Check engine light active - Fault P3007F1, P3007F2, P300CA8, or P300CA9 present in CDI control unit

Topic number	LI14.30-N-075882
Version	4
Function group	14.30 - Secondary air injection
Date	11/28/24
Validity	Model 907 with engine 654
Reason for change	Remedy updated

Complaint

Check engine warning light active.

The following fault codes may be present in the engine control unit:

- P3007F1 Leak detected in intake air system or
- P3007F2 Mass air flow malfunction in intake air system (cylinder bank 1) or
- P300CA8 Leak detected in intake air system or
- P300CA9 Mass air flow malfunction in intake air system (cylinder bank 1) or
- P300CA9 and P3007F1: Faults are present simultaneously in the quick test

Cause

Causes for FC P3007F1:

Faults are set if:

- There is a leakage upstream of the exhaust gas turbocharger.
- The housing intermediate flange located at the high-pressure exhaust gas recirculation valve (where the exhaust back pressure sensor connects) is carbonized or clogged. Please refer to the attached file "Gehaeusezwischenflansch_intermediate_flange.jpg."

Note: This is only relevant if the correction value in load range 1 is less than -8%. See the attached file "verstopfter_Gehaeusezwischenflansch_clogged_Intermediate_Flange.jpg."

- The engine timing is misadjusted.
- There is a defective hot film mass air flow sensor or a hot film mass air flow sensor that is affected by incorrect airflow (this can be due to a clogged or deformed air filter). Refer to the attached file "Luftfilter_air_filter."
- There is carbonization or incomplete sealing of the high-pressure or low-pressure exhaust gas recirculation valves.

Cause for FC P3007F2:

Faults are set if:

- There is a leakage downstream of the exhaust gas turbocharger.
- The charge air distribution line (intake manifold) is severely carbonized. See file in annex "Saugrohr_intake_manifold.jpg".
- There is a defective hot film mass air flow sensor or a hot film mass air flow sensor that is affected by incorrect airflow (this can be due to a clogged or deformed air filter). Refer to the attached file "Luftfilter_air_filter."

Cause for fault P300CA8:

For vehicles with:

- code MU1 or MU3 or MU5 (single-speed turbocharger) and CDI control unit N3/40 with software release E080, G090 and G0B0 or
- code MU6 (dual-speed turbocharger) and CDI control unit N3/40 with software release G090, there is a software malfunction.

Note: For this software effect, the correction value of the air intake in load range 4 has a noticeable problem. All other correction values do not have noticeable problems here.

Faults may also occur under the following conditions:

- If there is a leakage upstream of the exhaust gas turbocharger. Please refer to the file attached as "Dichtring_Sealant.jpg.
- There is a defective hot film mass air flow sensor or a hot film mass air flow sensor that is affected by incorrect airflow (this can be due to a clogged or deformed air filter). Refer to the attached file "Luftfilter_air_filter."
- If the intake manifold (charge air distribution line) or the charge air cooler is carbonized. For more information, see the file attached as "Saugrohr_intake_manifold.jpg."
- If the timing is misadjusted.
- If there is carbonization or incomplete closure of the high-pressure or low-pressure exhaust gas recirculation valve, particularly in the housing intermediate flange connected to the high-pressure exhaust gas recirculation valve (which is linked to the exhaust back pressure sensor).

Cause for fault P300CA9:

For vehicles with:

- Code MU1 or MU3 or MU5 (single-speed turbocharger) and CDI control unit N3/40 with software release E080, G090 and G0B0 or
- Code MU6 (dual-speed turbocharger) and CDI control unit N3/40 with software release G090, there is a software malfunction.

Note: For this software effect, the correction value of the air intake in load range 4 has a noticeable problem. All other correction values do not have noticeable problems here.

Faults may also occur under the following conditions:

- There is a leak located downstream of the exhaust gas turbocharger.
- The charge air distribution line (intake manifold) is heavily carbonized. Please refer to the attached file "Saugrohr_intake_manifold.jpg" for reference.
- If there is carbonization or incomplete closure of the high-pressure exhaust gas recirculation valve, particularly in the housing intermediate flange connected to the high-pressure exhaust gas recirculation valve (which is linked to the exhaust back pressure sensor).

