SolarVu™ Installation Guide
PayCheck for Acuvim II Meter

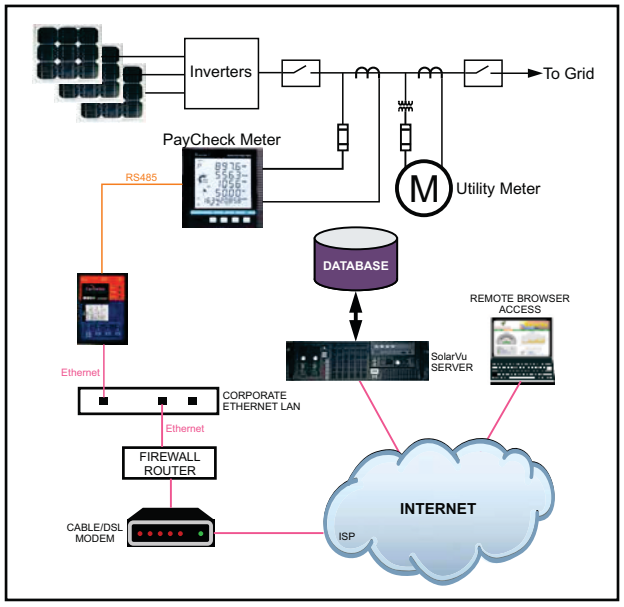
Introduction

A revenue grade meter can be added to a SolarVu™ energy portal with the PayCheck option. Cachelan provides the Acuvim II meter base sensor module, detachable display with connector cable and back panel mounting bracket. The installer must supply CTs, optional PTs, fuses, meter enclosure for mounting the meter and do the installation. PayCheck is an option that allows the user to have a revenue grade meter installed beside the utility meter for accurate total system output monitoring. With the ANALYZER - PayCheck screen in SolarVu it is possible to verify that the utility payment received is correct. For maintenance and troubleshooting, the PayCheck status and log display all measured values for identifying grid and equipment issues.

Site Preparation

SolarVu is accessed from a browser using data sent over the internet from the PayCheck meter by a Cachelan M504 gateway connected to the site network as shown in fig 1. The M504 connects to the PayCheck meter over RS485 using twisted pair wire. The M504 is connected to the LAN side of router inside SolarVu enclosure. The SolarVu gateway RJ45 ethernet jack plugs into an RJ45 LAN jack connected to the building router using a standard Cat5e patch cable. The LAN must have persistent high speed internet service to an ISP to provide access to the internet. 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 to power the internal devices

Fig 1 Typical connection for Acuvim II meter



GE845

Fig 2 Typical SolarVu enclosure

PayCheck Meter Installation

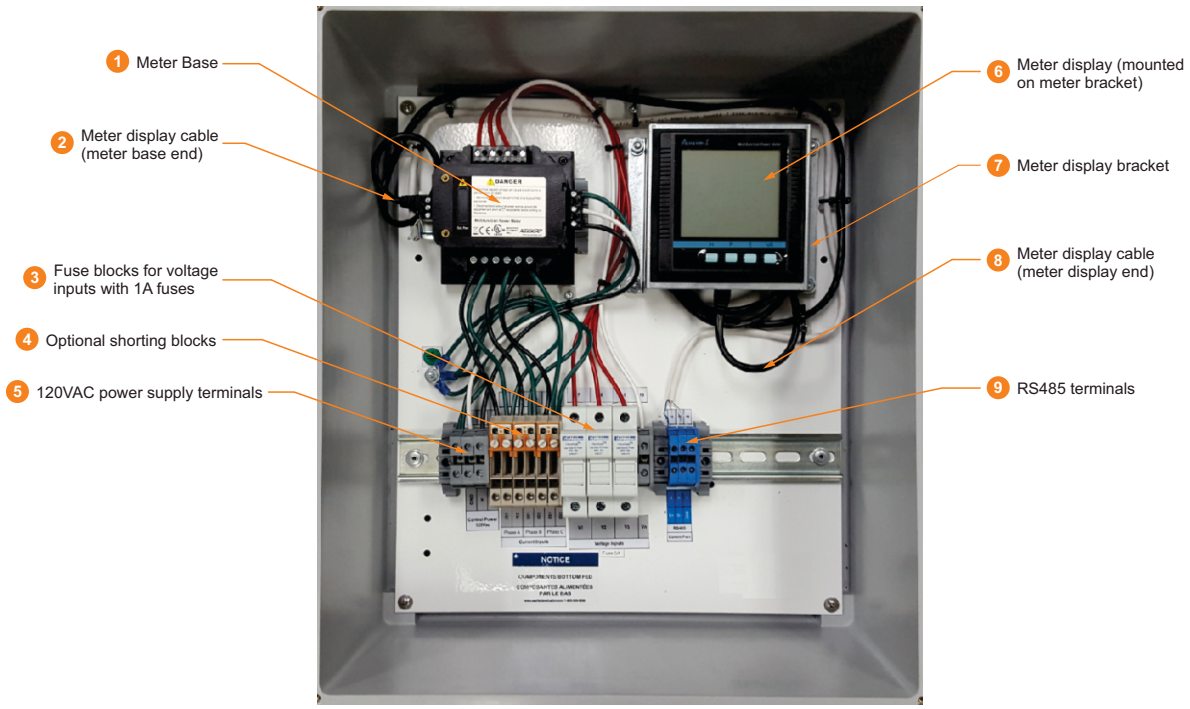
PayCheck Meter Enclosure: A meter enclosure must be provided by the customer to mount the PayCheck meter base on a DIN rail. The meter display can be either mounted on the meter enclosure door with a cutout (see Appendix 1 for cutout dimensions) or can be mounted inside the enclosure with the meter back panel bracket supplied. For the split display and module configuration, connect the meter cable (10 Pin) between the meter base and display. It is also recommended to install 1A fuses for each voltage input. Shorting blocks for current inputs are only required if CTs are mounted in a separate enclosure from the meter for safety. Refer to fig 6 and fig 7 for detailed meter enclosure wiring.

