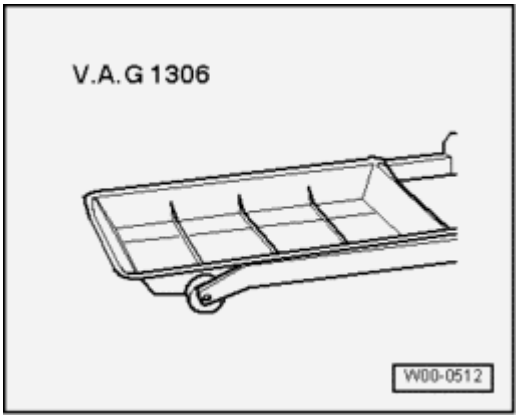


Fig. 153: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

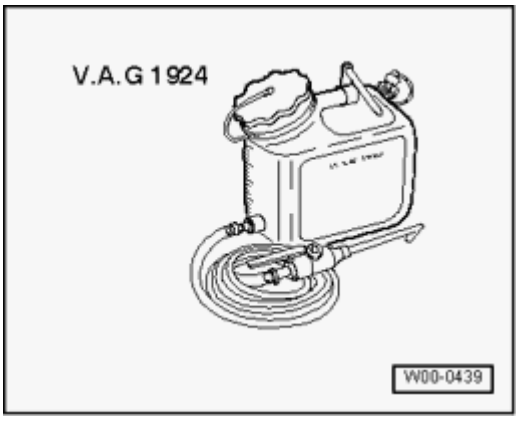


Fig. 154: V.A.G 1924 Reservoir
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- ATF filler tool VAG1924
- Engine switched off.

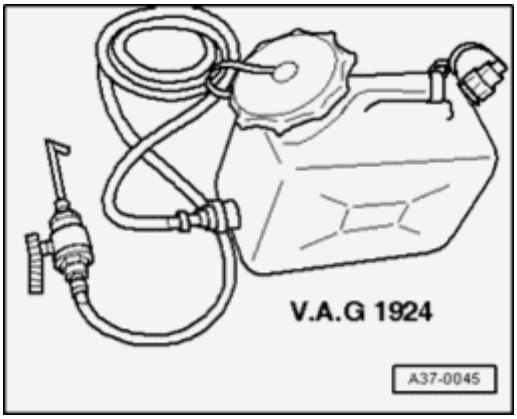


Fig. 155: Securing Container Of ATF Filler Tool VAG1924 As High Up On Vehicle As Possible

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure container of ATF filler tool VAG1924 as high up on vehicle as possible.
- Raise vehicle.

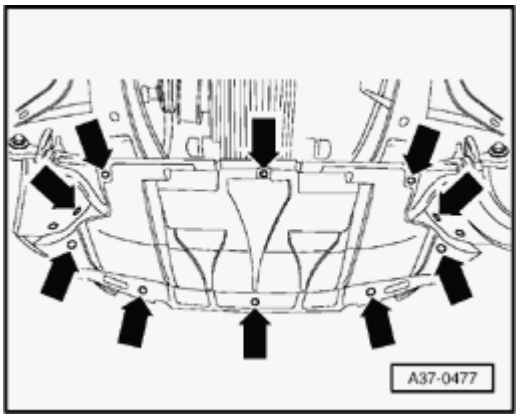


Fig. 156: Identifying Noise Insulation Panel Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove noise insulation panel (arrows).

NOTE:

- **Observe disposal regulations.**
- **Engine must not be started without ATF and vehicle must not be towed!**

- Place Drip tray VAG1306 under transmission.

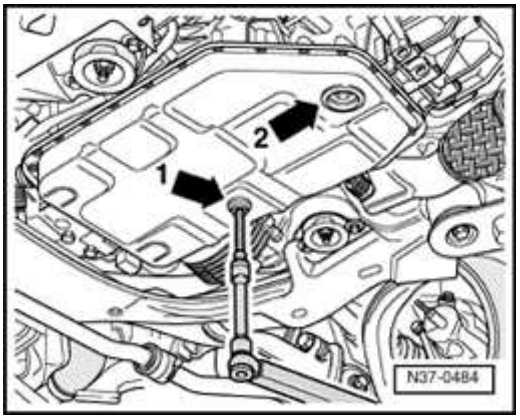


Fig. 157: Identifying ATF Drain Plug and ATF Inspection Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove drain plug (arrow - **1** -).
- Let ATF drain.
- Tighten new drain plug (arrow - **1** -) to 40 Nm.

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NOTE:

- **Drain plug and oil seal must both be replaced.**

- Remove ATF check plug (arrow - **2** -).

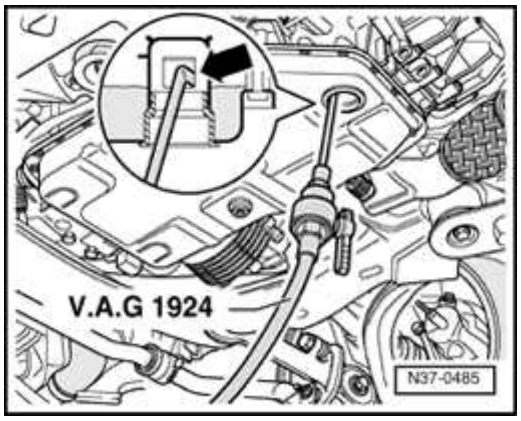


Fig. 158: Guiding V.A.G 1924 In Through An Opening In Deflector Cap
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert ATF filler tool VAG1924 into an opening (arrow) in the protective cap, but do not knock cap upward.

- ATF specification --> **Capacity**

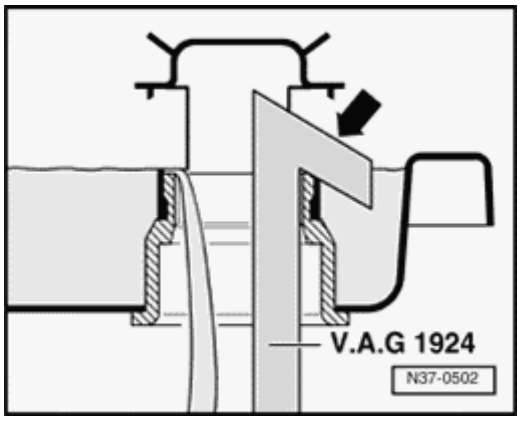


Fig. 159: Fill With ATF Using V.A.G 1924
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Fill with ATF using ATF filler tool VAG1924 until ATF exits from the check hole.
- Shift selector lever into position "P".
- Start engine.
- Keeping the brake pedal depressed, shift into all selector lever positions at idle speed. Each position must remain selected for at least 10 seconds.

- Shift selector lever into position "P".

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- Check ATF level and top off --> **ATF level, checking** onward.
- Install noise insulation.

NOTE:

- **Observe all notes and test requirements for "Checking ATF level".**

POWER TRANSFER, OVERVIEW

Transmission diagram (All Wheel Drive (AWD) vehicles)

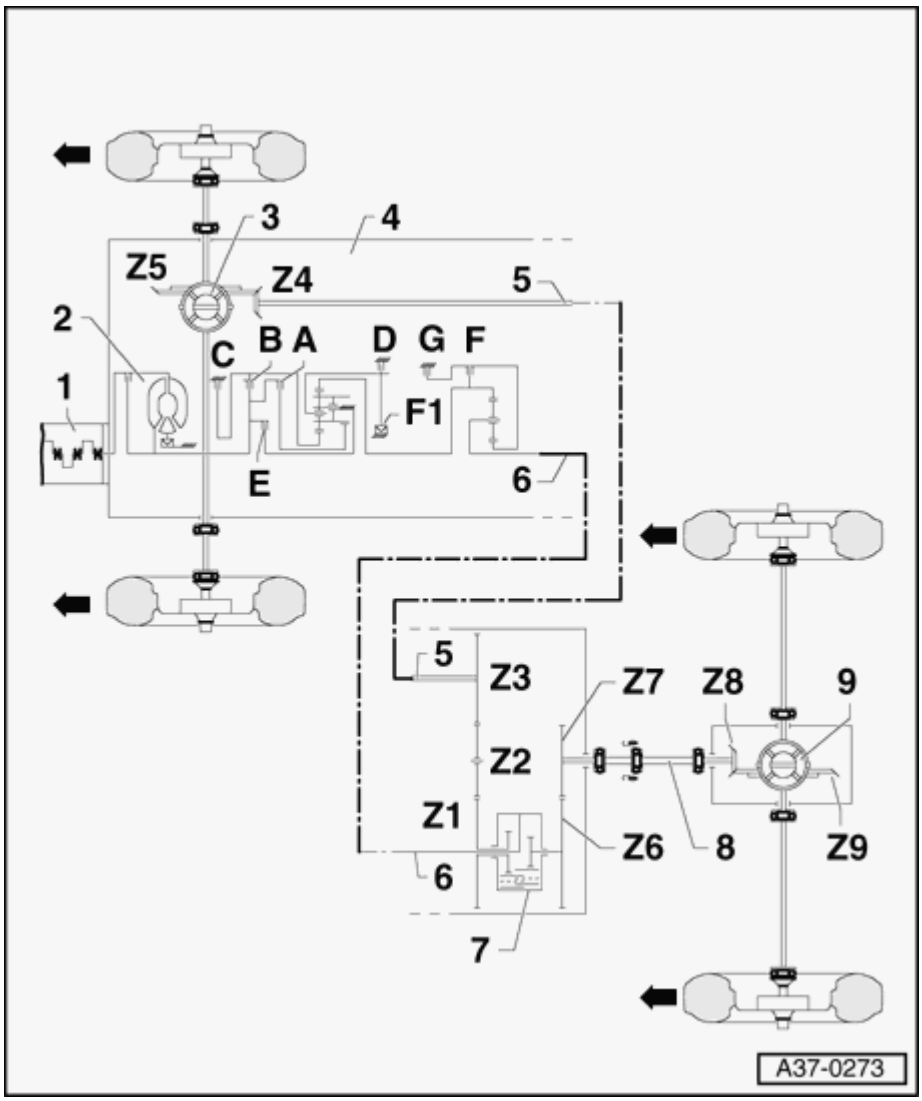


Fig. 160: Transmission Diagram (All Wheel Drive (AWD) Vehicles)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Clutch A

B - Clutch B

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E - Clutch E

F - Clutch F

C - Brake C

D - Brake D

G - Brake G

F1 - Freewheel 1

1 - Engine

2 - Torque converter with lock-up clutch

3 - Front differential

4 - Automatic transmission

5 - Drive pinion

6 - Output shaft

7 - Center differential

8 - Driveshaft

9 - Rear differential

Z1, Z2 and Z3 = spur gears of front intermediate drive; ratio --> **Code letters, allocation, ratios, equipment**

Z4, Z5 = front gear set; ratio --> **Code letters, allocation, ratios, equipment**

Z6, Z7 = spur gears of rear intermediate drive; ratio **All Wheel Drive (AWD)**

Z8, Z9 = rear ring gear, ratio **All Wheel Drive (AWD)**

NOTE:

- **Arrows point in direction of travel.**

Shift element positions

- When dealing with problems relating to poor acceleration and performance or general malfunctions, the following chart indicates which selector elements are actuated in the various gears. This should help to identify the selector elements that are not working properly.

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	Solenoid valves							Clutches							
	Solenoid valves			Pressure regulation valves				Clutch				Brake			Freewheel
Position/gear	N88	N89	N90	N215	N216	N217	N218	A	B	E	F	C	D	G	1. Gear
R = Reverse	x			x		x			x				x	x	
N = Neutral	x	x		x		x								x	
D, 1st gear	x	x		x		x		x						x	x
D, 2nd gear	x	x		x	x	x		x				x		x	
D, 3rd gear		x	x - x	x	x			x			x	x			
D, 4th gear			x - x	x				x		x	x				
D, 5th gear	x		x - x	x	x					x	x	x			
2, 1. Gear	x			x		x		x					x	x	x
D, 5th to 4th gear	x		x	x	x		x	(x)		x	x	(x)			

x = Component is actuated

- = Component is not actuated

(x) = Component actuation is dependent on driving condition

TRANSMISSION, DISASSEMBLING AND ASSEMBLING

Transmission, disassembling and assembling

- Observe general repair instructions --> **Servicing notes**.

Rules of cleanliness for working on automatic transmissions

- Thoroughly clean all connections and the surrounding area before disconnecting.
- Place parts that have been removed on a clean surface and cover. Use foils and paper. Use lint-free cloths only!
- Carefully cover over opened components or seal, if repairs are not carried out immediately.
- Only install clean components: Only unpack replacement parts immediately prior to installation.

- Always replace O-rings, gaskets and sealing rings.
- Lightly lubricate O-rings before installing, this prevents the rings from being pinched when inserting.
- Use only ATF in areas near ATF. Other lubricating substances cause functional problems in the hydraulic transmission control.
- Check the following fluid levels after installing, top off if necessary. ATF in planetary gear --> **ATF level, checking** , gear oil in front final drive --> **Gear oil in front final drive, checking** , gear oil in center differential --> **Gear oil in center differential, checking and topping off**. Capacities and specifications --> **Capacity** onward.

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ATF lines, removing and installing (overview)

Special tools, testers and auxiliary items required

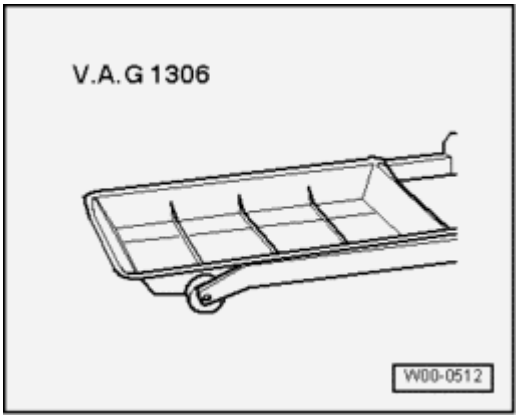


Fig. 161: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

Removing and installing ATF lines for 4 cylinder gasoline engines --> **ATF lines, removing and installing, (vehicles with 4 cyl. engine)**

Removing and installing ATF lines for 6 cylinder gasoline engines --> **ATF lines, removing and installing, (vehicles with 6 cyl. engine)**

ATF lines, removing and installing, (vehicles with 4 cyl. engine)

NOTE:

- **Place drip tray VAG1306 underneath.**

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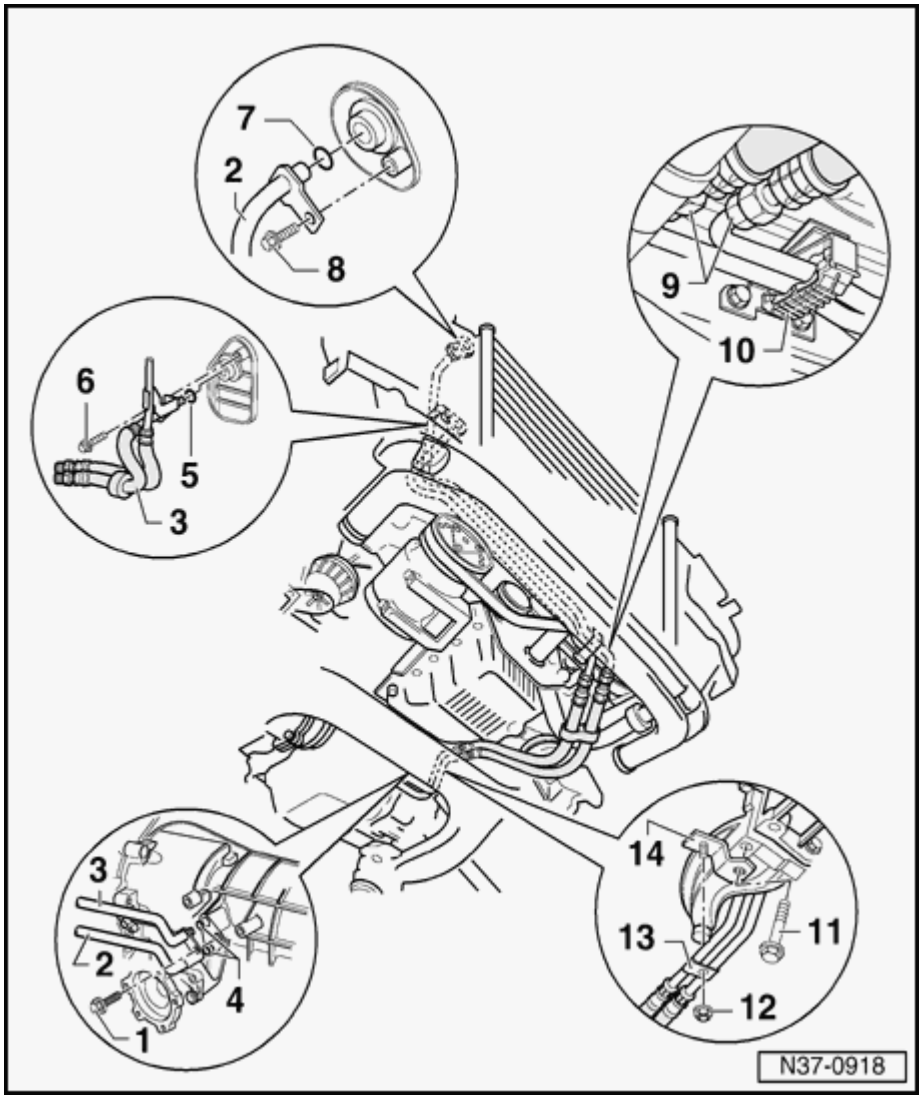


Fig. 162: ATF Lines, Removing And Installing, Overview (Vehicles With 4-Cylinder Engine)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Bolt (21Nm)

- Insert line until impact by hand before tightening

2 - Oil line to cooler

- Note marking on transmission housing

3 - Oil line from cooler

- Note marking on transmission housing

4 - O-ring

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- Apply ATF when inserting
- Always replace

5 - O-ring

- Apply ATF when inserting
- Always replace

6 - Bolt (5Nm)

- Insert line until impact by hand before tightening

7 - O-ring

- Apply ATF when inserting
- Always replace

8 - Bolt (5Nm)

- Insert line until impact by hand before tightening

9 - Union nut - 29 Nm

10 - Bracket

11 - Hex bolt

- Does not need to be removed when removing and installing ATF lines.

12 - Nut - 5 Nm

13 - Clamp

14 - Bracket

- On engine/transmission support

ATF lines, removing and installing, (vehicles with 6 cyl. engine)

NOTE:

- **Place drip tray VAG1306 underneath.**

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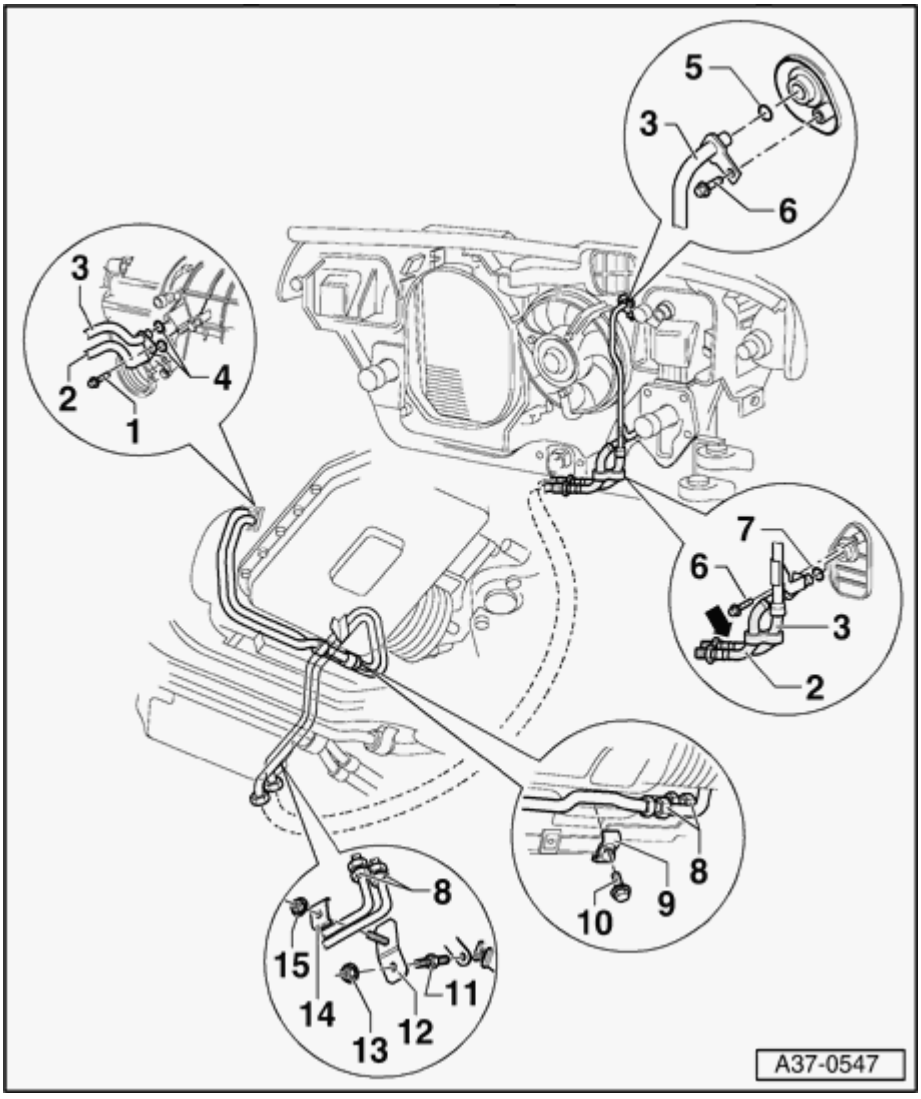


Fig. 163: ATF Lines, Removing And Installing Overview (Vehicles With 6 Cyl. Engine)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Bolt (21Nm)

- Insert line until impact by hand before tightening

2 - Oil line to cooler

- Note marking on transmission housing
- Note color identification (arrow)

3 - Oil line from cooler

- Note marking on transmission housing
- Note color identification (arrow)

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4 - O-ring

- Apply ATF when inserting
- Always replace

5 - O-ring

- Apply ATF when inserting
- Always replace

6 - Bolt (5Nm)

- Insert line until impact by hand before tightening

7 - O-ring

- Apply ATF when inserting
- Always replace

8 - Union nut - 29 Nm

9 - Bracket

10 - Bolt (5Nm)

11 - Double bolt - 10 Nm

12 - Bracket

13 - Combination nut - 10 Nm

14 - Clamp

15 - Combination nut - 5 Nm

ATF lines and ATF cooler, cleaning

Special tools, testers and auxiliary items required

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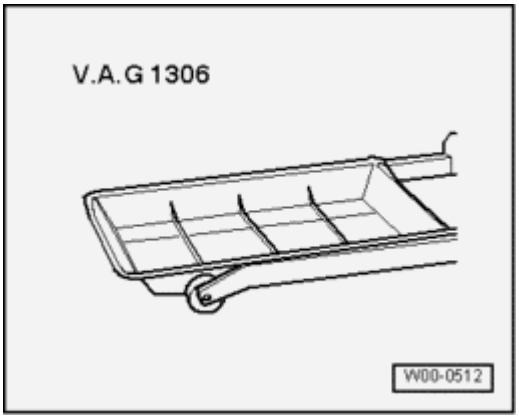


Fig. 164: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306
- Hose, approx. 18 mm
- Compressed air gun, standard
- Protective glasses

NOTE:

- **Always blow compressed air through oil cooler and ATF lines (max. 10 mbar) before installing a replacement transmission.**
- **When installing ATF lines, insert into transmission or cooler by hand until impact first and then tighten bolts.**

CAUTION: Wear protective glasses.

- Place drip tray VAG1306 underneath.

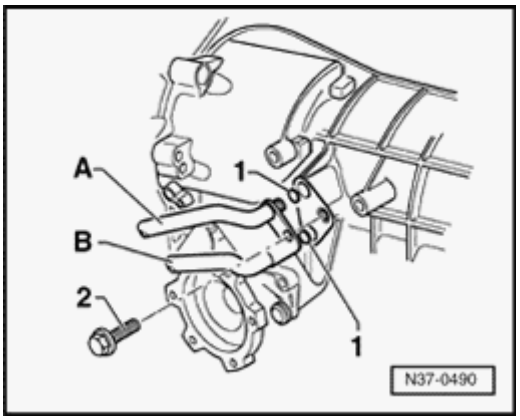


Fig. 165: Location Of ATF Lines At Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Remove bolt - **2** -.
- Disconnect ATF lines from transmission.
- Slide a hose with approx. 18 mm diameter onto ATF line - **A** - and secure with hose clamp. Place the other end of the hose into an appropriate container.
- Blow through ATF line - **B** - with compressed air gun.

- Change hose from ATF line - **A** - to ATF line - **B** - and repeat procedure.
- Replace O-ring - **1** -.
- Coat O-ring with ATF.
- Insert ATF lines completely into transmission by hand until stop.

- Re-secure ATF lines.
- Then check ATF level and top off --> **ATF level, checking** onward.

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38 - AUTOMATIC TRANSMISSION - GEARS, HYDRAULIC CONTROLS

OIL PAN, OIL STRAINER AND VALVE BODY, REMOVING AND INSTALLING

Oil pan, oil strainer and valve body, removing and installing

CAUTION: Do not run engine with the oil pan removed or without ATF filling and do not tow vehicle.