Cause of fault code combination P300CA9 and P3007F1:

- Carbonization of the intermediate housing flange at the high-pressure EGR valve, specifically at the connection for the exhaust back pressure sensor.

Remedy

In the case of fault code P3007F1:

1) Verify the clean air line between the air filter housing and the exhaust gas turbocharger for proper assembly.

Refer to the WIS documents AR09.10-S-8130EA, AR09.40-S-0500EA (dual-stage exhaust gas turbocharger), AR09.20-S-0010EA, and/or AR09.41-S-6817EA for guidance.

a) Check the correct assembly of the components of the intake air system and their connections by ensuring:

- The transition from the exhaust gas turbocharger to the clean airline on the right and from the clean airline on the right to the clean airline in the center is properly connected via the quick-release coupling. Refer to the relevant area of the exhaust gas turbocharger to the clean airline on the right (see picture

b) Ensure the alignment of the clean airline on the right with the exhaust gas turbocharger is correct:

- For a single-stage turbocharger, the alignment of the cast lug with the counterpart profile must be accurate (see picture 1b).

- For a dual-stage turbocharger, the alignment of the cast lug with the tab must be proper (see picture 1c).

Note: When performing repair or assembly work in this area, always replace the red sealing ring.

c) Check the relevant area from the clean airline on the right to the clean airline in the center (quick-release coupling - see picture 2a). Follow these operational steps:

- Operate the quick-release coupling until it reaches the end stop rib (open position), as shown in picture 2b.

- Hold the quick-release coupling open while pushing the clean airline on the left into the quick-release coupling until it reaches the end stop and sits flush all around (see picture 2c).

- Release the quick-release coupling and actively slide it back to the closed position.

- Verify the correct seating of the clean airline using the lock position. If the lock position is not visibly reached, as illustrated in picture 2d, the clean airline must be repositioned.

Note: See WIS documents AR09.10-D-8130TSM and AR09.40-D-0500TSM for further details. Examples of proper and improper installations can be found in pictures 3 and 4.

2) Inspect the housing intermediate flange on the high-pressure exhaust gas recirculation (EGR) valve, specifically at the connection for the exhaust back pressure sensor. Use a flashlight to check for any inconsistencies or carbon buildup.

Note: This step is only necessary if the correction value for air intake in load range 1 is less than -8%.

3) Check the intake air system for leaks:

a) It is best to pressurize the intake air system with 0.25 bar from the end pipe of the exhaust system. The intake air system must be sealed using an adapter connected to the clean air line leading to the air filter box. Refer to the picture of "Adapter_Reinluftleitung_Clean_Air_Line_Model_Type_907" in the annex.

4) Inspect the sealing ring between the exhaust gas turbocharger and the clean airline (see the annex "Dichtring_Sealant_nok") for damage while in the installed position, using an endoscope. If any issues are detected, perform the necessary repairs.

5) For vehicles with mileage over 90,000 / 150,000 km or those that have undergone prior repairs to the control assembly, check and readjust the timings as needed.

6) Conduct a visual inspection of the air filter for dirt or deformation.

7) Activate the high-pressure and low-pressure exhaust gas recirculation valves using Xentry Diagnostics and check their functionality. Also, visually examine the parts for carbon buildup and replace them based on your findings. If the low-pressure EGR valve shows significant issues, ensure to perform additional cleaning immediately downstream of the DPF and inspect the low-pressure EGR cooler for carbonization.

Note: After completing the repair work, follow this sequence:

8) Reset the correction factors for the air mass of the intake system.

Note: To do this, select the following menu items:

CDI control unit N3/40 → Adaptations → Teach-in processes → Reset learned values → Intake air system.

9) Perform a quick test again and delete the fault memory (see AD00.00-S-2000-04E).

Note: If you delete the fault memory first and then reset the correction factors for air intake, faults P300CA8 or P300CA9 may reoccur!