Power Supply: Inside the meter enclosure, connect 120VAC control power to the meter L, N, G terminals. Refer to fig 4 for connection details.

RS485 Serial: Connect the RS485 serial cat5e cable to the M504 gateway terminals as shown in fig 4. Be careful to match the correct wire colour 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.

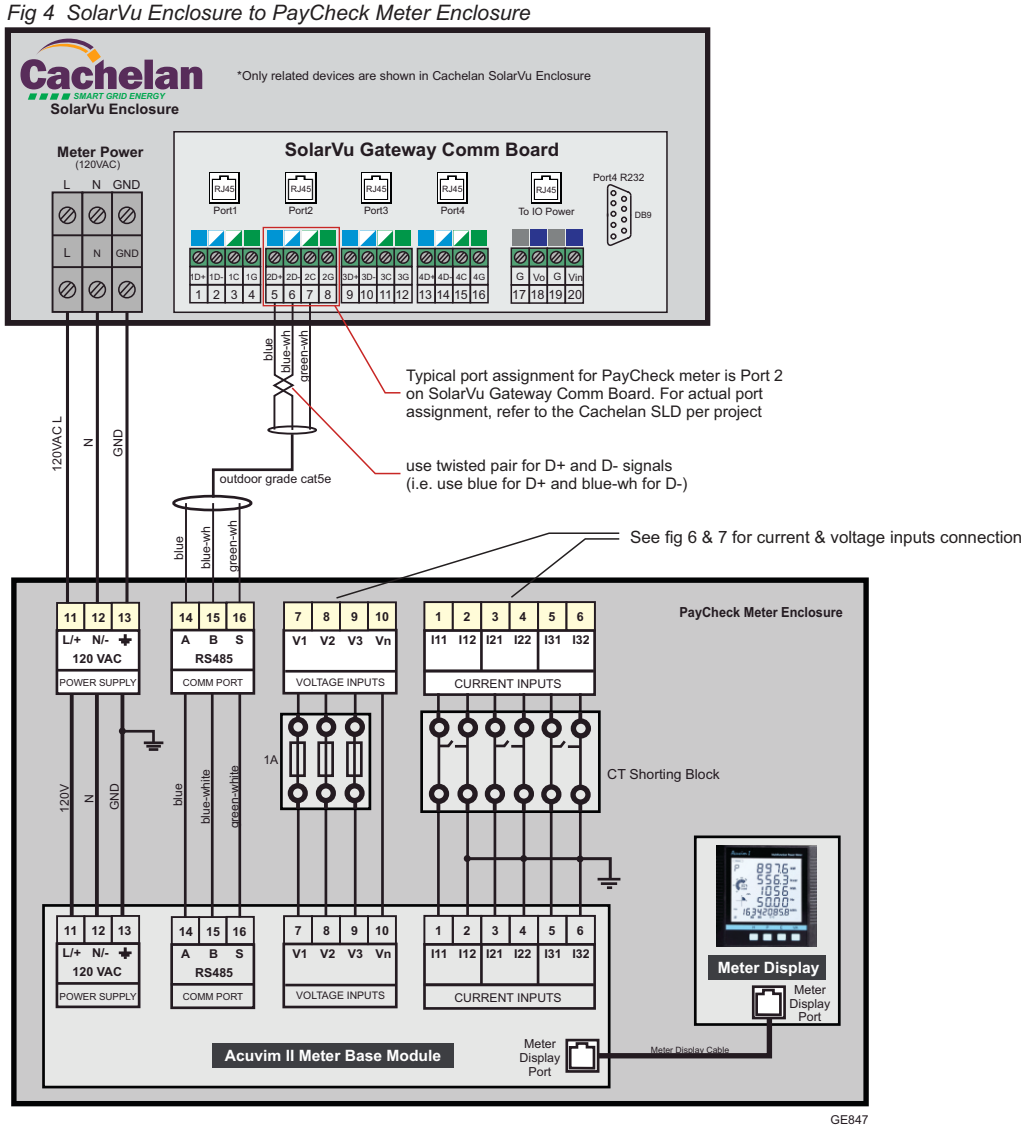
CTs & PTs Wiring: The direction that the CTs and optional PTs (also referred to as VTs) are installed is important for correct meter reading. Refer to fig 6 for CT orientation details. Refer to fig 6 for wye 4-wire wiring and fig 7 for Delta 3-wire. If CT shorting blocks are used make sure to remove all CT shorting blocks after installation. Also remove the safety shorting bars if present on the physical CTs after installation is complete. Otherwise the phase currents will read 0.

