Low boost on the 2019 Vito: what the drive log shows

Mercedes Vito W447, 2019, VIN WDF447•••••••••• Fault P300A6D, boost pressure too low
Drive log 19 Nov 2026, 20:21–20:51 UK time 1,087 samples, about one per second

The small turbo is not being driven at low and medium engine speed. The engine unit asks for about 3,200 hPa and gets about 1,300 to 1,700. The vane actuator moves exactly as commanded, but closing the vanes barely raises the pressure in front of the turbine and the small turbo adds almost nothing. Above about 2,900 rpm the large turbo takes over and the boost reaches its target.

That pattern fits a vane mechanism that no longer follows its actuator, which agrees with the workshop's own suspicion about the vane cartridge. The log cannot tell a worn or stuck vane ring from a broken link between actuator and ring, and one other part has to be ruled out by hand: the flap that lets air pass around the small compressor. The checks are listed at the end. This is engineering judgement from the recorded values, not a confirmed diagnosis.

What happened on the drive

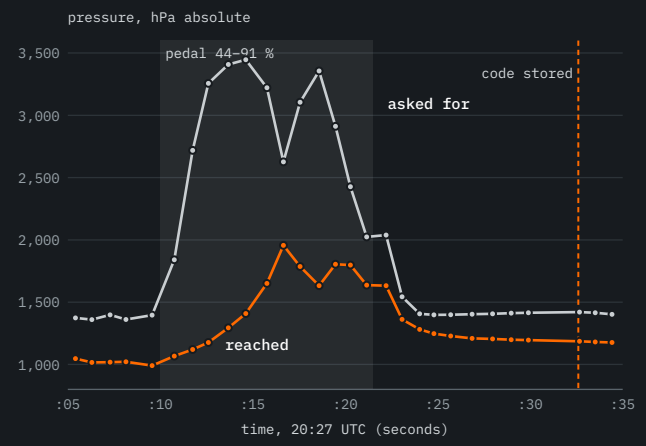
before	P300A6D stored. Freeze frame read and saved, then the fault memory was erased with the engine off.
20:21	Recording starts. The van leaves.
20:27:10	Pull in 2nd and 3rd gear, pedal up to 91 %. The unit asks for up to 3,446 hPa and the boost stays near 1,300.
20:27:32	**The fault comes back**, about 11 seconds after the pull. New freeze frame saved. The unit's boost monitoring changes state at the same moment and stays in that state for the rest of the drive.
20:29	Second erase, engine running, at the workshop's request.
20:29–20:51	Another 22 minutes of driving with the same shortfall. The fault does not set again. The most likely reason is that the monitoring stayed in its changed state until the next ignition cycle, so the missing code here does not mean the problem went away.
20:51	Van back. Final read: no fault stored.

The pull that set the code

Shaded area: the driver is on the pedal. The unit asks for more than three times atmospheric pressure. The boost hardly moves. In the same seconds the vanes are commanded 75 to 92 % closed and the position sensor reports the same, so the actuator and its electrics are doing their job.

