

SolarVu™ Installation Guide for HUAWEI SUN Series Inverters

Introduction

SolarVu™ is an energy portal that enables remote monitoring of renewable energy generation sites over the internet. It requires the installation of a SolarVu gateway which continuously transfers data from the inverters to the remote SolarVu servers. This guide explains how to connect the SolarVu gateway to HUAWEI SUN Series inverters in two different versions: with and without HUAWEI Smart Logger 1000. These steps are required to wire and configure a system:

- 1) If a Smart Logger 1000 is not used, connect SolarVu M504 gateway to the inverters directly as Fig 1a. Otherwise connect Smart Logger 1000 to the inverters as Fig 1b.
- 2) If Smart Logger is used, connect Smart Logger 1000 into SolarVu router.
- 3) Connect the SolarVu gateway to the building LAN for internet access.
- 4) Enter the communications settings into each inverter through the Huawei SUN2000 phone APP.
- 5) If Smart Logger 1000 is used, configure internet settings in the logger.
- 6) Access SolarVu from a browser and configure the SolarVu energy portal.

Video Overview

Go to the following link or click on the icon below for a helpful video which explains how to connect and configure the communication settings.

<http://www.cachelan.com/link-huawei>



Site Preparation

Before going to the site for any site work, the installer should:

- 1) Download the SUN2000 APP from either Google Play or Apple Store and install it on their smart phone.
- 2) Bring the phone and its data cable to the site. The APP and cable will be used to program each inverter address described later in this guide.

SolarVu Installation

Power Supply: Connect from a 120VAC source to the breaker (terminal L), terminal N and GND inside the SolarVu enclosure.

Inverter Wiring & Setup:

The inverters communicate serially as shown either

- 1) Fig 1a. to a Cachelan SolarVu M504 gateway
- 2) Fig 1b. to a Smart Logger 1000 and a SolarVu M504 gateway which communicates to the Smart Logger 1000 in Modbus TCP for inverter data

As shown in Fig 3 for the case without Smart Logger 1000, for the SolarVu M504 gateway to inverter connection via RS485, use twisted pair wire, typically Cat5e cables. Connect from terminals 1&2 at the SolarVu M504 Comm board to the first inverter terminal 6&8 (485 out). Connect a separate wire from the first inverter terminals 5&8 (485 in) to the next inverter terminals 6&8 (485 out). Repeat for each additional inverter as shown in Fig 3.

As shown in Fig 4 for the case with a Smart Logger 1000, use an ethernet cable to connect the Smart Logger 1000 to SolarVu router. For RS485 wiring, connect the Cat5e cable from the COM1 terminals on the Smart Logger 1000 to the terminals 6&8 (485 out) in the first inverter. Connect separate Cat5e wires from the first inverter terminals 5&8 (485 in) to the next inverter terminals 6&8 (485 out). Repeat for each additional inverter as shown in Fig 4.

The LAN must have high speed internet service to an ISP to provide access to the internet. The SolarVu gateway RJ45 ethernet jack plugs into an RJ45 LAN jack connected to the building router using a standard Cat5e patch cable. Alternatively, SolarVu can be ordered with a 3G cellular modem for wireless internet connection. A source of 120VAC for control power needs to be connected to the SolarVu enclosure.

Inverter & Smart Logger 1000 Setup:

After all physical connections are made, with the SUN2000 app and the phone charging cable, follow pages 4&5 and watch the video to setup the address for each inverter. If a Smart Logger 1000 is used, after setting each inverter address, follow page 6 to set up the Smart Logger 1000.

