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# SINUS PENTA KEYPAD CONNECTED TO NETWORK RS485

## USERS MANUAL

Upd. 08/06/04  
R. 00

*English*

- 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.
- Elettronica 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 the Engineering Department of Elettronica Santerno.
- Elettronica Santerno assumes no responsibility for the consequences resulting by the use of non original spare-parts.
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## GENERAL FEATURES

The keypad remoting kit is used to connect a standard SINUS PENTA keypad to one or multiple inverters manufactured by Elettronica Santerno via an RS485 link using protocol MODBUS RTU. The keypad can then communicate with one device at a time and will become the network master, thus avoiding communicating with any other master devices (e.g. PLCs).

The keypad automatically detects which device it is connected to. If multiple devices are connected, you can select the device to be used from a selection list.



NOTE

The devices connected to the same network must have different addresses, otherwise no communication is possible.



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## **1 KIT COMPONENT PARTS**

The kit covered in this manual includes the following component parts:

N.1 Interface converter provided with 1 plug RJ45 on one side, and with a 9-pole, female sub-d connector on the other side.

N.1 220 VAC – 9 VAC feeder for standard SINUS PENTA keypad

### **1.1 Applicability**

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The keypad remoting kit can be applied to the following devices manufactured by Eletronica Santerno:

“Sinus PENTA” industrial inverters

“Sunway T” solar inverters (starting from products manufactured in 2004)

“Sunway Bach” solar battery chargers

“ALADIN M/T” hybrid inverters

## 2 CONNECTING THE KEYPAD

Inverter-side connection: use 9-pole, male D connector. To gain access to the D connector, just remove the cover on top of the inverter (size S05..S15), or remove the cover from the inverter bottom, located next to the control terminals (size  $\geq$  S20). For more details on D connector, see Sunway T's Installation Manual. If multiple inverters are connected to the same network, use a connector having the same features as the connector installed on the inverter.

The connector pins are detailed in the table below.

PIN	FUNCTION
1 – 3	(TX/RX A) Differential input/output A (bidirectional) according to standard RS485. Positive polarity with respect to pins 2 – 4 for one MARK.
2 – 4	(TX/RX B) Differential input/output B (bidirectional) according to standard RS485. Negative polarity with respect to pins 1 – 3 for one MARK.
5	(GND) Control board zero volt
6	(VTEST) Test supply input – <b>do not connect</b>
7 – 8	Not connected
9	+5 V, max. 100mA power supply



NOTE

The metal frame of the connector is connected to the ground. Connect the braiding of the twisted pair data cable to the metal frame of the female connector to be connected to the inverter.

Connector RJ 45 must be connected to the keypad:

PIN	FUNCTION
4	(TX/RX A) Differential input/output A (bidirectional) according to standard RS485. Positive polarity with respect to pin 6 for one MARK.
6	(TX/RX B) Differential input/output B (bidirectional) according to standard RS485. Negative polarity with respect to pin 4 for one MARK.
1-2-3	(GND) keypad zero volt.
5-7-8	+5 V, max. 100mA power supply

## 2.1 Communications Protocol

Standard MODBUS RTU protocol is used for communications.

Set the following values for the inverter/keypad; please refer to the Programming Manual of the inverter being used for the setup of the relevant parameters:

### Setting values to the inverter

Baud rate:	38.400 bps
Data format:	8 bits
Start bit:	1
Parity:	NO
Stop bit:	2
Protocol:	MODBUS RTU
Device address:	set between 1 and 247 to avoid conflicts (default address is 1)
Electrical standard:	RS485
Inverter response delay:	5 ms
End of message timeout:	2 ms

### Setting values to the keypad

Device address:	set between 0 to 247 (default address is 1)
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In order to scan the connected inverters, set the device address to 0 for the keypad. The keypad can communicate with one device at a time, based on the address that has been set up.



**CAUTION**

If different parameter values are set, communication errors between the inverter and the keypad may occur.

### **3 CONNECTION**

Remove voltage from the inverter. Then proceed as follows:

**Disconnect the keypad installed on the inverter (if any)**

Please refer to the Installation Manual of the inverter being used.

**Connect the cable to the interface converter and the keypad**

Connect connector DB9 to the inverter or to network RS485. The inverter side with telephone connector RJ45 must be already connected to the keypad.

**Check that communication is correct**

Turn on one of the inverters connected to the network. The keypad shows POWER ON. To scan the inverters connected to the network, set the device address on the keypad to 0 (please refer to the Programming Manual of the inverter being used). The list of the connected devices appears on the keypad display. Select the device to be used to start communicating with the keypad, using all functionalities offered by the connected device. Please refer to the Users Manual of the device being used for the operation of the keypad connected to the device.

**Segregate the keypad power supply using the feeder**

Connect the feeder output to the proper plug and set the toggle to ON.