NOTE:

- **Always replace a soiled or faulty valve body.**
- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**
- **General repair notes --> Servicing notes.**
- **Coat O-rings and sealing rings with ATF. Other lubricating substances lead to functional problems in the hydraulic transmission control.**

Removed parts for transmission with hydraulic control E18/2, overview

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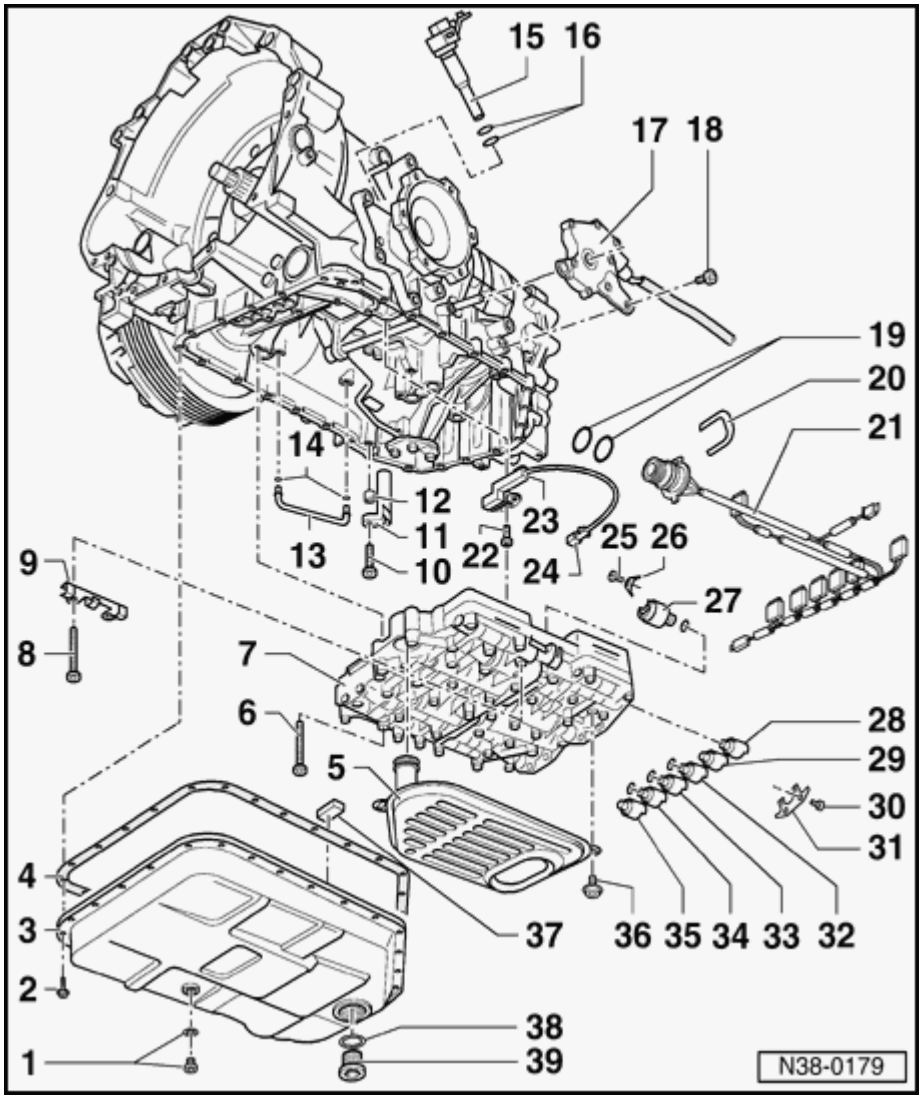


Fig. 166: Valve Body For Transmissions With Hydraulic Control Type E18/2, Assembly Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Drain plug - 40 Nm

- With seal
- Always replace
- 5 mm socket-head bolt
- Remove to drain ATF

2 - Bolt - 10 Nm

- Tighten bolts for oil pan in several stages in diagonal sequence

3 - Oil pan

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- Removing and installing --> **Oil pan, removing and installing**

4 - Gasket

- Always replace

5 - Oil strainer

- Removing and installing --> **Oil strainer, removing and installing**

6 - Bolt - 8 Nm

- For mounting valve body: 16 bolts M6 x 60
- Observe tightening sequence --> **Fig. 177**

7 - Valve body

- Removing and installing --> **Valve body, removing and installing**

8 - Bolt - 8 Nm

9 - Bracket

- For wiring harness
- Hook in wiring harness
- Mounted with valve body bolts

10 - Bolt - 6 Nm

11 - Transmission Vehicle Speed Sensor (VSS) G38 (also designated as Sender for transmission output RPM G195)

- Removing and installing --> **Transmission Vehicle Speed Sensor (VSS) G38 , removing and installing**

12 - Spacer sleeve

- Height: 8 mm

13 - Inner oil line

- Always replace
- Removing and installing --> **Oil line inside transmission, removing and installing**

14 - O-ring

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- Always replace

15 - Speedometer Vehicle Speed Sensor (VSS) G22

- Removing and installing --> **Speedometer Vehicle Speed Sensor (VSS) G22 , removing and installing**

16 - O-ring

- Always replace
- Coat with gear oil and insert

17 - Multi-Function Transmission Range (TR) Switch F125

- Removing and installing --> **Multi-Function Transmission Range (TR) Switch F125 , removing and installing**
- Replacing shift rod sealing ring --> **Shift rod seal, replacing**

18 - Bolt - 8 Nm

19 - O-ring

- Always replace
- Coat with ATF and insert

20 - Locking clamp

- Always replace

21 - Wiring harness in transmission

- Always replace --> **Wiring harness inside transmission, removing and installing**
- Transmission Fluid Temperature Sensor G93 is integrated into the wiring harness
- Remove and install valve body to replace --> **Valve body, removing and installing**
- Unhook from bracket for wiring harness, item 10

- Installation position wiring harness connector: Flat part of rear collar points toward oil pan, the tabs at collar are horizontal

22 - Bolt - 9 Nm

23 - Sensor for transmission RPM G182

- Removing and installing --> **Sensor for transmission RPM G182 , removing and installing**

24 - Connector

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- Is connected at wiring harness in transmission
- Must be disconnected before removing the valve body

25 - Bolt - 6 Nm

26 - Bracket

- For solenoid valve

27 - Pressure Control Valve 1 for Auto. Transmission N215

- With O-ring
- Remove and install valve body to replace --> **Valve body, removing and installing**

28 - Solenoid valve 3 N90

- Without O-ring
- Remove and install oil pan to replace --> **Oil pan, removing and installing**

29 - Solenoid valve 2 N89

- Without O-ring
- Remove and install oil pan to replace --> **Oil pan, removing and installing**

30 - Bolt - 6 Nm

31 - Bracket

- For solenoid valves

32 - Pressure Control Valve 3 for Auto. Transmission N217

- With O-ring
- Remove and install oil pan to replace --> **Oil pan, removing and installing**

33 - Pressure Control Valve 4 for Auto. Transmission N218

- With O-ring
- Remove and install oil pan to replace --> **Oil pan, removing and installing**

34 - Pressure Control Valve 2 for Auto. Transmission N216

- With O-ring
- Remove and install oil pan to replace --> **Oil pan, removing and installing**

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35 - Solenoid valve 1 N88

- Without O-ring
- Remove and install oil pan to replace --> **Oil pan, removing and installing** and unbolt guide plate for park locking mechanism
- When installing, do not tighten bolts for guide plate (23 Nm) in selector lever position "P".

36 - Bolt - 6 Nm

37 - Magnet

- 4 pieces in the oil pan recesses
- Clean after every removal of oil pan
- Ensure full surface contact in oil pan

38 - O-ring

- Always replace

39 - ATF check plug - 80 Nm

- 17 mm socket-head bolt

Oil pan, removing and installing

Special tools, testers and auxiliary items required

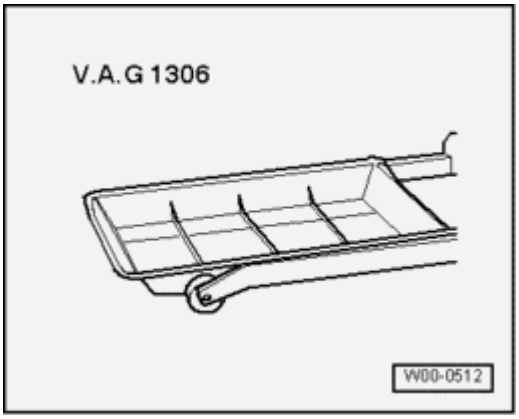


Fig. 167: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

Removing

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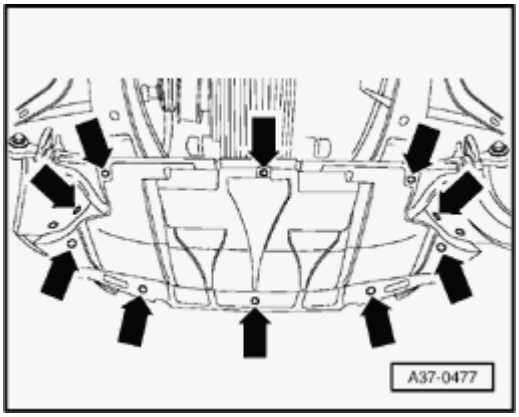


Fig. 168: Identifying Noise Insulation Panel Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove noise insulation panel (arrows).
- Place drip tray VAG1306 under transmission.

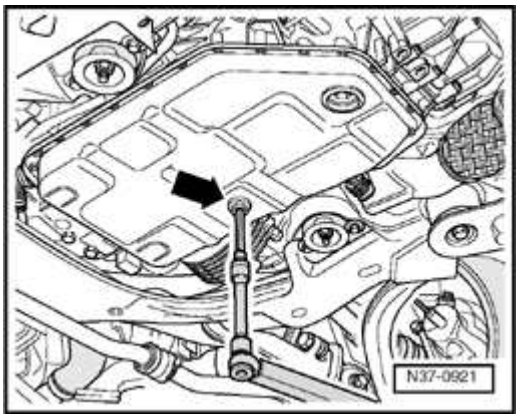


Fig. 169: Identifying ATF Drain Plug And ATF Inspection Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove ATF drain plug (arrow) and drain ATF.
- Loosen oil pan bolts diagonally and remove oil pan.

Installing

Installation is reverse of removal, noting the following:

- Clean all 4 magnets in oil pan recesses. Ensure full surface contact of the magnets on the oil pan.
- Replace gaskets.

NOTE:

- **Drain plug and oil seal must both be replaced.**

- Fill up ATF --> **ATF, changing or topping off after repairs**.

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Tightening torques

Component	Nm
Drain plug to oil pan	40
Oil pan to transmission housing (diagonally in sequence)	10

Oil strainer, removing and installing

Removing

- Removing oil pan --> **Oil pan, removing and installing**.

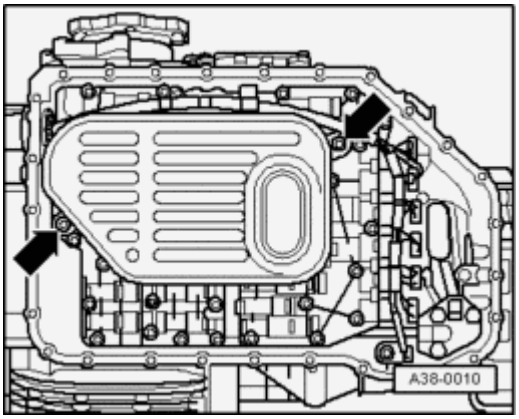


Fig. 170: ATF Screen Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Removing oil strainer bolts (arrows).
- Pull oil strainer off of valve body.

Installing

- Lightly coat seal on suction collar of oil strainer with ATF.
- Carefully press suction collar of oil strainer into the opening at valve body up to stop.
- Bolt on oil strainer.
- Installing oil pan.

- Fill up ATF --> **ATF, changing or topping off after repairs**.

Tightening torque

Component	Nm
Oil strainer to valve body	6

Valve body, removing and installing

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NOTE:

- **Always replace a soiled or faulty valve body.**
- **General repair notes --> Servicing notes.**
- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**

Removing

- Removing oil pan --> **Oil pan, removing and installing**.
- Removing oil strainer --> **Oil strainer, removing and installing**.

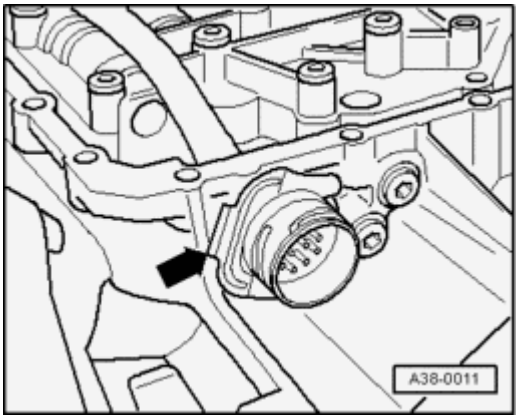


Fig. 171: Location Of Wiring Harness/Harness Connector Securing Circlip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect clip for wiring harness connectors (arrow).

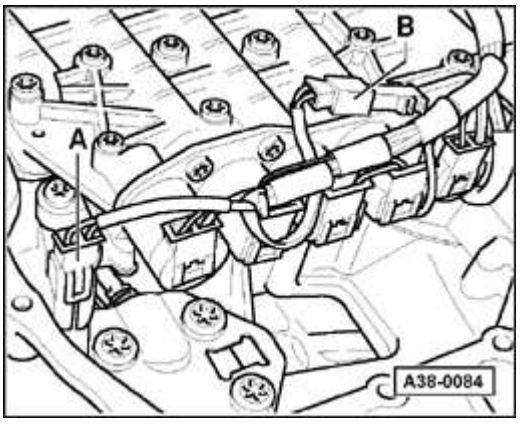


Fig. 172: Identifying Connector Transmission Vehicle Speed Sensor -G38- And Connector transmission RPM Sensor -G182-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect harness connector from Transmission Vehicle Speed Sensor (VSS) G38 (- **A** -).
- Disconnect harness connector from Sensor for transmission RPM G182 (- **B** -).

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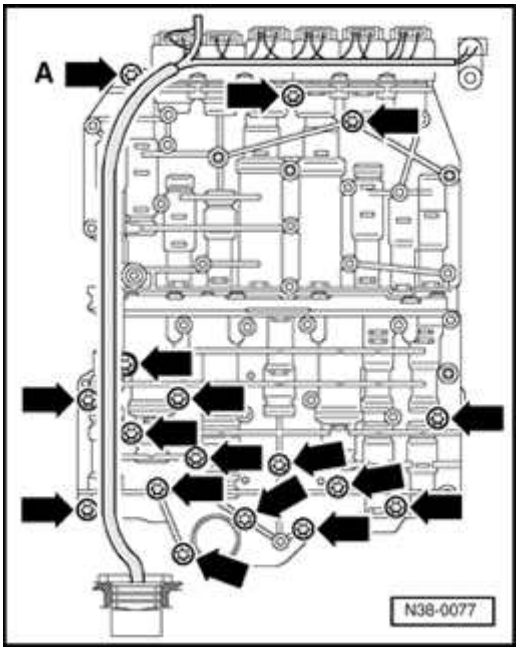


Fig. 173: Remove/Install Bolts From Valve Body Which Are Marked With An Arrow (Bolt Is Shorter Than The Other Bolts)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen mounting bolts (arrows) of valve body and remove valve body with wiring harness.

NOTE:

- **Only the marked mounting bolts (arrows) must be loosened.**
- **When loosening other bolts, the function of the valve body can be influenced or the valve body splits up.**
- **The bolt (arrow A) is not installed on transmissions with hydraulic control E18/2 and can therefore be disregarded.**

- Remove valve body from transmission while advancing the wiring harness connector.

Installing

- Lightly coat O-rings of wiring harness connector with ATF.
- Insert wiring harness connector into transmission housing.

- Installation position: Flat part of rear collar points downward, the tabs at collar are horizontal

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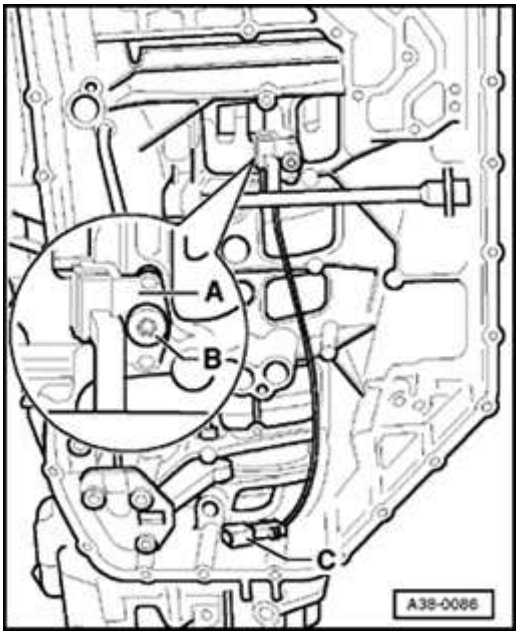


Fig. 174: Sensor For Transmission RPM (Transmissions With Hydraulic Regulation -E18/2-)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Route wire with connector - **C** - according to illustration, so that the wire is not pinched when installing the valve body.

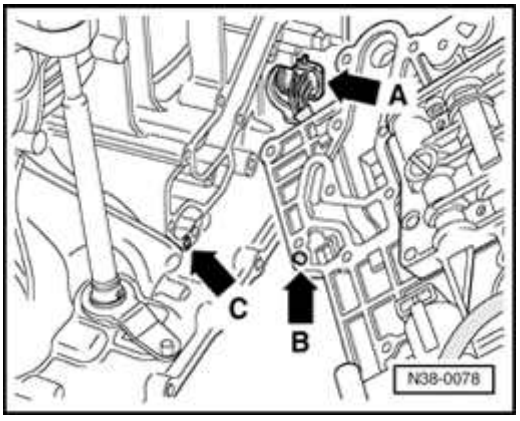


Fig. 175: Installing Valve Body, Note Position Of A, B And C
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert connector with flat part (arrow - **A** -) facing toward oil pan into transmission housing.
- Align valve body to hole in transmission housing (arrow - **C** -) using alignment pin (arrow - **B** -).

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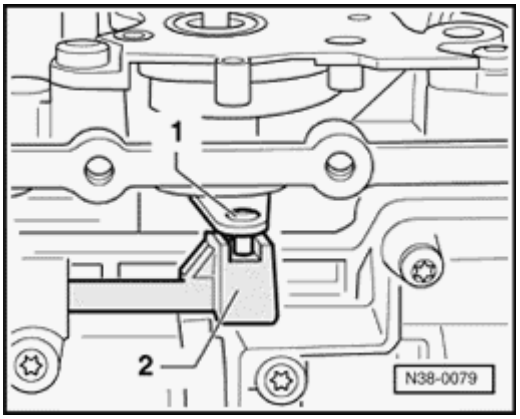


Fig. 176: Installing Valve Body, Note Position Of Pin Of Detent Plate And Selector Slide
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Set valve body in place without force while placing bolt of notched disc - **1** - into the groove of the selector register - **2** -.

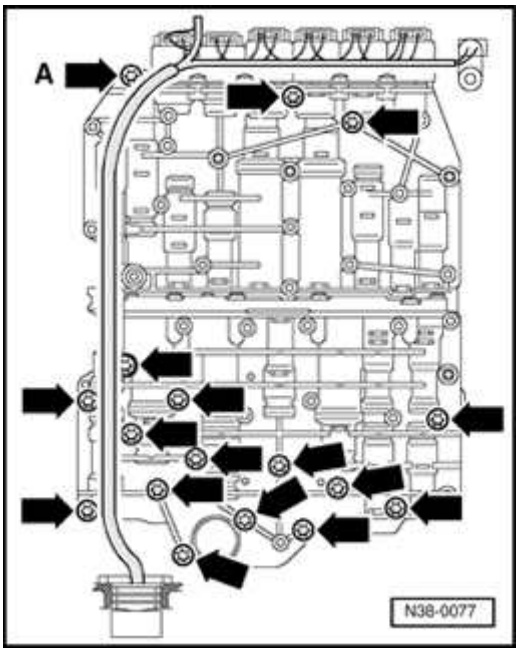


Fig. 177: Remove/Install Bolts From Valve Body Which Are Marked With An Arrow (Bolt Is Shorter Than The Other Bolts)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Next, tighten valve body bolts (arrows) by hand.

NOTE:

- **The bolt (arrow A) is not installed on transmissions with hydraulic control E18/2 and can therefore be disregarded.**

- Then tighten valve body bolts from inside out to final tension.

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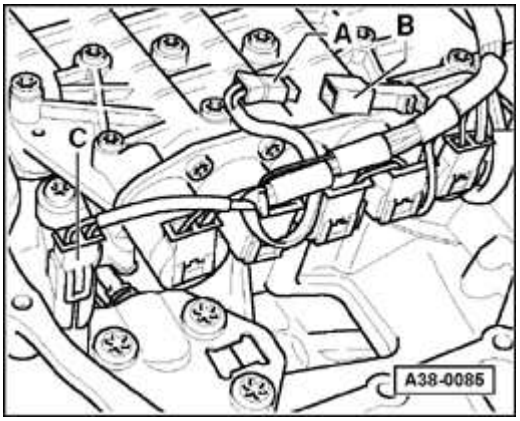


Fig. 178: Connecting Connector To Connector At Wiring Harness
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull wiring with connector - **B** - of Sensor for transmission RPM G182 between valve body and wiring harness upward.
- Connect connector - **B** - to connector - **A** - at wiring harness.
- Connect connector - **C** - to Transmission Vehicle Speed Sensor (VSS) G38.

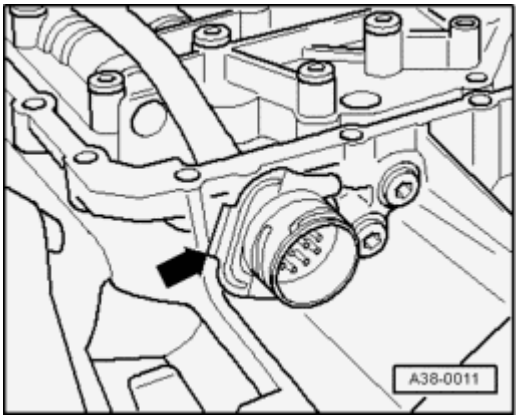


Fig. 179: Location Of Wiring Harness/Harness Connector Securing Circlip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect clip to wiring harness connector (arrow).
- Installing oil strainer --> **Oil strainer, removing and installing**.
- Installing oil pan.
- Fill up ATF --> **ATF, changing or topping off after repairs**.

Tightening torque

Component	Nm
Valve body to transmission housing (from inside out)	8

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Oil line inside transmission, removing and installing

Special tools, testers and auxiliary items required

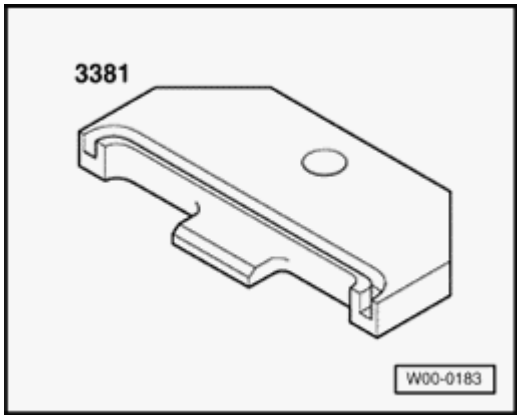


Fig. 180: 3381 Fitting tool
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 3381oil line installer

NOTE:

- **Faulty O-rings at inner oil line allow ATF to enter the differential, which becomes over-filled and oil escapes at differential vent.**
- **A removed oil line generally must be replaced.**
- **The oil line must only be inserted using 3381oil line installer. Otherwise there is a risk of leaks because of bending of the oil line.**

Removing

- Removing valve body --> **Valve body, removing and installing**.

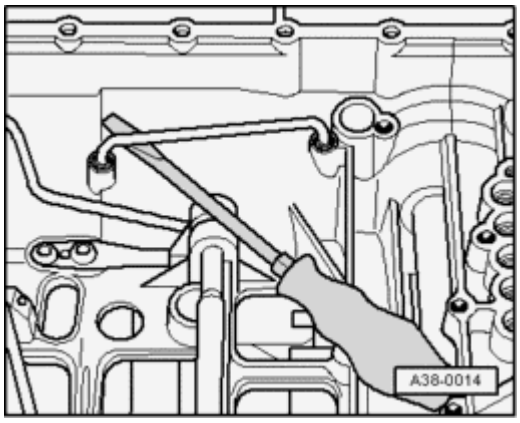


Fig. 181: Pry Internal Oil Line Off Transmission Housing Using Screwdriver
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lever off inner oil line evenly from transmission housing.

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Installing

Installation is reverse of removal, noting the following:

- Replace O-rings.

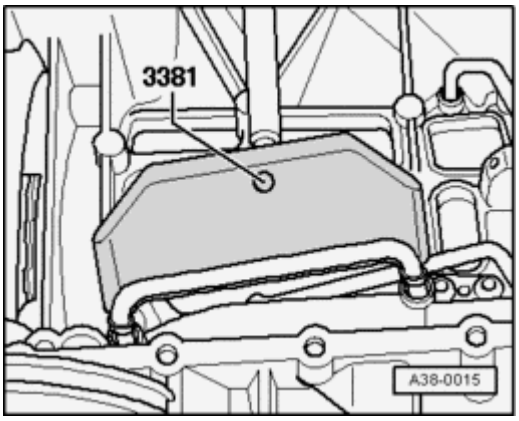


Fig. 182: Open Side Of Fitting Tool 3381 Faces Toward Outside Of Transmission
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert oil line into oil line installer 3381.
- Drive oil line into transmission housing by lightly tapping on the oil line installer 3381 up to stop using a plastic mallet.

NOTE:

- **The open side of oil line installer 3381 faces toward the outer wall of the transmission.**
- **Do not cant oil line. Drive in both line ends uniformly.**

- Installing valve body.
- Fill up ATF --> **ATF, changing or topping off after repairs**.
- Check oil level in front final drive --> **Gear oil in front final drive, checking**.

Shift rod seal, replacing

Special tools, testers and auxiliary items required

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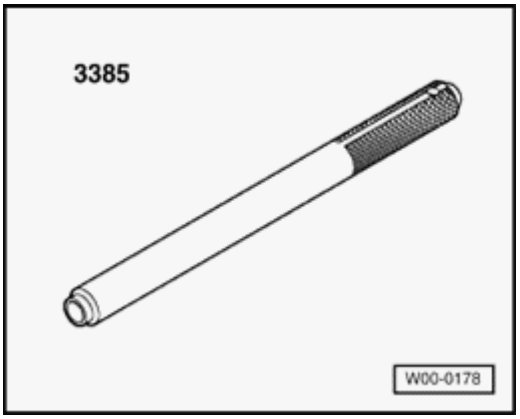


Fig. 183: 3385 Thrust piece
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Sealing ring installer 3385

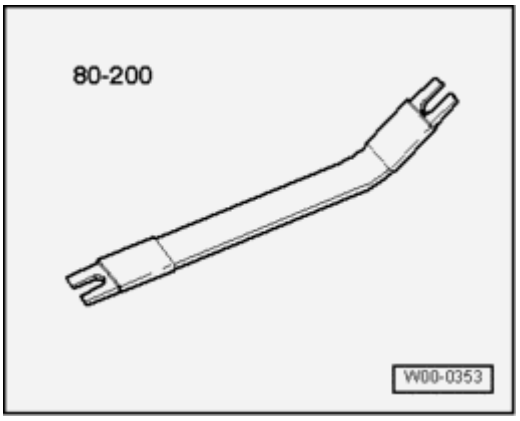


Fig. 184: Identifying Pry Lever 80-200
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry lever 80-200

Removing

- Removing left transmission support --> **Right and left transmission mounts, removing and installing**.
- Removing Multi-Function Transmission Range (TR) Switch F125 --> **Multi-Function Transmission Range (TR) Switch F125 , removing and installing**.

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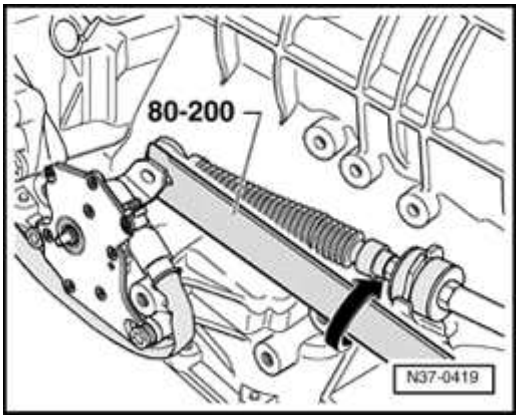


Fig. 185: Removing Selector Lever Cable From Selector Shaft Lever
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry off selector lever cable from lever/shift rod (arrow).

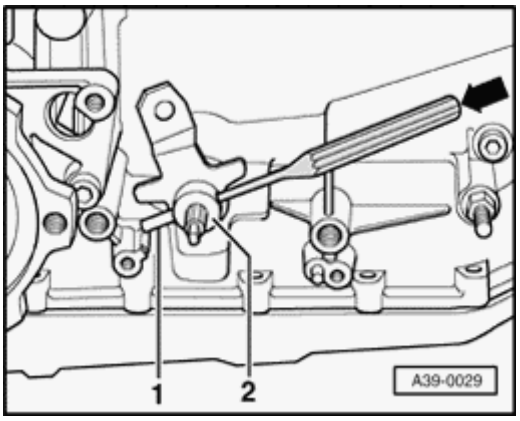


Fig. 186: Driving Out Spring Dowel Sleeve At Lever/Shift Rod Of Travel Toward Front
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive out spring dowel sleeve - **1** - at lever/shift rod - **2** - in direction of travel toward the front (arrow), until the lever/shift rod can be pulled off the shift rod.

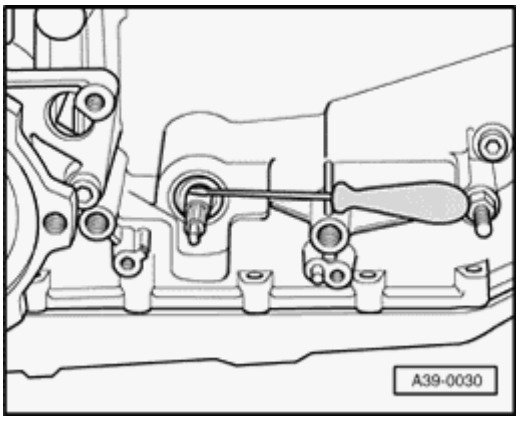


Fig. 187: Prying Seal Out With A Screwdriver

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pierce sealing ring using a small screwdriver and pull out.