Fig 1a Network Connections without Smart Logger 1000

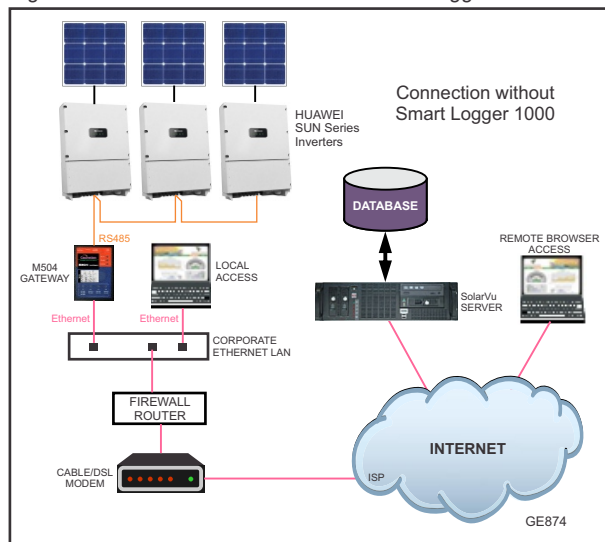


Fig 1b Network Connections with Smart Logger 1000

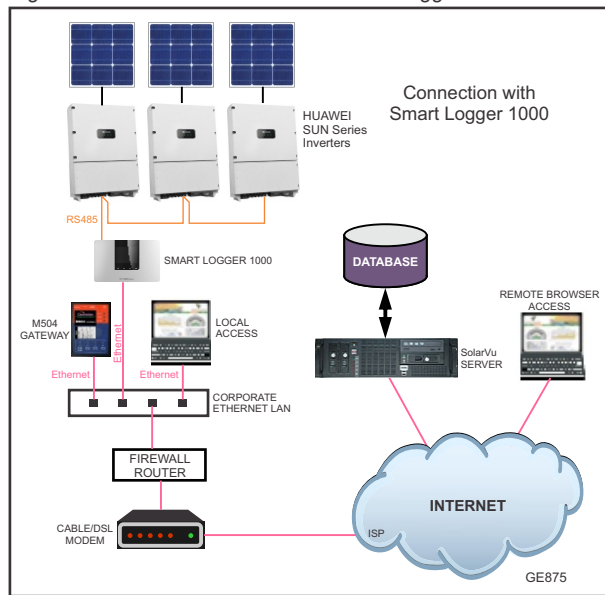


Fig 2 SolarVu enclosure - for M504 gateway

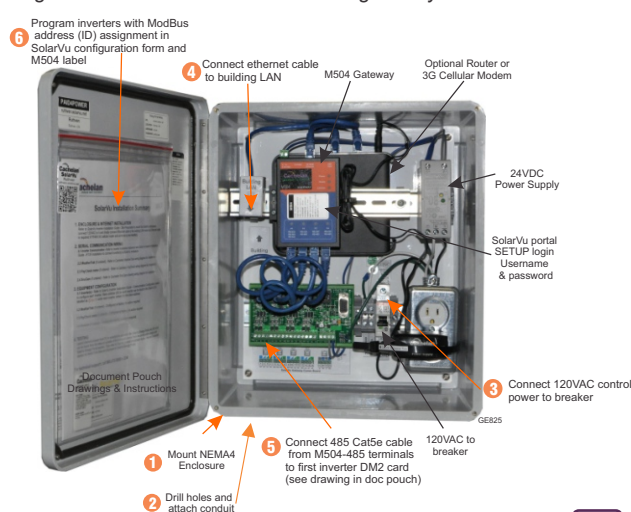
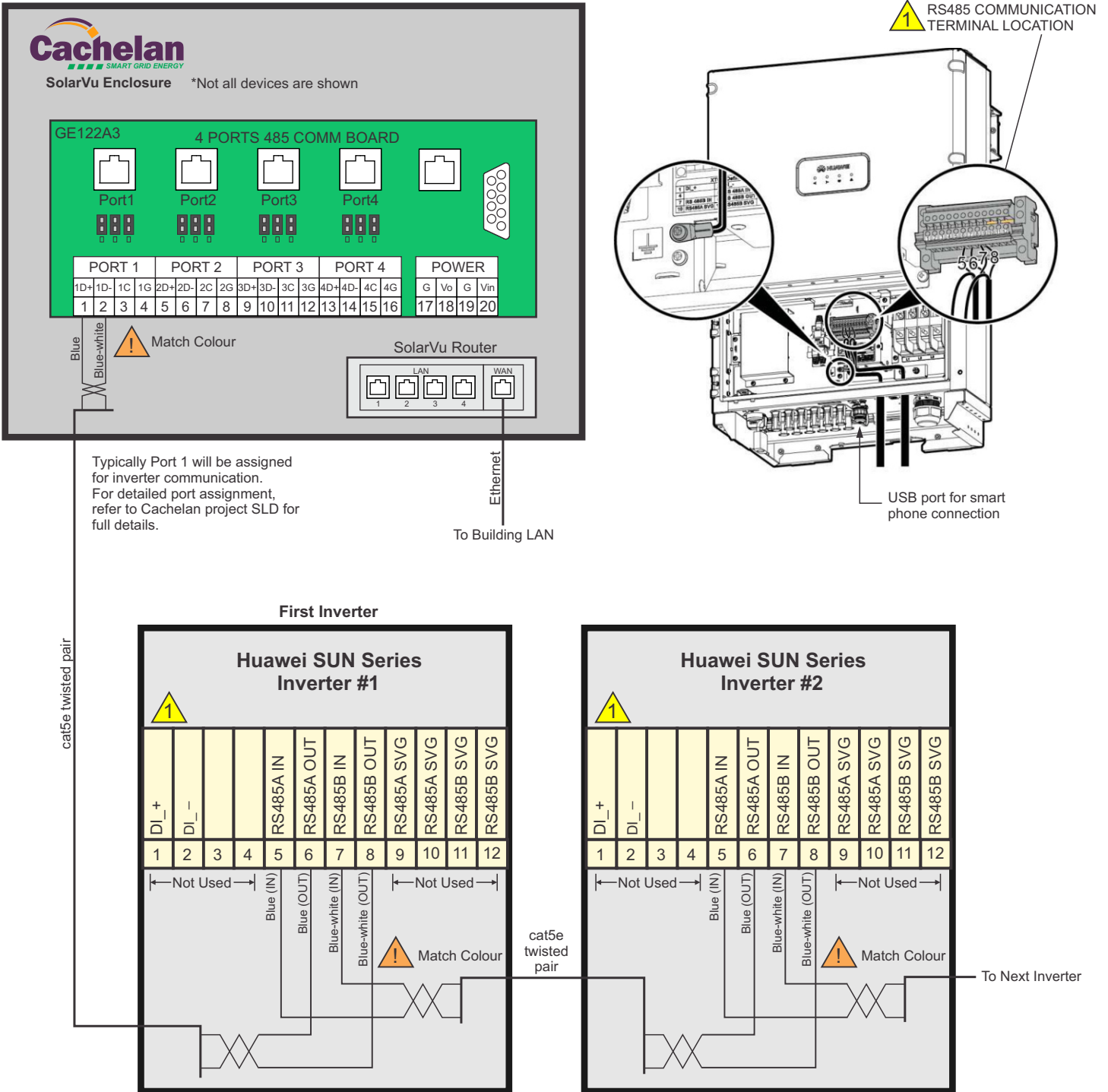


