Automotive Diagnostic Report

DW10CD Engine ECU Trace Analysis — Turbo Boost Lag & Air Doser Mechanical Fault

LOG FILE	TOTAL DURATION	PRIMARY DIAGNOSIS
turbo_lag_test_07-26-2026.csv	651 Samples (~10.8 min)	Air Doser Mechanical Sticking

EXECUTIVE DIAGNOSTIC SUMMARY

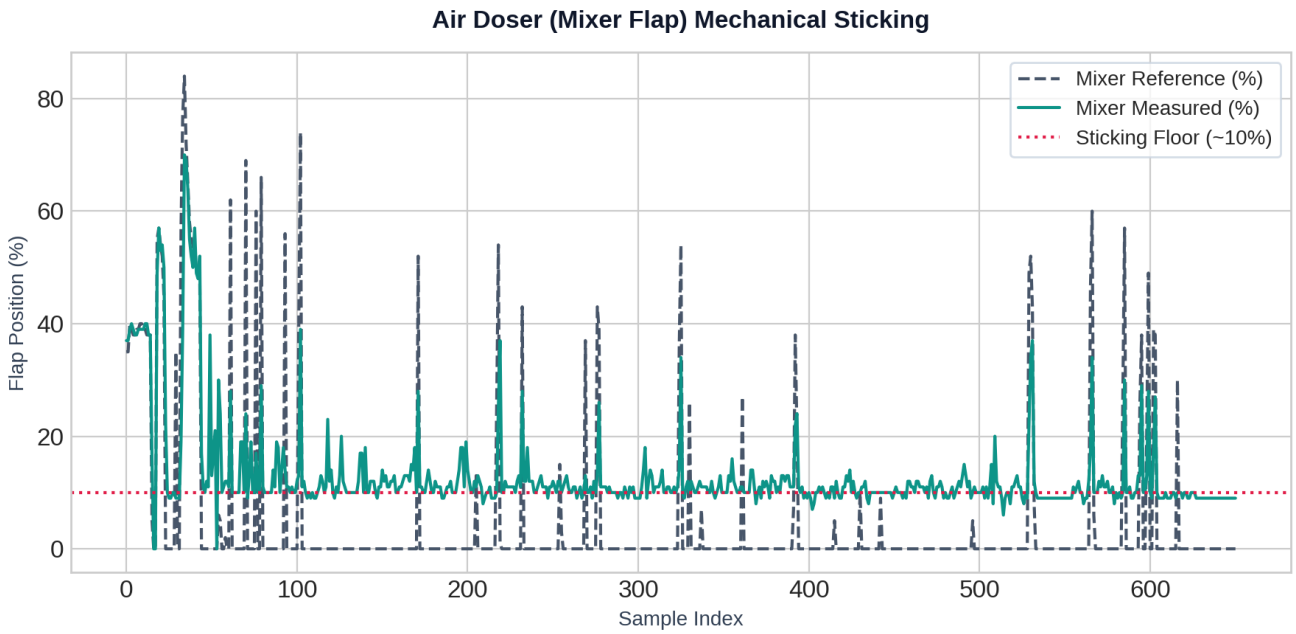
Data log analysis confirms a direct causality between **air doser butterfly valve sticking**, **intake air throttling starvation**, and **transient underboost (turbo lag)**:

- **Air Doser Mechanical Restriction:** When requested to open completely (0% target), the actual flap remains bound at **9.0% – 18.0% closed** (mean offset ~11%).
- **Intake Air Starvation & Rich Burn:** Physical restriction causes measured air mass (MAF) to lag demand by up to **375 mg/stroke**, causing intake $ ext{O}_2$ levels to drop down to **1.02** (rich burn limit).
- **Transient Underboost Spikes:** Despite proper VGT turbo vane positioning (reaching 90–98%), choked airflow delays boost build, spiking transient underboost up to **791 mbar**.

1. Air Doser (Boîtier Papillon) Performance

The ECU issues a 0% command when maximum fresh airflow is required. Out of 485 instances requesting 0%, the flap failed to reach 0% single time, settling at a persistent mechanical floor around 10%.

