

Misfiring at High RPM (59/15)



Information

This Technical Information replaces the previous Technical Information dated September 2, 2015.

- **Reason: Different repair concept used if there are visible signs of wear on camshaft and/or valve levers**

If visible signs of wear are found on the camshaft and/or valve levers during the fault finding steps described in this Technical Information, **the engine must always be replaced.**

This means that the various repair stages used previously depending on the date of manufacture of the respective engine will no longer be used.

Please note that although the various repair stages are no longer used, **the issue must still be investigated first by Technical Support in order to obtain approval for the repair work and allocate the required replacement engine before carrying out repairs.**

You will find details of the procedure in the description below.

Vehicle Type: **911 GT3 (991)**

Model Year: **As of 2014**

Concerns: **Engine malfunction (Misfiring at high rpm)**

- Situation:
- **Diagnostic path for fault finding in the event of the complaint "Engine malfunction"**
 - **Required repair measures**

Diagnostic path for systematic fault finding

Action
Required:



Information

The following diagnostic path will assist you to quickly and effectively diagnose "**Misfires at high rpm** (> 7,000 rpm)".

In particular, this involves identifying possible wear on the valve levers which usually occurs at high engine speeds.

If misfires occur even at **considerably lower engine speeds** or **over the entire rpm range** and depending on the fault memory entries stored in the DME control unit fault memory, the **components that are usually affected by this type of fault** (spark plugs, ignition coils, injectors, etc.) must always be checked **first** in accordance with the instructions provided under Guided Fault Finding in the PIWIS Tester.

The recommended procedure for systematic fault finding in the event of the complaint "Misfires at high rpm (> 7,000 rpm)" is described here. For greater clarity, the detailed description includes a condensed overview of the information in the form of a table.

Customer complaint:

- Engine malfunctions occur during **full-load acceleration at high rpm** (> 7,000 rpm).
- The **yellow warning message** "Reduced power Driving permitted Consult a garage" is displayed on the multi-function display in the instrument cluster.
- The **engine warning light** ("Check Engine" symbol) also comes on in the instrument cluster.
- Engine running in **limp-home mode**.
- The engine warning light and warning message disappear after switching off the ignition and then switching it back on again (ignition reset). The engine is running normally again.

Fault verification:

If these symptoms are present, the fault must be verified using the procedure described below.



Information

If misfires occur even at **considerably lower engine speeds** or **over the entire rpm range** and depending on the fault memory entries stored in the DME control unit fault memory, the **components that are usually affected by this type of fault** (spark plugs, ignition coils, injectors, etc.) must always be checked **first** in accordance with the instructions provided under Guided Fault Finding in the PIWIS Tester.

- **Read out the fault memory using the PIWIS Tester:** The fault entry **P0300 – Misfire totals error** together with a fault entry **P0301 ... P0306 (Misfire cylinder 1 ... 6)** is set in the DME control unit fault memory.
- **Create Vehicle Analysis Log (VAL)** using the PIWIS Tester.
- **Test-drive the vehicle until the fault occurs:** Drive with full-load acceleration in 3rd gear (manual gate) over a rev range of 4,000 – 8,500 rpm
- **Reproduce the fault:** The fault can be reproduced again - always in the same rpm range (+/- 300 rpm) - as described above.

Action Required:

1 The fault **cannot** be reproduced:

- There is a high probability that the malfunction is **not** caused by wear on a valve lever. Another component must be checked in order to determine the cause.
- If necessary, contact Technical Support in order to decide what to do next.

2 **The fault can be reproduced:**

2.1 Swap the ignition coil and spark plug from the "suspect" cylinder with the ignition coil and spark plug from a cylinder that is working perfectly.

For instructions, see ⇒ *Workshop Manual '282020 Removing and installing ignition coils'* and ⇒ *Workshop Manual '287020 Removing and installing spark plugs'*.

2.2 Test-drive the vehicle and try to reproduce the fault again under the conditions specified above.

2.3 Then read out the fault memory of the DME control unit using the PIWIS Tester and check whether the same fault memory entry is stored again, i.e. after swapping the ignition coil and spark plug, the previously suspect cylinder is now working perfectly and the fault occurs instead on the cylinder into which you installed the ignition coil and spark plug from the cylinder that was originally suspect.