Fig 3 SolarVu Inverter Communication Wiring - Without Huawei Smart Logger 1000

SolarVu M504 to Huawei SUN Series Inverters (Without Smart Logger 1000)



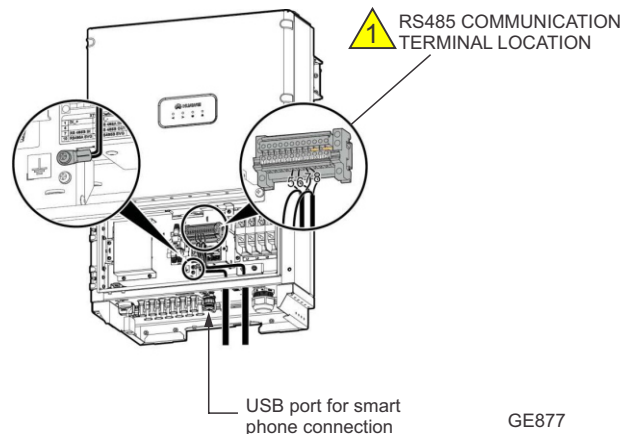
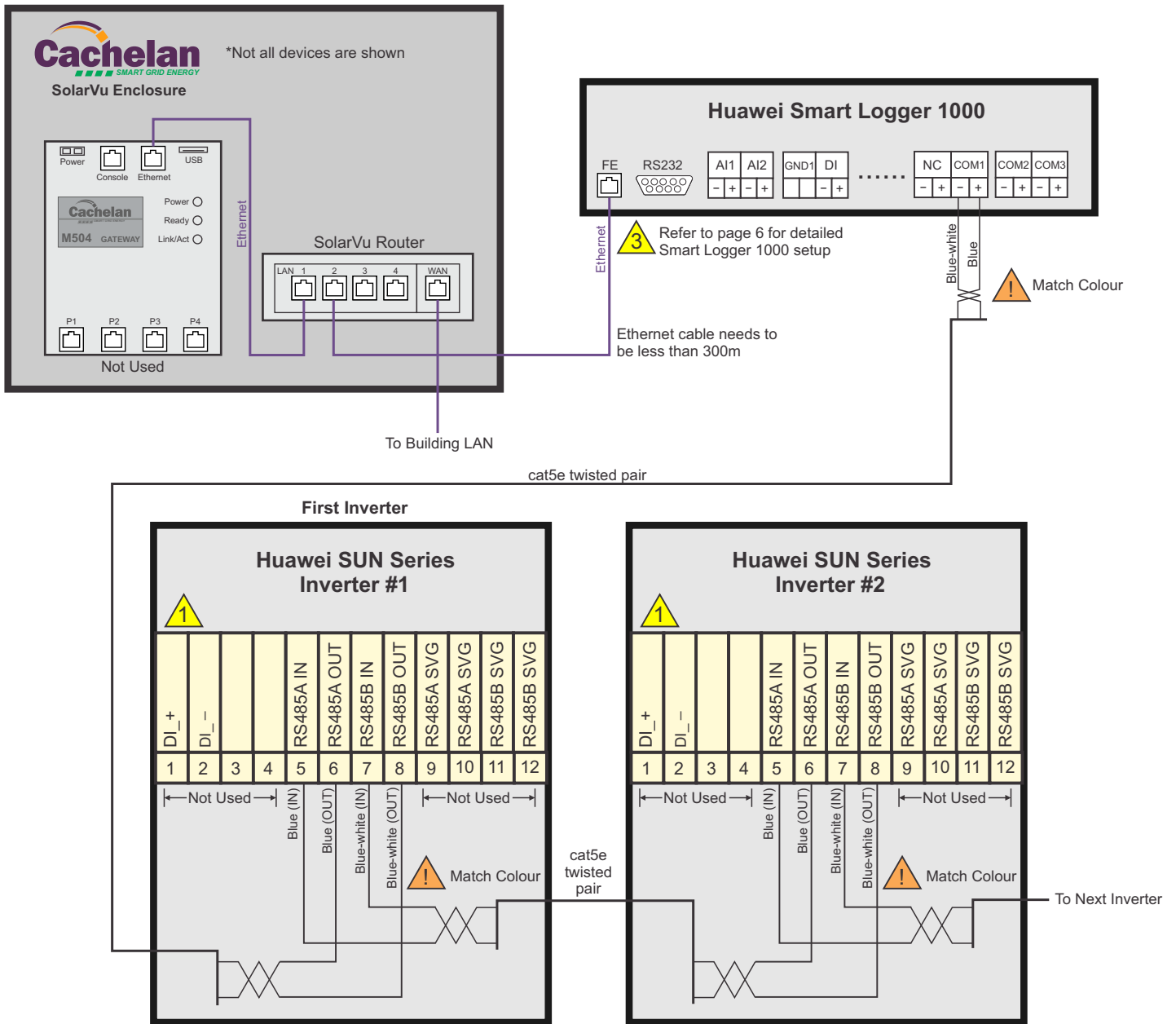
Each inverter is required to be assigned by a unique Modbus address for communication purposes. Refer to page 4&5 for detailed procedures.

