

FLATROCK

# TLV Sensor

Tank Level Vision — non-contact optical level & distance sensor

**0.02 m to 4 m range**

±15 mm typical accuracy

1 mm resolution • 10 Hz update

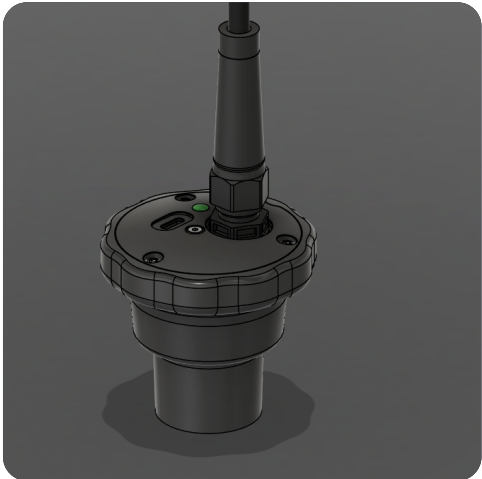
4-20mA • 0-20mA • 0-5V • 0-10V

1in NPT • -40 °C to 85 °C

The Flatrock Tank Level Vision (TLV) Sensor is a compact, non-contact level and distance sensor for tanks and vessels. It threads into a 1in NPT process connection on the top of the vessel, looks down at the liquid (or other target) surface, and reports the measured distance as a standard analogue process signal — no controller-side maths required.

Direct time-of-flight ranging over a narrow central cone is conditioned on-board by outlier rejection and adaptive (Kalman) filtering, yielding one stable distance value per update. That distance is mapped linearly onto the selected output span between a user-defined near point (DMIN) and far point (DMAX), clamped and invertible.

A USB-C port drives configuration from the Windows TLV Configurator app, or hosts a USB drive for standalone CSV logging. Settings persist in non-volatile memory.



Shown: TLV-S-N1-BK-1B

Housing, electronics, firmware, and software — all designed and assembled in-house in Albany, Oregon.

## Key features

- **0.02 m to 4 m** non-contact range, 1 mm resolution, 10 Hz update rate.
- **Four selectable outputs** — 4-20mA, 0-20mA, 0-5V, or 0-10V.
- **On-board conditioning** — outlier rejection plus adaptive filtering for a stable reading.
- **USB-C configuration** via virtual COM port; no drivers required.
- **Standalone CSV logging** to a USB mass-storage drive when no host is connected.
- **Class 1 eye-safe** 940 nm infrared source (IEC 60825-1).
- **-40 °C to 85 °C** operating range in a splash-resistant polycarbonate enclosure.

## At a glance

|                                  |                                     |                                 |                             |
|----------------------------------|-------------------------------------|---------------------------------|-----------------------------|
| RANGE<br><b>0.02 m to 4 m</b>    | ACCURACY<br><b>±15 mm</b>           | RESOLUTION<br><b>1 mm</b>       | UPDATE RATE<br><b>10 Hz</b> |
| SUPPLY<br><b>18 V to 36 V DC</b> | FIELD OF VIEW<br><b>11° central</b> | PROCESS CONN.<br><b>1in NPT</b> | MASS<br><b>118 g</b>        |

## Typical applications

- Tank and vessel liquid-level measurement
- Continuous level feed to a PLC or DCS analogue input
- Bulk-storage inventory monitoring
- Non-contact standoff / presence sensing on equipment
- Retrofit level sensing on existing 1in NPT ports
- Field diagnostics via standalone CSV data logging

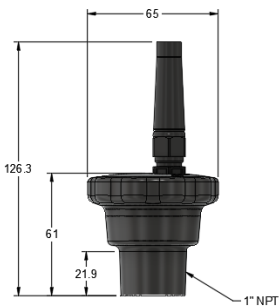
*The TLV Sensor is not a safety device and must not be the sole means of preventing an overfill, collision, or other hazardous condition.*

Specifications

Unless otherwise stated, values apply at 24 V DC supply and 25 °C ambient. Operate the sensor within the limits stated below.

