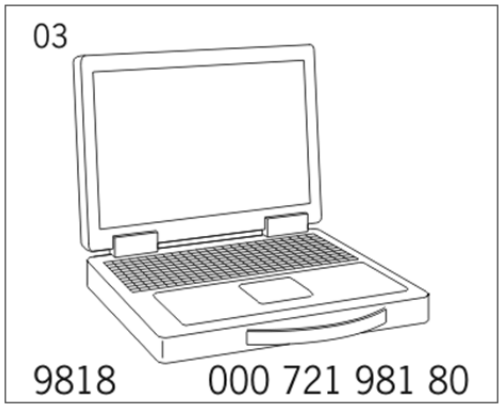
WM 430115 CALIBRATING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > TOOLS

Designation	Type	Number	Description	
Quick clamping device	Workshop equipment	WE 1621		
PIWIS Tester II	Special tool	9818		

WM 430115 CALIBRATING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > TECHNICAL VALUES

Location	Description	Type	Basic value	Tolerance 1	Tolerance 2
Current rating		Nominal value	40 A		

WM 430115 CALIBRATING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > CALIBRATING THE LEVELLING SYSTEM > CHECKING

Calibration must be performed if one or more of the following situations apply:

- Control unit was replaced.
- Level sensors were replaced.
- Vehicle lies to one side after being raised. If lifting platform mode is activated, carry out a test drive (lifting platform mode switches off and the vehicle corrects itself). If this does not work, check the system for faults → 430149 TROUBLESHOOTING THE LEVELLING SYSTEM and then calibrate the system.

Level sensors are calibrated by determining a correction value (corresponding to the actual height of the vehicle) and storing it permanently in the control unit.

WM 430115 CALIBRATING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > CALIBRATING THE LEVELLING SYSTEM > NOTES ON CALIBRATION

The nominal values for the nominal heights of the level sensors are stored in the control unit. The actual values of the respective axle heights, front left, front right, rear left, rear right, have to be measured manually and then entered using the Porsche System Tester. The actual values must be measured on the front and rear axle, both on the left and right. → Height Measurement Point On Rear Axle ; - Height Measurement Point On Front Axle .

See also: → Conditions For Carrying Out Calibration .

WM 430115 CALIBRATING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > CALIBRATING THE LEVELLING SYSTEM > HEIGHT MEASUREMENT POINT ON REAR AXLE

The distance between the lower edge of the wing and upper edge of the measured-value pickup **-X-** is measured.

Fig 1: Identifying Rear Axle Point Height

Courtesy of PORSCHE CARS NORTH AMERICA, INC.

WM 430115 CALIBRATING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > CALIBRATING THE LEVELLING SYSTEM > HEIGHT MEASUREMENT POINT ON FRONT AXLE

Information

Check the following at the height measuring point on the front axle:

- Lower edge of the wing is covered by the front lid.
- Only measure the height on the front axle when the front lid is open.

The distance between the lower edge of the wing and upper edge of the measured-value pickup **-X-** is measured.

Fig 1: Identifying Front Axle Point Height

Courtesy of PORSCHE CARS NORTH AMERICA, INC.

WM 430115 CALIBRATING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > CALIBRATING THE LEVELLING SYSTEM > CONDITIONS FOR CARRYING OUT CALIBRATION

Information

- Calibration can only be carried out while the vehicle is stationary.
- The vehicle must stand "floating" on the measuring platform to avoid straining the axles.
- Calibration is also required for the variants with "steel springs - PASM". The headlight beam adjustment (HBA) sensors are also calibrated.
- Before calibration is performed, the vehicle must be adjusted to Normal level and the Height sensor system component test must be carried out!
- Ensure that tire pressures have been adjusted to the respective tire specifications. (WM 4405IN WHEELS AND TIRES (ALL MODELS))
- The vehicle is raised and lowered during the height sensor system component test and then adjusts to the correct level!
- The measured values for the vehicle height must correspond approximately to the values specified under Adjustment values for suspension alignment . An implausible value will not be accepted. For the current comparative values for the vehicle height, please refer to the adjustment values for suspension alignment → 4495TW ADJUSTMENT VALUES FOR SUSPENSION ALIGNMENT
- Do not cancel calibration! If calibration is interrupted, the fault code 000286 "Customer service mode not complete" remains stored and is active! A warning appears in the instrument cluster. Select >>Drive links/checks<< in the menu. Delete the fault memory and perform calibration again!

WM 430115 CALIBRATING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > CALIBRATING THE LEVELLING SYSTEM > CALIBRATION PROCEDURE

NOTE: Voltage drop

- *Risk of irreparable damage to control unit*
- *Risk of damage to control unit*
- *Fault entries in the control unit*
- *Coding in the control unit is aborted*
- *Malfunctions in control unit, even during programming*

→ Prior to disconnecting the control unit, switch off ignition and remove ignition key.

→ Ensure that the power supply is not interrupted during programming.

→ Connect a battery charger with a current rating of at least → **Nominal value: 40 A** to the vehicle battery.

Adhere strictly to the information provided under "Conditions for carrying out calibration"!

Always carry out the "Calibration procedure" **step-by-step** until calibration is complete!

1. Fit measured-value pickup **Quick clamping device WE 1621** on the relevant wheel.
2. **PIWIS Tester II 9818** must be connected to the vehicle before starting the Tester. Switch on ignition using original remote control (hand-held transmitter).
3. Apply electric parking brake.
4. Close the doors and tailgate.
5. **Erase the fault memory.**

   To do this, connect the Porsche System Tester. Select >>Levelling system/PASM<< >>Fault memory<< >>Erase fault memory<< in the control unit overview.

   Follow the instructions on the Porsche System Tester.
6. **Perform Height sensor system component test.**

   Select >>Maintenance/repairs<< >>Height sensor system component test<< in the menu.

   Follow the instructions on the Porsche System Tester.
7. **Perform height sensor calibration.**

   Select >>Maintenance/repairs<< >>Height sensor calibration<< in the menu.

   Follow the instructions on the Porsche System Tester.

   Information

   Check the following at the height measuring point on the front axle:

   1. Lower edge of the wing is covered by the front lid.
   2. Only measure the height on the front axle when the front lid is open.

      1. 7.1. Determine the actual value for the height of the vehicle body at the measuring points.

         1. 7.1.1. When determining the height of the vehicle body, the height is measured from the lower edge of the wing to the upper edge of the measured-value pickup, dimension **X** .
         2. 7.1.2. Then add the **radius** of the measured-value pickup **32.5 mm** to this measured dimension X.

            Sample calculation:

            Measured dimension X = 430 mm; measured-value pickup radius = 32.5 mm

            X + measured-value pickup radius = height of vehicle body

            430 mm + 32.5 mm = 462.5 mm

      2. 7.2. Enter the determined values in the Porsche System Tester.

         If an implausible value is entered (actual value is not accepted by Porsche System

Tester), please refer to the information under: "Procedure: Measured actual value is not accepted".

8. **Complete the diagnostic session (only for steel springs)**

   Select >>Drive links/checks<< >>Completion of height sensor calibration<< in the menu.

   Follow the instructions on the Porsche System Tester.

   When calibration is completed successfully, >>**Result** << >>**Function completed** << is displayed!

When calibration is complete, the vehicle does not adjust automatically to Normal Level. The height values can only be checked after test-driving the vehicle.

WM 430115 CALIBRATING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > CALIBRATING THE LEVELLING SYSTEM > PROCEDURE: MEASURED ACTUAL VALUE IS NOT ACCEPTED

Information

During height sensor calibration, a height value that is entered may not be accepted by the Porsche System Tester.

In this case, at least one value is implausible, i.e. the value is not within the tolerance range for the vehicle height stored in the control unit.

The reason for this may be as follows:

- An incorrect calibration was carried out previously (e.g. by entering an incorrect measured value).
- A level sensor is faulty (e.g. due to a bent level sensor linkage or holder).

1. Measure the vehicle body height again.
2. If the measured values are identical to the values measured previously, check the front and rear level sensors for damage. Check, in particular, that the level sensor linkage or holders are not bent.

   If the level sensors are damaged, these must be replaced and the calibration must be repeated.

   → 431855 REPLACING FRONT LEVEL SENSOR

   → 431955 REPLACING REAR LEVEL SENSOR

3. If level sensors are intact, the specified vehicle level (required value: → 4495TW ADJUSTMENT VALUES FOR SUSPENSION ALIGNMENT) must be set step-by-step.

   Information

   The Porsche System Tester accepts height values with a required value tolerance of +/- 25 mm.

   If the determined mean value is not within this tolerance range during the step-by-step

procedure for setting the vehicle level, the closest tolerance range limit value must be entered as the actual value in the Porsche System Tester.

1. 3.1. Enter the mean value determined from the actual/required value at the affected vehicle position (front left, front right, rear left or rear right) instead of the unaccepted actual value.

   Example:

   The height measurement shows that front left vehicle height is 430 mm and the measured value is not accepted during height sensor calibration.

   Actual value: 430 mm; required value: 464 mm

   (Actual value + required value)/2 = mean value

   (430 mm + 464 mm)/2 = 447 mm

   Now enter the value 447 mm for the front left height in the Porsche System Tester.

2. 3.2. **Perform Height sensor system component test** (vehicle is adjusted to the required value on the affected side of the vehicle).

   Select >>Maintenance/repairs<< >>Height sensor system component test<< in the menu.

   Follow the instructions on the Porsche System Tester.

3. 3.3. **Perform height sensor calibration.**

   Select >>Maintenance/repairs<< >>Height sensor calibration<< in the menu.

   Follow the instructions on the Porsche System Tester.

   1. 3.3.1. Determine the actual value for the height of the vehicle body at the measuring points.

   2. 3.3.2. Enter the determined values in the Porsche System Tester.

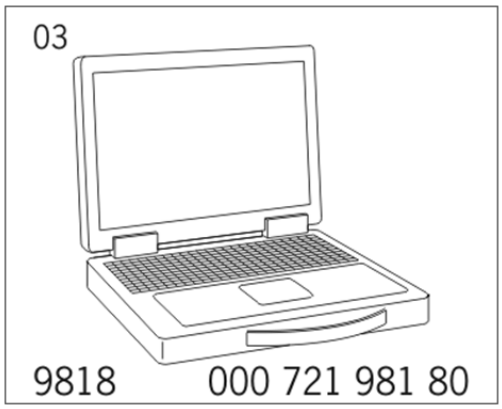
4. 3.4. **Perform Height sensor system component test** again (vehicle is now at the required level).

   Select >>Maintenance/repairs<< >>Height sensor system component test<< in the menu.

   Follow the instructions on the Porsche System Tester.

WM 430149 TROUBLESHOOTING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) (MACAN, MACAN S, MACAN TURBO) > TOOLS

Designation	Type	Number	Description	
Quick clamping device	Workshop equipment	WE 1621		

PIWIS Tester II	Special tool	9818		

WM 430149 TROUBLESHOOTING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) (MACAN, MACAN S, MACAN TURBO) > GENERAL WARNING NOTES > SAFETY INSTRUCTIONS AND INFORMATION FOR REPAIRING THE CHASSIS

Safety instructions and information for repairing the chassis → 4X00IN SAFETY INSTRUCTIONS AND INFORMATION FOR REPAIRING THE CHASSIS

WM 430149 TROUBLESHOOTING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) (MACAN, MACAN S, MACAN TURBO) > INFORMATION > GUIDED FAULT FINDING

Symptom	Fault detection	Possible causes	Solution
Gradual loss of pressure ○ Vehicle lying to one side after a long time ○ Longer than average regulating times ○ No reaction to driver's request	Observe vehicle height over a long period of time and try to find the leak using commercially available leak detection spray	Leak in air-spring strut/air spring	Replace air-spring strut/air spring → 433019 REMOVING AND INSTALLING FRONT AIR-SPRING STRUT → 434319 REMOVING AND INSTALLING REAR AIR SPRING or carry out repairs
		Leak in air lines or valve unit	Check tightening torques for air line connections, check insertion depth of air lines (color marking), replace air line

Symptom	Fault detection	Possible causes	Solution
Vehicle lying to one side	1.) Check that the air	Air line on front axle not	Insert air line on front

○ No leaks in the system	line is fitted correctly on the front air springs	inserted far enough (fault code 284)	axle as far as it will go; only one marking should be visible. To check that the air line is fitted correctly, pull it briefly against the insertion direction. If it cannot be pulled out or can only be pulled out with considerable effort, the air line is fitted correctly.
	2.) Carry out Guided Fault Finding using the Porsche System Tester	Vehicle level sensor faulty	Replace vehicle level sensor → 431855 REPLACING FRONT LEVEL SENSOR → 431955 REPLACING REAR LEVEL SENSOR
		Linkage or holder for vehicle level sensor is bent	

Symptom	Fault detection	Possible causes	Solution
Vehicle is too high ○ Vehicle cannot be lowered	1.) Check that the vehicle has sufficient ground clearance	Vehicle position is raised	Look for signs of damage and check clearance around the air-spring struts/air springs and anti-roll bars
	2.) Check air line and line routing	Air line blocked, kinked or frozen Air line on front axle not inserted far enough (fault code 284)	Replace kinked air lines; carefully blow out frozen and blocked air lines using compressed air Insert air line on front axle as far as it will go; only one marking should be visible. To check that the air line is fitted correctly, pull it briefly against the insertion direction. If it cannot be pulled out or can only be pulled out with considerable effort, the air line is fitted correctly.
	3.) Levelling system: Upper/lower limit value exceeded	Compressor fuse faulty Air line on front axle not inserted far enough (fault code 284)	Replace compressor → 431519 REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM Insert air line on front axle as far as it will go; only one marking should be visible. To check that

			the air line is fitted correctly, pull it briefly against the insertion direction. If it cannot be pulled out or can only be pulled out with considerable effort, the air line is fitted correctly.
	4.) Vehicle cannot be lowered despite having reconnected the air line on the front axle	Valve on the air-spring strut does not open.	Replace pressure retaining valve on the affected air-spring strut → 433655 REPLACING FRONT VALVE (PRESSURE RETAINING VALVE)
	5.) Carry out Guided Fault Finding using the Porsche System Tester	Check relays, plug contacts, wire harness and fuses in the vehicle electrical system Drain valve in the compressor faulty/leaking/open	Replace compressor → REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM
		Drain valve in compressor or control valves in valve block do not work Valve unit does not work	Replace compressor → REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM
	6.) Valve unit blocked	Dirt in valve unit	Replace valve unit → 432355 REPLACING VALVE UNIT (LEVELLING SYSTEM)
	7.) Compressor/valve block blocked	Dirt in compressor/valve block	Replace compressor → REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM
	8.) If no faults were found after carrying out Step 6.), the compressor is faulty	Compressor faulty	Replace compressor → REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM

Symptom	Fault detection	Possible causes	Solution
Vehicle is too low ○ Vehicle cannot be raised or can	1.) Check air line and line routing	Air line blocked, kinked or frozen	Replace kinked air lines; carefully blow out frozen and blocked air lines using compressed air

only be raised very slowly	2.) Valve unit blocked	Dirt in valve unit	Replace valve unit → 432355 REPLACING VALVE UNIT (LEVELLING SYSTEM)
	3.) Compressor/valve block blocked	Dirt in compressor/valve block	Replace compressor → REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM
	4.) Carry out Guided Fault Finding using the Porsche System Tester	Check relays, plug contacts, wire harness and fuses in the vehicle electrical system Drain valve in the compressor faulty/leaking/open	Replace compressor → REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM
		Drain valve in compressor or control valves in valve block do not work	Replace compressor → REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM
	5.) If no faults were found after carrying out Step 4.), the compressor is faulty	Compressor faulty	Replace compressor → REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM

Symptom	Fault detection	Possible causes	Solution
Rapid loss of pressure	Vehicle lying to the left or right; when you try to switch to a different level, you can hear air coming from the faulty air spring	Air-spring strut/air spring is faulty	Replace air-spring strut/air spring → 433019 REMOVING AND INSTALLING FRONT AIR-SPRING STRUT → 434319 REMOVING AND INSTALLING REAR AIR SPRING or carry out repairs → 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM
		Air line torn off	Replace air line → 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM

Symptom	Fault detection	Possible causes	Solution

Insufficient damping	Test drive: Adjust the damping level while the vehicle is in motion. You should feel a significant change in the damping effect when driving on uneven road surfaces. Also listen for "rumbling noises"	Damping adjustment valve faulty	Replace air-spring strut → 433019 REMOVING AND INSTALLING FRONT AIR-SPRING STRUT or replace rear shock absorber → 429319 REMOVING AND INSTALLING REAR SHOCK ABSORBER
		Vibration damper worn	Replace air-spring strut → 433019 REMOVING AND INSTALLING FRONT AIR-SPRING STRUT ; clean the air line system → **2.** Cleaning air line system or replace rear shock absorber → 429319 REMOVING AND INSTALLING REAR SHOCK ABSORBER
Error message "PASM failure" with significant inward/outward spring motion. The error message is gone after switching the ignition off and on again.	Fault code 322, 323, 324 or 325 stored in the fault memory.	Front level sensor holder bent.	Replace front level sensor → 431855 REPLACING FRONT LEVEL SENSOR .

WM 430149 TROUBLESHOOTING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) (MACAN, MACAN S, MACAN TURBO) > INFORMATION > PROCEDURE FOR CHECKING THE LEVELLING SYSTEM

1. Perform the following check under these conditions:
    1. The vehicle must be standing on a level surface.
    2. The vehicle must be cold and must not be moved during the check.
    3. The room temperature should be between 10 °C and 30 °C and must not fluctuate to any great extent.
        1. 1.1. Adjust the vehicle to Normal Level.
            1. 1.1.1. Stop the engine and move selector lever to position P.
            2. 1.1.2. **PIWIS Tester II 9818** must now be connected.

                Do not get into or out of the vehicle while adjusting the vehicle to normal level and after adjusting it to normal level. This can give false

alignment results.

3. 1.1.3. Select >>Levelling system/PASM<< >>Drive links/checks<< >>Adjust vehicle level<< in the control unit overview.

4. 1.1.4. Select the value **Low level 1** and press [F8] to start. Vehicle adjusts to Low Level.

5. 1.1.5. Once Low Level has been reached, select **Normal Level** and press [F8] to start. Vehicle now adjusts to Normal Level.

2. 1.2. Switch off the levelling system (switch it back on again when work is complete).

    1. 1.2.1. Use **PIWIS Tester II 9818** to select >>Levelling system/PASM<< >>Drive links/checks<< >>Activate/deactivate vehicle<< in the control unit overview.

    2. 1.2.2. Select the value **Deactivate levelling system (permanently)** and press [F8] to start. The levelling system is now switched off.

3. 1.3. Compress vehicle at front and rear axles by approximately 25 mm 2-3 times and allow it to spring back freely.

4. 1.4. Open the bonnet.

5. 1.5. Fit measured-value pickup **Quick clamping device WE 1621** on the relevant wheel.

    Information

    Check the following at the height measuring point on the front axle:

    1. Lower edge of the wing is covered by the front lid.

    2. Only measure the height on the front axle when the front lid is open.

6. 1.6. Determine the actual value for the height of the vehicle body at the measuring points.

Fig 1: Identifying Front Axle Height

Courtesy of PORSCHE CARS NORTH AMERICA, INC.

1. 1.6.1. When determining the height of the vehicle body, the height is measured from the lower edge of the wing to the upper edge of the measured-value pickup, dimension **X** .

2. 1.6.2. Then add the **radius** of the measured-value pickup **32.5 mm** to this measured dimension **X** .

   Sample calculation:

   Measured dimension X = 430 mm; measured-value pickup radius = 32.5 mm

   X + measured-value pickup radius = height of vehicle body

430 mm + 32.5 mm = 462.5 mm

7. 1.7. Measure the vehicle height (→ **1.6.**) again after two hours and compare it with the first measurement.

   Dimensions and tolerances can be taken from the prescribed vehicle height for vehicles with air suspension. → 4495TW ADJUSTMENT VALUES FOR SUSPENSION ALIGNMENT

If the vehicle is lying at an angle, there is a leak at the wheel suspension with the greatest difference between the first and second measurement.

Use commercially available leak detection spray to check the affected air-spring strut/air spring and the relevant air line one after the other.

If there is no difference after two hours, the vehicle height must be measured again after 24 hours.

The following components must also be checked:

1. Air line connections
2. Air-spring strut/air spring
3. Valve unit

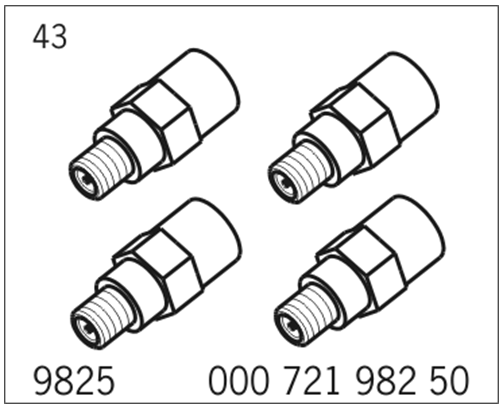
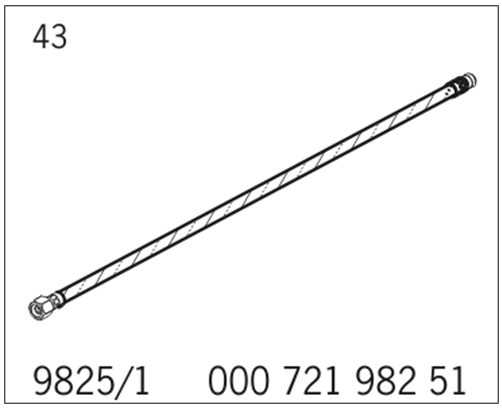
If the vibration dampers are faulty, oil from the vibration damper may have entered the air supply system. To ensure that the air spring system works perfectly, it is absolutely essential that you clean the system after a fault is found and replace other components.

2. Procedure for repairing the air spring system after a fault is found on the vibration dampers:
   1. Screw off the affected line on the air-spring strut/air spring and solenoid valve block.
   2. Blow out the line several times until it is clean using compressed air by introducing the compressed air at the end of the line at the solenoid valve block.
   3. Check for traces of vibration damper oil in the solenoid valve block.
   4. If vibration damper oil has contaminated the valve unit, it must be replaced.
   5. Check the internal line from the compressor to the solenoid valve block.
   6. If there is oil in the line between the compressor and the pressure accumulator, the line and the pressure accumulator must be replaced.

      If there is oil in the internal line, the compressor must be replaced.

WM 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > TOOLS

Designation	Type	Number	Description	

pressure reducer	Workshop equipment	WE 1409		
adapter	Special tool	9825	For connecting to the air spring line	
connecting line	Special tool	9825/1	For connecting to the compressed gas bottle of nitrogen	
valve screwdriver	Commercially available tool	Nr.164 Pos.5		

WM 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > BLEEDING AND FILLING THE LEVELLING SYSTEM >

INSTRUCTIONS FOR WORKING ON VEHICLES WITH AN EMPTY AIR SUSPENSION SYSTEM IN THE WORKSHOP

Information

Vehicles That Have Been Raised With The Air Suspension System Empty Must Not Be Set Back Down On Their Wheels Or Driven.

- Raising A Vehicle With Empty Air-Spring Struts Creates A Vacuum In The Air Springs. The Air-Spring Strut Bellows May Develop Creases After The Vehicle Has Been Set Back Down On The Floor. This Results In The Premature Failure Of The Air-Spring Struts.
- If The Vehicle Has Been "Driven" With One Or More Empty Air Springs, These Air Springs Must Be Replaced.
- Absolute Cleanliness Is Essential When Working On Air Suspension Systems.

Maneuvering A Vehicle With An Empty Air Suspension System Is Not Permitted Because This Will Damage The Air Springs!

WM 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > BLEEDING AND FILLING THE LEVELLING SYSTEM > BLEEDING AND FILLING AN AIR SPRING > BLEEDING AN AIR SPRING WITHOUT ANY LOSS OF SYSTEM AIR

This function is used for bleeding when working on an air spring or the lines for an air spring. The air from up to two air-spring struts can be stored in the pressure accumulator.

1. Switch off the levelling system
    1. 1.1. Switch on ignition.
    2. 1.2. Press the levelling system button for at least → **Time: +10 s** .
2. Raise the vehicle (wheels must be suspended freely). → 4X00IN LIFTING THE VEHICLE
3. Select >>Levelling system/PASM<< >>Maintenance/repairs<< >>Replacement of an air spring<< in the control unit overview. Select the relevant air spring and then select >>Bleed<<. Follow the instructions on the Porsche System Tester.
4. After completing repair work, select >>Levelling system/PASM<< >>Maintenance/repairs<< >>Replacement of an air spring<< in the control unit overview and then select >>Fill<<. Follow the instructions on the Porsche System Tester.

WM 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > BLEEDING AND FILLING THE LEVELLING SYSTEM > BLEEDING AND FILLING MULTIPLE COMPONENTS AND/OR THE PRESSURE ACCUMULATOR > BLEEDING MULTIPLE COMPONENTS AND/OR THE PRESSURE ACCUMULATOR WITH PARTIAL LOSS OF SYSTEM AIR

This function is used for bleeding when working on the system and/or the pressure accumulator. Some of the system air is lost in the process.

1. Select >>Levelling system/PASM<< >>Maintenance/repairs<< >>Replacement of several components or replacement of the pressure accumulator<< in the control unit overview and then select >>Bleed<<. Follow the instructions on the Porsche System Tester.
2. After completing repair work, select >>Levelling system/PASM<< >>Maintenance/repairs<< >>Replacement of several components or replacement of the pressure accumulator<< in the control unit overview and then select >>Fill<<. Follow the instructions on the Porsche System Tester. Refer to "FILLING " .

WM 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > INFORMATION > FILLING

Information

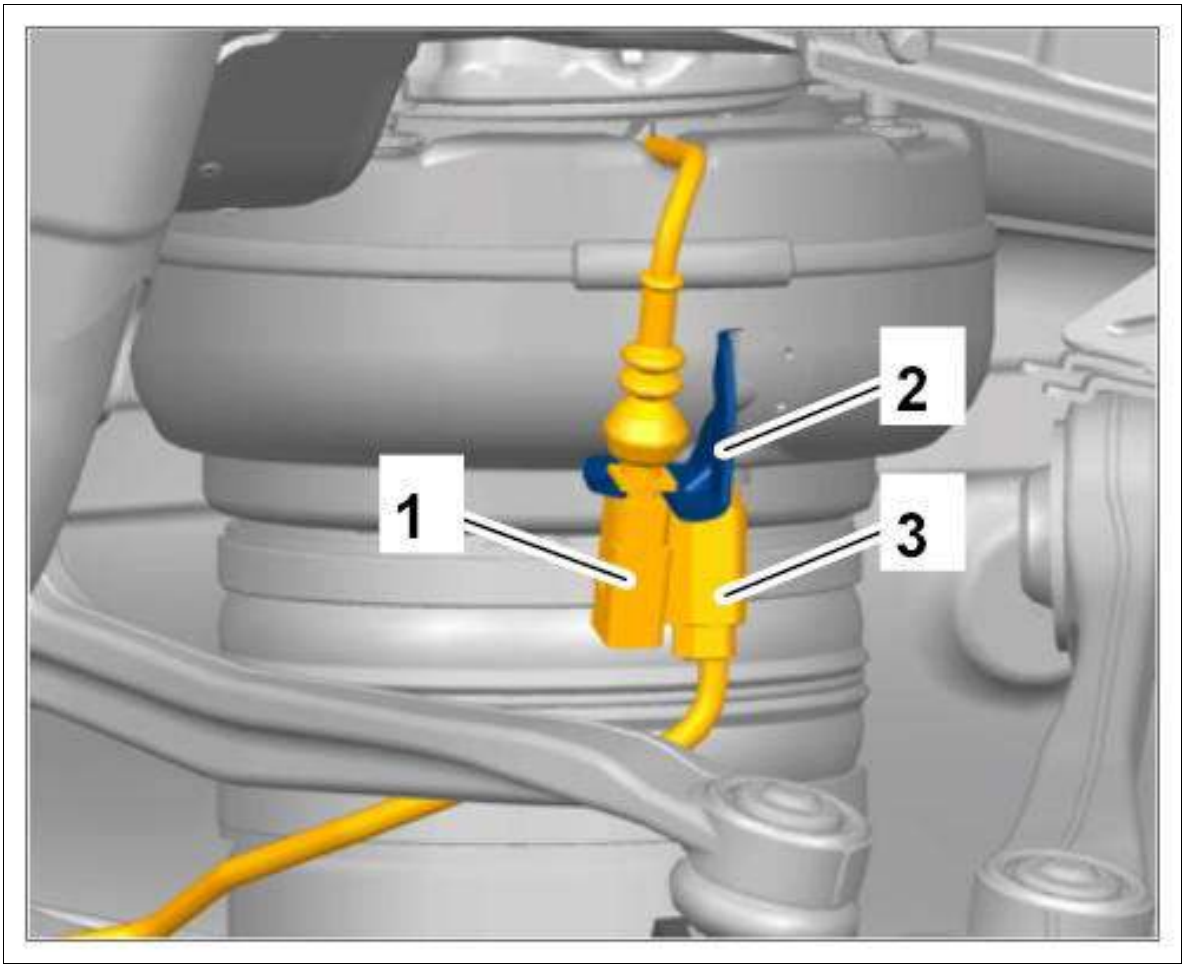
Only nitrogen 5.0 may be used for filling the air suspension system.

- Use a compressed gas bottle with a corresponding pressure reducer unit and pressure gauge.
- Fill the air suspension system to at least → Pressure: +16 bar.
- Fill the air suspension system to max. → Pressure: +17 bar
- Wheels must be suspended freely.
- Switch on ignition.

The air suspension system is filled from the front right air line. After filling the system using the compressed gas bottle of nitrogen, the front right air-spring strut is filled from the pressure accumulator.

1. Raise the vehicle. → 4X00IN LIFTING THE VEHICLE
2. Disconnect air-spring strut line **-3-** at the front right.

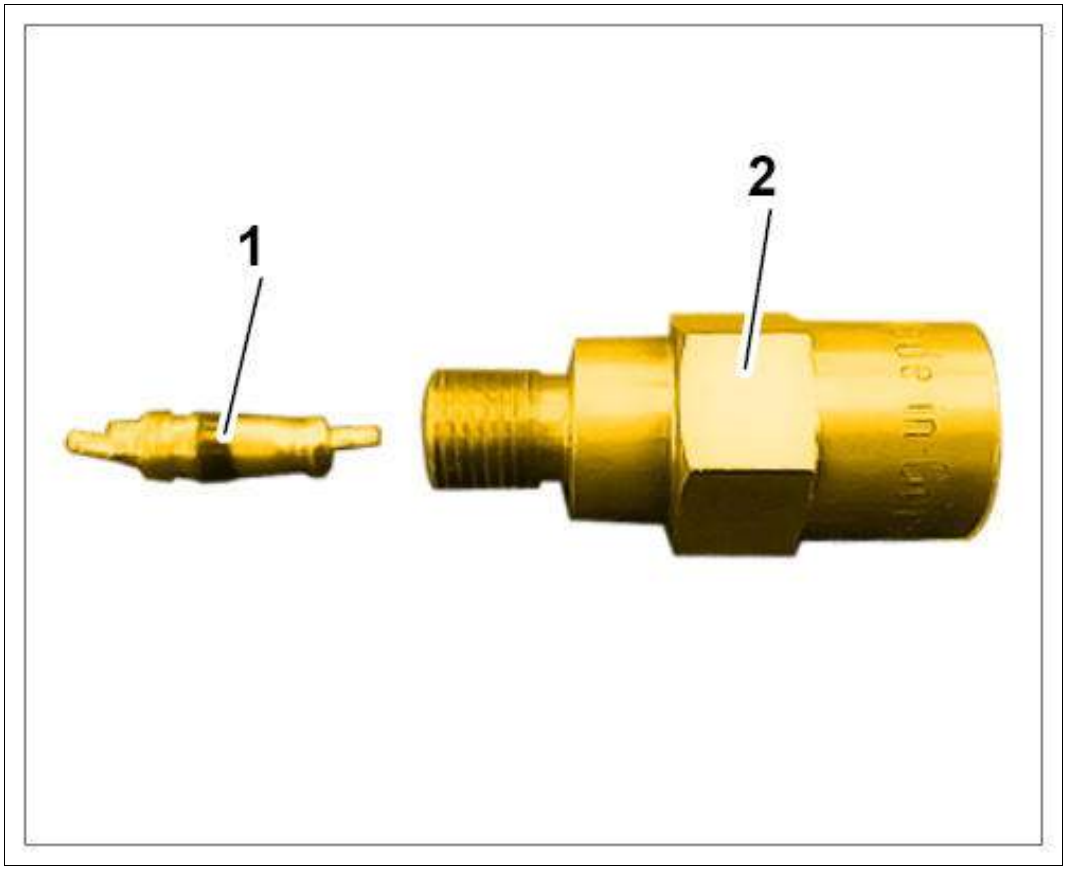
Fig 1: Identifying Line Connections For Air-Spring Strut



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

1. 2.1. Remove valve pin **-1-** using **valve screwdriver Nr.164 Pos.5** from **adapter 9825 -2-** .