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REFER TO PAGE 4&5 FOR INVERTER ADDRESS SETUP

Fig 4 SolarVu Inverter Communication Wiring - With Huawei Smart Logger 1000

SolarVu M504 to Huawei SUN Series Inverters (With Smart Logger 1000)



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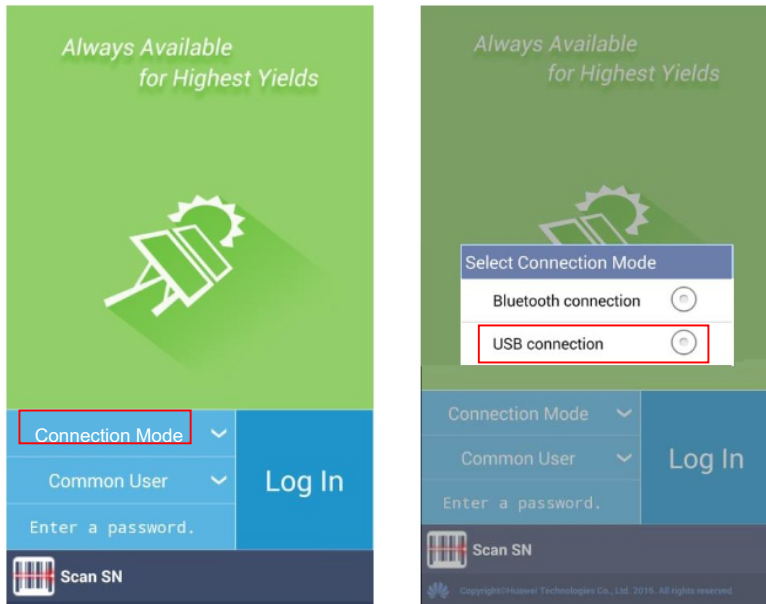
Inverter Address Setup Procedure

A smart phone (either Android or Apple) and a USB data cable are required to configure the Modbus address for each inverter.

For Android users, launch Google Play and search for **SUN2000** 
For Apple users, launch Apple Store and search for **SUN2000**

Once the SUN2000 app is installed on the phone, bring the smart phone USB data cable to the site and perform the following steps to set up each inverter address.

1. Connect the USB data cable to the USB port at the bottom of the inverter.
2. Start the SUN2000 app. The Login screen is displayed.
3. Tap **Connection Mode** and select **USB Connection**



4. For first time connection, a message will pop up to confirm the USB access. Check Use by default for this USB accessory and tap **OK**. This message will not show for future connections



Inverter Address Setup Procedure - Continued

5. Tap Log In. The initial password is **00000a**
Enter the password and tap **Log In**.

After logging in, make sure the following settings are correct:

Under **Comm. Param.**


Baud rate(bps) is set to **9600**

Protocol is set to **MODBUS RTU**

The screenshot shows a mobile application interface titled "Quick Settings" with a back arrow on the left and "OK" on the right. The settings are organized into sections: "Feature Param." (VDE-AR-N-4105), "User Param." (Date: 2012-01-01, Time: 00:00:00), and "Comm. Param." (Baud rate(bps): 9600, Protocol: MODBUS RTU, Address: 25). Each setting has a dropdown arrow next to it.

6. Set the **Address** to match the inverter number by tapping the **Address** field.
The inverter address normally starts at 1 and increment for each inverter in the chain. For example,
inverter #1 address: 1
Inverter #2 address: 2
Confirm from SolarVu SLD or the configuration documents supplied with the SolarVu portal.

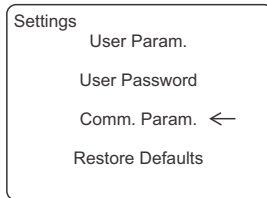
This screenshot is identical to the previous one, but with red rectangular boxes highlighting the "Baud rate(bps)" field (9600), the "Protocol" field (MODBUS RTU), and the "Address" field (25).

7. Tap  at top left of the screen to return to the login screen. Disconnect the USB data cable. Repeat procedure 1 to 7 for the next inverter until all inverters have been programmed with a unique address.

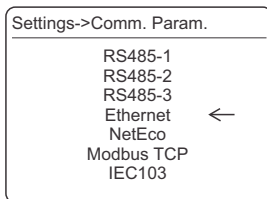
Smart Logger Network Setup Procedure

Follow the Inverter Address Setup Procedure to enter the address in each inverter first before proceeding to this section. Refer to Fig 5 for detailed button functions.