10) Finally, disconnect the diagnostic device from the vehicle (see AD00.00-S-2000-04E).

In case of fault code P3007F2:

1) Check Charge Air System for Leaks:
a) Ideally, pressurize the charge air system to 0.25 bar from the end pipe of the exhaust system. Ensure the intake air system is sealed using an adapter connected to the clean air line leading to the air filter box. Refer to the picture labeled *Adapter_Reinluftleitung_Clean_Air_Line_Model_Type_907* in the annex.

- Alternatively, you can check the charge air system for leaks using overpressure as indicated by Xentry Diagnostics. To do this, navigate to: CDI Control Unit N3/40 → Tests → Manual Leak Test of the Charge Air System

Note regarding an optional test method: Use the leak tester part number 000 588 18 21 00 (see WS09.00-P-0028B) to perform flue gas diagnosis for leaks in the intake air system with UltraTraceUV. For more information on this procedure, access the WIS Service Media (WSM) under the following menu: Contents → Model Series → Van → V-Class / Vito → 09 - Air Intake, Charging → AD - Flue Gas Diagnosis for Leaks with UltraTraceUV.

If any significant issues are identified, initiate appropriate repair measures.

2) Visual Inspection of the Intake Manifold:

- Check the charge air distribution line for carbon buildup.

3) Visual Inspection of the Air Filter:

- Inspect the air filter for any blockages or deformation. Also, check if the HFM-SFI can be evaluated using Xentry.

Note: After completing the repair work, follow this sequence:

4) Reset Correction Factors for the Air Mass of Air Intake:

- To reset these values, select the following menu items:

CDI Control Unit N3/40 → Adaptations → Teach-in Processes → Reset Learned Values → Intake Air System.

5) Conduct a Quick Test Again and Clear Fault Memory:

- Refer to the procedure outlined in AD00.00-S-2000-04E.

Note: If the fault memory is cleared before resetting the correction factors, fault codes P300CA8 or P300CA9 may reoccur.

6) Finally, disconnect the diagnostic device from the vehicle as specified in AD00.00-S-2000-04E.

In case of fault code P300CA8:

1) For vehicles with:

- Code MU1, MU3, or MU5 (single-speed turbocharger) and CDI control unit N3/40 with software release E080 or G090, and G0B0, or

- Code MU6 (dual-speed turbocharger) and CDI control unit N3/40 with software release G090,

The CDI Control Unit needs updated software.

Note: If the engine control unit software is already up to date, proceed with the following diagnostic steps:

2) Inspect the clean air line between the air filter housing and the exhaust gas turbocharger for proper assembly. Refer to the WIS documents AR09.10-S-8130EA, AR09.40-S-0500EA (dual-stage exhaust gas turbocharger), AR09.20-S-0010EA, and/or AR09.41-S-6817EA for guidance.

a) Verify the correct assembly of the intake air system components and their connections:

- Check the transition from the exhaust gas turbocharger to the clean airline on the right, and from the clean air line on the right to the clean air line in the center via the quick-release coupling.

- Examine the relevant area of the exhaust gas turbocharger where it connects to the clean airline on the right (refer to picture 1a).

b) Assess the alignment of the clean airline on the right to the exhaust gas turbocharger:

- For a dual-speed turbocharger, confirm that the alignment of the cast lug to the tab is accurate (see picture 1c).

Note: Always replace the red sealing ring when performing repair and assembly work in this area.

c) Examine the relevant area connecting the clean airline on the right to the clean airline in the center (quick-release coupling - see picture 2a). Follow these operational steps:

- Operate the quick-release coupling to its end stop rib (open position); refer to picture 2b.

- Hold the quick-release coupling open while pushing the clean airline on the left into it until it reaches the end stop and sits flush all around (see picture 2c).

- Release the quick-release coupling and slide it back to the closed position.

- Verify the correct seating of the clean airline using the lock position. If the lock position is not visibly engaged as shown in picture 2d, the clean air line must be repositioned.