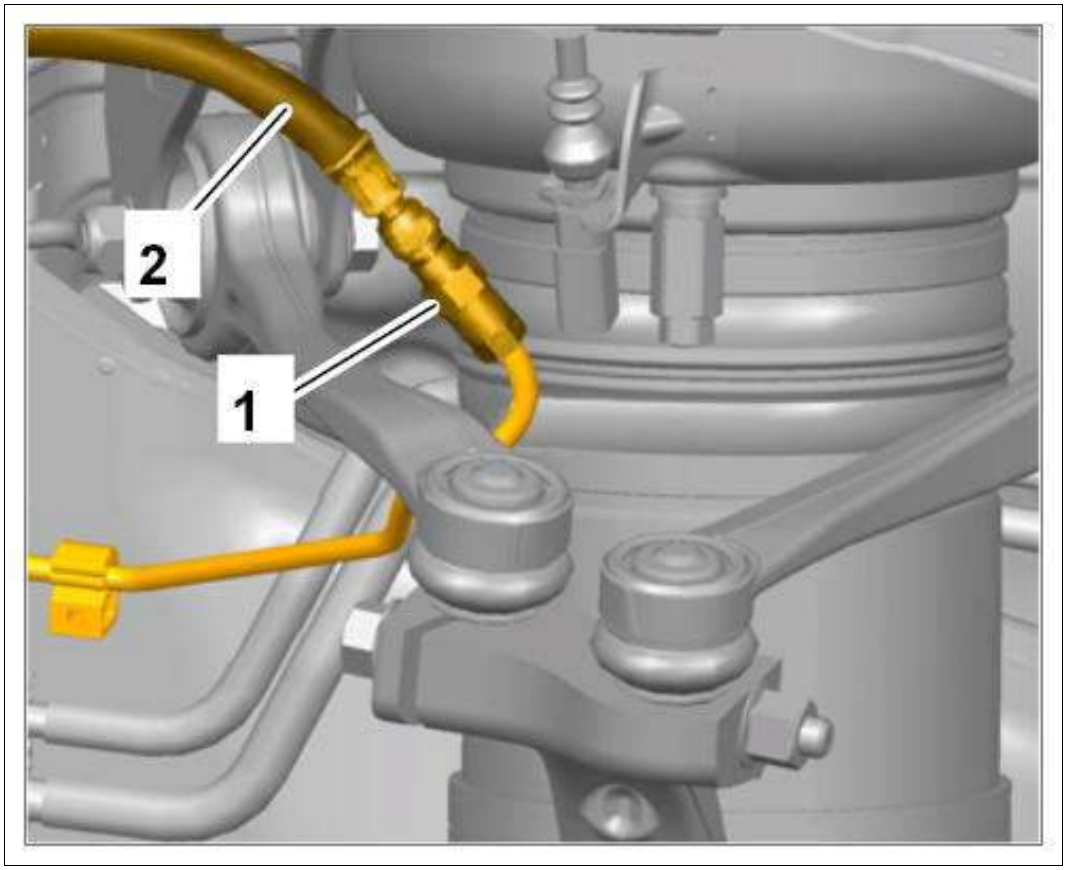
Fig 2: Removing Valve Pin



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

2. 2.2. **Adapter 9825 -1-** and **connecting line 9825/1 -2-** must be connected to the compressed gas bottle of nitrogen and **pressure reducer WE 1409.**

Fig 3: Connecting Adapter And Compressed Gas Bottle



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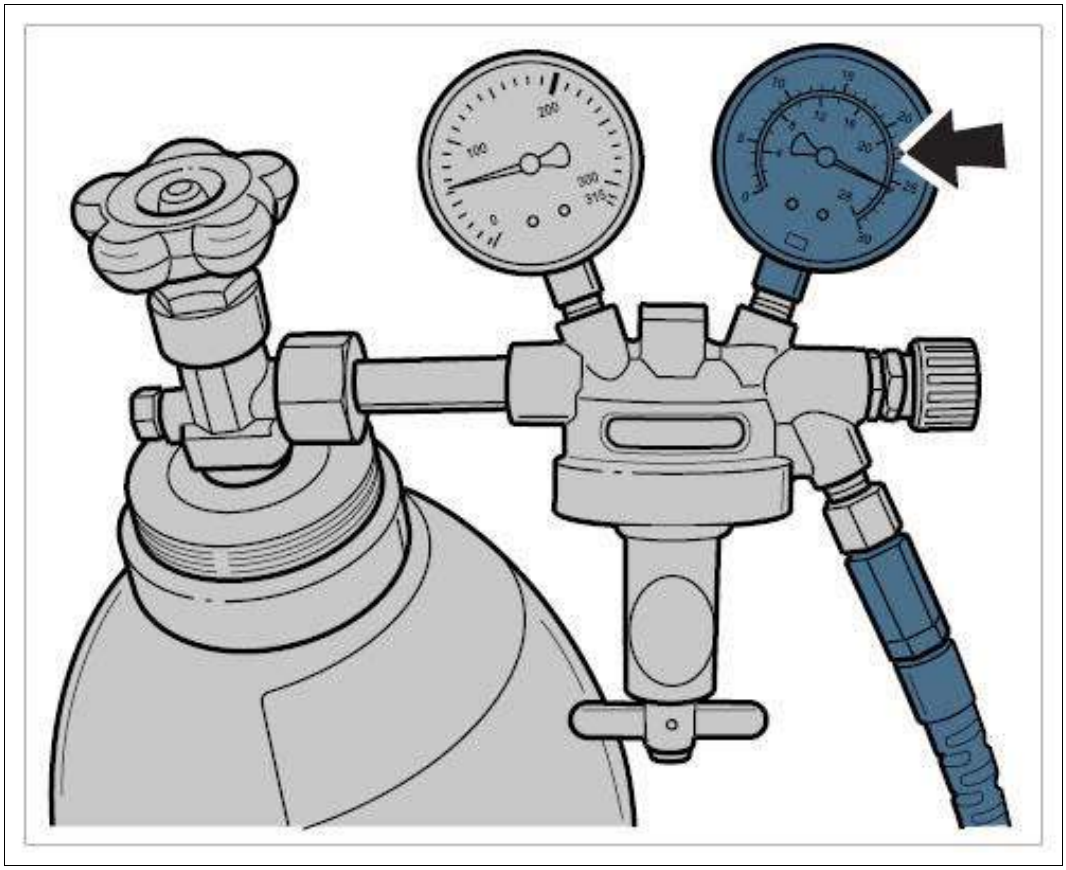
3. 2.3. Open the compressed gas bottle and set the → **Pressure: +17 bar** max. (shown as an example!)

Fig 4: Checking Gas Bottle Pressure



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3. Connect the Porsche System Tester and select >>Levelling system/PASM<< >>Maintenance/repairs<< >>Replacement of several components or replacement of the pressure accumulator<< in the control unit overview and then select >>Fill<<. Follow the instructions on the Porsche System Tester.

4. Fit air line at the front right.

5. Complete the >>Fill<< process. Follow the instructions on the Porsche System Tester.

WM 4301IN COMPONENT ARRANGEMENT - AIR SUSPENSION (MACAN, MACAN S, MACAN TURBO) > COMPONENT ARRANGEMENT - AIR SUSPENSION > COMPONENT ARRANGEMENT - AIR SUSPENSION

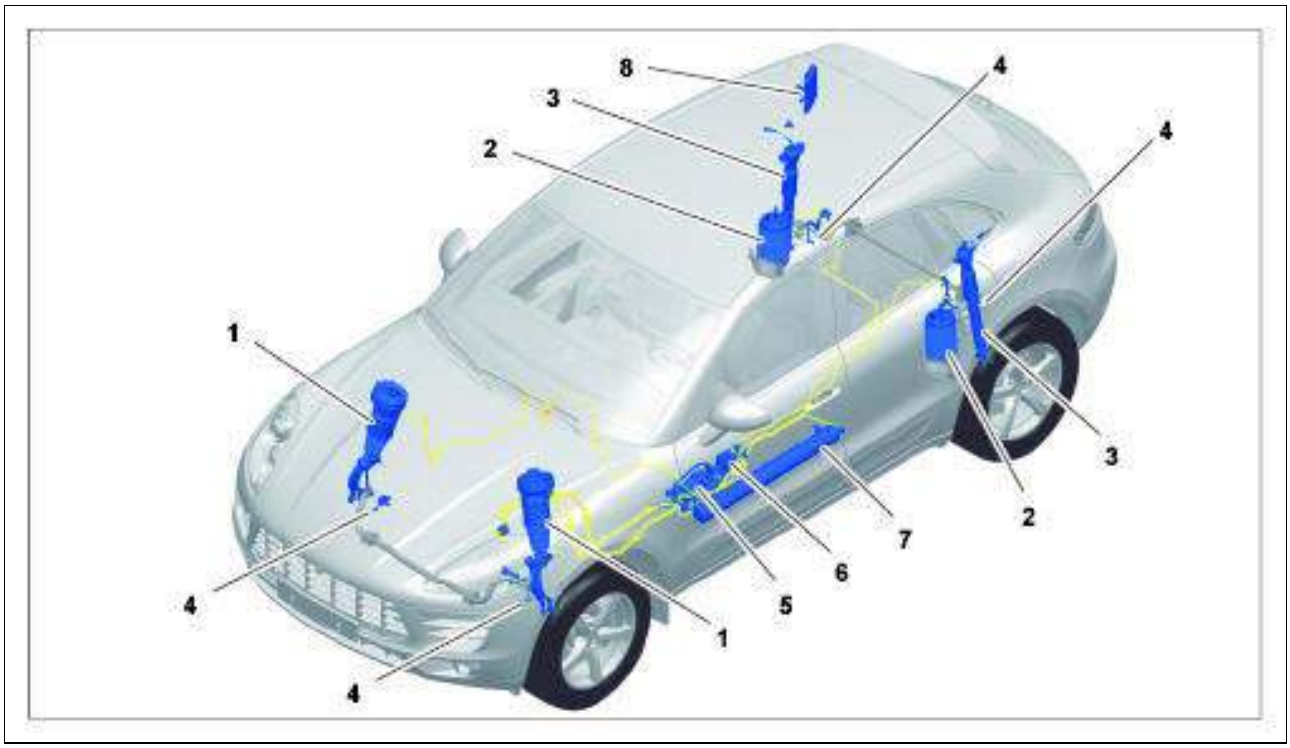
The Macan models feature an optional levelling system with fully supporting air suspension on both axles and an electronically controlled damping system Porsche Active Suspension Management (PASM).

The air suspension with level control makes it possible to actively adapt the ground clearance of the Macan to the current driving situation or to the vehicle load.

Depending on the load, various vehicle ride heights with various suspension characteristics can be achieved by increasing or decreasing the air volume. The amount of air needed for each air-spring strut is determined by means of a control unit and provided via an air supply consisting of a compressor, a

solenoid valve unit and pressure accumulator.

Fig 1: Identifying Air Suspension Components



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No.	Description of component	Qty.	Position
-1-	Air-spring strut, front axle	2	Wheel housing/lower trailing arm
-2-	Air spring, rear axle	2	Air spring mounting on wheel bearing housing
-3-	Vibration damper, rear axle	2	Vibration damper mounting on wheel bearing housing
-4-	Level sensors	4	Lower trailing arm/front axle Lower trailing arm/rear axle
-5-	Compressor	1	Driver's side, lower
-6-	Valve unit	1	Driver's side, lower
-7-	Pressure accumulator	1	Driver's side, lower
-8-	Levelling system control unit/PASM	1	Luggage compartment, right

WM 431519 REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > TECHNICAL VALUES

Location	Description	Type	Basic value	Tolerance 1	Tolerance 2
Compressor to holder	M6 thread	Tightening torque	8 Nm (6 ftlb.)		
Compressor/valve unit holder to underbody	M8 thread	Tightening torque	20 Nm (15 ftlb.)		
Pressure lines to valve block	Union nuts	Tightening torque	3.5 Nm (2.5 ftlb.)		

WM 431519 REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > PRELIMINARY WORK

1. Raise the vehicle. → 4X00IN LIFTING THE VEHICLE .
2. Bleed the levelling system. → BLEEDING AND FILLING THE LEVELLING SYSTEM .
3. Remove center underbody panelling (left cover). → 519319 REMOVING AND INSTALLING COVER FOR CENTER UNDERBODY .

WM 431519 REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM > REMOVING COMPRESSOR FOR LEVELLING SYSTEM

WARNING: Danger of objects or loads falling down

- *Risk of squashing or crushing*

→ Secure components to prevent them from falling down.

CAUTION: Escaping residual air

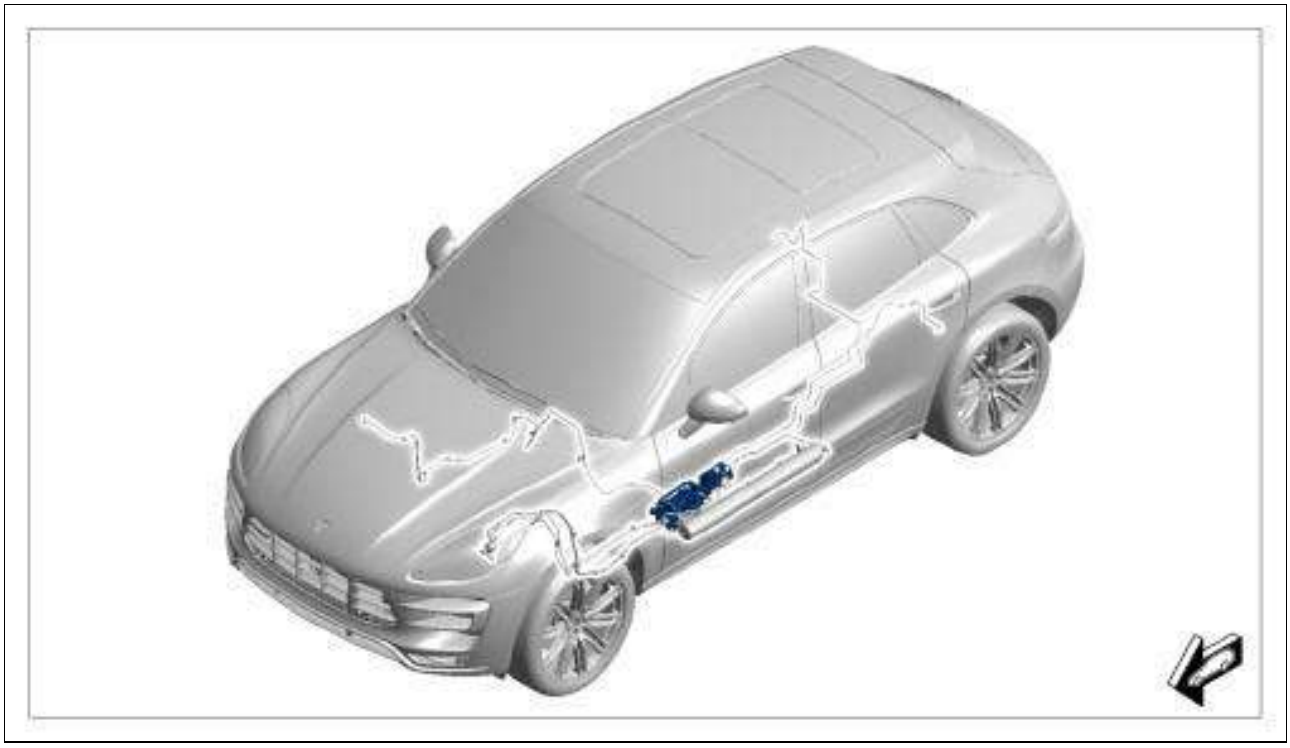
- *Risk of eye injuries*

→ Wear protective goggles.

Information

The instructions for removing and installing relate to the entire compressor unit with holder and valve unit.

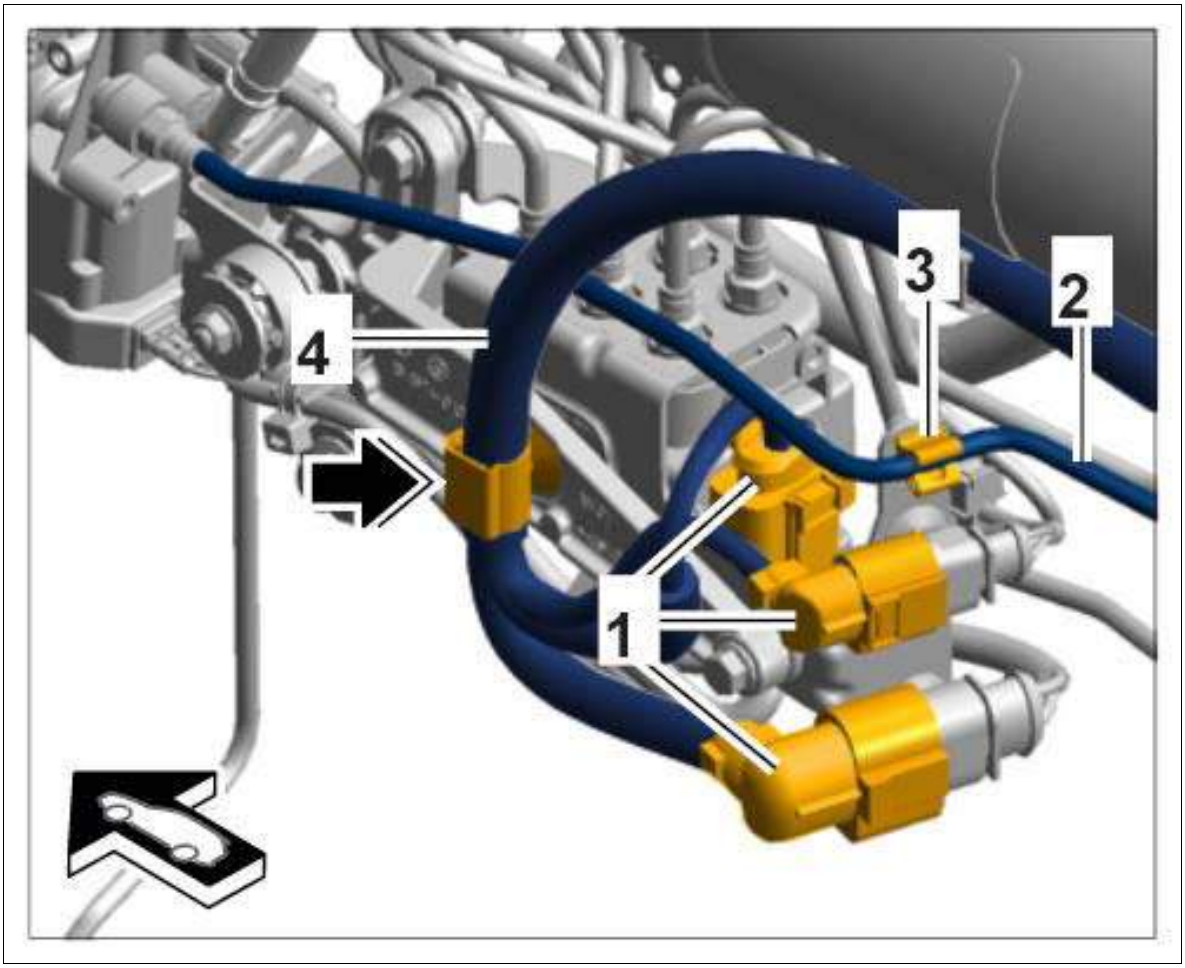
Fig 1: Identifying Compressor Unit With Holder And Valve Unit



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

1. Release and disconnect electric plug connections **-1-** .
2. Unclip pressure line **-2-** (black) from the holder **-3-** .
3. Unclip wiring harness **-4-** from the underside of the compressor **-arrow-** .

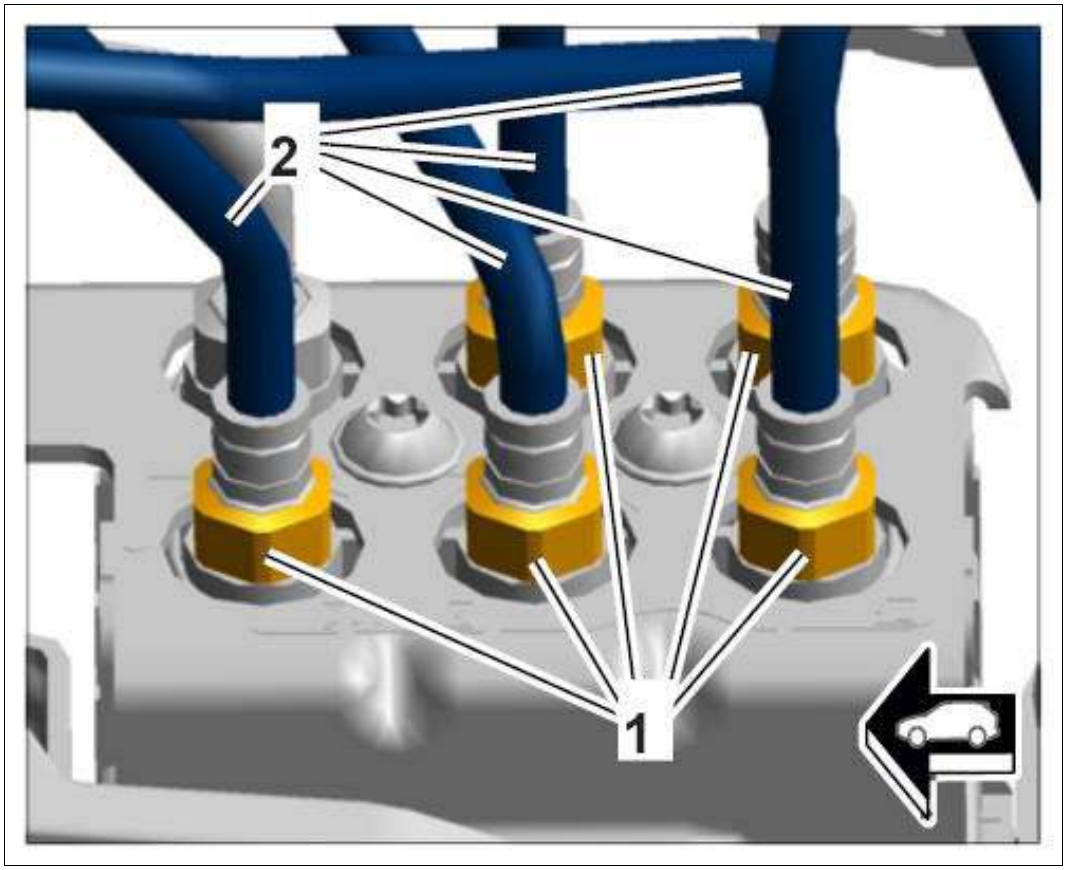
Fig 2: Locating Compressor Pressure Line



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

4. Remove pressure lines **-2-** on the valve block.
    1. 4.1. Unscrew union nuts **-1-** .
    2. 4.2. Remove pressure lines **-2-** .

Fig 3: Identifying Pressure Lines Union Nuts

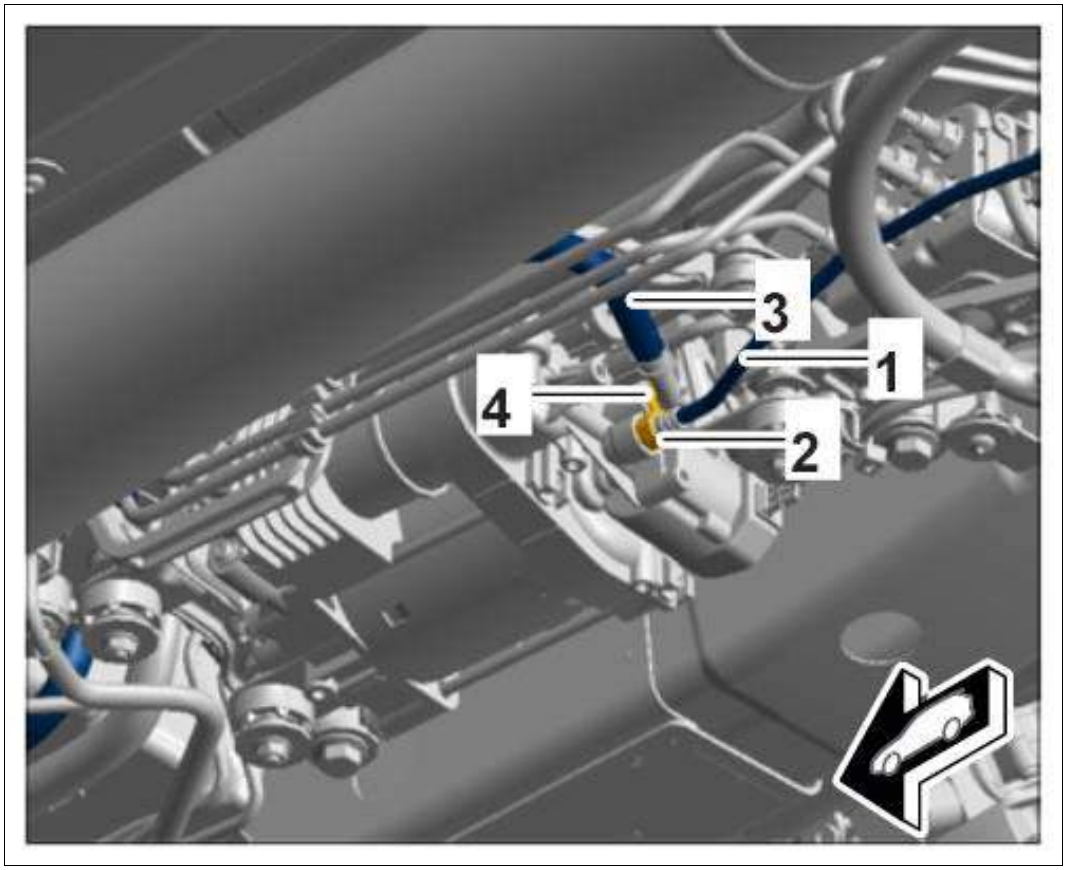


Courtesy of PORSCHE CARS NORTH AMERICA, INC.

5. Remove pressure line and suction line from the compressor.

    1. 5.1. Unscrew union nut **-2-** on the pressure line **-1-** (black).
    2. 5.2. Remove pressure line **-1-** (black).
    3. 5.3. Carefully release sleeve **-4-** on the suction line **-3-** using a screwdriver.
    4. 5.4. Carefully disconnect suction line **-3-** .

Fig 4: Identifying Compressor Lines



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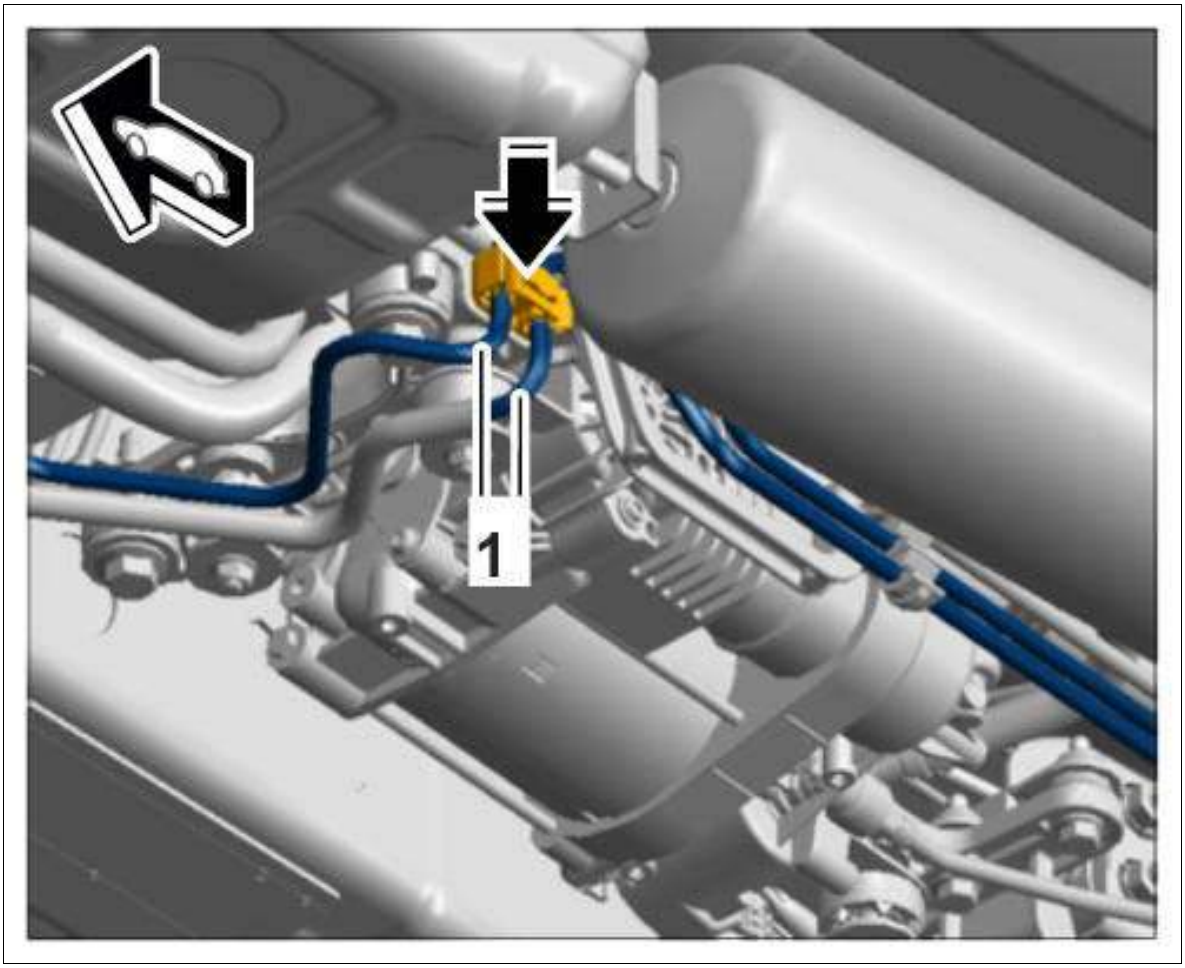
6. Unclip pressure lines **-1-** (black and violet) at the holder **-arrow-** .

Fig 5: Locating Pressure Lines Holder



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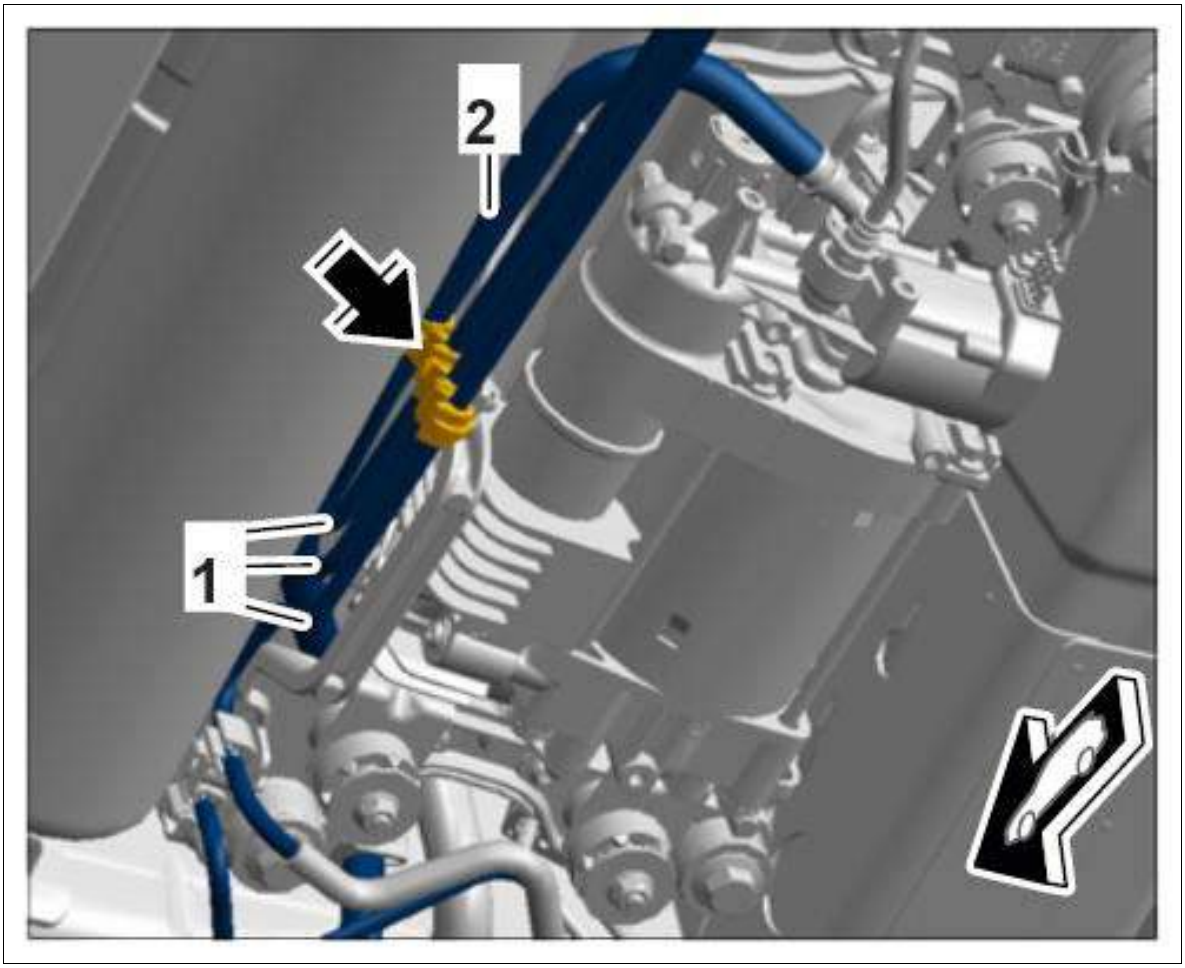
7. Unclip pressure lines **-1-** (black, violet and green) and suction line **-2-** from the holder **-arrow-**.