Fig 3 Typical meter enclosure example for wye 4-wire grid connection - provided by installer



GE846

Fig 4 SolarVu Enclosure to PayCheck Meter Enclosure

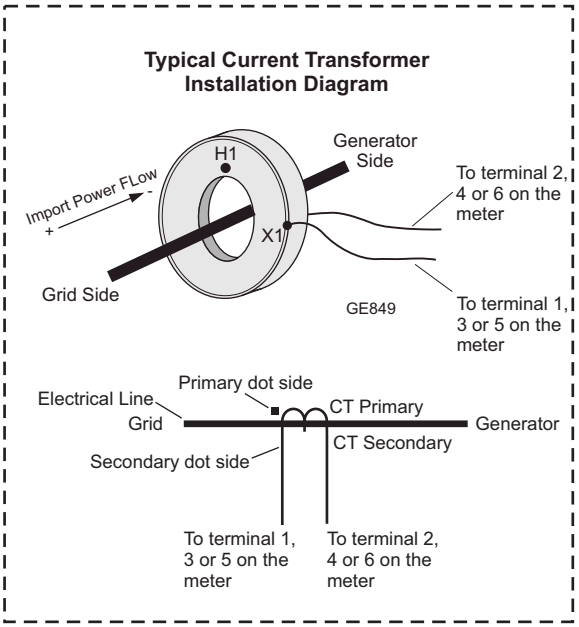


GE847

Observing CT Direction (Polarity)

Each current transformer (CT) typically has a dot or some equivalent mark on one side. Make sure the marked side faces the grid. On the secondary (or CT output), the wire which has the same mark labelled is the polarity which connects to the meter current input terminal 1, 3 or 5 (1 