

MONITORING

USER MANUAL
Installation, use and maintenance

English

BRIDGE MINI

15P4600B100
2021/04/12 R.02



INDEX OF REVISIONS:

In this Bridge Mini Manual R.02 the following topics have been added, changed or deleted compared to the previous revision R.01.

TECHNICAL DATA, BENEFITS and TROUBLESHOOTING.

- This manual is integrant and essential to the product. Carefully read the instructions contained herein as they provide important hints for use and maintenance safety.
- This device is to be used only for the purposes it has been designed to. Other uses should be considered improper and dangerous. The Manufacturer is not responsible for possible damages caused by improper, erroneous and irrational uses.
- Enertronica Santerno is responsible for the device in its original setting.
- Any changes to the structure or operating cycle of the device must be performed or authorized by Enertronica Santerno.
- Enertronica Santerno shall hold no responsibilities for any consequences caused by use of non-original spare-parts.
- Enertronica Santerno reserves the right to make any technical changes to this manual and to the device without prior notice. If printing errors or similar are detected, the corrections will be included in the new releases of the manual.
- The information contained herein is the property of Enertronica Santerno and cannot be reproduced. Enertronica Santerno enforces its rights on the drawings and catalogues according to the law.

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1. GENERAL DESCRIPTION

Bridge Mini is a datalogger, designed for remote monitoring and assistance purposes, offering features such as the acquisition of measures and indicators, the representation of energy production patterns, the upgrade of the connected inverter firmware and the log download, with a simple browser web interface.

Bridge Mini can manage devices of any brand and model, using standard IoT protocols and industrial protocols.

Compact and performing, it is available in two variants:

- Embedded: mounted inside a Santerno inverter and powered directly by the inverter itself, thus offering maximum convenience and an easy installation.
- Stand-alone: with DIN support.

Bridge Mini may be interconnected with the plant devices through two serial connections (RS485 ports) with Modbus RTU protocol, called COM1 (non isolated) and COM2 (isolated) and an Ethernet port (LAN) with TCP/IP protocol.

Also, it allows to connect USB 2.0 flash drives to download the logs.

It is connected to the Santerno Cloud via secure and encrypted connections through the Internet, to allow remote monitoring and remote assistance.

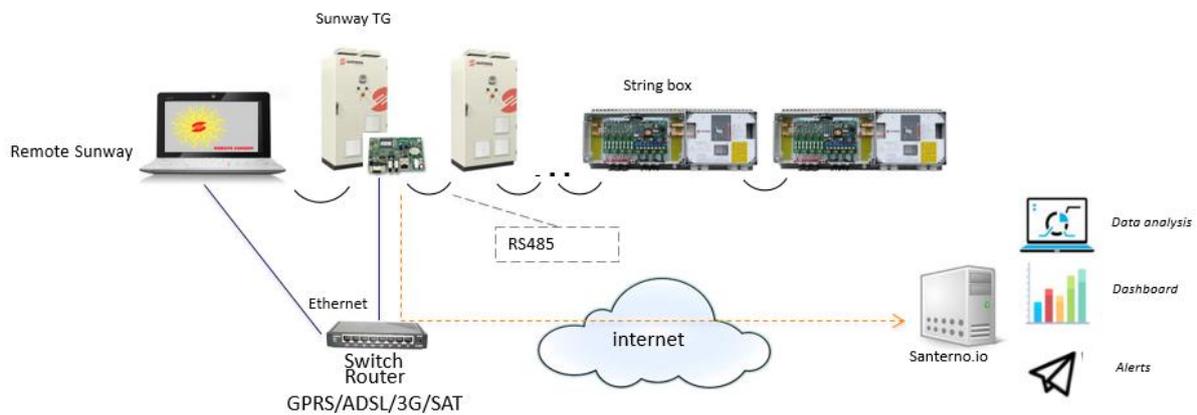


Figure 1 - Plant Connection Example 1

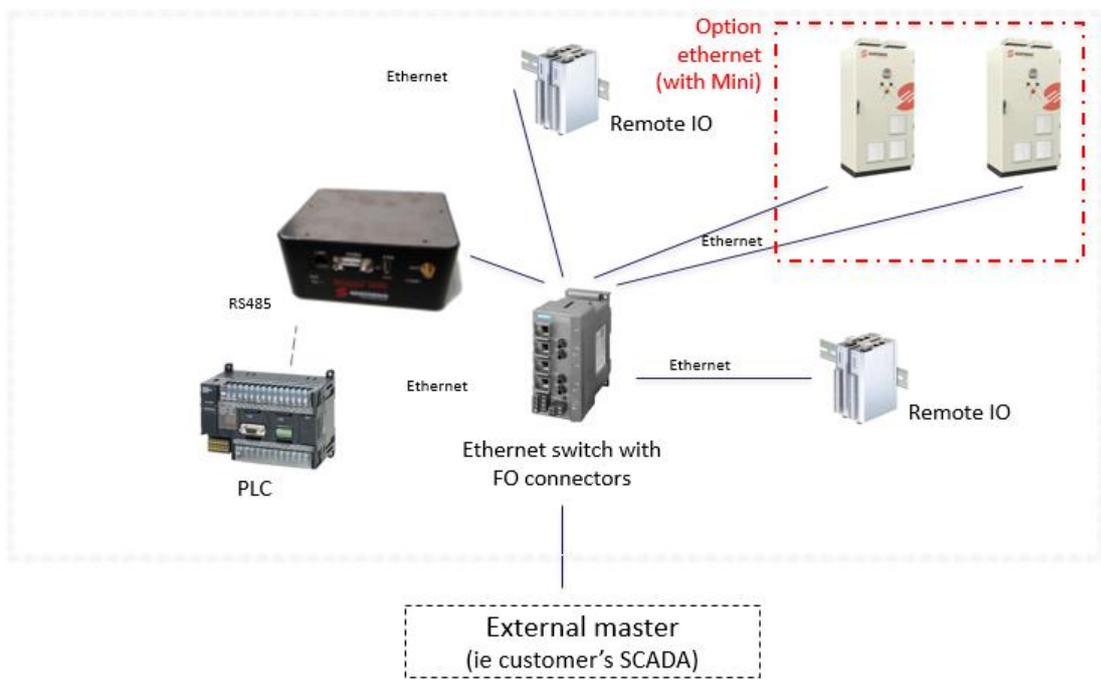


Figure 2 - Plant Connection Example 2

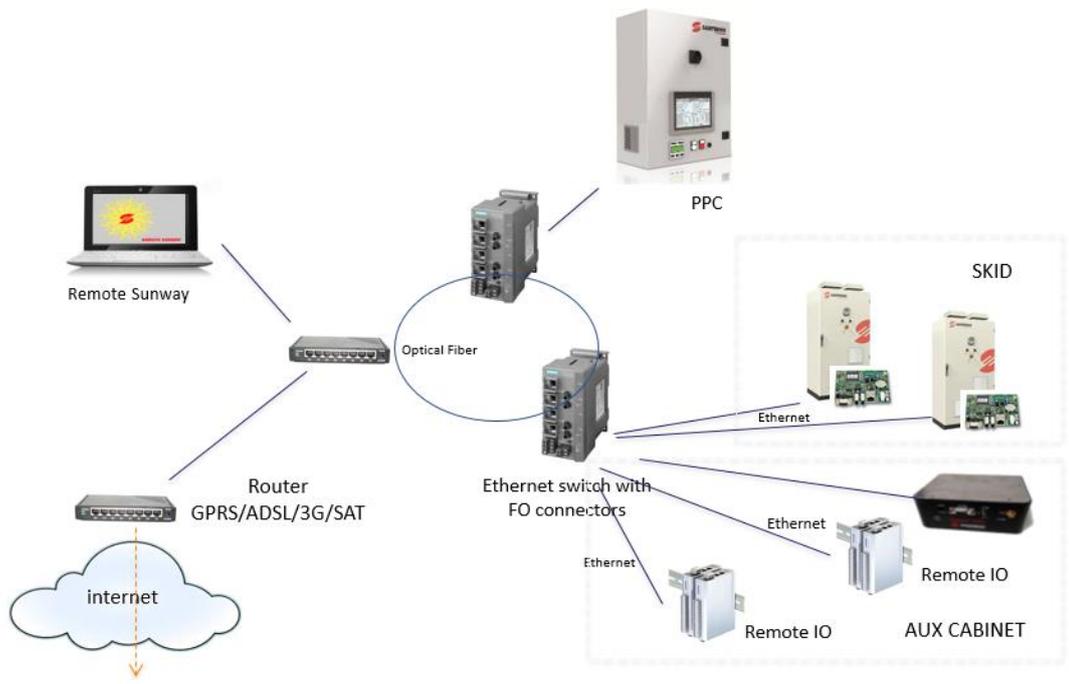


Figure 3 - Plant Connection Example 3

1.1. Product Overview

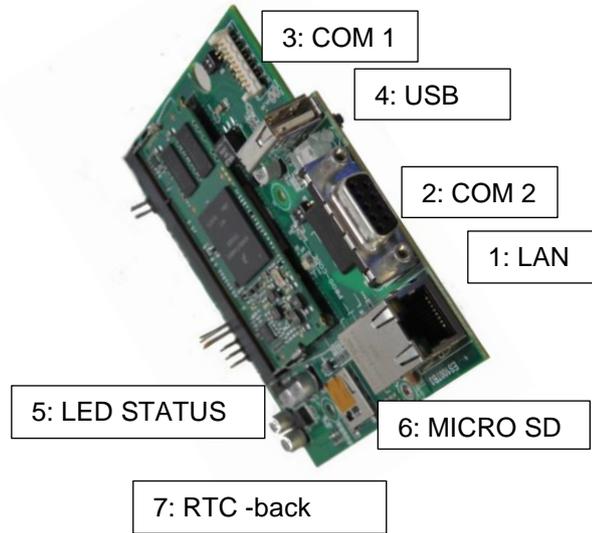


Figure 4 - Bridge Mini Embedded (Top View)

Position		Description
1	LAN	ETHERNET 10/100Base-TX IEEE 803.3 connection
2	COM 2	RS485 optically isolated connection
3	COM 1	RS485 non isolated connection
4	USB	USB 2.0 host interface
5	LED	LED board/communication status
6	Micro SD	Additional Micro SD Flash Memory reader - not implemented yet
7	RTC	Real Time Clock



Figure 5 - Bridge Mini Stand Alone

Position		Description
1	PWR	9 – 36 Vdc power supply
2	LAN	ETHERNET 10/100Base-TX IEEE 803.3 connection
3	COM 2	RS485 optically isolated connection
4	USB	USB 2.0 host interface

1.2. Caution statement

1.2.1. Symbols and levels of warning message in the document

The following levels of messages are used through the document:

	DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury due electric shock.
	WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	NOTE	Indicates a situation which, if not avoided, can result in property damage.
	PROHIBITION	Indicates an operation must not be carried out
	INFORMATIVE	Information that is important for a specific topic or goal, but is not safety-relevant

1.2.2. Intended use

Bridge-Mini is a monitoring equipment designed for data collection and low-voltage connection to inverters, power meters and other equipment.