Fig 6: Locating Suction And Pressure Lines Holder



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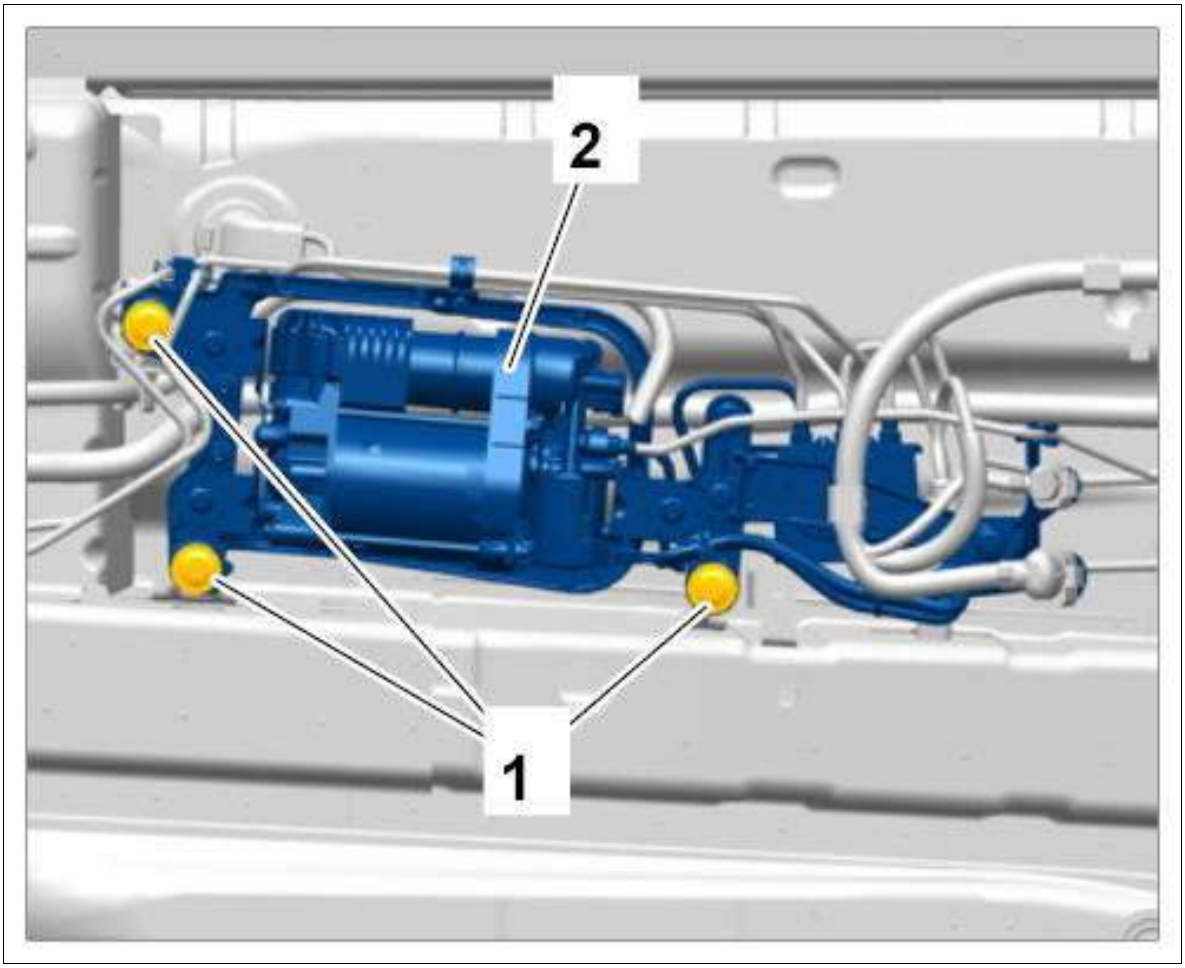
8. Unscrew fastening screws **-1-** on the compressor unit **-2-** and remove compressor unit.

Fig 7: Identifying Compressor Holder And Valve Unit Mounting

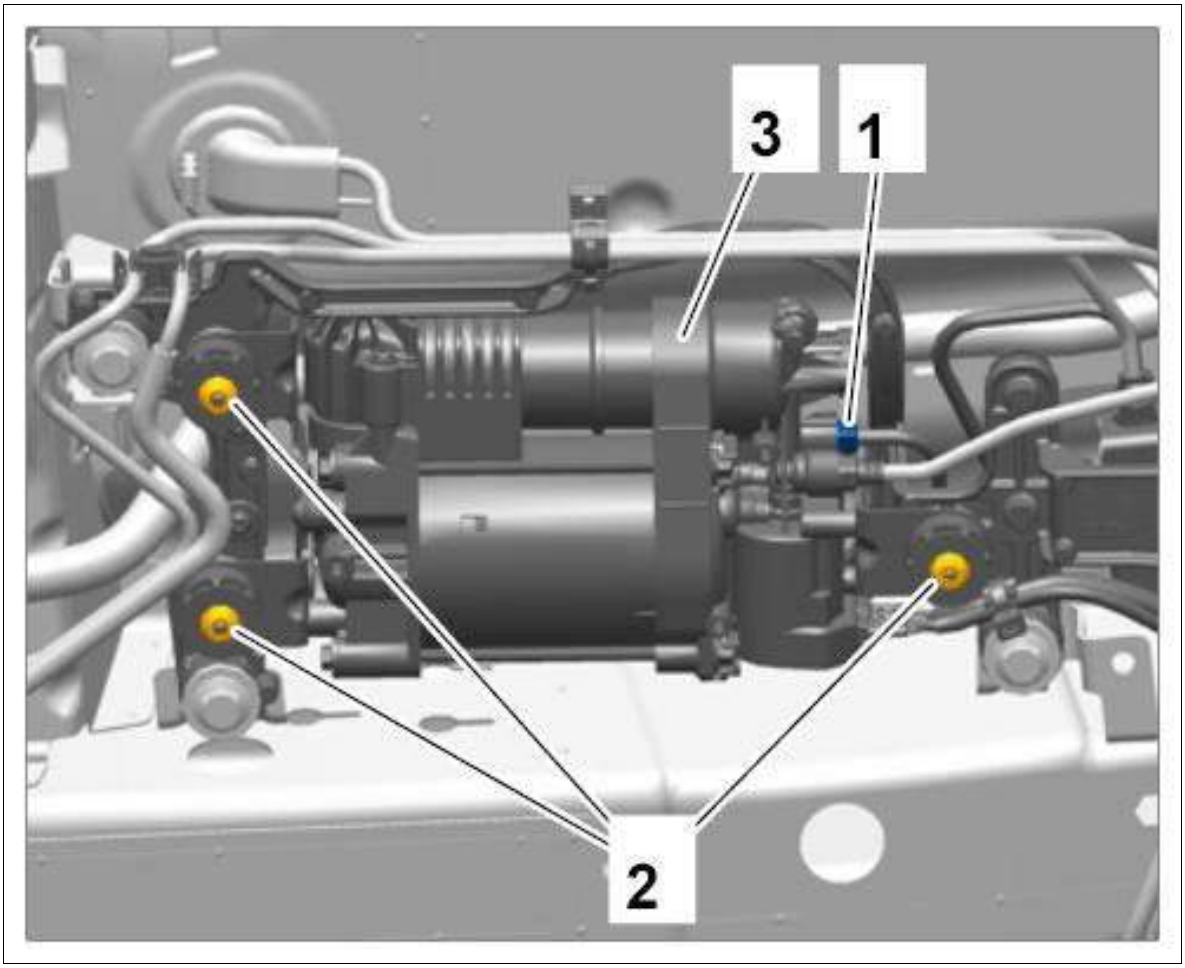


Courtesy of PORSCHE CARS NORTH AMERICA, INC.

WM 431519 REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM > REPLACING COMPRESSOR FOR LEVELLING SYSTEM

1. Loosen connecting line from the compressor to the valve block (blue) **-1-** at the compressor.
2. Loosen the threaded joint **-2-** for the compressor.
3. Remove compressor **-3-** .

Fig 1: Identifying Compressor Mounting Joint



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

WM 431519 REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM > INSTALLING COMPRESSOR FOR LEVELLING SYSTEM

Installation is performed in reverse order.

Observe specified tightening torques:

Compressor to holder: **Tightening torque 8 Nm (6 ftlb.)**

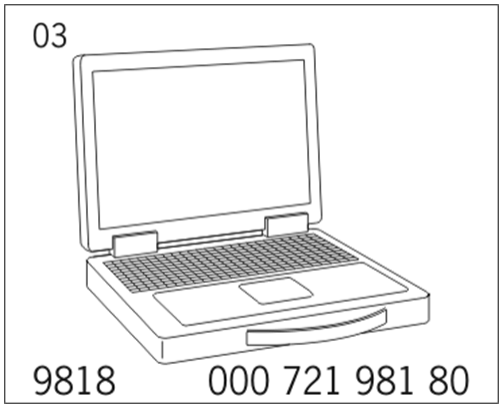
Holder to body: **Tightening torque 20 Nm (15 ftlb.)**

Air lines to compressor/valve unit: **Tightening torque 3.5 Nm (2.5 ftlb.)**

WM 431519 REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > SUBSEQUENT WORK

1. Install center underbody panelling (left cover). → INSTALLING COVER FOR CENTER UNDERBODY .
2. Fill the levelling system. → BLEEDING AND FILLING THE LEVELLING SYSTEM .

WM 431619 REMOVING AND INSTALLING PASM CONTROL UNIT (MACAN, MACAN S, MACAN TURBO) > TOOLS

Designation	Type	Number	Description	
PIWIS Tester II	Special tool	9818		

WM 431619 REMOVING AND INSTALLING PASM CONTROL UNIT (MACAN, MACAN S, MACAN TURBO) > PRELIMINARY WORK

1. Remove side trim panel for rear luggage compartment. → 700319 REMOVING AND INSTALLING SIDE TRIM PANEL FOR REAR LUGGAGE COMPARTMENT

WM 431619 REMOVING AND INSTALLING PASM CONTROL UNIT (MACAN, MACAN S, MACAN TURBO) > REMOVING AND INSTALLING PASM CONTROL UNIT > REMOVING PASM CONTROL UNIT

NOTE: Voltage peaks

- *Risk of damage to load or to the control unit*

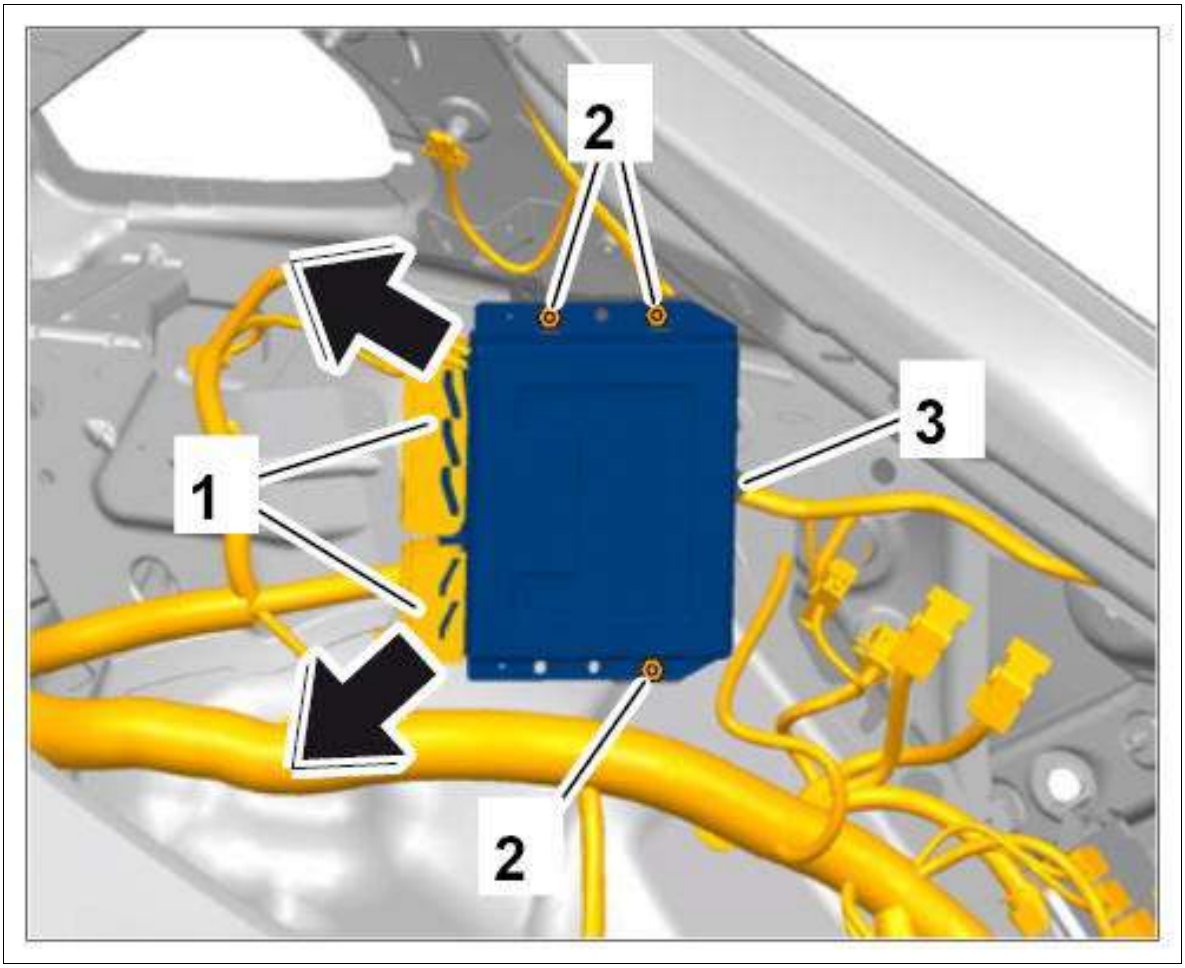
→ Remove the ignition key and switch off load before disconnecting or removing load.

Installation position: → 4301IN POSITION OF AIR SUSPENSION COMPONENTS

1. Release connector **-1-** and disconnect it **-arrows-** .
2. Unscrew nuts **-2-** .

3. Remove PASM control unit **-3-** from the holder.

Fig 1: Locating PASM Control Unit Nut



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

WM 431619 REMOVING AND INSTALLING PASM CONTROL UNIT (MACAN, MACAN S, MACAN TURBO) > REMOVING AND INSTALLING PASM CONTROL UNIT > INSTALLING PASM CONTROL UNIT

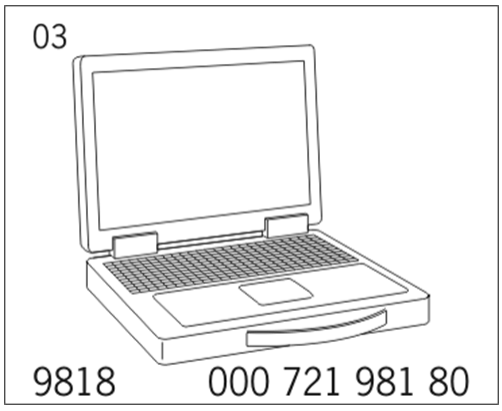
Installation is performed in reverse order.

WM 431619 REMOVING AND INSTALLING PASM CONTROL UNIT (MACAN, MACAN S, MACAN TURBO) > SUBSEQUENT WORK

1. Install side trim panel for rear luggage compartment. → INSTALLING SIDE TRIM PANEL FOR REAR LUGGAGE COMPARTMENT .

2. If the control unit was replaced, the "new" control unit must be adapted to suit the vehicle using **PIWIS Tester II 9818.** → 431655 REPLACING PASM CONTROL UNIT .

WM 431655 REPLACING PASM CONTROL UNIT (MACAN, MACAN S, MACAN TURBO) > TOOLS

Designation	Type	Number	Description	
PIWIS Tester II	Special tool	9818		

WM 431655 REPLACING PASM CONTROL UNIT (MACAN, MACAN S, MACAN TURBO) > TECHNICAL VALUES

Location	Description	Type	Basic value	Tolerance 1	Tolerance 2
Current rating		Nominal value	40 A		

WM 431655 REPLACING PASM CONTROL UNIT (MACAN, MACAN S, MACAN TURBO) > PRELIMINARY WORK

1. Switch off ignition and replace control unit. → 431619 REMOVING AND INSTALLING PASM CONTROL UNIT .

WM 431655 REPLACING PASM CONTROL UNIT (MACAN, MACAN S, MACAN TURBO) > CODING PASM CONTROL UNIT

NOTE: Voltage drop

- *Risk of irreparable damage to control unit*
- *Risk of damage to control unit*
- *Fault entries in the control unit*
- *Coding in the control unit is aborted*

- *Malfunctions in control unit, even during programming*

→ Prior to disconnecting the control unit, switch off ignition and remove ignition key.

→ Ensure that the power supply is not interrupted during programming.

→ Connect a battery charger with a current rating of at least → **Nominal value: 40 A** to the vehicle battery.

Information

The **PIWIS Tester II 9818** instructions take precedence since the description may be different with later Tester releases.

The procedure described here has been structured in general terms. Different text or additional information may appear in **PIWIS Tester II 9818** .

1. Connect the PIWIS Tester to the vehicle and start the Tester. Switch on ignition and press [F12] to continue.
2. Select the vehicle type and start the diagnostic application.
3. Select the required control unit **PASM** in the **overview** .
4. **Extended identifications** must now be selected.
5. **Enter the vehicle identification number** and press [Enter] to confirm your entry.
6. **Maintenance/repairs** must then be selected.
7. **Control unit replacement** must now be selected. Then press [F12] to continue.
8. **Select Write data,** press [F12] and then press [F8] to start. Data is installed.
9. The Tester confirms that **Coding has been written successfully.** Press [F12] to continue.
10. Read out the fault memory and erase it if necessary.
11. Check the PASM function during the test drive.

WM 431855 REPLACING FRONT LEVEL SENSOR (MACAN, MACAN S, MACAN TURBO) > TECHNICAL VALUES

Location	Description	Type	Basic value	Tolerance 1	Tolerance 2
Front level sensor to front-axle carrier	M8 thread	Tightening torque	20 Nm (15 ftlb.)		
Level sensor to lower trailing arm	M6 thread	Tightening torque	9 Nm (6.5 ftlb.)		

WM 431855 REPLACING FRONT LEVEL SENSOR (MACAN, MACAN S, MACAN TURBO) > PRELIMINARY WORK

1. Raise the vehicle. → 4X00IN LIFTING THE VEHICLE

WM 431855 REPLACING FRONT LEVEL SENSOR (MACAN, MACAN S, MACAN TURBO) > REPLACING FRONT LEVEL SENSOR

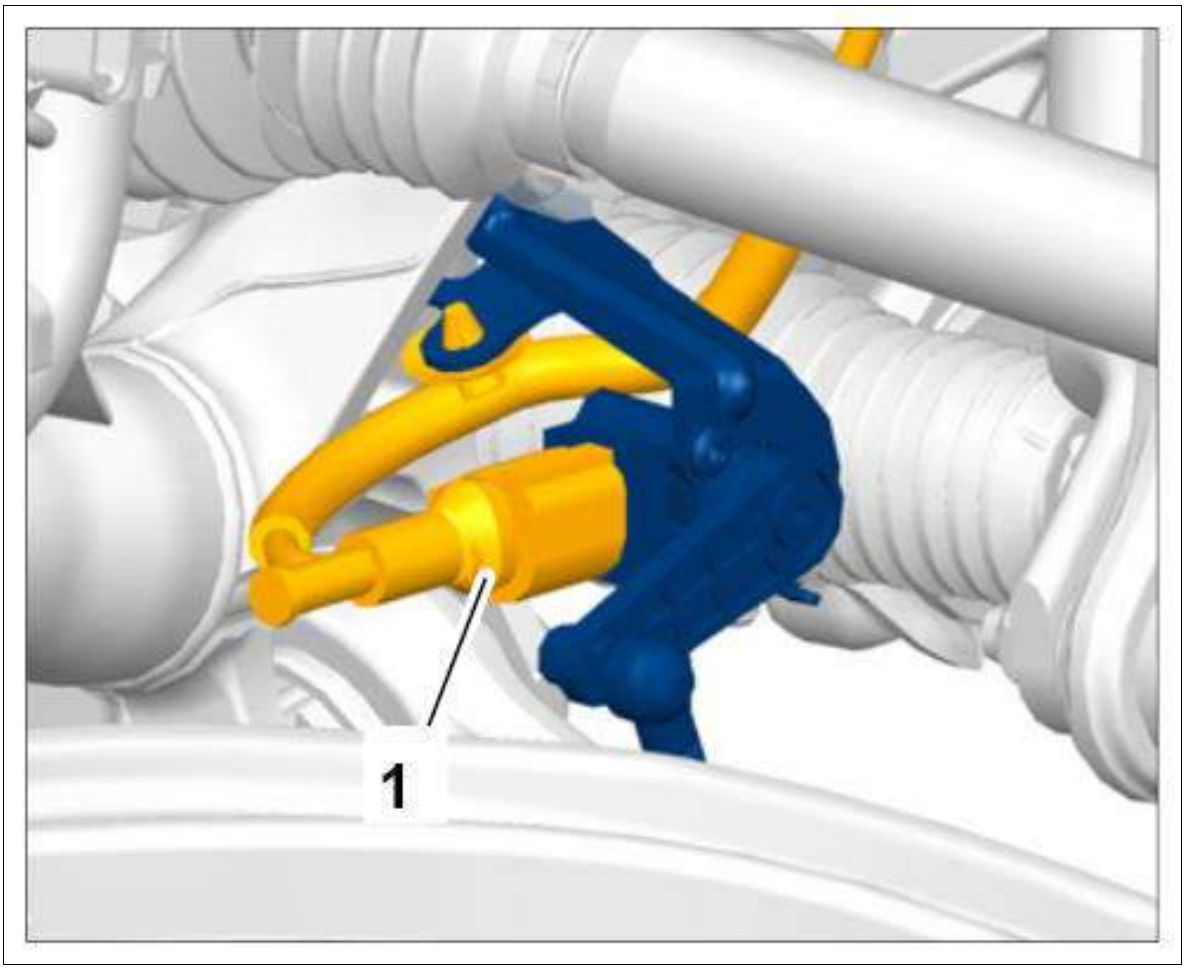
Information

Either two or four level sensors are installed on the vehicle, depending on equipment variant:

- Steel springs without PASM: only left side of the vehicle (front and rear axle)
- Air springs and steel springs with PASM: left and right side of the vehicle (front and rear axle)

1. Press electric connector **-1-** together and disconnect it.

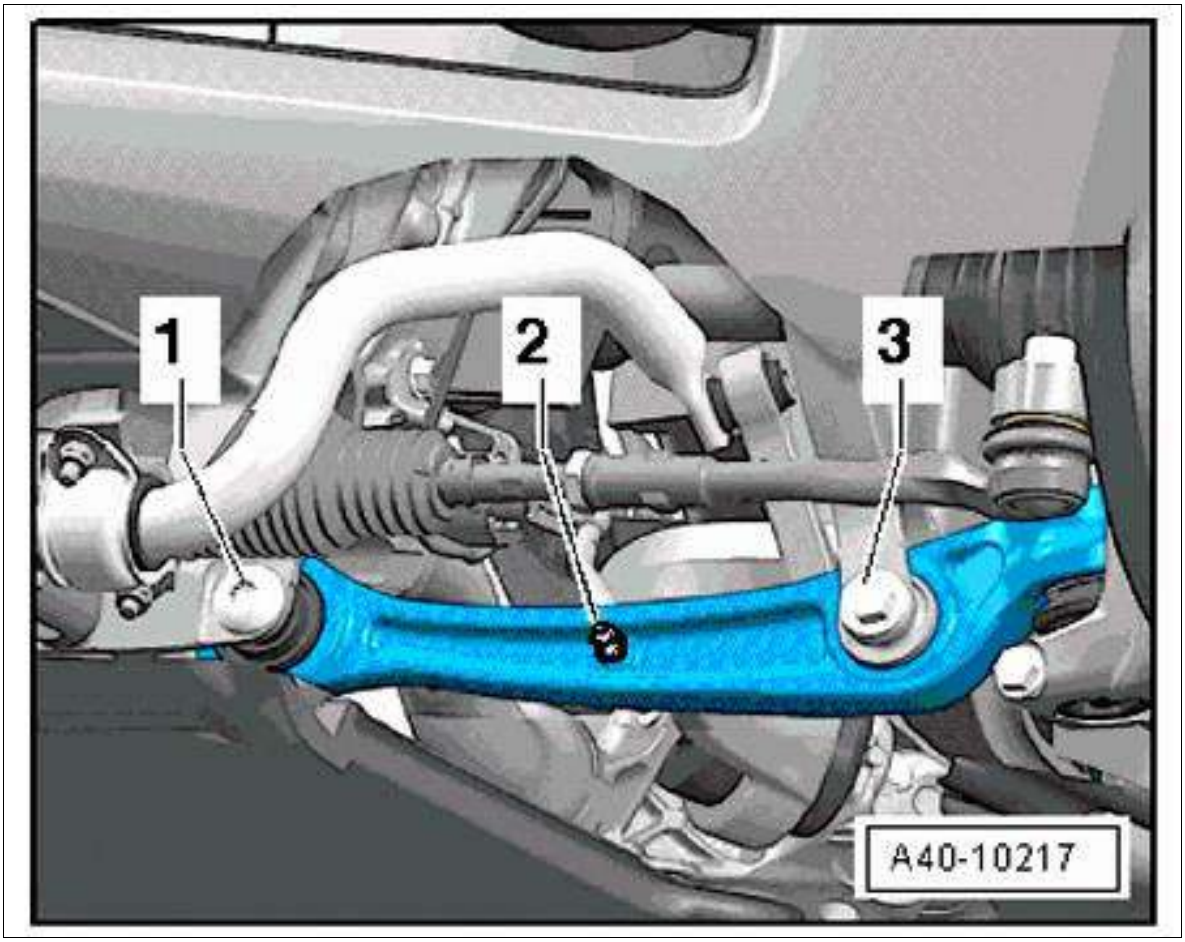
Fig 1: Identifying Level Sensor Connector



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

2. Unscrew nut **-2-** for the level sensor on the lower trailing arm.

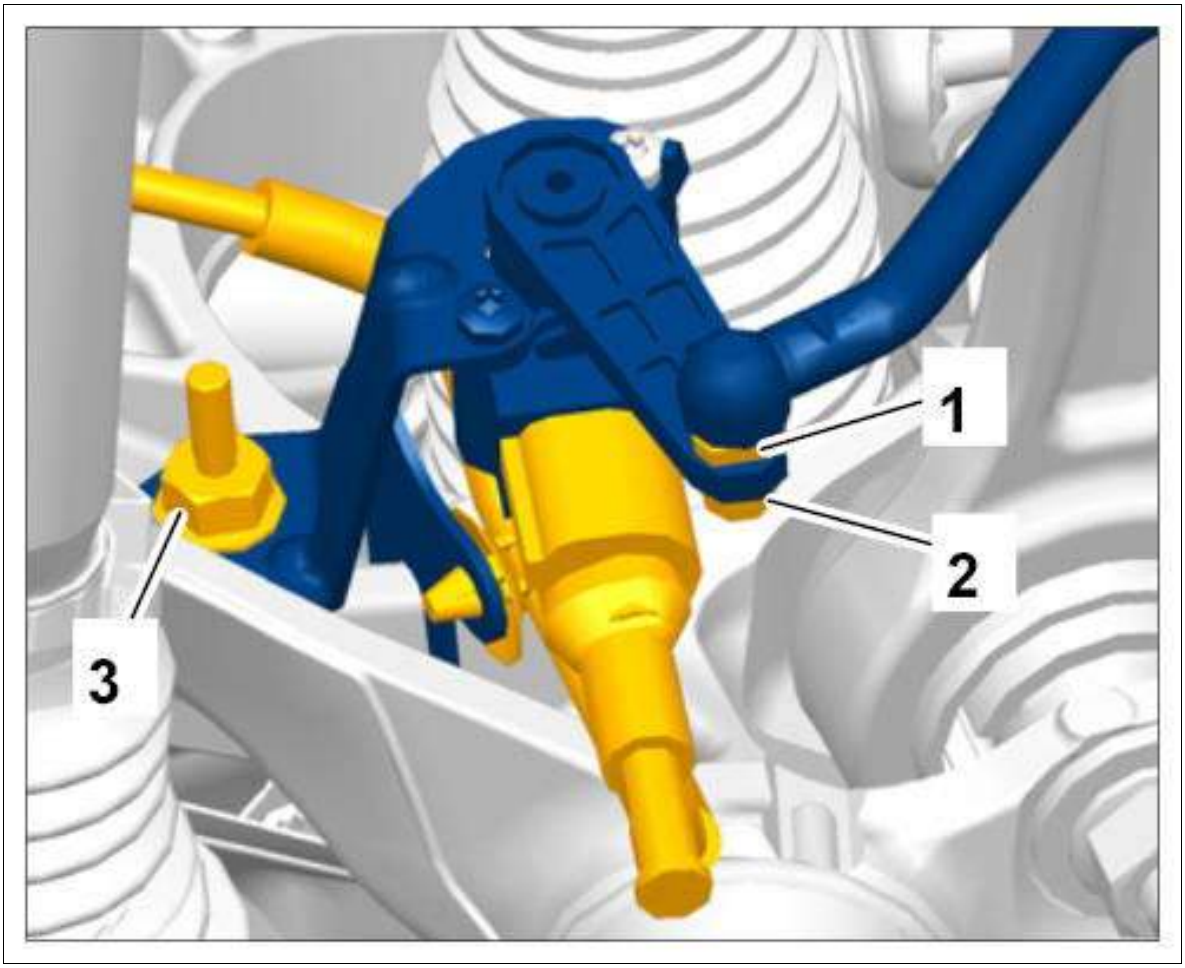
Fig 2: Identifying Lower Trailing Arm Mounting



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

3. Loosen nut **-3-** and remove level sensor.

Fig 3: Identifying Level Sensor Mounting



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

WM 431855 REPLACING FRONT LEVEL SENSOR (MACAN, MACAN S, MACAN TURBO) > REPLACING FRONT LEVEL SENSOR > INSTALLING FRONT LEVEL SENSOR

1. Installation is performed in reverse order.

   Observe specified tightening torques:

   Level sensor to front-axle carrier: **Tightening torque 20 Nm (15 ftlb.)**

   Level sensor to lower trailing arm: **Tightening torque 9 Nm (6.5 ftlb.)**

2. Calibrate level sensor.

   Information, measuring points, procedure and conditions for calibration: → 430115 CALIBRATING THE LEVELLING SYSTEM

   1. 2.1. Connect the Porsche System Tester to the vehicle and start the System Tester. Switch on ignition.

2. 2.2. Select vehicle type.
3. 2.3. Select Levelling system/PASM.
4. 2.4. Select the Maintenance/repairs menu and run the Calibrate level sensor function.

WM 431955 REPLACING REAR LEVEL SENSOR (MACAN, MACAN S, MACAN TURBO) > TECHNICAL VALUES

Location	Description	Type	Basic value	Tolerance 1	Tolerance 2
Level sensor to lower trailing arm	M6 x 16 thread	Tightening torque	9 Nm (6.5 ftlb.)		
Upper control arm to rear axle housing	M12 thread/always use new screws or bolts and nuts following removal	Initial tightening	70 Nm (52 ftlb.)		

WM 431955 REPLACING REAR LEVEL SENSOR (MACAN, MACAN S, MACAN TURBO) > PRELIMINARY WORK

1. Raise the vehicle. → 4X00IN LIFTING THE VEHICLE

WM 431955 REPLACING REAR LEVEL SENSOR (MACAN, MACAN S, MACAN TURBO) > REPLACING REAR LEVEL SENSOR

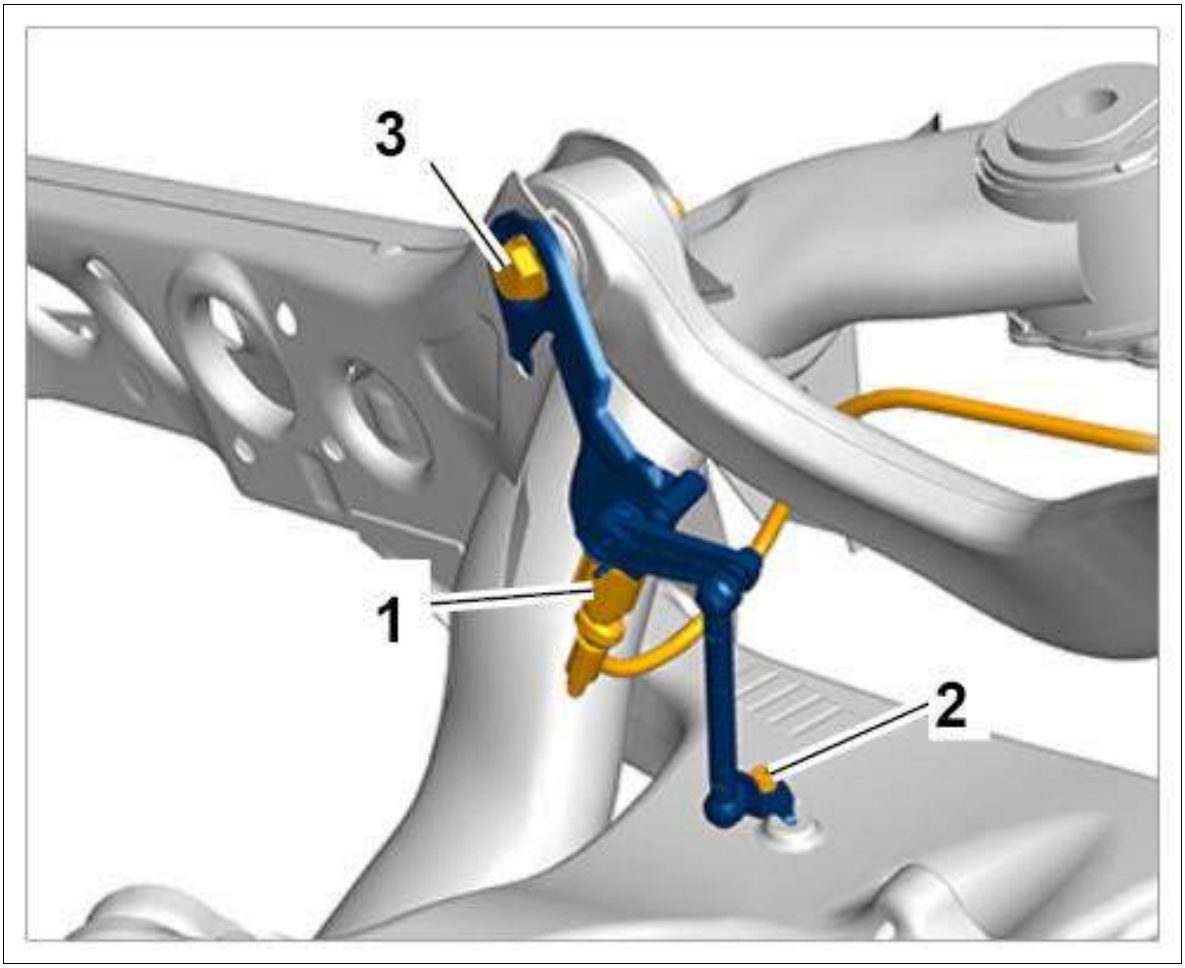
Information

Either two or four level sensors are installed on the vehicle, depending on equipment variant:

- Steel springs without PASM: only left side of the vehicle (front and rear axle)
- Air springs and steel springs with PASM: left and right side of the vehicle (front and rear axle)

1. Release and disconnect electric connector **-1-** .
2. Unscrew fastening screw **-2-** on the lower trailing arm.
3. Unscrew fastening screw **-3-** on the rear axle housing.
4. Remove level sensor.

