



O3 Protégelo— Installation Troubleshooting Notes

Revision: Rev-Final

Scope: Diagnostic support for installers, workshops, and distributor technical teams

Governing document: Definitions & Conventions — Rev-Final

This document provides **symptom-based troubleshooting guidance** following installation of the O₃ Protégelo device.

It addresses installation-related issues, fuel quality effects, and system boundary conditions.

It does not replace OEM diagnostic procedures.

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1. General Diagnostic Principles

Always confirm installation correctness first (fittings, torque, bleeding, checklist completed).

Distinguish between:

- Immediate symptoms (air ingress, fitting issues, or commissioning issues)
- Delayed symptoms (fuel filter loading, contamination, system limits).

- The device does not repair mechanical wear or existing system faults.
- Use OEM diagnostics where fault codes are present.

2. Immediate Issues After Installation

2.1 Fuel smell, seepage, or visible leak

Possible causes:

- Incorrect fitting size (pipe side or device side)
- Incomplete seating or insertion
- Incorrect sealing method
- Insufficient torque
- Reused push-in connector

Actions:

- Switch off the engine immediately
- Inspect all connections visually and by touch
- Confirm correct fitting selection on both sides
- Replace any reused push-in connectors
- Re-torque fittings to specification
- Repeat bleed and commissioning sequence

2.2 Engine warning light or fault code shortly after installation

Possible causes:

- Air left in the fuel line
- Minor air ingress at a fitting
- Hand-tightened or under-torqued fittings
- Incorrect connector sizing
- Early-stage fuel filter loading due to contaminated fuel
- ECU or sensor-related faults unrelated to installation

Actions:

- Inspect and re-torque all fittings
- Repeat the full bleeding and commissioning procedure
- Check fuel filter condition and replace if restriction is suspected
- Diagnose ECU or sensor faults using OEM procedures

3. Drivability Issues

3.1 Hesitation, rough running, or unstable idle

Possible causes:

- Air trapped in the fuel line
- Localised air accumulation within the device on higher fuel flow systems where installed horizontally
- Partial restriction due to incorrect fitting or routing
- Fuel line kink or excessive bend radius
- Insufficient line support causing vibration
- Developing fuel filter restriction due to contaminated fuel
- Fuel system operating close to pressure or suction limits

Actions:

- Confirm correct routing and minimum bend radius
- Inspect fittings for full seating and correct torque
- Repeat bleed and commissioning sequence
- Where practicable, re-orient the device vertically to promote passive air migration and release
- Inspect fuel filter and replace if contaminated or near service limit

- Monitor behaviour under comparable duty conditions

4. Issues Developing Over Time

4.1 Power loss or engine stoppage after a period of normal operation

Possible causes:

- Progressive fuel filter clogging (dirt, water, sludge, microbial growth)
- Tank contamination causing repeated filter loading
- Fuel system operating near minimum pressure margins
- Lift-pump suction limits exceeded under load
- Orientation-related air behaviour does not indicate loss of hydraulic integrity or a device fault in the device itself

Actions:

- Inspect and replace fuel filter
- Examine removed filter for contamination
- Inspect fuel tank where contamination is suspected
- Monitor filter loading rate after replacement
- Verify fuel supply behaviour returns to normal
- Review installation orientation and consider vertical re-orientation where system layout allows

Note:

Fuel restriction may develop gradually and can first appear as warning lights or hesitation before progressing to power loss or stoppage.

4.2 Repeated warning lights, derate, or shutdown after corrective action

Possible causes:

- Ongoing fuel contamination
- Fuel tank hygiene not addressed
- Plumbing factors increasing restriction sensitivity
- Existing mechanical, injection, or aftertreatment faults

Actions:

- Address fuel hygiene (tank inspection and cleaning where required)
- Replace filters and monitor loading rate
- Review routing for suction-side restriction
- Diagnose and rectify underlying system faults per OEM procedures

Orientation-related air behaviour does not indicate loss of hydraulic integrity or a device fault, but reflects air management characteristics under sustained higher fuel flow conditions.

5. No Apparent Change Observed

5.1 No noticeable difference after installation

Possible causes:

- Observation period too short
- Highly variable duty cycle masking trends
- ECU or telematics data dominated by other variables
- Device at or beyond service life
- Device or fuel system affected by magnetisation

Actions:

- Evaluate operation under comparable operating conditions
- Review trends rather than single data points
- Confirm service life status and replace cartridge or unit if required
- If all installation, fuel quality, and system conditions have been verified, check for magnetisation using a magnetometer or Gauss-measurement application (see Section 7)

6. System Boundary Conditions

6.1 Existing fuel or injection system faults

Notes:



Worn injectors, weak pumps, pressure regulation issues, or air leaks may become more apparent after installation.

These conditions are not caused by the device.

Action:

Rectify underlying faults before evaluating operation with the device.

6.2 Aftertreatment systems already in fault condition

Notes:

DPF or SCR systems that are saturated, damaged, or in fault state must be serviced before evaluation.

7. Magnet Exposure

Exposure to strong external magnetic fields may magnetise components of the fuel system, including fuel lines, fittings, filters, or the device.

Magnetisation may occur anywhere along the fuel system.

If the device becomes magnetised, normal operation cannot be restored.

Actions:

Verify magnetisation using a magnetometer or Gauss-measurement application

Replace the device if magnetised

Avoid storing or installing the device near strong permanent magnets or magnetised tools.

8. When to Remove the Device

- Remove the device and reinstate the original fuel line configuration if:
- Fuel contamination has not yet been resolved



- Fuel filters continue to clog due to contaminated fuel
- Underlying fuel system, injection, or aftertreatment faults require repair

Additional guidance for fuel contamination:

- Where fuel contamination is present, empty and clean the fuel tank if possible
- This helps prevent repeated filter clogging and recurrence of fuel restriction
- Reinstall the device only after fuel system cleanliness has been restored

9. Escalation

If issues persist after following this document:

- Retain the completed installation checklist and records
- Record fault codes, operating conditions, and duty cycle
- Escalate through distributor technical support channels

End— Installation Troubleshooting Notes Document Version: Rev-2

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