

Labcom 221 GPS

Data transfer unit



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1 General information about the manual

This manual is an integral part of the product.

- Please read the manual before using the product.
- Keep the manual available for the entire duration of the product's life span.
- Provide the manual to the next owner or user of the product.
- Please report any errors or discrepancies related to this manual before commissioning the device.

1.1 Conformity of the product

The EU declaration of conformity and the product's technical specifications are integral parts of this document.

All of our products have been designed and manufactured with due consideration to the essential European standards, statutes and regulations.

Labkotec Oy has a certified ISO 9001 quality management system and ISO 14001 environmental management system.

1.2 Limitation of liability

Labkotec Oy reserves the right to make changes to this user guide.

Labkotec Oy cannot be held liable for direct or indirect damage caused by neglecting the instructions provided in this manual or directives, standards, laws and regulations regarding the installation location.

The copyrights to this manual are owned by Labkotec Oy.

2 Safety and the environment

2.1 General safety instructions

The plant owner is responsible for the planning, installation, commissioning, operation, maintenance and disassembly at the location.

Installation and commissioning of the device may be performed by a trained professional only.

Protection of operating personnel and the system is not ensured if the product is not used in accordance with its intended purpose.

Laws and regulations applicable to the usage or the intended purpose must be observed. The device has been approved for the intended purpose of use only. Neglecting these instructions will void any warranty and absolve the manufacturer from any liability.

2.2 Intended use

Labcom 221 GPS is primarily intended for transferring measurement, accrual, positioning, alarm and status information to the LabkoNet server from locations where there is no fixed power supply or installing it would be too expensive.

An LTE-M / NB-IoT network must be available for the device for data transfer. An external antenna can also be used for data transfer. The positioning functionalities require a satellite connection to the GPS system. The positioning (GPS) antenna is always internal, and there is no support for an external antenna.

A more specific description of the product's operation, installation and use is provided later in this guide.

The device must be used in accordance with the instructions provided in this document. Other use is counter to the product's purpose of use. Labkotec cannot be held liable for any damage caused by using the device in violation of its purpose of use.

2.3 Transport and storage

Check the packaging and its content for any possible damage.

Ensure that you have received all the ordered products and that they are as intended.

Keep the original package. Always store and transport the device in the original packaging.

Store the device in a clean and dry space. Observe the permitted storage temperatures. If the storage temperatures have not been presented separately, the products must be stored in conditions that are within the operating temperature range.

2.4 Repair

The device may not be repaired or modified without the manufacturer's permission. If the device exhibits a fault, it must be delivered to the manufacturer and replaced with a new device or one repaired by the manufacturer.

2.5 Decommissioning and disposal

The device must be decommissioned and disposed of in compliance with local laws and regulations.

3 Product description



Figure 1 . Labcom 221 GPS product description

1. Internal external antenna connector
2. SIM card slot
3. Device serial number = device number (also on the device cover)
4. Battery connector
5. Additional card
6. TEST button
7. External antenna connector (option)
8. Connection wire lead-throughs

4 Installation and commissioning

The device must be installed on a firm foundation where it is not at immediate risk of physical impacts or vibrations.

The device features screw holes for installation, as shown in the measurement drawing.

The cables to be connected to the device must be installed in such a way that prevents moisture from reaching the lead-throughs.

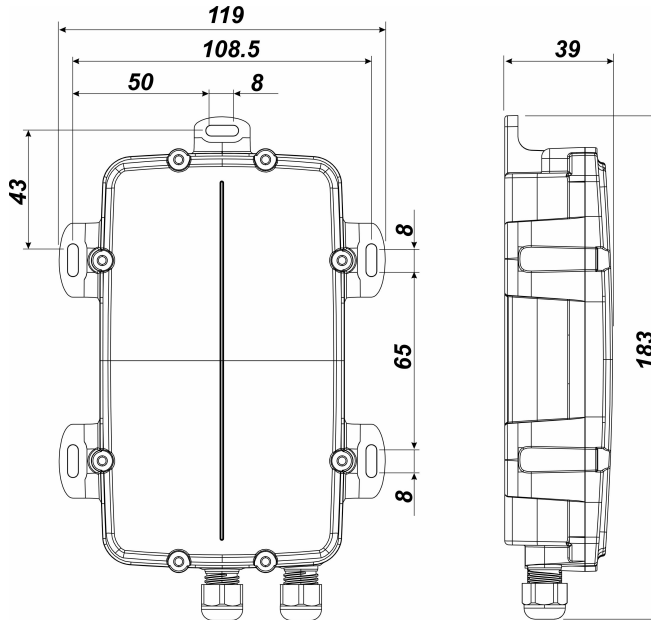


Figure 2 . Labcom 221 GPS measurement drawing and installation dimensions (mm)

