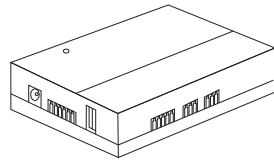


User manual

V1000+



1. Purpose

This document introduces the V1000+ in terms of installation, electrical connections, operation, maintenance, and troubleshooting.

2. General description

The V1000+ provides a simple and cost-effective solution to achieve the following goals:

2.1 A data logger for monitoring the inverters only(Datalogger)

The V1000+ is a data logger for monitoring the inverters via both RS485-1 and RS485-2 ports, for each port supporting a maximum 20 inverters. An external sensor can be installed to the system for irradiance and cell temperature monitoring. The RS485-2 port should be configured to "inverter" mode. Refer to chapter 5.12 for more detail.

2.2 A data logger and a power limiter for a plant(Powerlimiter)

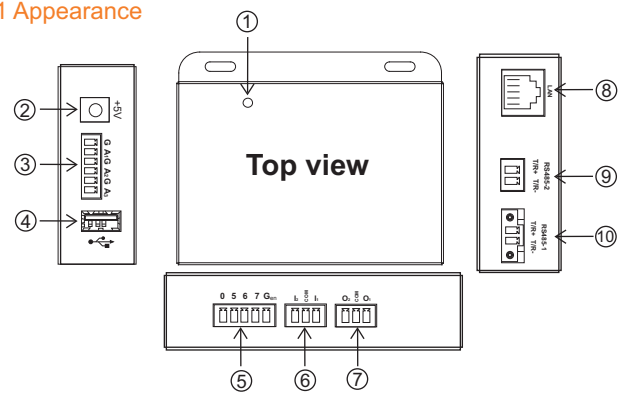
An extra energy meter is required for this use. The V1000+ monitors and controls the inverters via RS485-1 port and monitors the energy meter via RS485-2 port. Also the external sensor can be installed into the system. The RS485-2 port should be configured to "Meter" mode, refer to chapter 5.12.

The V1000+ supports for the following meters:

No.	Vendor	Meter type	Protocol	Connection
1	Lovato	DMG210, three phase meter	MODBUS-RTU	RS485
2	Gavazzi	ET340, three phase meter		
3	Gavazzi	ET112, single phase meter		
4	CHINT	DTSU666, three phase meter		

3. Device characteristics

3.1 Appearance



- LED
- +5V adapter connector
- External sensor signal connector
- USB connector
- Remote control signal connector
- Input signal connector
- Output signal connector
- RJ45 connector
- RS485-2 connector
- RS485-1 connector

3.2 Port description

Appearance	Port	Description
	G	GND
	A1	Irradiance sensor input(range 0-10V)
	G	GND
	A2	Solar panel temperature sensor input(range 0-10V)
	G	GND
	A3	Temperature sensor input(range 0-10V)
	USB	Use for FW upgrade or data export.
	0	When this pin connects to Gen, the inverter will be shutdown
	5	When this pin connects to the Gen, the output power of inverter will be limited to 0%
	6	When this pin connects to the Gen, the output power of inverter will be limited to 50%
	7	When this pin connects to the Gen, the output power of inverter will be limited to 75%
	Gen	GND
	Input signal	Reserved
	Output signal	Reserved
	LAN	RJ45
	T/R+	RS485-2 port signal+
	T/R-	RS485-2 port signal1-
	T/R+	RS485-1 port signal+
	T/R-	RS485-1 port signal1-

Both port RS485-1 and RS485-2 are using Modbus-RTU, with 8 data bit, 1 stop bit, no parity and 9600 baud rate. Please make sure that the devices connect to the V1000+ have the same configuration. RS485-2 port is a multi-functional port that can be configured as chapter 5.12 showed.

The V1000+ is powered by an external power supply 5V 1A. An AC adaptor is included in the package.

