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— WORKSHOP REFERENCE —

DPF & Catalytic Converter Fault Codes

A diagnostic reference guide to the OBD-II / EOBD fault codes that flag Diesel Particulate Filter and catalytic converter problems — what each code means, what triggers it, and what happens if it's ignored.

MOTOR MECHANICS | INDEPENDENT WORKSHOPS | FLEET MANAGERS

P0420 CATALYST EFFICIENCY

P2002 DPF EFFICIENCY

P2453 DPF PRESSURE SENSOR

P0546 EGT SENSOR

P244B DPF RESTRICTION

P0431 WARM-UP CATALYST

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HOW TO USE THIS GUIDE

Before You Start

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Read this page once — it explains the shorthand used on every code entry.

CODE FAMILIES

Codes shown are the generic OBD-II / EOBD codes (SAE J2012 standard). Most manufacturers use these exactly; some (VW/Audi Group, PSA, Ford, GM, and heavy-duty trucks) also use manufacturer-specific P1xxx / P3xxx codes, or proprietary SPN/FMI codes on trucks and buses, for the same underlying faults. Cross-check against the OEM database if a generic code doesn't fully match the symptoms in front of you.

BANK & SENSOR NUMBERING

Bank 1 / **Bank 2** — the side of a V-configured engine; Bank 1 contains cylinder No.1. Inline engines only ever report Bank 1.

Sensor 1 / **2** / **3** — position along the exhaust: Sensor 1 is closest to the engine (upstream); higher numbers sit progressively further downstream, toward the tailpipe.

DIAGNOSTIC ORDER

If a pressure-sensor or EGT-sensor circuit code (e.g. P2453, P0546) is present alongside an efficiency code (e.g. P2002, P0420), diagnose and clear the sensor/circuit code first. A bad sensor reading is one of the most common root causes of a false efficiency code — roughly a third of DPF/catalyst codes trace back to a sensor, connector or wiring fault rather than a failed part.

READING THE CONSEQUENCE TAGS

MILD — IF IGNORED

What typically happens if the vehicle keeps running with this code for a short period: economy loss, minor performance drop, a failed emissions test.

SEVERE — IF IGNORED

What happens with prolonged neglect: component damage, limp mode, a breakdown, or a repair bill that's an order of magnitude larger.

QUICK REFERENCE

Contents & Fault Code Index

Look up any code below, or jump straight to a section.

SECTION NAVIGATION

FAULT CODE SHORTCUTS

PART 1: CATALYST CODES

P0420 P0430 P0421 P0431 P0422 P0432 P0424 P0434

PART 2: DPF CODES

P2002 P2003 P2452 P2453 P2454 P2455 P244A P244B
P2459 P2463 P242F

PART 3 & 4: EGT & PRESSURE CODES

P0545 / P0546 P0548 / P0549 P2032 / P2033 P0471 / P0472 / P0473

PART ONE

Catalytic Converter Codes

Efficiency codes for the three-way catalyst (petrol/gasoline engines) and the diesel oxidation catalyst (DOC), which sits upstream of the DPF on diesel vehicles and can trigger the same family of codes.

P0420 / P0430 / P0421 / P0431 / P0422 / P0432 / P0424 / P0434

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CATALYST EFFICIENCY

P0420 / P0430 Catalyst System Efficiency Below Threshold — Bank 1 / Bank 2

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What it means: The main catalytic converter is no longer converting exhaust gases (CO, HC, NOx) as efficiently as the ECU expects.

TRIGGERING SENSORS & LOCATION

Upstream O2/AFR sensor, threaded into the manifold or downpipe before the catalyst, and a downstream O2 sensor immediately after it.

The ECU compares their switching patterns — a healthy catalyst keeps the downstream signal flat.

PROBABLE CAUSES

- Degraded/melted substrate (oil burning, coolant leak, overheating)
- Unresolved misfire (P0300 series) dumping fuel into the catalyst
- Failing or contaminated O2 sensors
- Exhaust leak near either sensor
- Aftermarket converter below the efficiency threshold

MILD — IF IGNORED

Failed emissions test, slightly reduced economy, faint sulphur smell — often no drivability change at all.