Installing

- Coat outer circumference and gap between sealing lips with ATF.
- Installation position: The open side of the sealing ring faces the transmission.

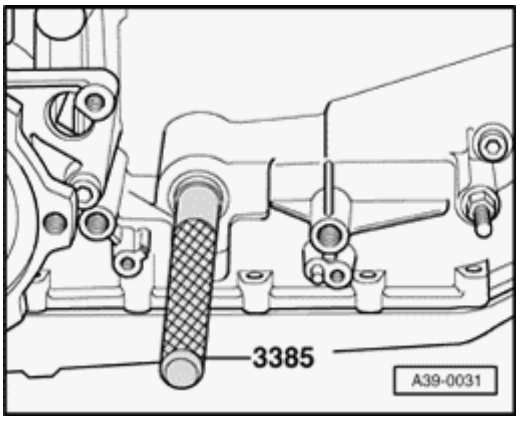


Fig. 188: Drive In New Seal Until Using Thrust Piece 3385
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide new sealing ring onto sealing ring installer 3385 without canting and drive in up to stop of pressure piece.
- Installing Multi-function switch --> **Multi-Function Transmission Range (TR) Switch F125 , removing and installing**.
- Drive back spring dowel sleeve with transmission not yet removed in opposite direction through the lever.
- Slide transmission shift lever onto shift rod and drive in spring dowel sleeve.

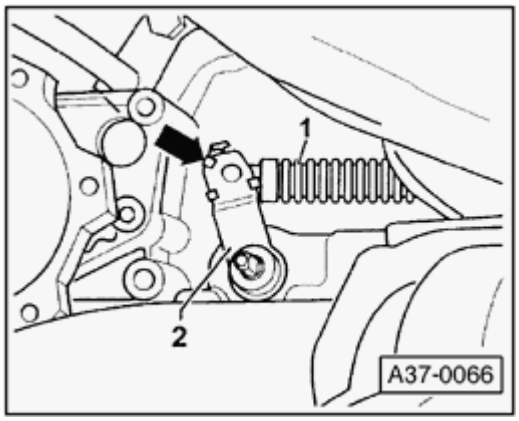


Fig. 189: Pushing Lever/Selector Shaft On Transmission Fully Forward Into Position "S"
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Push lever/selector shaft - **2** - on transmission fully forward (on illustration fully left).
- Shift selector lever into "S" and carefully press up ball head of selector lever cable - **1** - on lever/shift rod - **2** - using a pair of pliers.

NOTE:

- **Do not deform lever/shift rod when pressing up or else shifting cannot be precisely adjusted any more.**

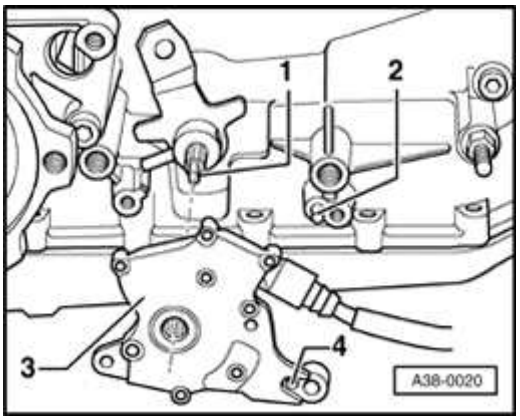


Fig. 190: Location Of 10 Pin Harness Connector & Multi-Function Transmission Range (TR) Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Rotate multi-function switch - **3** - until the alignment bore - **4** - at switch housing can be fitted on the alignment pin - **2** - at transmission housing.
- Installing left transmission support --> **Right and left transmission mounts, removing and installing**.

Tightening torques

Component	Nm
Multi-function Transmission Range (TR) switch F125 to transmission	8

Multi-Function Transmission Range (TR) Switch F125 , removing and installing

Removing

- Removing left transmission support --> **Right and left transmission mounts, removing and installing**.
- Unbolt Multi-Function Transmission Range (TR) Switch F125 from transmission and pull off from shift rod.

Installing

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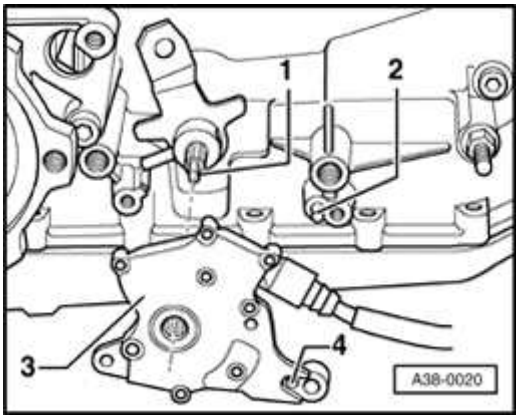


Fig. 191: Location Of 10 Pin Harness Connector & Multi-Function Transmission Range (TR) Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect Multi-Function Transmission Range (TR) Switch F125 to shift rod. Flap part at splines in switch - **3** - must align with flat part of shift rod - **1** -.

NOTE:

- **Set Multi-Function Transmission Range (TR) Switch F125 onto shift rod in centered manner. Do not cant and do not set with force. Risk of damage at switch terminals.**

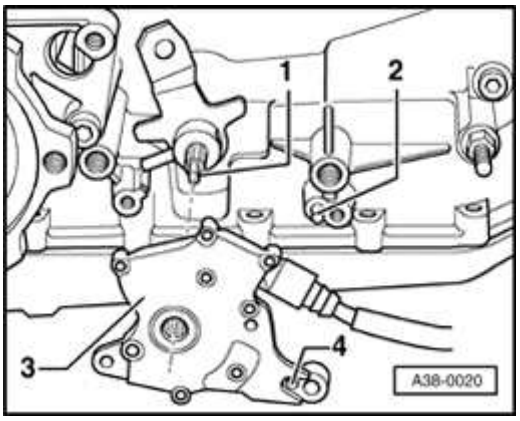


Fig. 192: Location Of 10 Pin Harness Connector & Multi-Function Transmission Range (TR) Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Rotate switch until the alignment bore - **4** - at switch housing can be fitted on the alignment pin - **2** - at transmission housing.
- Installing left transmission support --> **Right and left transmission mounts, removing and installing**.

Tightening torques

Component	Nm
Multi-function Transmission Range (TR) switch F125 to transmission	8

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Speedometer Vehicle Speed Sensor (VSS) G22 , removing and installing

Removing

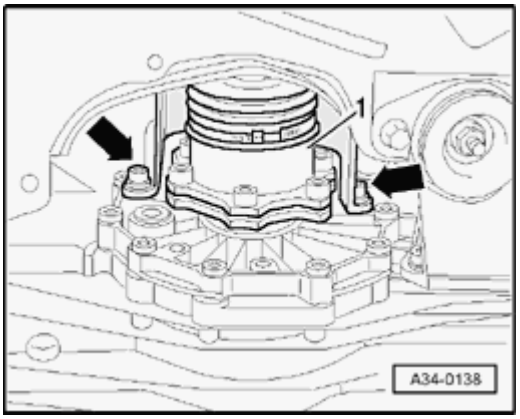


Fig. 193: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield - **1** - for left drive axle (arrows), if installed.

Third bolt is not visible in the illustration.

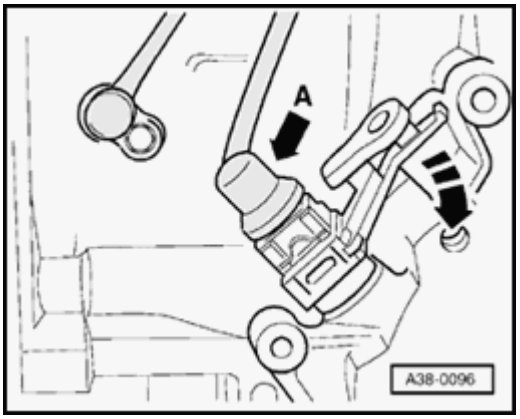


Fig. 194: Removing Speedometer Vehicle Speed Sensor -G22- And Vehicle Speed Sensor -G68-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect harness connector from Speedometer Vehicle Speed Sensor (VSS) G22 (arrow - **A** -).
- Push retaining bracket of sensor downward, and turn (arrow).
- Remove sensor.

Installing

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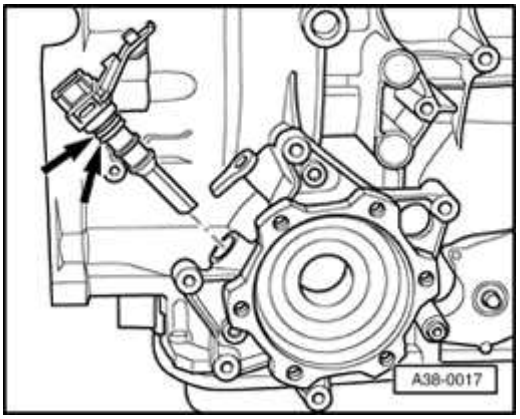


Fig. 195: Installing Speedometer Vehicle Speed Sensor -G22- And Vehicle Speed Sensor -G68-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace sealing rings (arrows).
- Insert O-rings with gear oil.
- Insert sensor.
- Engage retaining bracket at mounting bracket for flange shaft.

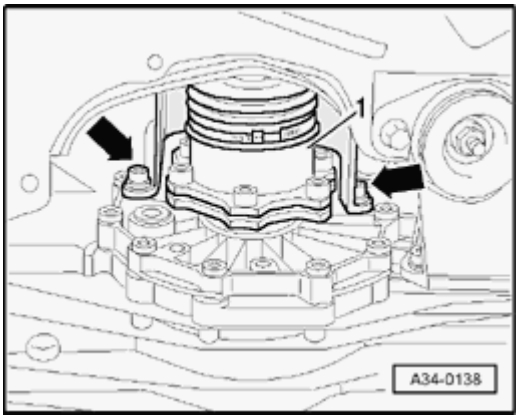


Fig. 196: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install heat shield - **1** - for left drive axle (arrows), if present.

Third bolt is not visible in the illustration.

Sensor for transmission RPM G182 , removing and installing

Removing

- Removing valve body --> **Valve body, removing and installing**.

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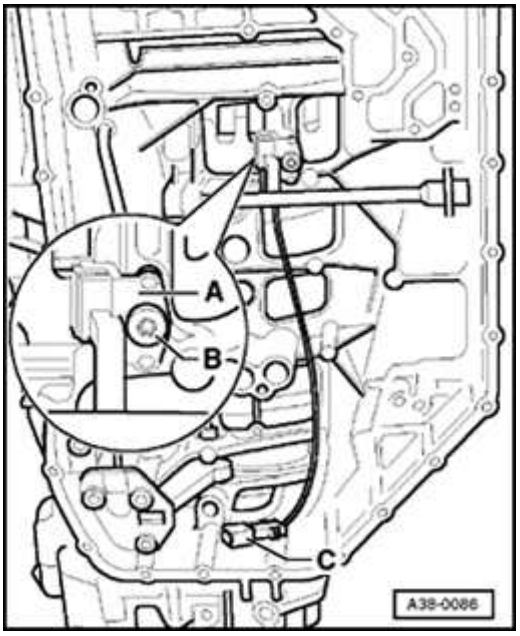


Fig. 197: Sensor For Transmission RPM (Transmissions With Hydraulic Regulation -E18/2-)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt Sensor for transmission RPM - **A** - from transmission.

Installing

- Bolt on Sensor for transmission RPM - **A** - at transmission via bolt - **B** -. Tightening torque is 9 Nm.
- Route wire with connector - **C** - according to illustration, so that the wire is not pinched when installing the valve body.
- Installing valve body.
- Fill up ATF --> **ATF, changing or topping off after repairs**.

Transmission Vehicle Speed Sensor (VSS) G38 , removing and installing

Also referred to as Sender for transmission output RPM G195.

Removing

- Removing oil pan --> **Oil pan, removing and installing**.

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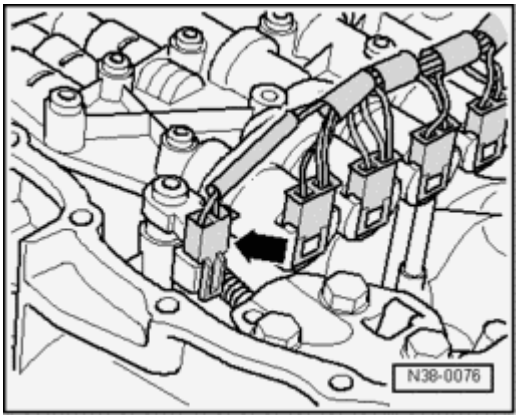


Fig. 198: Transmission Vehicle Speed Sensor -G38- Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect harness connector from Transmission Vehicle Speed Sensor (VSS) G38 (arrow).

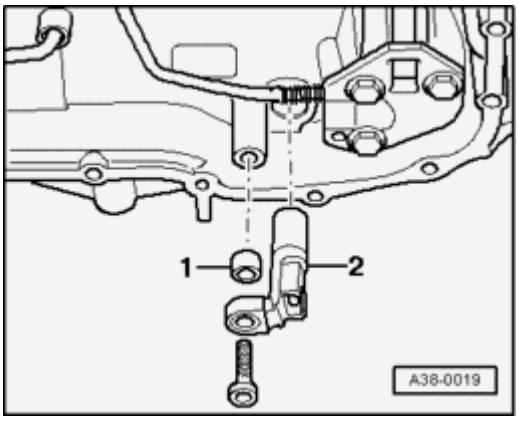
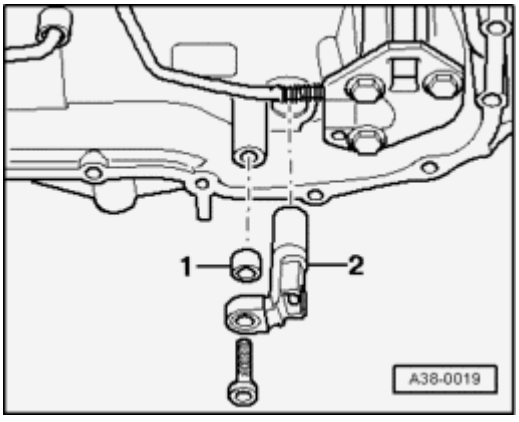


Fig. 199: Identifying Transmission Vehicle Speed Sensor (VSS) And Spacer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove Transmission Vehicle Speed Sensor (VSS) - **2** -.

Installing



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Fig. 200: Identifying Transmission Vehicle Speed Sensor (VSS) And Spacer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install and tighten Transmission Vehicle Speed Sensor (VSS) - **2** - using spacer sleeve - **1** - (height: 8 mm) to 6 Nm.

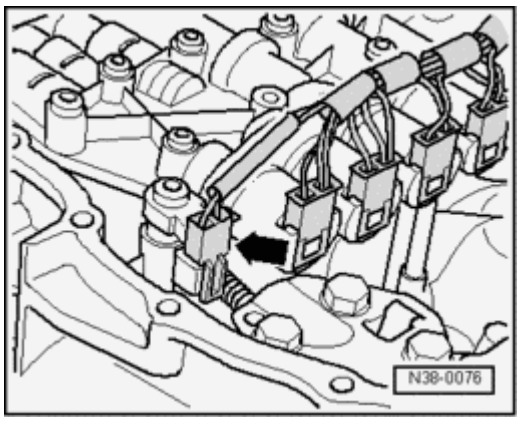


Fig. 201: Transmission Vehicle Speed Sensor -G38- Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect connector at Transmission Vehicle Speed Sensor (VSS) G38.
- Installing oil pan.
- Fill up ATF --> **ATF, changing or topping off after repairs**.

Wiring harness inside transmission, removing and installing

Removing

- Removing valve body --> **Valve body, removing and installing**.

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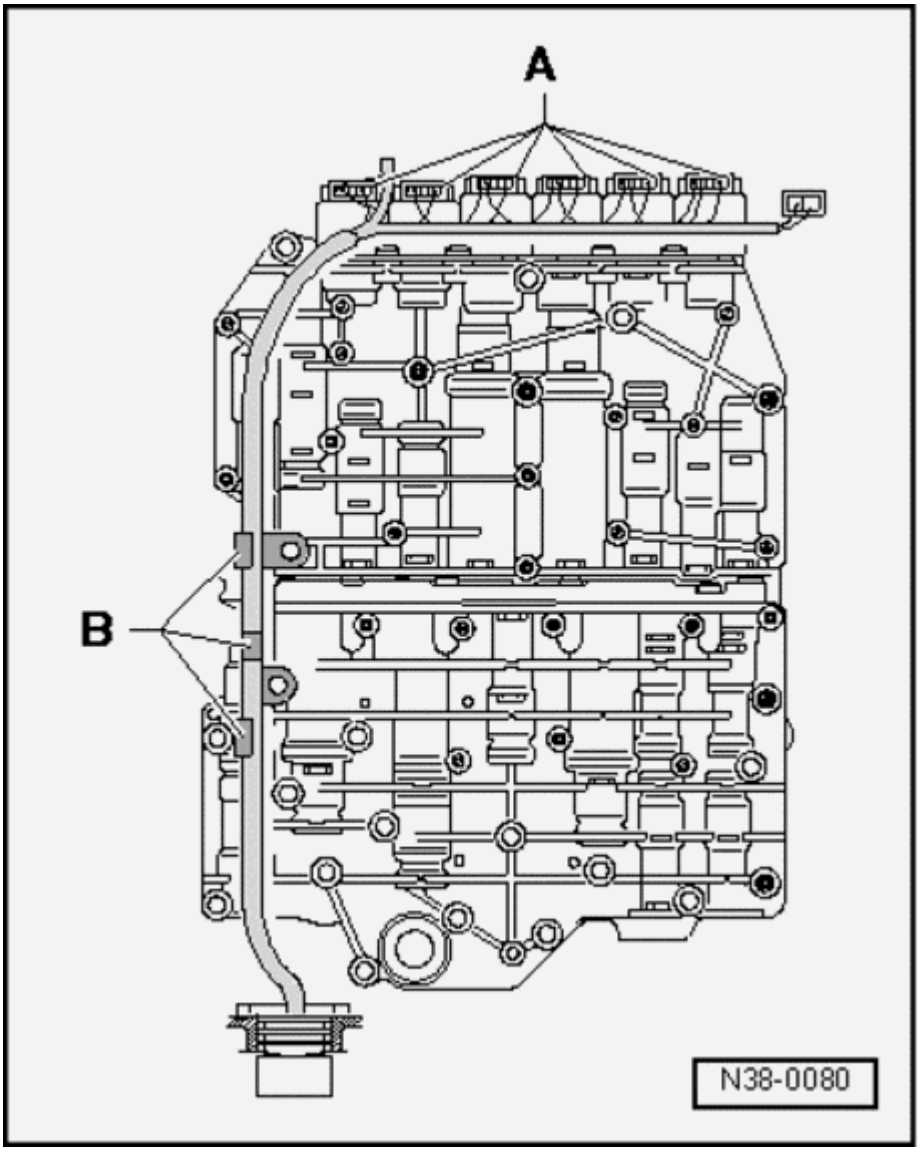


Fig. 202: Identifying Solenoid Valve Connectors And Wiring Harness Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lever out retainer straps of connectors at solenoid valves and pressure control valves using a small screwdriver and disconnect connectors - **A** - in sequence.
- Unhook wiring harness at side retainer straps **- B -** of valve body.

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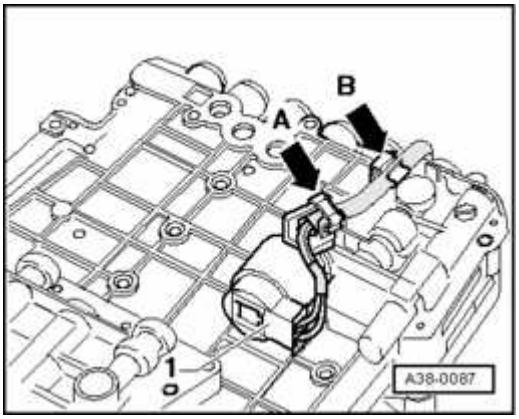


Fig. 203: Identifying Pressure Control Valve 1 (-N125-) And Wiring Harness Retainers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn valve body on its back side and loosen connector - **1** - at Pressure Control Valve 1 for Auto. Transmission N215.
- Remove retaining clip (arrow A) and unclip wiring harness from retaining clip (arrow B).

Installing

Installation is reverse of removal, noting the following:

- When installing, connect connectors of wiring harness to the corresponding solenoid valves and pressure control valves.
- Clip wiring harness into the respective retaining clips. In case of deviations, the wiring harness can be pinched during installation of the valve body.
- Installing valve body.
- Fill up ATF --> **ATF, changing or topping off after repairs**.

Transmission Fluid Temperature Sensor G93 , replacing

NOTE:

- **Transmission Fluid Temperature Sensor G93 is integrated in the transmission wiring harness.**

Removal

- Remove wiring harness in transmission --> **Wiring harness inside transmission, removing and installing**.

Installing

Installation is the reverse of removal. Also carry out the following procedure.

- Replace wiring harness with a new one.
- Install new wiring harness in transmission --> **Wiring harness inside transmission, removing and**

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installing.

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39 - FINAL DRIVE, DIFFERENTIAL

GEAR OIL IN FRONT FINAL DRIVE, CHECKING

Special tools, testers and auxiliary items required

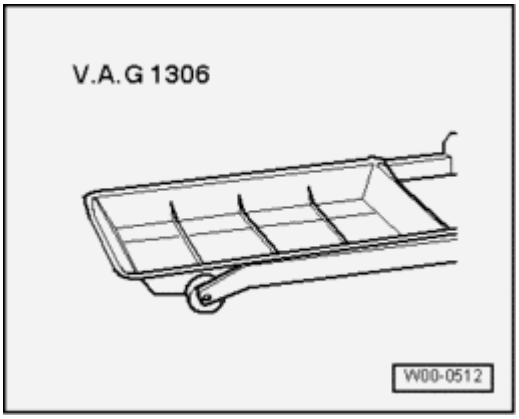


Fig. 204: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

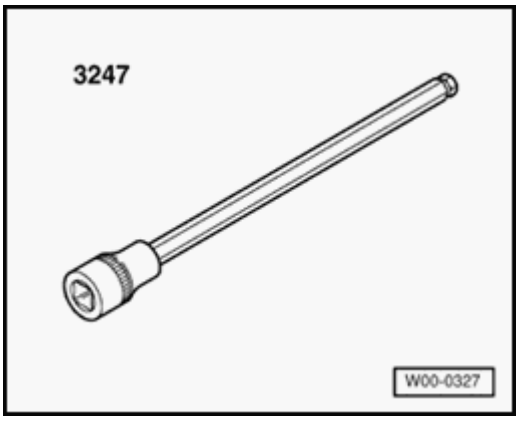


Fig. 205: 3247 Socket AF 8
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Plug insert 3247 (8mm)

Procedure

- Warm up gear oil in front final drive to approx. 60 ° C by performing a short road test.
- Drive vehicle onto a 4-column lift or over a work pit.

NOTE:

- **The vehicle must be on a level surface.**

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- Place drip tray VAG1306 underneath.

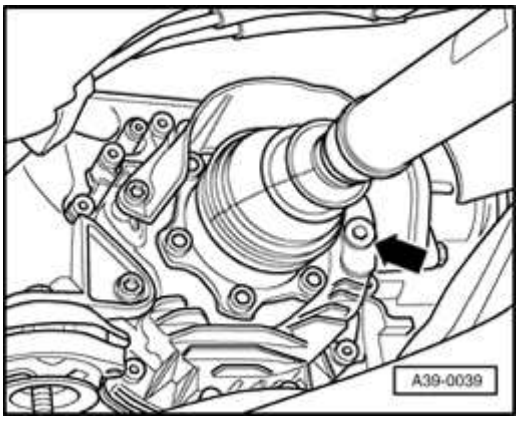


Fig. 206: Locating Sealing Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove locking screw (arrow).

NOTE:

- **Loosen locking bolt using an angled socket-head wrench, but do not use hex ball socket 3247. For improved accessibility it may be necessary to remove the heat shield and drive axle and to set them aside.**
- **If hex ball socket 3247 is used for loosening the bolt, it could be destroyed.**

- With engine switched off, allow gear oil to drip out for approx. 2 minutes.

Oil level is correct when the front final drive is filled up to lower edge of oil filler hole.

- Let excessive gear oil drain or top up gear oil --> **Gear oil in front final drive, filling up after servicing**.

NOTE:

- **Replace locking screw with seal.**

- When the oil level is correct, tighten locking bolt using hex ball socket 3247 (8mm socket) to 30 Nm.

GEAR OIL IN FRONT FINAL DRIVE, FILLING UP AFTER SERVICING

Gear oil in front final drive, filling up after servicing

Special tools, testers and auxiliary items required

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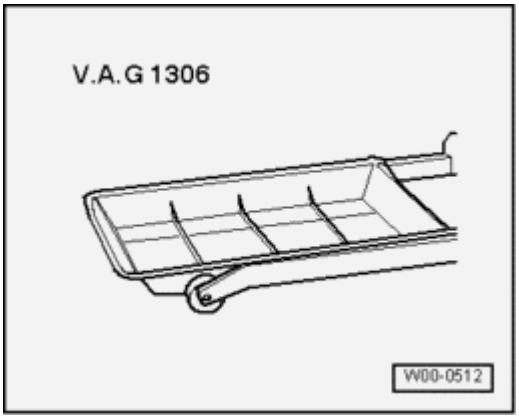


Fig. 207: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

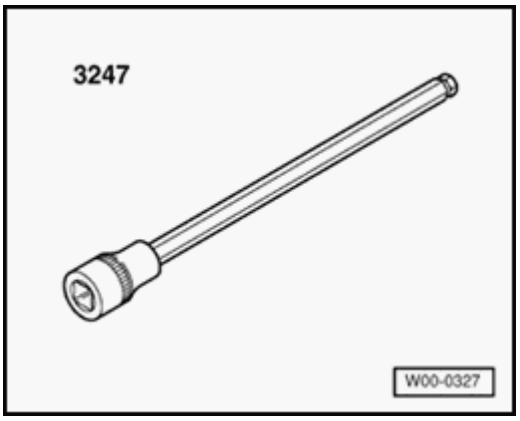


Fig. 208: 3247 Socket AF 8
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Plug insert 3247 (8mm)

Procedure

- Drive vehicle onto a 4-column lift or over a work pit.

NOTE:

- **The vehicle must be on a level surface.**

- Place drip tray VAG1306 underneath.

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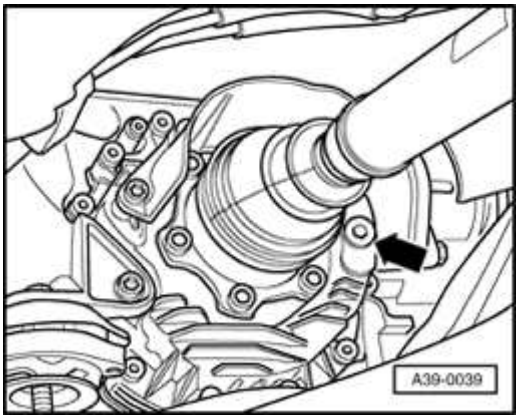


Fig. 209: Locating Sealing Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove locking screw (arrow).

NOTE:

- **Loosen locking bolt using an angled socket-head wrench, but do not use hex ball socket 3247. For improved accessibility it may be necessary to remove the heat shield and drive axle and to set them aside.**
- **If hex ball socket 3247 is used for loosening the bolt, it could be destroyed.**

- Slowly and uniformly fill front final drive over a time period of at least 5 minutes until gear oil escapes at lower edge of oil filler hole.

