



USER AND MAINTENANCE MANUAL

Energy monitoring platform

Trace&Follow



IDT S.r.l. B

Headquarters: Corso Orbassano 402/6 - 10137 - Torino (TO)
Registered office: Via Sebastiano Valfrè 16 - 10121 - Turin (TO)

Tel. +39 011 0922786

E-mail administration: monica.giacomelli@dtsolution.com

E-mail technical department:
alberto.mazzucchelli@idsolution.com

E-mail business office: margherita.ferragatta@idsolution.com

Site: <https://idsolution.com/>

Rev. 2 - 04-04-2024

Summary

Section 1.....	4
<i>DECLARATION OF CONFORMITY</i>	5
<i>MANUFACTURER'S DATA</i>	5
<i>AUTHORIZED SERVICE</i>	5
<i>MANUAL PRESENTATION</i>	6
Conventions	7
Pictograms	7
<i>ATTACHED DOCUMENTS</i>	8
Section 2.....	9
<i>GENERAL SAFETY REGULATIONS</i>	11
Warning.....	11
Safety Standards	11
<i>DESCRIPTION</i>	12
<i>HARDWARE COMPONENTS</i>	13
Boards	13
Current sensors.....	15
<i>TECHNICAL DATA</i>	16
Main board.....	16
LoRaWAN board.....	16
Voltage sampling	16
Led board	17
SD board.....	17
<i>INTENDED USE</i>	18
<i>UNINTENDED USE</i>	18
Residual Risks.....	18
Section 3.....	20
<i>WARNINGS</i>	21
<i>UNPACKING INSTRUCTIONS</i>	21
<i>UBICATIONS</i>	21
<i>HANDLING</i>	21
<i>INSTALLATION AND CONFIGURATION</i>	22
Warning.....	22
Preliminary verifications	22
Installation and connection	22
LoRaWAN Gateway.....	23
Configuration	23
Reset to factory settings	24



USE..... 25

 Problems 25

 Usage procedures 27

 TCP modbus server 27

Section 4.....**28**

MAINTENANCE 29

 Security 29

 Periodic maintenance 29

 Extraordinary maintenance 29

DECOMMISSIONING 30

 Deactivating the device 30

 Disposal 30

Section 1

Declaration of Conformity

Manufacturer's data

About the documentation

Documentation attached

DECLARATION OF CONFORMITY

The device described in this documentation is accompanied at sale by the declaration of conformity, drawn up in accordance with the legislation in force on the European territory.



NOTE

BEFORE USING THE DEVICE IN ANY FORM, CHECK FOR THE DECLARATION OF CONFORMITY.



NOTE

IF THE DEVICE IS GIVEN TO A THIRD PARTY, ALL DOCUMENTATION MUST BE HANDED OVER WITH IT.

MANUFACTURER'S DATA

Company name	IDT S.r.l. B
Company headquarters	Corso Orbassano 402/6 - 10137 - Turin (TO)
VAT NO.	11481370010
PEC	idt@pec.idtsolution.com
Tel.	+39 011 0922786
Cell phone	Technical Office: +39 349 8886994 Administrative Office: +39 340 4951357 Commercial office: +39 334 9789002
E_mail	Administration: monica.giacomelli@dtsolution.com Technical department: alberto.mazzucchelli@idtsolution.com Business office: margherita.ferragatta@idtsolution.com
Website	https://idtsolution.com/

AUTHORIZED SERVICE

Authorized service on the device is performed directly by the manufacturer or by a technician licensed and appointed by the manufacturer.

MANUAL PRESENTATION



NOTE

UPON RECEIPT OF THE DEVICE, PLEASE READ THIS MANUAL CAREFULLY BEFORE PERFORMING ANY OPERATION.

The manual consists of several sections, each of which covers a range of topics, divided into chapters and paragraphs.

The general index lists all the topics covered in the entire manual. Page numbering is progressive, and each page is numbered. This manual is intended for the user in charge of configuration, operation and maintenance of the device and relates to its technical life after its manufacture and sale.

If it is subsequently transferred to a third party for any reason (sale, loan for use, or any other reason), the device must be delivered complete with all documentation.

Before beginning any operation, it is necessary to have at least read through the entire manual and then delved deeper into the topic related to the operations you intend to perform.

This manual contains proprietary information and may not be even partially provided to third parties for any use and in any form without the prior written consent of the manufacturer.

The manufacturer declares that the information in this manual is congruent with the technical and safety specifications of the device to which the manual refers.

A true copy of this manual is deposited in the technical file of the device, which is kept with the manufacturer.

The manufacturing company does not recognize any documentation that has not been produced, issued, or distributed by itself or its authorized representative.

This manual, like the entire technical file, will be kept by the manufacturer for the period required by law (10 years).

During this period, copies of the documentation accompanying the product may be requested at the time of sale.

The entire technical file remains available for this period only to the inspection authorities, who may request copies.

After that period has passed, it will be the obligation and care of the person handling the product to make sure that both the product and the documentation, comply with the laws in force, at the time of the inspection.

Conventions

To enhance comprehension, this manual employs graphic and typographical symbols and conventions, which are explained below.

