

# SolarVu™ Installation Guide for Sungrow SG60KU-M Inverter

## Introduction

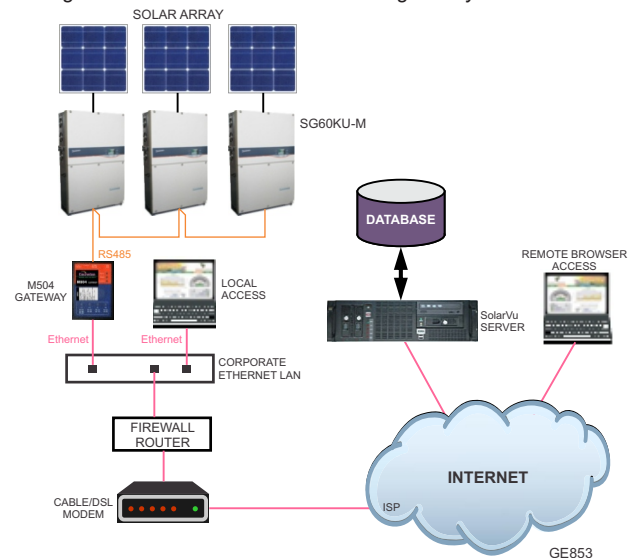
SolarVu™ is an energy portal that enables remote monitoring of renewable energy generation sites over the internet. It requires the installation of a SolarVu M504 gateway which continuously transfers data from the inverter(s) to the remote SolarVu servers. This guide explains how to connect the M504 gateway to SUNGROW SG60KU-M 60kW inverters. Several steps are required:

- 1) Connect the M504 gateway to the inverter(s)
- 2) Connect the M504 gateway to the building LAN for internet access if the 3G cellular modem option is not purchased
- 3) Enter the communications settings into each inverter from the front panel
- 4) Access SolarVu from a browser and configure the energy portal

## Site Preparation

To access SolarVu from a browser, the inverters communicate serially with a SolarVu M504 gateway connected to the site network as shown in fig 1. The M504 connects to inverter(s) over RS485 using shielded twisted pair wire, daisy chained for multiple inverters. The LAN must have high speed internet service to an ISP to provide access to the internet. The M504 RJ45 ethernet jack plugs into an RJ45 LAN router or wall jack using a standard Cat5e patch cable of convenient length. Alternatively, SolarVu can be ordered with a 3G cellular modem for wireless internet connection. A 120VAC outlet for the gateway power dongle is required.

Fig 1 Internet connection of SolarVu gateway



## M504 Gateway Installation

Mount the SolarVu enclosure containing the SolarVu gateway in a suitable location, typically in the electrical room near the inverters. The NEMA4 enclosure can also be mounted outdoors if preferred. The RS485 serial cable can run long distances, over 1000 feet, if necessary.

**Power Supply:** Source the 120VAC supply from a 15 amp breaker electrical circuit suitable for control power and connect to the breaker as shown in fig 2.

**RS485 Serial:** Connect the RS485 serial cat5e cable to the gateway terminals as shown in fig 2, 3 and 4. Be careful to match the correct wire colours to the terminals. Recommended cable type is Cat5e, 8 wire, UTP, #24 solid. Twisted pair must be used for the RS485 serial data wires. Use a tie wrap to provide strain relief for the cat5e cable. Over 1000 feet of wire can be used for reliable serial communications.

**Ethernet:** Use a standard ethernet patch cable with RJ45 plug on each end of the appropriate length to connect from the RJ45 ethernet jack on the gateway to the network ethernet at a RJ45 wall jack or router/switch. The network router must be configured to match the gateway IP settings. This is usually auto IP assignment using DHCP for small sites but a larger commercial organization may require static IP settings specified by the IT system administrator. This should be specified at time of order. Settings as shipped can be verified from the SolarVu configuration sheet included in the enclosure document pouch. Alternatively, SolarVu can be ordered with a 3G cellular modem/router installed for wireless connection. This requires installation of a customer supplied SIM card with an active telco account for service.