The device features preset configurations and parameters and comes with a SIM card installed. DO NOT remove the SIM card.

Ensure the following in the context of commissioning before connecting the battery.

- The wires have been installed correctly and tightened firmly to the terminal strips.
- If installed, the antenna wire has been tightened properly to the antenna connector in the housing.
- If installed, the internal antenna wire installed in the device has stayed connected.
- All lead-throughs have been tightened to keep moisture out.

Once all of the above are in order, the battery can be connected to the circuit board with the wire provided and the device cover can be closed. When closing the cover, make sure that the cover seal is seated correctly to keep dust and moisture out of the device.

When the battery is connected, the device contacts the server. This is indicated by the circuit board LEDs flashing.

The commissioning of the device is confirmed with the LabkoNet server by checking that the device has sent the correct information to the server.

5 Connections



Read the section *General safety instructions* before installation.



Make the connections when the device is de-energised.

5.1 Passive mA sensor

Labcom 221 GPS supply the operating voltage required by the sensor to the passive measurement transmitter's/sensor's measurement circuit. The measurement circuit's plus conductor is connected to the 221 GPS device's voltage output (+Vboost Out, I/O2) and the circuit's grounding conductor is connected to the device's analogue input (4–20 mA, I/O9).

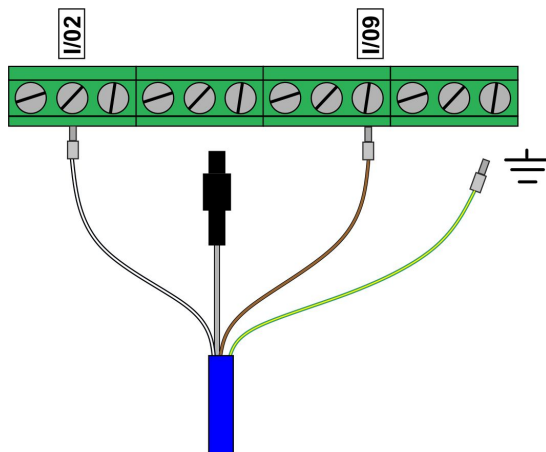


Figure 3 . Example connection

5.2 Active mA sensor

The voltage to the measurement circuit of the active measurement transmitter/sensor is supplied by the transmitter/sensor itself. The measurement circuit's plus conductor is connected to the Labcom 221 GPS device's analogue input (4–20 mA, I/O9) and the circuit's grounding conductor is connected to the grounding connector (GND).

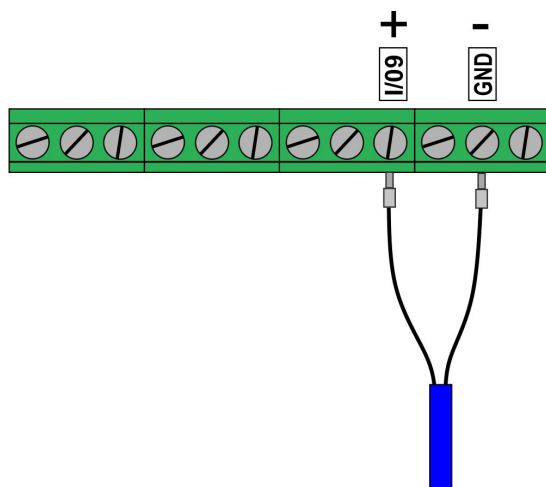


Figure 4 . Example connection

5.3 Switch output

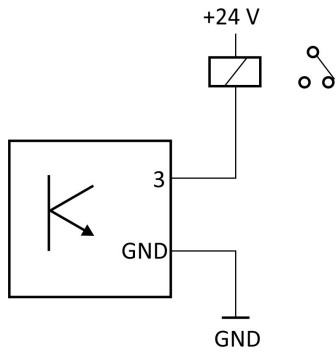


Figure 5 . Example connection

The Labcom 221 GPS device has one digital output. The approved voltage range is 0...40VDC and the maximum current is 2A. For larger loads, a separate auxiliary relay must be used, which is controlled by the Labcom 221 GPS.

