

T R A C K A L W A Y S A F R I C A

Venus Fleet Management System

Fuel Monitoring

User Manual

Version 7.0 · 8 July 2026

Platform: venus.trackalways.cloud

Audience: Tenant Admin, Manager, and Field Technicians

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1. Before Fuel Hub Appears

1. Contact TrackAlways support if Fuel Hub is missing — the module must be enabled for your account.
2. Administration → Licenses — assign Fuel Monitoring or Advanced Tracking capacity to every device that should report fuel.
3. Trial accounts: fuel visibility may be included while the trial is active. Legacy accounts need licence packs.
4. Use fuel-capable hardware. GT06 / Concox units are basic GPS-only trackers — they have no fuel input and will never report fuel regardless of licensing or Sensor Map setup.

For fuel monitoring, install Teltonika FMB920 or higher (FMB130/140/150, etc.) for wired analog, RS485, CAN, or BLE fuel — or Queclink GV/GL trackers wired directly, or paired with a Mercetech SP-BLE probe over Bluetooth for tank-level fuel.

To confirm which devices are actually reporting fuel today, check the Vehicles reporting card on the Fuel Hub Overview, or open Sensors → vehicle card → Raw telemetry for a specific device.

2. Tracking Server and SMS Configuration

Devices must be online before any other setup can proceed. This section applies to Teltonika devices.

Item	Value
Server IP	76.13.58.184
Teltonika port	5027

SMS Commands (Teltonika)

Command	SMS Text
Server setup	[PWD] setparam 2001:76.13.58.184;2002:5027;2003:1;2004:0
APN — Safaricom	[PWD] setparam 2100:safaricom;2101;;2102:
APN — Airtel	[PWD] setparam 2100:airtelgprs.com;2101;;2102:

Replace [PWD] with the device SMS password (default is blank on most Teltonika units). Set the APN in a separate SMS from the server command.

Queclink devices are provisioned via USB/vendor tool or a different SMS/AT-command set — not the Teltonika setparam syntax. Contact TrackAlways support for the exact command set for your Queclink model.

3. How Fuel Monitoring Works

The tracker sends a fuel signal with each GPS position. Venus maps that field, converts it to litres using your calibration curve and tank capacity, stores the reading on every position, and detects refuels and drains/theft.

Setup Order — Do Not Skip Steps

5. Map the fuel sensor (Fuel Hub → Sensors → Sensor Map).
6. Confirm live telemetry is arriving.
7. Set the tank capacity.
8. Save a calibration curve (minimum 2 points; 5 or more recommended).
9. Verify in Fuel Hub — level, history chart, and events.

Diagnostics: check calibration range when reviewing samples — below_range / above_range means the raw sensor reading is outside your calibration table (add points or re-calibrate).

4. Sensor Mapping (All Methods)

Path: Fuel Hub (sidebar) → Sensors panel → vehicle card → Sensor Map → enable Fuel. The old standalone /sensors page redirects here — Sensors is one of the 7 panels inside Fuel Hub, not a separate top-level page.

Method	Hardware	Attribute Key	Unit in Sensor Map
A — Analog sender	Float on ADC (FMB920, GV300W, etc.)	io270, adc1, io18	raw → calibrate
B — RS485 digital	Escort LLS, Omnicomm on FMB130+	fuelLevel	liters or percent
C — CAN bus	Teltonika FMB130/140 + LV-CAN200 or ALL-CAN300	can_fuel, canFuel, fuelLevel	usually percent + tank capacity
D — OBD-II	OBD PID 0x2F	fuelLevel	percent + tank capacity
E — Queclink + BLE probe	BLE fuel probe (Mercetech SP-BLE, etc.) on Queclink tracker	tag1Raw	raw → calibrate

Never mix protocol keys. io270 is a Teltonika AVL IO id — Queclink devices never emit it. Mapping io270 on a Queclink tracker leaves fuel stuck at 0%.

Never map fuel1 / fuel / fuelLevel / fuel_level on a Queclink + BLE probe vehicle. Fixed 2026-07-07 — those keys can carry the BLE tag's own battery voltage instead of the real fuel reading. Use tag1Raw. See Section 9b, Cause 3.

