

Repairing Temperature Sensor in PDK Transmission (90/11)



Information

This Technical Information replaces the TI dated August 10, 2012.

Changes/additions compared to the previous Technical Information:

- ▶ "Parts Info." section: Part number for screws for electrohydraulic control unit omitted. Screws must **not** be replaced.
- ▶ Steps "5" and "14": New illustration.

Vehicle Type: **Boxster (987)/Boxster S (987)
Cayman/Cayman S/Cayman R
911 Carrera (997)/911 Carrera S (997)/911 Turbo (997)/911 Turbo S (997)**

Model Year: **As of 2009 up to 2011**

Equipment: PDK transmission (I-no. 250)

Concerns: **Temperature sensor in PDK transmission**

Information: **Defective crimp connection on temperature sensor in PDK transmission.**
Defective crimp connections on the temperature sensor in the PDK transmission can cause the warning message "Gearbox emergency operation" to be displayed.

In addition, the fault memory entries

- P0711 **with** P17F0/P17F1/P17F2
- P172D **by itself or with** P17F1/P17F2/P17F2

are stored in the PDK control unit.



Information

For details of the exact procedure for the various fault codes, see flow charts ⇒ '3730 - Flow charts for PDK fault codes'.

Action Required: Replace the temperature sensor in the PDK transmission.

The repairs are documented and invoiced under fault location (FES5) "38230" and damage code (SA4) "4021" in the PQIS job.
Also attach the related Vehicle Analysis Log (VAL) to this PQIS job.

Work on the PDK transmission requires absolute cleanliness and extreme care.

**Information**

The procedure described here may **only** be carried out using the **crimping tool 'AD-1377 Crimp Tool'** (000.043.207.78).

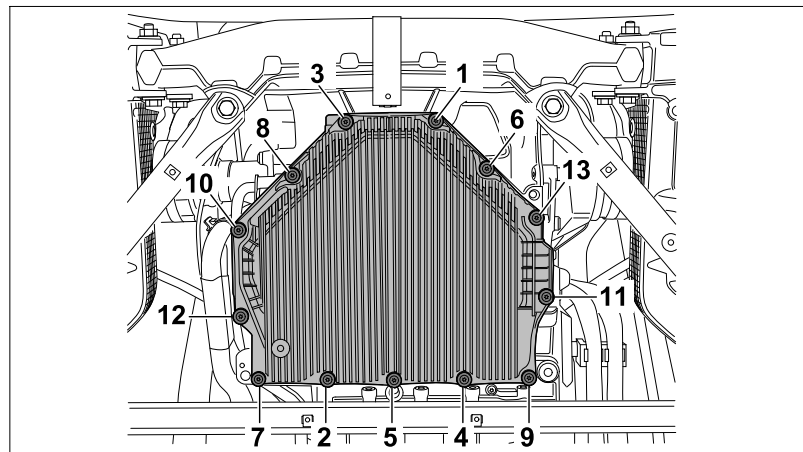
Part Nos.:	997.612.930.01	New/ ⇒ Transmission fluid temperature sensor repair kit
	9G1.321.025.00	⇒ ATF pan, complete (with aluminum screws and drain plug)
	000.043.207.78	New/ ⇒ Crimping tool 'AD-1377 Crimp Tool'

**Information**

Only **one** crimping tool can be ordered **for each Porsche dealership** and **additional crimping tools cannot** be supplied.

Tools:	Nr.155-2 Pos.2 - Hand pliers
	Nr.155-1 Pos.2 - Hot-air blower
	9768 - Electronic torque wrench, 2 - 100 Nm/1.5 - 74 ftlb.
	WE1372 - Manual metering pump
	9818 - PIWIS Tester II

- Work Procedure: 1 Jack and raise the vehicle at the prescribed jacking points.
⇒ *Workshop Manual '4X00IN01 Lifting the vehicle'*
- 2 Remove underbody panelling.
⇒ *Workshop Manual '519419 Removing and installing cover for rear underbody - section on "Removing"*
- 3 Drain ATF.
⇒ *Workshop Manual '370255 Changing ATF - section on "Draining"*
- 4 Remove ATF pan.