5.4 Switch inputs

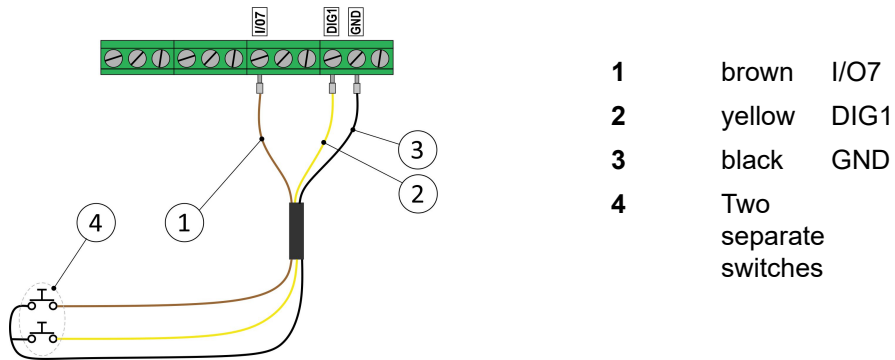


Figure 6 . Example connections

5.5 Example connections

5.5.1 Connection idOil-LIQ

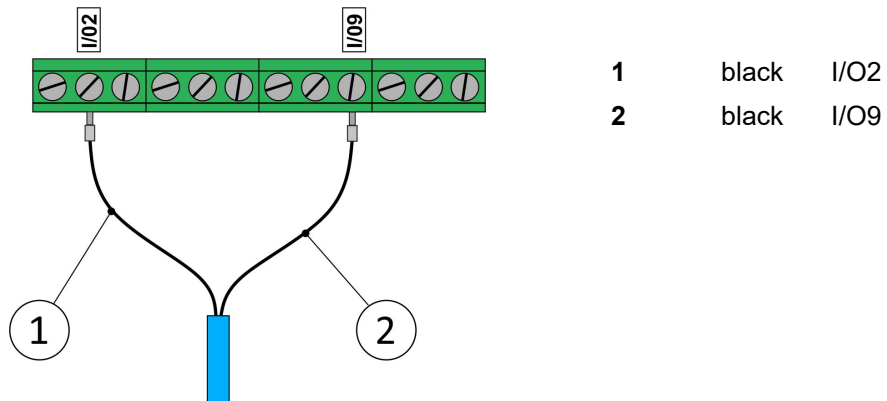


Figure 7 . Labcom 221 GPS - idOil-LIQ sensor; Connection



The Labcom 221 GPS data transfer unit + idOil-LIQ sensor must not be installed in potentially explosive atmospheres.

5.5.2 Connection idOil-SLU

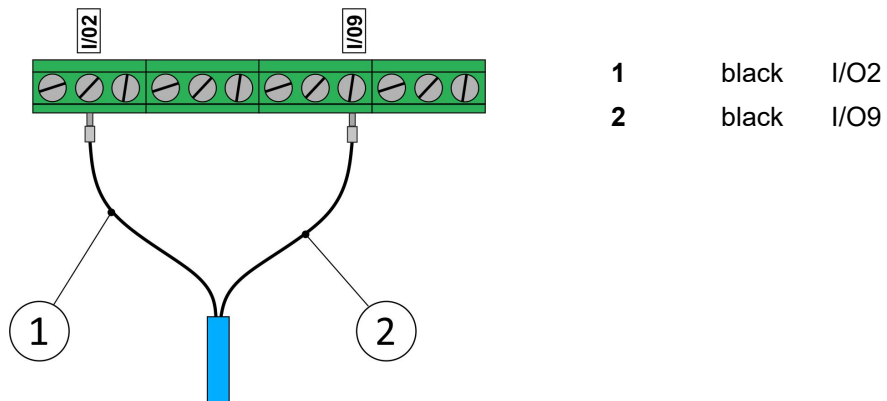


Figure 8 . Labcom 221 GPS – idOil-SLU sensor; Connection



The Labcom 221 GPS data transfer unit + idOil-LIQ sensor must not be installed in potentially explosive atmospheres.