Graphic warning conventions



NOTE

NOTES CONTAIN IMPORTANT INFORMATION, HIGHLIGHTED OUTSIDE THE TEXT TO WHICH THEY REFER



WARNING

CAUTION STATEMENTS INDICATE THOSE PROCEDURES WHOSE TOTAL OR PARTIAL DISREGARD MAY RESULT IN DAMAGE TO THE DEVICE, ITS COMPONENTS, AND MAY EXPOSE PEOPLE TO DANGER.



DANGER

HAZARD INDICATIONS IDENTIFY PROCEDURES THAT, IF NOT FULLY COMPLIED WITH, MAY RESULT IN DAMAGE OR INJURY TO A PERSON'S HEALTH OR CAUSE SERIOUS DAMAGE TO THE DEVICE.

Pictograms

The following pictograms are present in the device:



Electrocution Danger



General Danger



Manual reading is mandatory



WARNING!

Pictograms that serve a safety function must not be removed, covered or damaged.

ATTACHED DOCUMENTS



NOTE

BEFORE USING THE DEVICE, CHECK FOR ALL ATTACHED DOCUMENTATION.



NOTE

IF IT IS GIVEN TO A THIRD PARTY, ALL DOCUMENTATION OF THE DEVICE MUST BE HANDED OVER WITH IT.

In addition to this manual and the Declaration of Conformity, the following documents that can be accessed at the links will be attached:

- <https://www.tme.eu/Document/dd9ef0ab4024b6aae1366a3daad4b123/SIM7600G-H.pdf> (4G expansion datasheet)

Section 2

Warranty

General safety standards

Technical characteristics

Intended and unintended use

Residual hazards

WARRANTY

The warranty regulations, listed in full in the purchase agreement, are only valid if the device is used under the conditions of its intended use.

Any repairs or modifications made to the device by the user or unauthorized firms, except for the work described in **Sect. MAINTENANCE** and performed with the indicated procedures, will result in forfeiture of the warranty.

The warranty excludes damage from misuse, negligence, or lack of maintenance.

Products sold by us are covered by warranty regarding the device under the following conditions:	
1	The warranty is valid for 12 to 24 months, depending on the customer's legal status.
2	The manufacturer agrees to replace malfunctioning or incorrectly manufactured parts at their discretion, following careful inspection and identification of incorrect assembly.
3	The buyer is always responsible for transportation and/or shipping costs associated with repairing or replacing the product.
4	During the warranty period, any products that are replaced will become the property of the manufacturer.
5	This warranty is only valid for the original purchaser who has followed the maintenance instructions in the manual. Our warranty liability ends if the product ownership is transferred or if any modifications are made to the product.
6	The warranty does not cover damage resulting from overuse, such as continuing to use the product after a fault has been found, using unsuitable operating methods, or failing to follow the operating and maintenance instructions.
7	The manufacturer is not responsible for any issues that may arise during the resale or use of the product in a foreign country due to the regulations in that country.
8	Proof of purchase (invoice or copy of payment) is required for replacement of defective product or part. Otherwise, the buyer will be charged for the replacement part.

Notice: if it is deemed necessary to use the warranty, please provide the following information:

1	Type/version
2	Purchase Date (Submit Purchase Document)
3	Detailed description of the problem



NOTE

FAILURE TO FOLLOW THE PROCEDURES FOR SERVICING AND USING THE DEVICE AS DESCRIBED IN THIS DOCUMENTATION WILL RESULT IN FORFEITURE OF THE WARRANTY TERMS.

GENERAL SAFETY REGULATIONS

Warning

Before performing any further work on the device, consult the manufacturer if any part of the documentation is even partially missing or illegible.

This chapter outlines the general safety rules to be followed during any operation involving the device. The intervention procedures, described in the following chapters, must be carried out while adhering to both the specified methods of execution and the safety rules outlined in this chapter.

This document provides safety rules, operation, and maintenance procedures as a supplement to the general occupational safety rules that must be followed.

In cases where the safety regulations of the nation in which the device is used conflict with or are more restrictive than those stated in the documentation, the regulations of the nation will take precedence.



NOTE

THE MANUFACTURER IS NOT LIABLE FOR ANY ACCIDENTS OR DAMAGES RESULTING FROM INAPPROPRIATE USE OF THE DEVICE OR FAILURE TO COMPLY WITH THE SAFETY RULES AND INTERVENTION PROCEDURES DESCRIBED IN THE DOCUMENTATION.

Not adhering to the rules for operating, using, and maintaining the device as outlined in the manual will result in voiding the warranty terms.

Safety Standards

During installation, configuration, and use of the device, unexpected situations may occur that are not described in the documentation. These situations can be caused by environmental factors or accidental failures that were not anticipated by the manufacturer.

The user and/or personnel responsible for operating, maintaining, and using the device must keep this manual.

If the original document is lost or damaged, the client may request a certified copy from the producing company. It is recommended to keep a backup copy in a secure location to prevent loss or damage.



WARNING

ALL OPERATIONS NOT EXPLICITLY DESCRIBED IN THE DEVICE MANUAL ARE CONSIDERED INFEASIBLE, AS IT IS IMPOSSIBLE TO DESCRIBE ALL PROHIBITED OR IMPOSSIBLE OPERATIONS.