	PROHIBITION	It is absolutely forbidden to modify the equipment. Any modification, manipulation, or alteration not expressly agreed with the manufacturer, concerning either hardware or software, shall result in the immediate cancellation of the warranty.
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1.2.3. Qualified technical personal

All work on Bridge Mini products must be carried out by skilled technical personnel only.

By skilled personnel it is intended persons who have been suitably trained to carry out the work in question.

2. INSTALLATION

2.1. Bridge Mini Embedded

Product-Accessory compatibility		
Product	Bridge-Mini Embedded	Comments
Sinus Penta	√	
Penta Marine	√	
Iris Blue	√	
Solardrive Plus	√	
Sunway TG BT	√	
Sunway TG TE	√	

Table 1: Bridge-Mini product compatibility

	DANGER	Before gaining access to the components inside the inverter, remove voltage from the inverter and wait at least 20 minutes. Wait for a complete discharge of the internal capacitors to avoid any electric shock hazard.
	CAUTION	Electric shock hazard: do not connect/disconnect the signal terminals or the power terminals when the inverter is on. This also prevents the inverter from being damaged.
	NOTE	All the screws used to fasten removable parts (terminals cover, serial interface connector, cable plates, etc.) are black, round-head, cross-head screws. When wiring the inverter, remove only this type of screws. If different screws or bolts are removed, the inverter warranty will be no longer valid.

Bridge Mini Embedded can be directly installed onto a Santerno inverter.

The board is connected to the inverter control board (either a ES821 or a ES927) via the slot B, through the strip connection and fixed on the dedicated support.

1. Remove voltage from the inverter and wait at least 20 minutes
2. The electronic components in the inverter and the communications board are sensitive to electrostatic discharge.

Be careful when you reach the component parts inside the inverter and when you handle the communications board. The board should be installed in a workstation equipped with proper grounding and provided with an antistatic surface.

If this is not possible, the installer must wear a ground bracelet properly connected to the PE conductor.



3. Remove the cover allowing gaining access to the inverter control terminals. The fixing spacers and the signal connector are located on the right
4. Fit Bridge-Mini Embedded board and make sure that all contacts enter the relevant housing in the signal connector. Fasten the board to the fixing spacers using the screws supplied.
5. Connect the communications cables to the relevant ports based on the type of communications to be established. Set DIP-switches accordingly (see sections below).
6. Close the inverter frame by reassembling the cover, allowing access to the inverter control terminals

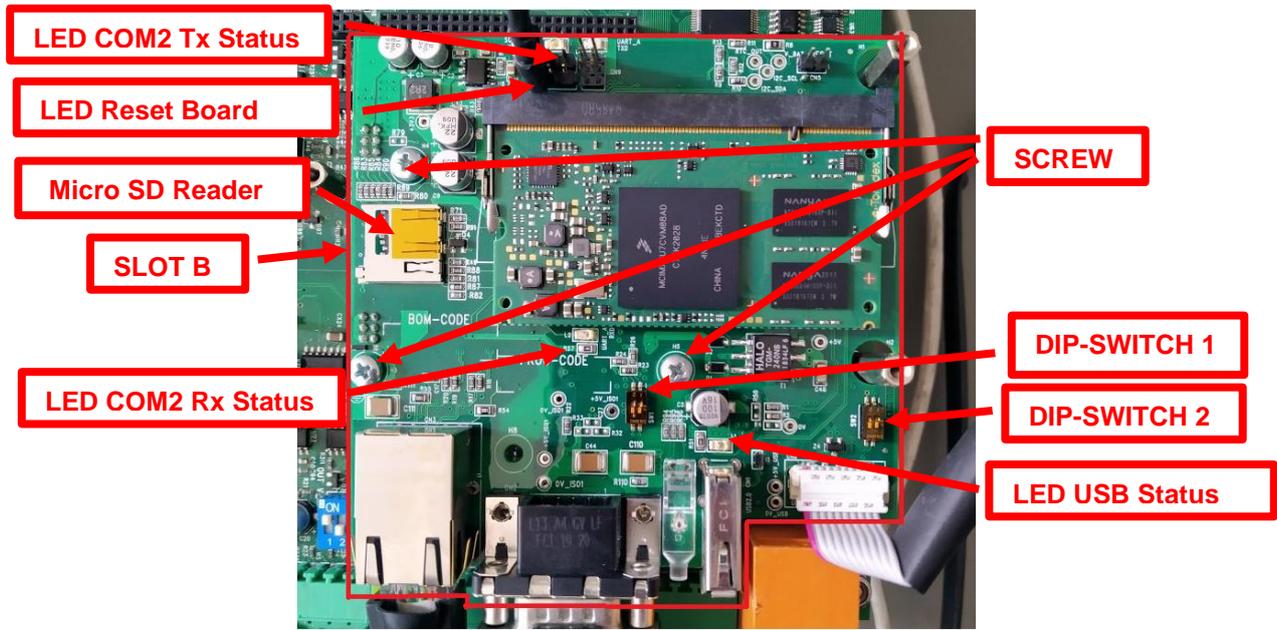


Figure 6 - Embedded Installation (Top view)

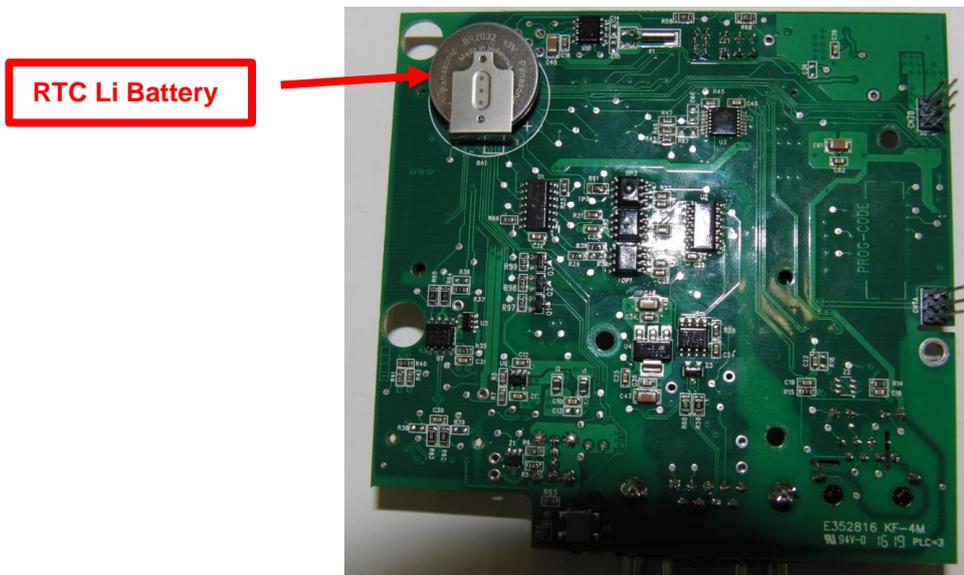


Figure 7 - Embedded installation (Bottom view)

When the data logger is embedded it is located on slot B (ES821 and ES927) of the inverter and is directly powered.



Figure 8 - Connection view 1

2.2. Bridge Mini Stand Alone (DIN-Rail Mounting)

	<p>WARNING</p>	<p>Ensure a proper electrical connection between the mounting rail contact and the mounting rail in order to guarantee sufficient grounding and to avoid electric shock in the event of an error. Observe the properties of the mounting rail.</p>
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Bridge Mini can be inserted on a DIN-Rail, placed on its back, which allows an easy hooking in any position of the cabinet.

To release Bridge Mini, push the tab and release the handle so that it clicks into place.

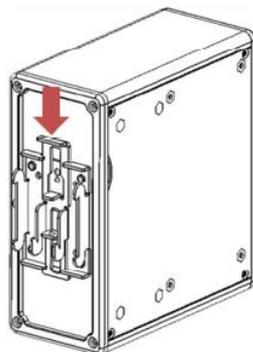


Figure 9 - DIN-rail mounting

3. TECHNICAL DATA

3.1. Nameplate

Bridge-Mini Standalone nameplate indicates the product’s technical data and identification details.

- 1) Name of the product.
- 2) Part number assigned to the product by Enertronica Santerno.
- 3) Technical data (input voltage and current range, rated power, etc.)
- 4) CE marking and indications of the relative reference Standards applied in the construction of the equipment (CE is a registered collective trademark).
- 5) Product revision index.
- 6) Serial Number: identifies the product serial number.