5.5.3 Connection GA-SG1

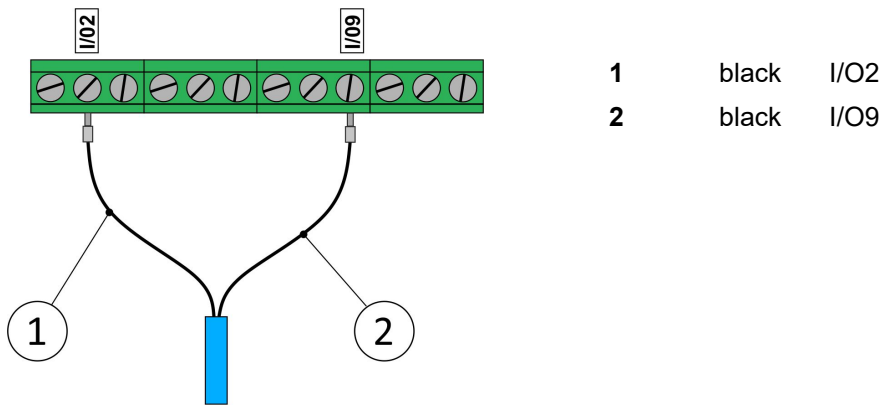


Figure 9 . Labcom 221 GPS - GA-SG1 sensor; Connection

5.5.4 Connection SGE25

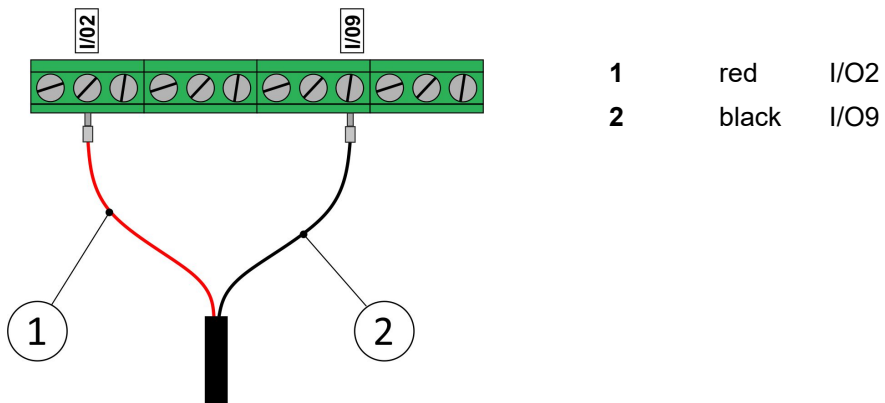


Figure 10 . Labcom 221 GPS - SGE25 sensor; Connection

5.5.5 Connection 1-wire temperature sensor

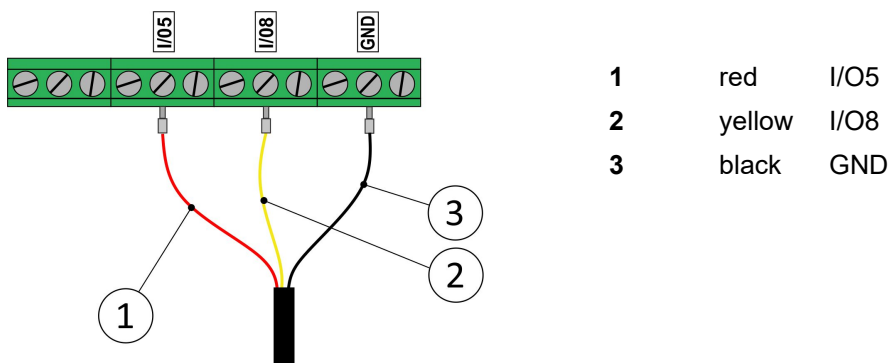


Figure 11 . Labcom 221 GPS – 1-wire temperature sensor; Connection

5.5.6 Connection DMU-08 and L64

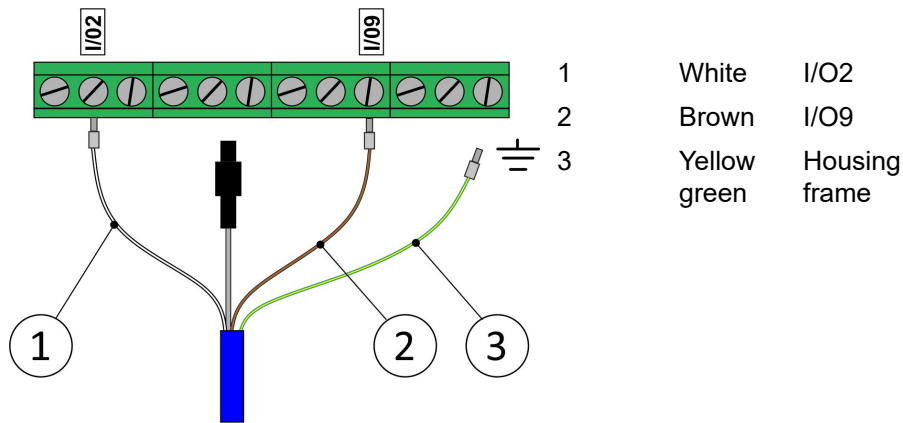


Figure 12 . Labcom 221 GPS – DMU-08 and L64 sensors; Connection

If you want to connect a DMU-08 sensor to the device, use a cable extension (e.g. LCJ1-1) with DMU-08 sensor wires