4. Installation

4.1 Box contents

The package contains the following:

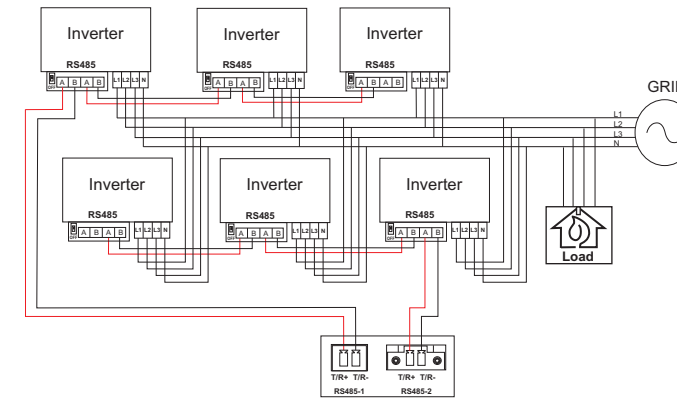
- 1x V1000+ control and monitoring unit
- 1x bag of accessories (screws and terminals)
- 1x AC adapter 5V 1A

An energy meter should be prepared by the user in case for powerlimiter.

4.2 Connections

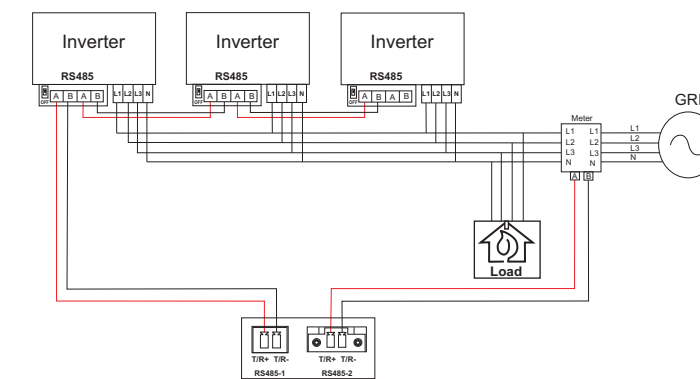
4.2.1 Datalogger

1. Connect the V1000+ to the inverter using the port RS485-1, maximum 20 inverters
2. Connect the V1000+ to the inverter using the port RS485-2 if needed, maximum 20 inverters. RS485-2 has to be configured to "Inverter" mode, refer to chapter 5.12 .
3. Configure the communication address for each inverter, default address for port RS485-1 is 1 to 20, and default address for port RS485-2 is 21 to 40. The address for inverter can be configured using APP.
4. Connect the LAN cable
5. Power on the V1000+

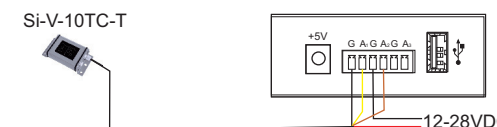


4.2.2 Powerlimiter

1. Install the Energy Meter. Refer to the Energy Meter manual for additional information regarding its connections. Just make sure that the protocol for the meter is set to Modbus-RTU, and the data format is: 8 data bit, 1 stop bit, no parity bit, baudrate is 9600bps.
2. Connect the V1000+ to the energy meter using the port RS485-2. Refer to the Energy Meter manual for additional information regarding its RS485 connections, RS485-2 has to be configured to "Meter" mode, refer to chapter 5.12
3. Connect the V1000+ to the inverter using the port RS485-1
4. Configure the communication address for each inverter, default address for port RS485-1 is 1 to 20
5. Connect the LAN cable
6. Power on the V1000+



The connection for the external sensor, supporting Si-V-10TC-T, shows below:



5. Changing default settings of V1000+

5.1 Connecting to the V1000+ using web browser

	V1000+ default	PC
IP	192.168.0.100	192.168.0.101
Netmask	255.255.255.0	255.255.255.0
Gateway	192.168.0.254	192.168.0.254

First time connects to V1000+:

1. Change the IP for PC based on the info above
2. Connect the PC and V1000+ via RJ45 directly
3. Key in 192.168.0.100 on browser

After changing the IP for V1000+ and V1000+ connects to a router, the IP address that the router of the LAN assigned to the device can be found on router with the device named "V1000Plus". Below is the setting page of V1000+:

The name and password for setting are both admin:

Name :

Password :

5.2 Logger info

The "logger info" page shows the basic info for the logger. The name for the logger can be changed, and the KWP here means the capacity of the plant in kw.