- Specification --> **Capacity**

NOTE:

- **Filling time of at least 5 minutes is essential, so that the internal oil level compensation between differential and retaining area can occur.**

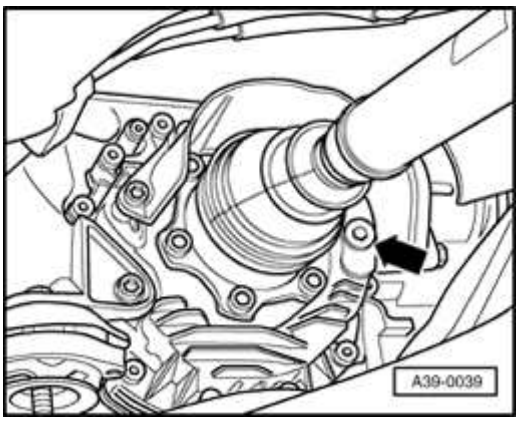


Fig. 210: Locating Sealing Plug
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Screw in old locking screw (arrow).
- Perform a short test drive to warm gear oil to approx. 60 ° C.
- Check front final drive oil level --> **Gear oil in front final drive, checking**.

NOTE:

- **Replace locking screw with seal.**

- When the oil level is correct, tighten locking bolt using hex ball socket 3247 (8 mm socket) to 30 Nm.

FRONT FINAL DRIVE, SERVICING

Front final drive, servicing

- Transmission installed

NOTE:

- **General repair notes --> Servicing notes.**
- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**

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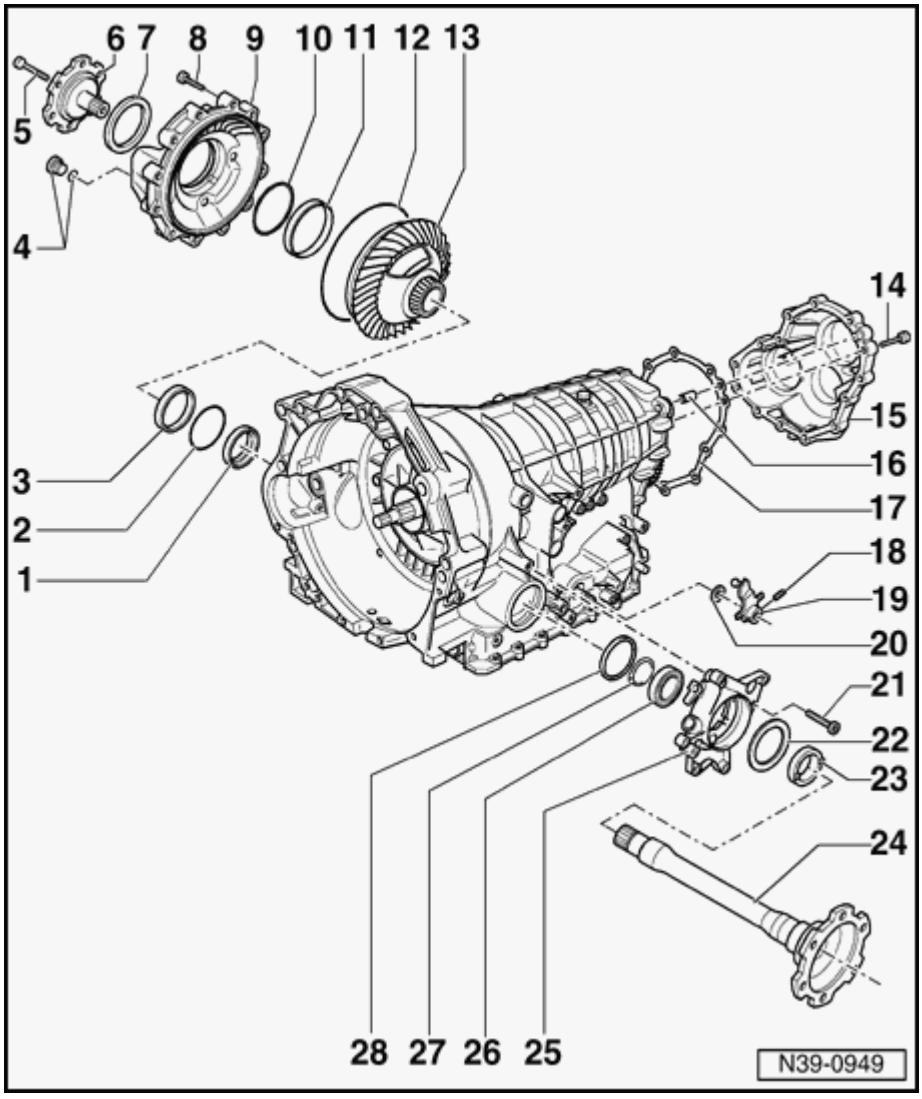


Fig. 211: Front Final Drive, Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Seal

- Between final drive and transmission housing
- Always replace --> **Final drive sealing ring/transmission housing, replacing**

2 - Adjustment shim

- Behind tapered roller bearing outer race

3 - Tapered roller bearing outer race

4 - Locking screw - 30 Nm

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- With seal
- Always replace

5 - Bolt - 23 Nm

6 - Right drive flange

7 - Right drive flange seal

- Always replace --> **Sealing ring for right drive flange, replacing**

8 - Bolt - 23 Nm

- Observe tightening sequence

9 - Cover for final drive

10 - Adjustment shim

- Behind tapered roller bearing outer race

11 - Tapered roller bearing outer race

12 - O-ring

- Always replace --> **O-ring at cover for final drive, replacing**

13 - Differential

14 - Bolt - 23 Nm

- Observe tightening sequence **Tightening sequence:**

15 - Cover for front final drive

- Front wheel drive version shown

16 - Bushing

17 - Gasket

- Always replace --> **Seal for front final drive, replacing**

18 - Spring dowel sleeve

19 - Lever

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- For shift rod

20 - Seal

- For shift rod
- Always replace --> **Shift rod seal, replacing**

21 - Bolt - 23 Nm

22 - Left drive flange seal

- Always replace --> **Sealing ring and grooved ball bearing for left drive flange, replacing**

23 - Drive gear

- For speedometer Vehicle Speed Sensor (VSS) G22
- Installation position --> **Fig. 231**

24 - Left drive flange

- Removing and installing --> **Sealing ring and grooved ball bearing for left drive flange, replacing** onward

25 - Mounting bracket for drive flange

26 - Grooved ball bearing for drive flange

- Always replace --> **Sealing ring and grooved ball bearing for left drive flange, replacing**

27 - Snap ring

28 - O-ring

- Square cross section
- Remove and install left drive flange to replace --> **Sealing ring and grooved ball bearing for left drive flange, replacing**

Sealing ring for right drive flange, replacing

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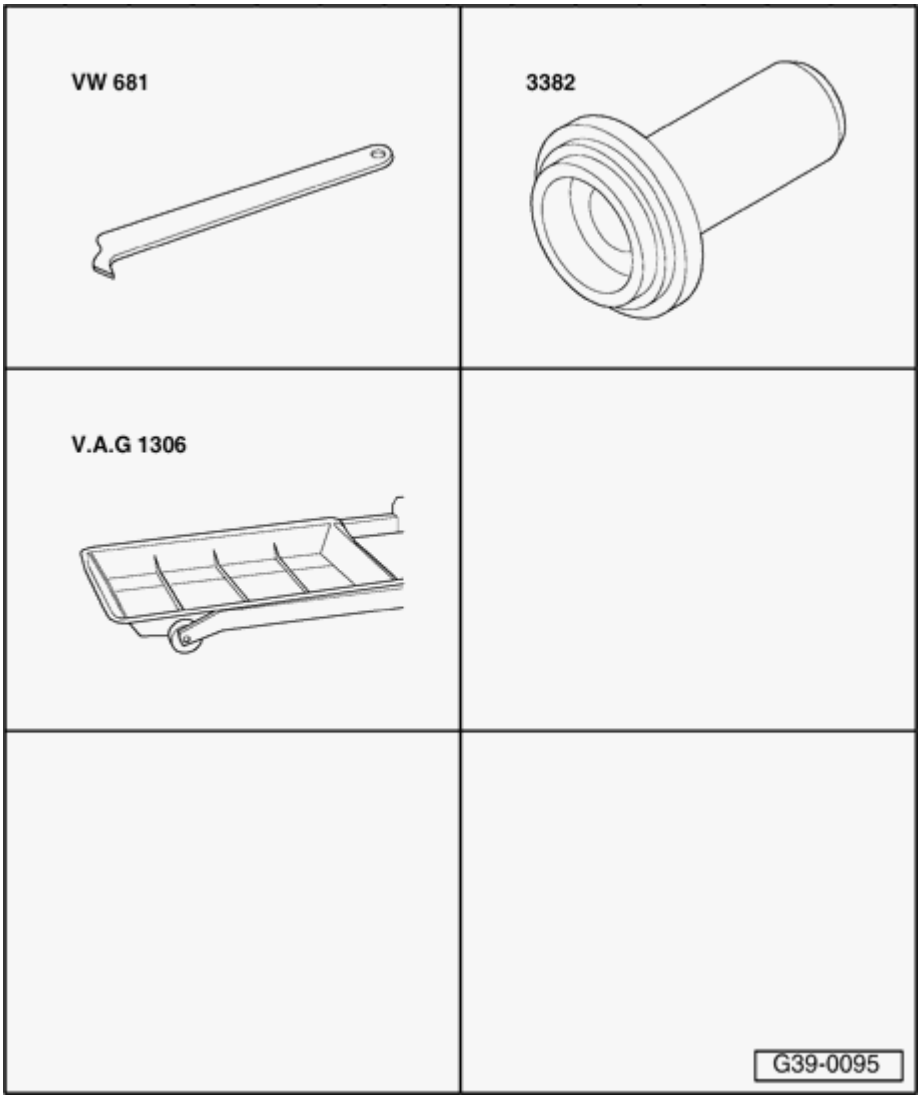


Fig. 212: Identifying Special Tools - Sealing Ring For Right Drive Flange, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Extractor lever VW681
- Right sealing ring installer 3382
- Drip tray VAG1306

Additional information

- **SUSPENSION, WHEELS, STEERING**

Removing

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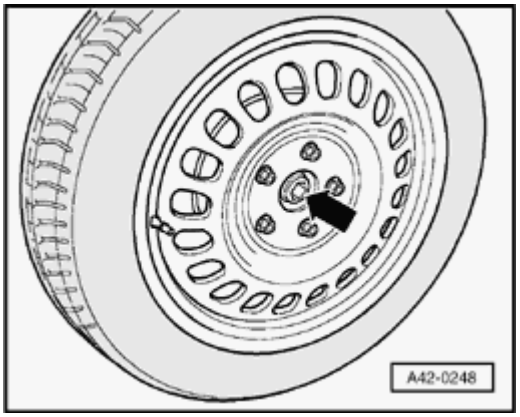


Fig. 213: Wheel Hex Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen bolt drive axle/wheel hub while the vehicle is still standing on its wheels. --> **40 - FRONT SUSPENSION**
- Remove wheel.

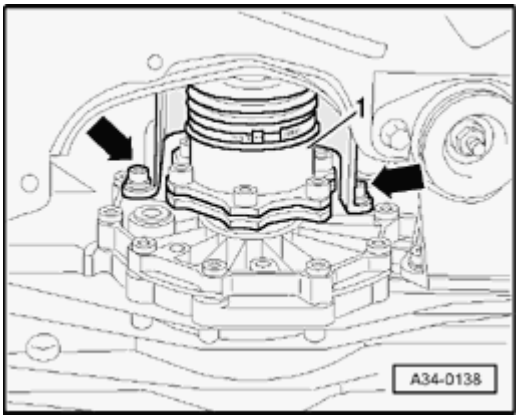


Fig. 214: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for right drive axle (arrows).

Third bolt is not visible in the illustration.

- Unbolt right drive axle - **1** - from transmission flange and remove. --> **40 - FRONT SUSPENSION**

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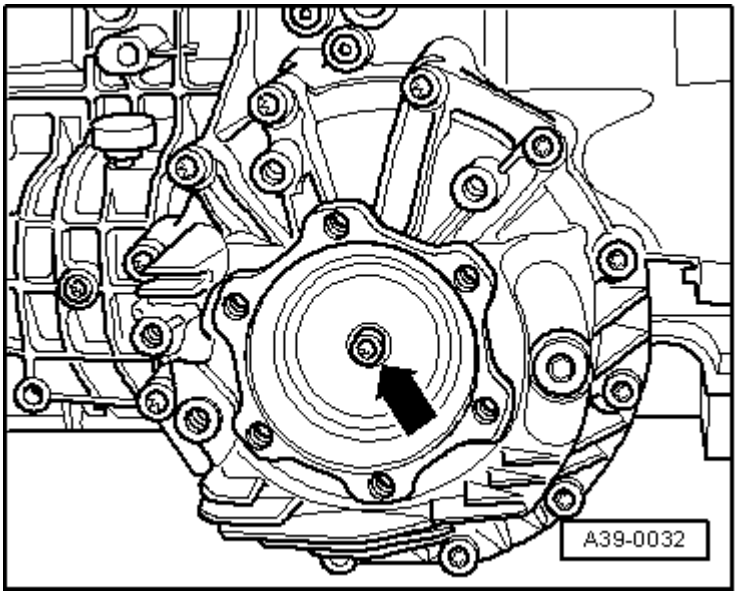


Fig. 215: Flange Shaft Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt for flange shaft (arrow) while securing against turning using a drift.
- Place drip tray VAG1306 underneath.
- Remove right drive flange.

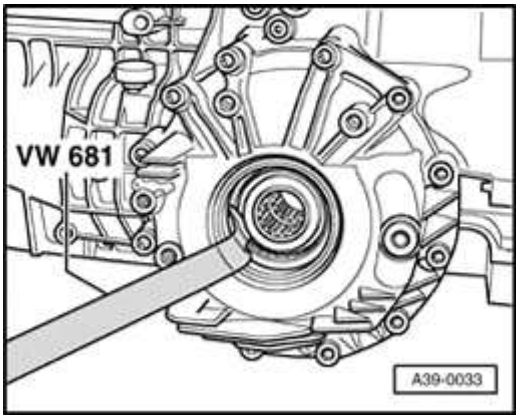


Fig. 216: Removing Flange Shaft Oil Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull out drive flange seal.

Installing

- Coat outer edge of oil seal with gear oil.

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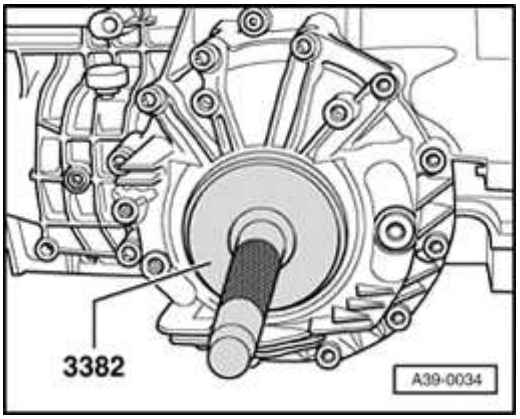


Fig. 217: Driving New Seal Using Drift 3382
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive in new seal to stop, without canting seal.
- Installation position: The open side of the sealing ring faces the transmission.
- Fill area between sealing lip and dust lip halfway with sealing grease G 052 128 A1.
- Install right drive flange.

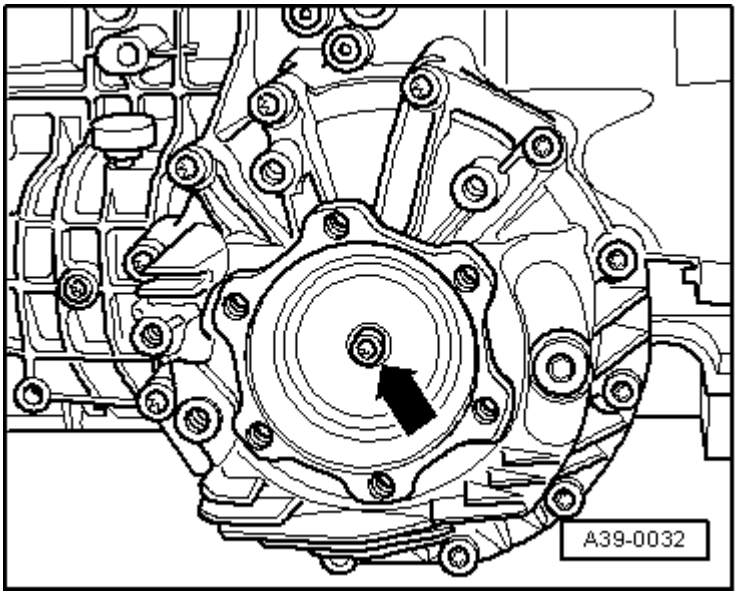


Fig. 218: Flange Shaft Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install bolt for drive flange (arrow, 23 Nm) while securing drive flange against turning, using a drift.

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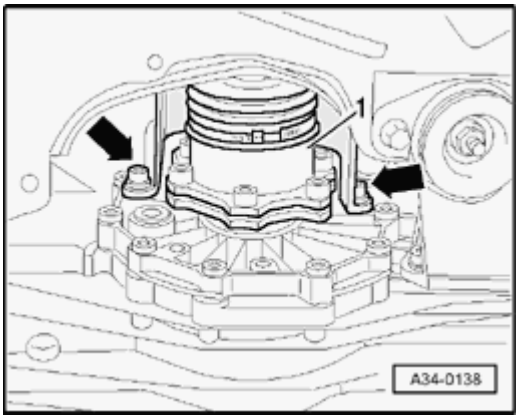


Fig. 219: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install right drive axle **- 1 -**. --> **40 - FRONT SUSPENSION**
- Install heat shield for right drive axle (arrows).

Third bolt is not visible in the illustration.

- Install front wheel. --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**
- Check oil level in front final drive --> **Gear oil in front final drive, checking**.

Tightening torques

Component	Nm
Drive flange to transmission	23
Heat shield for driveshaft to transmission	23

Sealing ring and grooved ball bearing for left drive flange, replacing

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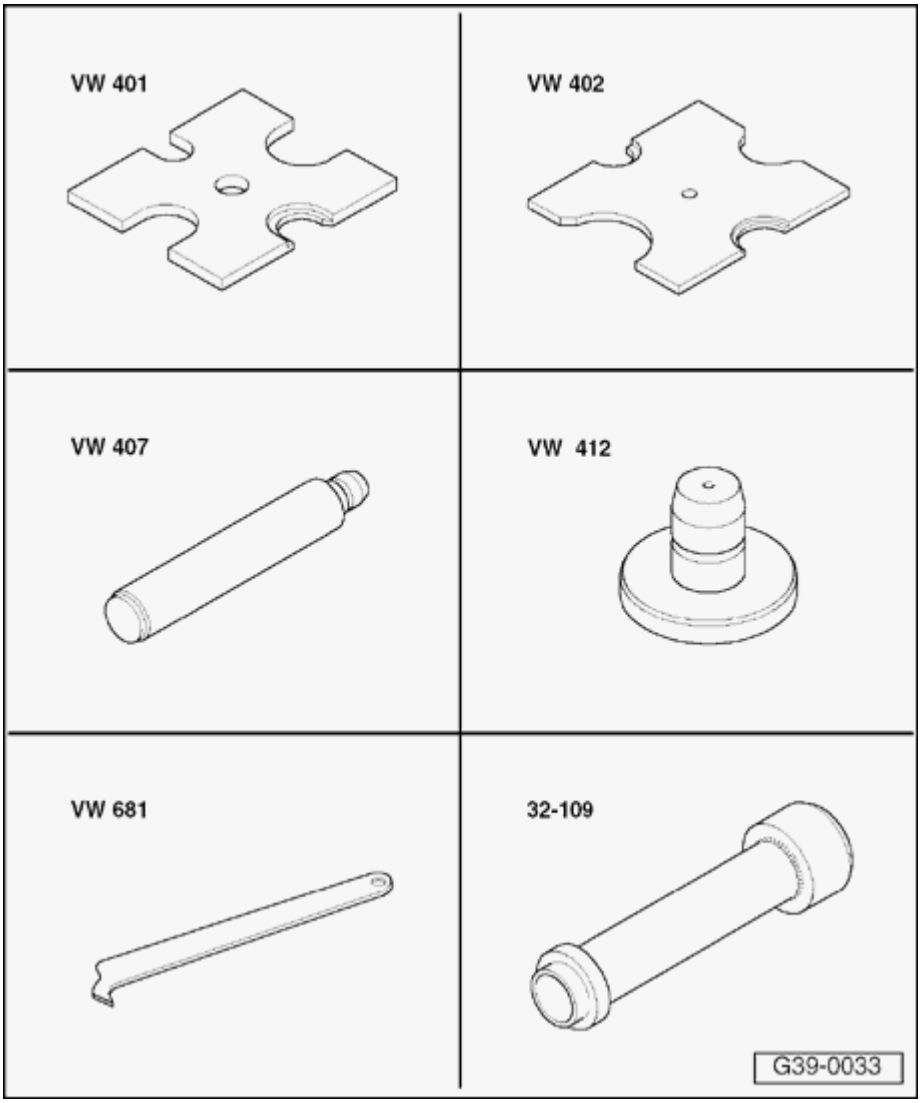


Fig. 220: Identifying Special Tools - Sealing Ring And Grooved Ball Bearing For Left Drive Flange, Replacing (1 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Thrust plate VW401
- Thrust plate VW402
- Punch VW407
- Punch VW412

- Extractor lever VW681
- Driving sleeve 32-109

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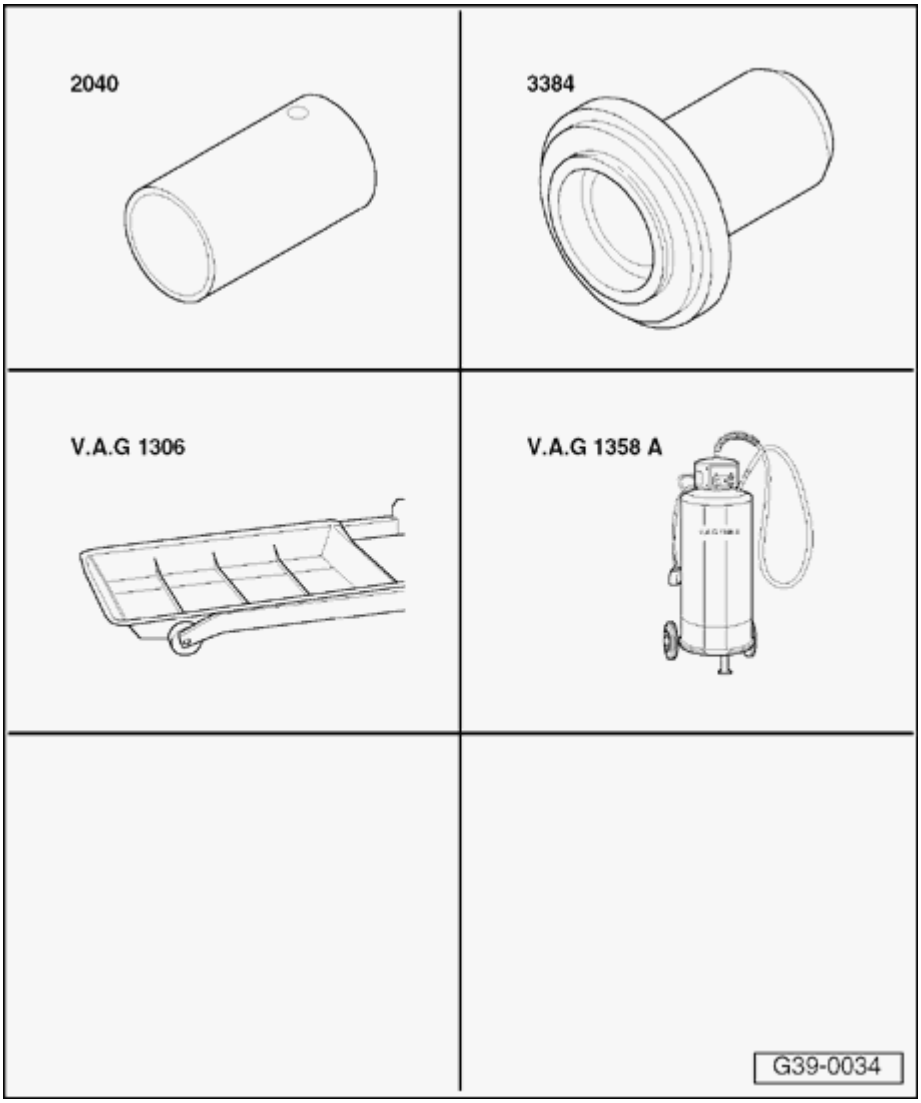


Fig. 221: Identifying Special Tools - Sealing Ring And Grooved Ball Bearing For Left Drive Flange, Replacing (2 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Press tube 2040
- Assembly mandrel 3384
- Drip tray VAG1306
- Oil siphoning unit VAG1358A

Additional information

- **SUSPENSION, WHEELS, STEERING**

Remove left drive flange

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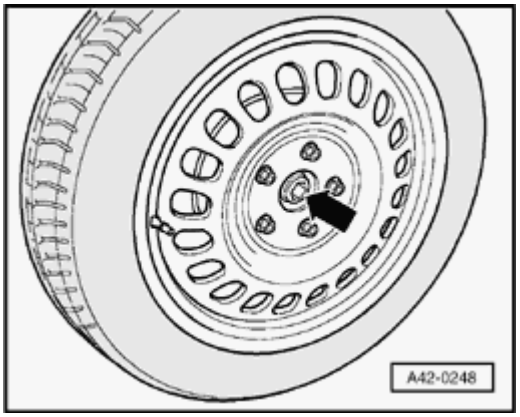


Fig. 222: Wheel Hex Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen bolt drive axle/wheel hub while the vehicle is still standing on its wheels. --> **40 - FRONT SUSPENSION**
- Remove wheel.

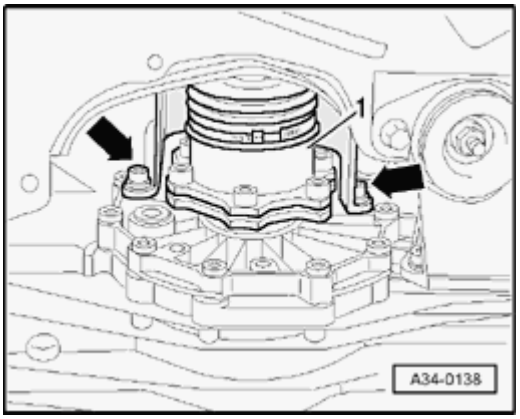


Fig. 223: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for left drive axle (arrows), if installed.

Third bolt is not visible in the illustration.

- Unbolt left drive axle - **1** - from transmission flange and remove. --> **40 - FRONT SUSPENSION**
- Place drip tray VAG1306 underneath.

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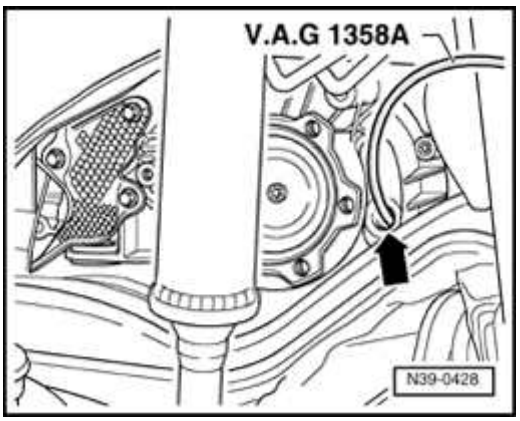


Fig. 224: Extracting Gear Oil From Front Final Drive Using VAG 1358 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove oil filler plug (arrow) and siphon off at least 0.5 L gear oil from front final drive using oil siphoning unit VAG1358A

NOTE:

- **Oil must be siphoned from final drive, otherwise there is a risk that the gear oil could mix with the ATF.**

- Remove Speedometer Vehicle Speed Sensor (VSS) --> **Speedometer Vehicle Speed Sensor (VSS) G22 , removing and installing**.
- Remove harness connector bracket from mounting bracket for drive flange.