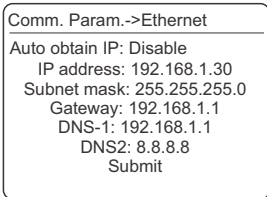
1. Press **ESC** key to light up the screen
2. Press the **Down** key to move the cursor to *Settings*. Press **Enter**
3. Select *Advanced User* on the screen, press **Enter**
4. The default password is 000001. Press **Enter** key 5 times to move the cursor to the last digit, then press **Up** key to change to 1. Press **Enter** again.
5. Press the **Down** key to select *Comm. Param.*, then press **Enter**.



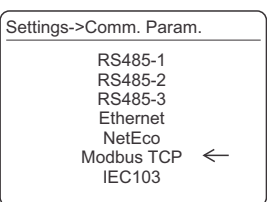
7. Press the **Down** key to select *Ethernet*. Press **Enter**



8. Use the **Down & Up** key to decrease or increase a value. Press the **Enter** key to move to the next position. Make sure that Auto obtain IP is set to *Disable*. Then refer to the project SLD for detailed IP settings and enter them here. Move cursor down to *Submit*. Press **Enter** when finished.



9. Go to *Modbus TCP*. Press **Enter**



10. *Link setting* by default is *Disabled*. Press the **Enter** key then press **Down** key to change it to *Enable*. Make sure that *Address mode* is at *Physical addr*. Refer to the project SLD and look for the SolarVu gateway M504 IP address and enter it as *Client 1 IP* address. The other client addresses can be left at the default 0.0.0.0

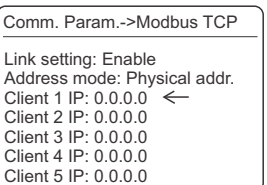
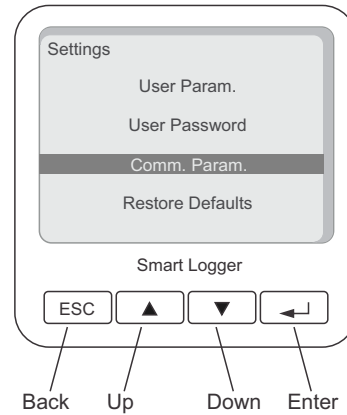
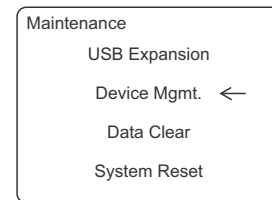


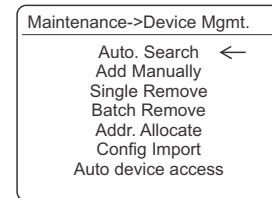
Fig 5 Huawei Smart Logger Button Functions



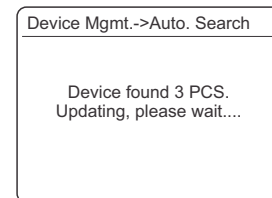
11. Press **ESC** several times to return to the main menu. Select *Maintenance*. Press **Enter** key.
12. Select *Advanced User* and enter the password 000001
13. Select *Device Mgmt*. Press **Enter** key.



14. Select *Auto. Search* and press the **Enter** key. If prompted a message of *Device already exist, search again?* press **Enter**.



15. The Smart Logger 1000 will start searching for all inverters in this network. It can take up to 2 to 5 minutes to look for all inverters depending on the number of inverters



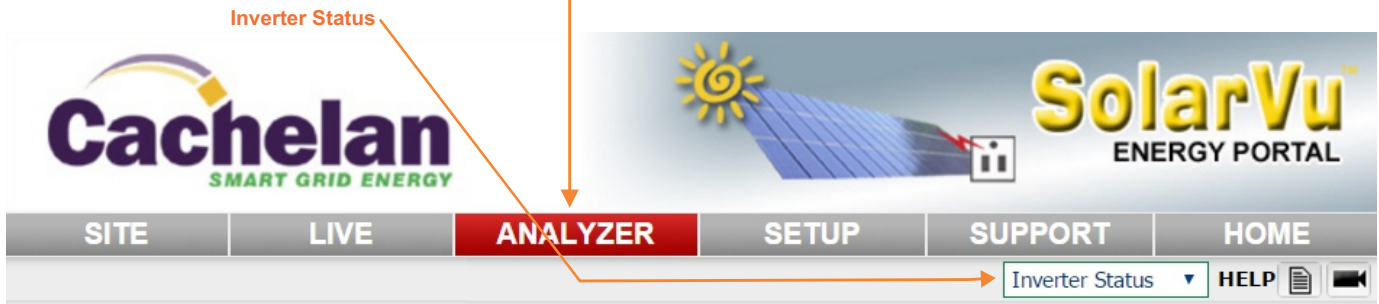
16. When the searching process is finished, press OK. Press **ESC** until back to the main menu. The setup is complete.

Testing the System

At this point the installation should be complete ready for testing. It is helpful to have access to a PC that is connected to the internet for viewing SolarVu screens. Using the URL supplied for the system. The gateway is preconfigured to automatically send inverter data to the SolarVu servers. To do this it must first establish an internet connection. Then it will collect data from the inverters and periodically transmit it.