Fig 2 SolarVu enclosure - for M504 gateway

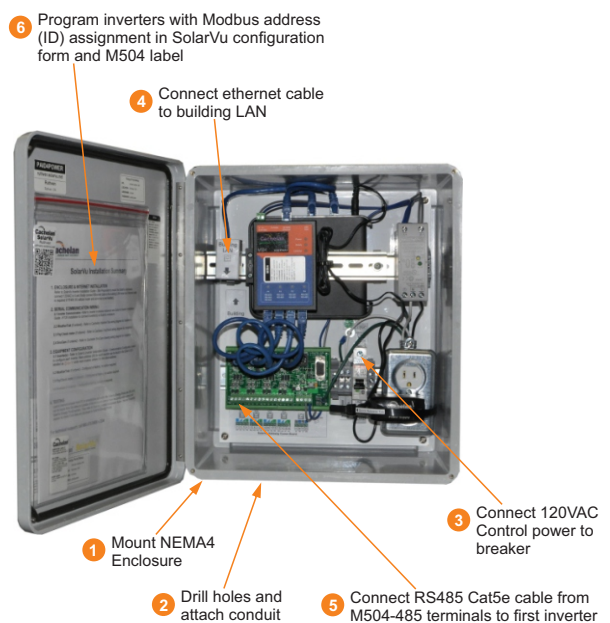
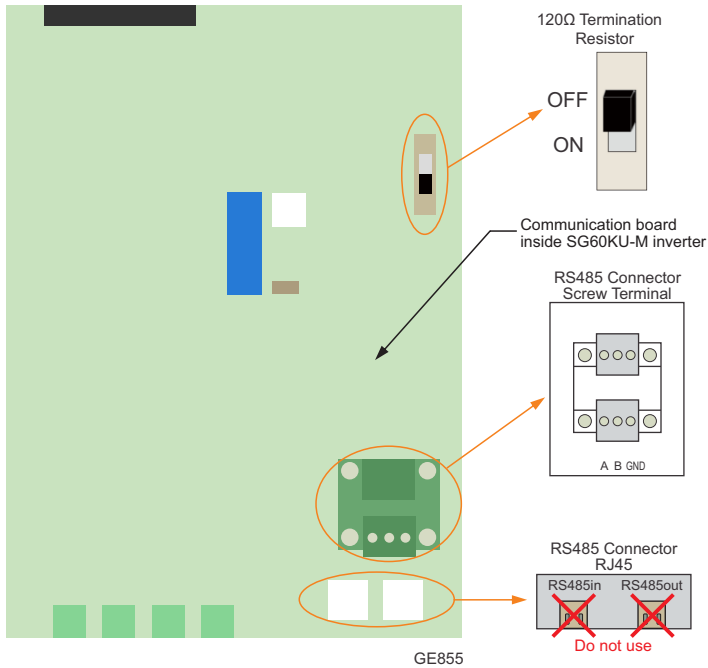


Fig 3 SG60KU-M Comm Board

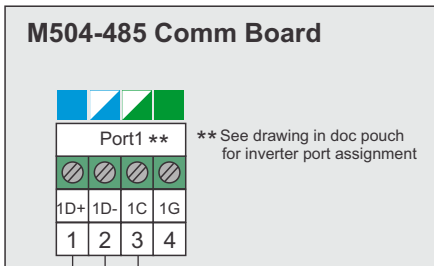


## Inverter Communication Wiring

Use outdoor grade cat5e cable to connect between SolarVu M504-485 Comm board and the inverters as shown in Fig 4. The SG60KU-M inverter communication board comes with two types of connections - screw terminals and RJ45 jacks. Use the screw terminals for SolarVu communication.

After wiring is complete, refer to fig 5 in the next page to configure the communication settings and address in each inverter.