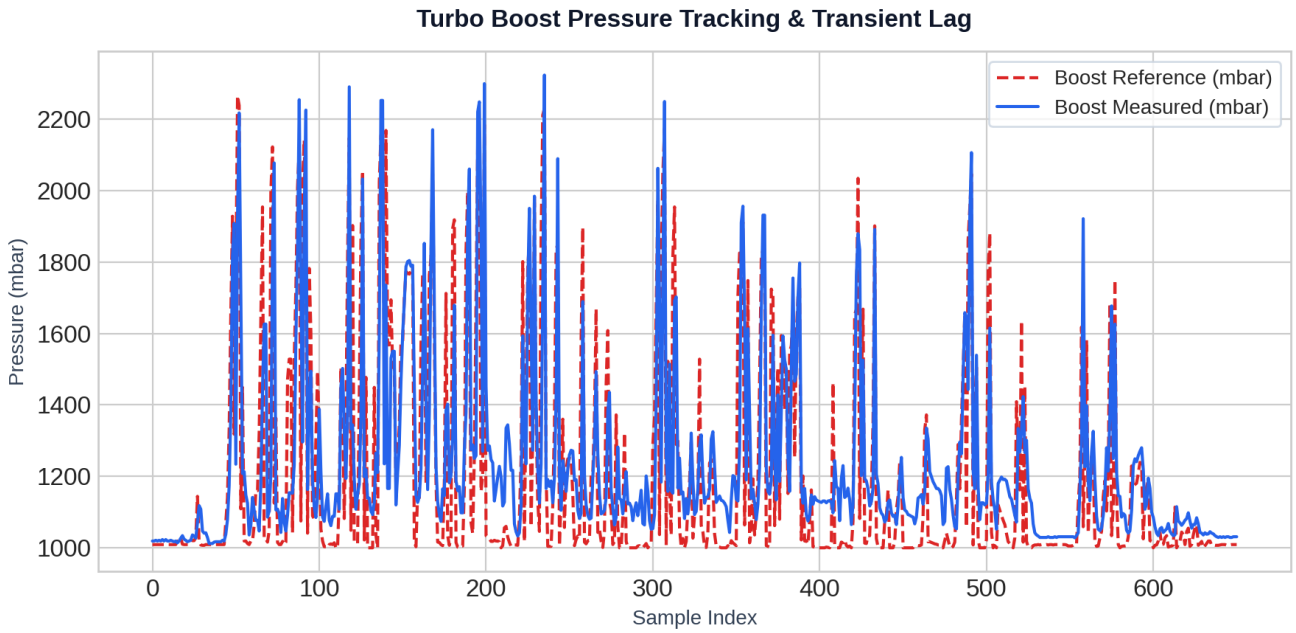
Parameter / Metric	Expected Nominal	Measured Log Value	Evaluation
Wide Open Flap Position	0.0%	9.0% – 18.0% (Mean ~11.0%)	**FAIL (Sticking)**
Mean Position Error	< 2.0%	11.07%	**POOR TRACKING**
Maximum Transient Delta	0.0%	45.0% (Requested 69%, Actual 24%)	**SEVERE BINDING**


Air Doser (Mixer Flap) Mechanical Sticking
Mixer Reference (%)
Mixer Measured (%)
Sticking Floor (~10%)
Flap Position (%)
0
20
40
60
80
0
100
200
300
400
500
600
Sample Index

2. Severe Transient Underboost Spikes

During tip-in acceleration from low RPM, target boost increases rapidly, but airflow restriction prevents timely spooling. The turbocharger VGT actuator responds correctly (closing to 90–98%), ruling out a faulty boost solenoid or actuator failure.

Sample	RPM	Target Boost	Actual Boost	Boost Lag	VGT Actuator	Doser Position
71	1,585	1,995 mbar	1,204 mbar	**-791 mbar**	97.0%	9.0% (Stuck)
90	1,762	2,018 mbar	1,296 mbar	**-722 mbar**	88.0%	10.0% (Stuck)
312	1,492	1,817 mbar	1,153 mbar	**-664 mbar**	93.0%	11.0% (Stuck)
233	1,969	1,859 mbar	1,234 mbar	**-625 mbar**	92.0%	12.0% (Stuck)



3. Recommended Action Plan

1. **Air Doser Assembly Cleaning:** Remove the air doser housing (*boîtier papillon*) and inspect the internal throttle plate for heavy carbon and oil sludge accumulation. Clean thoroughly using carb/intake cleaner.
2. **Mechanical & Gear Inspection:** Check the internal return spring and plastic gears for binding, mechanical damage, or gear tooth stripping causing the ~10% zero-point offset.
3. **Diagnostic Calibration:** After cleaning or replacement, perform an Air Doser Adaption / Relearn procedure using Diagbox to recalibrate zero-position limits.