Verifying correct operation is described in the sections that follow. Indicator lights and actual values accessible from the SolarVu Analyzer > Inverter Status screen Fig 6 are useful for determining the status of the system.

To access the inverter status screen, enter the SolarVu URL in your browser
Click ANALYZER



Time of last update received from the M504 gateway → Monday, February 8, 2016 11:51:04 AM (GMT -5:00)

Huawei SUN2000-25KTL-US #1 (Device ID : 1) Manual Installation

DC Input Power Now 22 kW	Total DC Power			22 kW		
	MPPT1 Power	7.33 kW	PV1 Voltage	636 V	PV1 Current	5.6 A
				PV2 Voltage	636 V	PV2 Current
	MPPT2 Power	7.45 kW	PV3 Voltage	629 V	PV3 Current	5.9 A
				PV4 Voltage	629 V	PV4 Current
	MPPT3 Power	7.48 kW	PV5 Voltage	632 V	PV5 Current	5.9 A
				PV6 Voltage	632 V	PV6 Current
AC Input Lifetime Energy 8,882 kWh	L1-L2 Voltage	510 V	L2-L3 Voltage	514 V	L3-L1 Voltage	512 V
	L1 Current	25.1 A	L2 Current	24.8 A	L3 Current	24.9 A
	Frequency	60.0 Hz	Power Factor	1.00	Efficiency	98.9 %
	Inverter					
Cabinet Temp.	12 °C	Rated Power	25 kW	ESN:210107303810G5000030		
Status On-grid						
Fault						

Codes Update

Listen ● Last Data Updated: Mar 6, 2017, Mon 4:25 PM (GMT -5:00)

Listen ● Last Communication: Mar 6, 2017, Mon 4:25 PM (GMT -5:00)

Measured values from the inverter

Alarms and status reported by inverter

Light is green if M504 gateway is reading valid data from the inverter over RS485. M504 must be connected to the internet.

Light goes green if M504 is connected to the internet

Time of last communication. M504 sends an update every 10 minutes

Network Setup

On power up, the gateway looks for a DHCP server to provide it a dynamic IP address. If a PC connected to the network can automatically connect to the internet through a browser then the network is already configured to accept the gateway. If a dedicated IP address was programmed instead, subnet mask and DNS server address are required. This needs to be entered into the gateway before shipment. Network configuration is shown on the gateway label and the Configuration Settings page in the doc pouch. Once the gateway receives its IP address it acts as a client. It will automatically try to connect to the SolarVu server and begin transferring data from the inverter to the server.

Fig 7 M504 Gateway Indicators

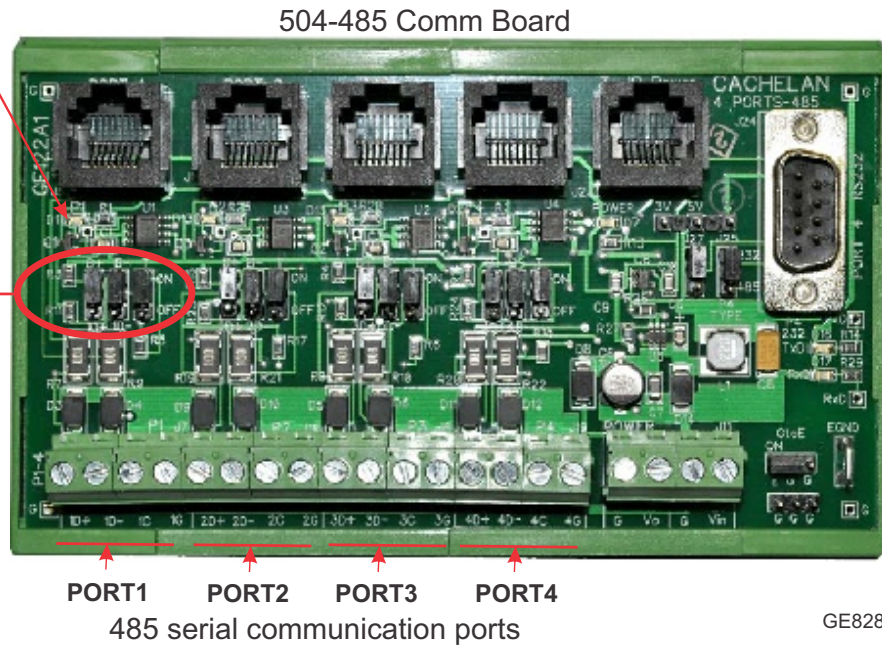
Blue data LED flashes when transmitting and receiving data from the inverter

JUMPER SETTINGS
Terminator Resistor + Biasing

B+ Bias high = ON
B- Bias low = ON
T 120R termination = ON

B+	B-	T	
ON	ON	ON	ON
OFF	OFF	OFF	OFF

Inverter is normally connected to PORT1. See SLD drawing in doc pouch for details