MODEL : V1000+ Plus
 S/N : 1291931000400
 Version : 010608
 DB Version : 23107-03 / DBEX02
 Name :
 KWP : KW

5.3 Date & Time

"Date & Time" page can set the time zone and enable/disable NTP function, and change the NTP server:

On Off

Asia/Taipei

pool.ntp.org

5.4 IP Address

Set the IP mode to DHCP or Fixed IP mode. When setting to fixed IP mode, make sure that the IP is set base on the local router, default is a Fixed IP mode. The IP Address must be configured so that the V1000+ can communicate with the portal.

IP Mode:

IP Address:

IP Mask:

Gateway:

5.5 Language

"Language" page can change the language between English and Chinese.

Language:

5.6 Administration

"Administration" page can change the name and password:

Name:

Password:

Re-enter Password:

5.7 Irradiance

"Irradiance" shows the irradiance measure by the external sensor and inside this page a calibration value can be write to calibrate the irradiance, with unit w/m2.

Irradiance Calibration Value:

5.8 Solar Cell Temperature

"Solar Cell Temperature" shows the cell temperature measure by the external sensor and inside this page a calibration value can be write to calibrate the cell temperature, with unit 0.1 °C.

Temperature Calibration Value:

5.9 RS485-1 Search Starting Address

For RS485-1 port, it can connect to a maximum 20 inverters, which default address is from 1 to 20. The start address can be set to 1-216.

RS485-1 Search Starting Address:

5.10 RS485-2 Search Starting Address

For RS485-2 port, it also can connect to a maximum 20 inverters, default address is from 21 to 40. The start address can be set to 1-228.

RS485-2 Search Starting Address:

5.11 Irradiance Meter address and Temperature Meter Address

The V1000+ also supports for connecting with JD auspice meter, like JDA-W with LP PYRA 03(Pyranometer) and JDA-T with PT-100(Thermal), this two meter will connects to the RS485-1 port, with the following address. The address here is based on the start address of RS485-1 port (chapter), with a fixed index of 31 and 32.

Irradiance Meter Address	31	Temperature Meter Address	32
--------------------------	----	---------------------------	----

5.12 RS485-2 Configuration

The RS485-2 port is a multi-function port, which can be configured as:

RS485-2 Configuration:

"Device" means that the RS485-2 port of V1000+ is a device, a host connects to the RS485-2 port can get the information of V1000+, this is used by factory only.

"Inverter" means that the RS485-2 port is a host, it tries to communicate with the inverter connects to the port(set when RS485-2 is for monitoring inverters).

"Digital Meter" means that the RS485-2 port is a host, it tries to communication with the digital meter set by chapter (set to meter as the V1000+ is a powerlimiter).

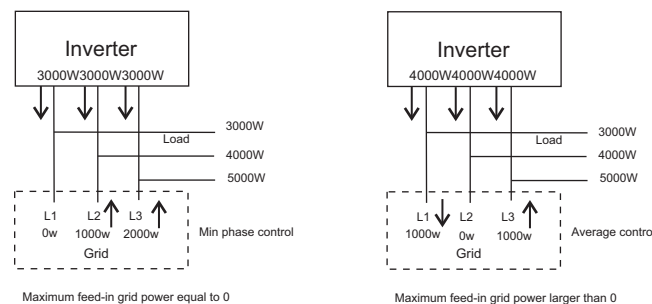
5.13 Power limit

In the use of power limitation, the V1000+ should change the following settings:

- Enable the power limit function
- Set the digital meter address to what the meter address is (check the meter address base on the user manual of specify meter)
- Set the meter type
- Set the meter power direction, the power from grid to load is positive
- Set the meter position base on the meter installed on load or on grid
- Set maximum feed-in grid power if needed

Function	Parameter
Power limit function	<input type="text" value="Disable"/>
Digital meter modbus address	<input type="text" value="1"/>
Digital meter type	<input type="text" value="Unknown"/>
Digital meter power direction	<input type="text" value="Positive"/>
Digital meter position	<input type="text" value="Meter on Grid"/>
Maximun feed-in grid power(w)	<input type="text" value="0"/>

- IPower control methods base on "Maximum feed-in grid power"



5.14 Grid Configuration

The V1000+ provides an easy way to configure the online inverters, using the web. The "Grid Configuration" mainly configures the grid parameters for inverter, like over voltage, under voltage, etc. In order to proceed the configuration, one has to select the specify inverter via the drop-down list, and then set the values wanted.