SEVERE — IF IGNORED

Substrate breaks apart internally, blocking exhaust flow — major power loss, exhaust overheating (fire risk), and debris can be drawn back into a cylinder.

CATALYST EFFICIENCY

P0421 / P0431 Warm-Up Catalyst Efficiency Below Threshold — Bank 1 / Bank 2

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What it means: Same efficiency concept as P0420/P0430, but for a small "warm-up" catalyst mounted close to the manifold (common on Honda, Mazda, Mitsubishi, some Toyota) that's designed to light off quickly and cut cold-start emissions.

TRIGGERING SENSORS & LOCATION

Same upstream/downstream O2 sensor pair, positioned around the small close-coupled warm-up catalyst rather than the main underfloor unit.

PROBABLE CAUSES

- Same root causes as P0420/P0430
- Excessively rich cold-start fuelling
- Leaking manifold gasket near the warm-up catalyst
- Heat shield fault skewing the sensor reading

MILD — IF IGNORED

Failed emissions test; slightly worse cold-start emissions and fuel trim.

SEVERE — IF IGNORED

Same substrate break-up risk as P0420 — debris is more likely to migrate downstream and damage the main catalyst too.

CATALYST EFFICIENCY

P0422 / P0432 Main Catalyst Efficiency Below Threshold — Bank 1 / Bank 2

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What it means: Used on systems that separately monitor the main underfloor catalyst as distinct from a warm-up catalyst.

TRIGGERING SENSORS & LOCATION

Downstream O2/AFR sensor positioned after the main (underfloor) catalyst.

PROBABLE CAUSES

Functionally identical to P0420/P0430 — use the same diagnostic logic.

MILD — IF IGNORED

As P0420/P0430: emissions failure, minor economy loss.

SEVERE — IF IGNORED

As P0420/P0430: substrate breakup and potential engine damage from debris.

CATALYST TEMPERATURE

P0424 / P0434 Heated Catalyst Temperature Below Threshold — Bank 1 / Bank 2

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What it means: Applies to electrically-heated catalyst systems (less common, mostly older low-emission vehicles). The catalyst isn't reaching operating temperature quickly enough.

TRIGGERING SENSORS & LOCATION

Catalyst temperature sensor mounted directly on/in the catalyst housing, plus the heater circuit itself.

PROBABLE CAUSES

- Failed catalyst heater element
- Blown heater fuse or relay
- Wiring fault or faulty temperature sensor

MILD — IF IGNORED

Elevated cold-start emissions; possible emissions test failure.

SEVERE — IF IGNORED

Rare — a control-strategy fault rather than a mechanical-damage risk, though prolonged cold-start richness accelerates normal catalyst aging.

PART TWO

DPF Codes

Diesel Particulate Filter codes: soot loading, differential pressure, regeneration frequency, and physical filter restriction or damage.

P2002/3 / P2452–5 / P244A / P244B / P2459 / P2463 / P242F

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SOOT LOADING & EFFICIENCY

P2002 / P2003 DPF Efficiency Below Threshold — Bank 1 / Bank 2

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What it means: The ECU has calculated the DPF is no longer filtering soot to the expected standard — either it's too full (restricted) or, less commonly, damaged/cracked and letting soot pass through.

TRIGGERING SENSORS & LOCATION

DPF differential (delta) pressure sensor, usually bracket-mounted near the DPF, connected by two small hoses tapping the exhaust just before and just after the filter.

Cross-checked against EGT sensors before/after the DPF.

PROBABLE CAUSES

- Soot overload from repeated short trips (regen never completes)
- Failed or overdue regeneration cycles
- Cracked/melted substrate after a runaway regen
- Faulty pressure sensor or blocked/split hoses
- Poor fuel quality or oil contamination increasing soot load

MILD — IF IGNORED

DPF warning light, slightly reduced power/economy, more frequent regeneration attempts.

SEVERE — IF IGNORED

Complete blockage forcing limp mode; an uncontrolled forced regen can melt the substrate or ignite accumulated soot — full DPF replacement.

PRESSURE SENSOR CIRCUIT

P2452 DPF Pressure Sensor "A" Circuit — Malfunction

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What it means: No signal, or an implausible signal, from the DPF differential pressure sensor circuit.

