Engine: intermittent power loss and shaking under load

Vehicle	Mercedes-Benz Sprinter 315 CDI (W906), 2011, OM651 engine
Chassis number	WDB906…642
Unit checked	CDI engine control unit (CRD2)
Complaint	Intermittent power loss; the engine shakes under load; code seen earlier: P00BC62 (air flow too low)
Recording	15:54 – 16:21 (Romanian time), through Gateway PRO, driving and at idle; 1,188 samples, about one per second

Summary

- **Cylinder 1 deviates under load.** With the pedal pressed past 40 %, the “running smoothness” value of cylinder 1 averages +22.7 rpm, while cylinders 2, 3 and 4 stay between –3.7 and –5.3 rpm.
- **At idle the four cylinders are equal** (within ±4 rpm), both with no electrical loads and with all electrical loads switched on.
- **No fault code is stored.** P00BC62 did not come back during the recording.
- **Air, boost pressure and rail pressure look normal** in the recorded drive.
- Recommendation: check the injector and cylinder 1 (the tests in section 5).

1. Fault memory

The fault memory of the engine unit was read at 15:06, at 15:52 and then every 30 seconds for the whole recording. No code was found, neither active nor stored. P00BC62 was cleared or went out by itself before the test. We did not clear or change anything on the vehicle: every operation was a read.

2. Injectors: running smoothness per cylinder

The engine unit measures how much the crankshaft accelerates at each cylinder and shows the deviation in rpm. Values close to zero mean the cylinders are working equally.

Condition	Samples	Cylinder 1	Cylinder 2	Cylinder 3	Cylinder 4
Idle, no electrical loads (760 rpm)	176	–0.2	–0.4	–0.1	–0.4
Idle, all electrical loads on	102	+0.9	+0.1	–1.2	–0.8
Driving, pedal 20 – 40 %	141	**+14.8**	–5.6	–4.1	–1.0
Driving, pedal over 40 %	96	**+22.7**	–5.3	–4.8	–3.7
Driving, pedal over 60 % (little data)	7	**+22.4**	–2.2	–7.8	–16.4

Average values, in rpm. Under load, cylinder 1 repeatedly peaked at +40 to +55 rpm (for example 16:00:41, 16:02:53, 16:06:55, 16:11:24, 16:13:01), while the other three stayed negative or close to zero.

- The deviation of cylinder 1 grows with load and shows the same way in both parts of the recording, so it is not a chance value.
- It matches the complaint: the engine shakes under load, not at idle.
- Rail pressure: about 250 bar at idle, up to 1,494 bar under load, with the variation from the requested value close to zero at idle.
- Injected quantity: 4.7 – 5.9 mg per stroke at idle, up to 50 mg under load.

3. Spikes recorded

Time	Condition	Cyl. 1	Cyl. 2	Cyl. 3	Cyl. 4	Note
16:17:00	Idle, 761 rpm	+78	+45	+23	+82	A single sample, about 70 seconds after the engine was started. At the same moment the quantity control valve current rose from 151 to 683 mA.
16:19:51	Idle with loads	+19	+42	+28	+29	All cylinders in the same direction.
16:20:01	Idle with loads	+49	+40	+33	+24	All cylinders in the same direction.
16:20:28	Idle with loads, pedal 11 %	–21	–35	–52	–34	The pedal was touched; injected quantity rose to 20 mg.

- These spikes appear on all cylinders at once, so they show a short change in the speed of the whole engine, not one particular cylinder.
- The spike at 16:17:00 coincides with rail pressure control moving over to the quantity valve after the start. Idle speed and rail pressure (251 bar) did not change. The exact cause is not confirmed.
- With the loads on there were more short spikes than without, but the average per cylinder stayed equal.

4. Air, boost, exhaust

Value	Lowest	Highest	Assessment
Boost pressure (absolute)	0.93 bar	2.56 bar	The turbos charge normally in the recorded drive
Air mass per stroke	450 mg	1,392 mg	Rises correctly with boost pressure
EGR valve position	0 %	3 %	Closed under load
Exhaust back pressure (absolute)	0.93 bar	3.70 bar	No sign of a blocked exhaust
Particulate filter pressure difference	0.00 bar	0.19 bar	Low, the filter is not loaded
Lambda	1.02	1.19	—
Coolant temperature	71 °C	99 °C	Engine warm for the second part of the test
Battery voltage (engine running)	13.8 V	14.2 V	Normal charging, also with the loads on

In the recorded drive we did not see an air flow that was too low, which is the situation P00BC62 describes. The power loss was not caught with an exact time in this drive.

5. Recommendations

1. **Injector leak-off test** (return quantity on all four cylinders, engine warm, at idle and at raised speed). An injector with much more return than the others must be replaced.
2. **Cylinder 1 injector:** check the connector and wiring, the seal at its seat (soot traces) and the classification code stored in the engine unit against the one on the injector.
3. **Compression per cylinder**, if the leak-off and the electrical side are in order.
4. **For P00BC62:** check the intake path after the air mass sensor (hoses, clamps, intercooler) for air leaks, and check the air mass sensor if the code comes back.
5. **Do not clear the codes** if they come back. A new recording, with a few full-pedal accelerations in 3rd or 4th gear from 1,500 to 3,500 rpm and the time noted at each power loss, will show exactly what happens at that moment.

6. Limits of this report

- Cylinder numbering is the one shown by the engine unit. We did not confirm on the vehicle which one is physically “cylinder 1”; that is why the leak-off test is done on all four.

- Running smoothness shows that one cylinder works differently, not why: the cause can be the injector, compression or sealing.
- The pedal did not go past 65 %, so there is no data at sustained full load.
- The data link dropped five times, a few seconds each time; those intervals are not recorded.