6-2020-15082003T

Function	Parameter	Function	Parameter
First start delay time(s)	<input type="text" value="60"/>	Reconnect delay time(s)	<input type="text" value="60"/>
Grid Frequency High Level 1 Limit(0.01Hz)	<input type="text" value="5150"/>	Grid Frequency Low Level 1 Limit(0.01Hz)	<input type="text" value="4750"/>
Grid Voltage High Level 1 Limit(0.1V)	<input type="text" value="4750"/>	Grid Voltage Low Level 1 Limit(0.1V)	<input type="text" value="3040"/>
Grid Frequency High Level 1 Trip Time(ms)	<input type="text" value="100"/>	Grid Frequency Low Level 1 Trip Time(ms)	<input type="text" value="100"/>
Grid Voltage High Level 1 Trip Time(ms)	<input type="text" value="100"/>	Grid Voltage Low Level 1 Trip Time(ms)	<input type="text" value="3000"/>
Grid Frequency High Level 2 Limit(0.01Hz)	<input type="text" value="9990"/>	Grid Frequency Low Level 2 Limit(0.01Hz)	<input type="text" value="0"/>
Grid Voltage High Level 2 Limit(0.1V)	<input type="text" value="9990"/>	Grid Voltage Low Level 2 Limit(0.1V)	<input type="text" value="1710"/>
Grid Frequency High Level 2 Trip Time(ms)	<input type="text" value="9999"/>	Grid Frequency Low Level 2 Trip Time(ms)	<input type="text" value="9999"/>
Grid Voltage High Level 2 Trip Time(ms)	<input type="text" value="9999"/>	Grid Voltage Low Level 2 Trip Time(ms)	<input type="text" value="300"/>
Grid Frequency High Level 1 back(0.01Hz)	<input type="text" value="5005"/>	Grid Frequency Low Level 1 back(0.01Hz)	<input type="text" value="4755"/>
Derating Grid Frequency High back(0.01Hz)	<input type="text" value="5020"/>	Derating Grid Frequency Low back(0.01Hz)	<input type="text" value="0"/>
Grid Voltage High Moving Average Limit(0.1V)	<input type="text" value="4180"/>	Soft output power percent(%)	<input type="text" value="8"/>

5.15 Reactive Power Control

In some cases, the inverter has to provide reactive power, to achieve the reactive power compensation. The reactive power can be controlled using different methods: fixed PF, fixed reactive power percent, Cosφ(P) curve and Q(U) curve.

6-2020-15082003T

Function	Parameter	Function	Parameter
Q mode	<input type="text" value="0"/>	P.F (Cosφ)(0.001)	<input type="text" value="990"/>
Reactive power percent(%)	<input type="text" value="0"/>	Q(U) control response time(s)	<input type="text" value="10"/>
Cosφ(P) curve node1 percent(%)	<input type="text" value="0"/>	Cosφ(P) curve node1 value(0.001)	<input type="text" value="1000"/>
Cosφ(P) curve node2 percent(%)	<input type="text" value="20"/>	Cosφ(P) curve node2 value(0.001)	<input type="text" value="1000"/>
Cosφ(P) curve node3 percent(%)	<input type="text" value="50"/>	Cosφ(P) curve node3 value(0.001)	<input type="text" value="1000"/>
Cosφ(P) curve node4 percent(%)	<input type="text" value="100"/>	Cosφ(P) curve node4 value(0.001)	<input type="text" value="-910"/>
Q(U) curve node1 percent(%)	<input type="text" value="93"/>	Q(U) curve node1 value(0.1%)	<input type="text" value="330"/>
Q(U) curve node2 percent(%)	<input type="text" value="97"/>	Q(U) curve node2 value(0.1%)	<input type="text" value="0"/>
Q(U) curve node3 percent(%)	<input type="text" value="103"/>	Q(U) curve node3 value(0.1%)	<input type="text" value="0"/>
Q(U) curve node4 percent(%)	<input type="text" value="107"/>	Q(U) curve node4 value(0.1%)	<input type="text" value="-330"/>