TRIGGERING SENSOR & LOCATION

DPF differential pressure sensor and its wiring/connector — bracket-mounted, dual hose take-off before/after the DPF.

PROBABLE CAUSES

Open/short circuit, corroded connector pins, sensor failure, or a disconnected sensor.

MILD — IF IGNORED

Regeneration strategy runs "blind" — may regenerate too often (wasted fuel) or too rarely.

SEVERE — IF IGNORED

ECU can't verify actual filter loading and may fail to trigger regeneration when genuinely needed — hard blockage and limp mode.

PRESSURE SENSOR CIRCUIT

P2453 DPF Pressure Sensor "A" Circuit — Range/Performance

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What it means: The sensor produces a signal, but it's outside the plausible range for current operating conditions — often a reading that doesn't move, or moves the wrong way relative to engine load.

TRIGGERING SENSOR & LOCATION

Same DPF differential pressure sensor as P2452.

PROBABLE CAUSES

Blocked, split, kinked or swapped sensor hoses (soot/condensate blockage is very common here), a degraded sensor diaphragm, or an out-of-calibration sensor.

MILD — IF IGNORED

Inaccurate soot-load estimate; unnecessary or delayed regenerations.

SEVERE — IF IGNORED

A frequent root cause behind a "false" P2002 — if unresolved, can lead to an unnecessary and costly filter replacement despite the DPF itself being fine.

DIFFERENTIAL PRESSURE OUT OF RANGE

P2454 / P2455 DPF Pressure Sensor "A" Circuit — Low / High

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What it means: Voltage from the differential pressure sensor circuit is stuck below (P2454) or above (P2455) the expected range.

TRIGGERING SENSOR & LOCATION

Same DPF differential pressure sensor and hose assembly as P2452/P2453.

PROBABLE CAUSES

Short to ground (Low) or short to voltage/open circuit (High); a disconnected hose reading atmospheric pressure instead of exhaust pressure; failed sensor.

MILD — IF IGNORED

Unreliable soot-load data feeding the regeneration strategy.

SEVERE — IF IGNORED

As P2452/P2453 — poor regen timing leading to filter blockage or an unnecessary replacement.

FILTER INTEGRITY & DAMAGE

P244A DPF Differential Pressure Too Low

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What it means: The pressure drop across the DPF is lower than it should be for current exhaust flow — the opposite problem to a clogged filter.

TRIGGERING SENSOR & LOCATION

DPF differential pressure sensor, as above.

PROBABLE CAUSES

Cracked/melted substrate letting exhaust bypass the filter media (soot bridging or a burned-through core), an exhaust leak between the two pressure taps, or a disconnected/leaking sensor hose.

MILD — IF IGNORED

Often no drivability symptom at all — engine runs fine, so this code is easy to overlook.

SEVERE — IF IGNORED

A physically breached filter emits particulates well above legal limits and will fail an emissions/MOT test outright; it can't be cleaned, only replaced.

REGENERATION & SOOT/ASH ACCUMULATION

P244B DPF Differential Pressure Too High

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What it means: The classic "blocked filter" code — pressure drop across the DPF is higher than expected, meaning exhaust flow is heavily restricted.

TRIGGERING SENSOR & LOCATION

DPF differential pressure sensor, as above.

PROBABLE CAUSES

Heavy soot or ash accumulation, failed regeneration cycles, a blocked sensor hose exaggerating the reading, or (rarely) physical collapse inside the filter housing.

MILD — IF IGNORED

Reduced power, poor economy, DPF light, frequent regen attempts that don't fully clear it.

SEVERE — IF IGNORED

Complete blockage → limp mode → possible turbo damage from excess backpressure → stalling risk in traffic. A common cause of unplanned fleet downtime.

REGENERATION FREQUENCY

P2459 DPF Regeneration Frequency

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What it means: The ECU is initiating regeneration cycles far more often than normal — the filter isn't holding a clean state between regens.

SENSORS INVOLVED

Differential pressure sensor and EGT sensors feed the soot-load model that sets regen frequency; this is a calculated/performance code, not a single circuit fault.