DESCRIPTION

Trace&Follow is a device that monitors the energy consumption of industrial machinery and sends the acquired data to a cloud platform. It was designed and developed entirely by RedSmart, a business unit of IDT.

MODULAR APPROACH

The Main board is the central device of Trace&Follow. It serves as a HUB to which different expansion boards can be connected to expand its functionality:

- LoRaWAN Expansion Card
- 4G expansion card
- SD expansion card
- Led expansion board
- CAN board
- Voltage sampling expansion board "Voltage Sens"

The system's different boards will be used according to the specific needs of each project's application.

CONNECTIVITY

The device is able to connect to the cloud platform via various network protocols:

- Wi-Fi (built-in)
- Ethernet (built-in)
- LoRaWAN (expansion + dedicated infrastructure)
- 4G (expansion)

Once the data reaches the cloud platform, they are stored in a database.

CONFIGURATION INTERFACE

Trace&Follow allows users to configure parameters through its dedicated interface, creating a local network that can be accessed to reach a configuration page.

MODBUS SERVER

Trace&Follow enables a Modbus TCP server, which allows other devices to send production data for monitoring.

DIGITAL I/O

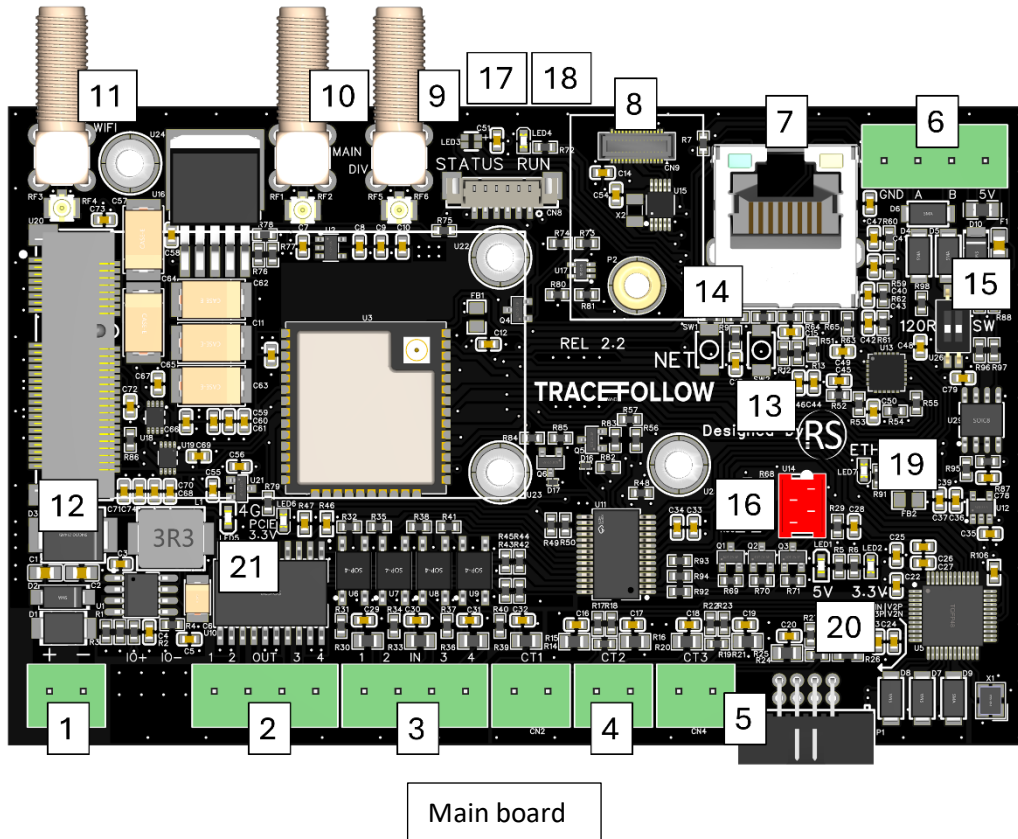
Trace&Follow has four digital inputs and four digital outputs. These can be configured in 4 different ways to monitor and control different types of digital signals.

BLUETOOTH

Trace&Follow can be equipped with Bluetooth capabilities to enable ad hoc development and interaction with compatible devices.

HARDWARE COMPONENTS

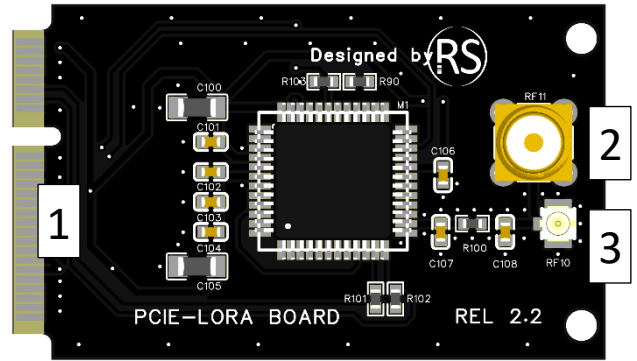
Boards



1. Power terminal
2. Digital output terminal
3. Digital input terminal
4. Current sensor connection terminals
5. Connection port for "Voltage sampling" expansion
6. RS485 terminal
7. Ethernet connector
8. SD expansion card connector
9. Auxiliary antenna connector
10. Main antenna connector
11. Wi-Fi antenna connector
12. PCIe expansion card connector
13. Reset button
14. NET button
15. RS485 end of line selection switch
16. Led expansion board connector
17. Status Led
18. Led Run
19. Led ethernet
20. Led power supply
21. Led PCIe