The nameplate measures 100 x 70 mm and it is silver in color. Example of a nameplate on Bridge-Mini Standalone:

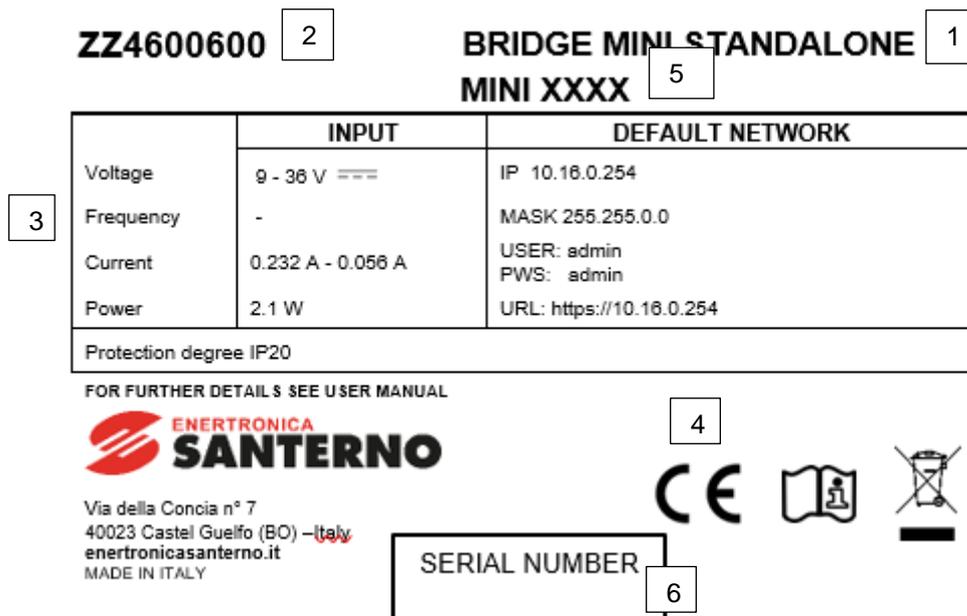


Figure 10 - Nameplate

3.2. Environmental requirement

Operating

Operating ambient temperature	-25 to +55°C ambient temperature (please contact Enertronica Santerno S.p.A. for higher ambient temperatures)
Operating ambient humidity	5 to 95% (non-condensing)
Max. operating altitude	2000 m a.s.l.

	(please contact Enertronica Santerno S.p.A. for installation above 2000 m and up to 4000 m)
Installation site	Indoor
Degree of protection	IP20
Pollution degree	2

Transport and storage

Ambient temperature for storage and transport	-25 to +60°C
Ambient humidity for storage	From 5% – 95%, from 1 g/m ³ – 25 g/m ³ , with no condensation or ice formation
Ambient humidity for transport	Maximum 95% up to 60 g/m ³ . Slight condensation may occur when the equipment is not running
Atmospheric pressure for storage	86 – 106 kPa
Atmospheric pressure for transport	70 – 106 kPa

3.3. Electrical specification

Hardware

CPU	Colibri iMX6DL
DRAM	512 MB
Flash Memory	4 GB

Bridge-Mini Embedded

It is directly connected to the inverter, so it does not need an external power supply.

Bridge-Mini Standalone

Input Voltage Range	9 – 36 Vdc
Max Input Current	0.232 – 0.056 A
Max Input Power	2.1 W

3.4. Dimension and weight

Bridge-Mini Standalone

Dimension W x H x D [mm]	60.6 x 140 x 100
Weight [kg]	0.44

3.5. Connection of power port and signal port

3.5.1. Power supply port

Bridge-Mini Embedded

It is directly connected to the inverter, so it does not need any external power supply cables.

Bridge-Mini Standalone

Cables coming from an external power supply must be connected directly to the PWR connector:

Decisive voltage class A according to EN 61800-5-1

TERMINAL	N. of connectable cable	Rated Insulation Voltage [V]	Max allowable cable cross section [mm ²]	Tightening torque [Nm]
PWR (+,-)	2	300	0.14 – 1.5	0.22 – 0.25

	NOTE	Check the polarity of connection, miswiring could cause damage on Bridge-Mini Standalone.
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3.5.2. Signal port

	CAUTION	Remove voltage from the inverter before wiring Bridge-Mini Embedded board. Take any safety measure required before touching the connectors and handling the Bridge-Mini Embedded board.
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Bridge-Mini is provided with the following serial communications ports:

Port	Description	Terminal Board	Link
COM1 RS485	Slave supervisor connection	ES1007B3 – CN6	DB9 – Male
COM2 RS485	Master supervisor connection	ES1007B3 – CN2	DB9 - Female
LAN	Ethernet connection	ES1007B3 – CN3	RJ45
USB	USB 2.0 connection	ES1007B3 – CN1	USB - Male

3.5.2.1. RS485 (COM1, COM 2)

RS485 links are needed for certain communication options required by Bridge-Mini:

- Direct connection to a computer with a properly wired cable and an RS485/USB converter (MODBUS RTU protocol in slave mode or PPP protocol);
- Direct connection to the multidrop network of the plant's devices (MODBUS RTU in master mode).

The MODBUS-IDA (<http://www.modbus.org>) Association defines the type of connection for MODBUS communications over serial link RS485, used by the drive, as a "2-wire cable". Specifications are:

Type of cable	Shielded cable made up of a balanced pair known as D1/D0 + common conductor.
Recommended cable model	Belden 3106A Paired EIA Industrial RS485 PLTC/CM AWG23 corresponding to 0.258 mm ² . For long lengths it is advisable to use a larger section, up to 0.75 mm ² .
Maximum length	500 meters based on the max. distance measured between two stations.
Characteristic impedance	Greater than 100 Ω (recommended), typically 120 Ω.
Standard colors	Yellow/brown for the D1/D0 pair, grey for the "Common" signal

The typical wiring diagram recommended by the MODBUS-IDA Association for the connection of "2-wire" devices is shown in the following figure.

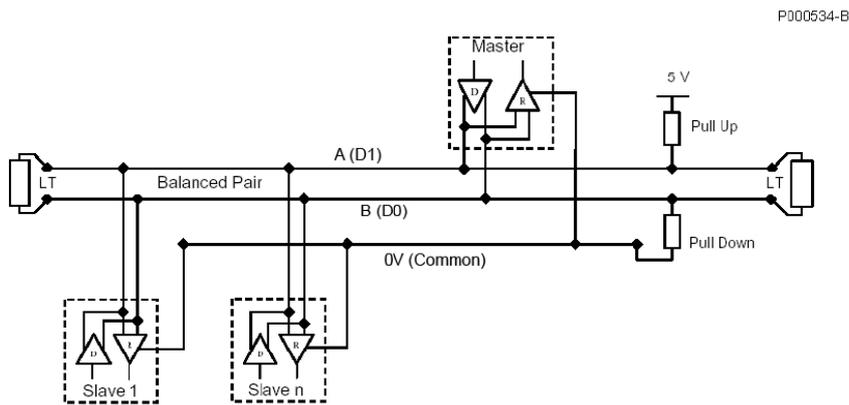


Figure 11 - Recommended wiring diagram for the connection of 2-wire MODBUS devices

The network composed of the termination resistor and the polarization resistors is incorporated into the inverter and can be activated via DIP-switches. The figure above shows the termination network for the devices located at both ends of the network, where the terminator must be installed. For multidrop connections, 1 to 128 devices may be connected.

	NOTE	<p>All the devices connected to the communication multidrop network should be grounded to the same conductor (0V) to minimize any difference of ground potentials between devices that can adversely affect communications.</p>
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Provide a linear wiring (not a star wiring) for multidrop line RS485: the first device in the multidrop connection will have only one outgoing line, while the last device will have only one incoming line. The line terminator is to be installed on the first device and the last device. The line master device (Bridge-Mini) is typically placed at the beginning or at the end of a multidrop connection; in that case, the line terminator of the farthest inverter from the master computer shall be "ON".

	NOT E	Communication does not take place or is adversely affected if multidrop terminators are not properly set up, especially in case of high baud rate. If more than two terminators are fitted, some drivers can enter the protection mode due to thermal overload, thus stopping dialoguing with some of the connected devices.
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RS485 Serial communication ratings:

Baud rate:	Configurable between 1200..115200 bps (default value: 38400 bps)
Data format:	8-bit
Start bit:	1
Parity: ⁽¹⁾	NO, EVEN, ODD (default: NO)
Stop bits:	2,1 (default: 2)
Protocol:	MODBUS RTU
Supported functions:	03h (Read Holding Registers) 10h (Preset Multiple Registers)
Device address:	Configurable between 1 and 247 (default value: 1)
Electric standard:	RS232, RS484

⁽¹⁾ Ignored when receiving communication messages.