Note: For further assistance, consult WIS Media: AR09.10-D-8130TSM and AR09.40-D-0500TSM. For examples of good and poor installation, refer to pictures 3 and 4.

3) Check Charge Air System for Leaks:

a) Ideally, pressurize the charge air system to 0.25 bar from the end pipe of the exhaust system. Ensure the intake air system is sealed using an adapter connected to the clean air line leading to the air filter box. Refer to the picture labeled *Adapter_Reinluftleitung_Clean_Air_Line_Model_Type_907* in the annex.

- Alternatively, you can check the charge air system for leaks using overpressure as indicated by Xentry Diagnostics. To do this, navigate to: CDI Control Unit N3/40 → Tests → Manual Leak Test of the Charge Air System

Note regarding an optional test method: Use the leak tester part number 000 588 18 21 00 (see WS09.00-P-0028B) to perform flue gas diagnosis for leaks in the intake air system with UltraTraceUV. For more information on this procedure, access the WIS Service Media (WSM) under the following menu: Contents → Model Series → Van → V-Class / Vito → 09 - Air Intake, Charging → AD - Flue Gas Diagnosis for Leaks with UltraTraceUV.

If any significant issues are identified, initiate appropriate repair measures.

4)Check sealing ring between the exhaust gas turbocharger and clean airline (see annex "Dichtring_Sealant_nok") for damage in the installed state by means of an endoscope.

- If there are noticeable problems, perform the appropriate repair measures.

5) Visual check of the following parts for severe carbonization or consistency:

a) Intake manifold (charge air distribution line) – in the event noticeable problems are found, the cylinder head intake ports must then be checked,

b) Housing intermediate flange at the high-pressure EGR valve (assembly of exhaust back pressure sensor) using a light cone of a flashlight

c) Charge air cooler

- If there are noticeable problems, initiate the appropriate repair measures.

6) Check air filter element for deformation, severe soiling, or damage

7) For vehicles with mileage over 90,000 / 150,000 km or those that have undergone prior repairs to the control assembly, check and readjust the timings as needed.

8) Actuate high-pressure and low-pressure exhaust gas recirculation valves via Xentry Diagnostics and check for functionality. Visually check parts for carbonization and replace them as per findings.

- If the low-pressure EGR valve has noticeable problems here, extended wiping must also be performed directly downstream of the DPF and the low-pressure EGR cooler checked for carbonization.

9) Fault can be set if the sensor element of the hot film mass air flow sensor is oiled up.

Note: After completing the repair work, follow this sequence:

10) Reset Correction Factors for the Air Mass of Air Intake:

- To reset these values, select the following menu items:

CDI Control Unit N3/40 → Adaptations → Teach-in Processes → Reset Learned Values → Intake Air System.

11) Conduct a Quick Test Again and Clear Fault Memory:

- Refer to the procedure outlined in AD00.00-S-2000-04E.

Note: If the fault memory is cleared before resetting the correction factors, fault codes P300CA8 or P300CA9 may reoccur.

12) Finally, disconnect the diagnostic device from the vehicle as specified in AD00.00-S-2000-04E.)

<u>In case of fault code P300CA9:</u>

1) For vehicles with:

- Code MU1, MU3, or MU5 (single-speed turbocharger) and CDI control unit N3/40 with software release E080 or G090, and G0B0, or

- Code MU6 (dual-speed turbocharger) and CDI control unit N3/40 with software release G090,

The CDI Control Unit needs updated software.

Note: If the engine control unit software is already up to date, proceed with the following diagnostic steps:

2) Check Charge Air System for Leaks:

a) Ideally, pressurize the charge air system to 0.25 bar from the end pipe of the exhaust system. Ensure the intake air system is sealed using an adapter connected to the clean air line leading to the air filter box. Refer to the picture labeled *Adapter_Reinluftleitung_Clean_Air_Line_Model_Type_907* in the annex.