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INDICATOR STATUS		
LED	NORMAL	STATUS
Power	●	OFF-no power ON-power OK
Ready	●	ON M504 booted up and running
Link/Act	●	OFF-no ethernet connection FLASH- data traffic activity
P1	●	Serial Port 1 usually inverter Transmit=orange, Receive=green, flashing
P2	●	Serial Port 2 usually option Transmit=orange, Receive=green, flashing
P3	●	Serial Port 3 usually option Transmit=orange, Receive=green, flashing
P4	●	Serial Port 4 usually option Transmit=orange, Receive=green, flashing

TROUBLESHOOTING CHECKLIST	
IP Address	Obtain IP by DHCP or set static IP Network must be configured to same settings
Serial	Check inverter connected to correct port. Polarity of serial twisted pair wires. Serial ID entered correctly in each inverter
Inverter	Powered on. Serial ID has been set to match SLD drawing. Serial wiring correct.
Internet	Internet connection for ISP to LAN working
Support	For Cachelan technical support 905.470.8400 x224 contactus@cachelan.com

GE829

Video Tour

For an overview of available features, visit www.solarvu.net and play the What is SolarVu video. Each screen has a HELP button that explains how all the features work. An online help guide is available for printing under SETUP > DOWNLOADS > PRINTED HELP.

Visit www.solarvu.net for a features video



Help guide



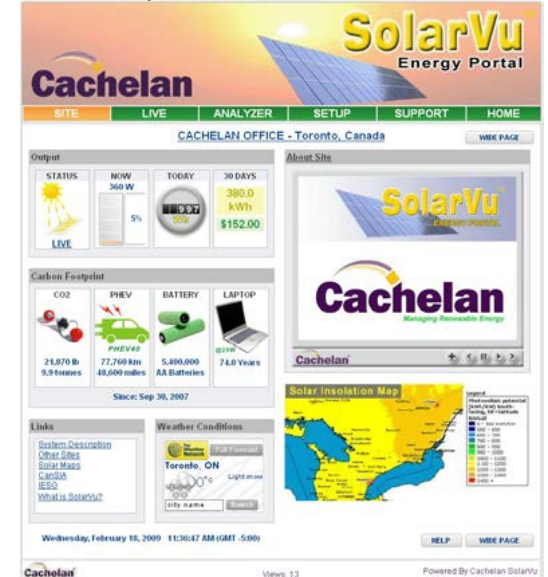
Site Screen

For a summary of information about the site, click the SITE menu button. On the upper left, the current charging status of the solar panels, total power being generated now and in the last 30 days is displayed. Underneath, the carbon footprint of energy equivalents is displayed since startup. Links to other websites can be left as defaults or changed in SETUP to personal preferences. The local weather is preset. Email contactus@cachelan.com to have it changed. For viewing on a widescreen TV suitable for display in a public place, click the WIDE PAGE button. On the right is a slideshow for public viewing. Content can be personalized using uploaded graphics in SETUP.

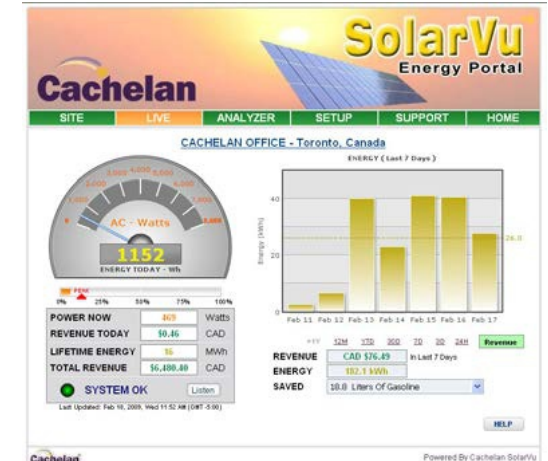


Select wide screen view for public display on an HDTV

Site Summary Screen



LIVE view shows current conditions



Live Data

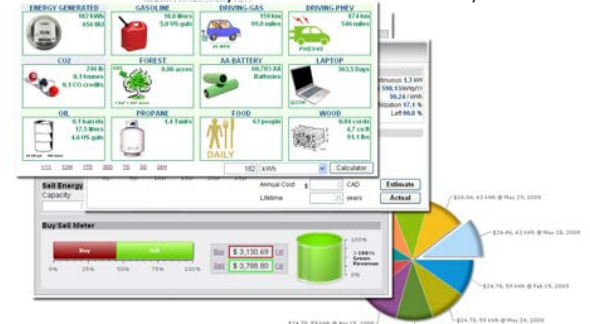
Click the LIVE menu button to display current power being generated in the array. Actual power and energy generated today are shown on the meter dial. For a normally operating system, the status indicator should be green with the last update time less than 15 minutes ago. Lifetime energy and revenue are shown digitally. For correct revenue display, the sell price per kWh must be entered in SETUP. If connection to the site is lost, or if an alarm is detected, the status indicator will be red. Click the Listen button with sound on for more information.

Trends are shown for the lifetime of the system using the graphs on the right. Select either an Energy or Revenue view using the button. Click the desired time period under the graph. Scroll over a data point with the mouse for more detailed information about that day. The carbon footprint pulldown gives energy equivalents for the solar power generated for the selected time period.