COM1, COM2 Configuration and Wiring

Decisive voltage class A according to EN 61800-5-1

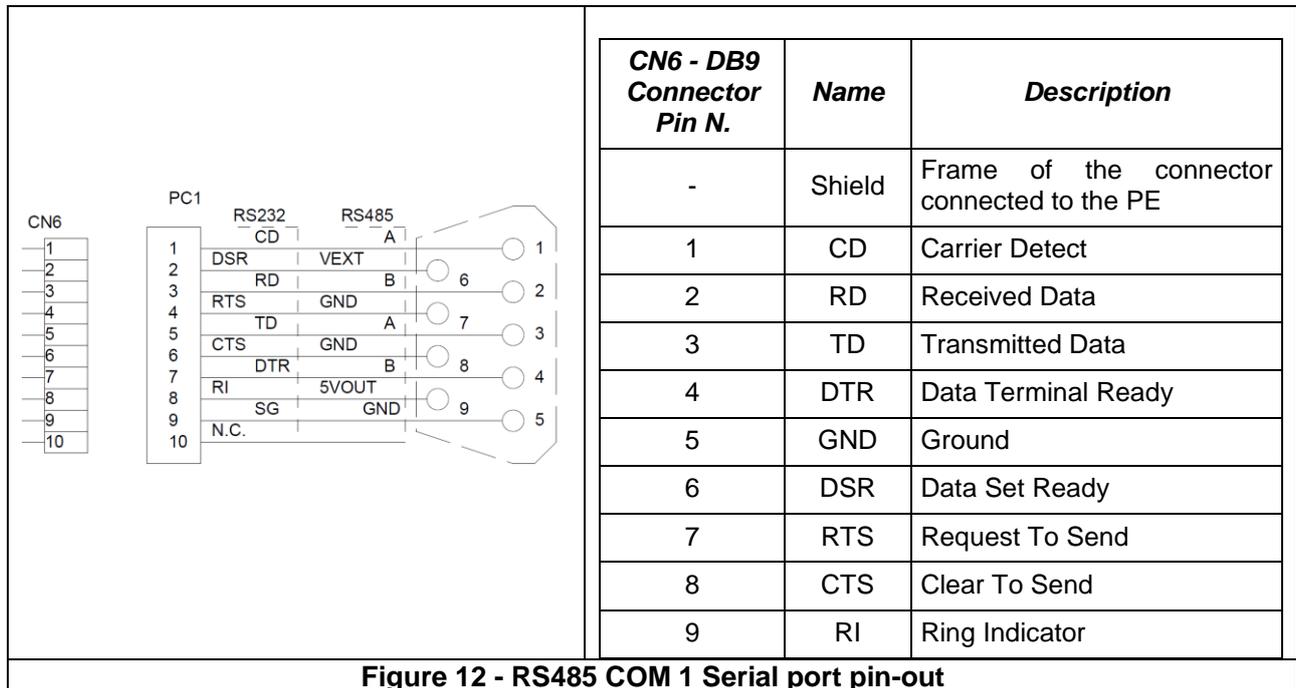


Figure 12 - RS485 COM 1 Serial port pin-out

Decisive voltage class A according to EN 61800-5-1

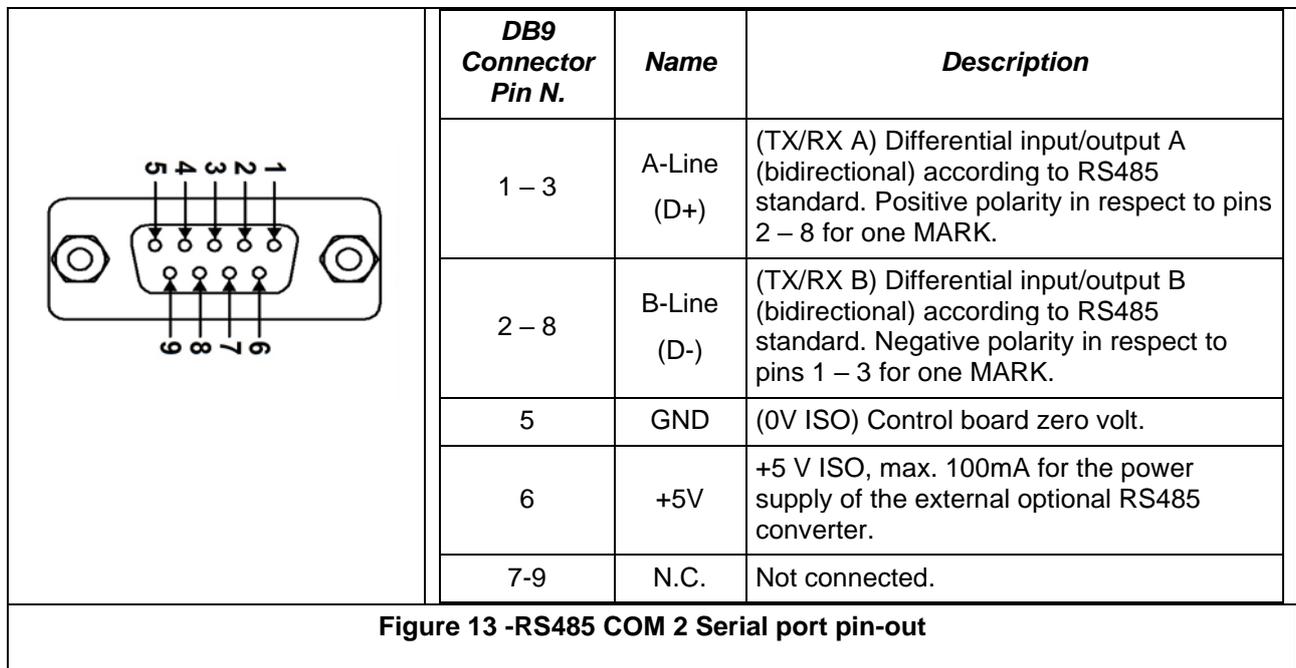
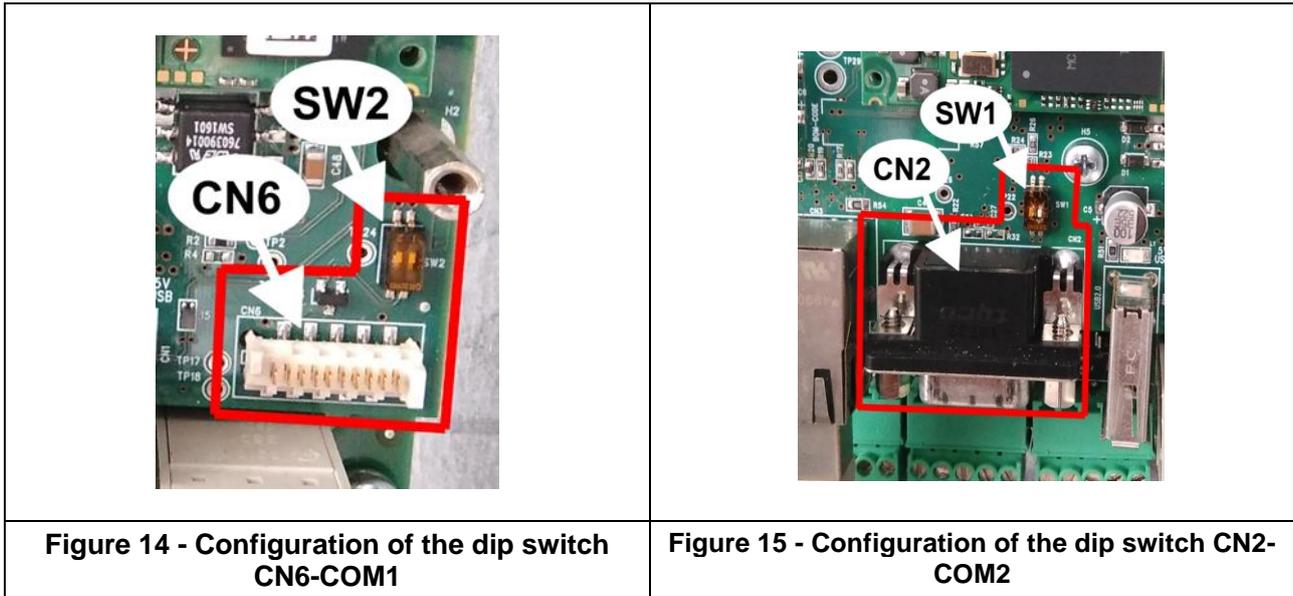


Figure 13 -RS485 COM 2 Serial port pin-out

Terminators and polarizers can be configured for each serial port via dip switches.

- For the COM1, the dip switch SW2 is visible above the CN6 connector
- For the COM2, the dip switch SW1 is visible above the CN2 connector



The dip switches are:

DP switch	Function
1,2 [ON]	Terminator and polarizer active
1,2 [OFF]	Terminator and polarizer not active

	NOTE	Variants of this configuration are not allowed.
	NOTE	When the termination is active, a 120 Ω resistance is inserted between the two signal lines of the RS485 port.
	WARNING	When connect COM 2 to another inverter, other pins than 1/2/5 must not be used and it is not possible to use a complete flat extension cable.

3.5.2.2. Ethernet Port (LAN)

The Ethernet port, or LAN port, is a communication port which may be configured to work with either a static or a dynamic IP address. Integrated web interface is available through this port.

Default configuration is static, with IP 10.16.0.254, netmask 255.255.0.0.

LAN Configuration and Wiring

Bridge Mini is provided with a standard RJ-45 connector (IEEE 802) for Ethernet connection 10/100 (10Base-T, 100Base-T).

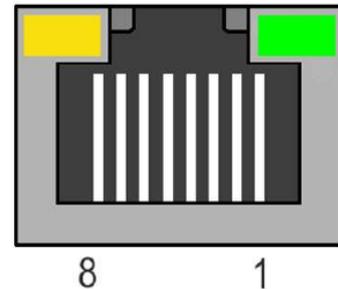
The yellow LED indicates the Link/Operation with 10Mbps baud rate, whereas the green LED indicates the

Link/Operation with 100Mbps baud rate.

Pins are arranged as follows (same layout as in network boards used for personal computers):

Decisive voltage class A according to EN 61800-5-1

N.	Name	Description
1	TD+	Positive signal transmission line
2	TD-	Negative signal transmission line
3	RD+	Line receiving positive signals
4	Term	Terminated pair – not used
5	Term	Terminated pair – not used
6	RD-	Line receiving negative signals
7	Term	Terminated pair – not used
8	Term	Terminated pair – not used



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Bridge Mini can be connected, through Ethernet interface, to an Ethernet control device with a master (PC) in one of the following ways:

- Through a LAN (Ethernet business network);
- Through a router (e.g. ISDN, ADSL, GPRS)
- Through a direct point-to-point connection.

	NOTE	The link to a router is available only if you purchased the LINK service for the connection to the Internet.
	NOTE	The Ethernet interface board cannot be connected to old LANs using Thin Ethernet (10base2) coaxial cables. Connection to this type of LANs is possible using a Hub provided with both Thin Ethernet (10base2) connectors and 100Base-T or 10Base-T connectors. The LAN topology is a star one, with each node connected to the Hub or the Switch through its cable.

If you purchased the LINK service for the connection to the Internet, the Internet connection through a LAN is obtained by connecting Bridge Mini to the LAN using a standard Straight-Through Cable TIA/EIA-568-B of class 5 UTP (Patch cable for LAN), as shown in Figure 5.

In that case, the plant can be accessed from any remote computer that can be connected to the Internet.

P000518-B

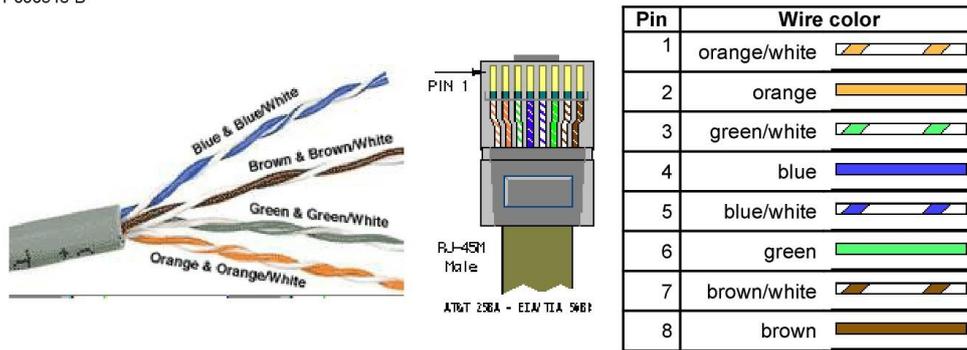


Figure 16 - Cable of Cat. 5 for Ethernet and standard color arrangement in the connector

If you did not purchase the option for the connection to the Internet (LINK service), Bridge Mini can be connected to the LAN so that Bridge Mini and the plant can be detected from the LAN ONLY, once the DataLogger parameters have been programmed accordingly.