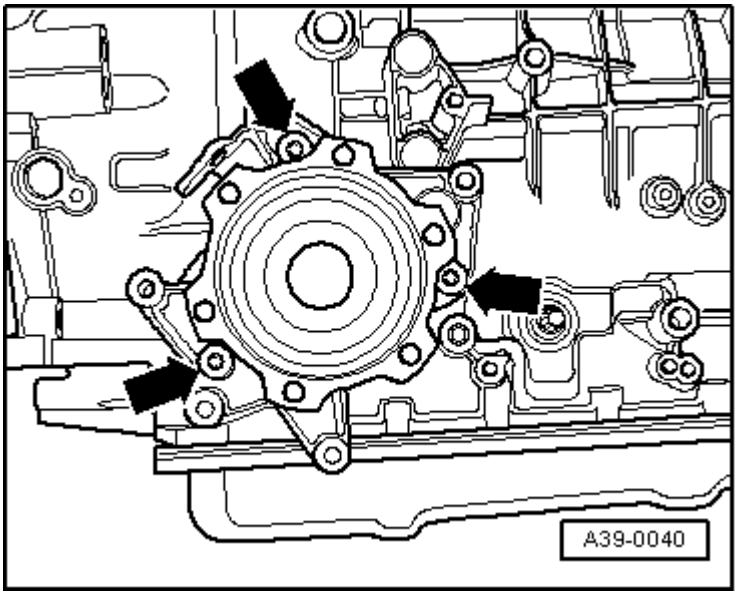


Fig. 225: Removing/Installing Left Drive Flange Mounting Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove drive flange mounting bracket (arrows).
- Pull out drive flange.

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NOTE:

- **The left drive flange can be pulled out between body and subframe with the transmission installed if the mounting bracket for drive flange is turned approx. 60 ° to the right against the installation position.**

Removing seal

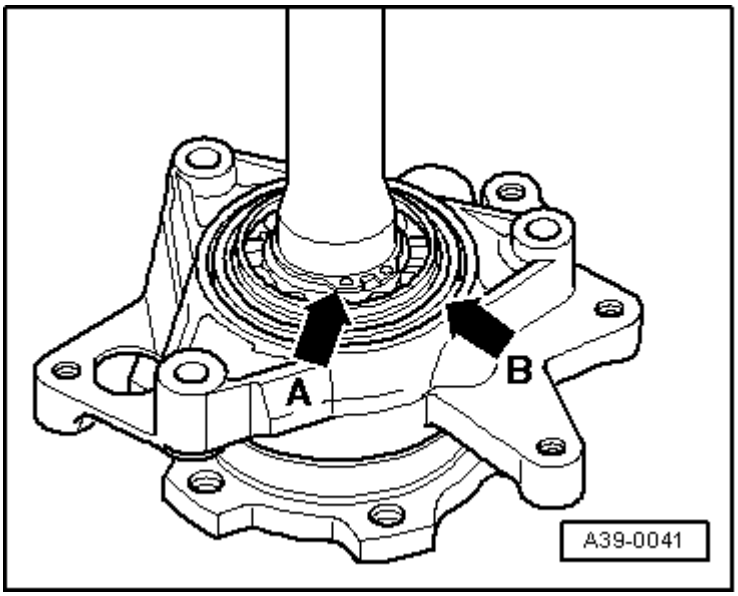


Fig. 226: Removing/Installing Circlip And Seal At Grooved Ball Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove circlip (arrow A) for grooved ball bearing.

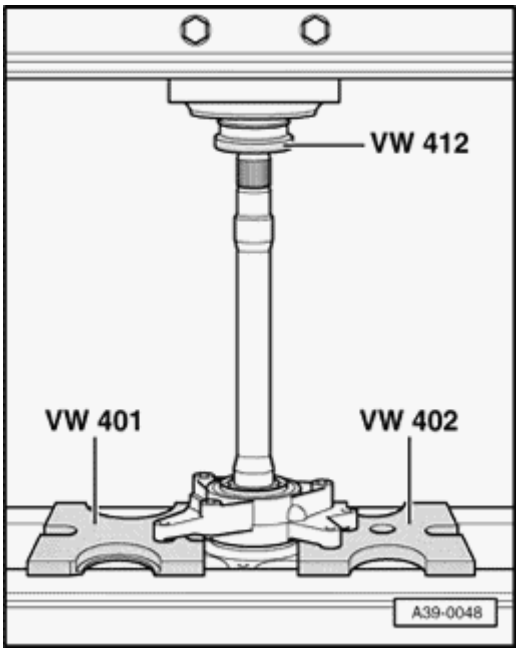


Fig. 227: Pressing Flange Shaft Out Of Flange Shaft Bearing Bracket

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press drive flange out of drive flange mounting bracket.
- Remove drive flange seal using extractor lever VW681.

Removing grooved ball bearing

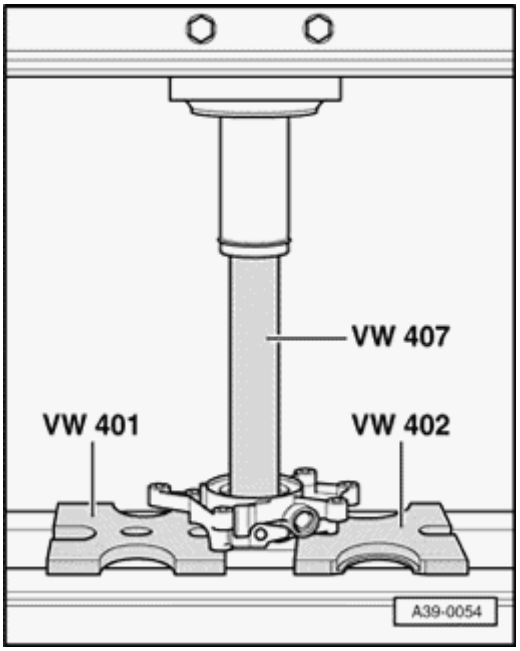


Fig. 228: Pressing Grooved Ball Bearing Out Of Bearing Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press grooved ball bearing out of mounting bracket.

Installing grooved ball bearing

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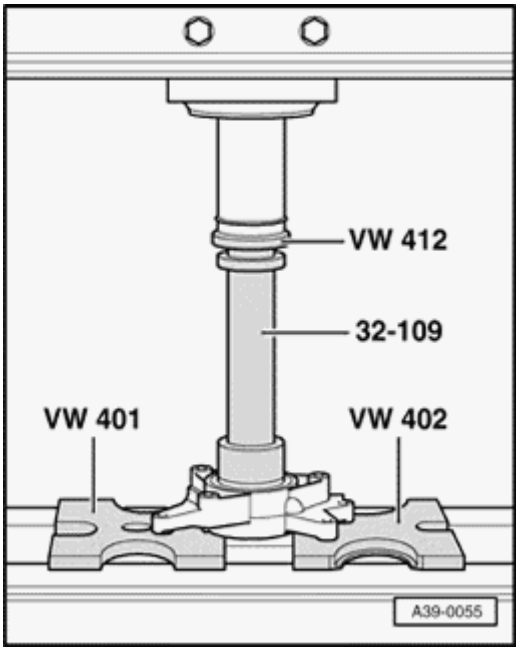


Fig. 229: Pressing New Grooved Ball Bearing Into Bearing Bracket
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press new grooved ball bearing into mounting bracket.

Installing sealing ring

- Coat outer edge and sealing lip of oil seal with gear oil.

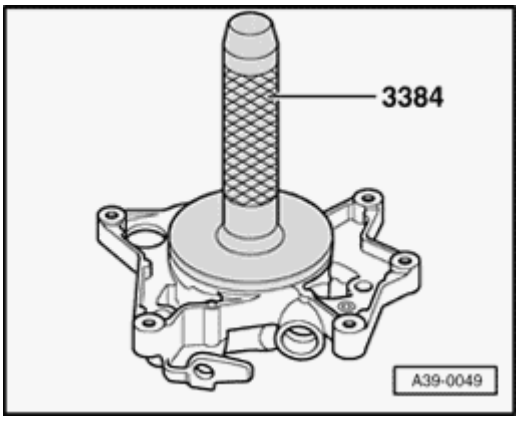


Fig. 230: Driving In New Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive in new sealing ring to stop, without canting.
- Installation position: The open side of the sealing ring faces the transmission.
- Fill area between sealing lip and dust lip halfway with sealing grease G 052 128 A1.

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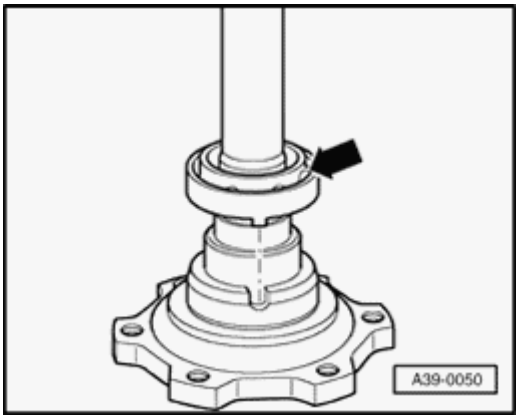


Fig. 231: Installation Position Of Speedometer Drive Gear On Flange Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Set drive gear for Speedometer Vehicle Speed Sensor (VSS) G22 on drive flange (arrow).
- Installation position: The carriers at drive wheel must engage in grooves of drive flange

NOTE:

- **If necessary, coat contact surface with grease to affix drive wheel in installation position.**

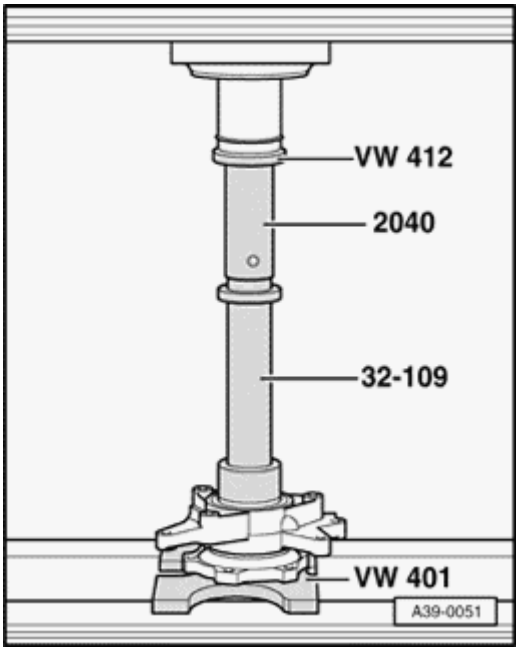


Fig. 232: Pressing Bearing Bracket With Grooved Ball Bearing Onto Flange Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press mounting bracket with grooved ball bearing onto drive flange.

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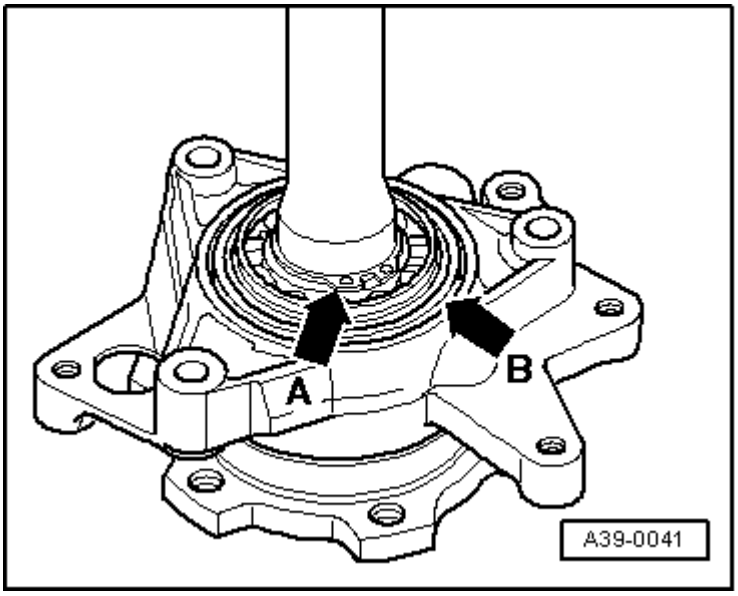


Fig. 233: Removing/Installing Circlip And Seal At Grooved Ball Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert circlip (arrow - **A** -).

Installing left drive flange

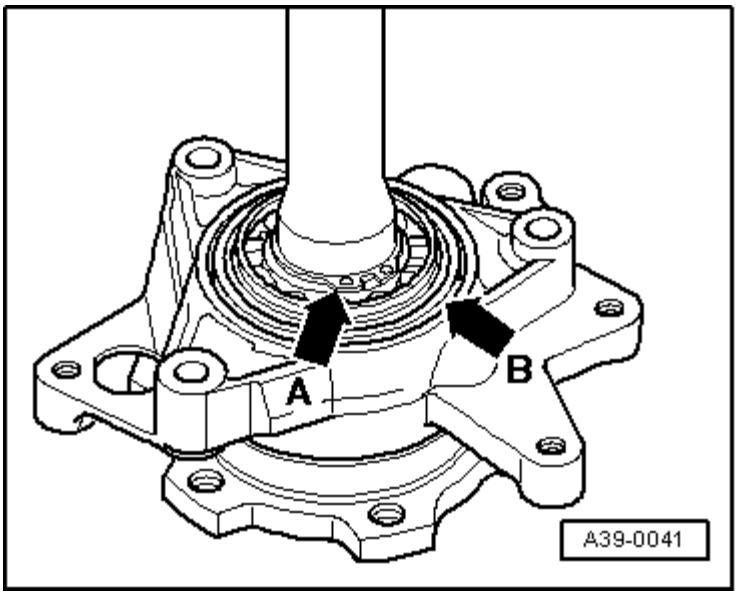


Fig. 234: Removing/Installing Circlip And Seal At Grooved Ball Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace sealing ring (arrow B) in mounting bracket for drive flange.

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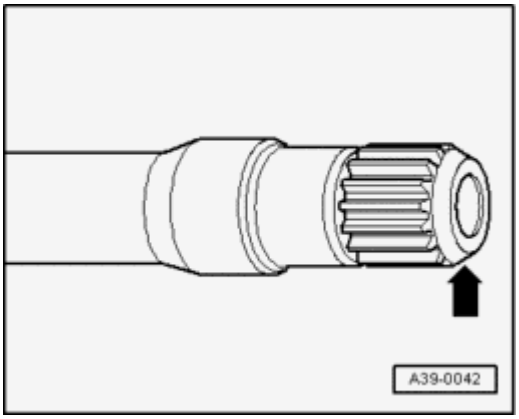


Fig. 235: Checking That There Are No Sharp Edges On Transmission End Of Flange Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check drive flange for sharp edges on transmission side of flange end (arrow) and if necessary, deburr.
- Insert left drive flange into transmission.

NOTE:

- **When sliding in, left drive flange must be carefully guided by hand to prevent damage to the double sealing ring in transmission.**

- Secure mounting bracket for drive flange.
- Bolt on harness connector bracket to mounting bracket for drive flange.
- Install speedometer Vehicle Speed Sensor (VSS) G22 --> **Speedometer Vehicle Speed Sensor (VSS) G22 , removing and installing**.

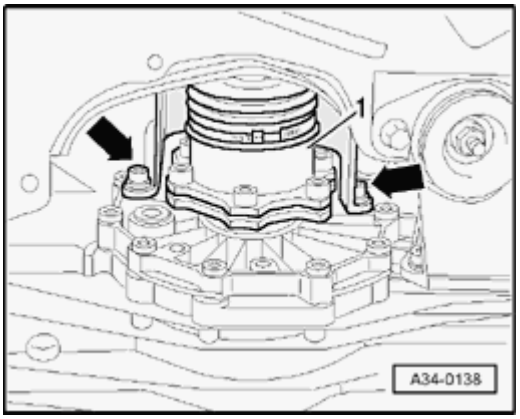


Fig. 236: Axle Shaft Shielding Plate
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install left drive axle - **1** -. --> **40 - FRONT SUSPENSION**
- Install heat shield for left drive axle (arrows).

Third bolt is not visible in the illustration.

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- Install left front wheel. --> **44 - WHEELS, TIRES, VEHICLE ALIGNMENT**
- Check oil level in front final drive --> **Gear oil in front final drive, checking**.

Tightening torques

Component	Nm
Mounting bracket for left drive flange at transmission	23
Heat shield for driveshaft to transmission	23

O-ring at cover for final drive, replacing

Special tools, testers and auxiliary items required

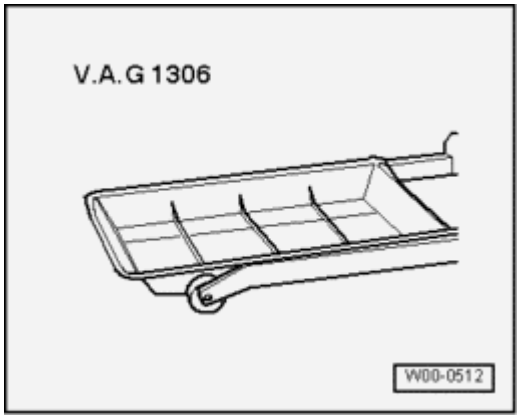


Fig. 237: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

Additional information

- **SUSPENSION, WHEELS, STEERING**
-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

Removing

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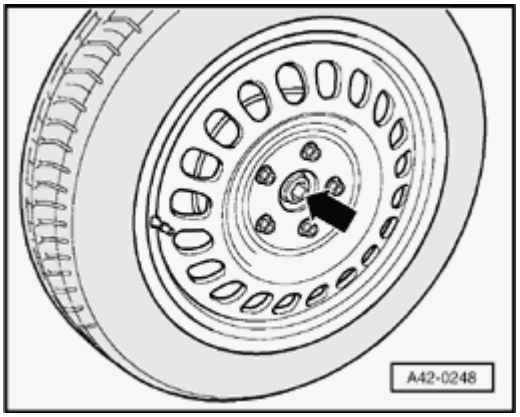


Fig. 238: Wheel Hex Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen bolt drive axle/wheel hub while the vehicle is still standing on its wheels. --> **40 - FRONT SUSPENSION**
- Remove right wheel.
- Remove heat shield for right drive axle.
- Remove right drive axle: --> **40 - FRONT SUSPENSION**
- Remove right front exhaust pipe. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Remove right transmission support --> **Right and left transmission mounts, removing and installing**.

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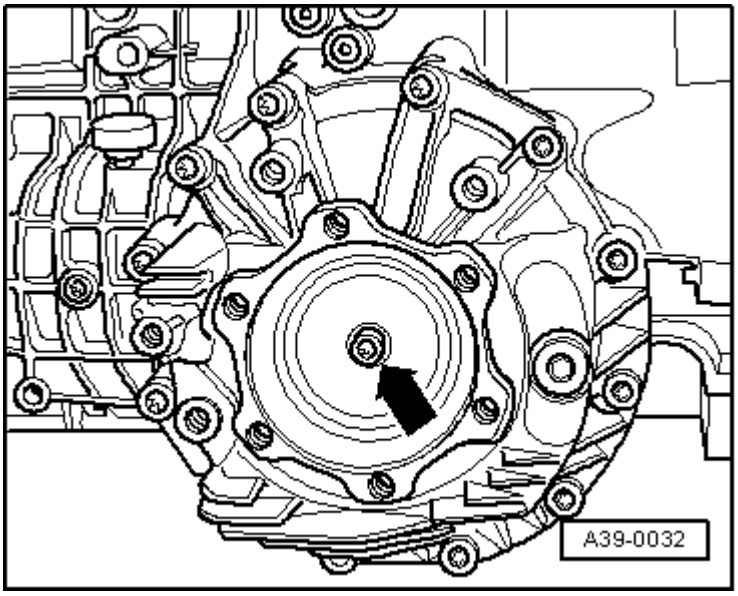


Fig. 239: Flange Shaft Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt for flange shaft (arrow) while securing against turning using a drift.
- Place drip tray VAG1306 underneath.
- Remove right drive flange.

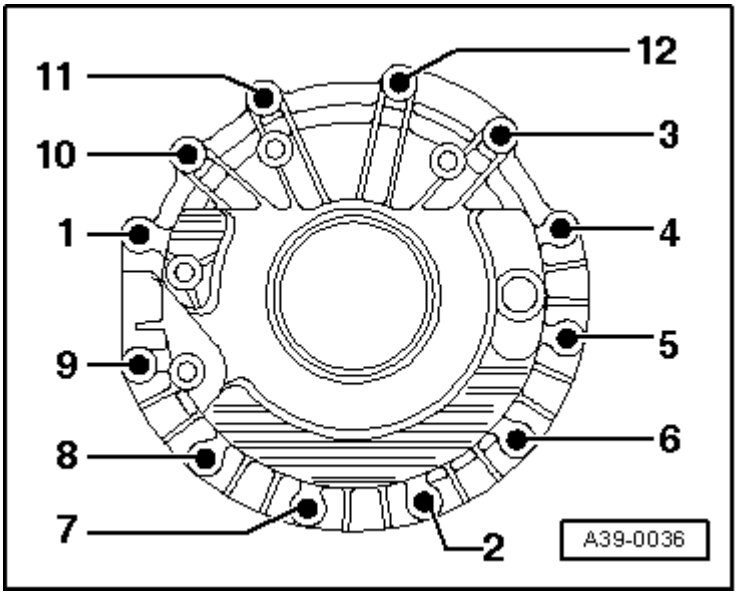


Fig. 240: Installing Cover For Front Final Drive, Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts for final drive cover opposite of shown tightening sequence and remove cover.

Installing

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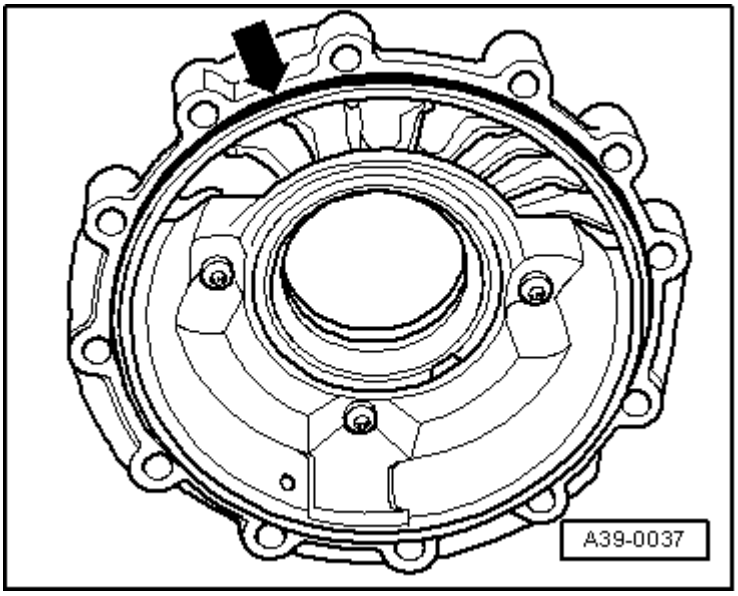


Fig. 241: Identifying Cover For Front Final Drive And O-Ring
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Replace sealing ring (arrow).

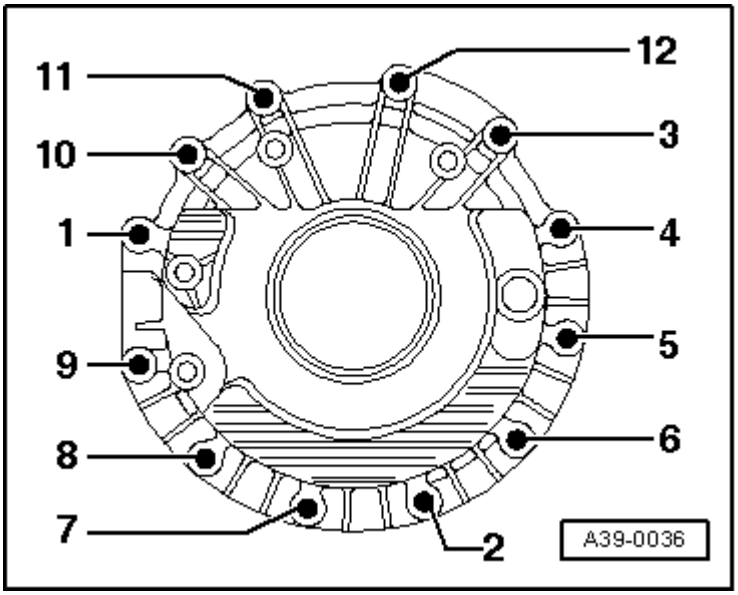


Fig. 242: Installing Cover For Front Final Drive, Tightening Sequence
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install cover for final drive.

Tightening sequence:

- 1. Stage: Tighten bolts - **1** - to - **3** - by hand
- 2. Stage: Tighten bolts - **1** - to - **12** - in specified sequence to tightening torque

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- Install right drive flange.
- Install transmission support --> **Right and left transmission mounts, removing and installing**.
- Install right front exhaust pipe. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Install drive axle. --> **40 - FRONT SUSPENSION**
- Top-up and check gear oil in front final drive --> **Gear oil in front final drive, checking**.

Tightening torques

Component	Nm
Cover for front final drive to transmission housing	23
Drive flange to transmission	23
Heat shield for driveshaft to transmission	23

Final drive sealing ring/transmission housing, replacing

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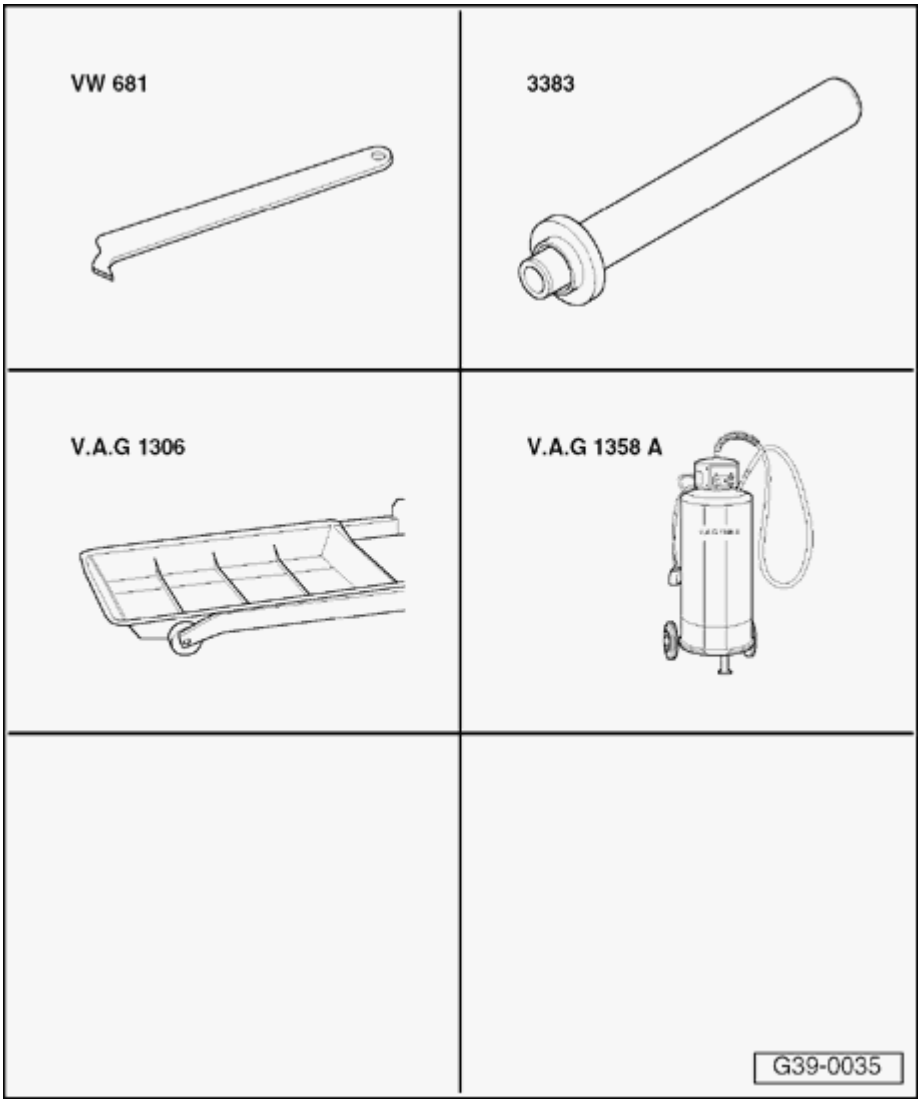


Fig. 243: Identifying Special Tools - Final Drive Sealing Ring/Transmission Housing, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Extractor lever VW681
- Double sealing ring installer 3383
- Drip tray VAG1306
- Oil siphoning unit VAG1358A

NOTE:

- **A faulty sealing ring lets ATF or gear oil escape into the converter housing via the center vent of the shaft seal (between the two sealing lips).**
- **In addition, a faulty sealing ring can let ATF escape into the center differential. It over-fills and oil escapes at the differential vent.**

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Removing

- Remove cover for front final drive --> **O-ring at cover for final drive, replacing**.
- Pull out differential and remove.