| Measurement             |                                                          | Configuration & logging |                                                                                  |
|-------------------------|----------------------------------------------------------|-------------------------|----------------------------------------------------------------------------------|
| Principle               | Non-contact optical, direct time-of-flight (multi-zone)  | Interface               | USB-C virtual COM port (CDC), 115 200 baud, 8-N-1                                |
| Range                   | 0.02 m to 4 m                                            | Data logging            | CSV to USB mass-storage drive; PC-side CSV also available                        |
| Resolution              | 1 mm                                                     | Settings retention      | Non-volatile; restored on power-up                                               |
| Ranging accuracy        | ±15 mm typical                                           | Status indication       | Single LED (solid green = fault-free)                                            |
| Update rate             | 10 Hz nominal                                            |                         |                                                                                  |
| Signal conditioning     | Outlier rejection + adaptive (Kalman) filtering          |                         |                                                                                  |
| Optical                 |                                                          | Mechanical & materials  |                                                                                  |
| Effective field of view | Approx. 11° (16° diagonal), central zones only           | Process connection      | 1 in NPT (≈ 21.9 mm engagement)                                                  |
| Illumination source     | Invisible infrared, 940 nm                               | Dimensions              | 65 mm × 65 mm × 61 mm (W × D × H) body, excl. gland                              |
| Laser safety            | Class 1 per IEC 60825-1                                  | Overall height          | 126.3 mm incl. gland and strain relief                                           |
| Optical window          | Polyetherimide (PEI)                                     | Mass                    | 118 g without cable                                                              |
|                         |                                                          | Enclosure               | Polycarbonate (PC), black or clear                                               |
|                         |                                                          | Wetted materials        | PEI (window), PC (enclosure)                                                     |
|                         |                                                          | Output cable            | 3-conductor 24 AWG (0.205 mm <sup>2</sup> ), shielded, 6.1 mm OD, igus chainflex |
| Analogue output         |                                                          | Cable length            | 1 m or 2 m; hardwired, bare end or connector                                     |
| Output types            | 4-20mA, 0-20mA, 0-5V, 0-10V (user-selectable)            |                         |                                                                                  |
| Current-loop drive      | Max. loop resistance 320 Ω at 20 mA                      |                         |                                                                                  |
| Voltage-mode load       | Min. 1000 Ω, high-impedance receiver                     |                         |                                                                                  |
| Power supply            |                                                          | Environmental           |                                                                                  |
| Nominal supply          | 24 V DC                                                  | Operating temperature   | −40 °C to 85 °C                                                                  |
| Operating range         | 18 V to 36 V DC (full performance)                       | Storage temperature     | −40 °C to 85 °C, non-condensing                                                  |
| Absolute max. input     | 36 V — do not exceed                                     | Ingress protection      | Not formally rated; splash-resistant by design. Do not submerge                  |
| Supply current          | ≈ 100 mA at 24 V                                         | Years of manufacture    | From 2026                                                                        |
| Surge immunity          | Designed to IEC 61000-4-5 (not verified to the standard) |                         |                                                                                  |

Dimensions



All dimensions in millimetres.

Ordering information

| TLV - S - N1 - BK - 1B |      |                          |
|------------------------|------|--------------------------|
| Field                  | Code | Description              |
| Family                 | TLV  | Tank Level Vision Sensor |
| Variant                | S    | Standard                 |
| Process                | N1   | 1 in NPT                 |
| Enclosure              | BK   | Black (polycarbonate)    |
|                        | CL   | Clear (polycarbonate)    |
|                        | 1B   | 1 m, bare end            |
| Cable                  | 2B   | 2 m, bare end            |
|                        | 1C   | 1 m, custom connector    |
|                        | 2C   | 2 m, custom connector    |

All combinations of the shipping options above are orderable (8 configurations). Example: TLV-S-N1-CL-2B is a clear-bodied unit with a 2 m bare-end cable.

| FLATROCK                                             | Contact                                                                                 | Document                                                                                                                                       |
|------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 626 Queen Ave SW<br>Albany, OR, 97322, United States | Phone: +1 (971) 599-7164<br>Email: info@flatrocksystems.dev<br>Web: flatrocksystems.dev | TLV Sensor datasheet, Rev 1.0 (2026-07-15)<br>For installation, configuration, and service procedures, see the <i>TLV Sensor User Manual</i> . |

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