Fig 1: Identifying Rear Level Sensor Mounting Screws



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

WM 431955 REPLACING REAR LEVEL SENSOR (MACAN, MACAN S, MACAN TURBO) > REPLACING REAR LEVEL SENSOR > INSTALLING REAR LEVEL SENSOR

1. Installation is performed in reverse order.

   Observe the specified tightening torque:

   Level sensor with upper control arm to rear axle housing: **Initial tightening 70 Nm (52 ftlb.)**

   Level sensor to lower trailing arm: **Tightening torque 9 Nm (6.5 ftlb.)**

2. Calibrate level sensor.

   Information, measuring points, procedure and conditions for calibration: → 430115 CALIBRATING THE LEVELLING SYSTEM

   1. 2.1. Connect the Porsche System Tester to the vehicle and start the System Tester. Switch on ignition.

   2. 2.2. Select vehicle type.

3. 2.3. Select Levelling system/PASM.
4. 2.4. Select the Maintenance/repairs menu and run the Calibrate level sensor function.

WM 432355 REPLACING VALVE UNIT (LEVELLING SYSTEM) (MACAN, MACAN S, MACAN TURBO) > TECHNICAL VALUES

Location	Description	Type	Basic value	Tolerance 1	Tolerance 2
Valve unit to holder	M6 thread	Tightening torque	4.5 Nm (3 ftlb.)		
Pressure lines to valve block	Union nuts	Tightening torque	3.5 Nm (2.5 ftlb.)		

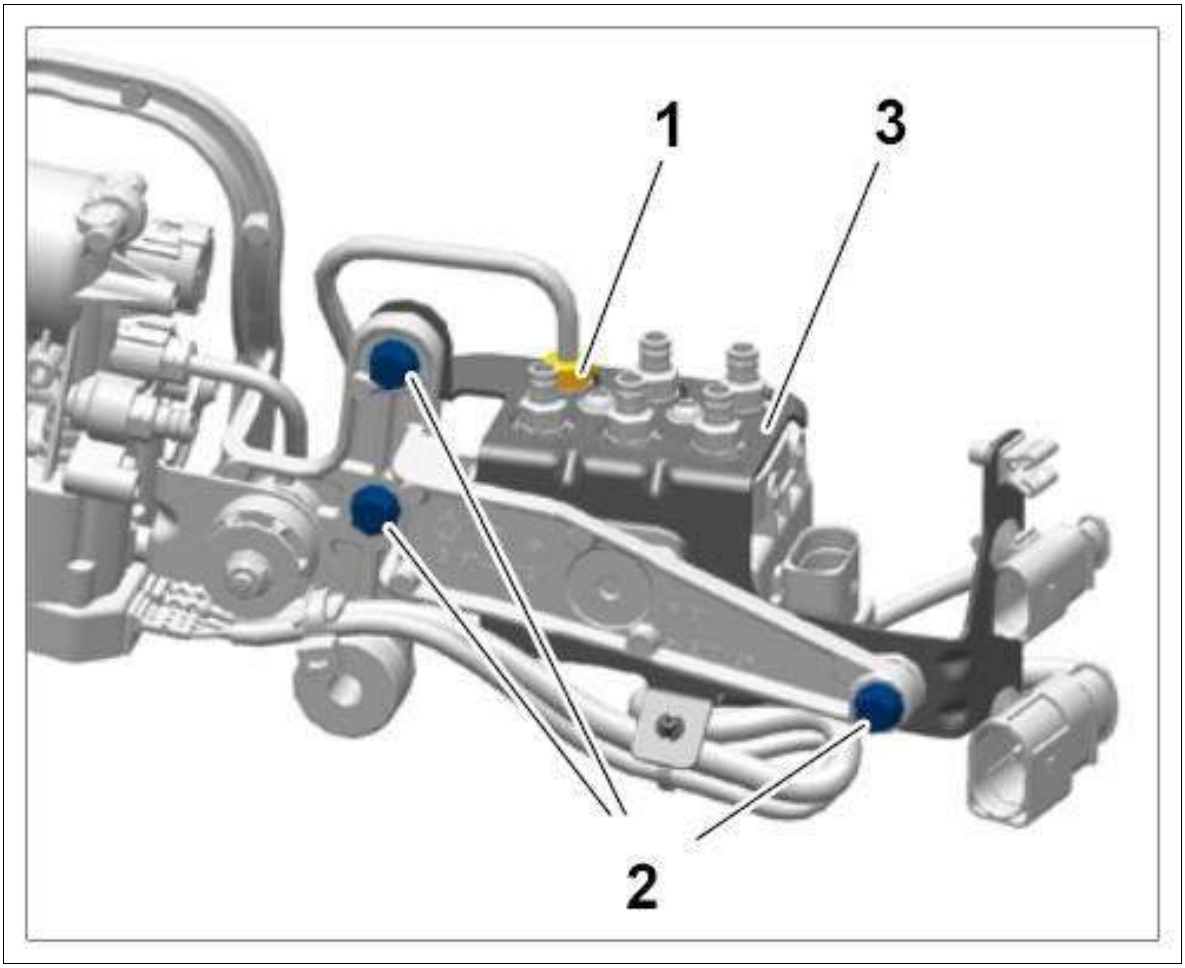
WM 432355 REPLACING VALVE UNIT (LEVELLING SYSTEM) (MACAN, MACAN S, MACAN TURBO) > PRELIMINARY WORK

1. Raise the vehicle. → 4X00IN LIFTING THE VEHICLE
2. Bleed the levelling system. → BLEEDING AND FILLING THE LEVELLING SYSTEM
3. Remove center underbody panelling (left cover). → 519319 REMOVING AND INSTALLING COVER FOR CENTER UNDERBODY
4. Remove compressor for levelling system. → 431519 REMOVING AND INSTALLING COMPRESSOR FOR LEVELLING SYSTEM

WM 432355 REPLACING VALVE UNIT (LEVELLING SYSTEM) (MACAN, MACAN S, MACAN TURBO) > REPLACING VALVE UNIT (LEVELLING SYSTEM)

1. Disconnect connecting line from the compressor to the valve unit (blue) **-1-** at the valve unit.
2. Unscrew fastening screws **-2-** from the valve unit
3. Remove valve unit **-3-** .

Fig 1: Identifying Valve Unit Mounting



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WM 432355 REPLACING VALVE UNIT (LEVELLING SYSTEM) (MACAN, MACAN S, MACAN TURBO) > REPLACING VALVE UNIT (LEVELLING SYSTEM) > INSTALLING VALVE UNIT (LEVELLING SYSTEM)

Installation is performed in reverse order.

Observe specified tightening torques:

Valve unit to holder: **Tightening torque 4.5 Nm (3 ftlb.)**

Air lines to valve unit: **Tightening torque 3.5 Nm (2.5 ftlb.)**

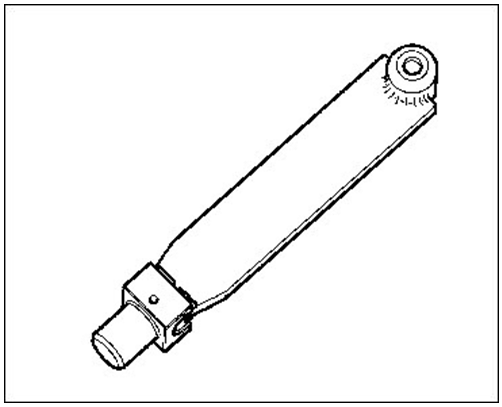
WM 432355 REPLACING VALVE UNIT (LEVELLING SYSTEM) (MACAN, MACAN S, MACAN TURBO) > SUBSEQUENT WORK

1. Install compressor for levelling system → INSTALLING COMPRESSOR FOR LEVELLING SYSTEM .

2. Install center underbody panelling (left cover). → INSTALLING COVER FOR CENTER UNDERBODY .

3. Fill the levelling system. → BLEEDING AND FILLING THE LEVELLING SYSTEM .

WM 433019 REMOVING AND INSTALLING FRONT AIR-SPRING STRUT (MACAN, MACAN S, MACAN TURBO) > TOOLS

Designation	Type	Number	Description	
transmission jack	Workshop equipment	WE 1082		
Support	VW tool	T10149		

WM 433019 REMOVING AND INSTALLING FRONT AIR-SPRING STRUT (MACAN, MACAN S, MACAN TURBO) > TECHNICAL VALUES

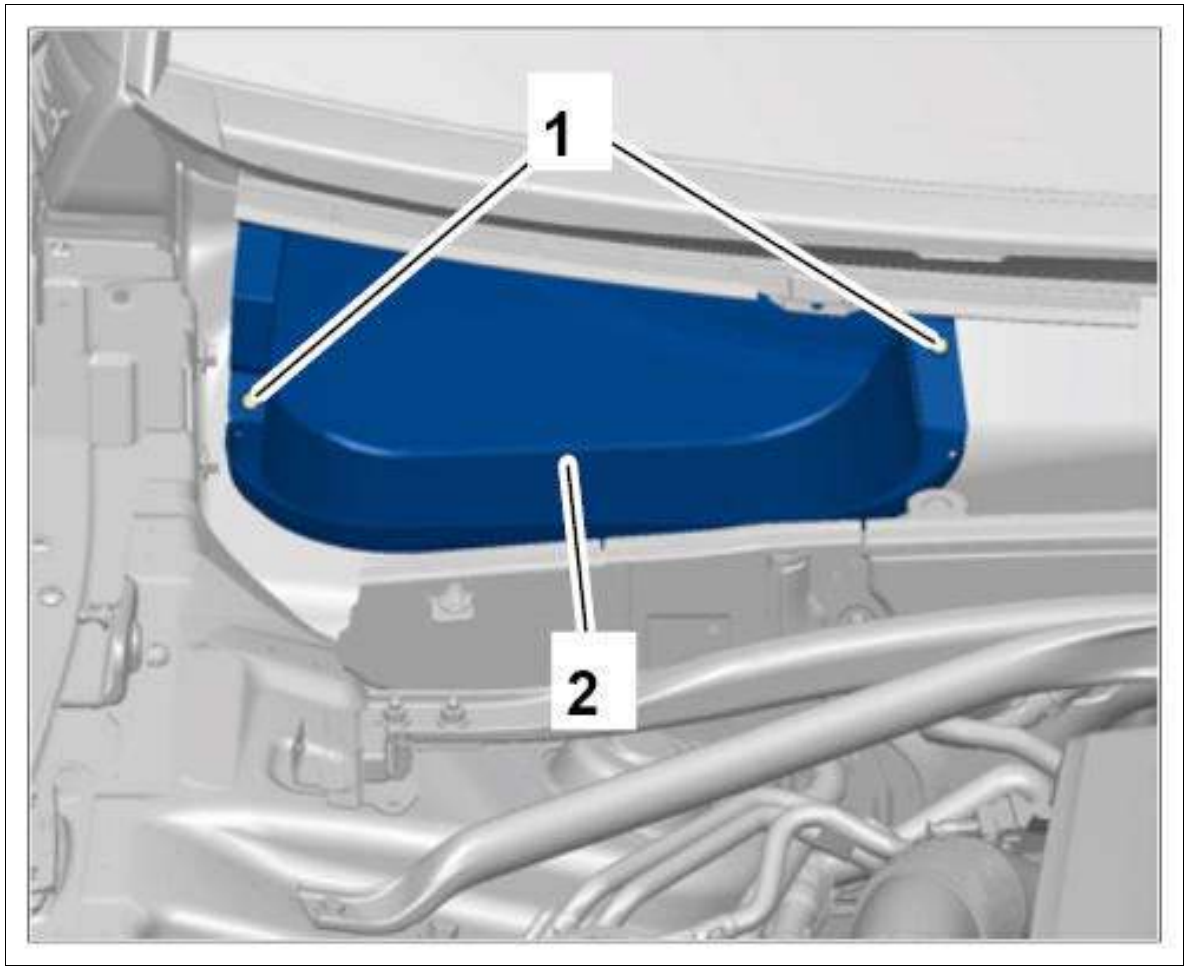
Location	Description	Type	Basic value	Tolerance 1	Tolerance 2
Upper trailing arm to wheel bearing housing	M10 thread	Tightening torque	45 Nm (33 ftlb.)		
Mounting saddle to spring strut (PASM only)	M8 thread	Tightening torque	30 Nm (22 ftlb.)		
Mounting saddle to body	M10 x 35 thread/observe tightening sequence/always use new screws or bolts following removal	Initial tightening	40 Nm (30 ftlb.)		

Mounting saddle to body	M10 x 35 thread/observe tightening sequence/always use new screws or bolts following removal	Final tightening	+90°		
Air line to air-spring strut		Tightening torque	3 Nm (2 ftlb.)		
Level sensor to lower trailing arm	M6 thread	Tightening torque	9 Nm (6.5 ftlb.)		

WM 433019 REMOVING AND INSTALLING FRONT AIR-SPRING STRUT (MACAN, MACAN S, MACAN TURBO) > PRELIMINARY WORK

1. Raise the vehicle → 4X00IN LIFTING THE VEHICLE .
2. Bleed the levelling system → BLEEDING AND FILLING THE LEVELLING SYSTEM .
3. Remove wheel → 440519 REMOVING AND INSTALLING WHEEL .
4. Remove cowl panel cover → 508719 REMOVING AND INSTALLING COWL PANEL COVER .
5. Unscrew fastening screws **-1-** and remove air inlet housing cover **-2-** .

Fig 1: Identifying Air Inlet Housing Cover Mounting Screws



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6. Remove front trim panel → 700219 REMOVING AND INSTALLING FRONT TRIM PANEL .
7. Remove additional reinforcement on dome strut → 408619 REMOVING AND INSTALLING FRONT STRUT (DOME STRUT) .

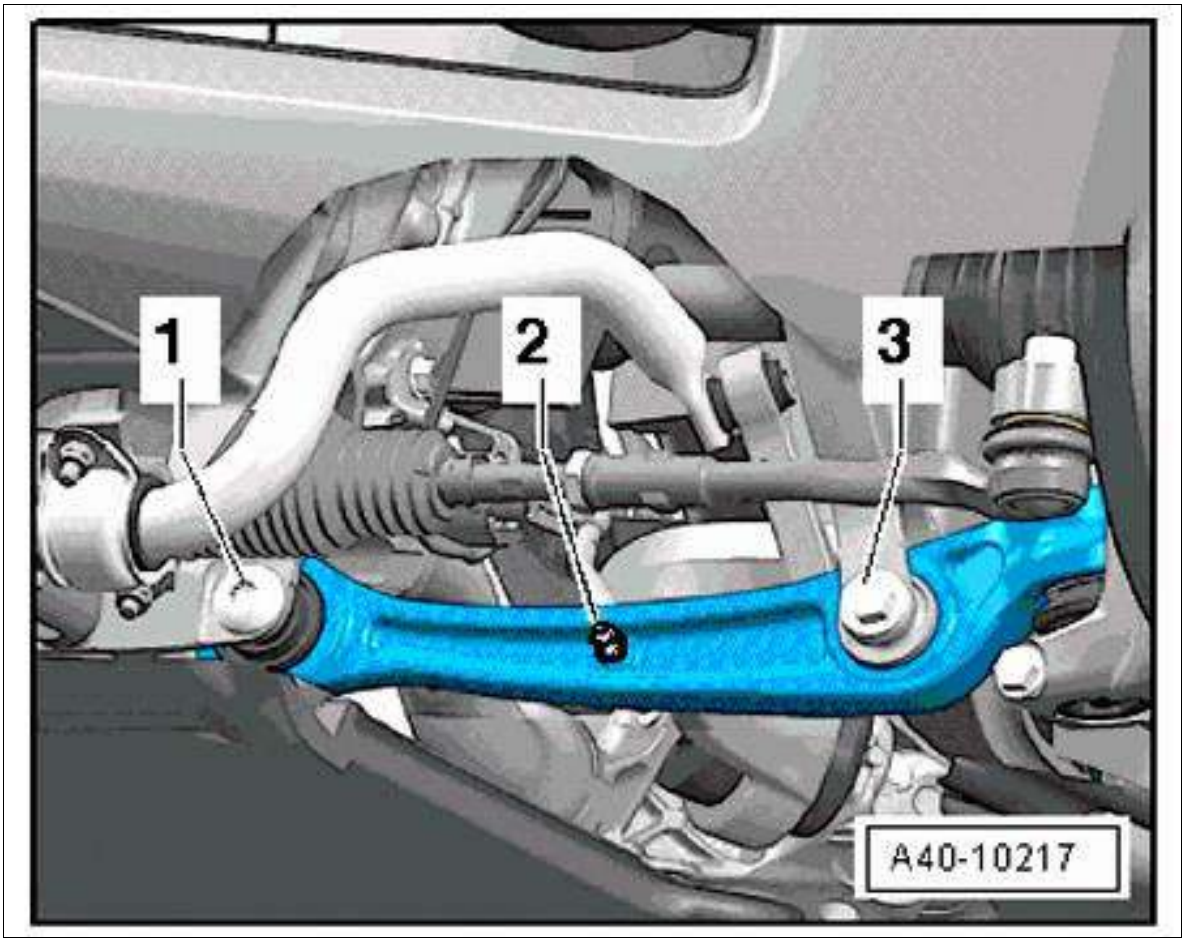
   Information

   If the level sensor remains fitted, this can bend the level sensor holder.

   This causes a malfunction in the levelling system!

8. Screw off nut **-2-** on the level sensor.

Fig 2: Identifying Lower Trailing Arm Mounting



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9. Remove shock absorber fork. → 408919 REMOVING AND INSTALLING SHOCK ABSORBER FORKS

WM 433019 REMOVING AND INSTALLING FRONT AIR-SPRING STRUT (MACAN, MACAN S, MACAN TURBO) > REMOVING AND INSTALLING FRONT AIR-SPRING STRUT > REMOVING FRONT AIR-SPRING STRUT

Information

To prevent damage to the air springs, pay particular attention to the following points when handling air springs:

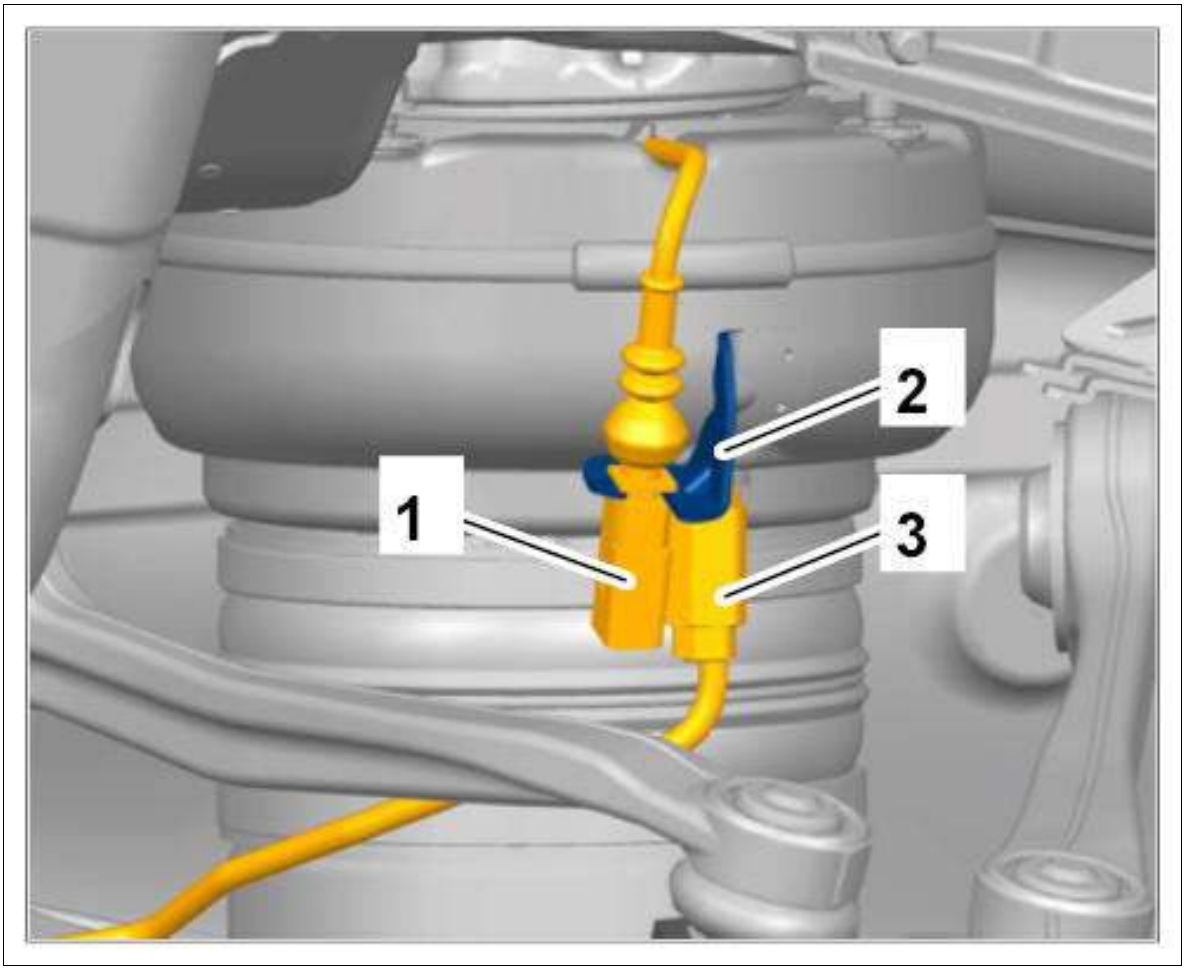
- Never empty air springs completely. This applies to both installed and removed air springs . Air springs must only be bled as described under → 4301IN DRAINING AND FILLING THE LEVELLING SYSTEM .
- Never lower a vehicle with empty air springs

1. Remove PASM connector.

1. 1.1. Loosen connector and release line from the holder **-1-** .
2. 1.2. Release connector **-2-** and disconnect it.

2. Loosen the air line **-3-** on the air-spring strut **quickly (only a small amount of air should escape)** and counter at the pressure-retaining valve while doing this (the pressure-retaining valve must not loosen!).

Fig 1: Identifying Line Connections For Air-Spring Strut



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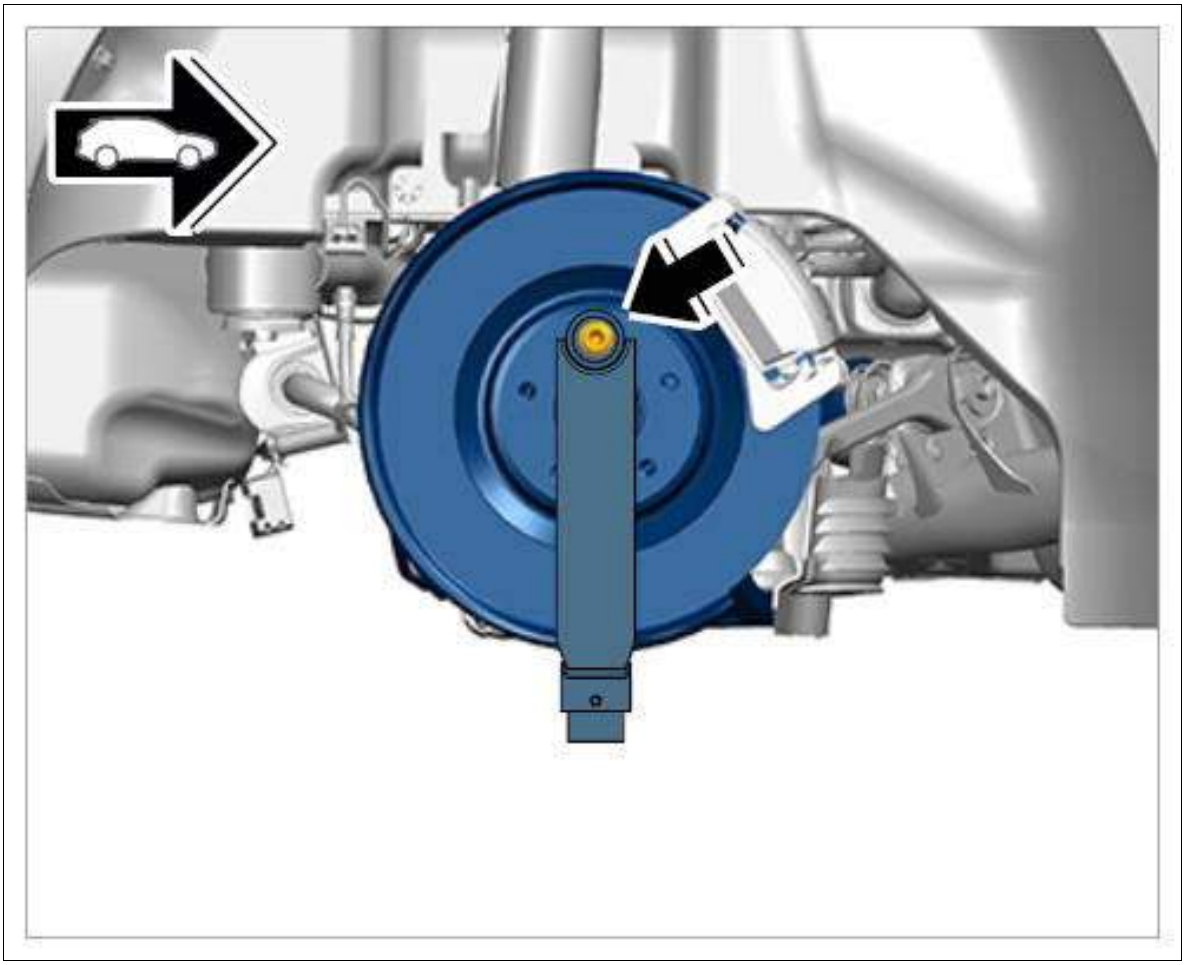
3. Support the wheel bearing housing to prevent the wheel bearing housing from tilting.

Fig 2: Locating Support (T10149) Mounting



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

1. 3.1. Turn the wheel hub in such a way that a bore for a wheel bolt is at the top.
2. 3.2. **Support T10149** must be secured to the wheel hub with a wheel bolt **-arrow-**
3. 3.3. **Support T10149** must now be fitted into the **transmission jack WE 1082.**

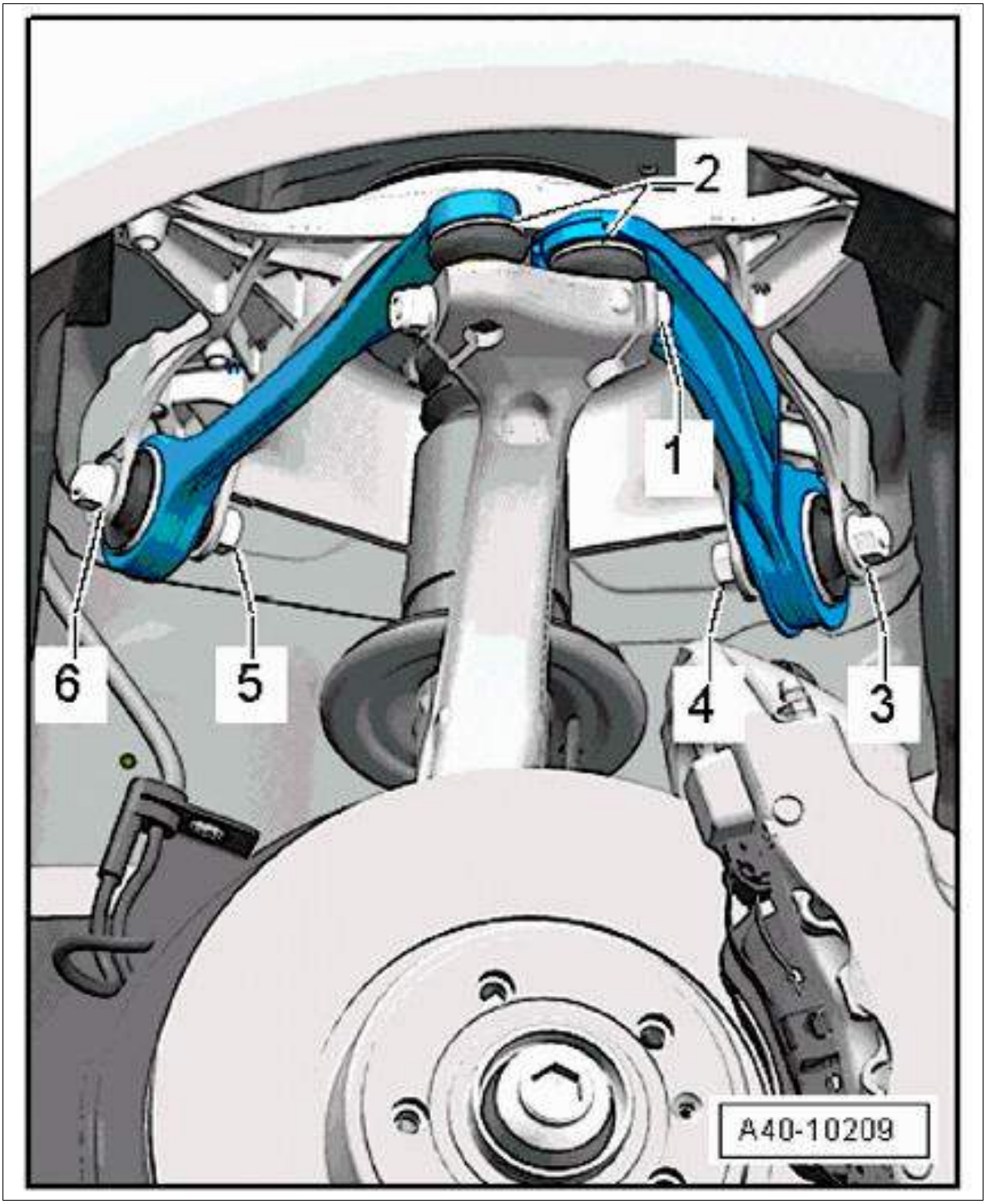
4. Separate threaded joint **-1-** on the wheel bearing housing at the top.

   Information

   The slots in the wheel bearing housing must not be widened using a chisel or similar tool!