- Alternatively, you can check the charge air system for leaks using overpressure as indicated by Xentry Diagnostics. To do this, navigate to: CDI Control Unit N3/40 → Tests → Manual Leak Test of the Charge Air System

Note regarding an optional test method: Use the leak tester part number 000 588 18 21 00 (see WS09.00-P-0028B) to perform flue gas diagnosis for leaks in the intake air system with UltraTraceUV. For more information on this procedure, access the WIS Service Media (WSM) under the following menu: Contents → Model Series → Van → V-Class / Vito → 09 - Air Intake, Charging → AD - Flue Gas Diagnosis for Leaks with UltraTraceUV.

If any significant issues are identified, initiate appropriate repair measures.

3) Visual Inspection of High-Pressure EGR System Components:

- High-pressure EGR valve

- High-pressure EGR cooler (A6541409000)

- EGR pipe (A6541400702)

- Charge air mixing pipe (A6540902000) and intake manifold (charge air distribution line)

- Check housing intermediate flange (A6541407000) including exhaust back pressure sensor for carbonization and consistency.

Note: If any significant issues are found, initiate the appropriate repair measures.

Note: After completing the repair work, follow this sequence:

4) Reset Correction Factors for the Air Mass of Air Intake:

- To reset these values, select the following menu items:

CDI Control Unit N3/40 → Adaptations → Teach-in Processes → Reset Learned Values → Intake Air System.

5) Conduct a Quick Test Again and Clear Fault Memory:

- Refer to the procedure outlined in AD00.00-S-2000-04E.

Note: If the fault memory is cleared before resetting the correction factors, fault codes P300CA8 or P300CA9 may reoccur.

6) Finally, disconnect the diagnostic device from the vehicle as specified in AD00.00-S-2000-04E.)

In the case of fault code combination P300CA9 and P3007F1:

1)Inspect the housing intermediate flange on the high-pressure exhaust gas recirculation (EGR) valve, specifically at the connection for the exhaust back pressure sensor. Use a flashlight to check for any inconsistencies or carbon buildup.

Note: After completing the repair work, follow this sequence:

2) Reset Correction Factors for the Air Mass of Air Intake:

- To reset these values, select the following menu items:

CDI Control Unit N3/40 → Adaptations → Teach-in Processes → Reset Learned Values → Intake Air System.

3) Conduct a Quick Test Again and Clear Fault Memory:

- Refer to the procedure outlined in AD00.00-S-2000-04E.

Note: If the fault memory is cleared before resetting the correction factors, fault codes P300CA8 or P300CA9 may reoccur.

4) Finally, disconnect the diagnostic device from the vehicle as specified in AD00.00-S-2000-04E.)

Attachments	
File	Description
Dichtring_Sealant.jpg 	
Gehaeusezwischenflansch_Intermedidate_Flange.jpg 	
Luftfilter_air_filter.jpg	