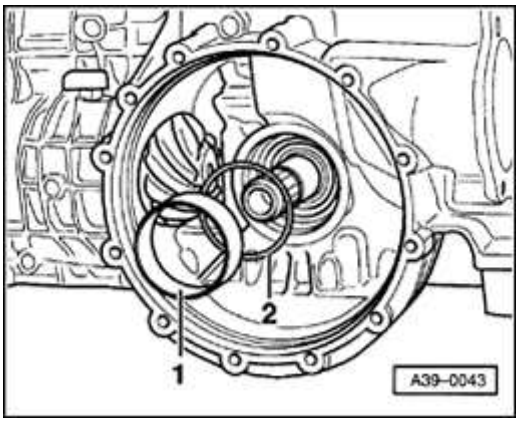


Fig. 244: Identifying Tapered Roller Bearing Outer Race For Differential And Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove tapered roller bearing outer race of differential - **1** - and shim - **2** - which is behind it from transmission housing by hand.

NOTE:

- **Shim is pre-determined and must not be exchanged for a shim with another thickness.**

- Remove left drive flange --> **Sealing ring and grooved ball bearing for left drive flange, replacing**.

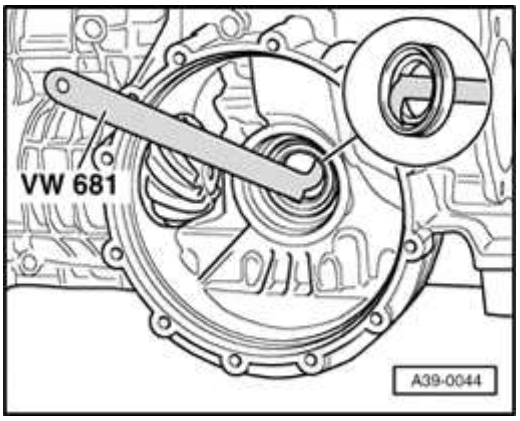


Fig. 245: Pulling Out Oil Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull out seal.

NOTE:

- **Extractor lever must be positioned behind both sealing lips of the sealing**

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ring. Do not position at outer circumference of sealing ring, otherwise the contact surface in transmission housing will be damaged. When levering out, carefully guide extractor lever.

Installing

- Check seal seat in transmission housing for damage; rework if necessary.
- Coat outer circumference and sealing lip of sealing ring with ATF.

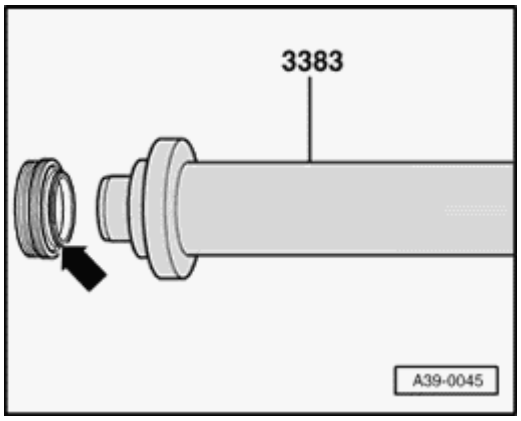


Fig. 246: Placing Seal Onto Press Piece 3383 With Protruding Sealing Lip On Seal Facing Toward Tool
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide seal onto double sealing ring installer 3383 so that the projecting sealing lip (arrow) of sealing ring faces tool.

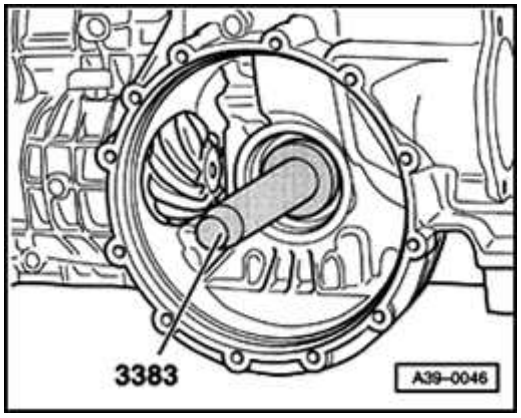


Fig. 247: Driving In New Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive in new sealing ring to stop.
- Install left drive flange --> **Sealing ring and grooved ball bearing for left drive flange, replacing**.

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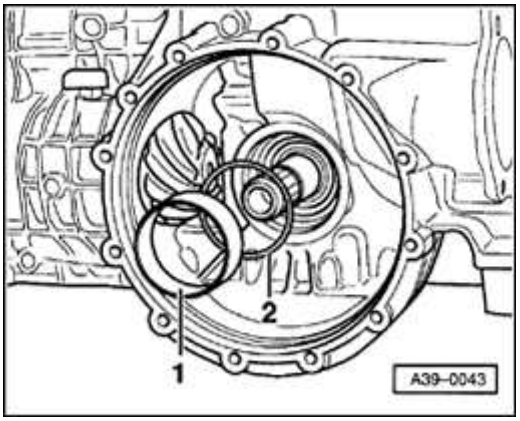


Fig. 248: Identifying Tapered Roller Bearing Outer Race For Differential And Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert adjustment shim - **2** - and tapered roller bearing outer race for differential - **1** - into transmission housing up to stop by hand.
- Insert differential into transmission housing.
- Install cover for front final drive.
- Install right drive flange.

- Install transmission support --> **Right and left transmission mounts, removing and installing**.
- Install right front exhaust pipe. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Install drive axle. --> **40 - FRONT SUSPENSION**
- Top-up and check gear oil in front final drive --> **Gear oil in front final drive, checking**.

Tightening torques

Component	Nm
Cover for front final drive to transmission housing	23
Mounting bracket for left drive flange at transmission	23

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Drive flange to transmission	23
Heat shield for driveshaft to transmission	23

Seal for front final drive, replacing

Special tools, testers and auxiliary items required

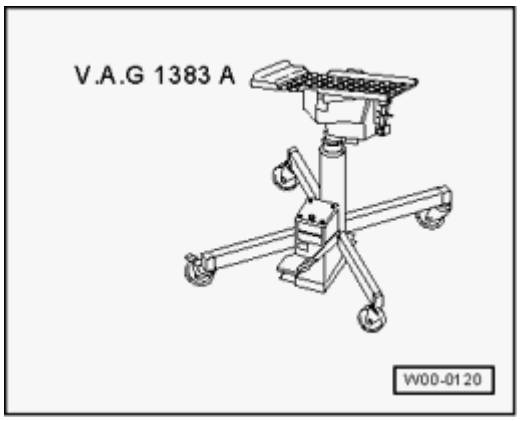


Fig. 249: Identifying Engine/Transmission Jack V.A.G. 1383 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission jack VAG1383 with plate VAG1359/2

Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

Removing

- Remove front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH

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- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

- Remove heat shield for selector lever cable, if installed.
- Remove center differential --> **Center differential, removing and installing**.

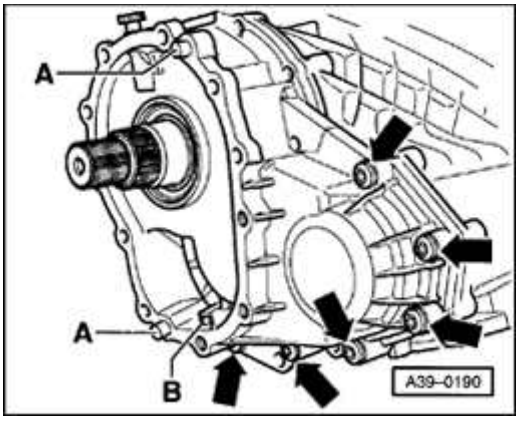


Fig. 250: Seal In Front Final Drive Intermediate Flange, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts (arrows) at intermediate flange for front final drive.

CAUTION:

- **Slowly and carefully remove cover for front final drive/intermediate flange from transmission housing. The spur gears can otherwise fall out of the transmission.**
- **Do not reinstall spur gears that have fallen to the ground. The transmission must be swapped in this case.**

- Lift off cover i.e. intermediate flange for front final drive.

NOTE:

- **Do not remove spur gears for front final drive. Secure spur gears so they do not fall out.**
- **If the spur gears for front final drive were removed, the wheel marking must face outward (away from transmission) for re installation.**

Installing

Installation is reverse of removal, noting the following:

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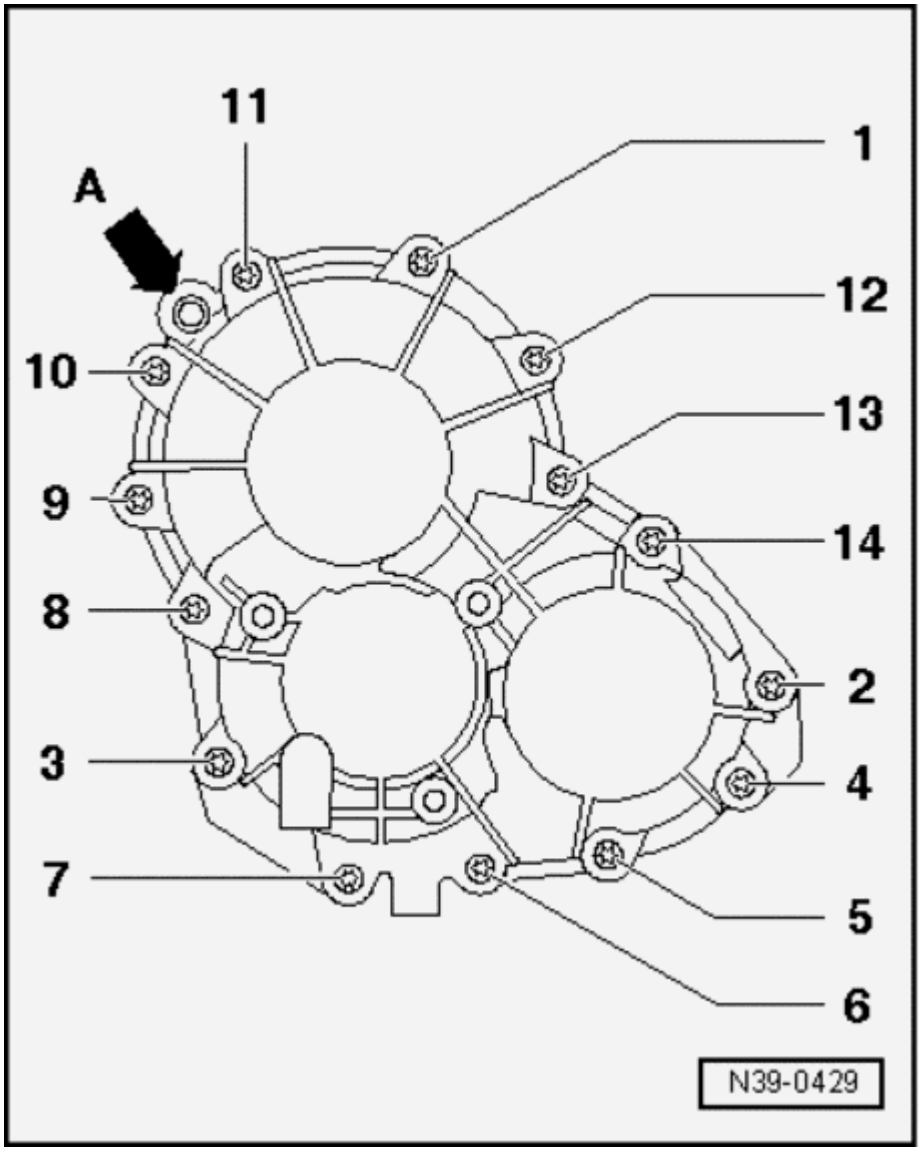


Fig. 251: Identifying Alignment Sleeve And Front Final Drive Cover Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Make sure centering sleeve - **A** - is correctly seated before installing.
- Install gasket
- Set on cover i.e. intermediate flange for front final drive.

NOTE:

- **If installing the intermediate flange to the output shaft carelessly, the sealing lips of the sealing ring can be damaged.**

Tightening sequence:

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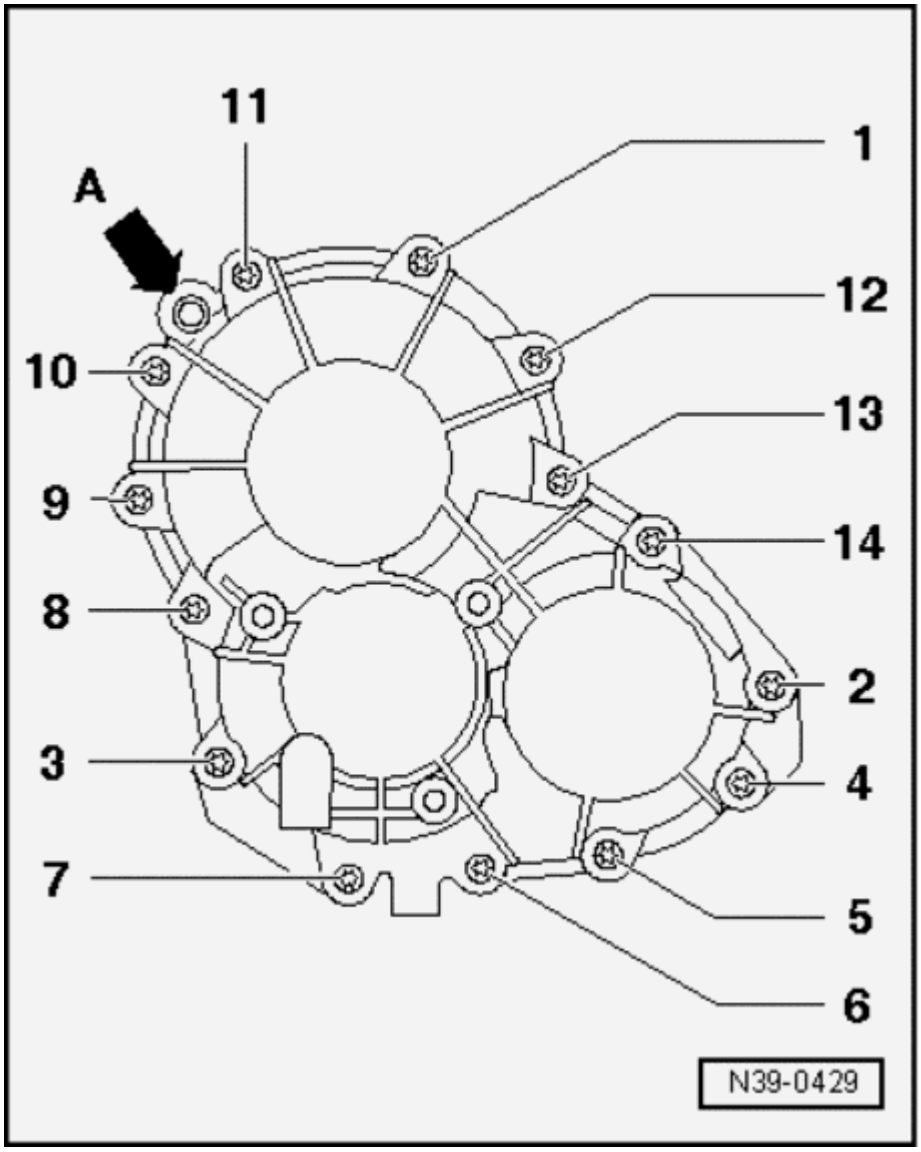


Fig. 252: Identifying Alignment Sleeve And Front Final Drive Cover Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 1. Stage: Tighten bolts - **1** - to - **3** - by hand

NOTE:

- **When tightening bolts by hand, make sure the housing gap between cover and transmission housing decreases evenly around circumference.**
- **2. Stage: Tighten bolts - 1 - to - 14 - in specified sequence to tightening torque**

- Check ATF level and top off --> **ATF level, checking** onward.
- Install center differential.

Tightening torques

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Component	Nm
Cover for front final drive to transmission housing	23
Intermediate flange for front final drive to transmission housing	23
Center differential to transmission housing	23

GEAR OIL IN CENTER DIFFERENTIAL, CHECKING AND TOPPING OFF

Gear oil in center differential, checking and topping off

Special tools, testers and auxiliary items required

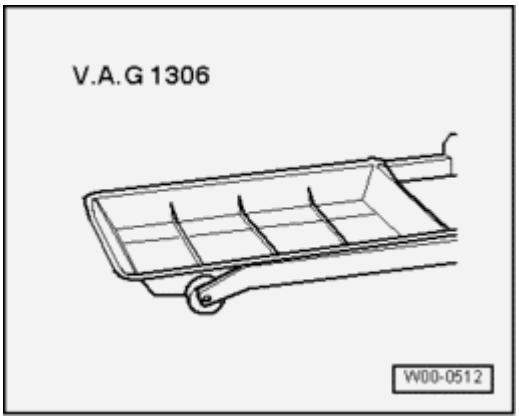


Fig. 253: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

Procedure

- Drive vehicle onto a 4-column lift or over a work pit.

NOTE:

- **The vehicle must be on a level surface.**

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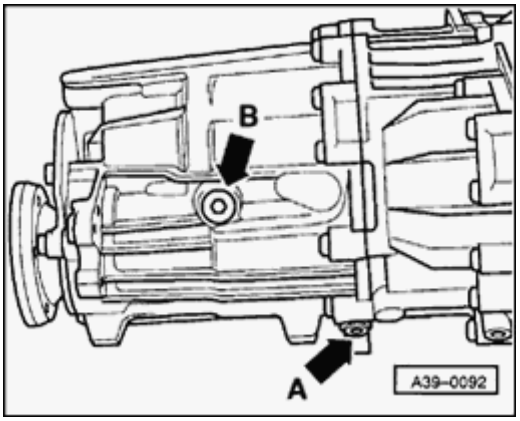


Fig. 254: Location Of Locking Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If necessary, loosen or remove relevant parts of the exhaust system to gain access to oil filler plug (arrow B). -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Place drip tray VAG1306 underneath.
- Remove oil filler plug (arrow B).

Oil level is correct when the final drive is filled up to lower edge of oil filler hole.

- Let excessive gear oil drain or top up gear oil --> **Gear oil in center differential, changing or topping up after repair**.
- Always replace oil filler plug.
- Thread in new oil filler plug and tighten to 35 Nm.
- Secure or reinstall exhaust system free of stress. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE

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MECHANICAL, ENGINE CODE(S): AVK, BGN

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

GEAR OIL IN CENTER DIFFERENTIAL, CHANGING OR TOPPING UP AFTER REPAIR

Gear oil in center differential, changing or topping up after repair

Special tools, testers and auxiliary items required

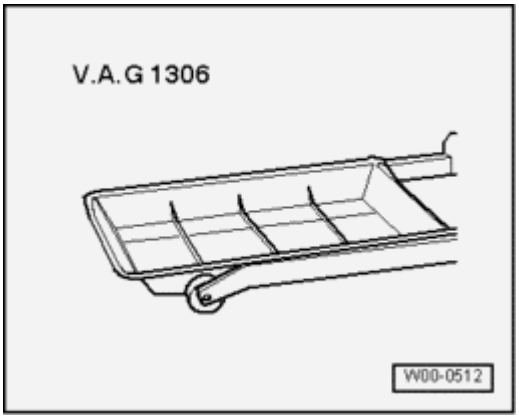


Fig. 255: Identifying Drip Tray V.A.G 1306
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drip tray VAG1306

Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

Procedure

- Drive vehicle onto a 4-column lift or over a work pit.

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NOTE:

- **The vehicle must be on a level surface.**

Drain gear oil

- Place drip tray VAG1306 underneath.

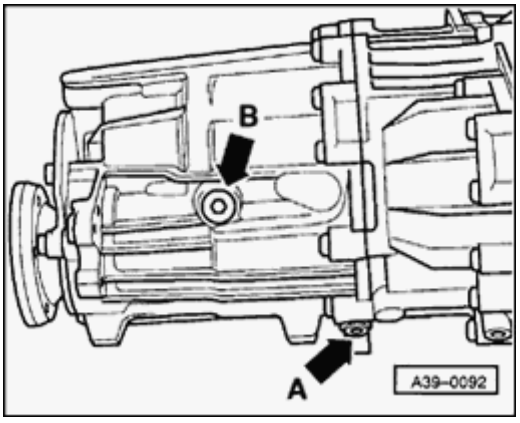


Fig. 256: Location Of Locking Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Removing drain plug (arrow A) and draining gear oil.
- Always replace drain plug.
- Thread in new drain plug (arrow A) again and tighten to 20 Nm.

Filling up gear oil

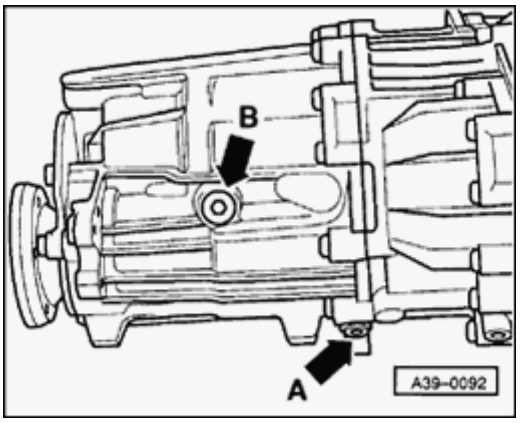


Fig. 257: Location Of Locking Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If necessary, loosen or remove relevant parts of the exhaust system to gain access to oil filler plug (arrow B). -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB

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- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
- **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

NOTE:

- **There is a distinction made between two cases:**
- **A - Center differential was not removed.**
- **B - Center differential was removed**

A - Center differential was not removed (e.g. after removing and installing drive flange/drive shaft)

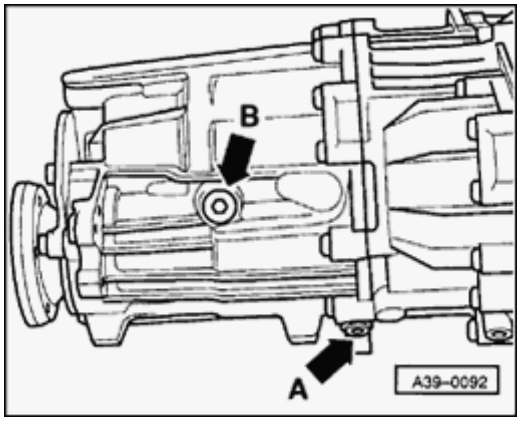


Fig. 258: Location Of Locking Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove oil filler plug (arrow B).
- Top up transmission fluid to lower edge of oil filler hole. Specification and capacity **Center differential**.
- Thread in old oil filler plug and tighten to 35 Nm.

NOTE:

- **If it was necessary to loosen or remove the exhaust system, this must be re-secured or reinstalled for the road test. It must be removed and installed again for the final oil level check.**

- Road test vehicle (15 minutes pure driving).

NOTE:

- **During road test, gear oil enters output cover and Torsen differential; oil**

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level in center differential housing will drop.

- Fill transfer housing with gear oil and check oil level --> **Gear oil in center differential, checking and topping off**.

B - Center differential was removed and disassembled

- Add 200 ml. gear oil to output cover.
- Center differential, assembling and installing.

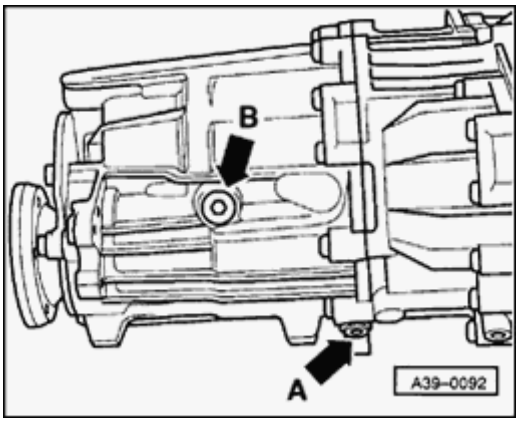


Fig. 259: Location Of Locking Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove oil filler plug (arrow B).
- Add 600 ml. gear oil to center differential housing.
- Always replace oil filler plug.
- Thread in new oil filler plug and tighten to 35 Nm.

