



INTAKE & EXHAUST SYSTEM



SYSTEM STATE OF HEALTH BASICS

EGR Valve

- Function:** Reduces NOx via exhaust gas recirculation
- Impact:** ↑ NOx & combustion chamber t °C
- Risk:** Turbo/DPF damage

Temperature Sensor

- Function:** Monitors intake air temperature
- Impact:** Vehicle limp mode
- Risk:** Can cause catalyst & DPF damage

Turbo Actuator

- Function:** Controls turbo boost
- Impact:** Over/under-boost working conditions
- Risk:** Turbo or engine failure

Pressure Sensor

- Function:** Measures intake air pressure
- Impact:** Power loss → turbo & DPF damage
- Risk:** Premature DPF/turbo replacement

Oxygen Sensor

- Function:** Monitors exhaust O₂ for ideal air-fuel ratio
- Impact:** Incorrect dosing → SCR overload
- Risk:** SCR ageing

MAF Sensor

- Function:** Measures fresh intake airflow
- Impact:** Wrong air-fuel ratio → poor combustion
- Risk:** Fuel waste + DPF clogging

NOx Sensor, Upstream

- Function:** Measures NOx before SCR
- Impact:** Wrong air-fuel ratio → poor combustion, ↑ DPF soot
- Risk:** Fuel waste + DPF clogging

Exhaust Gas Pressure Sensor

- Function:** Monitors pressure across DPF
- Impact:** Failed regeneration attempts → DPF damage
- Risk:** DPF premature ageing

NOx Sensor, Downstream

- Function:** Determines NOx reducing efficiency of SCR
- Impact:** False readings → failed emissions test
- Risk:** Miss-diagnosed replacement of SCR

Exhaust Gas Temperature Sensor

- Function:** Monitors gas temperature across exhaust system
- Impact:** Failed regeneration attempts → DPF damage
- Risk:** DPF premature ageing

*NOx (nitrogen oxides) **H₂O (water)
 CO (carbon monoxide) N₂ (nitrogen)
 HC (un-combusted hydrocarbons) CO₂ (carbon dioxide)

CRUCIAL COMPONENTS & DOMINO EFFECTS

- Turbocharger:**
 - Function:** Boosts intake air pressure
 - Impact:** Failure affects power & emissions
 - Cost:** €1000+
- DPF:**
 - Function:** Traps & burns excessive soot
 - Impact:** Clogging leads to backpressure & turbo damage
 - Cost:** €1000+



Warning! Driving a vehicle outside of emissions regulations can result in significant financial legal penalties.

- Excessive Smoke
- High Fuel Consumption
- Check Engine Light
- Reduce Engine Power