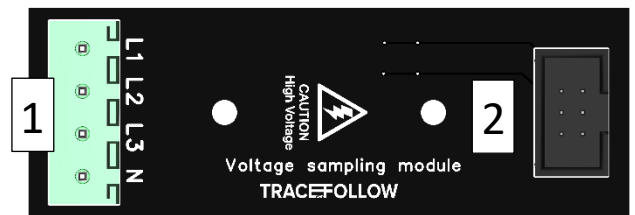
LoRaWAN Expansion Card

1. PCIe connection
2. SMA Antenna Connector (if available)
3. Pig-tail antenna connector



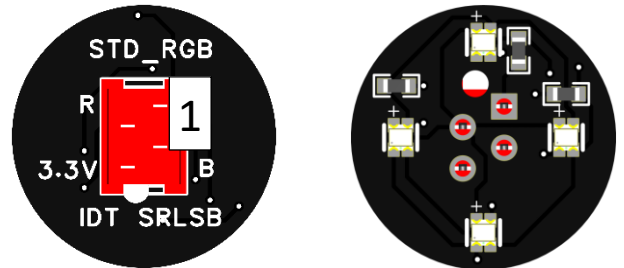
Voltage Sampling tab

1. Power phase connector
2. Connection connector with main board



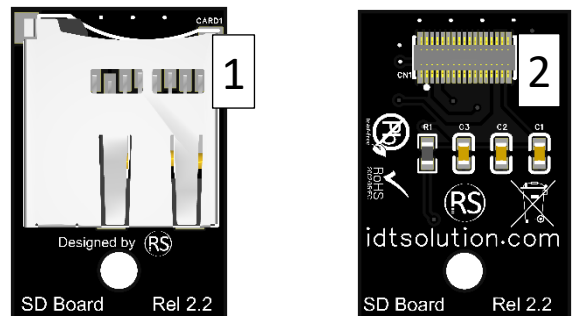
LED expansion board

1. Connection connector with main board



SD expansion card

1. SD card connector
2. Main board connector



Expansion boards not shown here are commercial boards. Refer to their datasheets for more information.

Current sensors

Trace&Follow utilizes current sensors called current transformers to measure the energy consumption of industrial machinery. These sensors are crucial for collecting accurate current data and monitoring energy efficiency. Current transformers are devices that measure the current flowing in a conductor without interrupting its flow.

Features:

- **Measurement Range:** Current sensors should be selected according to the current range of the machinery you wish to monitor. It is essential that the range of the sensors cover the full range of current that the machinery can consume.
- **Accuracy:** To ensure reliable data, current sensors must provide high accuracy, often expressed as a percentage of the measured value.
- **Transformation Factor:** Each current sensor has a transformation factor that determines the ratio between the current measured in the primary conductor and the current measured in the secondary conductor. This factor is crucial for accurately calculating power consumption.
- **Output Type:** Current sensors can have different types of output, such as direct current (DC) or alternating current (AC). It is important to select sensors with the appropriate output for the Trace&Follow system.
- **Installation:** Proper installation of current sensors around the conductor being measured is crucial. It is important to follow the manufacturer's instructions to ensure accurate readings.



TECHNICAL DATA.

Main board

Mechanical data	
Overall dimensions (mm)	115 x 72 x 15
Weight (g)	200
IP rating	IP20
Electrical Data	
Supply voltage (Vdc)	12-28V DC.
Max Power Consumption(W)	10W
Current Consumption Max(A)	0.84A
Electrical safety class	Class III
Input	Tolerated voltage range: 0-24V Minimum switching voltage: 7V Maximum absorbable current: 10mA (Max)
Output	Voltage range: 0-(Vin-1)V Maximum single channel output current: 3A Total maximum output current: 6.5A
Protocol	Modbus-RTU master, Modbus TCP
Connection	pluggable terminals, ethernet, wireless
Configuration	Via DIP switch you can enable RS485 line file resistor, web interface for software configuration

LoRaWAN board

Mechanical data	
Overall dimensions (mm)	50 x 30 x 4
Weight (g)	5
IP rating	IP20
Electrical Data	
Power supply voltage	3.3V
Power consumption (W)	0.05
Current consumption (A)	0.01
Electrical safety class	Class III
Protocol	UART

Voltage sampling

Mechanical data	
Overall dimensions (mm)	25 x 72 x 15
Weight (g)	10
IP rating	IP20
Electrical Data	
Power consumption (W)	0.05
Current consumption (A)	0.0002
Electrical safety class	Class III