NOTE:

- **Oil level does not need to be re-checked.**

All:

- Secure or re-install exhaust system free of stress. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE

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MECHANICAL, ENGINE CODE(S): BNS

- **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

CENTER DIFFERENTIAL, SERVICING

Center differential, servicing

Transmission installed

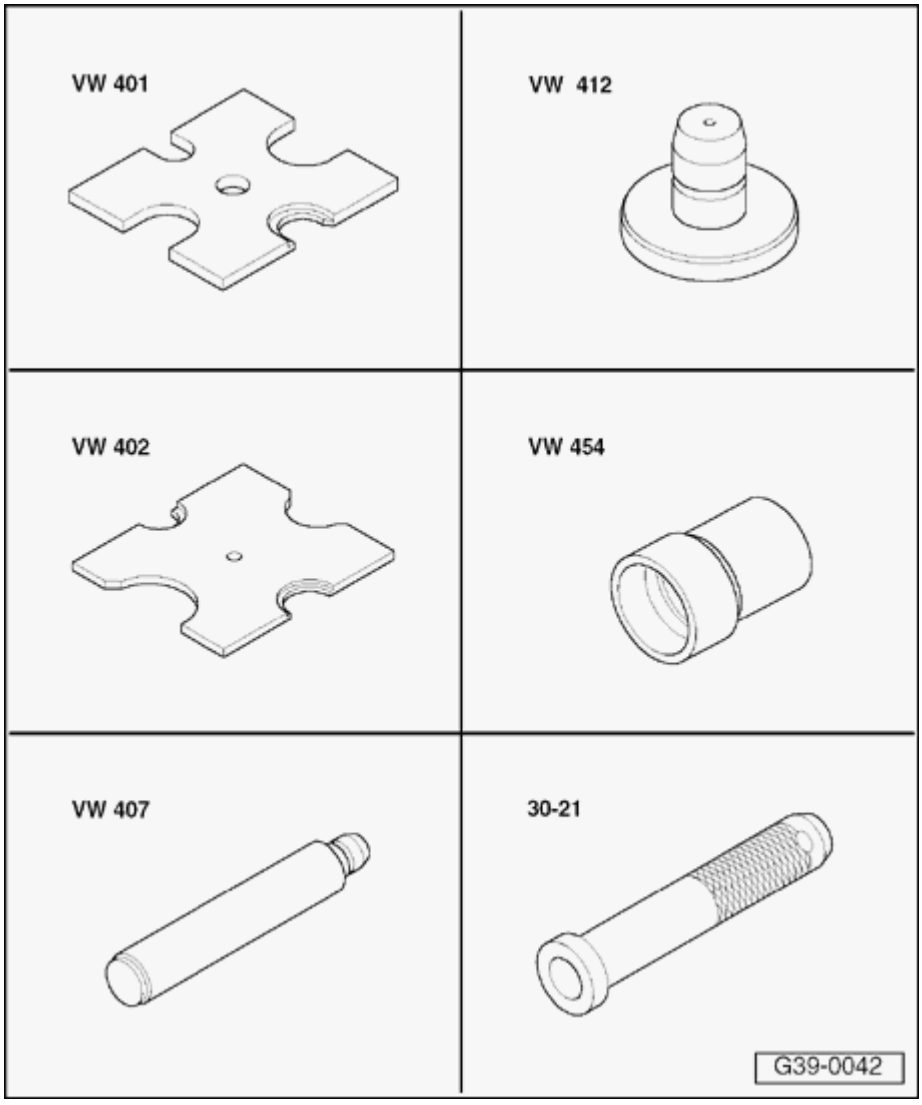


Fig. 260: Identifying Special Tools - Center Differential, Servicing (1 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Thrust plate VW401

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- Punch VW412
- Thrust plate VW402
- Thrust tube VW454

- Punch VW407
- Sleeve 3021

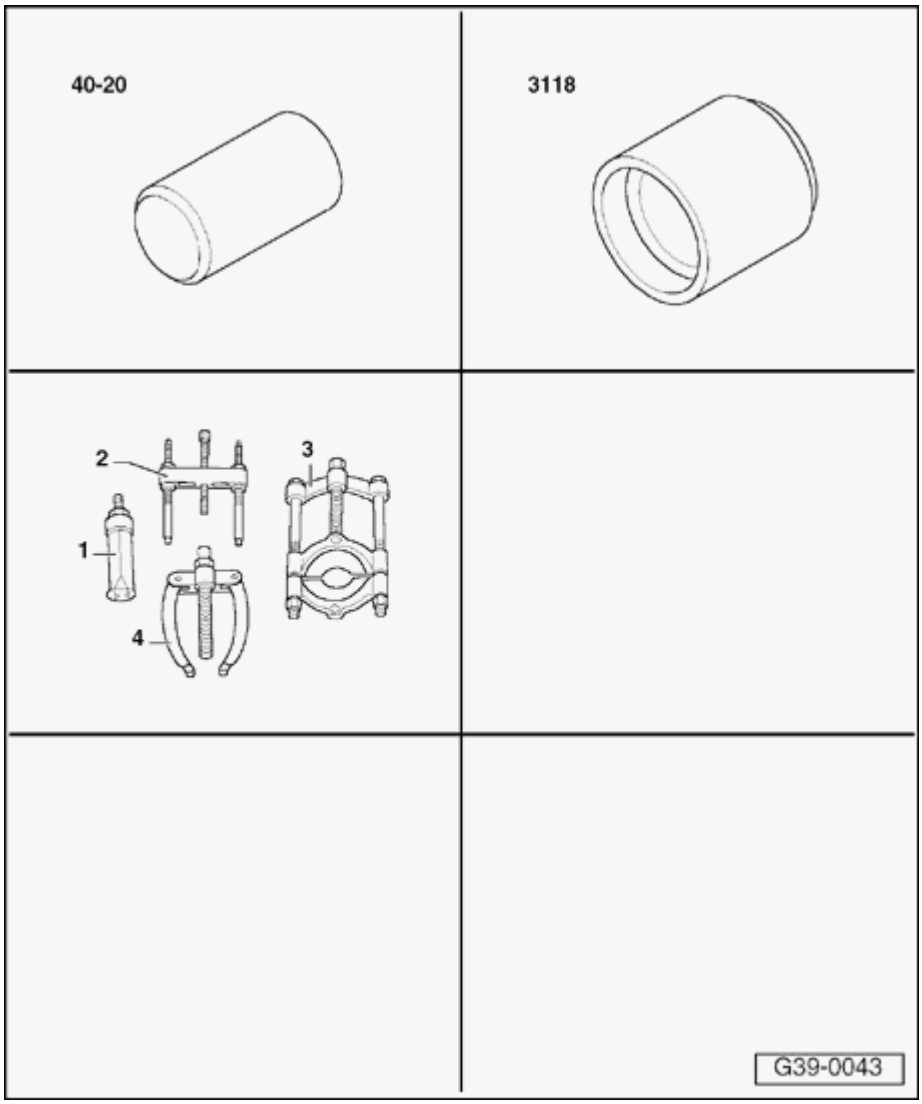


Fig. 261: Identifying Special Tools - Center Differential, Servicing (2 Of 2)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Sleeve 40-20
- Press support 3118
- Item 3 Kukko 17/2 separating tool

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CAUTION: Do not run engine with the center differential removed or without gear oil and do not tow vehicle.

NOTE:

- **Rules of cleanliness for working on automatic transmissions --> Rules of cleanliness for working on automatic transmissions.**
- **General repair notes --> Servicing notes.**

The parts listed in the following illustration can be removed with the transmission installed.

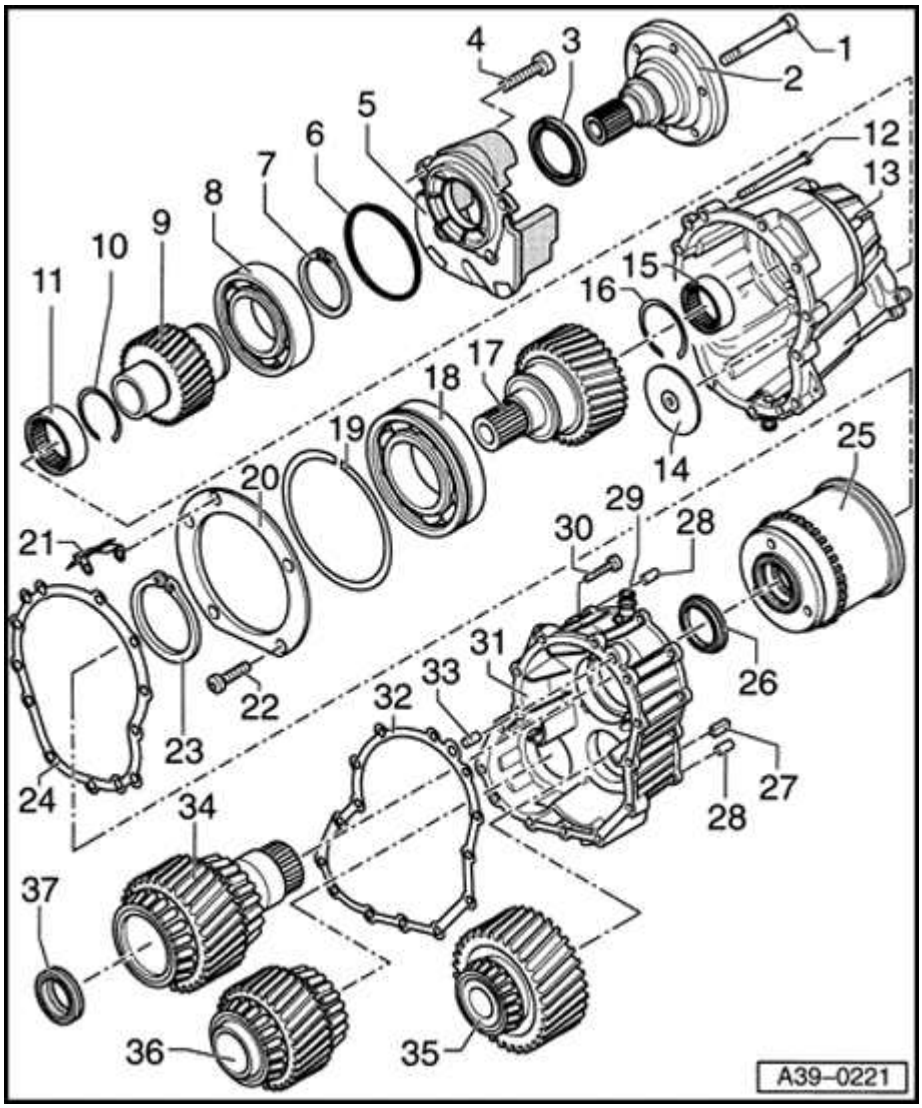


Fig. 262: Center Differential Remove/Install Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Socket head bolt- 25 Nm

2 - Output flange/driveshaft

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3 - Seal

- Always replace --> **O-ring for output flange/driveshaft, replacing**

4 - Bolt - 23 Nm

- 4x

5 - Housing cover

- With dampener

6 - O-ring

- Coat with transmission fluid

7 - Snap ring

8 - Grooved ball bearing

- Pressing off **Press off grooved ball bearing for spur gear 1**
- Pressing on **Press on grooved ball bearing for spur gear 1**

9 - Spur gear 1

- For rear gear set

10 - Snap ring

11 - Needle bearing

- Only remove for replacement
- To replace, heat up transfer gear housing to approx. 100 ° C and drive out needle bearing toward rear using drift (Warning! Wear protective gloves)
- Drive in to stop using 30-21 sleeve

12 - Bolt - 23 Nm

- Loosen or tighten in stages and in diagonal sequence

13 - Center differential housing

14 - Tension nut

15 - Needle bearing

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- Only remove for replacement
- Always replace --> **Needle bearing for spur gear 2, replacing**

16 - Snap ring

17 - Spur gear 2

- For rear gear set

18 - Grooved ball bearing

- Pressing off **Press off grooved ball bearing for spur gear 2**
- Pressing on **Press on grooved ball bearing for spur gear 2**

19 - Snap ring

20 - Washer

21 - Alignment plate

22 - Bolt - 10 Nm

23 - Snap ring

24 - Gasket

- Always replace --> **Center differential, removing and installing**

25 - Torsen differential

- If damaged replace as complete unit
- Removing and installing --> **Center differential, removing and installing**

26 - Seal

- Always replace --> **Sealing ring in intermediate flange for front final drive, replacing**

27 - Magnet

- Removing and installing --> **Center differential, removing and installing**

28 - Bushing

- 2x

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29 - Breather

- For transfer gear
- With cap installed
- Installation position: Without cover, breather must project 10 - 11 mm out of housing

30 - Bolt - 23 Nm

- Observe tightening sequence **Tightening sequence:**

31 - Intermediate flange for front final drive

32 - Gasket

- Always replace --> **Seal for front final drive, replacing**

33 - Bushing

34 - Drive pinion

- For front final drive
- Removing and installing --> **Sealing ring in drive pinion, replacing**

35 - Intermediate pinion

- For front final drive
- Installation position: gear identification faces toward transfer gear

36 - Output pinion

- For front final drive
- Installation position: gear identification faces toward transfer gear

37 - Seal

- Always replace --> **Sealing ring in drive pinion, replacing**

Press off grooved ball bearing for spur gear 1

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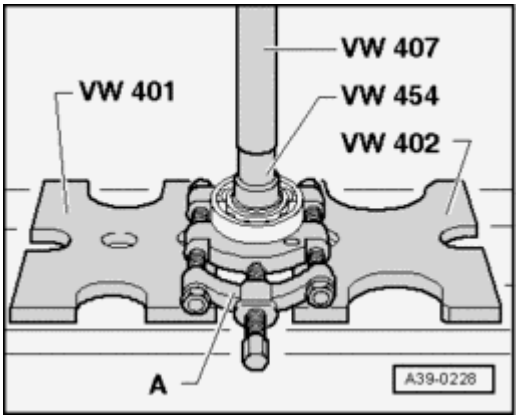


Fig. 263: Pressing Off Grooved Ball Bearing For Spur Gear 1
Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Separating device 22-115 mm, e.g. Kukko 17/2 separating tool

Press on grooved ball bearing for spur gear 1

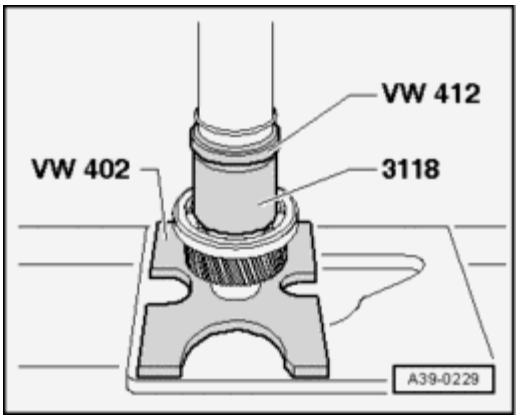
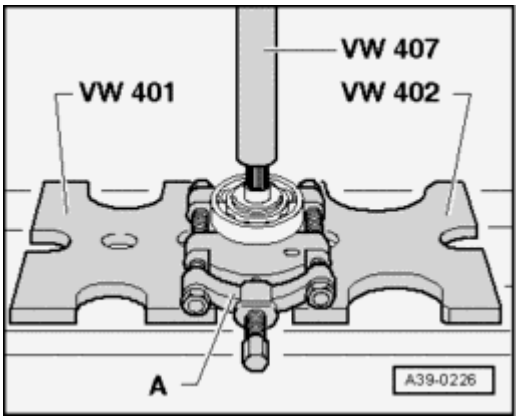


Fig. 264: Pressing On Grooved Ball Bearing For Spur Gear 1
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Press off grooved ball bearing for spur gear 2



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Fig. 265: Pressing Off Grooved Ball Bearing For Spur Gear 2
Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Separating device 22-115 mm, e.g. Kukko 17/2 separating tool

Press on grooved ball bearing for spur gear 2

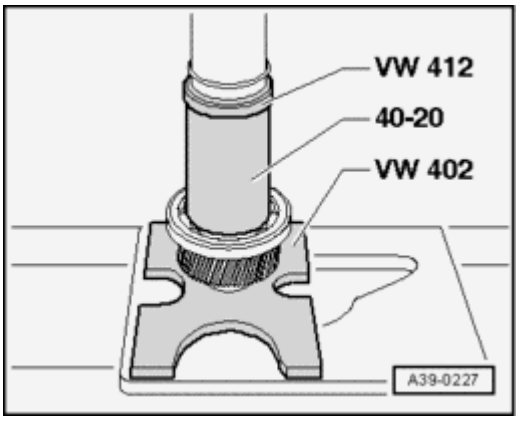


Fig. 266: Pressing On Grooved Ball Bearing For Spur Gear 2
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Center differential, removing and installing

(Transmission installed)

Special tools, testers and auxiliary items required

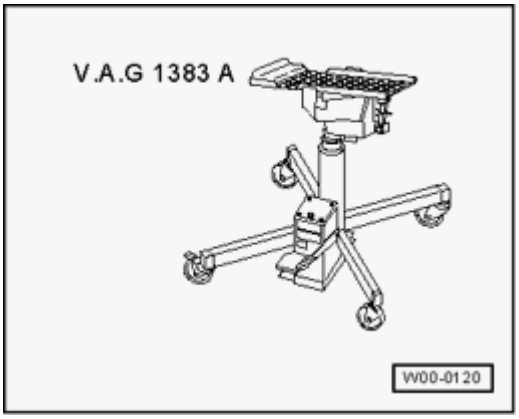


Fig. 267: Identifying Engine/Transmission Jack V.A.G. 1383 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission lifter VAG1383A with universal transmission holder VAG1359/2

Additional information

-

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- **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
- **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
- **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
- **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
- **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
- **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**

- **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
- **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

Removing

- Remove front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

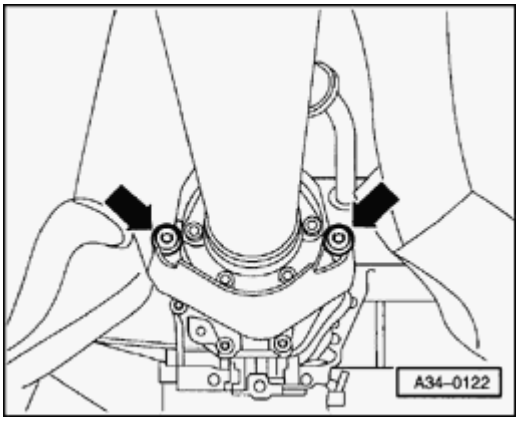


Fig. 268: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for driveshaft from cover for Torsen differential (arrows).

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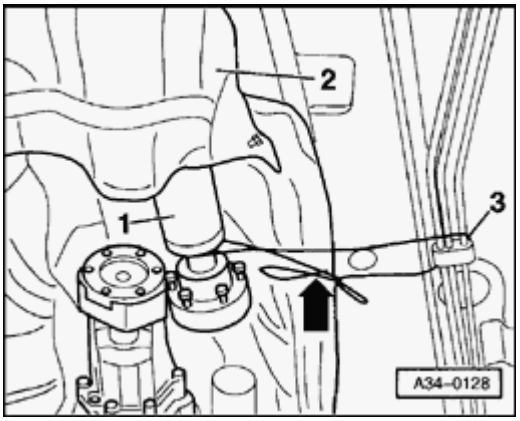


Fig. 269: Securing Driveshaft To Fuel Pipe Bracket With Wire
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt driveshaft - **1** - from transmission and let rest on heat shield - **2** - -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Secure driveshaft using wire (arrow) to bracket - **3** - of fuel lines or support driveshaft using engine/transmission hoist VAG1383A.
- Drain center differential gear oil --> **Gear oil in center differential, changing or topping up after repair**.

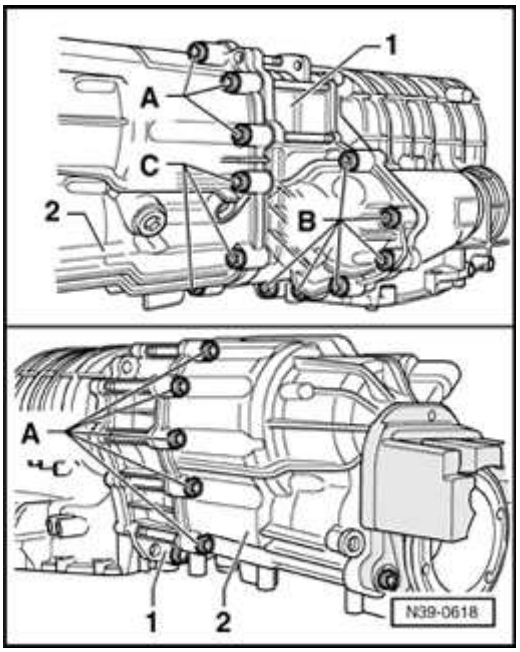


Fig. 270: Transfer Case, Removing And Installing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen mounting bolts - **A** - and - **C** - for transfer housing - **2** - in diagonal sequence and remove.
- Do not remove bolts - **B** -.

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CAUTION: Carefully pull center differential housing off of transmission toward rear. The Torsen differential could otherwise fall out of the transmission.

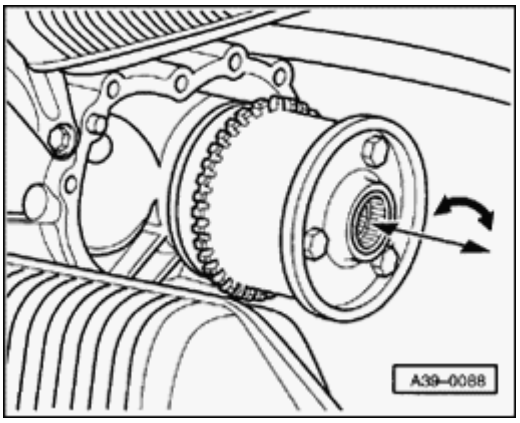


Fig. 271: Pulling Torsen Differential From Output Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull Torsen differential off output shaft toward rear.

Installing

Installation is reverse of removal, noting the following:

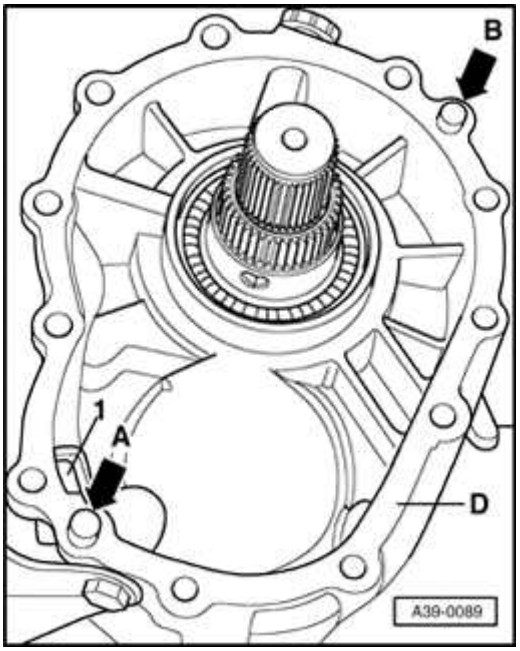


Fig. 272: Location Of Alignment Pins -A/B-, Magnet and Seal Surface
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check for presence of dowel sleeves (arrows - **A** - and - **B** -).

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- Install gasket

NOTE:

- **Lightly coat sealing surface -D- with gear oil to prevent the seal from slipping.**

- Slide cleaned magnets into cast holding pocket - **1** - in intermediate flange.
- Add 200 ml. gear oil to output housing (comparable to gear oil, topping up on removed and disassembled center differential).

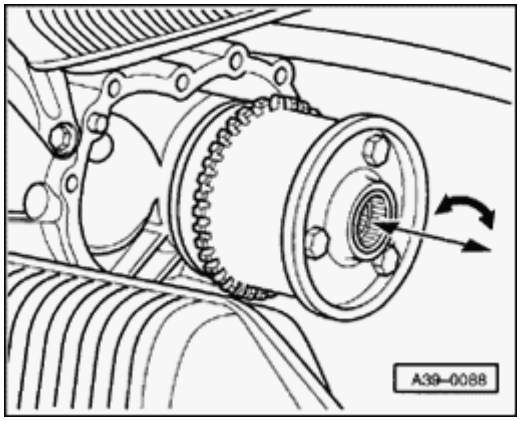


Fig. 273: Pulling Torsen Differential From Output Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install Torsen differential onto splines of output shaft and bottom spur gear while turning slowly.
- Check whether installed Torsen differential can be turned by hand.

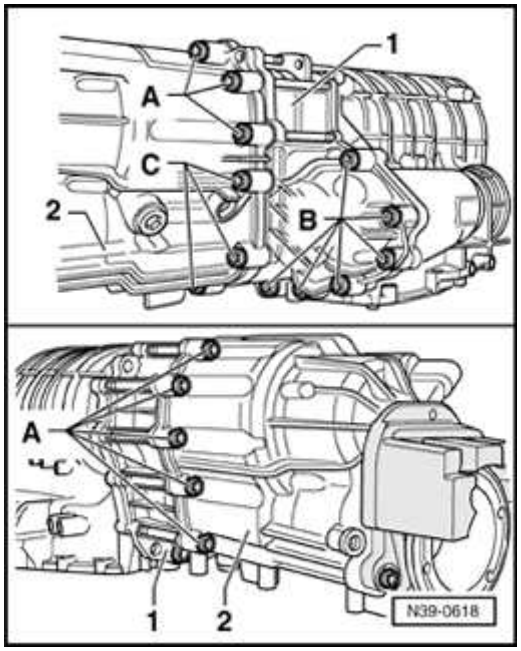


Fig. 274: Transfer Case, Removing And Installing

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install fully assembled transfer housing with installed spur gears and drive flange/drive shaft onto transmission flange.
- Insert bolts - **A** - and - **C** - for transfer housing - **2** - and tighten to final tightening torque in diagonal sequence in several stages.
- Bolt driveshaft to output flange/driveshaft -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Install front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Fill transfer housing with gear oil and check oil level --> **Gear oil in center differential, changing or topping up after repair**.

Tightening torques

Component	Nm
Center differential housing to transmission housing	23
Heat shield for driveshaft to transmission	23

O-ring for output flange/driveshaft, replacing

(Transmission installed)

Special tools, testers and auxiliary items required

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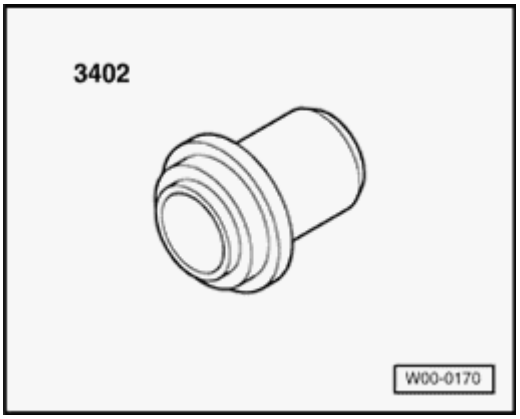


Fig. 275: Pressure Piece 3402
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pressure piece 3402

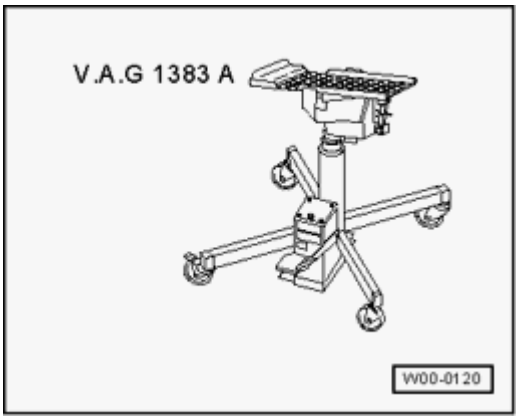


Fig. 276: Identifying Engine/Transmission Jack V.A.G. 1383 A
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engine/transmission lifter VAG1383A with Universal transmission holder VAG1359/2

Additional information

-
  - **1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB**
  - **2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT**
  - **3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN**
  - **3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH**
  - **4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS**
  - **4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF**
-
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

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Removing

- Remove front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF

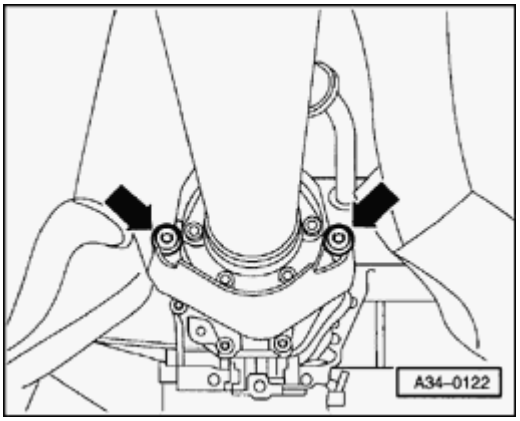


Fig. 277: Identifying Heat Shield Fasteners For Torsen Differential
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove heat shield for driveshaft from cover for Torsen differential (arrows).

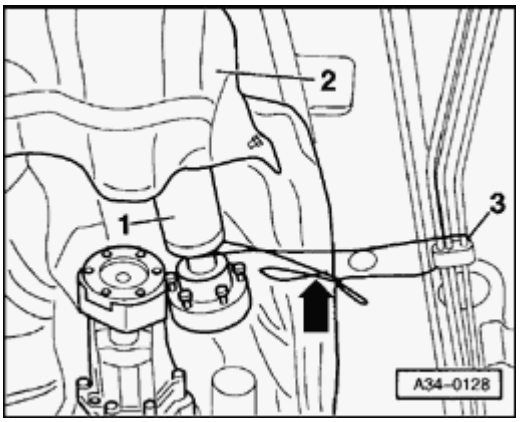


Fig. 278: Securing Driveshaft To Fuel Pipe Bracket With Wire

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Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt driveshaft - **1** - from transmission and let rest on heat shield - **2** - -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Secure driveshaft using wire (arrow) to bracket - **3** - of fuel lines or support driveshaft using engine/transmission hoist VAG1383A.
- Drain center differential gear oil --> **Gear oil in center differential, changing or topping up after repair**.

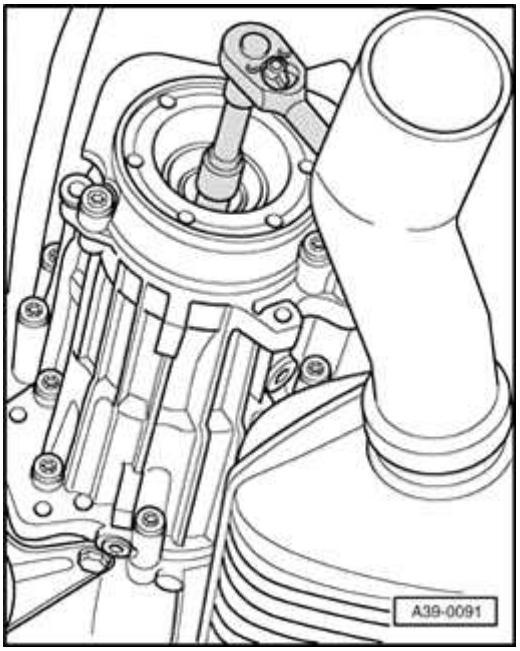


Fig. 279: Removing/Installing Flanged Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt output flange driveshaft while securing output flange/driveshaft against turning using a drift.
- Pull out output flange/driveshaft.