Tightening sequences for PDK transmission



Information

Although you have drained the ATF, there will still be residual oil in the ATF pan.

- 4.1 Loosen all screws on the ATF pan except for screws 1 and 3 in reverse tightening sequence and then unscrew them.



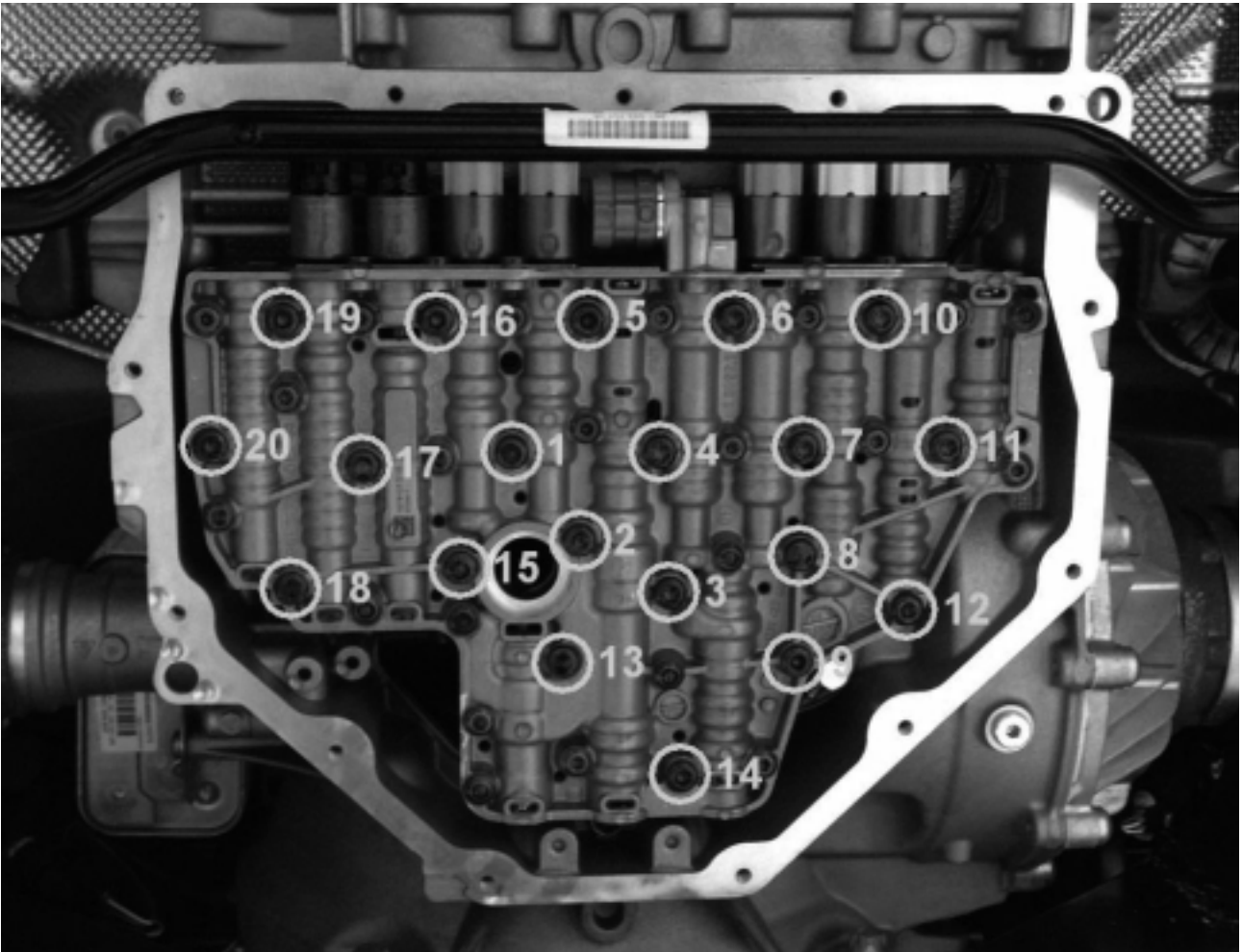
Hot fluid

- **Danger of scalding**
- ⇒ **Let the fluid cool down.**
- ⇒ **Wear personal protective gear.**

- 4.2 Carefully lever off the ATF pan on the opposite side to screws 1 and 3 and catch any oil that overflows.