Led board

Mechanical data	
Overall dimensions (mm)	16 x 16 x 3
Weight (g)	5
IP rating	IP20
Electrical Data	
Power supply voltage	3.3V - 5V
Power consumption (W)	0.84
Current consumption (A)	0.25
Electrical safety class	Class III

SD board

Mechanical data	
Overall dimensions (mm)	15.8 x 23 x 3
Weight (g)	5
IP rating	IP20
Electrical Data	
Power supply voltage	3.3V
Power consumption (W)	0.01
Current consumption (A)	0.003
Electrical safety class	Class III

INTENDED USE

The Trace&Follow system is adaptable to various industrial applications and offers an advanced method for monitoring energy consumption using current sensors. This device provides accurate data for efficient resource management and identification of possible machinery inefficiencies. The Trace&Follow seamlessly integrates into industrial settings with its advanced connectivity and flexible configuration options. This allows for real-time monitoring and the ability to adapt to specific user needs without compromising reliability.

UNINTENDED USE

The intended use of this product is limited to the purposes described in the **DESCRIPTION** and **INTENDED USE** section. Any other use is strictly prohibited:

- Using components not supported or supplied with the product at purchase may cause device malfunction.
- Using the device for applications other than those indicated.
- Modify the device (hardware and firmware).

The manufacturer is relieved of any liability arising from the use of any unit that is reused after the device has been taken out of service.



NOTE

THE MANUFACTURER IS NOT LIABLE FOR ANY ACCIDENTS OR DAMAGES RESULTING FROM UNINTENDED USE OF THE DEVICE. FURTHERMORE, UNINTENDED USE WILL VOID THE WARRANTY.

Residual Risks

During the design stage, the manufacturing company conducted a comprehensive risk analysis of the system in question. The analysis identified risks that are inherent and cannot be eliminated. In this manual, we provide guidance on how to avoid these risks. It is crucial that any user responsible for configuring, operating, and maintaining the device reads the manual beforehand.



NOTE

THE MANUFACTURER IS NOT LIABLE FOR ANY ACCIDENTS OR DAMAGES RESULTING FROM UNINTENDED USE OF THE DEVICE DUE TO USER NEGLIGENCE.

In particular:

- It is strictly prohibited to make any modifications to the device. If an unauthorized operator improperly modifies the device, the manufacturer will not be held liable for any resulting damage to persons, animals, or property.



- Keep this manual in a safe place as it is necessary for the proper and safe use of the device. Periodically check the condition of the label attached to the product and replace it if it is damaged. If necessary, contact authorized service.
- If any of the device components have sharp edges or corners due to accidental impact, making them dangerous, contact authorized service and follow their instructions.

Important:

- Avoid exposing the device to water or other liquids.
- Use caution when installing, configuring, and using the device to prevent damage.
- The device must only be used with compatible systems.
- The device must only be used with power supplies that are compatible.

OPERATIONS THAT POSE RISKS TO THE OPERATOR:

During the design stage, measures were taken to ensure the safety of the device throughout its entire lifecycle, including transportation, assembly, adjustment, use, and maintenance. However, it is important to note that not all potential risks to operators and the environment have been eliminated. This is due to technological limitations in device reliability and management challenges in risk elimination. As a result, residual risks are still present.

Section 3

Locations

Handling

Installation and configuration

Usage

WARNINGS

The lighting system, whether natural or artificial, in the configuration area must provide a minimum illuminance of 200 lux.

Personal protective equipment (PPE) such as:

- **Gloves:**

When working with hazardous tools and live parts, it is necessary to use CE-marked gloves as PPE to protect against the risks analyzed.

- **Protective goggles:**

In any work situation where there is a risk of objects or materials being projected into an operator's eyes, eye protection is mandatory.



UNPACKING INSTRUCTIONS

The device comes inside a plastic and cardboard packaging inside which you will find:

- Trace&Follow board.
- DIN rail housing.
- Wi-Fi antenna.
- Any expansions with attached mounting screws and antennas (if required).

UBICATIONS

Before handling and using the device, keep in mind the following factors:

- The storage area for the product should be selected in a way that it is not susceptible to damage from water, steam jets, or corrosive acids.
- The device should not be exposed to weather conditions.
- Temperature range of use -20°C to +50°C
- Storage temperature range -20°C to +50°C
- Maximum relative air humidity conditions: up to 90%.
- The device is restricted to indoor use or use within containment systems that meet the specified conditions.

HANDLING

The device comes in packaging to protect it during storage and transportation. However, it should be handled with care and using appropriate electrostatic discharge (ESD) prevention devices to prevent damage. Once the packaging is removed, dispose of it properly and keep it away from children.

The manufacturer is not responsible for any harm caused to individuals, animals, or property resulting from use that does not comply with the specifications outlined in this manual.

Due to its small size and weight, the device can be easily handled manually. It is important to handle the device with care to prevent any damage.

INSTALLATION AND CONFIGURATION

Warning

The manufacturing company tests and fine-tunes all devices before shipment and delivery to the customer. The device is designed, manufactured, and tested to meet specific standards (see Declaration of Conformity) when configured properly. Improper use and maintenance may cause abnormalities during use and safety problems, which will void the warranty terms.