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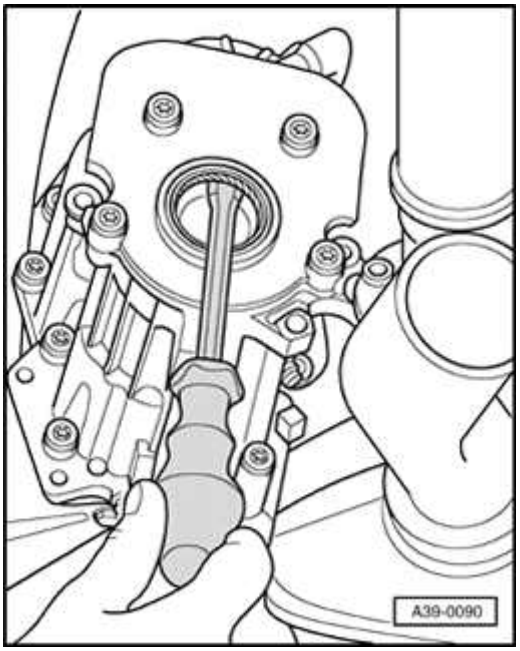


Fig. 280: Removing O-Ring Using Appropriate Screwdriver
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove O-ring using appropriate screwdriver.

Installing

Installation is reverse of removal, noting the following:

- Coat outer edge and sealing lip of oil seal with gear oil.

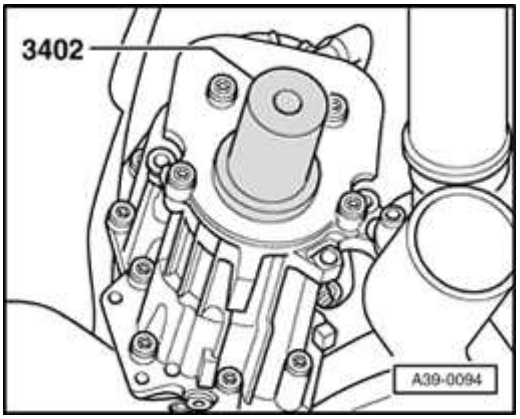


Fig. 281: Driving In Sealing Ring To Stop Using Pressure Piece 3402
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Drive O-ring in to stop using pressure piece 3402.
- Fill area between sealing lip and dust lip halfway with sealing grease G 052 128 A1.
- Secure output flange/driveshaft with socket-head bolt.

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- Bolt driveshaft to output flange/driveshaft -->
  - **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
  - **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR
- Install front exhaust system with catalytic converter. -->
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 1.8 LITER 4-CYL. 5V TURBO ENGINE MECHANICAL, ENGINE CODE(S): AMB
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 2.0 LITER 4-CYL. 4V TURBO ENGINE MECHANICAL, ENGINE CODE(S): BPG, BWT
  - **26 EXHAUST SYSTEM, EMISSION CONTROLS** for 3.0 LITER 6-CYL. 5V ENGINE MECHANICAL, ENGINE CODE(S): AVK, BGN
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 3.2 V6 4V ENGINE MECHANICAL, ENGINE CODE(S): BKH
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 4V ENGINE MECHANICAL, ENGINE CODE(S): BNS
  - **26 - EXHAUST SYSTEM, EMISSION CONTROLS** for 4.2 LITER V8 5V ENGINE MECHANICAL, ENGINE CODE(S): BHF
- Fill transfer housing with gear oil and check oil level --> **Gear oil in center differential, changing or topping up after repair**.

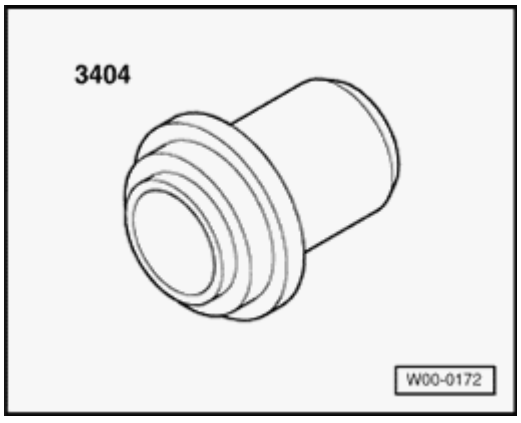
Tightening torques

Component	Nm
Socket-head bolt for output flange/driveshaft, rear	25
Heat shield for driveshaft to transmission	23

Sealing ring in intermediate flange for front final drive, replacing

(Transmission installed)

Special tools, testers and auxiliary items required



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Fig. 282: Thrust Piece 3404
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Thrust piece 3404

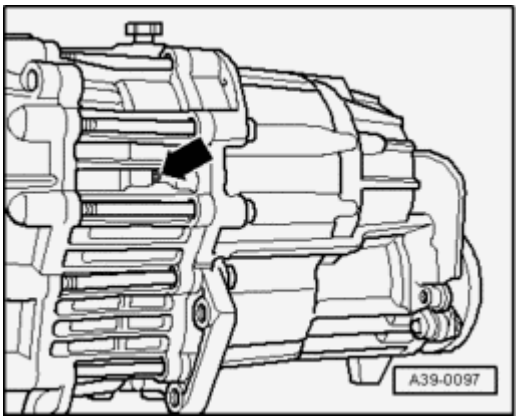


Fig. 283: Oil Leak Inspection Opening For Shaft Seal In Drive Pinion And Shaft Seal In Intermediate Flange
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **An inspection opening is provided on the left side of the intermediate flange to check for oil leaks (arrow) for the sealing ring in drive pinion and the sealing ring in intermediate flange.**
- **If oil escapes at this oil leak inspection opening, this double sealing ring must be replaced.**

Removing

- Remove center differential --> **Center differential, removing and installing**.
- Removing intermediate flange for front final drive --> **Seal for front final drive, replacing**.

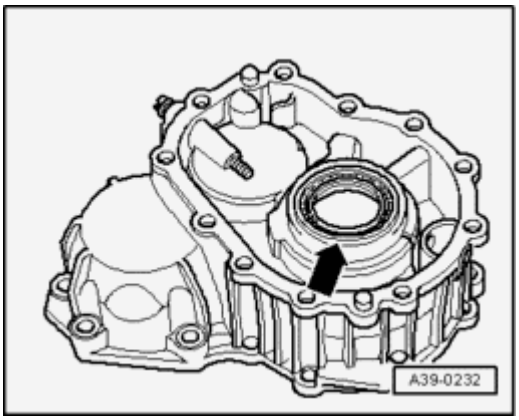


Fig. 284: Identifying Drive Shaft Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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- Drive out sealing ring (arrow) in direction of transfer gear using a mandrel.

Installing

Installation is reverse of removal, noting the following:

- Check seal seat in intermediate flange for damage; rework if necessary.
- Coat outer edge and sealing lip of oil seal with gear oil.

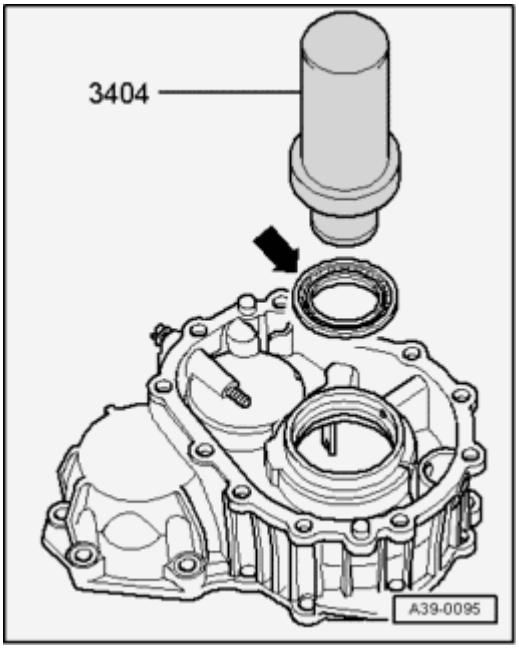


Fig. 285: Slide Shaft Seal Onto Thrust Piece 3404
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide sealing ring onto thrust piece 3404 so that the larger and projecting outer ring (arrow) of sealing ring faces tool.
- Drive in sealing ring up to thrust piece 3404 stop.

NOTE:

- **If installing the intermediate flange to the output shaft carelessly, the sealing lip of the sealing ring can be damaged.**

- Fill area between sealing lip and dust lip halfway with sealing grease G 052 128 A1.
- Installing intermediate flange for front final drive --> **Seal for front final drive, replacing**.
- Install center differential.

Sealing ring in drive pinion, replacing

(Transmission installed)

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Special tools, testers and auxiliary items required

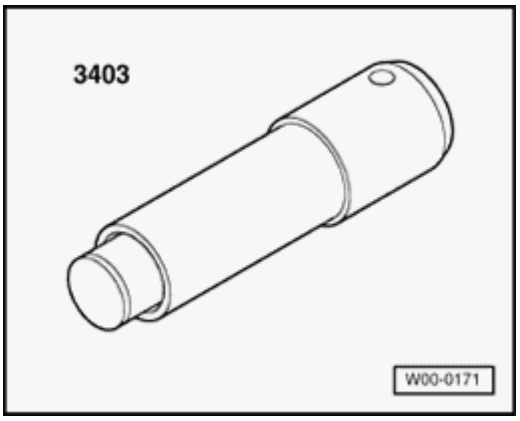


Fig. 286: Thrust Piece 3403
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Thrust piece 3403

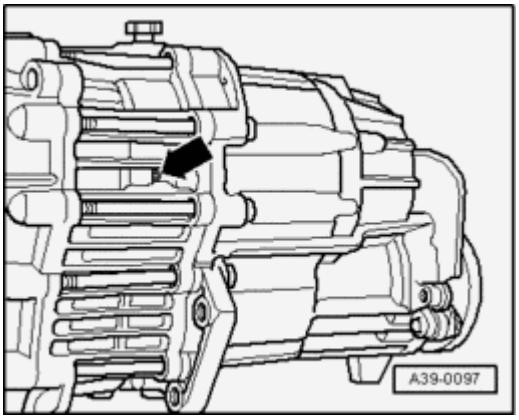


Fig. 287: Oil Leak Inspection Opening For Shaft Seal In Drive Pinion And Shaft Seal In Intermediate Flange
Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE:

- **An inspection opening is provided on the left side of the intermediate flange to check for oil leaks (arrow) for the sealing ring in drive pinion and the sealing ring in intermediate flange.**
- **If oil escapes at this inspection opening, this sealing ring must be replaced.**

Removing

- Remove center differential --> **Center differential, removing and installing**.
- Removing intermediate flange for front final drive --> **Seal for front final drive, replacing**.

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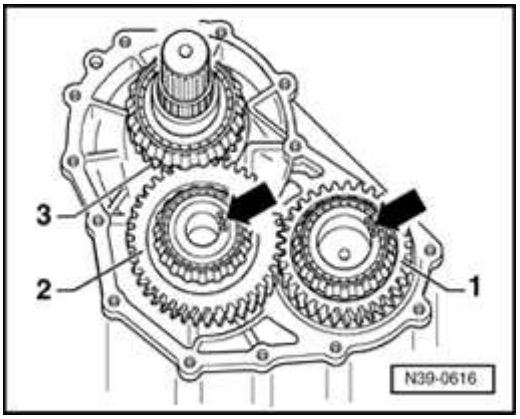


Fig. 288: Identifying Output Pinion, Intermediate Pinion And Drive Pinion
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove intermediate pinion - **2** - for front final drive from transfer housing.
- Pull drive pinion - **3** - from output shaft.

CAUTION: Do not reinstall spur gears that have fallen to the ground. The transmission must be replaced in this case.

Output pinion - **1** - remains on the drive pinion.

- Drive out sealing ring using drift.

Installing

Installation is reverse of removal, noting the following:

- Coat outer edge and sealing lip of oil seal with gear oil.

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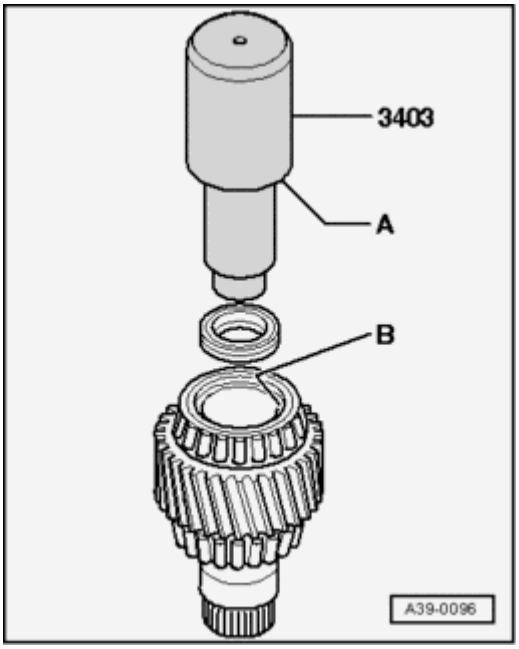


Fig. 289: Installing Driveshaft Seal
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide sealing ring onto thrust piece 3403.
- Drive sealing ring in up to thrust piece 3403 stop.

Contact surface - **A** - of thrust piece must lie against drive pinion - **B** -.

- Fill area between sealing lip and dust lip halfway with sealing grease G 052 128 A1.

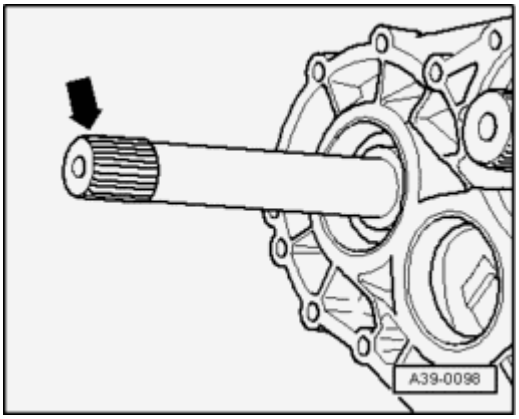


Fig. 290: Identifying Input Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Completely cover splines on end of shaft (arrow) with insulating tape without creasing or overlapping the tape, to prevent damage to sealing ring when sliding on drive pinion.
- Install drive pinion on center of output shaft. (Installation position)

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NOTE:

- **If installing the intermediate flange on the output shaft carelessly, the sealing lips of the sealing ring can be damaged.**

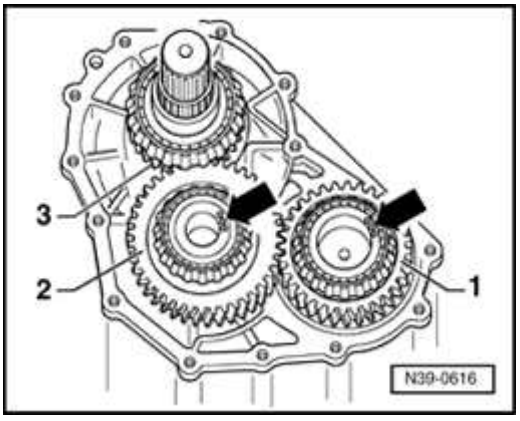


Fig. 291: Identifying Output Pinion, Intermediate Pinion And Drive Pinion
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide drive pinion - **3** - together with the intermediate pinion - **2** - into final drive housing up to stop (tapered roller bearing).

Observe installation position of spur gears (pinion):

Wheel identification (arrows) point outward, away from final drive.

- Installing intermediate flange for front final drive --> **Seal for front final drive, replacing**.
- Install center differential.

Needle bearing for spur gear 2, replacing

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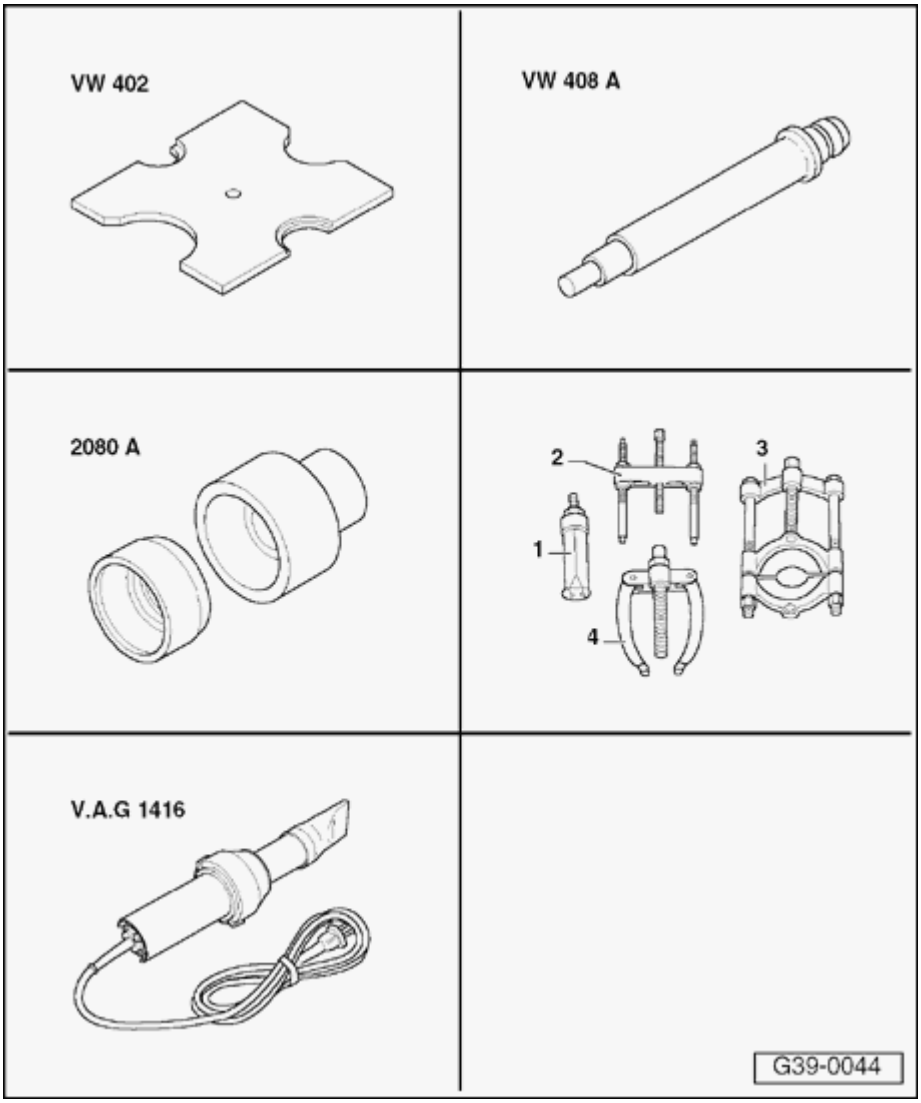


Fig. 292: Identifying Special Tools - Needle Bearing For Spur Gear 2, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary items required

- Thrust plate VW402
- Punch VW408A
- Press sleeve for sleeve 2080A
- Item 1 Kukko 21/4 extractor
- Item 3 Kukko 22/1 support
- Hot air blower VAG1416

Removing

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- Remove center differential --> **Center differential, removing and installing**.

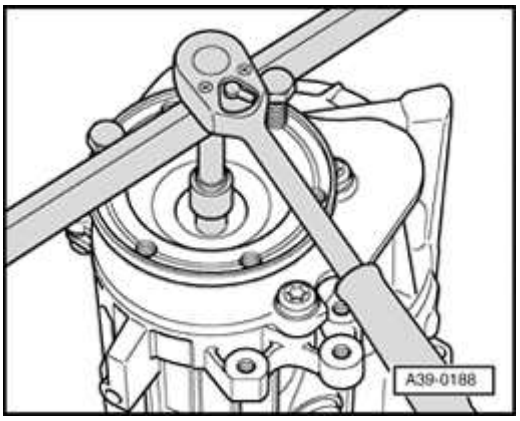


Fig. 293: Unbolting Rear Flanged Shaft
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unbolt rear output flange/driveshaft while securing output flange/driveshaft against turning.

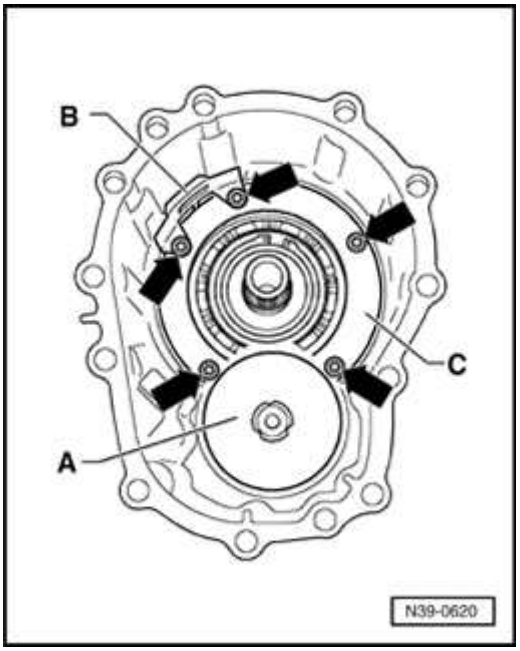


Fig. 294: Identifying Tension Nut, Guide Plate And Shim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull tension nut - **A** - out of spur gear shaft.
- Remove bolts (arrows).
- Remove guide plate - **B** - and shim - **C** -.
- Remove securing ring for securing grooved ball bearing in center differential housing

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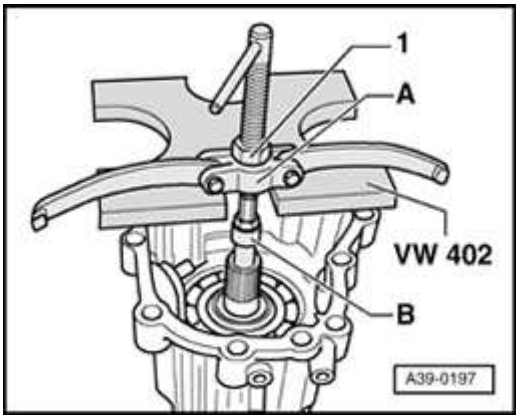


Fig. 295: Needle Bearing For Spur Gear -2, Removing (As Shown)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Attach support - **A** - at internal extractor - **B** - as shown and insert spur gear shaft - **2** -.

A - Support, e.g. 22/1 Kukko

B- extractor, e.g. 21/2 Kukko

- Support retainer - **A** - using thrust plate VW402 and pre-tension at nut - **1** - of retainer.
- Pull out spur gear and carefully remove upward.
- Remove needle bearing securing ring.

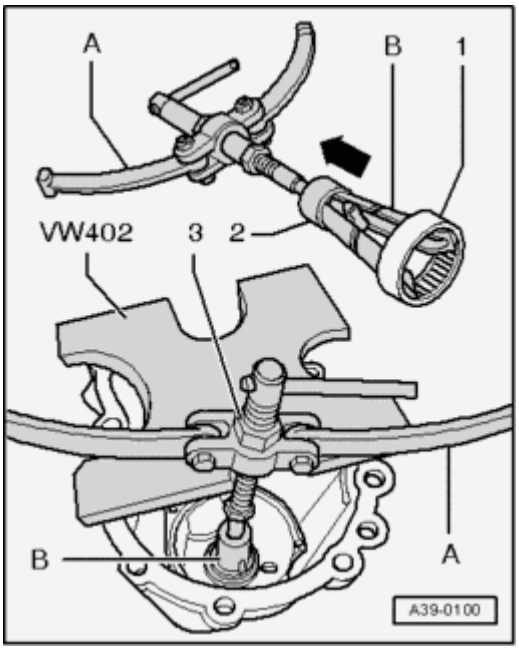


Fig. 296: Needle Bearing For Spur Gear 2, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

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NOTE:

- **The upper part of the illustration shows how the pulling hooks of extractor - B - must be inserted into needle bearing.**

- Slide centering sleeve - **2** - of extractor - **B** - approx. 4 mm into direction of arrow in order to be able to open pulling hooks of extractor far enough.

A - Support, e.g. 22/1 Kukko

B- extractor, e.g. 21/2 Kukko

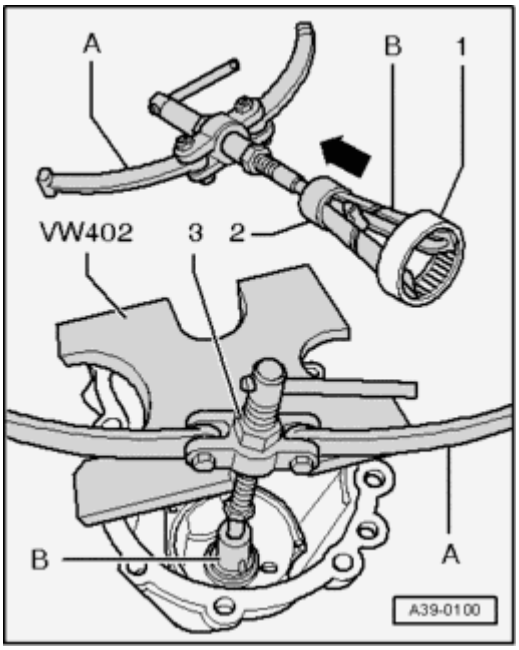


Fig. 297: Needle Bearing For Spur Gear 2, Replacing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Spread extractor - **B** - into upper lip of needle bearing - **1** - and secure extractor at nut.
- Install retainer - **A** - on extractor - **B** - as illustrated.
- Support retainer - **A** - using thrust plate VW402 and pre-tension at nut - **3** - of retainer.
- Using hot air blower, e.g. VAG141, quickly heat up outside of transfer housing in vicinity of needle bearing seat to approx. 80 to 100 ° C.

CAUTION: Wear protective gloves!

- Quickly pull out needle bearing.

Installing

Installation is the reverse of removal. Also carry out the following procedure.

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- Check needle bearing seat in transfer housing for damage, rework if necessary.
- Using hot air blower, e.g. VAG141, quickly heat up outside of transfer housing in vicinity of needle bearing seat to approx. 80 to 100 ° C.

CAUTION: Wear protective gloves!

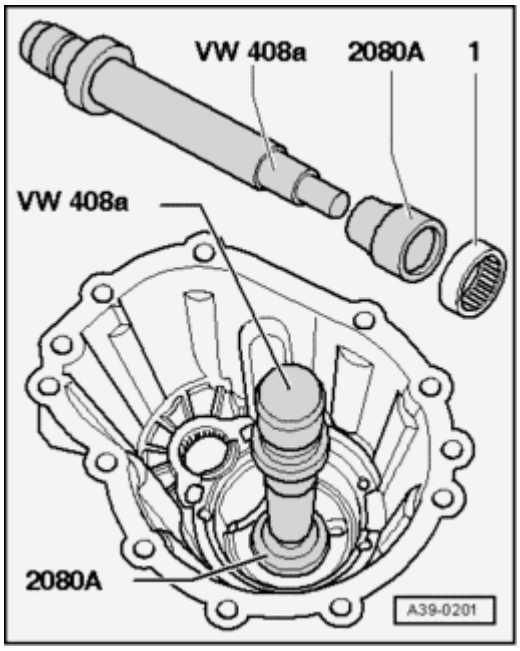


Fig. 298: Inserting New Needle Bearing And Set Sleeve 2080A Onto New Needle Bearing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert new needle bearing and set sleeve 2080A onto new needle bearing - **1** -.

Sleeve 2080A must be centered when set onto sleeve.

- Drive needle bearing into transfer housing up to stop using punch VW408A.

DRIVESHAFT, SERVICING

Driveshaft, servicing

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- **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
- **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

Driveshaft, removing and installing

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- **39 FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE
- **39 - FINAL DRIVE, DIFFERENTIAL** for REAR FINAL DRIVE 0AR

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