CAN Bus Setup (Method C)

10. Install LV-CAN200 (or ALL-CAN300) on the vehicle CAN line per the Teltonika wiring guide.
11. In Teltonika Configurator (USB): enable the CAN / LV-CAN profile for your vehicle make.
12. Confirm the tracker reports can_fuel or fuelLevel in live attributes.
13. In Venus Sensor Map: set attribute key to can_fuel or fuelLevel, unit to percent (or liters if applicable).
14. Set tank capacity — required for % → litres conversion on hub gauges.
15. Analog calibration is usually not needed for CAN %; verify litres match the dashboard after a known fill.

OBD Setup (Method D)

Same mapping as CAN: set fuelLevel, unit percent, and set tank capacity. Accuracy varies by vehicle ECU.

Queclink + BLE Fuel Probe (Most Common Mistake)

If the vehicle has a BLE fuel probe (e.g. Mercetech SP-BLE) paired to a Queclink tracker over Bluetooth (+RESP:GTERI reports):

16. Map tag1Raw with unit raw in the Sensor Map — NOT fuel1.
17. Complete calibration — raw value → litres — at least 2 points, built from real field readings on tag1Raw.
18. Set tank capacity on the vehicle (required for % display).
19. In Raw telemetry, confirm you see tag1Raw: <number> and tag1Id: <BLE MAC> — not io270.

Never map io270 on Queclink — Teltonika-only key, fuel stays at 0%.

Never map fuel1 / fuel / fuelLevel / fuel_level on a vehicle whose raw telemetry shows a tagNId. Those keys can silently carry the BLE tag's own battery voltage. Venus now blocks them automatically for this reason. See Section 9b, Cause 3.

If tag1Raw does not appear in raw telemetry:

- The tracker may not have sent a fresh report since the server was updated — wait for the next trip or power-cycle.

- The BLE probe may not be paired on the tracker — check field install and Queclink accessory setup.
- Contact Venus support if GTERI reports are present on the server but tag1Raw is still missing (needs the Traccar GTERI decoder patch on the server side).

5. Calibration (Analog / Raw ADC)

Field Procedure

20. Record raw value → litres at known fill levels (e.g. every 10 L).
21. Wait approximately 2 minutes after each step for the float to settle.
22. Minimum 2 points; 5–8 or more recommended for accuracy.

Example CSV:

```
raw,litres
3200,100
2600,80
1900,60
1200,40
500,20
150,10
```

Enter in Venus

Go to Fuel Hub → Calibration panel (bulk setup and CSV import/export live here), or click a vehicle row → Calibration drawer → import CSV / edit table → set tank capacity → Save.

Rules: raw values must be strictly increasing; litres must be non-decreasing; 2–80 points accepted; max 30,000 L per point. CSV import auto-detects header columns (raw/adc vs litres/vol) and swaps columns when needed.

Finding the Raw Value

Go to Fuel Hub → Sensors panel → expand the vehicle card → Raw telemetry. Look for your mapped key:

Tracker / Probe Combination	Key to Look For
Queclink + BLE probe (Mercetech, etc.)	tag1Raw (never fuel1)
Queclink wired analog	adc1 or adc2
Teltonika	adc1 or io270

6. Using Fuel Hub

Fuel Hub uses a secondary sidebar with seven panels. Click Fuel Hub in the main sidebar to expand it, then pick a panel:

Panel	Purpose
Overview	Summary cards, history chart, distribution, low-fuel table, events
Refuels	Refuel and large-fill event log
Drains & Theft	Rapid drain, theft suspect, and sudden-drop events
Fuel Cards	Import fuel card CSV and match to sensor refuels
Sensors	Live telemetry, Sensor Map, raw keys, hardware diagnostics
Calibration	Raw → litres curves, history chart, CSV import
Alert Rules	Low fuel, sudden drop, large fill, rapid drain — a full page, not a collapsible section on Overview

The legacy /sensors URL redirects straight into Fuel Hub → Sensors. Click a vehicle row on Overview for History, Calibration, Detection Policy, and Tank Config.

Overview Summary Cards

The Overview panel shows six cards: Vehicles reporting, Avg fuel %, Fuel in tanks (L) (current fleet stock), Fleet km/L, Period fuel spend, and an estimated CO₂ figure (2.68 kg CO₂ per litre of diesel consumed). Period fuel spend and Fleet km/L are covered in Sections 7 and 8.