- 4.3 Unscrew screws 1 and 3 on the ATF pan and carefully remove the ATF pan.

- 5 Remove electrohydraulic control unit.



Overview of tightening sequence for electrohydraulic control unit

- 5.1 Unscrew screws 16 and 18.
- 5.2 Screw two M6 x 300 screws approx. 10 turns into screw holes 16 and 18.
- 5.3 Unscrew the remaining screws in reverse tightening sequence and carefully set the electrohydraulic control unit down on the screw heads of the long screws (16 and 18).
- 5.4 Remove retaining clip ⇒ *Figure 1-1-* for the temperature sensor ⇒ *Figure 1-2-* (retaining clip and screw will be re-used during fitting).

The cable plugs on the solenoid valves must not be removed.

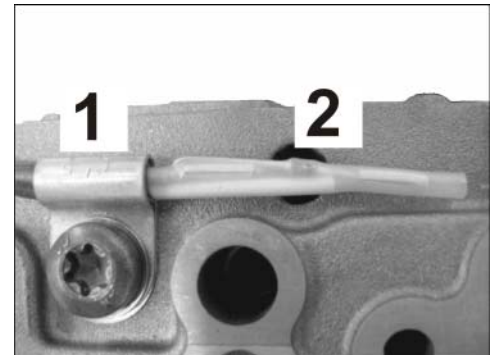


Figure 1

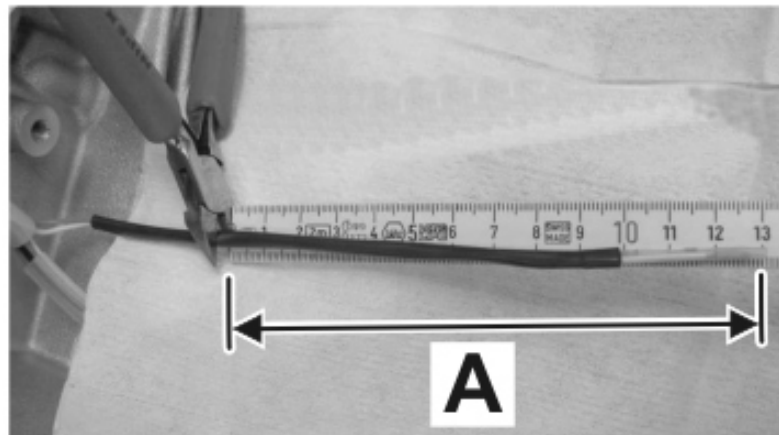


Figure 2

- 6 Disconnect old sensor line (starting from the front edge of the temperature sensor) ⇒ Length 130 mm (⇒ *Figure 2-A*).
- 7 Remove the remaining black shrink-fit hose.

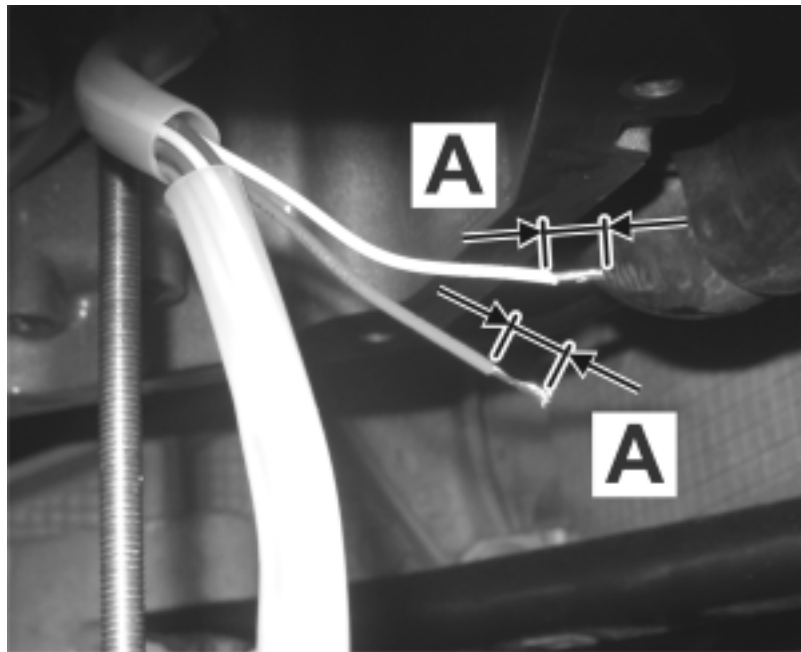


Figure 3

- 8 Strip white and orange line ⇒ Length 5 mm (⇒ Figure 3-A-).
When stripping the lines, make sure not to damage or disconnect any strands.