- If **YES** (The same fault is stored again): Remove the ignition coil from the cylinder that is now suspect and install it again in the cylinder that was originally suspect. Leave the spark plug in the cylinder that is now suspect. Then test-drive the vehicle again and reproduce the fault again in order to clearly identify the component that is causing the fault.
- If **NO** (The cylinder that was originally suspect is still suspect): Remove the cylinder head cover on the suspect cylinder bank and check the camshafts and valve levers for visible signs of wear. For instructions, see section ⇒ *Technical Information '1X0000 Checking camshafts and valve levers for wear'*.

Summary:

Customer complaint	
<ul style="list-style-type: none"> • Engine malfunctions occur during full-load acceleration at high rpm (> 7,000 rpm). • The yellow warning message "Reduced power Driving permitted Consult a garage" is displayed on the multi-function display in the instrument cluster. • The engine warning light ("Check Engine" symbol) also comes on in the instrument cluster. • Engine running in limp-home mode. • The engine warning light and warning message disappear after switching off the ignition and then switching it back on again (ignition reset). The engine is running normally again. 	
Fault verification	
<ul style="list-style-type: none"> • Read out the fault memory using the PIWIS Tester: The fault entry P0300 – Misfire totals error together with a fault entry P0301 ... P0306 (Misfire cylinder 1 ... 6) is set in the DME control unit fault memory. • Create Vehicle Analysis Log (VAL) using the PIWIS Tester. • Test-drive the vehicle until the fault occurs: Drive with full-load acceleration in 3rd gear (manual gate) over a rev range of 4,000 – 8,500 rpm. • Reproduce the fault: The fault can be reproduced again - always in the same rev range (+/- 300 rpm) - as described above. 	
Fault can be reproduced	Fault cannot be reproduced
<ul style="list-style-type: none"> • Swap the ignition coil and spark plug from the "suspect" cylinder with the ignition coil and spark plug from a cylinder that is working perfectly. • Test-drive the vehicle and try to reproduce the fault again under the conditions specified above. • Check whether the same fault memory entry is stored again. • If YES: Remove the ignition coil from the cylinder that is now suspect and install it again in the cylinder that was originally suspect. Leave the spark plug in the cylinder 	<ul style="list-style-type: none"> • There is a high probability that the malfunction is not caused by wear on a valve lever. Another component must be checked in order to determine the cause. • If necessary, talk to your contact person for technical enquiries at your importer's office in order to decide what to do next.

that is now suspect. Then test-drive the vehicle again and reproduce the fault again in order to clearly identify the component that is causing the fault.

- If **NO**: Remove the cylinder head cover on the suspect cylinder bank and check the camshafts and valve levers for visible signs of wear. For instructions, see section ⇒ *Technical Information '1X0000 Checking camshafts and valve levers for wear'*.

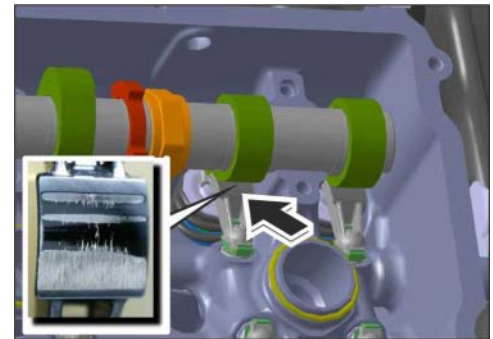
Checking camshafts and valve levers for wear

Work Procedure: 1 Remove cylinder head cover on the affected cylinder bank ⇒ *Workshop Manual '158219 Removing and installing cylinder head cover'*.

2 Remove camshafts and valve levers, inspect for visible signs of wear.

The following problems indicate a worn valve lever:

- Rough surface on the cams of the cylinder in question. If there is a significant amount of wear, the contour of the tip of the cam will be "square" and will show significant tempering colors (blue/brown discoloration of the material caused by high temperatures).
- The valve lever shows significant signs of linear wear on the contact surface to the cam ⇒ *Wear on valve lever -arrow-* at the edge of the hydraulic valve clearance compensating element ⇒ *Wear on valve lever -inset-*. The black coating is worn down and the silver base material can be seen.



Wear on valve lever

3 Take a photo of the relevant damaged areas of the valve lever ⇒ *Wear on valve lever -arrow-* for documentation purposes. Make sure that the photos clearly show the installation position of the valve levers in question.

Also indicate the installation position of the valve levers in question (e.g. cylinder 6 – intake) or identify the components by labelling them ⇒ *Marking valve levers*.



