Engine Symptom – Vibration Noises from the Engine Compartment (SY 62 / 23)

Vehicle Type: **718 Cayman GTS 4.0 (982)**
718 Boxster GTS 4.0 (982)
25 Years of the Boxster (982)
718 Spyder (982)
718 Cayman GT4 (982)

Model Year: **As of 2019 up to 2024**

Concerns: **Piezo injection valve**

Symptom: **Customers complain of an audible vibrating noise from the engine compartment. The noise is particularly noticeable when the vehicle is stationary or the engine is idling.**

Cause: Piezo injection valves are installed in 718 model line vehicles with a 4.0-liter flat-6 engine, which cause a certain noise pattern and are significantly more perceptible due to the mid-engine concept.

Remedial Action: Inform customer that the use of piezo injection valves can generally lead to acoustic excitation in the fuel high-pressure system and thus to these noise abnormalities (state of the art).

Information

Since replacing the fuel injectors or the fuel high-pressure pump is not expedient in this fault pattern, and other measures also do not ensure that the noise can be reduced, proceed in steps as follows in case of a customer complaint:

1 First explain the acoustic characteristics of piezo injection valve technology to the customer. See the corresponding description in the section ⇒ *Technical Information 'Explanations of acoustic characteristics of piezo injection valve technology'*.

2 If the customer continues to complain about a particularly loud vibration noise, first assess the noise using a comparison vehicle from the 718 model line with a 4.0-liter flat-6 engine. For procedure, see ⇒ *Technical Information 'Assessing vibration noise using a comparison vehicle'*.

3 If the fuel injector vibration noise in the vehicle in question is significantly louder than in a comparison vehicle, loosen and refasten the fuel collection pipe. For procedure, see ⇒ *Technical Information 'Loosening and fastening fuel collection pipe'*.

4 If, despite loosening and rethreading the fuel collection pipe, the vibration noise is still significantly louder than in the comparison vehicle, replace the fuel collection pipe. For procedure, see ⇒ *Technical Information 'Replacing fuel collection pipe'*.

Explanations of acoustic characteristics of piezo injection valve technology

Information

In contrast to 718 model line vehicles with 4 cylinder Boxer engines, piezo injection valves are used instead of the conventional solenoid injection valves for derivatives with 4.0-liter flat-6 engine.

Piezo injection valves have a directly actuated and outwardly opening nozzle in conjunction with the piezo actuator, enabling extremely short switching times (up to four times shorter than with solenoid valves), making high-precision fuel dosing possible. With up to five injections per working cycle, highly flexible injection technologies are implemented, optimizing combustion and ultimately reducing fuel consumption.

Compared to motors with solenoid valve injectors, the piezo injection system is characterized by a metallic impact noise in the range of 3 kHz. This frequency range is perceived particularly intensely by humans.

Particularly in the lower load and engine speed range, when engine and driving noises move into the background, the injection system's impact noise can be perceived as dominant. Operating states such as idling, starting off and manoeuvring are particularly noticeable. As the load and engine speed increases, the sound of the fuel injectors fades into the background due to the increased noise level of the engine, exhaust system as well as rolling and wind noises.

Propagation of sound waves is particularly encouraged by the installation position of the flat engine. Due to the low position in the vehicle, the sound radiates in the direction of the road and the wheel housing. The sound waves are reflected and diffused in the vehicle surroundings.

Efficiently absorbing sound via acoustic insulation in the engine compartment is difficult due to the center or rear engine configuration compared to the front engine. In addition, some vehicles are also operated on the race circuit. The resulting high thermal loads make a complete acoustic engine compartment encapsulation impossible.

On 718 model line vehicles with a 4.0-liter flat-6 engine, piezo injection valves were deliberately chosen, as the emission benefits outweigh possible acoustic drawbacks while at the same time maintaining high specific power.

Assessing vibration noise using a comparison vehicle

Work Procedure:

If customers continue to complain about a particularly loud vibration noise, this must be assessed using a comparison vehicle from the 718 model line with a 4.0-liter flat-6 engine.

Assessment	Action
Vibration noise identical to comparison vehicle.	No action required. If necessary, inform customer again about the special features of the piezo injection valve.
Vibration noise much louder than comparison vehicle.	Continue by ⇒ *Technical Information 'loosening and fastening fuel collection pipe'*.

Loosening and fastening fuel collection pipe

Information

The remedial action described below entails considerable work, and reduced noise cannot be guaranteed.

Please inform the customer about this in advance and coordinate the next steps with them.