PROBABLE CAUSES

Mostly short, low-speed trips that never reach regen temperature; developing internal filter damage reducing capacity; EGR or injector faults increasing soot production.

MILD — IF IGNORED

Increased fuel use from constant regen attempts; extra oil dilution from post-injection fuel used during regen.

SEVERE — IF IGNORED

Accelerated filter aging leading to premature P2002/P244B codes; diluted oil can cause internal engine wear if oil changes aren't shortened.

SOOT ACCUMULATION

P2463 DPF Restriction — Soot Accumulation

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What it means: The ECU's calculated soot mass in the filter has exceeded the maximum safe limit.

TRIGGERING SENSORS & LOCATION

Same differential pressure sensor and EGT sensors used for the soot-mass model (before/after DPF).

PROBABLE CAUSES

As P244B — failed/incomplete regens, short-trip driving, EGR fault increasing soot load, or a falsely high sensor reading.

MILD — IF IGNORED

DPF light, noticeably reduced performance; ECU may derate engine power to protect the filter.

SEVERE — IF IGNORED

Full blockage requiring forced regen, professional cleaning, or replacement; driving on in a derated state raises roadside breakdown risk.

ASH ACCUMULATION

P242F DPF Restriction — Ash Accumulation

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What it means: Unlike soot, ash (an incombustible by-product of engine oil and additives) builds up permanently and can't be burned off. This code means ash loading now restricts flow and regeneration can't fix it.

TRIGGERING SENSORS & LOCATION

DPF differential pressure sensor, cross-referenced against accumulated mileage/ regen-cycle counters logged by the ECU.

PROBABLE CAUSES

High-mileage accumulation (typically 100,000+ miles, a normal wear code), wrong oil specification (non-low-SAPS oil is a major accelerant), or excess oil consumption from worn rings/turbo seals.

MILD — IF IGNORED

Gradually reducing power and fuel economy as restriction builds.

SEVERE — IF IGNORED

Regeneration cannot clear ash, so restriction only worsens — the filter eventually needs physical removal and ash-cleaning, or replacement. No software fix exists.

PART THREE

EGT Sensor Codes

Exhaust Gas Temperature sensors don't measure soot or emissions directly — but they protect the catalyst and DPF from heat damage, and the ECU relies on them to know when a regeneration is safe to run.

P0545 / P0546 / P0548 / P0549 / P2032 / P2033

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A FAULT HERE OFTEN CAUSES A DOWNSTREAM DPF OR CATALYST CODE

P0545 / P0546 EGT Sensor Circuit Low / High — Bank 1, Sensor 1

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What it means: Implausible voltage from the first EGT sensor in the exhaust — closest to the engine, before the catalyst/DPF.

TRIGGERING SENSOR & LOCATION

EGT Sensor 1 — in the exhaust manifold or downpipe, ahead of the catalytic converter (petrol) or ahead of the DPF/DOC (diesel), often near the turbo outlet.

PROBABLE CAUSES

- Failed sensor element
- Damaged or corroded connector
- Wiring insulation melted from heat exposure (common near the turbo)
- Aftermarket exhaust with no sensor provision

MILD — IF IGNORED

Check engine light with no immediately obvious drivability change.

SEVERE — IF IGNORED

On diesels, regeneration is commonly disabled entirely until fixed — progressive filter clogging and eventual limp mode. On any engine, an unmonitored over-temperature event can permanently damage the catalyst or DPF substrate.

EGT SENSOR CIRCUITS

P0548 / P0549 & P2032 / P2033 — Bank 2 Sensor 1 & Bank 1 Sensor 2

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P0548 / P0549 EGT SENSOR CIRCUIT LOW / HIGH — BANK 2, SENSOR 1

What it means: Same fault as P0545/P0546, on the opposite bank of a V-configuration engine.

Triggering Sensor: EGT Sensor 1 on Bank 2 — mirrored position to Bank 1 Sensor 1.

Probable Causes / Mild / Severe: Identical to P0545/P0546.

P2032 / P2033 EGT SENSOR CIRCUIT LOW / HIGH — BANK 1, SENSOR 2

What it means: Implausible voltage from the second EGT sensor, positioned further downstream than Sensor 1.