Fig 4 M504 to Sungrow SG60KU-M RS485 wiring



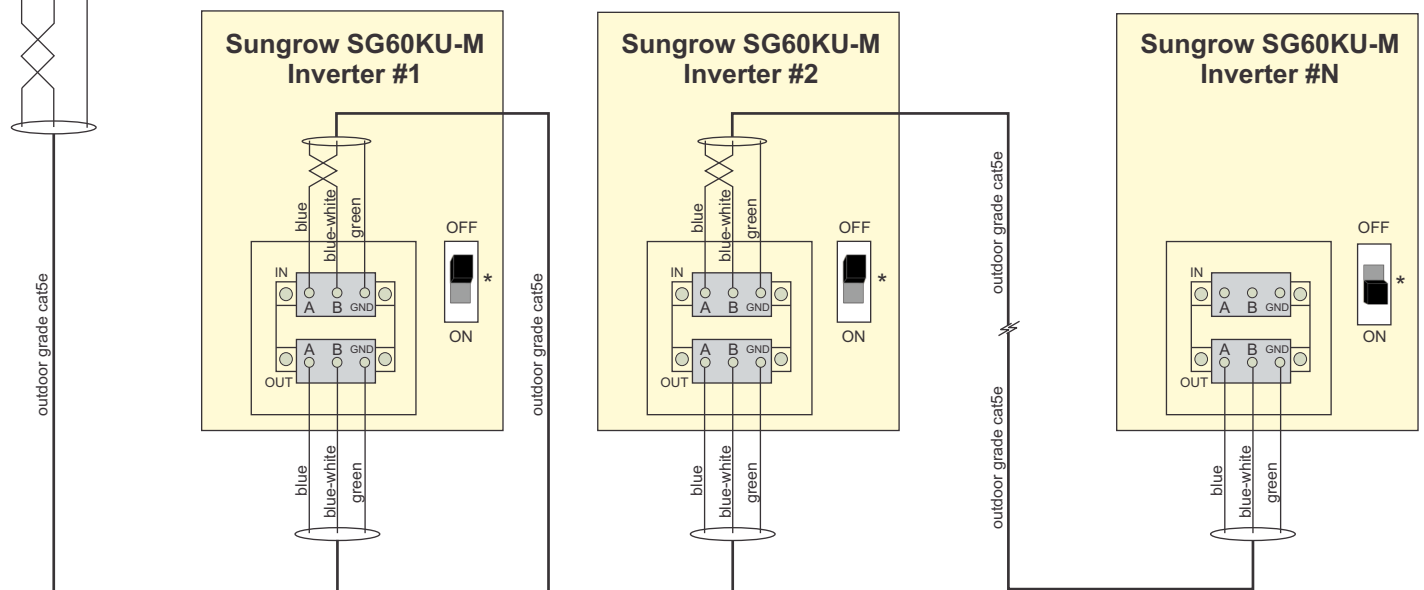
\* Optional 120Ω termination resistor. Use for >100 foot connections.

If termination resistor is required:

For one inverter only, leave the switch at ON position.

For multiple inverters, leave the switch at ON position only at the last inverter in the daisy chain.



Use twisted pair for D+ and D- signal  
(i.e. blue for D+ and blue-white for D-)



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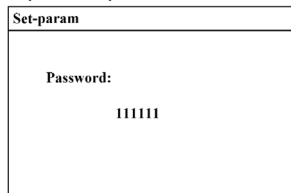
Fig 5 SG60KU-M inverter communication configuration setup

## Button Functions and Description

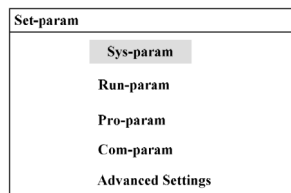
Button	Operation	Description
	Press for less than 2 seconds	Move upwards or downwards or scroll among set values. Hereinafter, it is referred to as "Press ▼".
	Press for more than 2 seconds	Return to the previous menu or cancel the command. Hereinafter, it is referred to as "Press ESC".
	Press for less than 2 seconds	Move left or right, or turn pages. Hereinafter, it is referred to as "Press ►".
	Press for more than 2 seconds	Enter into the sub-menu or confirm the command. Hereinafter, it is referred to as "Press ENTER".