Marking valve levers

- 4 Send the **photos** together with the **Vehicle Analysis Log** to Technical Support via PTEC -> Techline Assistance Request and specify the **vehicle identification number (VIN)** and **engine number** of the relevant vehicle.

The information must then be **sent via PRMS ticket to Technical Support in order to investigate the issue and obtain approval for the replacement engine**.

References: ⇒ *Workshop Manual '158219 Removing and installing cylinder head cover'*
⇒ *Workshop Manual '282020 Removing and installing ignition coils'*
⇒ *Workshop Manual '287020 Removing and installing spark plugs'*

Repair measures

- Work Procedure: 1 Following **feedback** and approval from **Technical Support**, replace the engine. For instructions, see ⇒ *Workshop Manual '100119 Removing and installing engine'*.
- 2 **After** you have **replaced the engine**, re-program the **DME control unit** using the **PIWIS Tester** with PIWIS Tester software version **32.000** (or higher) installed: **DME control unit** > ⇒ **'Programming'** menu >> **'Automatic programming'** function.
 - 3 **After** completing the **work**, carry out a **test drive** until the **engine** reaches **operating temperature**.
 - 4 **After** carrying out the **test drive**, use the **PIWIS Tester** to create a **Vehicle Analysis Log (VAL)** and select the function ⇒ **'Data management'** > **'VAL data return'** using the PIWIS Tester to **send it to Porsche AG**.

Parts Info:



Information

To **simplify** the **ordering process**, the **additional parts required for replacing the engine** have been grouped together as a **repair kit** under **one part number**.

Overview of the parts to be ordered for replacing the engine:

Part No.	Designation - Use	Qty.
9A1 100 975 EX	⇒ Replacement engine	1 ea.
000 043 303 61	⇒ Engine repair kit	1 ea.

The **parts** included in the **repair kit** and details of where they are used are **listed** here **for your information**.

There is no need to order the parts individually unless additional individual parts are required.

Part No.	Designation - Use	Qty.
000 043 303 61	Engine repair kit	1 ea.
Includes:		
• 999 073 443 01	Combination screw, M12 x 1.5 x 40 – Threaded joint for diagonal brace	2 ea.
• 999 072 869 01	Hexagon-head bolt, M12 x 1.5 x 45 – Threaded joint for diagonal brace	2 ea.
• 999 084 123 09	Hexagon nut, M10 – Threaded joint securing anti-roll bar to connecting link	2 ea.
• 900 076 064 02	Hexagon nut, M8 – Threaded joint securing anti-roll bar to body	4 ea.
• 999 072 868 01	Hexagon-head bolt, M12 x 1.5 x 80 – Threaded joint for rear axle cross member	2 ea.
• 999 072 859 01	Hexagon-head bolt, M12 x 1.5 x 58 – Threaded joint for rear axle cross member	2 ea.
• 999 084 445 01	Hexagon nut, M12 x 1.5 – Threaded joint for rear axle cross member	4 ea.
• 999 076 053 01	Hexagon nut, M10 – Threaded joint for transmission support	2 ea.
• 999 086 009 02	Hexagon nut, M12 – Threaded joint for transmission mount	1 ea.

• N 908 484 05	Hexagon nut, M12 x 1.5 – Threaded joint for engine carrier	2 ea.
• 996 106 801 03	O-ring – Coolant lines	3 ea.
• 999 707 660 40	O-ring – Desiccator	2 ea.
• 944 573 143 01	Desiccator	1 ea.
• N 906 651 01	Cheese head bolt, M10 x 1 x 29 – Threaded joint securing flywheel to crankshaft	10 ea.
• 999 385 009 01	Hexagon round-head bolt, M12 x 1.5 x 55 – Threaded joint securing transmission to engine	6 ea.
• 999 073 517 01	Cheese head bolt, M10 x 1 x 46.5 – Threaded joint securing drive shaft to transmission	12 ea.
• 997 111 336 90	Clamp – For securing front silencer to catalytic converter flange	2 ea.
• 900 380 005 01	Hexagon nut, M8 – For securing front silencer holder	4 ea.
• 900 067 362 01	Cheese head bolt, M8 x 50 – Threaded joint for restraining straps for rear silencer	2 ea.
• 999 651 401 01	Line bracket – For securing control line for exhaust flaps to engine carrier	4 ea.
• 999 512 707 00	Hose clamp – For securing control line for exhaust flaps to vacuum unit	2 ea.
• N 100 988 11	Hexagon-head bolt, M6 x 16 – Threaded joint for heat shield on engine carrier	3 ea.
• 980 111 561 00	Seal – Exhaust manifold	2 ea.