Before operating the device, ensure that all dust, moisture protection, and packaging material have been completely removed.

Preliminary verifications

Damage control

Check all system components for physical damage caused by impact, tearing, or abrasion :

- Ensure that there are no marks or dents that may have occurred during transport.
- Ensure that the input and output connectors are undamaged.
- Ensure proper connection of expansion modules to the main board.
- Ensure that both anchor screws are securely fastened when using PCIe expansions.
- In the case of expanding SD, ensure that the anchor screw is securely fastened.

Damage reporting procedure

If any damage is found, stop the configuration procedure, and report the nature of the damage found to the manufacturer's customer support department.

Installation and connection



WARNING

VERIFY THAT THE FINISHED PRODUCT FEEDING SYSTEM COMPLIES WITH THE TECHNICAL SPECIFICATIONS OF THE DEVICE.



WARNING

BEFORE INSTALLING THE DEVICE, ENSURE THAT THE SYSTEM IS DE-ENERGIZED TO AVOID THE RISK OF ELECTROCUTION.

1. **Placement and Connection:** Select a strategic location for installation, ensuring sufficient access to the machinery being monitored. Connect the current sensors to the Trace&Follow input channels according to the instructions provided in the sensor manual.
2. **DIN Rail Mounting:** Use the provided enclosure for DIN rail mounting. Ensure that the housing is securely anchored to the DIN rail to provide a stable base for Trace&Follow.
3. **Current sensor connection:** Connect the current sensors to the input channels of the Trace&Follow following the instructions provided in the sensor manual.
4. **Connecting antennas if needed:** Always connect the Wi-Fi antenna. Connect the other two antennas as described below:

LoRaWAN protocol: connect only the LoRa antenna to the main antenna connector

4G protocol: connect the 4G antenna to the main antenna connector and a second 4G antenna to the

secondary antenna connector.

5. **Network Connectivity:** To connect Trace&Follow to the network, use one of the available options: Ethernet, Wi-Fi, 4G, or LoRaWAN. Follow the specific instructions for the desired connection and ensure that the device has access to the network for data communication.
6. **Power supply:** Power the Trace&Follow device using the provided power supply. Make sure the power supply is stable and meets the device's specifications.
7. **Starting the Device:** Activate Trace&Follow and confirm all LED indicators are on. Use the web user interface to verify device connectivity and functionality.
8. **Verify Connection:** Check the Trace&Follow connectivity by verifying that the device is properly connected to the cloud platform.

LoRaWAN Gateway

When using the LoRa protocol for connectivity, it is crucial to install LoRa gateways with internet connectivity in strategic locations. The LoRa protocol is designed for long-distance data transmission, but it requires gateways to enable data transmission from the Trace&Follow board to the cloud platform.

- Place LoRa gateways strategically to maximize coverage and ensure reception of data transmitted by the Trace&Follow board.
- Ensure that LoRa gateways have reliable connectivity to the Internet.
- Access the gateway configuration page (refer to the individual gateway manual) and configure the endpoint of the cloud platform to which you want to send data.

Configuration

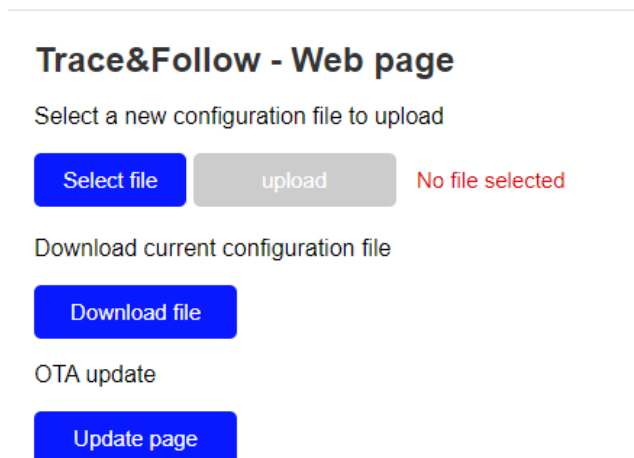
The Trace&Follow tab is configured through a configuration file that can be uploaded and downloaded via the web interface.

Upon initial startup, the board comes preloaded with a configuration file that is available in the technical datasheet.

The board boots with Ethernet connectivity and a fixed IP address of **192.168.1.100**.

To access the board's web page, connect your PC directly to the board using an Ethernet cable and enter the IP address into your browser.

note: the ethernet network interface must be configured to be in the same subnet as the board.



To download the file currently saved on the card, click the '**Download file**' button.

To upload a JSON format configuration file for the board, click the '**Select file**' button and refer to the technical datasheet for the file structure.

To update the board's firmware, click the '**Update page**' button. The file must be uploaded in binary format.

Only upload files from the manufacturer.

Note: If non-compliant files are loaded, it is possible to make the card unusable.

To access the update page, you must enter the credentials provided in the configuration file.

The image shows a login form with the following elements:

- Title: **Accedi**
- Warning: La connessione a questo sito non è privata
- Field: Nome utente (with a cursor)
- Field: Password
- Buttons: **Accedi** (blue) and **Annulla** (white with blue border)

Once the correct credentials are entered, the update page is accessed.