Triggering Sensor: EGT Sensor 2 — after the catalytic converter or after the DPF, monitoring outlet temperature.

Probable Causes: Sensor failure, connector corrosion, wiring damage.

Severe: ECU cannot verify a regen completed safely — risking incomplete regen or unmonitored over-temperature.

PART FOUR

Exhaust Pressure Codes

Some diesel platforms use a single absolute exhaust back-pressure sensor, in addition to or instead of the DPF differential sensor, to help monitor filter loading and EGR function.

P0471 / P0472 / P0473

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SINGLE-SENSOR BACKPRESSURE SYSTEMS

P0471 / P0472 / P0473 Exhaust Pressure Sensor "A" — Circuit / Low / High

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What it means: An implausible, low, or high signal from a single absolute exhaust back-pressure sensor used (on some platforms) to help monitor DPF loading and EGR function.

TRIGGERING SENSOR & LOCATION

Exhaust back-pressure sensor, typically bulkhead-mounted with a single pressure hose running to a tap point upstream of the DPF/turbo.

PROBABLE CAUSES

- Blocked or split sensor hose (soot/condensate is a very common cause)
- Failed sensor
- Wiring fault

MILD — IF IGNORED

Inaccurate backpressure data feeding the EGR and regen strategy; minor performance/economy loss.

SEVERE — IF IGNORED

Miscalculated backpressure can mask a genuinely restricted DPF, or push EGR outside safe limits — increasing soot production and accelerating filter loading.

QUICK REFERENCE

Sensor Location Map & Summary Table

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TYPICAL LAYOUT ON A DPF-EQUIPPED DIESEL EXHAUST LINE, ENGINE TO TAILPIPE

SENSOR	TYPICAL LOCATION	WHAT IT PROTECTS / MONITORS
Upstream O2 / AFR	Threaded into exhaust manifold or downpipe, before the catalyst	Catalyst efficiency — input side
Downstream O2	Exhaust pipe immediately after the catalyst	Catalyst efficiency — output side
DPF differential pressure	Firewall/bracket-mounted, two hoses tapping before & after DPF	Soot loading / filter restriction
Exhaust back-pressure (single-hose)	Engine bay bulkhead, one hose to tap point upstream of DPF/turbo	Overall exhaust restriction, EGR control
EGT Sensor 1	Manifold/downpipe, before catalyst/DPF, often near turbo outlet	Protects converter/DPF from over-temp; confirms regen start
EGT Sensor 2 (& 3)	After the catalyst, and after the DPF on some diesels	Confirms regeneration is progressing/completing safely
Catalyst heater temp.	Mounted on/in catalyst housing (heated-catalyst systems only)	Confirms catalyst reaches light-off temperature quickly

BEFORE YOU CLOSE THE JOB

Workshop Notes — Habits That Save Comebacks

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1. CLEAR CODES AND ROAD-TEST AFTER EVERY REPAIR

Many DPF and catalyst efficiency codes require a full drive cycle — including a sustained highway-speed section — before the monitor re-runs and confirms the fix.

2. DON'T REPLACE HARDWARE ON AN EFFICIENCY CODE ALONE

If a related sensor/circuit code is present alongside an efficiency code, fix the sensor or wiring first, clear codes, and re-test. A large proportion of "failed" catalysts and DPFs turn out to be sensor or wiring faults.

3. FOR FLEET MANAGEMENT: DRIVING PATTERN DRIVES THESE CODES

Part 2 and Part 3 codes (DPF and EGT) are strongly linked to how a vehicle is used — vehicles doing predominantly short, low-load trips are disproportionately likely to set them. Route planning that allows periodic sustained higher-speed running can meaningfully cut DPF-related downtime and cleaning/replacement costs across a fleet.

4. CONFIRM AGAINST OEM DOCUMENTATION

Codes and thresholds can vary between manufacturers even where the generic P-code text is identical. Confirm against OEM technical documentation before committing to a major repair. Manufacturer-specific codes (e.g. heavy-duty truck SPN/FMI codes, or OEM P1xxx codes) follow the same diagnostic logic as the codes in this guide but should be cross-checked against service documentation.

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