Connection through a router

If you purchased the connection to the Internet, the Internet connection through a router is obtained by connecting Bridge Mini to the router using the cable supplied.

Point-to-point connection

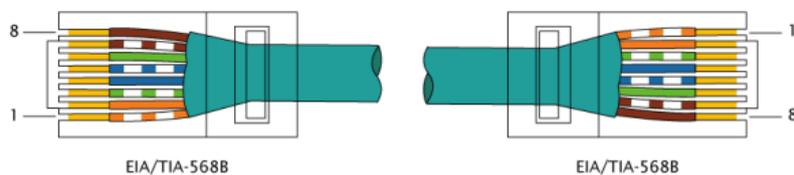
Special software programming is required for the point-to-point connection.

Direct point-to-point connection is obtained with a Cross-Over Cable TIA/EIA-568-B, cat. 5.

This type of cable performs a cross-over of the pairs so that the TD+/TD- pair corresponds to the RD+/RD- pair, and vice versa.

The table below shows the colour matching on the connector pins for the Cross-Over Cable and the cross-over diagram of the two pairs used from 100Base-T or 10Base-T connection.

- EIA/TIA 568 standard patch cable, UTP/STP type, cat. 5 P000689-B



- EIA/TIA 568 cross-over cable, UTP/STP type, cat. 5

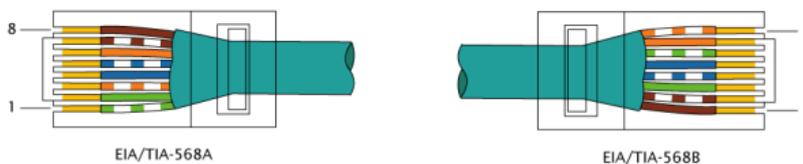


Figure 17 - Standard Eth Connector.

	<p>NOTE</p>	<p>The inverter is typically installed with other electric/electronic devices inside a cubicle. Normally, the electromagnetic pollution inside the cubicle is remarkable and is due to both radiofrequency disturbance caused by the inverters and to bursts caused by the electromechanical devices. To avoid propagating disturbance to Ethernet cables, they must be segregated and kept as far as possible from the other power cables and signal cables in the cubicle.</p> <p>Disturbance propagation to Ethernet cables may affect the correct operation of the inverter and the other devices (computers, PLCs, Switches, Routers) connected to the same LAN.</p>
	<p>NOTE</p>	<p>The maximum length of the LAN cable, cat. 5 UTP allowed by IEEE 802 standards results from the max. transit time allowed from the protocol and is equal to 100m.</p> <p>The longer the cable length, the higher the risk of communications failure.</p>
	<p>NOTE</p>	<p>For Ethernet wiring, only use cables certified for LAN cables of 5 UTP category or higher. For standard wiring, avoid creating your own cables; Straight-Through or Cross-Over cables should be purchased from an authorised dealer.</p>

	<p>CAUTION</p>	<p>Remove voltage from the drive before wiring Bridge-Mini board.</p> <p>Take any safety measure required before touching the connectors and handling the Bridge-Mini board.</p>
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Remove the cover and access to the control board of the drive.

Insert the male connector to the female RJ45 connector located on ES851. Press until the tab snaps.

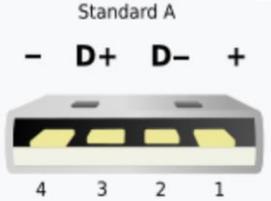
3.5.2.3. USB 2.0 Port (USB)

The drivers currently pre-installed are “Prolific” and “FTDI”.
The USB 2.0 port has two main purposes:

- download data: to download data on the USB
- service: the USB port allows performing application updates; this functionality is allowed to authorized Service personnel only.

	<p>NOTE</p>	<p>The maximum length of the USB cable allowed is equal to 3 m.</p> <p>The longer the cable length, the higher the risk of communications failure.</p>
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Decisive voltage class A according to EN 61800-5-1

	CN1 Connector Pin N.	Name	Description
	1	+	+ 5 V
	2	D-	Negative signal data line
	3	D+	Positive signal data line
	4	-	0 V

3.5.2.4. Micro SD Reader

Not yet implemented.

3.5.2.5. RTC Real Time Clock

The Real Time Clock (RTC) option board is provided with a clock, indicating date and time, working even when the inverter is not powered. The inverter firmware may use date and time to manage different timed events. Time zone and System clock can be set from the Bridge Mini browser page.

To prevent data loss there is a Li 3V 190 mA buffer battery.

4. BENEFITS

4.1. Datalogging

The main feature implemented by the Bridge Mini is the device logging.

Once configured, the datalogger will cyclically read from every logged device. Log records are regularly saved to file, by default every 5 (five) minutes.

The log files are rotated and compressed daily: this means that a new log file is created every day, whilst the log file relating to the day before is saved in zip format.

The available logging space is enough for a time span of several months, depending on the number of devices that are logged at the same time. When the logging space is running out, Bridge Mini deletes the oldest files. In order to avoid losing any data, it is recommended to periodically download the logs to a different safe place.

4.2. Data concentrator

Bridge Mini is also a data concentrator: this means that any data item is stored in an internal cache until it is replaced by a new data item. This operating mode is devised for integrated systems with external SCADAs, that can perform high frequency queries: the cache values are returned to the SCADAs, avoiding the need to perform queries to the devices, in order to ensure the maximum throughput and the minimum latency for the external queries. The protocol to be used for this service is the Modbus TCP/IP, using the proper commands for a query to a device. Please refer to the Data Refresh Rate and External Queries section for further details.

4.3. Data proxying

Once the devices to be logged have been configured on Bridge Mini, this will act as a Modbus “router”, propagating read and write instances to the physical devices.

This service also enables local or remote changes to all the parameters of all the devices configured on Bridge Mini.

4.4. Download dei log

The datalogger is also a standard FTP server. The user and password to enter are “logreader”; you can use a popular FTP client (e.g. Filezilla) to easily download the stored logs.

4.5. Inverter Firmware Upgrade

The inverter firmware upgrade in local and/or remote mode is allowed only to Santerno personnel.

Each case is different and separate and we evaluate the feasibility of the upgrade on case-by-case base.

5. DATALOGGER CONFIGURATION: WEB INTERFACE

Data display and datalogger configurations are made available by a safe and handy web interface.

5.1. Login

The web interface allows configuring the datalogger and viewing its contents. A browser is all that is needed to carry out any operation.

Please follow this procedure to access the web interface the first time:

- 1) configure your PC with a static IP, compatible with the network, for example 10.16.0.10 with netmask 255.255.0.0 and connect it with an ethernet cable to the Bridge Mini LAN port.
- 2) Launch a browser, for example Firefox, and enter “https://10.16.0.254” in the address bar, press “Enter”, ignore the self-signed certificate warning and press “Enter” again.

The following mask appears:

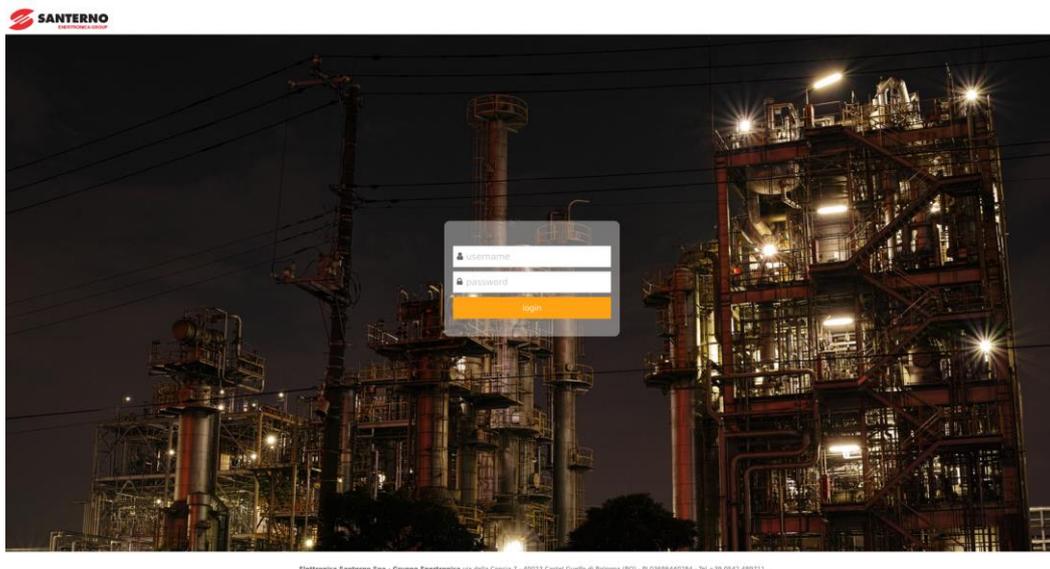


Figure 18 - Login Page

- 3) Enter “user” as the username and “user” as the password to log in.

5.2. Home

In this page all the useful information of the logged devices is shown.

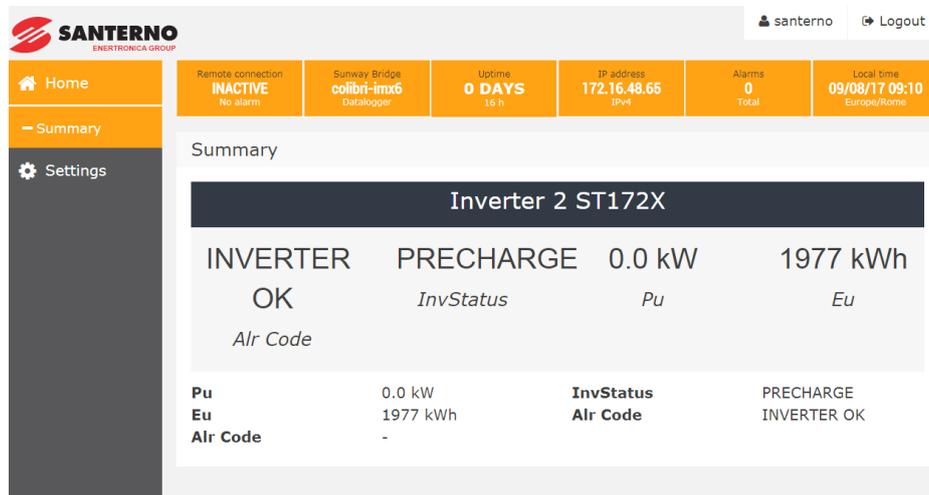


Figure 19 - Home page Bridge Mini

5.3. Settings

Bridge Mini settings contain several pages:

- a) Devices
- b) Measurements
- c) Time
- d) Network
- e) Serial Ports
- f) Profiles
- g) Logging

5.3.1 Devices

This page shows the list of configured devices and lets the user adding or removing them. For each device Virtual ID, Modbus ID, connection protocols, Endpoint, Model, and Storage appropriate parameters should be set.