for L1, 3 for L2, 5 for L3) depending on the phase. Refer to fig 5 for details

Fig 5 Typical Current Transformer Installation



Identifying Grid Type

Current and voltage wiring is shown in fig 6 for a wye 4-wire system and fig 7 for a 3-wire delta system.

Double check that the CT direction matches that shown in fig 5. This is important for correct energy reading.

Fig 6 Typical voltage & current inputs wiring for wye grid connection

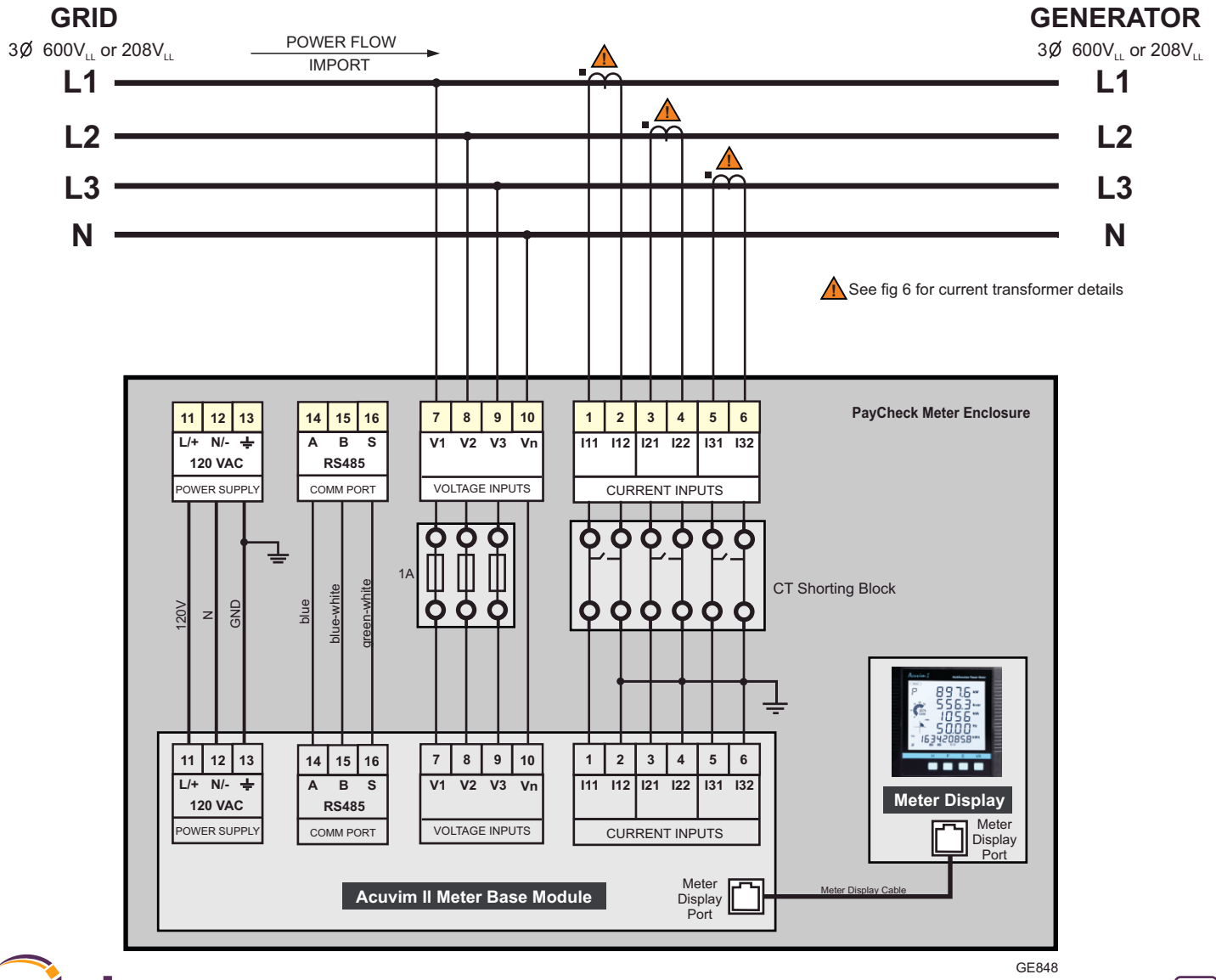
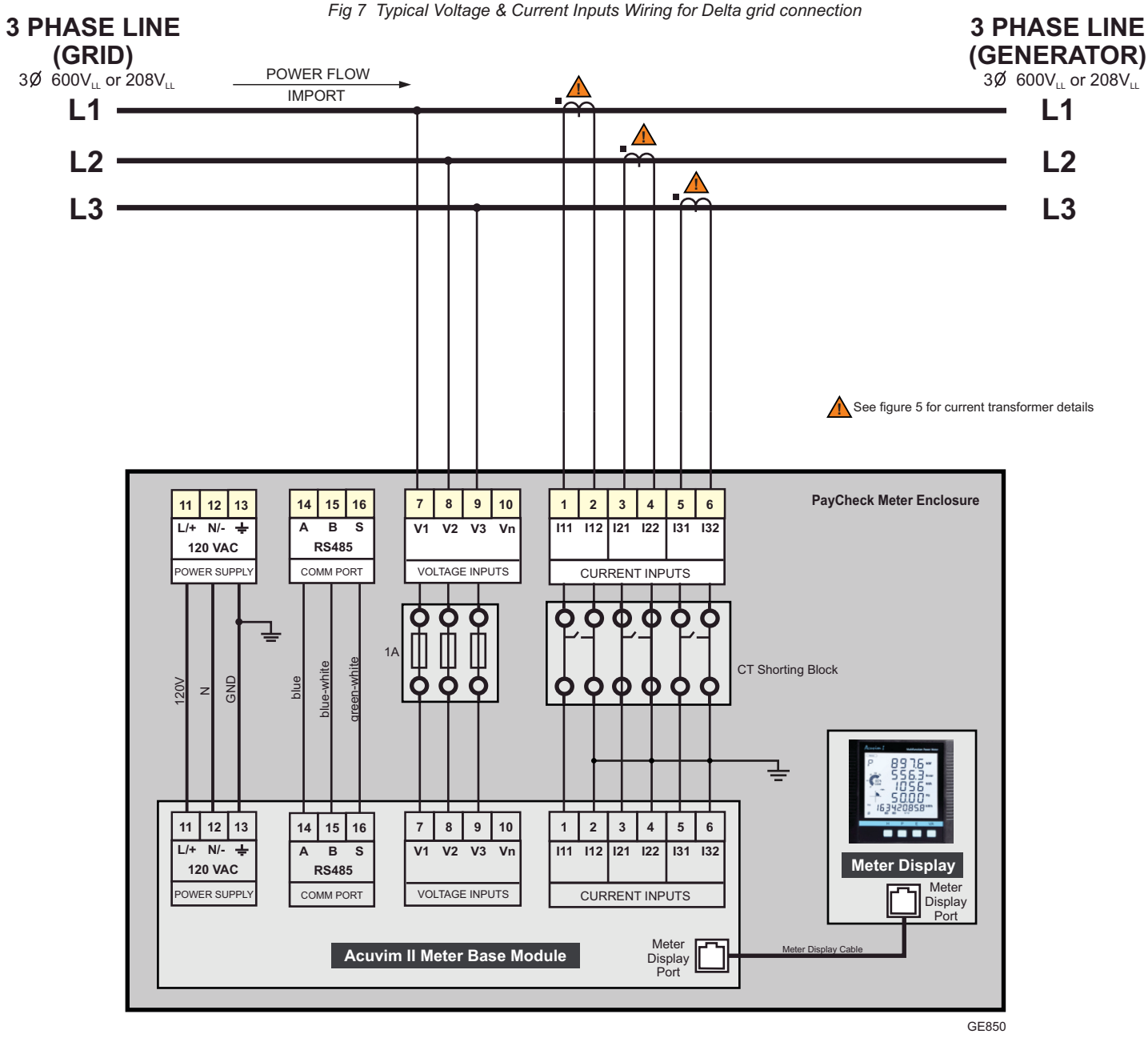