	
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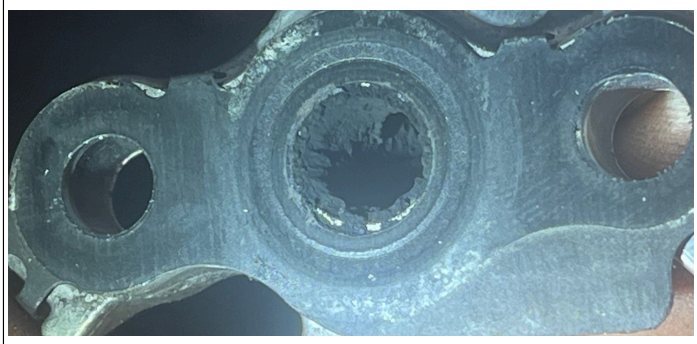
verstopfter_Gehaeusezwischenflansch_clogged_Intermediate_Flange.jpg 	
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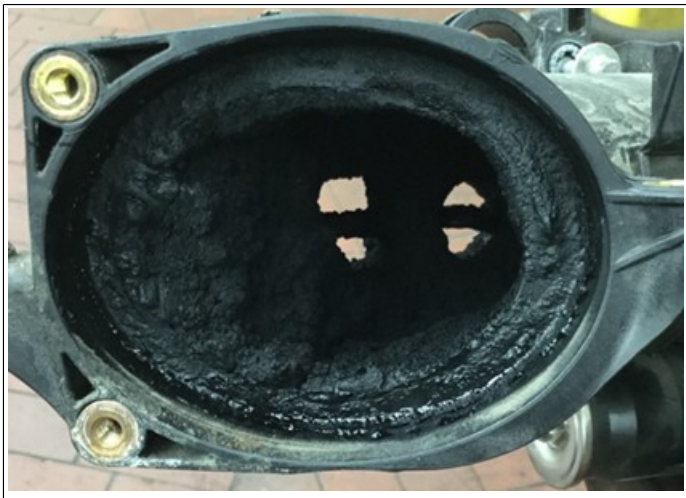	
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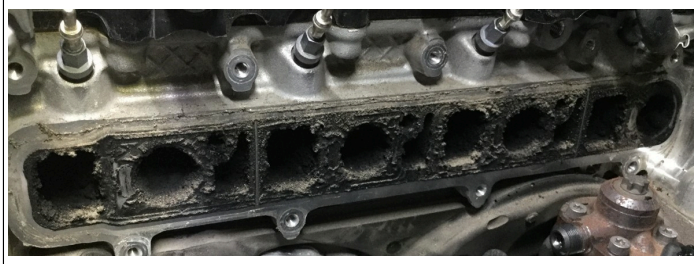
Einlasskanaele_ZK_inlet_ports_CH.jpg 	
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 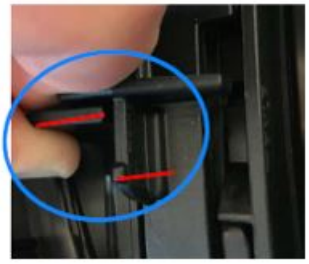	
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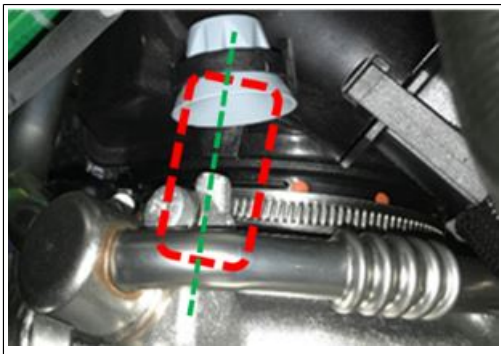

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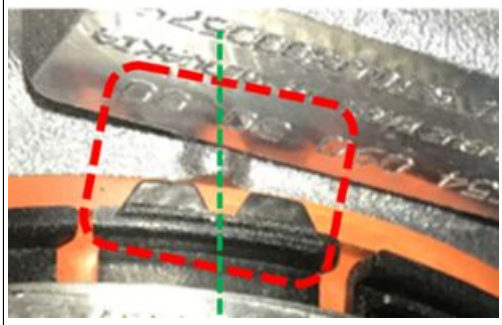

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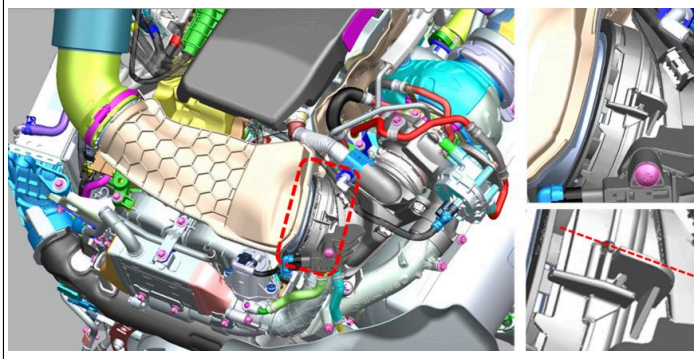