5. Pull the two pins for the upper trailing arm **-2-** out of the wheel bearing housing. (Upper trailing arms remain fitted on the mounting saddle **-3 to 6-**)

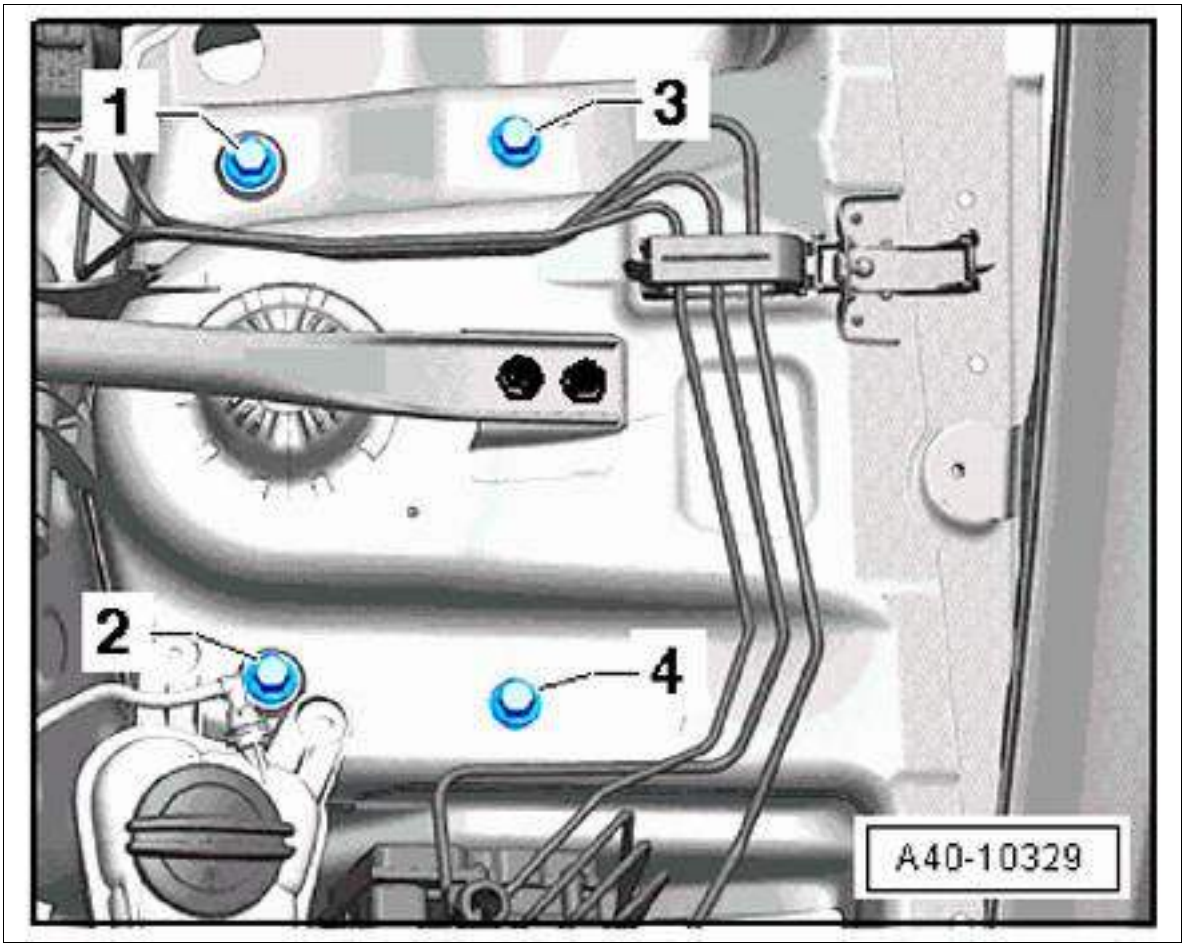
Fig 3: Identifying Upper Trailing Arm Mounting



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

6. Unscrew fastening screws **-1 to 4-** at the top of the spring strut.

Fig 4: Identifying Upper Spring-Strut Mount



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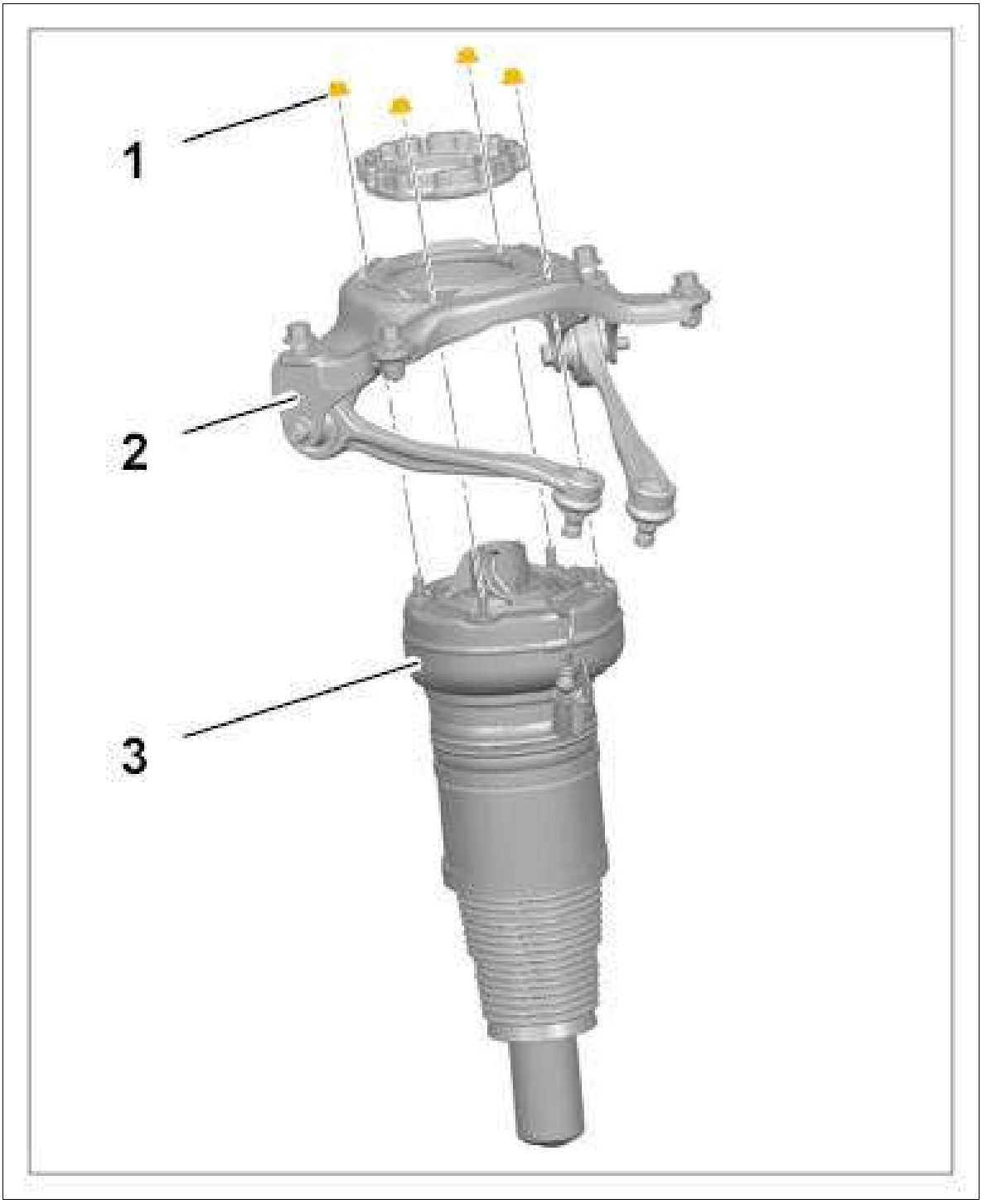
7. Remove air-spring strut.
8. Unscrew fastening screws **-1-** and remove mounting saddle **-2-** from the air-spring strut **-3-** .

Fig 5: Identifying Mounting Saddle Mounting



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WM 433019 REMOVING AND INSTALLING FRONT AIR-SPRING STRUT (MACAN, MACAN S, MACAN TURBO) > REMOVING AND INSTALLING FRONT AIR-SPRING STRUT > INSTALLING FRONT AIR-SPRING STRUT

⚠ *CAUTION: Wheel carrier raised incorrectly*

- *Risk of squashing*
- *Risk of damage to components*

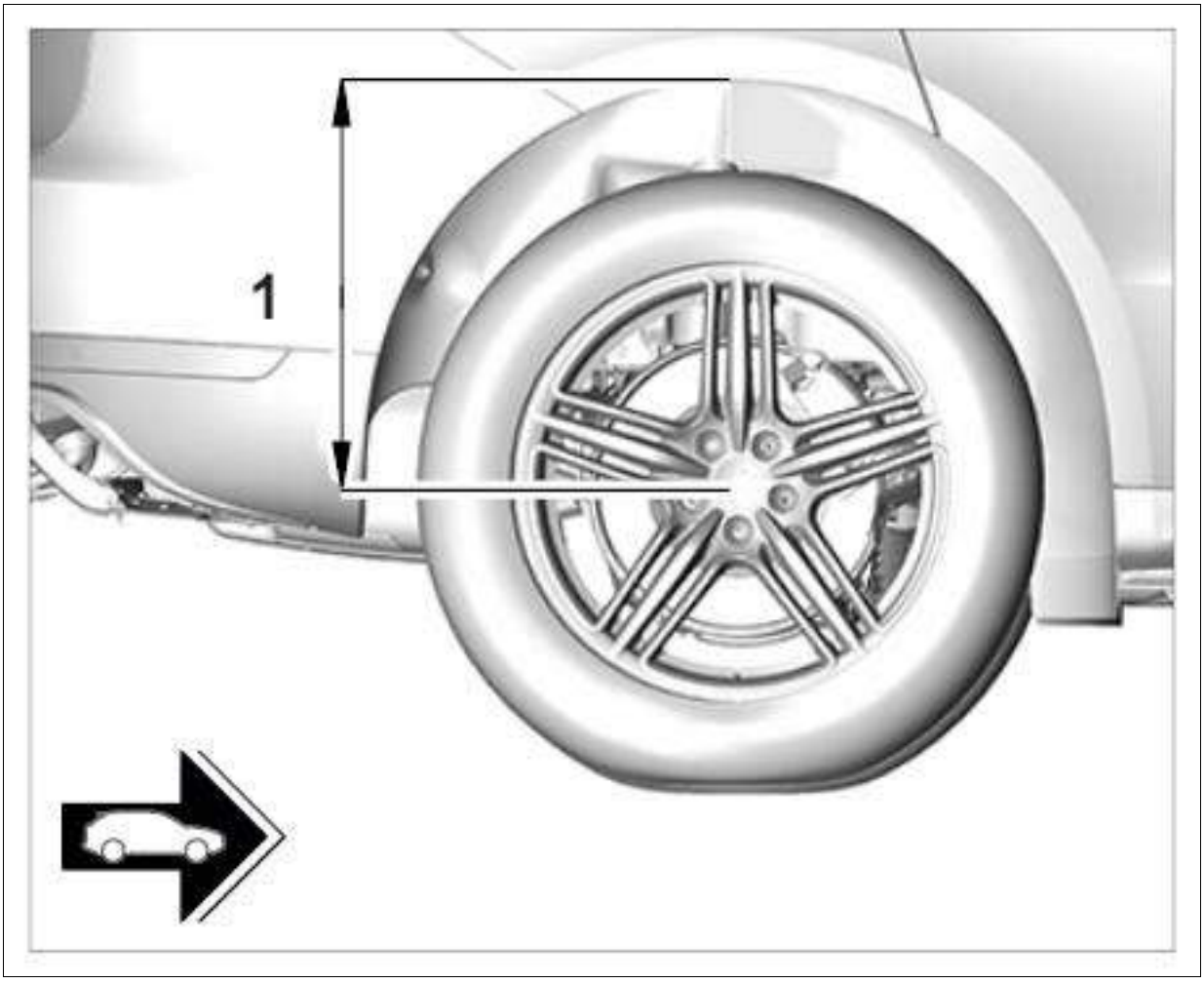
→ Wear personal protective gear.

→ Do not raise the wheel suspension higher than the normal vehicle position (vehicle resting on wheels).

Information

- All screws and threaded joints on the axle must be tightened in vehicle position. Vehicle position means: vehicle standing on its wheels or the wheel suspension is raised with a universal vehicle lift. Dimension -1- , from lower edge of wing to center of axle corresponds to vehicle position. The current height can be found in → 4495TW ADJUSTMENT VALUES FOR SUSPENSION ALIGNMENT . Always observe the following points!

  Fig 1: Identifying Wheel To Wing Lower Edge Dimension (Rear Axle)



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- Screws and nuts are Geomet-coated and must not be greased.

1. Installation is performed in reverse order.

   Observe specified tightening torques:

   Mounting saddle to air-spring strut: **Tightening torque 30 Nm (22 ftlb.)**

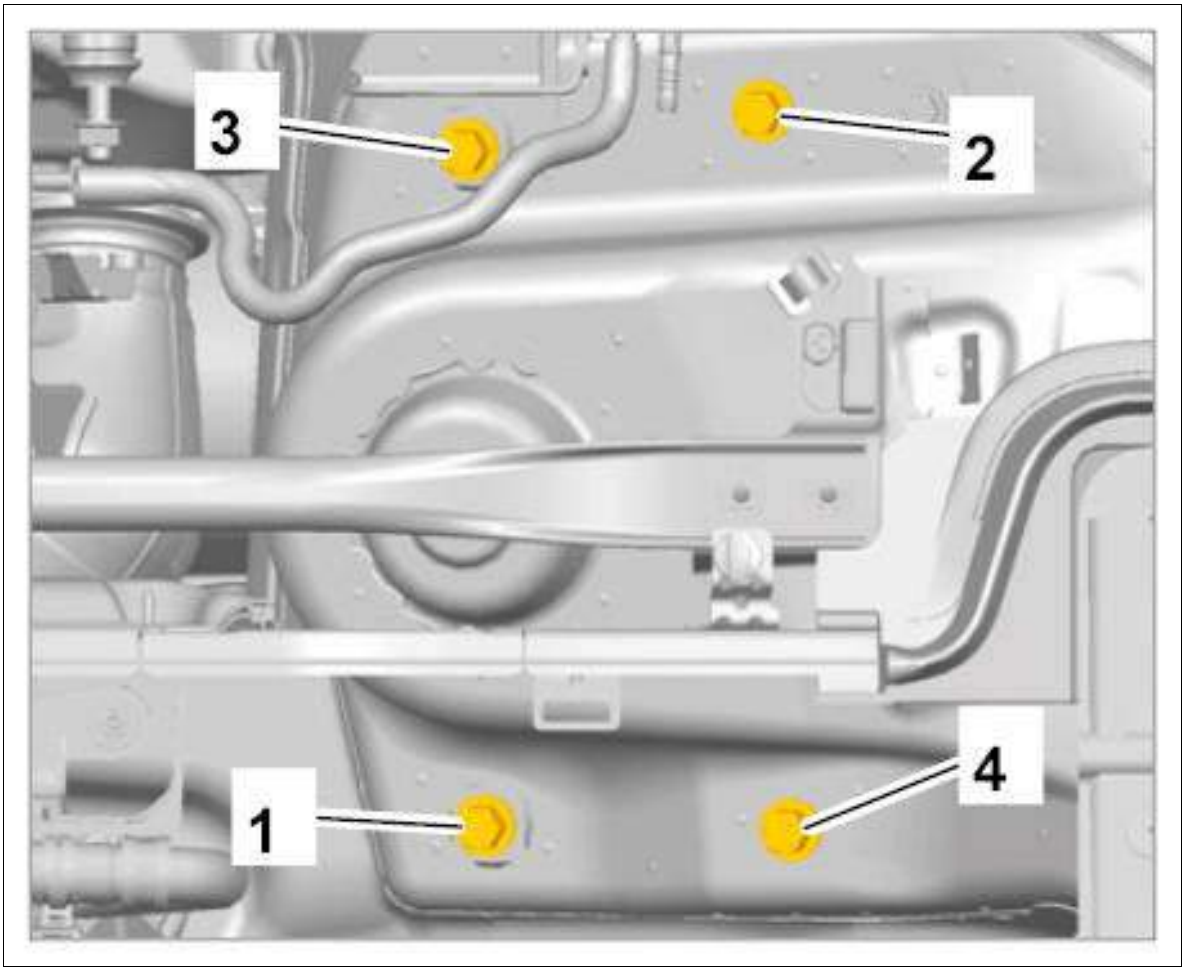
   Upper air-spring strut to body: **Initial tightening 40 Nm (30 ftlb.) Final tightening +90°**

   Observe the tightening sequence **-1 to 4-** !

   Upper trailing arm to wheel bearing housing: **Tightening torque 45 Nm (33 ftlb.)**

   Air line to air spring: **Tightening torque 3 Nm (2 ftlb.)**

   Fig 2: Saddle Body Screws Tightening Sequence

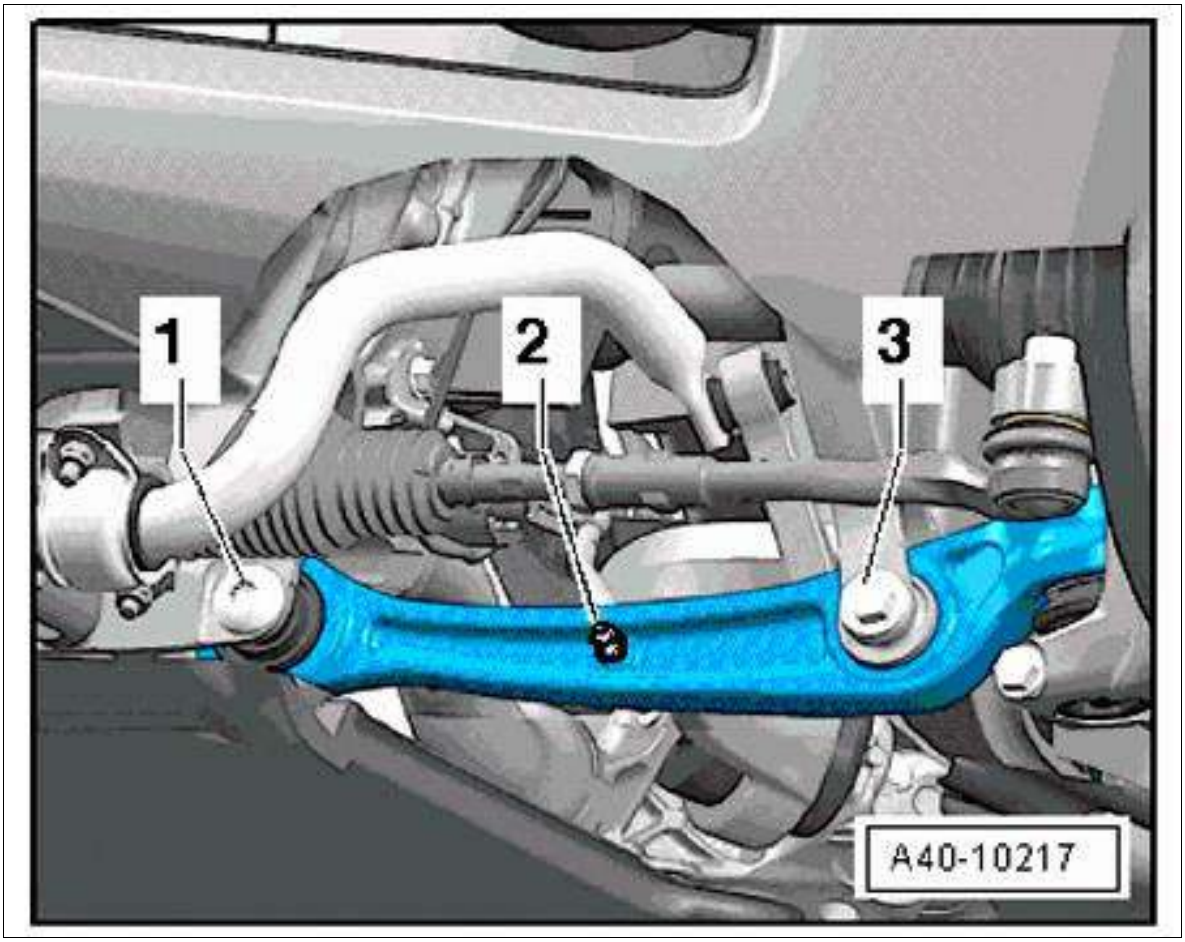


Courtesy of PORSCHE CARS NORTH AMERICA, INC.

WM 433019 REMOVING AND INSTALLING FRONT AIR-SPRING STRUT (MACAN, MACAN S, MACAN TURBO) > SUBSEQUENT WORK

1. Install shock absorber fork. → INSTALLING SHOCK ABSORBER FORK .
2. Tighten nut **-2-** on level sensor. **Tightening torque 9 Nm (6.5 ftlb.)**

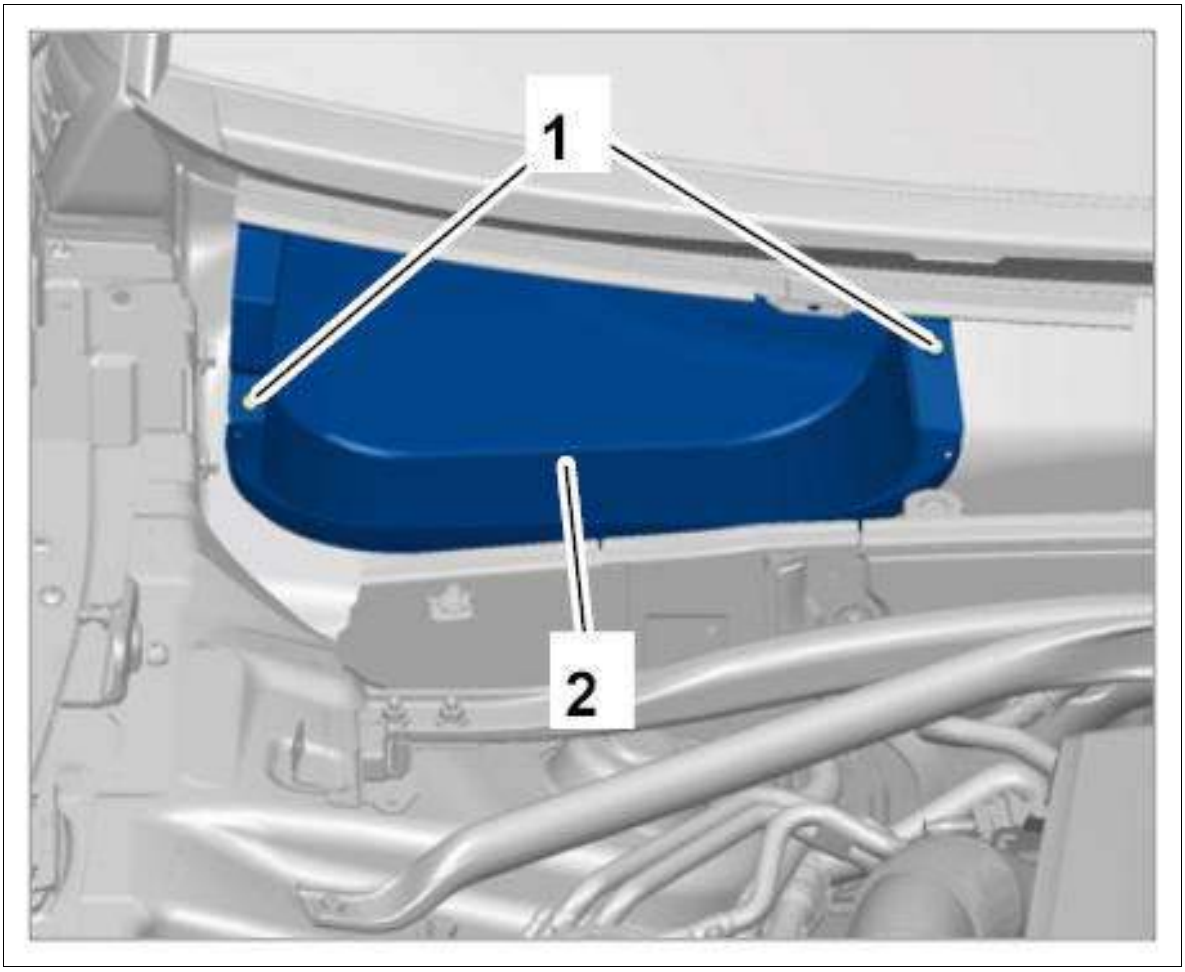
Fig 1: Identifying Lower Trailing Arm Mounting



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

3. Install additional reinforcement on dome strut → INSTALLING FRONT STRUT .
4. Install front trim panel → INSTALLING FRONT TRIM PANEL .
5. Install air inlet housing cover **-2-** and tighten fastening screws **-1-** .

Fig 2: Identifying Air Inlet Housing Cover Mounting



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

6. Install cowl panel cover. → INSTALLING COWL PANEL COVER
7. Fill the levelling system. → BLEEDING AND FILLING THE LEVELLING SYSTEM .
8. Fit wheel → INSTALLING WHEEL .

WM 433655 REPLACING FRONT VALVE (PRESSURE CONTROL VALVE) (MACAN, MACAN S, MACAN TURBO) > TECHNICAL VALUES

Location	Description	Type	Basic value	Tolerance 1	Tolerance 2
Air line to air-spring strut		Tightening torque	3 Nm (2 ftlb.)		
Pressure control valve to air-spring strut		Tightening torque	8 Nm (6 ftlb.)		

WM 433655 REPLACING FRONT VALVE (PRESSURE CONTROL VALVE) (MACAN, MACAN S, MACAN TURBO) > PRELIMINARY WORK

1. Raise the vehicle → 4X00IN LIFTING THE VEHICLE .
2. Remove wheel → 440519 REMOVING AND INSTALLING WHEEL .

WM 433655 REPLACING FRONT VALVE (PRESSURE CONTROL VALVE) (MACAN, MACAN S, MACAN TURBO) > REPLACING FRONT VALVE (PRESSURE CONTROL VALVE)

WARNING: Vehicle is lowered when air line is loosened

- *Risk of squashing*

→ When loosening the pressure control valve, raise the vehicle on a lifting platform.

→ Only leave the vehicle on the lifting platform until a new pressure control valve is installed and the air-spring strut is filled.

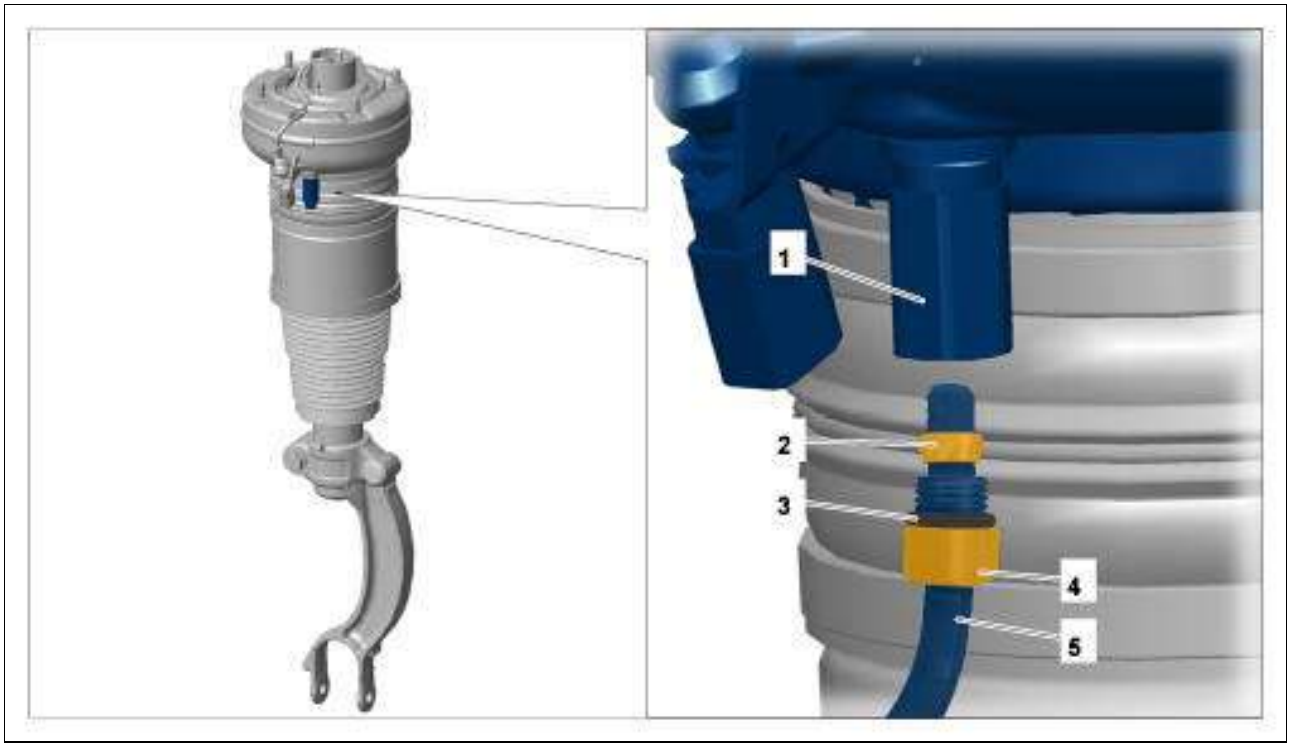
Information

The pressure control valve can only be replaced if:

- it was damaged during removal and installation ,
- the sealing ring in the pressure control valve is defective ,
- it no longer lets air out (valve jammed/vehicle cannot be lowered).

Never lower a vehicle with empty air springs.

Fig 1: Identifying Pressure Control Valve Components



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

1. Pressure control valve
2. Cutting ring
3. Sealing ring (always replace sealing ring)
4. VOSS threaded joint
5. Air line

1. To prevent dirt from getting into the threaded bore on the air-spring strut, clean the pressure control valve area thoroughly with a lint-free cloth.
2. Unscrew VOSS threaded joint (with air line) from the pressure control valve. Counter at the pressure control valve at the same time.

> *NOTE: Escaping residual air*
>
> *1. Risk of eye injuries*

→ Wear protective goggles.

3. Carefully bleed the air-spring strut by hand. To do this, push the valve lifter open slightly using a 5-mm Allen key.
4. Unscrew pressure control valve at the air-spring strut.

WM 433655 REPLACING FRONT VALVE (PRESSURE CONTROL VALVE) (MACAN, MACAN S, MACAN TURBO) > REPLACING FRONT VALVE (PRESSURE CONTROL VALVE) > INSTALLING FRONT VALVE (PRESSURE CONTROL VALVE)

Depending on the condition of the VOSS threaded joint and air line fitted on the vehicle, the VOSS threaded joint and air line can either be used again or replaced.

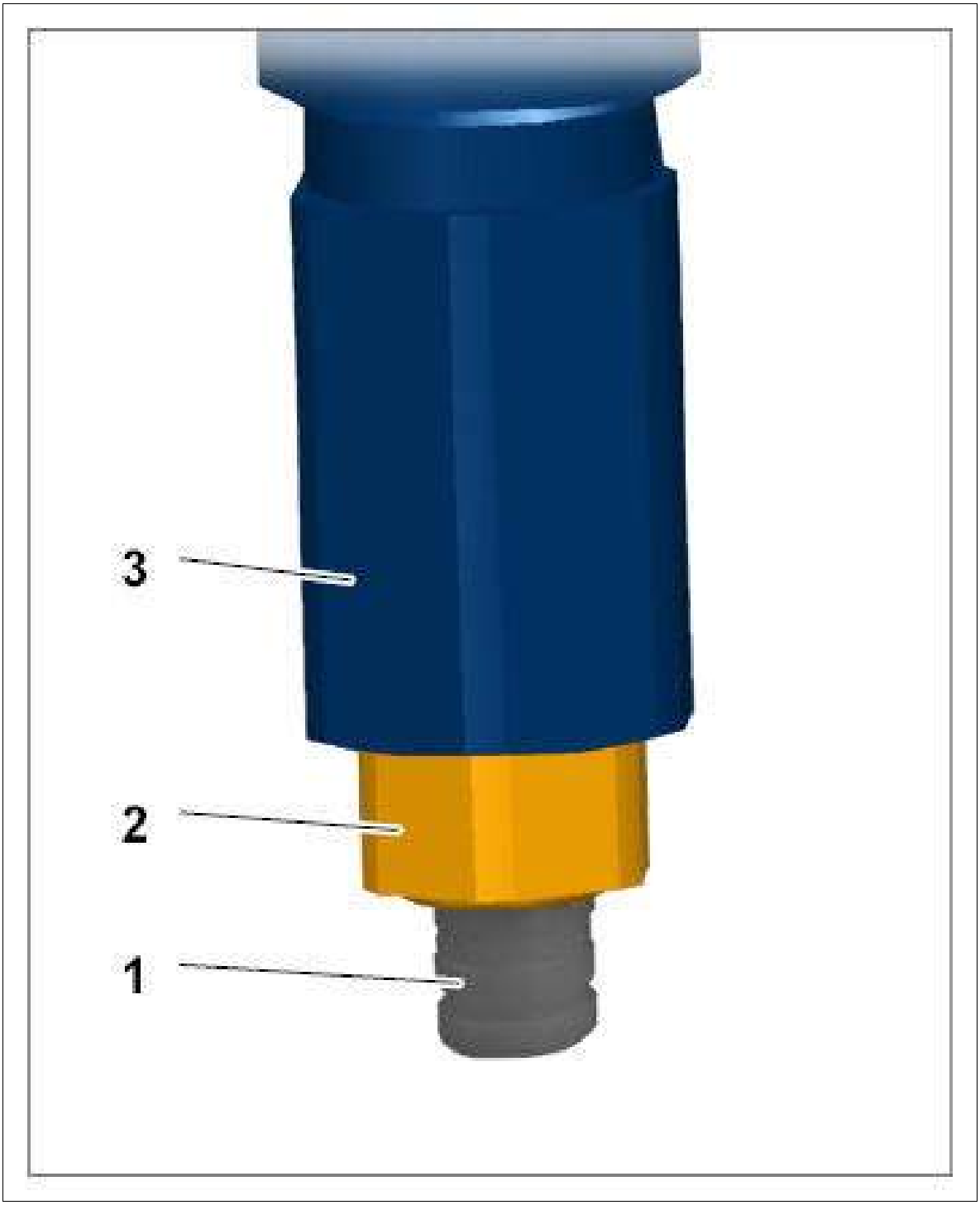
Using the same VOSS threaded joint on the vehicle:

Information

If you intend to re-use the VOSS threaded joint fitted on the vehicle, the VOSS threaded joint (including stopper and cutting ring) that comes pre-fitted on the new pressure control valve must first be removed.

1. Pull stopper **-1-** out of the new pressure control valve **-3-** .
2. Unscrew VOSS threaded joint **-2-** on the new pressure control valve **-3-** .