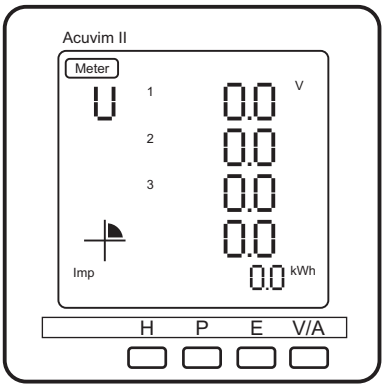
Fig 7 Typical Voltage & Current Inputs Wiring for Delta grid connection



PayCheck Meter Settings

For correct display of measured values, the CT and PT ratios must be entered into the meter as setpoints. This is done through the meter display using the front panel keys as described in the next section. The ratios are typically marked on the physical CTs and PTs. Read and record the CT and PT ratios as they will be needed for entry in the next steps. If no PTs are installed, use the system voltage for both the PT primary and secondary.

Meter's initial state

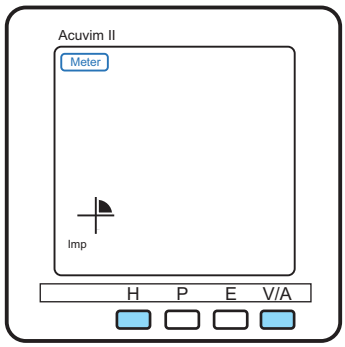


Meter Key Functions

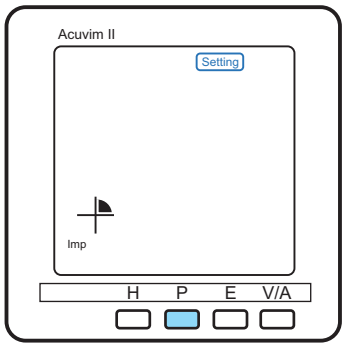
Mode	H	P	E	V/A
Meter	Harmonics	Power	Energy	Voltage Current
Setting	Shifting Cursor	Next/ Increment	Previous/ Decrement	Enter/Exit

1. Entering Setting Mode

1.1 Press H (shift) and V/A (enter) at the same time. The Meter cursor will be flashing

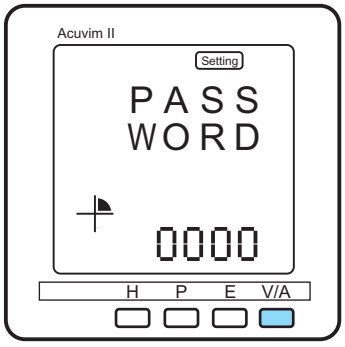


1.2 Press P (next) button to move the cursor to Setting and then press V/A (enter)



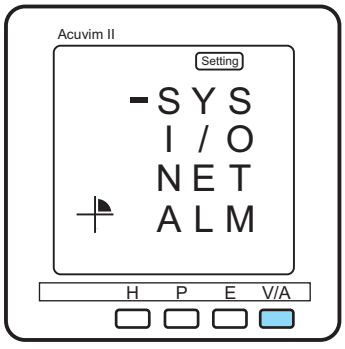
2. Enter password

Press V/A (enter) to enter the default password 0000



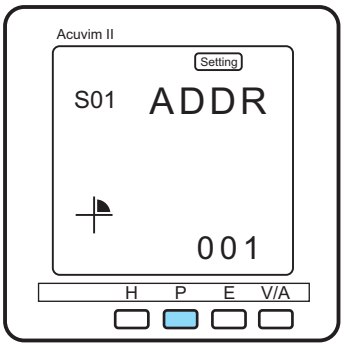
3. System Setting

Press V/A (enter) to enter the system setting page

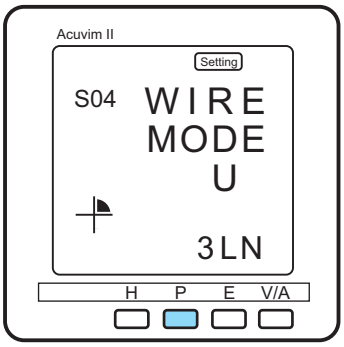


4. Configuring Grid Type

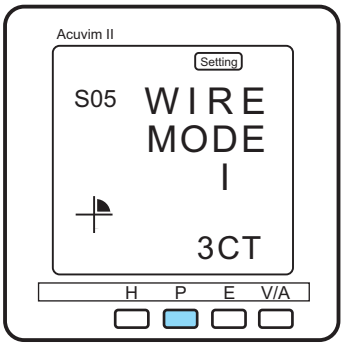
4.1 Press P (next) button 3 times to go to setting point S04



4.2 Make sure the value is set to 3LN for 4-wire wye grid type and 3LL for 3-wire delta. To make changes, press V/A (enter), P (next) E (previous). When done, press V/A (exit) and press P (next) to move to setting point S05



4.3 Make sure the value is set to 3CT for both 4-wire wye grid type and 3-wire delta. To make changes, press V/A (enter), P (next) E (previous). When done, press V/A (exit) and press P (next) to move to setting point S06



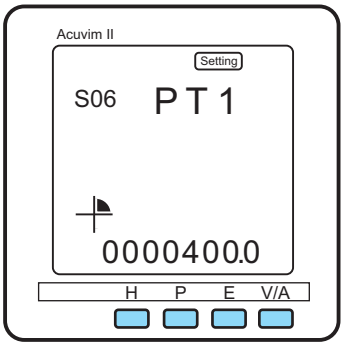
5. Configuring PT ratio

5.1 Primary PT (S06-PT1)

-If PT ratio is 360:120, then set PT1 to 0000360.0

-If there is no physical PT present in the system, set PT1 to 0000400.0

1) press V/A (enter) enter into the session
2) press H (shift) to move cursor to the desired digit
3) press P (increase) or E (decrease) to the desired value
4) when done, press V/A (exit) to exit the session
5) press P (next) to move to the next session

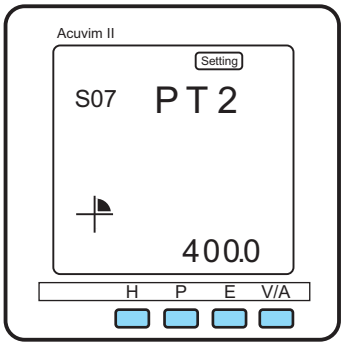


5.2 Secondary PT (PT2)

-If PT ratio is 360:120, then set PT2 to 120.0

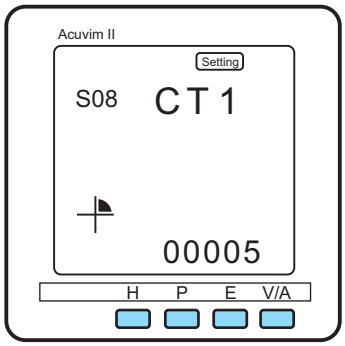
-If there is no physical PT present in the system, set PT2 to 400.0

1) press V/A (enter) enter into the session
2) press H (shift) to move cursor to the desired digit
3) press P (increase) or E (decrease) to the desired value
4) when done, press V/A (exit) to exit the session
5) press P (next) to move to the next session

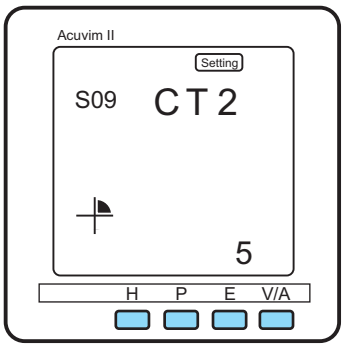


Continue at next page...