The picture below gives an example.

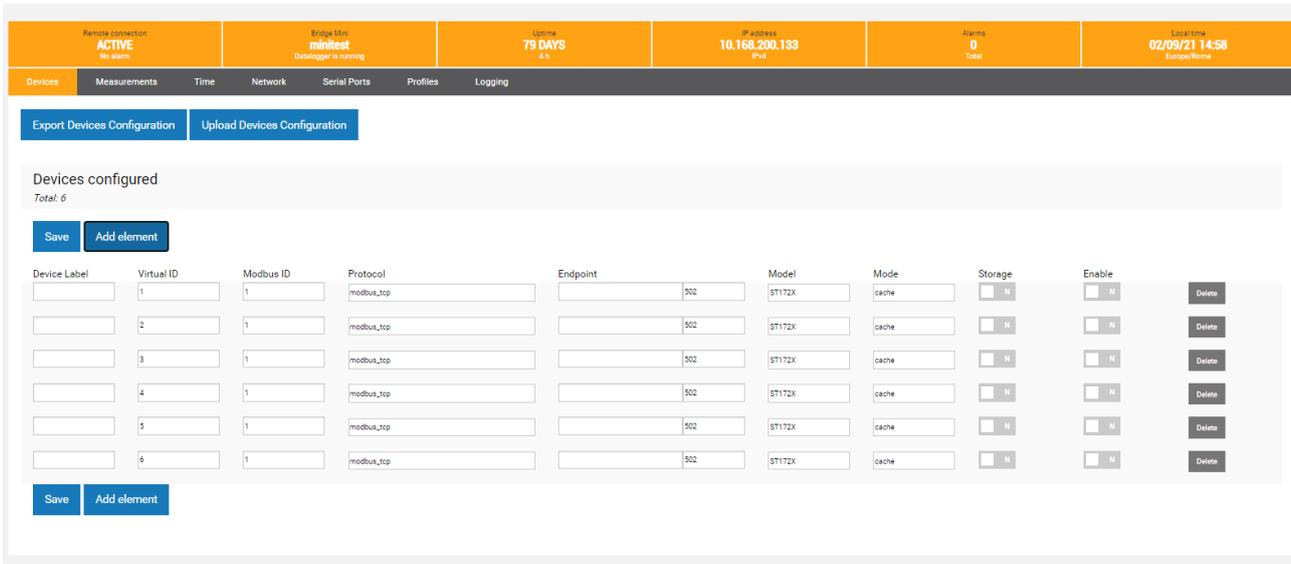


Figure 20 - Device Page

Device Label: It is possible to add the name of the logged device, for example: INV 23, QF105X.

Virtual ID: since the data logger is a data concentrator, the virtual ID corresponds to the “logical” ID Modbus that uniquely identify any device configured in the data logger. This ID is the ID an external Modbus client must use to communicate with the device

Modbus ID: the physical Modbus ID of the device

Protocol: In this list it’s possible to choose between three options:

Modbus rtu: In order to use this protocol, please fill in the serial port details in the appropriate page.

Modbus tcp: It’s similar to the rtu protocol but it uses Ethernet and transmits with TCP / IP, so the device IP address is needed

Modbus Santerno: This is a proprietary communication protocol and should not be used for monitoring purposes

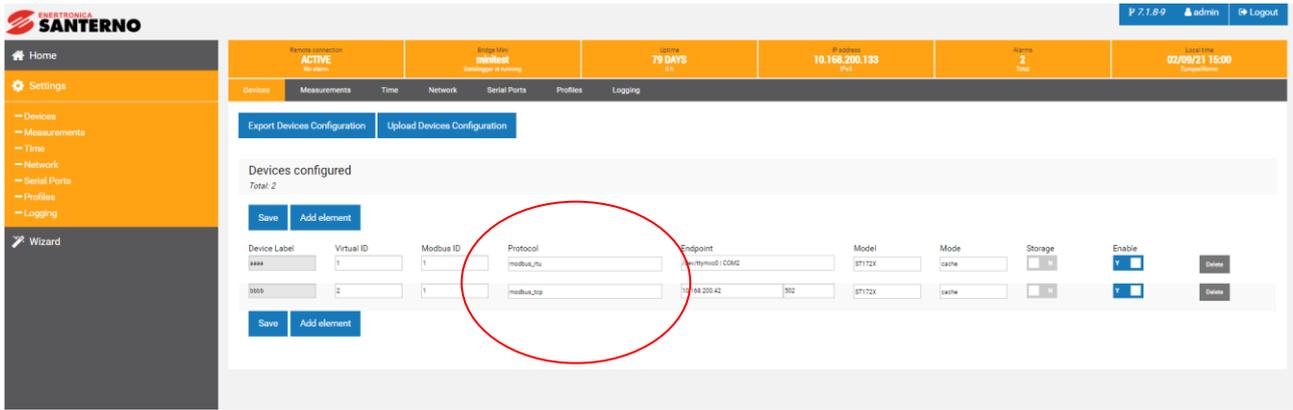


Figure 21 - Device Configuration

Endpoint: In this space it's possible to insert the serial port (defined in serial ports) or define an IP and a TCP port. To select the right serial port, please use:

- /dev/ttyxc0, COM2, that is the serial port with DB9 connector
- /dev/ttyxc1, COM1, that is the serial port with the flat serial cable
- /dev/ttyxc2, COM 3, the serial port used by Bridge Mini Embedded to communicate with the inverter it's mounted onto

Model: Device profile, which contains all the variables that can be logged

Mode: It is possible to choose between: Gateway and Cache.

If gateway is selected all the incoming requests will be routed to the target devices, synchronously, and returned to the client. With cache mode, Bridge Mini will return the last valid data available in its memory.

Storage: For each component it is possible to historicize the data logged by the device.

Enable: Enable or disable the device logging and external request management.

5.3.2 Measurements

When all the devices are defined, this page allows to select the measurements to be acquired. In each device there may be Alarm, Logs and Warnings categories. By selecting a measure, its panel changes color, going from gray (non-logged measurement) to green or red. On the top-right page it's possible to add all measurements, deselect all and enter a refresh time to all of them.

Measurements

Save

Inverter 2 : 2
selected measures: 5

[Select All](#)
[Deselect All](#)
[Set refresh time](#)

alarms

M090

Alr Code

logs

M130 <input style="width: 20px;" type="text" value="60"/>	M089 <input style="width: 20px;" type="text" value="2"/>	M000 <input style="width: 20px;" type="text" value="60"/>	M001 <input style="width: 20px;" type="text" value="60"/>	M002 <input style="width: 20px;" type="text" value="60"/>	M003 <input style="width: 20px;" type="text" value="2"/>
der_status	InvStatus	Vf_Ref R	Freq	Cosfi	Pu
M004 <input style="width: 20px;" type="text" value="60"/>	M006 <input style="width: 20px;" type="text" value="60"/>	M007 <input style="width: 20px;" type="text" value="60"/>	M009 <input style="width: 20px;" type="text" value="60"/>	M010 <input style="width: 20px;" type="text" value="60"/>	M011 <input style="width: 20px;" type="text" value="60"/>
Qu	Vi	Vu	Iu	Vdc	Idc
M012 <input style="width: 20px;" type="text" value="60"/>	M013 <input style="width: 20px;" type="text" value="2"/>	M015 <input style="width: 20px;" type="text" value="60"/>	M090 <input style="width: 20px;" type="text" value="2"/>	M097 <input style="width: 20px;" type="text" value="60"/>	M098 <input style="width: 20px;" type="text" value="60"/>
Pdc	Eu	En2	Alr Code	LimitT.	OT.
M099 <input style="width: 20px;" type="text" value="60"/>	M008 <input style="width: 20px;" type="text" value="60"/>	M021 <input style="width: 20px;" type="text" value="60"/>	M022 <input style="width: 20px;" type="text" value="60"/>	M023esa <input style="width: 20px;" type="text" value="60"/>	M023esb <input style="width: 20px;" type="text" value="60"/>
ST.	Iinv	wng_system	wng_system	Id	Iq

Figure 22 - Measurements Configuration

5.3.3 Time Zone

Here it's possible to set the correct Time Zone where the system is located. NTP is used to synchronize the internal clock with Santerno cloud. The user may specify other NTP servers.

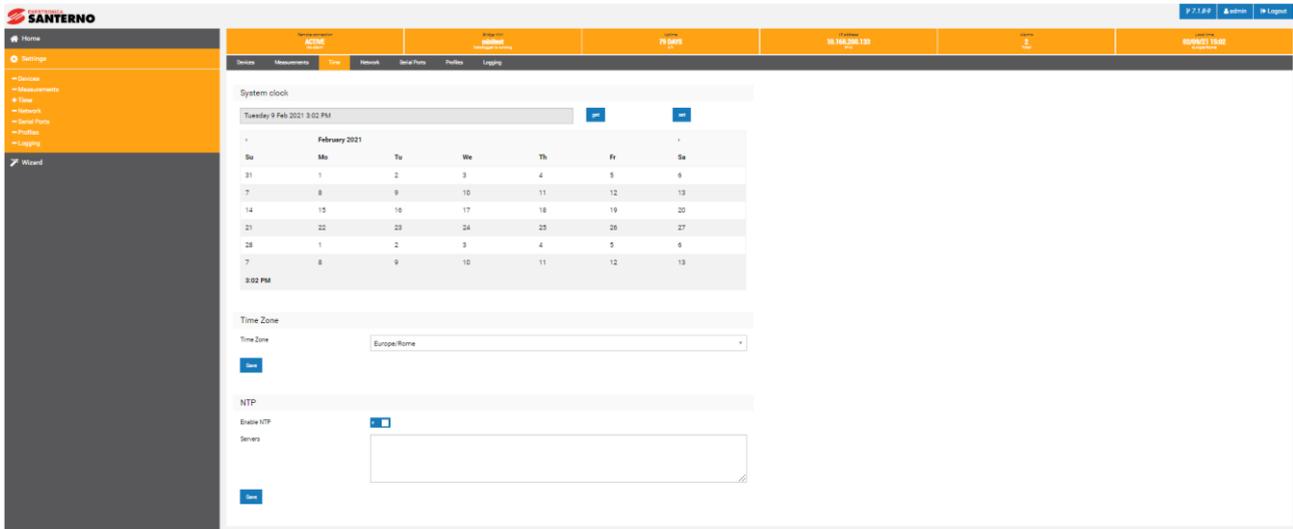


Figure 23 - Time Zone Configuration

5.3.4 Network

The user can change the ethernet port and the DNS settings in the network configuration page. With DHCP mode, Bridge Mini will try to get the network configuration automatically from a local DHCP server. To ensure the right functionality, this server must provide the local gateway and DNS as well. With static mode, all the fields must be filled in manually.