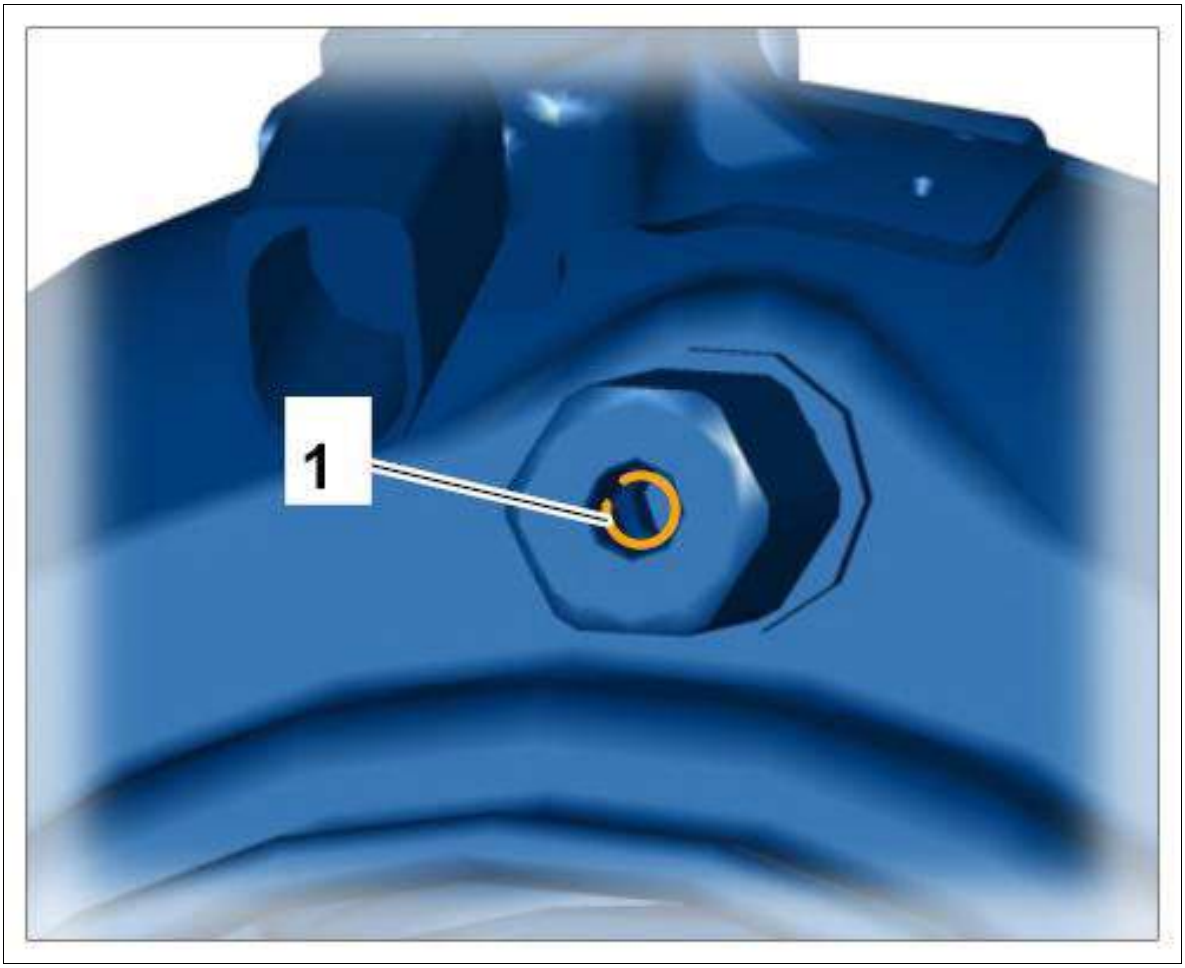
Fig 1: Identifying Pressure Control Valve And Stopper



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

3. Remove cutting ring **-1-** .

Fig 2: Identifying Pressure Valve Cutting Ring



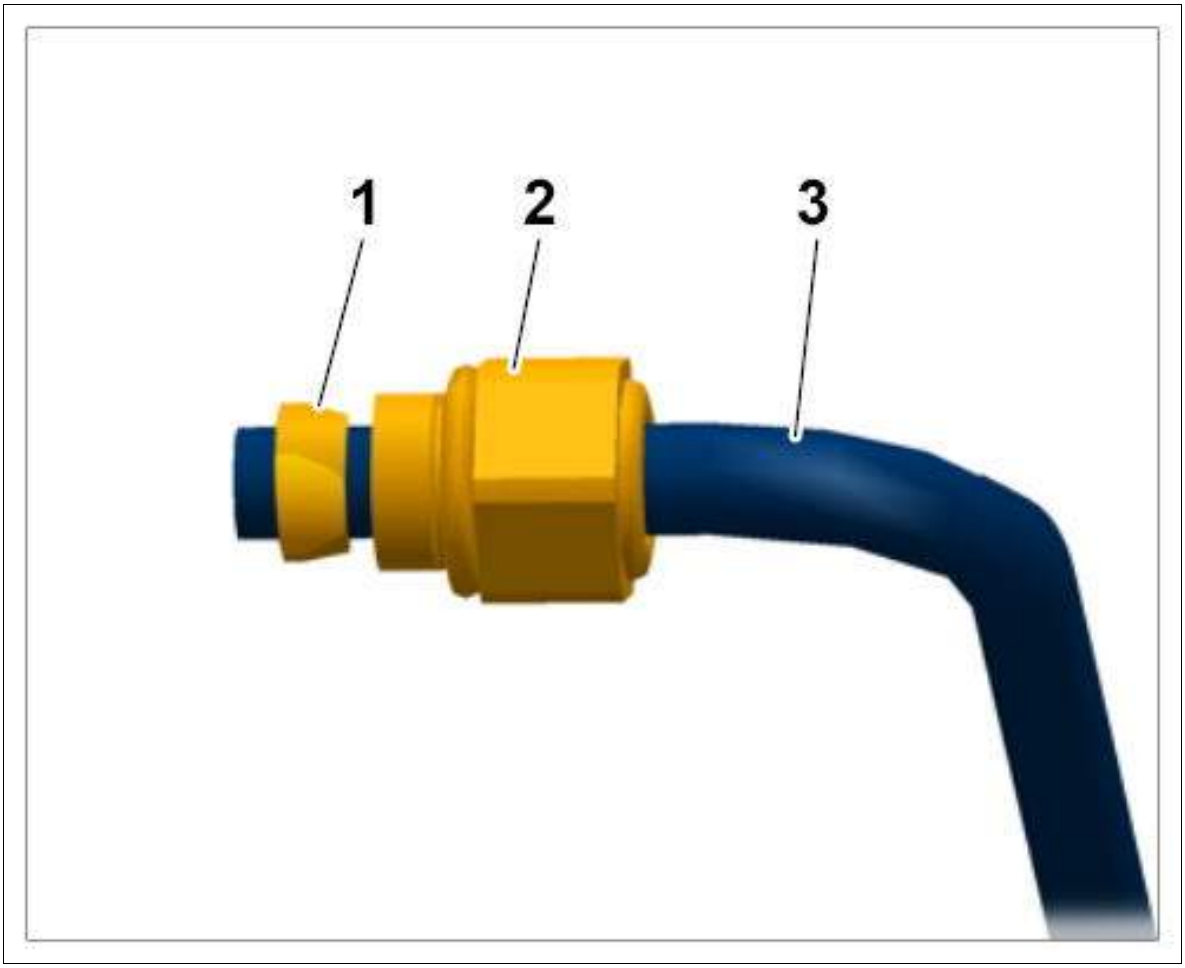
Courtesy of PORSCHE CARS NORTH AMERICA, INC.

4. Screw new pressure control valve into the air-spring strut. **Tightening torque 8 Nm (6 ftlb.)**
5. Fit VOSS threaded joint on pressure control valve. **Tightening torque 3 Nm (2 ftlb.)**

Replacing VOSS threaded joint on the vehicle:

1. Loosen the cutting ring **-1-** on the air line **-3-** using a suitable tool.
2. Pull VOSS threaded joint **-2-** off the air line **-3-** .

Fig 3: Identifying Valve Cutting Ring And VOSS Threaded Joint



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

Information

Sharp edges at the end of the air line or at the point where the cutting ring is fitted can damage the newly fitted O-ring.

For this reason, always de-burr the end of the air line.

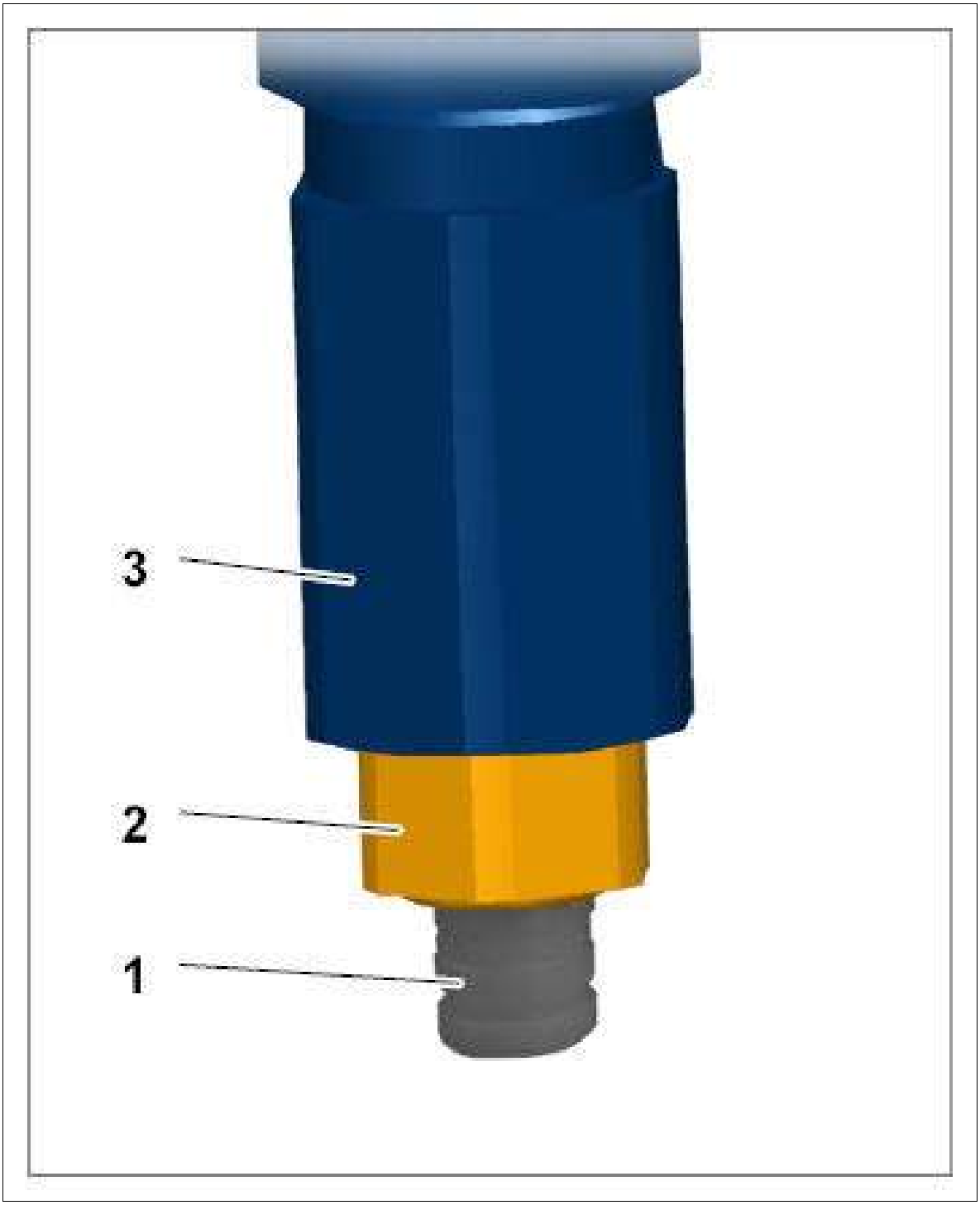
If there is also a sharp edge at the point where the cutting ring is fitted, the air line must be repaired. → 438541 REPAIRING AIR LINE

3. Check air line for damage/leaks.

   Repair the air line if it is damaged → 438541 REPAIRING AIR LINE .

4. Pull stopper **-1-** out of the new pressure control valve.

Fig 4: Identifying Pressure Control Valve And Stopper



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5. Screw new pressure control valve into the air-spring strut. **Tightening torque 8 Nm (6 ftlb.)**

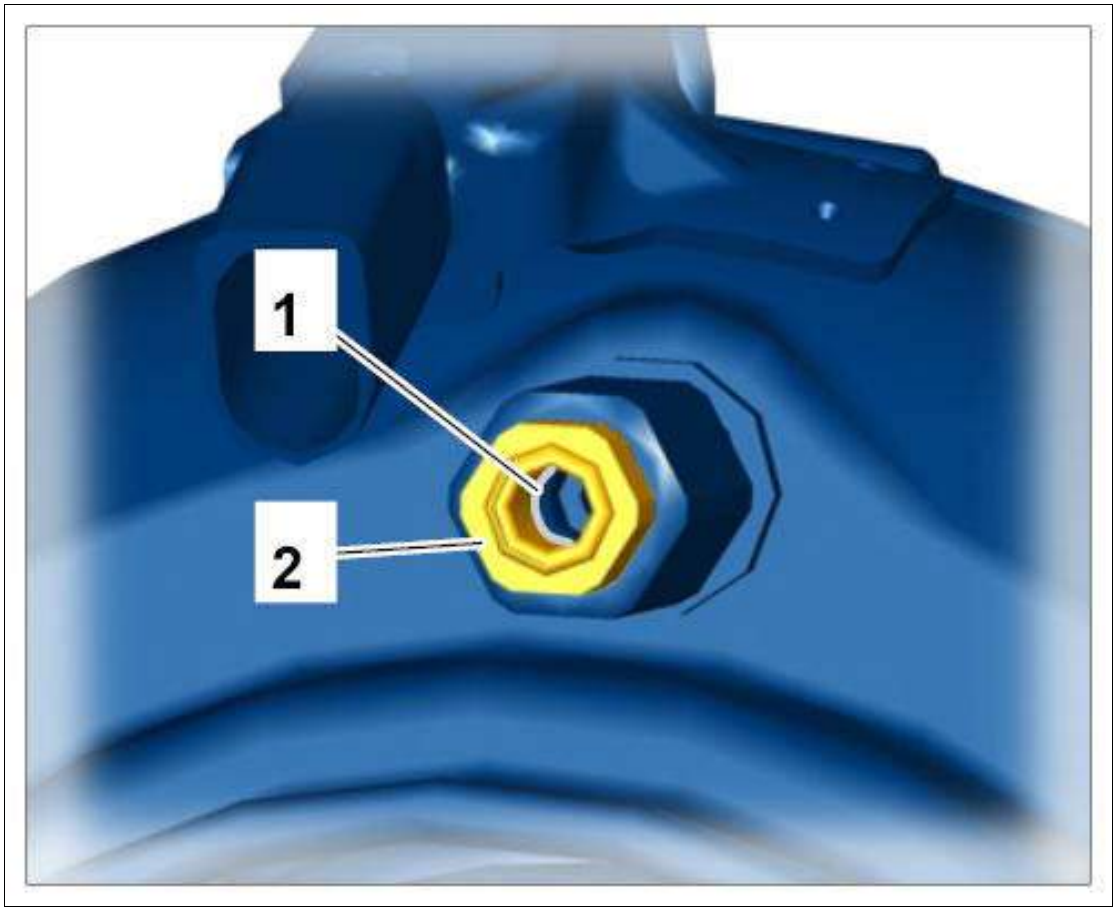
Information

Before installation, the following parts must be pre-fitted on the pressure control valve:

1. Cutting ring -1-

2. VOSS threaded joint -2-

Fig 5: Identifying Pressure Control Valve Ring And Threaded Joint



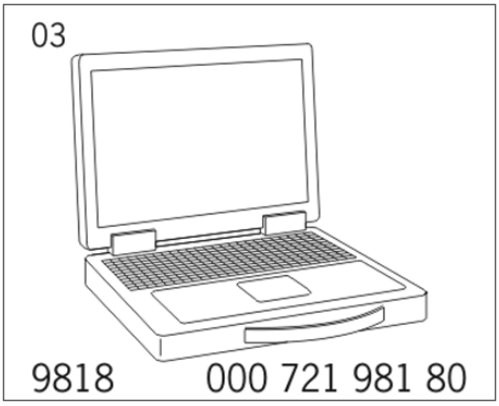
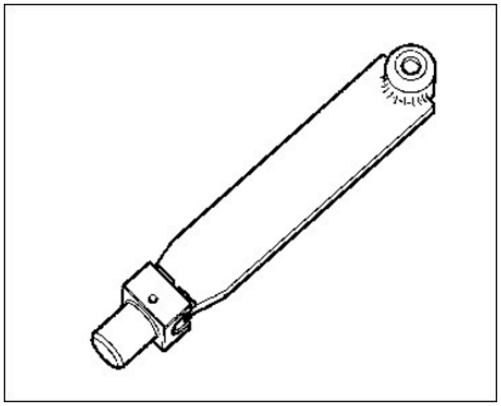
Courtesy of PORSCHE CARS NORTH AMERICA, INC.

6. Insert air line as far as it will go into the VOSS threaded joint on the pressure control valve.
7. Check that the air line is fitted correctly:
    1. Only one marking on the air line should be visible.
    2. Pull the air line briefly against the insertion direction. If it cannot be pulled out, the air line is fitted correctly.

WM 433655 REPLACING FRONT VALVE (PRESSURE CONTROL VALVE) (MACAN, MACAN S, MACAN TURBO) > SUBSEQUENT WORK

1. Fit wheel → INSTALLING WHEEL .
2. Fill the air spring → 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM .

WM 434319 REMOVING AND INSTALLING REAR AIR SPRING (MACAN, MACAN S, MACAN TURBO) > TOOLS

Designation	Type	Number	Description	
transmission jack	Workshop equipment	WE 1082		
PIWIS Tester II	Special tool	9818		
Support	VW tool	T10149		

WM 434319 REMOVING AND INSTALLING REAR AIR SPRING (MACAN, MACAN S, MACAN TURBO) > TECHNICAL VALUES

Location	Description	Type	Basic value	Tolerance 1	Tolerance 2
Air line to air spring		Tightening torque	3 Nm (2 ftlb.)		

WM 434319 REMOVING AND INSTALLING REAR AIR SPRING (MACAN, MACAN S, MACAN TURBO) > PRELIMINARY WORK

1. Raise the vehicle → 4X00IN LIFTING THE VEHICLE .
2. Bleed the relevant air spring using **PIWIS Tester II 9818.** → 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM .

WM 434319 REMOVING AND INSTALLING REAR AIR SPRING (MACAN, MACAN S, MACAN TURBO) > REMOVING AND INSTALLING REAR AIR SPRING > REMOVING REAR AIR SPRING

NOTE: Air springs can become kinked/fall out

- *Risk of damage to air springs*

→ Switch off the levelling system (press and hold the levelling system button for at least 10 seconds).

→ Check the bellows before lowering the vehicle.

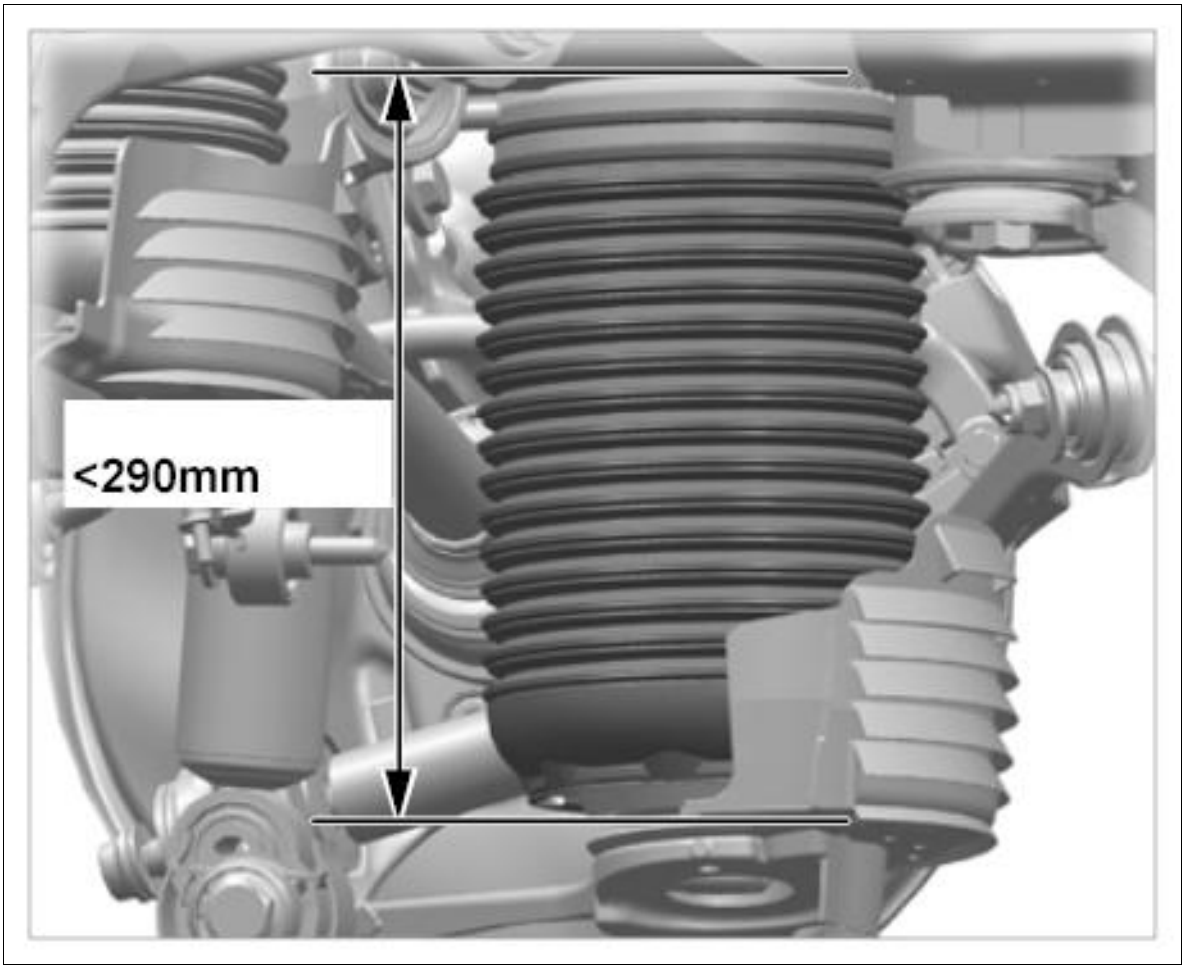
Information

To prevent damage to the air springs, pay particular attention to the following points when handling air springs:

- Do not pull the air spring apart.
- Do not bend the air spring.
- Do not carry the air spring at the insertion pin.
- The length must not be less than 220 mm.
- Never lower a vehicle with empty air springs.

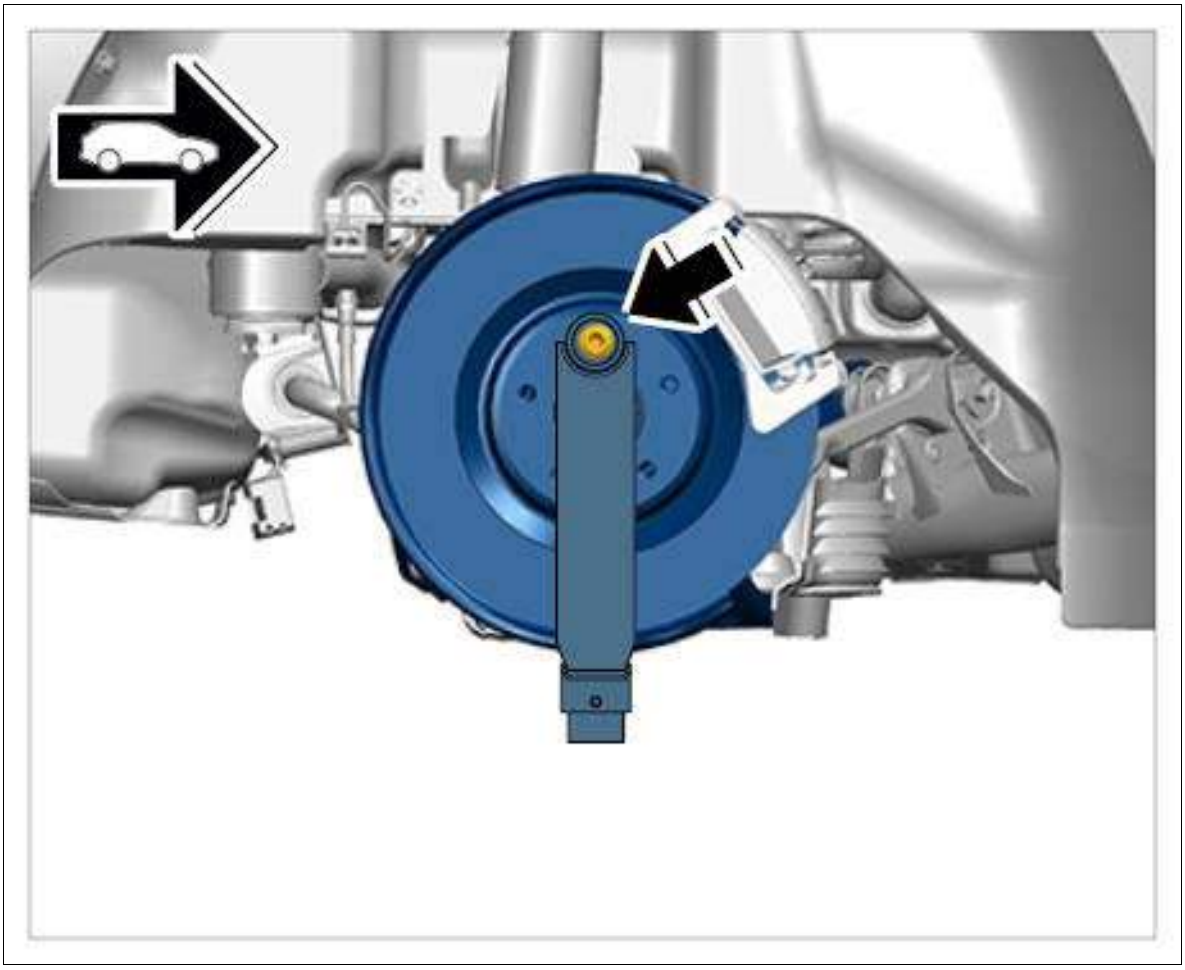
1. Raise the wheel bearing housing until an air spring length of < 290 mm is reached (the length must not be less than 220 mm!).

Fig 1: Identifying Air Spring Length



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

Fig 2: Locating Support (T10149) Mounting

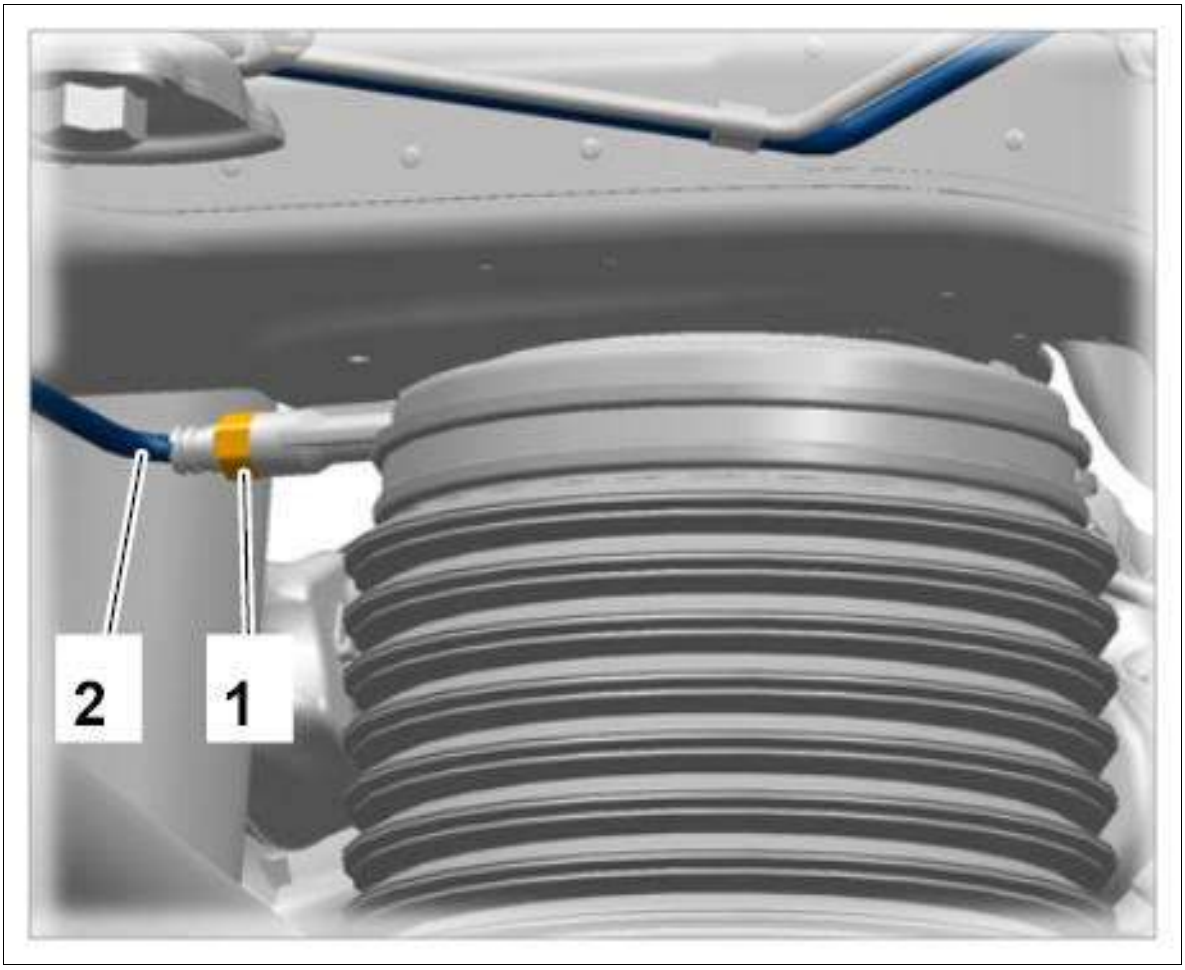


Courtesy of PORSCHE CARS NORTH AMERICA, INC.

1. 1.1. Turn the wheel hub in such a way that a bore for a wheel bolt is at the top.
2. 1.2. **Support T10149** must be secured to the wheel hub with a wheel bolt **-arrow-**
3. 1.3. **Support T10149** must now be fitted into the **transmission jack WE 1082** .

2. Unscrew union nut **-1-** and pull off air line **-2-** .

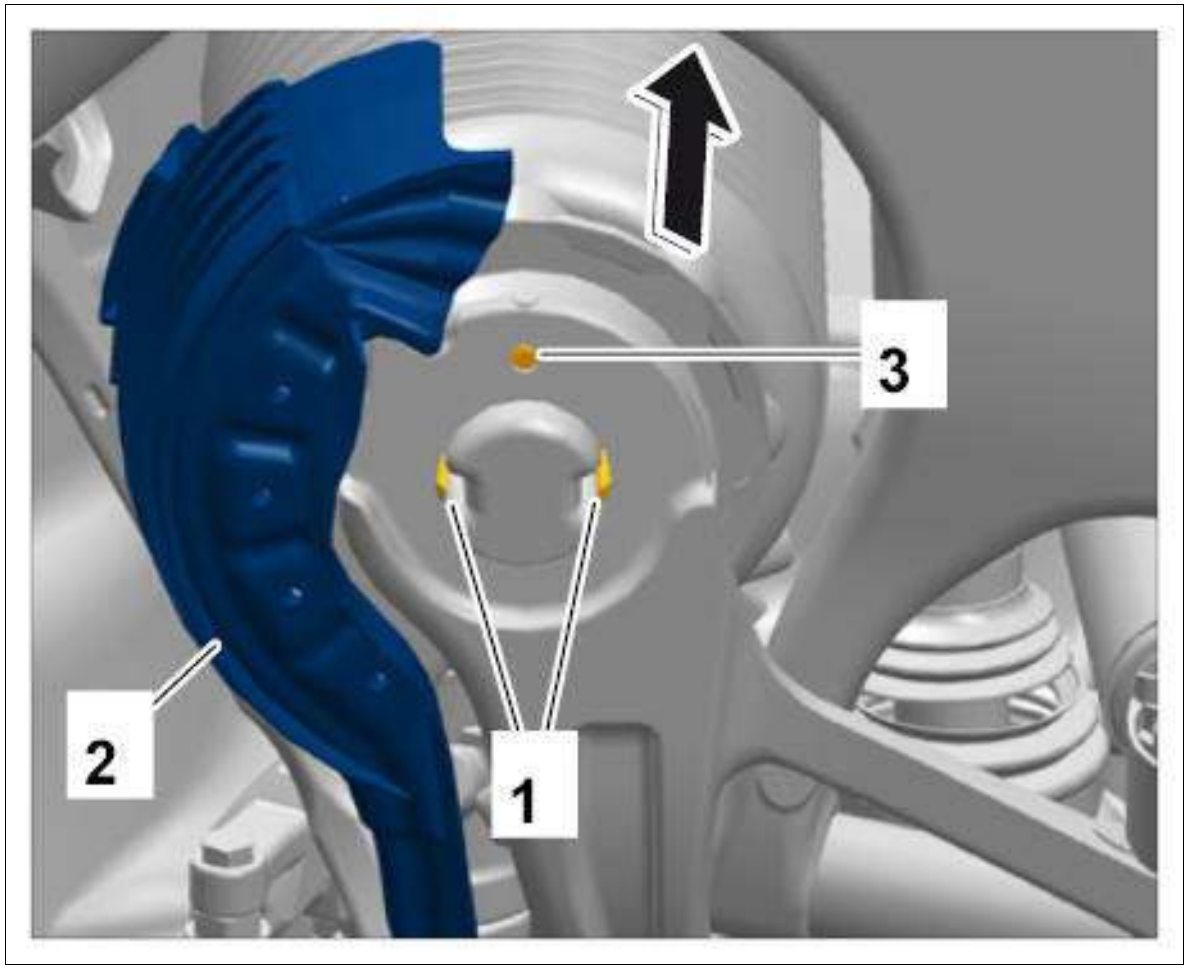
Fig 3: Identifying Air Line Connection And Union Nut



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

3. Lower the transmission jack.
4. Press clips **-1-** on the lower air spring together and press the air spring upwards **-arrow-** .
5. Remove stone guard **-2-** .

Fig 4: Pressing Air Spring



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6. Carefully remove the air spring by pulling it downwards. → Removing air spring

   Do not pull air spring apart!

Fig 5: Removing Air Spring

Courtesy of PORSCHE CARS NORTH AMERICA, INC.