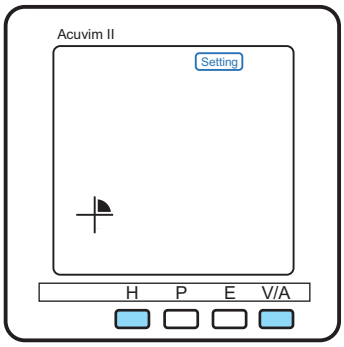
6. Set the CT primary ratio
6.1 Primary CT (S08-CT1)
-If CT ratio is 200:5, then set CT1 to 00200
1) press V/A (enter) enter into the session
2) press H (shift) to move cursor to the desired digit
3) press P (increase) or E (decrease) to the desired value
4) when done, press V/A (exit) to exit the session
5) press P (next) to move to the next session



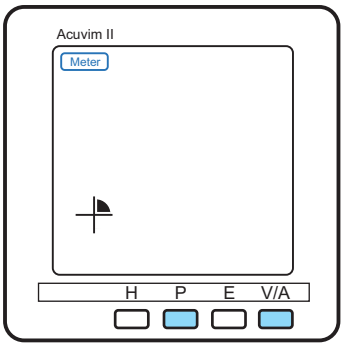
6.2. Secondary CT (S09-CT2)
-If CT ratio is 200:5, then set CT2 to 5
1) press V/A (enter) enter into the session
2) press H (shift) to move cursor to the desired digit
3) press P (increase) or E (decrease) to the desired value
4) when done, press V/A (exit) to exit the session



7. Exit Setting Mode
Press H (shift) and V/A (enter) at the same time to exit setting session. Now the cursor Setting should be flashing



8. Entering Meter mode
Press P (next) button 2 times to move the cursor to Meter, then press V/A (enter) button to enter into the meter mode.



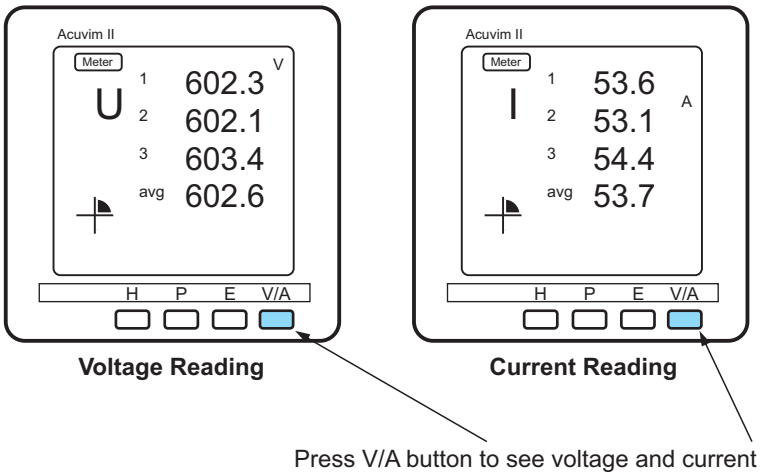
This completes entering meter settings for system wiring.

Verify Meter Reading

After calibration, perform a sanity check to verify the voltage and current readings on the PayCheck meter display by comparing the voltage and current reading obtained from the grid using a DMM and clampon ammeter.

Press V/A button once on PayCheck meter to display the voltage reading, press V/A button again to display the current reading.

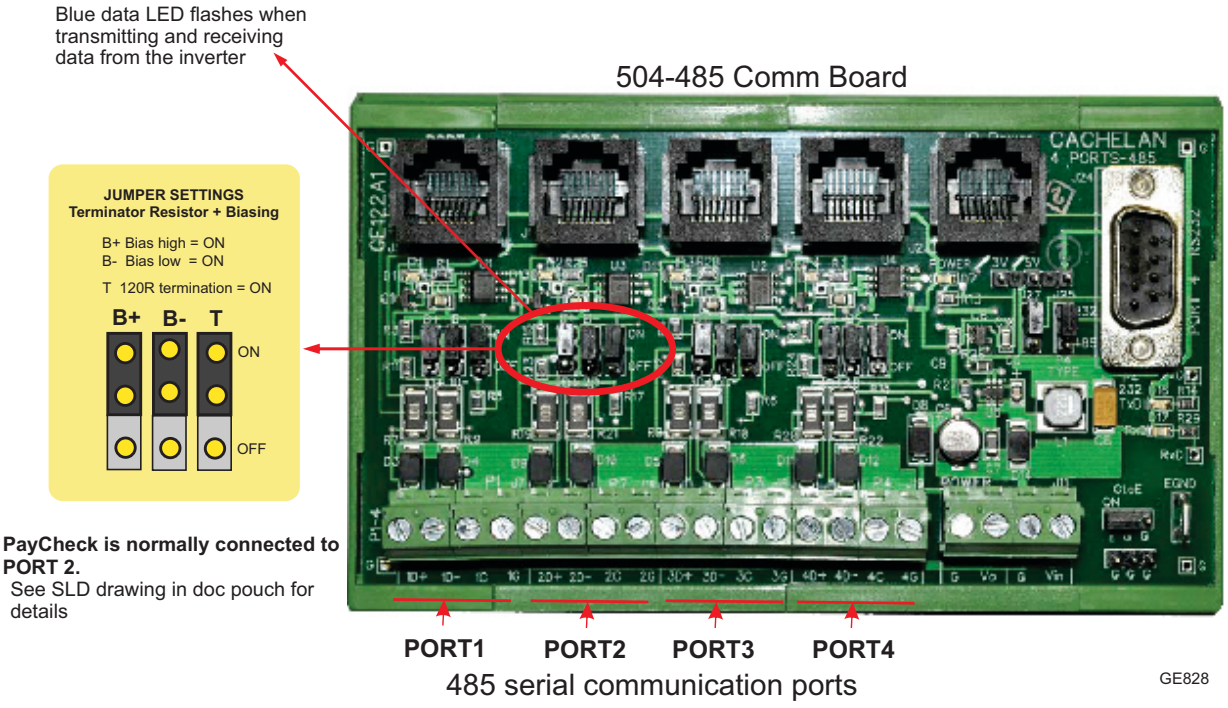
Both meter readings should closely match. If not, double check that the CT and PT ratios entered as setpoints in the meter match the labels on the CTs and PTs.