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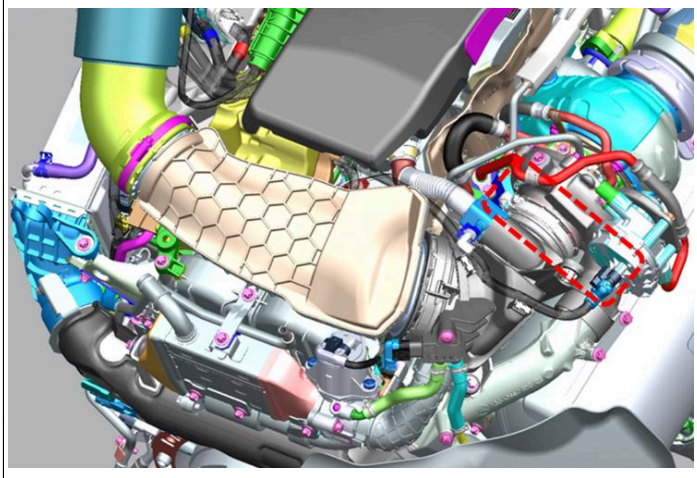

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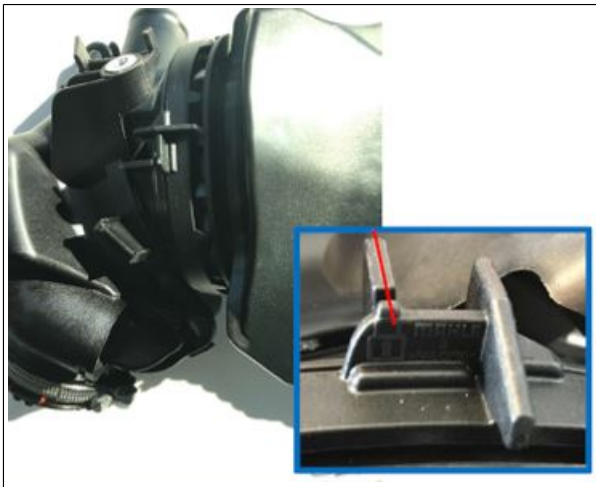

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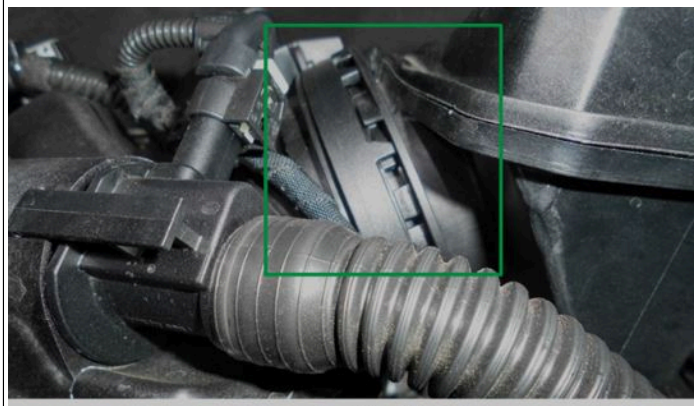