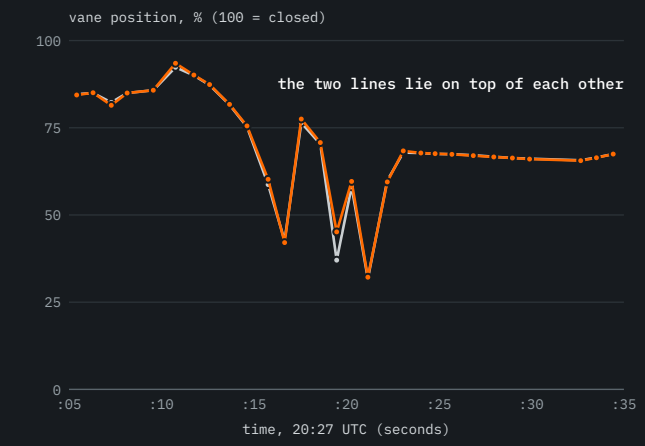
Boost asked for and boost reached

asked for reached



Vane position, commanded and measured

commanded measured

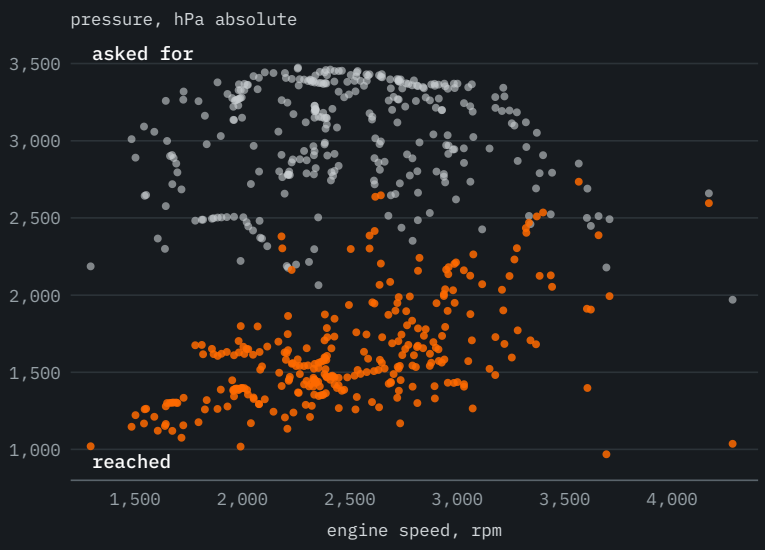


The shortfall is there all the time, except at high revs

Every sample of the whole drive with the pedal at 60 % or more. In 279 of 301 of them (93 %) the boost is 600 hPa or more below what was asked. The customer feels it as intermittent because the two rows of dots only meet above about 2,900 rpm, where the van pulls normally.

Boost against engine speed, pedal 60 % or more

asked for reached



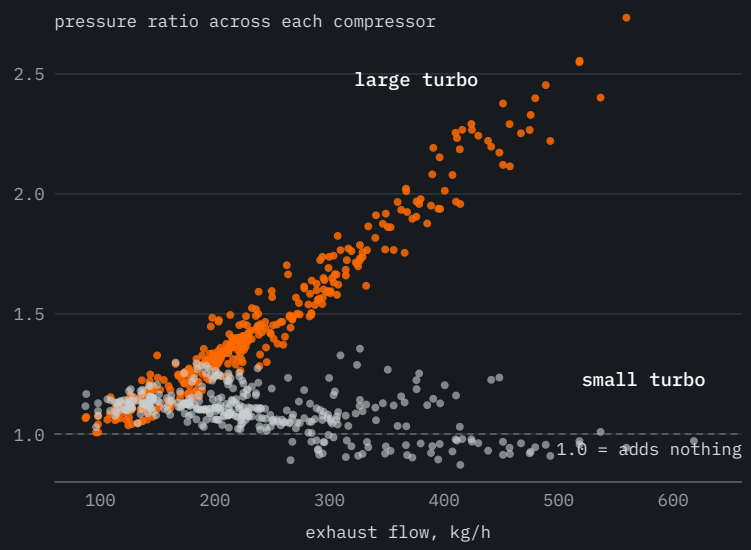
Each dot is one recorded sample.

The large turbo works. The small one adds almost nothing.

The engine unit reports a pressure between the two compressors as well as the final boost, so the work of each turbo can be separated. The large turbo's pressure ratio climbs steadily with exhaust flow, as it should. The small turbo should do most of the work on the left side of this chart. It stays close to 1.0, which means the air leaves it at nearly the pressure it came in with.

What each turbo adds, against exhaust flow

large turbo (first stage) small turbo (second stage)



Samples with fuel being injected. Exhaust flow is calculated from measured air mass plus fuel.

The small turbo is not seized. At 20:43:48, with a large exhaust flow of about 430 kg/h forced through it, it produced a ratio of 1.23 and the pressure in front of the turbine rose to 3,400 to 3,900 hPa. Two seconds earlier, with the turbine bypass open, the ratio was 0.98 and the pressure 2,700. So the turbine bypass valve opens and closes, and the small turbo spins up when it gets a lot of gas. It only fails to respond to its vanes.