Please, make sure to have a continuous Internet connection available to guarantee a constant time alignment with Santerno cloud; this ensures maximum accuracy in log records.

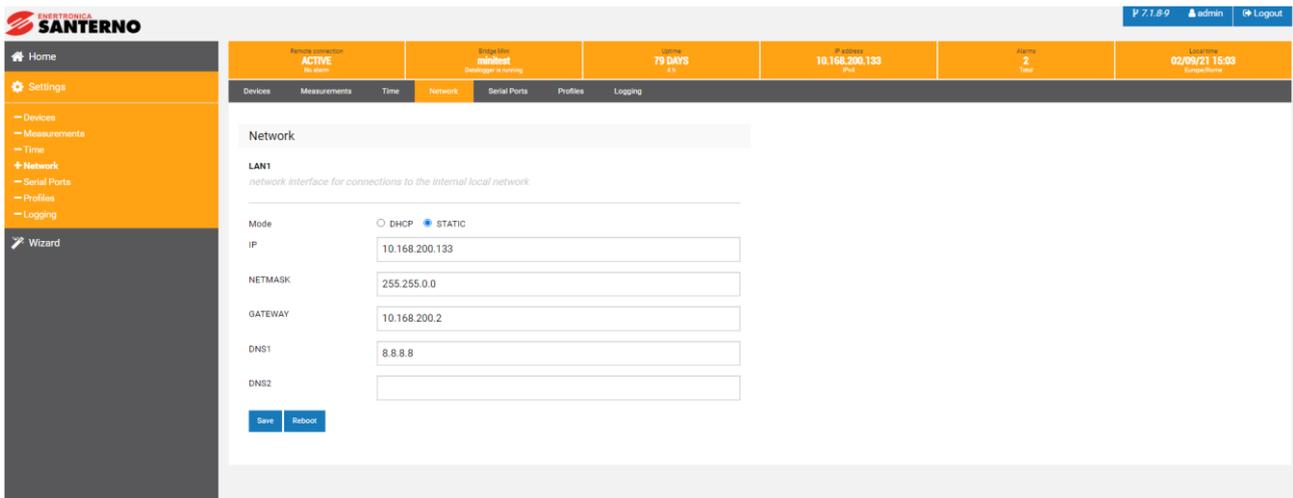


Figure 24 - Networking Page

The default configuration for the Ethernet port is IP 10.16.0.254 and netmask 255.255.0.0.

5.3.5 Serial Ports

In this page it is possible to configure the serial port communication details.

The "Master" flag must be enabled for all the ports the Bridge may use to acquire data via Modbus RTU protocol.

You may use:

- /dev/ttyS0, COM2, that is the serial port with DB9 connector
- /dev/ttyS1, COM1, that is the serial port with the fault serial cable
- /dev/ttyS2, COM3, the serial port used by Bridge Mini Embedded to communicate with the inverter it's mounted onto

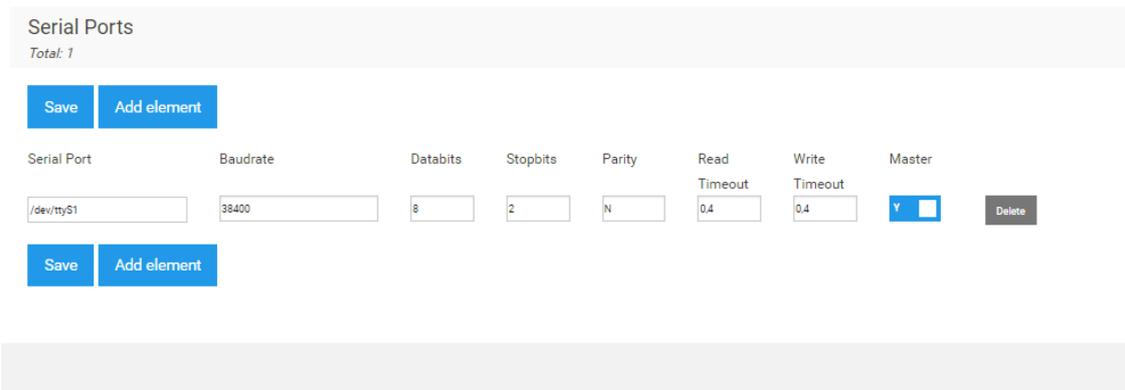


Figure 25 - Serial Ports configuration

5.3.6 Logging

In this page it is possible to set the recording time of the data inside the data logger. This logging will then be visible in the download file.

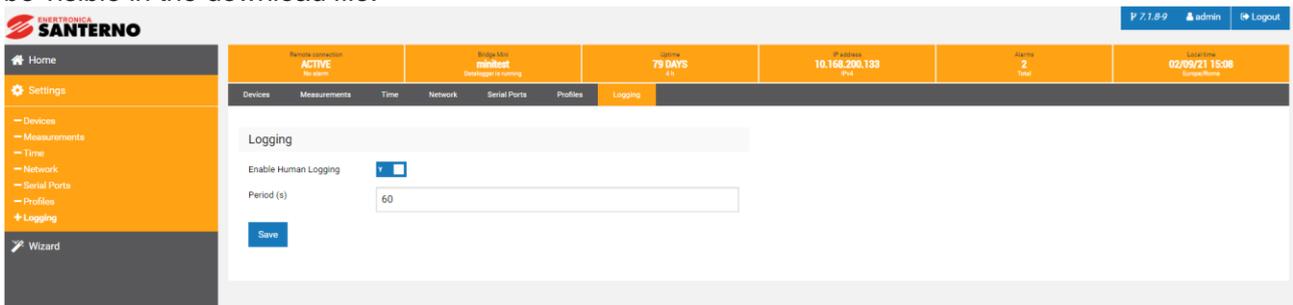


Figure 26 - Setting Loggind period

5.4 Alarms

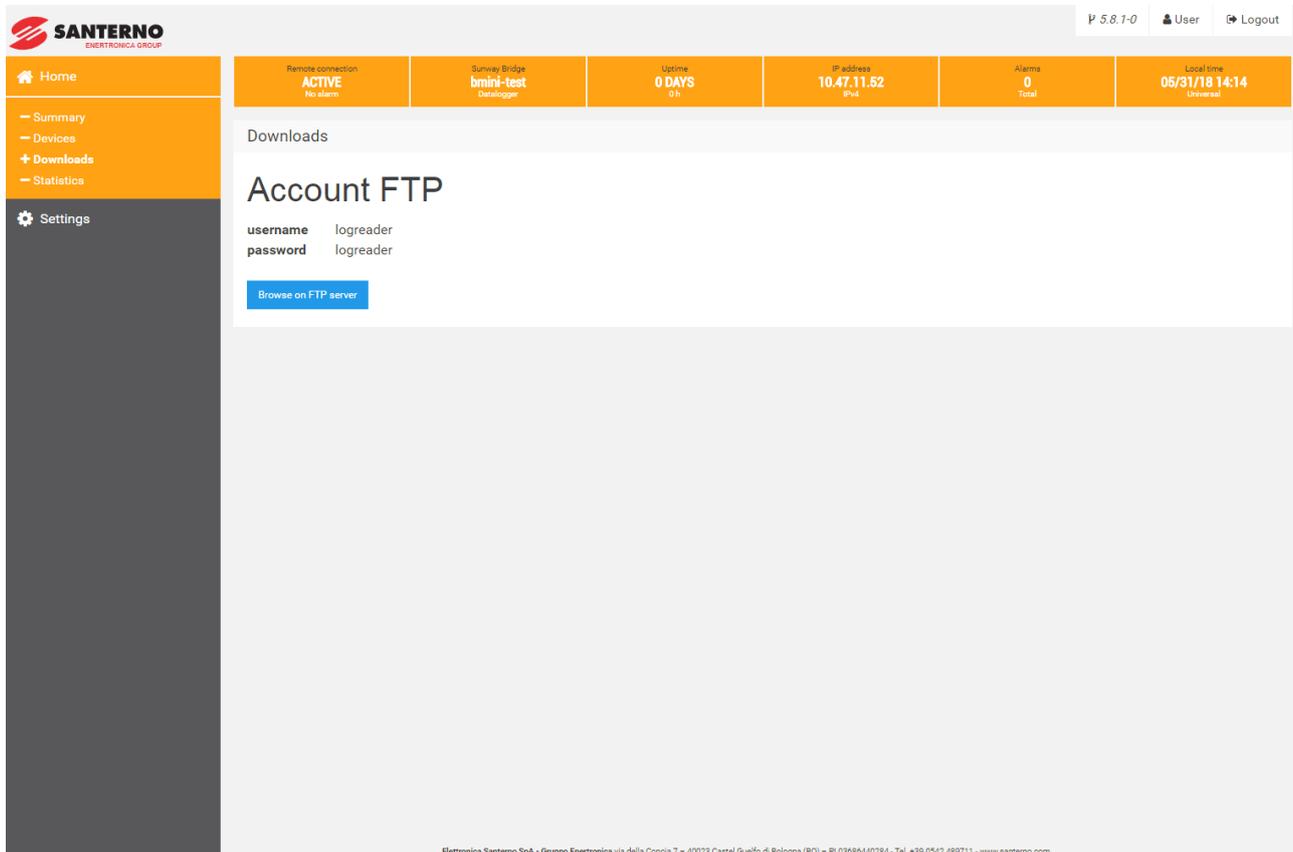
This page summarizes the events currently active on the logged devices. Each active alarm will be described on this page in order to allow a fast intervention.