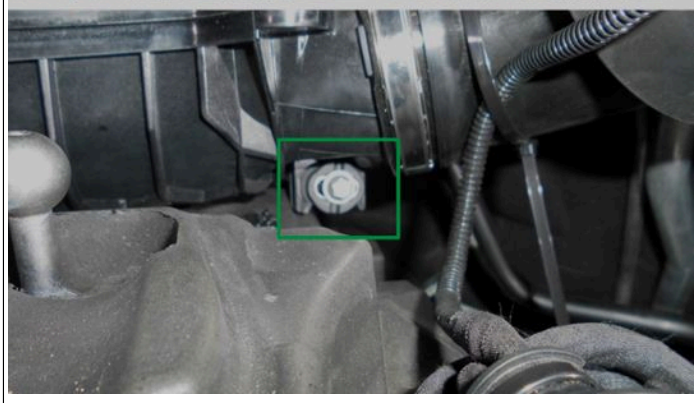

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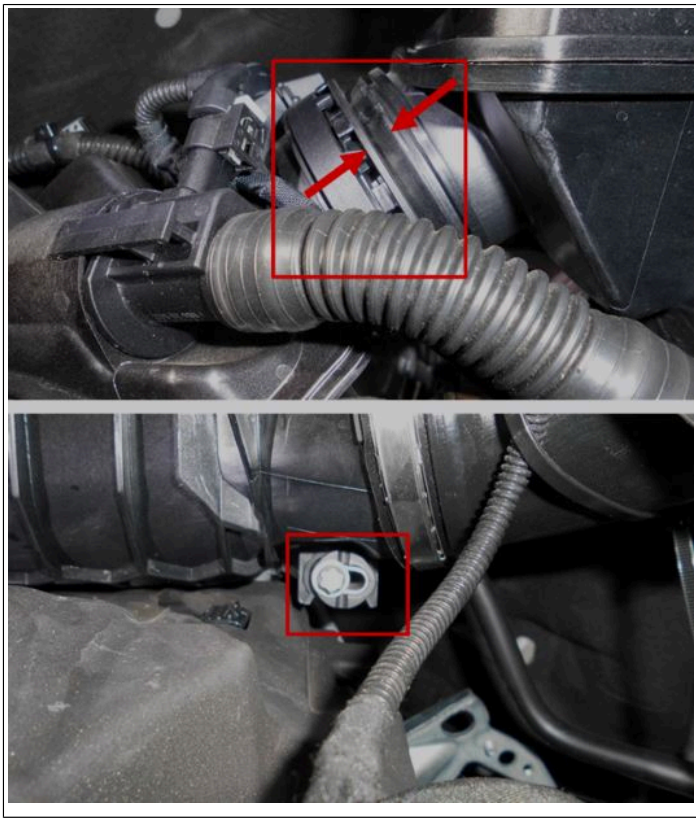

WIS-References		
Document number	Title	Note
AR09.10-S-8130EA	Remove/install engine intake air duct downstream of air filter	26.03.2024
AR09.40-S-0500EA	Remove/install air intake duct upstream of turbocharger	26.03.2024
AR09.20-S-0010EA	Remove/install resonance chamber	01.08.2023
AR09.41-S-6817EA	Remove/install charge air cooler	26.03.2024
AR09.10-D-8130TSM	Remove/install engine intake air duct downstream of air filter	27.07.2022
AR09.40-D-0500TSM	Remove/install air intake duct upstream of turbocharger	29.07.2022
AD00.00-S-2000-04E	Connect STAR DIAGNOSIS and read out fault memory	
WS09.00-P-0028B	000 588 18 21 00 Leak tester	20.02.2023

Disclaimer

NOTE: The information contained in this document is intended for use by trained, professional technicians with the knowledge to properly and safely perform diagnosis and repairs on Mercedes-Benz vehicles, using Mercedes-Benz approved tools and equipment. It informs service technicians about conditions that could occur in certain vehicles and provides information that could assist in proper vehicle diagnosis, service, or repair. It does not indicate that a defect is present in any vehicle referenced in this document nor does it imply warranty coverage. DO NOT assume that a symptom or condition, or a described cause of a symptom or condition, affects any particular vehicle or groups of vehicles, or that a described repair applies to any particular vehicle or groups of vehicles. There can be multiple causes resulting in the same or similar symptoms or conditions described in this document, and trained professional service

technicians must use their diagnostic skills to make evaluations on a case-by-case basis. The information contained in this document does not guarantee warranty coverage nor does it extend the vehicle’s warranty in any way.

Symptoms
Power generation > Engine management > Indicator lamp > Engine diagnosis > lit

Control unit/fault code	
Control unit	Fault text
N3/40 - Motor electronics 'MRD1' for combustion engine 'OM654' (CDI) (MRD1NFZ)	P3007F2 - The air mass flow in the intake air system (cylinder bank 1) has a malfunction. P3007F1 - A leak was detected in the intake air system. P300CA9 - The air mass flow in the intake air system (cylinder bank 1) has a malfunction. P300CA8 - A leak was detected in the intake air system.

Operation numbers/damage codes				
Op. no.	Operation text	Time	Damage code	Note