Firmware Filesystem

Scegli file Nessun file selezionato

D41CB2B0 - ESP32

Select the appropriate file and the update process will begin. Once the update is complete, a green check mark will appear on the screen.

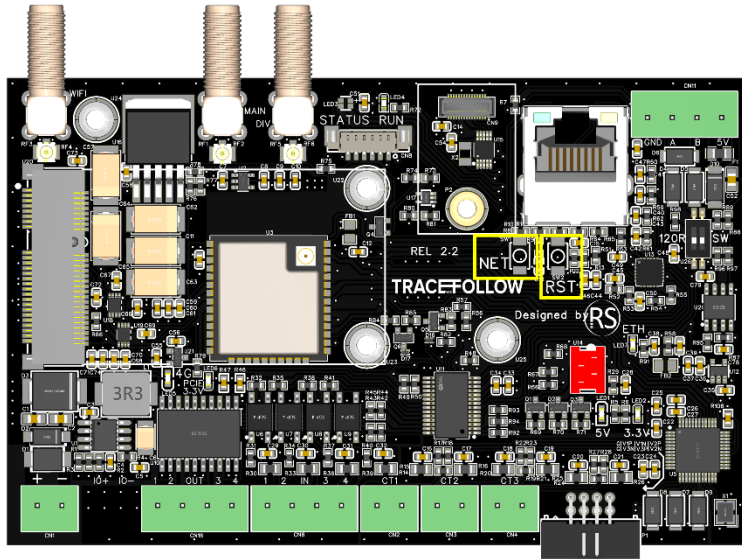
The board will then restart, and the web page may be temporarily unavailable until the procedure is finished.

Reset to factory settings

In case of an error during the configuration file upload or if the uploaded configuration is incorrect, the board may not work correctly. If you are unable to access the web page, reset the board to its factory settings.

To do this, press and hold the 'NET' button on the board, then press and release the reset button keeping the NET button pressed. The board will reset, and the STATUS LED will turn yellow. Hold the NET button for 5 seconds. The STATUS LED will flash yellow during this time. Once the 5 seconds have elapsed, the LED will turn solid, indicating that the procedure was successful. If the button is released before the 5 seconds are up, the LED will turn red, indicating that the procedure has failed.

This procedure will delete the currently saved configuration file and restore the default one.



USE

During normal operation, the board requires no special actions.

Problems

Trace&Follow is designed to operate reliably. However, if inconsistencies or problems arise, perform a series of checks and corrective actions. Below are some troubleshooting tips for common issues:

LED Not Illuminated:

- **Verification:** Ensure that Trace&Follow is properly powered.
- **Action:** Check the power supply connection and replace the power supply if necessary. If the problem persists, perform a reset.

Ethernet/Wi-Fi Connection Not Stable:

- **Verification:** Check the Ethernet cables or Wi-Fi configuration.
- **Action:** Check the network settings and make sure the signal strength is not too weak.

LoRa Connection Problems:

- **Verification:** Ensure that LoRa gateways are properly placed and have connectivity to the Internet.
- **Action:** Review LoRa settings and gateway configuration. Check that the LoRa antenna is properly installed.

Inability to Write to Modbus TCP Registers:

- **Verification:** Verify the configuration of the external device writing to the registers and that the selected port is the same as configured.
- **Action:** Ensure that the external device is properly configured and able to communicate via Modbus TCP.

Data Not Displayed on the Cloud Platform:

- **Verification:** Check Trace&Follow Internet connectivity and cloud platform configuration.
- **Action:** Make sure the device is connected to the Internet and the cloud platform settings are correct. In case of 4G connectivity, check that the SIM is valid and that it is properly inserted.

Instability in Power Supply:

- **Verification:** Check power supply stability and quality.
- **Action:** Use a suitable power supply and check that the supply voltage is in the specified range.



Unable to Access the User Interface:

- **Verification:** Check login credentials and network connectivity.
- **Action:** Restore credentials or perform a network connectivity check.

Incorrect or Absent Current Data:

- **Verification:** Verify the correct installation of current sensors.
- **Action:** Make sure the sensors are placed correctly and the parameter configuration is accurate.

General:

Card Reset:

- **Verification:** In case of persistent problems, perform a reset.
- **Action:** Follow the instructions in the user manual to perform a reset and reset configurations.

Technical Support:

- In case of persistent difficulties, contact Trace&Follow technical support, providing specific details of the problem encountered for personalized assistance.

To troubleshoot effectively, carefully follow the guidance provided in the user manual. If difficulties persist, it is advisable to seek direct support from the Trace&Follow technical support team.

If an unforeseen and dangerous anomaly occurs during the device's power-up or use phase, it is recommended to turn off the device and contact technical support.

Usage procedures

After successfully configuring all parameters, Trace&Follow will automatically begin monitoring energy consumption. The current sensors will record the data, which will then be sent to the cloud platform for analysis and visualization. The Trace&Follow Status LED and Run LED provide a visual indication of its operation.

LED Run:

- Flashing at a frequency of 1Hz: board running.
- Fixed on or off: error.