Detection Policy (Tuning)

Setting	If You See...
Min fill Δ (L)	False refuels → increase
Min drain Δ (L)	Missing drains → decrease
Stop-only fills	Refuels while moving → enable
Median filter	Spiky graph → enable

Tenant Scope (Superadmin / Multi-Tenant)

- The tenant picker in the Fuel Hub header applies to all seven panels — switching accounts reloads whichever panel you're on.
- Fuel price, alert rules, calibration import, and purge actions all require a single tenant selected — they return an error if viewing multiple or zero accounts.
- The fleet-wide (no tenant) view is read-mostly for aggregates; pick one account before editing settings.

7. Period Fuel Spend (Summary Card)

The green Period fuel spend card answers: “How much did we spend on fuel we actually put in tanks during this date window?”

What It Tallies

Input	Source
Litres	Sum of refuel events only (event_type = refuel), using each event's delta_l (litres added)
Price	Your tenant fuel price per litre on the account
Formula	period fuel spend = total refuel litres in window × price per litre

What It Does NOT Include

- Drain / theft / rapid-drain events — spend is refills only, not consumption or losses.
- Trip-based fuel used — covered by Fleet km/L (Section 8) and trip reports.
- Current tank stock — see Fuel in tanks (L).
- Manual fuel receipts, unless the system detected a matching refuel event from the sensor.

Date Window — Period Fuel Spend

This card follows the hub’s Fuel events From / To filter — a different date control from the Fleet km/L Consumption window in Section 8.

- Default: last 7 days through today.
- Change From / To and the hub reloads — Period fuel spend updates to match.
- If no dates are sent to the API, the backend falls back to the last 30 days.

When the Card Shows — (Dash)

- 23. No fuel price set. Ask TrackAlways support to set fuel price per litre on your account.
- 24. No refuel events in the selected window.
- 25. Zero litres summed from refuels in that window.

8. Fleet km/L (Summary Card)

The Fleet km/L card shows fleet-wide fuel efficiency: kilometres your fleet travels per litre of fuel consumed.

Input	Source
Distance	Sum of trip distance over the window
Fuel used	Sum of trip fuel consumption over the window
Formula	$\text{fleet km/L} = \text{total distance (km)} \div \text{total fuel used (L)}$, rounded to 2 decimal places

Date Window — Fleet km/L

Fleet km/L uses the hub’s Consumption window (same control that drives Top Fuel Consumers) — NOT the Fuel events From/To filter used by Period fuel spend. Default: last 30 days.

Because Period fuel spend and Fleet km/L use different date windows by default (7 days vs 30 days), don’t assume they describe the same period unless you align both ranges manually.

9. Troubleshooting — Fuel Shows 0%

- 26. Last GPS update — is the vehicle online and reporting?
- 27. Raw telemetry — is your mapped key present with a real number?
- 28. Key missing — likely wrong mapping (e.g. io270 on Queclink) or device has not yet reported fuel.
- 29. Key present but % wrong — set tank capacity or fix the calibration curve.

Queclink + BLE Probe Quick Reference

Symptom	Likely Cause	Action
Always 0%, mapped to io270	Wrong key — Teltonika key used on Queclink	Change Sensor Map to tag1Raw, unit raw
Blank/no reading, mapped to fuel1/fuel on a device reporting tagNId	Venus is correctly blocking a contaminated key (fixed 2026-07-07 — see Section 9b Cause 3)	Change Sensor Map to tag1Raw, unit raw, and rebuild the calibration curve
Blank, mapped to tag1Raw, no tag1Raw in raw telemetry	No new GTERI report yet, or server-side decoder patch missing	Wait, drive, power-cycle the tracker, or contact support to confirm the patch is applied
Litres look OK, % is blank or wrong	Tank capacity not set	Set tank size in Fuel Hub
Raw value jumps when parked	Normal float slosh	Calibrate with more mid-range points

Other Common Symptoms

Symptom	Check
Fuel Hub missing from sidebar	Module not enabled — contact support
Charts locked	Assign fuel/advanced licence to the device
CAN % wrong	Tank capacity; correct CAN profile in Configurator
No refuel events	Lower min fill Δ ; enable stop-only fills
Shared vehicles (linked account)	Visible if linked to your account; calibration may be owned by the primary fleet — coordinate with your operator

9b. Troubleshooting — Fuel Stuck Near 100%

A vehicle showing a fixed “Full” reading that never moves, no matter how much it drives, has one of three causes. Check all three before acting.