## Configuration Steps

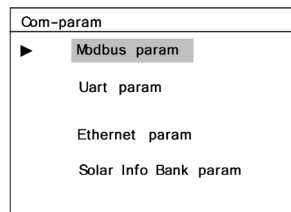
1. Press **ENTER** to enter the Menu screen
2. Press **▼** to move the cursor to "Set-param" and confirm by pressing **ENTER**
3. A password confirmation screen will show up. Press **►** to move cursor right and Press **▼** to input the password "111111"



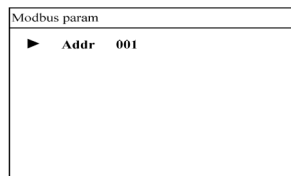
4. Press **ENTER** to confirm the password and enter the "Set-param" sub menu



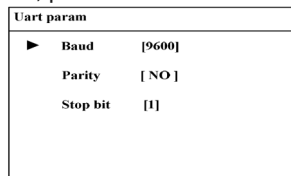
5. Press **▼** to move the cursor to "Com-param" and press **ENTER**
6. Press **▼** to move the cursor to "Modbus param" and press **ENTER**



7. Press **ENTER** and use **▼** to set the address to the desired value. Typically, set address to match the inverter #. i.e. set 1 for inverter #1, 2 for inverter #2 etc. Address settings can be found in the configuration sheet in the SolarVu document pouch. When done, press **ESC** to return to the previous menu.



8. Press **▼** to move the cursor to "Uart param" and confirm by pressing **ENTER**
9. Make sure the Baud is set to "9600", Parity is set to "NO" and Stop bit is set to "1". When done, press **ESC** to return to the previous menu.



10. Press **ESC** 3 times to exit to the main menu.

# Testing the System

At this point the installation should be complete and 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.

Fig 6 Use the ANALYZER > Inverter Status screen to check system status

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

**Cachelan** **SolarVu**  
ENERGY PORTAL

SITE LIVE **ANALYZER** SETUP SUPPORT HOME

Inverter Status Inverter Status HELP

Layout PowerWatch Time of last update received from the M504 gateway Wednesday, May 11, 2016 10:51:18 AM (GMT -5:00)

**Sungrow SG60KU-M #4 ( Device ID : 1 )** Log Manual Installation

Lifetime Energy **30,043 kWh**

DC Input

DC Power	54.6 kW	Voltage 1	672 V	Current 1	23.3 A
		Voltage 2	666 V	Current 2	23.6 A
		Voltage 3	675 V	Current 3	22.7 A
		Voltage 4	670 V	Current 4	11.7 A
		String 1	5.86 A	String 9	5.91 A
		String 2	5.89 A	String 10	5.77 A
		String 3	5.94 A	String 11	5.50 A
		String 4	6.07 A	String 12	5.80 A
		String 5	5.94 A	String 13	6.10 A
		String 6	5.93 A	String 14	5.75 A
		String 7	6.14 A	String 15	0.00 A
		String 8	6.27 A	String 16	0.00 A

AC Output

L1-N Voltage	281 V	L2-N Voltage	282 V	L3-N Voltage	282 V
L1 Current	64 A	L2 Current	64 A	L3 Current	64 A
AC Power	53.5 kW	VAR	281 W	Efficiency	97.9 %
Power Factor	1.000	Frequency	60.0 Hz		

Now

Daily Energy	128 kWh	Operation	2,031 Hrs	Temperature	43 °C
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Inverter

Model	SG60KU-M	Rated Power	60 kW	Type	3 Phase
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Status **Run** Error Log Codes Update

Measured values from the inverter → **Current Power 53.5 kW**

Time of last update received from the M504 gateway → **May 11, 2016, Wed 10:45 AM (GMT -5:00)**

Alarms and status reported by the inverter → **Run**

Time of last communication. M504 sends an update every 10 minutes. → **May 11, 2016, Wed 10:45 AM (GMT -5:00)**