- 9 Crimping on new temperature sensor.

- 9.1 Slide shrink-fit sleeve over the line ⇒ Figure 4.

Twist the individual strands.

- 9.2 Slide insulated cable connection sleeve over the stripped area of the line as far as the insulation.

All strands of the line must be covered (crimped).

If more than two strands are sticking out of the insulated cable connection sleeve following crimping, the PDK transmission must be replaced.



Figure 4

- 9.3 First hold the insulated cable connection sleeve firmly in the **red** crimping jaw of the crimping tool (do not press together).

Make sure that the edge of the insulated cable connection sleeve is aligned with the edge of the crimping tool ⇒ *Figure 5*.

- 9.4 Guide the new cable with temperature sensor as far as it will go into the insulated cable connection sleeve. **Check that the line colors are assigned correctly.**

All strands of the line must be in the insulated cable connection sleeve.

If more than two strands are sticking out of the insulated cable connection sleeve following crimping, the transmission must be replaced.

- 9.5 Crimp the insulated cable connection sleeve using the **red** crimping jaw of the crimping tool.



Information

Press the crimping tool together firmly as far as it will go. It only opens again after it has been **completely actuated** .

- 10 Repeat the process (crimping) on the second line ⇒ 9.1.

- 11 Slide the shrink-fit sleeves over the crimped contacts and shrink the sleeves with a hot-air blower ⇒ *Figure 6*.



Information

Adhesive in the heat shrink sleeves turns to liquid when heated. The adhesive can emerge slightly at the ends of the heat shrink sleeves after they shrink.

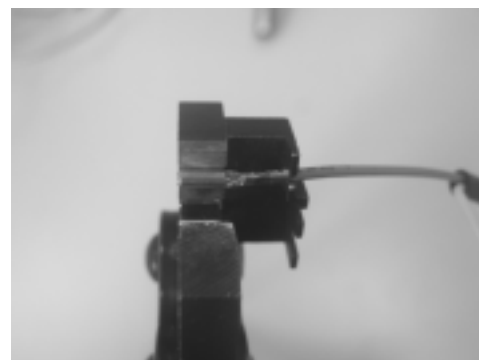


Figure 5

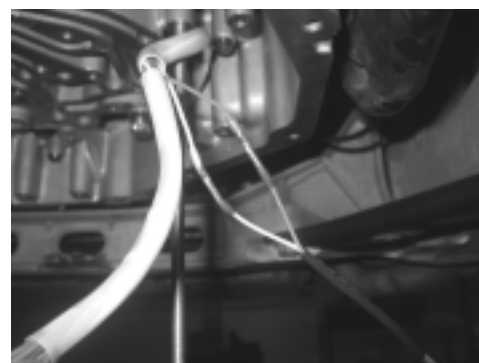
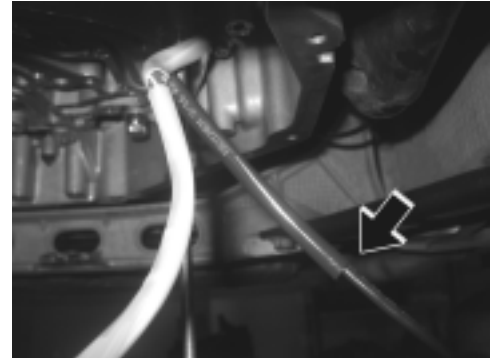
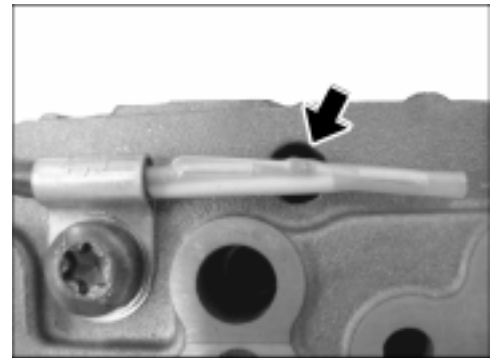