Status LEDs:

- White: waiting for the network
- Blue: cloud connection in progress
- 2 Red flashes during cloud connection phase: automatic time acquisition from network failed.
- 1 red blink during cloud connection phase: connection failed.
- Green: board correctly in operation.
- Flashing red/white: Error sending data to cloud platform.
- Red: Ethernet link not present.
- Orange: if input configured in "Function Mode," it indicates that the associated function is active.
- Flashing Red White: Fixed IP setting error.

TCP modbus server

The Trace&Follow includes a Modbus TCP server, allowing communication with other devices that support the Modbus TCP protocol. This chapter provides instructions on writing to the Modbus TCP server registers using a predefined table and how this data is subsequently sent to the cloud platform. The server must be enabled during the configuration phase.

Writing to the Registers of the Modbus TCP Server:

1. **Register Table:** Please refer to the Modbus TCP register address table provided in the Trace&Follow manual. This table specifies the register addresses available for both writing and reading.
2. **External Device Configuration:** Make sure the external device is properly configured to communicate via the Modbus TCP protocol in order to write to the Trace&Follow Modbus TCP registers.
3. **Writing Data:** Using either the software or the Modbus TCP interface of the external device, write data to the registers specified in the table.

The Modbus commands that allow interaction with the Modbus server are:

- READ HOLDING REGISTERS (3)
- READ INPUT REGISTERS (4)
- WRITE MULTIPLE REGISTERS (16)

Section 4

**Maintenance
Disposal**

MAINTENANCE

Personnel who will perform maintenance operations must read the manual beforehand. Cleaning or physical maintenance work should only be done when the system is off and disconnected from the power supply. Follow the instructions in this manual strictly when performing such work.

Security

During extraordinary maintenance operations of the device, it is necessary to use PPE, such as:

- Gloves:

When working with hazardous tools and live parts, it is necessary to use CE-marked gloves as PPE to protect against the risks analyzed.

- Protective goggles:

In any work situation where there is a risk of objects or materials being projected into an operator's eyes, eye protection is mandatory.



DANGER



DISCONNECT THE DEVICE FROM THE POWER SYSTEM OR DE-ENERGIZE THE SYSTEM BEFORE PERFORMING ANY CLEANING OR MAINTENANCE.



When performing maintenance and cleaning tasks, it is important to follow the instructions provided in this manual as well as any relevant safety regulations. This includes both general safety regulations and any specific work safety regulations that may be in effect at the location where the work is being carried out.

Periodic maintenance

Periodically, it is necessary to clean the device to remove any accumulated dust and dirt from its surface. Use a non-abrasive cloth that is free of alcohol or harsh solvents. Do not use abrasive sponges, chemical solvents, or detergents. While cleaning, ensure that water does not come into contact with the internal electrical components of the device.

Extraordinary maintenance

In case of device failure, breakage, or inappropriate use, extraordinary maintenance is required.

Intervention procedures cannot be described due to the unpredictable nature of potential situations.

If needed, refer to the technical service department of the manufacturer for instructions that are appropriate to the situation.

All mechanical, electrical, or electronic work, whether ordinary or extraordinary, must be performed by trained and authorized personnel or by our service department.

DECOMMISSIONING

Deactivating the device

The device is designed to be robust, durable, and flexible for long-term use. When it reaches the end of its technical and operational life, it must be decommissioned in a way that prevents it from being used for its original purpose but allows for the reuse of its raw materials.

The same decommissioning procedures apply in all cases:

- Decommission the device and store it in the warehouse.
- Final decommissioning and subsequent disposal.

NOTE



THE MANUFACTURER IS NOT LIABLE FOR ANY DAMAGE TO PERSONS OR PROPERTY RESULTING FROM THE REUSE OF INDIVIDUAL PARTS OF THE DEVICE FOR FUNCTIONS OR IN MOUNTING CONFIGURATIONS OTHER THAN THE ORIGINAL ONES. THE MANUFACTURING COMPANY DOES NOT RECOGNIZE, EITHER IMPLICITLY OR EXPLICITLY, THE FITNESS OF PARTS OF THE DEVICE THAT HAVE BEEN REUSED AFTER FINAL DECOMMISSIONING WITH A VIEW TO DISPOSAL FOR SPECIFIC PURPOSES.

Disposal

The user is solely responsible for reusing any electrical parts of the device. The label displays the symbol required by Legislative Decree No. 49 of March 14, 2014, which implements Directive 2012/19/EU. This symbol indicates that the product must be disposed of as sorted waste, specifically as electrical and electronic waste. Please refer to the waste collection center in your area. Symbol:



Refer to the symbols on the product packaging for disposal.

NOTE



THE MANUFACTURING COMPANY IS NOT RESPONSIBLE FOR ANY DAMAGE CAUSED BY THE DEVICE IF IT IS NOT USED IN ITS ENTIRETY AND FOR THE USES AND METHODS OF USE SPECIFIED IN THIS MANUAL. THE COMPANY IS ALSO NOT RESPONSIBLE FOR ANY DAMAGE TO PERSONS OR PROPERTY RESULTING FROM THE RECOVERY OF PARTS OF THE DEVICE USED AFTER ITS DISPOSAL.