and a separate extension wire to the Labcom 221 GPS's terminal strips (not included in the delivery).

5.5.7 Connection Nivusonic CO 100 S

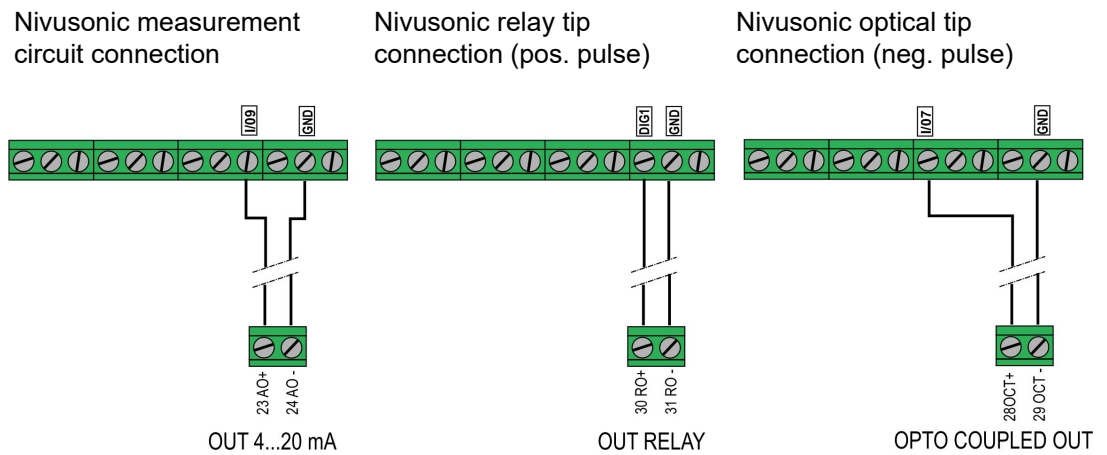


Figure 13 . Labcom 221 GPS – Nivusonic CO 100 S; Connection

6 External voltage supply

External voltage supply can be connected to the Labcom 221 GPS device (see Technical specifications) for charging the battery of the device or supplying the device continuously. The plus conductor of the external supply is connected to the device's separate external supply connector (VIN) and the supply's grounding conductor is connected to the device's grounding connector (GND).