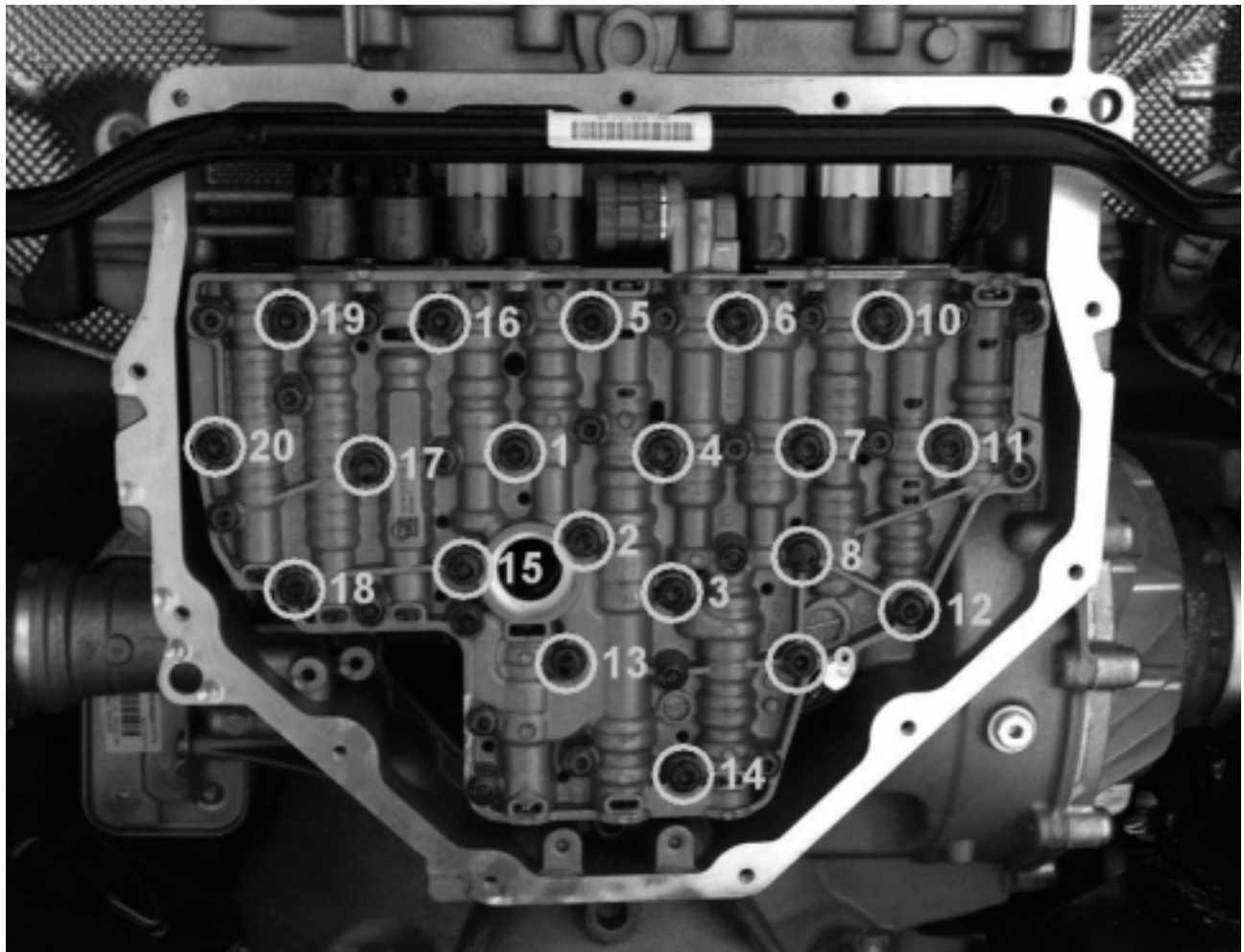
Figure 6

- 12 Slide the additional black protective tube as far as it will go over the two new crimps.
 - 12.1 The existing black protective tube and the new protective tube must overlap. **There must be no bare cable visible** (⇒ *Figure 7 -arrow-*).
 - 12.2 Shrink protective tube using a hot-air blower.

