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Johannesburg Branch
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ULTRASONIC LEVEL TRANSMITTER TU2000

DATASHEET – V1.0X

1 PRESENTATION

The **TU2000** is an intrusive ultrasonic level transmitter designed for a wide range of applications, with a measurement range of up to 20 meters. It operates using the time-of-flight principle of a 33 kHz ultrasonic sound wave, which is above the audible range.

It can be used to measure the level of solids and liquids in silos and tanks, even in environments with dust and water jets. It is also suitable for measuring water levels in cooling-system tanks (HVAC) and building automation applications.

The **TU2000** features a BLE (Bluetooth Low Energy) interface, allowing configuration through the **SigNow** software (Windows) or mobile app (Android and iOS), as well as monitoring the level of the tank or reservoir where it is installed.

With **SigNow**, you can:

- Configure the analog output.
- Configure the digital/alarm output.
- Configure a custom tank profile using up to 20 level-percentage points.
- Perform real-time sensor diagnostics.
- Adjust the best filter suited to the application.
- Analyze the tank echo and adjust the sensor sensitivity and/or detection threshold.
- Update the firmware to the latest version available on the **NOVUS** website.

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2 DIMENSIONS

2.1 OVERVIEW

The housing is made of durable plastic, complies with UL94 standards, has an IP67 rating, and is flame-retardant:

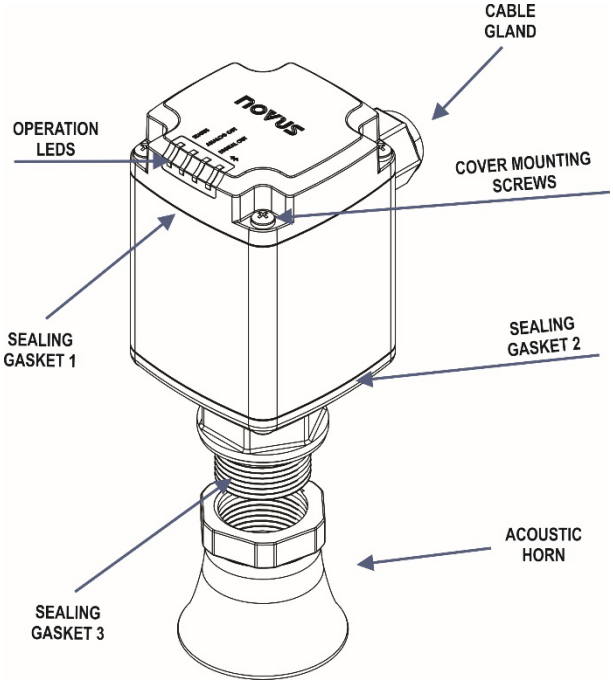


Figure 1

2.2 DIMENSIONS

The **TU2000** has the following dimensions:

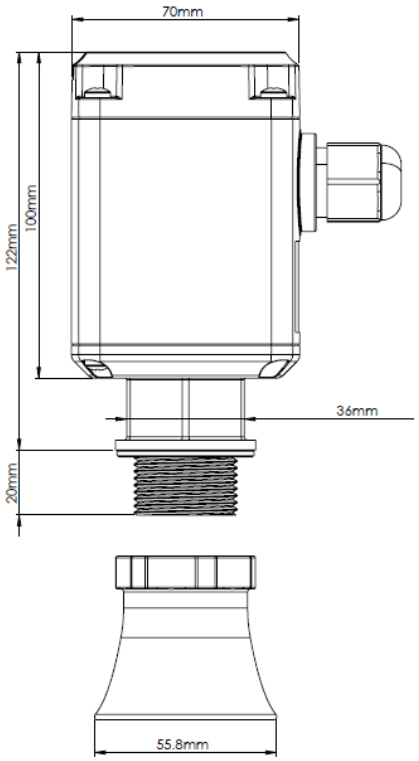


Figure 2

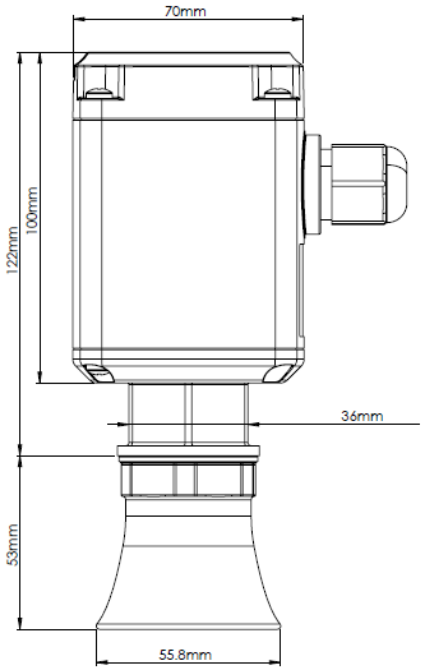


Figure 3

3 ELECTRICAL INSTALLATION

3.1 INSTALLATION RECOMMENDATIONS

- Electronic and analog signal conductors should be routed separately from the output and supply conductors. If possible, in grounded conduits.
- The power supply for electronic instruments must come from a power network dedicated to 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 internal safety features of the equipment do not guarantee full protection.
- You must remove the terminal block before making the electrical connections. Before connecting them, make sure that the connections have been made correctly.