Closing the vanes changes very little

Closed vanes should squeeze the exhaust gas through narrow gaps, which shows as a strong rise of the pressure in front of the turbine and a fast-spinning turbo. The table compares samples at the same exhaust flow with the vanes at different measured positions and the turbine bypass commanded closed.

EXHAUST FLOW	VANES OPEN, UNDER 15 %	15–55 %	55–80 %	CLOSED, OVER 80 %
80–150 kg/h	no data	no data	1,585 ×1.13 · 61	1,891 ×1.14 · 14
150–200 kg/h	1,719 ×1.06 · 4	1,730 ×1.12 · 34	1,966 ×1.20 · 27	no data
200–260 kg/h	1,905 ×1.08 · 38	2,020 ×1.15 · 32	2,212 ×1.22 · 12	no data

Pressure in front of the turbine in hPa (median). Small print: the small turbo's pressure ratio, and the number of samples. From fully open to mostly closed the pressure rises only a few hundred hPa and the small turbo's ratio only moves from about 1.07 to 1.2. A healthy unit at these flows would be expected to show a much larger step. The figure for a healthy van of this type was not measured here, so treat that comparison as experience and not as a measured reference.

What the log rules out

SUSPECT	RESULT	EVIDENCE IN THE LOG
Boost leak (hose, intercooler)	UNLIKELY	Measured air mass matches what the engine can swallow at the measured boost (88 to 99 %) through the whole drive. Boost reaches target at high revs.
EGR valves	NOT THE CAUSE	Both valves at 0 % under load from the fault pull onwards. The shortfall is the same.
Throttle valve	NOT THE CAUSE	0 % (open) under load.
Particulate filter	NOT THE CAUSE	Pressure difference 65 hPa typical, 211 hPa above 3,000 rpm, 280 hPa at most.
Air filter, intake	NOT THE CAUSE	Pressure after the filter 971 to 995 hPa against 986 hPa atmospheric.
Fuel supply	NOT THE CAUSE	Rail pressure follows its target, typical difference 4 bar, 28 bar at most.
Boost and pressure sensors	UNLIKELY	All pressure sensors agree at idle and move together plausibly. Target reached at high revs.
Vane actuator, wiring	UNLIKELY	Measured position follows the command within 0.1 % (typical).
Large turbo	WORKS	2,735 hPa at 3,565 rpm against 2,852 asked (20:30:49).
Small turbo, vane side	SUSPECT	No response to vane position at low and medium flow.

The vane cartridge theory, and what else fits

The data supports it. The actuator position sensor sits on the actuator, so it reports "closed" even if the vanes themselves stay open. The three ways this can happen, most likely first:

1. **Vanes not following the actuator.** Vane ring stuck or worn in the cartridge, or the lever or pin between actuator and ring broken or slipped. Fits everything recorded.
2. **Air passing around the small compressor.** The flap that lets air bypass the small compressor at high revs works on its own and is not visible in the data. If it hangs open, the small turbo can spin and still add no pressure. This explains the flat ratio, but explains less well why the pressure in front of the turbine responds so little to the vanes.

3. **Turbine bypass leaking at low flow.** Less likely. It sealed well enough at high flow to drive the pressure to 3,900 hPa.

Checks on the van before ordering parts

- Engine off: move the vane lever by hand over its full travel. It should move freely and return, with no dead travel between actuator rod and lever.
- Watch the lever, not only the actuator, while the actuator runs through its range.
- Check the compressor bypass flap for sticking open, and the turbine bypass flap and its actuator for play.
- With the dongle on again: read the unit's stored vane learning values and counters.
- On the next test drive also record the temperature in front of the turbine and the vane sensor voltage.

Limits of this log

- The two-turbo layout is read from the unit's own values (a second turbo control, a turbine bypass valve and a pressure between the compressors, all changing with engine speed). It was not confirmed against the van's parts data.
- After the fault at 20:27:32 the unit ran a changed boost strategy and often commanded the vanes fully open under load. The cleanest evidence is the six minutes before that.
- One sample per second. Fast events between samples are not seen.
- The recording has short gaps of a few seconds, and one of five minutes from 20:35. None fell inside the pull that set the code.
- Two extra records of the freeze frame were saved but are not decoded yet.