*Figure 7*

- 13 Fit temperature sensor with the clip ⇒ Tightening torque 6 Nm (4.5 ftlb.) (⇒ *Figure 8 -arrow-*).
- 14 Install electrohydraulic control unit.

*Figure 8*



Overview of tightening sequence for electrohydraulic control unit



Information

- Before installation, check the sealing faces on the electrohydraulic control unit and on the transmission for damage and dirt/grime.
- Damaged or soiled parts must not be used. Ensure absolute cleanliness during installation.
- 14.1 The wire harness for the solenoid valves and the cable for the temperature sensor must be routed in the recess between the transmission housing and electrohydraulic control unit because otherwise the cables can be crushed, resulting in damage and malfunctions.
- 14.2 Check that the wire harness is positioned correctly after installing the electrohydraulic control unit.
- 14.3 Make sure that the electrohydraulic control unit is flat on the PDK transmission housing.
- 14.4 The electrohydraulic control unit must be positioned exactly with respect to the port plate.

- 14.5 Fit and tighten screws 1 to 15 in the specified sequence.
- 14.6 Unscrew long screws (16 and 18).
- 14.7 Fit and tighten screws 16 to 20 in the specified sequence.
- 14.8 Check the position of the electrohydraulic control unit again.
- 14.9 Tighten screws 1 to 20.

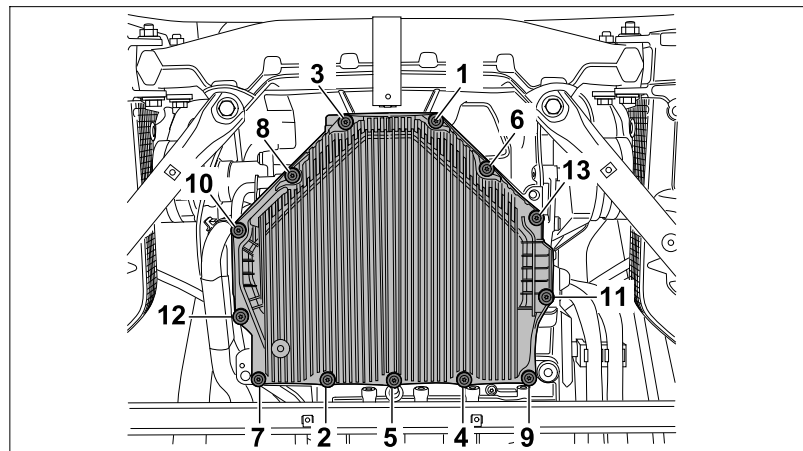
Observe tightening specifications for screws for electrohydraulic control unit.

Screws are tightened in 2 steps:

Step 1: ⇒ Tightening torque 1.5 Nm (1 ftlb.) + 1.5 Nm (+1 ftlb.)

Step 2: ⇒ Tightening torque 7.9 Nm (6 ftlb.) + 0.2 Nm (+0.1 ftlb.)

- 15 Install new ATF pan.



Tightening sequences for PDK transmission



Information

Always use a new ATF pan and new aluminum screws.

The sealing faces of the transmission and ATF pan must be clean and dry for installation.

Before screwing in the new screws, blow out the threaded bore thoroughly with compressed air. Have a clean, lint-free cloth on hand to collect any emerging particles of dirt.

- 15.1 Coat the sealing ring on the intake snorkel on the ATF pan with oil.
- 15.2 Fit ATF pan on the PDK transmission and make sure that the sealing ring on the intake connection of the ATF pan is lying on the intake duct of the electrohydraulic control unit.
- 15.3 Press the ATF pan onto the PDK transmission until the sealing ring on the intake connection clicks into the intake duct of the electrohydraulic control unit and the ATF pan is flat on the PDK transmission.