It is also reported if the inverters are offline or have anomalies.

5.5 Downloads

This page shows the link to the FTP site provided by the Bridge Mini: just click the Downloads menu to be redirected to the logs, that can be downloaded from the browser as well.

An external client is recommended for quicker download (for example FileZilla).



The screenshot shows the Santerno Bridge Mini web interface. At the top, there is a navigation bar with 'Home', 'Downloads', and 'Settings' options. The main content area is titled 'Downloads' and features an 'Account FTP' section. This section includes two input fields: 'username' and 'password', both containing the text 'logreader'. Below these fields is a blue button labeled 'Browse on FTP server'. The interface also includes a top status bar with '5.0.1-0', 'User', and 'Logout' options, and a bottom footer with contact information for Elettronica Santerno SpA.

Figure 27 - Download Page

5.6 Statistic

In this sub-menu there is the statistical summary of all the Bridge read and write communications.

5.7 Connection to internet

Connect the data logger to the Internet through a local area network. Use standard Ethernet cable and connect it to the Ethernet RJ-45 port marked LAN (Eth) on the front of the data logger. The data logger can connect through any switch or router in the network.

The LED can be used for detecting network link and network traffic:

- LED = GREEN = Link
- LED = GREEN BLINK = Traffic
- LED = OFF = No network link

If no activity is seen on the LEDs, double-check all connections.

Santerno does not provide Internet service or the cables required to connect the data logger to the Internet.

6. REMOTE MONITORING

6.1. Santerno.io

santerno.io is an IoTplatform that allows to monitor in real time all the data in the plant.

The monitoring is continuous and granular, with a system of personalized alarms and dedicated dashboard.

The portal makes use of the concepts of Industry 4.0, for instance smart production and smart services, and thus creating more performing systems. Santerno,.io is designed to monitoring and control all types of plants: industrial, fotovoltaic, HVAC, water management and electric recharger. A system diagram constantly photographs the situation of the components, each variation corresponds to a color and a code that describes the situation in real time.

Log in <https://santerno.io/> and enter with your own and secure username and password.



Figure 28 - Home Page Santerno.io

6.2. Mobile App

For practical and functional monitoring from a mobile, the santerno.io app was released both for iOS and Android devices. Access to the portal can therefore take place directly from the application.

To download the app, access the store on your smartphone and search for the app "santerno.io" by Enertronica Santerno S.p.A..

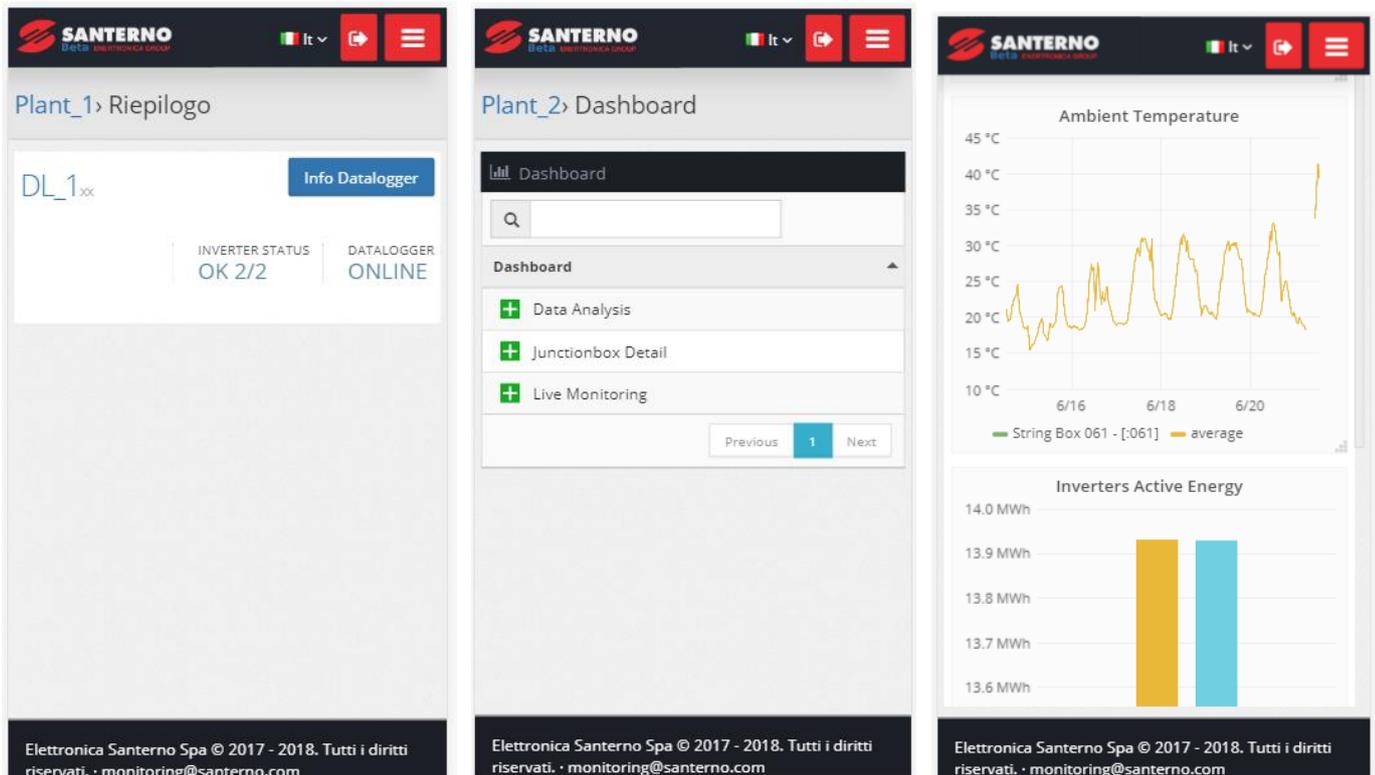


Figure 29 - App

7. SERVICES

7.1. Prerequisites for Remote Communications

In order to guarantee a correct connectivity to the Santerno Cloud, the following rules must be used:

- Minimum bandwidth must be 64 kbit/s, that is the GPRS bandwidth. However, if possible, Santerno suggests adopting a > 200 kbit/s bandwidth to ensure a smooth data sending and remote assistance. Any internet connection can be used: GPRS, 3G-4G, ADSL, Fiber Optic, SAT, Wimax.
- Under 200 Kbit / s it is not possible to carry out remote assistance.
- Bridge Mini makes use of outgoing TCP/UDP connections only, towards public networks 217.19.155.64/28 and 185.96.206.128/27, so in case firewall rules must be updated accordingly.
- DNS and NTP protocols must not be filtered (since public servers may be used).
- In case a private DNS is configured, names resolving in private network must be allowed (ie networks 192.168.0.0/16, 172.16.0.0/12 and 10.0.0.0/8).
- Proxy connections are not supported.

Using private network 10.0.0.0/8, even if used with smaller net masks, is forbidden in order to avoid conflicts with the remote networks used by Santerno remote monitoring services.

Failure to do so will affect the full functionality of the device. Please contact Enertronica Santerno if using private network 10.0.0.0/8 is required.

7.2. Remote Connection Security

The datalogger is a client, so no input port is required on the plant, thus ensuring maximum safety.

The physical login is protected by the SSH protocol. The access privileges are granted to Santerno Engineering staff only.

Every communication instance begins an SSL session with bidirectional certificate authentication and renegotiates a 128-bit BF-CBC key every hour; SHA1 is the hash used for every HMAC authentication.

Forwarding between Ethernet interfaces is disabled to ensure that Santerno personnel is forbidden to access the customer's LAN.

The maximum safety level, especially for corporate LANs, is obtained if the datalogger is part of a DMZ.

7.3. Data Refresh Rate and External Queries

Santerno recommends that the following setup should be used to integrate external SCADAs (or any other master):

- Limit to up to 3 (three) concurrent connections, each of which with min 1s timeout.
- Wait several seconds before sending a new request for the same datum: the Bridge keeps in its cache every datum it reads (typically for approx. 60 seconds); therefore, each request sent in that range will return the same value.
- Preferably send requests with few Modbus registers (up to four), even for contiguous addresses. This is particularly effective for devices connected to the Bridge through serial wires, where a single error invalidates the entire frame (the shorter, the better).
- Avoid having Remote Sunway clients always connected with auto-refreshing measures, since they are always served before any other request.

Any modifications to the settings above can be evaluated depending on the application. In any case, Santerno will make the final decision and will not guarantee the overall functionalities if the recommended setup is not respected.

8. TROUBLESHOOTING

8.1. Connection Test

- a) Verify the datalogger is connected to power and the data logger's LED = GREEN.
- b) Verify that the datalogger has a network link, by checking that the Eth LED on the data logger is green. If there is no network link then test the Ethernet (Cat-5 or better) cable with an appropriate data cable tester and verify the router, switch, or hub is operational.
- c) Verify that you have a working Internet connection. This can be tested with a laptop by unplugging the Ethernet cable from Eth port and connecting it to the laptop. Test to see if the laptop can connect to the Internet using the dynamic or static TCP/IP configuration for this network.
- d) If all of the previous steps are correct restart the data logger by removing and then supplying power to the data logger.
- e) If all of the previous steps do not solve this issue, contact Santerno Technical Support.

8.2. Devices Offline

- a) If the devices are correctly configured they will be green on the "Home page".
- b) Make sure that the inverter you do not see is correctly settled in the Routing table. (list of devices, check on page 25)

- c) Check the real serial configuration on the devices.
- d) Check the serial configurations configured on the "Serial Ports" page on Mini. (check on page 26)

9. ANNEX

9.1. Purchase codes

<i>Purchase code</i>	<i>Component</i>
ZZR1007A0	Bridge Mini Embedded
ZZ4600600	Bridge Mini Standalone



SANTERNO
ENERTRONICA GROUP



Elettronica Santerno Spa - Enertronica Group
P.I. 03686440284
Via della Concia 7 - 40023 Castel Guelfo - Italy



(+39) 0542 489711



info@santerno.com

www.santerno.com