WM 434319 REMOVING AND INSTALLING REAR AIR SPRING (MACAN, MACAN S, MACAN TURBO) > REMOVING AND INSTALLING REAR AIR SPRING > REPLACING REAR AIR SPRING

If the rear air spring is replaced, pay particular attention to the following points:

Depending on the condition of the VOSS threaded joint (air line connection to air spring) fitted on the vehicle, the VOSS threaded joint can either be used again or replaced.

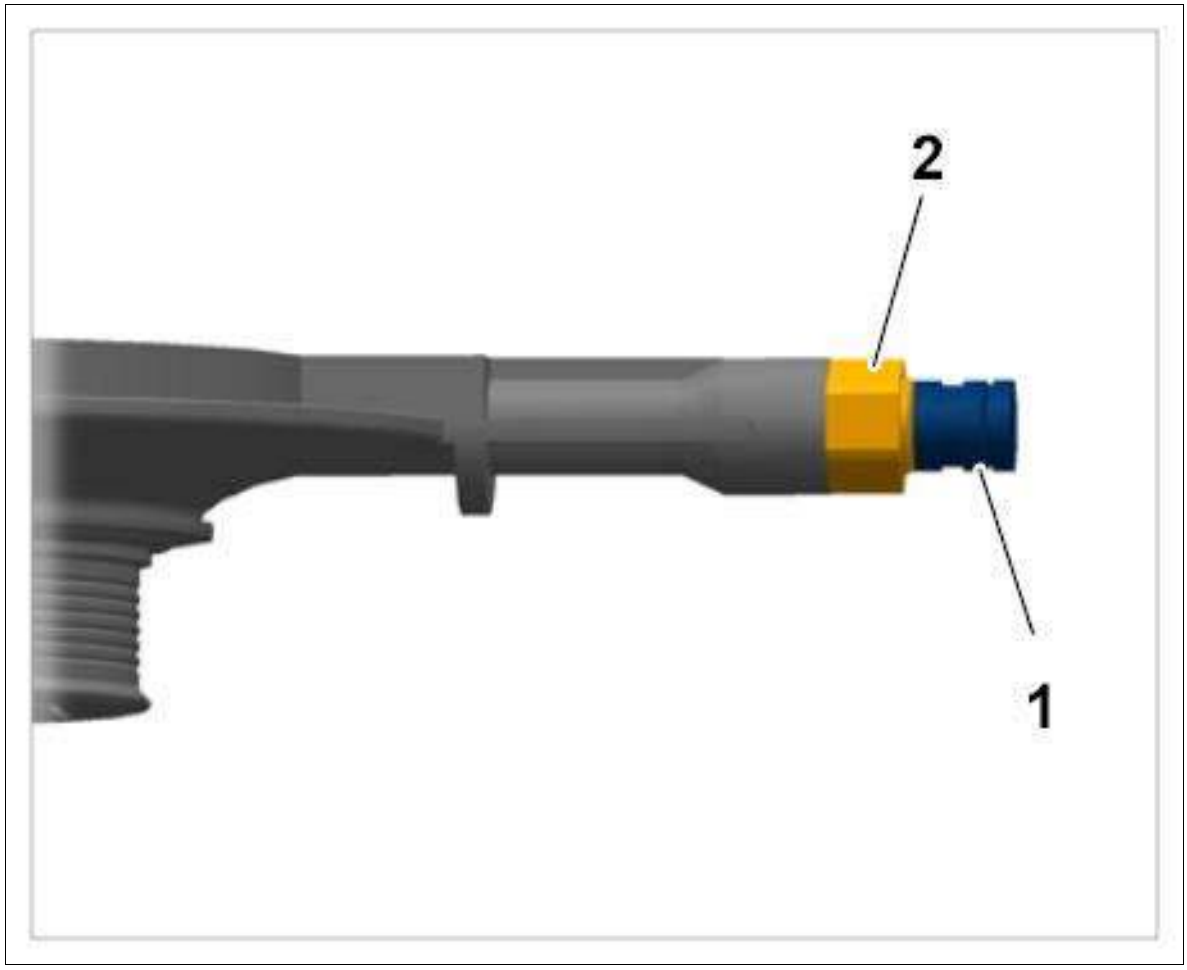
Using the same VOSS threaded joint on the vehicle:

Information

If you intend to re-use the VOSS threaded joint fitted on the vehicle, the VOSS threaded joint (including stopper and cutting ring) that comes pre-fitted on the new air spring must first be removed.

1. Pull stopper **-1-** out of the new air spring.
2. Unscrew VOSS threaded joint **-2-** on the new air spring.

Fig 1: Identifying Air Spring And Stopper



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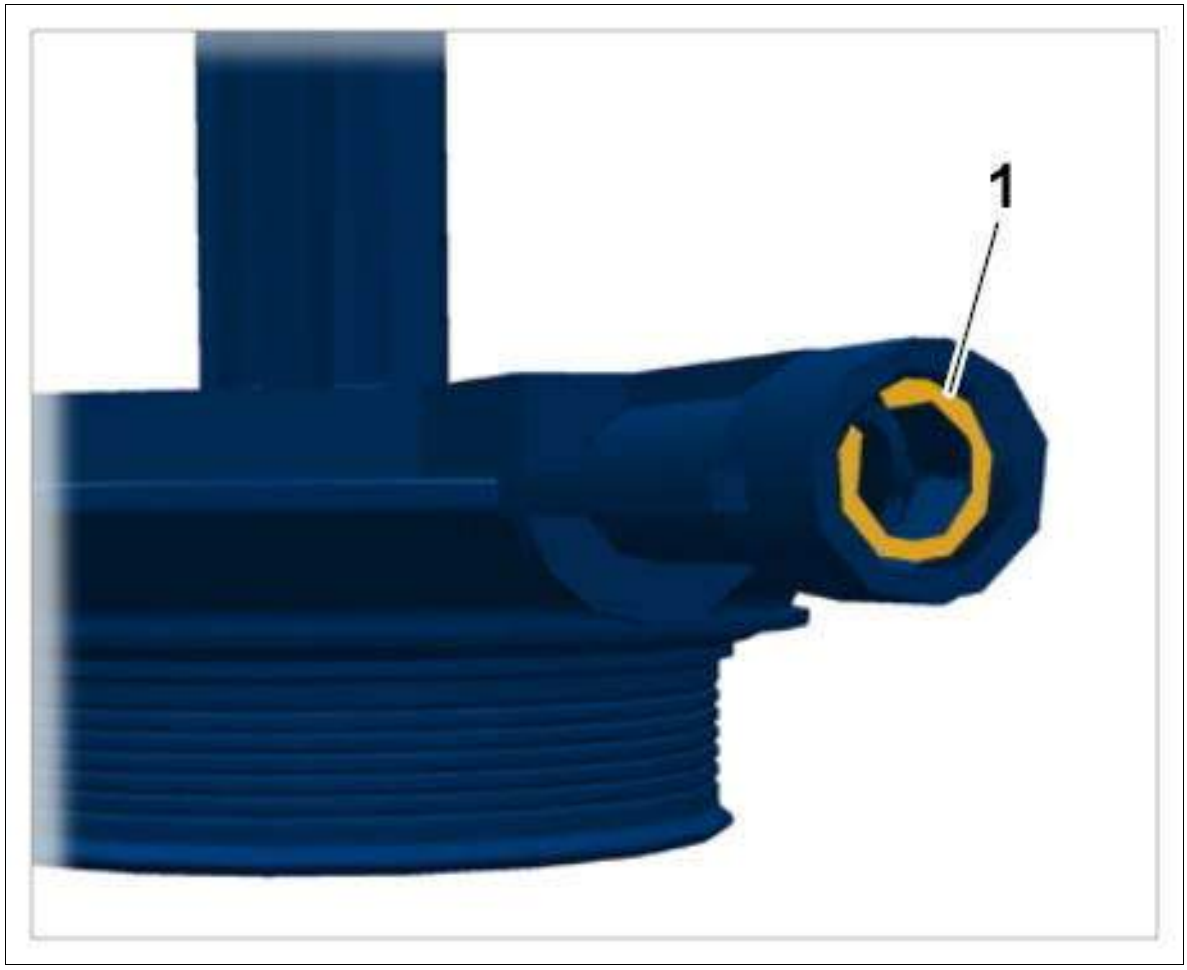
3. Remove cutting ring **-1-** .

Fig 2: Identifying Rear Air Spring Cutting Ring



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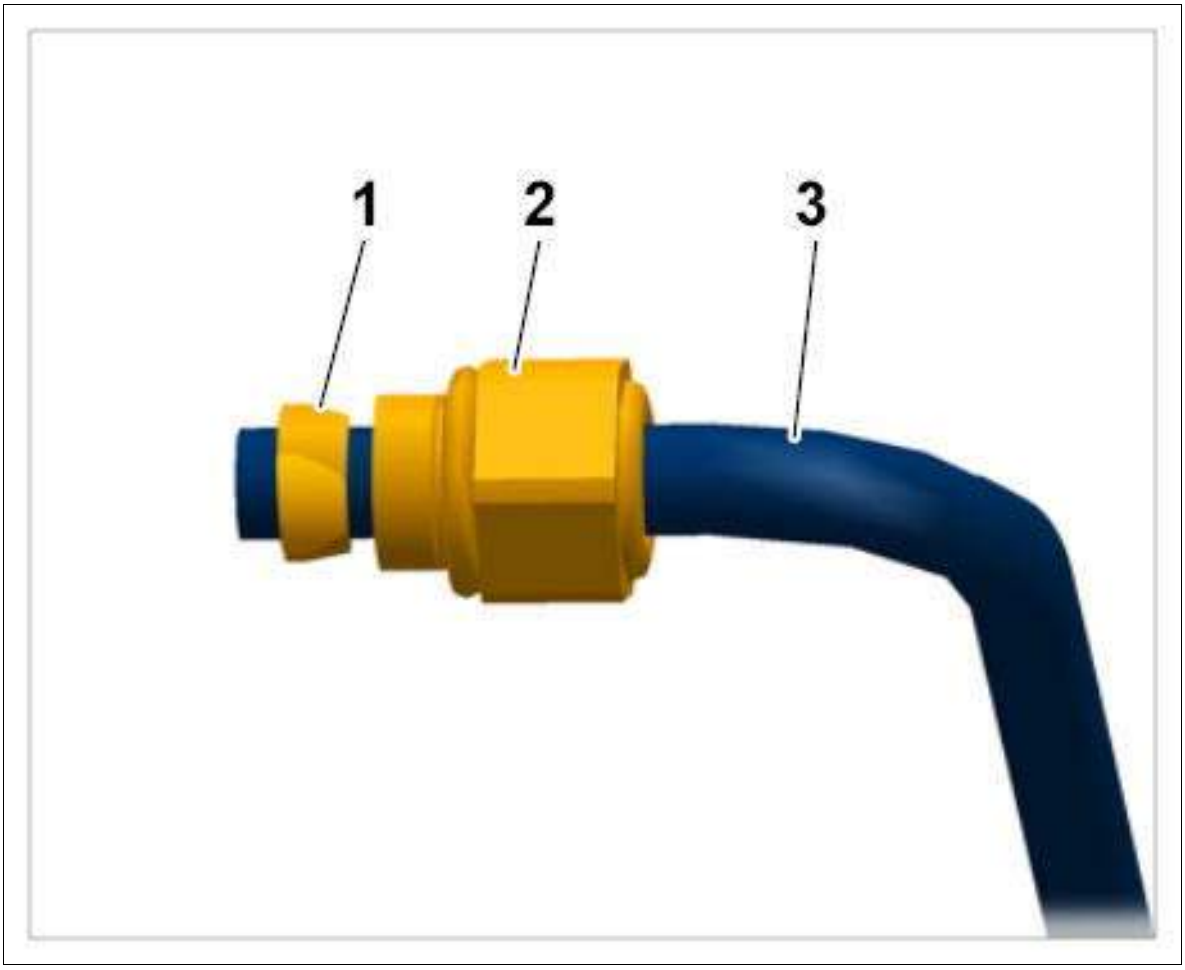
4. Install new rear air spring (see "INSTALLING REAR AIR SPRING ").

Replacing VOSS threaded joint on the vehicle:

1. Loosen the cutting ring **-1-** on the air line **-3-** using a suitable tool.
2. Pull VOSS threaded joint **-2-** off the air line **-3-** .

Fig 3: Identifying Rear Air Spring Cutting Ring And VOSS Threaded Joint



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

Information

Sharp edges at the end of the air line or at the point where the cutting ring is fitted can damage the newly fitted O-ring.

For this reason, always de-burr the end of the air line.

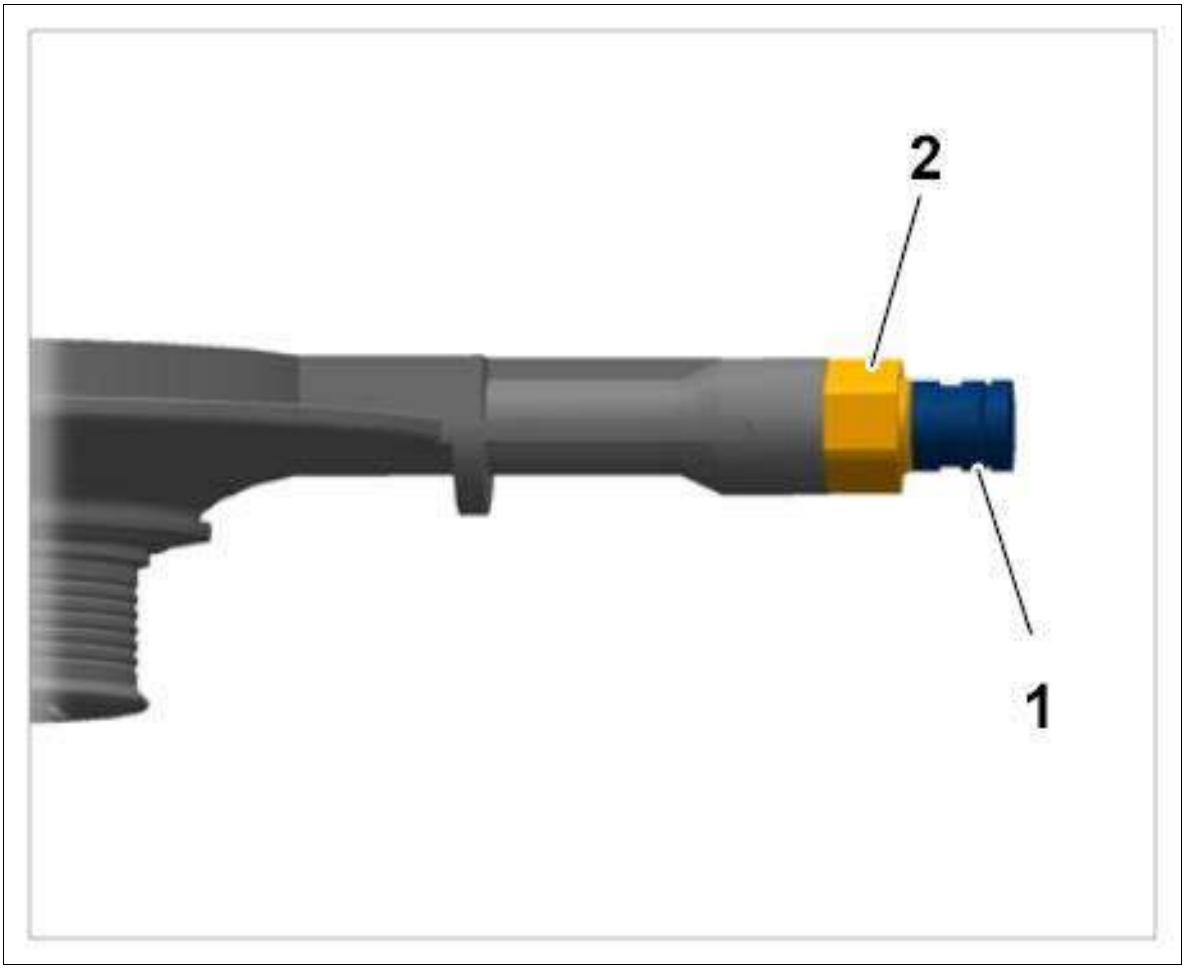
If there is also a sharp edge at the point where the cutting ring is fitted, the air line must be repaired. → 438541 REPAIRING AIR LINE

3. Check air line for damage/leaks.

   Repair the air line if it is damaged → 438541 REPAIRING AIR LINE .

4. Pull stopper **-1-** out of the new air spring.

Fig 4: Identifying Air Spring Stopper



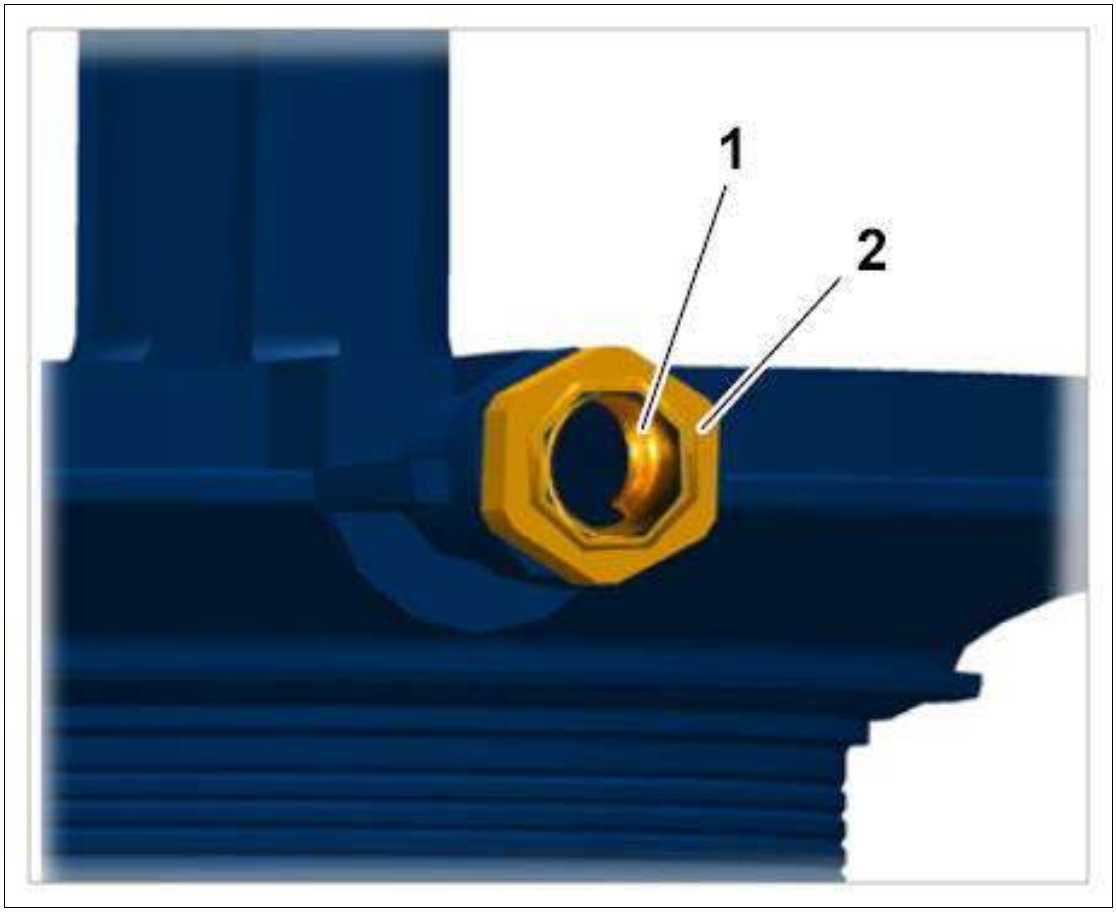
Courtesy of PORSCHE CARS NORTH AMERICA, INC.

Information

Before installation, the following parts must be pre-fitted on the air connection of the new air spring:

1. Cutting ring -1-
2. VOSS threaded joint -2-

Fig 5: Identifying Air Connection Cutting Ring And Threaded Joint



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5. Install new rear air spring (see "INSTALLING REAR AIR SPRING ").

   Pay particular attention to the following when fitting the air line on the air spring:

   1. Insert air line as far as it will go.
   2. To check that the air line is fitted correctly, pull it briefly against the insertion direction. If it cannot be pulled out or can only be pulled out with considerable effort, the air line is fitted correctly.

WM 434319 REMOVING AND INSTALLING REAR AIR SPRING (MACAN, MACAN S, MACAN TURBO) > REMOVING AND INSTALLING REAR AIR SPRING > INSTALLING REAR AIR SPRING

1. Installation is performed in reverse order. Pay particular attention to the following:

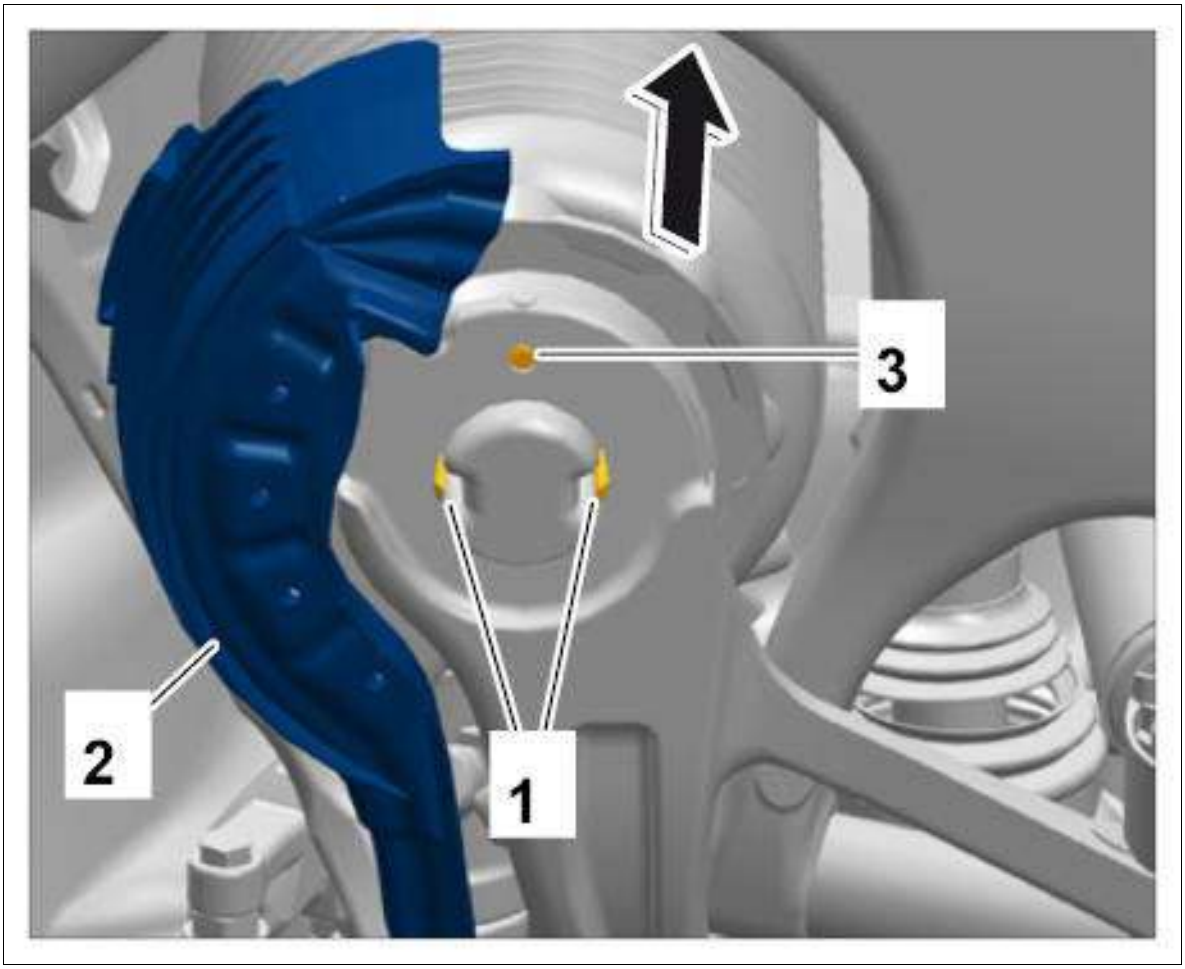
   The length of the air spring must not exceed max. 290 mm! Otherwise, there is a danger that the air spring will be damaged.

2. Align the air spring in such a way that the pin of the lower air spring is seated in the bore on the support **-3-** at the bottom.

Observe specified tightening torques:

Air line to air spring: **Tightening torque 3 Nm (2 ftlb.)**

Fig 1: Installing Air Spring



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WM 434319 REMOVING AND INSTALLING REAR AIR SPRING (MACAN, MACAN S, MACAN TURBO) > SUBSEQUENT WORK

WARNING: Sudden filling of the air spring

- *Risk of squashing*

→ Do not reach into the danger area.

→ Keep third parties away from the danger area.

→ Remove tools from the danger area.

1. Fill the relevant air spring using **PIWIS Tester II 9818.** → 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM .

2. Perform a visual test and touch test on the rear air springs.

   Air springs must be adequately filled and rolling creases in the protective boot must be removed correctly (no kinks)! → Rolling creases on air spring

   Fig 1: Identifying Air Spring Rolling Creases

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WM 438219 REMOVING AND INSTALLING PRESSURE ACCUMULATOR FOR LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > TECHNICAL VALUES

Location	Description	Type	Basic value	Tolerance 1	Tolerance 2
Pressure accumulator to body		Tightening torque	20 Nm (15 ftlb.)		
Pressure line to pressure	Union nut	Tightening torque	3.5 Nm (2.5 ftlb.)		

accumulator					

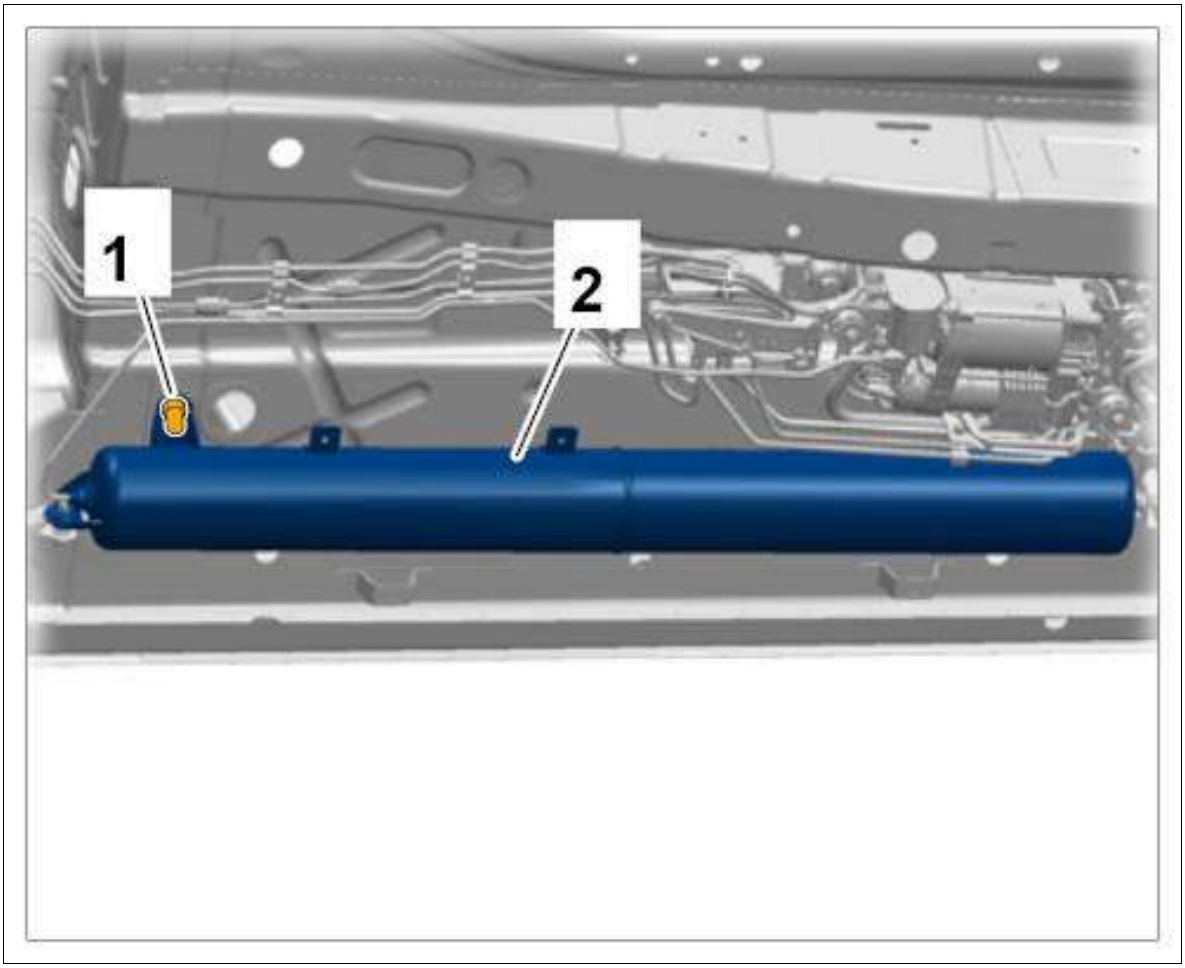
WM 438219 REMOVING AND INSTALLING PRESSURE ACCUMULATOR FOR LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > PRELIMINARY WORK

1. Bleed the pressure accumulator. → 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM
2. Raise the vehicle. → 4X00IN LIFTING THE VEHICLE
3. Remove center underbody (left cover). → 519319 REMOVING AND INSTALLING COVER FOR CENTER UNDERBODY

WM 438219 REMOVING AND INSTALLING PRESSURE ACCUMULATOR FOR LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > REMOVING AND INSTALLING PRESSURE ACCUMULATOR FOR LEVELLING SYSTEM > REMOVING PRESSURE ACCUMULATOR FOR LEVELLING SYSTEM

1. Disconnect air line on the pressure accumulator.
2. Unscrew fastening screw **-1-** on the pressure accumulator **-2-** .

Fig 1: Identifying Pressure Accumulator Mounting



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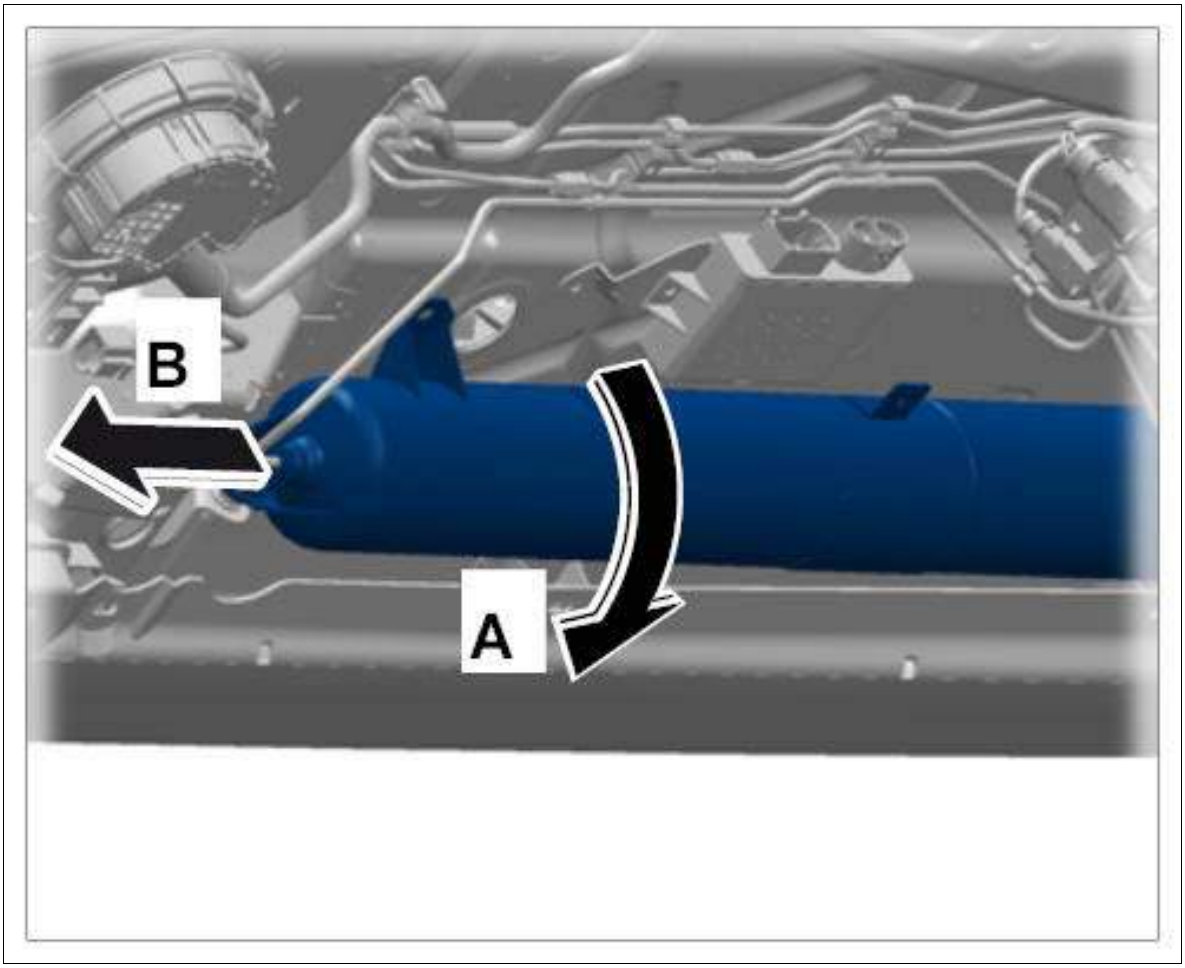
3. Tilt the pressure accumulator down slightly **-direction arrow A-** and remove it by pulling it to the side **-direction arrow B-** .

