# Non-Intrusive Laser Level Sensor

## TL400-I

- **Measures tanks with any geometry**
- **Level, volume or distance output**
- **Digital filter for stirred liquids**
- **Configuration and update via Bluetooth**

The **TL400-I** is a non-intrusive level and volume sensor that is ideal for detect liquids, grains, fluids and bulk solids in static or moving applications.

With a low-power laser beam, it performs several measurements per second while an advanced algorithm calculates not only the exact level, but also converts the volume to liters or other units.

It can be parameterized by a mobile app via Bluetooth. With this feature is possible to save customized points and get proper measurement even in irregular tanks.

RUGGED HOUSING

IP68 RATING

HIGHLY ACCURATE

BLUETOOTH CONFIGURATION

BUILT-IN DIGITAL FILTERS

## Technical Specifications

| | |
|---|---|
| **Measurement Range** | Up to 4 m |
| **Accuracy** | 0.1 % up to 1 m or 1 % up to 4 m |
| **Sampling Rate** | 1 Hz |
| **Tank Geometry** | In addition to the standard formats, it allows to save up to 20 linearization points |
| **Output Signal** | 4 – 20 mA |
| **Connector Type** | 150 mm cable with M12 4-pin male connector |
| **Communication Interface** | Bluetooth |
| **Configuration Software** | SigNow mobile |

| | |
|---|---|
| **Power Supply** | 8 Vdc to 33 Vdc<br>Internal protection against reverse polarity |
| **Consumption** | < 70 mA @ 12 Vdc or < 40 mA @ 24 Vdc |
| **Dimensions** | Ø66 x 31 mm |
| **Housing** | Polycarbonate with NBR gasket |
| **Mounting Pattern** | SAE 5 Bolt Hole |
| **Protection Rating** | IP68 |
| **Certification** | CE, FCC, Anatel (13883-22-07089), UKCA and LASER CLASS 1 |
| **Warranty** | 3-year |

202300405 - FL TL400-I - EN

**MIMIC CAPE** Unit 41A, Stella Park, 57 Stella Road, Montague Gardens, Cape Town, 7441
Email: info@mimic-cape.co.za | Website: www.mimic-cape.co.za | Switchboard: 021-551-8185 | Fax: 021-551-8169

novus
We Measure, We Control, We Record

We Measure, We Control, We Record

# LASER LEVEL TRANSMITTER
# TL400-I

**DATASHEET – V3.1x A**

## 1. INTRODUCTION

**TL400-I** is a non-intrusive level transmitter with no moving parts, using an infrared laser technology (~920 nm) that is completely safe to the human eye (LASER CLASS-1). Its measurement principle is based on ToF (Time of Flight), providing an accurate and reliable distance measurement, regardless of the color or transparency of the surface[1] . It can be used to measure from grains and solids to transparent liquids such as water and diesel.

It has a robust housing, withstanding pressures up to 8 bar, and excellent resistance to flammable materials such as diesel, gasoline, or alcohol.

With a measurement capacity up to 4 meters and 1 Hz sampling, **TL400-I** is an excellent alternative to level sensors based on ultrasonic, capacitive, or floating technology since it does not need to be in contact with the surface to be measured.

The transmitter has a dedicated filter for non-static tank applications based on machine learning algorithms that have been validated in real-life situations and have configurable parameters for specific applications.

The sensor allows you to configurate the opening angle, ranging from 12° degrees for irregular tank or reservoir applications to 27° degrees for tanks where the base diameter is half the height to be measured.

**TL400-I** has a BLE (Bluetooth Low Energy) interface. With it you can:

- Configure the **analog output** (4-20 mA), according to the specific application.
- Configure the **opening angle** of the sensor (from 12° to 27° opening degrees).
- Customize the tank with up to 20 points in level percentage.
- Perform sensor **diagnostics** in real time.
- Configure the dynamic **filter** based on the application.
- Update the **firmware** to the most current version, which will always be available on **NOVUS** website.

These functions can be adjusted through the **SigNow** app, available for Android and iOS.

The sensor can retransmit the analog output in **Level**, **Volume**, or **Distance**. Level and distance are set in your preferred unit (mm, cm, m, inches, or feet) and volume is always displayed in percent.

The figure below shows **TL400-I** in an application:

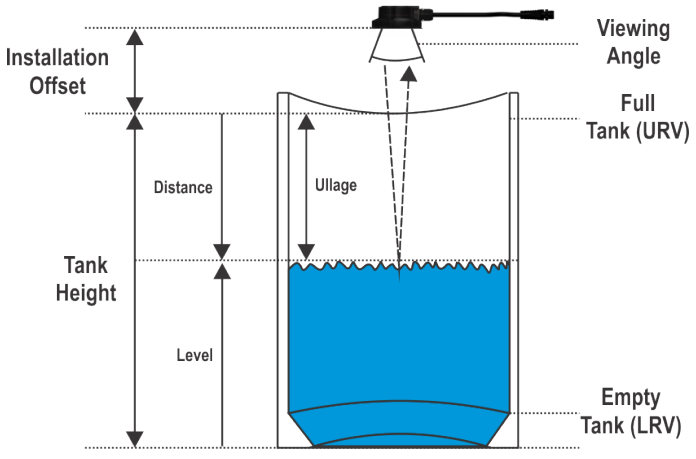


**Figure 1**

[1] In sunlit environments or in small to medium sized tanks that have reflective walls, the sensor may have difficulty to make an accurate measurement. See recommendations for use and application.