Cause 1 — Software Display Bug (Fixed July 2026)

Before this fix, a properly-configured raw-unit sensor (e.g. Queclink fuel1) could display a false 100% regardless of the real level. This happened because some Queclink devices report the same raw ADC count under two attribute names at once (the mapped key, e.g. fuel1, and the generic fuel key) — the display logic could mistakenly read the generic duplicate as if it were already litres and divide it by tank capacity, always landing at 100%.

This is fixed as of July 2026. If you still see a hard 100% that never changes after this date, treat it as Cause 2 — it’s very likely a real sensor problem, not the old software bug.

Cause 2 — Sensor Not Actually Measuring the Tank (Hardware)

If the raw telemetry value itself (Sensors panel → Raw telemetry) stays within a narrow band — for example always 3700–3800 — for hours or days despite active driving, the probe is very likely not measuring real fuel. A working probe’s raw value rises on refuels and falls with consumption; a value pinned in a ~200-count band means it’s reporting a fixed, cached, or default value.

Venus automatically flags this: a vehicle whose raw fuel signal hasn’t moved meaningfully over 72 hours of active driving shows a “Sensor stuck / not measuring the tank” badge in Fuel Hub. If you see that badge, skip straight to physical inspection — do not assume it’s a software or calibration issue.

Check	What to Do
Raw value flat for 72h+ while driving	Sensor stuck badge should be showing — confirm probe physically (seating, length, BLE pairing, battery). First rule out Cause 3 if this is Queclink + BLE mapped to fuel1.
Probe is a BLE probe on Queclink	Re-run BLE pairing fresh; confirm only one probe paired per vehicle; swap-test with a known-good probe to isolate probe vs. tracker.
Raw value changes but % still looks wrong	Calibration accuracy issue, not a stuck sensor — see Section 5.

Cause 3 — BLE Tag's Own Battery Voltage Misread as Fuel (Fixed 2026-07-07)

If the vehicle is Queclink + a BLE probe and Sensor Map is mapped to fuel1 (or fuel), a flat raw value that never moves — even a value that looks like a real number, e.g. staying near 3700–3800 for weeks — is very likely NOT a stuck fuel sensor at all. It's the BLE tag's own Li-ion battery reporting, which lands in the exact same fuel1/fuel field as real fuel on affected firmware, and a battery sitting near-full for weeks looks exactly like a stuck probe.

This is fixed at the server level (2026-07-07): Venus blocks fuel1/fuel/fuelLevel/fuel_level from being trusted whenever the vehicle's tracker also reports a BLE tag ID (tagNId) — you'll see no fuel signal instead of the wrong number. The real fuel reading for this hardware lives in tag1Raw.

If you have a Queclink + BLE probe vehicle stuck on this:

30. Change Sensor Map to tag1Raw, unit raw (not fuel1).
31. Confirm in Raw telemetry that tag1Raw actually changes with driving — this is the real probe signal, separate from the tag's battery.
32. Build a fresh calibration curve from real field readings on tag1Raw — do not reuse a curve built for fuel1. The raw number ranges are completely different (battery mV vs. probe counts).

Check	What to Do
Queclink + BLE probe, mapped to fuel1, raw value flat near a plausible-looking number for weeks	Don't assume the probe is dead — repoint to tag1Raw first and see if that value moves with driving.
tag1Raw moves normally with driving after repointing	Probe is fine; the old flat reading was battery contamination, not a hardware fault. Needs fresh calibration on tag1Raw.
tag1Raw is also flat / absent after repointing	Now treat as genuine Cause 2 (hardware) — inspect the probe physically.

11. Quick Checklist (Per Vehicle)

- ☐ Device online on 76.13.58.184
- ☐ Fuel licence assigned (legacy) or trial fuel enabled
- ☐ Sensor Map: correct key + unit for your protocol (use tag1Raw for Queclink + BLE probe, NOT fuel1)
- ☐ Tank capacity set
- ☐ Calibration saved (analog/raw) or CAN/OBD % verified
- ☐ Test refuel appears on the Refuels panel
- ☐ Account fuel price per litre set (needed for Period fuel spend — see Section 7)