Fig 2: Removing Pressure Accumulator



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

WM 438219 REMOVING AND INSTALLING PRESSURE ACCUMULATOR FOR LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > REMOVING AND INSTALLING PRESSURE ACCUMULATOR FOR LEVELLING SYSTEM > INSTALLING PRESSURE ACCUMULATOR FOR LEVELLING SYSTEM

1. Installation is performed in reverse order.

   Observe specified tightening torques:

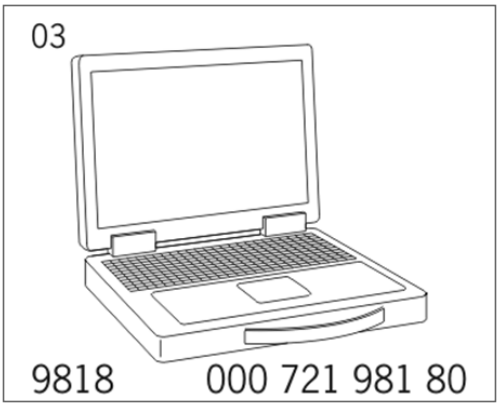
   Pressure accumulator to body: **Tightening torque 20 Nm (15 ftlb.)**

   Air line to pressure accumulator: **Tightening torque 3.5 Nm (2.5 ftlb.)**

WM 438219 REMOVING AND INSTALLING PRESSURE ACCUMULATOR FOR LEVELLING SYSTEM (MACAN, MACAN S, MACAN TURBO) > SUBSEQUENT WORK

1. Install center underbody (left cover). → INSTALLING COVER FOR CENTER UNDERBODY .
2. Fill the levelling system. → BLEEDING AND FILLING THE LEVELLING SYSTEM .

WM 438541 REPAIRING AIR LINE (MACAN, MACAN S, MACAN TURBO) > TOOLS

Designation	Type	Number	Description	
cutting pliers	Workshop equipment	WE 1506		
PIWIS Tester II	Special tool	9818		

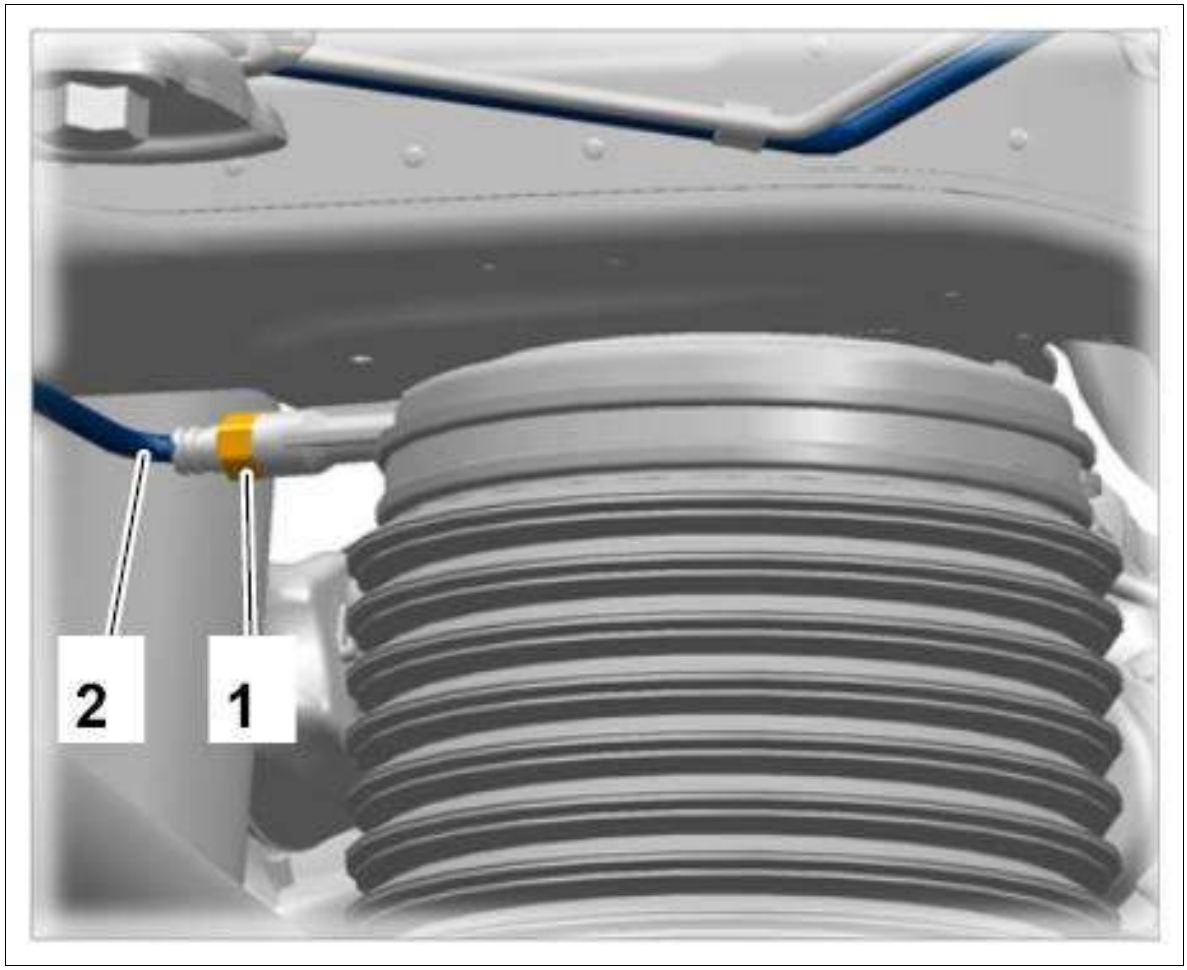
WM 438541 REPAIRING AIR LINE (MACAN, MACAN S, MACAN TURBO) > REPAIRING AIR LINE

Information

If a new air spring/new pressure control valve is to be installed, the VOSS threaded joint is already pre-fitted.

1. Raise the vehicle. → 4X00IN LIFTING THE VEHICLE
2. Bleed the relevant section using **PIWIS Tester II 9818.** → 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM .
3. Loosen VOSS threaded joint **-1-** on the defective air line **-2-** from the relevant component (e.g. air spring/compressor).

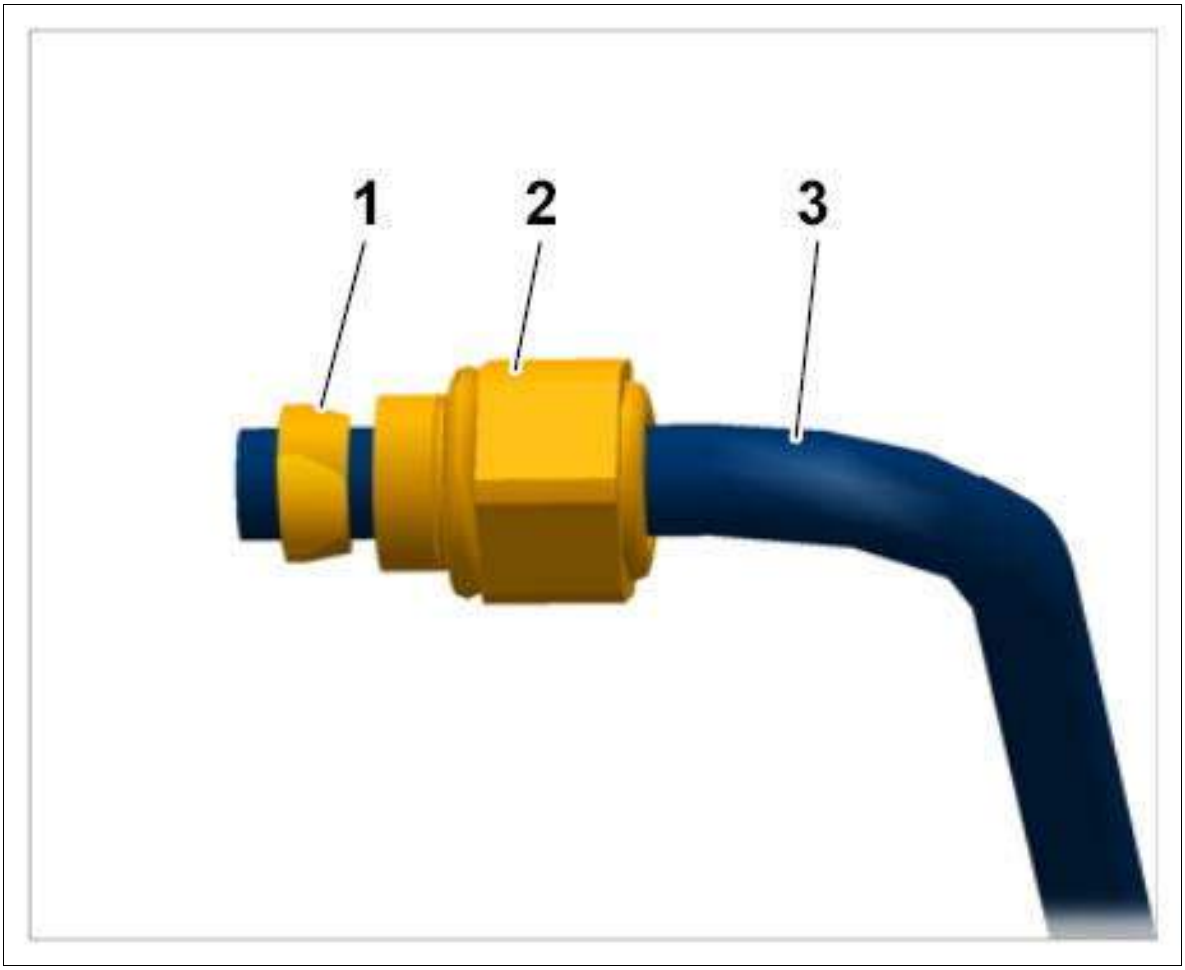
Fig 1: Identifying Air Line Connection



Courtesy of PORSCHE CARS NORTH AMERICA, INC.

4. Loosen the cutting ring **-1-** on the air line **-3-** using a suitable tool.
5. Pull VOSS threaded joint **-2-** off the air line **-3-** .

Fig 2: Identifying Air Line Cutting Ring And VOSS Threaded Joint



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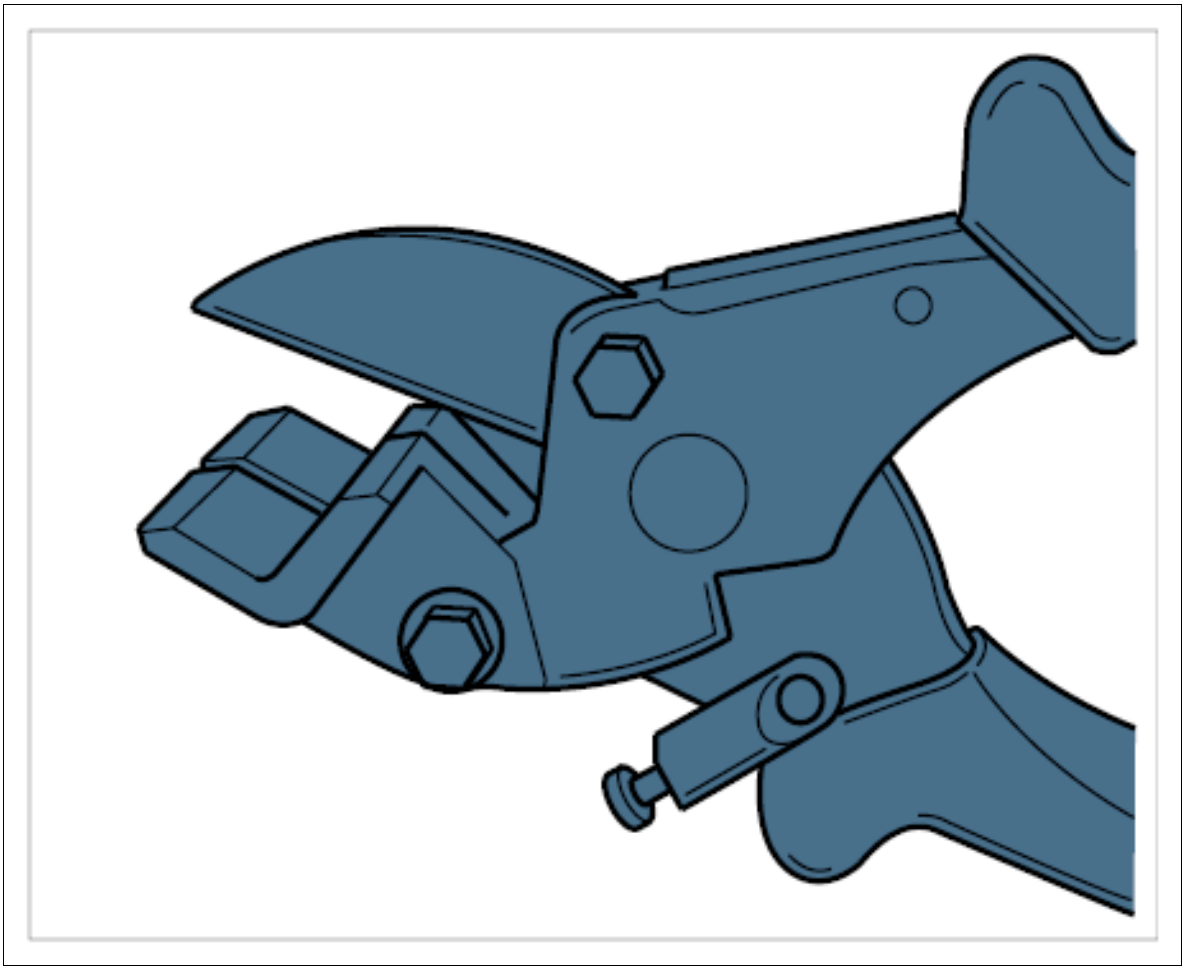
Information

Pay particular attention to the following points when choosing the repair point:

1. The repair point must be in an area protected from water spray.
2. Only straight line sections should be chosen for repairs. If a bent section of line is selected, this can result in leaks in the push-on connector.

6. Cut off defective section of the air line with a straight cut using **cutting pliers WE 1506.**

Fig 3: Identifying Pliers VAS 6228



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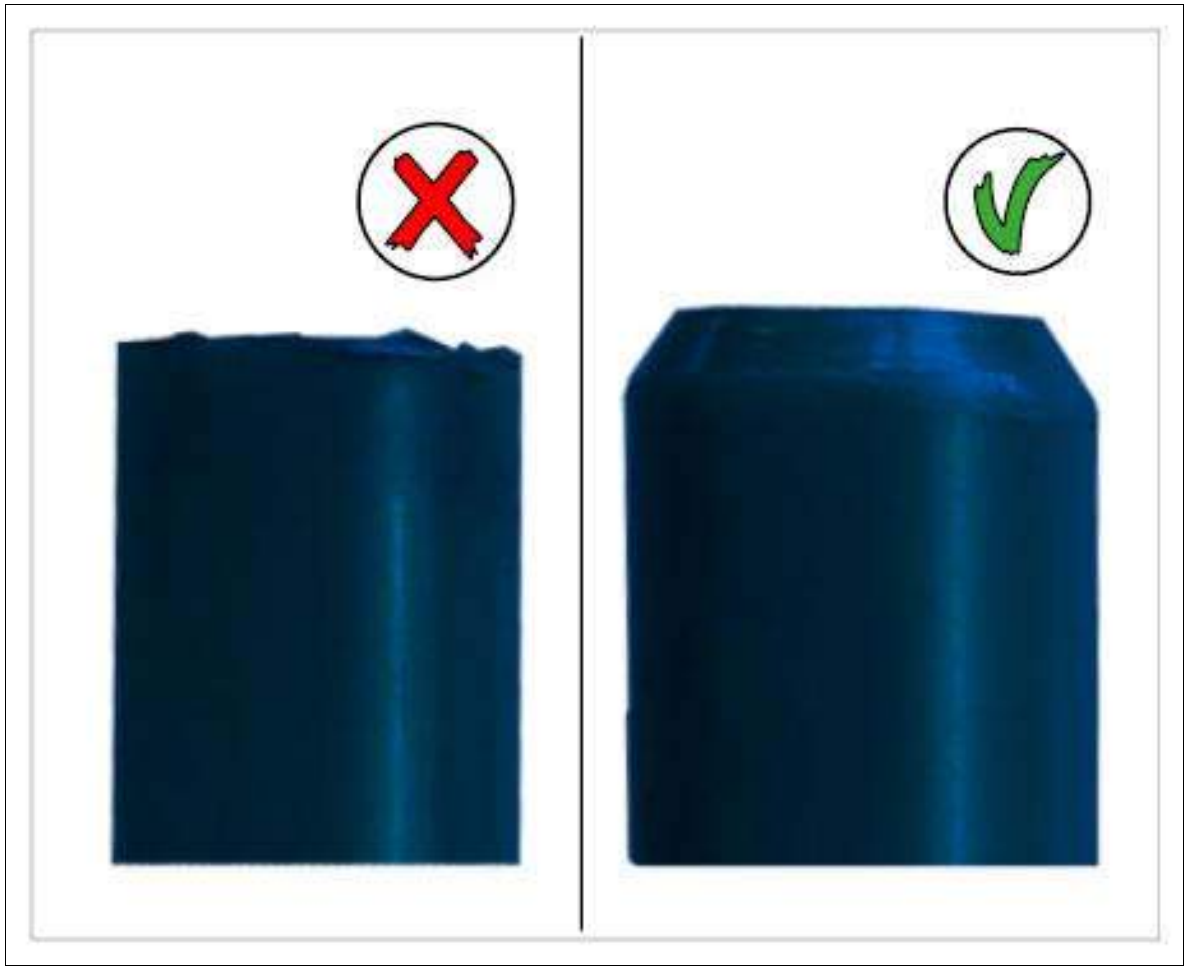
Information

Sharp edges at the end of the air line or at the point where the cutting ring is fitted can damage the newly fitted O-ring.

For this reason, always de-burr the end of the air line.

7. De-burr the end of the new air line section using a suitable tool → De-burring air line .

Fig 4: Identifying De-Burring Air Line



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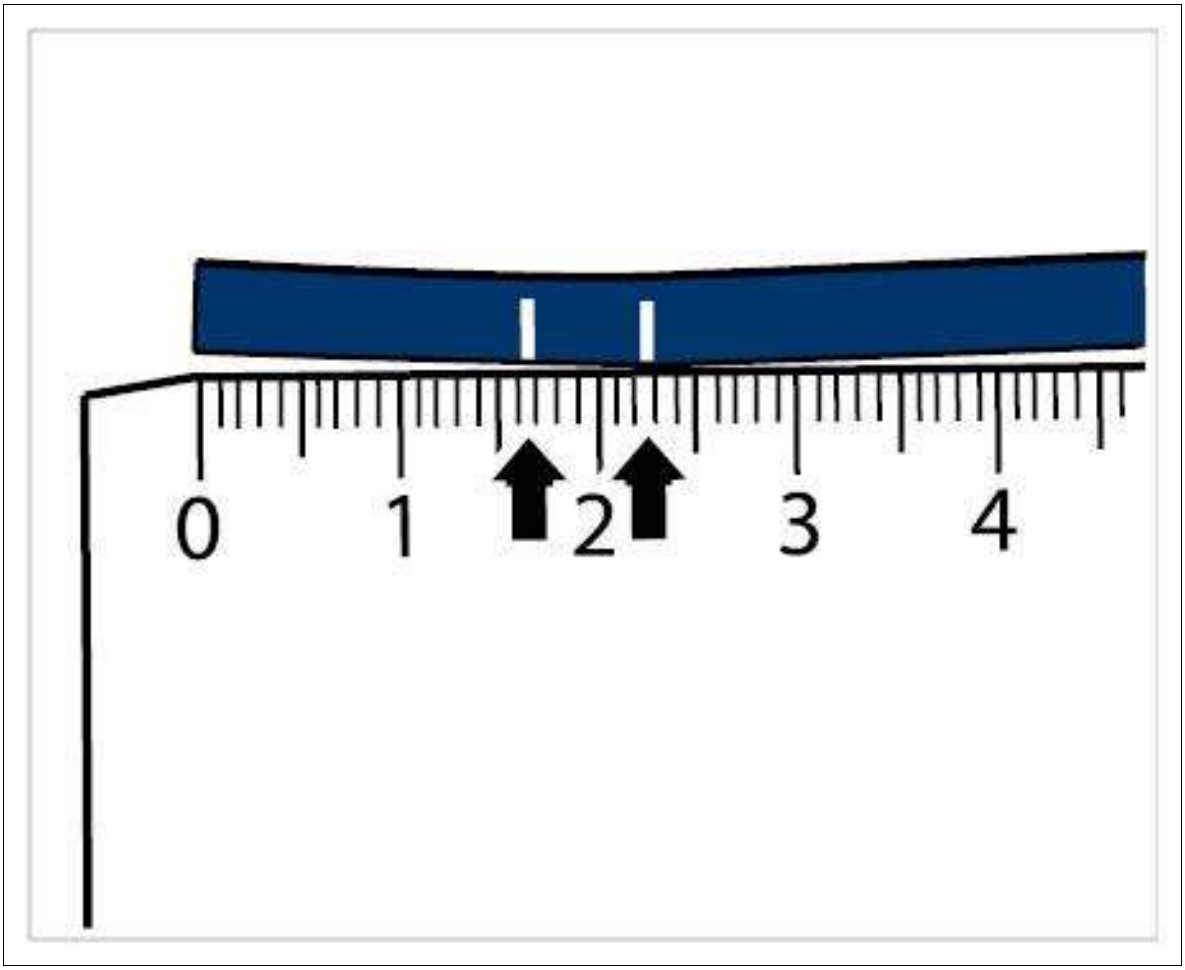
8. Mark the new air line with a colored marking (e.g. using a water-resistant marker).

   Applies to end of hose on valve block: Measured from the end of the hose, make two colored markings at 17 mm and 22 mm respectively **-arrows-** .

Fig 5: Locating Air Line Mark (Valve Block Side)



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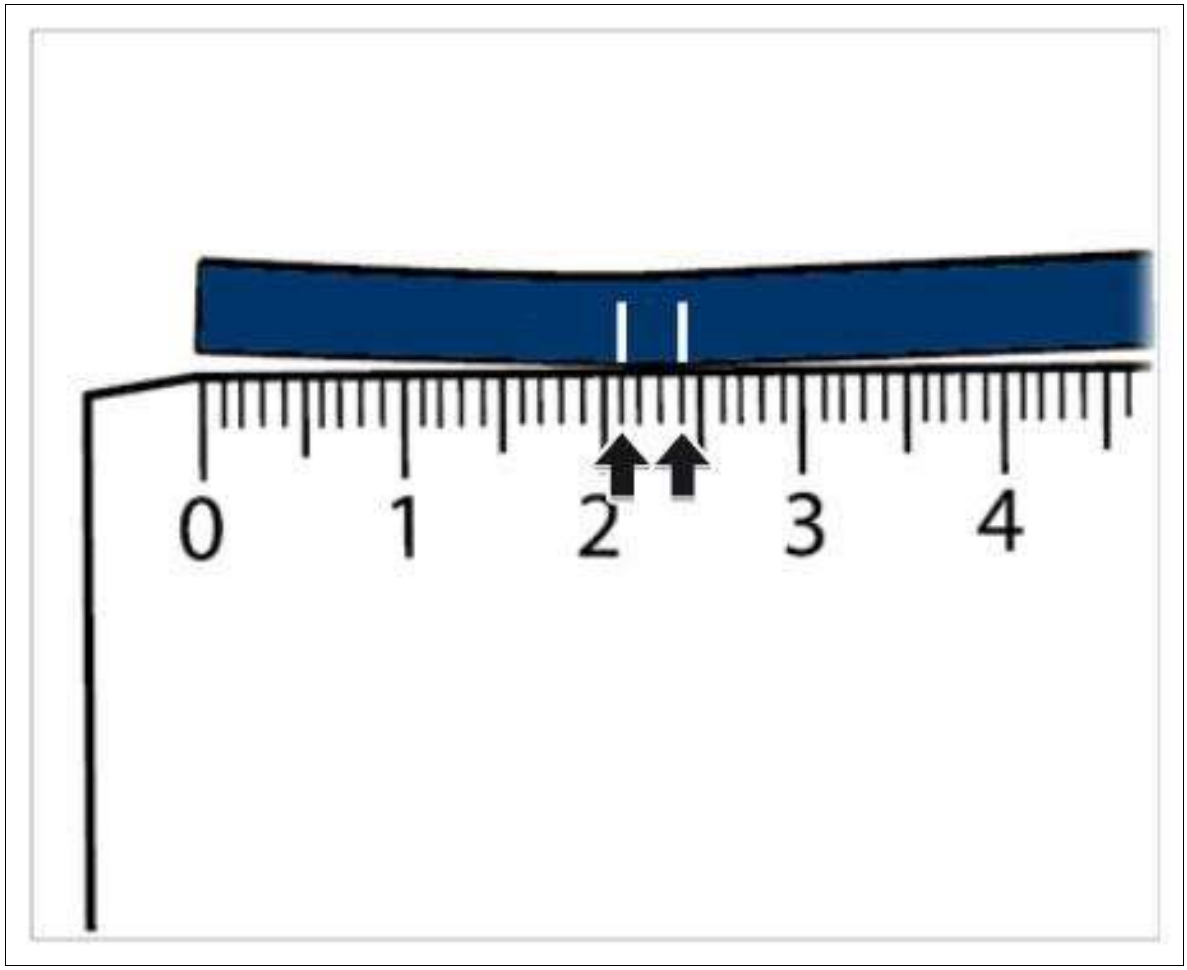
Applies to end of hose on air spring: Measured from the end of the hose, make two colored markings at 21 mm and 24 mm respectively **-arrows-** .

Fig 6: Locating Air Line Mark (Air Spring Side)



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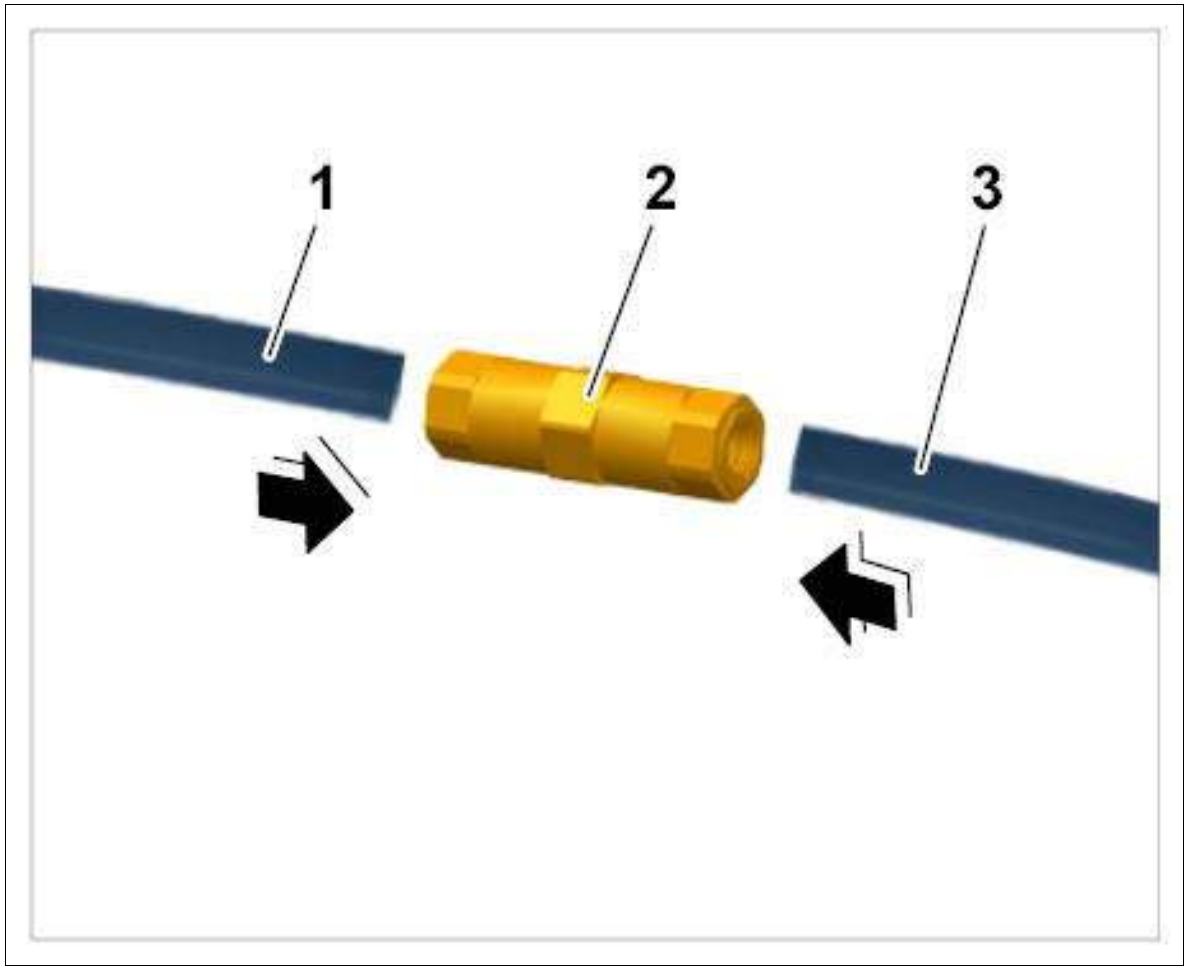
9. Check air line for soiling (e.g. dust particles) and clean it if necessary.

   Information

   Insert air lines as far as they will go into the push-on connector.

10. Connect new air line section **-1-** using the push-on connector **-2-** to the air line installed in the vehicle **-3-** .

Fig 7: Connecting Air Lines



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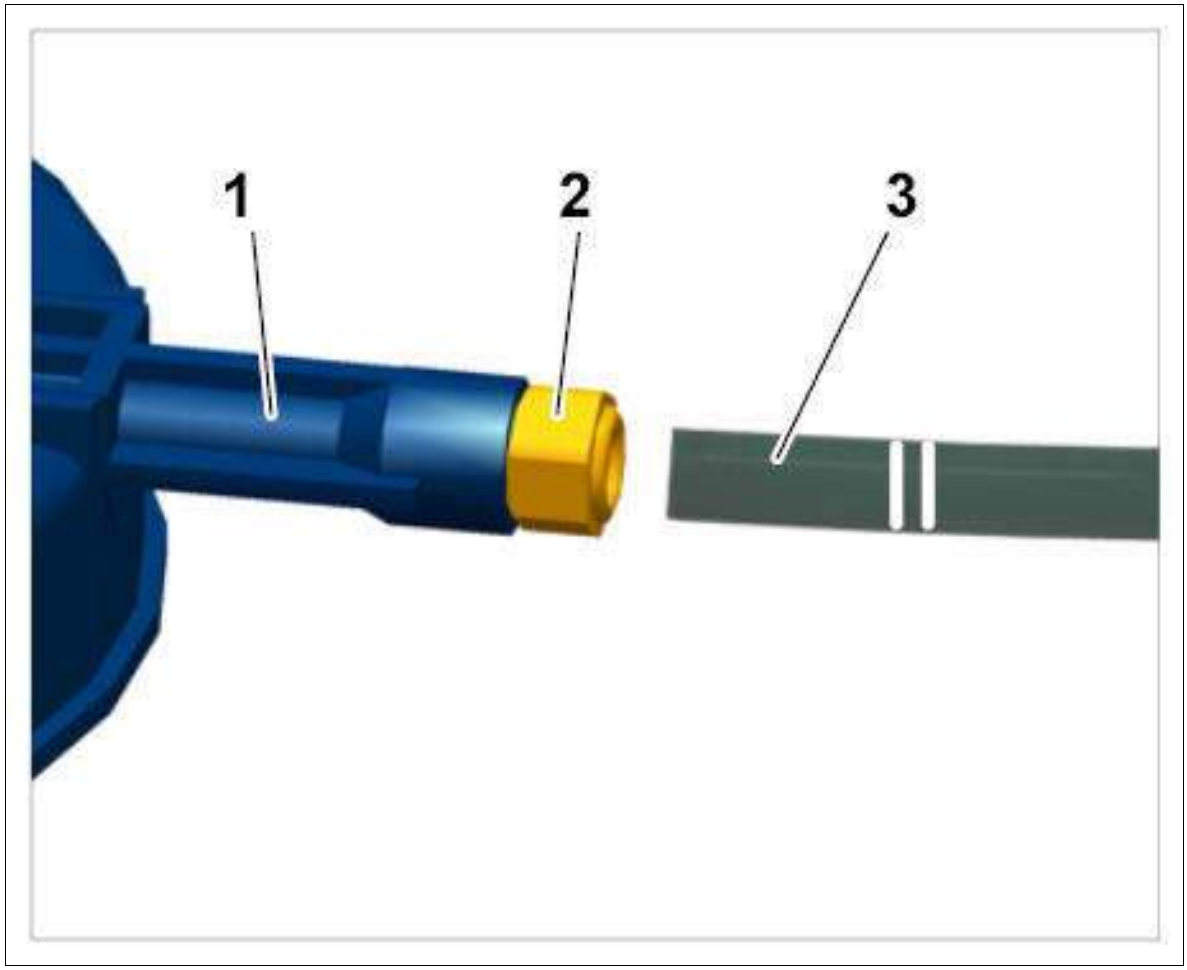
11. Insert air line **-3-** as far as it will go into the VOSS threaded joint **-2-** on the air spring/valve block **-1-** .

Fig 8: Identifying Air Line And VOSS Threaded Joint (Rear Air Spring)



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12. Check that the air line is fitted correctly:
    1. Only one marking on the air line should be visible.
    2. Pull the air line briefly against the insertion direction. If it cannot be pulled out, the air line is fitted correctly.
13. Fill the relevant section using **PIWIS Tester II 9818.** → 4301IN BLEEDING AND FILLING THE LEVELLING SYSTEM .