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 8 M504 Gateway Indicators



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

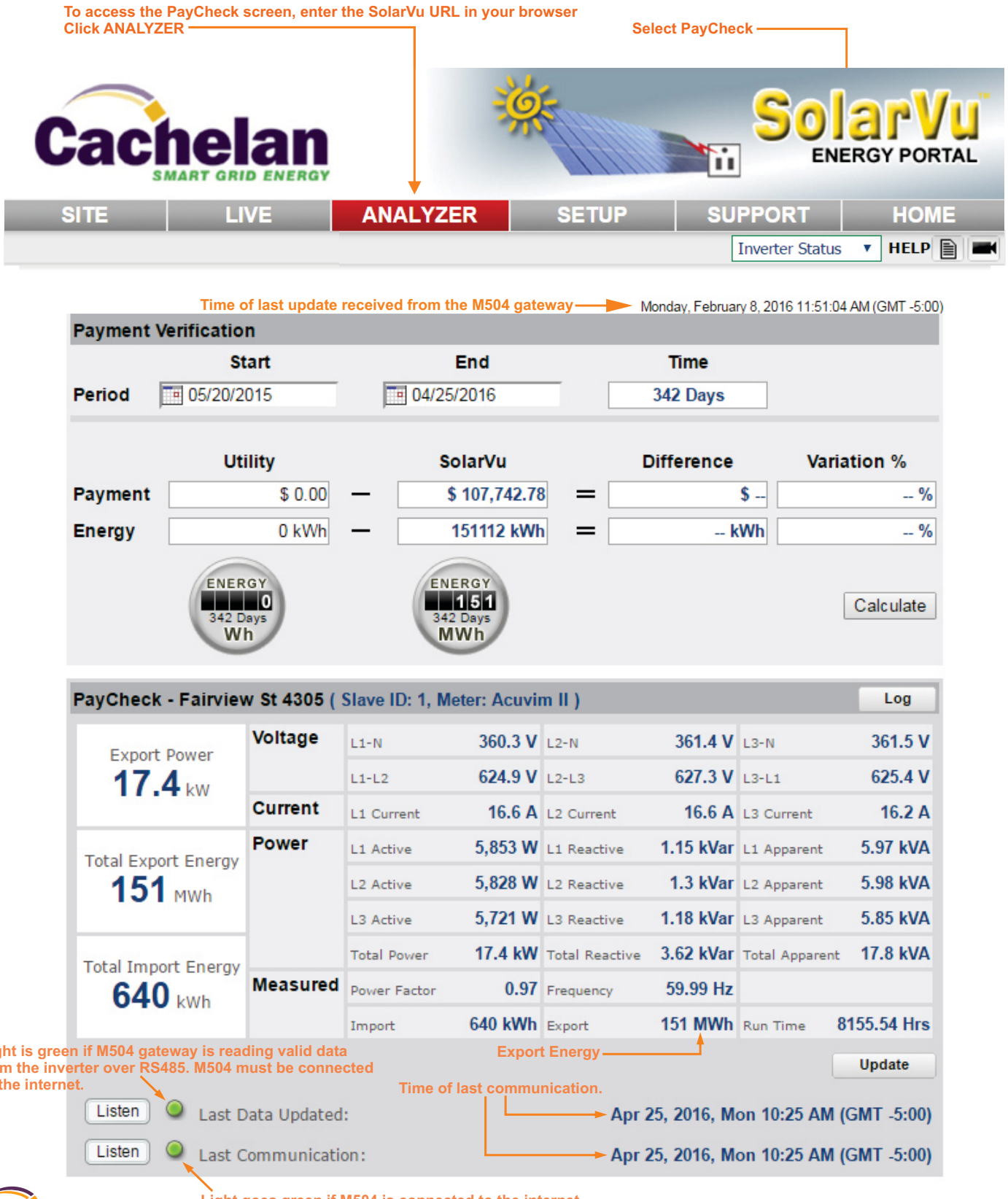
GE829

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.