- 15.4 Screw M6 screws into the ATF pan and tighten according to the specified sequence,
 ⇒ *Tightening sequences for PDK transmission.*



Information

- The aluminum screws for the differential housing cover must be replaced.
- The aluminum screws for the Porsche Doppelkupplung (PDK) must be tightened using the yield-point-controlled tightening method.
- Special tool **9768 - electronic torque wrench** is used for this.
- To ensure that the screws are tightened uniformly, the corresponding tightening setting "light, medium or hard" must always be used.

Tighten M6 screws at "medium" setting.

⇒ Tightening torque 2.4 Nm (1.5 ftlb.)

- 16 Screw in and tighten new ATF drain plug. ⇒ Tightening torque 15 Nm (11ftlb.) + 3 Nm (+2 ftlb.)

- 17 Fill in ATF.

⇒ *Workshop Manual '370255 Changing ATF - section on "Filling".*

- 18 Get the vehicle ready.

- 18.1
- Move selector lever to position "P".
 - Start the engine and leave it running at idle speed.
 - Apply the parking brake.

- 18.2 Unscrew ATF filler screw.

18.2.1 ATF emerges: Collect emerging ATF until only drops of ATF are emerging.

18.2.2 No ATF emerges: Top up ATF until drops of ATF emerge at the filler bore.

18.2.3 Screw in ATF filler screw.

- 18.3 Preparatory work for checking ATF.



Information

Oil fill mode can be activated for ⇒ Transmission fluid temperature 35°C +/-5°C . The transmission control unit ends oil fill mode automatically after 5 minutes.

Prerequisite: Transmission fluid temperature ⇒ Minimum temperature 10°C

- 18.3.1 Connect PIWIS Tester II.

- 18.3.2 Shift the selector lever through gearshift positions "R", "N" and "D" once with the engine running and pause for one second at each position.

- 18.3.3 Move selector lever to position "P".

18.3.4 Start oil fill mode on PIWIS Tester II and follow the instructions.

18.4 Check ATF in oil fill mode.



WARNING

Hot fluid

- **Danger of scalding**
- ⇒ **Let the fluid cool down.**
- ⇒ **Wear personal protective gear.**

18.4.1 Unscrew ATF filler screw.

18.4.2 ATF emerges: Collect emerging ATF until only drops of ATF are emerging.

18.4.3 No ATF emerges: Top up ATF until drops of ATF emerge at the filler bore.

18.5 Screw in and tighten new ATF filler screw, ⇒ Tightening torque 35 Nm (26 ftlb.) +/-3 Nm (+/-2 ftlb.) .

18.6 Disconnect PIWIS Tester II from the vehicle and switch off engine.

19 Install underbody panelling.

⇒ *Workshop Manual '519419 Removing and installing cover for rear underbody - section on "Installing"*.

Location	Explanation	Type	Basic value	Tolerance 1	Tolerance 2
Disconnect temperature sensor line		Length	130 mm		
Strip lines		Length	5 mm		
Screw securing retaining clip to PDK transmission housing		Tightening torque	6 Nm (4.5 ftlb.)		
Screws securing electrohydraulic control unit to PDK transmission		Tightening torque	1.5 Nm (1 ftlb.)	+1.5 Nm (+1 ftlb.)	
Screws securing electrohydraulic control unit to PDK transmission		Tightening torque	7.9 Nm (6 ftlb.)	+0.2 Nm (+0.1 ftlb.)	

Location	Explanation	Type	Basic value	Tolerance 1	Tolerance 2
Screw securing ATF pan to PDK transmission	M6, "Medium" setting	Tightening torque	2.4 Nm (1.5 ftlb.)		
ATF drain plug in ATF pan		Tightening torque	15 Nm (11 ftlb.)	+ 3 Nm (+2 ftlb.)	
Oil fill mode		Transmission fluid temperature	35°C	+/-5°C	
Check ATF		Minimum temperature	10°C		
ATF filler screw on PDK transmission		Tightening torque	35 Nm (26 ftlb.)	+/-3 Nm (+/-2 ftlb.)	

- References:
- ⇒ *Workshop Manual '4X00IN01 Lifting the vehicle'*
 - ⇒ *Workshop Manual '519419 Removing and installing cover for rear underbody'*
 - ⇒ *Workshop Manual '370255 Changing ATF'*

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