# 2. DIMENSIONS

## 2.1 TL400-I

The figures below show the dimensions of the **TL400-I** and the gasket:

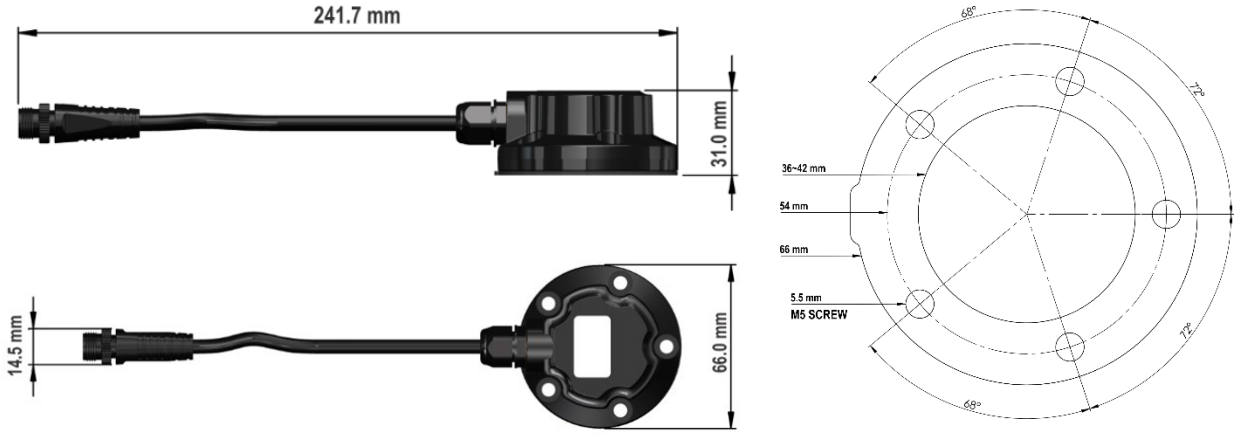


**Figure 2**

## 2.2 5-HOLE TO 4-HOLE ADAPTER (ACCESSORY)

The figure below shows the dimensions and drilling of the adapter for attaching the equipment:

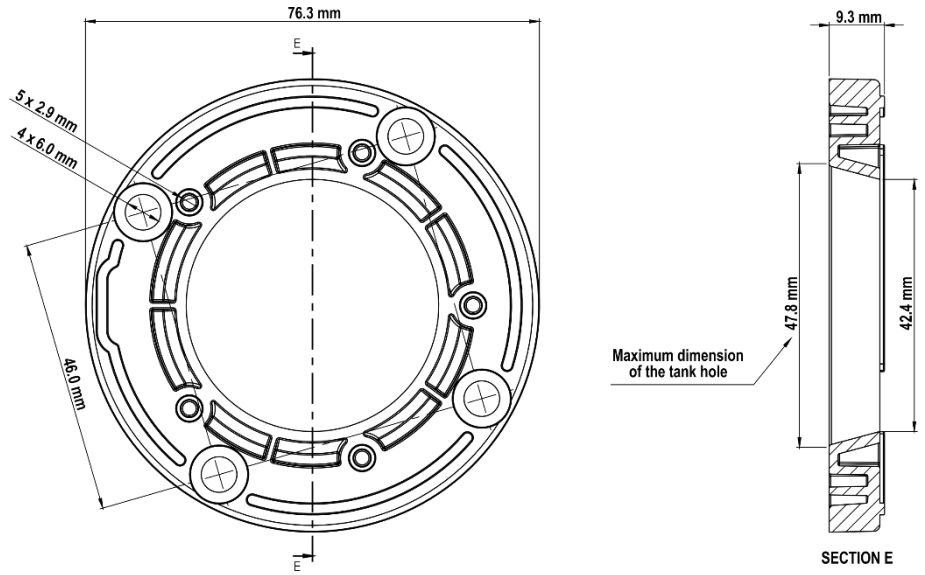


**Figure 3**

This adapter must be purchased separately:

- 4-hole adapter for **TL400** (Order code: *8802100300*)

# 3. ELECTRICAL CONNECTIONS

The output connector is a M12 type with the following wiring connections:

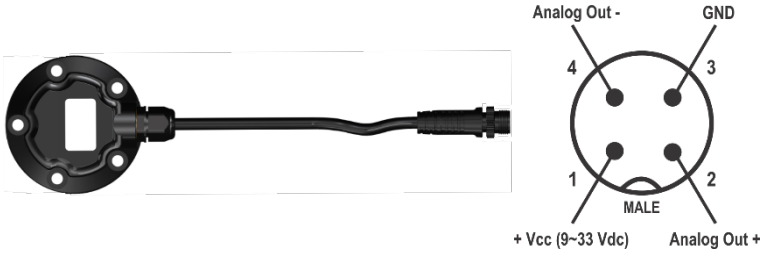


**Figure 4**

**TL400-I** has two accessory cables, which can be purchased separately:

- 1 m PVC sensor cable 4-pin | M12 female connector (Order code: *8806065000*)
- 3 m PVC sensor cable 4-pin | M12 female connector (Order code: *8806065100*)

The connection to the M12 female connector must be made in accordance with the following wiring connections:


**Figure 5**

## 3.1 ANALOG INPUT CONNECTION

Below is an example of how to connect the output to an analog input:

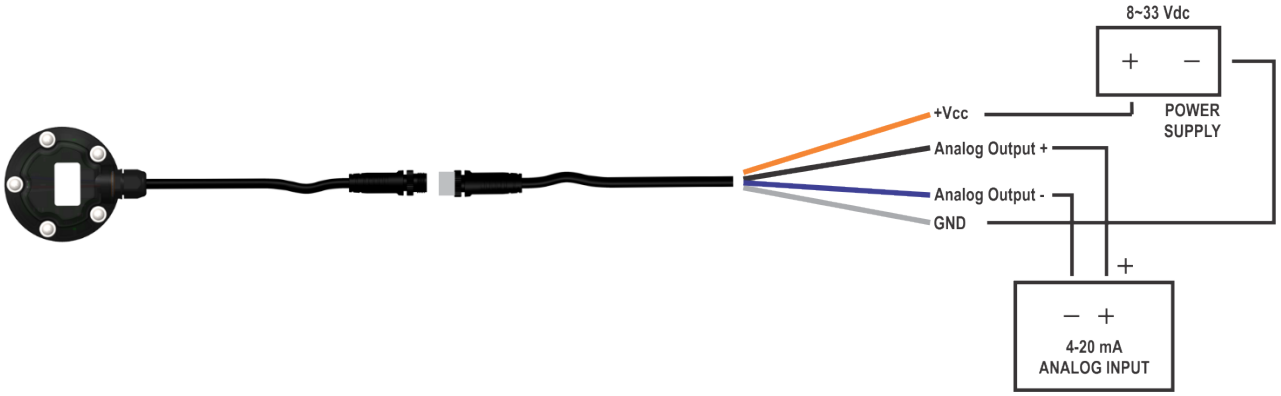


**Figure 6**

## 3.2 INSTALLATION RECOMMENDATIONS

- Electronic and analog signal drivers must run the plant separately from the output and power leads. If possible, in grounded conduits.
- The power supply for the electronic instruments must come from a proper power grid for instrumentation.
- It is recommended to use RC FILTERS (noise suppressors) in contactor coils, solenoids, etc.
- In control applications, it is essential to consider what can happen when any part of the system fails. The device internal security features do not guarantee full protection.

# 4. TECHNICAL SPECIFICATIONS

| FEATURES | TL400-I |
|---|---|
| **Dimensions** | 241.7 x 66 x 31 mm |
| **Distance Measurement** | Configurable from 0 to 4000 mm. |
| **Accuracy** | Minimum of 30 mm but can reach 2 mm if in good measuring conditions.[2] |
| **Resolution** | 1 millimeter |
| **Blind spot** | 30 millimeters |
| **Sampling** | 1 Hz |
| **Connector** | M12 with 4 pins. |
| **Output** | 4-20 mA with 0.01 mA resolution. |
| **Assembly** | Standard SAE 5 holes or adapter for standard 4 holes. |
| **Consumption** | <70 mA @ 12 V or <40 mA @ 24 V |
| **Power Supply** | 8 – 33 Vdc |
| **Storage Temperature** | -20 to 80 °C |
| **Operation Temperature** | -20 to 80 °C |
| **Protection Index** | IP68 |
| **Housing** | Polycarbonate |
| **Configuration Application** | SigNow (for smartphones) |
| **Certifications** | CE, LASER CLASS 1, ISO 16750-2 |

**Table 1**

## 4.1 CERTIFICATIONS

### CE MARK

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

### LASER CLASS 1

The radiation used by the sensor is classified by IEC 60825-1:2014 as CLASS 1 LASER PRODUCT and does not present a risk to the human eye as long as you do not make any changes not described in the manual.

2 A good measuring environment consists of a tank where the sensor can work at a maximum opening angle of 27°, without the incidence of sunlight. Factors that worsen the measurement conditions involve the reflectivity of the walls and bottom of the tank and the incidence of sunlight.

## 5. WARRANTY

Warranty conditions are available on our website www.novusautomation.com/warranty.