3.2 POWER SUPPLY CONNECTIONS

To perform the electrical installation of the **TU2000**, proceed as follows:

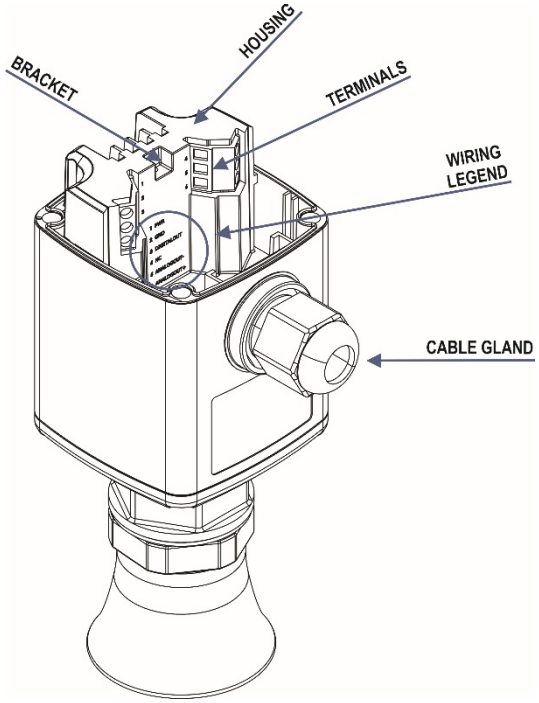


Figure 4

1. Remove the 4 screws from the cover.
2. Remove the cover from the device.
3. Loosen the cable gland cover.
4. Insert the cables through the cable gland.
5. Make the electrical connections as shown in the figure on the left.
6. Tighten the cable gland cover.
7. Reinstall the cover.
8. Reinstall the 4 screws on the cover.

The electrical connections for the analog output must be made as follows:

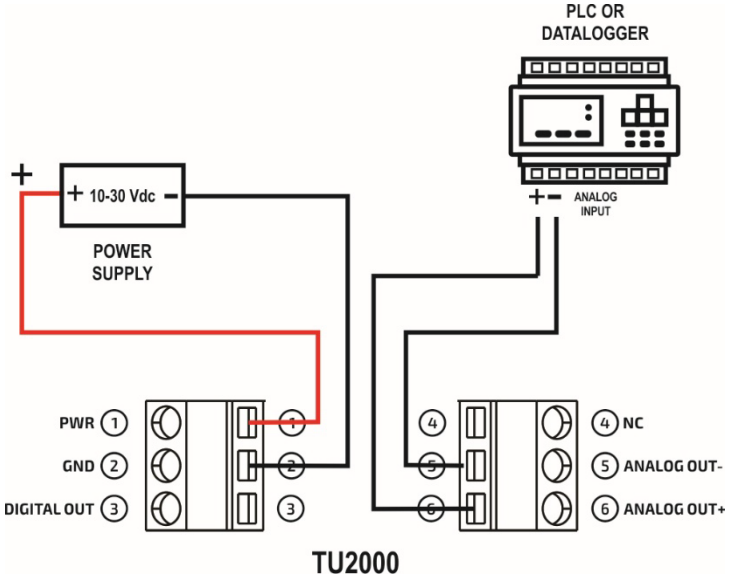
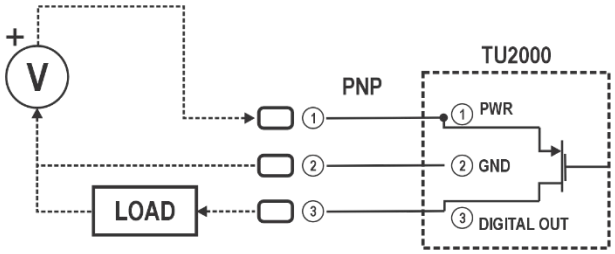
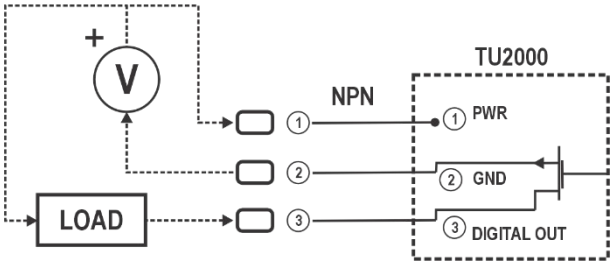


Figure 5

3.3 DIGITAL OUTPUT CONNECTIONS

The digital output can be configured as PNP (Sourcing – equivalent to the PWR terminal) or NPN (Sinking – equivalent to the GND terminal), according to the corresponding schematic shown below:

PNP DIGITAL OUTPUT	NPN DIGITAL OUTPUT
	
Figure 6	Figure 7

3.4 OPERATION LEDS

The **TU2000** has 4 status LEDs, located on the front of the housing:



Figure 8

3.4.1 NAMUR NE 107 COMPATIBILITY

The **TU2000** is compatible with NAMUR NE 107. According to this standard, LED status messages are divided into the following categories:

COLOR	DEFINITION	DESCRIPTION
Red	FAILURE	This indicates that a failure or malfunction has occurred.
Flashing red	FUNCTIONAL TEST	This indicates that the device is undergoing a functional test.
Yellow	OUT OF SPECIFICATION	This indicates that the settings are outside the specified range.
Green	OK	This indicates that the device is operating normally.
Off	OFF	This indicates that the device is turned off.

Table 1

3.4.2 STATUS LED

COLOR	DESCRIPTION
Green	This indicates that the device is operating normally.
Yellow	This indicates that normal operating conditions are outside the specified range.
Red	This indicates an error in the sensor circuitry or another internal failure detected by the device itself.
Flashing red	This indicates a forced input (Level, volume, or distance).
Off	This indicates that the device is turned off.

Table 2

3.4.3 ANALOG OUTPUT LED

COLOR	DESCRIPTION
Green	This indicates that the device is operating normally.
Yellow	This indicates that normal operating conditions are outside the specified range.
Red	This indicates that the 4–20 mA output has an error of 3.6 mA or 21 mA.
Flashing red	This indicates that the device is testing the function by forcing a current output.

Table 3

3.4.4 DIGITAL OUTPUT LED

COLOR	DESCRIPTION
Green	This indicates that the alarm is enabled and no alarm condition has been detected.
Flashing green	This indicates that the alarm is enabled and an alarm condition has been detected.
Yellow	This indicates that the device has detected an overcurrent outside the product specifications.
Flashing red	This indicates that the device is testing the function by forcing the alarm output.
Off	This indicates that the alarm is disabled.

Table 4

3.4.5 BLUETOOTH LED

COLOR	DESCRIPTION
Green	This indicates that the Bluetooth signal is available for connection.
Flashing green	This indicates that the device is connected for setup via Bluetooth.
Flashing blue	This indicates that the device is updating its firmware via OTA (Over The Air).
Off	This indicates that Bluetooth is turned off.

Table 5

4 TECHNICAL SPECIFICATION

4.1 TECHNICAL SPECIFICATION

FEATURES	TU2000
Dimensions	175 x 110 x 70 mm
Distance measurement	Configurable from 0 to 20000 mm
Accuracy	30 mm minimum, which may be as low as 2 mm under optimal measurement conditions[1]
Precision	0,1 %
Process pressure	Up to 2 bars
Resolution	1 mm
Blind zone	500 mm[2]
Sampling	1 Hz (1 second)[3]
Sensor startup time	2.5 seconds
Connector	Internal terminals with cable gland output
Analog output	4 to 20 mA with 0.01 mA resolution
Alarm output	NPN or PNP up to 200 mA
Assembly	32 mm flange and horn with hexagonal opening
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
Temperature compensation	Maximum error of 2 °C (average error of 0.1% with temperature)
Protection degree	IP67
Housing	UL94 Polycarbonate
Software	**SigNow** (for smartphones and PCs)
Certification	CE
The device's specifications were validated for the factory-set sensitivity and threshold settings by measuring a target with a radius of 2 meters, with no obstacles between the sensor and the target.	

Table 6

4.2 FACTORY SETTINGS

The **TU2000** comes from the factory configured as follows:

SECTION	FACTORY SETTINGS	
	PARAMETER	VALUE
IDENTIFICATION	**BLE: Active time after startup**	60 seconds
TANK	**Quantity associated with the analog output**	Level
	Units of level and distance	Centimeters
	Installation Offset	50.0 cm
	Tank height	1950.0 cm
	Filter time constant in seconds	0
ANALOG OUTPUT	**Error action on analog output**	Low
	Reverse output polarity	No

[1] Factors related to sound reflection, such as surface hardness, the presence of obstacles in front of the sensor, and the alignment of the sensor with the surface being measured, affect the ultrasonic sensor.

[2] By default, the blind zone is 500 mm. For tanks smaller than 10 m, it can be reduced to about 250 mm. Simply adjust the additional intensity in the Sensitivity settings.

[3] For tanks <= 10 meters, the sampling is 2 Hz (500 ms).

SECTION	FACTORY SETTINGS	
	PARAMETER	VALUE
	Minimum output value	0.0 cm
	Maximum output value	1950.0 cm
DIGITAL OUTPUT	**Digital output type**	Disabled
SAFETY	**Password**	No password

Table 7

4.3 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.

5 WARRANTY

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

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