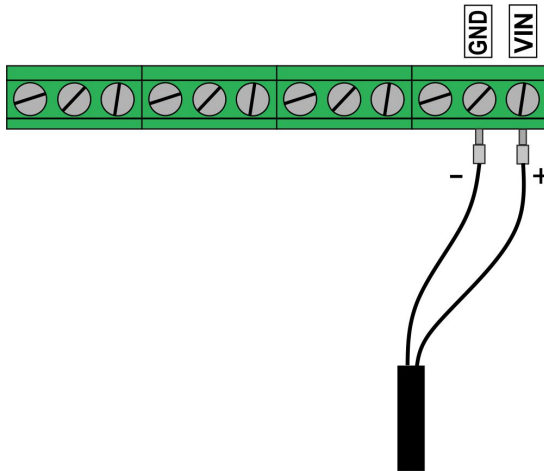


Figure 14 . External voltage supply; Connection

When the device is connected to an external voltage source, the LED on the circuit board is green. When the green LED begins to blink, the battery is charged and can be disconnected from charging.

6.1 Under Voltage Lockout mode (UVLO)

The Labcom 221 GPS device features an Under Voltage Lockout mode (UVLO), which shuts down the device. In this mode, the device will not start itself before an external voltage source is connected to it. The mode is reached once the battery voltage is no longer sufficient for the safe activation of the device. The lockout mode protects the device and any other devices and sensors connected to it.

When an external voltage source is connected to the device once it has switched to the UVLO mode, the device checks the stability of the voltage source before exiting the lockout mode. If the voltage source is found to be stable, the device exits the lockout mode. If the voltage source is unstable, the charging is continued for 15 min after which the battery charge is checked. If the charge is higher than 3.7 V, the device exits the lockout mode, whereas if the charge is lower than 3.7 V, the device returns to the voltage source stability check and proceeds once the requisite battery charge is reached.

If the device does not detect a battery, it exits the lockout mode when an external voltage source is connected. However, in this case it should be noted that if the device does not have a battery and enters the lockout mode for the fifth time, the device cannot be started for five minutes. To exit the lockout mode manually, press the TEST button for about 200 ms.

7 Troubleshooting FAQ

If the instructions in this section do not help with rectifying the problem, write down the device number and primarily contact the seller of the device or alternatively the e-mail address labkonet@labkotec.fi or Labkotec Oy's customer support +358 29 006 6066.

PROBLEM	SOLUTION
The device does not contact the LabkoNet server = connection failure	Open the device cover and press the TEST button on the right side of the circuit board (if the device is in the vertical position) for three (3) seconds. This forces the device to contact the server.
The device is connected to the server, but the measurement/accrual data is not updated to the server.	Make sure that the sensor/transmitter is in order. Check that the connections and conductors are tightened to the terminal strip.
The device is connected to the server, but the positioning data is not updated.	Change the installation location of the device so that it connects to the positioning satellite.

8 Technical specifications Labcom 221 GPS

TECHNICAL SPECIFICATIONS Labcom 221 GPS	
Dimensions	183 mm x 119 mm x 39 mm
Enclosure	IP 68 IP 67 when using an external antenna (option) IK08 (Impact protection)
Weight	310 g
Lead-throughs	Cable diameter 2.5–6.0 mm
Operating environment	Temperature: -20°C...+60°C The internal battery is not charged if the temperature is below -10°C or over +45°C.
Supply voltage	Internal 3,500 mAh LiPo chargeable battery and/or External 6–28 VDC, however over 5 W
Antennas (*)	GSM antenna internal/external GPS antenna internal
Data transfer	LTE-M / NB-IoT Encryption AES-256 and HTTPS
Positioning	GPS
Measurement inputs (*)	1 pc 4–20 mA +/-10 µA 1 pc 0–30 V +/- 1 mV
Digital inputs (*)	2 pcs 0–40 VDC, alarm and counter function for inputs
Switch outputs (*)	1 pc digital output, max 2 A, 42 VDC
Other connections (*)	SDI12, 1-wire and i2c-bus
Approvals:	
Health and Safety	IEC 62368-1 EN 62368-1 EN 62311
EMC	EN 301 489-1 EN 301 489-3 EN 301 489-19 EN 301 489-52
Radio Spectrum Efficiency	EN 301 511 EN 301 908-1 EN 301 908-13 EN 303 413
RoHS	EN IEC 63000
Article 10(10) and 10(2)	No operating restrictions in any EU Member State.

(*) depends on the device configuration