Materials: **Required materials** (usually already available in the Porsche dealership, only order if additional materials are required):

Part No.	Designation – Use	Qty.
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000 043 020 00	Optimoly TA mounting paste – Wheel centering surface on wheel hub	100g tube (approx. 5–10 grams required per vehicle)
000 043 205 93	Klüberplus Gel grease – For coating O-rings and coolant hoses	100g tube (approx. 5 grams required per vehicle)
000 043 305 16	Antifreeze	20-liter container (approx. 5 liters required per vehicle)
000 043 004 00	Optimoly HT mounting grease – For greasing clamp securing front muffler to catalytic converter flange	90g tube (approx. 10 grams required per vehicle)

Tools:

• **Auxiliary tool:**

Part No.	Designation – Use	Qty.
9A1 101 213 00	Transport eyebolt – For lifting engine	1 for every Porsche dealership (only if not already available)

• **Special tools:**

Designation/Comment	Use
9900 - PIWIS Tester 3 Battery Charger/Power Supply - Suitable for AGM Type batteries, recommended current rating of 70A fixed voltage 13.5V to 14.5V.	Creating VAL/On-board diagnosis
9453 - Access ramps Only if required (depending on type of lifting platform)	Moving the vehicle onto the lifting platform
9794 - Assembly aid 9796 - Socket wrench Torque wrench, 150 – 800 Nm (111 – 592 ftlb.), e.g. V.A.G 1601 - Torque wrench, 150 - 800 Nm (111 - 592 ftlb.)	Removing and fitting rear wheels

Suitable air-conditioning service unit, e.g. VAS 6456A - A/C service station with rinsing device	Draining and filling refrigerant in the air conditioning system
Disassembly tool, e.g. VAS 6933 - Disassembly tool	Disconnecting parking lock cable from PDK transmission
9822 - Assembly tool	Opening and fitting air conditioning lines
9443 - Oil filter wrench Oil collection container	Removing oil filter
Assembly pliers for spring band clamps, e.g. VAS 6856 - Spring band clamp pliers VAS 6832 - Master Gear unit elevating platform 9769 - Retainer plate 9769/1 - Support Suitable tension strap for securing the engine on the lifting platform during removal, e.g. 9454 - strapping belts	Removing and installing engine
Workshop crane, e.g. VAS 6100 - Workshop crane Suitable lifting equipment, e.g. cross member with carabiner hook and lifting straps	Lifting the engine
VAS 6766 - Counter-hold tool 9321 - Centring pins Torque angle torque wrench for tightening the fastening screws for the flywheel to a tightening torque of 25 Nm (19 ftlb.) and torque angle of 120°, e.g. VAS 6942 - Torque/torque angle screw tool	Removing and installing flywheel
VAS 6199 - Pliers for hose clamp with side cutters	Removing and fitting hose clamps on the control line for exhaust flaps
Coolant collection container	Draining coolant
9696 - Filling device	Filling coolant and bleeding the cooling system

- **Other tools:**

Torque screwdriver, 1.5 – 3 Nm (1 – 2 ftlb.), e.g. **VAS 6494 - Torque screwdriver**

Torque wrench, 4 – 20 Nm (3 – 15 ftlb.), e.g. **WE1052 - Torque wrench V.A.G. 1410/1576**

Torque wrench, 6 – 50 Nm (4.5 – 37 ftlb.), e.g. **V.A.G 1331 - Torque wrench, 6-50 Nm (4.5-37 ftlb.)**

Torque wrench, 40 – 200 Nm (30 – 148 ftlb.), e.g. **V.A.G 1332 - Torque wrench, 40-200 Nm (30-148 ftlb.)**

Torque angle torque wrench, 4 – 400 Nm (3 – 296 ftlb.), e.g. **VAS 6942 - Torque/torque angle screw tool**

Insert for torque wrench, Torx E18

Ring insert for torque wrench, a/f 18

References: ⇒ *Workshop Manual '100119 Removing and installing engine'*
 ⇒ *Workshop Manual '373427 Removing and mounting Porsche Doppelkupplung (PDK)'*

For invoicing and documentation using PQIS, enter the following coding:

Location (FES5)	15050	Camshaft
Damage type (SA4)	1824	severe wear

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