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

Light is green if M504 gateway is connected to the internet



# 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

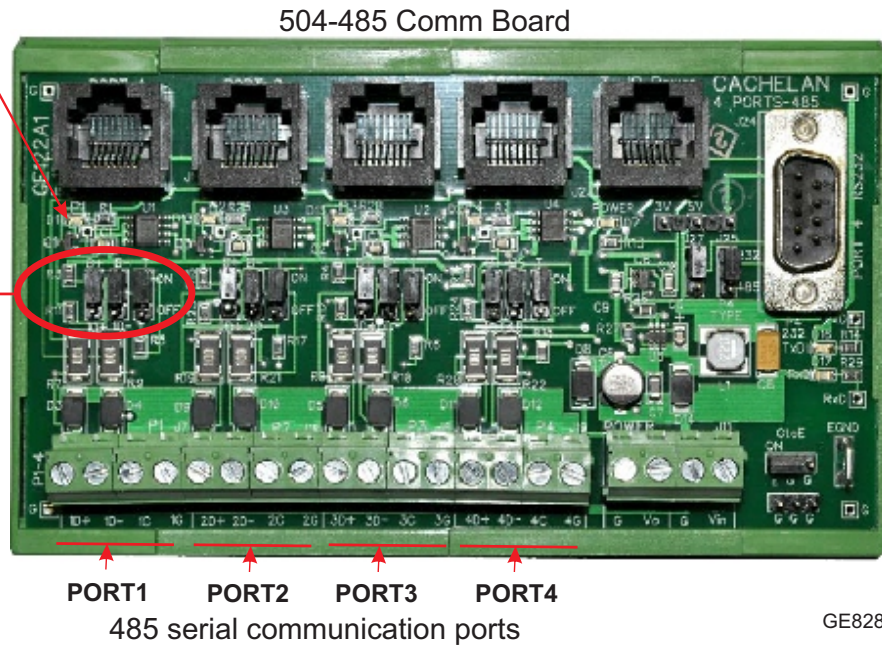
Blue data LED flashes when transmitting and receiving data from the inverter

**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](http://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](http://www.solarvu.net) for a features video



Help guide



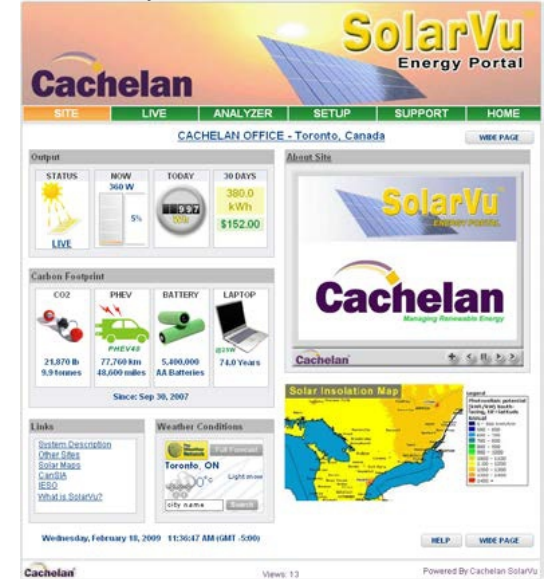
## Site Screen

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](mailto: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.

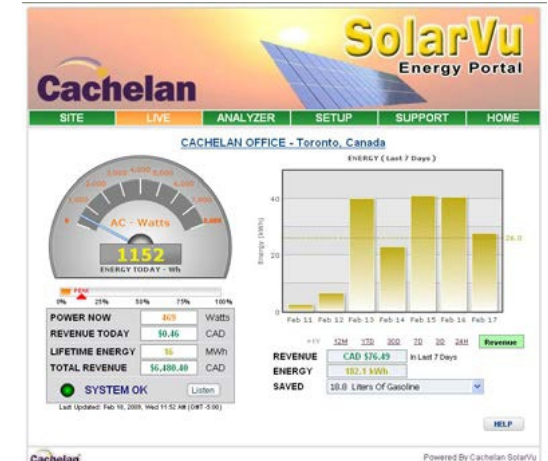


Select wide screen view for public display on an HDTV

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 within the pulldown menu. The screen will return to the last value selected on return.

ANALYSER - select performance views from pulldown