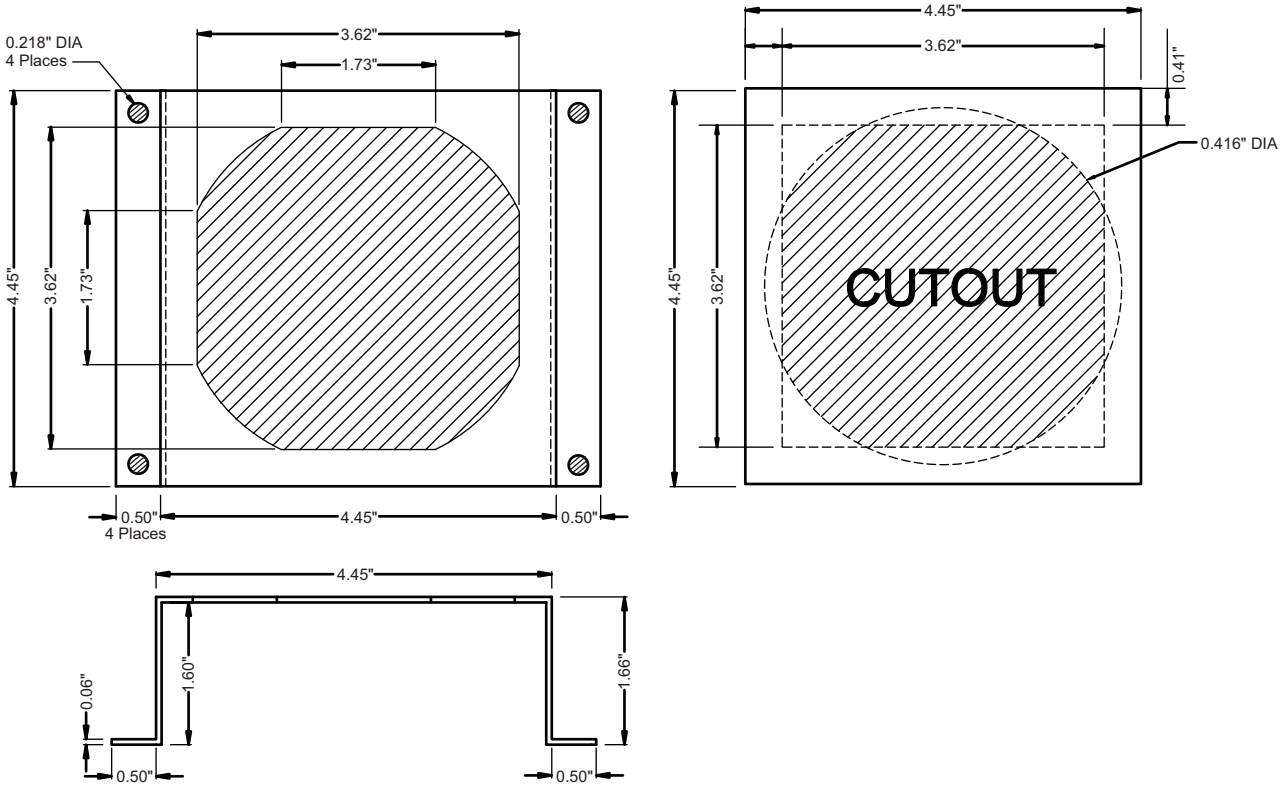
Verifying correct operation is described in the sections that follow. Indicator lights and actual values accessible from the SolarVu Analyzer > PayCheck Fig 9 are useful for determining the status of the meter.

Fig 9 Use the ANALYZER > Inverter Status screen to check system status

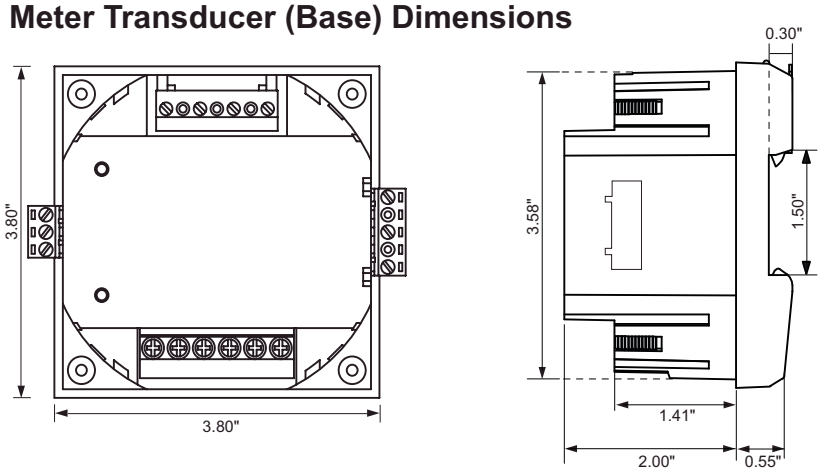


Appendix 1 Meter Dimension Specifications

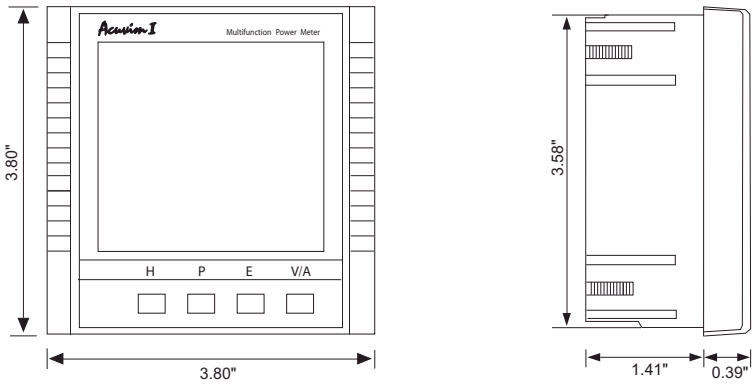
Meter Display Mounting Bracket Dimensions



Meter Transducer (Base) Dimensions



Meter Display Dimensions



GE851

Cachelan Technical Support
contactus@cachelan.com
905.470.8400 x224