Parts Info:

Part No.	Designation – Location	Number
N 91257801	⇒ Hexagon-head bolt, M8 x 80 – Fuel collection pipe	6 pieces
982251261	⇒ Seal – Exhaust manifold/cylinder head	2 pieces
982251263B	⇒ Seal – Exhaust manifold/particle filter	2 pieces
9A700384201	⇒ Hexagon nut – Exhaust manifold at cylinder head	18 pieces

Materials: **Required materials** (usually already available in the Porsche Center):

Part No.	Designation – Location	Quantity
00004330508	⇒ Mounting paste (100 gram/ 3.52 oz tube) – Wheel centring surface to wheel hub	As required

Tools:

- Torque spanner, 6–50 Nm (4.5–37 ftlb.), e.g. **V.A.G 1331A - torque spanner, 6–50 Nm (4.5–37 ftlb.)**
- Torque spanner 40–200 Nm (30–148 ftlb.), e.g. **V.A.G 1332A - Torque spanner 40–200 Nm (30–148 ftlb.)**
- **9961/2 - Guide pins**
- **P90013 - Guide pins**
- **9769 - Retainer plate**
- **9769/1 - Support**
- **9769/2 - Support**
- **VAS 6832 - Master Gear unit elevating platform**
- **VAS 6931 - Transmission and gearbox jack**
- **Nr.90 Pos.3 - Torque spanner**

- **Nr.98-1 Pos.3 - Insert adapter with universal joint**
- **Nr.96-3 - Open-end / ring spanner**
- **VAS 261 021 - Ring spanner insert, SW 22**

Additional required tool for **vehicles with central wheel bolts (I-no. 1PJ)**:

- Torque spanner, 150–800 Nm (111–592 ftlb.), e.g. **V.A.G 1601 - torque spanner, 150–800 Nm (111–592 ftlb.)**
- **9796 - Socket spanner**
- **9794 - Assembly aid**
- **VAS 6266A - Wheel fitting trolley**

Work Procedure:

Information

The fuel lines on the fuel collection pipes are not loosened.

1 Loosen and fasten fuel collection pipe screw connections. For instructions, see ⇒ *Workshop Manual '243019 Removing and installing fuel collection pipe (with injector valves)'*

2 Assess the vibration noise again using a comparison vehicle.

Assessment	Action
Vibration noise identical to comparison vehicle.	No further action required.
Vibration noise much louder than comparison vehicle.	Continue by replacing ⇒ *Technical Information '243019 fuel collection pipe'*.

Replacing fuel collection pipe

Information

The remedial action described below entails considerable work.

Replacing the fuel collection pipe may compensate for unfavorable component tolerances, which may contribute to additional acoustic excitation, thus reducing noise complaints. However, this action does not ensure that the noise abnormality can be reduced.

Please inform the customer about this in advance and coordinate the next steps with them.

Parts Info:

Part No.	Designation – Location	Number
0PB128373J	⇒ Fuel collection pipe cylinders 1-3	1 piece
0PB128374J	⇒ Fuel collection pipe cylinders 4-6	1 piece

N 91257801	⇒ Hexagon-head bolt, M8 x 80 – Fuel collection pipe	6 pieces
0PB127219	⇒ Spacer ring – Fuel collection pipe	6 pieces
PAF006121	⇒ O-ring – Fuel collection pipe	6 pieces
0PB127291	⇒ Retaining ring – Fuel collection pipe	6 pieces
0PB128071	⇒ Support ring – Fuel collection pipe	6 pieces
0PB127199	⇒ Circlip – Fuel collection pipe	6 pieces
0PB127404	⇒ Sealing ring (Teflon) – High-pressure injector	6 pieces
0PB127269	⇒ Sealing ring – High-pressure injector	6 pieces
0PB825411	⇒ Seal – High-pressure injector	6 pieces
0PB128626	⇒ Retaining clip – High-pressure injector	6 pieces
982251261	⇒ Seal – Exhaust manifold/cylinder head	2 pieces
982251263B	⇒ Seal – Exhaust manifold/particle filter	2 pieces
9A700384201	⇒ Hexagon nut – Exhaust manifold at cylinder head	18 pieces

Materials: **Required materials** (usually already available in the Porsche Center):

Part No.	Designation – Location	Quantity
00004330508	⇒ Mounting paste (100 gram/ 3.52 oz tube) – Wheel centring surface to wheel hub	As required
00004320935	⇒ Lubricant (400 ml/ 13.52 oz spray can) – Fuel collection pipe thread	As required

Tools:

- **9900 - PIWIS Tester 3 / 4**
- Battery charger with a current rating of **at least 90 A**, **VAS 5908 - battery charger 90 A**
- **9961 - Puller**
- **9961 / 1 - Assembly tool**
- **9961 / 3 - Assembly tool**

Work Procedure:

Information

The fuel injectors are not replaced.

1 Replace fuel collection pipe and rebuild fuel injectors. For instructions, see
⇒ *Workshop Manual '243019 Removing and installing fuel collection pipe (with injector valves)'*

Labor position and PCSS encryption

Labor position:

APOS	Labour operation	I No.
24304942	Loosening and fastening fuel collection pipe	
24304943	Removing and installing fuel collection pipe	

PCSS encryption:

Location (FES5)	24400	Injection valve
Damage type (SA4)	1111	Adjustment error