The Q mode here defines the 4 methods with:

- 0: no reactive power output
- 1: fixed PF
- 2: fixed reactive power percent
- 3: Cosφ(P) curve
- 4: Q(U) curve

When Q mode is set to 0, all other settings for reactive power control will take no effect. When Q mode sets to 1, only the values set to "P.F (cosφ)(0.001)" affects. When Q mode sets to 2, only the values set to "Reactive power percent(%)" affects. When Q mode sets to 3, it relates to the following parameters:

Cosφ(P) curve node1 percent(%)	<input type="text" value="0"/>	Cosφ(P) curve node1 value(0.001)	<input type="text" value="1000"/>
Cosφ(P) curve node2 percent(%)	<input type="text" value="20"/>	Cosφ(P) curve node2 value(0.001)	<input type="text" value="1000"/>
Cosφ(P) curve node3 percent(%)	<input type="text" value="50"/>	Cosφ(P) curve node3 value(0.001)	<input type="text" value="1000"/>
Cosφ(P) curve node4 percent(%)	<input type="text" value="100"/>	Cosφ(P) curve node4 value(0.001)	<input type="text" value="-910"/>

When Q mode sets to 4, it relates to the following parameters:

Q(U) curve node1 percent(%)	<input type="text" value="93"/>	Q(U) curve node1 value(0.001)	<input type="text" value="330"/>
Q(U) curve node2 percent(%)	<input type="text" value="97"/>	Q(U) curve node2 value(0.001)	<input type="text" value="0"/>
Q(U) curve node3 percent(%)	<input type="text" value="103"/>	Q(U) curve node3 value(0.001)	<input type="text" value="0"/>
Q(U) curve node4 percent(%)	<input type="text" value="107"/>	Q(U) curve node4 value(0.001)	<input type="text" value="330"/>

5.16 Active Power Control

Active power control only supports for over frequency derating now. Setting "Frequency Derating Function" to 1 enables this function and the active power control will based on the start frequency with 100% and end frequency with 0% linear linearly.

6-2020-15082003T

Function	Parameter	Function	Parameter
Frequency Derating Function	<input type="text" value="0"/>	Over frequency derating start(0.01Hz)	<input type="text" value="5020"/>
Over frequency derating end(0.01Hz)	<input type="text" value="5270"/>		

5.17 Digital Meter

This page shows the digital meter value read from the meter. When the system is configured to support the meter, the one can check the values here to confirm if the meter works well.

Function	Value	Function	Value
L1 phase voltage(V)	0.0	L1-L2 phase voltage(V)	0.0
L2 phase voltage(V)	0.0	L2-L3 phase voltage(V)	0.0
L3 phase voltage(V)	0.0	L3-L1 phase voltage(V)	0.0
L1 phase current(A)	0.00	L1 phase watt(W)	0
L2 phase current(A)	0.00	L2 phase watt(W)	0
L3 phase current(A)	0.00	L3 phase watt(W)	0
L1 phase watt(VA)	0	L1 phase watt(VAR)	0
L2 phase watt(VA)	0	L2 phase watt(VAR)	0
L3 phase watt(VA)	0	L3 phase watt(VAR)	0
L1 phase power factor	0.000	System watt(VA)	0
L2 phase power factor	0.000	System VA(VA)	0
L3 phase power factor	0.000	System VAR(VAR)	0
System power factor	0.000		

6. Registering the system on the portal

Manual for operation the portal is available at <http://www.solaxcloud-project.com>

7. Troubleshooting

The following table summarizes the status of the indicators depending on the condition of the system.

Description	LED on V1000+	Web interface on V1000+	Warning on portal
Inverter fault	Red led on	Specify fault message	Specify fault message
Lost communication with meter	Yellow led on	"Energy Meter Offline"	"Energy Meter Offline"
Lost communication with server	Yellow led blinking	"LAN Unavailable"	N/A
Lost communication with inverter	Green led blinking	"Inverter Offline"	Inverter Offline Status
Communication with inverter well	Green led on	N/A	N/A