Analyzer - Performance

Click the ANALYZER menu button and select a category in the pulldown menu and a time period under the graph. The carbon footprint will compute the energy equivalents to the solar energy generated over the selected time period. This helps visitors get a practical feel for the benefits available. To find the carbon equivalent for an arbitrary value, override the actual solar amount by entering a kWh value and selecting a category, then click the Calculator button. Other views including buy/sell energy use, performance and payback can be selected with in the pulldown menu. The screen will return to the last value selected on return.

ANALYSER - select performance views from pulldown



Analyzer - Troubleshooting

When problems occur with the system or to check inverter operation, click ANALYZER > INVERTER STATUS. Each inverter connected to the system with a gateway will have its own display panel showing actual values sent. Remotely located technical personnel can assist in interpreting what the values are conveying. If no communication has been received from the device for more than 2 hours a No Data Available message will be shown

For detailed analysis, it may be helpful to download all readings for the time period of interest into a spreadsheet for further analysis using SETUP > DOWNLOAD.



Download printable HELP guide or actual readings for any time period

Setup

For entering settings to configure your site, click the SETUP menu button. Enter your unique username and password from the account label. The setup screen appears showing communication status and current preference settings. Check the last communication time ❶. It should show a time within the last 15 minutes if communication between the site and SolarVu™ server is working normally.

For the payback and revenue calculators to work properly, correct parameters for energy sell rate, capacity, average insolation etc should be entered. Account > Equipment Setup is for factory use. All changes take immediate effect. The Site Setup tab is used to customize the banner, links, slideshow and system description. Click the Help ❷ button for each section for a description of the effect for each entry. For further analysis, individual energy readings for any time period can be downloaded into a spreadsheet from the DOWNLOAD section.

Enter the email address ❸ for each individual that wants a regular status report sent to them and select the frequency. This report will include energy and revenues for different time periods and indicate if there are any alarms. In the Password tab, include an email address to receive the Setup login password if this is forgotten.



Support

See the What is SolarVu? video at www.solarvu.net for a feature overview. Each screen has a HELP button with details for the items on that view. A printable HELP guide can be downloaded in SETUP > DOWNLOAD.

For additional technical support, send an email to contactus@cachelan.com or dial our support line in Toronto, Canada at 905.470.8400

Click ANALYZER > INVERTER STATUS for troubleshooting

Lifetime Energy 1,800 Whr	AC Output	Power: 0 W	Vrms (L1-L2): 217 V	Current: 0.0 A
		Vrms (L1-N): 125 V	Vrms (L2-N): 132 V	Frequency: 60.0 Hz
	DC Input	Power: 33 W	Volts: 349 V	Current: 0.1 A
	Performance	Power Efficiency: 0 %	Heatsink Temp.: 29 °C	
AC Output Power 0 W		Today On-Grid: 2.2 Hrs	Lifetime: 13.5 Hrs	Relay Cycle: 36
	Lifetime	DC Input: 2,700 Whr	AC Output: 1,800 Whr	Efficiency: 67 %
	Inverter	Model: PVI 5000 S/N: 10010063	RS485 Address: 15	
PV Input Power 33 W		Hardware Ver.: 65	DSP1 Ver.: 1.40	DSP2 Ver.: 1.18
	Status	Fault mode Vact1 - The AC voltage of mains utility is over the upper limit Vact2 - The AC voltage of mains utility is under the lower limit COMN - External communication failed warning message Vact2-N - The voltage between L2 and neutral is exceeding the upper limit		

See gateway label for SETUP login

Customer Login

Username
myusername

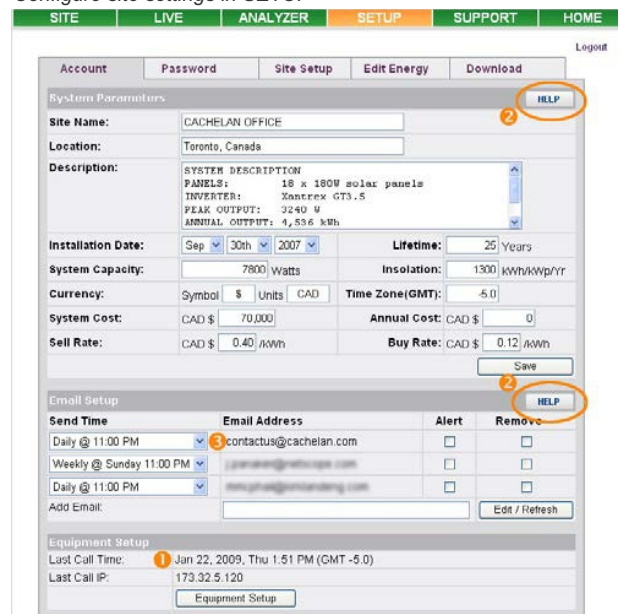
Password
mypassword

Go

Forgot your password?

K135 GATEWAY
URL: mysite.solarvu.net
USER: myusername
PASSWORD: mypassword
IP: DHCP
MAC: 00-01-95-06-E8-33
ID: SS100 070300075 v1.4.1
TYPE:
DATE: Feb 2009
SUPPORT: cachelan.com

Configure site settings in SETUP



Cachelan Technical Support
contactus@cachelan.com
905.470.8400 x224